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## TECHNICAL MANUAL UNIT MAINTENANCE

CARRIER, PERSONNEL,  
FULL TRACKED, ARMORED, M113A2  
2350-01-068-4077

CARRIER, COMMAND POST,  
LIGHT TRACKED, M577A2  
2350-01-068-4089

CARRIER, MORTAR, 107-MM, M30;  
SELF-PROPELLED, M106A2  
2350-01-069-6931

CARRIER, MORTAR, 81-MM, M29A1;  
SELF-PROPELLED, M125A2  
2350-01-068-4087

CARRIER, MORTAR, 120-MM, M121;  
SELF-PROPELLED, M1064  
2350-01-338-3116

CARRIER, SMOKE GENERATOR,  
FULL TRACKED, M1059  
2350-01-203-0188

COMBAT VEHICLE, ANTI-TANK,  
IMPROVED TOW VEHICLE, M901A1  
2350-01-103-5641

CARRIER, STANDARDIZED INTEGRATED  
COMMAND POST SYSTEM, M1068  
2350-01-354-5657

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This manual supersedes TM 9-2350-261-20-1 dated July 1985, including all changes.

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CHANGE  
No. 4

TM 9-2350-261-20-1

C4  
HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D.C., 15 July 1997

TECHNICAL MANUAL  
UNIT MAINTENANCE  
FOR

CARRIER, PERSONNEL, FULL TRACKED, ARMORED, M113A2  
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2350-01-103-5641

CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, M1068  
2350-01-354-5657

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Official:

  
JOEL B. HUDSON

Administrative Assistant to the  
Secretary of the Army  
03785

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

**Distribution:**

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C3

CHANGE  
No. 3HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D. C., 21 January 1994**TECHNICAL MANUAL  
UNIT MAINTENANCE  
FOR**

**CARRIER, PERSONNEL, FULL TRACKED, ARMORED, M113A2  
2350-01-068-4077**

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2350-01-068-4087**

**CHASSIS, GUN, ANTI-AIRCRAFT ARTILLERY, M741A1  
2350-01-099-8929**

**CARRIER, SMOKE GENERATOR, FULL TRACKED, M1059  
2350-01-203-0188**

**COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901A1  
2350-01-103-5641**

**CARRIER, MORTAR, 120-MM, M121; SELF-PROPELLED, M1064  
2350-01-338-3116**

**CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, M1068  
2350-01-354-5657**

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1. Title is changed to reflect added new item of equipment, Carrier. Standardized Integrated Command Post System, M1068.
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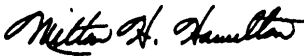
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**GORDON R. SULLIVAN**  
*General, United States Army*  
*Chief of Staff*

Official:

  
**MILTON H. HAMILTON**  
*Administrative Assistant to the*  
*Secretary of the Army*  
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**Distribution**

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## SUMMARY OF WARNINGS

### WARNING

This list summarizes critical WARNINGS in this manual. They are repeated here to let you know how important they are. Study these WARNINGS carefully; they can save your life and the lives of personnel with whom you work.

### WARNING



Dry cleaning 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 dry cleaning solvent is 100°F (38°C) and for type II 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



Unlocked ramp can open and move down slowly. If ramp system is damaged, unlocked ramp can fall suddenly. Personnel can be killed or injured. Take care when you work near ramp. Keep away from ramp that has come open during carrier operation.

### WARNING



Energized systems and equipment can burn you. If MASTER SWITCH is ON, electrical system and equipment will be energized. Make sure MASTER SWITCH is OFF when you work on electrical systems or equipment.

### WARNING



Failure to set the parking brake and block the road wheels can allow the carrier to move and could result in injury or death. Always set the parking brake and block road wheels before working on the carrier.

### WARNING



Battery post and cables touched by metal objects can short circuit and burn you. Gas from batteries can explode and injure you. Battery acid can blind you or burn you. Do not wear jewelry when you work on electrical systems. Use caution when you work near battery or electrical system with tools or other metal objects. Do not get acid on your skin or in your eyes. Do not allow sparks near batteries.

**WARNING**



Heater and engine exhaust can kill or poison you. Close power plant access panels tight before you start engine. Do not run heater or engine indoors without very good fresh air flow. Keep power plant access cover closed when you run engine. Check for the smell of exhaust fumes. If you notice any fumes, open hatches and turn on vent fans.

**WARNING**



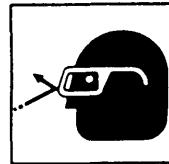
Exhaust gases can make you ill or kill you. Signs of exhaust gas poison are dizziness, headache, loss of muscle control, sleepiness, coma, or death. If anyone shows signs of exhaust gas poisoning. Get all personnel out of carrier. Get medical help. Make sure personnel have lots of fresh air. Keep personnel warm. Do not let anyone do hard exercise. If anyone stops breathing, give artificial respiration.

**WARNING**



Torsion springs or bars can fly out and injure you. Make sure spring tension is released before you start work.

**WARNING**



Air pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

**WARNING**



If you work on a carrier that has been running, you could be burned. All tasks begin with a cooled down carrier. Allow carrier to cool, or use care if you work on a hot carrier.

**WARNING**



Unsafe use of chemical products, tools, and equipment can injure you. Read and follow warnings and instructions on labels of all chemical products. Follow all general shop safety procedures. See unit commander for further instructions on safety.

**WARNING**



Fire bottles can discharge and injure you. Insert antirecoil plugs, lock pins, and cotter pins before you work on or near fire bottles.

**WARNING**



Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment. Keep hands out of engine compartment while power unit is being removed or installed.

**WARNING**



NBC agents can kill you. Do not service air cleaner or vent system after NBC attack until carrier has been decontaminated.

**WARNING**



Starting engine right after a fire could restart the fire and kill or injure you. Do not turn MASTER SWITCH ON until cause of fire has been repaired or removed.

**WARNING**



Loctite sealing compound can damage your eyes. Before you handle loctite sealing compound, wear safety glasses/goggles, avoid contact with eyes. If it gets into your eyes; flush eyes with fresh water and get medical help.

**WARNING**



Remove machine gun and all ammunition when operating M113A2 as a litter earner. Display Red Cross symbol on exterior of earner.

**WARNING**



To prevent litter tilt, which could cause injury, be sure to install repair link at chain link.

**WARNING**



Loose clothing is dangerous around moving belts and pulleys. You could get badly hurt if your clothes get caught in moving parts.

**WARNING**



Hot radiator coolant can burn you. Use hand to remove cap ONLY if cool to touch. Turn cap slowly to release pressure. Replace cap by pressing down and turning until tight.

**WARNING**



Radiator is heavy and can cause back injury if handled improperly. Be sure to use a hoist and helper to remove radiator.

**WARNING**



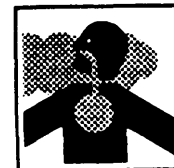
Do not work under power plant. Power plant is heavy and may cause personnel and equipment damage if it falls. Lower power plant on wooden blocks before starting task.

**WARNING**



Carbon Monoxide is poisonous and can kill you. Do not idle engine with driver's power plant access panel off unless there is very good air flow.

**WARNING**



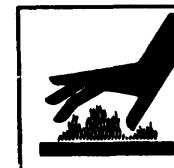
Carbon Monoxide gas is deadly poison. Play it safe: make sure power plant access covers and door are closed tight before you start engine.

**WARNING**



Damaged lifting slings can fail with load. Soldiers can be killed or injured. Inspect all slings before use. Do not use damaged slings.

**WARNING**



Do not touch exhaust pipes with bare hands. You could get a bad burn.



**WARNING**

Gas from batteries can explode. Ventilate compartment before you disconnect or connect battery cables. Battery acid can burn or blind you. Do not get acid on your skin or eyes. ALWAYS disconnect negative (circuit 7) lead first and connect it last.



**WARNING**

Battery posts and cables touched by metal objects can short circuit and burn you or injure you. Use caution when you work with tools or other metal objects. Do not wear jewelry when you work on electrical system.



**WARNING**

Fuel and fog oil can burn and could poison you.



**WARNING**

Fog oil is slippery and can cause soldiers to fall and get injured. Clean up all spillage or leakage of fog oil as soon as possible by washing the area or absorbing the fog oil with sand or other absorbent material.



**WARNING**

You could be killed or injured by accidental carrier movement. Before you perform maintenance, make sure to properly block the carrier.



**WARNING**

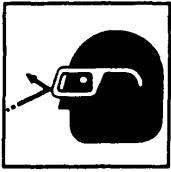
Hanging loads can kill or injure you. Keep away from hanging loads and overhead equipment. Keep hands away from pinch points.



**WARNING**

Lifting or moving objects in excess of 70 pounds could injure you. Make sure to get an assistant or use a lifting device to move fog oil tank, armor, or other heavy objects.

**WARNING**



Compressed air pressure from smoke generator can cause serious injury or death. To avoid accidents, bleed air before working on air compressor assembly or disconnecting any air hose.

**WARNING**



Fire resistant hydraulic (FRH) fluid may contain Tricresyl Phosphate which, if taken internally, can produce paralysis. Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

**WARNING**



Chemical Agent Resistance Coatings (CARC) are toxic. Use a respirator when spraying or brushing CARC. To identify the needed respirator and detailed safety information, consult your environmental or safety office before using CARC. Protect your hands and wrists with rubber gloves. Wear coveralls. Keep your eyes protected with splash goggles or face shield. Never mix paint or use thinner near an open flame during painting and for at least four to six hours afterward. Make sure the temperature of the surface to be painted is not less than 60°F and no more than 100°F. One person is not to use more than one quart of CARC a day. Two people will not paint an item at the same time.

**WARNING**



Vehicle operation during hot weather may result in potential heat stress to crew members. Crew members should limit their exposure based on TB med 507 using PHEL Chart (Appendix C) curve as a guide.

**WARNING**



Start up of equipment or moving parts could injure you or others. If other personnel are working on your carrier, be sure you know what they are doing. Place DO NOT OPERATE tags on MASTER SWITCH when needed to prevent startup.

**WARNING**



Power cable connections should not be attempted until grounding system and signal/data cabling have been completed.

System ground must be completed prior to making any power connections. Failure to do so may result in personal injury and/or damage to the equipment.

Improper or loose connection between the surface wire grounding systems and ground lugs could cause a short in the system, which may cause personal injury.



**WARNING**



**HIGH VOLTAGE** is used in the operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be competent in giving first aid. When an operator helps a technician, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. When working inside equipment with power off, take special care to ground every capacitor likely to hold a dangerous potential.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.

**BEEP** one hand away from the equipment to reduce the hazard of current flowing through life-sustaining organs of the body.

**WARNING**



The insulator blanket is made out of asbestos. Handle with care. Discard insulator blanket properly as a hazardous material per local standard operating procedure. The insulator washer takes the place of the blanket.

Technical Manual

No. 9-2350-261-20-1

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D.C., 11 July 1990

**TECHNICAL MANUAL  
UNIT MAINTENANCE**

**CARRIER, PERSONNEL, FULL TRACKED, ARMORED, M113A2  
2350-01-068-4077**

**CARRIER, COMMAND POST, LIGHT TRACKED, M577A2  
2350-01-068-4089**

**CARRIER, MORTAR, 107-MM, M30; SELF-PROPELLED, M106A2  
2350-01-069-6931**

**CARRIER, MORTAR, 81-MM, M29A1; SELF-PROPELLED, M125A2  
2350-01-068-4087**

**CARRIER, MORTAR, 120-MM, M121; SELF-PROPELLED, MI064  
2350-01-338-3116**

**CARRIER, SMOKE GENERATOR, FULL TRACKED, MI059  
2350-01-203-0188**

**COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901A1  
2350-01-103-5641**

**CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, MI068  
2350-01-345-5657**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes, or if you know 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, directly to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN:AMSTA-AC-NML, Rock Island, IL. 61201-9948. A reply will be furnished to you.

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## HOW TO USE THIS MANUAL

This manual tells you how to perform unit maintenance for the M113A2, M106A2, M125A2, M577A2, M741A1, M1059, M1064, M1068, and M901A1 Carriers.

Before starting a task or procedure, read HOW TO USE THIS MANUAL and CHAPTER 2, PRINCIPLES OF OPERATION.

### USING YOUR MANUAL ON THE JOB

The best way to learn about this manual is to practice using it. Knowing how to use this manual will save both time and energy.

#### *WHICH TYPE OF TASK DO YOU USE?*

There are two different types of tasks in this manual. They are maintenance tasks and troubleshooting tasks. Decide which type of task you need to use.

#### *TROUBLESHOOTING TASKS*

Troubleshooting tasks help you locate faulty parts. They direct you to the maintenance task to correct these faults. CHAPTER 3, TROUBLESHOOTING, contains detailed information on how to perform troubleshooting tasks. Read CHAPTER 3, Section I, before performing the troubleshooting tasks in the chapter.

#### *MAINTENANCE TASKS*

Doing maintenance tasks will keep the carrier in shape to operate. Maintenance tasks are used to present maintenance instructions. Each maintenance task details steps which you need to perform. If the vehicle and parts need maintenance that is not included in any task in the manual, report this to your supervisor.

#### *HOW DO YOU FIND THE CORRECT TASK?*

Pick a key word from the carrier part or system to be used during the task. Look in the ALPHABETICAL INDEX for this key word or the name of the action you will perform. Turn to the page indicated.

The ALPHABETICAL INDEX lists each task under one or more headings. The task, REPLACE TOWING PINTLE, could be found:

Under "P"

Pintle, towing:

Repair: 24-4

Under "T"

Towing pintle:

Repair: 24-4

#### *HOW DO YOU READ MAINTENANCE TASKS?*

*Be sure to read all warnings, cautions, and notes. These are in all types of tasks. They help you avoid harm to yourself, other personnel and equipment. They also tell you things you should know about the task.*



Before starting, get all tools, supplies, and personnel listed on the setup page needed to do the task. Be sure to read the task before performing the maintenance. If any other tasks are referenced, you must go to the setup page for each of those tasks to find out what tools, parts and materials will be needed.

Start with step 1 and do each step in given order.

Look at the drawings. These show you what to look for when reading a maintenance task.

**REFERENCES**

References within a task refer to a different manual or to another task in the same manual. They are found in the INITIAL SETUP and in the FOLLOW-THROUGH STEPS. Below is an example.

**MASTER SWITCH OFF** (see your -10)  
 Battery ground lead disconnected (page 13-2)

For all tasks, the following comments apply:

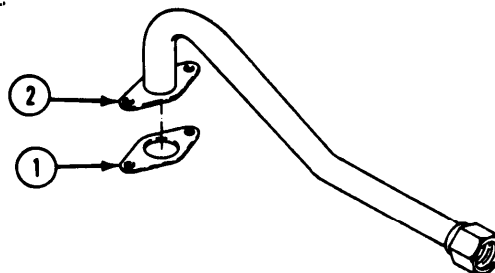
Parts which are listed on the setup page will be referred to as “new” in the task setup when installed.

- Examples are:
- gaskets
  - lockwashers
  - some preformed packings
  - some retaining rings

These and other new parts are listed under MATERIALS/PARTS in the initial set up.

**GENERAL MAINTENANCE**

Cleaning, inspecting, checking for leaks, and similar procedures which apply to most tasks are found in CHAPTER 2, Section IV, GENERAL MAINTENANCE PROCEDURES. Use these steps to clean and inspect any part being removed, repaired, or installed. Special cleaning will be covered in the task step. Below is a step that would require general cleaning.



5. Remove gasket (1) from upper tube flange (2). Discard gasket.

After doing this step, you would clean the mating surface with cleaning solvent and a wiping rag according to the general cleaning procedures. In other tasks, hoses or rubber hatch seals will need to be checked for leaks. Refer to CHAPTER 2 for general procedures.

SAMPLE OF SETUP ITEMS

The sample below shows the *DESCRIPTION* and *INITIAL SETUP* sections on the first page of a task. Items to watch for are listed in the legend. Match them with the sample.

① → **REPLACE MASTER SWITCH ASSEMBLY**

---

② → **DESCRIPTION**  
 This task covers: Remove (page 9-13). Install (page 9-14).

③ → **Tools:**  
 General mechanic Tool Kit (Item 30, App D)

④ → **Materials/Parts;**  
 Lockwasher (3)  
 Self-locking nut (2)  
 Self-locking nut (8)

⑤ → **personnel required:**  
 Unit Mechanic

References: \_\_\_\_\_ ⑥  
 see your -lo

**Equipment Conditions:** ← \_\_\_\_\_ ⑦  
 Engine stopped / shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Battery ground lead disconnected (page13-2)

---

Legend to Sample

- ① **TITLE** This is the name of the task.
- ② **DESCRIPTION** This describes the overall actions you will perform. Also, it tells you the page where each action begins.
- ③ **TOOLS** These are the tools and equipment you will need to do the task.
- ④ **MATERIALS/PARTS** These are supplies you will need to do the task. If more than one part is needed, the quantity will be in parenthesis following the name of the part. The only parts listed are those you must replace every time the task is performed. Use the Repair Parts and Special Tools List (RPSTL), TM9-2350-261-24P, to order parts you need for the task.
- ⑤ **PERSONNEL REQUIRED** These are the personnel needed to do the task.
- ⑥ **REFERENCES** These are the other technical publications you will need to do the task.
- ⑦ **EQUIPMENT CONDITIONS** These are the conditions the equipment must be in before you start the task. You will be referred to the task or technical publication needed to meet each equipment condition. This reference will be given in parenthesis after each equipment condition.

**NOTE**

**When performing equipment conditions tasks, do only those steps required to gain access to complete the major task. Some tasks will include all of the items listed in the legend. Others will only include some of the items.**

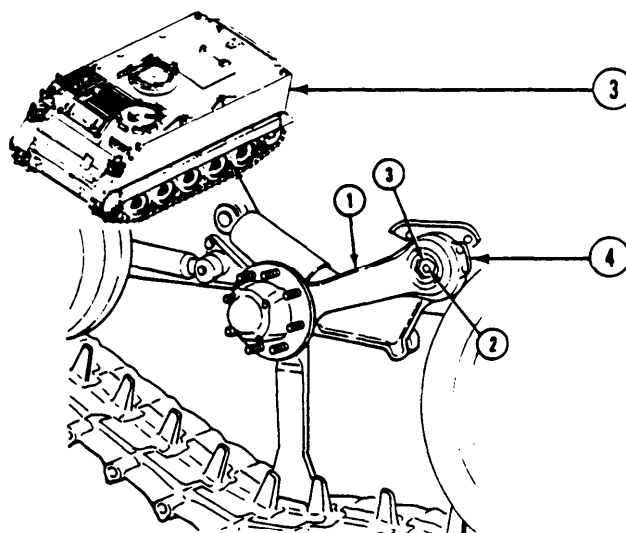
Read the **INITIAL SETUP** section carefully before you start each task. Get the tools and supplies listed and the personnel needed. Be sure the equipment is in the condition required.

**SAMPLE OF TASK STEPS**

The sample below shows you some of the signs to watch for when you are performing a task. Read all the steps, warnings, cautions and notes before starting each task. Some items to watch for are listed in the legend, match them with the sample.

**REMOVE**

- ① 
- WARNING**  
If road wheel lifter slips while lowering road arm, it could injure you. Stand clear before you lower road arm.
- ② 1. With road wheel removed and road arm raised on lifter, start engine (see your - 10). Place range selector in 1. Slowly drive carrier forward off lifter so that road wheel support arm (1) hangs freely.
2. Remove screw (2) from plug (3).



Legend to *Sample Above*

- ① **WARNING** This describes possible injury to personnel.
- ② **STEP** This tells you what to do and how to do it.
- ③ **LOCATOR** This helps you locate equipment on the earner or major components. An arrow will lead you from the locator to the closeup. If the arrow is dotted, it means that the item is located behind something.
- ④ **CLOSEUP** This shows you a closeup of the equipment.

In addition to the items listed, cautions and notes may be listed. Cautions deal with things or actions which could damage equipment. Notes contain facts to make tasks easier. Also, notes tell you about conditions that effect the step that follows them.

Each task includes step-by-step illustrated instructions. The numbered steps tell you WHAT to do and HOW to do it. Each numbered part in the instructions matches the same number in the drawings of the task. When they are needed, warnings, cautions, and notes always appear just above the task step to which they apply.

Read all steps, warnings, cautions and notes before starting to do the task. It is important to do each step in the order given. **FOLLOW-THROUGH STEPS** tell you what to do after the maintenance task is done. The words **END OF TASK** will tell you when you have finished the job.

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

Preventive maintenance is required to keep your carrier in good running condition. Preventive Maintenance Checks and Services (PMCS) for unit maintenance are made on a periodic basis, and are found in CHAPTER 2, Section V of this manual.

**SAMPLE OF PMCS PROCEDURES**

The sample below shows you what to look for when you read a PMCS procedure. Items to watch for are listed in the legend. Match them with the sample.

**UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

**SEMIANNUAL (S) OPERATION CHECKS**

ITEM NO.	ITEM TO BE INSPECTED	PR OCEDURES
7	TRACKS PIN/NUTS	Check track pin nuts (1)for looseness or cracks. Replace cracked nuts. Check track pins (2) for stripped threads. Replace stripped track pine. Tighten loose nuts to 115-135 lb-ft (156-183 N•m) torque. Use torque wrench (Item 96, App D).
8	TRACK GROUSER	Check grouser (3) for wear or cracks on both tracks Replace track shoe if grouser measures less than 1/8 inch (3mm) in height or is cracked.

*Legend to Sample*

- ① **ITEM NO.** This tells you the number of the item to be checked or serviced.
- ② **INTERVAL** This tells you how often the items are checked or serviced.
- ③ **ITEM TO BE INSPECTED** This tells you the item to be checked or serviced.
- ④ **PROCEDURES** This tells you what to do. Illustrations may be included in this section to help you perform the procedures or you will be directed to another manual.

*WARNINGS, CAUTIONS, AND NOTES*

Be sure to read all warnings and cautions in the task. Ignoring a warning could cause death or injury to yourself or other personnel. Ignoring a caution could cause damage to equipment. Notes contain facts to make the task easier. Warnings, cautions, and notes always appear just above the task step to which they apply.

WARNINGS: Call attention to the things that could injure personnel.



... **WARNING**  
**Lowering ramp could injure personnel. Make sure ramp zone is clear before you lower ramp.**

CAUTIONS: Call attention to the actions or materials that could damage equipment.

**CAUTION**  
**Improper cable actions or removal can cause a short circuit. Remove negative cable prior to removing positive cable.**

NOTES: Contain information you should know.

**NOTE**  
**Two personnel are required to perform this task.**

*HELPER*

Helpers are needed in tasks that require more than one person such as to help lift heavy objects. A helper may also be needed to act as an outside observer, drive the earner, or do similar tasks.

If a helper is needed to perform a task, the INITIAL SETUP will tell you:

Example: Personnel required:  
 Unit Mechanic  
 Helper (H)

If a helper assists with a step or substep, the step or substep will include: 'Have helper assist.'

Example: 3. Remove panel. Have helper assist.

If a helper performs the action alone, the step or substep will start with (H).

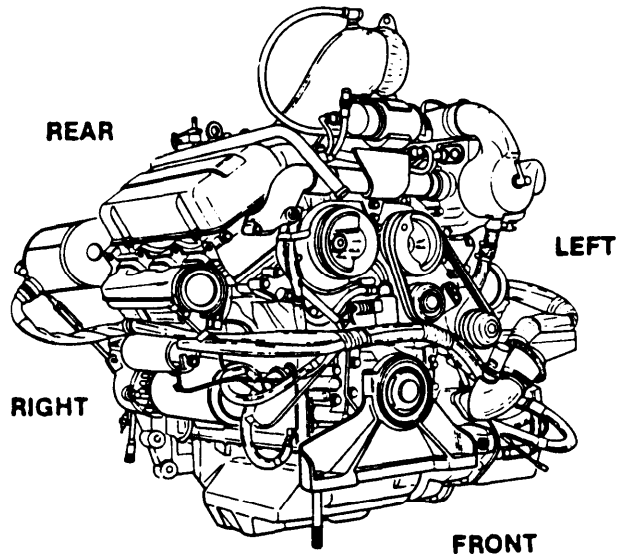
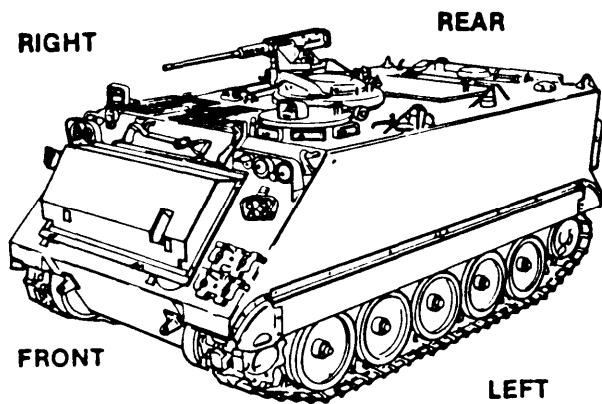
Example: 2. (H) Turn MASTER SWITCH ON.

### LOCATIONAL TERMS

The terms FRONT, REAR, LEFT AND RIGHT are used to describe where items are located. THE POINT OF REFERENCE FOR THESE TERMS IS DIFFERENT FOR CARRIER ITEMS AND POWER UNIT ITEMS. (Carrier items are items which are not on the power unit. Power unit items are items on the engine, transmission, differential, or transfer gearcase.)

If you are working with carrier items, use this point of reference. Think of the location as if you were sitting in the driver's seat looking forward.

If you are working with power unit items, use this point of reference. Think of the locations as if you were standing at the transfer gearcase end of the power unit and facing the flywheel. This rule applies whether the power unit is IN or OUT of the carrier.



**HOW TO USE THE REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) WITH THIS MANUAL**

The RPSTL (TM 9-2350-261-24P) gives the National Stock Number (NSN) required to order parts used in the maintenance tasks. To use the RPSTL to identify and order a part, do the following:

1. In this manual, turn to the first page of the task to be performed.
2. Find Materials/Parts under INITIAL SETUP, and read the part(s) that need replacement. If required, find the illustrated part in the task steps.
3. Go to the RPSTL and find the same illustrated part. That part will have an item number assigned to it. Look this item number up in the listing for that figure. The NSN can be found in the NSN column.
4. If you inspect an item and find that it is damaged, go to the RPSTL and find the SMR code for the item. If the SMR code does not authorize you to repair the item, reassemble it and send it to the authorized level of maintenance.
5. The usable on code in the RPSTL appears in the lower left corner of the Description column heading. Usable on codes are shown as 'UOC . . . . . 'in the Description Column justified left) on the first line following the item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable on codes in the RPSTL are:

<b>Code</b>	<b>Used On</b>
<b>V35</b>	<b>M113A2 Carrier, Personnel</b>
<b>V36</b>	<b>M125A2 Carrier, 81 mm Mortar</b>
<b>V37</b>	<b>M577A2 Carrier, Command Post</b>
<b>V38</b>	<b>M106A2 Carrier, 107 mm Mortar</b>
<b>V83</b>	<b>M981 Carrier, Personnel, Armored Fire Support</b>
<b>V95</b>	<b>M741A1 Chassis, 20 mm Anti-Aircraft Gun</b>
<b>011</b>	<b>M901A1 Combat Vehicle, Anti-Tank Improved TOW Vehicle</b>
<b>056</b>	<b>M1059 Carrier, Personnel, Smoke</b>
<b>120</b>	<b>M1064 Carrier, 120 mm Mortar</b>
<b>ACP</b>	<b>M1068 Carrier, Standardized Integrated Command Post System</b>

## CHAPTER 1 INTRODUCTION

### Section I. GENERAL INFORMATION

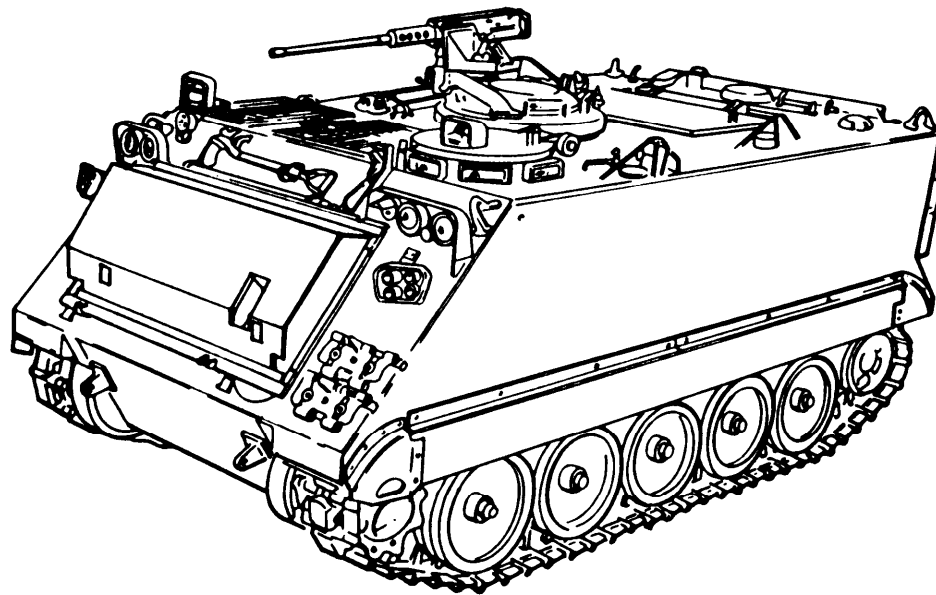
#### SCOPE

Type of Manual: Unit Maintenance

Model Number and Equipment Name:

M113A2 - Armored Personnel Carrier, Full Tracked

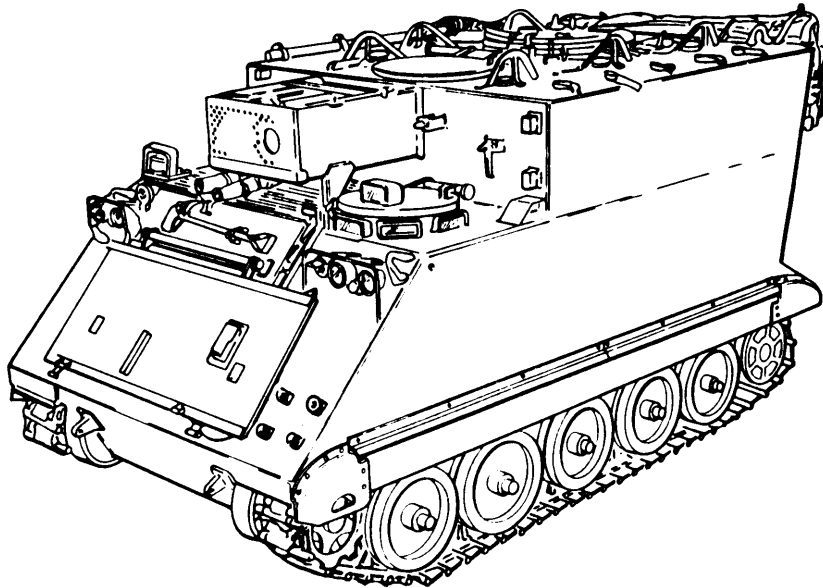
Purpose of Equipment: Transportation and positioning combat troops and supplies.





M577A2 - Light Tracked Command Post Carrier.

Purpose of Equipment: Provides protection and mobility for field commanders in a tactical environment.

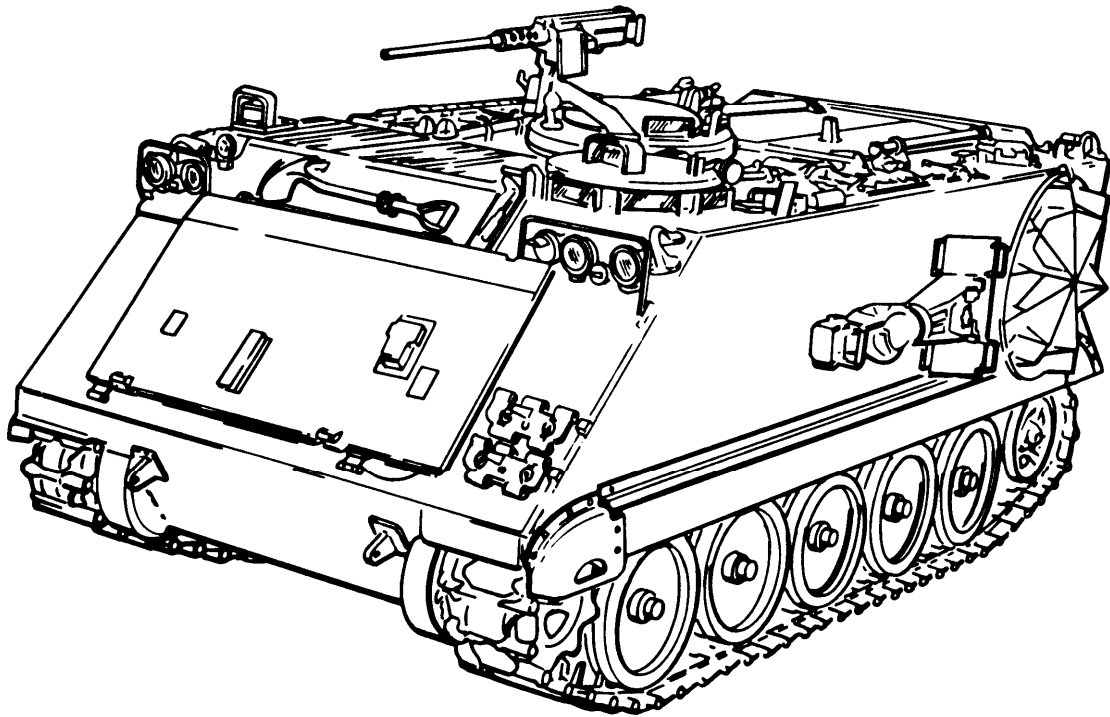


**M106A2 - Self-propelled 107-mm Mortar Carrier.**

**Purpose of Equipment:** Provides mobility for the 4.2 inch (107-mm) mortar M30. The mortar can be fired from a turntable mounted in the carrier or from a portable off vehicle mount.

See TM 9-1015-232-23&P for Unit and D S maintenance and repair parts for the 81-mm turntable and mount and the 4.2 inch (107-mm) turntable and mount.

See TM 9-1015-215-20&P for Unit maintenance and repair parts for the 4.2 inch (107-mm) mortar M30.

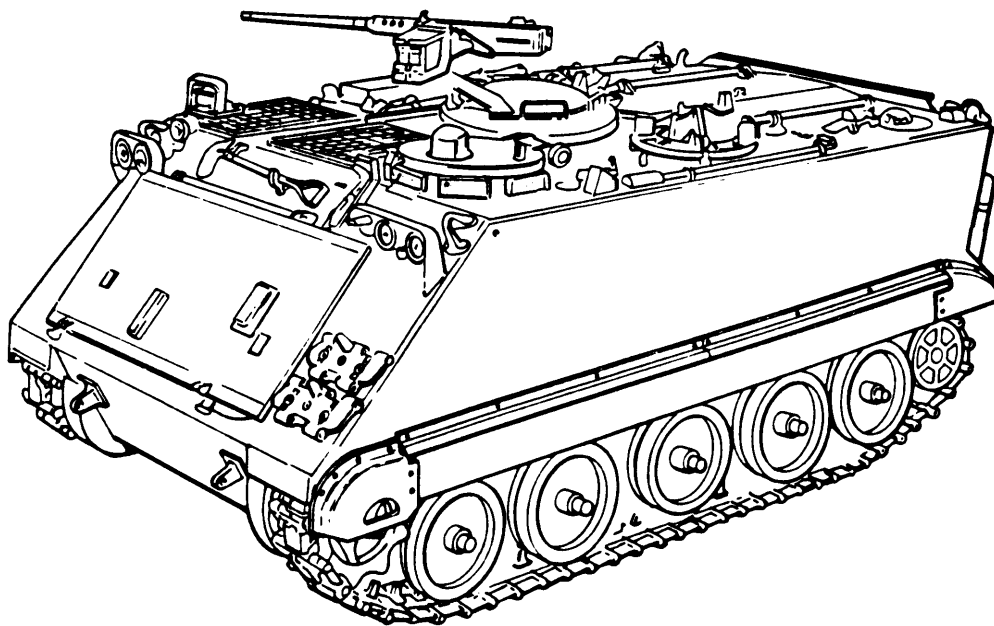


**M125A2 - Self-propelled 81-mm Mortar Carrier.**

Purpose of Equipment: Provides mobility for the **81-mm mortar cannon**. **The mortar can be fired from a turntable mounted in the carrier or from a portable off vehicle mount.**

See **TM 9-1015-232-23&P** for Unit and D S maintenance and repair parts for the **81-mm** turntable and mount and the **4.2 inch (107-mm)** turntable and mount.

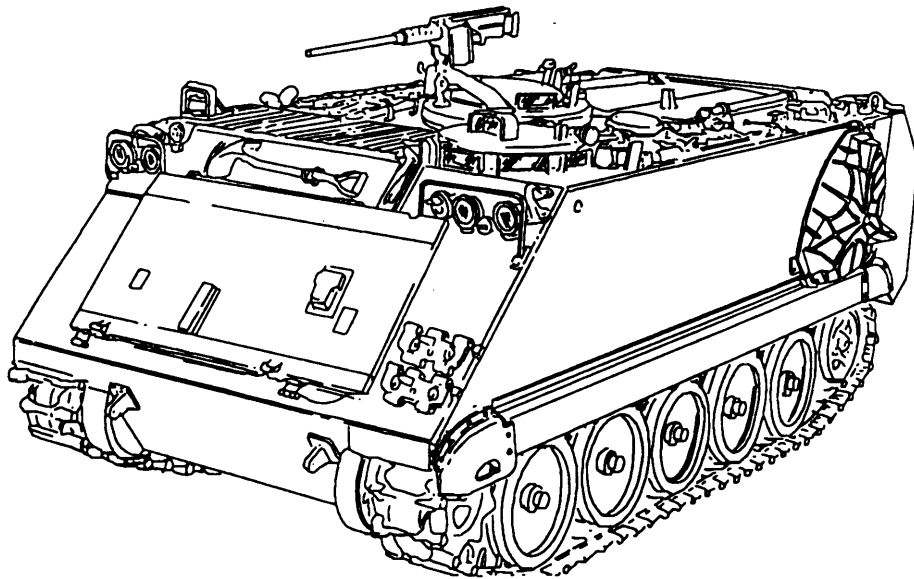
See **TM 9-1015-200-20&P** for Unit maintenance and repair parts for the 81-mm mortar M29A1.



M1064 - Self-propelled 120-mm Mortar Carrier.

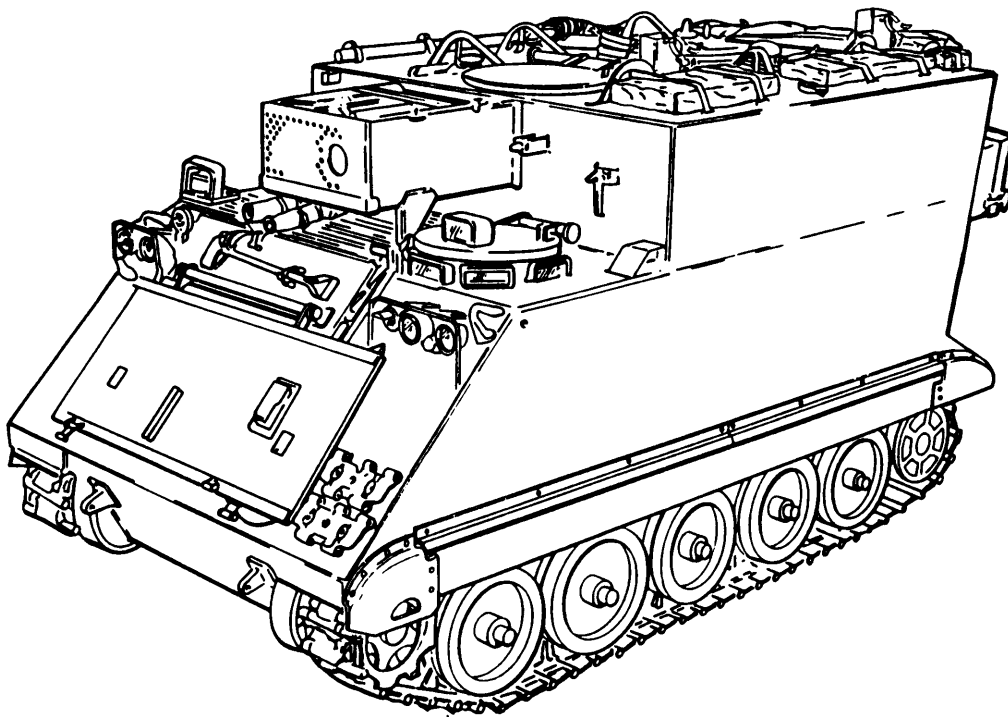
Purpose of Equipment: Provides mobility for the 4.7 inch (120-mm) mortar, M121 or M120. The M121 mortar can be fired from a turntable mounted in the carrier and the M120 mortar from a portable mount off the vehicle.

See TM 9-1015-250-23 and TM 9-1015-250-23&P for Unit and DS maintenance and repair parts for the 4.7 inch (120-mm) mortar, M121 or M120.



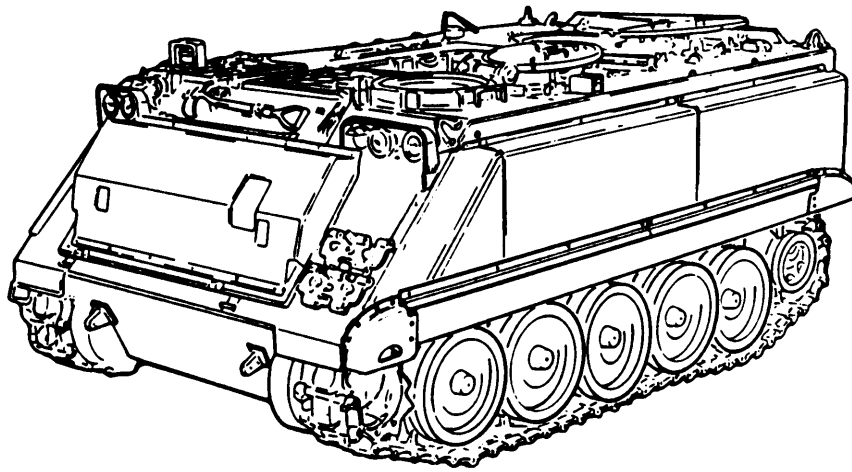
M1068 - Standardized Integrated Command Post System Carrier

Purpose of Equipment: Designed as a command post and field office to support the various configurations and installation layouts of the ATCCS Army Tactical Command And Control System and provide protection for field commanders in a tactical environment.



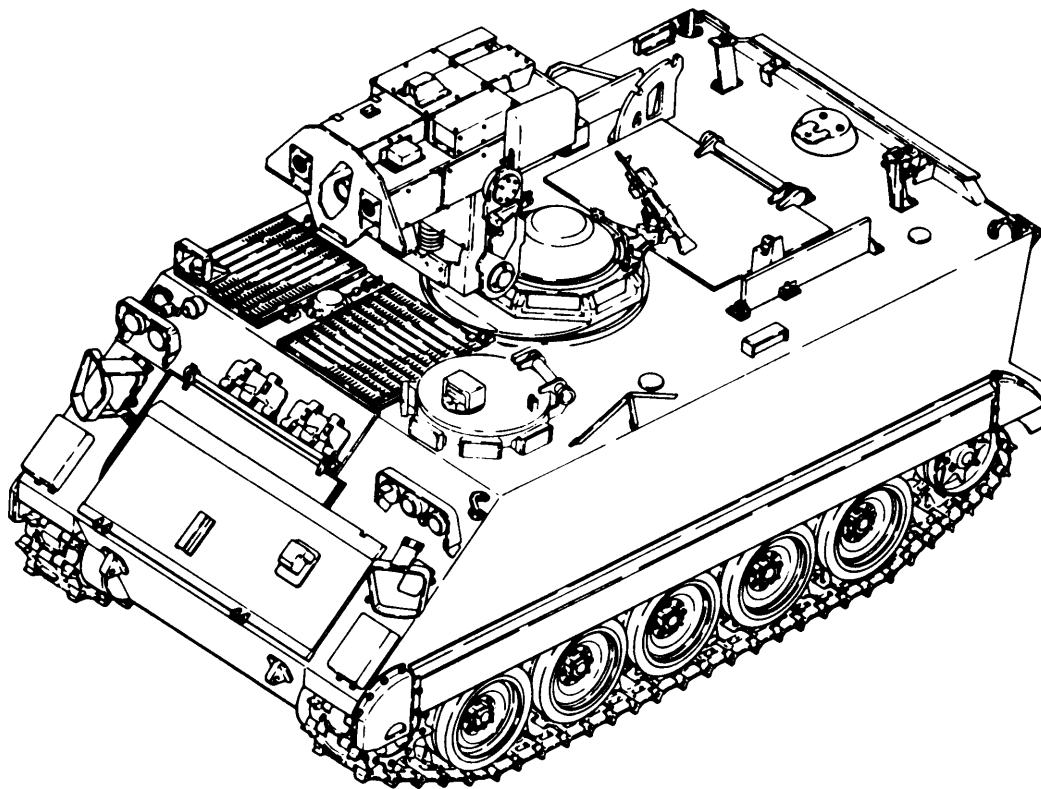
**M741A1 - Self-Propelled 20-mm Anti-Aircraft Artillery Gun Chassis Carrier.**

**Purpose of Equipment:** Provides mobility for the M168 20-mm cannon.



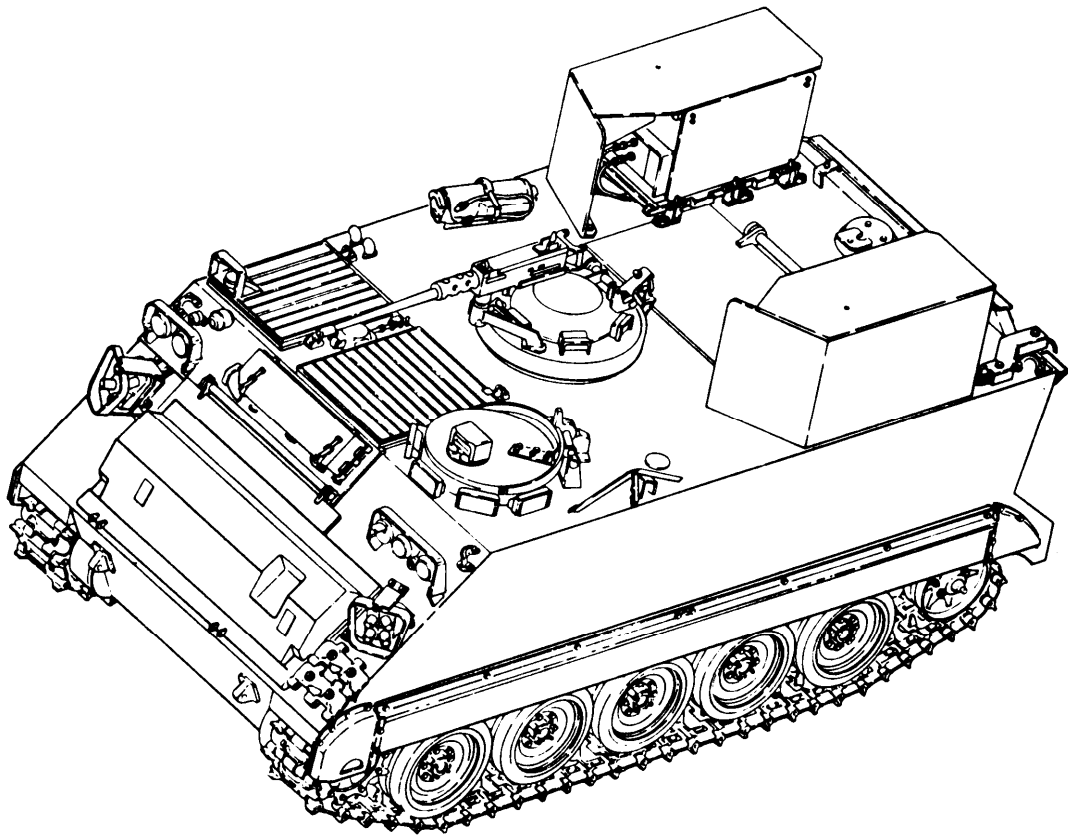
M901A1 - Combat Vehicle, Anti-Tank, Improved Tow Vehicle.

Purpose of Equipment: Provides mobility for heavy anti-tank weapon designed and built to attack and defeat armored vehicles and other targets such as field fortifications.



M1059 - Full Tracked Smoke Generator Carrier.

Purpose of Equipment: Designed to generate a smoke screen in the battlefield environment.





## **TM9-2350-261-20-1**

The M741A1 Self-Propelled Carrier, and M901A1 Combat Vehicle have their own Lubrication Order and Operator's Manual; LO 9-2350-300-13, TM 9-2350-300-10 (M741A1), LO 9-2350-259-12, and TM 9-2350-259-10 (M901A1). The M113A2, M577A2, M125A2, M106A2, M1059, M1068, and M1064 have a common Lubrication Order, LO 9-2350-261-12, and a common Operator's Manual, TM 9-2350-261-10.

The 81-mm, 4.7 inch (120-mm), and 4.2 inch (107-mm) mortars have their own unit maintenance manuals; TM 9-1015-200-20&P, TM 9-1015-215-20&P, and TM 9-1015-250-23&P. However, their turntables and mounts are common and are covered in TM 9-1015-232-23&P.

Data for the M113A2 Personnel Carrier which is common to the M901A1 Anti-Tank Improved TOW Vehicle is contained in this manual. Data peculiar to the M901A1 is contained in TM 9-2350-259-20.

The terms left and right as used in this manual are defined as standing at the rear ramp and looking toward the front of the carrier.

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

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pamphlet 738-750, The Army Maintenance Management Systems (TAMMS). Forms needed by units maintaining this material are listed in Appendix A.

### **DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

See the following technical manuals for information on destruction of army materiel:

TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy use.
TM 750-244-5-1	Procedures for Destruction of Conventional ammunition and Improved Conventional Munitions to Prevent Enemy Use.
TM 750-244-6	Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use.
TM 750-244-7	Procedures for Destruction of Equipment in Federal Supply Classifications 1000, 1005, 1010, 1520, 2530, 5590, 5595 to Prevent Enemy use.

### **PREPARATION FOR STORAGE OR SHIPMENT**

See MIL-C-45360F(AT) for information about administrative storage or shipment of the M113A2 Family of Vehicles (FOV) and their components. See the -10 for information about transportability of carriers.

**NOMENCLATURE CROSS REFERENCE LIST**

This listing includes nomenclature cross references used in this manual.

COMMON NAME	OFFICIAL NOMENCLATURE
Adapter	Nipple, pipe, union
Air vent, personnel	Register, metal: personnel air vent
Arming device, remote	Remote control system: arming assembly
ATTCS/CHS	Army Tactical Command and Control System/Common Hardware System
Auxiliary reservoir	Auxiliary reservoir: below deck hydraulic
Battery, TOW	Battery assembly, storage
Bilge pump	Rotary pump
Breather	Air filter intake
Bulb	Incandescent lamp
Chassis assembly, gunner's level/nightsight controls	Indicator, level, gunner's
Cleaning solvent	Chlorathane solvent
Coolant gage	Temp indicator
Detector	Liquid transmitter
Digital message device	Message device, digital, AN/PSG-50
Dipstick	Liquid level gage rod
Dispenser, smoke grenade	Grenade launcher
Drain plug	Pipe plug
Driver's periscope	Periscope, M17
Engine head bolt wrench	Spanner wrench
Engine oil falter	Fluid pressure falter
Engine oil gage	Dial pressure gage
Exhaust collector	Exhaust connection
Fastener	Toggle pin
Fiber optics	Fiber optic LAN/Thin LAN
Fire bottle	Compression gas cylinder
Fluid level detector	Liquid transmitter
Fuel control cable	Fuel control
Fuel falter	Fluid falter
Fuel gage	Liquid quantity gage
Fuel tank	Fuel compartment
Gear box	Mechanical housing
Grease fitting	Lubrication fitting
Ground/vehicular laser locator designator (G/VLLD or GLLD)	Target designator set, electro-optical AN/TVQ-2
Hand brake	Parking brake lever
Hatch	Hatch cover
Hatch, gunner's cupola, turret	Hatch, vehicular: gunner's cupola

**NOMENCLATURE CROSS REFERENCE LIST (con't)**

COMMON NAME	OFFICIAL NOMENCLATURE
Head assembly, upper	Head assembly: tank periscope
Hinge pin	Headless straight pin
Horn switch	Push switch
Hub	support
Hydraulic power unit	Ramp power unit
Image transfer assembly	Periscope, tank
Indicator, level position, driver's	Level indicator assembly: driver's
Infrared (IR) periscope	Periscope, M19
Indicator light	Indicator lamp
Inlet grill	Intake grill
Jack	Receptacle
Jam nut	Hexagonal nut
Key washers	Locking plates
Laser designator/rangefinder (LD/R)	Rangefinder-target designator, laser MX-9759/TVQ-2
Link	Plain rod bearing
Locknut	Self-locking nut
Lock screw	Self-locking bolt
Lockwasher	Self-locking washer
Lockwire	Non-electrical wire
M25A1 mask	Mask chemical-biological: tank M25A1
Machine gun, mounting assembly	Mount, secondary weapon
Nightsight (M901A1)	Sight, vision, night, AN/TAS-4A infrared
Nightsight mount	Adapter, transversing unit to AN/TAS-4
Periscope, squad leader's	Telescope, panoramic, tank vehicle
Assembly	Adapter assembly
Plug	Connector
Propeller shaft	Flexible drive shaft
Quick disconnect	Quick coupling half
Radio	Receiver-transmitter
Road wheel	Solid rubber wheel
Rod	connecting link
Screen	Metal grill
screw	Machine bolt
Seatbelt	Vehicular safety belt
shim	Spacer
Shim pack	Spacer assortment
SICPS	Standardized Integrated Command Post System (M1068)
Slave cable	Adapter cable assembly
Splined shaft	Output carrier
Starter switch	Interlock switch

**NOMENCLATURE CROSS REFERENCE LIST (con't)**

COMMON NAME	OFFICIAL NOMENCLATURE
Stop light	Taillight
Stowage box	Vehicular accessory box
Strut assembly, hold open, Gunner's hatch	Latch assembly, cupola: Gunner's hatch external
Switch	Circuit breaker
Throttle control cable	Throttle control
Tie strap	Electric tiedown strap
Towing pintle	Pintle hook latch
Turn signal assembly	Vehicle directional light
Universal joint	Universal joint spider
Vision block, cupola	Block, direct vision
Vehicle power cable	Cable, vehicle, W2

**REPORTING OF EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**

If your carrier needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, U.S. Army Tank-automotive and Armaments Command, Attn: AMSTA-TR-QCL, Warren, MI 48397-5000. We'll send you a reply.

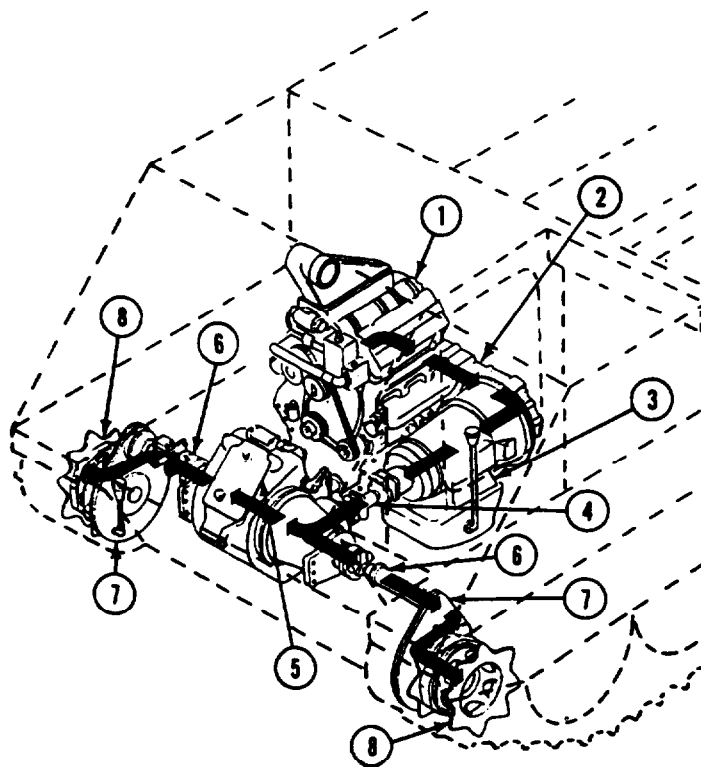
## Section II. EQUIPMENT DESCRIPTION AND DATA

For equipment characteristics, capabilities, and features, see your -10.

### LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

The major components that are connected together to form the carrier's power train are:

1. Engine - 6V53 diesel (1) provides source of power.
2. Transfer gearcase (2) transfers engine power to the transmission (3).
3. Transmission (3) automatically selects (depending on range selected) correct gear based on road and load conditions.
4. Drive shaft (4) connects transmission (3) to differential (5).
5. Drive shafts (6) connect differential (5) to the left and right final drives.
6. Differential (5) steers and brakes the carrier.
7. Final drives (7) drive the track sprockets (8).
8. Sprockets (8) drive the tracks on which the carrier moves.



## DIFFERENCES BETWEEN CARRIERS

This manual covers nine different carriers. The major differences can be determined from the chart below. Minor differences are described under SCOPE in each chapter or section.

DIFFERENCES BETWEEN CARRIERS									
Carrier function	M113A2	M577A2	M106A2	M125A2	M741A1	M1059	M901A1	M1064	M1068
Command Post	—	X	—	—	—	—	—	—	X
Gun Carrier	—	—	—	—	X	—	—	—	—
Mortar Carrier	—	—	X	X	—	—	—	X	—
Personnel/Cargo	X	—	—	—	—	—	—	—	—
Smoke Generator	—	—	—	—	—	X	—	—	—
Combat Vehicle	—	—	—	—	—	—	X	X	—
Armament and fire control:									
Caliber .50 machine gun	X	—	X	X	—	X	—	X	—
Caliber 7.62 machine gun	—	—	—	—	—	—	X	—	—
81-mm Mortar	—	—	—	X	—	—	—	—	—
107-mm Mortar	—	—	X	—	—	—	—	—	—
120-mm Mortar	—	—	—	—	—	—	—	x	—
Periscope M17	X	X	X	X	X	X	X	X	X
Periscope, squad leader's	—	—	—	—	—	—	X	—	—
Nightsight, AN/TAS-4	—	—	—	—	—	—	X	—	—
Guide missile launcher	—	—	—	—	—	—	—	—	—
optical sight	—	—	—	—	—	—	X	—	—
TOW 2 missile launcher	—	—	—	—	—	—	X	—	—
Auxiliary equipment:									
Air grille curtain	—	—	X	X	X	—	—	X	—
Artillery communication kit	—	X	—	—	—	—	—	—	X
ATCCS common hardware	—	—	—	—	—	—	—	—	X
Capstan kit	X	—	—	—	—	X	X	—	—
Chemical agent automatic alarm kit	X	—	—	—	—	—	x	—	—
Driver's windshield kit	X	X	X	X	X	X	X	X	X
Electronic equipment heater kit	—	X	—	—	—	—	—	—	—
Engine heater coolant kit	X	X	X	X	X	X	X	X	X
Fiber optics	—	—	—	—	—	—	—	—	X
Generator set and cover	—	X	—	—	—	—	—	—	X
Litter kit	X	—	—	—	—	—	—	—	—
Machine gun armor shield kit	X	—	X	X	—	X	—	X	—
Marine recover kit	X	—	—	—	—	X	X	—	—
NBC mounting kit	X	X	X	X	—	—	—	X	X
Non-skid ramp kit	—	—	X	X	—	—	—	X	—
Personnel heater kit	X	X	X	X	X	X	X	X	X
Smoke grenade launcher kit	X	—	—	—	—	X	X	—	—
Tent (covered extension)	—	X	—	—	—	—	—	—	X
Turn signal kit	—	—	—	—	X	—	—	—	—

## EQUIPMENT DATA

Engine	Characteristics	Metric Equivalents
Manufacturer .....	Detroit Diesel Engine Division — GMC	
Model .....	5063-5299	
Series .....	6V53	
Type .....	two-cycle diesel compression-ignition	
Number of cylinders .....	6	
Bore .....	3.875 in.....	10 cm
Stroke .....	4.5 in.....	11 cm
Piston displacement.....	318cu/in.....	5.2 liters
Compression ratio.....	21:1	
Injectors.....	M50	
Crankshaft rotation (viewed at pulley) .....	clockwise	
Compression pressure (minimum speed 600 rpm, injectors removed) .....	510 psi .....	3516 kPa
Firing order	1L-3R-3L-2R-2L-1R	
Cylinder numbering left bank (front-to-rear).....	1L-2L-3L	
Cylinder numbering right bank (front-to-rear).....	1R-2R-3R	
Idle speed .....	650 to 700 rpm	
Governed speed (no load) with quick disconnect engaged .....	2925 to 2975 rpm	
Horsepower .....	212	
Lubrication (type).....	forced feed	
Lubrication pressure (normal at 2800 rpm) .....	40-60 psi.....	276 to 414 kPa
Lubricating pump type .....	rotary	
Stall speed (2-3 range) .....	1900 to 2100 rpm	
Valves .....	overhead, rocker arm	
Dry weight .....	1345 lb .....	611 kg

Suspension	Characteristics	Metric Equivalents
Torsion bars	5 each side	
Shock absorbers, hydraulic, direct action .....	3 each side (all except M741A1)	
Shock absorbers, hydraulic, direct action .....	1 each side (M741A1 only)	
Road arm bumpers .....	1 each side (M741A1 only)	
Lockout cylinders .....	4 each side (M741A1 only)	
Support assembly guards .....	3 each side (all except M741A1)	
Idler wheels, unmatched .....	2 each side (all except M741A1)	
Idler wheels, matched .....	2 each side (M741A1)	
Sprockets .....	2 each side	
Idler assemblies .....	1 each side	
Road wheels:		
Type .....	disk with solid rubber tires	
Quantity .....	20 (10 duals)	
Size .....	24 in. dia x 2 1/8 in. wide .....	61 cm dia x 5 cm wide
Support assembly, road wheel .....	5 each side	
Track, flat, single pin, hinged (removable rubber pads)		
Model .....	T130E1 6 in.....	15 cm pitch
Tread (centerline to centerline of tracks).....	85 in .....	216 cm
Number of shoes (new) .....	63 left side 64 right side	
Width .....	15 in.....	38 cm
Tension (between track and 2nd road wheel) .....	1/2 in.....	13 mm



Electrical System	Characteristics	Metric Equivalent
Batteries		
Type.....	6TN	
Voltage (two 12-volt in series).....	24 V dc	24 V dc
Generator 100 AMP		
Manufacturer.....	Leece Neville	
Model.....	2184AC	
Generator 200 AMP		
Manufacturer.....	Leece Neville	
Model.....	226OAC	
Generator 200 AMP		
Manufacturer.....	Prestolite	
Model.....	AMZ-4000	
Generator 200 AMP		
Manufacturer.....	Niehoff	
Model.....	N1205	
Starter		
Manufacturer.....	Delco Remy Division GMC	
Model.....	16764-11663416 (MS53011-4)	
Optional manufacturer.....	Prestolite	
Model.....	11668641 (MS50311-4)	
Optional manufacturer.....	Leece Neville	
Model.....	12253404 (MS53011-4)	
Type.....	4-pole, 24 V dc	
Brushes.....	8	
Rotation (viewed from drive end).....	clockwise	
Type of engagement.....	shift lever solenoid plunger	
Internal wiring.....	series	
Engine low oil pressure switch (transmitter) breaks contact at.....	9-13 psi.....	62-90 kPa
Differential high oil temperature switch (transmitter) closes at.....	305° F + 5°.....	152° C
Transmission high oil temperature switch (transmitter) closes at.....	305° F + 5°.....	152° C

<b>Cooling System</b>	<b>Characteristics</b>	<b>Metric Equivalents</b>
Capacity .....	14 gal .....	53 liters
Thermostat (closed) .....	174-176° F .....	79-80° C
(open) .....	190-192° F .....	88-89° C
Normal operating temperature (engine) .....	160-230° F .....	71-110° C
Radiator cap (auxiliary tank) pressure rating .....	13-18 psi .....	90-124 kPa

<b>Transfer Gearcase</b>	<b>Characteristics</b>	<b>Metric Equivalents</b>
Type .....	four helical gears w/power takeoff	
Transfer ratio .....	1:1.286	
Dry weight .....	118 lb .....	54 kg

<b>Transmission</b>	<b>Characteristics</b>	<b>Metric Equivalents</b>
Manufacturer .....	Allision Division GMC	
Model .....	TX 100-1	
Hydraulic torque converter .....	single stage, multiple phase w/lockup	
Drive ranges .....	reverse, neutral, 2-3, 1-3, 1-2, 1	
Dry weight .....	309 lb .....	140 kg

<b>Control Differential</b>	<b>Characteristics</b>	<b>Metric Equivalents</b>
Model .....	DS200	
Suspension .....	3-point	
Rating:		
Input (maximum) .....	4675 lb-ft .....	6339 N·m
Input (maximum) .....	3825 rpm	
Net input (maximum) .....	215 hp	
Rotation:		
Input shaft (in forward range) .....	clockwise	
Left output shaft (in forward range) .....	clockwise	
Right output shaft (in forward range) .....	counterclockwise	
Steering control (internal) .....	mechanical brakes	
Bevel gear ratio .....	1.28:1	

## METRIC EQUIVALENTS

Metric equivalents are used throughout this manual. Metric symbols and units are:

SYMBOL	UNIT
c	Celsius
cc	cubic centimeter
cm	centimeter
kg	kilogram
kg/min	kilogram per minute
km	kilometer
km/h	kilometer per hour
kPa	kilopascal
kw hr	kilowatt hour
m	meter
mm	millimeter
N·m	Newton meters

## EQUIPMENT DATA

For equipment data, see your -10.

## EQUIPMENT CONFIGURATION

The equipment you will be working on may be equipped with one of several special purpose kits. These kits are:

- Artillery Communication Kit (M577A2 only) (page 37-5).
- Capstan Kit (M113A2 and M1059 only) (page 34-1).
- Chemical Agent Automatic Alarm Kit (M113A2 only) (see Chapter 2, PMCS and page 44-1).
- Driver's Windshield Kit (all carriers) (page 30-1).
- Electronic Equipment Heater Kit (M577A2 only) (page 31-1).
- Engine Coolant Heater Kit (all carriers) (page 32-1).
- Litter Kit (M113A2 only) (page 36-1).
- Machine Gun Armor Shield Kit (page 38-1).
- —NBC Mounting Kit (M113A2, M1068, and M577A2 only) (page 48-1).
- — NBC Kit (page 17-30).
- Personnel Heater Kit (all carriers) (page 29-1).

- Marine Recovery Kit (M113A2 and M1059 only) (page 35-1).
- Non-Skid Ramp Kit (M125A2, M1064, and M106A2) (page 33-1).
- Turn Signal Kit (M741A1 only) (page 39-1).

Refer to TM 9-2350-261-10, TM 9-2350-259-10 (M901A1 only), or TM 9-2350-300-10 (M741A1 only) for operation of these kits. Also see page number referenced in this manual for description, data, and maintenance.

## **CARE AND HANDLING OF AMMUNITION**

For general care of the ammunition you may have on board your carrier, see TM 9-1300-206.

## CHAPTER 2

### PRINCIPLES OF OPERATION

#### Section I. INTEGRATED SYSTEMS

##### SCOPE

This section describes how major systems of the carrier operate. An understanding of how each part functions in a system and how components relate to each other will help you solve Possible maintenance problems with the earner.

##### POWER PLANT

The power plant consists of the diesel engine, transfer gearcase, transmission and differential. The fuel, exhaust, cooling, starter, generator, and engine air systems are support systems for the power plant.

##### DIESEL ENGINE

The diesel engine is the primary source of power for the earner. The engine converts air and diesel fuel into energy and delivers this power to the transfer gearcase.

##### STARTER

The engine is equipped with a heavy duty starter. The starter, with built-in solenoid, is used to crank the engine for starting.

##### GENERATOR

The generator is part of the carrier electrical system. It is driven by the transfer gearcase. The generator charges the batteries in the carrier when the engine is running. A regulator mounted in the driver's compartment keeps the voltage at correct levels.

##### GENERATOR FIELD SWITCH

The generator switch is mounted on the secondary fuel filter. When starting the engine the field switch is open and the generator is not energized to allow the engine to start with less drag. When the secondary fuel filter is pressurized with fuel, the field switch closes and signals the regulator to energize the generator and start charging the batteries.

## **OIL SYSTEM**

The engine, transmission, and differential oil cooling system keeps the oil clean and within proper operating temperature range. The components of the system and their functions are:

Engine, transmission, and differential oil cooler unit is mounted on the engine. By circulating the hot oil through this unit, heat is given off to the surrounding engine coolant. Engine coolant is in turn cooled by the engine cooling system.

Oil cleanliness is maintained by circulating engine oil through the engine oil filter, and differential oil through the differential oil filter. Transmission oil is cleaned by the transmission oil filter which is an integral part of the transmission.

Differential oil pump is mounted on the transfer gearcase. It pumps oil from the bottom of the differential housing and to the differential oil filter. Oil flows through the filter, cooler, and back to the top of the differential.

## **FUEL SYSTEM**

Diesel fuel is stored in the fuel tank located inside the carrier. Fuel is gravity fed to the primary fuel filter. The engine driven fuel pump draws fuel from the primary fuel filter and pumps fuel through the secondary fuel filter to the engine injectors. The injectors force fuel into combustion cylinders where it is mixed with air and changed into energy. The excess fuel is returned to the fuel tank.

External fuel tanks are mounted on rear of carrier and hold about 95 gallons of diesel fuel. Shutoff cocks are located inside of carrier at each connection. Turn fuel on and off for maintenance (M981 only).

## **TRANSFER GEARCASE**

The transfer gearcase transfers power from the engine to the transmission. The transfer gearcase is a compact unit that transfers power from the engine flywheel to transmission torque converter. An engine disconnect allows the engine to run without transferring power to the transmission. A power takeoff drives the differential oil pump and a ramp pump. Another power takeoff drives the cooling fan, and a third drives the generator.

## **TRANSMISSION**

The transmission is a three speed, constant mesh, planetary gear train with hydraulic torque converter and lockup clutch. It automatically selects the proper gear based on road and load conditions. The transmission delivers power from the transfer gearcase to the differential.

## **EXHAUST SYSTEM**

Major exhaust system parts are the exhaust manifolds, and muffler. The exhaust manifolds carry the exhaust gases to the muffler. The muffler cuts down engine noise and allows exhaust to escape outside the carrier.

## **COOLING SYSTEM**

The cooling system cools the engine and transmission. It consists of a fan, fan drive belts, radiator, coolant pump, auxiliary tank, transmission oil cooler and thermostats. The cooling system contains approximately 14 gallons of liquid coolant. The liquid coolant is pumped by the coolant pump from the radiator and circulated through the engine and thermostat and back to the radiator where it loses heat to the atmosphere. This process keeps the engine, transmission, and differential temperature in a safe operation range.

As coolant flows through the engine, it absorbs heat from the engine and transmission. The heated coolant then flows to the radiator to remove coolant heat. The coolant fan pulls outside air in and through the radiator to remove heat. The fan is powered by the transfer gearcase.

The radiator auxiliary tank acts as an overflow tank to keep the cooling system from overpressurizing. It also removes air from the engine coolant.

## **ENGINE AIR SYSTEM**

The engine air system allows air to enter the engine. The air cleaner cleans air that enters the engine. Air is filtered through a reusable filter element before delivery to the engine. An air filter indicator shows when the element is clogged and needs cleaning or replacing. After being filtered, the air moves through the air horn and into the engine cylinders.

## **AUXILIARY AUTOMOTIVE SYSTEM**

The auxiliary system includes driver controls, personnel heater, bilge pumps, crew ventilation system, and fire suppression system.

### **DRIVER CONTROLS**

The driver controls regulate the engine, transmission, and steering braking systems of the earner.

The fuel shutoff control is used to stop the supply of fuel to the injectors. To start the engine, the driver must push in the fuel shutoff control. The throttle linkages are used to control the engine speed. The gear selector allows the driver to choose the proper gear for the carrier. The steering and braking levers control separate right and left steering brakes in the control differential. By pulling on the levers, you can slow or stop either track for steering, or both tracks at once for stopping. A lock button at the top of each lever lets you set and lock the brakes for parking.

### **PIVOT STEERING AND BRAKES**

Pivot steer brakes are disk brakes and work like the differential brakes but quicker.

### **DIFFERENTIAL COMPONENTS**

The differential consists of three major assemblies. These are the right angle gearbox, steering unit with brake shoes, and two output shafts.

Power flow is from the transmission to the right angle gearbox to the steering unit.

When driving straight forward the steering unit delivers equal power to both output shafts. Pressure on either steering lever slows or stops the right or left brake drum, inside the center steering unit, and reduces the speed of the right or left output shaft. By slowing down on one side you increase the speed of the other and the earner will turn in the direction of the applied brake.



Equal pressure on both steering levers applies both brakes and slows or stops the carrier.

The differential overheat switch is connected to a warning light in the driver's compartment. When warning light comes on it means oil temperature is too high.

## PERSONNEL HEATER

The personnel heater system provides heat inside the carrier. Major parts are the combination combustion chamber/heat exchanger, blowers, a fuel pump, and an electrical control. The heater operates using diesel fuel pumped from the fuel tank. Fuel is delivered to the combustion chamber from the fuel pump. Outside air is drawn into the combustion chamber by one of the blowers. A blower draws air from the crew compartment into the heater exchanger. The air is warmed by heat created by the combustion process and then returned to the crew compartment.

## BILGE PUMPS

Two electrically driven bilge pumps remove water and other liquids from the hull. Water enters the pumps through a screened inlet. The pumps force water out of the carrier through outlet tubes. The bilge pumps are controlled by a switch on the driver's panel.

## HYDRAULIC SYSTEM

The ramp is raised or lowered by an hydraulic system which consists of a pump, a cylinder, a control valve, and an hydraulic tank. This system is controlled by a three position valve located near the driver. Moving the valve to the RAISE position directs fluid to the ramp cylinder. Moving the valve to the LOWER position allows the gravity of the ramp to return hydraulic fluid to the reservoir.

## FIRE EXTINGUISHER SYSTEM

The fire extinguisher system consists of two CO<sub>2</sub> (Carbon Dioxide) cylinders; one fixed and **one Portable**. Carbon Dioxide can put out fires quickly and effectively. The fixed cylinder is located near the driver's compartment and is operated manually by pulling cables located on top of carrier next to driver's hatch. The fixed cylinder releases CO<sub>2</sub> in the power plant compartment only. The portable fire extinguisher is located in the crew compartment and is manually discharged.

## **SUSPENSION SYSTEM**

The suspension system supports the carrier and delivers engine power to the road. It allows the carrier to maneuver and be stable. Suspension system parts are the drive sprockets, tracks, idler wheels, track tension adjuster, road wheels, and support arms. Also, there are torsion bars and shock absorbers. The M741A2 has lockout cylinders to stabilize the carrier during operation of the weapon.

The drive sprockets drive the tracks. They are powered by left and right final drives from differential. The tracks consist of two flexible chains of track shoes. The tracks ride on the drive sprockets and are guided by the road wheels and idler wheels. The idler wheels can be adjusted to maintain correct track tension.

There are five pairs of road wheels per side. Track centerguides fit between each pair of road wheels. Road wheels and torsion bars are connected to support inns. The torsion bars act as springs to keep the road wheels on the ground and from hitting the bottom of the carrier.

## **ELECTRICAL SYSTEM**

The electrical system provides power for the carrier. The system operates on wet cell batteries and includes charging, regulating, and monitoring equipment. The batteries provide a normal operating 24 volts with an amperage capability of 100 or 200 amps per hour (depending on the system installed).

The batteries supply the carrier with electricity when the engine is off. All electrical power is delivered through the distribution box. Electrical power flows from the batteries through the distribution box, cables, and wiring assemblies to the electrical equipment. The hull is a ground for the electrical system.

The generator recharges the batteries and supplies electricity while the engine is running. The generator has 100 or 200 amps per hour capability (depending on the system installed).

There are several electrical subsystems within the hull. Each subsystem contains at least one wiring assembly. Major electrical subsystems and assemblies are:

Interior and Exterior Lights. Exterior lights include blackout lights, stop light, and headlights. Interior lights include domelights and panel lights.

Starting and Charging. A generator with a regulator keeps batteries charged to operating voltage. A starter with a built-in solenoid is used to crank the engine for starting.

Ventilation and Heating. Fresh air for the crew is provided by a vent aft of the cargo hatch. The M577A2 has a compartment blower to exhaust air from inside the M577A2 into the power plant compartment. Heating is provided by a forced air heater.

Bilge Pumps. Two pumps, one in the front and one in the rear of the earner, remove any water that may have entered the carrier.

## **SPECIAL EQUIPMENT**

Chemical Agent Automatic Alarm Kit (see Chapter 2, PMCS and page 44-1).

Driver's Windshield Kit (page 30-1).

Engine Coolant Heater Kit (page 32-1).

Litter Kit (page 36-1).

Machine Gun Armor Shield Kit (page 38-1).

NBC Kit (page 17-30).

NBC Mounting Kit (page 43-1).

Personnel Heater Kit (page 29-1).

## Section II. INTEGRATED COMPONENTS

### SCOPE

This section has important information on how the major components that make up a carrier operate. You'll be working on these components and gain an understanding of just how each relates to the other and how they will help you solve many maintenance problems.

Study this information and its illustrations closely. It will help you to know the major components and their parts.

### MAJOR COMPONENTS

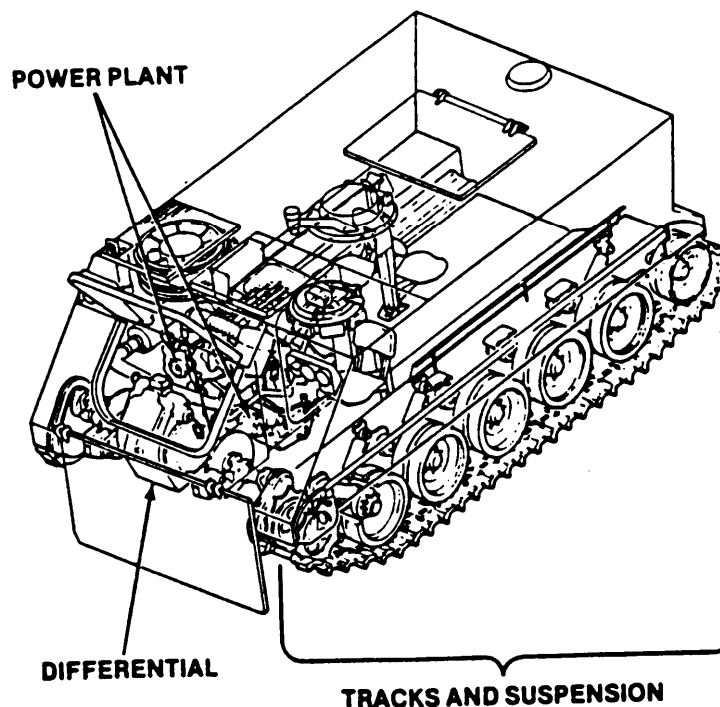
There are three major integrated components used in all of the vehicles. These three major components are:

Power plant components

Differential suspension

Tracks and suspension.

Special purpose kits, when installed, provide their own integrated components. Integration of these kits is described in their respective chapters.



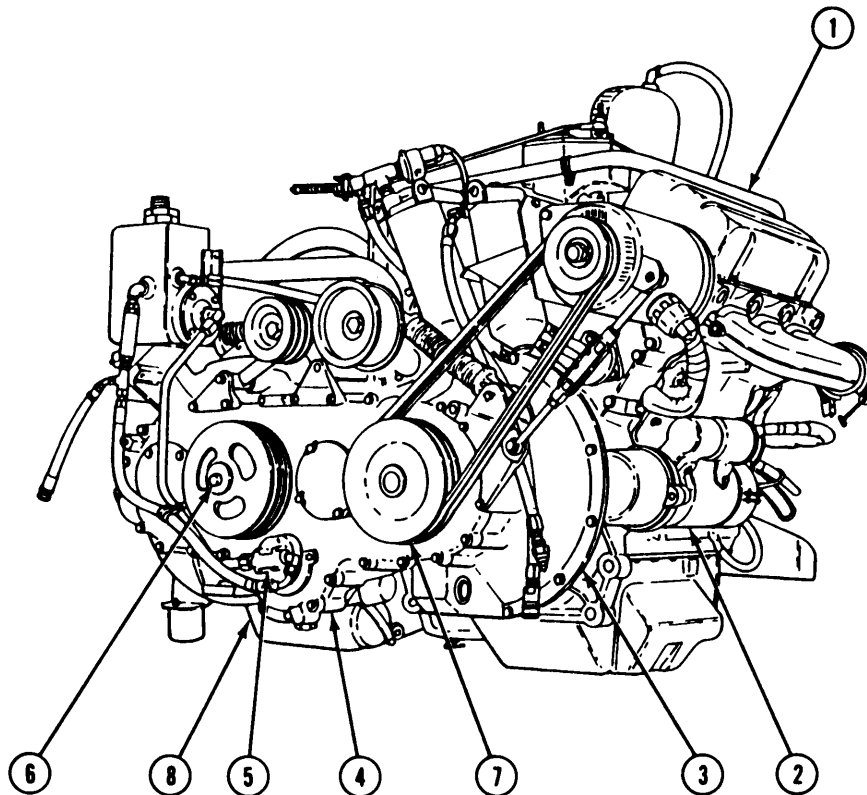
## POWER PLANT COMPONENTS

The power plant consists of three main components:

Engine (1) is a liquid cooled, V-type, six cylinder, compression ignition (CI) unit. Starting is by a heavy duty 24 volt starter (2). Engine is protected from low oil pressures and high temperatures by switches in the oil and cooling systems which activate warning light circuits.

Transfer gearcase (3) is a compact unit that transfers power from engine flywheel to transmission torque converter. An engine disconnect allows the engine to run without transferring power to the transmission. A power takeoff drives the differential oil pump (4) and a ramp pump (5). Another power takeoff drives the cooling fan (6), and a third drives the generator (7).

Transmission (8) is a three speed, constant mesh, planetary gear train with hydraulic torque converter and lockup clutch. It automatically selects the proper gear based on road, load conditions, and range selected.



## DIFFERENTIAL COMPONENTS

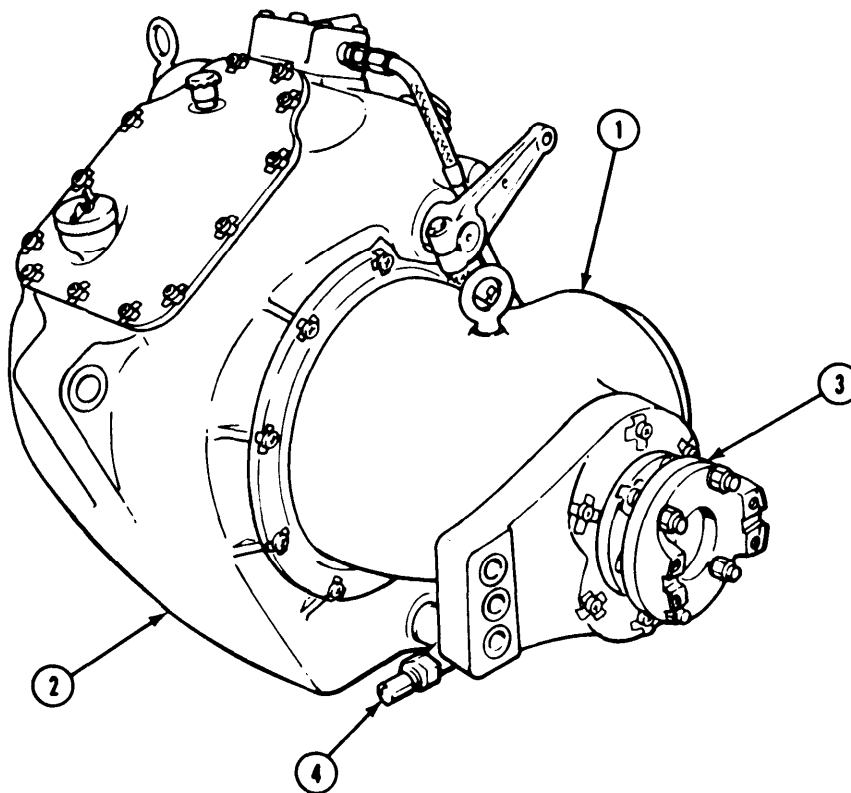
The differential consists of three major assemblies. These are the right angle gearbox (1), steering unit with brake shoes (2), and two output shafts (3).

Power flow is from the transmission to the right angle gearbox (1) to the steering unit (2).

When driving straight forward the steering unit (2) delivers equal power to both output shafts (3). Pressure on either steering lever slows or stops the right or left brake drum, inside the center steering unit (2), and reduces the speed of the right or left output shaft (3). By slowing down one side you increase the speed of the other and the carrier will turn in the direction of the applied brake.

Equal pressure on both steering levers applies to both brakes and slows or stops the earner.

The differential overheat switch (4) is connected to a warning light in driver's compartment. When warning light comes on it means oil temperature is too high.



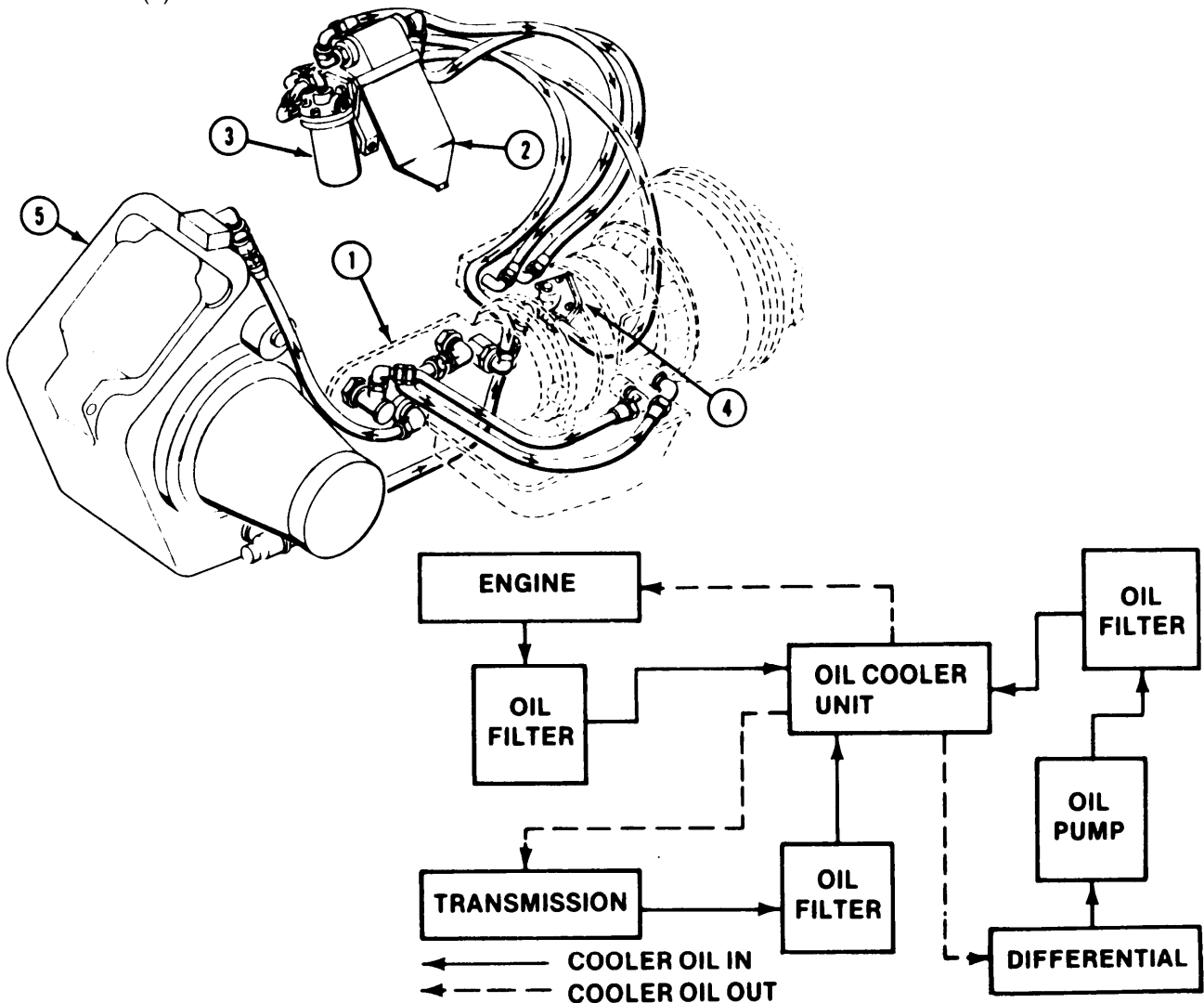
## OIL COOLING SYSTEM COMPONENTS — ENGINE, TRANSMISSION, AND DIFFERENTIAL

The engine, transmission and differential oil cooling system keeps the oil clean and within proper operating temperature range. The components of the system and their functions are:

Engine, transmission, and differential oil cooler unit (1) is mounted on the engine. By circulating the hot oil through this unit, heat is given off to the surrounding engine coolant. Engine coolant is in turn cooled by the engine cooling system (page 2-3).

Oil cleanliness is maintained by circulating engine oil through the engine oil filter (2), and differential oil through the differential oil filter (3). Transmission oil is cleaned by the transmission oil filter which is an integral part of the transmission.

Differential oil pump (4) is mounted on the transfer gearcase. It pumps oil from the bottom of the differential housing and to the differential oil filter (3). Oil flows through filter (3), through cooler (1), and back to top of differential (5).



## TRACKS AND SUSPENSION COMPONENTS

The earner moves on its tracks and suspension system. The components and their function are:

Road wheels (1), 10 to each side, carry the weight of the earner.

Road wheel arms (2), five to each side, are splined to individual torsion bars to suspend the carrier.

Torsion bars (3), one for each road wheel arm, extend the width of the carrier and are firmly anchored to the hull on the side opposite its road wheel arm.

Tracks (4), on each side, consist of track shoes with rubber pads. Shoes are linked together by pins to form a continuous rolling surface for the road wheels. Track guides keep track centered on the road wheels.

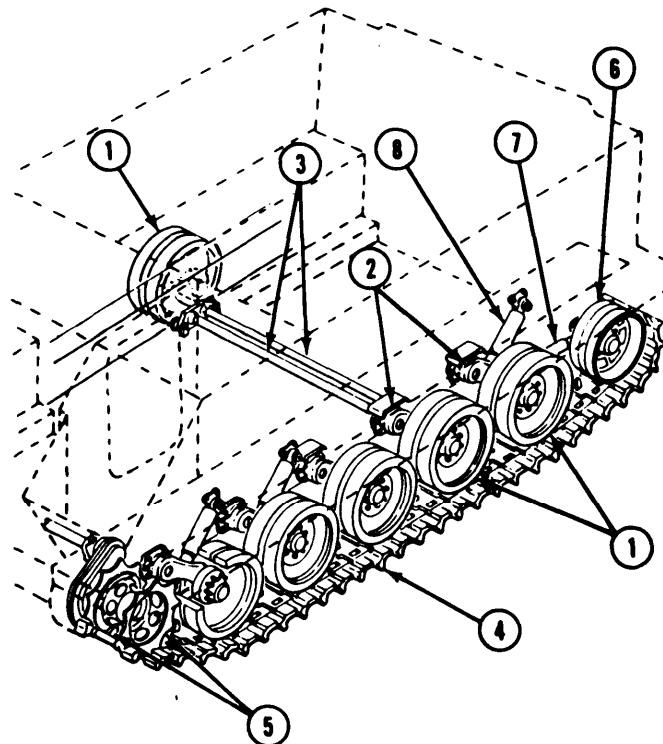
Sprockets (5), mounted on each final drive, power the tracks.

Idler wheels (6), pushed rearward by track adjusters (7), keep the track under tension.

Shock absorbers (8) at first, second, and fifth wheel positions stabilize the carrier.

### NOTE

See page 20-47 for M741A1 lockout suspension system.





## ELECTRICAL SYSTEM (M113A2 AND M1059 ONLY)

The electrical system is designed to sense pressures and temperatures, activate panel indicators, and generate and store electrical energy.

The components and their functions are:

Batteries (1) store a supply of 24 V dc power.

Generator (2) supplies 24 V dc power for the system.

Regulator (3) controls voltage output of the generator.

Starter (4) cranks the engine.

Master switch panel (5) connects electrical power from the batteries to the system. Panel is main junction point for the main harnesses and circuit breakers. Heaters are wired direct to batteries.

Instrument panel (6) contains gages and switches necessary to control carrier.

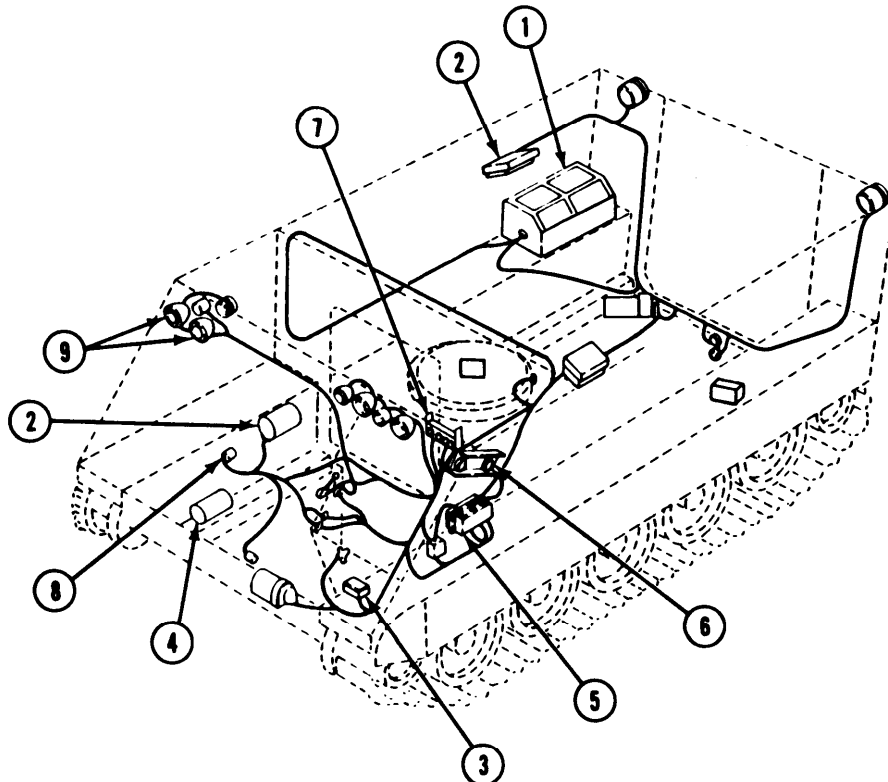
Warning light panel (7) indicates overheating or low oil pressure in major components of power plant.

Wiring harnesses (8) distribute power to engine, transmission, differential, and other components.

Headlights (9) are used for night vision.

### NOTE

See fold outs (FO-1 and FO-2) in the rear of TM for wiring diagram.



## ELECTRICAL SYSTEM (M113A2 AND M1059 ONLY) (cont)

Blackout marker lights (1) and blackout headlight (2) are used for driving in blackout conditions.

Horn (3) is used to alert traffic and personnel.

High beam selector switch (4) raise or lowers light beams.

Infrared power pack (5) power M19 periscope.

Bilge pumps (6) keep bilge clear of water.

Fuel quantity sending unit (7) measure amount of fuel in tank.

Trailer receptacle (8) supplies electrical power to a towed trailer.

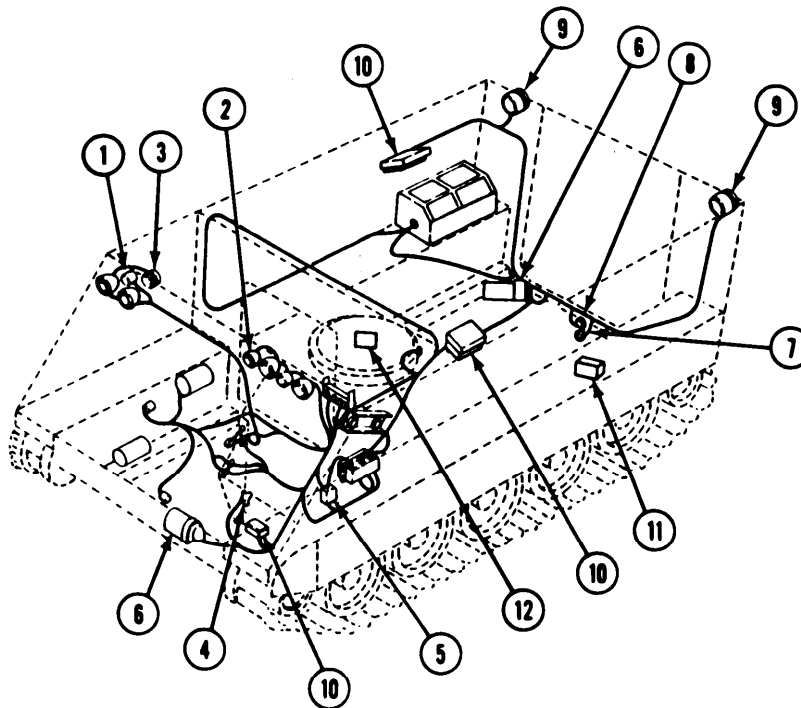
Stop lights (9) indicate brake is on. Tail lights (9) illuminate rear of earner at night.

Dome lights (10) provide night vision inside carrier.

Electrical transient suppressor (11) protects communication system from transients induced by engine starter. The electrical transient suppressor also protects the system from accidental reversal of power leads.

Smoke grenade arming firing unit (12) contains controls for arming and firing smoke grenades.

**NOTE**  
See fold outs (FO-1 and FO-2) in the rear of  
TM for wiring diagram.



## ELECTRICAL SYSTEM (M901A1 ONLY)

The electrical system is designed to sense pressures and temperatures, activate panel indicators, and generate and store electrical energy.

The components and their functions are:

Batteries (1) store a supply of 24 V dc power.

Generator (2) supplies 24 V dc power for the system.

Regulator (3) controls voltage output of the generator.

Starter (4) cranks the engine.

Master switch panel (6) connects electrical power from the batteries to the system. Panel is main junction point for the main harnesses and circuit breakers. Heaters are wired direct to batteries.

Instrument panel (6) contains gages and switches necessary to control carrier.

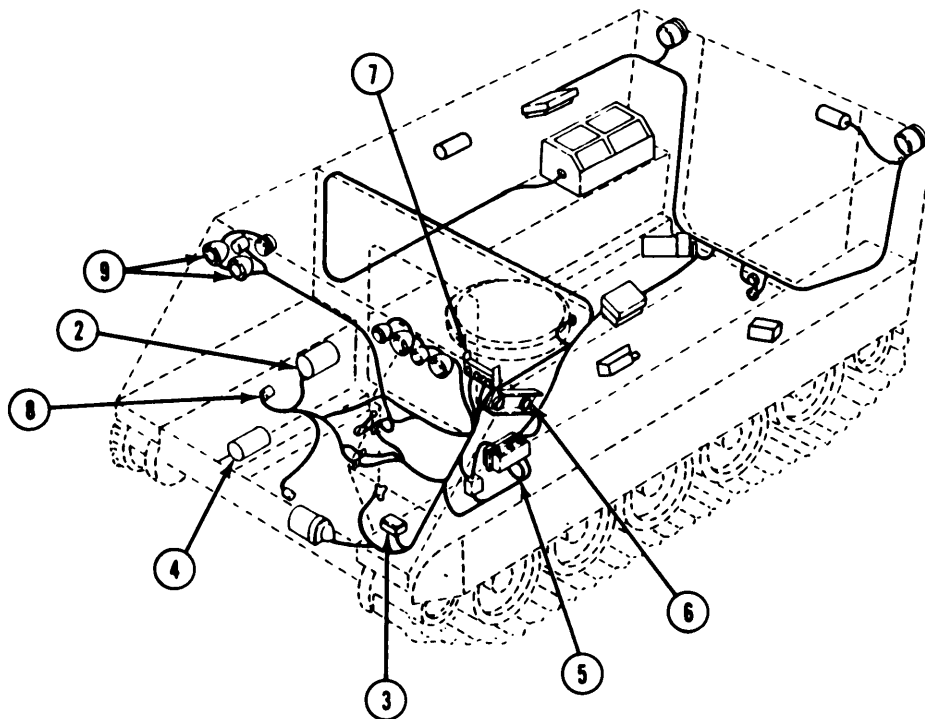
Warning light panel (7) indicates overheating or low oil pressure in major components of power plant.

Wiring harnesses (8) distribute power to engine, transmission, differential, and other components.

Headlights (9) are used for night vision.

### NOTE

See foldout (F04) in the rear of TM for wiring diagram.



## ELECTRICAL SYSTEM (M901A1 ONLY) (cont)

Blackout marker lights (1) and blackout headlight (2) are used for driving in blackout conditions.

Horn (3) is used to alert traffic and personnel.

High beam selector switch (4) raise or lowers light beams.

Inbred power pack (5) power periscope.

Bilge pumps (6) keep bilge clear of water,

Fuel quantity sending unit (7) measure amount of fuel in tank.

Trailer receptacle (8) supplies electrical power to a towed trailer.

Stop lights (9) indicate brake is on. Tail lights (9) illuminate rear of carrier at night.

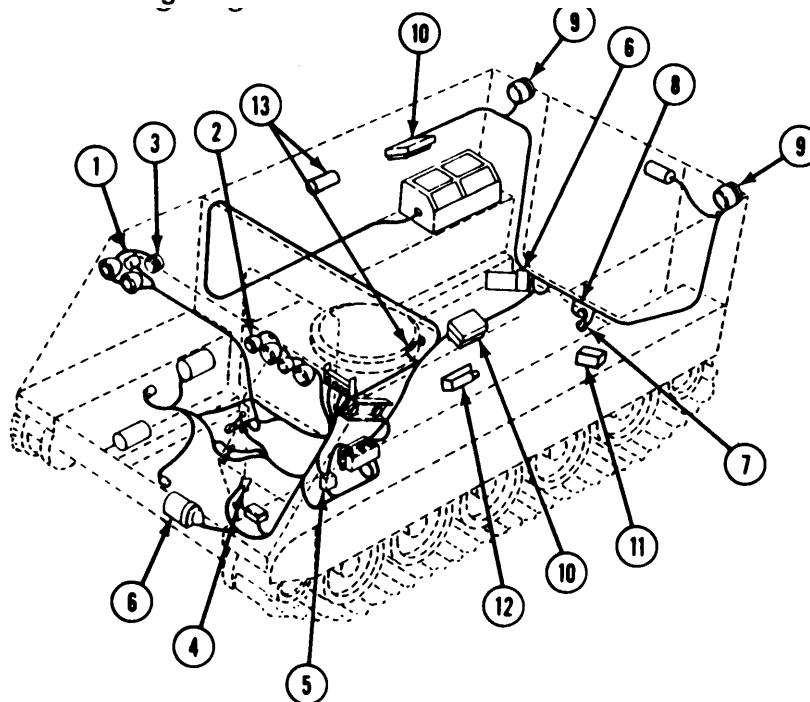
Dome lights (10) provide night vision inside carrier,

Electrical transient suppressor (11) protects communication system from transients induced by engine starter. The electrical transient suppressor also protects the system from accidental reversal of power leads.

Smoke grenade arming firing unit (12) contains controls for arming and firing smoke grenades.

Proximity switch (13) indicator will identify open or closed hatches.

**NOTE**  
See foldout (FO-6) in the rear of TM for  
wiring diagram



## ELECTRICAL SYSTEM (M577A2 ONLY)

The electrical system is designed to sense pressures and temperatures, activate panel indicators, and generate and store electrical energy.

The components and their functions are:

Batteries (1) store a supply of 24 V dc power.

Generator (2) supplies 24 V dc power for the system.

Regulator (3) controls voltage output of the generator.

Starter (4) cranks the engine.

Master switch panel (5) connects electrical power from batteries to the system. Panel is main junction point for the main harnesses and circuit breakers. Heaters are wired direct to batteries.

Instrument panel (6) contains gages and switches necessary to control carrier.

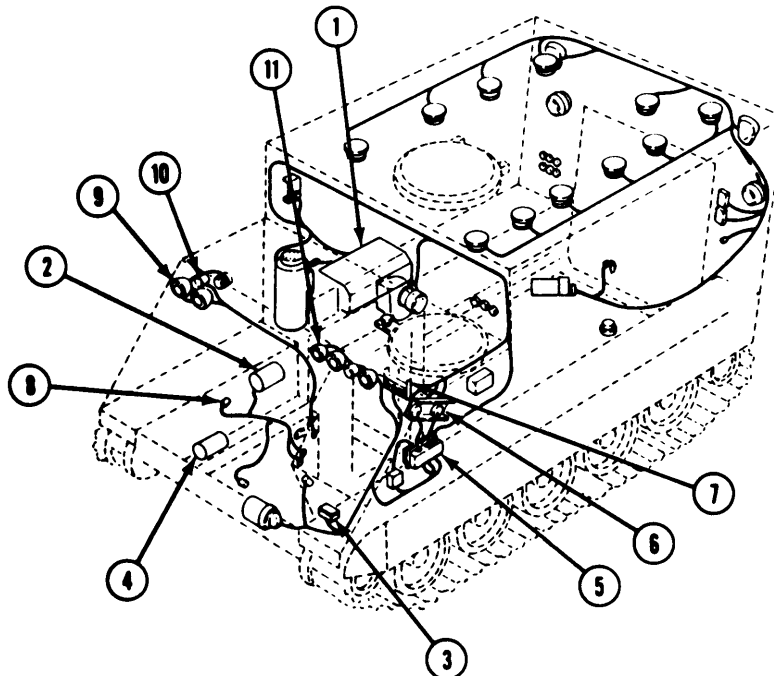
Warning light panel (7) indicates overheating or low oil pressure in major components of power plant.

Wiring harnesses (8) distribute power to engine, transmission, differential, and other components.

Headlights (9) are used for night vision.

Blackout marker lights (10) and blackout headlight (11) are used for driving in blackout conditions.

**NOTE**  
See foldout (FM) in the rear of TM for wiring diagram.



## ELECTRICAL SYSTEM (M577A2 ONLY) (cont)

Horn (1) is used to alert traffic and personnel.

High beam selector switch (2) raise or lowers light beams.

Infrared power pack (3) power periscope.

Bilge pumps (4) keep bilge clear of water.

Fuel quantity sending unit (5) measure amount of fuel in tank.

Trailer receptacle (6) supplies electrical power to a towed trailer.

Stop lights (7) indicate brake is on. Tail lights (7) illuminate rear of earner at night.

Dome lights (8) provide night vision inside earner.

Utility outlet (9) provide 24 V dc power for accessories and the tent lighting.

Communication receptacles (10) provide power for radio and telephone lines.

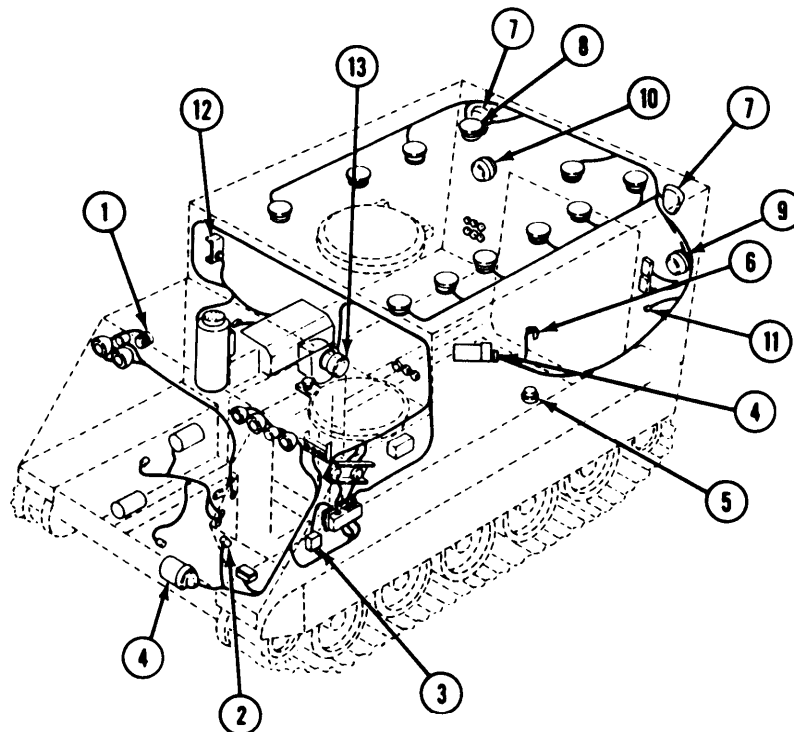
Ramp door switch (11) automatically turns on blackout dome lights when ramp is down or ramp is open.

Generator set power receptacle (12) provides power outlet for lights and communication equipment.

Blower (13) provides forced air circulation to vent personnel compartment.

### NOTE

See foldout (FO-3) in the rear of TM for wiring diagram.



## ELECTRICAL SYSTEM (M1068 ONLY)

The electrical system is designed to sense pressures and temperatures, activate panel indicators, and generate and store electrical energy.

The components and their functions are:

Batteries (1) store a supply of 24 V dc power.

Generator (2) supplies 24 V dc power for the system.

Regulator (3) controls voltage output of the generator.

Starter (4) cranks the engine.

Master switch panel (5) connects electrical power from batteries to the system. Panel is main junction point for the main harnesses and circuit breakers. Heaters are wired direct to batteries.

Instrument panel (6) contains gages and switches necessary to control earner.

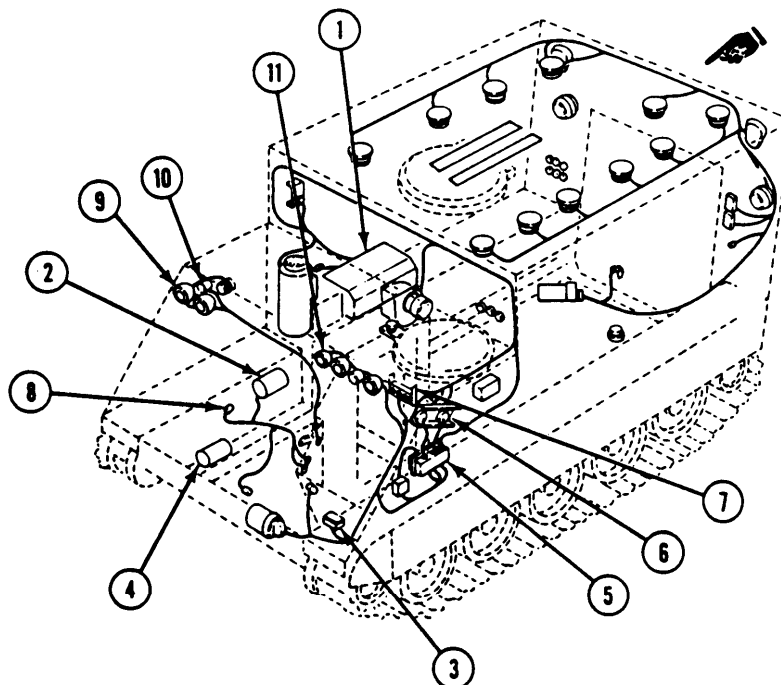
Warning light panel (7) indicates overheating or low oil pressure in major components of power plant.

Wiring harnesses (8) distribute power to engine, transmission, differential, and other components.

Infrared headlights (9) are used for night vision.

Blackout marker lights (10) and blackout headlight (11) are used for driving in blackout conditions.

**NOTE**  
See foldouts (FO-9, FO-10, and FO-11) in the rear of TM for wiring diagrams.



## ELECTRICAL SYSTEM (M1068 ONLY) (cont)

Horn (1) is used to alert traffic and personnel.

High beam selector switch (2) raise or lowers light beams.

Infrared power pack (3) power periscope.

Bilge pumps (4) keep bilge clear Of water.

Fuel quantity sending unit (5) measure amount of fuel in tank,

Trailer receptacle (6) supplies electrical power to a towed trailer.

Stop lights (7) indicate brake is on. Tail lights (7) illuminate rear of carrier at night.

Dome lights (8) provide night vision inside carrier.

Fluorescent lights (9) provide working light.

Utility outlet (10) provide 24 V dc power for accessories and the tent lighting.

Communication receptacles (11) provide power for radio and telephone lines.

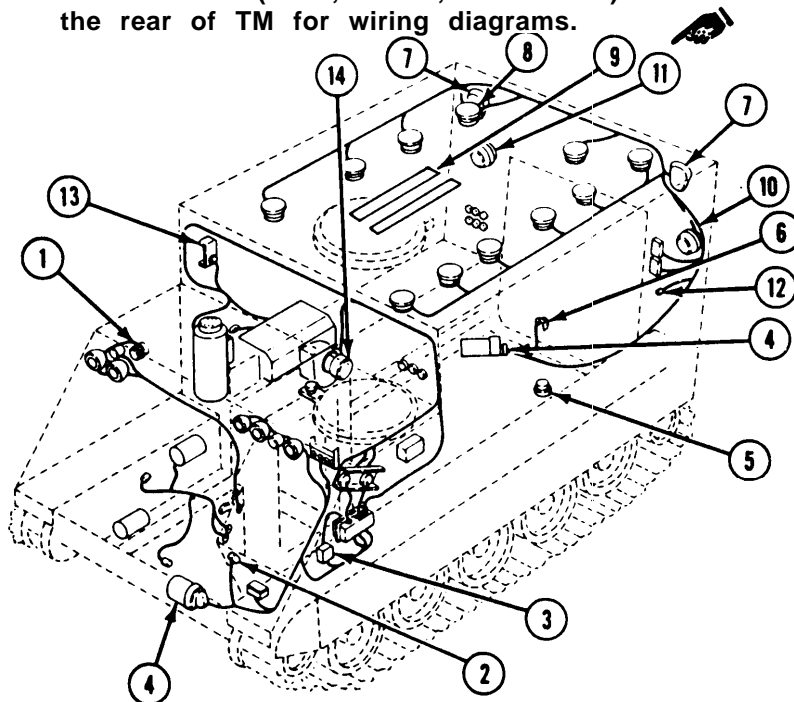
Ramp door switch (12) automatically turns on blackout dome lights when ramp is down or ramp is open.

Generator set power receptacle (13) provides power outlet for lights and communication equipment.

Blower (14) provides forced air circulation to vent personnel compartment.

### NOTE

See fold out (FO-9, FO-10, and FO-11) in the rear of TM for wiring diagrams.





## ELECTRICAL SYSTEM (M125A2, M106A2, AND M1064 ONLY)

The electrical system is designed to sense pressures and temperatures, activate panel indicators, and generate and store electrical energy.

The components and their functions are:

Batteries (1) store a supply of 24 V dc power.

Generator (2) supplies 24 V dc power for the system.

Regulator (3) controls voltage output of the generator.

Starter (4) cranks the engine.

Master switch panel (5) connects electrical power from the batteries to the system. Panel is main junction point for the main harnesses and circuit breakers. Heaters are wired direct to batteries,

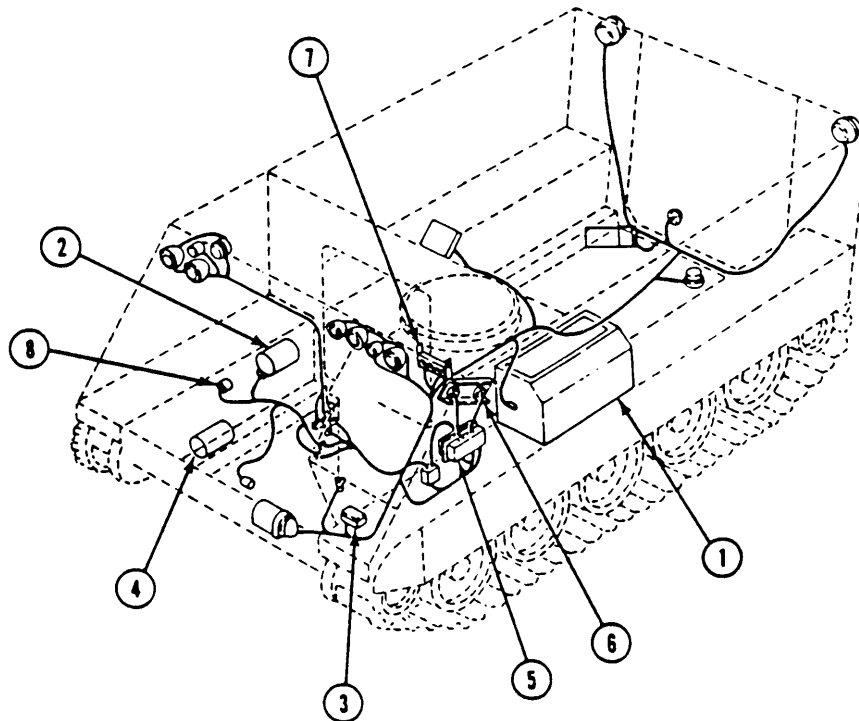
Instrument panel (6) contains gages and switches necessary to control carrier.

Warning light panel (7) indicates overheating or low oil pressure in major components of Power Plant.

Wiring harnesses (8) distribute power to engine, transmission, differential, and other components.

### NOTE

See foldout (FO-4) and (FO-8) in the rear of TM for wiring diagram.



## ■ ELECTRICAL SYSTEM (M125A2, M106A2, AND M1064 ONLY) (cont)

Headlights (1) are used for night vision.

Blackout marker lights (2) and blackout headlight (3) are used for driving in blackout conditions.

Horn (4) is used to alert traffic and personnel.

High beam selector switch (5) raise or lowers light beams.

Infrared power pack (6) power periscope.

Bilge pumps (7) keep bilge clear of water.

### NOTE

M1064 fuel quantity sending unit is in external fuel tanks.

Fuel quantity sending unit (8) measure amount of fuel in tank.

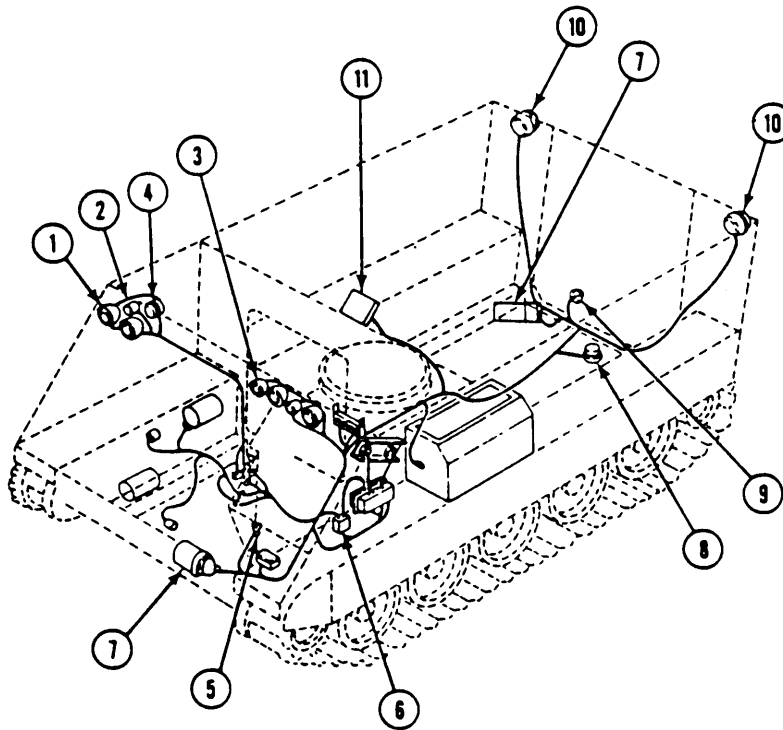
Trailer receptacle (9) supplies electrical power to a towed trailer.

Stop lights (10) indicate brake is on. Tail lights (10) illuminate rear of carrier at night.

Dome lights (11) provide night vision inside earner.

### NOTE

See foldout FO-4 and FO-8 in the rear of TM for wiring diagram.



## ELECTRICAL SYSTEM (M741A1 ONLY)

The electrical system is designed to sense pressures and temperatures, activate panel indicators, and generate and store electrical energy.

The components and their functions are:

Batteries (1) store a supply of 24 V dc power.

Generator (2) supplies 24 V dc power for the system.

Regulator (3) controls voltage output of the generator.

Starter (4) cranks the engine.

Master switch panel (5) connects electrical power from the batteries to the system. Panel is main junction point for the main harnesses and circuit breakers. Heaters are wired direct to batteries.

Instrument panel (6) contains gages and switches necessary to control carrier.

Warning light panel (7) indicates overheating or low oil pressure in major components of power plant.

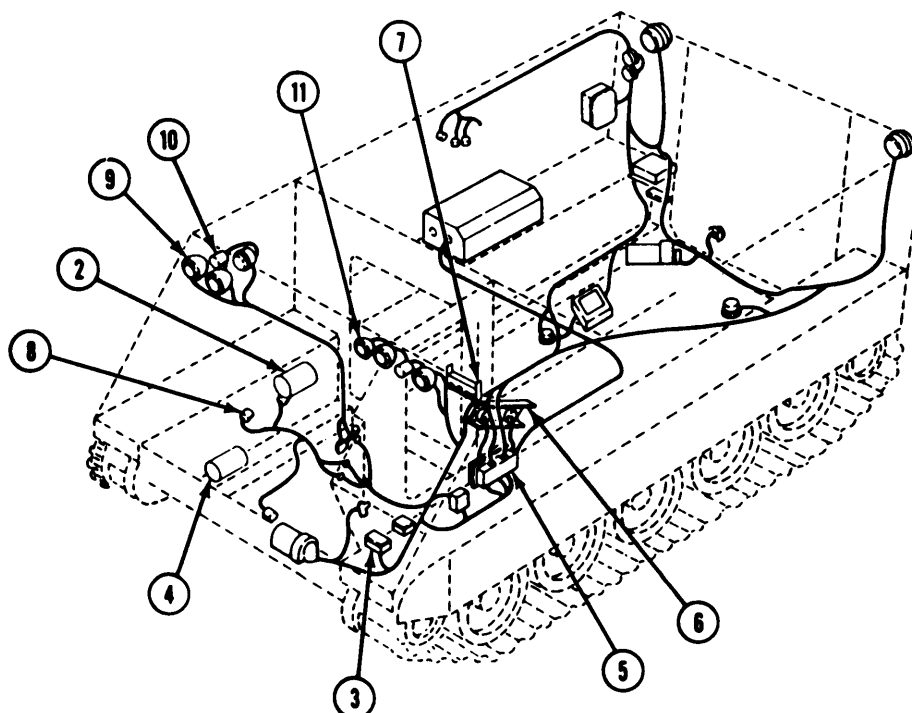
Wiring harnesses (8) distribute power to engine, transmission, differential, and other components.

Headlights (9) are used for night vision.

Blackout marker lights (10) and blackout headlight (11) are used for driving in blackout conditions.

### NOTE

See foldout (FO-6) in the rear of TM for wiring diagram.



## ELECTRICAL SYSTEM (M741A1 ONLY) (cont)

Horn (1) is used to alert traffic and personnel.

High beam selector switch (2) raise or lowers light beams.

Infrared power pack (3) power periscope.

Bilge pumps (4) keep bilge clear of water.

Fuel quantity sending unit (5) measure amount of fuel in tank.

Trailer receptacle (6) supplies electrical power to a towed trailer.

Stop lights (7) indicate brake is on. Tail lights (7) illuminate rear of carrier at night.

Dome lights (8) provide night vision inside carrier.

Auxiliary power unit (APU) diode box (9) allows power to flow from weapon system distribution box (10) and prevents reverse current flow.

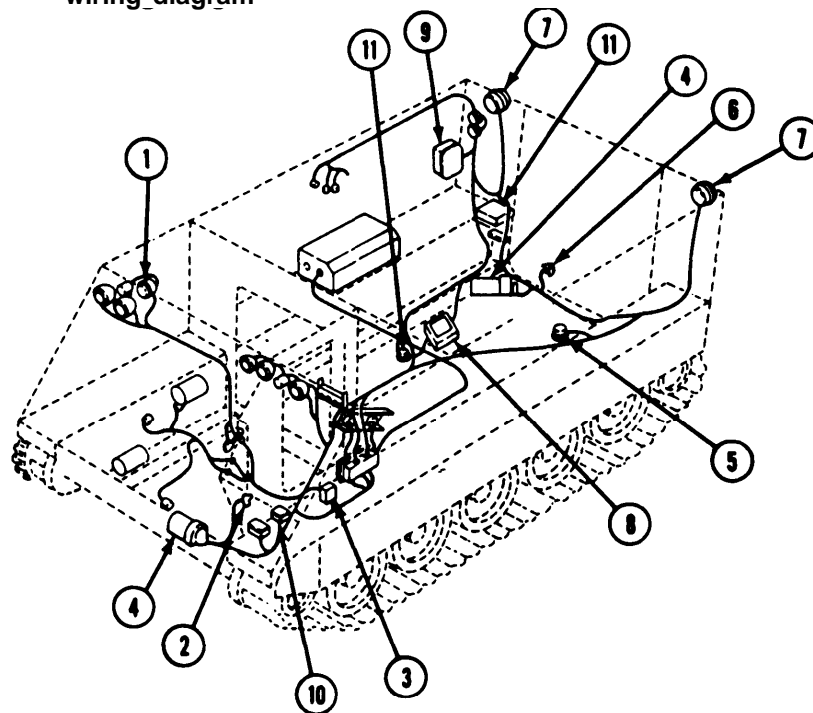
Terminal boards (11) interconnect APU diode box with weapon system distribution box.

Weapon distribution box (10) allows power to flow from APU to carrier starter circuit and prevents reverse current flow.

Driver's and commander's hatch switches (11) prevent gun from firing if either hatch is open.

### NOTE

See foldout (FO-6) in the rear of TM for wiring diagram



## KIT INTEGRATED SYSTEMS

When special purpose kits are installed, their systems and components become integrated with the earner's systems and components. For information on these kits, see:

Artillery Communication Kit (M577A2 Only) (page 37-5).

Capstan Kit (M113A2 and M1059 Only) (page 34-1).

Chemical Agent Automatic Alarm Kit (M113A2 Only) (see Chapter 2, PMCS and page 44-1).

Driver's Windshield Kit (all carriers) (page 30-1).

Electronic Equipment Heater Kit (M577A2 only) (page 31-1).

Engine Coolant Heater Kit (all carriers) (page 32-1).

Litter Kit (M113A2 Only) (page 36-1).

Machine Gun Armor Shield Kit (page 38-1).

Marine Recovery Kit (M113A2 and M1059 Only) (page 35-1).

NBC Kit (page 17-30).

NBC Mounting Hardware Kit (M113A2, M1068, and M577A2 Only) (page 43-1).

Ramp Non-Skid Winterization Kit (M125A2, M106A2, and M1064 Only) (page 33-1).

Turn Signal Kit (M741A1 Only) (page 39-1).

Personnel Heater Kit (all carriers) (page 29-1).

## Section III. SERVICE UPON RECEIPT OF MATERIAL

### SCOPE

This section tells you how to service your carrier when it is first received from a depot. It also give you information on administrative storage.

### GENERAL INSTRUCTIONS

#### CAUTION

**M741A1 (M163 Weapon System) suspension will be damaged if the suspension lockout system is locked while driving. Be sure the suspension lockout system is NOT locked. See your -10.**

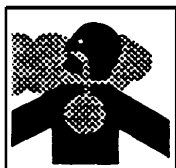
If you find anything wrong during this preliminary check, or during break-in period, report it to your supervisor. These must be correct before carrier can be placed in service.

You are required to report any serious problems which appear to involve unsatisfactory design or material. Prepare the Equipment Improvement Recommendations (EIR) using SF-368, Quality Deficiencies Report, as stated in DA PAM 738-750.

### REPROCESSING CARRIER

All new or reconditioned carriers, when first received by using soldiers, must be reprocessed. Unit mechanics must decide if carrier has been properly prepared for service. The carrier must be in condition to perform its assigned mission.

#### WARNING



**Dry cleaning 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 dry cleaning solvent is 100°F (38°C) and for Type II is 138°F (50°C). Failure to do so may result in injury or death to personnel.**

Remove rust-preventive coatings from all exterior surfaces. Use dry cleaning solvent (Item 13, App C).

Read DD Form 1397 (Processing and Reprocessing record for Shipment, Storage, and Issue of Vehicles and Spare Engines). Follow precautions checked on the form. Form should be in a waterproof cover attached to one of the headlight. A duplicate copy should be in the driver's compartment.

Read all warning tags attached to power plant components and those in the driver's compartment. Follow instructions on these tags.

**SPECIFIC REPROCESSING PROCEDURES**

<b>Item</b>	<b>Action</b>
1. Tiedowns and covers.....	Remove and stow covers. They are reuseable. Do not damage covers. Check with supply personnel about cover disposition.
2. Tape and protective paper.....	Remove and discard from seats, air intake, and exhaust grills, and all lamp lenses.
3. Basic issue items .....	Unpack and stow on carrier (TM 9-2350-261-10, TM 9-2350-300-10, or TM 9-2350-259-10. Report any missing items.
4. Tools and hardware .....	Clean and degrease.
5. Batteries.....	Install batteries in earner (page 13-16 or 13-18). Check electrolyte and add distilled water as needed.
6. Drain plugs .....	Install and tighten (pages 24-34 and 24-35).
7. Drive belts .....	Restore tension Water pump (page 8-9). Generator (page 9-29 or 9-47). Fan (page 8-35).
8. Engine, transfer gearcase, differential final drives, and fan.....	Check lubricant levels. Check drain plugs and filters for leaks (LO 9-2350-261-12, LO 9-2350-300-13, or LO 9-2350-259-12). Tighten all plugs and hose connections.
9. DD Form 1397.....	Check for correct viscosity. This tag should be in driver's compartment attached to a steering lever or the range selector.
10. Fuel.....	Fill tanks with diesel fuel (TM 9-2350-261-10, TM 9-2350-300-10, TM 9-2350-259-10, or TM 9-2350-266-10). Check for fuel leaks at filler, drain cocks, drain plugs, quick disconnects, filters, and pump.

- 11. Start engine ..... Check immediately for fuel leaks and oil leaks (TM 9-2350-259-10, TM 9-2350-261-10 or TM 9-2350-300-10). Disregard smoky exhaust for first few minutes of operation. Some rust-preventive fuel will be in the system and will burn along with the regular fuel.
- 12. Semi-annual check ..... Perform all semi-annual checks and service required for your carrier (page 241).
- 13. Road test ..... See TM 9-2350-261-10, TM 9-2350-300-10, or TM 9-2350-259-10 for proper operating instructions. Become familiar with all controls and instruments before you road test. Drive a new or reconditioned carrier at least 5 to 10 miles (8 to 16 km). Make sure carrier operates normally. Don't start out too fast, or drive too fast. You'll overload the engine or power train. Stop at least every mile. Look for overheated hubs, loose parts, and fuel or oil leaks. After the road test, the earner is ready for regular soldier use.

**ADMINISTRATIVE STORAGE**

Instructions for administrative storage of your earner are contained in the following documents:

<u>Specification</u>	<u>Applicable Carriers</u>
MIL-C-45360G(AT)	M113A2, M106A2, M125A2, M1064, & M1059
MIL-C-46746D(AT)	M577A2 & M1068
MIL-C-62074C(AT)	M741A1
MIL-C-62327A(AT)	M901A1 TOW Vehicle (Less TOW Weapon)



## Section IV. GENERAL MAINTENANCE INSTRUCTIONS

### SCOPE

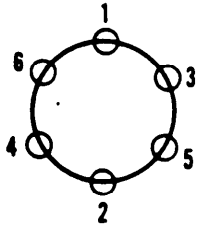
This section contains safety warnings, guidelines, and general maintenance instructions. They should be followed when doing maintenance procedures.

### PREPARATION FOR MAINTENANCE

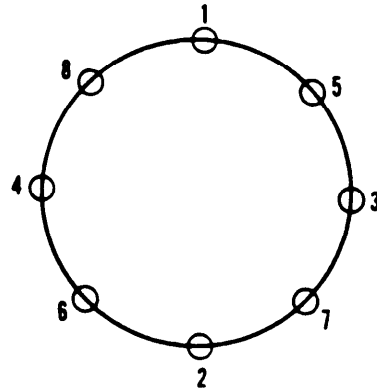
- a. **PERSONNEL SAFETY.** Practice all shop safety procedures and read all warnings in this manual.
- b. **PROPER EQUIPMENT.** Get tools and equipment before starting a maintenance task. See Chapter 2, Section 1, TM9-2350-261-24P, and the maintenance task for tools, equipment, parts, and materials.
- c. **WHAT TO DISCARD.** Parts to discard, such as lock washers, locknuts, and gaskets, are listed in the maintenance tasks. If the step does not say to discard a part, the part should be saved. It may be used later or repaired.
- d. **HANDLING TECHNIQUES.**
  - (1) Avoid damage to parts during removal, cleaning, inspection, repair, and installation procedures. Nicks, scratches, and dents caused by careless handling could result in equipment failure.
  - (2) Dirt can damage parts and cause malfunctions. Make sure all air and fluid openings, lines, and hoses are capped or plugged during maintenance procedures.
- e. **IDENTIFICATION.**
  - (1) During removal, tag parts to ensure proper assembly.
  - (2) During removal, tag leads on electrical parts to ensure proper assembly. Tag each lead as it is removed.

f. *TORQUING*. Where needed, torque values are listed in the maintenance task. When torquing, use one of the star pattern sequences below unless otherwise stated in the maintenance task.

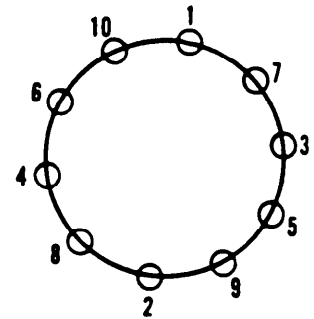
**6-HOLE PATTERN**



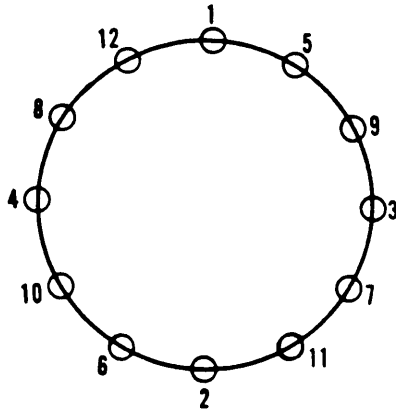
**8-HOLE PATTERN**



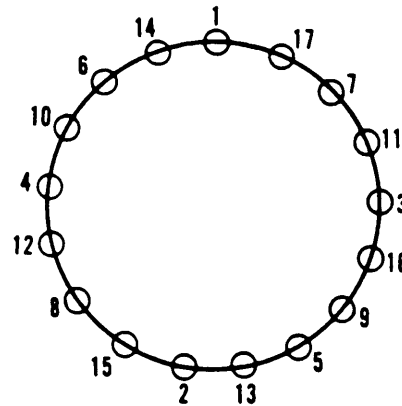
**10-HOLE PATTERN**



**12-HOLE PATTERN**



**17-HOLE PATTERN**



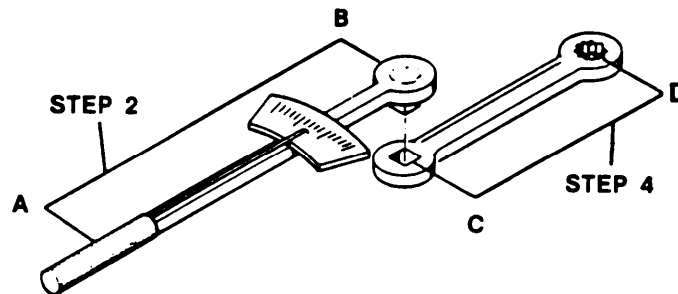
*g. USE OF TORQUE WRENCH ADAPTERS AND THE CONVERSION FORMULA.*

(1) Torque wrench adapters (extensions) are used to tighten screws and nuts to specific values that cannot be reached with a regular socket on the end of a torque wrench. This makes the dial or scale reading less than the actual torque applied to the screw or nut. When using an adapter, determine the dial or scale reading as follows:

- Step 1. Check your manual for specific torque value to which the screw or nut should be tightened.
- step 2. Measure the length of your torque wrench from the center of the handle (point A) to the center of the socket (point B). Record this measurement.
- step 3. Multiply the above measurement by the desired torque. Record this product.
- step 4. Measure length of adapter from socket end (point C) to screw or nut end (point D). Record this measurement.
- step 5. Add length of adapter (step 4) to the length of torque wrench (step 2). Record this sum.
- Step 6. Divide the product recorded in step 3 by the sum found in step 5.
- step 7. The value found in step 6 is your torque wrench setting. Set your dial.

**NOTE**

**Setting the torque wrench dial at the reading found in step 7 will deliver the required torque at the end of your adapter.**



Example: Metric equivalents deleted for clarity.

- step 1. 40 lb-ft required.
- step 2. 12 inches.
- step 3.  $12 \times 40 = 480$  lb-ft.
- step 4. 4 inches.
- step 5.  $12 + 4 = 16$  inches.
- step 6.  $\frac{480}{16} = 30$  lb-ft.
- step 7. Torque wrench dial setting = 30.

## CLEANING

- a. *GENERAL*. Cleaning is very important. All parts must be cleaned well and kept clean during maintenance. Dirt or foreign matter can cause malfunctions and equipment failure. General cleaning procedures are detailed in steps b through n. Special cleaning procedures are covered in the task relating to the specific part.
- b. *CLEAN EVERY PART*. Clean every part well after removal and before you install them. Clean parts such as housings, covers, and dipsticks before removal. Avoid getting dirt and foreign matter in a system.
- c. *HANDLE WITH CARE*. Use care when handling parts during cleaning and maintenance. Nicks, scratches, dents, or burns can prevent proper assembly or cause malfunctions after assembly.
- d. *AVOID ABRASIVES*. Except where called for in a task, don't use abrasives, files, wire brushes, or sharp tools. On some surfaces, finish is important to the operation of closefitting parts.

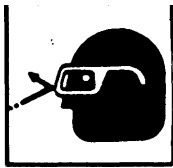
### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- e. *REMOVAL AGENTS*. Remove gum or old grease deposits by soaking parts in dry cleaning solvent (Item 13, App C). Scrub with a brush. Use crocus cloth to remove minor surface defects.

### WARNING



Air under pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

### CAUTION

Lye or caustic mixtures will damage metal surfaces. Do not use lye or caustic mixtures to clean metal surfaces.

- f. *STEAM CLEANING*. If steam cleaning is used, dry clean parts at once with compressed air. Apply a thin film of clean oil to surfaces that are not painted to prevent rusting. Never use lye or caustic mixtures that will corrode or etch metal surfaces.
- g. *LUBRICATION OF NEW BEARINGS*. See TM 9-214 for cleaning and lubrication procedures. Bearings that have been in service should also be lubricated.

h. **CLEANING INSTRUCTIONS.** Care is needed in all cleaning procedures. Dirt can damage parts and cause malfunctions. When you perform any cleaning procedure, do the following:

- (1) Inspect and cap all air and fluid openings, lines, and hoses,

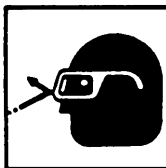
**WARNING**



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- (2) Clean all parts before inspection, after repair, and before assembly. Use dry cleaning solvent (Item 13, App C) or approved cleaner. Dry parts with wiping rag (Item G1, App C).

**WARNING**



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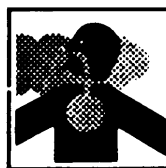
**CAUTION**

Lye or caustic mixtures will damage metal surfaces. Do not use lye or caustic mixtures to clean metal surfaces.

- (3) Keep hands free of grease; grease collects dirt.
- (4) After cleaning, cover or wrap parts to protect from dirt.

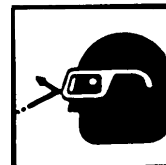
i. **CASTINGS.**

**WARNING**



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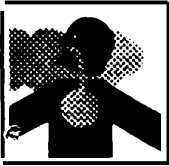
**WARNING**



Air pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

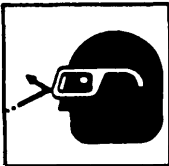
- (1) Clean inner and outer surfaces of casting with dry cleaning solvent (Item 13, App C). Dry casting with compressed air.
  - (2) Remove sludge and gum deposits with stiff brush.
  - (3) Blow out all tapped holes with compressed air.
- j. *BALL BEARINGS*. Bearings require special cleaning techniques. See TM 9-214 for cleaning and maintenance procedures for ball bearings.
- k. *BATTERIES*. See TM 9-6142-200-14 to service batteries.
- l. *OIL PASSAGES*.
- (1) Make sure oil passages are not clogged.
  - (2) Clean oil passages with brass wire probes to break up any sludge or gum deposits.

**WARNING**



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**WARNING**



Air pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

- (3) Flush oil passages with dry cleaning solvent (Item 13, App C). Dry parts with compressed air.

m. *OIL SEALS, ELECTRICAL CABLES, AND FLEXIBLE HOSES*.

**CAUTION**

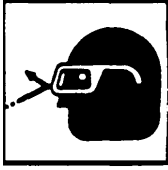
Cleaning solvent causes leather, rubber, and synthetic materials to become brittle. Do not use cleaning solvent to clean seals, cables, and flexible hoses.

**CAUTION**

Clean seals, cables, and flexible hoses with general purpose detergent (Item 17, App C) and water. Dry parts with wiping rag (Item 61, App C).

n. *INSERTS*. Blow out insert holes with compressed air.

**WARNING**



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**WARNING**



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o. *GASKETS*. If a gasket is being removed, scrape old gasket material **and** sealant off mating surface. Clean mating surface with dry cleaning solvent Item 13, App C). Dry with wiping rag Item 61, App C).

**INSPECTION**

Au removed parts must be inspected with care. Replace parts if damage or wear exceeds allowable limits.

- a. *GENERAL*. Procedures for inspection will be the same for most parts. General inspection procedures are given in steps b through p below. Special inspection procedures are covered in the task as needed.
- b. *CASTINGS*.
  - (1) *Inspect all castings* and forgings for breaks, cracks, and wear or scoring that would impair function.
  - (2) Inspect machined surfaces for nicks, burs, and raised metal. Mark damaged areas for repair.
  - (3) Use straightedge to check all mounting flanges on housings and supports for bends. Inspect mating flanges for stains which would indicate oil leakage.
  - (4) Inspect all threaded parts for damaged or stripped threads.
- c. *NEEDLE ROLLER BEARINGS*. Inspect bearings for free and smooth rotation and broken or missing rollers. Also look for tightness of fit in bearing bores. Inspect bearing races for wear and color changes due to heat. See TM 9-214 for inspection procedures.
- d. *STUDS*. Inspect all studs for stripped or damaged threads, bent or loose condition, and signs of stretching.
- e. *GEARS*. Inspect gears for burs, wear, cracked or broken teeth, and pitting at tooth contact areas.
- f. *BUSHINGS AND BUSHING-TYPE BEARINGS*.
  - (1) *Check all bushings* and bushing-type bearings for secure fit in casting. Check for color changes which could mean overheating. Inspect for size, scoring, out-of-roundness, burs, sharp edges, and signs of seizing.
  - (2) Check for dirt in oil holes and in bushing-type bearings. Oil holes and grooves must be clean and not damaged.

g. *OIL SEALS.*

- (1) *Inspect feather edge* of oil seals for tears, fraying, hardening, and cracking.
- (2) Replace metal-covered oil seals when there are signs of damage or oil leakage.

h. *CORE HOLE PLUGS.* Inspect core hole plugs for signs of leakage. Replace damaged core hole plugs.

i. *INSERTS.*

- (1) Inspect inserts for cracks and stripped or damaged threads.
- (2) Check inserts for loose fit.

j. *GREASE SEALS, PREFORMED PACKINGS, AND GASKETS.*

- (1) Inspect seals that are composition-type, rings, and preformed packings for wear, brittleness, cracks, cuts, and damage.
- (2) Inspect lip seals for cracks, wear, cuts, and brittleness. Inspect springs and seal shells for damage.
- (3) Gaskets and seals on electrical parts maybe reused. Inspect gaskets and seals for wear, nicks, cuts, and torn or missing gasket material. Replace gasket if needed.

k. *SPLINED PARTS.* Inspect splined parts for burrs, wear, twisted, cracked, or broken splines.

l. *THREADED PARTS.* Inspect all threaded parts for burrs and stripped or damaged threads.

m. *RETAINING RINGS.* Inspect retaining rings for nicks, burrs, defects, loss of tension, and wear.

n. *SPRINGS.* Inspect springs for wear, defects, breaks, and loss of tension or compression. Inspect springs using a spring tester.

o. *SHAFTS AND SPINDLES.* Inspect shafts and spindles for excessive wear, binding, scores, cracks, and burrs.

p. *ELECTRICAL PARTS.*

- (1) Inspect electrical parts before you install them. Look for mildewed, corroded, or burned parts.
- (2) Inspect electrical parts for pinched or loose wires and for cracked or broken wires, circuit cards, relays, and connectors.
- (3) Inspect insulation and heat shrink tubing for cracks, tears, burns, or missing material.

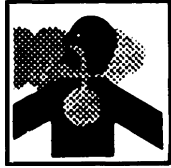
## **REPAIR**

- a. *GENERAL.* General repair procedures are given in steps b through 1 below. Special repairs are covered in the task. After repair, clean all parts well.



**b. CASTINGS.**

- (1) Replace all cracked or broken castings.

**WARNING**

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- (2) Repair minor damage to machined surfaces of castings with crocus cloth. Replace any part with defects that cannot be corrected or which will impair function.
- (3) Repair minor surface bends by working bent surface of casting across sheet of crocus cloth on surface plate. Replace bent castings which would impair assembly or function.

c. **BALL BEARINGS.** See TM 9-214 for inspection and maintenance for ball bearings.

d. **NEEDLE ROLLER BEARINGS.** See TM 9-214 for inspection and maintenance of needle roller bearings.

e. **BUSHINGS AND BUSHING-TYPE BEARINGS.** Replace. Replace bushings and bushing-type bearings if they are loose, scored, or have color change due to heat. When you replace bushings and bushing-type bearings, check nearby parts for damage or wear.

f. **OIL SEALS.** *Oil seals* must be replaced when thin feather edge is damaged or when seal material is brittle.

- (1) Press damaged oil seal from casting. Be careful not to damage bore.

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- (2) When oil seal bore is damaged so an oil-tight seal is impossible, replace casting or adapter. Remove alight nicks, burs, and scratches with crocus cloth dipped in dry cleaning solvent (Item 13, App c).
- (3) Install new oil seal in casting bore or adapter using suitable oil seal replacement tool.

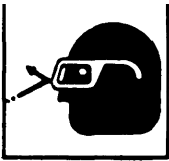
g. **GREASE SEALS, PREFORMED PACKINGS, AND GASKETS.**

- (1) Replace seals which show signs of wear, brittleness, cracks, and damage.
- (2) Replace defective lip seals, springs, and seal shells.
- (3) Preformed packings and gaskets should be replaced when removed unless otherwise stated in the maintenance task. They should not be reused.

- h. *THREADED PARTS*. Replace all parts that have stripped or damaged threads. Replace parts that cannot be repaired by chasing threads with a used tap or die.
- i. *RETAINING RINGS*.
  - (1) Replace retaining rings that have defects.
  - (2) Some retaining rings are beveled on one side. When installing this type of ring, the beveled side must face the part to be retained.
- j. *SPRINGS*. Discard springs that have defects. Load and height inspection data, where needed, are given in maintenance procedures.

**WARNING**

**Air pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.**



k. *SHAFTS AND SPINDLES*.

- (1) Replace shafts and spindles that show signs of wear, binding, scores, cracks, burrs, or clogged oil passages.
- (2) Remove obstructions with compressed air or by probing with soft wire.
- (3) Remove burrs and minor surface defects with a crocus cloth.

1. *ELECTRICAL PARTS*.

- (1) Replace corroded or burned parts and parts which show signs of mildew.
- (2) Tighten loose connections.
- (3) Replace cracked or broken wires, circuit cards, relays, and connectors.
- (4) Replace cracked, torn, or burned insulation and heatshrink tubing.

**FLUID LEAKS AND CHECKING FOR LEAKS**

a. **GENERAL**. Fluid leaks in hoses and fluid lines affect the carrier parts operation. The types and classes of leaks are given below.

CLASS I Fluid Seepage is not great enough to form drops, but is shown by wetness or color changes.

CLASS II Fluid leakage is great enough to form drops. Drops **do** not drip from the item being checked or inspected.

CLASS III Mud leakage is great enough to form drops that fall from the item being checked or inspected.

**NOTE**

**You are allowed to operate equipment with minor leaks (Class I or II). You must consider how much fluid the item or system being checked or inspected can hold. When in doubt, notify your supervisor. Any fuel or Class 111 leaks will make the vehicle NOT READY/ AVAILABLE.**

- b. **CHECKING FOR LEAKS AFTER A MAINTENANCE TASK.** After doing maintenance on a part which involves hoses or fluid lines, check for leaks. If leaks occur after you have done a replace or repair task, find the source of the leak, Correct the problem. Follow these procedures.
- (1) Do visual inspections to find the source of the leak.
    - (a) Check for cracks on housing or cover.
    - (b) Check that screws and any connections are not loose or overtight.
  - (2) If you cannot see the source of the leak, repeat the maintenance task. Check the items listed below as you repeat the task.
    - (a) Check that preformed gasket is not bent, or pinched.
    - (b) Check machined surfaces for fit and cleanliness.
    - (c) Install new" replacement parts.
  - (3) After you repeat the task and install a new part, the leak could persist. If so, report the problem to your supervisor.
- c. **CHECKING FOR LEAKS USING CHALK TEST.** Following replacement, repair, or adjustment of a ramp, door, hatch cover, access panel, or rubber seal, check for leaks by performing a chalk test. Use the following procedures.
- (1) Use chalk or chalk powder to coat area around seal.
  - (2) Close ramp, door, hatch cover, or panel.
  - (3) Open ramp, door, hatch cover, or panel.
  - (4) Check for unbroken chalk line on mating surface. Where chalk does not stick to mating surface, there is a leak in the seal surface.
  - (5) If a leak is found, perform adjustment to correct the problem.

## **WARM-UP ENGINE**

To warm up the engine for a maintenance or troubleshooting task, do the following:

1. Cover air inlet grill.
2. Start engine. See your -10.
3. Lock steering levers.
4. Move gear selector to 2-3 range. Do not release steering levers.
5. Raise engine speed to 1500 rpm until normal operating temperature is reached.
6. Lower engine rpm to idle.
7. Move gear selector to NEUTRAL.
8. Stop engine. See your -10.
9. Uncover air inlet grill.

## Section V. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

### SCOPE

This section details preventive maintenance checks and services (PMCS) required for the unit maintenance level. For crew level PMCS, see your -10.

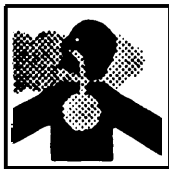
### MAINTENANCE FORMS AND RECORDS

The forms and records you fill out have many uses. They are a permanent record of the services, repairs, and changes made to your carrier. They also tell you whether faults have been repaired. For information on forms and records, see DA Pamphlet 733-750.

### PMCS PROCEDURES

- a. Obey all WARNINGS and CAUTIONS when you do PMCS.
- b. Name, caution, and instruction plates should be easy to read: If they are dirty or corroded, clean them, and coat them with lacquer. See TM 43-0139 for instructions.
- c. Perform all lubrication in accordance with LO9-2350-261-12, LO9-2350-259-12, and LO 9-2350-300-13.
- d. If something doesn't work, troubleshoot it using the troubleshooting procedures beginning on page 3-1 of this manual.
- e. Do the semiannual PMCS every 1500 miles (2400 km) of operation or no later than 6 months after the last semiannual PMCS.
- f. Always do your PMCS in the same order so it gets to be a habit. With practice, you'll spot anything that is wrong.
- g. Keep your earner clean. Dirt, grease, oil, and debris only get in the way, and may cover up a serious problem. Clean your carrier as you work and as needed.

### WARNING



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- h. Use dry cleaning solvent (Item 13, App C) on metal surfaces. Use general purpose detergent (Item 17, App C) and water when you clean rubber or plastic parts.
- i. You need to know how fluid leaks affect your carrier. Definitions of the types and classes of leaks are given below. You need to know them to determine the condition of your earner. Learn them. REMEMBER: WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR!

**T M 9 - 2 3 5 0 - 2 0 - 1**

- CLASS I      Seepage of fluid is not great enough to form drops, but is shown by wetness on the assembly or item.
- CLASS II     Leakage of fluid is great enough to form drops, but drops do not drip from item being checked or inspected.
- CLASS III    Leakage of fluid is great enough to form drops that fall from the item being checked or inspected.

**NOTE**

**The carrier may continue to operate with minor water or oil leaks (Class I or II). You must consider how much fluid the item or system being checked or inspected can hold. When in doubt, notify your supervisor. Any fuel or Class III leaks will make the carrier NOT MISSION CAPABLE.**

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If
1	Semi-Annual	Road Test	<p style="text-align: center;"><b>NOTE</b></p> <p>Be sure that all operator level PMCS in your -10 have been completed prior to performing this PMCS. Any non-mission capable faults must be corrected prior to road test. Check instruments, gages and warning lights for normal indications as outlined in your -10. All operator recorded deficiencies should be reviewed prior to road test.</p> <p>Perform a road test. Drive carrier at least 5 miles (8 km).</p> <p style="text-align: center;"><b>NOTE</b></p> <p>When conditions prevent a road test, perform engine idle test (page 2-43), governed no load test, and stall check (page 2-44).</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Do not allow engine to operate for prolonged periods if : outside air temperature is less than 85° F (29° C) and coolant temperature gage is above 200° F (93° C). Outside air temperature is above 85° F (29° C) and coolant temperature gage is above 230° F (110° C). Serious damage to engine may result.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Power plant can be damaged. Do not pivot steer when carrier is moving except in a track failure emergency.</p>	<p>Any Class III leak or damage that would prevent operation of carrier.</p>
a	Semi-Annual	Left and Right Steering	<p>Check steering levers for left and right turns. If carrier does not turn left or right when lever is applied, troubleshoot lever adjustment.</p>	<p>Binding, grabbing, unusual noise, vibration, or carrier fails to turn.</p>

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If
b	Semi-Annual	Steering in Forward and Reverse Range	Check steering in forward range and in reverse range. If earner does not make a complete turn after steering levers are pulled to the left and right, troubleshoot steering system (page 3-176).	Binding, grabbing, unusual noise, vibration or earner fails to turn.
c	Semi-Annual	Carner Braking	Check earner braking. If carrier does not stop when steering levers are fully depressed, troubleshoot differential brake adjustment (page 3-176).	Carrier fails to stop.
d	Semi-Annual	Carner Shifting in All Ranges	<p>Check shifting of carrier in all ranges. If carrier does not respond properly to selected driving range, troubleshoot gear selection system (page 3-1 77).</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Failure to lock the steering levers and block the road wheels can allow the carrier to move and could result in injury or death. Always lock the steering levers and block road wheels before working on the carrier.</b></p>	Carrier fails to shift into selected range.
2	Semi-Annual	After Road Test	<p>Immediately after road test, cautiously feel all wheel and idler hubs for noticeable difference in temperature between hubs. An overheated hub indicates that bearing is out of adjustment, poorly lubricated, or damaged.</p> <p>Check temperature of shock absorbers. They should be warm. A cold shock is faulty.</p> <p>Visually check inside, outside, and underneath of carrier for fuel, oil, or hydraulic leaks.</p>	Any Class III leak or cold shocks.



Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
3	Semi-Annual	Idle Test	<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p><b>Avoid lengthy engine idling. This causes coolant temperature to drop below operating temperatures and can shorten engine life.</b></p> <p>Run engine at 800 rpm for 3-5 minutes with range selector in 2-3 range and brakes locked until normal operating temperature is reached.</p> <p>If outside air temperature is less than 85°F (29°C), normal operating temperature should be 160° to 200° F (71° to 93°C). If outside air temperature is greater than 85° (29°C, normal operating temperature should be 160° to 230°F (71° to 110°C).</p> <p>With range selector in N, engine should idle smoothly at 650 to 700 rpm.</p> <p>High or low engine idle speed is usually caused by accelerator linkage being out of adjustment. Adjust linkage if necessary (page 23-34).</p> <p>Rough idling is usually caused by faulty injector timing and rack setting, faulty injectors, or air in the injection system. Contact next higher level maintenance.</p>	<p>Engine runs hot or rough.</p>

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
4	Semi-Annual	Governed No-Load Test	<p>Run engine at 800 rpm for 3-5 minutes with range selector in 2-3 range and brakes locked until normal operating temperature is reached.</p> <p>If outside air temperature is less than 85° F (29°, normal operating temperature should be 160° to 200° F (71° to 93°C If outside air temperature is greater than 85° (29°C, normal operating temperature should be 160° to 230° F (71° to 110°C.</p> <p>With engine quick-disconnect lever in NEUTRAL, slowly open throttle control until accelerator is fully depressed.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p><b>When you suspect a faulty governor, do not exceed 3,000 rpm engine speed for more than 2 or 3 seconds.</b></p> <p>Engine speed may exceed 3,000 rpm momentarily, but should stabilize at 2,925 to 2,975 rpm.</p>	Governor cuts in and out, or surges at this speed, adjustments are needed. Notify higher maintenance level.
5	Semi-Annual	Stall Check	<p>The stall check will tell you if the power plant is producing maximum power. If it is not, the check will tell you whether the engine or transmission is at fault.</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>If check fails and a faulty tachometer is suspected, verify tachometer reading by performing STE-ICE check number 10 (page 3-284) before sending to next higher level of maintenance.</b></p> <p>Run engine at 800 rpm for 3-5 minutes with range selector in 2-3 range and brakes locked until normal engine operating temperature is reached</p> <p>If outside air temperature is less than 85° C (29° C), normal operating temperature should be 160° to 200° F (71° to 93° C).</p>	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
5	Semi-Annual	Stall Check  Continued	<p>If outside air temperature is greater than 85° F (29° C, normal operating temperature should be 160° to 230° F (71° to 110° C.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p><b>Limit stall test to 30 seconds. Lengthy full throttle operation with brakes locked creates high oil temperatures and will damage engine and transmission. If you suspect a faulty governor, do not perform stall check.</b></p> <p>With brakes locked, move range selector to the 2-3 range and push accelerator all the way down. Tachometer reading of 1900 to 2100 rpm indicates power plant is operating correctly.</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Extremely high ambient temperature and high altitude will lower stall speed.</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Use STE-ICE to verify the Tachometer is calibrated or to get a reading when performing a stall check. See page 3-284 for STE-ICE Test 10 Engine RPM.</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>If check fails and a faulty tachometer is suspected, verify tachometer reading by performing STE-ICE check number 10 (page 3-284) before sending to next higher level of maintenance.</b></p> <p>Tachometer reading above 2100 rpm indicates transmission problems.</p> <p>Tachometer reading below 1900 rpm indicates a faulty engine. Troubleshoot fuel system (page 3-30). Check for correct vehicle tachometer adapter. If no fault can be found, contact next higher level of maintenance.</p>	<p><b>Tachometer above 2100 rpm or below 1900 rpm.</b></p>

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
6	Semi-Annual	Engine and Transmission  Continued	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Hot parts can burn you. Use care when working near hot components.</b></p> <p><b>With engine at idle, sample engine oil and transmission oil.</b></p> <p style="text-align: center;"><b><u>HARDTIME</u></b></p> <p>Hardtime interval may be shortened if equipment operates under adverse conditions (for arctic operations, refer to FM 9-207; for desert operations, refer to FM 90-3).</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>If AOAP laboratory is not available, drain engine oil and change filter element/gaskets every 1500 miles or annually. Transmission oil should be drained and filter element/gaskets changed every 150 hours/1500 miles or semi-annually.</b></p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p><b>Engine and transmission can be damaged if filled above the full (F) mark on the gage rods.</b></p> <p style="text-align: center;"><b><u>ON CONDITION</u></b></p> <p>To drain engine or transmission oil, remove bottom access cover and drain plug. Inspect oil for metal particles. Replace engine or transmission oil filters each time an oil change is required. If metal chips are found, notify Direct Support maintenance. See TM 9-2350-261-20, pages 4-3 or 18-8 for removal of oil filters.</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Remove the driver's side access panel to replace engine oil filter. Transmission oil filter is replaced through the bottom access cover.</b></p>	Hardtime interval exceeded.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If
6	Semi-Annual	Engine and Transmission  Continued	<p style="text-align: center;">NOTE</p> <p><b>Drain oil only when hot after operation. Allow oil to drain for one hour if time permits. Do not mix OE/HDO-15 W 40 with single grade lubricants.</b></p> <p style="text-align: center;">NOTE</p> <p><b>Visual inspection of engine/transmission should not be justification to change oil. Detergent oils may appear dark in color due to additives. Change oil and filters when converting from OE/HDO to OEA, PE30-1 and from OE/HDO, PE10-1 to OE/HDO. See engine and transmission temperature key charts on Lubrication Table.</b></p> <p>Clean inside of engine filter cover or transmission filter cavity with dry cleaning solvent (PD-680, Type II, Item 13, Appendix C).</p> <p>Install new engine filter element/gasket, or transmission element/packings (see TM 9-2350-261-20, page 4-7 or 18-9).</p> <p>Refill engine and check oil level with approximately 18 quarts of OE/HDO or OEA. Bring level between full and low marks on gage rod. Start and run engine and check for oil leaks.</p> <p>Refill transmission with approximately 16 quarts of OE/HDO or OEA after oil change. Start and run engine and operate transmission through all gear selector positions.</p> <p>Engine and transmission operational check: run engine and check for oil leaks at filter and drain plug IAW TM 9-2350-261-10. Inspect access covers on hull bottom and replace gasket or cover if required.</p>	<p>Any Class III leaks.</p> <p>Any Class III leaks.</p>

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If
7	Semi-Annual	Track Pin/Nuts	Check track pin nuts for looseness or cracks. Replace cracked nuts. Check track pins for stripped threads. Replace stripped track pins. Tighten loose nuts to 115-135 lb-ft (156-183 N.m) torque. Use torque wrench (Item 96, Appendix D).	Any pin/nuts that are cracked, broken, bent, stripped, missing or protruding.
8	Semi-Annual	Track Grouser	Check grouser for wear or cracks on both tracks. Replace track shoe if grouser measures less than 1/8" (3mm) in height or is cracked.	Grouser is worn below 1/8" or cracked.

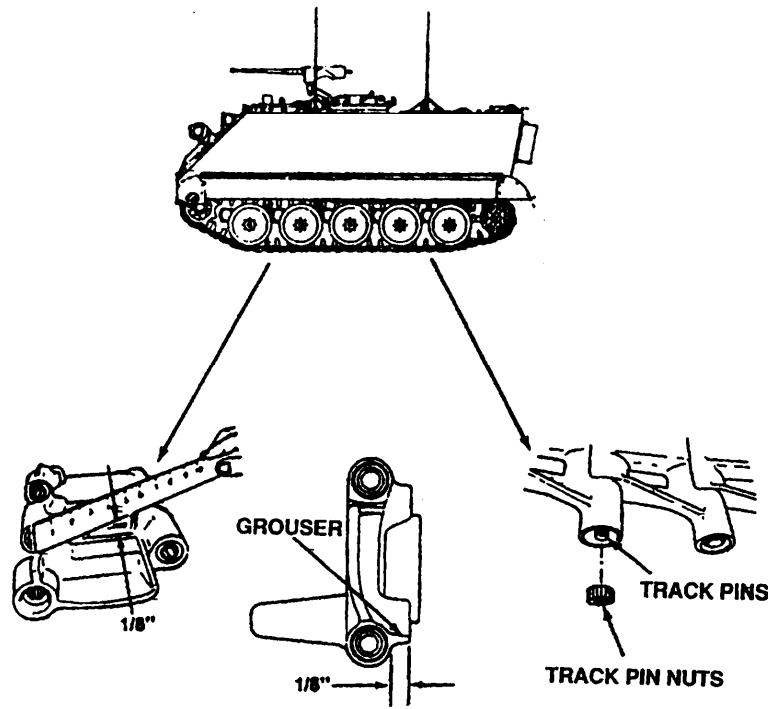


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No..	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
9	Semi-Annual	Track Shoe Pads and Mounting Studs/ Nuts	Check track shoe pads and mounting nuts for looseness and stripped threads on both tracks. If mounting nuts are stripped, replace track shoe pad (page 22-6). Tighten loose nuts to 135-155 lb-ft (183-210 N.m) torque. Use torque wrench (Item 96, Appendix D).	Studs/nuts are cracked, stripped, missing, or pad height is less than 1/16" above grouser.

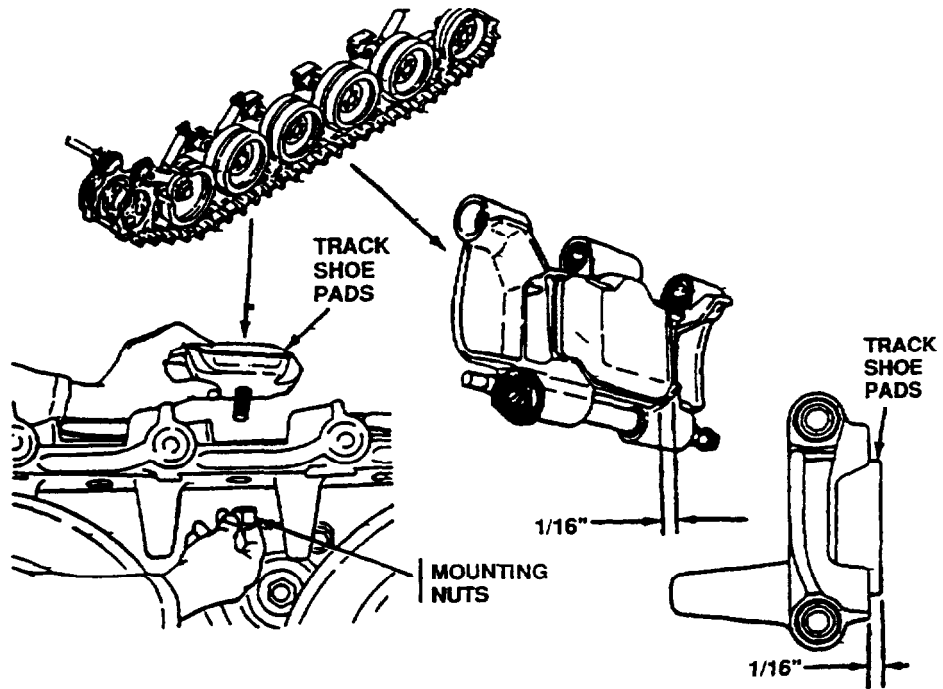


Table 2-1 Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
10	Semi-Annual	Track Tension Adjuster Mounting Hardware	<p>Replace adjuster if either end is cracked or broken (page 22-24). Replace broken adjuster mount (page 22-24).</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;"><b>See page 2-29 for proper use of torque wrench adapters.</b></p> <p>Replace missing track tension adjuster mount screws (page 22-24). Tighten loose screws to 130-140 lb-ft (176-190 N.m) torque. Use adapter (Item 6, Appendix D) and torque wrench (Item 96, Appendix D).</p>	<b>Hardware is broken, cracked, missing or stripped. Any class II or III leaks.</b>
11	Semi-Annual	Track Tension Adjuster Collar Leaks	Replace leaking track adjuster (page 22-24).	Any leaks or fitting will not accept grease.

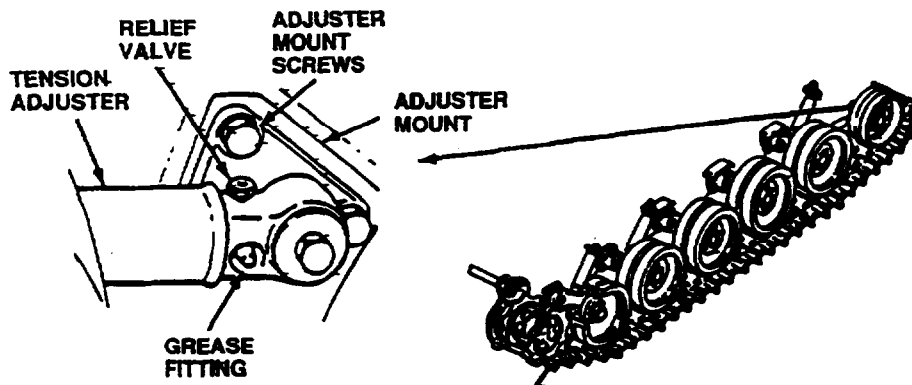


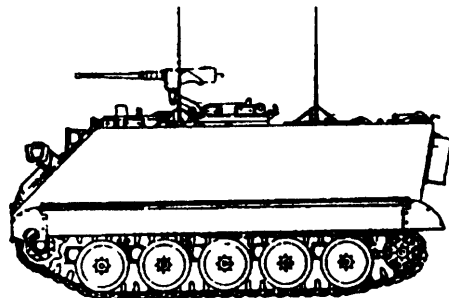


Table 2-1. Unit Level Preventive Maintenance Checks and Services for MI13A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
12	Semi-Annual	Sprocket Mounting Screws	<p>Tighten loose screws to 110-115 lb-ft (149-156 N.m) torque. Use torque wrench (Item 96, Appendix D).</p> <p>Replace cushions if gouges, chips, or cuts cause thumping (page 22-30).</p> <p>Replace or reverse any worn sprocket (page 22-30) that won't pass your -10 PMCS inspection.</p>	Any screws are missing, loose or worn.
13	Semi-Annual	Sprocket Hub Screws	<p>Tighten loose sprocket hub screws to 170-190 lb-ft (231-258 N.m) torque. Use torque wrench (Item 98, Appendix D). If screws are missing, replace (page 22-30).</p>	Any screws are missing, loose or worn.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
14	Semi-Annual	Final Drive	<p>Tighten loose final drive-to-hull screws to 75-85 lb-ft (101-115 N.m) torque. Use torque wrench (Item 97, Appendix D).</p> <p>Drain final drives every 1500 miles or semi-annually. Remove and inspect drain plugs from bottom of housing.</p> <p>Inspect oil and drain plugs for metallic particles. If chips are found, notify Direct Support maintenance.</p> <p>Refill final drives with OE/HDO or OEA (approximately 3-1/2 quarts) as applicable. Check oil level for proper amount between full and add marks on the gage rods.</p>	<p>Oil is contaminated with metal chips or particles.</p>



DRIVE-TO-HULL SCREWS

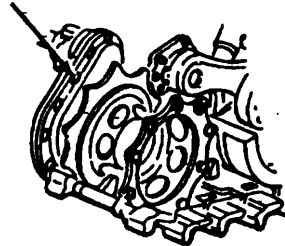


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
15	Semi-Annual	Idler and Road Wheel Arms	Replace cracked or bent idler or road wheel arms (page 22-12, 22-20 or 22-22). Replace idler or road wheel arm relief valves and grease fittings if leaking (pages 22-12,22-20, or 22-22). Replace leaking road wheel arm seals and gaskets (page 22-12).	Any bent, broken or cracked arm or leaking seal.
16	Semi-Annual	Idler and Road Wheel Mounting Nuts	Check idler and road wheel mounting nuts for looseness. Tighten loose nuts to 150-170 lb-ft (203-230 N.m) torque. Use torque wrench (Item 98, Appendix D).	Any missing or stripped nuts.
17	Semi-Annual	Idler/Road Wheels and Idler/Road Wheel Hubs	<p>Replace cracked, broken or bent idler/road wheels and idler/road wheel hubs (page 22-7, 22-9, 22-16, or 22-17). Refer to page 2-54 for road wheel components.</p> <p>At each service, or whenever track is removed, adjust wheel bearings if looseness or end play is shown (page 22-9 or 22-17).</p> <p>Replace leaking seals and gaskets (page 22-9 or 22-17).</p>	<p>Any broken, bent or cracked idler/road wheels or leaking hub seals.</p> <p>Number 1 and/or number 5 road wheel bearings loose.</p>

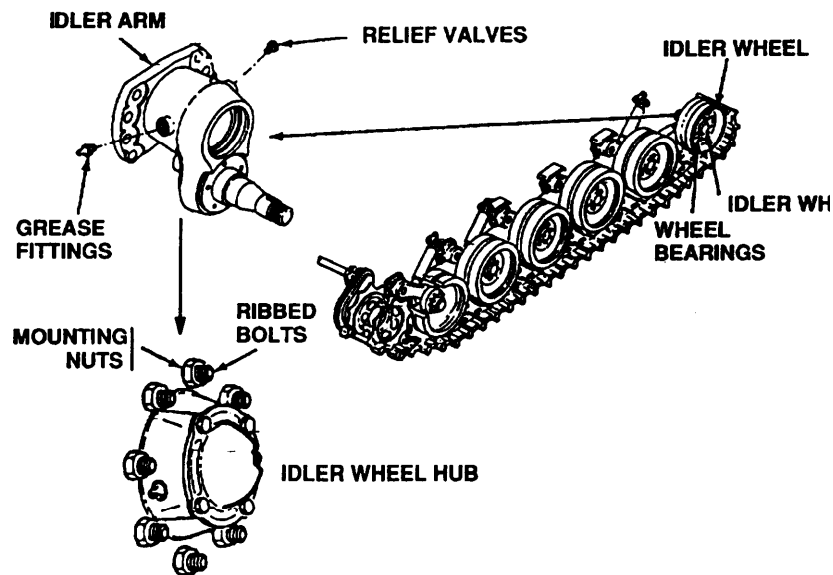


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
17	Semi-Annual	Idler/Road Wheels and Idler/Road Wheel Hubs  Continued	Replace grease fittings and relief valves if they are leaking (page 22-9 or 22-17).	Any leaking grease fittings are found.
18	Semi-Annual	Idler and Road Wheel Hub Ribbed Bolts	Replace bent, broken or stripped idler/road wheel hub ribbed bolts (page 22-9 or 22-16). Refer to page 2-53 for idler components.	Any broken, bent or stripped bolts.

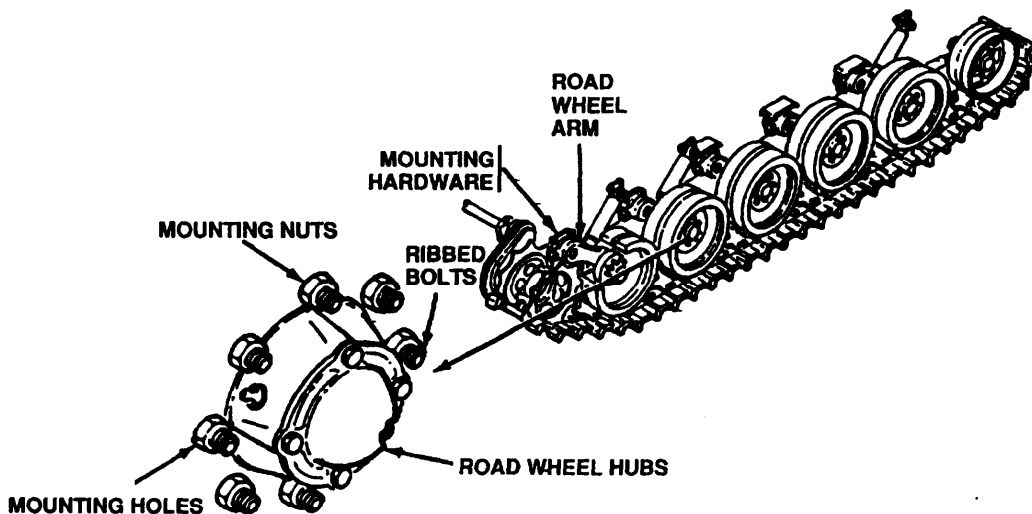


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable It:
19	Semi-Annual	Road Wheel <b>Arm</b> Mounting Hardware	Tighten loose road wheel arm mounting hardware to 130-140lb-ft (176-190 N.m) torque. Use torque wrench (Item 96, Appendix D).	Any loose mounting hardware.
20	Semi-Annual	Road Wheel Mounting Holes	If road wheel mounting holes extend beyond head of mounting nut, replace road wheel (page 22-9).	Any elongated holes that extend beyond mounting nuts.

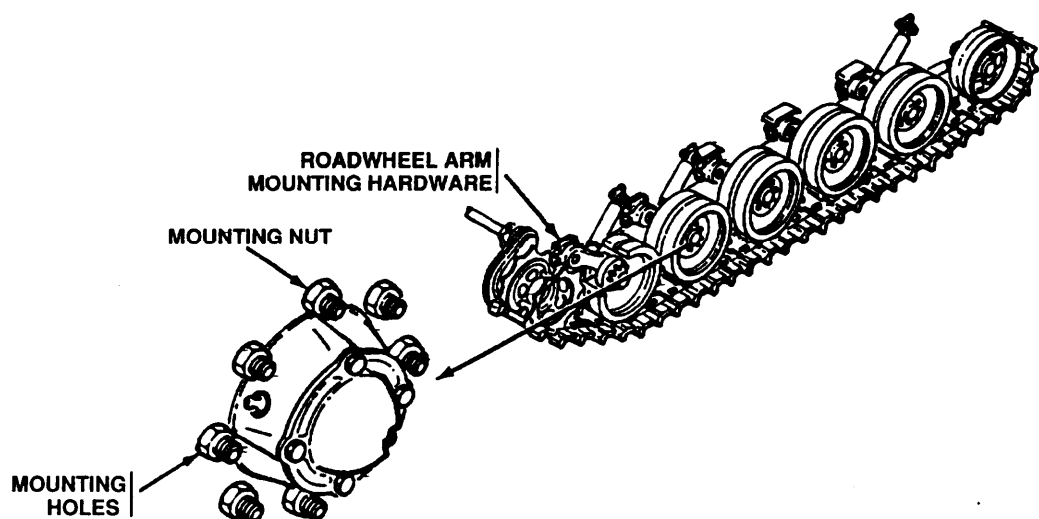


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
21	Semi-Annual	Torsion Bar Anchors/ Splines/ End Plugs	<p>Remove floor plates (page 24-36). Check torsion bar anchors, splines, and end plugs in arm and box beam for looseness on both sides of earner. If loose, tighten screw.</p> <p>Check plugs. Be sure they are fully seated. Tighten plug to 50-75 lb-ft (68-102 N.m) torque. Use torque wrench (Item 97, Appendix D).</p> <p>Replace missing or damaged cotter pins and pins or bolts from torsion bar anchors (page 22-36).</p>	Any broken, bent, missing, stripped torsion bars or attaching hardware.

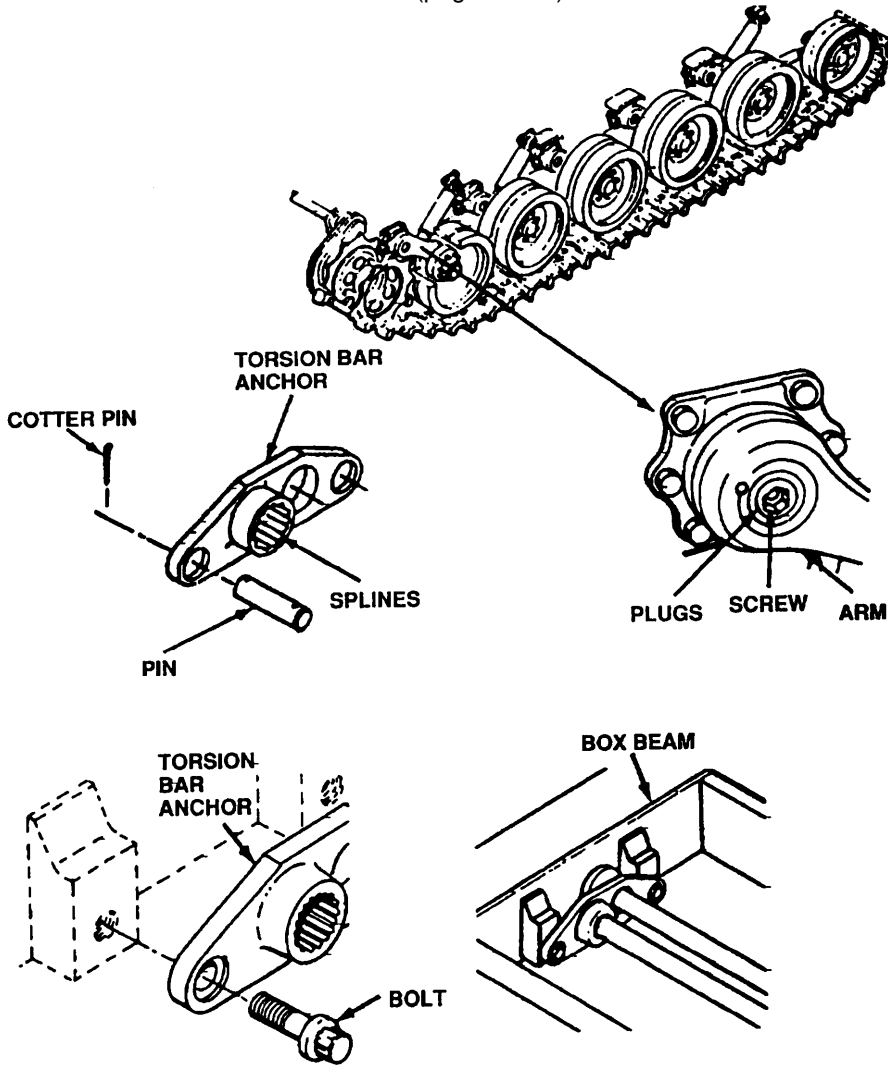


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
22	Semi-Annual	Shock Absorber	<p>Check shock absorber for dents or cracks. Replace shock absorber that is bent, broken, cracked or dented enough to hinder operation (page 22-26).</p> <p>Replace shock absorbers if they have Class III fluid leaks or loose fitting bearings (page 22-26).</p>	Any cracked, broken, bent or missing shocks, dents that hinder shock operation, or Class III fluid leaks.
23	Semi-Annual	Shock Absorber Mounting Hardware	Check shock absorber mounting hardware for looseness. Tighten loose hardware to 130-140 lb-ft (176-190 N.m)torque. Use torque wrench (Item 96, Appendix D).	
24	Semi-Annual	Shock Absorber Bracket Mounting Hardware	Check shock absorber bracket mounting hardware for looseness. Tighten loose hardware to 130-140 lb-ft (176-190 N.m) torque. Use torque wrench (Item 96, Appendix D).	

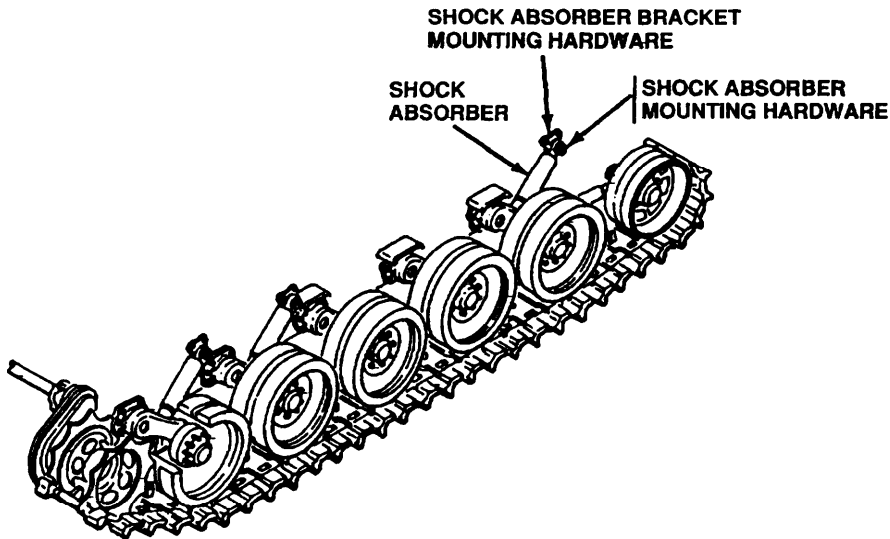


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
25	Semi-Annual	Suspension Lockout Cylinders (M741A1 only)	Replace leaking suspension lockout cylinders (page 28-74)	
26	Semi-Annual	Track Shroud	Replace torn shrouds. Tighten or replace loose or missing hardware. Repair bent shroud clamps.	
27	Semi-Annual	Flotation Pods (M741A1 only)	Repair or replace flotation pods that have bulging foam (page 24-215).  Tighten all flotation pod mounting screws.	

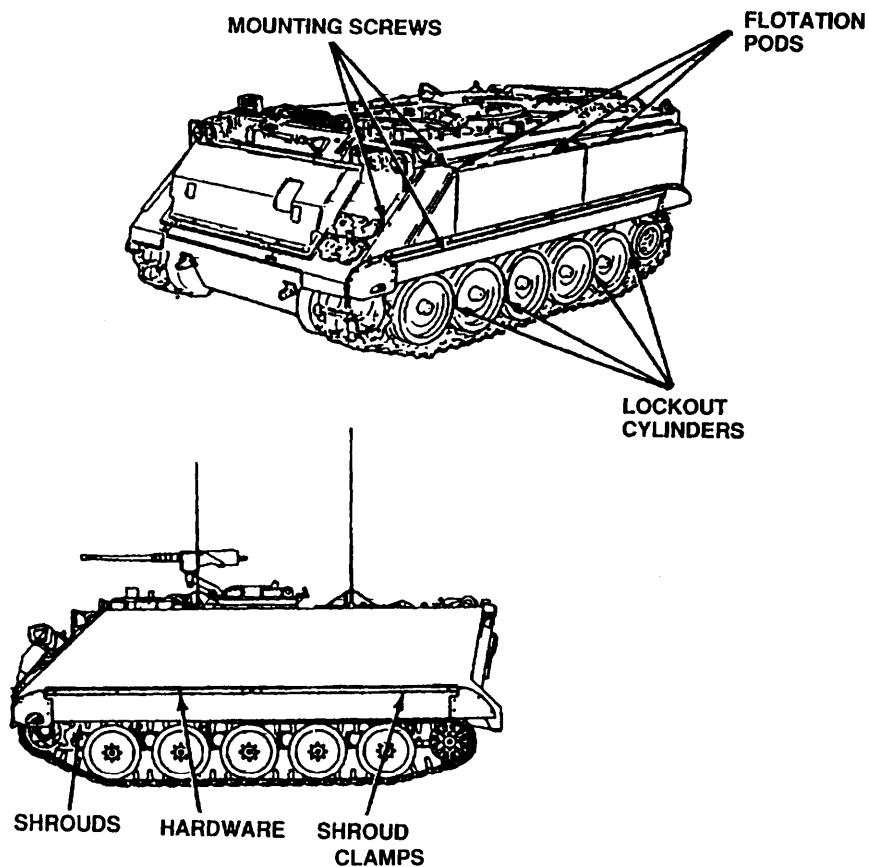




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
28	Semi-Annual	Mortar Base and Bridge Stowage Brackets (M106A2 only)	<p>Replace missing pin on base locking clamp (page 24-255).</p> <p>Replace clamp that binds (page 24-255).</p> <p>Replace cracked, cut or hard bridge bumpers (page 24-256).</p> <p>Repair or replace bridge lock that binds or has damaged locking pin (page 24-256).</p>	
28.1	Semi-Annual	Master Base and Bridge Stowage Brackets (M1064 Only)	<p>Ensure that bracket (1) closes and locks properly. Check bracket (1, 2) for cracks. Tighten or replace base or missing bolts on brackets (1, 2).</p>	

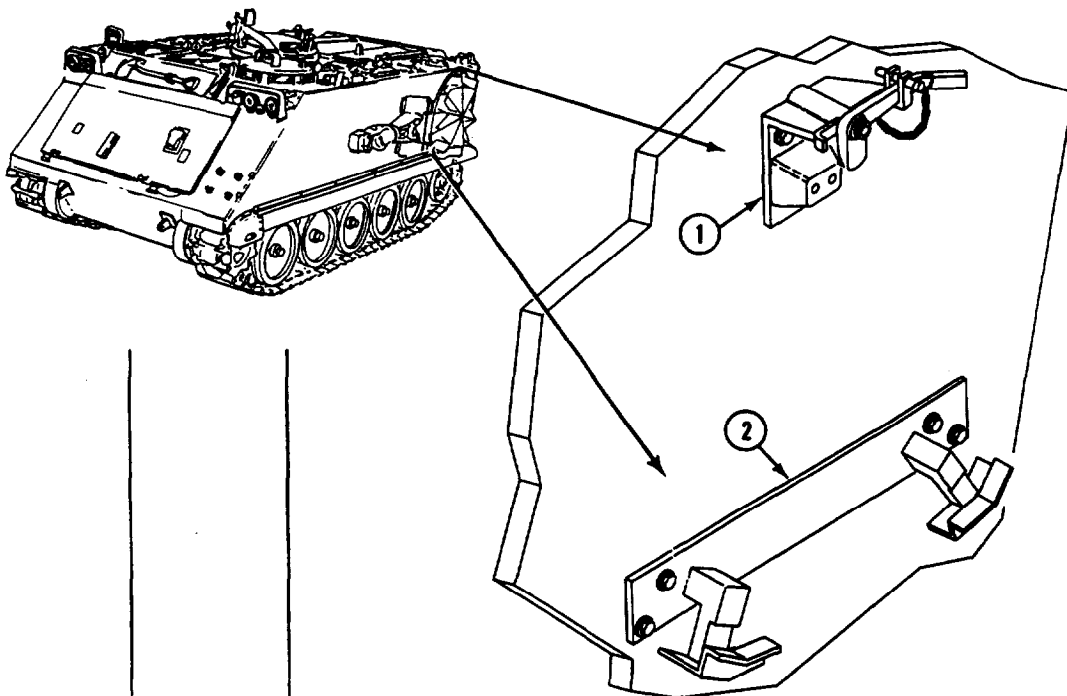


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
29	Semi-Annual	Generator Set Enclosure (M577A2 only)	<p>Tighten or replace loose or missing screws on enclosure to 55-60 lb-ft (75-81 N.m) torque. Use torque wrench (Item 97, Appendix D).</p> <p>Replace damaged enclosure (page 24-118).</p>	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
30	Semi-Annual	Fuel Filler Screen and Cap	<p style="text-align: center;"><u>WARNING</u></p> <p><b>Dry cleaning solvent P-D-680 is toxic and flammable. Always open in area with good air flow, away from sparks, heat or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.</b></p> <p>Check filler cap vent. If dirty, clean with dry cleaning solvent (Item 13, Appendix C).</p> <p>Attach or replace loose, broken or missing keeper chain on filler cap.</p>	

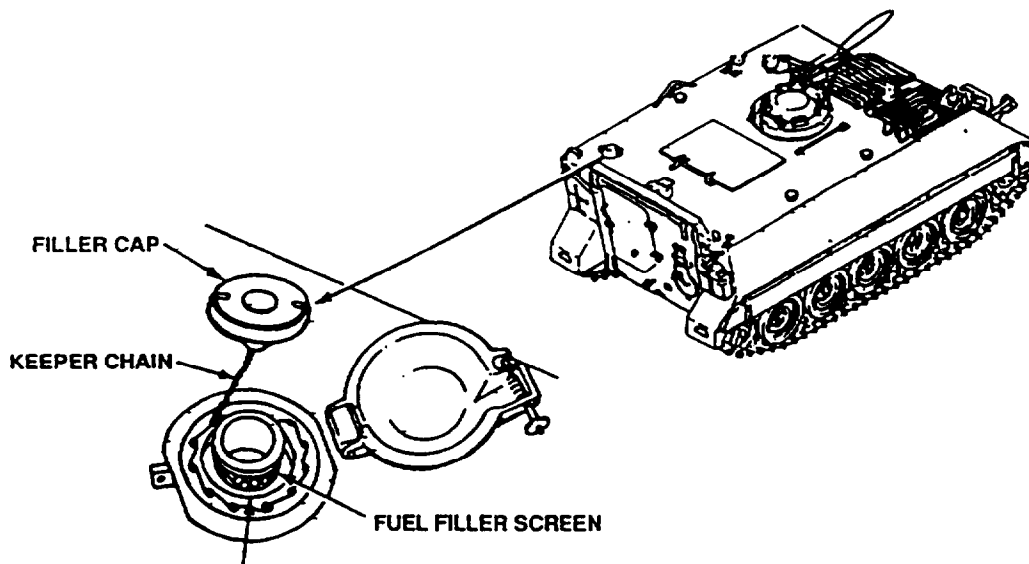




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
31	Semi-Annual	Fuel Tank (M1 059 only)	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Fuel can catch fire and burn you. Do not smoke. Disconnect battery ground lead (page 13-2) before you work on fuel system. Wipe up spilled fuel.</b></p> <p>Repair or replace any leaking tanks (page 40-23).</p>	Any contaminated fuel tank or fuel leak.
32	Semi-Annual	Tow Hooks and Pintle	<p>Check pintle for proper operation (see your -10).</p> <p>Lubricate pintle every 1500 miles or semi-annually with GAA. Late model pintles do not require lubrication.</p> <p>Check tow hook mount screws for looseness. Tighten loose screws to 130-140 lb-ft (176-190 N.m) torque. Use torque wrench (Item 96, Appendix D).</p> <p>Replace missing retaining pin or key (page 27-3).</p>	

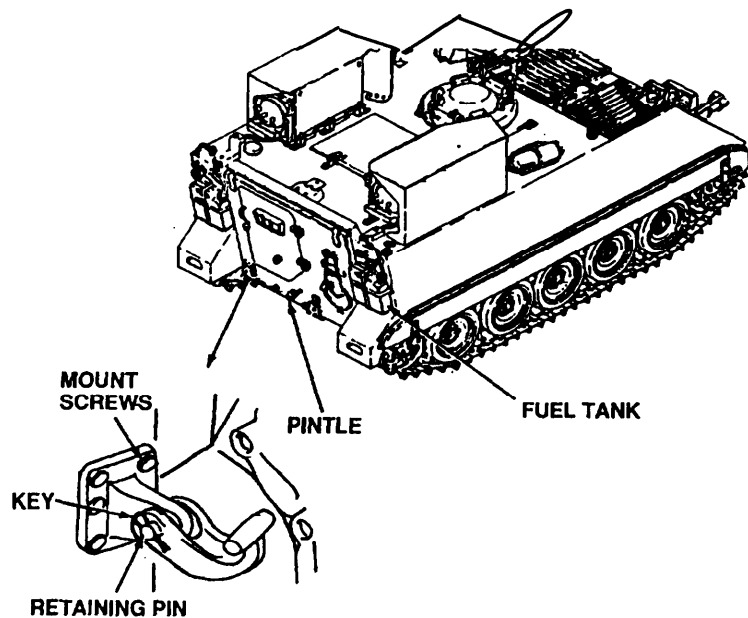


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
33	Semi-Annual	Trailer Wiring Harness Receptacle Cover	Check cover for tight seal on wiring harness receptacle. Replace leaky cover (page 17-2).	
34	Semi-Annual	Rubber Guards	Replace cracked, cut or hard guards (page 12-57).	
35	Semi-Annual	Webbing Straps and Loops	Replace cracked, cut or frayed webbing straps and loops (see your -10).	
36	Semi-Annual	Tail Lights, stop Lights and Blackout Lights	<p>Replace discolored and cracked tail light lens (page 12-13).</p> <p>Have assistant operate service tail light, service stop light, blackout tail light, and blackout stop light (see your -10). Repair or replace lights that do not work. See Chapter 12 for specific task.</p>	

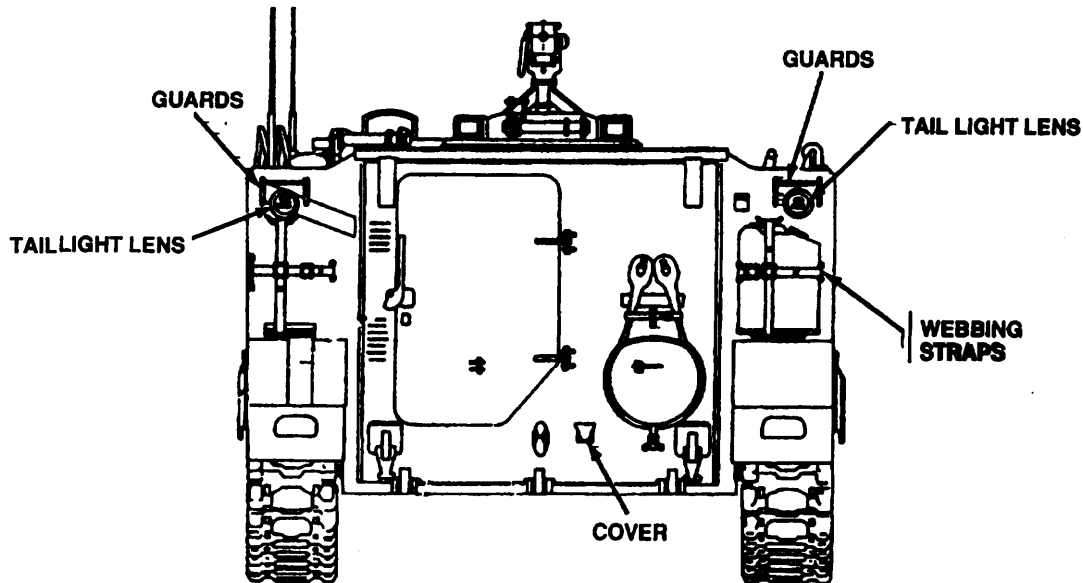


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 F'OV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
37	Semi-Annual	Ramp Door, Seal, and Catch	<p>Perform chalk test (page 2-37). Replace leaky ramp door seal (page 25-32).</p> <p>Check door for smooth operation. If hinges bind, notify higher level of maintenance. Repair catch if door does not lock in open position (page 25-33).</p> <p>Adjust handle if door does not seal tightly in closed position (page 25-34).</p>	Door fails to lock in any position.

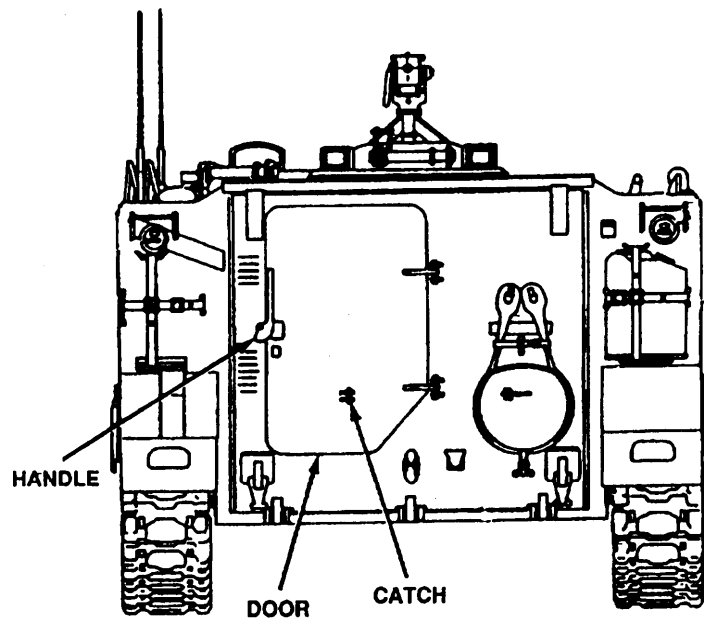


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
38	Semi-Annual	Ramp Latches, Seals, and Wire Rope	<p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Lowering ramp could injure personnel. Make sure no one is in ramp zone before you lower ramp. Unlocked ramp can fall open suddenly. Personnel can be killed or injured. Ramp system and hull can get damaged if ramp unlocks when carrier is in operation. Do not operate carrier if locks do not secure ramp properly.</li> <li>• Keep away from ramps that have come open during carrier operation.</li> </ul> <p>With ramp closed, check for tight fit on rear seal. Adjust ramp lock and linkage, if needed (page 25-2 or 25-1 O).</p> <p>Replace ramp seal that is cut, cracked or hard (page 25-36).</p> <p>Replace wire rope that is frayed or has broken strands (page 25-30 or 25-31).</p>	<p>Ramp fails up/down operation using controls.</p> <p>Damage allows ramp to free fall or wire rope is frayed or broken.</p>

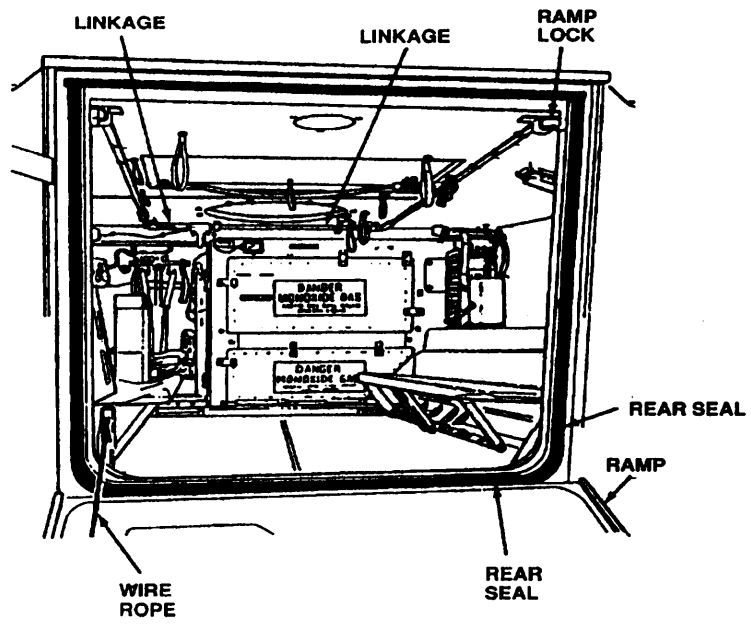




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
39	Semi-Annual	Tent and Stowage Brackets (M577A2 only)	Replace tent that has tears, breaks, fraying or other damage (page 24-183).  Tighten screws on mounting clamps and strip.	
40	Semi-Annual	Dome Lights and Switches (M577A2 only)	Check that dome lights and blackout lights work right (see your -10). Troubleshoot faulty lights (page 3-117).	

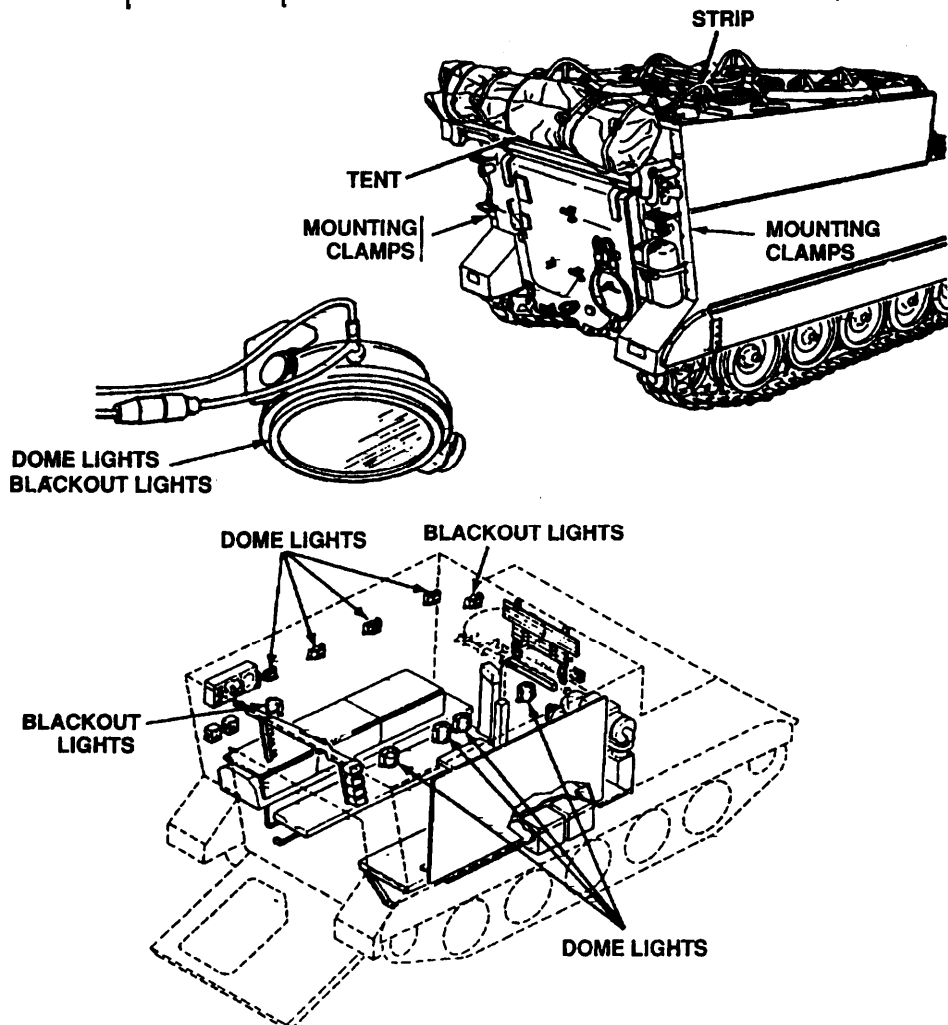


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
40	Semi-Annual	Dome Lights and Switches (M577A2 only)  Continued	<p>Check that dome light switches and blackout bypass switch work right (see your -10). Troubleshoot faulty switches (page 3-117).</p> <p>Check that ramp door switch operates properly (see your -10). Troubleshoot faulty switch (page 3-182).</p> <p>Check that admittance buzzer operates properly (see your -10). Troubleshoot faulty buzzer (page 3-122). Replace unrepairable buzzer (page 12-72).</p> <p>Check that blower operates properly (see your -10). Troubleshoot faulty blower (page 3-125).</p> <p>Tape frayed electrical leads.</p> <p>Replace damaged connectors (page 14-3).</p>	

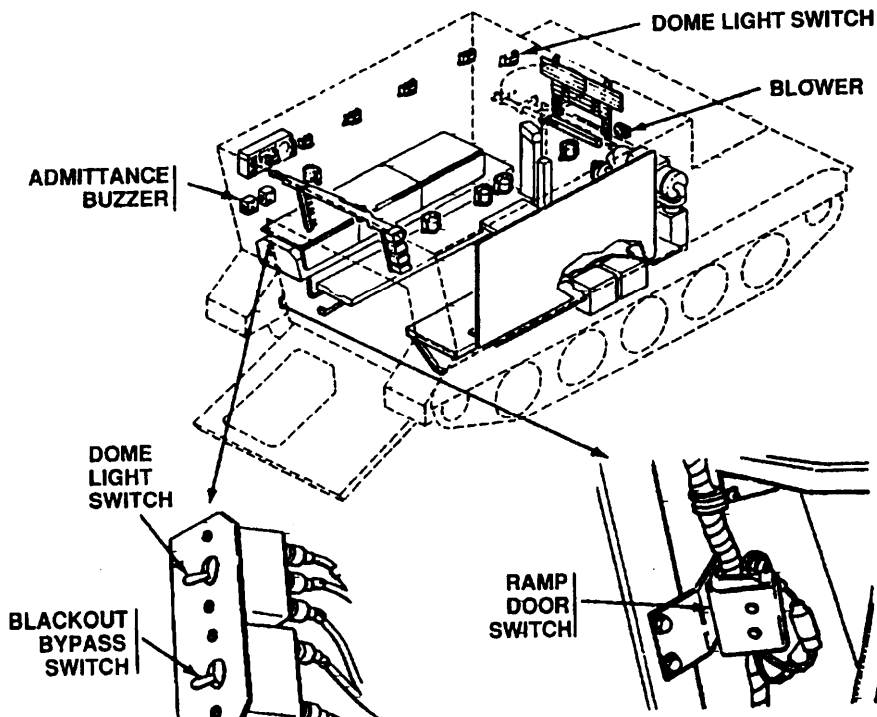


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
41	Semi-Annual	Map Tables and Map Board (M577A2 only)	<p>Tighten or replace loose or missing screws on map tables and supports.</p> <p>Replace map table or map board that is badly damaged or warped (page 24-173 or 24-178).</p> <p>Replace map table or map board with badly damaged work surface (page 24-173,24-175 or 24-178).</p> <div data-bbox="649 850 1144 1270" style="text-align: center;"> <p>The diagram shows a perspective view of the map table assembly. It consists of a flat rectangular top surface supported by a complex metal frame. Three labels with arrows point to specific parts: 'MAP BOARD' points to the top surface, 'MAP TABLES' points to the side rails, and 'SUPPORTS' points to the vertical and diagonal structural members of the frame.</p> </div>	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

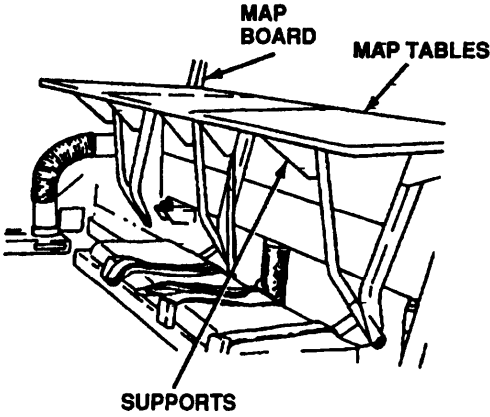
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
41	Semi-Annual	Map Tables and Map Board (M577A2 only)	<p>Tighten or replace loose or missing screws on map tables and supports.</p> <p>Replace map table or map board that is badly damaged or warped (page 24-173 or 24-178).</p> <p>Replace map table or map board with badly damaged work surface (page 24-173,24-175 or 24-178).</p> 	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
42	Semi-Annual	Head-lights, Blackout Lights, and Horn	<p>Replace cracked or discolored lens in service headlights, infrared headlights, blackout marker lights or blackout headlight. See Chapter 12 for specific task.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Looking directly at infrared headlights may burn your eyes. Do not look directly into infrared headlights.</b></p> <p>Have assistant operate service headlights, infrared headlights and feel for heat, blackout marker lights, blackout headlight and horn. Repair or replace lights or horn that do not work. See Chapter 12, Section I for specific task.</p>	

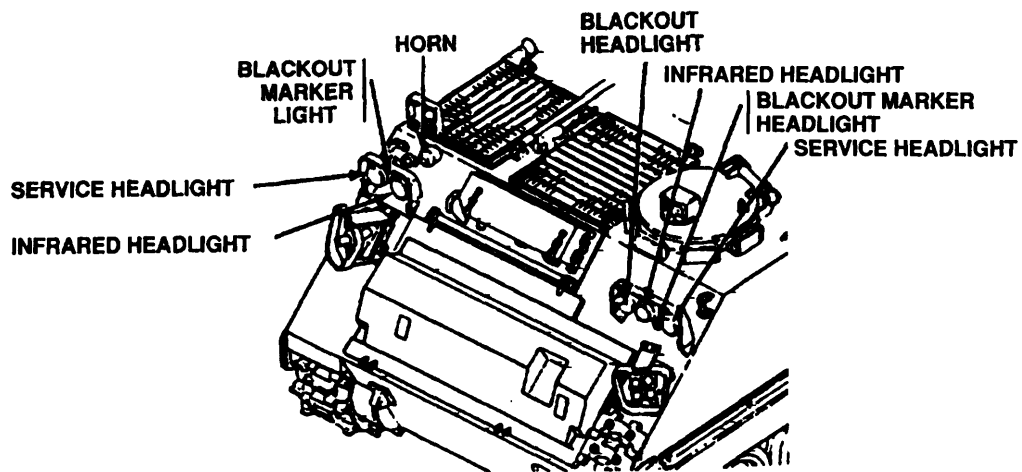


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
43	Semi-Annual	Remove Smoke Grenade Discharger (if installed)	<p>Remove base from front hull plate (page 40-2).</p> <p>Check wiring harness. Replace cracked or broken leads and connectors (page 14-3).</p> <p>Check guard, plate and base. Replace damaged parts. Tighten loose screws and nuts.</p> <p>Install base on front hull plate (page 40-2).</p> <p>Repeat steps above for opposite side of earner.</p>	

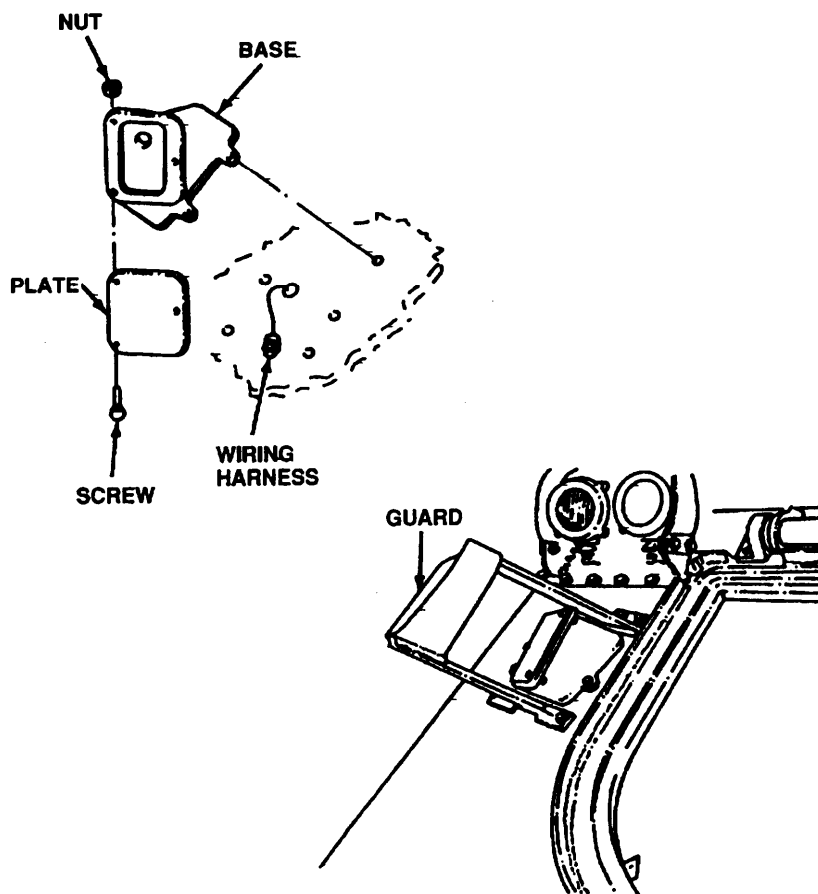


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
44	Semi-Annual	Trim Vane	<p>Replace gouged or hard trim vane bumpers (page 24-11 or 24-13).</p> <p>Replace or repair warped or badly damaged trim vane (page 24-11 or 24-13).</p> <p>Check release mechanism and control linkage for proper operation. Replace weak springs and broken parts (page 24-11 or 14-13).</p>	
45	Semi-Annual	Power Plant Grill and Power Plant Front Access Door	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Power plant door may spring open. Soldiers can be injured. When opening, stay out of door path.</b></p> <p>Check screws on power plant grill for looseness. Tighten loose screws to 100-120 lb-ft (136-163 N.m) torque. Use torque wrench (Item 96, Appendix D).</p> <p>Check power plant front access door seal for cracks, cuts, stiffness and looseness. If seal is loose, tighten. If damaged, replace (page 24-24).</p> <p>Check for tight seal on door in closed position. Perform chalk test (page 2-37).</p>	<p>Damage prevents door from closing, sealing or locking.</p>

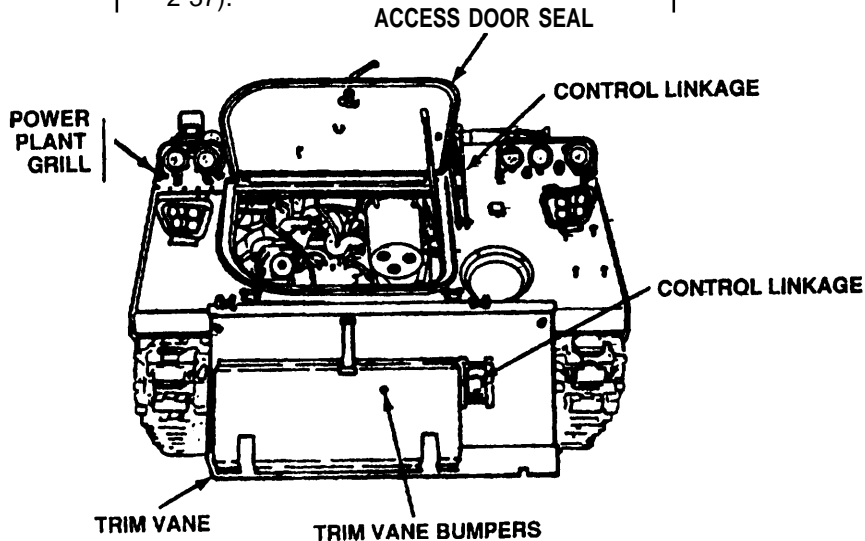


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
46	Semi-Annual	Radiator Auxiliary Tank Filler Cap	<p>Replace filler cap that does not seal tightly on auxiliary tank filler neck (page 8-28).</p> <p>Attach or replace loose, broken or missing keeper chain on filler cap (page 8-28).</p>	Any Class III coolant leaks.
47	Semi-Annual	Lifting Eyes	<p>Check for loose or missing screws on lifting eyes. Replace missing screws. Tighten loose screws to 175-200 lb-ft (237-271 N.m) torque. Use torque wrench (Item 98, Appendix D).</p>	

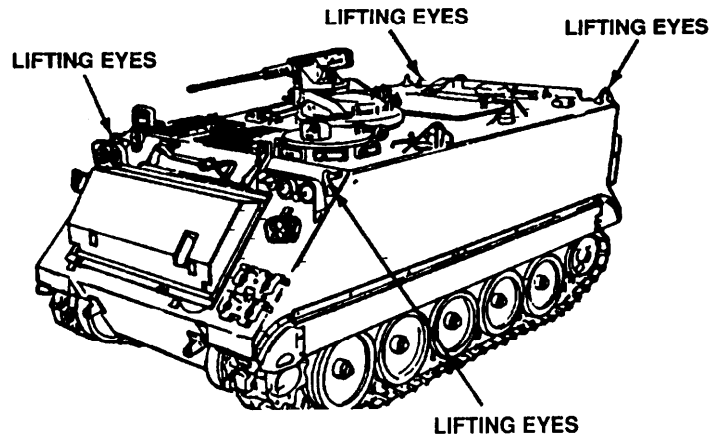
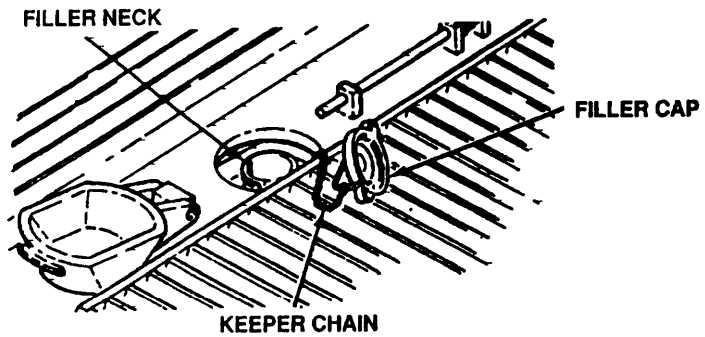




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
48	Semi-Annual	Hatch Covers, Latches and Seals	<p>Replace cracked, cut or hard seal (see Chapter 24, Section V).</p> <p>Check covers for smooth operation. Repair or lubricate cover that binds. Repair catch if cover does not lock in open position.</p> <p>Replace damaged or missing catch safety pins,</p> <p>Replace bumpers that are cut, gouged or hard.</p> <p>Adjust bumpers that do not compress when covers are locked open (see your -10).</p>	Hatch fails to lock in any position, or catch safety pin is missing.

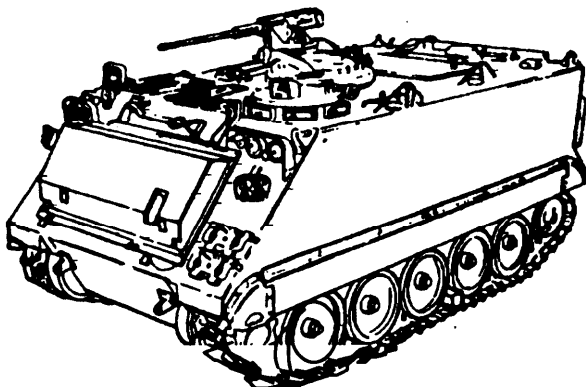
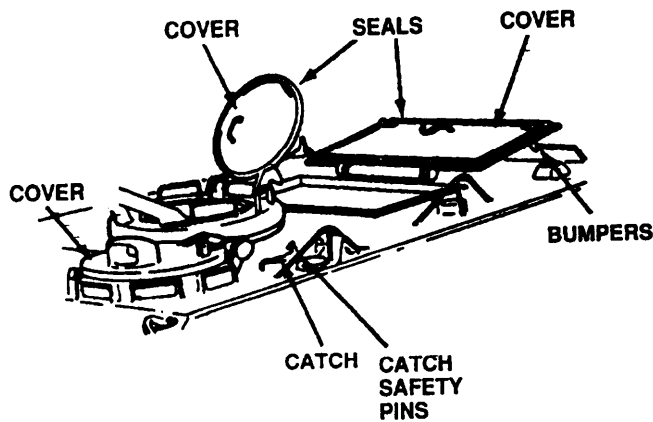


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

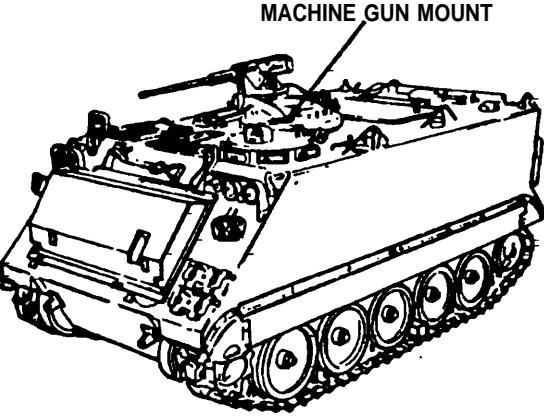
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
49	Semi-Annual	Machine Gun Mount	<p>Check for loose or missing screws on machine gun mount. Replace missing screws. Tighten loose screws (page 24-90).</p> 	Mount is cracked or broken.
50	Semi-Annual	Power Plant Bottom Access Cover, Hull Drain Plugs, and Final Drive Drain Plugs	<p>Check final drive drain plugs for leaks. Tighten leaking plugs (page 24-34).</p> <p>Check for loose or missing hull drain plugs. If missing, replace. Tighten loose plugs (page 24-34).</p> <p>Remove power plant bottom access cover and check for missing or damaged seal. Replace missing or damaged seal. Install bottom access cover. Torque screws 40-50 lb-ft (54-68 N.m) torque. Use torque wrench (Item 97, Appendix D).</p>	<p>Any Class III leaks, missing seals, covers or plugs.</p> <p>Missing or loose seals, plugs or covers.</p>

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
50	Semi-Annual	Power Plant Bottom Access Cover, Hull Drain Plugs, and Final Drive Drain Plugs  Continued	Check for loose or missing screws in power plant bottom access cover. Replace screws if missing. Tighten loose screws to 40-50 lb-ft (54-68 N.m) torque. Use torque wrench (Item 97, Appendix D).	
51	Semi-Annual	Final Drive	Inspect final drive input shaft oil seals for evidence of leakage. Replace final drive seals (page 20-11) using torque wrench (Item 97, Appendix D). Tighten screws to 252-300 lb-in (28-34 N•m) torque.	Any Class III leak.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
52	Semi-Annual	Power Plant Noises	Check power plant operation. When unusual noises are heard, repair suspect component or contact higher level of maintenance for assistance and repair.	
53	Semi-Annual	Exhaust System	<p style="text-align: center;"><b>NOTE</b></p> <p><b>Carrier leaks exhaust gas when cold. For this reason, carbon will be present around joints and exhaust pipe connecting clamps. This is normal. The exhaust system joints will seal after pipes heat up. Check for exhaust leaks only after engine reaches normal operating temperature of 180° to 205° F (71° to 93.3° C). Your carrier may be equipped with new exhaust pipes which do not require a muffler clamp.</b></p> <p>Check for loose, missing, or damaged manifold pipes, muffler and exhaust clamps. After leak check, replace any pipes, clamps or muffler (page 7-21 or 7-22) that fail to stop exhaust leaks.</p>	Missing or damaged hardware that would allow leakage.

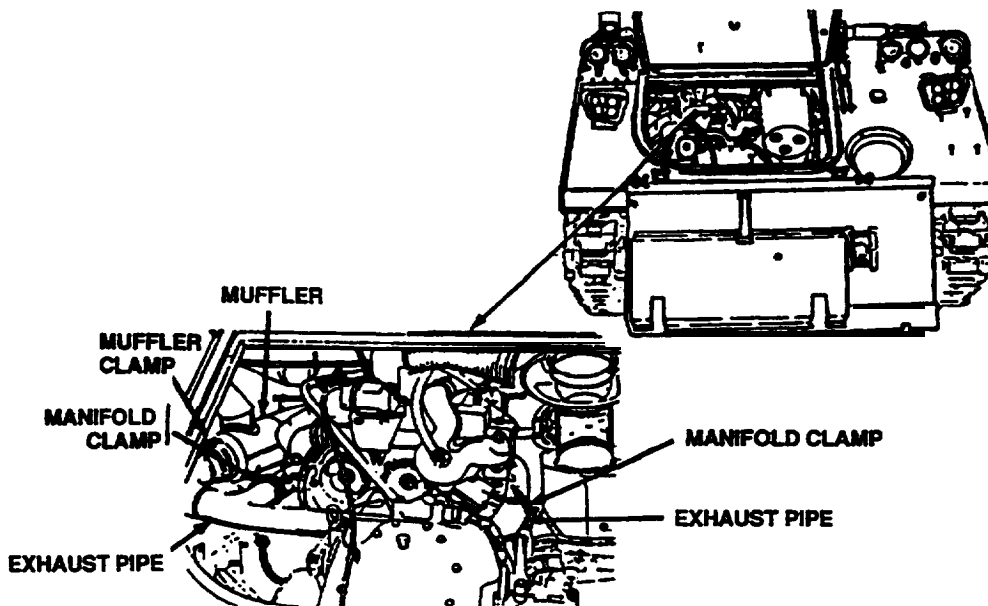


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
54	Semi-Annual	Air Cleaner	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Air pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>You will have one of two air cleaner configurations. Body and elements are not interchangeable!, except as sets.</b></p> <p>Clean or replace air cleaner element (see your -10).</p>	Latches or element is missing, damaged or broken. Gasket is torn or separated from element.
55	Semi-Annual	Air Cleaner Hoses	Clean drain hole on bottom of air cleaner container. Replace damaged container (page 7-7).	
56	Semi-Annual	Electrical Connectors and Leads	<p>Replace cracked, broken or brittle hoses. See Chapter 7 for specific hose.</p> <p>Check electrical connectors for looseness or broken contact. Replace broken connectors (page 14-1).</p> <p>Check that electrical leads in power plant compartment are not frayed, cut or broken. If leads are damaged, identify damaged lead. Go to the Alphabetical Index and locate specific task to repair or replace damaged lead or wiring harness.</p>	

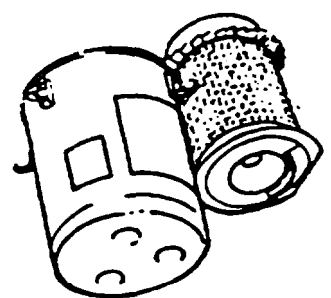
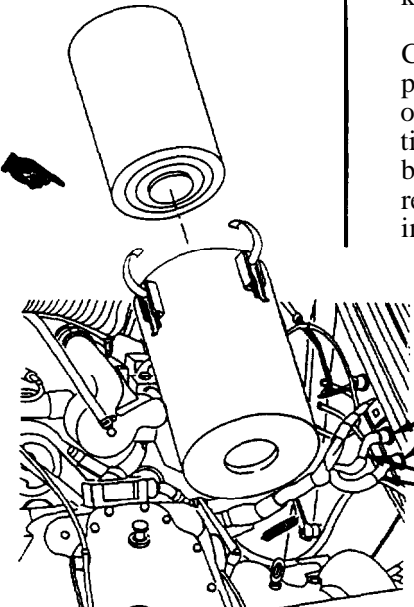


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

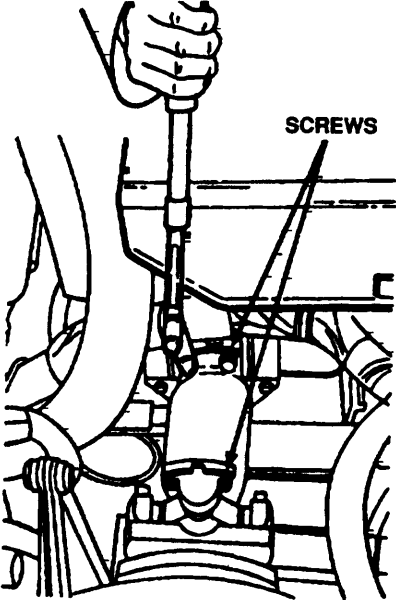
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
57	Semi-Annual	Drive Shafts and Universal Joints	<p>Check for loose or missing screws and lockwashers on universal joints. Joints are located on drive shaft between transmission and differential and between differential and final drives.</p> <p style="text-align: center;">NOTE</p> <p>See page 2-29 for proper use of torque wrench adapters.</p> <p>Use adapter (Item 8, Appendix D for 6C joints or Item 7, Appendix D for 7C joints) to tighten screws.</p> <p>If you have 6C joints, tighten screws (3/8 -24 x 1-3/4) to 35-40 lb-ft (47-54 N.m) torque. If you have 7C joints, tighten screws (1/2-20x2) to 83-100 lb-ft (113-136 N.m) torque. See page 2-29 for torque wrench reading with adapter.</p> <p>Lubricate U-joints every 150 hours, 1500 miles or semi-annually with GAA. Clean fittings with PD 680 Type of solvent</p> 	Any hardware is loose, broken or missing.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable It:
58	Semi-Annual	Differential	<p>Replace missing or damaged retaining clips and mount pins on differential mounts (page 21-20). Drain differential every 100 hours, 1500 miles or semi-annually. Remove front hull plug and differential drain plug. Inspect drain plugs for metallic particles and refill oil system with OE/HDO as needed. Clean and inspect breather and oil filter with PD 680 Type III solvent. If metal chips are found notify Direct Support Maintenance.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>FireResistantHydraulic (FRH) fluid may contain tricresyl phosphate which, if taken internally, can produce paralysis. Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking. Application of these measures is considered an effective control of the hazard.</b></p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p><b>Use only FRH or OHA hydraulic fluid. Do not mix different types of hydraulic fluids. Do not overfill.</b></p>	Any cracked or broken mounts.
59	Semi-Annual	Differential Brake Adjustment	<p style="text-align: center;"><b><u>NOTE</u></b></p> <p><b>If hydraulic fluid is contaminated, or fluid type is changed, drain pivot steer system using procedure in LO 9-2350-281-12, card 19, paragraph 4.</b></p>	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
59	Semi-Annual	Differential Brake Adjustment  Continued	Using weighing scale (Item 61, Appendix D), perform pull test to inspect for proper operation of steering levers and differential brakes. With the levers locked at the second quadrant position, 10 to 30 pounds (4.5-14 kg) of pull should unlock the levers. Adjust differential brakes if needed (page 21-18). Remove fill plugs and check pivot steer master cylinders every 150 hours, 1500 miles or semi-annually. Add FRH as required to bring fluid within 1/2 to 3/4" from top of cylinder.	

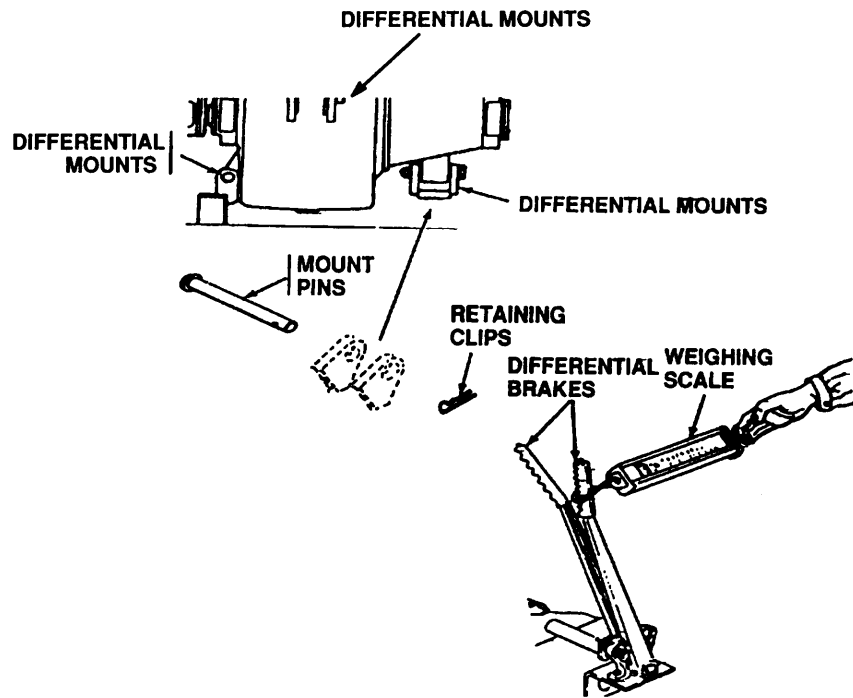
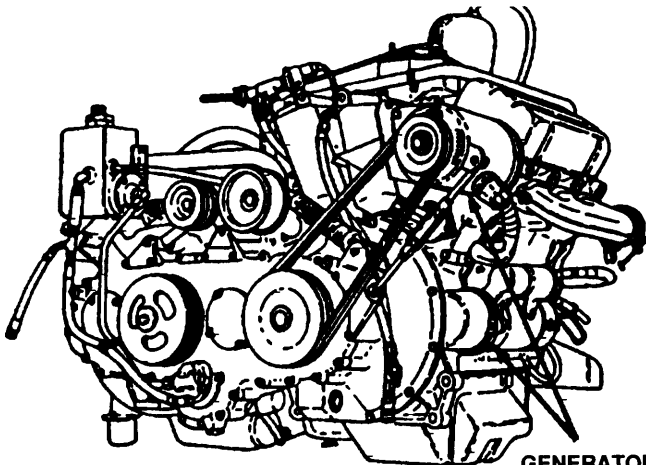




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

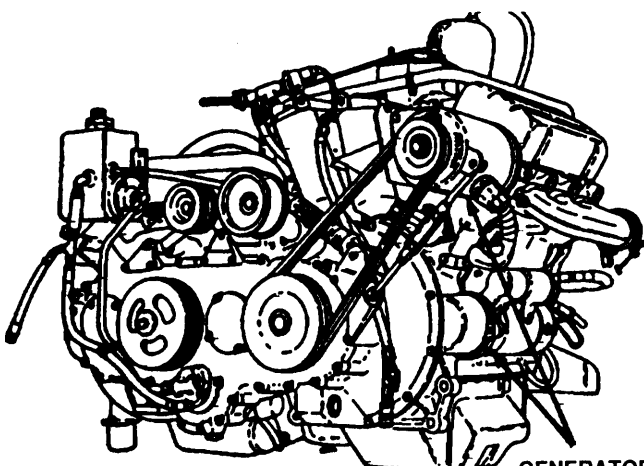
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
60	Semi-Annual	Power Plant Compartment	<p>Open power plant front access door (see your -10) and remove hull access cover (page 24-24).</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Dry cleaning solvent PD 680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat or flames. Wear goggles and gloves. Do not breathe vapors. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.</p> <p>Clean power plant compartment with dry cleaning solvent (Item 13, Appendix C). Remove debris and wipe up spilled oil and fuel.</p>	



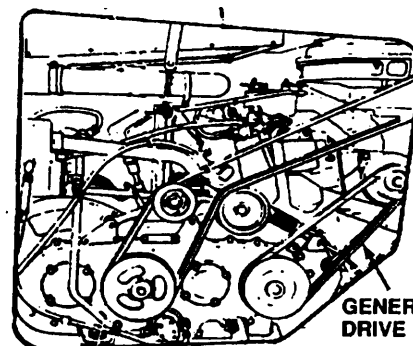
**GENERATOR/STARTER COMPONENTS**

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
61	Semi-Annual	Electrical System	<p>Check all generator mounting bolts for tightness. Tighten or replace parts.</p> <p>Check generator drive belt for cracking, fraying and breaks. Check for tightness. Play should be about 1/2".</p> <p>Check generator pulley for tightness on alternator shaft. Grasp pulley with both hands and try to move it fore and aft on shaft. If pulley moves on shaft, tighten shaft nut.</p> <p>Check starter hardware and wiring for tightness. Tighten or replace parts as required.</p>	<p>Belt is broken, cracked to belt fiber, has more than one crack (1/8" in depth or 50% of the belt thickness), has frays more than 2" long or excessive play.</p> <p>Pulley moves on shaft.</p>



GENERATOR/STARTER COMPONENTS



GENERATOR DRIVE BELTS

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
61	Semi-Annual	Electrical System  Continued	<p>Check drive pulley on transfer gearcase for play or wobble and for cracks. Grasp pulley with both hands and try to move it in all directions. If pulley moves on shaft or shows signs of cracking, report it to Direct Support.</p> <p>Check regulator mounting screws for tightness. Tighten if necessary.</p> <p>Check regulator operating voltage. Adjust voltage if necessary. voltage adjustment (page 9-38)</p> <div data-bbox="558 1073 992 1472" style="text-align: center;"> </div> <p data-bbox="558 1507 716 1535">DRIVE PULLEY</p>	Pulley moves on shaft or shows signs of cracking.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
62	Semi-Annual	Power Plant Mount	<p>Forward engine mount. Tighten loose mount screws to 360-420 lb-in (41-48 N.m) torque. Use torque wrench (Item 95, Appendix D) and socket set (Item 89, Appendix D).</p> <p>Tighten loose mount screws to 90-100 lb-ft (122-135 N.m) torque. Use torque wrench (Item 97, Appendix D).</p>	Any cracked or broken mounts.
63	Semi-Annual	Drive Belts	<p>Check fan belts for proper tension (see your -10). Adjust, if needed (page 8-35).</p> <p>Check generator drive belts for proper tension (see your -10). Adjust, if needed (page 9-29 or 9-47).</p> <p>Replace frayed or cracked belts (page 8-35,9-29 or 9-47).</p>	Any belt that is missing, broken, frayed more than 2", cracks 1/8" in depth of 50% of belt thickness.
64	Semi-Annual	Cooling Fan	Replace cracked or bent drive pulley and idler pulley (page 8-41 or 8-37). Replace loose/worn bearings (page 8-46).	Any cracked, broken, loose or missing hardware.

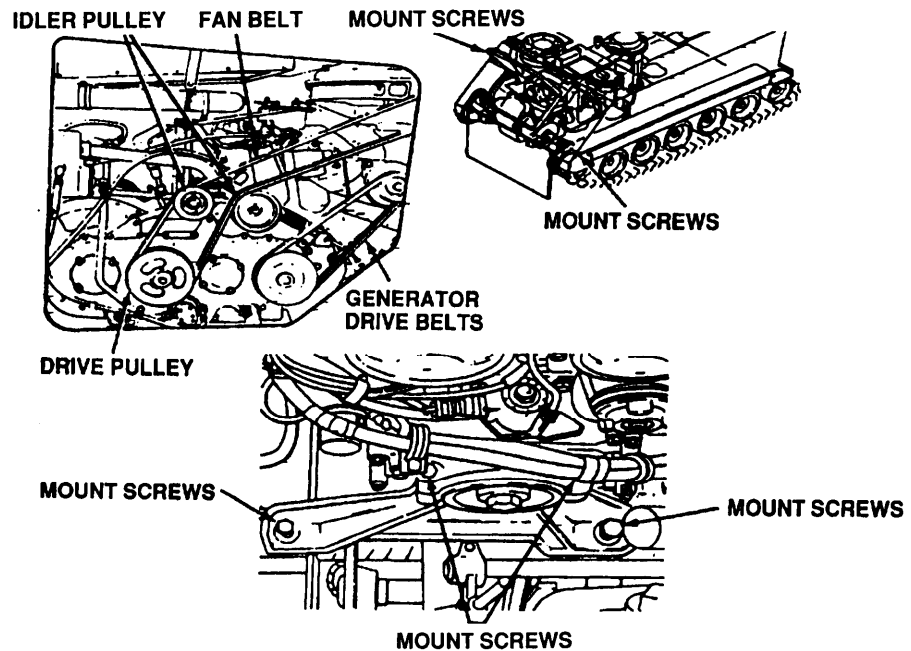


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
65	Semi-Annual	Transfer Gearcase	<p>Replace missing or damaged retaining clip and mount pin on transfer gearcase (page 19-2).</p> <p>Use adapter (Item 5, Appendix D) and tighten mounting nut to 75-80 lb-ft (102-108 N.m) torque. Use torque wrench (Item 97, Appendix D).</p> <p>Loosen and re-torque 10 transfer gearcase to transmission bolts to 252-300 lb-in (28-34 N.m) torque. Use torque wrench (Item 95, Appendix D) and socket set (Item 89, Appendix D).</p> <p>-Drain transfer gearcase every 150 hours, 1500 miles or semi-annually. Remove the hull drain plug and gearcase drain plug.</p> <p>-Inspect oil for metallic particles. If metal chips are found, notify Direct Support Maintenance.</p>	Any missing, broken, cracked hardware or Class III leaks.

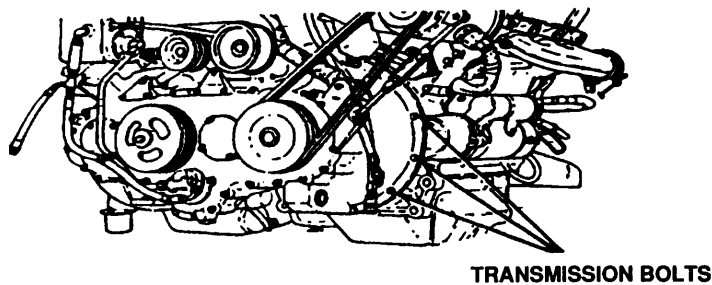
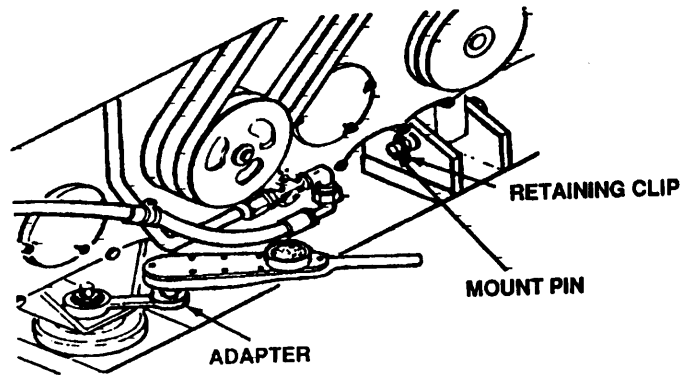


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
66	Semi-Annual	Cooling System	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Compressed air can injure you and others. Do not aim air at soldiers. Do not use more than 30 psi. Always wear goggles.</b></p> <p>Clean outside of radiator including fins. Use air gun.</p> <p>Check radiator for damage, cracks and leaks.</p> <p>Check hoses for kinks, cracks and breaks.</p> <p>Check engine coolant pump belt for cracking, fraying and breaks. Check for tightness. Play should be about 1/2".</p> <p>Check for bent or damaged pulley.</p>	<p>Any Class III leaks.</p> <p>Missing hardware or Class III leaks.</p> <p>Belt is broken, cracks to belt fiber, has more than one crack (1/8" in depth or 50% of belt thickness), has frays more than 2" long or excessive play.</p> <p>Pulley damaged or unserviceable.</p>

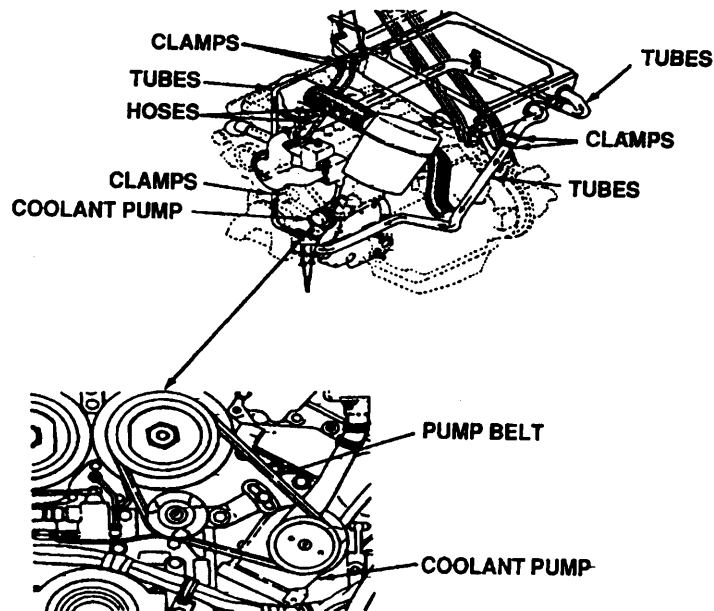


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:				
66	Semi-annual	Cooling System  Continued	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p style="text-align: center;"><b>Hot coolant can burn you. Do not open radiator cap access cover or remove cap until coolant gage reads in the bottom one-quarter of green zone.</b></p> <p style="text-align: center;"><b><u>Table 1.</u></b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b><u>Lowest Estimated Temperature in Geographic Area</u></b></p> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Pints of Ethylene Glycol Antifreeze to be Included in Preparation of 1-Gal. <u>Antifreeze Solution.</u></b></p> </td> </tr> <tr> <td style="vertical-align: top;"> <p>+20 °F (-7C) .....1-1/2</p> <p>+10 °F (-12 C) .....2</p> <p>0°F (-18C) .....2-3/4</p> <p>-10° F (-23C) .....3-1/4</p> <p>-20° F (-29C) .....3-1/2</p> <p>-30° F (-34C) .....4</p> <p>-40° F (-40C) .....4-1/4</p> <p>-50° F (-46C) .....4-1/2</p> <p>-55° F (-48C) .....4-3/4</p> </td> <td style="vertical-align: top;"></td> </tr> </table> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;"><b>A freeze protection indication beyond the limits shown in Table 1 or below -55° F (-48° C), when MIL-A-46153 antifreeze is used, will require partial coolant drain and replacement with water. Freeze protection must not exceed -55° F (-48° C) when MIL-A-46153 is used.</b></p>	<p><b><u>Lowest Estimated Temperature in Geographic Area</u></b></p>	<p><b>Pints of Ethylene Glycol Antifreeze to be Included in Preparation of 1-Gal. <u>Antifreeze Solution.</u></b></p>	<p>+20 °F (-7C) .....1-1/2</p> <p>+10 °F (-12 C) .....2</p> <p>0°F (-18C) .....2-3/4</p> <p>-10° F (-23C) .....3-1/4</p> <p>-20° F (-29C) .....3-1/2</p> <p>-30° F (-34C) .....4</p> <p>-40° F (-40C) .....4-1/4</p> <p>-50° F (-46C) .....4-1/2</p> <p>-55° F (-48C) .....4-3/4</p>		
<p><b><u>Lowest Estimated Temperature in Geographic Area</u></b></p>	<p><b>Pints of Ethylene Glycol Antifreeze to be Included in Preparation of 1-Gal. <u>Antifreeze Solution.</u></b></p>							
<p>+20 °F (-7C) .....1-1/2</p> <p>+10 °F (-12 C) .....2</p> <p>0°F (-18C) .....2-3/4</p> <p>-10° F (-23C) .....3-1/4</p> <p>-20° F (-29C) .....3-1/2</p> <p>-30° F (-34C) .....4</p> <p>-40° F (-40C) .....4-1/4</p> <p>-50° F (-46C) .....4-1/2</p> <p>-55° F (-48C) .....4-3/4</p>								

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
66	Semi-Annual	Cooling System  Continued	<p>Test for antifreeze protection by use of a combination antifreeze and battery tester.</p> <p>Test for reserve alkalinity (corrosion protection) by means of the Test Kit, Reserve Alkalinity (NSN 6630-10-011-5039). Color indication of the test kit stick will determine condition of the coolant and its potential corrosion protection. Instructions for use are as follows:</p> <p style="padding-left: 40px;">Dip stick into coolant, and remove immediately. Do not use test stick if coolant temperature is below 50° F (10° C) or if using a commercial brand antifreeze.</p> <p>Fifteen seconds after dipping, compare color on the stick with the color chart on the container, and annotate.</p> <p>(a) Blue indicates coolant is safe to use.</p> <p>(b) Green indicates reserve alkalinity and corrosion protection of coolant is marginal but may be used safely until the next service inspection.</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Do not use antifreeze extender additive (MIL-A-53009) when arctic antifreeze is used in the cooling system.</b></p> <p>Yellowish green indicates the coolant is unsafe to use. If the DD Form 314 identifies the coolant as the original charge, then add three percent by volume (1 pint per 17 quarts) of the antifreeze extender additive (MIL-A-53009) to the cooling system.</p>	<p>Antifreeze protection does not comply with Table 1.</p> <p>Test kit indicates the coolant is unsafe.</p>

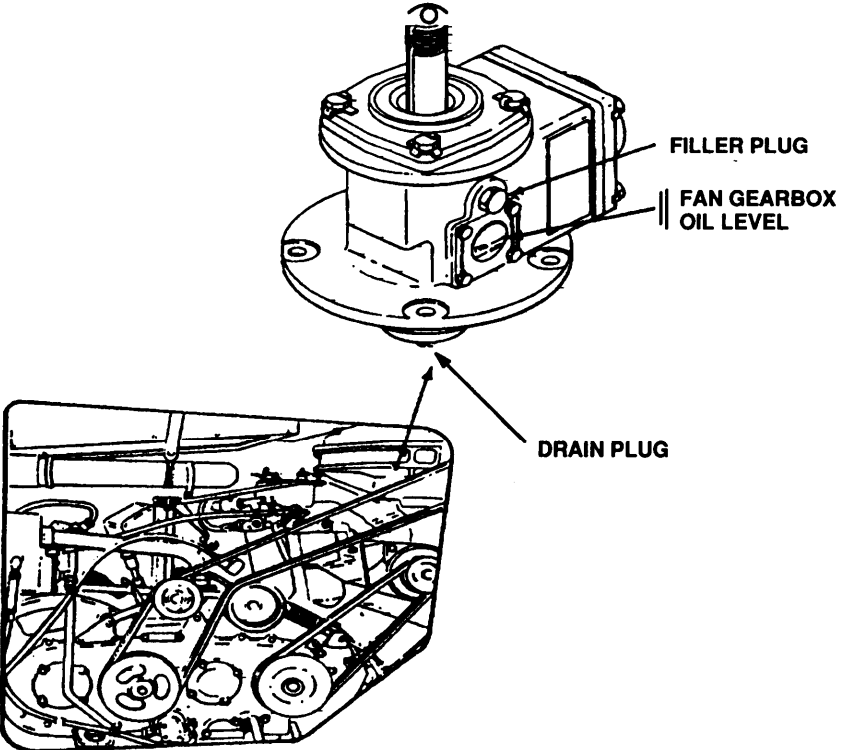


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No,	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
66	Semi-Annual	Cooling System Continued	<p>Addition of extender to antifreeze is a one time service. When the extender is added to the antifreeze, the date must be recorded in the "remarks" block of DED Form 314. If the DD Form 314 identifies the unsafe coolant as having been extended before, or the coolant as artic antifreeze, then the coolant must be drained and replaced with fresh coolant. See Flush Cooling System, Chapter 8 (pages 8-3 through 8-6).</p> <p>Check coolant cleanliness by draining a small amount of coolant into a clean container, and look for excessive rust, foreign particles and/or sediment.</p>	Excessive coolant contamination is found.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
67	Semi-Annual	Fan Gear-box	<p>Check fan gearbox oil level and add oil, if needed.</p> <p>-Drain gearbox every 1500 miles or semi-annually. Remove drain plug and packing; discard packing.</p> <p>-Inspect drain plug and oil for metallic particles and foreign matter. If metal chips are found, cooling fan assembly may require replacement (see pages 8-44, 8-45). Clean drain plug and apply antiseize compound to threads (see Item 4, Appendix C). Lubricate new packing with OE/HDO oil. Install drain plug and packing in gearbox housing. Refill gearbox with OE/HDO oil (approximately 10 ounces). Bring oil level to top center of sight gage.</p>	<p>No oil in sight glass. Any Class II or greater oil leak.</p>

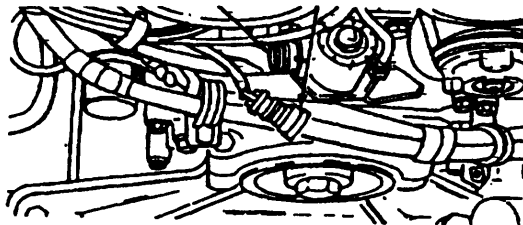


The diagram illustrates the fan gearbox assembly. It features a top view of the gearbox housing with a central filler plug and a sight glass for oil level. A drain plug is located at the bottom of the housing. An inset view shows the gearbox installed within the vehicle's engine compartment, with an arrow pointing to the drain plug location.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable It:
68	Semi-Annual	Operate Air Box Heater Air Pump	<p style="text-align: center;"><b>NOTE</b></p> <p>The purpose of this item is to exercise the vanes in the air box heater air pump.</p> <p>Disconnect lead from fuel shut-off solenoid.</p> <p>To prevent engine from starting, pull fuel cutoff out (see your -10).</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Air pump can be damaged if switch is held on too long. Do not exceed a total of 20 seconds of operation.</p> <p>Have assistant crank engine and run air pump at the same time intermittently for total of 20 seconds. Listen for air pump operation (see your -10).</p> <p>Connect lead to fuel shutoff solenoid.</p> <p>Lubricate air motor with OE/HDO every 1500 miles, semi-annually or as required.</p>	

FUEL SHUTOFF SOLENOID LEAD



AIR PUMP

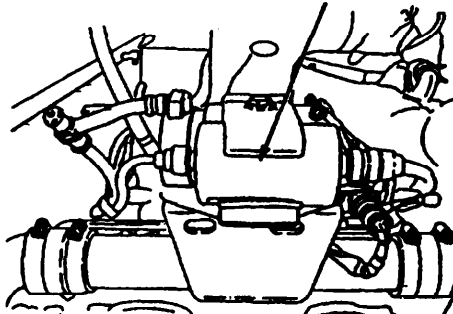


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
69	Semi-Annual	Throttle Controls and Transmission Linkage	<p>Operate hand throttle while pressing on throttle pedal to check for binding.</p> <p>Operate accelerator to check for binding in linkage.</p> <p>Check transmission range selector mounting screws for proper installation.</p> <p>Check to see that the engine will start only with the range selector in "N" position.</p> <p>Move range selector through all gears to check for binding.</p>	Any binding, broken, cracked, missing or loose hardware.

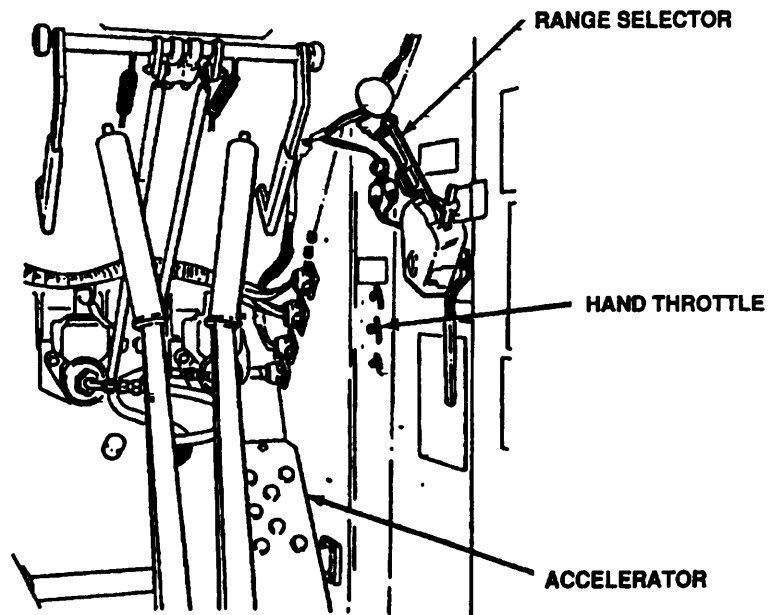


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
70	Semi-Annual	Fuel System	<p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Air pressure in excess of 30 psi (207 kPa) can injure personnel. Don't direct pressurized air at yourself or others. Always wear safety goggles.</li> <li>• Fuel can catch fire and burn you. Do not smoke. Disconnect battery ground cables before you work on fuel system. Wipe up spilled fuel.</li> </ul> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Don't expose sealed areas to steam for more than 15 minutes.</p> <p>Check fuel tank for leaks. Repair or replace fuel tanks that leak (page 6-11 or 6-21).</p> <p>Tighten all fuel hoses, tubes and fittings that leak.</p> <p>Replace fuel hoses and tubes that are cracked, crimped or worn (see Chapter 6).</p> <p>Replace cracked or stripped fittings (see Chapter 6).</p>	Any contaminated tanks, fuel leaks or cracked, broken, stripped or crimped hardware.

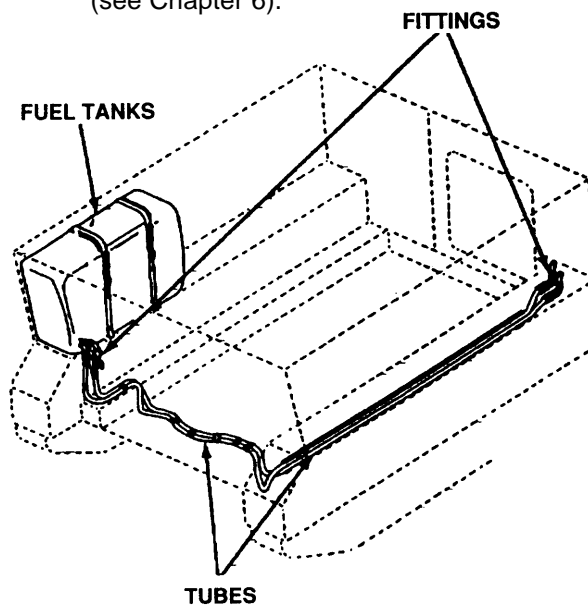


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
71	Semi-Annual	Fuel Cutoff	<p>Operate fuel cutoff to check for binding. If binding occurs, adjust (page 23-44).</p> <p>Operate accelerator to check for binding in linkage. If binding occurs, adjust (page 23-34).</p> <p>Move range selector through all gears to check for binding. If binding occurs, adjust (page 23-55).</p>	Any binding, broken, cracked, missing or loose hardware.
72	Semi-Annual	Fuel Filters	<p style="text-align: center;"><b>NOTE</b></p> <p><b>Large amounts of sediment or debris may indicate contamination of fuel tanks.</b></p> <p>Replace primary and secondary fuel filter elements (page 6-128) every 1500 miles or annually. Remove rear power plant access panels and drain fuel filter assemblies.</p> <p>Remove and inspect primary filters/shell first, then secondary filter/shell</p> <p>Pre-fill primary and secondary shells with fuel and install.</p>	Any fuel leaks.

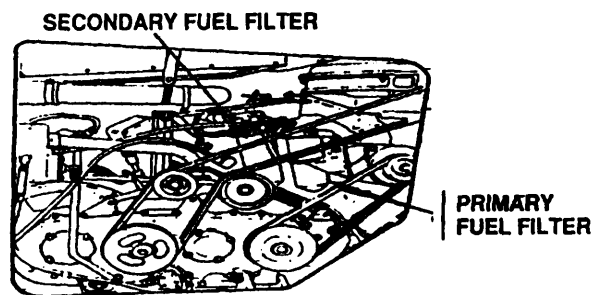
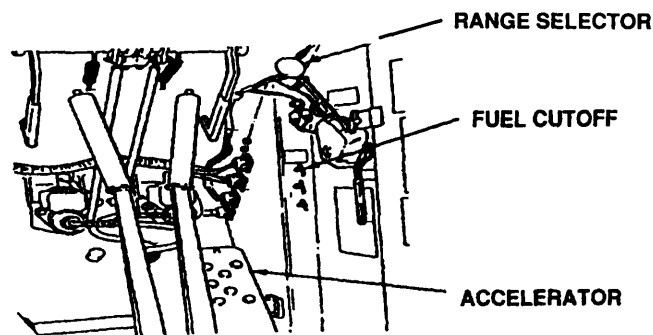


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
73	Semi-Annual	Hydraulic System	<p style="text-align: center;"><b>NOTE</b></p> <p><b>General checks and services are the same for all carriers. See Chapter 28 for specific component maintenance.</b></p> <p>Replace ramp control or pump that leaks (page 28-84 or 28-81).</p> <p>Tighten or replace fittings on hydraulic fluid tank, ramp cylinder, pump, and ramp control that are cracked or leak.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Hydraulic fluid is poisonous and can be absorbed through your skin. Wash off any hydraulic fluid which contacts your skin. Read Warning in manual front.</b></p> <p>Check hydraulic tank, fluid level, and service, if needed. Drain hydraulic system tank and replace strainer every 1500 miles, semi-annually or when hydraulic fluid type is changed.</p> <p>Lower ramp and remove drain plug. Disconnect hose at filter elbow, remove four bolts and washers that secure filter adapter to tank. Remove filter and packing from adapter. Clean and inspect tank interior and adapter with PD-680, Type II.</p>	<p>Any hydraulic leaks, fluid not visible in sight gage, cracked, broken, crimped, missing or loose hardware.</p>

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable It:
73	Semi-Annual	Hydraulic System  Continued	<p>Install new filter and packing on adapter. Secure adapter to tank with new washers and original bolts. Connect hose to adapter elbow. Fill tank with FRH to bring level between max and min on sight window (approximately two quarts).</p> <p>Tighten tubes or hoses that leak.</p> <p>Replace tubes or hoses that are cracked, crimped or worn (page 28-91).</p> <p>Replace ramp cylinder that leaks (page 28-93).</p> <p>Operate ramp and check for leaks.</p>	Pump fails to raise ramp or operate.

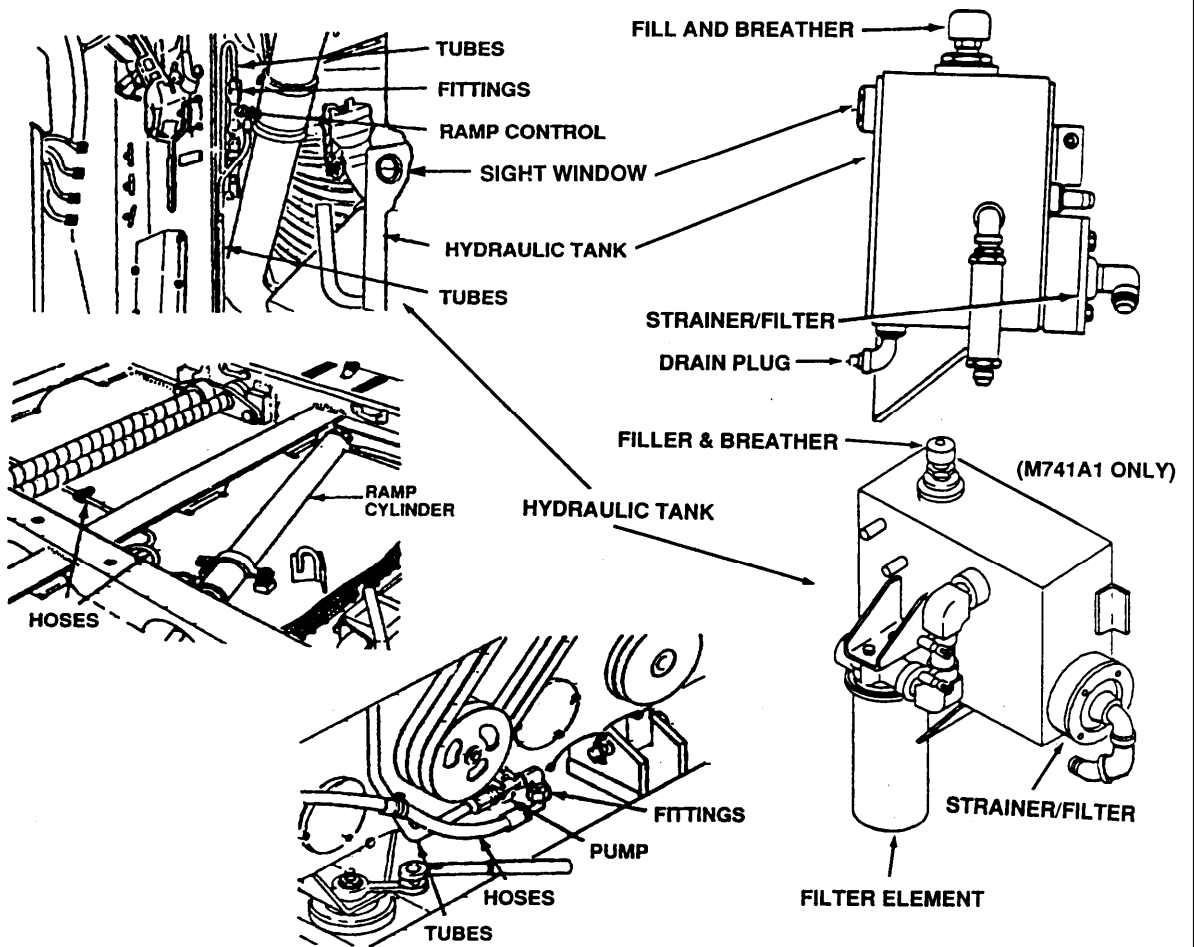




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable It:
74	Semi-Annual	Suspension Lockout system (M741A1 only) (see Chapter 28)	<p>Replace suspension lockout control that leaks (page 28-87).</p> <p>Tighten hoses and fittings that leak.</p> <p>Replace hoses that are cracked, crimped or worn (see Chapter 28).</p> <p>Replace cracked or stripped fittings (see Chapter 28).</p>	Any leaks, cracked, crimped, broken, missing or loose hardware.

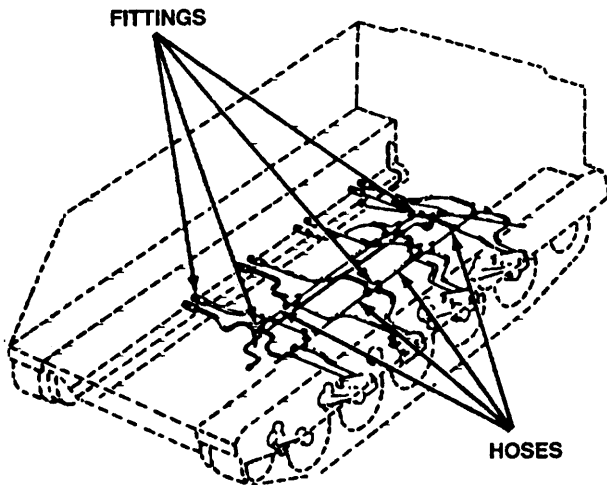
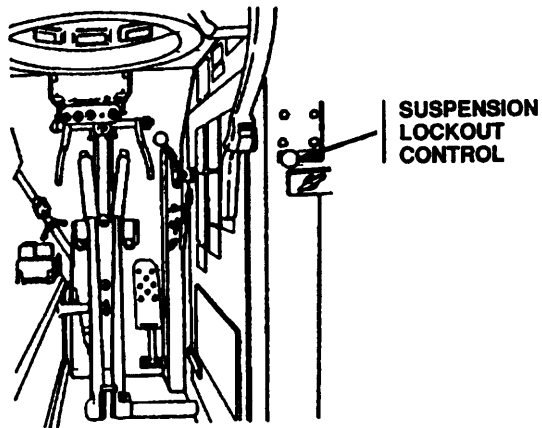


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
75	Semi-Annual	Portable Fire Extinguisher	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>You could be injured if cylinder discharges when it is out of its mounting bracket or is dropped. Handle with great care.</b></p> <p>Weigh portable fire extinguishers. Recharge or exchange fire extinguisher if weight loss is more than 10 percent of charged weight stamped on bottle. Fill out DA Form 2407 for recharging or DA Form 2402 to exchange cylinders.</p>	Extinguisher is missing or seal/hardware is missing or broken

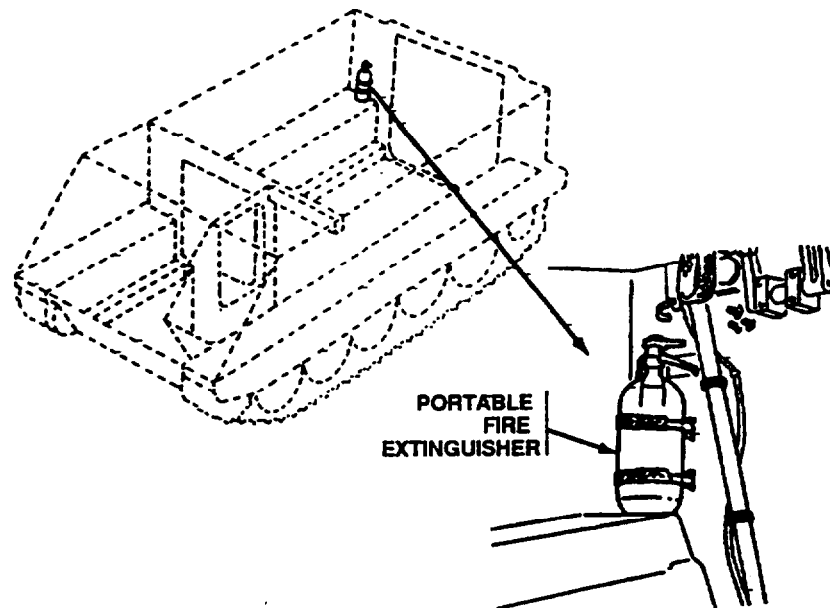


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
76	Semi-Annual	Fixed Fire Extinguisher	<p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;"><b>Extinguisher contains CO,</b></p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p style="text-align: center;"><b>Fire extinguisher control valve sealed with wire will not work, Make sure seal wire is made out of light copper.</b></p> <p>Remove and weigh fixed fire extinguisher cylinder (page 42-13).</p> <p>Recharge or exchange fire extinguisher if weight loss is more than 10 percent of charged weight stamped on bottle.</p> <p>Inspect fire extinguisher cylinder data plate to ensure that a hydrostatic test has been performed within the past 5 years. Faulty extinguishers or those beyond the test time limit (5 years) shall be declared unserviceable and replaced.</p>	<p>Extinguisher is missing, seal/lock-wire missing or broken, bottles overdue hydrostatic test.</p>

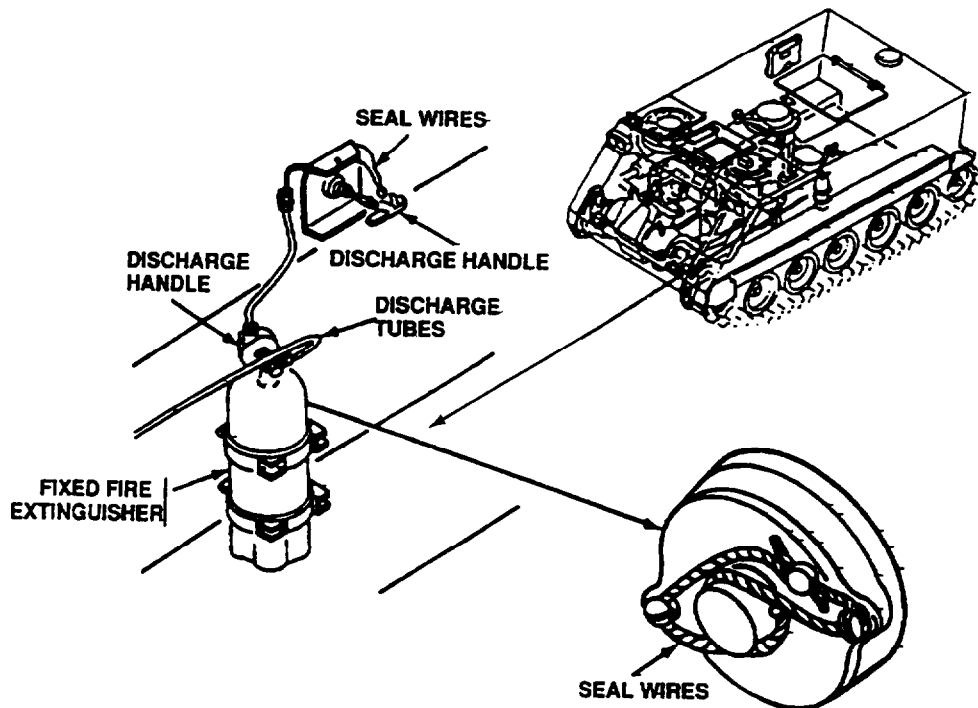


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
76	Semi-Annual	Fixed Fire Extinguisher  Continued	<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Inspect cylinder/bottle data to ensure the latest hydrostatic test was performed within the past 5 years. Any cylinder/bottle beyond the test time limit shall be declared unserviceable and replaced.</p> <p>Before reconnecting cylinder, operate discharge handles to be sure cables and controls work properly.</p> <p>Install cylinder and replace copper seal wires (page 42-5).</p> <p>Replace discharge tubes that are crimped, plugged or cracked (page 42-11).</p>	

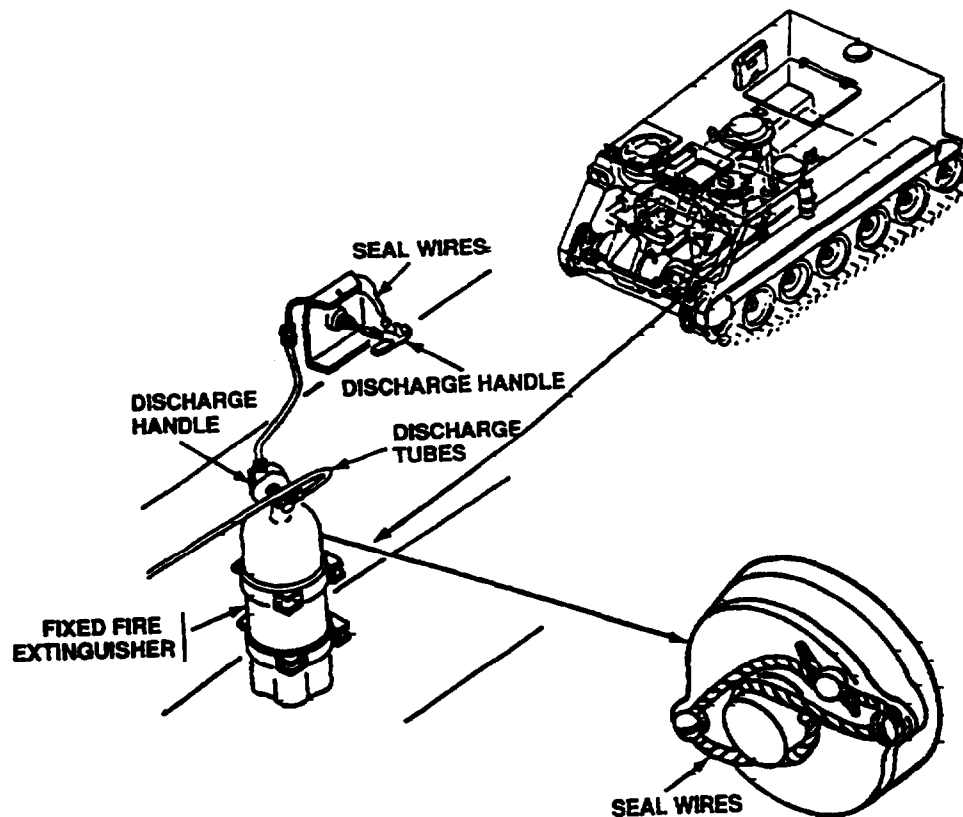


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
77	Semi-Annual	Batteries	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Battery posts and cables touched by metal objects can short circuit and bum or injure you. Use caution when you work with tools or other metal objects. Do not wear jewelry when you work on electrical system. Electrical current can bum you. Remove battery ground lead before you start task (page 13-2).</b></p> <p>Clean batteries and battery box (page 13-20 or 13-22).</p> <p>Replace batteries that leak, have cracked cases, or burned post (page 13-16 or 13-18).</p> <p>Check and record specific gravity of each cell (see TM 9-6140-200-14).</p> <p style="text-align: center;">Tropical Electrolyte <u>1.180-1.225</u></p> <p style="text-align: center;">Temp Electrolyte <u>1.225-1.280</u></p>	<p>Any leaks, loose, damaged, cracked, broken or missing battery or hardware.</p> <p>Specific gravity is not within set standards.</p>

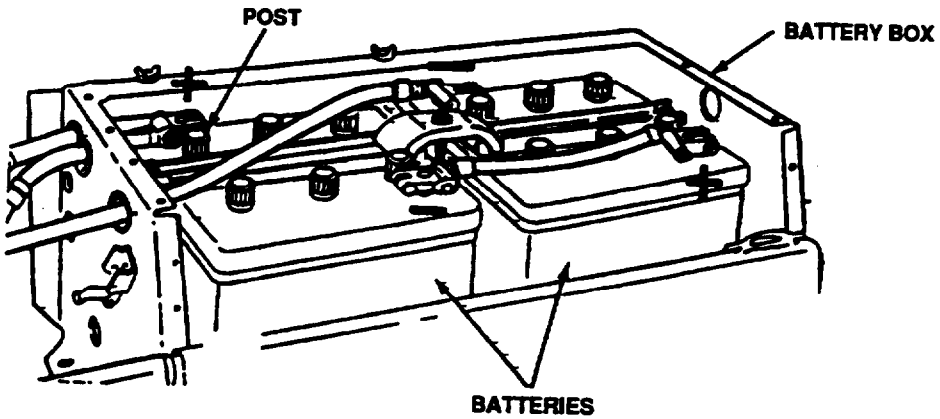


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
77	Semi-Annual	Batteries Continued	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Gas from batteries can explode and injure you. Do not allow sparks near batteries. Battery acid can blind or burn you. Do not get acid on your skin or eyes.</b></p> <p>Check electrolyte level. If low, add distilled water. Check battery cables for frays, splits and security. Clean top of batteries and coat terminals lightly with grease.</p> <p>Install batteries.</p>	One or more batteries unserviceable, missing, cables frayed or broken.

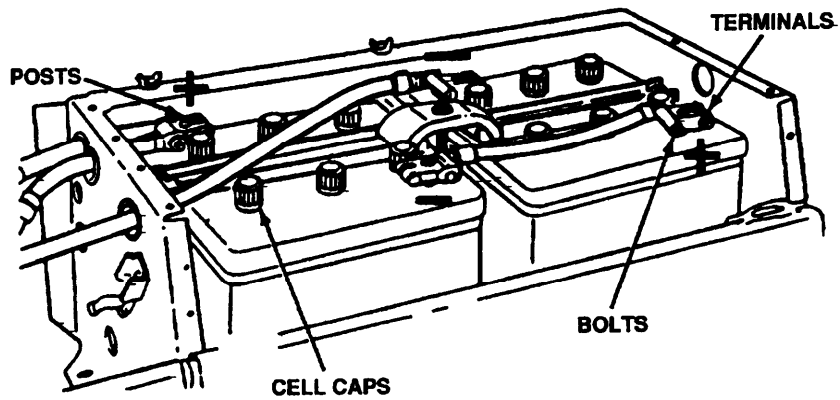


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
78	Semi-Annual	Driver's Hatch	<p>Replace hard, cracked or cut cushioning pad (page 24-51).</p> <p>Check periscope quick release for smooth operation.</p> <p>Check vision blocks for cracks and chips (see your -10).</p> <p>Replace vision blocks that have more than 50 percent impairment (page 24-52).</p>	Any missing lock pins or latches that fail to secure hatch in any position.

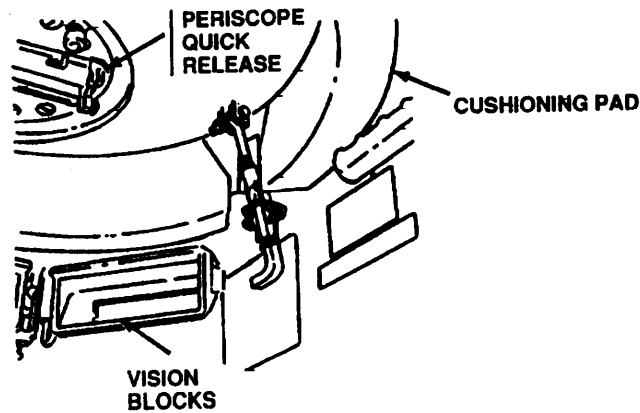


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
79	Semi-Annual	Driver's Seat	<p>Replace damaged seat cushion (page 24-129).</p> <p>Replace seat belt with cuts, frays or broken buckle (page 24-129).</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Seat can spring up and hit you when vertical control handle is released. Make sure you are sitting in the seat before releasing vertical control handle.</b></p> <p>check that seat vertical locking mechanism and horizontal locking mechanism work properly (see your -10). Lubricate locking mechanism as needed with OE/HDO.</p>	Any missing, broken or cracked seat (less seat cushion), hardware or locking mechanisms fail to lock in any position.

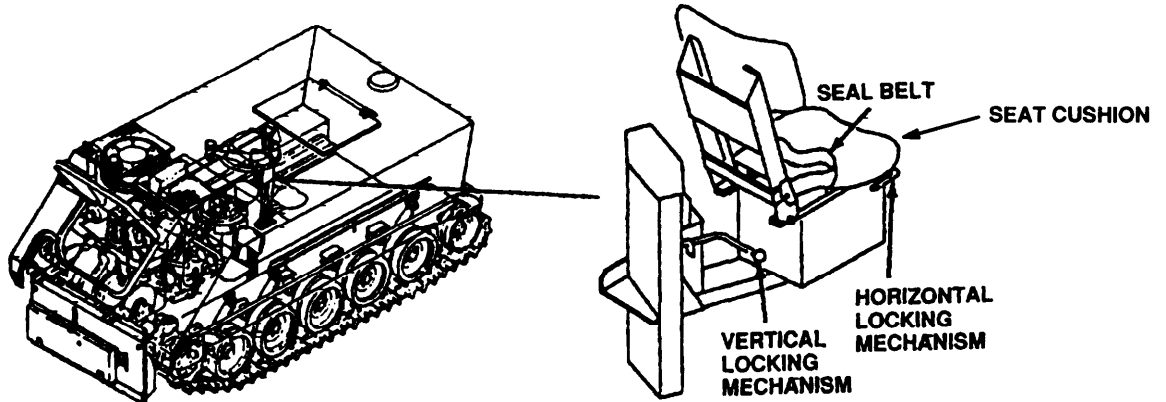




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
80	Semi-Annual	Personnel Seats	<p>Repair or replace damaged seat cushions (page 24-163, 24-165, or 24-167).</p> <p>Repair or replace cut, broken or frayed seat belts (page 24-163, 24-165 or 24-167).</p>	Any missing, broken or cracked seat (less seat cushion), hardware or cut, frayed seat belts.
81	Semi-Annual	Commanders Seat	<p>Replace damaged seat cushion (page 24-145).</p> <p>Replace cut, broken or frayed seat belt (page 27-145).</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Seat can spring up and hit you when vertical control handle is release. Make sure you are sitting in the seat before releasing vertical control handle.</b></p> <p>Check for smooth operation of seat and vertical locking mechanism (see your -10). Lubricate locking mechanism as needed with OE/HDO.</p>	Any missing, broken or cracked seat (less seat cushion), hardware or cut, frayed seat belts, or locking mechanism fails to lock in any position.

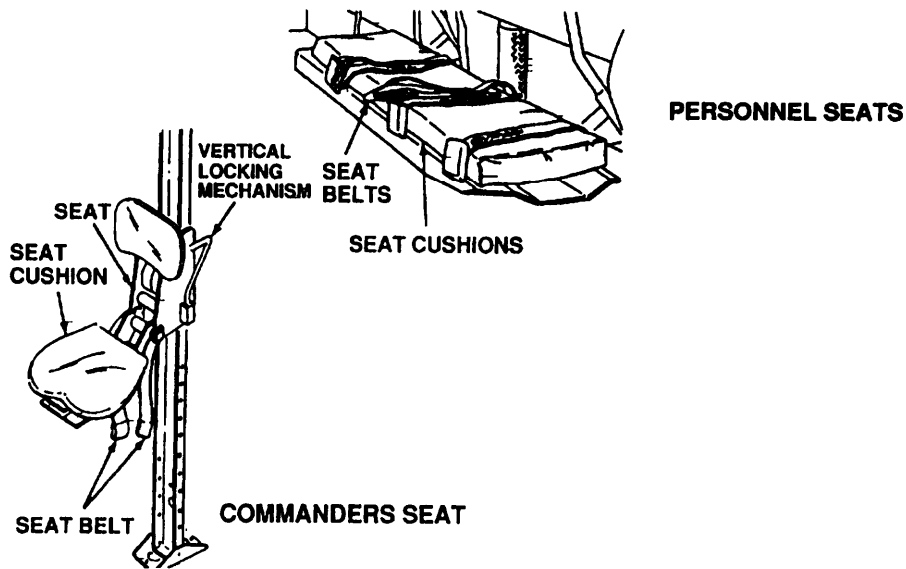


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
82	Semi-Annual	Com-mander's Platform	<p>Check platform lock to make sure the platform locks securely in various vertical positions (see your -10).</p> <p>Check that platform securing catch and stowing catch work properly (see your -10).</p> <p>Lubricate locking mechanism and catch as needed with OE/HDO.</p>	Any missing, broken or cracked platform hardware or vertical locking mechanism fail to lock in any position.

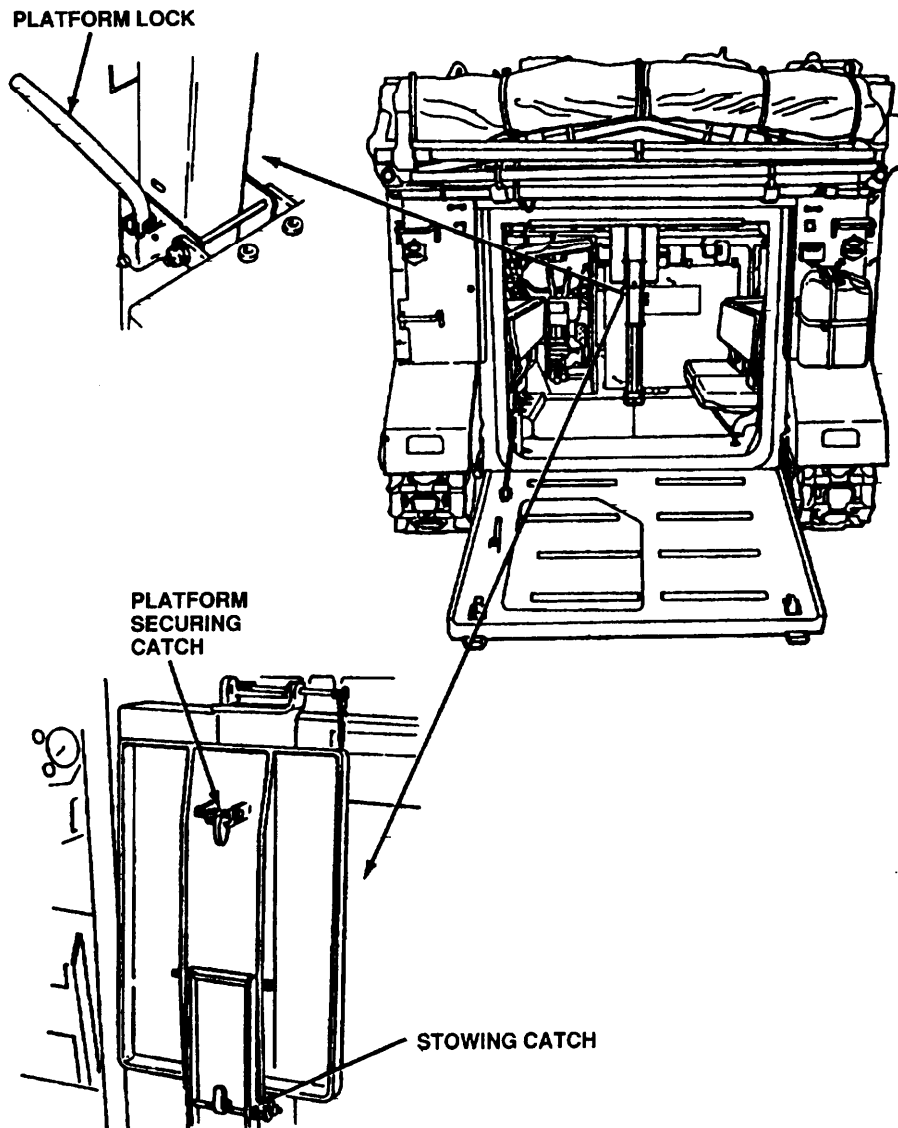


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
83	Semi-Annual	Com-mander's Cupola	<p>Replace cut, cracked, or hard cushioning pad. Replace vision blocks that have more than 50 percent impairment (see your -10).</p> <p>Replace cracked or chipped vision blocks (page 24-79).</p> <p>Check for smooth rotation of commanders cupola. Replace bearings as required.</p>	
84	Semi-Annual	Dome Lights	<p>Check that all dome lights work properly. Troubleshoot faulty lights (page 3-117).</p> <p>Tape frayed electrical leads and replace damaged connectors (page 14-3).</p>	

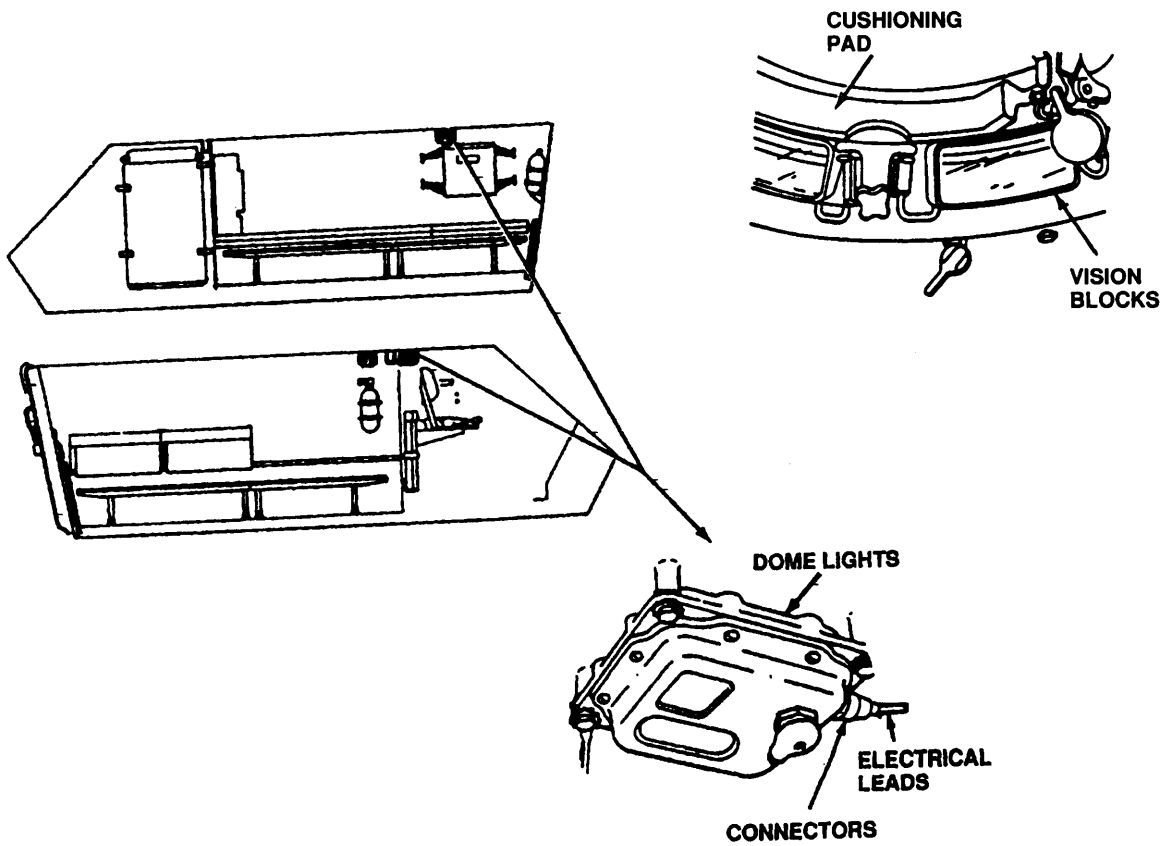


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

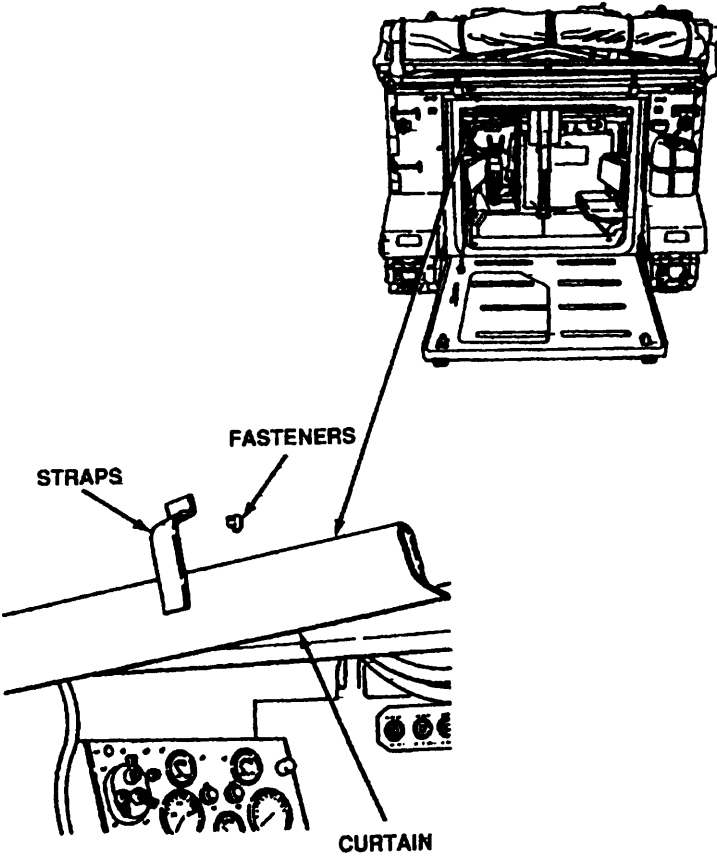
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
85	Semi-Annual	Blackout Curtain (M577A2 only)	<p>Repair or replace curtain that is torn or worn thin (page 24-171).</p> <p>Replace curtain that has torn or missing straps (page 24-171).</p> <p>Replace broken or missing fasteners (page 24-171).</p>	
 <p>The diagram illustrates the inspection points for the blackout curtain on an M113A2 FOV. It shows a top-down view of the vehicle with the rear hatch open, and a detailed side view of the curtain assembly. Labels with arrows point to 'STRAPS' (the attachment points on the curtain), 'FASTENERS' (small circular components), and 'CURTAIN' (the main fabric panel). The side view also shows the interior dashboard area with various gauges and controls.</p>				
86	Semi-Annual	Data Plates, Decals, Stencils, and Markers	Replace missing or damaged data plates, decals, stencils and markers (page 24-217).	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
87	Semi-Annual	Carrier	<p>Lubricate steering control lever and shaft bearings every 1500 miles or semi-annually with GAA.</p> <p>Lubricate tachometer and speedometer shafts annually with GIA. Disconnect shafts at both ends (TM 9-2350-261-20), remove slotted washers from drive ends of cores and remove cores from instrument panel end of shafts.</p> <p>Clean, inspect and lubricate cores. Insert cores in shafts. Install slotted washers and connect both ends of shafts. If tachometer adapter has a grease fitting, lubricate sparingly with GIA.</p>	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Inspected	Procedure	Not Mission Capable If:
88	Semi-Annual	Final Road Test	<p>Insure all operational faults are corrected. Pay attention to any items that were previously recorded on DA Form 2404.</p> <p>Perform final carrier road test. Drive carrier at least 5 miles (8 km).</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p><b>Power plant can be damaged. Do not pivot steering when carrier is moving except on a track failure emergency.</b></p> <p>Operate steering levers and check for satisfactory response (see your -10). With carrier operating at moderate speed and steering levers released, check for tendency to wander or pull to one side. Release accelerator and apply brakes. Check if carrier stops without pulling to one side. With carrier stopped on an incline, loch steering levers and move transmission to N position. Check that brakes loch securely and carrier is held in place. On level ground, operate pivot steer levers, one at a time, and check for pivot steer.</p> <p>If steering or brakes do not operate properly, see steering system troubleshooting (page 3-176).</p> <p>Check shifting of carrier in all ranges. If carrier does not respond properly to selected driving range, troubleshoot gear selection system (page 3-177).</p>	<p>Any Class III leaks or operational faults.</p> <p>Carrier fails to slow doen or stop.</p>
89			Deleted.	



Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
90	Semi-Annual	Capstan Drum and Adapter (M113A2 and M1059)	<p>Check capstan drum and adapter. Replace cracked or damaged drum or adapter. Tighten loose screws or retainer.</p> <p>If retainer can be unscrewed from drum, replace spring pin (page 34-2).</p>	

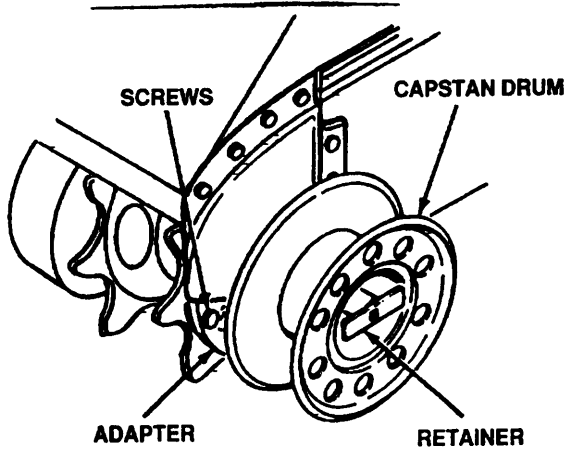
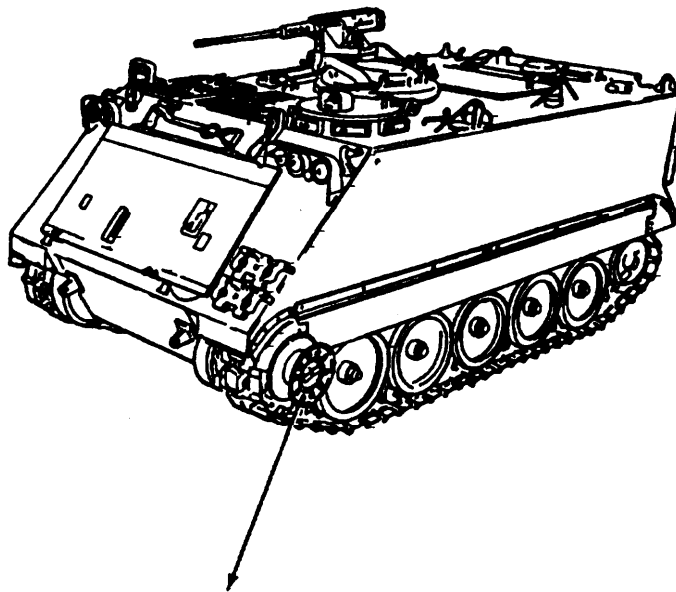




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
g1	Semi-Annual	Marine Recovery Kit (M113A2 and M1059) Tarpaulin	Check tarpaulin. Replace torn tarpaulin and missing or damaged straps.	
a	Semi-Annual	Anchors	Check anchors. Replace anchors that have missing or broken eyes, tines or handles.	
b	Semi-Annual	Towlines and Shackles	Check towlines and shackles. Replace damaged or worn towlines and shackles.	
c	Semi-Annual	Cables	Checkable. Replace frayed or damaged cable.	
d	Semi-Annual	Clamps	Check clamps. Tighten loose clamps.	
e	Semi-Annual	Stowage Brackets	Check stowage brackets and hooks. Replace damaged or missing parts.	

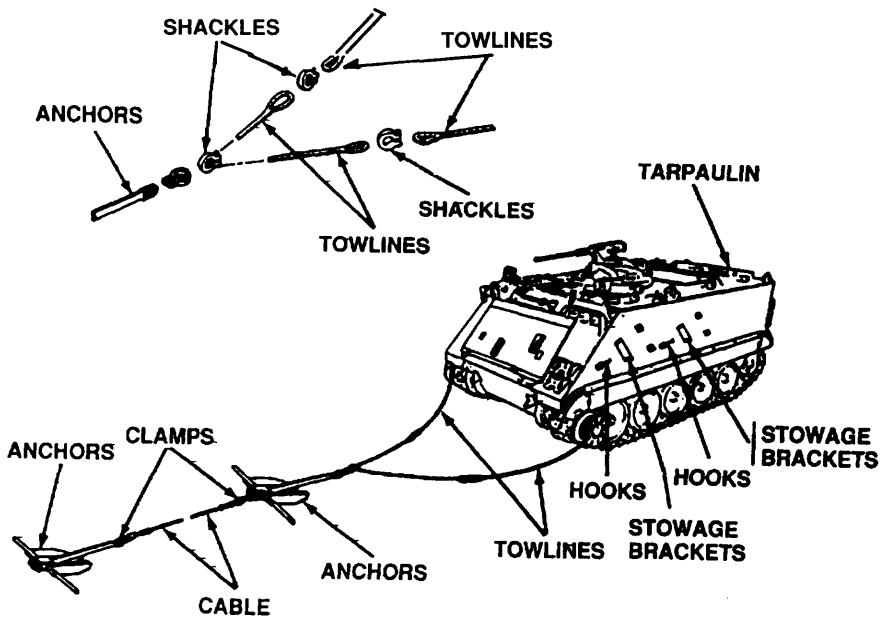


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
92	Semi-Annual	Chemical Agent Automatic Alarm Kit	<p>Perform preventive maintenance checks and services every 750 miles (1207 km), 75 hours, or semi-annually, whichever comes first.</p> <p>Cable maintenance is limited to replacement of terminals (page 44-4). Notify your supervisor for replacement of cable.</p> <p>Remove distributor box from hull (page 44-2). Check terminal board and circuit breaker. Tighten loose connections. Install distribution box on hull (page 44-2).</p>	

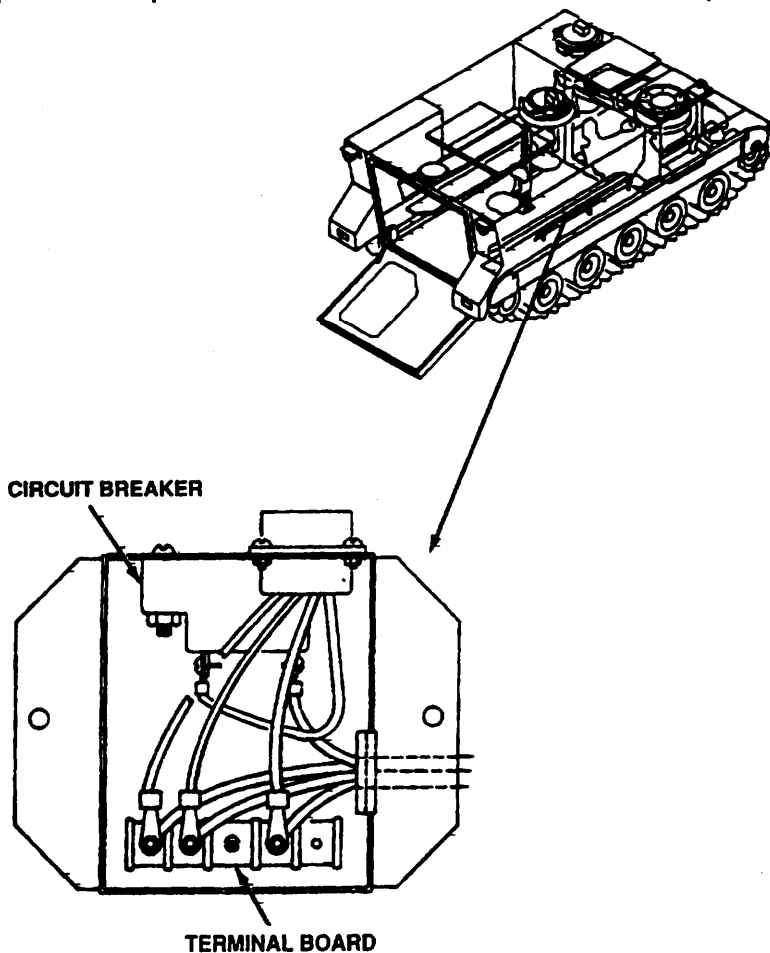


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
92	Semi-Annual	Chemical Agent Automatic Alarm Kit  Continued	<p style="text-align: center;"><b>NOTE</b></p> <p><b>Additional data on Chemical Agent Automatic Alarm Kit for the M113 FOV can be found in:</b>  <b>TM 3-6665-224-12 Operators and Unit Manual</b>  <b>TM 3-6665-274-20 Unit Maintenance Manual</b>  <b>TM 9-2350-261-24P Unit Repair Parts Manual.</b></p> <p>Check mounting screws on junction box. Tighten loose screws to 72 lb-in (8 N.m) torque. Use torque wrench (Item 93, Appendix D) and socket set (Item 89, Appendix D).</p> <p>Check grommet. Replace cracked or worn grommet.</p> <p>Check cable and circuit breaker terminals. Tighten loose connections. Replace damaged terminals (page 44-4).</p> <p>Check cables. Replace frayed or cracked cables (page 44-5).</p>	

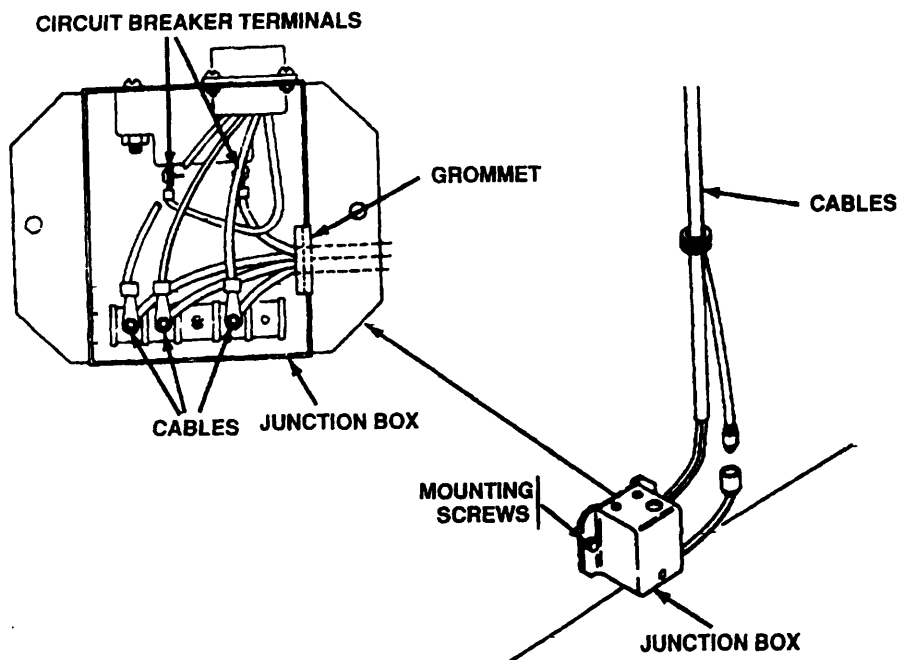


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
92	Semi-Annual	Chemical Agent Automatic Alarm Kit Continued	<p>Check brackets. Replace cracked or broken brackets.</p> <p>Check mounting screws. Tighten loose screws. Tighten screws to 264-285 lb-in (30-32 N.m) torque. Use torque wrench (Item 95, Appendix D) and socket set (Item 89, Appendix D).</p> <p>Check straps. Replace worn straps.</p>	

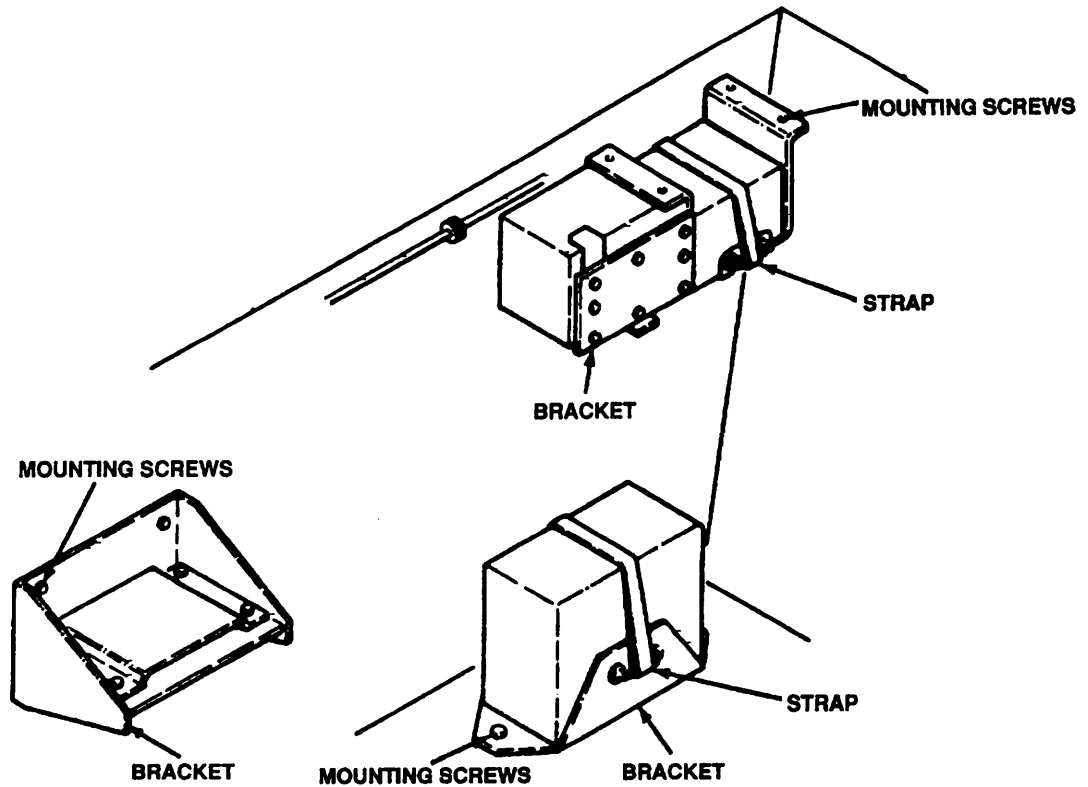


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
93	Semi-Annual	Electronic Equipment Heater (M577A2 only)	<p>Tighten loose mounting screws and clamps.</p> <p>Remove control cover by turning screw to the left.</p> <p>Check flame detector switch and ignition control. See TM 9-2540-205-24&amp;P.</p>	

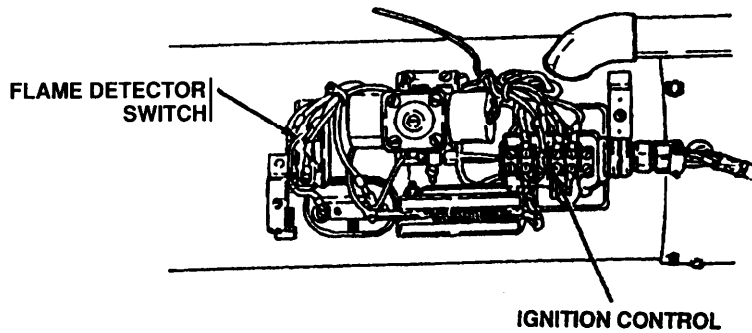
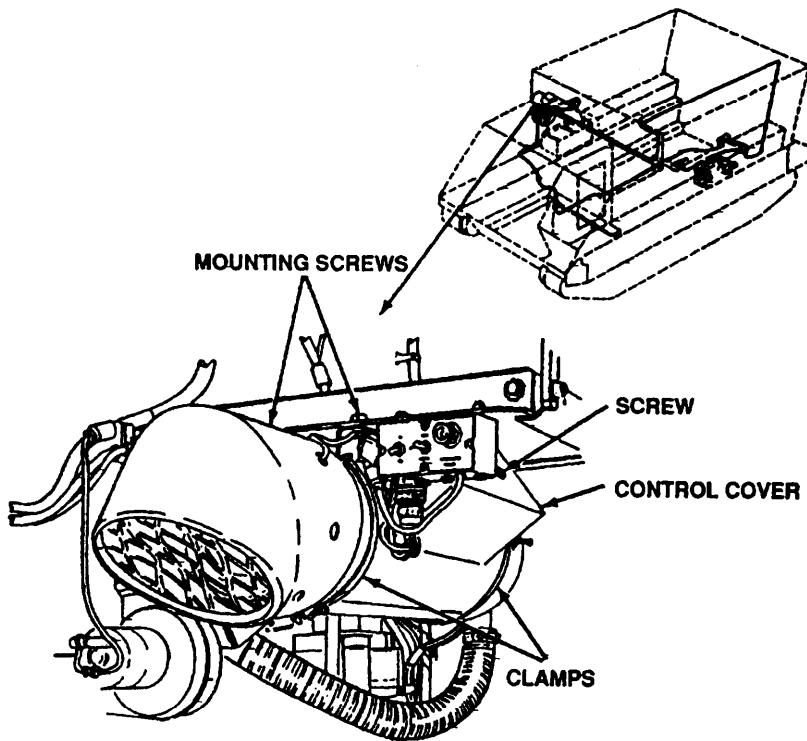


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
94	Semi-Annual	Fuel System (M577A2 only)	Check heater fuel pump, fuel lines, and connections. Tighten connections that leak. Replace connections that continue to leak.	Any fuel leaks.
95	Semi-Annual	Exhaust System (M577A2 only)	<p style="text-align: center;"><b>NOTE</b></p> <p><b>Your carrier may be equipped with new exhaust pipes which do not require muffler clamps.</b></p> <p>Check muffler for signs of exhaust leaks. Tighten loose clamps.</p>	Any exhaust leaks.

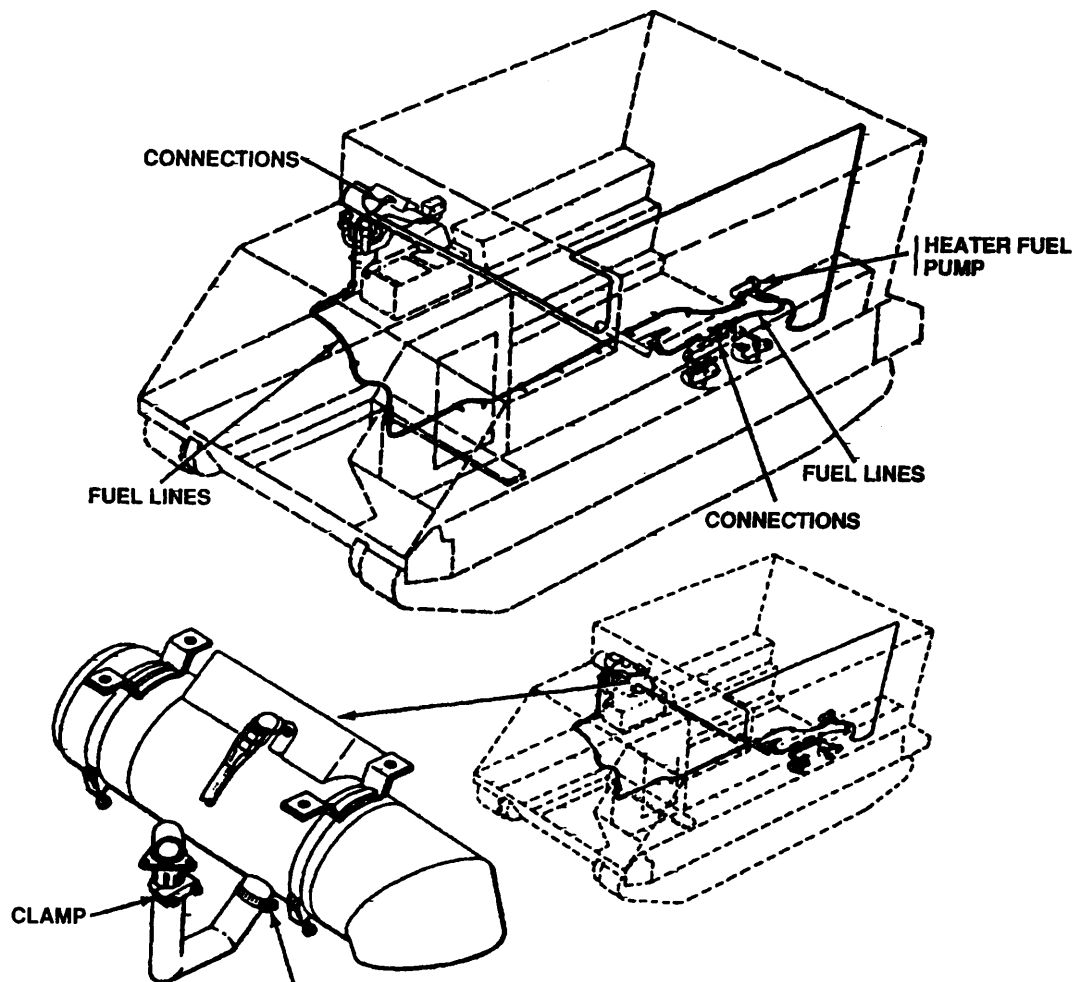


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
96	Semi-Annual	Electrical System (M577A2 only)	<p>Check electrical leads and connectors at heater, at control box, and at fuel pump. Tape frayed leads. Replace damaged connectors.</p> <p>Check heater control box, switches, and light bulb. Tighten or replace bad switches and bulbs (page 31-11).</p>	

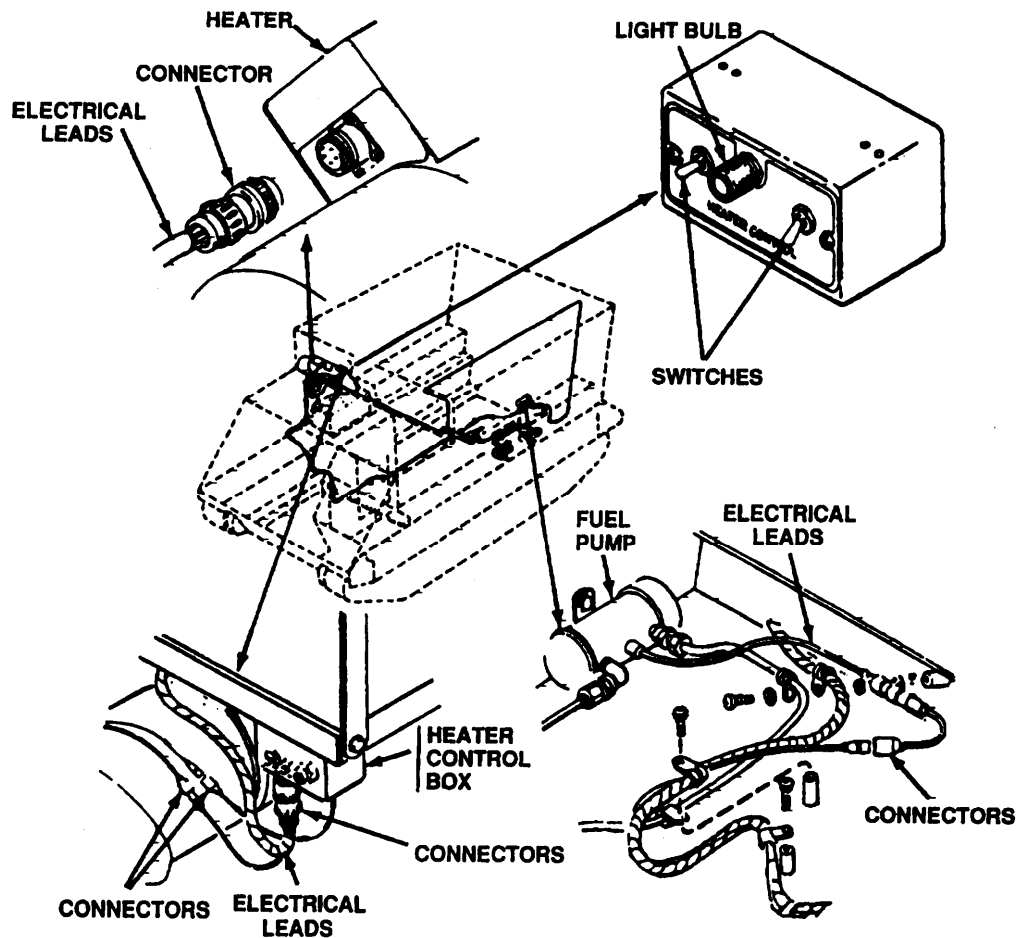


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
97	Semi-Annual	Performance Test (M577A2)	<p>Start, run and stop heater (see your -10). During start cycle, check that switches and light work right. Check for increase in blower speed after ignition.</p> <p>During operation, check for unusual noises. Check for differences between high and low heat levels. When stopping heater, check for correct purge cycle. Check that indicator light operates properly. If heater does not operate as specified above, perform troubleshooting (page 3-207).</p>	Any faults that would prevent proper operation.

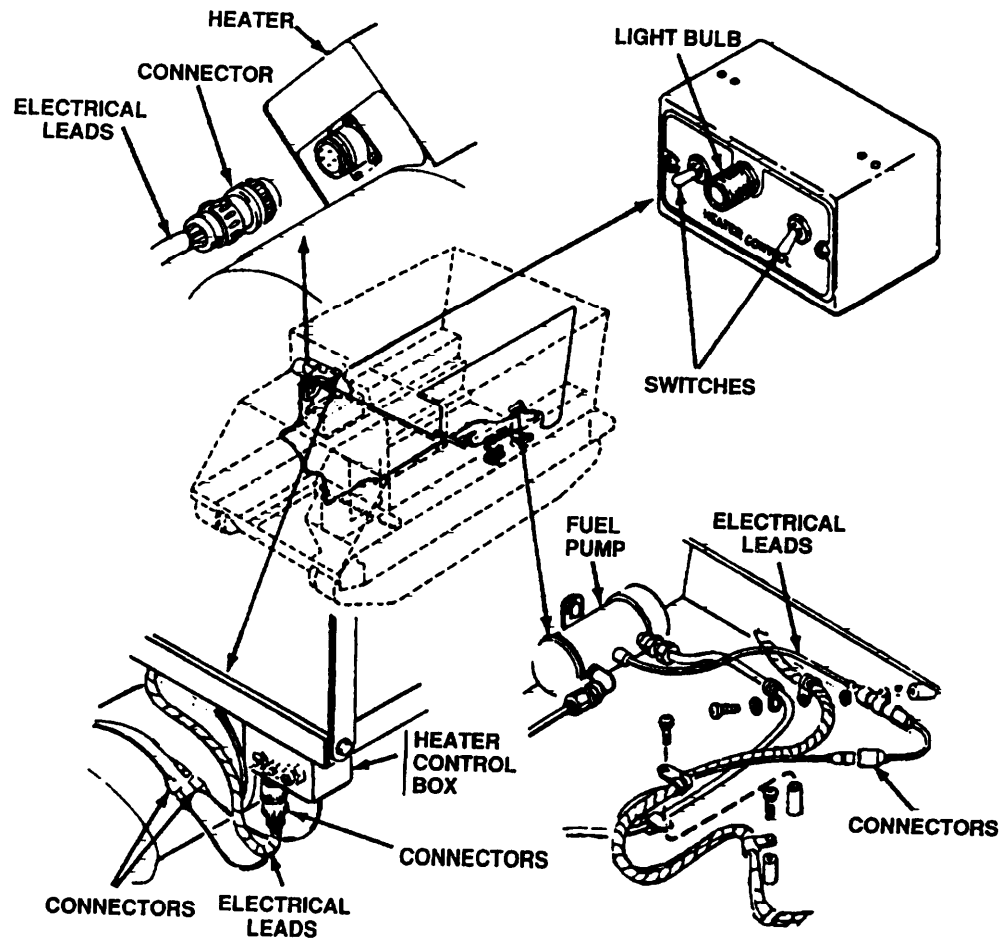




Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
98	Semi-Annual	Engine Coolant Heater Kit	<p>Perform preventive maintenance checks and services every 750 miles (1207 km), 75 hours, semi-annually or whichever comes first.</p> <p>Tighten mounting screws and clamps.</p> <p>Check heater inlet for debris.</p> <p>Tighten mounting screws.</p> <p>Check pump for leaks. Tighten connections that leak.</p>	Any fuel, coolant or exhaust leaks.

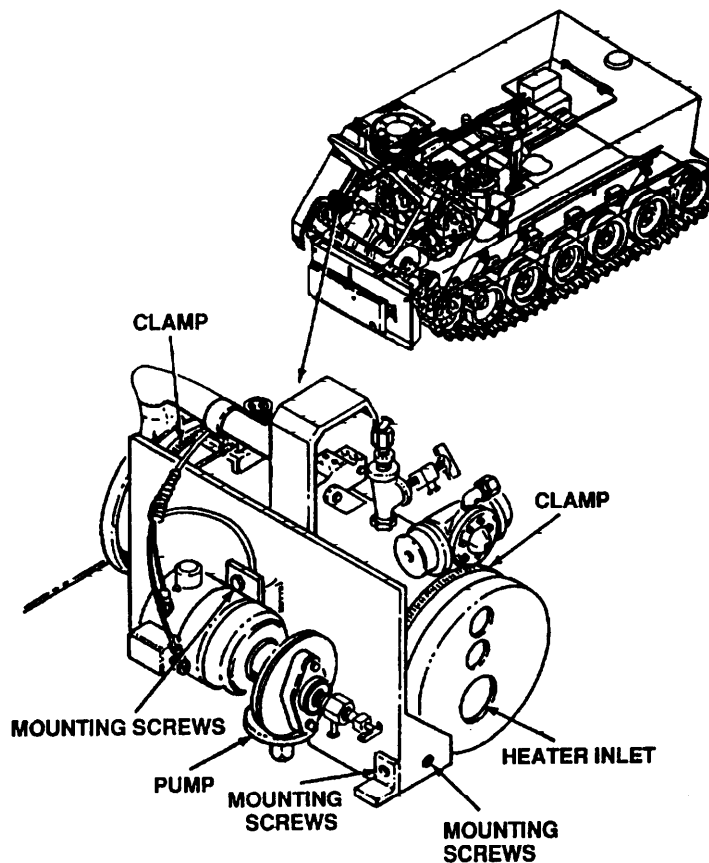


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
98	Semi-Annual	Engine coolant Heater Kit  Continued	<p>Check heat exchanger and hose connections for leaks. Tighten connections that leak. Replace connections that continue to leak.</p> <p>Check hose. Replace damaged hose (page 32-25).</p>	

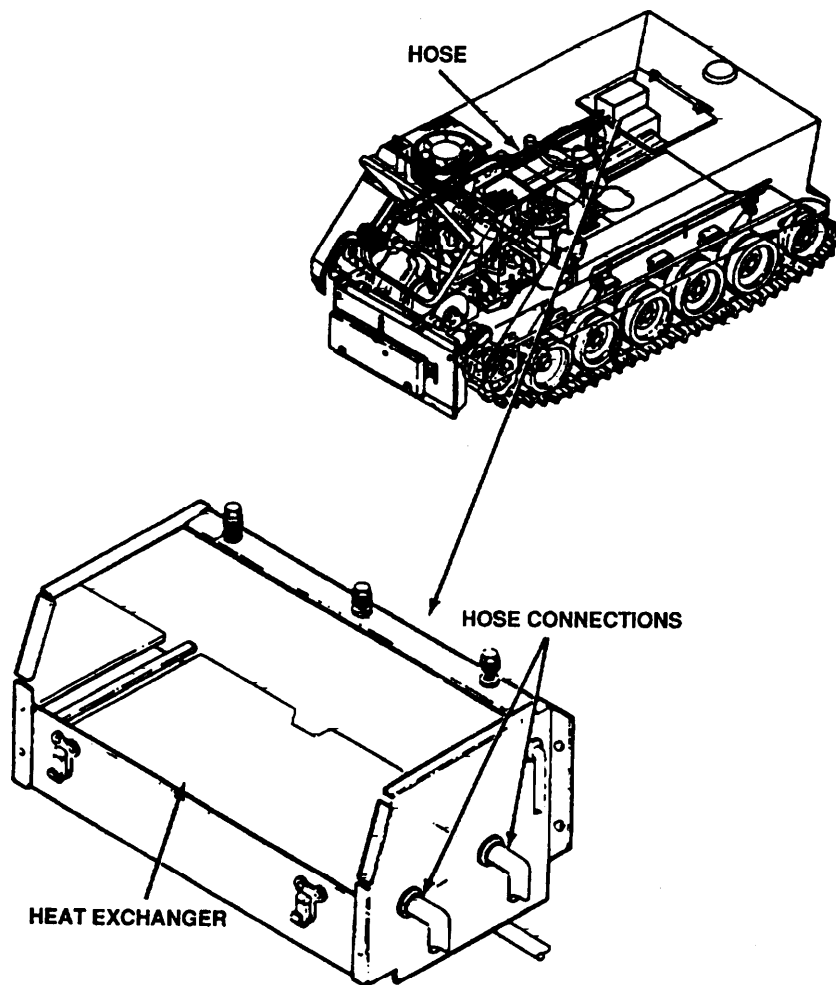


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
98	Semi-Annual	Engine coolant Heater Kit  Continued	<p>Check clamps and mount flange for exhaust leaks. Tighten clamp. Replace bad flange gasket (page 32-41).</p> <p>Check exhaust pipe. Replace cracked or damaged pipe.</p>	

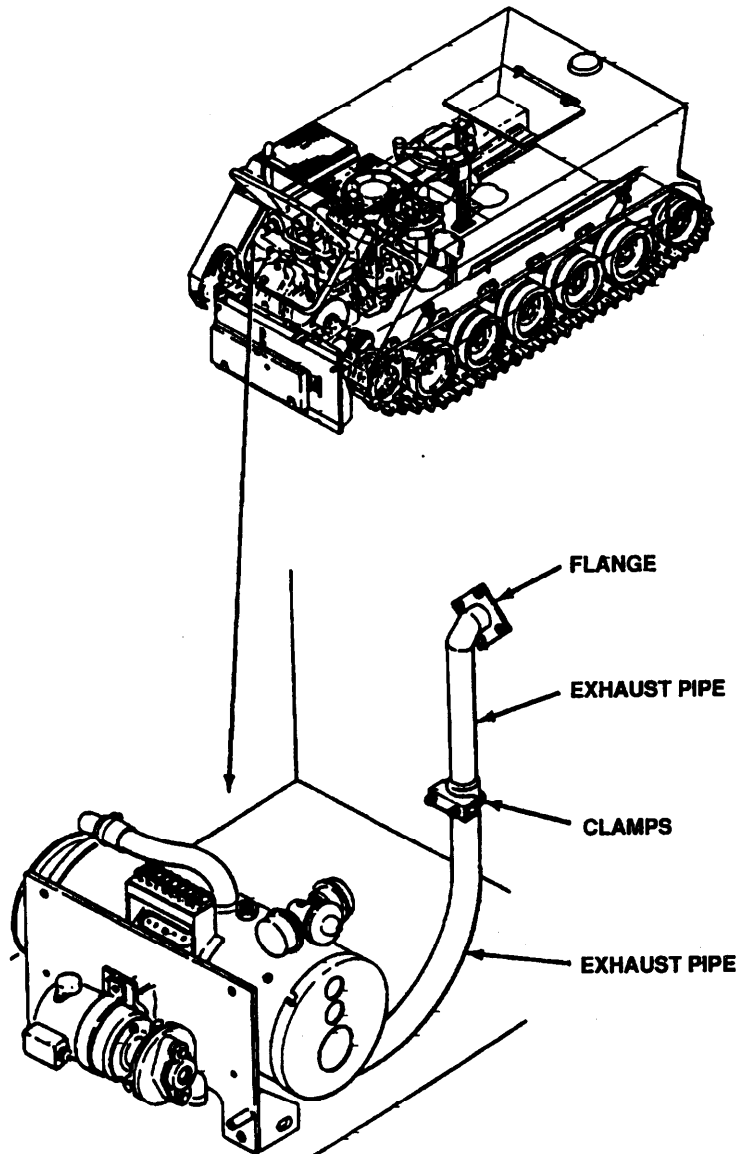


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
98	Semi-Annual	Engine coolant Heater Kit  Continued	<p>Check fuel hoses, hose connections and fuel pump for leaks. Tighten connections that leak. Replace connections that continue to leak.</p> <p>Service fuel pump (page 32-10).</p> <p>Tighten fuel pump mounting screws.</p>	

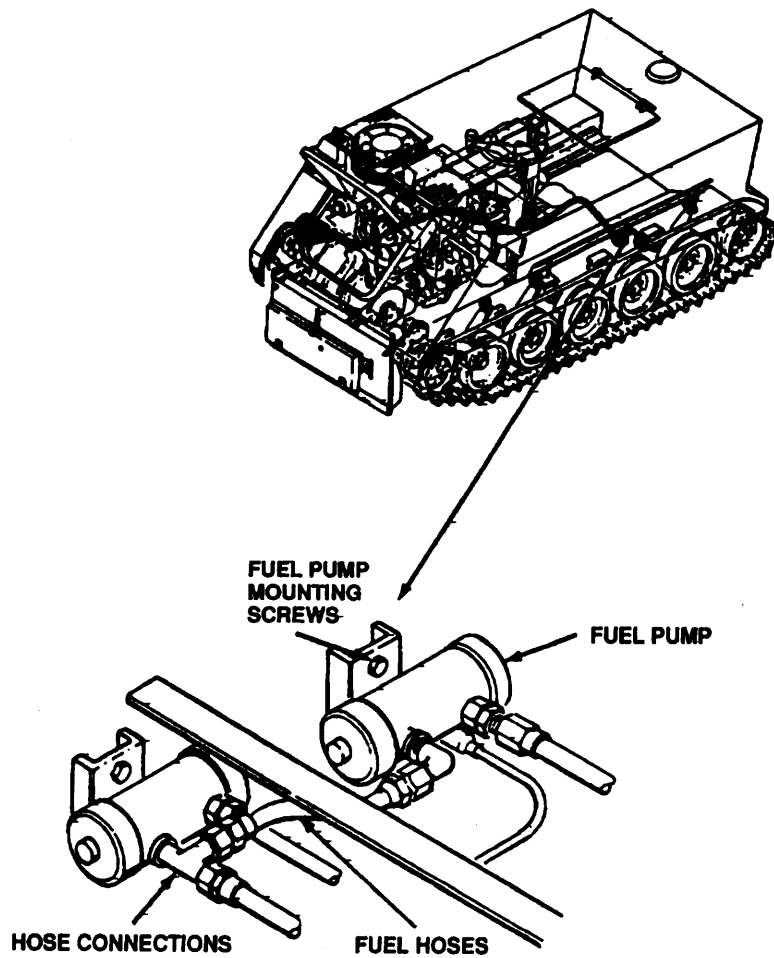


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
98	Semi-Annual	Engine Coolant Heater Kit  Continued	<p>Check electrical leads and connectors at heater, at control box, and at fuel pump. Tape frayed leads. Replace damaged connectors (page 14-1).</p> <p>Check heater control box, switches and light bulb. Tighten or replace bad switches and bulb (page 32-42).</p>	

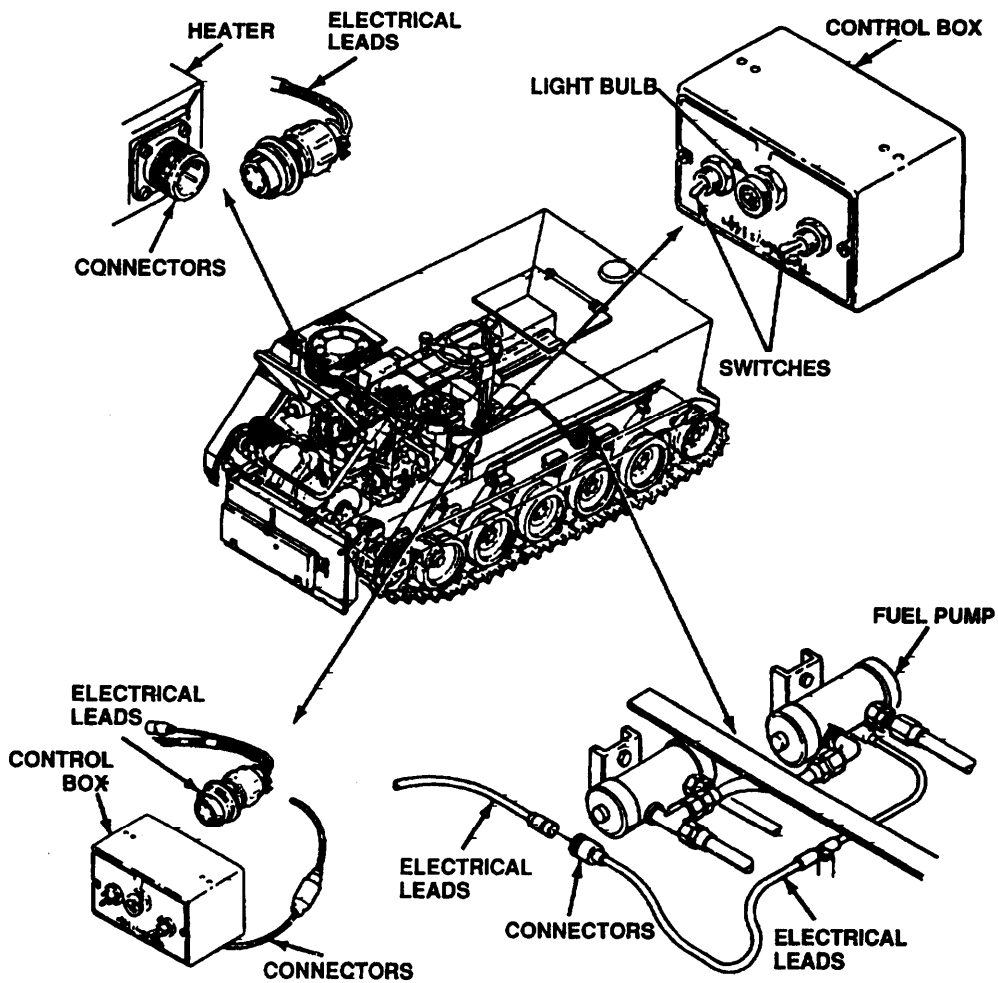


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
98	Semi-Annual	Engine Coolant Heater Kit  Continued	<p>Start, run and stop heater (see your -10). During start cycle, check that switches and lights work properly.</p> <p>During operation, check for unusual noises. Check for increase in coolant temperature.</p> <p>When stopping heater, check for correct purge cycle. Check that indicator light operates properly. If heater does not operate as specified above, perform troubleshooting (page 3-217).</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>The carrier is not considered NMC for an unserviceable litter kit. If litter kit hardware is unserviceable, the kit should be removed to prevent use.</b></p>	Any faults that would prevent proper operation.
99	Semi-Annual	Litter Kit	<p>Perform preventive maintenance checks and services every 750 miles (1207 km), 75 hours, semi-annually or whichever comes first.</p> <p>Check hanger. Replace hanger if cracked or if threads are stripped.</p> <p>Check three repair links. Replace cracked links.</p> <p>Check chain. Replace chain if links are broken.</p> <p>Check two litter straps. Replace straps if torn or if buckles are damaged.</p>	

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
99	Semi-Annual	Litter Kit Continued	<p>Check two litter hooks. Replace hooks if cracked or if they can't be recurved to hold litters.</p> <p>Check chain. Replace chain if links are broken.</p> <p>Check S hooks. Replace damaged S hooks.</p> <p>Check helical spring. Replace cracked spring.</p> <p>Check chain hook. Replace hook if cracked or if it can't be recurved.</p>	

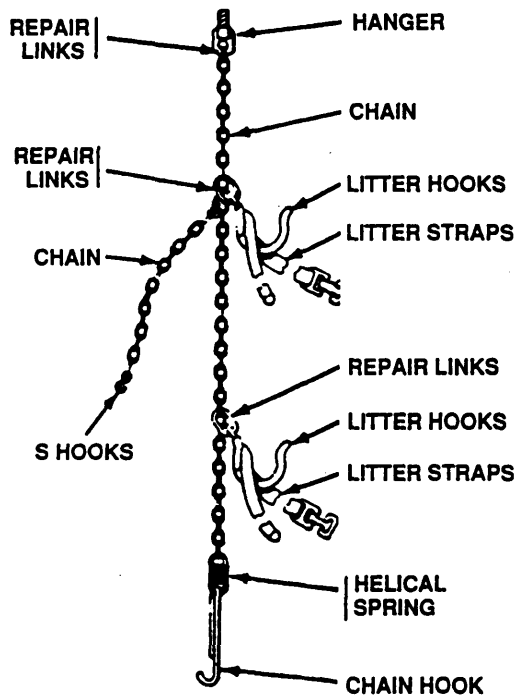


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

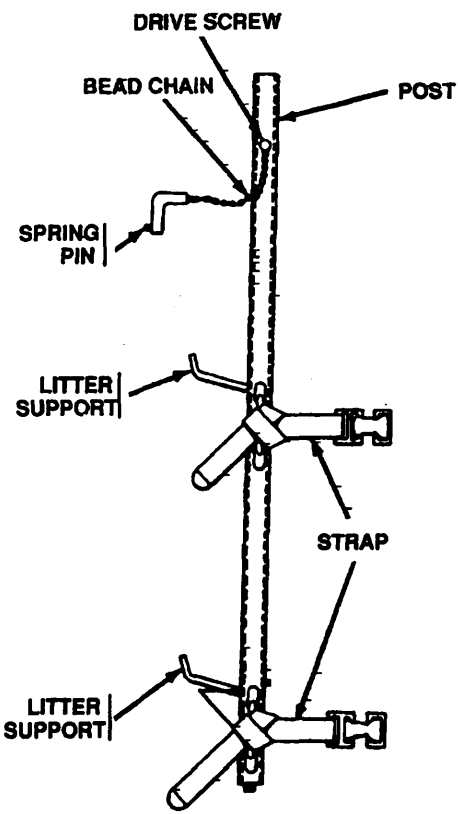
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
99	Semi-Annual	Litter Kit Continued	<p>Check post. Straighten bent posts. Replace cracked posts.</p> <p>Check drive screw. Make sure it holds bead chain securely. Replace loose screw.</p> <p>Check bead chain. Replace broken chain.</p> <p>Check spring pin. Replace loose pin.</p> <p>Check litter support. Replace post if support is cracked.</p> <p>Check strap. Replace strap if torn or if buckles are damaged.</p>  <p>The diagram shows a vertical post with a drive screw at the top. A bead chain is attached to the post. A spring pin is located on the post. Two litter supports are attached to the post. A strap is attached to the litter supports.</p>	



Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
100	Semi-Annual	Machine Gun Armor Shield Kit	<p>Check right armor shield. Repair bad welds (TM 9-237). Repair or replace cracked shield.</p> <p>Check doors and two clips. Straighten dents and bends. Replace cracked door or clip.</p> <p>Check left armor shield. Repair bad welds (TM 9-237). Repair or replace cracked shield.</p> <p>Check doors and clips. Straighten dents and bends. Replace cracked door or clip.</p> <p>Replace stowage strap or clamp if damaged.</p>	

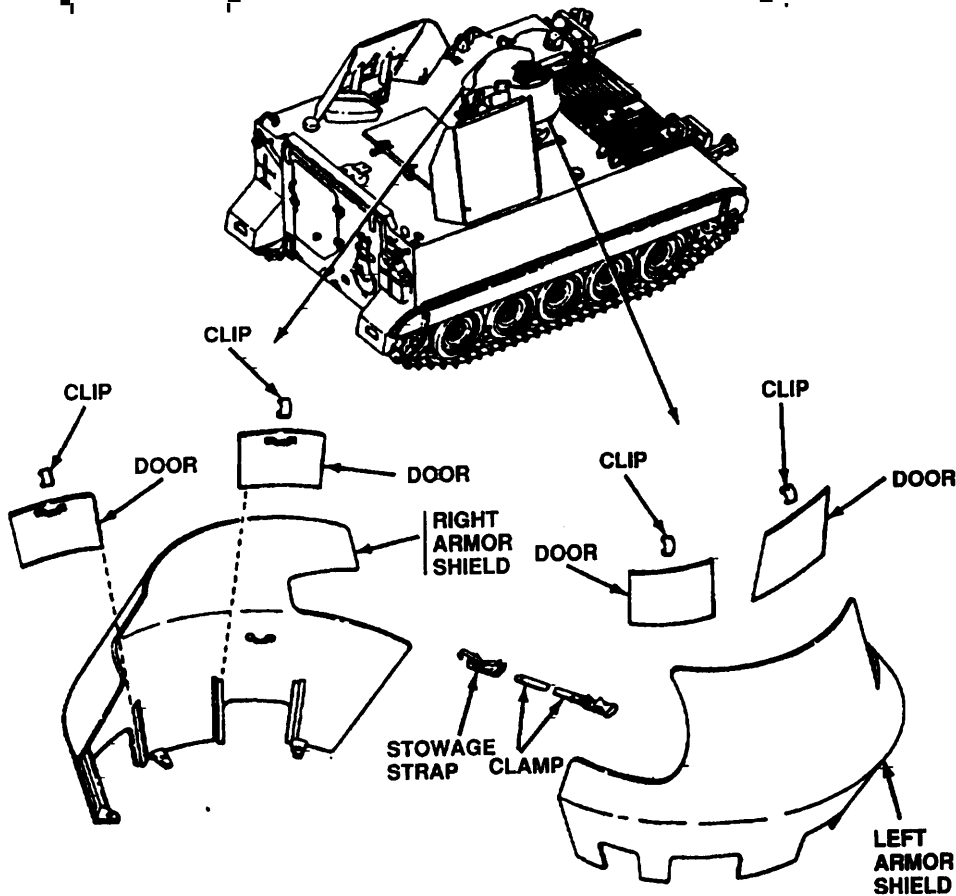


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
100	Semi-Annual	Machine Gun Armor Shield Kit  Continued	Check periscope door and door bracket on machine gun mount. Straighten dents and bends. Replace cracked parts.	

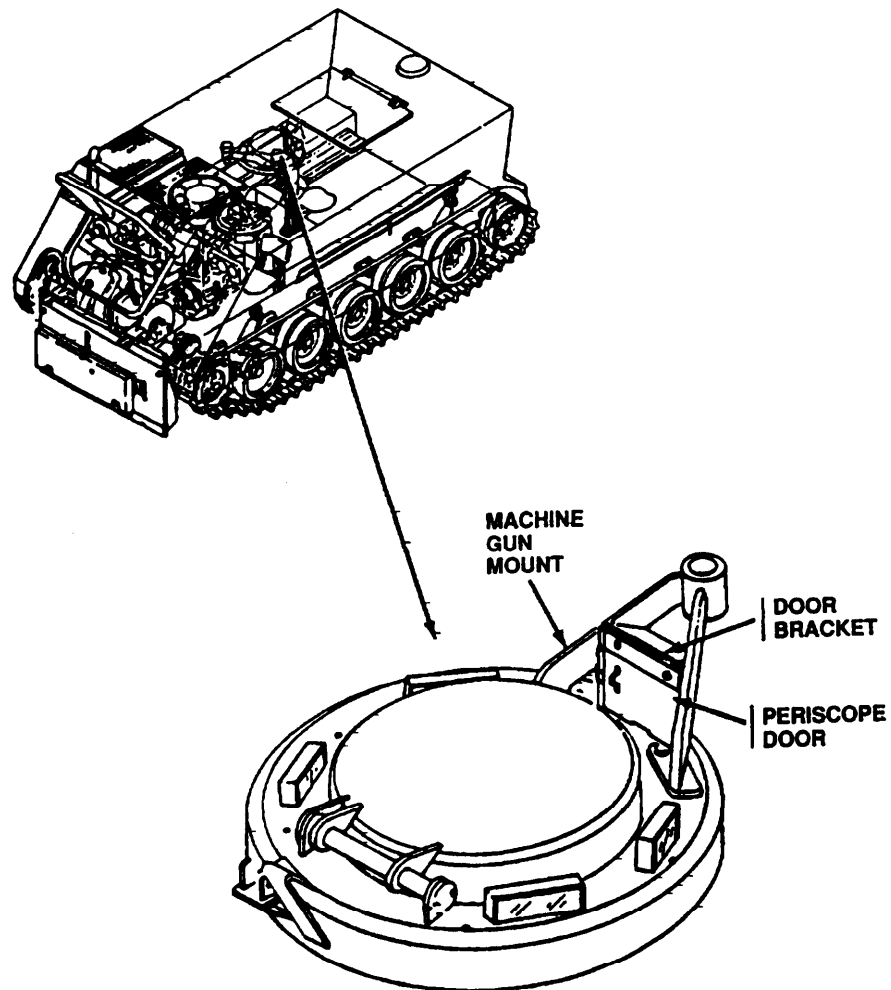


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
100	Semi-Annual	Machine Gun Armor Shield Kit  Continued	<p>Check left armor shield. Repair or replace cracked shield.</p> <p>Check straps. Replace worn or damaged straps.</p> <p>Check mounting arm. Replace damaged mounting arm.</p> <p>Check gun strap. Replace damaged strap.</p> <p>Check bracket and clip. Replace cracked or bent bracket.</p> <p>Check right gun traverse restrictor. Replace restrictor that has cracked rod or spring.</p>	

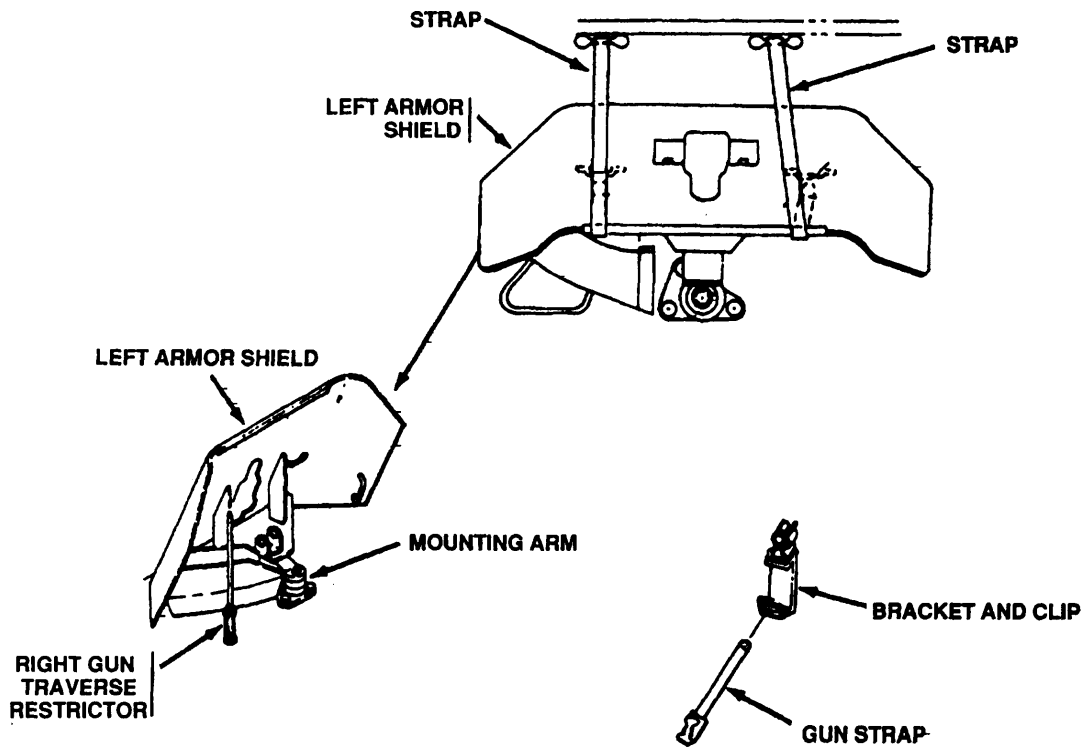


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
100	Semi-Annual	Machine Gun Armor Shield Kit Continued	<p>Check interior mounting plate. Replace cracked or damaged parts.</p> <p>Check strap, mounting plate and pintle socket. Replace cracked or damaged parts.</p>	

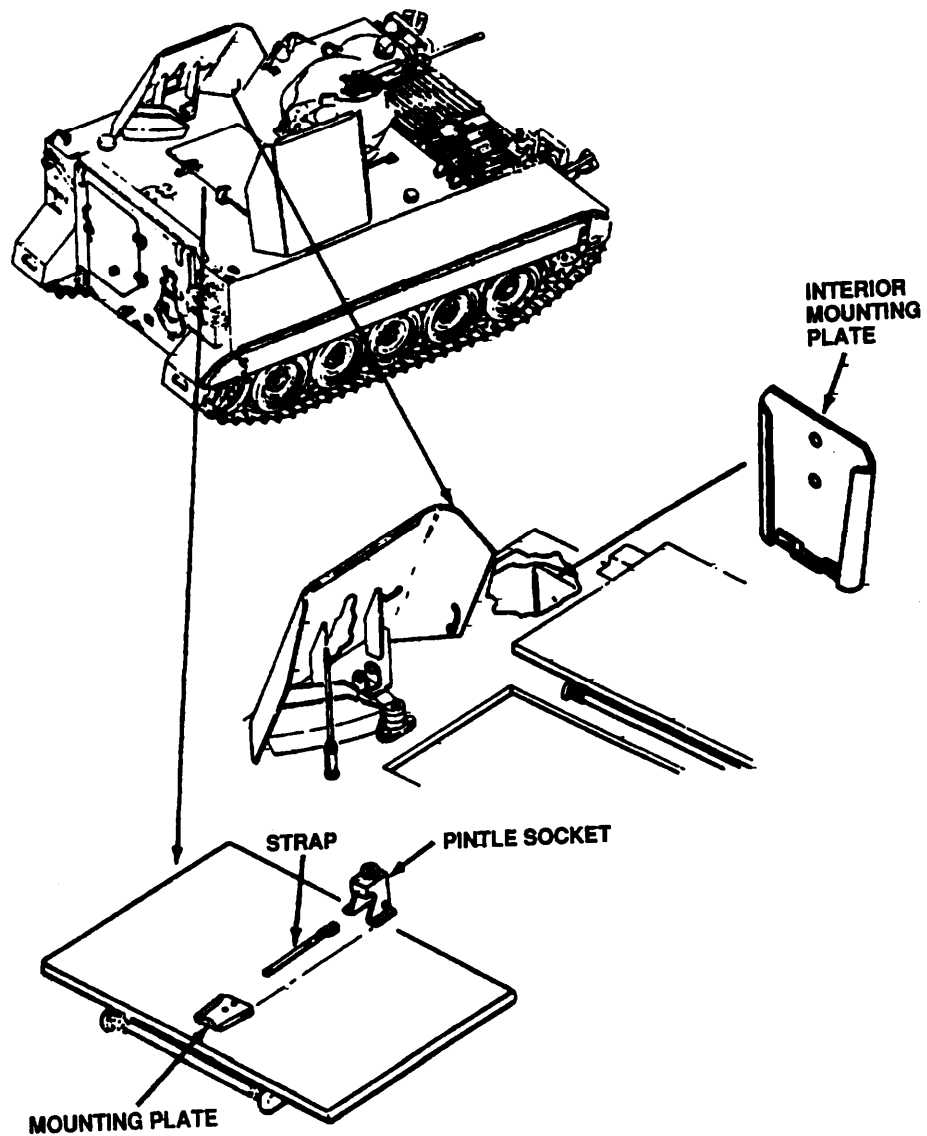


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
101	Semi-Annual	Personnel Heater Kit	<p>Tighten loose mounting screws and clamps.</p> <p>Remove control cover by turning two screws to the left.</p> <p>Check flame detector switch and ignition control (see TM 9-2540-205-24&amp;P).</p> <p>Check heater fuel pump, fuel lines and connections for leaks. Replace connections that continue to leak.</p> <p>Check for signs of exhaust leaks. Tighten clamps.</p>	Any fuel, coolant or exhaust leaks.

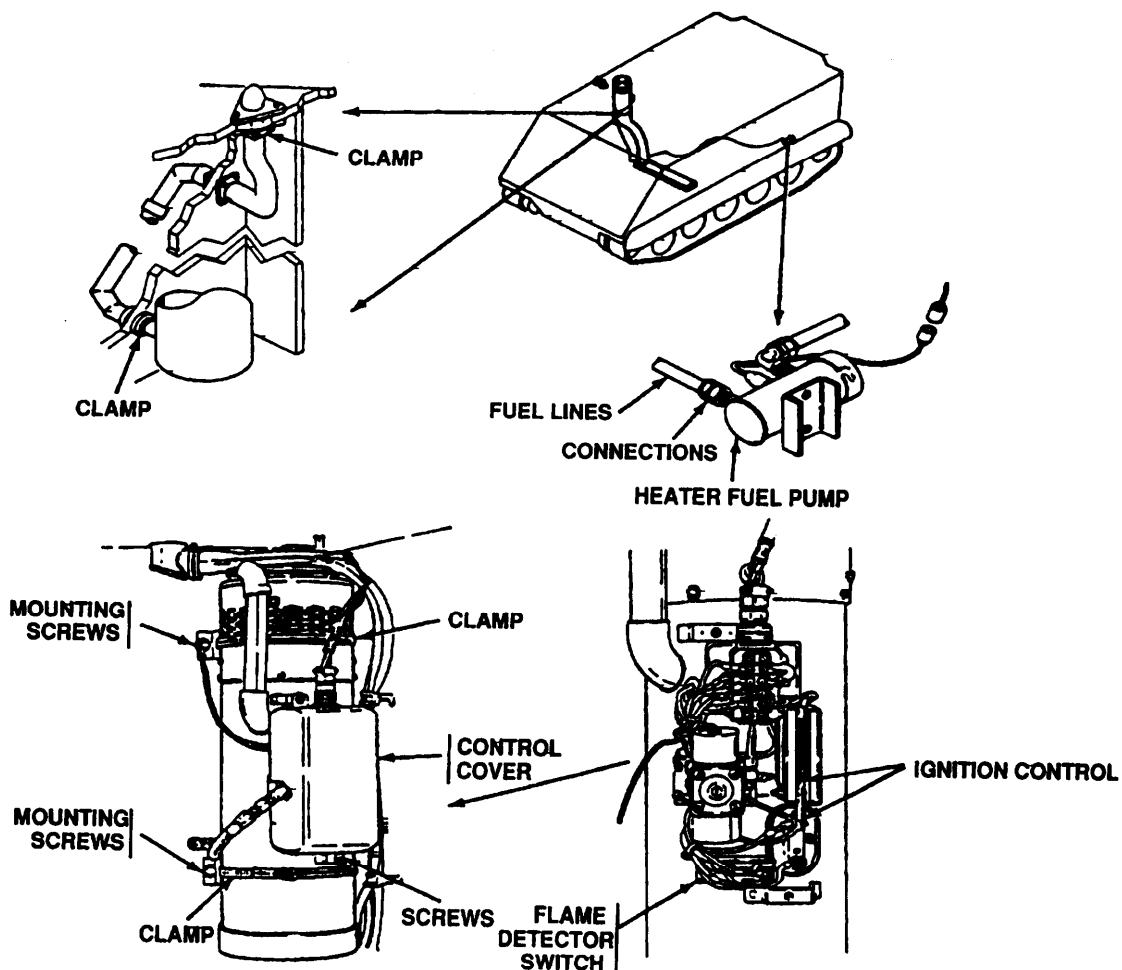


Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
101	Semi-Annual	Personnel Heater Kit  Continued	<p>Check electrical leads and connectors at heater, at heater control box and at fuel pump. Tape leads if frayed. Replace damaged connectors (page 14-1).</p> <p>Check heater control box, switches and light bulb. Tighten or replace bad switches and bulbs (page 29-43).</p> <p>Start, run and stop heater (see your -10). During start cycle, check that switches and lights work properly. Check for increase in blower speed after ignition.</p> <p>During operation, check for unusual noises. Check for differences between high and low heat levels.</p> <p>When stopping heater, check for correct purge cycle. Check that indicator light operates properly. If heater does not operate as specified above, perform troubleshooting (page 3-207).</p>	

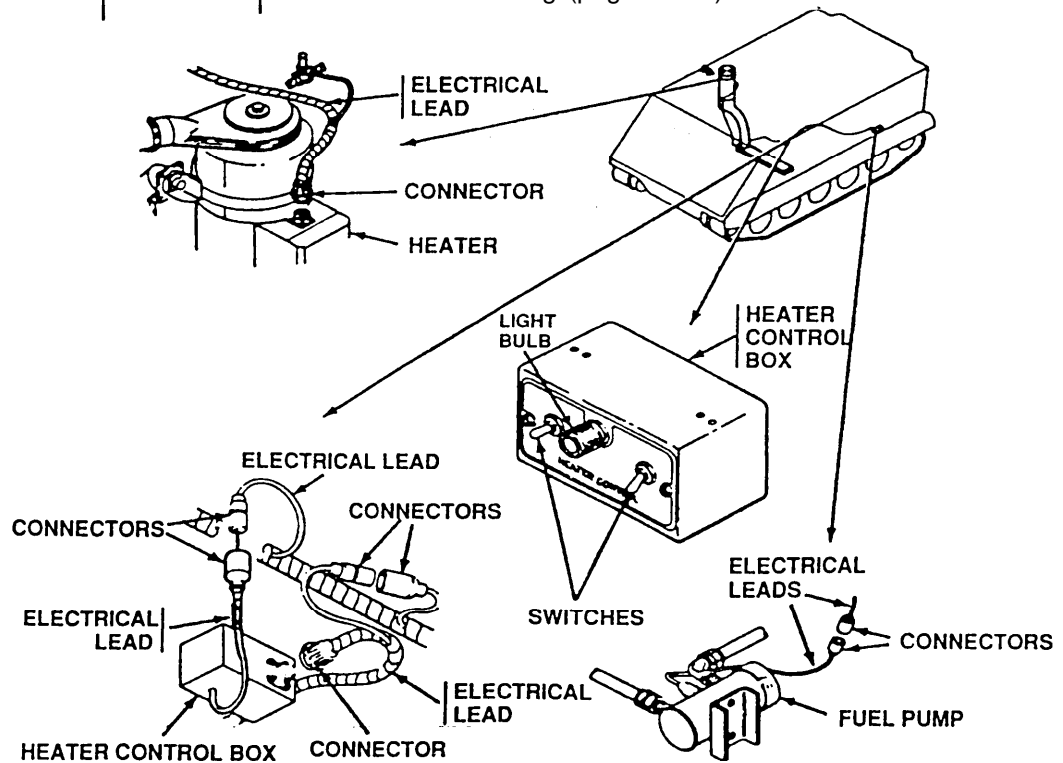


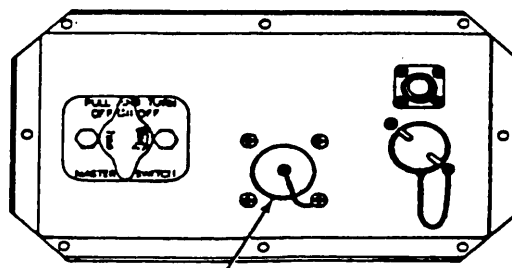
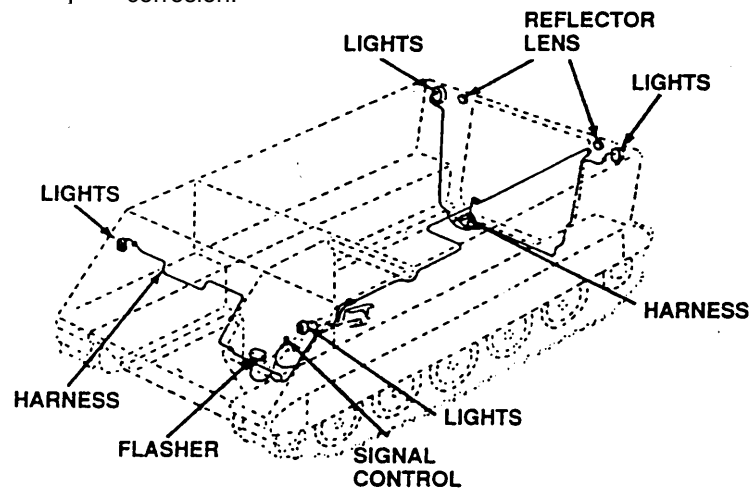
Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
102	Semi-Annual	Driver's Windshield Kit	<p>Clean windshield with clean water. Check windows. Replace cracked or chipped windshield.</p> <p>Check windshield. Replace windshield that has broken or missing legs.</p> <p>Check mounting bracket and plates. Replace damaged bracket or plates.</p> <p>Check windshield canvas. Repair tears with sealing tape (Item 56, Appendix C), or replace windshield.</p>	
103	Semi-Annual	Ramp Non-Skid Winterization Kit (M106A2 and M125A2 only)	<p>Check non-skid plates for cracks. Tighten loose mounting plate bolts. Replace cracked plates.</p>	

The diagram shows an M113A2 vehicle from a top-down perspective. An arrow points from the vehicle to a detailed view of the driver's compartment. This view is labeled with 'WINDOWS' pointing to the front and side glass, 'LEGS' pointing to the windshield support structure, 'PLATES' pointing to the base of the windshield, and 'MOUNTING BRACKET' pointing to the structure below the windshield. Below this, another detailed view shows the 'NON-SKID PLATES' on the ramp, with an arrow pointing to the textured surface of the plates.

Table 2-1. Unit Level Preventive Maintenance Checks and Services for M113A2 FOV

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
104	Semi-Annual	Turn Signal Lights, stop Lights, and Blackout stop Lights	Test operation of lights with signal control in all four operating positions. Repair or replace damaged or discolored lens. Repair or replace defective lights, control, flasher and lights.	
105	Semi-Annual	Reflectors	Check reflector lens. Replace damaged or missing lens.	
106	Semi-Annual	Electrical Wiring	Tighten electrical connections and mounting brackets. Tape frayed harness. Replace missing or damaged connectors.	
106	Semi-Annual	Slave Cable	Check the slave cable receptacle and cap for damage, burnt condition and corrosion.	



SLAVE CABLE RECEPTACLE AND CAP



**PMCS PARTS LIST**

The following list of parts is required when performing semi-annual, annual, or on-condition PMCS. The semi-annual parts list contains the mandatory replacement parts for one semi-annual PMCS. The annual parts list contains the mandatory replacement parts for one semi-annual PMCS combined with the mandatory replacement parts for one (1) annual PMCS. The on-condition parts list contains replacement parts that are required when engine and transmission oil changes are directed by the Army Oil Analysis Program (AOAP) Laboratory. If AOAP Laboratory support is not available, change oil and filter elements/gaskets every 1500 miles or annually.

SEMI-ANNUAL (1500 Miles)

ITEM NO	PART NUMBER	NSN	NOMENCLATURE	QTY
1.	MS28775-126	5305-00-702-1048	Packing	1

ANNUAL (1500 Miles)

ITEM NO	PART NUMBER	NSN	NOMENCLATURE	QTY
1.	MS28775-126	5330-00-702-1048	Packing	1
2.	10874832	4730-00-766-4714	Filter	1
3.	8756978	5310-00-655-9669	Key Washer	4
4.	MS28775-231	5330-00-527-7025	Packing	1
5.	5574161	5330-00-846-9841	Gasket	1
6.	CW226MP	2910-00-287-1912	Filter, Element	1
7.	5574126	5330-00-612-3123	Gasket	1
8.	1503536	5330-00-551-0433	Gasket	1
9.	T552	2940-00-745-7730	Filter, Element	1
10.	K-22002	2940-00-755-6584	Filter, Element (M741A1 Only)	1

ON-CONDITION (1500 Miles)

ITEM NO	PART NUMBER	NSN	NOMENCLATURE	Qty
1.	MS35802-3	2940-00-580-6283	Filter, Element	1
2.	5571024	5330-00-290-7860	Gasket	1
3.	5187310	5330-01-604-8094	Packing	1
4.	MS35769-21	5330-00-514-3289	Gasket	1
5.	C-1670	2940-00-678-0641	Filter, Element	1
6.	6772423	5330-00-064-6598	Packing	1
7.	6772373	5330-00-999-3756	Packing	1

LUBRICATION TABLE  
M113A2 FOV

**CHART A - LUBRICANTS FOR ENGINE APPLICATIONS\*\***

LUBRICANT	EXPECTED TEMPERATURE																				
	*F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120	
	*C	-67	-51	-48	-40	-34	-28	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+40	
OE/HDO (MIL-L-2104)	Lubricating Oil, ICE																				
OEA (MIL-L-46167)	Lubricating Oil, ICE, Arctic																				
OE/HDO-15/40 (O-1236)																					
OEA* (O-183)																					

\* If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE / HDO lubricant for all expected temperatures where OE / HDO is specified.

\*\*Engine applications include: engine, transfer gearcase, differential, final drives, fan gearbox, rampwire rope, oil can points.

LUBRICATION TABLE  
M113A2 FOV  
(Continued)

CHART B - LUBRICANTS FOR TRANSMISSION APPLICATIONS

LUBRICANT	EXPECTED TEMPERATURE																	
	°F																	
	-75	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100
	°C																	
	-57	-41	-40	-40	-34	-23	-16	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+40
OE/HDO (MIL-L-2104) OEA (MIL-L-46167)	Lubricating Oil, ICE, Tactical																	
	Lubricating Oil, ICE, Arctic																	
OE/HDO-15/40 (O-1236)																		
OEA* (O-183)																		

\* If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE / HDO-15 / 40 lubricant for all expected temperatures where OE / HDO-15 / 40 is specified.

CHART C - FLUIDS FOR HYDRAULIC SYSTEM APPLICATIONS

LUBRICANT	EXPECTED TEMPERATURE																	
	°F																	
	-75	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100
	°C																	
	-57	-41	-40	-40	-34	-23	-16	-12	-	+7	+4	+10	+16	+21	+27	+32	+38	+40
FHM (MIL-H-46170)	Hydraulic Fluid, Rust Inhibited Fire Resistant, Synthetic Hydrocarbon Base																	
FHM																		

LUBRICATION TABLE  
M113A2 FOV  
(Continued)

CHART D - LUBRICANTS FOR EXPOSED GEAR, CHAIN AND WIRE ROPE APPLICATIONS

LUBRICANT	EXPECTED TEMPERATURE																				
	*F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120	
	*C	-67	-51	-46	-40	-34	-28	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+40	
<b>CW-II</b> (VV-L-751) Lubricating Oil, Chain, Wire Rope, and Exposed Gear  <b>80</b> (MIL-L-2105) Lubricating Oil, Gear Multipurpose																					
<b>CW-IIC</b> (O-203)																					
<b>CW-IIB</b> (N/A)																					
<b>CW-IIA</b> (O-199)																					
<b>80-75</b> (O-186)																					

CHART E - LUBRICANTS FOR GENERAL PURPOSE APPLICATIONS

LUBRICANT	EXPECTED TEMPERATURE																				
	*F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120	
	*C	-67	-51	-46	-40	-34	-28	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+40	
<b>PL-S</b> (W-L-800) Lubricating Oil, General Purpose, Preservative, Water Displacing, Low Temperature  <b>PL-M</b> (MIL-L-3150) Lubricating Oil, Preservative, Medium																					
<b>PL-S</b> (O-190)																					
<b>PL-M</b> (O-192)																					

## CHAPTER 3 TROUBLESHOOTING

### Section I. HOW TO USE TROUBLESHOOTING

#### PURPOSE

The purpose of unit maintenance level troubleshooting is to diagnose carrier problems which are reported to unit maintenance. Troubleshooting tasks in this manual are common to all earners except where indicated. You should not begin unit maintenance troubleshooting until all operator troubleshooting procedures have been completed. You will perform four actions in unit maintenance troubleshooting:

1. Before starting a troubleshooting task, verify that the reported problem is present in the carrier.
2. After verifying the symptom, find the part that is causing the problem.
3. Replace or adjust that part.
4. Check to make sure the problem no longer exists, and that there are no other problems.

#### DEFINITIONS AND DESCRIPTIONS OF TROUBLESHOOTING PROCEDURES

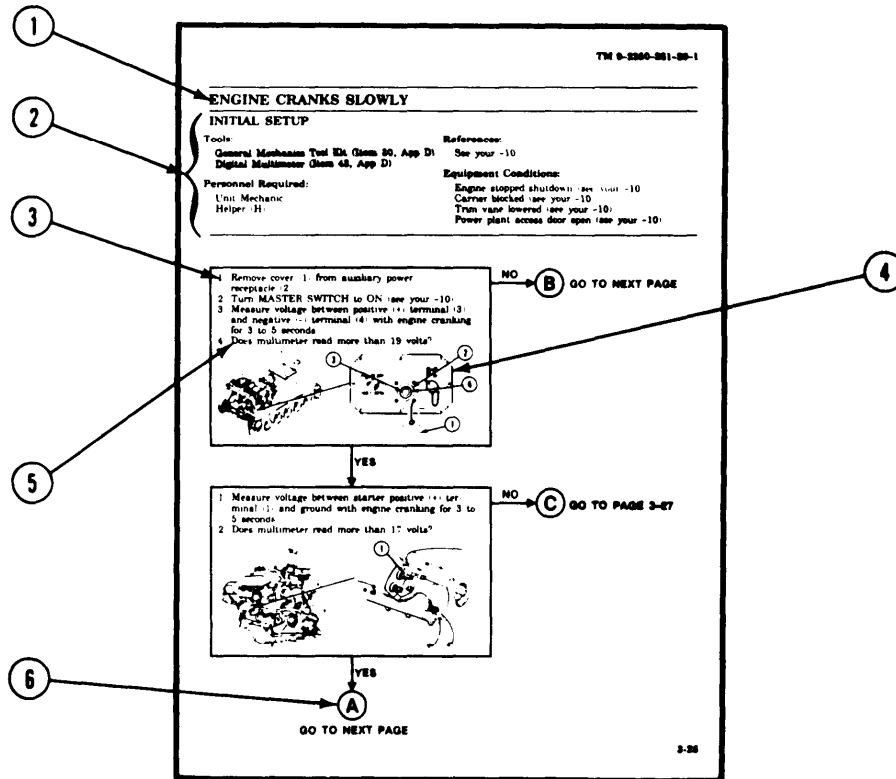
Troubleshooting tasks always have a beginning and an end. You will use task steps, test procedures, indexes, maintenance tasks, and other technical manuals to troubleshoot. Troubleshooting uses the following terms that are not used in other kinds of tasks:

1. **FAULT:** The part that is not operating correctly and is causing the problem.
2. **SYMPTOM:** The problem reported to unit maintenance.
3. **VERIFY NO FAULTS FOUND:** After you have completed the corrective action, you must verify that no faults exist. If the fault condition still exists, then the fault is not fixed or there is another fault. If this happens, start at the beginning of the troubleshooting procedure until you find and correct all faults. Always operate the system and/or earner to make sure that you have corrected the reported problem. If troubleshooting does not identify a faulty part, the earner is defective beyond the level of unit maintenance.

**TROUBLESHOOTING BASIC**

**Troubleshooting Procedure**

A troubleshooting procedure serves as a starting point for your troubleshooting work. You will branch in and out of procedures as you work to find a fault. Also, you will correct the fault, and check that the fault has been corrected. The parts of a troubleshooting procedure are given below.



**Legend to Sample Above**

- ① **TITLE** This is the name of the procedure.
- ② **INITIAL SETUP** This tells you the tools, materials/parts, personnel, references, and equipment conditions needed to do the procedure.
- ③ **TASK STEPS** These boxes give you step-by-step instructions.
- ④ **ILLUSTRATIONS** These help you locate and identify parts.
- ⑤ **QUESTIONS** This is the last step in YES blocks. The answer to this question will direct you to the next block.
- ⑥ **REFERENCE LETTER** This will send you to the correct block to continue with the troubleshooting procedure.

## TROUBLESHOOTING BASICS (cont)

### Locating the Correct Troubleshooting Procedure

1. Carrier arrives at shop.
2. Read DA form 2404.
3. Verify that the problem on DA form 2404 exists.
4. Look up the carrier symptom in Troubleshooting Task Index, Section II, in this chapter, and go to that task.

### Doing the Troubleshooting Procedure

5. Make sure you have all items in INITIAL SETUP.
6. Perform required action(s) in Equipment Conditions.
7. Complete the first block of task steps.
8. Refer to system schematic or diagram for system components, detail, and clarification.
9. Answer the question at the bottom of the first block.
10. Follow YES or NO arrows to the next block.
11. Move from block to block. Answer questions and follow instructions. You may be directed to:
  - do further checks and tests on parts;
  - go to another manual and do tasks; or
  - go to another task in this manual.

#### **NOTE**

**After completing the actions called for on another page or manual, return to the point in the troubleshooting procedure where you left off.**

12. Located the fault in the carrier or part, and perform the corrective action.
13. Check to make sure fault is corrected, and there are no new faults.
14. Button up by reinstalling items in Equipment Conditions after finishing the troubleshooting task.

## TROUBLESHOOTING SAMPLE

The following sample takes you through a typical troubleshooting procedure.

### Finding the Right Troubleshooting Procedure

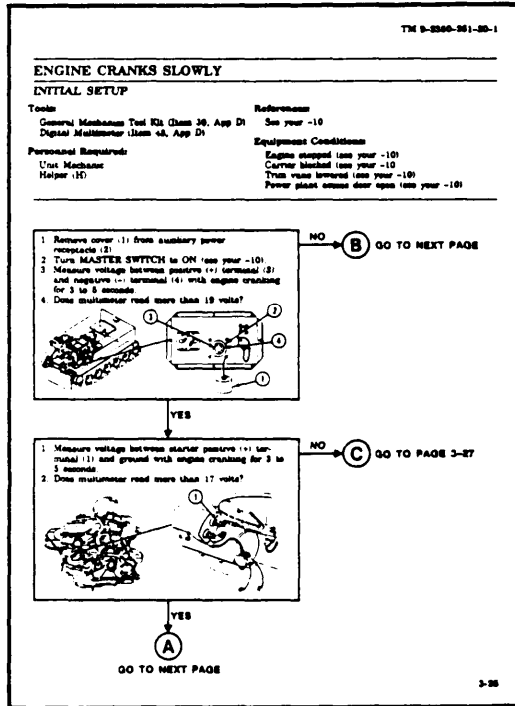
A carrier arrives at the shop. The DA form 2404 shows that the engine cranks slowly. Engine cranks slowly is part of the carrier Engine System. Therefore, you lookup engine cranks slowly listed under Engine System in Troubleshooting Task Index, Section II, in this chapter.

TM 9-2350-261-20-1	
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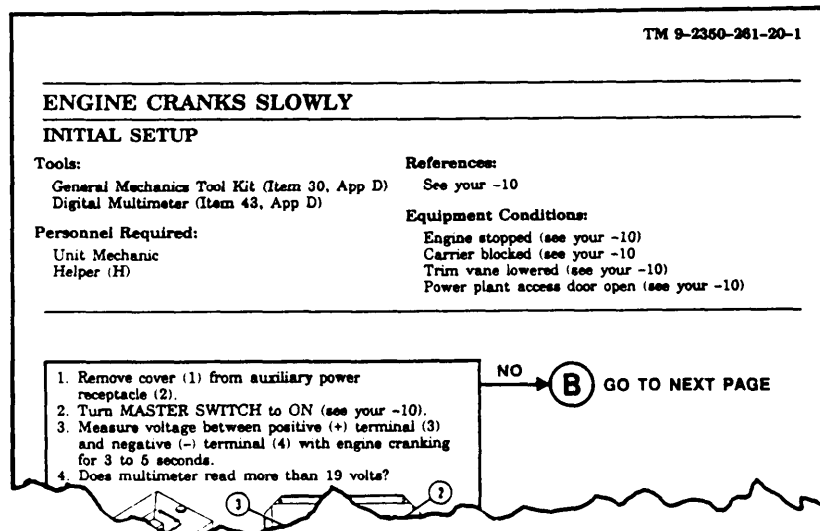


## HOW TO USE TROUBLESHOOTING (cont)

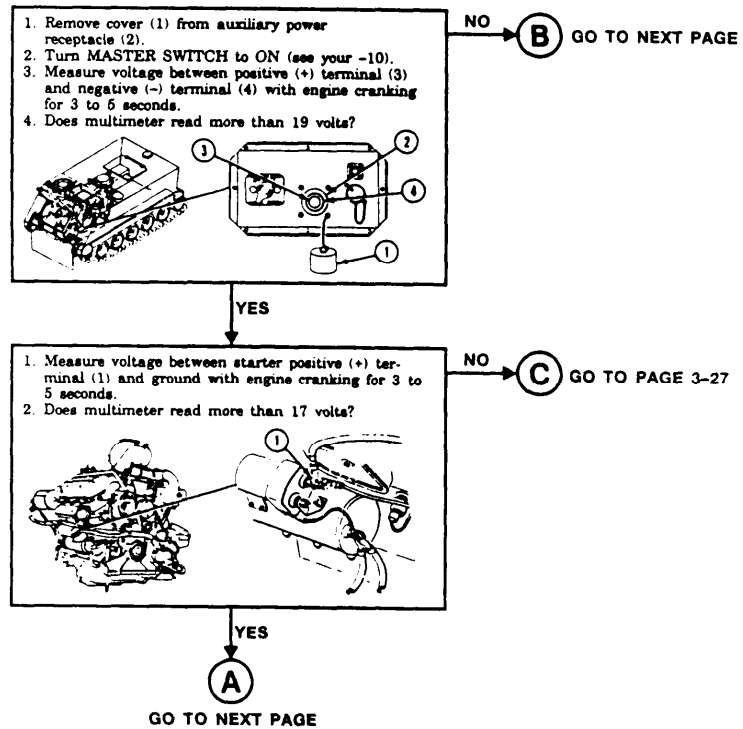
This is the procedure you want.



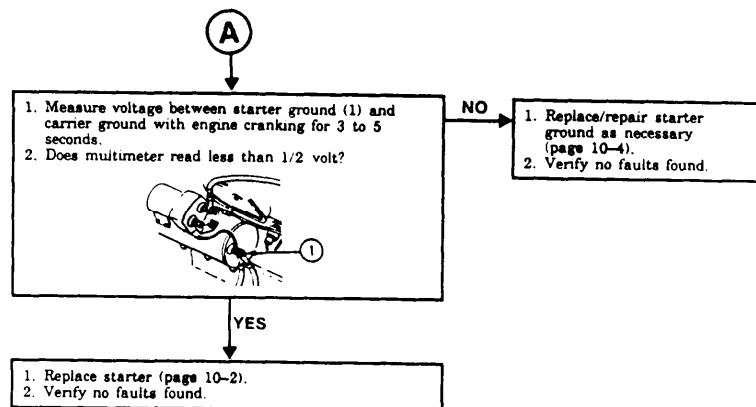
Check the title to make sure you are troubleshooting the correct system for the problem. Next, read the INITIAL SETUP carefully. Make sure you have all the items listed in the INITIAL SETUP. Some access steps in Equipment Conditions may not need to be performed depending on the fault location. The INITIAL SETUP also includes tools and references. In instances where STE/ICE-R troubleshooting may be more advantageous and time saving for the user, cross references to Section III, STE/ICE-R troubleshooting are given under references, and Section III, contains references to standard troubleshooting procedures. It's up to you to decide which are necessary for your particular problem.



Now you're ready to begin troubleshooting. Look at the first block. Read and do steps 1 through 4. Let's say the multimeter reads more than 19 volts. So the answer to the question, "Does multimeter read more than 19 volts," is YES. Follow the YES arrow to the next box. Do steps 1 and 2. Let's say the multimeter reads more than 17 volts. So the answer to the question, "Does multimeter read more than 17 volts," is YES. Follow the YES arrow to the reference letter **(A)**.

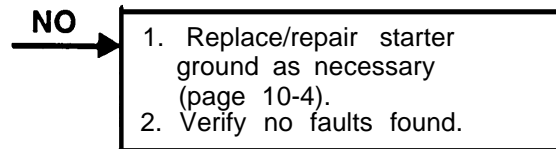


This is how **(A)** appears on the following page. Do steps 1 and 2. In this sample, let's say the multimeter reads more than 1/2 volt. So the answer to step 2 is NO. Follow the NO arrow to the next block.



## HOW TO USE TROUBLESHOOTING (cont)

The NO arrow takes you to this box. You have found the fault in the starter ground. This box gives you the step to correct the fault. Do step 1. It tells you to go to another task in the manual. Go to the page shown and perform the task. Return to this box when you have completed the task.



Step 2 in this box is "Verify no faults found." You must check to make sure you have correctly freed the fault.

After no faults found has been verified, return earner to operation. This is the end of the troubleshooting sample.

## Section II. TROUBLESHOOTING

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# ENGINE OVERHEATS

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Tube Pipe Pitting Kit (Item 25, App D)
- Radiator Testing Kit (Item 51, App D)

**Material&Parts:**

- Suitable container

**Personnel Required:**

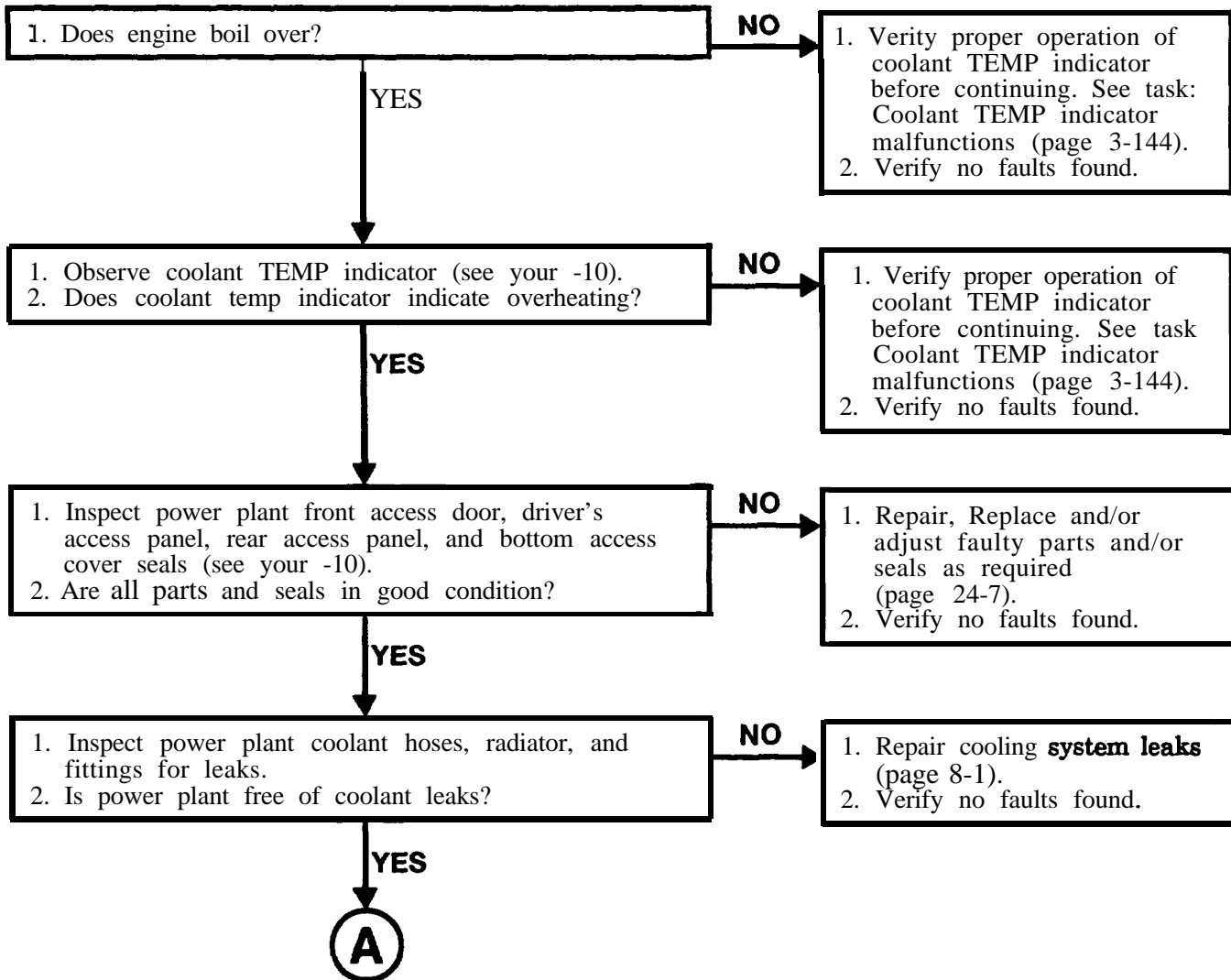
- Unit Mechanic
- Helper (H)

**References:**

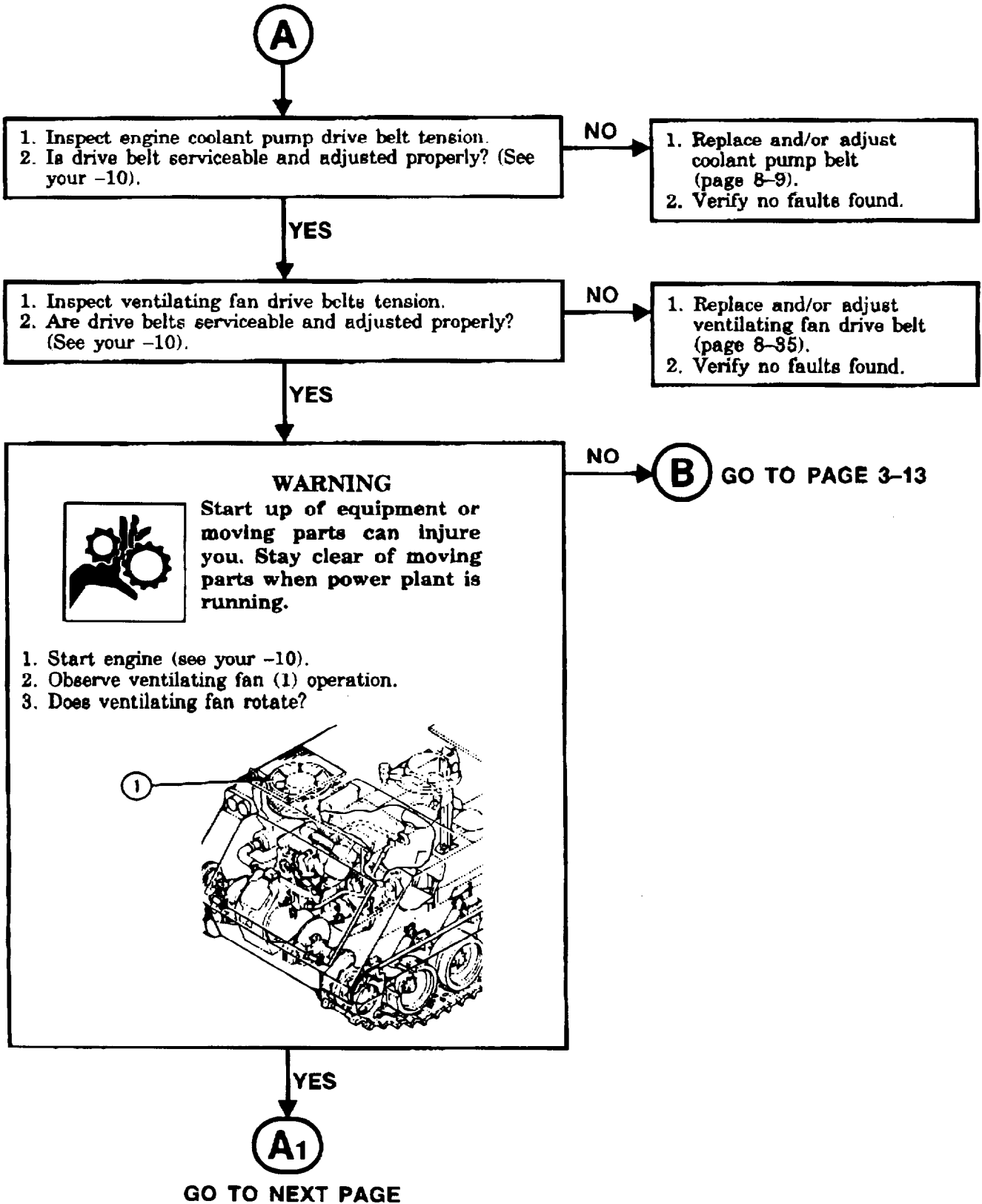
- See your -10

**Equipment Conditions:**

- Engine stopped (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Driver's power plant access panels removed (see your -10)
- Power plant rear access panels removed (see your -10)







A1

**WARNING**

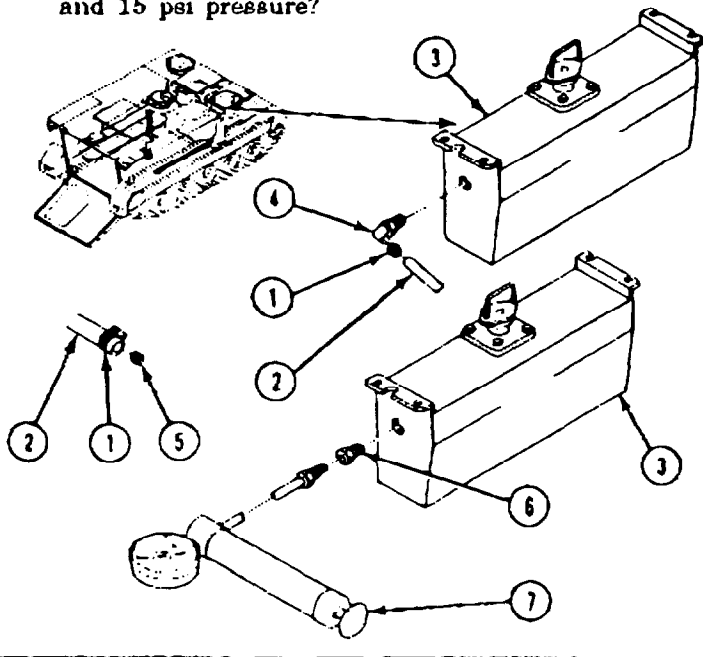
Hot coolant lines can burn you. Let power plant cool before you remove hose from auxiliary tank.



NO

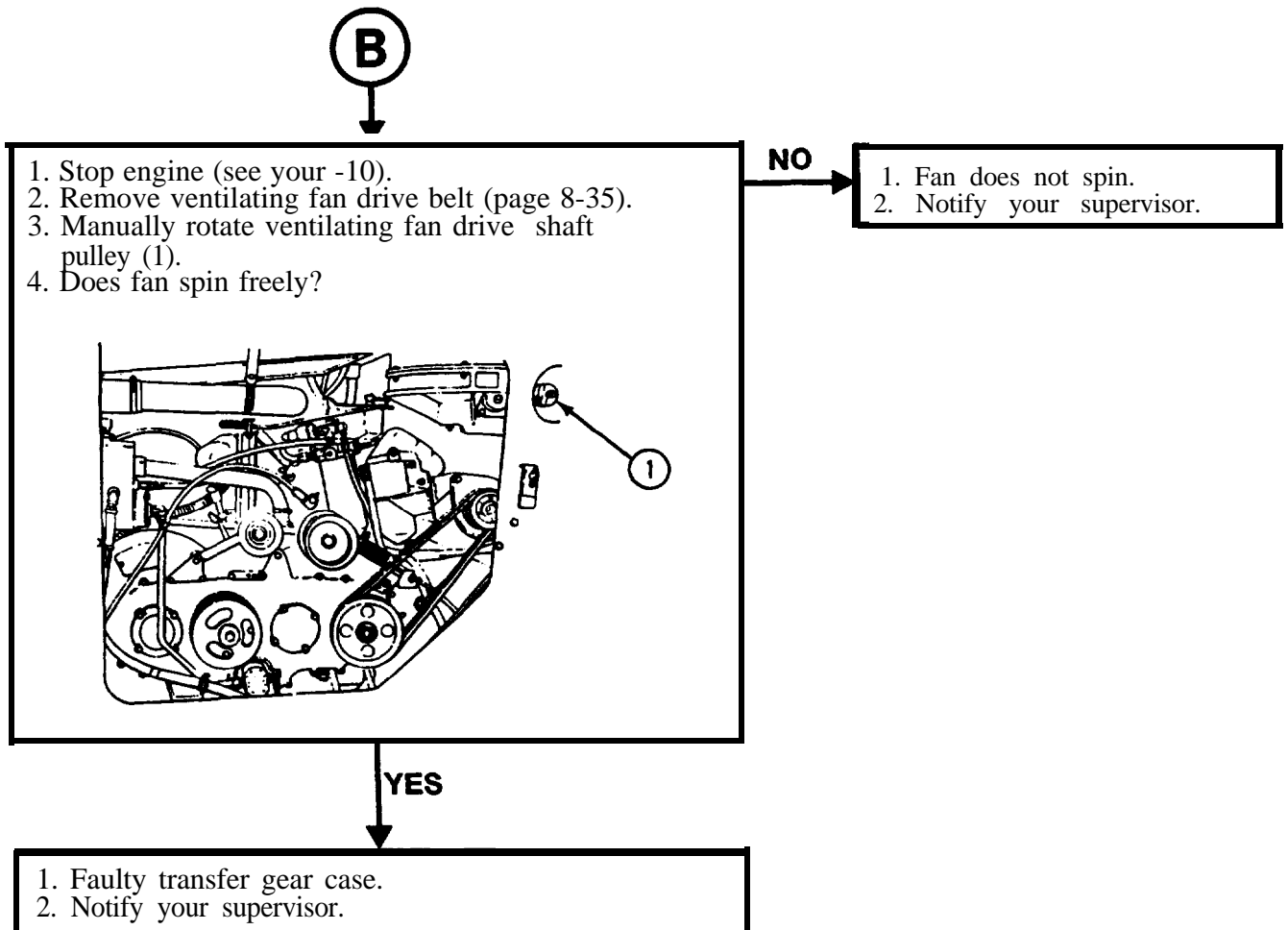
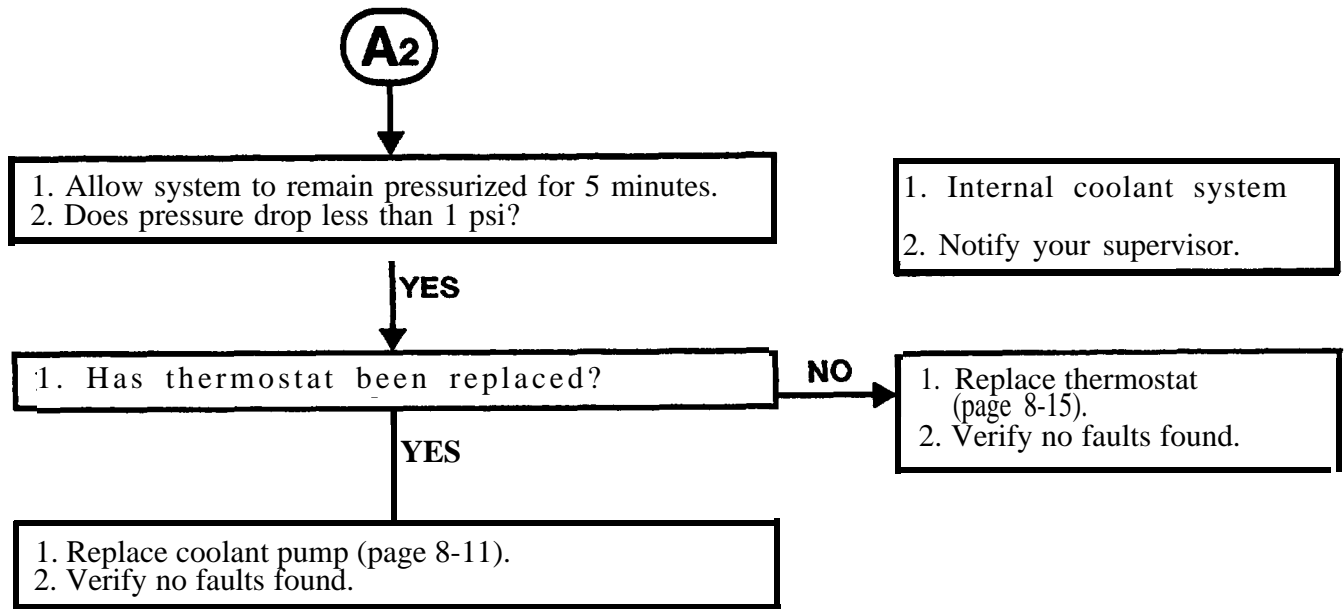
1. Replace auxiliary tank filler cap (page 8-28).
2. Verify no faults found.

1. Loosen hose clamp (1) on hose (2) at auxiliary tank (3).
2. Remove hose (2) from auxiliary tank (3).
3. Allow coolant to drain from elbow (4) on auxiliary tank (3). Use clean suitable container to catch coolant.
4. Install pipe plug (5) in hose (2) using hose clamp (1).
5. Remove elbow (4) from auxiliary tank (3).
6. Install bushing (6) on auxiliary tank (3).
7. Install radiator pressure tester (7) to bushing (6).
8. Pump system no higher than 15 psi pressure.
9. Does auxiliary tank filler cap relieve between 13 and 15 psi pressure?



YES

A2



---

## ENGINE OVERCOOLS

---

### INITIAL SETUP

**Personnel Required:**

Unit Mechanic

**Equipment Conditions:**

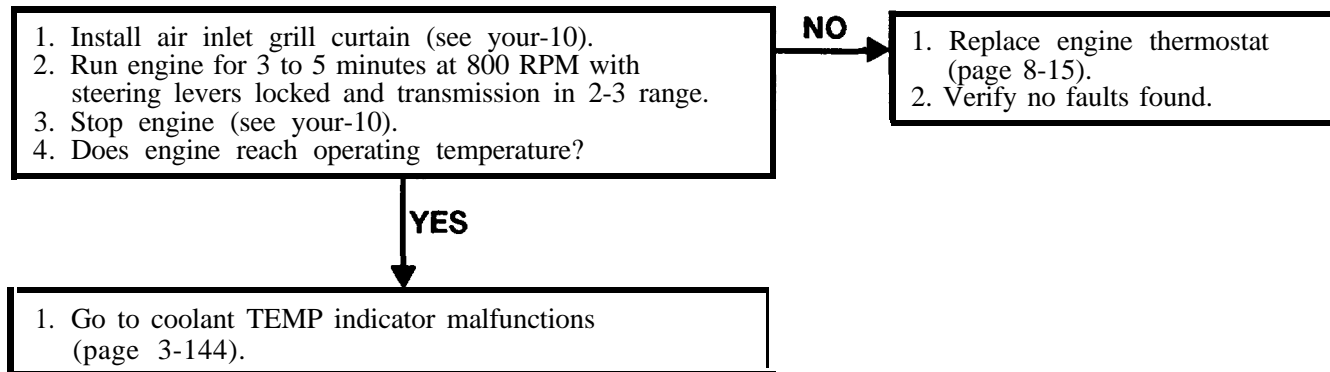
Engine stopped/shutdown (see your -10)

Carrier blocked (see your -10)

**References:**

See your -10

---



# ENGINE DOES NOT CRANK

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Socket Wrench Set (Item 89, App D)
- STE/ICE-R Test Set (Item 71.1, App D)

**References:**

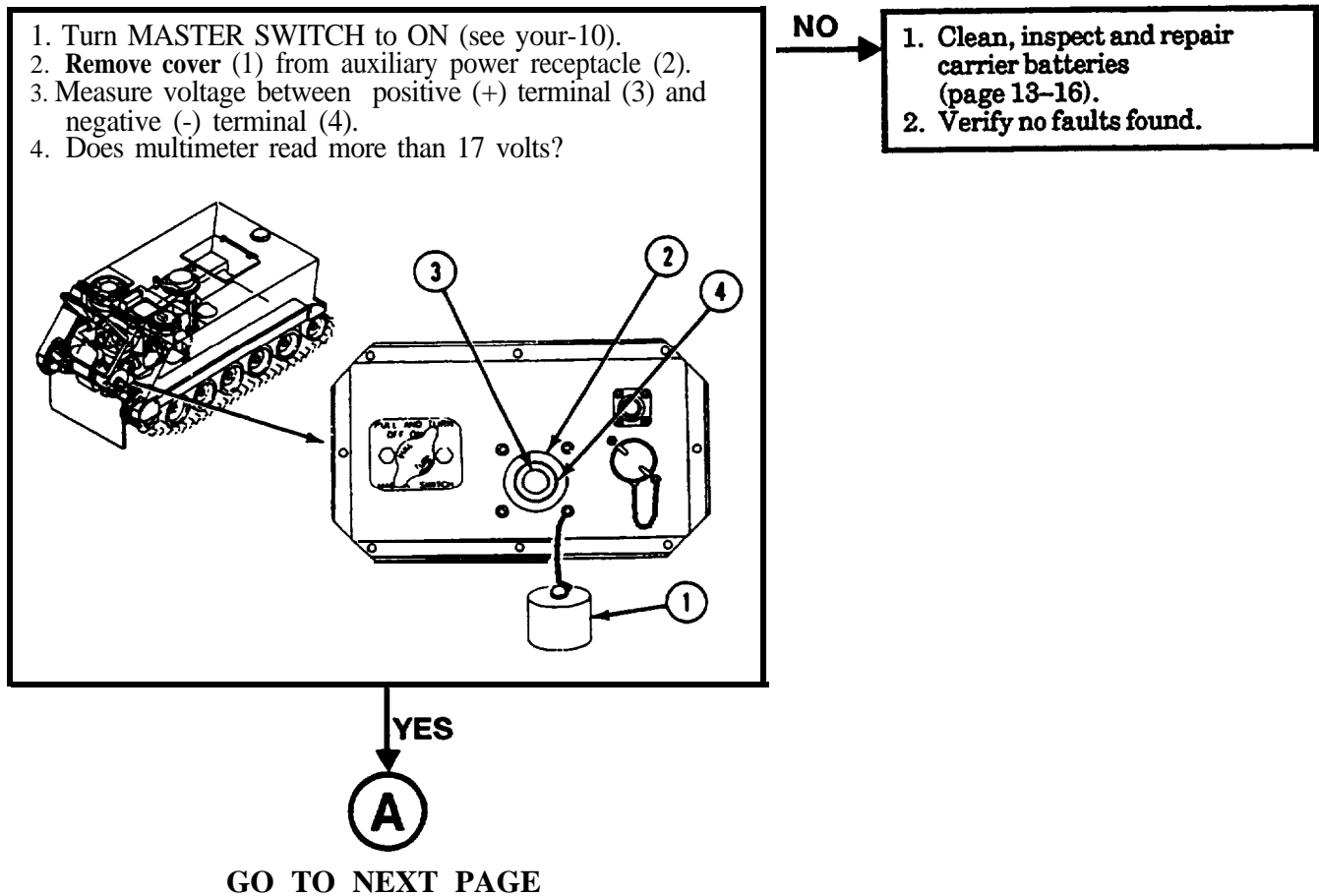
see your -10  
 STE/ICE-R engine will not crank  
 troubleshooting (page 3-270)

**Personnel Required:**

- Unit Mechanic
- Helper (H)

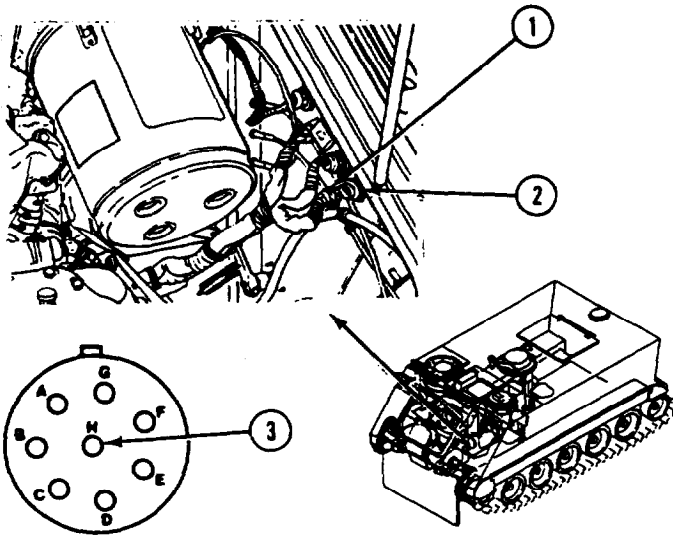
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Trim vane lowered (see your -10)  
 Power plant access door open (see your -10)  
 Driver's power plant access panel removed  
 (see your -10)



**A**

1. Turn MASTER SWITCH OFF (see your -10).
2. Remove engine harness plug (1) from front main harness jack (2) at carrier bulkhead.
3. Turn MASTER SWITCH to ON.
4. Depress start switch and hold for test.
5. Measure voltage between front main harness jack (2) socket H (3) and ground.
6. Does multimeter read less than 17 volts?
7. Turn MASTER SWITCH OFF (see your -10).



NO

**B** GO TO PAGE 3-19

YES

1. Is this carrier a M741A1?

NO

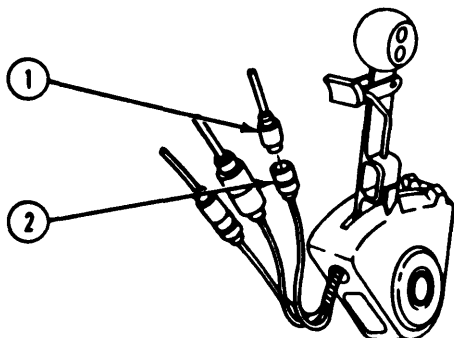
**D** GO TO PAGE

YES

**A1**

**A1**

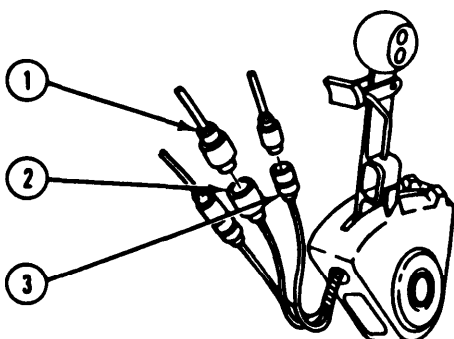
1. Remove front main harness circuit 14 plug (1) from neutral start switch jack (2).
2. Measure voltage between circuit 14 plug (1) and ground.
3. Does multimeter read more than 17 volts?



NO → **F** GO TO PAGE 3-24

YES

1. Turn MASTER SWITCH to OFF.
2. Remove front main harness circuit 74 plug (1) from neutral start switch jack (2).
3. Measure resistance between neutral start switch jacks (2 and 3).
4. Does multimeter read 0 ohms?



NO → **E** GO TO PAGE 3-24

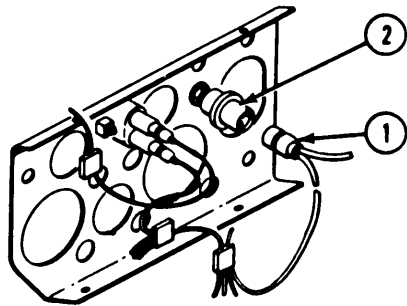
YES

**A2**

GO TO NEXT PAGE

**A2**

1. Install circuits 14 and 74 plugs on neutral start switch jacks.
2. Remove instrument panel for access (page 11-2).
- 3\* Remove circuit 74A/74 plug (1) from start switch (2).
4. Measure resistance between start switch (2) jack pins with start switch depressed.
5. Does multimeter read 0 ohms?

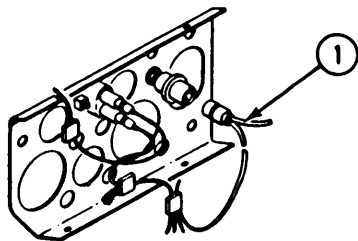


**NO**

1. Replace start switch (page 11-10).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to ON.
2. Measure voltage between circuit 74 pin (1) and ground.
3. Does multimeter read more than 17 volts?
4. Turn MASTER SWITCH to OFF.



**NO**

1. Repair front main wiring harness circuit 74 (page 14-3).
2. Verify no faults found.

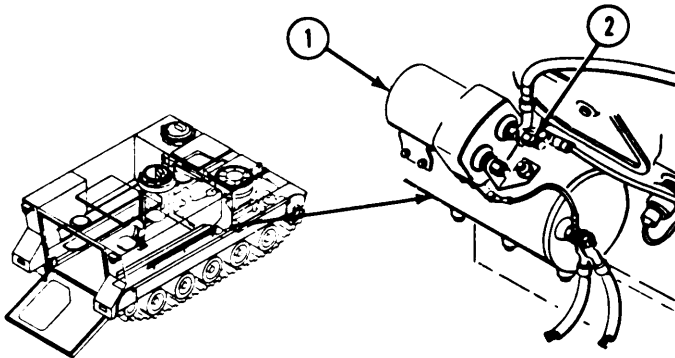
**YES**

1. Repair front main wiring harness circuit 74A (page 14-3).
2. Verify no faults found.



**B**

1. Install engine harness plug in front main harness bulkhead jack.
2. Turn MASTER SWITCH to ON.
3. Depress start switch and hold for test.
4. Measure voltage between starter solenoid (1) circuit 74A terminal (2) and ground.
5. Does multimeter read more than 17 volts?

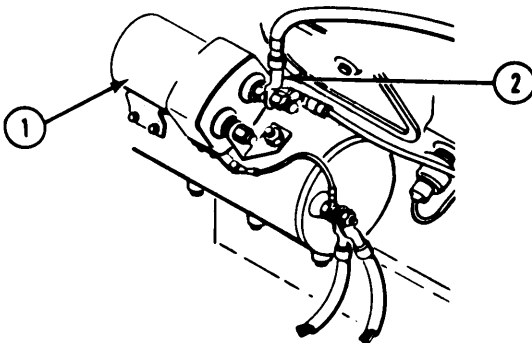


**NO**

1. Repair engine harness circuit 74A (page 14-3).
2. Verify no faults found.

**YES**

1. Measure voltage between starter solenoid (1) cable 6 terminal (2) and ground.
2. Does multimeter read less than 17 volts?
3. Turn MASTER SWITCH to OFF.



**NO**

**C** GO TO PAGE 3-21

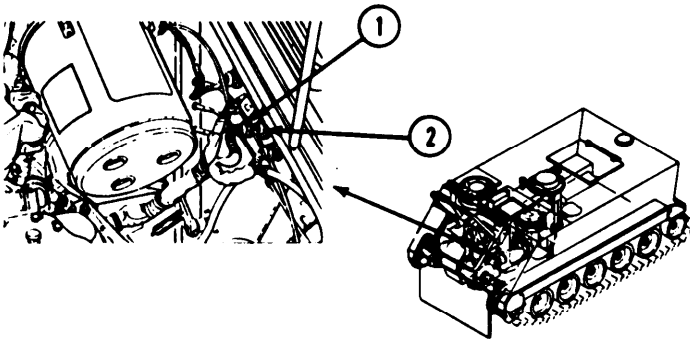
**YES**

**B1**

GO TO NEXT PAGE

**B1**

1. Turn MASTER SWITCH to OFF.
2. Remove engine harness circuit 6 plug (1) from front main harness circuit 6 jack (2) at carrier bulkhead.
3. Inspect plug and jack for corrosion and/or other damage.
4. Are parts in good condition?

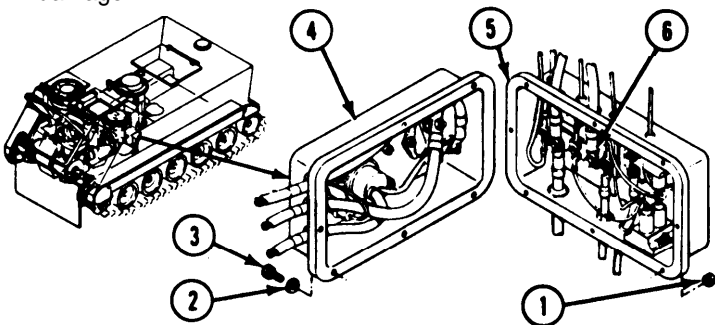


**NO**

1. Repair engine wiring harness or front main wiring harness circuit 6 (page 14-3).
2. Verify no faults found.

**YES**

1. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).
2. Inspect cable 49 (6) from master switch to distribution box.
3. Are cable and cable ends free from corrosion and damage?



**NO**

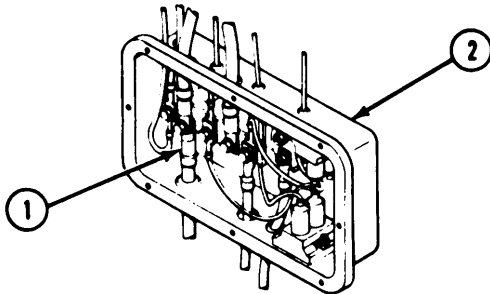
1. Repair master power to distribution box cable (page 14-9).
2. Install master switch panel on distribution box.
3. Verify no faults found.

**YES**

**B2**

**B<sub>2</sub>**

1. Inspect engine harness circuit 6 (1) leads on distribution box (2).
2. Are leads and terminal free of corrosion and damage?



**NO**

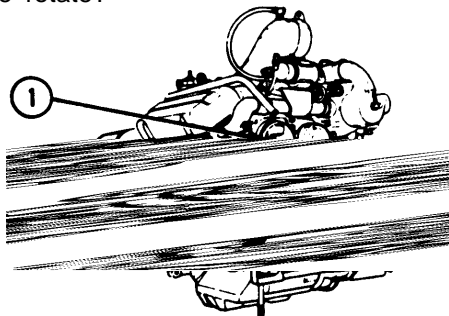
1. Repair engine harness circuit 6 (page 14-3).
2. Install master switch panel on distribution box.
3. Verify no faults found.

**YES**

1. Verify no faults found.

**C**

1. Manually rotate engine camshaft pulley (1) (use breaker bar, socket wrench set, and extension).
2. Does engine rotate?



**NO**

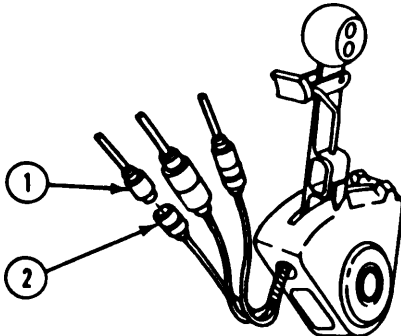
1. Engine or power train seized.
2. Notify your supervisor.

**YES**

1. Replace engine starter assembly (page 10-2).
2. Verify no faults found.

**D**

1. Remove front main harness circuit 74A plug (1) from neutral start switch jack (2).
2. Turn MASTER SWITCH to ON.
3. Measure voltage between jack (2) and ground with start switch depressed.
4. Does multimeter read less than 17 volts?
5. Turn MASTER SWITCH to OFF.

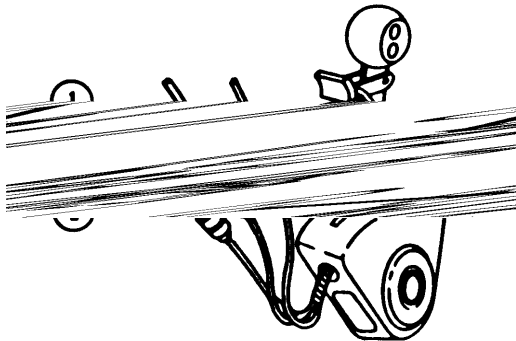


**NO**

1. Repair front main wiring harness circuit 74A (page 14-3).
2. Verify no faults found.

**YES**

1. Remove front main wiring harness circuit 74 plug (1) from neutral start switch switch jack (2).
2. Measure voltage between circuit 74 plug (1) with start switch depressed.
3. Does multimeter read less than 17 volts?



**NO**

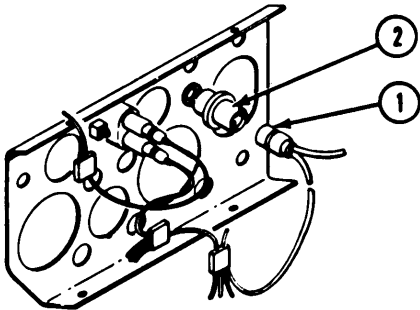
**E** GO TO PAGE 3-24

**YES**

**D1**

**D1**

1. Install circuit 14 and 74A plugs on neutral start switch.
2. Remove instrument panel for access (page 11-2).
3. Remove circuits 14/74 plug (1) from start switch (2).
4. Measure resistance between start switch (2) jack pins with start switch depressed.
5. Does multimeter read 0 ohms?

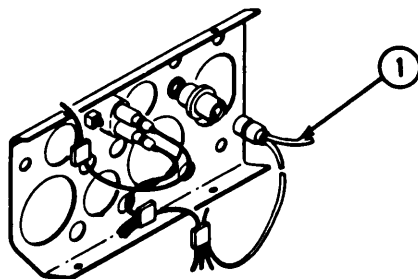


**NO**

1. Replace start switch (page 11-10).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to ON.
2. Measure voltage from panel power harness circuit 14 plug pin (1) and ground.
3. Does multimeter read more than 17 volts?
4. Turn MASTER SWITCH to OFF.



**NO**

1. Repair panel wiring harness circuit 14 (page 14-3).
2. Verify no faults found.

**YES**

1. Repair front main wiring harness circuit 74 (page 14-3).
2. Verify no faults found.

**E**

1. Has neutral start switch been adjusted?

**NO**

1. Adjust neutral start switch (page 23-53).  
2. Verify no faults found.

**YES**

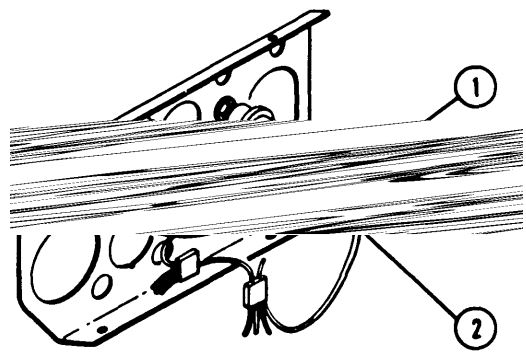
1. Replace neutral start switch (page 23-53).  
2. Verify no faults found.

**F**

1. Remove instrument panel for access (page 11-2).  
2. Remove front main wiring harness circuit 14 plug (1) from panel power harness circuit 14 jack (2).  
3. Turn MASTER SWITCH to ON.  
4. Measure voltage between circuit 14 jack (2) and ground.  
5. Does multimeter read less than 17 volts?  
6. Turn MASTER SWITCH to OFF.

**NO**

1. Repair front main wiring harness circuit 14 (page 14-3).  
2. Verify no faults found.



**YES**

1. Repair panel power wiring harness (page 14-3).  
2. Verify no faults found.

## ENGINE CRANKS SLOWLY

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- STE/ICE-R Test Set (Item 71.1, App D)

**References:**

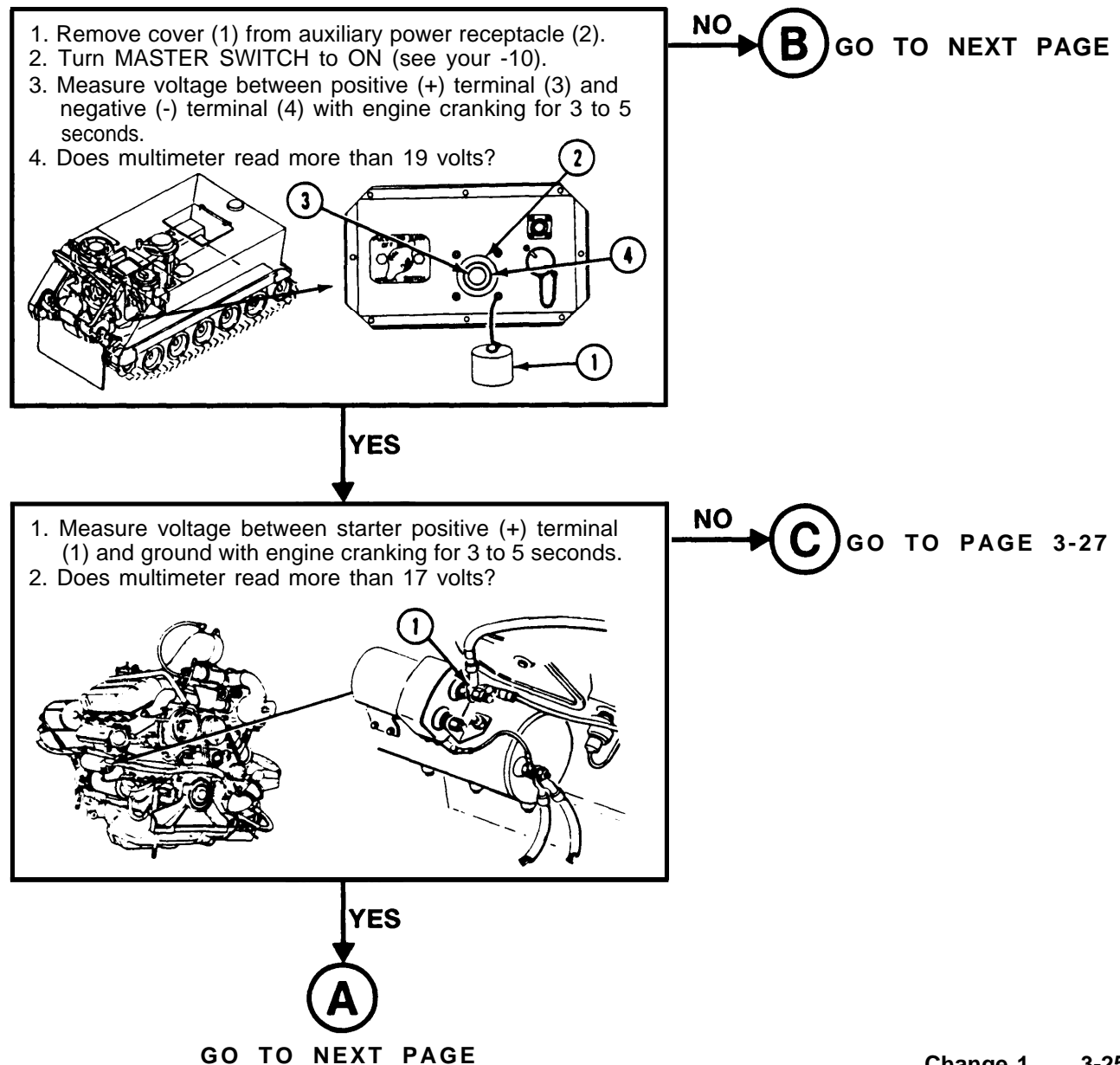
- See your -10  
STE/ICE-R starter circuit troubleshooting  
(page 3-259)

**Personnel Required:**

- Unit Mechanic
- Helper (H)

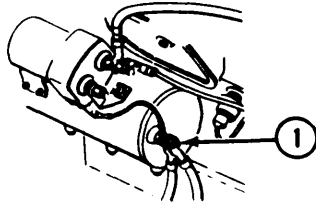
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant access door open (see your -10)



**A**

1. Measure voltage between starter ground (1) and carrier ground with engine cranking for 3 to 5 seconds.
2. Does multimeter read less than 1/2 volt?



**NO**

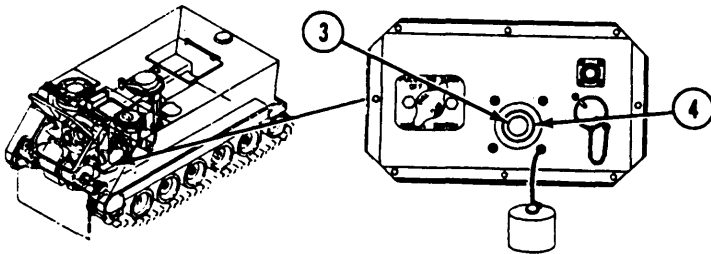
1. Replace/repair starter ground as necessary (page 10-4).
2. Verify no faults found.

**YES**

1. Replace starter (page 10-2).
2. Verify no faults found.

**B**

1. Turn MASTER SWITCH to OFF.
2. Clean, Inspect, and Repair earner batteries (page 13-13 or 13-16).
3. Turn MASTER SWITCH to ON.
4. Measure voltage between positive (+) terminal (3) and negative (-) terminal (4) with engine cranking for 3 to 5 seconds..
5. Does multimeter read more than 19 volts?



**YES**

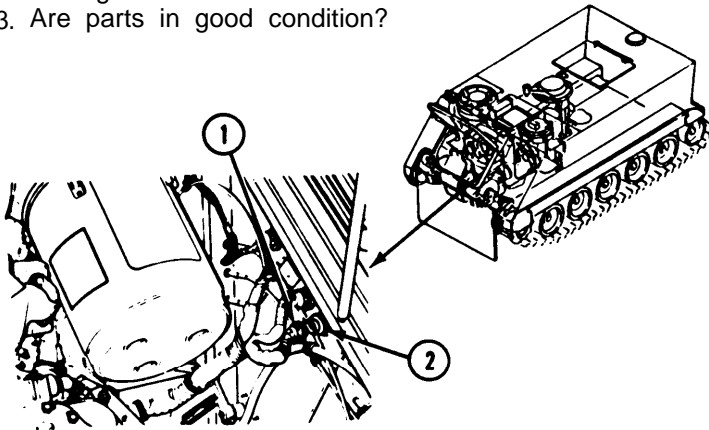
1. Verify no faults found.

PAGE 3-29



**C**

1. Remove engine harness circuit 6 plug (1) from main harness circuit 6 jack (2) at carrier bulkhead.
2. Inspect plug and jack for corrosion and/or other damage.
3. Are parts in good condition?

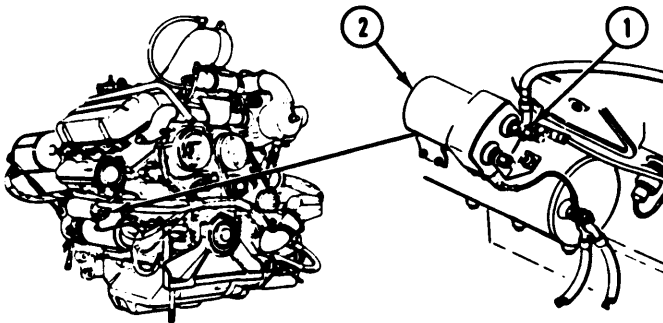


**NO**

1. Front main and/or engine harness damaged.
2. Notify your supervisor.

**YES**

1. Install front engine harness circuit 6 plug on main harness circuit 6 jack at carrier bulkhead.
2. Inspect engine harness circuit 6 terminal end (1) on starter (2).
3. Is terminal end free from corrosion and/or other damage?



**NO**

1. Repair engine harness circuit 6 (page 14-3).
2. Verify no faults found.

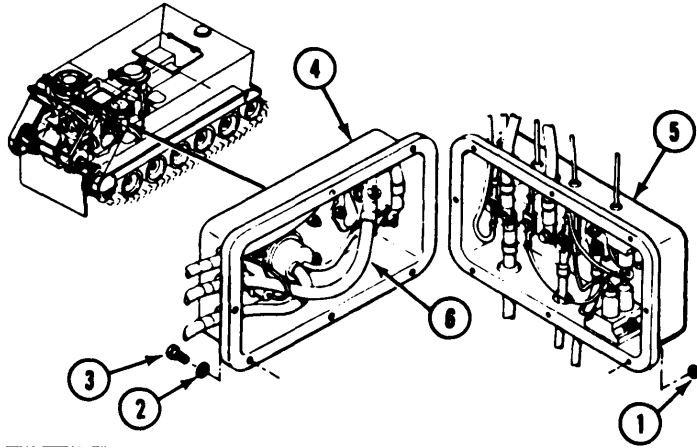
**YES**

**C1**

GO TO NEXT PAGE

**C1**

1. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).
2. Inspect cable 49 (6) from master switch to distribution box.
3. Are cable and cable ends free from corrosion and damage?

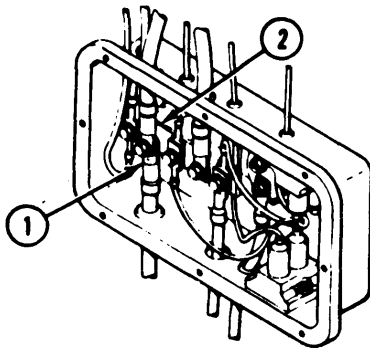


**NO**

1. Repair master power to distribution box cable (page 14-9).
2. Verify no faults found.

**YES**

1. Inspect front main harness circuit 6 (1) lead on distribution box bus bar (2).
2. Is lead terminal free from corrosion and damage?



**NO**

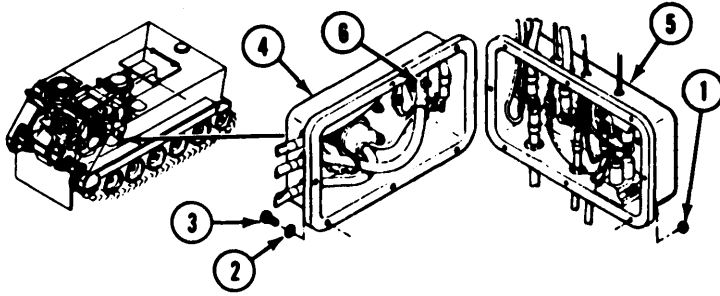
1. Repair front main harness circuit 6 (page 14-3).
2. Verify no faults found.

**YES**

1. Install master switch panel (9-16).
2. Replace starter assembly (page 10-2).
3. Verify no faults found.

**D**

1. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).
2. Inspect terminal end(s) on master switch (6).
3. Are terminal end and master switch free from corrosion and/or other damage?



**NO**

1. Repair battery to master power cable and/or master switch (page 14-9).
2. Verify no faults found.

**YES**

1. Verify no faults found.

---

## ENGINE CRANKS BUT WILL NOT START

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

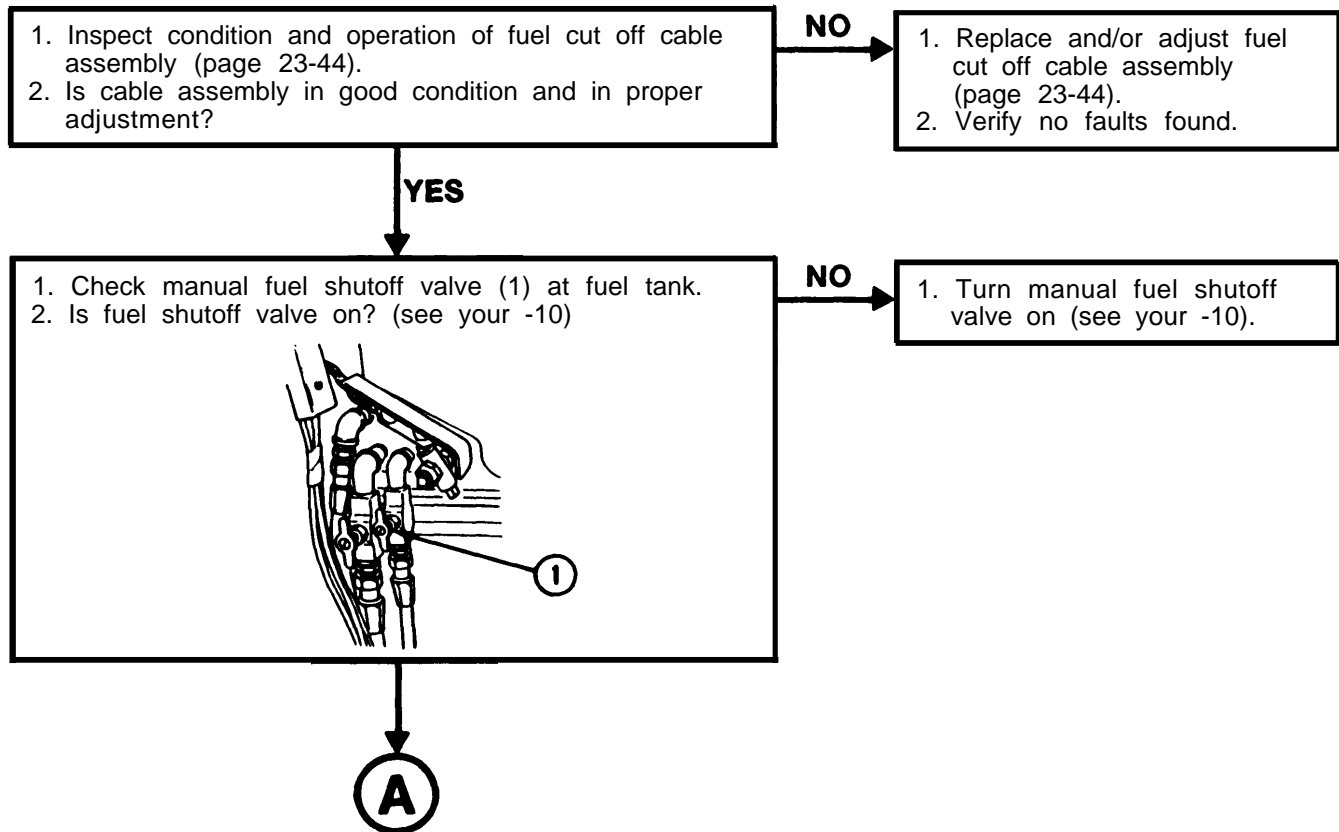
Suitable container

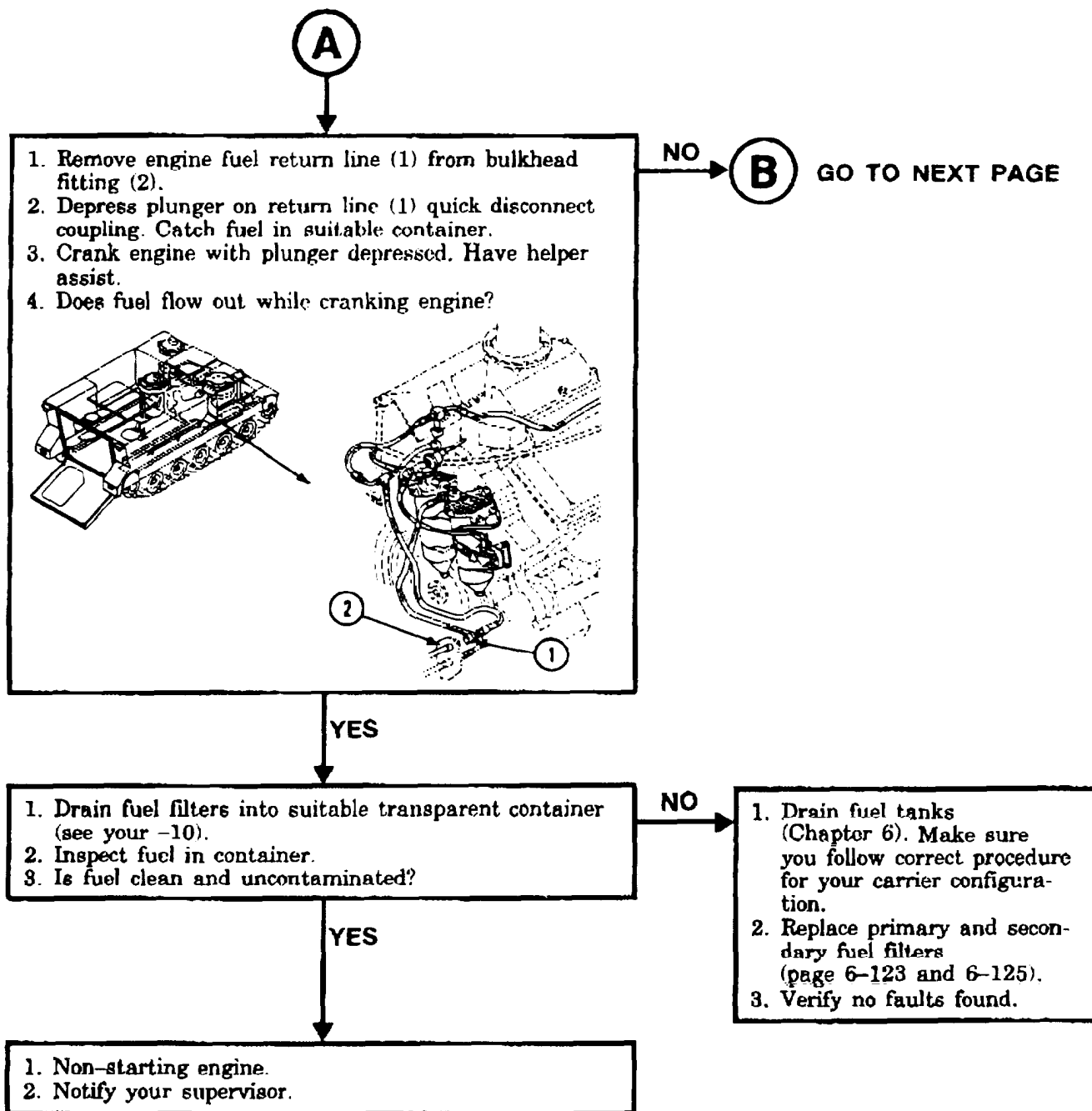
**Equipment Conditions:**

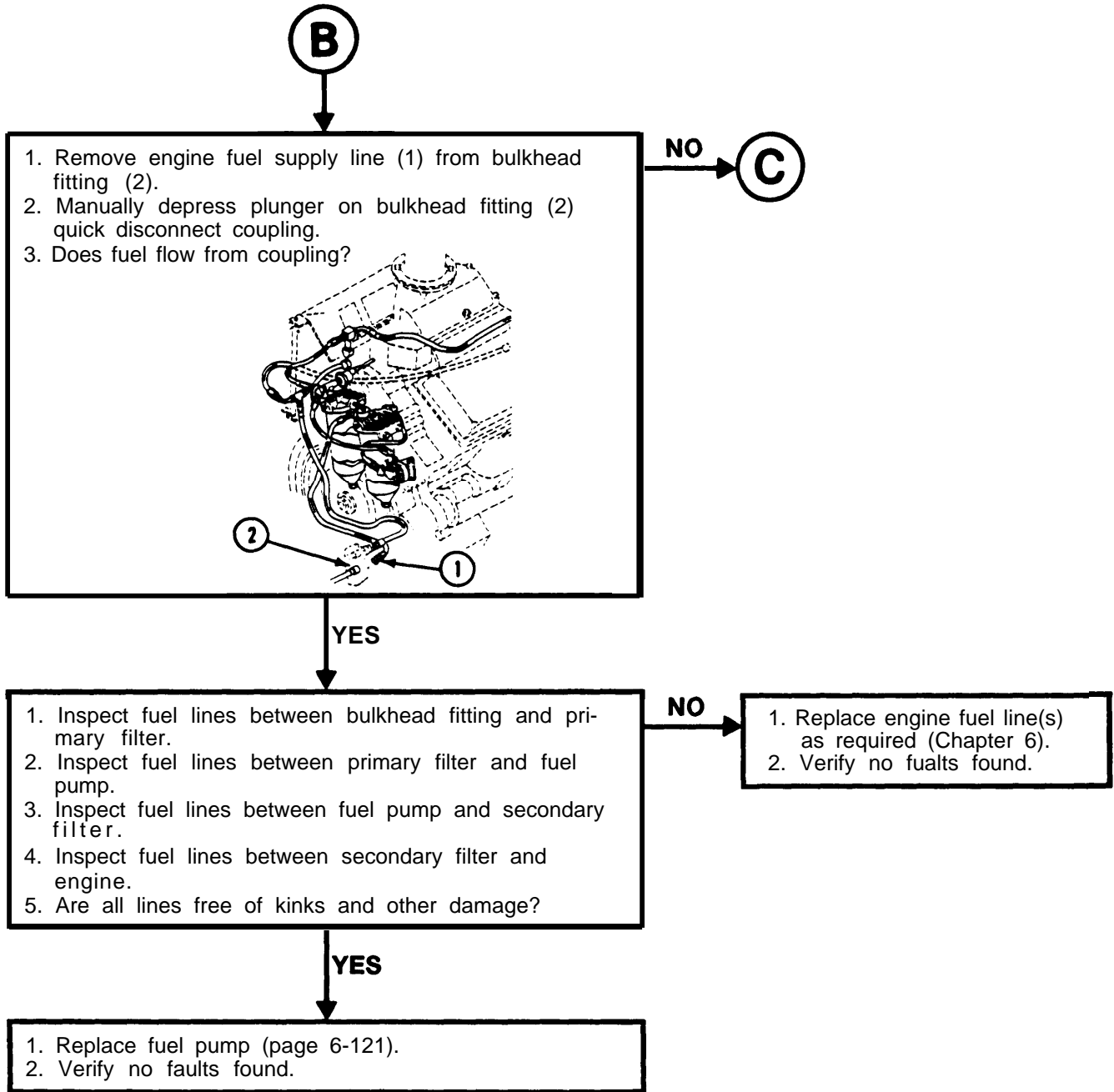
Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Trim vane lowered (see your -10)  
 Power plant access door open (see your -10)  
 Driver's power plant access panel removed  
 (see your -10)  
 Power-plant rear access panels removed (see  
 your -10)

**Personnel Required:**

Unit Mechanic  
 Helper (H)





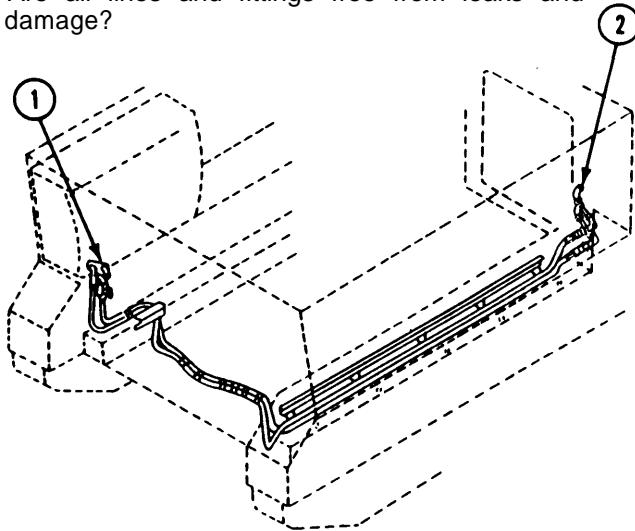


**C**

**NOTE**

There are additional fuel lines on the M677A2 carrier. Make sure to inspect all fuel lines.

1. Remove rear compartment floor plates (page 24-37).
2. Inspect fuel lines between fuel tank(s) (1) and bulk-head fittings (2).
3. Are all lines and fittings free from leaks and damage?



**NO**

1. Repair/replace fuel line(s) as required (Chapter 6).
2. Verify no faults found.

**YES**

1. Clear clogged fuel pickup inside fuel tank(s) (Chapter 6).
2. Verify no faults found.

---

## ENGINE CRANKS BUT WILL NOT START BELOW 40° (AIR BOX HEATER IS USED)

---

### INITIAL SETUP

#### Tools:

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- STE/ICE-R Test Set (Item 71.1, App D)

#### Personnel Required:

- Unit Mechanic
- Helper (H)

#### References:

See your -10

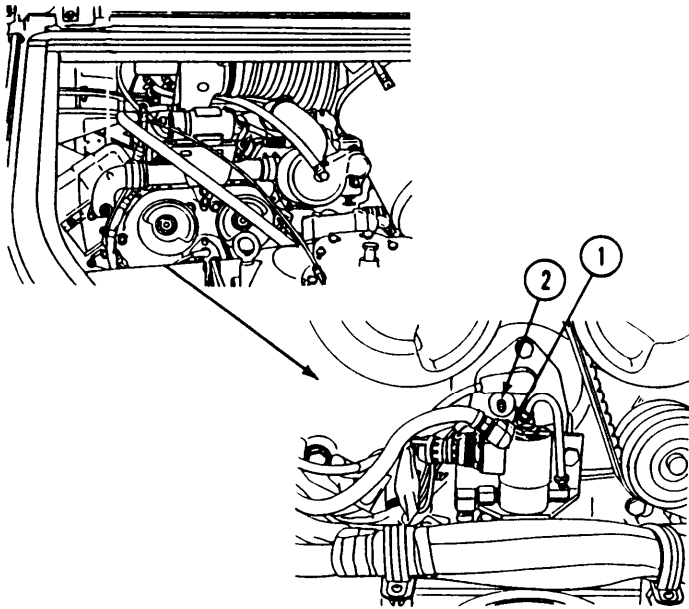
#### References (cont):

STE/ICE-R engine will crank but will not start troubleshooting (page 3-271)

#### Equipment Conditions:

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant access door open (see your -10)
- Driver's power plant access panel removed (see your -10)
- Power plant rear access panels removed (see your -10)

1. Remove air pump to air box heater hose (1) from air box (2).
2. Turn MASTER SWITCH to ON (see your -10).
3. Turn air box heater switch to ON.
4. Does airflow from end of hose?



NO



GO TO PAGE 3-38

YES





**A**

1. Release air box heater switch.
2. Turn MASTER SWITCH to OFF (see your -10).
3. Install air pump to air box heater hose onto air box heater (page 6-133).
4. Remove air box igniter high voltage wire (1) and igniter (2).
5. Install high voltage wire (1) on igniter (2).
6. Ground hex portion of igniter (2) on idler pulley pivot.

NO

**C**

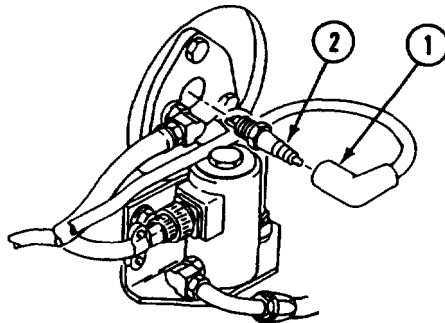
GO TO PAGE 3-40

**WARNING**

High voltage. Keep hands clear.



7. Turn MASTER SWITCH to ON (see your -10).
8. Turn air box heater switch to ON (see your -10).
9. Does igniter produce a spark?



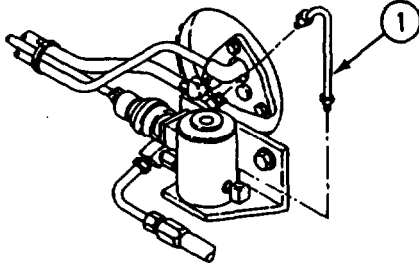
YES

**A1**

GO TO NEXT PAGE

**A1**

1. Release air box heater switch.
2. Turn MASTER SWITCH to OFF.
3. Install air box igniter.
4. Install air box heater harness plug wire on igniter coil.
5. Remove solenoid to air box heater tube assembly (1).
6. Turn MASTER SWITCH to ON.
7. Turn air box heater switch to ON with engine cranking. Do not allow engine to start. Have helper assist.
8. Does fuel fail to flow from solenoid with air box heater

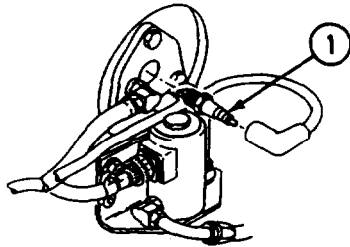


**NO**

1. Air box heater is working properly. Go to engine cranks, but will not start (page 3-30).
2. Verify no faults found.

**YES**

1. Release air box heater switch.
2. Turn MASTER SWITCH to OFF.
3. Remove air box heater assembly (page 6-138).
4. Is igniter electrode and spray nozzle free of contamination and damage?

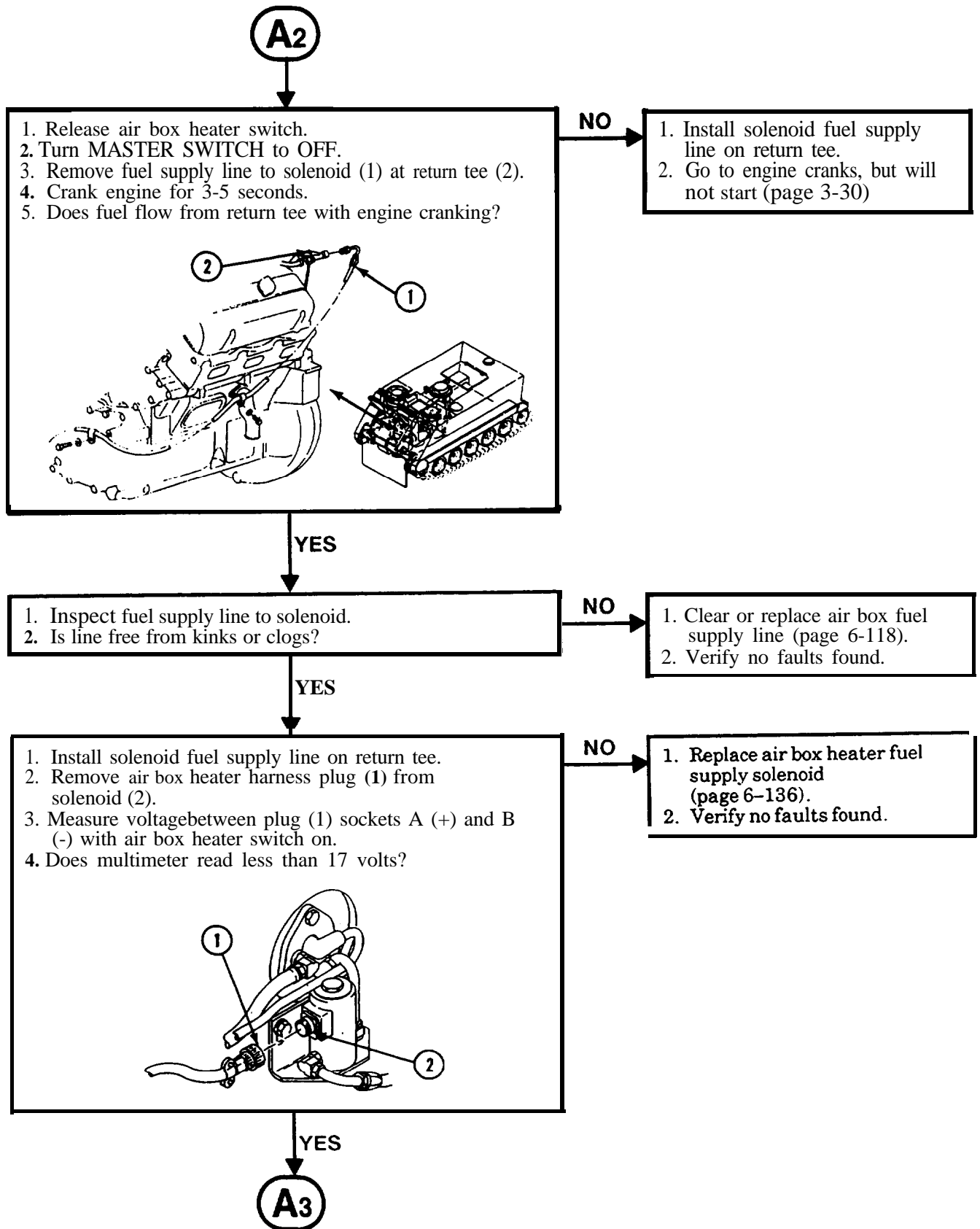


**NO**

1. Clean and/or replace air box heater assembly (page 6-138).
2. Verify no faults found.

**YES**

**A2**



**A3**



- 1. Install solenoid to air box heater fuel line.
- 2. Install air box heater harness plug on to fuel solenoid.



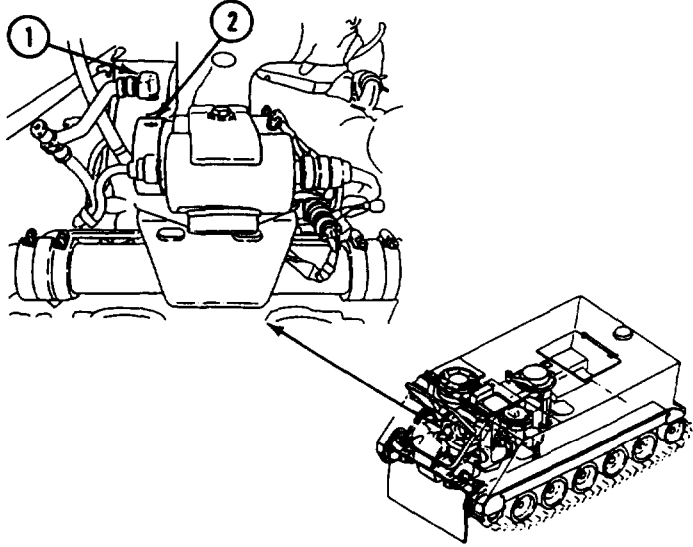
**D**

GO TO PAGE 3-42

**B**



- 1. Release air box heater switch.
- 2. Turn MASTERSWITCH to OFF.
- 3. Remove air hose (1) from air pump (2).
- 4. Is hose free from restriction and damage?

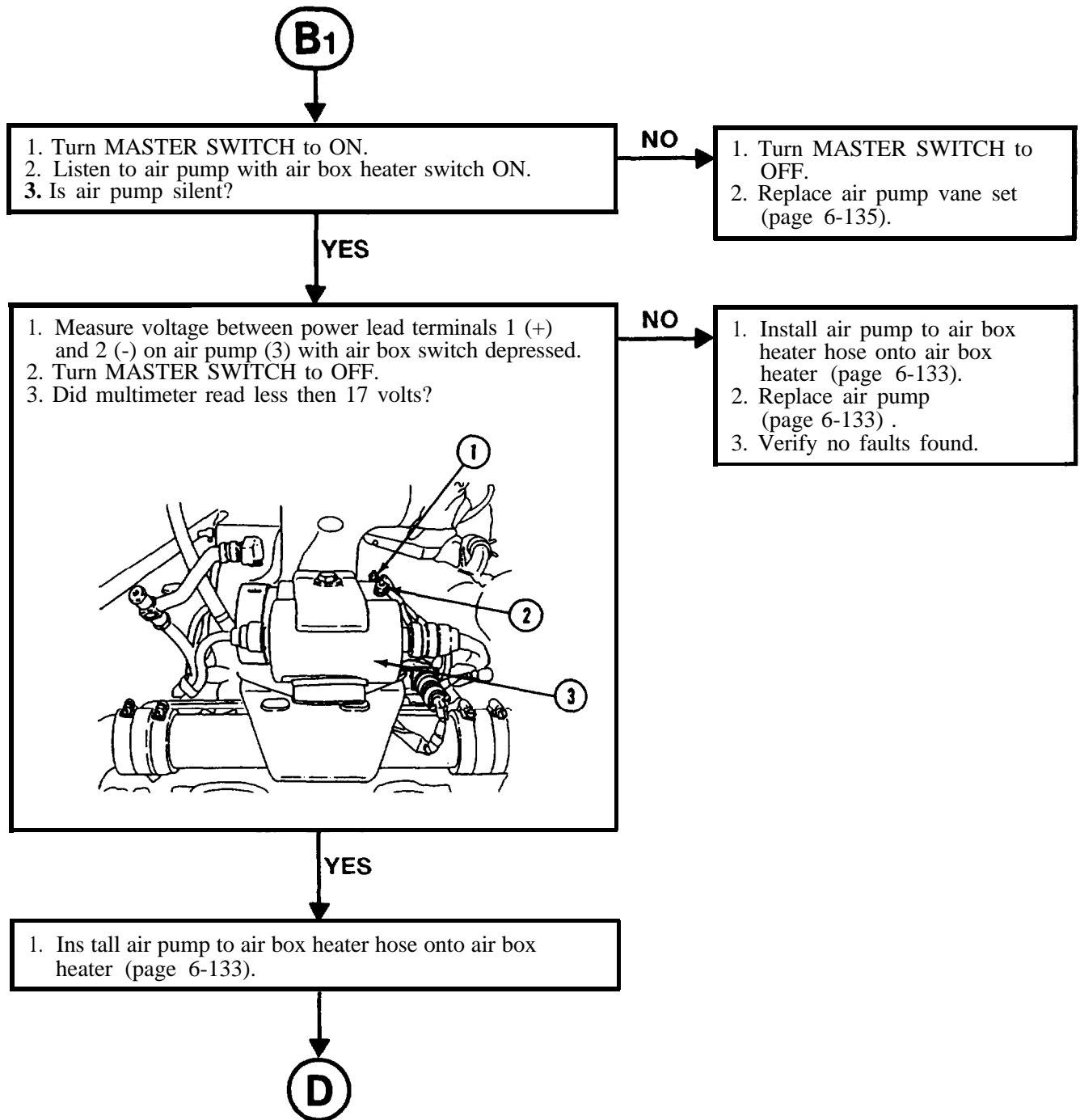


**NO**

- 1. Replace air pump to air box heater hose (page 6-133).
- 2. Verify no faults found.

**YES**

**B1**



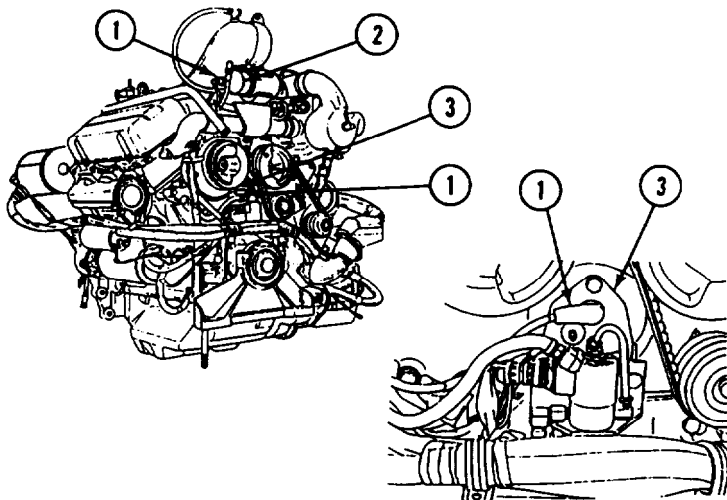
GO TO PAGE 3-42

C

1. Release air box heater switch.
2. Install air box heater assembly.
3. Disconnect ends of ignition wire (1) from coil (2) and air box heater (3).
4. Measure resistance between wire ends (2) and (3).
5. Is ignition wire in good condition and measure 0 ohms?

NO

1. Replace igniter wire.
2. Verify no faults found.

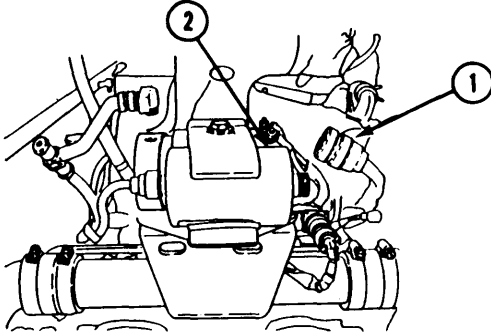


YES

C1

**C1**

1. Install ignition wire on igniter.
2. Remove air box heater harness plug (1) from ignition coil (2).
3. Turn MASTER SWITCH to ON.
4. Turn air box heater switch ON.
5. Measure voltage between air box heater harness plug sockets A (+) and B (-).
6. Does multimeter read less than 17 volts?



**NO**

1. Replace ignition coil (page 6-132).
2. Verify no faults found.

**YES**

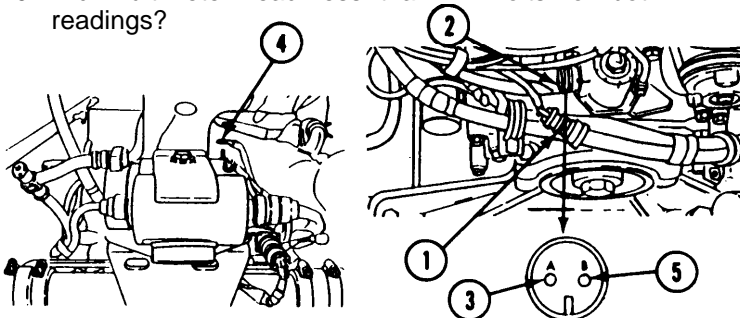
1. Release air box heater switch.
2. Turn MASTER SWITCH to OFF.
3. Install ignition wire on coil.

**D**

GO TO NEXT PAGE

**D**

1. Remove engine harness plug (1) from air box heater harness jack (2).
2. Turn MASTER SWITCH to ON.
3. Measure voltage between engine harness plug (1) pin A (3) to ground (4) and pin B (5) to ground (4) with air box heater switch depressed.
4. Turn MASTER SWITCH to OFF.
5. Did multimeter read less than 17 volts for both readings?

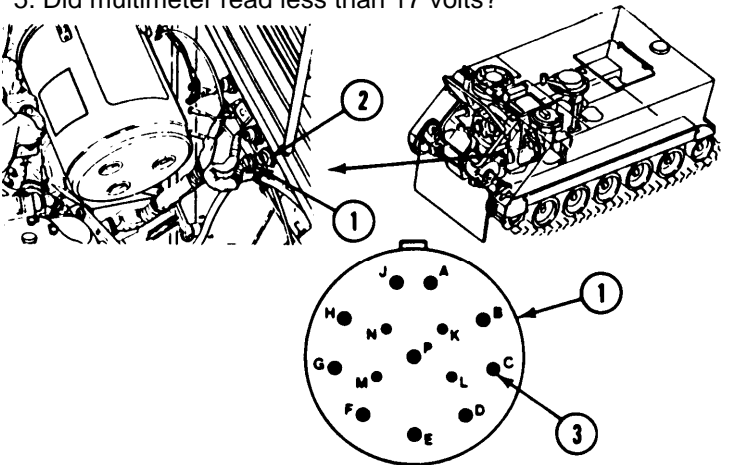


**NO**

1. Replace air box heater wiring harness (page 6-140).
2. Verify no faults found.

**YES**

1. Remove engine harness plug (1) from front main harness jack (2) at earner bulkhead.
2. Turn MASTER SWITCH to ON.
3. Measure voltage from front main harness jack (2) pin C (3) and ground with air box heater switch
4. Turn MASTER SWITCH to OFF.
5. Did multimeter read less than 17 volts?



**NO**

1. Faulty engine harness.
2. Notify your supervisor.

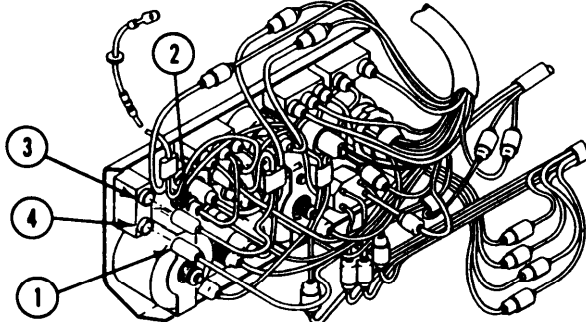
**YES**

**D1**



**D1**

1. Remove air box heater switch (page 11-7).
2. Remove circuits 406 (1) and 27C (2) plugs from air box heater switch jacks (3) and (4).
3. Measure resistance between switch jack (3) and (4) with air box heater ON.
4. Does multimeter read 0 ohms?

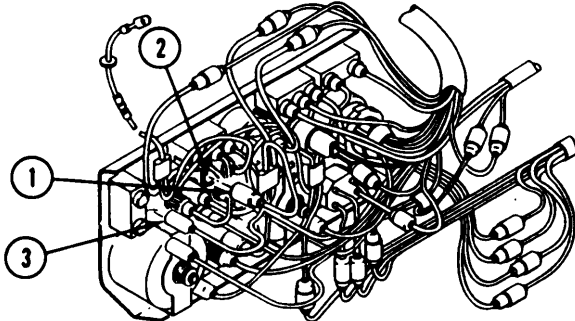


**NO**

1. Replace air box heater switch (page 11-7).
2. Verify no faults found.

**YES**

1. Remove circuit 27 plug (1) from instrument panel circuit breaker (2).
2. Measure resistance between instrument panel wiring harness circuit 27 (1) and 27C (3) plug pins.
3. Does multimeter read 0 ohms?



**NO**

1. Repair instrument panel wiring harness circuit 27C/27 (page 14-3).
2. Verify no fault found.

**YES**

1. Repair front main harness circuit 406 (page 14-3).
2. Verify no faults found.

---

## ENGINE RUNS ROUGH, STALLS, OR DOES NOT PUT OUT FULL POWER

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
STE/ICE-R Test Set (Item 71.1, App D)

#### References (cont):

See your LO  
STE/ICE-R Test 14 (page 3-287)

#### Materials/Parts:

Suitable container  
Wiping rag

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Air cleaner element cleaned (see your -10)  
Primary and secondary fuel filters serviced  
(see your -10)  
Trim vane lowered (see your -10)  
Power plant access door open (see your -10)  
Power plant rear access panels removed  
(see your -10)  
Rear compartment floor plates removed  
(page 24-37)

#### Personnel Required:

Unit Mechanic  
Helper (H)

#### References:

See your -10

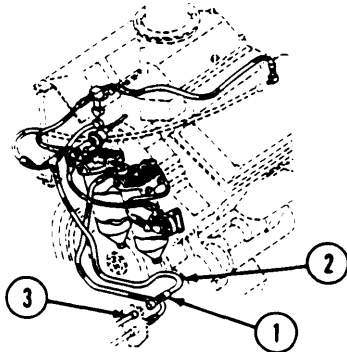
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1. Ensure manual shutoff valve is open (see your -10).
2. Push forward on quick disconnect coupling (1) to disconnect return hose (2) from fuel return line (3).

#### CAUTION

**Keep return hose clear of generator drive belts.**

3. Pull return hose (2) with quick disconnect coupling (1) out of power plant compartment. Remove half of quick disconnect coupling (1) from return hose (2), and retain.



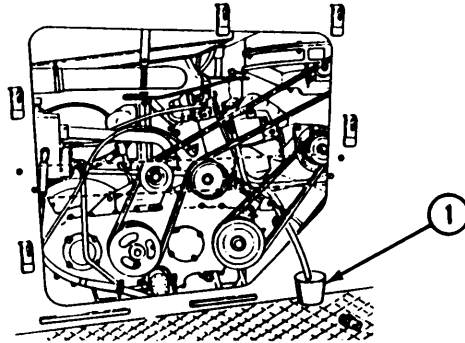
**A**

3. Insert hose into metal container (1) with at least 1 gallon (4 liter) capacity.

NO

**B**

GO TO PAGE 3-49



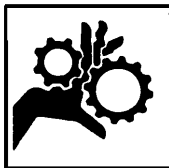
**WARNING**



Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

4. Make sure container (1) is making metal-to-metal contact with earner floor so there is a good ground.

**WARNING**



Loose clothing is dangerous around moving belts and pulley. You could get badly hurt if your clothes get caught in moving parts.

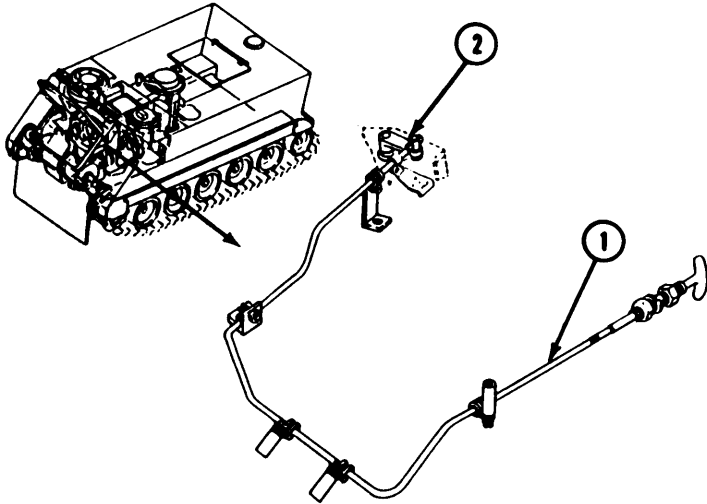
5. Start engine (see your -10). Run engine at 1200 RPM for 1 minute. Hold end of fuel return hose in fuel.
6. Install rear half of quick disconnect on hose.
7. Place fuel return hose inside power plant compartment and connect hose to return line. Make sure quick disconnect snaps firmly in place.
8. Did fuel flow at least 1/2 gallon (2 liter) per minute?

YES

**A1**

GO TO NEXT PAGE

1. Inspect fuel cut off control cable assembly (1) and fuel control arm (2).
2. Are fuel cut off control cable assembly and fuel control arm parts in good condition and working properly?

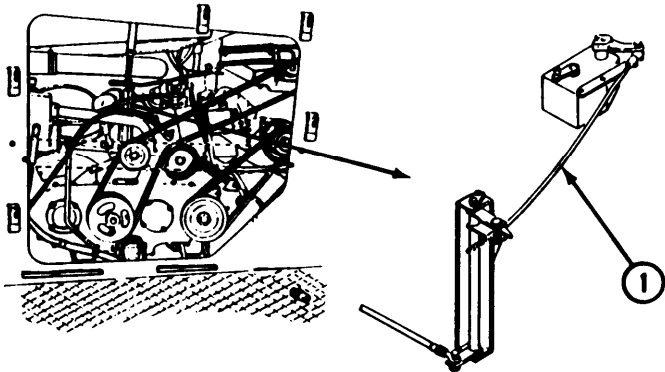


**NO**

1. Adjust/replace fuel cutoff cable (page 23-44).
2. Verify no faults found.

**YES**

1. Inspect governor throttle linkage (1) for bent, loose, broken or missing parts.
2. Are governor throttle linkage parts in good condition and working properly?



**NO**

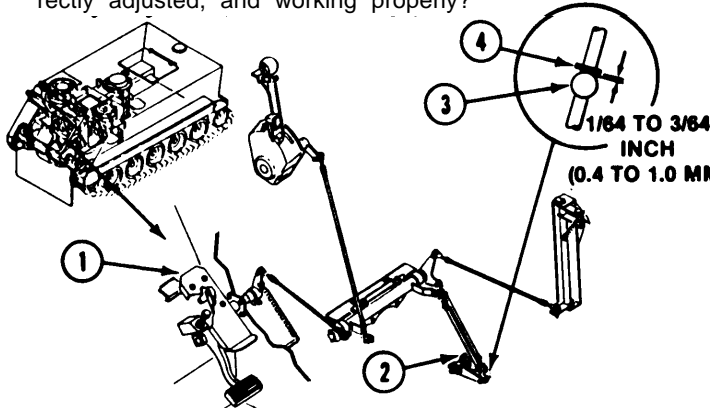
1. Repair/replace governor throttle linkage (page 23-31 and 23-33).
2. Verify no faults found.

**YES**

**A2**

**A2**

1. Inspect accelerator linkage for bent, loose, broken or missing parts.
2. With pedal (1) in full throttle position, travel spring (2) should be compressed so that a gap of 1/64 to 3/64 inch (0.4 to 1.0 mm) exists between pivot pin (3) and rod stop (4).
3. Are accelerator linkage parts in good condition, correctly adjusted, and working properly?

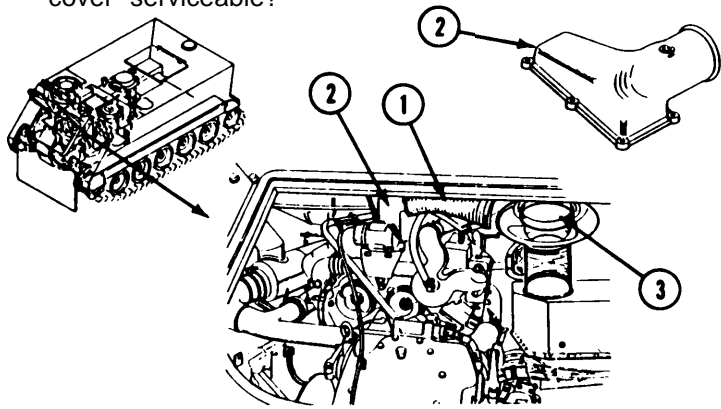


**NO**

1. Repair/adjust accelerator linkage parts (page 23-27).
2. Verify no faults found.

**YES**

1. Remove air cleaner element (see your -10).
2. Remove air cleaner hose (page 7-3).
3. Inspect air cleaner hose (1), engine intake (2), and air cleaner cover (3) for signs of obstruction or collapse.
4. Are air cleaner hose, engine intake, and air cleaner cover serviceable?



**NO**

1. Remove any obstructions.
2. Replace unserviceable air cleaner hose (page 7-3) or air cleaner cover (page 7-5).
3. Verify no faults found.

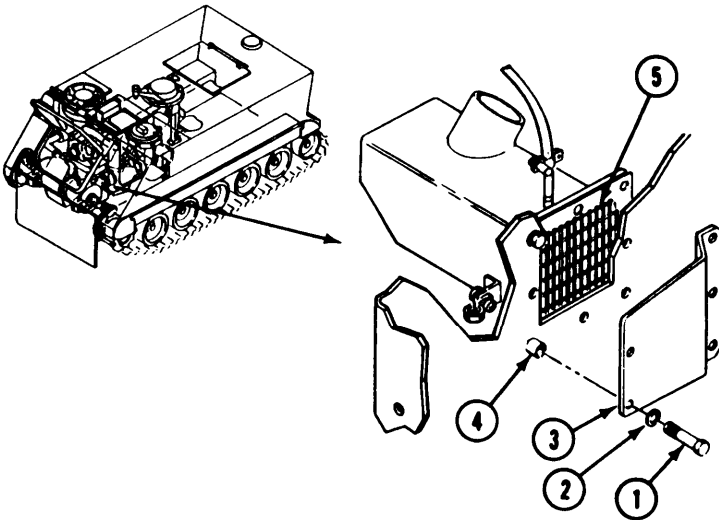
**YES**

**A3**

GO TO NEXT PAGE

**A3**

1. Install air cleaner hose (page 7-3).
2. Remove five screws (1), washers (2), plate (3), and two spacers (4) from drivers compartment bulkhead.
3. Ensure that air control valve handle is pushed in (see your -10).
4. Inspect air control valve baffle (5) for operation.
5. Are air control valve parts in good condition and operating properly?

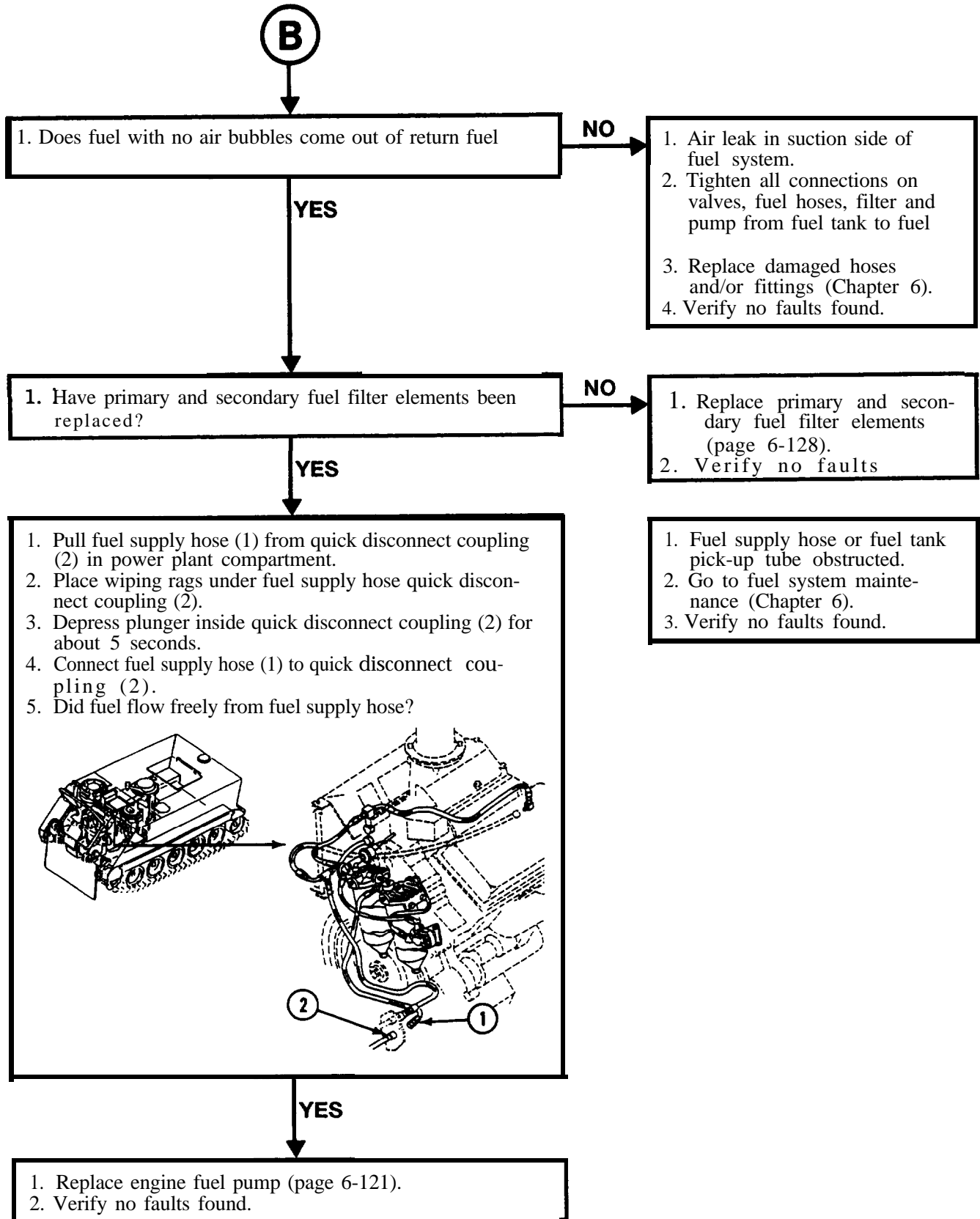


**NO**

1. Repair air control valve (page 7-11).
2. Report problem to supervisor.

**YES**

1. Engine does not produce full power.
2. Install plate on drivers compartment bulkhead.
3. Notify your supervisor.



---

# ENGINE OIL LOW PRESSURE INDICATOR FAILS TO GO OFF AFTER ENGINE STARTS

---

## INITIAL SETUP

### Tools:

- General Mechanic6 Tool Kit (Item 30, App D)
- Oil Pressure Gage Kit (Item 28, App D)
- STE/ICE-R Test Kit (Item 71.1, App D)

### References (cont):

- STE/ICE-R oil pressure troubleshooting (page 3-264)

### Personnel Required:

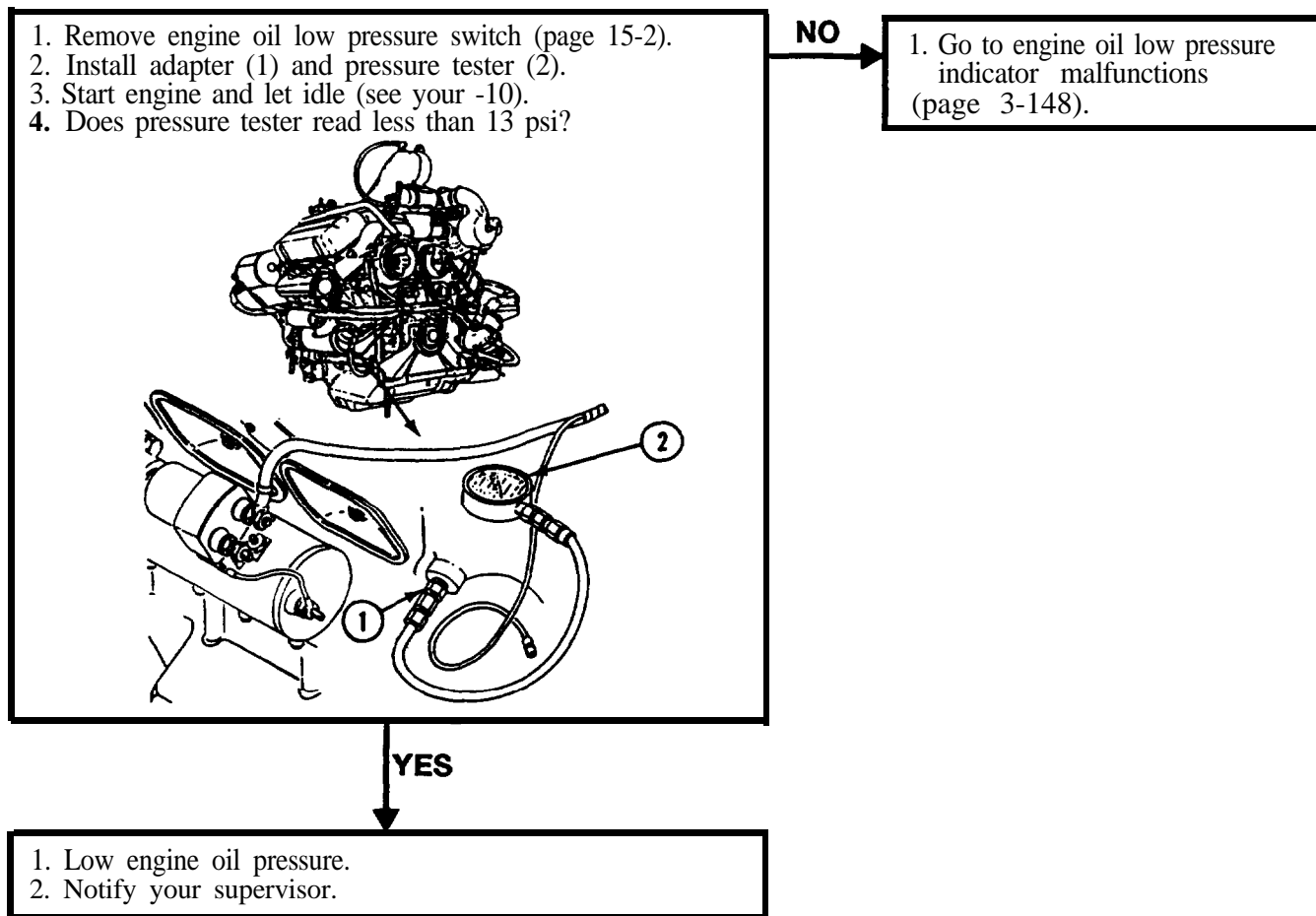
- Unit Mechanic

### Equipment Conditions:

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Engine warm
- Engine oil level checked (see your -12)
- Engine idle speed checked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)

### References:

- See your -10
- See your LO





**ENGINE DOES NOT REMAIN AT IDLE RPM WITH SUSPENSION LOCKOUT SYSTEM ENGAGED (M741A1 ONLY)**

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D) TM 9-2350-300-10

**References (cont):**

**Personnel Required:**

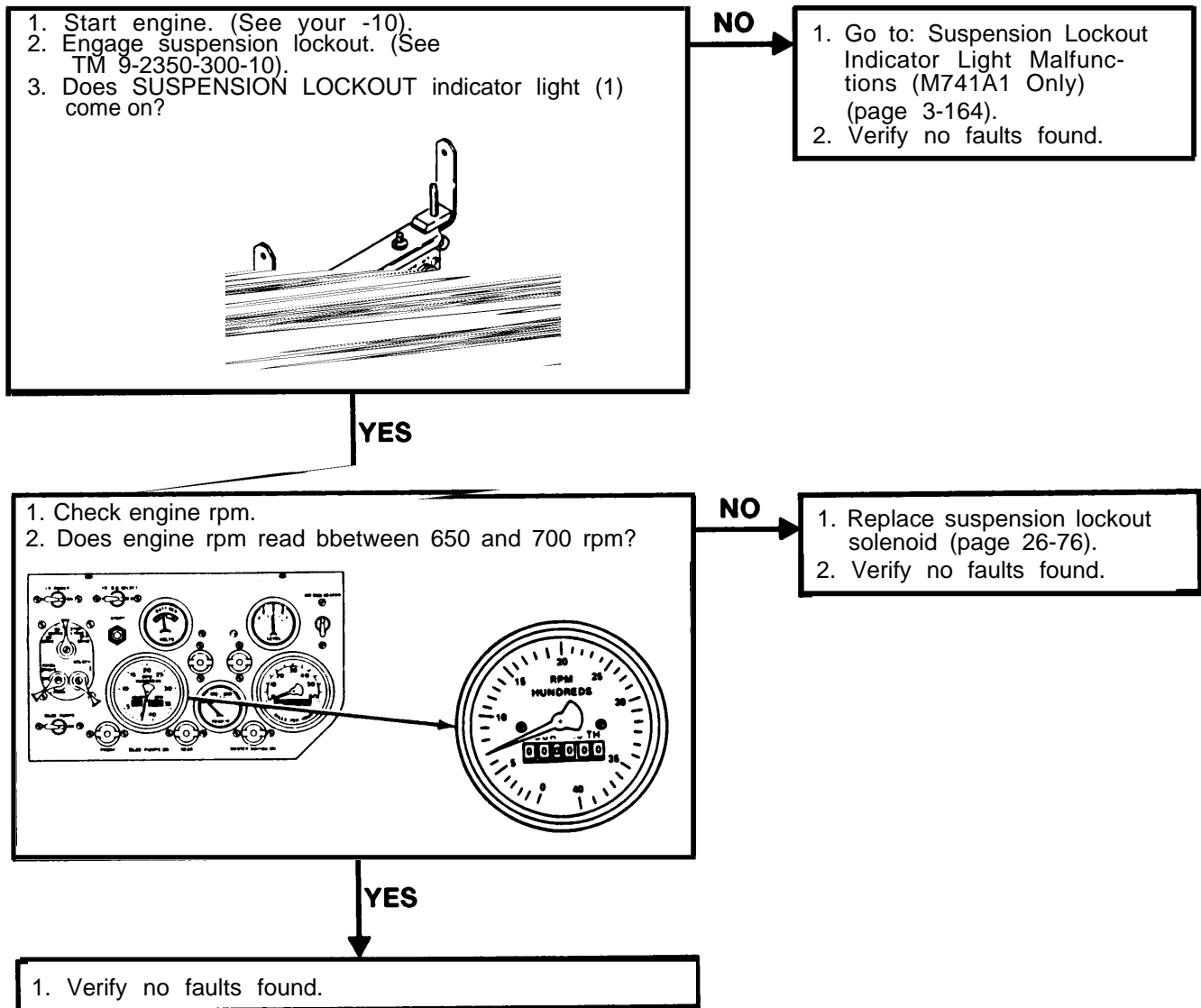
Unit Mechanic

**Equipment Conditions:**

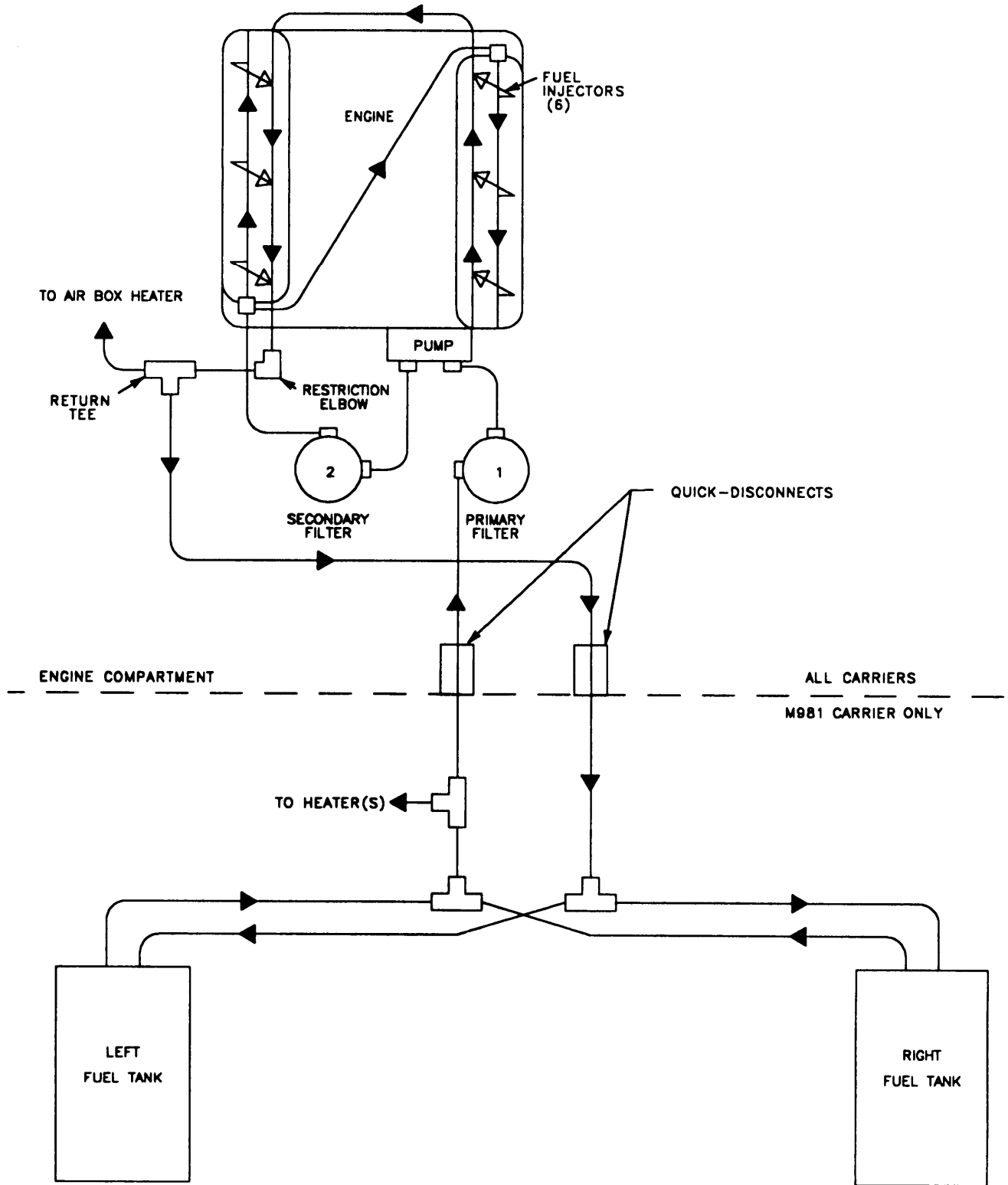
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

**References:**

See your -10

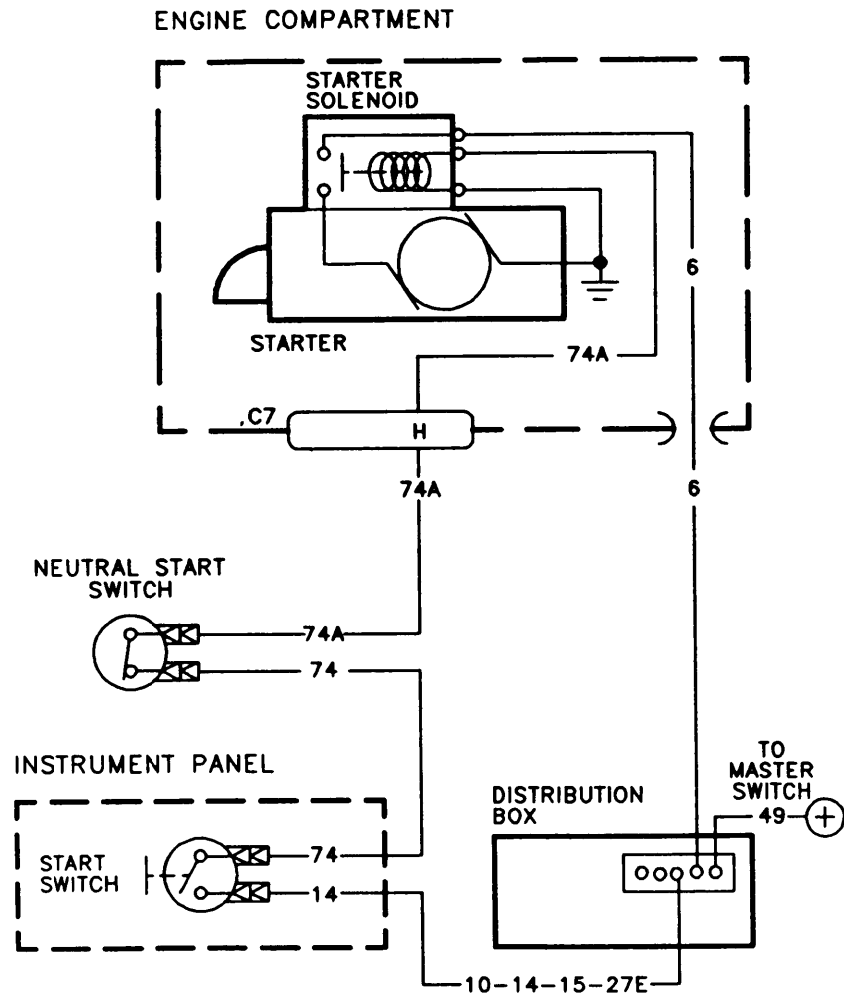


# ENGINE FUEL SYSTEM SCHEMATIC

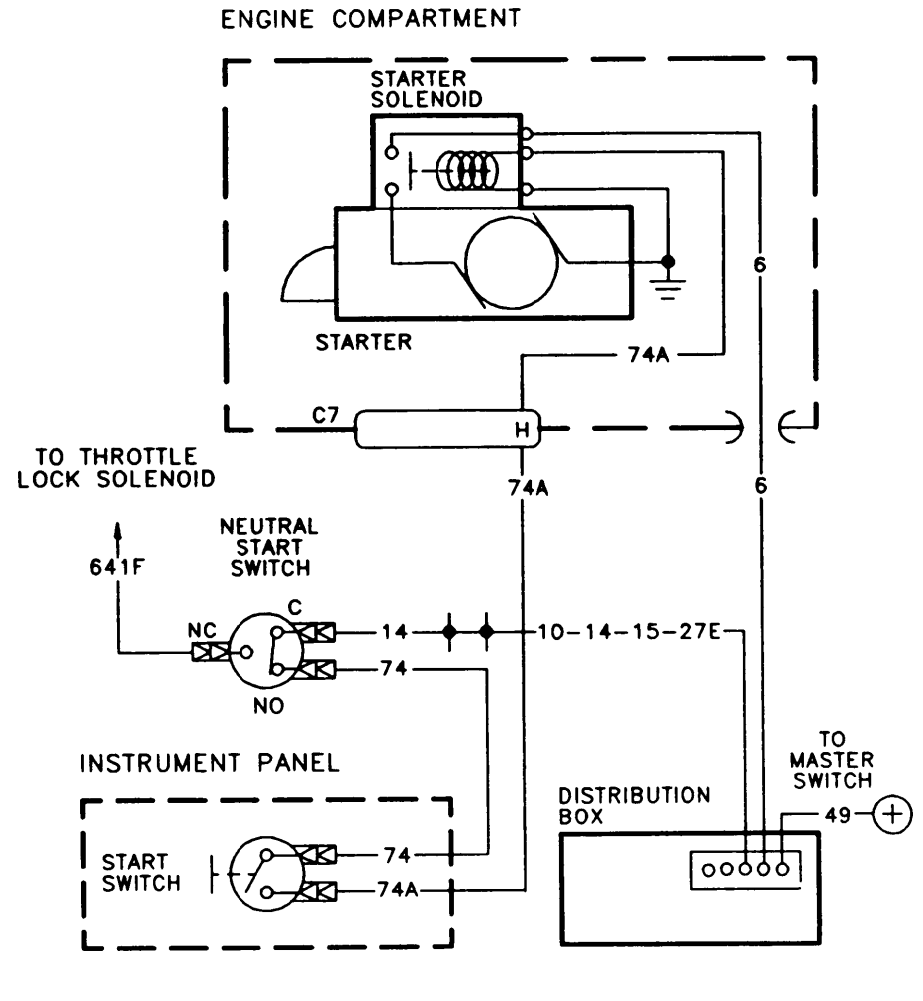


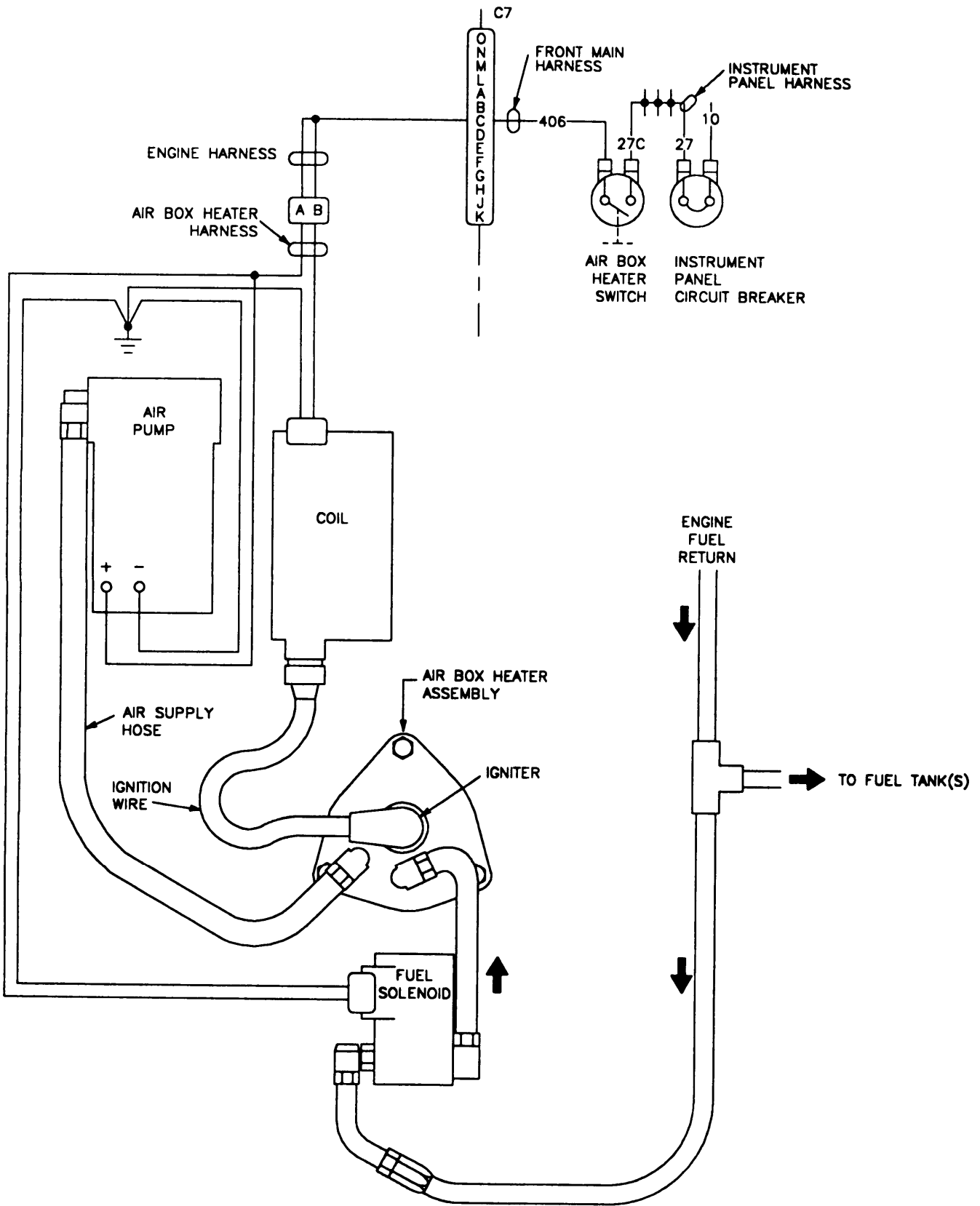
# STARTING SYSTEM SCHEMATIC

ALL EXCEPT M741



M741 ONLY





AIR BOX HEATER SYSTEM SCHEMATIC

# CHARGING SYSTEM MALFUNCTIONS

## INITIAL SETUP

### Tools:

- General Mechanic's Tool Kit (Item 30, App D)
- Inspection Mirror (Item 42, App D)
- Digital Multimeter (Item 43, App D)
- Jumper Wire
- STE/ICE-R Test Set (Item 71.1, App D)

### Equipment Conditions:

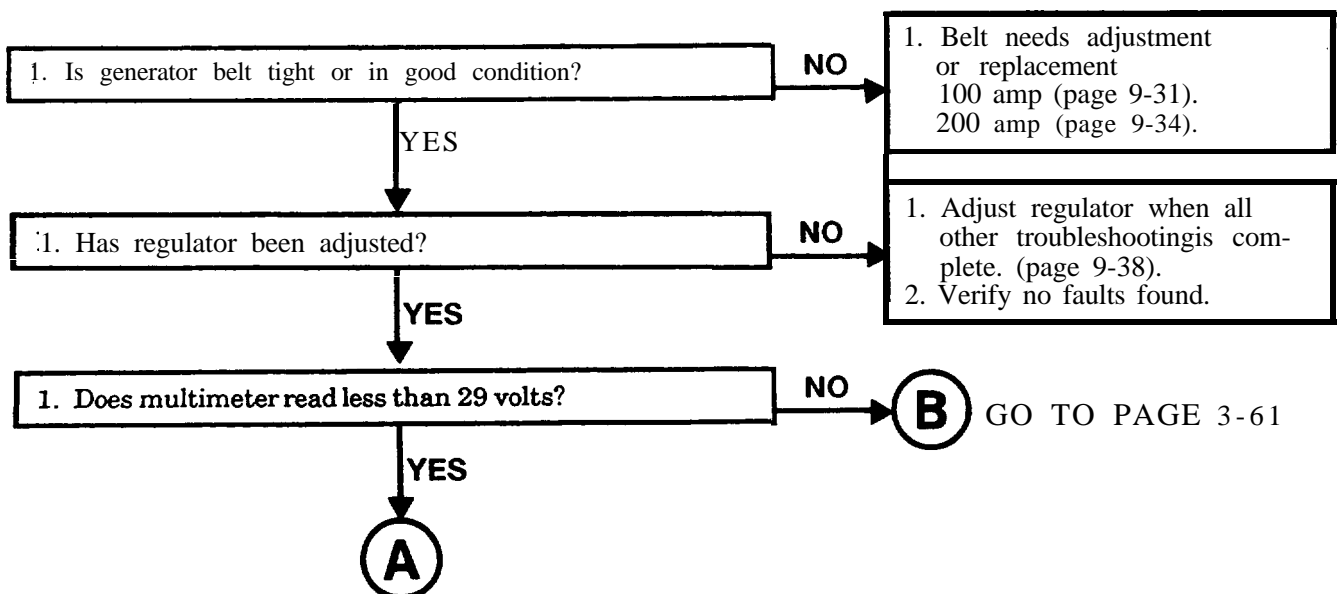
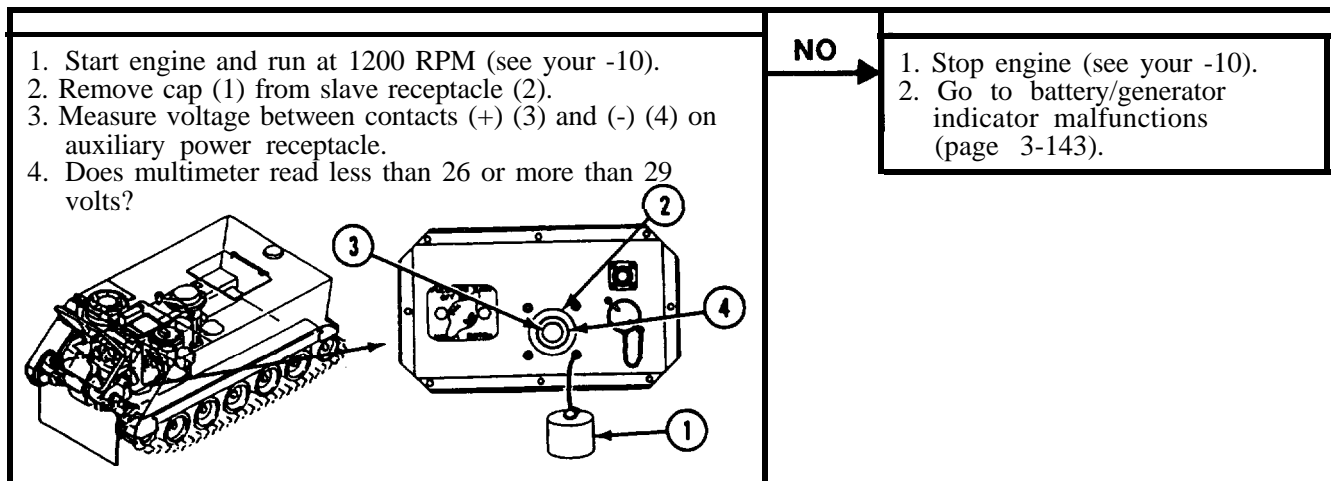
- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Driver's power plant access panel removed (see your -10)
- Power plant rear access panels removed (see your -10)
- Engine disconnect lever IN (see your -10)

### Personnel Required:

Unit Mechanic

### References:

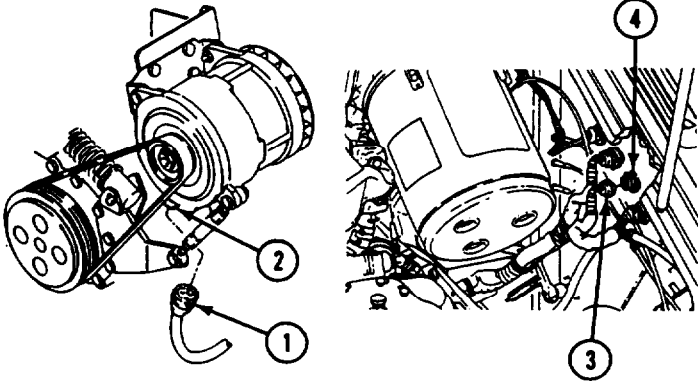
See your -10  
STE/ICE-R charging circuit troubleshooting  
(page 3-256)



GO TO NEXT PAGE

**A**

1. Stop engine (see your -10).
2. Remove engine harness plug C8 (1) from generator jack (2) and engine harness plug C3 (3) from front main harness bulkhead jack (4).
3. Inspect engine harness plugs C8 (1), C3 (3) and generator jack (2) and bulkhead jack (4) for corrosion and damage. Use mirror.
4. Are plugs and jacks clean and in good condition?

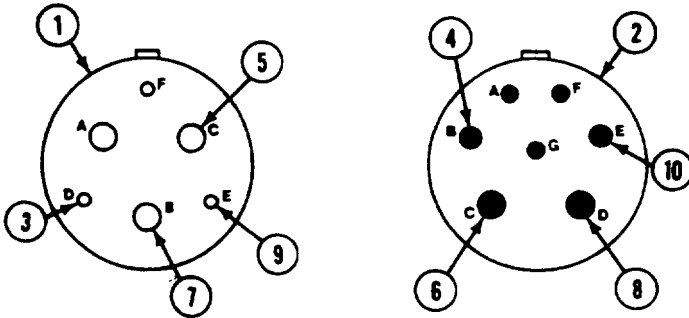


**NO**

1. Repair/replace engine harness and/or generator (page 14-3 or 9-31).
2. Verify no faults found.

**YES**

1. Measure resistance between engine harness plug C8 (1) and plug C3 (2), sockets D (3) to pins B (4), C (5) to C (6), B (7) to D (8), and E (9) to E (10).
2. Does multimeter read 0 ohms each time?



**NO**

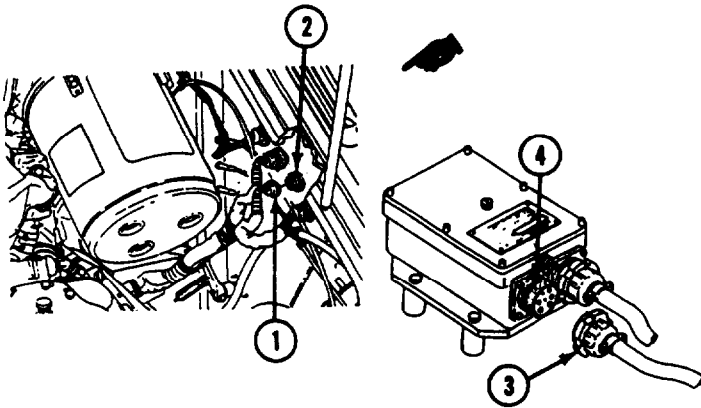
1. Repair/replace engine harness (page 14-3).
2. Verify no faults found.

**YES**

**A1**

**A1**

1. Install engine harness plug C8 on generator jack.
2. Remove engine wiring harness plug C3 (1) from bulkhead jack (2) and plug C4 (3) from regulator jack C4 (4).
3. Inspect engine harness plug C3 (1), bulkhead jack (2), front main plug C4 (3) and regulator jack C4 (4) for corrosion and damage.
4. Is plug and jack in clean and good condition?

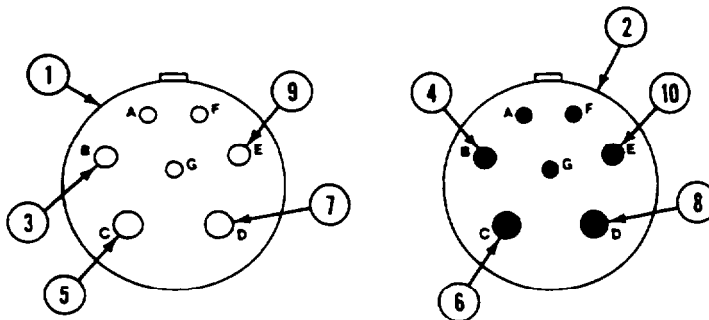


**NO**

1. Repair/replace front main wiring harness and/or regulator (pages 14-3 and 9-40).
2. Verify no faults found.

**YES**

1. Measure resistance between front main harness bulkhead jack (1) and front main plug C4 (2), sockets B (3) to pins B (4), C (5) to C (6), D (7) to D (8), and E (9) to E (10).
2. Does multimeter read 0 ohms each time?



**NO**

1. Repair/Replace Front Main Harness (page 14-3).
2. Verify no faults found.

**A2**

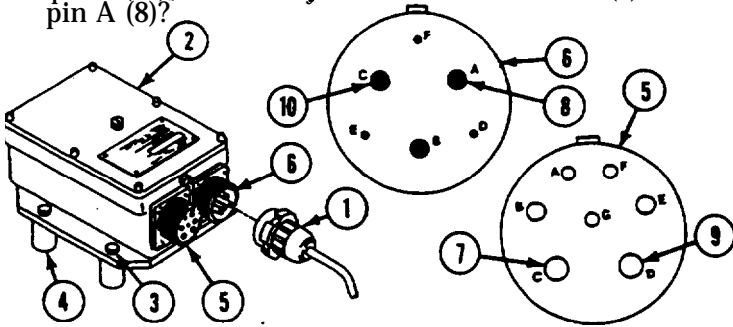
GO TO NEXT PAGE

**A2**

**NOTE**

If regulator is a 200 amp, reattach ground wire.

1. Install engine wiring harness plug C3 on front main harness bulkhead jack.
2. Remove front main harness plug C5 (1) from regulator (2).
3. Remove four screws (3) and regulator (2) from regulator plate (4).
4. Measure resistance between regulator jacks (5 and 6), socket C (7) to pin A (8), and socket D (9) to pin C (10).
5. Does multimeter read 0 ohms between socket D (9) and pin C (10), and infinity ohms between socket C (7) and pin A (8)?

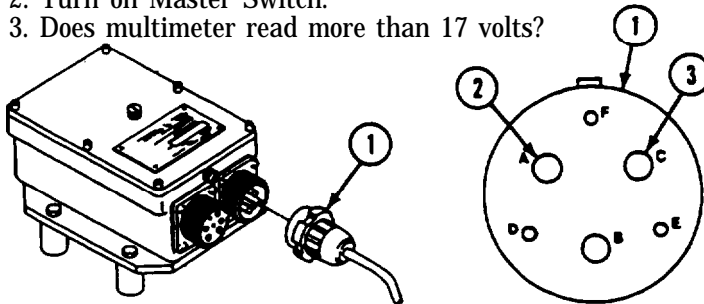


**NO**

1. Replace regulator (page 9-40).
2. Verify no faults found.

**YES**

1. Measure voltage between front main wiring harness plug C5 (1), socket A (+) (2), and socket C (-) (3). (If your carrier is equipped with a 200 amp generator system, measure voltage between socket A and ground, then between pin C and ground).
2. Turn on Master Switch.
3. Does multimeter read more than 17 volts?



**NO**

**C**

GO TO PAGE 3-62

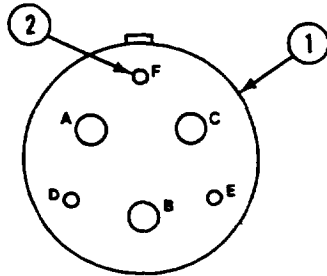
**YES**

**A3**



**A3**

1. Start engine and let idle (see your -10).
2. Measure voltage between front main harness plug C5 (1), socket F (2), leave in ground.
3. Does multimeter read less than 17 volts?



**NO**

1. Stop engine (see your -10).
2. Replace generator and regulator assemblies (page 9-31 or 9-34 and 9-40).
3. Verify no faults found.

**YES**

**A4**

GO TO NEXT PAGE

**A4**

1. Stop engine (see your -10).
2. Install regulator on regulator plate.
3. Install front main wiring harness plug C4 on regulator.
4. Remove engine harness plug (1) from generator field switch jack (2).
5. Install jumper (3) on engine harness plug (1) between pins NO (4) and C (5).
6. Turn MASTER SWITCH to ON.
7. Measure voltage between front main wiring harness plug C5 (6), socket F (7), and ground.
8. Does multimeter read less than 17 volts?

**NO**

1. Replace generator field switch (page 9-44).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove engine wiring harness plug C7 (1) from front main wiring harness bulkhead jack C7 (2).
3. Measure resistance between C7 plug (1), pins B (3), and F (4).
4. Does multimeter read 0 ohms?

**NO**

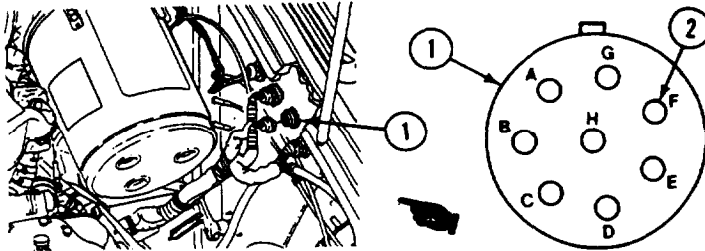
1. Remove jumper wire from generator field switch plug.
2. Measure resistance between plug C7, pin B, and engine harness plug pin NO. If multimeter reads 0 ohms, see step 4.
3. Measure resistance between plug C7, pin F, and engine harness plug pin C. If multimeter reads 0 ohms, see step 4.
4. Repair engine wiring harness circuit 1A or 1B (page 14-3).
5. Verify no faults found.

**YES**

**A5**

**A5**

1. Remove jumper wire from engine harness plug.
2. Install engine wiring harness on generator field switch.
3. Turn MASTER SWITCH to ON.
4. Measure voltage between front main harness bulkhead jack C7 (1) pin F (2) to ground.
5. Turn MASTER SWITCH to OFF.
6. Did multimeter read more than 17 volts?



**NO**

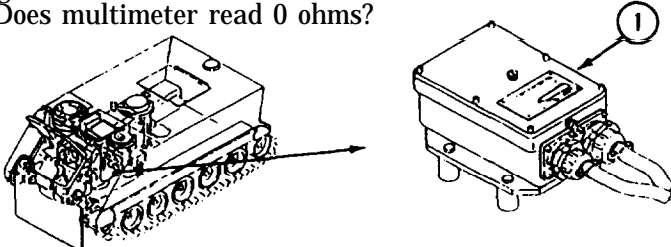
1. Install front main harness plug C5 on regulator jack.
2. Repair front main wiring harness circuit 1A (page 14-3).
3. Verify no faults found.

**YES**

1. Repair front main wiring harness circuit 1B (page 14-3).
2. Verify no faults found.

**B**

1. Engine stopped/shutdown (see your -10).
2. Measure resistance between regulator housing (1) and ground.
3. Does multimeter read 0 ohms?



**NO**

1. Remove regulator (page 9-40) and clean ground contacts (bolted surface).
2. Install regulator.
3. Verify no faults found.

**B1**

1. Has regulator been replaced?

**NO**

1. Replace regulator (page 9-40).  
2. Verify no faults found.

**YES**

1. Replace generator (page 9-31 or 9-34).  
2. Verify no faults found.

**C**

1. Does your carrier have a 100 amp charging system?

**NO**

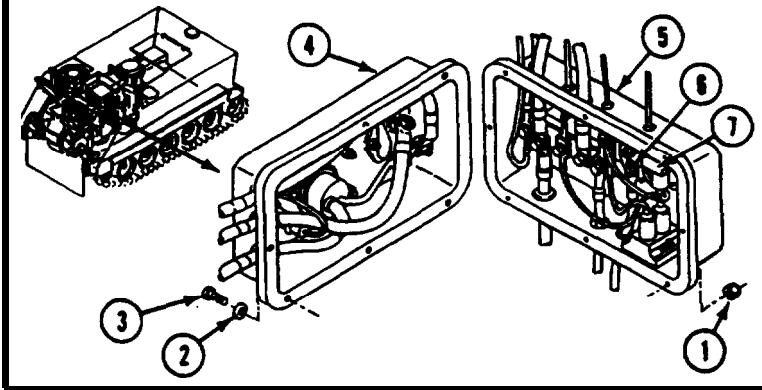
**D**

**YES**

1. Install regulator on regulator plate.  
2. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).  
3. Measure resistance between front main harness circuit 3 terminal (6) on circuit breaker (7) and ground.  
4. Does multimeter read 0 ohms?

**NO**

1. Replace generator-regulator circuit breaker (page 9-42).  
2. Verify no faults found.



**YES**

1. Repair front main wiring harness circuit 2 or 3 (page 14-3).  
2. Verify no faults found.

**D**

- 1. Install plug C4 to regulator jack.
- 2. Is this earner a M741A1?

NO

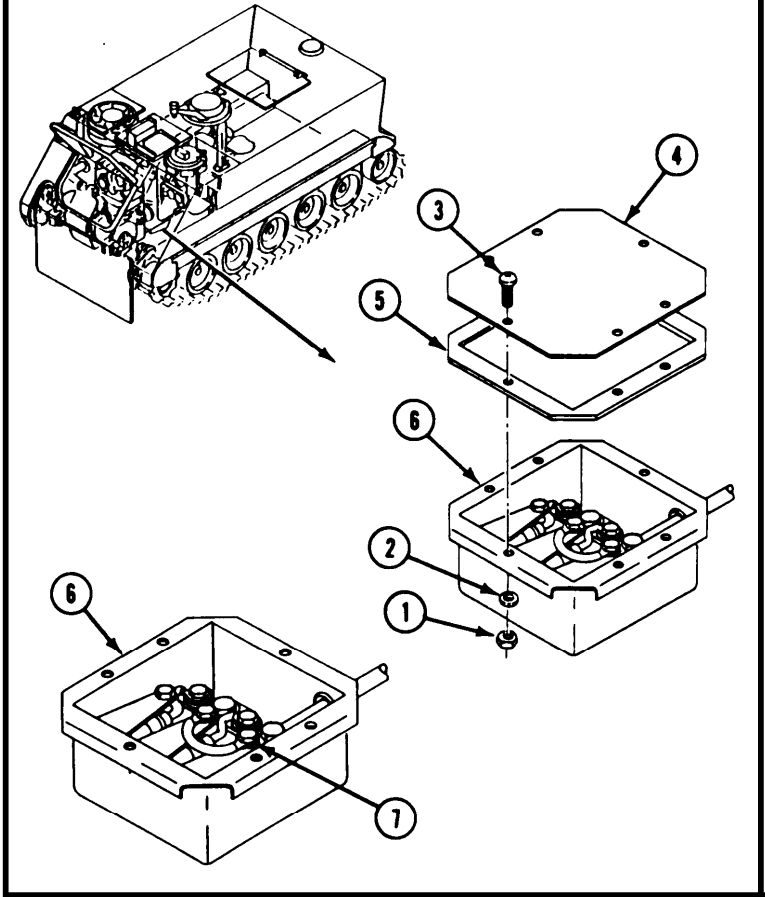
- 1. Front main wiring harness circuit 2 or 2A for 200 amp systems damaged.
- 2. Notify your supervisor.

YES

- 1. Remove six nuts (1), washers (2), screws (3), cover (4), and gasket (5) from turret distribution box (6).
- 2. Turn MASTER SWITCH to ON.
- 3. Measure voltage in turret distribution box (6) circuit 2A (7) to ground.
- 4. Does multimeter read more than 18 volts?

NO

- 1. Turn MASTER SWITCH to OFF.
- 2. Repair circuit 2A (page 14-3).
- 3. Verify no faults found.



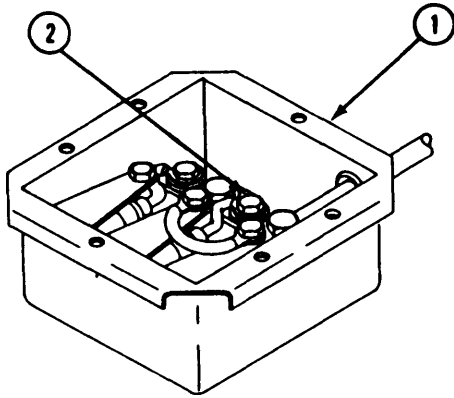
YES

**D1**

GO TO NEXT PAGE

**D1**

1. Measure voltage in turret distribution box (1) circuit 2 (2) to ground.
2. Turn MASTER SWITCH to OFF.
3. Did multimeter read more than 17 volts?



NO

1. Replace all damaged diode semiconductor device assemblies and wire wound fixed resistors in turret distribution box (page 17-25).
2. Verify no faults found.

YES

1. Repair front main wiring harness (page 14-3).
2. Verify no faults found.

**DISCONNECT/CONNECT ALTERNATOR (GENERATOR) TEST KIT****INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
 Alternator Test Kit (Item 74.1, App D)  
 Electrical Connector Pliers (Item 44, App D)

**Personnel Required:**

Unit Mechanic

**References:**

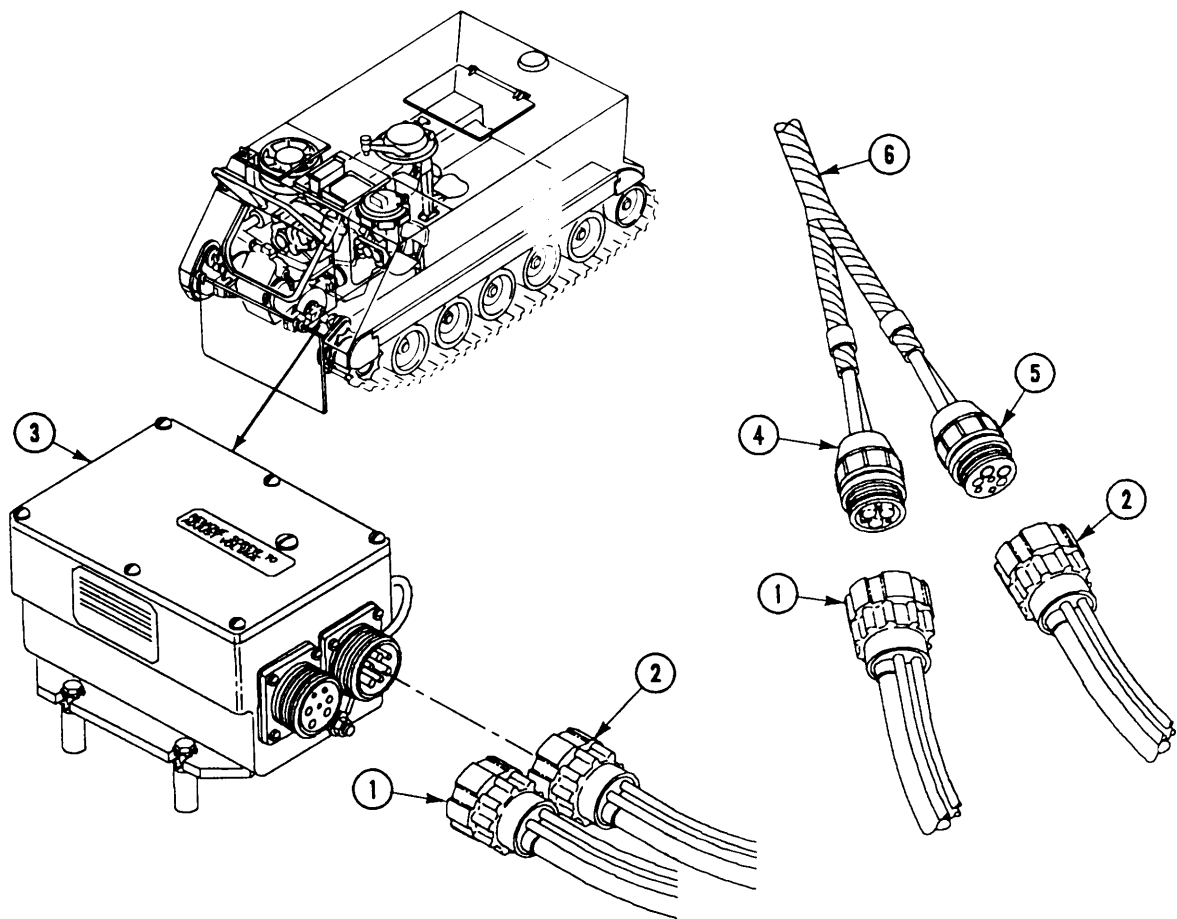
See your -10

**Equipment Conditions:**

Engine stopped (see your -10)  
 Ramp lowered (see your -10)  
 All radio and heaters turned off  
 (see your -10)  
 Battery box cover removed (page 13-3)  
 Battery drawer open (page 13-24)

**CONNECT**

1. Disconnect batteries (page 13-2).
2. Check all electrical connectors, cannon plugs, and wiring harnesses before connecting alternator test kit.
3. Remove two front main wiring harness cannon plugs (1,2) from voltage regulator (3). Use electrical connector pliers.
4. Connect two cannon plugs (4,5) of diagnostic test wiring harness (6) to cannon plugs (1,2). Use electrical connector pliers.



GO TO NEXT PAGE

Change 1

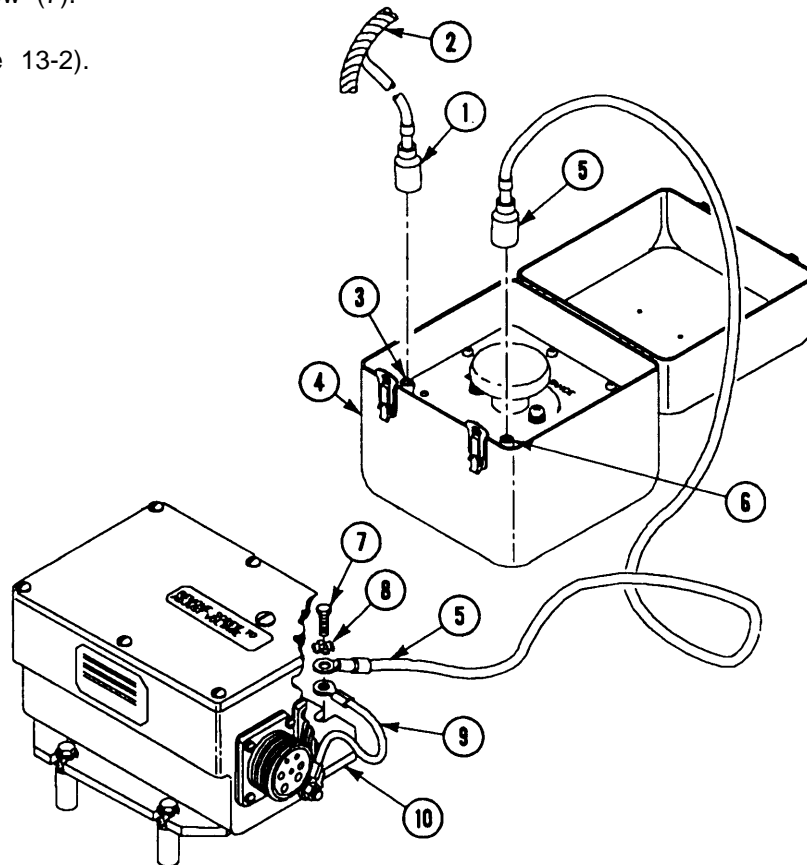
3-64.1

5. Connect lead 2 (1) of diagnostic test wiring harness (2) to terminal 5 (3) of alternator test kit (4).

**CAUTION**

**If ground lead (5) is not connected to chassis and test kit, the alternator could be damaged when engine is started.**

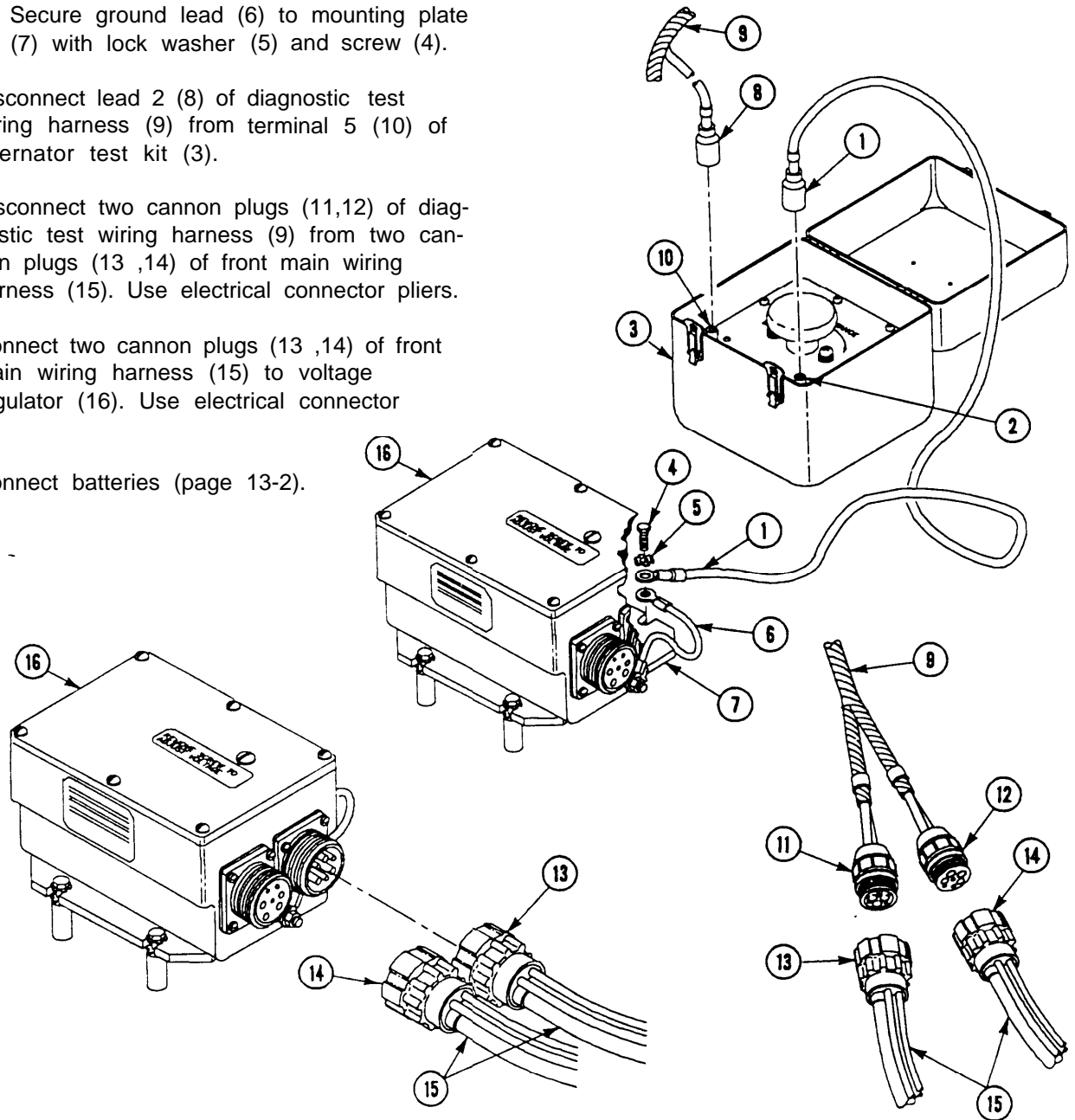
6. Connect ground lead (5) to terminal 6 (6) of alternator test kit (4) and ground.
  - a. Remove screw (7), lock washer (8), and ground lead (9) from voltage regulator mounting plate (10).
  - b. Secure ground lead (5) and ground lead (9) to mounting plate (10) with lock washer (8) and screw (7).
7. Connect batteries (page 13-2).





## DISCONNECT

8. Disconnect batteries (page 13-2).
9. Disconnect ground lead (1) from terminal 6 (2) of alternator test kit (3) and ground.
  - a. Remove screw (4), lock washer (5), and ground leads (1,6) from voltage regulator mounting plate (7).
  - b. Secure ground lead (6) to mounting plate (7) with lock washer (5) and screw (4).
10. Disconnect lead 2 (8) of diagnostic test wiring harness (9) from terminal 5 (10) of alternator test kit (3).
11. Disconnect two cannon plugs (11,12) of diagnostic test wiring harness (9) from two cannon plugs (13 ,14) of front main wiring harness (15). Use electrical connector pliers.
12. Connect two cannon plugs (13 ,14) of front main wiring harness (15) to voltage regulator (16). Use electrical connector
13. Connect batteries (page 13-2).



END OF TASK

**200 AMP CHARGING SYSTEM OPERATIONAL CHECK**

**INITIAL SETUP**

**Tools :**

General Mechanic's Tool Kit (Item 30, App D)  
Multimeter (Item 43, App D)

**References:**

See your-10  
TM 9-6140-200-14

**Personnel Required:**

Unit Mechanic

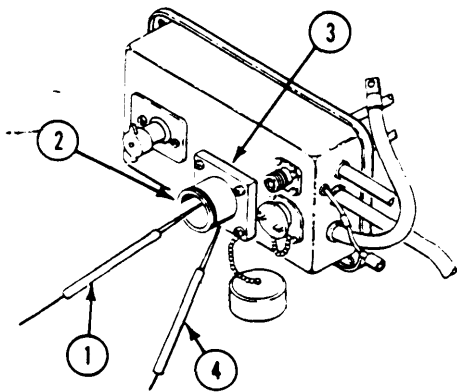
**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your-10)

1. Turn MASTER SWITCH ON.
2. Measure battery voltage by placing red lead (1) in positive socket of nato plug (2) on auxiliary power (slave) receptacle (3). Touch negative lead (4) to outside of nato plug on receptacle.

**NOTE**

On carriers that have standard auxiliary power receptacles, touch red lead to positive and black lead to negative sockets in the receptacle.



3. Is battery voltage more than 24.8 volts?

NO

1. Replace or charge batteries (TM 9-6140-200-14).
2. Verify no faults found.

YES

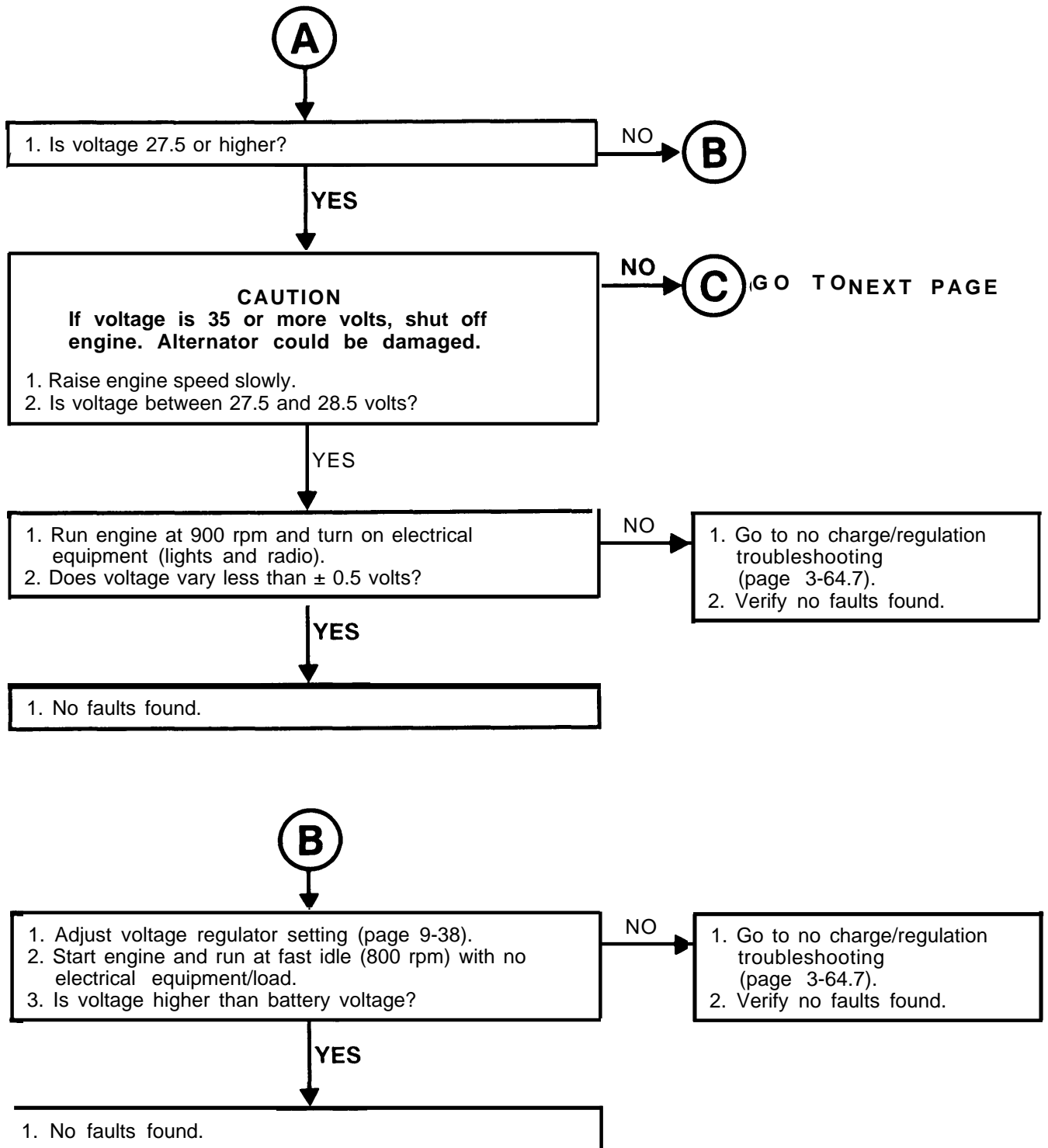
1. Start engine and run at fast idle (800 rpm) with no electrical equipment/load.
2. Is voltage higher than battery voltage?

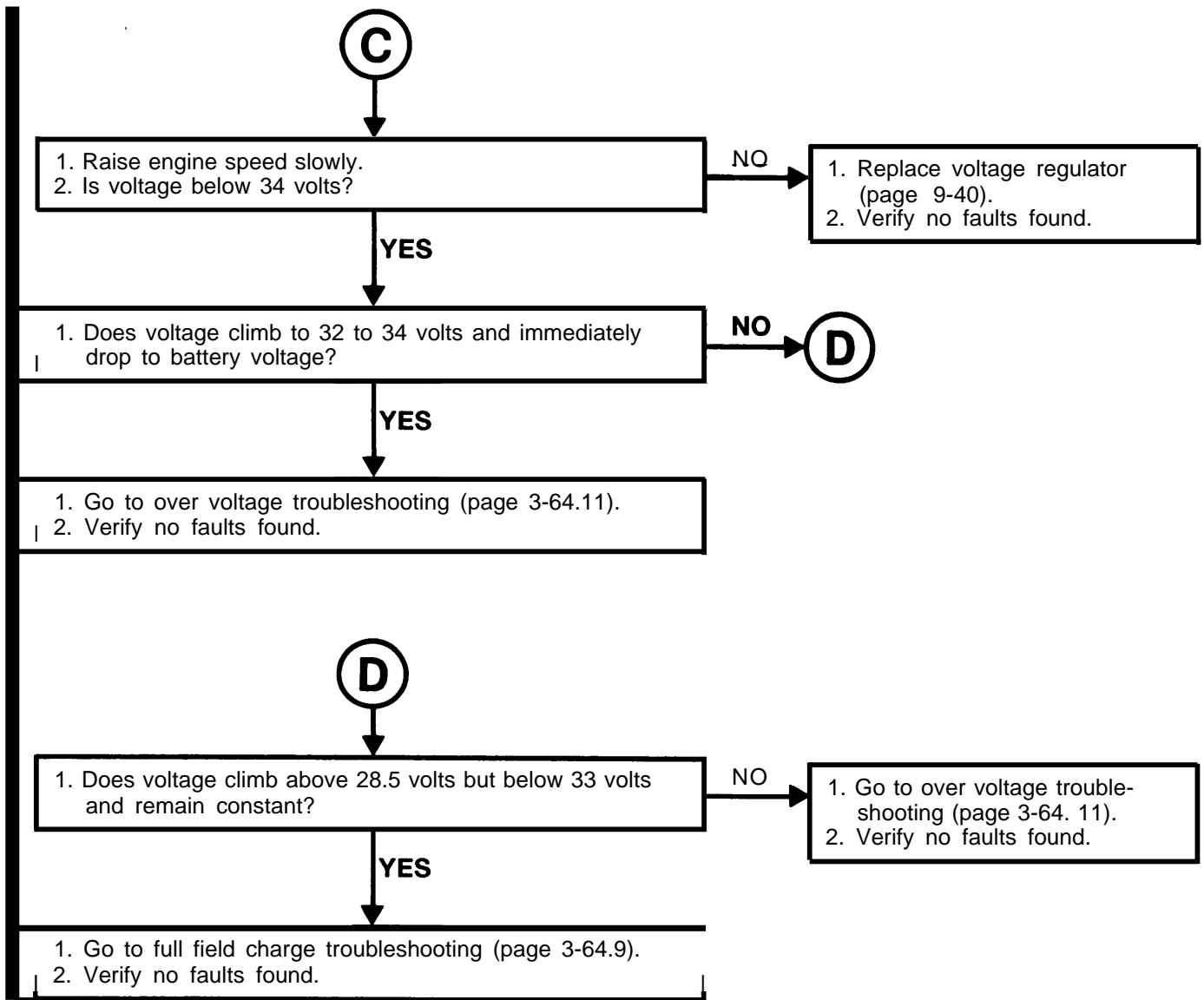
NO

1. Go to no charge/regulation troubleshooting (page 3-64.7).
2. Verify no faults found.

YES







**200 AMP NO CHARGE/REGULATION TROUBLESHOOTING**

**INITIAL SETUP**

**Tools:**

- General Mechanic's Tool Kit (Item 30, App D)
- Multimeter (Item 43, App D)
- Electrical Connector Pliers (Item 44, App D)
- Alternator Test Kit (Item 74.1, App D)

**References:**

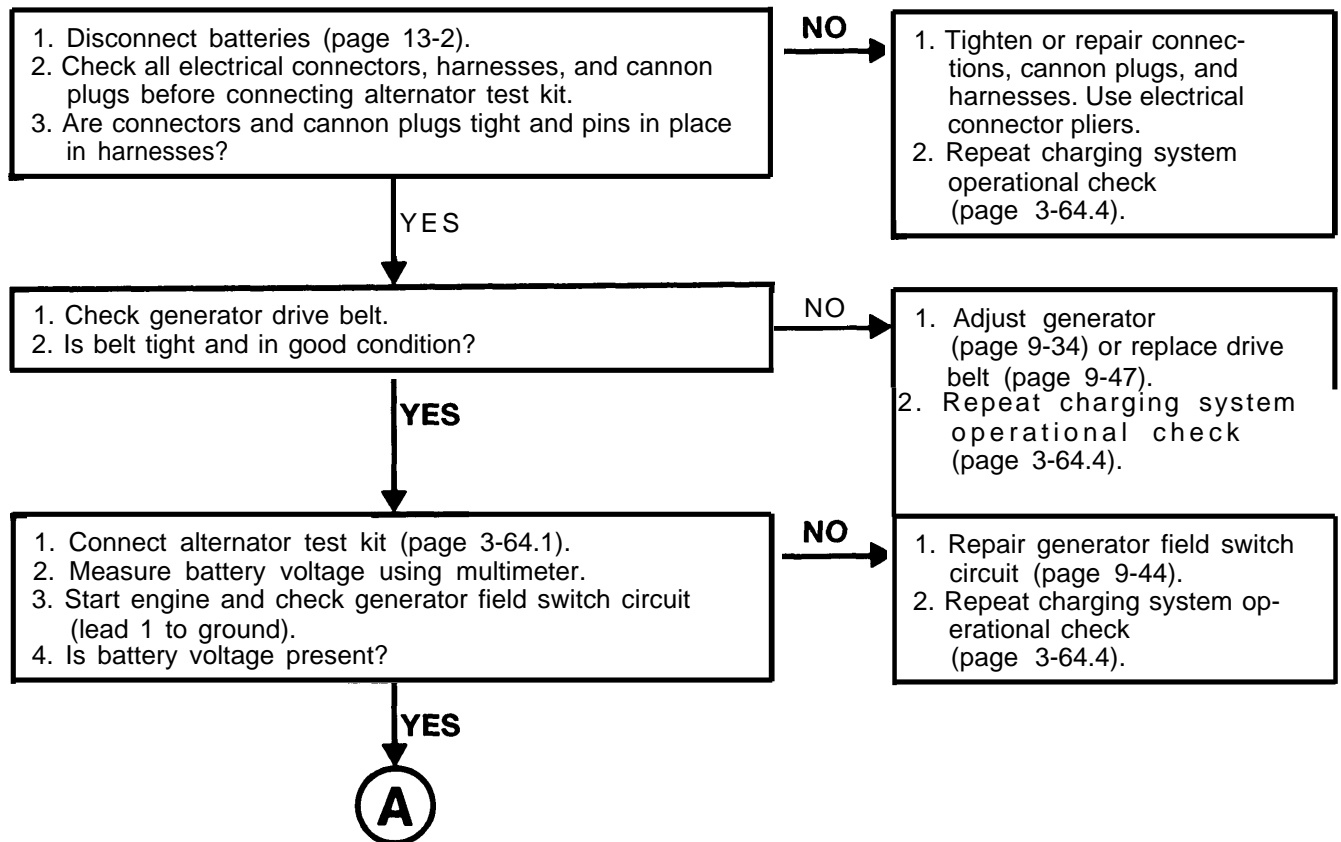
- See your -10
- TM 9-6140-200-14

**Equipment Conditions:**

- Engine stopped (see your -10)
- Carrier blocked (see your -10)
- Ramp lowered (see your -10)
- All radios and heaters OFF (see your -10)
- Battery box cover removed (page 13-3) or battery drawer open (page 13-23)

**Personnel Required:**

- Unit Mechanic



GO TO NEXT PAGE



1. Check batteries to make sure they are fully charged (TM 9-6140-200-14).
2. Turn off all electrical equipment/loads.

**CAUTION**

**If voltage climbs above 33 or more volts, shut off engine. Alternator could be damaged.**

3. Adjust rheostat to maximum resistance.
4. Connect diagnostic test harness leads 1 and 4 together.
5. Start engine and run at 800 rpm and lower resistance.
6. Does voltage rise above battery voltage (test harness lead 3 to ground) to approximately 28 volts?

**NO**

1. Remove alternator test kit (page 3-64.1).
2. Replace generator (200 amp) (page 9-34).
3. Repeat charging system operational check (page 3-64.4).

**YES**

1. Remove alternator test kit (page 3-64.1).
2. Replace voltage regulator (200 amp generator) (page 9-40).
3. Repeat charging system operational check (page 3-64.4).

## 200 AMP FULL FIELD CHARGE TROUBLESHOOTING

### INITIAL SETUP

**Tools:**

- General Mechanic's Tool Kit (Item 30, App D)
- Multimeter (Item 43, App D)
- Electrical Connector Pliers (Item 44, App D)
- Alternator Test Kit (Item 74.1, App D)

**Personnel Required:**

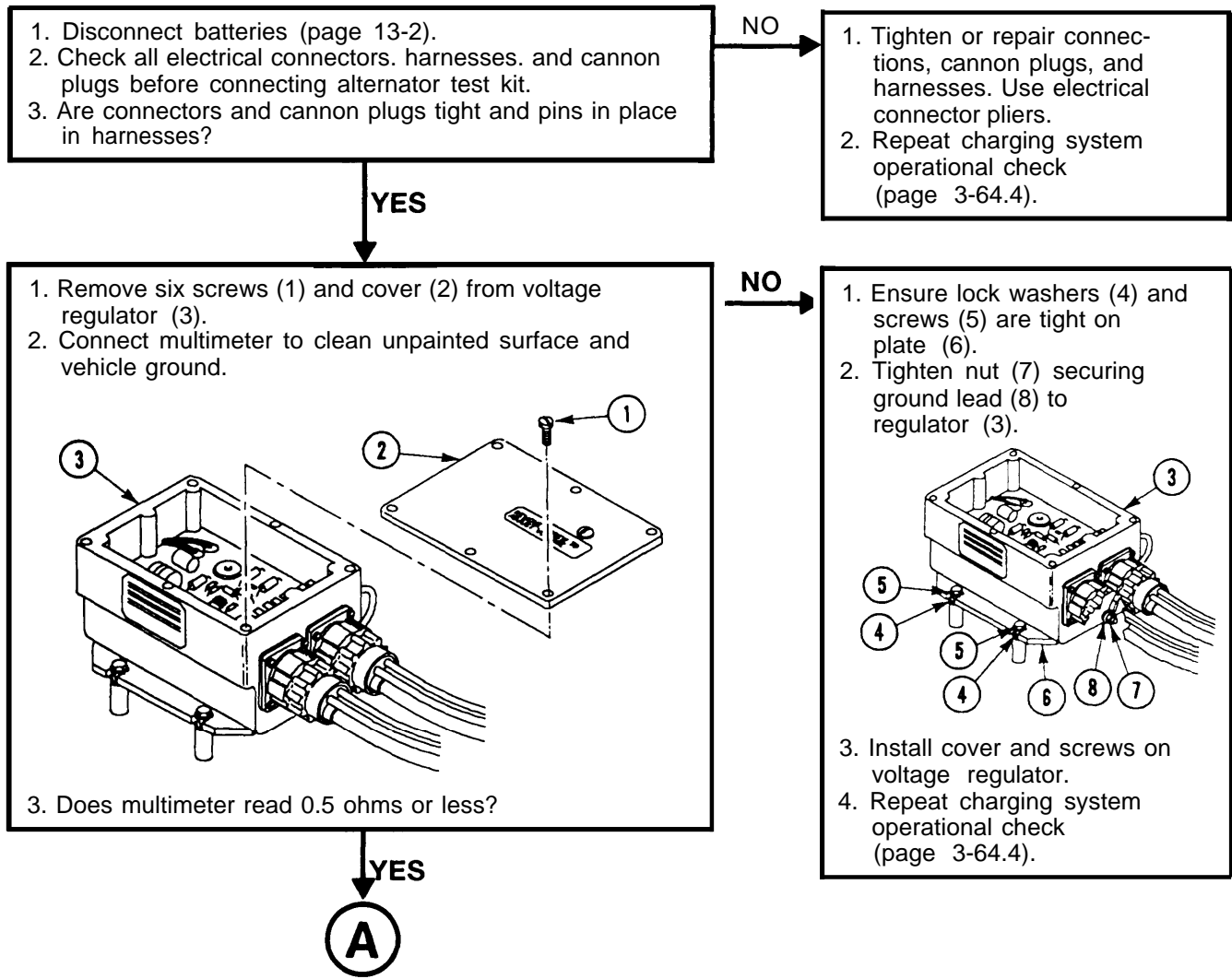
Unit Mechanic

**References:**

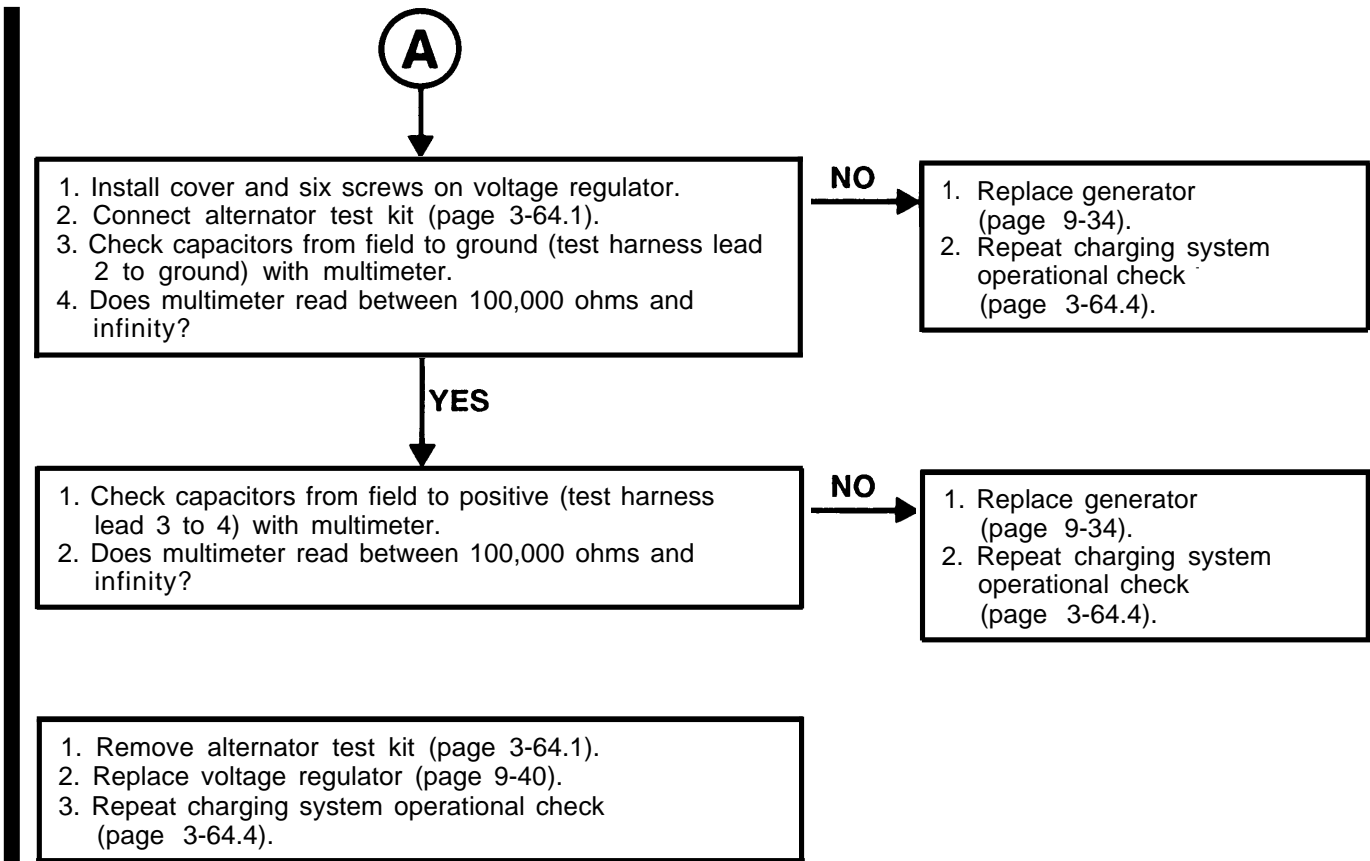
See your -10

**Equipment Conditions:**

- Engine stopped (see your -10)
- Carrier blocked (see your -10)
- Ramp lowered (see your -10)
- All radios and heaters OFF (see your -10)
- Battery box cover removed (page 13-3) or battery drawer open (page 13-24)



GO TO NEXT PAGE





**200 AMP OVER VOLTAGE TROUBLESHOOTING**

**INITIAL SETUP**

**Tools:**

- General Mechanic's Tool Kit (Item 30, App D)
- Multimeter (Item 43, App D)
- Electrical Connector Pliers (Item 44, App D)
- AlternatorTest Kit (Item 74.1, App D)

**References:**

- See your -10
- TM 9-6140-200-14

**Equipment Conditions:**

- Engine stopped (see your -10)
- Carrier blocked (see your -10)

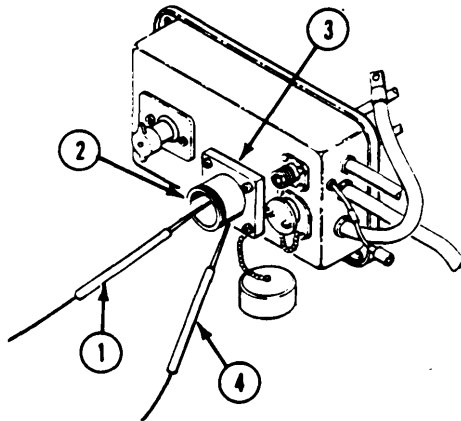
**Personnel Required:**

Unit Mechanic

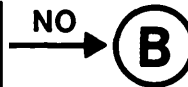
1. Turn MASTER SWITCH ON.
2. Measure battery voltage by placing red lead (1) in positive socket of NATO plug (2) on auxiliary power (slave) receptacle (3). Touch black negative lead (4) to outside of NATO plug on receptacle.

**NOTE**

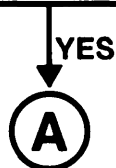
On earners that have standard auxiliary power receptacles, touch red lead to positive and black lead to negative sockets in the receptacle.



3. Adjust voltage regulator (200 amp) to lowest setting (page 9-38).
4. Start engine and accelerate.
5. Does voltage climb to 32 to 34 volts and suddenly drop to battery voltage?



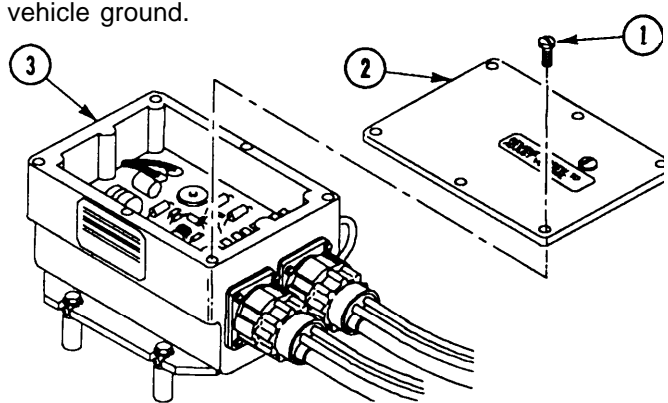
GO TO PAGE 344.13



GO TO NEXT PAGE

A

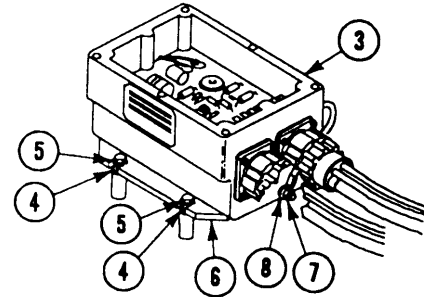
1. Remove six screws (1) and cover (2) from voltage regulator (3).
2. Connect multimeter to clean unpainted surface and vehicle ground.



3. Does multimeter read 0.5 ohms or less?

NO

1. Ensure lock washers (4) and screws (5) are tight on plate (6).
2. Tighten nut (7) securing ground lead (8) to regulator (3).



3. Install cover and screws on voltage regulator.
4. Repeat charging system operational check (page 3-64.4).

YES

1. Install cover and six screws on voltage regulator.
2. Connect alternator test kit (page 3-64.1).
3. Check batteries to make sure they are fully charged (see TM 9-6140-200-14).
4. Turn off all electrical equipment/loads.

**CAUTION**  
If voltage climbs above 33 or more volts, shut off engine. Alternator could be damaged.

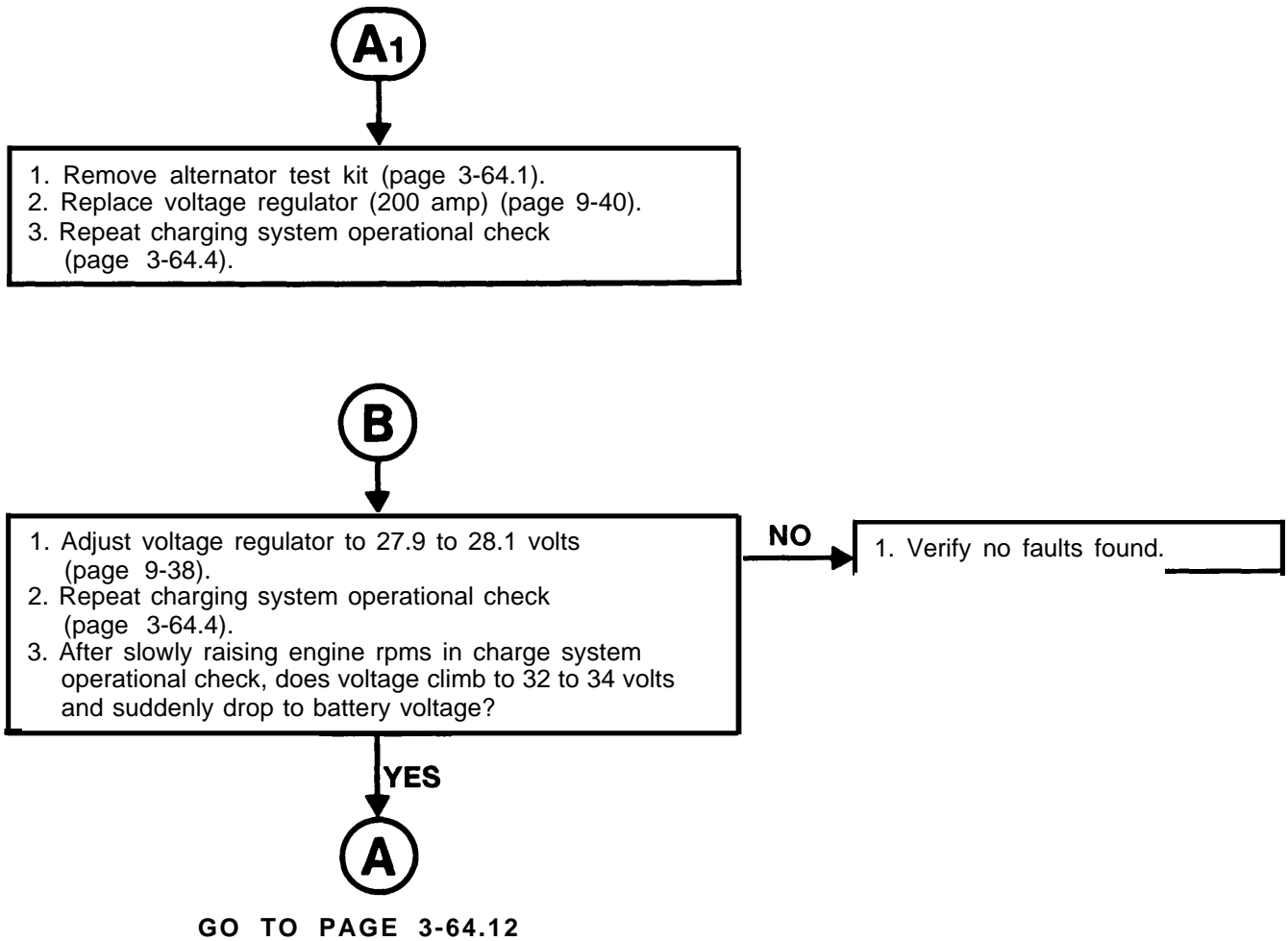
5. Adjust rheostat to maximum resistance.
6. Connect diagnostic test harness leads 1 and 4 together.
7. Start engine and run at 800 rpm and lower resistance.
8. Does voltage rise above battery voltage (test harness lead 3 to ground) to approximately 28 volts?

NO

1. Remove alternator test kit (page 3-64.1).
2. Replace generator (200 amp) (page 9-34).
3. Repeat charging system operational check (page 3-64.4).

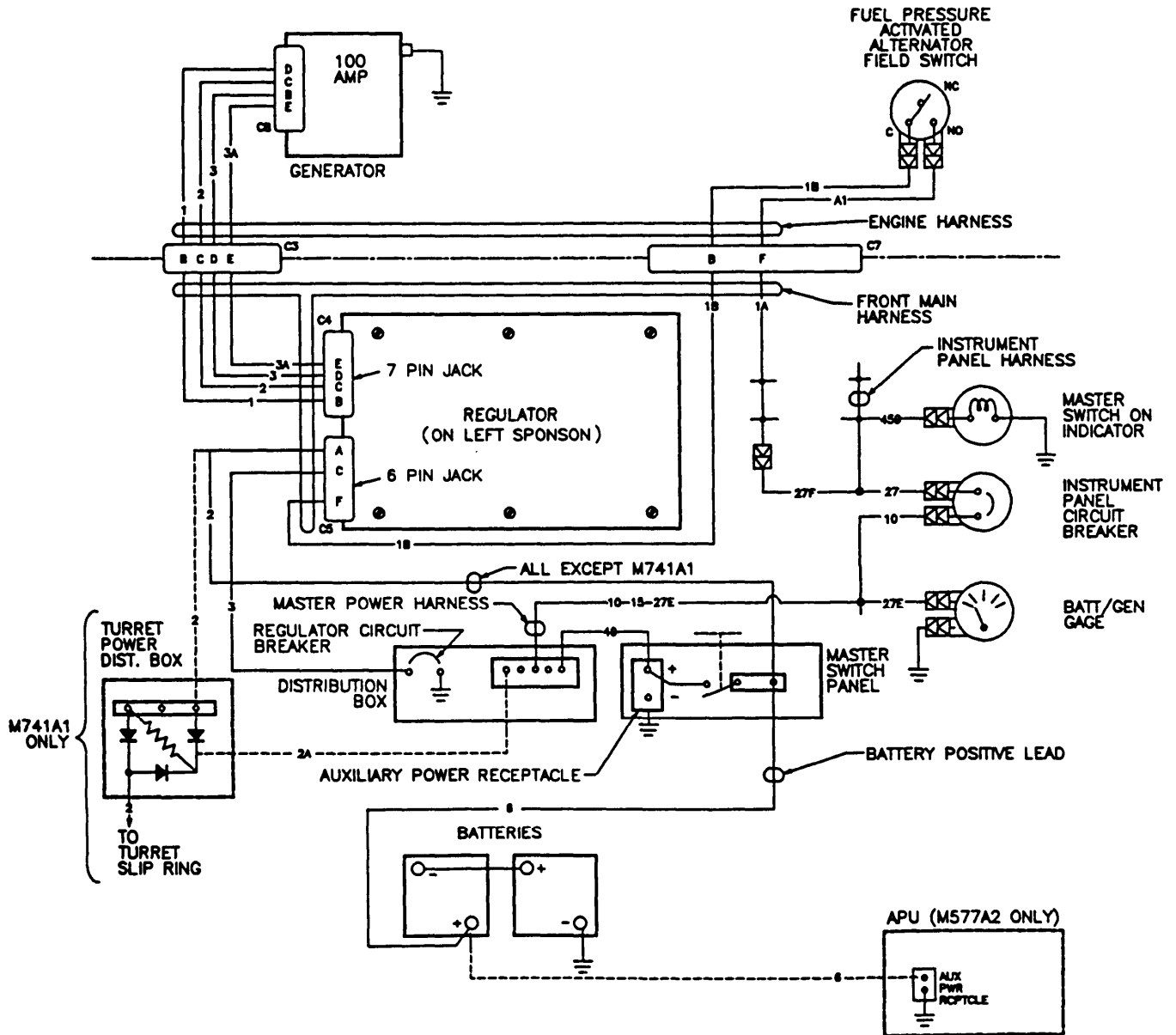
YES

A1

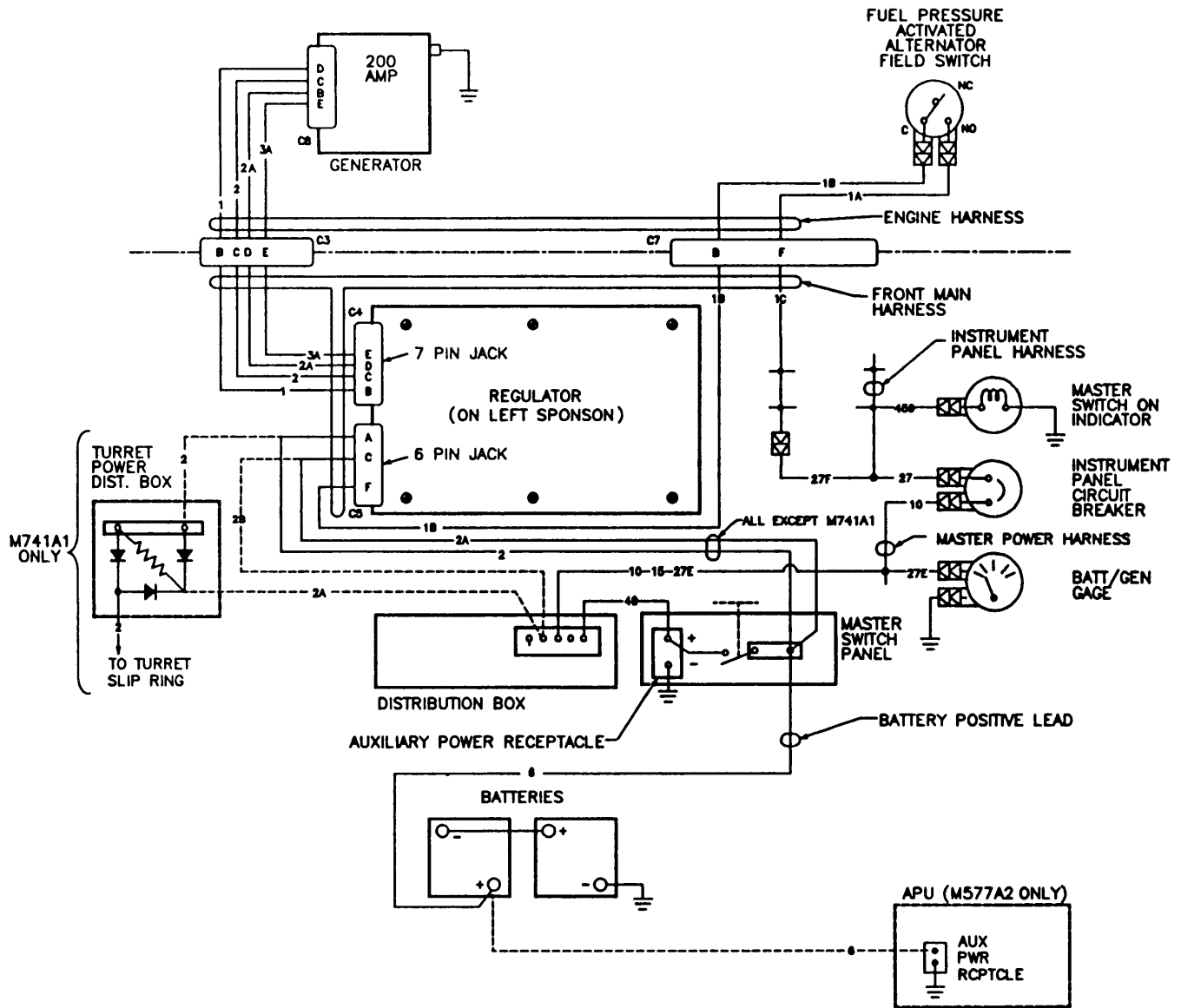




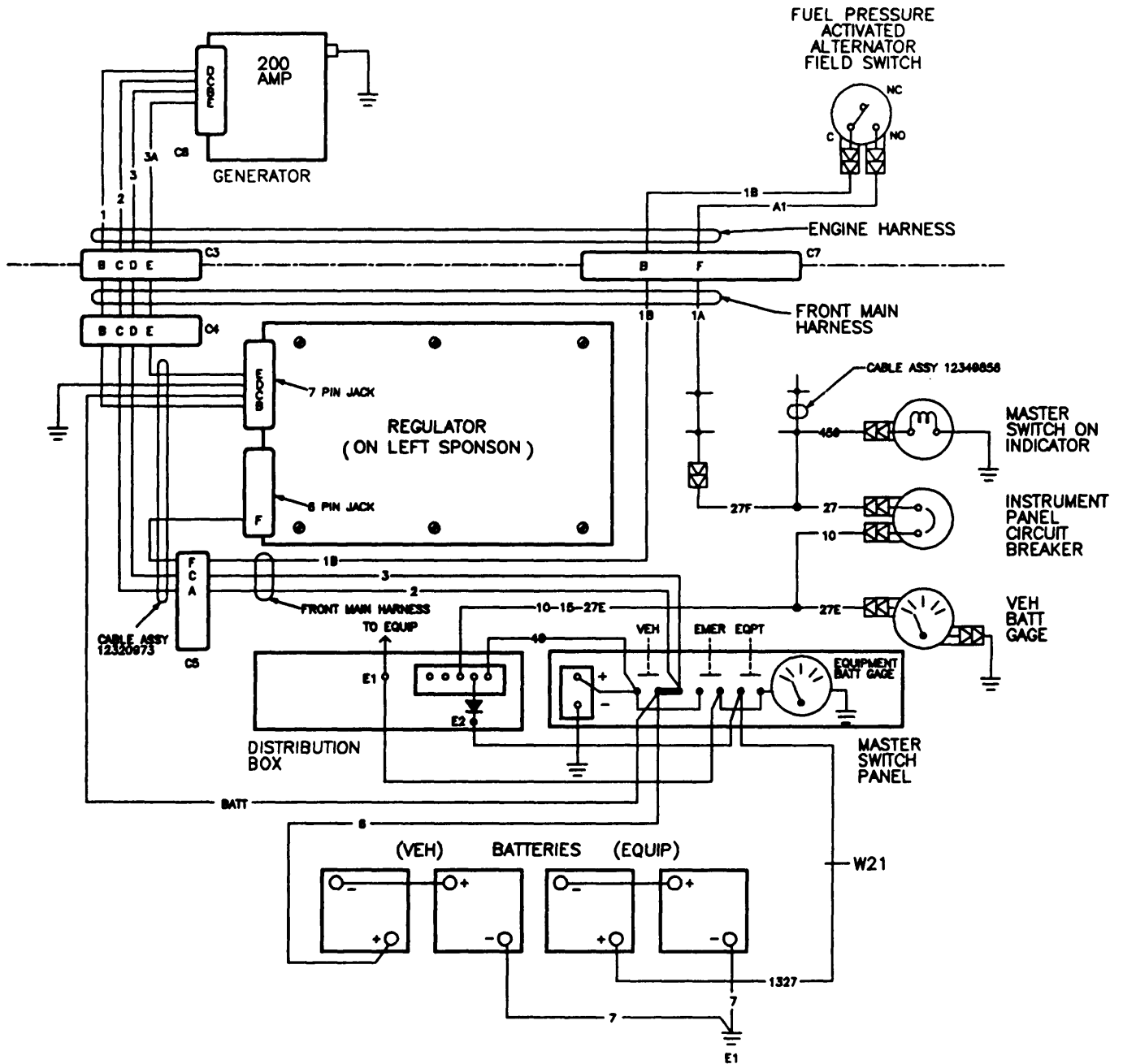
# 100 AMP ENGINE CHARGING SYSTEM SCHEMATIC



# 200 AMP ENGINE CHARGING SYSTEM SCHEMATIC



# 200 AMP ENGINE CHARGING SYSTEM SCHEMATIC (M981 ONLY)



---

## DIFFERENTIAL HI OIL TEMP INDICATOR COMES ON

---

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**Equipment Conditions:**

- Engine stopped/shutdown see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant access door open (see your -10)
- Differential cold

**Personnel Required:**

- Unit Mechanic
- Helper (H)

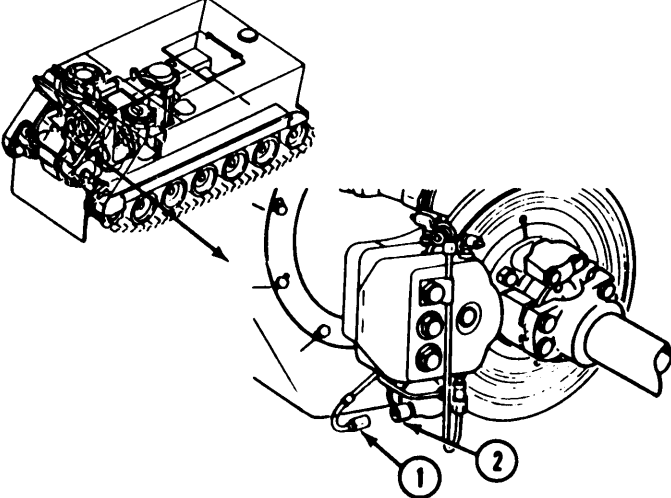
**Reference:**

see your -10

---

**CAUTION**  
Do not operate carrier with differential HI OIL TEMP indicator on. Serious damage may result.

1. Disconnect engine harness circuit 328 (1) from differential hi oil temp switch (2).
2. Turn MASTER SWITCH ON.
3. Is differential HI OIL TEMP indicator off?



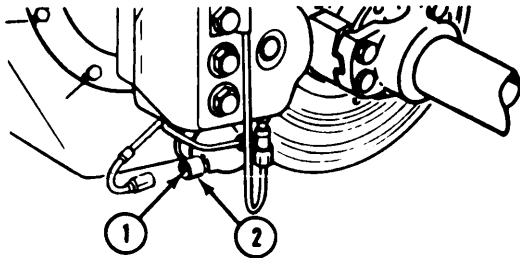
NO → 1. Go to differential OIL HI TEMP indicator malfunctions (page 3-159).

↓  
**A**



**A**

1. Turn MASTER SWITCH OFF.
2. Measure resistance between connector pin (1) and ground (2) of differential high oil temp switch.
3. Does multimeter read more than 5 ohms?

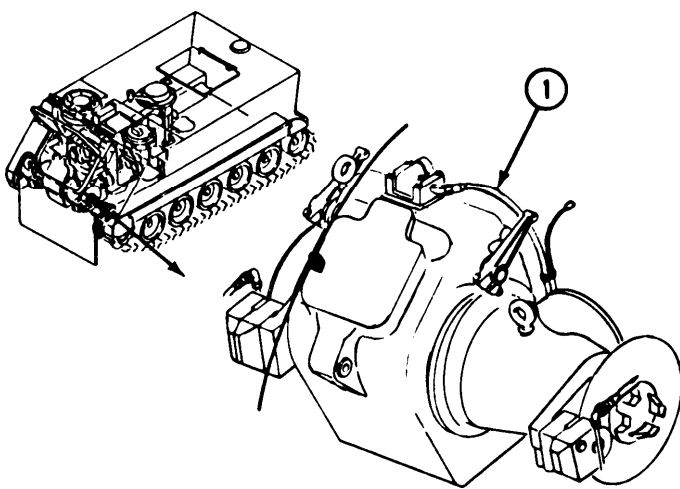


**NO**

1. Replace differential high oil temp switch (page 15-4).
2. Verify no faults found.

**YES**

1. Connect engine harness circuit 328 plug to differential HI OIL TEMP switch.
2. Inspect differential oil cooler hoses (1) for blockage and/or damage.
3. Are differential oil cooler hoses free from blockage and/or damage?



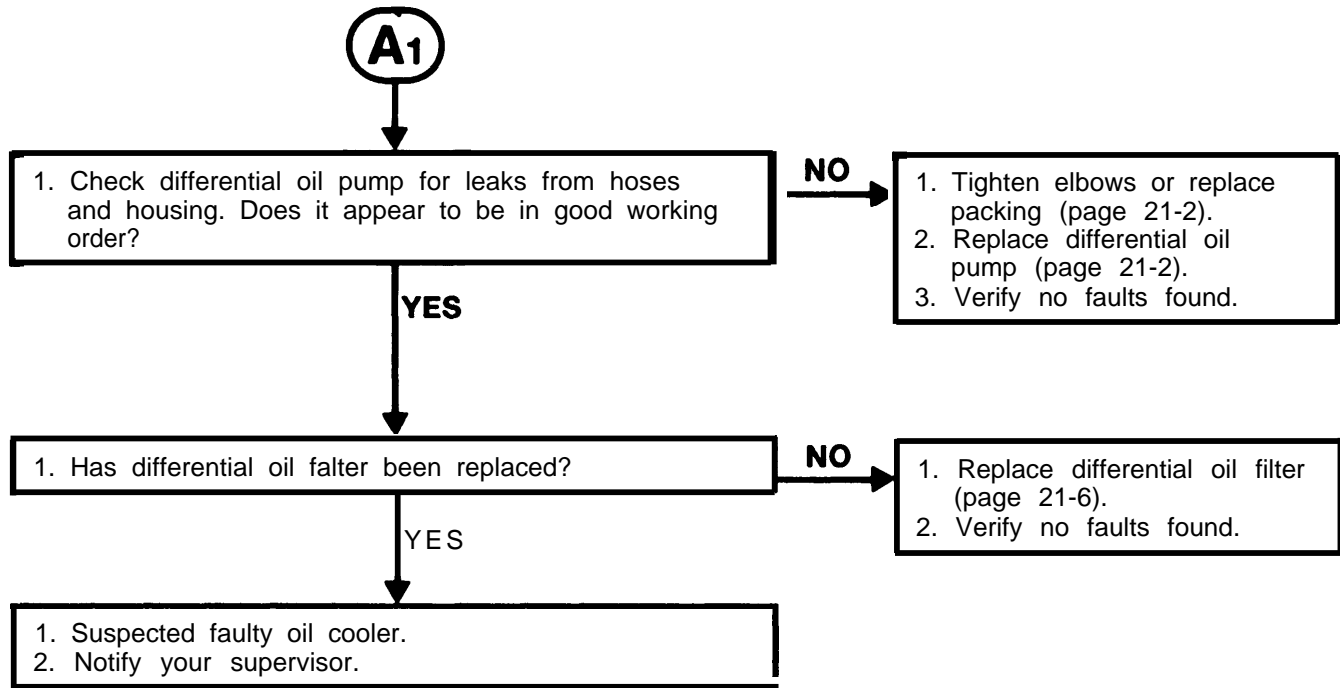
**NO**

1. Clear blockage or replace differential oil cooler hoses (page 21-14).
2. Verify no faults found.

**YES**

**A1**

GO TO NEXT PAGE



**TRANSMISSION OIL HI TEMP INDICATOR COMES ON**

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personal Required:**

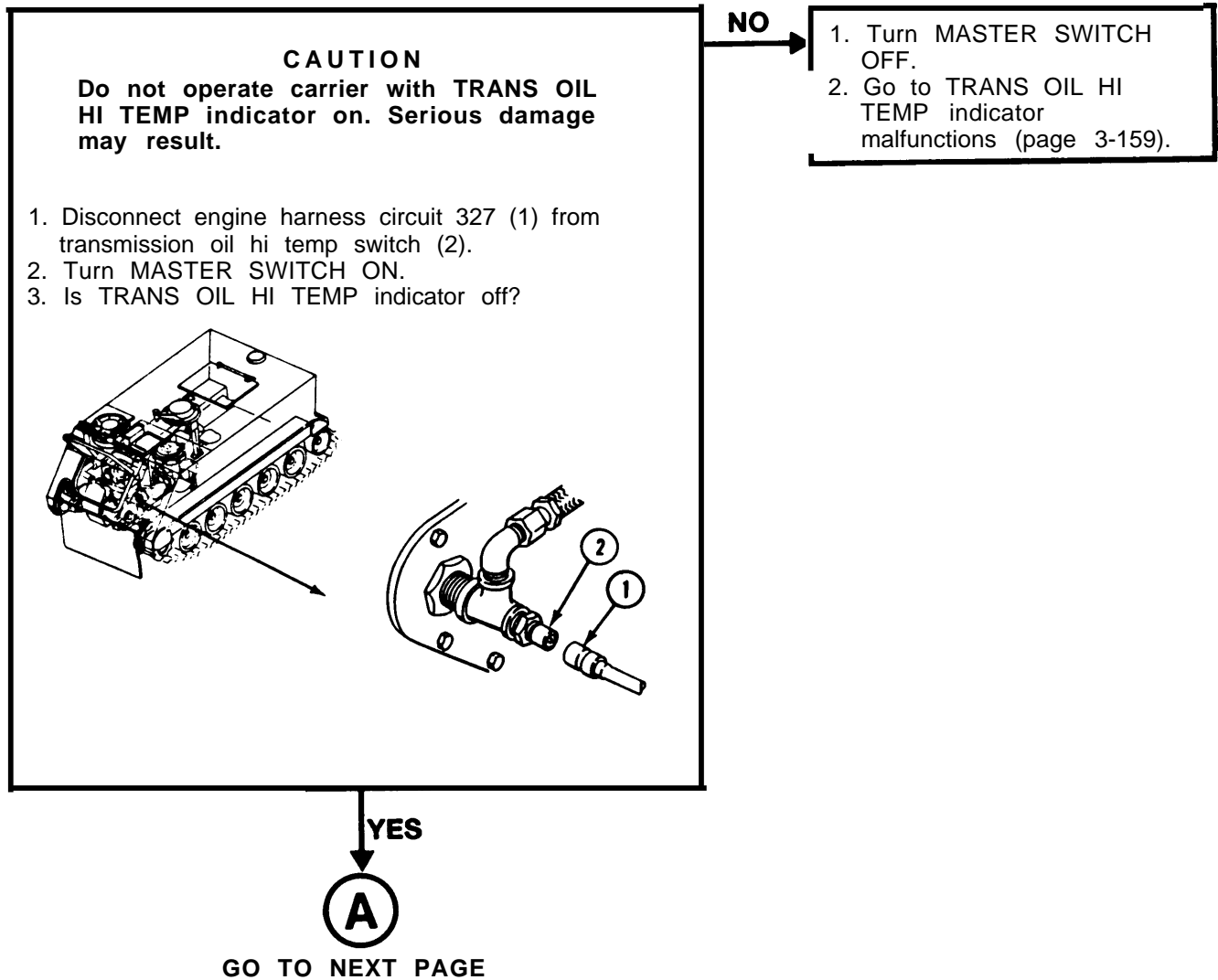
Unit Mechanic  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant access door open (see your -10)

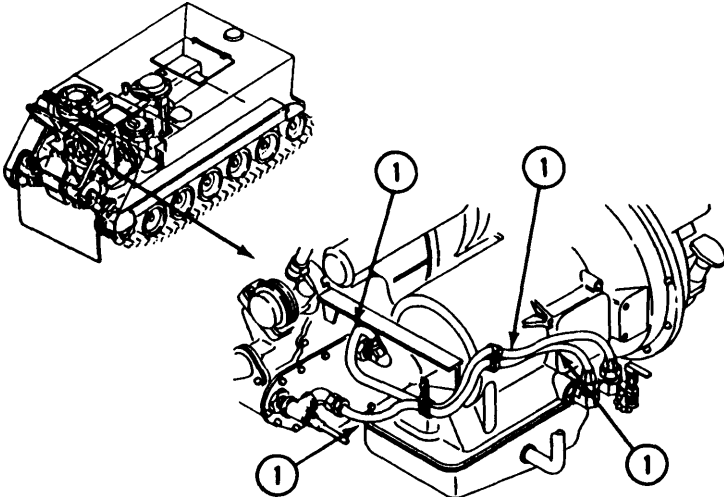
**Reference:**

see your -10



**A**

1. Turn MASTER SWITCH OFF.
2. Inspect transmission oil cooler hoses (1) for blockage and/or damage.
3. Are transmission oil cooler hoses free from blockage and serviceable?



**NO**

1. Clear blockage or replace transmission oil cooler hoses (page 18-2).
2. Verify no faults found.

**YES**

1. Connect engine harness circuit 327 plug to transmission oil hi temp switch.
2. Has transmission oil filter been replaced?

**NO**

1. Replace transmission oil falter (page 18-8).
2. Verify no faults found.

**YES**

1. Suspected faulty oil cooler/oil pump.
2. Notify your supervisor.

**NO EXTERIOR LIGHTS OPERATE**

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

see your -10

**Personnel Required:**

Unit Mechanic

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

1. Remove instrument panel for access. See task: replace instrument panel mounts and ground lead (page 11-2).
2. Remove front main harness plug (1) from lighting control switch jack (2).
3. Remove front main harness circuit 15 plug (3) from master power harness circuit 15 jack (4).
4. Measure resistance between front main harness circuit 15 plug (3) and lighting control switch plug (1) pin F (5).
5. Does multimeter read 0 ohms?

**NO** →

1. Repair front main harness circuit 15 (page 14-3).
2. Verify no faults found.

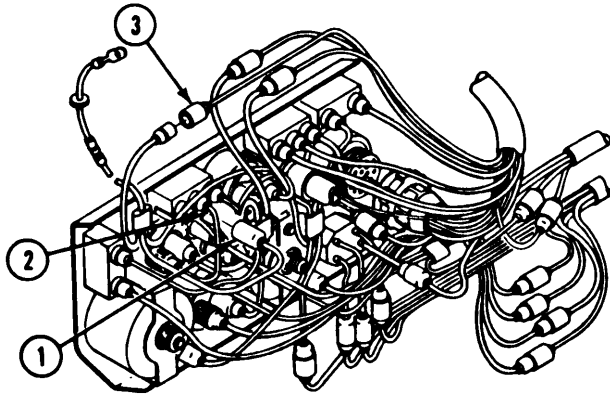
**YES**



**GO TO NEXT PAGE**

**A**

1. Remove master power harness circuit 10 plug (1) from instrument panel circuit breaker (2).
2. Measure resistance between master power harness circuit 15 plug (3) and circuit 10 plug (1).
3. Does multimeter read 0 ohms?



**NO**

1. Install front main harness lighting control switch plug on switch.
2. Repair master power harness (page 14-3).
3. Verify no faults found.

**YES**

1. Install master power harness circuit 10 and 15 plugs.
2. Replace lighting control switch (page 11-9).
3. Verify no faults found.

# BLACKOUT DRIVE LIGHT DOES NOT WORK

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

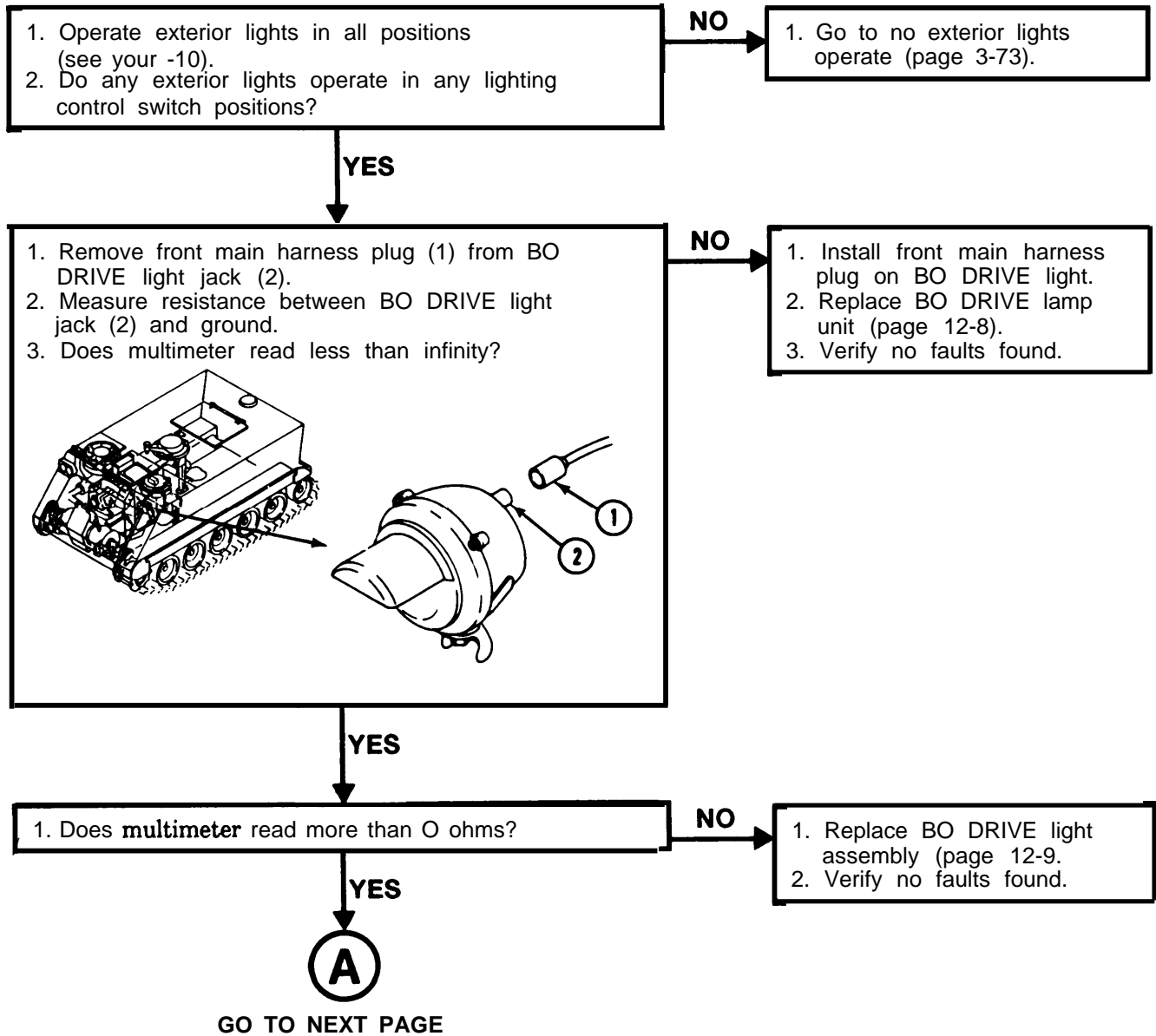
See your -10

**Personnel Required:**

- Unit Mechanic
- Helper (H)

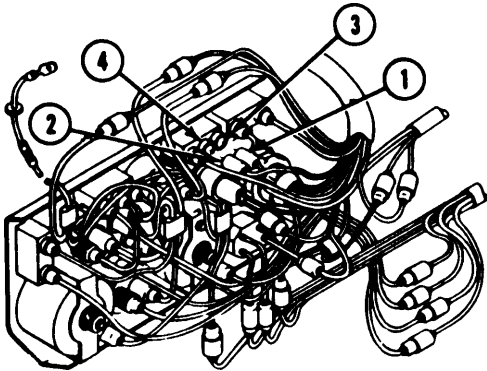
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- IR/BO selector on BO (see your -10)



**A**

1. Install front main harness plug on BO DRIVE light.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness circuit 19 (1) and 520 (2) from IR/BO selector jacks (3) and (4).
4. Measure resistance between IR/BO selector jacks (3) and (4) with selector on BO.
5. Does multimeter read 0 ohms?

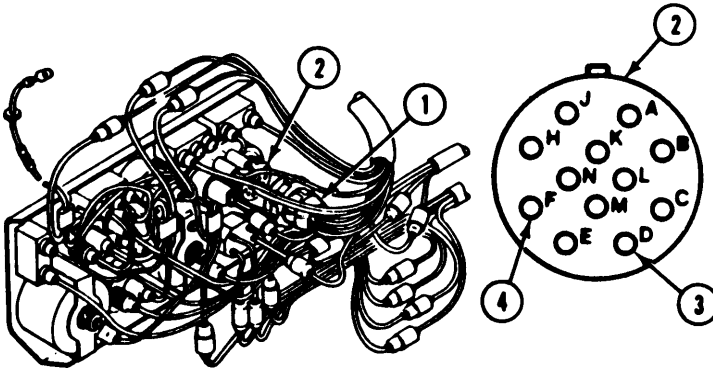


**NO**

1. Install front main harness plug on BO DRIVE light.
2. Replace IR/BO selector switch (page 11-7).
3. Verify no faults found.

**YES**

1. Remove front main harness plug (1) from lighting control switch jack (2).
2. Turn lighting control switch to BO DRIVE.
3. Measure resistance between lighting control switch jack (2) pins D (3) and F (4).
4. Does multimeter read 0 ohms?



**NO**

1. Install front main harness plugs on IR/UBO selector switch jacks.
2. Replace lighting control switch (page 11-9).
3. Verify no faults found.

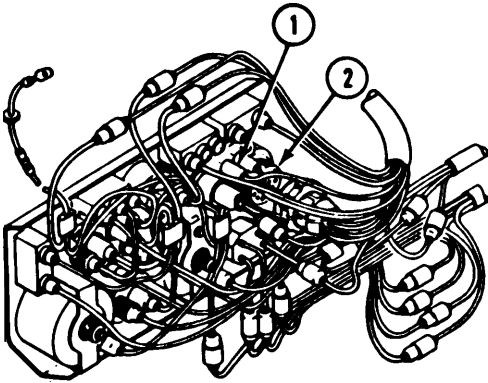
**YES**

**A1**



**A1**

1. Measure resistance between front main harness circuit 620 plug (1) and lighting control switch plug (2) pin D (3).
2. Does multimeter read 0 ohms?



**NO**

1. Install front main harness circuit 19 plug on IR/BO selector switch jack.
2. Repair front main harness circuit 520 (page 14-3).
3. Verify no faults found.

**YES**

1. Install front main harness circuit 520 plug on IR/BO selector switch jack.
2. Install front main harness plug on light control switch jack.
3. Repair front main harness circuit 19 (page 14-3).
4. Verify no faults found.

# SERVICE HEADLIGHTS DO NOT OPERATE

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

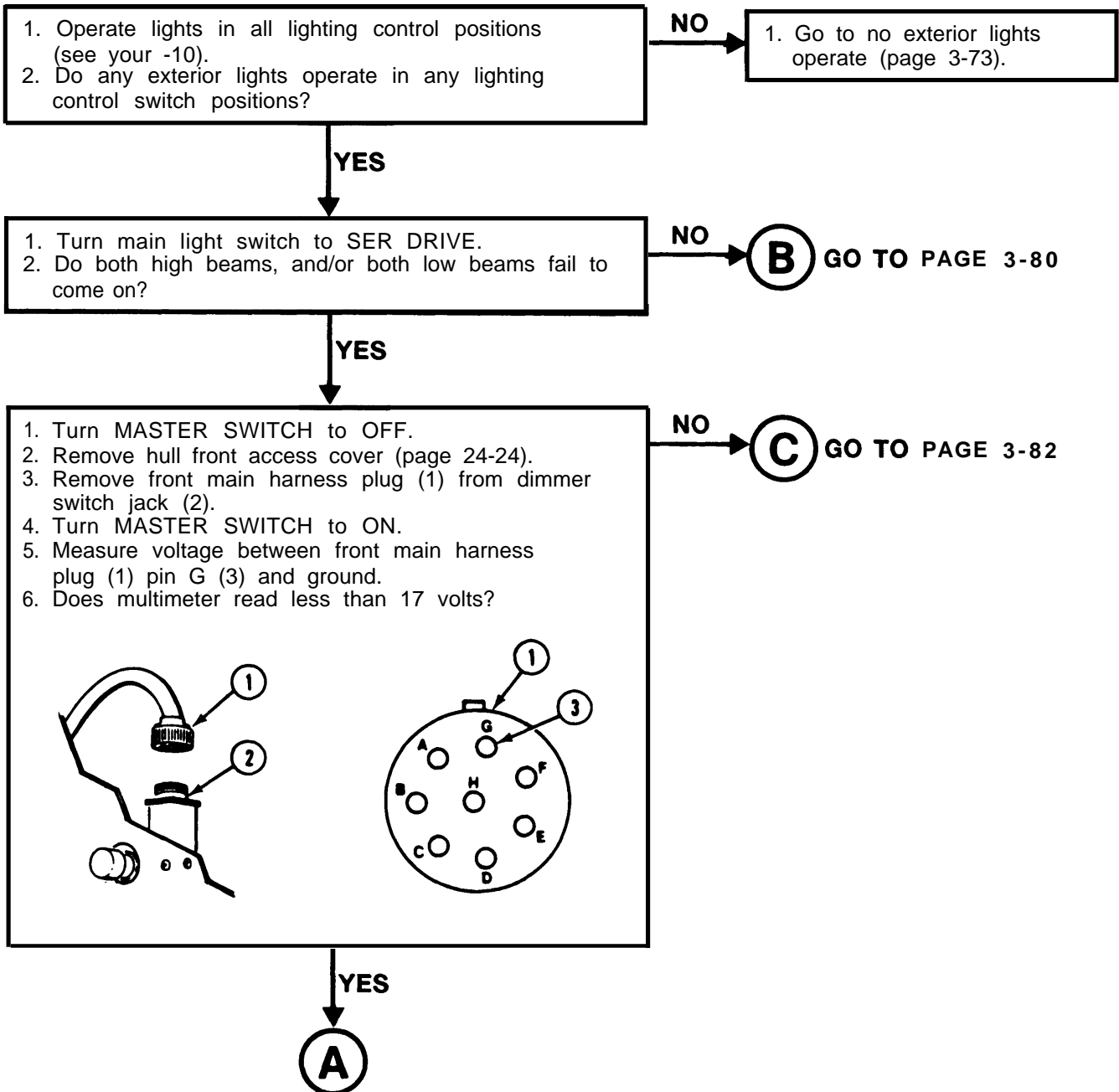
See your -10

**Personnel Required:**

Unit Mechanic

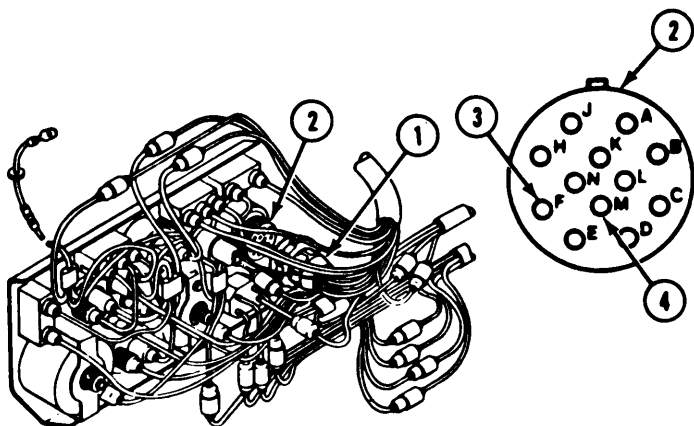
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)



**A**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness plug (1) from lighting control switch jack (2).
4. Measure resistance between lighting control switch jack (2) pins F (3) and M (4).
5. Does multimeter read 0 ohms?



**NO**

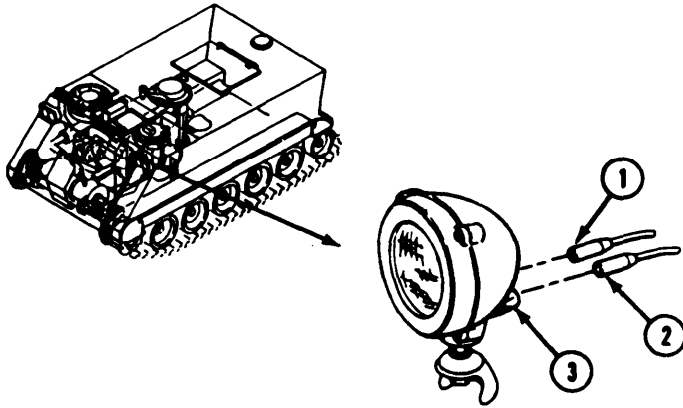
1. Install dimmer switch and front main harness plug on dimmer switch jack.
2. Replace lighting control switch (page 11-9).
3. Verify no faults found.

**YES**

1. Repair front main harness circuit 16 (page 14-3).
2. Verify no faults found.

**B**

1. Remove circuit 17 (high beam) plug (1) or circuit 18 (low beam) plug (2) from failing service headlight jack (3).
2. Measure voltage on front main harness circuit 17 plug (1) or circuit 18 plug (2) and ground.
3. Does multimeter read less than 17 volts?



**NO**

1. Replace service headlight lamp unit (page 12-5) or service headlight assembly (page 12-3).
2. Verify no faults found.

**YES**

1. Is failing headlight located on right side of carrier?

**NO**

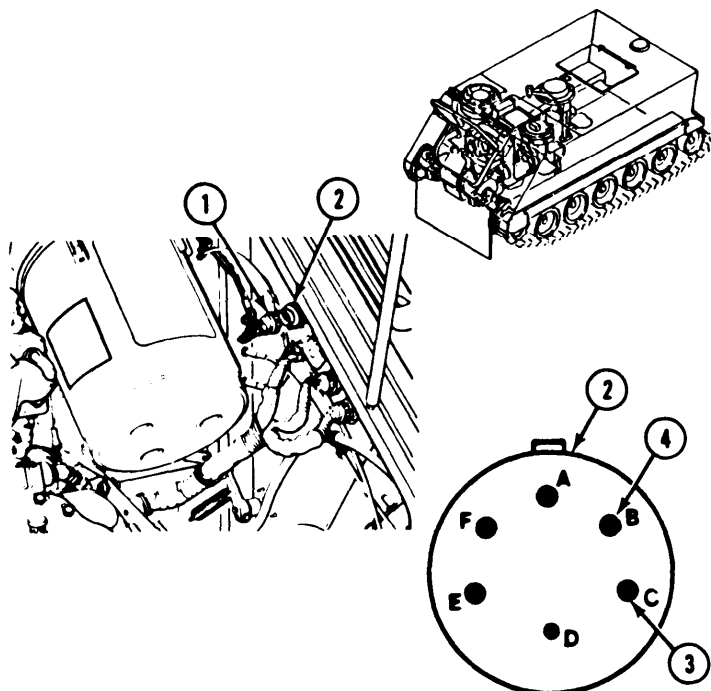
1. Repair front main harness circuit 517 or 518 between left headlight and dimmer switch.
2. Verify no faults found.

**YES**

**B1**

**B1**

1. Lower trim vane (see your -10).
2. Open power plant front access door (see your -10).
3. Remove right headlight wiring harness plug (1) from connector jack (2) at carrier bulkhead.
4. Measure voltage between front main wiring harness jack (2) pin C (low beam) (3) or pin B (high beam) (4) and ground.
5. Does multimeter read less than 17 volts?



**NO**

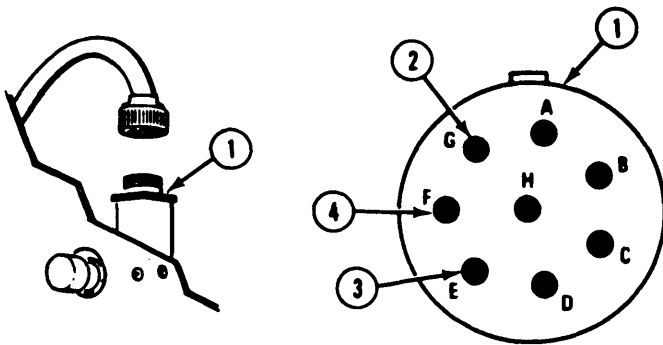
1. Repair faulty right headlight wiring harness (page 14-3).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Install right headlight wiring harness circuit 17 (high beam) or 18 (low beam) on service headlight.
3. Repair front main wiring harness circuit 17 or 18 between bulkhead and dimmer switch (page 14-3).
4. Verify no faults found.

**C**

1. Measure resistance between dimmer switch jack (1) pins G (2) and E (3) and between pins G (2) and F (4). Multimeter should read 0 ohms once and infinity once.
2. Click dimmer switch and measure resistance between dimmer switch jack (1) pins G (2) and E (3) and between pins G (2) and F (4). Multimeter should read infinity once and 0 ohms once.
3. Is high beam selector switch operating properly?



**NO**

1. Replace dimmer switch (page 12-77).
2. Verify no faults found.

**YES**

1. Repair front main wiring harness circuit 18 (low beam) or circuit 17 (high beam) (page 14-3).
2. Verify no faults found.

---

## INFRARED HEADLIGHT(S) DOES NOT OPERATE

---

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Electrical Connector Pliers (Item 44, App D)
- Digital Multimeter (Item 43 App D)

**References:**

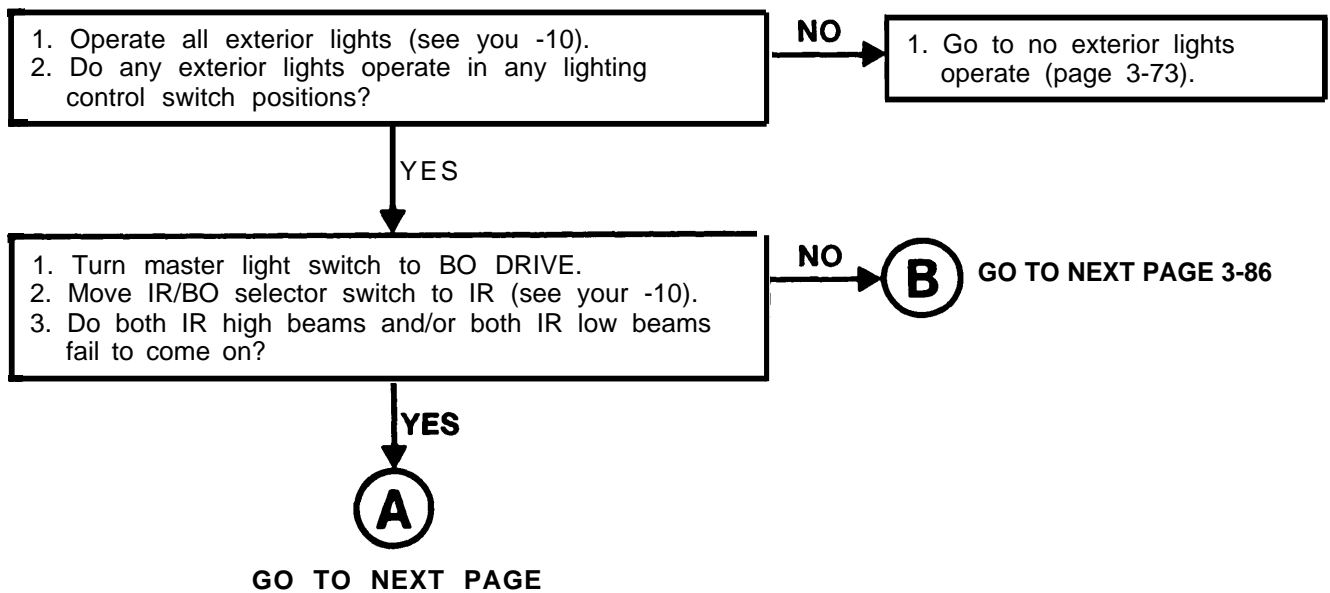
see your -10

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)

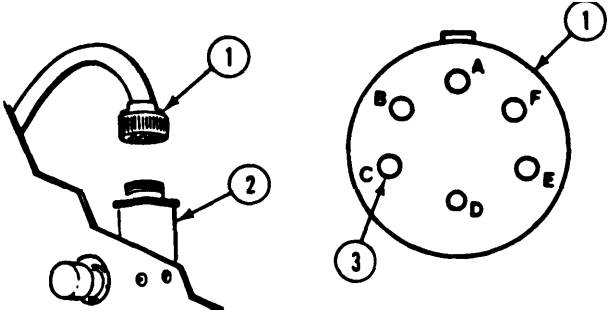
**Personnel Required:**

- Unit Mechanic
  - Helper (H)
- 



**A**

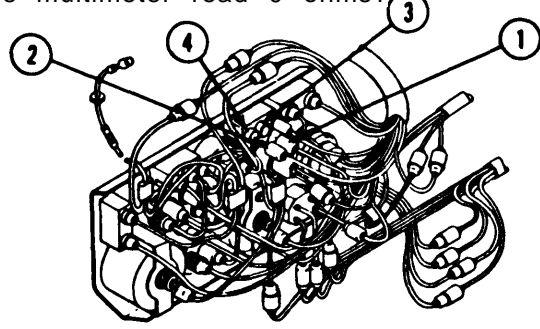
1. Turn MASTER SWITCH to OFF.
2. Remove hull front access cover (page 24-24).
3. Remove front main harness plug (1) from dimmer switch jack (Z).
4. Turn MASTER SWITCH to ON.
5. Measure voltage between front main harness plug (1) pin C (3) and ground.
6. Does multimeter read less than 17 volts?



NO → **C** GO TO PAGE 3-88

YES

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness circuit 514/515 (1) and 520 (2) from IR/BO selector switch jacks (3 and 4).
4. Measure resistance between IR/BO selector switch jacks (3 and 4).
5. Does multimeter read 0 ohms?



NO → 

1. Install dimmer switch and front main harness plug on dimmer switch.
2. Replace IR/BO selector switch (page 11-7).
3. Verify no faults found.

YES

**A1**



**A1**

1. Measure resistance between front main harness circuit 514/515 selector switch plug (1) and dimmer switch plug (2) pin C (3).
2. Does multimeter read 0 ohms?

**NO**

1. Install dimmer switch and front main harness plug on dimmer switch.
2. Repair front main harness circuit 514/515 (page 14-3).
3. Verify no faults found.

**YES**

1. Install dimmer switch and front main wiring harness plug on dimmer switch.
2. Install front main wiring harness circuit 514/515 plug on IR/BO selector switch jack.
3. Remove front main harness plug (1) from lighting control switch jack (2).
4. Measure resistance between wiring front main harness lighting control switch plug (1) pin D (3) and IR/BO selector circuit 520 plug (4).
5. Does multimeter read 0 ohms?

**NO**

1. Repair front main wiring harness circuit 520 (page 14-3).
2. Verify no faults found.

**YES**

**A2**

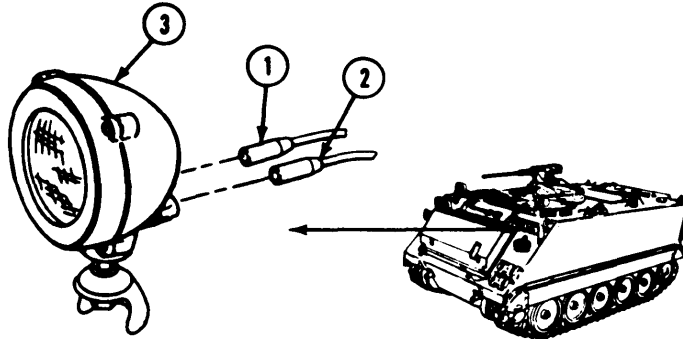
GO TO NEXT PAGE

**A2**

1. Install circuit 520 plug on IR/BO selector switch.
2. Replace lighting control switch (page 11-9).
3. Verify no faults found.

**B**

1. Remove circuit 514 (high beam) plug (1) or 515 (low beam) plug (2) from failing IR service headlight (3).
2. Measure voltage between front main harness circuit 514 plug (1) or 515 plug (2) and ground.
3. Does multimeter read less than 17 volts?



NO

1. Replace IR service headlight lamp unit (page 12-3).
2. Verify no faults found.

YES

1. Is failing IR headlight located on right side of carrier?

NO

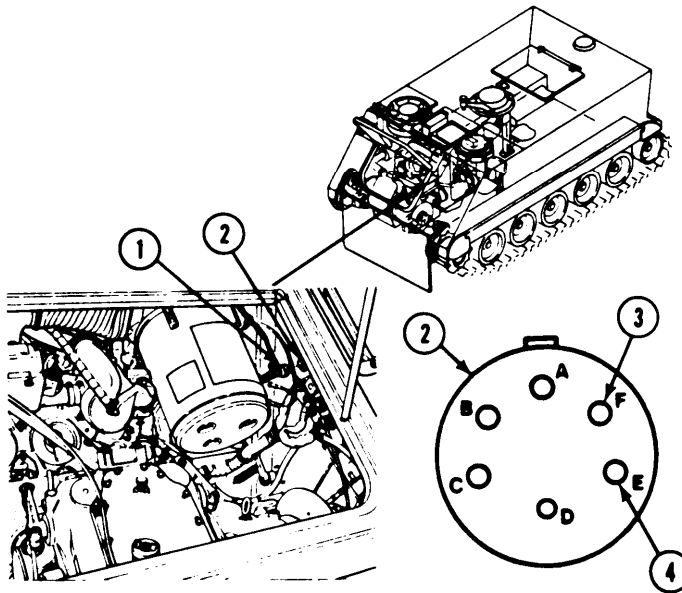
1. Repair front main harness circuit 514 or 515 between left IR head light and dimmer switch (page 14-3).
2. Verify no faults found.

YES

**B1**

**B1**

1. Lower trim vane (see your -10).
2. Open power plant front access door (see your -10).
3. Remove right headlight wiring harness plug (1) from front main harness jack (2) at bulk head.
4. Measure voltage between front main harness jack (2) pin F (low beam) (3) or pin E (high beam) (4) and ground.
5. Does multimeter read less than 17 volts?



**NO**

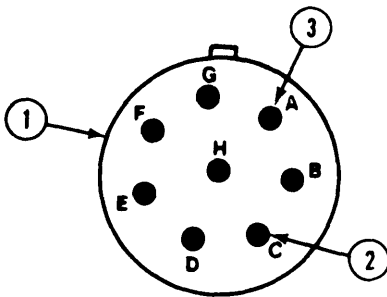
1. Repair faulty right headlight wiring harness circuit 514/515. (page 14-3).
2. Verify no faults found.

**YES**

1. Install right headlight wiring harness circuit 514 or 515 plug on IR head light.
2. Faulty front main wiring harness
3. Notify your supervisor.

C

1. Measure resistance between dimmer switch jack (1) pins C (2) to A (3) and between pins C (2) to B (4). Multimeter should read 0 ohms once and infinity once.
2. Click dimmer switch and repeat above test. Multimeter should read infinity once and 0 ohms once.
3. Is dimmer switch operating properly?



NO

1. Replace dimmer switch (page 12-77).
2. Verify no faults found.

YES

1. Faulty front main wiring harness circuit 514 or 515.
2. Notify your supervisor.

---

**SERVICE AND/OR BLACKOUT STOP LIGHTS MALFUNCTION**

---

**INITIAL SETUP**

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

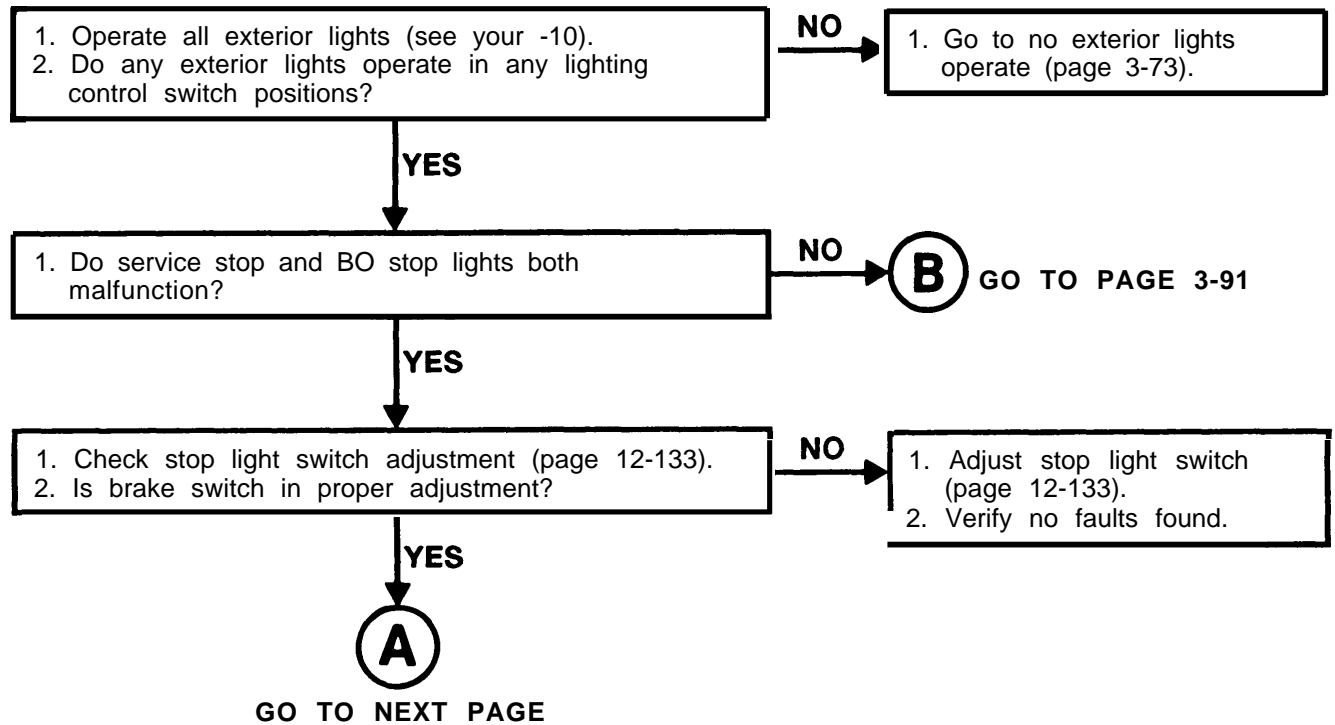
see your -10

**Personnel Required:**

- Unit Mechanic
- Helper (H)

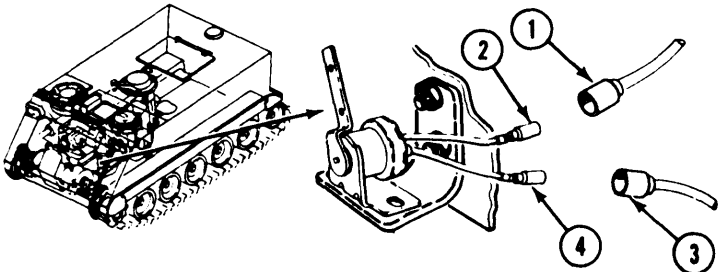
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
  - Carrier blocked (see your -10)
  - Ramp lowered (see your -10)
- 



**A**

1. Turn MASTER SWITCH to OFF.
2. Remove front main harness circuit 75A plug (1) from stop light switch jack (2).
3. Remove front main harness circuit 75B plug (3) from stop light switch jack (4).
4. Measure resistance between switch jacks (2) and (4) with switch depressed and with switch released.
5. Does multimeter read infinity with switch depressed and 0 ohms with switch released?

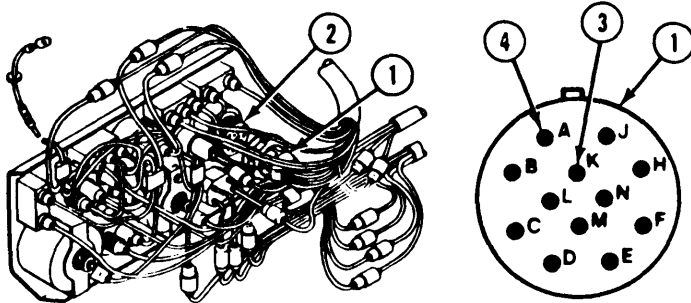


NO

1. Replace stop light switch (page 12-132).
2. Verify no faults found.

YES

1. Install front main harness circuit leads 75A and 75B on stop light switch.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness plug (1) from lighting control switch jack (2).
4. Measure resistance between front main harness plug (1) pins K (3) and A (4) with both steering levers locked in parking brake position.
5. Does multimeter read 0 ohms?



NO

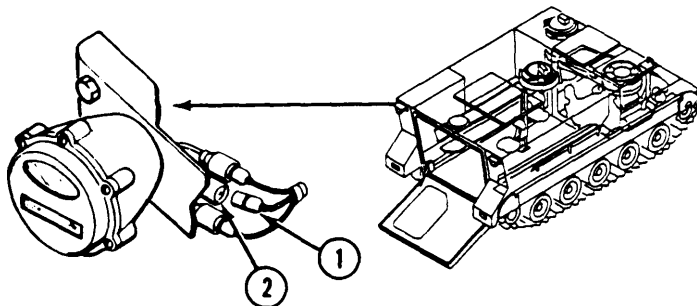
1. Faulty front main harness circuit 75A and/or 75B.
2. Notify your supervisor.

YES

1. Replace main light switch (page 11-9).
2. Verify no faults found.

**B**

1. Remove rear main harness circuit 22 plug (1) from jack (2) on malfunctioning left tail light, or circuit 23 plug from jack on malfunctioning right tail light.
2. Turn main light switch lever on lighting control switch to STOP LIGHT or to BO MARKER.
3. Measure voltage between circuit 22 (left) plug (1) or circuit 23 (right) plug and ground with both steering levers locked in parking brake position.
4. Does multimeter read less than 17 volts?

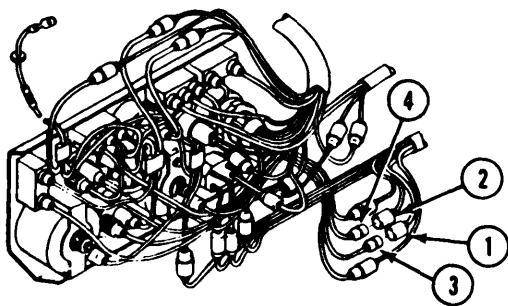


NO

1. Install rear main harness jack on tail light.
2. Replace service stop or BO stop light bulb (page 12-3).
3. Verify no faults found.

YES

1. Remove rear main harness circuit 22 plug (left) (1) or circuit 23 plug (right) (2) from front main wiring harness circuit 22 jack (3) or circuit 23 jack (4).
2. Measure voltage between rear main harness circuit 22 jack (2) or circuit 23 jack (3) and ground.
3. Does multimeter read less than 17 volts?



NO

1. Repair rear main harness circuit 22 or circuit 23 (page 14-3).
2. Verify no faults found.

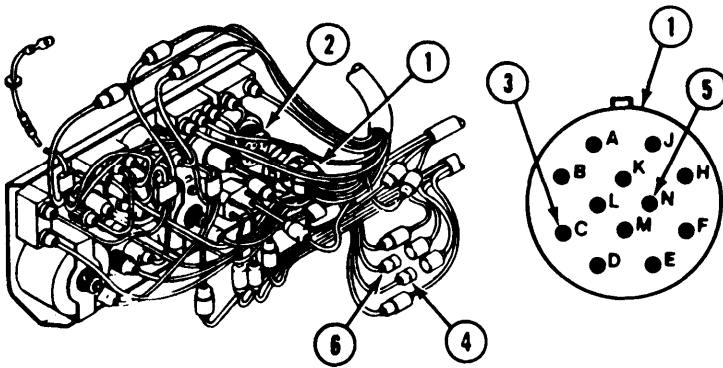
YES

**B1**

GO TO NEXT PAGE

**B1**

1. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
2. Remove front main harness plug (1) from lighting control switch (2).
3. Measure resistance between lighting control switch plug (1) pin C (3) to circuit 22 jack (4) (service stop) or pin N (5) to circuit 23 jack (6) (BO stop) .
4. Does multimeter read 0 ohms?



**NO**

1. Install rear main harness on tail light.
2. Repair front main harness circuit 22 or 23 (page 14-3).
3. Verify no faults found.

**YES**

1. Install rear main harness plugs on jack and tail light.
2. Replace main light switch (page 11-9).
3. Verify no faults found.



---

## BLACKOUT MARKER LIGHT(S) AND/OR TAIL LIGHT(S) DO NOT OPERATE

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References**

see your -10

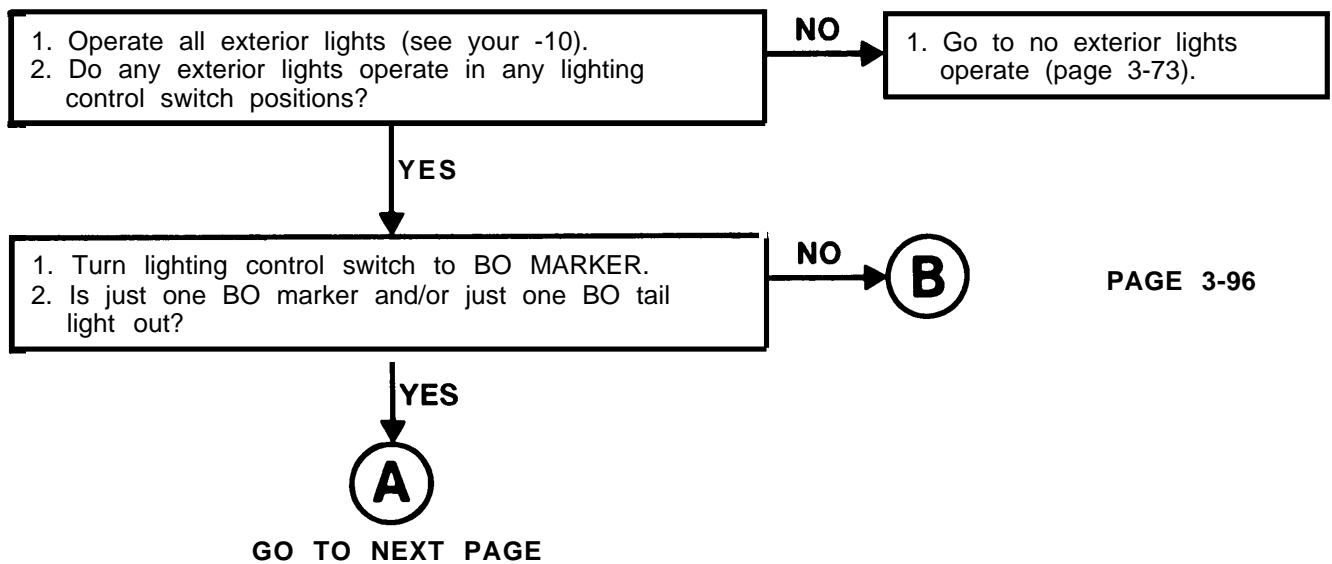
**Personnel Required:**

Unit Mechanic  
 Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

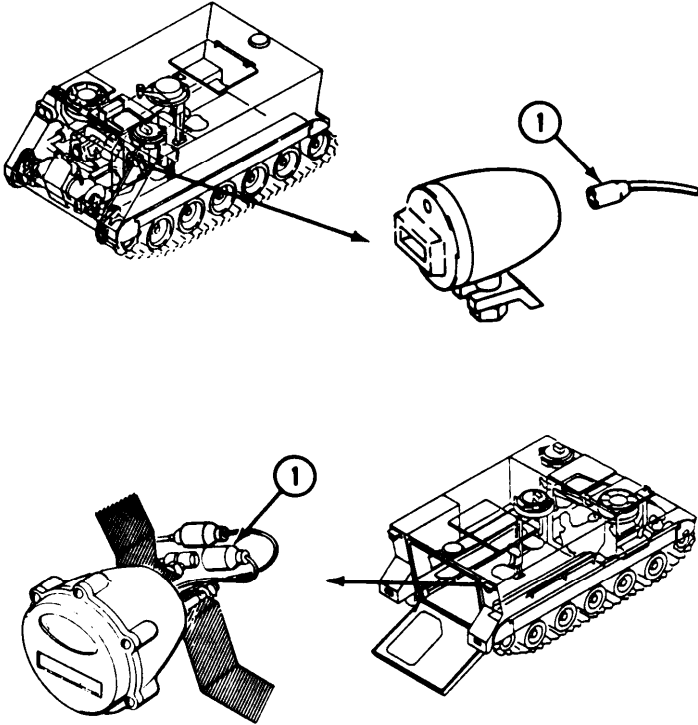
---



PAGE 3-96

**A**

1. Locate failing light(s).
2. Remove circuit 20 plug (1) (BO marker) and/or circuit 24 plug (2) (BO tail light) from failing light jack.
3. Measure voltage between plug pin and ground.
4. Does multimeter read less than 17 volts?



**NO**

1. Replace faulty light bulb.  
For BO marker light (page 12-7). For left/right tail light (page 12-13).
2. Verify no faults found.

**YES**

1. Is one front BO marker light not operating?

**NO**

1. Repair rear main wiring harness circuit 24 (page 14-3).
2. Verify no faults found.

**YES**

**A1**

**A1**

1. Is right BO marker light out?

**NO**

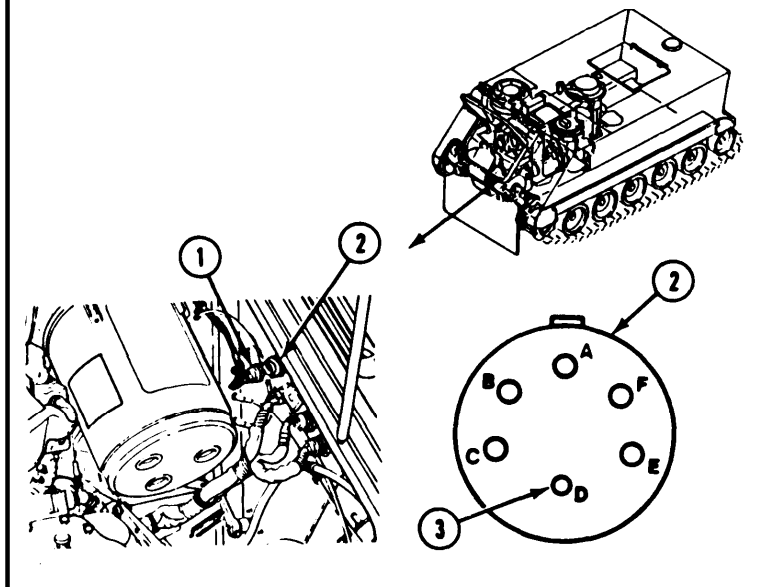
1. Repair front main wiring harness circuit 20 (page 14-3).  
2. Verify no faults found.

**YES**

1. Lower trim vane (see your -10).  
2. Open power plant front access door (see your -10).  
3. Remove right headlight wiring harness plug (1) from front main harness jack (2) at carrier bulkhead.  
4. Measure voltage between front main harness jack (2) pin D (3) and ground.  
5. Does multimeter read less than 17 volts?

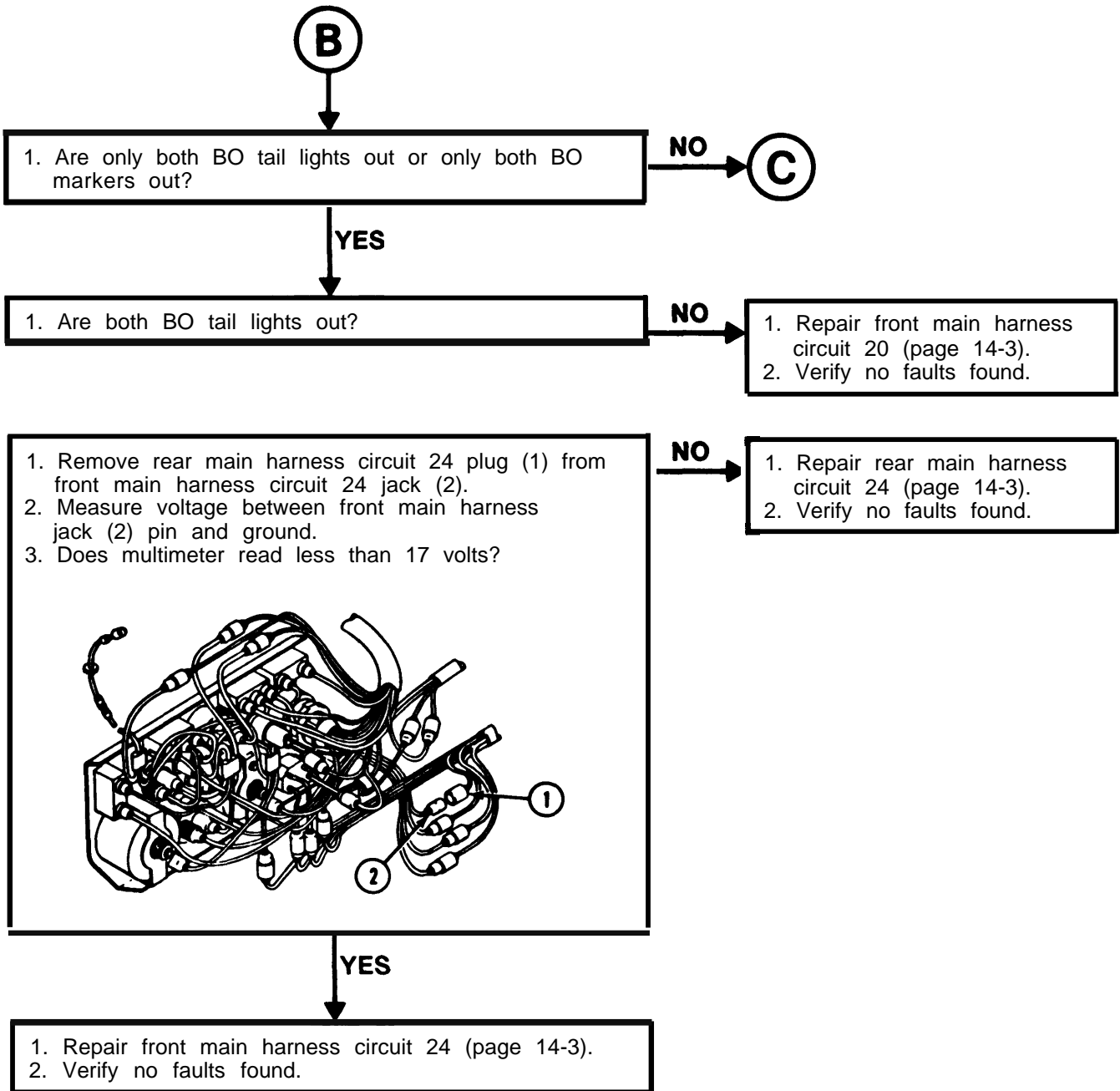
**NO**

1. Repair right headlight wiring harness (page 14-3).  
2. Verify no faults found.



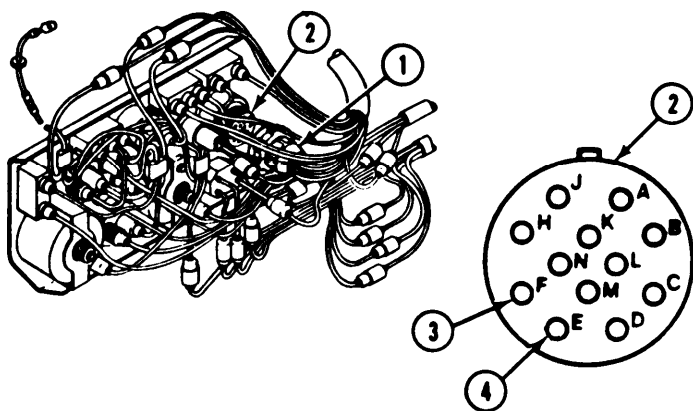
**YES**

1. Install right headlight wiring harness circuit 20 jack on right BO marker light.  
2. Repair front main harness circuit 20 (page 14-3).  
3. Verify no faults found.



**C**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness plug (1) from lighting control switch jack (2).
4. Measure resistance between switch jack (2) pins F (3) and E (4).
5. Does multimeter read 0 ohms?



**NO**

1. Replace main light switch (page 11-9).
2. Verify no faults found.

**YES**

1. Repair front main harness circuit 20/24 (page 14-3).
2. Verify no faults found.

---

## SERVICE TAIL LIGHT DOES NOT OPERATE

---

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

see your -10

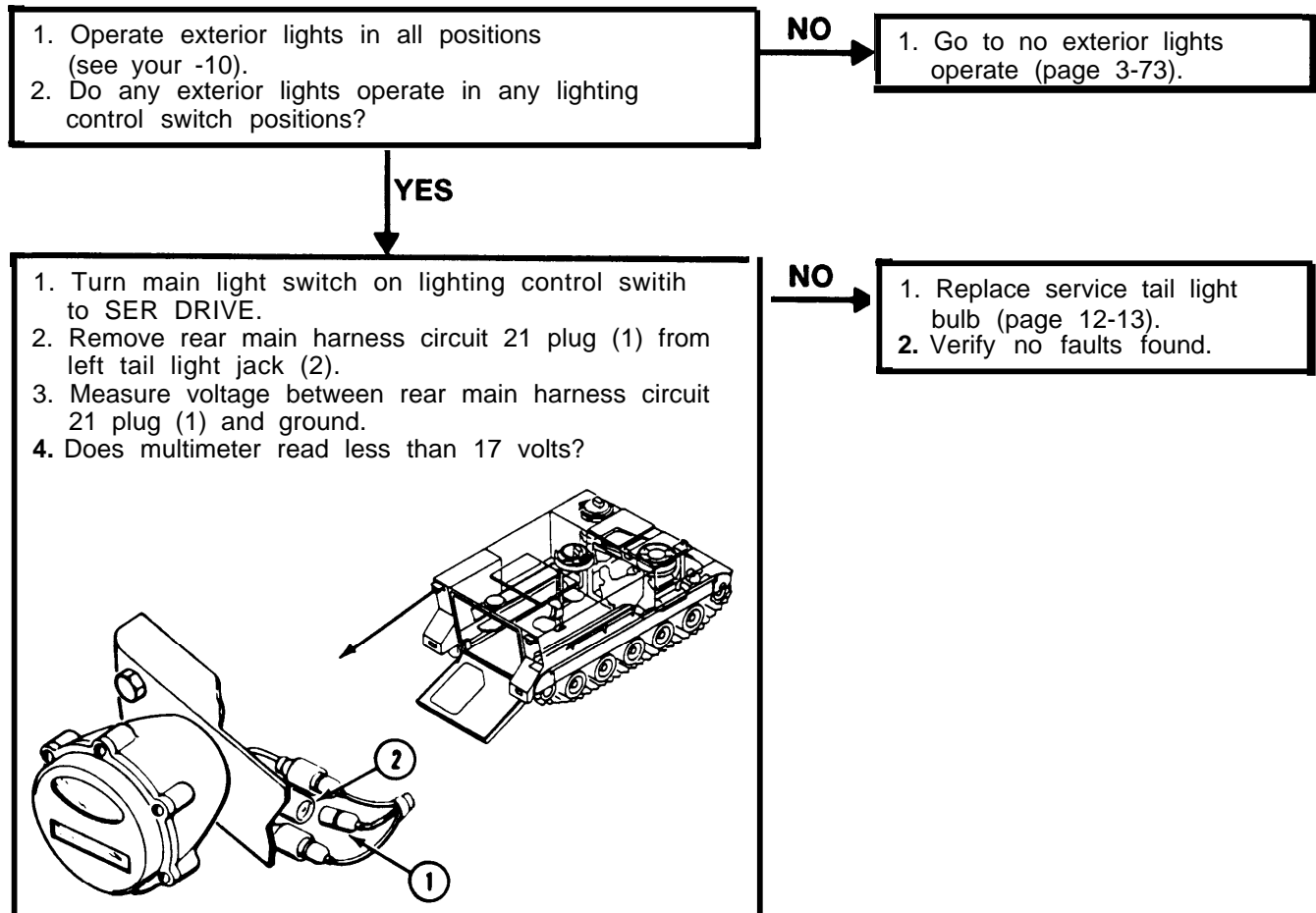
**Personnel Required:**

Unit Mechanic

**Equipment Conditions**

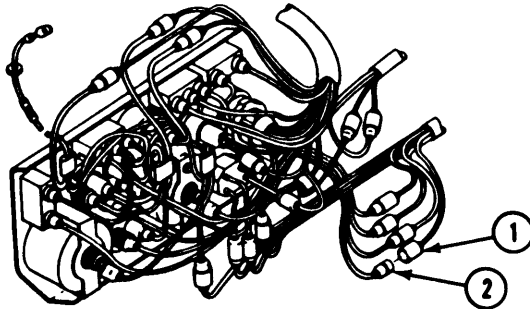
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**A**

1. Remove rear main harness circuit 21 plug (1) from front main harness circuit 21 jack (2) on instrument panel.
2. Measure voltage between front main harness jack (2) and ground.
3. Does multimeter read less than 17 volts?

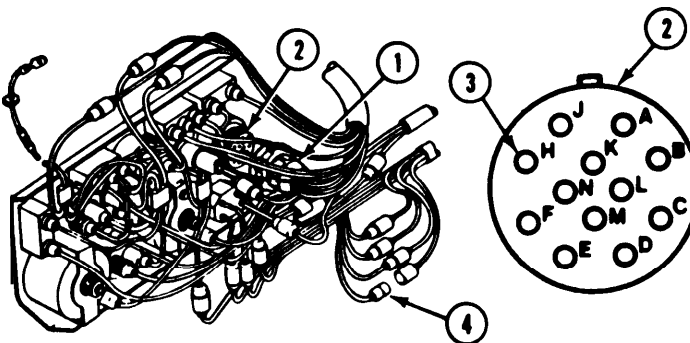


**NO**

1. Repair rear main harness circuit 21 (page 14-3).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness plug (1) from lighting control switch jack (2).
4. Measure resistance between lighting control switch jack (2) pin H (3) and circuit 21 jack (4).
1. Does multimeter read 0 ohms?



**NO**

1. Install rear main harness circuit 21 plug on left tail light jack.
2. Repair front main harness circuit 21 (page 14-3).
3. Verify no faults found.

**YES**

1. Install rear main harness circuit 21 plug on left tail light jack.
2. Replace main light switch (page 11-9).
3. Verify no faults found.

# TRAILER LIGHTS DO NOT OPERATE

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

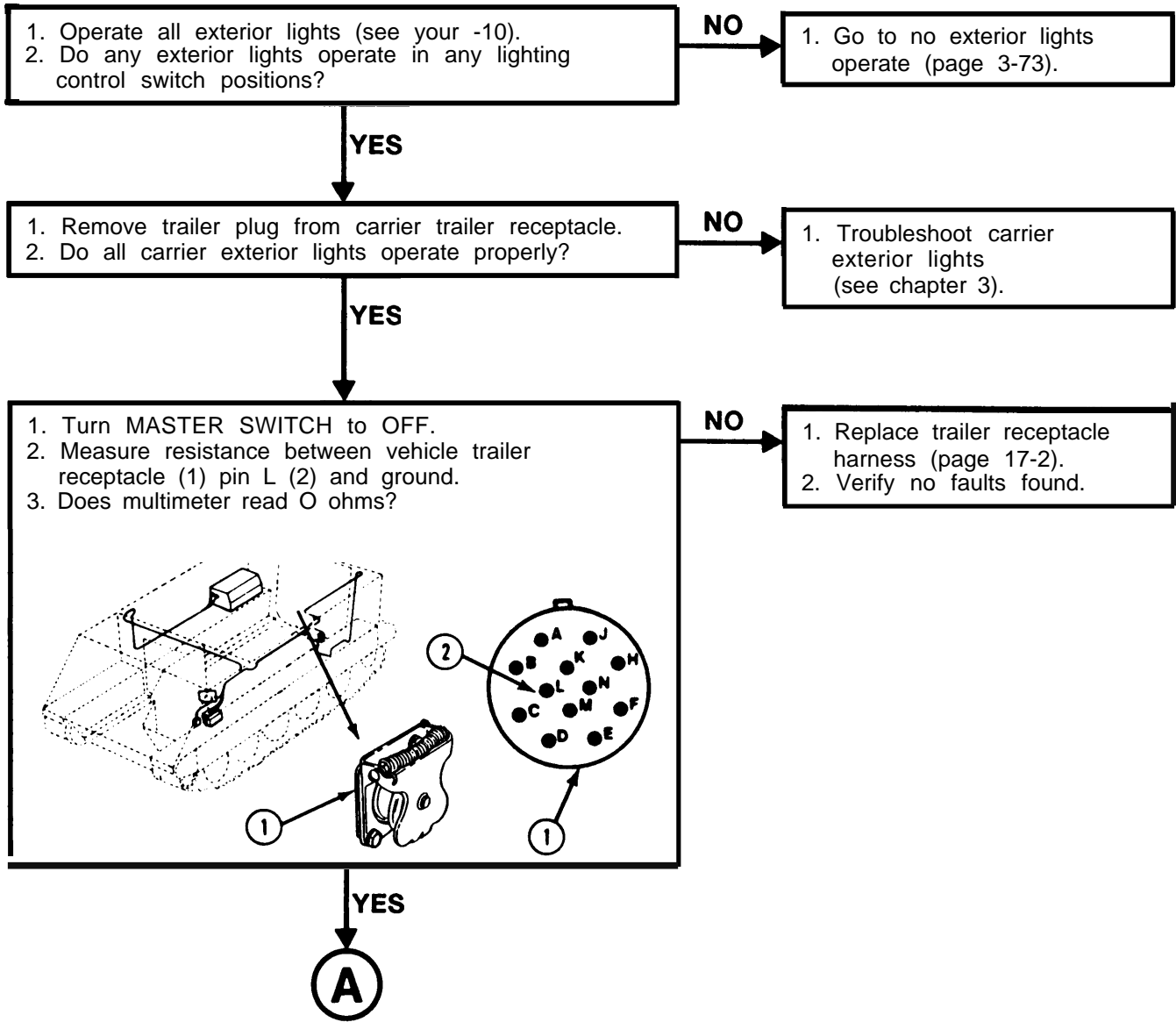
See your -10

**Personnel Required:**

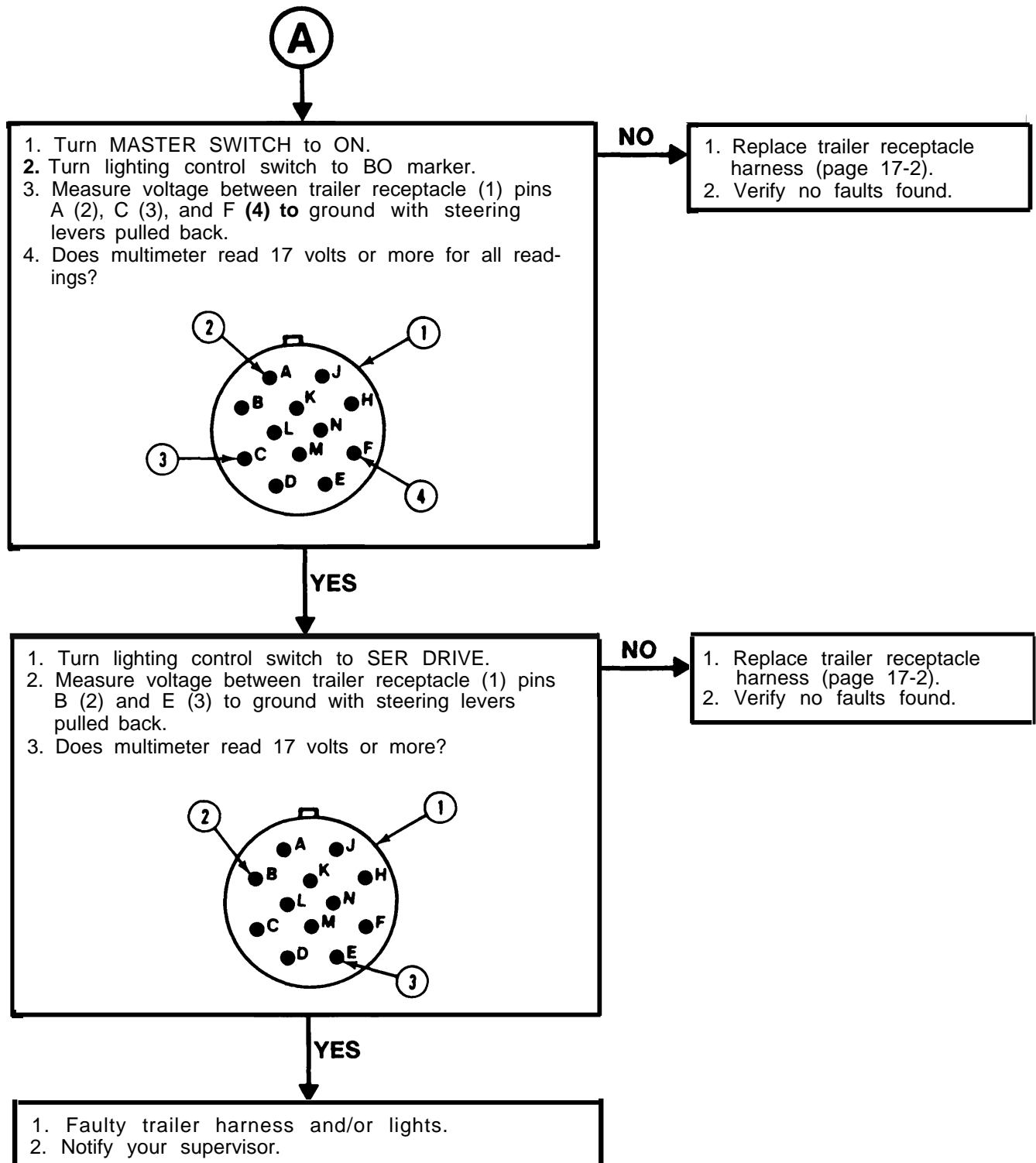
- Unit Mechanic
- Helper (H)

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)







---

## HORN DOES NOT OPERATE

---

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Jumper Wire

**Personnel Required:**

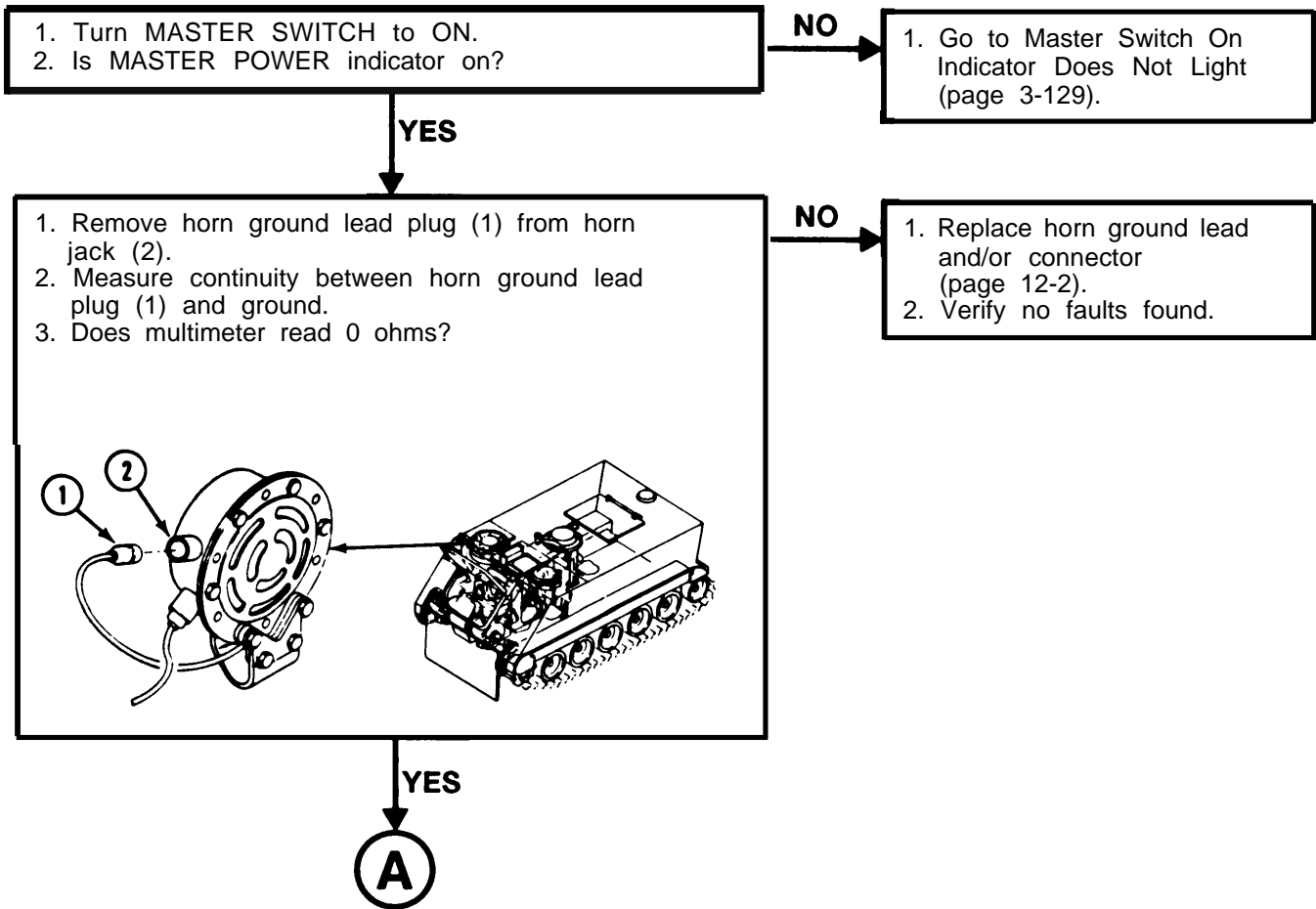
- Unit Mechanic
- Helper (H)

**References:**

See your -10

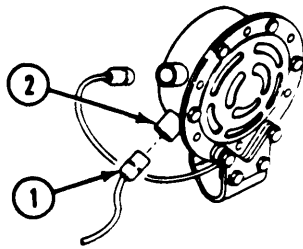
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
  - Carrier blocked (see your -10)
  - Trim vane lowered (see your -10)
  - Power plant front access door open (see your -10)
- 



**A**

1. Remove right headlight wiring harness circuit 25 plug (1) from horn iack (2).
2. Turn MASTER SWITCH to ON.
3. Measure voltage between right headlight wiring harness circuit 25 plug (1) and ground with horn button depressed.
4. Does multimeter read less than 17 volts?



**NO**

1. Replace horn (page 12-2).
2. Verify no faults found.

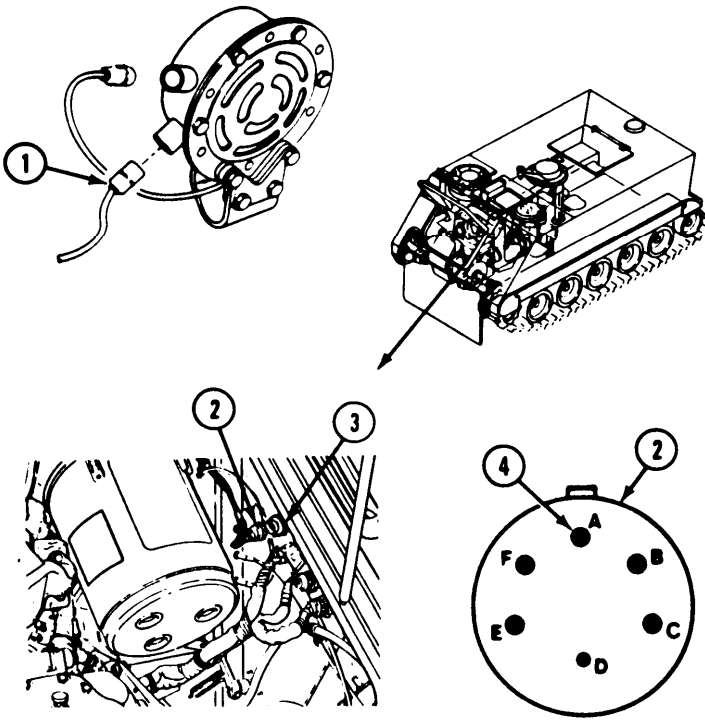
**YES**

**A1**

**GO TO NEXT PAGE**

**A1**

1. Turn MASTER SWITCH to OFF.
2. Install jumper wire between right headlight wiring harness circuit 25 plug (1) and ground.
3. Remove right headlight wiring harness plug (2) from front main harness (3) at carrier bulkhead.
4. Measure resistance between right headlight wiring harness plug (2) pin A (4) and ground.
5. Does multimeter read 0 ohms?



**NO**

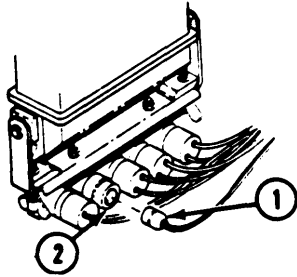
1. Remove jumper wire.
2. Repair right headlight wiring harness circuit 25 (page 14-3).
3. Verify no faults found.

**YES**

**A2**

**A<sub>2</sub>**

1. Remove circuit 25/25A plug (1) from horn switch jack (2).
2. Measure resistance between horn switch jack (2) pins with horn switch depressed.
3. Does multimeter read 0 ohms?



**NO**

1. Install right headlight wiring harness plug to front main harness jack at fire wall.
2. Install horn ground lead plug to horn jack.
3. Install right headlight wiring harness circuit 25 plug onto horn jack.
4. Replace horn switch (page 11-24).
5. Verify no faults found.

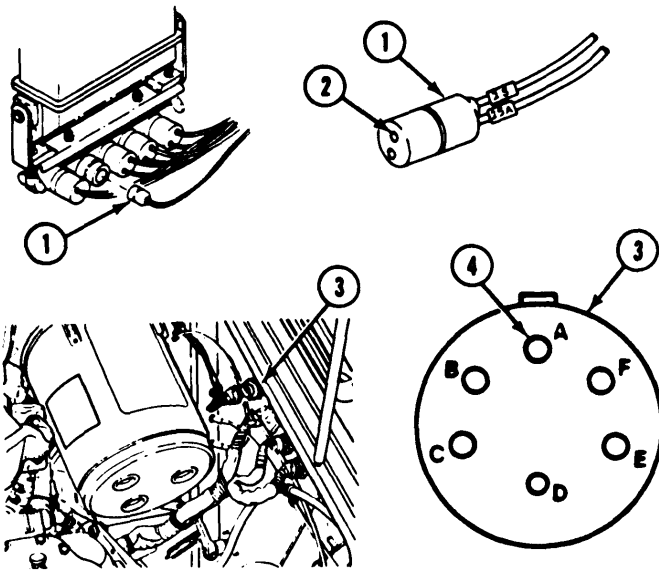
**YES**

**A<sub>3</sub>**

**GO TO NEXT PAGE**

**A3**

1. Remove jumper wire from right headlight wiring harness circuit 25.
2. Install circuit 25 plug on horn jack.
3. Install a jumper wire between horn switch plug (1) circuit 25 pin (2) and ground.
4. Measure resistance between front main harness jack (3) pin A (4) and ground.
5. Does multimeter read 0 ohms?



**NO**

1. Remove jumper wire from horn switch plug.
2. Repair front main harness circuit 25 (page 14-3).
3. Verify no faults found.

**YES**

1. Remove jumper wire from instrument panel cable assembly circuit 25A.
2. Repair instrument panel cable assembly circuit 25A (page 14-3).
3. Verify no faults found.

# INSTRUMENT PANEL ILLUMINATION LIGHTS MALFUNCTION

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

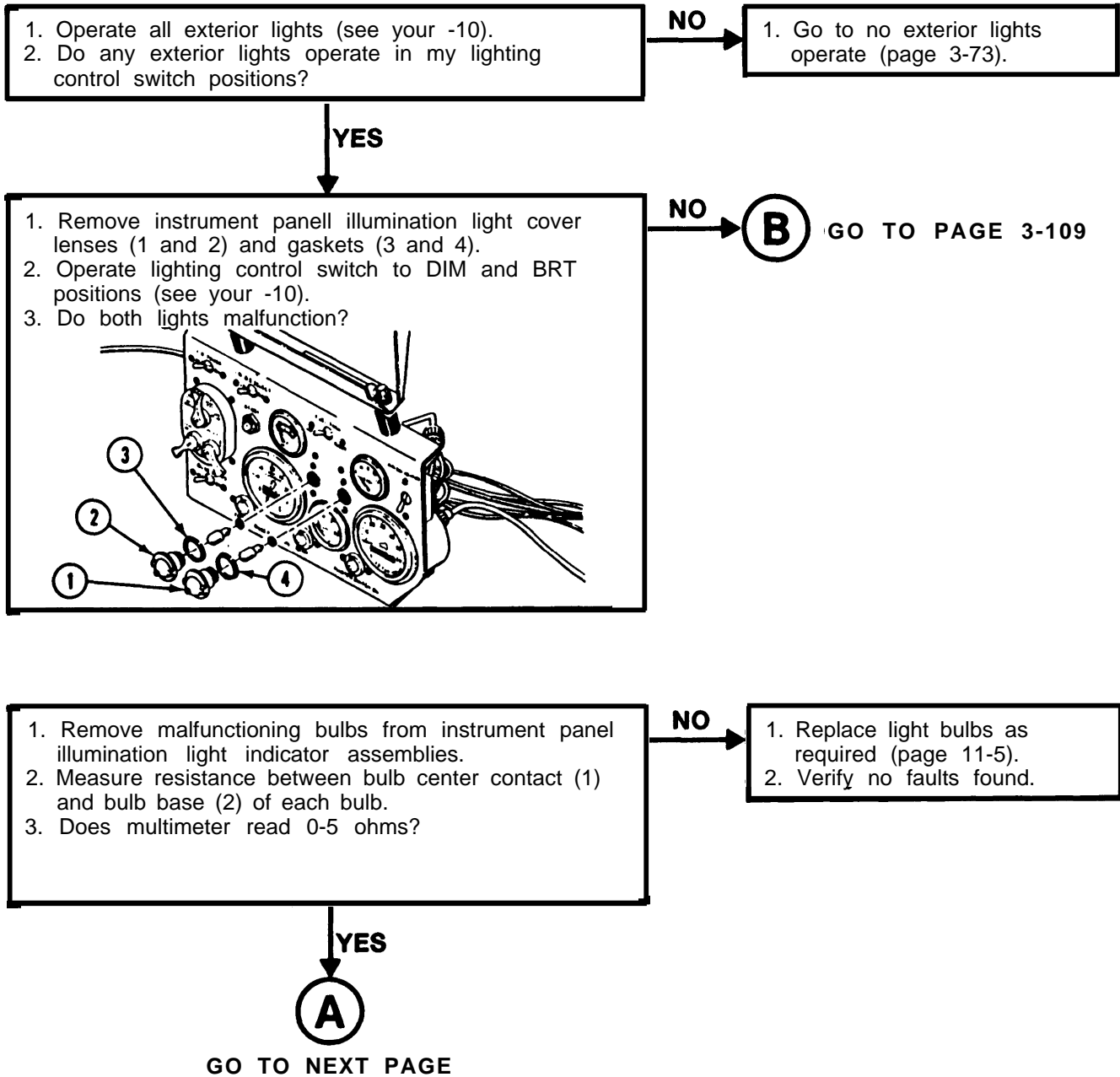
See your -10

**Equipment Conditions:**

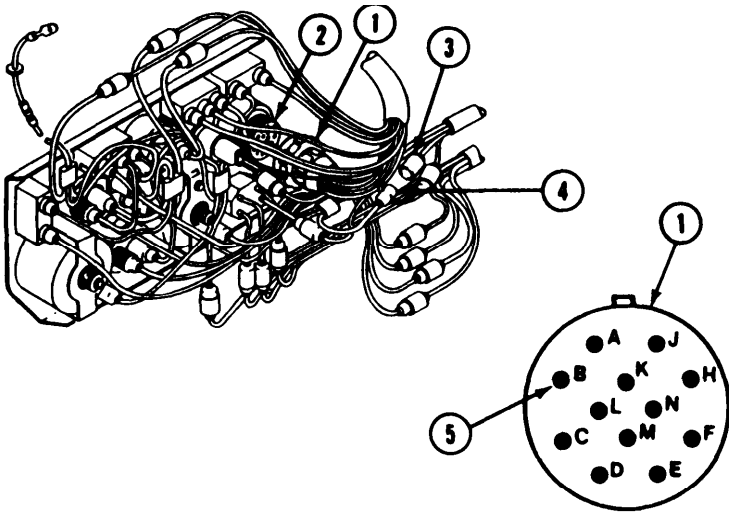
- Engine stopped/shutdown (see your -10)
- Carrier blocked (me your -10)

**Personnel Required:**

- Unit Mechanic
- Helper (H)



1. Turn MASTER SWITCH to OFF.
2. Install instrument panel light bulbs.
3. Install instrument panel illumination light cover lenses and gaskets.
4. Remove instrument panel for access (page 11-2).
5. Remove front main harness plug (1) from lighting control switch jack (2).
6. Remove from main harness circuit 40 plug (3) from either illumination light jack (4).
7. Measure resistance between front main harness lighting control switch plug (1) pin B (5) and illumination light plug circuit 40 (3).
8. Does multimeter read 0 ohms?



**NO**

1. Repair front main harness circuit 40 (page 14-3).
2. Verify no faults found.

**YES**

1. Replace main light switch (page 11-9).
2. Verify no faults found.



**B**

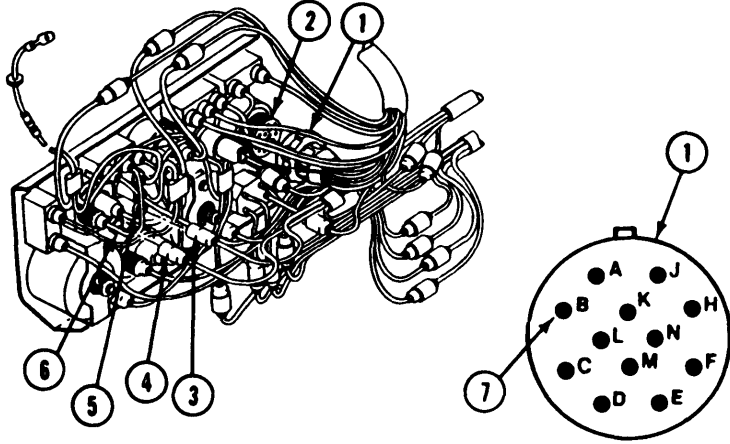
1. Remove malfunctioning bulb from instrument panel illumination light indicator assembly.  
 2. Measure resistance between bulb center contact (1) and bulb base (2).  
 3. Does multimeter read 0-5 ohms?

NO

1. Replace light bulb as 1 required (page 11-5).  
 2. Verify no faults found.

YES

1. Remove instrument panel for access (page 11-2).  
 2. Remove front main harness plug (1) from lighting control switch jack (2).  
 3. Remove front main harness circuit 40 plug (3) or (4) from failing instrument panel light (5 or 6).  
 4. Measure resistance between front main harness lighting control switch plug (1) pin B (7) and failing circuit 40 light plug (3 or 4).  
 5. Does multimeter read 0 ohms?



NO

1. Install bulbs.  
 2. Repair front main harness circuit 40 (page 14-3).  
 3. Verify no faults found.

YES

1. Install front main harness plug on lighting control switch jack.  
 2. Replace instrument panel light assembly (page 11-5).  
 3. Verify no faults found.

## DOME LIGHT(S) WORK IMPROPERLY

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

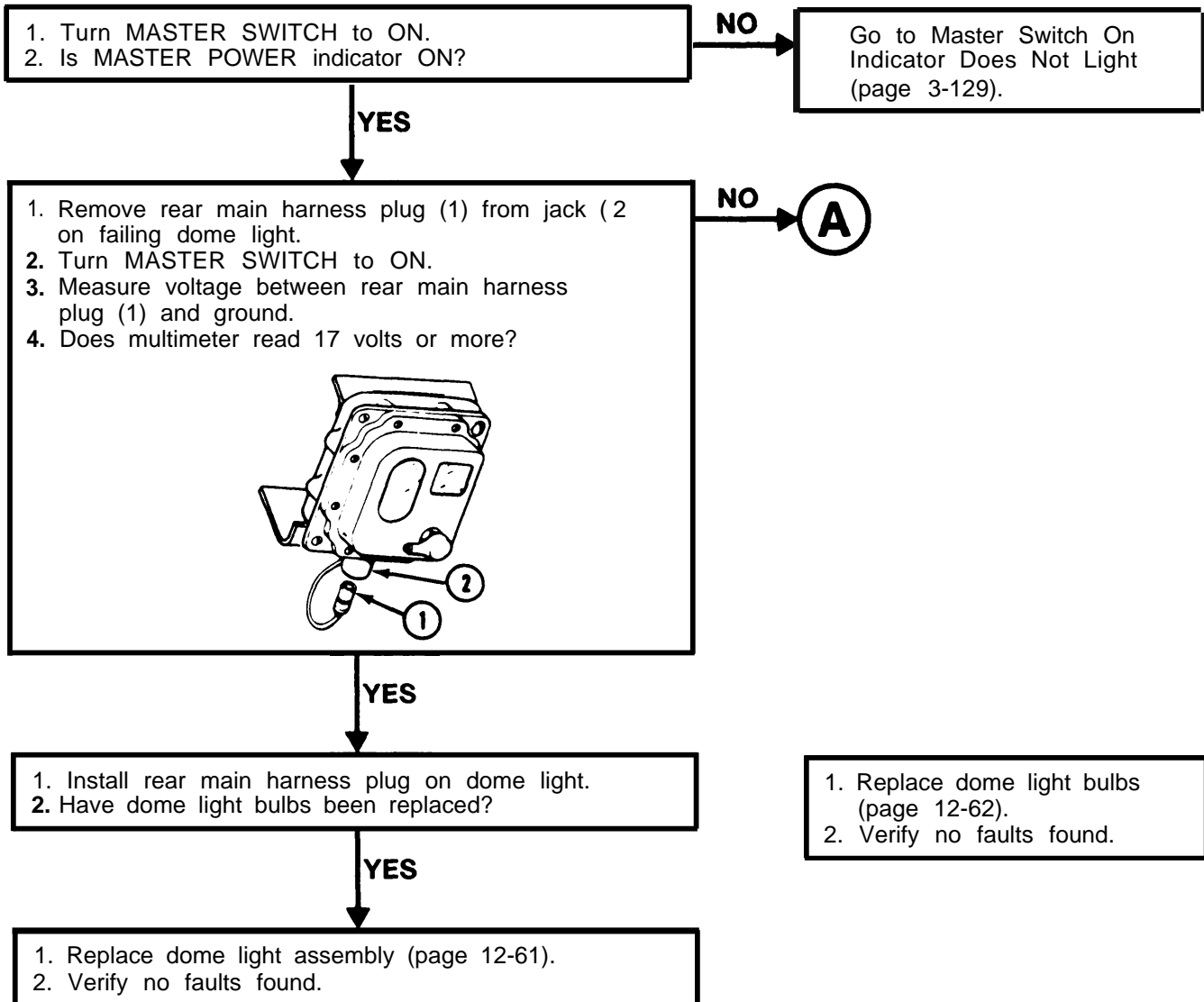
see your -10

**Personnel Required:**

- Unit Mechanic
- Helper (H)

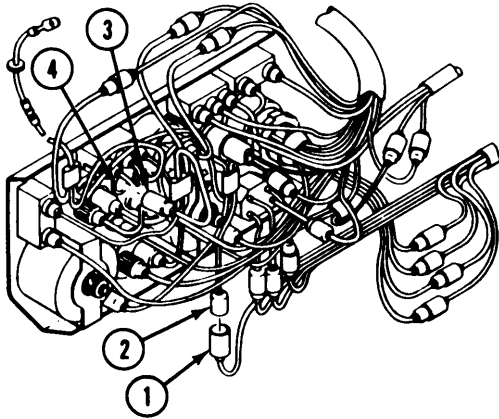
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)



**A**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access (page 11-2).
3. Remove rear main harness circuit 38 plug (1) from instrument panel cable assembly circuit 38 jack (2).
4. Remove instrument panel cable assembly circuit 27 plug (3) from instrument panel circuit breaker jack (4).
5. Measure resistance between instrument panel cable assembly circuit 38 jack (2) and circuit 27 plug (3).
6. Does multimeter read 0 ohms?



**NO**

1. Install rear main harness plug on dome light jack.
2. Repair instrument panel cable assembly circuit 38 (page 14-3).
3. Verify no faults found.

**YES**

1. Repair rear main harness circuit 38 (page 14-3).
2. Verify no faults found.

---

**INFRARED PERISCOPE WORKS IMPROPERLY**

---

**INITIAL SETUP**

**Tools:**

- General Mechanic's Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**Personnel Required:**

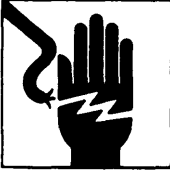
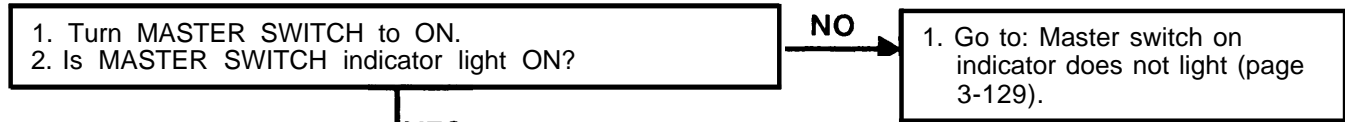
Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
  - Carrier blocked (see your-10)
  - Periscope stowed (see your -10)
  - I.R. power switch OFF (see your-10)
- 



**WARNING**  
High voltage in the M19 periscope can cause serious injury or death. Voltage could exceed 16,000 volts. To avoid accidents, observe the following

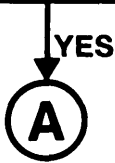
Always connect power cable to periscope before turning MASTER SWITCH and infrared (I.R.) POWER switch to ON.

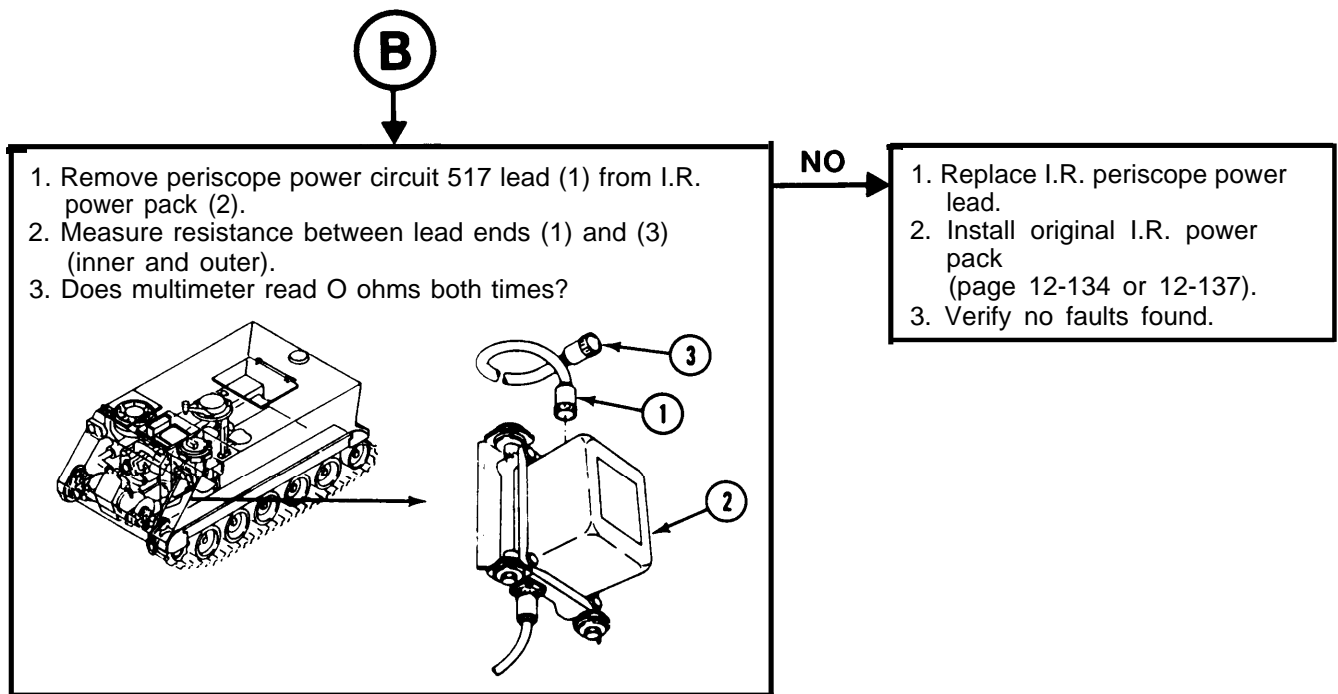
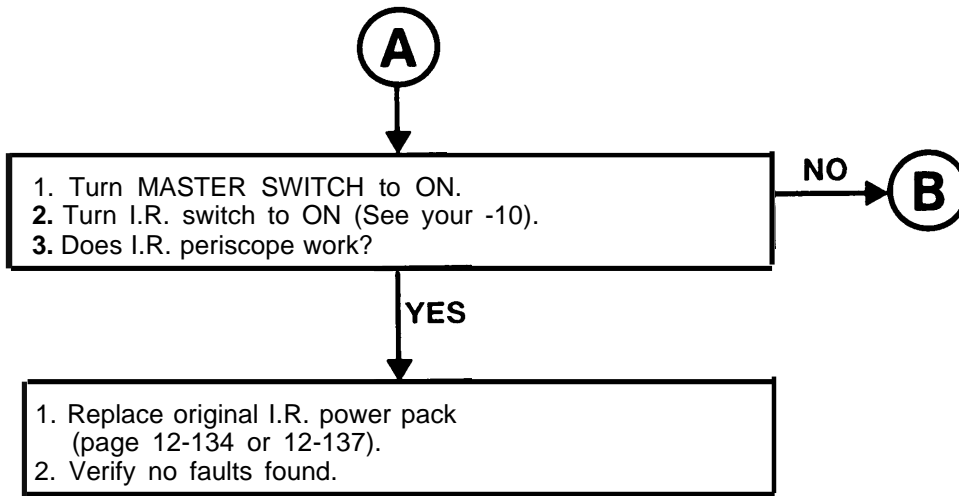
Before disconnecting power cable from M19 periscope, always wait at least two minutes after turning infrared (I.R.) POWER switch and MASTER SWITCH OFF.

Do not disconnect power cable until image disappears from periscope screen.

Never touch end of power cable, or allow it to contact metal surfaces.

1. Replace I.R. power pack with known good power pack (page 12-134 or 12-137).

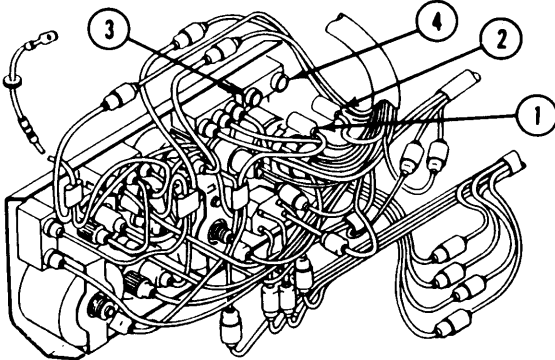




**B1**  
GO TO NEXT PAGE

**B1**

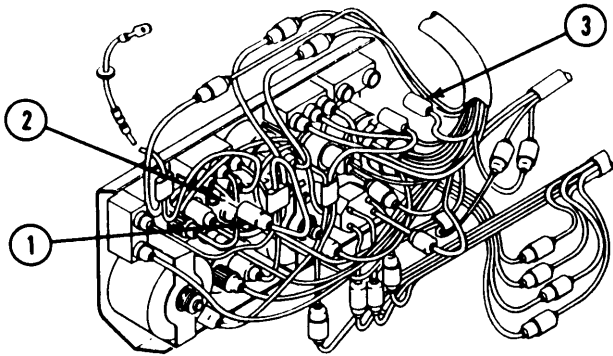
1. Remove circuit plugs 516 (1) and 516A (2) from I.R. POWER switch jacks (3) and (4).
2. Measure resistance between I.R. POWER switch jacks (3) and (4) with switch ON.
3. Does multimeter read 0 ohms?



1. Replace I.R. POWER switch (page 11-7).
2. Install original I.R. power pack (page 12-134 or 12-137).
3. Verify no faults found.

YES

1. Remove instrument panel cable assembly circuit 27 plug (1) from instrument panel circuit breaker (2).
2. Measure resistance between circuit 516 plug (3) and circuit 27 plug (1).
3. Does multimeter read 0 ohms?



NO

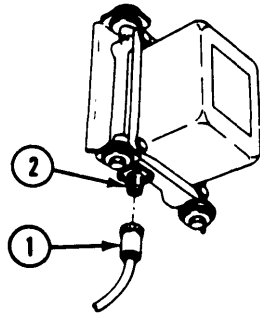
1. Repair instrument panel cable assembly circuit 516 (page 14-3).
2. Install original I.R. power pack (page 12-134 or 12-137).
3. Verify no faults found.

YES

**B2**

**B<sub>2</sub>**

1. Remove cable assembly circuit 5160A plug (1) from I.R. power pack (2).
2. Turn MASTER SWITCH to ON.
3. Turn I.R. POWER switch to ON.
4. Measure voltage between cable assembly circuit 516A plug (1) and ground.
5. Turn MASTER SWITCH to OFF.
6. Did multimeter read less than 17 volts?



**NO**

1. Repair front main harness circuit 516A (page 14-3).
2. Install original I.R. power pack (page 12-134 or 12-137).
3. Verify no faults found.

**YES**

1. Faulty I.R. periscope.
2. Install original I.R. **power** pack (page 12-134 or 12-137).
3. Notify your supervisor.

## RADIO(S) DOES NOT WORK

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)  
 Jumper Wire

**References:**

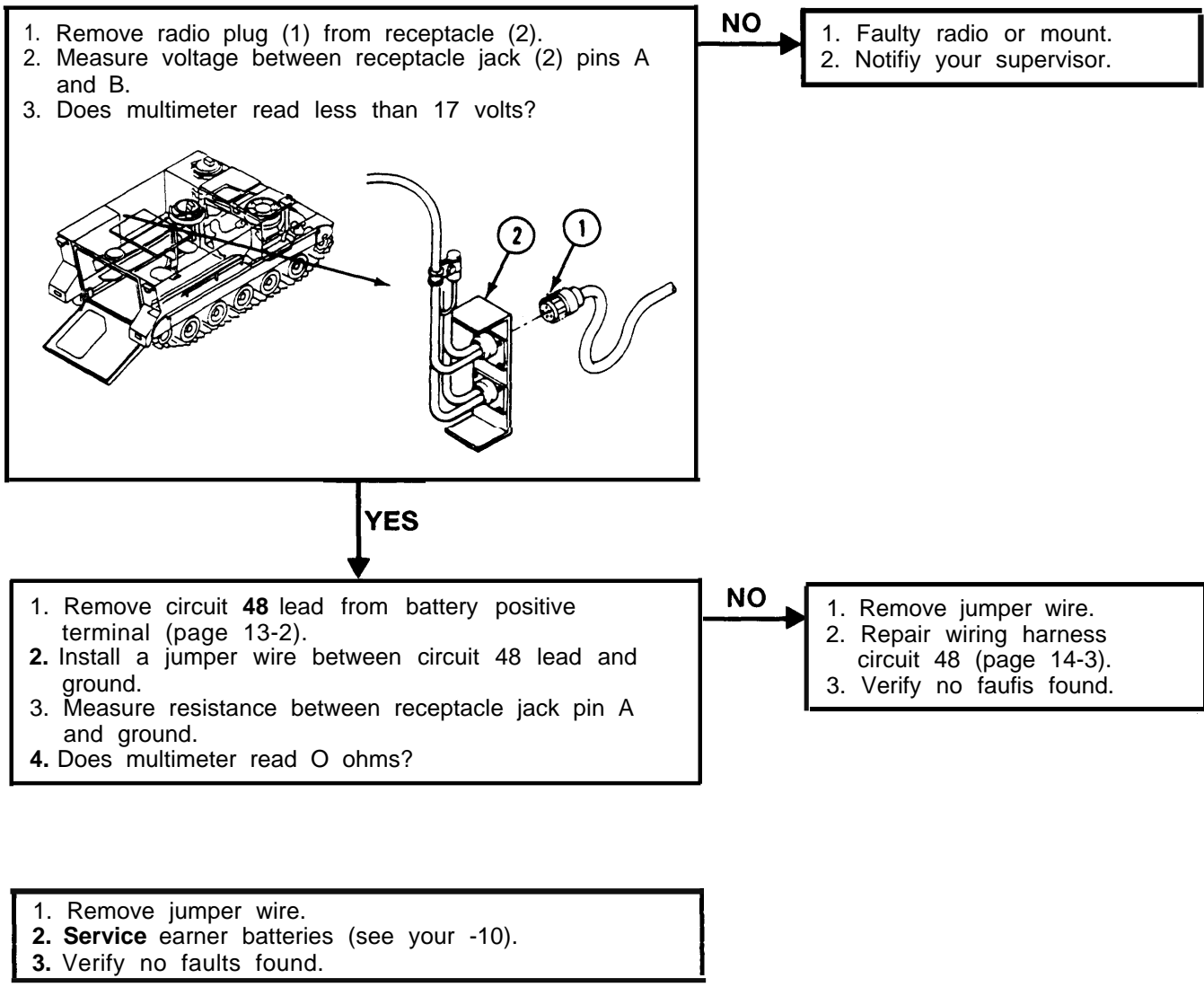
See your -10

**Equipment Conditions:**

Carner blocked (see your -10)  
 Ramp lowered (see your -10)

**Personnel Required:**

Unit Mechanic  
 Helper (H)





## DOME LIGHTS MALFUNCTION (M577A2 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

See your -10

**Personnel Required:**

Unit Mechanic  
 Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Ramp lowered (see your -10)

1. Turn MASTER SWITCH to ON (see your-10).
2. Turn BLACKOUT BYPASS switch to ON.
3. Do white dome lights come on?

NO →



GO TO PAGE 3-119

1. Turn BLACKOUT BYPASS switch to OFF.
2. Operate rear dome light switch.
3. Operate front dome light switch.
4. Do blackout lights malfunction?

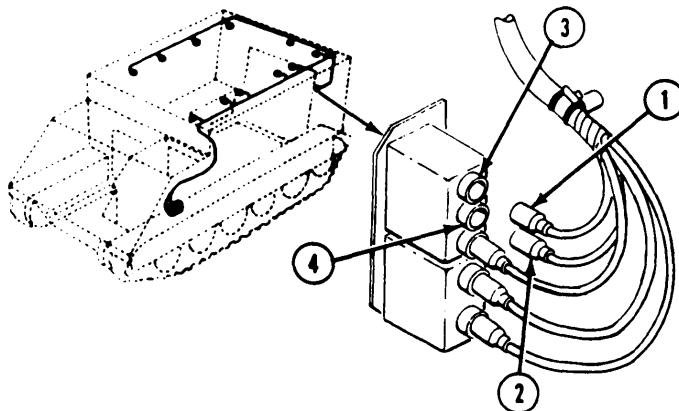
GO TO PAGE 3-119

1. Remove circuit 38E (1) and 38A (2) plugs from rear dome light switch jacks (3 and 4).
2. Install a jumper wire between circuit 38E and 38A plugs (1 and 2).
3. Operate front dome light switch.
4. Do blackout dome lights malfunction?

NO →



GO TO PAGE 3-120



YES ↓



**A**

1. Remove jumper from circuits 38E and 38A plugs.  
 2. Measure voltage at circuit 38E plug.  
 3. Does multimeter read 17 volts or more?

NO

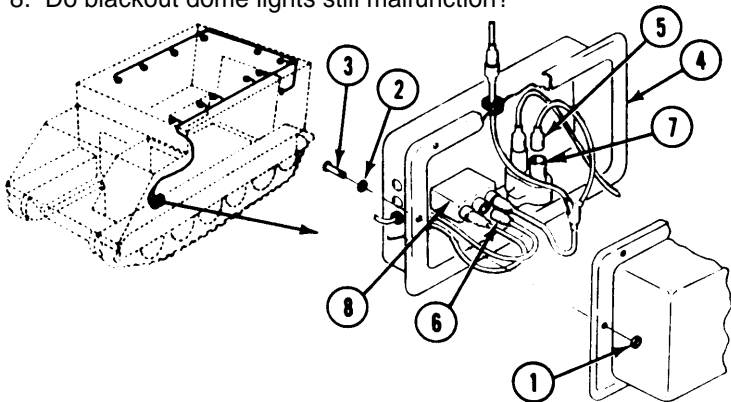
1. Turn MASTER SWITCH to OFF  
 2. Repair rear main harness circuit 38E (page 14-3).  
 3. Verify no faults found.

YES

1. Turn MASTER SWITCH to OFF.  
 2. Install circuit 38E and 38A plugs on rear dome light switch.  
 3. Remove eight nuts (1), washers (2) and screws (3) from master switch panel (4). Pull panel away from distribution box.  
 4. Remove circuits 10 (5) and 38A (6) plugs from circuit breaker (7) and front dome light switch (8).  
 5. Install a jumper wire between circuit 10 and 38A plugs.  
 6. Turn MASTER SWITCH to ON.  
 7. Operate rear dome light switch.  
 8. Do blackout dome lights still malfunction?

NO

**E** GO TO PAGE 3-120.1



YES

1. Remove jumper wire from circuits 10 and 38A plugs.  
 2. Measure voltage at circuit 10 plug.  
 3. Does multimeter read 17 volts or more?

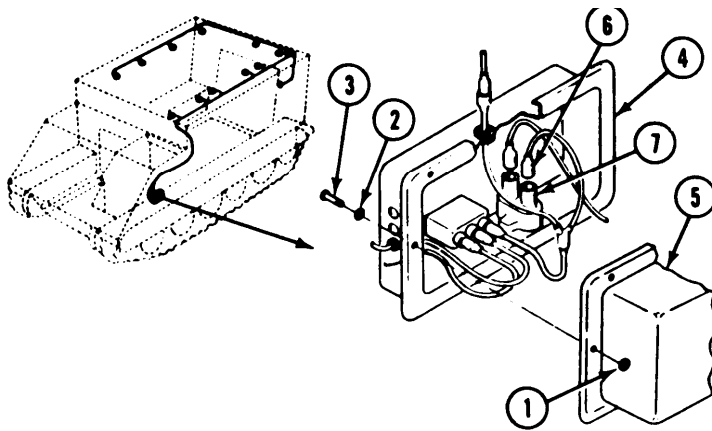
1. Turn MASTER SWITCH to OFF.  
 2. Repair/replace wiring harness 10917788 (page 14-3).  
 3. Verify no faults found.

YES

1. Turn MASTER SWITCH to OFF.  
 2. Repair wiring harness circuit 38A (page 14-3).  
 3. Verify no faults found.

**B**

1. Turn MASTER SWITCH to OFF.
2. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).
3. Remove circuit 10 plugs (6) from circuit breaker jacks (7).
4. Measure resistance between circuit breaker jacks (7).
5. Does multimeter read 0 ohms?



1. Replace circuit breaker (page 12-70).
2. Verify no faults found.

YES

1. Repair circuit 10 lead assembly from the circuit breaker to the front dome light switch.
2. Verify no faults found.

**C**

1. Has the ramp door switch been adjusted?

NO

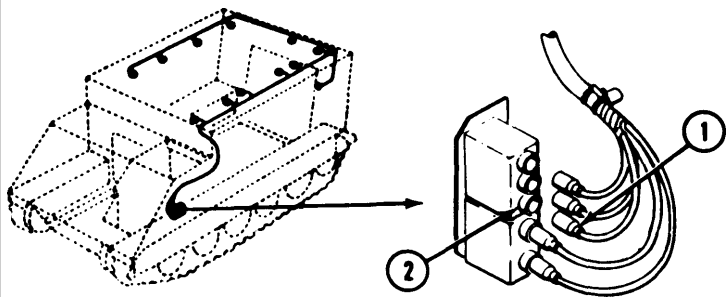
1. Adjust the ramp door switch (page 12-75).
2. Verify no faults found.

YES

1. Replace ramp door switch (page 12-74).
2. Verify no faults found.

**D**

1. Turn blackout dome lights on using front dome light switch.
2. Remove circuit 38 plug (1) from rear dome light switch jack (2).
3. Measure voltage between circuit 38 plug (1) and ground.
4. Does multimeter read 17 volts or more?



**NO**

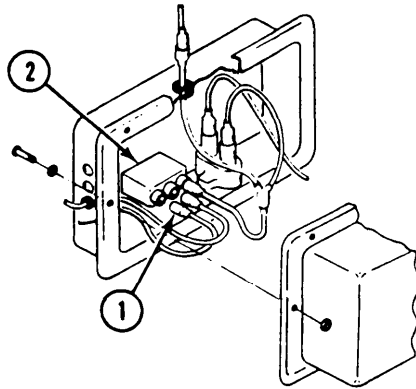
1. Turn MASTER SWITCH to OFF.
2. Repair rear main harness circuit 38 (page 14-3)
3. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Replace rear dome light switch (page 12-69).
3. Verify no faults found.

**E**

1. Turn dome lights on using rear dome light switch.
2. Remove circuit 38 plug (1) from front dome light switch jack (2).
3. Measure voltage between circuit 38 plug (1) and ground.
4. Does multimeter read 17 volts or more?



**NO**

1. Turn MASTER SWITCH to OFF.
2. Repair wiring harness circuit 38 (page 14-3).
3. Install master switch panel on distribution box.
4. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove jumper wire from circuit 10 and 38 plugs.
3. Replace front dome light switch (page 12-68).
4. Verify no faults found.

## BLACKOUT DOME LIGHTS DO NOT WORK (M1068 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

See your -10  
 See M1068 Wiring Diagrams (FO-9 & FO-10)

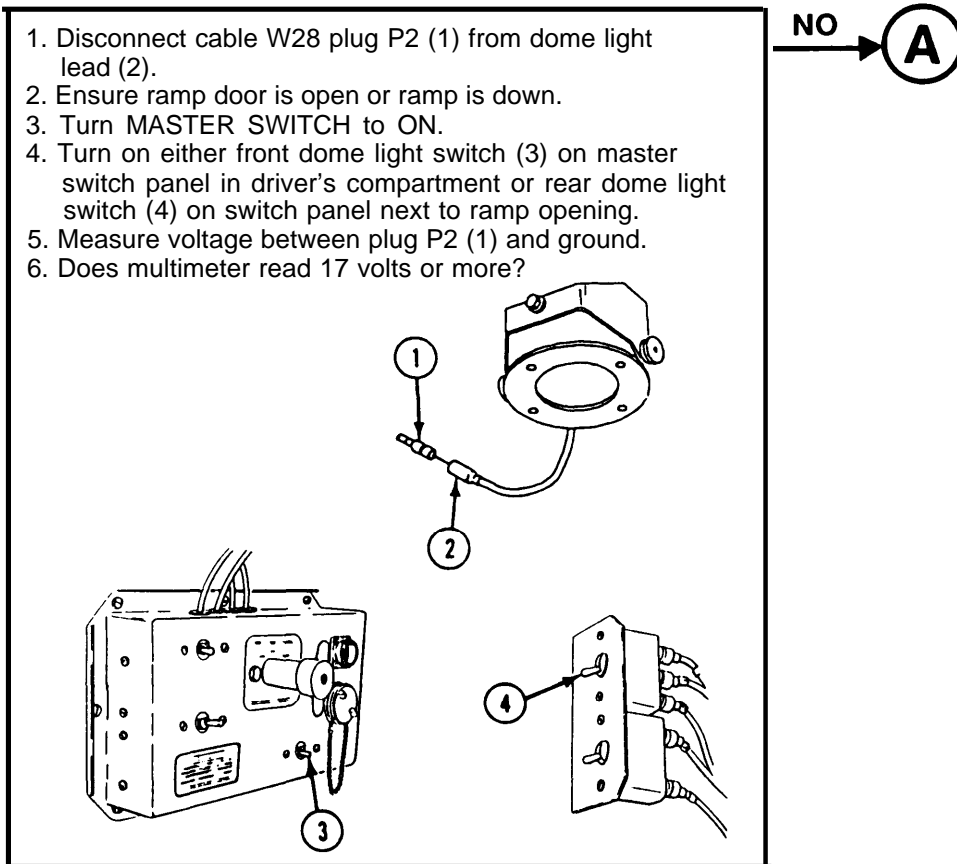
**Personnel Required:**

Unit Mechanic

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

1. Disconnect cable W28 plug P2 (1) from dome light lead (2).
2. Ensure ramp door is open or ramp is down.
3. Turn MASTER SWITCH to ON.
4. Turn on either front dome light switch (3) on master switch panel in driver's compartment or rear dome light switch (4) on switch panel next to ramp opening.
5. Measure voltage between plug P2 (1) and ground.
6. Does multimeter read 17 volts or more?



YES

1. Turn MASTER SWITCH to OFF.  
 2. Have dome light bulbs been replaced?

NO

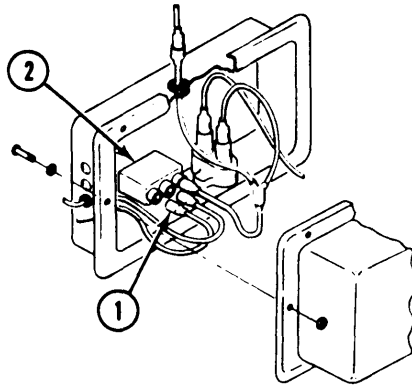
1. Replace dome light bulbs (page 12-64).  
 2. Verify no faults found.

YES

1. Repair dome light assembly (page 12-65).  
 2. Verify no faults found.

**E**

1. Turn dome lights on using rear dome light switch.
2. Remove circuit 38 plug (1) from front dome light switch jack (2).
3. Measure voltage between circuit 38 plug (1) and ground.
4. Does multimeter read 17 volts or more?



**NO**

1. Turn MASTER SWITCH to OFF.
2. Repair wiring harness circuit 38 (page 14-3).
3. Install master switch panel on distribution box.
4. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove jumper wire from circuit 10 and 38 plugs.
3. Replace front dome light switch (page 12-68).
4. Verify no faults found.

## RIGHT REAR UTILITY OUTLET/ADMITTANCE BUZZER WORKS IMPROPERLY (M577A2 AND M1068 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)  
 Jumper Wire

**References:**

See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 MASTER SWITCH turned to ON  
 (see your -10)

**Personnel Required:**

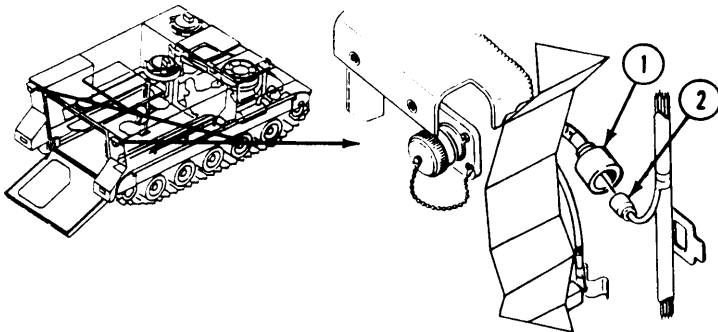
Unit Mechanic  
 Helper (H)

1. Does either the right rear utility outlet or the admittance buzzer operate? **NO** → **(A)**

1. Does the admittance buzzer operate correctly? **NO** → **(B)** GO TO PAGE 3-124

1. Remove circuit 37A plug (1) from utility outlet jack (2).  
 2. Measure voltage between circuit 37A plug (1) and ground.  
 3. Does multimeter read less than 17 volts? **NO** →

1. Turn MASTER SWITCH to OFF (see your -10).  
 2. Replace utility outlet receptacle (page 17-9).  
 3. Verify no faults found.



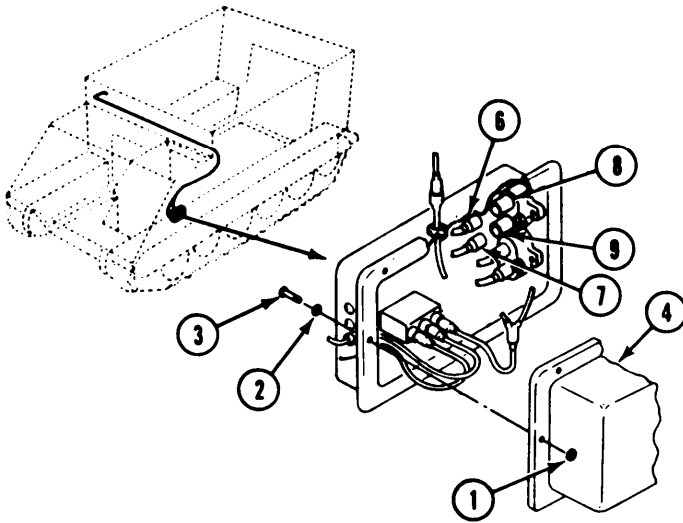
**YES**

1. Turn MASTER SWITCH to OFF.  
 2. Repair rear main wiring harness (page 14-3).  
 3. Verify no faults found.



**A**

1. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).
2. Remove circuit 10 and 37A plugs (6 and 7) from circuit breaker jacks (8 and 9).
3. Measure resistance between circuit breaker jacks (8 and 9).
4. Does multimeter read 0 ohms?



**NO**

1. Replace circuit breaker (page 17-11).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to ON.
2. Measure voltage at circuit 10 plug.
3. Does multimeter read less than 17 volts?

**NO**

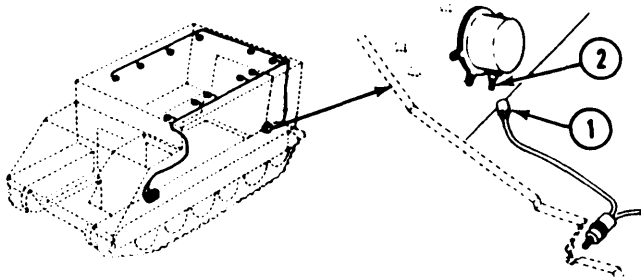
1. Turn MASTER SWITCH to OFF.
2. Repair rear main wiring harness circuit 37A (page 14-3).
3. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Repair circuit 10 in master switch panel from the bus bar to the circuit breaker (page 14-3).
3. Verify no faults found.

**B**

1. Remove circuit 509 plug (1) from admittance buzzer jack (2).
2. (H) Depress admittance buzzer switch.
3. Measure voltage between circuit 509 plug (1) and ground.
4. Does multimeter read less than 17 volts?

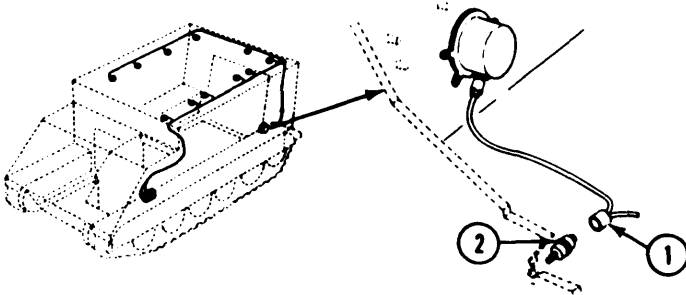


**NO**

1. Turn MASTER SWITCH to OFF.
2. Replace admittance buzzer (page 12-72).
3. Verify no faults found.

**YES**

1. Remove rear main harness circuit 509 plug (1) from admittance buzzer switch (2).
2. Install a jumper wire between admittance buzzer circuit 509 plug (1) and ground.
3. Measure voltage across two pin contacts of circuit 509 plug (1) from admittance buzzer switch.
4. Does multimeter read less than 17 volts?



**NO**

1. Turn MASTER SWITCH to OFF.
2. Replace admittance buzzer switch (page 12-72).
3. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove jumper wire.
3. Repair rear main wiring harness circuit 509 (page 14-3).
4. Verify no faults found.

# LEFT REAR UTILITY OUTLET/BLOWER DOES NOT WORK (M577A2 AND M1068 ONLY)

## INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

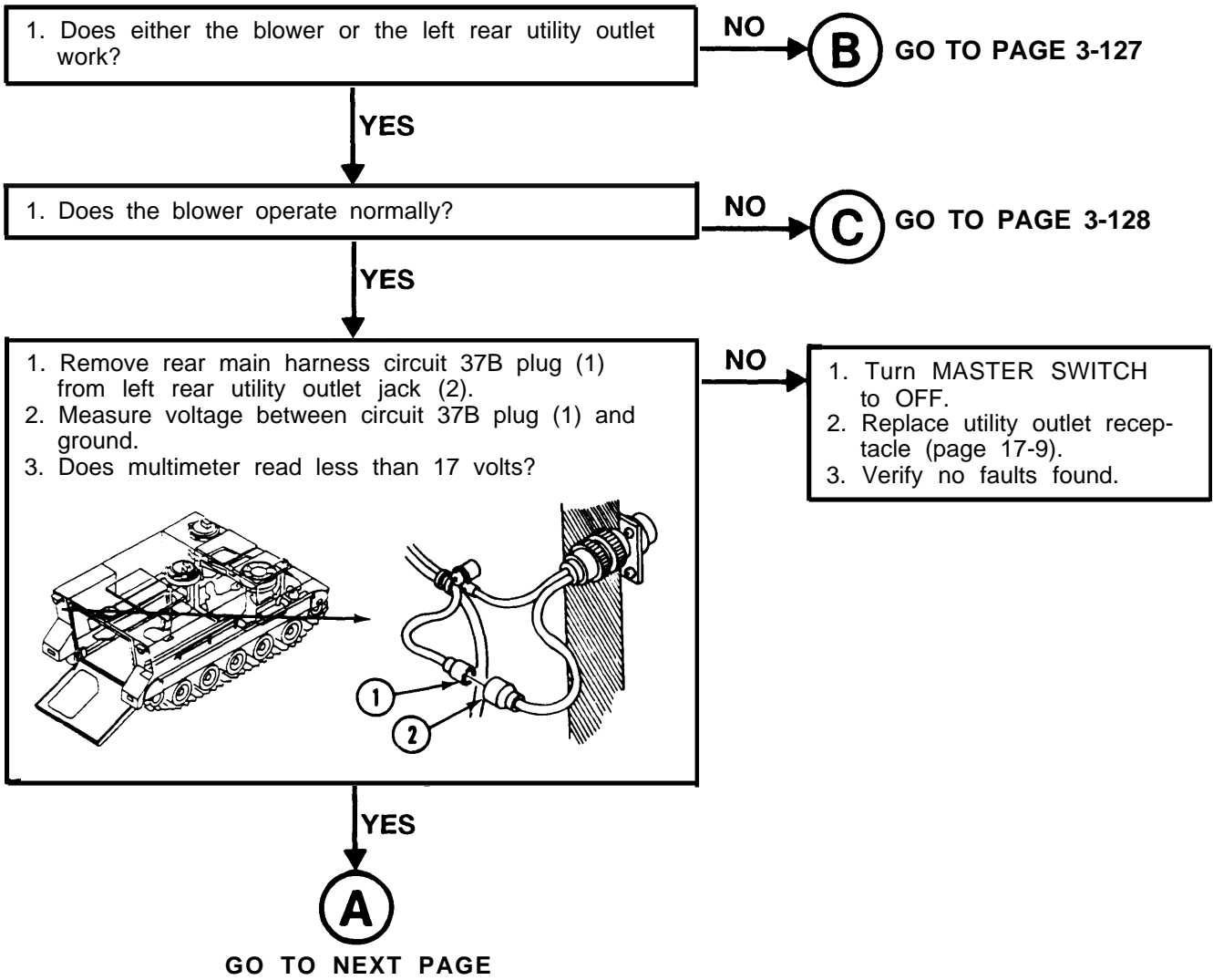
See your -10

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- MASTER SWITCH turned to ON (see your -10)

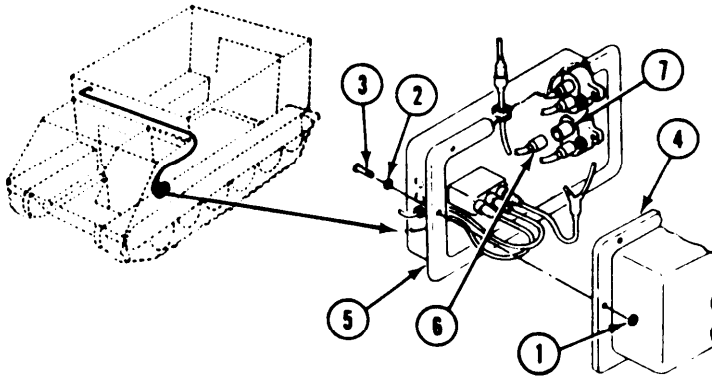
**Personnel Required:**

- Unit Mechanic
- Helper (II)



**A**

1. Turn MASTER SWITCH to OFF.
2. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4) and distribution box (5). Pull panel away from distribution box.
3. Remove circuit 37B plug (6) from circuit breaker jack (7).
4. Turn MASTER SWITCH to ON.
5. Measure voltage between circuit breaker jack (7) and ground.
6. Does multimeter read less than 17 volts?

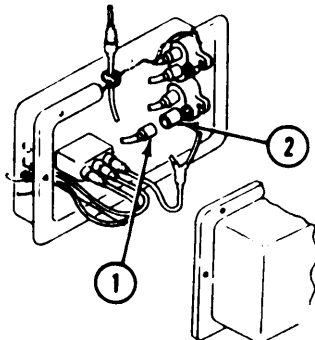


**NO**

1. Turn MASTER SWITCH to OFF.
2. Repair rear main wiring harness circuit 37B (page 14-3).
3. Verify no faults found.

**YES**

1. Remove circuit 10 plug (1) from circuit breaker jack (2).
2. Measure voltage between circuit 10 plug (1) and ground.
3. Does multimeter read less than 17 volts?



**NO**

1. Turn MASTER SWITCH to OFF.
2. Replace circuit breaker (page 17-11).
3. Verify no faults found.

**A1**



1. Turn MASTER SWITCH to OFF.
2. Repair circuit 10 lead from bus bar to circuit breaker (page 14-3).
3. Install master switch panel on distribution box.
4. Verify no faults found.

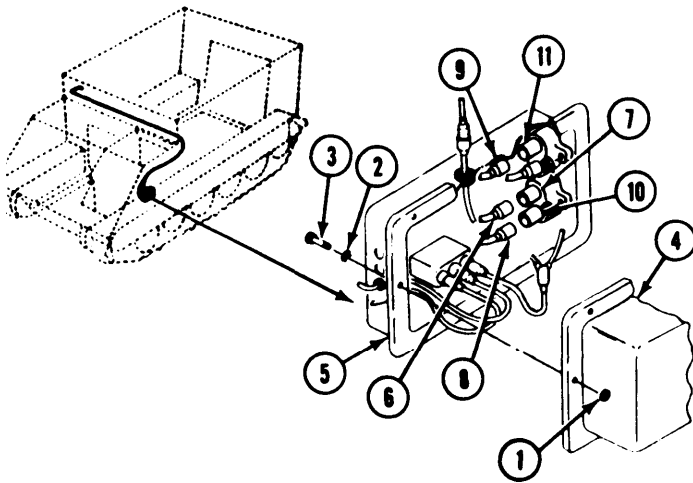
**B**



1. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4) and distribution box (5). pull panel away from distribution box.
2. Remove circuit 37B plug (6) from circuit breaker jack (7) and two circuit 10 plugs (8 and 9) from circuit breaker jacks (10 and 11).
3. Measure resistance between circuit breaker contacts.
4. Does multimeter read 0 ohms?

NO

1. Replace circuit breaker (page 17-11).
3. Verify no faults found.

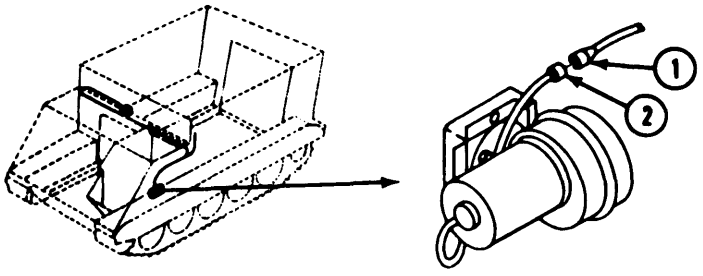


YES



1. Repair circuit 10 from bus bar to circuit breaker (page 14-3).
2. Install master switch panel on distribution box.
3. Verify no faults found.

1. Remove circuit 59 plug (1) from blower motor jack (2).
2. Turn BLOWER SWITCH to ON.
3. Measure voltage between circuit 59 plug (1) and ground.
4. Does multimeter read less than 17 volts?

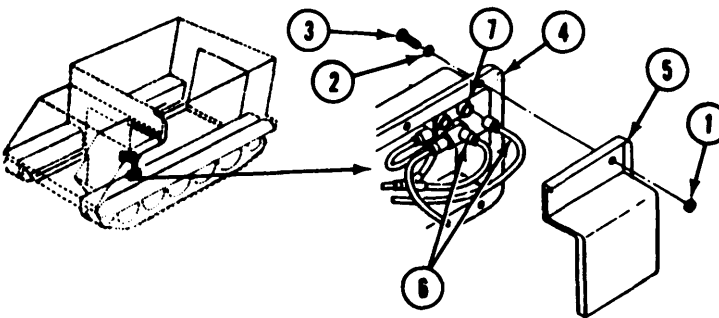


**NO**

1. Replace blower motor (page 17-15).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Install a jumper wire between circuit 59 plug at blower motor and ground.
9. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4) and distribution box (5). Pull panel away from distribution box.
4. Remove circuit 59 plugs (6) from blower switch (7).
6. Check for continuity between circuit 59 plugs (6).
6. Does multimeter read 0 ohms?



**NO**

1. Replace blower switch (page 17-16).
2. Install master switch panel on distribution box.
3. Verify no faults found.

**YES**

1. Repair wiring harness circuit 59 from circuit breaker to blower switch (page 14-3).
2. Install master switch panel on distribution box.
3. Verify no faults found.

**MASTER SWITCH ON INDICATOR DOES NOT LIGHT**

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

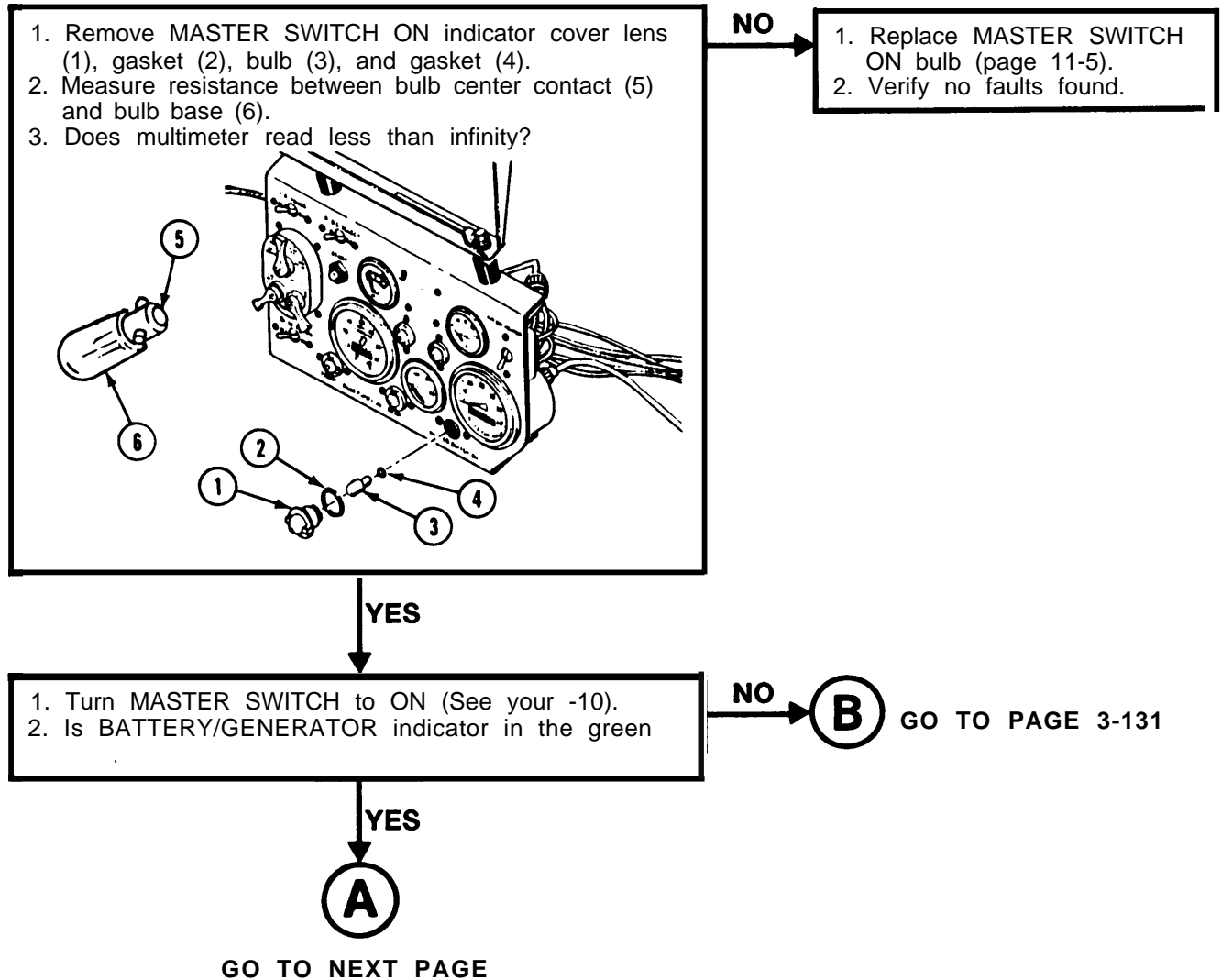
See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

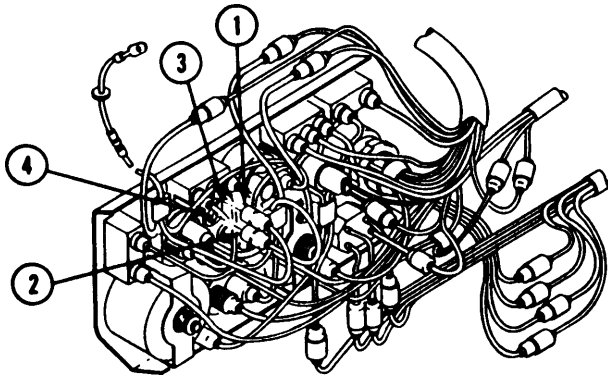
**Personnel Required:**

Unit Mechanic



**A**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove circuit 10 plug (1) and circuit 27 plug (2) from instrument panel circuit breaker jacks (3) and (4).
4. Measure resistance between circuit breaker jacks (3 and 4).
5. Does multimeter read 0 ohms?



**NO**

1. Replace instrument panel circuit breaker (page 11-4).
2. Verify no faults found.

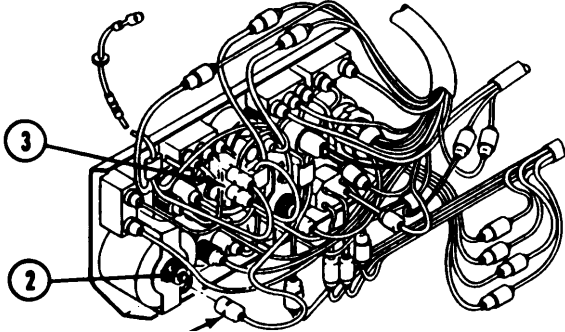
**YES**

**A1**



**A1**

1. Remove circuit 459 plug (1) from MASTER SWITCH ON indicator jack (2).
2. Measure resistance between circuit 27 plug (3) and circuit 459 plug (1).
3. Does multimeter read 0 ohms?



**NO**

1. Repair instrument panel cable assembly (page 14-9).
2. Verify no faults found.

**YES**

1. Replace indicator light assembly (page 11-5).
2. Verify no faults found.

**B**

1. Turn MASTER SWITCH to OFF.
2. Inspect carrier batteries (page 13-3).
3. Are batteries in proper maintenance and well charged?

**NO**

1. Service carrier batteries (see your -10).
2. Verify no faults found.

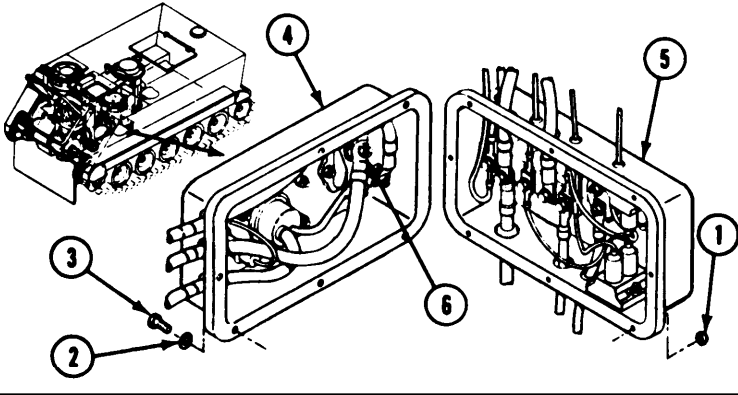
**YES**

**B1**

GO TO NEXT PAGE

**B1**

1. Remove eight nuts (1), washers (2), and screws (3) from master switch panel (4). Pull panel away from distribution box (5).
2. Inspect circuit 6 terminal end on master switch (6).
3. Is terminal end and master switch free from corrosion and/or other damage?

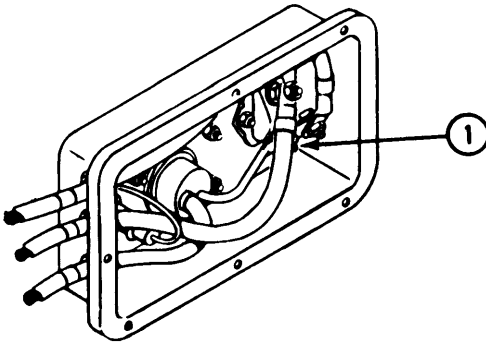


**NO**

1. Repair battery to master power cable (page 14-9).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to ON (see your -10).
2. Measure voltage between master switch terminals (1) and ground.
3. Does multimeter read more than 17 volts?



**NO**

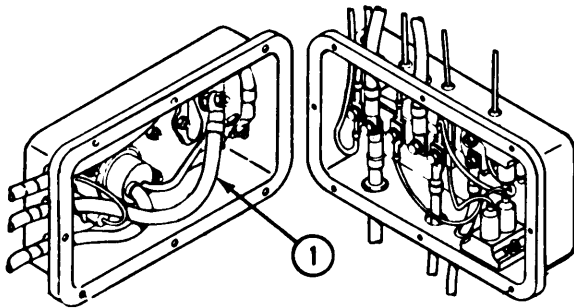
1. Replace master switch (page 9-13).
2. Verify no faults found.

**YES**

**B2**

**B<sub>2</sub>**

1. Inspect cable 49 (1) from master switch to distribution box.
2. Are cable and cable ends free from corrosion and damage?



**NO**

1. Repair master power to distribution box cable (page 14-9).
2. Verify no faults found.

**YES**

1. Repair master power harness (page 14-3).
2. Verify no faults found.

---

## FUEL LEVEL INDICATOR MALFUNCTIONS

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### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)  
Jumper Wire

**References:**

see your -10

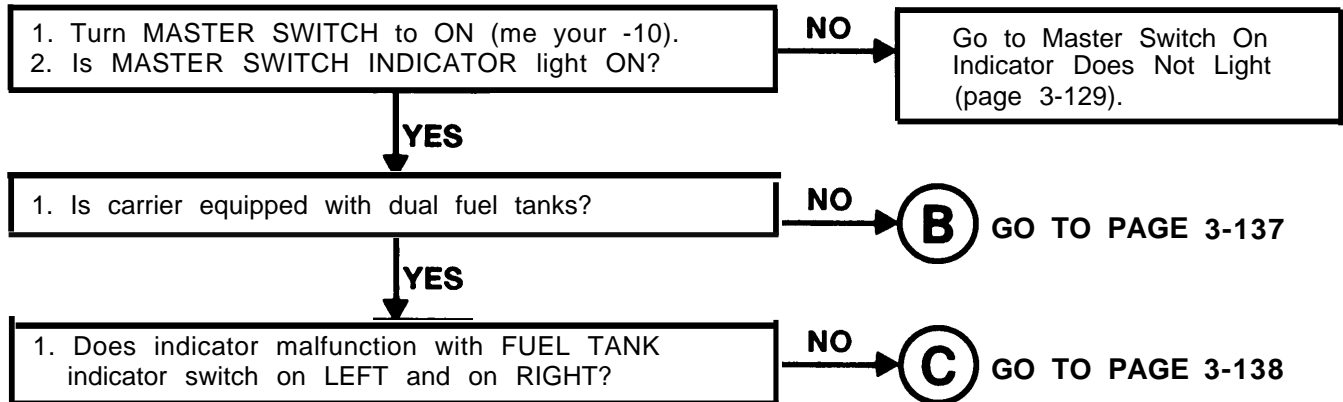
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

**Personnel Required:**

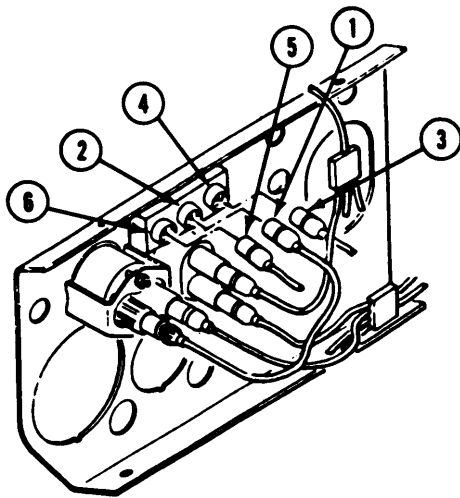
Unit Mechanic

---



**A**

1. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
2. Remove circuit 28 plug (1) from FUEL TANK switch jack (2).
3. Remove circuit 29 or 31A plug (3) from FUEL TANK switch jack (4).
4. Remove circuit 30 or 30A plug (5) from FUEL TANK switch jack (6).
5. Turn FUEL TANK switch to LEFT and measure resistance between FUEL TANK switch jack (2) and FUEL TANK switch jack (6).
6. Turn FUEL TANK switch to RIGHT and measure resistance between FUEL TANK switch jack (2) and FUEL TANK switch jack (4).
7. Did multimeter read 0 ohms both times?



**NO**

1. Replace FUEL TANK select switch (page 11-7).
2. Verify no faults found.

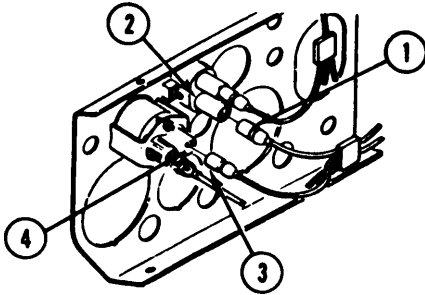
**YES**

**A1**

GO TO NEXT PAGE

**A1**

1. Remove circuit 27 plug (1) from instrument panel circuit breaker jack (2).
2. Remove circuit 27A plug (3) from fuel level indicator jack (4).
3. Measure resistance between circuit 27 plug (1) and circuit 27A plug (3) .
4. Does multimeter read 0 ohms?

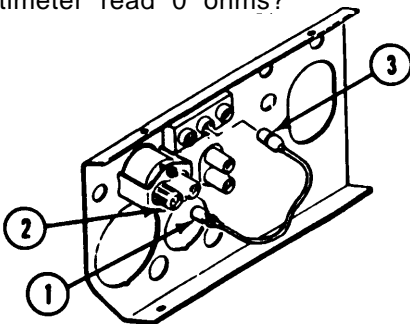


**NO**

1. Install circuit 29 or 31A and 30 or 30A plugs on FUEL TANK switch.
2. Repair instrument panel cable assembly circuit 27A (page 14-3).
3. Verify no faults found.

**YES**

1. Install circuit 29 or 31A plug and circuit 30 or 30A plug onto fuel level switch jacks.
2. Remove circuit 28 lead (1) from FUEL LEVEL indicator jack (2).
3. Measure resistance between circuit 28 lead ends (1) and (3).
4. Does multimeter read 0 ohms?



**NO**

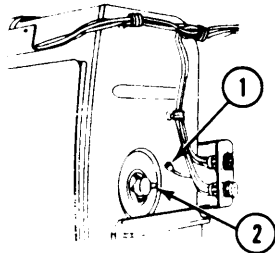
1. Replace circuit 28 lead (page 14-3).
2. Verify no faults found.

**YES**

1. Install circuit 28 lead on FUEL TANK switch jack.
2. Replace FUEL LEVEL indicator (page 11-11).
3. Verify no faults found.

**B**

1. Remove circuit 28 plug (1) from fuel tank jack (2).
2. Turn MASTER POWER switch to ON.
3. Does fuel indicator read full?



1. Repair circuit 28 lead to fuel tank sender (page 14-3).
2. Verify no faults found.

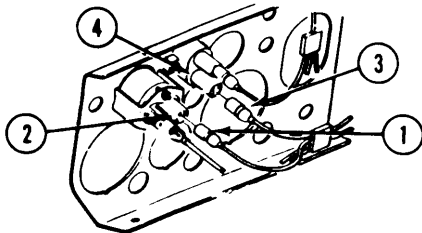
**YES**

1. Install jumper wire between circuit 28 plug and ground.
2. Does fuel quantity gage fail to read empty?

**NO**

1. Replace fuel quantity sending unit (page 6-9 or 6-32).
2. Verify no faults found.

1. Turn MASTER POWER switch to OFF.
2. Remove instrument panel for access (page 11-2).
3. Remove circuit 27A plug (1) from fuel quantity gage jack (2).
4. Remove circuit 27 plug (3) from instrument panel circuit breaker jack (4).
5. Measure continuity between circuit 27 plug (3) and circuit 27A plug (1).
6. Does multimeter read 0 ohms?



**NO**

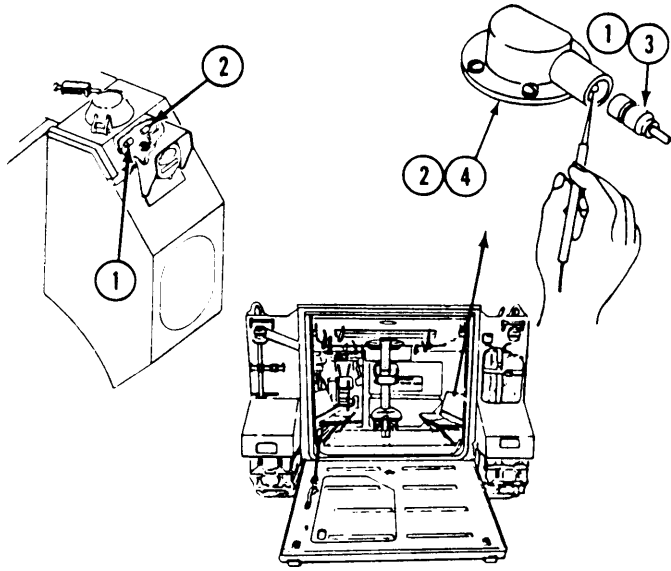
1. Repair instrument panel cable assembly (page 14-9).
2. Verify no faults found.

**YES**

1. Replace fuel quantity gage (page 11-11).
2. Verify no faults found.

**C**

1. Remove circuit 29 (M577A2 only) or 31A (M981 and M1064 only) plug (1) from right tank (2) or circuit 30 or 30A (M981 and M1064 only) plug (3) from left tank (4).
2. Turn FUEL TANK switch to failing side.
3. Does indicator read full scale?



The diagram illustrates the removal of a fuel tank plug. On the left, a fuel tank is shown with a plug labeled '1' and a tank labeled '2'. On the right, a hand is shown using a tool to remove a plug labeled '1' from a tank labeled '2'. Another plug labeled '3' is shown being removed from a tank labeled '4'. Below these diagrams is a perspective view of the fuel tank assembly with the plug '1' removed.

NO

1. Repair main harness circuit 29 or 30 (M577A2 only), or 30 or 31A (M981 and M1064 only) (page 14-3).
2. Verify no faults found.

YES

1. Install jumper wire between plug removed above and ground.
2. Does fuel indicator fail to read empty?

NO

1. Replace FUEL LEVEL transmitter for M577A2, page 6-54 and M981 and M1064, page 6-32.
2. Verify no faults found.

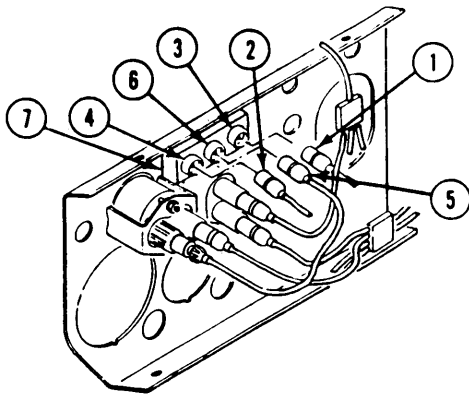
**C1**

GO TO NEXT PAGE



**C1**

1. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
2. Remove circuit 29 M577A2 only) or 31A (M981 and M1064 only) plug (1) (right tank) or circuit 30A plug (2) (left tank) from FUEL TANK switch jack (3) or jack (4).
3. Remove circuit 28 plug (5) from FUEL TANK switch jack (6).
4. Measure resistance between exposed jack pins on FUEL TANK switch (7).
5. Does multimeter read 0 ohms?



**NO**

1. Install plug on fuel tank transmitter.
2. Replace FUEL TANK switch (page 11-7).
3. Verify no faults found.

**YES**

1. Repair rear main harness circuit 29,30, 30A, or 31A (page 14-3).
2. Verify no faults found.

## HIGH BEAM INDICATOR LIGHT MALFUNCTIONS

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Jumper Wire

**References:**

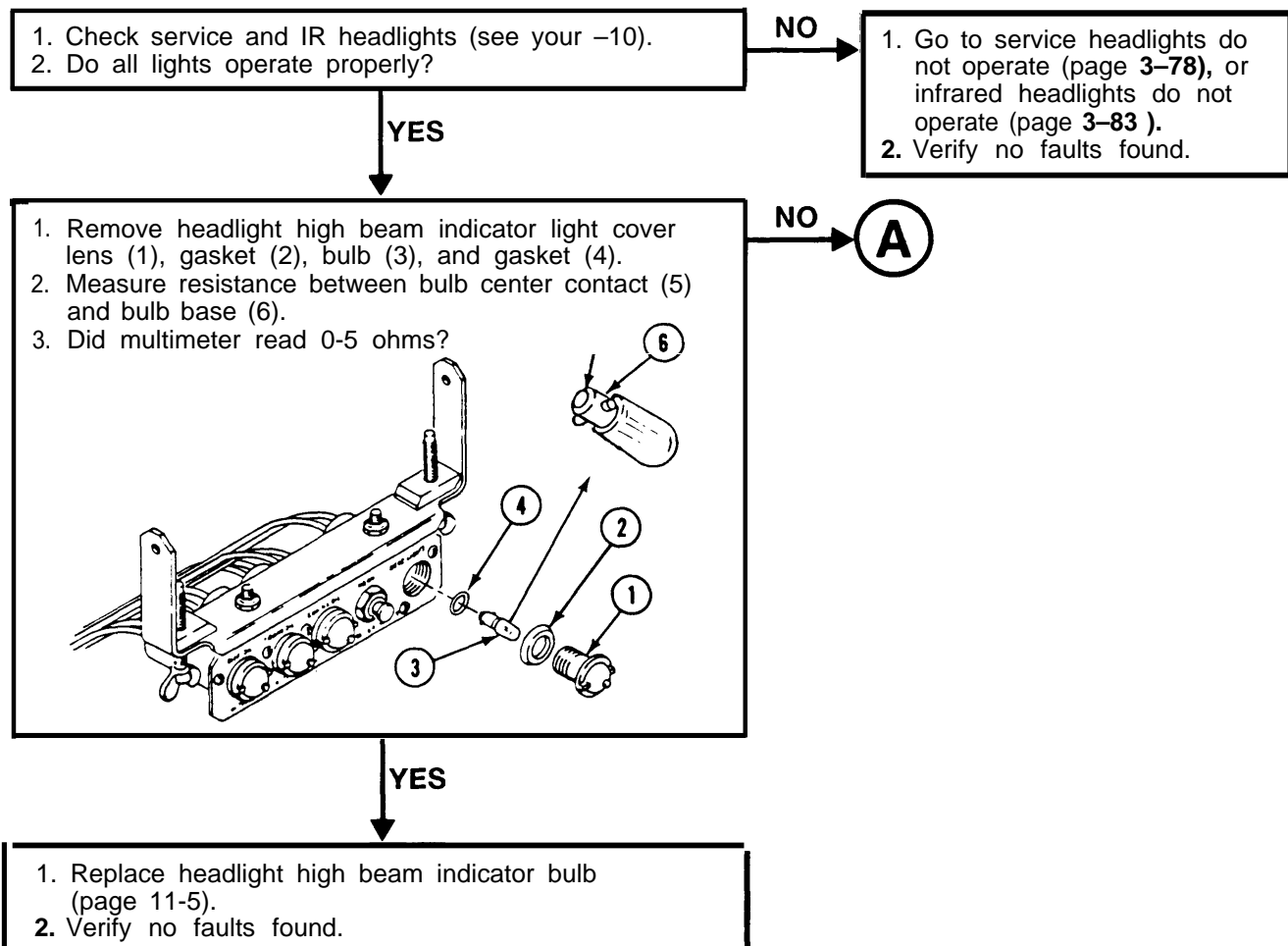
See your -10

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- MASTER SWITCH OFF (see your -10)

**Personnel Required:**

Unit Mechanic



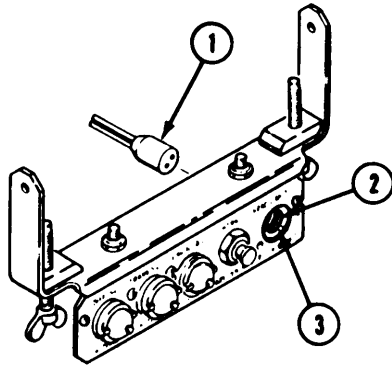
**A**

1. Remove circuit 519/519A lead (1) from high beam indicator light assembly.
2. Measure resistance between each terminal (2), (3), and ground.
3. Does meter read less than infinity?

NO

**B**

GO TO NEXT PAGE

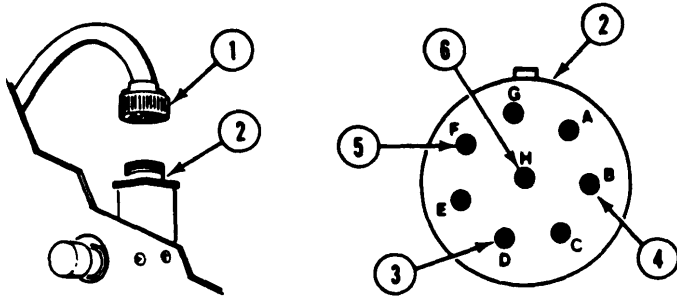


YES

1. Replace high beam indicator light assembly (page 11-5).
2. Verify no faults found.

**B**

1. Remove power plant access cover (page 24-24).
2. Remove front main harness plug (1) from dimmer switch jack (2).
3. Measure resistance between dimmer switch jack (2) pins D (3) and B (4) and between pins F (5) and H (6).
4. Did multimeter read 0 ohms for both measurements?



**NO**

1. Replace dimmer switch (page 12-77).
2. Verify no faults found.

**YES**

1. Install jumper wire between front main harness dimmer switch plug (1) pins D (2) and H (3).
2. Measure resistance between pins on plug (4).
3. Does multimeter read 0 ohms?

**NO**

1. Repair front main harness circuits 519 or 519A (page 14-3).
2. Verify no faults found.

**YES**

1. Replace high beam indicator light assembly (page 11-5).
2. Verify no faults found.

---

**BATTERY/GENERATOR INDICATOR MALFUNCTIONS**

---

**INITIAL SETUP**

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- STE/ICE-R Test Kit (Item 71.1, App D)

**References:**

- See your -10 STE/ICE-R battery troubleshooting (page 3-266)

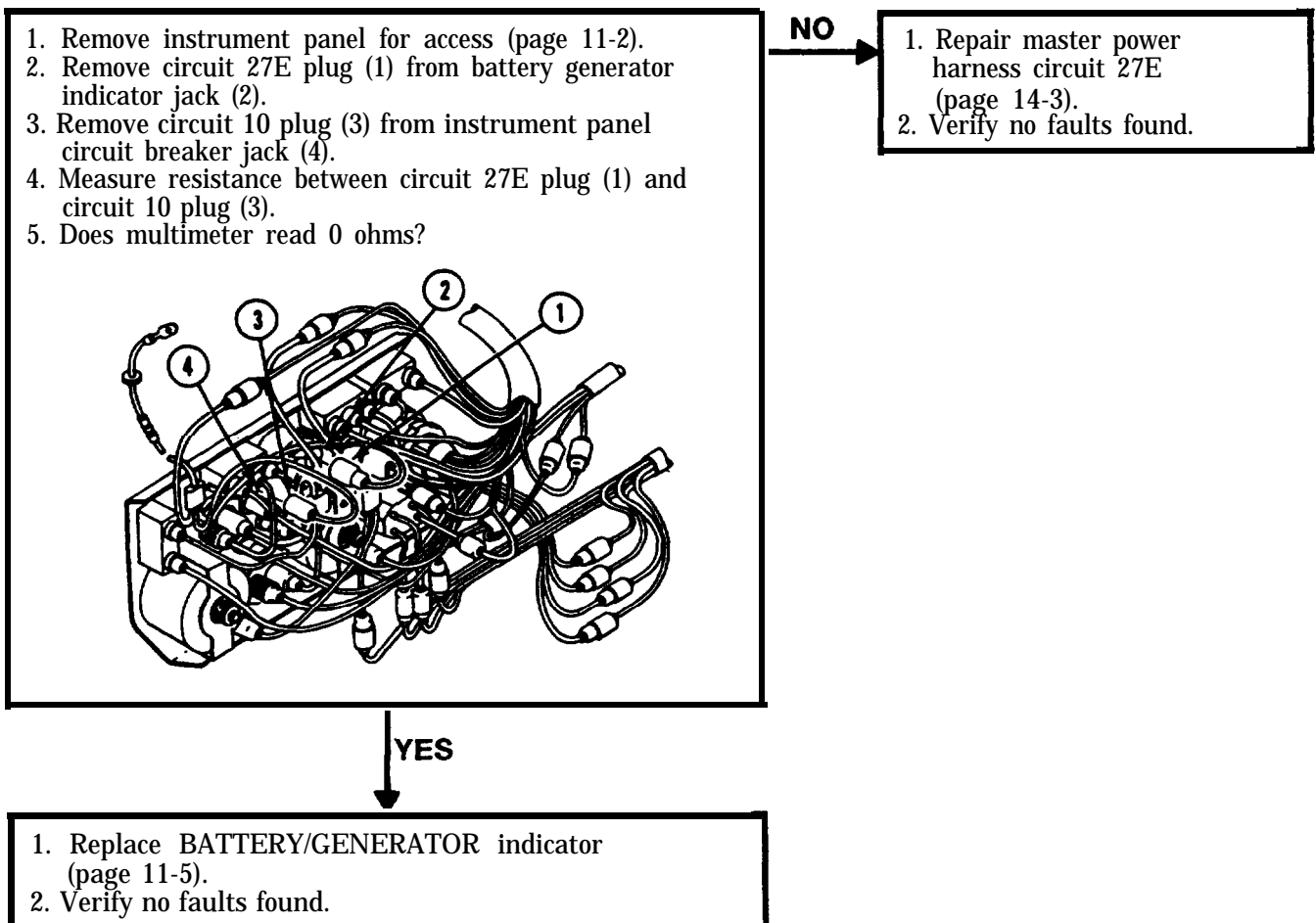
**Personnel Required:**

Unit Mechanic

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



---

## COOLANT TEMPERATURE INDICATOR MALFUNCTIONS

---

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Jumper Wire

**Personnel Required:**

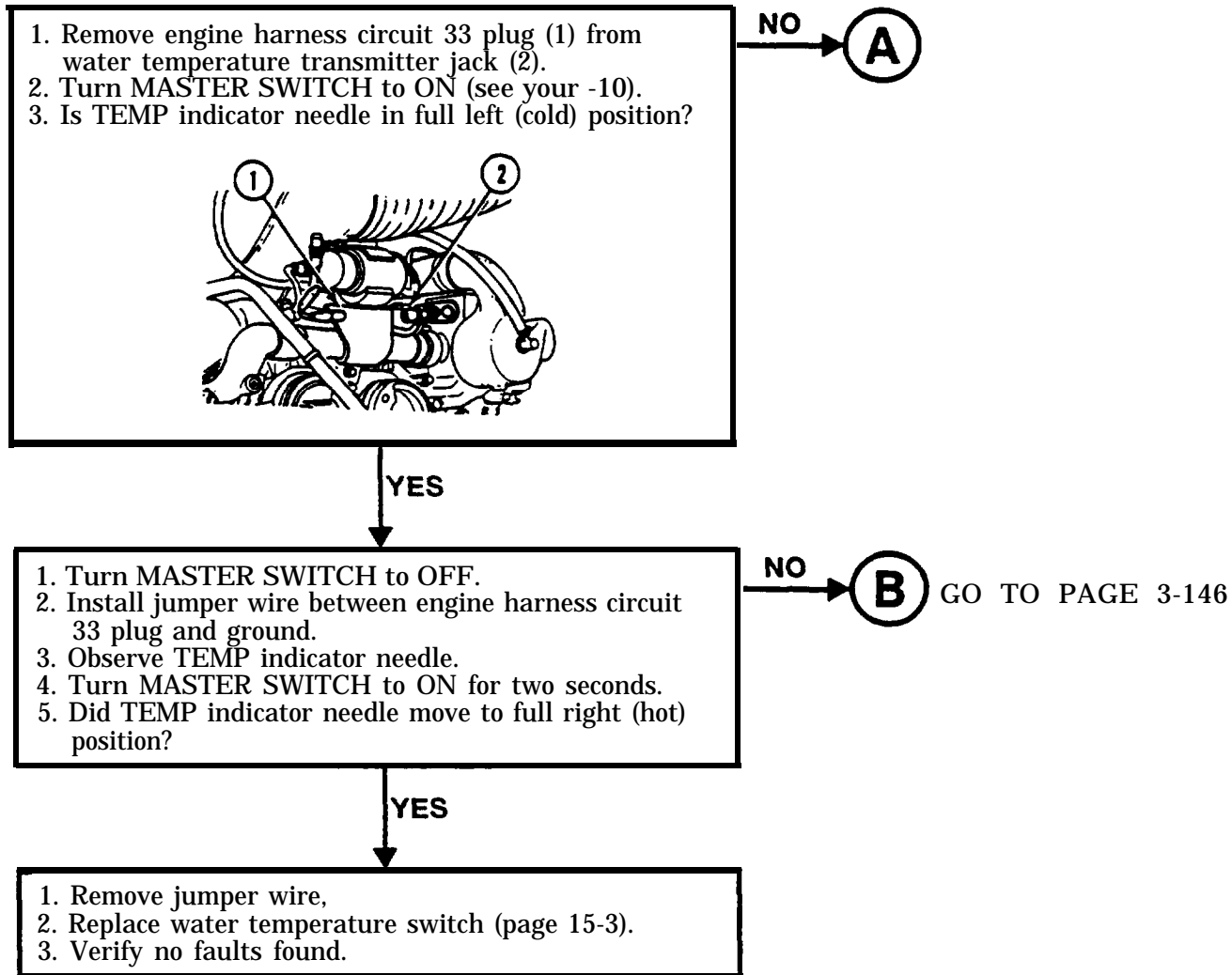
- Unit Mechanic

**References:**

- See your -10

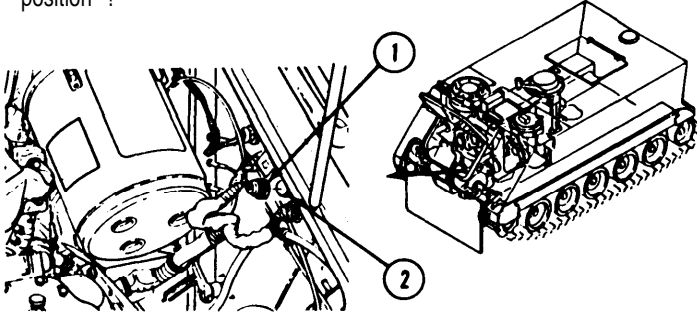
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Driver's power plant access panels removed (see your -10)
- Power plant rear access panel removed (see your -10)



**A**

1. Turn MASTER SWITCH to OFF.
2. Remove engine harness plug (1) from front main harness jack (2) at earner bulkhead.
3. Turn MASTER SWITCH to ON.
4. Is TEMP indicator still not in full left (cold) position ?

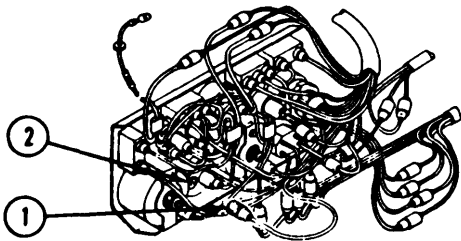


**NO**

1. Repair engine harness circuit 33 (page 14-3).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
3. Remove front main harness circuit 33 plug (1) from TEMP indicator jack (2).
4. Measure resistance between front main harness circuit 33 plug (1) and ground.
5. Does multimeter read infinity?



**NO**

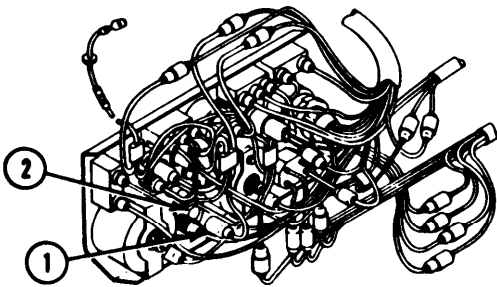
1. Repair front main harness circuit 33 (page 14-3).
2. Verify no faults found.

**YES**

1. Install engine harness plug on front main harness jack at carrier bulkhead.
2. Install engine harness circuit 33 plug on TEMP transmitter jack.
3. Replace TEMP indicator (page 11-11).
4. Verify no faults found.

**B**

1. Remove instrument panel for access. See task: Remove instrument panel mounts and ground leads (page 11-2).
2. Remove circuit 27B plug (1) from coolant temperature indicator (2).
3. Turn MASTER SWITCH to ON.
4. Measure voltage between circuit 27B plug (1) pin and ground.
5. Does multimeter read at least 17 volts?

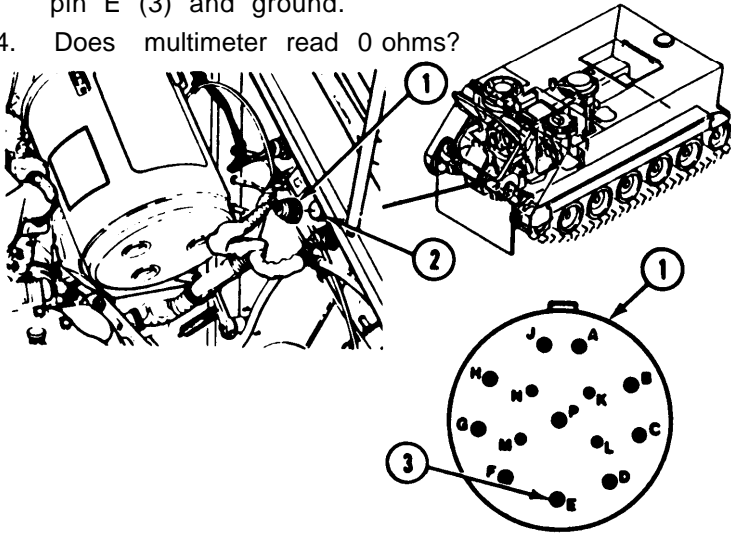


**NO**

1. Repair faulty special purpose cable circuit 27B (page 14-9).
- z. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove engine harness plug (1) from front main harness jack (2) at carrier bulkhead.
3. Measure resistance between engine harness plug (1) pin E (3) and ground.
4. Does multimeter read 0 ohms?



**NO**

1. Repair engine harness circuit 33 (page 14-3).
2. Verify no faults found.

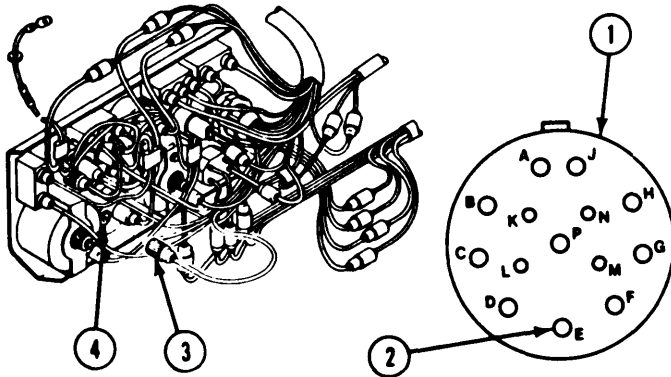
**YES**

**B1**



**B1**

1. Remove jumper wire.
2. Install engine harness circuit 33 plug on water temperature transmitter.
3. Install jumper wire between front main harness jack (1) pin E (2) and ground (at bulkhead).
4. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
5. Remove front main harness circuit 33 plug (3) from TEMP indicator jack (4).
6. Measure resistance between front main harness circuit 33 (3) and ground.
7. Does multimeter read 0 ohms?



**NO**

1. Remove jumper wire.
2. Repair front main harness circuit 33 (page 14-3).
3. Verify no faults found.

**YES**

1. Remove jumper wire.
2. Install engine harness plug onto front main harness jack at carrier bulkhead.
3. Replace TEMP indicator (page 11-11).
4. Verify no faults found.

---

## ENGINE OIL LOW PRESSURE INDICATOR MALFUNCTIONS

---

### INITIAL SETUP

**Tool:**

General Mechanics Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)  
Jumper Wire

**Personnel Required:**

Unit Mechanic

**Reference:**

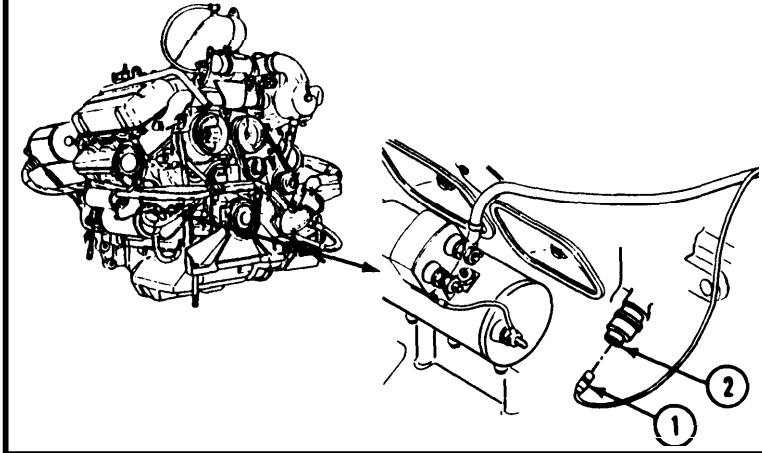
See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant front access door open  
(see your -10)

---

1. Remove engine harness circuit 34 plug (1) from engine oil low pressure transmitter (2).
2. Turn MASTER SWITCH to ON (see your -10).
3. Is ENGINE OIL LOW PRESSURE indicator off?



NO → (A)

1. Install jumper wire between engine harness circuit 34 plug pin and ground.
2. Is ENGINE OIL LOW PRESSURE indicator on?

NO → (B)

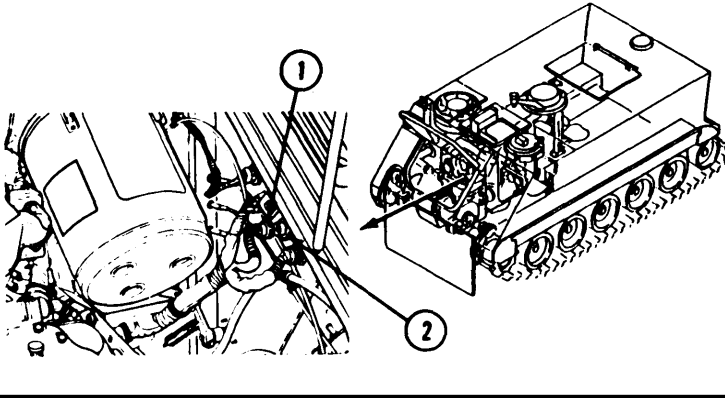
GO TO PAGE 3-150

YES

1. Replace engine oil low pressure switch (page 15-2).
2. Verify no faults found.

**A**

1. Remove engine harness plug (1) from front main harness jack (2) at carrier bulkhead.
2. Is ENGINE OIL LOW PRESSURE indicator still on?

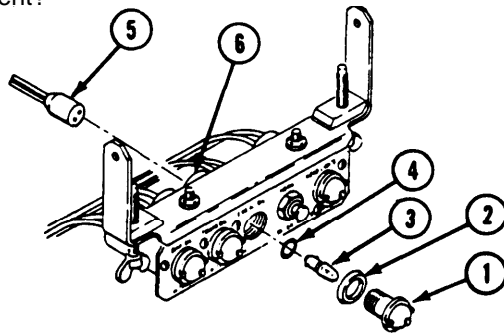


**NO**

1. Repair engine harness circuit 34 (page 14-3).
2. Verify no faults found.

**YES**

1. Remove ENGINE OIL LOW PRESSURE indicator cover lens (1) gasket (2), bulb (3), and gasket (4).
2. Remove front main harness circuit 27J/34 plug (5) from ENGINE OIL LOW PRESSURE indicator jack (6).
3. Measure resistance between indicator jack (6) pins and ground, one at a time.
4. Did multimeter read less than infinity for either measurement?



**NO**

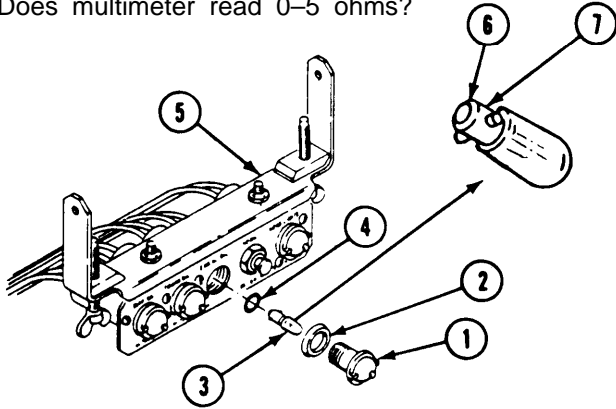
1. Repair front main harness circuit 34 (page 14-3).
2. Verify no faults found.

**YES**

1. Replace ENGINE OIL LOW PRESSURE indicator light assembly (page 11-22).
2. Verify no faults found.

**B**

1. Remove ENGINE OIL LOW PRESSURE indicator cover lens (1), gasket (2), bulb (3), and gasket (4) from indicator assembly (5).
2. Measure resistance between bulb center contact (6) and bulb base (7).
3. Does multimeter read 0-5 ohms?

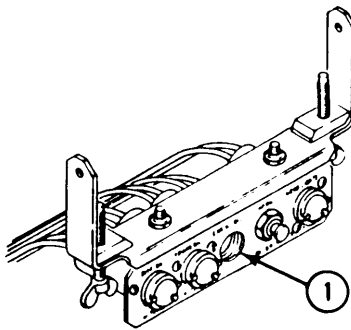


**NO**

1. Replace ENGINE OIL LOW PRESSURE bulb (page 11-22).
2. Verify no faults found.

**YES**

1. Measure voltage between indicator assembly (1) center contact and ground.
2. Does multimeter read less than 17 volts?



**NO**

**C**

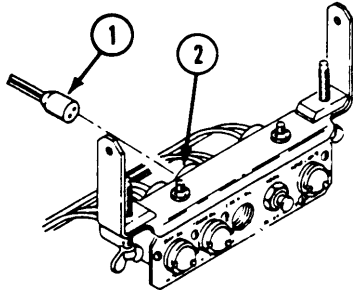
GO TO PAGE 3-152

**YES**

**B1**

**B1**

1. Remove front main harness circuit 27J/34 plug (1) from ENGINE OIL LOW PRESSURE indicator assembly jack (2).
2. Measure voltage between circuit 27J plug pin and ground.
3. Does multimeter read less than 17 volts?

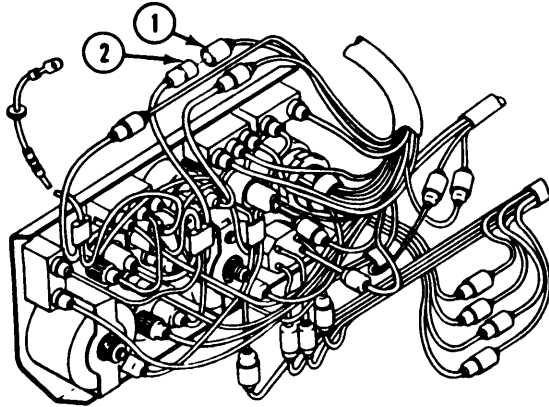


**NO**

1. Replace ENGINE OIL LOW PRESSURE indicator assembly (page 11-22).
2. Verify no faults found.

**YES**

1. Remove instrument panel for access (page 11-2).
2. Remove front main harness circuit 27F plug (1) from instrument panel cable assembly circuit 27F jack (2).
3. Measure resistance between front main harness circuit 27J plug and circuit 27F plug (1).
4. Does multimeter read 0 ohms?



**NO**

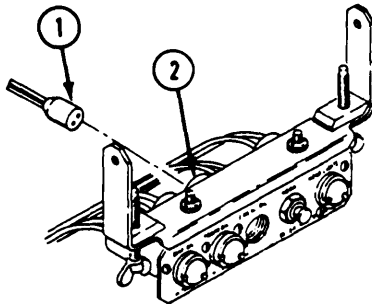
1. Repair front main harness circuit 27F/27J (page 14-3).
2. Verify no faults found.

**YES**

1. Repair instrument panel cable assembly circuit 27F (page 14-9).
2. Verify no faults found.

**C**

1. Remove front main harness circuit 27J/34 plug (1) from ENGINE OIL LOW PRESSURE indicator assembly jack (2).
2. Measure resistance between circuit 34 plug pin and ground.
3. Does multimeter read more than 0 ohms?

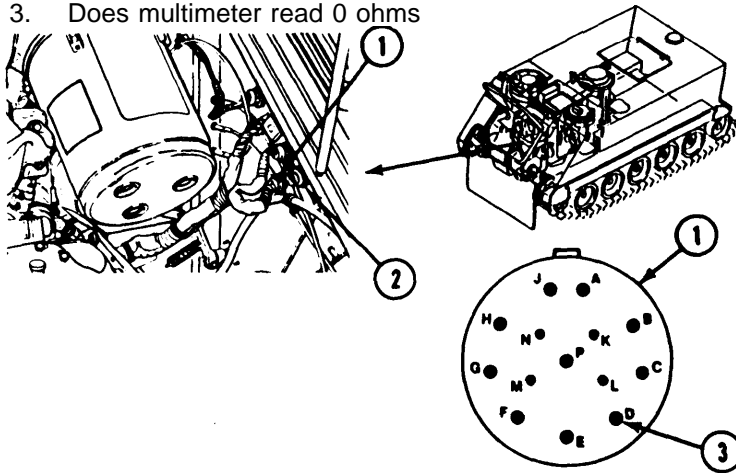


**NO**

1. Install front main harness plug on ENGINE OIL LOW PRESSURE indicator jack.
2. Remove jumper wire.
3. Replace engine oil low pressure switch (page 15-2).
4. Verify no faults found.

**YES**

1. Remove engine harness plug (1) from front main harness jack (2) at carrier bulkhead.
2. Measure resistance between engine harness plug (1) pin D (3) and ground.
3. Does multimeter read 0 ohms



**NO**

1. Remove jumper wire.
2. Install front main harness plug on ENGINE OIL LOW PRESSURE indicator assembly jack.
3. Install indicator cover lens and bulb.
4. Repair engine harness circuit 34 (page 14-3).
5. Verify no faults found.

**YES**

1. Remove jumper wire.
2. Install engine harness onto ENGINE OIL LOW PRESSURE switch.
3. Repair front main harness circuit 34 (page 14-3).
4. Verify no faults found.

## TRANSMISSION OIL HI TEMP INDICATOR MALFUNCTIONS

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Jumper Wire

**Personnel Required:**

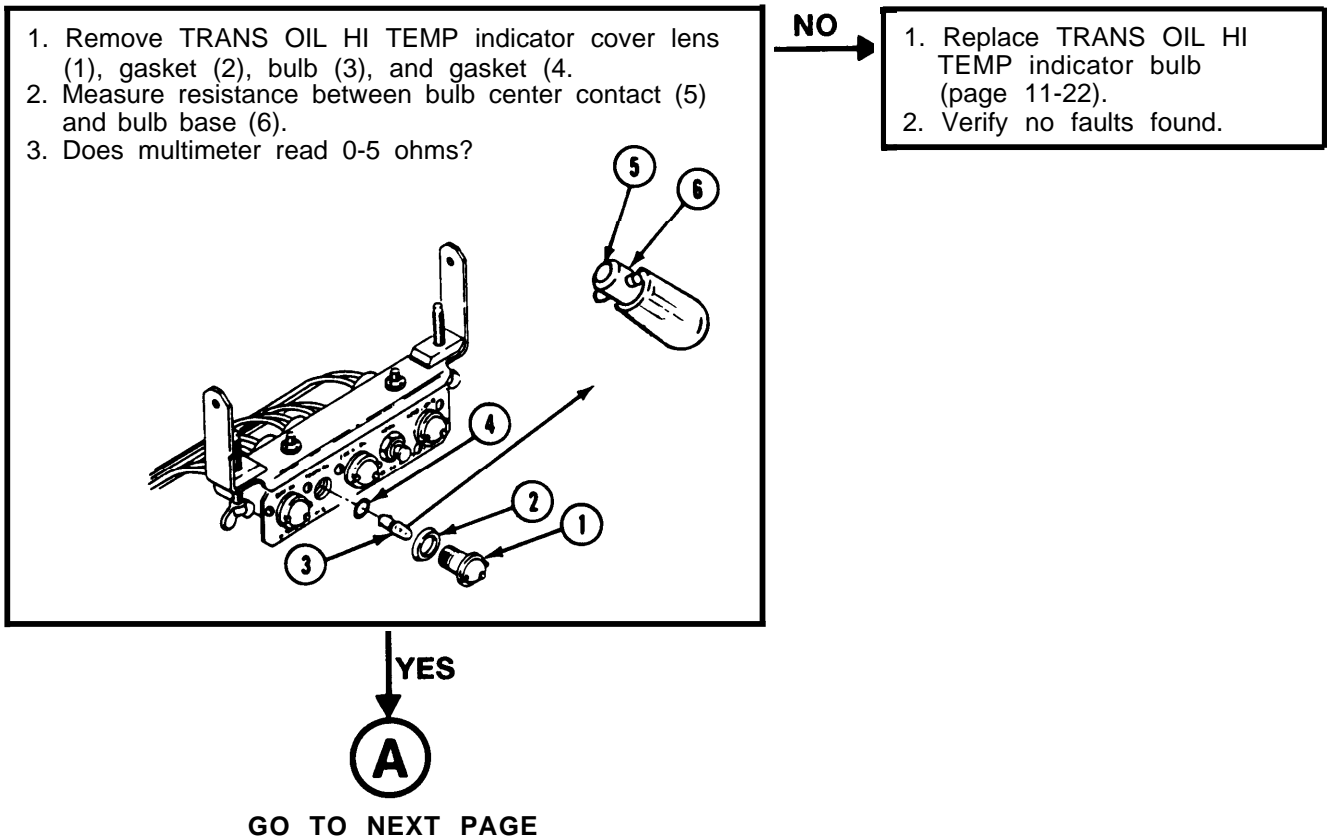
- Unit Mechanic

**References:**

- See your -10

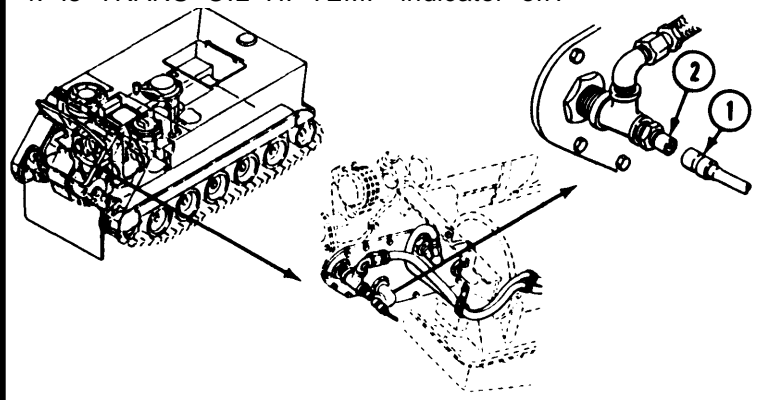
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Engine and transmission cooled down
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Driver's power plant access panel removed (see your -10)
- Power plant rear access panels removed (see your -10)



**A**

1. Install TRANS OIL HI TEMP indicator cover lens bulb and gaskets.
2. Remove engine harness circuit 327 plug (1) from trans oil hi temp switch (2).
3. Turn MASTER SWITCH to ON (see your -10).
4. Is TRANS OIL HI TEMP indicator off?



NO

**B**

YES

1. Install jumper wire between engine harness circuit 327 plug and ground.
2. Is TRANS OIL HI TEMP indicator on?

NO

**C**

GO TO PAGE 3-156

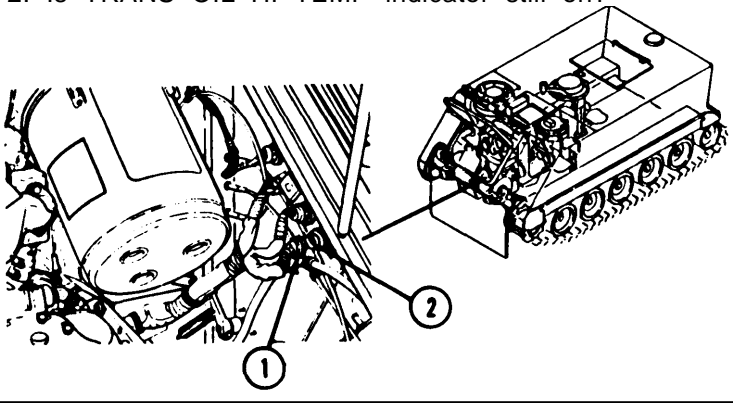
YES

1. Remove jumper wire.
2. Replace trans oil hi temp switch (page 15-6).
3. Verify no faults found.



**B**

1. Remove engine harness plug (1) from front main harness jack (2) at earner bulkhead.
2. Is TRANS OIL HI TEMP indicator still on?

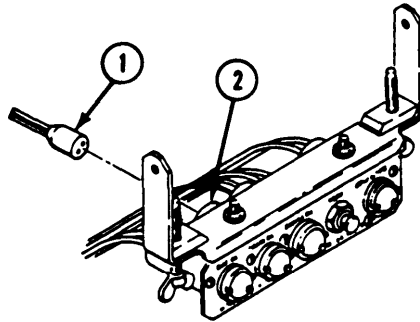


**NO**

1. Repair engine harness (page 14-3).
2. Verify no faults found.

**YES**

1. Remove front main harness circuit 327/27G plug (1) from TRANS OIL HI TEMP indicator (2).
2. Measure resistance between front main harness circuit 327/27G plug (1) circuit 327 pin and ground.
8. Does multimeter read 0 ohms?

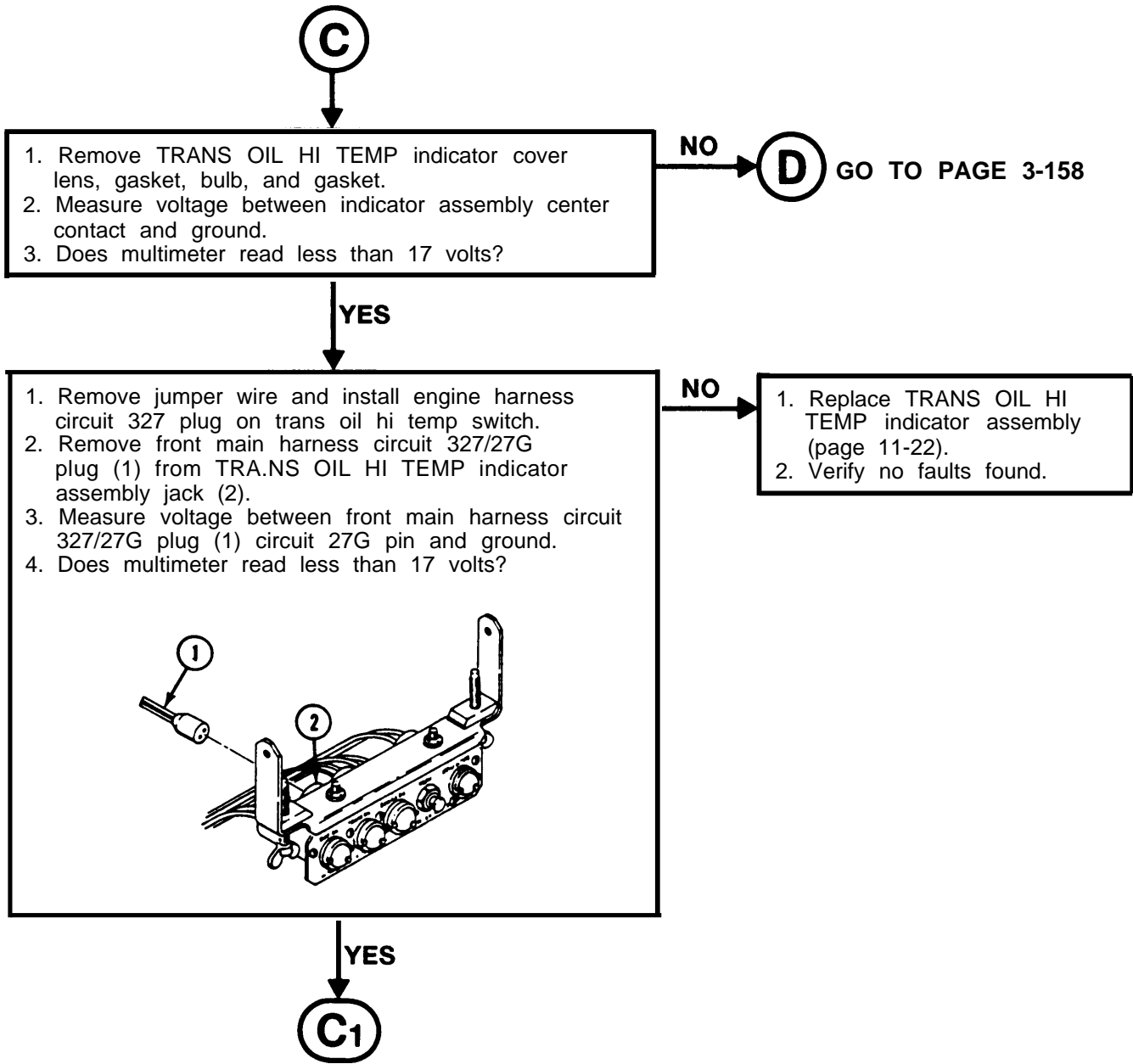


**NO**

1. Replace TRANS OIL HI TEMP indicator assembly (page 11-22).
2. Verify no faults found.

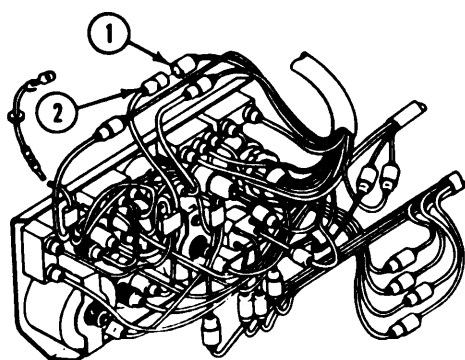
**YES**

1. Shorted front main harness circuit 327.
2. Notify your supervisor.



**C1**

1. Turn MASTER SWITCH to OFF.
2. Remove instrument panel for access (page 11-2).
3. Remove front main harness circuit 27F plug (1) from instrument panel cable assembly circuit 27F jack (2).
4. Measure resistance between front main harness circuit 27F plug (1) and circuit 27G pin on circuit 327/27G plug.
5. Does multimeter read 0 ohms?



**NO**

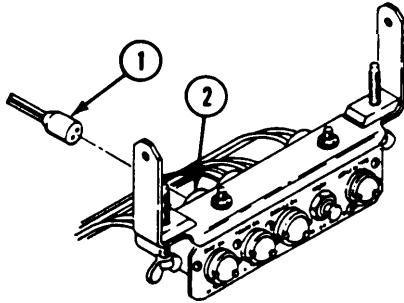
1. Repair front main harness circuit 27G/27F (page 14-3).
2. Verify no faults found

**YES**

1. Install front main harness circuit 327/27G plug on TRANS OIL HI TEMP indicator jack.
2. Repair instrument panel cable assembly circuit 27F (page 14-9).
3. Verify no faults.

**D**

1. Turn MASTER SWITCH to OFF.
2. Remove front main harness circuit 327/27G plug (1) from TRANS OIL HI TEMP assembly jack (2).
3. Measure resistance between front main harness circuit 327/27G (1) circuit 327 pin and ground.
4. Does multimeter read more than 0 ohms?

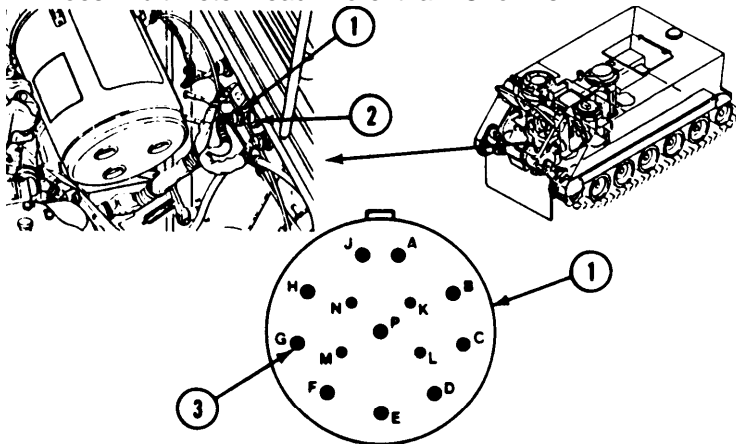


**NO**

1. Remove jumper cable and install circuit 327 plug on trans oil hi temp switch.
2. Replace TRANS OIL HI TEMP indicator assembly (page 11-22).
3. Verify no faults found.

**YES**

1. Install TRANS OIL HI TEMP indicator cover lens, gasket, bulb, and gasket.
2. Remove engine harness plug (1) from front main harness jack (2) at earner bulkhead.
3. Measure resistance between engine harness plug (1) pin G (3) and ground.
4. Does multimeter read more than 0 ohms?



**NO**

1. Remove jumper wire and install engine harness circuit 327 plug on trans oil hi temp switch.
2. Repair front main harness circuit 327 (page 14-3).
3. Verify no faults found.

**YES**

1. Install front main harness circuit 327/27G plug on trans oil hi temp indicator.
2. Repair engine harness circuit 327 (page 14-3).
3. Verify no faults found.

## DIFFERENTIAL OIL HI TEMP INDICATOR MALFUNCTIONS

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**Personnel Required:**

Unit Mechanic

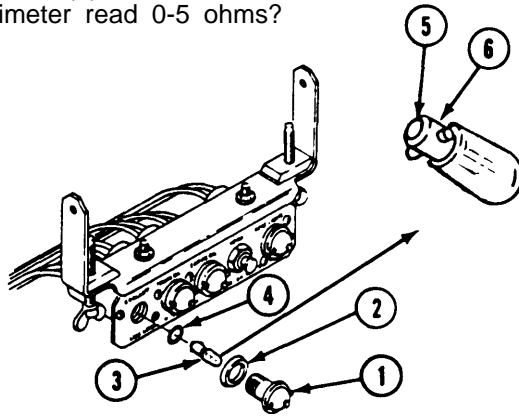
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Trim vane lowered (see your -10)  
 Power plant front access door open  
 (see your -10)

**References:**

See your -10

1. Remove DIFF OIL HI TEMP indicator cover lens (1), gasket (2), bulb (3), and gasket (4).
2. Measure resistance between bulb center contact (5) and bulb base (6).
3. Does multimeter read 0-5 ohms?



YES



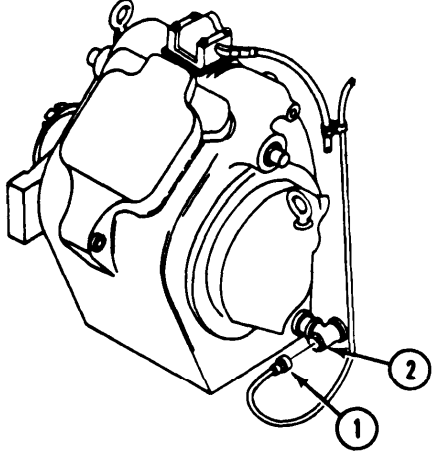
GO TO NEX T PAGE

1. Replace DIFF OIL HI TEMP bulb (page 11-22).
2. Verify no faults found.

**A**



1. Install indicator bulb, gaskets, and lens.  
2. Remove engine harness circuit 328 plug (1) from differential high oil temp switch (2).  
3. Turn MASTER SWITCH to ON (see your -10).  
4. Is DIFF OIL HI TEMP indicator off?



NO

**B**

YES



1. Install a jumper wire between engine harness circuit 328 plug pin and ground.  
2. Is DIFF OIL HI TEMP light ON?

NO

**C**

GO TO PAGE 3-162

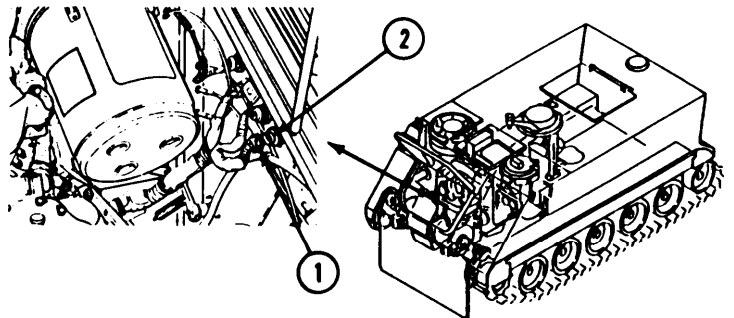
YES



1. Replace differential high oil temp switch (page 15-4)  
2. Verify no faults found.

**B**

1. Remove engine harness plug (1) from front main harness jack (2) at carrier bulkhead.
2. Is the DIFF OIL HI TEMP indicator still ON?

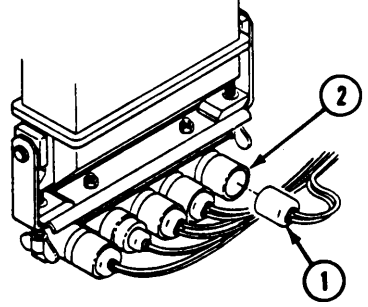


**NO**

1. Repair engine harness circuit 328 (page 14-3).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove front main harness circuit 328/27K plug (1) from DIFF OIL HI TEMP jack (2).
3. Measure resistance between indicator jack (2) pins and ground one at a time.
4. Did multimeter read 0 ohms for either measurement?



**NO**

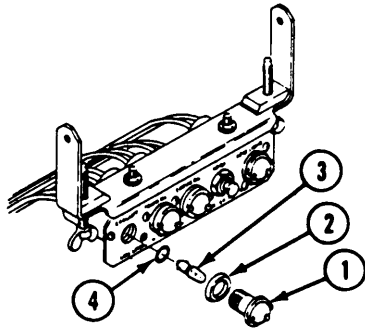
1. Repair front main harness circuit 328/27K (page 14-3).
2. Verify no faults found.

**YES**

1. Install engine harness plug on front main harness jack at carrier bulkhead.
2. Replace DIFF OIL HI TEMP indicator light assembly (page 11-22).
3. Verify no faults found.

**C**

1. Remove DIFF OIL HI TEMP indicator cover lens (1), gasket (2), bulb (3) and gasket (4) from indicator assembly.
2. Measure voltage between indicator center contact and ground.
3. Does multimeter read less than 17 volts?

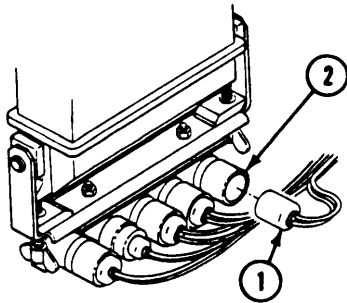


NO

**D**

YES

1. Remove front main harness circuit 328/27K plug (1) from DIFF OIL HI TEMP indicator jack (2).
2. Measure voltage between circuit 27K pin and plug on ground.
3. Does multimeter read less than 17 volts?



NO

1. Replace DIFF OIL HI TEMP indicator assembly (page 11-22).
2. Verify no faults found.

1. Do any of the other indicators on the warning light panel operate normally?

NO

1. Repair instrument panel harness circuit 27F (page 14-3).
2. Verify no faults found.

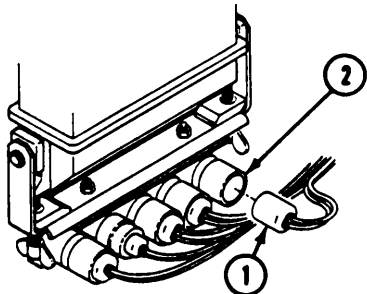
YES

1. Repair front main harness circuit 27K (page 14-3).
2. Verify no faults found.



**D**

1. Turn MASTER POWER SWITCH to OFF.
2. Remove circuit 328/27K plug (1) from DIFF OIL HI TEMP indicator (2).
3. Measure resistance between circuit 328 and ground.
4. Does multimeter read more than 0 ohms?

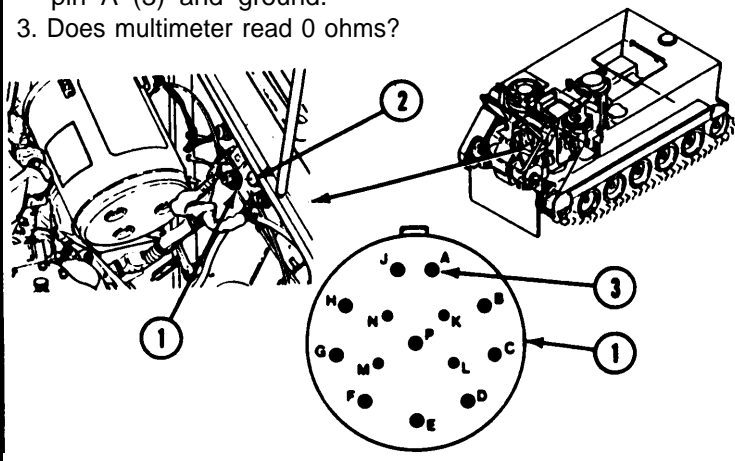


**NO**

1. Remove jumper wire.
2. Install plug on differential high oil temp switch in engine compartment.
3. Replace differential high oil temp indicator assembly (page 11-22).
4. Verify no faults found.

**YES**

1. Remove engine harness plug (1) from front main harness jack (2) at bulkhead.
2. Measure resistance between engine harness plug (1) pin A (3) and ground.
3. Does multimeter read 0 ohms?



**NO**

1. Remove jumper wire.
2. Install plug on differential high oil temp switch in engine compartment.
3. Install indicator bulb, gaskets, and lens.
4. Repair engine harness circuit 328 (page 14-3).
5. Verify no faults found.

**YES**

1. Remove jumper wire.
2. Install plug on DIFF OIL HI TEMP indicator assembly.
3. Repair front main harness circuit 328 (page 14-3).
4. Verify no faults found.

---

## SUSPENSION LOCKOUT INDICATOR MALFUNCTIONS (M741A1 ONLY)

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### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Jumper Wire

**Personnel Required:**

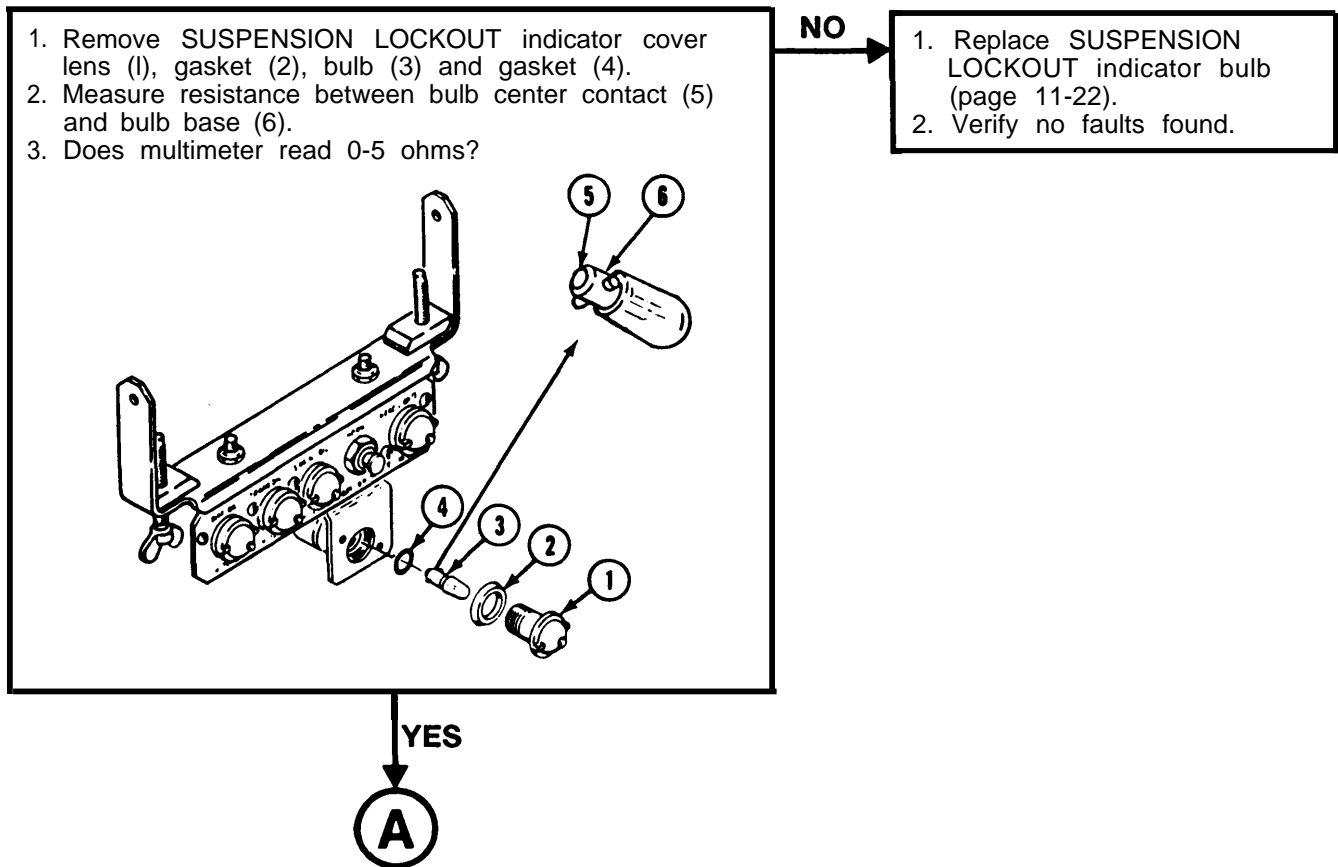
- Unit Mechanic

**References:**

- See your -10

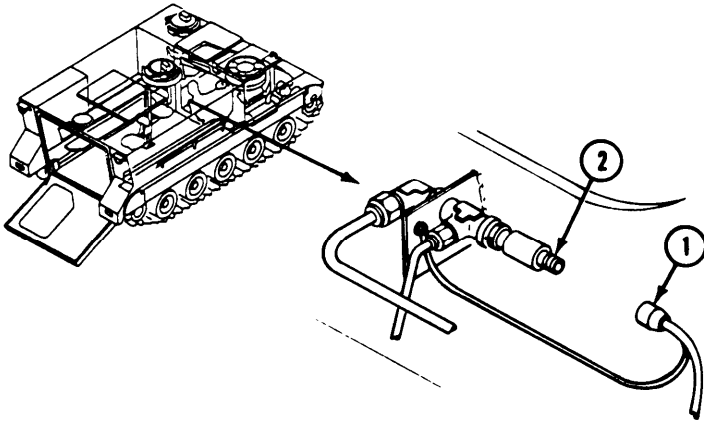
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Driver's power plant access panel removed (see your -10)
- Power plant rear access panels removed (see your -10)



**A**

1. Install SUSPENSION LOCKOUT indicator cover lens, bulb, and gaskets.
2. Remove special purpose cable circuit 509 plug (1) from suspension lockout pressure switch (2).
3. Turn MASTER SWITCH to ON.
4. Is SUSPENSION LOCKOUT indicator off?



NO → **B** GO TO NEXT PAGE

YES

1. Install a jumper wire between special purpose cable circuit 509 and ground.
2. Is SUSPENSION LOCKOUT indicator ON?

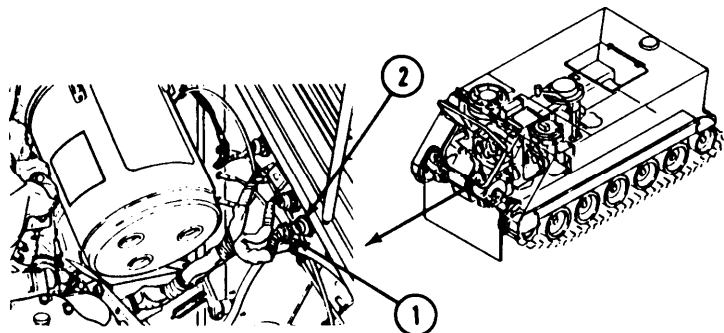
NO → **C** GO TO PAGE 3-167

YES

1. Turn MASTER SWITCH to OFF.
2. Remove jumper wire.
3. Replace SUSPENSION LOCKOUT indicator pressure switch. (page 29-60).
4. Verify no faults found.

**B**

1. Remove special purpose cable plug (1) from jack (2) at carrier bulkhead.
2. Is SUSPENSION LOCKOUT indicator still ON?

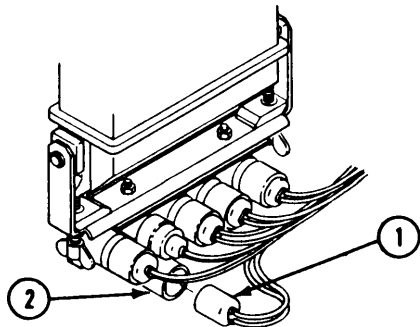


**NO**

1. Turn MASTER SWITCH to OFF.
2. Repair special purpose cable (page 14-9).
3. Verify no faults found.

**YES**

1. Remove lead assembly 27H/509 plug (1) from SUSPENSION LOCKOUT indicator (2).
2. Measure resistance between lead assembly 27H/509 plug (1) circuit 509 and ground.
3. Does multimeter read 0 ohms?

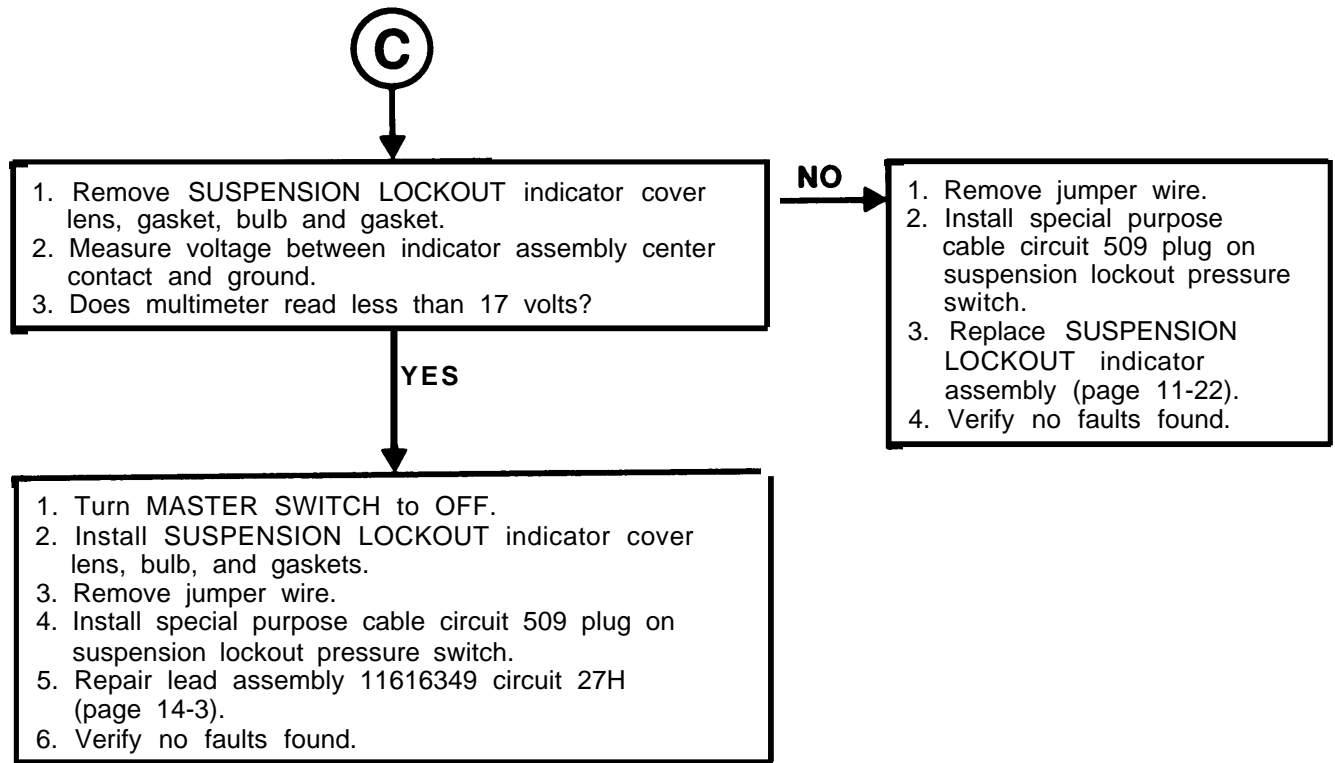


**NO**

1. Replace SUSPENSION LOCKOUT indicator assembly (page 11-22).
2. Verify no faults found.

**YES**

1. Repair lead assembly 11616349 from indicator to bulkhead connector (page 14-3).
2. Verify no faults found.



## TURRET POWER/PROXIMITY SWITCH TROUBLESHOOTING (M741A1 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Driver and cargo hatches closed  
(see Your -10)  
Rear compartment floor plates removed  
(page 24-40)

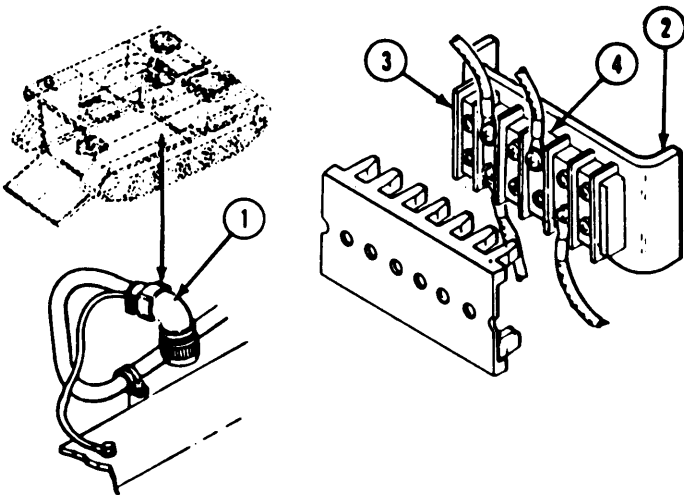
1. Turn MASTER SWITCH to ON (see your -10).  
2. Turn TURRET POWER to ON (see your -10).  
3. Does turret power come on?

NO → **(B)** GO TO PAGE 3-170

YES

1. Move MASTER SWITCH to OFF.  
2. Remove wiring harness plug (1) from slip ring jack A14J1.  
3. Measure resistance on terminal board TB1 (2) between terminals 1 (3) and 4 (4). Read measurement.  
4. Open commander's hatch door and repeat measurement.  
5. Does multimeter read 0 ohms with hatch closed and infinity with hatch open?

NO → 1. Replace commanders hatch interlock switch (page 17-22).  
2. Verify no faults found.

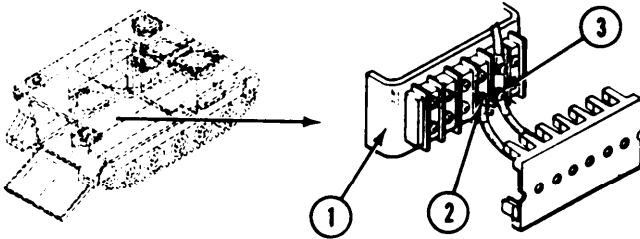


YES

**(A)**

**A**

1. Measure resistance on terminal board TB2 (1) between terminals 3 (2) and 4 (3). Record measurement.
2. Open drivers hatch and repeat measurement.
3. Does multimeter read 0 ohms with hatch closed and infinity with hatch open?

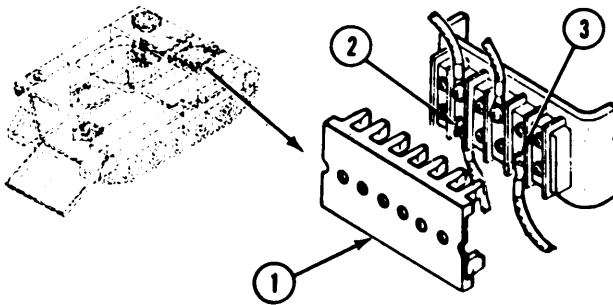


**NO**

1. Replace driver's hatch interlock switch (page 17-19).
2. Verify no faults found.

**YES**

1. Install a jumper wire on terminal board TB1 (1) between terminals 2 (2) and 4 (3).
2. Measure resistance between wiring harness 11677930 plug (4) pin K (5) and S (6).
3. Does multimeter read 0 ohms?



**NO**

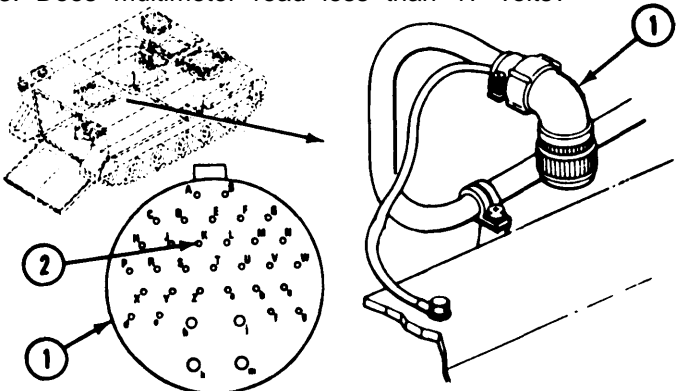
1. Repair/replace wiring harness 11677930 (page 14-3).
2. Verify no faults found.

**YES**

1. Hull wiring and switches are OK.
2. Faulty turret wiring. Notify your supervisor.

**B**

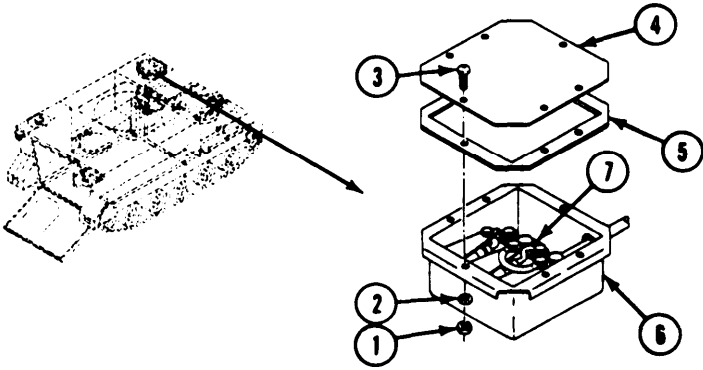
1. Remove wiring harness 11677930 plug (1) from slipping jack A14J1.
2. Measure voltage between wiring harness plug (1) pin k (2) and ground.
3. Does multimeter read less than 17 volts?



**NO** → 1. Faulty turret wiring.  
Notify your supervisor.

**YES**

1. Remove six nuts (1) washers (2) screws (3), cover (4) and gasket (5) from turret distribution box (6).
2. Measure voltage between bus bar (7) and ground.
3. Does multimeter read less than 17 volts?



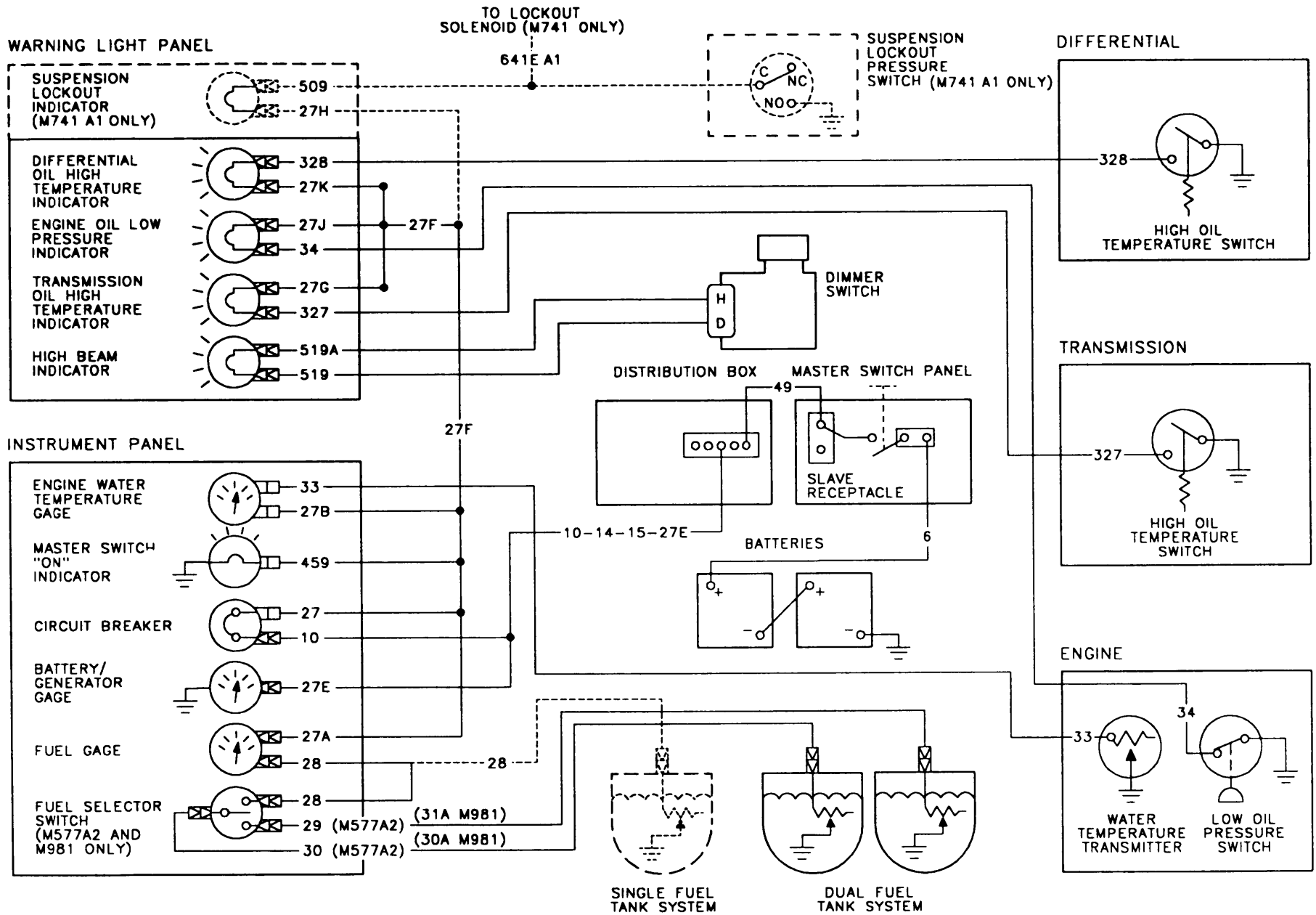
**NO** → 1. Replace diode semiconductor device assembly (page 17-27).  
2. Verify no faults found.

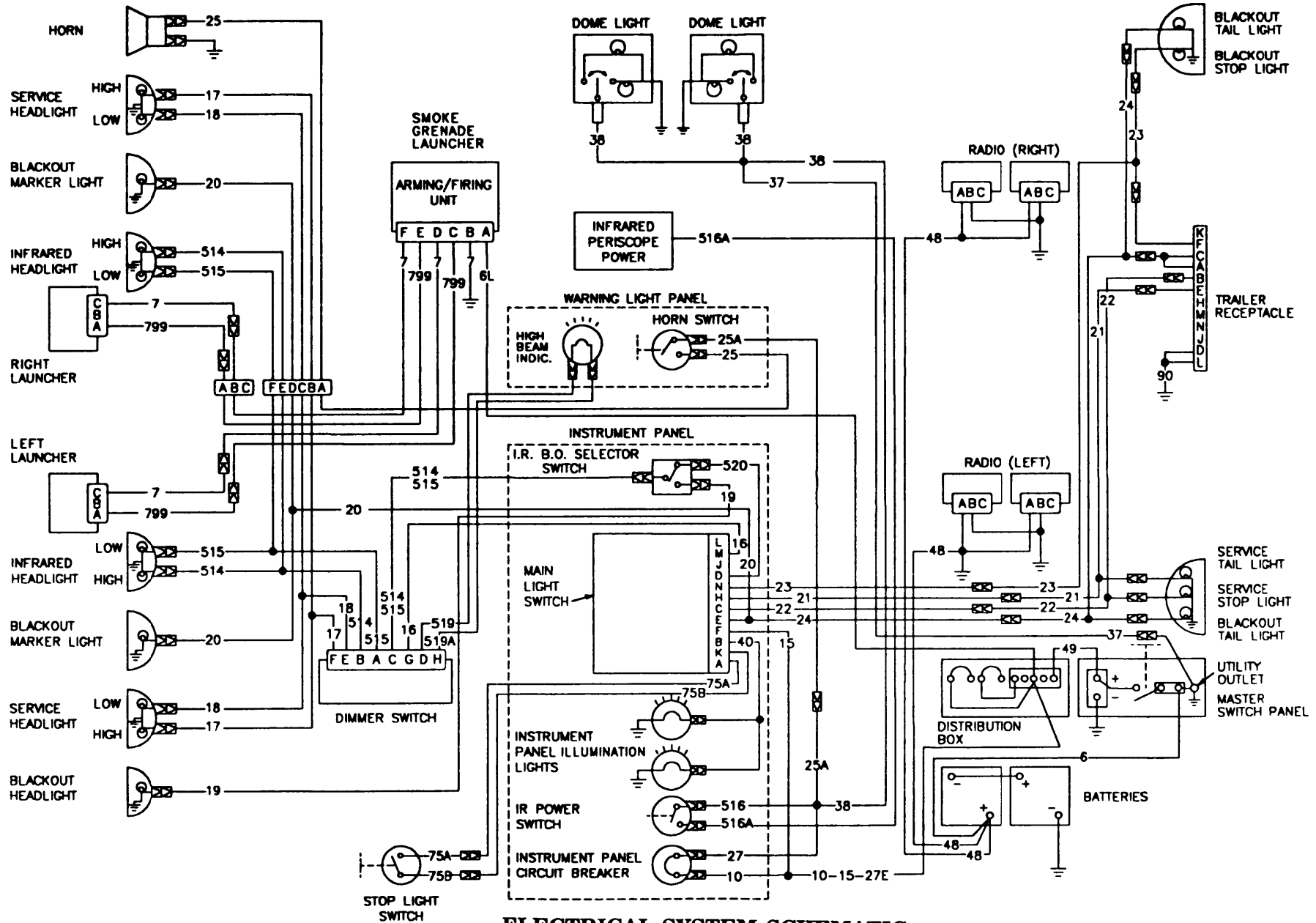
**YES**

1. Go to charging system malfunctions (page 3-55).

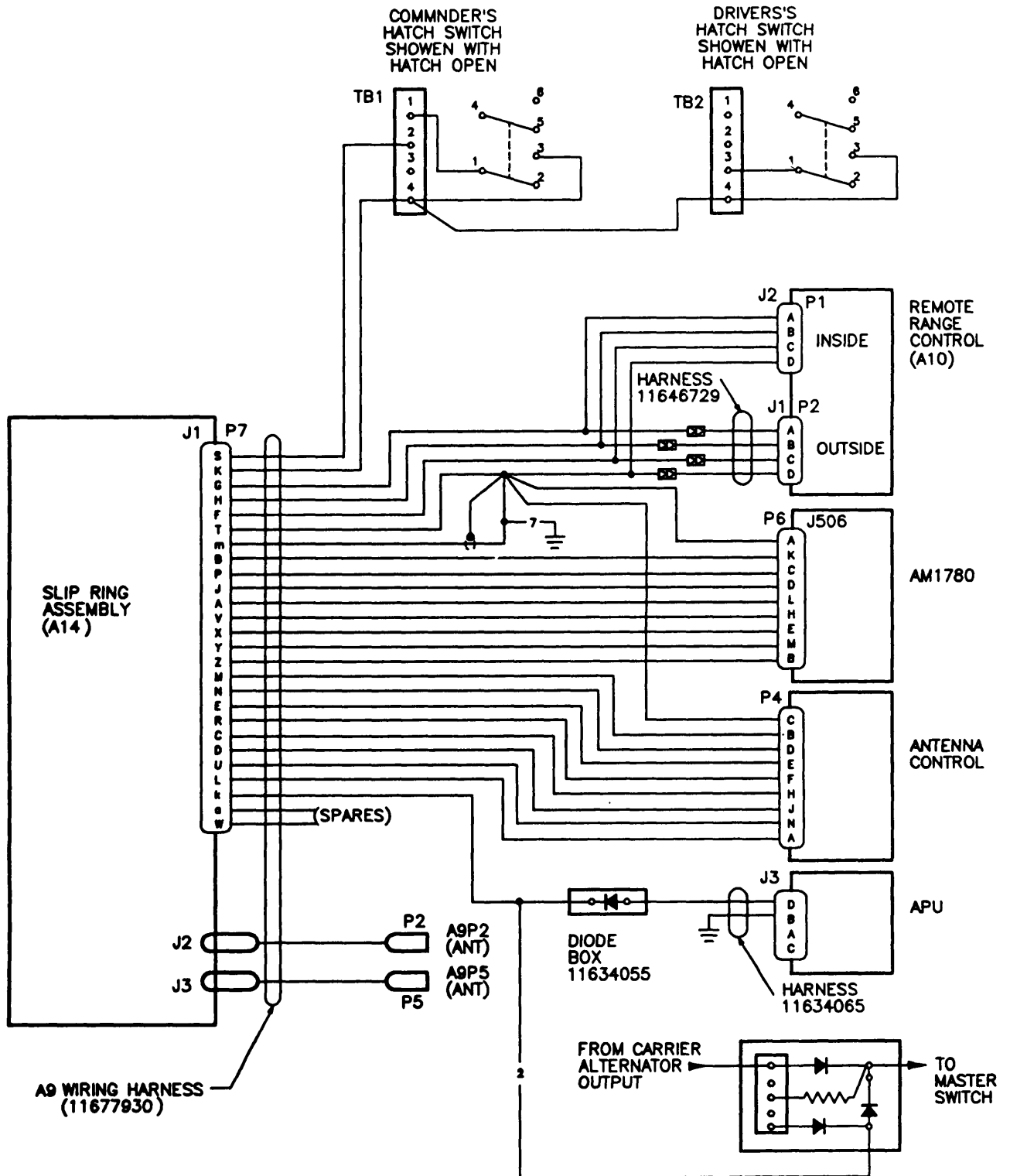


# INDICATORS (ALL CARRIERS)

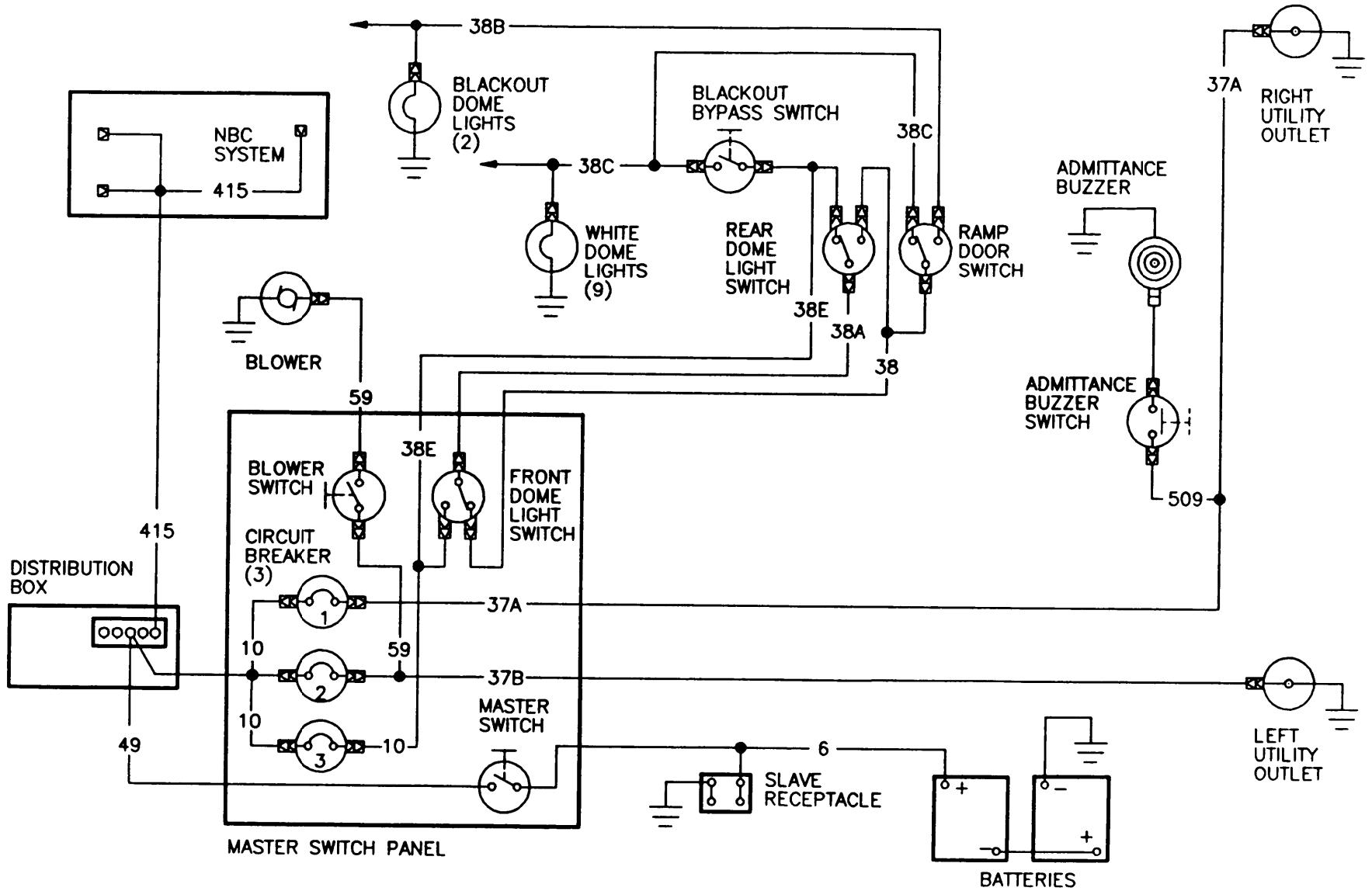




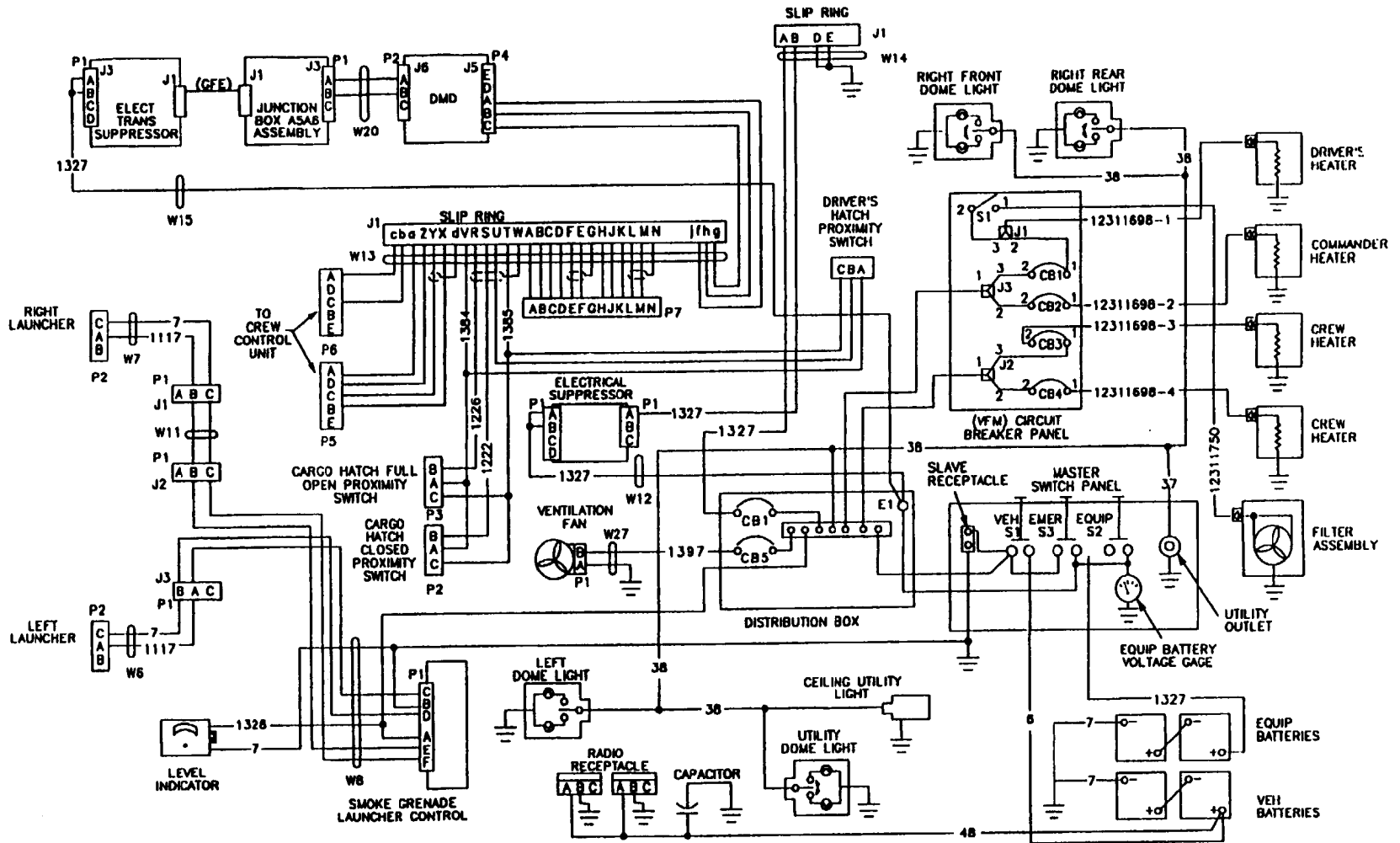
ELECTRICAL SYSTEM SCHEMATIC



TURRET POWER/PROXIMITY SWITCH SYSTEM SCHEMATIC (M741 A1 ONLY)



ADDITIONAL ELECTRIC SCHEMATIC (M577A2 ONLY)



ADDITIONAL ELECTRICAL SCHEMATIC  
(M981 ONLY)

---

## STEERING/BRAKES MALFUNCTION

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

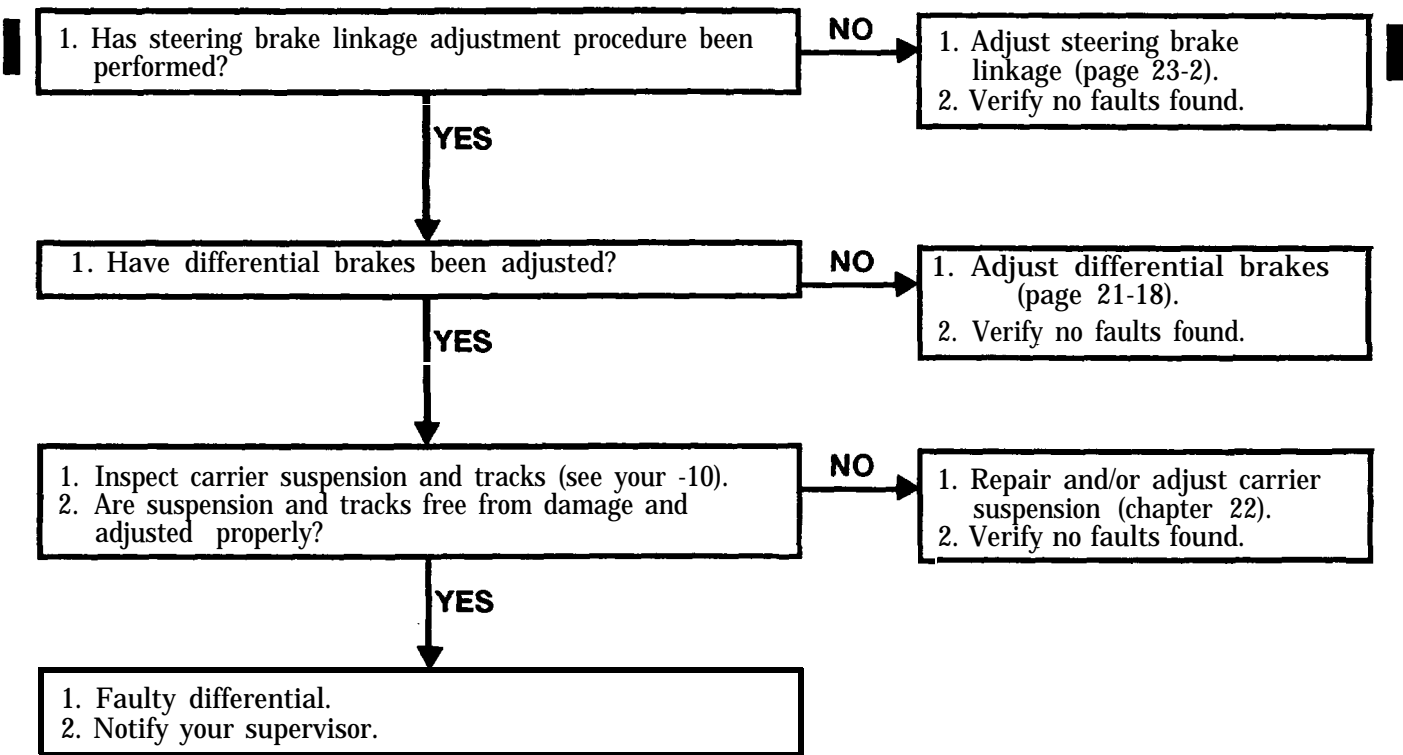
**Personnel Required:**

Unit Mechanic

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power Plant access door open (see your -10)

---



## CARRIER DOES NOT MOVE IN ANY SHIFT LEVER POSITION

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Personnel Required:

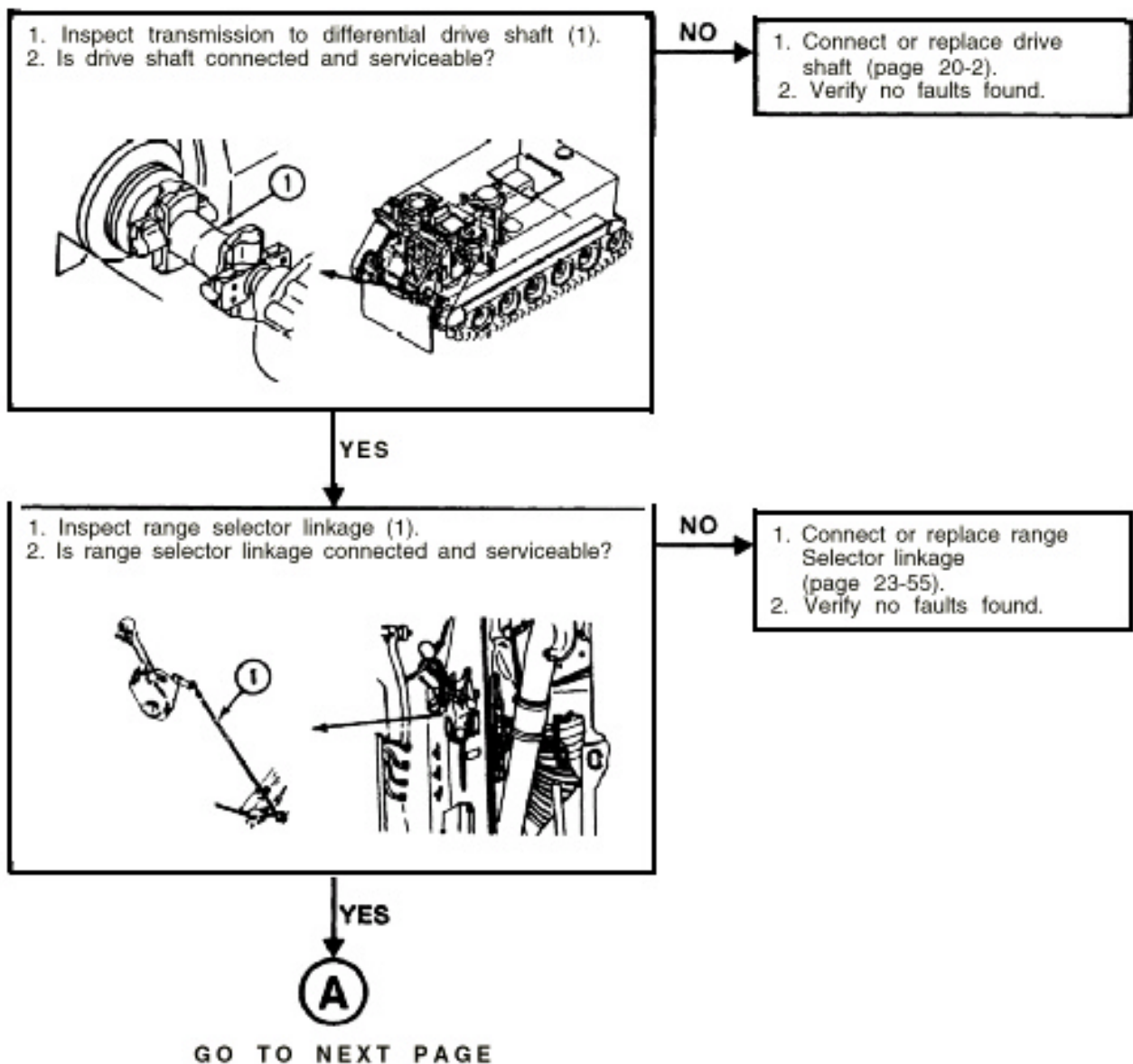
Unit Mechanic

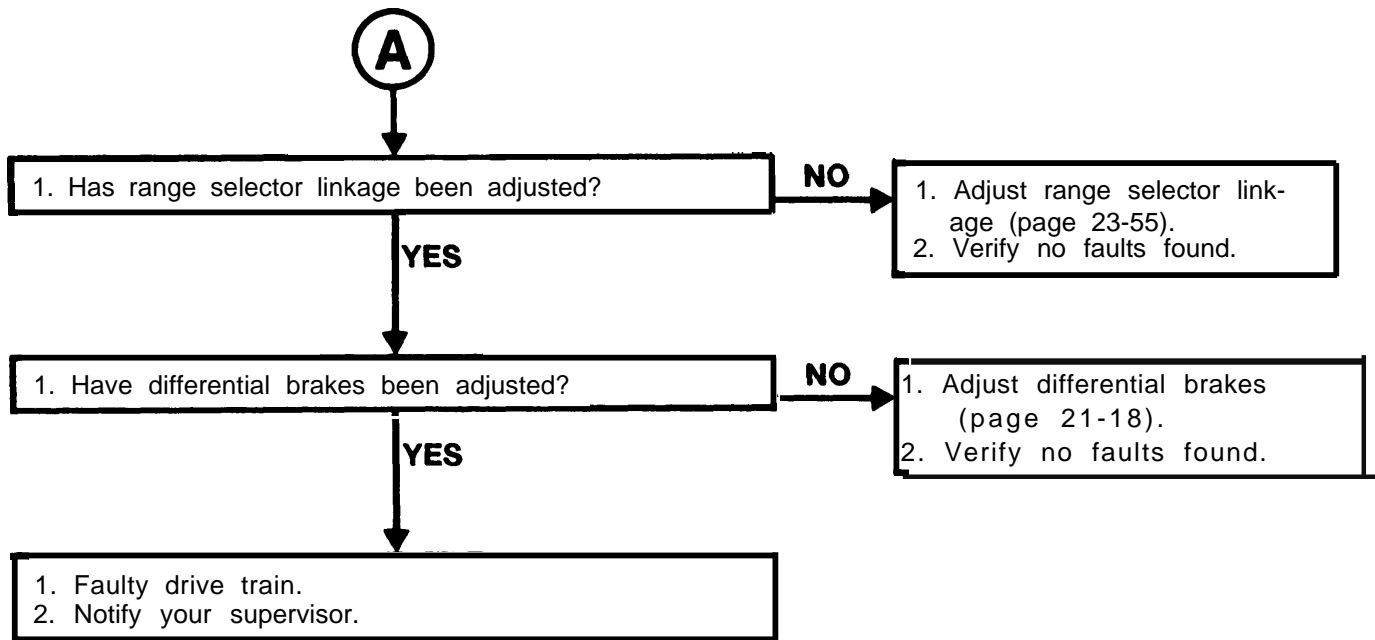
#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Trim Vane lowered (see your -10)  
 Power plant access door open (see your -10)  
 Engine disconnect lever IN (see your -10)  
 Driver's engine access panel removed  
 (see your -10)







**CARRIER DOES NOT PIVOT**

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Reference (cont):**

See your LO

**Personal Required:**

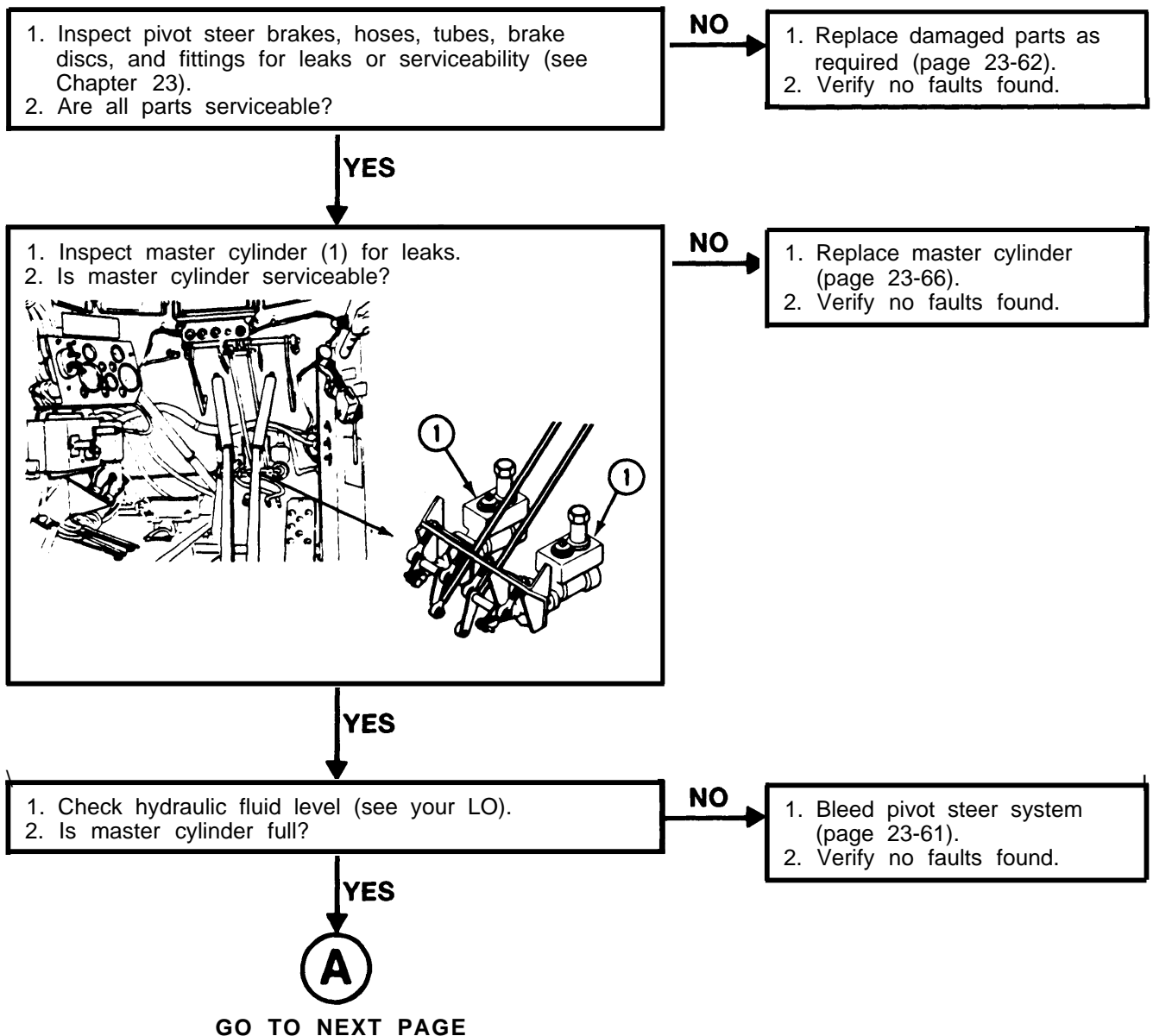
Unit Mechanic  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant access door open (see your -10)

**Reference:**

See your -10



**A**

1. Has pivot steer linkage been adjusted?

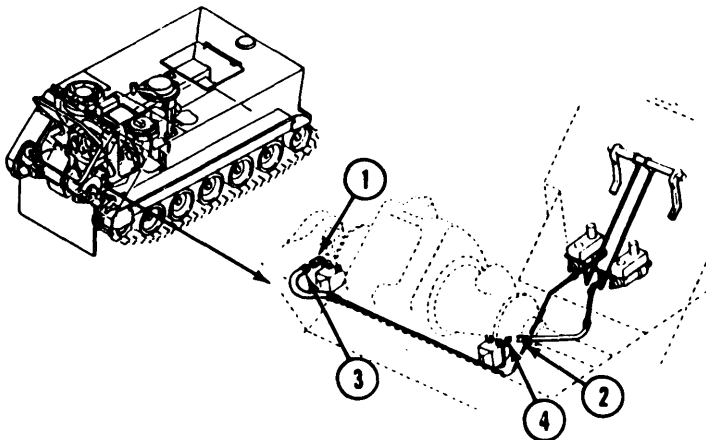
**NO**

1. Adjust pivot steer linkage (page 23-72).  
2. Verify no faults found.

1. Remove quick disconnect coupling (1 or 2) from left or right caliper (3 or 4).
2. Pull left or right pivot steer handle and hold. Handle should stop about half way and not bleed off or feel spongy.
3. Does handle stop firmly and hold?

**NO**

1. Replace master cylinder (page 23-66).  
2. Verify no faults found.



**YES**

1. Inspect pivot steer brake linings for wear (page 23-68).
2. Are brake linings serviceable?

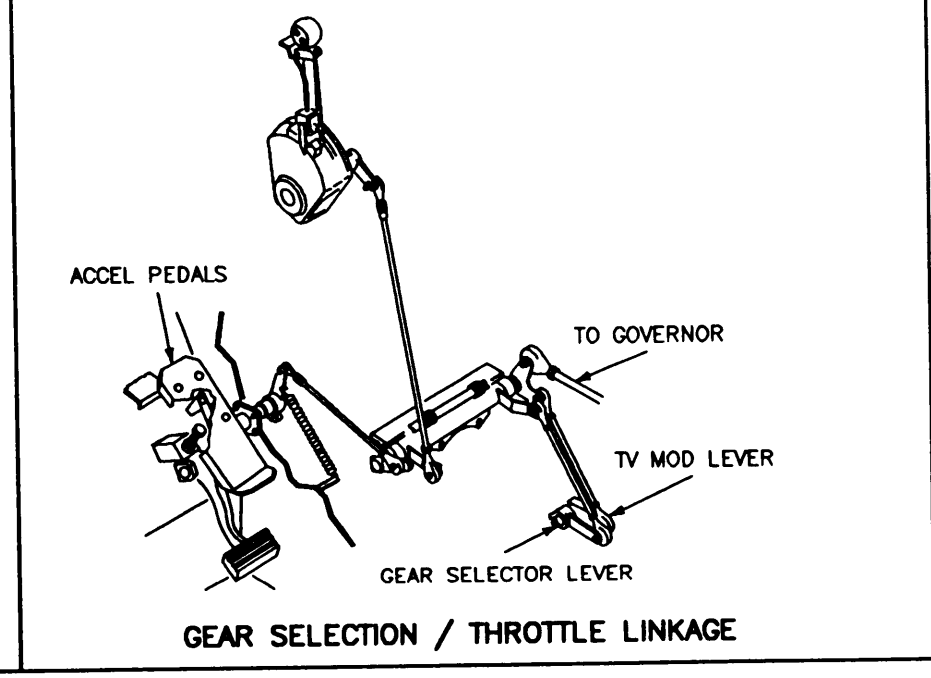
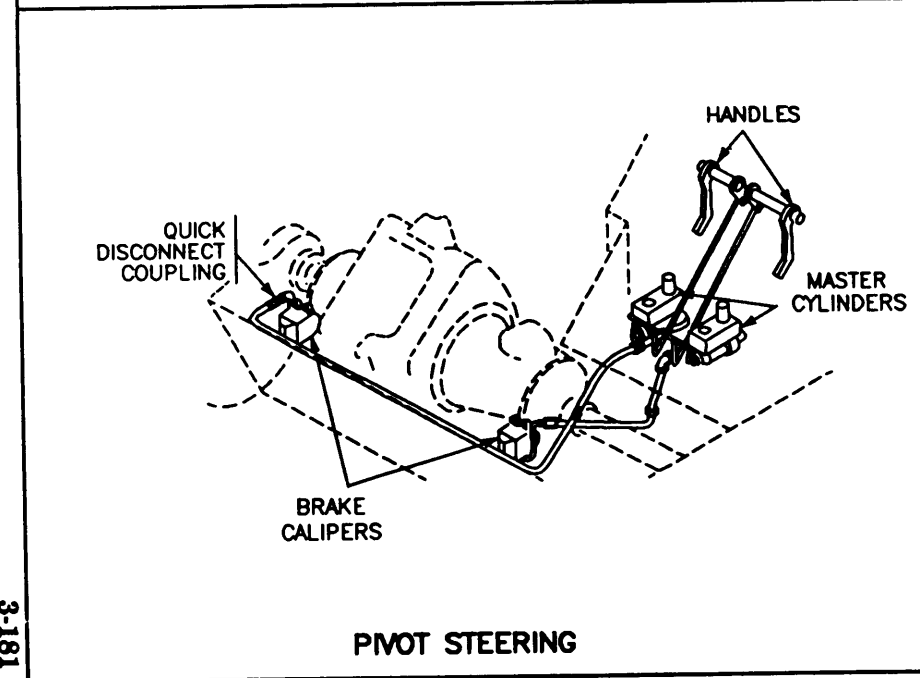
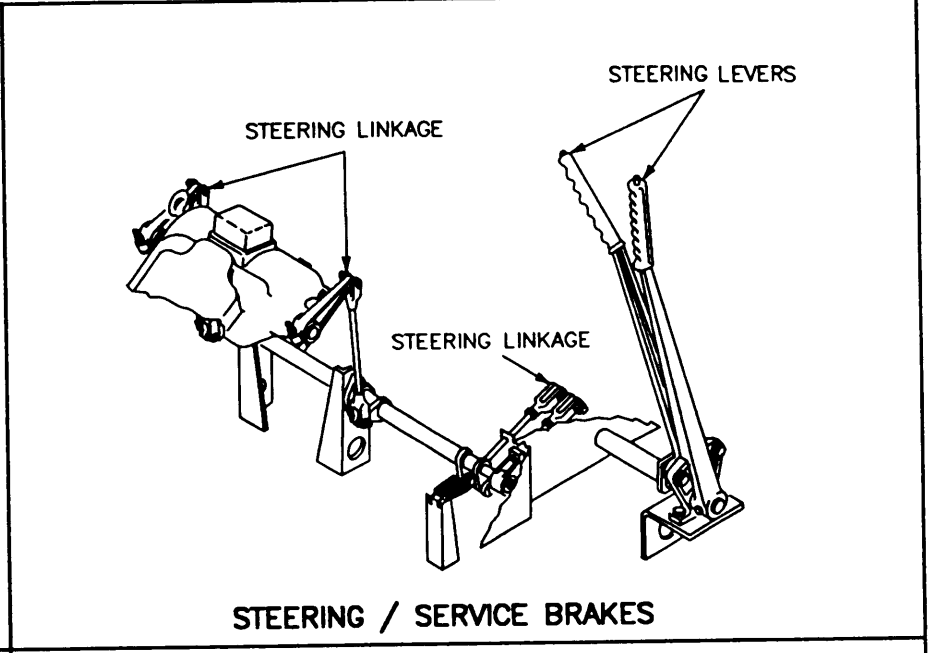
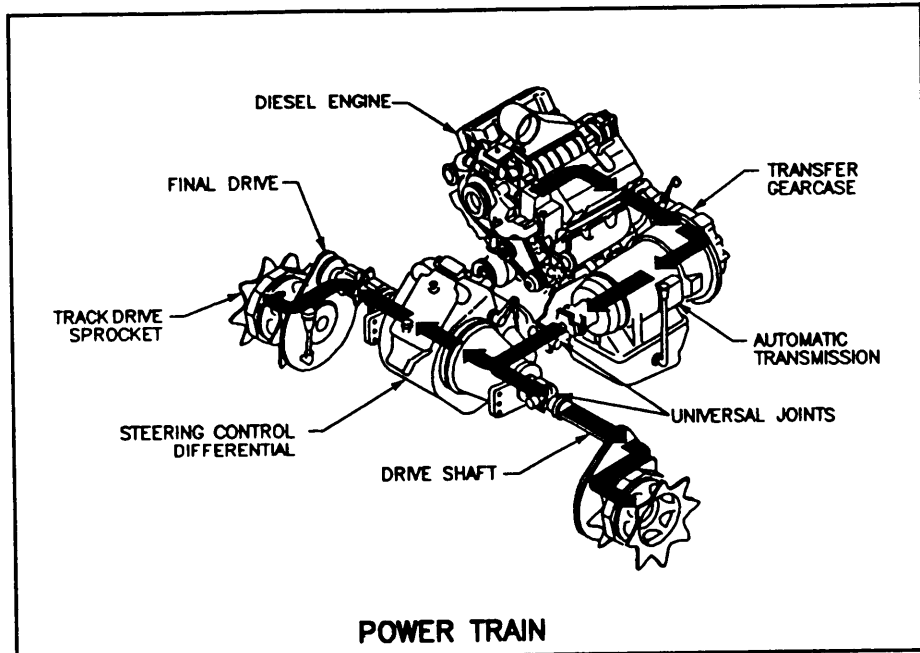
**NO**

1. Replace pivot steer brake linings (page 23-68).  
2. Verify no faults found.

**YES**

1. Faulty differential.
2. Notify your supervisor.

TITLE : POWER TRAIN / STEERING / BRAKES / GEAR SELECTION / THROTTLE DIAGRAMS



---

## RAMP WILL NOT LOWER

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

Unit Mechanic  
Helper (H)

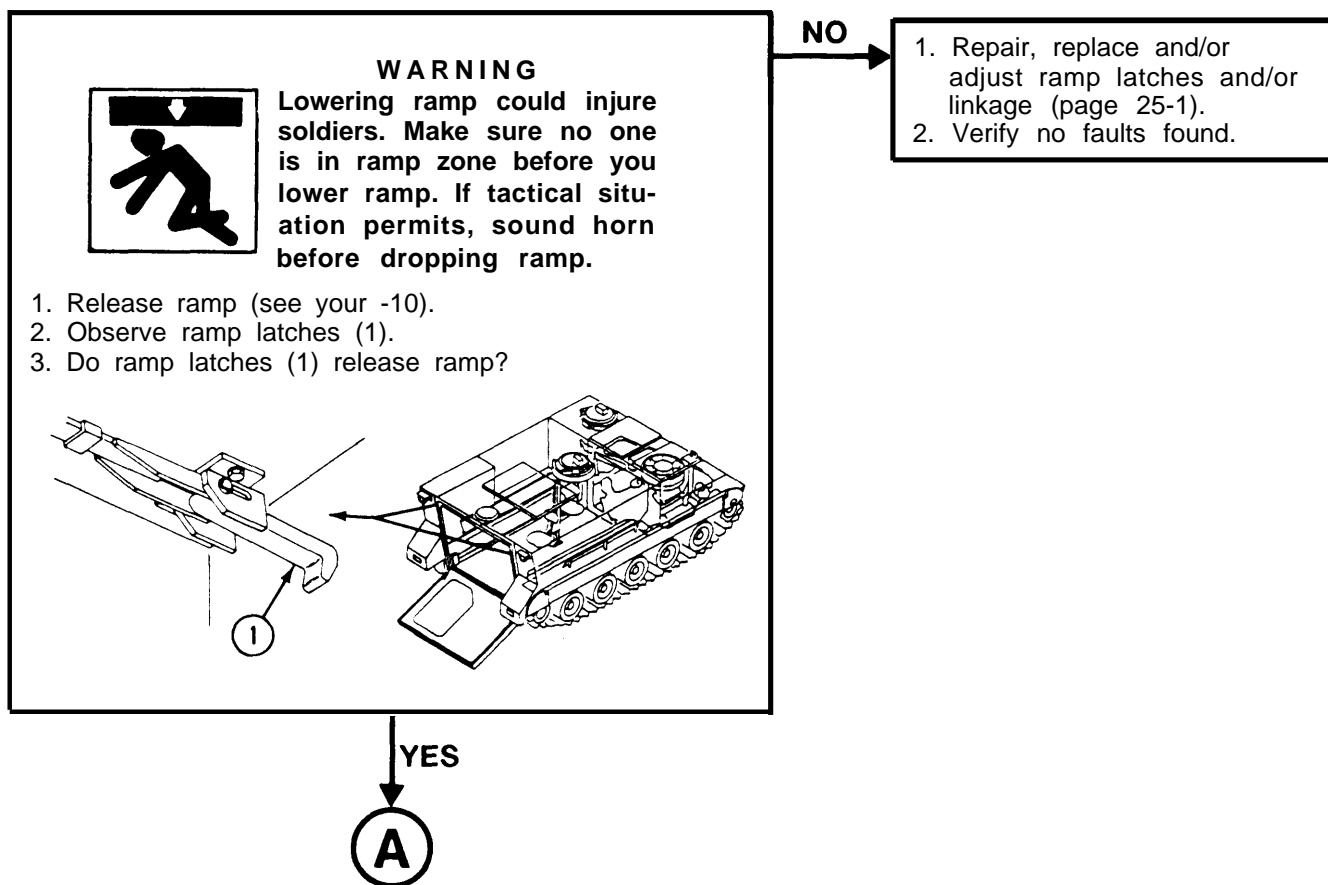
**References:**

See your -10

**Equipment Conditions:**

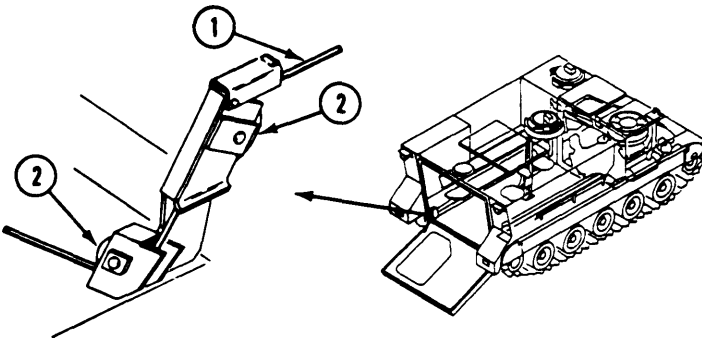
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Driver's power plant access panel removed (see your -10)  
Power plant rear access panels removed (see your -10)  
Rear compartment floor plates removed (page 24-36)

---



**A**

1. Inspect ramp hydraulic cylinder wire rope (1) and pulleys (2).  
 2. Are wire rope and pulleys in good condition?

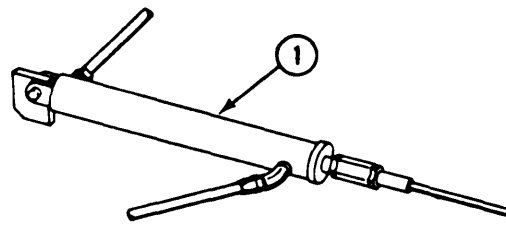


**NO**

1. Replace wire rope and/or Pulleys (page 25-30 or 25-31).  
 2. Verify no faults found

**YES**

1. Inspect hydraulic cylinder (1)  
 2. Is hydraulic cylinder free of bends and dents that could restrict its movement?



**NO**

1. Replace hydraulic cylinder (page 28-93).  
 2. Verify no faults found

**YES**

1. Inspect hydraulic lines and quick disconnect couplings between fluid tank and hydraulic cylinder.  
 2. Are any lines damaged? Are all quick disconnect couplings fully connected?

**NO**

1. Replaced control valve (page 28-84 or 28-87).  
 2. Verify no faults found.

**YES**

1. Connect couplings.  
 2. Repair lines as necessary (page 28-1).  
 3. Verify no faults found.

---

## RAMP OPERATION IS SLOW OR SLUGGISH

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Ramp lowered (see your -10)  
 Power plant rear access panels removed  
 (see your -10)

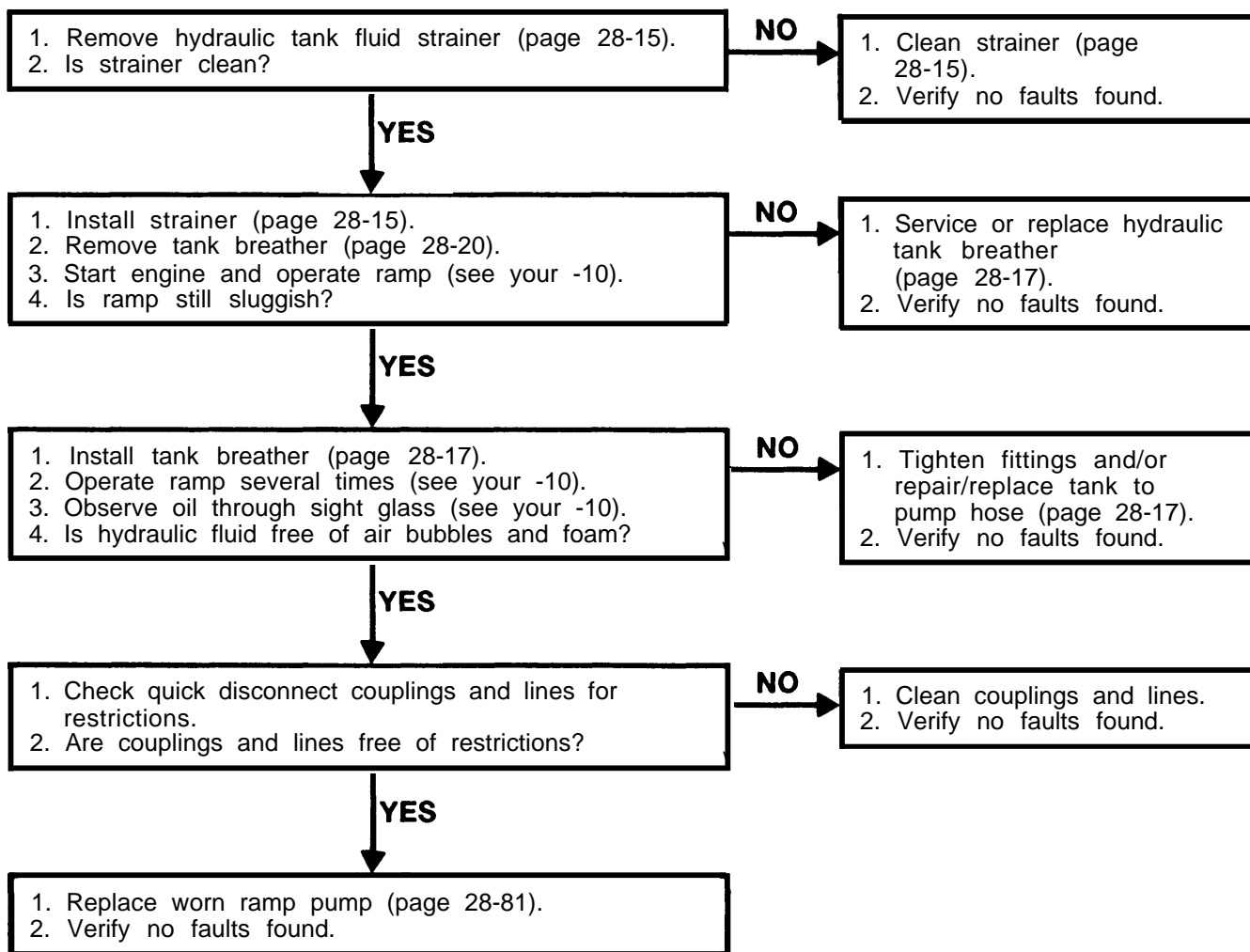
**Personnel Required:**

Unit Mechanic

**References:**

see your -10

---



# RAMP WILL NOT RAISE OR FREE FALLS

## INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

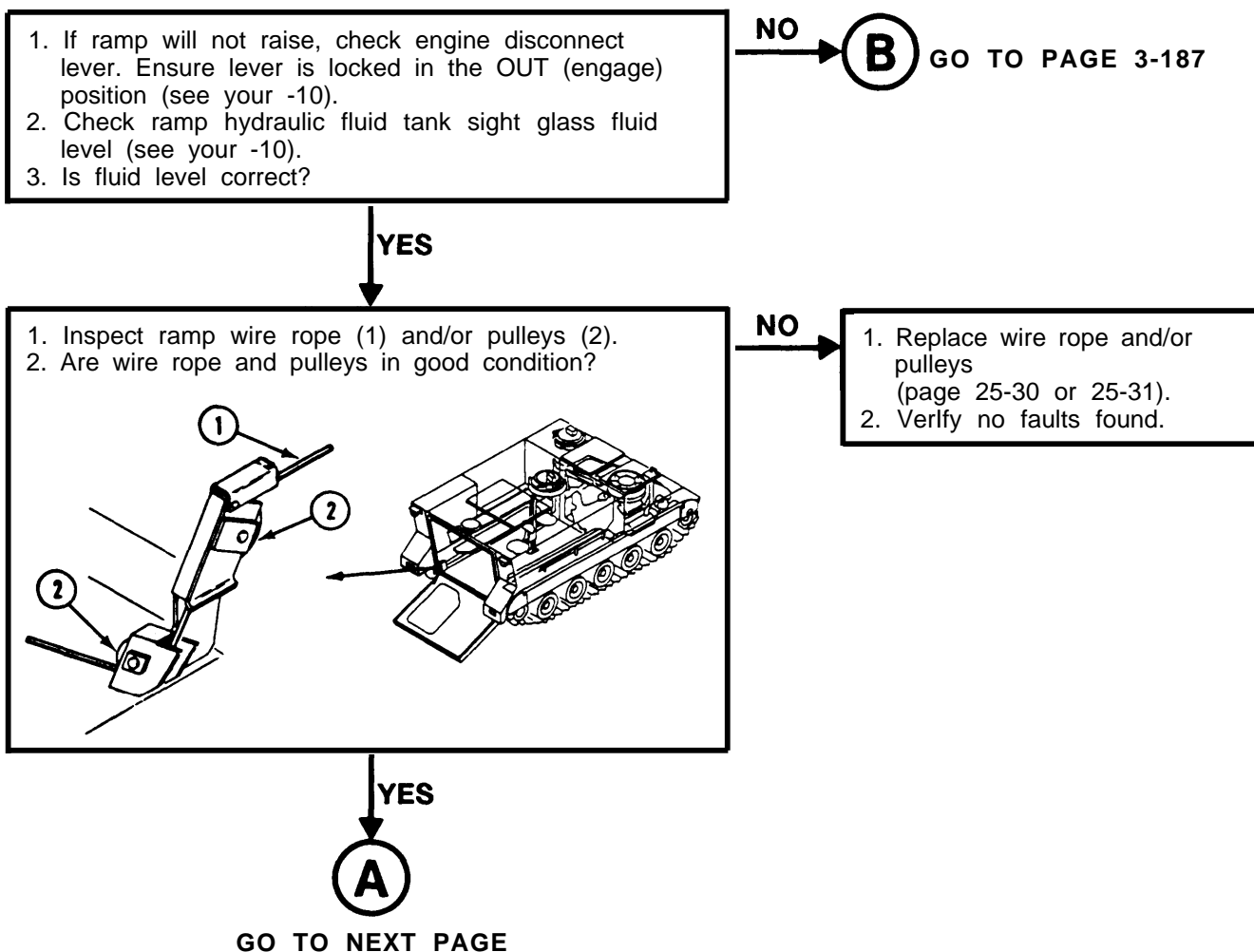
Unit Mechanic

**References:**

See your -10  
see your -12

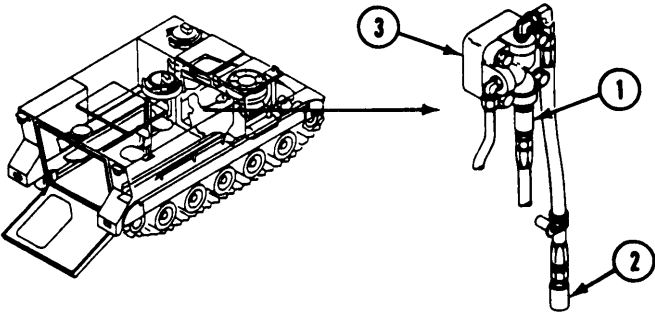
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Driver's power plant access panel removed (see your -10)  
Power plant rear access panels removed (see your -10)  
Rear compartment floor plates removed (page 24-36)



**A**

1. Inspect quick-disconnect coupling fittings (1) and (2) on control valve (3).  
2. Inspect control valve (3).  
3. Are fittings hooked up to control valve, and are all parts free from damage and leaks?

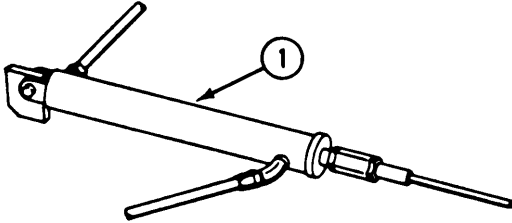


**NO**

1. Replace parts as needed (page 28-1).  
2. Verify no faults found.

**YES**

1. Inspect ramp hydraulic cylinder (1) for leaks.  
2. Is hydraulic cylinder free of leaks?



**NO**

1. Replace ramp hydraulic cylinder (page 23-93).  
2. Verify no faults found.

**YES**

1. Has pressure relief valve on fluid tank been replaced?

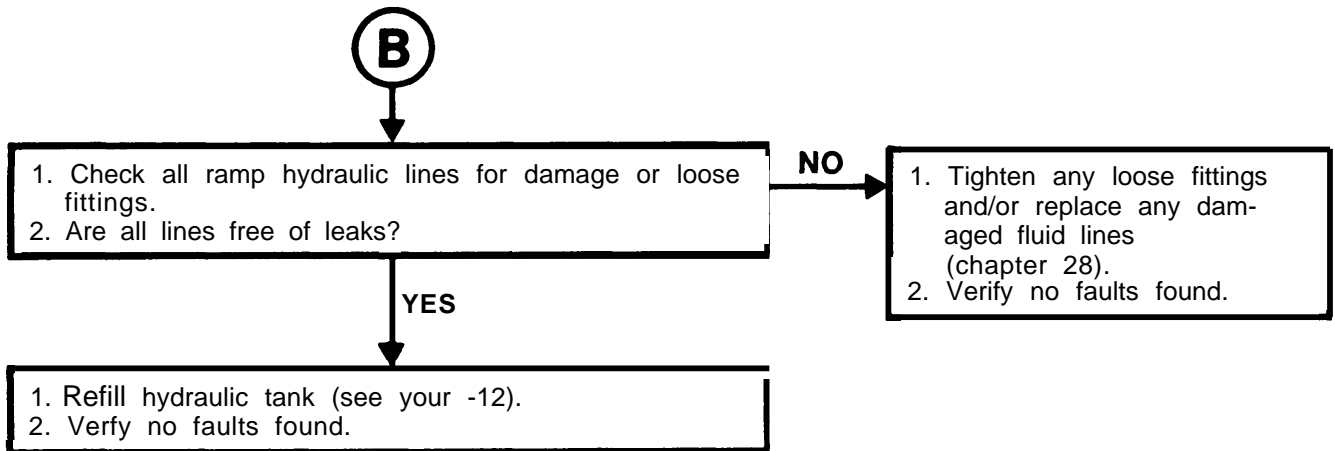
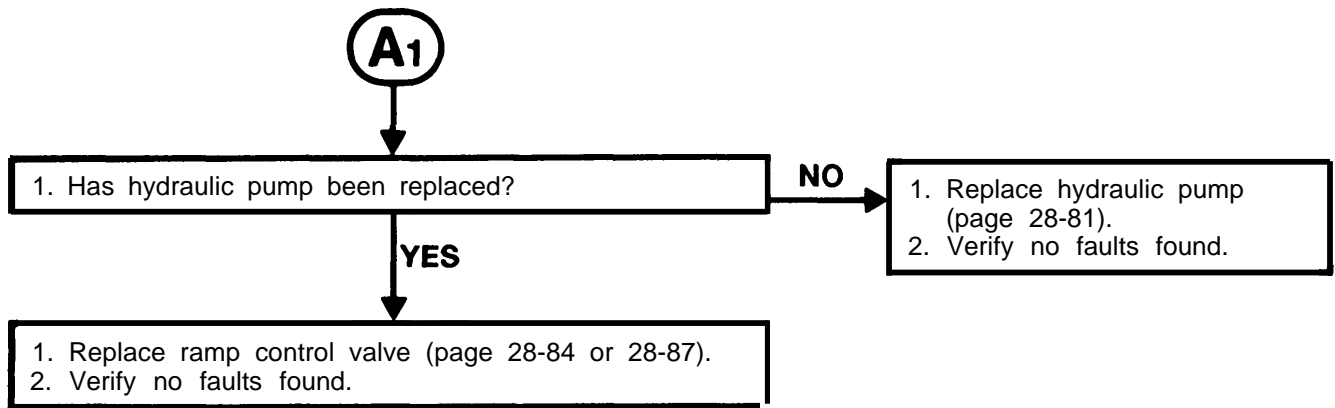
**NO**

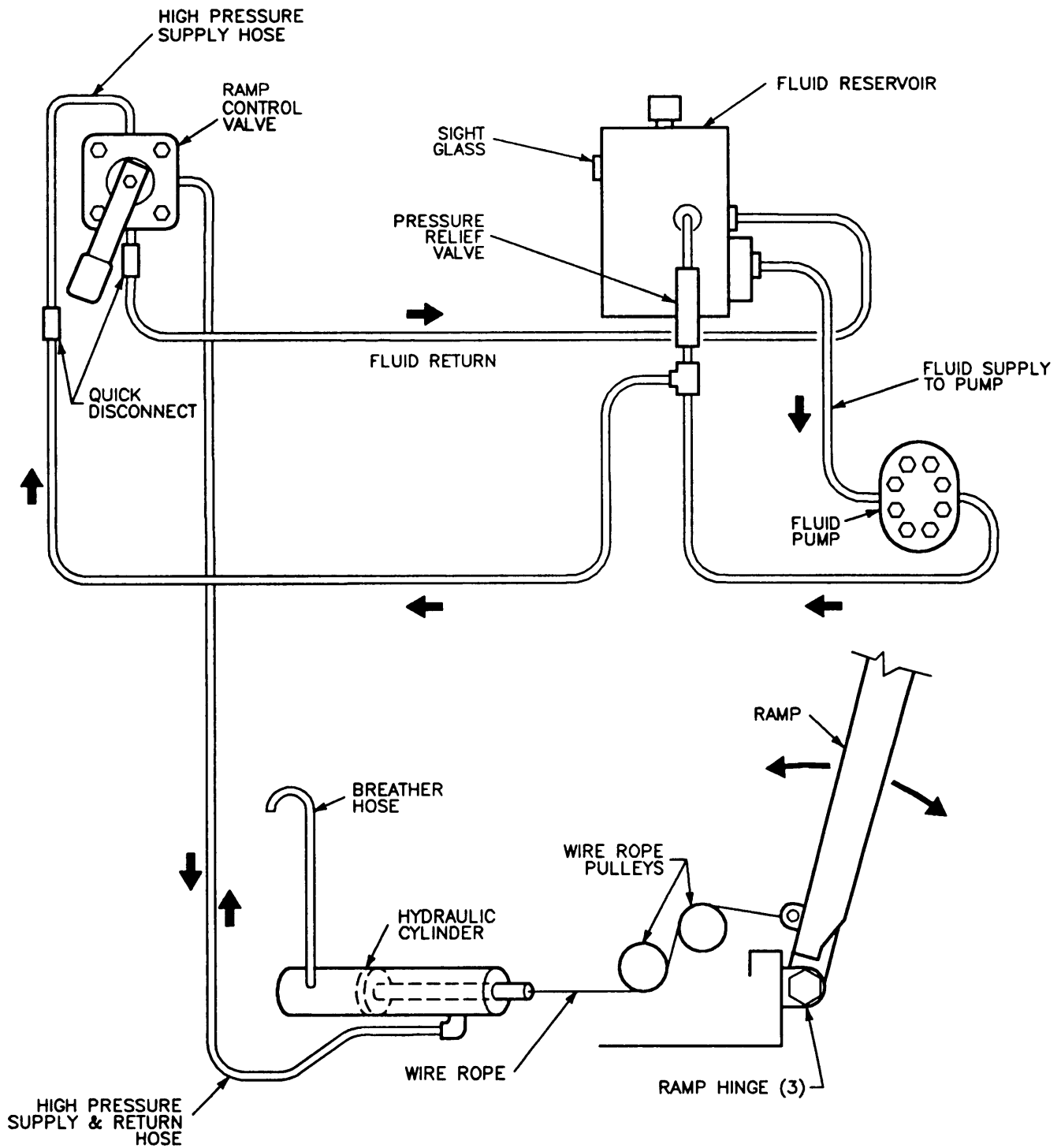
1. Replace pressure relief valve. See task: Repair/replace hydraulic tank (page 28-17).  
2. Verify no faults found.

**YES**

**A1**







RAMP HYDRAULIC SYSTEM SCHEMATIC

## SUSPENSION LOCKOUT DOES NOT EXTEND (M741A1 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10  
See your -12

**Materials/Parts:**

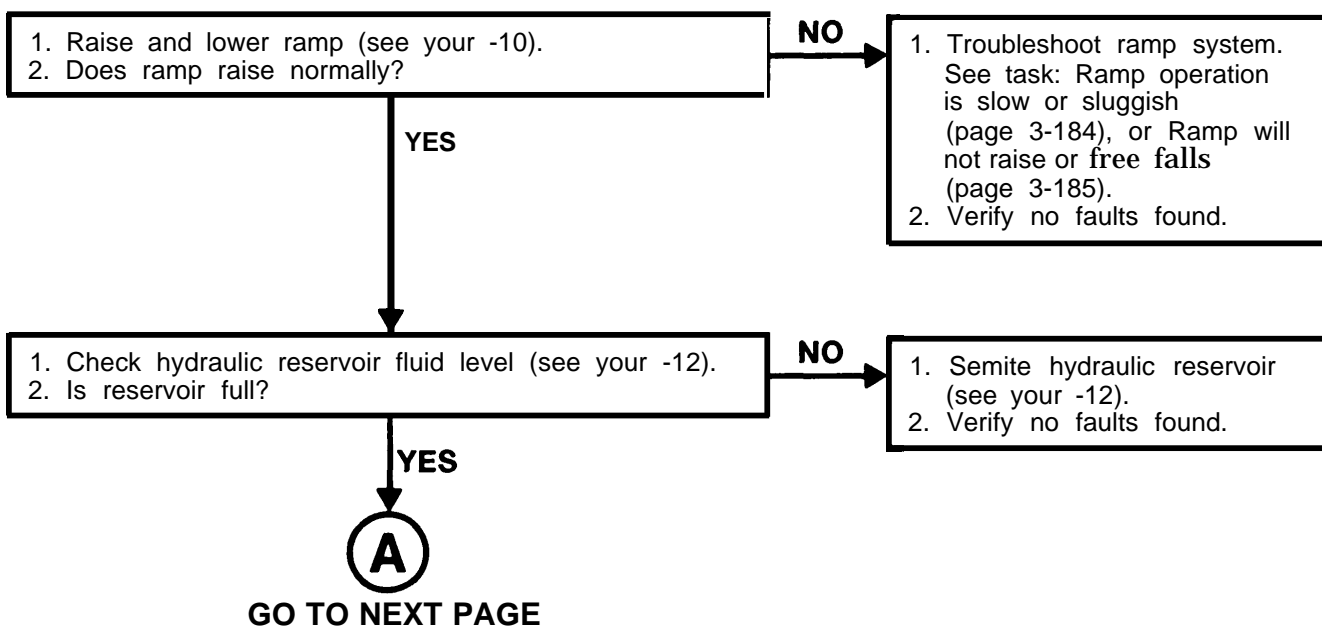
Wiping rag (Item 61, App C)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)

**Personnel Required:**

Unit Mechanic  
Helper (H)



**A**

**NOTE**

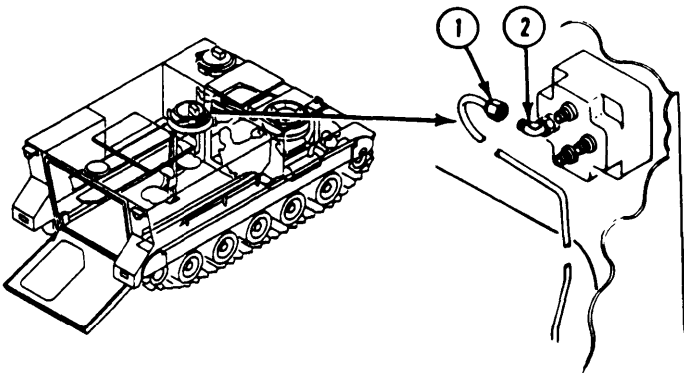
Hydraulic fluid may drain from disconnected tubes and valves. Use wiping rags.

1. Remove tube fitting (1) from control valve return port (2).
2. Observe return port (2).

**NOTE**

If hydraulic fluid flows from return port during step 3 or 4, stop engine and go to step 5.

3. Start engine and let idle (see your -10).
4. Move control valve to EXTEND position.
5. Does fluid fail to flow from selector valve return port?



**NO**

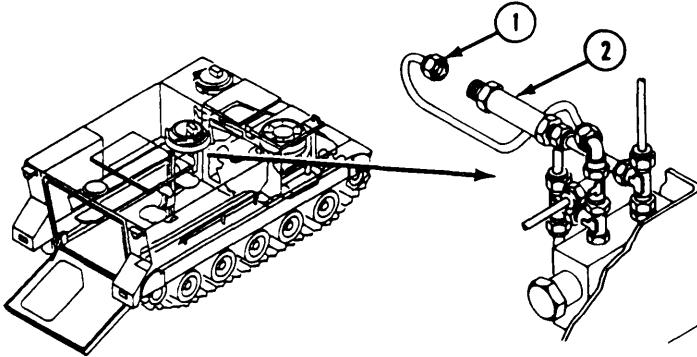
1. Replace ramp control valve (page 28-84).
2. Verify no faults found.

**YES**

**A1**

**A1**

1. Connect tube fitting to control valve return port.
2. Start engine and let idle (see your -10).
3. Disconnect tube fitting (1) from pressure relief valve (2).
4. Does pressure relief valve leak hydraulic fluid?



**NO**

1. Replace unloader valve (page 28-60).
2. Verify no faults found.

**YES**

1. Replace pressure relief valve (page 28-60).
2. Verify no faults found.

## SUSPENSION LOCKOUT DOES NOT HOLD (M741A1 ONLY)

### INITIAL SETUP

**Tools**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts**

Wood block

**Personnel Required:**

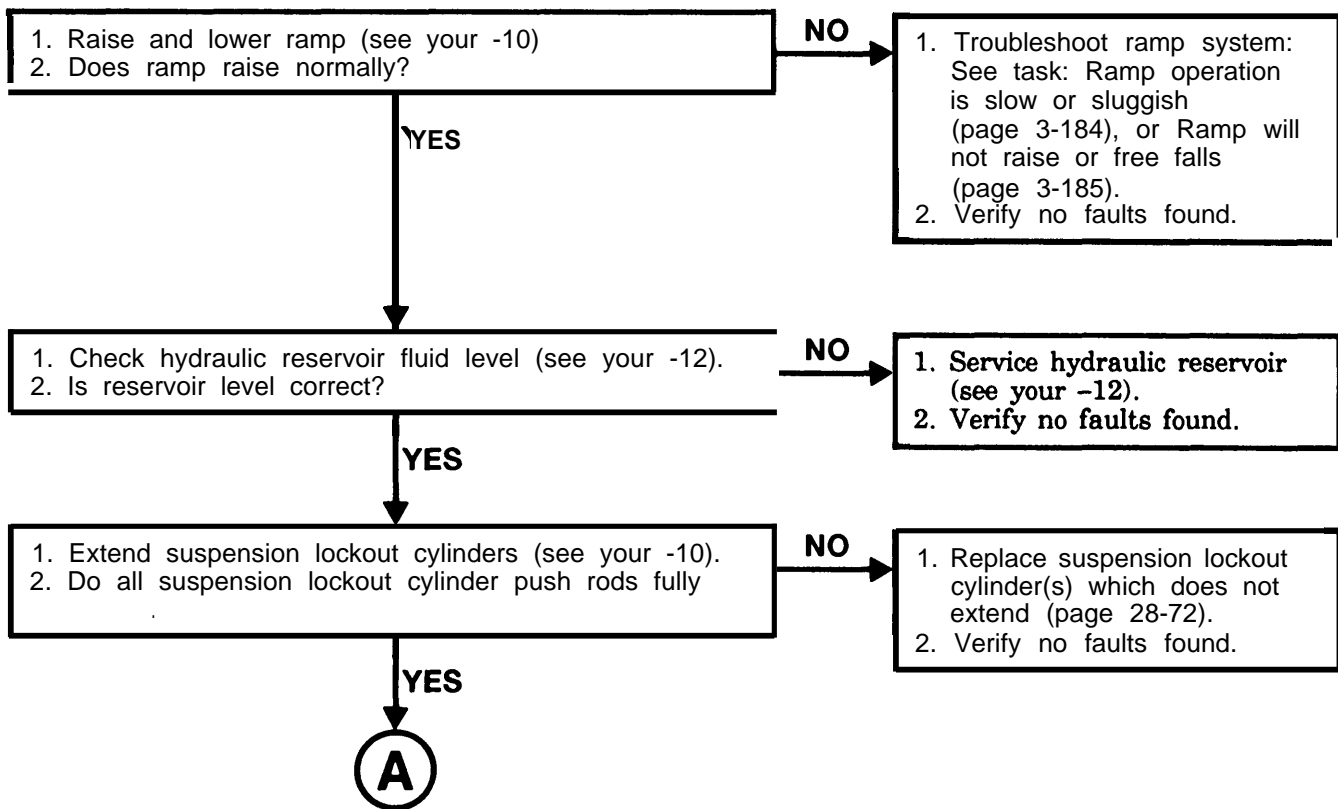
Unit Mechanic  
Helper (H)

**References:**

See your -10  
See your -12

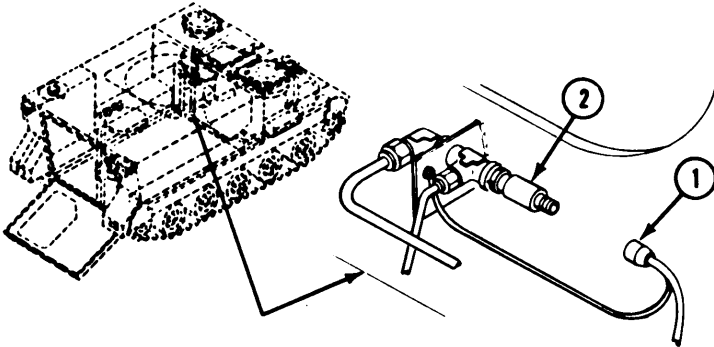
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)



**A**

1. Disconnect plug 509 (1) from pressure switch M9395/31 (2).
2. Unblock earner (see your -10).
3. Place a wood block in front of earner and drive carrier over wood block slowly. Have helper observe.
4. Does each road arm remain in fixed position when rolling over block?



**YES**

1. Block earner (see your -10).
2. Connect plug 509 to pressure switch M9395/31.
3. Go to: Suspension lockout does not extend (page 3-289).
4. Verify no faults found.

1. Block carrier (see your -10).
2. Replace lockout cylinder which does not hold road arm in fixed position (page 28-72).
3. connect plug 509 to pressure switch M9395/31.
4. Verify no faults found.

---

## SUSPENSION LOCKOUT DOES NOT RELEASE (M741A1 ONLY)

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

See your -12

**Equipment Conditions:**

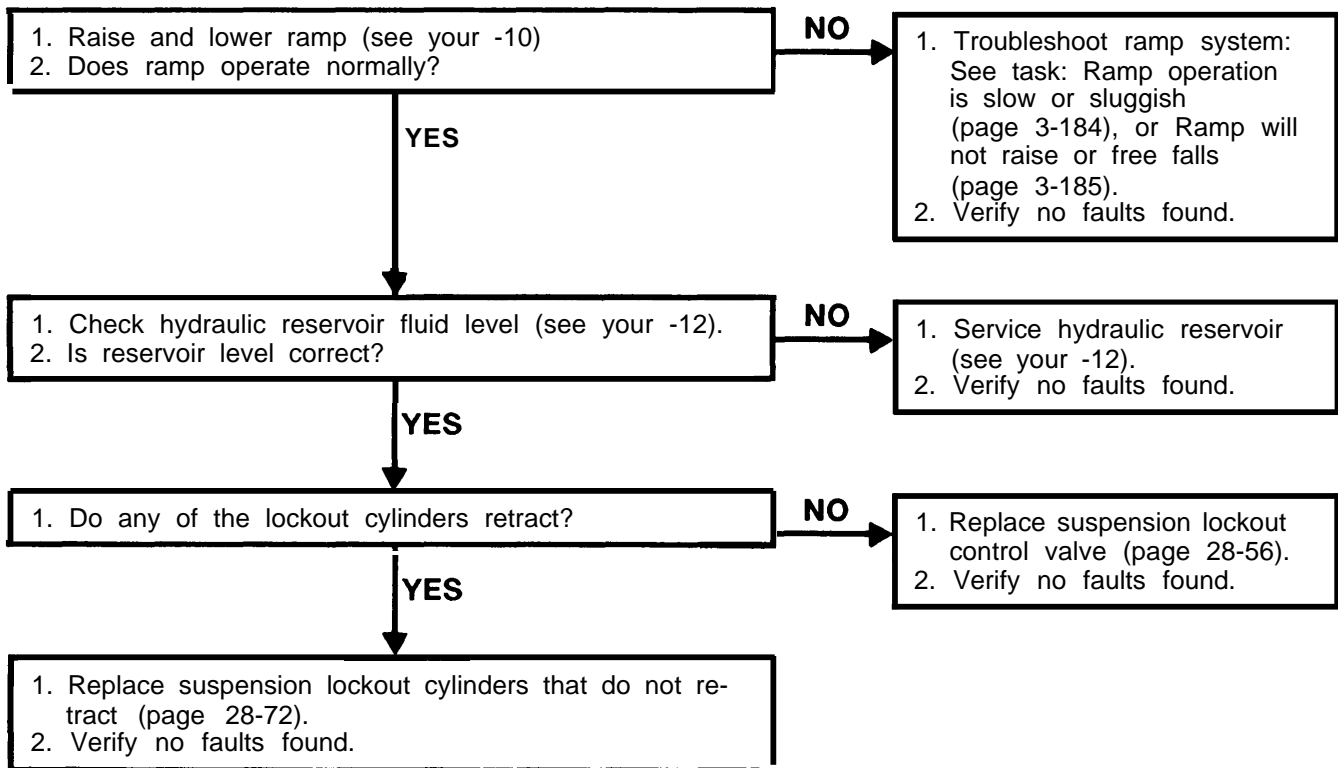
Engine stopped/shutdown (see your -10)

Carrier blocked (see your -10)

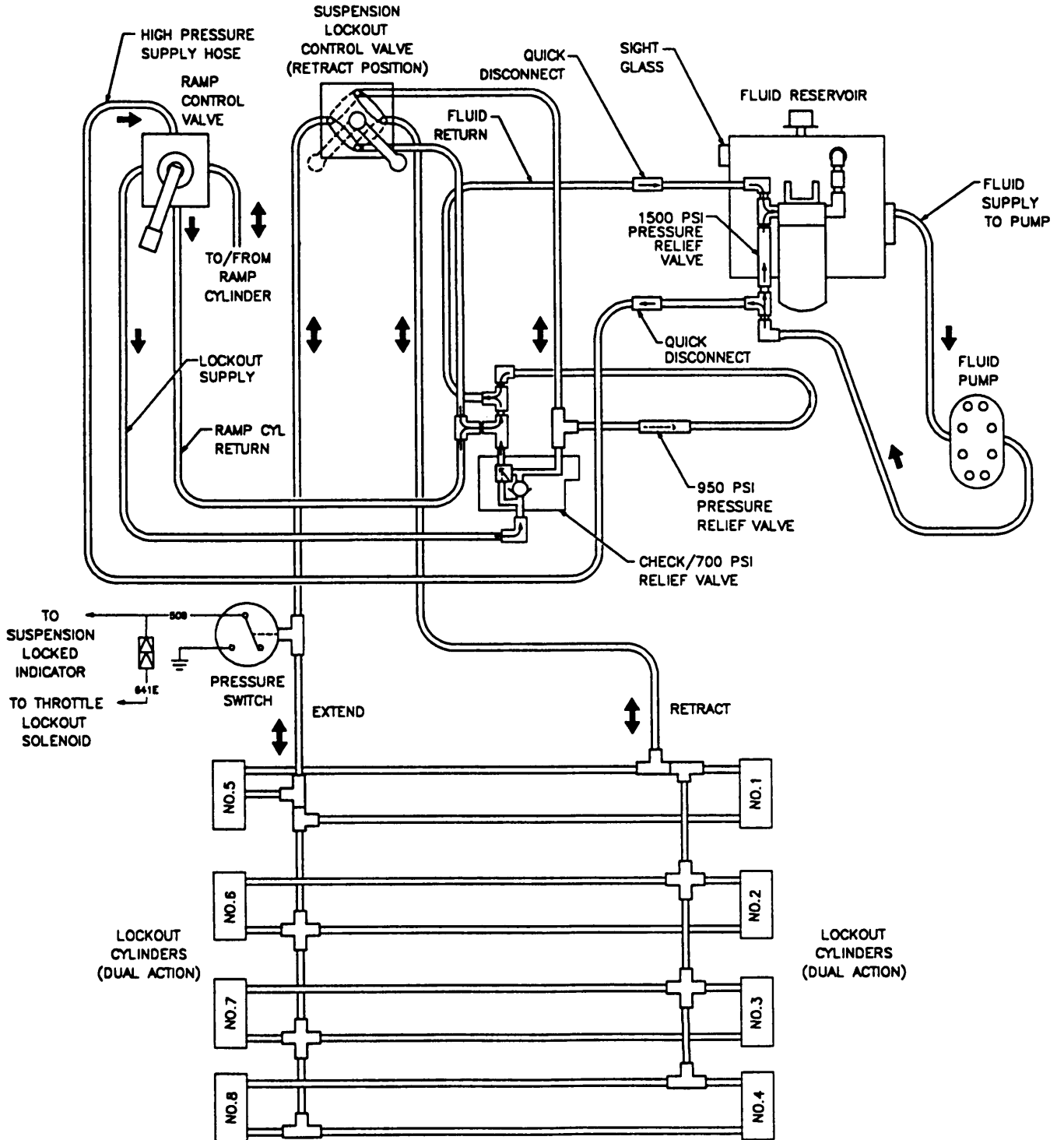
Ramp lowered (see your -10)

Driver's power plant access panel removed  
(see your -10)

Power plant rear access panels removed  
(see your -10)







**SUSPENSION LOCKOUT SCHEMATIC  
(M741A1 ONLY)**

## SMOKE GRENADE LAUNCHER(S) MALFUNCTION

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**Personnel Required:**

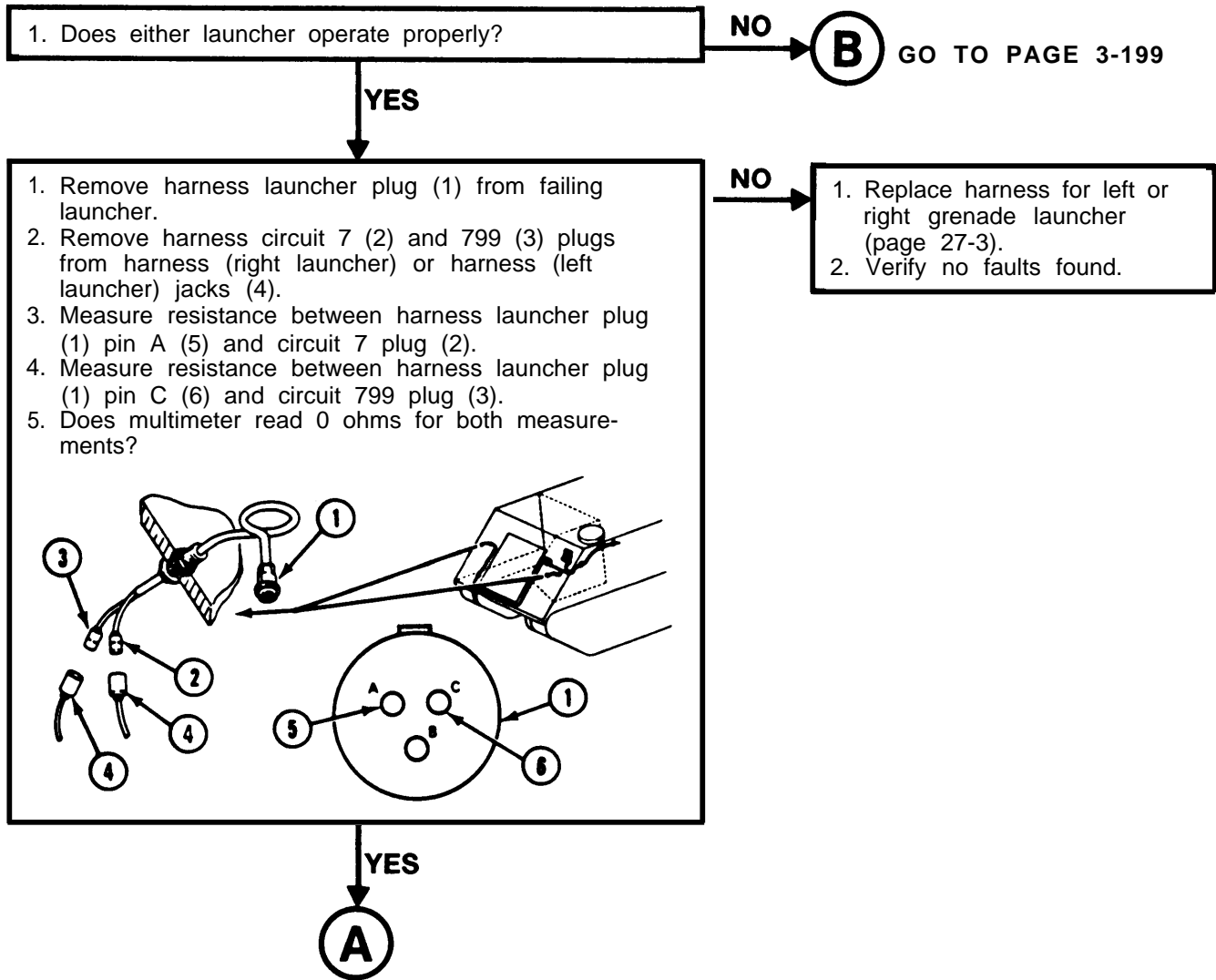
- Unit Mechanic
- Helper (H)

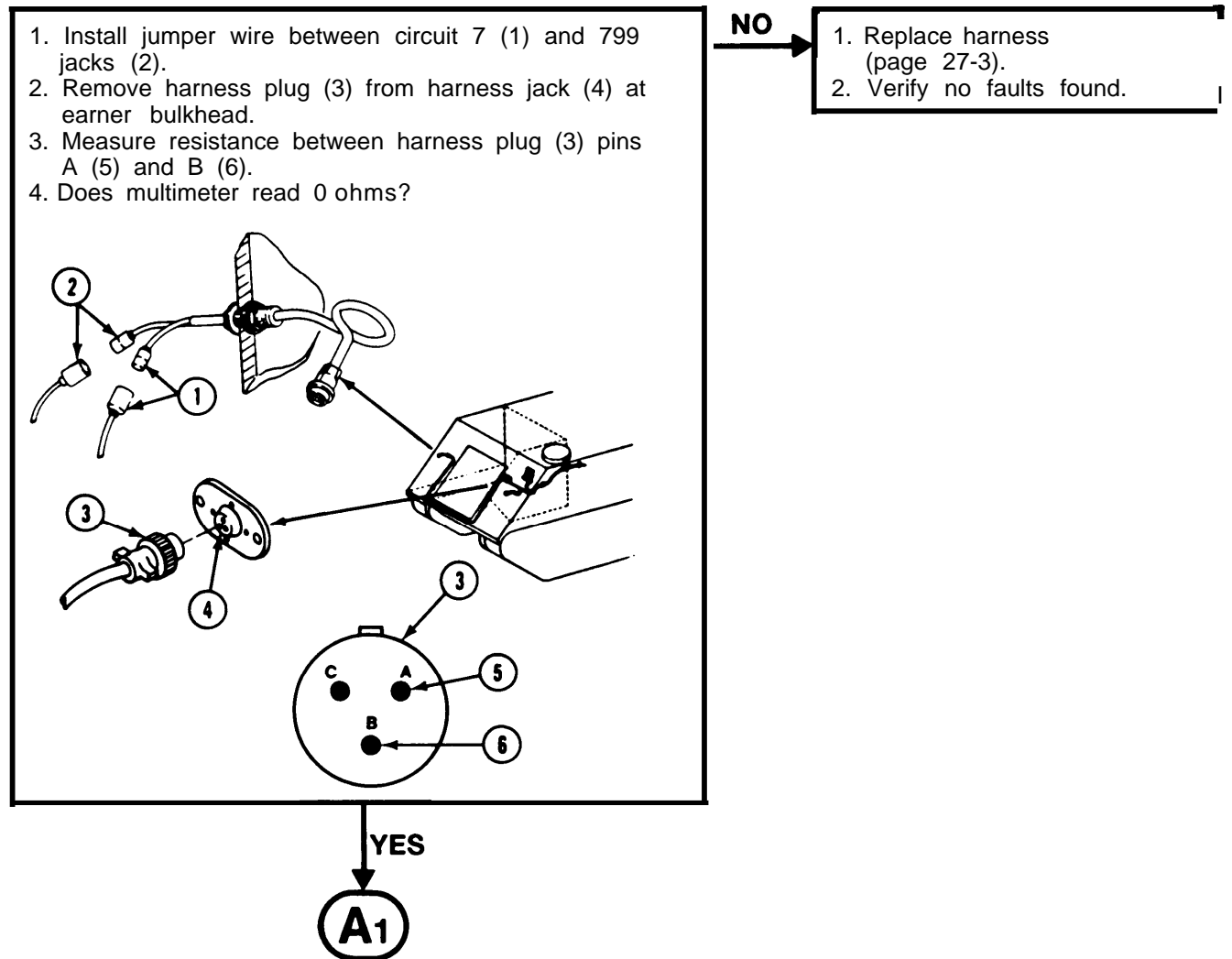
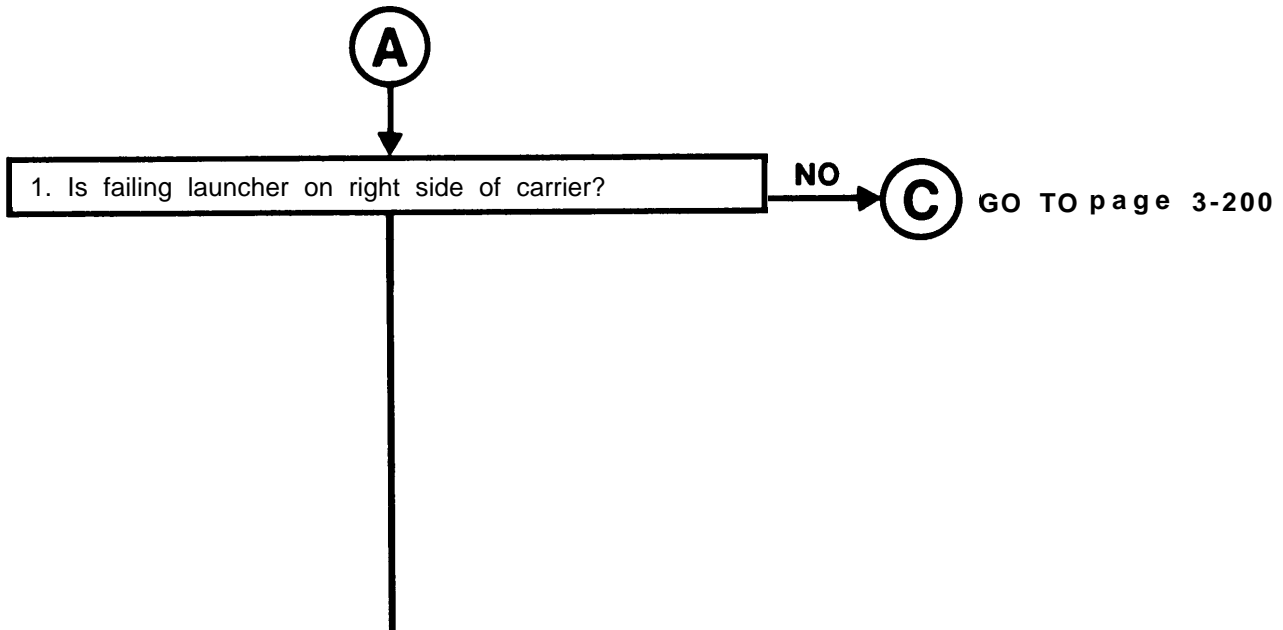
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Harness 12313235 removed from launcher arming/firing unit

**Inferences**

see your -10





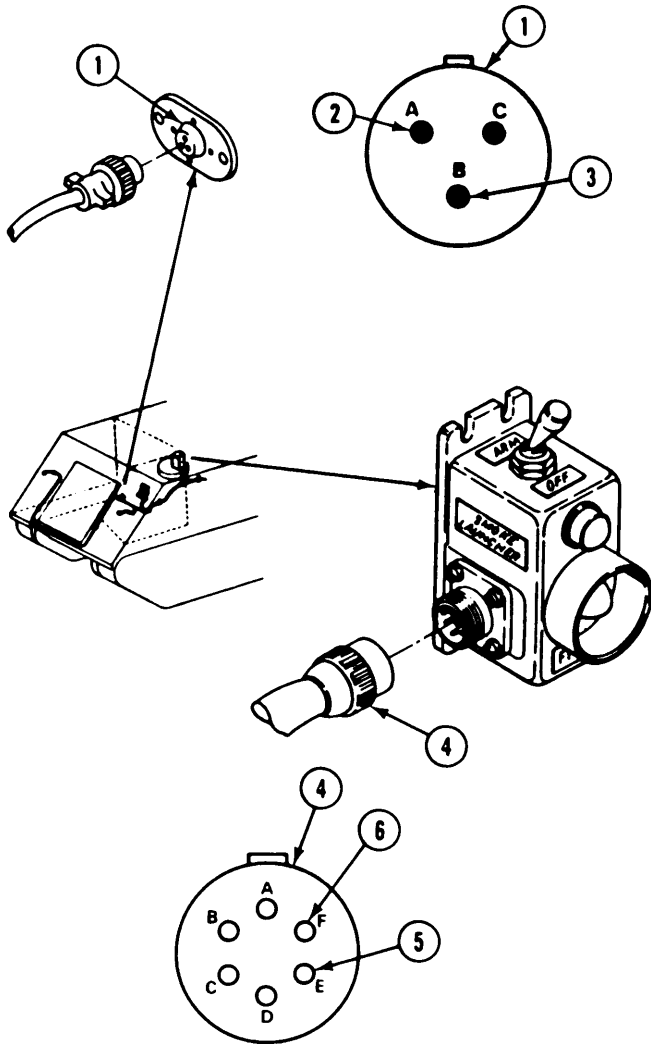
GO TO NEXT PAGE

**A1**

1. Install jumper wire between harness jack (1), pins A (2) and B (3) at bulkhead.
2. Measure resistance between harness arming/firing unit plug (4), pins E (5) and F (6).
3. Does multimeter read 0 ohms?

**NO**

1. Replace harness (page 27-3).
2. Verify no faults found.

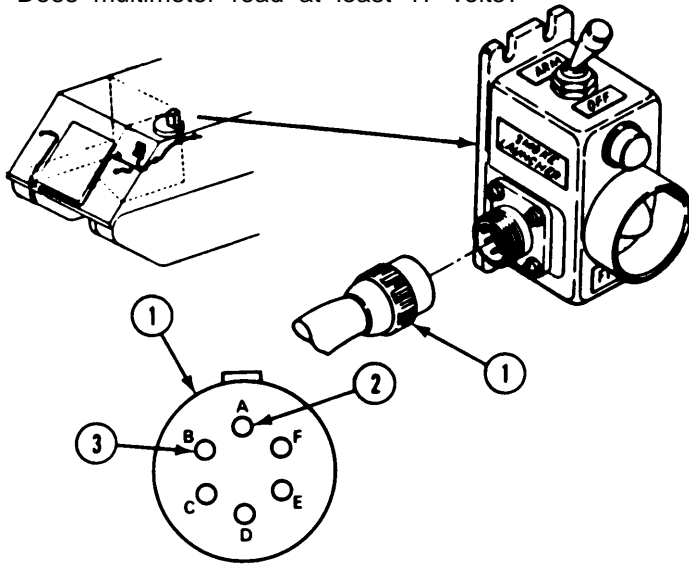


**YES**

1. Faulty arming/firing unit.
2. Notify your supervisor.

**B**

1. Turn MASTER SWITCH to ON (see your -10).
2. Measure voltage between harness firing/arming unit plug (1) pin A (2) and B (3).
3. Does multimeter read at least 17 volts?



**NO**

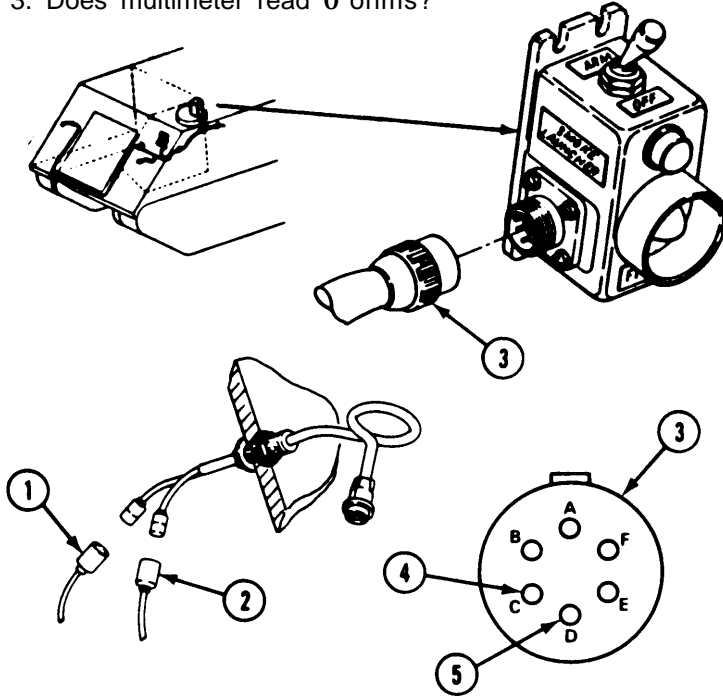
1. Replace harness (page 27-3).
2. Verify no faults found.

**YES**

1. Faulty arming/firing unit.
2. Notify your supervisor.

**C**

1. Install jumper wire between harness jacks circuit 7 (1) and circuit 799 (2).
2. Measure resistance between harness arming/firing unit plug (3) pins C (4) and D (5).
3. Does multimeter read 0 ohms?



**NO**

1. **Replace harness**  
(page 27-3).
2. **Verify no faults found.**

**YES**

1. Faulty arming/firing unit.
2. Notify your supervisor.

**FRONT AND/OR REAR BILGE pump(s) AND/OR LIGHTS DO NOT OPERATE**

**INITIAL SETUP**

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**Personnel Required:**

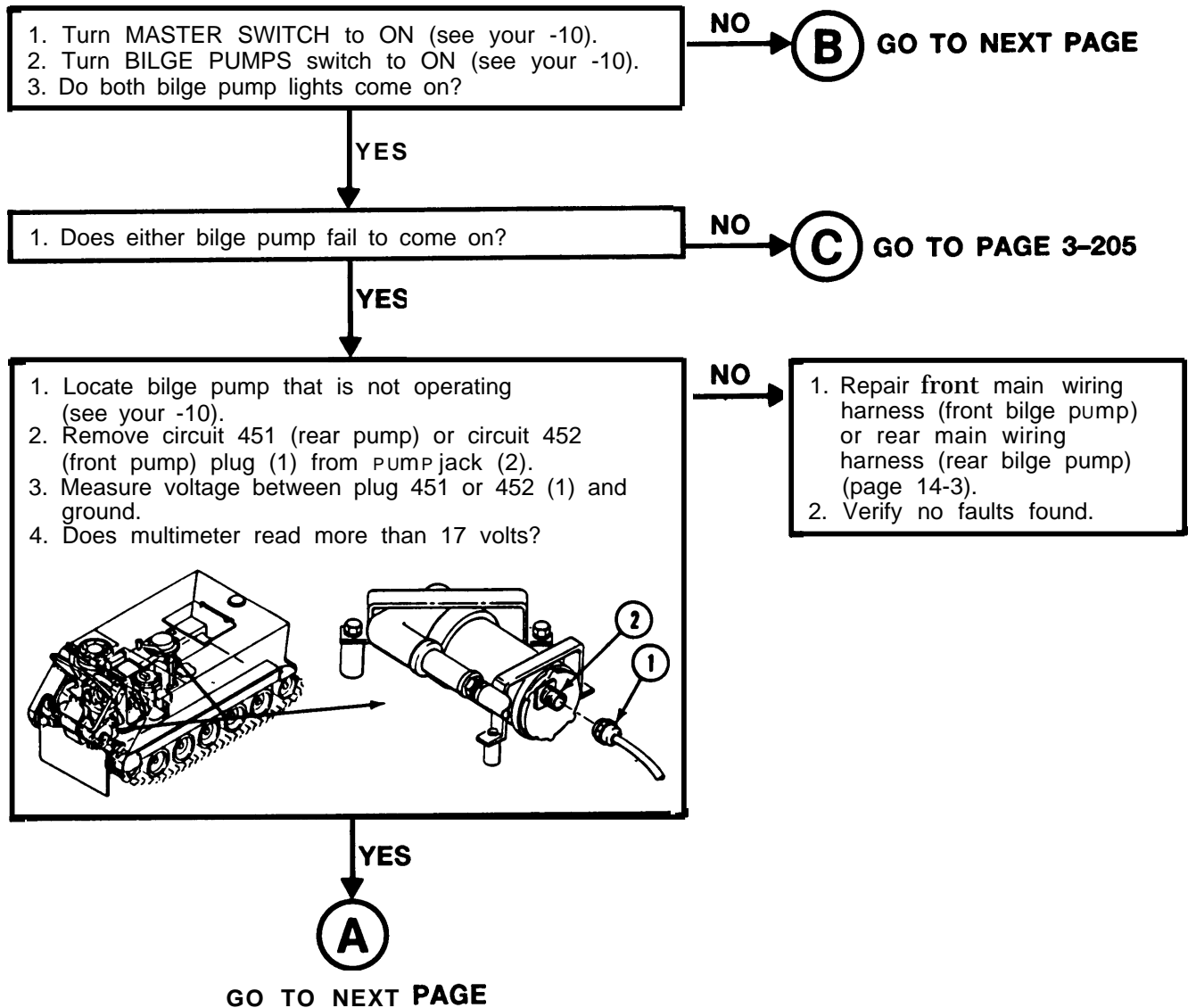
Unit Mechanic

**References:**

See your -10

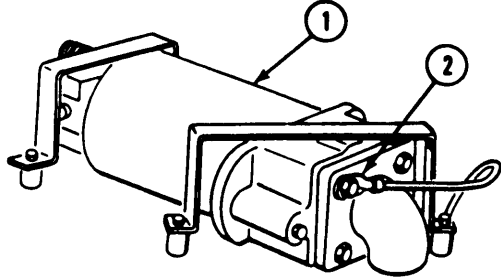
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- MASTER SWITCH OFF (see your -10)
- Power plant front access cover removed (front bilge pump) (page 24-24)
- Trim vane lowered and power plant front access door open (see your -10)
- Ramp lowered (rear bilge pump) (see your -10)
- Rear floor plate removed (rear bilge pump) (page 24-37)



**A**

1. Turn MASTER SWITCH to OFF.
2. Measure resistance between bilge pump body (1) and ground lead (2).
3. Does multimeter read 0 ohms?



**NO**

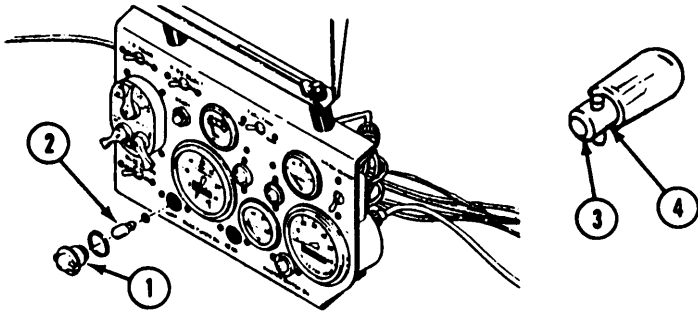
1. Replace ground lead to bilge pump (page 16-2 or 16-8).
2. Verify no faults found.

**YES**

1. Replace bilge pump (page 16-2 (front) or 16-8 (rear)).
2. Verify no faults found.

**B**

1. Remove BILGE PUMPS ON indicator lens (1) and bulb (2).
2. Measure resistance between bulb center contact (3) and bulb base (4).
3. Does multimeter read more than 5 ohms?



**NO**

1. Replace BILGE PUMPS ON indicator light bulb (page 11-5).
2. Verify no faults found.

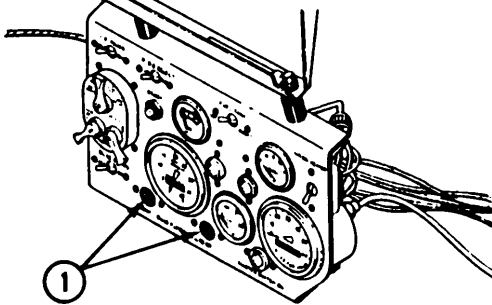
**YES**

**B1**



**B1**

1. Measure voltage between bulb socket center contact (1) and ground (2).
2. Does multimeter read less than 17 volts?

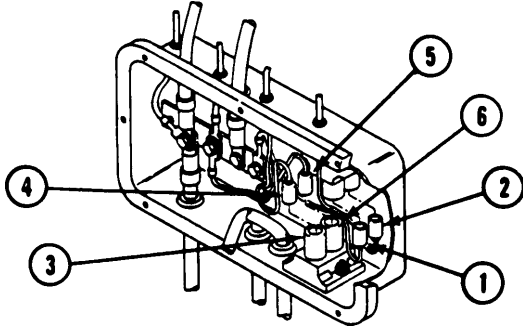


**NO**

1. Replace BILGE PUMPS ON indicator light assembly (page 11-5).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF.
2. Remove master switch panel from distribution box (page 9-13). Do not disconnect battery negative lead.
3. Remove plug 450 B (1) and plug 450 C (2) from front bilge pump circuit breaker (3) or remove plug 450 (4) and plug 450 A (5) from pump bilge Pump circuit breaker (6).
4. Measure resistance between circuit breaker jacks.
5. Does multimeter read 0 ohms?



**NO**

1. Replace bilge pump circuit breaker (page 16-12).
2. Verify no faults found.

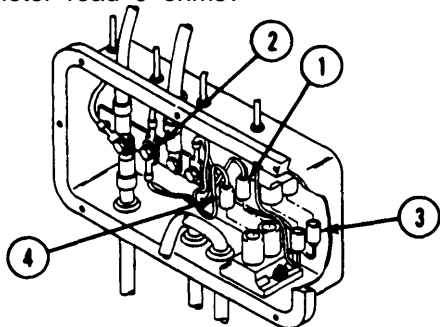
**YES**

**B2**

GO TO NEXT PAGE

**B2**

1. Measure resistance between plug 450 A (rear bilge pump) (1) to 450 A lead end at bus bar (2) or plug 450 C (front bilge pump) (3) to 450 C lead end at bus bar (4).
2. Does multimeter read 0 ohms?

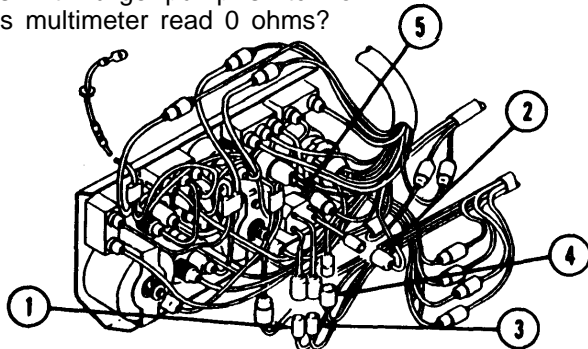


**NO**

1. Replace circuit 450A (rear bilge pump) or circuit 450C (front bilge pump) lead (page 14-3).
2. Verify no faults found.

**YES**

1. Remove instrument panel for access. See task: remove instrument panel mounts and ground lead (page 11-2).
2. Remove plug 450 B (1) and plug 452 A (2) (front bilge pump) or plug 450 (3) and 451 A (4) (rear bilge pump) from bilge pump switch (5).
3. Measure resistance between bilge pump switch jacks with bilge pump switch on.
4. Does multimeter read 0 ohms?

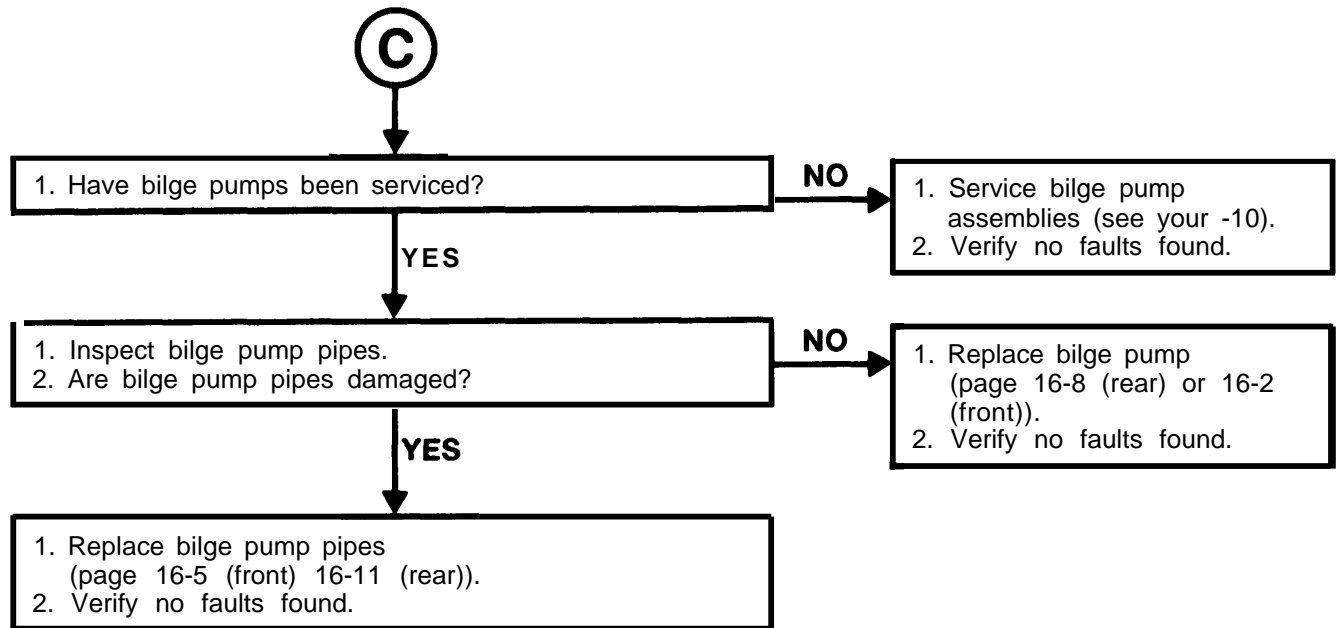


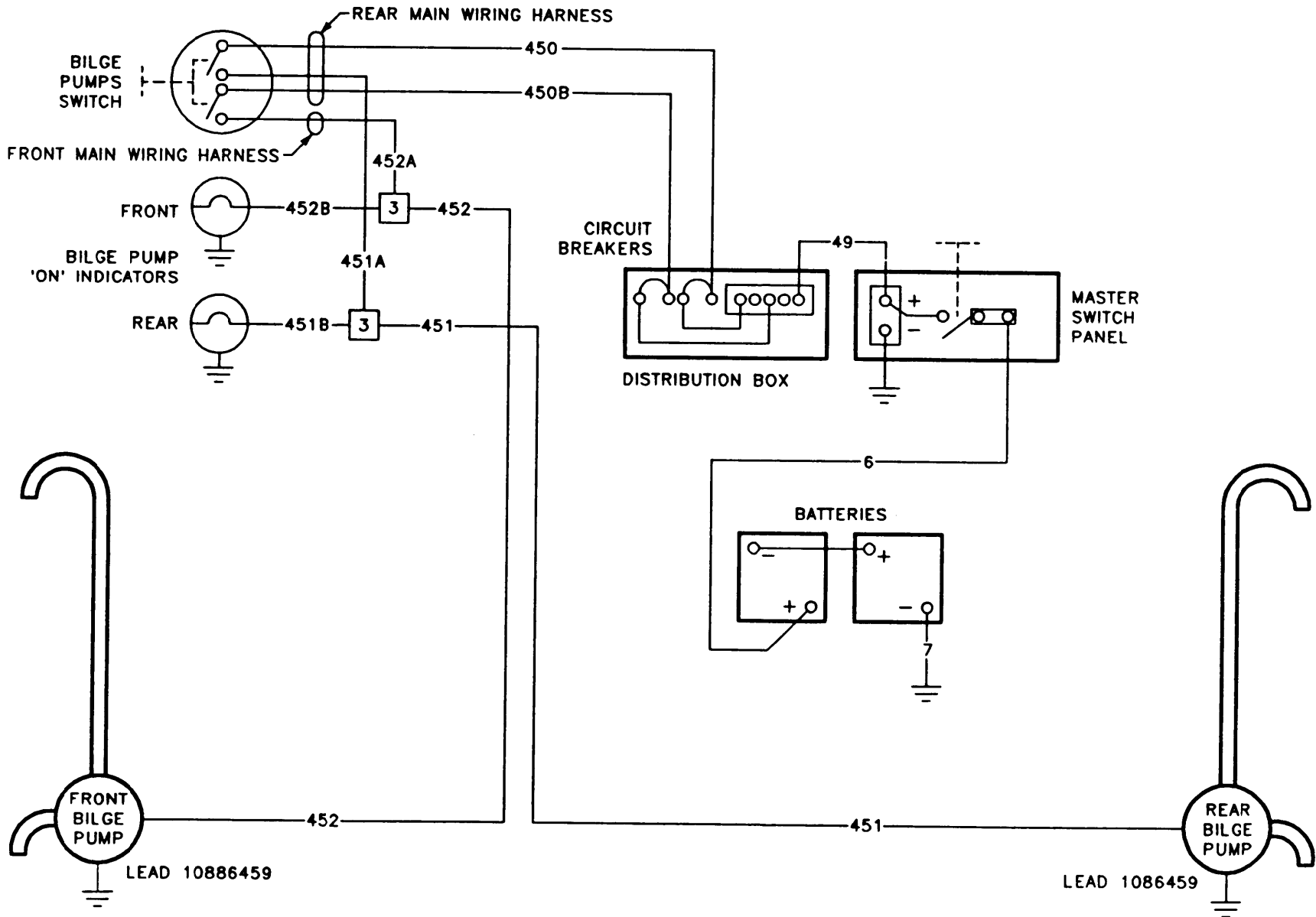
**NO**

1. Install master switch panel on distribution box.
2. Replace bilge pump switch (page 11-7).
3. Verify no faults found.

**YES**

1. Repair rear main harness circuit 450 or 451A, or front main harness circuit 450B or 452A (page 14-3).
2. Install master switch panel on distribution box.
3. Verify no faults found.





BILGE PUMP SYSTEM SCHEMATIC

**PERSONNEL HEATER MALFUNCTIONS**

**INITIAL SETUP**

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Electrical Connector Pliers (Item 44, App D)

**Personnel Required:**

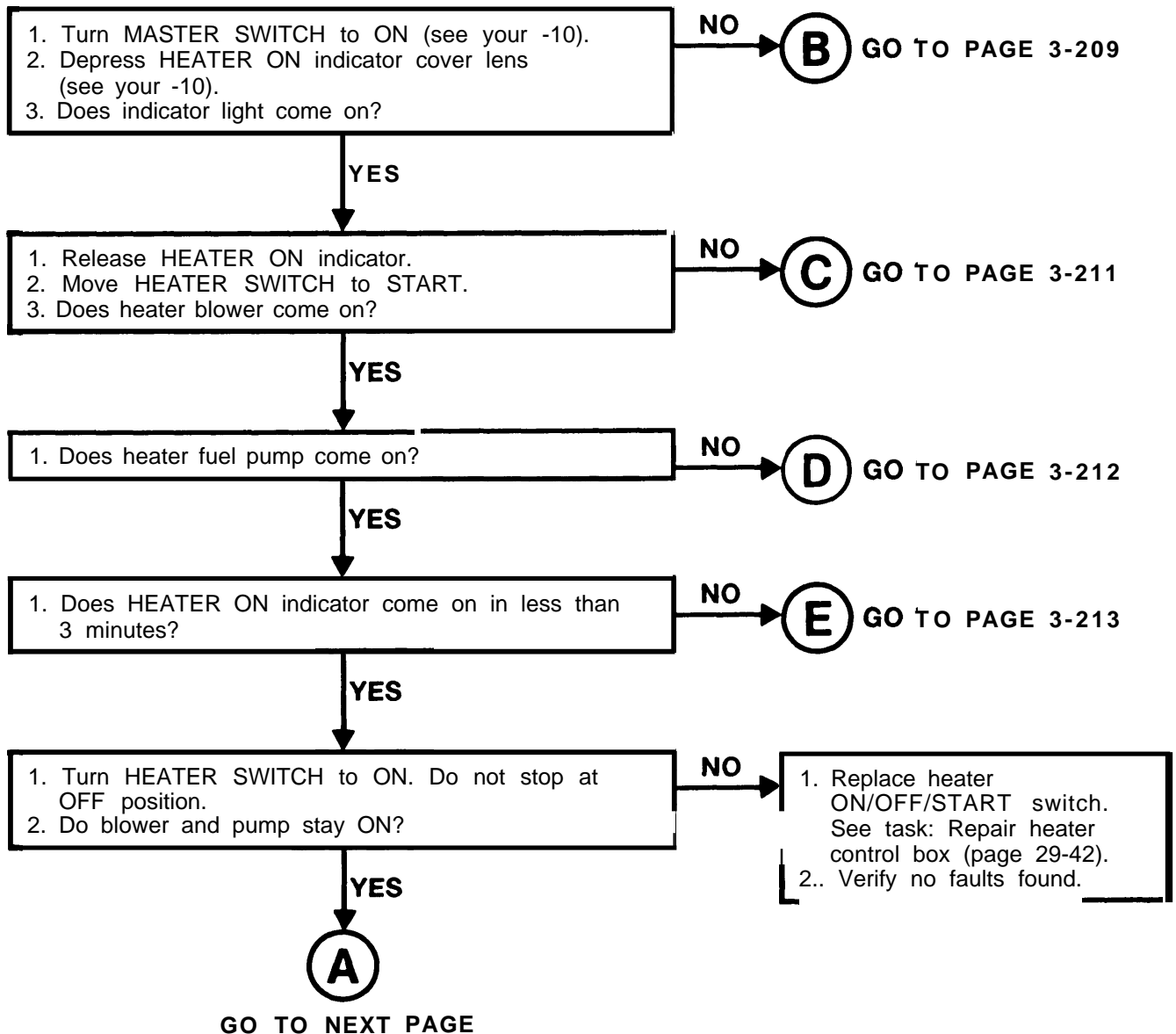
Unit Mechanic

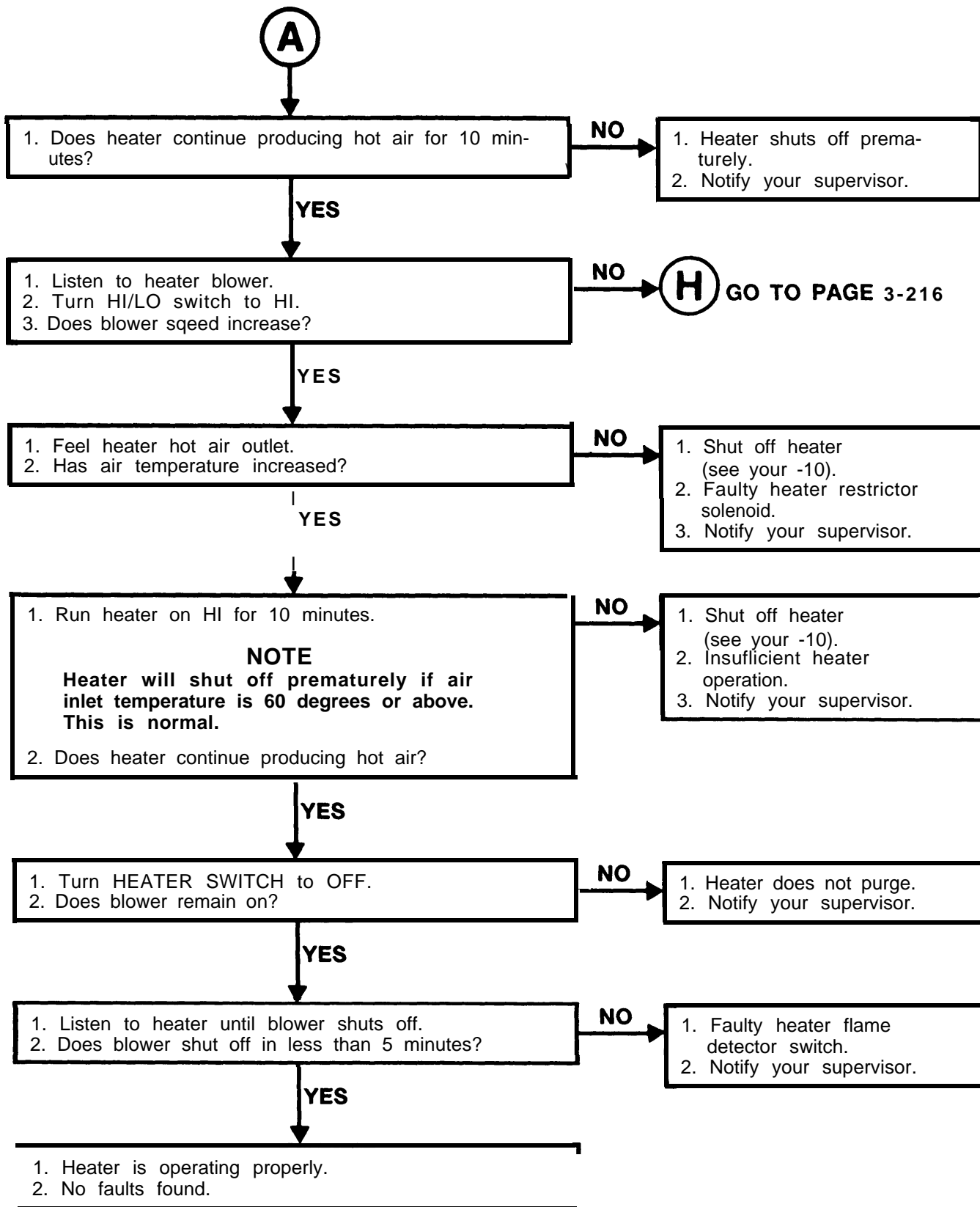
**References:**

See your -10

**Equipment Conditions:**

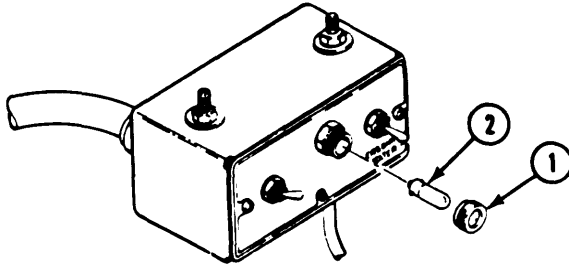
- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Front access door open (see your -10)
- Driver's access panel removed (page 24-25)
- Rear access panel removed (page 24-27 and 24-29)
- Rear floor plates removed (page 24-37)
- Ramp lowered (see your -10)
- Heater on LOW (see your -10)





**B**

1. Remove heater indicator cover lens (1) and bulb (2).
2. Measure resistance between bulb center contact and base.
3. Does multimeter read 0-5 ohms?

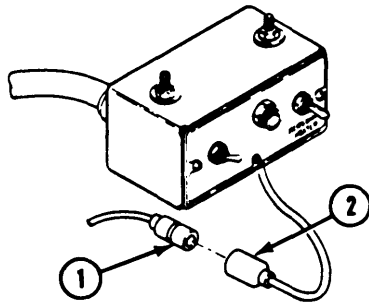


**NO**

1. Replace heater bulb (page 29-42).
2. Verify no faults found.

**YES**

1. Remove rear main harness circuit 400 plug (1) from control box jack (2).
2. Measure voltage between rear main harness circuit 400 plug (1) pin and ground.
3. Does multimeter read 17 volts or more?



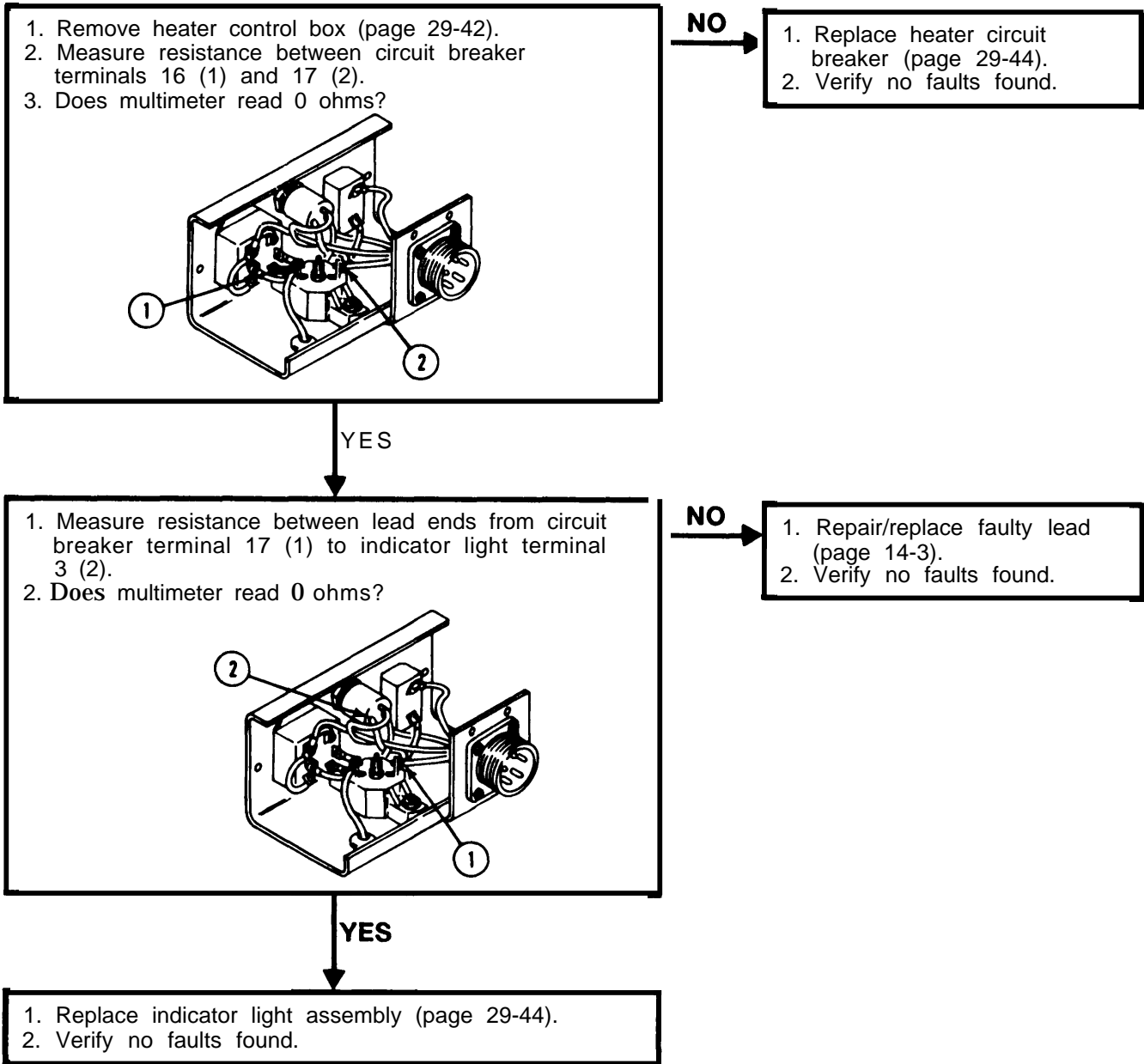
**NO**

1. Repair rear main harness circuit 400 between master switch and heater control box (page 14-3).
2. Verify no faults found.

**YES**

**B1**

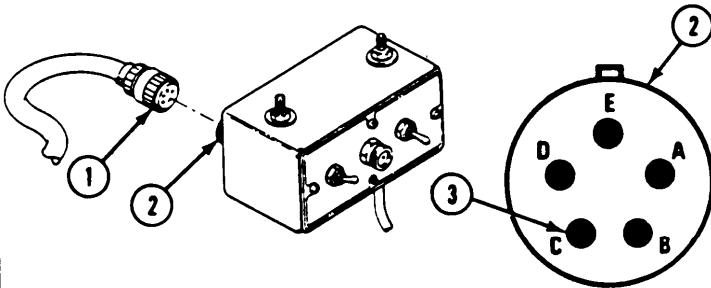
GO TO NEXT PAGE





**C**

1. Remove heater harness plug (1) from heater control box jack (2).
2. Measure voltage between heater control box jack (2) pin C (3) and ground with heater switch on start.
3. Does multimeter read 17 volts or more?



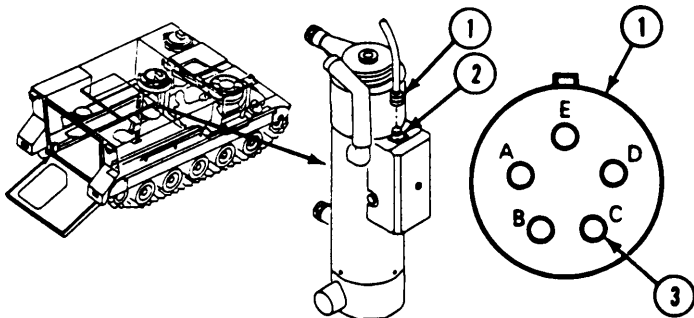
NO

**D**

GO TO NEXT PAGE

YES

1. Install heater harness plug on heater control box jack.
2. Remove heater harness plug (1) from heater jack (2).
3. Measure voltage between heater harness plug (1) pin C (3) and ground with heater switch on start.
4. Does multimeter read 17 volts or more?



NO

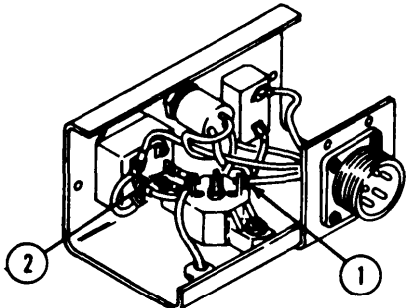
1. Faulty heater wiring harness.
2. Notify your supervisor.

YES

1. Faulty Personnel Heater.
2. Notify your supervisor.

**D**

1. Remove heater control box (page 29-42).
2. Measure resistance between lead ends from circuit breaker terminal 17 (1) and ON/OFF/STA.RT switch terminal 15 (2).
3. Does multimeter read 0 ohms?

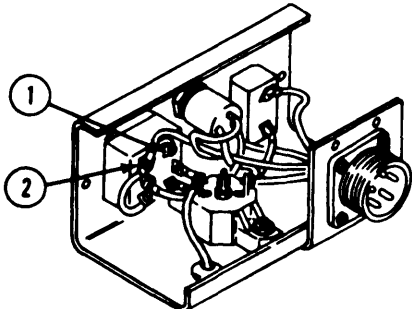


**NO**

1. Repair faulty lead (page 14-3).
2. Verify no faults found.

**YES**

1. Measure resistance between lead ends from ON/OFF/START switch terminals 21 (1) and 14 (2).
2. Does multimeter read 0 ohms?



**NO**

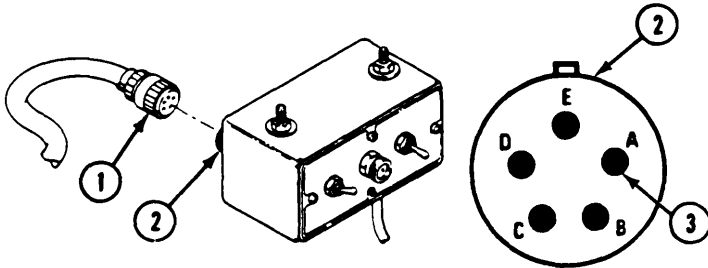
1. Repair heater switch jumper lead between terminal 21 and 14 (page 14-3).
2. Verify no faults found.

**YES**

1. Replace heater ON/OFF/START switch (page 29-43).
2. Verify no faults found.

**E**

1. Remove heater harness plug (1) from heater control jack (2).
2. Measure voltage between heater control jack (2) pin A (3) and ground. With HEATER switch on START.
3. Does multimeter read 17 volts or more?



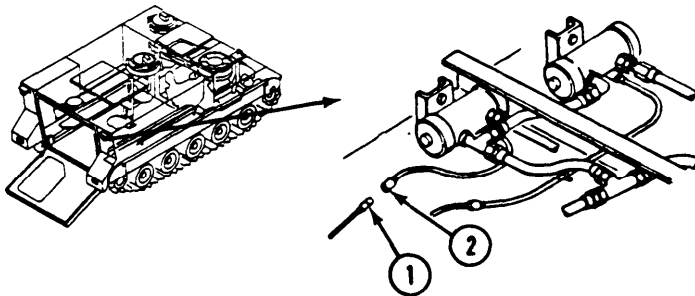
NO

**F**

GO TO NEXT PAGE

YES

1. Install heater harness on heater control box jack.
2. Remove heater harness circuit 402 plug (1) from heater fuel pump jack (2).
3. Measure voltage between heater harness plug pin (1) and ground. With HEATER switch on START.
4. Does multirneteter read 17 volts or more?



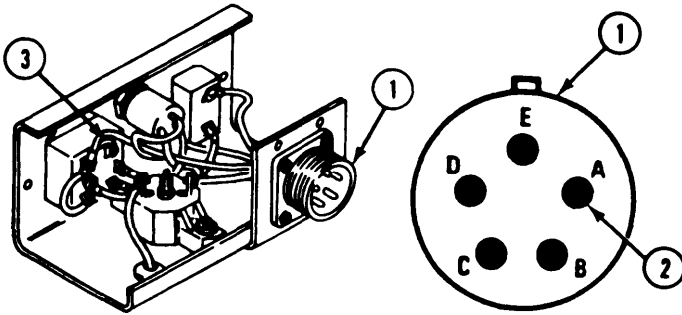
NO

1. Faulty control box to heater harness circuit 402.
2. Notify your supervisor.

1. Replace personnel heater fuel pump (page 29-8, 29-11, or 29-13).
2. Verify no faults found.

F

1. Remove heater control box (page 29-42).
2. Measure resistance between lead ends of heater output jack (1) pin A (2) and ON/OFF/START switch terminal 14 (3).
3. Does multimeter read 0 ohms?



NO

1. Replace faulty lead (page 14-3).
2. Verify no **faults** found.

YES

1. Replace heater ON/OFF/START switch (page 29-43).
2. Verify no faults found.

G

1. Is heater exhaust cold?

NO

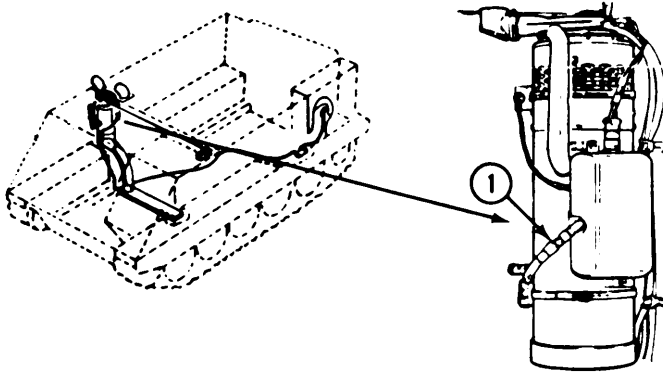
1. Defective flame detector switch.
2. Notify your supervisor.

YES

G1

**G1**

1. Loosen fuel inlet line (1) to heater with heater switch on start.
2. Does fuel fail to flow out of loosened fitting?

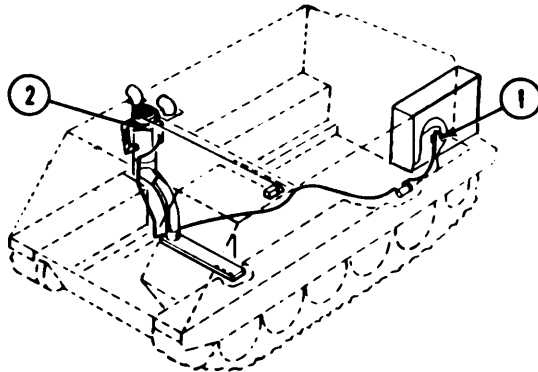


**NO**

1. Heater does not start.
2. Notify your supervisor.

**YES**

1. Inspect fuel lines between fuel tank (1) and heater (2).
2. are all lines free from kinks, restrictions, or other damage?



**NO**

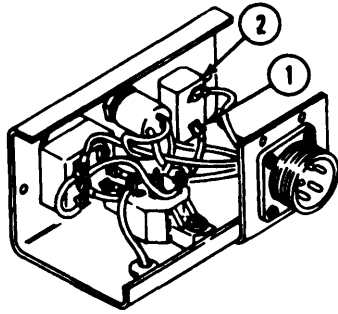
1. Replace heater fuel lines as required (Chapter 29).
2. Verify no faults found.

**YES**

1. Replace personnel heater fuel pump (page 29-8, 29-11, or 29-13).
2. Verify no faults found.

**H**

1. Remove heater control box (page 29-42).
2. Measure resistance between HI/LO switch terminals 12 (1) and 13 (2).
3. Does multimeter read 0 ohms?



**NO**

1. Replace heater HI/LO switch (page 29-43).
2. Verify no faults found.

**YES**

1. Repair lead between heater switch and jack or heater switch and ON/OFF/START switch (page 14-3).
2. Verify no faults found.

## COOLANT HEATER MALFUNCTIONS

### INITIAL SETUP

**Tools:**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)
- Electrical Connector Pliers (Item 44, App D)

**Personnel Required:**

- Unit Mechanic

**References:**

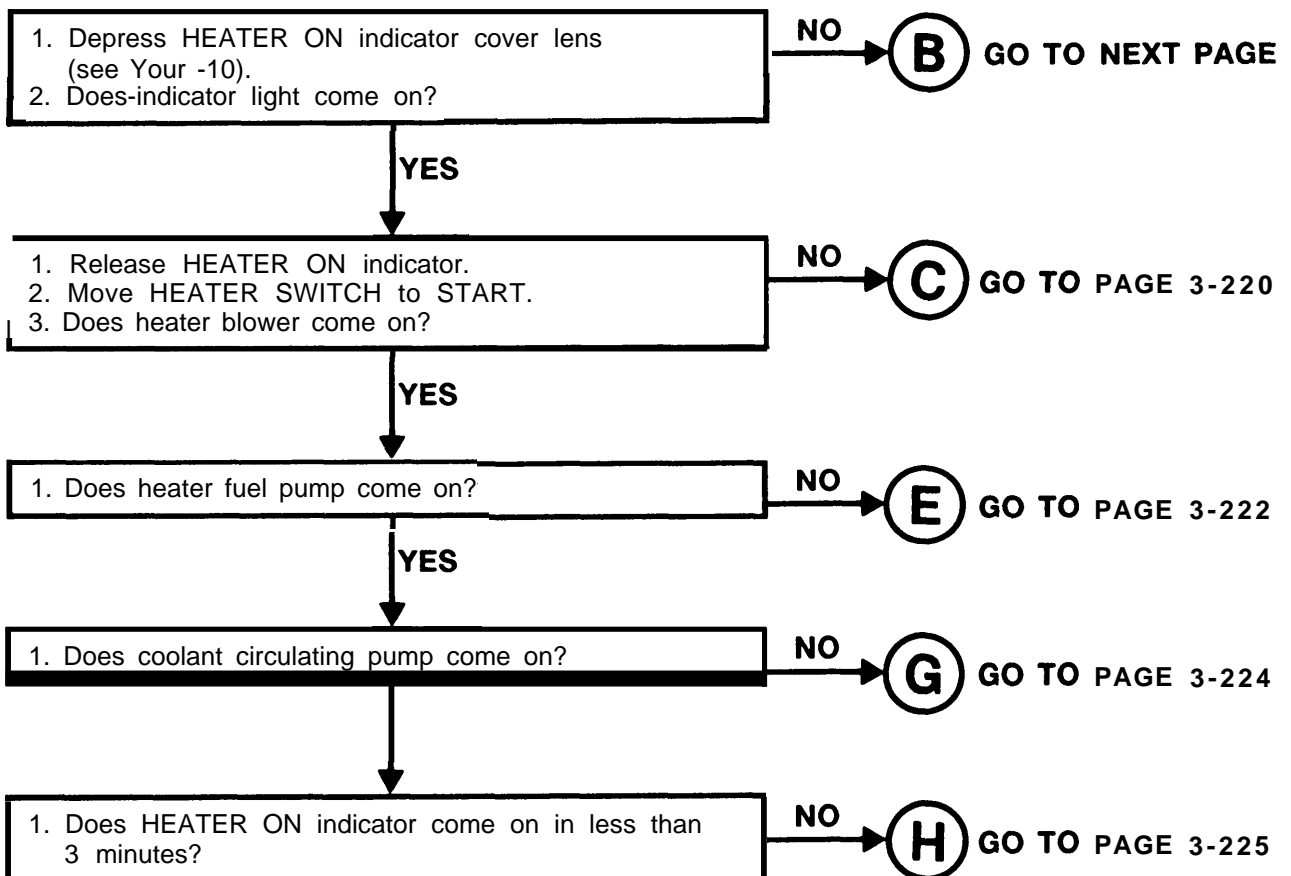
- See your -10

**Equipment Conditions:**

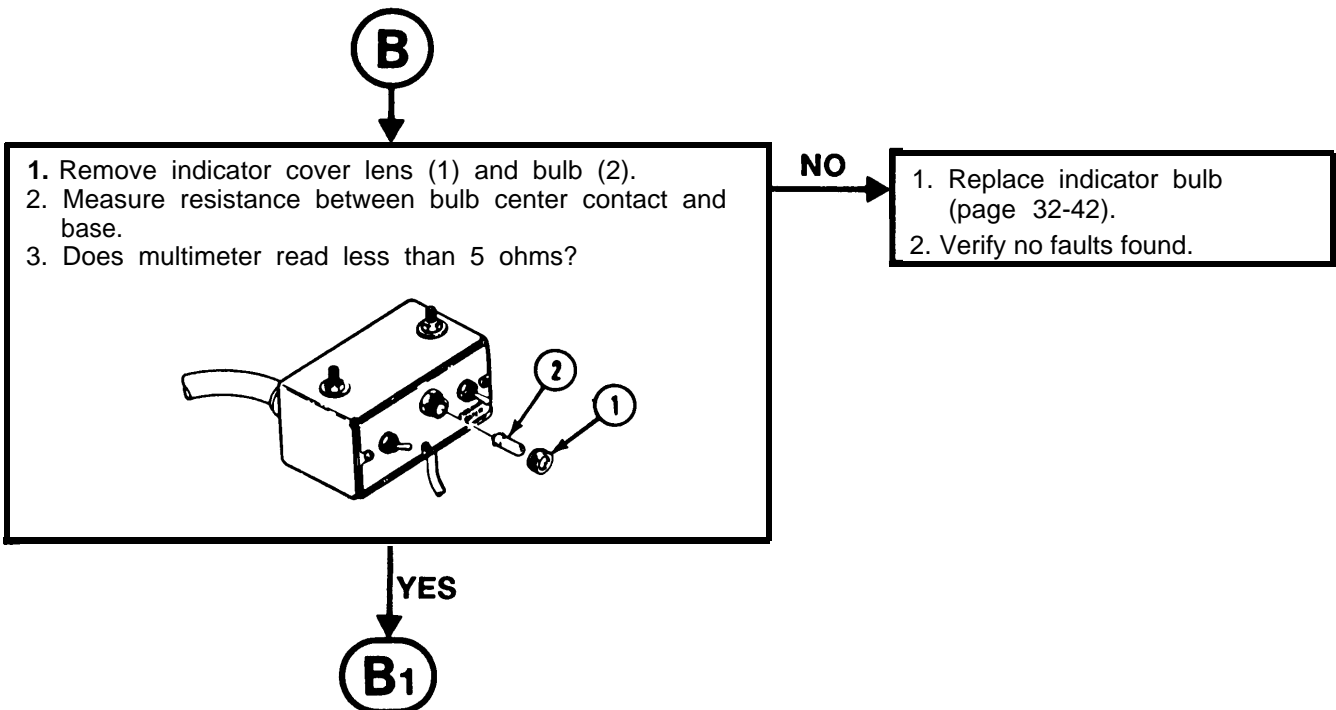
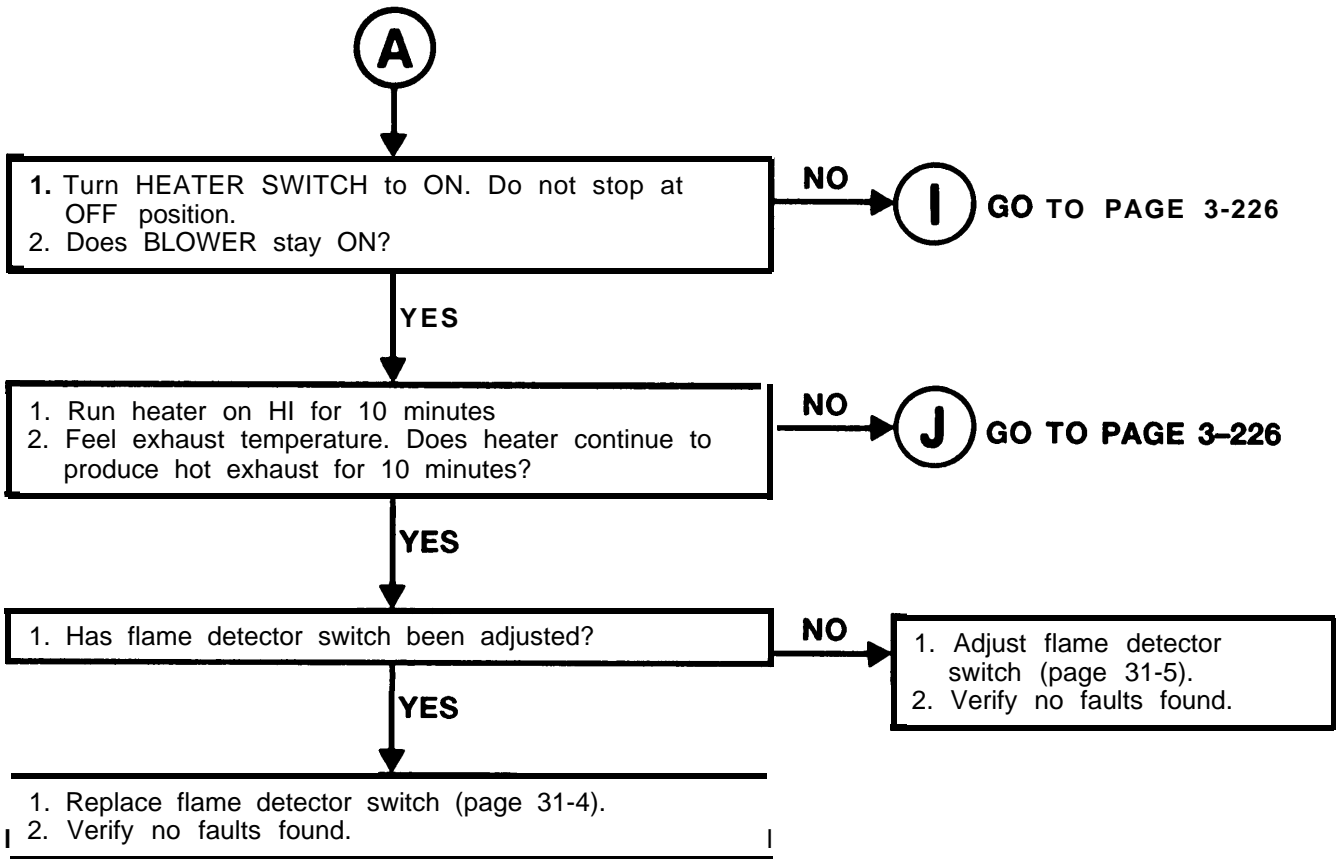
- Engine stopped/shutdown (see your -10)

**Equipment Conditions (cont):**

- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door open (see your -10)
- Ramp lowered (see your -10)
- Driver's power plant access panel removed (see Your -10)
- Power plant rear access panels removed (see your -10)
- Heater on HI (see your -10)
- Rear floor plates removed (page 24-37)
- Engine cold



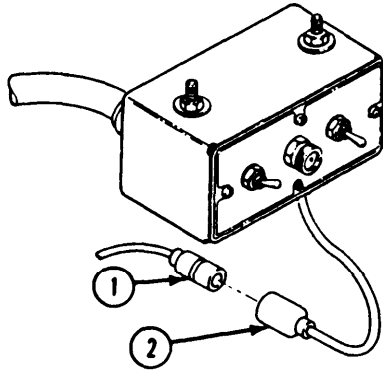
GO TO NEXT PAGE





**B1**

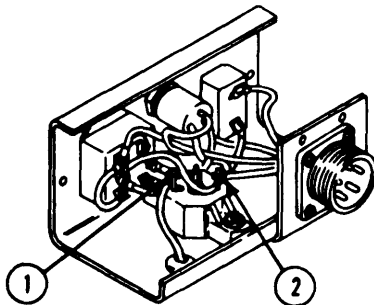
1. Remove rear main harness circuit 400A plug (1) from control box jack (2).
2. Measure voltage between rear main harness circuit 400A plug (1) pin and ground.
3. Does multimeter read more than 17 volts?



1. **Repair** rear main harness circuit 400 between master switch and heater control box (page 14-3).
2. Verify no faults found.

YES

1. Remove heater control box (page 32-42).
2. Measure resistance between lead ends from circuit breaker terminals 16 (1) and 17 (2).
3. Does multimeter read 0 ohms?



NO

1. Replace heater circuit breaker (page 32-42).
2. Verify no faults found.

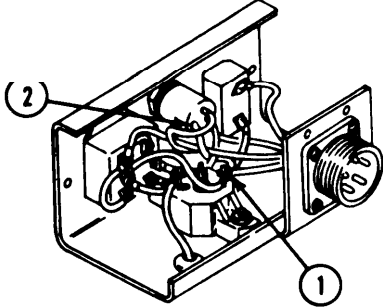
YES

**B2**

GO TO NEXT PAGE

**B<sub>2</sub>**

1. Measure resistance between lead ends from circuit breaker terminal 17 (1) to indicator light terminal 3 (2).
2. Does multimeter read 0 ohms?



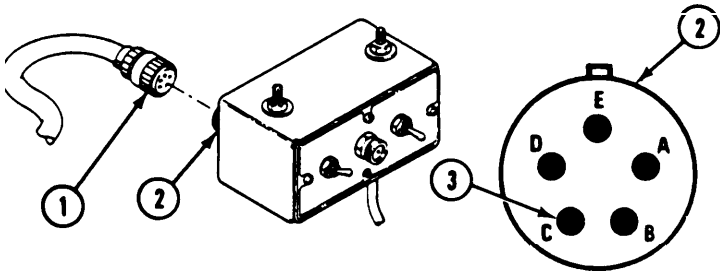
1. **Repair/replace** faulty lead (page 14-3).
2. **Verify** no faults found.

**YES**

1. Replace indicator light assembly (page 32-42).
2. Verify no faults found.

**C**

1. Remove heater harness plug (1) from heater control box jack (2).
2. Measure voltage between heater control box jack (2) pin C (3) and ground with HEATER switch on START.
3. Does multimeter read at more than 17 volts?



**NO**

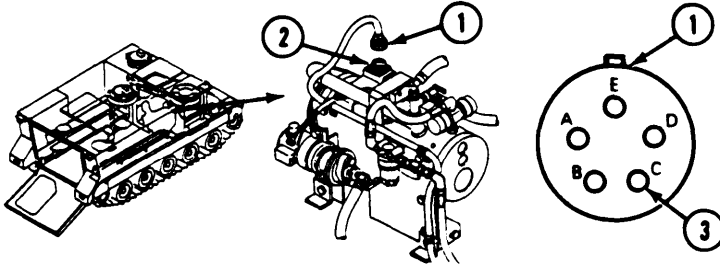
**D**

**YES**

**C<sub>1</sub>**

**C1**

1. Install heater harness plug on heater control box jack.
2. Remove heater harness plug (1) from heater jack (2).
3. Measure voltage between plug (1) pin C (3) and ground. With HEATER switch on START.
4. Does **multimeter** read at least 17 volts?.



**NO**

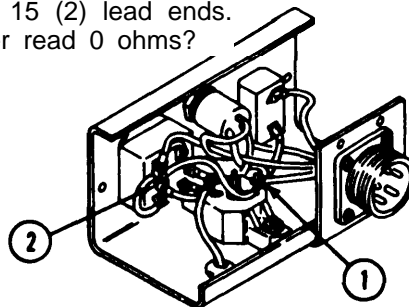
1. Faulty coolant heater harness.
2. Notify your supervisor.

**YES**

1. Replace coolant heater (page 32-49).
2. Verify no faults found.

**D**

1. Remove heater control box (page 32-42).
2. Measure resistance between lead ends from circuit breaker terminal 17 (1) and ON/OFF/START switch terminal 15 (2) lead ends.
3. Does multimeter read 0 ohms?



**NO**

1. Repair faulty lead (page 14-3).
2. Verify no faults found.

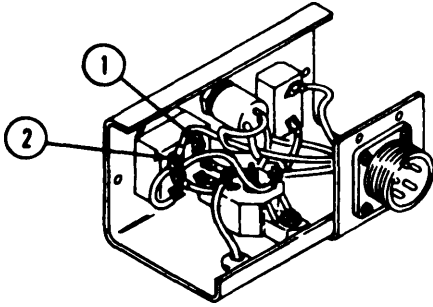
**YES**

**D1**

GO TO NEXT PAGE

**D1**

1. Measure resistance between lead ends from ON/OFF/START switch terminals 21 (1) and 14 (2).
2. Does multimeter read 0 ohms?



NO

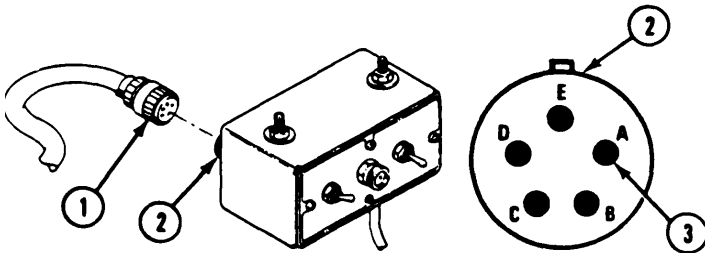
1. Repair heater switch jumper lead between terminal 21 and 14 (page 14-3).
2. Verify no faults found.

YES

1. Replace heater ON/OFF/START switch (page 32-42).
2. Verify no faults found.

**E**

1. Remove heater harness plug (1) from heater control jack (2).
2. Measure voltage between heater control jack (2) pin A (3) and ground with HEATER switch on START.
3. Does multimeter read more than 17 volts?



NO

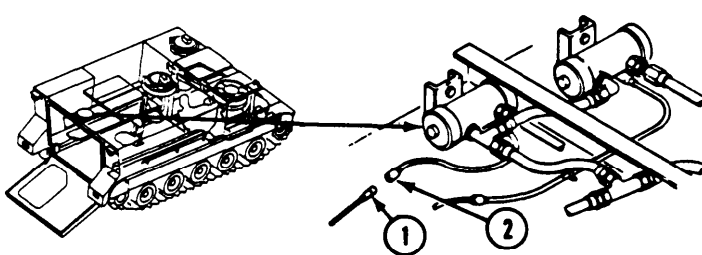
**F**

YES

**E1**

**E<sub>1</sub>**

1. Install heater harness on heater control box jack.
2. Remove heater harness 402A plug (1) from heater fuel pump jack (2).
3. Measure voltage between plug (1) pin and ground with HEATER switch on START.
4. Does multimeter read more than 17 volts?



**NO**

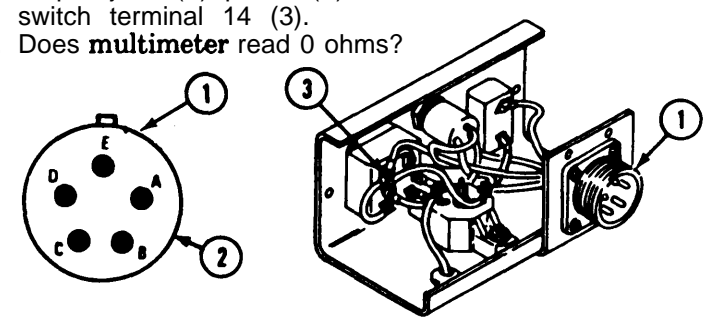
1. Faulty heater harness circuit 402.
2. Notify your supervisor.

**YES**

1. Replace coolant heater fuel pump (page 32-16).
2. Verify no faults found.

**F**

1. Remove heater control box (page 32-42).
2. Measure resistance between lead ends of heater output jack (1) pin A (2) and ON/OFF/START switch terminal 14 (3).
3. Does **multimeter** read 0 ohms?



**NO**

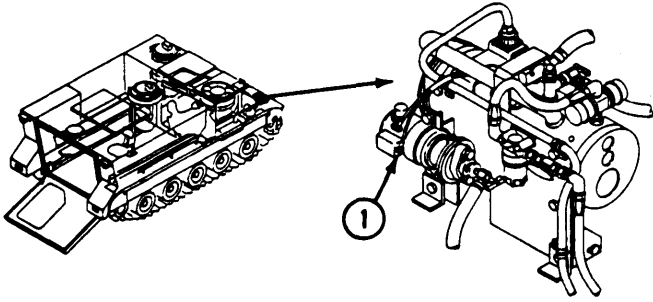
1. Repair/replace faulty lead (page 14-3).
2. Verify no faults found.

**YES**

1. Replace heater ON/OFF/START switch (page 32-42).
2. Verify no **faults** found.

G

1. Measure voltage between coolant pump to heater harness terminal circuit 402B (1) on coolant pump and ground with switch in start position.
2. Does multimeter read less than 17 volts?

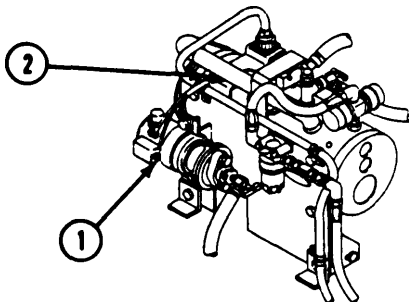


NO

1. Replace coolant heater pump (page 32-14).
2. Verify no faults found.

YES

1. Measure voltage between coolant pump to heater harness circuit 402B (1) on terminal strip (2) and ground with switch in start position.
2. Does multimeter read less than 17 volts?

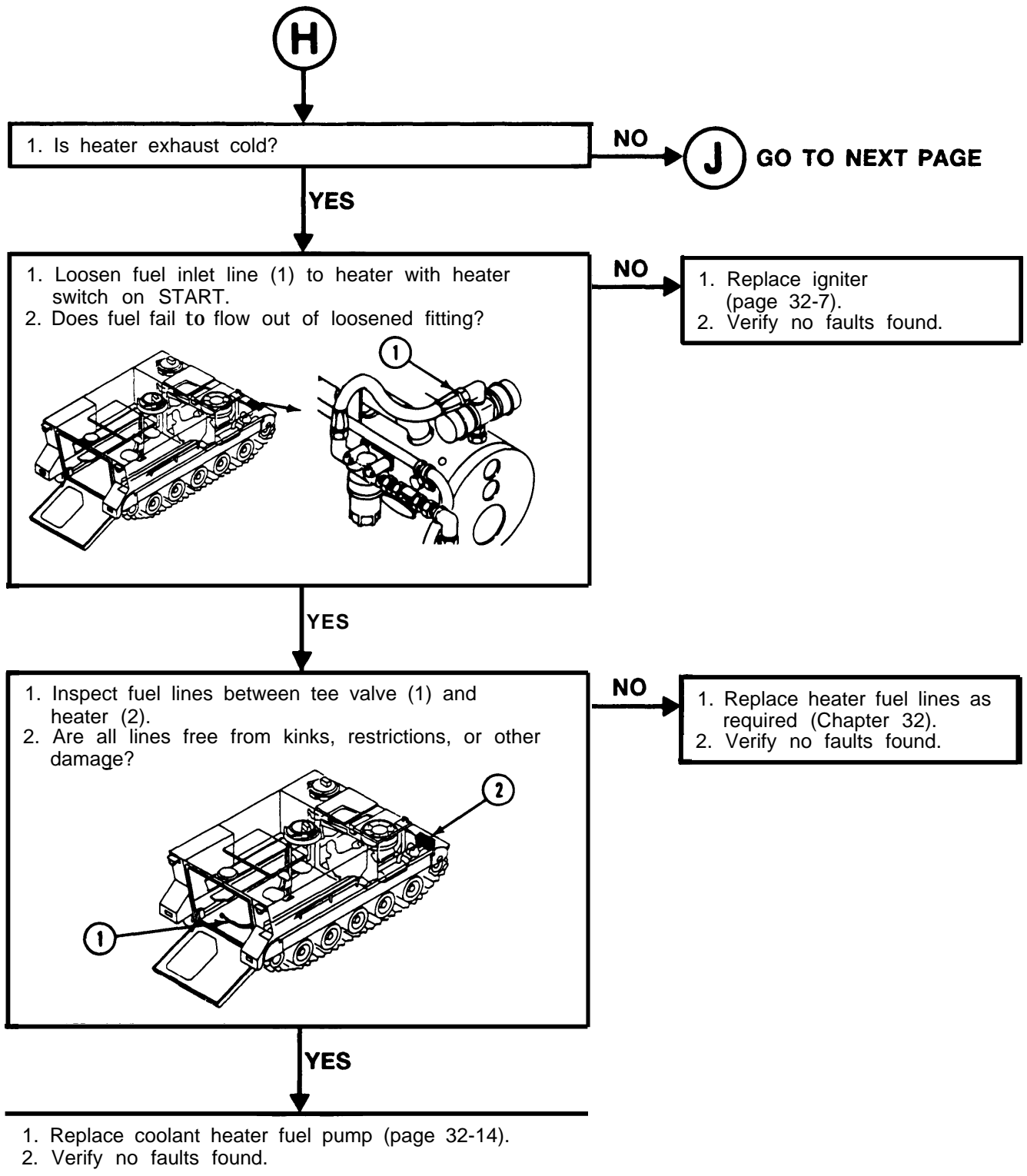


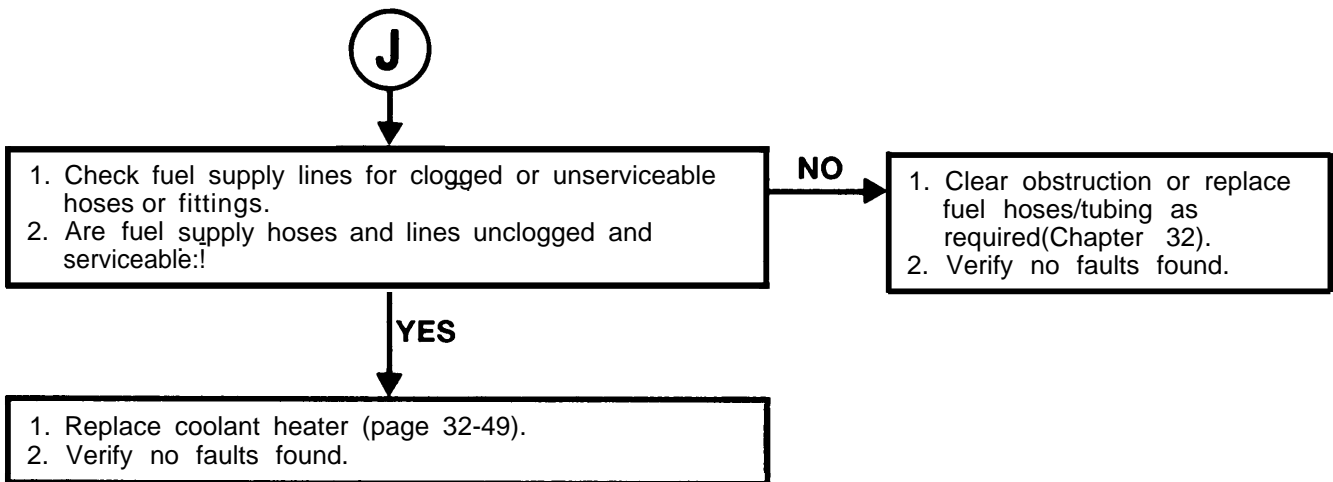
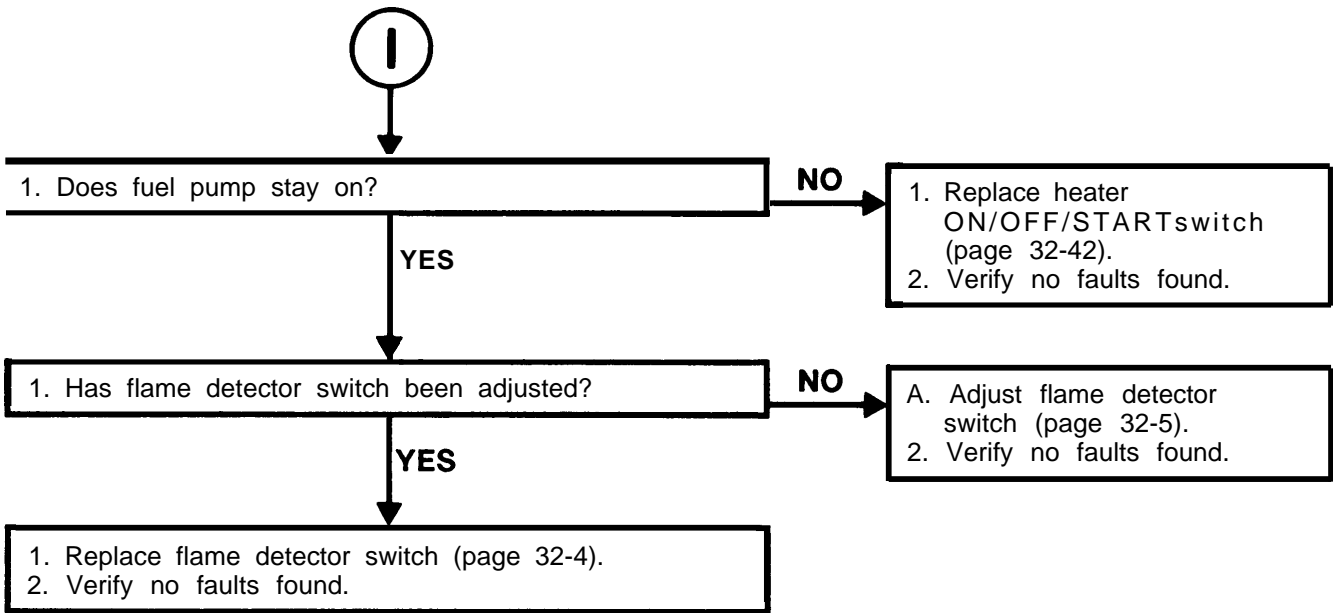
NO

1. Replace coolant pump to heater harness (page 32-44).
2. Verify no faults found.

YES

1. Replace coolant heater (page 32-49).
2. Verify no faults found.







---

**POWER CONTROL ENCLOSURE A1 DC INPUT/OUTPUT  
INOPERATIVE**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

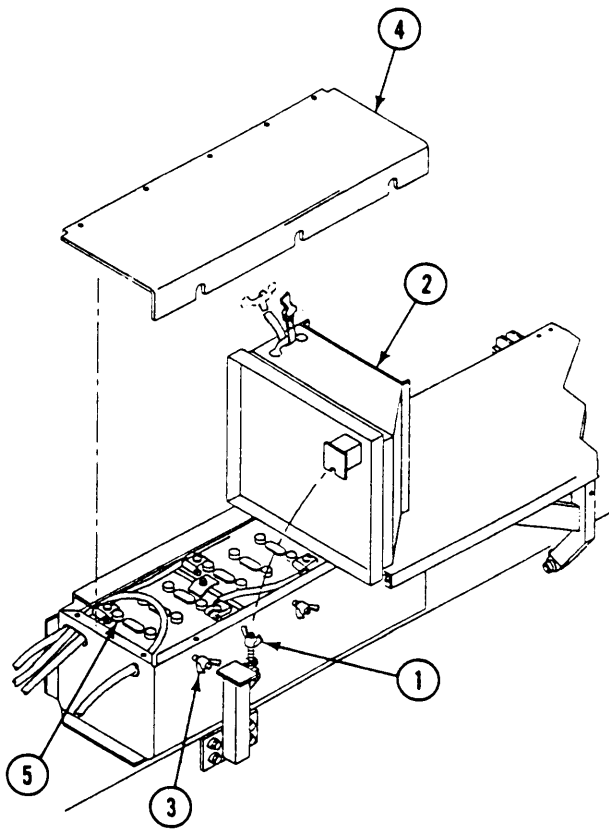
**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



**GO TO NEXT PAGE**

**A**

1. Loosen wing nut (1) and raise FAX hinged extension (2).
2. Loosen three wing nuts (3) and remove battery box cover (4).
3. Measure voltage between positive battery terminal (5) and ground.
4. Does multimeter read 22 volts DC or more?



**NO**

1. Service earner batteries (see your -10).
2. Verify no faults found.

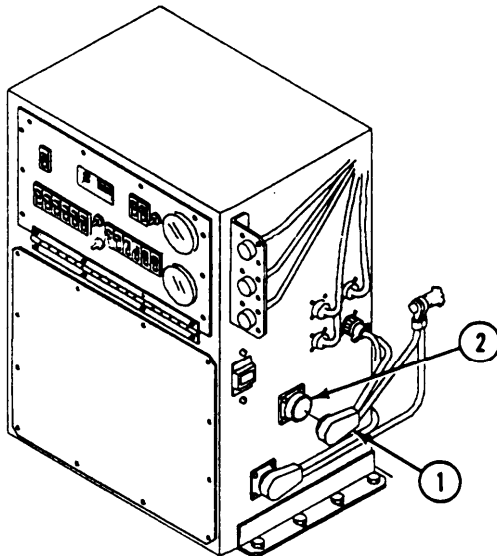
**A1**

**A1**

1. Remove cable W4 plug P1 (1) from Power Control Enclosure jack J25 (2).
2. Measure voltage between center of P1 (1) and ground.
3. Does multimeter read 22 volts DC or more?

**NO**

1. Replace cable W4 (page 40.1-60).
2. Verify no faults found.



**YES**

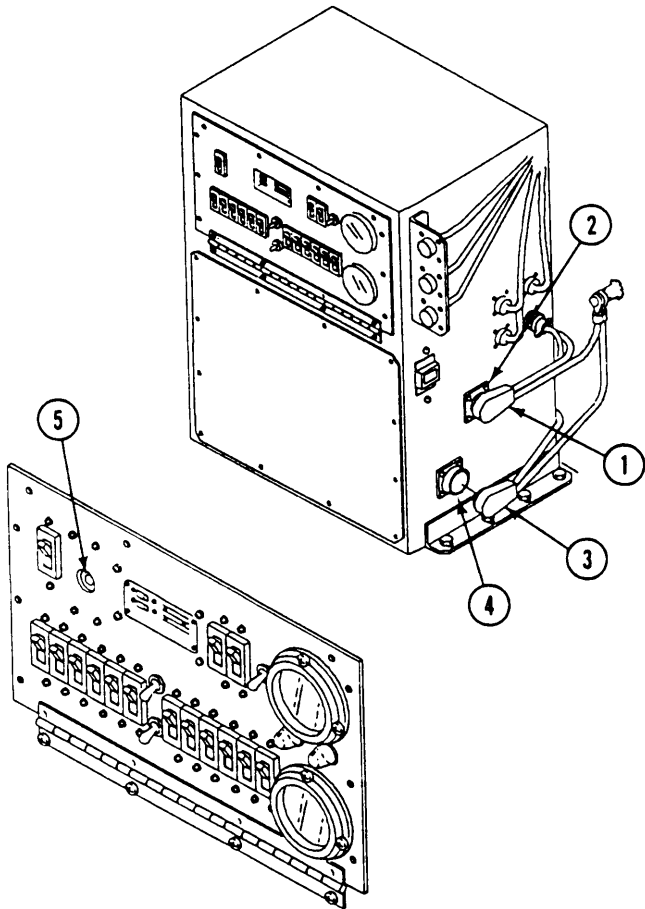
**A2**

**GO TO NEXT PAGE**

**A2**

1. Install cable W4 plug P1 (1) on Power Control Enclosure jack J25 (2).
2. Remove cable W6 plug P5 (3) from Power Control Enclosure jack J26 (4).
3. Turn MASTER SWITCH to ON and have helper press DC TO INVERTERS button (5) on Power Control Enclosure panel (see your -10 and TM 11-7010-256-128&P).
4. Measure voltage between center of J26 (4) and ground.
5. Does multimeter read 22 volts DC or more?

NO → **B** GO TO PAGE 3-226.6



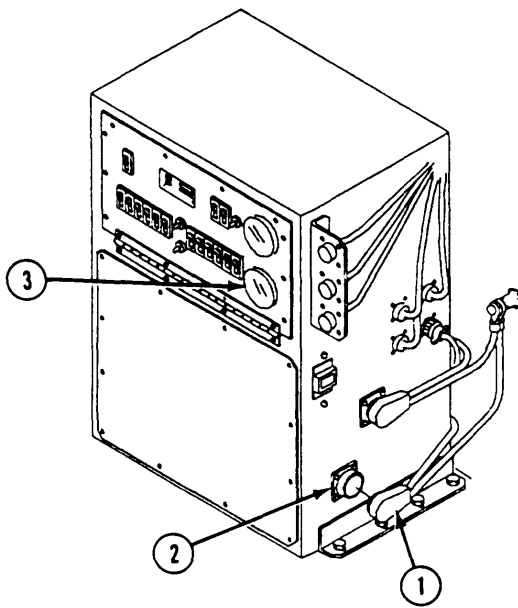
**A3**

1. Set MASTER SWITCH to OFF (see your -10).
2. Install cable W6 plug P5 (1) on Power Control Enclosure jack J26 (2).
3. Set MASTER SWITCH to ON (see your -10).
4. Does voltage on DC VOLTS meter (3) on Power Control Enclosure panel read the same as voltage at earner batteries?

NO



GO TO PAGE 3-226.10



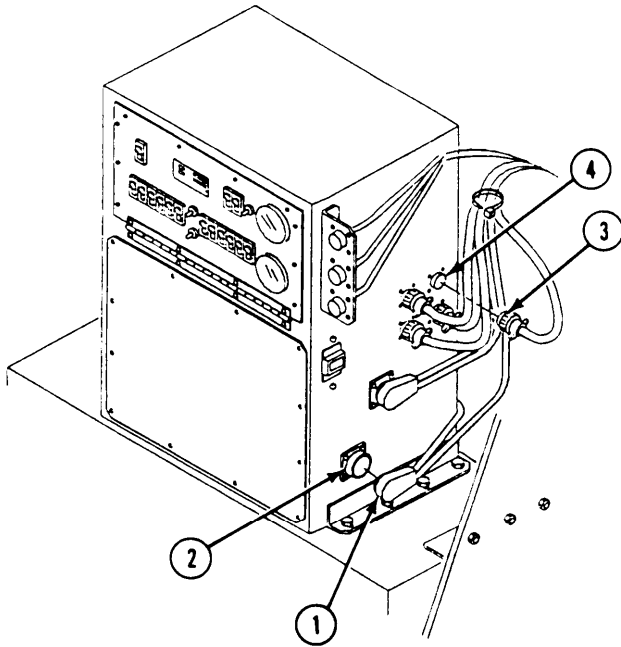
YES

1. Verify no faults found.

**B**

1. Set MASTER SWITCH to OFF (see your -10).
2. Install cable W6 plug P5 (1) on Power Control Enclosure jack J26 (2).
3. Remove cable W38 plug P7 (3) from Power Control Enclosure jack J28 (4).
4. Set MASTER SWITCH to ON (see your -10).
5. Measure voltage between center of P7 (3) and ground.
6. Does multimeter read 22 volts DC or more?

NO → **D** GO TO PAGE 3-226.11



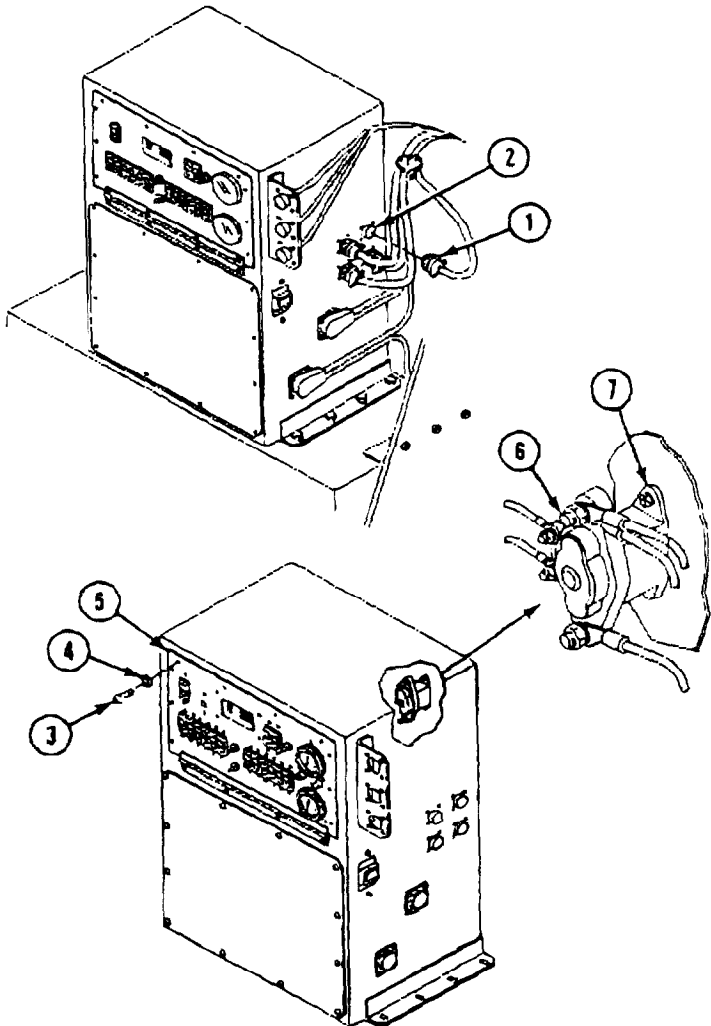
YES  
↓  
**B1**

**B1**

1. Set MASTER SWITCH to OFF (see your -10).
2. Install cable W38 plug P7 (1) on Power Control Enclosure jack J28 (2).
3. Remove ten screws (3) and lockwashers (4), and lower faceplate (5). Discard lockwashers.
4. Set MASTER SWITCH to ON (see your -10).
5. Measure voltage between terminal X1 (6) of relay K6 (7) and ground.
6. Does multimeter read 22 volts DC or more?

NO

1. Faulty circuit 44A in Power Control Enclosure.
2. Notify your supervisor.



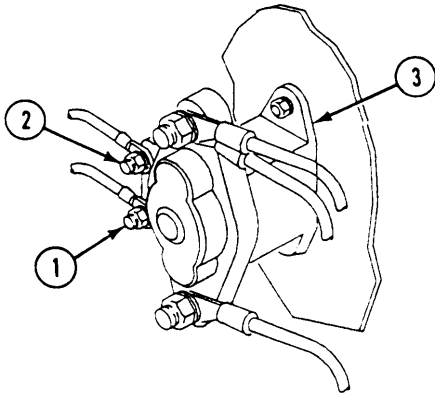
YES

**B2**

GO TO NEXT PAGE

**B2**

1. Measure voltage between terminals XI (1) and X2 (2) of relay K6 (3).
2. Does multimeter read 22 volts DC or more?

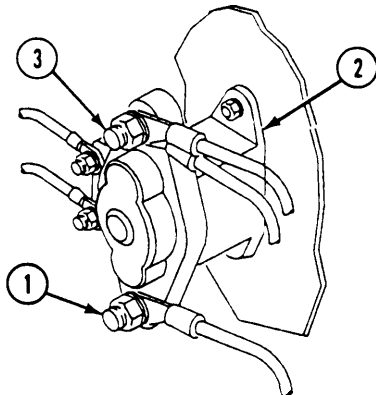


**NO**

1. Faulty relay K6 in Power Control Enclosure.
2. Notify your supervisor.

**YES**

1. Measure voltage between terminal AI (1) of relay K6 (2) and ground.
2. Repeat measurement between terminal A2 (3) and ground.
3. Does multimeter read 22 volts DC or more for both measurements?



**NO**

1. Faulty relay K6 in Power Control Enclosure.
2. Notify your supervisor.

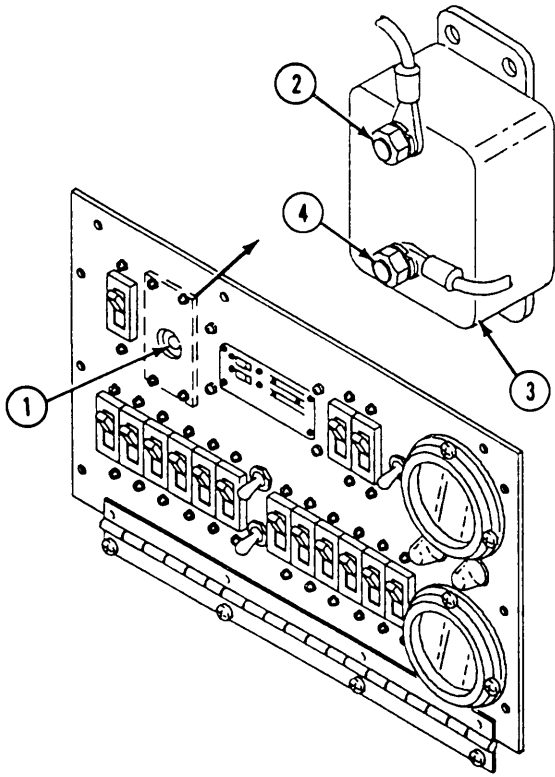
**YES**

**B3**



**B3**

1. Have helper depress DC TO INVERTERS button (1) on Power Control Enclosure panel.
2. Measure voltage between terminal 1 (2) of circuit breaker CB2 (3) and ground.
3. Repeat measurement between terminal 2 (4) and ground.
4. Does multimeter read 22 volts DC or more for both measurements?

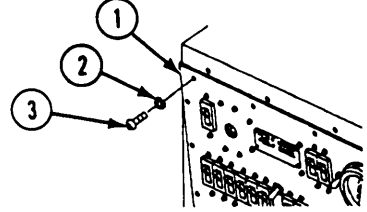


**NO**

1. Replace circuit breaker CB2 (page 40.1-33).
2. Verify no faults found.

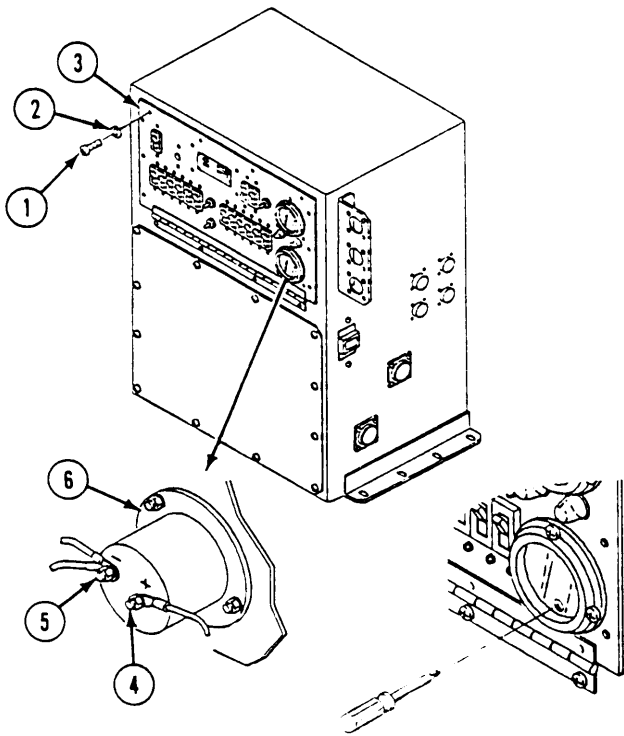
**YES**

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Verify no faults found.





1. Turn all vehicle power OFF (see your -10 and TM 11-7010-256-12&P).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Set MASTER SWITCH to ON (see your -10).
4. Measure voltage between positive (4) and negative (5) terminals on meter M2 (6).
5. Does multimeter read 22 volts DC or more, and the same as meter M2?

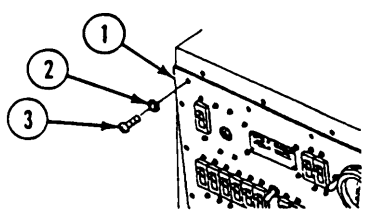


NO →

1. Adjust meter M2 needle to match multimeter reading.
2. If meter cannot be adjusted, replace DC meter M2 (page 40.1-29).
3. Verify no faults found.

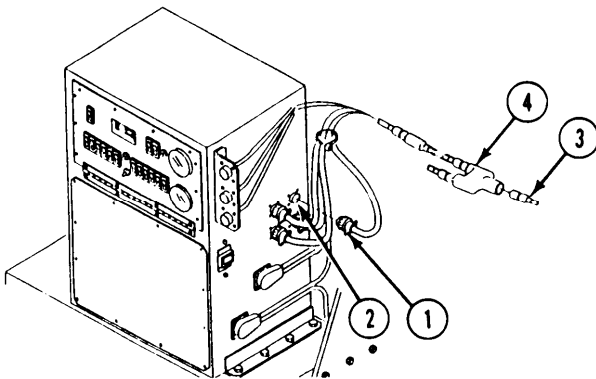
↓ YES

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Verify no faults found.



**D**

1. Set MASTER SWITCH to OFF (see your -10).
2. Install cable W38 plug P7 (1) on Power Control Enclosure jack J28 (2).
3. Remove circuit 415 plug P1 (3) from adapter T2 plug P1 (4).
4. Set MASTER SWITCH to ON (see your -10).
5. Measure voltage between circuit 415 plug P1 (3) and ground.
6. Does multimeter read 22 volts DC or more?

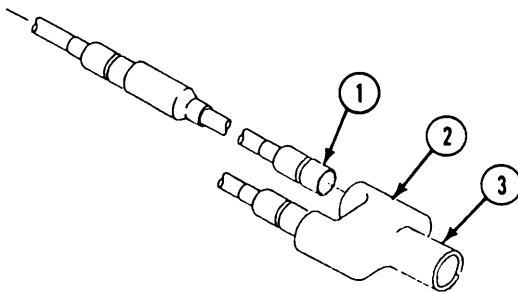


**NO**

1. Go to: MASTER SWITCH ON indicator does not light (page 3-129).

**YES**

1. Set MASTER SWITCH to OFF (see your -10).
2. Remove cable W29 plug P1 (1) from adapter T2 plug P2 (2).
3. Measure resistance between adapter T2 plugs P2 (2) and P1 (3).
4. Does multimeter read 0 ohms?



**NO**

1. Replace adapter T2 (page 40.1-84).
2. Verify no faults found.

**YES**

**D1**

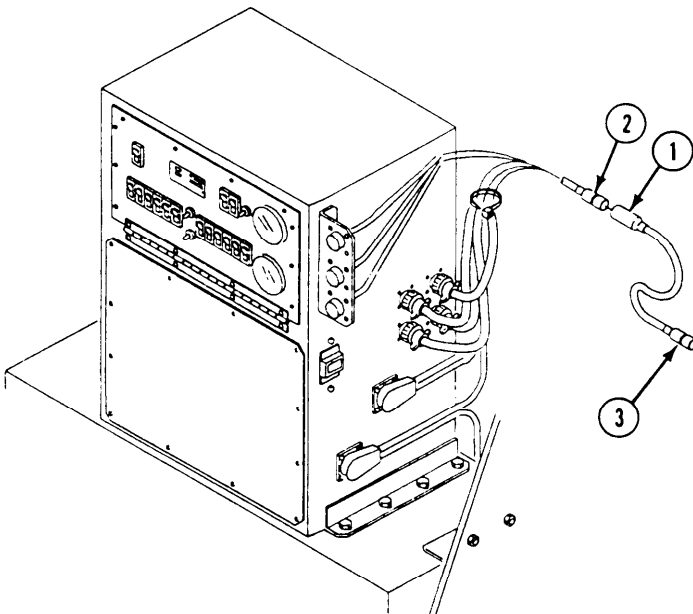
GO TO NEXT PAGE

**D1**

1. Remove cable W29 plug P2 (1) from cable W38 plug P6 (2).
2. Measure resistance between plugs P2 (1) and P1 (3) of cable W29.
3. Does multimeter read 0 ohms?

**NO**

1. Replace cable W29 (page 40.1-84).
2. Verify no faults found.

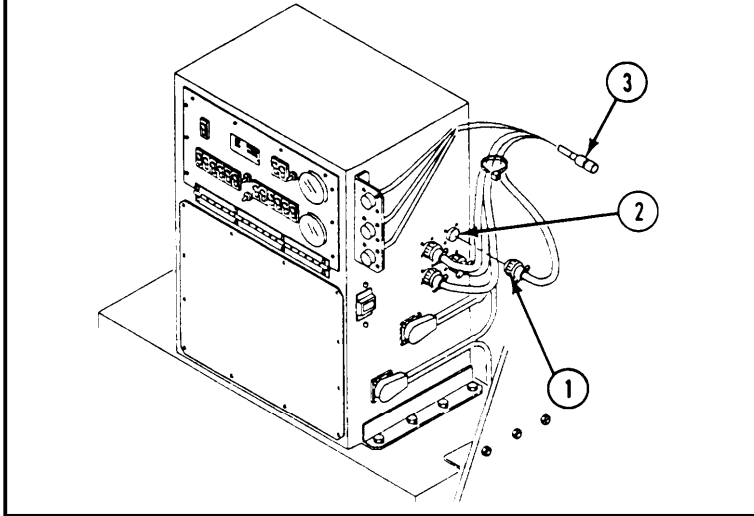


**YES**

**D2**

**D2**

1. Remove cable W38 plug P7 (1) from Power Control Enclosure jack J28 (2).
2. Measure resistance between center of plugs P7 (1) and P6 (3) of cable W38.
3. Does multimeter read 0 ohms?

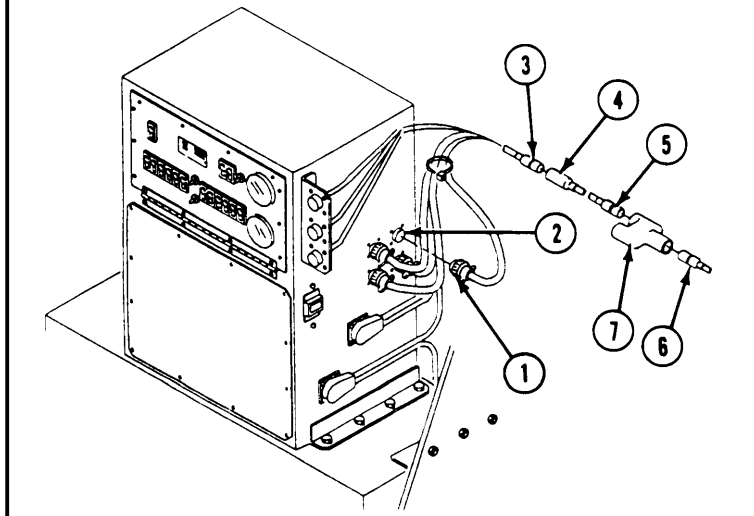


**NO**

1. Replace cable W38 (page 40.1-84).
2. Verify no faults found.

**YES**

1. Install cable W38 plug P7 (1) on Power Control Enclosure jack J28 (2).
2. Install cable W38 plug P6 (3) on cable W29 plug P2 (4).
3. Install cable W29 plug P1 (5) and circuit 415 plug P1 (6) on adapter T2 (7).
4. Verify no faults found.



---

## NO AC POWER FROM TENT INTERFACE PANEL A5

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment.  
**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.

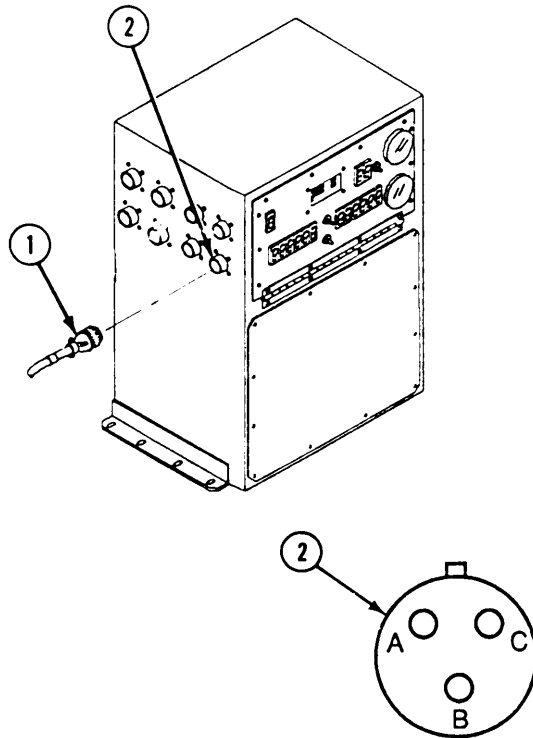


**A**

1. Remove cable W32, plug P15 (1) from Power Control Enclosure jack J32 (2).
2. Apply AC power to SICPS system, (See TM 11-7010-256-12&P).
3. Measure voltage between socket A to socket B of jack J32 (2) and then socket A to socket C.
4. Does multimeter read 110 volts AC or more for each measurement?

NO **B**

GO TO PAGE 3-226.17



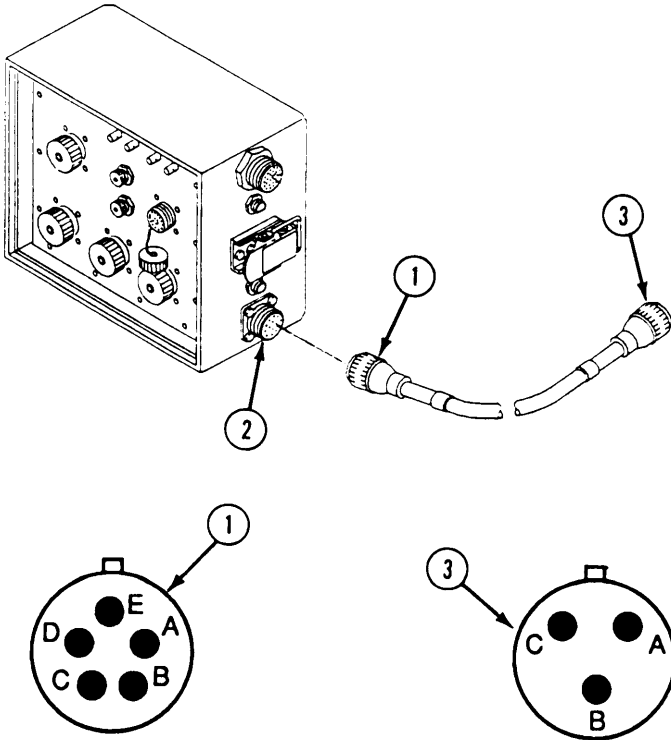
YES

**A1**

GO TO NEXT PAGE

**A1**

1. Turn all power OFF,  
(see your -10 and TM 11-7010-256-12&P).
2. Remove cable W32, plug P6 (1) from Tent Interface Panel jack J7 (2).
3. Measure resistance between pins on P6 (1) and P15 (3) of cable W32 as follows:  
P6 pin C to P15 pin A  
P6 pin D to P15 pin B  
P6 pin E to P15 pin C
4. Does multimeter read 0 ohms for each set of measurements?



**NO**

1. Replace cable W32  
(page 40.1-78).
2. Verify no faults found.

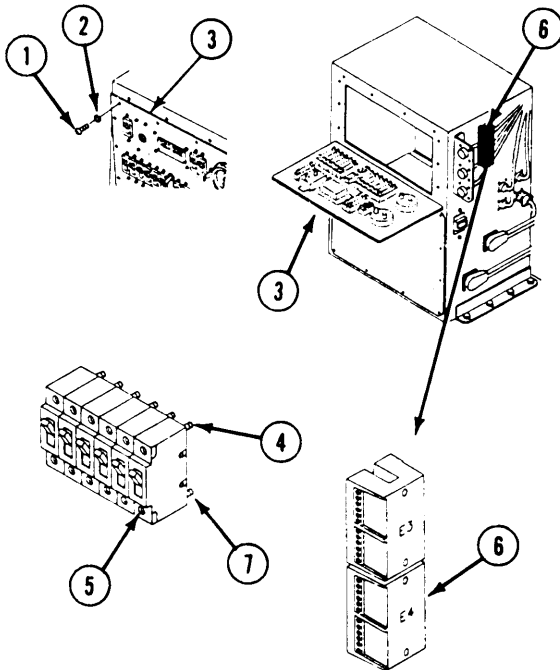
**YES**

1. Faulty Tent Interface Panel.
2. Notify your supervisor.



**B**

1. Remove ALL power from SICPS system, (see your -10 and TM 11-7010-256-12&P).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Apply AC power to the SICPS system, (see your -10 and TM 11-7010-256-12&P).
4. Set AC TENT INTERFACE PANEL circuit breaker to ON, (see TM 11-7010-256-12&P).
5. Measure voltage between terminal 1 (4) of circuit breaker CB10 (5) to anywhere on bus bar E4 (6). Repeat measurement for terminal 2 (7) to bus bar E4.
6. Does multimeter read 110 volts AC for each measurement?



NO

1. Replace circuit breaker CB10 (page 40.1-33).
2. Verify no faults found.

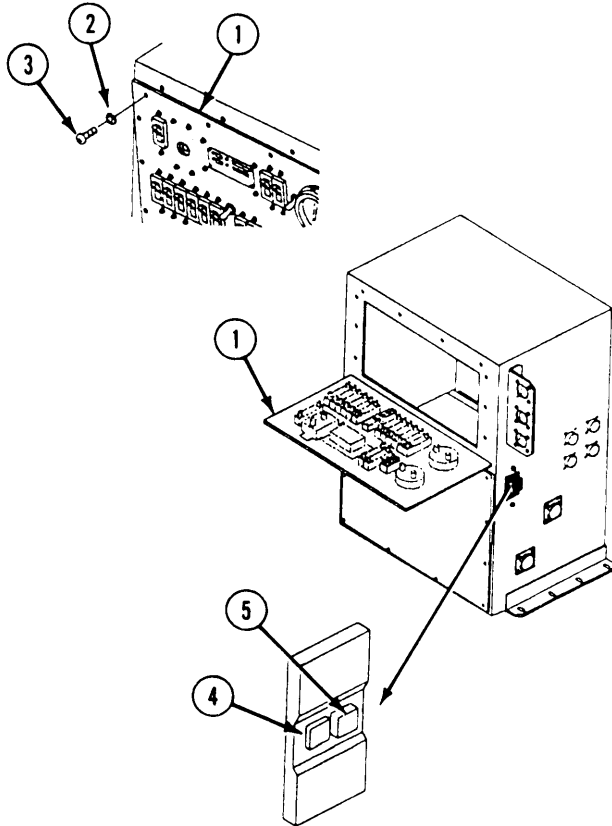
YES

**B<sub>1</sub>**

GO TO NEXT PAGE

**B1**

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Press ground fault interrupter TEST button (4).
3. Does RESET button (5) pop out?



**NO**

1. Faulty ground fault interrupter.
2. Notify your supervisor.

**YES**

1. Go to: No Power To AC Circuits (page 3-226.97).

---

**NO DC POWER FROM TENT INTERFACE PANEL A5**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)


**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment. **DO NOT** attempt power cable connections until grounding system and signal/data cabling have been completed.



GO TO NEXT PAGE

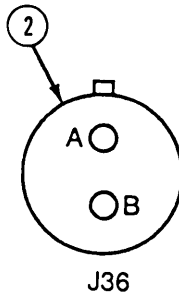
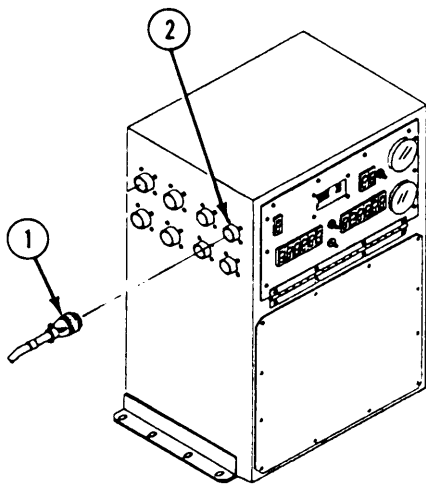
**A**

1. Remove cable W32, plug P16 (1) from Power Control Enclosure jack J36 (2).
2. Turn MASTER SWITCH to ON (see your -10).
3. Set DC TENT INTERFACE panel switch to ON (see TM 11-7010-256-12&P).
4. Measure voltage between jack J36 (2) socket A to socket B.
5. Does multimeter read 22 volts DC or more?

NO

**B**

GO TO PAGE 3-226.22

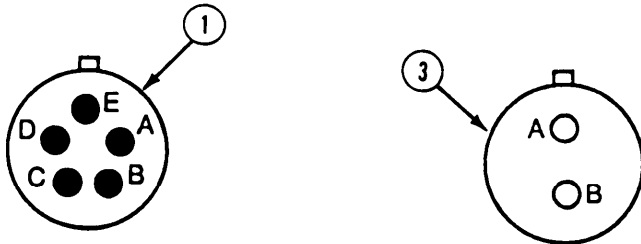
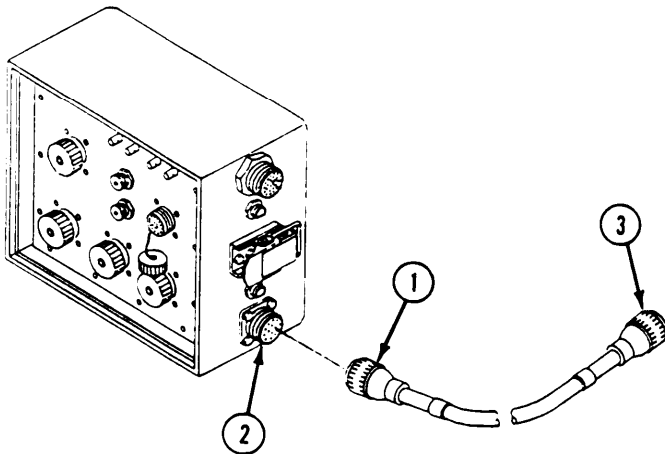


YES

**A1**

**A1**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove cable W32, plug P6 (1) from TENT INTERFACE panel jack J7 (2).
3. Measure resistance between pin A on plug P6 (1) and pin A on P16 (3) of cable W32. Repeat for pins B.
4. Does multimeter read 0 ohms for each set of measurements?



**NO**

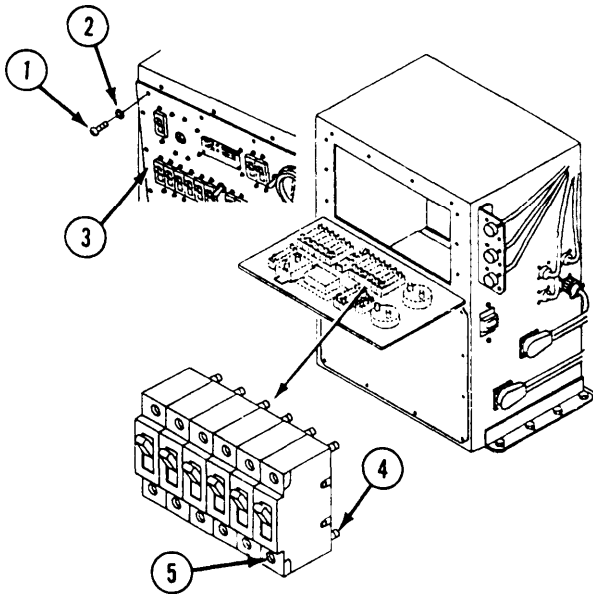
1. Replace cable W32 (page 40.1-78).
2. Verify no faults found.

**YES**

1. Faulty Tent Interface Panel.
2. Notify your supervisor.

**B**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove ten screws (1) and lockwashers (2) and lower faceplate (3). Discard lockwashers.
3. Set DC TENT INTERFACE panel circuit breaker to ON (see TM 11-7010-256-12&P).
4. Measure resistance between terminals (4) of circuit breaker CB16 (5).
5. Does multimeter read 0 ohms?

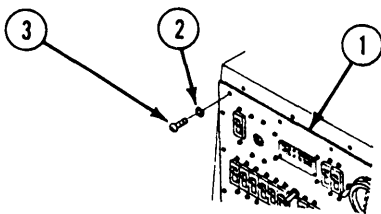


**NO**

1. Replace circuit breaker CB16 (page 40.1-33).
2. Verify no faults found.

**YES**

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Go to: Power Control Enclosure DC Input/Output Inoperative (page 3-226.1).



---

**NO POWER FROM ROADSIDE AC POWER EXTENSION BOX A6**

---

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

**See your -10**  
 TM 11-7010-256-12&P  
 See M1068 Wiring Diagram  
 (FO-9 thru FO-11)

**Personnel Required:**


Power-Generation Equipment Repairer 52D10  
 Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

---

**WARNING**



**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



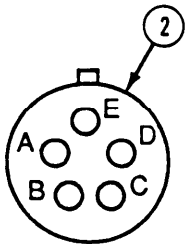
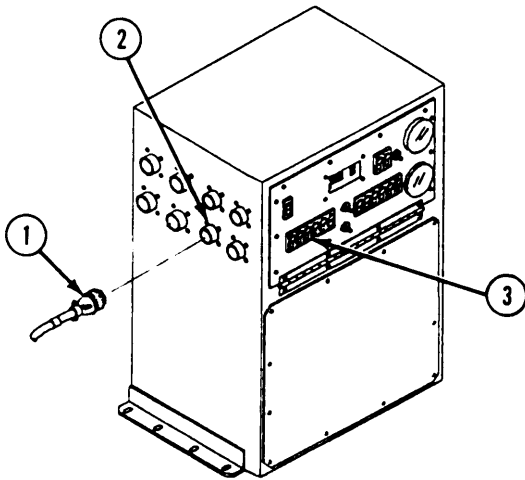
**GO TO NEXT PAGE**

**A**

1. Remove cable W7 plug P10 (1) from Power Control Enclosure jack J30 (2).
2. With AC power accepted, set AC LEFT OUTLETS switches (3) on Power Control Enclosure panel to ON (see TM 11-7010-256-12&P).
3. Measure voltage between sockets A and B of jack J30 (2). Repeat measurement for sockets C and D.
4. Does multimeter read 110 volts AC or more for both measurements?

NO **B**

GO TO PAGE 3-226.26

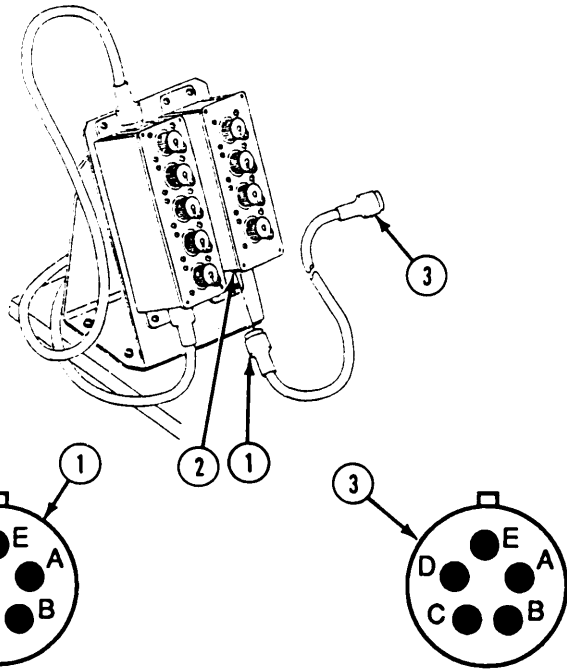


**A1**



**A1**

1. Set AC LEFT OUTLETS switches to OFF and remove all power from SICPS system (see your-10 and TM 11-7010-256-12&P).
2. Remove cable W7 plug P1 (1) from Roadside AC Power Extension Box jack J1 (2).
3. Measure resistance between pins of plugs P1 (1) and P10 (3) on cable W7 as follows:
  - P1 pin A to P10 pin A
  - P1 pin B to P10 pin B
  - P1 pin C to P10 pin C
  - P1 pin D to P10 pin D
  - P1 pin E to P10 pin E
4. Does multimeter read 0 ohms for each set of pins?



**NO**

1. Replace cable W7 (page 40.1-66).
2. Verify no faults found.

**YES**

1. Replace Roadside AC Power Extension Box A6 (page 40.1-48).
2. Verify no faults found.

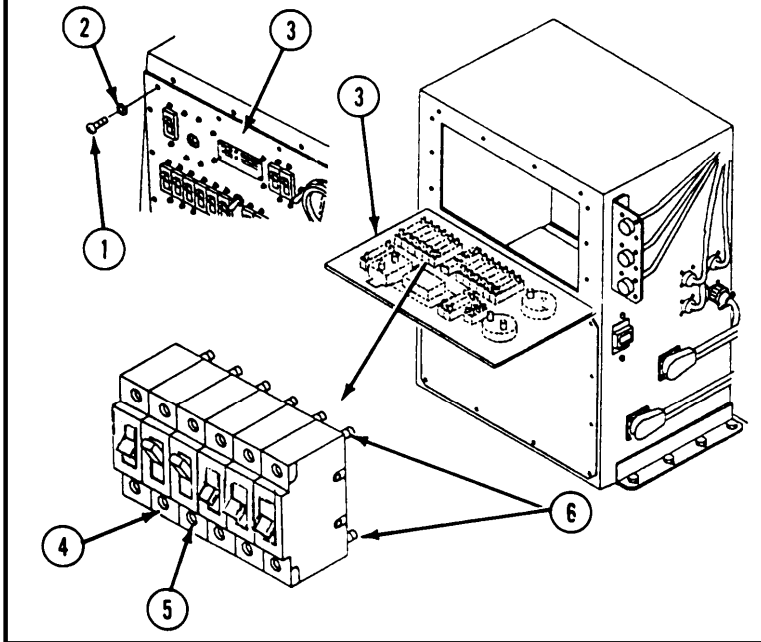
**B**

1. Turn MASTER POWER switch to OFF (see your -10 and TM 11-7010-256-12&P).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Turn ON AC LEFT OUTLETS circuit breakers CB6 (4) and CB7 (5).
4. Measure resistance between terminals 1 and 2 (6) of circuit breakers CB6 (4) and CB7 (5).
5. Does multimeter read 0 ohms for each measurement?

NO

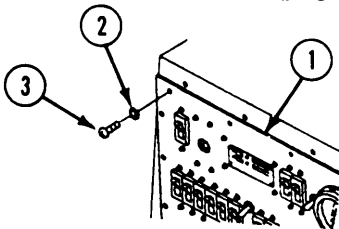
**NOTE**  
Resistance in CB6 and CB7 should be 0 ohms. If any resistance is present, replace that CB.

1. Replace circuit breaker CB6 and/or CB7 (page 40.1-33).
2. Verify no faults found.



YES

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Go to: No Power To AC Circuits (page 3-226.97).



**NO POWER FROM CURBSIDE AC POWER EXTENSION BOX A7**

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**


See your -10  
 TM 11-7010-256-12&P  
 See M1068 Wiring Diagram  
 (FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
 Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)



**WARNING**

**HIGH VOLTAGE** is used in the operatio of this equipment.  
**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

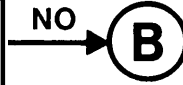
**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



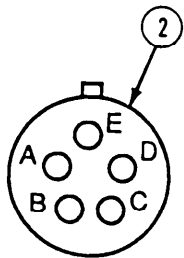
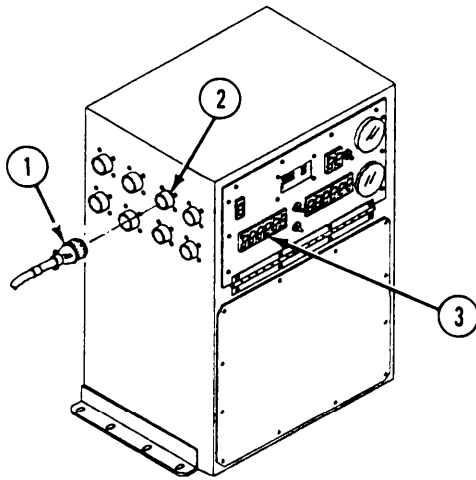
**GO TO NEXT PAGE**



1. Remove cable W8 plug P11 (1) from Power Control Enclosure jack J31 (2).
2. With AC power accepted, set AC RIGHT OUTLETS switches (3) on Power Control Enclosure panel to ON (see TM 11-7010-256-12&P).
3. Measure voltage between sockets A and B of jack J31 (2). Repeat measurement for sockets C and D.
4. Does multimeter read 110 volts AC or more for both measurements?



GO TO PAGE 3-226.30

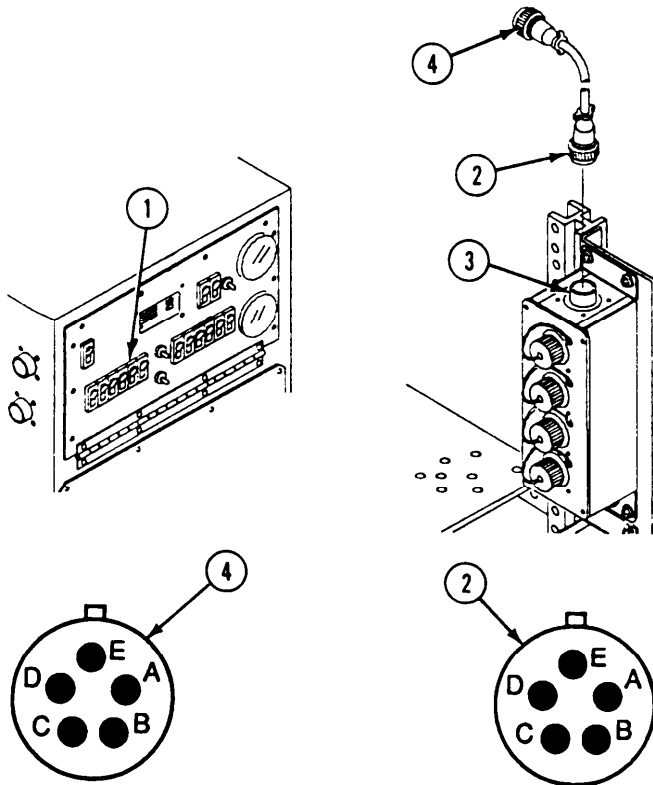


**A1**

1. Set AC RIGHT OUTLETS switches (1) to OFF and remove ALL power from SICPS system (see your -10 and TM 11-7010-256-12&P).
2. Remove cable W8 plug P1 (2) from Curbside AC Power Extension Box jack J1 (3).
3. Measure resistance between pins of plugs P1 (2) and P11 (4) on cable W8 as follows:
  - P1 pin A to P11 pin A
  - P1 pin B to P11 pin B
  - P1 pin C to P11 pin C
  - P1 pin D to P11 pin D
  - P1 pin E to P11 pin E
4. Does multimeter read 0 ohms for each set of pins?

**NO**

1. Replace cable W8 (page 40.1-68).
2. Verify no faults found.

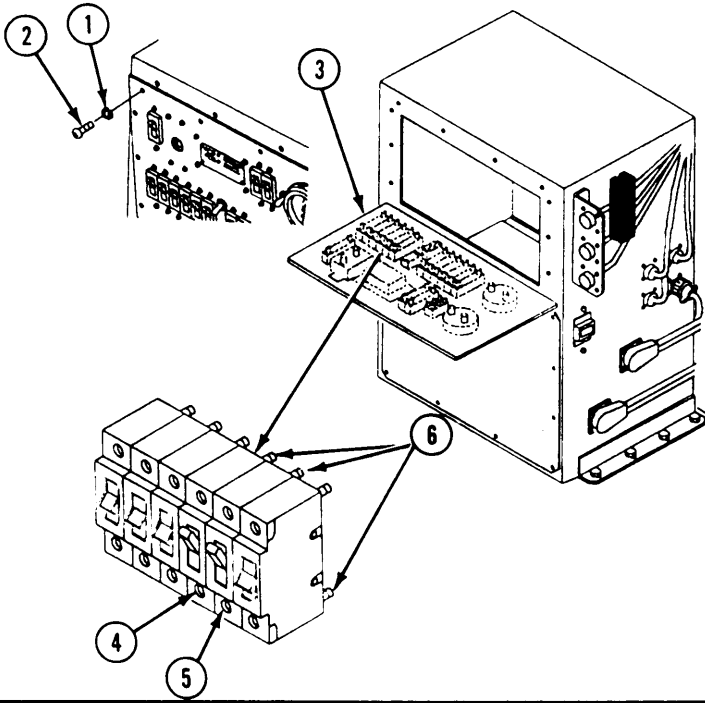


**YES**

1. Replace Curbside AC Power Extension Box A7 (page 40.1-12).
2. Verify no faults found.

**B**

1. Turn MASTER POWER switch to OFF (see your -10 and TM 11-7010-256-12&P).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Turn ON AC RIGHT OUTLETS circuit breakers CB8 (4) and CB9 (5).
4. Measure resistance between terminals 1 and 2 (6) of circuit breakers CB8 (4) and CB9 (5).
5. Does multimeter read 0 ohms for each measurement?



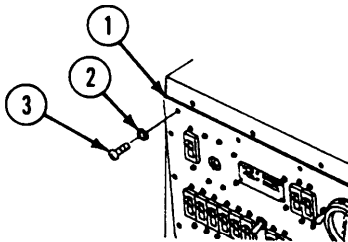
NO

**NOTE**  
Resistance in CB8 and CB9 should be 0 ohms. If any resistance is present, replace that CB.

1. Replace circuit breaker CB8 and/or CB9 (page 40.1-33).
2. Verify no faults found.

YES

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Go to: No Power To AC Circuits (page 3-226.97).



---

**NO POWER FROM DC POWER EXTENSION BOX A8**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru Fo-11)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



**GO TO NEXT PAGE**

**A**

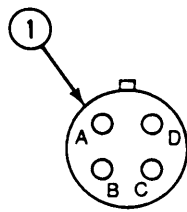
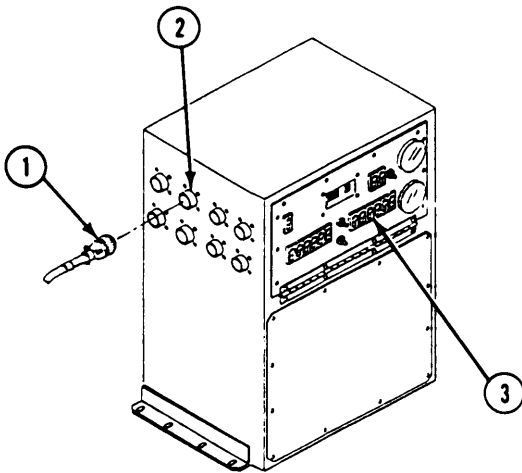


1. Remove cable W9 plug P15 (1) from Power Control Enclosure jack J35 (2).
2. Set DC RIGHT OUTLETS switches (3) on Power Control Enclosure panel to ON (see TM 11-7010-256-12&P).
3. Set MASTER SWITCH to ON (see your -10).
4. Measure voltage between sockets A and B of jack J35 (2). Repeat measurement for sockets C and D.
5. Does multimeter read 22 volts DC or more for both measurements?

NO

**B**

GO TO PAGE 3-226.34



**A1**

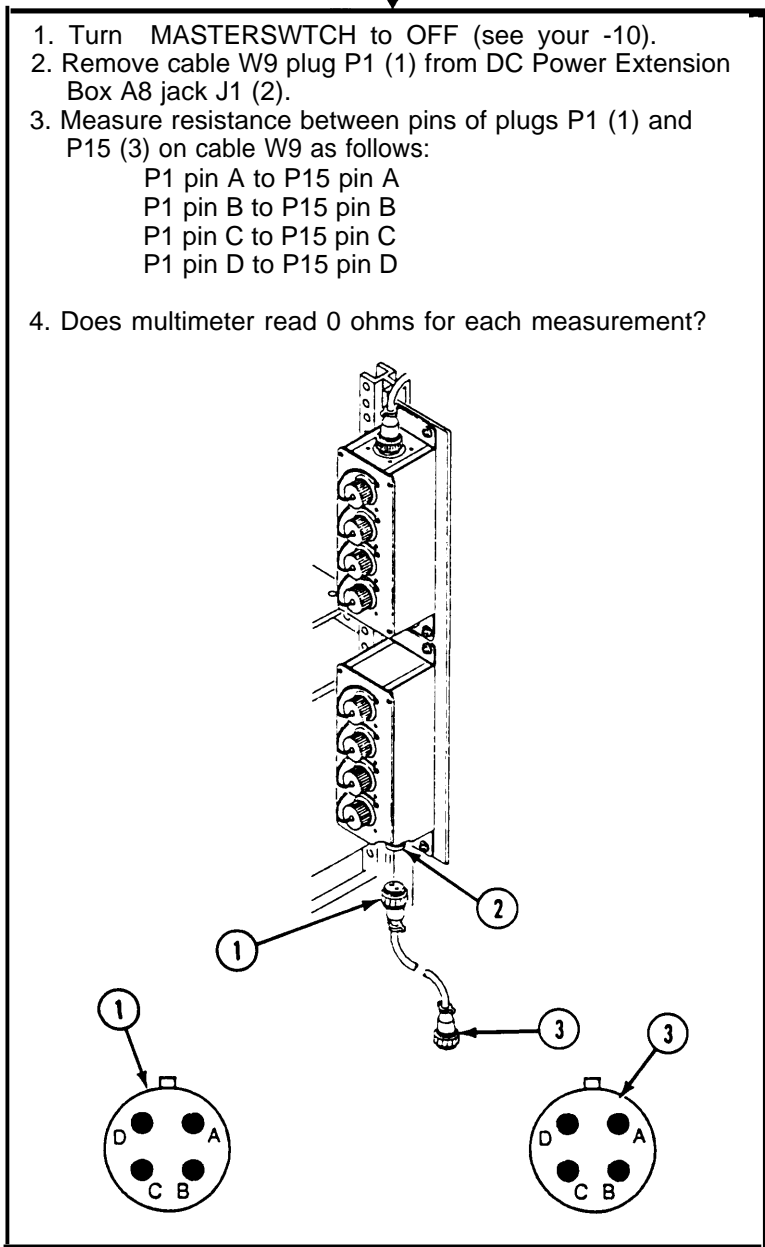


**A1**

1. Turn MASTERSWITCH to OFF (see your -10).
2. Remove cable W9 plug P1 (1) from DC Power Extension Box A8 jack J1 (2).
3. Measure resistance between pins of plugs P1 (1) and P15 (3) on cable W9 as follows:
  - P1 pin A to P15 pin A
  - P1 pin B to P15 pin B
  - P1 pin C to P15 pin C
  - P1 pin D to P15 pin D
4. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W9 (page 40.1-70).
2. Verify no faults found.

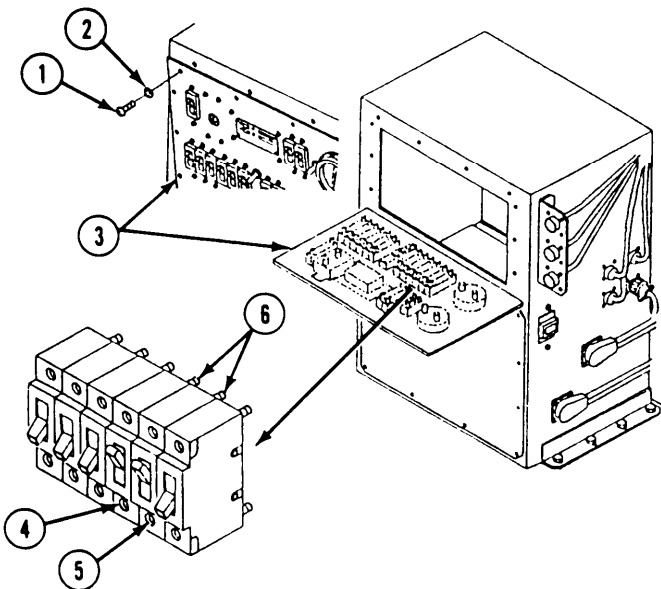


**YES**

1. Replace DC Power Extension Box A8 (page 40.1-13).
2. Verify no faults found.

**B**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Turn ON DC RIGHT OUTLETS circuit breakers CB14 (4) and CB15 (5).
4. Measure resistance between terminals 1 and 2 (6) of circuit breakers CB14 (4) and CB15 (5).
5. Does multimeter read 0 ohms for each measurement?



NO

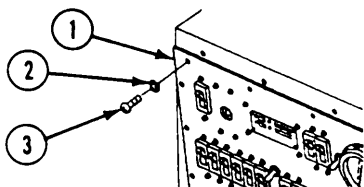
**NOTE**

Resistance in CB14 and CB15 should be 0 ohms. If any resistance is present, replace that CB.

1. Replace circuit breakers CB14 and/or CB15 (page 40.1-33).
2. Verify no faults found.

YES

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Go to: Power Control Enclosure A1 DC Input/Output Inoperative (page 3-226.1).



---

## NO POWER FROM DC POWER EXTENSION BOX A9 (ALL EXCEPT JACK J23)

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.

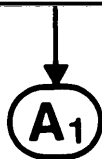
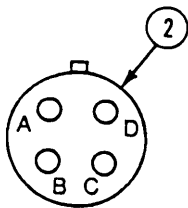
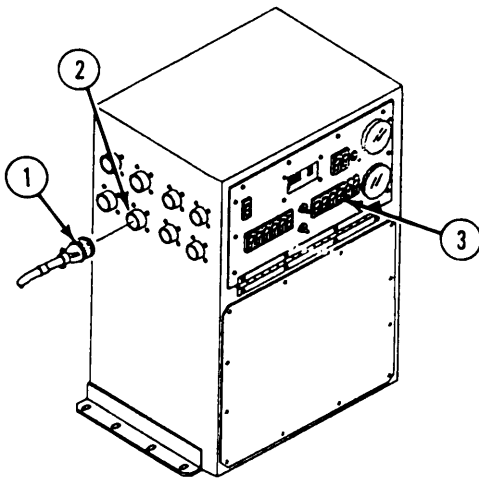


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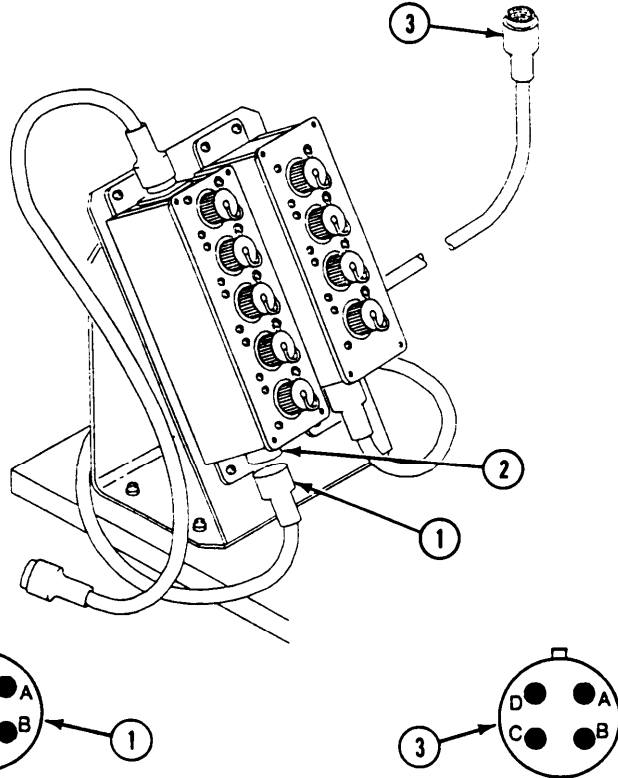
1. Remove cable W10 plug P14 (1) from Power Control Enclosure jack J34 (2).
2. Turn MASTER SWITCH to ON (see your -10).
3. Set DC LEFT OUTLETS switches (3) on Power Control Enclosure panel to ON (see TM 11-7010-256-12&P).
4. Measure voltage between sockets A and B of jack J34 (2). Repeat measurement for sockets C and D.
5. Does multimeter read 22 volts DC or more for each measurement?

NO → **B** GO TO PAGE 3-226.38



**A1**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove cable W10 plug P1 (1) from DC Power Extension Box A9 jack J1 (2).
3. Measure resistance between pins of plugs P1 (1) and P14 (3) on cable W10 as follows:
  - P1 pin A to P14 pin A
  - P1 pin B to P14 pin B
  - P1 pin C to P14 pin C
  - P1 pin D to P14 pin D
4. Does multimeter read 0 ohms for each set of pins?



**NO**

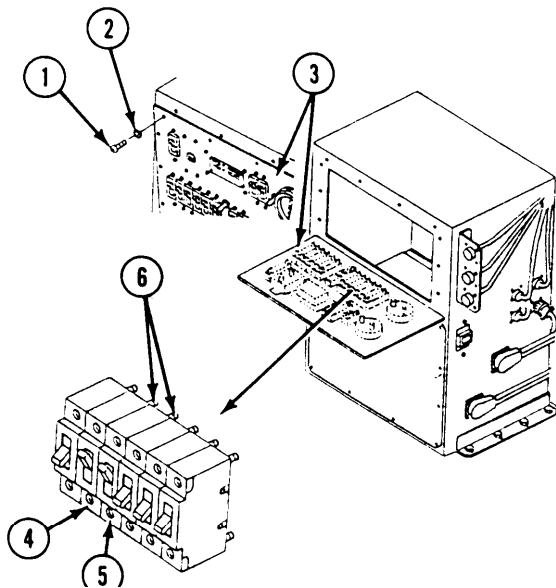
1. Replace cable W10 (page 40.1-73).
2. Verify no faults found.

**YES**

1. Replace DC Power Extension Box A9 (page 40.1-48).
2. Verify no faults found.

**A1**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Turn ON DC LEFT OUTLETS circuit breakers CB12 (4) and CB13 (5).
4. Measure resistance between terminals 1 and 2 (6) of circuit breakers CB12 (4) and CB13 (5).
5. Does multimeter read 0 ohms for each measurement?



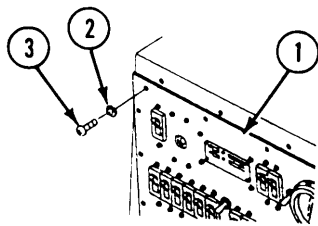
**NO**

**NOTE**  
Resistance in CB12 and CB13 should be 0 ohms. If any resistance is present, replace that CB.

1. Replace circuit breakers CB12 and/or CB13 (page 40.1-33).
2. Verify no faults found.

**YES**

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Go to: Power Control Enclosure A1 DC Input/Output Inoperative (page 3-226.1).



---

**NO POWER FROM DC POWER EXTENSION BOX A9, JACK J23  
(JTIDS)**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



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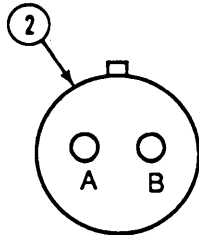
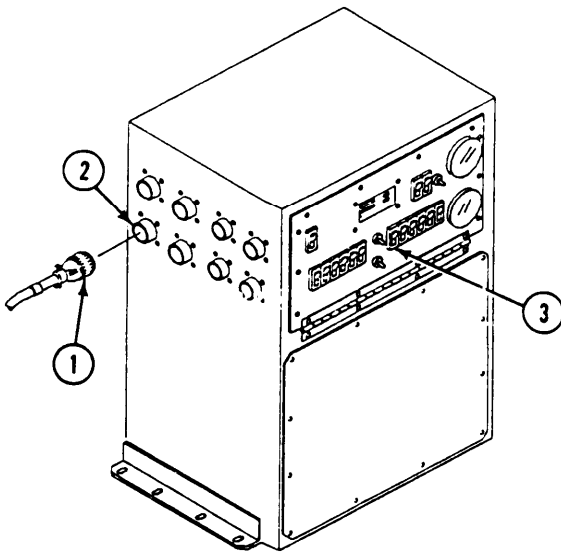
**A**

1. Remove cable W45 plug P13 (1) from Power Control Enclosure jack J33 (2).
2. Turn MASTER SWITCH to ON (see your -10).
3. Set JTIDS switch (3) on Power Control Enclosure panel to ON (see TM 11-7010-256-12&P).
4. Measure voltage between sockets A and B of J33 (2).
5. Does multimeter read 22 volts DC or more?

NO

**B**

GO TO PAGE 3-226.42



**A1**

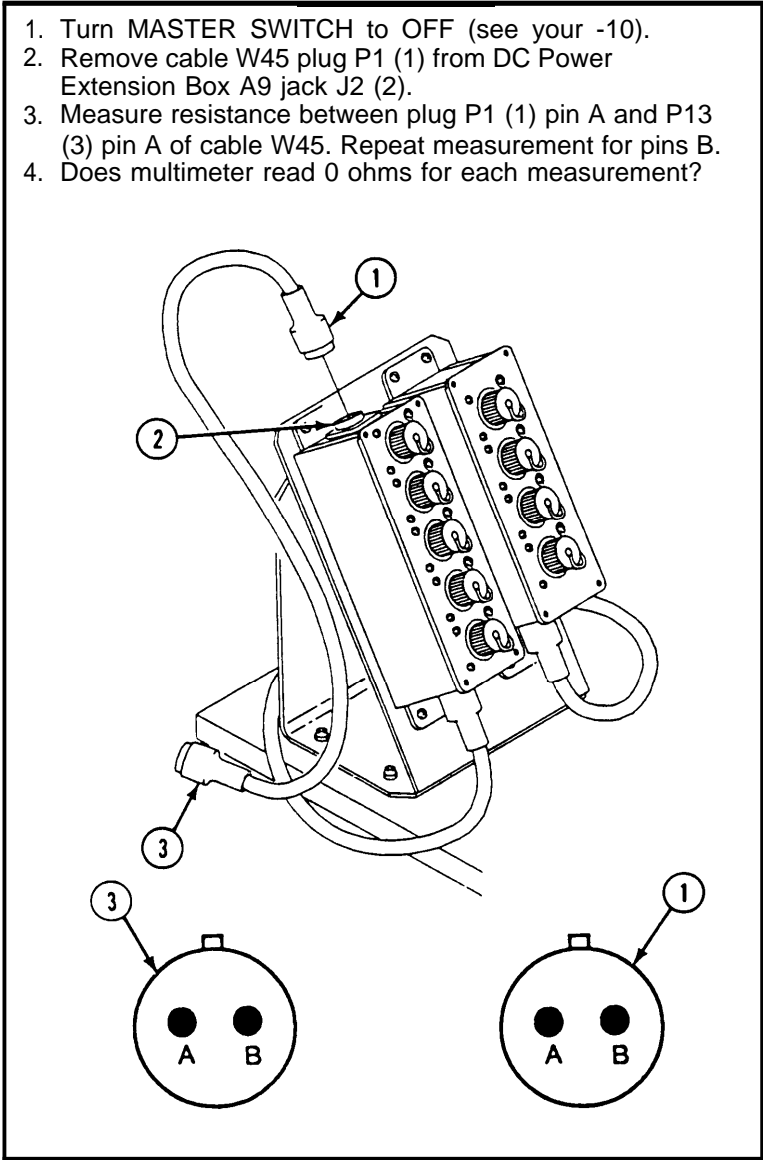


**A1**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove cable W45 plug P1 (1) from DC Power Extension Box A9 jack J2 (2).
3. Measure resistance between plug P1 (1) pin A and P13 (3) pin A of cable W45. Repeat measurement for pins B.
4. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W45 (page 40.1-90).
2. Verify no faults found.

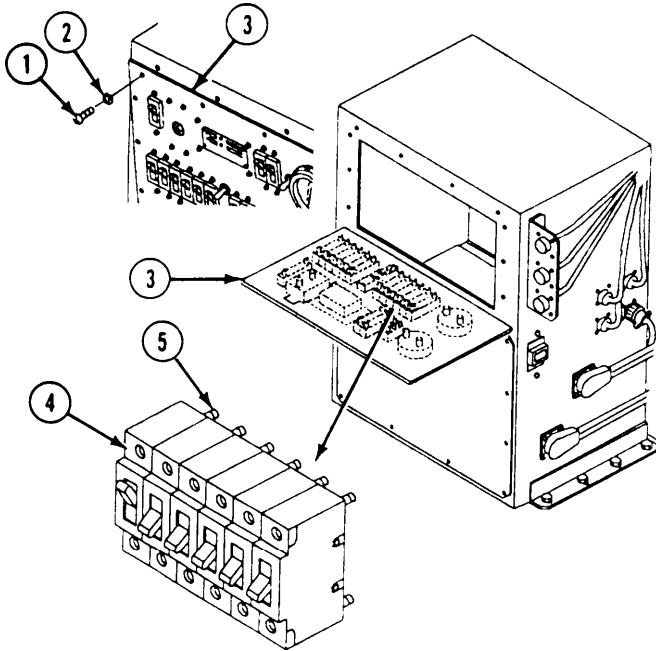


**YES**

1. Replace DC Power Extension Box A9 (page 40.1-48).
2. Verify no faults found.

**B**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
3. Turn ON JTIDS circuit breaker CB11 (4).
4. Measure resistance between terminals 1 and 2 (5) of circuit breaker CB11 (4).
5. Does multimeter read 0 ohms?

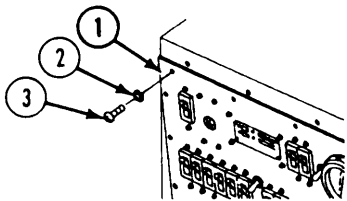


**NO**

1. Replace circuit breaker CB11 (page 40.1-33).
2. Verify no faults found.

**YES**

1. Raise faceplate (1) and secure to Power Control Enclosure with ten new lockwashers (2) and screws (3).
2. Go to: Power Control Enclosure A1 DC Input/Output Inoperative (page 3-226.1).



---

**NO DC POWER TO SINGLE POINT LAN GROUND BOX A15  
(M1068 ONLY)**

---

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
See TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)


**Personnel Required**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**W A R N I N G**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

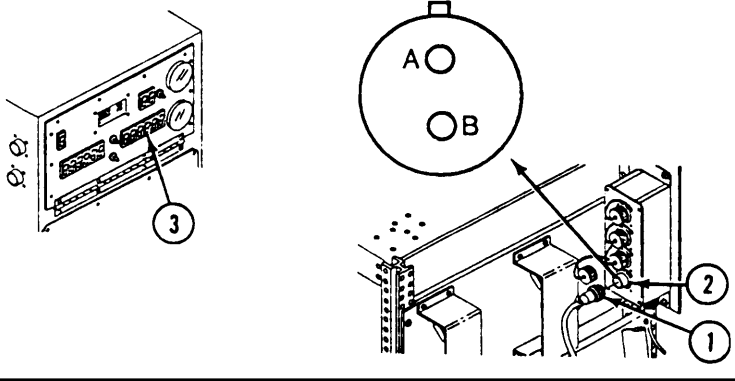
**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



**GO TO NEXT PAGE**

**A**

1. Remove cable W40 plug P1 (1) from DC Power Extension Box A8 jack J17 (2).
2. Turn MASTERSWITCH to ON (See your -10).
3. Set DC RIGHT OUTLETS switches (3) on Power Control Enclosure to ON (see TM 11-7010-256-12&P).
4. Measure voltage between sockets A and B of J17 (2).
5. Does multimeter read 22 volts DC or more?

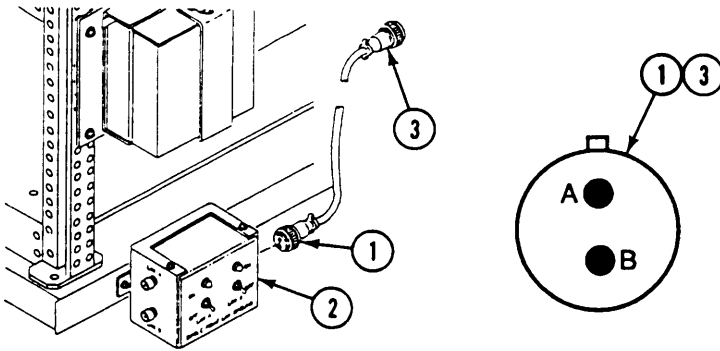


**NO**

1. Go To: No Power From DC Power Extension Box A8 (page 3-226.31).
2. Verify no faults found.

**YES**

1. Turn MASTER SWITCH to OFF (see your -10).
2. Disconnect cable W40 plug P2 (1) from Single Point LAN Ground Box A15 jack J1 (2).
3. Measure resistance between plug P1 (3) pin A and P2 (1) pin A of cable W40. Repeat measurement for pins B.
4. Does multimeter read 0 ohms for each measurement?



1. Replace cable W40 (page 40.1-86).
2. Verify no faults found.

**YES**

1. Repair LAN Ground Box A15 (page 40.1-16).
2. Verify no faults found.

---

**NO POWER FROM UPS POWER EXTENSION BOX A16**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**References:**

see your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



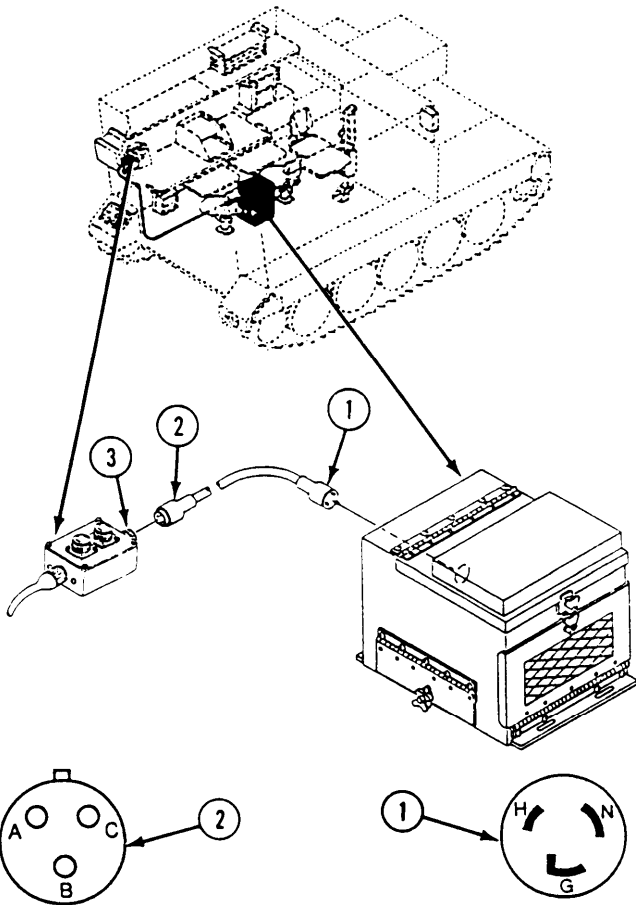
**GO TO NEXT PAGE**

A

1. Open front cover on ATCCS UPS Storage Box and remove cable W41 plug P1 (1) from UPS jack AC OUT.
2. Remove cable W41 plug P2 (2) from UPS Power Extension Box A16 jack J4 (3).
3. Measure resistance between pins of plugs P1 (1) and P2 (2) of cable W41 as follows:  
 P1 pin H to P2 socket A  
 P1 pin N to P2 socket B  
 P1 pin G to P2 socket C
4. Does multimeter read 0 ohms for each measurement?

NO

1. Replace cable W41 (page 40.1-88).
2. Verify no faults found.

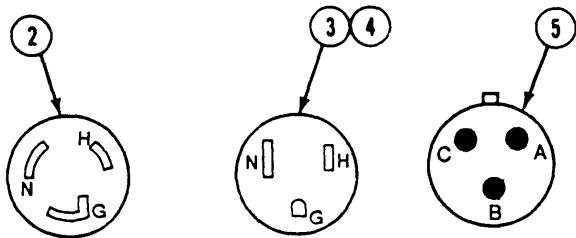
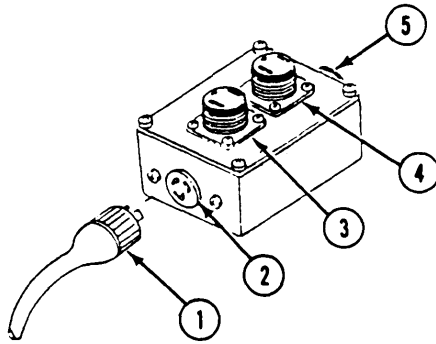


A1

**A1**

1. Remove cable W50 plug P1 (1) from UPS Power Extension Box A16 jack J1 (2).
2. Measure resistance between jacks J1 (2), J2 (3), J3 (4), and J4 (5) of UPS Power Extension Box A16 as follows:
  - J1 socket H to J2 and J3 socket H
  - J1 socket N to J2 and J3 socket N
  - J1 socket G to J2 and J3 socket G
  - J1 socket H to J4 pin A
  - J1 socket N to J4 pin B
  - J1 socket G to J4 pin C
3. Does multimeter read 0 ohms for each measurement?

- NO** →
1. Replace/repair UPS Power Extension Box A16 (page 40.1-8).
  2. Verify no faults found.



**YES**

- 
1. Faulty ATCCS UPS Power.
  2. Notify your supervisor.
-

---

## NO POWER FROM UPS POWER EXTENSION BOX A17

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**References:**

see your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**WARNING**  
**HIGH VOLTAGE** is used in the operation of this equipment.  
**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

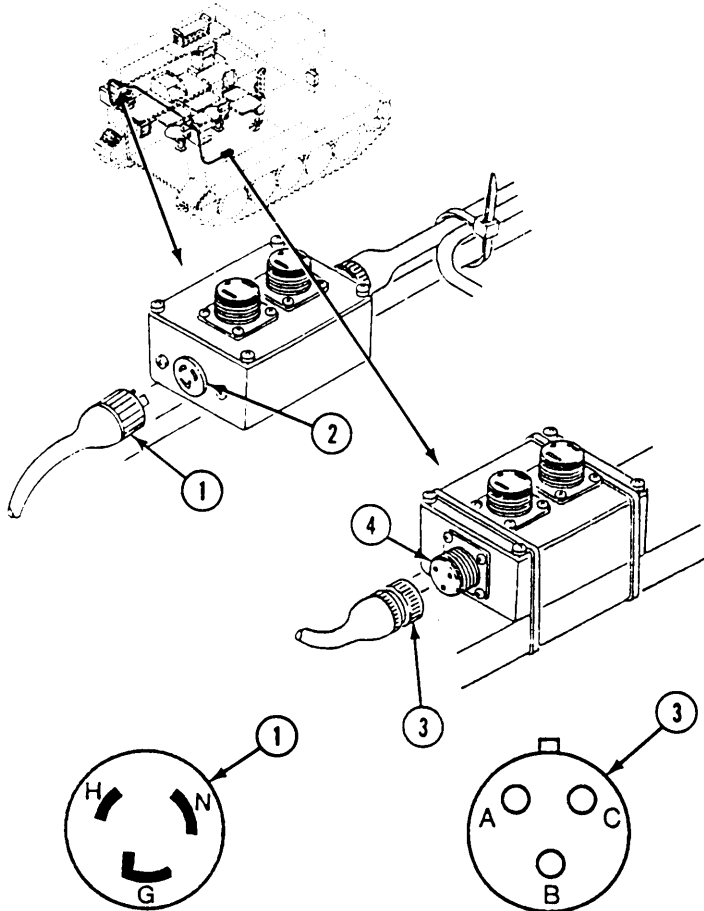
**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.  
**SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.  
**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.





**A**

1. Remove cable W50 plug P1 (1) from UPS Power Extension Box A16 jack J1 (2).
2. Remove cable W50 plug P2 (3) from UPS Power Extension Box A17 jack J4 (4).
3. Measure resistance between pins of plugs P1 (1) and P2 (3) of cable W50 as follows:  
 P1 pin H to P2 socket A  
 P1 pin N to P2 socket B  
 P1 pin G to P2 socket C
4. Does multimeter read 0 ohms for each measurement?



**NO**

1. Replace cable W50 (page 40.1-92).
2. Verify no faults found.

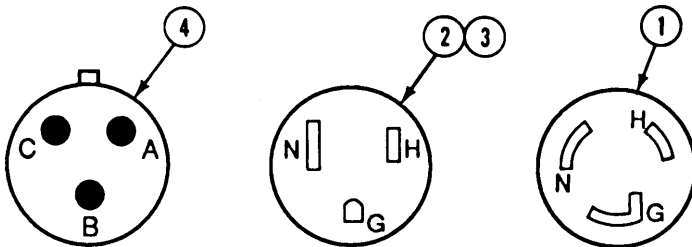
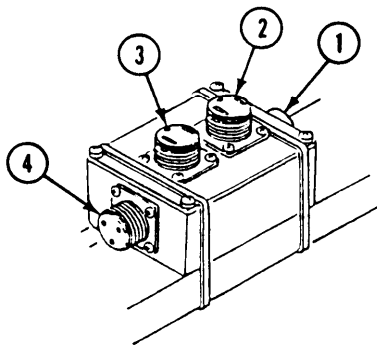
**YES**

**A1**

GO TO NEXT PAGE

**A1**

1. Measure resistance between jacks J1 (1), J2 (2), J3 (3), and J4 (4) of UPS Power Extension Box A17 as follows:
  - J1 socket H to J2 and J3 socket H
  - J1 socket N to J2 and J3 socket N
  - J1 socket G to J2 and J3 socket G
  - J1 socket H to J4 pin A
  - J1 socket N to J4 pin B
  - J1 socket G to J4 pin C
2. Does multimeter read 0 ohms for each measurement?



**NO**

1. Replace/repair UPS Power Extension Box A17 (page 40.1-8).
2. Verify no faults found.

**YES**

1. Faulty ATCCS UPS Power.
2. Notify your supervisor.

---

**NO AC/DC INPUT TO ATCCS UPS POWER BOX**

---

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

See your -10  
 TM 11-7010-256-12&P  
 See M1068 Wiring Diagram  
 (FO-9 thru FO-11)


**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
 Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

---



**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.

↓ YES



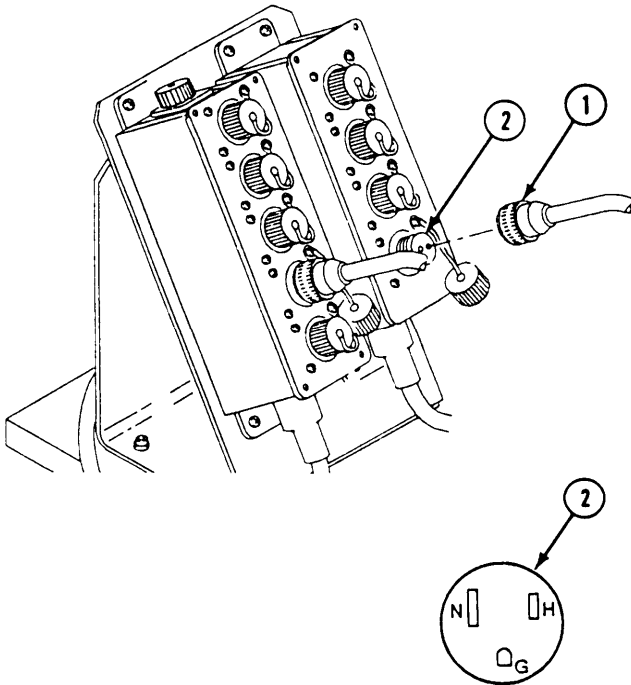
GO TO NEXT PAGE

**A**

1. Remove cable W43 plug P2 (1) from Roadside AC Power Extension Box A6 jack J6 (2).
2. Apply AC power to SICPS system (see TM 11-7010-256-12&P).
3. Set AC LEFT OUTLETS switches on Power Control Enclosure panel to ON.
4. Measure voltage between sockets H and N of J6 (2).
5. Does multimeter read 110 volts AC or more?

**NO**

1. Go to: No Power From Roadside AC Power Extension Box A6 (page 3-226.23).



**YES**

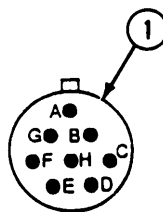
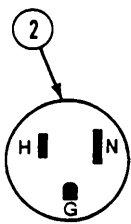
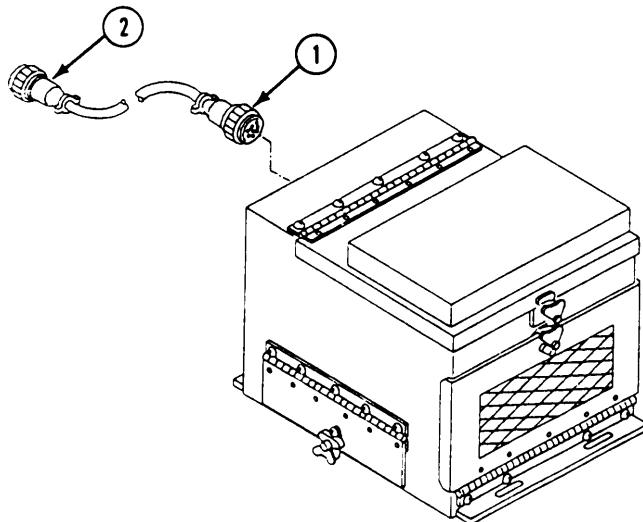
**A1**

**A1**

1. Turn all AC power OFF (TM 11-7010-256-12&P).
2. Open front cover on ATCCS UPS Storage Box and remove cable W43 plug P1 (1) from UPS jack AC IN.
3. Measure resistance between pins of plugs P2 (2) and P1 (1) of cable W43 as follows:
  - P2 pin H to P1 pin B
  - P2 pin N to P1 pin A
  - P2 pin G to P1 pin D
  - P1 pin F to P1 pin G
4. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W43 (page 40.1-88).
2. Verify no faults found.



**YES**

**A2**

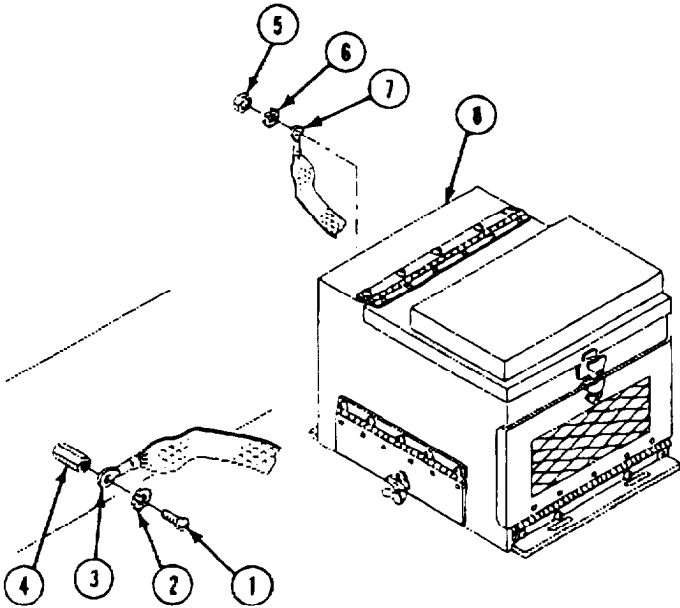
**GO TO NEXT PAGE**

**A2**

1. Remove screw (1), lockwasher (2), and ground strap W12 terminal (3) from ground lug (4). Discard lockwasher.
2. Remove nut (5), lockwasher (6), and ground strap W12 terminal (7) from ATCCS UPS storage box (8). Discard lockwasher.
3. Measure resistance between terminals (3 & 7) of ground strap W12.
4. Does multimeter read 0 ohms?

**NO**

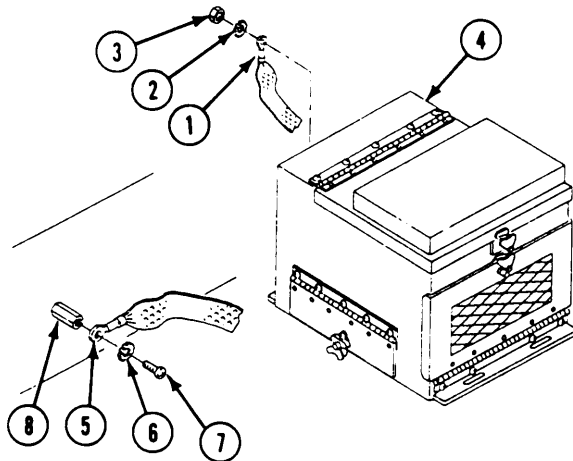
1. Replace ground strap W12 (page 40.1-77).
2. Verify no faults found.



**A3**

**A3**

1. Install ground strap W12 terminal (1), new lockwasher (2), and nut (3) on ATCCS UPS storage box (4).
2. Install ground strap W12 terminal (5), new lockwasher (6), and screw (7) on ground lug (8).
3. Remove cable W42 plug P2 (9) from DC Power Extension Box A9 jack J21 (10).
4. Set MASTER SWITCH to ON (see your -10).
5. Set DC LEFT OUTLETS switches on Power Control Enclosure panel to ON (see TM 11-7010-256-12&P).
6. Measure voltage between sockets A and B of J21 (10).
7. Does multimeter read 22 volts DC or more?



**NO**

1. Go to: No Power from DC Power Extension Box A9 (page 3-226.35).

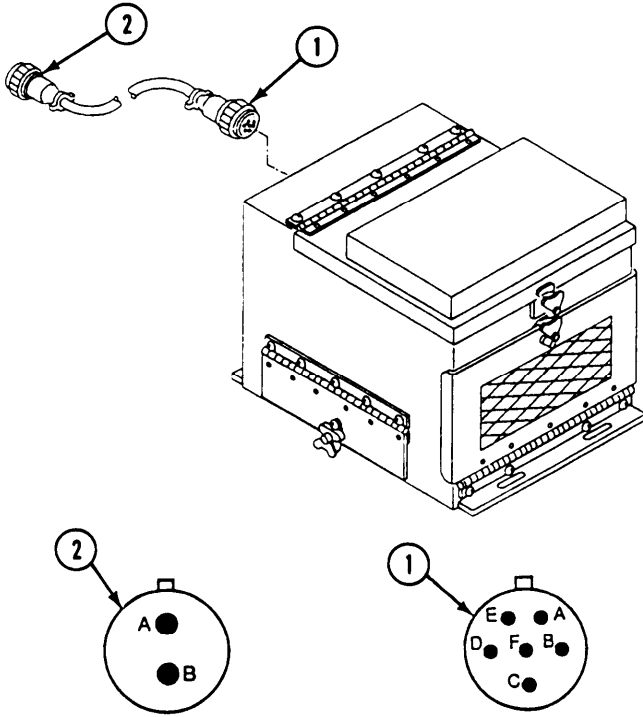
**YES**

**A4**

**GO TO NEXT PAGE**

**A4**

1. Set MASTER SWITCH to OFF (see your -10).
2. Open front cover on ATCCS UPS Storage Box and remove cable W42 plug P1 (1) from UPS jack DC IN.
3. Measure resistance between pins of plugs P2 (2) and P1 (1) of cable W42 as follows:  
P2 pin A to P1 pin A, E, and F  
P2 pin B to P1 pin B, C, and D
4. Does multimeter read 0 ohms for each measurement?



**NO**

1. Replace cable W42 (page 40.1-88).
2. Verify no faults found.

**YES**

1. Faulty ATCCS UPS Power.
2. Notify your supervisor.



---

**IN BLACKOUT MODE, FLUORESCENT LIGHTS OPERATE INCORRECTLY**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

**References (cont):**

See TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
All AC External and Internal Power is OFF  
(see TM 710-256-12&P)  
Carrier blocked (see your -10)

**References:**

See your -10

---

**WARNING**

**HIGH VOLTAGE** is used in operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person is near by and is familiar with its operations and hazards. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. Make sure all AC external power is off/disconnected.

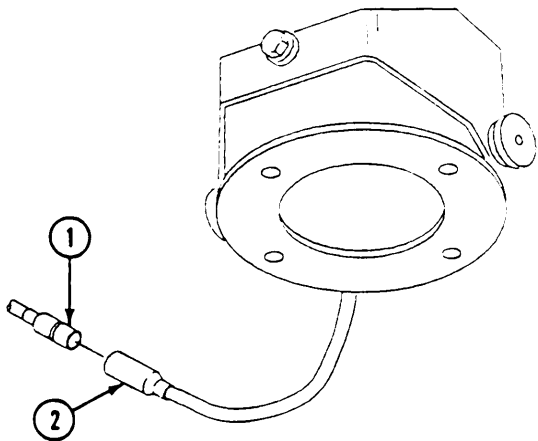
**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



**GO TO NEXT PAGE**

**A**

1. Disconnect cable W28, plug P2 (1) from light lead (2).
2. Ensure ramp door is open or down. Set MASTER SWITCH to ON (see your-10 and TM 11-7010-256-12&P).
3. Turn on dome lights from either the front dome light switch (on master switch panel) or at the rear dome light switch near the ramp. To do this, the blackout-by-pass switch must be OFF, the ramp up, and the rear door closed.
4. Measure voltage between plug P2 (1) and ground. Use multimeter.
5. Does multimeter read 22 volts DC or more?



NO

**B**

GO TO PAGE 3-226.59

YES

1. Turn MASTER SWITCH to OFF (see your-10).
2. Have light bulbs been replaced?

NO

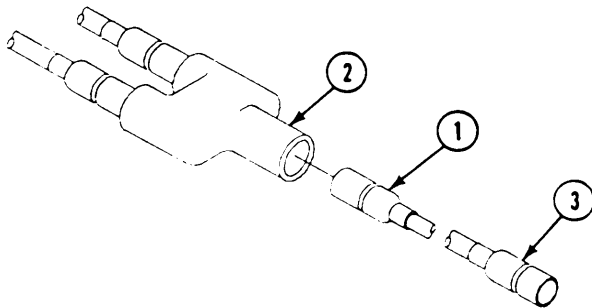
1. Replace light bulbs (page 12-65).
2. Verify no faults found.

YES

1. Repair light assembly (page 12-65).
2. Verify no faults found.

**B**

1. Set MASTER SWITCH to OFF (see your -10).
2. Remove cable W28, plug P1 (1) from adapter plug P1 (2).
3. Measure resistance between cable W28 plugs P1 and P2 (3).
4. Does multimeter read 0 ohms?

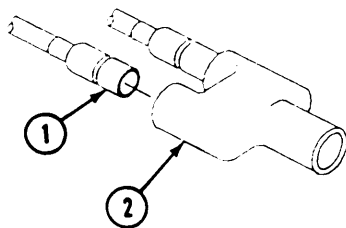


**NO**

1. Replace cable W28 (page 40.1-82).
2. Verify no faults found.

**YES**

1. Remove lead 38B (1) from adapter plug P3 (2).
2. Set MASTER SWITCH to ON (see your -10).
3. Measure voltage between lead 38B (1) and ground.
4. Does multimeter read 22 volts DC or more?



**NO**

1. Refer to: "Dome Lights Malfunction (M577A2)" (page 3-117).

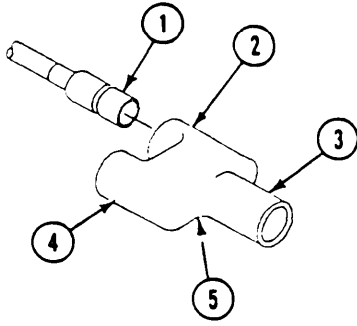
**YES**

**B<sub>1</sub>**

GO TO NEXT PAGE

**B<sub>1</sub>**

1. Set MASTER SWITCH to OFF (see your-10).
2. Remove cable W35, plug P1 (1) from adapter plug P2 (2).
3. Measure resistance between plugs P1 (3), P2 (2), and P3 (4) of adapter (5).
4. Does multimeter read 0 ohms for each measurement?



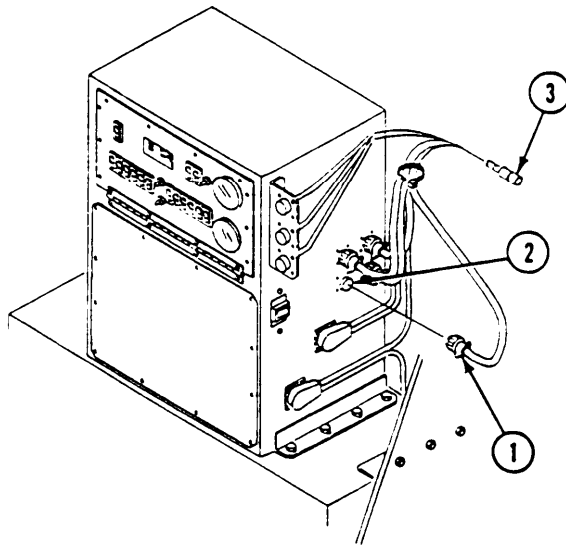
**NO**

1. Replace adapter (page 40.1-82).
2. Verify no faults found.

**B<sub>2</sub>**

**B<sub>2</sub>**

1. Remove cable W35, plug P9 (1) from jack J29 (2) of Power Control Enclosure.
2. Measure resistance between plugs P1 (3) and P9 (1) of cable W35.
3. Does multimeter read 0 ohms?



**NO**

1. Replace cable W35 (page 40.1-82).
2. Verify no faults found.

**YES**

**B<sub>3</sub>**

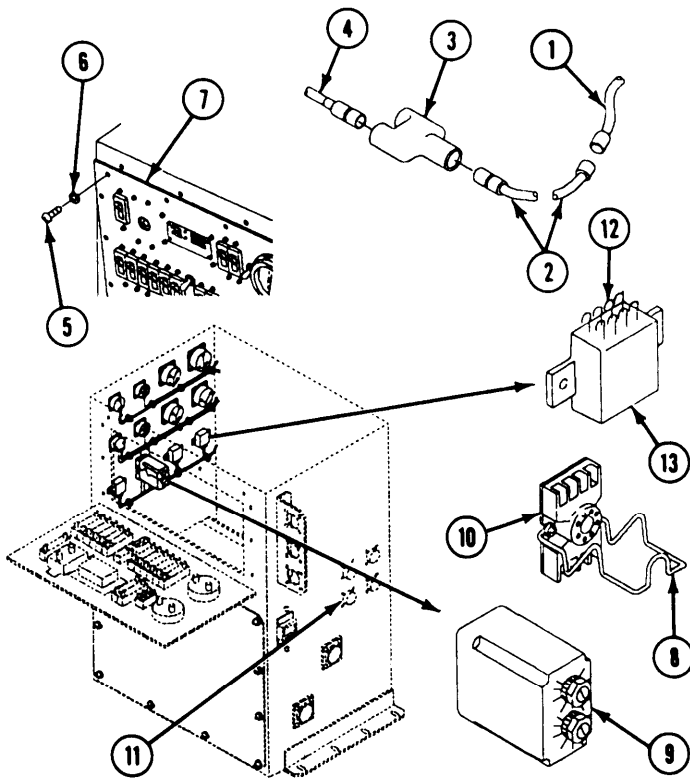
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**B3**

**WARNING**  
 Make sure ALL AC external  
 and internal power is OFF.



1. Install front light lead 38B (1) on cable W28 P2 (2) and cable to plug P1 of adapter (3).
2. Install rear domelight lead 38B (4) on plug P3 of adapter (3).
3. Remove ten screws (5) and lockwashers (6), and lower faceplate (7). Discard lockwashers.
4. Lift relay bail (8) and remove XK2 relay (9) from relay socket (10).
5. Measure resistance between jack J29 center pin (11) and pin X1 (12) of relay XK5 (13).
6. Does multimeter read 0 ohms?



NO

1. Faulty inside lead 34A of Power Control Enclosure.
2. Notify your Supervisor.

YES

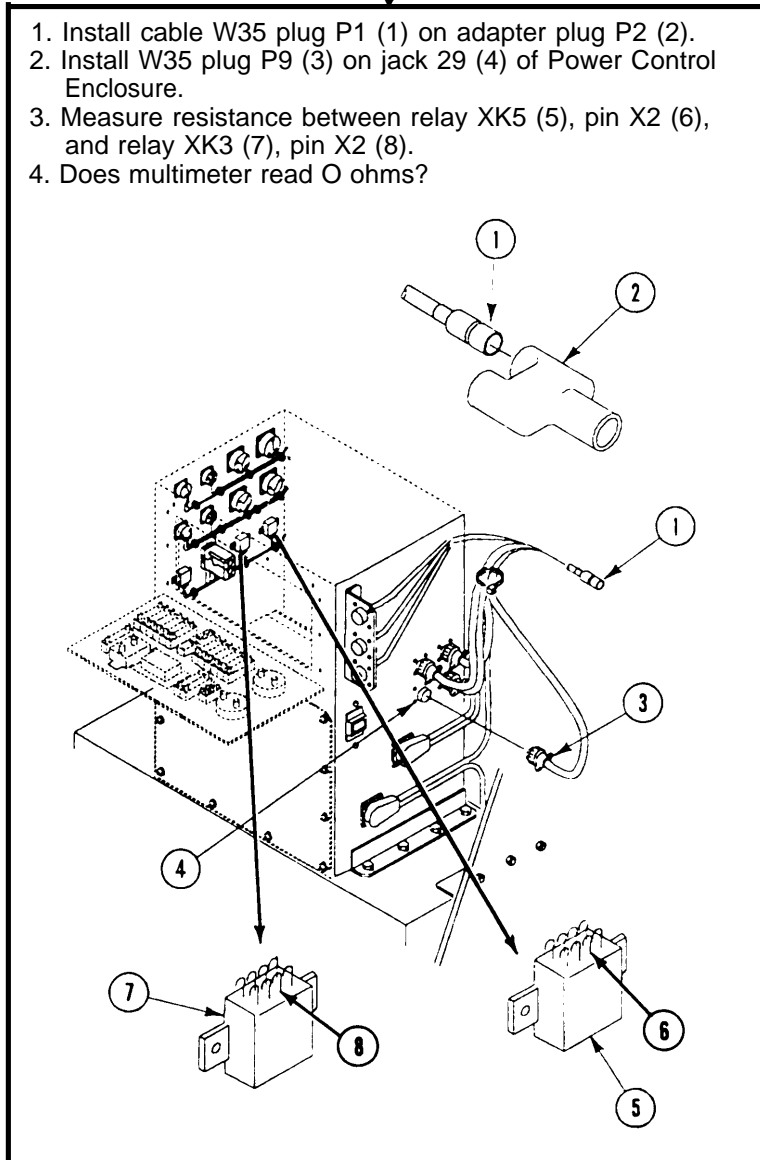
**B4**

**B4**

1. Install cable W35 plug P1 (1) on adapter plug P2 (2).
2. Install W35 plug P9 (3) on jack 29 (4) of Power Control Enclosure.
3. Measure resistance between relay XK5 (5), pin X2 (6), and relay XK3 (7), pin X2 (8).
4. Does multimeter read 0 ohms?

**NO**

1. Faulty lead 3F of XK2.
2. Notify your Supervisor.



**YES**

**B5**

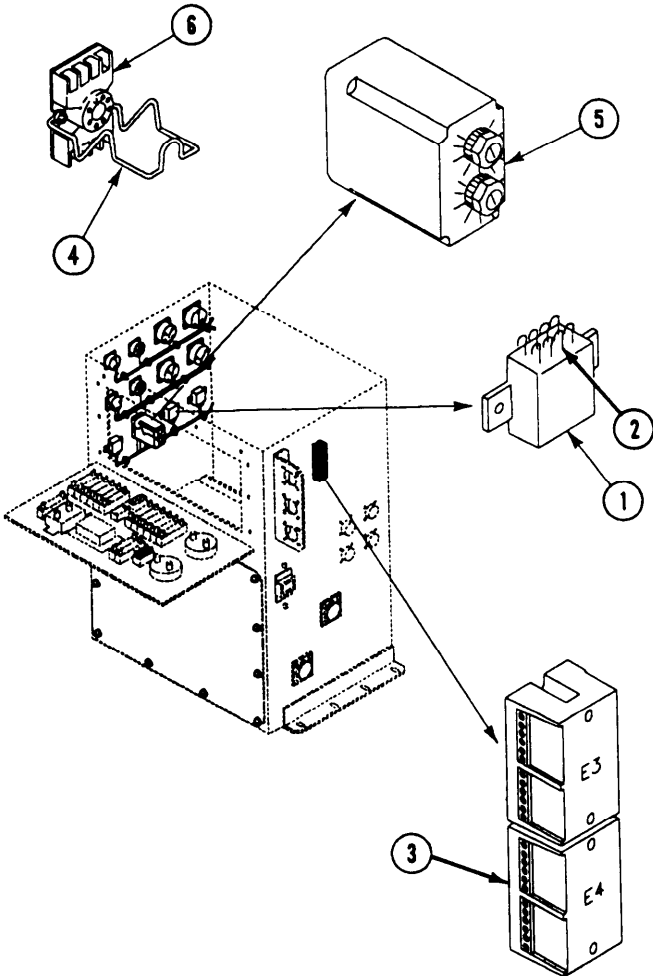
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**B5**

1. Measure resistance between relay XK3 (1), pin X2 (2) and terminal block E4 (3).
2. Does multimeter read 0 ohms?
3. Lift relay bail (4) and install XK2 relay (5) on relay socket (6).

**NO**

1. Faulty lead 3E of XK3.
2. Notify your Supervisor,



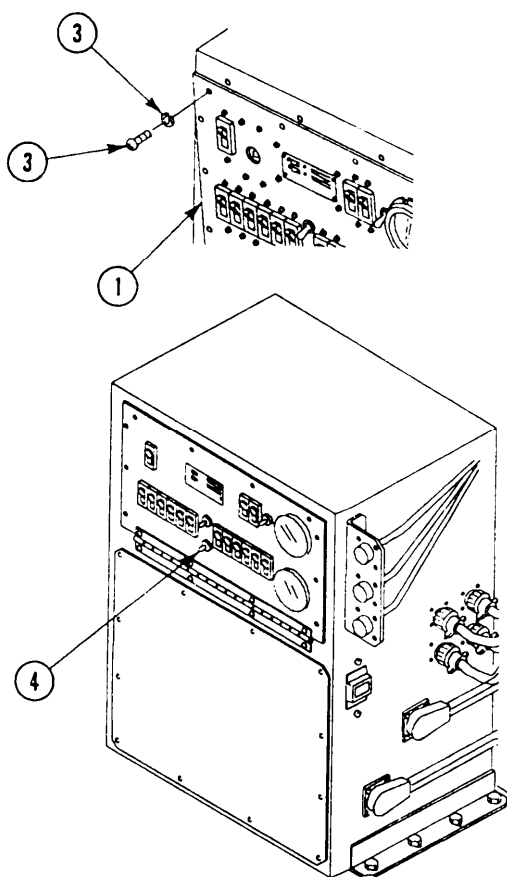
**YES**

**B6**



**B6**

1. Raise faceplate (1) and secure to enclosure with ten new lockwashers (2) and screws (3).
2. Set MASTER SWITCH to ON. Set vehicle BLACKOUT LIGHT to ON. Be sure ramp door is open (see your-10).
3. Apply AC power to SICPS system. Set BLACKOUT ENABLE switch (4) on Power Control Enclosure panel in upward position (TM 11-7010-256-12&P).
4. Do fluorescent lights illuminate?



**NO**

1. Faulty relay XK5.
2. Notify your Supervisor.

**YES**

1. Verify no faults found.

---

## FLUORESCENT LIGHTS DO NOT OPERATE

---

### INITIAL SETUP

#### Tools:

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

#### Personnel Required:

Power-Generation Equipment Repairer 52D10  
Helper (H)

#### References:

See your -10  
See TM 10-5410-229-13&P  
See TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

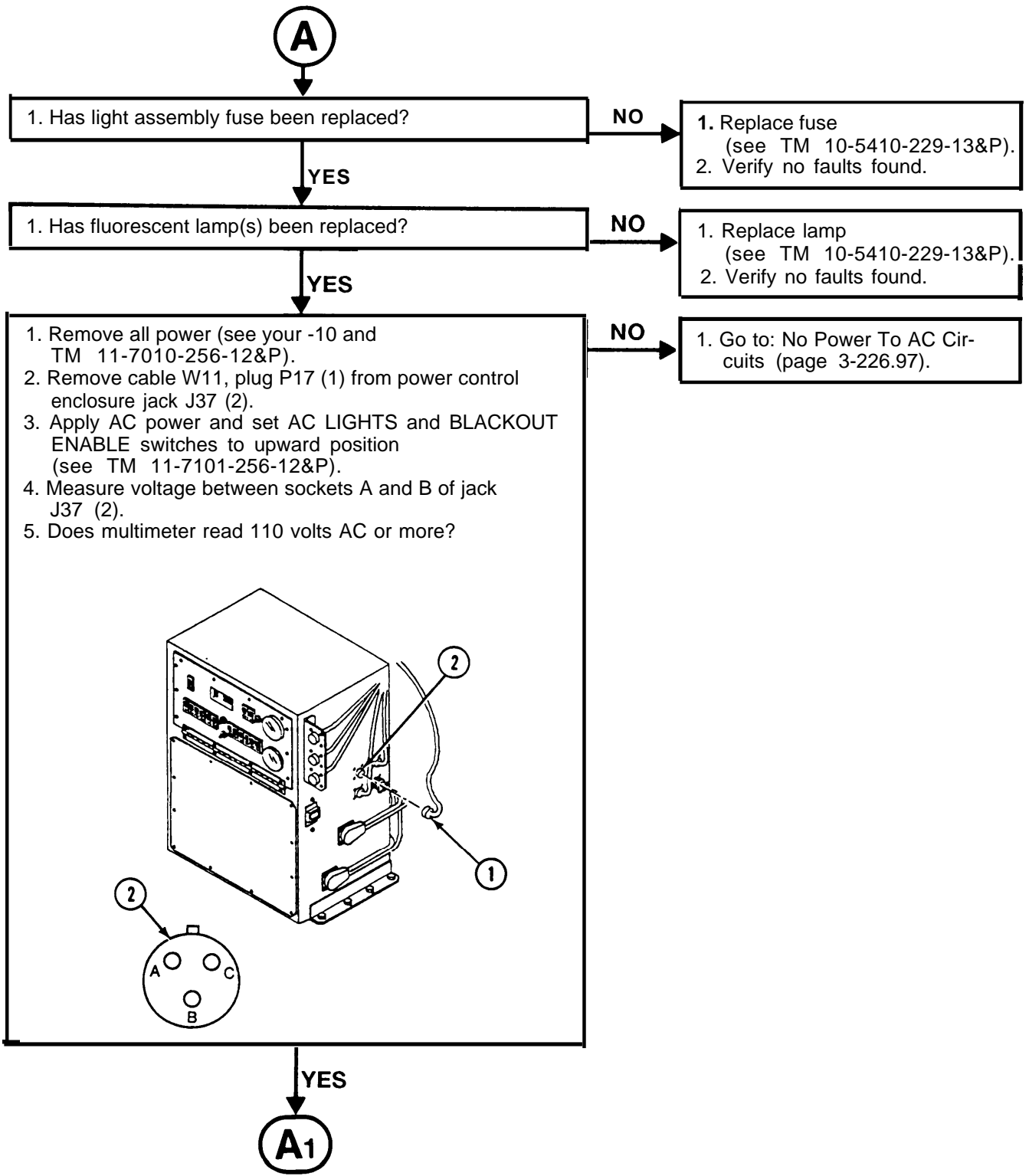


#### WARNING

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.





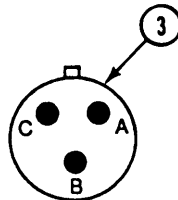
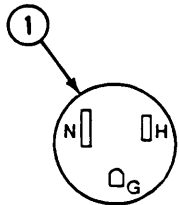
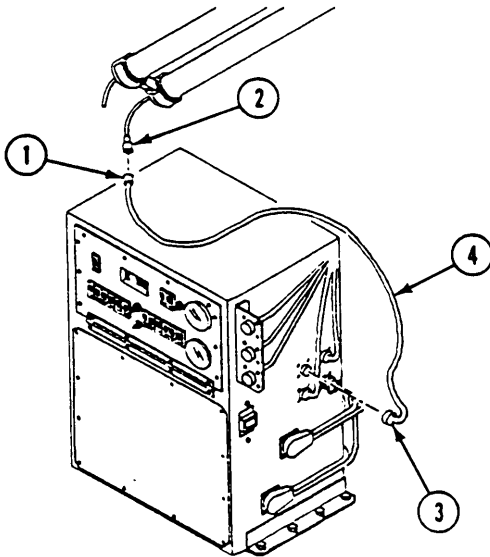
GO TO NEXT PAGE

**A1**

1. Set power control enclosure AC MAIN switch to OFF (see TM 11-7010-256-12&P).
2. Remove cable W11 plug P2 (1) from light assembly plug P1 (2).
3. Measure resistance between sockets of P2 (1) and pins of plug P17 (3) on cable W11 (4) as follows:

P2 socket H to P17 pin A  
P2 socket N to P17 pin B  
P2 socket G to P17 pin C

4. Does multimeter read 0 ohms for each measurement?



**NO**

1. Replace cable W11 (page 40.1-75).
2. Verify no faults found.

**YES**

1. Repair/replace light set assembly (See TM 10-5410-229-13&P).

---

## VEHICLE BATTERIES DISCHARGE WITH EXTERNAL AC POWER APPLIED

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

**Personnel Required:**

Power-generation Equipment Repairer 52D10  
Helper (H)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

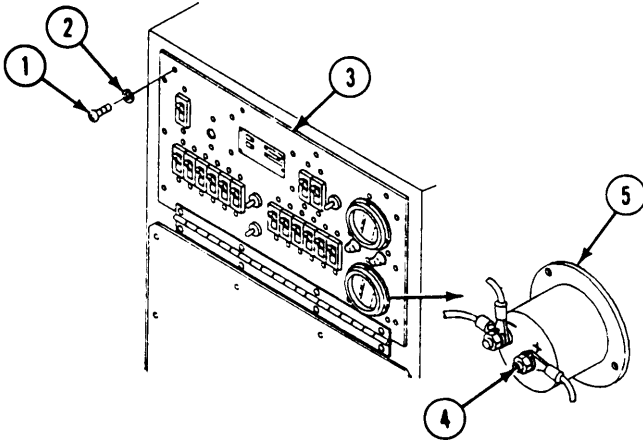
**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



GO TO NEXT PAGE

**A**

1. Remove ten screws (1), lock washers (2), and lower faceplate (3) on Power Control Enclosure. Discard lock washers.
2. Set MASTER SWITCH to ON (see your-10).
3. Measure voltage between positive (+) terminal (4) on meter M2 (5) and ground.
4. Does multimeter read 22 volts DC or more?

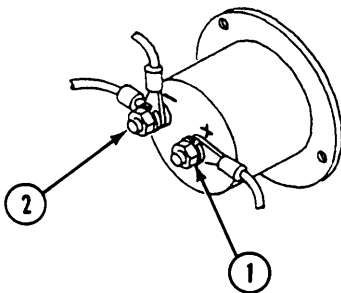


**NO**

1. Go to: Power Enclosure DC Input/Output Inoperative (page 3-226.1).

**YES**

1. Measure voltage between positive (+) terminal (1) and negative (-) terminal (2) of meter M2.
2. Does multimeter read 22 volts DC or more?



**NO**

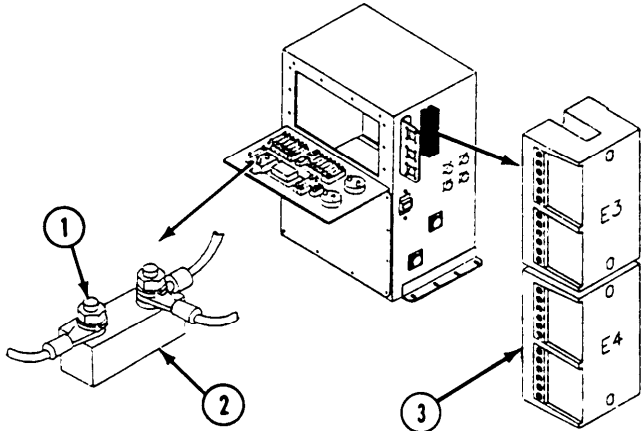
1. Replace meter M2 (page 40.1-29).
2. Verify no faults found.

**YES**

**A1**

**A1**

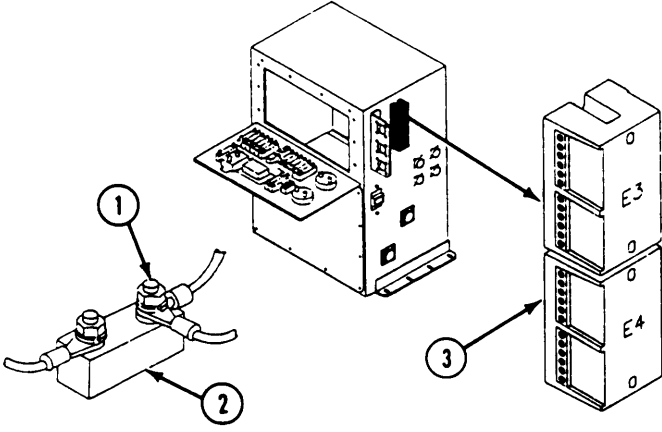
1. Set MASTER SWITCH to OFF (see your-10).
2. Apply external AC power to SICPS vehicle (see TM 11-7010-256-12&P).
3. Measure voltage between terminal 1 (1) of circuit breaker CB1 (2) and terminal block E4 (3).
4. Does multimeter read 110 volts AC or more?



**NO** → 1. Go to: Vehicle Will Not Accept External AC Power (page 3-226.80).

**YES**

1. Set AC MAIN switch to ON (see TM 11-7010-256-12&P).
2. Measure voltage between terminal 2 (1) of circuit breaker CB1 (2) and anywhere on terminal block E4 (3).
3. Does multimeter read 110 volts AC or more?

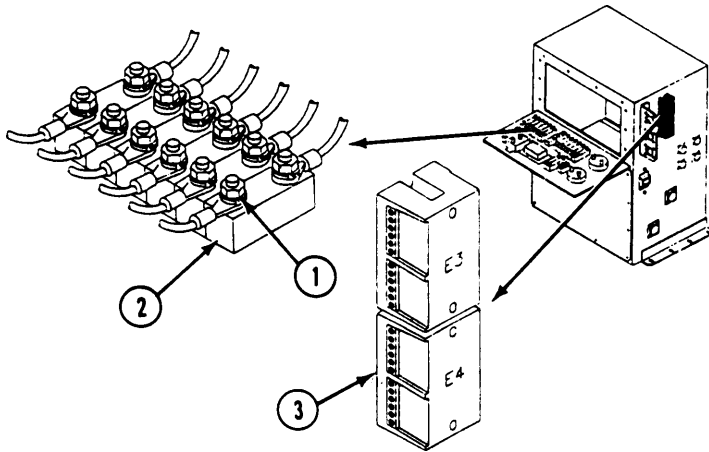


**NO** → 1. Replace circuit breaker CB1 (page 40.1-33).  
2. Verify no faults found.

GO TO NEXT PAGE

**A2**

1. Set DC POWER SUPPLY switch to ON (see TM 11-7010-256-128ZP).
2. Measure voltage between terminal 1 (1) of circuit breaker CB5 (2) to terminal block E4 (3).
3. Does multimeter read 110 volts AC or more?

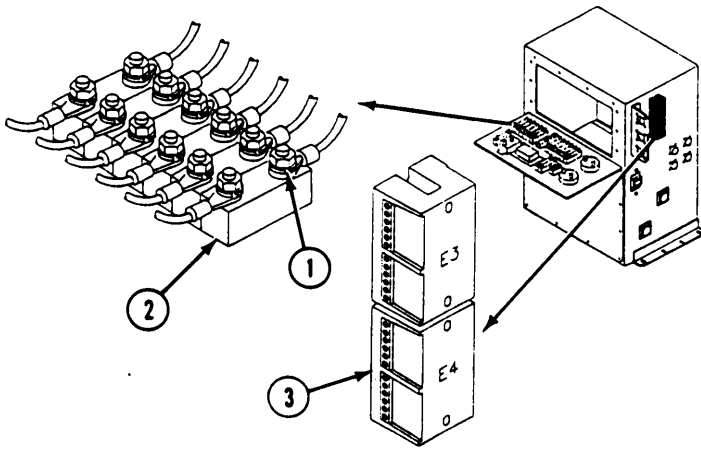


**NO**

1. Faulty circuit 9D.
2. Notify your Supervisor.

**YES**

1. Measure voltage between terminal 2 (1) of circuit breaker CB5 (2) and terminal block E4 (3).
2. Does multimeter read 110 volts AC or more?



**NO**

1. Replace circuit breaker CB5 (page 40.1-33).
2. Verify no faults found.

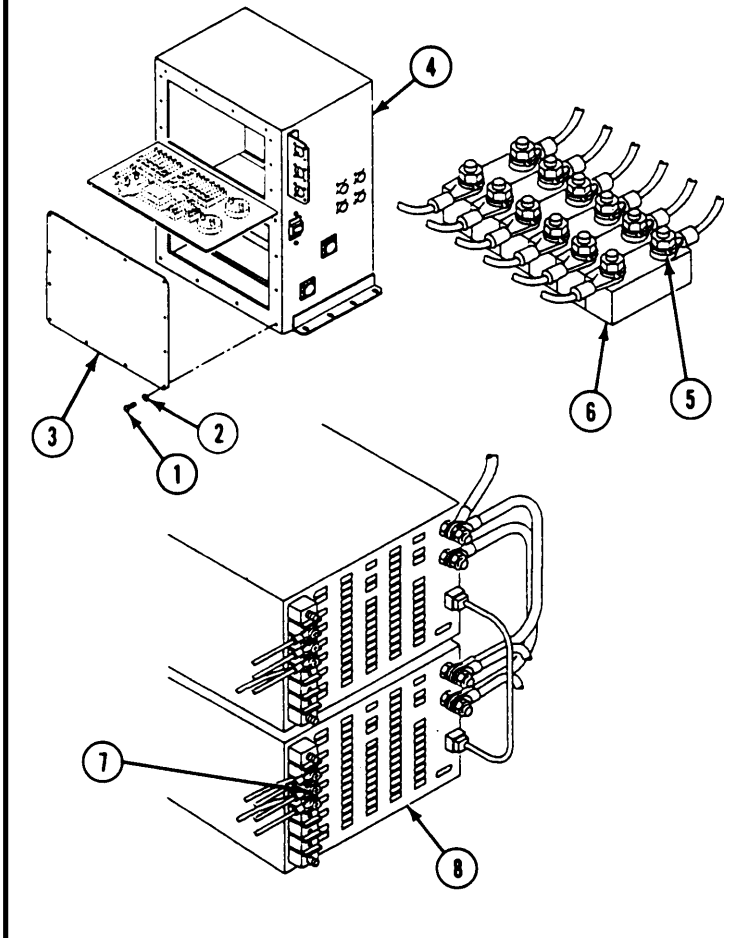
**YES**

**A3**



**A3**

1. Turn OFF AC/DC Power.
2. Remove 12 screws (1), lockwashers (2), and cover (3) from Power Control Enclosure (4). Discard lockwashers.
3. Measure resistance between terminal 2 (5) of circuit breaker CB5 (6) and AC HIGH terminal (7) of power supply PS2 (8).
4. Does multimeter read 0 ohms?



**NO** →  
 1. Faulty circuit 10A.  
 2. Notify your Supervisor.

**YES**

**A4**

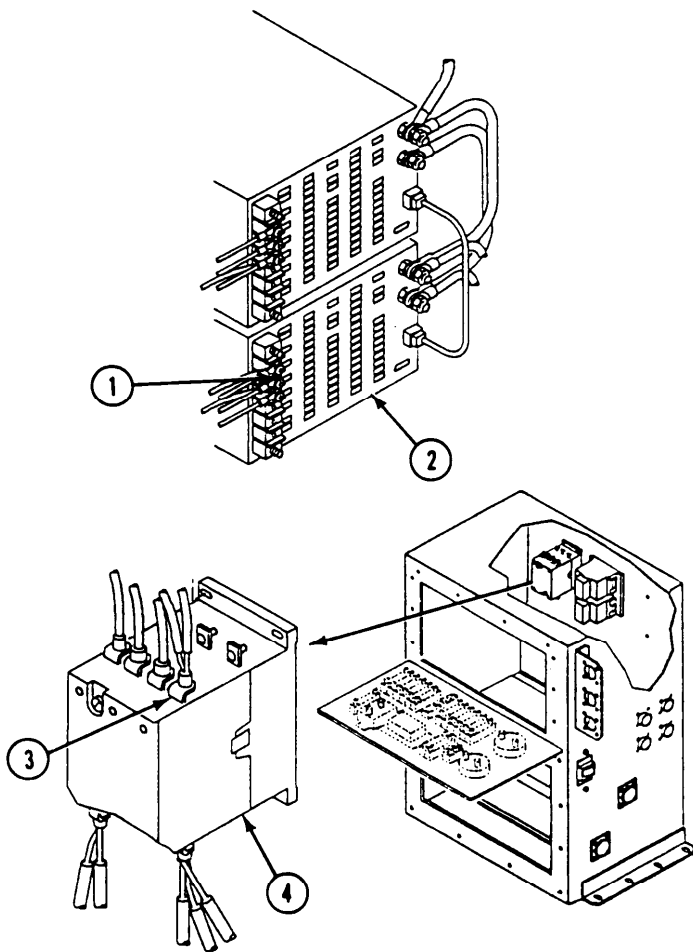
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**A4**

1. Measure resistance between terminal AC LOW (1) of power supply PS2 (2) and terminal L2 (3) of relay K1 (4).
2. Does multimeter read 0 ohms?

**NO**

1. Faulty circuit 8B.
2. Notify your Supervisor.



**YES**

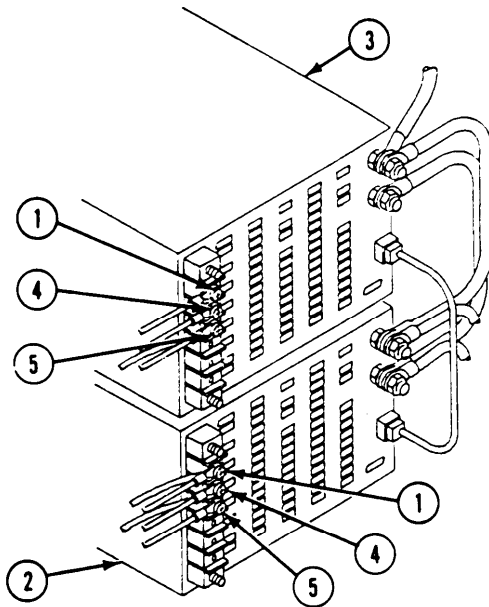
**A5**

**A5**

1. Measure resistance between circuit 10B terminals(1) on power supply PS2 (2) and power supply PS1 (3).
2. Measure resistance between circuit 8C terminals(4) on power supply PS2 (2) and power supply PS1 (3).
3. Measure resistance between circuit 3Z terminals (5) on power supply PS2 (2) and power supply PS1 (3).
4. Does multimeter read 0 ohms for each measurement?

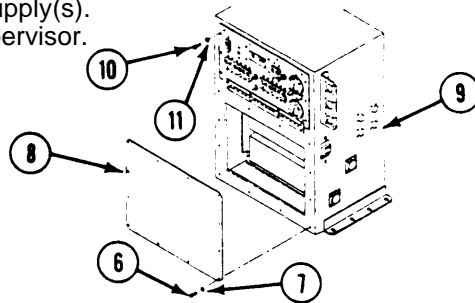
**NO**

1. Faulty circuit 10B, 8C, and/or 3Z.
2. Notify your Supervisor.



**YES**

1. Install 12 screws (6), new lockwashers (7), and cover (8) on Power Control Enclosure (9).
2. Raise faceplate on Power Control Enclosure (9) and secure with ten screws (10) and new lockwashers (11).
3. Faulty power supply(s).
4. Notify your Supervisor.



---

## VEHICLE WILL NOT ACCEPT EXTERNAL AC POWER

---

### INITIAL SETUP

#### Tools:

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

#### Personnel Required:

Power-Generation Equipment Repairer 52D10  
Helper (H)

#### References:

See your -10

#### References (cont):

TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Vehicle grounded (see your -10 and  
TM 11-7010-256-12&P)

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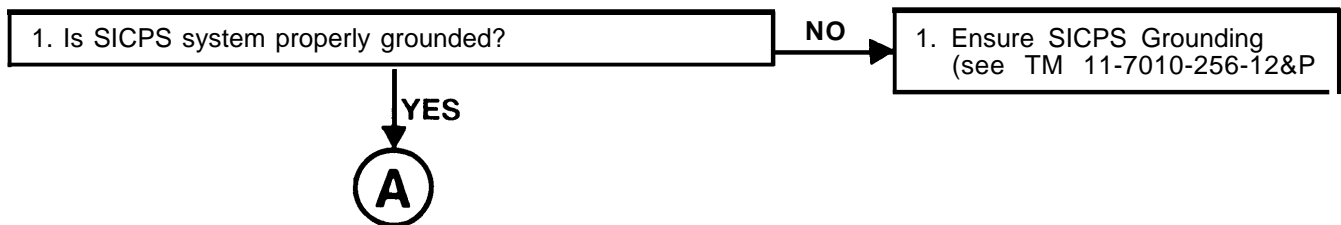


**WARNING**  
**HIGH VOLTAGE** is used in the operation of this equipment.  
**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



**A**

1. Is external source read between 103 and 135 vac?

**NO**

1. Apply a new source of external AC power.  
2. Verify no faults found.

**YES**

1. Apply external source of AC power to SICPS vehicle (TM 11-7010-256-12&P).  
2. Remove cable W1 leads (1) from generator (2), if applicable.  
3. Remove cable W2, J1 (3) from Power Entry Box (4).  
4. Measure resistance between W1 leads and W2 plug J1 as follows:

W1 HOT to J1 pin A  
W1 NEU to J1 pin N  
W1 GND1 to J1 pin G1  
W1 GND2 to J1 pin G2

5. Does multimeter read 0 ohms for all readings?

**NO**

1. Replace cable W1/2 (see TM 11-7010-256-12&P).  
2. Verify no faults found.

**YES**

**A1**

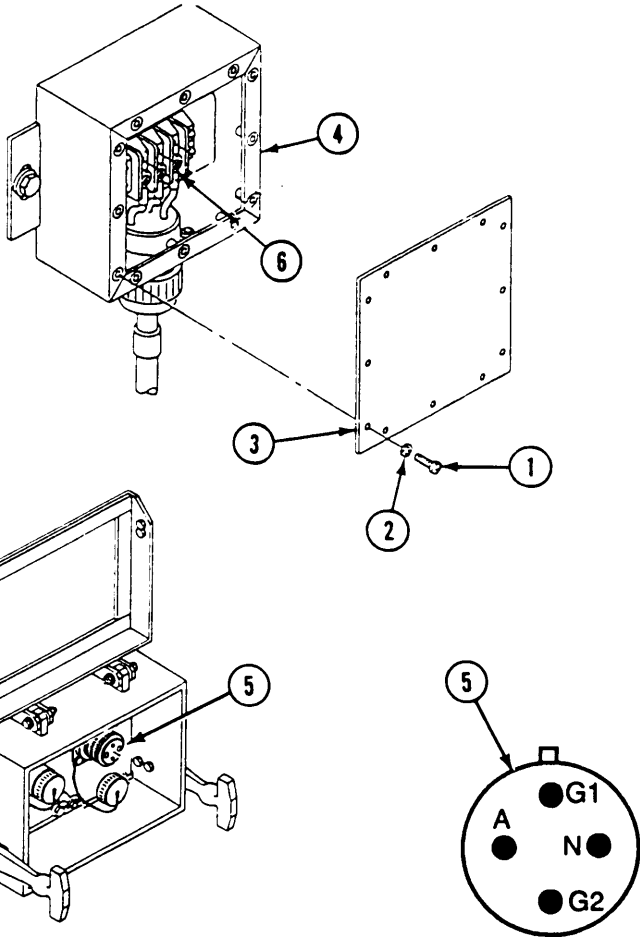
GO TO NEXT PAGE

**A1**

1. Remove 12 screws (1), lockwashers (2), and lid (3) from Power Distribution Box (4).
2. Measure resistance between Power Entry Box A4 plug P1 (5) and Power Distribution Box A3 (4) terminal block as follows:

P1 socket A to Post E1  
P1 socket N to Post E2  
P1 socket G1 to Post E3  
P1 socket G2 to Post E3

3. Does multimeter read 0 ohms for each reading?



**NO**

1. Replace Power Entry Box A4 (page 40.1-54).
2. Verify no faults found.

**YES**

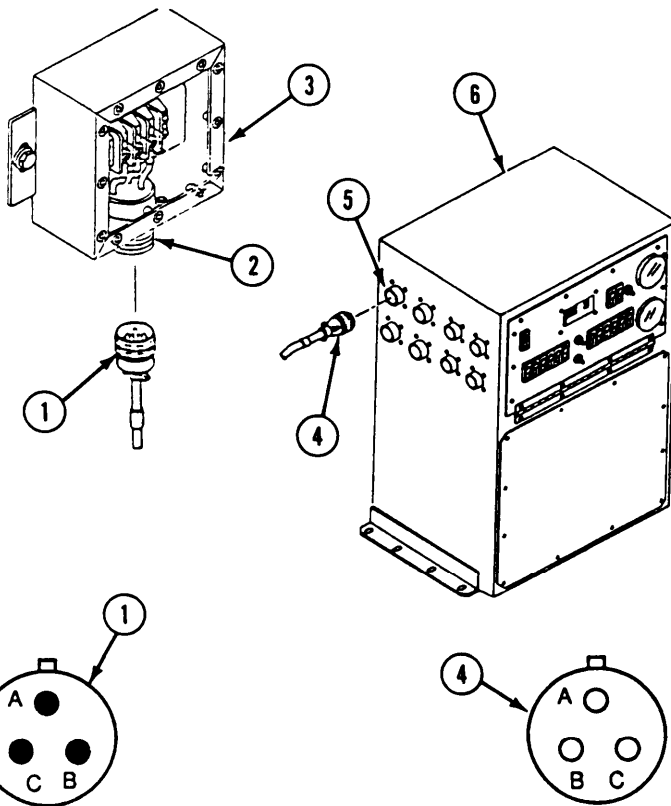
**A2**

**A2**

1. Remove cable W3 plug P1 (1) from jack J1 (2) on Power Distribution Box (3) and plug P3 (4) from jack J24 (5) on Power Control Enclosure (6).
2. Measure resistance between plug P1 (1) and plug P3 (4) as follows:

P1 pin A to P3 socket A  
 P1 pin B to P3 socket B  
 P1 pin C to P3 socket C

3. Does multimeter read 0 ohms for each reading?



**NO**

1. Replace cable W3 (page 40.1-58).
2. Verify no faults found.

**YES**

1. Faulty Power Control Enclosure.
2. Notify your Supervisor.

---

## VEHICLE WILL NOT ACCEPT INVERTER AC POWER

---

### INITIAL SETUP

#### Tools:

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

#### Personnel Required:

Power-Generation Equipment Repairer 52D10  
Helper (H)

#### References:

See your -10

#### References (cont):

TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Vehicle grounded (see your -10 and  
TM 11-7010-256-12&P)



**WARNING**  
HIGH VOLTAGE is used in  
the operation of this  
equipment.  
DEATH ON CONTACT may  
result if personnel fail to  
observe safety precautions.

NEVER work on equipment unless at  
least one other person familiar with the  
operation and hazards of the equipment  
is nearby. That person should also be  
familiar with giving first aid. When an  
operator helps a mechanic, that operator  
must be warned about dangerous areas.  
SHUT OFF POWER supply to equipment  
before beginning work. Make sure all  
external power is off/disconnected.  
BE CAREFUL not to contact high-voltage  
connections when installing or operating  
this equipment.



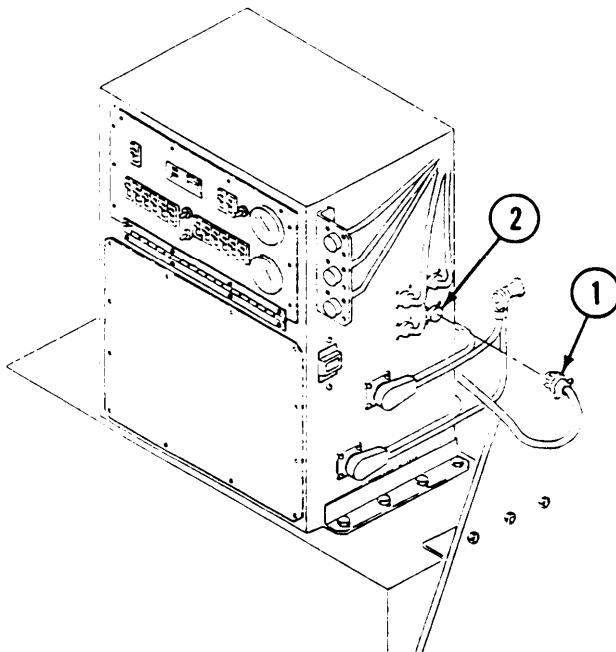


**A**

1. Remove all external power from SICPS system (see your -10 and TM 11-1070-256-12&P).
2. Remove cable W5 plug P6 (1) from power enclosure jack J27 (2).
3. Turn MASTER POWER switch ON.
4. Turn on inverters (TM 11-1070-256-12&P).
5. Measure voltage between pins A and B of plug P6 (1). Repeat measure for pins C and D.
6. Does multimeter read 110 volts AC or more for both measurements?

**NO**

1. Go to: No AC Power From Inverters (page 3-226.114).



**YES**

**A1**

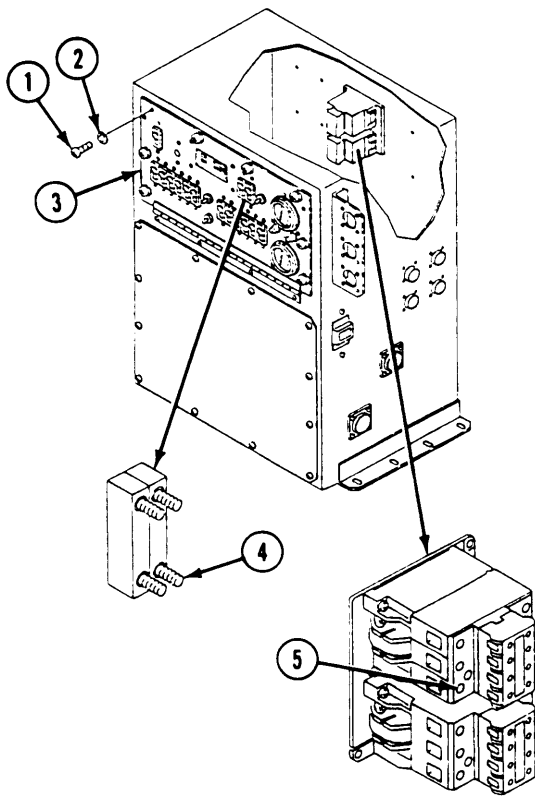
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**A1**

1. Turn MASTER POWER switch OFF.
2. Install cable W5 on power enclosure.
3. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
4. Measure resistance between circuit breaker CB3 pin 2 (4) and reversing contactor RC1-REV terminal L1 (5).
5. Does multimeter read 0 ohms?

**NO**

1. Faulty lead 13A.
2. Notify your Supervisor.

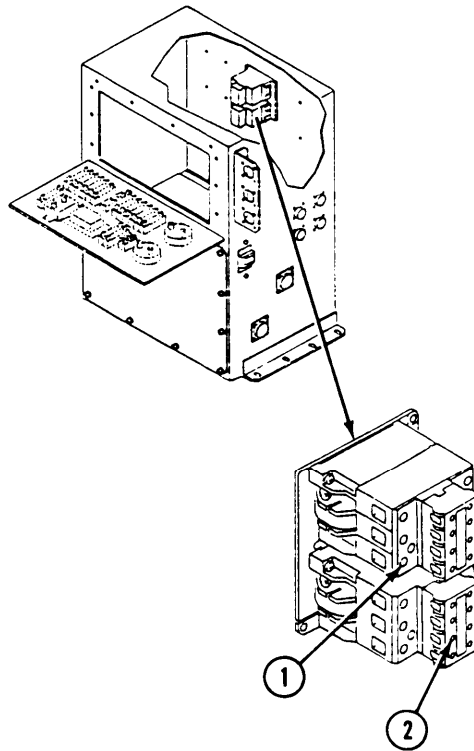


**YES**

**A2**

**A2**

1. Measure resistance between reversing contactor RC1-REV terminal L1 (1) and reversing contactor RC1-FWD terminal 51 (2).
2. Does multimeter read 0 ohms?



**NO**

1. Faulty lead 13D.
2. Notify your Supervisor.

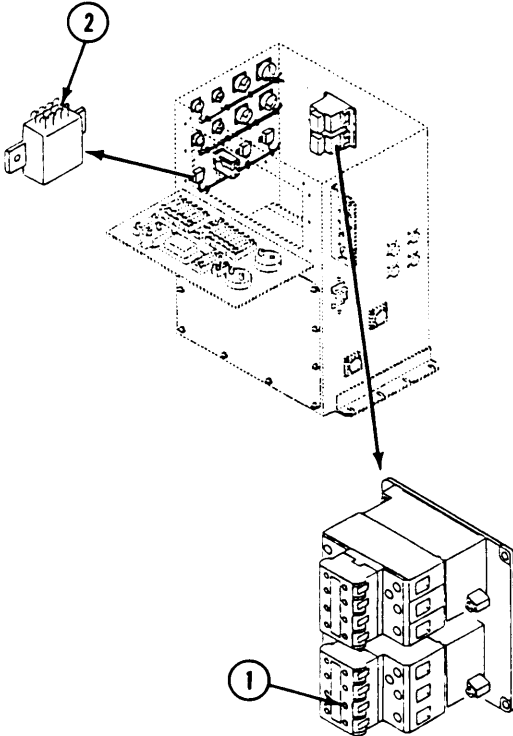
**YES**

**A3**

**GO TO NEXT PAGE**

**A3**

1. Measure resistance between reversing contactor RC1-FWD terminal 52 (1) and relay K4 terminal A3 (2).
2. Does multimeter read 0 ohms?



**NO**

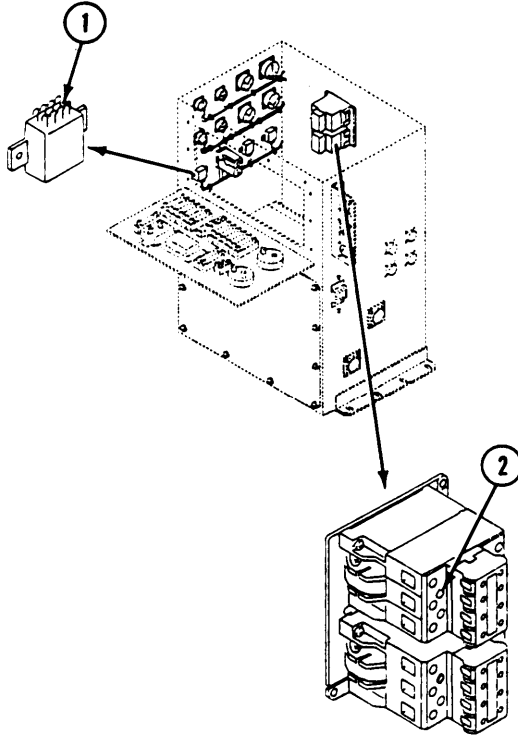
1. Faulty lead 14A.
2. Notify your supervisor.

**YES**

**A4**

**A4**

1. Measure resistance between relay K4 terminal A2 (1) and reversing contactor RC1-REV terminal A2 (2).
2. Does multimeter read 0 ohms?



**NO**

1. Faulty lead 16A.
2. Notify your Supervisor.

**YES**

**A5**

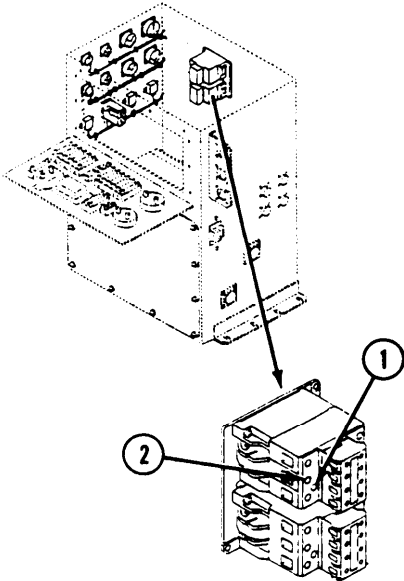
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**A5**

1. Measure resistance between reversing contactor RC1-REV terminal A1 (1) and terminal L2 (2).
2. Does multimeter read 0 ohms?

**NO**

1. Faulty lead 28D.
2. Notify your Supervisor.



**YES**

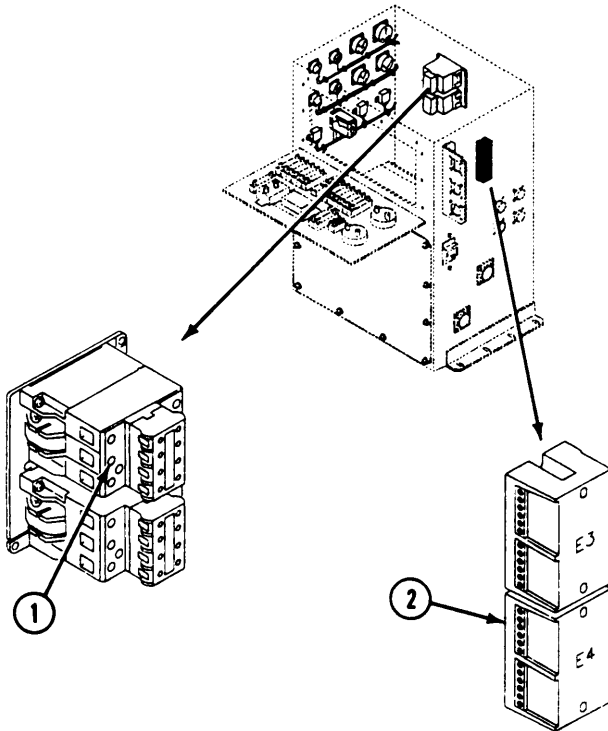
**A6**

**A6**

1. Measure resistance between reversing contactor RC1-REV terminal L2 (1) and anywhere on terminal block E4 (2).
2. Does multimeter read 0 ohms?

**NO**

1. Faulty lead 28G.
2. Notify your Supervisor.



**YES**

**A7**

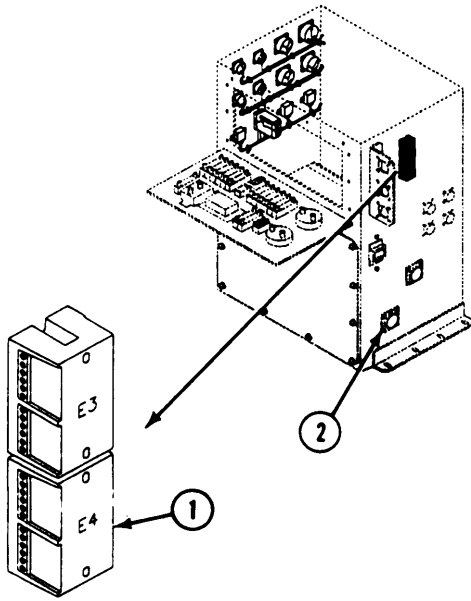
GO TO NEXT PAGE

**A7**

1. Measure resistance between anywhere on terminal block E4 (1) and power enclosure jack J26 outer shell (2).
2. Does multimeter read 0 ohms?

**NO**

1. Faulty lead 32C.
2. Notify your Supervisor.



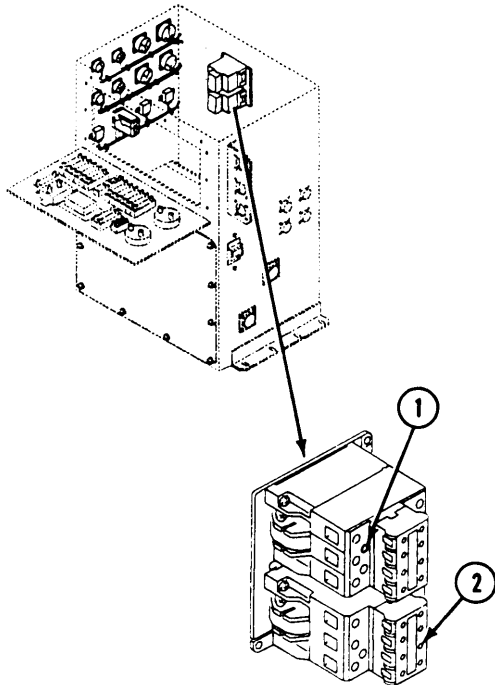
**YES**

**A8**



**A8**

1. Measure resistance between reversing contactor RC1-REV terminal A2 (1) and reversing contactor RC1-FWD terminal 52 (2).
2. Does multimeter read 0 ohms?



**NO**

1. Faulty relay K4.
2. Notify your Supervisor.

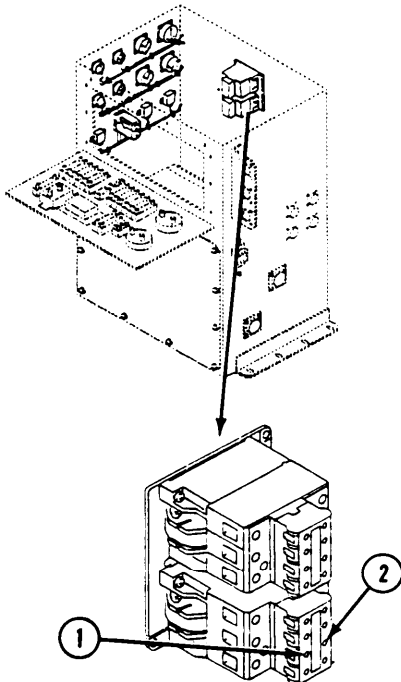
**YES**

**A9**

**GO TO NEXT PAGE**

**A9**

1. Measure resistance between reversing contactor RC1-FWD terminal 51 (1) and terminal 52 (2).
2. Does multimeter read 0 ohms?

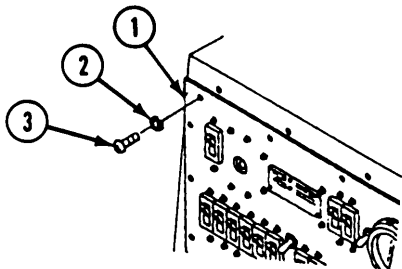


**NO**

1. Faulty reversing contactor.
2. Notify your Supervisor.

**YES**

1. Verify no faults found.
2. Raise faceplate (1) and secure with ten washers (2) and screws (3).



---

**NO POWER TO DC CIRCUITS**

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**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



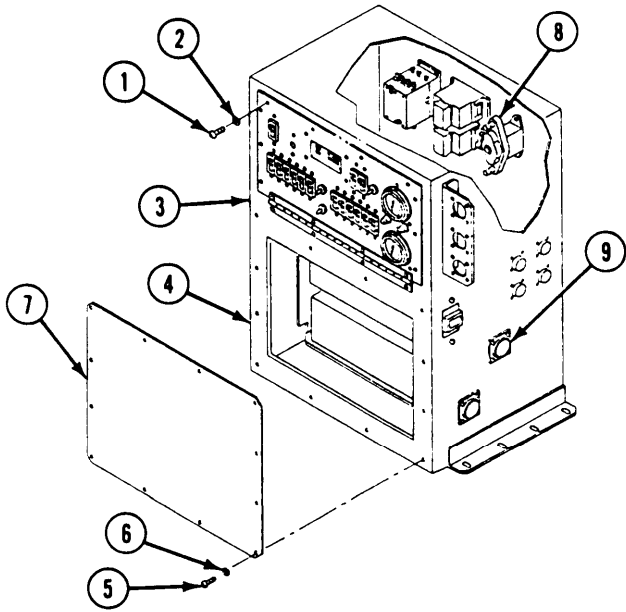
**GO TO NEXT PAGE**

**A**

1. Remove all external power from SICPS system (see your -10 and TM 11-7010-256-12&P).
2. Remove ten screws (1) and lockwashers (2), and lower faceplate (3) of Power Control Enclosure (4). Discard lockwashers.
3. Remove twelve screws (5), lockwashers (6), and cover (7) from front of Power Control Enclosure (4). Discard lockwashers.
4. Set MASTER SWITCH to ON (see your -10).
5. Measure voltage between relay K6 (8) terminal 2 and Power Control Enclosure jack J25 (9) negative terminal.
6. Does multimeter read 22 volts DC or more?

**NO**

1. Go to: Power Enclosure A1 DC Input/Output Inoperative (page 3-226.1).



**YES**

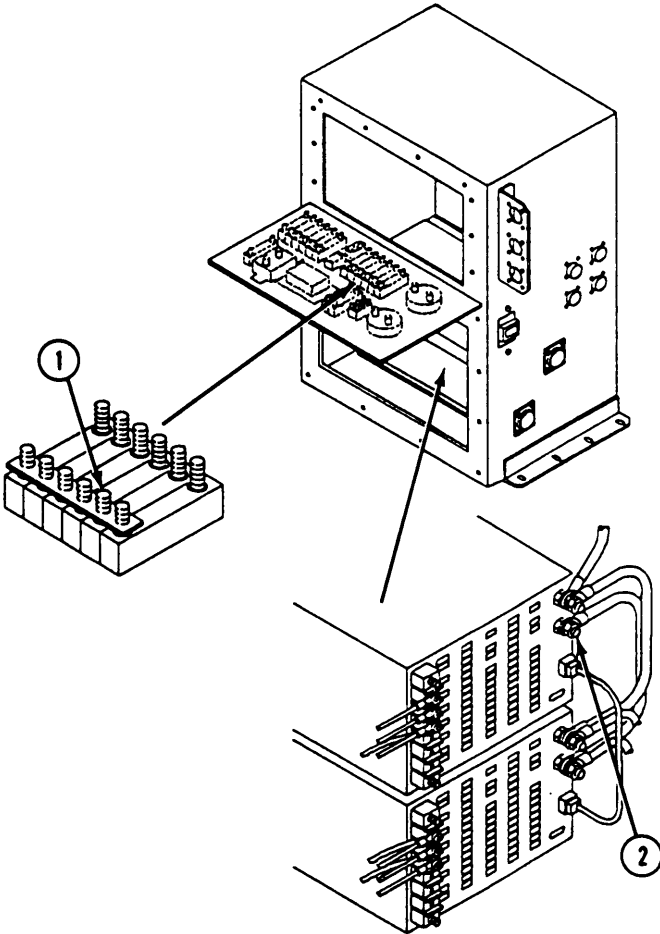
**A1**

**A1**

1. Measure voltage between circuit breaker CB15 (1) terminal 1 at DC bus bar and Power Supply PS1 output negative terminal (2).
2. Does multimeter read 22 volts DC or more?

**NO**

1. Go to: Vehicle Batteries Discharge with External AC Power Applied (page 3-226.69).



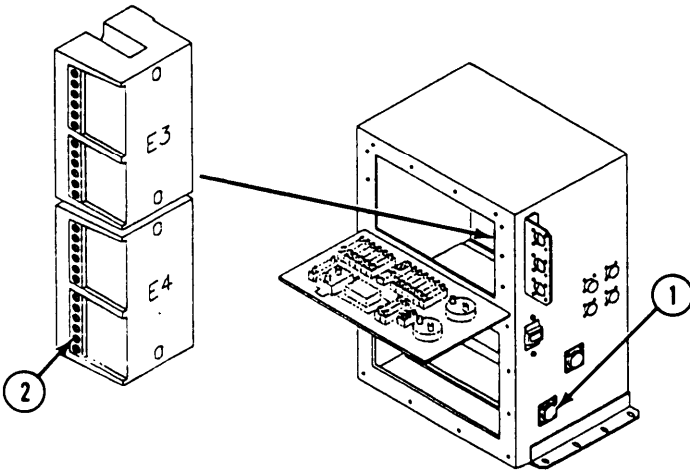
**YES**

**A2**

**GO TO NEXT PAGE**

**A2**

1. Set MASTER SWITCH to OFF (see your -10).
2. Measure resistance of circuit 32C between Power Control Enclosure jack J26 (1) and terminal block E4 terminal 2(2).
3. Does multimeter read 0 ohms?



**NO**

1. Faulty lead 32C in Power Control Enclosure.
2. Notify your supervisor.

**YES**

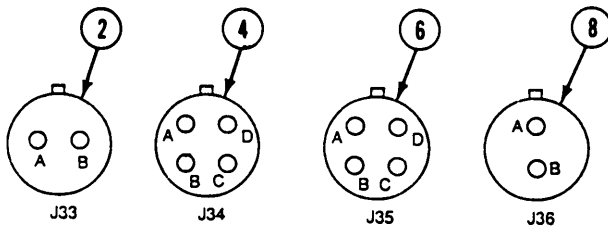
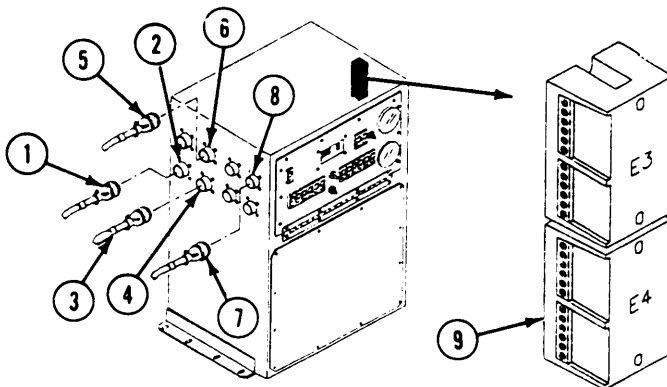
**A3**

**A3**

1. Remove the following cable plugs from jacks on Power Control Enclosure:
  - W45 plug P13 (1) from jack J33 (2)
  - W10 plug P14 (3) from jack J34 (4)
  - W9 plug P15 (5) from jack J35 (6)
  - W32 plug P16 (7) from jack J36 (8)
2. Measure resistance of the following leads between terminal block E4 (9) and the following jacks on Power Control Enclosure:
  - Lead 32G to J33 (2) socket B
  - Lead 32H to J34 (4) socket B
  - Lead 32J to J34 (4) socket D
  - Lead 32L to J35 (6) socket B
  - Lead 32N to J35 (6) socket D
  - Lead 32P to J36 (8) socket B
3. Does multimeter read 0 ohms for all readings?

**NO**

1. Faulty leads 32G, H, J, L, N, and P in Power Control Enclosure.
2. Notify your supervisor.



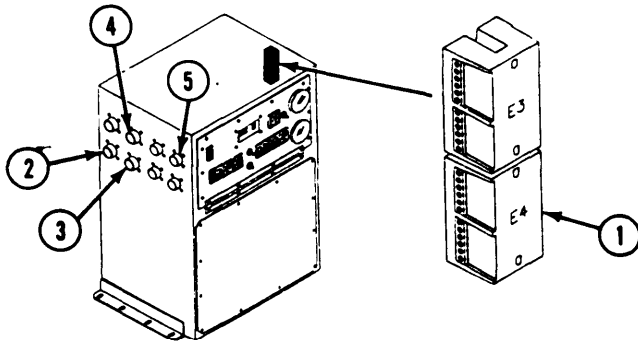
**YES**

**A4**

GO TO NEXT PAGE

**A4**

1. Set MASTER SWITCH to ON (see your -10).
2. Set all DC CIRCUITS circuit breakers on Power Control Enclosure panel to ON.
3. Measure voltage between terminal block E4 (1) and the following jacks on Power Control Enclosure:
  - J33 (2) socket A
  - J34 (3) socket A
  - J35 (4) socket A
  - J36 (5) socket A
4. Does multimeter read 22 volts DC or more for all readings?

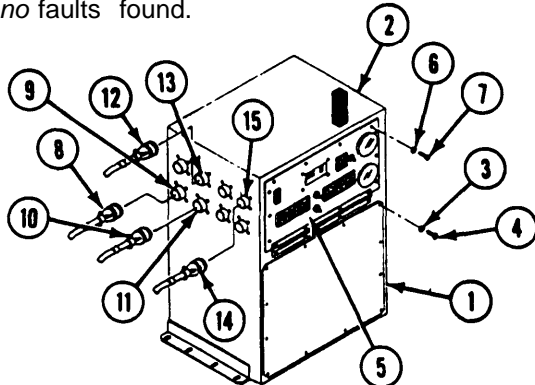


**NO**

1. Go to: Power Enclosure A1 DC Input/Output Inoperative (page 3-226.1).

**YES**

1. Install cover (1) on Power Control Enclosure (2) and secure with twelve new lockwashers (3) and screws (4).
2. Raise faceplate (5) and secure to Power Control Enclosure (2) with ten new lockwashers (6) and screws (7).
3. Install the following cable plugs:
  - W45 plug P13 (8) on jack J33 (9)
  - W10 plug P14 (10) on jack J34 (11)
  - W9 plug P15 (12) on jack J35 (13)
  - W32 plug P16 (14) on jack J36 (15)
4. Verify *no* faults found.





---

## NO POWER TO AC CIRCUITS

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital multimeter (Item 43, App D)

**Personnel Required:**

Power-generation Equipment Repairer 52D10  
Helper (H)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in operation of this equipment.

**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with operation and hazards of equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is **OFF/disconnected**.

**BE CAREFUL** not to touch high-voltage connections when installing or operating this equipment.



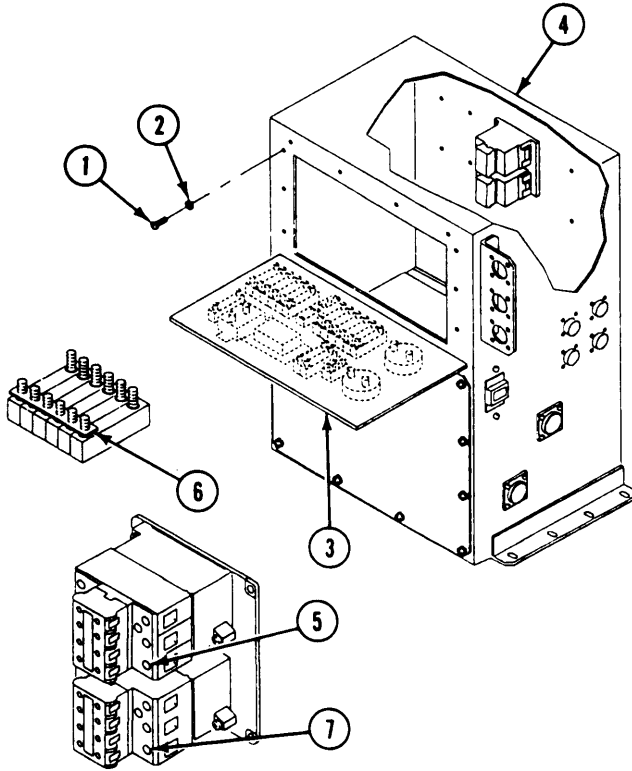
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**A**

1. Turnoff all power from SICPS system (see your -10 and TM 11-7010-256-12&P).
2. Remove ten screws (1), lockwashers (2), and lower faceplate (3) of power enclosure (4).
3. Measure resistance of circuit 17B between reversing contactor reverse terminal T1 (5) and circuit breaker CB10 terminal 1 (6). Also measure resistance of circuit 17A between terminal T1 and forward terminal T1 (7).
4. Does multimeter read 0 ohms for both readings?

**NO**

1. Faulty lead 17A and/or lead 17B.
2. Notify your Supervisor.



**YES**

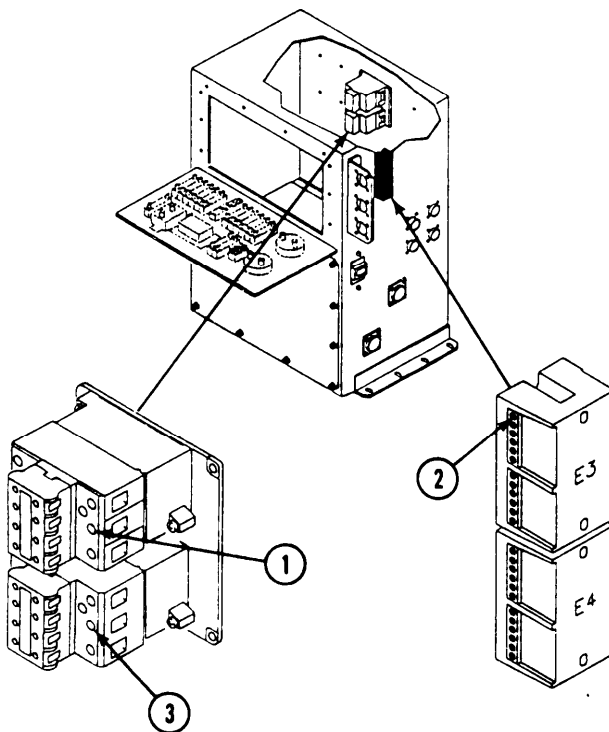
**A1**

**A1**

1. Measure resistance of circuit 18B between reversing contactor reverse terminal T2 (1) and terminal block E3 terminal 1 (2). Also measure resistance of circuit 18A between terminal T2 (1) and forward terminal T2 (3).
2. Does multimeter read 0 ohms for both readings?

**NO**

1. Faulty lead 18A and/or lead 18B.
2. Notify your Supervisor.



**YES**

**A2**

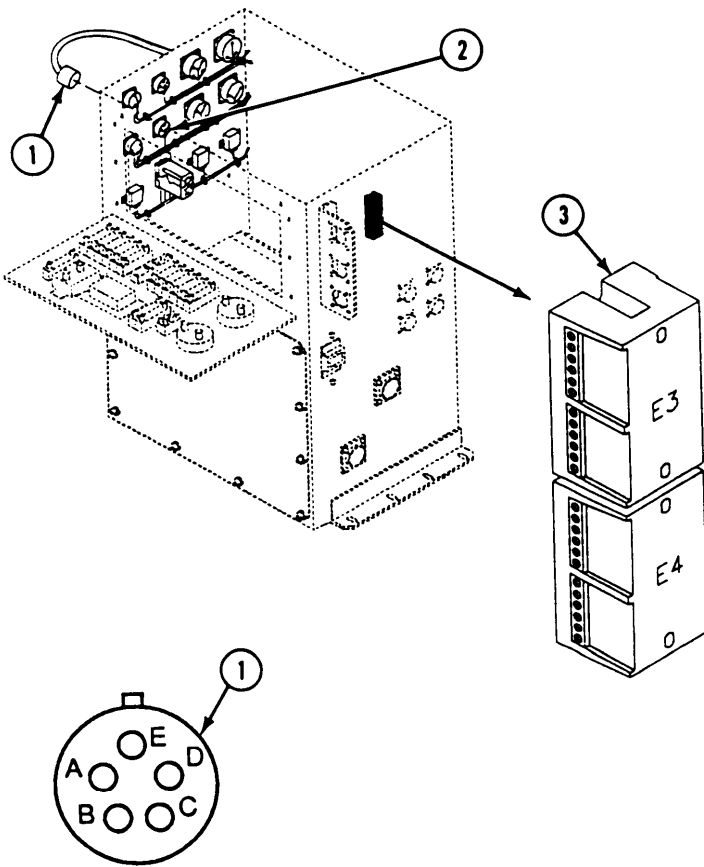
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**A2**

1. Remove plug P1 (1) from J30 (2).
2. Measure resistance of circuit 18N between power enclosure jack J30 (2), socket B, and terminal block E3 (3). Also measure resistance for circuit 18K between jack J30, socket D, and E3.
3. Does multimeter read 0 ohms for both readings?

**NO**

1. Faulty lead 18N and/or lead 18K.
2. Notify your Supervisor.

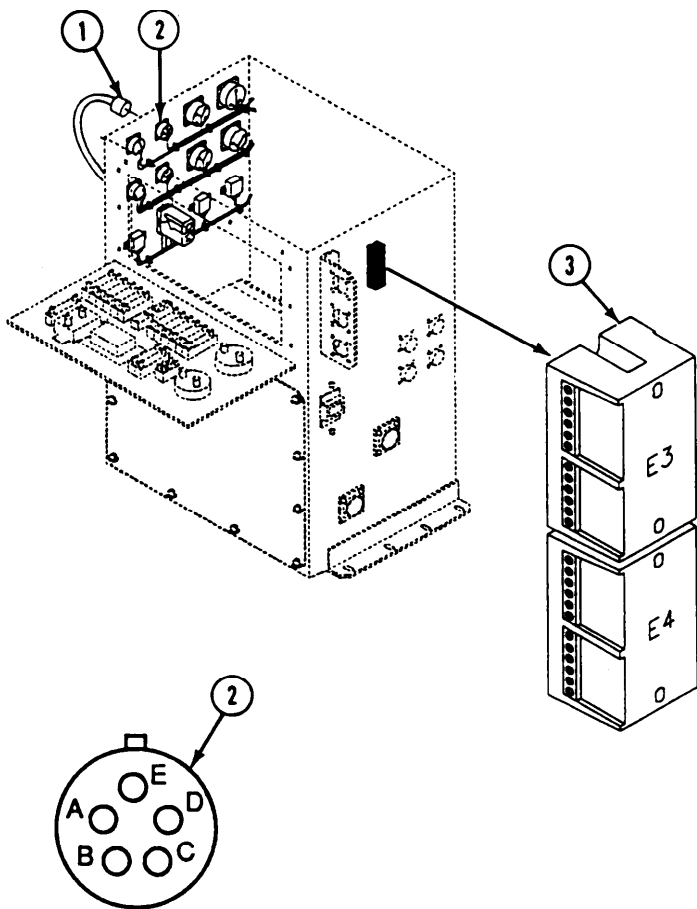


**YES**

**A3**

**A3**

1. Remove plug P11 (1) from J31 (2).
2. Measure resistance of circuit 18H between power enclosure jack J31 (2), socket B, and terminal block E3 (3). Also measure resistance for circuit 18E between jack J31, socket D, and E3.
3. Does multimeter read 0 ohms for both readings?



**NO**

1. faulty lead 18E and/or lead 18H.
2. Notify your Supervisor.

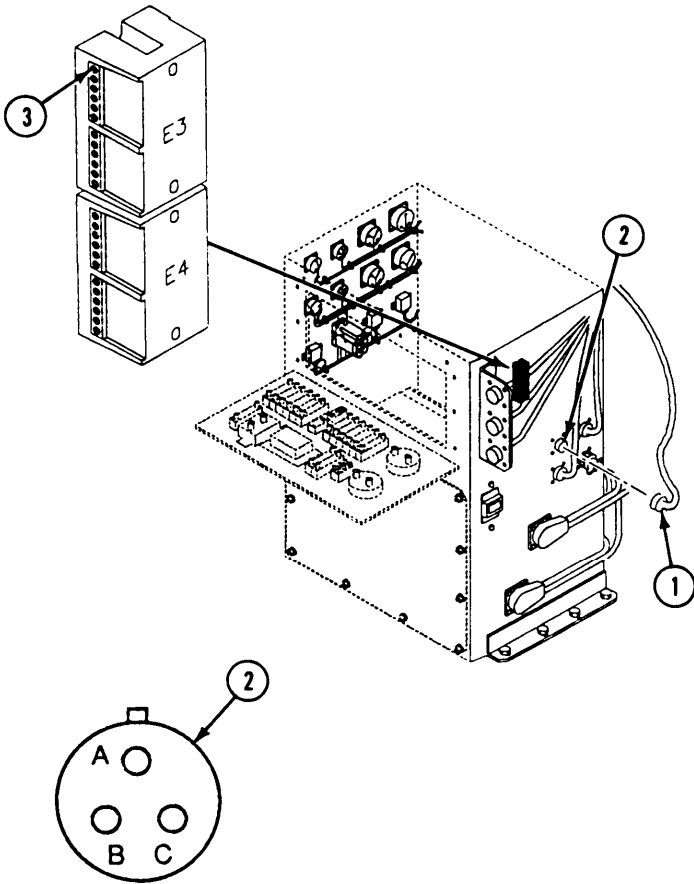
**YES**

**A4**

GO TO NEXT PAGE

**A4**

1. Remove plug P17 (1) from J37 (2).
2. Measure resistance of circuit 18D between power enclosure jack J37 (2), socket B, and terminal block E3 (3).
3. Does multimeter read 0 ohms?



**NO**

1. Faulty lead 18D.
2. Notify your Supervisor.

**YES**

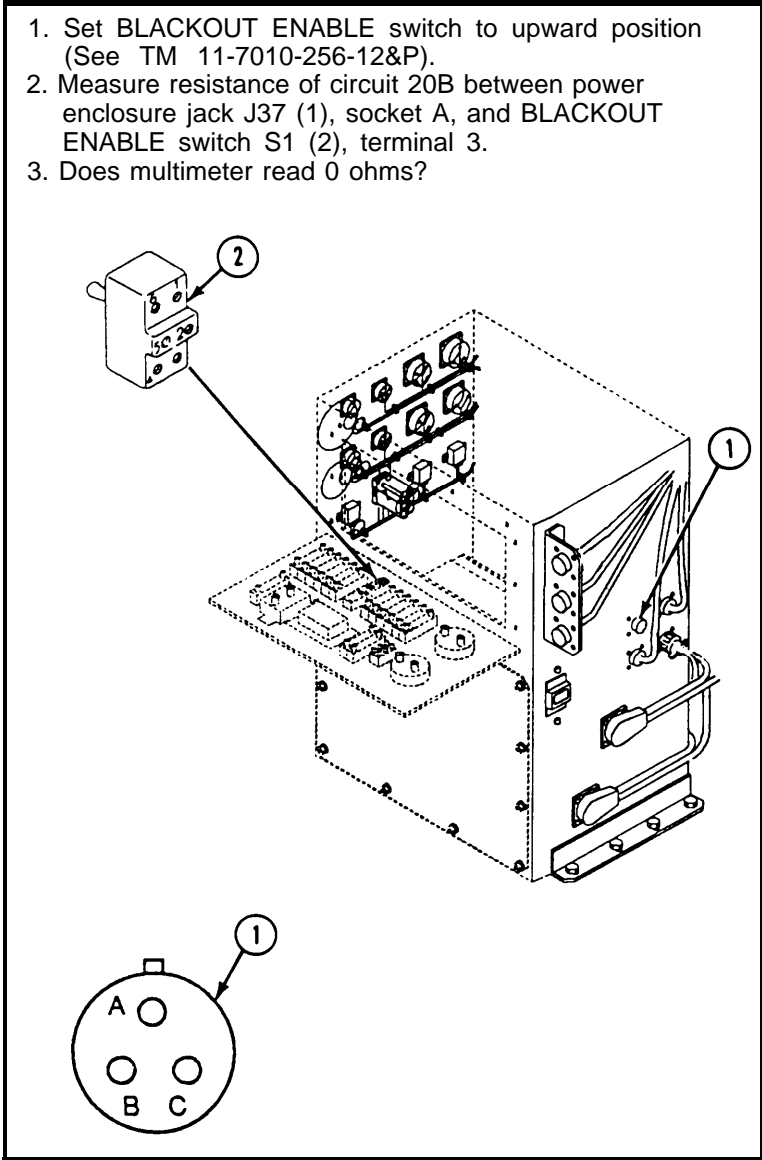
**A5**

**A5**

1. Set BLACKOUT ENABLE switch to upward position (See TM 11-7010-256-12&P).
2. Measure resistance of circuit 20B between power enclosure jack J37 (1), socket A, and BLACKOUT ENABLE switch S1 (2), terminal 3.
3. Does multimeter read 0 ohms?

**NO**

1. Faulty lead 20B.
2. Notify your Supervisor.



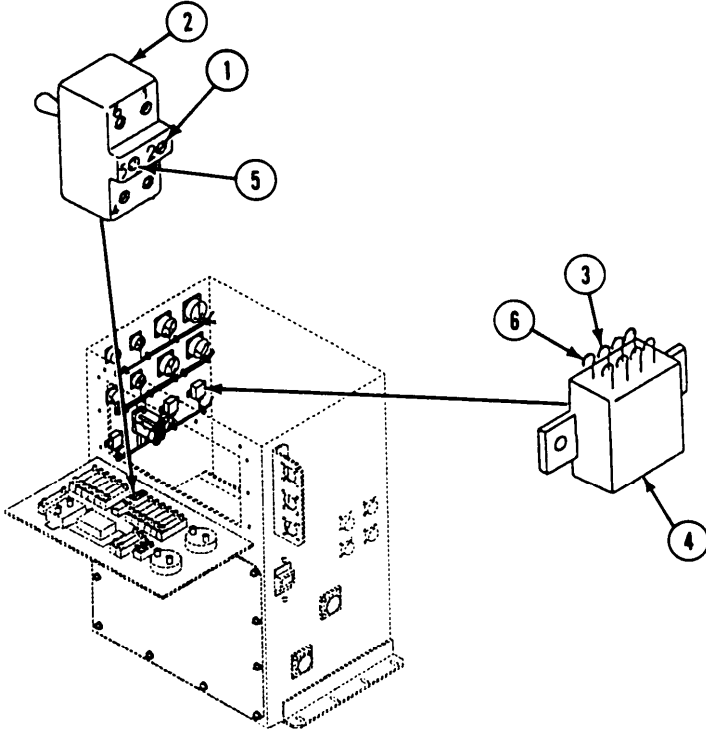
**YES**

**A6**

**GO TO NEXT PAGE**

**A6**

1. Measure resistance of circuit 19B from terminal 2 (1) of switch S1 (2) and A2 (3) of relay K5 (4).
2. Measure resistance of circuit 20A from terminal 3 (5) of switch S1 (2) and A3 (6) of relay K5 (4).
3. Does multimeter read 0 ohms?

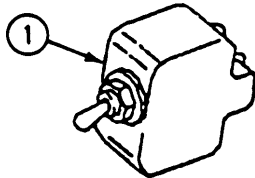


**NO**

1. Faulty leads 19B and/or 20A.
2. Notify your Supervisor.

**YES**

1. Remove leads 19A and 19B from switch S1 positing 2.
2. Measure resistance with switch S1 (1) in both up and down positions.
3. Does multimeter read 0 ohms when switch is down and infinite ohms when switch is up?



**NO**

1. Replace switch S1 (page 40.1-33).
2. Verify no faults found.

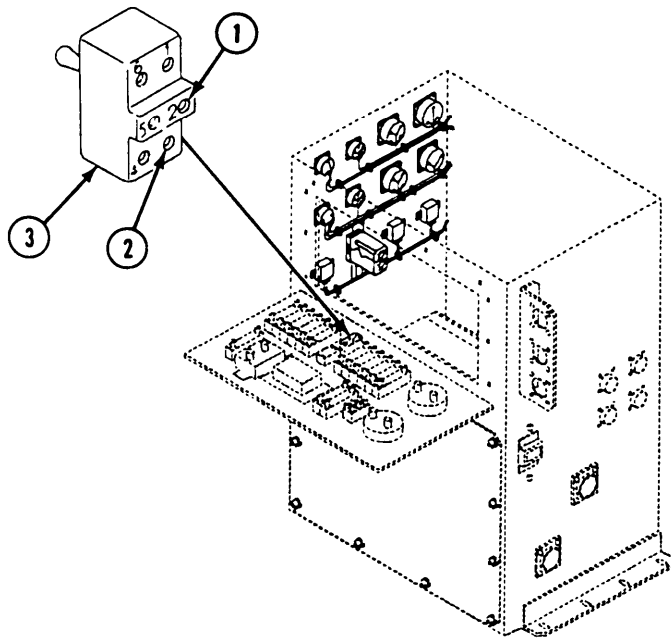
**YES**

**A7**



**A7**

1. Reconnect leads 19A and 19B to S1 position 2.
2. Set BLACKOUT ENABLE switch to upward position (see TM 11-7010-256-12&P).
3. Measure resistance between terminal 2 (1) and terminal 3 (2) of BLACKOUT ENABLE switch S1 (3).
4. Does multimeter read infinite ohms?



**NO**

1. Faulty relay K5.
2. Notify your Supervisor.

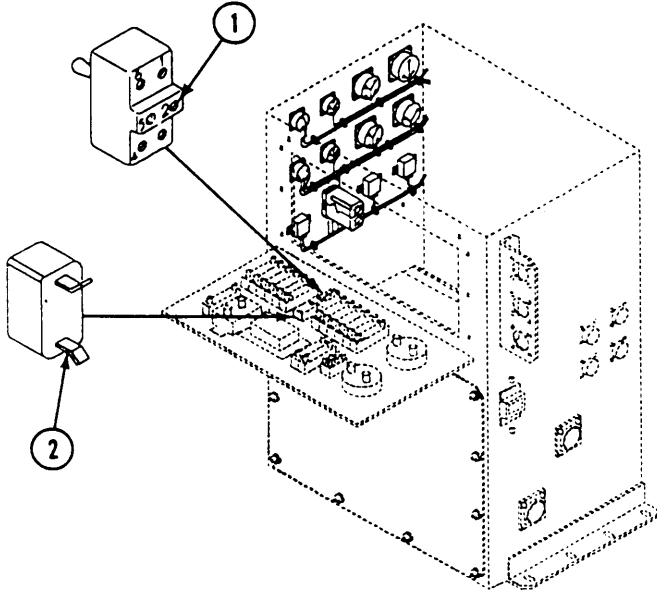
**YES**

**A8**

**GO TO NEXT PAGE**

**A8**

1. Measure resistance of circuit 19A between BLACK-OUT ENABLE switch S1 (1), terminal 2. and circuit breaker CB17 (2), terminal 2.
2. Does multimeter read 0 ohms for both readings?



**NO**

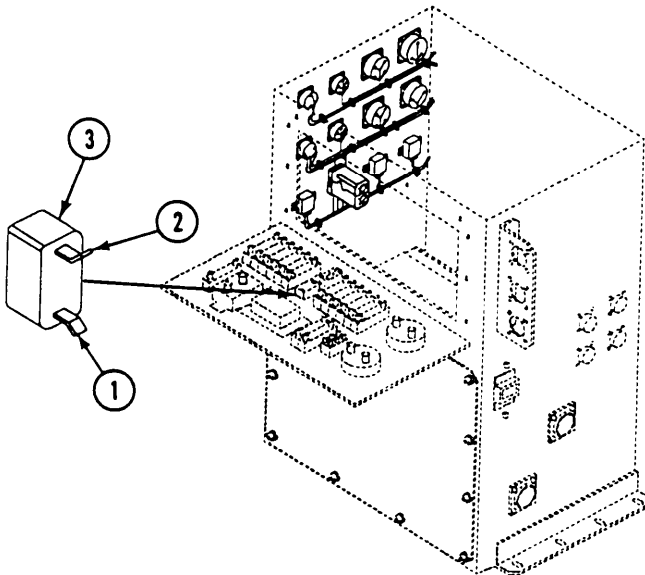
1. Replace lead 19A (page 40.1-33).
2. Verify no faults found.

**YES**

**A9**

**A9**

1. Set BLACKOUT ENABLE switch to down position.
2. Set AC LIGHTS switch in upward position (see TM 11-7010-256-12&P).
3. Measure resistance between terminal 2 (1) and terminal 1 (2) of circuit breaker CB17 (3).
4. Does multimeter read 0 ohms?



**NO**

1. Replace circuit breakers CB17 (page 40.1-33).
2. Verify no faults found.

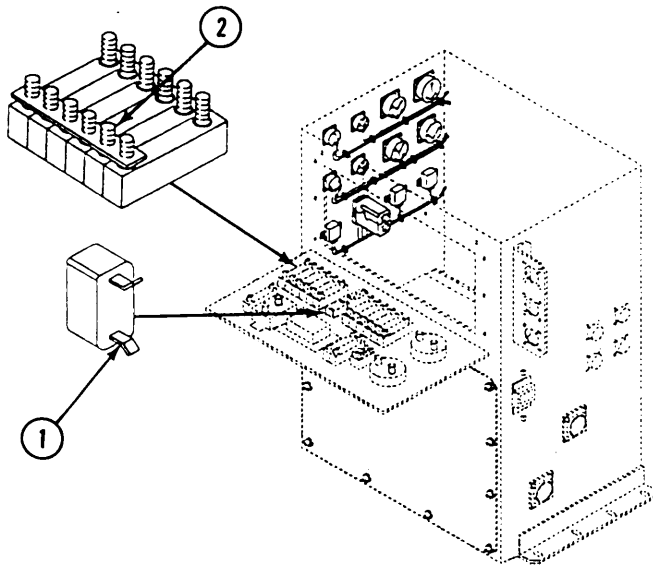
**YES**

**A10**

**GO TO NEXT PAGE**

**A10**

1. Set AC LIGHTS switch in upward position (see TM 11-7010-256-12&P).
2. Measure resistance of circuit 17C between circuit breaker CB17, terminal 2 (1), and AC bus bar at CB9 (2) terminal 1.
3. Does multimeter read 0 ohms?

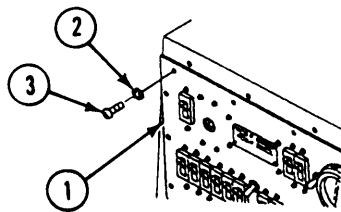


**NO**

1. Replace lead 17C (page 40.1-33).
2. Verify no faults found.

**YES**

1. Verify no faults found.
2. Raise faceplate (1) and secure with 10 lockwashers (2) and screws (3).



---

**NO DC OUTPUT FROM DC POWER SUPPLY**

---

**INITIAL SETUP****Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**References:**

See your -10  
TM 11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected.

**BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



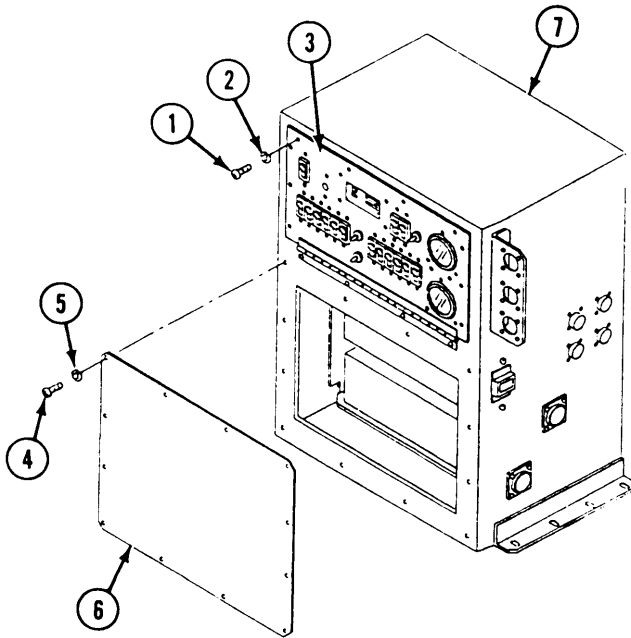
**GO TO NEXT PAGE**

**A**

1. Remove ten screws (1) and lockwashers (2), and lower faceplate (3). Discard lockwashers.
2. Remove twelve screws (4), lockwashers (5), and cover (6) from Power Control Enclosure (7). Discard lockwashers.
3. Apply an external source of AC power (TM 11-7010-256-12&P).
4. Set AC MAIN circuit breaker on Power Control Enclosure panel to ON.
5. Is external source of AC power accepted by Power Control Enclosure?

**NO**

1. Go to: Vehicle Will Not Accept External AC Power (page 3-226.76).

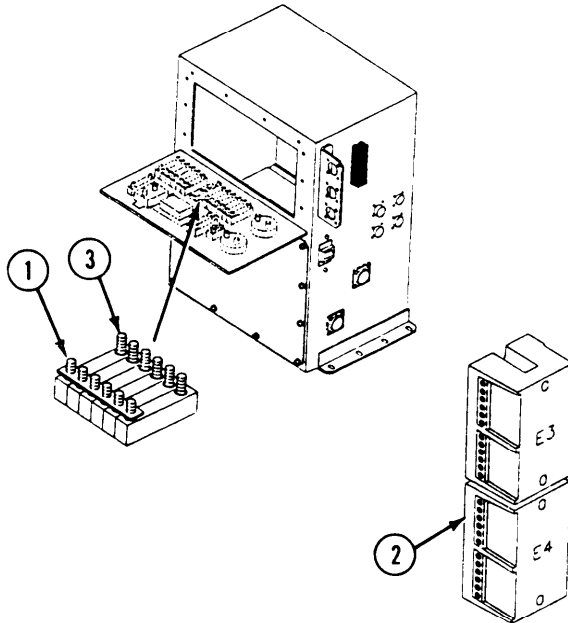


**YES**

**A1**

**A1**

- . Set DC POWER SUPPLY circuit breaker on Power Control Enclosure panel to ON.
- . Measure voltage between CB5 terminal 1 (1) and terminal block E4 (2). Also measure voltage from CB5 terminal 2 (3) to E4 (2).
- . Does multimeter read 110 volts AC or more for both measurements?



**NO**

1. Replace circuit breaker CB5 (page 40.1-33).
2. Verify no faults found.

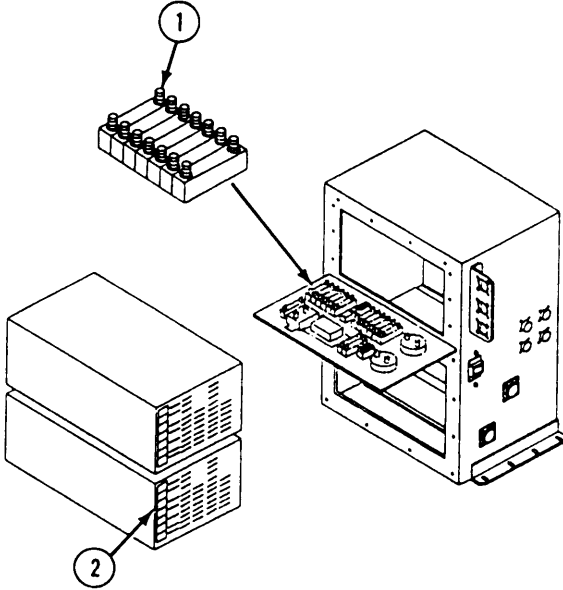
**YES**

**A2**

**GO TO NEXT PAGE**

**A1**

1. Set MASTER SWITCH to OFF (see your -10).
2. Measure resistance between circuit breaker CB5 terminal 2 (1) and Power Supply PS2 terminal AC HIGH (2).
3. Does multimeter read 0 ohms?



**NO**

1. Faulty lead 10A in Power Control Enclosure.
2. Notify your supervisor.

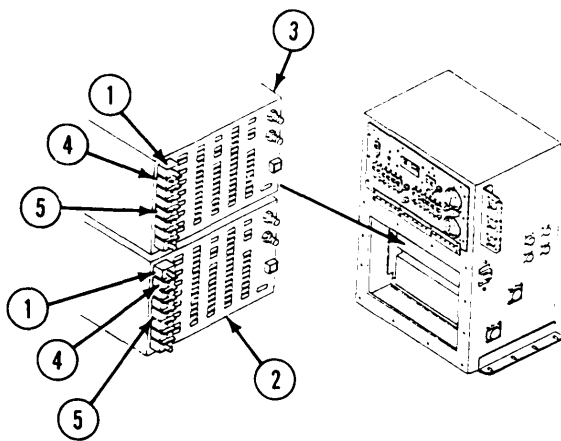
**YES**

**A2**



**A3**

1. Measure resistance between circuit 10B terminals (1) on Power Supply PS2 (2) and Power Supply PS1 (3).
2. Measure resistance between circuit 8C terminals (4) on Power Supply PS2 (2) and Power Supply PS1 (3).
3. Measure resistance between circuit 3Z terminals (5) on Power Supply PS2 (2) and Power Supply PS1 (3).
4. Does multimeter read 0 ohms for each measurement?



**NO**

1. Faulty lead 10B, 8C, and 3Z in Power Control Enclosure.
2. Notify your supervisor.

**YES**

1. Faulty Power Supply.
2. Notify your supervisor.

---

**NO AC POWER FROM INVERTERS**

---

**INITIAL SETUP**

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
Digital Multimeter (Item 43, App D)  
Inverter Test Solo Plug (Fig 1, App E)

**References:**

See your -10  
TM11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Power-Generation Equipment Repairer 52D10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment.  
**DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

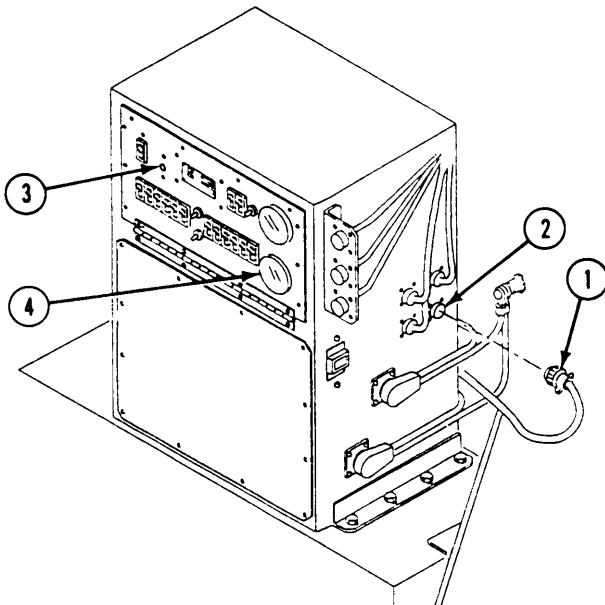
**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.

YES



**A**

1. Remove cable W5 plug P6 (1) from Power Control Enclosure jack J27 (2).
2. Set MASTER SWITCH to ON.
3. If popped out, press DC TO INVERTERS button (3) on Power Control Enclosure panel.
4. Does DC VOLTS meter (4) on Power Control Enclosure panel read 26 volts DC or more?



**NO**

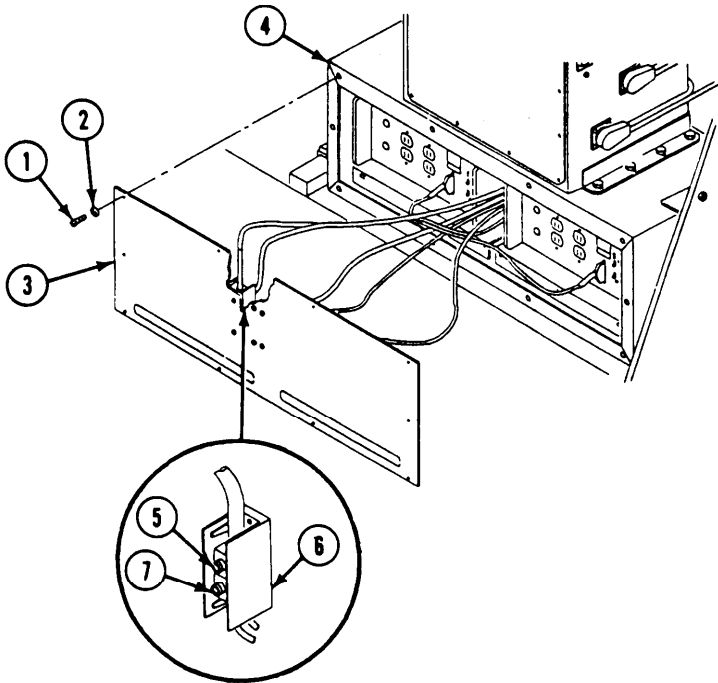
1. Go to: Power Control Enclosure A1 DC Input/Output Inoperative (page 3-226.1).

**YES**

**A1**

**GO TO NEXT PAGE**

1. Remove ten screws (1), lockwashers (2), and cover (3) from inverter housing (4). Discard lockwashers.
2. Measure voltage between terminal E2 (5) on terminal block TB1 (6) and ground.
3. Repeat measurement between terminal E4 (7) and ground.
4. Does multimeter read 22 volts DC or more for both measurements?



NO

1. Replace terminal block TB1 (page 40.1-28.1).
2. Verify no faults found.

YES

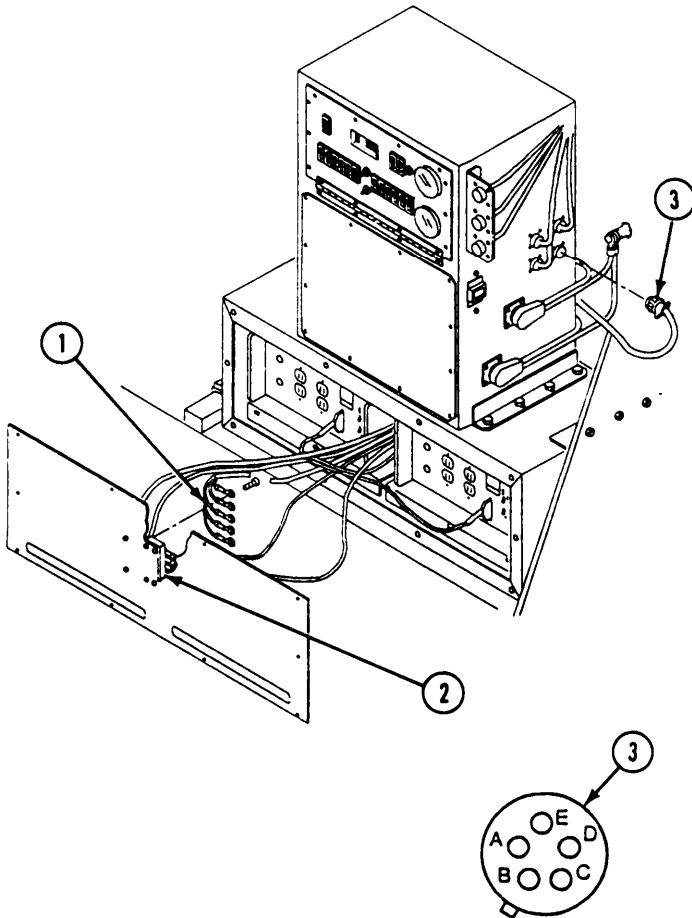
**A2**

**A2**

1. Set MASTER SWITCH to OFF.
2. Tag leads E1 thru E5 before removal. Remove cable W5 leads (1) from posts on terminal block TB2 (2).
3. Measure resistance between sockets of plug P6 (3) and W5 leads (1) as follows:
  - Socket A to lead E1
  - Socket B to lead E2
  - Socket C to lead E3
  - Socket D to lead E4
  - Socket E to lead E5
4. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W5 (page 40.1-62).
2. Verify no faults found.



**YES**

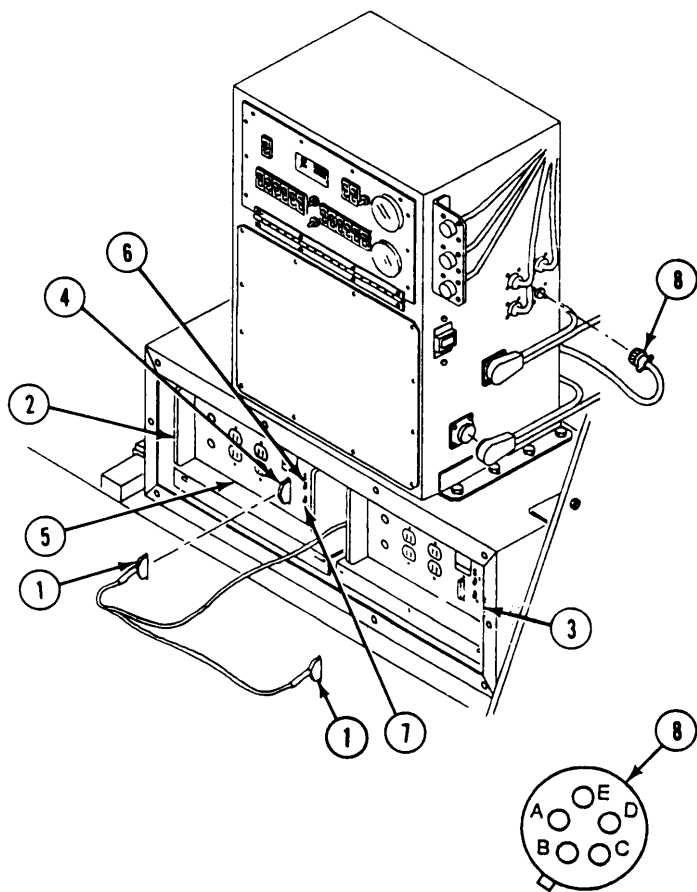
**A3**

GO TO NEXT PAGE

1. Install cable W5 leads on terminal block TB2.
2. Remove cable W15 plugs (1) from inverters IN1 (2) and IN2 (3).
3. Install inverter test solo plug (4) in inverter IN1 (2).
4. Set MASTER SWITCH to ON.
5. On inverter front panel (5), set POWER switch (6) to ON and momentarily move RESET switch (7) up.
6. Measure voltage between sockets A and B of cable W5 plug P6 (8).
7. Does multimeter read 110 volts AC or more?

NO

1. Faulty inverter IN1 (with solo plug installed).
2. Notify your supervisor.

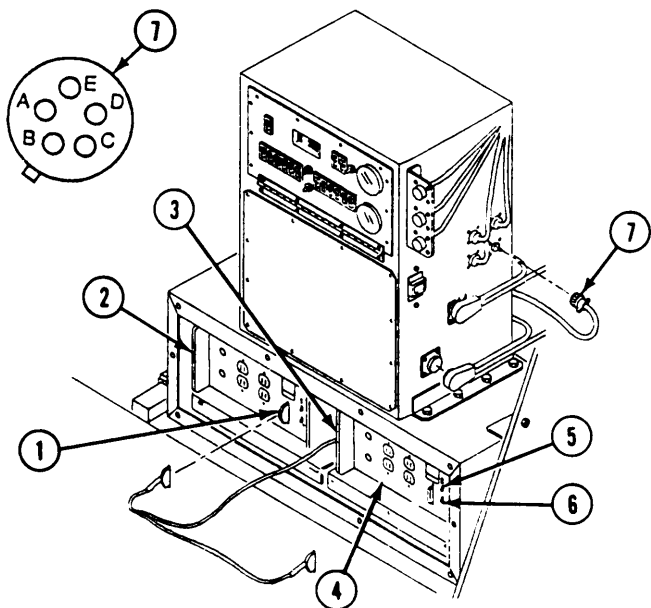


YES

**A4**

**A4**

1. Set MASTER SWITCH to OFF.
2. Remove solo plug (1) from tested inverter IN1 (2) and install in other inverter IN2 (3).
3. Set MASTER SWITCH to ON.
4. On inverter front panel (4), set POWER switch (5) to ON and momentarily move RESET switch (6) up.
5. Measure voltage between sockets C and D of cable W5 plug P6 (7).
6. Does multimeter read 110 volts AC or more?

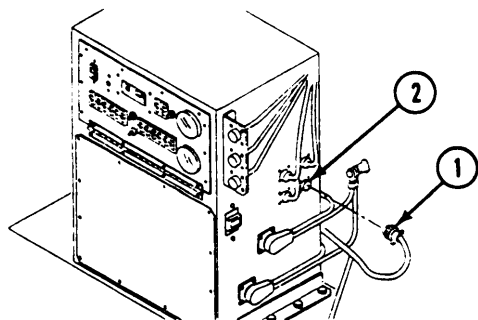


**NO**

1. Faulty inverter IN2 (with solo plug installed).
2. Notify your supervisor.

**YES**

1. Install cable W5 plug P6 (1) on Power Control Enclosure jack J27 (2).
2. Replace cascade remote harness W15 (page 40.1-26).
3. Verify no faults found.



NO DATA OUTPUT FROM DATA PANEL A12

INITIAL SETUP

**Tools:**

Electronic Equipment Tool Kit  
 (Item 75.1, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

See your -10  
 TM11-7010-256-12&P  
 See M1068 Wiring Diagram  
 (FO-9 thru FO-11)

**Personnel Required:**

Signal Support System Specialist 31U10  
 Helper (H)

**Equipment Conditions:**

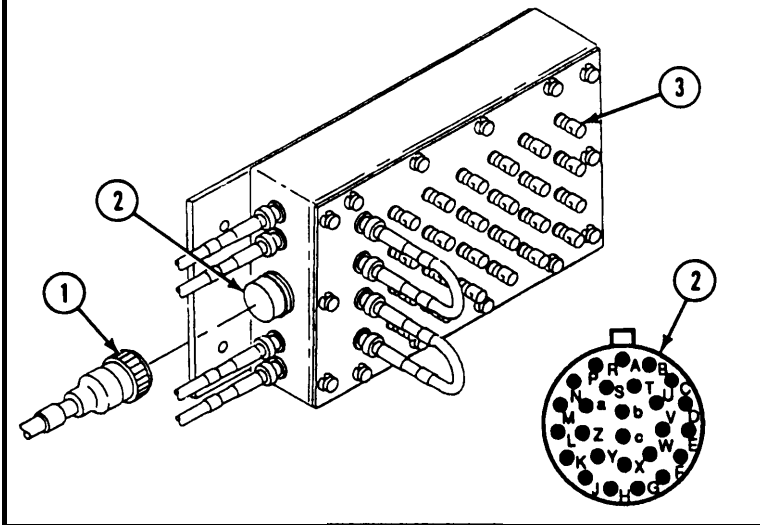
Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

1. Remove cable W124 plug P1 (1) from Data Panel A12 jack J3 (2).
2. Measure resistance between posts(3) and pins of jack J3 (2) as follows:
 

Post 1 (Red) to pin A	Post 7 (Red) to pin N
Post 1 (Blk) to pin B	Post 7 (Blk) to pin P
Post 2 (Red) to pin C	Post 8 (Red) to pin R
Post 2 (Blk) to pin D	Post 8 (Blk) to pin S
Post 3 (Red) to pin E	Post 9 (Red) to pin T
Post 3 (Blk) to pin F	Post 9 (Blk) to pin U
Post 4 (Red) to pin G	Post 10 (Red) to pin V
Post 4 (Blk) to pin H	Post 10 (Blk) to pin W
Post 5 (Red) to pin J	Post 11 (Red) to pin X
Post 5 (Blk) to pin K	Post 11 (Blk) to pin Y
Post 6 (Red) to pin L	Post 12 (Red) to pin Z
Post 6 (Blk) to pin M	Post 12 (Blk) to pin a
3. Does multimeter read 0 ohms for each measurement?

NO

1. Replace Data Panel A12 (page 40.1-4)
2. verify no faults found.



YES  
 A

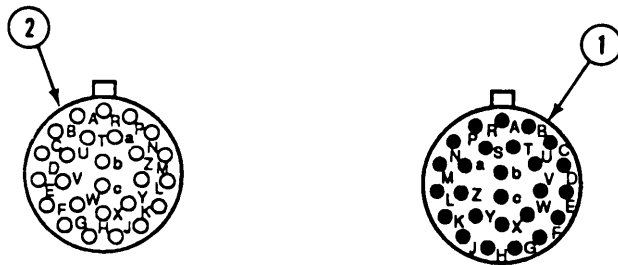
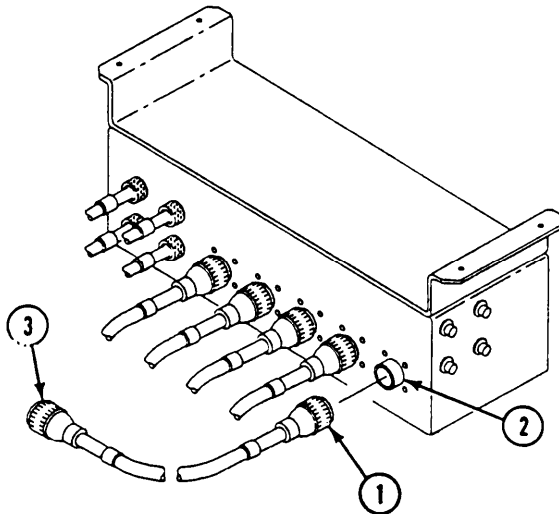


**A**

1. Remove cable W 124 plug P109 (1) from Patch Panel Box A10 jack J140(2).
2. Measure resistance between pin A on plug P109 (1) and socket A on plug PI (3) of cable W124. Repeat for pins B thru a
3. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W124 (page 40.1-97).
2. Verify no faults found.



**YES**

1. Replace Patch Panel Box A10 (page 40.1-21).
2. Verify no faults found.

---

**NO LAN OUTPUT FROM DATA PANEL A 1 2**

---

**INITIAL SETUP**

**Tools:**

Electronic Equipment Tool Kit  
(Item 75.1, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
TM11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Signal Support System Specialist 31U1O  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**WARNING**  
**HIGH VOLTAGE** is used in  
the operation of this  
equipment

**DEATH ON CONTACT** may  
result if personnel fail to  
observe safety precautions.

**NEVER** work on equipment unless at  
least one other person familiar with the  
operation and hazards of the equipment  
is nearby. That person should also be  
familiar with giving first aid. When an  
operator helps a mechanic, that operator  
must be warned about dangerous areas.

**SHUT OFF POWER** supply to equipment  
before beginning work. Make sure all  
external power is off/disconnected.  
**BE CAREFUL** not to contact high-voltage  
connections when installing or operating  
this equipment.

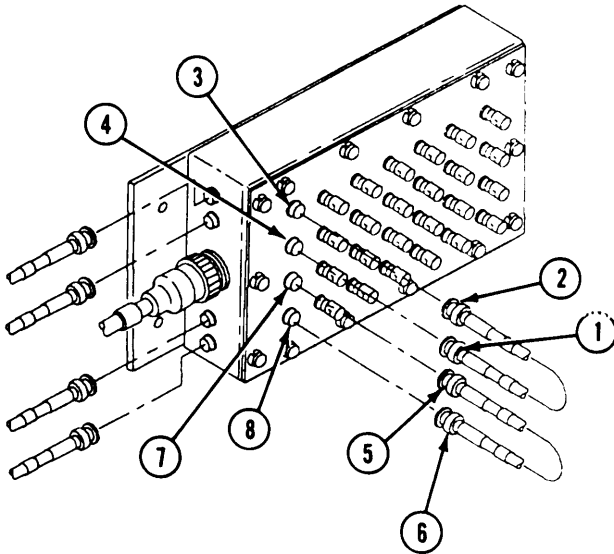


**A**

1. Remove cable W108 plugs P1 (1) and P2 (2) from Data Panel A12 jacks J107 (3) and J108 (4).
2. Remove cable W107 plugs P1 (5) and P2 (6) from Data Panel A12 jacks J105 (7) and J106 (8).
3. Measure resistance between center pins of plugs P1 and P2 of each cable.
4. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W107 and/or W108 (page 40.1-4).
2. Verify no faults found.



**YES**

**A1**

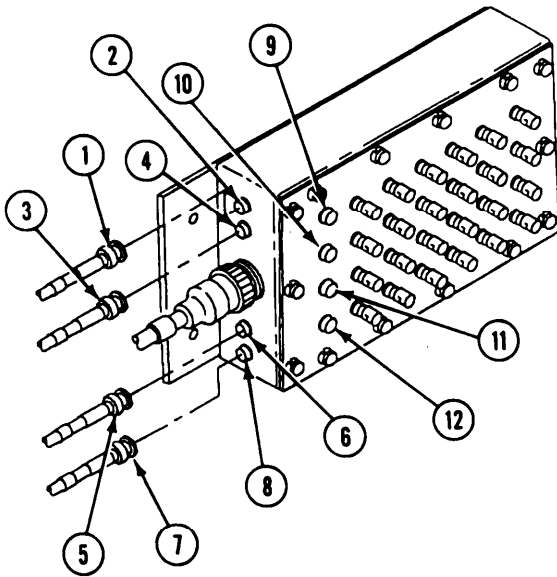
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**A1**

1. Remove the following cable plugs from jacks on Data Panel A12:
  - W101 plug P1 (1) from jack J1 (2)
  - W103 plug P1 (3) from jack J2 (4)
  - W102 plug P1 (5) from jack J4 (6)
  - W104 plug P1 (7) from jack J5 (8)
2. Measure resistance between pins of the following jacks on Data Panel A12:
  - J1 (2) to J105 (9)
  - J2 (4) to J106 (10)
  - J4 (6) to J107 (11).
  - J5 (8) to J108 (12)
3. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace Data Panel A12 (page 40.1-4).
2. Verify no faults found.

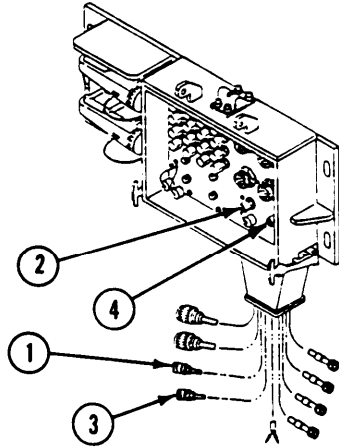


**YES**

**A2**

**A2**

1. Measure resistance between cable W101 plug P1 (1) and External Communication Box AI 1 jack J103 (2).
2. Measure resistance between cable W102 plug P1 (3) and External Communication Box A11 jack J 104 (4).
3. Does multimeter read 0 ohms for each measurement?

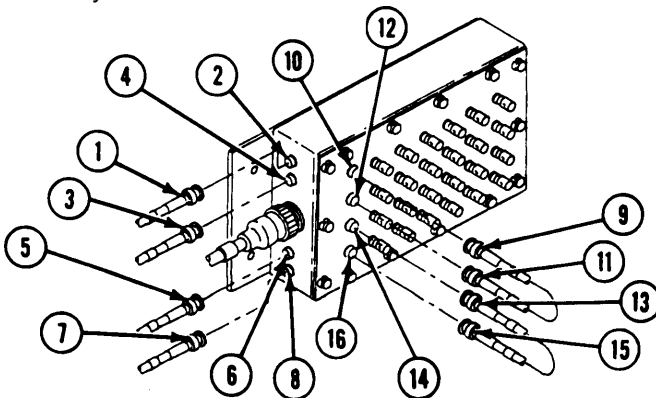


**NO**

1. Faulty cables W101 and/or W102.
2. Notify your supervisor.

**YES**

1. Install the following plugs and cables on Data Panel A12jacks:
  - W101 plug P1 (1) on jack J1 (2)
  - W103 plug P1 (3) on jack J2 (4)
  - W102 plug P1 (5) on jack J4 (6)
  - W104 plug P1 (7) on jack J5 (8)
  - W107 plug P1 (9) on jack J105 (10)
  - W107 plug P2 (11) on jack J106 (12)
  - W108 plug P1 (13) on jack J107 (14)
  - W108 plug P2 (15) on jack J108 (16)
2. Verify no faults found.



**NO DATA OUTPUT FROM DATA PANEL A13**

**INITIAL SETUP**

**Tools:**

Electronic Equipment Tool Kit  
 (Item 75.1, App D)  
 Digital Multimeter (Item 43, App D)

**References:**

See your -10  
 TM11-7010-256-12&P  
 See M1068 Wiring Diagram  
 (FO-9 thru FO-11)

**Personnel Required:**

Signal Support System Specialist 31U10  
 Helper (H)

**Equipment Conditions:**

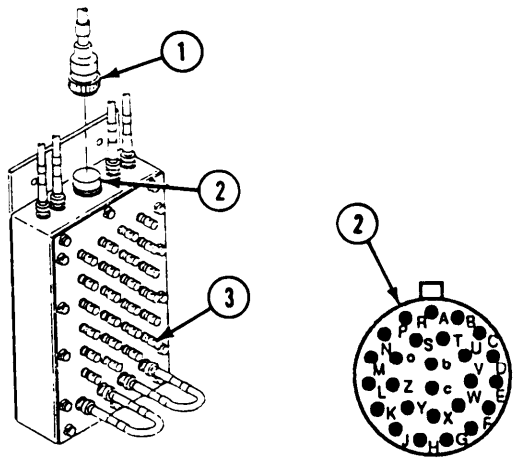
Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)

1. Remove cable W 126 plug P1 (1) from Data Panel A13 jack J3 (2).
2. Measure resistance between posts (3) and pins of jack J3 (2) as follows:
 

Post 1 (Red) to pin A	Post 7 (Red) to pin N
Post 1 (Blk) to pin B	Post 7 (Blk) to pin P
Post 2 (Red) to pin C	Post 8 (Red) to pin R
Post 2 (Blk) to pin D	Post 8 (Blk) to pin S
Post 3 (Red) to pin E	Post 9 (Red) to pin T
Post 3 (Blk) to pin F	Post 9 (Blk) to pin U
Post 4 (Red) to pin G	Post 10 (Red) to pin V
Post 4 (Blk) to pin H	Post 10 (Blk) to pin W
Post 5 (Red) to pin J	Post 11 (Red) to pin X
Post 5 (Blk) to pin K	Post 11 (Blk) to pin Y
Post 6 (Red) to pin L	Post 12 (Red) to pin Z
Post 6 (Blk) to pin M	Post 12 (Blk) to pin a
3. Does multimeter read 0 ohms for each measurement?

**NO** →

1. Replace Data Panel A13 (page 40.1-5).
2. Verify no faults found.



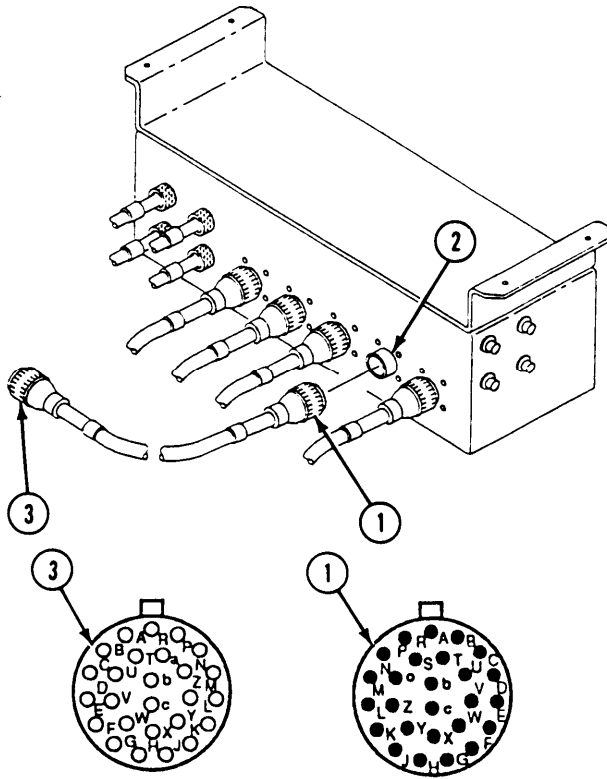
**YES**



1. Remove cable W 126 plug P108 (1) from Patch Panel Box A10 jack J139(2).
2. Measure resistance between pin A on plug P108 ( 1) and socket A on plug P1 (3) of cable W126. Repeat for pins B thru a
3. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W126 (page 40.1-100).
2. Verify no faults found.



**YES**

1. Replace Patch Panel Box A10 (page 40.1-21).
2. Verify no faults found.

---

**NO LAN OUTPUT FROM DATA PANEL A13**

---

**INITIAL SETUP**

**Tools:**

Electronic Equipment Tool Kit  
(Item 75.1, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
TM11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Signal Support System Specialist 31U10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

---



**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

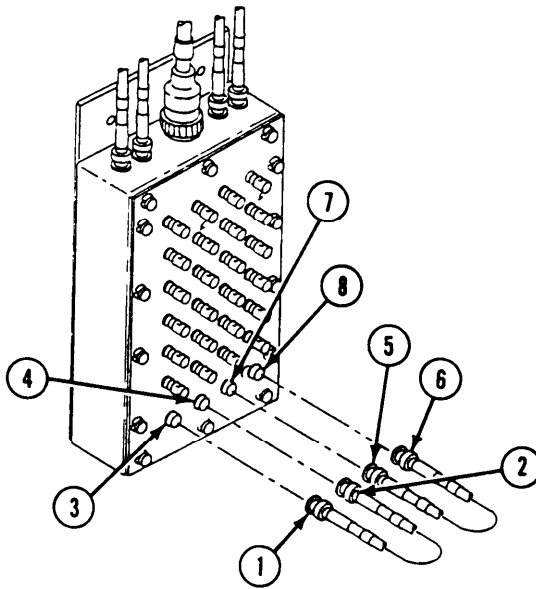
**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.





**A**

1. Remove cable W109 plugs P1 (1) and P2 (2) from Data Panel A13 jacks J109 (3) and J110 (4).
2. Remove cable W110 plugs P1 (5) and P2 (6) from Data Panel A13 jacks J111 (7) and J112 (8).
3. Measure resistance between center pins of plugs P1 and P2 of each cable.
4. Does multimeter read 0 ohms for each measurement?



**NO**

1. Replace cable W109 and/or W110 (page 40.1-5).
2. Verify no faults found.

**YES**

**A1**

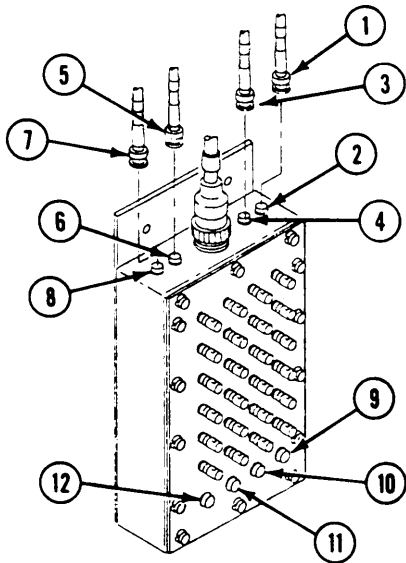
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1. Remove the following cable plugs from jacks on Data Panel A13:
  - W32 plug P5 (1) from jack J1 (2)
  - W104 plug P2 (3) from jack J2 (4)
  - W32 plug P4 (5) from jack J4 (6)
  - W103 plug P2 (7) from jack J5 (8)
2. Measure resistance between pins of the following jacks on Data Panel A13:
  - J1 (2) to J12 (9)
  - J2 (4) to J111 (10)
  - J4 (6) to J110 (11).
  - J5 (8) to J109 (12)
3. Does multimeter read 0 ohms for each measurement?

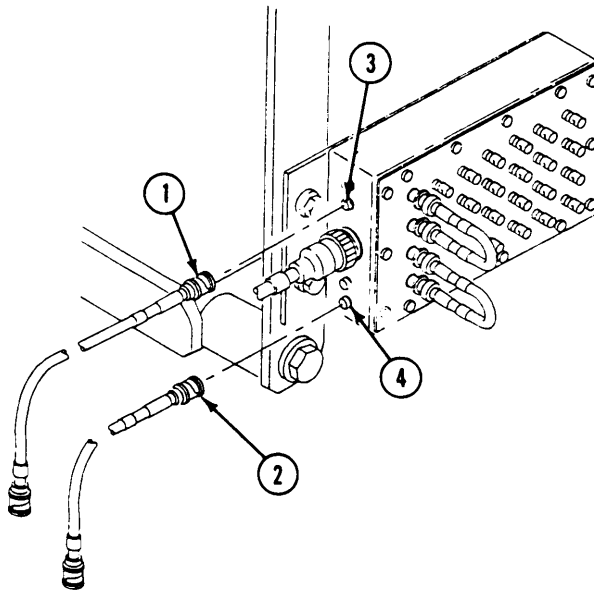
NO

1. Replace Data Panel A13 (page 40.1-5).
2. Verify no faults found.



**A2**

1. Remove cables W103 plug P1 (1) and W104 plug P1 (2) from jacks J2 (3) and J5 (4) on Data Panel A12.
2. Measure resistance between center pins of plugs P1 and P2 of cables W103 and W104.
3. Does multimeter read 0 ohms for each measurement?



**NO**

1. Replace cable W103 and/or W104 (page 40.1-94).
2. Verify no faults found.

**YES**

1. Go to: No LAN Output from Data Panel A12 (page 3-226.122).

---

**PHONE EXTENSION BOX A14 POST(S) INOPERATIVE**

---

**INITIAL SETUP**

**Tools:**

Electronic Equipment Tool Kit  
(Item 75.1, App D)  
Digital Multimeter (Item 43, App D)

**References:**

See your -10  
TM11-7010-256-12&P  
See M1068 Wiring Diagram  
(FO-9 thru FO-11)

**Personnel Required:**

Signal Support System Specialist 31U10  
Helper (H)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

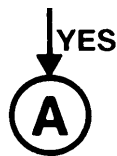
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**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. **DEATH ON CONTACT** may result if personnel fail to observe safety precautions.

**NEVER** work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. **SHUT OFF POWER** supply to equipment before beginning work. Make sure all external power is off/disconnected. **BE CAREFUL** not to contact high-voltage connections when installing or operating this equipment.



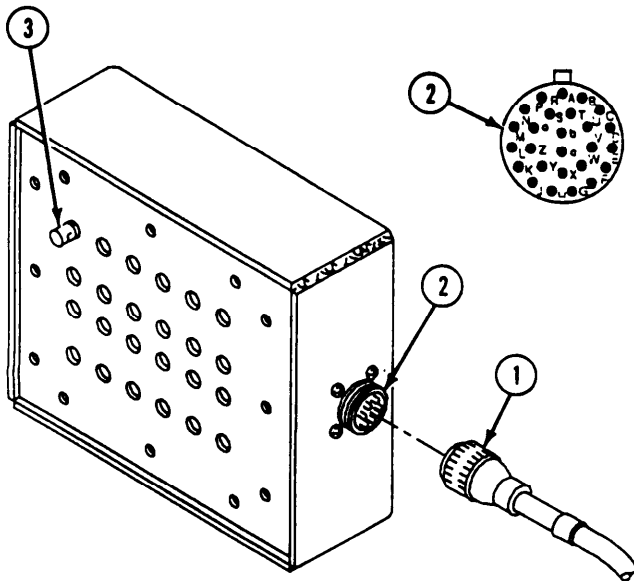
**A**

1. Remove cable W129 plug P2 (1) from Phone Extension Box A14 jack J1 (2).
2. Measure resistance between posts (3) and pins of jack J1 (2) as follows:
 

Post 1 (Blk) to pin A	Post 7 (Blk) to pin N
Post 1 (Red) to pin B	Post 7 (Red) to pin P
Post 2 (Blk) to pin C	Post 8 (Blk) to pin R
Post 2 (Red) to pin D	Post 8 (Red) to pin S
Post 3 (Blk) to pin E	Post 9 (Blk) to pin T
Post 3 (Red) to pin F	Post 9 (Red) to pin U
Post 4 (Blk) to pin G	Post 10 (Blk) to pin V
Post 4 (Red) to pin H	Post 10 (Red) to pin W
Post 5 (Blk) to pin J	Post 11 (Blk) to pin X
Post 5 (Red) to pin K	Post 11 (Red) to pin Y
Post 6 (Blk) to pin L	Post 12 (Blk) to pin Z
Post 6 (Red) to pin M	Post 12 (Red) to pin a
3. Does multimeter read 0 ohms for each measurement?

NO

1. Replace Phone Extension Box A14.
2. Verify no faults found.



YES

**A1**

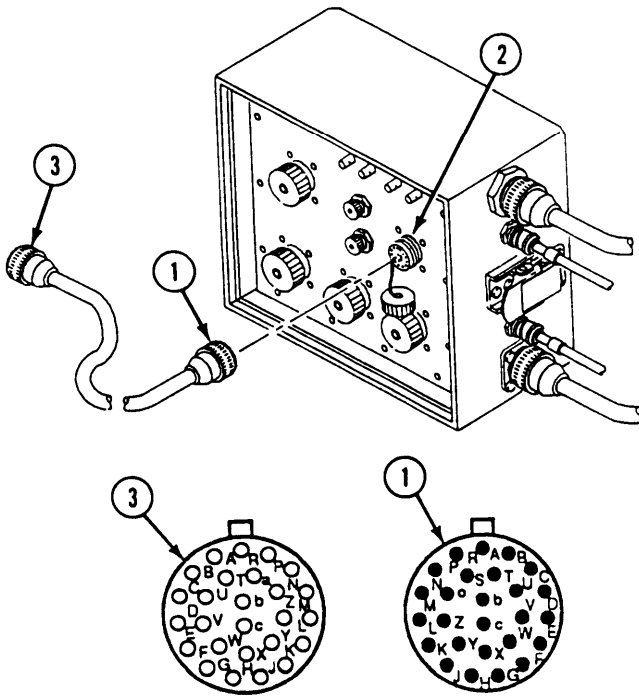
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**A1**

1. Remove cable W129 plug P1 (1) from Tent Interface Panel jack J137 (2).
2. Measure resistance between pin A on plug P1 (1) and socket A on plug P2 (3) of cable W 129. Repeat for pins B thru a
3. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W129.
2. Verify no faults found.



**YES**

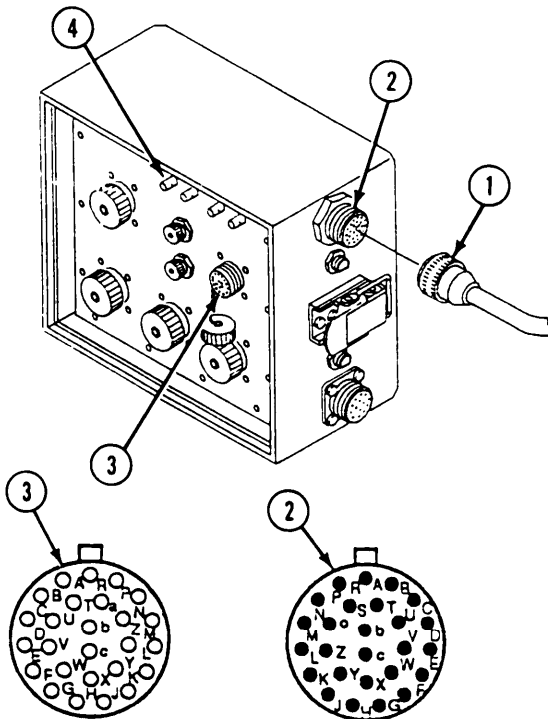
**A2**

**A2**

1. Remove cable W32 plug P7 (1) from Tent Interface Panel jack J8 (2).
2. Measure resistance between socket A of jack J137 (3) and pin A of jack J8 (2). Repeat for sockets/pins B through a.
3. Measure resistance between sockets of J137 (3) and posts (4) as follows:  
 Socket A to E117  
 Socket B to E118  
 Socket C to E119  
 Socket D to E120
4. Does multimeter read 0 ohms for each measurement?

NO

1. Replace Tent Interface Panel Box A5 (page 40.1-46).
2. Verify no faults found.



YES

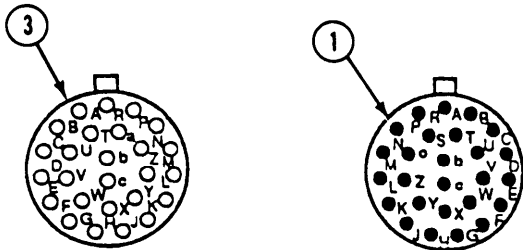
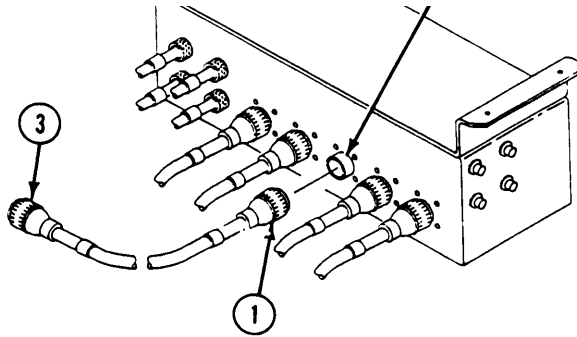
**A3**

GO TO NEXT PAGE

1. Remove cable W32 plug P107 (1) from jack J138 (2) on Patch Panel Box A10.
2. Measure resistance between socket A of plug P7 (3) and pin A of plug P107 (1). Repeat for socket/pins B through a.
3. Does multimeter read 0 ohms for each measurement?

**NO**

1. Replace cable W32 (page 40.1-78).
2. Verify no faults found.



**YES**

1. Replace Patch Panel Box A10 (page 40.1-21).
2. Verify no faults found.



**SPEEDOMETER MALFUNCTIONS**

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant front access door opened (see your -10)
- Driver's power plant access panel removed (page 24-25)
- Power plant front access cover removed (page 24-24)

1. Does speedometer fail to give any reading?

NO → **(B)** GO TO PAGE 3-229

1. Remove speedometer cable (1) from speedometer (2).  
 2. Check speedometer drive (3).  
 3. Does speedometer drive spin freely?

The diagram illustrates the process of checking the speedometer drive. On the left, a speedometer unit (2) is shown with its internal wiring and a speedometer cable (1) attached. An arrow points to the cable being removed. On the right, the speedometer drive (3) is shown, which is a small cylindrical component with a gear-like end. An arrow points to the drive, and a curved arrow indicates that it should be rotated to check if it spins freely.

NO

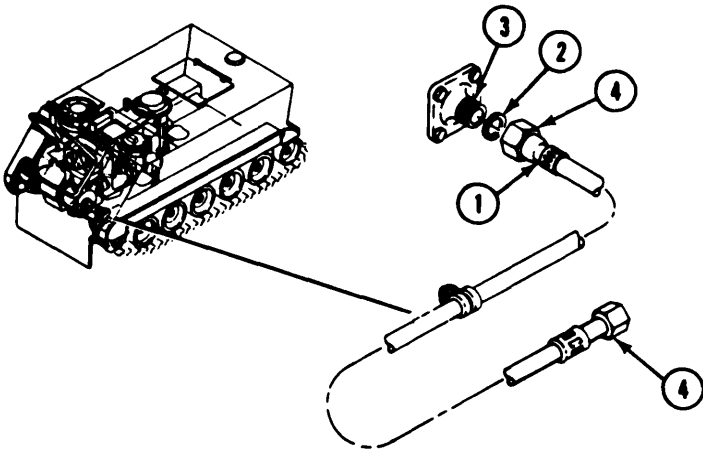
1. Replace speedometer (page 11-16).  
 2. Verify no faults found.

YES  
**(A)**

GO TO NEXT PAGE

**A**

1. Remove speedometer cable (1) and packing (2) from final drive adapter (3).
2. Check speedometer cable ends (4).
3. Does cable spin freely?



**NO**

1. Repair or replace speedometer cable (page 11-17).
2. Verify no faults found.

**YES**

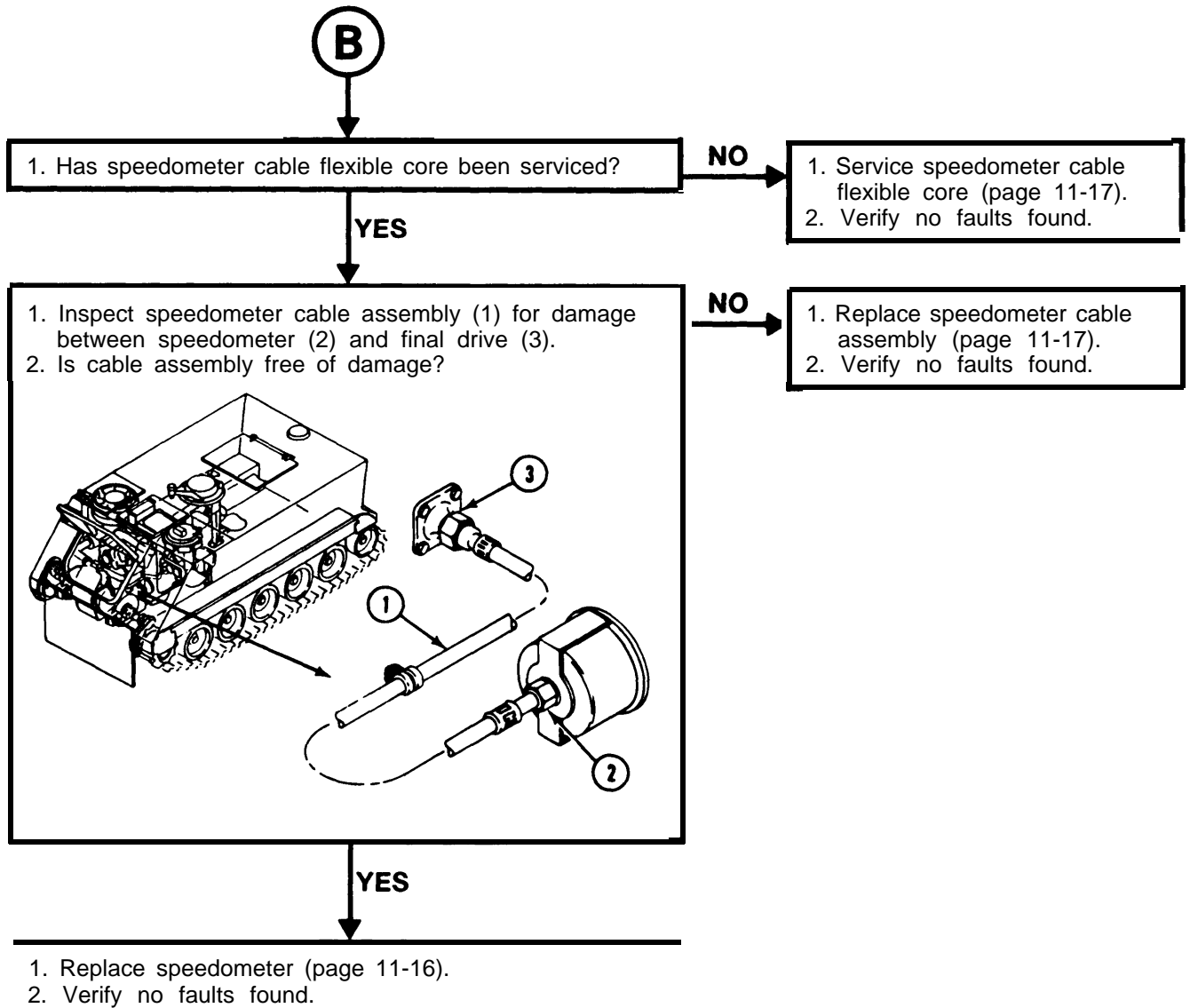
1. Remove speedometer drive adapter from final drive (page 11-17).
2. Inspect final drive adapter.
3. Is final drive adapter seized or damaged?

**NO**

1. Replace speedometer (page 11-16).
2. Verify no faults found.

**YES**

1. Install speedometer cable on speedometer.
2. Replace final drive adapter (page 11-17).
3. Verify no faults found.



## TACHOMETER MALFUNCTIONS

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

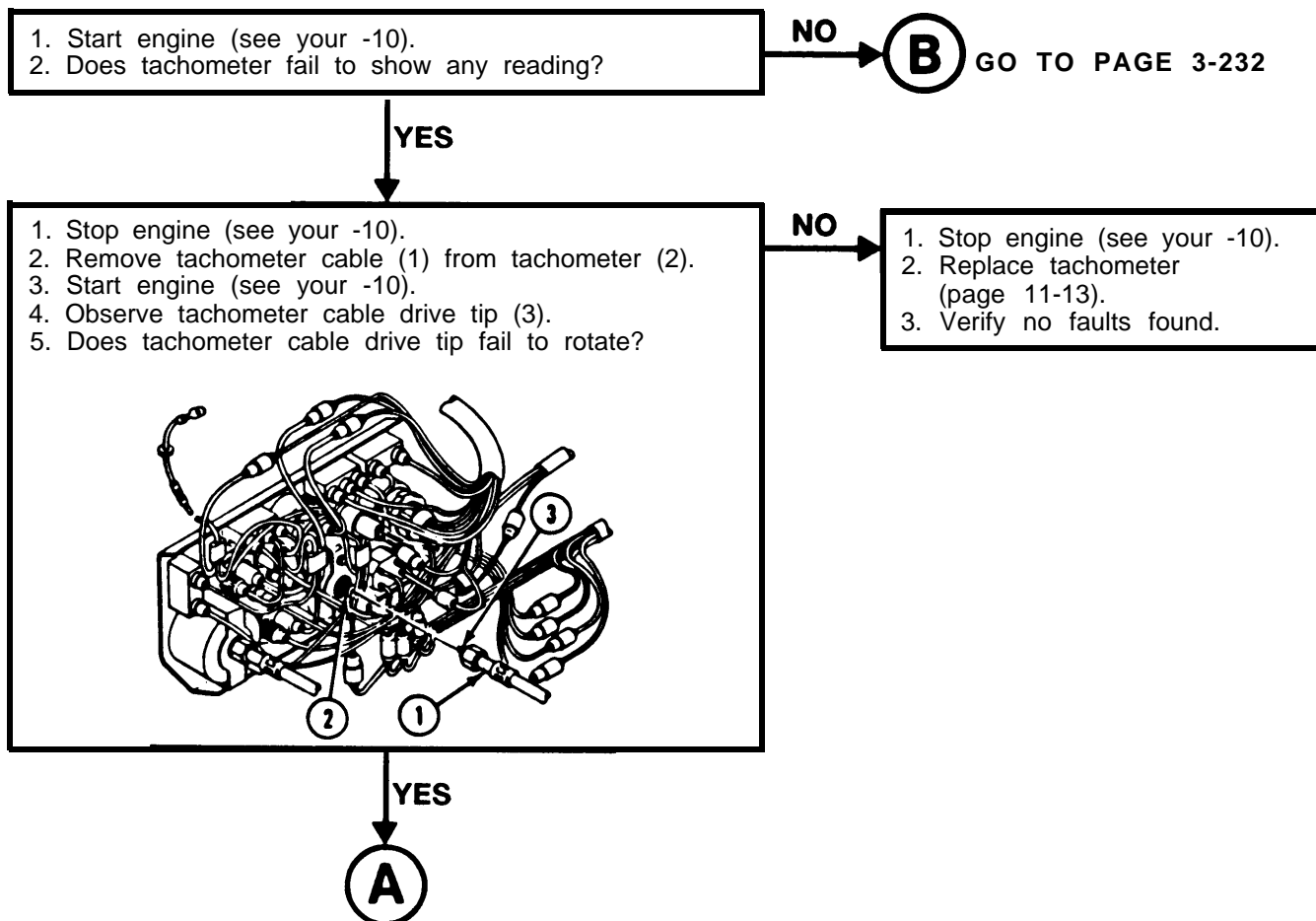
Unit Mechanic  
Helper (H)

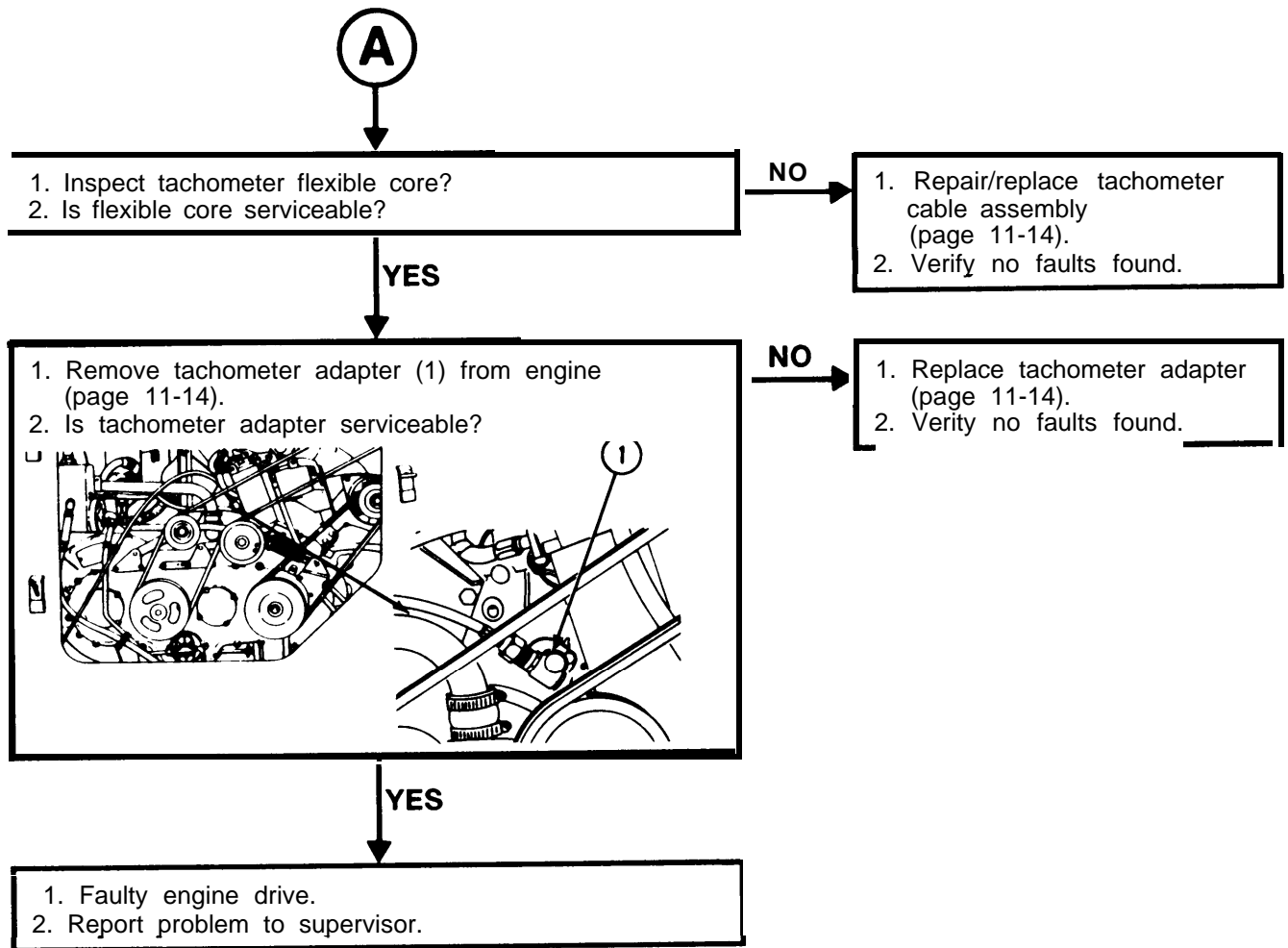
**References:**

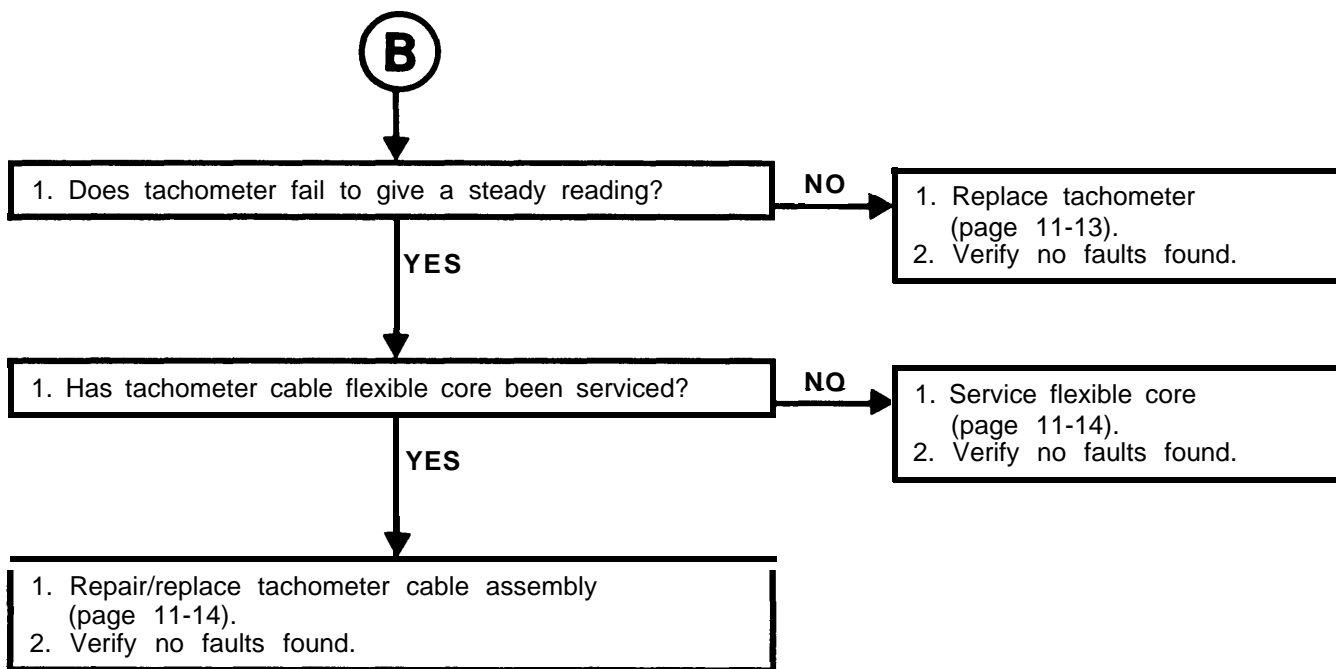
see your -lo

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant front access door opened  
(see your -10)  
Drivers power plant access panel removed  
(page 24-25)  
Power plant front access cover removed  
(page 24-24)  
Crew compartment power plant access panel  
removed (see your -10)







**CHEMICAL AGENT AUTO ALARM MALFUNCTIONS**

**INITIAL SETUP**

**Tools**

- General Mechanics Tool Kit (Item 30, App D)
- Digital Multimeter (Item 43, App D)

**References:**

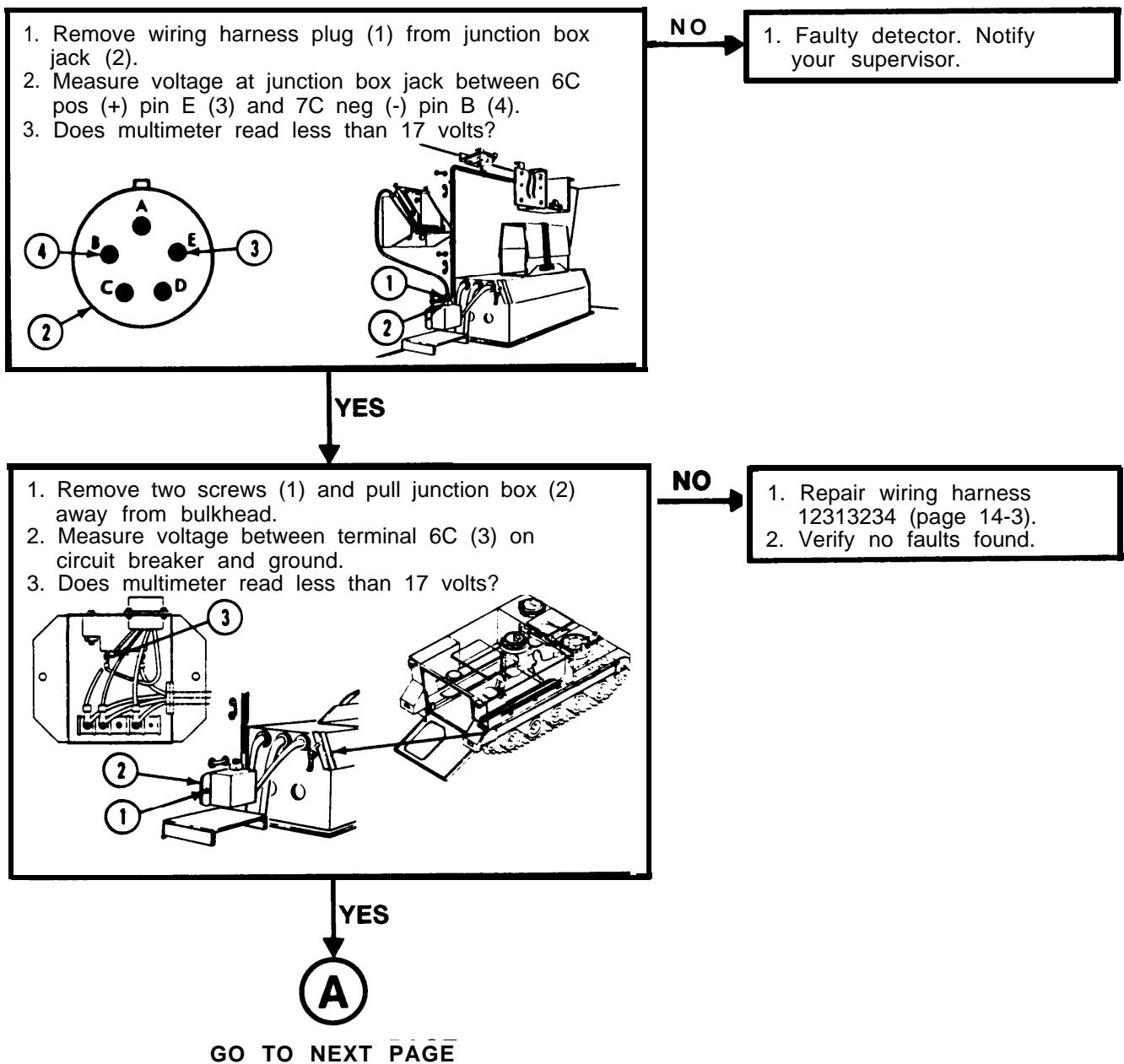
- see your -lo
- TM 3+665-22&12

**Personnel Required:**

- Unit Mechanic

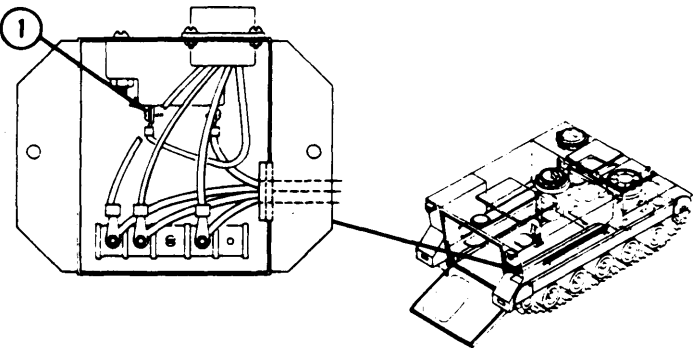
**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Operator's manual troubleshooting performed (TM3-6665-225-12)



**A**

1. Measure voltage between terminal 6B (1) on circuit breaker and ground.  
2. Does multimeter read less than 17 volts?



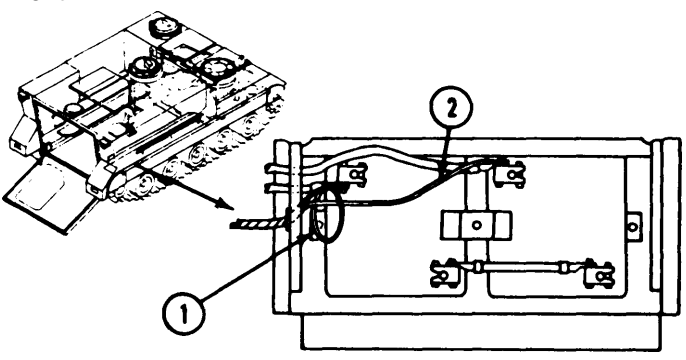
The diagram shows a circuit breaker assembly on the left with terminal 6B labeled with a circled '1'. To its right is a battery box assembly with several terminals. A dashed line indicates the connection between terminal 6B and the battery box.

**NO**

- 1. Replace circuit breaker (page 44-2).
- 2. Verify no faults found.

**YES**

1. Remove battery box cover.  
2. Remove 6B pos (+) and 7B neg (-) terminal from battery post.  
3. Measure resistance between 6B pos (+) (1) terminal from battery and circuit breaker.  
4. Measure resistance between 7B neg (-) (2) terminal from battery and circuit breaker.  
5. Does multimeter read 0 ohms for either measurement?



The diagram shows the battery box cover removed. Terminal 6B is labeled with a circled '1' and terminal 7B is labeled with a circled '2'. Wires connect these terminals to the circuit breaker assembly.

**NO**

- 1. Replace cable assembly 11647667 (page 44-6).
- 2. Verify no faults found.

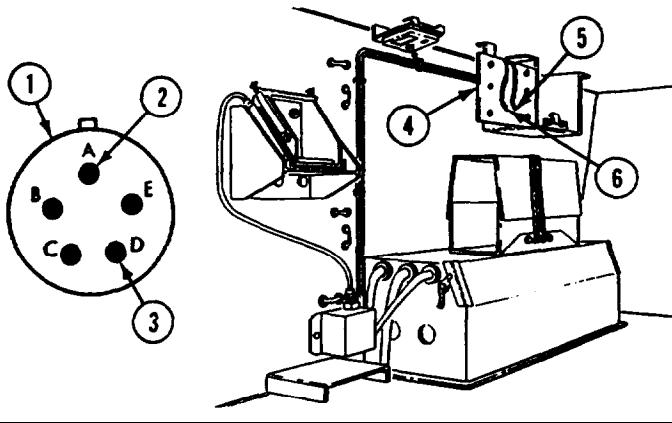
**YES**

**A1**



**A1**

1. Install a jumper wire on wiring harness 12313234 (1) connector between pins A (2) and D (3) on cable assembly 11647665 (4).
2. Measure resistance between circuits 509B (5) and 509C (6) at M42 alarm.
3. Does multimeter read 0 ohms?

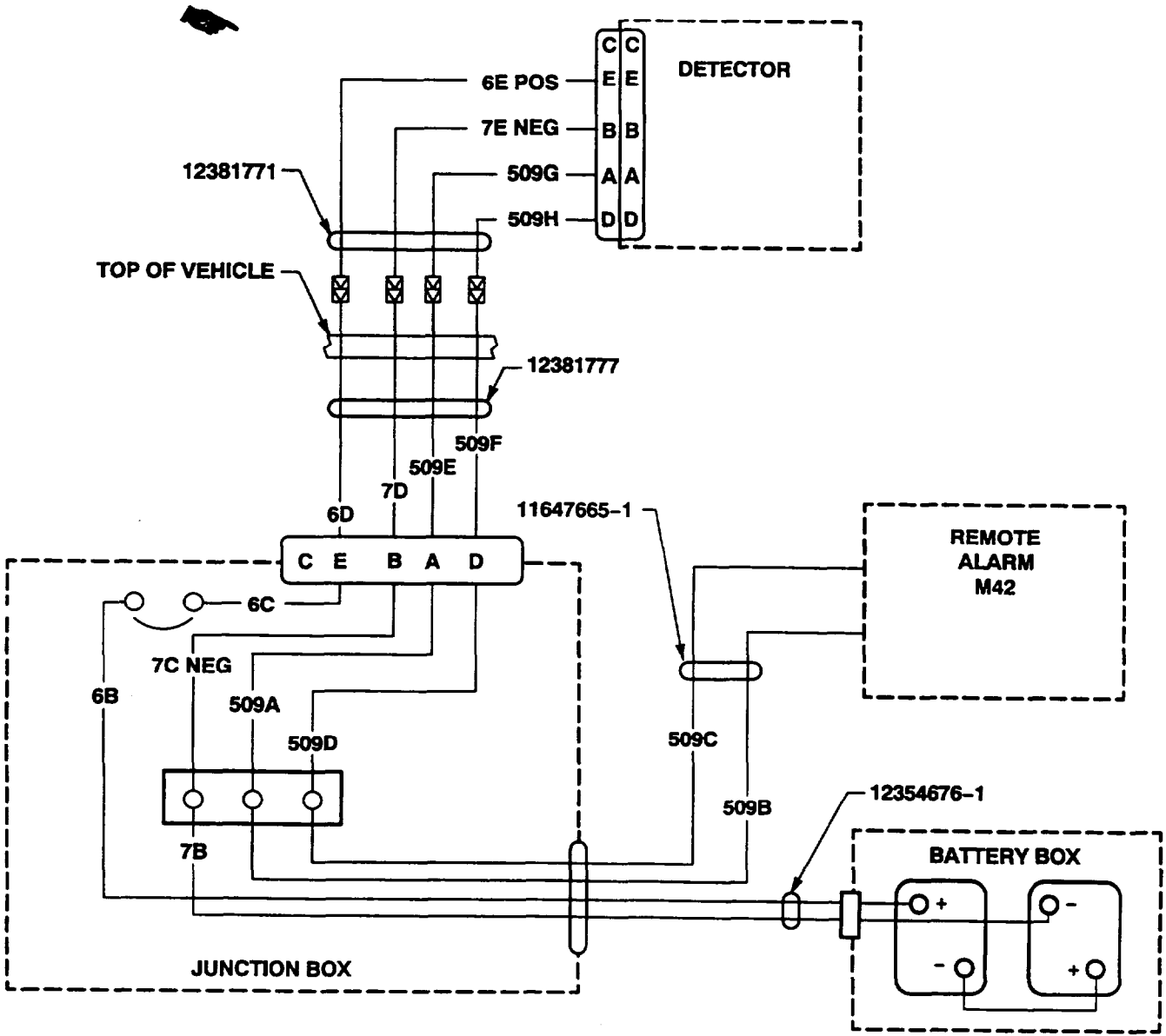


**NO**

1. Remove jumper wire.
2. Repair cable assembly 11647665 (page 14-3).
3. Verify no faults found.

**YES**

1. Faulty M42 alarm. Notify your supervisor.



# CHEMICAL AGENT AUTO ALARM

## Section III. STE/ICE-R TROUBLESHOOTING

### TASK INDEX

<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
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STE-ICE-R Procedures .....	3-237	STE-ICE-R Test 01 Display Engine RPM With Next Measurement .....	3-283
STE/ICE-R Charging Circuit Troubleshooting .....	3-256	STE/ICE-R Test 10 Engine RPM . . . .	3-284
STE/ICE-R Starter Circuit Troubleshooting .....	3-259	STE/ICE-R Test 13 Power (Percent) .....	3-285
STE/ICE-R Low Oil Pressure Troubleshooting .....	3-264	STE/ICE-R Test 14 Compression Unbalance (Power Cable) .....	3-287
STE/ICE-R Battery Troubleshooting	3-266	STE/ICE-R Test 67 Battery Voltage	3-289
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Hook Up/Remove STE/ICE-R for Starter Circuit Tests .....	3-279		
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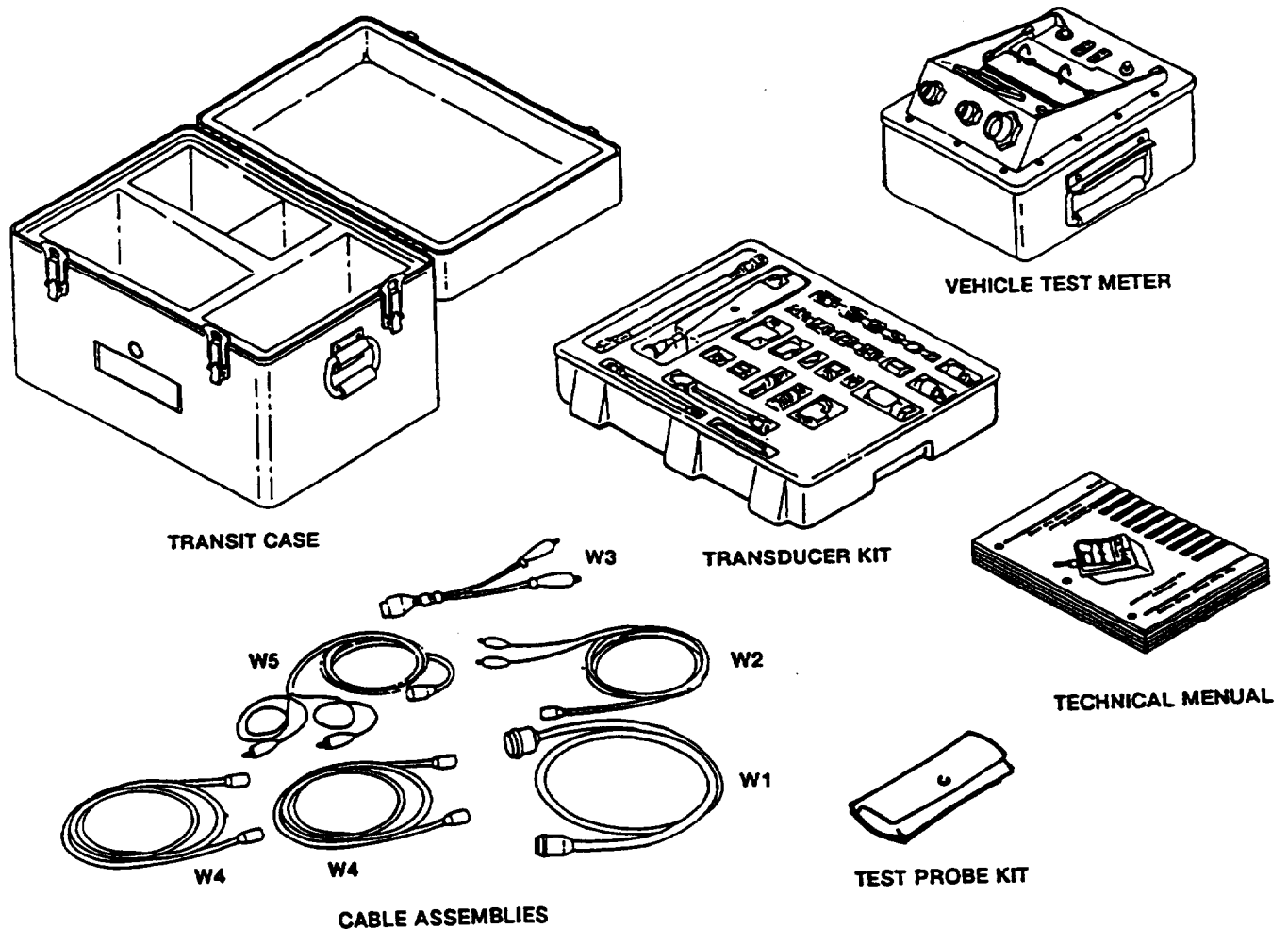
# STE/ICE-R PROCEDURES (SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES REPROGRAMMABLE)

## GENERAL

- a. STE/ICE-R a testing system for internal combustion engines, provides measurements on voltage resistance, pressure, temperature and speed to analyze the condition of an engine system.
- b. This section provides a general overview of STE/ICE-R equipment anti operations, along with specific procedures in diagnosing and isolating malfunctions of the M113A2, M577A2, M106A2, M125A2, M741A1, M901A1, or M1059 engine.
- c. STE/ICE-R will also provide a thorough preventative maintenance check on M113A2, M577A2, M106A2 M125A2 M741A1, M901A1, or M1059 engine as part of service upon receipt and as an annual check in the PMCS.

## DESCRIPTION OF STE/ICE-R EQUIPMENT

- a. The STE/ICE-R set consists of a vehicle test meter (VTM), five cable assemblies, transducer kit (TK), manual, test probe kit and transit case.

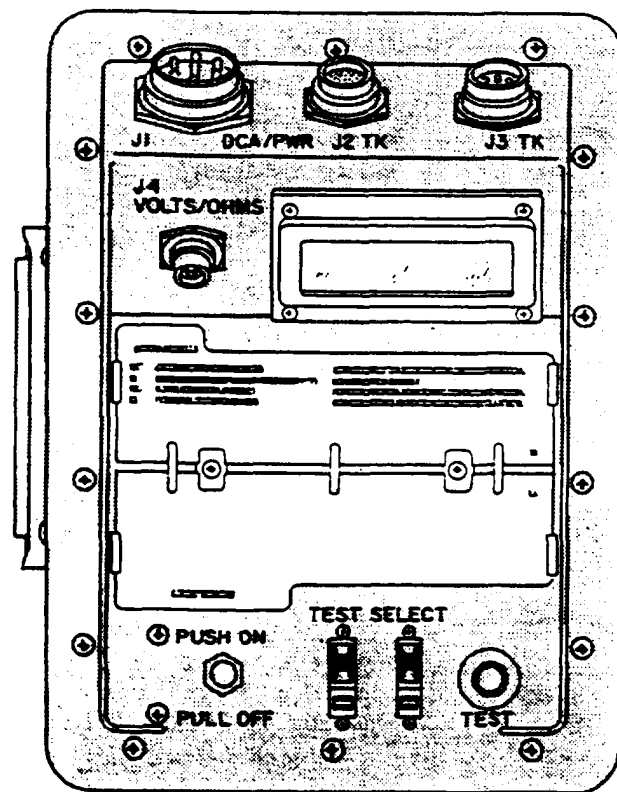


(1) Vehicle test meter (VTM). The VTM is the diagnostic meter of STE/ICE-R used for testing electrical and mechanical components of the M113A2, M577A2, M106A2, M125A2, M741A1, M901A1, or M1059 engine. The VTM consists of 3 switches, a readout display, flip cards and 4 cable connectors.

- (a) Switches. The three switches are a PUSH ON/PULL OFF switch, TEST SELECT switch and TEST button. The PUSH ON/PULL OFF switch is used to control power to the VTM from the power source. The TEST SELECT switch are two ten-position switches used to select the test to be performed. The TEST button has two functions: (1) when pressed and rebased it initiates selected test; (2) pressed and held it initiates an offset test.
- (b) Readout display. The readout display gives five different types of messages during testing and up to a maximum of four characters per message. The types of messages are:
- error
  - status
  - numerical
  - prompting
  - confidence test error

Readout display messages can be found on page 3-3.

- (c) Flip cards. The flip cards, attached to the front of the VTM, provide a quick but limited reference for the operator. These flip cards list test numbers, messages, and some procedures. Test limits are also provided for some vehicles.



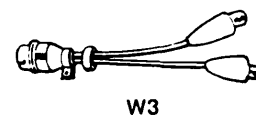
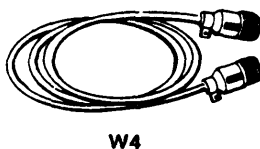
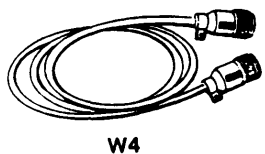
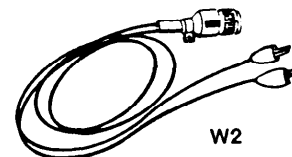
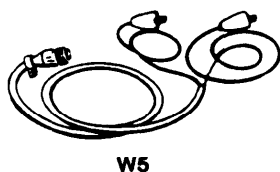
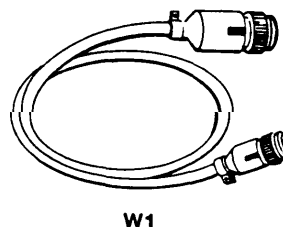
(d) Cable connectors. The four cable connectors on the VTM are DCA/PWR J1, transducer cable connectors J2TK and J3TK and VOLTS/OHMS J4.

- . DCA/PWR connector J1 — used to connect VTM to either a vehicle diagnostic connector with the DCA cable W1 or to a DC power source with the power cable W5. The DC power source is usually the vehicle's batteries.
- . Transducer cable connectors J2 TK and J3 TK — used to connect transducer cables W4 to VTM. Power and signals are routed through these connectors. Both connectors may be used when a test requires two measurements to be made at the same time.
- l VOLTS/OHNS connector J4 — used to connect test probe cable W2 to VTM for voltage and resistance tests.

(2) Cable assemble, In procedures in this manual, the cable assemblies are referred to by a number for quick identification. Each cable also has a name which describes its use. A reference to W 1, for example, would indicate the DCA cable. Connectors on the cable are identified by a number preceded by either a P or an E, such as P1 or E2.

The cable assemblies included in the **STE/ICE-R** are:

- w 1 — DCA cable
- w 2 — test probe cable
- w 3 — ignition adapter cable
- w 4 — transducer cable (two)
- w 5 — power cable



(2) Cable assemblies — continued

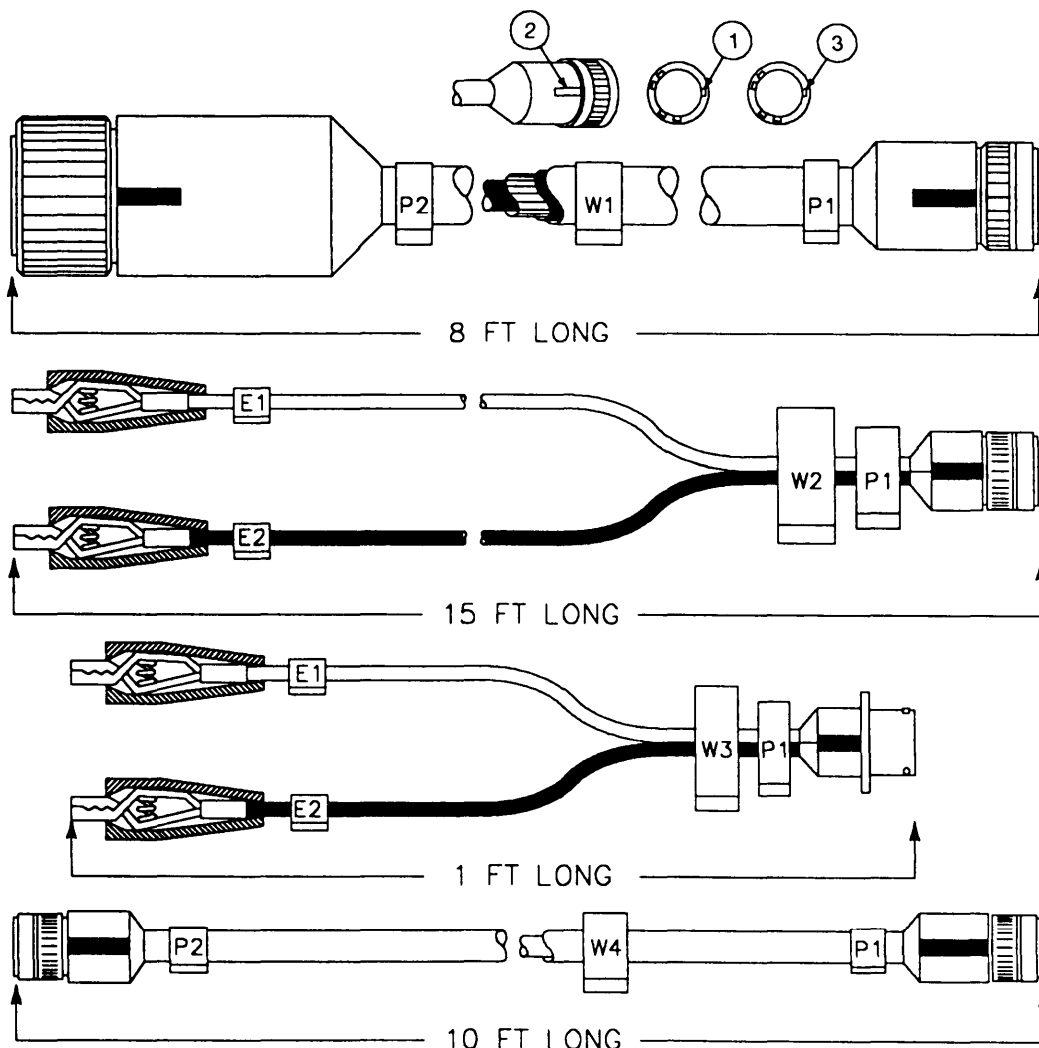
When cables are connected, the large key (1) located by the white stripe (2) on the cable connector mates with large keyway (3) of connector on VTM or transducer.

(a) Diagnostic Connector assembly Cable W1 is used to power the VTM and provide access to test points and sensors connected to vehicle/equipment mounted DCA. There is no DCA capability in the M113A2 FOV presently.

(b) Test probe cable w2. The test probe cable for both general and special measurements. It is used for measuring voltages, frequency, resistance and continuity, and also for the first peak series and compression unbalance tests. W2 is divided into two color coded leads, red for E1 and black for E2. Test clips E1 and E2 of W2 attach to points on the vehicle/equipment being tested.

(c) Ignition adapter cable W3. The ignition adapter cable W3 is used in measuring dwell angle, points voltage, engine rpm and power tests. W3 is divided into two color coded leads, red for E 1 and black for E2. Cable W3 is not used in the M113A2 FOV.

(d) Transducer cables W4. The transducer cables W4 are used as extensions to connect the VTM to a pressure transducer, pulse tachometer, current probe or ignition adapter cable. If necessary, two transducer cables can be joined using connector adapter, TK item 29.





(e) Power cable W5. The power cable W5 is used to power the VTM when cable W1 is not being used. Cable W5 is divided into two leads with color coded clips, red for E1 and black for E2. Battery clips E1 and E2 are attached to a vehicle/equipment battery or a 9 to 32 volt 4A regulated power supply. Do not connect the VTM to a battery charger. Damage to the VTM may result.

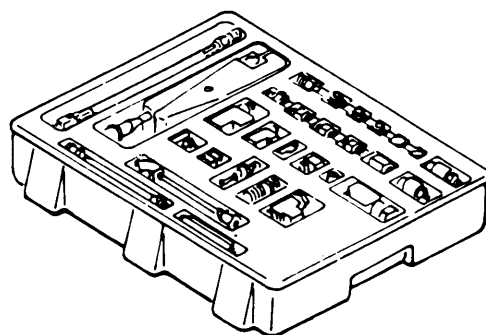
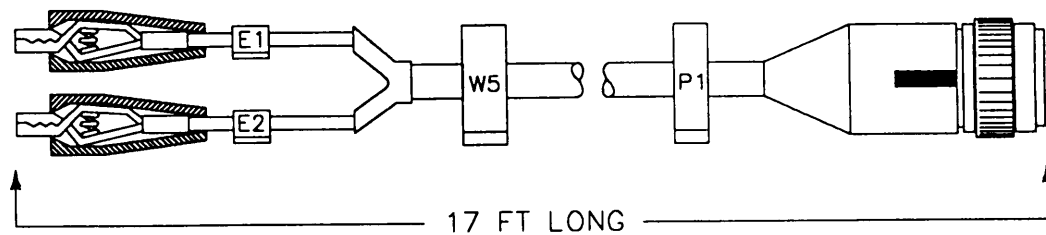
(3) Transducer kit(TK). The transducer kit is a tray inside the transit case that (TK) contains transducers, adapters, and fittings. The TK is stored in a molded tray in the top of the transit case.

Many of the fittings do not have part number markings on them and are referred to by TK Item Number and name. Each fitting is identified by TK item number and part number.

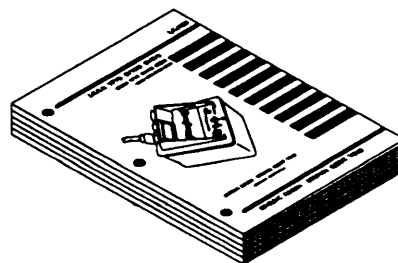
(4) Manual. TM 9-4910-571-12&P contains operating instructions, operator and organizational maintenance instructions, and repair parts and special tools information.

(5) Transit case. The STE/ICE-R is housed in a portable protective transit case which contains all necessary accessories and instructions.

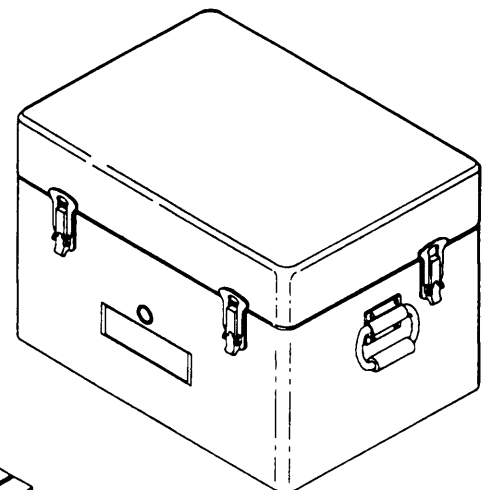
A pressure relief valve located on the front of the case allows the operator to release any pressure or vacuum resulting from changes in climate during transit.



TRANSDUCER KIT



TECHNICAL MANUAL



TRANSIT CASE

## READOUT DISPLAY MESSAGES

- a. **Error messages.** Error messages indicate the VTM needs additional or corrected information before testing can continue or additional procedures are required.

All error messages are displayed as an E followed by three numbers (for example, E003).

Display	Meaning
E000	VTM has been asked for information that it does not have. For example, you have requested the vehicle/equipment ID and it has not been entered.
E001	A test number which does not exist has been entered on the TEST SELECT switches.
E002	The required transducer is not connected.
E003	Test number wrong for DCA connected. This can occur if test selected does not apply to the class of vehicle/equipment under test or if the DCA harness does not have the required transducer.
E004	No longer used. If message appears turn in test set.
E005	Required offset test was not performed.
E007	The VID number and number-of-cylinders information entered do not agree.
E008	VTM is not receiving required voltage signal for selected test. This message can occur on tests, 14, 15, and 72 through 79.
E009	VTM is not receiving engine speed signal. This applies only to engine power test and SI full power simulation.
E010	A wrong VID) number was entered. The VTM will only accept numbers between 01 and 99. If E010 is displayed when the VID entered was between 01 and 99, it means that the VID) does not agree with the identity of the DCA harness powering the VTM. The VTM will accept this, allowing you to power through the DCA while testing another vehicle.
E011	Throttle control was operated incorrectly. It was taking too long to accelerate or decelerate during power test.
E012	The SI ignition adapter, TK item 30, or CI pulse tachometer, TK item 34, is missing or is not connected to the VTM.
E013	VTM is unable to use data received.
E014	The wrong number of cylinders was entered.
E015	No longer used. If message appears, turn in test set.
E017	VTM is not receiving ignition information during dwell test.

- E018 Test discontinued due to no information being detected by VTM. This will occur after several minutes of no-signal operation.
- E020 No first peak information was detected by the VTM.
- E021 VTM cannot calculate result. Current is over current probe's range, and VTM did not sample correct portion of data.
- E022 External voltage was detected in the circuit under test while measuring resistance.
- E023 VTM's constant voltage source is not working.
- E024 Test is not valid for VID entered.
- E027 Error in entry of compression unbalance constants.
- E028 Test just entered cannot be used with control function 06.
- E030 VID entered conflicts with speed transducer attached.
- E032 Vehicle's cranking speed is varying too much for a compression unbalance measurement.
- E033 Error in entry of power test constants.

b. Status messages. Status messages keep the operator informed of what is happening.

Display	Meaning
.8.8.8.8	There is power to the VTM and the display is working properly. This appears only for a short period after power is turned on.
.9.9.9.9	VTM is reading a test value beyond its range.
PASS	Unit under test has passed test, or VTM has accepted a control function entry.
FAIL	Unit under test has failed test.
CON	Accepted control function input.
AUE	Numerical display is an average value.
LO	Engine speed below 1600 rpm during SI power test indicates the engine failed the power test.
	VTM is busy.

c. Numerical readouts. Unit of measurement (psi, rpm, Volts, etc.) are not displayed. Numerical readouts indicates the measured value in units of the measurement being made. For example, if you are measuring 0-45 volts dc, 12.7 is volts dc. If you are measuring 0-25 psig pressure 12.7 is psig. The units for each test are listed on the flip cards. Also the readout when undulating vehicle identification data (VID).

d. Prompting messages. Prompting messages tell the operator to do something. After the operator action is completed, testing will continue. Some of the prompting messages and their meanings are as follows:

Display	Meaning
UEH	Tells the operator to enter VID on the TEST SELECT switches.
CYL	Tells the operator to enter the number-of-cylinders into the VTM.
GO	Tells the operator to crank engine.
0066	Tells the operator to set TEST SELECT switches to 99 during confidence test.
CAL	Tells the operator to release the TEST button during an offset test.
CIP	Tells the operator to apply full throttle in a CI power test.

e. Confidence test error messages. Confidence test messages are displayed either as PASS or by a C followed by three numbers (#). A C### is an error message used by VTM repair personnel as an aid in troubleshooting.

If a C### message appears during confidence test or during normal operation, go to confidence test fault isolation, TM 9-4910-571-12&P, for the necessary corrective action.

## TEST METHOD

The test method consists of a pre-test inspection and STE/ICE-R testing.

a. Pre-test inspection. Before using STE/ICE-R to test the vehicles, perform the following pre-test inspections:

- (1) Fan Belts. Check for proper tension. Replace if cracked or frayed.
- (2) Oil Level. Bring up to proper level if low.
- (3) Fuel Level. Check that the fuel tank has enough fuel for testing.
- (4) Radiator. Bring up to proper level if low.
- (5) Battery. Replace the battery if the case is cracked or the terminal posts are damaged. Clean off all corrosion. Check that the battery connections to ground and to starter motor are in good condition, securely connected, and clean. Check the electrolyte level (see TM 9-6140-200-14). If low, bring up to proper level with distilled water.

b. Vehicle test card (VTC). Once familiar with STE/ICE-R testing procedures the vehicle test card (located on page 3-248) can be used as a quick reference.

The front of the test card contains all of the information, in abbreviated format, that the user will need to perform common measurements on the vehicle. The organization from the top of the card to the bottom represents a logical order of steps from powering up the VTM to completing a series of tests.

The top of the card describes the power up sequence of STE/ICE-R for the vehicle. Next, a table is provided which lists many measurements that are useful in troubleshooting the vehicle. The table includes: the

associated VTM test number, any required offset test limits, operating condition of the engine, special connections required, the expected limits for pass or fail, and the units of measurement. Also included on the front of the card are hook-up diagrams.

The organization of the table allows measurements with the vehicle engine turned off to be performed first. These measurements will ensure that the starting system of the vehicle is in working order before proceeding. The order of the other measurements is as follows:

- . Measurements with the engine running but not warm
- . Measurements requiring the engine to be warm and running
- . Measurements requiring the engine to be warm and not running
- . Miscellaneous measurements

The back of the VTC contains the hookups for measurements used to troubleshoot vehicle components. Measurements that require special hookups are also included on this side of the VTC.

To start the test method, first perform the pre-test inspection and then the charging system operational check on page 3-64.4.

### **STE/ICE-R ENGINE TROUBLESHOOTING METHOD**

When a malfunction in the engine is recognized by the mechanic, the “flip cards to Troubleshooting” will provide a reference to a specific procedure to isolate the cause of the malfunction.

To start the STE/ICE-R engine troubleshooting method do the following:

- a. Perform Hook up. First, perform HOOKUP to set up STE/ICE-R and check to see if it is in working order.
- b. Perform procedurec Now that STE/ICE-R is hooked up properly and checks out, perform the procedure cited in the “Quick Guide to Troubleshooting.”

The rules to follow when using STE/ICE-R engine troubleshooting method are:

- (1) Never enter in the middle of a procedure.
- (2) Follow each instruction in a procedure. Do not skip any instructions or procedures.
- (3) after correction a problem with a procedure, test run the component, engine or powerplant to ensure the problem does not still exist.

### **BATTERY TEST CARDS**

The STE/ICE-R battery test procedures allow the user to evaluate the condition and state of charge of vehicle/equipment batteries. These procedures use the battery internal resistance and battery resistance change measurements. Battery internal resistance evaluates the state of charge of the battery. Battery resistance change evaluates the battery condition.

Battery state of charge is a measure of the amount of energy stored in the battery. A fully charged battery contains the maximum amount of energy *stored*. If the batteqy fails the battery state of charge evaluation, the battery may be recharged to return the battery to fti charge.

The battery condition is a measure of the battery's ability to accept and maintain a good charge. A battery in poor condition may be able to be fully recharged. However, a battery in poor condition with a full charge will lose its charge more quickly than a battery in good condition with a full charge. If a battery fails the battery condition evaluation, then the battery should be replaced.

The procedures for testing batteries are listed on three battery test cards. Each card describes procedures for evaluating different combinations of batteries:

- Complete battery pack
- Series pair of batteries
- Individual batteries

## **BATTERY PACKS**

A battery pack is the combination of four or more batteries in a particular circuit of a vehicle/equipment, i.e. the starting circuit. Testing the batteries in a pack evaluates the general condition of the pack as a whole. Note, the results of a battery pack test may be misleading. A single battery from a pack of four may be bad even though the pack as a whole may pass the tests. This can happen if the other three batteries in the pack are in very good condition. In order to test a battery pack, the current probe must be clamped around a single cable carrying all of the starter current. If such a connection cannot be made, then test each pair of batteries separately.

## **SERIES PAIRS**

A series pair is one in which the negative terminal of one battery is connected by a cable to the positive terminal of another battery. This test configuration should be used when any of the following conditions exists:

- There are only two batteries (one series pair) in the vehicle/equipment.
- An evaluation of the pack is desired, but the current probe cannot measure the total starter current. This condition can occur if the cable is not readily accessible or if the cable is physically too large.
- The battery pack test has failed, and the user wants to further identify any bad battery pair.
- Note, testing each series pair yields a better evaluation than testing the pack as a whole.

## **INDIVIDUAL BATTERIES**

An individual battery test refers to the process of testing one battery at a time. The battery could be part of a pack, a series pair, or a single battery. Test the batteries individually if a battery series pair failed the tests and it is desired to isolate to a single battery (or if there is only one battery in the circuit). Testing individual batteries gives the best evaluation.

## **DESCRIPTION OF TEST CARDS**

The front of each test card has three sections. The top of the card explains how to connect the VTM to the batteries being tested. The middle part of the card describes the procedure to follow in order to evaluate the batteries. The bottom of the card contains illustrations showing typical vehicle hookups.

The back of each card also has three sections. The upper left-hand block lists the possible VTM displays and explains their meanings. This block suggests corrective action for the user. The right-hand side of the card contains battery test limits for three common military batteries. These limits may be used if the vehicle/equipment TM does not provide limits. The lower left-hand portion of the card contains a table showing how to apply the limits to evaluate the battery condition and state of charge.

## BATTERY EVALUATION PROCEDURE

1. **Use procedures on battery test card to hook-up VTM.** The following information will enable the user to determine the correct tests:
  - a. Use test series 73 and 75 for the following conditions:
    - (1) Testing a battery pack that is also powering the VTM
    - (2) Testing a battery series pair that is also powering the VTM
    - (3) Testing an individual battery that is the only battery in the circuit and is powering the VTM
  - b. Use test series 77 and 79 for the following conditions:
    - (1) Testing a battery pack that is not powering the VTM-
    - (2) Testing a battery series pair that is not powering the VTM
    - (3) Testing an individual battery that is not the only battery in a circuit or is not powering the VTM
2. Use test procedure on battery test card to complete evaluation.
  - a. Evaluate battery condition using battery resistance change test (#75 or #79). Note the result.
  - b. Evaluate battery state of charge using the battery internal resistance test (#73 or #77). Note the result.
  - c. Compare test results to limits in vehicle/equipment TM. If vehicle/equipment TM does not have test limits, use test limits provided in this section. If the battery internal resistance test passes, then the batteries are fully charged. If the battery internal resistance test fails, then the batteries are not adequately charged. If the battery resistance change test passes, then the batteries are good and will retain their charge. If the battery resistance change test fails, then the batteries are bad and will not retain their charge.
  - d. If batteries are out of limits, perform one or all of the following:
    - (1) Check battery electrolyte level.
    - (2) Check battery connections and terminals. Clean or tighten if necessary. Check connections between VTM and batteries.
    - (3) Refer to vehicle/equipment TM to check battery specific gravity.
    - (4) Repeat battery resistance change and internal battery resistance tests one time. If internal battery resistance result (test #73 or #77) is out of limits, then charge batteries. If battery resistance change result (test #75 or #79) is out of limits, then continue testing to isolate bad batteries.

M113 VEHICLE TEST CARD - VID 03

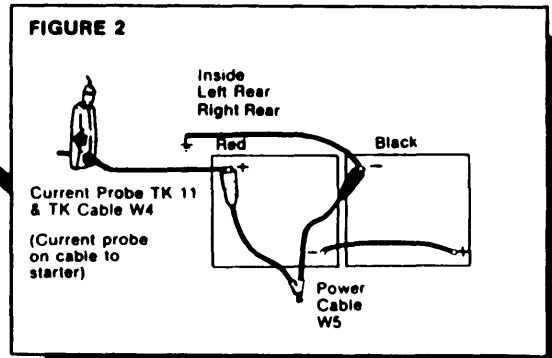
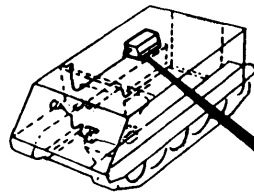
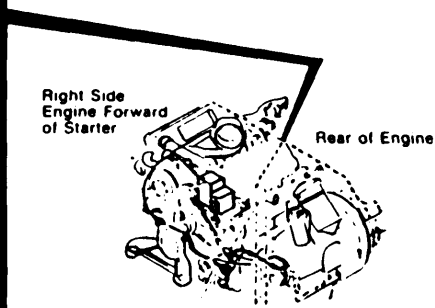
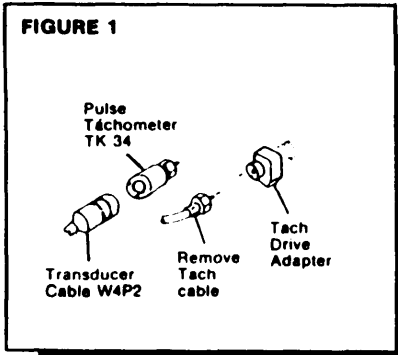
PRE-TEST INSPECTION	
1 Fan Belts	4 Fuel Level
2 Oil Level	5 Batteries
3 Coolant Level	

POWERING UP VTM
1 Connect VTM to W5 cable W5 cable attaches to batteries as shown in figure 2
2 Enter VID into VTM using test 60
3 Perform confidence test, test 66 (second entry 99)

MEASUREMENT NAME	VTM TEST NOS.	VTM OFFSET LIMITS	OPERATING CONDITION	SPECIAL CONNECTIONS REQUIRED	LIMITS		UNITS
					MIN	MAX	
Battery Voltage	67	—	Engine off		22	—	Volts
Current First Peak	72	±225	Crank on GO	Current probe — figure 2	700	1275	Amps
Vehicle Oil Pressure Warning Light	—	—	Idle-use test 10 to check idle speed	Pulse tachometer — figure 1	Light Goes Out		
Charging Voltage	01.67	—	Lights & accessories on 1000-1200 RPM	Pulse tachometer — figure 1	26.5	22.9	Volts
Vehicle Gage Coolant Temp	—	—	Warm engine		120	185	°F
Engine RPM (Average)	10	—	Governor	Pulse tachometer — figure 1	2950	3000	RPM
* Power	13	—	Engine warm	Pulse tachometer — figure 1	75	—	%
Engine RPM (Average)	10	—	Idle	Pulse tachometer — figure 1	650	700	RPM
Compression Unbalance	14	—	Warm Engine — Crank on GO		—	8	%
Cranking RPM	10	—	Cranking	Pulse tachometer — figure 1	100	—	RPM
Cranking Voltage	67	—	Cranking		18	—	Volts
Cranking Current	90	±225	Cranking	Current probe — figure 2	250	425	Amps
Battery Pack Internal Resistance	73	±225	Crank on GO	Current probe — figure 2	—	25.0	Milliohms
Starter Circuit Resistance	74	±225	Crank on GO	Current probe — figure 2	5	27.0	Milliohms
Battery Pack Resistance Change	75	±225	Crank on GO	Current probe — figure 2	—	50.0	Milliohms/sec

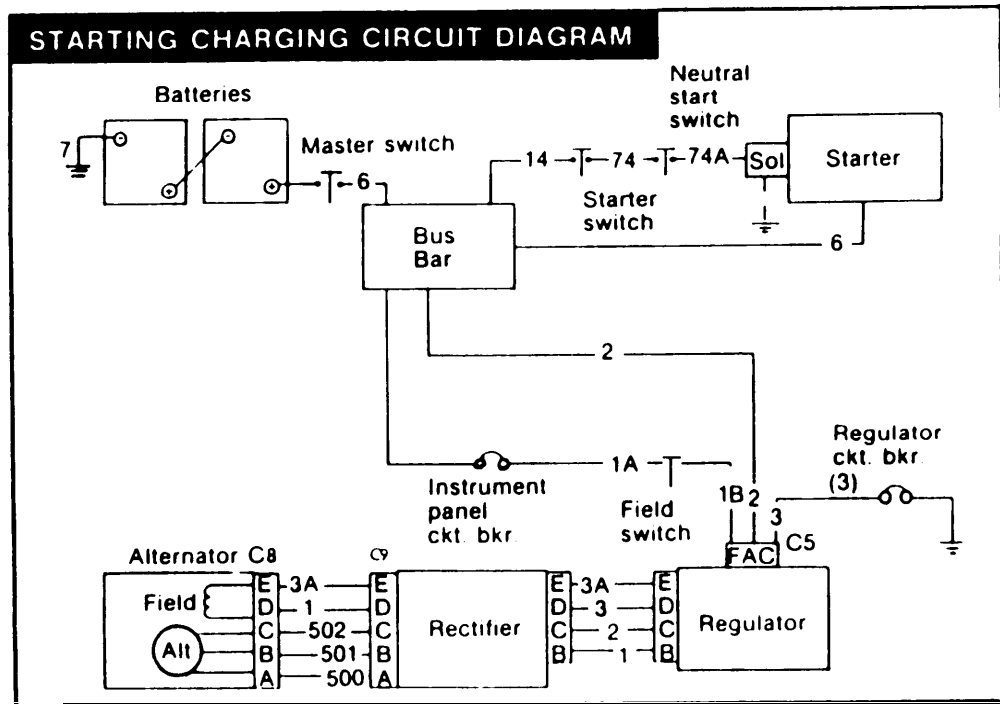
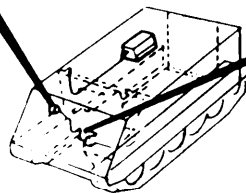
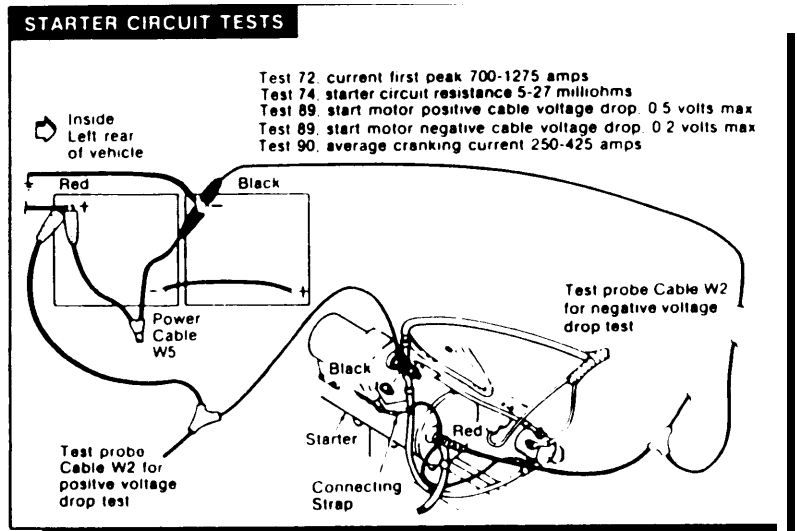
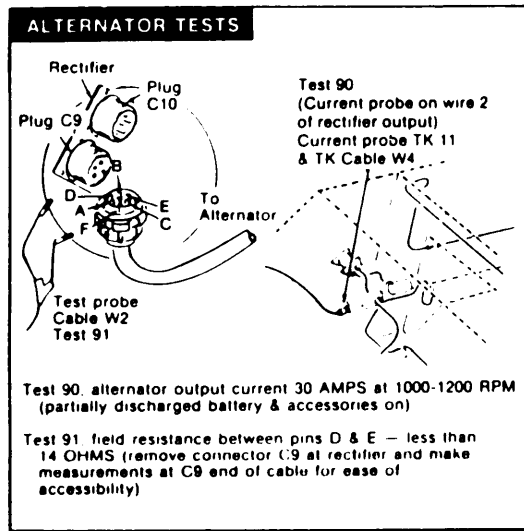
Test limits given are advisory only and are not necessarily the same as vehicle TM's specifications.  
If test limits are different, use vehicle TM's specifications.

\* If vehicle has a turbocharger or fuel limiter, go to vehicle TM for procedure to do power test



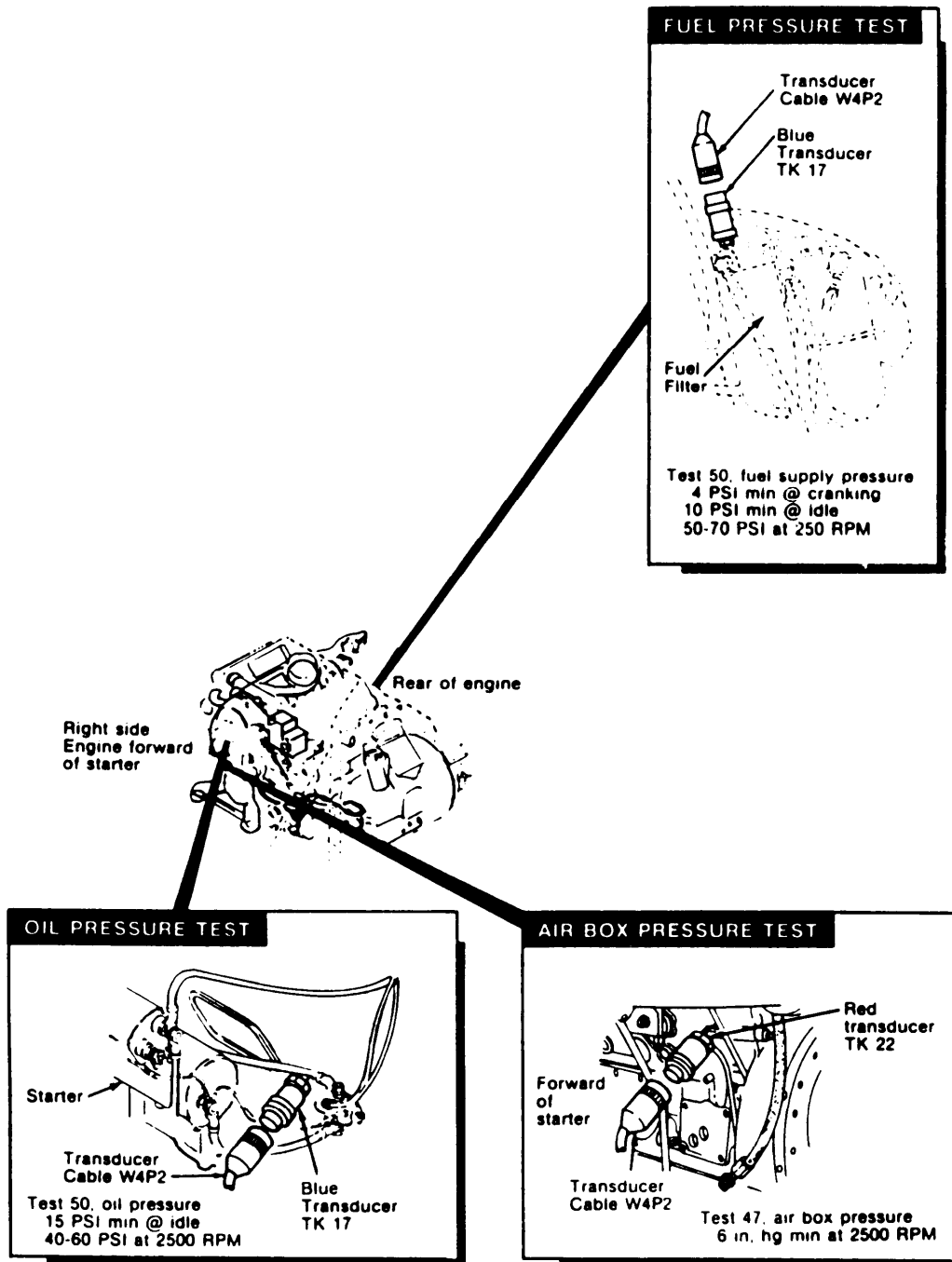


M113 VEHICLE TEST CARD - VID 03 Additional Test Connections



Test limits given are advisory only and are not necessarily the same as vehicle TM's specifications if test limits are different use vehicle TM's specifications.

# M113 VEHICLE TEST CARD - VID 03 Additional Test Connections



Test limits given are advisory only and are not necessarily the same as vehicle TM's specifications. If test limits are different, use vehicle TM's specifications.

## STE/ICE BATTERY SERIES PAIR TEST CARD

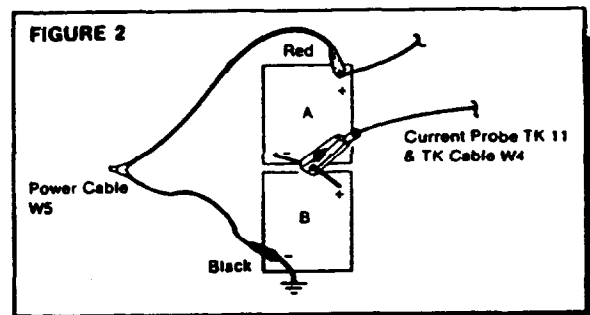
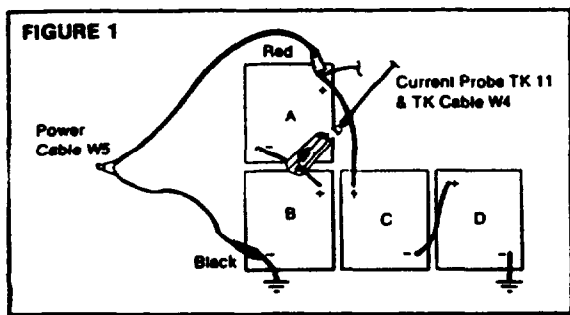
THE BATTERY INTERNAL RESISTANCE TEST (73 or 77) evaluates the state of charge of the battery series pair. The BATTERY RESISTANCE CHANGE TEST (75 or 79) evaluates whether the battery is good or bad, even if it is discharged. A good battery that is discharged may be recharged. A bad battery may hold a charge for a short time.

### STE/ICE HOOKUP

1. The power to operate the STE/ICE VTM may be taken from the batteries being tested as shown in the appropriate figure below or from an alternate power source (such as another vehicle's batteries).
2. Perform VTM general setup, run confidence test, and enter vehicle ID.
3. Find a series pair of batteries. A battery series pair has the negative terminal of one battery connected to the positive terminal of another battery by a cable. For example, in figures 1 and 2 below, batteries A and B are 1 series pair; and in figure 1 below batteries C and D are a series pair.
4. a. If power to the VTM comes from a different set of batteries than the batteries under test, use tests 77 and 79 instead of tests 73 and 75. Connect test probe cable W2 to the batteries under test. Connect the red clip to the positive terminal closest to the starter and the black clip lead to the negative terminal closest to the ground.
  - b. If power to the VTM comes from the same set of batteries as the batteries under test, use tests 73 and 75. The test probe cable W2 is not used.
5. Clamp the current probe around the cable connecting the two batteries. Point the arrow of the current probe along the cable leading towards the negative battery terminal as shown below in figures 1 and 2 for batteries A and B.

### TEST PROCEDURE

1. Condition the current probe before running these tests.
2. Measure the battery resistance change by entering test number 75 or 79 (as described in the hookup procedure). Then engage the starter for about 5 seconds.
3. Measure battery internal resistance by entering test number 73 or 77 (as described in the hookup procedure). Then engage the starter for about 5 seconds.
4. Compare the results of both measurements to limits in the vehicle/equipment TM or to limits on the reverse side of this card.
5. If either measurement is outside of normal limits, check battery terminals and connections, and check battery electrolyte level. Then perform both measurements a second time.
6. If the battery resistance change test (75 or 79) fails after the second measurement, then the battery series pair is in bad condition. Test each battery individually to determine which is good and which is bad or replace the battery series pair.
7. If the battery internal resistance test (73 or 77) fails after the second measurement, then the batteries should be recharged.

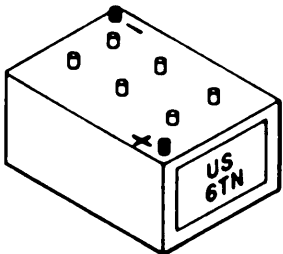
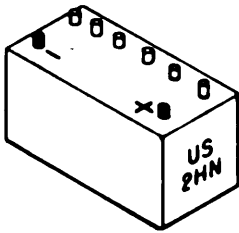
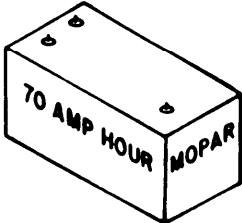


## STE/ICE INDIVIDUAL BATTERY TEST CARD

BATTERY TEST RESULTS	
STE/ICE DISPLAY AFTER TEST	<u>WHAT IT MEANS</u>
GO.....	<ol style="list-style-type: none"> <li>1. The battery in series with the battery under test may be bad. Check that battery next.</li> <li>2. There is a bad connection in the starter circuit somewhere. Check the battery negative cables, and cables to the starter for corroded or loose connections. If all of the cables and connections are o.k., then the starter is possibly faulty.</li> </ol>
.9.9.9.9.....	<ol style="list-style-type: none"> <li>1. There is a bad connection on the battery being tested. Clean and tighten the posts and clamps, and check the cable between the batteries.</li> <li>2. The battery under test is in extremely poor condition.</li> </ol>
14.2.....	<p>If any number is displayed, then the number is a STE/ICE test result. Compare the test result to the values shown along the right edge of this card to determine a pass or fail. See table below to determine the condition of the battery.</p>
E013.....	<ol style="list-style-type: none"> <li>1. The battery being tested may be in a discharged state. Check battery electrolyte level; charge battery, and then retest.</li> <li>2. If display shows E013 after battery has been charged, then the battery is in poor condition.</li> </ol>
E002.....	The current probe is not connected. Connect current probe.
E005.....	Offset test for current probe has not been performed. Perform current probe offset test.
E008.....	Test leads are improperly connected. Check test leads.

BATTERY CONDITION		
TEST 77 BATTERY INTERNAL RESISTANCE TEST RESULT	TEST 79 BATTERY RESISTANCE CHANGE TEST RESULT	BATTERY CONDITION
PASS	PASS	The battery tested is o.k. and in good state of charge.
PASS	FAIL	The battery tested is in poor condition, but has a fresh charge.
FAIL	PASS	The battery tested is o.k., but needs to be recharged.
FAIL	FAIL	The battery tested is in poor condition and in a state of discharge.

STE/ICE INDIVIDAL BATTERY TEST CARD

<b>TEST LIMITS</b>		<b>Individual Battery Test Limits</b>	
<b><u>For Type 6TN Batteries</u></b>			
<u>STE/ICE Test No.</u>		<u>Maximum Acceptable Value to Pass Test</u>	
Battery Internal Resistance Test 77		13 Milliohms max	
Battery Resistance Change Test 79		25 Milliohms/Sec max	
<b><u>For Type 2HN Batteries</u></b>			
<u>STE/ICE Test No.</u>		<u>Maximum Acceptable Value to Pass Test</u>	
Battery Internal Resistance Test 79		25 Milliohms max	
Battery Resistance Change Test 79		70 Milliohms/Sec max	
<b><u>For Commerical 12 volt batteries in M880 vehicles</u></b>			
<u>STE/ICE Test No.</u>		<u>Maximum Acceptable Value to Pass Test</u>	
Battery Internal Resistance Test 77		13 Milliohms max	
Battery Resistance Change Test 79		50 Milliohms/Sec max	

## STE/ICE INDIVIDUAL BATTERY TEST CARD

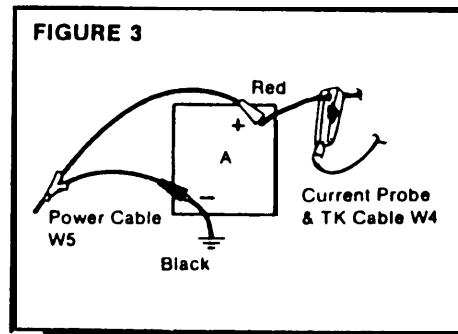
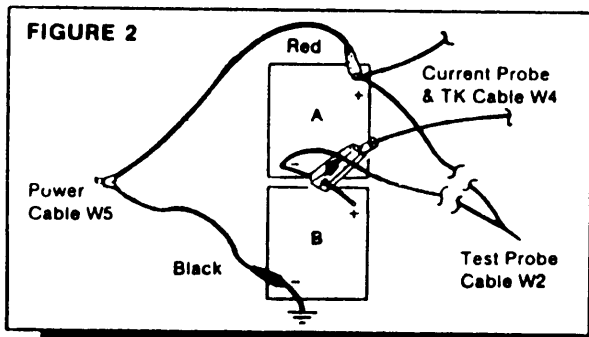
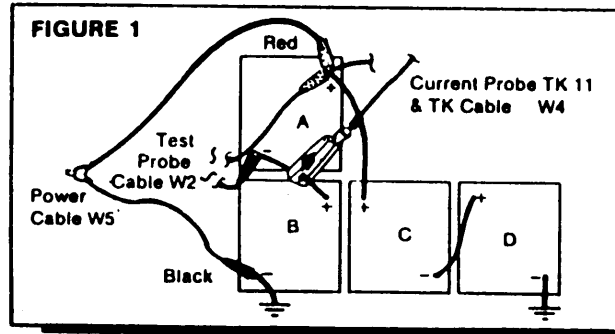
The BATTERY INTERNAL RESISTANCE TEST (73 or 77) evaluates the state of charge of an individual battery. The BATTERY RESISTANCE CHANGE TEST (75 or 79) evaluates whether the battery is good or bad, even if it is discharged. A good battery that is discharged may be recharged. A bad battery may hold a charge for a short time.

### STE/ICE HOOKUP

1. The power to operate the STE/ICE VTM may be taken from the batteries being tested as shown in the appropriate figure below or from an alternate power source (such as another vehicle's batteries).
2. Perform VTM general setup, run confidence test and enter vehicle ID.
3. If there is more than one battery in the vehicle/equipment, then find the battery series pair that includes the battery under test. A battery series pair is a pair of batteries for which the negative terminal of one battery is connected by a cable to the positive terminal of another battery. For example, in figure 1 and 2 below, batteries A and B are a series pair, and in figure 1 below, batteries C and D are a series pair.
- 4a. If the vehicle/equipment under test has more than one battery or if the VTM is powered from an alternate power source, then use tests 77 and 79. Connect the red clip of test probe cable W2 to the positive terminal of the battery under test. Connect the black clip of test probe cable W2 to the negative terminal of the battery under test.
- b. If the vehicle/equipment under test has only one battery which is also supplying power to the VTM, use tests 73 and 75. The test probe cable W2 is not used.
- 5a. If the vehicle/equipment under test has more than one battery, then the battery under test is part of a series pair of batteries. Clamp the current probe around the cable connecting the series pair. Point the arrow on the current probe along the cable leading towards the negative terminal as shown in figures 1 and 2.
- b. If the vehicle/equipment under test has only one battery, then clamp the current probe around the positive battery cable connected to the starter. Point the arrow on the current probe along the cable in the direction leading towards the starter as shown in figure 3.

### TEST PROCEDURE

1. Condition the current probe before running these tests.
2. Measure the battery resistance change by entering test number 75 or 79 (as described in the hookup procedure). Then engage the starter for about 5 seconds.  
 Measure the battery internal resistance by entering test number 73 or 77 (as described in the hookup procedure). Then engage the starter for about 5 seconds.  
 Compare the results of both measurements to limits in the vehicle/equipment TM or to limits on the reverse side of this card.  
 If either measurement is outside of normal limits, check battery terminals and connections, and check battery electrolyte level. Then perform both measurements a second time.
3. If the battery resistance change test (75 or 79) fails after the second measurement, then the battery is in bad condition. The battery may be able to accept and hold a charge, but it will quickly become discharged during use. A battery in bad condition should be replaced.
4. If the battery internal resistance test (73 or 77) fails after the second measurement, then the battery should be recharged.

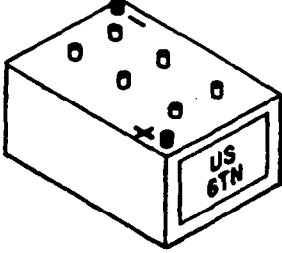
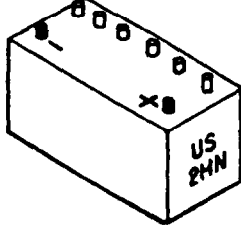
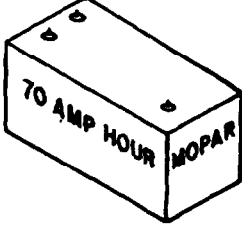


## STE/ICE BATTERY SERIES PAIR TEST CARD

BATTERY TEST RESULTS	
<u>STE/ICE DISPLAY AFTER TEST</u>	<u>WHAT IT MEANS</u>
GO.....	<ol style="list-style-type: none"> <li>1. The battery in series with the battery under test may be bad. Check that battery next.</li> <li>2. Check the battery negative cables and cables to the starter for corroded or loose connections. If all of the cables and connections are o.k., then the starter is possibly faulty. If all of the cables and connections are o.k., it is possible that the starter is faulty.</li> </ol>
.9.9.9.9.....	<ol style="list-style-type: none"> <li>1. There is a bad connection on the battery being tested. Clean and tighten the posts and clamps, and check the cable between the batteries.</li> <li>2. The battery under test is in extremely poor condition.</li> </ol>
14.2.....	<p>If any number is displayed, then the number is a STE/ICE test result. Compare the test result to the values shown along the right edge of this card to determine a pass or fail. See table below to determine the condition of the battery.</p>
E013.....	<ol style="list-style-type: none"> <li>1. The battery being tested may be in a discharged state. Check battery electrolyte level; charge battery, and then retest.</li> <li>2. If display shows E013 after battery has been charged, then the battery is in poor condition.</li> </ol>
E002.....	The current probe is not connected. Connect current probe.
E005.....	Offset test for current probe has not been performed. Perform current probe offset test.
E008.....	Test leads are improperly connected. Check test leads.

BATTERY CONDITION		
TEST 77 BATTERY INTERNAL RESISTANCE TEST RESULT	TEST 79 BATTERY RESISTANCE CHANGE TEST RESULT	BATTERY CONDITION
PASS	PASS	The battery tested is o.k. and in good state of charge.
PASS	FAIL	The battery tested is in poor condition, but has a fresh charge
FAIL	PASS	The battery tested is o.k., but needs to be recharged.
FAIL	FAIL	The battery tested is in poor condition and in a state of discharge.

## STE/ICE BATTERY SERIES PAIR TEST CARD

<b>TEST LIMITS</b>		<b>Battery Test Limits for a Series Pair</b>	
<b><u>For Type 6TN Batteries</u></b>			
<b>STE/ICE Test No.</b>		<b><u>Maximum Acceptable Value to Pass Test</u></b>	
Battery Internal Resistance Test 77		25 Milliohms max	
Battery Resistance Change Test 79		50 Milliohms/Sec max	
<b><u>For Type 2HN Batteries</u></b>			
<b>STE/ICE Test No.</b>		<b><u>Maximum Acceptable Value to Pass Test</u></b>	
Battery Internal Resistance Test 77		50 Milliohms max	
Battery Resistance Change Test 79		140 Milliohms/Sec max	
<b><u>For Commerical 12 volt batteries in M880 vehicles</u></b>			
<b>STE/ICE Test No.</b>		<b><u>Maximum Acceptable Value to Pass Test</u></b>	
Battery Internal Resistance Test 77		25 Milliohms max	
Battery Resistance Change Test 79		100 Milliohms/Sec max	



## STE/ICE BATTERY PACK TEST CARD

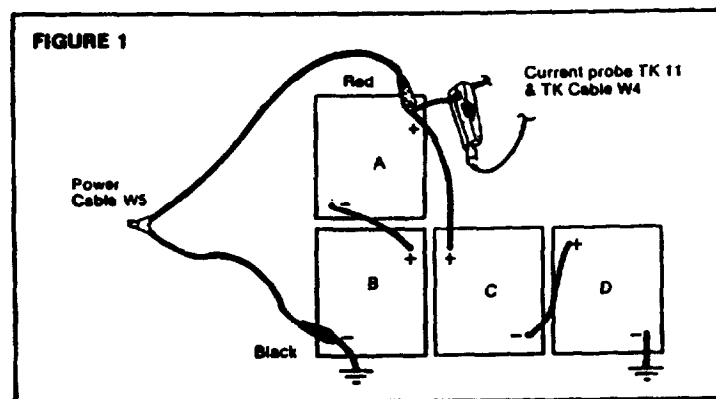
The BATTERY INTERNAL RESISTANCE TEST (73 or 77) evaluates the state of charge of an individual battery. The BATTERY RESISTANCE CHANGE TEST (75 or 79) evaluates whether the battery is good or bad, even if it is discharged. A good battery that is discharged may be discharged. A bad battery may hold a charge for a short time.

### STE/ICE HOOKUP

1. The power to operate the STE/ICE VTM may be taken from the batteries being tested as shown in the appropriate figure below or from an alternate power source (such as another vehicle's batteries).
2. Perform VTM general setup; run confidence test, and enter vehicle ID.
3. a. If power to the VTM comes from a different set of batteries than the battery pack under test, use tests 77 and 79. Connect test probe cable W2 to the battery pack under test. Connect the red clip to the positive terminal closest to the starter. Connect the black clip to the negative terminal closest to vehicle/equipment ground.
  - b. If power to the VTM comes from the battery pack under tests, use tests 73 and 75. The test probe cable W2 is not used.
4. Clamp the current probe around the positive cable connected to the starter. Point the arrow on the current probe along the cable leading towards the starter as shown in figure 1.

### TEST PROCEDURE

1. Condition the current probe before running these tests.
2. Measure the battery resistance change by entering test number 75 or 79 (as described in the hookup procedure). Then engage the starter for about 5 seconds.
3. Measure the battery resistance by entering test number 73 or 77 (as described in the hookup procedure). Then engage the starter for about 5 seconds.
4. Compare the results of both measurements to limits in the vehicle/equipment TM or to limits on the reverse side of this card.
5. If either measurement is outside of normal limits, check battery terminal and connections, and check battery electrolyte level. Then perform both measurements a second time.
6. If the battery resistance change test (75 or 79) fails after the second measurement, then the battery pack is in bad condition. Test each series pair to determine which is good and which is bad.
7. If the battery internal resistance test (73 or 77) fails after the second measurement, then the battery should be recharged.

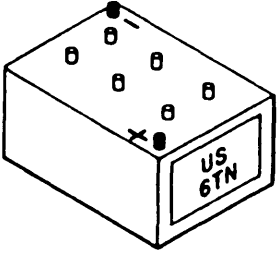
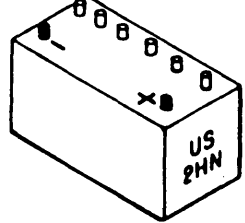
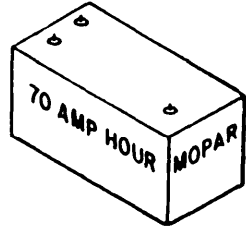


## STE/ICE BATTERY PACK TEST CARD

BATTERY TEST RESULTS		<u>WHAT IT MEANS</u>	
<b>STE/ICE DISPLAY AFTER TEST</b>			
GO.....	}	1. The battery in series with the battery under test may be bad. Check that battery next.	
		2. There is a bad connection in the starter circuit somewhere. Check the battery negative cables, and cables to the starter for corroded or loose connections. If all of the cables and connections are o.k., then the starter is possibly faulty.	
.9.9.9.9.....	}	1. There is a bad connection on the battery being tested. Clean and tighten the posts and clamps, and check the cable between the batteries.	
		2. The battery under test is in extremely poor condition.	
14.2.....	}	If any number is displayed, then the number is a STE/ICE test result. Compare the test result to the values shown along the right edge of this card to determine a pass or fail. See table below to determine the condition of the battery.	
E013 .....	}	1. The battery being tested may be in a discharged state. Check battery electrolyte level; charge battery, and then retest.	
		2. If display shows E013 after battery has been charged, then the battery is in poor condition.	
E002 .....		The current probe is not connected. Connect current probe.	
E005 .....		Offset test for current probe has not been performed. Perform current probe offset test.	
E008 .....		Test leads are improperly connected. Check test leads.	

BATTERY CONDITION		
TEST 77 BATTERY INTERNAL RESISTANCE TEST RESULT	TEST 79 BATTERY RESISTANCE CHANGE TEST RESULT	BATTERY CONDITION
PASS	PASS	The battery tested is o.k and in good state of charge.
PASS	FAIL	The battery tested is in poor condition, but has a fresh charge
FAIL	PASS	The battery tested is o.k., but needs to be recharged.
FAIL	FAIL	The battery tested is in poor condition and in a state of discharge.

## STE/ICE BATTERY PACK TEST CARD

<b>TEST LIMITS</b>		<b>Battery Test Limits for a Four Battery Pack *</b>	
<b><u>For Type 6TN Batteries</u></b>			
<u>STE/ICE Test No.</u>	<u>Maximum Acceptable Value to Pass Test</u>		
Battery Internal Resistance Test 77	13 Milliohms max		
Battery Resistance Change Test 79	25 Milliohms/Sec max		
<b><u>For Type 2HN Batteries</u></b>			
<u>STE/ICE Test No.</u>	<u>Maximum Acceptable Value to Pass Test</u>		
Battery Internal Resistance Test 77	25 Milliohms max		
Battery Resistance Change Test 79	70 Milliohms/Sec max		
<b><u>For Commerical 12 volt batteries in M880 vehicles</u></b>			
<u>STE/ICE Test No.</u>	<u>Maximum Acceptable Value to Pass Test</u>		
Battery Internal Resistance Test 77	13 Milliohms max		
Battery Resistance Change Test 79	50 Milliohms/Sec max		
<p>*When a vehicle has more than four batteries in a pack, it is usually easier to test each series pair separately.</p>			

---

## STE/ICE-R CHARGING CIRCUIT TROUBLESHOOTING

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
STE/ICE-R Test Set (Item 71.1, App D)

**References (cont):**

TM 9-4910-571-12&P  
Charging system malfunctions (page 3-55)

**Personnel Required**

Unit Mechanic

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant access door open (see your -10)  
STE/ICE-R power hooked up (page 3-275)

**References:**

see your-10

---

### CONDITION CURRENT PROBE

1. Clamp current probe around battery positive cable.
2. Point arrow on current probe toward starter and clamp probe on battery positive cable to starter.
3. Ensure current probe is closed.
4. Crank engine for several cycles with fuel off.
5. Turn off all electrical power.
6. Set test select switches to 90.
7. Press and hold test until CAL appears on display.
8. Is offset value within limits of- 225 to + 225?

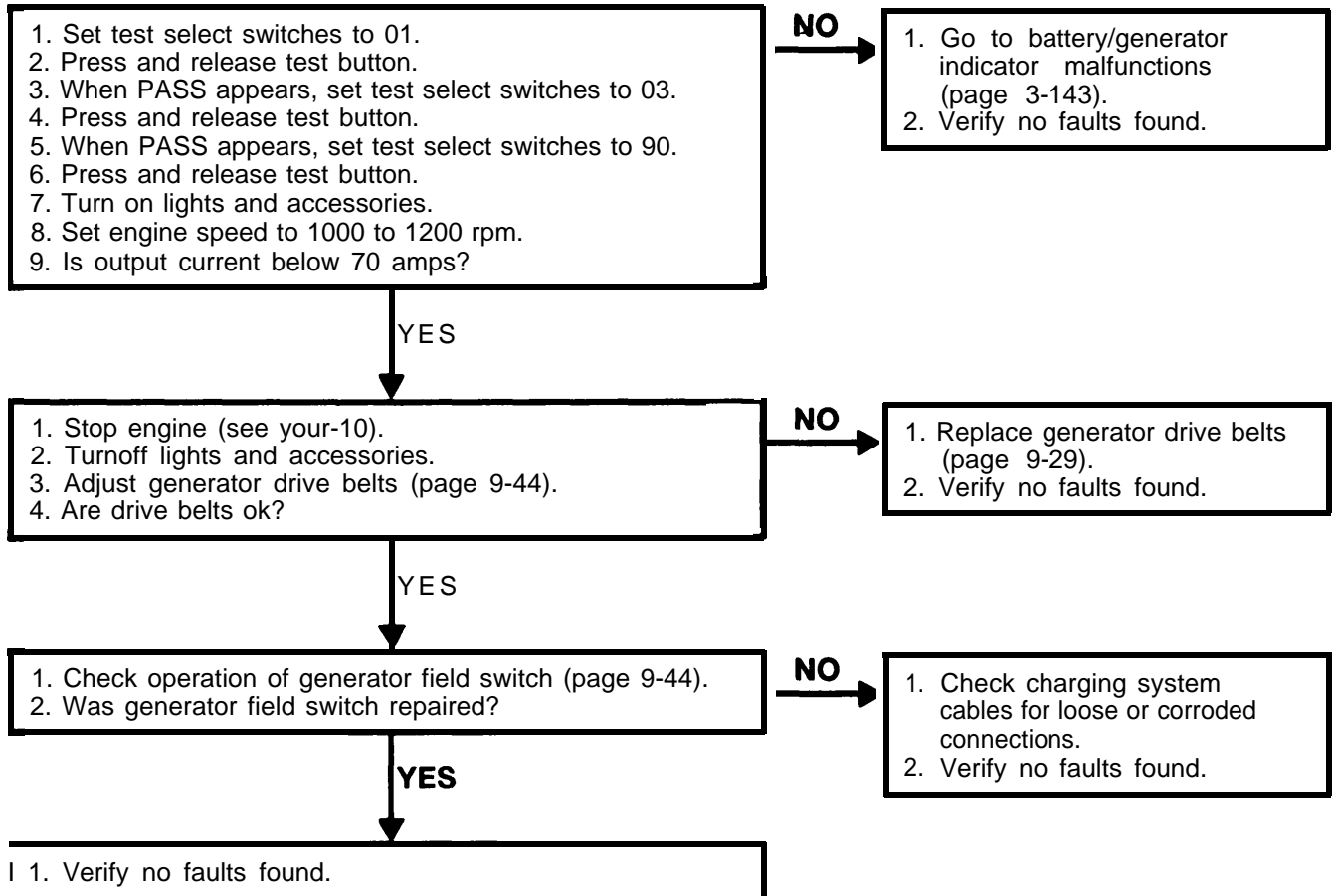
NO →

1. Go to offset fault isolation (TM 9-4910-571-12&P).
2. Repeat this troubleshooting.

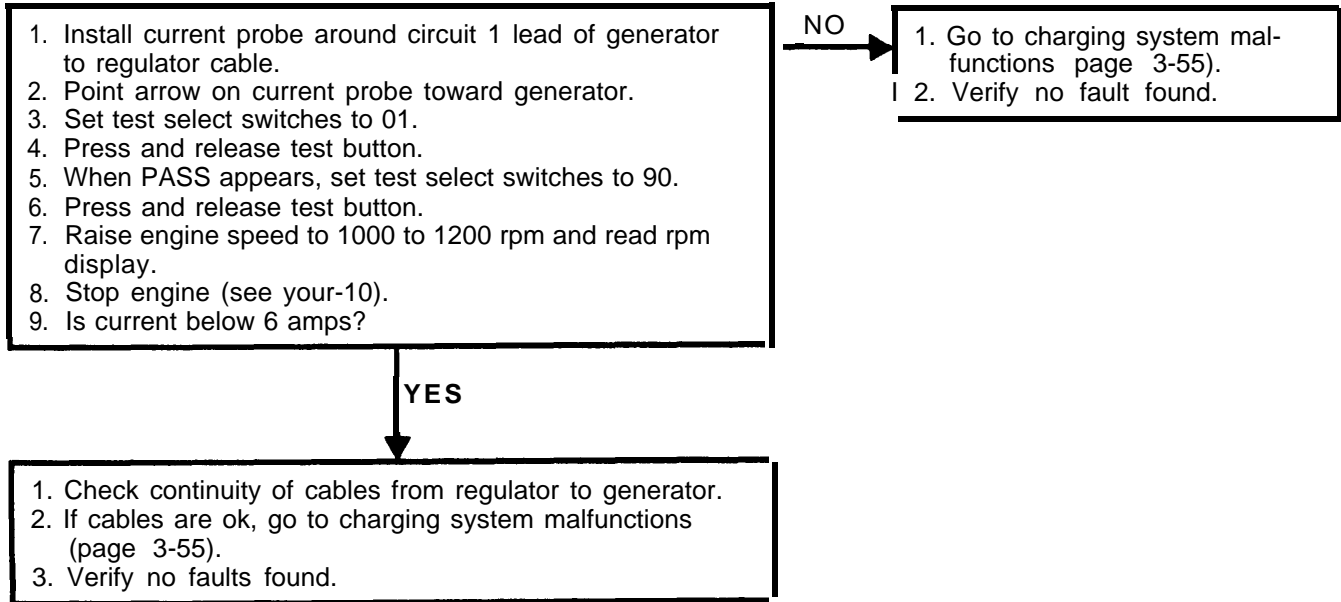
↓  
YES  
↓

1. Remove current probe from battery cable.
2. Start engine (see your-10).
3. Install current probe around circuit 2 lead of generator.
4. Point arrow on current probe toward battery.

**OUTPUT CURRENT**



## FIELD CURRENT



## STE/ICE-R STARTER CIRCUIT TROUBLESHOOTING

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

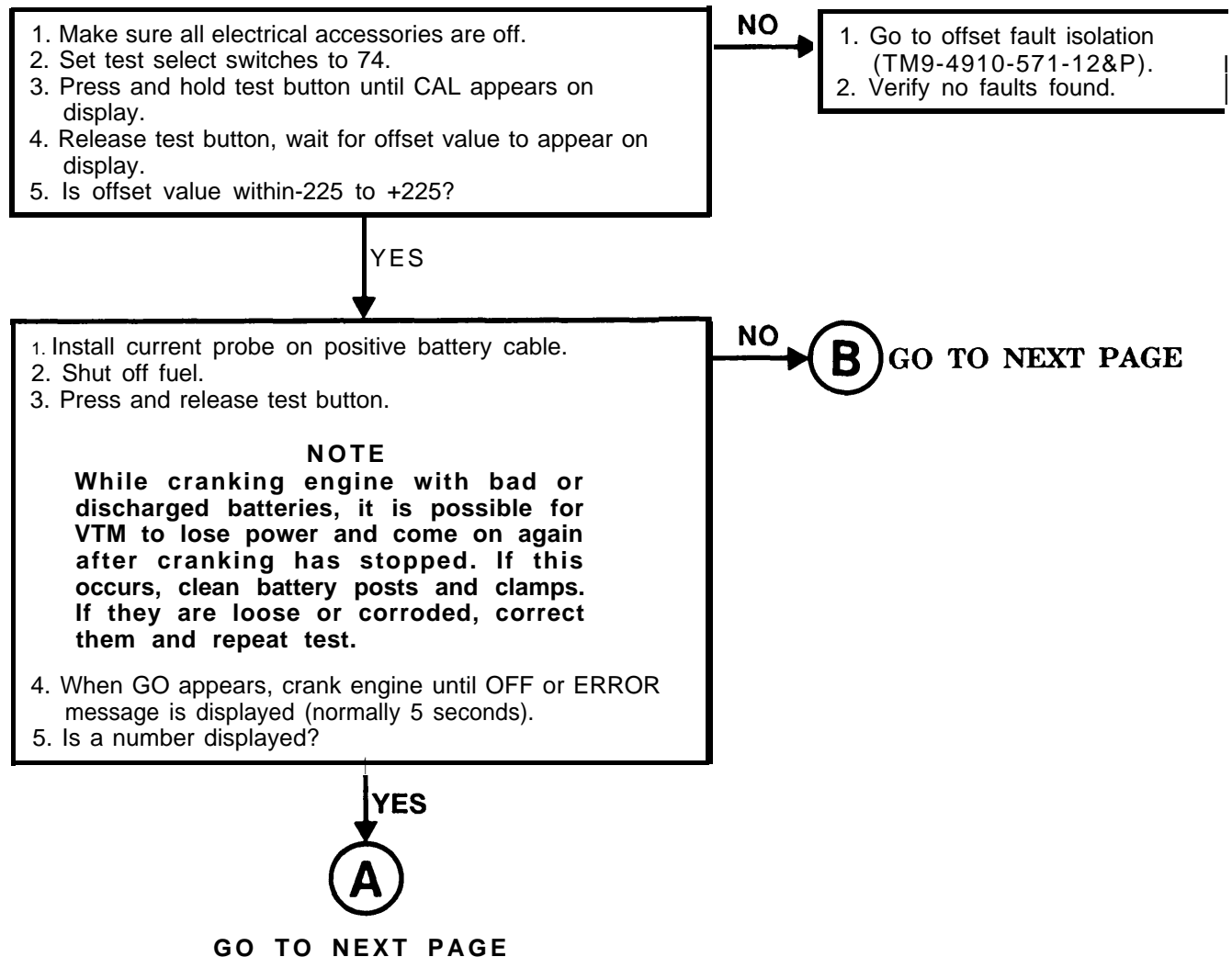
See your -10  
TM 9-4910-571-12&P  
TM 9-6140-200-14

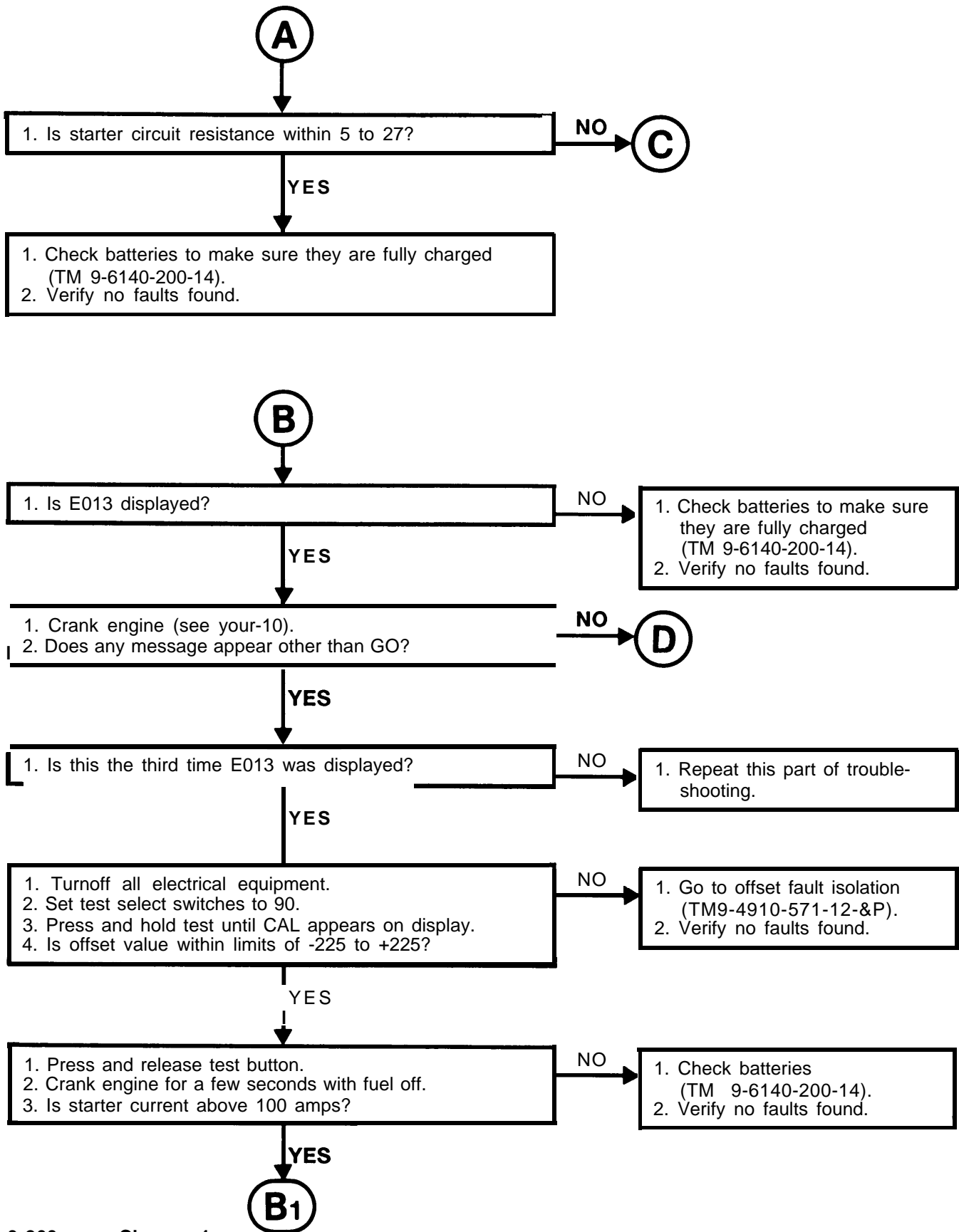
**References (cont):**

Engine cranks slowly (page 3-25)

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant access door open (see your -10)  
All electrical power off (see your -10)  
STE/ICE-R hooked up for tests 72 thru 75  
(page 3-281)  
STE/ICE-R hooked up for power (page 3-275)







**B1**

1. Error message E013 displayed earlier indicates short circuit, frozen starter, or tight engine.
2. Check wiring to starter for short circuits.
3. If wiring is ok, engine maybe tight.
4. Notify direct support maintenance.
5. Verify no faults found.

**C**

1. Is resistance high?

NO

1. Repair short circuit in starter circuit.
2. Verify no faults found.

YES

**D**

1. Attempt to start engine while listening for clicking of starter solenoid.
2. Does starter solenoid click?

NO

1. Check switches, wiring, relays, and circuit breakers to starter solenoid.
2. Verify no faults found.

YES

1. Connect test probe cable W2P1 to J4 on VTM.
2. Connect red and black clips together.
3. Set test select switches to 89.
4. Press and hold test until CAL appears on display.
5. Is offset value within limits of -6.8 to +6.8?

NO

1. Go to offset fault isolation (TM 94910-571-12&P).
2. Verify no faults found.

YES

1. Connect black clip of test probe cable W2 to the negative battery terminal.
2. Connect red clip of test probe cable W2 to the positive terminal of starter.
3. Press and release test button.
4. Crank engine and read displayed voltage.
5. Is starter voltage above 17 volts?

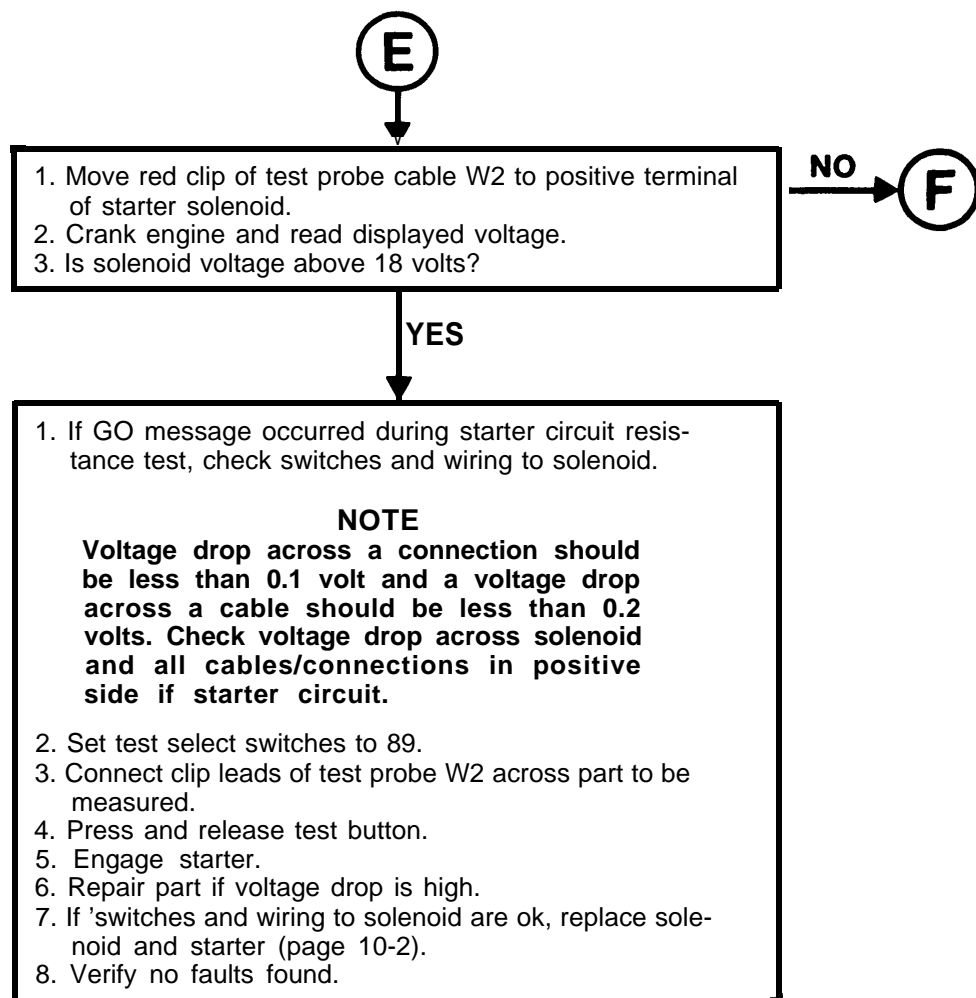
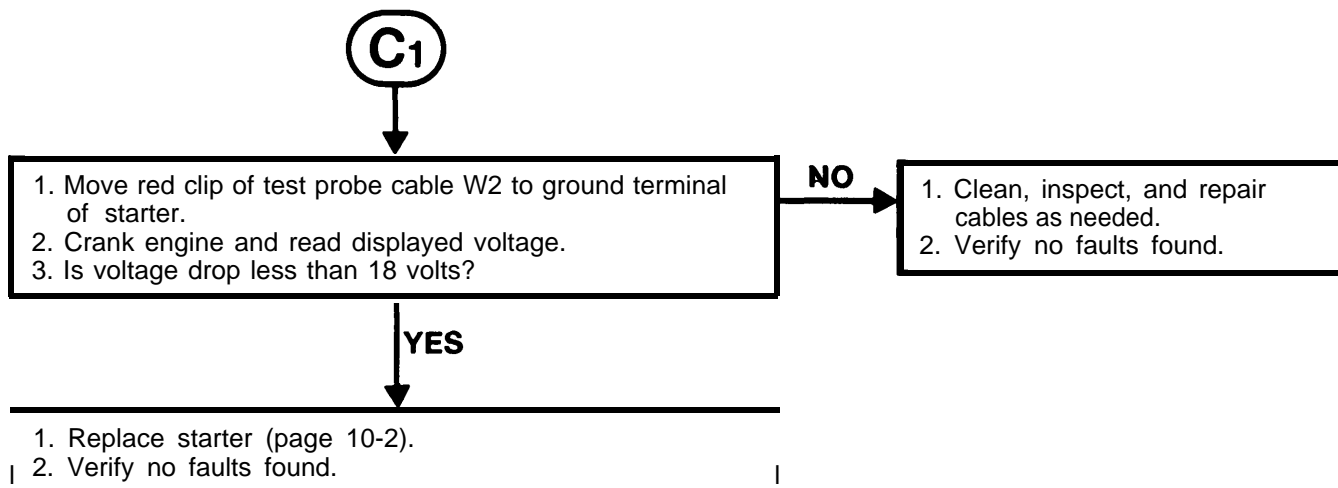
NO

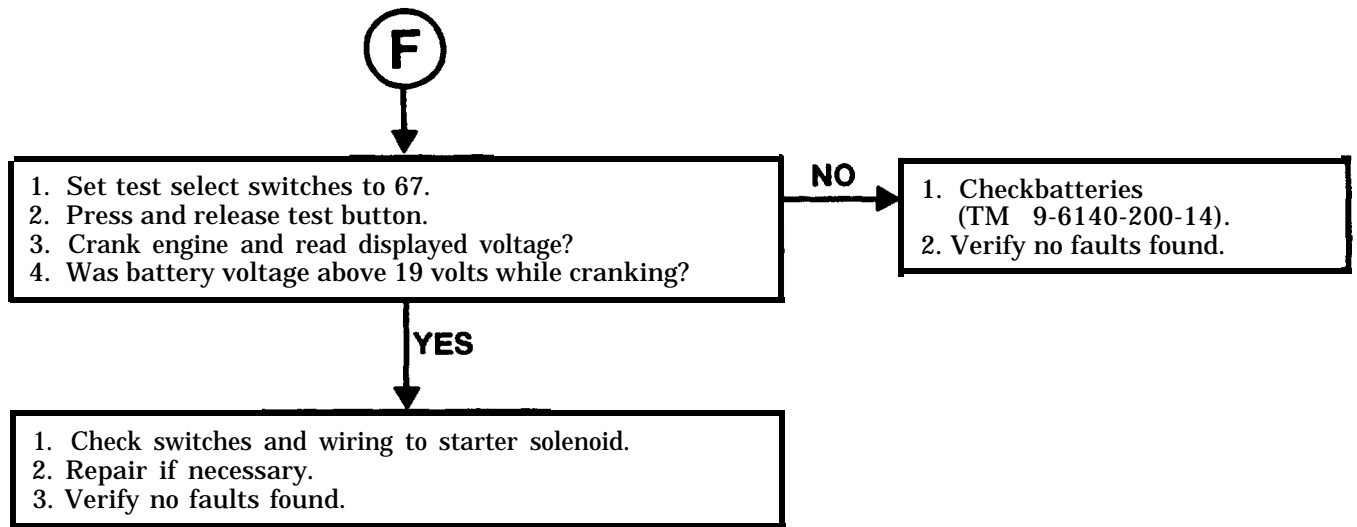
**E** GO TO NEXT PAGE

YES

**C1**

GO TO NEXT PAGE





---

## STE/ICE-R LOW OIL PRESSURE TROUBLESHOOTING

---

### INITIAL SETUP

#### Tools:

General Mechanic's Tool Kit (Item 30, App D)  
STE/ICE-R Test Set (Item 71.1, App D)

#### Personnel Required:

Unit Mechanic

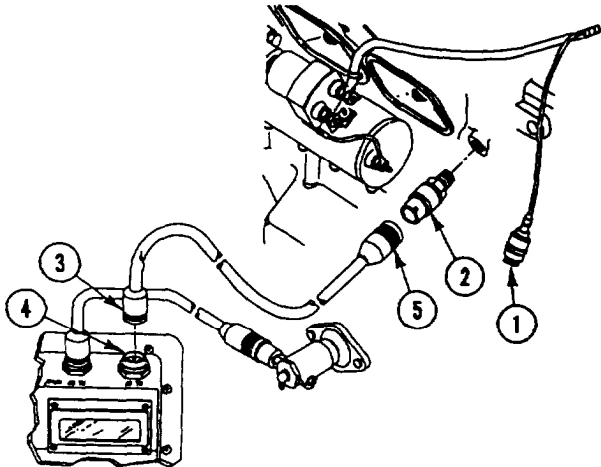
#### References:

See your -10  
Engine oil low pressure indicator fails to go  
off after engine starts (page 3-50)

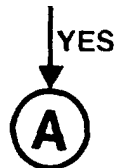
#### Equipment Conditions:

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant access door open (see your -10)  
STE/ICE-R hooked up for power (page 2-275)  
STE/ICE-R engine RPM test hooked up  
(page 3-277)

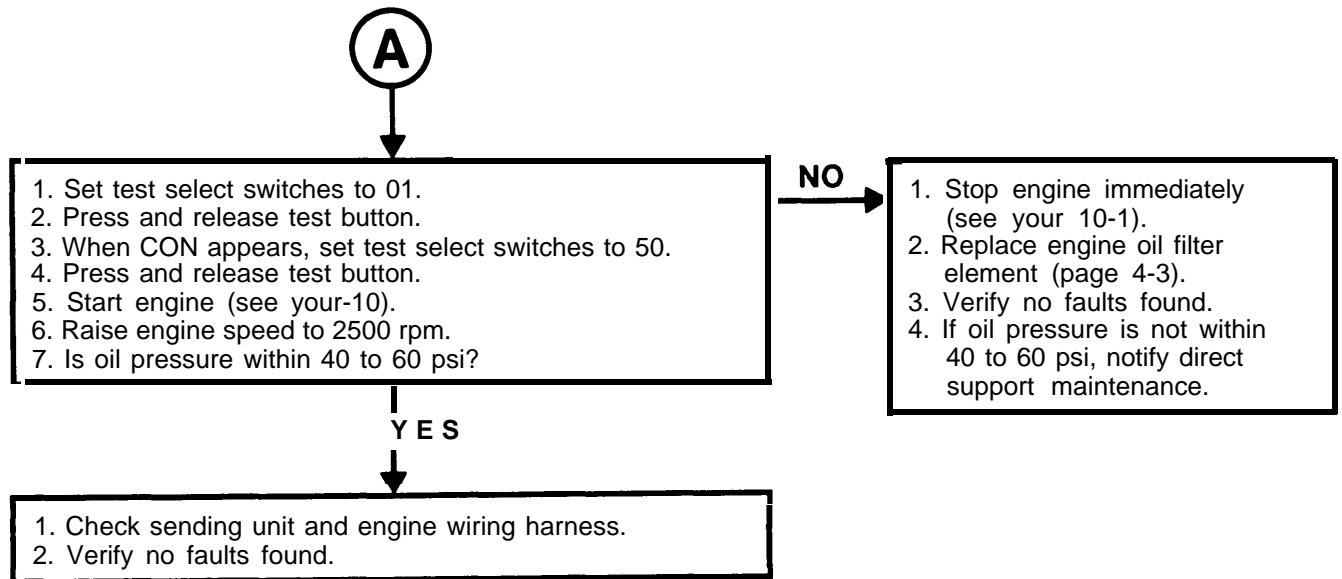
1. Remove oil pressure sending unit (1) from engine.
2. Install blue striped pressure transducer (2) in place of sending unit (1).
3. Connect transducer cable W4P1 (3) to J3 (4) on VTU.
4. Connect transducer cable W4P2 (5) to pressure transducer (2).



5. Set test select switches to 50.
6. Press and hold test button until CAL appears on display.
7. Is offset value within -150 to +150?



1. Go to offset fault isolation (TM 9-4910-541-12&P).
2. Verify no faults found.



## STE/ICE-R BATTERY TROUBLESHOOTING

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
STE/ICE-R Test Set (Item 71.1, App D)

**References (cont):**

Battery/generator indicator malfunctions  
(page 3-143)

**Personnel Required:**

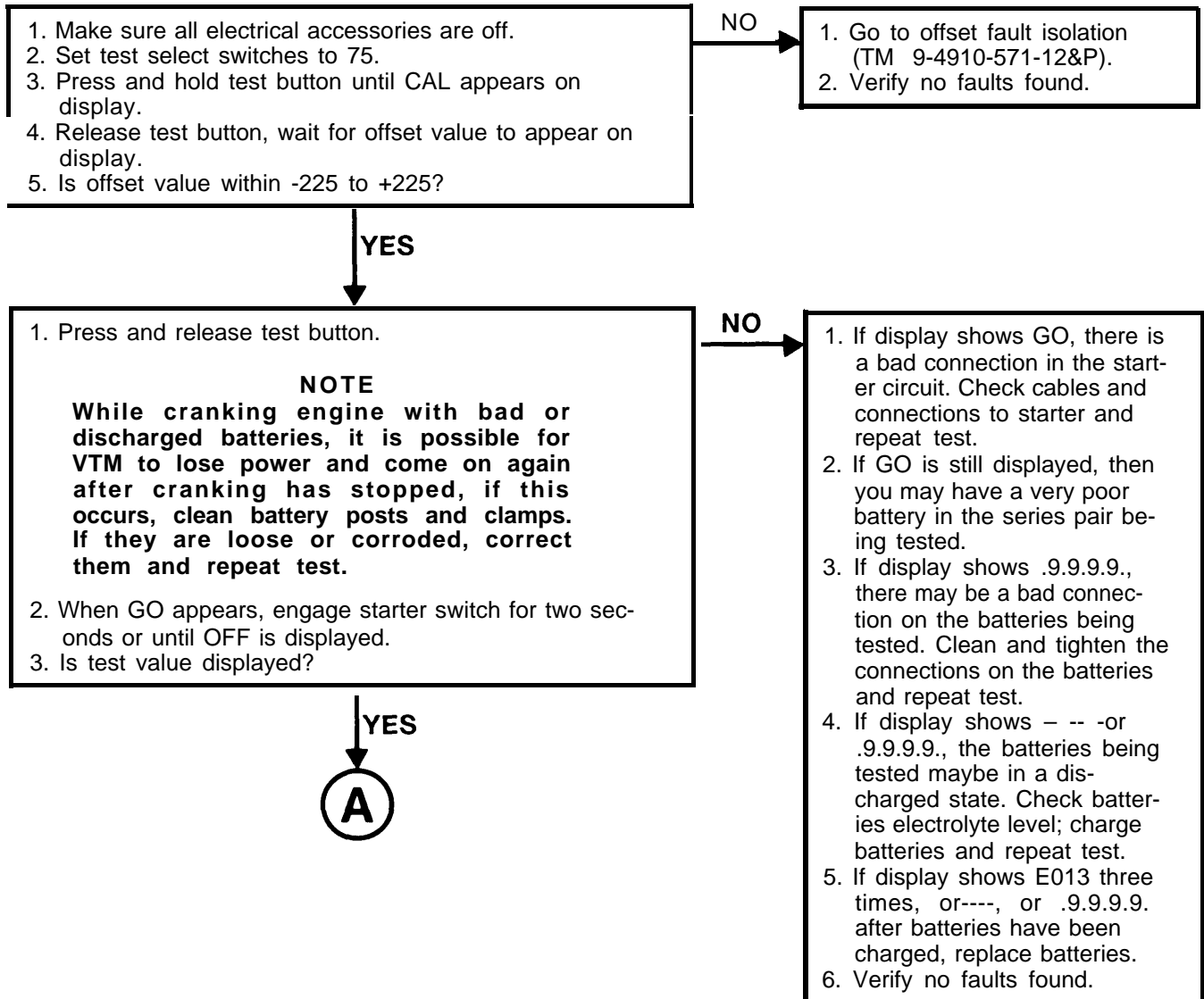
Unit Mechanic

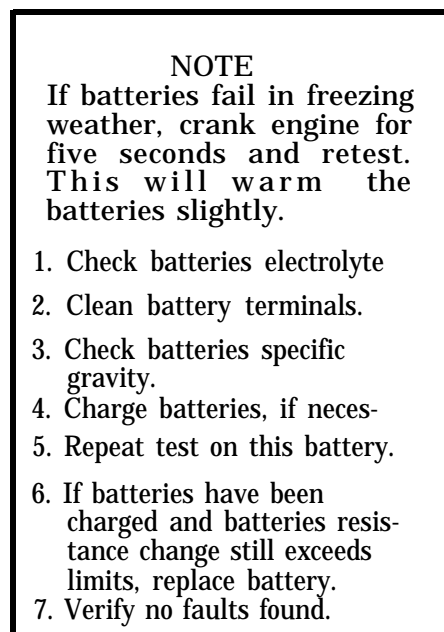
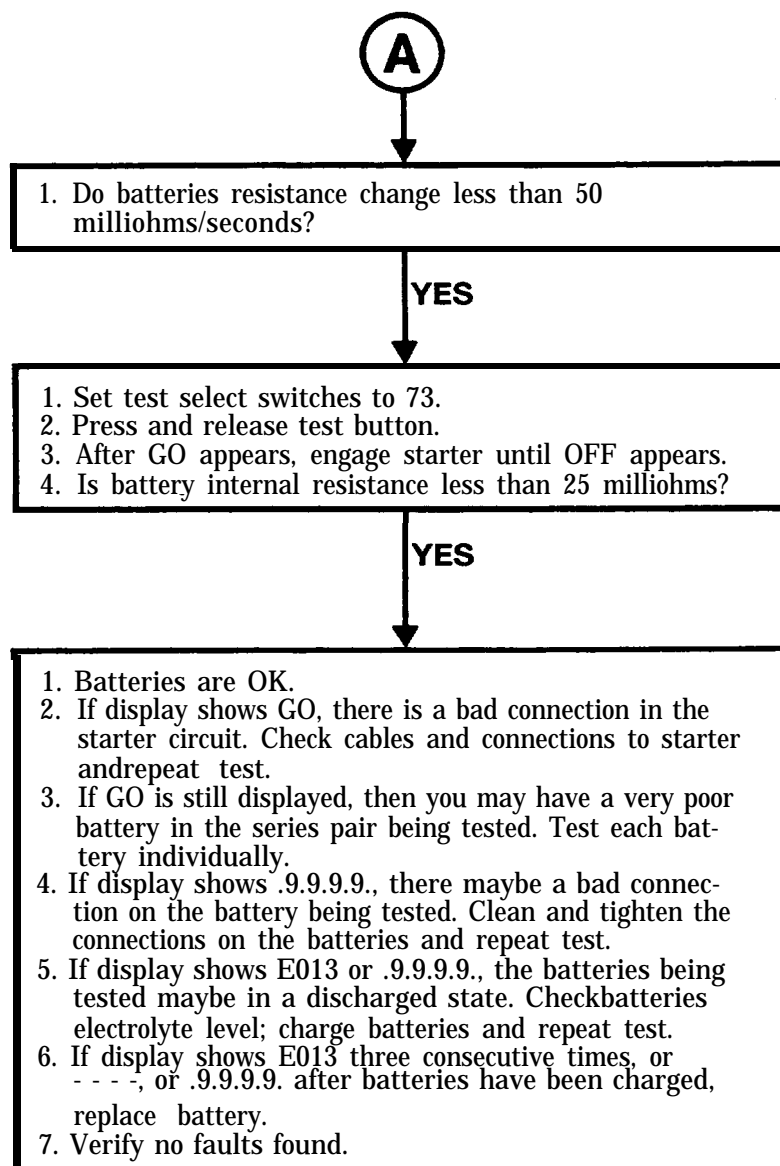
**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Fuel off, engine must not start (see your -10)  
All electrical power off (see your -10)  
STE/ICE-R Starter circuit test hooked up  
(page 3-279)  
STE/ICE-R Power hooked up (page 3-275)

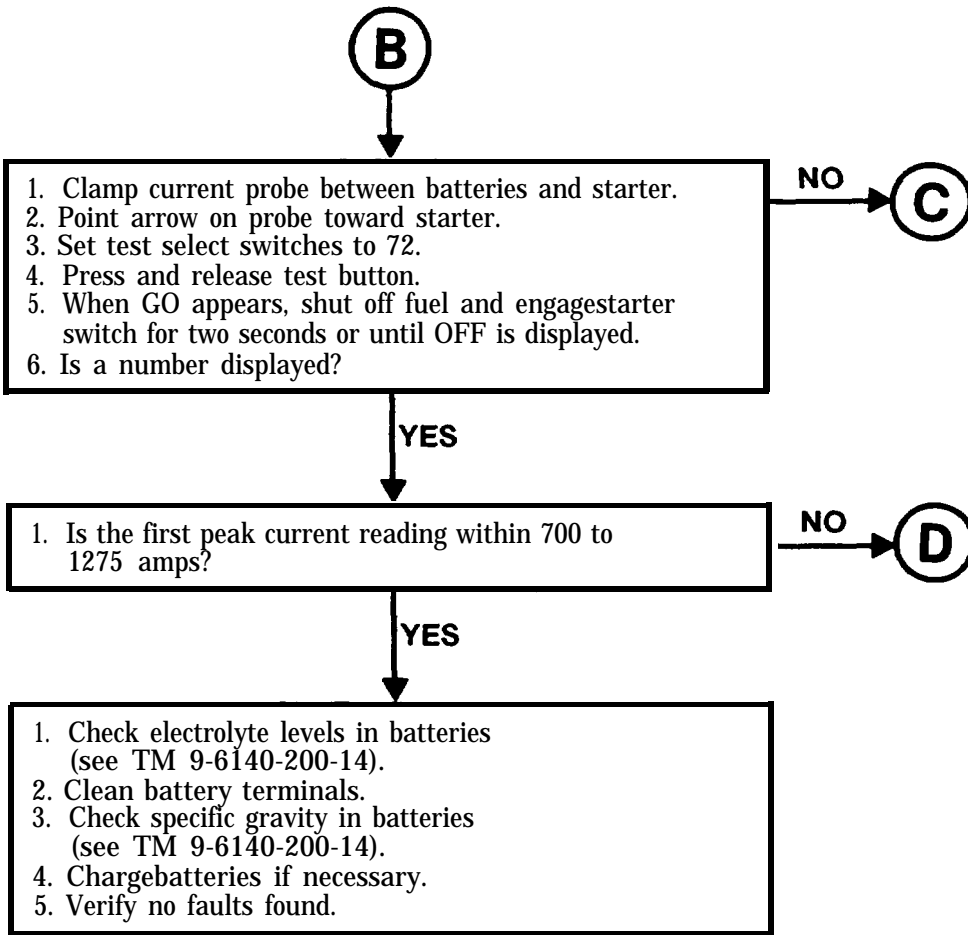
**References:**

See your -10  
TM 9-4910-571-12&P  
TM 9-6140-200-14



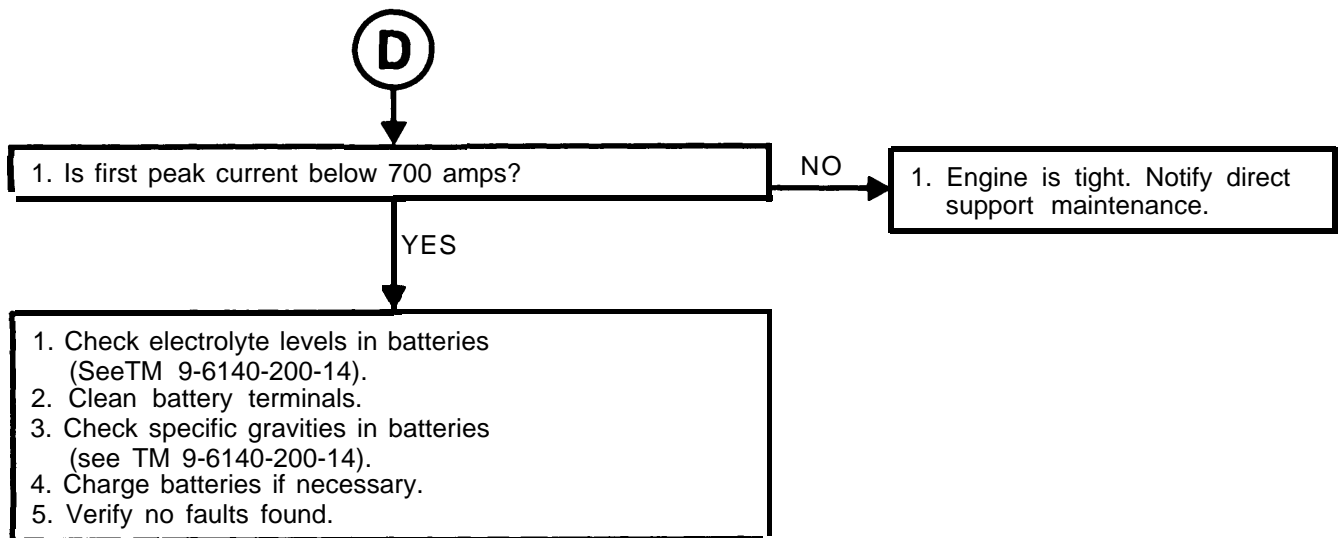
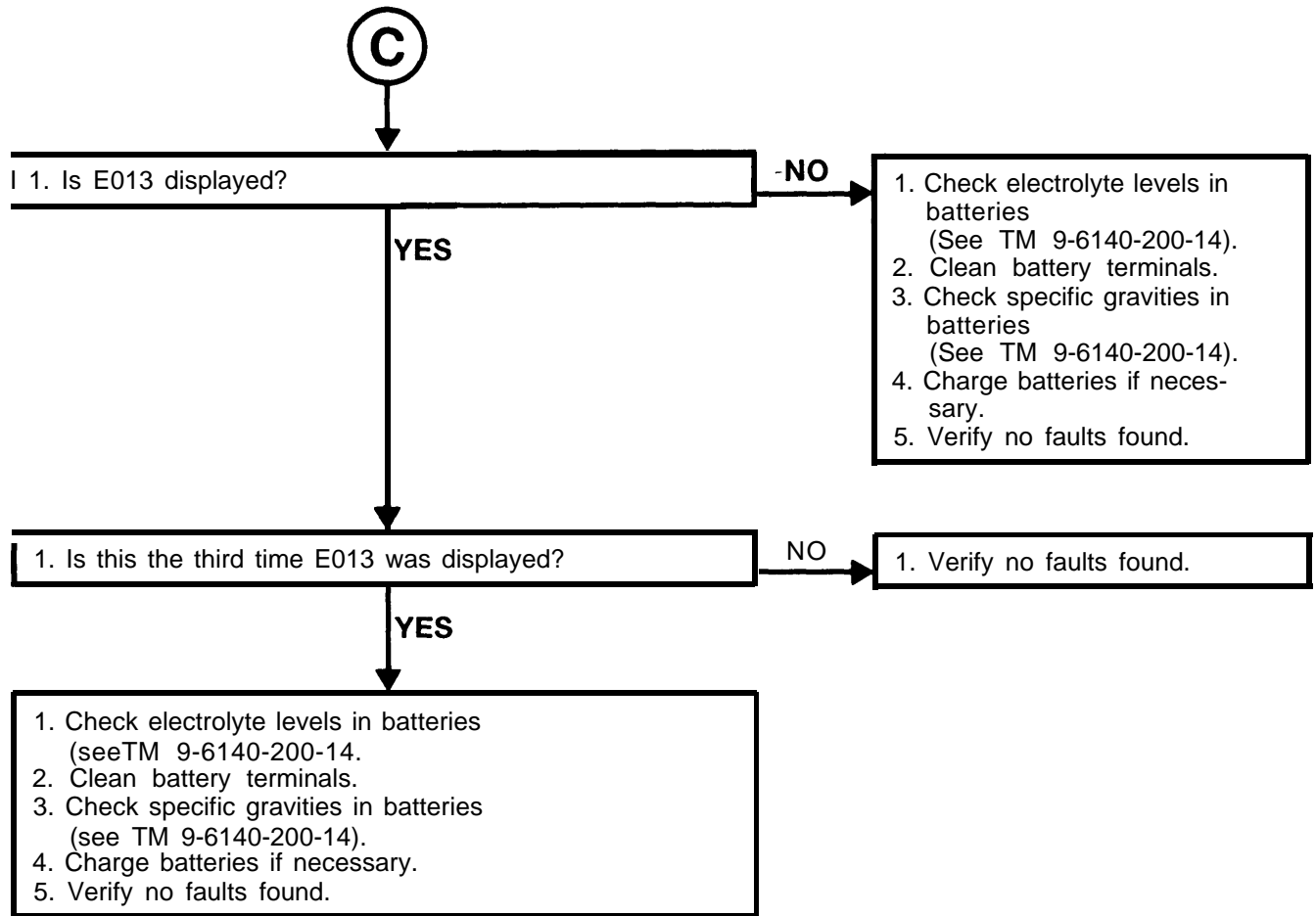


GO TO NEXT PAGE



TEST	RESULT
72	700-1275 Amps
73	≤ 25 milli ohms
75	≤ 50 milli ohms





---

## STE/ICE-R ENGINE WILL NOT CRANK TROUBLESHOOTING

---

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)

**References (cont):**

Engine does not crank (page 3-15)

**Personnel Required:**

Unit Mechanic

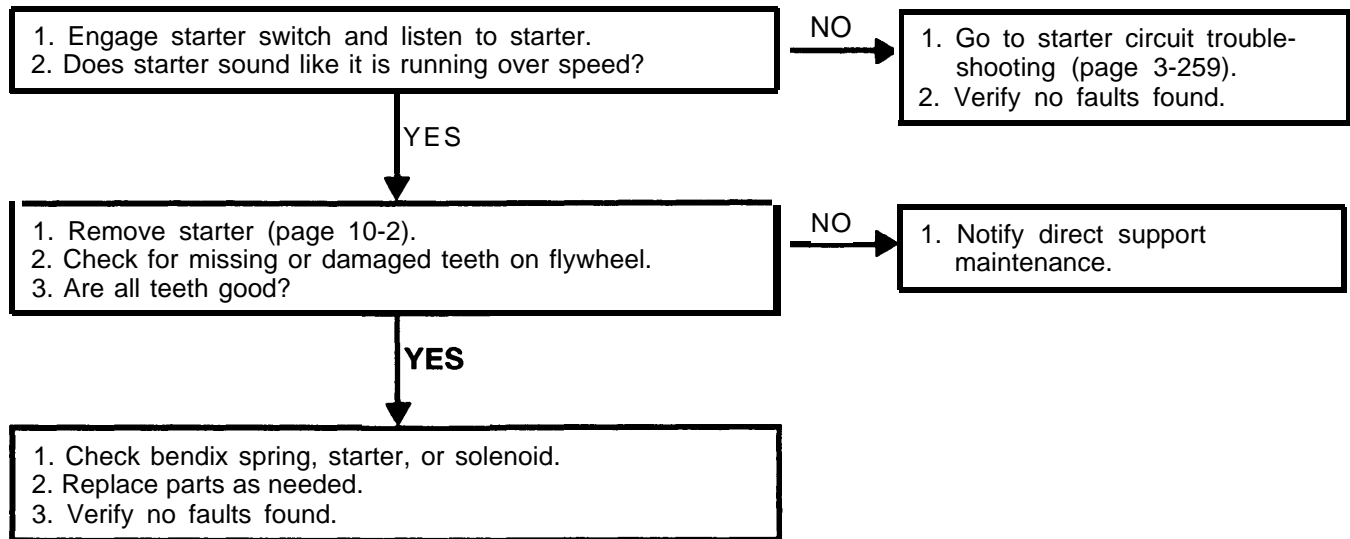
**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Power plant access door open (see your -10)  
Trim vane lowered (see your -10)

**References:**

See your -10

---



# STE/ICE-R ENGINE WILL CRANK BUT WILL NOT START TROUBLESHOOTING

## INITIAL SETUP

### Tools:

- General Mechanic's Tool Kit (Item 30, App D)
- STE/ICE-R Test Set (Item 71.1, App D)

### Personnel Required:

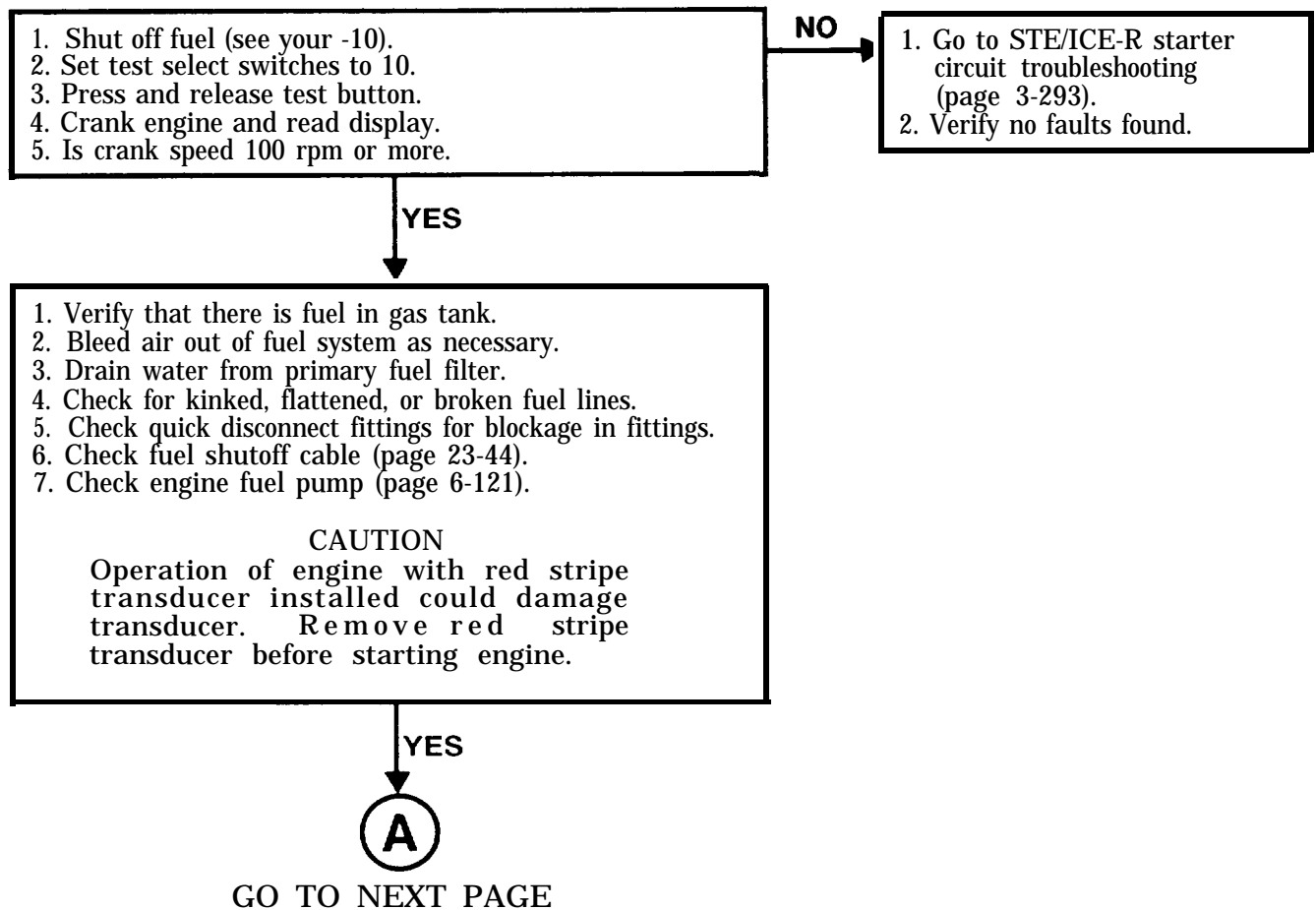
- Unit Mechanic

### References:

- See your -10
- Engine cranks but will not start below 40° (air box heater is used) (page 3-34)

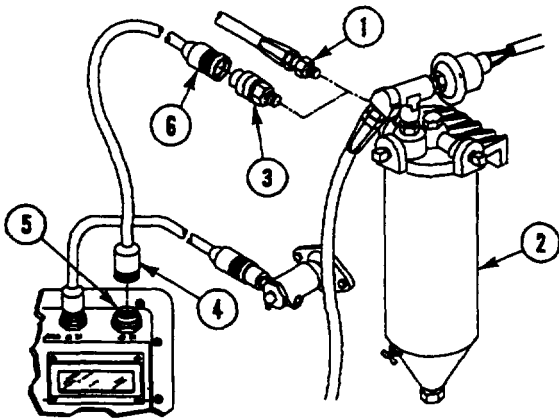
### Equipment Conditions:

- Engine stopped (see your -10)
- Carrier blocked (see your -10)
- Trim vane lowered (see your -10)
- Power plant access door open (see your -10)
- STE/ICE-R power hooked up (page 3-275)
- STE/ICE-R engine RPM test hooked up (page 3-277)



**A**

8. Disconnect fuel supply hose (1) from secondary fuel filter (2).
9. Connect red stripe pressure transducer (3) to secondary fuel filter outlet.
10. Connect transducer cable W4P1 (4) to J3 on VTM (5).
11. Connect transducer cable W4P2 (6) to red stripe pressure transducer (3).



12. Set test select switches to 49.
13. Press and hold test until CAL appears on display.
14. Is offset value within range of -4 to + 4?

1. Go to offset fault isolation (TM 9-4910-571-12&P).
2. Verify no faults found.

**YES**

1. Turn on fuel and accessory switches.
2. Press and release test button.
3. Crank engine and read display.
4. Is fuel pressure greater than 4 psi?

**NO**

**B**

**YES**

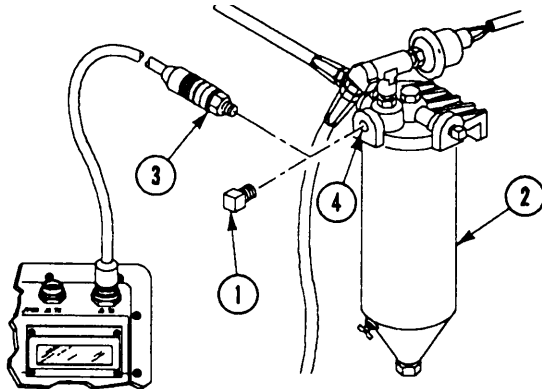
**A1**

**A1**

1. Remove red stripe pressure transducer from secondary fuel filter.
2. Check operation of engine shutoff cable (page 23-44).
3. Check restriction in air intake (page 23-44).
4. Check cold weather operation (see your -10).
5. If engine still does not start, notify direct support maintenance.
6. Verify no faults found.

**B**

1. Remove red stripe pressure transducer from secondary fuel filter.
2. Connect fuel supply hose to secondary fuel filter.
3. Remove inlet plug (1) from secondary fuel filter (2), and install red stripe pressure transducer (3) in inlet hole (4) of filter



**CAUTION**

**Pull fuel shutoff all the way out. Transducer will be damaged if engine starts.**

4. Pull fuel shutoff all the way out.
5. Crank engine and read display.
6. Is fuel pressure greater than 4 psi?

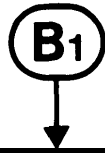
NO

1. Remove red stripe pressure transducer from secondary fuel filter.
2. Check engine fuel pump (page 6-121).
3. Check generator field switch (page 9-44).
4. In freezing temperatures, check fuel lines for ice blockage or coagulation of fuel.
5. Start engine (see your -10).
6. If engine still does not start, repair blockage in fuel line.
7. Verify no faults found.

YES

**B1**

GO TO NEXT PAGE



1. Remove red striped pressure transducer and install plug in secondary fuel filter.
2. Replace fuel filter element (page 6-128).
3. Start engine (see your-10).
4. If engine still does not start, check fuel system.
5. Verify no faults found.

## HOOK UP/REMOVE STE/ICE-R FOR POWER

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

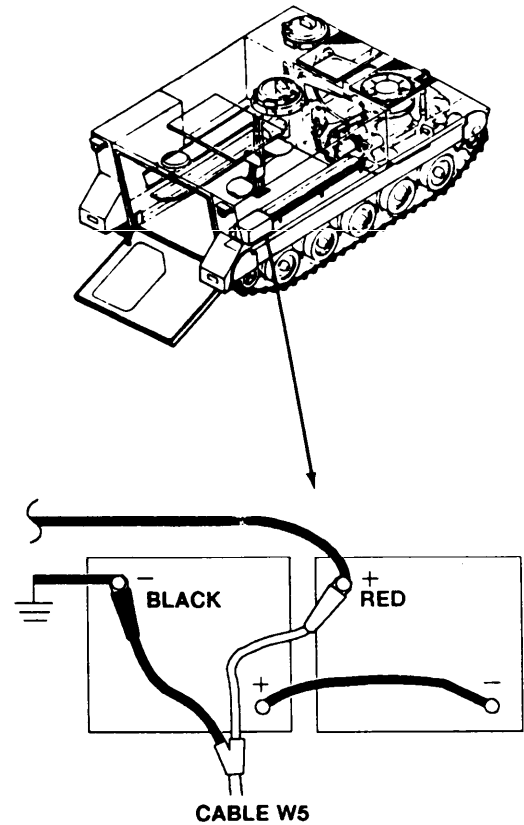
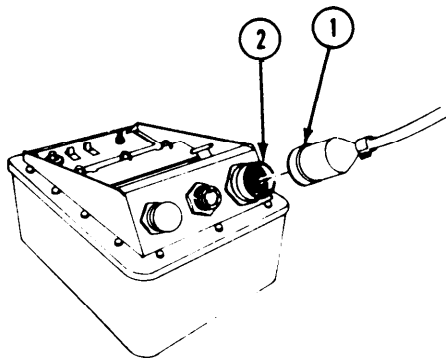
See your -10  
TM 9-4910-571-12&P

**Equipment Conditions:**

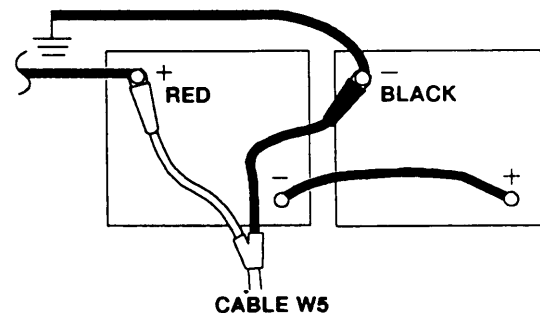
Engine stopped (see your -10)  
Carrier blocked (see your -10)

### HOOK UP

1. Remove VTM and power cable W5 from transit case.
2. Pull VTM circuit breaker to OFF.
3. Install plug W5P1 (1) on VTM jack J1 (2).



4. Remove battery cover. See CHECK CARRIER BATTERIES in your -10.
5. Connect red clip of power cable W5 to positive terminal of battery.
6. Connect black clip of power cable W5 to negative terminal of battery.



GO TO NEXT PAGE

7. Push VTM circuit breaker to ON.
    - a. If display reads (8888) and (- -- -), go to step 8.
    - b. If display is not blank, but does not read (8888) and (- - - -), write up DA form 2404 on faulty VTM display. Report problem to supervisor.
    - c. If display is blank, go to VTM blank display diagnostic troubleshooting (see TM 9-4910-571-12&P).
  8. Perform VTM confidence check (see TM 9-4910-571-12&P). If VTM confidence check does not pass, go to STE/ICE confidence test fault isolation (see TM 9-4910-571-12&P).
  9. Select test 60, then press and release TEST button.
  10. Enter earner VID (03) into VTM, then press and release TEST button.
  11. Select test 61, then press and release TEST button. If earner VID (03) does not appear on VTM display, (see-TM 9-4910-571-12&P).
  12. Return to troubleshooting.
- R E M O V E**
13. Pull VTM circuit breaker to OFF.
  14. Remove power cable W5 from batteries and VTM. Use electrical connector pliers.
  15. Install battery cover. See CHECK CARRIER BATTERIES in your -10.
  16. Stow VTM and power cable W5 in transit case.

---

**END OF TASK**



## HOOK UP/REMOVE STE/ICE-R FOR ENGINE RPM

### INITIAL SETUP

**Tools:**

General Mechanic's Tool Kit (Item 30, App D)  
STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**References (cont):**

TM 9-4910-571-12&P

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
STE/ICE-R power hooked up (page 3-275)  
Power plant rear access panel removed  
(page 24-27 or 24-29)

### HOOK UP

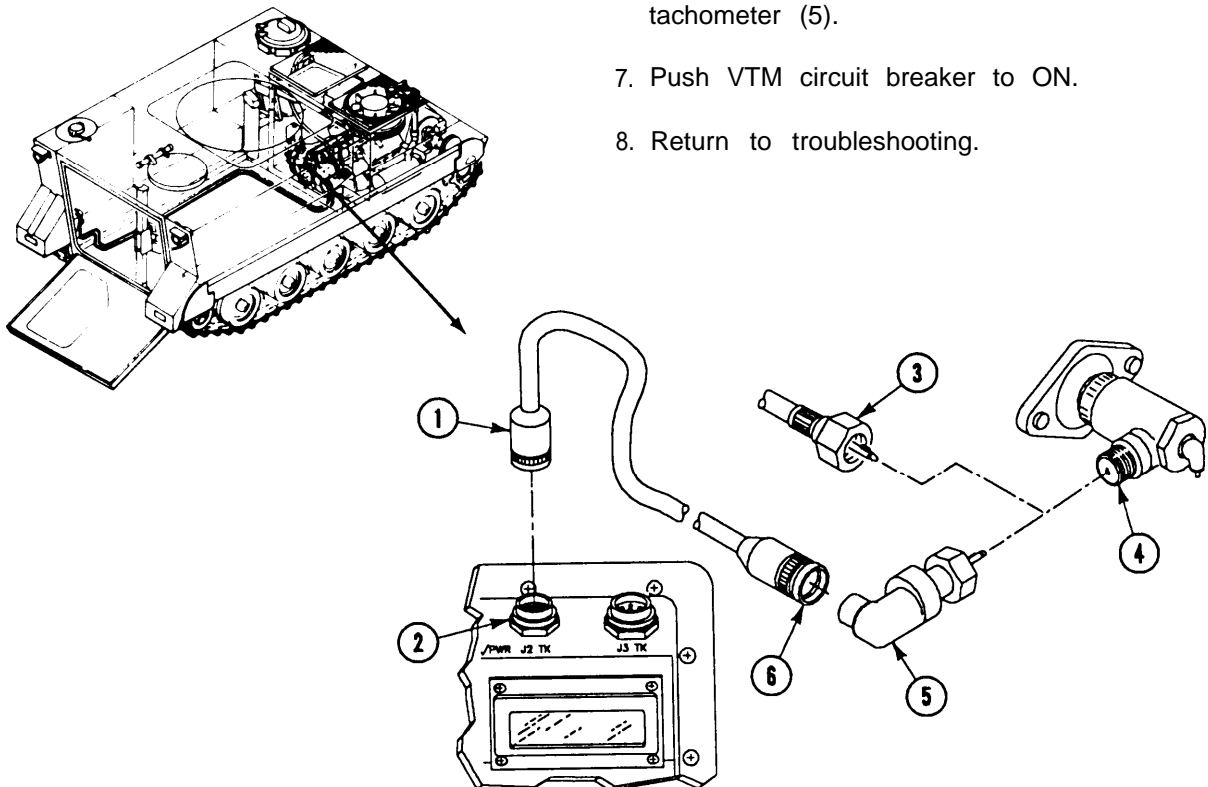
1. Remove transducer cable W4 and pulse tachometer from transit case.
2. Pull VTM circuit breaker to OFF.
3. Connect cable W4P1 (1) to jack J2 TK (2) on VTM.

4. Disconnect tachometer cable (3) from tachometer drive adapter (4) on engine (page 11-14).
5. Install pulse tachometer (5) on tachometer drive adapter (4).

**CAUTION**

To prevent cable damage, make sure cable is clear of belts and fan blade.

6. Connect cable W4P2 (6) to pulse tachometer (5).
7. Push VTM circuit breaker to ON.
8. Return to troubleshooting.



GO TO NEXT PAGE

**REMOVE**

9. Pull VTM circuit breaker to OFF.
10. Disconnect cable W4P2 from pulse tachometer.
11. Remove pulse tachometer from tachometer drive adapter.
12. Install tachometer cable on drive adapter (page 11-14).
13. Remove cable W4P1 from jack J2 TK on VTM.
14. Stow transducer cable and pulse tachometer in transit case.

---

**END OF TASK**

## HOOK UP/REMOVE STE/ICE-R FOR STARTER CIRCUIT TESTS

### INITIAL SETUP

#### Tools:

STE/ICE-R Test Set (Item 71.1, App D)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### References (cont):

TM 9-4910-571-12&P

#### Equipment Conditions:

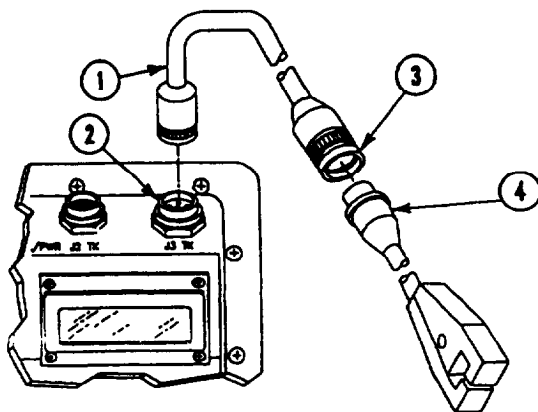
Engine stopped (see your -10)

Carrier blocked (see your -10)

STE/ICE-R power hooked up (page 3-275)

### HOOK UP

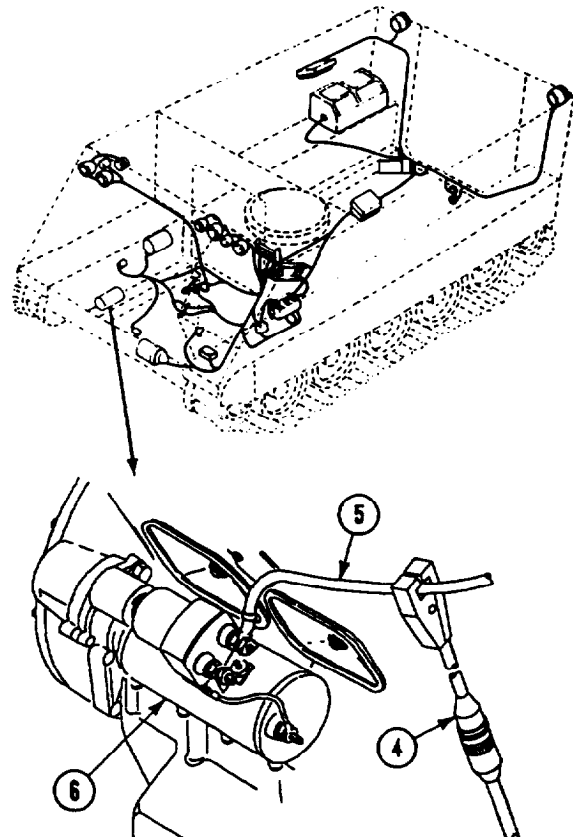
1. Remove transducer cable W4 from transit case.
2. Pull VTM circuit breaker to OFF.
3. Install cable W4P1 (1) on VTM jack J3 TK (2).
4. Attach cable W4P2 (3) to current probe (4).



### NOTE

If current probe is below room temperature, wait at least 5 minutes after connecting probe to VTM before doing offset test, or perform offset within 30 seconds of starting each measurement.

5. Clamp current probe (4) around positive (+) battery cable (5) going to the starter (6). Point arrow on probe along cable to starter. Make sure probe is closed.



GO TO NEXT PAGE

6. Push VTM circuit breaker to ON.

- a. If display reads (8888) and (- - - -), go to step 7.
- b. If display is not blank, but does not read (8888) and (- - - -), write up DA form 2404 on faulty VTM display. Report problem to supervisor.
- c. If display is blank, go to VTM blank display diagnostic troubleshooting (See TM 9-4910-571-12&P).

11. Return to troubleshooting.

REMOVE

- 12. Pull VTM circuit breaker to OFF.
- 13. Remove transducer cable W4 from battery cable and VTM.
- 14. Disconnect cable W4P2 from current probe.
- 15. Stow transducer cable W4 and current probe in transit case.

■ Steps 7 thru 10 deleted.

---

END OF TASK

# HOOK UP/REMOVE STE/ICE-R TEST SET FOR TEST NUMBERS 72 THRU 75

## INITIAL SETUP

### Tools:

STE/ICE-R Test Set (Item 71.1, App D)

### Personnel Required:

Unit Mechanic

### References:

See your -10

### Equipment Conditions:

Engine stopped (see your -10)

Carrier blocked (see your -10)

All electrical accessories turned off  
(see your -10)

Engine at operating temperature  
(see your -10)

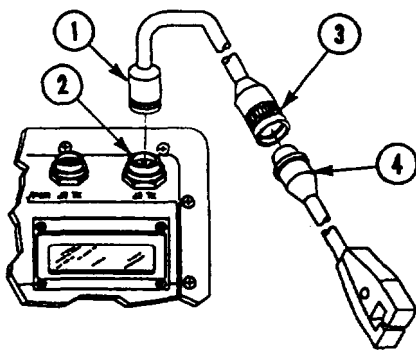
Fuel off, engine must not start (see your -10)  
STE/ICE-R power hooked up (page 3-275)

## HOOK UP

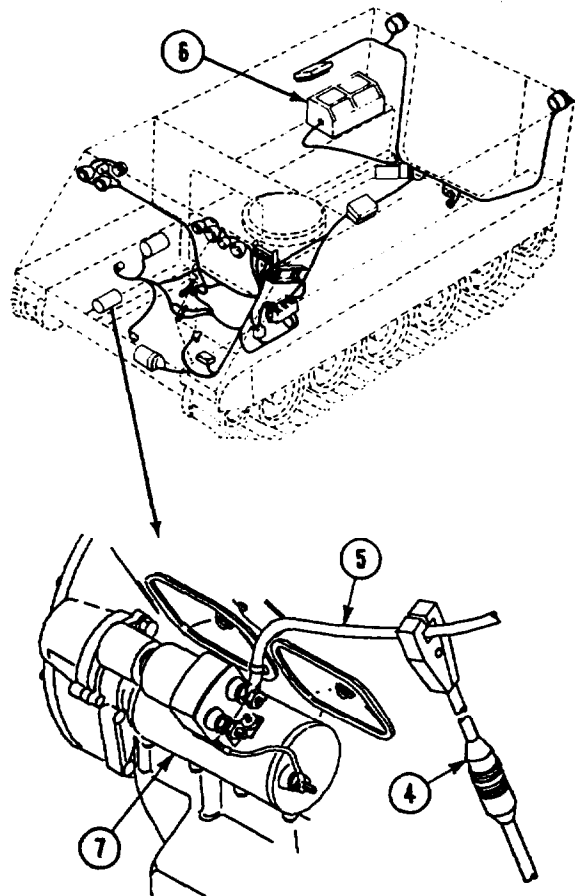
### NOTE

Do not have battery charger connected when performing test numbers 72 thru 75.

1. Remove transducer cable W4 and current probe from transit case.
2. Pull VTM circuit breaker to OFF.
3. Install cable W4P1 (1) on VTM jack J3 TK (2).
4. Attach cable W4P2 (3) to current probe (4).
5. Push VTM circuit breaker to ON.



6. Remove battery cover. See CHECK CARRIER BATTERIES in your -10.
7. For test numbers 72 or 74, current probe (4) is connected to positive cable (5) between battery (6) and starter (7). Point arrow on current probe along cable to starter. Make sure current probe is closed.



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8. For test numbers 73 or 75, clamp current probe (1) around cable (2) connecting series pair of batteries (3). Point arrow on current probe along cable toward negative (-) terminal (4). Make sure current probe is closed.

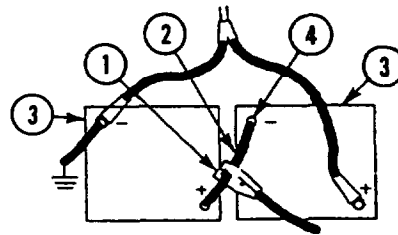
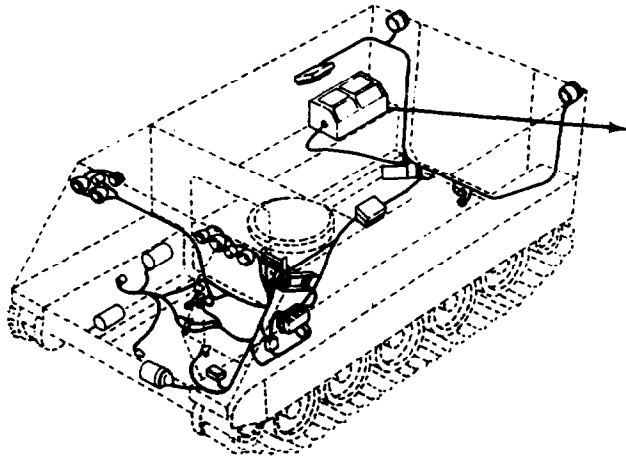
**NOTE**

Engine must not start while cranking engine. If engine starts, repeat step 8.

9. Continue current probe by engaging starter only long enough to briefly turn engine (approximately 1 second).
10. Return to troubleshooting.

**REMOVE**

11. Pull VTM circuit breaker to OFF.
12. Remove cable W4P1 from VTM jack J3 TK.
13. Remove cable W4P2 from current probe.
14. Install battery cover. See CHECK CARRIER BATTERIES in your -10.
15. Stow transducer cable W4 and current probe in transit case.



---

END OF TASK

---

## STE/ICE-R TEST 01 DISPLAY ENGINE RPM WITH NEXT MEASUREMENT

---

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
STE/ICE-R power hooked up (page 3-275)  
STE/ICE-R engine RPM test hooked up  
(page 3-277)

- 
1. Select TEST 01.
  2. Press and release TEST button.
  3. VTM will display CON.

**NOTE**

Hook up and offset steps should already have been completed. Do not repeat.

Go to desired measurement procedure. Follow that procedure. VTM will alternately display the engine speed and the desired measurement. The first number displayed will be RPM.

4. Return to troubleshooting.

---

END OF TASK

---

## STE/ICE-R TEST 10 ENGINE RPM

---

### INITIAL SETUP

#### Tools:

STE/ICE-R Test Set (Item 71.1, App D)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10  
TM 9-4910-571-12&P

#### Equipment Conditions:

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
STE/ICE-R power hooked up (page 3-275)  
STE/ICE-R starter circuit test hooked up  
(page 3-279)  
STE/ICE-R engine RPM test hooked up  
(page 3-277)

1. Select TEST 10.
2. Press and release TEST button.
3. VTM will display engine RPM:

CONDITION	ENGINE RPM
CRANKING	100 minimum
IDLE	650-700
GOVERNED SPEED (NO LOAD)	2975-3000

- a. If error message appears, see page 3-242.

#### NOTE

At speeds below 50 RPM, the VTM will display 0. At speeds above 5000 RPM, the display may give a false reading.

- b. If display is erratic or reads 0 with engine turning, see TM 9-4910-571-12&P.
4. Read cranking RPM while starting engine.
  5. Check engine idle speed.
    - a. Watch VTM for 10 seconds.
    - b. If engine idle speed does not remain between 650 and 700 RPM, notify direct support maintenance.
  6. Return to troubleshooting.

---

END OF TASK



---

## STE/ICE-R TEST 13 POWER (PERCENT)

---

### INITIAL SETUP

#### Tools:

STE/ICE-R Test Set (Item 71.1, App D)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped (see your -10)

Carrier blocked (see your -10)

STE/ICE-R power hooked up (page 3-275)

STE/ICE-R engine RPM test hooked up  
(page 3-277)

Warm engine to operating temperature  
(see your -10)

---

#### NOTE

If VID has been performed during power hookup procedures (page 3-275) go to step 2. If not, continue with step 1.

1. Enter VID.
  - a. Set TEST SELECT switches to 60.
  - b. Press and release TEST button.
  - c. Wait for prompting message UEH to appear on display.
  - d. Set TEST SELECT switches to 03.
  - e. Press and release TEST button.
  - f. Wait for VTM to display and hold VID number.
2. Start and idle engine.
  - a. Set TEST SELECT switches to 10.
  - b. Press and release TEST button.

#### NOTE

Engine idle speed must be checked before performing power test. If idle speed is not within limits specified for vehicle/equipment, adjust idle speed to be within proper limits.

Do not run power test if idle speed cannot be properly adjusted.

- c. Observe displayed value (rpm) and adjust idle speed if necessary.

#### CAUTION

Engine governor speed must be checked before performing power test. If governor speed is not within limits specified for vehicle/equipment, notify direct support maintenance.

Do not run power test if governor speed is not within specified limits. Damage to engine may result.

- d. Observe displayed value (rpm).
3. Perform power test.
  - a. Set TEST SELECT switches to 13.
  - b. Press and release TEST button.
  - c. Wait for prompting message UEH to appear on display. If UEH does not appear on display, go to substep g.
  - d. Set TEST SELECT switches to 03.
  - e. Press and release TEST button.

#### NOTE

The number just entered will remain on the display only a few seconds.

- f. Wait for VTM to display the VTD just entered.

GO TO NEXT PAGE

**NOTE**

If a prompting message Po-1 appears on the display, refer to substeps 2c for Po-1 and 2d for Po-2.

If prompting message Po-1 does not appear on the display, go to substep m.

- g. Wait for prompting message Po-1 to appear on display.
- h. Set TEST SELECT switches to Po-1 value.
- j. Press and release TEST button.
- k. Wait for prompting message Po-2 to appear on display.
- l. Set TEST SELECT switches to Po-2 value.
- m. Press and release TEST button.
- n. When CIP is displayed, sharply depress accelerator. Hold it to the floor. When VTM displays OFF, release accelerator.

**CAUTION**

To prevent damage to equipment, allow engine to idle for at least two minutes after running power test.

- o. A number will be displayed after engine has returned to idle speed. This number is the test result in units of percent of nominal rated power.
4. Return to troubleshooting.

% Power Minimum Test Limit			
Vehicle	Altitude		
	0-2000 ft	2000 ft to 4000 ft	Above 4000 ft
M113 FOV	75%	66%	60%

---

END OF TASK

---

## STE/ICE-R TEST 14 COMPRESSION UNBALANCE (POWER CABLE)

---

### INITIAL SETUP

#### Tools:

STE/ICE-R Test Set (Item 71.1, App D)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped (see your -10)

#### Equipment Conditions (cont):

Carrier blocked (see your -10)  
 STE/ICE-R power hooked up (page 3-275)  
 Warm engine to operating temperature  
 (see your -10)  
 Disengage transfer gearcase (see your -10)  
 Run test 72 (page 3-290)  
 Run test 73 (page 3-291)  
 Run test 74 (page 3-293)  
 Run test 75 (page 3-291)

### NOTE

If VID has been performed during power hookup procedure (page 3-275) go to step 2. If not, continue with step 1.

#### 1. Enter VID.

- a. Set TEST SELECT switches to 60.
- b. Press and release TEST button.
- c. Wait for prompting message UEH to appear on display.
- d. Set TEST SELECT switches to 03 for vehicle being tested.
- e. Press and release TEST button.
- f. Wait for VTM to display and hold VID number.

### NOTE

Do not run more than two compression unbalance tests in a row. Idle engine between pairs of compression unbalance tests.

Crank engine without fuel for 5 seconds to clear fuel from cylinders.

#### 2. Perform test.

- a. Set TEST SELECT switches to 14.
- b. Press and release TEST button.

- c. Wait for prompting message UEH to appear on display. If UEH does not appear on display, go to substep g.
- d. Set TEST SELECT switches to 03.
- e. Press and release TEST button.

### NOTE

The number just entered will remain on the display only a few seconds.

- f. Wait for VTM to display the VID just entered.
- g. Wait for prompting message CYL to appear on display. If cylinder does not appear, go to substep y.
- h. Set TEST SELECT switches to 06.
- i. Press and release TEST button.
- j. Wait for VTM to display the Cu-1 prompting message.
- k. Set TEST SELECT switches to the value of the Cu-1 constant.

GO TO NEXT PAGE

- l. Press and release TEST button.
- m. Wait for VTM to display the Cu-2 prompting message.
- n. Set TEST SELECT switches to the value of the Cu-2 constant.
- o. press and release TEST button.
- p. Wait for VTM to display the Cu-3 prompting message.
- q. Set TEST SELECT switches to the value of the Cu-3 constant.
- r. press and release TEST button.
- s. Wait for VTM to display the Cu-4 prompting message.
- t. Set TEST SELECT switches to the value of the Cu-4 constant.
- u. press and release TEST button.
- v. Wait for VTM to display the Cu-5 prompting message.
- w. Set TEST SELECT switches to the value of the Cu-5 constant.

- x. press and release TEST button.
- y. When GO appears, crank engine. Display will change to (- - -) while engine is turning.

**NOTE**

If E013 appears, test data cannot be analyzed because of weak batteries or interrupted cranking during test. Correct problem and repeat step 2.

- z. When OFF or E013 appears, stop cranking. Wait for message to appear.
  - (1) If a number is displayed, refer to the vehicle test card for its meaning.
  - (2) If GO appears, go back to substep y.
  - (3) A FAIL message usually means compression is too far unbalanced to measure with STE/ICE-R. Occasionally, a FAIL message may be caused by vehicle/equipment accessories that are activated during cranking or by imperfections in the starting system.

---

END OF TASK

---

## STE/ICE-R TEST 67 BATTERY VOLTAGE

---

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10  
TM 9-4910-571-12&P

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
STE/ICE-R power hooked up (page 3-275)  
STE/ICE-R starter circuit test hooked up  
(page 3-279)  
STE/ICE-R engine rpm test hooked up  
(page 3-277)

- 
1. Select TEST 67.
  2. Press and release TEST button.
  3. Return to troubleshooting.
- b. If error message appears, see page 3-242.
  - c. If .9.9.9.9 is displayed, voltage is not within test range. Use test 89, see TM 9-4910-571-12&P.

CONDITION	VOLTS
ENGINE OFF MASTER SWITCH OFF	22 or more
CRANKING ENGINE FUEL OFF	18 or more
CHARGING 1200 RPM SERVICE LIGHTS ON	26 to 29

- a. If display is erratic or shows 0 volts, see TM 9-4910-571-12&P.

---

END OF TASK

---

## STE/ICE-R TEST 72 STARTER CURRENT (FIRST PEAK)

---

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10  
TM 9-4910-571-12&P

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
All electrical accessories turned off  
(see your -10)  
Fuel OFF, engine must not start  
(see your -10)  
STE/ICE-R power hooked up (page 3-275)  
STE/ICE-R starter circuit test hooked up  
(page 3-279)

---

	DISPLAY	PERFORM/RESULT
1. Select TEST 72.		
2. Perform offset test.	a. OFF	Stop cranking and wait for message to appear.
a. Press and hold TEST button until CAL appears. Release TEST button.	b. A number	CIRCUIT RESISTANCE (in amps)
b. If VTM reads between -225 and +225, offset test passes.	c. .9.9.9.9	Beyond range of VTM, cannot be measured.
c. If offset test fails, see TM 9-4910-571-12&P.	d. Error message	See see page 3-242. ■
3. Press and release TEST button.		
4. When GO appears, turn MASTER SWITCH to ON and crank engine for 2 seconds or until one of the following appears on VTM:	5. Turn MASTER SWITCH to OFF.	
	6. Observe VTM reading.	
	a. If VTM reading is between 700 and 1275, test passes.	
	b. If reading is erratic or cannot be obtained, see TM 9-4910-571-12&P.	
	7. Return to troubleshooting.	

---

END OF TASK

---

## STE/ICE-R TEST 73 BATTERY RESISTANCE - STE/ICE-R TEST 75 BATTERY RESISTANCE CHANGE (PACK)

---

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10  
TM 9-4910-571-12&P

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Battery cover removed (see your -10)  
STE/ICE-R power hooked up (page 3-275)  
STE/ICE-R starter circuit test hooked up (page 3-279)

---

	DISPLAY	PERFORM/RESULT
<p>1. Reposition current probe.</p> <p style="margin-left: 20px;">a. Pull VTM switch to OFF.</p> <p style="margin-left: 20px;">b. Remove current probe from positive battery cable.</p> <p style="margin-left: 20px;">c. Connect current probe to cable connecting series pair of batteries together.</p> <p style="margin-left: 20px;">d. Push VTM switch to ON.</p> <p style="margin-left: 20px;">e. Select TEST 73.</p> <p style="text-align: center; margin-left: 40px;">NOTE</p> <p>Both TEST 73 and TEST 75 must be performed to determine condition of series pair of batteries.</p>		<p>Stop cranking and wait for message to appear.</p> <p>BATTERY RESISTANCE (milliohms test 73; milliohms/seconds test 75)</p> <p>Beyond range of VTM, cannot be measured.</p> <p>See page 3-242</p> <p>VTM lost power during test. Batteries may be too weak. Try powering VTM using external source.</p>
<p>2. Perform offset test.</p> <p style="margin-left: 20px;">a. Press and hold TEST button until CAL appears. Release TEST button.</p> <p style="margin-left: 20px;">b. If VTM reads between -225 and +225, offset test passes.</p> <p style="margin-left: 20px;">c. If offset test fails, see TM 9-4910-571-12&amp;P.</p>		
<p>3. Press and release TEST button.</p>		
<p>4. When GO appears, crank engine for two seconds or until one of the following appears on display:</p>		
	<p>c. .9.9.9.9</p> <p>d. Error message</p> <p>e. (- - - -)</p>	
		<p>5. Observe VTM reading.</p> <p style="margin-left: 20px;">a. If test 73 VTM reading is 25 or less, test passes.</p> <p style="margin-left: 20px;">b. If test 73 VTM reading is over 25, test fails.</p> <p style="margin-left: 20px;">c. If test 75 VTM reading is 50 or less, test passes.</p> <p style="margin-left: 20px;">d. If test. 75 VTM reading is over 50, test fails.</p>

GO TO NEXT PAGE

<b>TEST 73 BATTERY INTERNAL RESIS- TANCE TEST RE- SULT</b>	<b>TEST 75 BATTERY RESIS- TANCE CHANGE TEST RE- SULT</b>	<b>BATTERY PACK CON- DITION</b>
<b>PASS</b>	<b>PASS</b>	<b>The batteries tested are ok and in good state of charge.</b>
<b>PASS</b>	<b>FAIL</b>	<b>The batteries tested are in poor condition, but have a fresh charge.</b>
<b>FAIL</b>	<b>PASS</b>	<b>The batteries tested are ok, but need to be recharged.</b>
<b>FAIL</b>	<b>FAIL</b>	<b>The batteries tested are in poor condition and in a state of discharge.</b>

6. Select test 75.
7. Repeat steps 2 thru 5.
8. Determine condition of series pair of batteries using table.
  - a. If batteries are in poor condition, go to individual battery tests 77 and 79 (see TM 9-4910-571-12&P).
9. Return to troubleshooting.

---

END OF TASK



---

## STE/ICE-R TEST 74 STARTER CIRCUIT RESISTANCE

---

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10  
TM 9-4910-571-12&P

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
All electrical accessories turned off  
(see your -10)  
Fuel OFF, engine must not start  
(see your -10)  
STE/ICE-R power booked up (page 3-275)  
STE/ICE-R starter circuit test hooked up  
(page 3-279)

- 
- |  |   |   |
|--|---|---|
| <ol style="list-style-type: none"> <li>1. Select TEST 74.</li> <li>2. Perform offset test.               <ol style="list-style-type: none"> <li>a. Press and hold TEST button until CAL appears. Release TEST button.</li> <li>b. If VTM read6 between -225 and +225, offset test passes.</li> <li>c. If offset test fails, see TM 9-4910-571-12&amp;P.</li> </ol> </li> <li>3. Press and release TEST button.</li> <li>4. When GO appears, turn MASTER SWITCH to ON and crank engine for 5 seconds or until one of the following appears on VTM:</li> </ol> | <p>DISPLAY</p> <ol style="list-style-type: none"> <li>a. OFF</li> <li>b. A number</li> <li>c. .9.9.9.9</li> <li>d. Error message</li> </ol> | <p>PERFORM/RESULT</p> <p>Stop cranking and wait for message to appear.</p> <p>CIRCUIT RESISTANCE (in milliohms)</p> <p>Beyond range of VTM, cannot be measured.</p> <p>See page 3-242</p> |
| <ol style="list-style-type: none"> <li>5. Turn MASTER SWITCH to OFF.</li> <li>6. Observe VTM reading.               <ol style="list-style-type: none"> <li>a. If VTM reading is between 5 and 27, test passes.</li> <li>b. If reading is erratic or cannot be obtained, see TM 9-4910-571-12&amp;P.</li> </ol> </li> <li>7. Return to troubleshooting.</li> </ol>  |   |   |

---

END OF TASK

---

## STE/ICE-R TEST 90 DC CURRENT 0 TO 1500 AMPS

---

### INITIAL SETUP

**Tools:**

STE/ICE-R Test Set (Item 71.1, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10  
TM 9-4910-571-12&P

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
STE/ICE-R power hooked up (page 3-275)  
STE/ICE-R starter circuit test hooked up  
(page 3-279)

---

#### NOTE

If current probe is below room temperature, wait at least 5 minutes after connecting probe to VTM before doing offset test, or perform offset within 30 seconds of starting each measurement.

1. Perform offset test.
  - a. Set TEST select switches to 90.
  - b. Push and hold TEST button until CAL appears. Release TEST button.
  - c. If VTM reads between -225 and +225, offset test passes.
  - d. If offset test fails, see TM 9-4910-571-12&P.
2. Press and release TEST button.
3. Turn on circuit used to condition current probe. If starter is used to condition probe, energize starter long enough to obtain a reading. Do not allow engine to start.
4. Note polarity sign of conditioning current. If readout is negative (-), reverse current probe, and repeat steps 1 thru 4.
5. Turn off circuit used to condition current probe.
6. Perform offset test.

#### NOTE

Stray magnetic fields can affect the current reading. Such fields may exist within a foot or so of operating vehicle generators and alternators, motor generators under load, and electric motors. Keep current probe at least one foot away from any operating generators, alternators, or electric motors.

7. During offset test, the component being tested must be off, and the circuit must be de-energized.
  - a. Turn off component to be tested.
  - b. Install current probe where current is to be measured.
  - c. Push and hold TEST button until CAL appears. Release TEST button.
  - d. If VTM reads between -225 and +225, offset test passes.
  - e. If offset test fails, see TM 9-4910-571-12&P.

8. Press and release TEST button.
9. Turn on component to be tested.

**NOTE**

**If .9.9.9.9 appears on display, the test current is greater than 1500 amps and cannot be measured with STW/ICE-R.**

**If display reads a value with a minus sign, current probe has been installed backwards. Repeat steps 1 thru 5. Be careful not to reinstall current probe backwards.**

10. Observe VTM reading.
  - a. If VTM reads between 250 and 425 amps, test passes.
  - b. If reading is erratic or cannot be obtained, see TM9-4910-571-12&P.
11. Turn off component in step 9.
12. Return to troubleshooting.

---

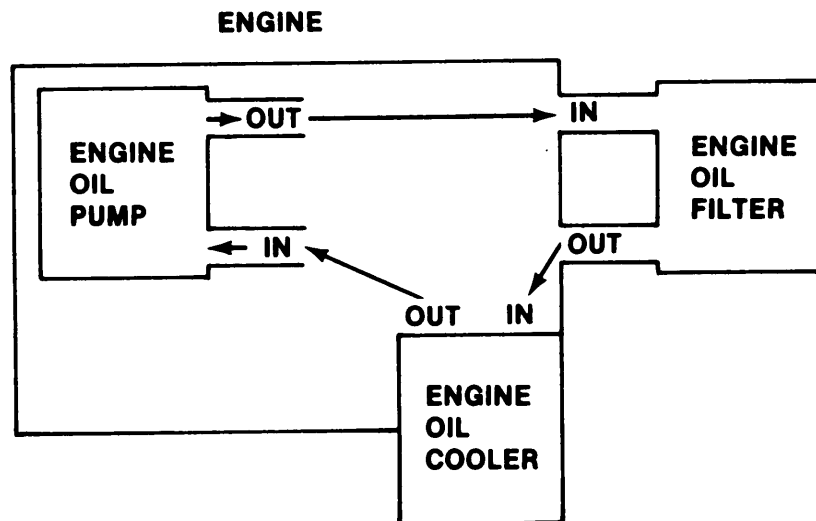
**END OF TASK**

## CHAPTER 4 ENGINE-RELATED COMPONENTS MAINTENANCE

### TASK INDEX

<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
Engine Oil Flow Diagram . . . . .	4-1	Replace Air Box Drain Hoses, Tubes, and Fittings . . . . .	4-9
Replace Front Engine Mount . . . . .	4-2	Replace Crankcase Breather Collector Can and Hose . . . . .	4-11
Replace Engine Oil Filter Element and Parts . . . . .	4-3	Replace Oil Filler Cap and Tube....	4-13
Replace Engine Oil Filter Assembly.....	4-5	Replace Oil Gage Rod and Guide.....	4-15
Replace Engine Oil Filter Bracket, Hoses, and Fittings . . . . .	4-7		

### ENGINE OIL FLOW DIAGRAM



## REPLACE FRONT ENGINE MOUNT

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Torque Wrench (Item 96, App D)

#### Materials/Parts:

Antiseize compound (Item 4, App C)  
Sealing compound (Item 46, App C)  
Key washer (2)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

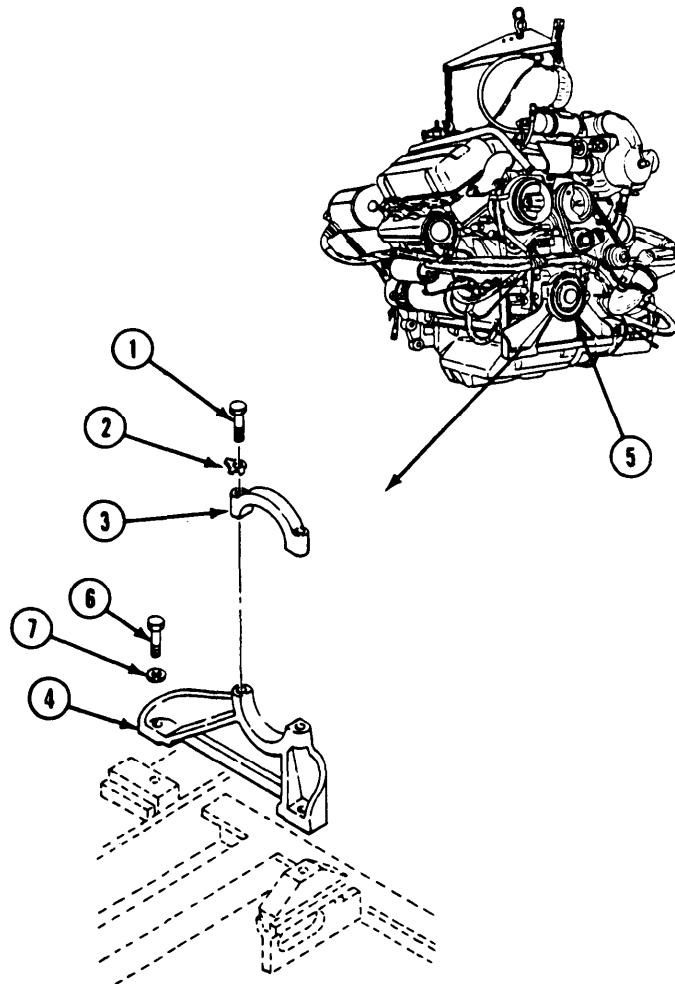
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

### REMOVE

1. Remove two screws (1), key washers (2), and cap (3), from base (4) on engine (5). Discard key washers.
2. Remove power plant (page 5-11).
3. Remove two self-locking bolts (6), washers (7), from base (4) on engine (5). Remove base (4) from engine (5).

### INSTALL

4. Apply a thin coat of antiseize compound and sealing compound to cleaned threads of two screws (1) and self-locking bolts (6).
5. Install base (4) on engine (5) with two self-locking bolts (6) and washers (7).
6. Install power plant (page 5-11).
7. Install cap (3) on base (4) with two new key washers (2) and screws (1).
8. Tighten two screws (1) to 30-35 ft-lb (41-48 N•m) torque. Tighten two self-locking bolts (6) to 90-100 ft-lb (122-135 N•m) torque. Use torque wrench.



END OF TASK

# REPLACE ENGINE OIL FILTER ELEMENT AND PARTS

## DESCRIPTION

This task covers: Remove (page 4-3). Install (page 4-4).

## INITIAL SETUP

### Tools

General Mechanics Tool Kit (Item 30, App D)  
Torque Wrench (Item 96, App D)

### Materials/Parts

Sealing compound (Item 46, App C)  
Gasket  
Gasket  
Preformed packing  
Suitable container

### Personnel Required

Unit Mechanic

### References

see your -lo  
See your LO

### Equipment Conditions

Engine stopped/shutdown (see your -10)  
Driver's power plant access panel removed  
(page 24-25)

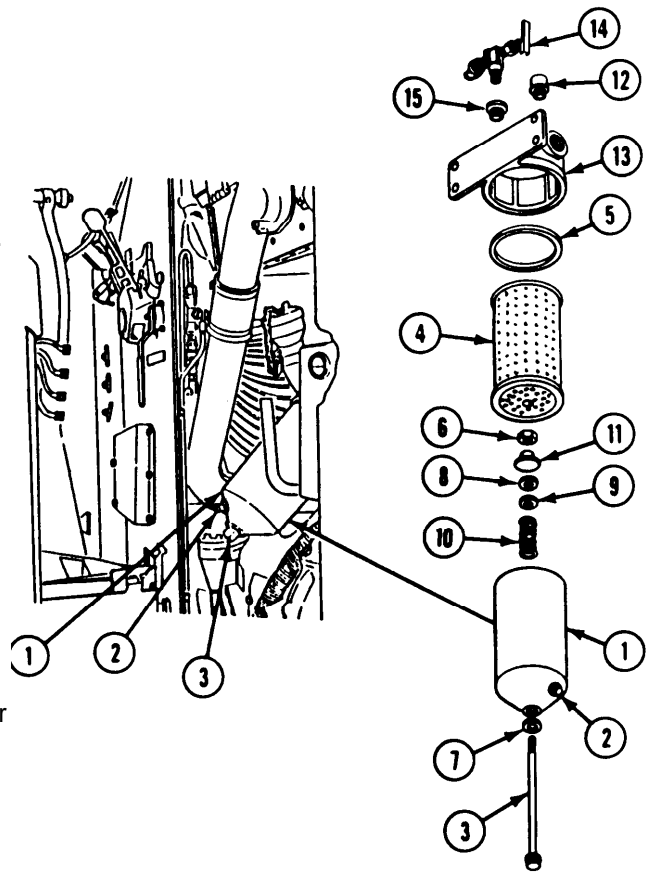
## REMOVE

1. Place a suitable size container under oil filter housing (1).
2. Remove drain plug (2) from housing and drain oil.
3. Back out retaining bolt (3). Remove housing (1), element (4), and bolt (3) as an assembly. Discard element (4) and gasket (5).

### NOTE

If only filter element is being replaced go to step 9.

4. Remove nut (6) from bolt (3).
5. Remove bolt (3) and gasket (7) from housing (1). Discard gasket.
6. Remove element preformed packing (8) and bolt (3). Discard preformed packing
7. Remove washer (9), spring (10) and retainer (11) from bolt (3).
8. If needed, remove plug (12) from head (13).
9. Remove valve (14) and bushing (15) from filter head (13).



GO TO NEXT PAGE

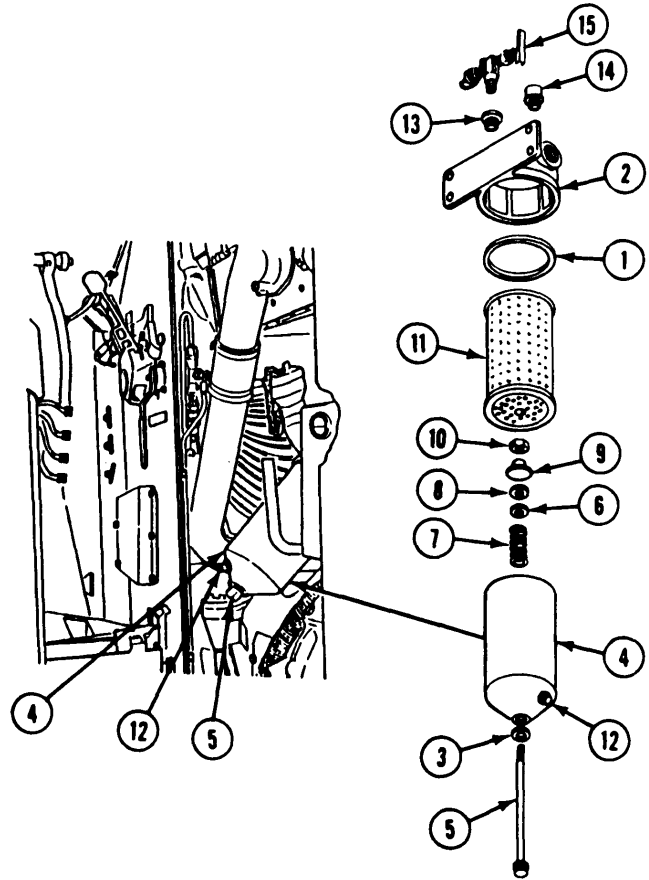
## INSTALL

### NOTE

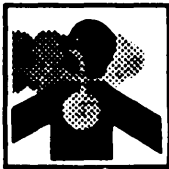
If only filter element is being replaced do steps 10, 13, 14, 15, 16, 21, and 22 only.

10. Apply a thin coat of engine oil on new gasket (1). Install gasket in falter head (2).
11. Install new gasket (3) on housing (4). Install bolt (5) in housing (4).
12. Install washer (6), spring (7), new preformed packing (8), and retainer (9) on bolt (5). Secure with nut (10).
13. Place new filter element (11) very carefully over bolt (5) in housing (4).
14. Install housing (4) with new element (11) on head (2).
15. Install drain plug (12) in housing (4).
16. Tighten bolt (5) to 50-60 lb-ft (68-81 N•m) torque. Use torque wrench.
17. Apply a thin coat of sealing compound to cleaned external threads of plug (14) and bushing (13).
18. If removed, install plug (14) in head (2).
19. Install bushing (13) in head (2).
20. Install valve (15) in bushing (13).

21. Start engine (see your -10). Check for oil leaks.
22. Stop engine (see your -10). Wait about 20 minutes for oil to drain back to pan, then check engine oil level. Add oil if needed (see your LO).



### WARNING



Carbon Monoxide is poisonous and can kill you. Do not idle engine with driver's power plant access panel off unless there is VERY GOOD AIR FLOW.

## FOLLOW-THROUGH STEPS

1. Install driver's power plant access panel (page 24-25).

END OF TASK

## REPLACE ENGINE OIL FILTER ASSEMBLY

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts

Sealing compound (Item 46, App C)

#### Personnel Required:

Unit Mechanic

#### References:

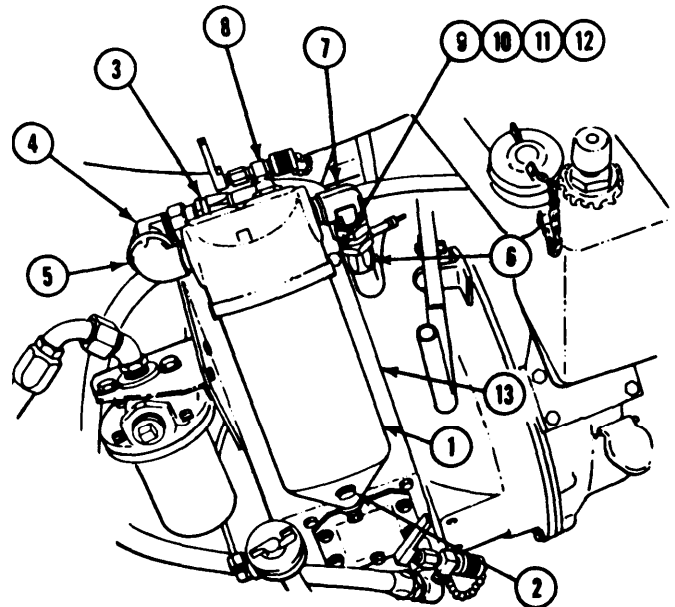
see your -10  
see your Lo

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Ramp lowered (see your -10)  
Driver's power plant access panel removed  
(page 24-25)

### REMOVE

1. Place a container of suitable size under filter assembly (1).
2. Remove drain plug (2) from filter assembly (1). Allow engine oil to drain.
3. Disconnect oil hose (3) from elbow (4).
4. Remove elbow (4) from elbow (5).
5. Remove elbow (5) from filter assembly (1).
6. Disconnect oil hose (6) from elbow (7).
7. Remove elbow (7) from filter assembly (1).
8. Remove sampling valve (8).
9. Remove four screws (9), two washers (10), four nuts (11), two clamps (12), and filter assembly (1) from bracket (13).



### INSTALL

10. Apply a thin even coat of sealing compound to cleaned external threads of elbows (4, 6, and 7) before installation.

#### NOTE

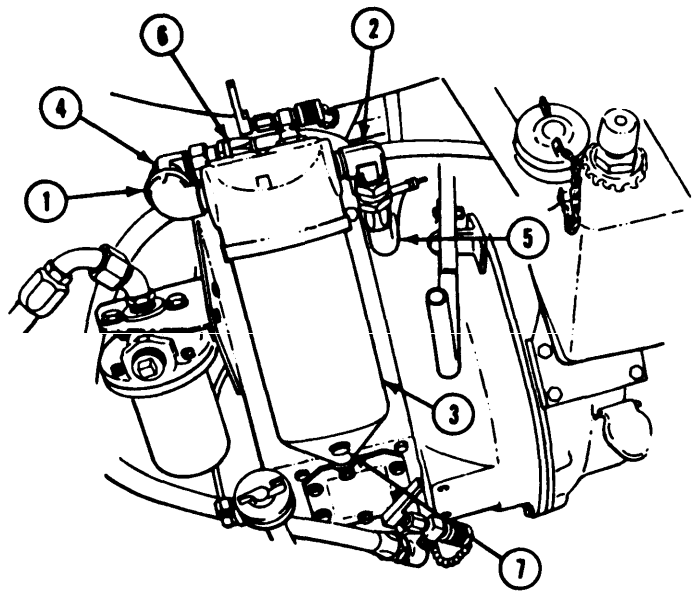
**Washers (10) are used on the two top screws only.**

11. Install filter assembly (1) and two clamps (12) on bracket (13). Secure with four screws (9), two washers (10), and four nuts (11).
12. Install sampling valve (8).

GO TO NEXT PAGE

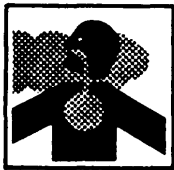


13. Install two elbows (1 and 2) in filter assembly (3).
14. Install elbow (4) in elbow (1).
15. Connect oil hose (5) to elbow (2).
16. Connect oil hose (6) to elbow (4).
17. Install drain plug (7) in filter assembly (3).



**WARNING**

Carbon monoxide is poisonous and can kill you. Do not idle engine with driver's power plant access panel off unless there is VERY GOOD AIR FLOW.



- '180 Start engine (see your -10). Check filter assembly for leaks.
19. Stop engine (see your -10). Wait about 20 minutes for oil to drain back to pan. Then check oil level. Add oil if needed (see your LO).

---

**FOLLOW-THROUGH STEPS**

- |  |   |
|--|---|
| 1. Install driver's power plant access panel (page 24-25). | 2. Raise and lock ramp (see your -10).  |
|  | 3. Stop/shutdown engine (see your -10). |

---

**END OF TASK**

## REPLACE ENGINE OIL FILTER BRACKET, HOSES, AND FITTINGS

### DESCRIPTION

This task covers: Remove (page 4-7). Install (page 4-8).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Adjustable Wrench (Item 80, App D)  
Open End Wrench, 1/2 x 9/16 inch  
(Item 82.1 App D)

#### Materials/Parts:

Antiseize compound (Item 4, App C)  
Sealing compound (Item 46, App C)  
Tab washer (4)

#### Personnel Required:

Unit Mechanic

#### References:

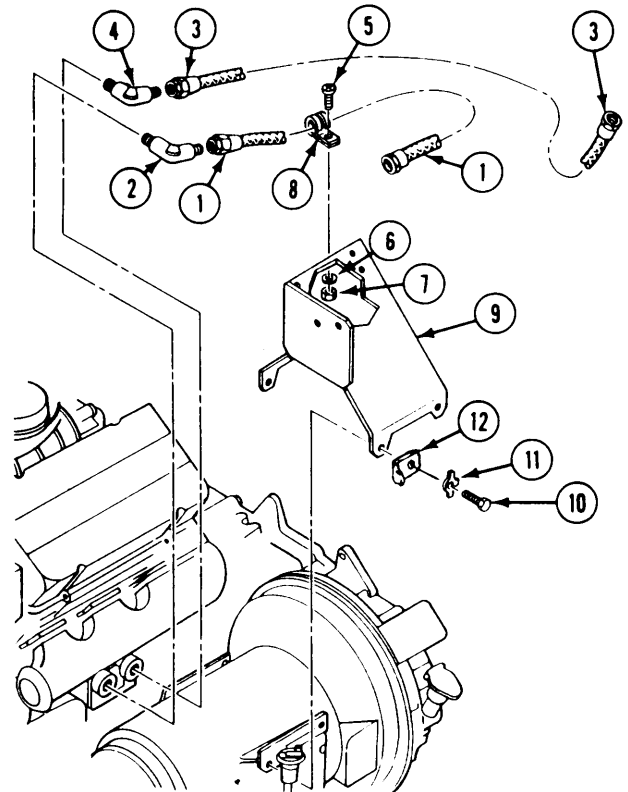
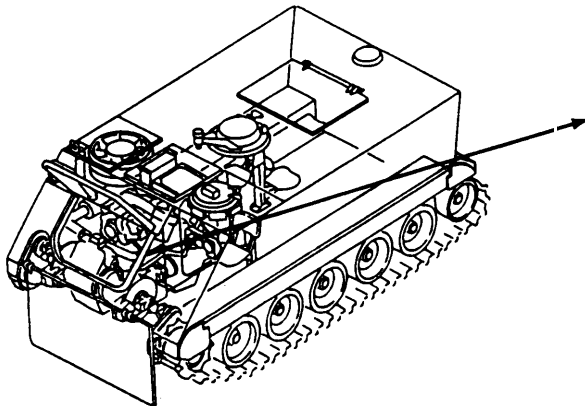
See your -10  
See your -LO

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Power plant removed (page 5-1 1)  
Engine oil filter assembly removed (page 4-5)  
Differential oil filter assembly removed  
(page 21-6)

### REMOVE

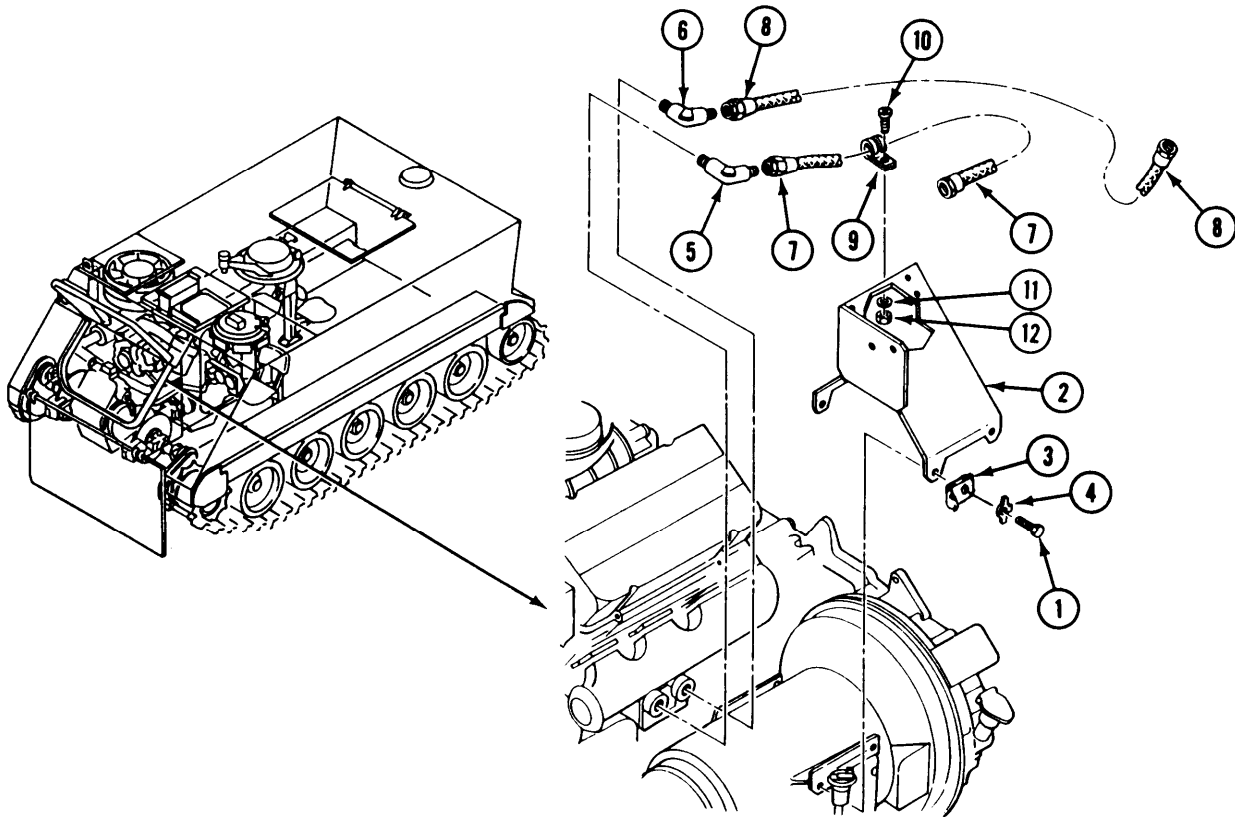
1. Disconnect engine oil hose (1) from elbow (2) and engine oil hose (3) from elbow (4). Use adjustable and open end wrenches.
2. Remove two elbows (2, 4) from engine block.
3. Remove screw (5), washer (6), nut (7), clamp (8), and engine oil hose (1) from bracket (9).
4. Remove clamp (8) from engine oil hose (1).
5. Remove four screws (10), tab washers (11), oil filler tube bracket (12), and bracket (9) from transmission. Discard four tab washers.



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## INSTALL

6. Apply a thin coat of antiseize compound to clean threads of four screws (1).
7. Place bracket (2) and oil filler tube bracket (3) on transmission. Secure with four screws (1) and new tab washers (4).
8. Apply a thin coat of sealing compound to cleaned external threads of two elbows (5 and 6).
9. Install two elbows (5 and 6) in engine block.
10. Connect engine oil hose (7) to elbow (5) and engine oil hose (8) to elbow (6). Use adjustable and open end wrenches.
11. Install clamp (9) on engine oil hose (7). Secure clamp to bracket (2) with screw (10), washer (11), and nut (12).



## FOLLOW-THROUGH STEPS

1. Start engine (see your -10). Check for leaks.
2. Stop/shutdown engine (see your -10). Wait about 20 minutes for oil to drain back to oil pan. Then check engine oil level (see your -LO). Add oil if needed.
3. Install engine oil filter assembly (page 4-5).
4. Install differential oil filter assembly (page 21-6).
5. Install power plant (page 5-11).

**END OF TASK**

---

## REPLACE AIR BOX DRAIN HOSES, TUBES, AND FITTINGS

---

### DESCRIPTION

This task covers: Remove (page 4-9). Install (page 4-10).

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
 Socket Set, (Item 89, App D)  
 Torque Wrench, (Item 95, App D)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

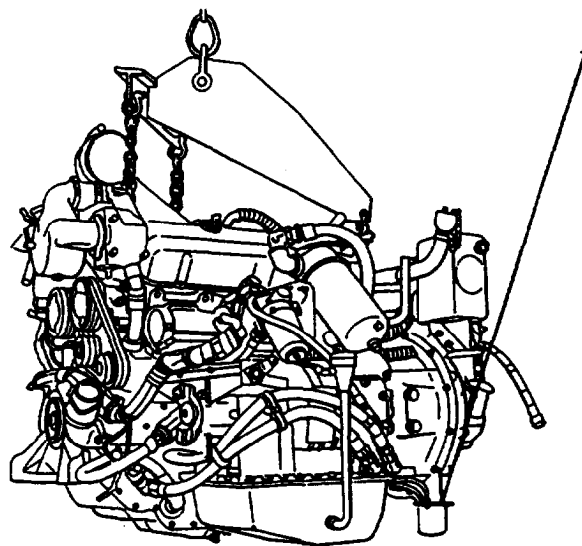
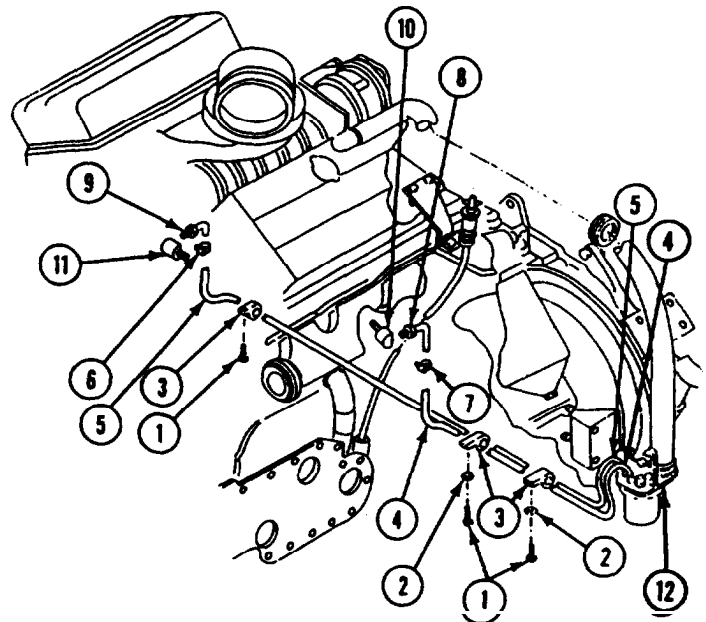
#### Equipment Conditions:

Power plant removed (page 5-11)  
 Starter removed (page 10-2)

---

### REMOVE

1. Remove three screws (1), two washers (2), and three clamps (3), that secure two drain hoses (4 and 5) to engine.
2. Loosen two hose clamps (6 and 7) on two drain hoses (4 and 5).
3. Disconnect two drain hoses (4 and 5) from two tube assemblies (8 and 9).
4. Remove two hose clamps (6 and 7) from two drain hoses (4 and 5).
5. Remove two tube assemblies (8 and 9) from elbows (10 and 11).
6. Remove two drain hoses (4 and 5) from container bracket (12).



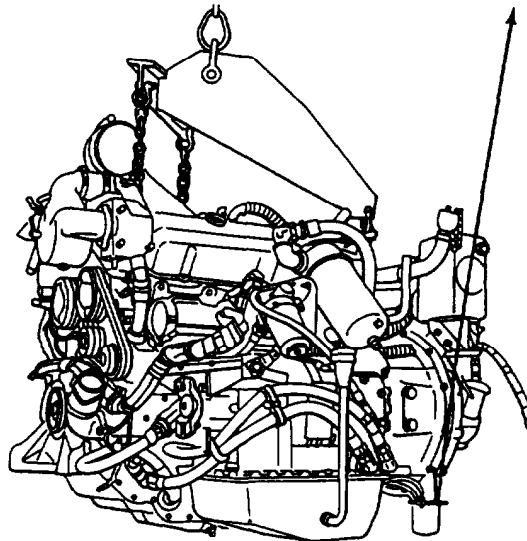
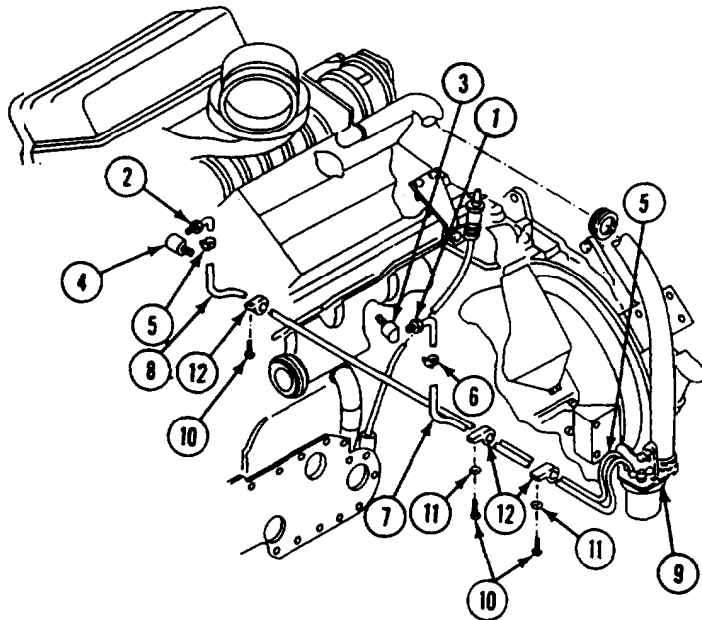
GO TO NEXT PAGE

INSTALL

NOTE

If elbows 3 and 4 need to be replaced, notify direct support maintenance.

7. Connect two tubs assemblies (1 and 2) to two elbows (3 and 4).
8. Install two hose clamps (5 and 6) on two drain hoses (7 and 8).
9. Connect two drain hoses (7 and 8) to two tube assemblies (1 and 2).
10. Tighten two hose clamps (5 and 6) on two drain hoses (7 and 8).
11. Install two drain hoses (7 and 8) on container bracket (9).
12. Install two drain hoses (7 and 8) in engine block. Secure with three screws (10), two washers (11), and three clamps (12). Tighten screws to 180-216 lb-in torque. Use torque wrench and socket set.




---

FOLLOW-THROUGH STEPS

1. Install starter (page 10-2).
  2. Install power plant (page 5-11).
- 

END OF TASK

## REPLACE CRANKCASE BREATHER COLLECTOR CAN AND HOSE

### DESCRIPTION

This task covers: Remove (page 4-11). Install (page 4-12).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
 Socket Wrench Set (Item 89, App D)  
 Torque Wrench (Item 95, App D)

#### References:

see your -10  
 see your Lo

#### Materials/Parts:

General lubricating oil (Item 16, App C)  
 Tab washer (2)

#### Equipment Conditions:

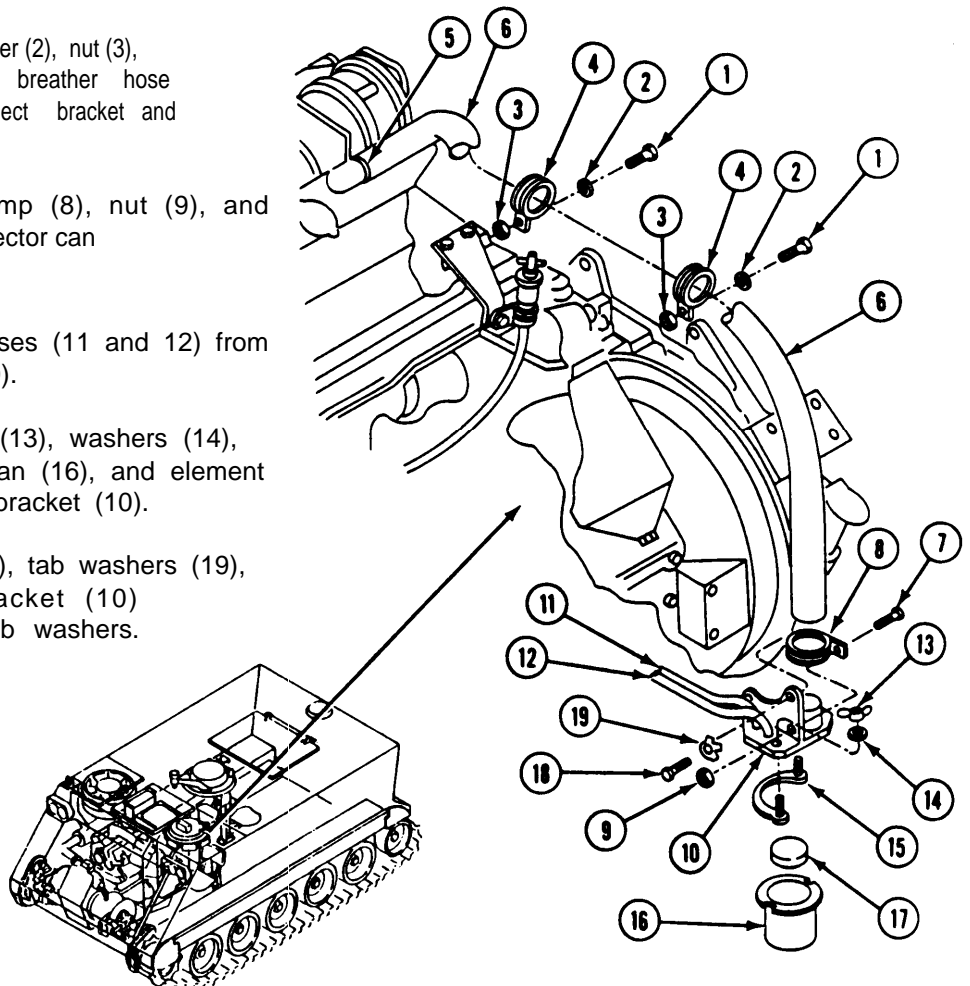
**Engine** stopped/shutdown (see your -10)  
**Carrier** blocked (see your -10)  
**Power plant rear access panel** removed  
 (page 24-27 or 24-29)  
**Driver's power plant access panel** removed  
 (page 24-26)

#### Personnel Required:

Unit Mechanic

### REMOVE

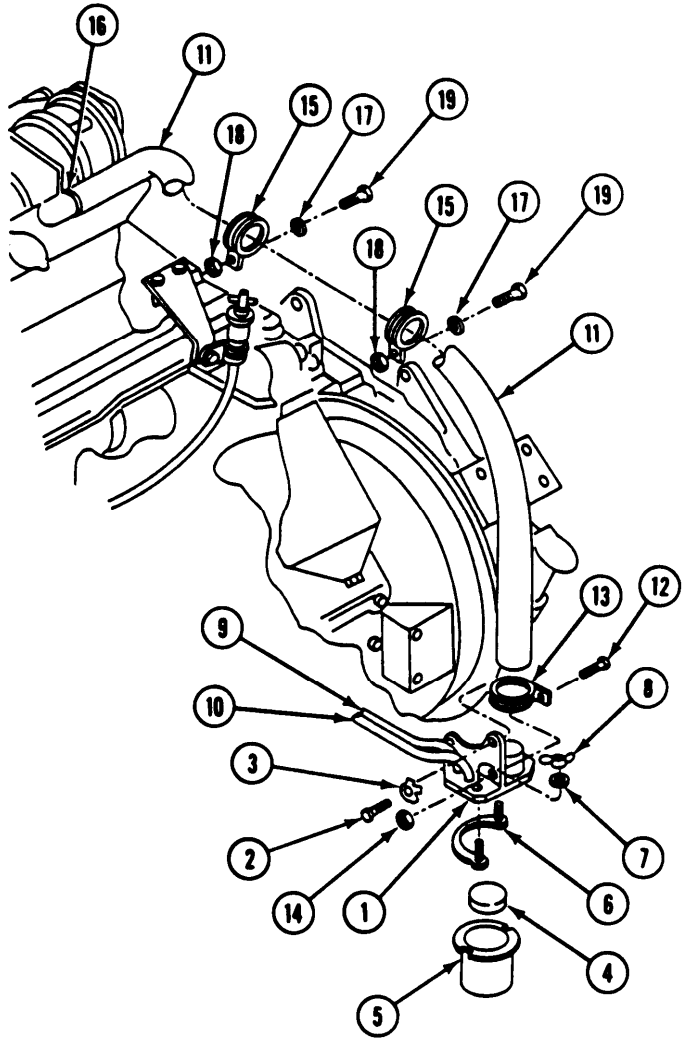
1. Remove two screws (1), washer (2), nut (3), two clamps (4), clamp (5), and breather hose (6) from power plant disconnect bracket and from engine.
2. Remove screw (7), clamp (8), nut (9), and breather hose (6) from collector can bracket.
3. Disconnect two drain hoses (11 and 12) from collector can bracket (10).
4. Remove two wing nuts (13), washers (14), retainer (15), collector can (16), and element (17) from collector can bracket (10).
6. Remove two screws (18), tab washers (19), and collector can bracket (10) transmission. Discard tab washers.



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## INSTALL

6. Install collector can bracket (1) on transmission case. Secure with two screws (2) and new tab washers (3). Tighten screws (2) to 252-800 lb-in (28-34 N•m) torque. Loosen screws and retighten to above torque. Use torque wrench and socket set.
7. Install clean element (4) in collector can (6).
8. Install collector can (5) on bracket (1). Secure with retainer (6), two washers (7), and wing nuts (8). Stake top threads of retainer studs after installing wing nuts (8).
9. Install two drain hoses (9 and 10) in collector can bracket (1).
10. Install breather hose (11) in collector can bracket (1). Secure with screw (12), clamp (13), and nut (14).
11. Install breather hose (11) on engine and on power plant disconnect bracket. Secure with two clamps (15), clamp (16), washer (17), nut (18), and two screws (19).




---

### FOLLOW - THROUGH - STEPS

- |   |  |
|---|--|
| 1. Install power plant rear access panel (page 24-27 or 24-29). | 2. Install driver's power plant access panel (page 24-25). |
|---|--|
- 

END OF TASK

## REPLACE OIL FILLER CAP AND TUBE

### DESCRIPTION

This task covers: Remove (page 4-13). Install (Page 4-14).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Gasket  
Key washers (3)  
Self-locking nut

#### Personnel Required:

Unit Mechanic

#### References:

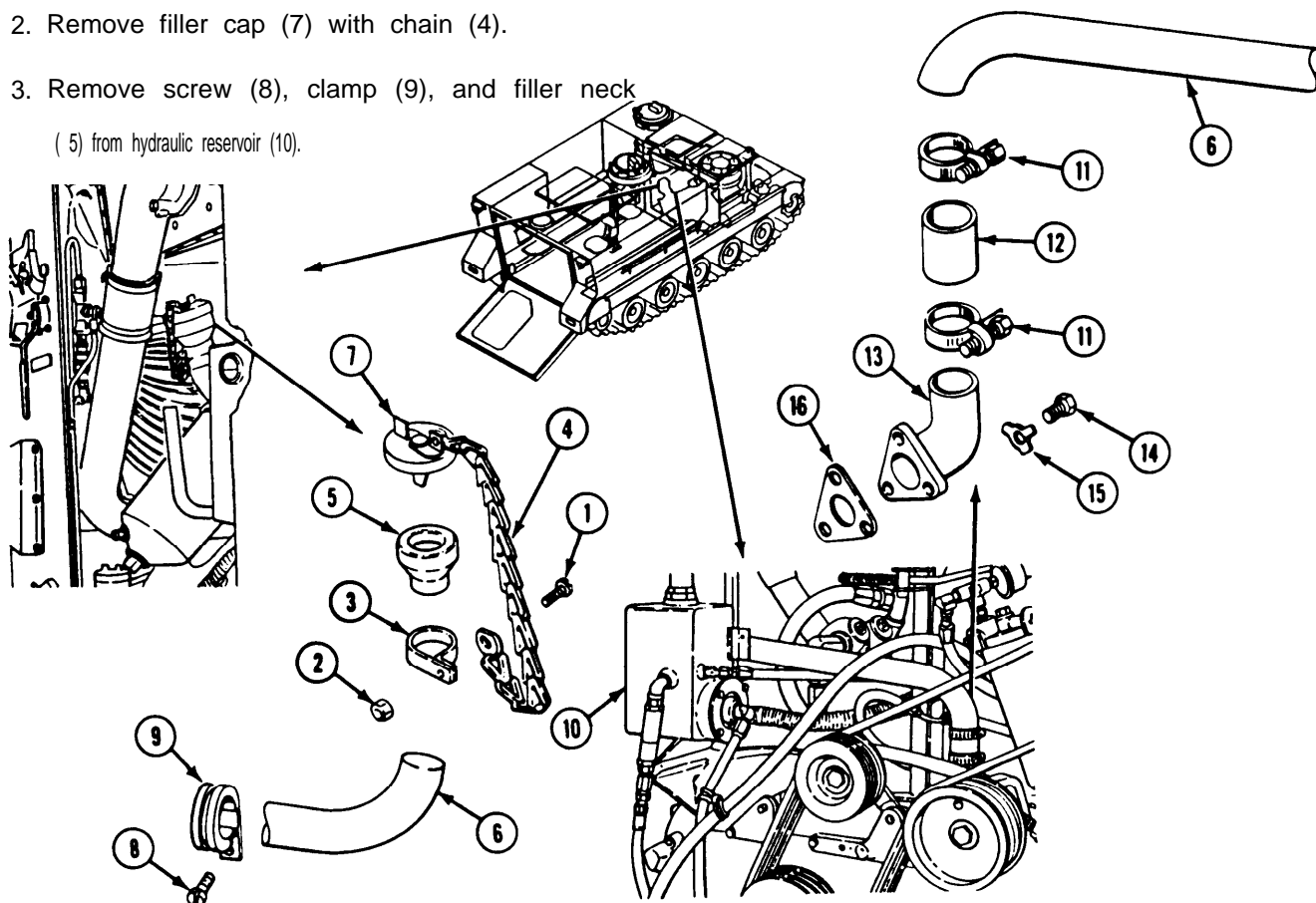
see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Power plant rear access panel removed (page 24-27 or 24-29)  
Driver's power plant access panel removed (page 24-25)

### REMOVE

1. Remove screw (1), locknut (2), clamp (3), chain (4), and sleeve (5) from filler neck (6). Discard locknut.
2. Remove filler cap (7) with chain (4).
3. Remove screw (8), clamp (9), and filler neck (5) from hydraulic reservoir (10).
4. Remove two clamps (11) and hose (12) from filler neck (6) and elbow (13).
5. Remove three screws (14), key washers (15) gasket (16), and elbow (13), from engine block. Discard key washers and gasket.



GO TO NEXT PAGE



## REPLACE OIL FILLER CAP AND TUBE

### DESCRIPTION

This task covers: Remove (page 4-13). Install (Page 4-14).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Gasket  
Key washers (3)  
Self-locking nut

**Personnel Required:**

Unit Mechanic

**References:**

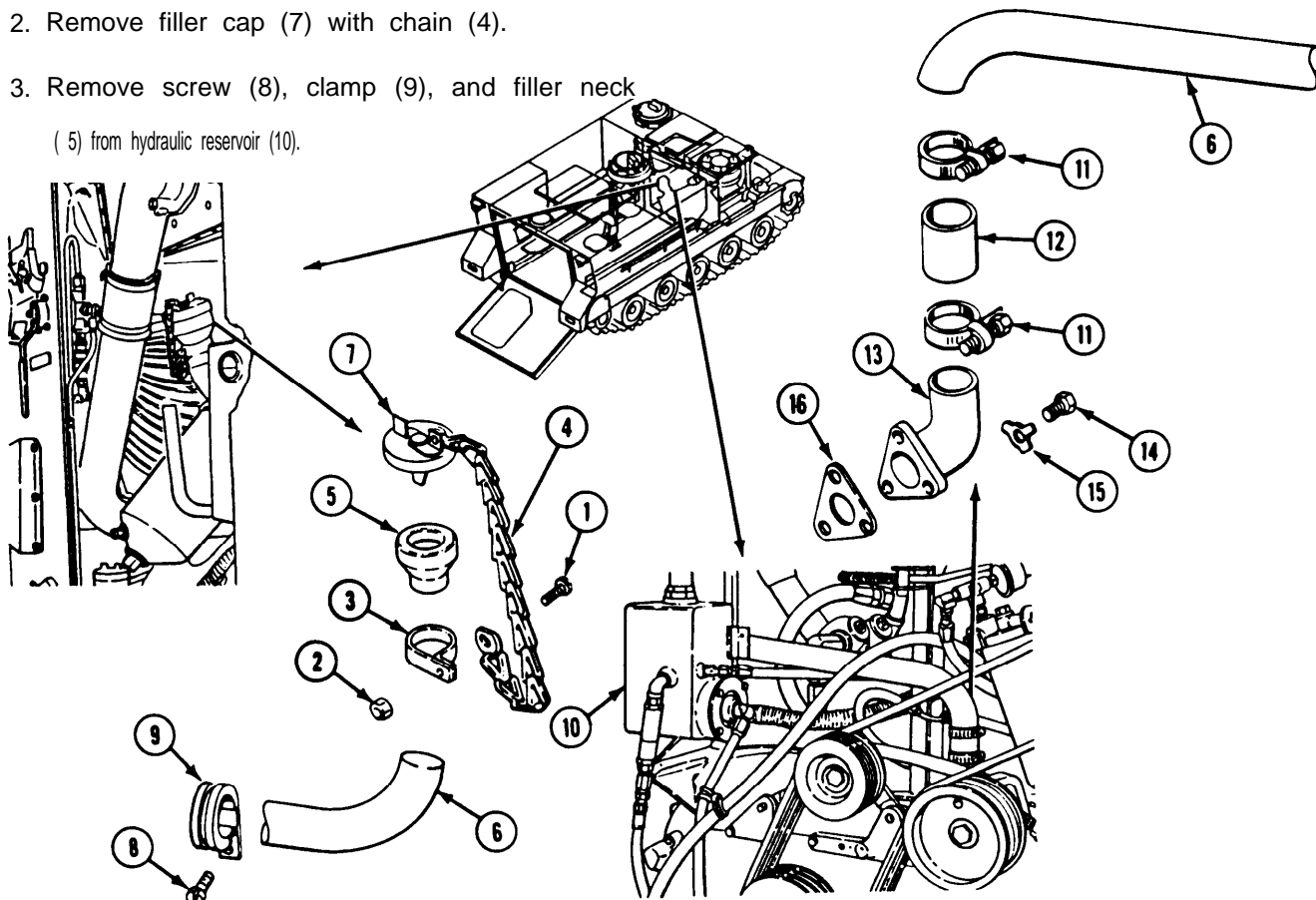
see your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Power plant rear access panel removed (page 24-27 or 24-29)  
Driver's power plant access panel removed (page 24-25)

### REMOVE

1. Remove screw (1), locknut (2), clamp (3), chain (4), and sleeve (5) from filler neck (6). Discard locknut.
2. Remove filler cap (7) with chain (4).
3. Remove screw (8), clamp (9), and filler neck (5) from hydraulic reservoir (10).
4. Remove two clamps (11) and hose (12) from filler neck (6) and elbow (13).
5. Remove three screws (14), key washers (15) gasket (16), and elbow (13), from engine block. Discard key washers and gasket.



GO TO NEXT PAGE

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## REPLACE OIL GAGE ROD AND GUIDE

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 52, App C)  
Self-locking nut

#### Personnel Required:

Unit Mechanic

#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Driver's compartment access panel removed (see your -10)  
Power plant rear access panel removed (see your -10)  
Power plant bottom access cover removed (page 24-32)

### REMOVE

1. Remove gage rod (1) from gage rod guide (2).
2. Remove lock nut (3), screw (4), washer (5), clamp (6), and gage rod guide (2) from bracket (7). Discard locknut.
3. Remove gage rod guide (2) from adapter (8).
4. Remove adapter (8) from engine block.

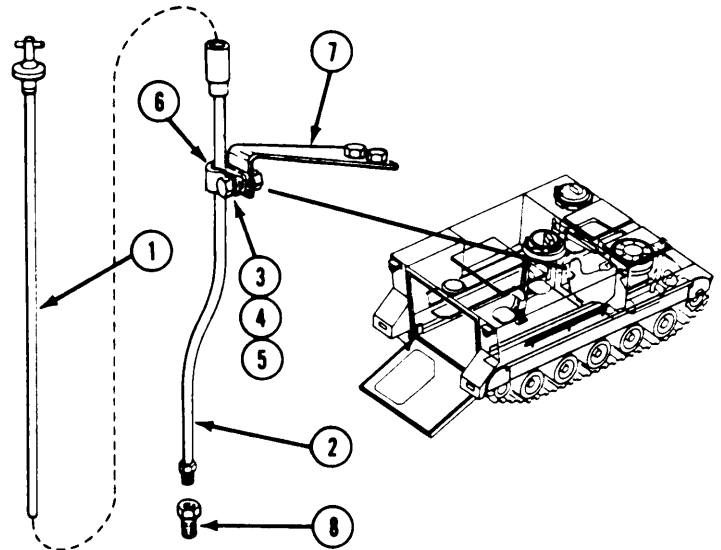
#### NOTE

Plug or cover engine block opening to prevent dirt or debris from entering engine.

### INSTALL

5. Apply a thin coat of sealing compound to external threads of adapter (8).
6. Install adapter (8) in engine block.
7. Install gage rod guide (2) in adapter (8).

8. Install gage rod guide (2) on bracket (7). Secure with clamp (6), screw (4), washer (5), and new locknut (3).
9. Install gage rod (1) in gage rod guide (2).




---

### FOLLOW-THROUGH STEPS

1. Install driver's compartment access panel (see your -10).
2. Install power plant access panel (see your -10),
3. Install power plant bottom access cover (page 24-32).

---

END OF TASK

**CHAPTER 5  
POWER PLANT MAINTENANCE**

---

**TASK INDEX**

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<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
Raise/Lower Power Plant Grill . . . . .	5-2	Remove and Install Power Plant . . . . .	5-11

---



---

## RAISE/LOWER POWER PLANT GRILL

---

### DESCRIPTION

This task covers: Raise (page 5-2). Lower (page 5-6).

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
 Antifreeze and Battery Tester,  
 (Item 74, App D)  
 Socket Wrench Set (Item 90, App D)  
 Torque Wrench (Item 97, App D)  
 Torque Wrench (Item 98, App D)

#### Materials/Parts:

Antifreeze (Item 8, App C)  
 Caulking compound (Item 8, App C)  
 Self-locking nut (2)  
 Tab washers (4)

#### Personnel Required:

Unit Mechanic  
 Helper (H)

#### References:

see your -lo  
 TM 92350-300-10

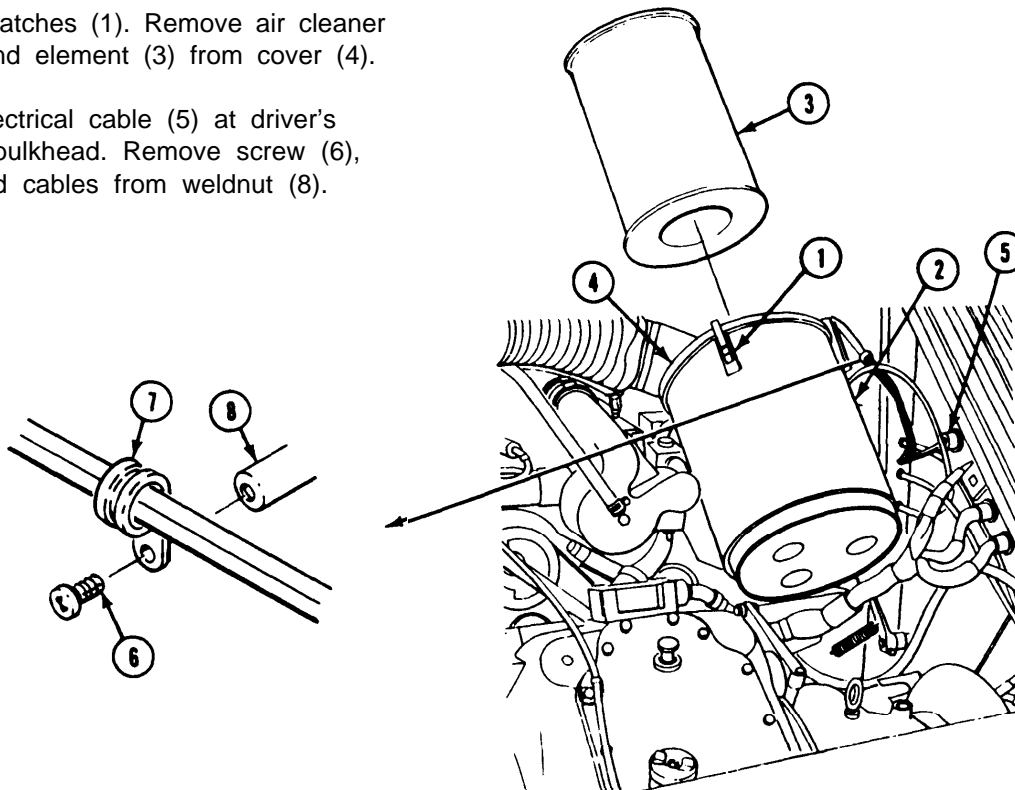
#### Equipment Conditions

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
**Trim vane** lowered (see your -10)  
 Power plant front access door open  
 (see your -10)  
 Driver's power plant access panel removed  
 (page 24-25)  
 Power plant rear access panel removed  
 (page 24-27 or 24-29)  
 Generator set removed (M577A2 only)  
 (see your -10)  
 Battery ground lead disconnected (page 13-2)

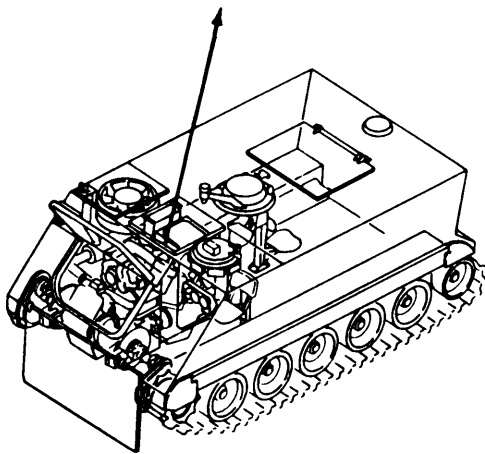
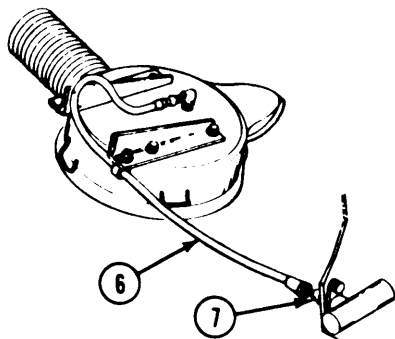
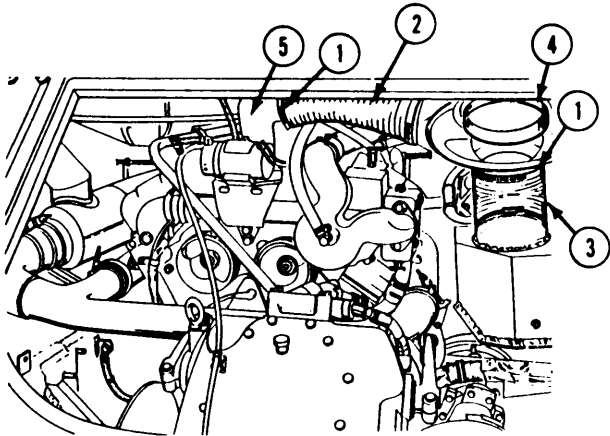
---

### RAISE GRILL

1. Release four latches (1). Remove air cleaner housing (2) and element (3) from cover (4).
2. Disconnect electrical cable (5) at driver's compartment bulkhead. Remove screw (6), clamp (7), and cables from weldnut (8).



3. Loosen two clamps (1). Disconnect two hoses (2 and 3) from air cleaner cover (4) and engine intake elbow (5).
4. Disconnect air indicator hose (6) from adapter (7) at driver's compartment bulkhead.

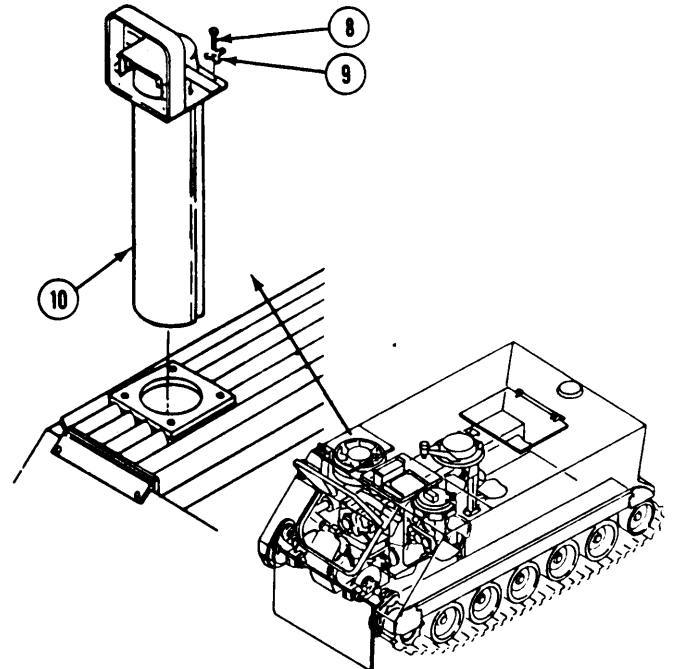


**WARNING**

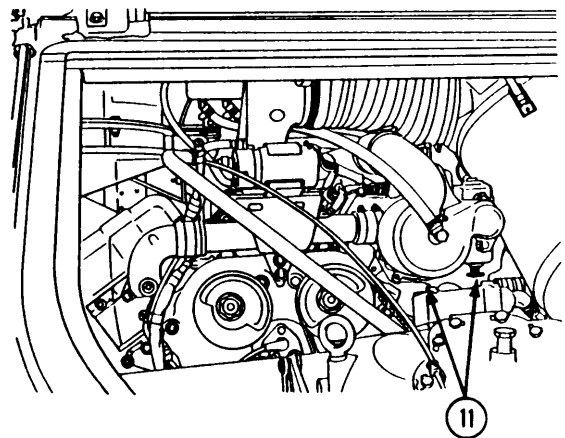
Do not touch hot exhaust pipes with bare hands. You could get a bad burn.



5. Remove four screws (8), tab washers (9), and exhaust extension (10) from power plant



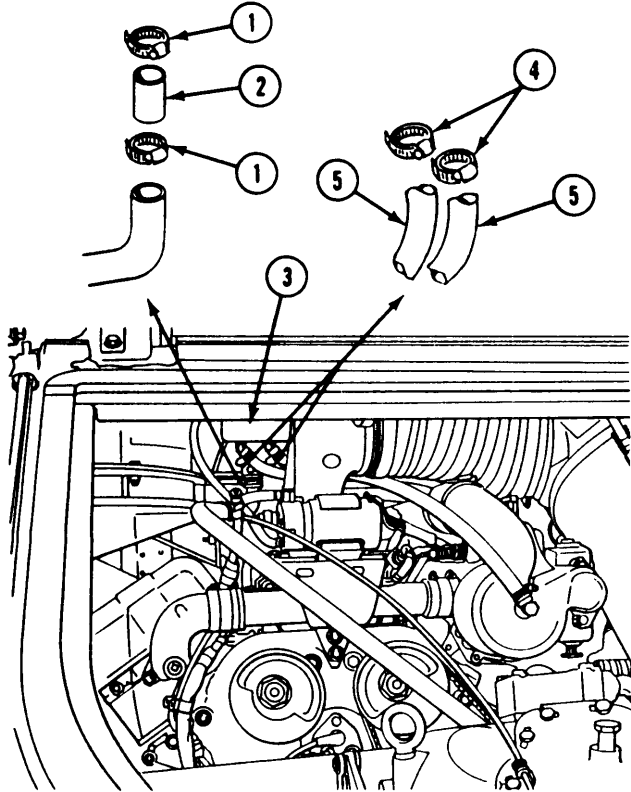
6. Remove radiator cap (see your -10). Open valves (11) and drain coolant into a container with capacity of 15 gallons (57 liters) or more.



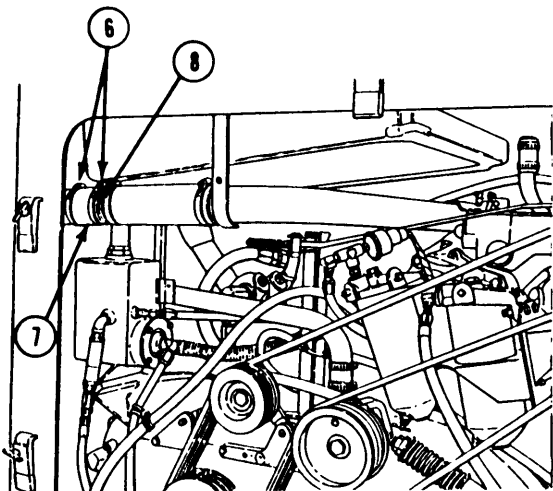
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7. Loosen two clamps (1). Disconnect hose (2) from auxiliary tank (3).

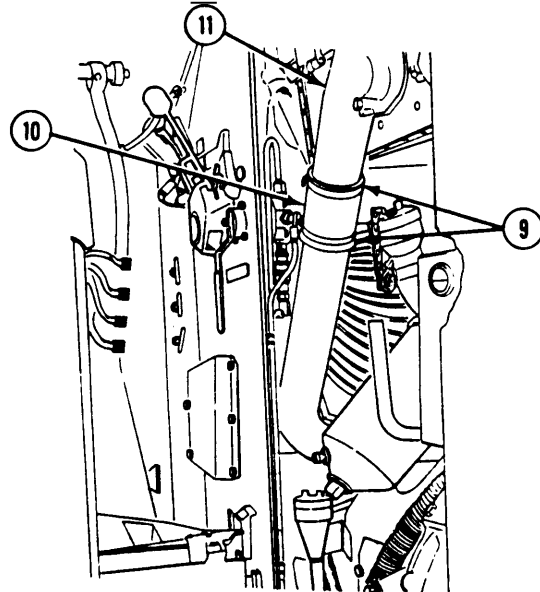
8. Loosen two clamps (4). Disconnect two deaeration hoses (5) from auxiliary tank (3).



9. Loosen two clamps (6). Disconnect hose (7) from tube (8).

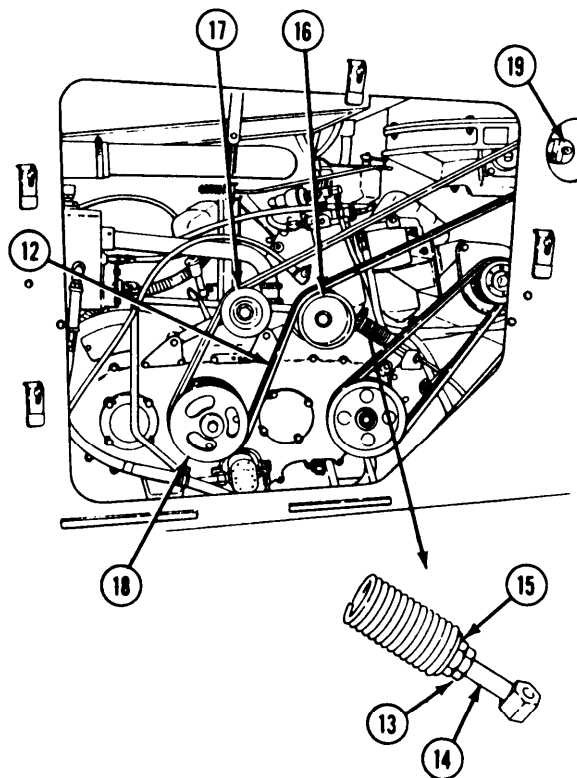


10. Loosen two clamps (9). Disconnect hose (10) from radiator elbow (11).

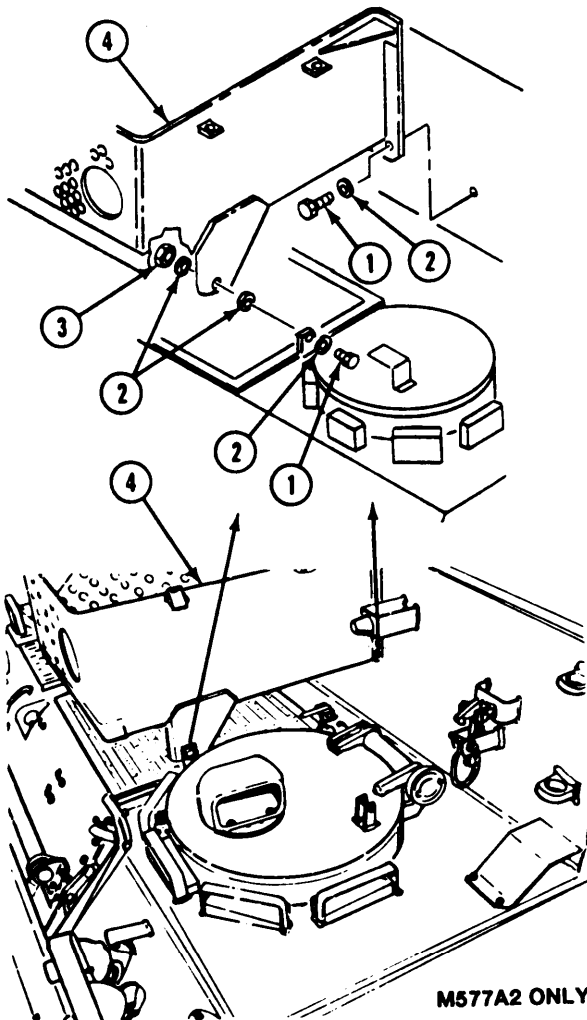


11. Remove drive belts (12) by loosening locknut (13) that secures rod end (14) to adjusting nut (15).

12. Remove drive belts (12) from idler pulleys (16 and 17) and pulleys (18 and 19).



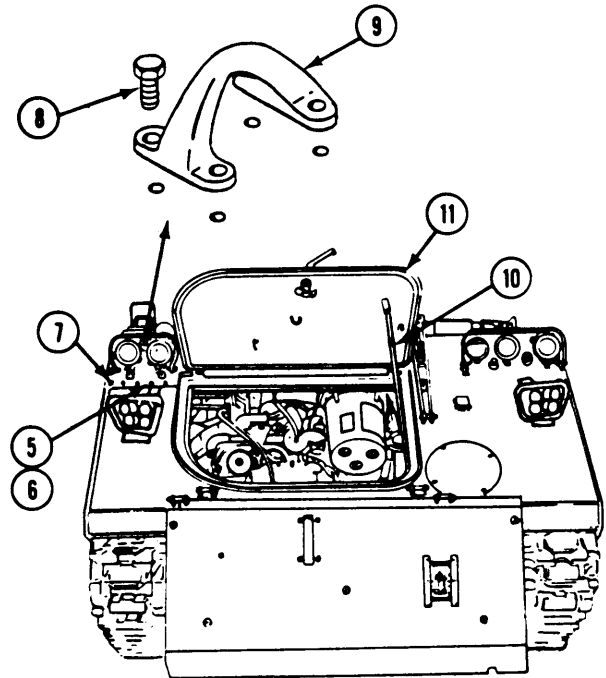
13. On M577A2 only, remove six screws (1), eight washers (2), two locknuts (3), and generator enclosure (4) from hull. Discard locknuts.
14. On M577A2 only, remove generator enclosure (4) from hull with davit used to remove the generator (see your -10).



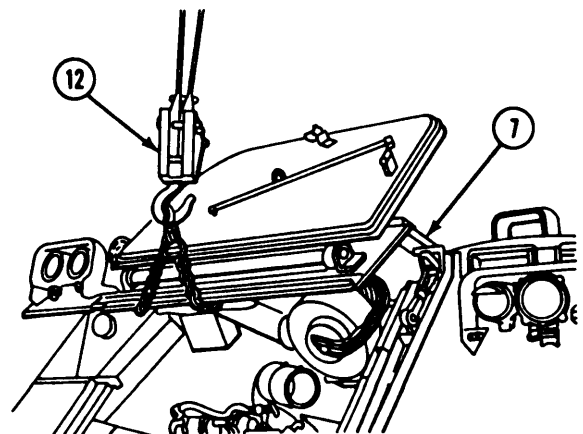
**NOTE**

**On M741A1, armament station gun must point to rear (see TM 9-2350-300-10).**

15. Remove 13 screws (5) and washers (6) that secure grill (7). Remove screw (8) that secures lifting eye (9) to hull.
16. Stow power plant front access door brace (10). Lay access door (11) back on power plant grill (7).



17. Use a lifting device (12) to raise grill (7) to vertical position.

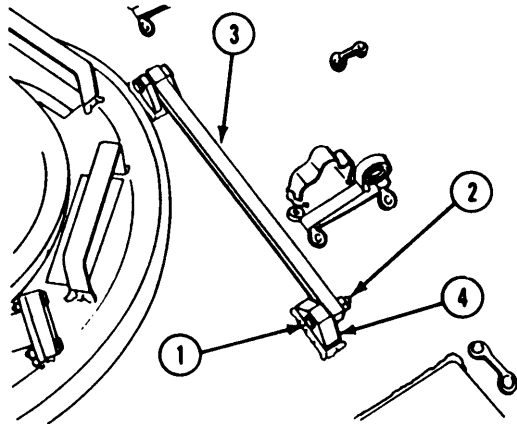


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**CAUTION**

To prevent damage to power plant front access door, guide the door as the power plant grill is lowered into braced position.

18. Remove screw (1) and locknut (2) that secure brace (3) to lug (4).



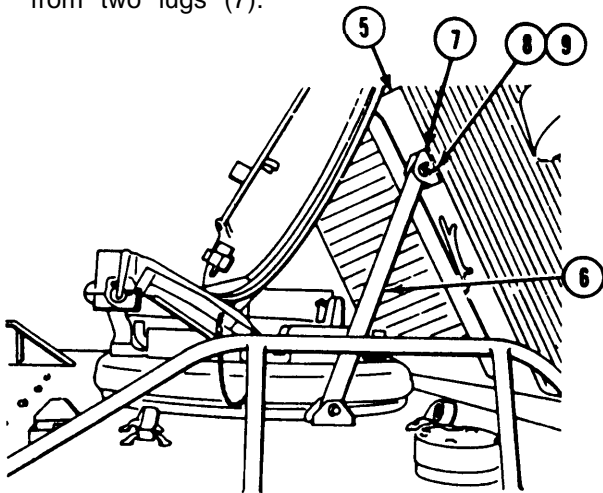
19. Lower power plant grill (5) into full open position. Place brace (6) between two lugs (7). Secure with screw (8) and locknut (9).

**LOWER GRILL**

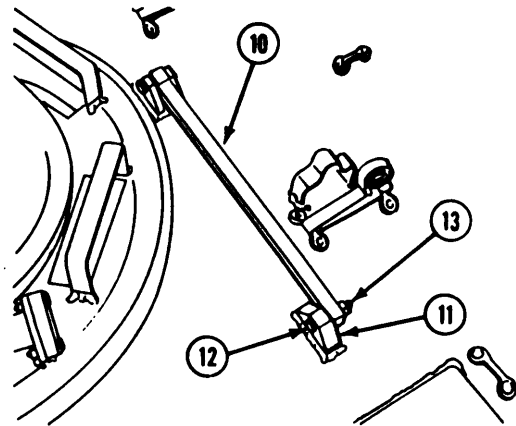
**NOTE**

Before lowering grill, apply caulking compound to metal joints between hull and lower support of grill to assure water tightness.

20. With lifting device attached to grill (5), remove screw (8), locknut (9), and brace (6) from two lugs (7).



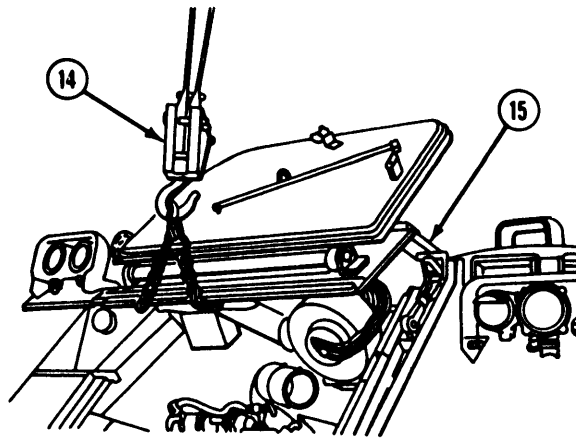
21. Secure brace (10) to lug (11) with screw (12) and locknut (13).



**CAUTION**

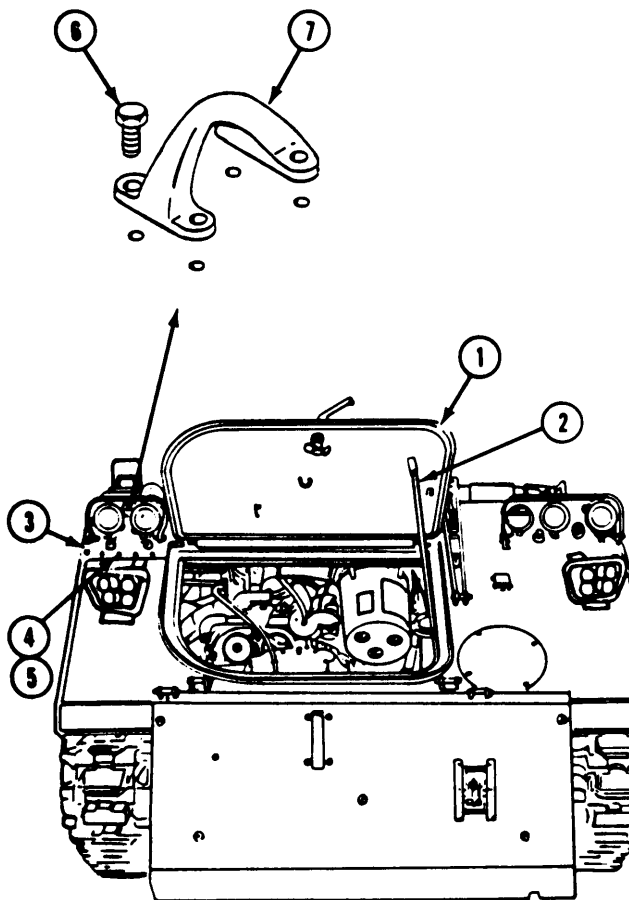
To prevent damage to power plant wiring harness, guide the door as the power plant grill is lowered into braced position.

22. Use lifting device (14) to lower grill (15) into closed position.

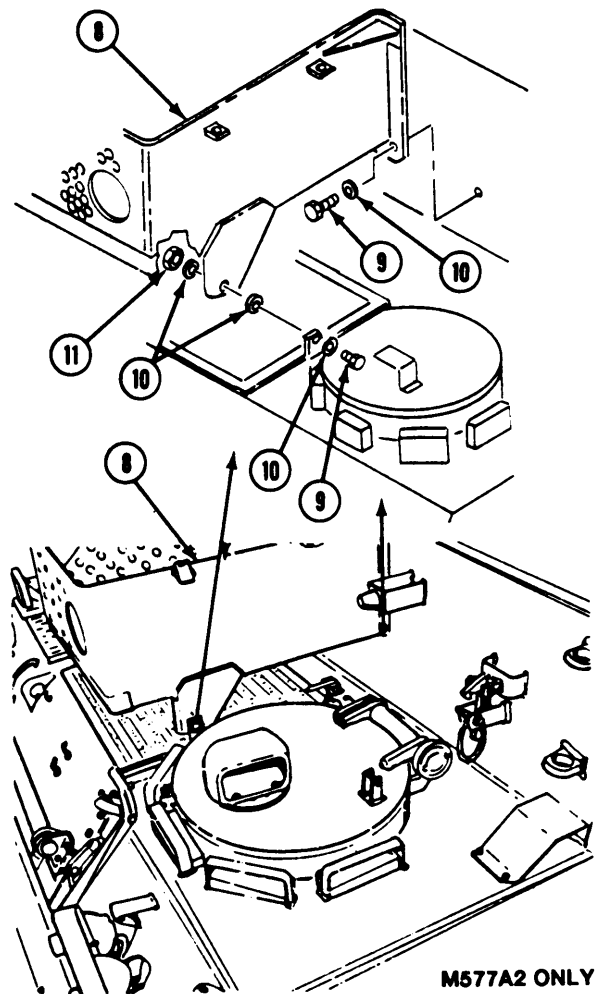




23. Secure power plant front access door (1) in open position with door brace (2).
24. Secure grill (3) to hull with 13 screws (4) and washers (5). Tighten 13 screws to 100-120 lb-ft (136-163 N•m) torque. Use torque wrench (Item 97).
25. Install lifting eye screw (6) on lifting eye (7) and hull. Tighten lifting eye screw to 176-200 lb-ft (237-271 N•m) torque. Use torque wrench (Item 98) and socket wrench set.



26. On M577A2 only, position generator enclosure (8) on hull with davit used to lift generator (see your -10).
27. On M577A2 only, secure generator enclosure (8) to hull with six screws (9), eight washers (10), and two new locknuts (11). Tighten four screws that secure rear enclosure to hull to 56-60 lb-ft (75-81 N•m) torque. Use torque wrench (Item 97).

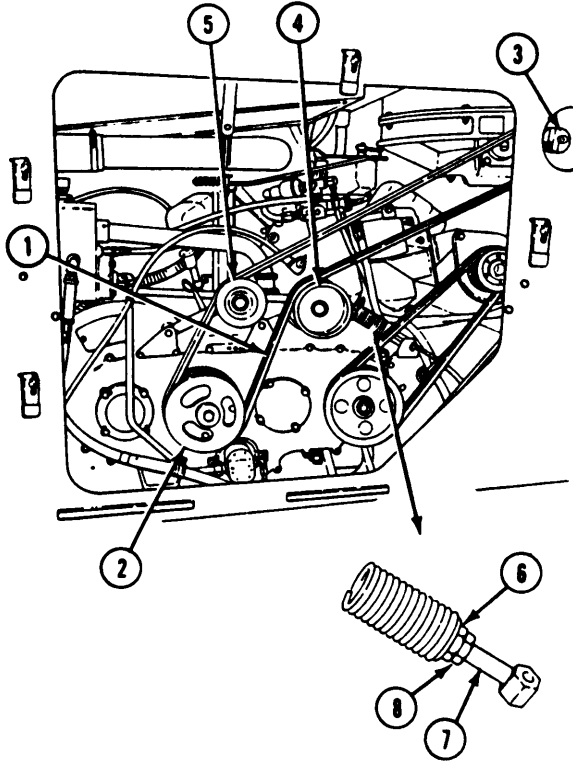


M577A2 ONLY

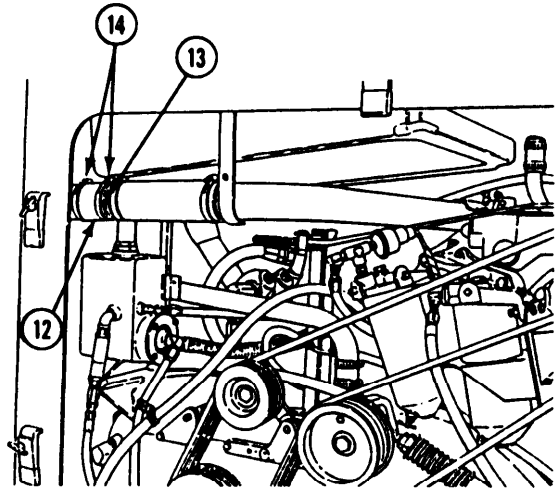
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28. Position matched set of drive belts (1) on pulleys (2 and 3) and idler pulleys (4 and 5).

29. Turn adjusting nut (6) on rod end (7) to left or right until lower end is within operating range shown on adjusting sleeve. Tighten locknut (8).

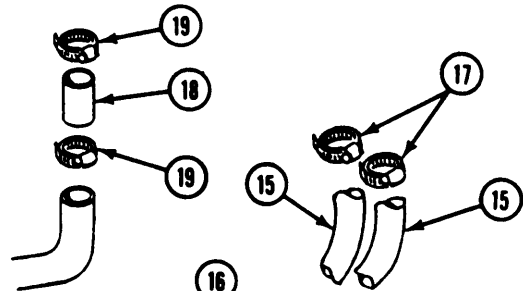


31. Position hose (12) on tube (13) and tighten two clamps (14).

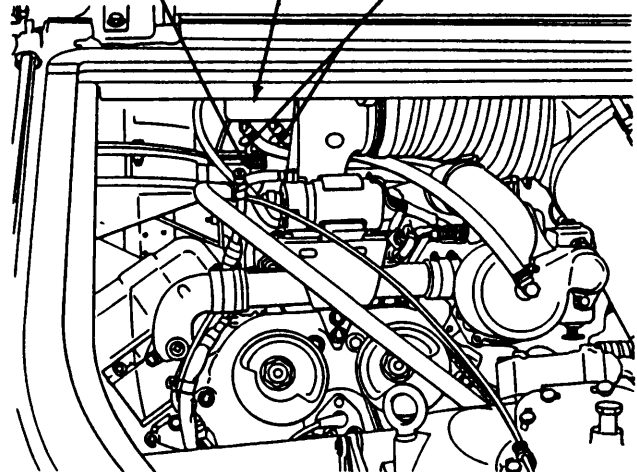
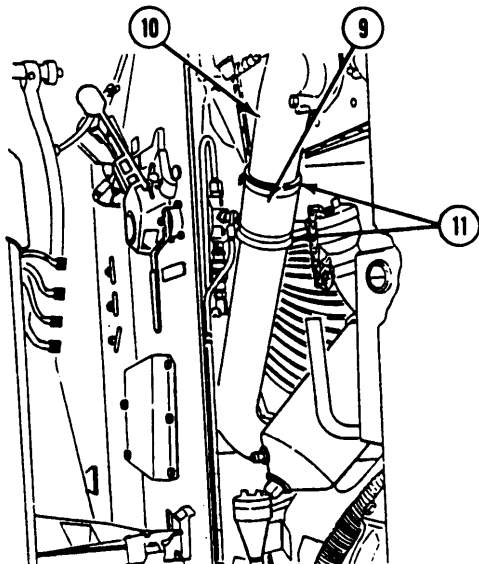


32. Secure two hoses (15) to auxiliary tank (16) with two clamps (17).

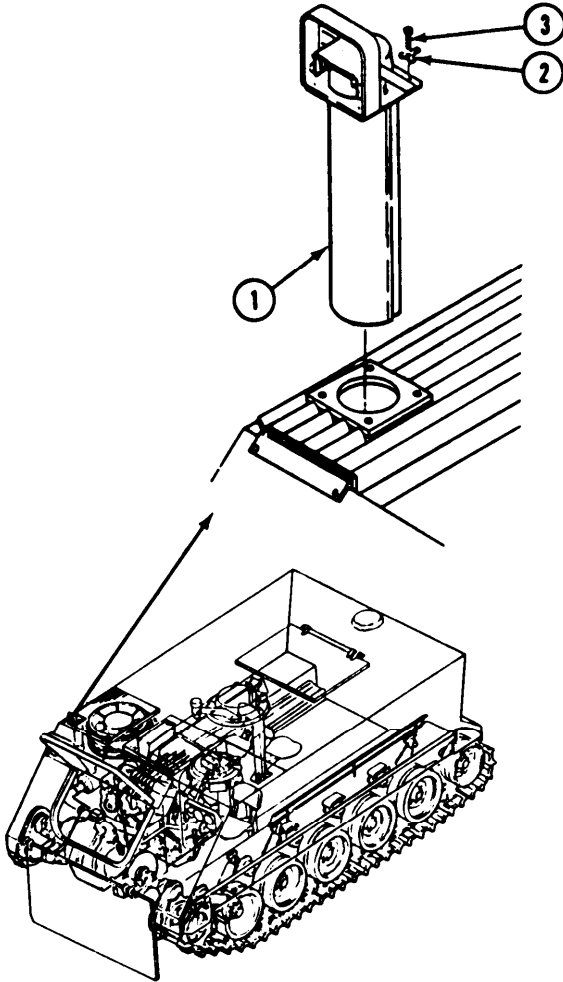
33. Position hose (18) on auxiliary tank (16) and tighten two clamps (19).



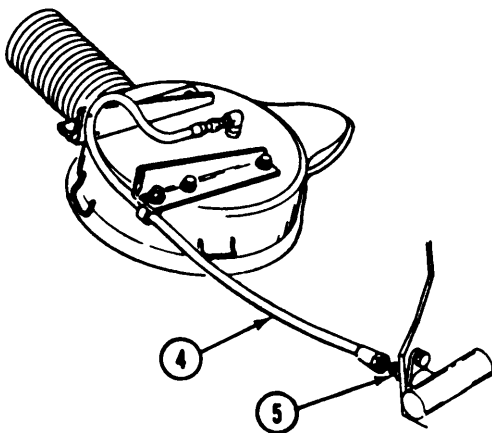
30. Position hose (9) on elbow (10) and tighten two clamps (11).



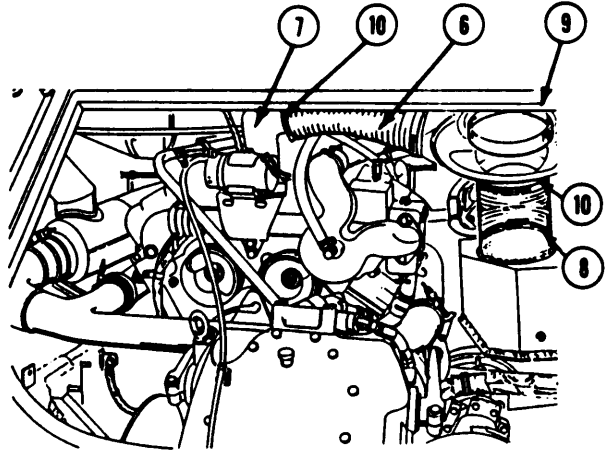
34. Secure exhaust extension (1) to power plant grill with four new tab washers (2) and screws (3).



35. Connect air indicator hose (4) to adapter (5) at driver's compartment bulkhead.



36. Position hose (6) on engine air intake elbow (7). Position hose (8) on air cleaner cover (9). Secure with two clamps (10).

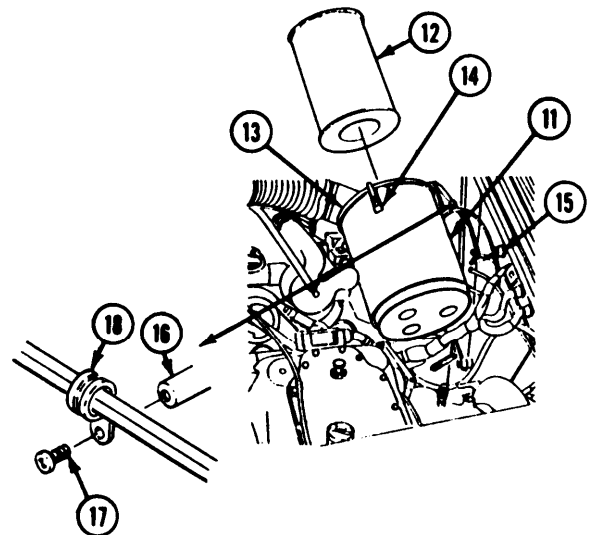


37. Position air cleaner housing (11) and element (12) on air cleaner cover (13) with housing drain hole in down position.

38. Secure housing (11) and element (12) to cover (13) with four latches (14).

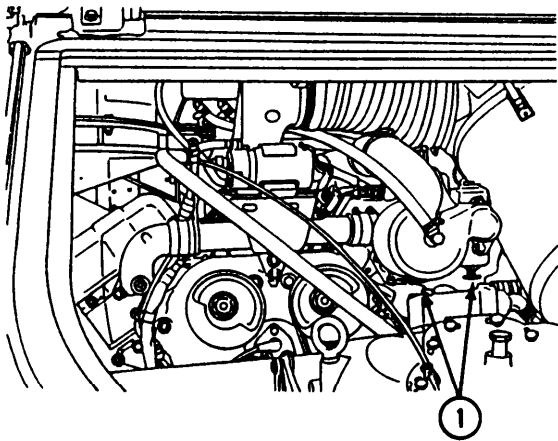
39. Secure electrical cable (15) to weldnut (16) with screw (17) and clamp (18).

40. Connect electrical cable (15) to receptacle at driver's compartment bulkhead.



GO TO NEXT PAGE

41. Close thermostat housing valves (1).



#### NOTE

Use coolant in cooling system at all times. It will reduce corrosion in engine block and cooling will provide low temperature protection. Mix coolant and clean water based on the requirements for your carrier. Use tester.

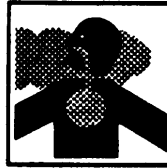
42. Fill cooling system slowly with 14 gallons (53 liters) of coolant and water until level is within 1/2 inch (13 mm) of filler neck (page 3-5).
49. Replace coolant filler cap (see your -10).

#### FOLLOW-THROUGH STEPS

1. Engine stopped/shutdown (see your -10).
2. Install power plant rear access panel (page 24-27 or 24-29).
3. Install driver's power plant access panel (page 24-25).
4. Close power plant front access door (see your -10).
5. Raise trim vane (see your -10).
6. Install generator set (M577A2 only) (see your -10).

END OF TASK

#### WARNING



Carbon monoxide is poisonous and can kill you. Do not idle engine with power plant access panels off unless there is a VERY GOOD AIR FLOW.

44. Connect battery ground lead (page 13-2).
45. Start engine (see your -10). Check that power plant grill is installed properly and the cooling system does not leak.

#### WARNING



Hot radiator coolant can burn you. Use hand to remove cap ONLY if cool to touch. Turn cap slowly to release pressure. Replace cap by pressing down and turning until tight.

46. Check coolant level (see your -10).

# REMOVE AND INSTALL POWER PLANT

## DESCRIPTION

This task covers: Remove (Page 5-11). Install (Page 5-17).

## INITIAL SETUP

### Tools:

- General Mechanics Tool Kit (Item 30, App D)
- Torque Wrench Adapter (Items 7, 8 and 9, App D)
- Engine and transmission sling (Item 65, App D)
- Socket wrench set (Item 89, App D)
- Torque Wrench (Item 96, App D)
- Torque Wrench (Item 96, App D)

### Materials/Parts:

- Key washer (2)
- self-locking bolt (2)
- screw (4)
- Washer (4)

### Personnel Required:

- Unit Mechanic
- Helper (H)

### References:

- see our -10
- see your -12

### Equipment Conditions:

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Battery ground lead disconnected (page 13-2)
- Power plant rear access panels removed (page 24-27 or 24-29)
- Driver's power plant access panel removed (page 24-25)
- Power plant bottom access cover removed (page 24-32)
- All coolant drained (page 8-3)
- Power plant grill raised (page 5-2)
- Fuel supply valve at tank closed (see your -10)
- Air control valve and housing assembly removed (page 7-11)

## REMOVE

1. Disconnect three electrical cables (1) at driver's compartment bulkhead.

2. Loosen two clamps (2) and remove pipe joint (3) from muffler (4) and exhaust pipe (5).

9. Loosen two clamps (6). Remove exhaust pipes (5 and 7).

### NOTE

On carriers with exhausts as shown in Figure A, go to step 3.

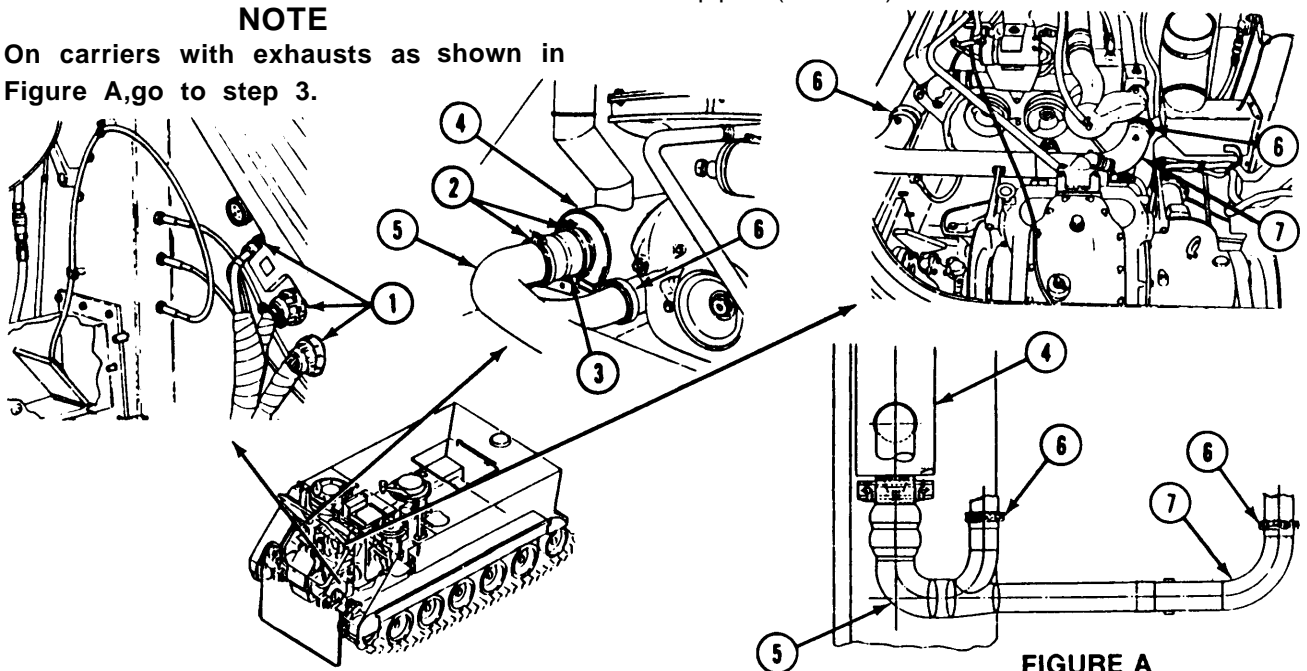
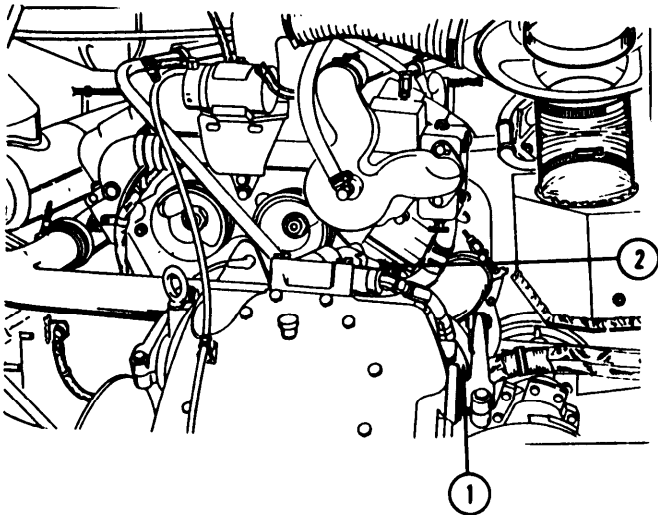


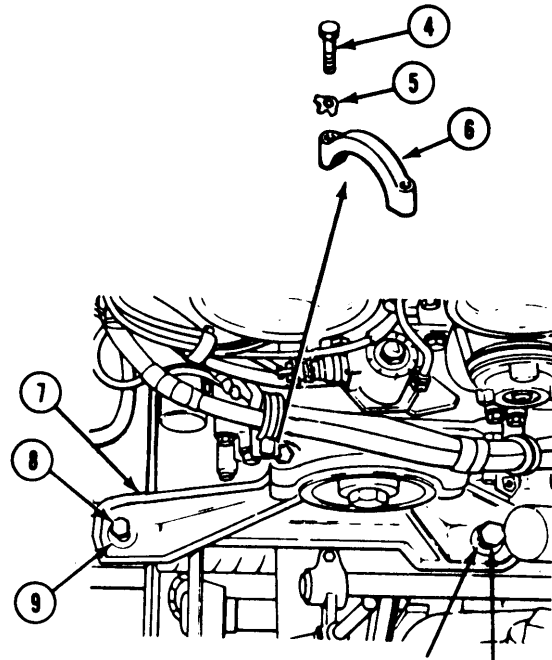
FIGURE A

GO TO NEXT PAGE

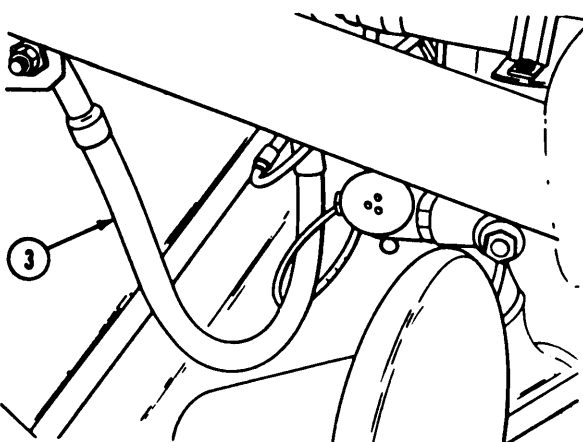
4. Disconnect differential oil temperature lead (1) from differential.
5. Disconnect oil inlet hose (2) from differential.



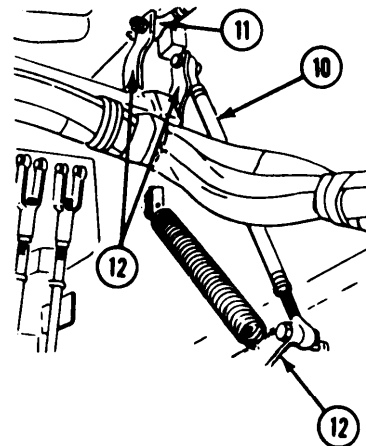
7. Remove two screws (4), key washers (5), and cap (6) from mount base (7). Discard key washers.
8. Remove two lockbolts (8) and washers (9) that secures engine mount base to carrier. Discard lockbolts.



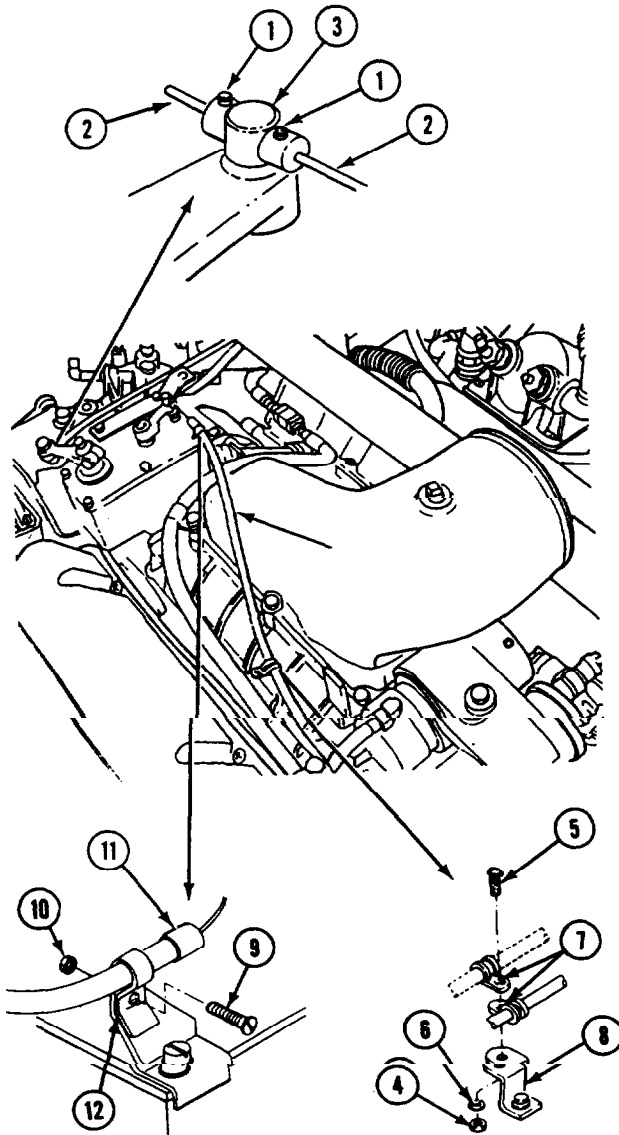
6. Disconnect starter ground lead (3) from hull.



9. Disconnect accelerator pedal linkage (10) and range selector linkage (11) from bellcranks (12).



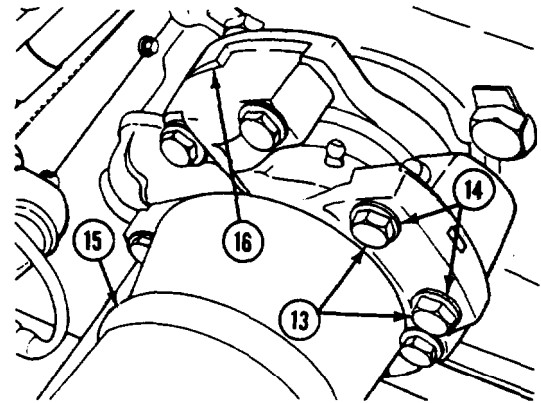
10. Loosen two setscrews (1) that secures fuel cutoff control cable (2) to governor arm pin (3).



11. Remove nut (4), screw (5), washer (6), and clamps (7) from engine cylinder head cover bracket (8).

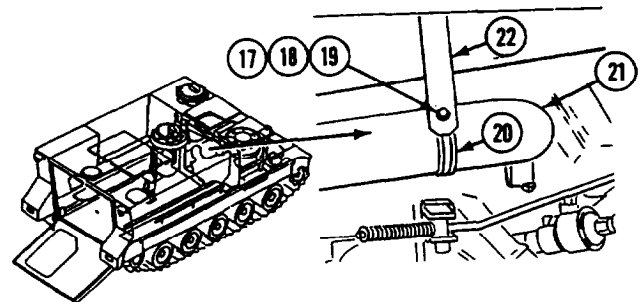
12. Remove screw (9) and nut (10). Pull cable (11) through clamp (12).

13. Remove four screws (13) and flat washers (14). Separate propeller shaft (15) from yoke (16) on transmission. Discard screws and washers.

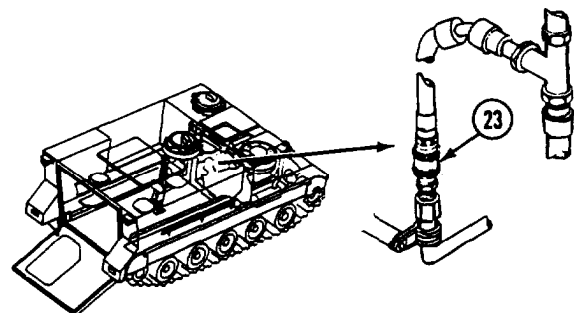


14. Remove L&R final drive propeller shafts (page 20-5 and 20-7).

15. Remove nut (17), washer (18), screw (19), clamp (20), and radiator inlet tube (21) from hanger (22).

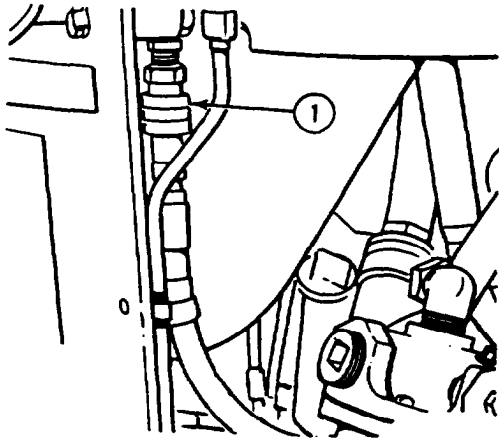


16. Disconnect ramp hydraulic line at coupling (23).

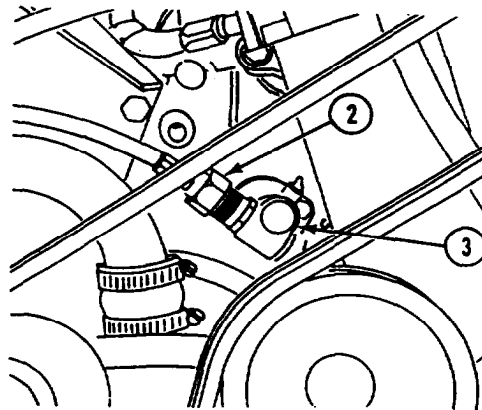


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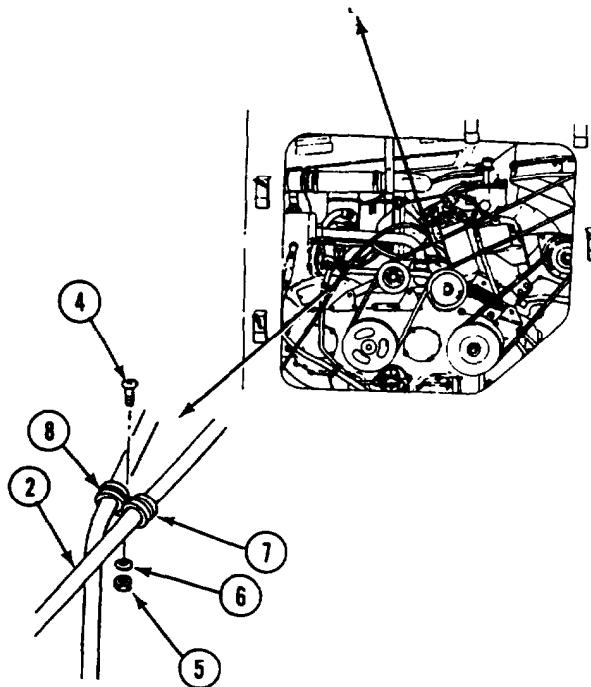
17. Disconnect ramp hydraulic line at coupling (1).



19. Disconnect tachometer cable (2) from adapter (3) on engine.



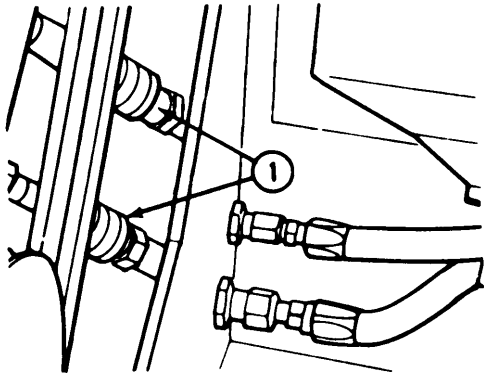
■ 18. Deleted.



20. Remove screw (4), nut (5), washer (6), clamp (7), and tachometer cable (2) from tank tube clamp (8).



21. Disconnect two fuel hoses at couplings (1).

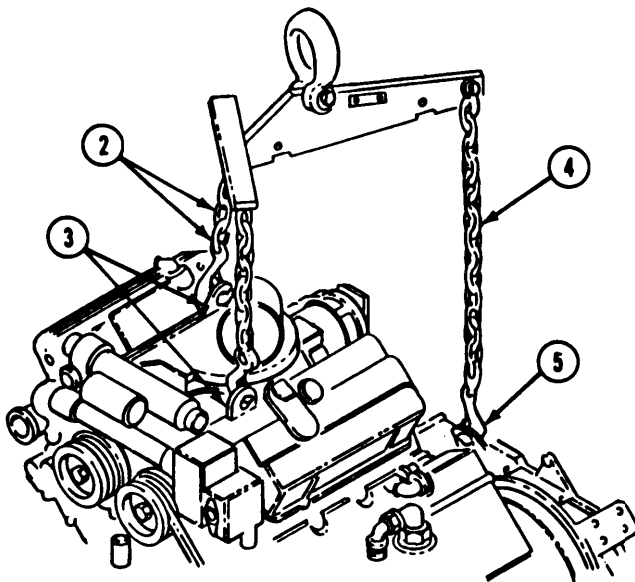


**WARNING**

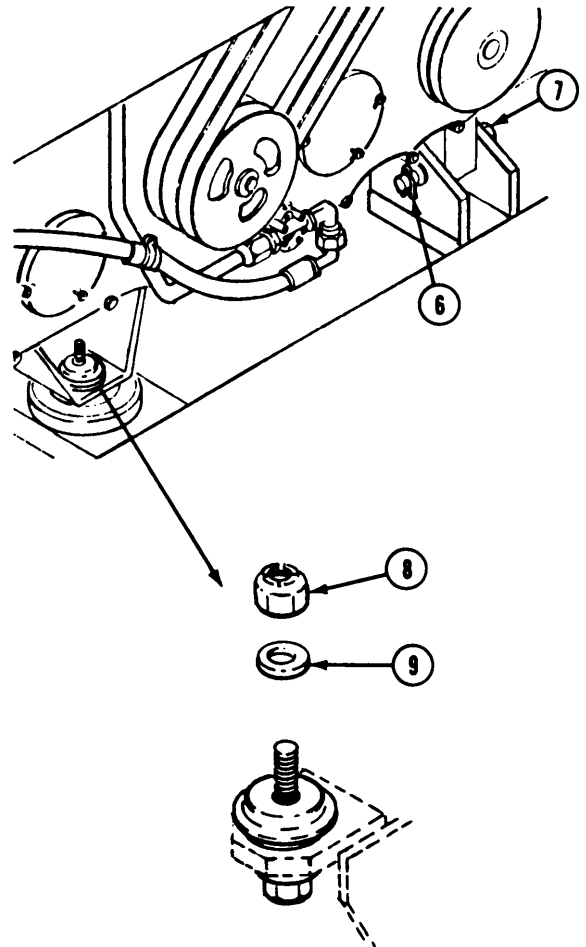


Damaged lifting slings can fail with load. Soldiers can be killed or injured. Do not use damaged slings.

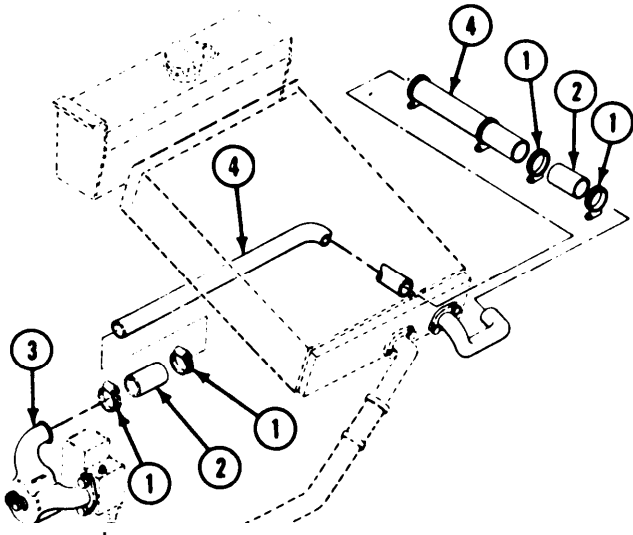
22. Attach power plant sling's two 6 link chains (2) to lifting eyes (3) on engine, and one 17 link chain (4) to lifting eye (5) on transfer gearcase.



23. Remove clip pin (6) from headed pin (7) at transfer gearcase right mount.
24. Remove nut (8) and washer (9) from transfer gearcase left mount.
25. Raise power plant slightly to permit removal of headed pin (7) from transfer gearcase right mount. Have helper assist.



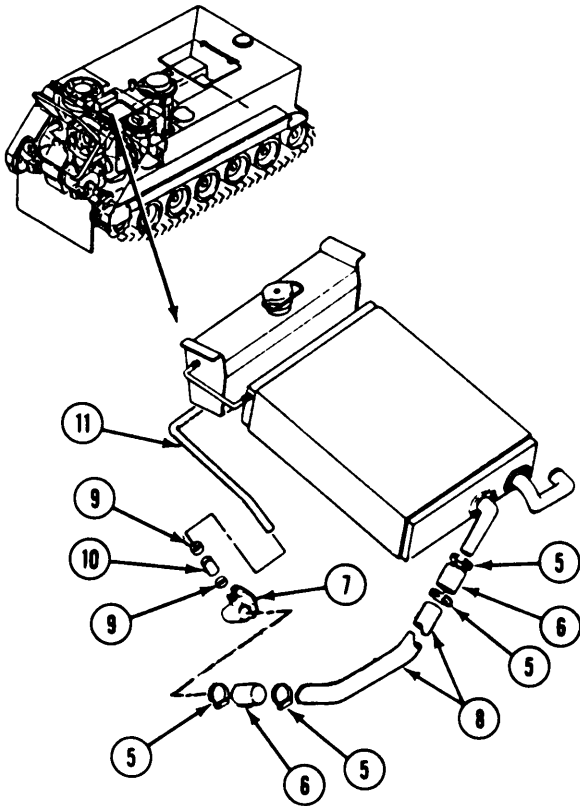
26. Remove four clamps (1) and two hoses (2) from deaeration elbow (3) and tube (4).



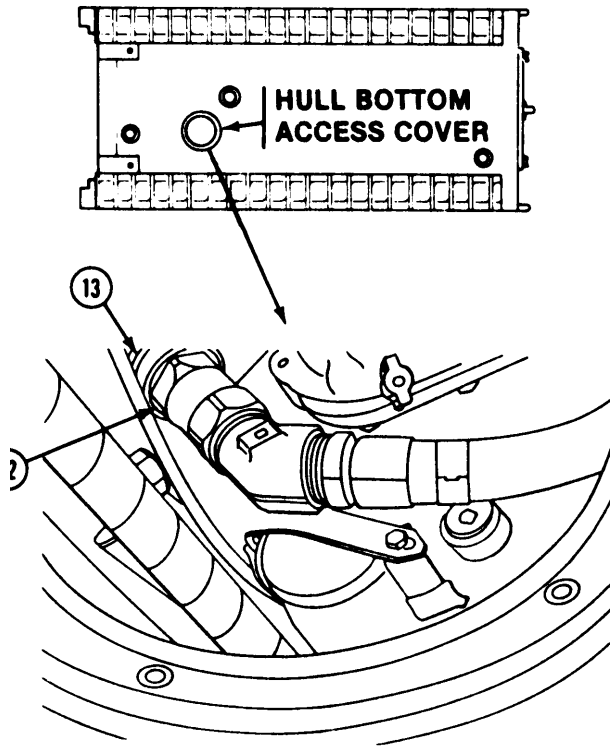
27. Remove four clamps (5) and two hoses (6) from oil cooler elbow (7) and tube (8).

28. Remove tubes (4 and 8) through power plant front access door opening.

29. Remove two clamps (9) and hose (10) from oil cooler elbow (7) and vent tube (11).



30. From underneath carrier, disconnect hose (12) from differential oil pump (13).



**WARNING**

Hanging loads can kill or injure you. Keep away from hanging loads and overhead equipment. Keep hands out of compartment while power plant is being

lifted for removal or lowered for installation.

31. Remove power plant from carrier. Have helper assist.

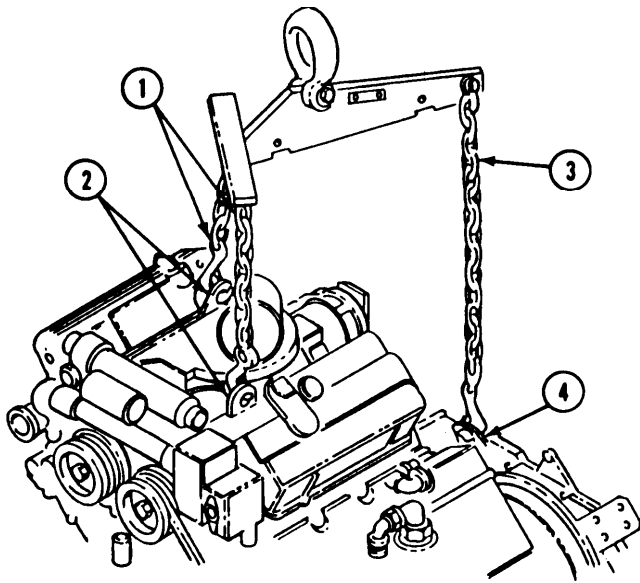
**INSTALL**

**WARNING**



Damaged lifting sling can fail with load. Soldiers can be killed or injured. Do not use damaged slings.

32. If required, attach power plant sling's two 6 link chains (1) to lifting eyes (2) on engine and one 17 link chain (3) to lifting eye (4) on transfer gearcase.



**WARNING**

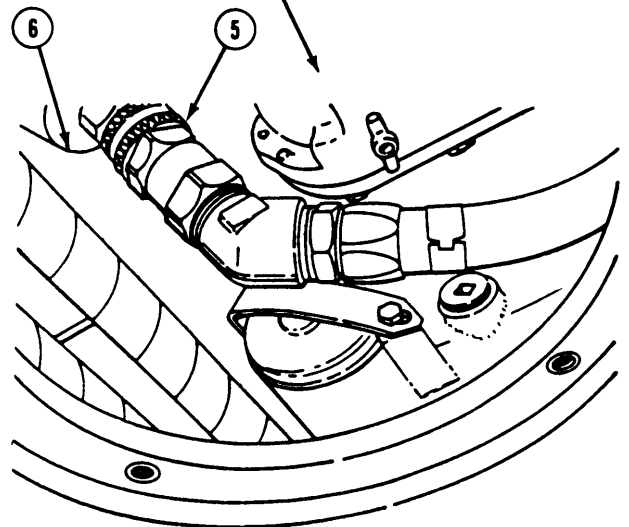
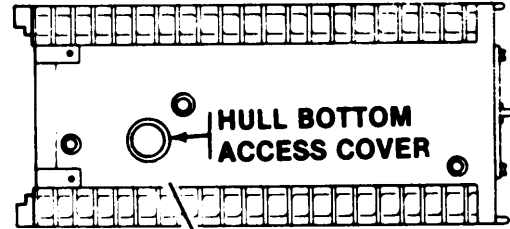


Hanging loads can kill or injure you. Keep away from hanging loads and overhead equipment. Keep hands out of compartment while power plant is being removed or lowered for

lifted for installation.

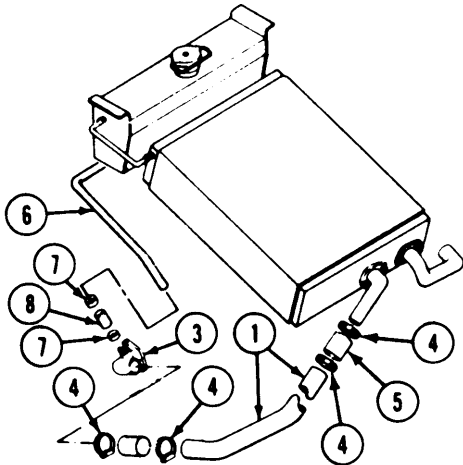
33. Lower power plant into earner. Have helper assist. Do not detach sling.

34. From underneath carrier, connect hose (5) to differential oil pump (6).

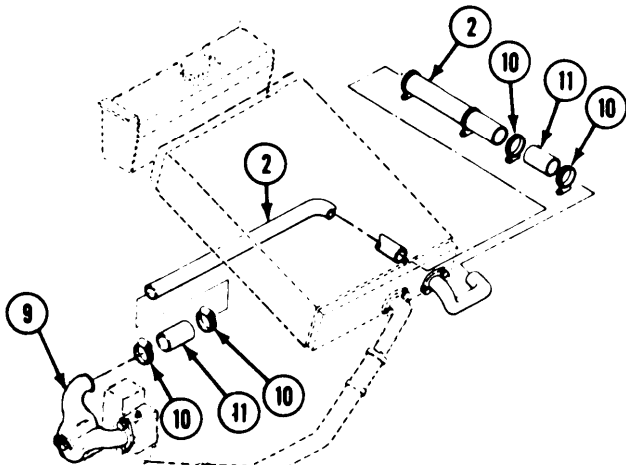


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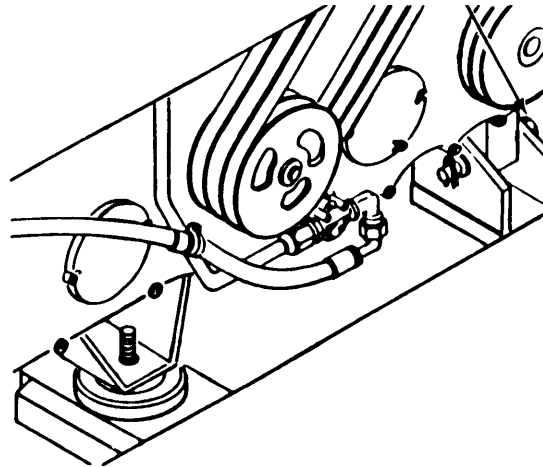
35. Install tubes (1 and 2) through power plant access door opening.
36. Connect tube (1) to oil cooler elbow (3) and radiator with four clamps (4) and two hoses (5).
37. Connect vent tube (6) to oil cooler elbow (3) with two clamps (7) and hose (8).



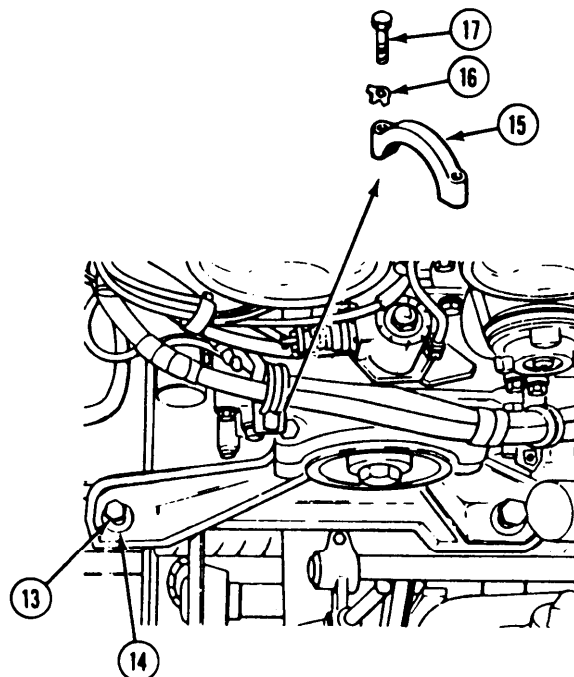
38. connect tube (2) to deaeration elbow (9) and radiator with four clamps (10) and two hoses (11).



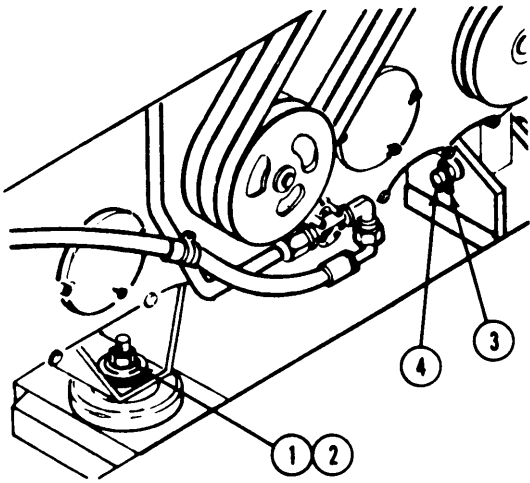
39. Raise power plant slightly and install headed pin (12) in transfer gearbox right mount.



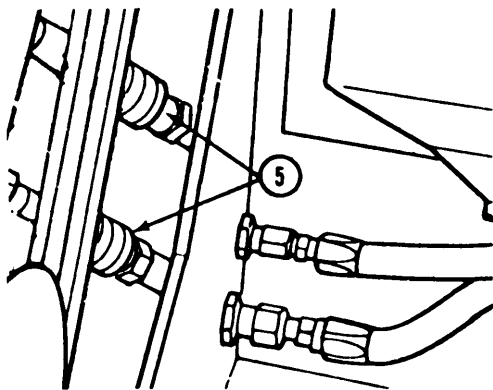
40. Lower power plant and remove lifting sling.
41. Install two washers (13) and new lockbolts (14) in front engine mount base. Tighten lockbolts to 120-130 lb-ft (162-176 N•m) torque. Use torque wrench (Item 96).
42. Install cap (15) with two new key washers (16) and screws (17). Tighten screws to 30-35 lb-ft (41-48 N•m) torque. Use torque wrench (Item 96).



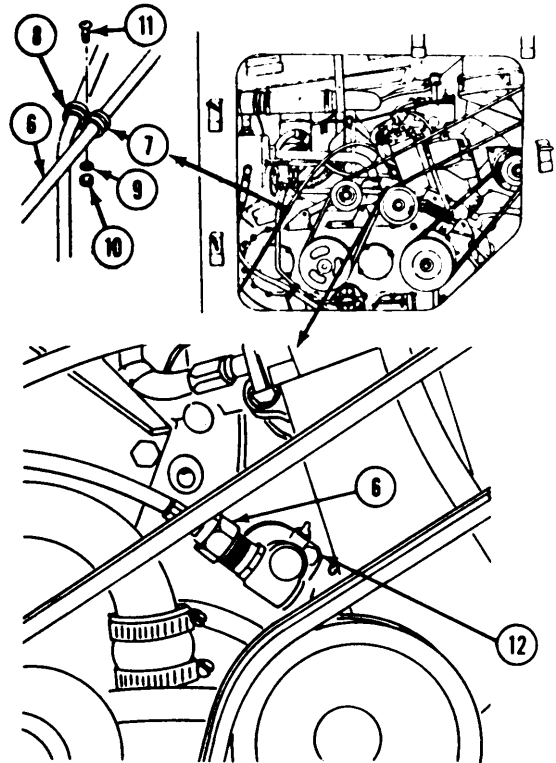
- 43. Install washer (1) and nut (2) on transfer gearcase left mount.
- 44. Tighten nut (2) to 75-80 lb-ft (102-108 N•m) torque. Use torque wrench (Item 96) and socket wrench set.
- 45. Install clip pin (3) on headed pin (4) at transfer gearcase right mount.



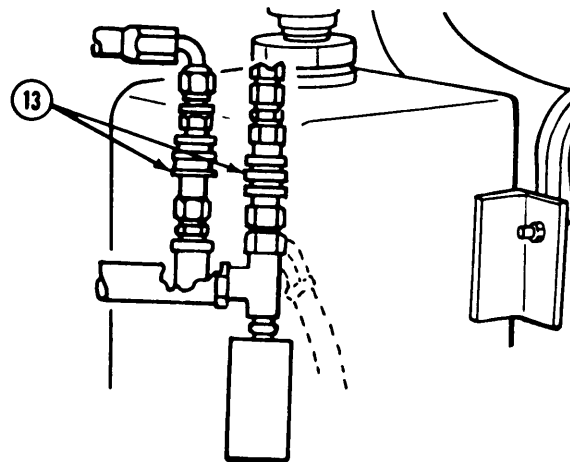
- 46. Connect two fuel hoses at couplings (6).



- 47. Install tachometer cable (6) on tank with clamp (7), clamp (8), washer (9) nut (10) and screw (11).
- 48. Connect tachometer cable (6) to engine adapter (12).



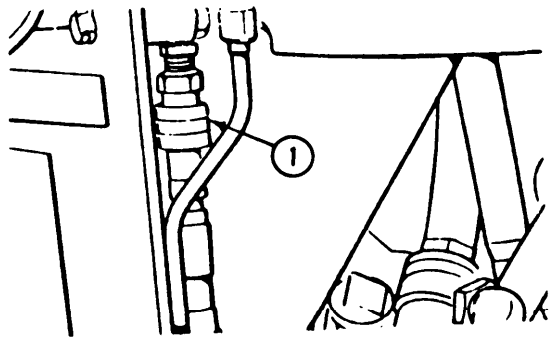
- 49. Connect ramp hydraulic lines at couplings (13) (M741A1 only).



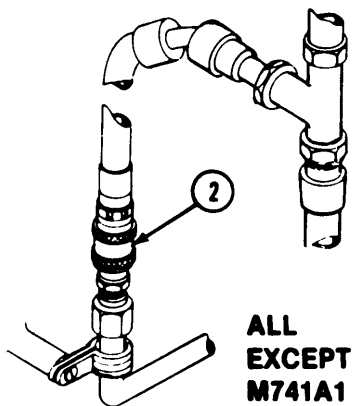
M741A1 ONLY

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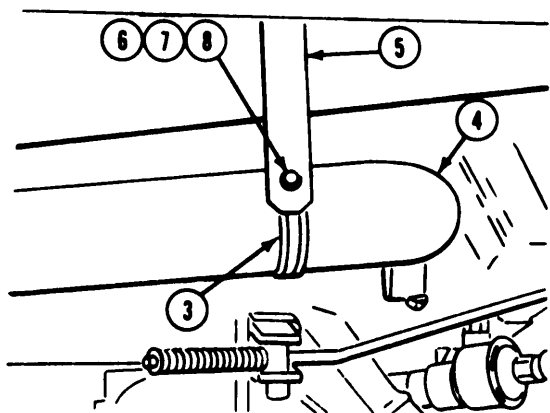
50. Connect ramp hydraulic line at coupling (1) (all except M741A1).



51. Connect ramp hydraulic line at coupling (2) (all except M741A1).



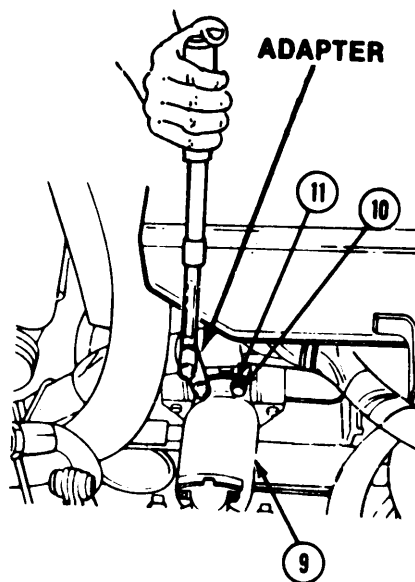
52. Install clamp (3), on radiator inlet tube (4). Secure clamp to hanger (5) with washer (6), screw (7), and nut (8).



**NOTE**

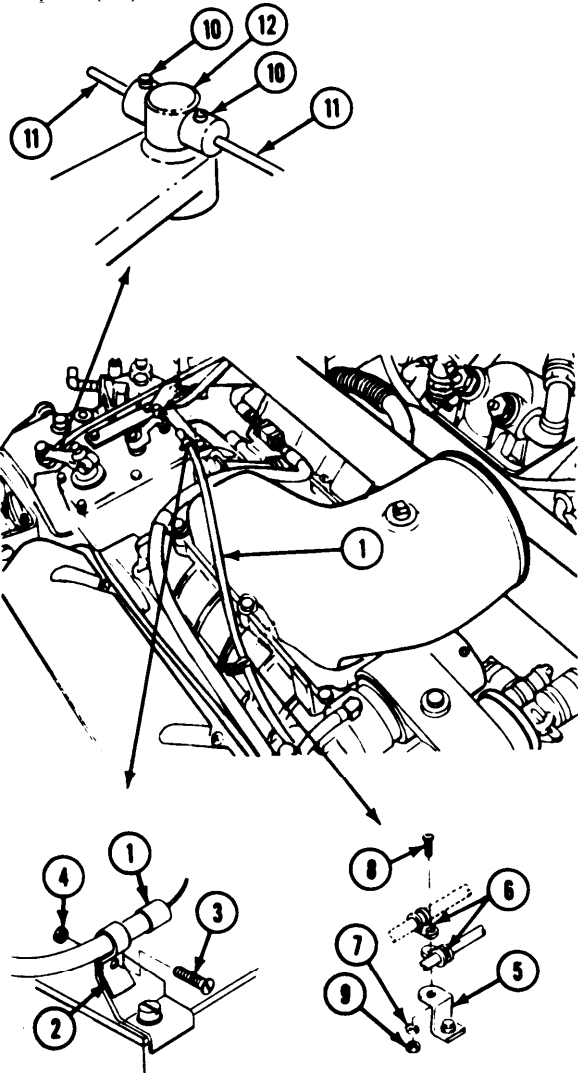
Screws and washers must be clean, dry, and free of lubricants and paint. If your carrier is equipped with 6C universal joints, screws are 3/8-24 x 1-3/4; if equipped with 7C universal joints, screws are 1/20 x 2.

53. Connect propeller shaft (9) to transmission with four new flat washers (10) and four new screws (11). Use torque wrench (Item 96) and adapter to tighten screws. On 6C universal joints, tighten to 35-40 lb-ft (47-54 N•m) torque, and on 7C joints, tighten to 83-100 lb-ft (113-136 N•m) torque, then loosen screws and tighten them to the correct torque again. See page 2-29 for correct readings on torque wrenches with adapters.

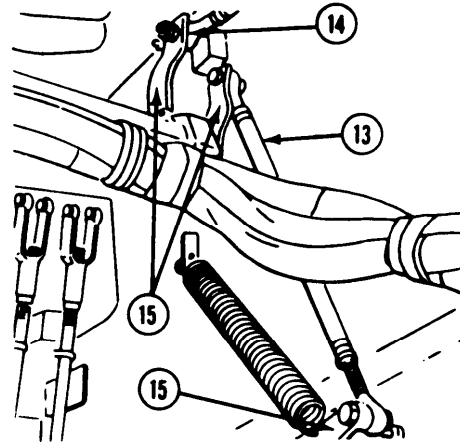


54. Install L&R final drive propeller shafts (page 20-5 and 20-7).

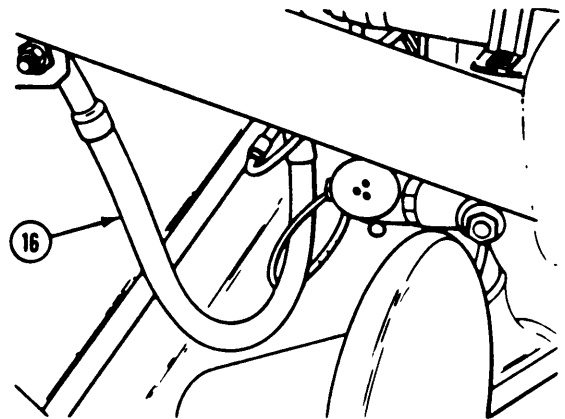
- 55. Install control cable (1) in clamp (2). Secure with screw (3) and nut (4).
- 56. Fasten control cable (1) to engine cylinder-head cover bracket (5) with two clamps (6), washer (7), screw (8), and nut (9).
- 67. Tighten setscrews (10) that secures fuel cutoff control cable (11) to governor arm pin (12).



- 58. Connect accelerator pedal linkage (13) and range selector linkage (14) to bell-cranks (15).

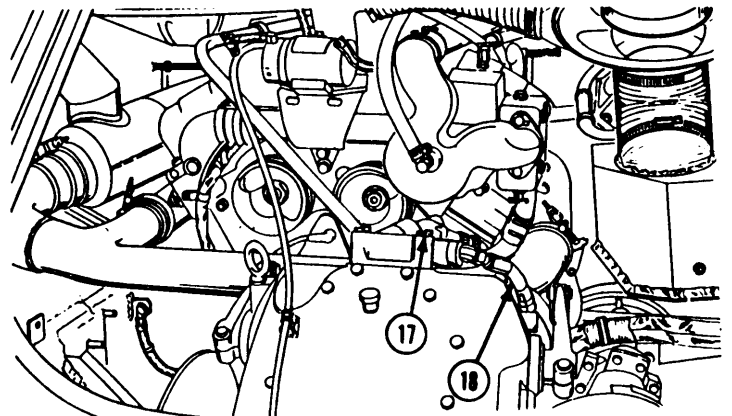


- 59. Connect starter ground lead (16) to hull.



- 60. Connect differential oil inlet hose (17) to differential.

- 61. Connect differential oil temperature lead (18) to differential.



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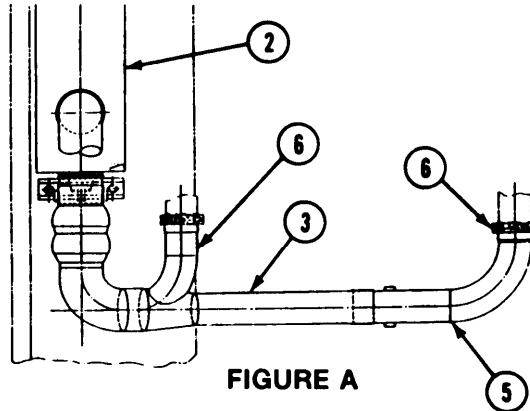
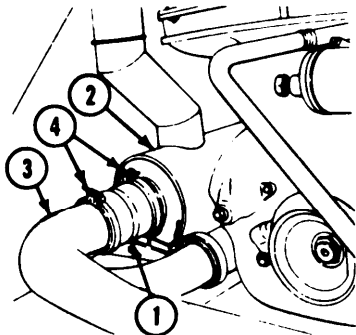
**NOTE**

On carriers with exhausts as shown in Figure A, go to step 63.

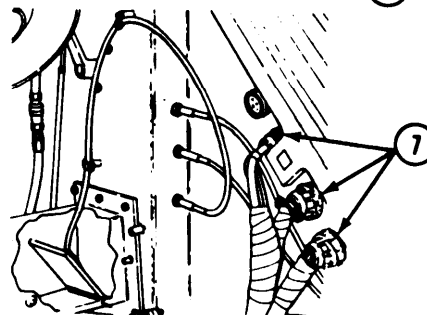
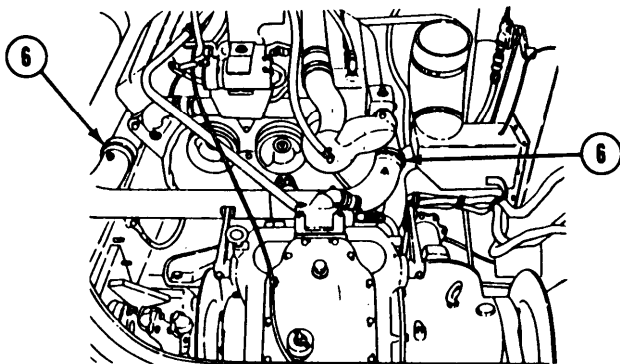
62. Install pipe joint (1) on muffler (2) and exhaust pipe (3). Secure with two clamps (4).

63. Install exhaust pipes (3 and 5) on engine exhaust manifolds. Secure with two clamps (6). Tighten clamps to 192-216 lb-in (22-24 N•m) torque. Use torque wrench (Mire 95) and socket wrench set.

64. Connect three electrical cables (7) at driver's compartment bulkhead.



**FIGURE A**



**FOLLOW-THROUGH STEPS**

1. Install air control valve and housing assembly (page 7-11).
2. Open fuel supply valve at tank (see your -10).
3. Connect battery ground lead (page 13-2).
4. Lower grill (page 6-2).
6. Fill cooling system (page 8-3).
6. Adjust fuel control cutoff cable (page 23-44).
7. Check installation and operation of controls.
8. Start engine (see your -10). Check for leaks and proper installation.
9. Stop/shutdown engine (see your -10).
10. Install power plant bottom access cover (page 24-32).
11. Install power plant rear access panels (page 24-27 or 24-29).
12. Install driver's power plant access panel (page 24-25).

**END OF TASK**



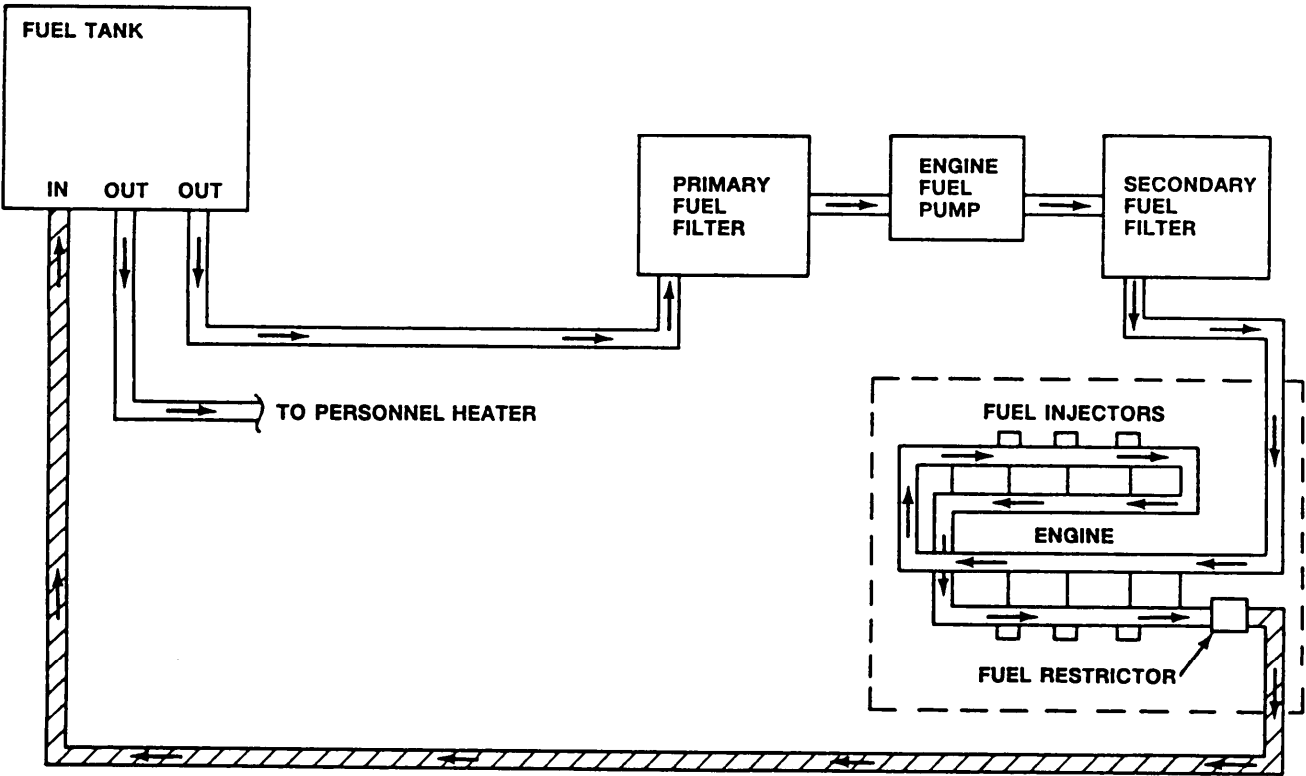
CHAPTER 6  
FUEL SYSTEM MAINTENANCE

Section I. FUEL SYSTEM HOSE REPLACEMENT, DIAGRAMS,  
AND TESTS

TASK INDEX

Task	Page	Task	Page
Fuel Flow Diagram (M113A2, M125A2, M106A2, and M741A1 with Inside Tank or Compartment) . . . . .	6-1	Fuel Flow Diagram (M577A2 and M1068 Only) . . . . .	6-2
		Fuel Flow Diagram (M981 and M1064 with External Fuel Tanks) . . . . .	6-3

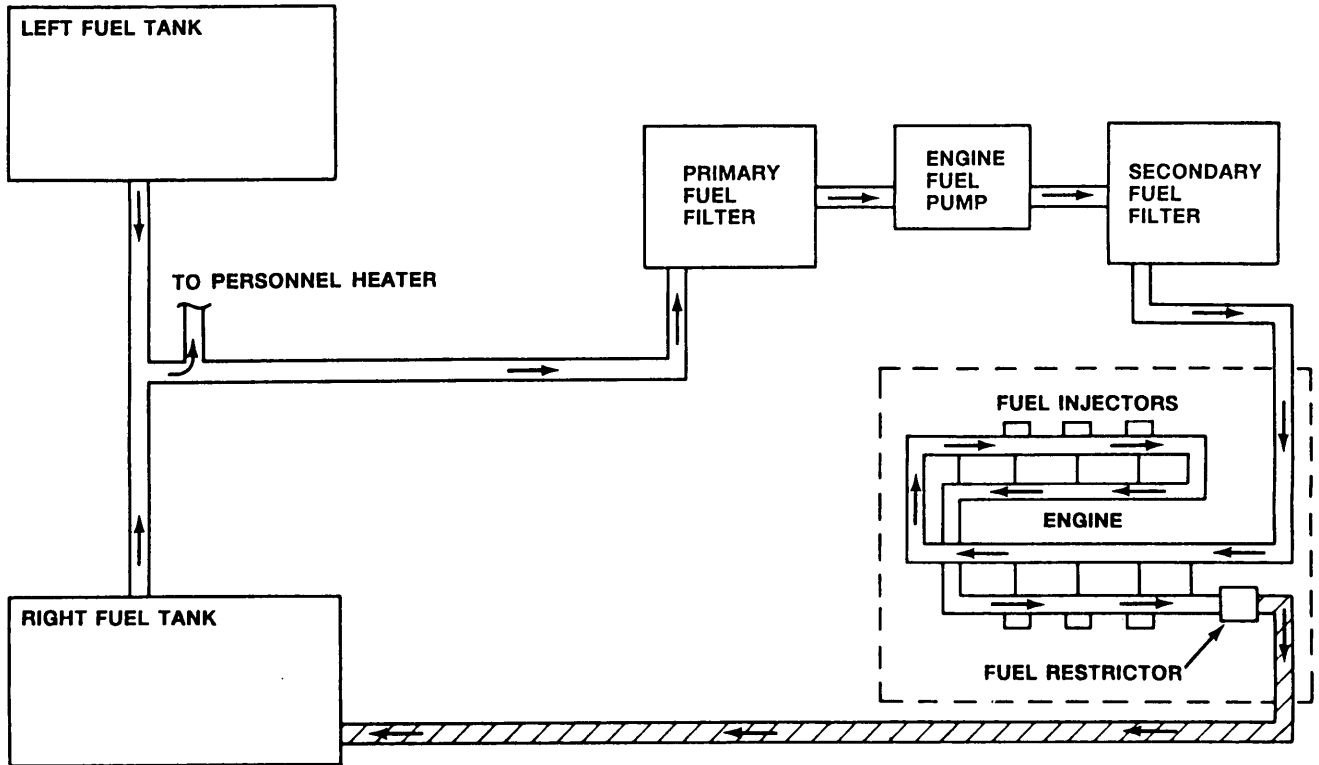
FUEL FLOW DIAGRAM (M113A2, M125A2, M106A2, AND M741A1 WITH INSIDE TANK OR COMPARTMENT)



□ SUPPLY FLOW  
 ▨ RETURN FLOW

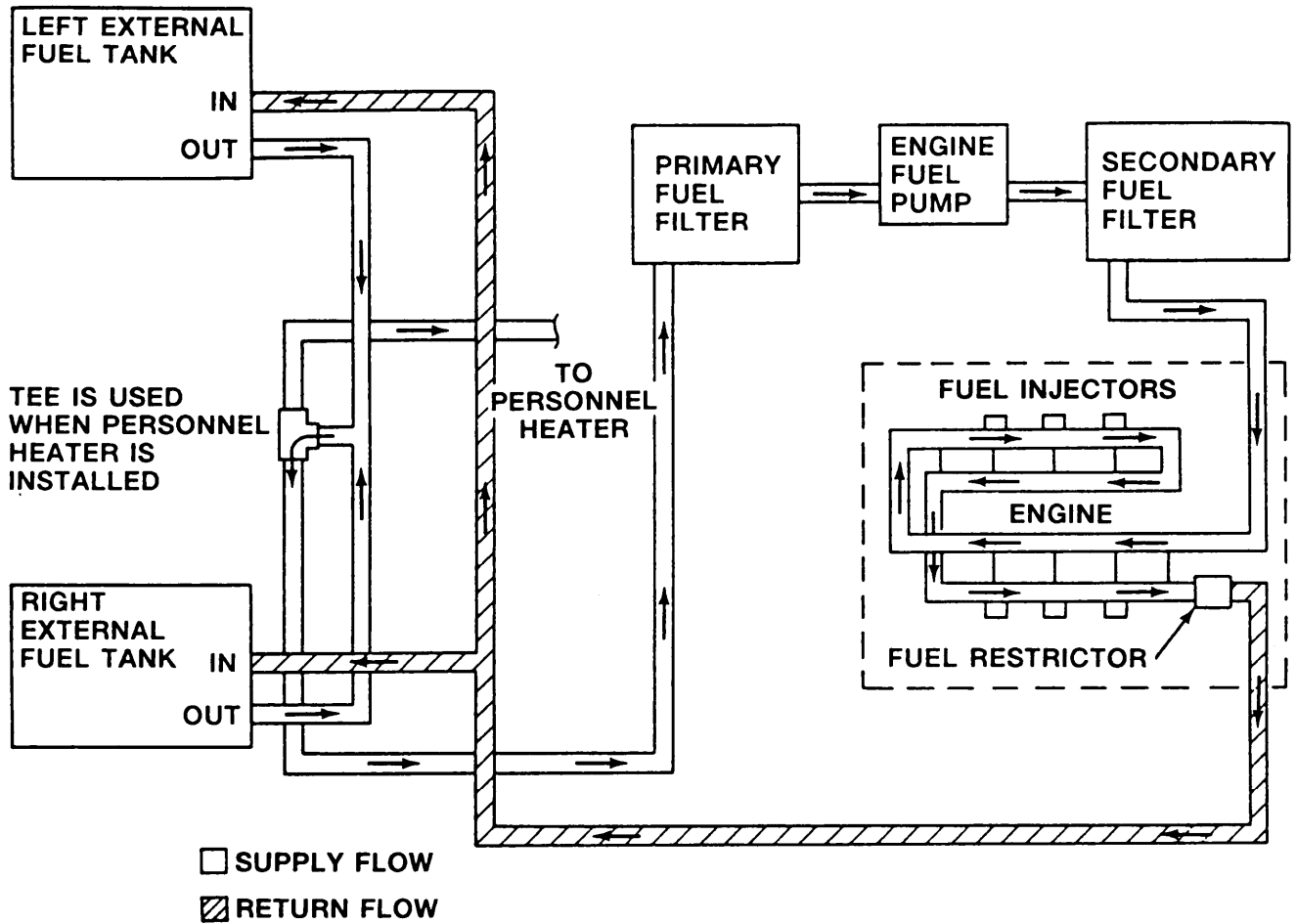
GO TO NEXT PAGE

**FUEL FLOW DIAGRAM (M577A2 AND M1068 ONLY)**



- SUPPLY FLOW
- ▨ RETURN FLOW

**FUEL FLOW DIAGRAM (M981 AND M1064 WITH EXTERNAL FUEL TANKS)**



GO TO NEXT PAGE

**Section II. INSIDE FUEL TANK AND HOSES, TUBES, AND FITTINGS (M113A2, M1059, M577A2, M1068, AND M901A1 ONLY)**

**TASK INDEX**

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---

## DRAIN FUEL TANK (M113A2, M901A1, AND M1059 ONLY)

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Hose assembly (Item 37, App D)

#### Materials/Parts:

Wiping rag (Item 61, App C)  
Suitable size containers at least 95 gal.  
capacity

#### Personnel Required:

Unit Mechanic

---

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Carrier blocked (see your -10)

### DRAIN

1. Place metal container (1) of suitable capacity directly behind carrier to the left of lowered ramp.



#### WARNING

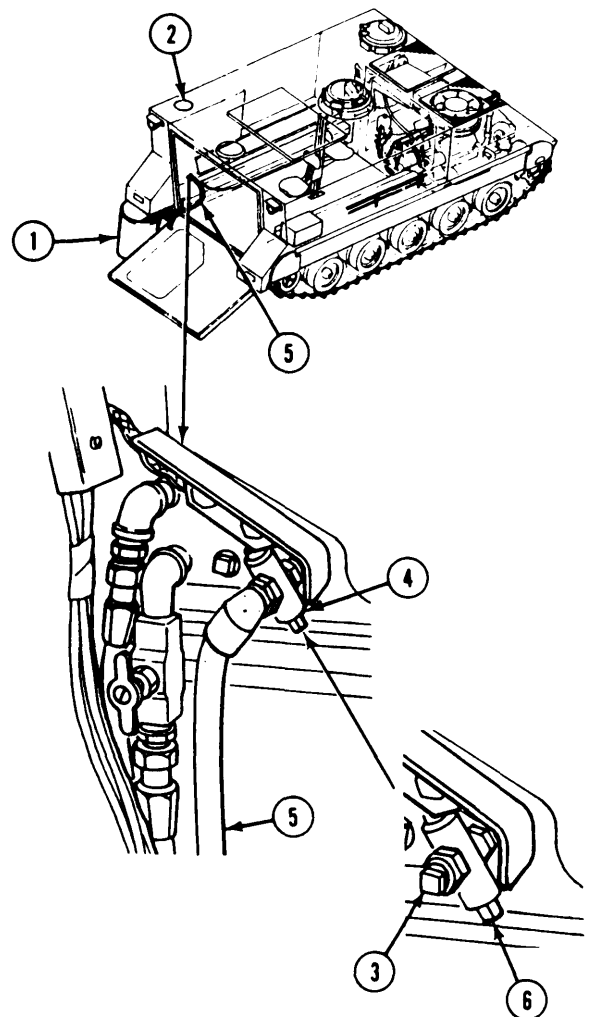
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

Use wiping rag to wipe up any spilled fuel.

2. Place container (1) against side of lowered ramp and rear of carrier to get metal-to-metal contact. Make sure there is a good ground.
3. Open fuel filler combat cover (2) and remove filler cap (see your -10).
4. Remove square head pipe plug (3) from drain valve (4).
5. Attach drain hose (5) to drain valve. Place open end of hose (5) in container (1).
6. Turn square fitting (6) on valve (4). Drain fuel from tank.
7. When tank is drained, remove drain hose (5) from valve (4). Insert plug (3).

8. Turn fitting (6) on valve (4) to close drain valve.
9. Install fuel filler cap and close filler combat cover (2) (see your -10).



GO TO NEXT PAGE

---

**FOLLOW-THROUGH STEPS**

1. After maintenance has been performed, fill fuel tank (see your -10).
2. Connect battery ground lead (page 13-2).
2. Start engine (see your -10).
3. Raise and lock ramp (see your -10).
4. Stop/shutdown engine (see your -10).

---

**END OF TASK**

## REPLACE COMBAT FILLER COVER AND LOCK (M113A2, M1059, M577A2, M1068, AND M901A1 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

spring pin  
Spring pin

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Ramp lowered (see your -10)

**Personnel Required:**

Unit Mechanic

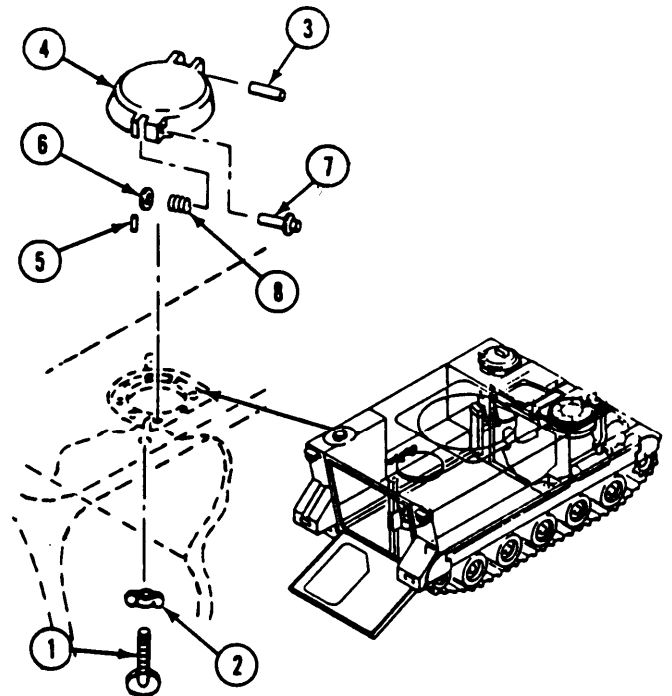
### REMOVE

**NOTE**

If threads on thumbscrew were previously deformed, do step 1.

1. Grind away deformed threads on thumbscrew (1). Remove wing nut (2) and thumbscrew.
2. Loosen wing nut (2) and thumbscrew (1) above fuel tank inside earner.
3. Remove spring pin (3) and cover (4) from top of hull. Discard spring pin.
4. Remove spring pin (5), washer (6), pin (7), and spring (8) from cover (4). Discard spring pin.

6. Secure spring (8), pin (7), and washer (6) to cover (4) with new spring pin (5).
7. Secure cover (4) to hull with new spring pin (3).
8. Turn thumbscrew (1) into lock position. Tighten wing nut (2).



### INSTALL

**NOTE**

If thumbscrew and wing nut were removed, do step 5.

5. Screw wing nut (2) on thumbscrew (1) and install thumbscrew inside carrier (4). Deform threads on thumbscrew. Tighten wing nut.

### FOLLOW-THROUGH STEPS

1. Raise and lock ramp (see your -10).
2. Stop/shutdown engine (see your -10).

END OF TASK

---

## REPLACE FILLER CAP AND STRAINER PARTS (M1059, M113A2, M577A2, M1068, AND M901A1 ONLY)

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Non-electrical wire (Item 31, App C)  
Gasket

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

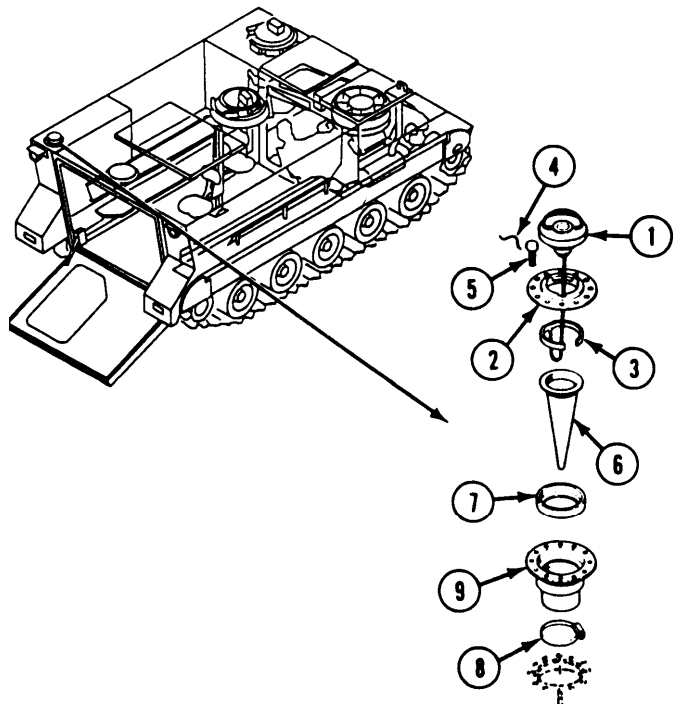
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Combat filler cover and lock open  
(see your -10)

---

### REMOVE

1. Unfasten fuel filler cap and chain assembly (1) from filler neck (2).
2. Compress C ring (3) and remove from filler neck (2).
3. Remove lockwire (4), 12 screws (5), filler neck (2), strainer (6), retainer (7), and filler cap and chain assembly (1) from hull top. Discard lockwire.
4. Loosen clamp (8) that secures boot (9) to inside fuel tank. Remove boot through top of hull.

7. Install new lockwire (4) through heads of 12 screws (5). Secure with double twist method.
8. Compress C ring (3) and install through filler neck (2).
9. Fasten filler cap and chain assembly (1) in filler neck (2).



### INSTALL

5. Aline mounting holes in boot (9) with mounting holes in hull top. Secure boot (9) to inside fuel tank neck with clamp (8).
6. Secure filler neck (2), retainer (7), strainer (6), and filler cap and chain assembly (1) to hull top with 12 screws (5).

---

### FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Combat filler cover closed and locked (see your -10).

---

**END OF TASK**



## REPLACE FUEL QUANTITY TRANSMITTER (M113A2, M901A1, AND M1059 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Nonelectrical wire (Item 31, App C)  
Gasket

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

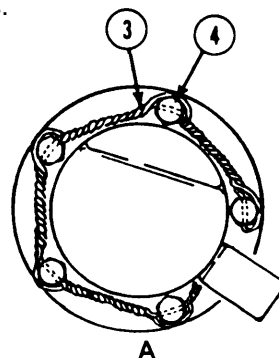
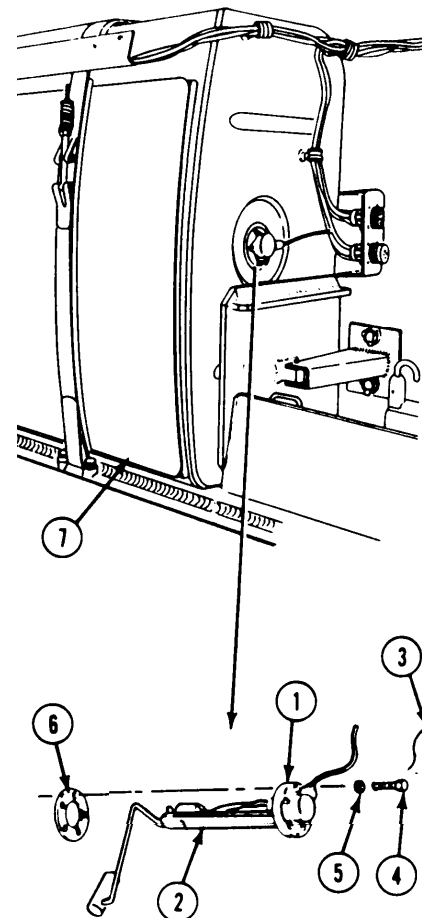
Engine stopped/shutdown (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel tank drained (page 6-5 )

### REMOVE

1. Disconnect circuit 28 lead (1) from transmitter (2).
2. Remove lock wire (3) from five screws (4). Discard lock wire.
3. Remove five screws (4), washers (5), transmitter (2), and gasket (6) from fuel tank (7). Discard gasket.

### INSTALL

4. Place new gasket (6) and transmitter (2) in fuel tank (7). Secure with five washers (5) and screws (4).
5. Secure five screws (4) with new lockwire. See figure A.
6. Connect circuit 28 lead (1) to transmitter (2).
7. Fill fuel tank (see your -10).
8. Check fuel tank for leaks.



GO TO NEXT PAGE

---

**FOLLOW-THROUGH STEPS**

1. Connect battery ground lead (page 13-2).
2. Raise and lock ramp (see your -10).
3. Check that fuel quantity transmitter works properly (see your -10).
4. Stop/shutdown engine (see your -10).

---

**END OF TASK**

## REPIACE FUEL TANK (M113A2, M901A1, AND M1059 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-11). Disassemble (page 6-14). Clean, Inspect, and Repair (page 6-15). Assemble (page 6-15). Install (page 6-17).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
 Socket Wrench Set (Item 89, App D)  
 Torque Wrench (Item 95, App D)  
 Torque Wrench (Item 97, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
 Tab washer (10)  
 Cotter pin  
 Lockwasher (6)  
 Self-locking nut (6)

#### Personnel Required:

Unit Mechanic

#### Personnel Required: (cont):

Helper (H)

#### References:

See your -10

#### Equipment Conditions:

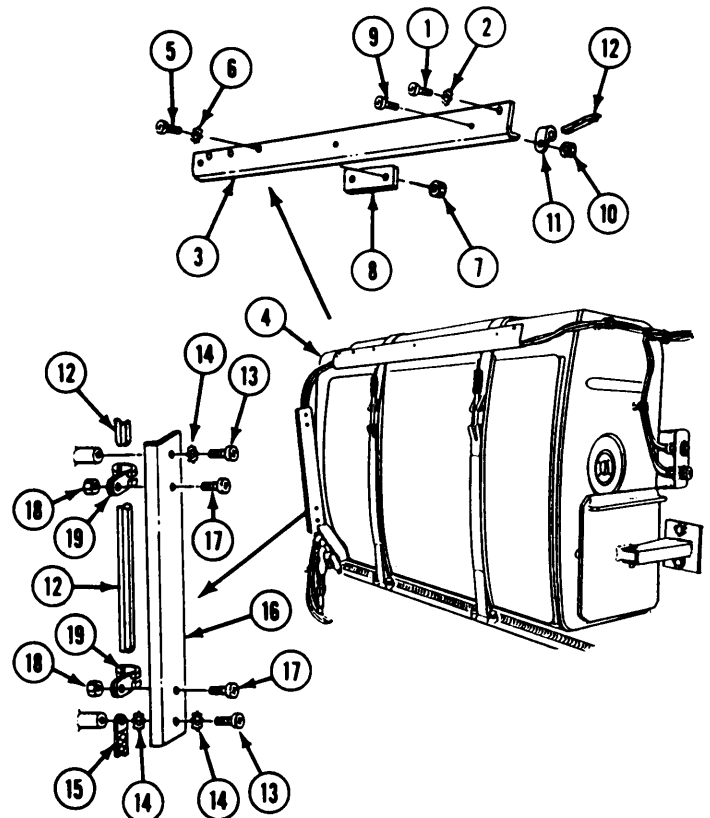
Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Fuel tank drained (page 6-5)  
 Fuel filler neck and boot removed (page 6-8)  
 Fuel quantity transmitter removed (page 6-9)

### REMOVE

#### NOTE

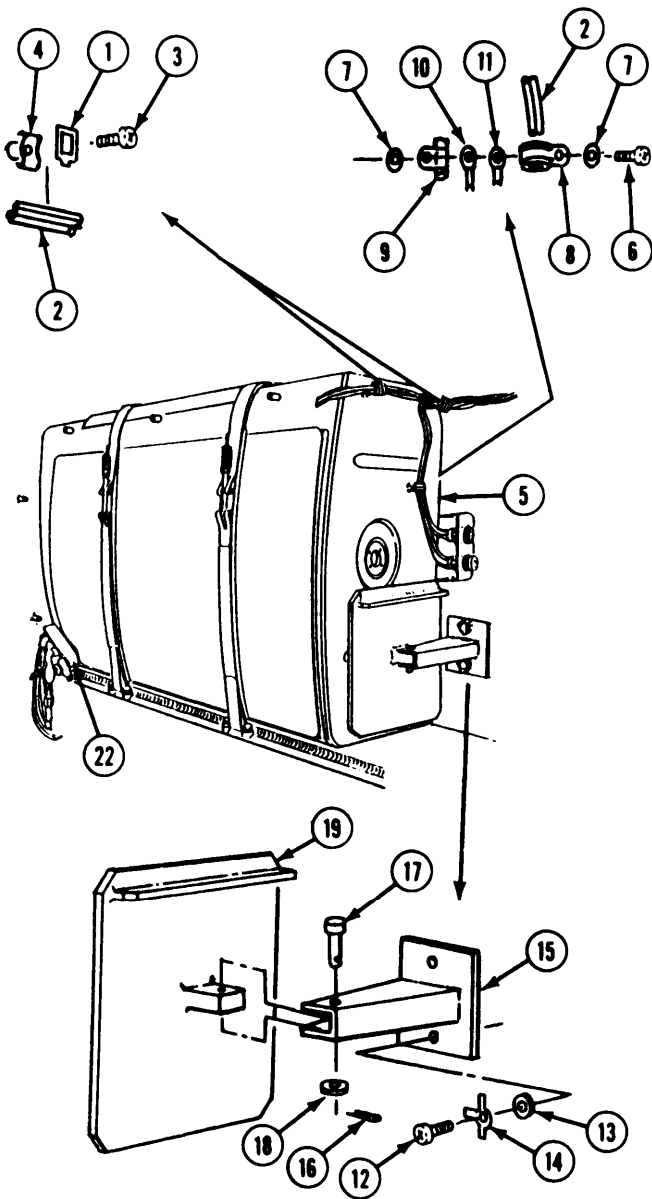
Permanent fuel tank repair is authorized at depot only. For temporary repair (page 6-21).

1. Remove two screws (1), lockwashers (2), and wiring harness cover (3) from fuel tank (4). Discard lockwashers.
2. Remove two screws (5), lockwashers (6), locknuts (7), and access cover (8) from cover (3). Discard lockwashers and locknuts.
3. Remove three screws (9), locknuts (10), clamps (11), and wiring harness (12) from cover (3). Discard locknuts.
4. Remove two screws (13), three lockwashers (14), ground lead (15), and wiring harness guard (16) from hull. Discard lockwashers.
5. Remove two screws (17), locknuts (18), clamps (19), and wiring harness (12) from guard (16). Discard locknuts.

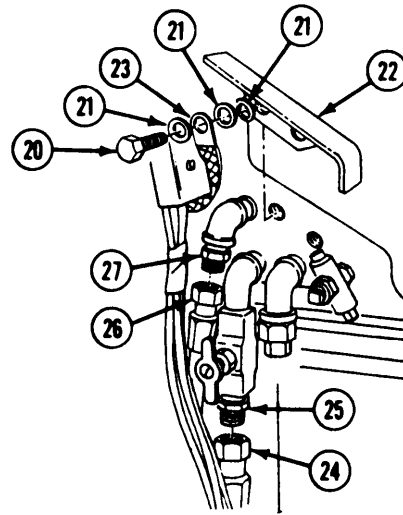


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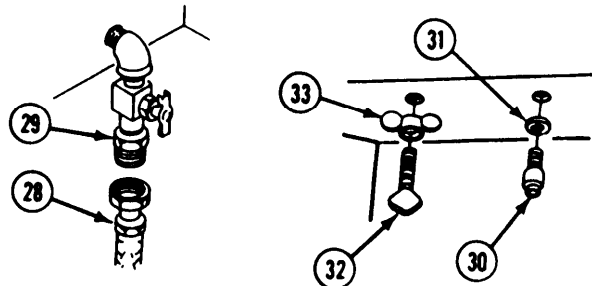
6. Remove two clips (1), harness (2), screws (3), and cradles (4) from front end of fuel tank (5).
7. Remove screw (6), two washers (7), clamp (8), condenser (9), and two ground leads (10 and 11), from harness (2) and fuel tank (5).
8. Remove two screws (12), flat washers (13), key washers (14), and bracket (15) from hull at front end of fuel tank (5). Discard key washers.
9. Remove cotter pin (16), headed pin (17), washer (18), and restraint plate (19) from bracket (15). Discard cotter pin.



10. Remove two screws (20), five lockwashers (21), fuel tank guard (22), and ground lead (23) from fuel tank (5). Discard lockwashers.
11. Disconnect fuel supply hose (24) from adapter (25).
12. Disconnect fuel return hose (26) from adapter (27).
13. Disconnect heater fuel supply hose (28) from fuel shutoff valve (29) (when personnel heater is installed).
14. Remove litter kit mount pin (30) and lockwasher (31) from hull top. Discard lockwasher.
15. Remove thumbscrew (32) and wing nut (33) from hull top.

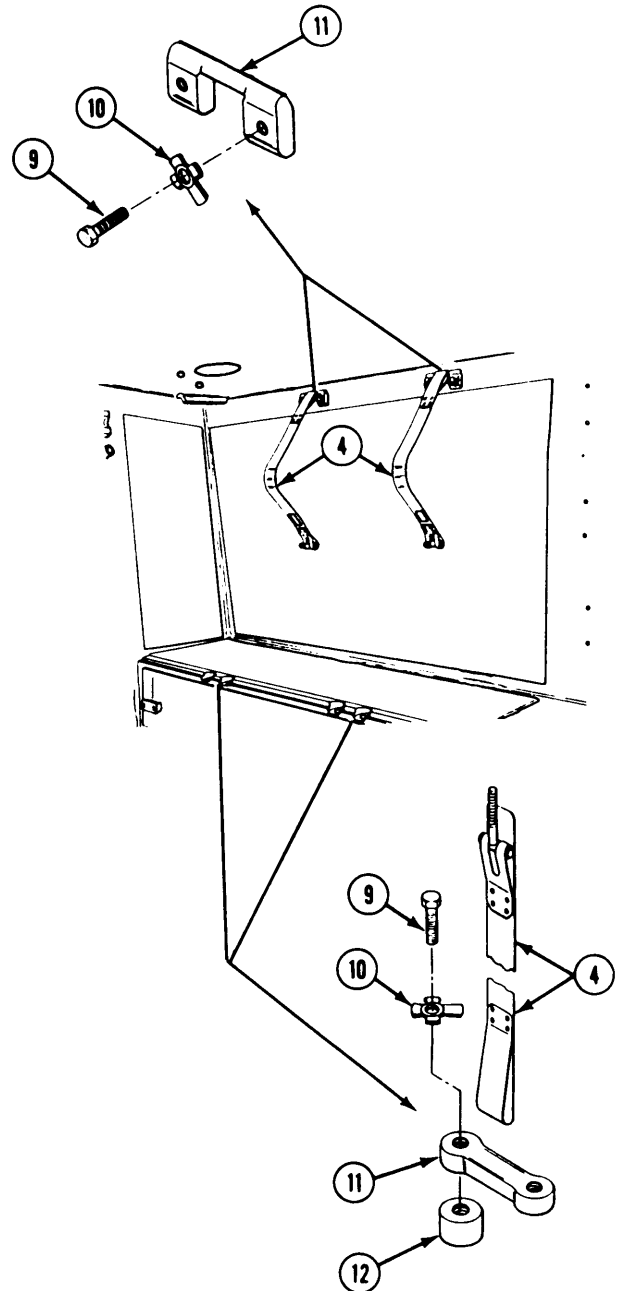
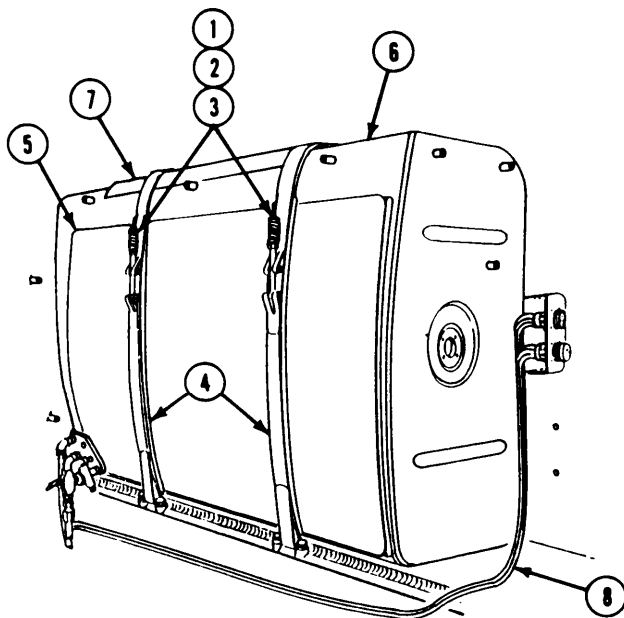


**WITHOUT PERSONNEL HEATER INSTALLED**



**WITH PERSONNEL HEATER INSTALLED**

16. Remove two locknuts (1), springs (2), and four washers (3) from four bands (4). Discard locknuts.
17. Remove shield (5) from inboard side of fuel tank (6).
18. Remove retainer (7) from top side of fuel tank (6).
19. Position harness (8) to clear top of fuel tank (6). Remove fuel tank from carrier.
20. Remove four screws (9), key washers (10), two brackets (11), and bands (4). Discard key washers.
21. Remove four screws (9), key washers (10), two brackets (11), four spacers (12), and two bands (4). Discard key washers.



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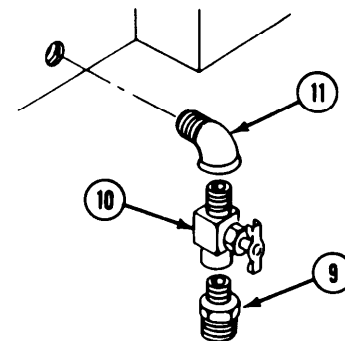
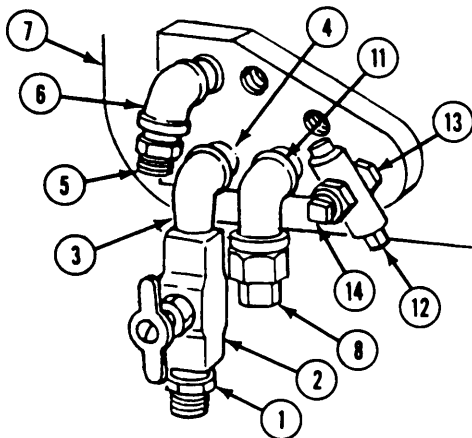
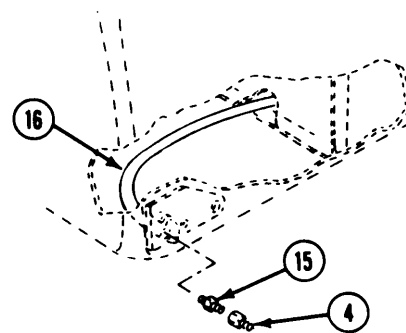
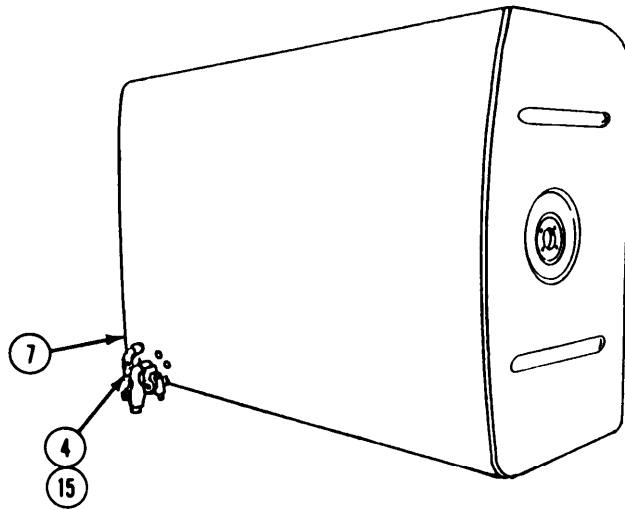
**DISASSEMBLE**

- 22. Remove adapter (1) from fuel shutoff valve (2).
- 23. Remove shutoff valve (2) from elbow (3).
- 24. Remove elbow (3) from adapter (4).
- 25. Remove adapter (5) from elbow (6).
- 26. Remove elbow (6) from fuel tank (7).

**NOTE**

If heater is installed, go to step 28.

- 27. Remove pipe plug (8) and elbow (11) from fuel tank (7) (without personnel heater installed).
- 28. Remove adapter (9), shutoff valve (10), and elbow (11) from fuel tank (7) (with personnel heater installed).
- 29. Remove fuel drain valve (12) from nipple (13). Remove drain plug (14) from drain valve (12).
- 30. Remove nipple (13) from fuel tank (7).
- 31. Remove adapter (4), adapter (15), and tube (16) from fuel tank (7).

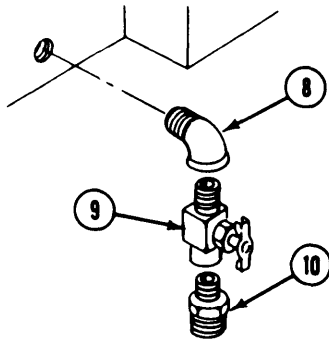


**WITHOUT PERSONNEL HEATER INSTALLED**

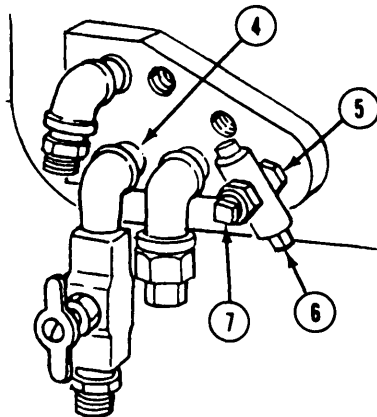
**WITH PERSONNEL HEATER INSTALLED**

## CLEAN, INSPECT, AND REPAIR

32. Clean hull, retainer, shield, and pad surface thoroughly so that metal and rubber surfaces are clean and dry.
33. Check fittings. Repair or replace parts that have stripped threads.
34. Check pads on bottom of tank retainer and on hull, and rubber strips on both sides of shield. Replace missing, cut, broken, or cracked pads and rubber strips (page 25-243).
35. Check decals. Replace decals that cannot be read (page 25-226).



**WITH PERSONAL HEATER INSTALLED**



**WITHOUT PERSONNEL HEATER INSTALLED**

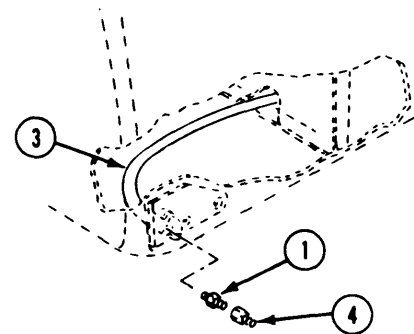
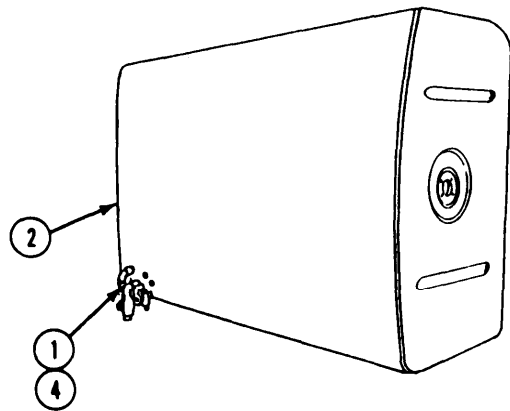
## ASSEMBLE

36. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.
37. Install adapter (1) in fuel tank (2).
38. Install tube (3) through adapter (1) and guide tube into tank baffle from fuel filler opening.
39. Install adapter (4) on adapter (1).
40. Install nipple (5) in fuel tank (2).
41. Install fuel drain valve (6) on nipple (5). Install drain plug (7) in drain valve (6).

### NOTE

If personnel heater is installed, go to step 43.

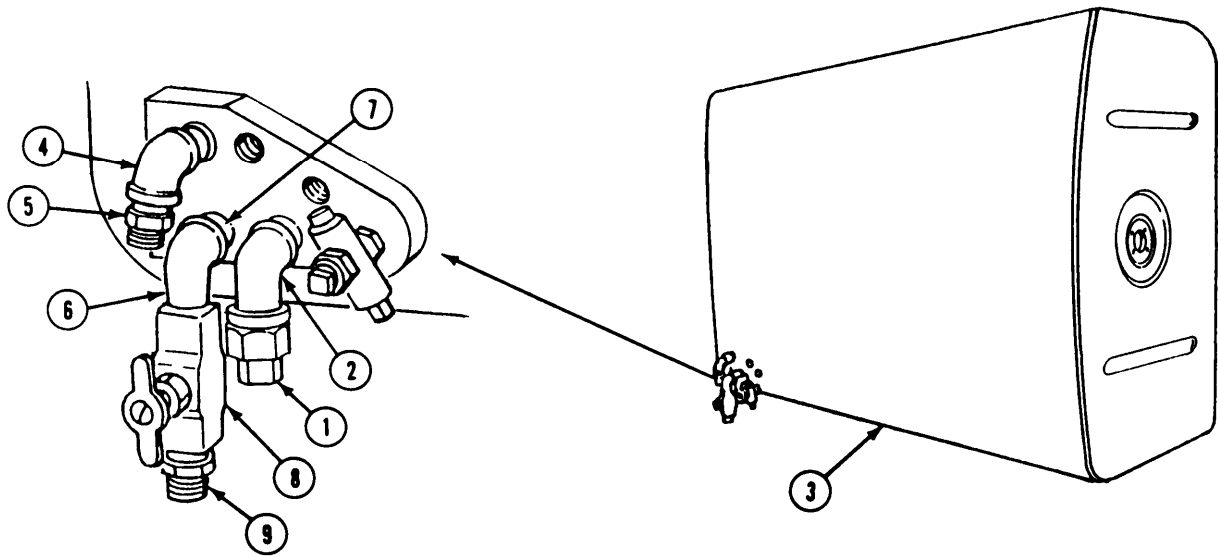
42. Install elbow (8), shutoff valve (9), and adapter (10) in fuel tank (2) (when personnel heater is installed).



GO TO NEXT PAGE

- 43. Install pipe plug (1) and elbow (2) in fuel tank (3) (without personnel heater installed).
- 44. Install elbow (4) in fuel tank (3).
- 45. Install adapter (5) in elbow (4).

- 46. Install elbow (6) in adapter (5).
- 47. Install fuel shutoff valve (8) on elbow (6).
- 48. Install adapter (9) in fuel shutoff valve (8).



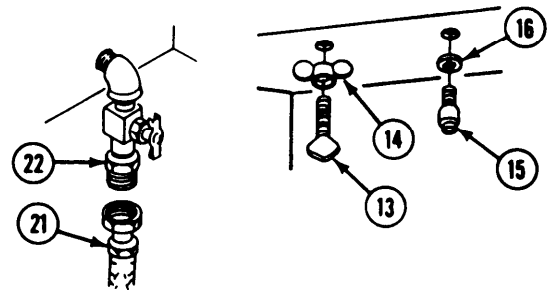
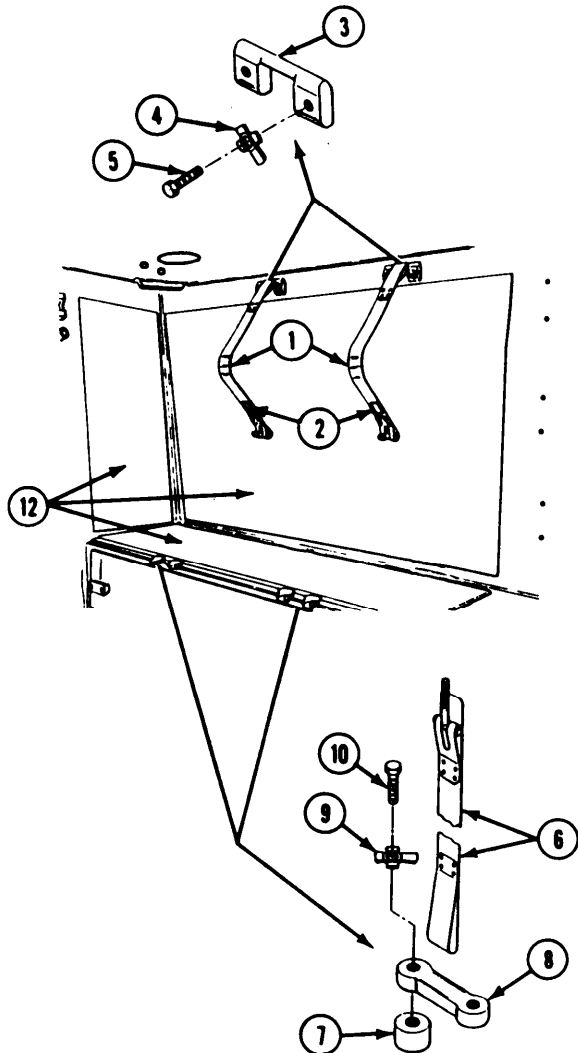
**WITHOUT PERSONNEL HEATER INSTALLED**



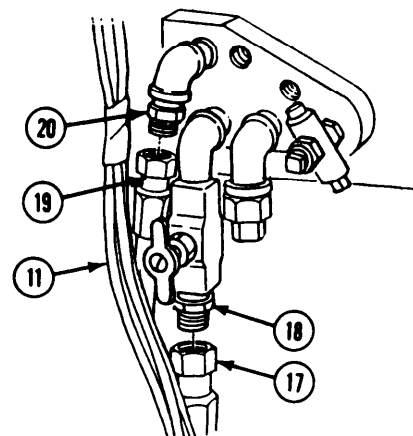
**INSTALL**

- 49. Secure bands (1) with two decals (2) to hull with two brackets (3), four new key washers (4), and screws (5). Tighten screws to 40-45 lb-ft (54-61 N•m) torque. Use torque wrench (Item 97).
- 50. Secure bands (6) to hull with four spacers (7), two anchor straps (8), four new key washers (9), and screws (10). Tighten screws to 168-204 lb-in (19-23 N•m) torque. Use torque wrench (Item 95) and rocket wrench set.
- 51. Position wiring harness (11) to clear fuel tank installation area (12). Install fuel tank in carrier.

- 52. Install thumbscrew (13) and wingnut (14) in hull top.
- 53. Install litter kit mount pin (15) and new lockwasher (16) in hull top.
- 54. Connect fuel supply hose (17) to adapter (18).
- 55. Connect fuel return hose (19) to adapter (20).
- 56. Connect heater fuel supply hose (21) to shutoff valve (22) (when personnel heater is installed).



**WITH PERSONNEL HEATER INSTALLED**



**WITHOUT PERSONNEL HEATER INSTALLED**

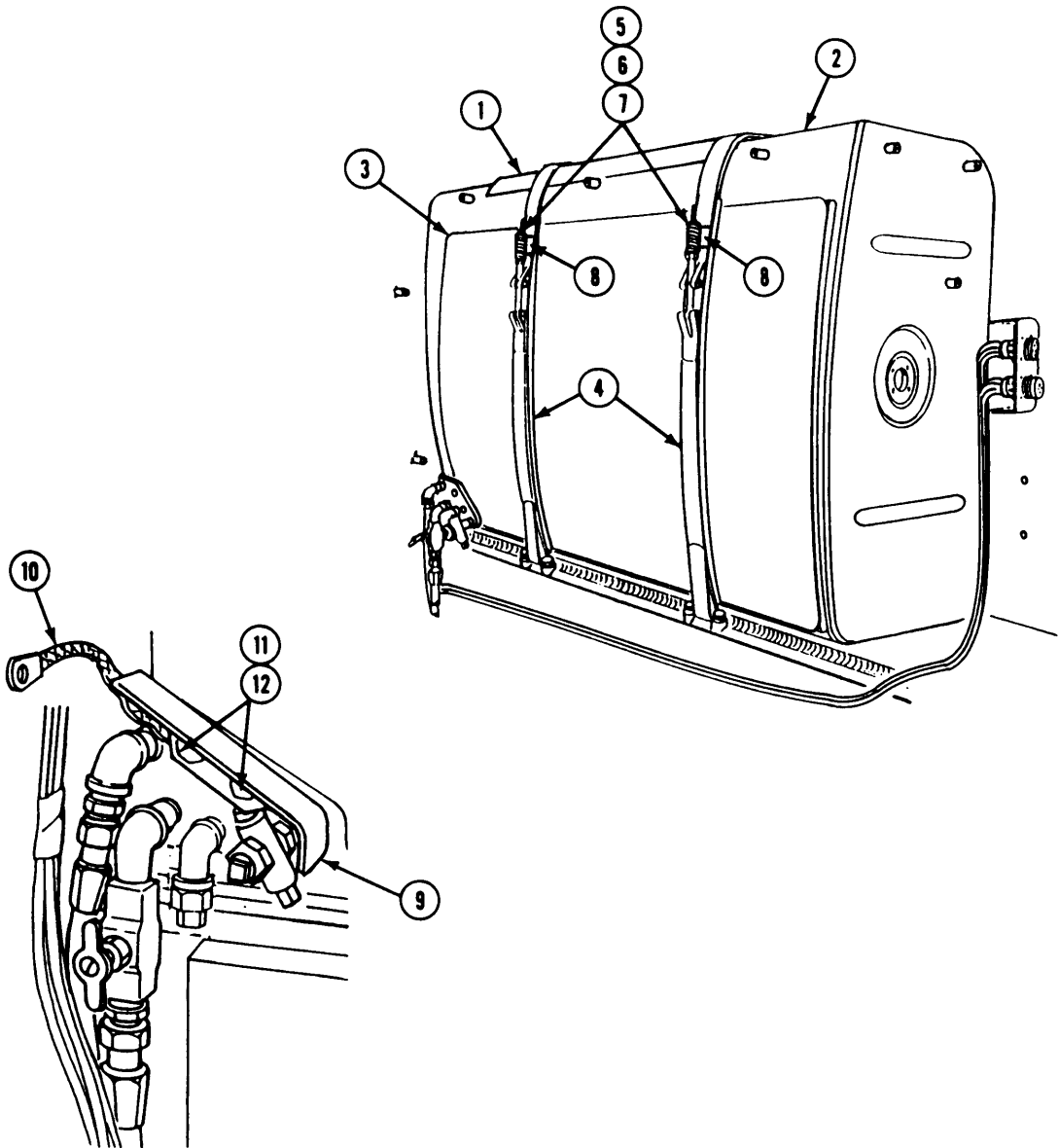
GO TO NEXT PAGE

57. Place retainer (1) on top side of fuel tank (2).

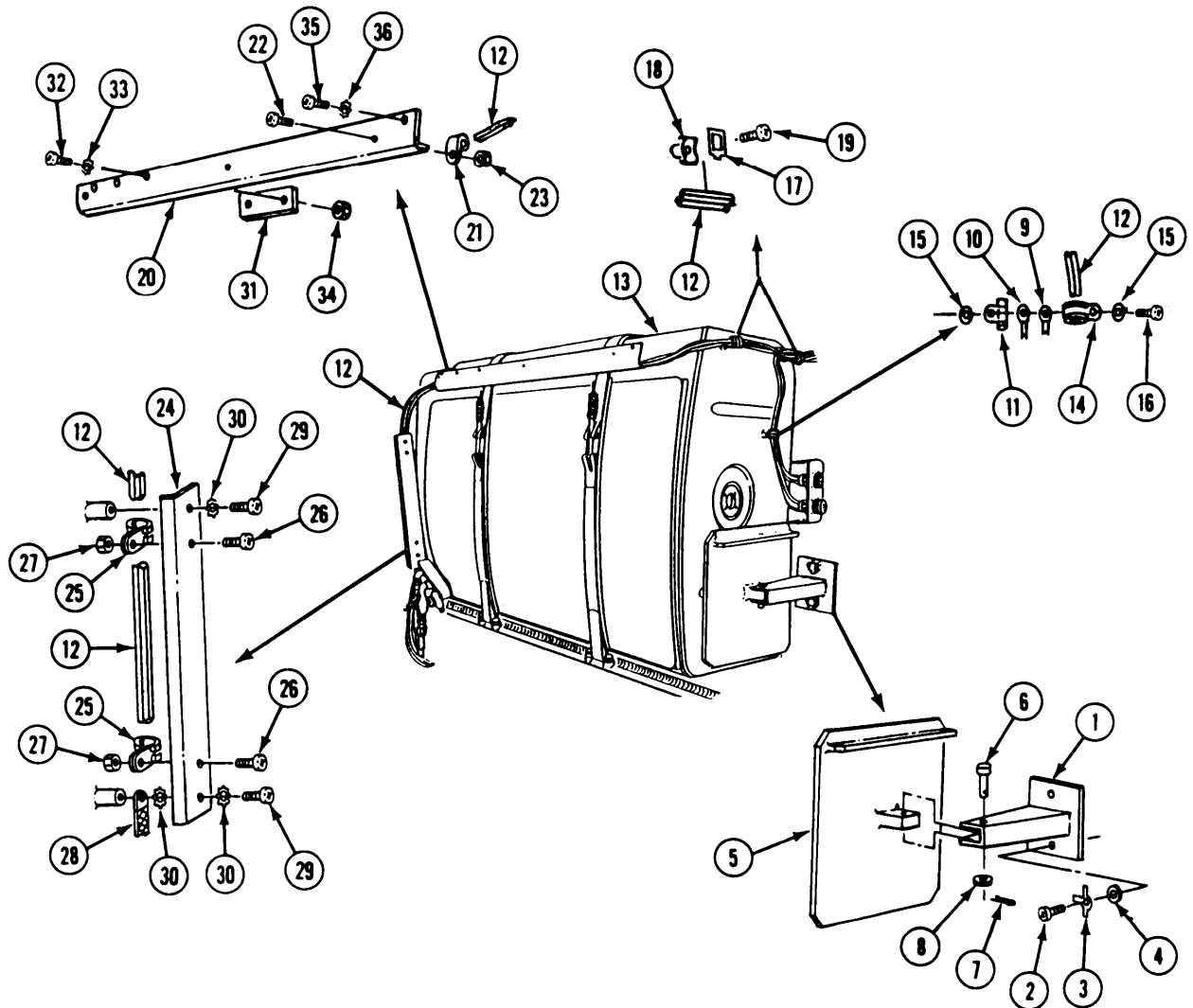
58. Place shield (3) on inboard side of fuel tank (2).

59. Secure fuel tank (2) to hull with four straps (4), two springs (5), nuts (6), and four washers (7). Adjust strap springs as shown on decal (8).

60. Install fuel line guard (9) and ground lead (10) on fuel tank (2). Secure with two screws (11) and five new lockwashers (12).



61. Secure bracket (1) to hull with two screws (2), new key washers (3), and flat washers (4). Tighten screws to 40-45 lb-ft (54-61 N•m) torque. Use torque wrench (Item 97).
62. Install restraint plate (5) on bracket (1). Secure with headed pin (6), new cotter pin (7), and washer (8).
63. Install two ground leads (9 and 10), condenser (11), and wiring harness (12) on fuel tank (13). Secure with clamp (14), two washers (15), and screw (16).
64. Install wiring harness (12) on front end of fuel tank (13). Secure with two clips (17), cradles (18), and screws (19).
65. Install wiring harness (12) on wiring harness cover (20). Secure with three clamps (21), screws (22), and new locknuts (23).
66. Install wiring harness (12) on wiring harness guard (24). Secure with two clamps (25), screws (26), and nuts (27).
67. Install guard (24) and ground lead (28) on hull. Secure with two screws (29) and three new lockwashers (30).
68. Install access cover (31) on cover (20). Secure with two screws (32), new lockwashers (33), and nuts (34).
69. Install cover (20) on fuel tank (13). Secure with two screws (35) and new lockwashers (36).



GO TO NEXT PAGE

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**FOLLOW-THROUGH STEPS**

1. Install fuel quantity transmitter (page 6-9).
2. Install fuel neck and boot (page 6-8).
3. Fill fuel tank (see your -10).
4. Connect battery ground lead (page 13-2).
5. Raise and lock ramp (see your -10).
6. Stop/shutdown engine (see your -10).

---

**END OF TASK**

**TEMPORARY FUEL TANK REPAIR (M113A2, M1059, M901A1 M1068, AND M577AZ ONLY)**

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Sealing compound (Item 49, App C)  
 Dry cleaning solvent (Item 13, App C)  
 Sealing tape (Item 56, App C)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Fuel tank removed (optional, page 6-11) or  
 fuel drained below area of repair (page 6-5)

**REPAIR**

**NOTE**

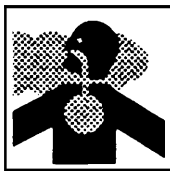
This task is for fuel tank temporary repair only. Repair is not feasible in temperatures below +40°F (+4°C). Best results are obtained if temperature is between 75° and 90°F (24° and 32°C).

**CAUTION**

Be sure fuel level in tank is below area to be repaired.

1. Clean 3 to 4 inches (8 to 10 cm) around repair area. Use a wire brush, steel wool, or emery cloth.

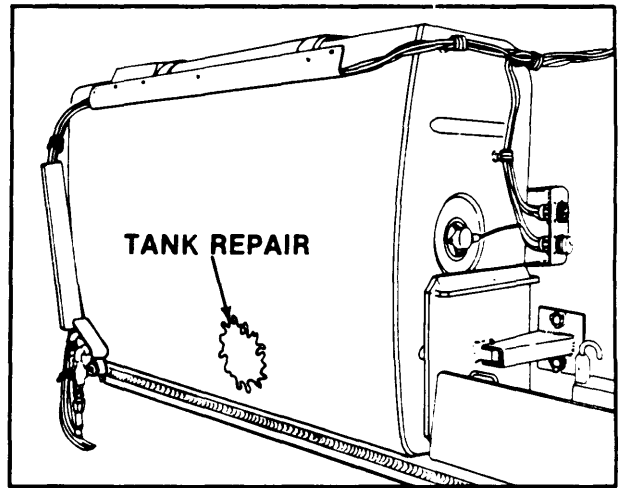
**WARNING**



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breath vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breath fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 2 Clean area with dry cleaning solvent. Dry area with a clean cloth.

3. Reinforce small repair area with clean cloth or sealing tape.
4. Reinforce large repair area with sheet metal (aluminum), cut to fit.



**NOTE**

Sealing compound is usable for two hours after mixing. Use mixed sealing compound within this time.

5. Apply mixed sealing compound 3/16-1/4 inch (4-6 mm) thick over repair area.
6. Apply 1/16 inch (2mm) minimum of sealing compound over reinforcement. Sealing compound must extend at least two inches (5 cm) beyond reinforcement on all sides.
7. Allow sealing compound to cure before filling fuel tank. Sealing compound will be tack-free in 40 hours and cured in 72 hours.

**GO TO NEXT PAGE**

---

**FOLLOW-THROUGH STEPS**

1. Install fuel tank (page 6-11, optional).
2. Fill fuel tank (see your -10). Check tank for leaks.
3. Connect battery ground lead (page 13-2).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).

---

**END OF TASK**

## REPLACE FUEL TANK-TO-BULKHEAD HOSES, TUBES, AND FITTINGS (M113A2, M901A1, AND M1059 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-23). Install (page 6-25).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Lockwasher (5)  
Strap (5)

#### Personnel Required:

Unit Mechanic

#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Disconnect battery ground lead (page 13-2)  
Rear compartment floor plates removed (page 24-37, 24-42, or 24-45)  
Power plant rear access panel removed (page 24-27)

### REMOVE



#### WARNING

Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

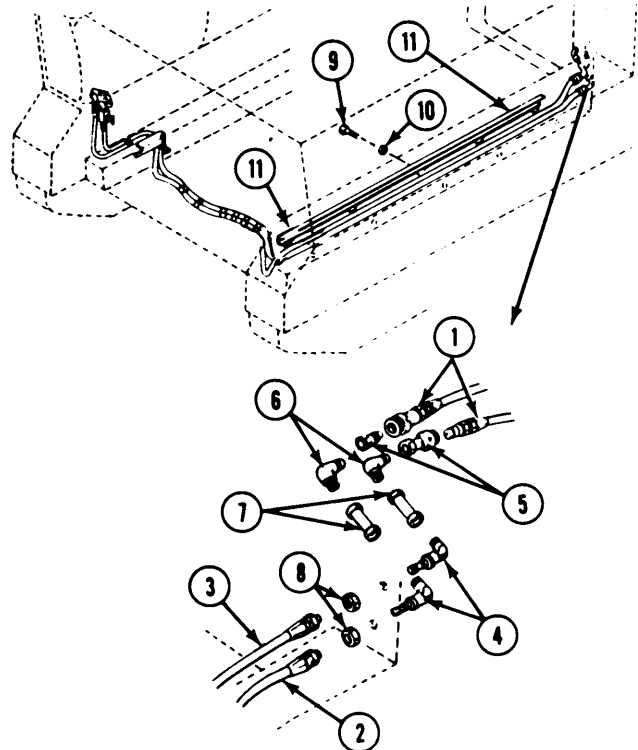
#### NOTE

Tag hoses and quick disconnects before removing.  
Use wiping rag to wipe up any spilled fuel.

1. Drain fuel tank (page 6-5).
2. Separate two quick-disconnect couplings (1) inside power plant rear bulkhead.
3. Disconnect fuel supply hose (2) and fuel return hose (3) from two bulkhead elbows (4).
4. Remove two quick-disconnect coupling halves (5) from two elbows (6).
5. Remove two elbows (6) from two tube assemblies (7).
6. Remove two tube assemblies (7) from two bulkhead elbows (4).

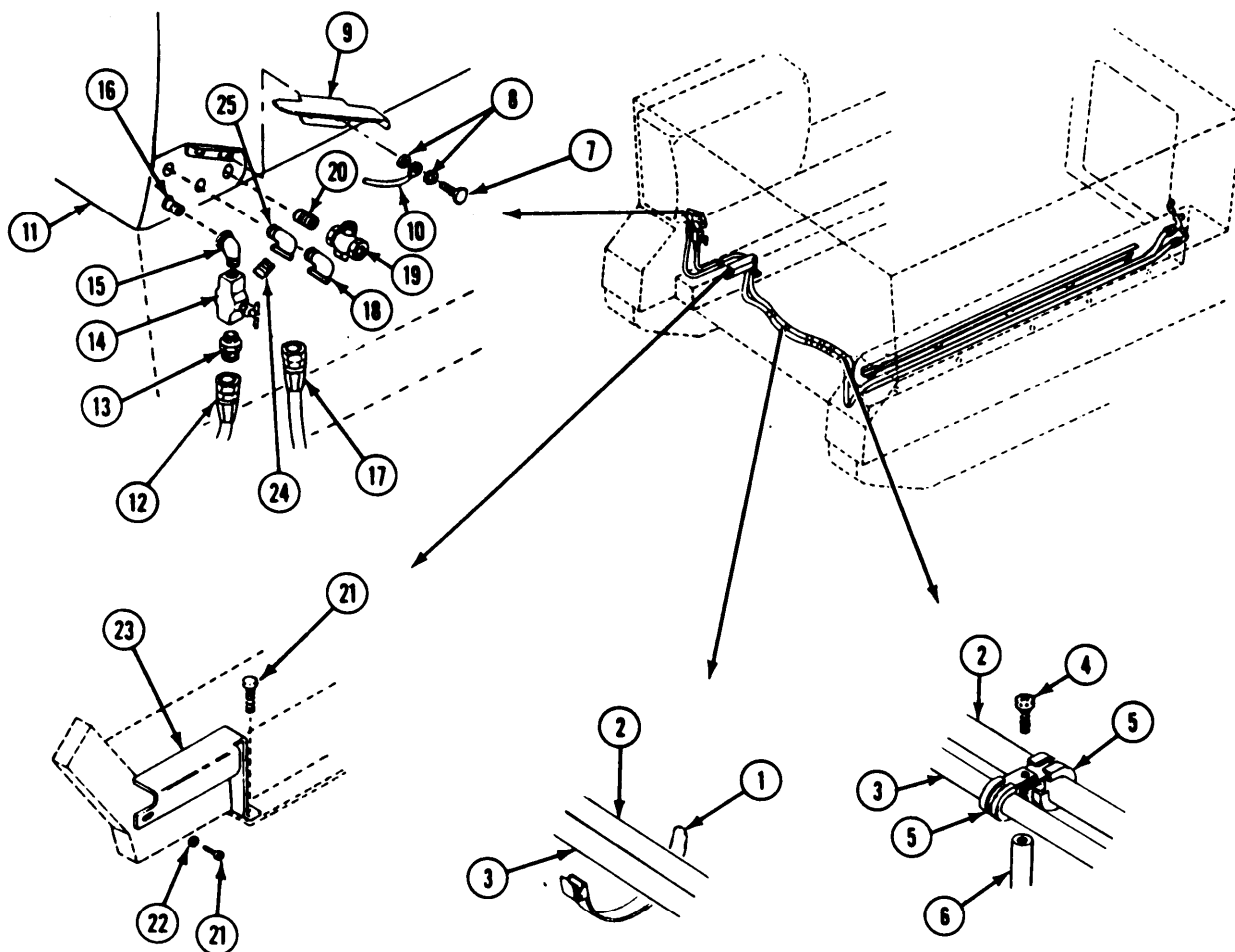
7. Remove two nuts (8) and bulkhead elbows (4) from power plant rear bulkhead.

8. Remove five screws (9), washers (10), and two guards (11) from hull.



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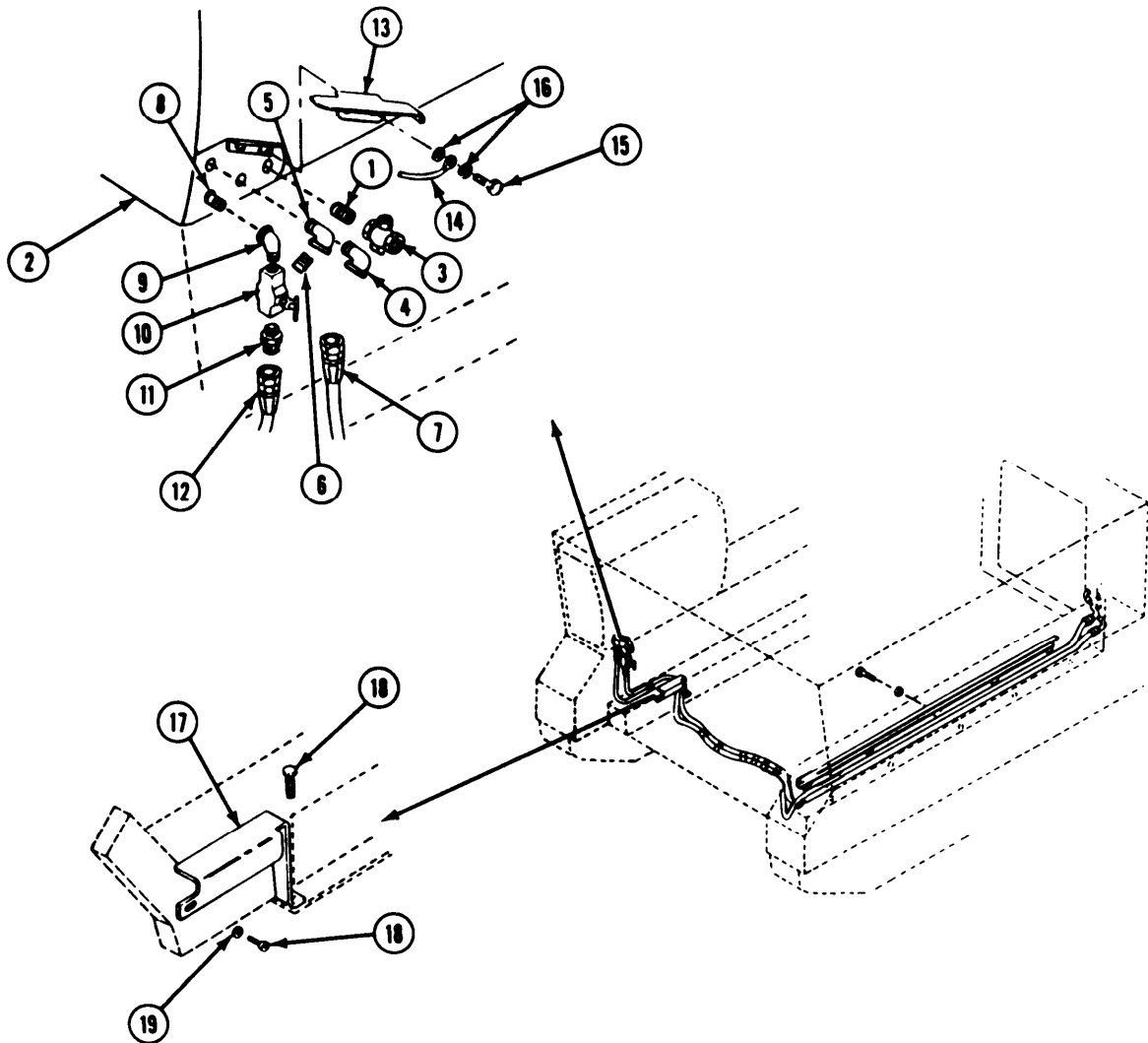
9. Remove five straps (1) from fuel hoses (2 and 3).
10. Remove four screws (4), eight clamps (5), and fuel hoses (2 and 3) from four weld-nuts (6).
11. Remove two screws (7), five lockwashers (8), guard (9), and ground lead (10) from fuel tank (11). Discard lockwashers.
12. Disconnect fuel supply hose (12) from adapter (13).
13. Remove adapter (13) from fuel shutoff valve (14).
14. Remove fuel shutoff valve (14) from elbow (15).
15. Remove elbow (15) from adapter (16).
16. Remove adapter (16) from fuel tank (11).
17. Disconnect fuel return hose (17) from elbow (18).
18. Remove elbow (18) from fuel tank (11).
19. Remove drain cock (19) from nipple (20).
20. Remove nipple (20) from fuel tank (11).
21. Remove two screws (21), and washers (22), and guard (23).
22. Remove plug (24) from elbow (25).
23. Remove elbow (25) from fuel tank (11).





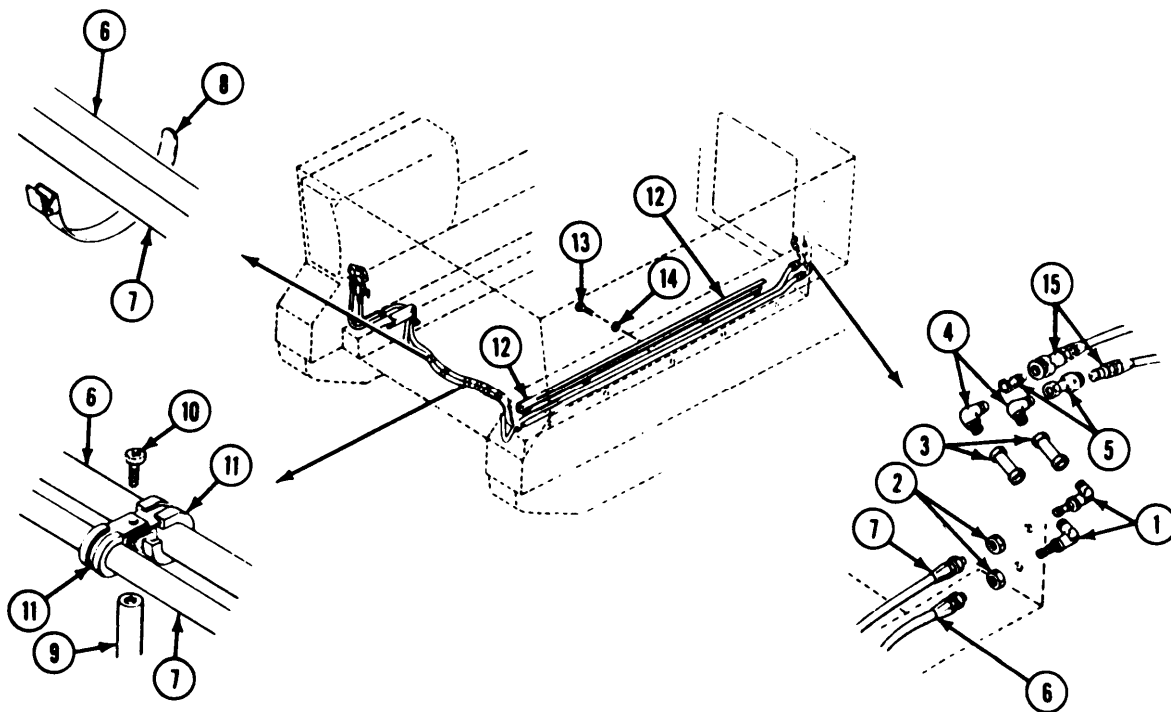
## INSTALL

24. Apply a thin, even coat of sealing compound to cleaned external threads of fittings.
25. Install nipple (1) in fuel tank (2).
26. Install drain cock (3) on nipple (1).
27. Install elbows (4 and 5) in fuel tank (2).
28. Install plug (6) in elbow (5).
29. Connect fuel return hose (7) to elbow (4).
30. Install adapter (8) in fuel tank (2).
31. Install elbow (9) on adapter (8).
32. Install fuel shutoff valve (10) on elbow (9) with arrow pointing in down direction.
33. Install adapter (11) in fuel shutoff valve (10).
34. Connect fuel supply hose (12) to adapter (11).
35. Install guard (13) and ground lead (14) on fuel tank (2). Secure with two screws (15) and five new lockwashers (16).
36. Install guard (17) . Secure with two screws (18) and washers (19).



GO TO NEXT PAGE

37. Secure two bulkhead elbows (1) to power plant rear bulkhead with two nuts (2).
38. Connect two tube assemblies (3) to two elbows (1).
39. Connect two elbows (4) to two tubes (3).
40. Install two quick-disconnect coupling halves (5) on two elbows (4).
41. Connect fuel supply hose (6) and fuel return hose (7) to two elbows (1).
42. Secure two fuel hoses (6 and 7) together with five straps (8).
43. Install two hoses (6 and 7) on four weldnuts (9). Secure with four screws (10) and eight clamps (11).
44. Secure two guards (12) to hull with five screws (13) and washers (14).
45. Connect two quick-disconnect couplings (15) inside power plant rear bulkhead.
46. Fill fuel tank (see your -10).




---

### FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
  2. Start engine (see your -10). Check for leaks.
  3. Install power plant rear access panel (page 24-27).
  4. Install rear compartment floor plates (page 24-37, 24-42, or 24-45).
  5. Raise and lock ramp (see your -10).
  6. Stop/shutdown engine (see your -10).
- 

END OF TASK

**Section III. EXTERNAL FUEL TANKS, TUBES, HOSES AND FITTINGS (M981 AND M1064 ONLY)**

**TASK INDEX**

<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
■ Drain Fuel Tanks (M981 and M1064 Only) .....	6-28	Replace Fuel Tanks (M981 and M1064 Only) .....	6-34
■ Replace Combat Filler Cover and Lock (M981 and M1064 Only) . . . . .	6-29	Replace Fuel Supply Hoses, Tubes, and Fittings (M981 Only) .....	6-39
■ Replace Filler Cap and Strainer Parts (M981 and M1064 Only) . . . . .	6-30	Replace Fuel Return Hoses, Tubes, and Fittings (M981 Only) .....	6-44
■ Replace Fuel Tank Access Covers and Drain Plugs (M981 and M1064 Only) .....	6-31	Clean Fuel Cap Vent and Filter Screen (M981 and M1064 Only) . . .	6-48.1
■ Replace Fuel Quantity Transmitter (M981 and M1064 Only) . . . . .	6-32	Replace Fuel Supply Hoses, Tubes, and Fittings (M1064 Only) . . . . .	6-48.3
		Replace Fuel Return Hoses, Tubes, and Fittings (M1064 Only) . . . . .	6-48.9

## DRAIN FUEL TANKS (M981 AND M1064 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Wiping rag (Item 61, App C)  
Suitable container (2)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)

### DRAIN

1. Open fuel filler combat cover (1). Remove fuel filler cap (see your -10).

**NOTE**

Fuel tank capacity is 47.5 gal.

2. Place suitable container (2) directly beneath fuel tank (3).



**WARNING**

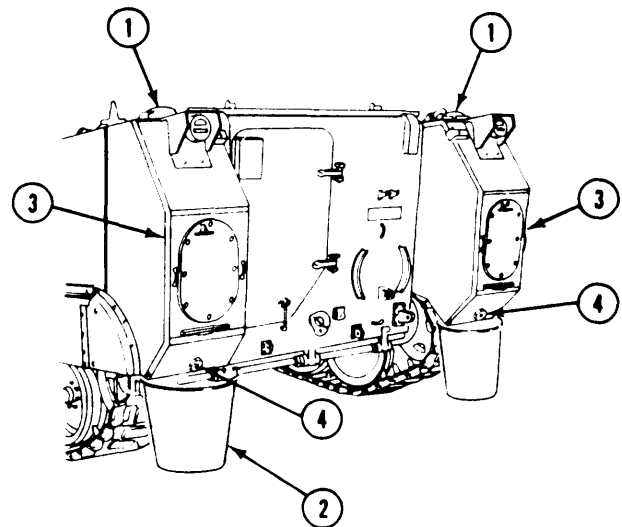
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**

Use wiping rag to wipe up any spilled fuel.

3. Ground container (2) to carrier.
4. Close both fuel tank shut off valves (see your -10).
5. Remove plug (4) from fuel tank (3). Drain fuel.

6. Install plug (4) in fuel tank (3) after the tank has been drained.
7. Install fuel filler cap (see your -10). Close filler combat cover (1).



### FOLLOW-THROUGH STEPS

1. Connect battery ground leads (page 13-2).
2. After maintenance has been performed, fill fuel tanks (see your -10).

**END OF TASK**

---

## REPLACE COMBAT FILLER COVER AND LOCK (M981 AND M1064 ONLY)

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Spring pin  
Spring pin

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

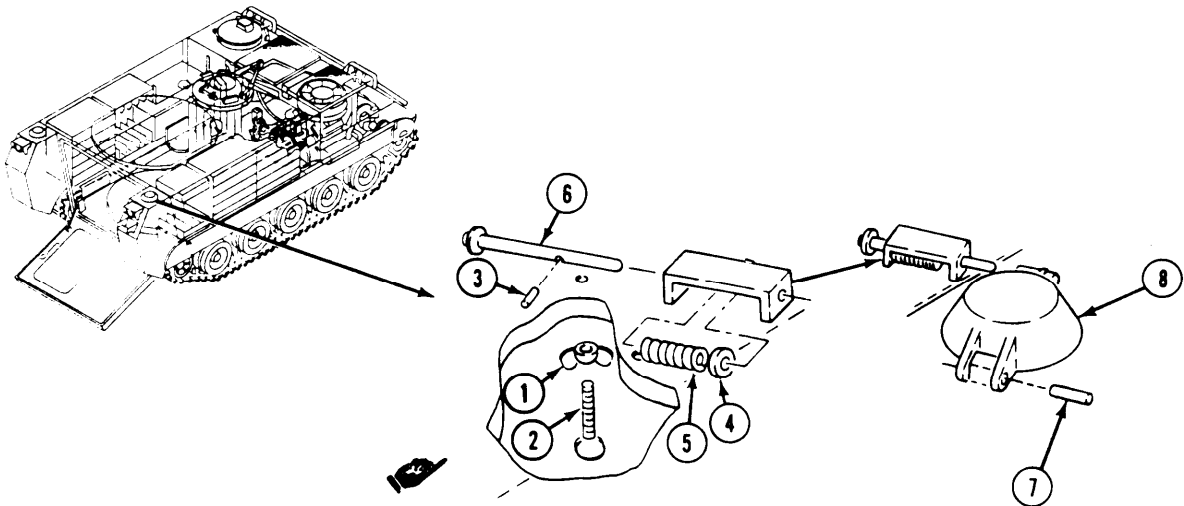
Engine stopped/shutdown (see your -10)  
Ramp lowered (see your -10)  
Carrier blocked (see your -10)

### REMOVE

1. Loosen wing nut (1). Remove thumbscrew (2) and wing nut from inside carrier.
2. Remove spring pin (3), washer (4), spring (5), and pin (6) from top of hull. Discard spring pin.
3. Remove spring pin (7) and cover (8) from fuel tank. Discard pins.

### INSTALL

4. Secure cover (8) to fuel tank with new spring pin (7).
5. Install pin (6) on top of hull. Secure with spring (5), washer (4), and new spring pin (3).
6. Install wing nut (1) and thumbscrew (2) from inside carrier. Tighten wing nut.




---

### FOLLOW-THROUGH STEPS

1. Raise and lock ramp (see your -10).
2. Stop/shutdown engine (see your -10).

---

END OF TASK

## REPLACE FILLER CAP AND STRAINER PARTS (M981 AND M1064 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Non-electrical wire (Item 31, App C)  
Gasket

**Personnel Required:**

Unit Mechanic

**References:**

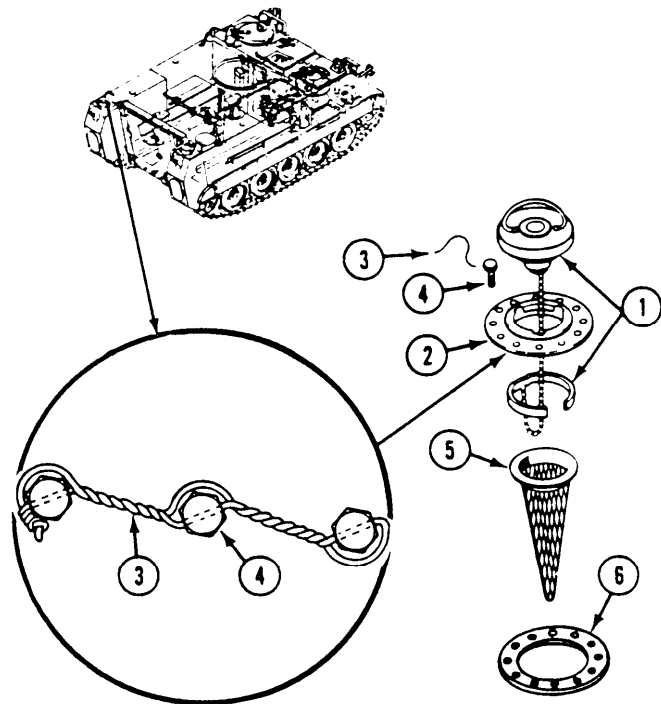
See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Combat filler cover open (see your -10)

### REMOVE

1. Unfasten fuel filler cap and chain assembly (1) from filler neck (2).
2. Remove lockwire (3), 12 screws (4), filler neck (2), strainer (5), and filler cap and chain assembly (1) from hull top. Discard lockwire.
3. Pull filler cap and chain assembly ( 1 ) through opening in filler neck (2).
4. Remove gasket (6). Discard gasket.



### INSTALL

5. Install new gasket (6).
6. Install filler cap and chain assembly (1) through filler neck (2).
7. Secure filler neck (2), strainer (5), and filler cap and chain assembly (1) to hull top with 12 screws (4).
8. Install new lockwire (3) thru heads of 12 screws (4).
9. Fasten filler cap and chain assembly (1) in filler neck (2).

### FOLLOW-THROUGH STEPS

1. Connect battery ground leads (page 13-2).
2. Combat filler cover closed and locked (see your -10).

END OF TASK

## REPLACE FUEL TANK ACCESS COVERS AND DRAIN PLUGS (M981 AND M1064 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
Torque Wrench (Item 96, App D)

**Materials/Parts:**

Sealing compound (Item 46, App C)  
Gasket  
Lockwasher (8)  
Lockwasher (2)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Fuel tanks drained (page 6-28)

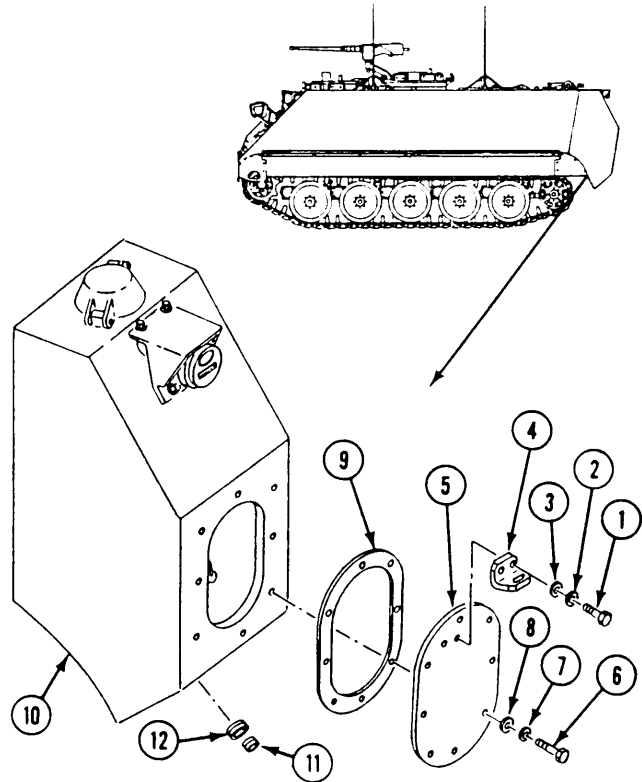
### REMOVE

**NOTE**

Right and left fuel tank access covers are the same. The following steps apply to one cover.

1. Remove two screws (1), lockwashers (2), flat washers (3), and bracket (4) from cover (5). Discard lockwashers.
2. Remove eight screws (6), lockwashers (7), flat washers (8), cover (5), and gasket (9) from fuel tank (10). Discard gasket and lockwashers.
3. Remove drain plug (11) and bushing (12) from fuel tank (10).

6. Apply a coat of sealing compound to cleaned threads of bushing (12) and drain plug (11).
7. Install bushing (12) in fuel tank (10).
8. Install drain plug (11) in bushing (12).



### INSTALL

4. Install cover (5) and new gasket (9) on fuel tank (10). Secure with eight screws (6), new lockwashers (7), and flat washers (8). Tighten screws to 45-50 lb-ft (61-88 N•m) torque. Use torque wrench.
5. Install bracket (4) on cover (5). Secure with two screws (1), new lockwashers (2), and flat washers (3).

### FOLLOW-THROUGH STEPS

1. Fill fuel tanks (see your -10).
2. Check for fuel leaks.

END OF TASK

## REPLACE FUEL QUANTITY TRANSMITTER (M981 AND M1064 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

- Sealing compound (Item 46, App C)
- Lock washer (2)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

- Engine stopped/shutdown (see your -10)
- Carrier blocked (see your -10)
- Battery ground lead disconnected (page 13-2)
- Fuel tanks drained (page 6-30)
- Fuel tank access covers removed (page 6-33)
- Tail lights and guards removed (page 12-57)

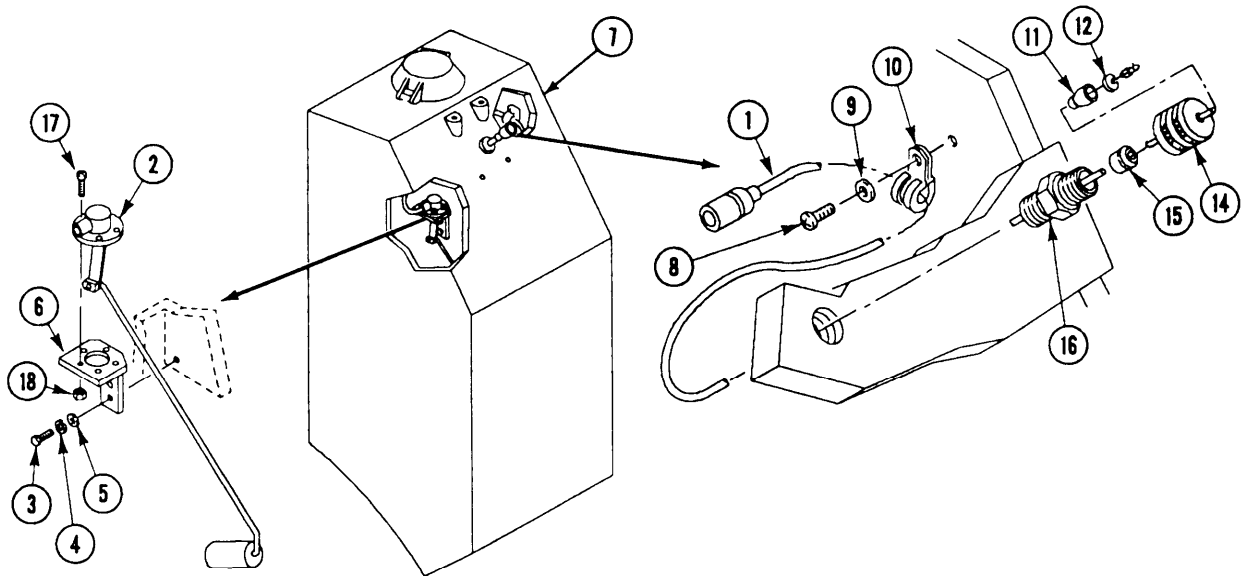
### REMOVE

**NOTE**

Right and left fuel quantity transmitters are the same. The following steps apply to one unit.

1. Disconnect lead (1) from transmitter (2). (Circuit 30A is left tank transmitter. Circuit 31A is right tank transmitter).
2. Remove two screws (3), lockwashers (4), washers (5), bracket (6), and transmitter (2) from fuel tank (7). Discard lock washers.

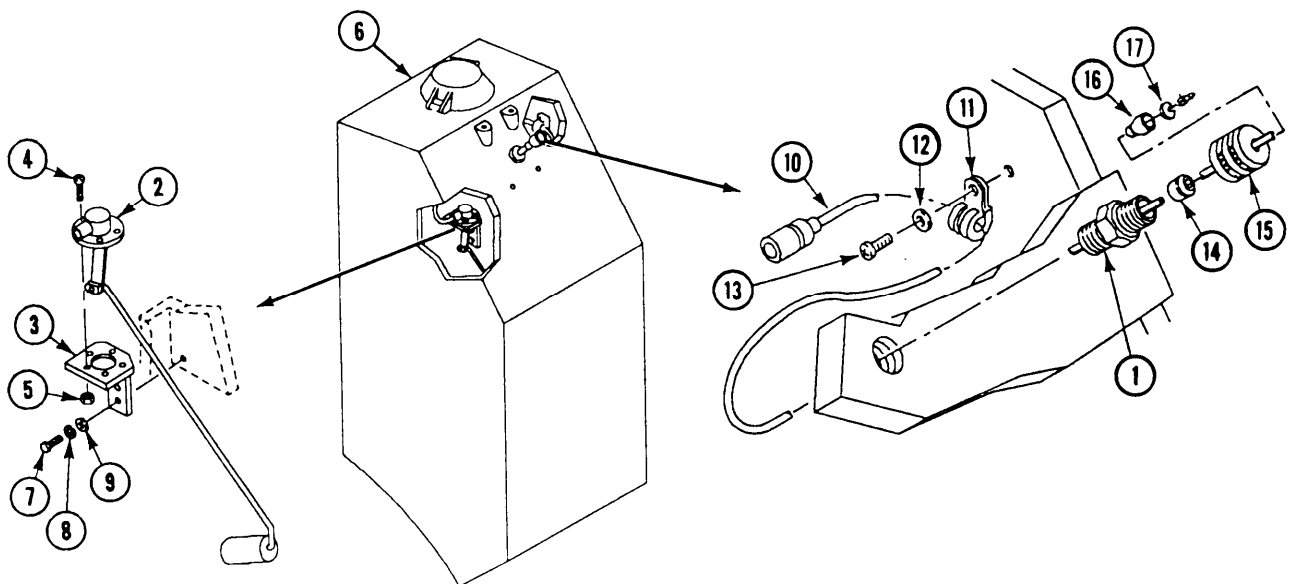
3. Remove screw (8), washer (9), and clamp (10) that secures lead (1) to fuel tank (7).
4. Remove shell (11) and washer (12) from lead(1).
5. Remove nut (14) and bushing (15) from connector (16).
6. Remove connector (16) and lead (1) from fuel tank (7).
7. Remove five screws (17) and nuts (18). Separate transmitter (2) from bracket (6).





## INSTALL

8. Apply a thin coat of sealing compound to cleaned external threads of connector (1) before installation.
9. Secure transmitter (2) to bracket (3) with five screws (4) and nuts (5).
10. Install bracket (3) and transmitter (2) on fuel tank (6). Secure with two screws (7), new lockwashers (8), and washers (9).
11. Install lead (10) and connector (1) in tank (6).
12. Connect lead (10) to transmitter (2). (Circuit 30A is left tank transmitter. Circuit 31A is right tank transmitter).
13. Secure lead (10) to tank (6) with clamp (11), washer (12), and screw (13).
14. Install bushing (14) and nut (15) on connector (1).
15. Install shell (16) and washer (17) from lead(10).



## FOLLOW-THROUGH STEPS

1. Install fuel tank access covers (page 6-33).
2. Fill fuel tanks (see your -10).
3. Connect battery ground lead (page 13-2).
4. Check that fuel level transmitter works properly (see your -10).
5. Install tail lights and guards (page 12-57).

END OF TASK

## REPLACE FUEL TANKS (M981 AND M1064 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-34). Install (page 6-36).

### INITIAL SETUP

#### Tools

General Mechanics Tool kit (Item 30, App D)  
 Angle Lifting Bracket (Item 15, App D)  
 Socket Wrench Set (Item 90, App D)  
 Torque Wrench (Item 98, App D)  
 Suitable Lifting Device

#### Materials/Parts:

Caulking compound (Item 8, App C)  
 Molybdenum D grease (Item 30, App C)  
 Sealing compound Primer (Item 43, App C)  
 Sealing compound (Item 46, App C)  
 Sealing compound (Item 50, App C)  
 Sealing compound (Item 52, App C)  
 Wiping rag (Item 61, App C)  
 Gasket  
 Lockwasher (5)  
 Set screw (4)

#### Personnel Required:

Unit Mechanic

#### Personnel Required: (cont):

Helper (H)

#### References:

See your -10

#### Equipment Conditions:

Engine shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2).  
 Fuel tanks drained (page 6-28)  
 Filler covers and locks removed (page 6-29)  
 Filler caps and strainers removed (page 6-30)  
 Fuel tank access covers removed (page 6-31)  
 Fuel quantity transmitter removed  
 (page 6-32)  
 Cable reel holder assembly removed  
 (page 41-7)  
 Tail lights and guards removed (page 12-57)  
 Track shrouds removed (page 22-2)

### REMOVE



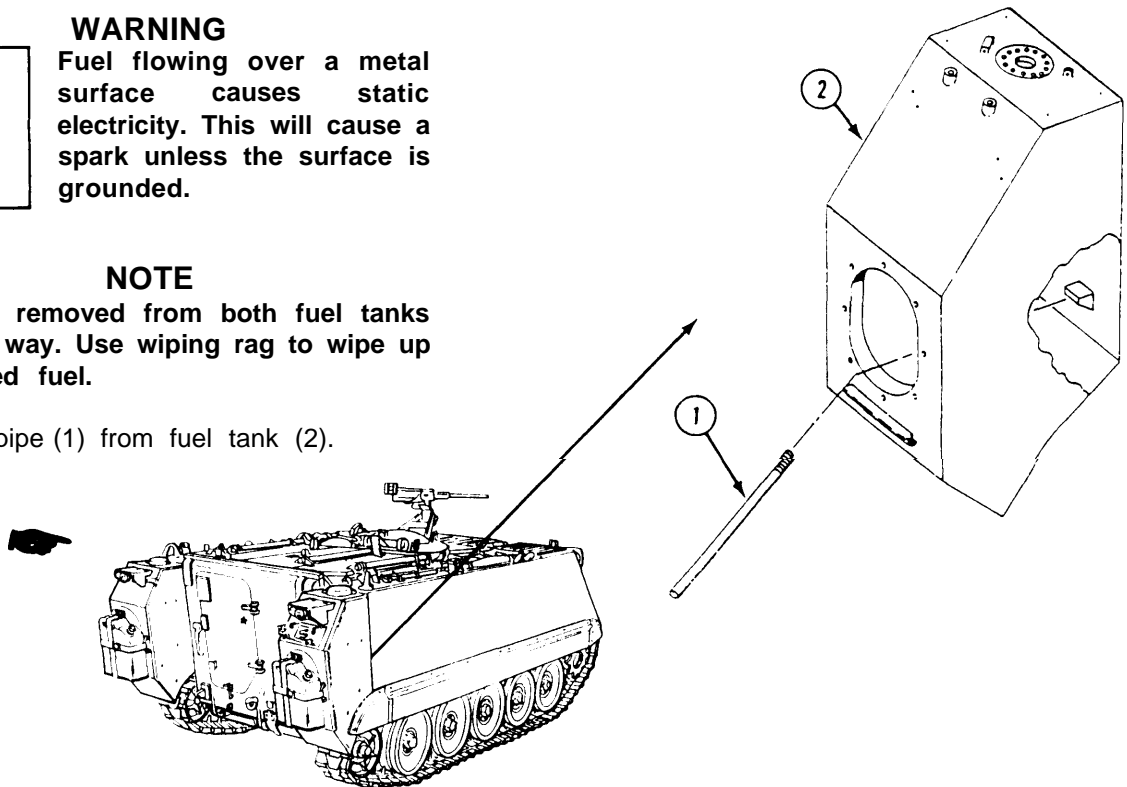
#### WARNING

Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

Pipes are removed from both fuel tanks the same way. Use wiping rag to wipe up any spilled fuel.

1. Unscrew pipe (1) from fuel tank (2).

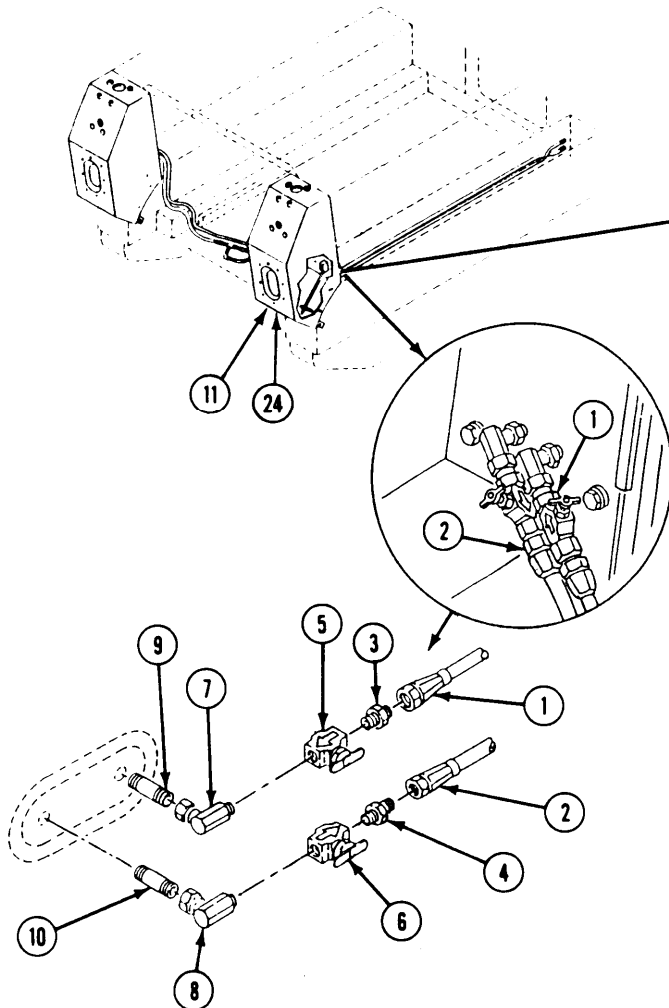


**NOTE**

Fuel hoses are removed from both fuel tanks the same way (right side fuel tank shown).

Do steps 2 thru 6 for M981 only.

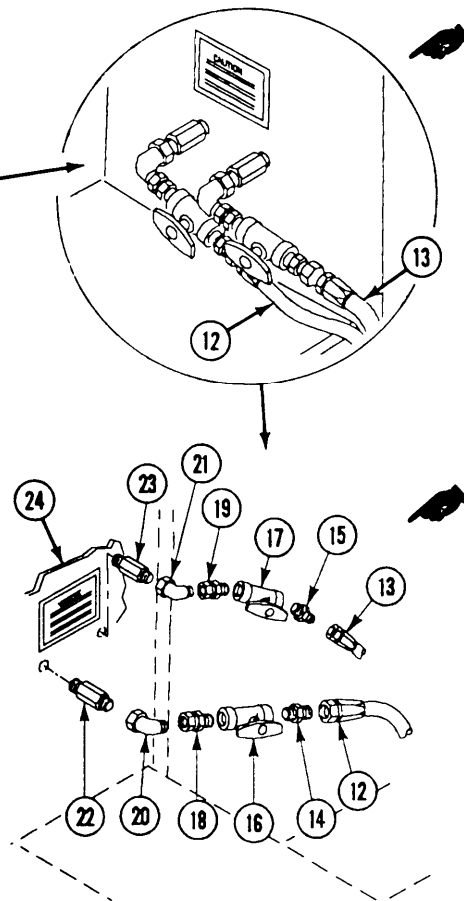
2. Disconnect fuel supply hose (1) and fuel return hose (2) from adapters (3 and 4).
3. Remove adapters (3 and 4) from valves (5 and 6).
4. Remove valves (5 and 6) from unions (7 and 8).
5. Remove unions (7 and 8) from nipples (9 and 10).
6. Remove nipples (9 and 10) from fuel tank (11).



**NOTE**

Do steps 6.1 thru 6.6 on M1064 only.

- 6.1 Disconnect fuel supply hose (12) and fuel return hose (13) from adapters (14 and 15).
- 6.2 Remove adapters (14 and 15) from valves (16 and 17).
- 6.3 Remove valves (16 and 17) from adapters (18 and 19).
- 6.4 Remove adapters (18 and 19) from elbows (20 and 21).
- 6.5 Remove elbows (20 and 21) from adapters (22 and 23).
- 6.6 Remove adapters (22 and 23) from fuel tank (24).



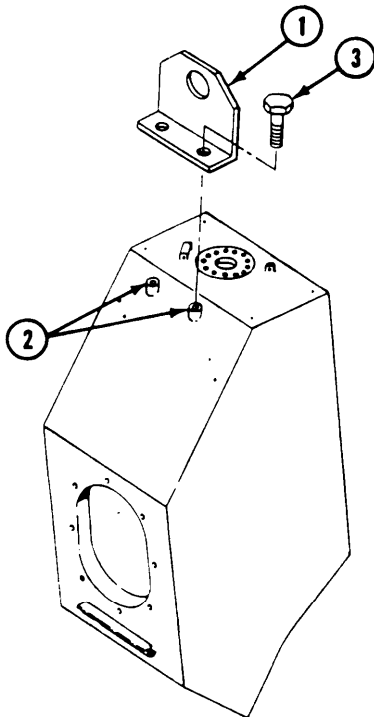
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**NOTE**

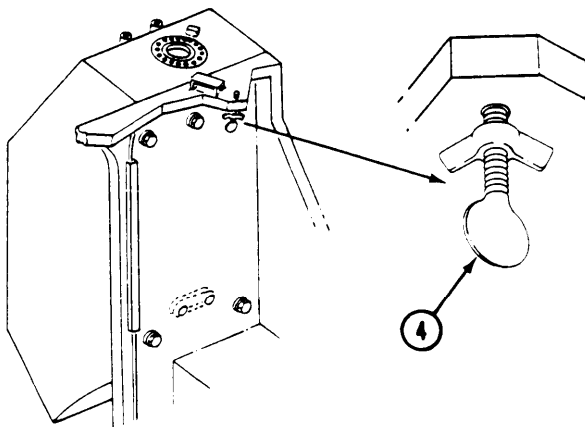
Both fuel tanks are removed from carrier the same way (left side fuel tank shown).

Use tail light bracket screws to secure lifting bracket to fuel tank.

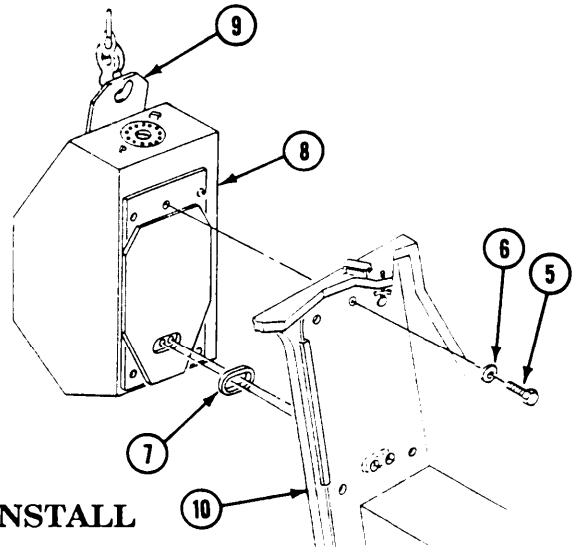
7. Install angle lifting bracket (1) on tail light bracket mounting holes (2). Secure with two screws (3). Attach lifting device to lifting bracket.



8. Remove fuel cap locking thumbscrew (4) from inside earner.



9. Remove five screws (5), washers (6), and gasket (7), from fuel tank (8). Discard gasket. Remove fuel tank from carrier. Have helper assist.



**INSTALL**

**NOTE**

Both fuel tanks are installed on carrier the same way (left side fuel tank shown).

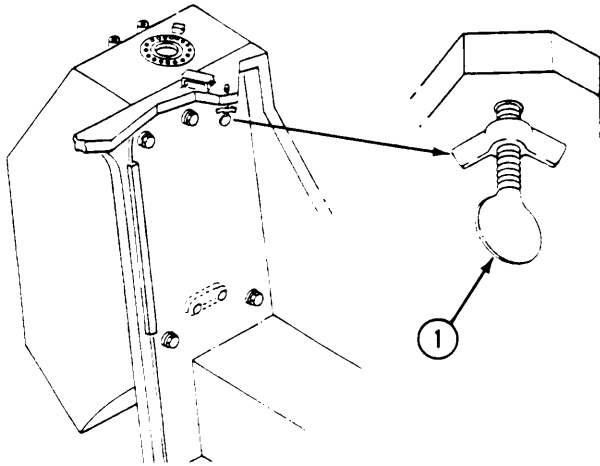
10. Apply thin coat of sealing compound (Item 52) to new gasket (7) and to gasket mating surface on fuel tank (8). When sealing compound has become tacky, install gasket on tank.
11. Attach lifting device to lifting bracket (9). Position fuel tank (8) to rear hull plate (10). Have helper assist.

**NOTE**

Inside of mounting holes and full diameter area under each washer must be free of paint to ensure a good electrical ground.

12. Apply molybdenum D grease to threads of five screws (5).
13. Secure fuel tank (8) to rear hull plate (10) with five screws (5) and washers (6). Tighten screws to 270-295 lb-ft (366-400 N•m) torque. Use torque wrench and socket wrench set. Have helper assist.
14. Apply caulking compound to space around installed screw heads and washers on rear hull plate (10). Do not apply compound to screw threads.

15. Install fuel cap locking thumbscrew (1) in carrier bulkhead.

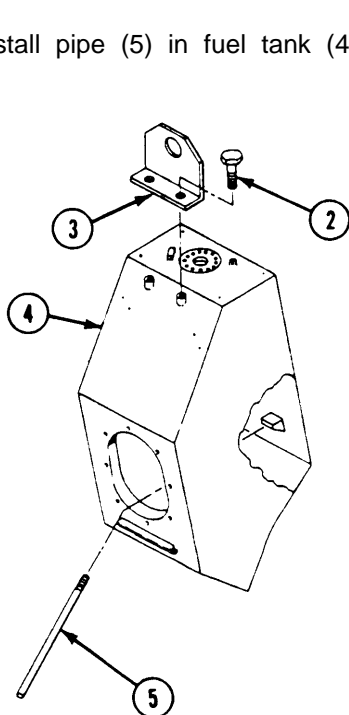


**NOTE**  
Save lifting bracket screws for installation of tail light bracket.

16. Remove two screws (2) and angle lifting bracket (3) from fuel tank (4).

**NOTE**  
Two pipes are installed in both fuel tanks the same way.

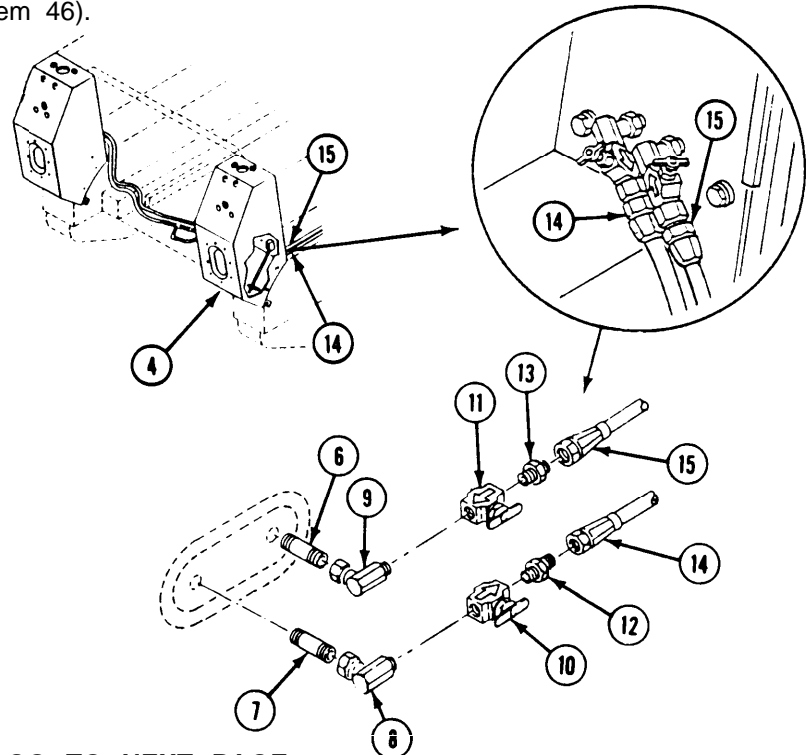
17. Apply primer to threads of pipe (5). coat threads with sealing compound (Item 46).
18. Install pipe (5) in fuel tank (4).



**NOTE**  
Fuel hoses are installed on both fuel tanks the same way (right side fuel tank shown).

Do steps 19 thru 26 on M981 only.

19. Apply sealing compound (Item 50) to pipe threads on nipples (6 and 7) and unions (8 and 9).
20. Install nipples (6 and 7) in fuel tank (4).
21. Install unions (8 and 9) on nipples (6 and 7).
22. Install fuel supply valve (10) on union (8) with arrow pointing toward the engine.
23. Install fuel return valve (11) on union (9) with arrow pointing toward fuel tank.
24. Install adapters (12 and 13) in valves (10 and 11).
25. Connect fuel supply hose (14) to adapter (12).
26. Connect fuel return hose (15) to adapter (13).



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**NOTE**

**Do steps 26.1 thru 26.9 on M1064 only.**

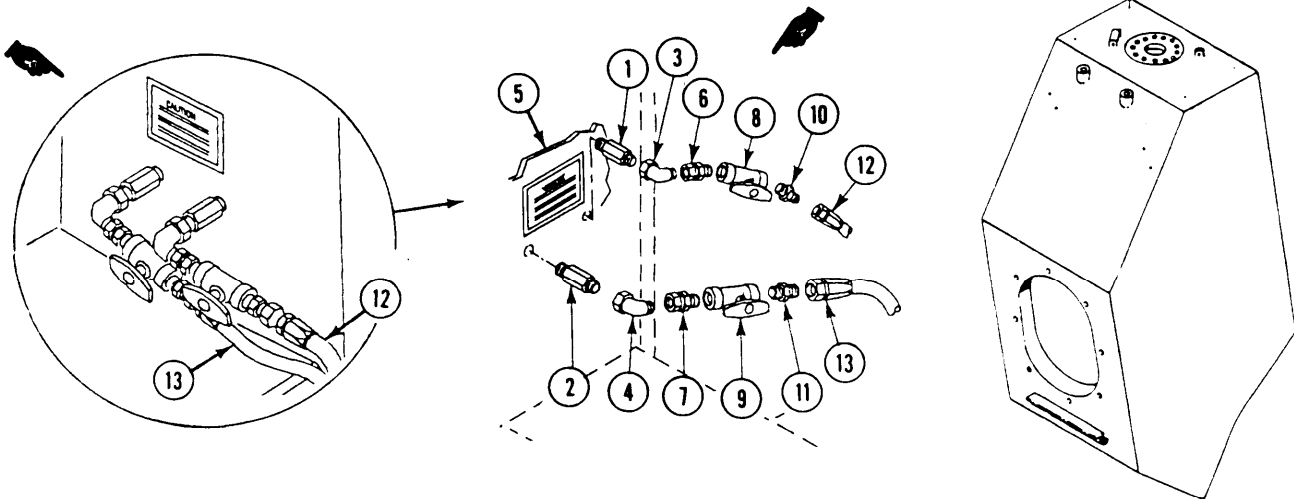
- 26.1 Apply sealing compound (Item 50) to pipe threads on adapters (1 and 2) and elbows (3 and 4).
- 26.2 Install adapters (1 and 2) in fuel tank (5).
- 26.3 Install elbows (3 and 4) on adapters (1 and 2).
- 26.4 Install adapters (6 and 7) on elbows (3 and 4).
- 26.5 Install fuel return valve (8) on adapter (6) with arrow pointing toward fuel tank.
- 26.6 Install fuel supply valve (9) on adapter (7) with arrow pointing toward the engine.

- 26.7 Install adapters (10 and 11) in valves (8 and 9).
- 26.8 Connect fuel return hose (12) to adapter (10).
- 26.9 Connect fuel supply hose (13) to adapter (11).

**NOTE**

**The four spare electrical mounting holes will always be the holes located on the outer edge of each fuel tank. The electrical guards are always mounted on the inner edge of each fuel tank.**

- 27. Install four setscrews (14) in spare holes provided for electrical mounting.



**FOLLOW-THROUGH STEPS**

- 1. Install filler caps and strainers (page 6-30).
- 2. Install filler covers and locks (page 6-29).
- 3. Install fuel quantity transmitter (page 6-32).
- 4. Install fuel tank access covers (page 6-31).
- 5. Install guards and tail lights (page 12-57).
- 6. Connect battery ground lead (page 13-2).
- 7. Cable reel holder assembly installed (page 41-7).
- 8. Fill fuel tanks (see your -10).
- 9. Start engine (see your -10). Check for leaks.
- 10. Raise and lock ramp (see your -10).
- 11. Install track shrouds (page 22-2).

**END OF TASK**

## REPLACE FUEL SUPPLY HOSES, TUBES, AND FITTINGS (M981 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-39). Install (page 6-41).

### INITIAL SETUP

#### Tools

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts

Sealing compound (Item 46, App C)

Wiping rag (Item 61, App C)

Lockwasher (6)

lockwasher (4)

Strap (4)

#### Personnel Required

Unit Mechanic

#### References

See your -10

TM 9-2350-266-20

#### Equipment Conditions

Engine stopped/shutdown (see your -10)

Ramp lowered (see your -10)

Battery ground lead disconnected (page 13-2)

Fuel tanks drained (page 6-28)

Cargo area floor plates removed

(See TM 9-2350-266-20)

Power plant rear access panel removed  
(page 24-27)

### REMOVE



#### WARNING

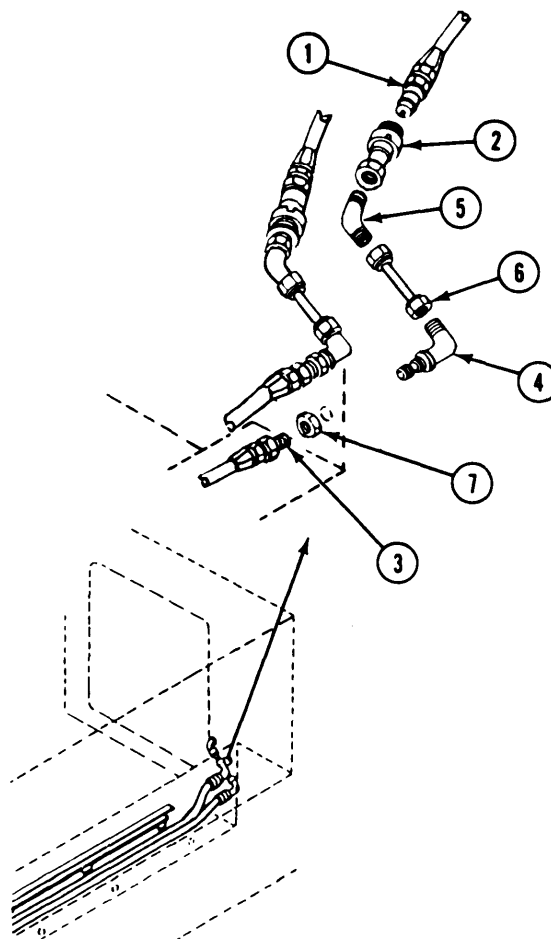
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

Tag hoses before removal.

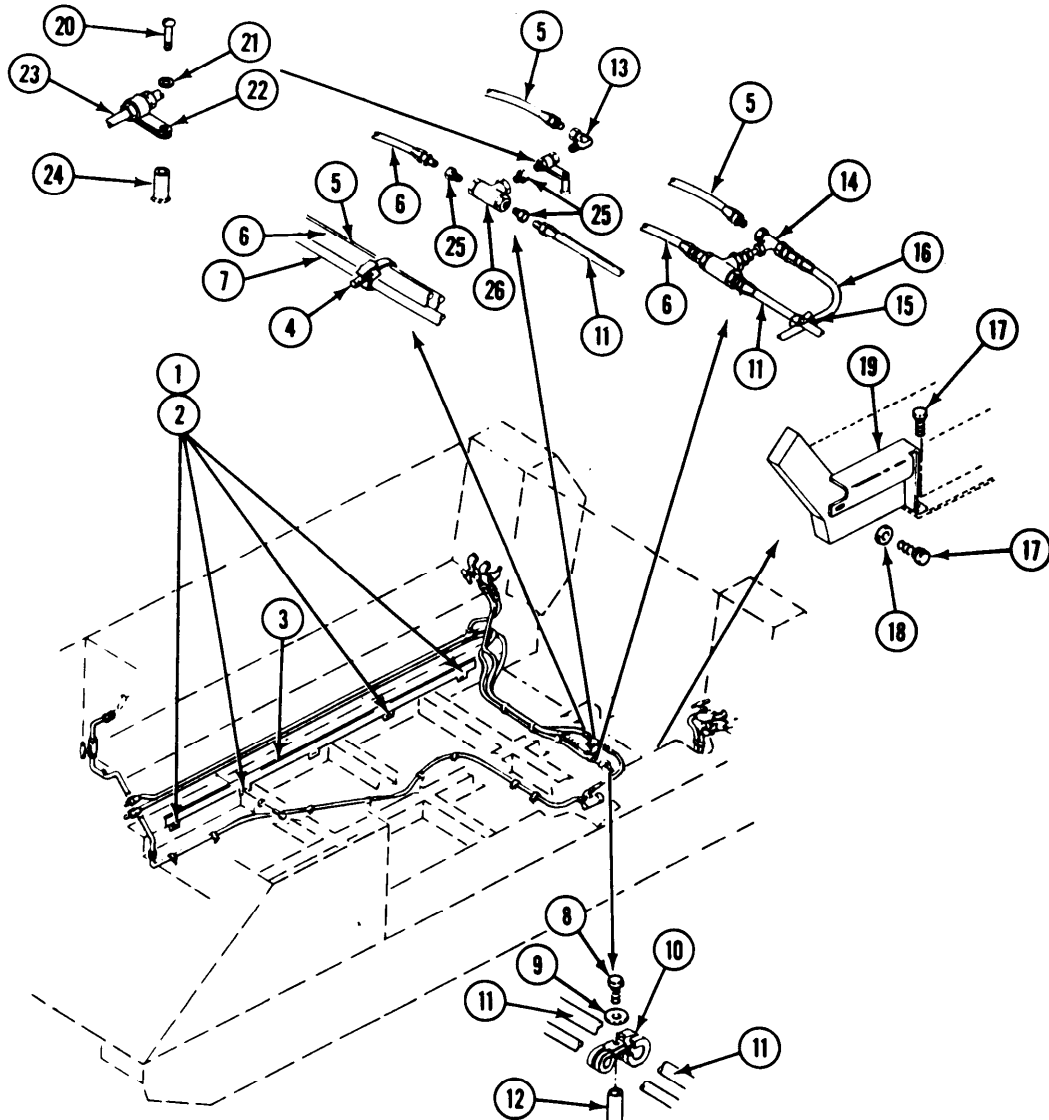
Use wiping rags to wipe any spilled fuel.

1. Disconnect quick disconnect half (1) from quick disconnect half (2) at power plant rear bulkhead.
2. Disconnect fuel supply hose (3) from bulkhead elbow (4).
3. Remove quick disconnect half (2) from elbow (5).
4. Disconnect tube assembly (6) from elbows (4 and 5).
5. Remove nut (7) and bulkhead elbow (4) from power plant rear bulkhead.



GO TO NEXT PAGE

6. Remove five screws (1), lockwashers (2), and two guards (3) from hull. Discard lockwashers.
7. Remove three straps (4) that secure supply hoses (5 and 6) and return hose (7) together. Discard straps.
8. Remove three screws (8), lockwashers (9), six clamps (10), and supply hose (11) from three weldnuts (12). Discard lockwashers.
9. Disconnect supply hose (5) from elbow (13) (or tee (14) if personnel heater is installed).
10. Remove strap (15) that secures personnel heater fuel hose (16) to supply hose (11) (if personnel heater is installed). Discard strap.
11. Remove two screws (17), washer (18), and guard (19) from hull.
12. Remove personnel heater tube (if personnel heater is installed) (page 29-26).
13. Remove screw (20), lockwasher (21), clamp (22), and tube assembly (23) from weldnut (24). Discard lockwasher.
14. Remove elbow (13) from tube (23).
15. Disconnect tube (23) and two supply hoses (6 and 11) from three adapters (25).
16. Remove three adapters (25) from check valve (26).

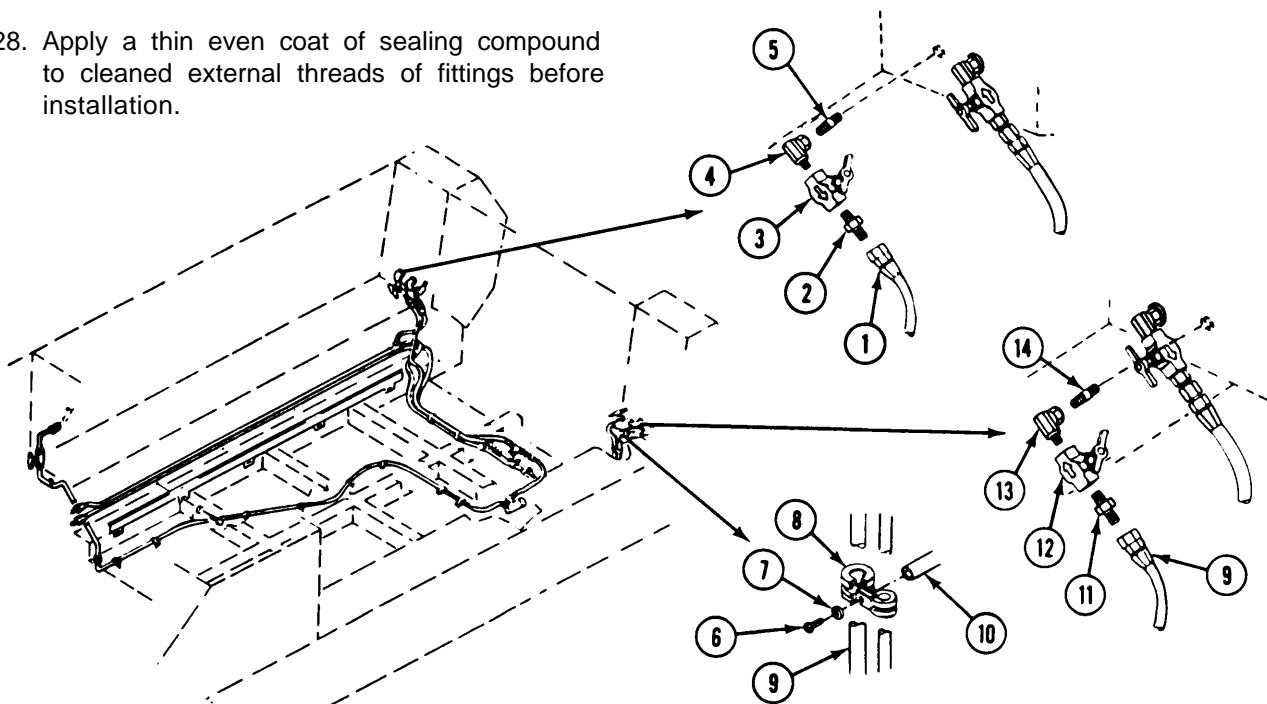




17. Disconnect supply hose (1) from adapter (2).
18. Remove adapter (2) from supply shutoff valve (3).
19. Remove supply shutoff valve (3) from union (4).
20. Remove union (4) from nipple (5).
21. Remove nipple (5) from right fuel tank.
22. Remove screw (6), lockwasher (7), clamp (8), and supply hose (9) from weldnut (10). Discard lockwasher.
23. Disconnect supply hose (9) from adapter (11).
24. Remove adapter (11) from supply shutoff valve (12).
25. Remove supply shutoff valve (12) from union (13).
26. Remove union (13) from nipple (14).
27. Remove nipple (14) from left fuel tank.
29. Install nipple (14) in left fuel tank.
30. Install union (13) on nipple (14).
31. Install supply shutoff valve (12) on union (13) with arrow pointing away from fuel tank.
32. Install adapter (11) in supply shutoff valve (12).
33. Connect supply hose (9) to adapter (11).
34. Secure supply hose (9) to weldnut (10) with clamp (8), new lockwashers (7), and screw (6).
35. Install nipple (5) in right fuel tank.
36. Install union (4) on nipple (5).
37. Install supply shutoff valve (3) on union (4) with arrow pointing away from fuel tank.
38. Install adapter (2) in supply shutoff valve (3).
39. Connect supply hose (1) to adapter (2).

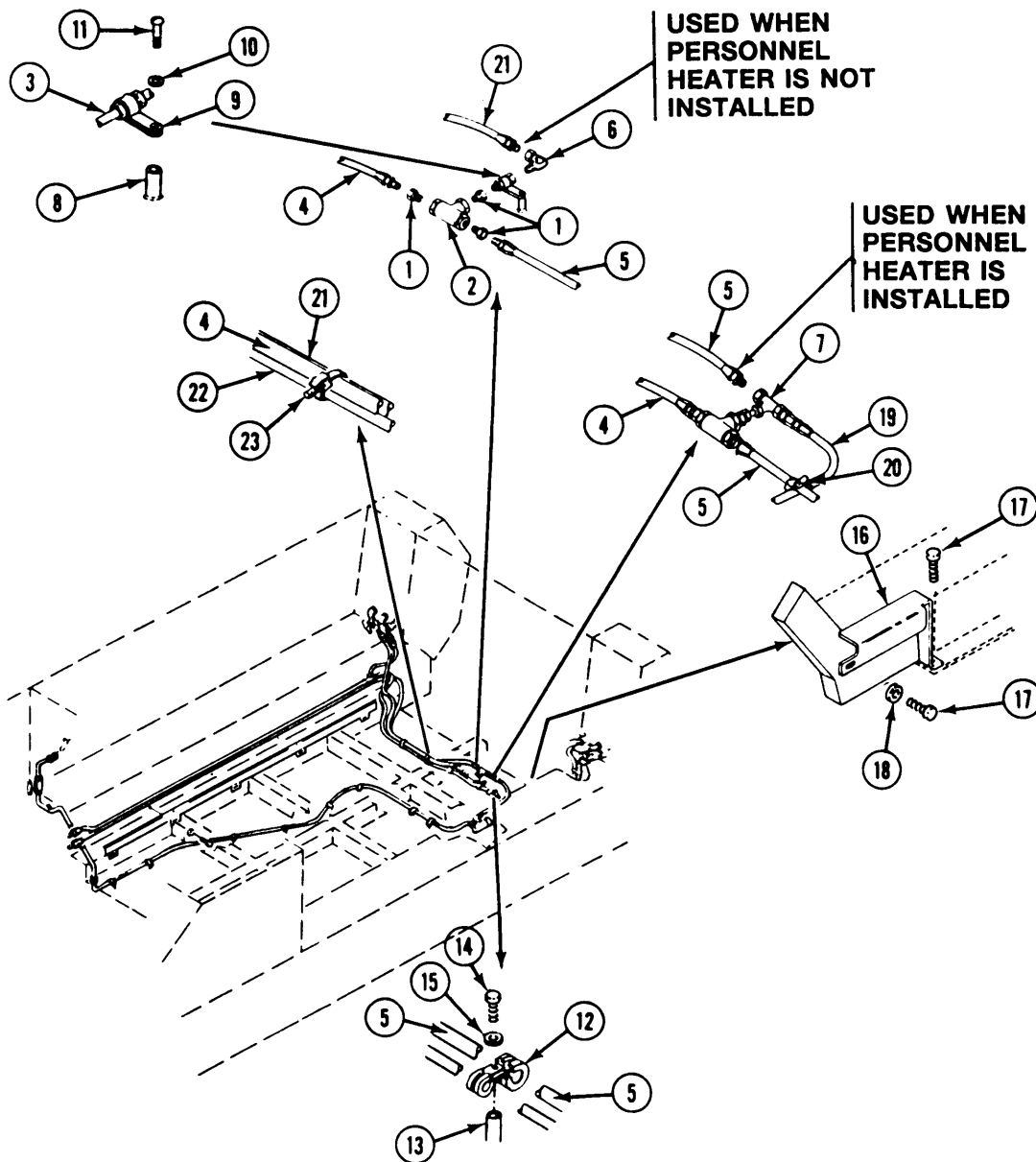
## INSTALL

28. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.

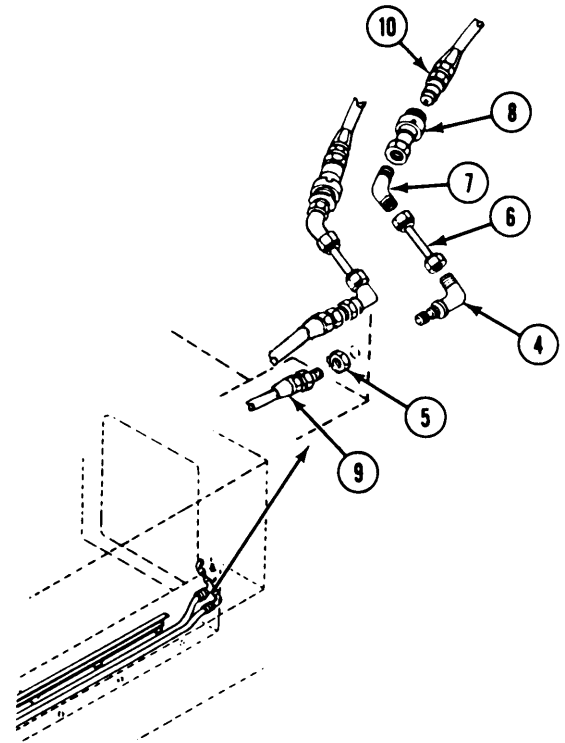
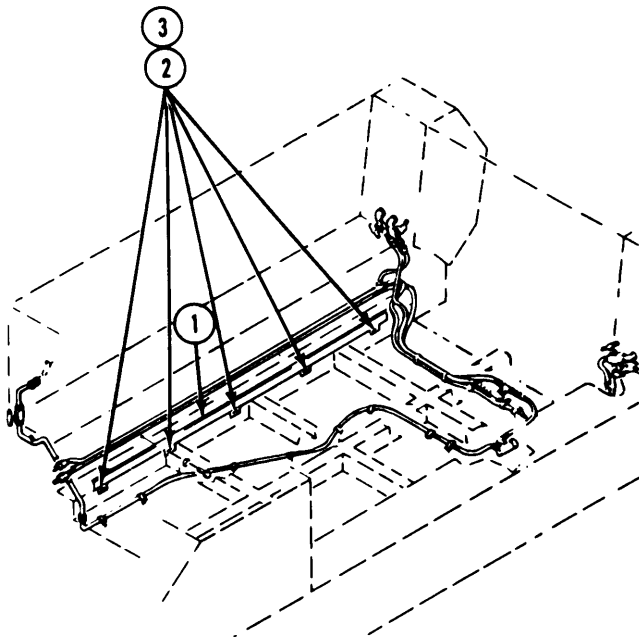


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40. Install three adapters (1) in check valve (2).
41. Connect tube assembly (3) and two supply hoses (4 and 5) to three adapters (1).
42. Connect elbow (6) (or tee (7) if personnel heater is installed) to tube (3).
43. Secure tube (3) to weldnut (8) with clamp (9), new lockwasher (10), and screw (11).
44. Install supply hose (5) and Six clamps (12) on three weldnuts (13). Secure with three screws (14) and new lockwashers (15).
45. Install heater tube (if personnel heater is installed) (page 29-26).
46. Secure guard (16) to hull with two screws (17) and washer (18).
47. Secure supply hose (5) to heater fuel hose (19) with new strap (20) (if personnel heater is installed).
48. Connect supply hose (21) to elbow (6) (or tee (7) if personnel heater is installed).
49. Secure supply hoses (21 and 4) and return hose (22) together with three new straps (23).



50. Install two guards (1) on hull. Secure with five screws (2) and new lockwashers (3).
51. Secure bulkhead elbow (4) to power plant rear bulkhead with nut (5).
52. Connect tube assembly (6) to bulkhead elbow (4).
53. Connect elbow (7) to tube assembly (6).
54. Connect quick disconnect half (8) to elbow (7).
55. Connect supply hose (9) to bulkhead elbow (4).
56. Connect quick disconnect half (10) to quick disconnect half (8) at power plant rear bulkhead.



### FOLLOW-THROUGH STEPS

1. Fill fuel tanks (see your -10).
2. Connect battery ground leads (page 13-2).
3. Start engine (see your -10). Check for leaks.
4. Install cargo area floor plates (see TM 9-2350-266-20).
5. Install power plant rear access panel (page 24-27).
6. Raise and lock ramp (see your -10).
7. Stop/shutdown engine (see your -10).

**END OF TASK**

## REPLACE FUEL RETURN HOSES, TUBES, AND FITTINGS (M981 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-44). Install (page 6-46).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing Compound (Item 46, App C)  
 Wiping rag (Item 61, App C)  
 Lockwasher (5)  
 Lockwasher (4)  
 Lockwasher  
 Strap (3)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10  
 TM 9-2350-266-20

#### Equipment Conditions:

Engine stopped/shutdown (see your-10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Fuel tanks drained (page 6-28)  
 Cargo area floor plates removed  
 see TM 9-2350-266-20)  
 Power plant rear access panel removed  
 (page 24-27)  
 Carrier blocked (see your -10)

### REMOVE



#### WARNING

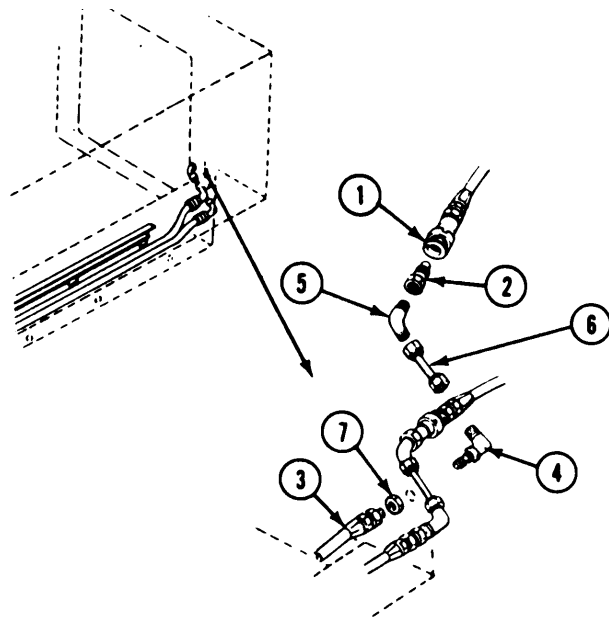
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

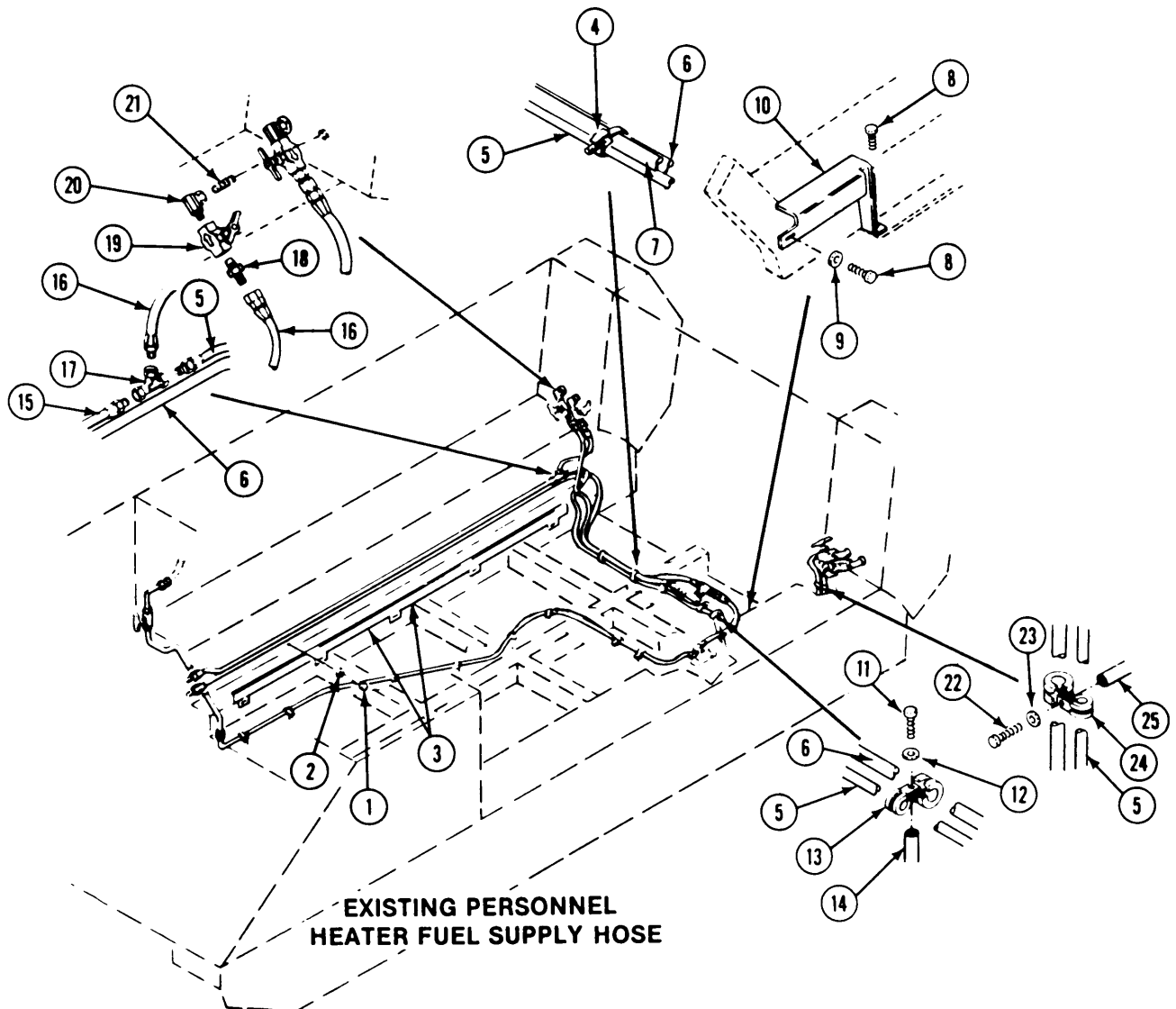
Use wiping rag to wipe up any spilled fuel.

1. Disconnect quick disconnect half (1) from quick disconnect half (2) at power plant rear bulkhead.
2. Disconnect fuel return hose (3) from bulkhead elbow (4).

3. Remove quick disconnect half (2) from elbow (5).
4. Disconnect tube assembly (6) from elbows (4 and 5).
5. Remove nut (7) and bulkhead elbow (4) from power plant rear bulkhead.



6. Remove five screws (1), lockwashers (2), and two guards (3) from hull. Discard lockwashers.
7. Remove three straps (4) that secure return hose (5) and supply hoses (6 and 7) together. Discard straps.
8. Remove two screws (8), lockwasher (9), and guard (10) from hull. Discard lockwasher.
9. Remove three screws (11), lockwashers (12), six clamps (13), and return hose (5) from three weldnuts (14). Discard lockwashers.
10. Disconnect return hoses (15, 5, and 16) from tee (17).
11. Disconnect return hose (16) from adapter (18).
12. Remove adapter (18) from return shutoff valve (19).
13. Remove return shutoff valve (19) from union (20).
14. Remove union (20) from nipple (21).
15. Remove nipple (21) from right fuel tank.
16. Remove screw (22), lockwasher (23), clamp (24), and return hose (5) from weldnut (25). Discard lockwasher.



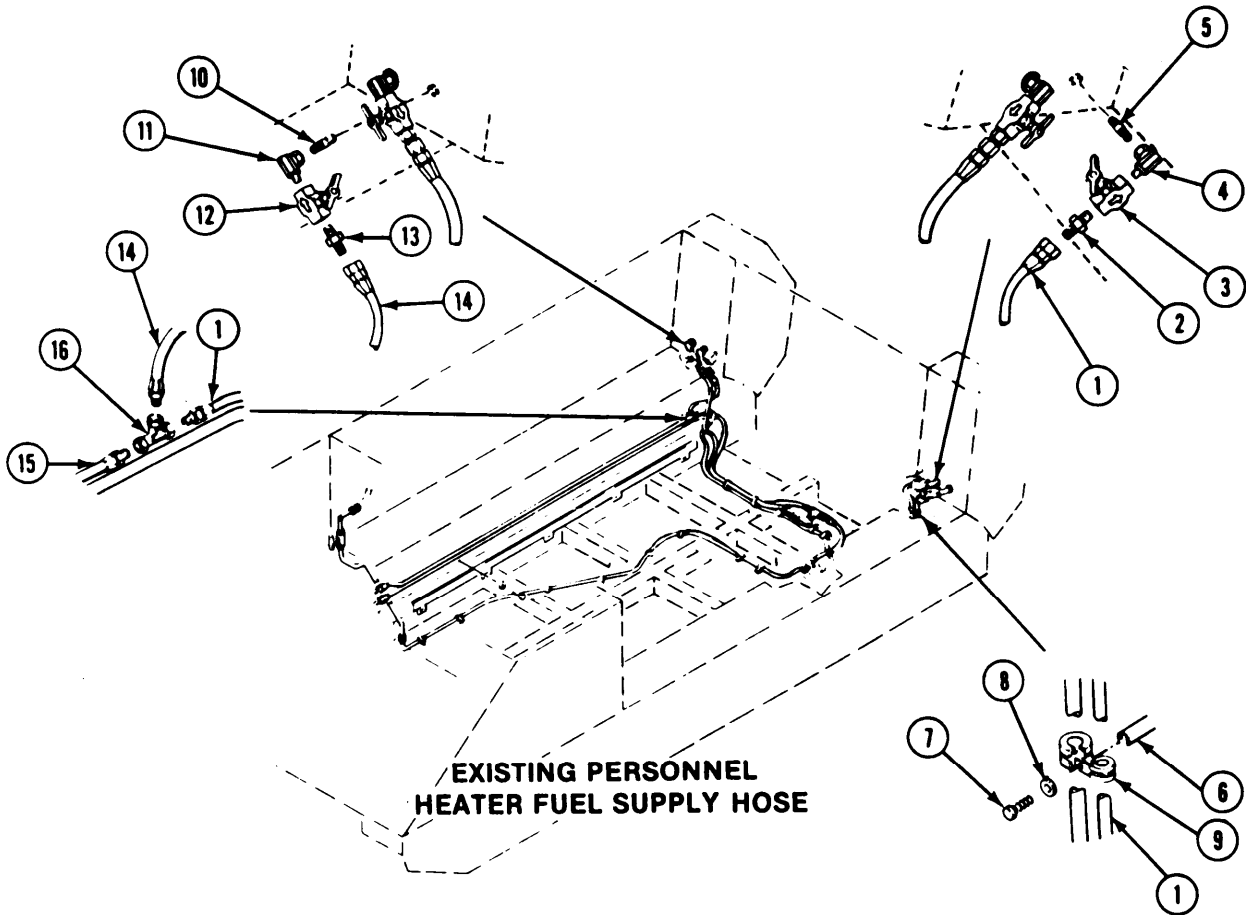
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- 17. Disconnect return hose (1) from adapter (2).
- 18. Remove adapter (2) from shutoff valve (3).
- 19. Remove shutoff valve (3) from union (4).
- 20. Remove union (4) from nipple (5).
- 21. Remove nipple (5) from left fuel tank.

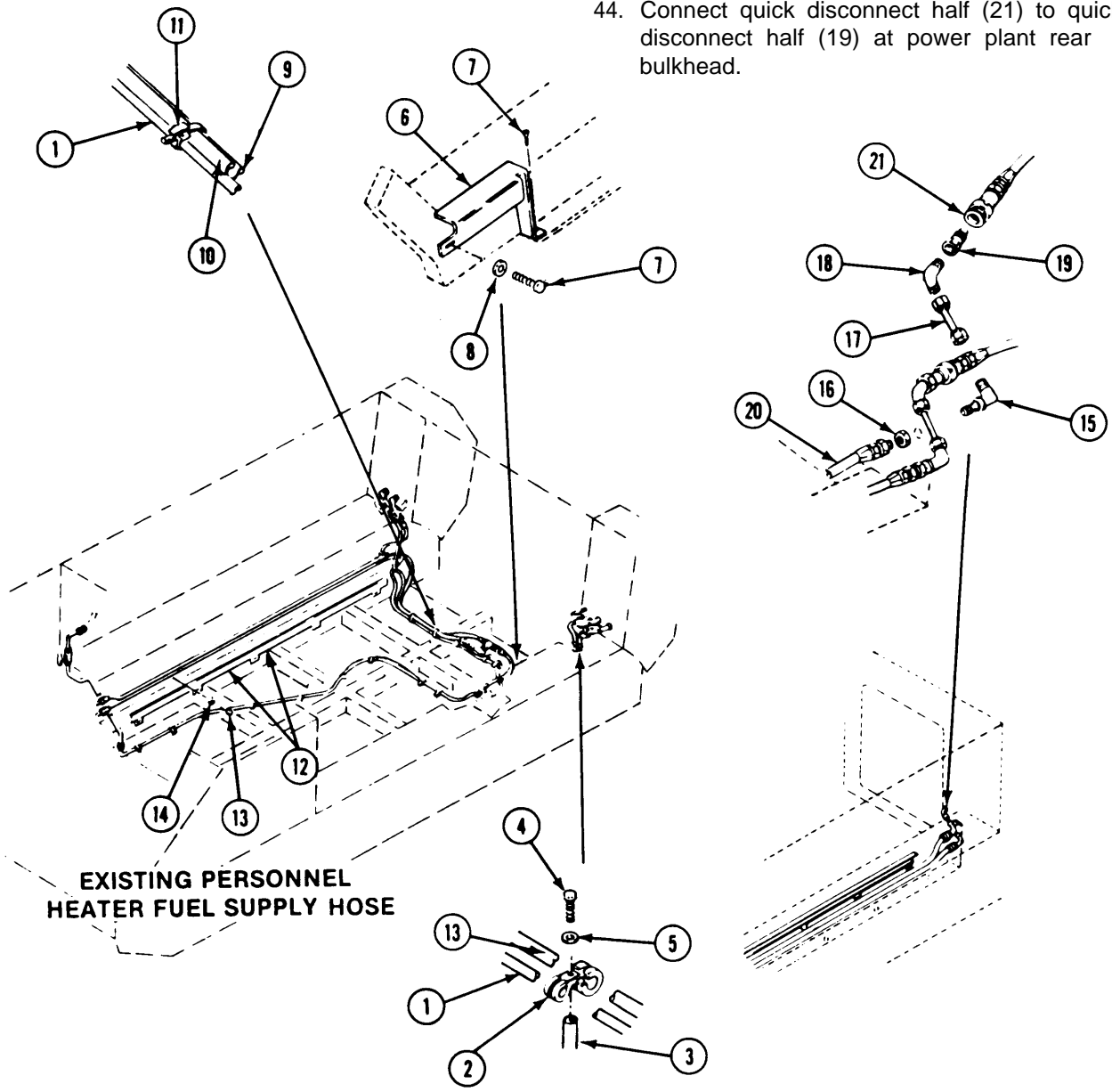
**INSTALL**

- 22. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.
- 23. Install nipple (5) in left fuel tank.
- 24. Install union (4) on nipple (5).
- 25. Install shutoff valve (3) on union (4) with arrow pointing toward tank.

- 26. Install adapter (2) in shutoff valve (3).
- 27. connect return hose (1) to adapter (2).
- 28. Install return hose (1) on weldnut (6). Secure with screw (7), new lockwasher (8), and clamp (9).
- 29. Install nipple (10) in right fuel tank.
- 30. Install union (11) on nipple (10).
- 31. Install shutoff valve (12) on union (11) with arrow pointing toward tank.
- 32. Install adapter (13) in shutoff valve (12).
- 33. Connect return hose (14) to adapter (13).
- 34. Connect return hoses (15, 1, and 14) to tee (16).



35. Install return hose (1) and six clamps (2) On three weldnuts (3). Secure with three screws (4) and new lockwashers (5).
36. Secure guard (6) to hull with two screws (7) and new lockwasher (8).
37. Secure return hose (1) and supply hoses (9 and 10) together with three new straps (11).
38. Secure two guards (12) to hull with five screws (13) and new lockwashers (14).
39. Secure bulkhead elbow (15) to power plant rear bulkhead with nut (16).
40. Connect tube assembly (17) to bulkhead elbow (15).
41. Connect elbow (18) to tube (17).
42. Connect quick disconnect half (19) to elbow (18).
43. Connect return hose (20) to bulkhead elbow (15).
44. Connect quick disconnect half (21) to quick disconnect half (19) at power plant rear bulkhead.



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**FOLLOW-THROUGH STEPS**

1. Install cargo area floor plates  
(See TM9-2350-266-20).
2. Fill fuel tanks (see your -10).
3. Connect battery ground lead (page 13-2).
4. Start engine (see your -10). Check for leaks.
5. Install power plant rear access panel  
(page 24-27).
6. Raise and lock ramp (see your -10).
7. Stop/shutdown engine (see your -10).

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**END OF TASK**



## CLEAN FUEL CAP VENT AND FILTER SCREEN (M981 AND M1064 ONLY)

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

wiping rag (Item 61, App C)  
Dry cleaning solvent (Item 13, App C)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)

### CLEAN



#### WARNING

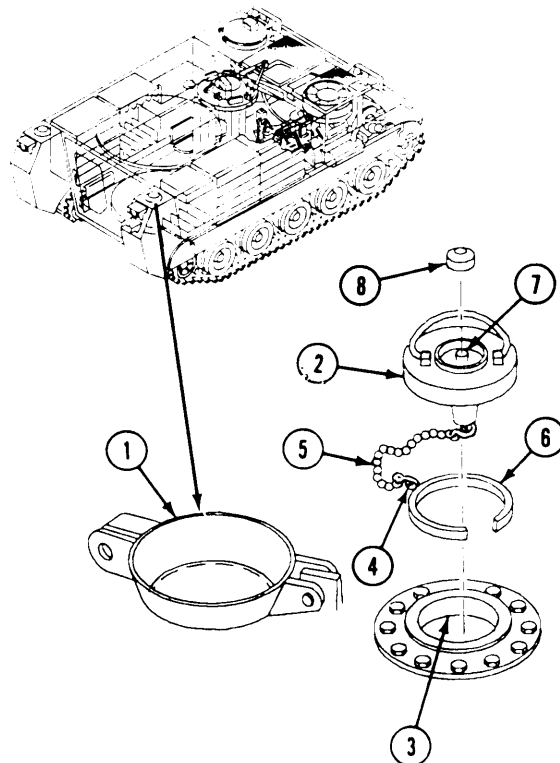
Fuel fumes can explode and burn you. Do not smoke or allow open flame near carrier when removing and cleaning fuel cap(s).

1. Open fuel filler combat cover (1), and remove fuel cap (2) from filler neck (3).
2. Open hook (4) and remove attached chain (5) with fuel cap (2) from spring plate (6).
3. While holding end of spring plate (6) out from groove, rotate spring plate and remove from filler neck (3).
4. Clean vent grommet (7) and screen cap (8) in fuel cap (2) as follows:
  - a. Using pliers, pull on the tab in the center of screen cap (8), and remove screen cap from fuel cap (2).

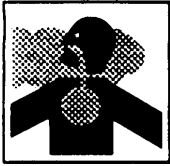
#### NOTE

Do not remove internal filter screen from screen cap.

- b. Check vent grommet (7) to make sure it is clean, free from damage, and secure.
- c. If vent grommet (7) is damaged, replace entire fuel cap.



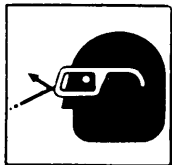
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**WARNING**

Dry cleaning 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 is 100°F (38°C) and for Type II is 138°F (50°C). Failure to do so may result in injury to death to personnel.

- d. If grommet (1) is clogged or dirty, remove and clean with dry cleaning solvent and clean rag.
- e. Install vent grommet (1) in fuel cap (2). Make sure it is properly seated.

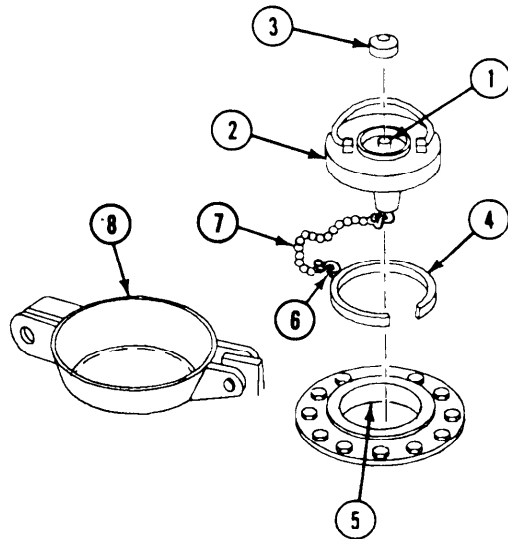


**WARNING**

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

- f. Clean screen cap (3) with dry cleaning solvent. Dry with compressed air.
- g. Install screen cap (3) in fuel cap (2). solvent. Dry with compressed air.

- 4. While holding one end of spring plate (4), place other end in groove in filler neck (5). Rotate spring plate and install in filler neck.
- 5. Install hook (6) with attached chain (7) and fuel cap (2) to spring plate (4).
- 6. Install fuel cap (2), with attached chain (7) in filler neck (5).
- 7. Close fuel filter combat cover (8).



END OF TASK

## REPLACE FUEL SUPPLY HOSES, TUBES, AND FITTINGS (M1064 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-48.3). Install (page 648.6).

### INITIAL SETUP

#### Tools

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Lockwasher (11)  
Lockwasher (8)  
Strap (20)

#### Personnel Required

Unit Mechanic

#### References

See your -10

#### Equipment Conditions

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel tanks drained (page 6-28)  
Power plant rear access panel removed (page 24-27)  
Heater duct removed (page 29-47)  
Floor plates removed (page 24-38)

### REMOVE



#### WARNING

Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

Use wiping rags to wipe any spilled fuel.

1. Separate quick disconnect half (1) from quick disconnect half (2) inside power plant rear bulkhead.
2. Remove fuel supply hose (3) from nipple (4).

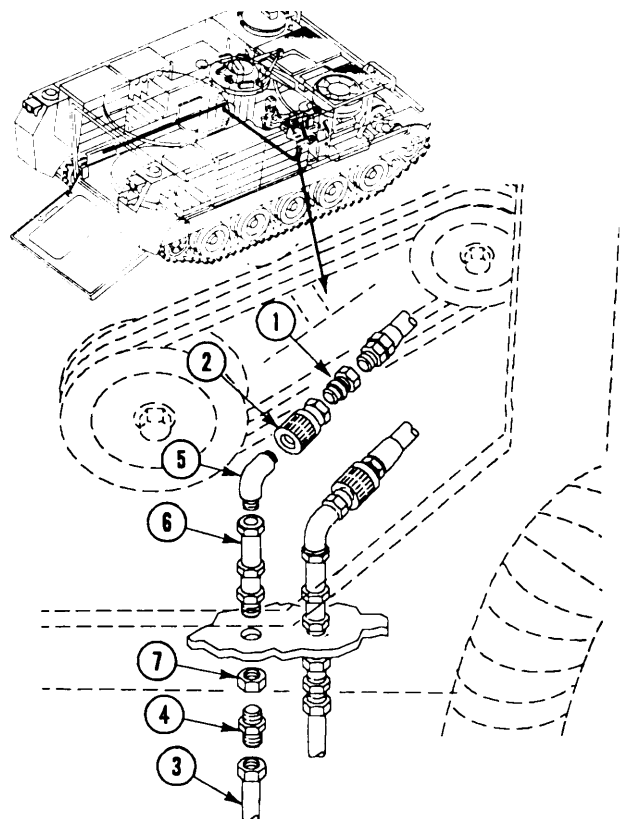
#### NOTE

Tag quick disconnect couplings before removal.

3. Remove quick disconnect half (2) from elbow (5).
4. Remove elbow (5) from tube assembly (6).

5. Remove tube assembly (6) from nipple (4).

6. Remove nut (7) and nipple (4) from transverse beam.



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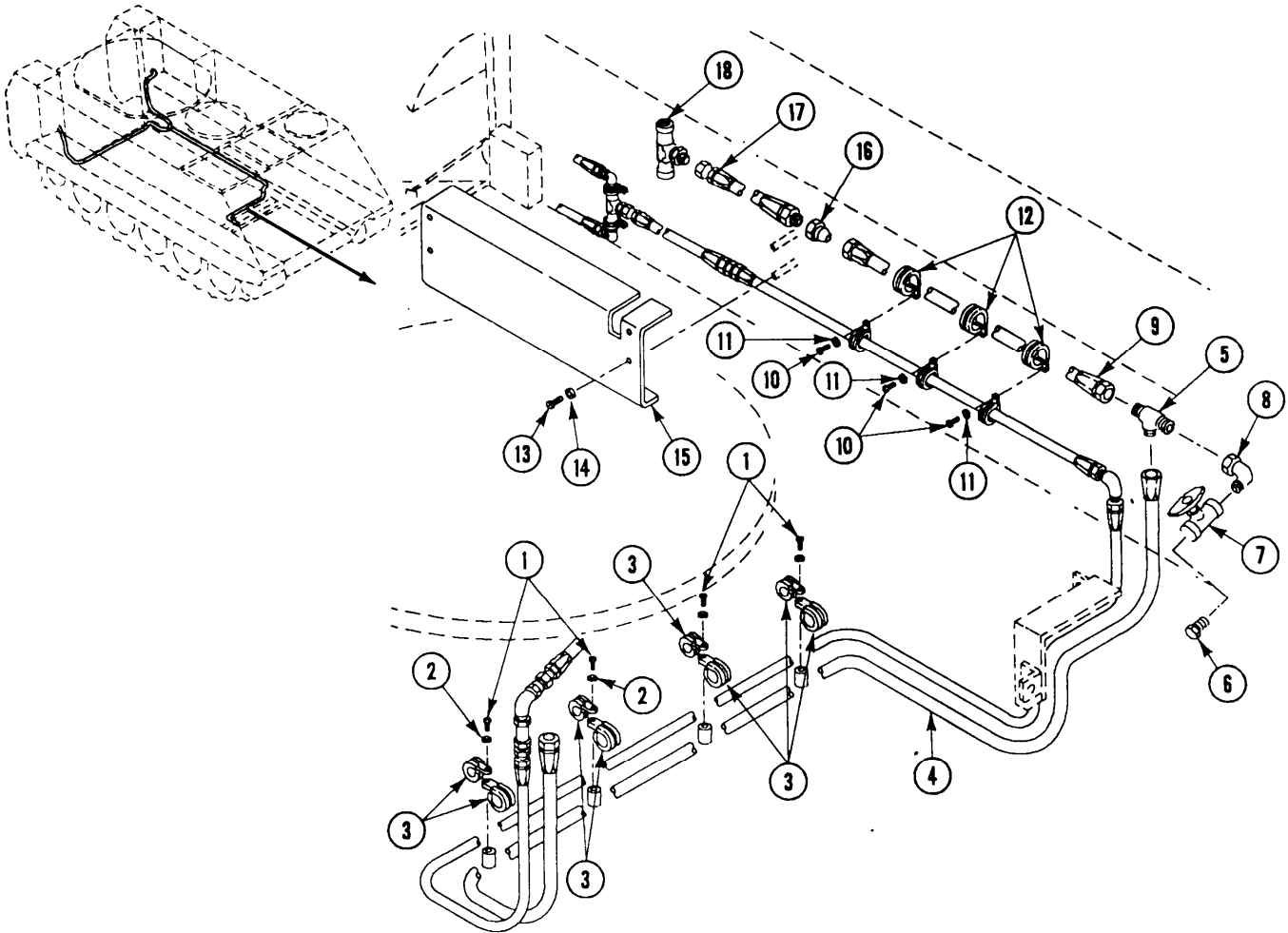
7. Remove four screws (1), lockwashers (2), and eight clamps (3) from weldnuts. Discard lockwashers.
8. Remove clamps (3) from fuel supply hose (4).
9. Disconnect fuel supply hose (4) from tee (5).

**NOTE**

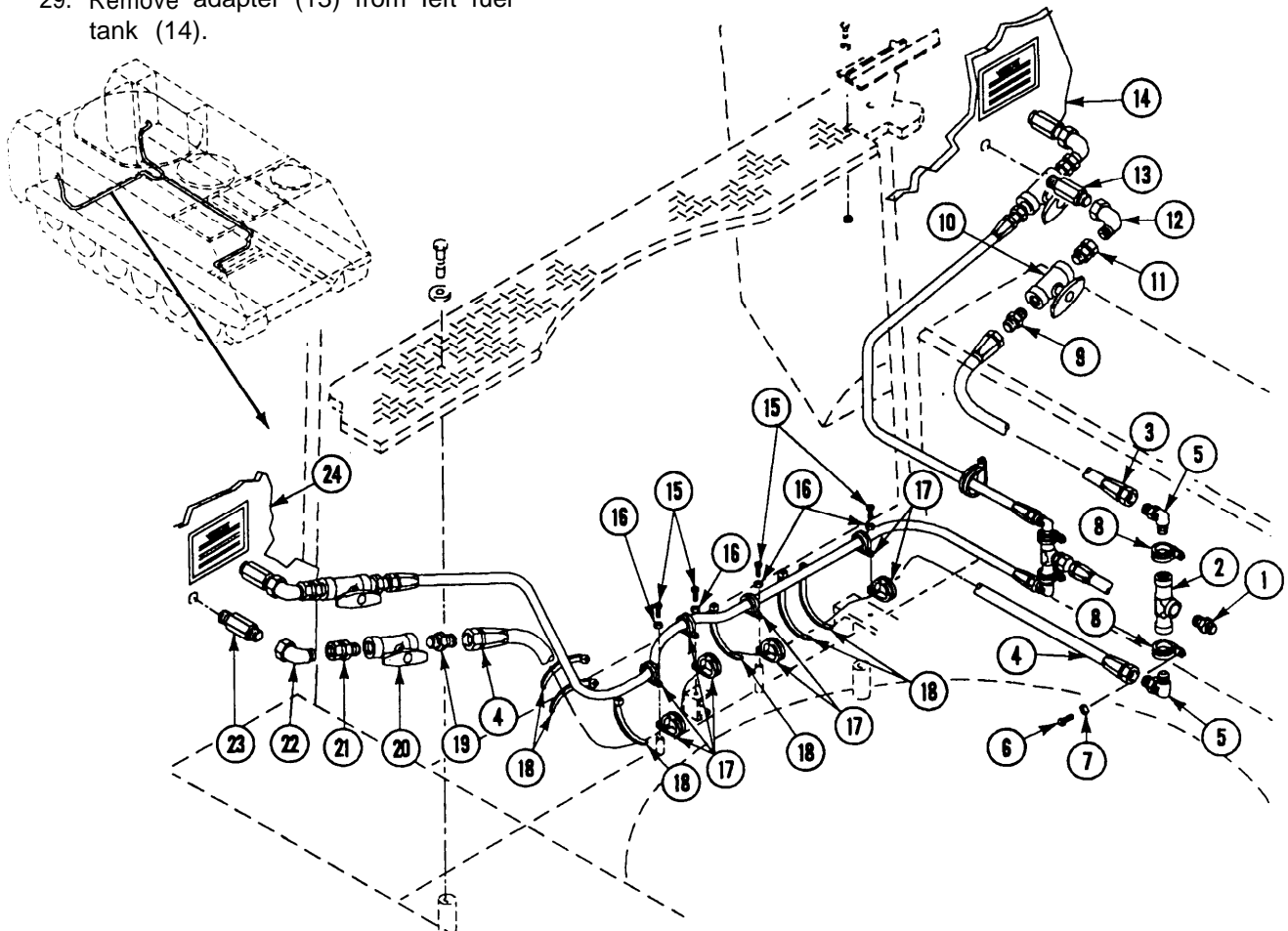
**If personnel heater is installed, plug (6) will be replaced by a hose.**

10. Remove plug (6) from valve (7).
11. Remove valve (7) from elbow (8).
12. Remove elbow (8) from tee (5).
13. Remove tee (5) from fuel supply tube (9).

14. Remove three screws (10), lockwashers (11), and six clamps (12) from weldnuts. Discard lockwashers.
15. Remove clamps (12) from fuel supply tube (9).
16. Remove four screws (13), lockwashers (14), and guard (15) from sponson. Discard lockwashers.
17. Disconnect fuel supply tube (9) from nipple (16).
18. Remove nipple (16) from fuel supply hose (17).
19. Remove fuel supply hose (17) from adapter (18).



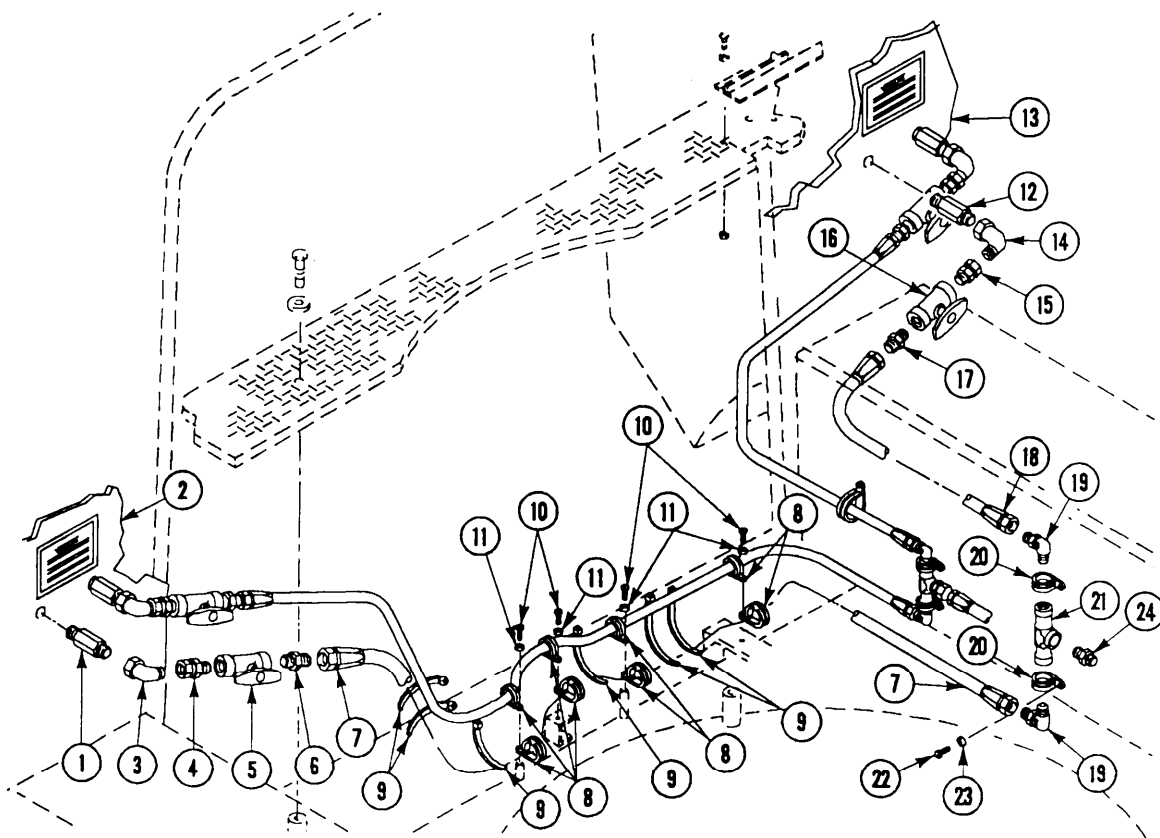
20. Remove adapter (1) from tee (2).
21. Disconnect two fuel supply hoses (3 and 4) from two elbows (5).
22. Remove two screws (6) and lockwashers (7) from clamps (8). Discard lockwashers.
23. Remove two clamps (8) and elbows (5) from tee (2).
24. Disconnect fuel supply hose (3) from adapter (9).
25. Remove adapter (9) from valve (10).
26. Remove valve (10) from adapter (11).
27. Remove adapter (11) from elbow (12).
28. Remove elbow (12) from adapter (13).
29. Remove adapter (13) from left fuel tank (14).
30. Remove four screws (15), lockwashers (16), and clamps (17) from weldnuts. Discard lockwashers.
31. Remove clamps (17) and straps (18) from fuel hoses, wiring harness, and bilge pump tube.
32. Disconnect fuel supply hose (4) from adapter (19).
33. Remove adapter (19) from valve (20).
34. Remove valve (20) from adapter (21).
35. Remove adapter (21) from elbow (22).
36. Remove elbow (22) from adapter (23).
37. Remove adapter (23) from right fuel tank (24).



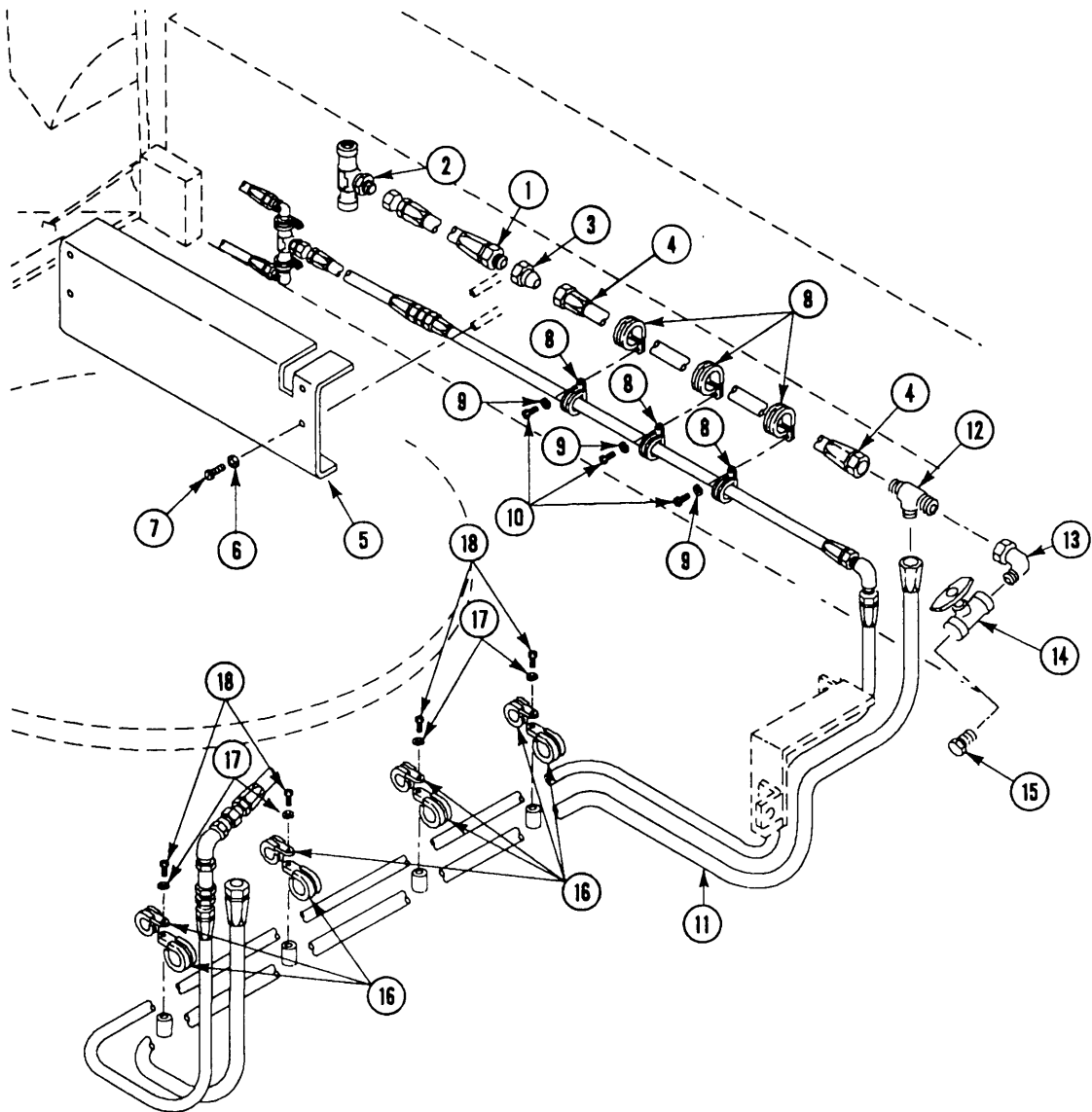
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## INSTALL

38. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.
39. Install adapter (1) in right fuel tank (2).
40. Install elbow (3) on adapter (1).
41. Install adapter (4) on elbow (3).
42. Install valve (5) on adapter (4) with arrow pointing away from fuel tank.
43. Install adapter (6) on valve (5).
44. Connect fuel supply hose (7) to adapter (6).
45. Install four clamps (8) and straps (9) as required on fuel hoses, wiring harness, and bilge pump tube.
46. Install four screws (10), new lockwashers (11), and clamps (8) on weldnuts.
47. Install adapter (12) in left fuel tank (13).
48. Install elbow (14) on adapter (12).
49. Install adapter (15) on elbow (14).
50. Install valve (16) on adapter (15).
51. Install adapter (17) on valve (16).
52. Connect fuel supply hose (18) to adapter (17).
53. Install two elbows (19) and clamps (20) on tee (21).
54. Install two screws (22), new lockwashers (23), and clamps (20) on weldnuts.
55. Connect two fuel supply hoses (7 and 18) to two elbows (19).
56. Install adapter (24) on tee (21).

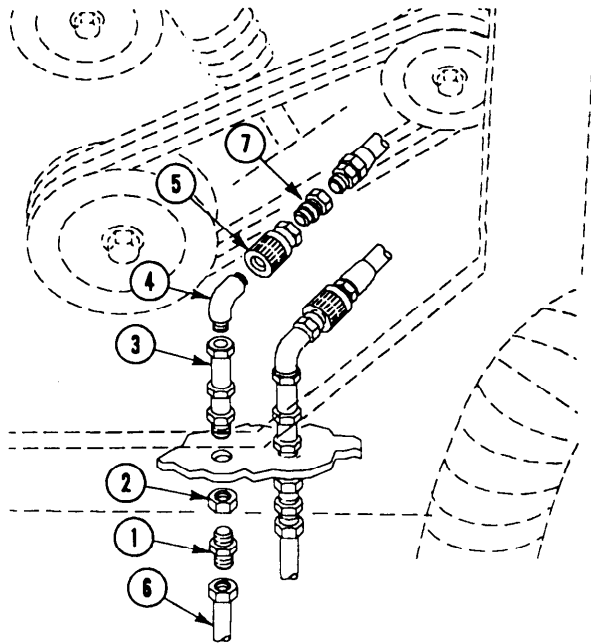


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|--|--|
| <p>57. Connect fuel supply hose (1) to adapter (2).</p> <p>58. Install nipple (3) to fuel supply hose (1).</p> <p>59. Connect fuel supply tube (4) to nipple (3).</p> <p>60. Install guard (5), four new lockwashers (6), and screws (7) on sponson.</p> <p>61. Install three clamps (8) on fuel supply tube (4).</p> <p>62. Install six clamps (8), three new lockwashers (9), and screws (10) on weldnuts.</p> | <p>63. Connect fuel supply hose (11) to tee (12).</p> <p>64. Install elbow (13) on tee (12).</p> <p>65. Install valve (14) on elbow (13).</p> <p>66. Install plug (15) on valve (14).</p> <p>67. Install fuel supply tube (4) on tee (12).</p> <p>68. Install four clamps (16) on fuel supply hose (11).</p> <p>69. Install eight clamps (16), four new lockwashers (17), and screws (18) on weldnuts.</p> |
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70. Install nipple (1) and nut (2) on traverse beam inside power plant rear bulkhead.
71. Connect tube assembly (3) to nipple (1).
72. Install elbow (4) on tube assembly (3).
73. Install quick disconnect half (5) on elbow (4).
74. Connect fuel supply hose (6) to nipple (1).
75. Connect quick disconnect half (7) to quick disconnect half (5) at power plant rear bulkhead.



### **FOLLOW-THROUGH STEPS**

1. Fill fuel tanks (see your -10).
2. Connect battery ground leads (page 13-2).
3. Start engine (see your -10). Check for leaks.
4. Install power plant rear access panel (page 24-27).
5. Install heater duct (page 29-47).
6. Install floor plates (page 24-38).
7. Raise and lock ramp (see your -10).
8. Stop/shutdown engine (see your -10).
9. Unblock earner (see your -10).

**END OF TASK**



## REPLACE FUEL RETURN HOSES, TUBES, AND FITTINGS (M1064 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-48.9). Install (page 6-48.12).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Lockwasher (5)  
Lockwasher (4)  
Strap (20)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your-10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel tanks drained (page 6-28)  
Power plant rear access panel removed  
(page 24-27)  
Heater duct removed (page 29-47)  
Floor plates removed (page 24-38)

### REMOVE



**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

Use wiping rags to wipe any spilled fuel.

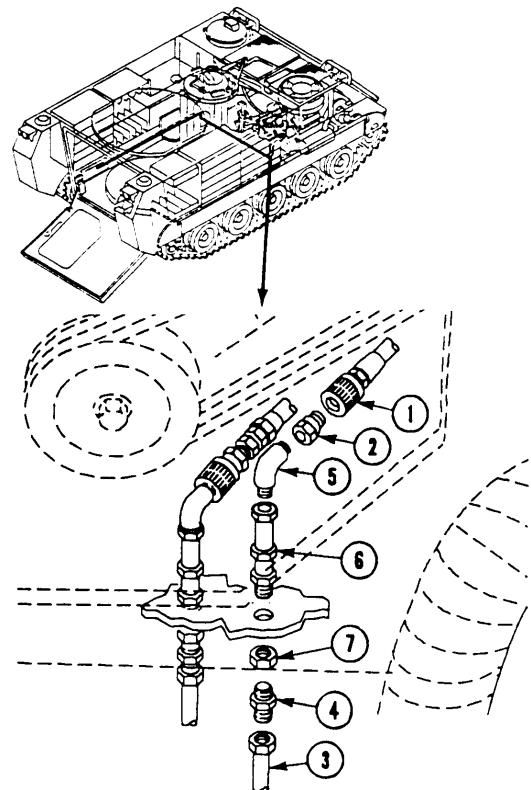
1. Separate quick disconnect half (1) from quick disconnect half (2) inside power plant rear bulkhead.
2. Remove fuel return hose (3) from nipple (4).

#### NOTE

Tag quick disconnect couplings before removal.

3. Remove quick disconnect half (2) from elbow (5).
4. Remove elbow (5) from tube assembly (6).

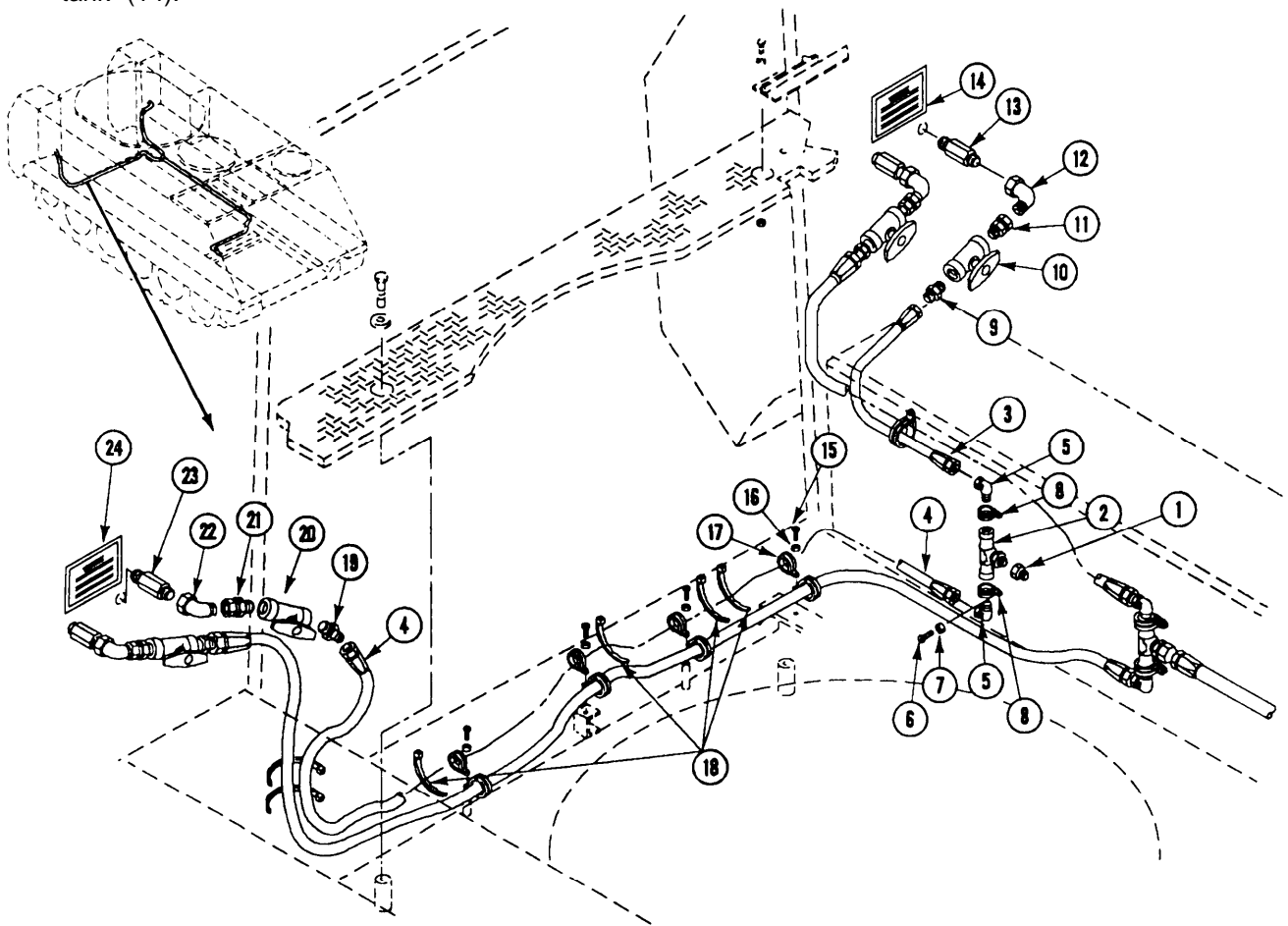
5. Remove tube assembly (6) from nipple (4).
6. Remove nut (7) and nipple (4) from transverse beam.



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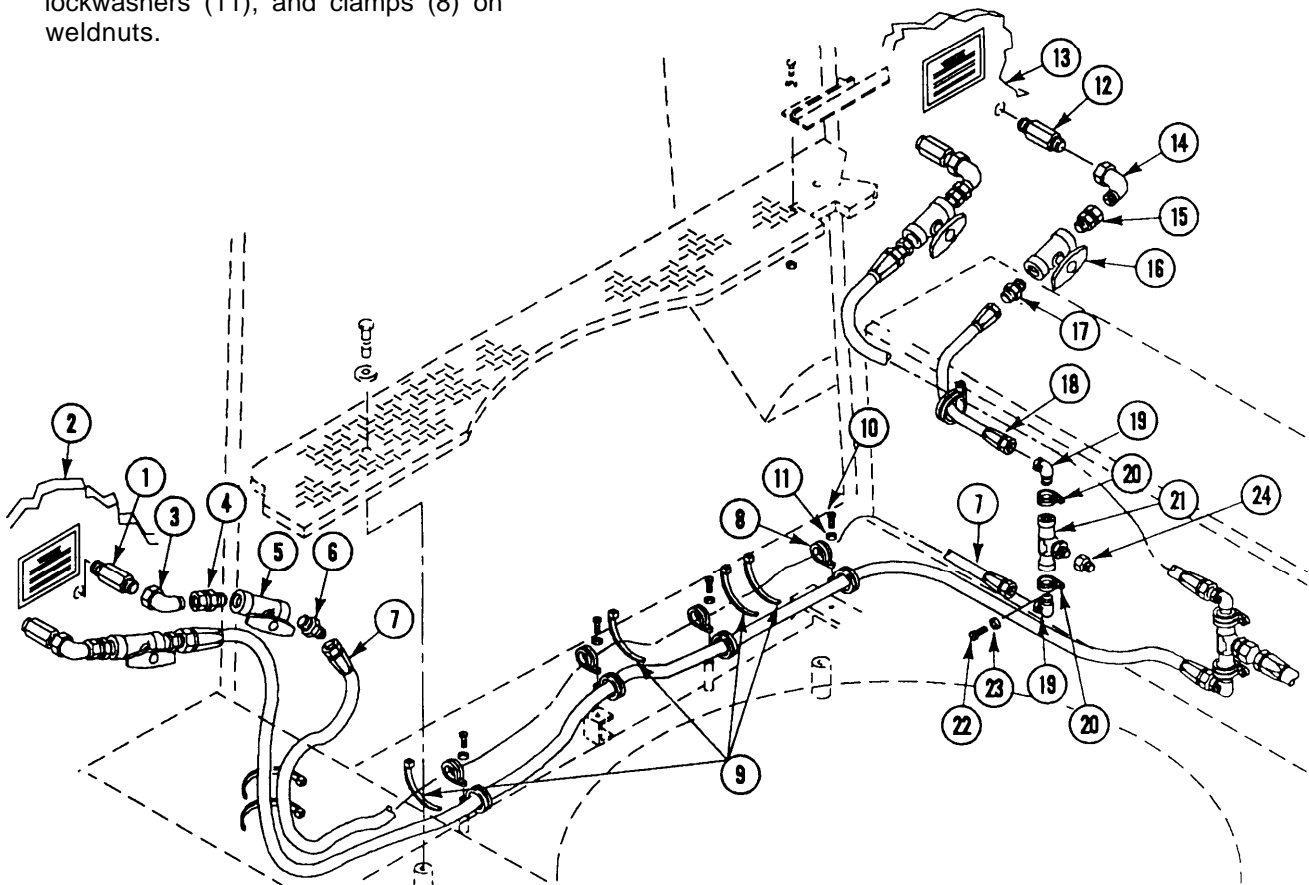
17. Remove adapter (1) from tee (2).
18. Disconnect two fuel return hoses (3 and 4) from two elbows (5).
19. Remove two screws (6) and lockwashers (7) from clamps (8). Discard lockwashers.
20. Remove two clamps (8) and elbows (5) from tee (2).
21. Disconnect fuel return hose (3) from adapter (9).
22. Remove adapter (9) from valve (10).
23. Remove valve (10) from adapter (11).
24. Remove adapter (11) from elbow (12).
25. Remove elbow (12) from adapter (13).
26. Remove adapter (13) from left fuel tank (14).
27. Remove four screws (15), lockwashers (16), and clamps (17) from weldnuts. Discard lockwashers.
28. Remove clamps (17) and straps (18) from fuel hoses, wiring harness, and bilge pump tube.
29. Disconnect fuel return hose (4) from adapter (19).
30. Remove adapter (19) from valve (20).
31. Remove valve (20) from adapter (21).
32. Remove adapter (21) from elbow (22).
33. Remove elbow (22) from adapter (23).
34. Remove adapter (23) from right fuel tank (24).



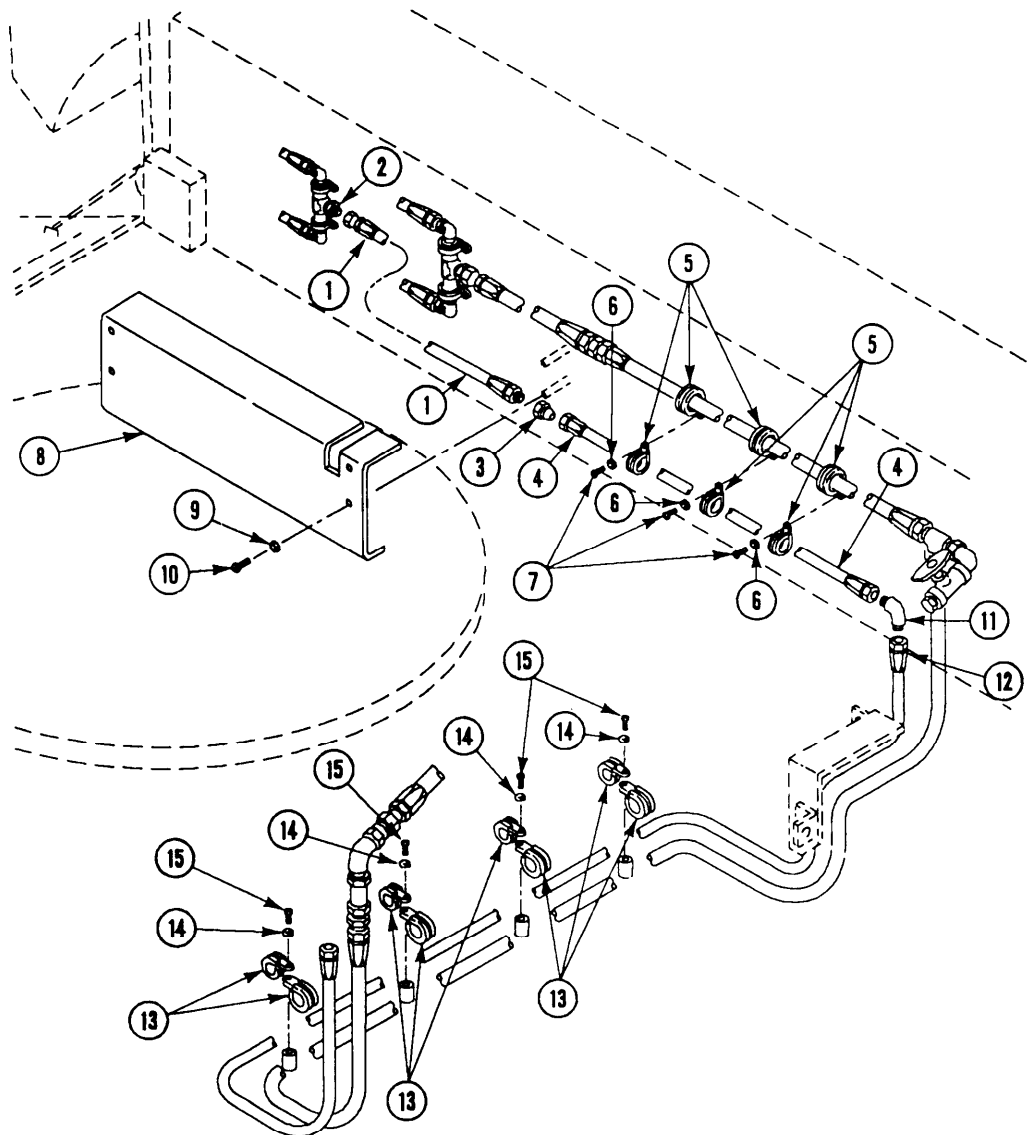
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## INSTALL

35. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.
36. Install adapter (1) in right fuel tank (2).
37. Install elbow (3) on adapter (1).
38. Install adapter (4) on elbow (3).
39. Install valve (5) on adapter (4) with arrow pointing away from fuel tank.
40. Install adapter (6) on valve (5).
41. Connect fuel return hose (7) to adapter (6).
42. Install four clamps (8) and straps (9) as required on fuel hoses, wiring harness, and bilge pump tube.
43. Install four screws (10), new lockwashers (11), and clamps (8) on weldnuts.
44. Install adapter (12) in left fuel tank (13).
45. Install elbow (14) on adapter (12).
46. Install adapter (15) on elbow (14).
47. Install valve (16) on adapter (15).
48. Install adapter (17) on valve (16).
49. Connect fuel return hose (18) to adapter (17).
50. Install two elbows (19) and clamps (20) on tee (21).
51. Install two screws (22), new lockwashers (23), and clamps (20) on weldnuts.
52. Connect two fuel return hoses (7 and 18) to two elbows (19).
53. Install adapter (24) on tee (21).

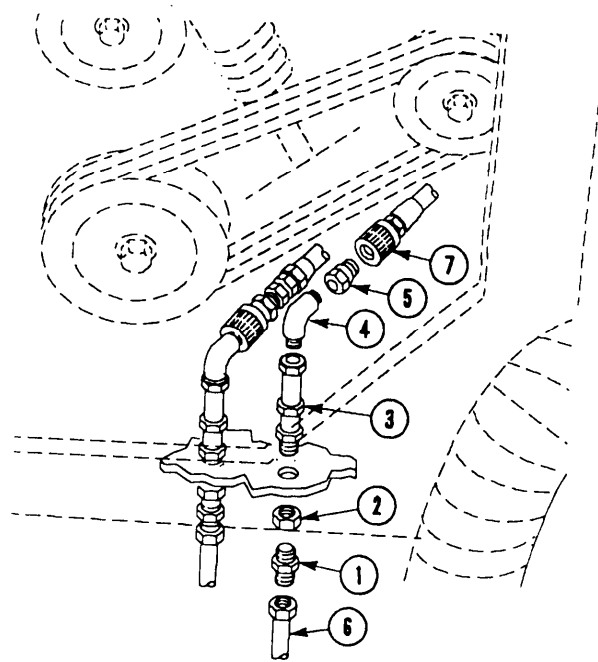


54. Connect fuel return hose (1) to adapter (2).
55. Install nipple (3) to fuel return hose (1).
56. Connect fuel return tube (4) to nipple (3).
57. Install three clamps (5) on fuel return tube (4).
58. Install six clamps (5), three new lockwashers (6), and screws (7) on weldnuts.
59. Install guard (8), four new lockwashers (9), and screws (10) on sponson.
60. Install elbow (11) on fuel return tube (4).
61. Connect fuel return hose (12) to elbow (11).
62. Install four clamps (13) to fuel return hose (12).
63. Install eight clamps (13), four new lockwashers (14), and screws (15) on weldnuts.



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64. Install nipple (1) with nut (2) on traverse beam inside power plant rear bulkhead.
65. Connect tube assembly (3) to nipple (1).
66. Install elbow (4) on tube assembly (3).
67. Install quick disconnect half(5) on elbow (4).
68. Connect fuel return hose (6) to nipple (1).
69. Connect quick disconnect half(7) to quick disconnect half (5) at power plant rear bulkhead.



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### FOLLOW-THROUGH STEPS

1. Fill fuel tanks (see your-10).
2. Connect battery ground leads (page 13-2).
3. Start engine (see your-10). Check for leaks.
4. Install power plant rear access panel (page 24-27).
5. Install heater duct (page 29-47).
6. Install floor plates (page 24-38).
7. Raise and lock ramp (see your -10).
8. Stop/shutdown engine (see your -10).
9. Unblock earner (see your -10).

---

END OF TASK

**Section IV. SPONSON MOUNTED FUEL TANKS AND LINES  
(M577A2 AND M1068 ONLY)**

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**TASK INDEX**

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## DRAIN FUEL TANKS (M577A2 AND) M1068 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
Hose assembly (Item 37, App D)

**Materials/Parts:**

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Suitable Container

**Personnel Required**

Unit Mechanic

**References:**

see your -10

**Equipment Conditions:**

Engine stopped/shutdown and ramp lowered  
(see your -10)  
Battery ground lead disconnected (page 13-2)  
Rear compartment floor plates removed  
(page 24-37)  
Carrier blocked (see your -10)

### D R A I N

1. Open fuel filler combat cover (1) and remove filler cap.
2. Loosen drain plug retaining screw (2) from under carrier. Remove drain plug (3).
3. Place a container (4) under hull drain opening.



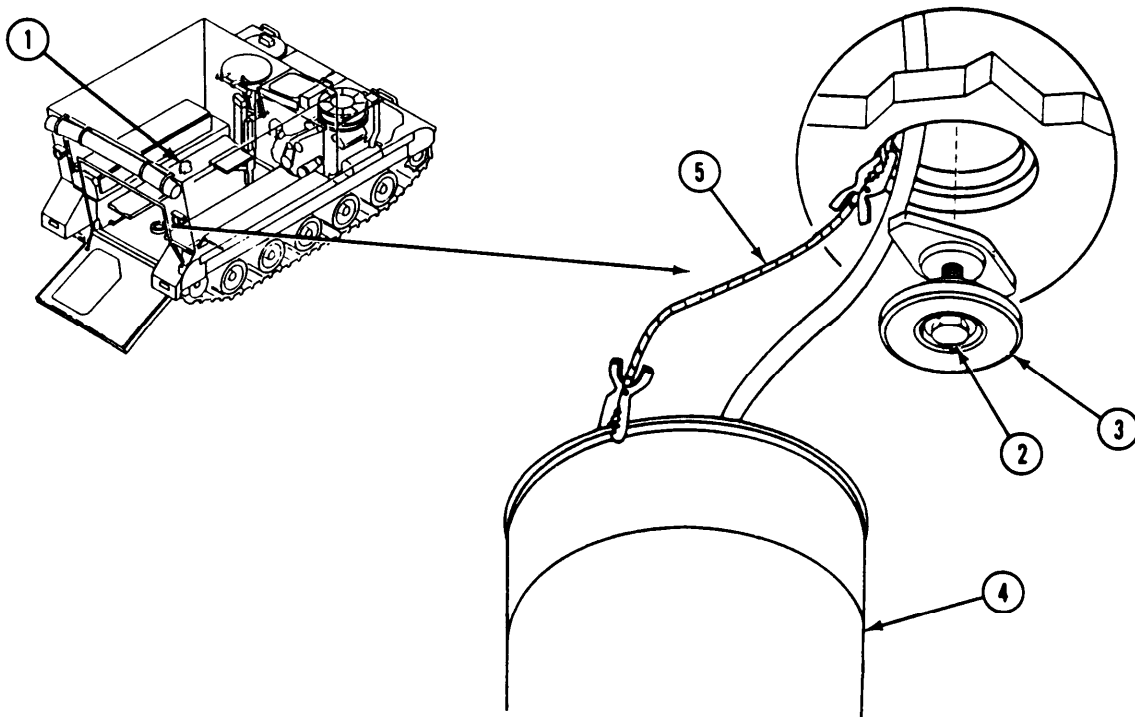
**WARNING**

**Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.**

**NOTE**

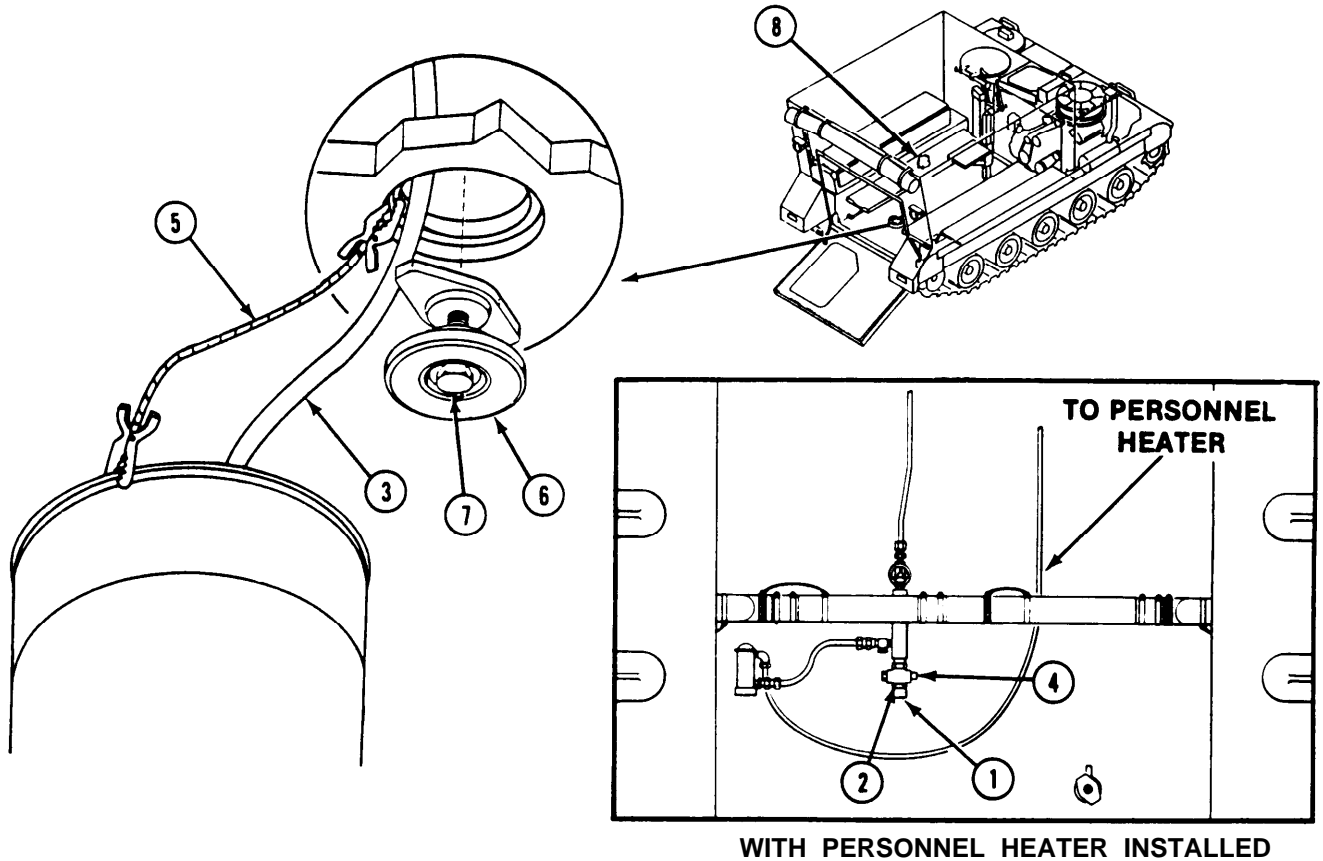
**Use wiping rag to wipe up any spilled fuel.**

4. Place a ground strap (5) between hull and metal container.





5. Remove pipe plug (1) from drain cock (2).
6. Install fuel drain hose (3) on drain cock (2). Insert drain hose through hull opening into metal container.
7. Open valve (4) and drain fuel from tanks.
8. Close valve (4) and remove hose (3) from drain cock (2).
9. Apply sealing compound to threads of pipe plug (1) and install plug in drain cock (2).
10. Remove ground strap (5) from hull and metal container.
11. Install drain plug (6) in hull and secure with retaining screw (7).
12. Install fuel filler cap. Close combat cover (8).



### FOLLOW-THROUGH STEPS

1. Fill fuel tanks (see your -10).
2. Install rear compartment floor plates (page 24-37).
3. Connect battery ground lead (page 13-2).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).

**END OF TASK**

## REPLACE FILLER AND STRAINER PARTS (M577A2 AND M1068 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-52). Install (page 6-53).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Gasket (2)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

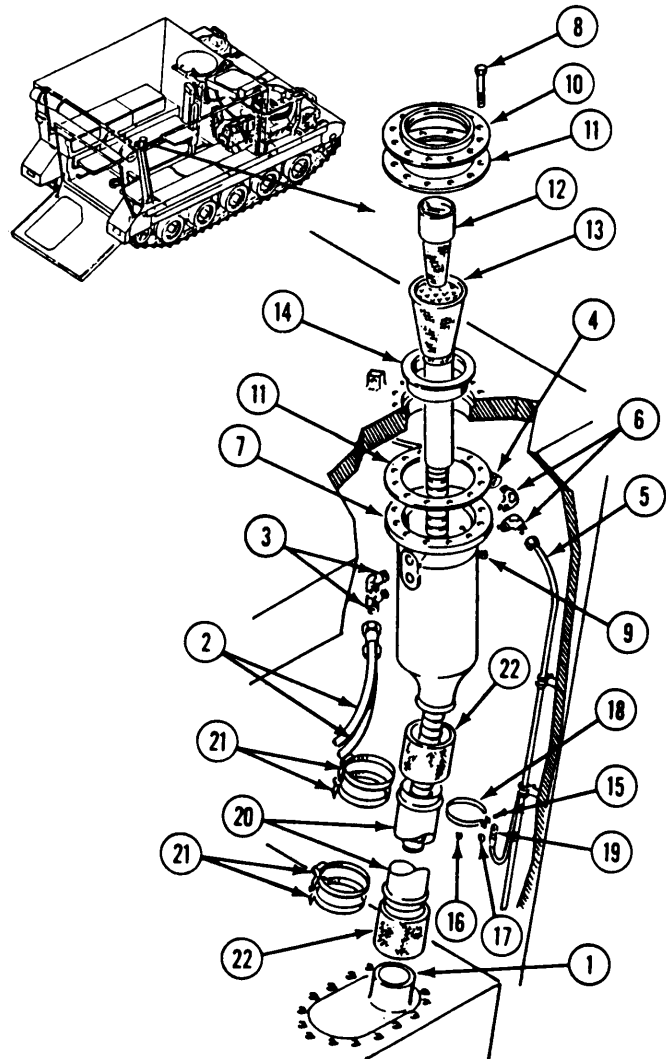
#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Filler cover and lock removed (page 6-7)  
Filler cap removed (page 6-8)

### REMOVE

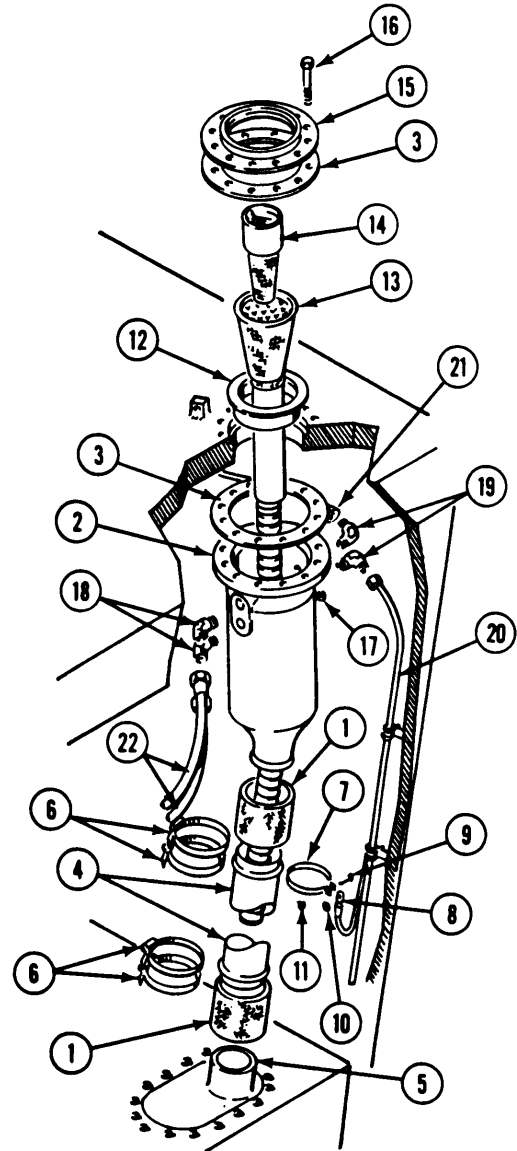
1. Drain fuel tanks below level of filler flange (1) on top of right fuel tank (page 6-50).
2. Disconnect two fuel tank vent hoses (2) from two elbows (3).
3. Disconnect fuel return tube (4) and fuel tank vent tube (5) from two elbows (6).
4. Remove two elbows (3) from lower filler neck (7).
5. Remove two elbows (6) from lower filler neck (7).
6. Remove 12 screws (8) and nuts (9) that secure flange (10), lower filler neck (7), and 2 gaskets (11) to hull top opening. Discard gaskets.
7. Remove filler neck (12), insert (13), and flange (14) from hull.
8. Remove screw (15), nut (16), washer (17), clamp (18), and ground lead (19) from filler tube (20).
9. Remove four clamps (21), filler tube (20), lower filler neck (7), and two hoses (22) from fuel tank flange (1).
10. Check hoses and tubes. Replace worn, crimped, or cracked parts.

11. Check machined surfaces of parts. Repair or replace nicked or dented parts.



**I N S T A L L**

12. Apply a thin even coat of sealing compound to clean external threads of fittings before installation.
13. Install two hoses (1), and lower filler neck (2) with a new gasket (3) and filler tube (4) on filler flange (5). Secure with four clamps (6).
14. Install clamp (7) and ground lead (8) on filler tube (4). Secure with screw (9), washer (10), and nut (11).
15. Install flange (12), insert (13), and filler neck screen (14) in hull.
16. Install flange (15), lower filler neck (2), and new gasket (3) on hull top opening. Secure with 12 screws (16) and nuts (17).
17. Install two elbows (18) in lower filler neck (2).
18. Install two elbows (19) in lower filler neck (2).
19. Connect fuel tank vent tube (20) and fuel return tube (21) to two elbows (19).
20. Connect two fuel tank vent hoses (22) to two elbows (18).
21. Fill fuel tank (see your -10).
22. Check filler tube and hoses for leaks.

**FOLLOW-THROUGH STEPS**

1. Install filler cap (page 6-8).
2. Install filler cover and lock (page 6-7).
3. Connect battery ground lead (page 13-2).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).

**END OF TASK**

## REPLACE FUEL QUANTITY TRANSMITTER (M577A2 AND M1068 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-54). Clean, Inspect, and Repair (page 6-55). Install (page 6-55).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30 App D)

#### Materials/Parts:

Dry cleaning solvent (Item 13, App C)  
Non-electrical wire (Item 31, App C)  
Gasket

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

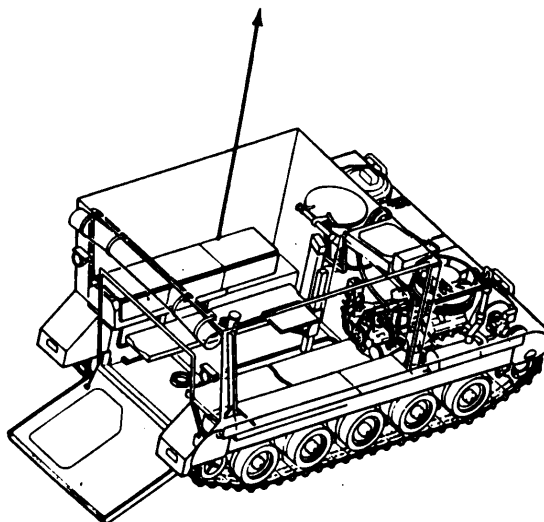
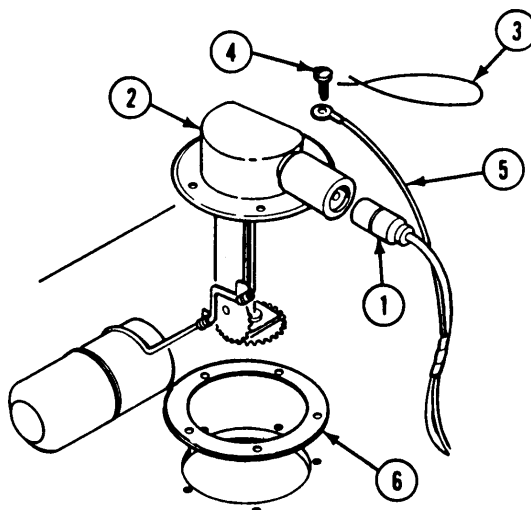
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Map board removed (see your -10)  
Work tables removed  
(page 24-173, 24-175 or 24-178)

### REMOVE

#### NOTE

Right and left fuel quantity transmitter are the same. The following steps apply to one transmitter.

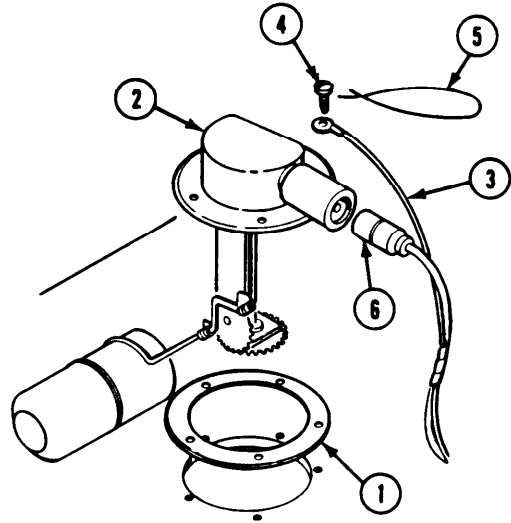
1. Drain fuel tank to less than 3/4 full (page 6-50).
2. Disconnect lead (1) from transmitter (2).  
Circuit 29 is lead for right transmitter.  
Circuit 30 is lead for left transmitter.
3. Remove lockwire (3) from five screws (4).  
Discard lockwire.
4. Remove five screws (4), ground lead (5), transmitter (2), and gasket (6) from fuel tank. Discard gasket.



## CLEAN, INSPECT, AND REPAIR



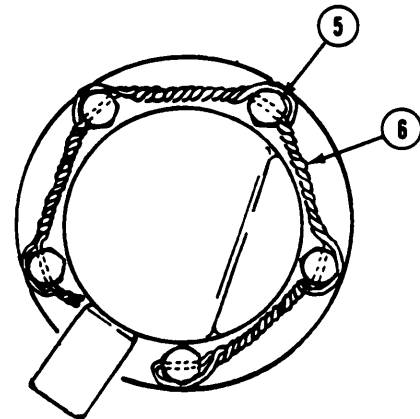
**WARNING**  
 Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.



5. Clean gasket mating surface on top of fuel tank with dry cleaning solvent.

## INSTALL

6. Install new gasket (1), transmitter (2), and ground lead (3) on fuel tank. Secure with five screws (4).
7. Install new lockwire (5) through heads of five screws (4). Secure with double twist method.
8. Connect lead (6) to transmitter (2). Circuit 29 is lead for right transmitter. Circuit 30 is lead for left transmitter.
9. Fill fuel tank (see your -10). Check for leaks.



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## **FOLLOW-THROUGH STEPS**

1. Connect battery ground lead (page 13-2).
2. Check that fuel quantity transmitter operates properly (see your -10).
3. Install map board (see your -10).
4. Install work tables (page 24-173, 24-175 or 24-178).
5. Raise and lock ramp (see your -10).
6. Stop/shutdown engine (see your -10).

---

**END OF TASK**

## REPLACE FUEL TANK ACCESS COVERS (M577A2 AND M1068 ONLY)

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Socket Wrench Set (Item 88, App D)  
Torque Wrench (Item 99, App D)

#### Materials/Parts:

Gasket  
Locking plate bolt (8)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10  
See your LO

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Map board removed (see your -10)  
Work tables removed  
(page 24-173, 24-175, or 24-178)

## R E M O V E

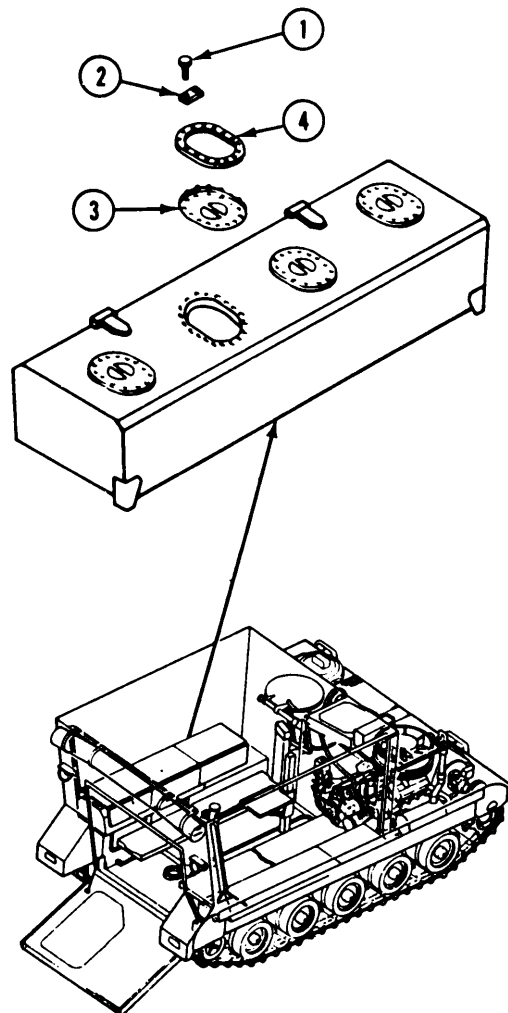
### NOTE

Left and right fuel tank access covers are the same. The following steps apply to one cover.

1. Drain fuel tank below access cover level (page 6-50).
2. Remove 16 screws (1) and 8 locking plate bolts (2) that secure fuel tank access cover (3) and gasket (4) to fuel tank. Discard locking plate bolts.
3. Remove fuel tank access cover (3) and gasket (4) from fuel tank. Discard gasket.

### INSTALL

4. Place new gasket (4) on access cover (3).
5. Place cover (3) and new gasket (4) inside fuel tank opening. Secure with 8 new locking plate bolts (2) and 16 screws (1).
6. Tighten 16 screws (1) to 36-48 lb-in (41-55 CMKG) torque. Use torque wrench and socket wrench set.
7. Fill fuel tank (see your -10). Check tank for leaks.



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## REPLACE FUEL TANK FILLER FLANGE (M577A2 AND M1068 ONLY)

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Socket Wrench Set (Item 88, App D)  
Torque Wrench (Item 99, App D)

#### Materials/Parts

Gasket  
Locking plate bolt (8)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Map board removed (see your -10)  
Work tables removed (page 24-173)  
Carrier blocked (see your -10)

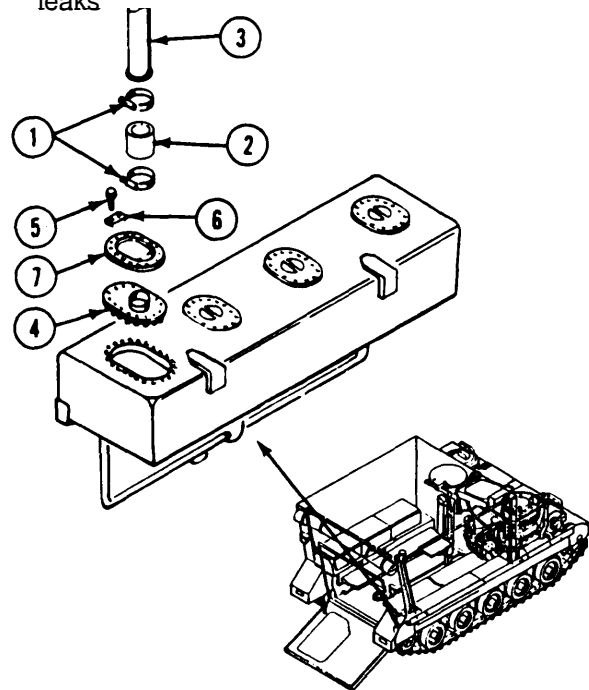
### REMOVE

1. Drain fuel tank below filler flange level (page 6-50).
2. Remove two clamps (1) and filler hose (2) from filler tube (3) and filler flange (4).
3. Remove 16 screws (5), 8 locking plate bolts (6), filler flange (4), and gasket (7) from fuel tank. Discard gasket and locking plate bolts.

### INSTALL

4. Place new gasket (7) on filler flange (4).
5. Place filler flange (4) and new gasket (7) inside fuel tank opening. Secure with 8 new locking plate bolts (6) and 16 screws (5).
6. Tighten 16 screws (5) to 36-48 lb-in (41-55 CMKG) torque. Use torque wrench and socket wrench set.

7. Secure filler hose (2) to filler flange (4) and filler tube (3) with two clamps (1).
8. Fill fuel tank (see your -10). Check tank for leaks



### FOLLOW-THROUGH STEPS

1. Install work tables (page 24-173).
2. Install map board (see your -10).
3. Connect battery ground lead (page 13-2).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).

END OF TASK



## REPLACE FUEL SUPPLY HOSES, TUBES AND FITTINGS (M577A2 AND M1068 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-60). Install (page 6-63).

### INITIAL SETUP

#### Tools:

General Mechanics Tool kit item 30, APP D)

#### Materials/Parts:

Sealing compound (Item 49, APP C)  
Wiping rag (Item 61, App C)  
Lockwasher (9)  
Lockwasher (4)  
Self-locking nut (4)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown and ramp lowered  
(see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel tanks drained (page 6-50)  
Power plant rear access panel removed  
(page 24-29)  
Rear compartment floor plates removed  
(page 24-37)

### REMOVE



#### WARNING

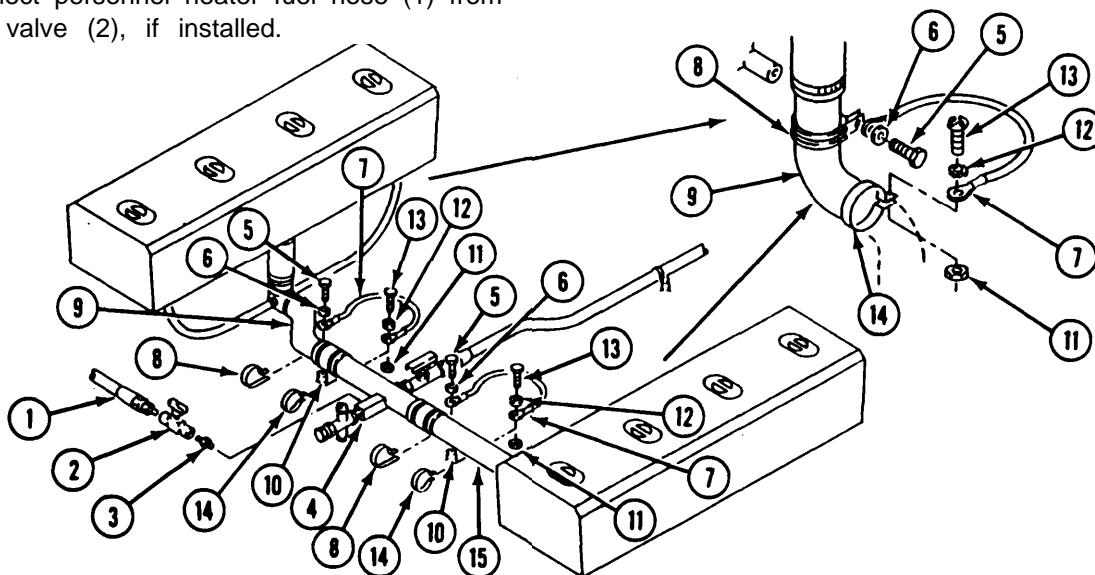
**Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.**

#### NOTE

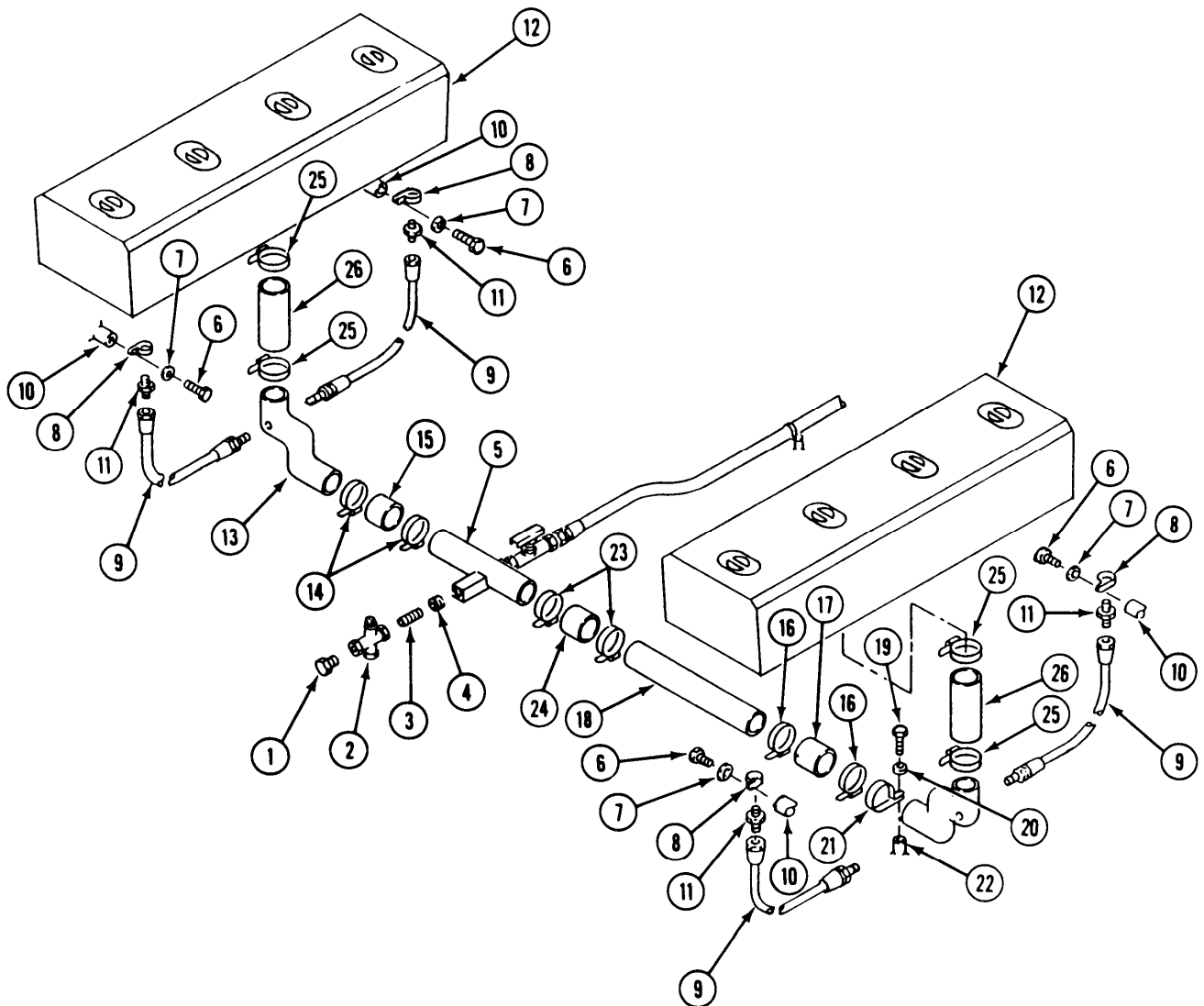
Use wiping rag to wipe up any spilled fuel.

1. Disconnect personnel heater fuel hose (1) from shutoff valve (2), if installed.

2. Remove shutoff valve (2) and nipple (3) from tube (4).
3. Remove four screws (5) and lockwashers (6) that secure four ground leads (7), clamps (8), and two elbows (9) to four weldnuts (10). Discard lockwashers.
4. Remove four locknuts (11), lockwashers (12), and screws (13) that secure four leads (7) and clamps (14) to elbows (9) and tubes (4 and 15). Discard locknuts and lockwashers.

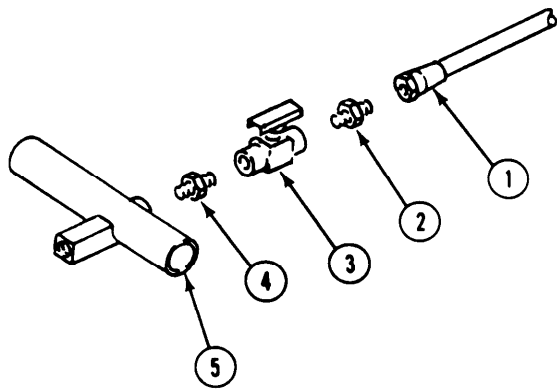


5. Remove plug (1) draincock (2), nipple (3), and bushing (4) from tube (5). Separate plug from draincock, draincock from nipple, and nipple from bushing.
6. Remove four screws (6), lockwashers (7), and clamps (8) that secure four hose assemblies (9) to weldnuts (10). Discard lockwashers.
7. Disconnect four hose assemblies (9) from nipples (11).
8. Remove four nipples (11) from two fuel tanks (12).
9. Disconnect four hose assemblies (9) from two elbows (13).
10. Remove two clamps (14) and hose (15) from elbow (13) and tube (5).
11. Remove two clamps (16) and hose (17) from elbow (13) and tube (18).
12. Remove screw (19), lockwasher (20), and clamp (21) that secure elbow (13) to weldnut (22). Discard lockwasher.
13. Remove two clamps (23) and hose (24) from two tubes (5 and 18).
14. Remove four clamps (25) that secure two hoses (26) to two elbows (13) and fuel tanks (12). Remove hoses.



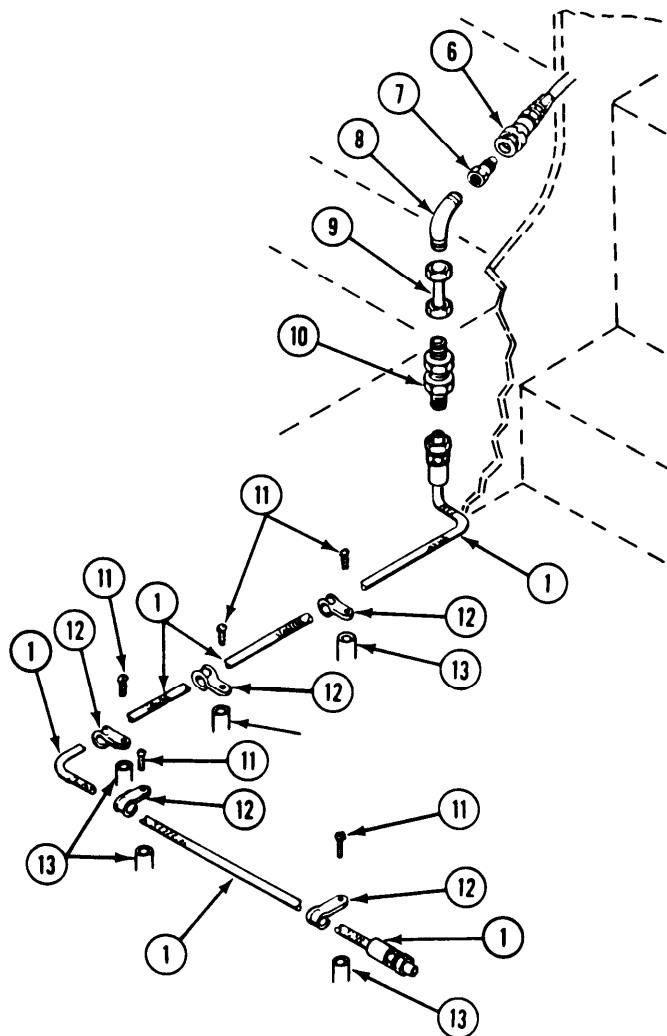
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15. Disconnect hose assembly (1) from adapter (2).
16. Remove adapter (2), shutoff valve (3), and nipple (4) from tube (5).



21. Remove five screws (11) and clamps (12) that secure hose assembly (1) to weldnuts (13).
22. Disconnect hose assembly (1) from nipple (10).
23. Remove jam nut and nipple (10) from power plant compartment bulkhead.

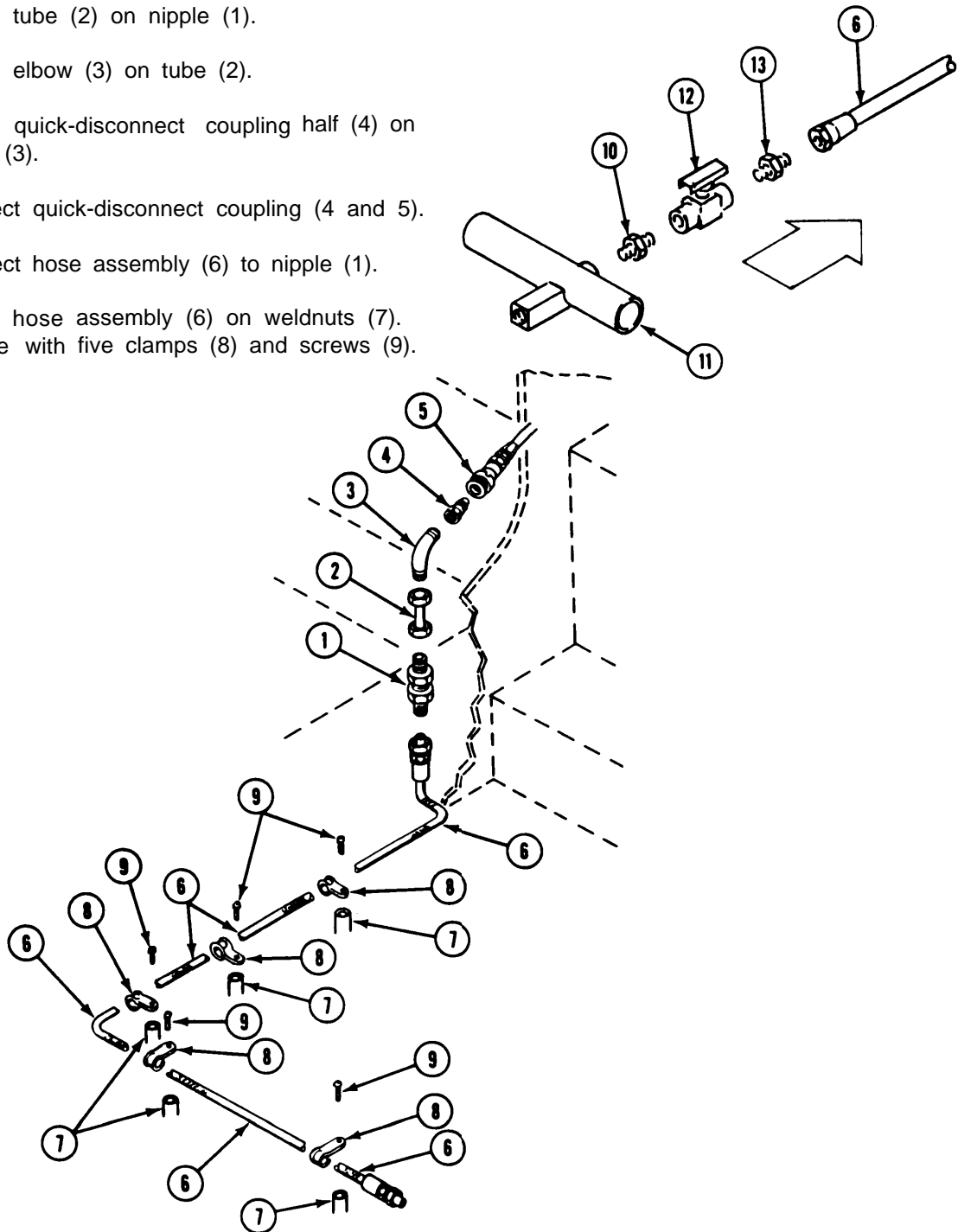
17. Separate quick-disconnect coupling (6 and 7).
18. Remove elbow (8) from tube (9).
19. Remove quick-disconnect coupling half (7) from elbow (8).
20. Remove tube (9) from nipple (10).



**INSTALL**

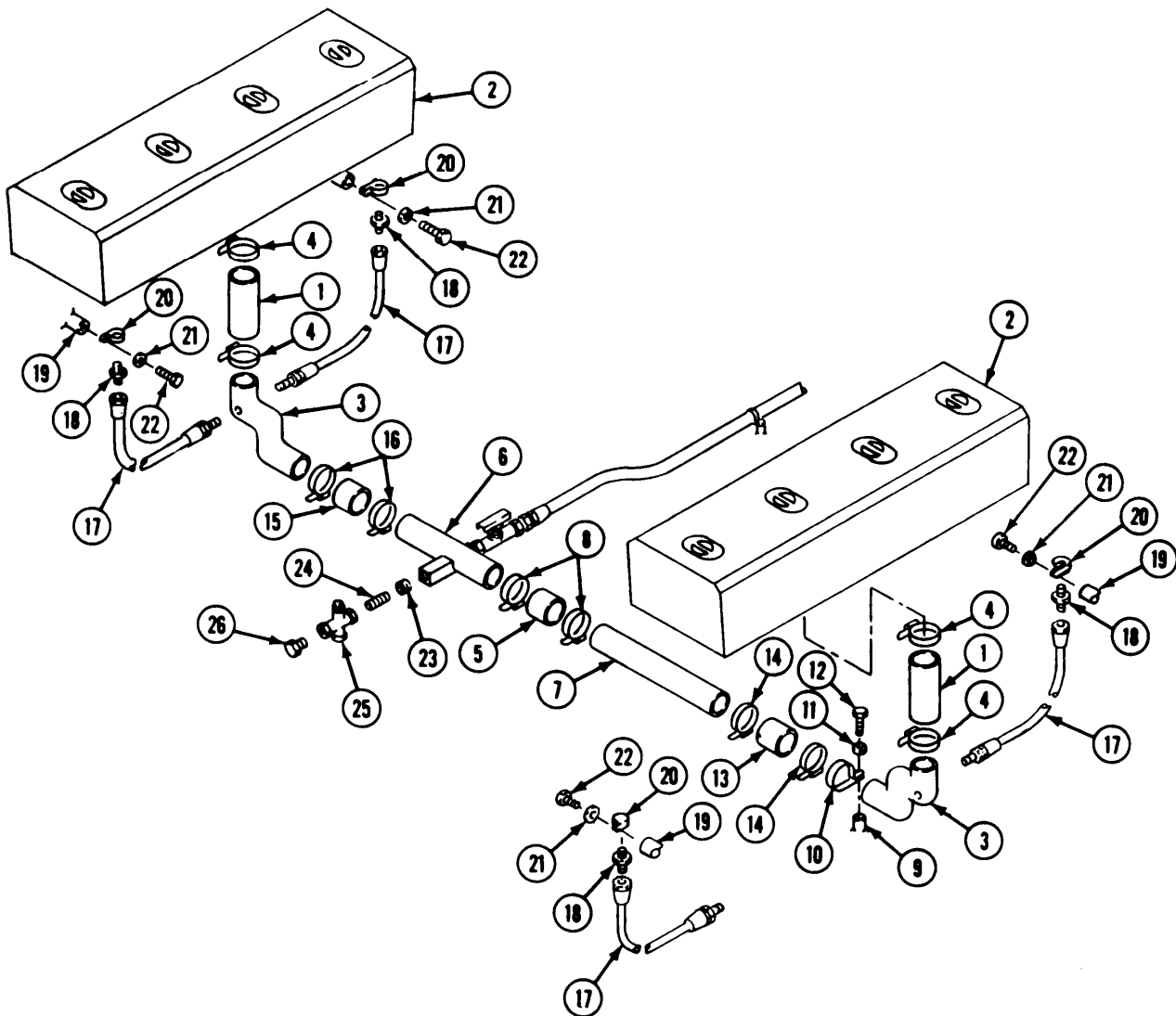
24. Apply a thin, even coat of sealing compound to cleaned external pipe threads on fittings.
25. Install nipple (1) in power plant compartment bulkhead. Secure with jam nut.
26. Install tube (2) on nipple (1).
27. Install elbow (3) on tube (2).
28. Install quick-disconnect coupling half (4) on elbow (3).
29. Connect quick-disconnect coupling (4 and 5).
30. Connect hose assembly (6) to nipple (1).
31. Install hose assembly (6) on weldnuts (7). Secure with five clamps (8) and screws (9).

32. Install nipple (10) in tube (11).
33. Install shutoff valve (12) on nipple (10) with arrow pointing toward front of carrier.
34. Install adapter (13) in shutoff valve (12).
35. Connect hose assembly (6) to adapter (13).

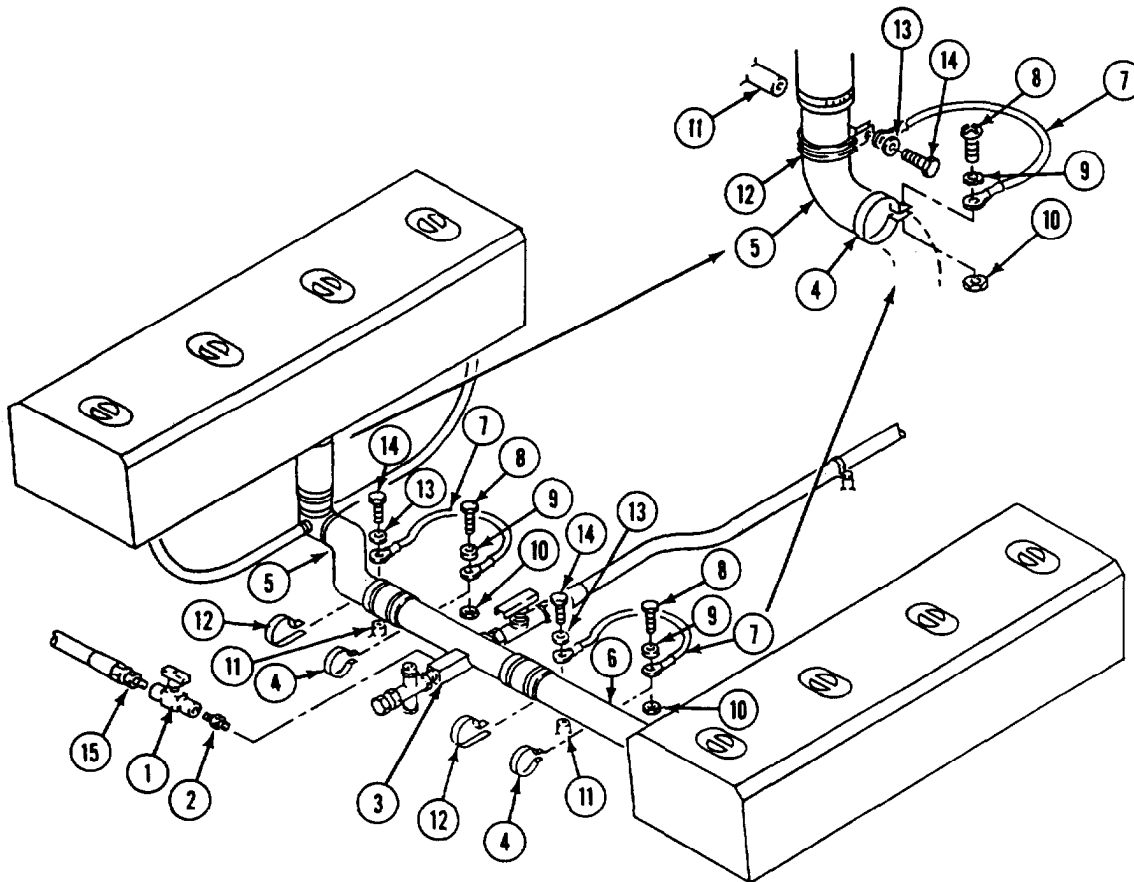


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36. Connect two hoses (1) to two fuel tanks (2) and elbows (3) with four clamps (4).
37. Connect hose (5) to tubes (6 and 7) with two clamps (8).
38. Secure elbow (3) to weldnut (9) with clamp (10), new lockwasher (11), and screw (12).
39. Connect hose (13) to elbow (3) and tube (7) with two clamps (14).
40. Connect hose (15) to elbow (3) and tube (6) with two clamps (16).
41. Connect four hose assemblies (17) to two elbows (3).
42. Install four nipples (18) in two fuel tanks (2).
43. Connect four hose assemblies (17) to four nipples (18).
44. Install four hose assemblies (17) on four weldnuts (19). Secure with four clamps (20), new lockwashers (21), and screws (22).
45. Install bushing (23), nipple (24), draincock (25), and plug (26) on tube (6).



46. Install shutoff valve (1) on nipple (2).
47. Install nipple (2) in tube (3).
48. Install four clamps (4) on two elbows (5) and tubes (3 and 6). Secure four ground leads (7) to clamps (4) with four screws (8), new lockwashers (9), and locknuts (10).
49. Install leads (7), two elbows (5), and two tubes (3 and 6) on four weldnuts (11). Secure with four clamps (12), new lockwashers (13), and screws (14).
50. Connect personnel heater fuel hose (15) to shutoff valve (1), if not connected.
51. Fill fuel tank (see your -10).




---

**FOLLOW-THROUGH STEPS**

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10) check for leaks.
3. Install power plant rear access panel (page 24-29).
4. Install rear compartment floor plates (page 24-37).
5. Raise and lock ramp (see your -10).
6. Stop/shutdown engine (see your -10).

---

**END OF TASK**

## REPLACE FUEL RETURN HOSES, TUBES, AND FITTINGS (M577A2 AND M1068 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-66). Install (page 6-68).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Lockwasher (8)  
Self-locking nut

#### Personnel Required:

Unit Mechanic

#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown and ramp lowered  
(see your -10)  
Battery ground lead disconnected (page 13-2)  
Electronic equipment heater removed  
(page 31-16)  
Generator removed (page 9-81 and 9-34)  
Personnel heater removed (page 29-51)  
Muffler removed (page 7-20)  
Power plant rear access panel removed  
(page 24-29)  
Map board removed (see your -10)  
Carrier blocked (see your -10)

### REMOVE

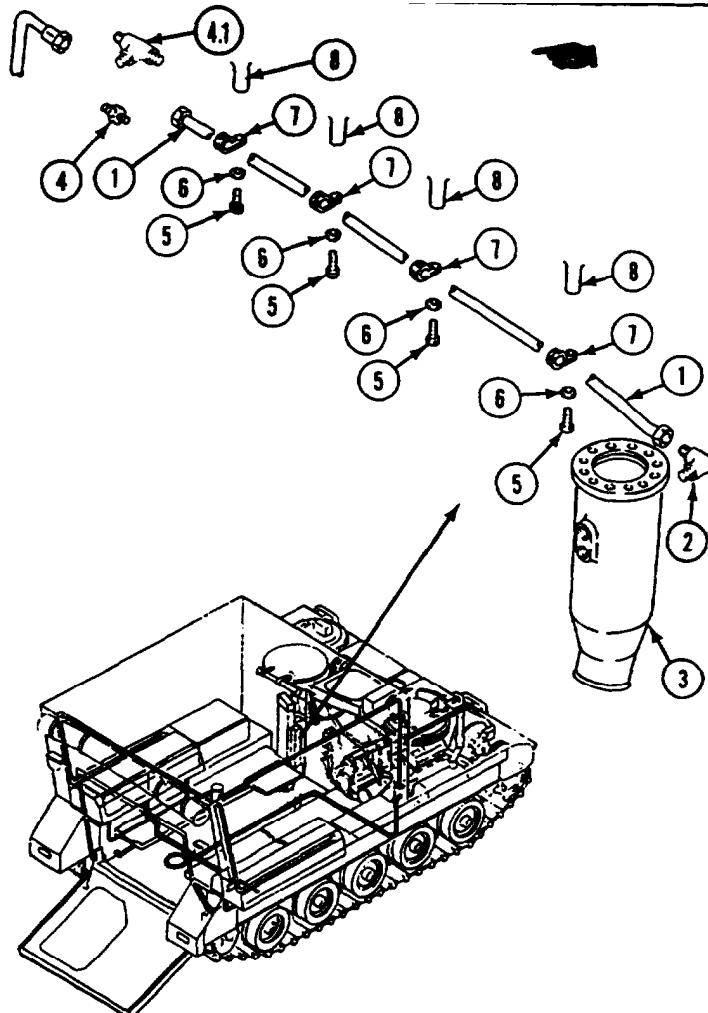


**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

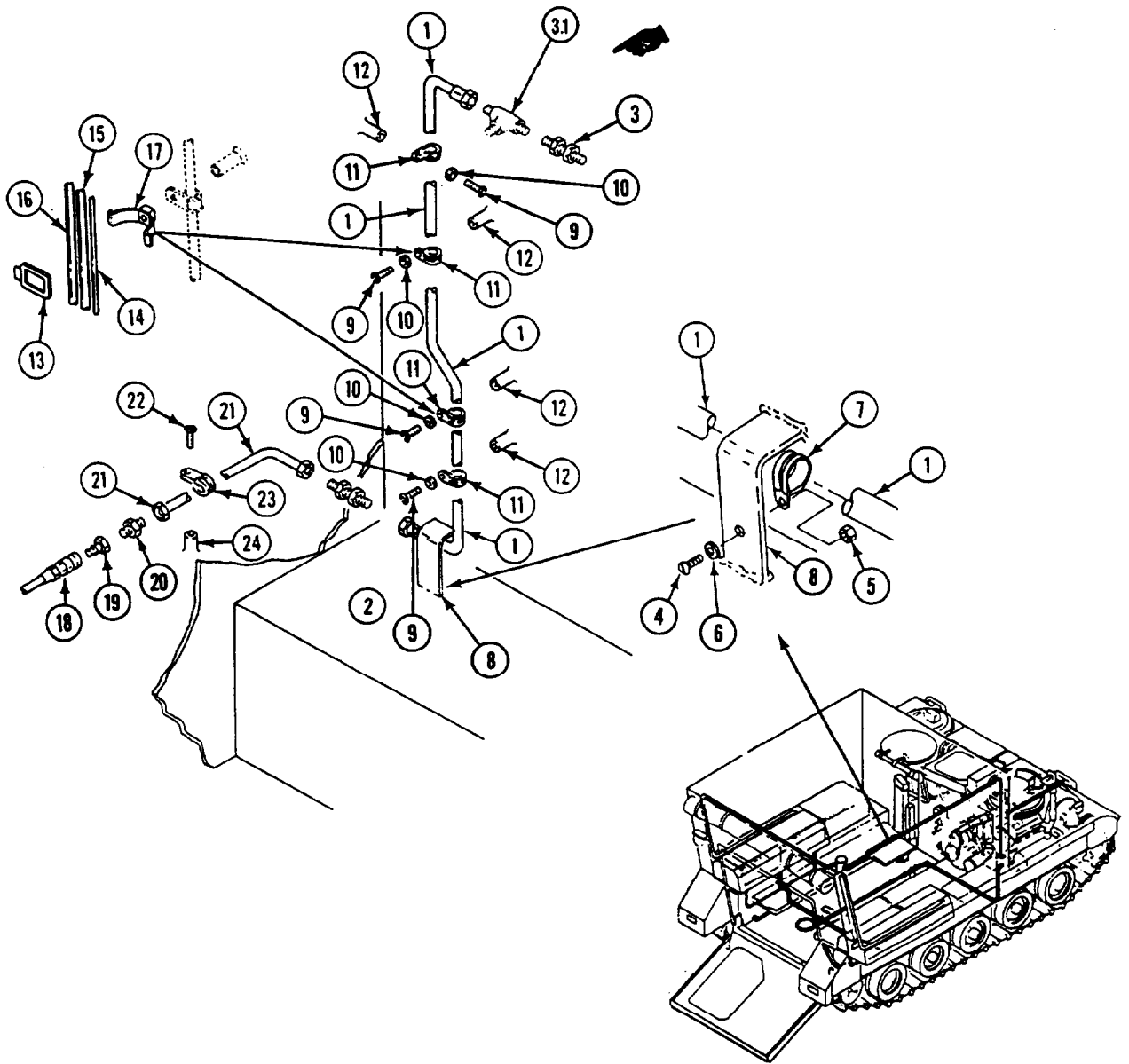
#### NOTE

Use wiping rag to wipe up any spilled fuel.

1. Disconnect return tube (1) from elbow (2).
2. Remove elbow (2) from filler neck (3).
3. Disconnect return tube (1) from nipple (4) or tee (4.1) (M1068).
4. Remove four screws (5), lockwashers (6), clamps (7), and return tube (1) from four weldnuts (8). Discard lockwashers.
5. Deleted.



6. Disconnect return hose (1) from nipples (2,3) or tee (3.1) (M1068).
7. Remove screw (4), locknut (5), washer (6), and clamp (7) that secure return hose (1) to bracket (8). Discard locknut.
8. Remove four screws (9), lockwashers (10), clamps (11), and return hose (1) from four weldnuts (12). Discard lockwashers.
9. Remove two clips (13), circuit 601 lead (14), circuit 6 cable (15), and circuit 48B cable (16) from two cradles (17). Remove two cradles (17).
10. Disconnect quick disconnect half (18) from quick disconnect half (19).
11. Remove quick disconnect half (19) from adapter (20).
12. Remove adapter (20) from return tube (21).
13. Disconnect return tube (21) from nipple (2).
14. Remove screw (22), clamp (23), and return tube (21) from weldnut (24).
15. Remove jamnut and nipple (2) from power plant rear bulkhead.



GO TO NEXT PAGE



**INSTALL**

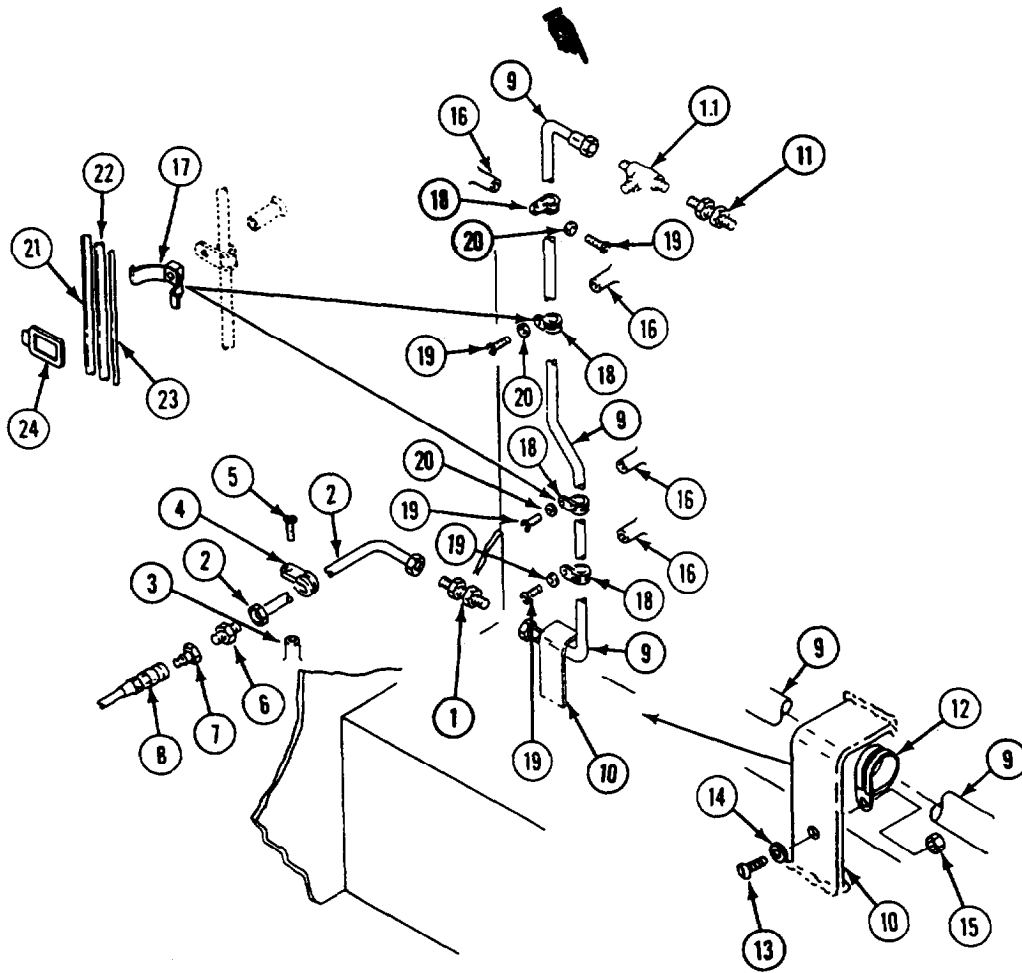
16. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.
17. Secure nipple with jamnut (1) on power plant rear bulkhead.
18. Connect return tube (2) to nipple (1).
19. Install return tube (2) on weldnut (3). Secure with clamp (4) and screw (5).
20. Install adapter (6) on return tube (2).
21. Install quick disconnect, half (7) on adapter (6).
22. Connect quick disconnect half (8) to quick disconnect half (7).

23. Install return hose (9) under bracket (10) and connect to nipple (1).
24. Install nipple with jamnut (11) or tee (1.1) (M1068) on return hose (9).
25. Secure return hose (9) to bracket (10) with clamp (12), screw (13), washer (14), and new locknut (15).

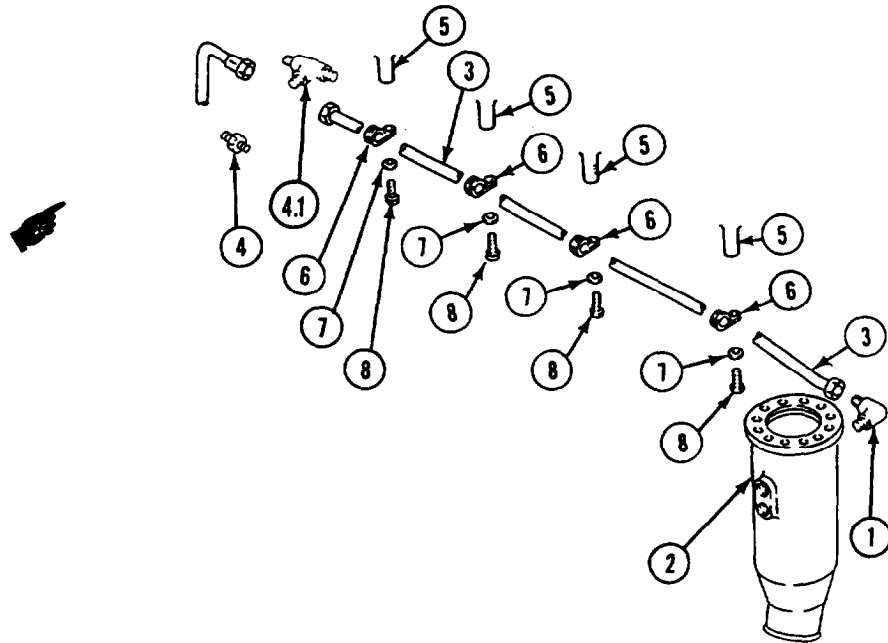
**NOTE**

**Make sure clamp is installed behind cradle.**

26. Position return hose (9) on four weldnuts (16). Secure return hose (9) and two cradles (17) with four clamps (18), screws (19), and new lockwashers (20).
27. Install circuit 48B cable (21), circuit 6 cable (22), and circuit 601 lead (23) on two cradles (17). Secure with two clips (24).



28. Install elbow (1) in filler neck (2).
29. Connect return tube (3) to elbow (1).
30. Connect return tube (3) to nipple (4) or tee (4.1) (M1068).
31. Install return tube (3) on four weldnuts (5). Secure with four clamps (6), new lockwashers (7), and screws (8).




---

### FOLLOW-THROUGH STEPS

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Install muffler (page 7-20).</li> <li>2. Install personnel heater page 29-51).</li> <li>3. Install generator (page 9-31 and 9-34).</li> <li>4. Install electronic equipment heater (page 31-16).</li> <li>5. Connect battery ground lead (page 13-2).</li> </ol> | <ol style="list-style-type: none"> <li>6. Start engine (see your -10). Check return hoses for leaks.</li> <li>7. Install map board (see your -10).</li> <li>8. Install power plant rear access panel (page 24-29).</li> <li>9. Raise and lock ramp (see your -10).</li> <li>10. Engine stopped/shutdown (see your -10).</li> </ol> |
|--|--|

---

**END OF TASK**

## REPLACE VENT HOSES, TUBES, AND FITTINGS (M577A2 AND M1068 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-70). Install (page 6-71).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### References:

See your -10

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Lockwasher (12)  
Lockwasher (5)  
Suitable container

#### Equipment Conditions:

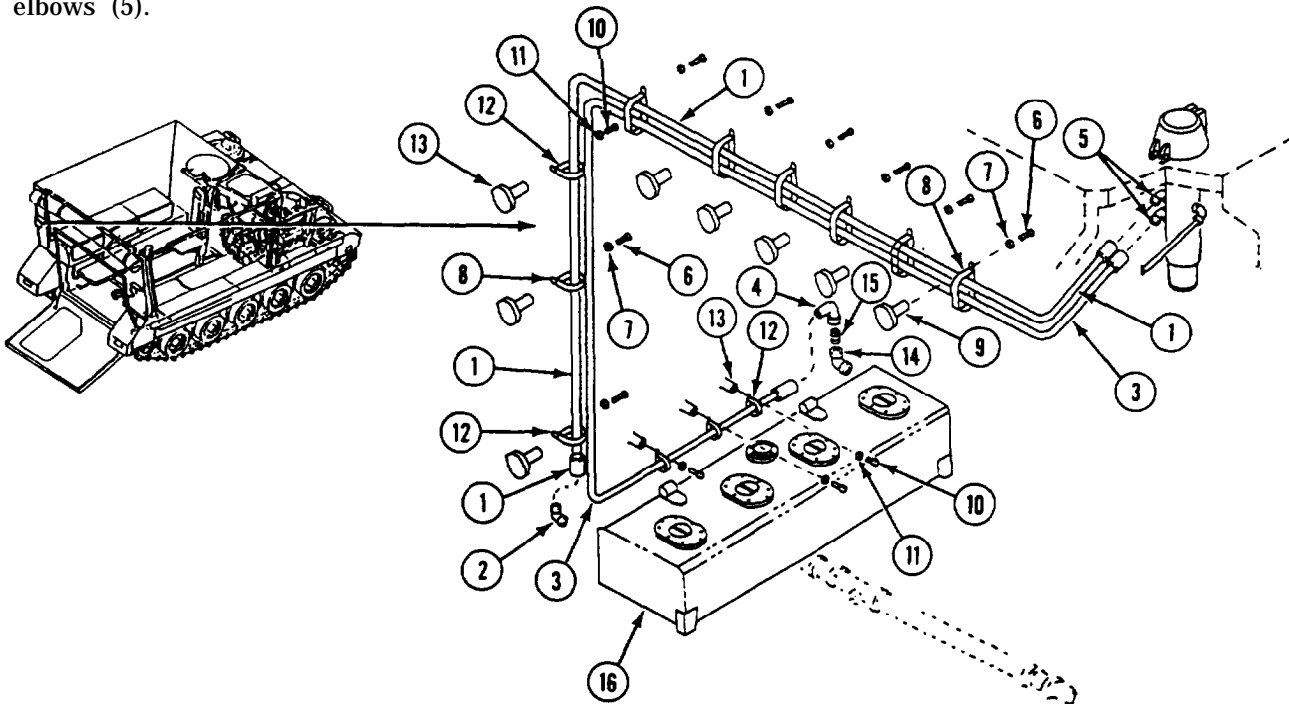
Battery ground lead disconnected (page 13-2)  
Engine stopped and ramp lowered  
(see your -10)  
Map board removed (see your -10)  
Work tables removed (page 24-178)  
Carrier blocked (see your -10)

#### Personnel Required:

Unit Mechanic

### REMOVE

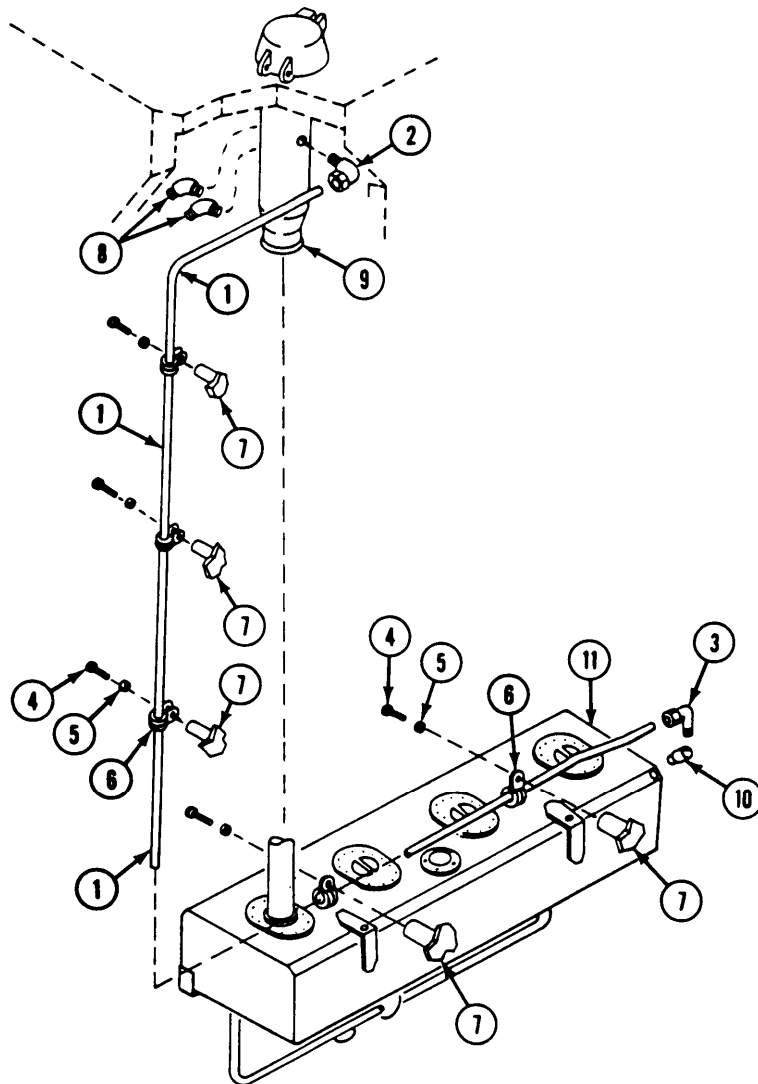
1. Drain fuel tanks below level of vent hoses (page 6-50).
2. Disconnect vent hose (1) from elbow (2).
3. Disconnect vent hose (3) from elbow (4).
4. Disconnect vent hoses (1 and 3) from two elbows (5).
5. Remove seven screws (6), lockwashers (7), clamps (8), and vent hoses (1 and 3) from seven weldnuts (9). Discard lockwashers.
6. Remove five screws (10), lockwashers (11), clamps (12), and vent hoses (1 and 3) from five weldnuts (13). Discard lockwashers.
7. Remove three elbows (2, 4, and 14) and nipple (15) from left fuel tank (16).



8. Disconnect vent tube (1) from two elbows (2 and 3).
9. Remove five screws (4), lockwashers (5), clamps (6), and vent tube (1) from five weldnuts (7). Discard lockwashers.
10. Remove two elbows (8) and elbow (2) from filler neck (9).
11. Remove elbow (3) and bushing (10) from right fuel tank (11).

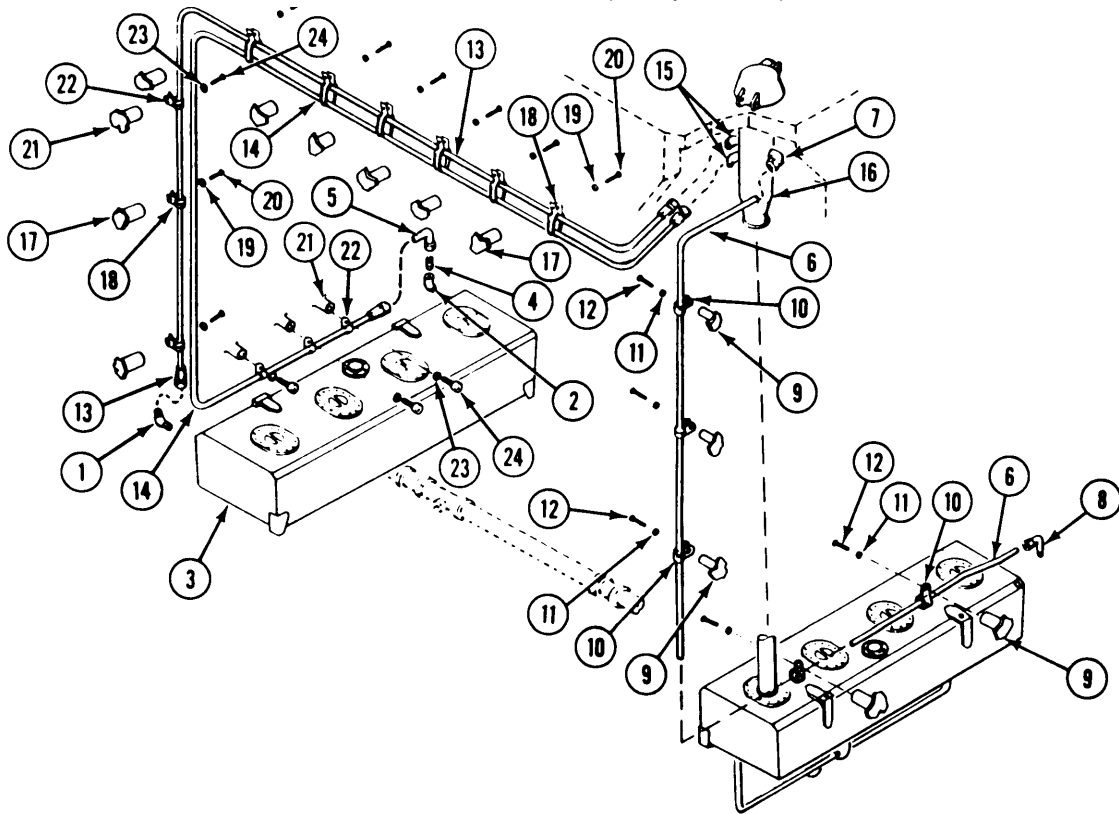
**INSTALL**

12. Apply a thin, even coat of sealing compound to cleaned external threads of fittings.
13. Install bushing (10) in right fuel tank (11).
14. Install elbow (3) on bushing (10).
15. Install two elbows (8) and elbow (2) in filler neck (9).



GO TO NEXT PAGE

16. Install two elbows (1 and 2) in left fuel tank (3).
17. Install nipple (4) in elbow (2).
18. Install elbow (5) on nipple (4).
19. Connect vent tube (6) to two elbows (7 and 8).
20. Install vent tube (6) on five weldnuts (9). Secure with five clamps (10), new lockwashers (11), and screws (12).
21. Connect vent hose (13) to elbow (1) at left fuel tank (3).
22. Connect vent hose (14) to elbow (5) at left fuel tank (3).
23. Connect two vent hoses (13 and 14) to two elbows (15) at filler neck (16).
24. Install two vent hoses (13 and 14) on seven weldnuts (17). Secure with seven clamps (18), new lockwashers (19), and screws (20).
25. Secure vent hose (14) to five weldnuts (21) with five clamps (22), new lockwashers (23), and screws (24).
26. Fill fuel tanks. Check for leaks (see your -10).



---

### FOLLOW-THROUGH STEPS

1. Install map board (see your -10).
2. Install work tables (page 24-178).
3. Connect battery ground lead (page 13-2).
4. Raise and lock ramp (see your -10).
5. Stop engine (see your -10).

---

END OF TASK

## REPLACE FUEL TANKS (M577A2 AND M1068 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-73). Install (page 6-74).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Key washers (6)  
Self-locking nut (4)

#### Personnel Required:

Unit Mechanic

#### References:

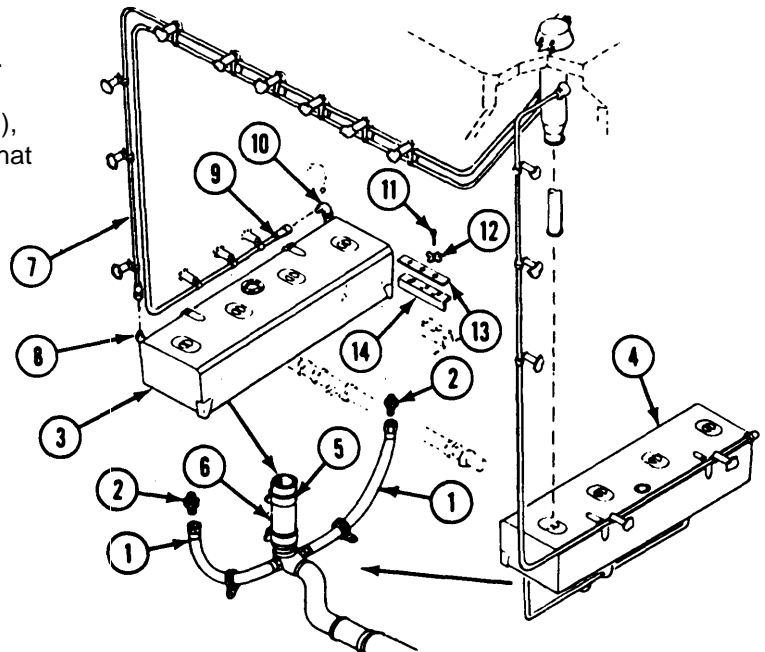
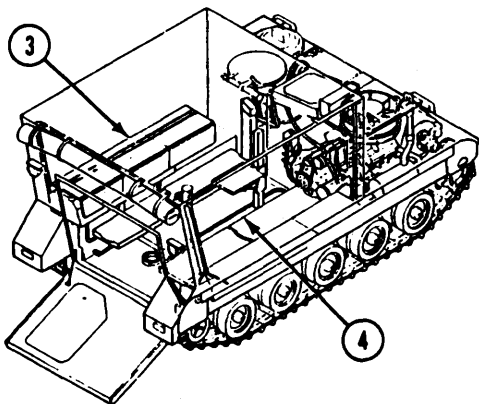
See your -10

#### Equipment Conditions:

Engine stopped/shutdown and ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Map board removed (see your -10)  
Work tables removed (page 24-173, 24-175 or 24-178)  
Fuel tanks drained (page 8-50)  
Rear bilge pump discharge tube removed (page 16-11)  
Fuel quantity transmitter removed (page 6-54)  
Fuel tank access cover removed (page 6-57)  
Fuel tank filler flange removed (page 6-59)

### REMOVE

1. Disconnect four supply hoses (1) and four adapters (2) from fuel tanks (3 and 4).
2. Loosen two clamps (5) and remove two supply hoses (6) from fuel tanks (3 and 4).
3. Disconnect vent hose (7) from elbow (8).
4. Disconnect vent hose (9) from elbow (10).
5. Remove six screws (11), key washers (12), two plates (13), and two brackets (14) that secure front of fuel tanks (3 and 4) on sponson. Discard tab washers.

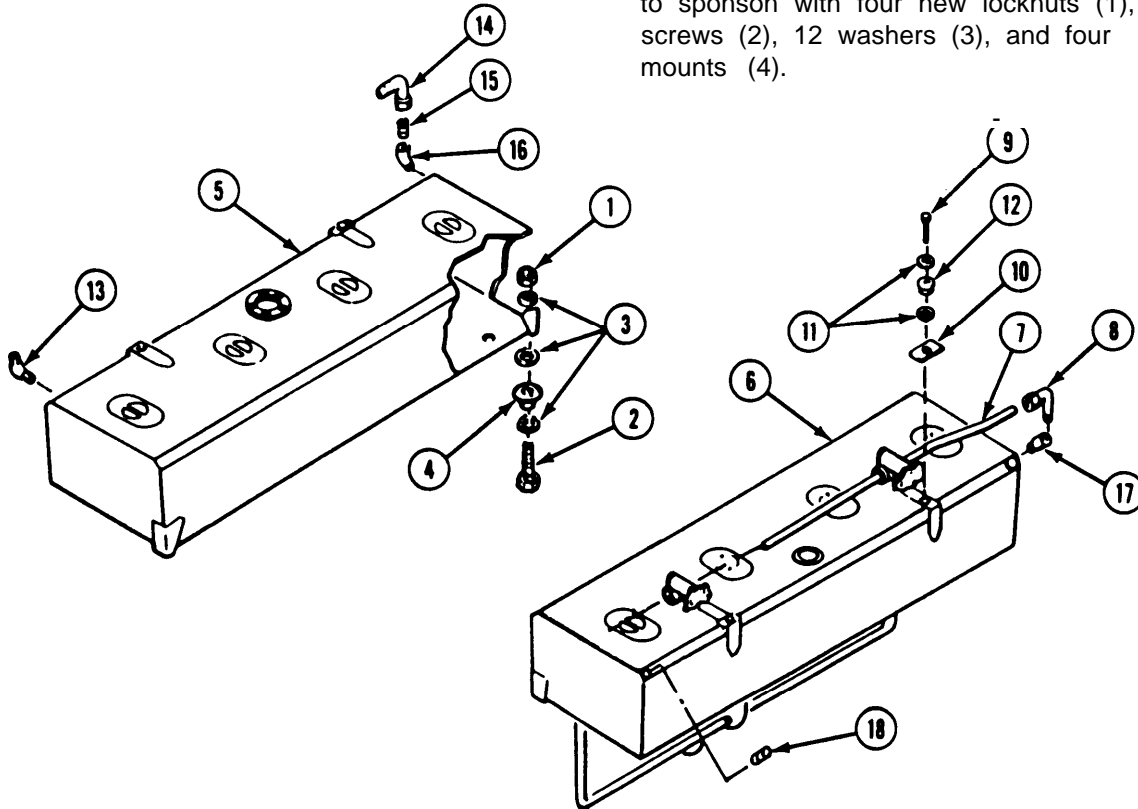


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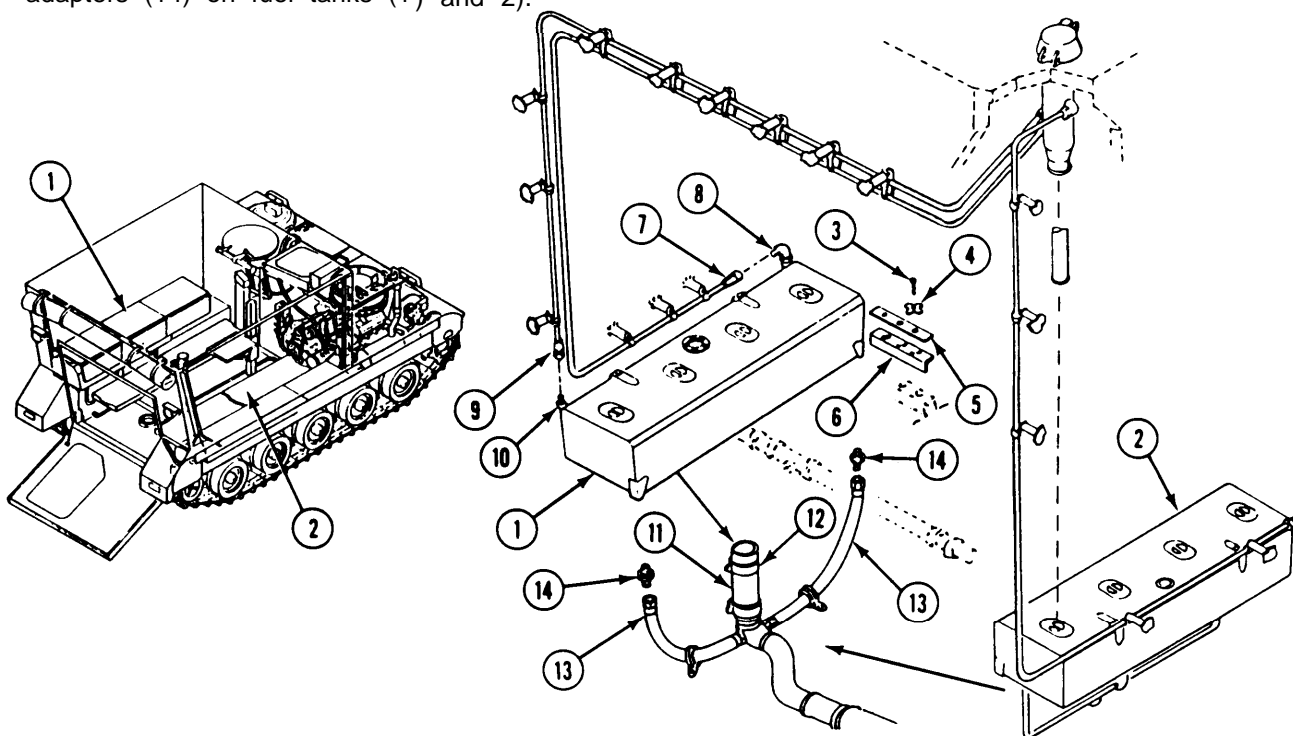
6. Remove four locknuts (1), screws (2), 12 washers (3), and 4 mounts (4) that secure bottom of fuel tanks (5 and 6) to sponson.
7. Disconnect vent tube (7) from elbow (8).
8. Remove four screws (9), plates (10), eight washers (11), and four mounts (12) that secure bottom of fuel tanks (5 and 6) to sponson.
9. Remove two fuel tanks (5 and 6) from carrier.
10. Remove elbow (13) from left fuel tank (5).
11. Remove elbow (14) from nipple (10).
12. Remove nipple (16) and elbow (16) from left fuel tank (5).
13. Remove elbow (8) and bushing (17) from right fuel tank (6).
14. Remove plug (18) from right fuel tank (6).

## INSTALL

15. Apply a thin, even coat of sealing compound to cleaned external threads of fittings.
16. Install plug (18) in right fuel tank(6).
17. Install bushing (17) in fuel tank (6).
18. Install elbow (8) in bushing (17).
19. Install elbow (13) in left fuel tank (5).
20. Install elbow (16) in left fuel tank (5).
21. Install nipple (15) in elbow (16).
22. Install elbow (14) on nipple (15).
23. Place fuel tanks (5 and 6) on left and right sponsons.
24. Secure top of two fuel tanks (5 and 6) to hull with four screws (9), plates (10), eight washers (11), and four mounts (12).
25. Secure bottom of two fuel tanks (5 and 6) to sponson with four new locknuts (1), screws (2), 12 washers (3), and four mounts (4).



26. Secure front of two fuel tanks (1 and 2) to sponson with six screws (3), new key washers (4), two plates (5), and bracket (6).
27. Connect vent hose (7) to elbow (8).
28. Connect vent hose (9) to elbow (10).
29. Install two supply hoses (11) on fuel tanks (1 and 2). Secure with two clamps (12).
30. Connect four supply hoses (13) with four adapters (14) on fuel tanks (1) and 2).



### FOLLOW-THROUGH STEPS

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Install fuel tank filler flange (page 6-59).</li> <li>2. Install fuel tank access covers (page 6-57)</li> <li>3. Install fuel quantity transmitter (page 6-54.</li> <li>4. Install rear bilge pump discharge tube (page 16-11).</li> <li>5. Fill fuel tanks (see your -10).</li> <li>6. Connect battery ground lead (page 13-2).</li> </ol> | <ol style="list-style-type: none"> <li>7. start engine (see your -10). Check for leaks.</li> <li>8. Raise and lock ramp (see your -10).</li> <li>9. Stop/shutdown engine (see your -10).</li> <li>10. Install work tables (page 24-173, 24-175 or 24-178).</li> <li>11. Install map board (see your -10).</li> </ol> |
|---|--|

END OF TASK



**Section V. FUEL COMPARTMENT AND HOSES, TUBES, AND  
FITTINGS (M125A2 AND M106A2 ONLY)**

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**TASK INDEX**

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Replace Filler Cap and Strainer Parts (M125A2 and M106A2 Only) .	6-78	Replace Compartment to Bulkhead Fuel Hoses, Tubes, and Fittings (M125A2 and M106A2 Only) . . . . .	6-81
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**DRAIN FUEL COMPARTMENT (M125A2 AND M106A2 ONLY)**

---

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

Wiping rag (Item 61, App C)  
Suitable size container

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)

**Personnel Required:**

Unit Mechanic

---

**DRAIN**

1. Open fuel filler combat cover (1). Remove fuel filler cap (see your -10).

**NOTE**

Fuel tank capacity is 95 gallons.

2. Place a suitable size container (2) directly behind earner and under left rear fender.

**WARNING**



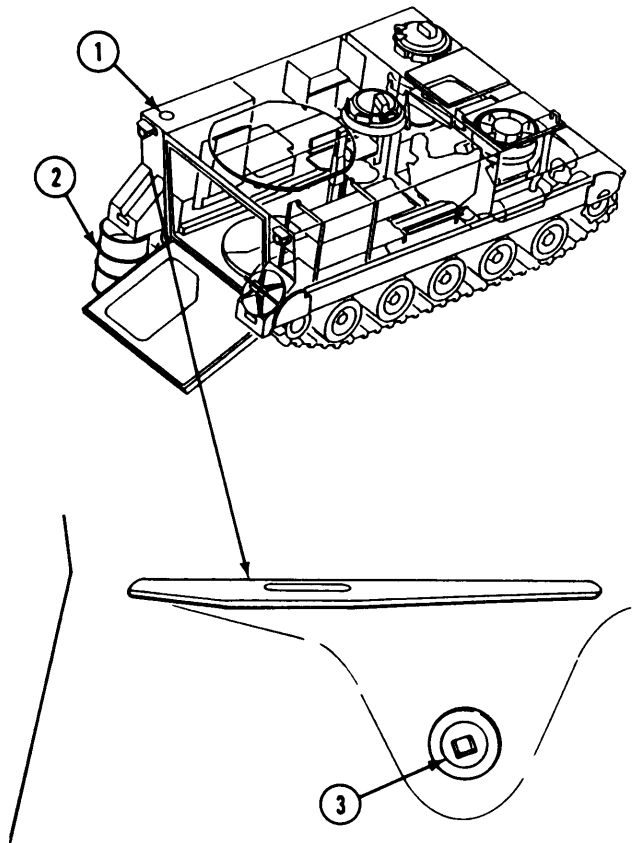
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**

Use wiping rag to wipe up any spilled fuel.

3. Make sure metal container (2) is making metal-to-metal contact with carrier so that there is a good ground.
4. Remove drain plug (3) from left rear bulkhead above fender, and drain fuel.
5. Apply sealing compound to cleaned threads of drain plug (3). Install plug in left rear bulkhead.

6. Install fuel filler cap. Close filler combat cover (1) to keep dirt out of fuel compartment.




---

**FOLLOW-THROUGH STEPS**

1. After maintenance has been performed, fill fuel compartment (see your -10).
- z. Connect battery ground lead (page 13-2)

---

**END OF TASK**

---

## REPLACE FILLER CAP AND STRAINER PARTS (M125A2 AND M106A2 ONLY)

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts**

Non-electrical wire (Item 31, App C)  
Gasket

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

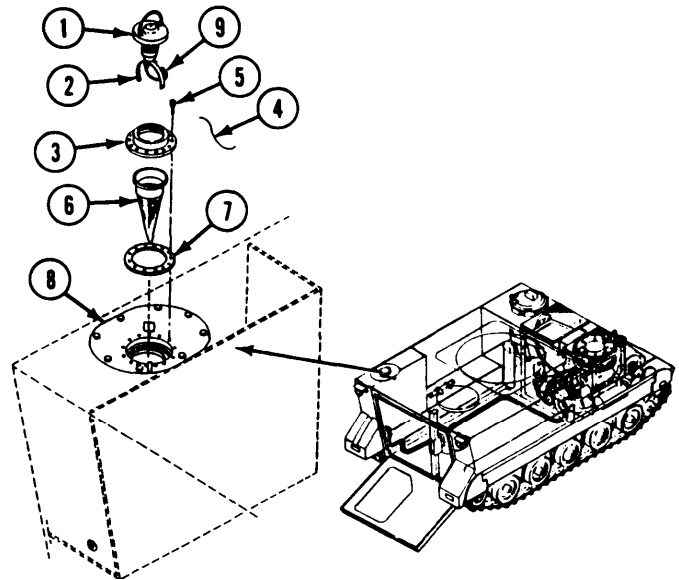
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Filler cover and lock removed (page 6-7)  
Fuel compartment drained (page 6-77)  
Carrier blocked (see your -10)

---

### REMOVE

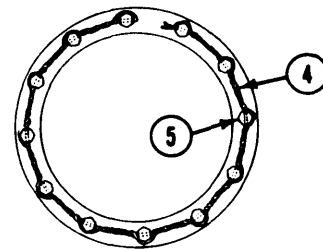
1. Remove fuel filler cap (1) and retainer (2) from fuel filler neck (3).
2. Remove lockwire (4), 12 screws (5), filler neck (3), strainer (6), and gasket (7) from fuel compartment access cover (8). Discard gasket and lockwire.
3. Open spring clip (9) and disconnect filler cap (1) chain from retainer (2).



### INSTALL

4. Install strainer (6) in fuel compartment access cover (8).
5. Place filler cap (1) chain through filler neck (3). Secure retainer (2) to chain with spring clip (9).
6. Install filler neck (3) and new gasket (7) on fuel compartment access cover (8). Secure with 12 screws (5).

7. Install new lockwire (4) on filler neck (3) through the heads of 12 screws (5).



8. Install filler cap (1) in tiller neck (3).
- 

### FOLLOW-THROUGH STEPS

1. Install filler cover and lock (page 6-7).
  2. Connect battery ground lead (page 13-2).
  3. Fill fuel compartment (see your -10).
- 

**END OF TASK**

---

## REPLACE FUEL COMPARTMENT ACCESS COVER (M125A2 AND M106A2 ONLY)

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Torque Wrench (Item 96, App D)

#### Materials/Parts:

Gasket

#### Personnel Required:

Unit Mechanic

#### References:

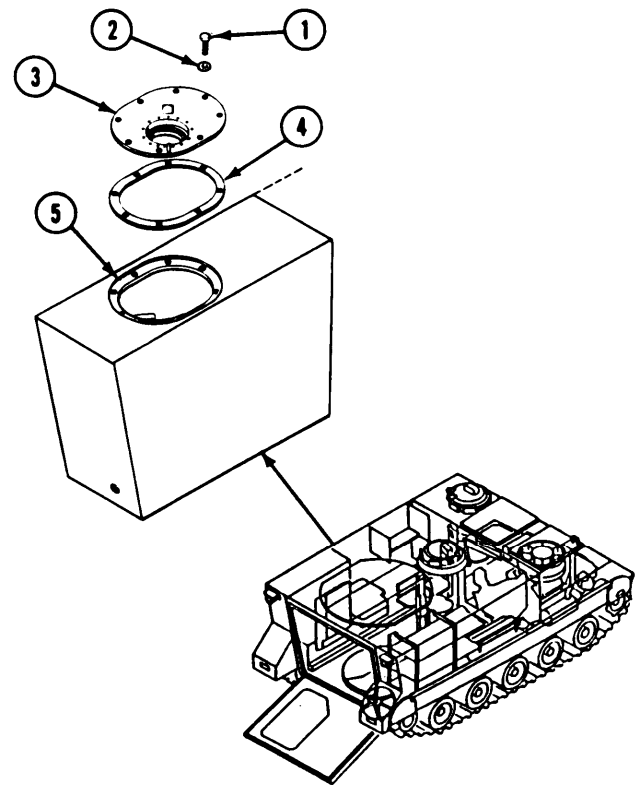
See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Filler cover and lock removed (page 6-7)  
Filler cap and strainer parts removed  
(page 6-78)

### REMOVE

1. Remove eight screws (1), washers (2), fuel compartment access cover (3), and gasket (4) from fuel compartment (5). Discard gasket.
2. Install new gasket (4) and fuel compartment access cover (3) on fuel compartment (5). Secure with eight washers (2) and Screws (1).
3. Tighten eight screws (1) to 60-65 lb-ft (81-88 N-m) torque. Use torque wrench.




---

### FOLLOW-THROUGH STEPS

1. Install filler cap and strainer parts (page 6-78).
2. Install filler cover and lock (page 6-7).
3. Connect battery ground lead (page 13-2).

---

END OF TASK

---

## REPLACE FUEL QUANTITY TRANSMITTER (M125A2 AND M106A2 ONLY)

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Gasket  
Non-electrical wire (Item 31, App C)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

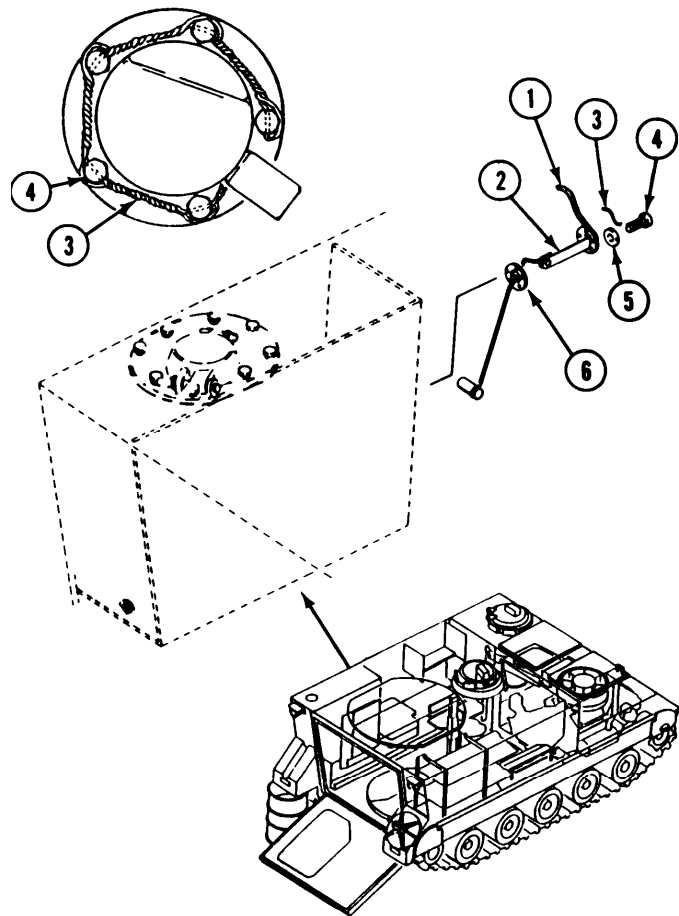
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel compartment drained (page 6-77)

---

### REMOVE

1. Disconnect circuit 28 lead (1) from fuel quantity transmitter (2).
2. Remove lockwire (3) from five screws (4). Discard lockwire.
3. Remove five screws (4), washers (5), transmitter (2), and gasket (6) from fuel compartment. Discard gasket.



### INSTALL

4. Place new gasket (6) and transmitter (2) in fuel compartment. Secure with five screws (4) and washers (5).
5. Install new lockwire (3) through the heads of five screws (4).
6. Connect circuit 28 lead (1) to fuel quantity transmitter (2).

---

### FOLLOW-THROUGH STEPS

- |   |  |
|---|--|
| 1. Fill fuel compartment (see your -10).    | 3. Raise and lock ramp (see your -10). |
| 2. Connect battery ground lead (page 13-2). | 3. Stop engine (see your -10).         |
- 

**END OF TASK**

# REPLACE COMPARTMENT TO BULKHEAD FUEL HOSES, TUBES AND FITTINGS (M125A2 AND M106A2 ONLY)

## DESCRIPTION

This task covers: Remove (Page 6-81). Install (Page 6-83).

## INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 30, App D)

### References:

See your -10

### Materials/Parts:

Sealing compound (Item 46, App C)  
 Wiping rag (Item 61, App C)  
 Self-locking nut  
 Self-locking nut (2)  
 Lockwasher (7)

### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
 Carrer blocked (see your -10)  
 Ramp lowered (see your -10)  
 Battery g-round lead disconnected (page 13-2)  
 Power plant rear access panel removed (page 24-29)  
 Fuse stowage racks removed (page 24-186)  
 Floor plates removed (page 24-38)  
 Fuel compartment drained (page 6-77)

### Personnel Required:

Unit Mechanic

## REMOVE



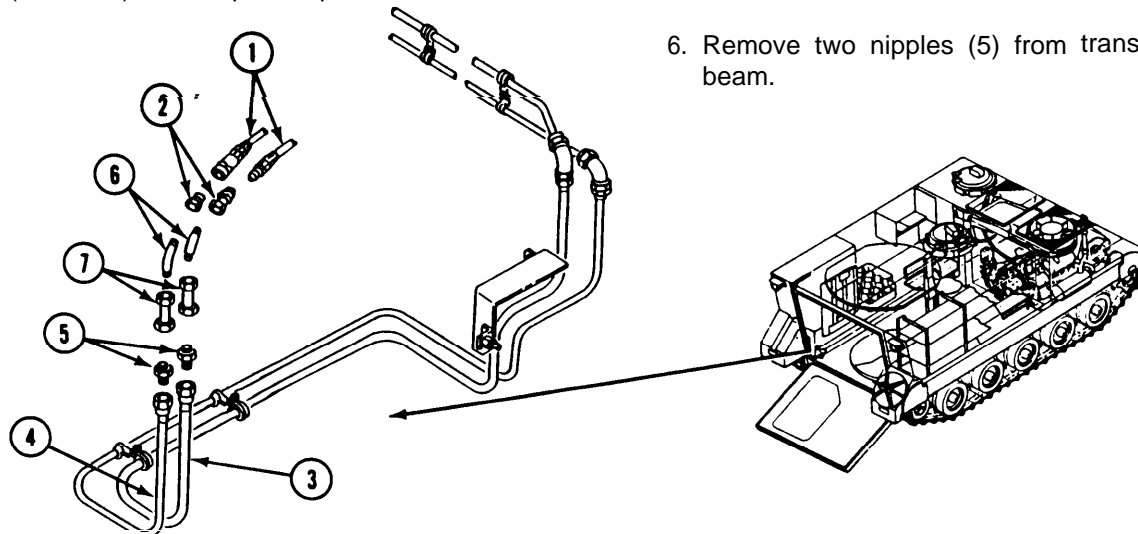
### WARNING

Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

### NOTE

Use wiping rag to wipe up any spilled fuel.

1. Separate two quick-disconnect fittings (1 and 2) inside power plant rear bulkhead.



2. Disconnect fuel supply hose (3) and fuel return hose (4) from two nipples (5).

### NOTE

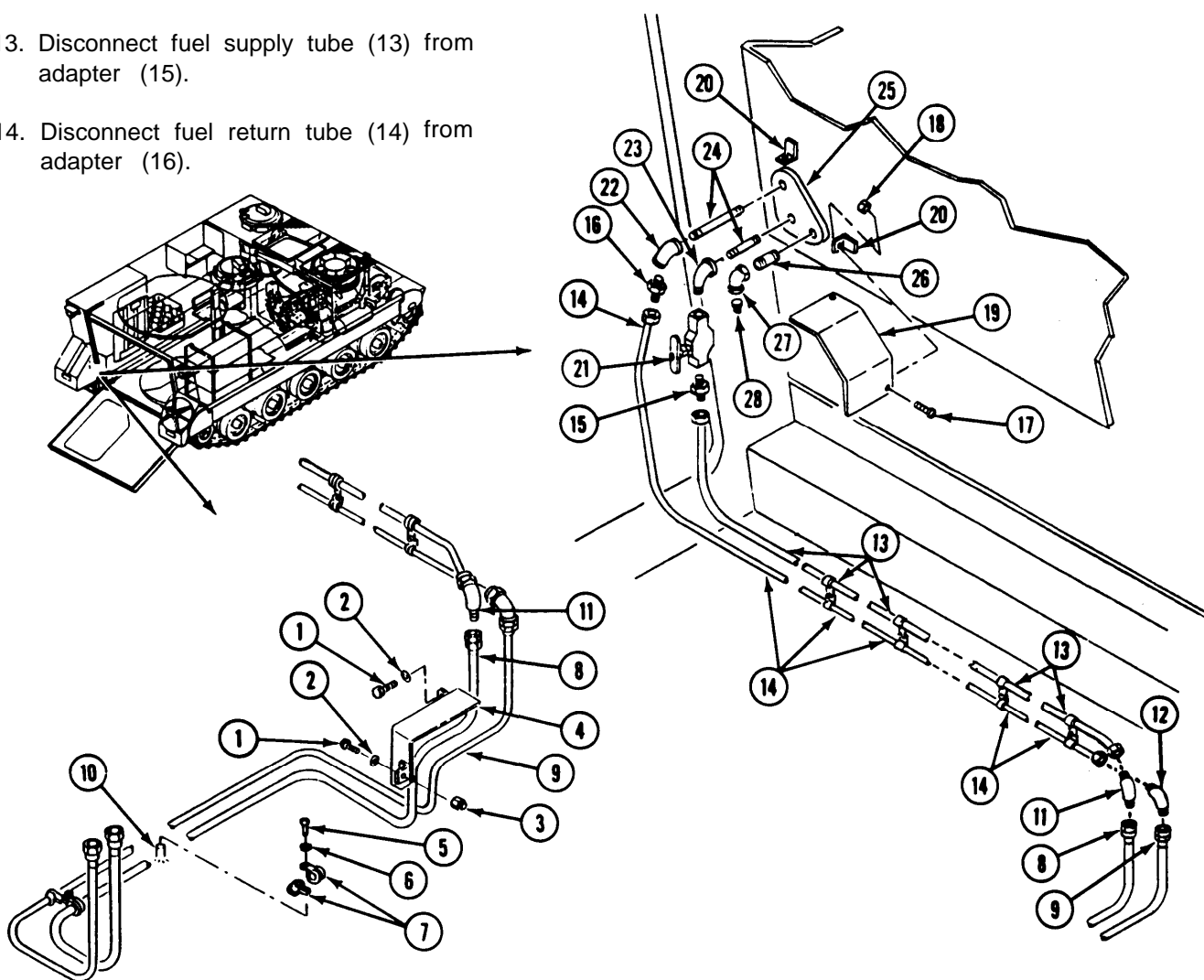
Tag quick disconnect couplings before removal.

3. Remove two quick-disconnect fittings (2) from two elbows (6).
4. Remove two elbows (6) from two tube assemblies (7).
5. Remove two tube assemblies (7) from two nipples (5).
6. Remove two nipples (5) from transverse beam.

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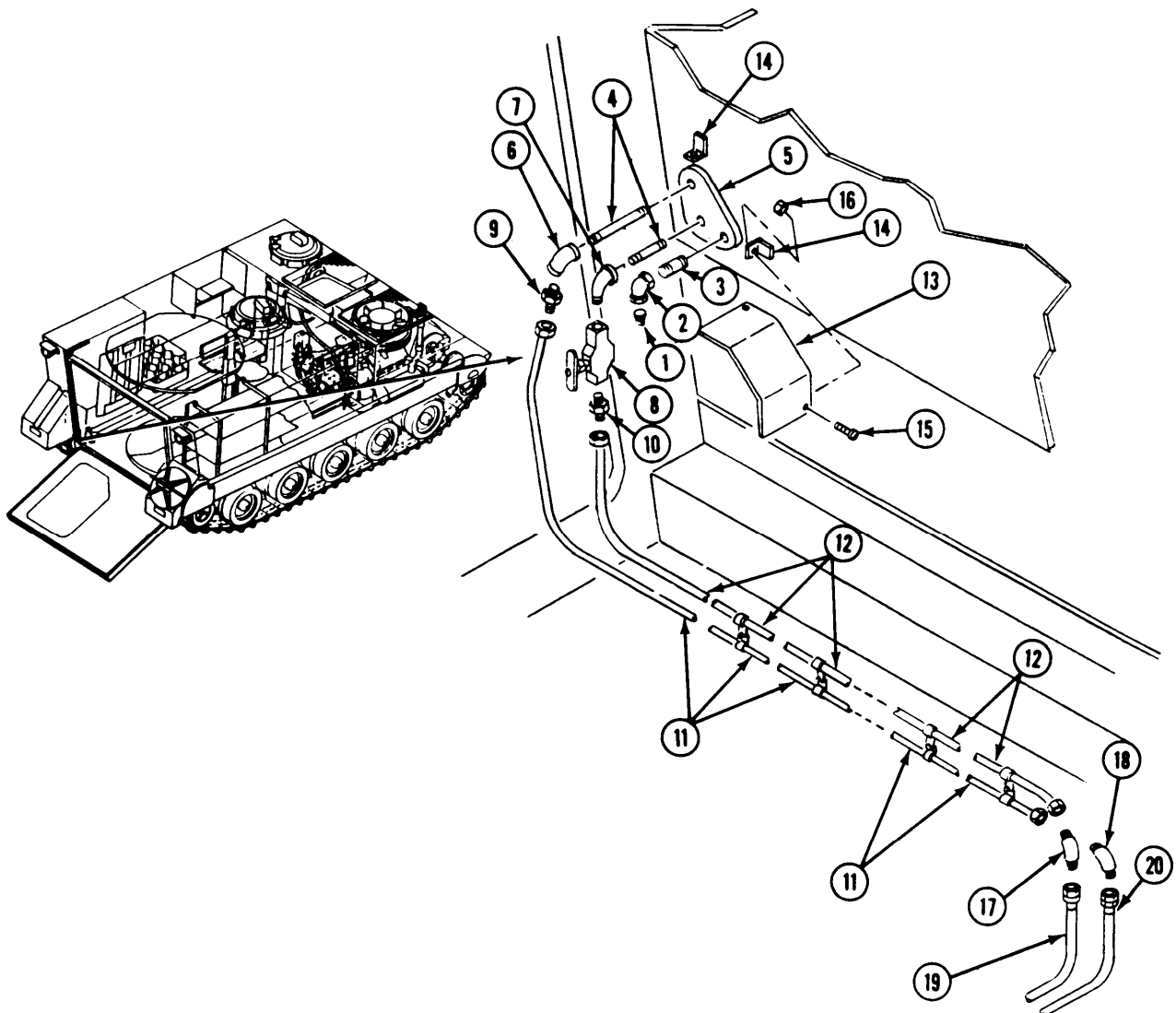
7. Remove two screws (1), washers (2) one locknut (3) and guard (4) from hull. Discard locknut.
8. Remove seven screws (5), lockwashers (6), fourteen clamps (7) fuel supply hose (8), and fuel return hose (9) from seven weldnuts (10). Discard lockwashers.
9. Disconnect fuel supply hose (8) from elbow (11).
10. Disconnect fuel return hose (9) from elbow (12).
11. Disconnect elbow (11) from fuel supply tube (13).
12. Disconnect elbow (12) from fuel return tube (14).
13. Disconnect fuel supply tube (13) from adapter (15).
14. Disconnect fuel return tube (14) from adapter (16).

15. Remove two screws (17) locknuts (18), and guard (19) from two brackets (20). Discard locknuts.
16. Remove adapter (15) from fuel shutoff valve (21).
17. Remove adapter (16) from elbow (22).
18. Remove shutoff valve (21) from elbow (23).
19. Remove elbows (22 and 23) from two nipples (24).
20. Remove two nipples (24) from fuel compartment (25).
21. Remove nipple (26), elbow (27) and pipe



**INSTALL**

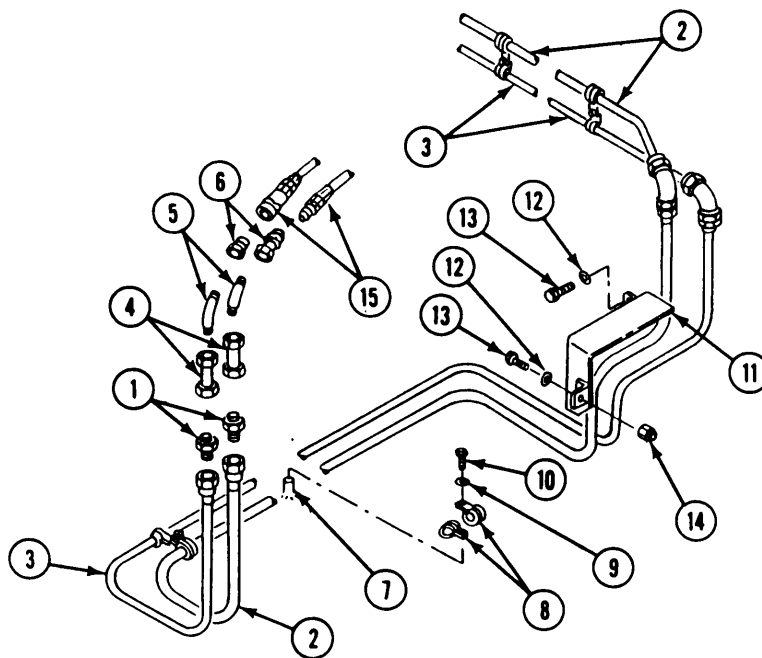
22. Apply a thin, even coat of sealing compound to cleaned external threads of fittings.
23. Install pipe plug (1), in elbow (2), on nipple (3). Secure nipple (3) and two nipples (4) in fuel compartment (5).
24. Install elbows (6 and 7) on two nipples (4).
25. Install fuel shutoff valve (8) on elbow (7) with arrow pointing down.
26. Install adapter (9) in elbow (6).
27. Install adapter (10) in shutoff valve (8).
28. Connect fuel return tube (11) to adapter (9).
29. Connect fuel supply tube (12) to adapter (10).
30. Secure guard (13) to two brackets (14) with two screws (15) and new locknuts (16).
31. Connect elbow (17) to fuel return tube (11).
32. Connect elbow (18) to fuel supply tube (12).
33. Connect fuel supply hose (19) to elbow (17).
34. Connect fuel return hose (20) to elbow (18).



GO TO NEXT PAGE



35. Install two nipples (1) in transverse beam.
36. Connect fuel supply hose (2) and fuel return hose (3) to two nipples (1).
37. Connect two tube assemblies (4) to two nipples (1).
38. Connect two elbows (5) to two tube assemblies (4).
39. Install two quick-disconnect fittings (6) on two elbows (5).
40. Install fuel supply hose (2) and fuel return hose (3) on seven weldnuts (7). Secure with fourteen clamps (8), seven new lockwashers (9) and seven screws (10).
41. Secure guard (11) to hull with two washers (12), screws (13), and one new locknut (14).
42. Connect two quick-disconnect fittings (6 and 15) inside power plant bulkhead.



---

#### FOLLOW-THROUGH STEPS

1. Fill fuel compartment (see your -10).
2. Connect battery ground lead (page 13-2).
3. Start engine (see your -10) Check for leaks.
4. Install floor plates (page 24-38).
5. Install fuse stowage rack (page 24-186).
6. Raise and lock ramp (see your -10).
7. Stop/shutdown engine (see your -10).
8. Install power plant rear access panel (page 24-29).

---

END OF TASK

# REPLACE FUEL TANK INTERNAL HOSES, TUBES, AND FITTINGS (M125A2 AND M106A2 ONLY)

## DESCRIPTION

This task covers: Remove (page 6-85). Install (page 6-86).

## INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 30, App D)

### Materials/Parts:

Non-electrical wire (Item 31, App C)  
Wiping rag (Item 61, App C)

### Personnel Required:

Unit Mechanic

### References:

See your-10

### Equipment Conditions:

Carrier blocked (see your-10)  
Engine stopped/shutdown (see your-10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel compartment drained (page 6-77)  
Filler cover and lock removed (page 6-7)  
Filler cap and strainer parts removed (page 6-78)  
Fuel compartment access cover removed (page 6-79)

## REMOVE



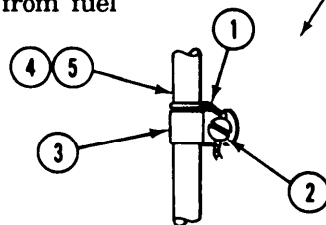
### WARNING

Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

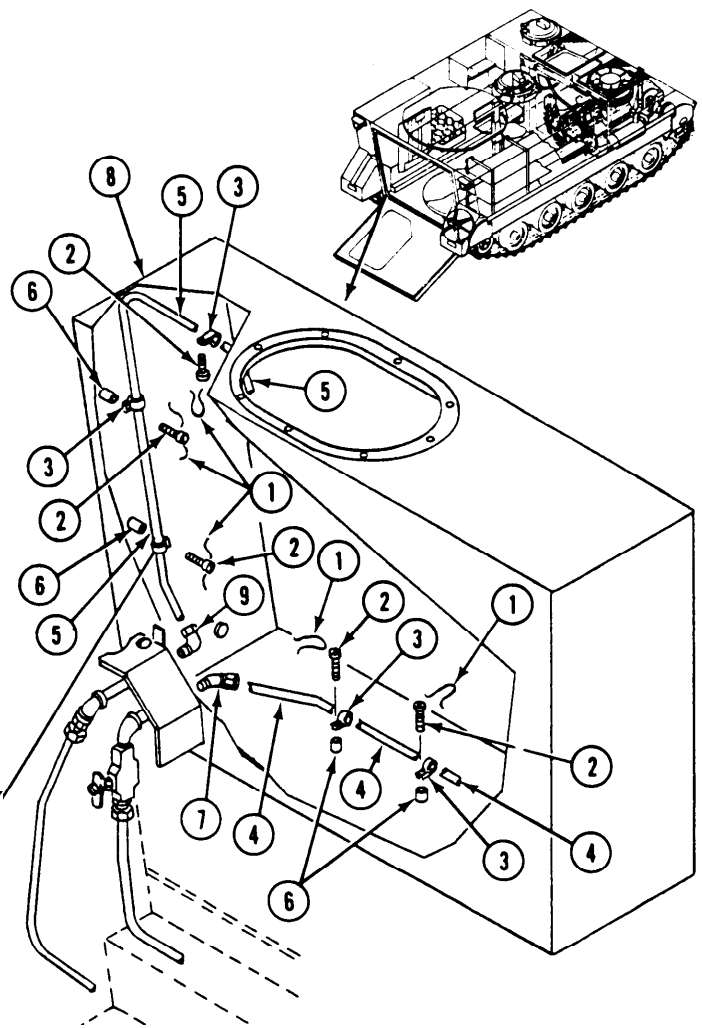
### NOTE

Use wiping rag to wipe up any spilled fuel.

1. Remove lockwire (1), five screws (2), and clamps (3) that secure fuel pickup tube (4) and fuel return tube (5) to five weldnuts (6). Discard lockwire.
2. Disconnect pickup tube (4) from elbow (7).
3. Remove elbow (7) from fuel compartment (8).
4. Disconnect return tube (5) from elbow (9).
5. Remove elbow (9) from fuel compartment (8).

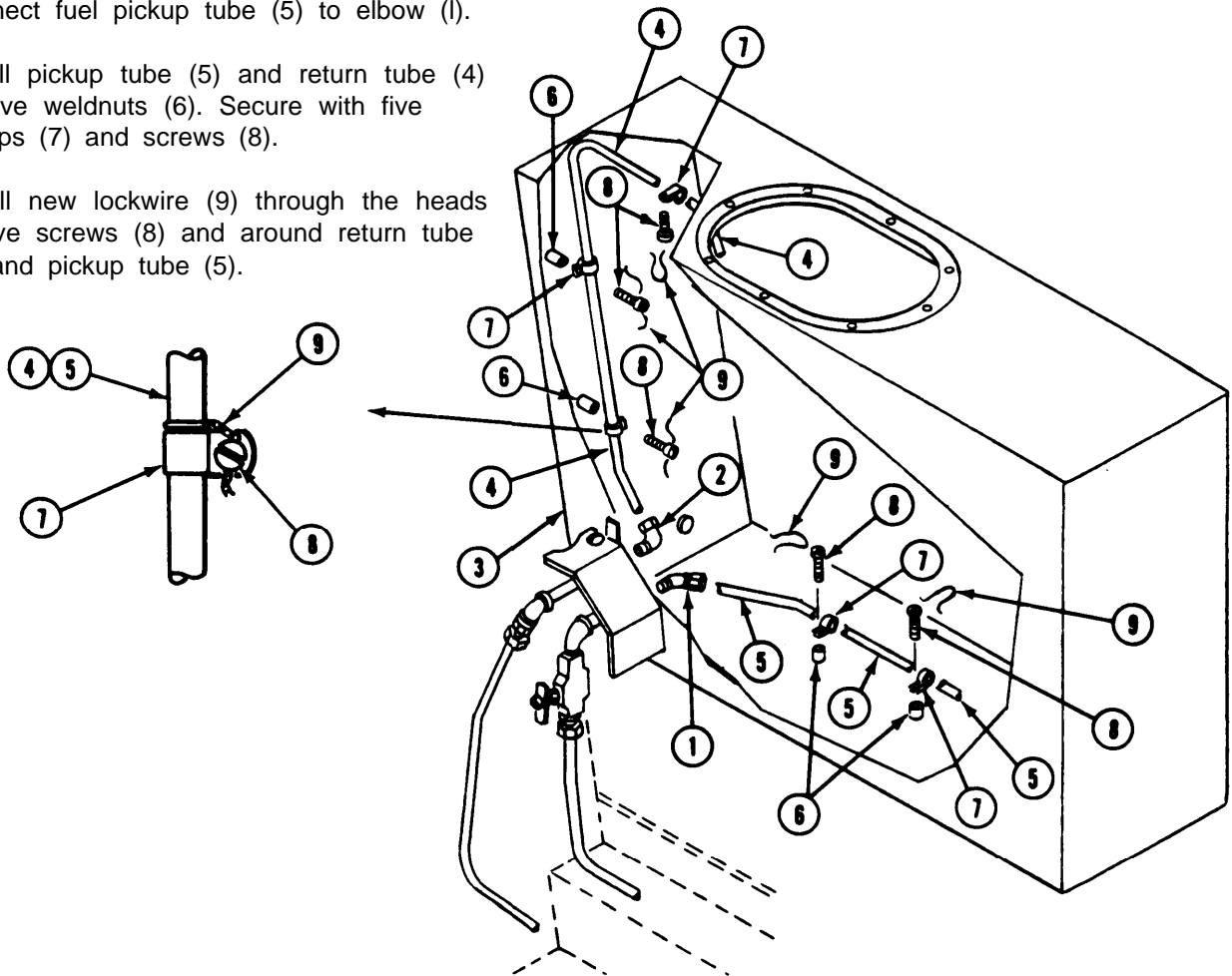


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## INSTALL

6. Install elbows (1 and 2) in fuel compartment (3).
7. Connect fuel return tube (4) to elbow (2).
8. Connect fuel pickup tube (5) to elbow (1).
9. Install pickup tube (5) and return tube (4) on five weldnuts (6). Secure with five clamps (7) and screws (8).
10. Install new lockwire (9) through the heads of five screws (8) and around return tube (4) and pickup tube (5).



## FOLLOW-THROUGH STEPS

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Install fuel compartment access cover (page 6-79).</li> <li>2. Install fuel cap and strainer parts (page 6-78).</li> <li>3. Install filler cover and lock (page 6-7).</li> </ol> | <ol style="list-style-type: none"> <li>4. Fill fuel compartment (see your-10).</li> <li>5. Connect battery ground lead (page 13-2).</li> <li>6. Raise and lock ramp (see your -10).</li> <li>7. Stop/shutdown engine (see your-10).</li> </ol> |
|--|--|

END OF TASK

**Section VI. FUEL COMPARTMENT, BLADDER, HOSES, TUBES,  
AND FITTINGS (M741A1 ONLY)**

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**TASK INDEX**

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<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
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Replace Filler Cap and Strainer Parts (M741A1 Only) .....	6-89	Replace Fuel Compartment Bladder (M741A1 only) .....	6-94
Replace Fuel Compartment Access Cover (M741A1 Only).....	6-91	Replace Compartment to Bulkhead Fuel Hoses, Tubes, and Fittings (M741A1 only) .....	6-98
Replace Fuel Bladder Filler Flange (M741A1 only) .....	6-92		

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---

## DRAIN FUEL BLADDER (M741A1 ONLY)

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Sealing Compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Suitable size container

**References:**

see your -10

**Equipment Conditions:**

Engine stopped (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)

**Personnel Required:**

Unit Mechanic

---

### DRAIN

1. Open fuel filler combat cover (1). Remove fuel filler cap (see your -10).

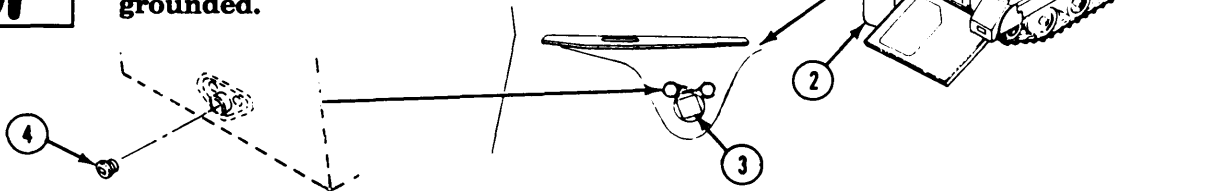
**NOTE**

**Fuel tank capacity is 95 gallons.**

2. Place a suitable container (2) behind left rear fender.
3. Make sure metal container (2) is making metal-to-metal contact with carrier so that there is a good ground.
4. Remove drain plug (3) from fuel compartment.

**WARNING**

**Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.**



**NOTE**

**Use wiping rag to wipe up any spilled fuel.**

5. Remove drain plug (4) from bladder through fuel compartment drain opening. Drain fuel.
6. After fuel is drained, apply a thin, even coat of sealing compound to clean threads of drain plugs (3 and 4).
7. Install drain plug (4) in fuel bladder through fuel compartment drain opening.
8. Install drain plug (3) in fuel compartment.
9. Install fuel filler cap (see your -10). Close filler combat cover (1).

---

### FOLLOW-THROUGH STEPS

1. After maintenance has been performed, fill fuel compartment (see your -10).
  2. Connect battery ground lead (page 13-2).
- 

**END OF TASK**

## REPLACE FILLER CAP AND STRAINER PARTS (M741A1 ONLY)

### INITIAL SETUP

**Tools:**

General Mechanics Tool kit (Item 30, App D)

**Materials/Parts:**

Nonelectrical wire (Item 31, App C)  
Gasket

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

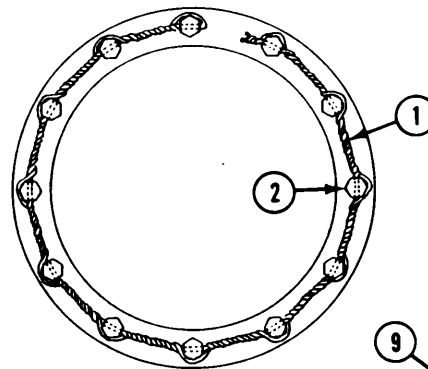
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Filler cover and lock removed (page 6-7 )

### REMOVE

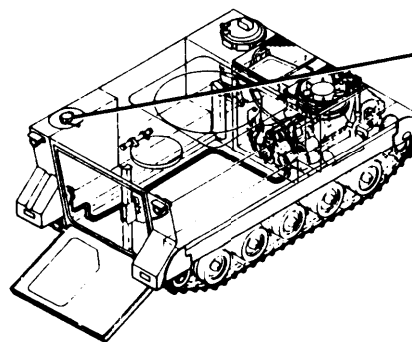
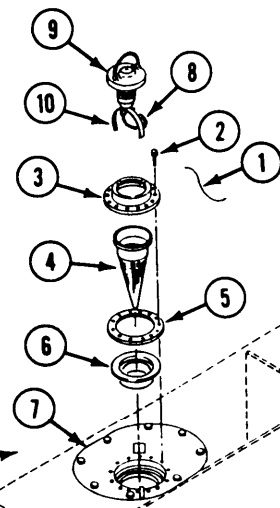
1. Remove lock wire (1), 12 screws (2), filler neck (3), strainer (4), gasket (5), and flange (6) from fuel compartment access cover (7). Discard gasket and lock wire.
2. Open spring clip (8) and disconnect filler cap (9) chain from retainer (10).
3. Remove filler cap (9) and retainer (10) from fuel tiller neck (3).

9. Install new lock wire (1) through the heads of 12 screws (2). Secure with double twist method.
10. Install filler cap (9) in filler neck (3).



### INSTALL

4. Install flange (6) in fuel compartment access cover (7).
5. Install strainer (4) in flange (6).
6. Place filler cap (9) chain through filler neck (3). Secure retainer (10) to filler cap chain with spring clip (8) .
7. Install retainer (10) in filler neck (3).
8. Secure filler neck (3) and new gasket (5) to fuel compartment access cover (7) with 12 screws (2).



GO TO NEXT PAGE

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**FOLLOW-THROUGH STEPS**

1. Install filler cover and lock (page 6-7).
2. Connect battery ground lead (page 13-2).

---

**END OF TASK**

---

## REPLACE FUEL COMPARTMENT ACCESS COVER (M741A1 ONLY)

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Torque Wrench (Item 96, App D)

#### Materials/Parts:

Gasket  
Seal

#### Personnel Required:

Unit Mechanic

#### References:

see your-10

#### Equipment Conditions:

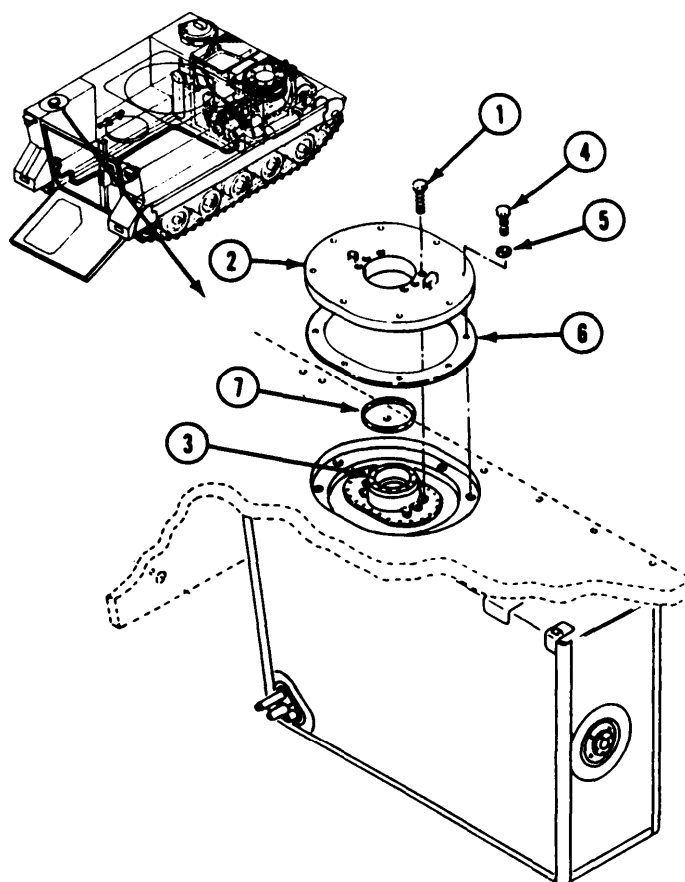
Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnect (page 13-2)  
Filler cover and lock removed (page 6-7)  
Filler cap and strainer parts removed  
(page 6-89)

### REMOVE

1. Remove six screws (1) that secure access cover (2) to filler flange (3).
2. Remove eight screws (4), washers (5), access cover (2), gasket (6), and seal (7) from fuel compartment opening. Discard gasket and seal.

### INSTALL

3. Install new gasket (6) and access cover (2) on fuel compartment opening. Secure with eight screws (4) and washers (6).
4. Tighten eight screws (4) to 60-65 lb-ft (81-88 N-m) torque. Use torque wrench.
5. Secure access cover (2) to filler flange (3) with six screws (1).
6. Install new seal (7) between access cover (2) and filler flange (3). Cut to length and press seal between cover (2) and flange (3). No gap allowed between filler flange and access cover.




---

### FOLLOW-THROUGH STEPS

1. Install filler cap and strainer parts (page 6-89).
2. Install filler cover and lock (page 6-7).
3. Connect battery ground lead (page 13-2).

---

END OF TASK



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## REPLACE FUEL BLADDER FILLER FLANGE (M741A1 ONLY)

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
Socket Wrench Set (Item 88, App D)  
Torque Wrench (Item 99, App D)

#### Materials/Parts:

Non-electrical wire (Item 31, App C)

#### Personnel Required:

Unit Mechanic

#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Filler cover and lock removed (page 6-7)  
Filler cap and strainer parts removed (page 6-89)  
Fuel compartment access cover removed (page 6-91)  
Fuel tank bladder drained (page 6-88)

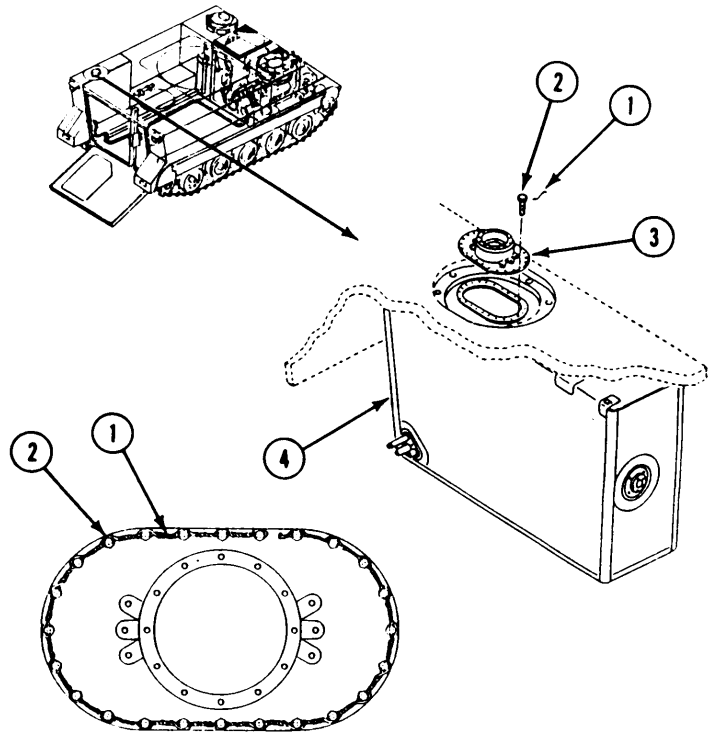
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### REMOVE

1. Remove lockwire (1), 24 screws (2), and filler flange (3) from fuel bladder (4). Discard lockwire.

### INSTALL

2. Secure filler flange (3) to fuel bladder (4) with 24 screws (2).
3. Tighten 24 screws (2) to 10-12 lb-in (11-13 CMKG) torque; Use torque wrench and socket wrench set.
4. Tighten screws (2) again to 40-60 lb-in (46-69 CMKG) torque, using cross torque pattern. Use torque wrench and socket wrench set.
5. Install new lockwire (1) through the heads of 24 screws (2).



---

### FOLLOW-THROUGH STEPS

1. Install fuel compartment access cover (page 6-91).
  2. Install filler cap and strainer parts (page 6-89).
  3. Install filler cover and lock (page 6-7).
  4. Fill fuel bladder (see your -10).
  5. Connect battery ground lead (page 13-2).
- 

END OF TASK

---

## REPLACE FUEL QUANTITY TRANSMITTER (M741A1 ONLY)

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

Non-electrical wire (Item 31, App C)  
Gasket

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel bladder drained (page 6-88)

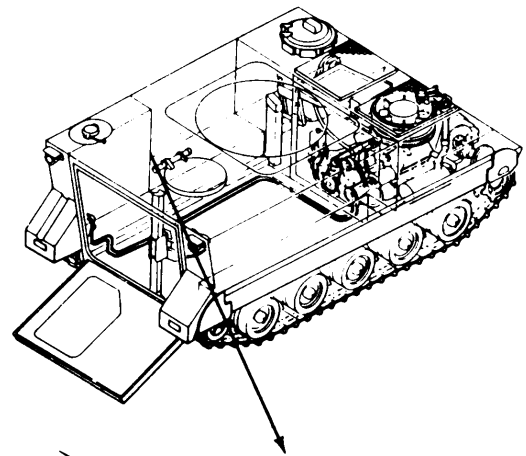
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**Personnel Required:**

Unit Mechanic

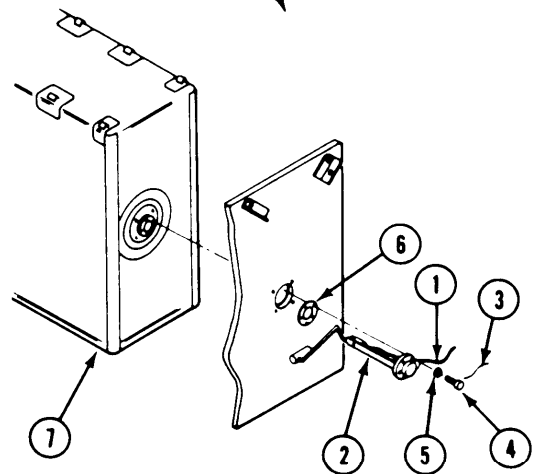
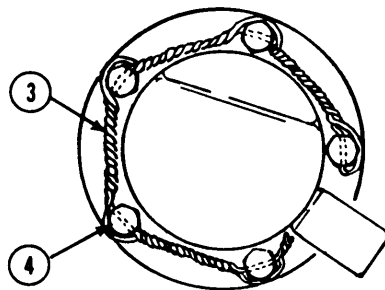
### REMOVE

1. Disconnect circuit 28 lead (1) from fuel quantity transmitter (2).
2. Remove lock wire (3), five screws (4), washers (5), transmitter (2), and gasket (6) from fuel bladder (7). Discard lock wire and gasket.



### INSTALL

3. Place new gasket (6) and transmitter (2) on fuel bladder (7). Secure with five screws (4) and washers (5).
4. Install new lock wire (3) through the heads of five screws (4).




---

### FOLLOW-THROUGH STEPS

1. Fill fuel bladder (see your -10).
  2. Connect battery ground lead (page 13-2).
  3. Raise ramp (see your -10).
  4. Stop/shutdown engine (see your -10).
- 

END OF TASK

## REPLACE FUEL COMPARTMENT BLADDER (M741A1 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-94). Clean, Inspect, and Repair (page 6-95).  
Install (page 6-96).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### References:

see your -10

#### Materials/Parts:

Nonelectrical wire (Item 31, App C)  
Sealing compound (Item 46, App C)  
Sealing compound (Item 52, App C)  
Cotter pin (2)  
Gasket  
Lockwasher (4)

#### Equipment Conditions:

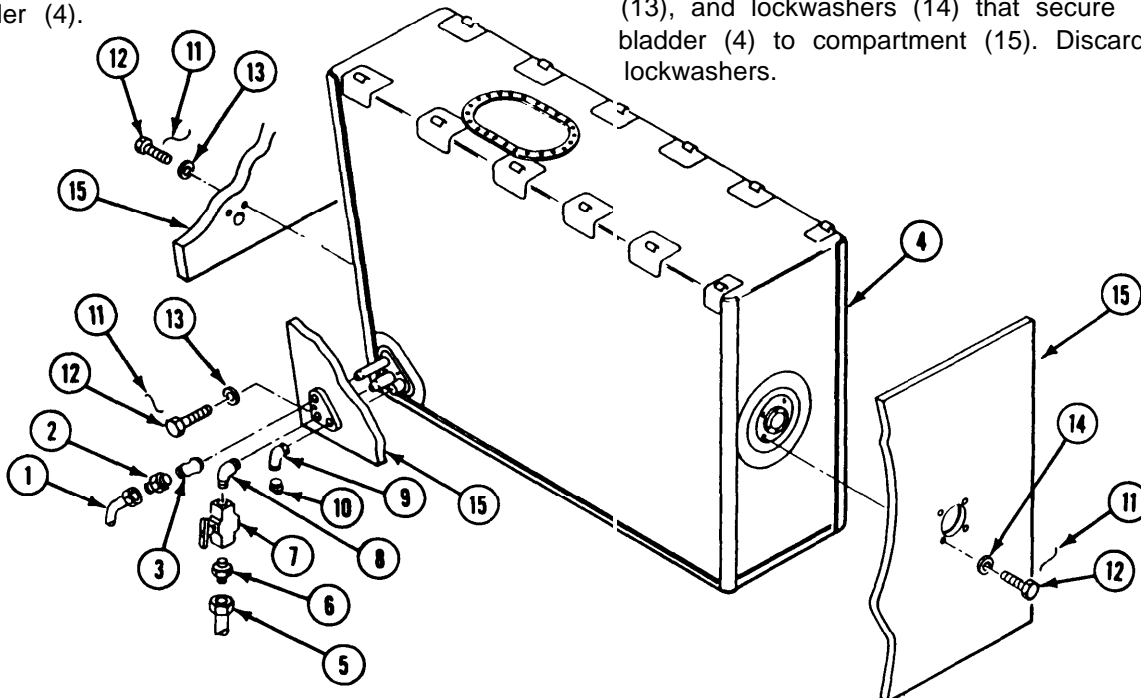
Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Fuel bladder drained (page 6-88)  
Filler cover and lock removed (page 6-7)  
Filler cap and strainer parts removed (page 6-89)  
Fuel compartment access cover removed (page 6-91)  
Fuel bladder filler flange removed" (page 6-92)  
Fuel quantity transmitter removed (page 6-93)

#### Personnel Required:

Unit Mechanic

### REMOVE

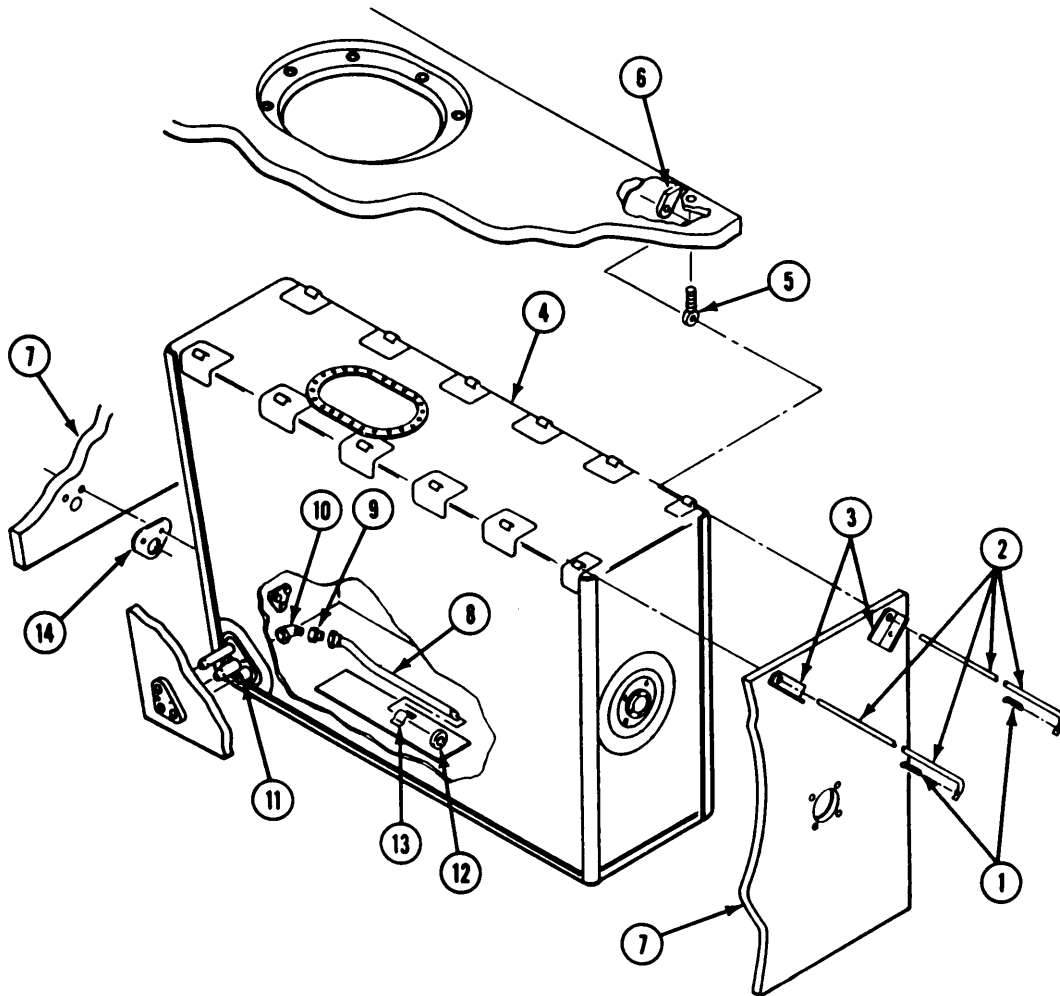
1. Remove fuel return hose (1), adapter (2), and elbow (3) from bladder (4).
2. Remove fuel supply hose (5), adapter (6), shutoff valve (7), and elbow (8) from bladder (4).
3. Remove elbow (9) and pipe plug (10) from bladder (4).
4. Remove lockwire (11) from eight screws (12). Discard lockwire.
5. Remove eight screws (12), four flat washers (13), and lockwashers (14) that secure bladder (4) to compartment (15). Discard lockwashers.



6. Remove two cotter pins (1) that secure two hanger rods (2) to two brackets (3). Discard cotter pins.
7. Remove two hanger rods (2) that secure bladder (4) to seven eyebolts (5) and brackets (6).
8. Remove bladder (4) through compartment (7) top opening.
9. Remove seven eyebolts (5) from inside compartment (7).
10. Disconnect hose assembly (8), adapter (9), and elbow (10) from supply tube (11).
11. Remove grommet (12) and hose assembly (8) from reinforcement (13).
12. Remove gasket (14) from bladder (4). Discard gasket.

### CLEAN, INSPECT, AND REPAIR

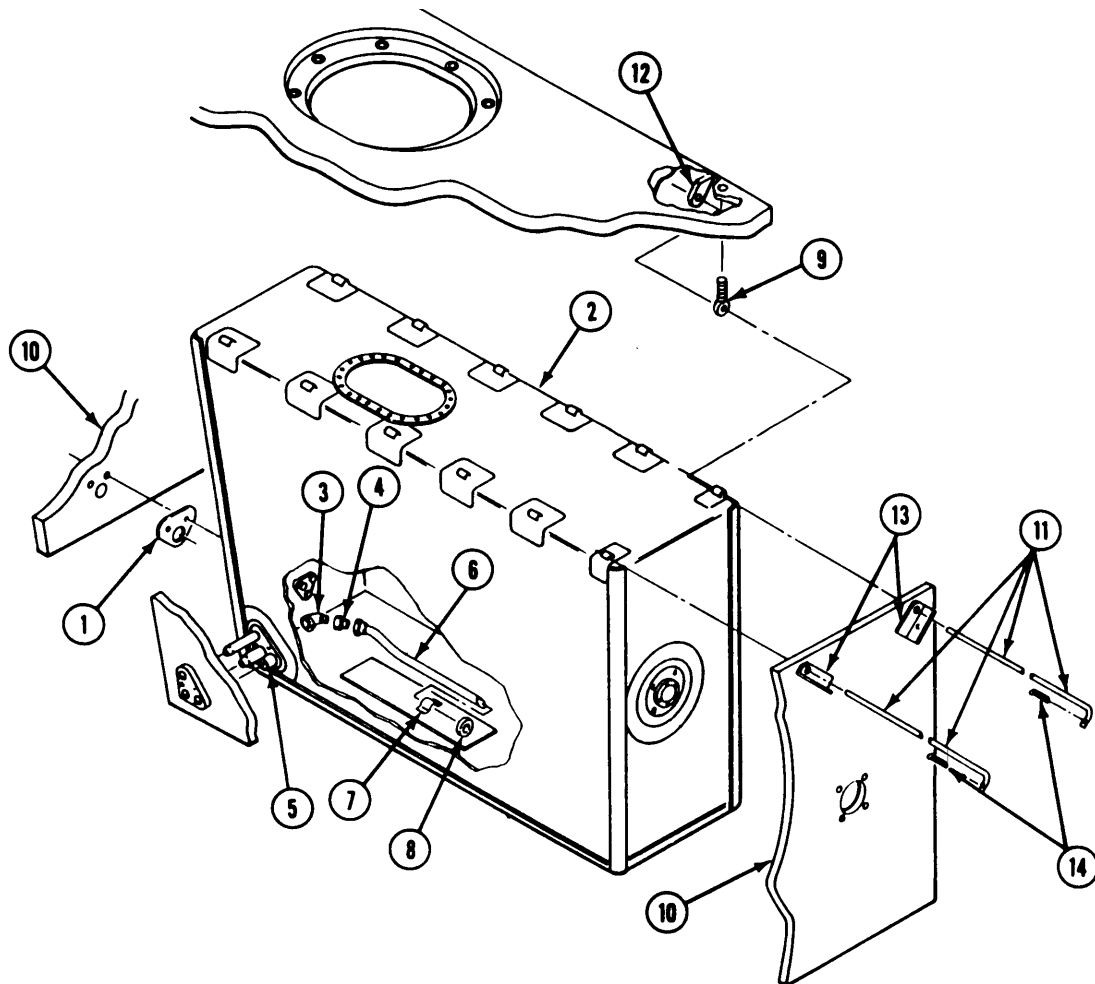
13. Check fuel bladder. Note direct support maintenance for repair of bladder. Replace cracked, broken, or leaky bladder that cannot be repaired.
14. Check inside of bladder compartment. Smooth rough areas and clean inside of bladder compartment.



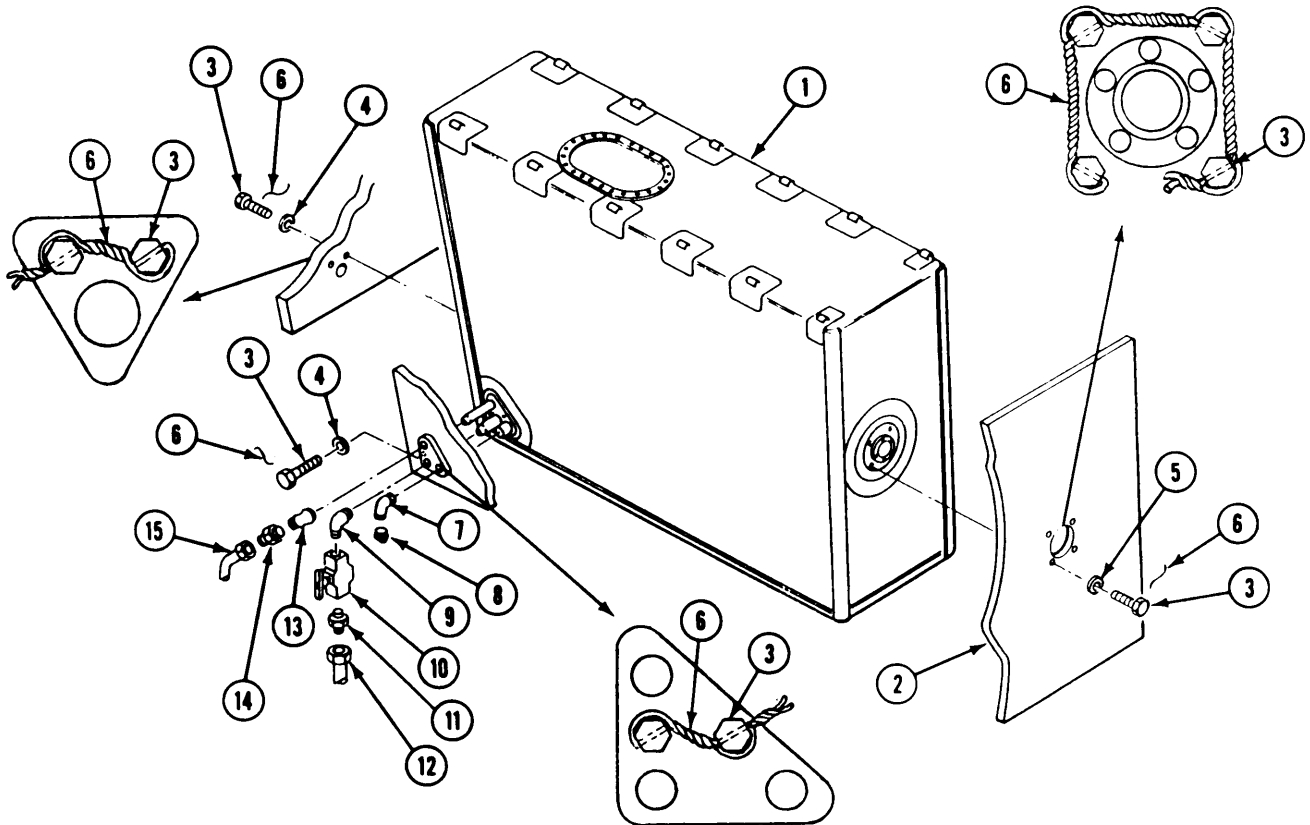
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## INSTALL

15. Apply a thin even coat of sealing compound (Item 52) to gasket mounting surface on bladder compartment.
16. Allow sealing compound to become tacky and install new gasket (1) on bladder (2).
17. Apply a thin even coat of sealing compound (Item 46) to cleaned external threads of fittings before installation.
18. Install elbow (3) and adapter (4) on supply tube (5).
19. Install hose assembly (6) in reinforcement (7).
20. Install grommet (8) on hose assembly (6).
21. Connect hose assembly (6) to adapter (4).
22. Install seven eyebolts (9) inside compartment (10). Align to accept hanger rods (11) when bladder (2) is installed.
23. Fold and compress bladder (2). Install in compartment (10) through top opening with bladder openings aligned with compartment openings.
24. Align ferrules on top of bladder (2) with eyebolts (9) and brackets (12). Start two hanger rods (11) through ferrules, eyebolts (9), and brackets (12).
25. Alternate from side to side until hanger rods (11) are through all bladder ferrules, eyebolts (9), and brackets (12).
26. Secure two hanger rods (11) to two brackets (13) with two new cotter pins (14).
27. Push bladder (2) into compartment (10) so it unfolds.



28. Secure bladder (1) to compartment (2) front, rear, and side openings with eight screws (3) four flat washers (4) and four new lockwashers (5).
29. Install new lockwire (6) through the heads of eight screws (3).
30. Install elbow (7) and pipe plug (8) in bladder (1).
31. Install elbow (9) in bladder (1).
32. Install shutoff valve (10) on elbow (9) with arrow pointing down.
33. Install adapter (11) and fuel supply hose (12) on shutoff valve (10).
34. Install elbow (13), adapter (14), and fuel return hose (15) on bladder (1).



### FOLLOW-THROUGH STEPS

1. Install fuel quantity transmitter (page 6-93).
2. Install fuel bladder filler flange (page 6-92).
3. Install fuel compartment access cover (page 6-91).
4. Install filler cap and strainer parts (page 6-89).
5. Install filler cover and lock (page 6-7).
6. Fill fuel bladder (see your -10). Check for leaks.
7. Connect battery ground lead (page 13-2).
8. Start engine (see your -10). Check for leaks.
9. Stop/shutdown engine (see your -10).

**END OF TASK**

## REPLACE COMPARTMENT TO BULKHEAD FUEL HOSES, TUBES, AND FITTINGS (M741A1 ONLY)

### DESCRIPTION

This task covers: Remove (page 6-98). Install (page 6-99).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Ramp lowered (see your -10)  
Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panel removed (page (24-27)  
Floor plates removed (page 24-40)  
Ammunition stowage containers removed (page 24-199)  
Fuel bladder drained (page 6-88)

### REMOVE

#### WARNING



Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

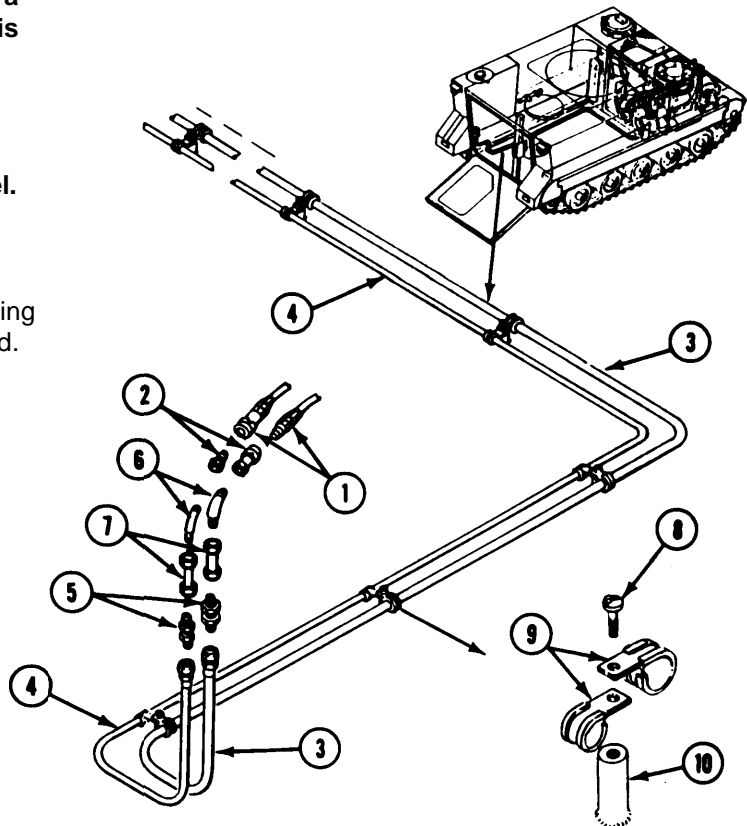
#### NOTE

Use wiping rag to wipe up any spilled fuel. Tag hoses before removing.

1. Disconnect two quick disconnect coupling halves (1) from two quick disconnect coupling halves (2) inside power plant rear bulkhead.
2. Disconnect fuel supply hose (3) and fuel return hose (4) from two nipples (5) in transverse beam.
3. Remove two quick disconnect coupling halves (2) from two elbows (6).
4. Remove two elbows (6) from two tube assemblies (7).
5. Remove two tube assemblies (7) from two nipples (5).

6. Remove two jamnuts and nipples (5) from transverse beam.

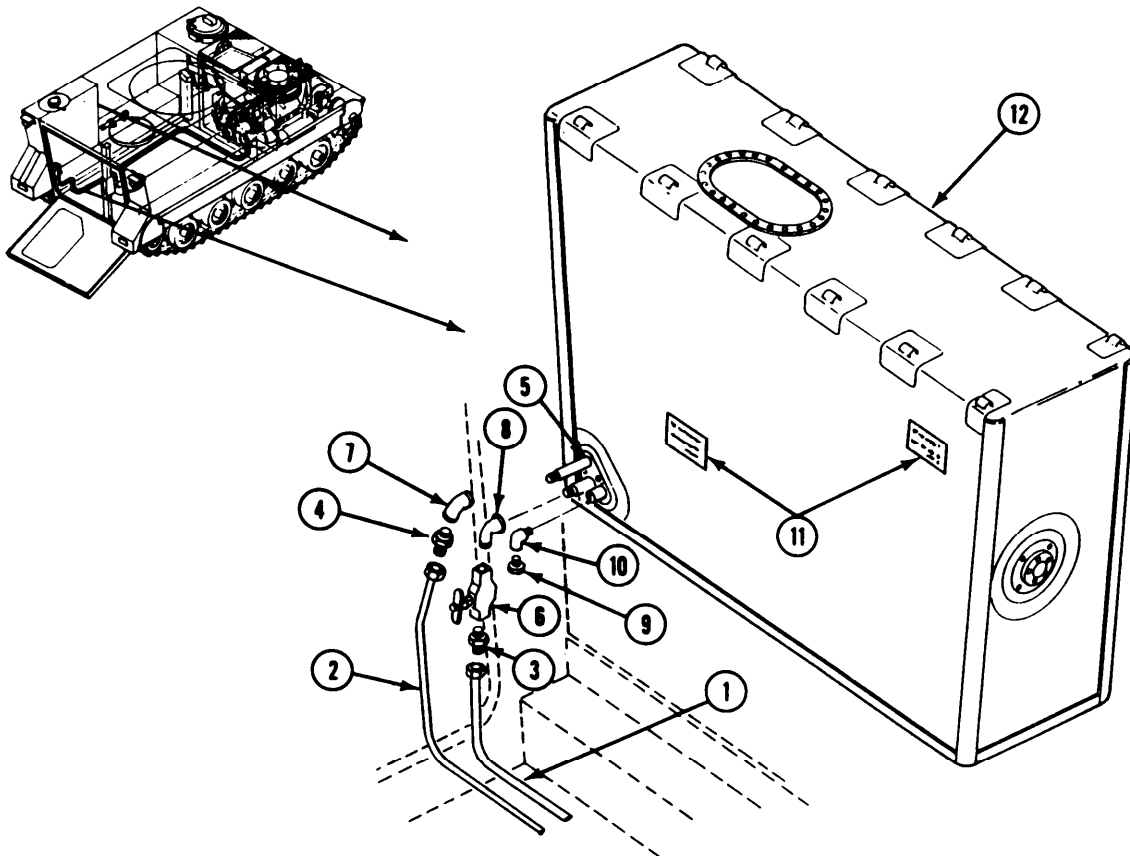
7. Remove 8 screws (8), 16 clamps (9), and fuel hoses (3 and 4) from 8 weldnuts (10).



8. Disconnect fuel supply hose (1) and fuel return hose (2) from adapters (3 and 4) on bladder (5).
9. Remove adapter (3) from shutoff valve (6).
10. Remove adapter (4) from elbow (7).
11. Remove shutoff valve (6) from elbow (8).
12. Remove pipe plug (9) from elbow (10).
13. Remove three elbows (7, 8, and 10) from bladder (5).
14. Check decals (11) on fuel tank (12). Replace decals that cannot be read (page 24-217).

## INSTALL

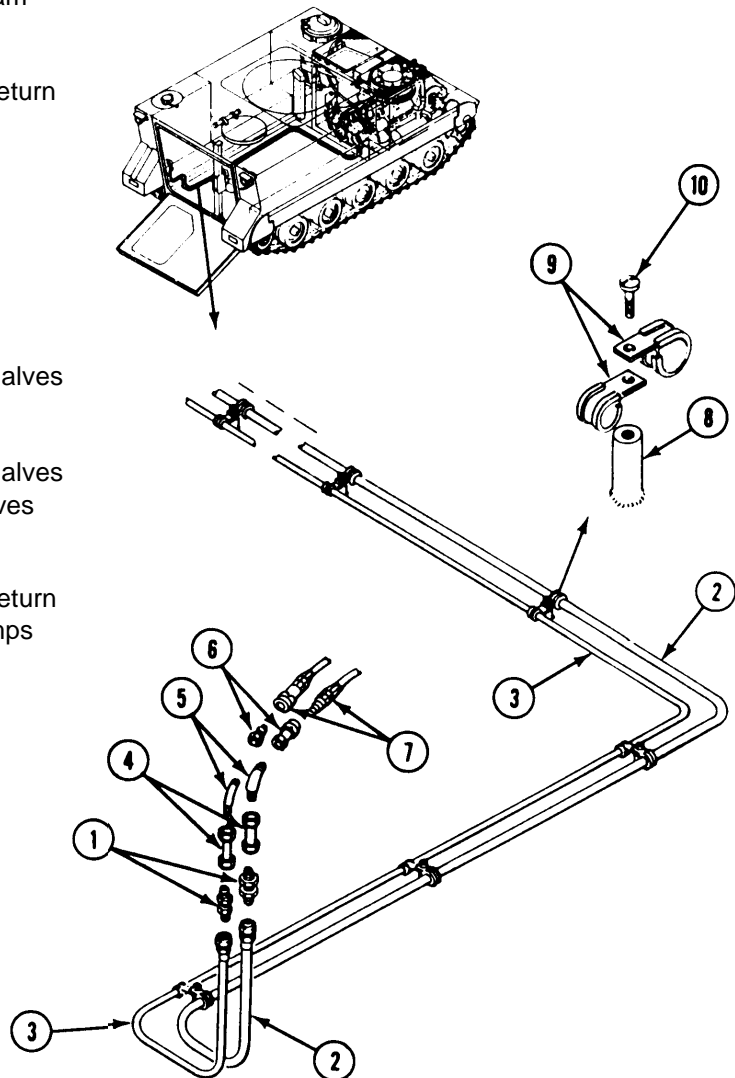
15. Apply a thin even coat of sealing compound to cleaned external threads of fittings before installation.
16. Install three elbows (7, 8, and 10) on bladder (5).
17. Install shutoff valve (6) on elbow (8) with arrow pointing down.
18. Install pipe plug (9) in elbow (10).
19. Install adapter (4) in elbow (7).
20. Install adapter (3) in shutoff valve (6).
21. Connect fuel supply hose (1) and fuel return hose (2) to adapters (3 and 4).



GO TO NEXT PAGE



22. Install two nipples (1) in transverse beam and secure with two jamnuts.
23. Connect fuel supply hose (2) and fuel return hose (3) on two nipples (1).
24. Install two tube assemblies (4) to two nipples (1).
25. Install two elbows (5) to two tube assemblies (4).
26. Connect two quick disconnect coupling halves (6) to two elbows (5).
27. Connect two quick disconnect coupling halves (7) to two quick disconnect coupling halves (6) inside power plant bulkhead.
28. Connect fuel supply hose (2) and fuel return hose (3) to 8 weldnuts (8) with 16 clamps (9) and 8 screws (10).




---

**FOLLOW-THROUGH STEPS**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Connect battery ground lead (page 13-2).</li> <li>2. Fill fuel bladder (see your -10).</li> <li>3. Start engine (see your -10). Check for leaks.</li> <li>4. Install power plant rear access panel (page 24-27).</li> </ol> | <ol style="list-style-type: none"> <li>5. Install floor plates (page 2440).</li> <li>6. Install ammunition containers (page 24-199).</li> <li>7. Raise and lock ramp (see your -10).</li> <li>8. Stop/shutdown engine (see your -10).</li> </ol> |
|---|--|
- 

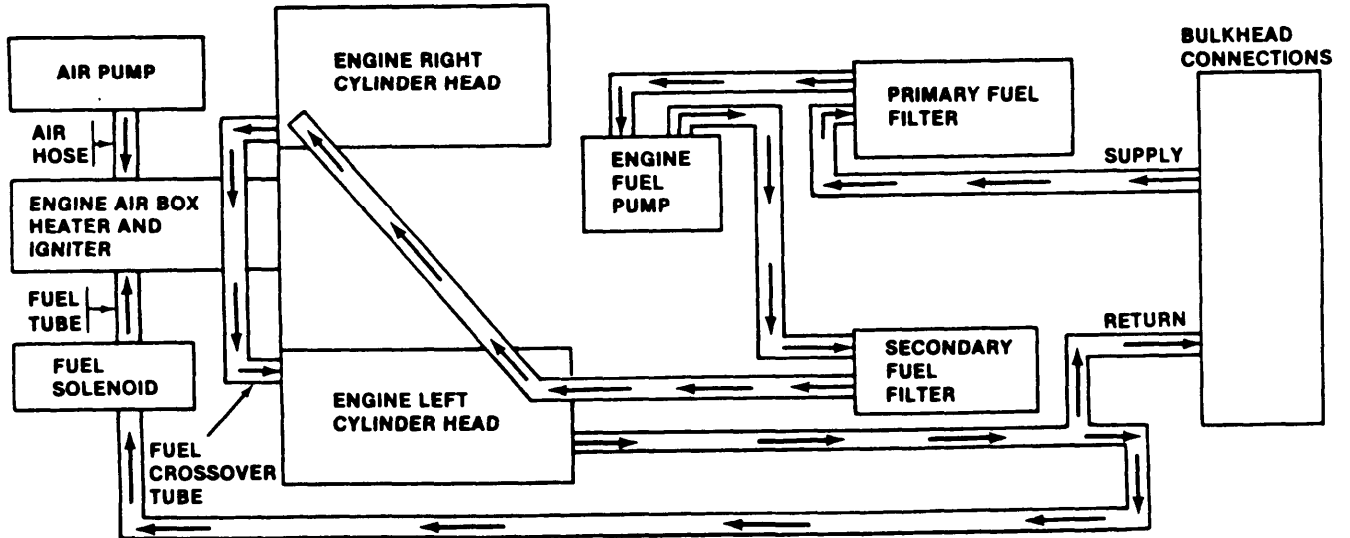
**END OF TASK**

## Section VU. BULKHEAD TO INJECTORS ENGINE FUEL AND AIR HOSES

### TASK INDEX

Task	Page	Task	Page
Engine Fuel System Diagram . . . . .	6-101	Replace Left to Right Engine Cylinder Head Fuel Hose . . . . .	6-110
Replace Bulkhead Connection to Primary Fuel Filter Hose . . . . .	6-102	Replace Engine Air Inlet Elbow to Air Box Heater Hoses . . . . .	6-112
Replace Primary Fuel Filter to Engine Fuel Pump Hose . . . . .	6-104	Replace Air Box Heater to Fuel Return Tee Tube and Hose . . . . .	6-115
Replace Engine Fuel Pump to Secondary Fuel Filter Hose . . . . .	6-106	Replace Left Cylinder Head Fuel Return Tube and Hose . . . . .	6-118
Replace Secondary Filter to Left Cylinder Head Fuel Hose . . . . .	6-108		

### ENGINE FUEL SYSTEM DIAGRAM



# REPLACE BULKHEAD CONNECTION TO PRIMARY FUEL FILTER HOSE

## INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panel removed (page 24-27 or 24-29)

## REMOVE



**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**

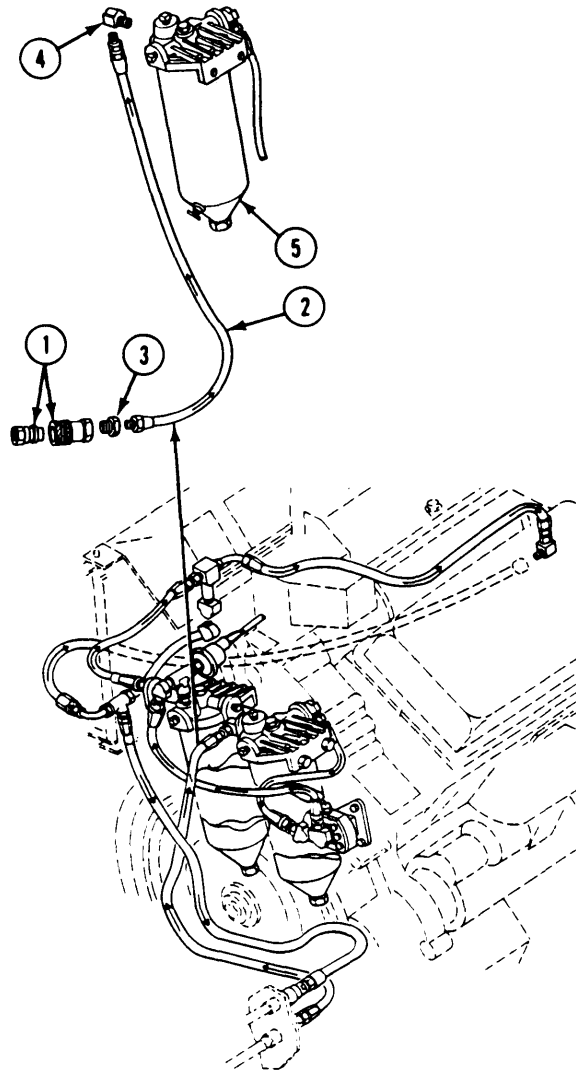
Use wiping rag to wipe up any spilled fuel.

1. Disconnect supply hose quick disconnect coupling (1).
2. Disconnect fuel supply hose (2) from adapter (3) and elbow (4).
3. Remove adapter (3) from quick disconnect coupling (1).
4. Remove elbow (4) from primary fuel filter (5).

## INSTALL

5. Apply a thin even coat of sealing compound to cleaned external threads of hose ends and fittings.
6. Install elbow (4) in primary fuel filter (5).
7. Install adapter (3) in quick disconnect coupling (1).

8. Connect fuel supply hose (2) to elbow (4) and adapter (3).
9. Connect quick disconnect coupling (1).



---

**FOLLOW-THROUGH STEPS**

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10). Check for leaks.
3. Raise and lock ramp (see your -10).
4. Stop/shutdown engine (see your -10).
5. Install power plant rear access panel (page 24-27 or 24-29).

---

**END OF TASK**

# REPLACE PRIMARY FUEL FILTER TO ENGINE FUEL PUMP HOSE

## INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

see your -10

**Materials/Parts:**

Sealing Compound (Item 46, App C)  
Wiping rag (Item 61, App C)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panel removed (page 24-27 or 24-29)

**Personnel Required:**

Unit Mechanic

## REMOVE



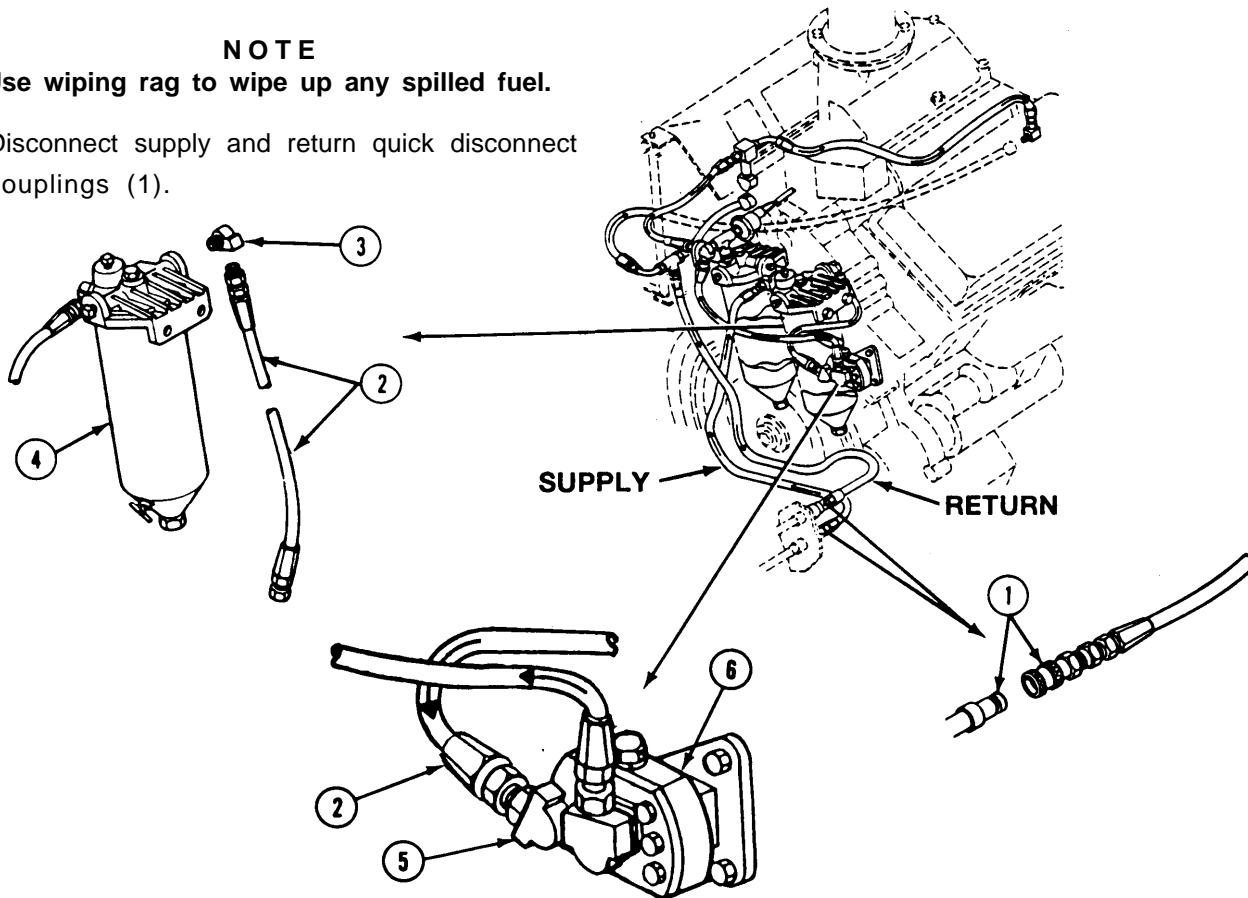
**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**

Use wiping rag to wipe up any spilled fuel.

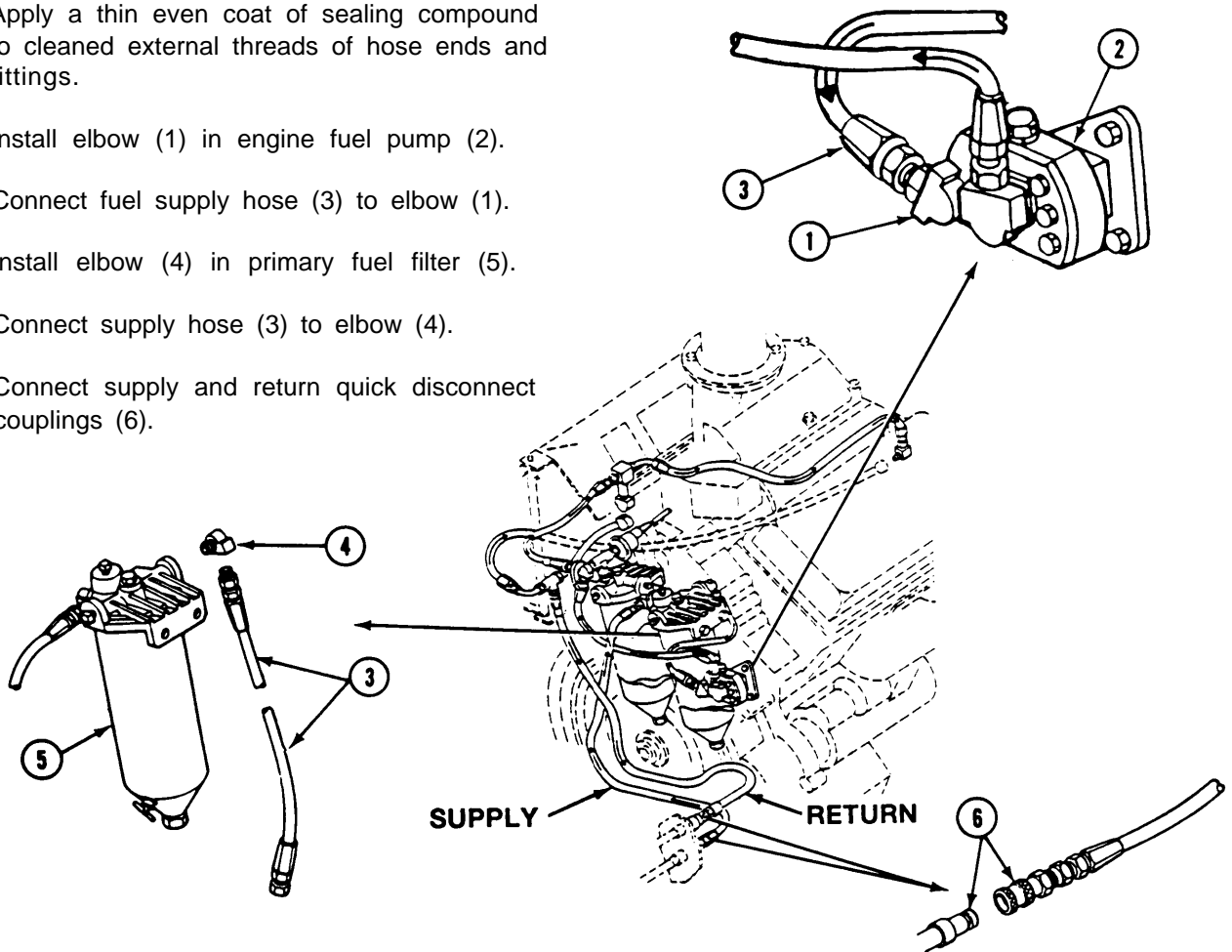
1. Disconnect supply and return quick disconnect couplings (1).

2. Disconnect fuel supply hose (2) from elbow (3).
3. Remove elbow (3) from primary fuel filter (4).
4. Disconnect fuel supply hose (2) from elbow (5).
5. Remove elbow (5) from engine fuel pump (6).



## INSTALL

6. Apply a thin even coat of sealing compound to cleaned external threads of hose ends and fittings.
7. Install elbow (1) in engine fuel pump (2).
8. Connect fuel supply hose (3) to elbow (1).
9. Install elbow (4) in primary fuel filter (5).
10. Connect supply hose (3) to elbow (4).
11. Connect supply and return quick disconnect couplings (6).




---

## FOLLOW-THROUGH STEPS

- |  |   |
|--|---|
| 1. Connect battery ground lead (page 13-2).      | 4. Stop/shutdown engine (see your -10).                         |
| 2. Start engine (see your -10). Check for leaks. | 5. Install power plant rear access panel (page 24-27 or 24-29). |
| 3. Raise and lock ramp (see your -10).           |   |

---

END OF TASK

## REPLACE ENGINE FUEL PUMP TO SECONDARY FUEL FILTER HOSE

### DESCRIPTION

This task covers: Remove (page 6-106). Install (page 6-107).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

Sealing compound (Item 49, App C)  
Wiping rag (Item 61, App C)

**Equipment Conditions:**

Ramp lowered (see your -10)  
Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panel removed (page 24-27 or 24-29)

**Personnel Required:**

Unit Mechanic

### REMOVE

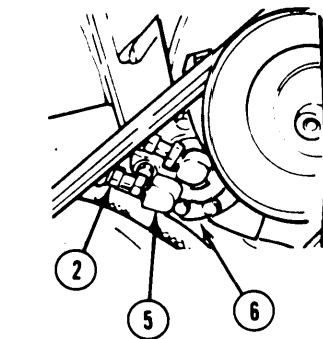
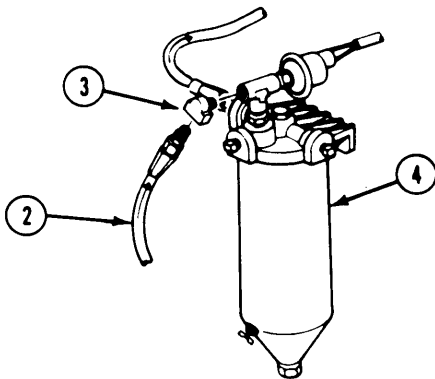


**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

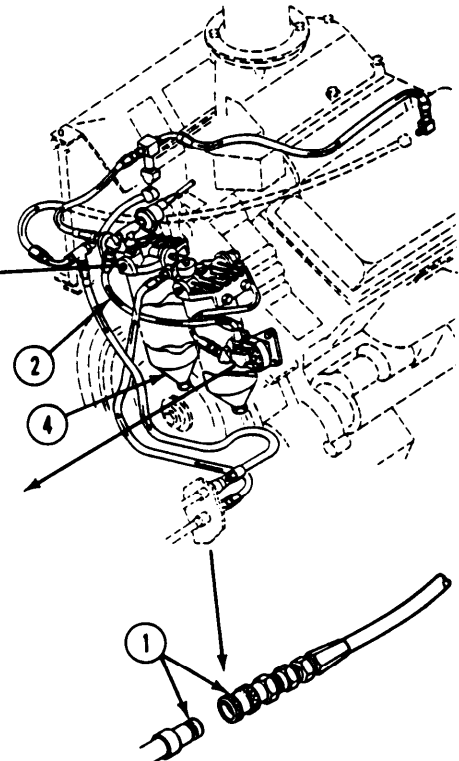
**NOTE**

Use wiping rag to wipe up any spilled fuel.

1. Disconnect supply and return quick-disconnect couplings (1).

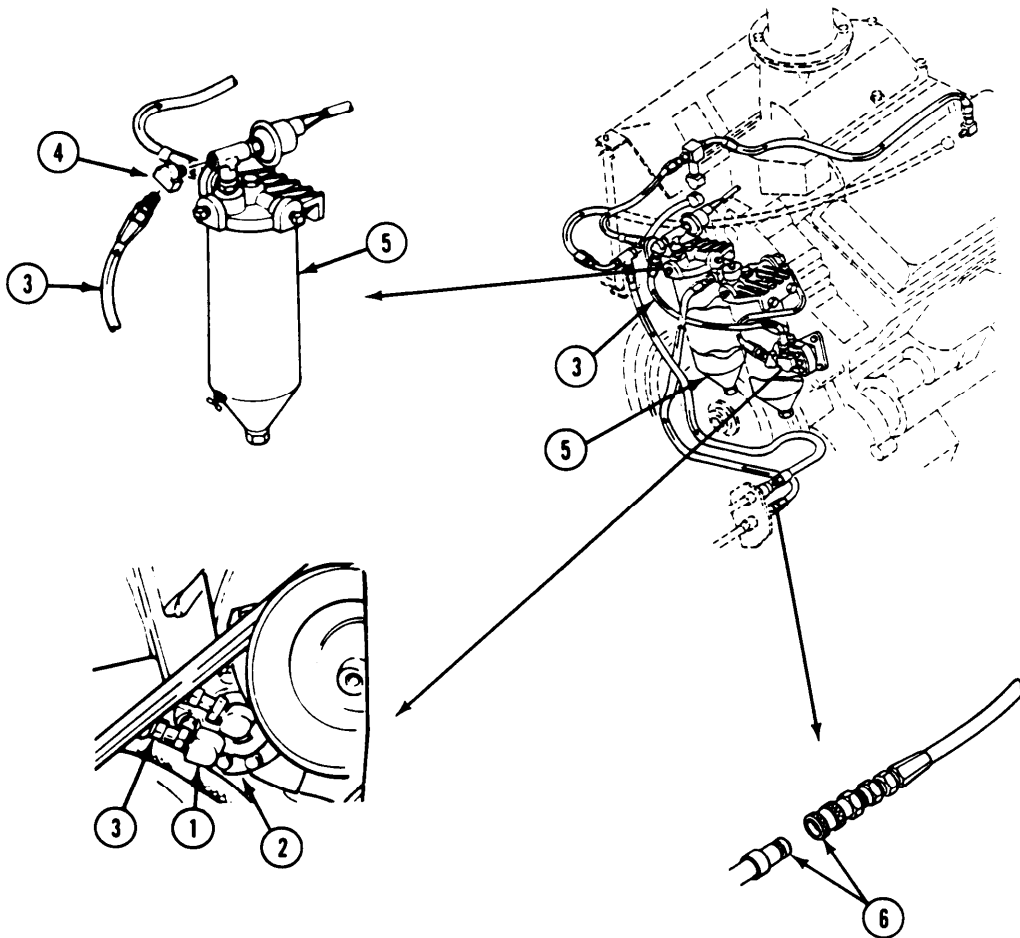


2. Disconnect fuel supply hose (2) from elbow (3).
3. Remove elbow (3) from secondary fuel filter (4).
4. Disconnect fuel supply hose (2) from elbow (5).
5. Remove elbow (5) from fuel pump (6).



## INSTALL

6. Apply a thin, even coat of sealing compound to cleaned external threads of hose ends and fittings.
7. Install elbow (1) in engine fuel pump (2).
8. Connect fuel supply hose (3) to elbow (1).
9. Install elbow (4) in secondary fuel filter (5).
10. Connect fuel supply hose (3) to elbow (4).
11. Connect supply and return quick-disconnect couplings (6).




---

## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10). Check for leaks.
3. Install power plant rear access panel (page 24-27 or 24-29).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).

---

END OF TASK



## REPLACE SECONDARY FILTER TO LEFT CYLINDER HEAD FUEL HOSE

### DESCRIPTION

This task covers: Remove (page 6-108). Install (page 6-109).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

see your -10

**Materials/Parts:**

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panel removed (page 24-27 or 24-29)  
Ramp lowered (see your -10)

**Personnel Required:**

Unit Mechanic

### REMOVE



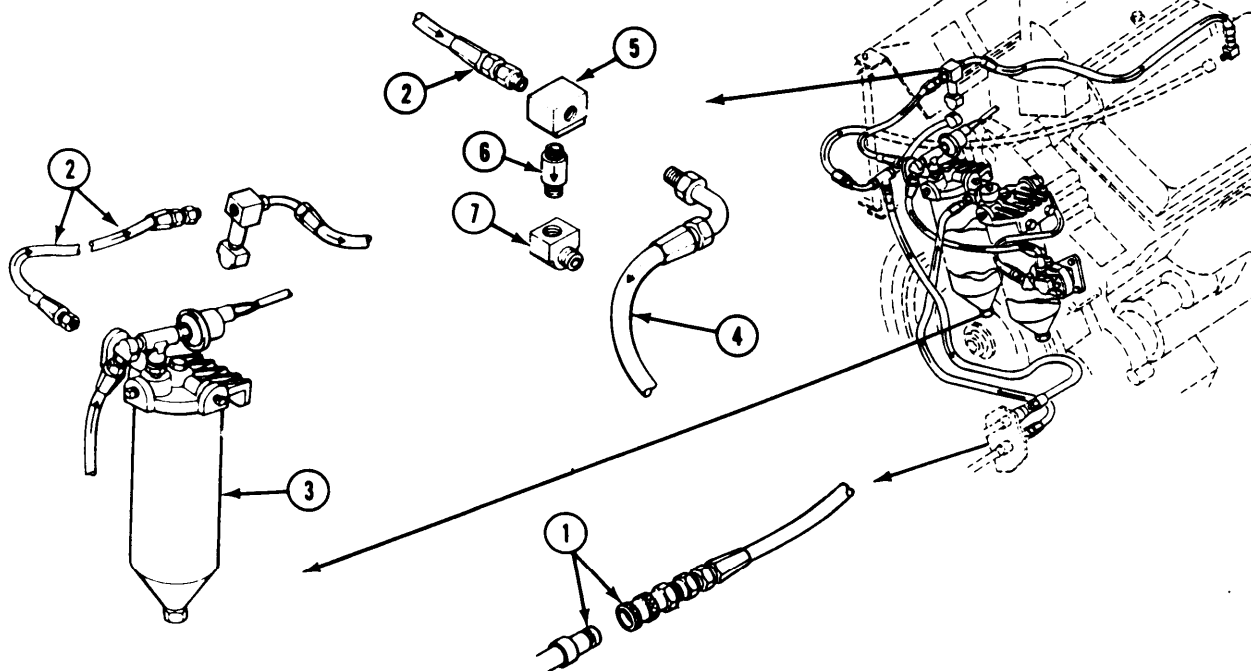
**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**

Use wiping rag to wipe up any spilled fuel.

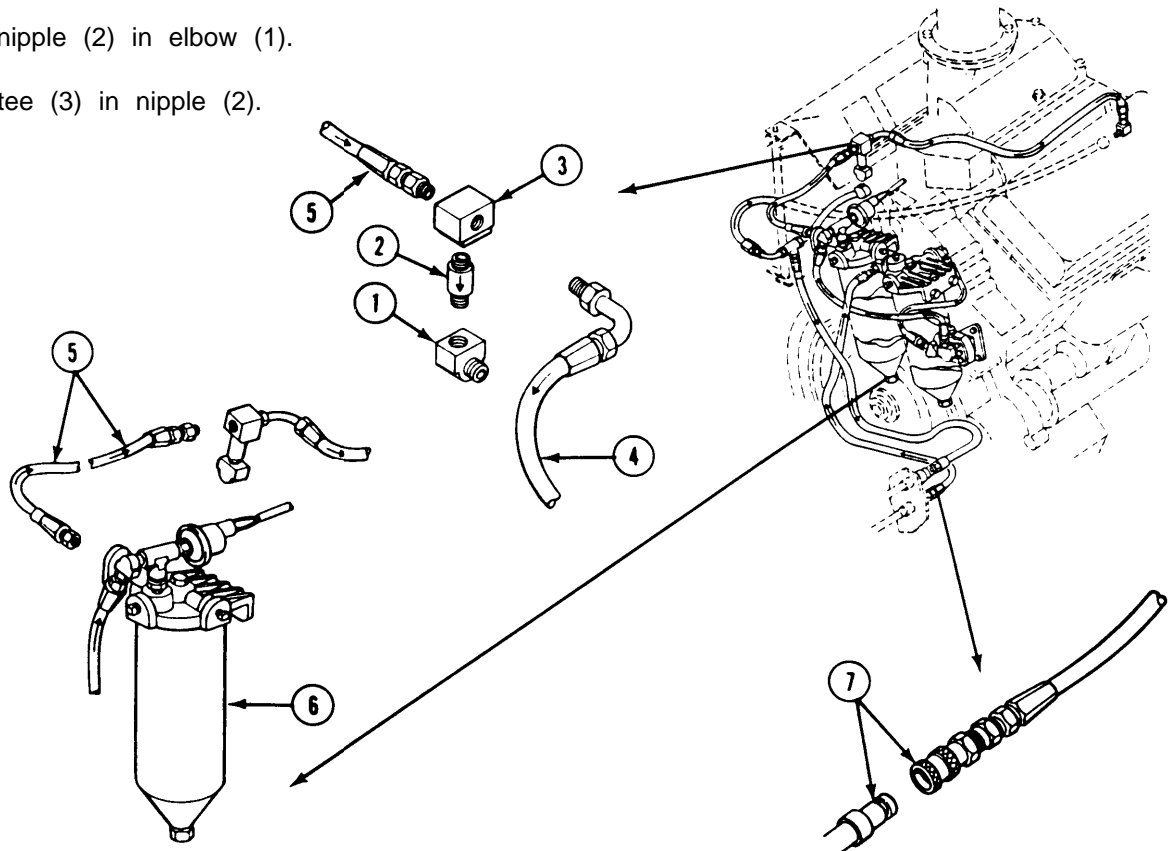
2. Disconnect fuel supply hose (2) from secondary fuel filter (3).
3. Disconnect fuel supply hoses (2 and 4) from tee (5).
4. Remove tee (5) from nipple (6).
5. Remove nipple (6) from elbow (7).
6. Remove elbow (7) from engine left cylinder head.

1. Separate quick-disconnect coupling (1).



## INSTALL

7. Apply a thin, even coat of sealing compound to cleaned external threads of hose ends and fittings.
8. Install elbow (1) in engine left cylinder head.
9. Install nipple (2) in elbow (1).
10. Install tee (3) in nipple (2).
11. Connect fuel supply hoses (4 and 5) to tee (3).
12. Connect fuel supply hose (5) to secondary fuel filter (6).
13. Connect quick-disconnect coupling (7).




---

## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10). Check for leaks.
3. Raise and lock ramp (see your -10).
4. Stop/shutdown engine (see your -10).
5. Install power plant rear access panel (page 24-27 or 24-29).

---

**END OF TASK**

---

## REPLACE LEFT TO RIGHT ENGINE CYLINDER HEAD FUEL HOSE

---

### DESCRIPTION

This task covers: Remove (page 6-110). Install (page 6-111).

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

---

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Carrier blocked (see your -10)  
Power plant rear access panel removed (page 24-27 or 24-29)  
Ramp lowered (see your -10)  
Trim vane lowered and power plant front access door open (see your -10)

### REMOVE

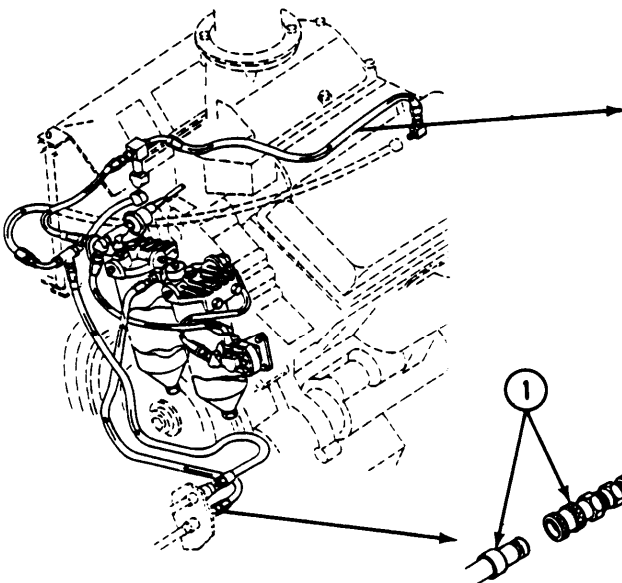


**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

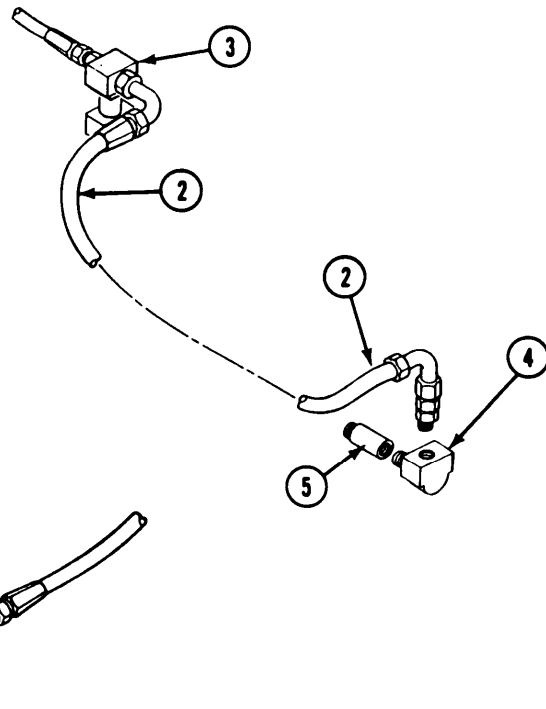
#### NOTE

Use wiping rag to wipe up any spilled fuel.

1. Separate quick disconnect coupling (1).

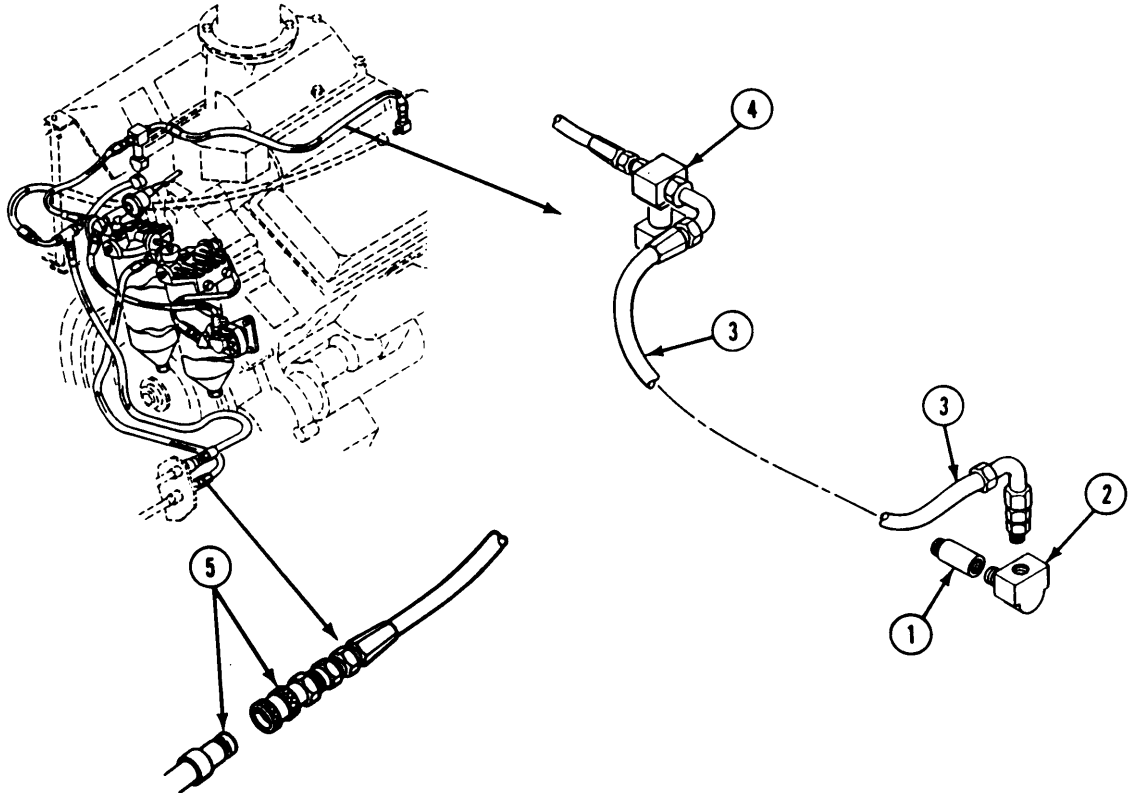


2. Disconnect fuel supply hose (2) from tee (3).
3. Disconnect fuel supply hose (2) from elbow (4).
4. Remove elbow (4) from adapter (5).
5. Remove adapter (5) from engine right cylinder head.



## INSTALL

6. Apply a thin, even coat of sealing compound to cleaned external threads of hose ends and fittings.
7. Install adapter (1) in engine right cylinder head.



8. Install elbow (2) in adapter (1).
9. connect fuel supply hose (3) to elbow (2).
10. Connect fuel supply hose (3) to tee (4).
11. connect quick disconnect coupling (5).

---

## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Start engine (me your -10). Check for leaks.
3. Install power plant rear access panel (page 24-27 or 24-29).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).
6. Close power plant front access door and raise trim vane (see your -10).

---

END OF TASK

---

## REPLACE ENGINE AIR INLET ELBOW TO AIR BOX HEATER HOSES

---

### DESCRIPTION

This task covers: Remove (page 6-112). Install (page 6-113).

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

see your -lo

**Materials/Parts:**

Sealing compound (Item 46, App C)

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered and power plant front access door open (see your -10)

---

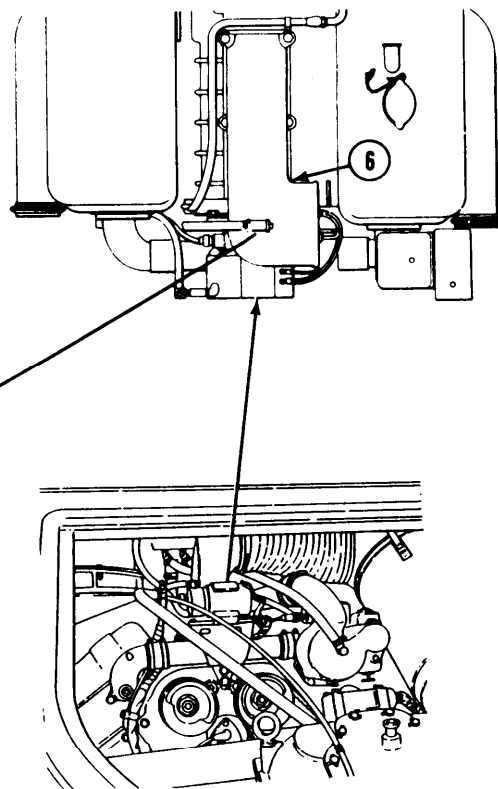
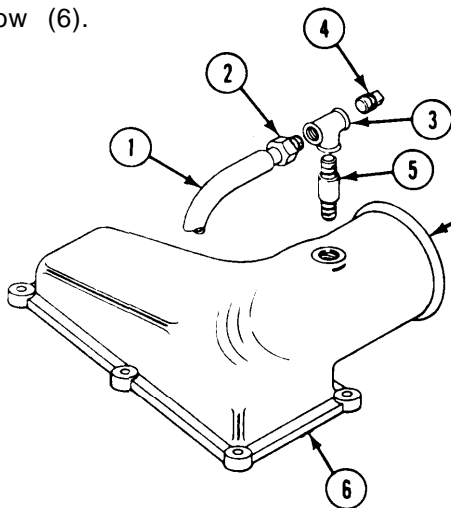
**Personnel Required:**

Unit Mechanic

---

### REMOVE

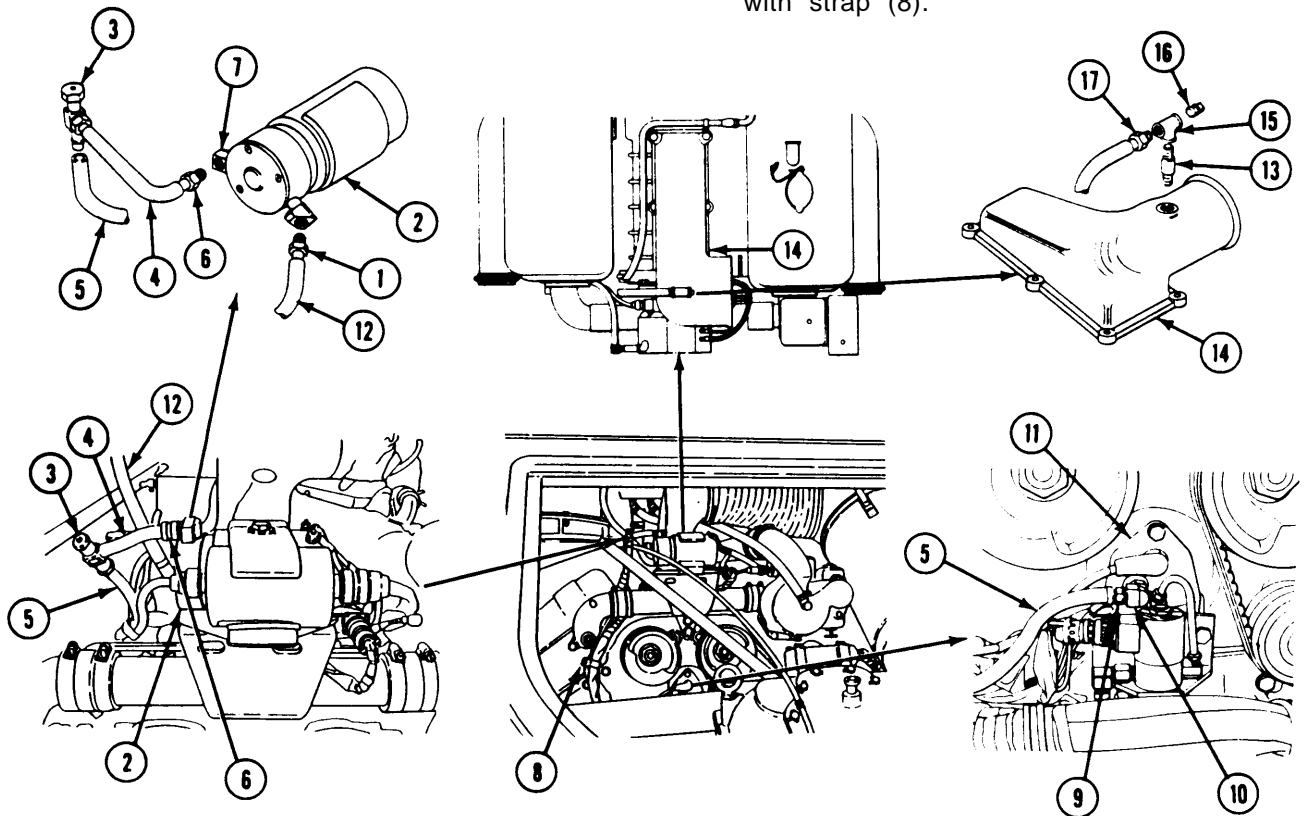
1. Remove hose (1) with adapter (2) from tee (3). If hose is damaged, cut hose from adapter.
2. Remove plug (4) from tee (3).
3. Remove tee (3) from nipple (5).
4. Remove nipple (5) from engine air inlet elbow (6).



5. Remove adapter (1) from air pump (2). If hose is damaged, cut hose from adapter.
6. Disconnect check valve (3) from air hoses (4 and 5).
7. Disconnect air hose (4) with adapter (6) from elbow (7).
8. Remove strap (8) that secures fuel, air, and electrical lines together.
9. Remove adapter (9) with hose (5) from elbow (10).
10. Remove elbow (10) from air box heater (11).
12. Install elbow (10) in air box heater (11).
13. Install adapter (9) with hose (5) in elbow (10).
14. Connect adapter (6) with hose (4) in air pump (2).
15. Connect hose (4) to elbow (7).
16. Connect check valve (3) to air hoses (4 and 5).
17. Install adapter (1) with hose (12) in air pump (2).
18. Install nipple (13) in engine air inlet elbow (14).
19. Install tee (15) on nipple (13).
20. Install plug (16) in tee (15).
21. Install adapter (16) with hose (17) in tee (15).
22. Secure fuel, air, and electrical lines together with strap (8).

## INSTALL

11. Apply a thin even coat of sealing compound to cleaned external threads of hoses and fittings.



GO TO NEXT PAGE

---

**FOLLOW-THROUGH STEPS**

1. Start engine (see your -10). Check for leaks.
2. Stop/shutdown engine (see your -10).
3. Close power plant front access door and raise trim vane (see your -10).

---

**END OF TASK**

**REPLACE AIR BOX HEATER TO FUEL RETURN TEE TUBE AND HOSE**

**DESCRIPTION**

This task covers: Remove (page 6-115). Install (page 6-116).

**INITIAL SETUP**

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts**

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)

**Personnel Required:**

Unit Mechanic

**References:**

see your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)

**Equipment Conditions: (cont):**

Carrier blocked (see your -10)  
Trim vane lowered and power plant front access door open (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panel removed (page 24-27 or 24-29)  
Driver's power plant access panel removed (page 24-25)  
Air cleaner housing and element removed (page 7-7)  
Air cleaner hose removed (page 7-3)  
Air control valve and guard removed (page 7-11)  
Differential oil filter bracket removed (page 21-6)

**REMOVE**

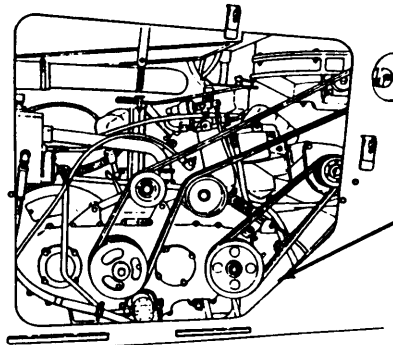


**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

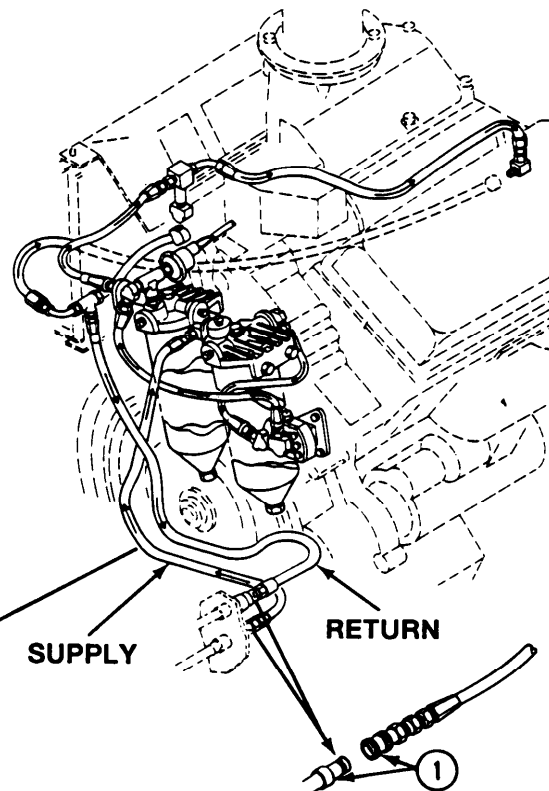
**NOTE**

Use wiping rag to wipe up any spilled fuel.

1. Disconnect supply and return quick disconnect couplings (1).



**REAR POWER PLANT ACCESS**



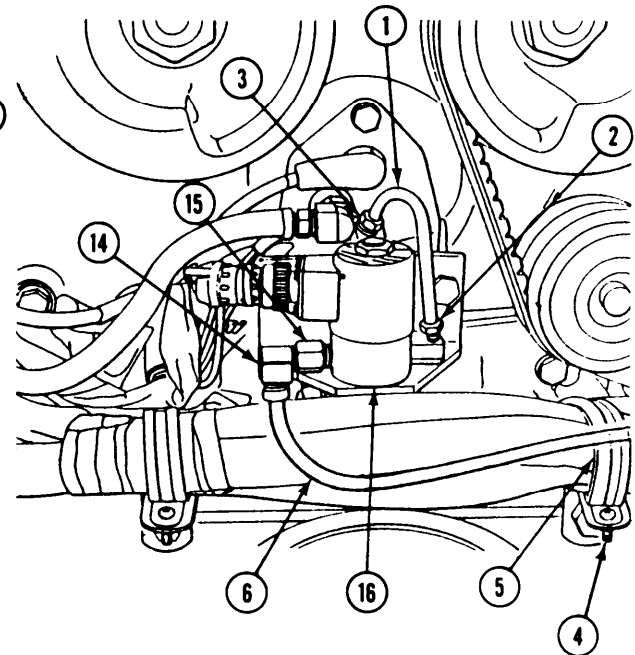
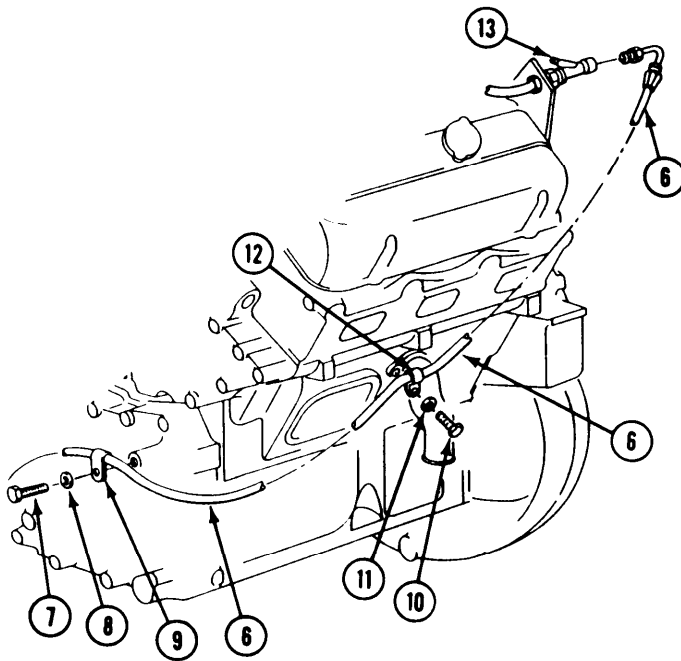
**GO TO NEXT PAGE**



2. Disconnect fuel tube (1) from elbows (2 and 3).
3. Remove screw (4) that secures wiring harness clamp (5) to bracket on engine block. Fuel hose (6) is behind wiring harness.
4. Remove screw (7), washer (8), clamp (9), and fuel hose (6) from engine block.
5. Remove screw (10), washer (11), clamp (12), and fuel hose (6).
6. Disconnect fuel hose (6) from fuel return tee (13).
7. Disconnect fuel hose (6) from elbow (14).
8. Remove elbow (14) from adapter (15).
9. Remove adapter (15) from solenoid (16).

## INSTALL

10. Apply a thin even coat of sealing compound to cleaned external threads of hose, tube, and fittings.
11. Install adapter (15) in solenoid (16).
12. Install elbow (14) in adapter (15).
13. Install elbow (2) in solenoid (16).
14. Connect fuel tube (1) to elbow (12).
15. Connect fuel hose (6) to elbow (14).
16. Feed fuel hose (6) behind wiring harness and through clamp (5). Secure clamp (5) to bracket on engine block with screw (4).

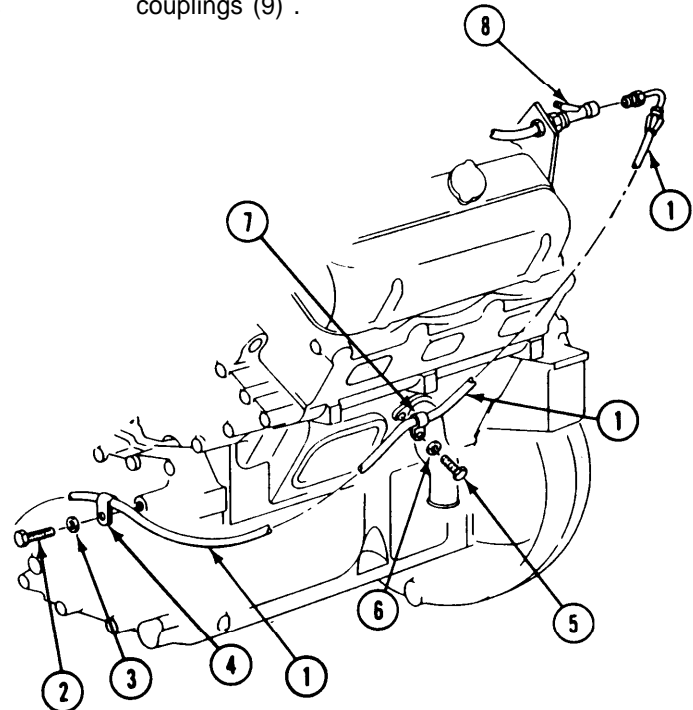
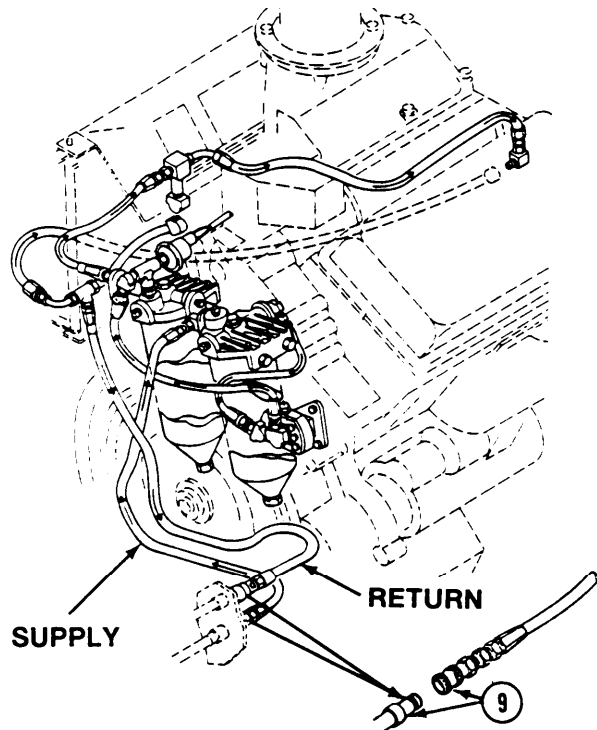


17. Install fuel hose (1) on engine block. Secure with screw (2), washer (3), and clamp (4).

18. Install fuel hose (1) on engine block. Secure with screw (5), washer (6), and clamp (7).

19. Connect fuel hose (1) to fuel return tee (8).

20. Connect supply and return quick disconnect couplings (9) .




---

### FOLLOW-THROUGH STEPS

1. Install differential oil filter bracket (page 21-6).
2. Install air control valve and guard (page 7-11).
3. Install air cleaner hose (page 7-3).
4. Install air cleaner housing and element (page 7-7).
5. Connect battery ground lead (page 13-2).

6. Start engine (see your -10). Check for leaks.
  7. Stop/shutdown engine (see your -10).
  8. Install driver's power plant access panel (page 24-25).
  9. Install power plant rear access panel (page 24-27 or 24-29).
  10. Close power plant front access door and raise trim vane (see your -10).
- 

**END OF TASK**

# REPLACE LEFT CYLINDER HEAD FUEL RETURN TUBE AND HOSE

## DESCRIPTION

This task covers: Remove (page 6-118). Install (page 6-119),

## INITIAL SETUP

### Tools:

- General Mechanics Tool Kit (Item 30, App D)
- Open End Box Wrench (Item 85, App D)

### Materials/Parts:

- Sealing compound (Item 46, App C)
- Wiping rag (Item 61, App C)
- Lockwasher (2)

### Personnel Required:

- Unit Mechanic

### References:

- See your -10

### Equipment Conditions:

- Engine stopped/shutdown (see your -10)
- Ramp lowered (see your -10)
- Battery ground lead disconnected (page 13-2)
- Power plant rear access panel removed (page 24-27 or 24-29).

## REMOVE



### WARNING

Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

### NOTE

Use wiping rag to wipe up any spilled fuel.

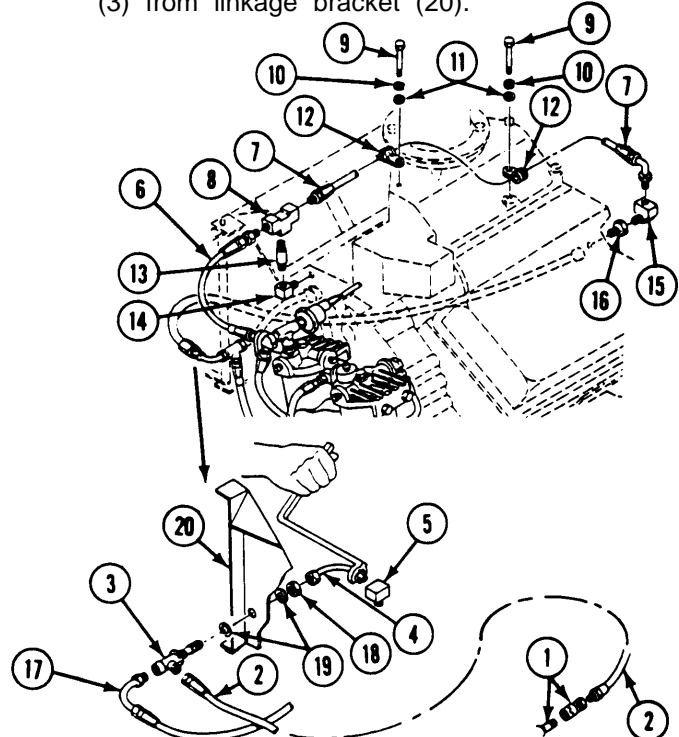
1. Disconnect quick disconnect couplings (1).
2. Remove quick disconnect coupling half (1) from fuel return hose (2).
3. Disconnect fuel return hose (2) from tee (3).
4. Disconnect tube (4) from tee (3) and elbow (5). Use open end box wrench.
5. Remove elbow (5) from left cylinder head.

### NOTE

If elbow (5) is damaged do steps 6, 7, and 8.

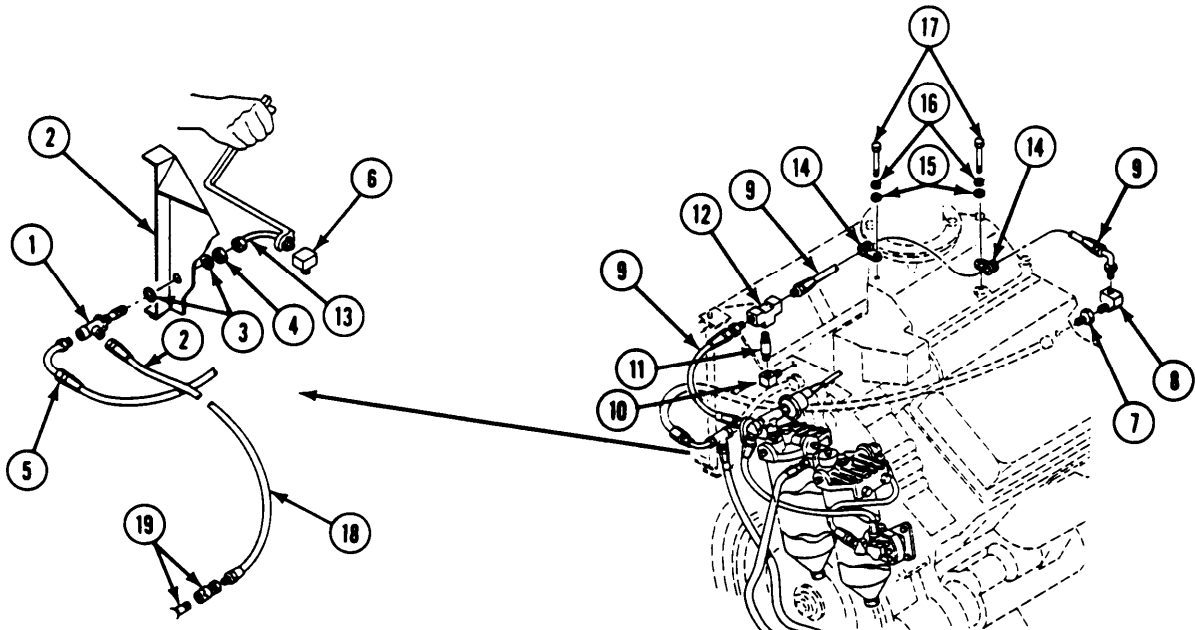
6. Remove hoses (6 and 7) from tee (8).
7. Remove two screws (9), lockwashers (10), washers (11), and clamps (12) from hose (7). Discard lockwashers.

8. Remove tee (8), nipple (13), and elbow (14) from engine.
9. Remove hose (7) from elbow (15). Remove elbow (15) and coupling (16) from engine.
10. Disconnect air box heater fuel hose (17) from tee (3).
11. Remove nut (18), two washers (19), and tee (3) from linkage bracket (20).



**INSTALL**

12. Apply a thin even coat of sealing compound to cleaned external threads of hose and fittings.
13. Install tee (1) in linkage bracket (2). Secure with two washers (3) and nut (4).
14. Connect air box heater fuel hose (5) to tee (1).
15. Install elbow (6) in left cylinder head.
16. Install coupling (7) and elbow (8) in engine. Connect hose (9) to elbow (8).
17. Install elbow (10), nipple (11), and tee (12) on engine.
18. Connect hoses (9) to tee (12).
19. Secure tube (9) with two clamps (14), washers (15), new lockwashers (16), and screws (17) to engine.
20. Connect tube (13) to tee (1) and elbow (6). Use open end wrench to tighten.
21. Connect fuel return hose (18) to tee (1).
22. Install quick disconnect coupling (19) in fuel return hose (18).
23. Connect quick disconnect couplings (19).



**FOLLOW-THROUGH STEPS**

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10). Check for leaks.
3. Raise and lock ramp (see your -10).
4. Stop/shutdown engine (see your -10).
5. Install power plant rear access panel (page 24-27 or 24-29).

**END OF TASK**

**Section VIII. FUEL SYSTEM COMPONENTS**

**TASK INDEX**

<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
Replace Engine Fuel Pump . . . . .	6-121	Replace Air Box Heater Ignition Coil . . . . .	6-132
Replace Primary Fuel Filter Assembly . . . . .	6-123	Replace Air Box Heater Air Pump . . . . .	6-133
Replace Secondary Fuel Filter Assembly . . . . .	6-125	Replace Air Pump Vanes . . . . .	6-135
Replace Fuel Filter Elements . . . . .	6-128	Replace Air Box Heater Solenoid Valve . . . . .	6-136
Replace Fuel Filter Mounting Bracket . . . . .	6-130	Replace Air Box Heater Wiring Harness . . . . .	6-140

## REPLACE ENGINE FUEL PUMP

### DESCRIPTION

This task covers: Remove (page 6-121). Install (page 6-122).

### INITIAL SETUP

**Tool:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

Sealing compound (Item 46, App C)  
wiping rag (Item 61, App C)  
Gasket

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Ramp lowered (see your -10)  
Battery ground lead disconnected (page 13-2)  
Power plant rear access panels and support removed (page 24-27 or 24-29)

**Personnel Required:**

Unit Mechanic

### REMOVE



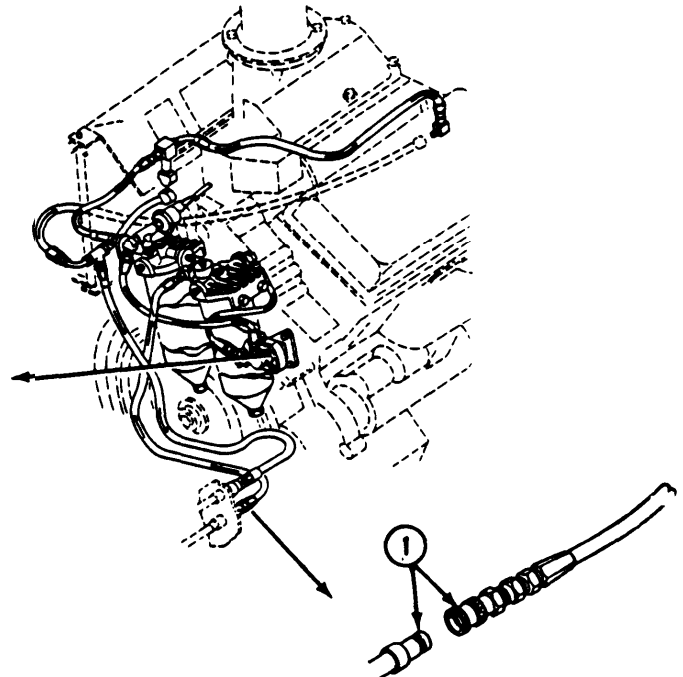
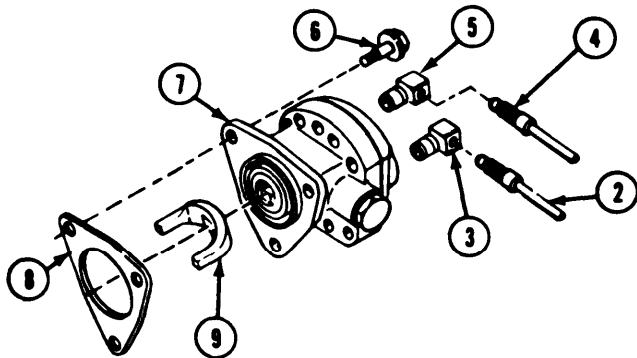
**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**

Use wiping rag to wipe up any spilled fuel.

1. Disconnect supply hose at quick disconnect coupling (1).

2. Disconnect primary fuel filter supply hose (2) from elbow (3).
3. Disconnect secondary fuel filter supply hose (4) from elbow (5).
4. Remove three screws (6), fuel pump (7), gasket (8), and fork (9) from engine block. Discard gasket.
5. Remove two elbows (3 and 5) from pump (7).

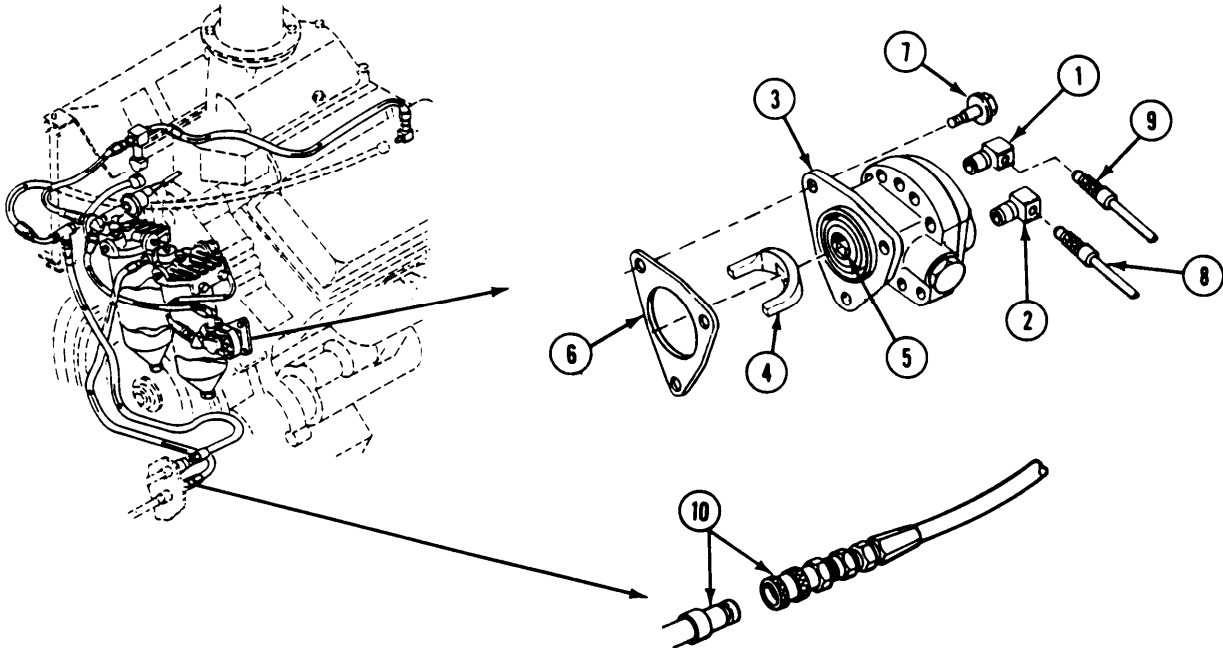


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## INSTALL

6. Apply sealing compound to cleaned external threads of hoses and fittings.
7. Install two elbows (1 and 2) in fuel pump (3).
8. Place fork (4) on pump drive shaft (5). Place new gasket (6) and pump (3) on engine.

9. Secure pump (3) to engine with three screws (7) .
10. Connect primary fuel filter supply hose (8) to elbow (2).
11. Connect secondary fuel filter supply hose (9) to elbow (1).
12. Connect supply hose at quick disconnect coupling (10) .



---

## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
  2. Start Engine (see your -10). Check for leaks.
  3. Raise and lock ramp (see your -10).
  4. Stop/shutdown engine (see your -10).
  5. Install power plant rear access panels and support (page 24-27 or 24-29).
- 

**END OF TASK**

## REPLACE PRIMARY FUEL FILTER ASSEMBLY

### DESCRIPTION

This task covers: Remove (page 6-123). Install (page 6-124).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
 Wiping rag (Item 61, App C)  
 Suitable container  
 1 1/4 inch hose

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Power plant rear access panel removed  
 (page 24-27 or 24-29)

### REMOVE

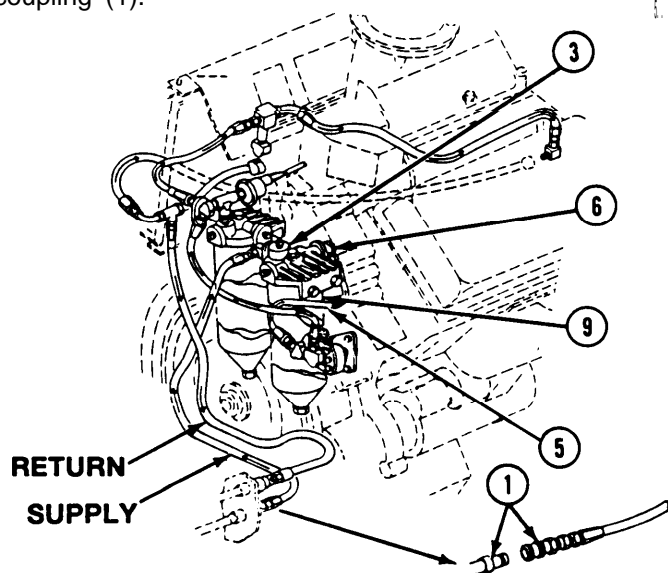


**WARNING**  
 Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

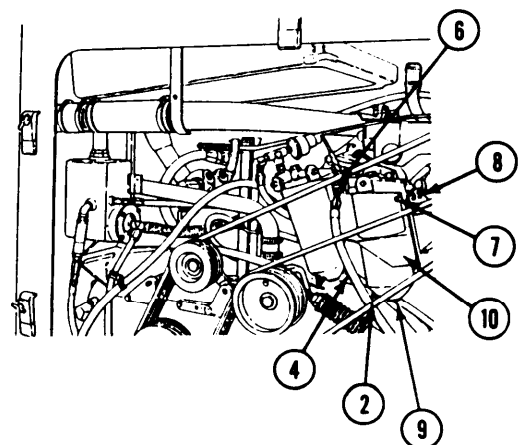
#### NOTE

Use wiping rag to wipe up any spilled fuel.

1. Disconnect supply hose at quick disconnect coupling (1).



2. Place a two foot length of 1 1/4 inch hose or other suitable bulk hose past the drive belts and idlers. Then slip one end of the hose over the drain cock. Run the other end of the hose into a suitable container resting on the crew compartment floor in order to catch the drained fuel. Open drain valve (2) and remove bleed plug (3) to drain filter.
3. Disconnect two fuel supply hoses (4 and 5) from two elbows (6).
4. Remove two nuts (7), screws (8), and filter assembly (9) from bracket (10).
5. Remove two elbows (6) from filter assembly (9).

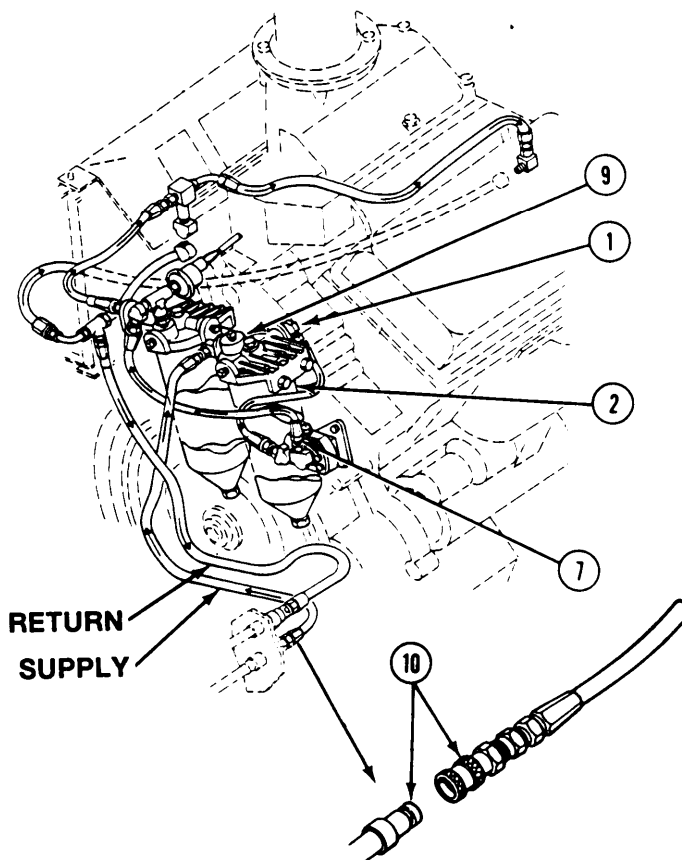
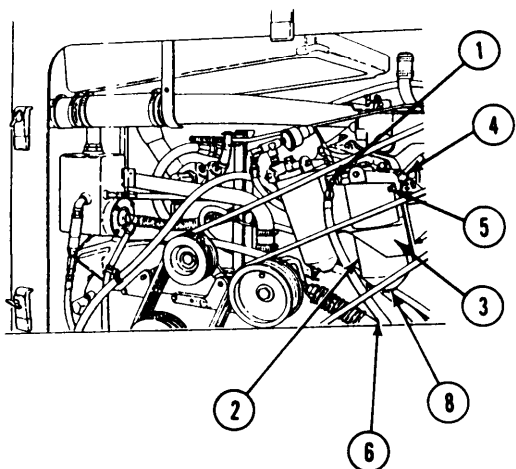


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## INSTALL

6. Install sealing compound to cleaned external threads of fittings.
7. Install two elbows (1) in filter assembly (2).
8. Secure filter assembly (2) to bracket (3) with two screws (4) and nuts (5).
9. Connect two fuel supply hoses (6 and 7) to two elbows (1).
10. Close drain valve (8) and fill filter assembly (2) with fuel.
11. Install bleed plug (9) in filter assembly (2).
12. Connect supply hose at quick disconnect coupling (10).



## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10).
3. Check for leaks. Install power plant rear access panel (page 24-27 or 24-29).
4. Raise and lock ramp (see your -10).
5. Stop/shutdown engine (see your -10).

END OF TASK

## REPLACE SECONDARY FUEL FILTER ASSEMBLY

### DESCRIPTION

This task covers: Remove (page 6-125). Install (page 6-126).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
 Wiping rag (Item 61, App C)  
 Suitable container  
 1 1/4 inch hose

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Power plant rear access panel removed (page 24-27 or 24-29)

### REMOVE



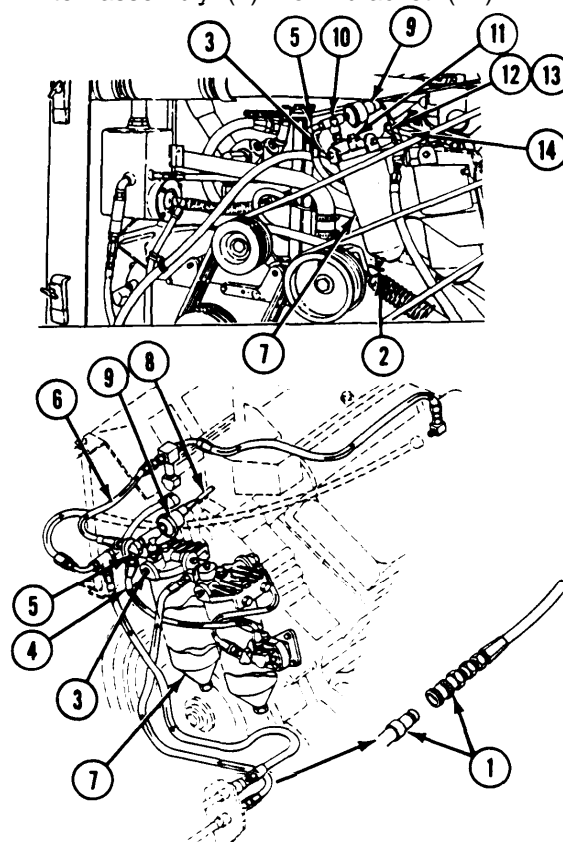
**WARNING**  
 Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

#### NOTE

Use wiping rag to wipe up any spilled fuel.

1. Disconnect quick disconnect coupling (1).
2. Place a two foot length of 1 1/4 inch hose or other suitable bulk hose past the drive belts and idlers. Then slip one end of the hose over the drain cock. Run the other end of the hose into a suitable container resting on the crew compartment floor in order to catch the drained fuel. Open drain valve (2) and remove bleed plug (3) to drain filter.
3. Disconnect fuel supply hose (4) from elbow (5).
4. Disconnect fuel supply hose (6) from secondary filter assembly (7).
5. Disconnect circuits 1A and 1B plug (8) from generator field switch (9).
6. Remove field switch (9) from tee (10).

7. Remove elbow (5) from tee (10).
8. Remove tee (10) from adapter (11).
9. Remove adapter (11) from filter assembly (7).
10. Remove two screws (12), nuts (13), and filter assembly (7) from bracket (14).

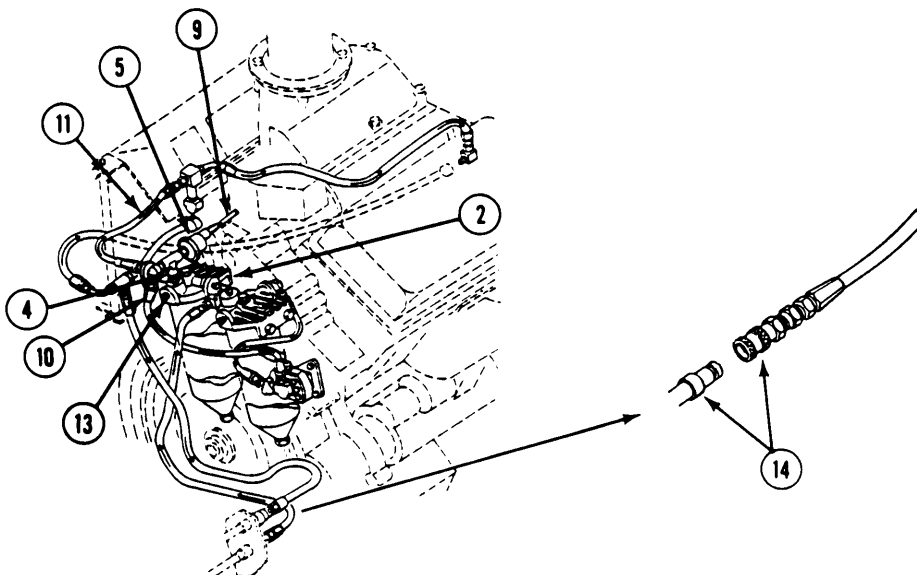
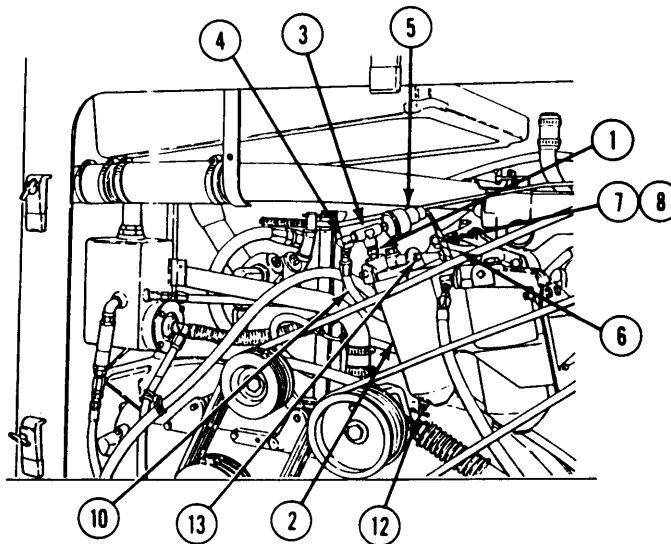


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**INSTALL**

11. Apply sealing compound to cleaned external threads of fittings.
12. Install adapter (1) in secondary filter assembly (2).
13. Install tee (3) in adapter (1).
14. Install elbow (4) and generator field switch (5) in tee (3).
15. Secure filter assembly (2) to bracket (6) With two screws (7) and nuts (8).
16. Connect circuits 1A and 1B plug (9) to field switch (5) .
17. Connect fuel supply hose (10) to elbow (4).
18. Connect fuel supply hose (11) to filter assembly (2).

19. Close drain valve (12) and fill filter assembly (2) with fuel.
20. Install bleed plug (13) in filter assembly (2).
21. Connect quick disconnect coupling (14).



---

**FOLLOW-THROUGH STEPS**

1. Connect battery ground lead (page 13-2).
2. Start engine (see your -10). Check for leaks.
3. Raise and lock ramp (see your -10).
4. Stop/shutdown engine (see your -10).
5. Install power plant rear access panel (page 24-27 or 24-29).

---

**END OF TASK**

## REPLACE FUEL FILTER ELEMENTS

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Part:**

Fuel filter element  
 Fuel filter element  
 Gasket (2)  
 Gasket (2)  
 Suitable container

**Personnel Required:**

Unit Mechanic

**References:**

see your -lo

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Power plant rear access panel removed (page 24-27 or 24-29)

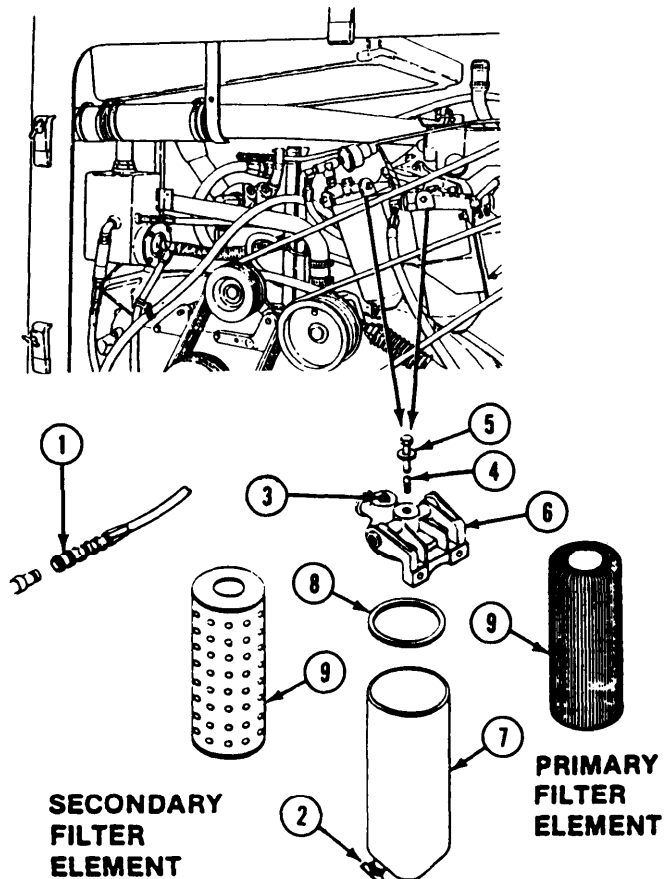
### REMOVE

**NOTE**

**Both primary and secondary filter elements are removed and installed in the same way.**

1. Disconnect supply hose at quick disconnect coupling (1).
2. Place suitable size container under fuel filter assembly to be drained.
3. Open drain valve (2) and loosen bleed plug (3). Drain fuel filter assembly.
4. Close drain valve (2).
5. Remove screw (4) and gasket (5) from filter head (6). Discard gasket.
6. Separate element container (7) and gasket (8) from fuel filter head (6). Discard gasket.
7. Remove primary and secondary element (9) from container (7).

11. Secure container (7) to fuel filter head (6) with screw (4) and new gasket (5).
12. Tighten bleed plug (3) in fuel filter head (6).
13. Connect supply hose at quick disconnect coupling (1).



### INSTALL

8. Install new fuel filter element (9) in container (7).
9. Fill container (7) with fuel.
10. Install new gasket (8) in fuel filter head (6).

---

**FOLLOW-THROUGH STEPS**

1. connect battery ground lead (page 13-2).
2. Start engine (see your -10).
3. Check for leaks. Install power plant rear access panel (page 24-27 or 24-29).
4. Raise and lock ramp (see your -10).
5. Stop engine (see your -10).

---

**END OF TASK**

---

## REPLACE FUEL FILTER MOUNTING BRACKET

---

### INITIAL SETUP

#### Tools

General Mechanics Tool Kit (Item 30, App D)  
Torque Wrench (Item 96, App D)

#### Materials/Parts

Antiseize compound (Item 4, App C)  
Lockwasher (4)

#### Personnel Required

Unit Mechanic

#### References

see your -10

#### Equipment Condition

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (pages 13-2)  
Power plant rear access panel removed (page 24-27 or 24-29)  
Primary fuel filter assembly removed (page 6-123)  
Secondary fuel filter assembly removed (page 6-125)  
Generator mounting bracket removed (100 amp only) (page 9-31) or (200 amp only) (page 9-34)

### REMOVE

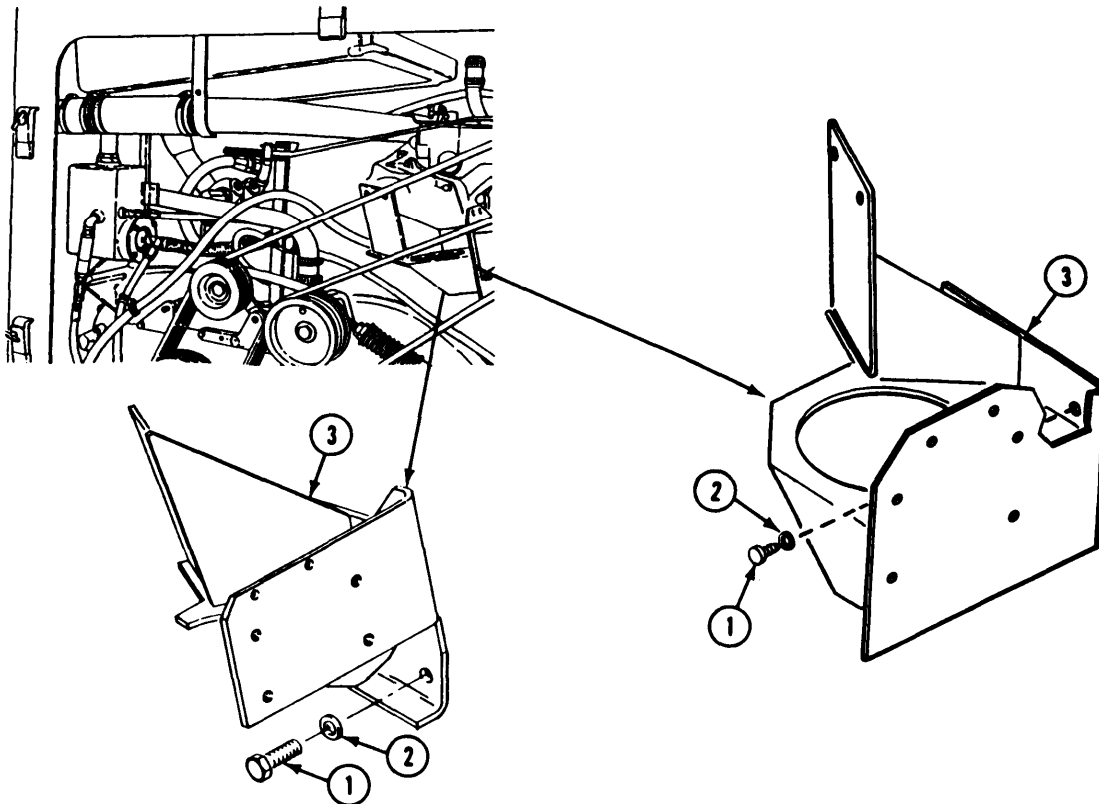
1. Remove four screws (1), lockwashers (2), and fuel filter mounting bracket (3) from engine. Discard lockwashers.

#### NOTE

The 200 amp fuel filter mounting bracket is different from the 100 amp fuel filter mounting bracket

### INSTALL

2. Apply antiseize compound to threads of four screws (1).
3. Secure bracket (3) to engine with four screws (1) and new lockwashers (2).
4. Tighten four Screws (1) to 50-55 lb-ft (6&75 N·m) torque. Use torque wrench.



---

**FOLLOW-THROUGH STEPS**

1. Install generator mounting bracket (100 amp only) (page 9-31) or 200 amp only) (page 9-34).
2. Install secondary fuel filter assembly (page 6-125).
3. Install primary fuel filter assembly (page 6-123).
4. Connect battery ground lead (page 13-2).
5. Start engine. Check for leaks.
6. Raise and lock ramp (see your -10).
7. Stop/shutdown engine (see your -10).
8. Install power plant rear access panel (page 24-27 or 24-29).

---

**END OF TASK**



---

## REPLACE AIR BOX HEATER IGNITION COIL

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

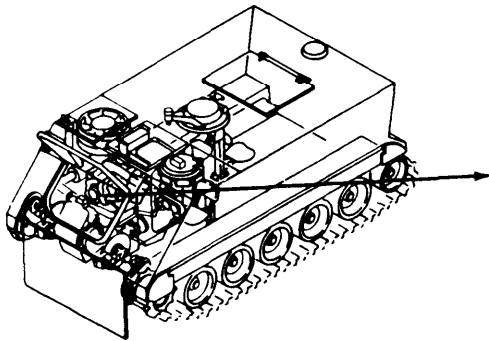
---

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Battery ground lead disconnected (page 13-2)  
Trim vane lowered and power plant front access door open (see your -10)

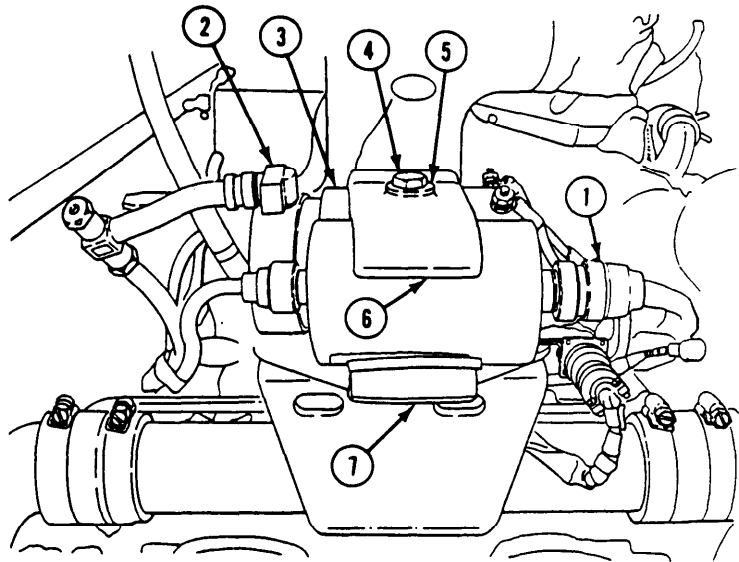
### REMOVE

1. Disconnect circuit 406 and 406A plug (1) and high tension wire (2) from ignition coil (3).
2. Remove screw (4), washer (5), retainer (6), coil (3), and pad from mount (7).



### INSTALL

3. Install ignition coil (3) and pad on mount (7). Secure with retainer (6), washer (5), and screw (4).
4. Connect circuit 406 and 406A plug (1) and high tension wire (2) to coil (3).



---

### FOLLOW-THROUGH STEPS

1. Close power plant front access door and raise trim vane (see your -10).
  2. Connect battery ground lead page 13-2).
- 

**END OF TASK**

## REPLACE AIR BOX HEATER AIR PUMP

### DESCRIPTION

This task covers: Remove (page 6-133). Install (page 6-134).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

sealing compound (Item 46, App C)

**Personnel Required:**

Unit Mechanic

**References:**

see your -10

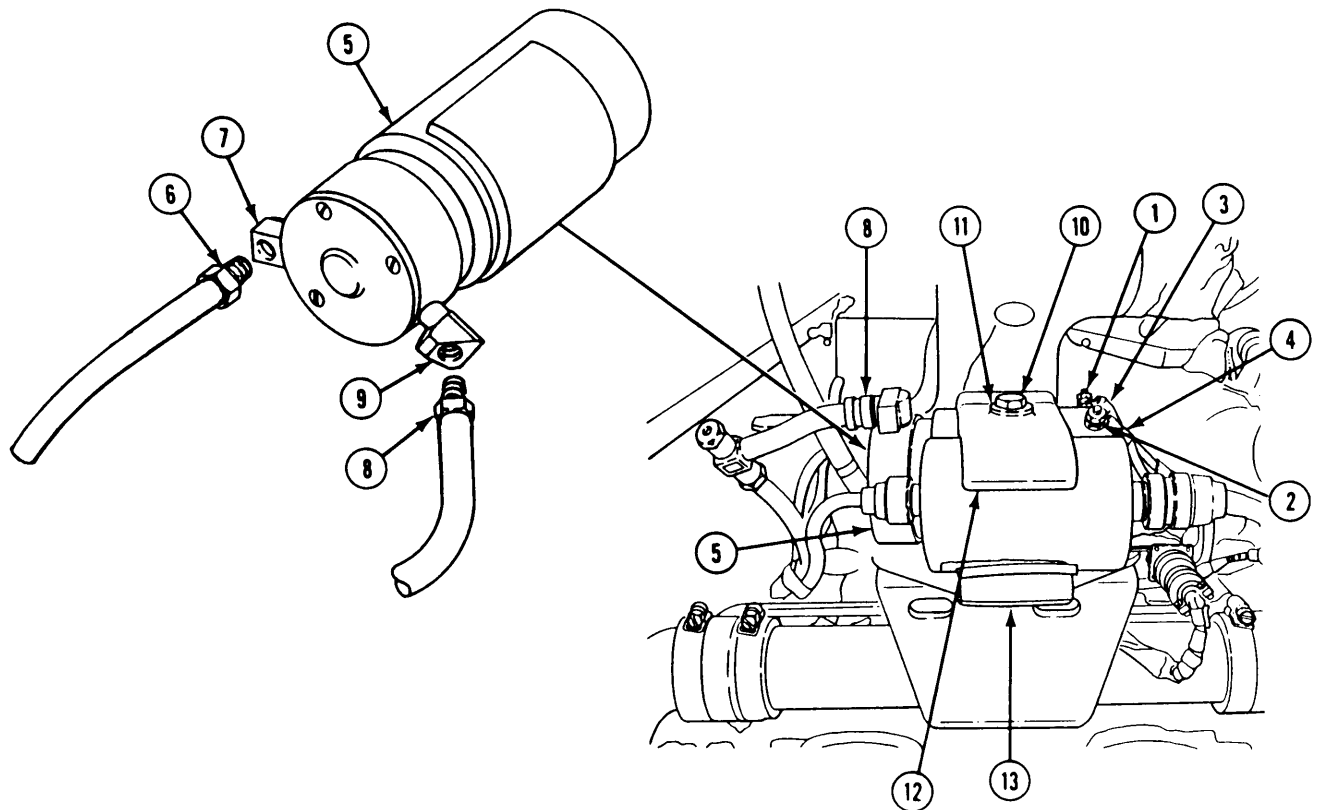
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Ramp lowered (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Trim vane lowered and power plant front access door open (see your -10)

### REMOVE

1. Remove two nuts (1), washers (2), and leads (3 and 4) from air box heater air pump (5).
2. Remove adapter (6) from elbow (7).
3. Remove adapter (8) from elbow (9).

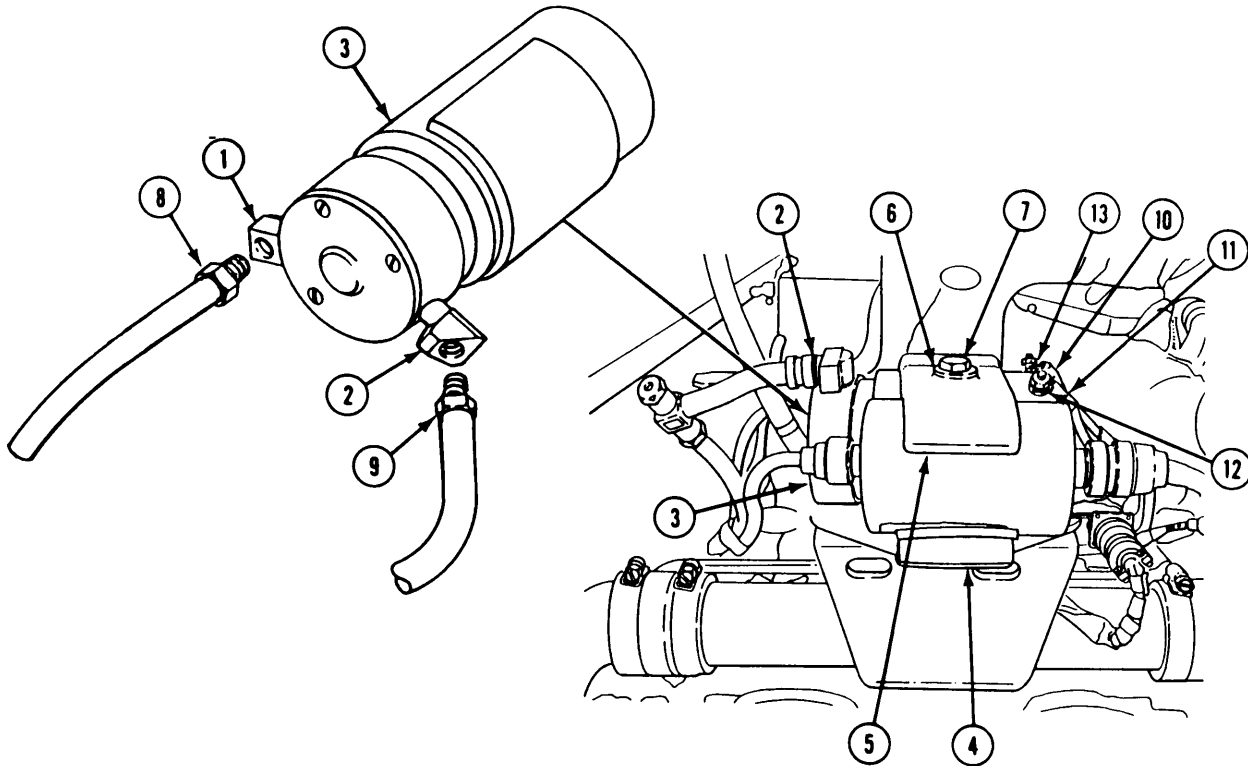
4. Remove screw (10), washer (11) retainer (12), air pump (5), and pad from mount (13).
5. Remove elbow (7) from air pump (5).
6. Remove elbow (9) from air pump (5).



GO TO NEXT PAGE

## INSTALL

7. Apply sealing compound to cleaned external threads of fittings.
8. Install elbows (1 and 2) in air pump (3).
9. Install air pump (3) and pad on mount (4). Secure with retainer (5), washer (6), and screw (7).
10. Install adapters (8 and 9) on elbows (1 and 2).
11. Secure leads (10 and 11) to air pump (3) with two washers (12) and nuts (13).



---

## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Close power plant front access door and raise trim vane (see your -10).

---

END OF TASK

---

## REPLACE AIR PUMP VANES

---

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**References:**

See your -10

**Materials/Parts:**

Vane kit

**Equipment Conditions:**

Air box heater pump removed (page 6-133)

**Personnel Required:**

Unit Mechanic

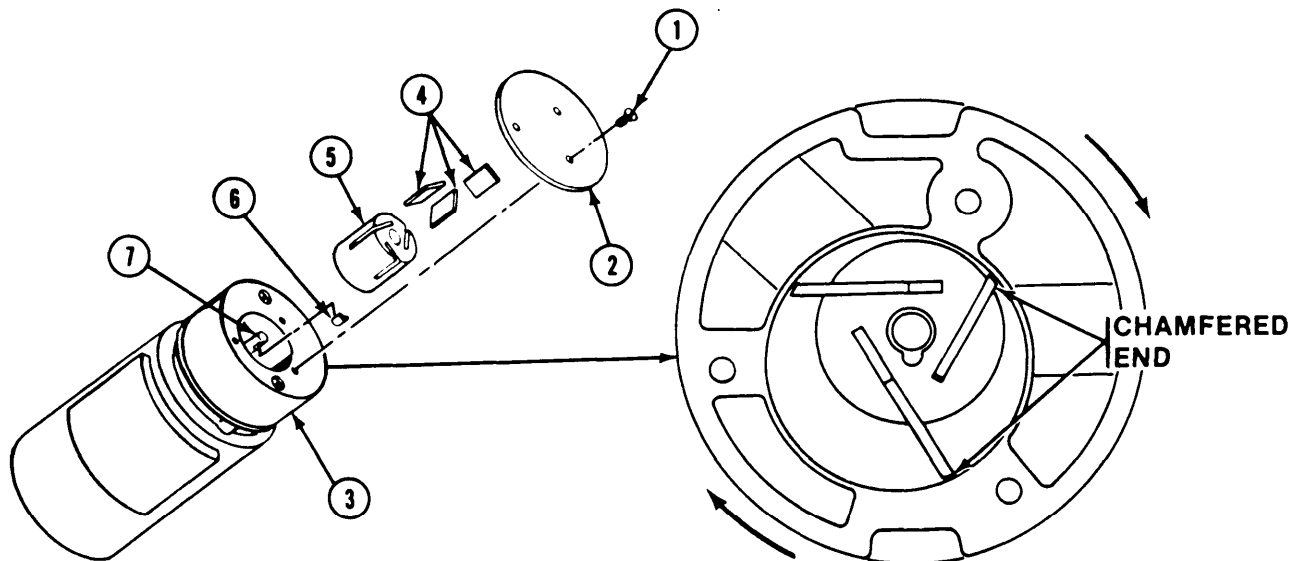
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### REMOVE

1. Remove three screws (1) and cover (2) from pump body (3).
2. Remove three vanes (4), hub (5) and key (6) from pump shaft (7). Discard vanes.

### INSTALL

4. Secure hub (5) to pump shaft (7) with key (6).
5. Install three new vanes (4) in hub (5). Be sure chamfered ends of vanes are against pump body.
6. Secure cover (2) to pump body (3) with screws (1).




---

### FOLLOW-THROUGH STEPS

1. Install air box heater pump on engine (page 6-133).
- 

END OF TASK

---

## REPLACE AIR BOX HEATER SOLENOID VALVE

---

### DESCRIPTION

This task covers: Remove (page 6-136). Install (page 6-137).

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Wiping rag (Item 61, App C)  
Lockwasher (4)

#### Personnel Required:

Unit Mechanic

#### References:

See your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Carrier blocked (see your -10)  
Trim vane lowered and power plant front access door open (see your -10)

---

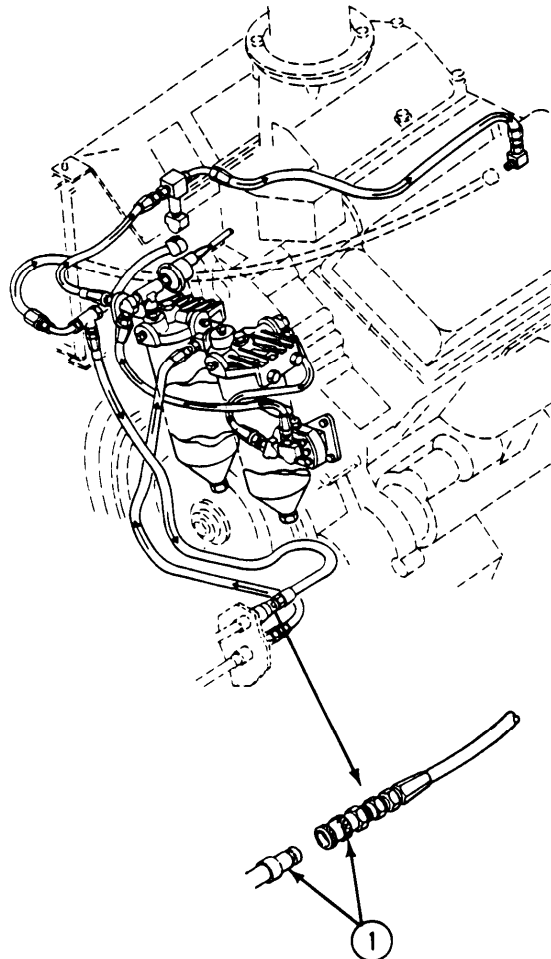
### REMOVE



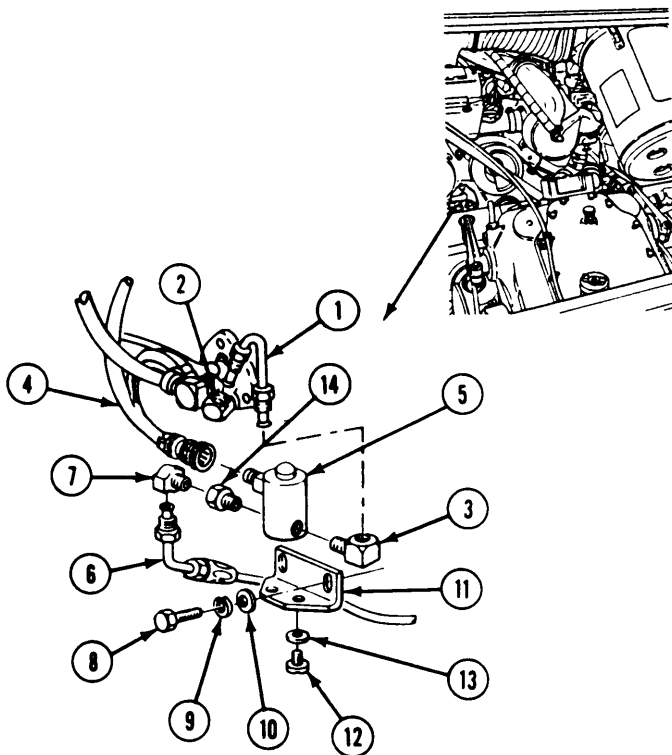
**WARNING**  
Fuel flowing over a metal surface causes static electricity. This will cause a spark unless the surface is grounded.

**NOTE**  
Use wiping rag to wipe up any spilled fuel.

1. Separate fuel return hose quick-disconnect coupling (1).

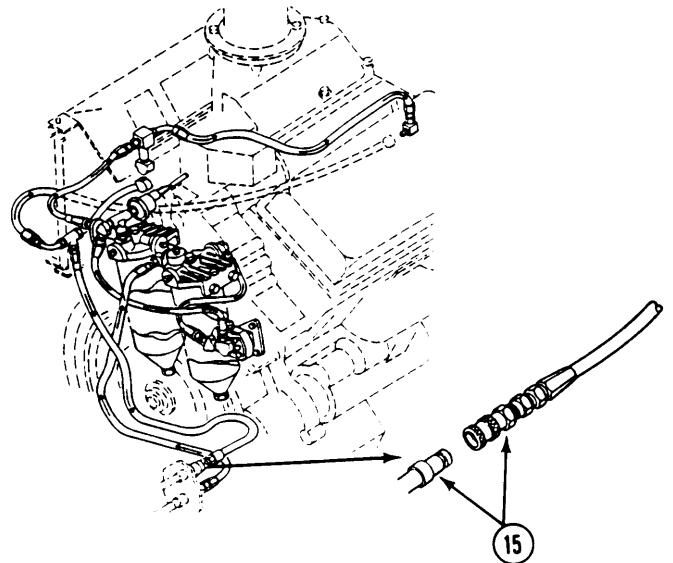


2. Disconnect fuel tube (1) from two elbows (2 and 3).
3. Disconnect electrical lead (4) from solenoid valve (5).
4. Disconnect fuel hose (6) from elbow (7).
5. Remove two screws (8), lockwashers (9), flat washers (10), bracket (11), and solenoid valve (5) from engine. Discard lockwashers.
6. Remove two screws (12), lockwashers (13), and solenoid valve (5) from bracket (11). Discard lockwashers.
7. Remove elbow (7) from adapter (14).
8. Remove adapter (14) from solenoid valve (5).
9. Remove elbow (3) from solenoid valve (5).



## INSTALL

10. Apply sealing compound to cleaned external threads of fittings.
11. Install elbow (3) in solenoid valve (5).
12. Install adapter (14) and elbow (7) in solenoid valve (5).
13. Secure solenoid valve (5) to bracket (11) with two new lockwashers (13) and screws (12).
14. Install bracket (11) and solenoid valve (5) on engine. Secure with two flat washers (10), new lockwashers (9), and screws (8).
15. Connect fuel hose (6) to elbow (7).
16. Connect electrical lead (4) to solenoid valve (5).
17. Connect fuel tube (1) to two elbows (2 and 3).
18. Connect fuel return hose quick-disconnect coupling (15).



## FOLLOW-THROUGH STEPS

1. Connect battery ground lead (page 13-2).
2. Close power plant front access door and raise trim vane (see your -10).

END OF TASK

---

## REPLACE AIR BOX HEATER

---

### DESCRIPTION

This task covers: Remove (page 6-138). Install (page 6-139).

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### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### References:

See your -10

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Gasket  
Preformed packing

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Battery ground lead disconnected (page 13-2)  
Carrier blocked (see your -10)  
Air box heater solenoid valve removed (page 6-136)  
Trim vane lowered and power plant front access door open (see your -10)

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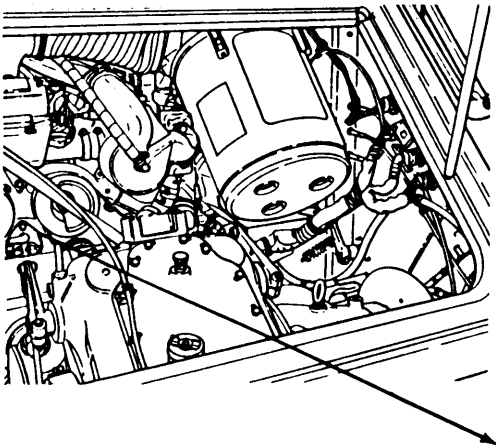
#### Personnel Required:

Unit Mechanic

### REMOVE

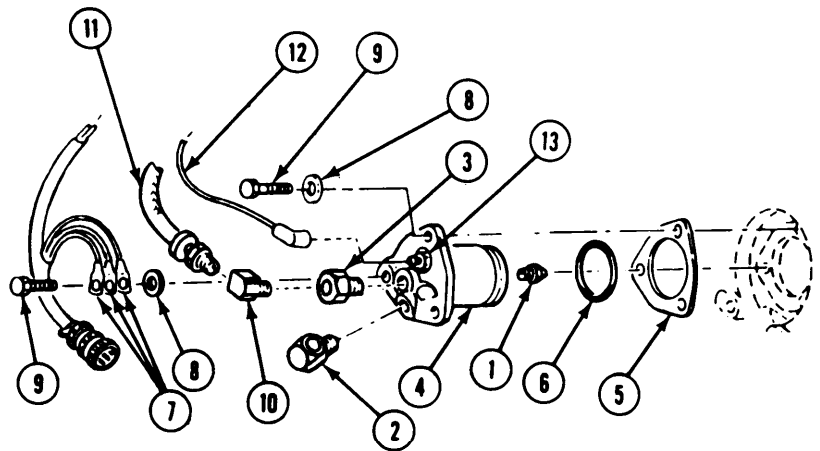
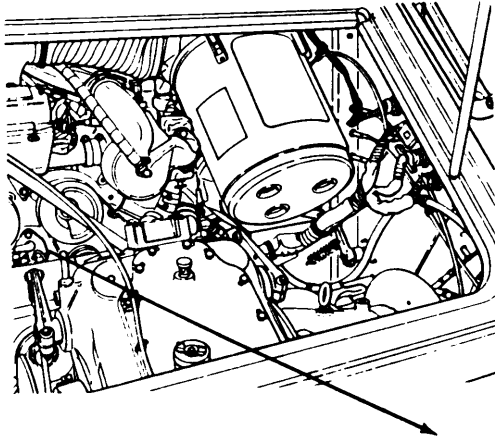
1. Disconnect lead (1) from igniter (2).
2. Disconnect air hose (3) from elbow (4).
3. Remove elbow (4) from adapter (5).

4. Remove three screws (6) and washers (7) that secure air box heater body (8) to engine. Three leads (9) will come off with one screw (6).
5. Remove heater body (8), packing (10), and gasket (11) from engine. Discard packing and gasket.
6. Remove elbow (12), spray nozzle (13), and adapter (5) from heater body (8).



## INSTALL

7. Apply sealing compound to cleaned external threads of fittings.
8. Install spray nozzle (1), elbow (2), and adapter (3) on air box heater body (4).
9. Place new gasket (5), new packing (6), and heater body (4) on engine.
10. Install heater body (4) on engine and attach three ground leads (7) to heater body. Secure with three washers (8) and screws (9).
11. Install elbow (10) in adapter (3).
12. Connect air hose (11) to elbow (10).
13. Connect lead (12) to igniter (13).




---

## FOLLOW-THROUGH STEPS

1. Install air box heater solenoid valve (page 6-136).
  2. Connect battery ground lead (page 13-2).
  3. Close power plant front access door and raise trim vane (see your -10).
- 

END OF TASK



## REPLACE AIR BOX HEATER WIRING HARNESS

### DESCRIPTION

This task covers: Remove (Page 6-140). Install (Page 6-141).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Sealing tape (Item 56, App C)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

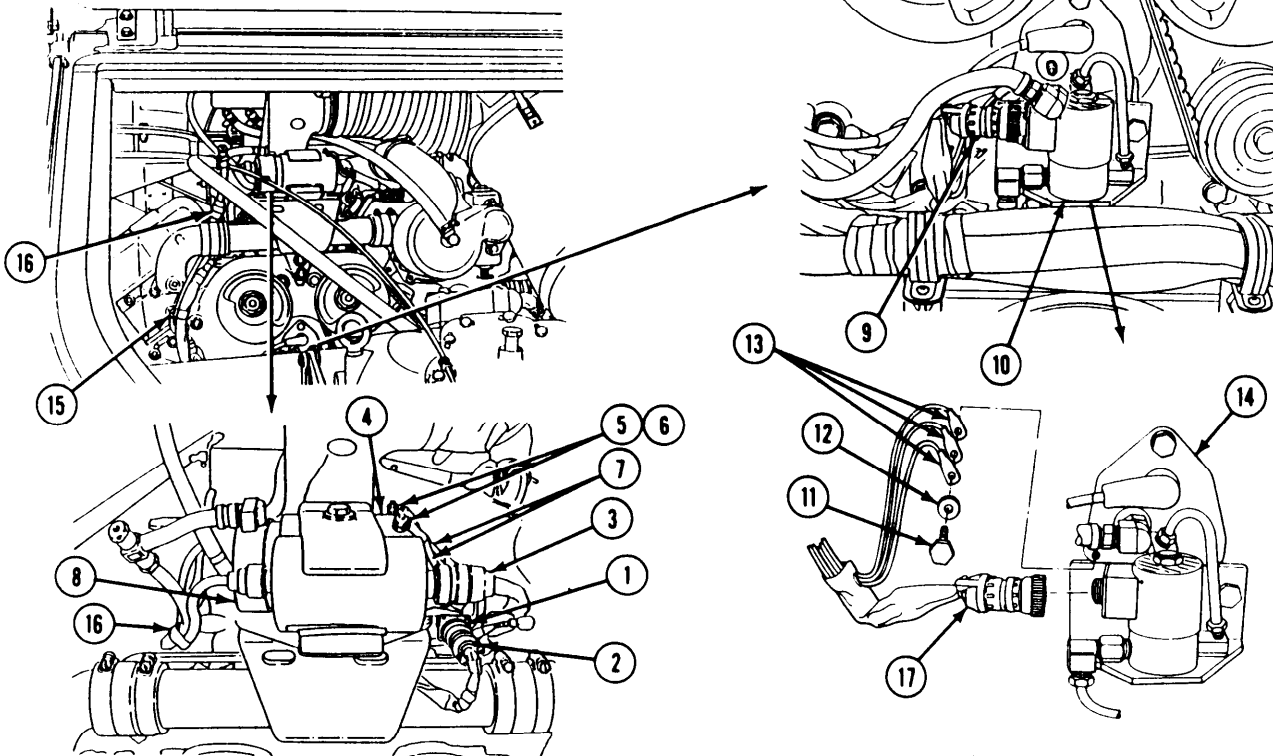
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
 Battery ground lead disconnected (page 13-2)  
 Carrier blocked (see your -10)  
 Trim vane lowered and power plant front access door open (see your -10)

### REMOVE

1. Disconnect air box heater wiring harness connector (1) from power plant wiring harness receptacle (2).
2. Disconnect wiring harness connector (3) from coil (4).
3. Remove two nuts (5), washers (6), and two wiring harness leads (7) from air pump (8).

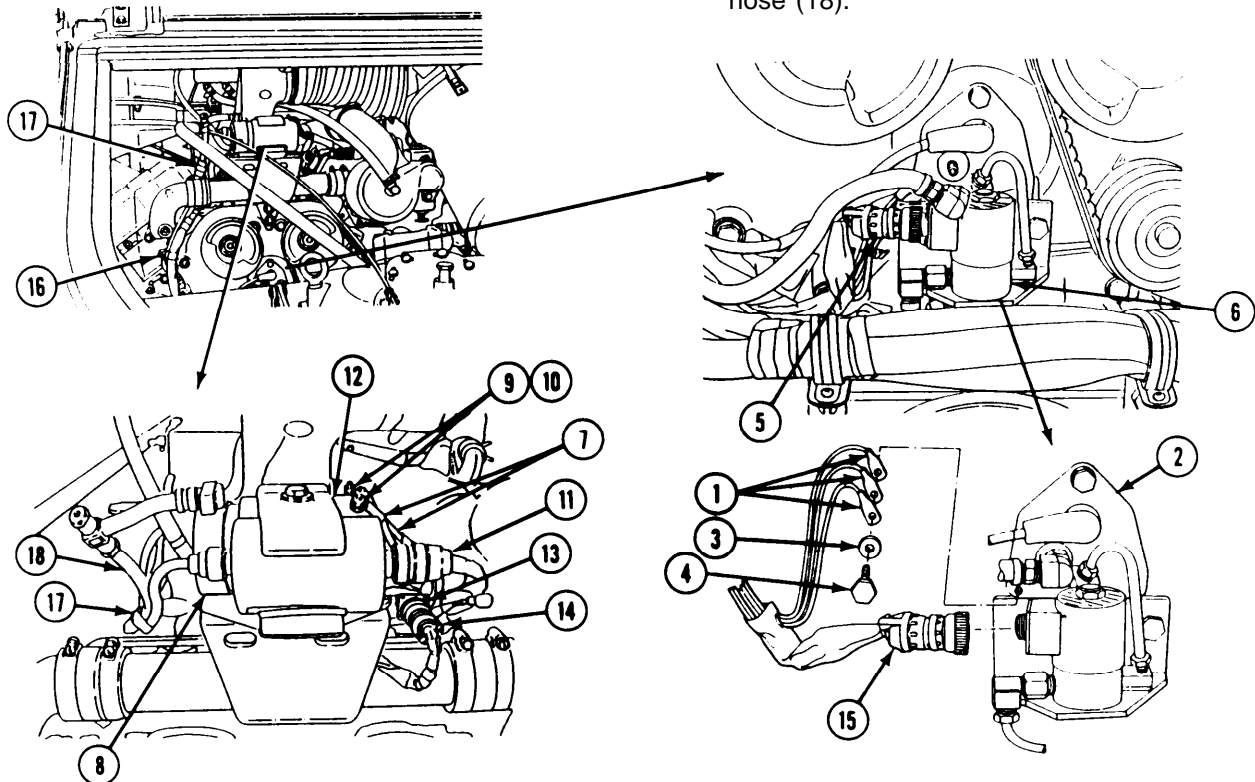
4. Disconnect wiring harness connector (9) from fuel control solenoid (10).
5. Remove screw (11), washer (12), and three ground leads (13) from air box heater (14).
6. Remove strap (15), sealing tape (16), air box heater wiring harness (17) from power plant compartment.



**INSTALL**

7. Secure three ground leads (1) to air box heater (2) with washer (3) and screw (4).
8. Connect wiring harness connector (5) to fuel control solenoid (6).
9. Secure two wiring harness leads (7) to air pump (8) with two washers (9) and nuts (10).

10. Connect wiring harness connector (11) to coil (12).
11. Connect air box heater wiring harness connector (13) to power plant wiring harness receptacle (14).
12. Secure air box heater wiring harness (15) to air box heater hose with strap (16).
13. Use sealing tape (17) to secure air box heater wiring harness (15) to air box heater hose (18).



**FOLLOW-THROUGH STEPS**

1. Close power plant front access door and raise trim vane (see your -10).
2. Connect battery ground lead (page 13-2).

END OF TASK

**CHAPTER 7**  
**AIR INDUCTION AND EXHAUST SYSTEM MAINTENANCE**

**Section I. AIR INDUCTION SYSTEM**

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**T A S K   I N D E X**

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Replace Air Cleaner Housing . . . . .	7-7		

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## SERVICE AIR CLEANER ELEMENT

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### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)  
Air Blow Gun (Item 33, App D)

**Material/Parts:**

General purpose detergent (Item 17, App C)  
Suitable container (5 Gal)

**Personnel Required:**

Unit Mechanic

**References:**

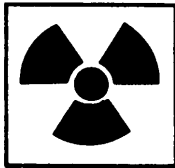
See your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Air cleaner element removed (see your -10)

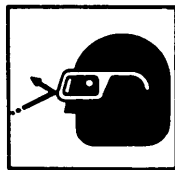
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### SERVICE



**WARNING**

After suspected NBC exposure of this earner, all air cleaner media shall be handled only by personnel wearing full NBC protective equipment.



**WARNING**

Air pressure in excess of 30 psi (207 kpa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

**NOTE**

Cleaning element may be cleaned by either or both of the following methods.

1. Using air blow gun, blow out element with 30 psi maximum compressed air from inside to outside of element (in direction opposite to normal air flow).

2. Wash element in solution of nonsudsing or low sudsing detergent and water or soap and water. Do not use gasoline or solvents for cleaning.

- a. Prepare solution of 1 cup of dry detergent to 5 gallons of water in a container large enough to completely submerge the element. The temperature of the solution should not exceed 190°F. Make solution stronger if element is extremely dirty.
- b. Immerse element completely in the washing solution. Agitate element gently for 2 minutes.
- c. Allow element to soak in solution for a minimum of 15 minutes. Agitate element gently for an additional 3 to 5 minutes.
- d. Remove element from solution and allow to drain.
- e. Rinse element with cold water from a hose with a maximum 30 psi water pressure from inside to outside of element. Continue rinsing until water runs clear and detergent or soap residue is removed from element.
- f. Allow element to air dry thoroughly.

---

### FOLLOW-THROUGH STEPS

1. Install air cleaner element (see your -10).

---

END OF TASK

## REPLACE AIR CLEANER HOSES

### DESCRIPTION

This task covers: Remove (page 7-3). Install (page 7-4).

### INITIAL SETUP

#### Tools

General Mechanics Tool Kit (Item 30, App D)

#### Personnel Required:

Unit Mechanic

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)

Carrier blocked (see your -10)

Trim vane lowered (see your -10)

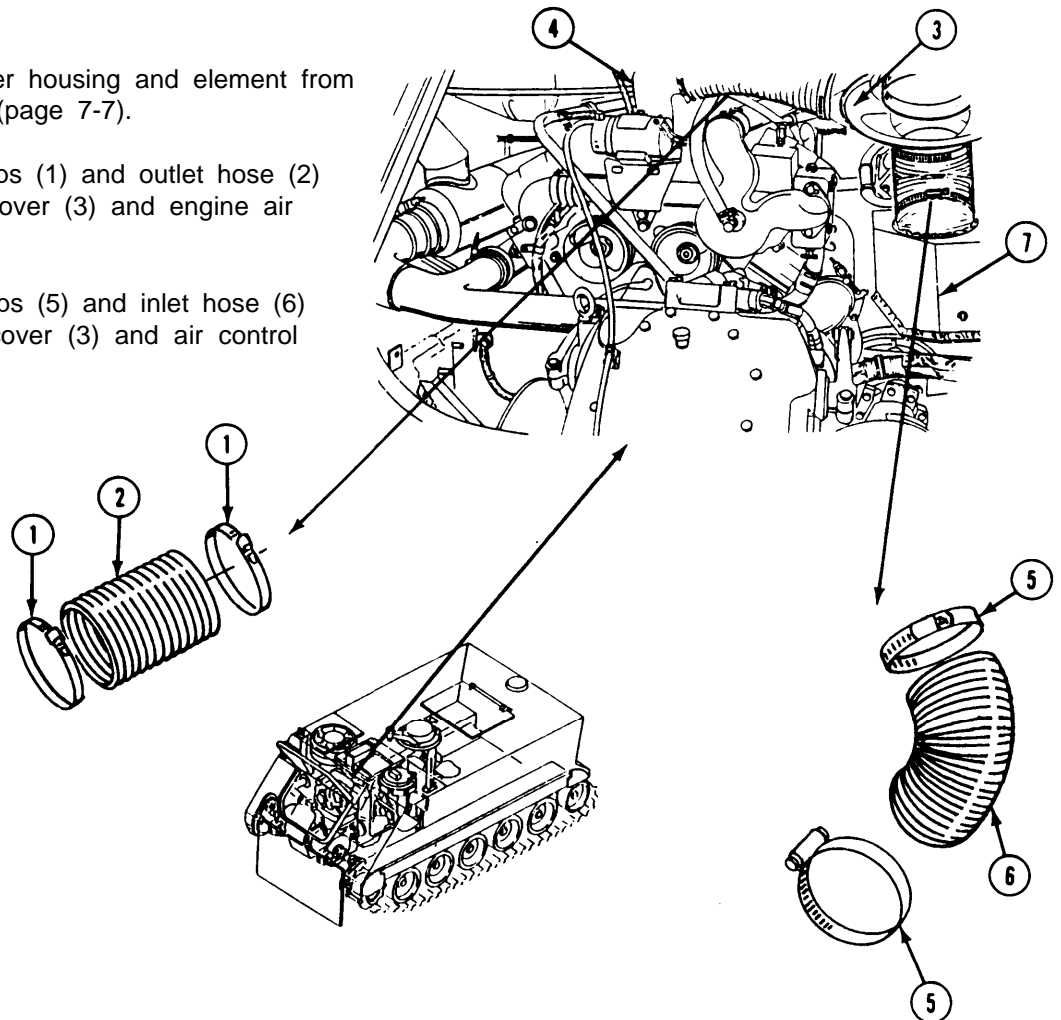
Power plant front access door open

(see your -10)

Driver's power plant access panel removed  
(page 24-25)

### REMOVE

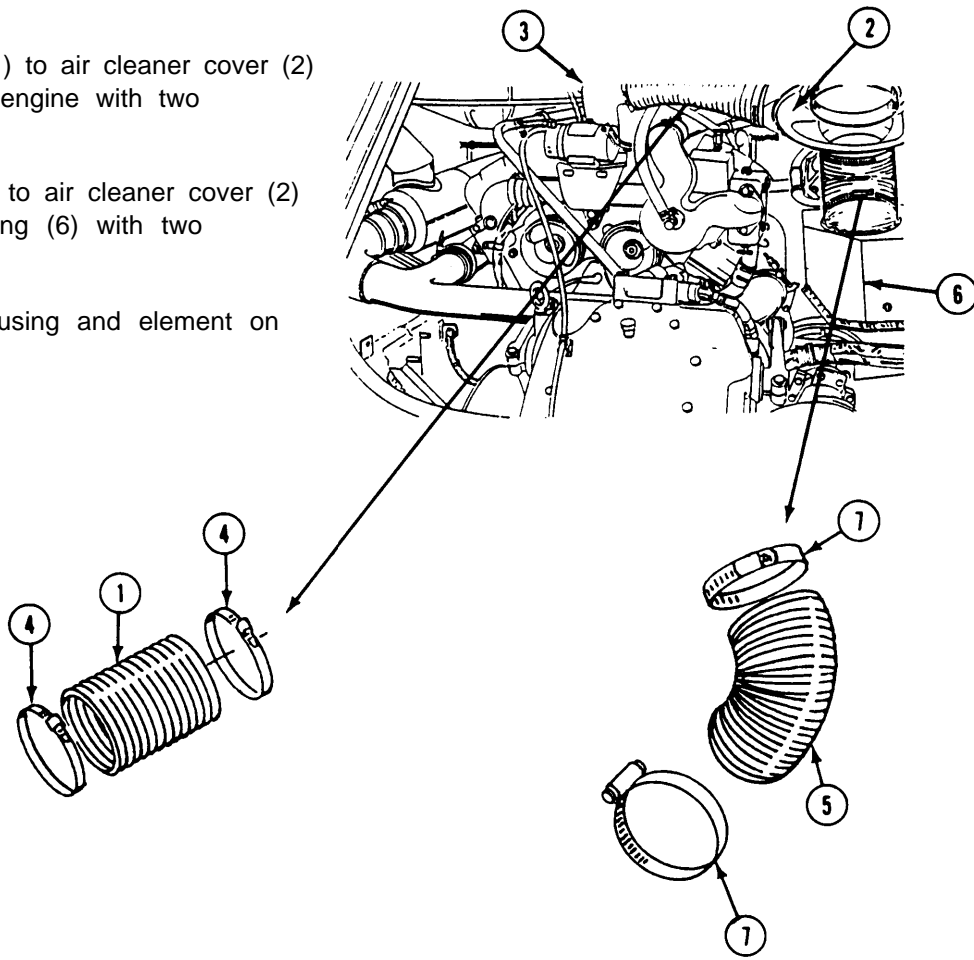
1. Remove air cleaner housing and element from air cleaner cover (page 7-7).
2. Remove two clamps (1) and outlet hose (2) from air cleaner cover (3) and engine air inlet (4).
3. Remove two clamps (5) and inlet hose (6) from air cleaner cover (3) and air control housing (7).



GO TO NEXT PAGE

## INSTALL

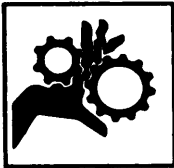
4. Secure outlet hose (1) to air cleaner cover (2) and air inlet (3) on engine with two clamps (4).
5. Secure inlet hose (5) to air cleaner cover (2) and air control housing (6) with two clamps (7).
6. Install air cleaner housing and element on cover (page 7-7).



---

## FOLLOW-THROUGH STEPS

1. Install driver's power plant access panel (page 24-25).



**WARNING**  
Loose clothing is dangerous around moving belts and pulleys. You could get badly hurt if your clothes get caught in moving parts.

2. Start engine (see your -10). Check air cleaner for proper operation.
3. Stop/shutdown engine (see your -10).
4. Close power plant front access door (see your -10).
5. Raise trim vane see your -10).

---

END OF TASK

---

## REPLACE AIR CLEANER COVER

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts

Sealing compound (Item 46, App C)

#### Personnel Required:

Unit Mechanic

#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Driver's power plant access panel removed  
(page 24-25)

Trim vane lowered (see your -10)  
Power plant front access door open  
(see your -10)

Carrier blocked (see your -10)  
Air cleaner element and housing removed  
(page 7-7)

Air cleaner hoses removed (page 7-3)

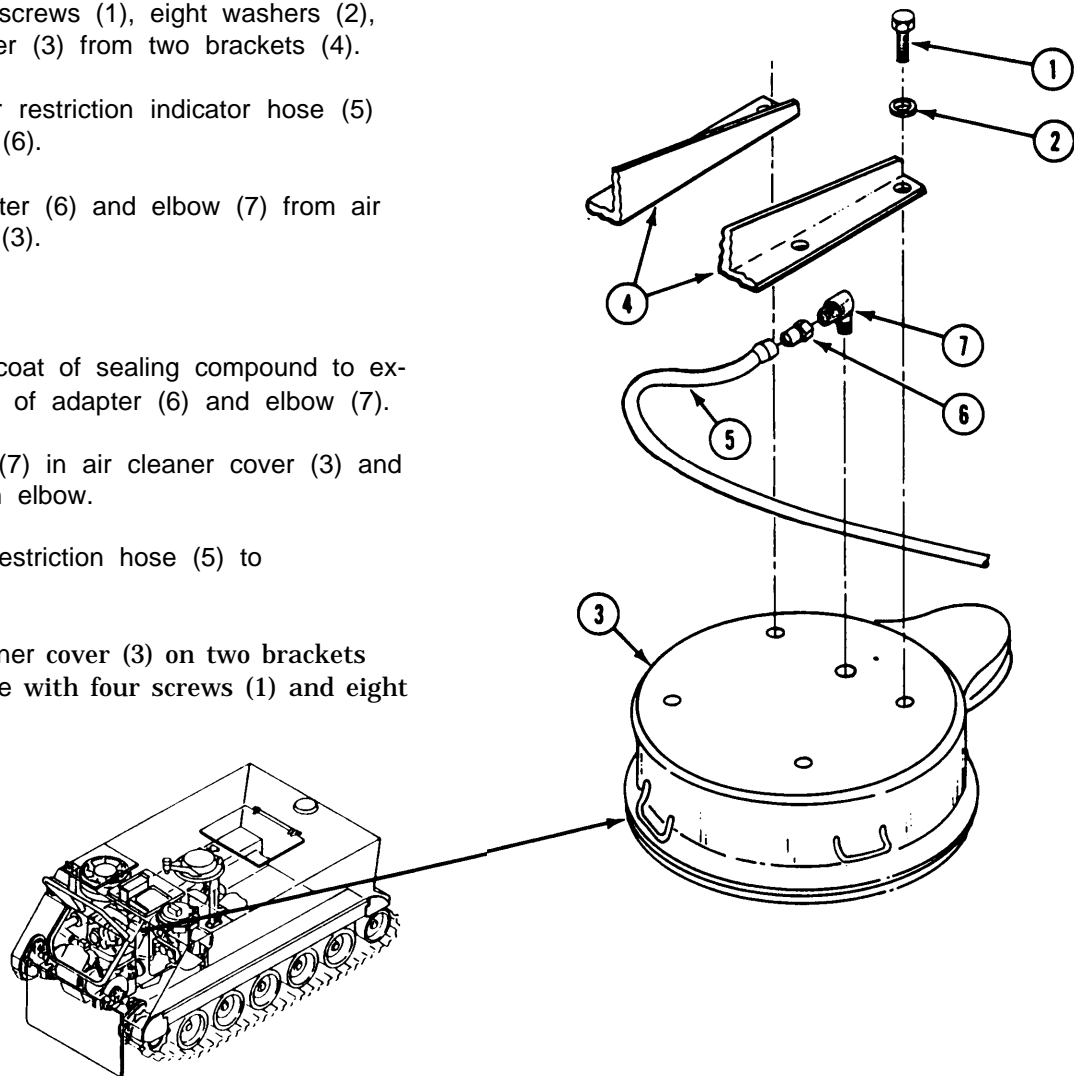
---

### REMOVE

1. Remove four screws (1), eight washers (2), and air cleaner (3) from two brackets (4).
2. Disconnect air restriction indicator hose (5) from adapter (6).
3. Remove adapter (6) and elbow (7) from air cleaner cover (3).

### INSTALL

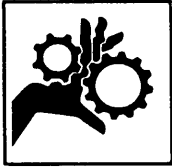
4. Apply a thin coat of sealing compound to external threads of adapter (6) and elbow (7).
5. Install elbow (7) in air cleaner cover (3) and adapter (6) in elbow.
6. Connect air restriction hose (5) to adapter (6).
7. Place air cleaner cover (3) on two brackets (4) and secure with four screws (1) and eight washers (2).



GO TO NEXT PAGE

## FOLLOW-THROUGH STEPS

1. Install air cleaner hoses (page 7-3).
2. Install air cleaner element and housing (page 7-7).
3. Install driver's power plant access panel (page 24-25).
4. Start engine (see your -10). Check air cleaner for proper operation.
5. Stop/shutdown engine (see your -10).
6. Close power plant front access door (see your -10).
7. Raise trim vane (see your -10).



### WARNING

Loose clothing is dangerous around moving belts and pulleys. You could get badly hurt if your clothes get caught in moving parts.

---

END OF TASK



## REPLACE AIR CLEANER HOUSING

### DESCRIPTION

This task covers: Remove (page 7-7). Install (page 7-8).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

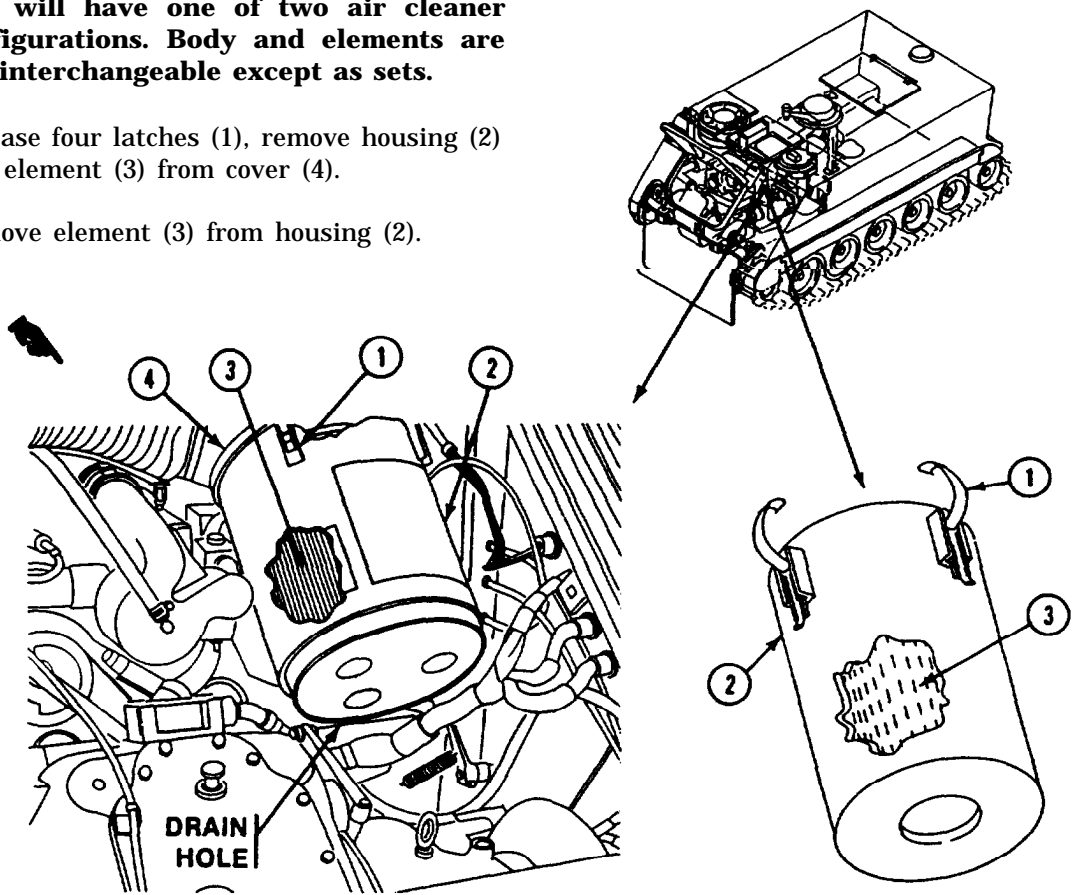
Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Trim vane lowered (see your -10)  
 Power plant front access door open  
 (see your -10)  
 Driver's power plant access panel removed  
 (page 24-25)

### REMOVE

**NOTE**

You will have one of two air cleaner configurations. Body and elements are not interchangeable except as sets.

1. Release four latches (1), remove housing (2) and element (3) from cover (4).
2. Remove element (3) from housing (2).



GO TO NEXT PAGE

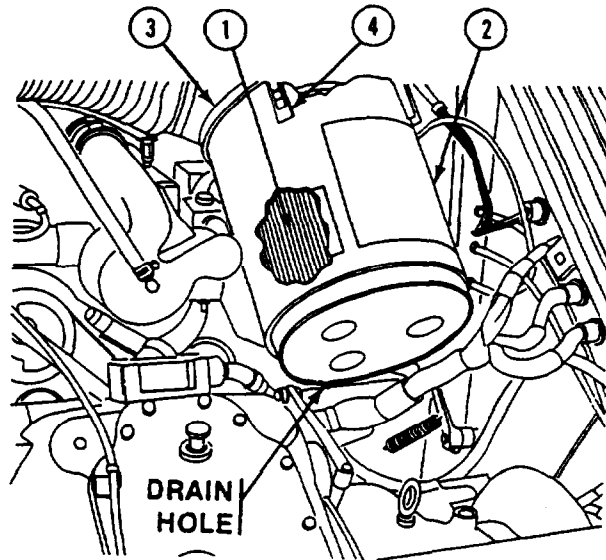
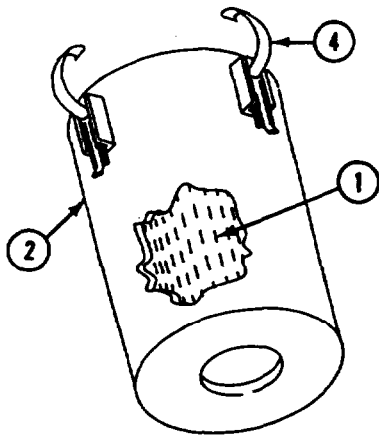
## INSTALL

3. Install air cleaner element (1) in housing (2) and turn element until slot on bottom is between stops in housing.

### NOTE

Drain hole in housing (2) must be positioned as shown to align latches.

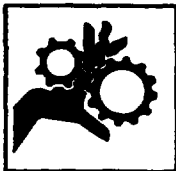
4. Secure housing (2) to cover (3) with four latches (4).



---

## FOLLOW-THROUGH STEPS

1. Install driver's power plant access panel (page 24-25).



**WARNING**  
Loose clothing is dangerous around moving belts and pulleys. You could get badly hurt if your clothes get caught in moving parts.

2. Start engine (see your -10). Check air cleaner for proper operation.
3. Stop/shutdown engine (see your -10).
4. Close power plant front access door (see your -10).
5. Raise trim vane (see your -10).

---

END OF TASK

---

## REPLACE AIR CLEANER RESTRICTION INDICATOR AND HOSE

---

### DESCRIPTION

This task covers: Remove (page 7-9). Install (page 7-10).

---

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts:

Sealing compound (Item 46, App C)  
Self-locking nut (2)

#### Personnel Required:

Unit Mechanic  
Helper (H)

#### References:

see your -10

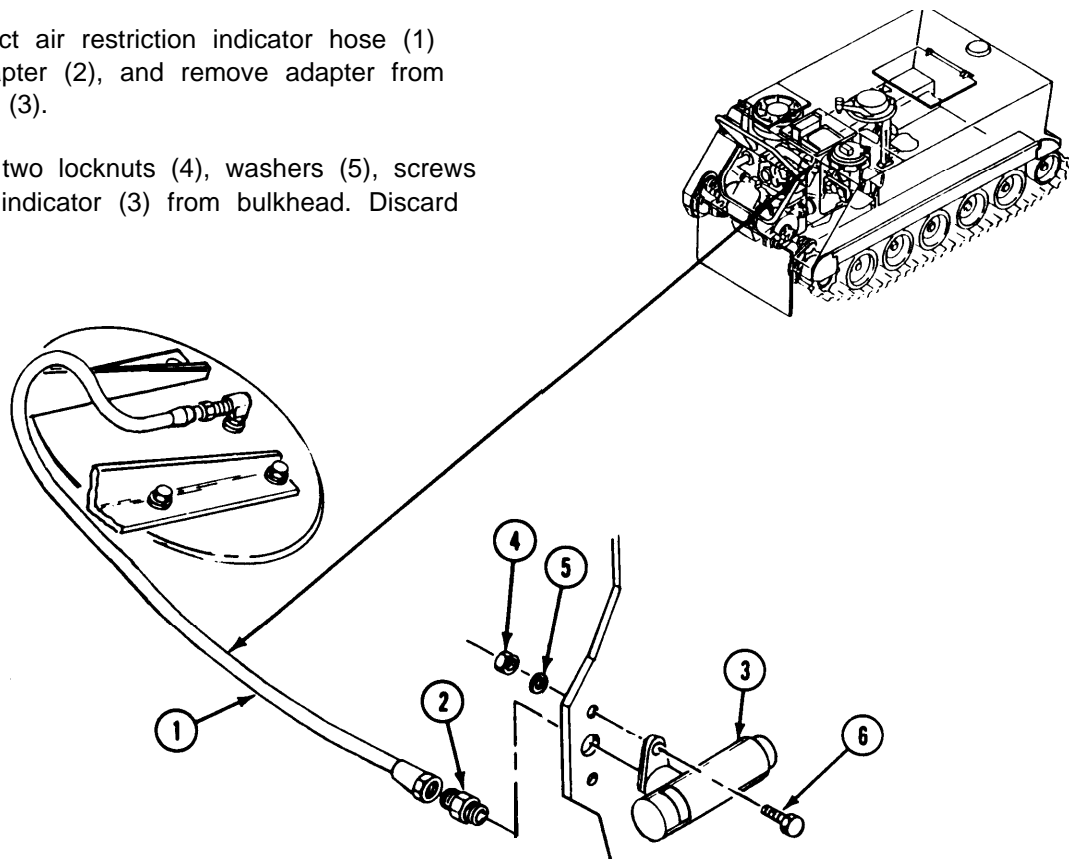
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#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
Trim vane lowered (see your -10)  
Power plant front access door open  
(see your -10)  
Carrier blocked (see your -10)  
Air cleaner element and housing removed  
(page 7-7)  
Air cleaner hoses removed (page 7-3)  
Air cleaner cover removed (page 7-5)  
Driver's power plant access panel removed  
(page 24-25)

### REMOVE

1. Disconnect air restriction indicator hose (1) from adapter (2), and remove adapter from indicator (3).
2. Remove two locknuts (4), washers (5), screws (6) and indicator (3) from bulkhead. Discard locknuts.

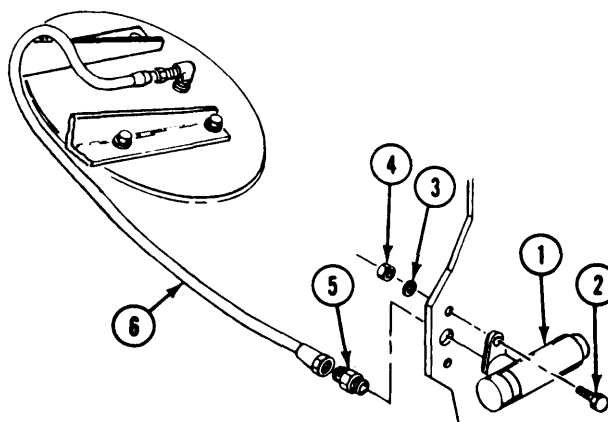


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**INSTALL**

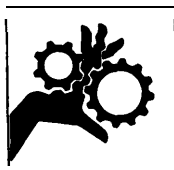
3. Secure indicator (1) to bulkhead with two screws (2), washers (3), and new locknuts (4) .
4. Apply a thin coat of sealing compound to threads of adapter (5).
5. Install adapter (5) in indicator (1).
6. Connect indicator hose (6) to adapter (5).
7. Install air cleaner cover (page 7-5).
8. Install air cleaner housing and element (page 7-7).
9. Install air cleaner inlet hose (page 7-3).
10. Install driver's power plant access panel (page 24-25).

12. Block air cleaner outlet opening with a piece of cardboard. Check window in indicator. It should be red.
13. Turn engine off, and remove cardboard. Indicator should remain red.
14. Press reset button on indicator. Window should turn green.
15. If indicator does not operate properly, replace it.



**WARNING**

Loose clothing is dangerous around moving belts and pulleys. You could get badly hurt if your clothes get caught in moving parts.



11. Start engine and set at 800 rpm (see your -10).

---

**FOLLOW-THROUGH STEPS**

1. Engine stopped/shutdown (see your -10).
2. Install air cleaner outlet hose (page 7-3).
3. Close power plant front access door (see your -10).
4. Raise trim vane (see your -10).

---

**END OF TASK**

## REPAIR AIR CONTROL VALVE

### DESCRIPTION

This task covers: Remove (page 7-11). Install (page 7-12).

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Gasket  
Cotter pin  
Self-locking nut (3)  
Self-locking nut

**Personnel Required:**

Unit Mechanic  
Helper (H)

**References:**

see your -10

**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant front access door open (see your -10)  
Driver's power plant access panel removed (page 24-25)  
Air cleaner hose removed (page 7-3)  
Air cleaner element and housing removed (page 7-7)

### REMOVE

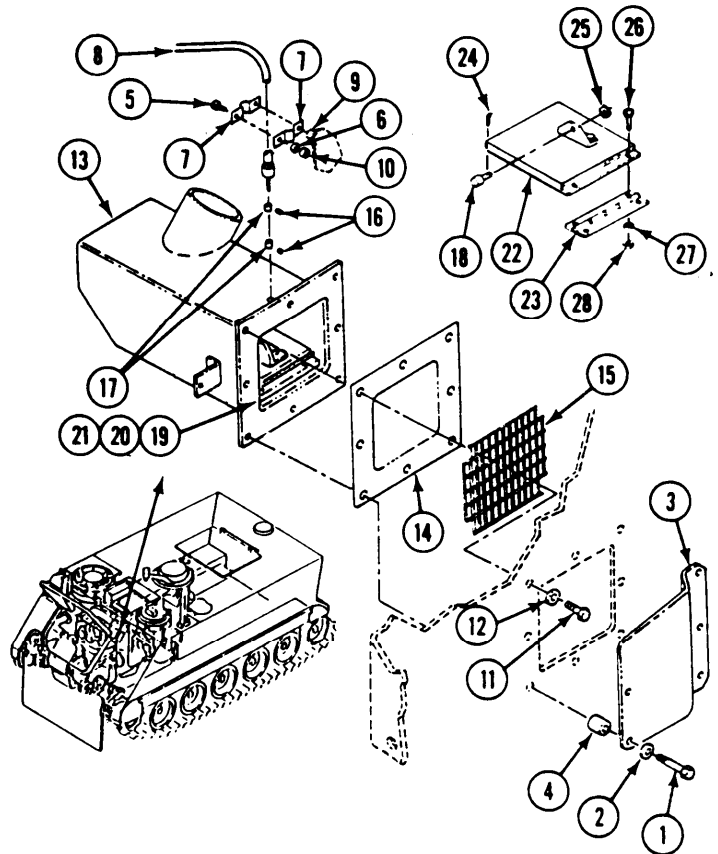
1. Remove five screws (1), washers (2), plate (3), and two spacers (4) from driver's compartment bulkhead.
2. Remove two screws (5), washer (6), two clamps (7) and cable (8) from weldnut (9) and locknut (10). Discard locknut.

**NOTE**

**Support air control valve housing (13) at this point to prevent its hanging by control cable. Have helper assist.**

3. Remove three screws (11), washers (12), housing (13), gasket (14), and screen (15) from driver's compartment bulkhead. Discard gasket.
4. Remove two setscrews (16) and collars (17) to separate cable (8) from pin (18).
5. Remove two screws (19), washers (20), nuts (21), baffle (22), and hinge (23) from housing (13).
6. Remove cotter pin (24), washer (25), and pin (18) from baffle (22). Discard cotter pin.

7. Remove two screws (26), washers (27), locknuts (28), and hinge (23) from baffle (22). Discard locknuts.

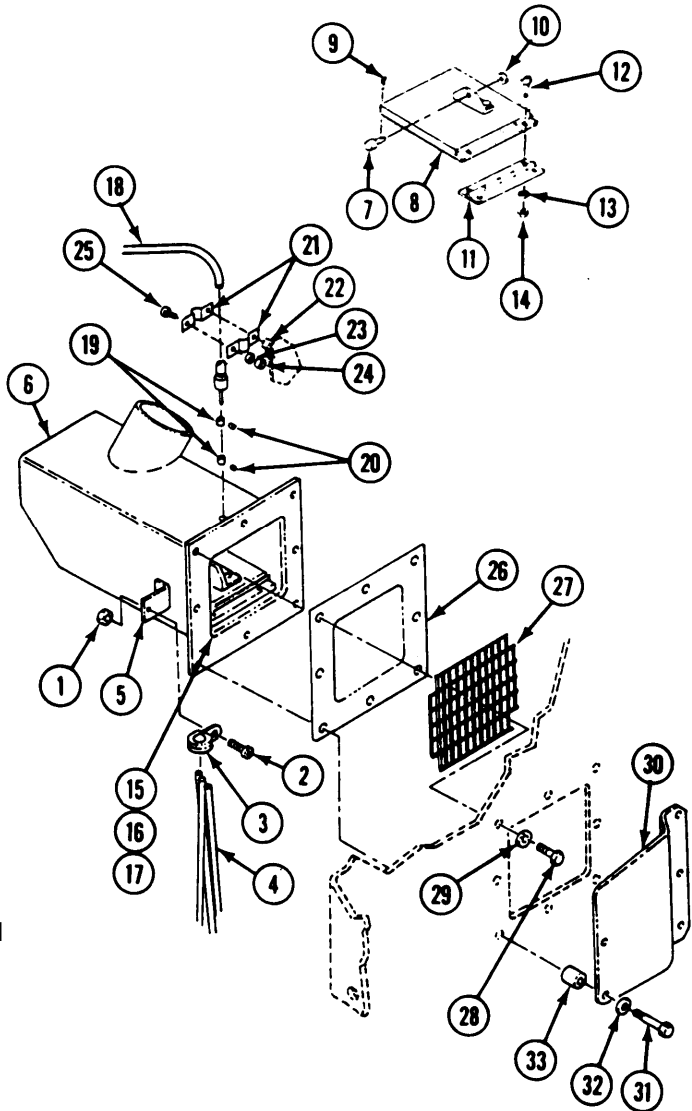


GO TO NEXT PAGE

- Remove locknut (1), screw (2), clamp (3), three cables (4) and bracket (5) from housing (6). Discard locknut.

**INSTALL**

- Install bracket (5) and three cables (4) on housing (6). Secure with clamp (3), screw (2), and new locknut (1).
- Secure pin (7) to baffle (8) with new cotter pin (9) and washer (10).
- Secure hinge (11) to baffle (8) with two screws (12), washers (13), and new locknuts (14).
- Install baffle (8) and hinge (11) in housing (6). Secure with two screws (15), washers (16), and nuts (17).
- With cable in full forward position and baffle in down position, support housing (6) and secure cable (18) to pin (7) with two collars (19) and setscrews (20).
- Secure cable (18) and two clamps (21) to weldnut (22) with washer (23), screw (25), and new locknut (24).
- Secure housing (6), new gasket (26), and screen (27) to driver's compartment bulkhead with three screws (28) and washers (29).
- Secure plate (30), housing (6), and new gasket (26) to driver's compartment bulkhead with five screws (31), washers (32), and two spacers (33).



**FOLLOW-THROUGH STEPS**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>Install air cleaner hose (page 7-3).</li> <li>Install air cleaner element and housing (page 7-7).</li> <li>Install driver's power plant access panel (page 24-25).</li> </ol> | <ol style="list-style-type: none"> <li>Close power plant from access panel door (see your -10).</li> <li>Raise trim vane (see your -10).</li> <li>Start engine (see your -10). Check air control valve for proper operation.</li> <li>Engine stopped/shutdown (see your -10).</li> </ol> |
|--|--|

END OF TASK

## REPLACE AIR CONTROL VALVE CABLE

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Self-locking nut

**Personnel Required:**

Unit Mechanic  
Helper (H)

**References:**

See your -10

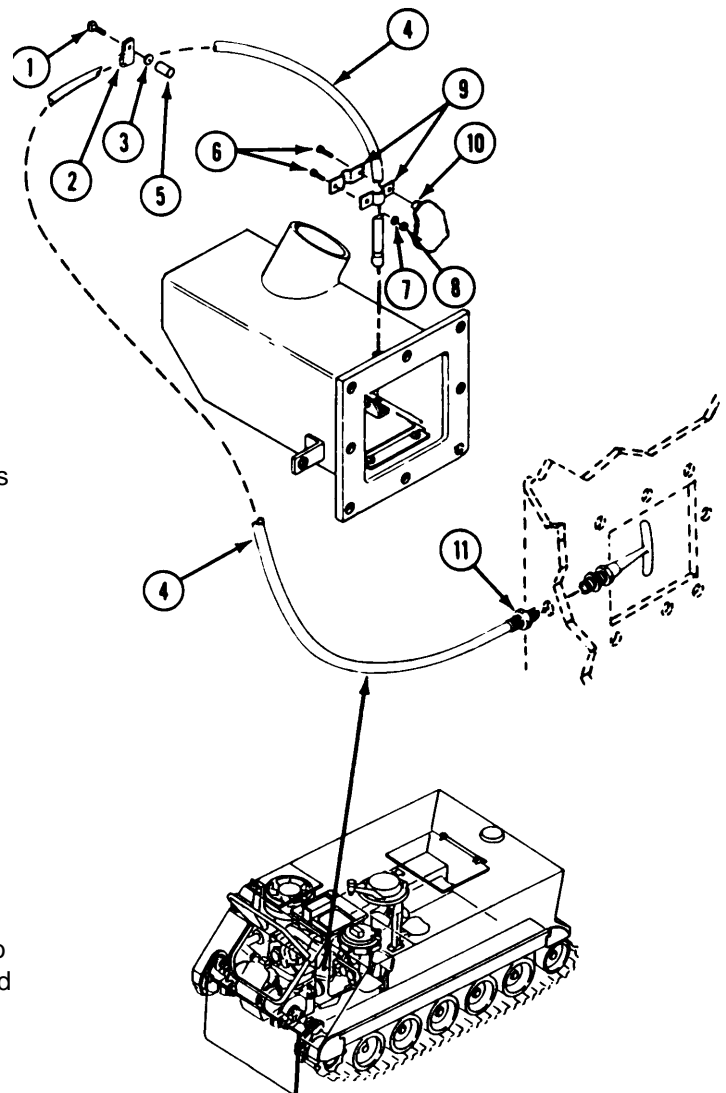
**Equipment Conditions:**

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered (see your -10)  
Power plant front access door open  
(see your -10)  
Air control valve removed (page 7-11)

### R E M O V E

**NOTE**  
Have helper ask.

1. Remove screw (1), clamp (2), and washer (3) that secure cable (4) to weldnut (5).
2. Remove clamp (2) from cable (4).
3. Remove two screws (6), washer (7), locknut (8), and two clamps (9) from cable (4), and weldnut (10). Discard locknut.
4. Remove nut (11) from cable (4).
5. Remove cable (4) through opening in driver's compartment bulkhead below throttle and fuel cutoff controls.



### INSTALL

**NOTE**  
Have helper assist

6. Install cable (4) through opening in driver's compartment bulkhead below the throttle and fuel cutoff controls.
7. Secure cable (4) to bulkhead with nut (11).
8. Secure two clamps (9) to cable (4) with two screws (6), washer (7), new locknut (8), and weldnut (10).
9. Install clamp (2) on cable (4).
10. Secure clamp (2) to weldnut (5) with screw (1) and washer (3).

GO TO NEXT PAGE

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**FOLLOW-THROUGH STEPS**

1. Install air control valve (page 7-11).
2. Close power plant front access door (see your -10).
3. Raise trim vane (see your -10).

---

**END OF TASK**



**Section II. ENGINE EXHAUST SYSTEM**

---

**TASK INDEX**

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<u>Task</u>	<u>Page</u>	<u>Task</u>	<u>Page</u>
Replace Exhaust Pipes .....	7-16	Replace Muffler And Brackets .....	7-20
Replace Muffler Extension And Valve .....	7-18		

---

## REPLACE EXHAUST PIPES

### DESCRIPTION

This task covers: Remove (page 7-16). Install (page 7-17).

### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 30, App D)  
 Socket Wrench Set (Item 88, App D)  
 Socket Wrench Set (Item 89, App D)  
 Torque Wrench (Item 95, App D)  
 Torque Wrench (Item 99, App D)

#### Personnel Required:

Unit Mechanic

#### References:

see your -10

#### Equipment Conditions:

Engine stopped/shutdown (see your -10)  
 Carrier blocked (see your -10)  
 Trim vane lowered (see your -10)  
 Power plant front access door open  
 (see your -10)  
 Air cleaner housing and element removed  
 (page 7-7)

### REMOVE



#### WARNING

Do not touch hot exhaust pipes with bare hands. you could get a bad burn.

#### NOTE

Muffler clamps are used on early exhaust system only. If muffler clamp has to be replaced, new exhaust pipes will need to be ordered.

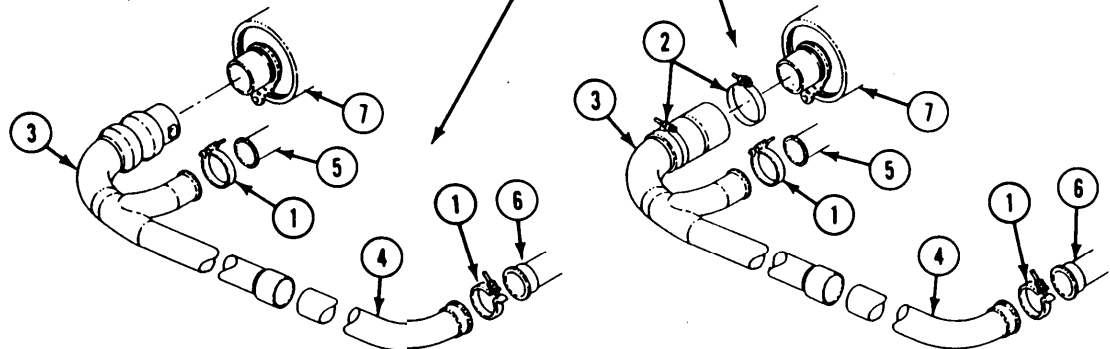
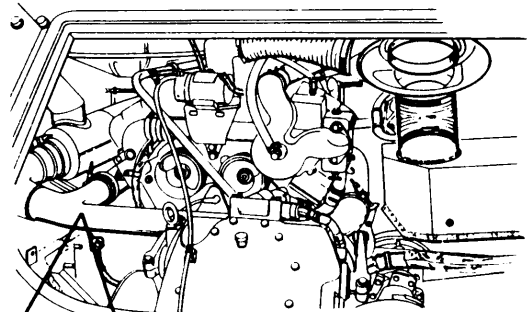
Step 1 is for the early system. Step 2 is for the current system.

1. Loosen two manifold clamps (1) and two muffler joint clamps (2).

2. Loosen two manifold clamps (1).

3. Remove exhaust pipes (3 and 4) from engine manifolds (5 and 6) and muffler joint (7).

4. Separate exhaust pipe (3) from exhaust pipe (4).



## INSTALL

5. Install exhaust pipe (1) in exhaust pipe (2).

### NOTE

Step 6 is for the early system. Step 7 is for the current system.

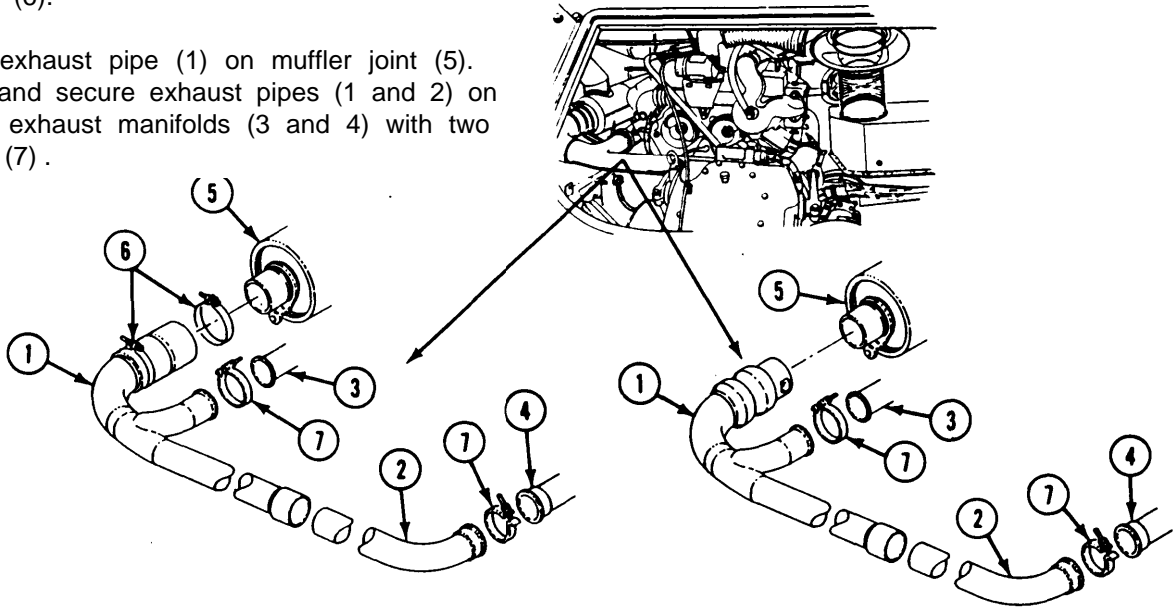
6. Install and secure exhaust pipes (1 and 2) on engine exhaust manifolds (3 and 4) and muffler joint (5) with two muffler joint clamps (6).
7. Install exhaust pipe (1) on muffler joint (5). Install and secure exhaust pipes (1 and 2) on engine exhaust manifolds (3 and 4) with two clamps (7).

8. Tighten two clamps (7) to 204-216 lb-in (23-25 N•m) torque. Use torque wrench (Item 95) and socket wrench set (Item 89).

### NOTE

Step 9 is for early system only.

9. Tighten two muffler clamps (6) to 36-60 lb-in (4-7 N•m) torque. Use torque wrench (Item 99) and socket wrench set (Item 88).



## FOLLOW-THROUGH STEPS

1. Install air cleaner housing and element (page 7-7).



**WARNING**  
Loose clothing is dangerous around moving belts and pulleys. You could get badly hurt if your clothes get caught in moving parts.

2. Start engine (see your -10). Check for leaks.
3. Engine stopped/shutdown (see you -10).
4. Close power plant front access door see your -10.
5. Raise trim vane (see your -10).

END OF TASK

## REPLACE MUFFLER EXTENSION AND VALVE

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Cotter pin  
Key washer (4)

**Personnel Required:**

Unit Mechanic

**References:**

See your -10

**Equipment Conditions:**

Carrier blocked (see your -10)  
Engine stopped/shutdown (see your -10)  
Power plant front access door open  
(see your -10)  
Trim vane lowered (see your -10)

### REMOVE

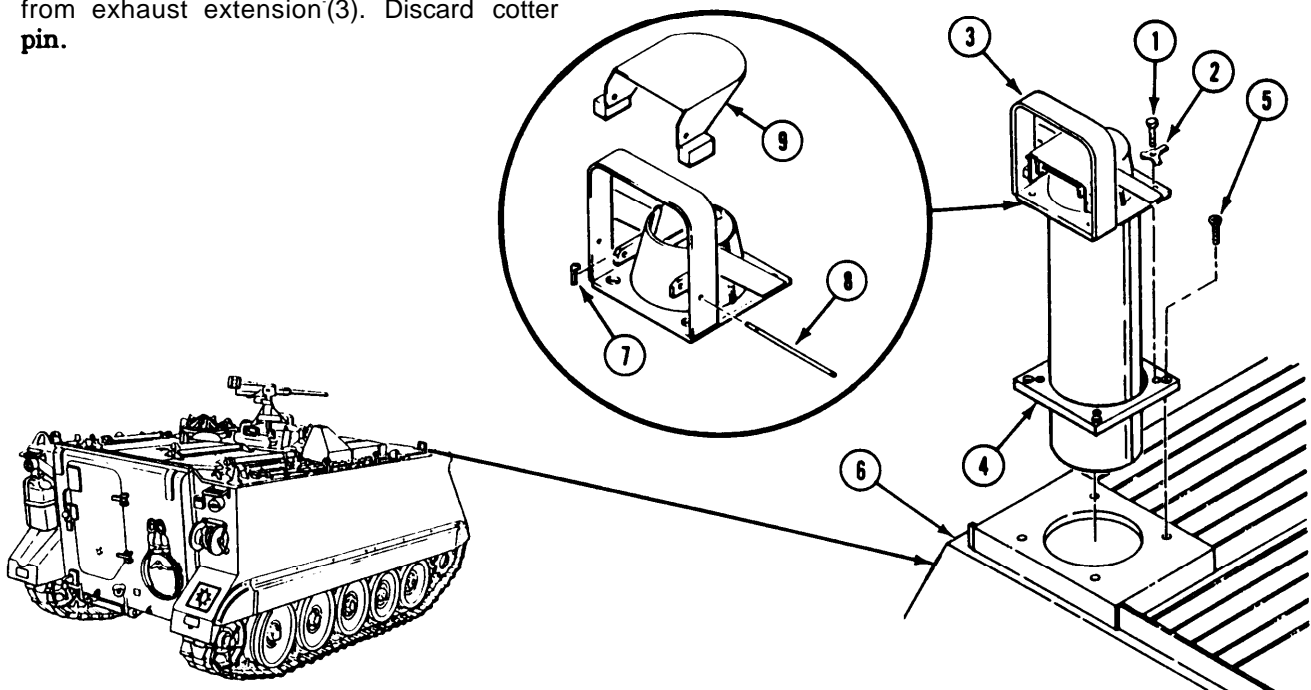


**WARNING**  
Hot exhaust pipes can burn you. Let power unit cool before you start work.

1. Remove four screws (1) and key washers (2). Lift out exhaust extension (3) from adapter plate (4). Discard washers.
2. Remove four screws (5) and adapter plate (4) from exhaust grill (6).
3. Remove cotter pin (7), pin (8), and valve (9) from exhaust extension(3). Discard cotter pin.

### INSTALL

4. Install valve (9) on exhaust extension (3). Secure with pin (8) and new cotter pin (7).
5. Install adapter plate (4) on exhaust grill (6). Secure with four screws (5).
6. Install exhaust extension (3) through adapter plate (4) on muffler inside carrier.
7. Secure exhaust extension (3) to adapter plate (4) and grill (5) with four new key washers (2) and screws (1).



## REPLACE MUFFLER EXTENSION AND VALVE

### INITIAL SETUP

**Tools:**

General Mechanics Tool Kit (Item 30, App D)

**Materials/Parts:**

Cotter pin  
Key washer (4)

**Personnel Required:**

Unit Mechanic

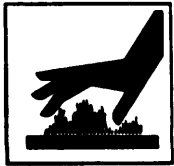
**References:**

See your -10

**Equipment Conditions:**

Carrier blocked (see your -10)  
Engine stopped/shutdown (see your -10)  
Power plant front access door open  
(see your -10)  
Trim vane lowered (see your -10)

### REMOVE

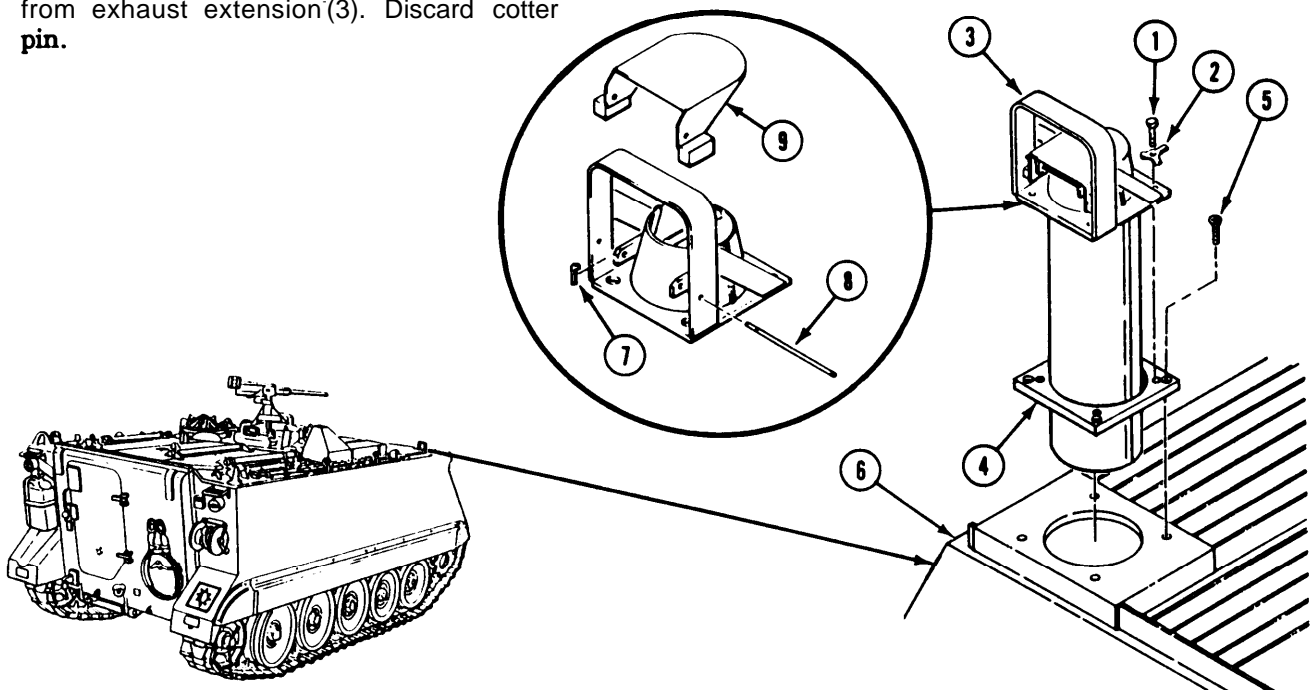


**WARNING**  
Hot exhaust pipes can burn you. Let power unit cool before you start work.

1. Remove four screws (1) and key washers (2). Lift out exhaust extension (3) from adapter plate (4). Discard washers.
2. Remove four screws (5) and adapter plate (4) from exhaust grill (6).
3. Remove cotter pin (7), pin (8), and valve (9) from exhaust extension (3). Discard cotter pin.

### INSTALL

4. Install valve (9) on exhaust extension (3). Secure with pin (8) and new cotter pin (7).
5. Install adapter plate (4) on exhaust grill (6). Secure with four screws (5).
6. Install exhaust extension (3) through adapter plate (4) on muffler inside carrier.
7. Secure exhaust extension (3) to adapter plate (4) and grill (5) with four new key washers (2) and screws (1).



## REPLACE MUFFLER AND BRACKETS

### DESCRIPTION

This task covers: Remove (page 7-20). Install (page 7-21).

### INITIAL SETUP

#### Tools

General Mechanics Tool Kit (Item 30, App D)

#### Materials/Parts

Lockwasher (2)  
Cotter pin  
Self-locking nut (2)

#### Personnel Required

Unit Mechanic

#### References

see your -10

#### Equipment Conditions

Engine stopped/shutdown (see your -10)  
Carrier blocked (see your -10)  
Trim vane lowered and power plant front access door open (see your -10)  
Power plant rear access panel removed (page 24-27 or 24-29)

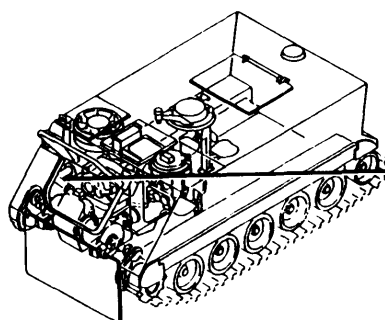
### REMOVE



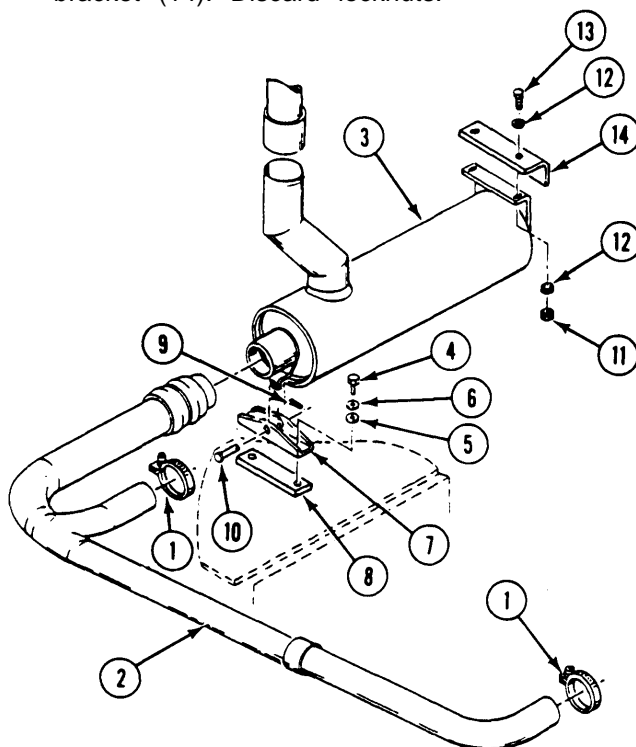
#### WARNING

If you work on a carrier that has been running, you could be burned. All tasks begin with a cooled down carrier. Allow carrier to cool, or use care if you work on a hot carrier.

1. Lift exhaust extension up until it clears the muffler (page 7-18).
2. Loosen two clamps (1) and remove pipe (2) from muffler (3) and manifold.

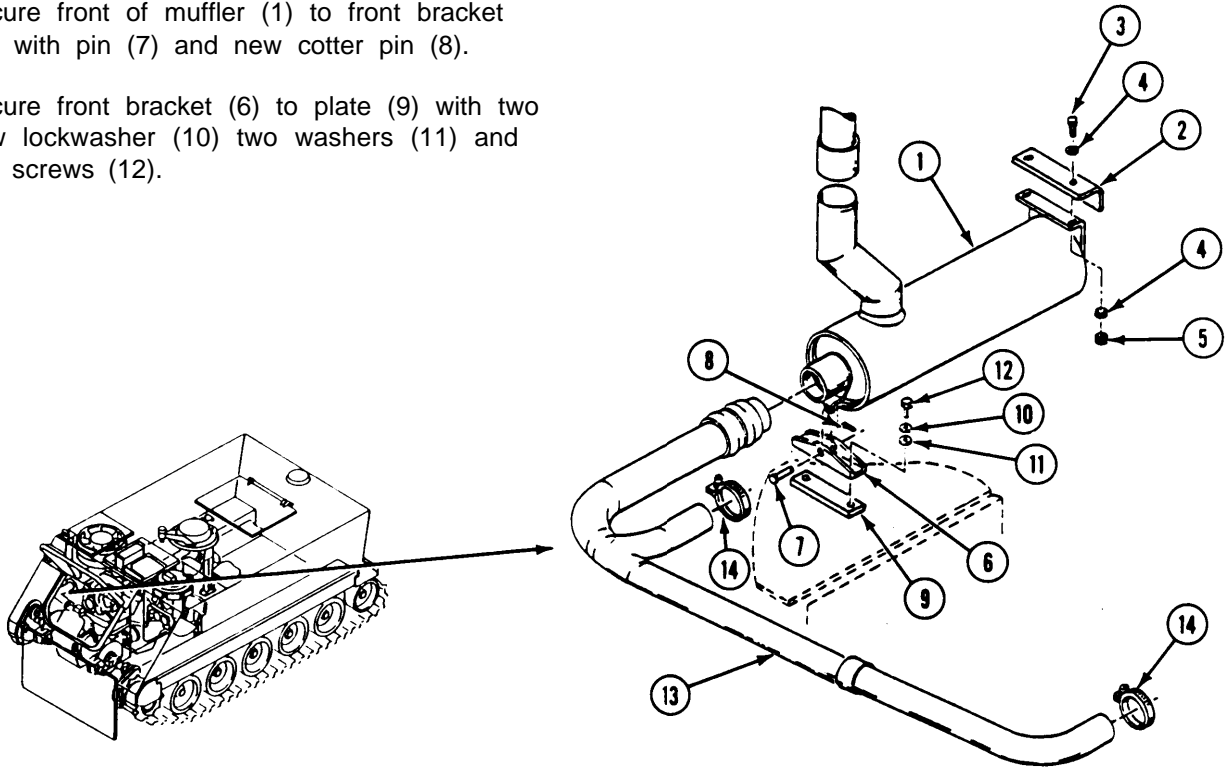


3. Remove two screws (4), two washers (5), two lockwashers (6), and front bracket (7) from plate (8). Discard lockwashers.
4. Remove cotter pin (9), pin (10), and muffler (3) from front bracket (7). Discard cotter pin.
5. Remove two locknuts (11), four washers (12), two screws (13), and muffler (3) from rear bracket (14). Discard locknuts.



## INSTALL

6. Secure rear of muffler (1) to bracket (2) with two screws (3), four washers (4), and two new locknuts (5).
7. Secure front of muffler (1) to front bracket (6), with pin (7) and new cotter pin (8).
8. Secure front bracket (6) to plate (9) with two new lockwasher (10) two washers (11) and two screws (12).
9. Secure pipe (13) to muffler (1) and manifold with two clamps (14).
10. Lower exhaust extension into muffler (page 7-18).




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## FOLLOW-THROUGH STEPS

1. Start engine (see your -10). Check for leaks.
2. Stop/shutdown engine (see your -10).
3. Install power plant rear access panel (page 24-27 or 24-29).
4. Close power plant front access door and raise trim vane (see your -10).

---

END OF TASK

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5-1-3	13		
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IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Step 6. The screws (2) on bracket (1) must be torqued.  
Please add torque information.

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Please correct.

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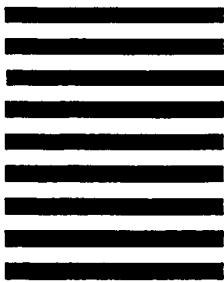
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## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.39371 Inches  
 1 Meter = 100 Centimeters = 100 Millimeters = 39.371 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 Lbs  
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

### LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0336 Fluid Ounces  
 1 Liter = 1000 Milliliters = 33.62 Fluid Ounces

### SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches  
 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet  
 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

### CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches  
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

### TEMPERATURE

$5/9(^{\circ} F - 32) = ^{\circ} C$   
 212 $^{\circ}$  Fahrenheit is equivalent to 100 $^{\circ}$  Celsius  
 90 $^{\circ}$  Fahrenheit is equivalent to 32 $^{\circ}$  Celsius  
 32 $^{\circ}$  Fahrenheit is equivalent to 0 $^{\circ}$  Celsius  
 $9/5 ^{\circ} C + 32 = ^{\circ} F$

## 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
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Inch-pounds	Centimeter-kilograms	1.152
Foot-pounds	Meter-kilograms	0.138
Pound-feet	Newton-meters	1.356
Pound-inches	Newton-meters	0.113
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	MULTIPLE BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Centimeter-kilograms	Inch-pounds	0.868
Meter-kilograms	Foot-pounds	7.233
Newton-meters	Pound-feet	0.738
Newton-meters	Pound-inches	8.851
Kilopascals	Pounds per Square inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



