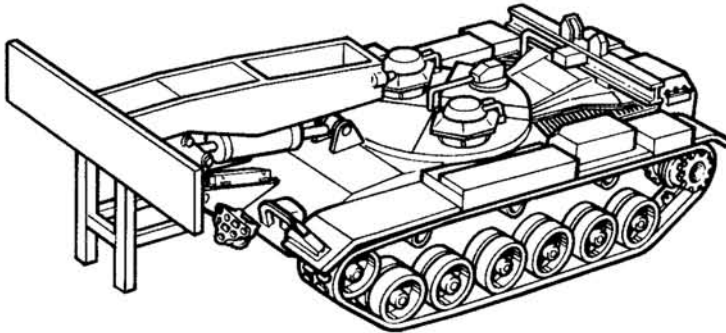

TECHNICAL MANUAL

ORGANIZATIONAL
MAINTENANCE MANUAL



M60A1 TANK CHASSIS,
TRANSPORTING:
FOR BRIDGE,
ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60
(5420-00-889-2020)

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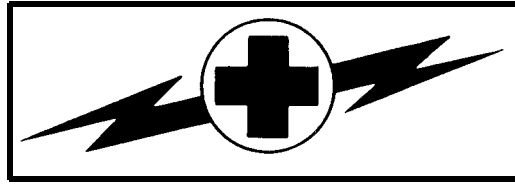
WARNING**CARBON MONOXIDE POISONING CAN BE DEADLY**

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which when breathed deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and/or coma. Permanent brain damage or death can result from severe exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to make sure of the safety of personnel whenever the personnel heater, main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

1. DO NOT operate heater or engine of vehicle in an enclosed area unless the area is ADEQUATELY VENTILATED.
2. DO NOT idle engine for long periods without maintaining ADEQUATE VENTILATION in personnel compartments.
3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
4. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE.
For artificial respiration, refer to FM 4-25.11.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

WARNING



WARNING

HIGH VOLTAGE

Used in the operation of this equipment

DEATH ON CONTACT

May result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When a technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the master battery switch and battery ground straps should be either turned off or disconnected before beginning work on the equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Before you work around tracked vehicles, remove rings, bracelets, and wristwatches. These items may be caught on projections and cause injury or may be shorted across an electrical circuit and cause severe burns and electrical shock.

For artificial respiration, refer to FM 4-25.11.

WARNING

HAZARDOUS NOISE

1. Hearing protection (helmet) required.
2. Double hearing protection (helmet and ear plugs) required on road marches at speeds over 15 mph.

WARNING

The following summary list is adapted from the warnings within this volume. However, all warnings should be observed as noted in the text.

Hold up rear drain valve seat when removing last screw attaching valve seat to hull floor. Valve seat is heavy and can cause injury if it falls.

Hold up front drain valve cage assembly when removing last screw attaching cage to hull. Valve assembly may fall and cause injury if cage is not held up.

Handle charged fire extinguisher cylinders with care. Do not jar or subject cylinders to temperature above 140 degrees F (60 degrees C).

Driver's hatch cover weights approximately 130 pounds. Do not try to lift it alone.

The unit commander or senior officer in charge of maintenance personnel assigned to remove and dispose of contaminated gas filters must prescribe necessary protective clothing to be worn when replacing gas particulate filters. He must also prescribe necessary safety measures to be performed before new gas filters are installed.

Contaminated gas particulate filters must be handled in accordance with FM 21-40 and must be disposed of by trained personnel.

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.)

FRH hydraulic fluid may contain Tricresyl Phosphate which if taken internally, can produce paralysis.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, glove, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on 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.

Dry cleaning solvent P-D-680 is toxic and flammable. To prevent personal injury, wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning Solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

Failure to correctly connect brake quick disconnect will result in brake failure and could cause serious injury or death.

CHANGE

NO. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 30 October 2006

**ORGANIZATIONAL
MAINTENANCE**

**M60A1 TANK CHASSIS,
TRANSPORTING:
FOR BRIDGE,
ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60
(5420-00-889-2020)**

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None
i and ii
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1-1 and 1-2
1-7 and 1-8
2-1 and 2-2
2-13 and 2-14
3-3 and 3-4
4-1 and 4-2
4-19 thru and 4-24
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4-29 and 4-30
4-31 thru 4-46
4-397 thru 4-400
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4-415 and 4-416
2028 Sample and blank
2028 and Envelope
2028 and Envelope
2028 and Envelope
Front Cover (inside blank)

Insert Pages

A thru F
i and ii
v/(vi blank)
1-1 and 1-2
1-7 and 1-8
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4-397 thru 4-400
4-414.1 thru 4-414.30
4-415 and 4-416
None
2028 and back
2028 and back
2028 and back
Front Cover and PIN

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NO. 5

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**ORGANIZATIONAL
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FOR BRIDGE,
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SCISSORING TYPE, CLASS 60
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c/d blank)
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3-111 and 3-112
Sample DA Forms 2028-2
DA Forms 2028-2


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TECHNICAL MANUAL
ORGANIZATIONAL MAINTENANCE
M60A1 TANK CHASSIS,
TRANSPORTING:
FOR BRIDGE,
ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60
(NSN 5420-00-889-2020)

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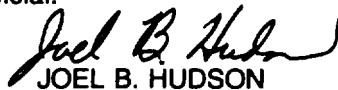
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None

Insert Pages

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TECHNICAL MANUAL
ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS,
TRANSPORTING:
FOR BRIDGE,
ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60
(5420-00-889-2020)

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3-85 and 3-86
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Insert Pages

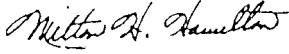
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3-71 and 3-72
3-85 and 3-86
4-25 and 4-26
4-697 thru 4-700

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TM 5-5420-202-20-1

C2

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 2 December 1987

Organizational Maintenance

M60A1 TANK CHASSIS, TRANSPORTING:
FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60

(5420-00-889-2020)

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TECHNICAL MANUAL
ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS, TRANSPORTING: FOR BRIDGE,
ARMORED-VEHICLE-LAUNCHED; SCISSORING TYPE, CLASS 60

(5420-00-889-2020)

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Change 3	27 February 1992		

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4-200	0	4-262	0	4-306.17 ADDED	1
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ORGANIZATIONAL MAINTENANCE MANUAL

M60A1 TANK CHASSIS, TRANSPORTING: BRIDGE,
ARMORED-VEHICLE-LAUNCHED: SCISSORING TYPE; CLASS 60

NSN 5420-00-889-2020

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <https://aeeps.ria.army.mil>. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or e-mail your letter or DA Form 2028 direct to: AMSTA-LC-LPIT/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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★'This manual together with TM 5-5420-202-20-2, TM 5-5420 -202-20-3 and TM 5-5420 -202-20-4 supersedes TM 5-5420-202-20,14, January 1976.

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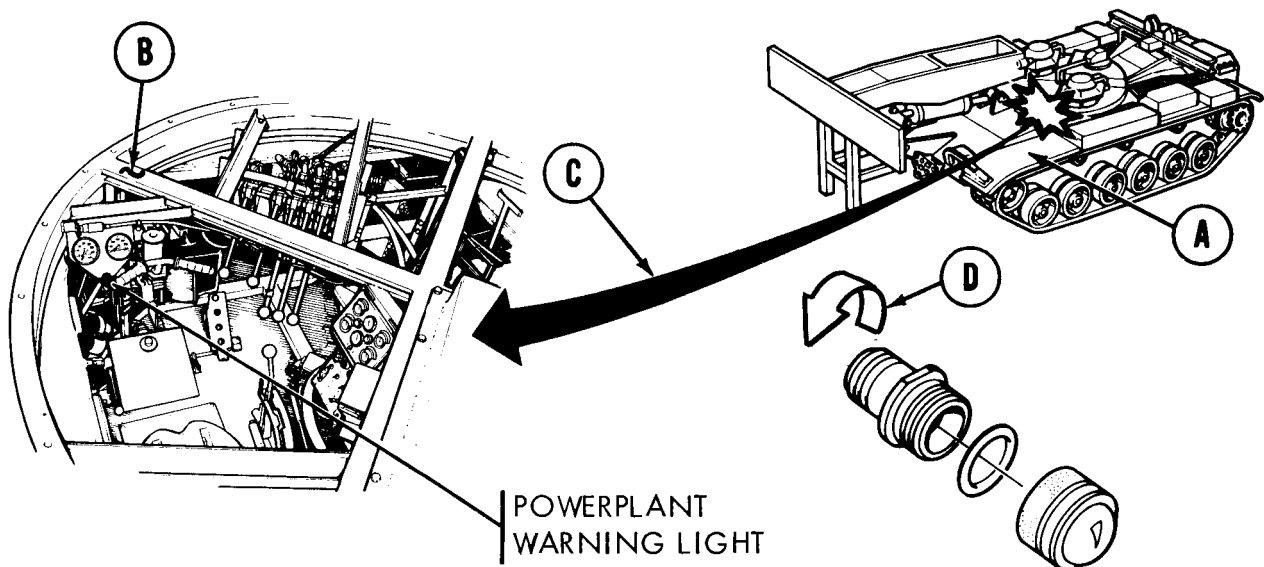
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HOW TO USE THIS MANUAL:

- Manual is divided into chapters.
- Chapters are by functional group code and are presented in same order as the RPSTL (Repair Parts and Special Tools List).
- Procedure indexes are on procedures that are four pages or more, and indicate how the procedure is set up, i.e., disassembly, removal, cleaning, inspection, etc.
- All references within this technical manual refer to page numbers.
- Steps are numbered and are to be performed in that order.
- Be sure to read all NOTES, WARNINGS, and CAUTIONS.
- Locator views are included wherever necessary. These will help you locate the item which the procedure is referencing.
- Jagged circle (*) on locator (A) indicates a cutout and means the item is inside the vehicle.
- A (~) symbol represents the outside surface (B) of a piece of equipment that cannot be shown in its entirety.
- Callouts are shown by a circle with a letter inside.
- Locator arrows (C) are black, and mechanical motion arrows (D) are white.
- Broken leader arrow (->) indicates the item is either inside or under the vehicle and cannot be seen.



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HOW TO USE THIS MANUAL - Continued

- An illustrated list of manufactured items includes complete instructions for making items authorized to be manufactured or fabricated and used at organizational maintenance.
- A maintenance information index lists all parts subject to maintenance tasks. It provides the location of all maintenance tasks related to a component in this manual.
- Certain sections of the manual have detailed "how to use " instructions at the beginning of the section - for example: troubleshooting.
- As a general maintenance practice, throw away all removed lockwashers, locknuts, o-rings, preformed packing, and cotter pins, and replace with new lockwashers, locknuts, o-rings, preformed packing, and cotter pins at installation.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

Type of Manual: Organizational Maintenance

Model Number and Equipment Name: M60A1 Tank Chassis, Transporting for Class 60 Scissoring Type, Armored-Vehicle-Launched Bridge (M60A1 AVLB).

Purpose of Equipment: Provide a transportable bridge that can be launched and retrieved while providing maximum ballistic protection for the crew.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by PAM 750-8, The Army Maintenance Management System (TAMMS).

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S)

If your M60A1 AVLB 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 our equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, U.S. Army Tank-Automotive Command, AMSTA-Q, Warren, Michigan 48397-5000. We'll send you a reply.

USE OF ENGLISH AND METRIC SYSTEM UNITS

Torque values specified in this manual are expressed in pound-feet (lb-ft.) or pound-inches (lb.-in.) followed by the metric equivalent in parentheses. The metric equivalent is expressed in system international units Newton meters (N•m). The metric system and equivalents conversion table is located on inside back cover of this manual.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-6 for instructions on destruction of materiel to prevent enemy use.

ADMINISTRATIVE STORAGE

Refer to TM 740-90-1 for instructions on administrative storage.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

- a. No particular quality assurance or quality control manual pertains specifically to the M60A1 AVLB.
- b. Defective materiel received through the supply system should be reported on Quality Deficiency Report (QDR) SF 368. Instructions for preparing QDR's are provided in AR 702-7, Reporting of Quality Deficiency Data. QDR's should be mailed to Commander, U.S.

Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, MI 48397-5000. A reply will be furnished to you.

Section II EQUIPMENT DESCRIPTION AND DATA

PURPOSE OF THE M60A1 ARMORED VEHICLE BRIDGE LAUNCHER

Capabilities and Features

- Provides a transportable bridge that can be launched and retrieved.
- Suited to a nuclear environment because armor protection reduces effects of blasts and radiation.
- Can be dispersed and concentrated rapidly over great distances.
- Provides deep penetration due to mobility and flexibility
- Provides close combat vehicle support.
- Major components:
 1. Hull
 2. Power train
 3. Fuel system
 4. Air intake system
 5. Exhaust system
 6. Cooling system
 7. Electrical system
 8. Tracks and suspension
 9. Personnel heater
 10. Steering and shifting controls
 11. Accelerator controls
 12. Brake controls
 13. Fixed fire extinguisher system

LOCATION AND DESCRIPTION OF EXTERNAL COMPONENTS**(A) FIXED FIRE EXTINGUISHER HANDLE**

Permits crew to release first and second shot of CO₂ into the engine compartment in the event of a powerplant fire.

(B) GRILLE DOORS

Provides access to powerplant.

(C) PINTLE

Permits attaching tow bar for towing or recovery of disabled vehicles.

(D) TRACK AND SUSPENSION

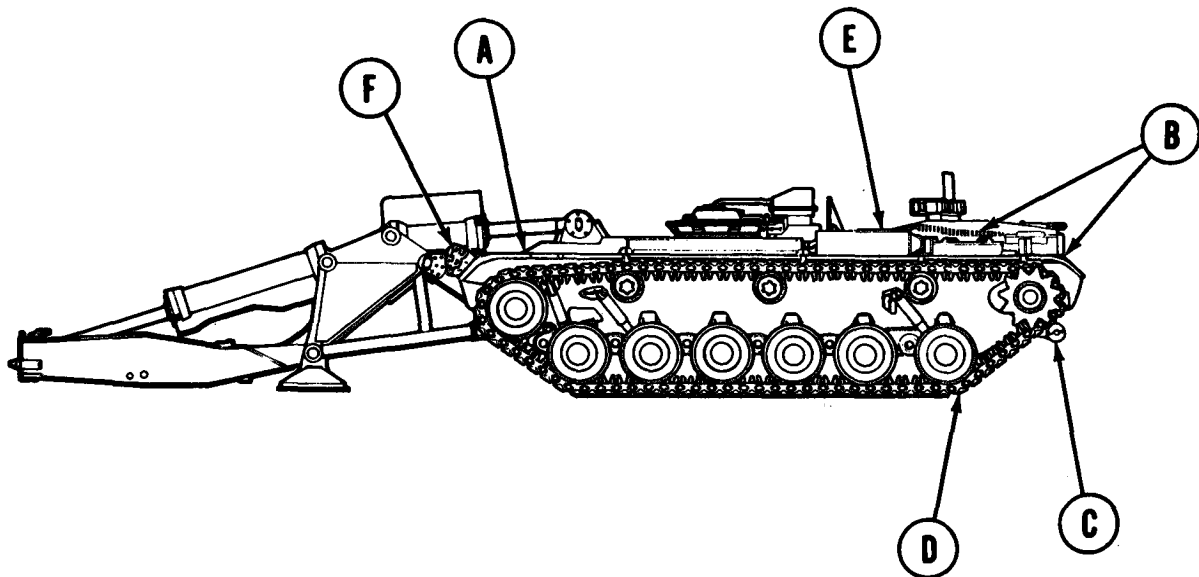
Provides optimum riding characteristics, over all types of terrain, by utilizing transverse torsion bars and individually supported roadwheels.

(E) AIR CLEANER

Filters engine combustion air prior to delivery to engine turbocharger. Draws air, through air intake screen. Removes larger dust particles in precleaned section and exhausts them by blower motor. Removes finer particles by surface-type air filter.

(F) SMOKE GRENADE LAUNCHER

Provides the vehicle with a self-screening capability.



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LOCATION AND DESCRIPTION OF INTERNAL COMPONENTS (1 of 2)

(A) TRANSMISSION

Transmits engine power to the final drives to move the vehicle. The transmission has two forward ranges, low and high, and one reverse range.

(B) UNIVERSAL JOINT

Transmits power from transmission to final drives. There is one universal joint on each side of the transmission.

(C) ENGINE WITH POWER TAKEOFF

Provides power to move vehicle. Provides power to drive hydraulic pump.

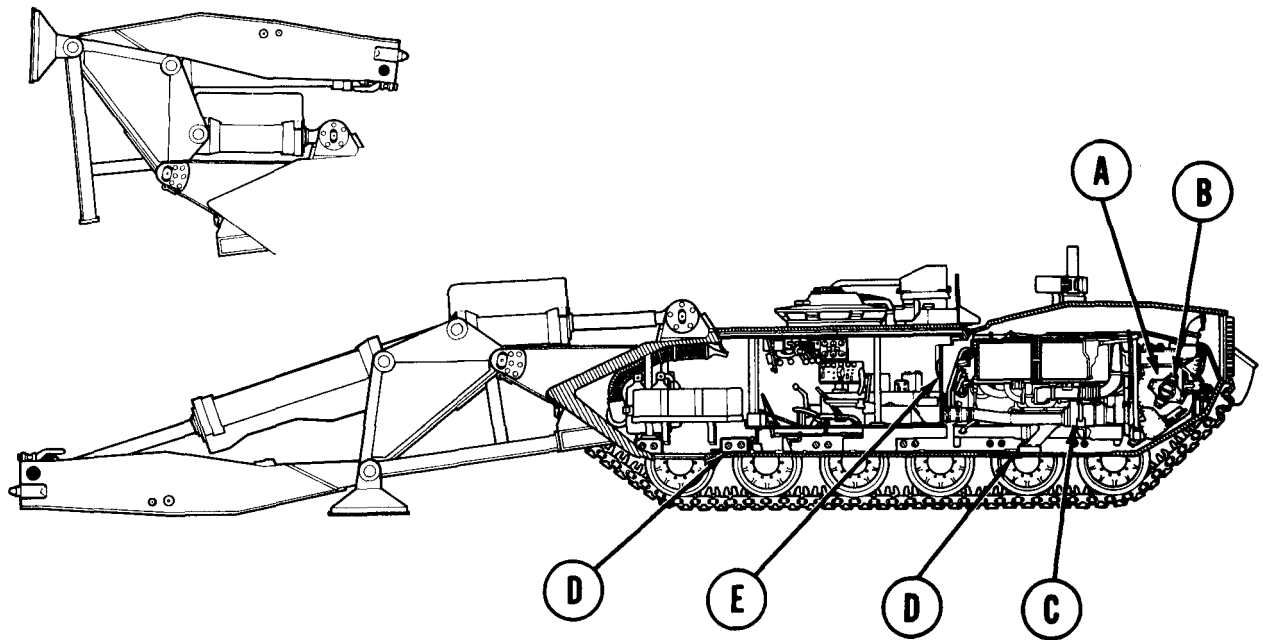
(D) HULL DRAIN VALVES

Provides means for draining any water accumulated.

(E) ENGINE AIR CLEANER INTAKE

Provides means of drawing air from crew compartment for air cleaners. This is usually done during fording or during operation under dusty or sandy conditions.

LAUNCHER IN
TRAVEL POSITION



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LOCATION AND DESCRIPTION OF INTERNAL COMPONENTS (2 of 2)**(F) DRIVER'S CONTROL PANELS**

Provides driver with means of monitoring all systems during vehicle operation. The panels are mounted to the right of the driver's station.

(G) BATTERIES

The six vehicle batteries are located forward of the operator on the hull floor, three on either side of the vehicle. They supply a 24-volt power source for the vehicle electrical system.

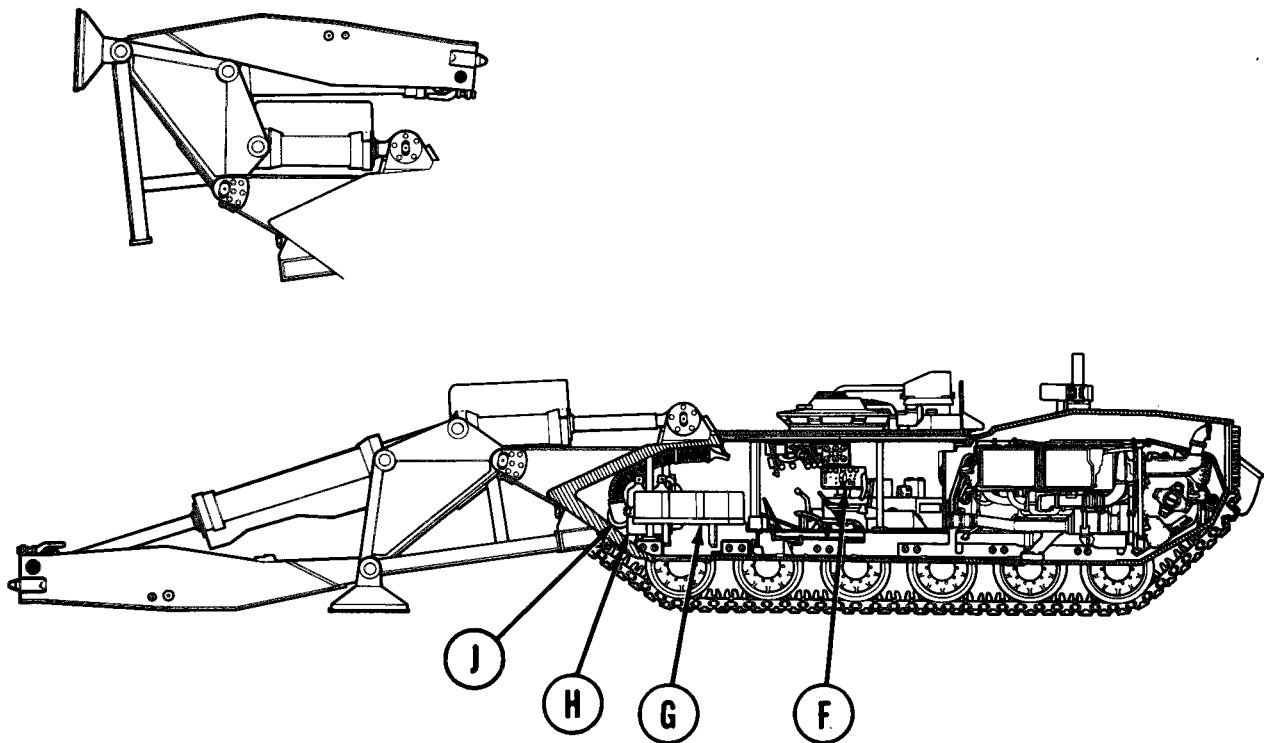
(H) FIXED FIRE EXTINGUISHERS

Provides a first and second shot of CO₂ into the engine compartment in the event of a powerplant fire.

(J) PERSONNEL HEATER

Provides heated air to hull for crew comfort during cold temperatures. Heater is turned on by a switch located on driver's control panel.

LAUNCHER IN
TRAVEL POSITION



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LOCATION OF DATA PLATES

Refer to TM 5-5420-202-10 for location of data plates.

EQUIPMENT DATA

Engine Characteristics

Manufacturer	Teledyne Continental
Model	AVDS-1790-2D
Speed:	
Governed, full load	2400 rpm
Governed, no load	2550 rpm
Idle	700-750 rpm
Horsepower, gross	750 bhp at 2400 rpm
Cooling system	Engine driven fans for cylinders, transmission and engine oil coolers
Induction system	Supercharged by two exhaust driven turbochargers
Oil pressure:	
At 700 rpm idle	20 psi with SAE 30 at 180°F
At 2400 rpm full load	50 to 70 psi with SAE 30 at 180°F
Oil temperature:	
Normal	180°F at 60°F ambient
Maximum	250°F
Lubricating oil:	
Type	LO 5-5420-202-12
Capacity	Dry engine-20 gallons, oil change- 17 gallons
Fuel:	
Type	Diesel
Grade	40 cetane min.
Specification	VV-F-800
Consumption	310 lb/hr at 2400 rpm and 750 bhp

Transmission Characteristics

Manufacturer	Detroit Allison Diesel
Model	CD-850-6A
Type	Cross-drive with hydraulic torque converter
Suspension	3-point (attached to engine and two transmission mounts)
Oil pumps:	
Number	Two
Oil capacity	20 gal (approx.)
Oil capacity, including coolers	25 gal (approx.)
Oil filter	air-maze, double, sock- type

Fuel System Characteristics

Fuel tanks:	
Capacity (total)	385 gallons
Left tank	189 gallons
Right tank	196 gallons
Construction	Welded aluminum
Intertank isolation valve:	
Type	3-inch butterfly
Rated flow	50 gpm
Operated pressure	4.5 psi
Fuel return selector valve:	
Type	Ball rotor
Rated flow	3.7 gpm
Operated pressure	30 psi
Fuel tank electrical fuel pumps:	
Type	Impeller (indirect drive, dry motor, hermetically sealed, magnetic coupling)
Rated capacity	220 gph at 5 psi
Check valve:	
Type	Double swing-check
Operating pressure	50 psi
Opening pressure	0.2 psi max
Primary fuel filter (disposable element)	40 micron
Fuel/water separator fuel filter (disposable inner element)	5 micron
Water separator filter (disposable inner element)	5 micron
Water separator filter (disposable outer element)	10 micron
Manifold heater fuel filter	10 micron
Purge line fuel filter	10 micron
Manifold heater solenoid valves	Fuel shutoff
Manifold heater spark plug	Gap 0,094 to 0.114 in.

Electrical System Characteristics

Air cleaner blower:	
Operating voltage	24 volts
Maximum current	7.5 amps at 77°F
Full load speed	11,500 rpm
Air flow (cubic feet per min)	60 CFM
Star ter assembly:	
Type	Solenoid-operated, enclosed lever
Voltage	24 vdc
Maximum rated current at full load	800 amp
Batteries:	
Type	6 TN (MS35000-3)
Voltage	12
Ampere-hour rating	100
Alternator (HEU Configuration)	
Voltage	Regulated between 27 to 29 vdc
Output	650 amps
Voltage Regulator (HEU Configuration)	
Type	Solid state
Voltage	28 vdc
Output	650 amps – 28 volts
Generator	
Voltage	Regulated between 25.8 to 30.2 vdc
Output	300 amps – 28 volts
Voltage Regulator:	
Type	Solid state
Voltage	28 vdc
Output	300 amps
Weight	6 lb
Special provisions	Waterproof
Headlights:	
Service drive headlamp	24 v sealed beam
Blackout drive (infrared headlamp)	24 v sealed beam
Blackout drive lamp	32 cp, 24-28 vdc
Blackout marker lamp	3 cp, 24-28 vdc
Taillights:	
Right taillight	
Blackout drive/marker lamp	3 cp, 24-28 vdc
Blackout stop lamp	3 cp, 24-28 vdc
Left taillight	
Service tail lamp	3 cp, 24-28 vdc
Blackout drive/marker lamp	3 cp, 24-28 vdc
Service stop lamp	32 cp, 24-28 vdc
Domelight and rheostat:	
Domelight	6 cp, 24-28 V and 15 cp, 24-28 V
Infrared powerpack:	
Input voltage	24 vdc

Suspension System Characteristics

Torsion bar:	
Number	12
Weight	105 lb
Diameter	2.35 in.
Length	82.25 in.
Roadwheels:	
Number	12 dual
Diameter	26 in.
Tire width	5.75 in.
Surfacing	Rubber, 1.5 in. thick
Compensating idler wheels:	
Number	2 dual
Diameter	26 in.
Tire width	5.75 in.
Surfacing	Rubber, 1.5 in. thick
Drive sprocket:	
Number	4 (one pair each side)
Track:	
Number	2 (one per side)
Type	T142/T97
Width	28 in.
Guide type	Centerguide
Length (ground contact)	166.72 in.
Distance between tracks center line	115 in.
Track pads:	
Number	320 (two per track shoe)
Thickness	2.12 in.
Height (above steel grouser)	0.89 in.
Contact area	67.1 sq. in.
Type	Rubber (replaceable)
Track shoes:	
Number	80 (each track)
Weight (per shoe assembly)	75.5 lb
Track guide type	
Centerguide	
Track adjusting link:	
Number	2 (one per track)
Assembly type	Screw link or grease actuated
Track support rollers:	
Number	6/10 dual (3 or 5 support) rollers
Diameter	13.56 in.
Tire width	3.5 in.
Surfacing	Rubber, 0.75 in. thick
Shock absorbers:	
Number	6 (3 per side)

Fire Extinguishers System Characteristics

Fixed:

Type	Two shot CO ₂ system
Number	Three ten-pound charged bottles
First shot	One ten-pound bottle
Second shot	Two ten-pound bottles
Force required to actuate handle	55 lb maximum
Actuation time for first shot	4 sec maximum
CO ₂ discharge time delay	11 sec maximum
Peak CO ₂ concentration	70% minimum
CO ₂ system total discharge time	60 sec maximum

Auxiliary:

Type	Portable CO ₂
Number	One 2.5 pound unit
Location	Behind operator's seat

Personnel Heater System Characteristics

Personnel heater:

Current consumption	Max. values
Starting	13 amp above 45°F 23 amp below 45°F
Operating	12 amp above 45°F 18 amp below 45°F
Fuel	Any hydrocarbon fuel ranging from gasoline per MIL-G-3056 (use type II below 0°F) through DF1, DF2, or DFA per spec. VV-F-800 down to cloud point of fuel except to -65°F when using DAF
Fuel pressure	3 to 15 psig at fuel inlet at 70°F ambient

CHAPTER 2

PRINCIPLES OF OPERATION

Section I - FUNCTIONAL DESCRIPTION

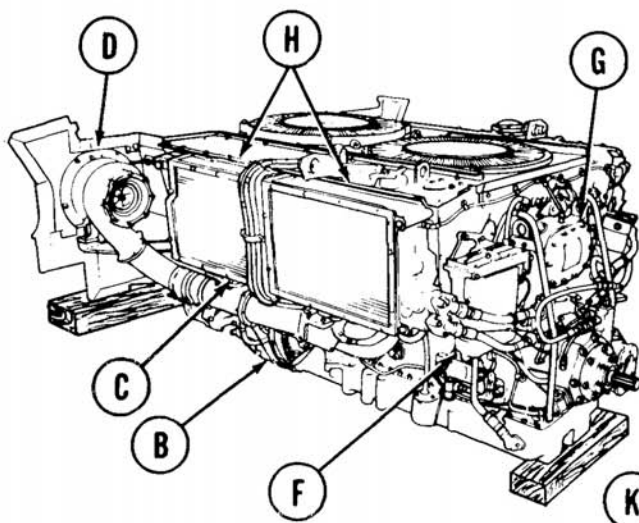
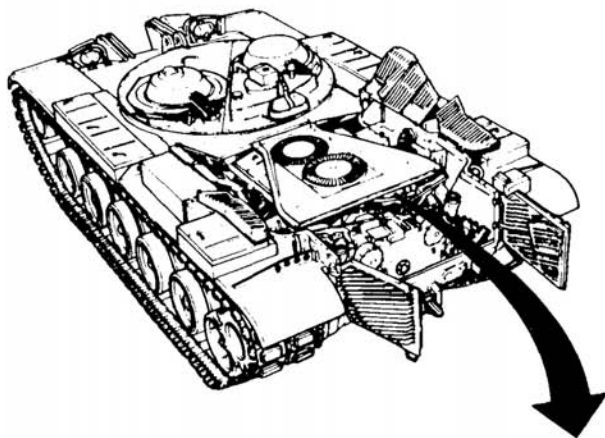
This chapter contains functional descriptions of engine and hull systems allocated to organizational maintenance, describing how the systems operate and how the systems relate to other equipment systems of the engine and hull. Systems described in Section II are:

- Engine
 - Engine lubrication subsystem
 - Engine fuel system
- Fuel system
 - Air cleaner assembly
 - Air cleaner hoses and screens
 - Manifold heater
- Fuel tanks and distribution system
 - Primer pump
 - Accelerator controls
- Exhaust system
- Cooling system
- Electrical system
 - Charging system
 - Starting system
 - Indicators, gages, and controls
 - Lighting system
 - Hull wiring harnesses/connectors
 - Radio interference suppression
- Transmission
- Final drive and coupling (universal joint)
- Brake system
- Tracks and suspension system
- Steering system
- Hull exterior
- Hull interior
- Personnel heater system
- Speedometer and tachometer
- Fixed fire extinguisher system
- Engine smoke generating system

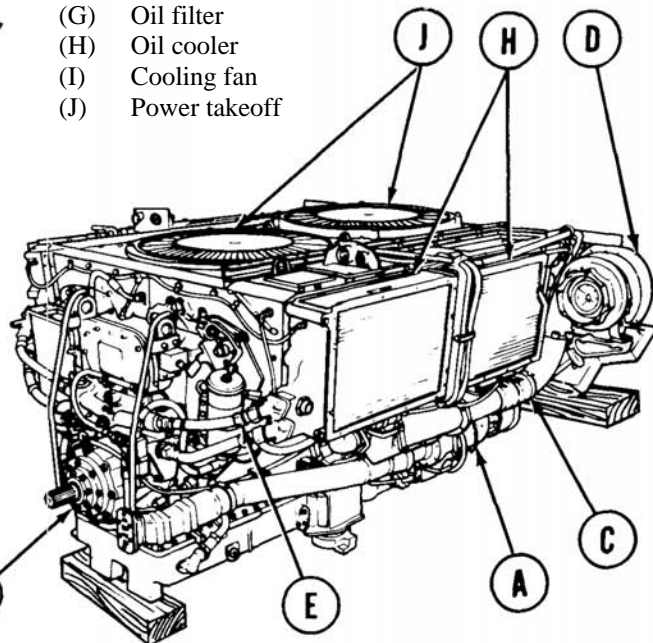
Section II - SYSTEMS OPERATION

ENGINE. The M60A1 AVLB is equipped with a Continental Model AVDS-1790-2D, that is a 12 cylinder, 90°, V-type, 4 cycle, air cooled, turbosupercharged diesel engine. Features of the engine include:

- 28-volt direct current air-cooled generator that provides vehicle electrical power.
- 28-volt direct current oil-cooled alternator that provides vehicle electrical power (HEU Configuration).
- 28-volt solenoid operated starter with circuitry that prevents starter activation when vehicle batteries are improperly charged.
- Intake manifold heaters that preheat intake air for easier cold weather starting.
- Turbosuperchargers that increase air intake pressure to produce a high density air that increases engine power.
- Fuel filter and fuel/water separator that remove contaminants and water from the diesel fuel.
- Oil filter and coolers that keep engine and transmission oil free of contaminants and at operating temperature.
- Cooling fans that cool the engine by drawing air from the engine underside through the cylinder fins.
- Power takeoff that drives the launcher hydraulic system pump.



LEFT SIDE

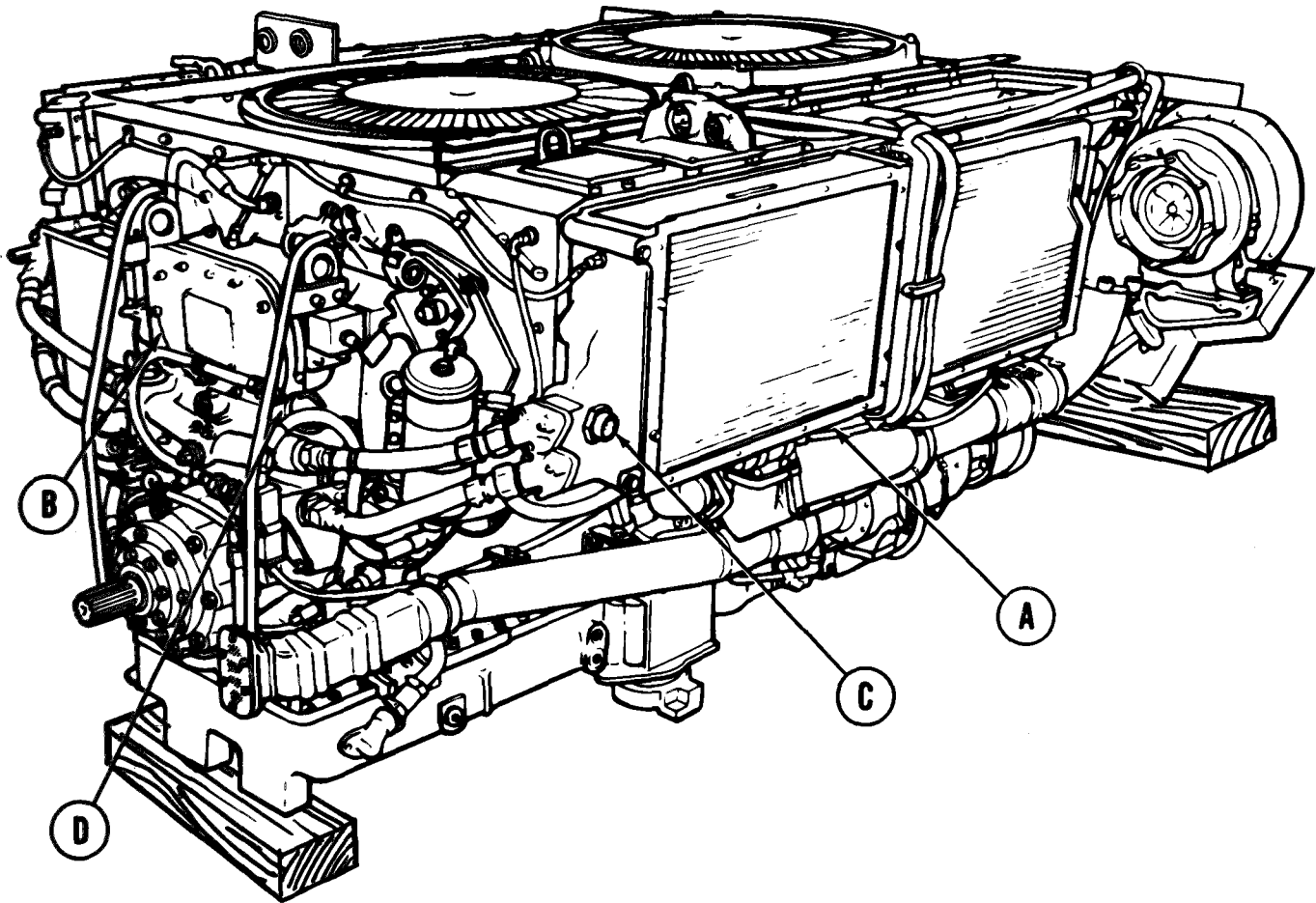


RIGHT SIDE

TA249772

SYSTEMS OPERATION - Continued

ENGINE LUBRICATION SUBSYSTEM. Forced feed system, drawing oil from oil pan. Oil is forced through engine oil coolers and oil filter to engine oil galleries, bearings, turbosuperchargers, fuel injection pump, and piston cooling spray jets. A pressure relief valve returns incoming excess unfiltered oil to oil pan. Oil filter and oil cooler bypass valves permit oil to bypass filters if clogged. Engine and transmission oil cooling is accomplished by external oil coolers on sides of engine. Bypass valves in each cooler control oil temperature.

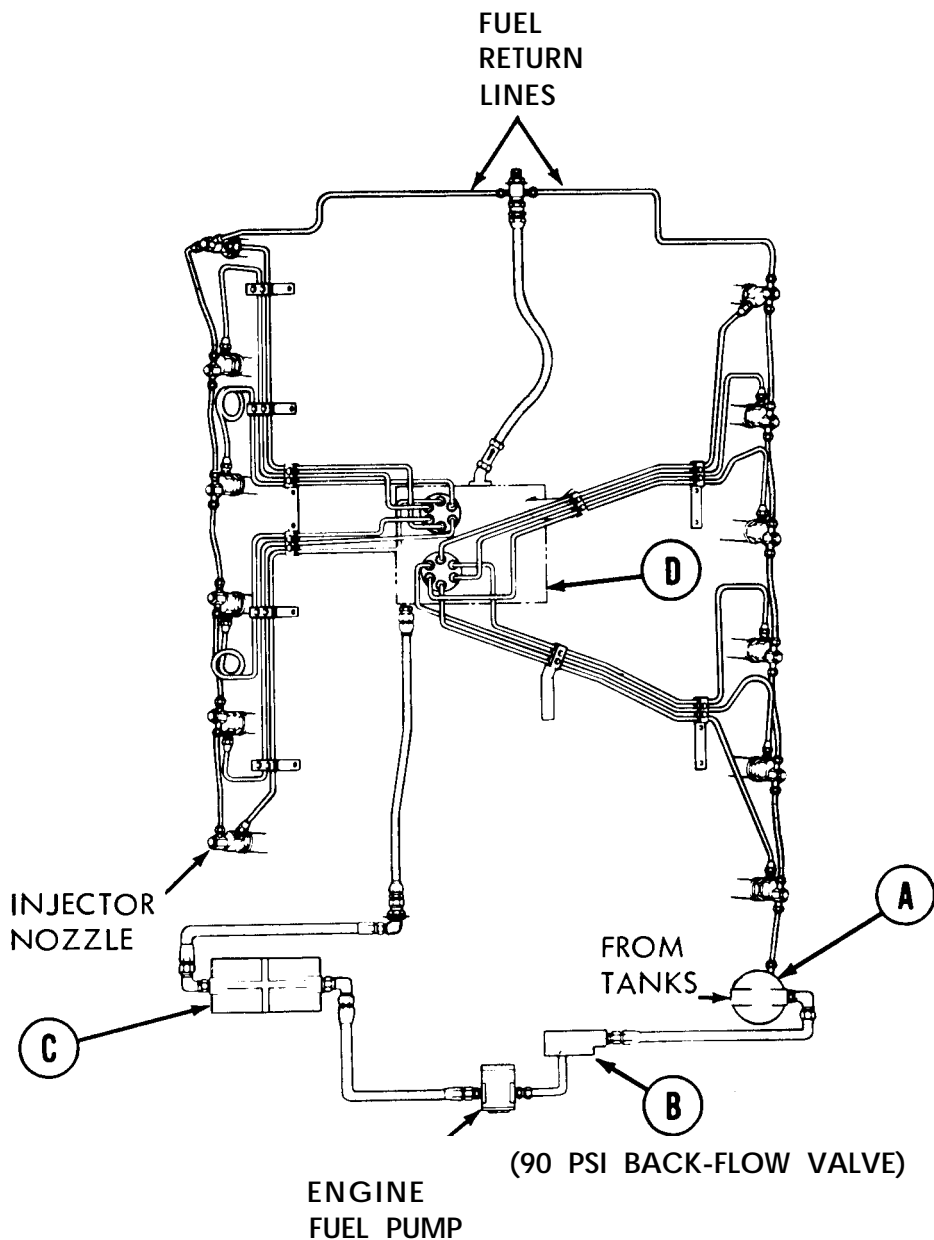


- (A) OIL COOLER
- (B) OIL FILTER
- (C) OIL COOLER BYPASS VALVE
- (D) OIL FILTER BYPASS VALVE

TA249773

SYSTEMS OPERATION - Continued

ENGINE FUEL SYSTEM. Fuel flows from tanks to primary fuel filter, through main fuel backflow valve to engine-driven, vane-type fuel pump that increases fuel pressure to fuel injector pump. Fuel from engine fuel pump is filtered through fuel-water separator into injector fuel pump that delivers accurately measured quantities of fuel under high pressure to each cylinder.

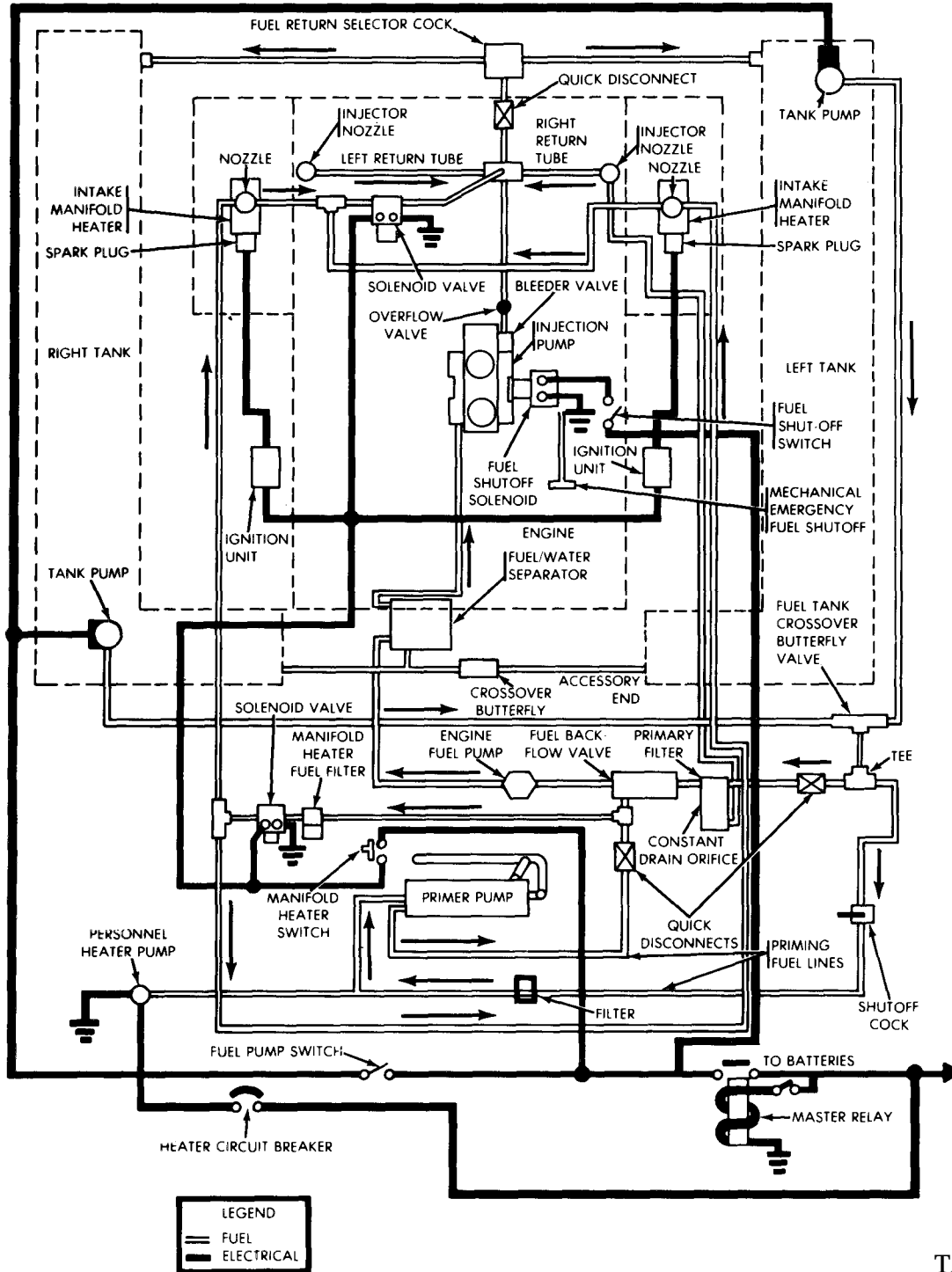


- (A) PRIMARY FUEL FILTER
- (B) FUEL BACKFLOW VALVE
- (C) FUEL-WATER SEPARATOR
- (D) FUEL INJECTOR PUMP

TA249774

SYSTEMS OPERATION - Continued

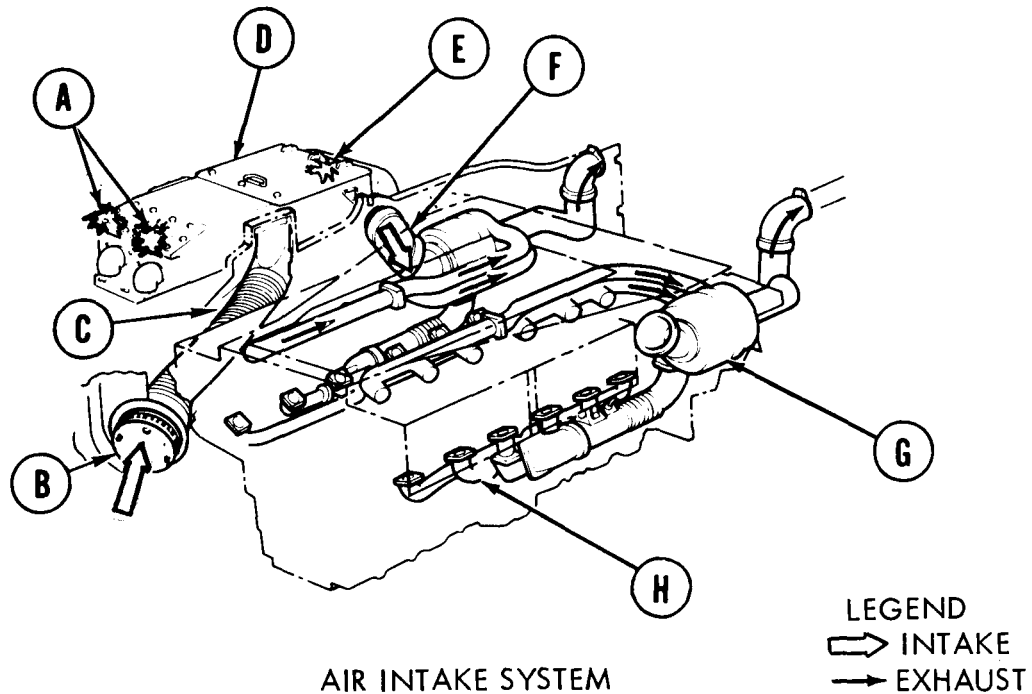
FUEL SYSTEM. Three functions: carrying fuel supply, supplying fuel to engine, supplying fuel to personnel heater and engine air intake manifold heaters. Accelerator controls and linkages are a major part of this system. For engine smoke generator system see page 2-34.



TA249775

SYSTEMS OPERATION - Continued

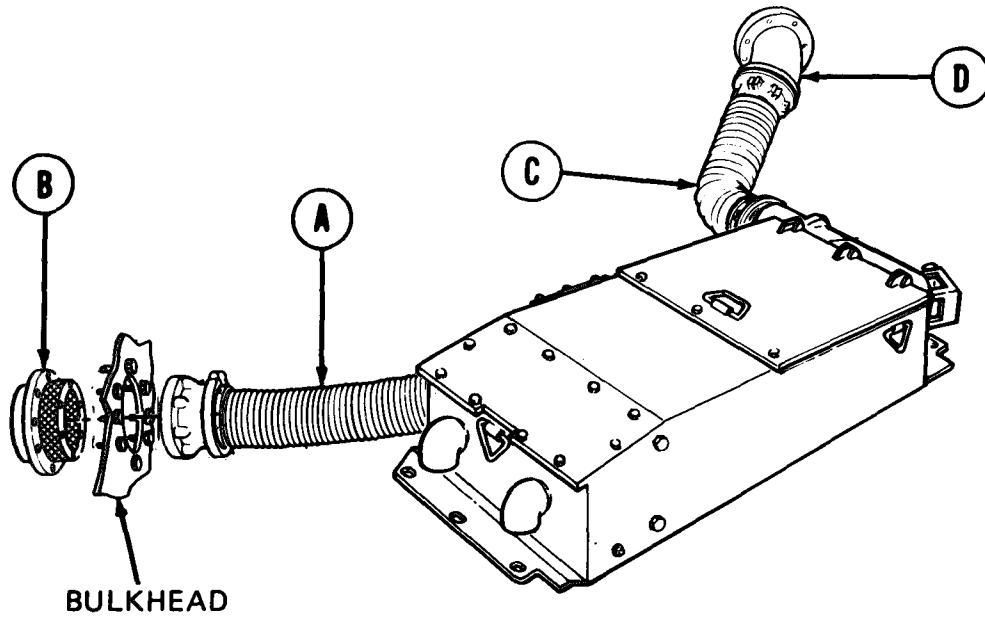
AIR CLEANER ASSEMBLY. Exhaust-driven turbosupercharger draws air from crew or engine compartment to air cleaners where two centrifugal fans clean air in primary separator stage. Air is drawn into dry-type, layer-filtration filters and is drawn through outlet hoses into turbosupercharger and forced into engine air intake manifolds.



- (A) AIR CLEANER BLOWER FANS
- (B) ENGINE AIR INTAKE
- (C) AIR INTAKE HOSE
- (D) AIR CLEANER
- (E) DRY-TYPE FILTER UNIT
- (F) AIR OUTLET HOSE ASSEMBLY
- (G) TURBOSUPERCHARGER
- (H) AIR INTAKE MANIFOLD

SYSTEMS OPERATION - Continued

AIR CLEANER HOSES AND SCREENS: Air cleaner intake hoses draw air from crew compartment or engine compartment to air cleaner through screen on reversible air intake mounted in bulkhead. Air outlet hoses direct filtered air from air cleaners to turbosuperchargers.

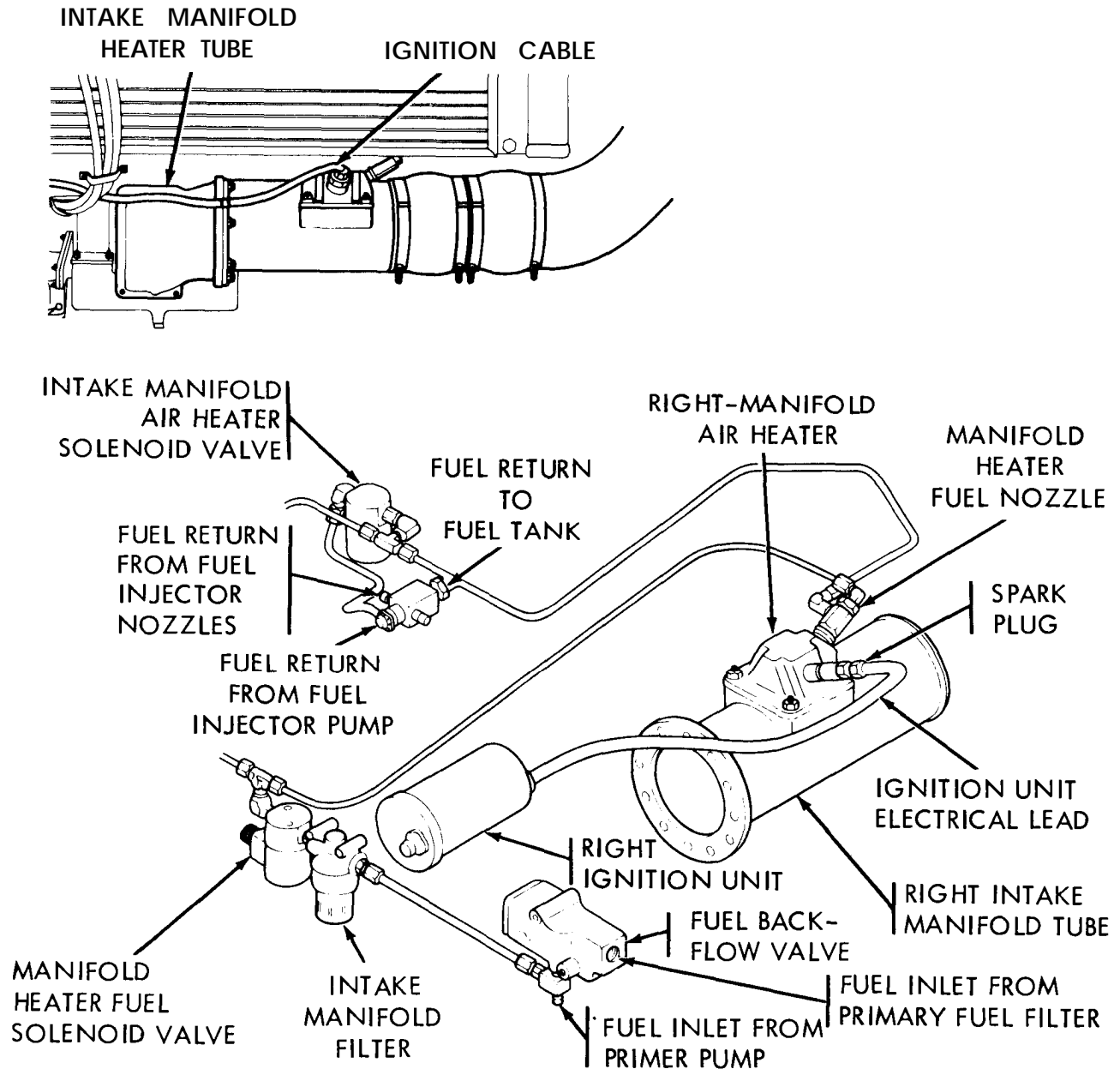


- (A) AIR INTAKE HOSE
- (B) REVERSIBLE AIR INTAKE
- (C) AIR OUTLET HOSE
- (D) AIR CLEANER TO TURBOSUPERCHARGER ELBOW

TA249777

SYSTEMS OPERATION - Continued

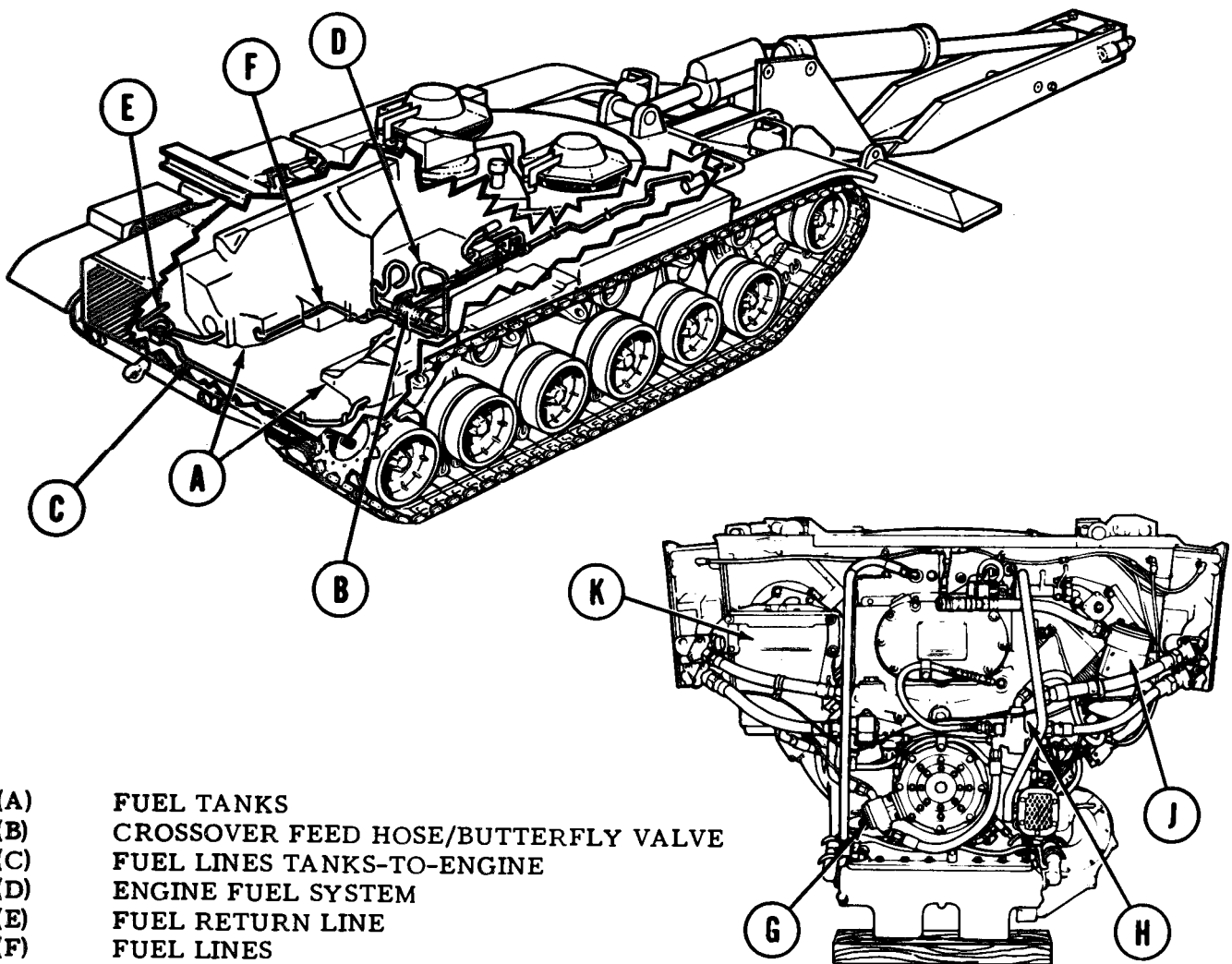
MANIFOLD HEATER. Manifold heater fuel system uses plastic and steel tubing to supply fuel from the primer pump pressure fuel line through the manifold heater fuel filter and manifold heater solenoid valve to manifold heater nozzles. Excess fuel from nozzles is returned through intake manifold air heater solenoid valve to engine fuel return system. Heaters mounted on intake manifolds use a spark plug to ignite and burn pressurized engine fuel to provide heated air for cold weather starting.



TA249778

SYSTEMS OPERATION - Continued

FUEL TANKS AND DISTRIBUTION SYSTEM. Two aluminum fuel tanks, one on either side of engine compartment, are interconnected by a flexible cross-feed hose fitted with a butterfly valve. Hose and valve are located beneath turret subfloor. Twelve stainless steel fuel lines carry fuel under pressure from fuel pumps on fuel tanks to fuel injector nozzles in each cylinder head. Fuel leakage from nozzles is carried through fuel return tubes on each cylinder back to fuel return system to fuel tanks. Flexible fuel hoses and tubing are interconnected to carry fuel to powerplant and personnel heater. Electric fuel pumps in each tank force fuel through fuel lines to engine fuel system. Backflow valve between engine fuel pump and primary fuel filter retains fuel in engine fuel lines when engine is shut off.

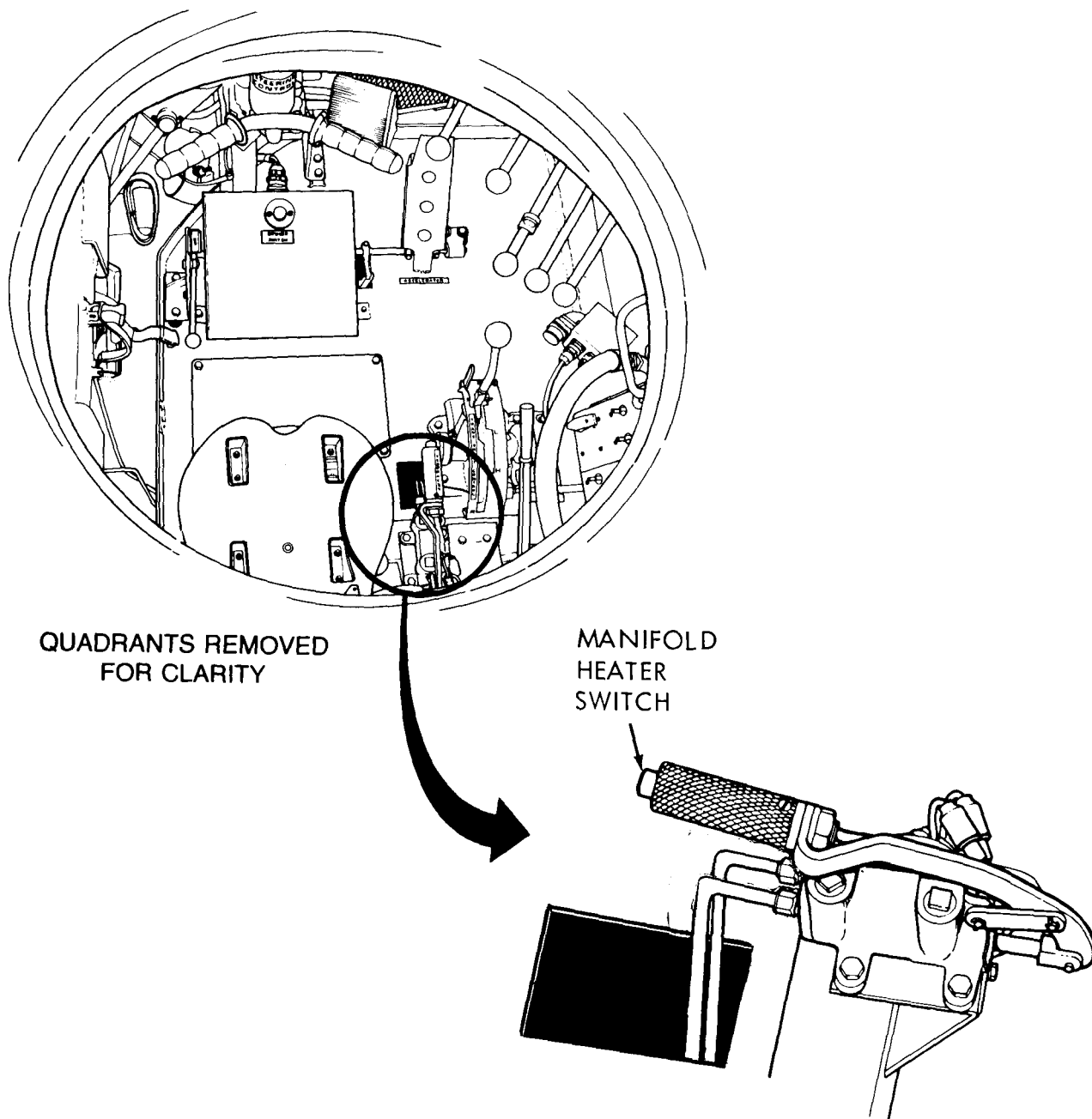


- (A) FUEL TANKS
- (B) CROSSOVER FEED HOSE/BUTTERFLY VALVE
- (C) FUEL LINES TANKS-TO-ENGINE
- (D) ENGINE FUEL SYSTEM
- (E) FUEL RETURN LINE
- (F) FUEL LINES
- (G) ENGINE FUEL PUMP
- (H) BACKFLOW VALVE
- (J) PRIMARY FUEL FILTER
- (K) FUEL/WATER SEPARATOR

TA249779

SYSTEMS OPERATION - Continued

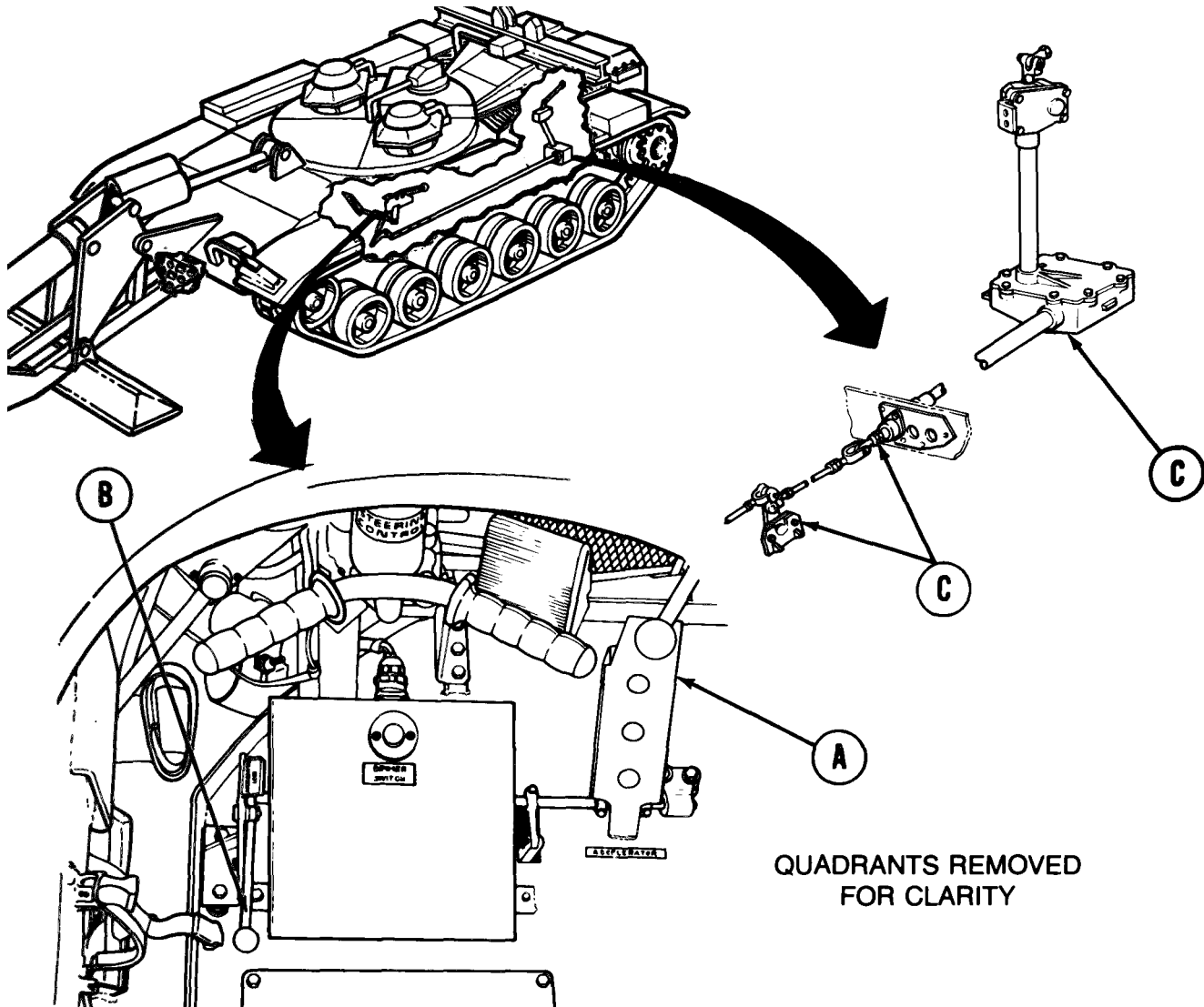
PRIMER PUMP. Provides pressurized fuel into engine fuel lines by driver-operated manual pump. Fuel is forced into manifold heater fuel lines and pump also purges fuel system of air. Air is forced into fuel tanks. Button on pump handle activates spark plugs on manifold heater system.



TA249780

SYSTEMS OPERATION - Continued

ACCELERATOR CONTROLS. Engine speed is controlled by accelerator control pedal and by a series of mechanical linkage. Accelerator linkage passes along hull floor and is connected with a yoke to an eye connection on engine accelerator linkage. An accelerator lock lever holds accelerator pedal in any required position. Adjustable return spring, mounted on accelerator linkage, returns pedal to up position when pedal or manual control lever is released.

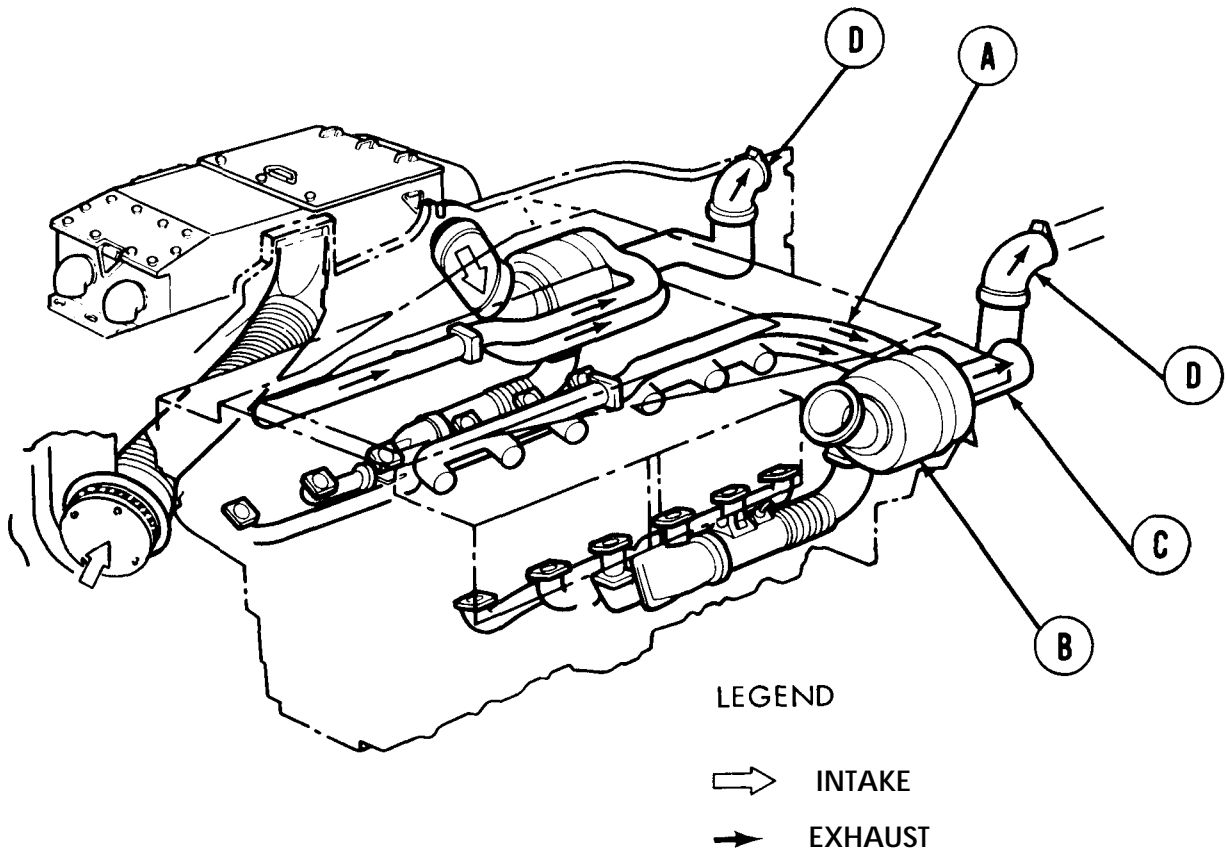


- (A) ACCELERATOR PEDAL
- (B) ACCELERATOR LOCK LEVER
- (C) ACCELERATOR LINKAGE

TA249781

SYSTEMS OPERATION - Continued

EXHAUST SYSTEM. Exhaust gases from cylinders travel through a pair of exhaust manifolds into exhaust-driven turbosuperchargers and gases are expelled into a pair of exhaust pipe assemblies that conduct gases upward through transmission shroud into outlet elbows, out engine exhaust doors and away from vehicle.

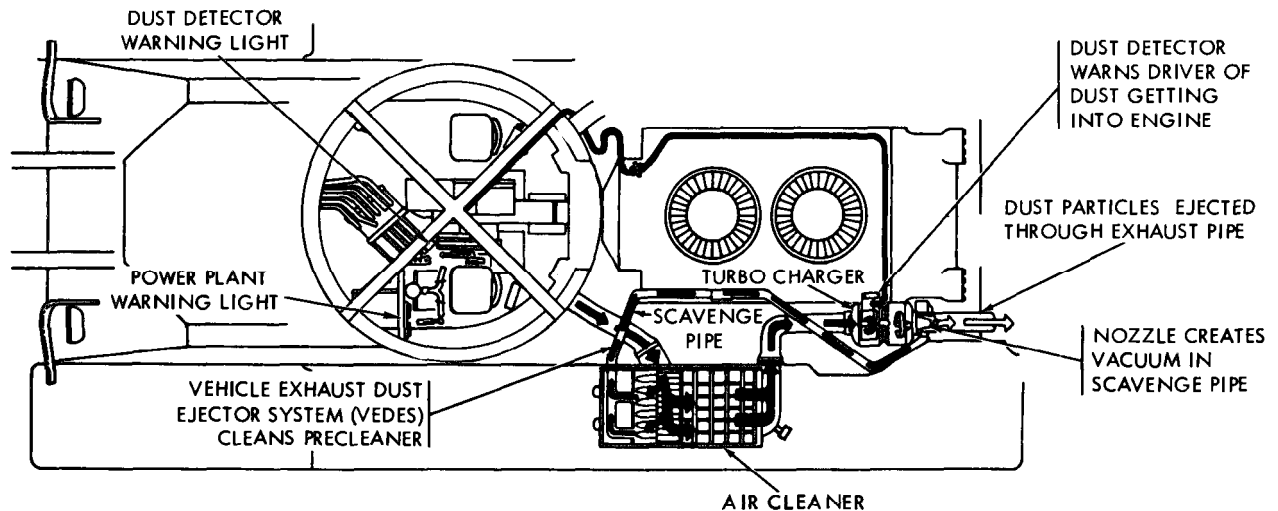


EXHAUST SYSTEM

- (A) EXHAUST MANIFOLD
- (B) TURBOSUPERCHARGER
- (C) EXHAUST PIPE
- (D) EXHAUST OUTLET ELBOW

PRINCIPLES OF OPERATION - Continued

VEHICLE EXHAUST DUST EJECTOR SYSTEM (VEDES). The vehicle exhaust dust ejector system (VEDES) replaces the air cleaner centrifugal fans. The air cleaner housing is modified to plug the fan exhaust elbows and to accommodate a tube manifold with its associated hoses, clamps, and mounting bracket installed in place of the fans. A system of dust scavenger tubes, check valves, and exhaust pipes with integral dust ejectors is mounted along each cylinder bank above and parallel to the engine and transmission oil coolers. VEDES scavenges dust from the precleaned section of the air cleaners through suction action of the exhaust ejectors.



DUST DETECTOR SYSTEM. The Dust Detector System is to alert the driver when the air induction system allows dust to bypass the filter.

The Dust Detector System uses engine air induction manifold pressure to circulate air through filter strips in the dust detectors mounted in the turbosupercharger compressor housings. When the filter strip(s) become clogged, the resultant change in pressure actuates a pressure switch which illuminates the powerplant warning light and the dust detector warning light in the driver's compartment.

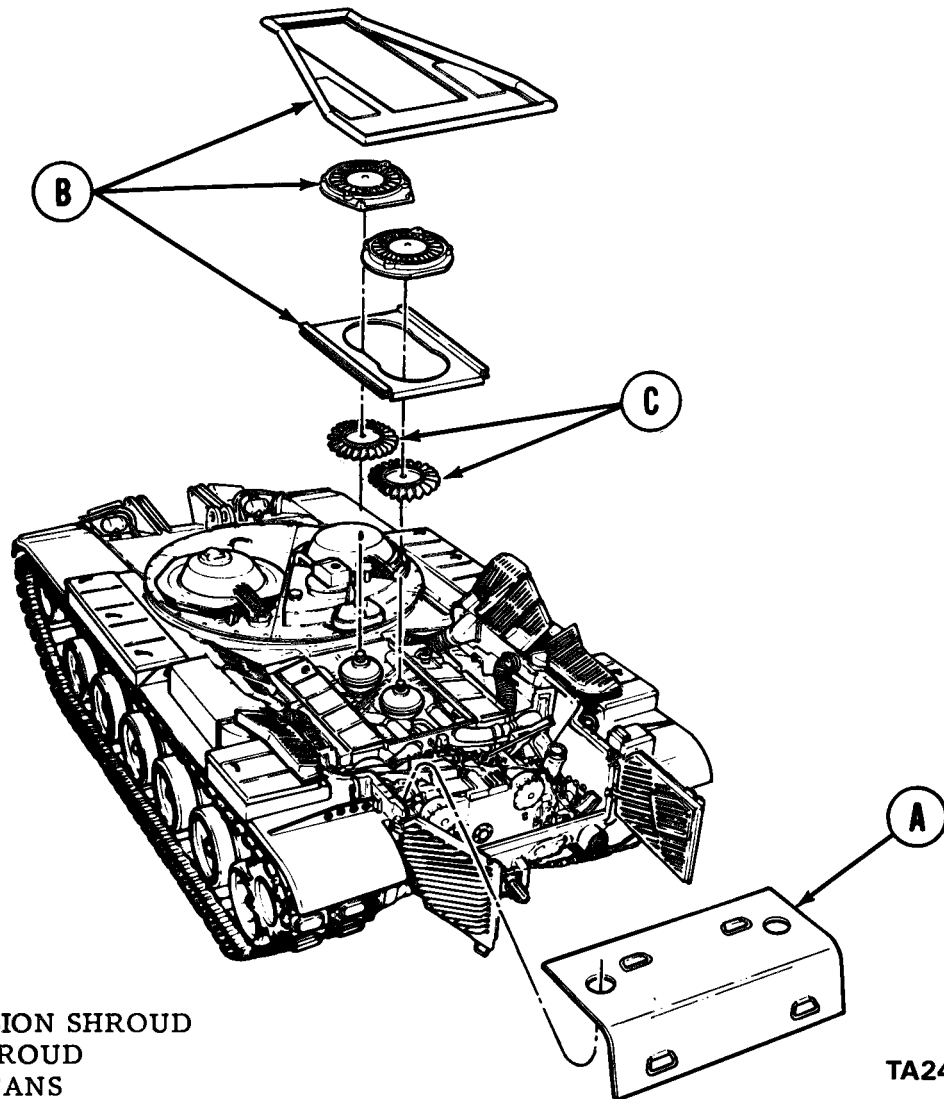
SYSTEMS OPERATION - Continued

COOLING SYSTEM. Air for cooling is drawn into engine compartment through air intake grille doors by two engine-mounted fans which draw air through engine and transmission oil coolers, over cylinder fins, and discharge air vertically from engine shroud. Baffles and deflectors on cooling fan shroud direct air flow across cylinders.

TRANSMISSION SHROUD. Insulated sheet metal assembly fitting over top and rear portions of transmission.

ENGINE SHROUD. Sheet metal assembly covering top of engine, guides hot air from engine cooling fans toward rear of tank. Removed with powerplant.

COOLING FANS. Mounted on oil-driven centrifugal clutch and disk towers on engine, fans draw air through engine and transmission oil cooler cores to cool circulated oil. Fans draw air over baffles and deflectors on engine and shroud to direct air flow across cylinders. Fans also force hot air and exhaust gases through exhaust doors.



- (A) TRANSMISSION SHROUD
- (B) ENGINE SHROUD
- (C) COOLING FANS

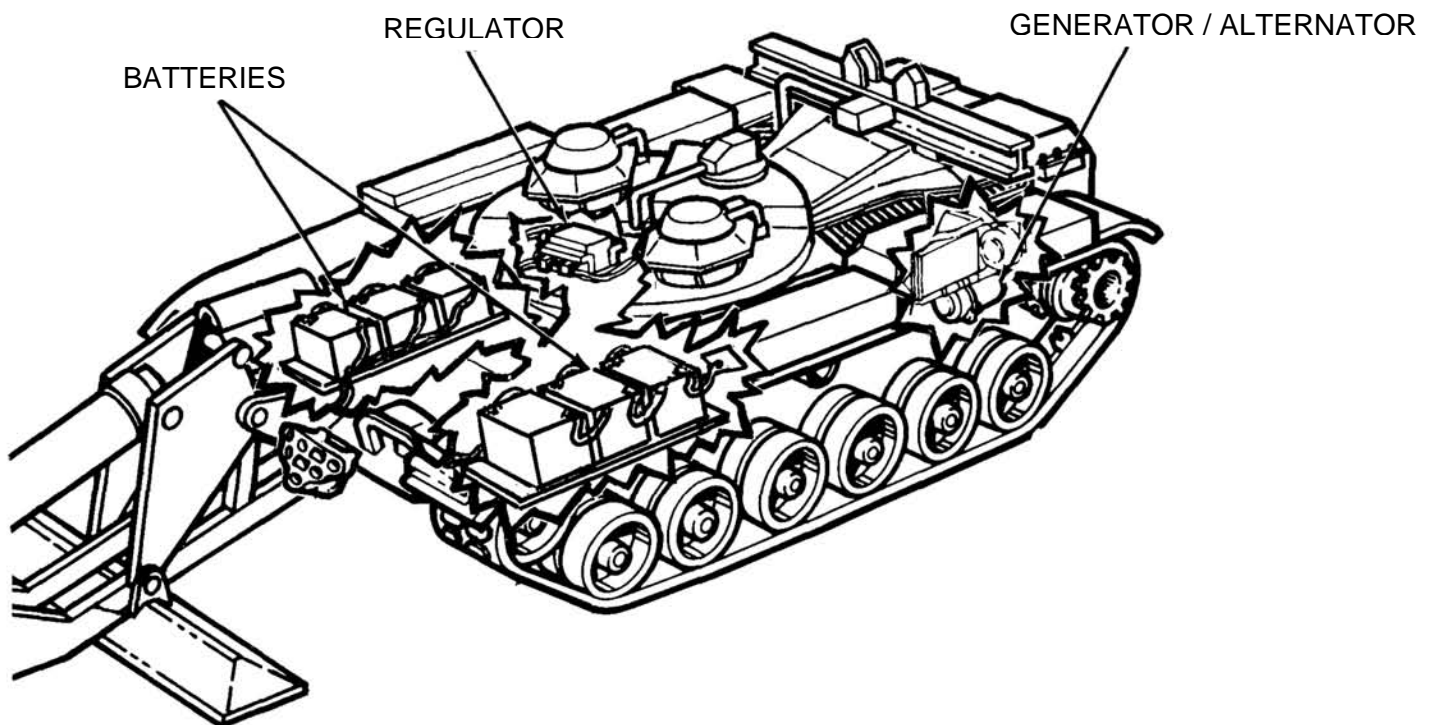
TA249783

SYSTEMS OPERATION - Continued

ELECTRICAL SYSTEM. An interrelated system of electrical components, consisting of starting system; charging system (batteries and generating system); lighting, including infrared lighting; electrical controls and gages; warning lights, switches, and transmitters; and various relays, circuit breakers, switches, and receptacles, all interconnected by wiring harnesses, cables, and leads located throughout tank hull and on engine and transmission. Repair of harnesses and powerplant wiring is limited to replacement of faulty connectors and to substitution of jumper wires for defective harness wires.

CHARGING SYSTEM. 28-volt, 300-ampere air-cooled generator produces direct current electrical output through voltage regulator to batteries. Regulator acts as reverse current relay preventing current flow back to generator when battery voltage exceeds generator output. Series parallel connected batteries supply direct current electrical power to master relay and starter relay.

CHARGING SYSTEM (HEU Configuration). 28-volt, 650-ampere oil-cooled alternator produces direct current electrical output, regulated by a voltage regulator, to batteries. Series parallel connected batteries supply direct current electrical power to master relay and starter relay.

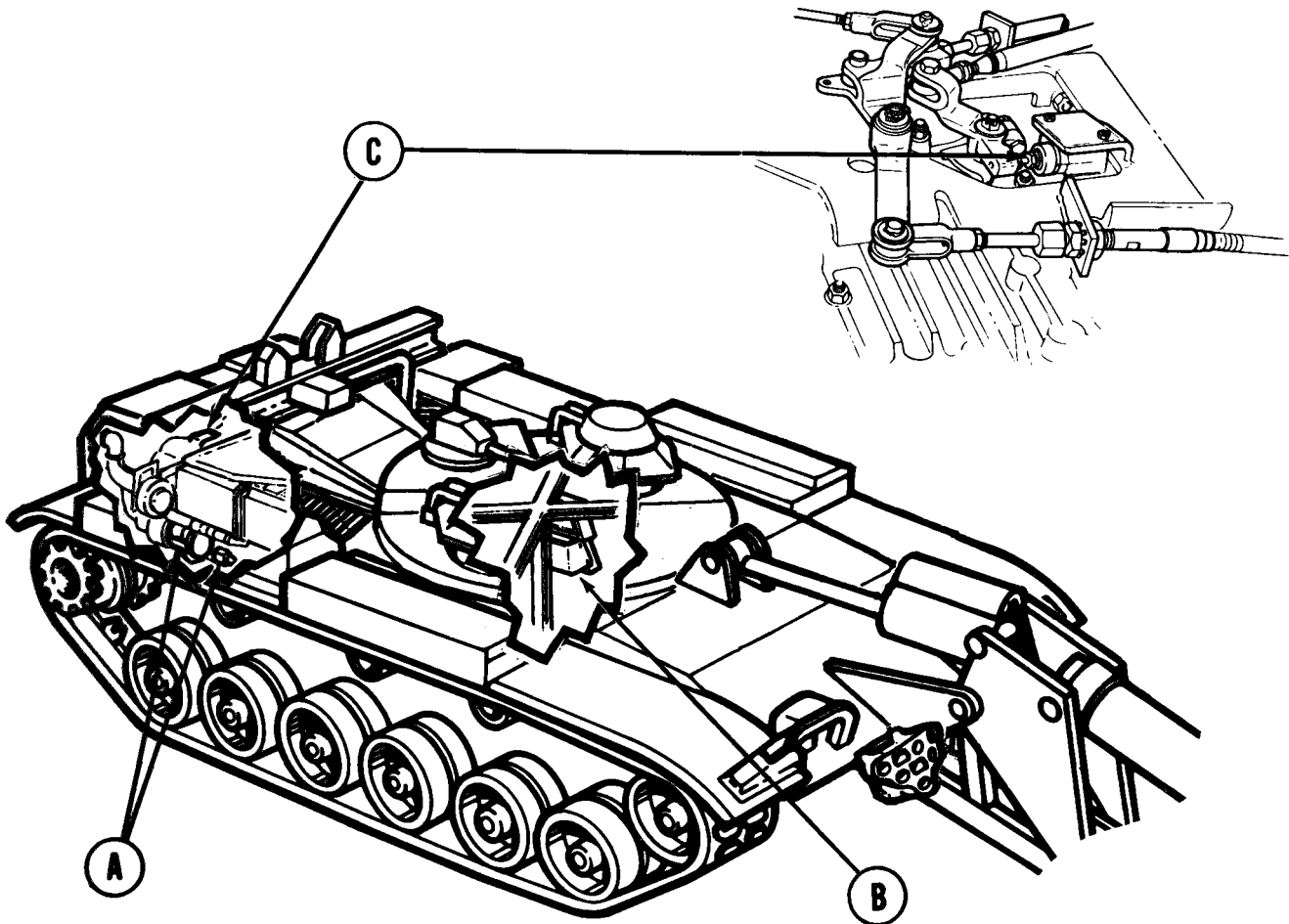


CHARGING SYSTEM

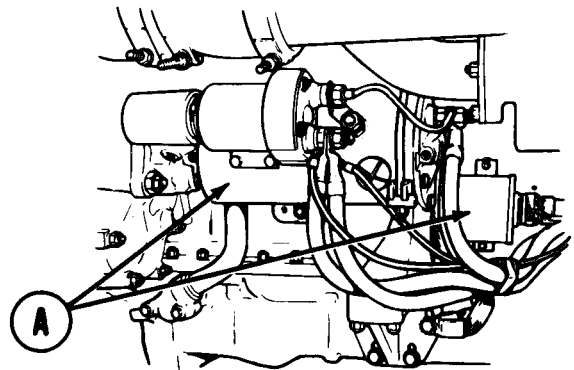
TA249784

SYSTEMS OPERATION - Continued

STARTING SYSTEM. Heavy-duty solenoid-operated starter is actuated by a starter button on the master control panel. Starter will not activate if neutral shift switch on transmission is not in neutral (N) or park (P) position. Starter low-voltage relay solenoid prevents energizing starter when battery voltage is below 11.75 volts.

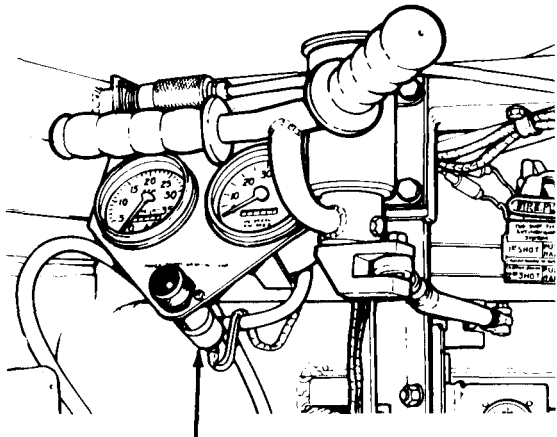
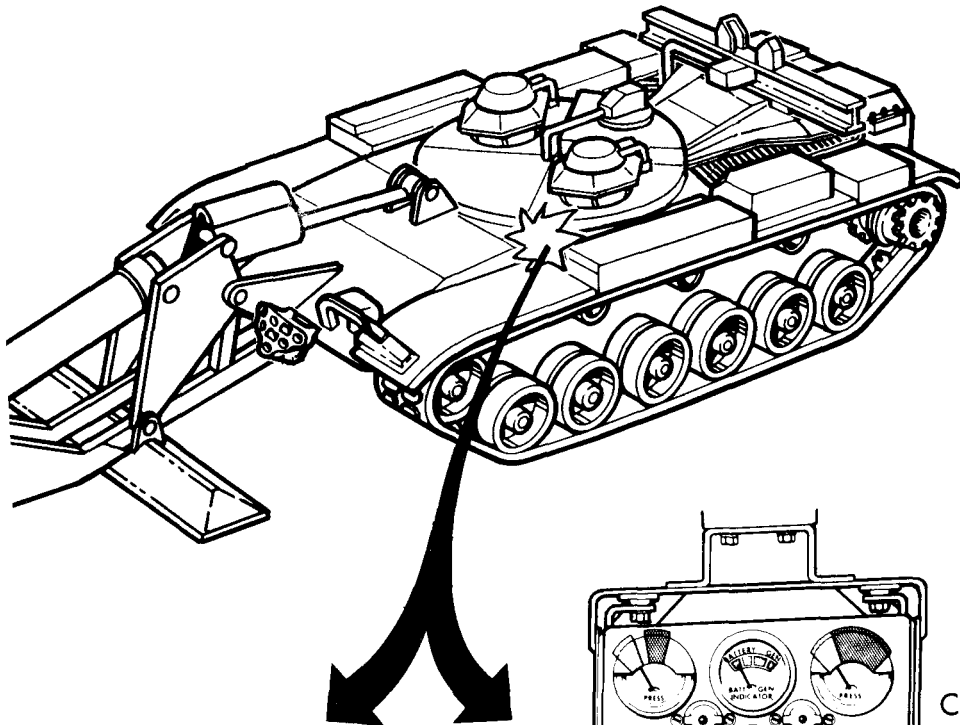


- (A) STARTER AND LOW VOLTAGE RELAY SOLENOID
- (B) STARTER SWITCH (MASTER CONTROL PANEL)
- (C) NEUTRAL SHIFT SWITCH

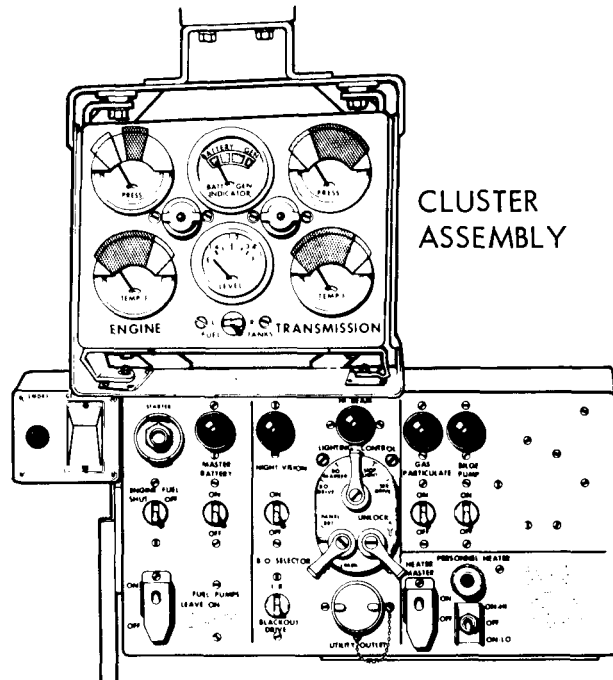


TA249785

INDICATORS, GAGES, AND CONTROLS. Master control panel contains switches, indicator lamps, and automatic-reset circuit breakers to control operation of various systems in hull. Cluster assembly contains engine and transmission oil temperature and pressure indicators, battery-generator indicator, fuel level indicator, fuel tank level switch, and indicator lights. Variable resistance type transmitters in engine and transmission oil systems provide electrical signals to drive oil temperature and pressure indicators. Mechanically actuated rheostats connected to fuel level circuit in fuel tanks vary electrical current to fuel tank indicator. Powerplant warning light is actuated by temperature and pressure-sensitive switches on engine and transmission when oil pressure falls or temperatures are beyond safe limits.



POWER PLANT
WARNING LIGHT



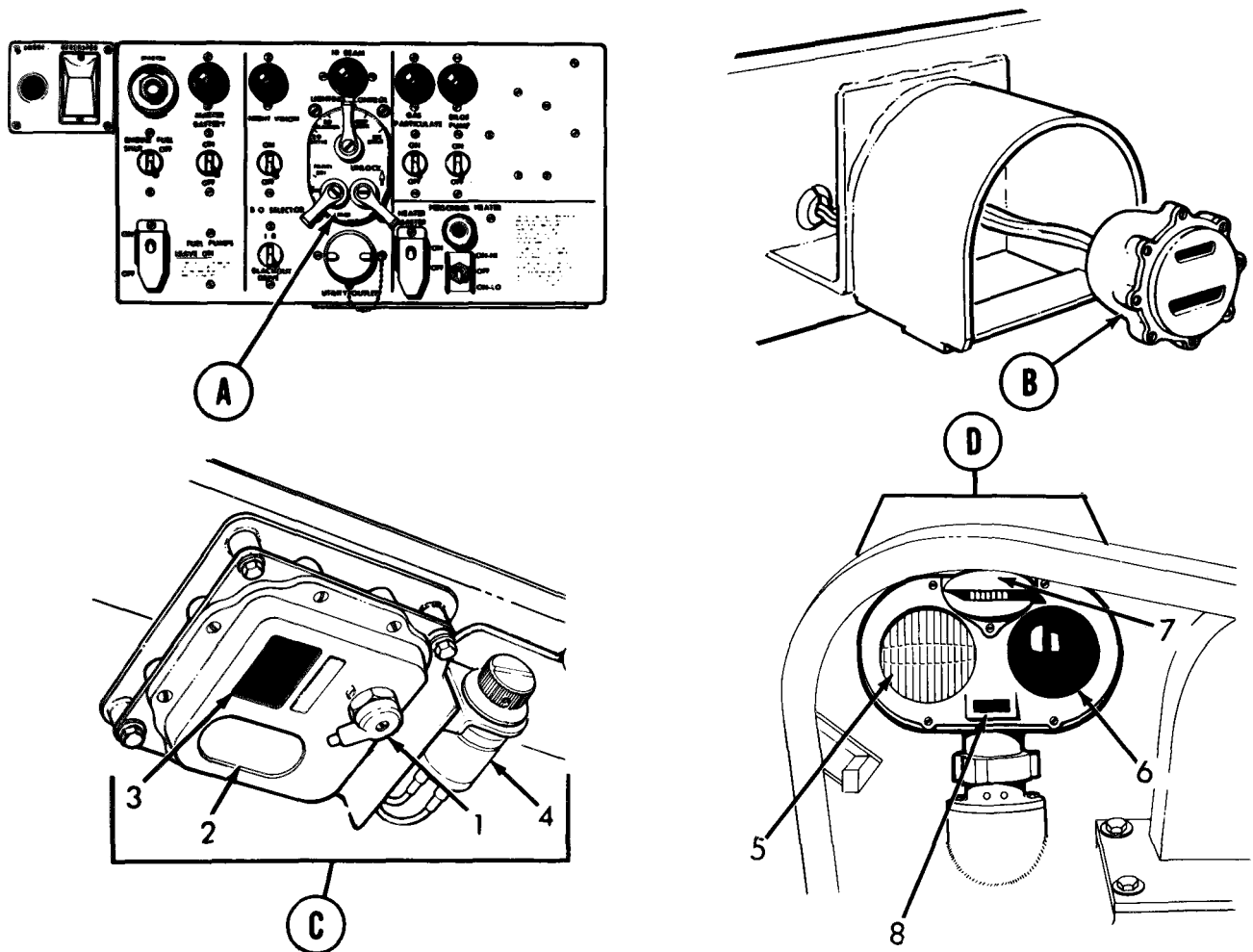
CLUSTER
ASSEMBLY

MASTER CONTROL PANEL

TA249786

SYSTEMS OPERATION - Continued

LIGHTING SYSTEM. Vehicle lighting consists of headlights and taillights that are controlled by the LIGHTING CONTROL switch on the MASTER CONTROL PANEL. Headlight assemblies have service drive and infrared-filtered blackout lamps and marker lamps. Service drive and stop lamps are in left taillight and blackout lamps are in both right and left taillights. Domelight is controlled by a three-position switch to select white or red light and turn domelight off.

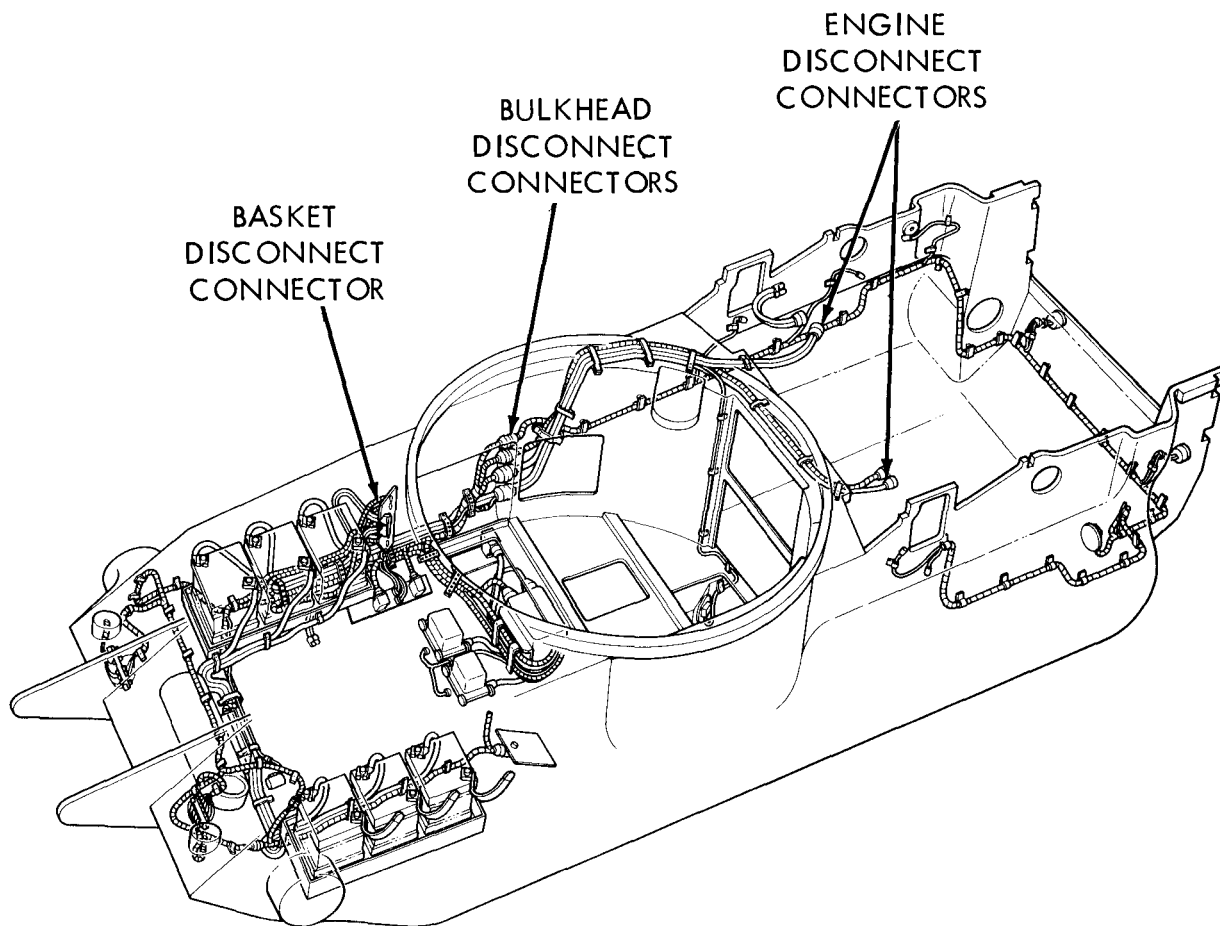


- (A) LIGHTING CONTROL (MASTER CONTROL PANEL)
- (B) TAILLIGHT-STOPLIGHT-BLACKOUT LIGHT ASSEMBLY
- (C) DOMELIGHT
 - 1. THREE-POSITION SWITCH
 - 2. WHITE LIGHT
 - 3. RED LIGHT
 - 4. DOMELIGHT RESISTOR
- (D) HEADLIGHT ASSEMBLY
 - 5. SERVICE DRIVE LAMP
 - 6. INFRARED LIGHT
 - 7. BLACKOUT DRIVE
 - 8. BLACKOUT MARKER

TA249787

SYSTEMS OPERATION - Continued

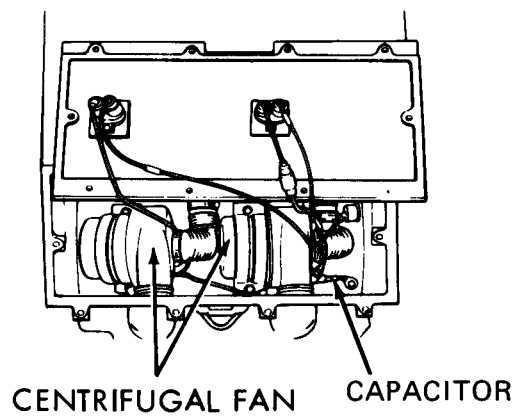
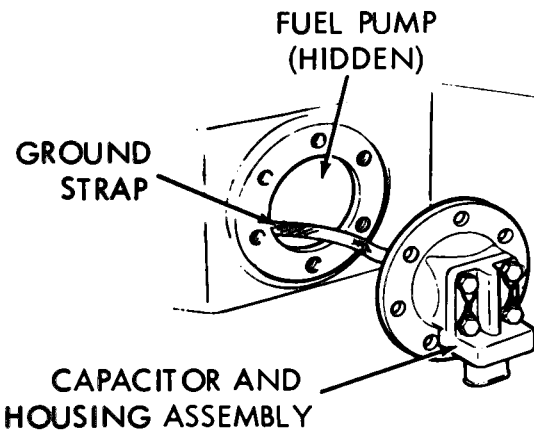
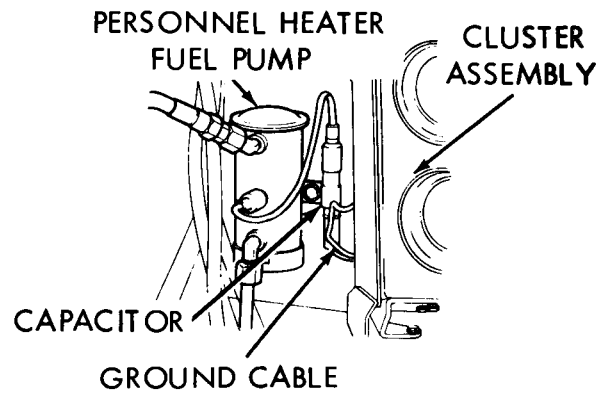
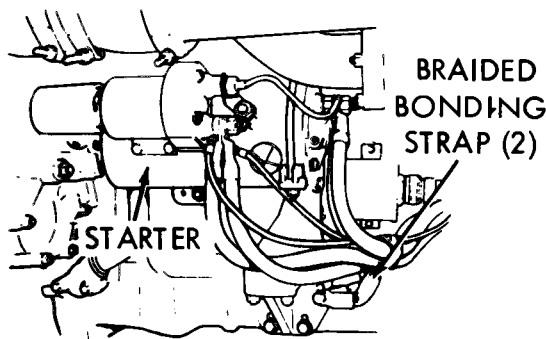
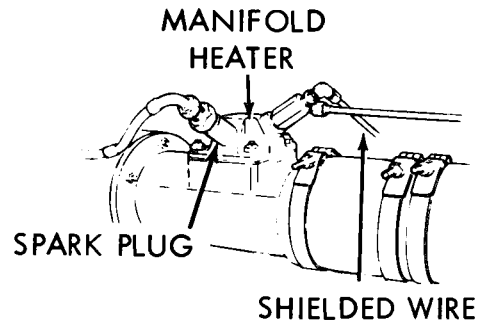
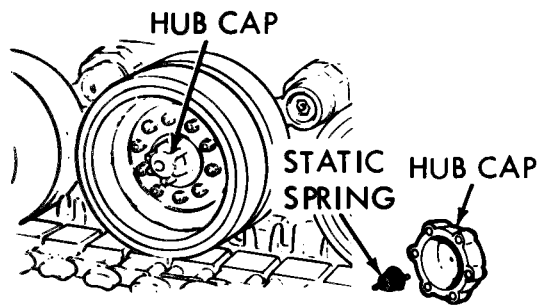
HULL WIRING HARNESSES/CONNECTORS. Various electrical components are interconnected by wiring harnesses, cables, and leads terminated in most instances by plug-in connectors and couplings. Wiring harnesses between crew and engine compartments are terminated at connector mounting plate on right side of hull interior and at the basket disconnect. Wiring harness connectors at top of engine permit quick disconnecting of starting , and charging systems from powerplant.



TA249788

SYSTEMS OPERATION - Continued

RADIO INTERFERENCE SUPPRESSION. Stray electrical currents must be prevented from building up between components and wiring harnesses to eliminate radio interference. Stray currents, if allowed to build up and spark (arc to a ground), will cause noise in, and possibly disrupt, radio communications. Electrical currents can also produce signals that may interfere with vehicle equipment sensitive to small changes in power or, in extreme cases, give off signals strong enough to give away location. Interference is eliminated by providing low resistance paths to ground for stray currents and by using shielded wiring. Low resistance components include capacitors, tooth-type lockwashers, grounding springs, and



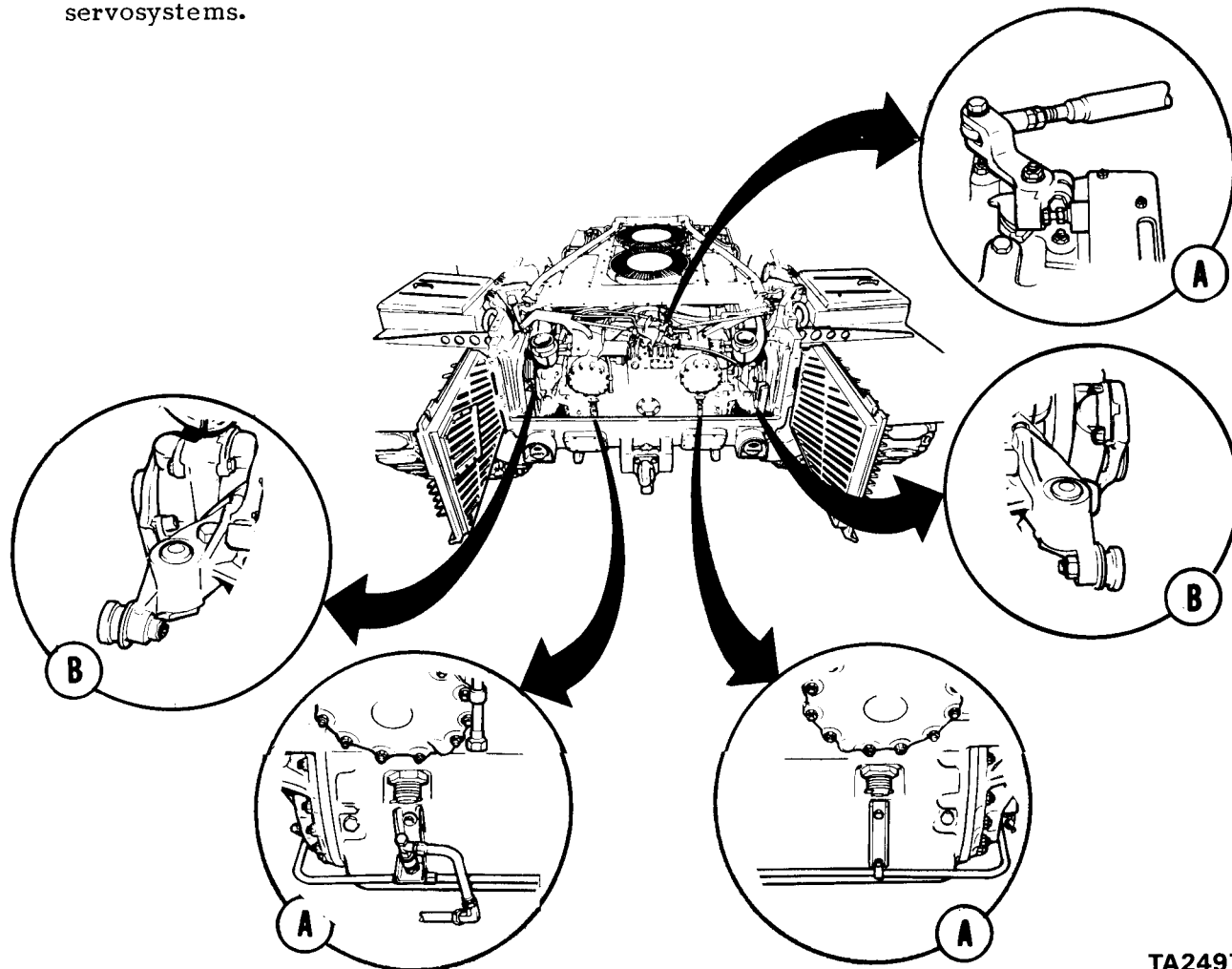
TA249789

SYSTEMS OPERATION - Continued

TRANSMISSION. Cross-drive transmission is controlled by driver with steering and shifting controls and brake pedal. Transmission hydraulic torque converter multiplies engine torque providing automatically variable torque output through planetary gearsets and hydraulically operated clutches and bands to final drive units, sprockets, and tracks.

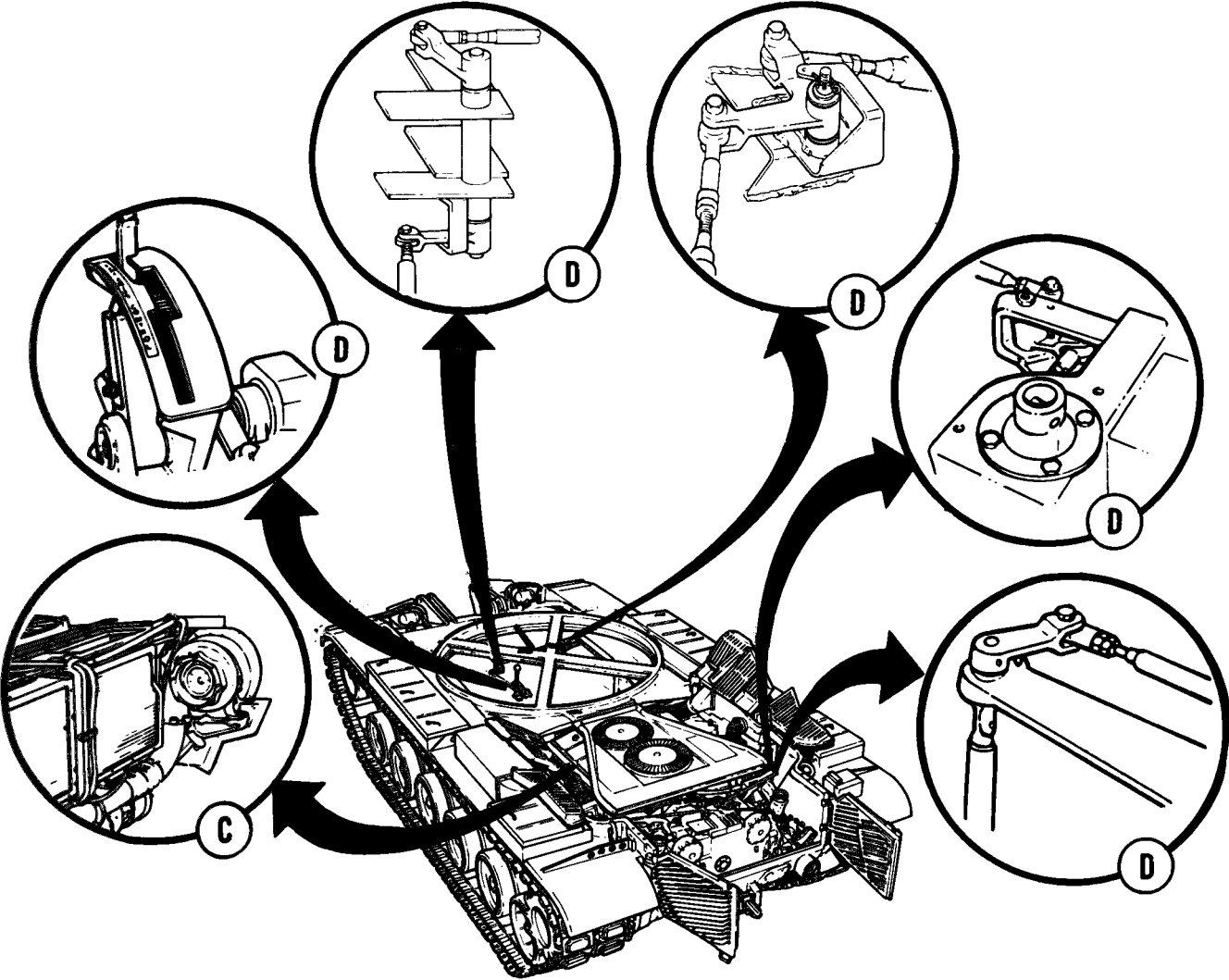
Refer to page 2-21.

- A. **TRANSMISSION ADJUSTMENTS.** Adjustments are made to mechanical linkages on rear of transmission.
- B. **TRANSMISSION MOUNTS.** Located one each side of transmission serve as powerplant installation guides and mounts.
- C. **TRANSMISSION OIL COOLER.** Oil flowing through oil coolers on each side of engine is cooled by air drawn in by engine cooling fans. Cooled oil flows through main oil supply line, and flow control thermostats in coolers stop oil circulation until oil is at operating temperature.
- D. **SHIFTING CONTROLS.** Shifting controlled by shift lever through system of mechanical links to transmission shift valve that hydraulically controls transmission driving range servosystems.



TA249790

SYSTEMS OPERATION - Continued



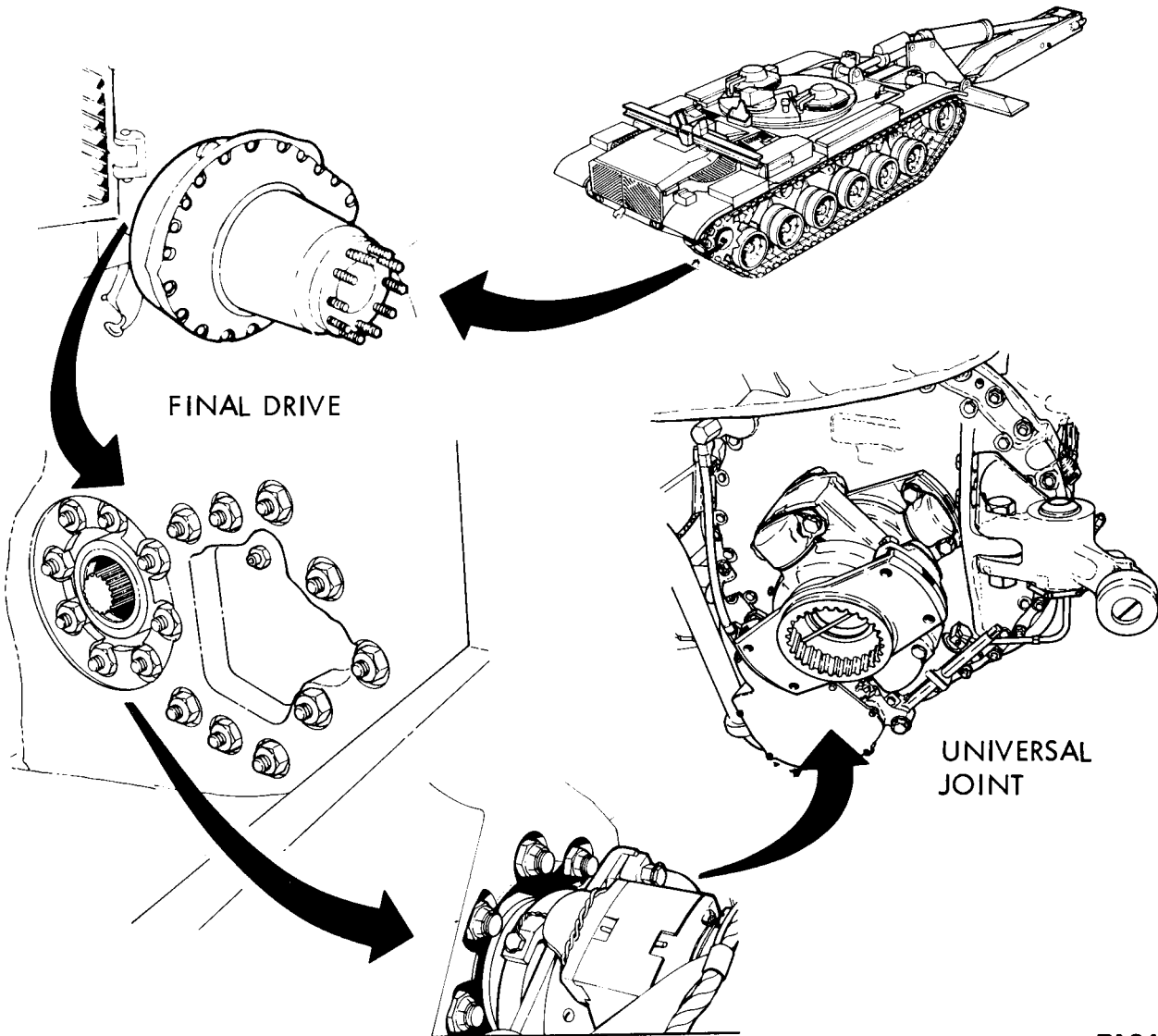
TA249791

SYSTEMS OPERATION - Continued

FINAL DRIVE AND COUPLING (UNIVERSAL JOINT). Power from two transmission output flanges is transmitted through universal joints and two final drive units and sprockets. Teeth of drive sprockets mesh with track link end connectors on both sides of track to move vehicle along track.

FINAL DRIVE. Identical single-stage, 5.08:1 gear ratio, speed reduction units. Gears operate in closed housing and are splash lubricated. Input pinion gear shaft is mated to universal joint by removable adapter. External teeth on adapter fit into internal splines in universal, and hollow shaft of adapter is splined to mate with final drive input gear shaft in final drive unit.

UNIVERSAL JOINT. Compensates for up to 7 degrees misalignment of transmission with final drive. Splined flange connects with final drive adapter on transmission. Universal joint is bolted to transmission output flange.



TA249792

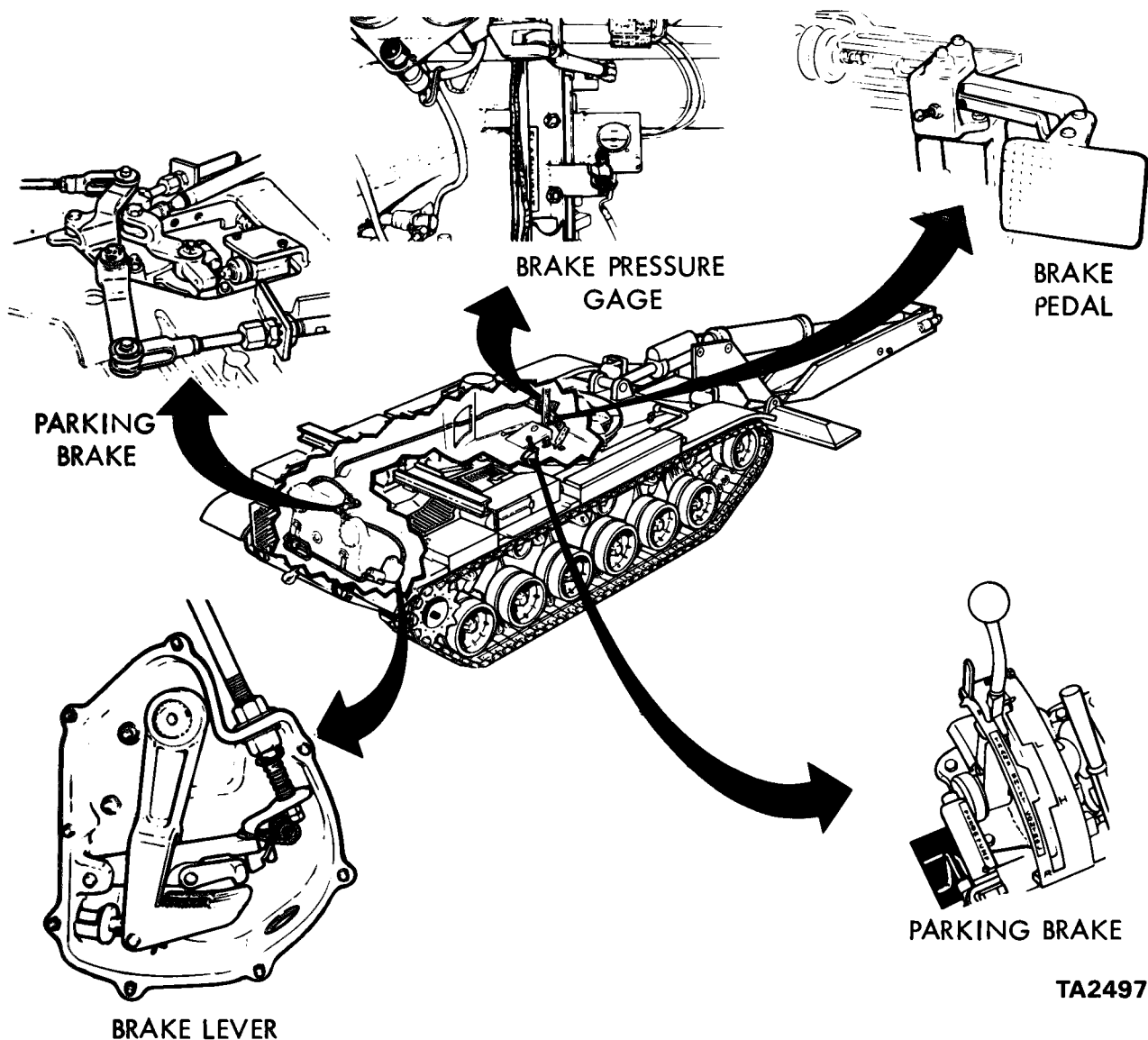
SYSTEMS OPERATION - Continued

BRAKE SYSTEM. Consists of brake control pedal connected to hydraulic brake and mechanical locking arrangement for parking.

ADJUSTMENT. Brake adjusting worm on transmission end covers is used when linkages have been disturbed. Adjusting brakes is done by bleeding hydraulic system at master cylinders and slave cylinders, or by adjusting braking controls and linkages on transmission.

HYDRAULIC SYSTEM. Brake pedal mechanically linked to master cylinder forces hydraulic fluid through lines to two hydraulic slave cylinders on transmission that apply force to brake levers attached to brake apply shafts on transmission.

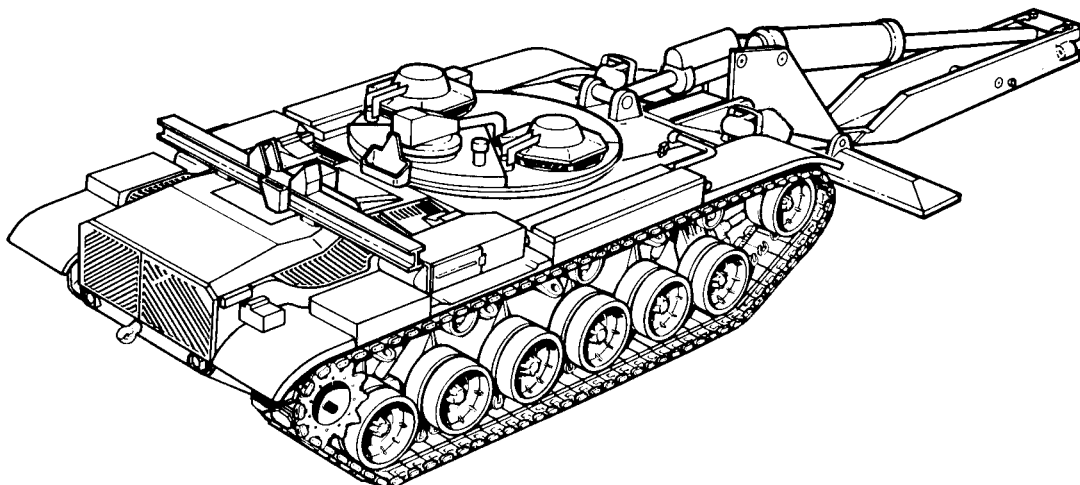
PARKING BRAKE SYSTEM. Lever and cam attached to shifting pedestal actuates cable to transmission fittings which lock brake levers by means of a ratchet mechanism when shifting lever is moved into park (P) position.



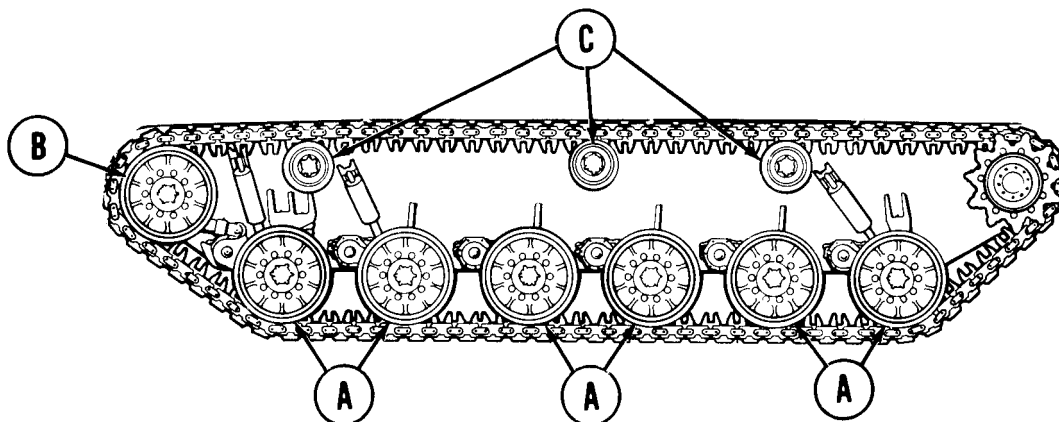
TA249793

SYSTEMS OPERATION - Continued

TRACKS AND SUSPENSION SYSTEM. Major components of the track and suspension system are described below.



- (A) **ROADWHEELS AND SUSPENSION.** Twelve roadwheels, dual-mounted on six hubs, carry vehicle weight on upper surface of lower track span. Space between dual-mounted wheels is running channel for track alining centerguides. Roadwheel arms 1, 2, and 6 bear shock absorber mounts. Each arm is sprung with torsion bars.
- (B) **COMPENSATING IDLER WHEELS.** Identical to and interchangeable with roadwheels, serves as track alining channel for centerguides and maintains track tension by means of track adjusting link connected to roadwheel number one and idler arm which forces idler wheel forward or rearward to maintain constant tension on unloaded free portion of track.
- (C) **TRACK SUPPORT ROLLERS.** Three dual-mounted track support rollers on each side of vehicle support upper track span between sprockets on drive hub and compensating idler wheels. One track support roller also drives the speedometer.

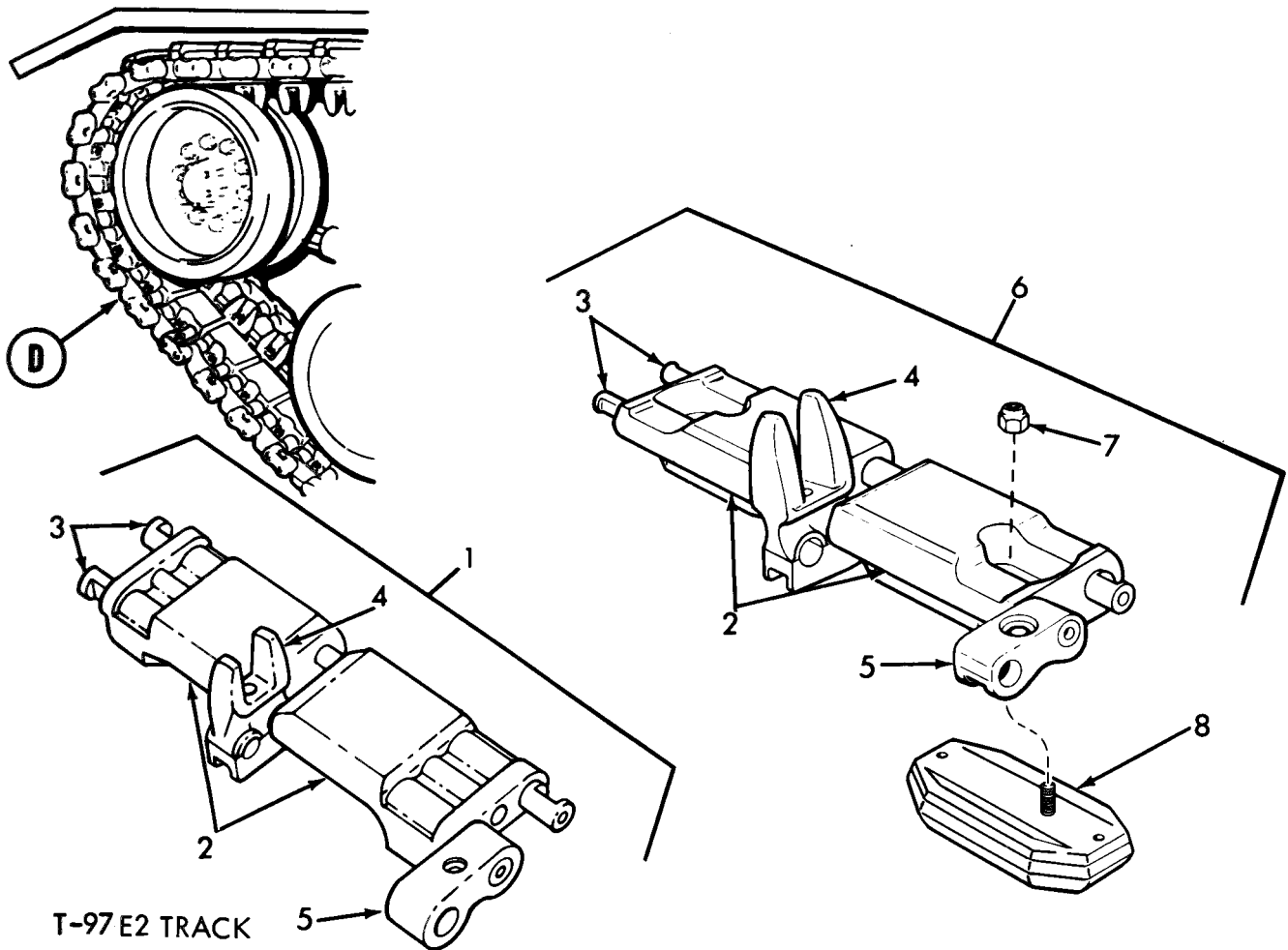


- (A) ROADWHEELS
- (B) COMPENSATING IDLER WHEELS
- (C) TRACK SUPPORT ROLLERS

TA249794

SYSTEMS OPERATION - Continued

(D) TRACK. Composed of 80 track links fastened together with end connectors and steel centerguides. Each link consists of two grousers, two link pins, and two rubber pads. Alinement maintained by 80 centerguides riding between dual track support rollers, dual compensating idler wheels, dual roadwheels and through channel in track drive sprocket hub. End connectors on both sides of track form track driving chain as they pass around drive sprocket. The vehicle may be equipped with either (but not both) T-97E2 track or T-142 track. T-97E2 track has replaceable links and the T-142 has replaceable pads.



(D) TRACK

1. TRACK LINK - T97 E2
2. GROUSER
3. LINK PINS
4. CENTERGUIDE
5. END CONNECTOR
6. TRACK LINK - T142
7. TRACK PAD MOUNTING NUT
8. TRACK PAD

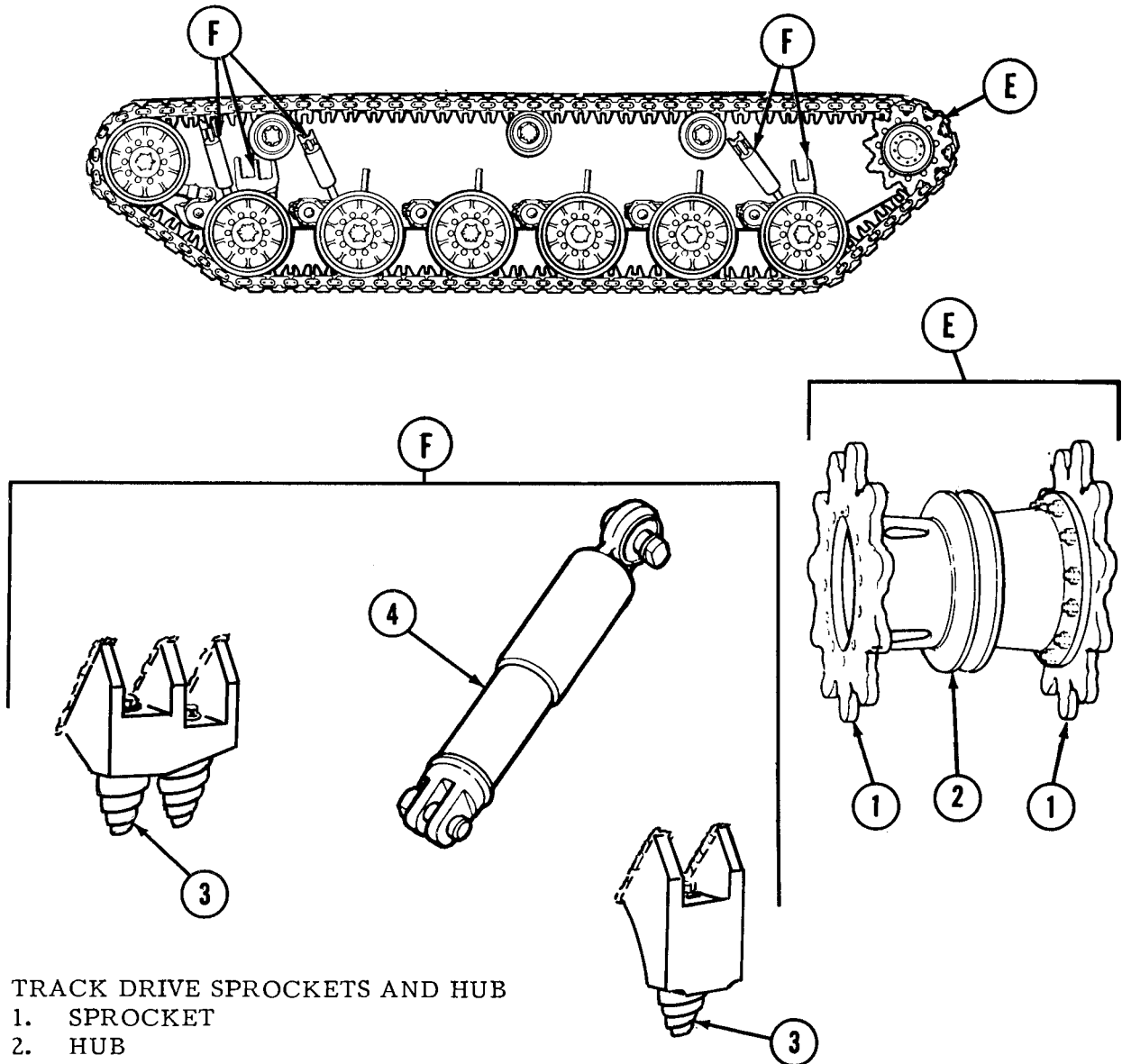
T-142 TRACK

TA249795

SYSTEMS OPERATION - Continued

(E) TRACK DRIVE SPROCKETS AND HUB. Hub transmits torque from final drive output shafts on each side of vehicle hull to sprockets bolted to hub. Sprockets mesh with end connectors on inner and outer edges of track to move track forward over track support rollers and roadwheels.

(F) VOLUTE BUMP SPRINGS AND SHOCK ABSORBERS. Bump springs mounted at roadwheels 1 and 6 on both sides of hull cushion roadwheel arms into bump stops welded to hull when arm displaced to full upward travel. Shock absorbers, connected to roadwheel arms 1, 2, and 6, dampen bounce and return cycles of roadwheel arms when driving over uneven surfaces.



(E) TRACK DRIVE SPROCKETS AND HUB

- 1. SPROCKET
- 2. HUB

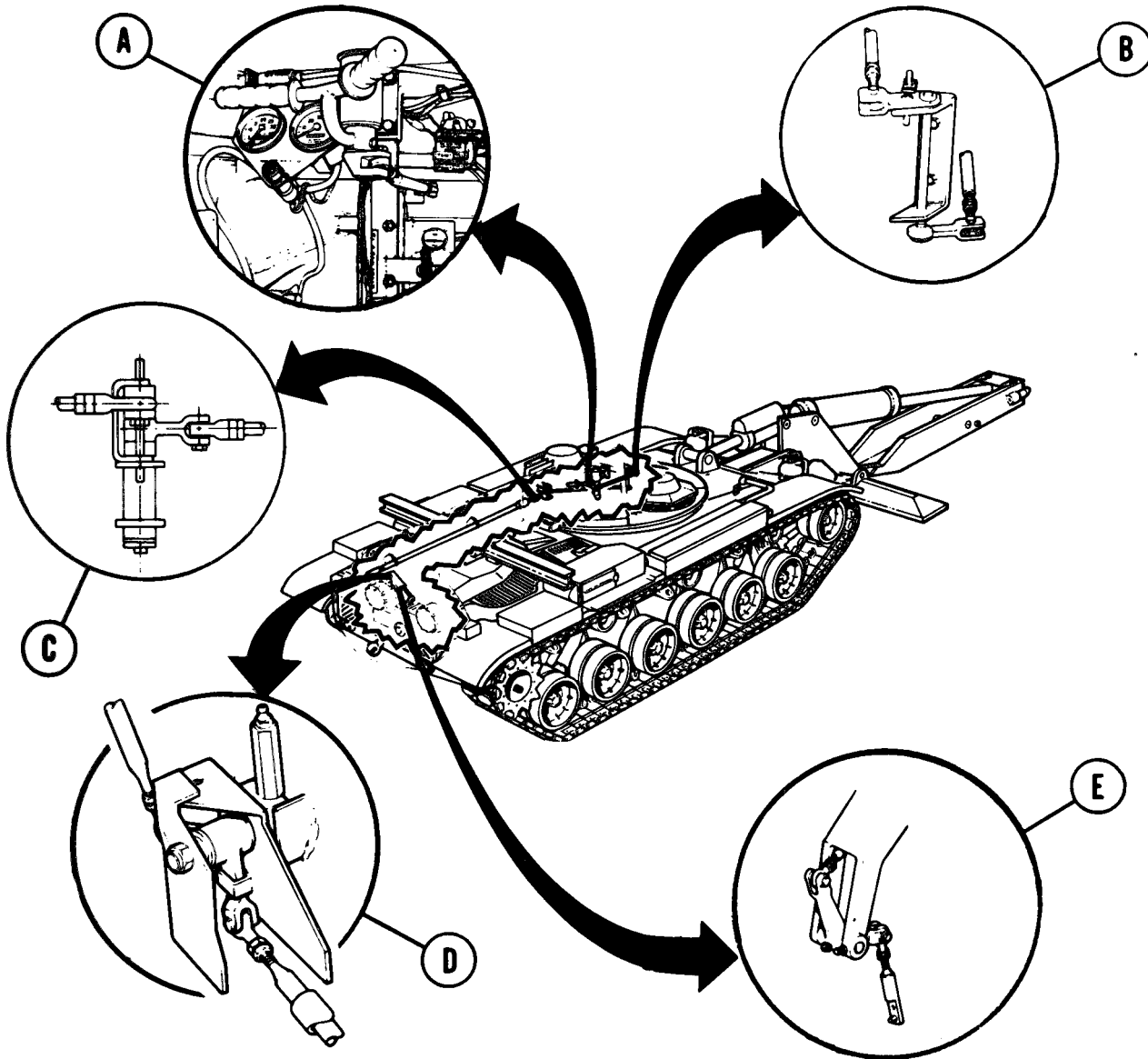
(F) VOLUTE BUMP SPRINGS AND SHOCK ABSORBERS

- 3. VOLUTE BUMP SPRINGS
- 4. SHOCK ABSORBERS

TA249796

SYSTEMS OPERATION - Continued

STEERING SYSTEM. Steering control is through a T-bar handle connected to transmission by linkage passing down left side of hull interior, connecting steering handle with steer valve shaft assembly. Transmission controls track drive through hydraulic clutches and bands. Adjusting points on steering controls are at steering rod ends, clevises and linkages located in operator's station, engine compartment, and on transmission.



- (A) STEERING HANDLE AND MOUNT ASSEMBLY
- (B) STEERING CONTROL LEVER ASSEMBLY
- (C) STEERING CONTROL LINK ASSEMBLY
- (D) STEERING CONNECTING LINK AND SHIELD ASSEMBLY
- (E) ENGINE COMPARTMENT STEERING CONTROL LINK ASSEMBLY

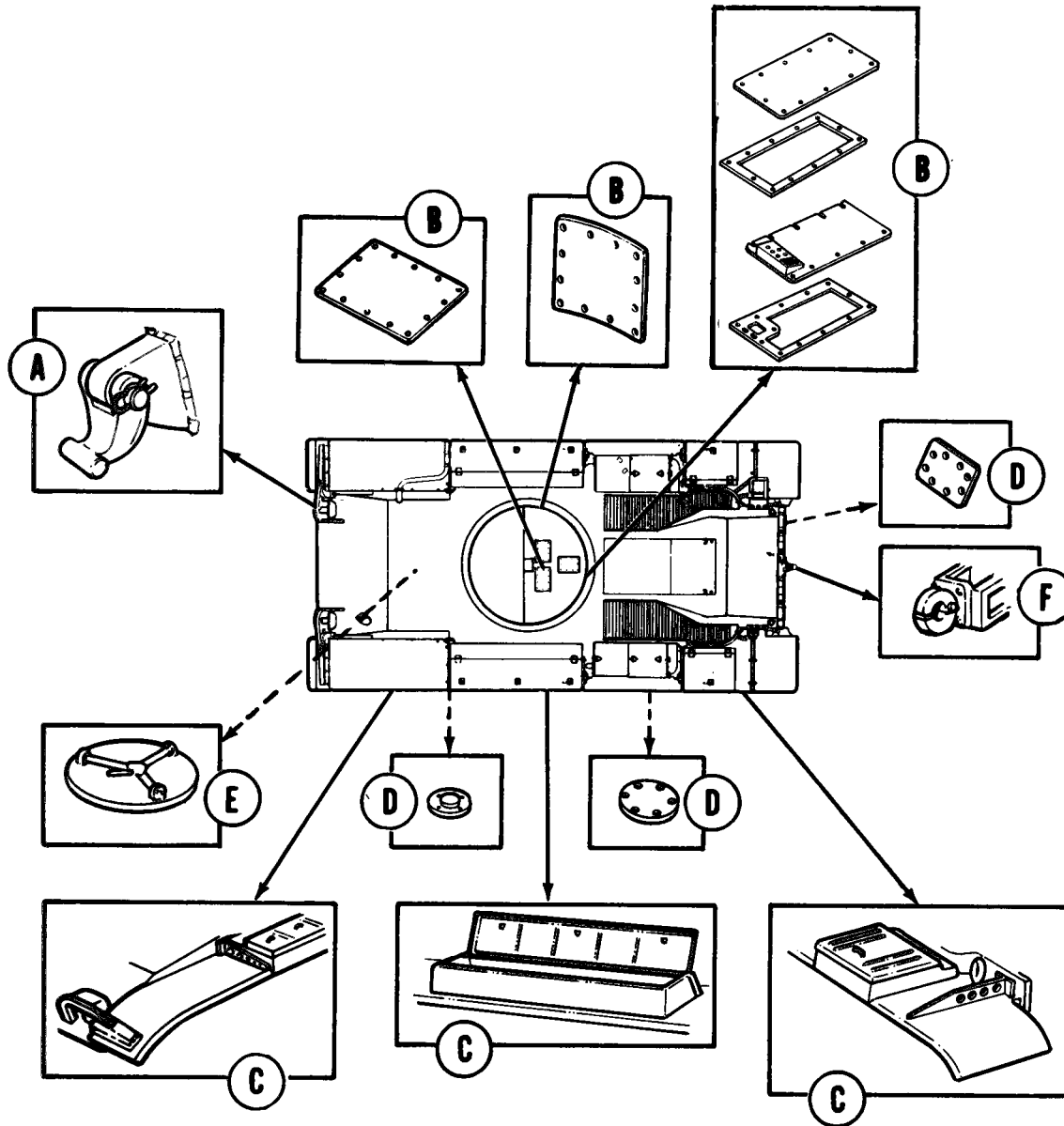
TA249797

SYSTEMS OPERATION - Continued

HULL-EXTERIOR. This section describes towing hooks and pintle, hull access covers, fenders and stowage boxes, hull body covers and hatches, and escape hatch.

- (A) **TOWING HOOKS AND PINTLE.** Towing cables can be attached to front- or rear-mounted hooks so vehicle can be towed or used to tow another vehicle. Towing pintle, mounted on rear of vehicle, used to attach towing bar to tow another vehicle or tank.
- (B) **HULL ACCESS COVERS.** Provide access to various interior hull openings so maintenance work can be done on vehicle parts.
- (C) **FENDERS AND STOWAGE BOXES.** Stowage boxes are mounted to fenders and provide storage space for vehicle equipment and tools.
- (D) **HULL BODY COVERS AND HATCHES.** Covers and hatches provide openings into hull from out side for maintenance, brake and transmission adjustment, and drainage.
- (E) **ESCAPE HATCH.** Escape hatch located on hull floor allows for exit in emergencies. A single-action dump handle and mechanism dumps the hatch.

SYSTEMS OPERATION - Continued



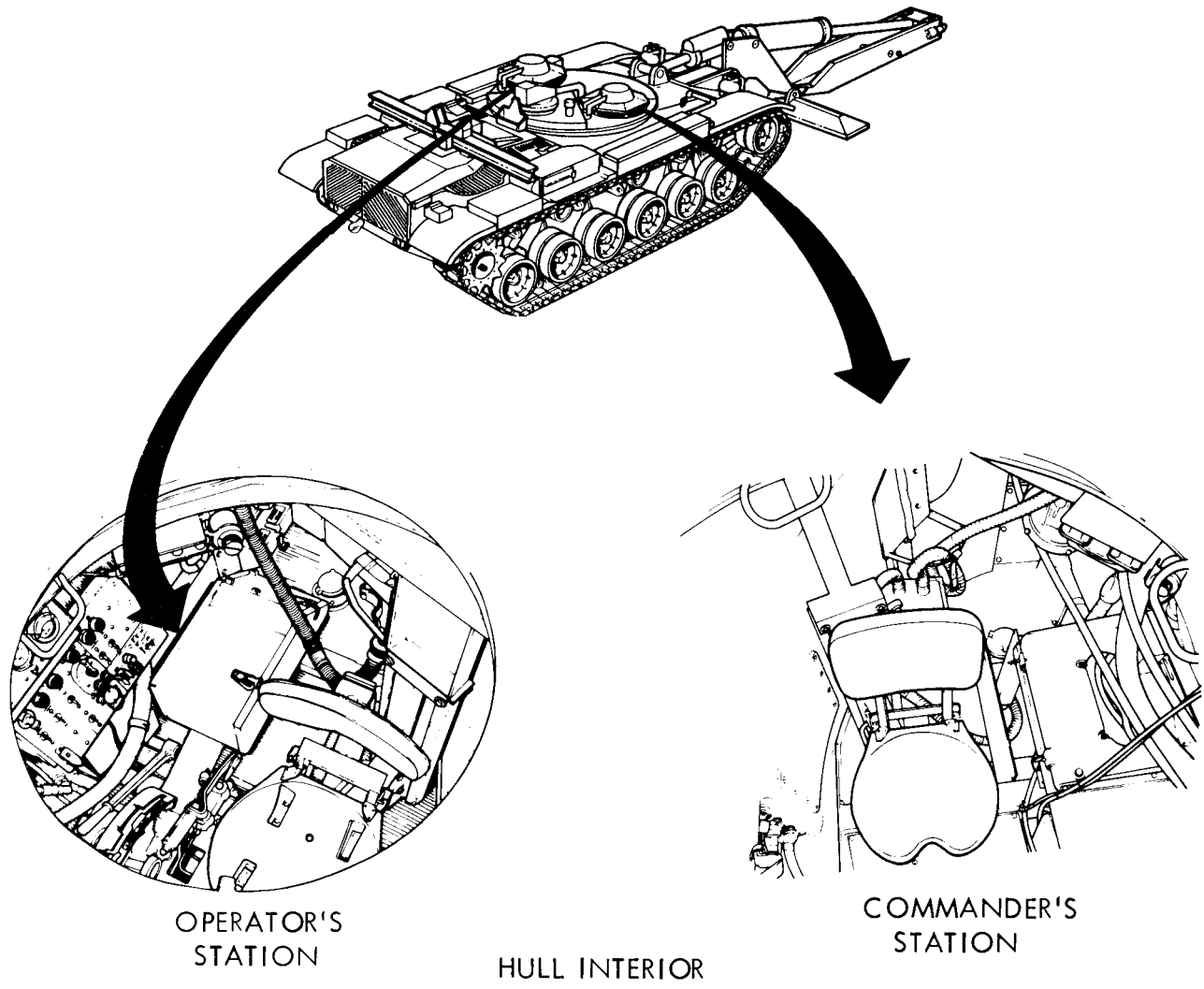
HULL EXTERIOR

- (A) TOWING HOOKS
- (B) HULL ACCESS COVERS
- (C) FENDERS AND STOWAGE BOXES
- (D) HULL BODY COVERS AND HATCHES
- (E) ESCAPE HATCH
- (F) TOWING PINTLE

TA249798k

SYSTEMS OPERATION - Continued

HULL-INTERIOR. Operator's and commander's seats are mounted on a support column. Seat can be adjusted forward and backward, and up and down, and seat back can be adjusted for comfort. Seat cushion and backrest are padded with foam rubber and covered with coated cloth. Backrest is easily removable. Periscope stowage boxes are mounted next to the operator's and commander's seats.



OPERATOR'S
STATION

HULL INTERIOR

COMMANDER'S
STATION

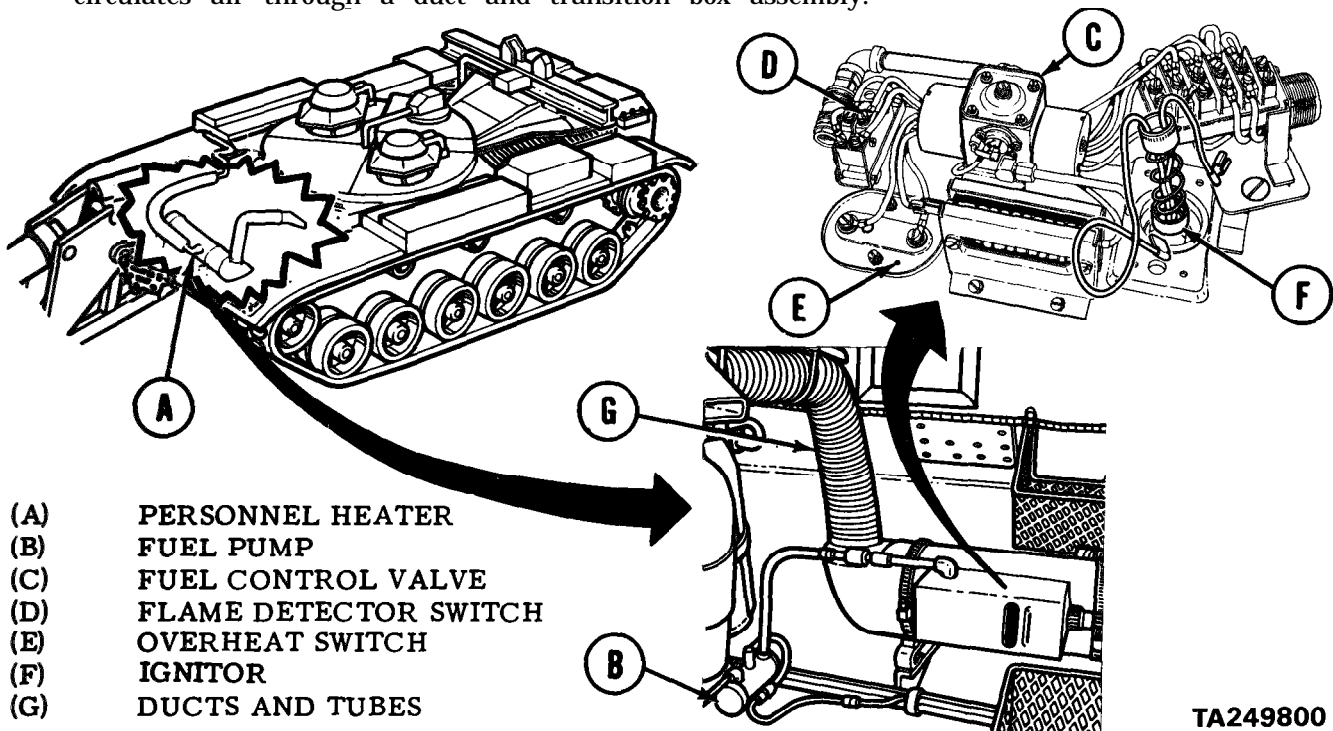
QUADRANTS REMOVED
FOR CLARITY

TA249799

SYSTEMS OPERATION - Continued

PERSONNEL HEATER SYSTEM. Provides heater air for vehicle crew. Circulates air through vehicle in air duct system. Air flow speed is constant. Heater switch has two heater selections, low and high.

- (A) **PERSONNEL HEATER.** Combustion type heater, burns same fuels as engine in a sealed heat exchanger. Combustion air and air to be heated supplied by two separate blowers on a single blower motor. Combustion air fan flows air into primary and secondary combustion air openings where air flows around circular channel in combustion chamber. Combustion products are exhausted to outside through flexible metal hose coupled through hull to metal exhaust tube mounted on right front fender.
- (B) **FUEL SYSTEM.** Fuel flows from personnel heater fuel pump forward of driver's station to heater where fuel flow is regulated by solenoid-actuated fuel control valve on top of heater case. Fuel control valve is controlled by personnel heater switch on master control panel.
- (C) **IGNITION CONTROL.** Fuel enters through two standpipes on heater and is ignited in combustion chamber by glow-plug-type ignitor. Electric heating element in fuel control valve preheats fuel for cold weather starts.
- (D) **FLAME DETECTOR SWITCH.** Shuts off heater motor after flame in heater is established and permits blower to operate.
- (E) **OVERHEAT SWITCH.** Safety switch to shut off fuel flow when heater temperature exceeds safe maximum limits.
- (F) **IGNITOR.** A glow-plug-type ignitor, ignites fuel in combustion chamber.
- (G) **DUCTS AND TUBES.** Ventilating air blower forces air through slots in heat exchanger and circulates air through a duct and transition box assembly.

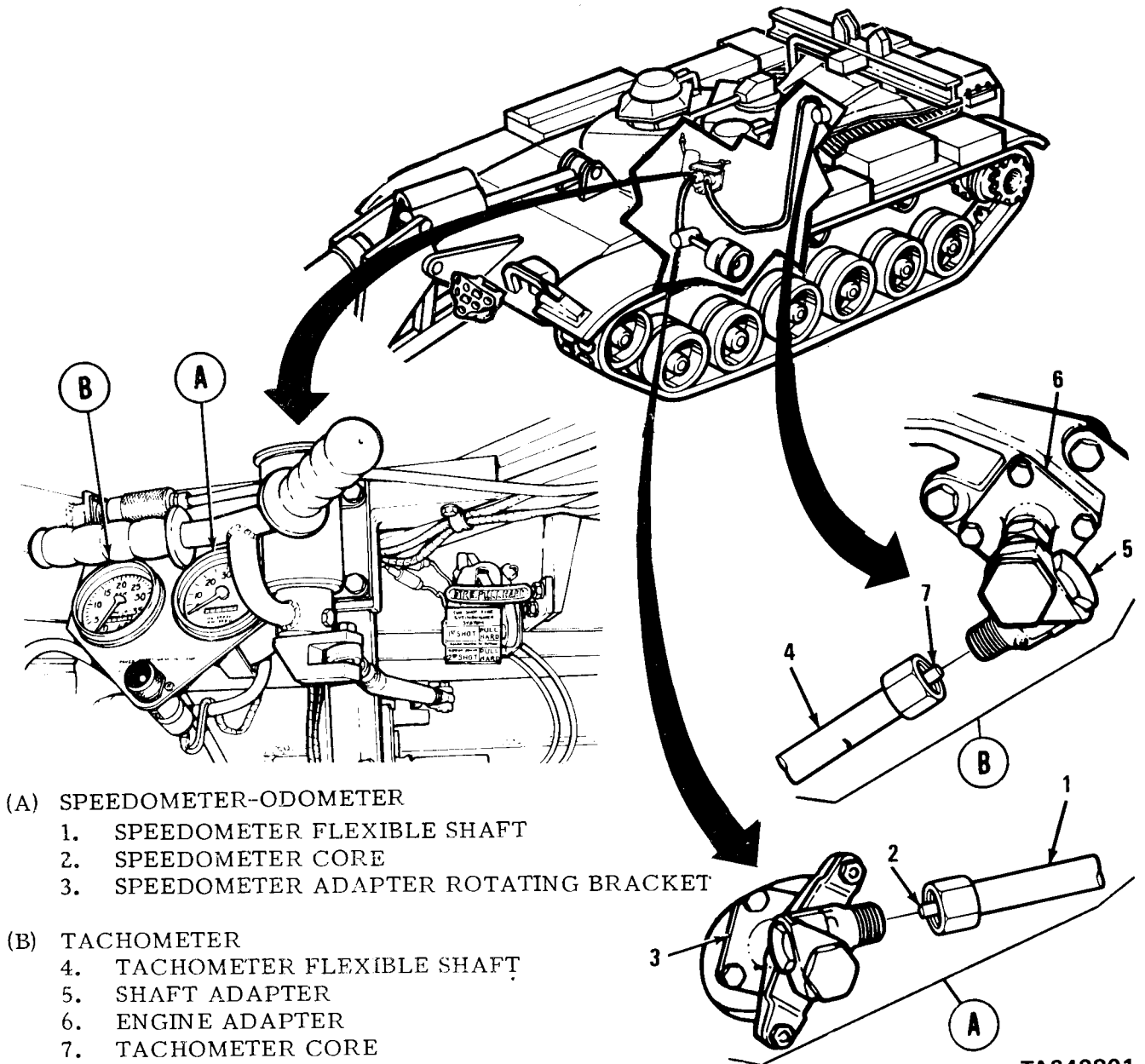


SYSTEMS OPERATION - Continued

SPEEDOMETER AND TACHOMETER. Speedometer-odometer and tachometer-hours meter mount on hull roof in front of driver. Speedometer-odometer driven by shaft in left front track support roller through right-angle drive adapter driven by shaft rotating with hubcap. Tachometer-hour meter driven through flexible shaft attached to engine adapter on accessory end of engine.

SPEEDOMETER-ODOMETER. Displays speed and mileage driven.

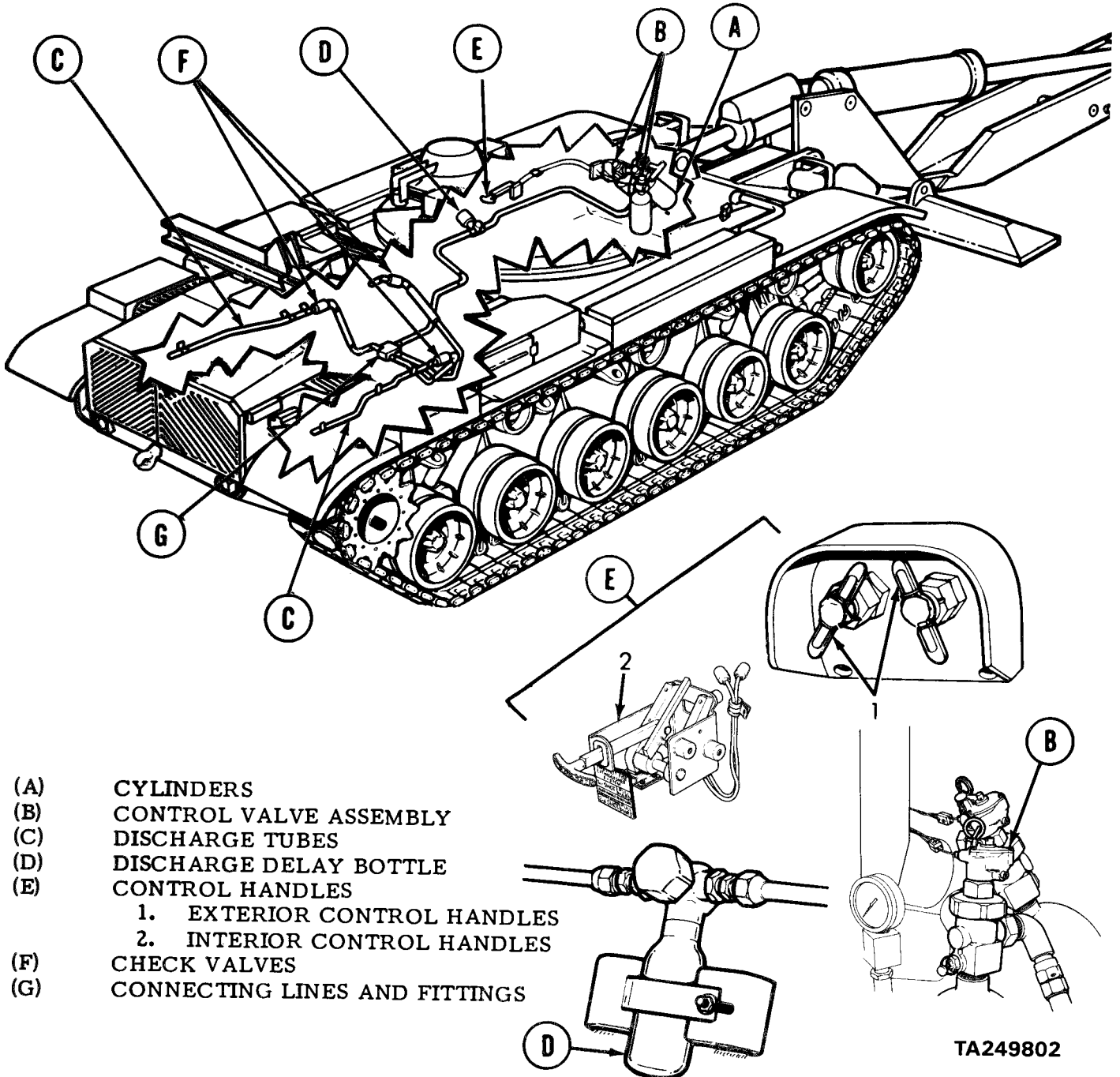
TACHOMETER-HOUR METER. Displays engine speed (RPM) and clock hours on engine based on operation at 2025 RPM.



TA249801

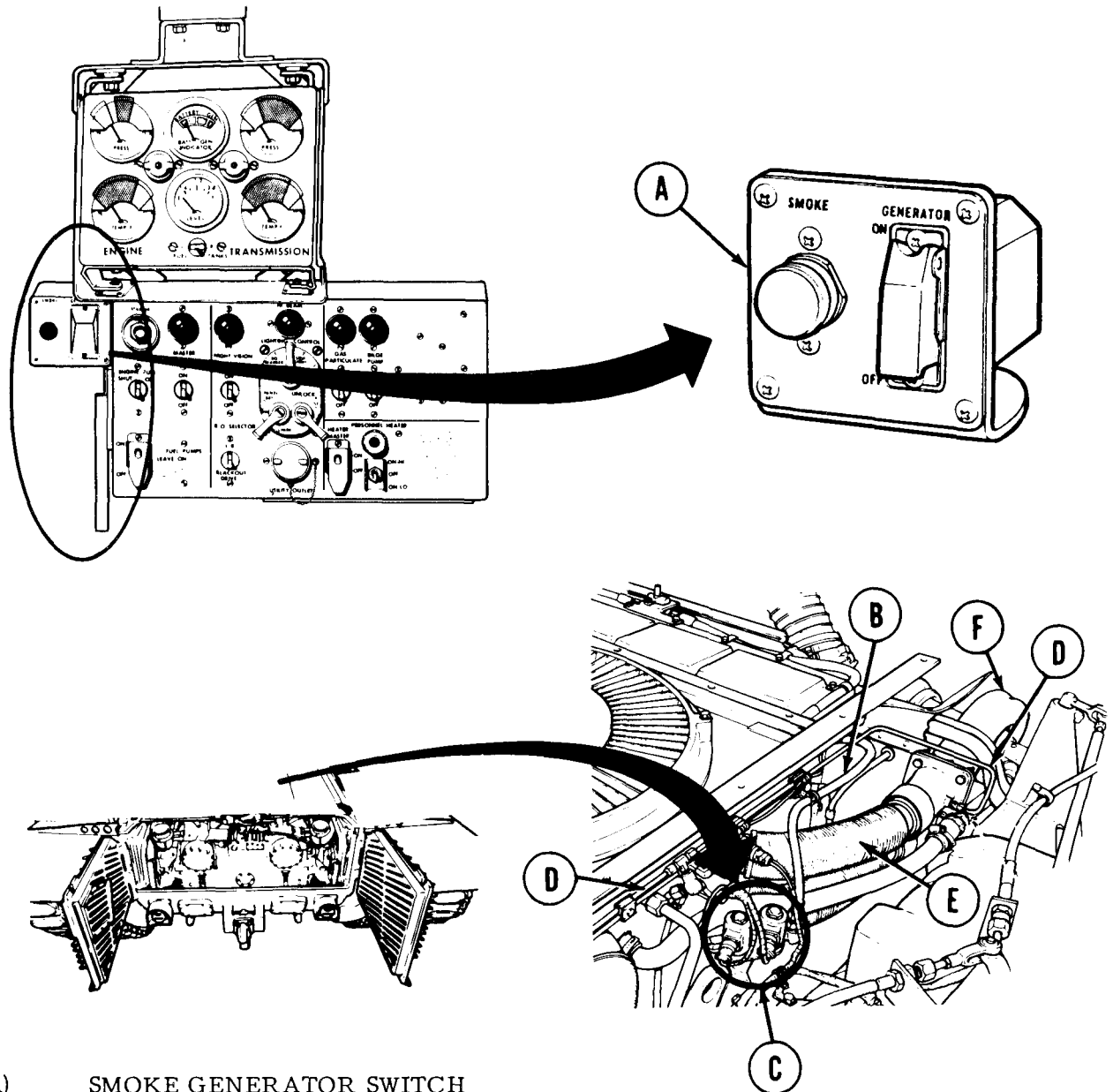
SYSTEMS OPERATION - Continued

FIXED FIRE EXTINGUISHER SYSTEM. Mounted to left front of driver's seat, system is a two-shot system. First shot discharges one carbon dioxide cylinder; second shot discharges remaining two carbon dioxide cylinders. Discharge tubes permit extinguishing fires in engine compartment. Charge flows through tubes to discharge delay bottle. At predetermined time, discharge delay valve opens to allow charge to flow through check valves and out of perforated tubing on fuel tanks. Exterior control handles on left front of hull permit operation from outside vehicle. Interior handles are located to right of driver's seat at eye level.



SYSTEMS OPERATION - Continued

ENGINE SMOKE GENERATING SYSTEM. Smoke generating system provides a smoke screen capability to improve combat effectiveness. Smoke generating system is controlled by a switch on master control panel, and receives power through air cleaner blower motor relay. Fuel, regulated by two solenoid valves at rear of powerplant, is provided to system from main fuel lines into right and left bank upper exhaust pipes where fuel passes through turbosupercharger and finally exhausted through exhaust tubes as dense, white smoke.



- (A) SMOKE GENERATOR SWITCH
- (B) MAIN FUEL LINE
- (C) FUEL SOLENOID VALVES
- (D) FUEL OUTPUT TUBES
- (E) EXHAUST PIPE
- (F) TURBOSUPERCHARGER

TA249803

CHAPTER 3
HULL MAINTENANCE

Section I.
REPAIR PARTS, SPECIAL TOOLS, TESTING, MEASURING,
DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

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

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools for organizational maintenance are listed and illustrated in TM 5-5420-202-24P, which is the authority for requisitioning replacements. ■

ENGINE

Item	Use
1. Mechanical Puller (5379997)	Remove fan drive oil seal housing
2. Sleeve Spacer (10882651)	Prevent oil leakage from fan rotor hub when performing leak check (two required)
3. Open End Wrench (8761568)	Remove and install starter mounting nuts
4. Box and Open Wrench (10935476)	Remove and install generator mounting nuts
5. V-Pack Cleaner (12326132)	Clean air cleaner filter

TRANSMISSION

Item	Use
6. Socket Wrench Socket (7003946)	Loosen and tighten locknuts on reverse band adjusting screw and low range band adjusting screw
7. Deleted	

SUSPENSION

Item	Use
8. Axle Remover Adapter (12304246)	Remove track support roller axle. (used with slide hammer puller 5573615)
9. Roadwheel Adapter (7080285)	Remove roadwheel arm and track adjusting link (used with slide hammer puller 5573615)
10. Track End Connector Wear Gage (10873933)	Check wear of end connectors
11. Track Torquing Tool Kit (12326261)	Torque track components
12. Manual Control Handle (7083883)	Remove and install bearing cups (used with inserter set items 17 and 18 and remover replacer 7082863)
13. Roadwheel Arm Lifter (7010355)	Remove and install roadwheels
14. Bushing Tool Handle (12326060)	Remove and install shock absorber yoke bracket bushing (used with remover and replacer, item 30.3)
15. Final Drive Dowel Remover (8390335)	Replace track drive sprocket tapered dowels
16. Bearing Tool Assembly (12325917)	Remove and install roadwheel support arm adjusting link bearing
17. Bearing Inserter Set (7082834)	Remove and install outer bearing cups from track support roller wheel and compensating idler wheel hub (used with handle, item 12)
18. Bearing Inserter Set (7082876)	Remove and install inner bearing cups on roadwheel hub and com- pensating idler hub (used with handle, item 12)
19. Track Connecting Fixture (12252120)	Connect track
20. Removal and Replacer (11645917)	Remove and install track adjusting link pin (used with slide hammer puller 5573615)

SUSPENSION (Continued)

Item	Use
21. Seal Inserter (7078977)	Install inner bearing oil seal on compensating arm spindle and roadwheel arm spindle (used with remover and replacer handle 7082881)
22. Seal Inserter (7078973)	Install outer bearing oil seal on roadwheel arm support spindle (used with remover and replacer handle 7082881)
23. Seal Inserter (7082882)	Install inner bearing oil seal on track support roller wheel
24. Seal Inserter (8708188)	Install oil seal and retainer assembly on compensating idler arm
25. Wire Rope Assembly (8366458)	Remove and install final drive hub and sprocket assembly
26. Shock Absorber Bearing Replacer (11654533)	Remove shock absorber bearing
27. Spanner Wrench (12284929)	Remove and install roadwheel and compensating idler arm support spindle retaining nut
28. Socket Wrench Adapter (7078976)	Remove roadwheel arm torsion bar end plug
29. Face Wrench Socket (12257561)	Remove and install bearing adjusting nut on roadwheel track support roller and compensating idler wheel
30. Sprocket Tooth Gage (8708388)	Check wear of final drive sprockets
30.1 Dial Pressure Gage (12310644)	Check grease actuated track adjusting link pressure
30.2 Bearing Driver (12290993)	Remove and install track adjusting link bearing
30.3 Remover and Replacer (12326059)	Remove and install shock absorber yoke bracket bushing (used with handle, item 14)

POWERPLANT

Item	Use
31 Ground Hop Kit (Powerplant Tests) (12304135)	Used to ground hop powerplant outside of tank
31.1 Tachometer Assembly (Fabricated, Figure 2, Appendix F)	Measure RPM during tests
32 Engine and Transmission Sling (12257229)	Remove and install powerplant and top deck grille doors
33 Oil Cooler Cleaning Tool (11641959)	Clean oil coolers with cleaning solution
34 Resilient Mount Remover (10933782)	Remove resilient mounts from transmission mounting bracket

MISCELLANEOUS

Item	Use
35 Torque Wrench Adapter (11663358-2)	Removal/Installation engine guide mount
36 Deleted	
37 Track End Connector Puller and Pump (11669394-1)	Remove track end connectors
37.1 Center Punch (Fabricated, Figure 9, Appendix F)	Stake pin in final drive quick-disconnect clamp
38 "T" Harness (11674369)	Used to troubleshoot 650 amp alternator/regulator

All data on page 3-5 deleted.

Section II. SERVICE UPON RECEIPT

GENERAL

This section contains information on services to be performed upon receipt of the vehicle from the issuing organization. Where practicable, the crew will assist in the described services. For services to be performed on the launcher components, refer to TM 5-5420-228-24.

INSPECTION AND SERVICING

- a. Inspect vehicle for damage.
- b. Check inventory components (with assistance of issuing organization) against packing list.
- c. Check packing list against Basic Issue Items List (TM 5-5420-202-10) to ensure that all indicated items have been received.
- d. Record all missing items.

INSTALLATION AND SETUP

- a. Make sure that grade of engine oil installed, as indicated on processing tag (DD Form 1397), is of the grade specified by LO 5-5420-202-12 for temperatures in your area.
- b. Check oil level in engine and transmission. Service as required (LO 5-5420-202-12).
- c. Start engine (TM 5-5420-202-10). Check for fuel and oil leaks. If leaks are observed, shut engine down and correct.
- d. Perform Preventive Maintenance Check and Services, Sub Section I, weekly (TM 5-5420-202-10).

CORROSION INSPECTION

- a. During normal semiannual inspection, check all parts and surrounding areas for corrosion. Corrosion damage is divided into the following stages.
 - Stage 1. Red, black, and white corrosion deposits on surface, etching, and pitting. Base metal is sound.
 - Stage 2. Powdered, granular, or scaled condition. Base metal is sound.
 - Stage 3. Surface condition and corrosion deposits are similar to Stage 2, except that metal in the corroded area is unsound and small pin holes may be present.
 - Stage 4. No metal remains at point of severest corrosion. Corrosion holes in the area or metal is completely missing.
- b. Corrosion areas in Stages 1 and 2 shall be cleaned, primed, and painted with required final top coat in accordance with DA PAM 738-750. In the areas where Stages 3 and 4 corrosion conditions exist, the corrosion must be completely removed, repairs made, or parts/assemblies replaced with serviceable parts/assemblies where repair is not economical.

SECTION III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS), LUBRICATION INSTRUCTIONS, AND MANDATORY REPLACEMENT PARTS

INTRODUCTION

a. General.

Preventive maintenance is the systematic care, inspection, and service of the M60A1 AVLB to keep it in serviceable condition and to detect faults and failures before extensive and time consuming repairs or replacement are required. Maintenance checks are services performed by organizational maintenance and are described below.

This section contains the procedures and instructions to perform M60A1 AVLB hull organizational preventive maintenance checks and services. These services are performed by organizational maintenance personnel assisted by the vehicle crew. Ensure that all crew level hull PMCS procedures have been completed prior to performing organizational semiannual PMCS. Refer to DA PAM 738-750 for instructions on the use of forms pertaining to PMCS.

Organizational services are defined by, and restricted to, the procedures outlined in this section and Appendix B, Maintenance Allocation Chart, unless approval to perform higher category services has been given by the support maintenance unit. For additional inspection and classification information on track components, see TM 9-2530-200-24.

Knowledge of operating and maintenance procedures outlined in TM 5-5420-202-10 are essential to the performance of organizational PMCS. Organizational mechanics must be familiar with these procedures so that they can apply them in the performance of their duties.

The driver of the vehicle is often unaware of gradually developing defects. Therefore, the vehicle must be road tested by organizational maintenance personnel during semiannual maintenance checks and services. Any repairs or adjustments necessary to ensure safe operation should be made prior to road test. All faults and corrective actions will be noted on DA Form 2404, column "a". The item number recorded in this column must correspond to the PMCS item. After deficiencies have been corrected and the tactical situation permits, an additional road test must be made for a distance of not less than three nor more than five miles.

The preventive maintenance checks and services listed in this section are to be performed at intervals determined by calendar days or vehicle operating hours, whichever comes first:
(a) bimonthly or after 25 operating hours, (b) semiannually or after 150 operating hours,
(c) annually or after 300 operating hours.

Hard (fixed) time intervals and the related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. Change the interval if your lubricants are contaminated or if you are operating the equipment under adverse conditions, including longer-than-usual operating hours. The interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken.

PMCS items and intervals have been determined by using Reliability Centered Maintenance (RCM) logic.

If anything looks wrong and cannot be fixed, report it on DA Form 2404. If something looks dangerous or may cause equipment damage, report it immediately to your maintenance supervisor.

INTRODUCTION - Continued

b. PMCS Procedure. PMCS column explanations are as follows:

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

Column 2- Interval. The second column lists the interval at which the items are to be inspected.

Column 3- Location - Item to Check/Service. The third column lists the item to be checked or serviced.

Column 4- Procedures. The fourth column contains all the information required to accomplish the checks and services.

Column 5- Not Fully Mission Capable if. The fifth column contains all the conditions which make the vehicle not fully mission capable.

c. Special Information.

(1) Precautions. The following precautions will help prevent personal injury or damage to equipment.

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

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

Do not clean inside hull with high pressure steam, water, or air. Some parts inside hull may rust or be damaged.

Do not use polishing cloths, liquids, pastes, or other rough cleaners to clean instrument lenses or mirrors. Use lens tissue paper to clean lenses and mirrors. Remove fingerprints, oil, and dirt with lens cleaning compound and lens tissue paper.

(2) Services. Services performed by the organizational maintenance mechanic consist of the following tasks:

Adjusting. Making all necessary adjustments and alinements.

Servicing. Draining and refilling units with oil and changing or cleaning oil falters, fuel falters, and air cleaners.

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

Repairing. Repairing includes inspection, cleaning, preserving, adjusting, replacing, welding, strengthening, and other tasks associated with putting parts in working condition.

INTRODUCTION - Continued

(3) General Cleaning Instructions.

If a steam cleaner is available, it may be used to remove any remaining dirt. After water or steam cleaning, lubricate vehicle. Check all lubricant reservoirs for water droplets. If water is found, drain and refill. Clean grease, oil, or dirt from all metal parts with dry cleaning solvent, cleaning compound, or equivalent.

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

Remove rust or dirt from fine-machined surfaces with dry cleaning solvent and crocus cloth, if necessary. Do not use any other material. Be careful not to change the dimension of parts when rubbing off rust. Coat bare metal surfaces, after cleaning, with lubricating oil.

Nameplates, caution plates, and instruction plates may rust quickly. When they are rusty, clean parts and coat them with lubricating oil.

(4) General Maintenance Instructions

Put protective cape or plugs on all tubes, hoses, and fittings as soon as you disconnect them. Dirt could get in and ruin the system. Do not remove cape or plugs until you are ready to connect the system.

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

Inspect electric wires for broken, chafed, cracked, discolored, frayed, loose, melted, or worn insulation. Replace or repair bad parts.

Have another soldier help align mating ends of connectors, plugs, and receptacle on larger harnesses. Make sure that pins and keyways line up. Tighten twist-snap type connector, plugs, or receptacles until a click is heard. Tighten screw-on type connector until a ratchet noise is heard to indicate that connectors, plugs, or receptacle are tight.

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

Hold fitting adapter with one wrench and tighten nut with another wrench. When tightening fittings, tighten nut snug and then tighten 1/6-turn to 1/8-turn more. If fitting leaks, loosen nut a full turn and then tighten. If still leaking, replace defective parts.

Service, clean, or change oil filters, as applicable, when they are known to be contaminated or clogged; service is recommended by AOAP laboratory analysis; or at prescribed hardtime intervals.

(5) Lubrication.

Use only authorized lubricants.

All lubrication instructions are mandatory.

INTRODUCTION - Continued

When checking fluid levels, vehicle must be on level surface.

Oil filters shall be serviced/cleaned/changed when they are known to be contaminated or clogged, service is recommended by AOAP, or hard time service is required.

Dispose of used lubricant in accordance with local Standing Operating Procedures (SOP).

For arctic operation, see FM 9-207.

For desert operation, see FM 90-3.

Clean all grease fittings before attaching grease gun.

When using grease gun, operate until grease appears around seals or out of relief valve and check escaping grease for contamination. If contamination is found, notify support maintenance.

If no other treatment is directed, paint or clean and coat unprotected metal surfaces with cleaner, lubricant, preservative (CLP).

Clean around filler necks/drain plugs/openings before servicing to keep dirt from entering system.

Lubricate oil can points as they become accessible while performing PMCS procedures. Use the applicable lubricant identified and lubricate the following items as a part of PMCS:

- | | |
|---------------------------------------|-----------------------------|
| Headlight removal nuts | Grille door hinges |
| Fender stowage box latches and hinges | Control rod clevises |
| Towing hooks (hinge pin) | Ammunition box latches |
| Brake linkage | Driver's and commander's |
| Transmission support guide | seats moving parts |
| rails and rollers | Hatch locks and hinges |
| Driver's escape hatch late | Universal joints |
| model (clean and coat pins, plungers, | Driver's night viewer hatch |
| and all unpainted surfaces) | door pivot pin and latch |

Oil Can Points Lubricants

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Oil Can Points + 5°F to + 125°F (-15°C to 52°C)	OE/HDO-15/40 (0-1236) MIL-L-2104	AR	AWS	0.4
+ 5°F to -70°F (-15°C to -57°C)	OEA (0-183) MIL-L-46167			

For arctic operation, see FM 9-207

Do not lubricate the following items:

- | | |
|------------------------------------|---------------------------|
| Starter solenoid | Gas particulate fan motor |
| Air cleaner blower motor | Tracks |
| Hydraulic powerpack electric motor | Tachometer drive adapter |
| Heater motor | Ventilator blower motor |
| | Any item not pointed out. |

INTRODUCTION - Continued

(6) Leakage Definitions.

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

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

All Class III leaks and any class fuel leak in the engine compartment or in the personnel heater system must be repaired before operating the vehicle. Vehicle may be operated with Class I or Class II leaks.

(7) Corrosion. Check for corrosion on entire vehicle. Become familiar with the four stages of corrosion listed below and take the appropriate maintenance action required outlined below.

Stage 1-	Red, black, or white corrosion deposits on surface with etching or pitting. However, base metal is sound.
Stage 2-	Powdered granular or scaled condition. Base metal is sound.
Stage 3-	Surface condition is similar to stage 2 except that metal in the corroded area is unsound and pin holes may be present.
Stage 4-	No metal remaining at point of severest corrosion. Corrosion holes in the area or metal completely worn away.

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

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

INITIAL SETUP

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

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

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

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

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

Tools. Be sure all common tools are on hand.

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

Preventive Maintenance Checks and Services for M60A1 AVLB Hull

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
	Bimonthly	Engine and Transmission	<p>Perform powerplant oil sampling IAW DA PAM 738-750.</p> <p>ARMY OIL ANALYSIS PROGRAM (AOAP).</p> <p>Oil samples from both engine and transmission must be submitted to an assigned AOAP laboratory every 25 hours of operation or 60 days, whichever occurs first, in accordance with DA PAM 738-750. Oil will be analyzed for condition and will be changed only when directed by the AOAP laboratory. In the event AOAP laboratory support is not available, drain oil every 1500 miles or semiannually, whichever occurs first. Semiannual oil changes are to be coordinated with seasonal changes. When using OEA oil, drain every 750 miles or quarterly, whichever occurs first.</p>	AOAP recommends oil change.
	On Condition	Engine	<p>Replace engine oil falters (page 6-76) and drain and fill engine crankcase (page 6-12).</p> <p>Run engine and check for oil leaks at filters and drain plugs TM 5-5420-202-10).</p>	Any class III leak.

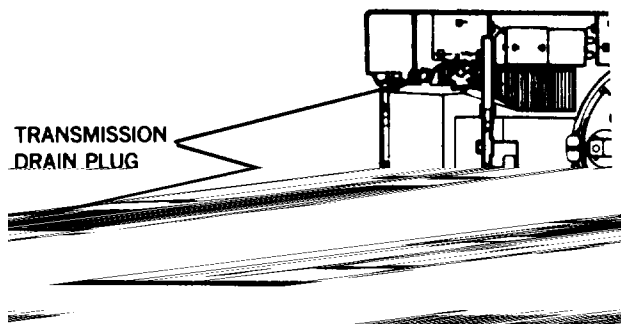
Enifne Lubricants

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Engine 0° to +125°F (-18°C to 52°C)	OE/HDO-15/40 (0-1236) MIL-L-2104	17 gal	OC	0.5
5°F to -70°F (-15°C to -57°C)	OEA (0-183) MIL-L-46167			

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
3	On Condition	Transmission	<p>Drain and fill transmission: Remove two drain plug access plates from bottom of hull (page 16-39). Position 20-gallon container under drain plugs. Remove drain plugs and allow to drain into container.</p> <p>Clean transmission oil filter (page 11-89).</p> <p>Clean side oil screen (page 11-96).</p> <p>Clean and install drain plugs and access plates. Refill transmission to "ADD" mark on dipstick. Check oil level (TM 5-5420-202-10)</p> <p>Run engine and check for oil leaks at filters and drain plugs (TM 5-5420-202-10).</p>	Any class III leak.



Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Transmission 0°F to t 125°F (-18°C to 52°C)	OE/HDO-15/40 (0-1236) MIL-L-2104	17 gal	OC	0.5
5°F to - 70°F (-15°C to -57°C)	OEA (0-183) MIL-L-46167			

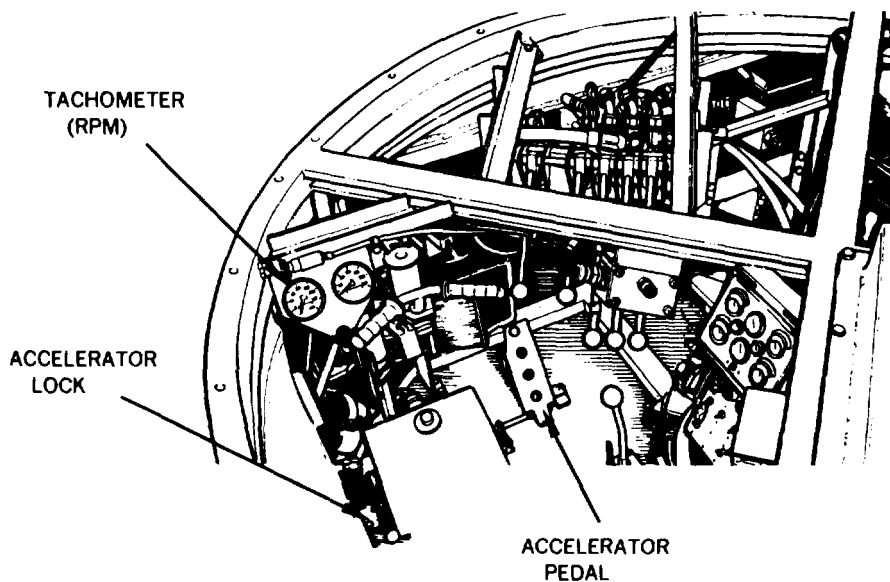
For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
4	Semiannual	Powerplant	<p>Ensure all before operation checks listed in TM 5-5420-202-10, Preventive Maintenance Checks and Services (PMCS), are performed.</p> <p>If STE/ICE is available, perform the following electrical component checks.</p> <p>Perform BATTERY CONDITION TEST No. 77/79 (page 4-60).</p> <p>Perform CHARGING CIRCUIT AND BATTERY VOLTAGE TEST No. 67 (page 4-67).</p> <p>Perform STARTER CURRENT FIRST PEAK TEST No. 72 (page 4-70).</p> <p>Perform CI (COMPRESSION IGNITION) POWER TEST No. 13 (page 4-76).</p> <p>INITIAL ROAD TEST</p>	
5	Semiannual	Starter	<p>While starting engine, listen for unusual noises and difficult cranking at starter.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Driver must remain in driver's station at all times while engine is running.</p>	Any unusual noise or improper cranking.
6	Semiannual	Engine Idle	<p>Start engine and operate at 1000 to 1200 rpm until normal operating temperature is reached.</p>	Any unusual noise or improper cranking.

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
6	Semiannual	Engine Idle - Continued	<p>Reduce engine speed to an idle.</p> <p>Check that idle speed returns to 700-750 rpm.</p> <p>If engine speed does not return to 700-750 rpm, adjust accelerator linkage (page 7-300).</p>	Engine speed is nonadjustable.
7	Semiannual	Accelerator Lock (Engine Running)	<p>Engage accelerator lock with engine running.</p> <p>Check that engine rpm remains the same when foot is removed from accelerator pedal. Adjust accelerator linkage, if required (page 7-300).</p>	Accelerator linkage cannot be adjusted.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
8	Semiannual	Engine (Governed No-Load Test)	<p style="text-align: center;"><u>CAUTION</u></p> <p>DO NOT RUN engine faster than 2640 rpm for more than 2 or 3 seconds in the event of governor malfunction.</p> <p>With transmission shift lever in "P" (Park) and brakes applied, gradually open throttle until accelerator pedal is fully depressed.</p> <p style="text-align: center;"><u>NOTE</u></p> <p>In most cases, engine speed will surge over 2800 rpm and then stabilize within 30 seconds between 2550-2640 rpm.</p> <p>Check that governor does not cut in and out.</p> <p>Check that tachometer rpm stabilizes between 2550 and 2640 rpm.</p>	<p>Governor keeps cutting in and out (adjustments are required). Notify support maintenance.</p> <p>Tachometer does not stabilize. Notify support maintenance.</p>
<p>The diagram shows a top-down view of the engine compartment. A tachometer is labeled on the left. An accelerator pedal is labeled at the bottom. A transmission shifting control is labeled on the right.</p>				

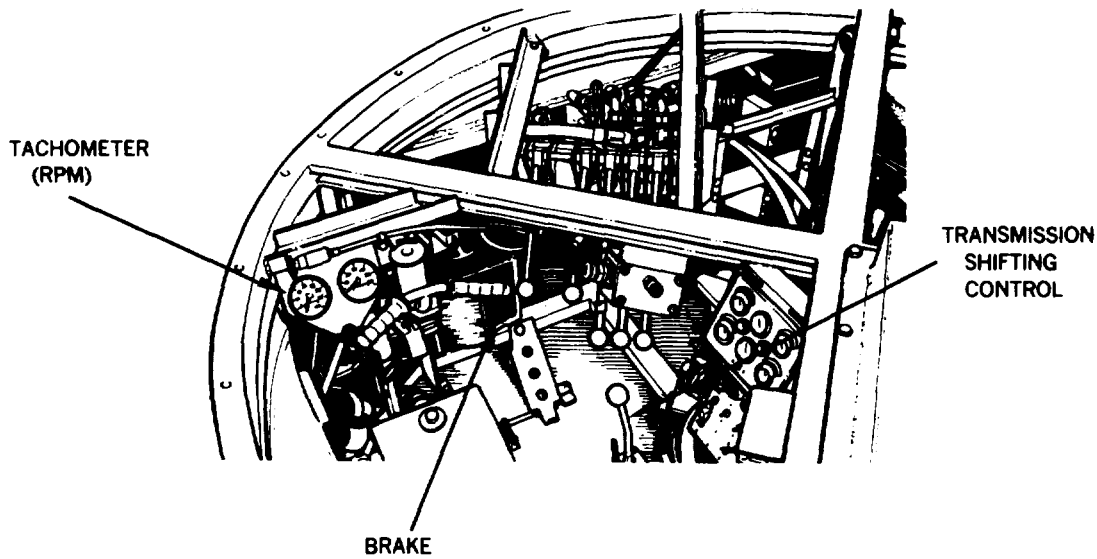
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
9	Semiannual	Engine (Stall Test)	<p>Perform governed no-load test before attempting stall test.</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Take all necessary safety precautions to eliminate possible injury to personnel or damage to equipment. Make sure areas in front and rear of vehicle are clear of personnel and equipment.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not stall test for more than 30 seconds at full throttle or allow transmission oil temperature to go over 300° F (149° C), red area, on TRANSMISSION TEMP F gage.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; border-right: 1px solid black; padding-right: 5px;"> <p>With engine at normal operating temperature, apply brakes and place transmission shift lever in high range. Run engine at full throttle for no more than 30 seconds.</p> <p>Check that engine speed stabilizes between 1800-2050 rpm.</p> </div> <div style="width: 45%; padding-left: 5px;"> <p>Engine speed is below 1800 rpm after three stall checks.</p> </div> </div>	

TRANSMISSION
TEMP F GAGE

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
10	Semiannual	Transmission (Slippage Check)	<p>Check shifting control linkage adjustment, adjust as required (page 11-52). If slippage still exists, notify support maintenance. Apply brakes.</p> <p>Shift transmission into low and then into reverse range. Run engine at full throttle until engine rpm stabilizes 1800-2050 (not more than 30 seconds).</p> <p>If engine speed is more than 2050 rpm, there is slippage in transmission servobands. Adjust bands (page 11-83) and retest.</p> <p>If slippage still exists, notify support maintenance.</p> <p>Release brakes.</p>	Engine speed is more than 2050 rpm.

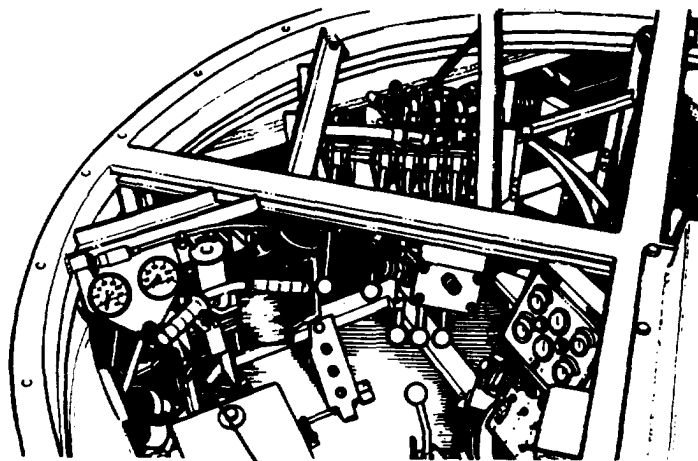


Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
11	Semiannual	Engine (Governed Speed and Performance)	<p>DURING ROAD TEST</p> <p>Test engine for normal acceleration and full power in each transmission range while vehicle is moving.</p> <p>While testing in low speed range, accelerate to wide open throttle.</p> <p>Check that engine speed under load does not exceed more than 2450 rpm. If engine speed exceeds 2450 rpm, notify support maintenance.</p>	<p>High engine speed or low power.</p> <p>Engine speed exceeds 2450 rpm.</p>

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

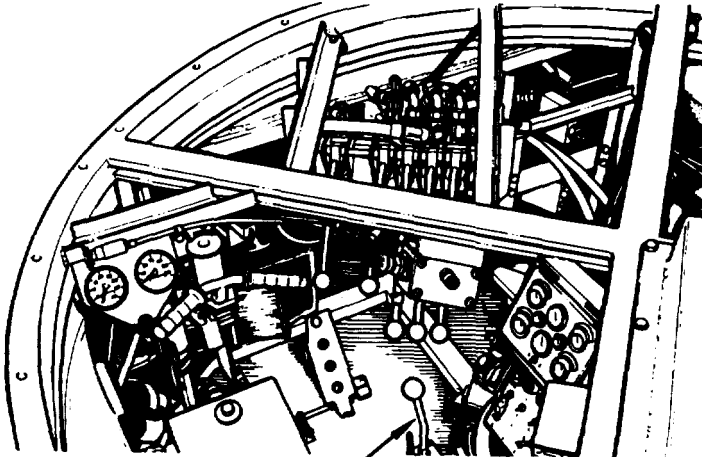
Item No.	Interval	Location		Procedure	Not Fully Mission Capable if:
		Item to Check/Service			
12	Semiannual	Steering Control		<p>NOTE</p> <p>If possible, the last mile of road test should be rough terrain to check shock absorbers after road test.</p> <p>Move steering control through full range and check for sticking or binding and that vehicle turns in direction selected.</p> <p>Check that steering control returns to center position when released after turning vehicle right and left.</p> <p>With steering control centered, check that vehicle does not wander or pull to one side at low, medium, or high speeds.</p> <p>Adjust steering control linkage, if required (page 15-31).</p>	Binding, grabbing, unusual noise, vibration or failure to turn.



STEERING CONTROL

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

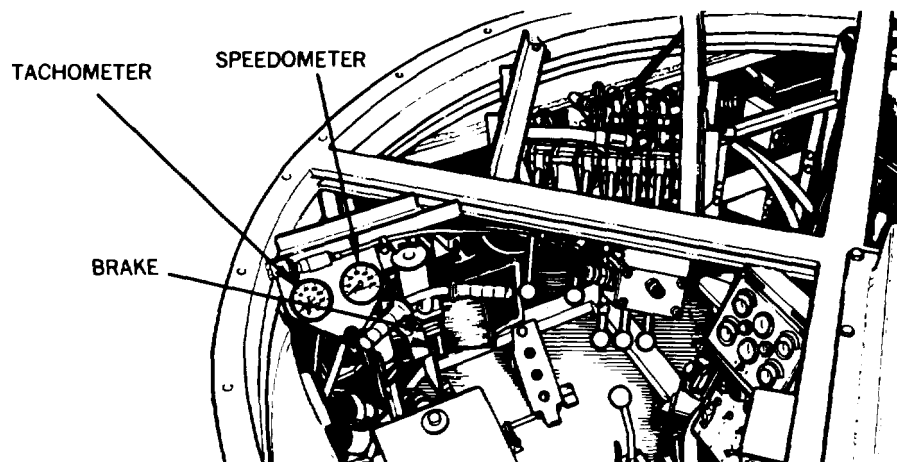
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
13	Semiannual	Shifting Control	<p>Move shifting control through all positions.</p> <p>Check that shifting control does not bind or stick.</p> <p>Check for satisfactory shifting.</p> <p>Adjust shifting linkage, if required (page 11-52).</p>	<p>Shifting control binds or sticks.</p> <p>Shifting linkage cannot be adjusted.</p>



TRANSMISSION
SHIFTING
CONTROL

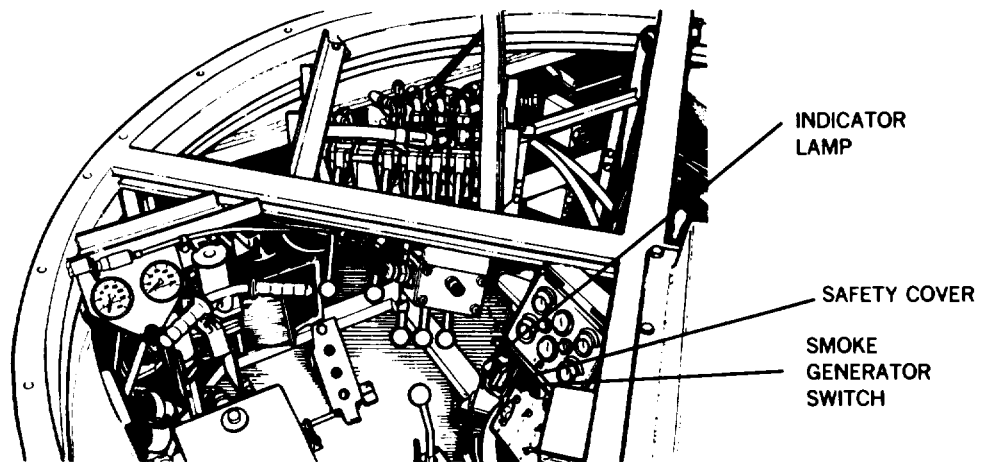
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if.
		Item to Check/Service		
14	Semiannual	Brake Controls	<p style="text-align: center;"><u>WARNING</u></p> <p>Driver must notify all personnel that brake check is to take place so they can be prepared for sudden stops.</p> <p>Move vehicle forward at 10-15 mph (16-24 kph) on level surface.</p> <p>Apply brake pedal for both normal and sudden stops.</p> <p>Check for straight stopping of vehicle.</p> <p>Adjust track tension (TM 5-5420-202-10) if vehicle does not stop in a straight line.</p>	Vehicle fails to stop.
15	Semiannual	Parking Brake	<p>If possible, position vehicle on steep incline and engage parking brake.</p> <p>Check that parking brake holds vehicle when brake pedal is released.</p> <p>Adjust parking brake if required (page 13-132).</p>	Parking brake will not hold.
16	Semiannual	Tachometer and Speedometer	<p>Check that tachometer and speedometer dial readings are not erratic.</p>	Tachometer inoperative or erratic.



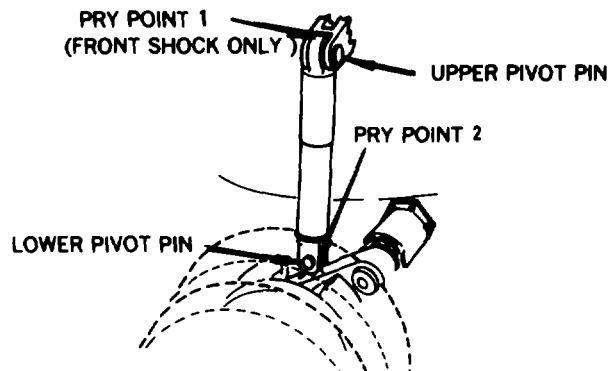
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
17	Semiannual	Engine Smoke Generator (If equipped)	<p>Set engine speed at 1600 rpm.</p> <p>Lift toggle switch safety cover. Place SMOKE GENERATOR switch to ON position. Check that indicator lamp lights.</p> <p>Have commander check for smoke emission from engine exhaust pipes.</p> <p>If smoke is not observed within 10 seconds, system is defective. Place SMOKE GENERATOR switch to OFF position.</p>	Smoke is not observed within 10 seconds.



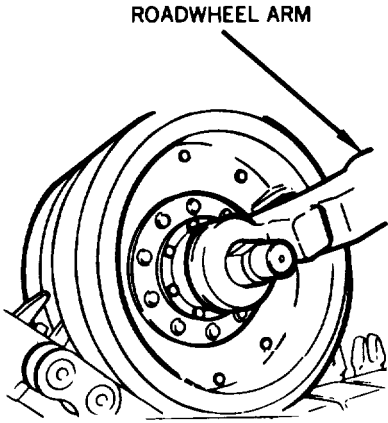
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
18	Semiannual	Shock Absorbers (Left and Right sided)	<p>AFTER ROAD TEST</p> <p style="text-align: center;"><u>WARNING</u></p> <p>To prevent injury, use care, shock absorbers may be extremely hot.</p> <p>Visually check for missing, cracked, bent, leaking, dented, or broken shock absorbers.</p> <p>Check wear of shock absorber upper and lower pivot Pins by inserting pinch bar between shock absorber eye and hull mounting yoke (pry point 1). Pry down on shock absorber and observe pins. Insert bar between shock absorber mounting yoke and roadwheel arm mounting eye (pry point 2). Pry up on shock absorber and observe pins.</p> <p>If pins move more than 1/8-inch (0.32 cm) while prying up or down, replace defective pins (page 14-93).</p>	<p>Any cracked, broken, bent, or missing shock absorbers.</p> <p>Dents that hinder shock absorber operation.</p> <p>Any clam III leak.</p>



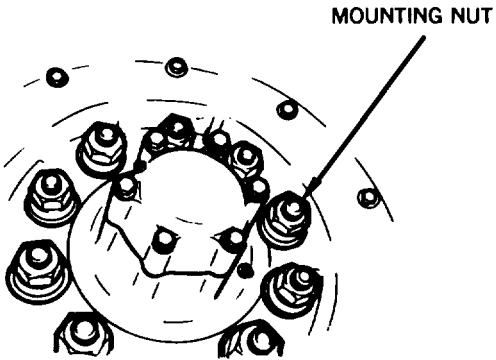
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides)	<p>Check all roadwheel arms for cracks, bends or damage.</p> <p>Using 0 to 1200 lb-ft torque multiplier check that all nuts are tightened to at least 550 lb-ft (746 N•m) dry.</p>	Any bends or cracks.



ROADWHEEL ARM

ROADWHEEL (INSIDE)

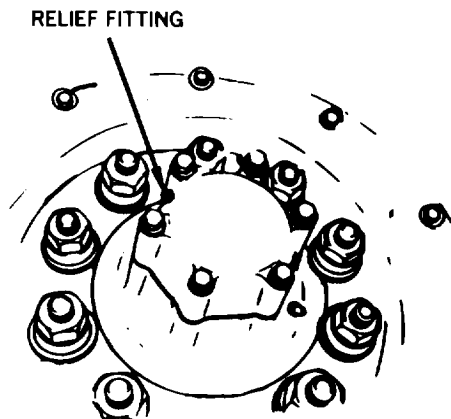
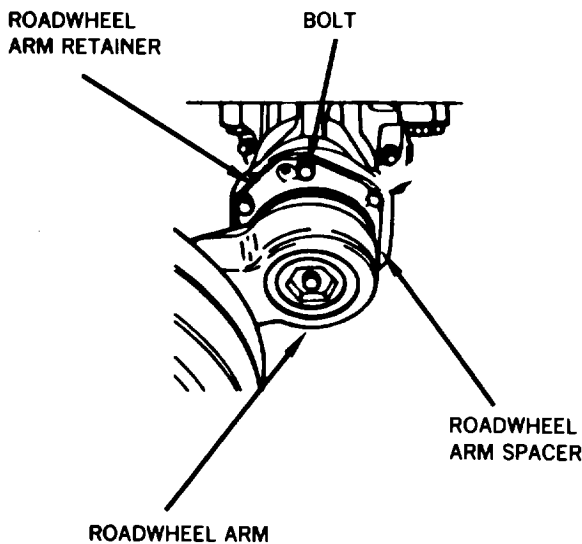


MOUNTING NUT

ROADWHEEL (OUTSIDE)

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides) - Continued	<p>Check for crushed or defective roadwheel arm inner and outer bearings at inside of roadwheel as follows:</p> <p>Using a 3/4 inch socket and socket wrench, check that socket fits on top three bolts of roadwheel arm of retainer. If bearings are damaged or defective, socket will not fit or will be a very difficult fit.</p> <p>Looking straight-on at the roadwheel arm, check the gap between the roadwheel arm retainer and the roadwheel arm spacer. Gap should be equal (approximately 1/4in) (0.635 cm) all the way around. If gap is smaller at top and greater at bottom, check for bearing damage, bearing dislocation, or a loose bearing assembly retainer nut. Correct defect. Clean grease from seal assembly. Clean lubricant pressure relief fitting using a clean, lint-free, dry cloth.</p>	Socket will not fit or is very difficult to fit any top three bolts.

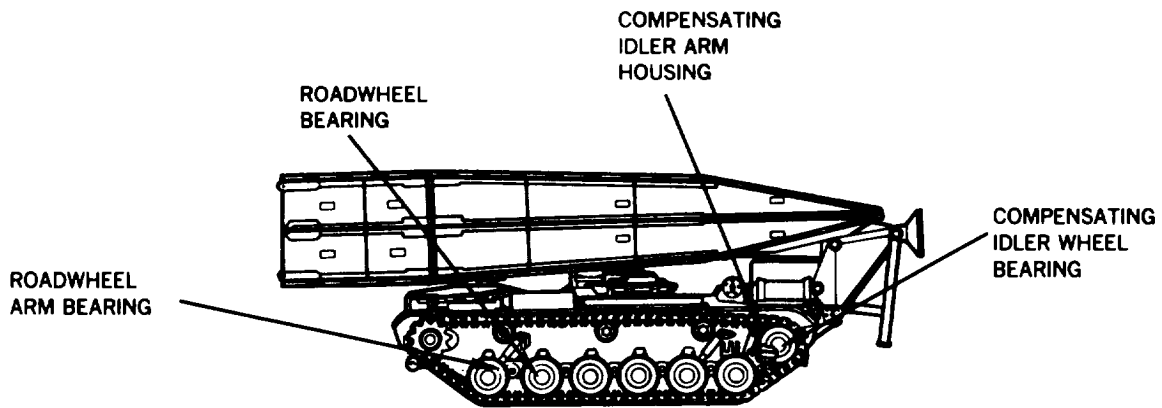


Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides) - Continued	<p style="text-align: center;"><u>WARNING</u></p> <ul style="list-style-type: none"> ● Dry Cleaning Solvent P-D-MO is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (36°C), and for Type II is 140°F (60°C). If You become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately. ● Compressed air for cleaning purposes should not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.). <p>Check compensating idler wheel bearings and roadwheel bearings relief fittings for proper operation. Plunger type fittings are checked by pulling up on plunger. Plunger should move freely. Ball-type fittings should be checked to ensure that the two relief ports are open. If plunger does not move freely or relief ports are not open, remove and thoroughly clean in dry cleaning solvent (P-D 680). Dry with compressed air or lint free cloth. Verify that ball moves and ports are open.</p> <p>Apply lubricant until it appears at lubricant pressure fitting. No lubricant should appear at seal assembly. Wipe off excess lubricant from relief valve.</p>	

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides) - Continued	Lubricate roadwheel arm bearings (Six fittings) until clean lubricant appears between arm retainer and arm. Wipe off excess grease. Lubricate compensating idler arm housing until clean lubricant appears at relief vent.	

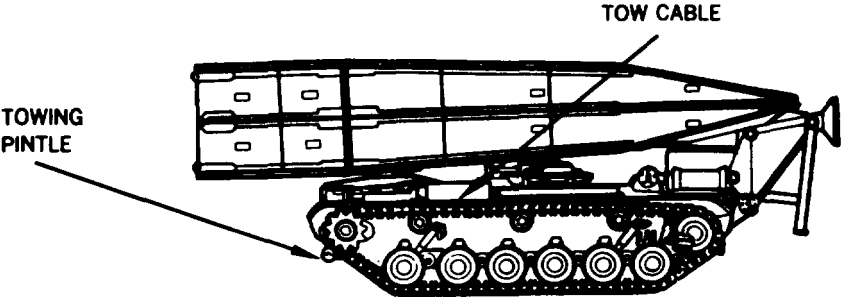


Suspension Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Compensating Idler Wheel Bearings	WTR (G-395) MIL-G-81322	AR	S	0.5
Compensating Idler Arm Housing		AR	S	0.5
Roadwheel Bearings All Temperatures		AR	S	0.5

For arctic operation, see FM 9 207

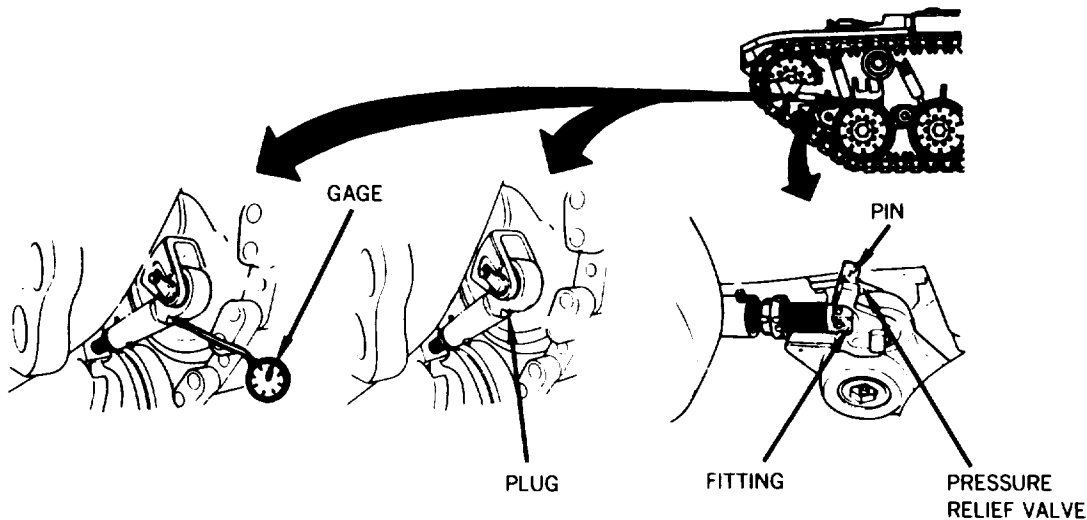
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:															
		Item to Check/Service																	
20	Semiannual	Towing Pintle and Tow Cables	Lubricate tow pintle (3 fittings). <p style="text-align: center;"><u>WARNING</u></p> Dry Cleaning Solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately. Clean tow cables with dry cleaning solvent (P-D-680) and coat with corrosion preventive compound (MIL-C 16173, Grade I).																
 <p style="text-align: center;">Tow Cables and Towing Pintle Lubricants</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Temperature Range</th> <th>Lubricant Mil. Symbol (NATO Code) Specification</th> <th>Capacity</th> <th>Interval</th> <th>Man-hour</th> </tr> </thead> <tbody> <tr> <td>Tow Cables</td> <td>N/A (N/A) MIL-C-16173</td> <td>AR</td> <td>S</td> <td>0.1</td> </tr> <tr> <td>Towing Pintle All Temperatures</td> <td>WTR (G-395) MIL-G-81322</td> <td>AR</td> <td>S</td> <td>0.5</td> </tr> </tbody> </table>					Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour	Tow Cables	N/A (N/A) MIL-C-16173	AR	S	0.1	Towing Pintle All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5
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Towing Pintle All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5															

For arctic operation, see FM 9-207

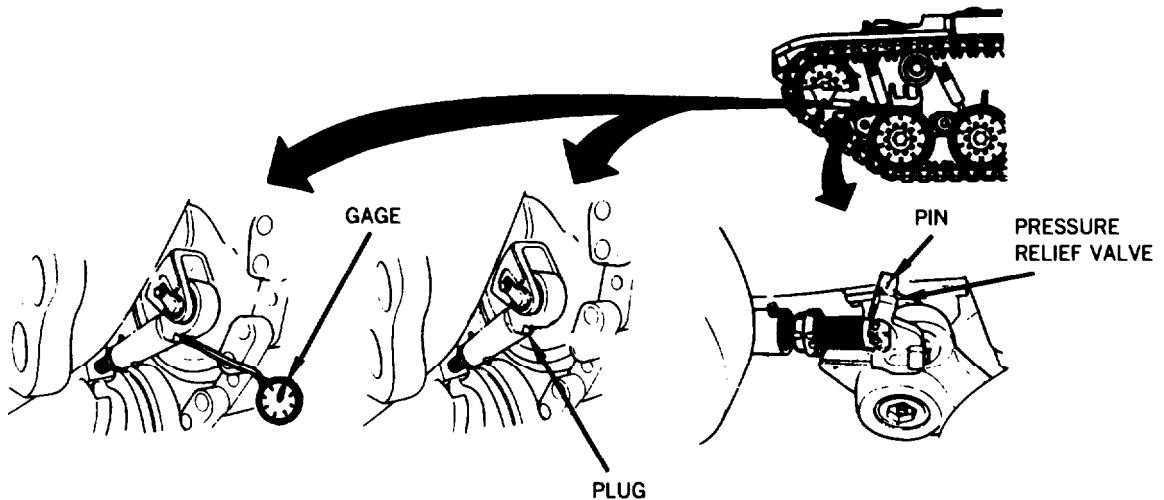
Preventive Maintenance Checks and Services for M60A1 AVLB Hull- Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
21	Semiannual	Grease Actuated Track Adjusting Links (Left and Right Sides)	<p>Check that grease fitting, pressure relief valve, and plug are not damaged or missing.</p> <p style="text-align: center;"><u>WARNING</u></p> <p>To avoid personal injury due to high pressure grease, pressure must be reduced to zero before gage is attached to adjusting link.</p> <p>Check pressure relief valve as follows:</p> <ol style="list-style-type: none"> 1. Pry up and hold pin on pressure relief valve until grease stops flowing. 2. Remove plug and install gage (Item 30.1, Chapter 3, Section I) into opening. 3. Attach grease gun to grease fitting. 4. Pump grease into adjusting link until grease comes out of pressure relief valve. 	Pressure relief valve does not hold pressure or does not bleed at proper pressure.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
21	Semiannual	Grease Actuated Track Adjusting Links (Left and Right Sides) - Continued	<p>5. Note pressure on gage when grease first starts to come out of pressure relief valve.</p> <p>6. If gage indicates less than 2150 psi, replace relief valve (page 14-106) and repeat steps 4 and 5.</p> <p>7. If gage indicates 2150-2250 psi, pressure relief valve is serviceable, proceed to step 8.</p> <p style="text-align: center;"><u>WARNING</u></p> <p>To avoid personal injury due to high pressure grease, pressure must be reduced to zero before gage is removed.</p> <p>8. Pry up and hold pin on pressure relief valve until grease stops flowing.</p> <p>9. Remove gage and install plug.</p> <p>10. Adjust track tension (TM 5-5420-202-10).</p>	



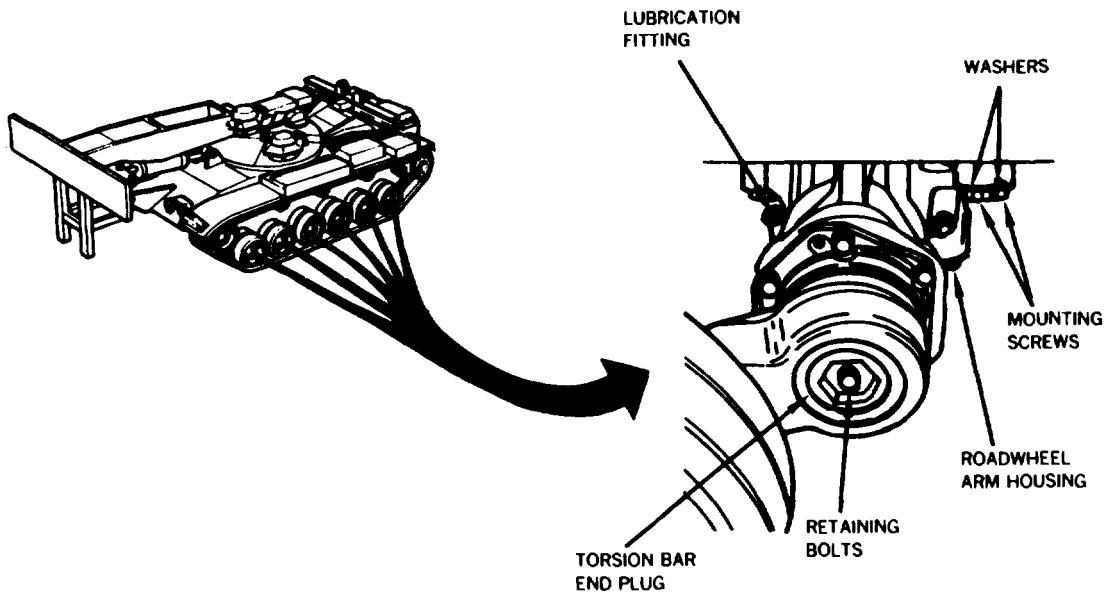
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:										
		Item to Check/Service												
22	Semiannual	Mechanical Track Adjusting Links (Left and Right Sides)	<p>Check track adjusting link assemblies for broken or missing cotter pin, lubrication fitting and pin assemblies.</p> <p>Check adjusting link assembly barrel, shaft, eye and yoke for cracks.</p> <p style="text-align: center;">NOTE</p> <p>Pin at roadwheel arm maybe installed with head of pin facing toward hull.</p> <p>Lubricate until clean lubricant appears between barrel and shaft.</p>											
<p style="text-align: center;">Suspension Lubricant</p>														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Temperature Range</th> <th style="width: 30%;">Lubricant Mil. Symbol (NATO Code) Specification</th> <th style="width: 10%;">Capacity</th> <th style="width: 10%;">Interval</th> <th style="width: 15%;">Man-hour</th> </tr> </thead> <tbody> <tr> <td>Mechanical Track Adjusting Link All Temperatures</td> <td style="text-align: center;">WTR (G-395) MIL-G-81322</td> <td style="text-align: center;">AR</td> <td style="text-align: center;">S</td> <td style="text-align: center;">0.1</td> </tr> </tbody> </table>					Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour	Mechanical Track Adjusting Link All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.1
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For arctic operation, see FM 9-207

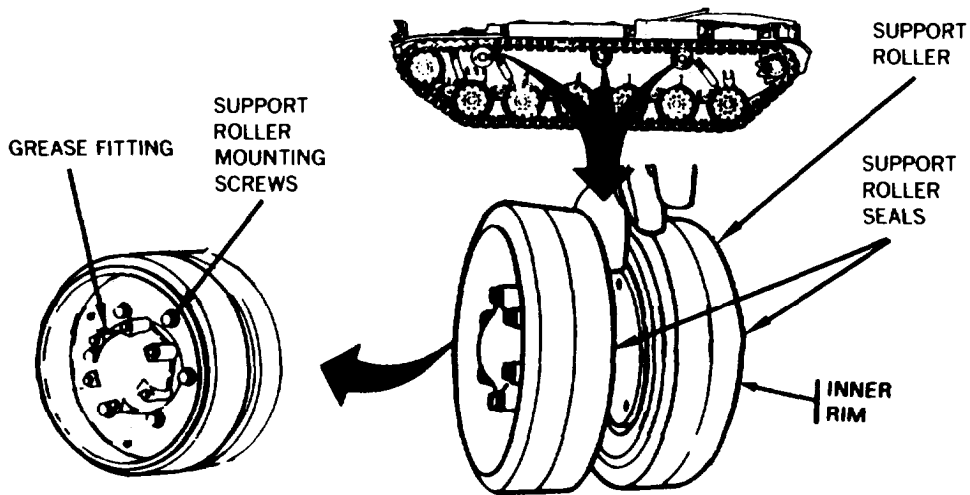
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
23	Semiannual	Roadwheel Arm Housings (Left and Right Sides)	<p>Check that roadwheel arm housings, mounting screws, washers, and lubrication fittings are not damaged or missing.</p> <p>Make sure that mounting screws are not backed out of mounting holes.</p> <p style="text-align: center;">NOTE</p> <p>If mounting screw must be tightened, replace lockwasher before tightening screw.</p> <p>Using a 0-600 lb-ft torque wrench, tighten replaced or loose mounting screws to 450-470 lb-ft (610-637 N•m).</p> <p>Check that screws are not loose, damaged, or missing.</p> <p>Check that torsion bar end plugs are fully seated and retaining bolts are secure.</p>	Roadwheel arm housing damaged.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

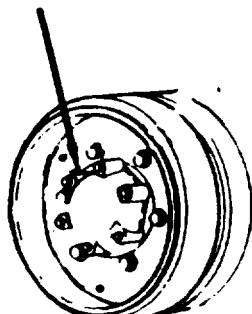
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
24	Semiannual	Track Support Rollers (Left and Right Sides)	<p>Check track support roller seals and bearings by inspecting inboard side of track support rollers for grease spattering along inner rim.</p> <p>If there is grease spattering on inner rim, clean all lubricant from behind the roller, seal, and along roller inner rim, check for space at bottom side of seal indicating worn or damaged bearings.</p> <p>If lubricant spattering is found, track support roller seal is defective. Replace defective seal (page 14-34).</p> <p>Check if support roller mounting screws and grease fitting are damaged or missing.</p>	<p>Any class III leak.</p> <p>Any worn or defective bearings.</p>



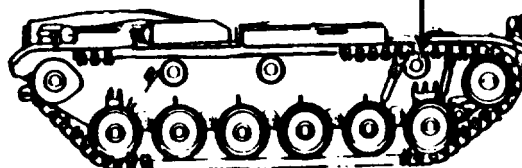
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
25	Semiannual	Track Support Roller Bearings	Lubricate (three fittings) until lubricant can be felt at seal behind roller. Wipe off excess lubricant from behind roller, seal, and along inner rim.	Any class III leak.

GREASE FITTING



SUPPORT ROLLER



Track Support Roller Bearings Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Track Support Roller Bearings All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.2

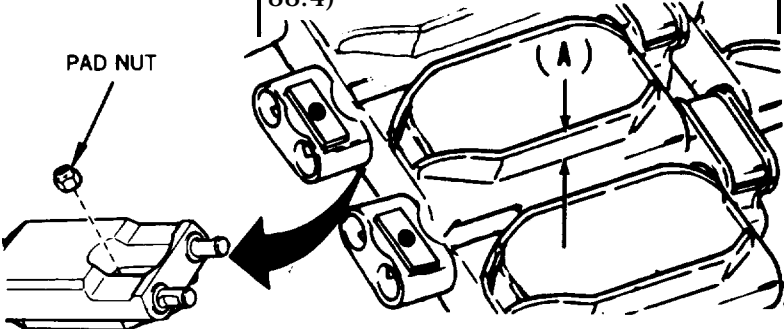
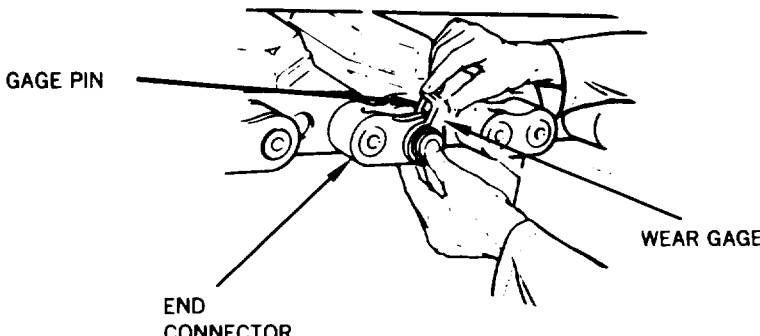
For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
26	Semiannual	Volute Bump Springs (Left and Right Sides)	<p>Check if volute bump springs are broken, cracked, deformed, or missing.</p> <p>Check that volute bump spring tap pet is not damaged or missing.</p> <p>Check that mounting screws are tightened to at least 160 lb-ft (217 N•m).</p>	Broken or missing springs.

The diagram illustrates the location of Volute Bump Springs on the AVLB hull. It shows a top-down view of the hull with arrows pointing to the Volute Bump Springs. Below this, there are three detailed views: 1) A view of the Volute Bump Spring mounted on the hull, showing the Mounting Screws. 2) A view of the Volute Bump Spring and Tappet. 3) A view of the Volute Bump Spring and Tappet, showing the Mounting Screws.

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

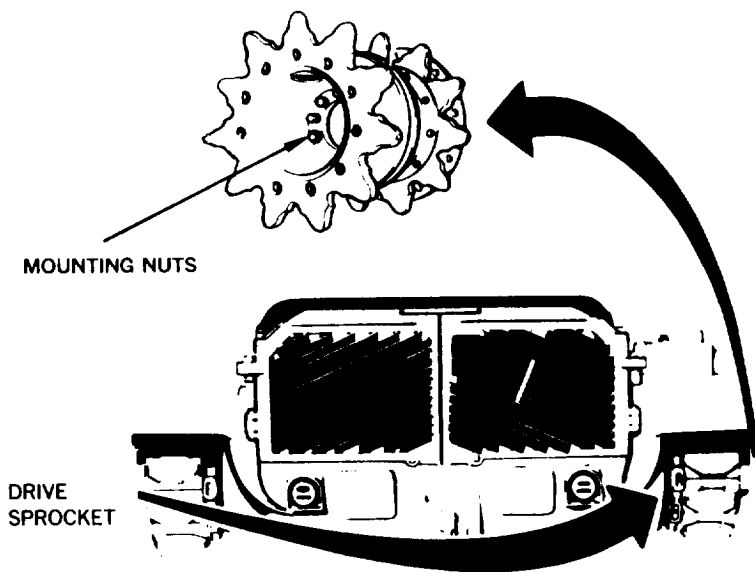
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
27	Semiannual	Track Shoes and Grousers (Left and Right Sides)	<p>Check that pad nut on replaced track shoe is tightened to 240-270 lb-ft (325-366 N•m).</p> <p>Measure metal grouser height (A). If grouser is less than 1/4-inch (0.635 cm), replace track shoe (page 14-88.4)</p> 	
28	Semiannual	Track End Connectors (Left and Right Sides)	<p>To inspect end connectors, position wear gage (Item 10, Chapter 3, Section I) on end connector.</p> <p><u>WARNING</u></p> <p>To avoid personal injury, wear goggles when hitting bolt or end connector with hammer.</p> <p>Turn gage around both end surfaces of connector and depress gage pin at several positions. Check that pin touches at each position.</p> <p>If pin touches at each position, end connector is okay. If pin does not touch, end connector is worn.</p> 	End connectors are worn or missing.

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
29	Semiannual	Track Wedge and Wedge Bolts (Left and Right Sides)	Check that all wedge bolts are tightened to 140-160 lb-ft (190-217 N•m).	Loose or missing Wedges/bolts.
30	Semiannual	Centerguides (Left and Right Sides)	<p>Move vehicle as necessary to gain access to center guide(s).</p> <p>Measure down 1 inch (2.54 cm) from top of centerguide.</p> <p>Check that centerguide thickness measures 5/8 in (1.6 cm) or more. Replace if less than 5/8 in (1.6 cm).</p> <p>Check that centerguide nuts are tightened to at least 300 lb-ft (407 N•m).</p>	<p>Worn centerguide.</p> <p>Loose or missing centerguide nuts.</p>

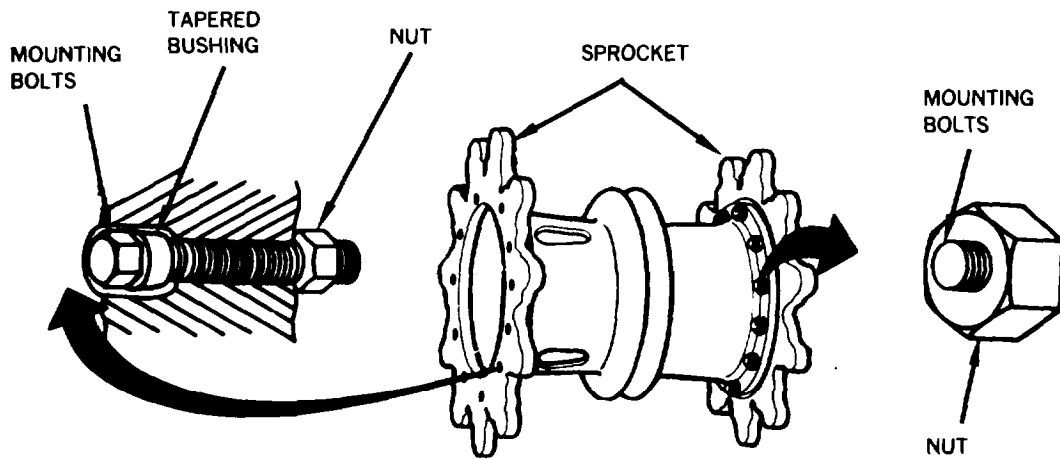
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
31	Semiannual	Sprocket Hub Left and Right Sides)	<p>Check that final drive hub mounting nuts are tight. Do not tighten loose mounting nuts, replace them.</p> <p>Check that mounting holes are not egg-shaped (out of round). Shiny areas next to mounting nuts indicate out of round holes.</p> <p>Use a 0-600 lb-ft torque wrench to tighten replacement nuts to 450-470 lb-ft (610-637 N•m).</p> <p>Visually check final drive output seal for leaks by inspecting lower part of inboard side of drive sprocket for evidence of oil. If oil is present, notify support maintenance final drive seal is defective.</p>	<p>Any nuts missing or loose.</p> <p>Mounting holes are out of round.</p> <p>Any class III leak.</p>



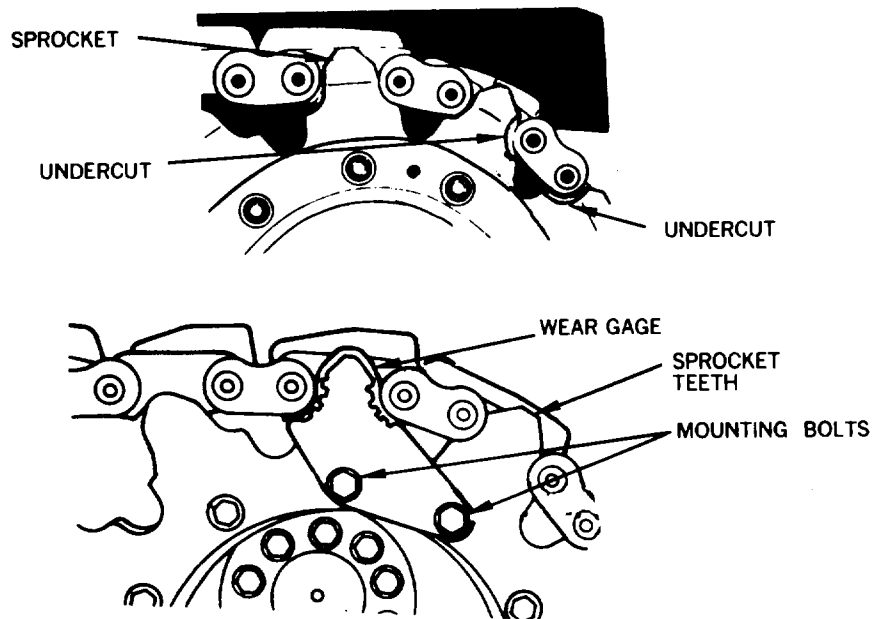
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
32	Semiannual	Drive Sprockets (Left and Right Sides)	<p>Move vehicle as needed to perform sprocket checks.</p> <p>Visually check that nuts for both inside and outside sprockets have not backed off mounting bolts. (Each bolt should stick out of nut about same distance.)</p> <p>Do not tighten loose nuts and bolts, replace them. When replacing nuts and bolts, also replace tapered bushings. Lightly lubricate replacement bolts and thread into hub through bushings into sprocket. Tighten bolts to 140-190 lb-ft (190-257 Nom). Tighten replacement nuts to 115-165 lb-ft (156-224 N•m).</p>	Any nuts are missing or loose.



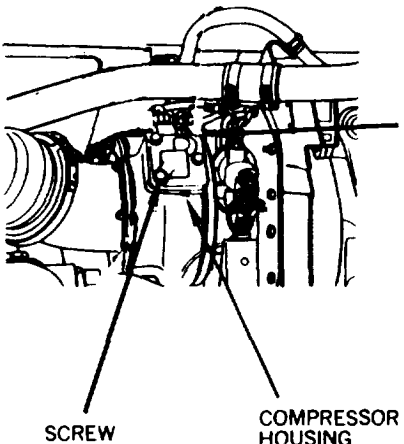
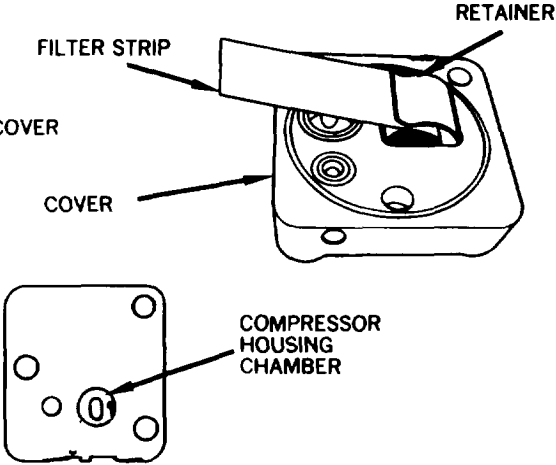
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
32	Semiannual	Drive Sprockets Left and Right Sides) - Continued	<p>Check sprocket teeth for wear by looking at undercut on sprocket (undercut is located on two teeth). Sprocket teeth are excessively worn if wear has reached bottom of undercut.</p> <p>If sprocket is not equipped with undercut indicators, use wear gage (Item 28, Chapter 3, Section I) to measure wear on driving side of sprocket teeth. If sprockets have been reversed, use side "B" of gage. If not, use side "B" of gage. Place wear gage over two mounting bolts and check for wear. Sprocket teeth are excessively worn if wear has reached bottom of any notch on gage.</p> <p>If sprocket teeth are excessively worn, reverse or replace sprocket (page 14-72).</p>	Sprocket teeth are excessively worn on both sides.



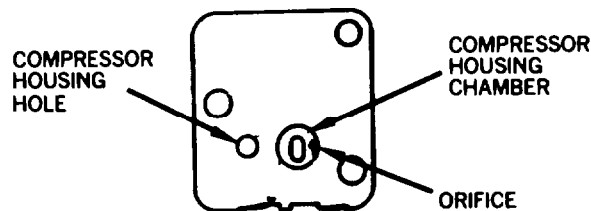
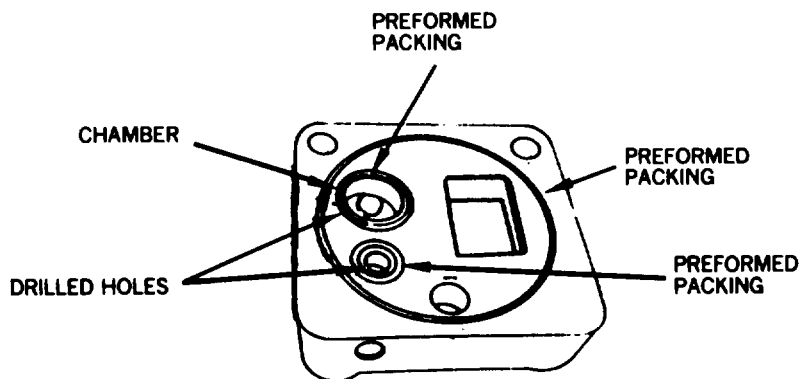
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
33	Semiannual	Dust Detector Filter Strip (Left and Right Sides) (If Equipped)	<p style="text-align: center;">NOTE</p> <p>Service dust detector filter strip quarterly, or after 750 miles of operation, or when dust detector indicates ingestion of foreign matter.</p> <p>Open top deck grille doors (TM 5-5420-202-10).</p> <p>Remove dust and dirt from filter strip cover and compressor housing.</p> <p>Loosen three screws securing filter strip cover to compressor housing. Remove cover.</p> <p>Remove filter strip with retainer from filter strip cover (page 7-130.11).</p> <p>Clean cover and mounting face of compressor housing.</p> <p>Inspect compressor housing chamber for contamination. Clean chamber as required.</p>	

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Internal	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
33	Semiannual	Dust Detector Filter Strip (Left and Right Sides) (If Equipped) - Continued	<p>Using pipe cleaner (Item 75, Appendix D), clean compressor housing chamber. Use a small (not more than 0.030 inch diameter) wire to clean orifice. Blow out chamber and orifice by mouth using a short piece of tubing (Item 78, Appendix D).</p> <p>Blow out (by mouth) compressor housing hole.</p> <p>Inspect cover chamber for contamination. Clean chamber as required.</p> <p>Using pipe cleaner (Item 75, Appendix D), clean drilled holes and blow out (by mouth).</p> <p>Replace three preformed packings (page 7-130.13).</p>	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
33	Semiannual	Dust Detector Filter Strip (Left and Right Sides) (If Equipped) - Continued	<p>Service dust detector filter strip.</p> <p>Cut off approximately 2-inches from end of filter strip.</p> <p>Pull filter strip so that approximately 1/2-inch will extend past edge of cover when filter strip is installed.</p> <p>Install filter strip and retainer in cover. Filter strip must be approximately 1/2-inch past edge of cover.</p> <p>Ensure all orifices are clean.</p> <p>Install cover. Tighten three screws.</p> <p>Perform dust detector operational test (page 10-298.17).</p>	

A technical drawing showing a rectangular filter strip being inserted into a square cover. A dashed line indicates the path of the strip. Labels 'FILTER STRIP' and 'COVER' are present with arrows pointing to the respective parts.

A technical drawing showing the cover being secured onto a mechanical assembly. A label 'COVER' points to the top part, and a label 'SCREW' points to one of the fasteners used to secure it.

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

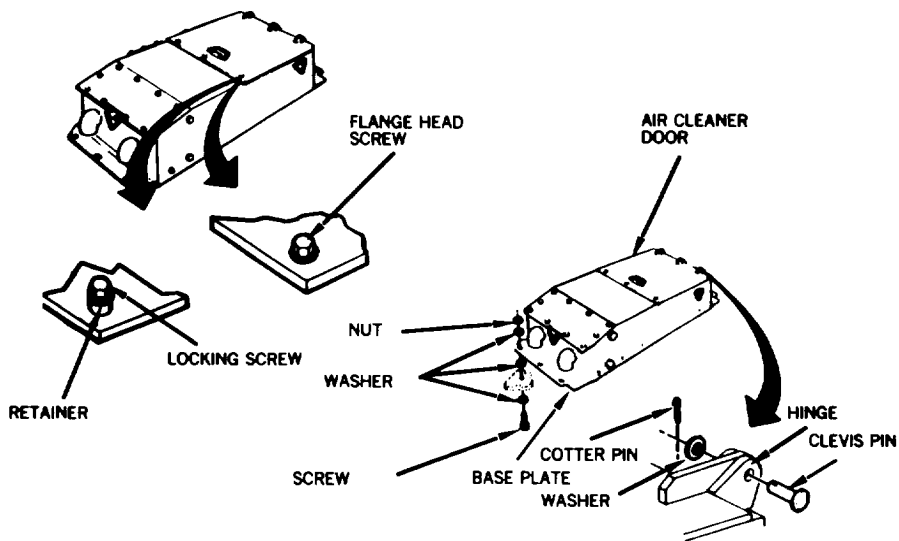
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
34	Semiannual	Vehicle Exhaust Dust Ejector System (VEDES) (If Equipped)	Remove cap assembly (page 8-14). Inspect cap assembly to make sure flapper is not sticking or broken. If sticking or broken, install new cap assembly (page 8-16). Install cap assembly (page 8-16).	

ENGINE SHOWN REMOVED FOR CLARITY

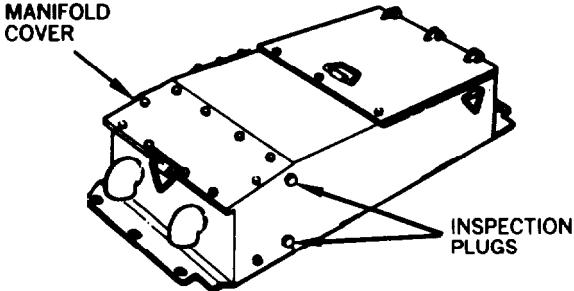
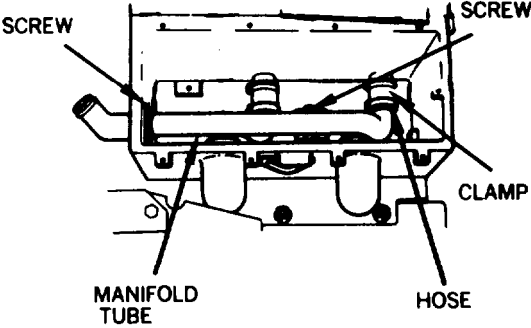
CAP ASSEMBLY

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
36	Semiannual	Air Cleaners (Left and Right Sides)	<p style="text-align: center;">NOTE</p> <p>Air cleaners doors are equipped with either locking screws and retainers or with flanged-head screws.</p> <p>Check air cleaner door for loose or missing screws or damaged retainers. Replace missing or damaged door screws or retainers. Make sure screw holes are free of dirt.</p> <p>Check that clevis pins, washers, or cotter pins are not missing from hinges.</p> <p>Check that base plate is secured to tank outrigger by six screws, 18 washers, and six nuts.</p> <p>Check that hinges are not cracked.</p> <p>Check that access plate mounting screws are not loose or missing.</p>	

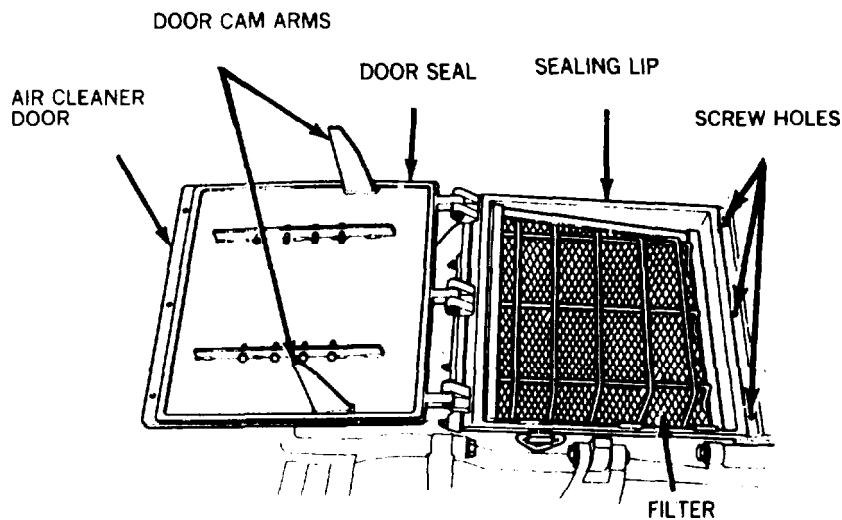


Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
35	Semiannual	Air Cleaners (Left and Right Sides) - Continued	<u>WARNING</u>	
			<p>When using compressed air, use effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).</p> <p>Remove two inspection plugs. Using V-pack cleaner (Item 5, Chapter 3, Section I), direct compressed air into upper hole until air coming out of lower hole is free of dirt.</p> <p>If equipped with Vehicle Exhaust Dust Ejector System (VEDES), perform the following</p> <p>Remove manifold cover (page 7-148.2).</p> <p>Check that four clamps are not loose, damaged, or missing.</p> <p>Check that two hoses are not damaged or loose.</p> <p>Check that six mounting screws are not loose or missing.</p> <p>Check that manifold tube is not damaged.</p> <p>Install manifold cover (page 7-148.3).</p>	
				
				

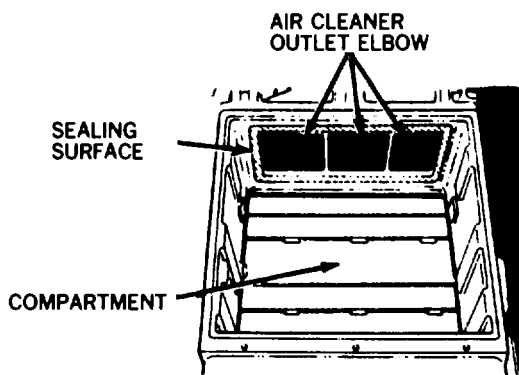
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
35	Semiannual	Air Cleaners (Left and Right Sides) - Continued	<p>Open air cleaner door (page 7-97). Check that door cam arms are not bent, cracked, or missing.</p> <p>Check that air cleaner door seal is not hardened, damaged, missing, or does not have indentations.</p> <p>Check that screw holes are drilled through and free of dirt or obstructions.</p> <p>Check that sealing lip on housing is not damaged. If housing sealing lip is damaged, notify support maintenance.</p> <p>Remove filter.</p>	



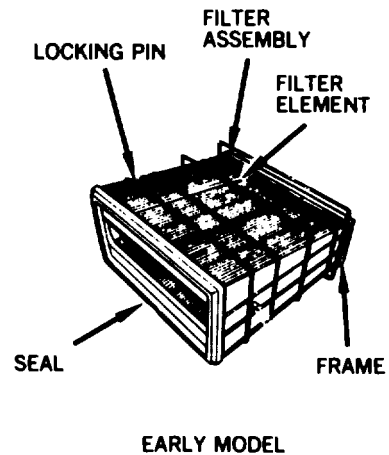
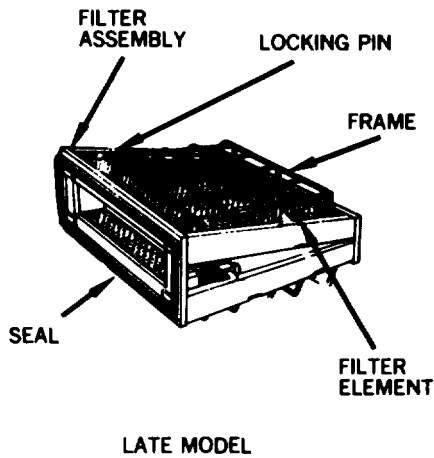
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
35	Semiannual	Air Cleaners (Left and Right Sides) - Continued	Check compartment for internal cracks and damage.	Element is damaged.
			Check filter element sealing surface for dirt damage that would prevent proper sealing of filter element.	
NOTE				
Dust trails in the outlet elbow maybe caused by damaged seal between air cleaner and outlet elbow, missing air restriction indicator (if equipped), or damaged air filter element.				
			Check inside of air cleaner outlet elbow for dust trails.	



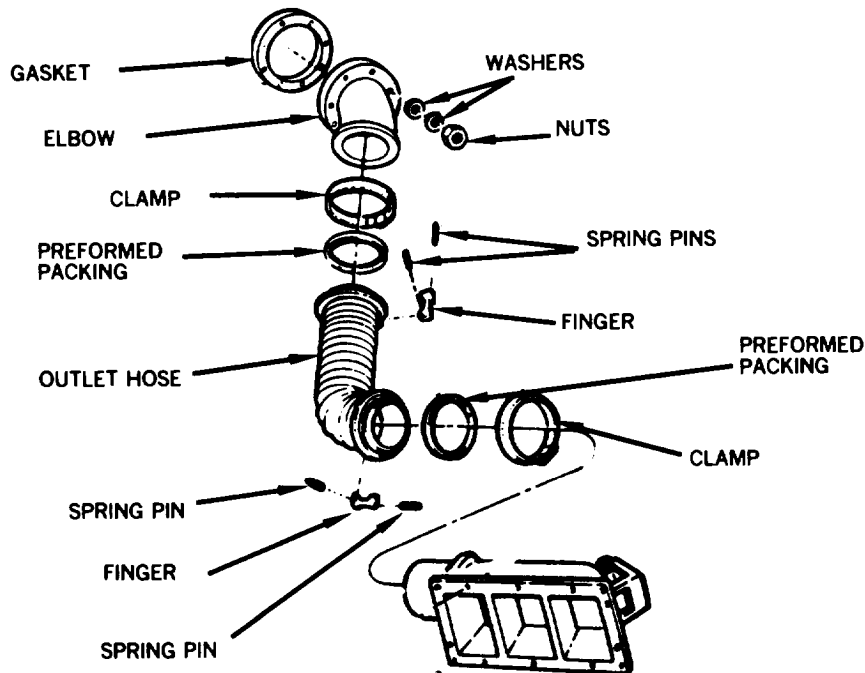
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
36	Semiannual	Air Cleaners Filters (Left and Right Sides)	<p>Service air cleaner falter assemblies (page 7-96).</p> <p>Check that seal is not hardened, cracked, damaged, missing, or does not have permanent indentations.</p> <p>Check that frame or either locking pin is not damaged or missing.</p> <p>Check falter element for ripe, holes, tears, or other damage.</p>	Air filter seal is unserviceable.



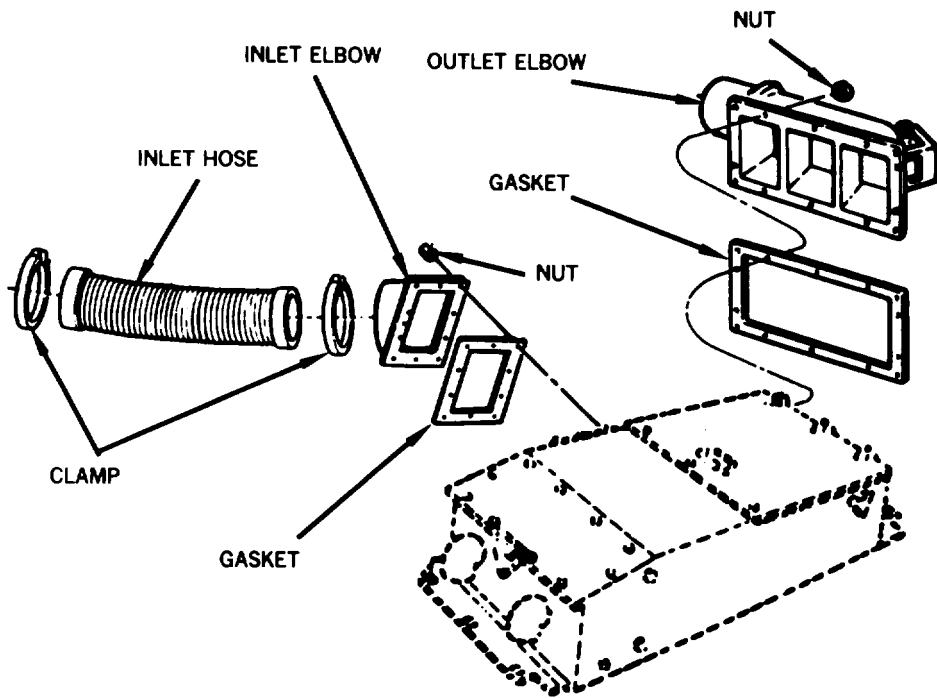
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
37	Semiannual	Air Cleaner Elbows, Hoses, and Clamps (Left and Right Sides)	Remove air cleaner outlet hose (page 7-84).	
NOTE				
Dust trails in the outlet hose maybe caused by bad preformed packing, loose clamps, damaged outlet hose, or improper installation of hose.				
			Check that outlet hose is not cracked, torn, or leaking and that clamps are not loose or missing.	Cracked, tom leaking, or missing.
			Check that fingers and spring pins (if used) are not loose, damaged, or missing.	
			Check that preformed packings are not hardened, cracked, or missing.	
			Check that turbocharger elbow, gasket, washers, and nuts are not damaged or missing.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
37	Semiannual	Air Cleaner Elbows, Hoses, and Clamps (Left and Right Sides) - Continued	<p>Check that outlet elbow, inlet elbow, gaskets, and mounting nuts are not damaged or missing.</p> <p>Check that inlet hose is not torn or damaged, and that clamps are not damaged, loose, or missing.</p> <p>Install air cleaner outlet hose (page 7-85).</p>	

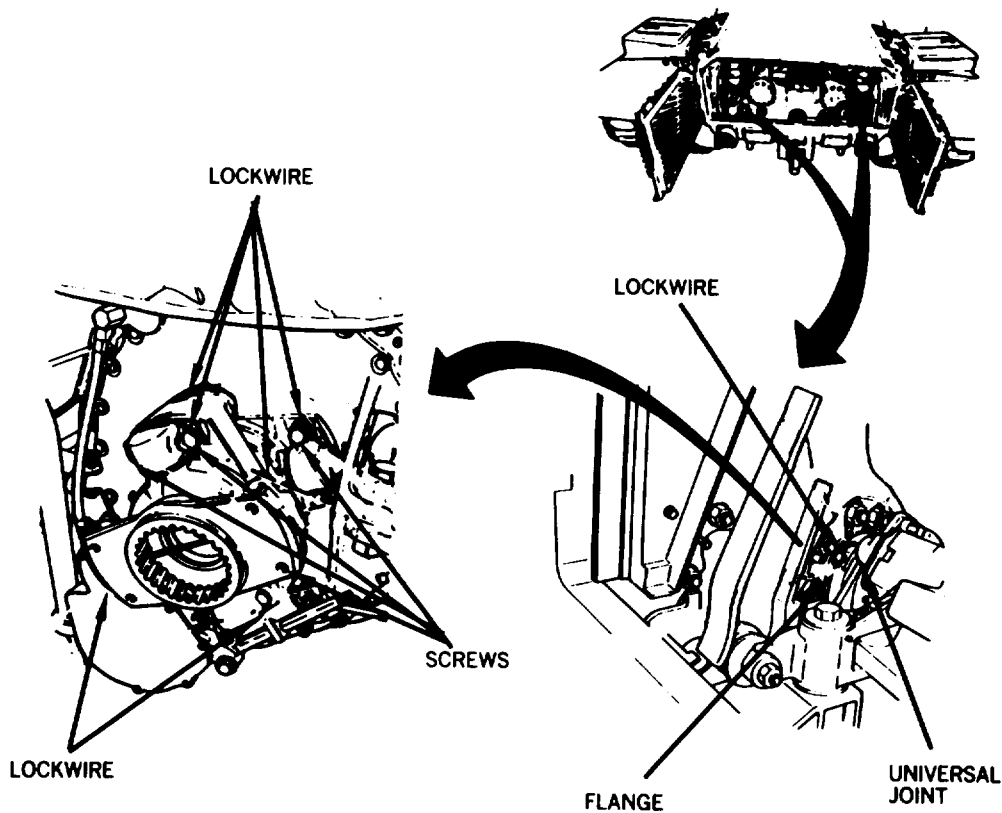


**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
38	Semiannual	Parking Brake Control Linkage	<p>Remove transmission shroud (page 9-2).</p> <p>Check parking brake linkage in engine compartment for binding, corroded or damaged cable.</p> <p>Check for broken or damaged bracket and rod end.</p> <p>Check nuts and pin for damage.</p>	Parking brake inoperative.

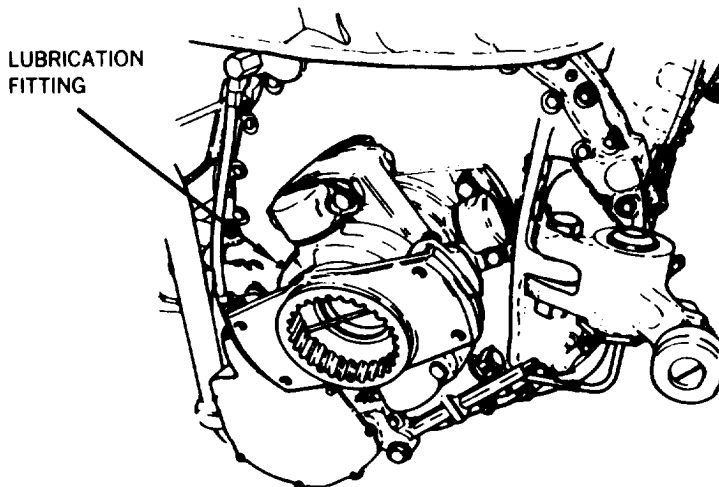
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
39	Semiannual	Final Drive Universal Joints and Disconnect Flanges (Left and Right Side)	<p>Check universal joint and disconnect flanges for cracks and damage. Check for missing or broken lockwire.</p> <p>If lockwire is missing or broken, check that screws are tightened to at least 118 lb-ft (160 N-m). It may be necessary to remove power plant (page 5-1) before torque can be checked. Do not tighten loose screws, replace them. Tighten new screws to 118-128 lb-ft (160-173 N-m).</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
39	Semiannual	Final Drive Universal Joints and Disconnect Flanges (Left and Right Side) - Continued	Lubricate universal joints. If lubrication fitting holes are plugged with protective plugs, remove plugs and install lubrication fitting and lubricate. Leave fittings in universal joints.	

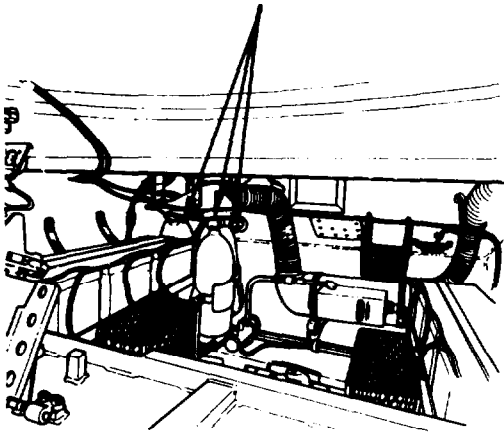


Final Drive Universal Joints Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Final Drive Universal Joints All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

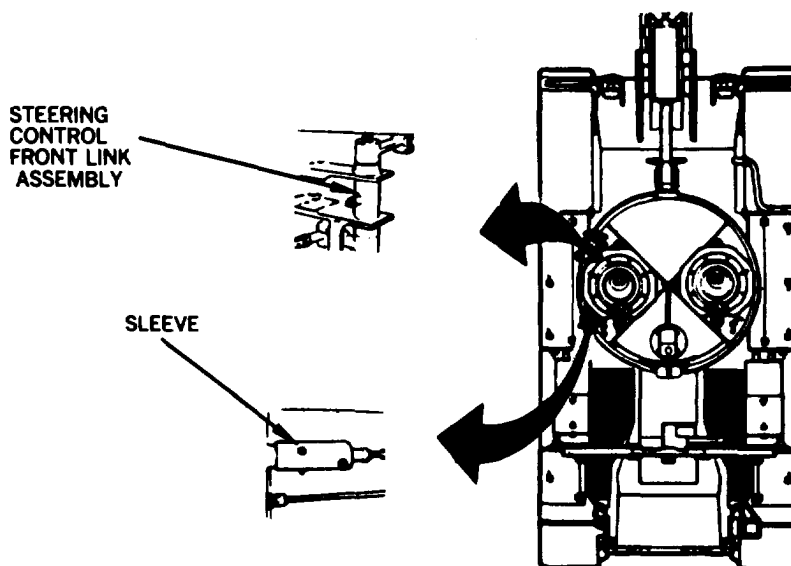
For arctic operation, see FM 9-207

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
<u>WARNING</u>				
Handle charged cylinders with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.				
40	Semiannual	Fixed Fire Extinguisher System	<p>Remove three fixed fire extinguisher cylinders from vehicle and weigh (page 20-52).</p> <p>Check neck of cylinder for last pressure test date. If last pressure test was performed more than 5 years ago, replace fire extinguisher cylinder (page 20-52). Notify support maintenance fire extinguisher requires pressure test.</p>	<p>Fire extinguisher cylinder is missing.</p> <p>Any fire extinguisher cylinder requires pressure test.</p>
<p align="center">FIXED FIRE EXTINGUISHER CYLINDERS</p> 				

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
40	Semiannual	Fixed Fire Extinguisher System - Continued	While fire extinguishers are removed, lubricate steering control front link assembly and sleeve.	



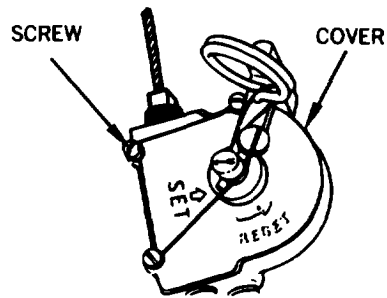
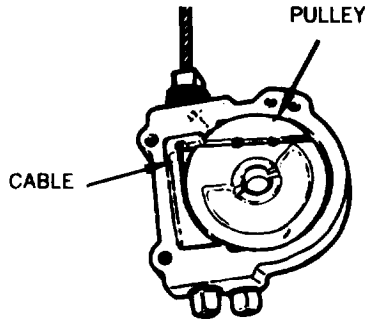
Steering Linkage Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Steering Control Linkage Steering Linkage Sleeve All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.2

For arctic operation, see FM 9-207

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
40	Semiannual	Fixed Fire Extinguisher System - Continued	Remove three screws securing cover and remove cover. Clean pulley mechanism and surrounding areas. Check for proper operation of actuator mechanism. Coat pulleys and cables with WTR.	



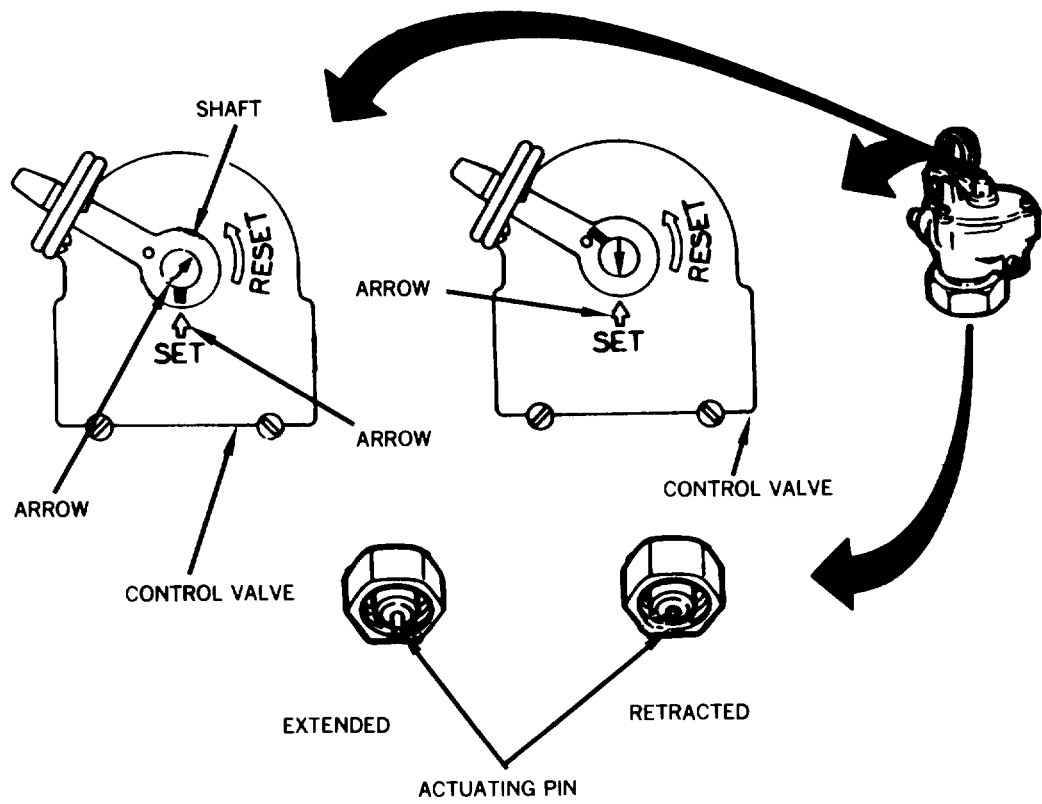
Fire Extinguisher Pulleys Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Fire Extinguisher Pulleys All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.1

For arctic operation, see FM 9-207

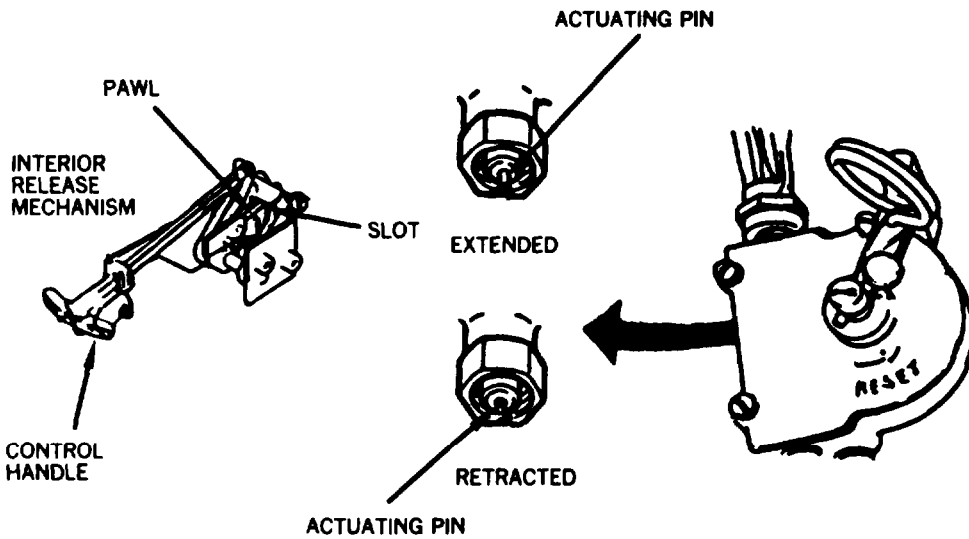
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
40	Semiannual	Fixed Fire Extinguisher System - Continued	<u>WARNING</u>	
			<p>Handle charged cylinders with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.</p>	
			<p>Reset control valves. Turn shaft counter-clockwise until arrow on cover end of shaft is aligned with SET arrow on cover.</p> <p>Check for retraction of actuating pins on control valves No.1 and 2.</p>	



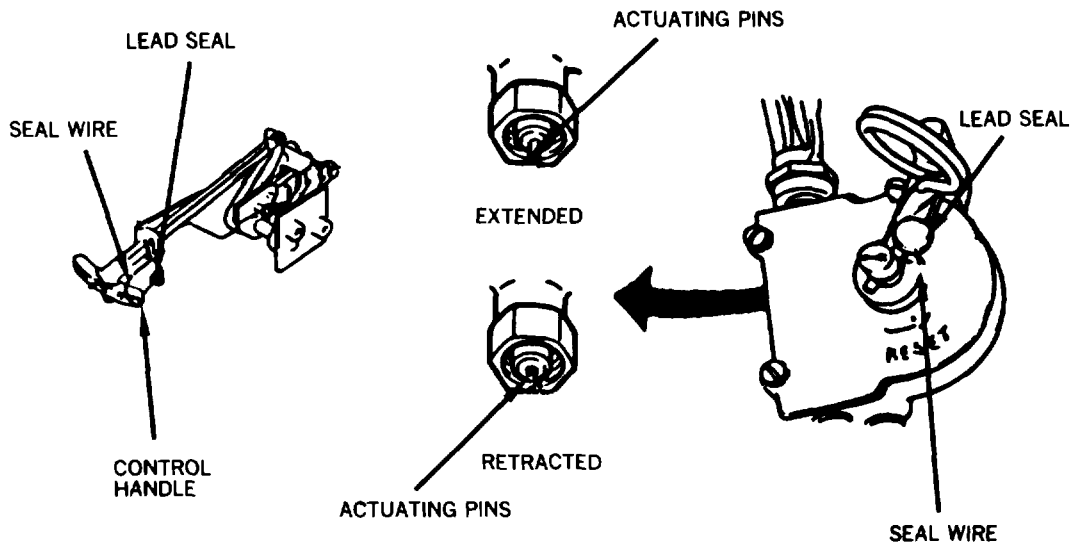
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
40	Semiannual	Fixed Fire Extinguisher System - Continued	<p align="center">NOTE</p> <p>Control valves must be held firmly in position while handle is being pulled. If this is not done, control valves may not be actuated.</p> <p>Pull FIRE-PULL hard interior control handle and release.</p> <p>Check for smoothness and freedom of action of cables and controls.</p> <p>Check extension of actuating pin on control valve No. 1.</p> <p>Push FIRE-PULL hard interior control handle and release again.</p> <p>Check for smoothness and freedom of action of cables and controls.</p> <p>Check for extension of actuating pin on control valve No. 2.</p> <p>Reset control handle position pawl in slot.</p>	



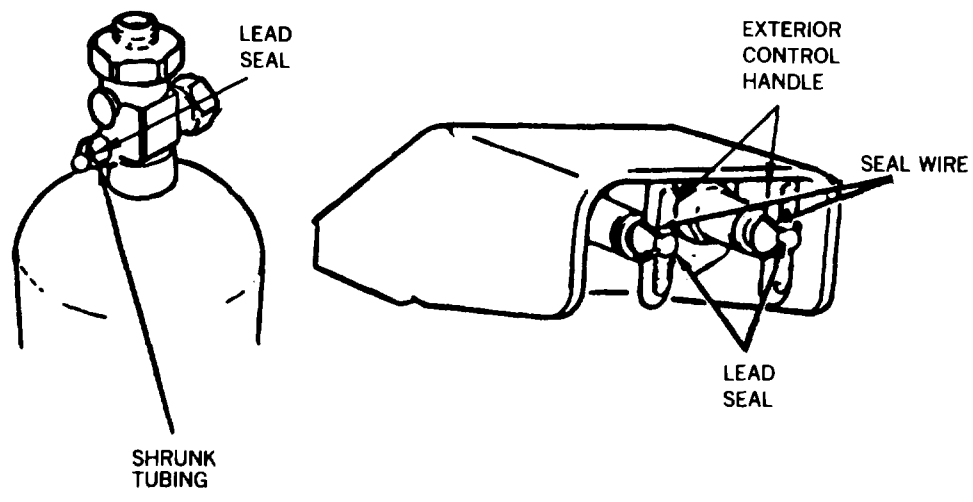
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
40	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Reset control valves. Turn shaft counter-clockwise until arrow on end of shaft is aligned with SET arrow on cover.</p> <p>Check for retraction of actuating pins on control valves, No. 1 and 2.</p> <p align="center">CAUTION</p> <p>Use only approved seal wire. Do not use safety wire or lock wire. Do not make additional loops/runs for additional strength.</p> <p>Install seal wire and lead seal on control valves No. 1 and 2 and interior release mechanism.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
40	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Check each replacement cylinder for lead seal.</p> <p>Check each replacement cylinder for shrunk tubing over safety valve outlet.</p> <p>Replace cylinder if shrunk tubing is missing or broken.</p> <p align="center"><u>WARNING</u></p> <p>Handle charged cylinders with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.</p> <p align="center"><u>CAUTION</u></p> <p>Use only approved seal wire. Do not use safety wire or lock wire. Do not make additional loops/runs for additional strength.</p> <p>Install seal wire and lead seals on 1st shot and 2nd shot exterior control handles.</p> <p>Install three fixed fire extinguishers in vehicle (page 20-52).</p>	

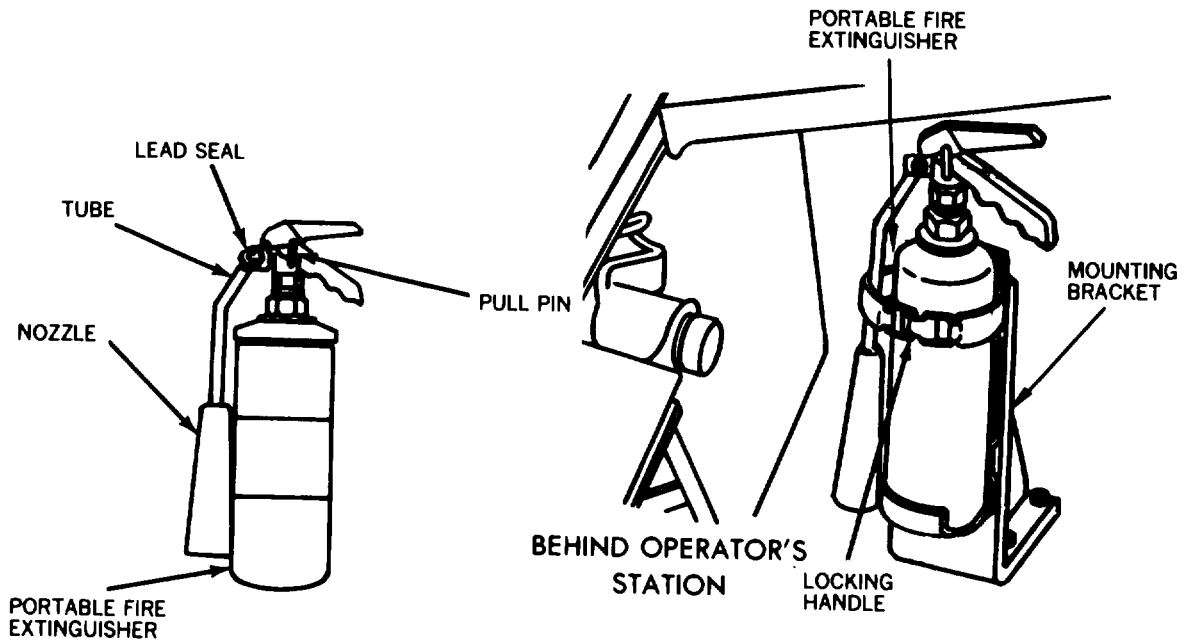


Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
<u>WARNING</u>				
Handle charged cylinder with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.				
41	Semiannual	Portable Fire Extinguisher	<p>Remove and weigh portable fire extinguisher. If cylinder charge is low, request exchange (DA Form 2402) or request recharging (DA Form 2407).</p> <p>Check portable fire extinguisher mounting bracket is securely mounted behind operator's seat.</p> <p>Check locking handle for freedom of action.</p>	Extinguisher is missing or seal/hardware is missing or broken.
<p>The diagram shows a portable fire extinguisher mounted on a bracket. The bracket is attached to a structure behind the operator's station. The extinguisher has a locking handle. Labels with leader lines point to the 'PORTABLE FIRE EXTINGUISHER', 'MOUNTING BRACKET', 'LOCKING HANDLE', and 'BEHIND OPERATOR'S STATION'.</p>				

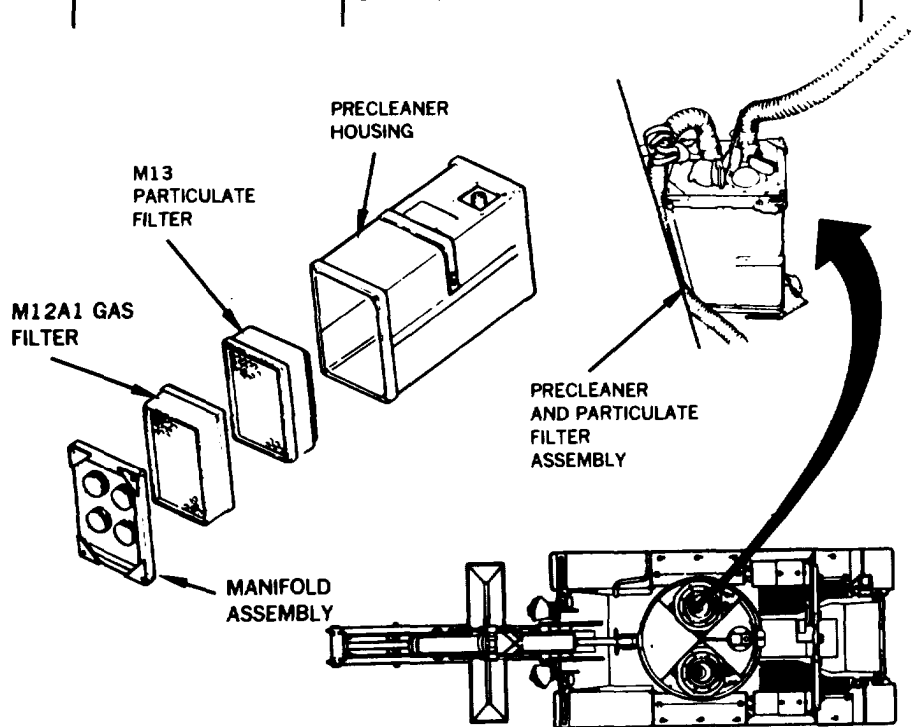
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull-
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
41	Semiannual	Portable Fire Extinguisher - Continued	<p>Check that plastic indicator is intact.</p> <p align="center">NOTE</p> <p>Some fire extinguishers have a safety wire-lead seal attached to pull pin.</p> <p>Check that safety wire-lead seal is not broken or missing.</p> <p>Check that tube is not kinked.</p> <p>Check that nozzle is clear of obstructions.</p> <p>Install portable fire extinguisher on mounting bracket.</p> <p>Check that locking handle holds fire extinguisher firmly in position on mounting bracket.</p>	



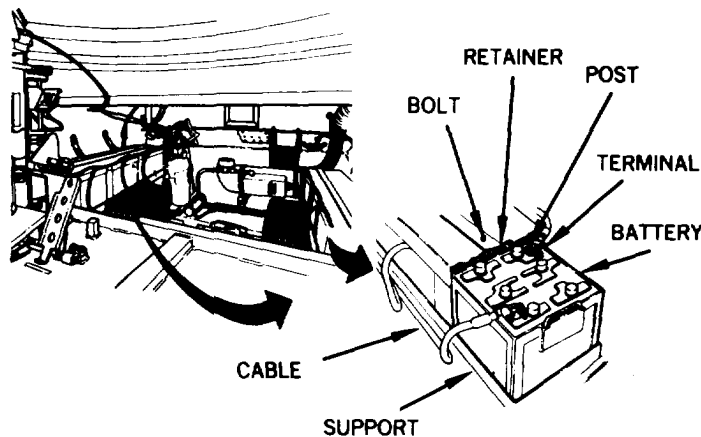
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
<u>WARNING</u>				
<ul style="list-style-type: none"> • If NBC exposure is suspected, all filter media must be handled by personnel wearing protective equipment. Contact your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures. • Gas particulate filters must be replaced at the initiation of combat operations where the use of a blood agent (AC or CK) is expected or after a known blood agent attack. 				
42	Semiannual	Gas Particulate Filter System	<p>For air flow testing see (TM 3-6680-316-10).</p> <p>Check precleaner housing, M12A1 gas filter, and M13 particulate filter and particulate filter assembly and two M18 gas particulate filters for dents/damages. Replace defective filters.</p> <p>Replace filters when notified by vehicle operator that gas filter change criteria has been met.</p>	



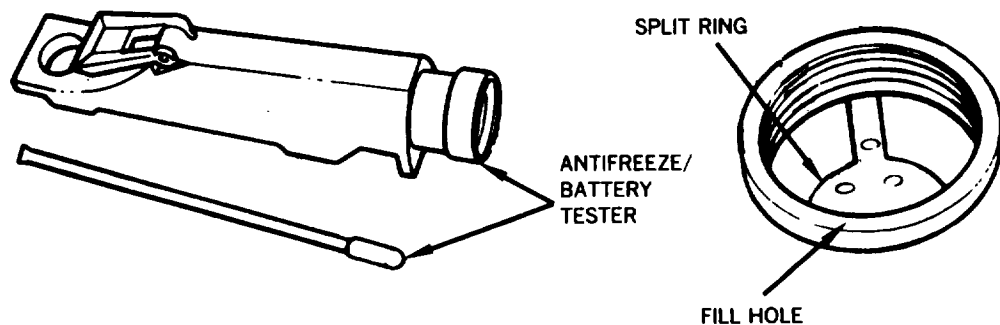
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
<p><u>WARNING</u></p> <p>Never allow flame or sparks near battery. Battery gas (hydrogen and air) is a dangerous explosive.</p> <p><u>NOTE</u></p> <p>maintenance instructions see TM 9-6140-200-14.</p>				
43	Semiannual	Batteries and Battery Retainer	<p>Check if cable terminals, posts, batteries, supports, retainers, bolts, and washers are clean of dirt, excess grease, and corrosion.</p> <p>If dirt, grease, or corrosion are found, remove batteries (page 10-253).</p> <p>Using a stiff brush and solution of water and bicarbonate of soda, clean cables, terminals, posts, batteries, supports, retainers, bolts, and washers.</p> <p>Install batteries if removed (page 10-256).</p> <p>Tighten terminals and retainer hold-down screws carefully to avoid damage to batteries.</p> <p>Apply light coat of grease (Item 37, Appendix D) to terminals.</p> <p>Check battery cover for cracks and damage.</p>	



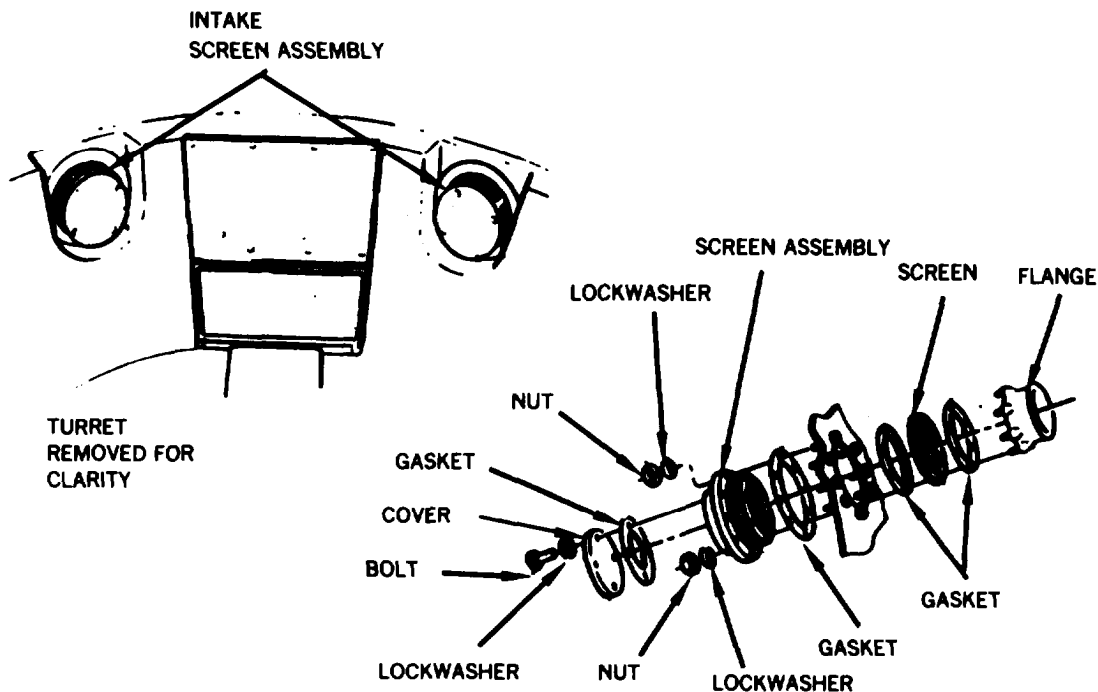
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
43	Semiannual	Batteries and Battery Retainer - Continued	<p>Remove battery caps.</p> <p>Check that electrolyte covers plates at bottom of fill hole.</p> <p align="center"><u>WARNING</u></p> <p>Do not fill battery cells from a pressurized water source. Electrolyte and battery corrosion can injure you. Wear safety goggles and gloves. If for any reason electrolyte or battery corrosion contacts the eyes, skin, or clothing, immediately flush with large amounts of fresh water. In case of eye or skin contact, see doctor immediately.</p> <p>If level is low, add distilled water to fill hole, as required, until level is above plates (if equipped with split ring fill to bottom of split ring). Do not overfill.</p> <p>If water is added to batteries, install caps, start engine and charge batteries for 15 minutes (TM 5-5420-202-10). Wait 30 minutes for batteries to stabilize, then perform battery testing (page 10-258).</p>	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
44	Semiannual	Air Intake Screens and Covers (Left and Right Sides)	<p>Remove four bolts and lockwashers. Remove cover and gasket.</p> <p>Remove 14 nuts and lockwashers. Remove intake screen assembly.</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Do not remove flange from air cleaner hose. • Later models (improved clean air system) have only one gasket and no screen. <p>Check gaskets and screens for damage. If damaged, remove gaskets from metal parts and discard gaskets.</p>	

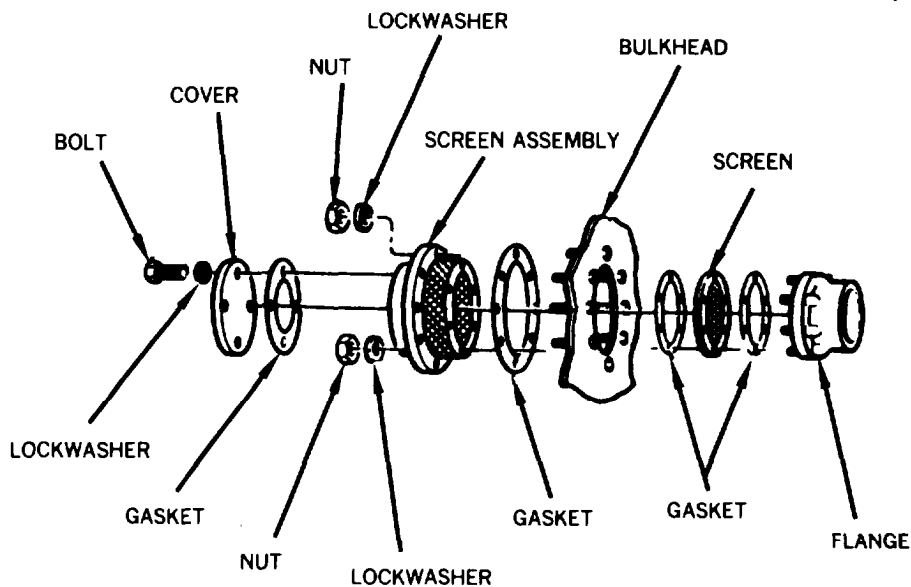


**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
44	Semiannual	Air Intake Screens and Covers (Left and Right Sides) - Continued	<p><u>WARNING</u></p> <p>Dry Cleaning Solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.</p>	
			<p>Clean cement from metal parts using dry cleaning solvent (Item 55, Appendix D).</p> <p>Cement new gaskets in place using adhesive (Item 2, Appendix D).</p>	

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
44	Semiannual	Air Intake Screens and Covers (Left and Right Sides) - Continued	<p align="center">NOTE</p> <p>Late models (improved clean air system) have only one gasket and no screen.</p> <p>Cement gaskets to flange and screen.</p> <p>Cement gasket to bulkhead and cover.</p> <p>Aline flange studs with holes in intake screen.</p> <p>Position intake screen assembly on bulkhead with holes alined. Install six new lockwashers and nuts on flange studs. Install eight new lockwashers and nuts. Position cover on intake screen assembly with holes alined. Install four new lockwashers and four bolts.</p>	



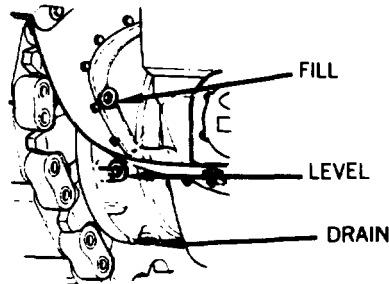
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
45	Semiannual	Engine Compartment	<p>Remove powerplant (page 5-2) and check engine compartment for oil, grease, sand and dirt.</p> <p>Clean engine compartment to remove all oil, grease, sand, and dirt.</p>	Any class III
46	Semiannual	Final Drive (Left Right Sides)	<p>Visually check final drive input seal for leaks by inspecting the area below the final drive adapter for evidence of oil.</p> <p>If there are signs of leaks, seal is defective.</p> <p>Use 0-600 lb-ft torque wrench, check that final drive mounting nuts are tightened to at least 460 lb-ft (623 N·m).</p> <p>Do not tighten loose nuts, nuts not meeting torque requirements are to be discarded and replaced. Tighten replaced nuts to 460-500 lb-ft (623-677 N·m).</p> <p>If equipped, replace air pressure relief valve (page 12-6).</p>	

The diagram illustrates the location of the air pressure relief valve, mounting nut, adapter, and input seal on the M60A1 AVLB hull. It shows a side view of the hull with a callout to the final drive assembly. The callout includes a detailed view of the final drive adapter and input seal, and a view of the mounting nut. Labels include: AIR PRESSURE RELIEF VALVE, MOUNTING NUT, ADAPTER, and INPUT SEAL.

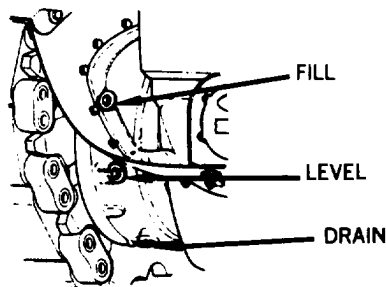
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
46	Semiannual	Final Drive (Left and Right Sides) - Continued	<p>If performing biennial PMCS, go to Item 77 (page 3-111).</p> <p>Check oil level. Check more frequently if there is evidence of leakage. Check before operating vehicle when oil is cold.</p> <p>To check oil level remove level plug. If oil has been overfilled, allow excess oil to drain into a suitable container. It is normal for a small quantity of oil (approximately 2 or 3 tablespoons), trapped behind plug, to run out when plug is removed.</p> <p>Check level (magnetic) plug and oil for metal content.</p> <p>Check that oil level is up to lower edge of level plug hole. Carefully insert finger into plug hole and feel for oil. If oil level is up, clean and install level plug.</p>	Any large metal chips or shavings.



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
46	Semiannual	Final Drive (Left and Right Sides) - Continued	<p>If oil level is low, install level plug, remove fill plug, and add oil. Check oil level at level plug. Repeat procedure as necessary until proper level is reached. Do not overfill. Clean and install fill and level plugs.</p> <p>When temperatures are constantly below +10°F (-12°C) for 7 days or more, change oil to OEA (MIL-L-46167).</p>	



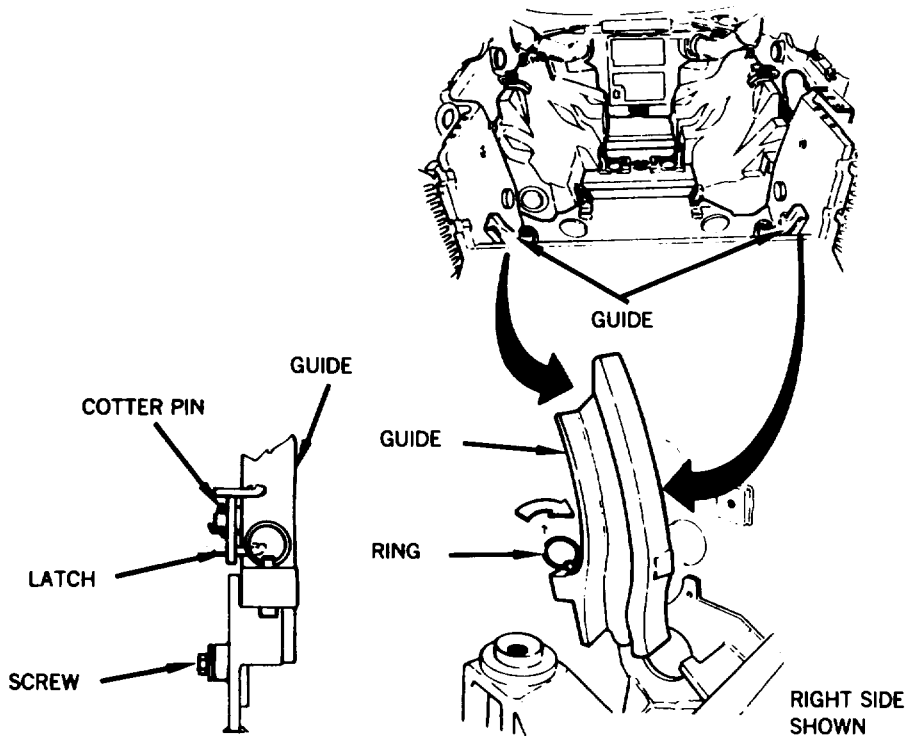
Final Drive Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Final Drive +5°F to +125°F (-15°C to +52°C)	OE/HDO-15/40 (O-1236) MIL-L-2104	AR	S	0.5
+5°F to -70°F (-15°C to -57°C)	OEA (O-183) MIL-L-46167			

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
47	Semiannual	Powerplant Mounting Guides (Front and Rear)	<p>Check rear guides for cracks and wear. Enter engine compartment.</p> <p>Pull up on ring. While holding ring up, move guide back and forth. Guide should move freely. Release ring. Ring should return to its original position.</p> <p>If ring does not return, spring (hidden) is defective. Check back of guide.</p> <p>Check that screw cannot be turned by hand.</p> <p>Check that cotter pin is not broken or missing.</p> <p>Lift latch up. Latch should move freely.</p>	Any cracked or broken mounts.

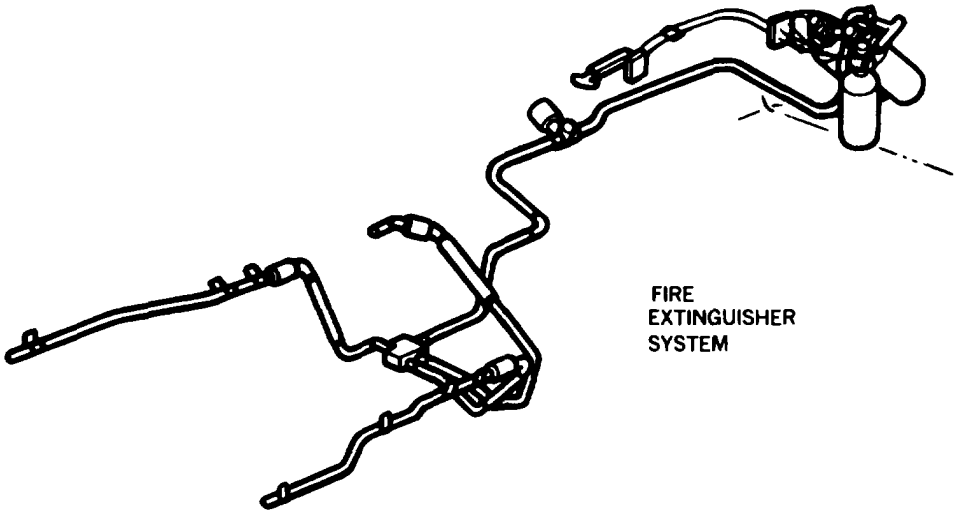


**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
47	Semiannual	Powerplant Mounting Guides (Front and Rear) - Continued	Check front guides for cracks and wear. Check both guides for broken or missing washers and screws.	Any cracked or broken mounts.

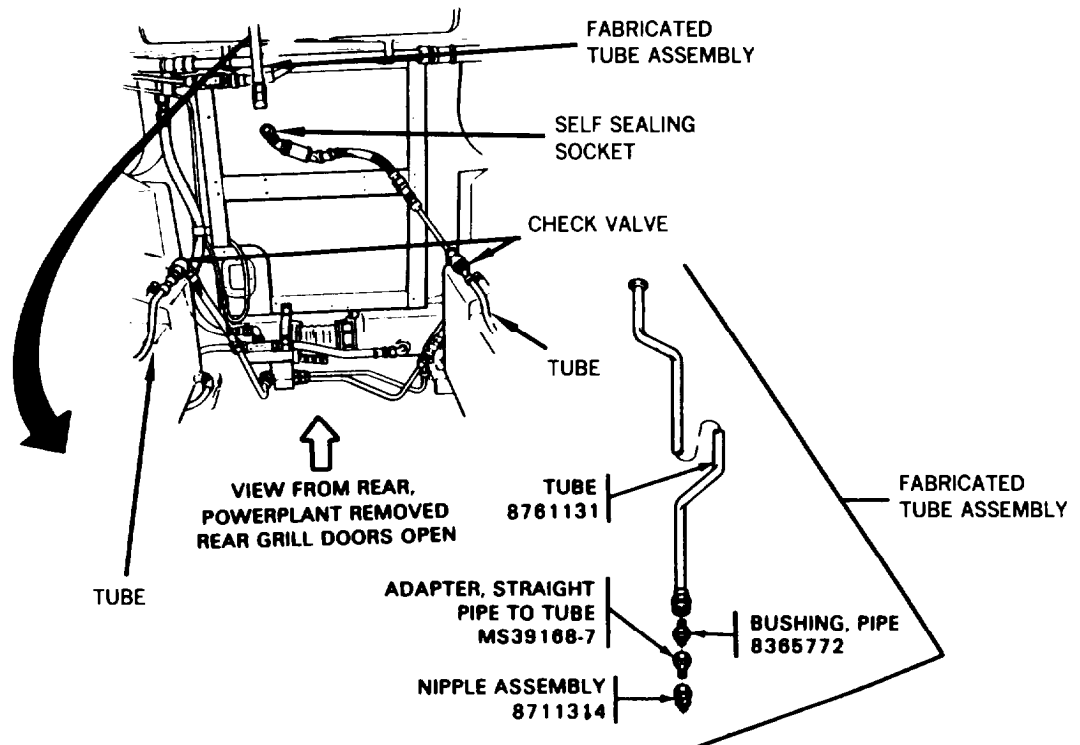
The diagram consists of two parts. The upper part is a perspective view of the AVLB hull's front section, showing the powerplant area. A large black arrow points from this view down to a detailed technical drawing of a mounting guide. This drawing shows a metal bracket with several fasteners. Labels with leader lines point to 'SCREWS' (two visible), 'WASHER', 'SCREW', 'GUIDE', and 'TWO SCREWS (HIDDEN)'. Below the drawing, it says 'RIGHT SIDE SHOWN'.

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System	Step 1	
<p>NOTE</p> <p>One person is required to perform steps 1 through 4, 12 and 13. Three persons are required to perform steps 5 through 11.</p>				
			<p>Remove floor plate panels as required to inspect fire extinguisher system lines and fittings mounted to hull floor and walls.</p> <p>Inspect fire extinguisher system lines and fittings on floor and walls of hull.</p> <p>Check for looseness of lines and fittings.</p> <p>Check for cracked, dented, or broken lines.</p> <p>Tighten loose fittings.</p>	
 <p>FIRE EXTINGUISHER SYSTEM</p>				

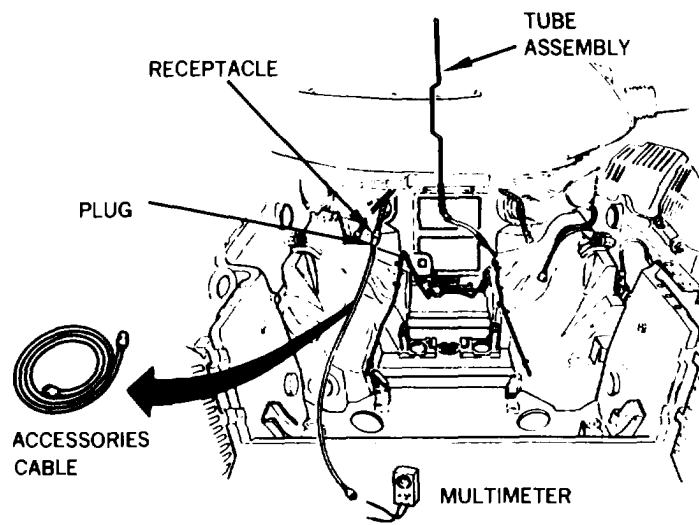
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Step 2</p> <p>Check that 18 spray holes, located in tubes are clear.</p> <p>Check that drain holes located at bottom of each tube adjacent to check valves are clear.</p> <p>Check tubes for punctures, damage, or dents larger than 1/16 inch (0.16 cm).</p> <p>Step 3</p> <p>Attach fabricated tube assembly to engine quick disconnect upper discharge self-sealing socket.</p>	



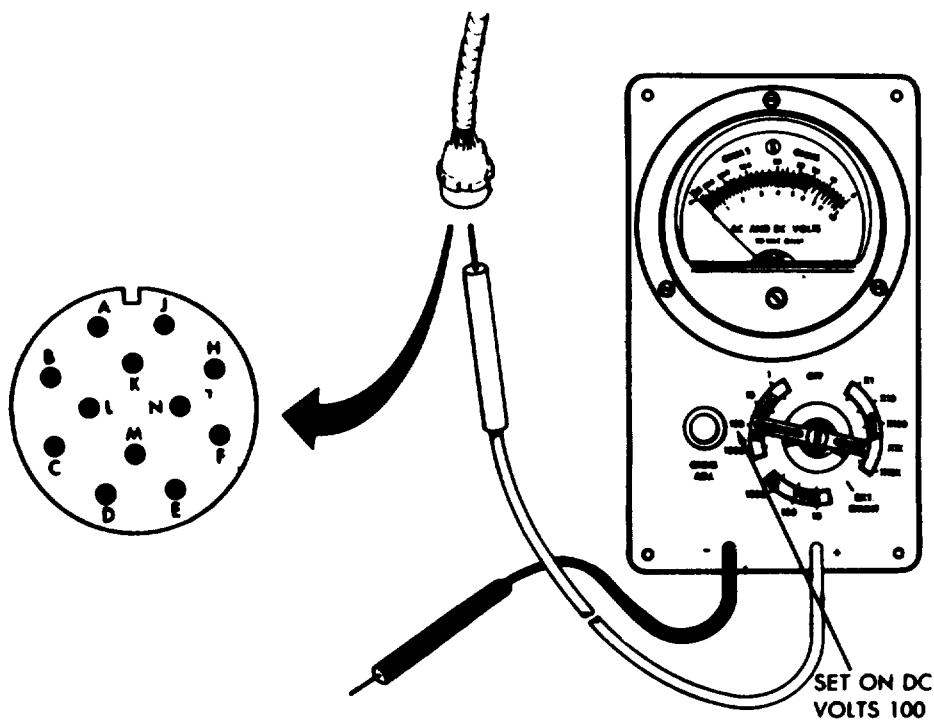
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Position tube assembly in an upright position and secure to launcher quadrant with webbing strap. Do not obstruct spray holes in tube assembly with webbing strap or handrail.</p> <p>Step 4</p> <p>Connect plug of powerplant test run accessories cable (Item 31, Chapter 3, Section I) to receptacle of engine accessories harness at left side hull-engine disconnect.</p>	



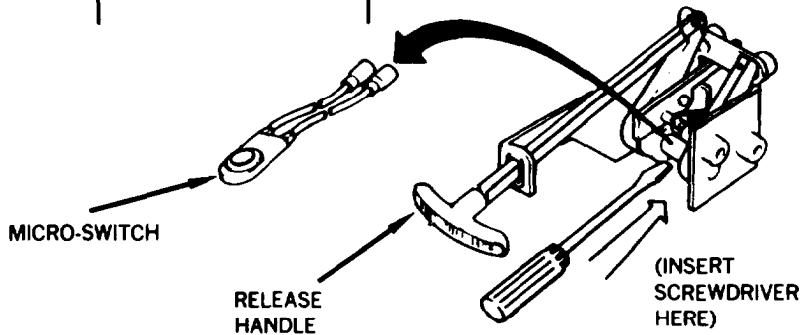
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p style="text-align: center;">NOTE</p> <p>Negative battery terminals must be connected for this procedure.</p> <p>Set multimeter to 100 volts DC scale.</p> <p>Connect red probe of multimeter to pin B of accessory cable.</p> <p>Connect black probe of multimeter to vehicle ground.</p>	

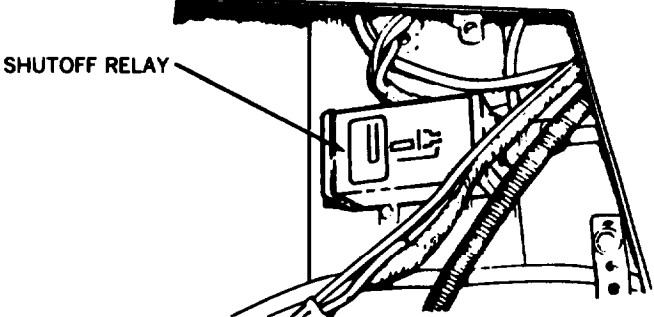
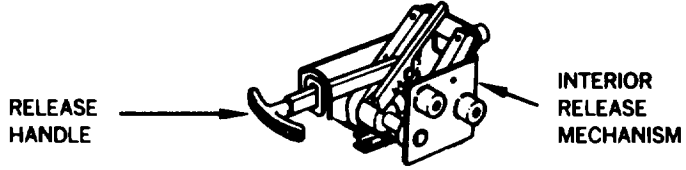


Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Station person No. 1 in driver's station, person No. 2 in commander's station, and person No. 3 at rear of vehicle just outside of engine compartment.</p> <p>Step 5</p> <p>Person No. 1 set MASTER BATTERY switch to ON. Operate (and hold momentarily) ENGINE FUEL SHUT OFF switch.</p> <p>Person No. 3 check that multimeter reads 18-30 volts dc.</p> <p>Person No. 1 set MASTER BATTERY switch to OFF.</p> <p style="text-align: center;">NOTE</p> <p>Do not pull inside fire extinguisher release handle.</p> <p>Person No. 1, insert 6-inch flat tip screwdriver from front side between fuel shutoff switch guard and release cam. Depress (and immediately release) micro-switch located in handle release mechanism.</p> <p>Step 6</p> <p>Person No. 3 check that multimeter reads 18-30 volts dc for a minimum of 10 seconds.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>If multimeter indicates 18 to 30 volts dc for less than 10 seconds in duration, fire extinguisher fuel shut-off relay is defective. If no voltage is observed, troubleshoot fire extinguisher fuel shutoff switch circuitry (page 4-572).</p> <p align="center">NOTE</p> <p align="center">Do not disconnect multimeter (multimeter is needed for step 9).</p>  <p align="center">Step 7</p> <p align="center">WARNING</p> <p>Relieve system of high pressure (800-1800 psi) gas slowly. Gloves and eye protection must be worn. Avoid breathing vapors. Failure to comply may result in injury or death to personnel.</p> <p align="center">NOTE</p> <ul style="list-style-type: none"> • All personnel must be completely familiar with steps 7 through 11 before proceeding. Steps must be performed within duration of cylinders discharge (approximately 9 to 15 seconds). • Complete steps 7 through 11 before attempting repair or retest. <p align="center">Person No. 1 pull inside release handle, announce firing and push handle back in.</p> 	

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued		

NOTE

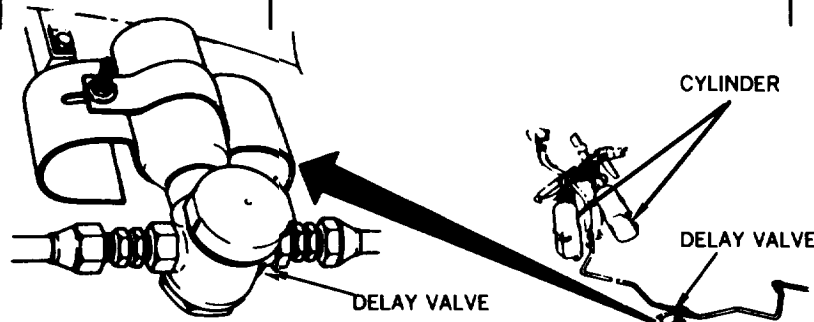
Leaks can be located by checking for frost on system lines immediately after system is fired. If check is not completed immediately, all lines normally will frost within 20-30 seconds and cover frost formed due to leaks.

Person No. 1 and 2, immediately after handle has been pulled and before delay valve releases charge (when vapor is seen at engine extinguisher tubes), check system from cylinders to delay valve for sound of leaks, visible vapor, or frosting around leak.

If vapor does not appear from engine compartment within 10 seconds after handle is pulled, proceed to step 13. If vapor is seen from only one line in engine compartment, proceed to step 12.

Person number 2 also check the time interval from firing announcement to exit of vapor from engine spray tubes is from 6 to 10 seconds.

If time interval is less than 6 seconds or more than 10 seconds, replace defective delay valve (page 20-56).

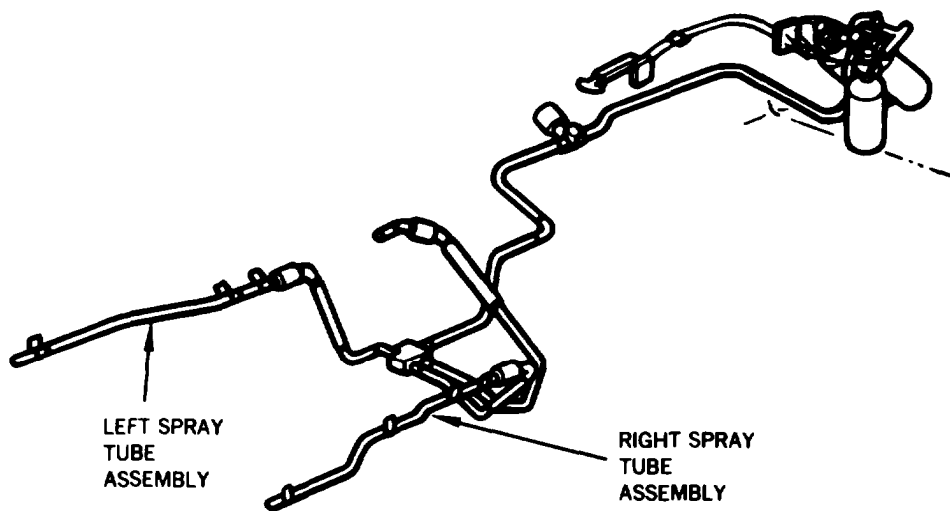


**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Step 8</p> <p>Person No. 2 check downstream of delay valve for sound of leaks, visible vapor, and frosting around leak.</p> <p>Step 9</p> <p>As firing of extinguisher is announced, person No. 3 check that multimeter immediately shows 18-30 volts.</p>	
<p><u>WARNING</u></p> <p>Handle charged cylinders with care. Do not jar or expose cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.</p> <p>NOTE</p> <p>Observation of the CO₂ discharge should be performed when little or no wind is present. Start timing when CO₂ cloud spray is first seen. Stop timing when CO₂ cloud starts to shrink.</p>				
			<p>Step 10</p> <p>Person No. 3 check that time of visible duration of CO₂ cloud/spray is no more than 8 seconds.</p>	
			<p>The diagram shows a complex network of pipes and valves. On the right side, there is a cylindrical component labeled 'FIRST SHOT CYLINDER'. A pipe extends from it to the left, passing through a 'DELAY VALVE'. Further left, the pipe branches into several other lines, with one section labeled 'INTERIOR RELEASE MECHANISM'.</p>	

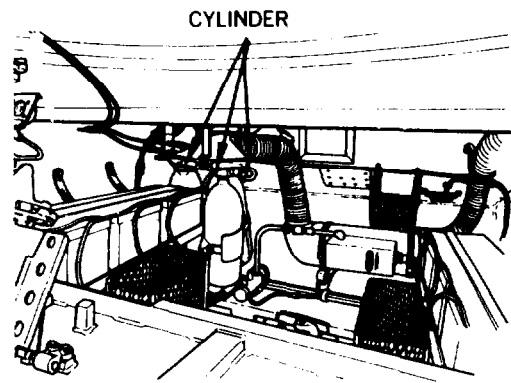
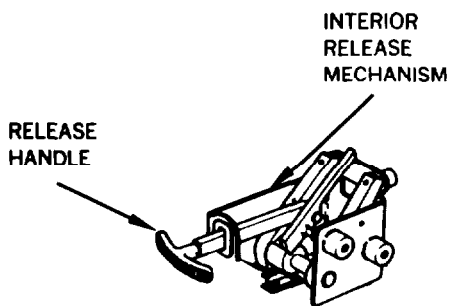
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Start timing when CO₂ cloud/spray is first seen.</p> <p>Stop timing when CO₂ cloud/spray starts to shrink.</p> <p>Check that CO₂ cloud/spray in hull area is continuous and uniform with no voids in upper and lower rows of spray holes in left and right spray tubes.</p> <p>If cloud spray is not continuous and uniform, check for punctures, leaks, and clogging. Correct defects before continuing with preventive maintenance checks.</p> <p>Check that CO₂ cloud/spray from left and right tubes are of equal size.</p> <p>If either cloud/spray is 1/3 size of other, check for restricted tubes and valves.</p>	



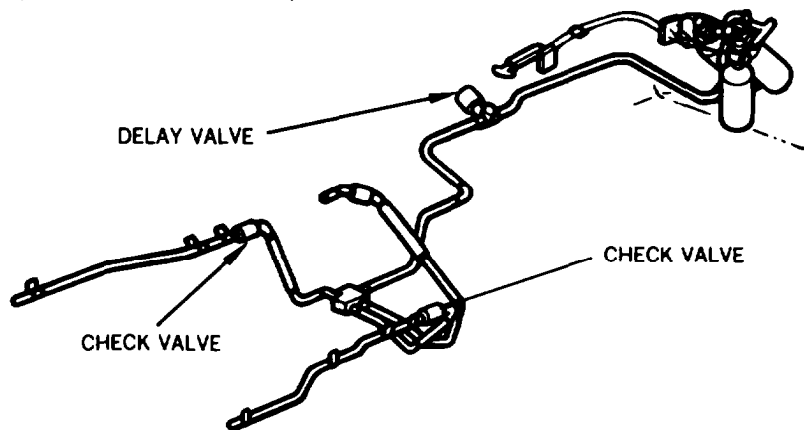
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Immediately after timing cloud/spray person No. 3 check that tube assembly and both hull extinguisher lines are frosted their full length.</p> <p>All lines should be frosted their full length. If any line is only partially frosted, check for clogging in spray line. If not frosted at all, check for faulty check valve or clogged supply line. If duration of spray cloud is more than 8 seconds, immediately check to see if No. 2 and 3 cylinders are frosted. If cylinders are frosted (discharging), interior release handle mechanism is defective. Replace release handle mechanism (page 20-23).</p>	



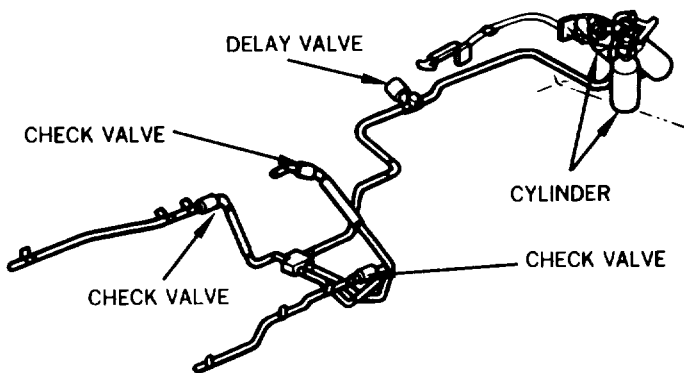
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Clocked time for CO₂ cloud duration is valid only when all other checks (non-electrical) are acceptable. If all checks are met except cloud duration time, No. 1 cylinder was defective. If any defects are found, correct defects, and retest. If no defects are found, continue with step 12.</p> <p>Step 11</p> <p>If retest is needed, reset control handle by positioning pawl into slot, reset No. 1 control valve, and replace cylinder No. 1.</p> <p>Repeat steps 7 through 10 to retest cloud/spray duration time.</p> <p align="center">NOTE</p> <p>If delay valve is still open (from having fired No. 1 shot), there will be no (6 to 10 second) delay of CO₂ when a subsequent shot is fired. Opened delay valve may take 2 to 4 hours to thermally reseal before it can delay another CO₂ shot. (Resetting is not necessary to time cloud duration.)</p> <p>Step 12</p> <p>If only one hull spray line discharges, check valve on other line and check for clogged or pinched lines.</p>	



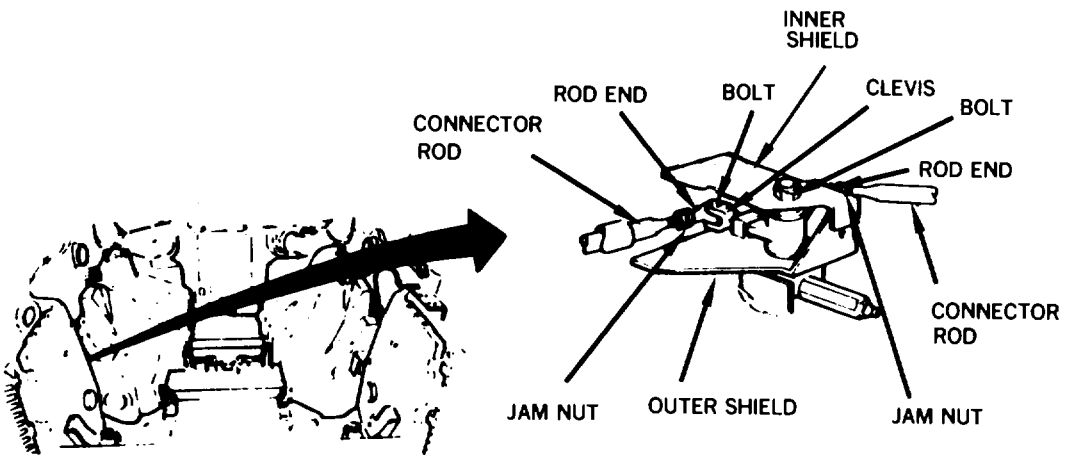
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
48	Semiannual	Fixed Fire Extinguisher System - Continued	<p>Step 13 If there is no CO₂ discharge whatsoever, check for trapped high pressure gas.</p> <p align="center"><u>WARNING</u></p> <p>Relieve system of high (800-1800 psi) pressure gas slowly. Wear gloves and eye protection. Avoid breathing vapor. Failure to comply may result in injury or death to personnel.</p> <p>Loosen any fitting between delay valve and check valve. If trapped gas escapes, replace all three check valves and repeat step 7.</p> <p>If no gas escapes, tighten fitting. Loosen any fitting between the CO₂ cylinder and delay valve. If gas escapes, replace discharge delay bottle assembly (page 20-56). Remove No. 1 CO₂ cylinder (page 20-52). Tag cylinder and send to support maintenance for recharging. Reset control handle and reset control valve. Replace No. 1 CO₂ cylinder (page 20-52). Repeat steps 7 through 11.</p> <p>Remove multimeter from accessory test cable. Remove accessory test cable from engine accessory control harness.</p> <p>Reset control handle, reset control valve and replace No. 1 CO₂ cylinder.</p>	Fixed fire extinguisher system does not operate properly.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
49	Semiannual	Steering Control Linkage	<p>Check steering control linkage, inner and outer shields, clevis, connector rods, and rod ends for looseness, damage, and corrosion.</p> <p>Check that bolts and jam nuts are secure.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
49	Semiannual	Steering Control Linkage - Continued	Lubricate steering bellcranks.	

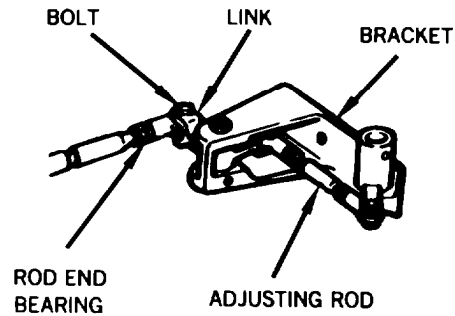
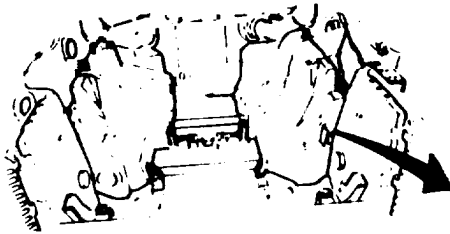
Steering Bellcranks Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Steering Bellcranks All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.3

For arctic operation, see FM 9-207

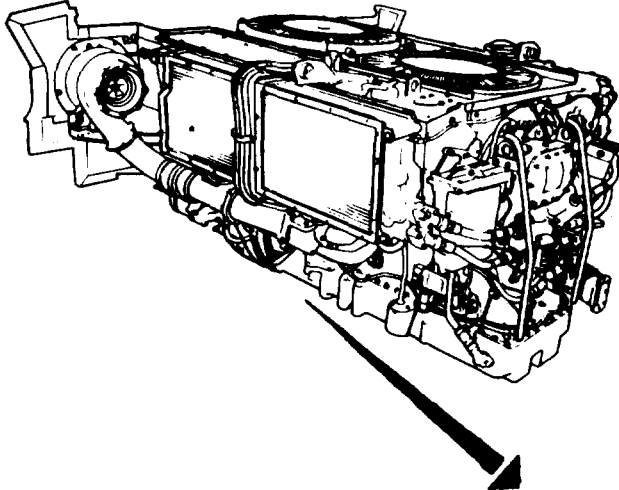
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

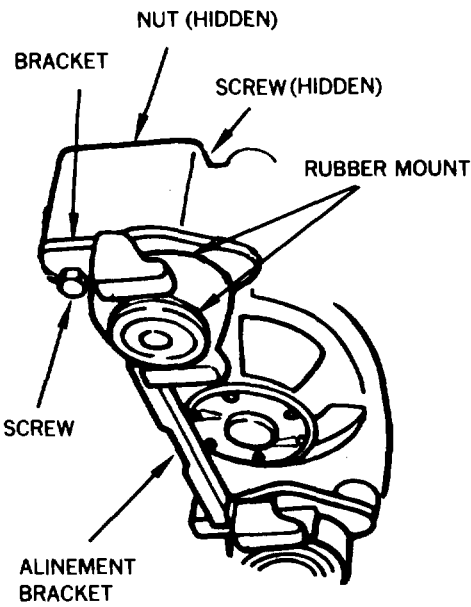
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
50	Semiannual	Shifting Control Linkage	<p>Check shifting control linkage bracket, link, adjusting rod, and rod end bearing for looseness, damage, and corrosion.</p> <p>Check that bolt is secure.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
51	Semiannual	Engine Mounts (Left and Right Sides)	<p>Check for broken, bent, or damaged mount bracket.</p> <p>Check for loose, missing, or broken screws and nuts.</p> <p align="center">NOTE</p> <p>Use torque wrench from the underside of the mount. Position mirror under torque wrench to observe torque reading.</p> <p>Using 0-600 lb-ft torque wrench, check that screws and nuts are tightened to at least 450 lb-ft (610 N-m).</p> <p>Check for cracks and damage to rubber mount.</p> <p>Check for bent or broken alignment bracket.</p>	Broken or damaged mounts.





**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
52	Semiannual	Drain Valve Control Rod Housing	Lubricate drain valve control rod housing.	

DRAIN VALVE CONTROL ROD HOUSING

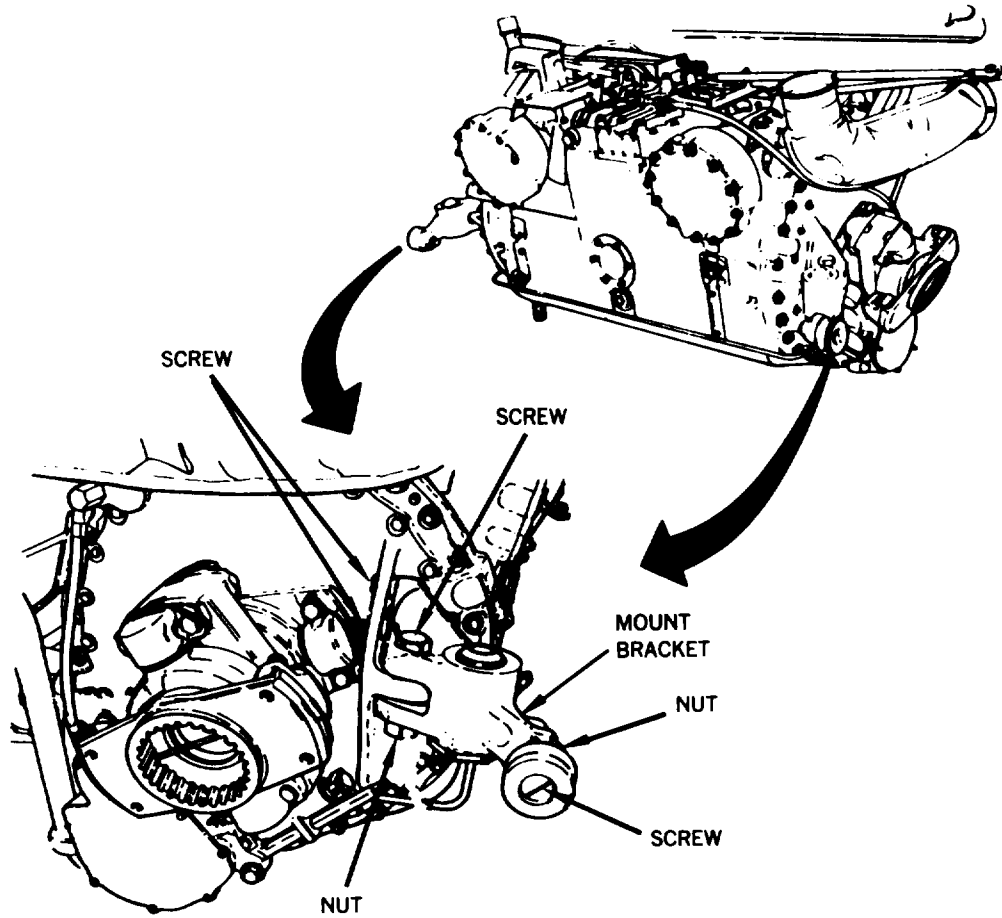
Drain Valve Control Rod Housing Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Drain Valve Control Rod Housing All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.3

For arctic operation, see FM 9-207

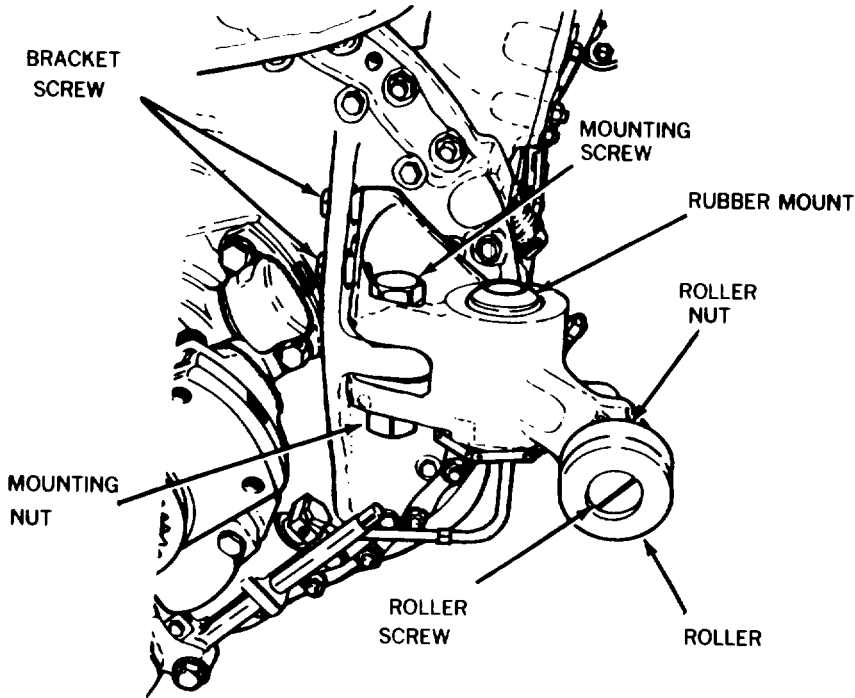
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
53	Semiannual	Transmission Mounts (Left and Right Sides)	<p>Check for broken, bent, or damaged mount bracket.</p> <p>Check for loose, missing, or broken nuts and screws.</p>	Broken or damaged mount.



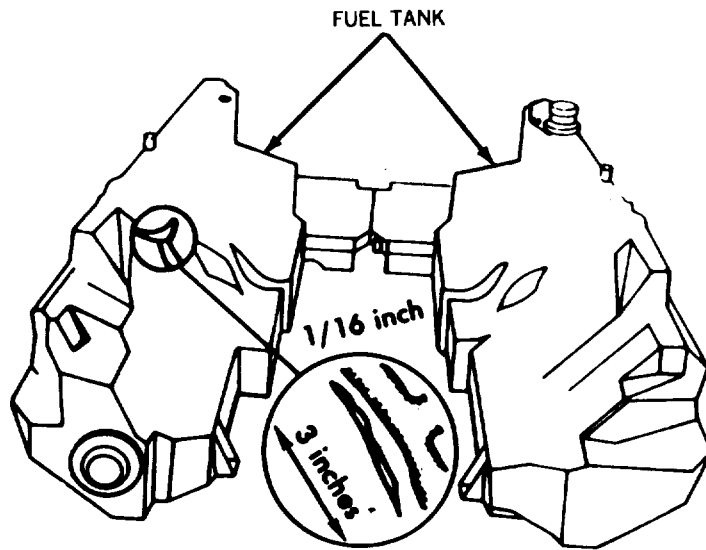
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
53	Semiannual	Transmission Mounts (Left and Right Sides) - Continued	<p>Check that rubber mount is not torn or cracked.</p> <p>Check roller for freedom of movement.</p> <p>Check that bracket screws are tightened to at least 70 lb-ft (95 N·m).</p> <p>Check that mounting screw and mounting nut are tightened to at least 380 lb-ft (515 N·m).</p> <p>Check that roller nut is not backed off roller screw.</p>	



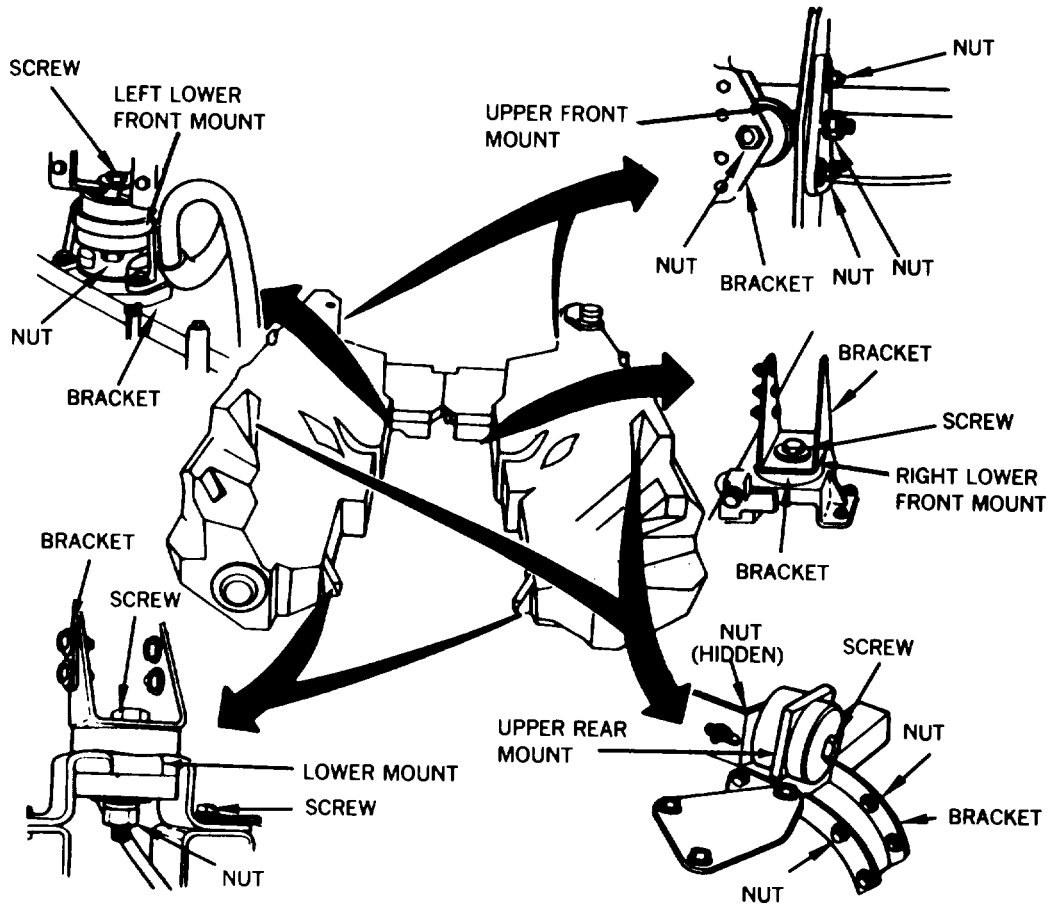
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
54	Semiannual	Fuel Tanks (Left and Right Sides)	<p>Check fuel tanks for cracks.</p> <p>If cracks are less than 3 inches (7.62 cm) long and 1/16 inch (0.16 cm) wide, repair cracks (page 7-331).</p> <p>If cracks are larger, notify support maintenance.</p> <p>Check engine compartment floor for diesel fuel leaking from back of fuel ...</p> <p>If any fuel is found, report to support maintenance.</p>	Any class III fuel leak.



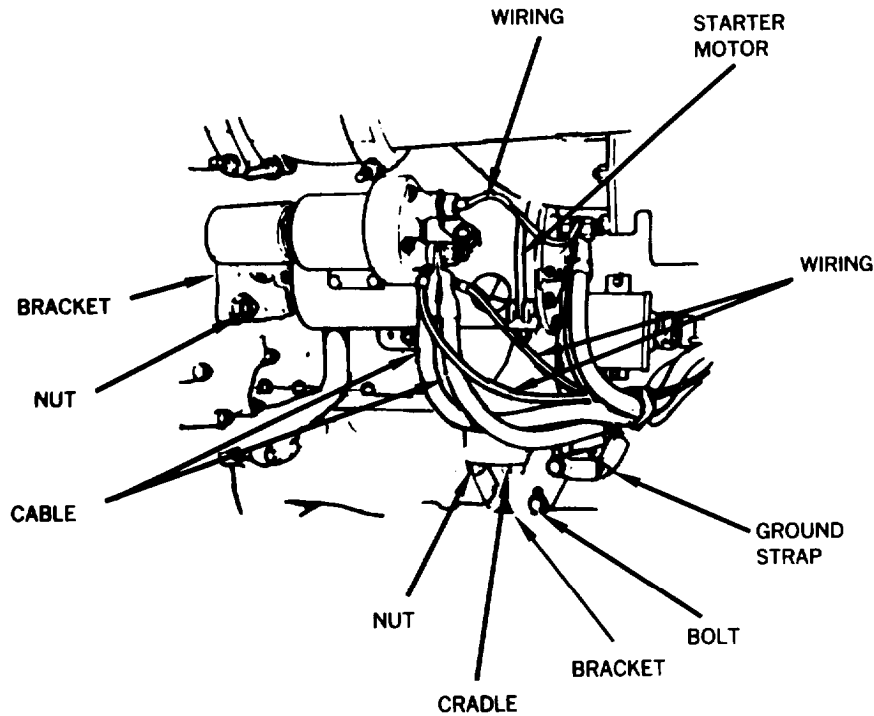
**Preventiv Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
55	Semiannual	Fuel Tank Mounts and Brackets	<p>Check rubber bumpers on upper front mounts, left lower front mount, right lower front mount, upper rear, and lower mounts for deterioration, cracks, and cuts.</p> <p>Check brackets for looseness, cracks, and other damage.</p> <p>Check that nuts, screws, and bolts are not loose.</p> <p>Notify direct support maintenance of any damaged rubber mounts or brackets.</p>	Any loose or damaged brackets.



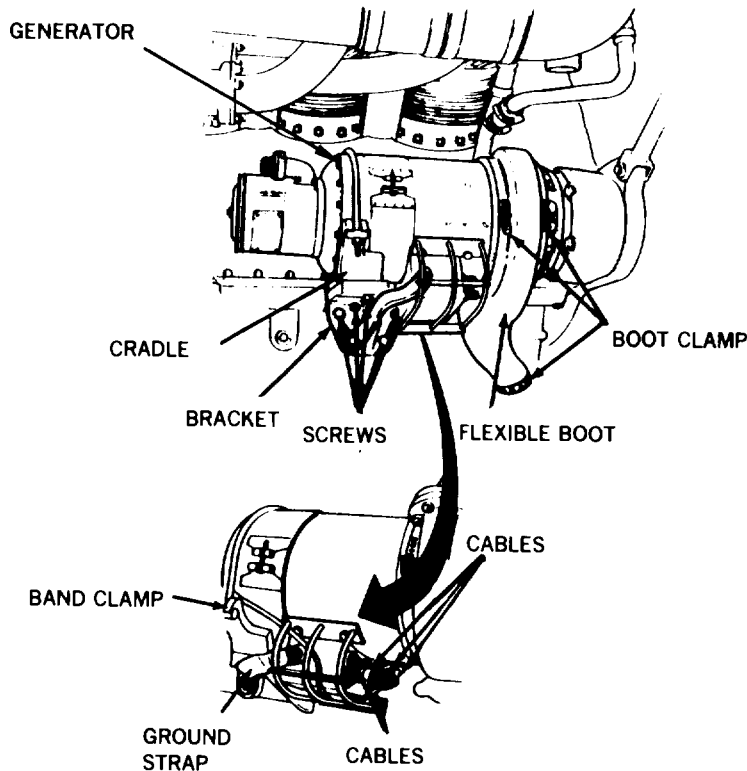
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
56	Semiannual	Starter Motor	<p>Check starter motor for bent, cracked, or damaged brackets, and cradle.</p> <p>Check for loose, missing, or damaged nuts and bolts.</p> <p>Check for missing or broken lockwire at bolts.</p> <p>Check starter for frayed wiring or cables.</p> <p>Check that cables, wiring, and ground strap are securely connected.</p>	<p>Damaged or bent brackets or cradle.</p> <p>Frayed wiring or cables.</p>



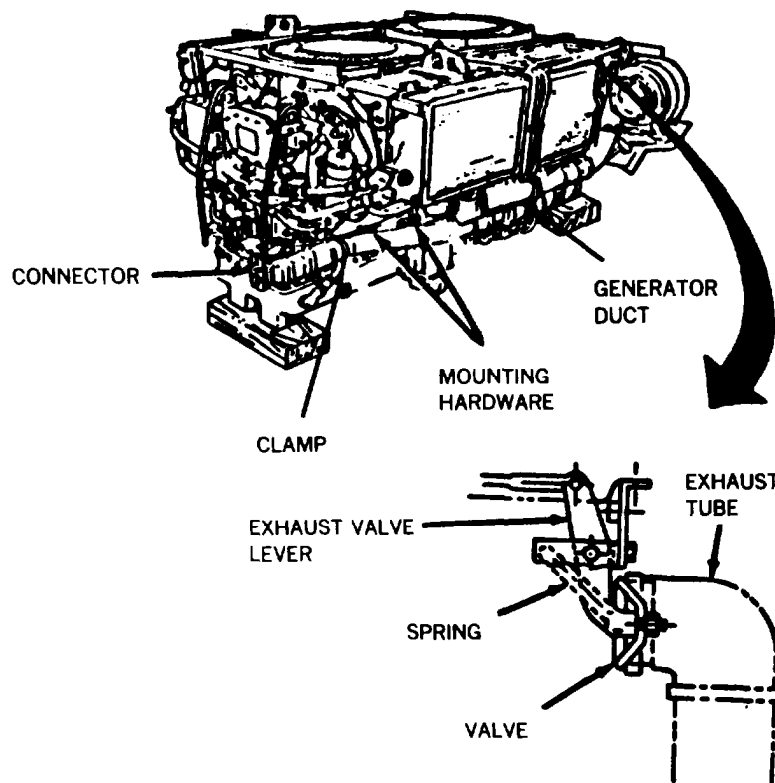
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
57	Semiannual	Generator	<p>Check generator for bent or damaged bracket and cradle.</p> <p>Check for loose, missing, or damaged screws.</p> <p>Check for damaged or cracked flexible boot.</p> <p>Check for frayed cables. Check for secure connections of ground strap and cables.</p> <p>Check that cable connections and ground strap connections are free of corrosion.</p> <p>Check that cable band clamp and flexible boot clamps are not loose.</p>	<p>Damaged or bent brackets or cradle.</p> <p>Frayed wiring or cables.</p>



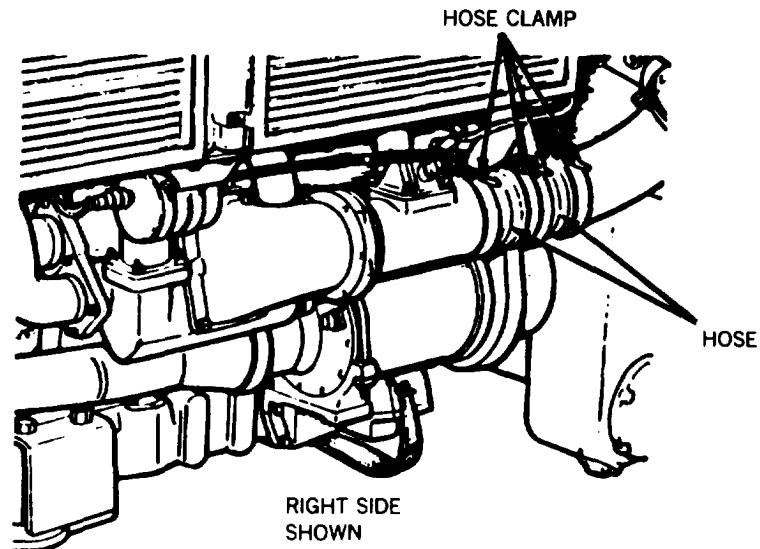
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location		Procedure	Not Fully Mission Capable if:
		Item to Check/Service			
58	Semiannual	Generator Duct		<p>Check flexible connector for cracks and tears.</p> <p>Check that clamp is not loose or missing.</p> <p>Check that generator duct mounting hardware is not loose or missing.</p> <p>Check the generator duct for cracks.</p> <p>Check that springs are not missing or broken.</p> <p>Manually pull and hold generator exhaust valve lever.</p> <p>Check that valve is firmly seated on exhaust tube.</p> <p>Release generator exhaust valve lever.</p>	



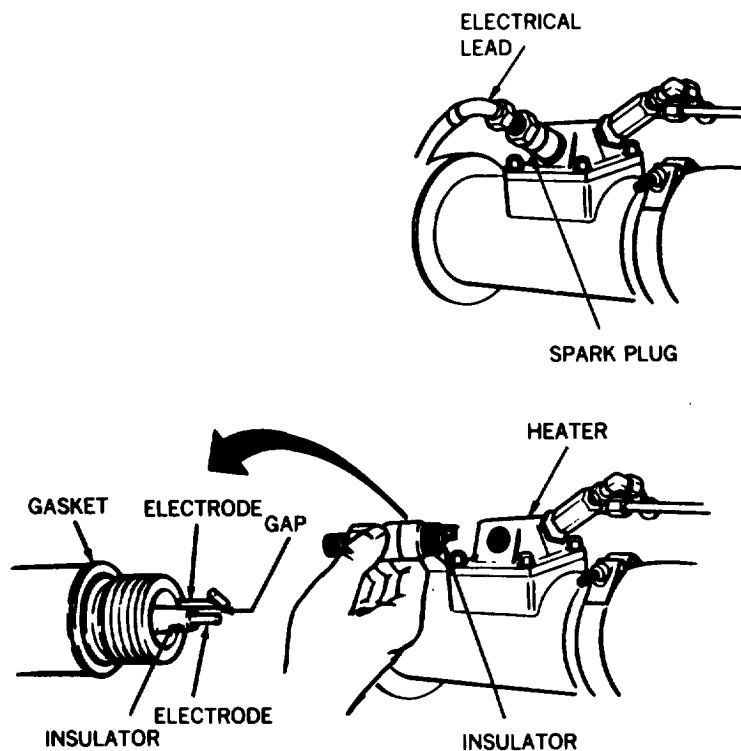
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
59	Semiannual	Water separator Outer Filter Elements	Service and replace water separator outer filter elements and final filter (center) element (page 7-196).	System does not operate.
60	Semiannual	Water separator Drain Sensor and Solenoid Valve	Perform operational check on water separator, drain sensor, and solenoid valve (page 7-208).	
61	Semiannual	Primary Fuel Filter and Housing	Replace primary fuel filter element and clean housing, 2DA engine (7-192).	
62	Semiannual	Manifold Heaters Fuel Filters	Service and inspect manifold heater fuel filter (page 7-245).	
63	Semiannual	Manifold Heater Spray Nozzles (Left and Right)	Service and inspect manifold heater spray nozzles (page 7-273).	
64	Semiannual	Manifold Hoses and Clamps (right and left)	Check that intake manifold hose clamps are tightened to 30-40 lb-in (3-5 N·m). Check hoses for cracks and damages.	



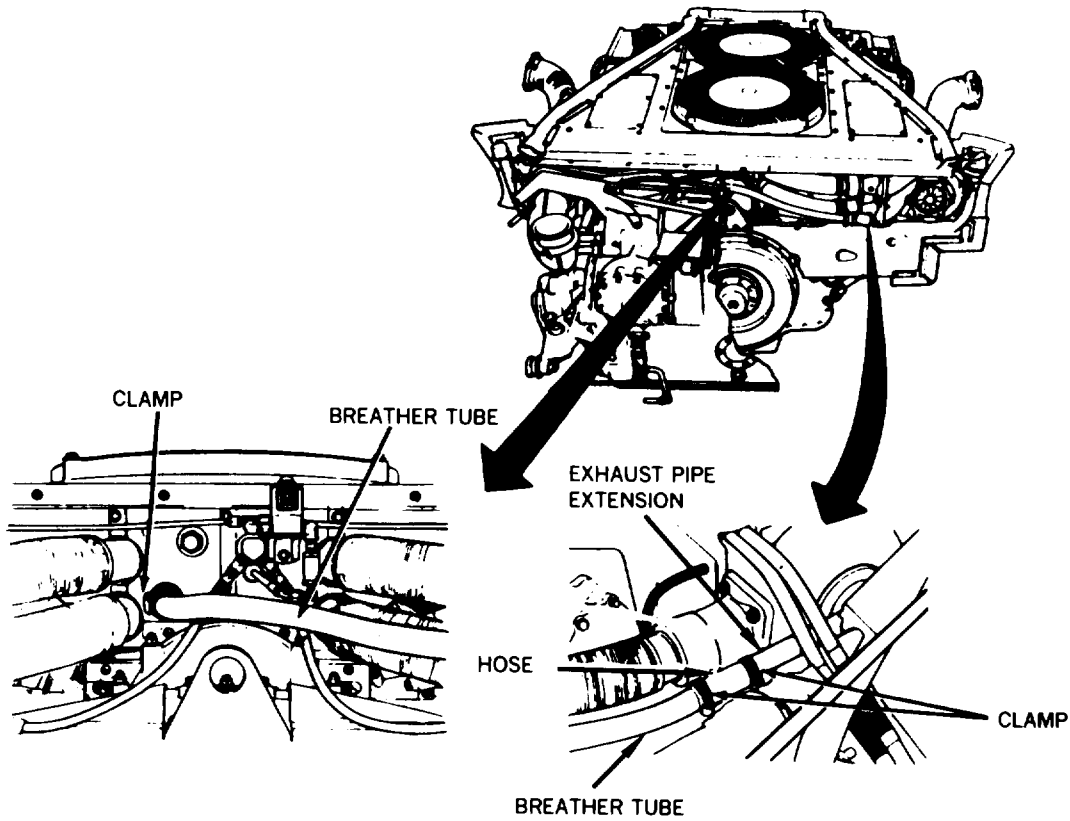
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
65	Semiannual	Manifold Heater Spark Plugs (Left and Right)	<p>To check and service manifold heater spark plug, disconnect electrical lead from manifold heater spark plug. Unscrew spark plug and remove plug and gasket from heater.</p> <p>Wipe off grease and dirt from electrode and insulator.</p> <p>Check electrodes for pitting and carbon buildup.</p> <p>Clean spark plug and check insulator for cracks.</p> <p>Set spark plug gap to 0.094 to 0.114 inch (0.24 to 0.29 cm).</p> <p>Install spark plug and gasket in manifold heater.</p> <p>Connect electrical lead to spark plug.</p>	



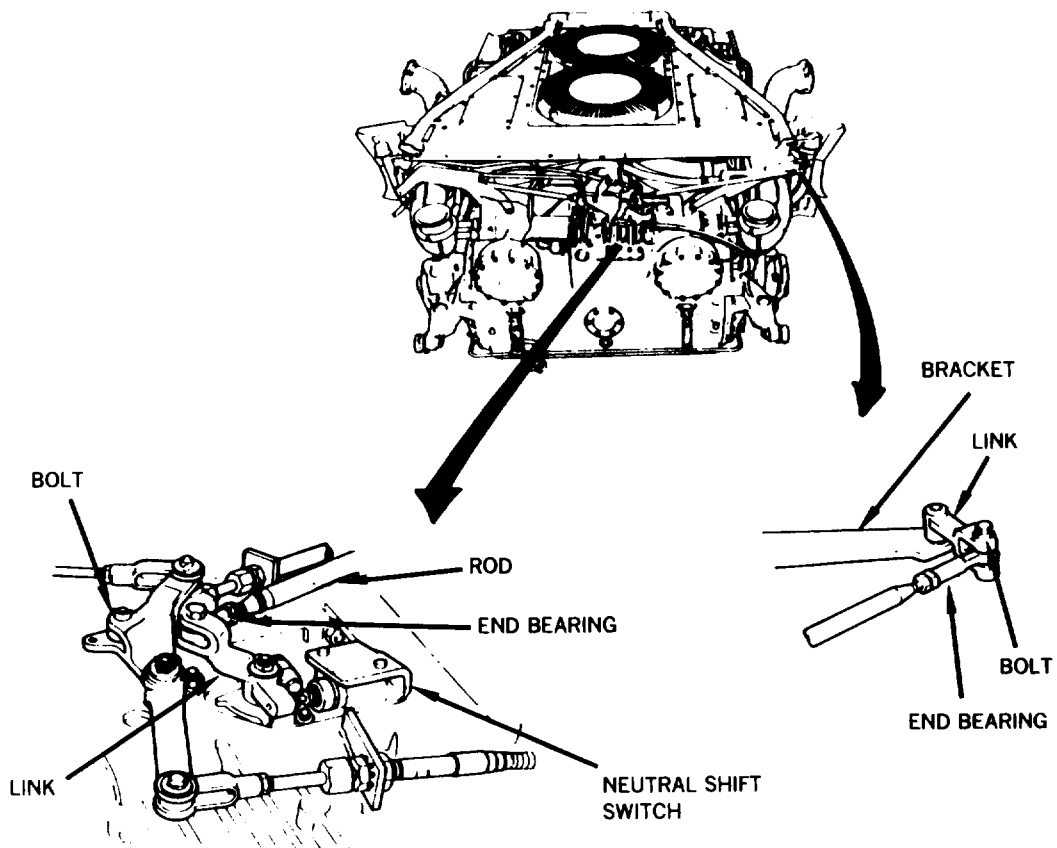
Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
66	Semiannual	Crankcase Breather Tube	<p>Remove two hose clamps.</p> <p>Loosen breather tube clamp.</p> <p>Remove hose from breather tube and exhaust pipe extension.</p> <p>Insert rod into exhaust pipe extension to remove carbon buildup.</p> <p>Install two hose clamps on hose.</p> <p>Install hose between breather tube and exhaust pipe extension and secure with two clamps.</p>	



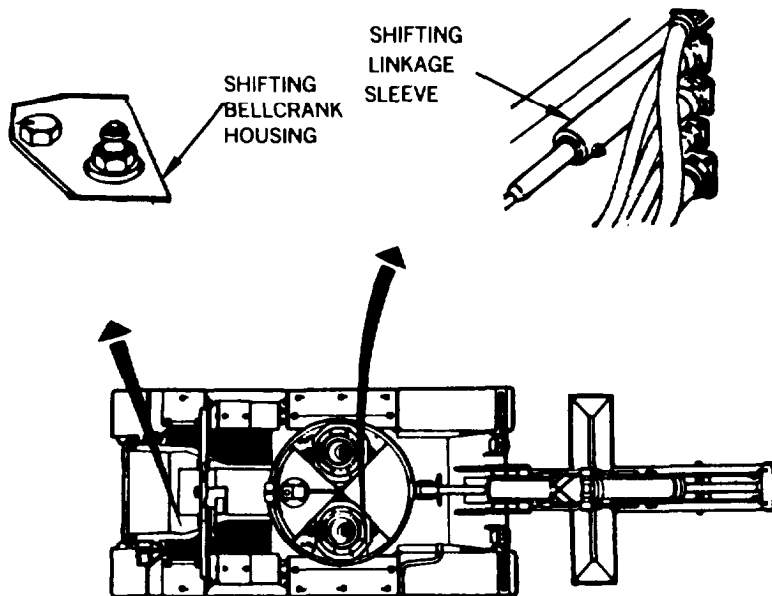
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
67	Semiannual	Transmission	Clean and service main oil filters (page 11-89).	
68	Semiannual	Shifting Control Linkage	<p>Check rod end bearing, link, and bolt, located on top of transmission, for looseness, damage, or corrosion.</p> <p>Check neutral shift switch, for loose bolts and loose or damaged wiring.</p> <p>Check end bearing, link, bracket, and bolt for looseness, damage, or corrosion.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
69	Semiannual	Shifting Control Linkage - Continued	Lubricate shifting bellcrank housing located at rear of right fuel tank. Lubricate shifting linkage sleeve.	



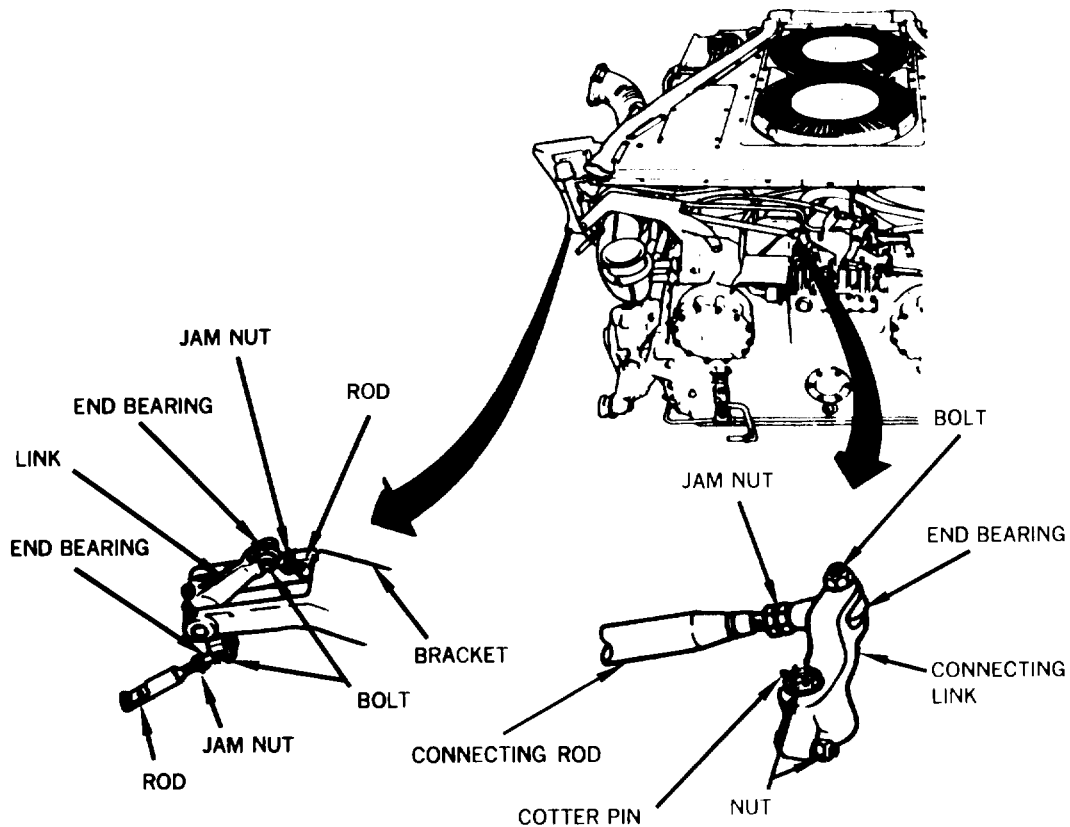
Shifting Bellcrank Housing and Linkage Sleeve Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Shifting Bellcrank Housing	WTR (G-395) MIL-G-81322	AR	S	0.1
Shifting Linkage Sleeve All Temperatures		AR	S	0.5

For arctic operation, see FM 9-207

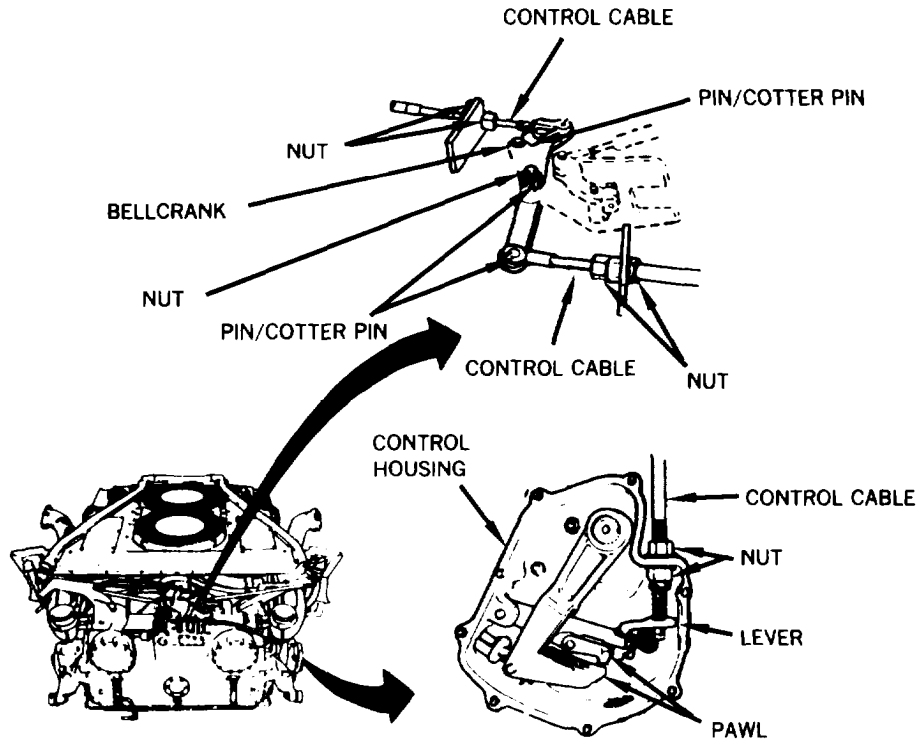
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
70	Semiannual	Steering Control Linkage	<p>Check steering control brackets, links, rods, and end bearings, on top of transmission, for looseness, damage, or corrosion: .</p> <p>Check that bolts and jam nuts are tight.</p> <p>Check connecting rod, end bearing, and connecting link for looseness, damage, or wear.</p> <p>Check that bolts, nuts, and jam nut are tight and cotter pin is not missing or damaged.</p>	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
71	Semiannual	Brake Control and Linkage	<p>Check control cable and bellcrank, at top of transmission, for looseness, damage, or corrosion. Check security of pin/cotter pins and nuts.</p> <p>Remove cover and gasket from brake control housing on each side of transmission. Check cable for looseness, damage, or corrosion.</p> <p>Check that nuts are tight.</p> <p>Check for damage to teeth of remote control lever and of pawl.</p> <p>Clean all moving parts with CLP.</p> <p>Install cover and gasket on brake control housing on each side of transmission.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
72	Semiannual	Accelerator Control Flange Housing	Lubricate accelerator control flange housing.	

ACCELERATOR
CONTROL
FLANGE
HOUSING

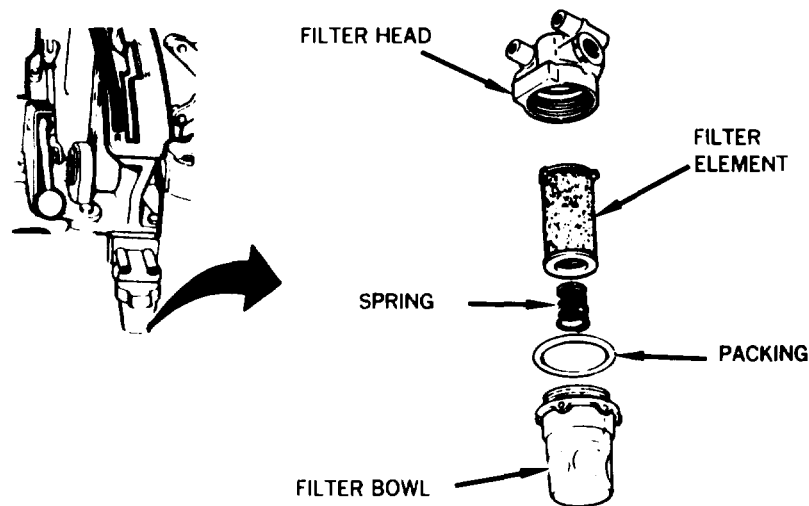
Accelerator Control Flange Housing Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Accelerator Control Flange Housing All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

For arctic operation, see FM 9.207

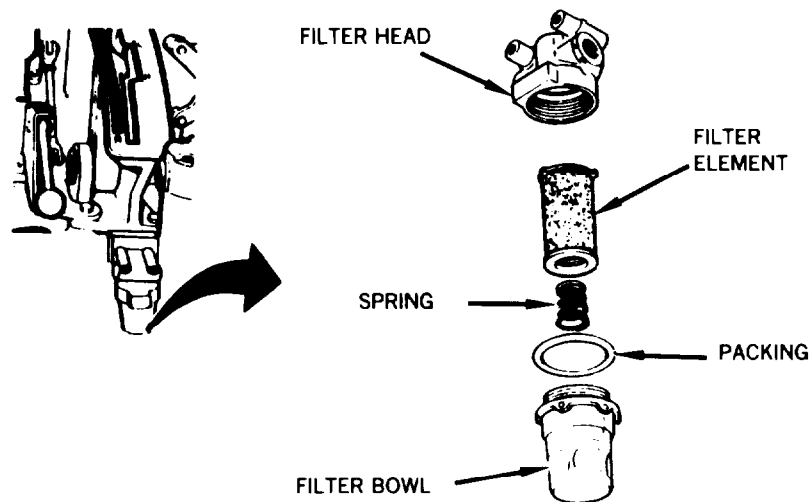
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
73	Semiannual	Primer Pump Filter	<p>To service primer pump filter assembly, unscrew filter bowl from filter head. Remove packing and discard. Remove filter element and spring.</p> <p align="center"><u>WARNING</u></p> <p>Dry Cleaning Solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.</p> <p>Clean filter bowl, filter head, element, and spring with dry cleaning solvent (Item 55, Appendix D).</p>	



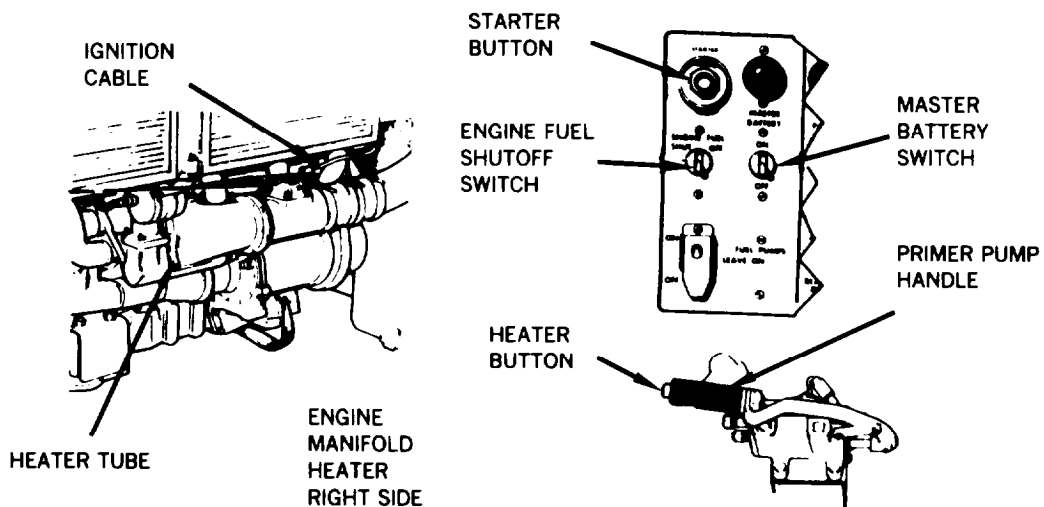
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
73	Semiannual	Primer Pump Filter - Continued	<p align="center"><u>WARNING</u></p> <p>Compressed air for cleaning purposes must not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles shield, gloves, etc.).</p> <p>Blow low pressure compressed air through filter element to remove dirt particles.</p> <p>Inspect element for dents, tears, and separations. Replace defective filter element.</p> <p>Inspect for broken or cracked components.</p> <p>Position spring and filter element in filter bowl.</p> <p>Position new packing over lip of filter bowl and install on filter head.</p>	



**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
74	Semiannual	Manifold Heater (Left and Right Sides)	<p>Install ground hop kit (page 5-25). Check that all cables and hoses are connected for ground hop test.</p> <p align="center"><u>WARNING</u></p> <p>Keep hand away from high voltage ignition cable. Perform the following steps in sequence given to prevent damage to engine and possible injury to personnel.</p> <p>Position a person on each side of engine with hand on intake manifold heater tube.</p> <p>Set MASTER BATTERY switch to ON. Press STARTER button and at same time operate primer pump handle and press heater button on handle for no more than 15 seconds.</p> <p>Check that heater is working by feeling for heat at each intake heater tube.</p> <p>If heat is felt, heater is working. Shut off engine by raising and holding ENGINE FUEL SHUT OFF switch until engine stops.</p> <p>Set MASTER BATTERY switch to OFF.</p>	



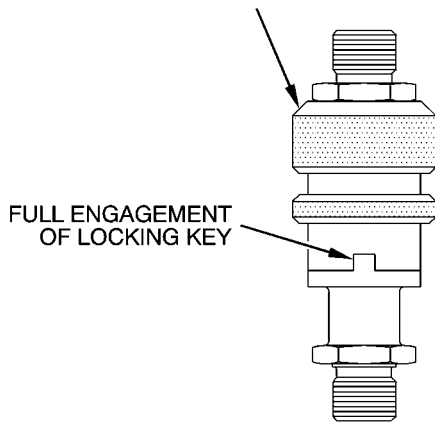
**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
75	Semiannual	Powerplant	Perform out-of-vehicle engine test run (ground hop) (page 5-25). After engine test run, install powerplant (page 5-14).	

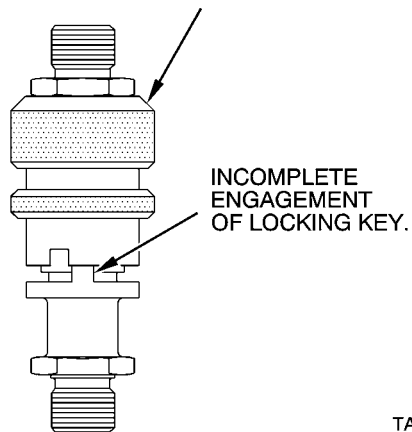
WARNING

Failure to correctly connect quick disconnect (full engagement) will result in brake failure and could cause serious injury or death.

FULL ENGAGEMENT OF LOCKING KEY WILL ALLOW COLLAR AND INNER ELEMENT TO BE FLUSH. COUPLING WILL NOT PULL APART WHEN YOU PULL UP ON HOSE.



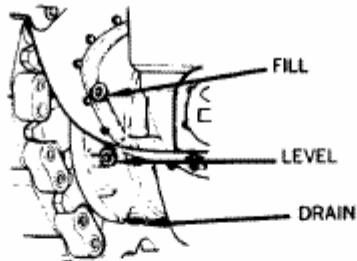
INCOMPLETE ENGAGEMENT OF LOCKING KEY WILL CAUSE THE COLLAR AND INNER ELEMENT NOT TO BE FLUSH.



TA270973

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
76	Semiannual	Roadtest	Perform final road test.	Any large metal chips or shavings.
77	Biennial	Final Drive (Left and Right Sides)	Drain and fill. To drain, remove drain plug from bottom of housing. Drain only after operation while oil is warm. Drain into suitable container. Check magnetic drain plug for metal shavings. After draining, clean and install drain plug. Fill to proper level (page 3-72).	



Final Drive Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Final Drive ± 10°F to ± 125°F (-12°C to ± 52°C)	OE/HDO-30 (O-238) MIL-L-2104	8 qt	B	0.4
-70°F to ± 20°F (-57°C to -7°C)	OEA (O-183) MIL-L-46167			

For arctic operation, see FM 9-207

**Preventive Maintenance Checks and Services for M60A1 AVLB Hull -
Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to Check/Service		
78	Biennial	Suspension System (Left and Right Sides)	<p>HARD TIME SERVICE</p> <p>Remove six roadwheel arms (page 14-2).</p> <p>Disassemble, clean, and inspect six roadwheel arms (14-9).</p> <p>Disassemble, clean, and inspect six roadwheel hubs (page 14-15).</p> <p>Disconnect track adjusting link at compensating idler wheel (page 14-55 or 14-99).</p> <p>Remove compensating idler arm (page 14-62).</p> <p>Remove track support rollers (page 14-34).</p> <p>Install roadwheel arm (page 14-6).</p> <p>Install track adjusting link at compensating idlerwheel (page 14-57).</p> <p>Install track support rollers (page 14-40).</p>	Any worn bearings. Damaged or leaking seals.

PMCS MANDATORY REPLACEMENT PARTS LISTS

The following tables provide a list of all mandatory replacement parts required to perform semiannual, annual, or biennial PMCS. The semiannual/annual PMCS parts list contains the quantity of parts required to perform one semiannual PMCS or one annual PMCS. The biennial PMCS parts list contains the quantity of parts required to perform one annual PMCS and all the additional mandatory replacement parts to complete the required biennial tasks.

SEMIANNUAL/ANNUAL PMCS PARTS LIST

Nomenclature	NSN	Part Number and CAGE	Quantity
Packing, preformed	5330-00-180-9951	MS9068-038 (96906)	2
Packing, preformed	5330-00-724-5541	MS9068-018 (96906)	2
Packing, preformed	5330-00-724-7902	MS9068-013 (96906)	2
Seal, antipilferage	5340-00-902-0426	MS51938-6 (96906)	6
Filter	4240-00-828-3952	D5-19-2350 (81361)	2
Filter	4240-00-866-1825	C5-19-1175 (81361)	1
Valve, vent (early model)	4820-00-726-4719	5196397 (57733)	2
Kit, fuel filter	4330-00-801-1152	5702738 (19207)	1
Kit, fuel filter	4330-00-410-1964	5704487 (19207)	1
Filter, fuel	2940-00-808-2421	A-3002-1 (08181)	1
Kit, filter, fluid	4330-00-397-3404	5704486 (19207)	1
Gasket, brake housing	5330-00-888-9403	10911888 (19207)	2
Packing, preformed	5330-00-265-1089	7413738 (19207)	1
Parts Kit, fluid	4330-00-229-5723	5703567 (19207)	2

BIENNIAL PMCS PARTS LIST

Nomenclature	NSN	Part Number and CAGE	Quantity
Packing, preformed	5330-00-180-9951	MS9068-038 (96906)	2
Packing, preformed	5330-00-724-5541	MS9068-018 (96906)	2
Packing, preformed	5330-00-724-7902	MS9068-013 (96906)	2
Seal, antipilferage	5340-00-902-0426	MS51938-6 (96906)	6
Filter	4240-00-828-3952	D5-19-2350 (81361)	2
Filter	4240-00-866-1825	C5-19-1175 (81361)	1
Valve, vent (early model)	4820-00-726-4719	5196397 (57733)	2
Kit, fuel filter	4330-00-801-1152	5702738 (19207)	1
Kit, fuel filter	4330-00-410-1964	5704487 (19207)	1
Filter, fuel	2940-00-808-2421	A-3002-1 (08181)	1
Kit, filter, fluid	4330-00-397-3404	5704486 (19207)	1
Gasket, brake housing	5330-00-888-9403	10911888 (19207)	2
Packing, preformed	5330-00-265-1089	7413738 (19207)	1
Parts Kit, fluid	4330-00-229-5723	5703567 (19207)	2
Seal, plain	5330-01-126-8190	12270997 (19207)	14
Seal, plain	2530-00-736-4672	7364672 (19207)	14
Seal, plain	5330-00-350-9945	343XW420 (80201)	6
Gasket	5330-00-291-8991	8387092 (19207)	21
Gasket	5330-00-291-7465	8387093 (19207)	14

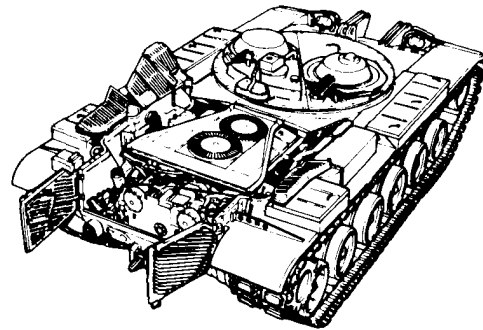
CHAPTER 4 TROUBLESHOOTING

CONTENTS	PAGE
USER GUIDE	4-2
TROUBLESHOOTING SYSTEM INDEX	4-20
TROUBLESHOOTING SUBJECT INDEX.....	4-21
VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE.....	4-24
INDICATOR SYMPTOM AND RESOURCE TABLE.....	4-26
SUPPORT SYSTEM SYPTOM AND RESOURCE TABLE	4-28
USE OF DIGITAL MULTIMETER.....	4-30
STANDARD TROUBLESHOOTING PROCEDURE	4-31
SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET.....	4-46
STE/ICE TEST PROCEDURES.....	4-55
DETAILED TROUBLESHOOTING PROCEDURES	
SYMPTOMS 1-78.....	4-91

USER GUIDE

NOTE

This troubleshooting USER GUIDE is presented in the same format as the detailed troubleshooting procedures you will be using to identify and correct the trouble in the M60A1 AVLB vehicle.



USER GUIDE APPROACH

1

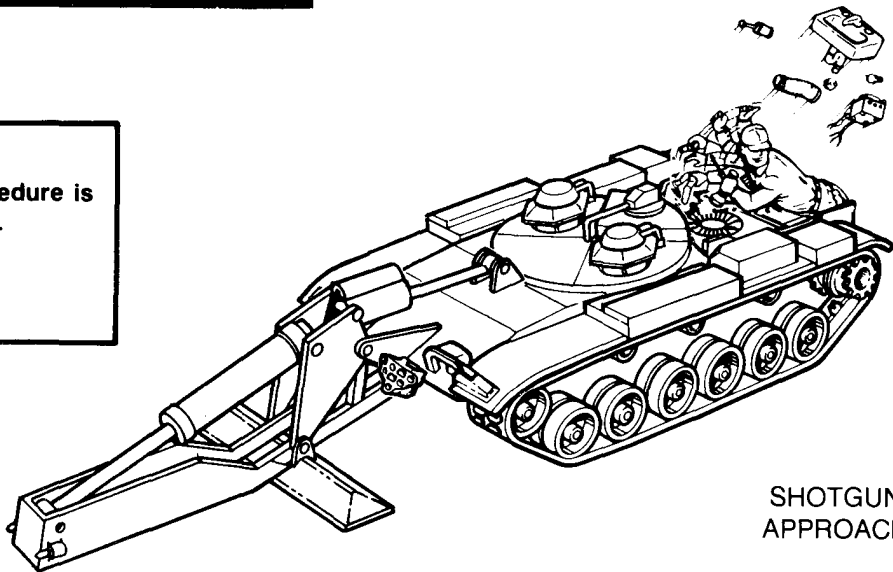
Check the four key steps in logical troubleshooting (Troubleshooting without the SHOTGUN APPROACH).

- Identify the trouble.
- Find the right troubleshooting procedure.
- Determine the test equipment, special tools and number of technicians needed to perform the troubleshooting procedure.
- Use the Detailed Troubleshooting Procedure to isolate and repair the trouble.

How do you "identify" the trouble spot?

NOTE

This line indicates the procedure is continued on the next page.



SHOTGUN APPROACH

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USER GUIDE
(Continued)

NOTE
This line indicates the procedure is continued from the previous page.

2 To identify the trouble spot, check DA Form 2404 filled out by the crew.

- Check what the crew has entered on DA Form 2404.
- Question the crew to get as much information as possible about the trouble.

Example:

- Are the gages reading normal?
- Has the vehicle been using excessive oil?
- Was the engine running?
- Make sure there was no crew error in following the operator procedure listed in TM 5-5420-202-10.
- If necessary, operate the vehicle to help identify the trouble.

WARNING
Do not attempt to operate the vehicle if there is any chance the trouble may harm personnel or damage equipment. For example: Brakes don't work.

Now that you have an idea what the trouble is, how do you find the right troubleshooting procedure?

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET

REGISTRATION NO. / 1/71 - 3 rd PLT			REGISTRATION NO. / 1703 432		
AVIS MG041			20 JUNE 92		
APPLICABLE REFERENCE		NOV 81			
INSTRUCTIONS: Before form is filled in the TM applicable to the subject is performed. Following the sequence listed in equipment TM, complete form as follows:					
COLUMN a - Enter the item number.			COLUMN b - Enter corrective action for deficiency or abnormality (fill in Column).		
COLUMN c - Enter the applicable condition status symbol.			COLUMN d - Indicate abating/completed corrective action (initial in this column).		
ALL DEFICIENCIES AND ABNORMAL CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED TO BE CORRECTED IN ACCORDANCE WITH THE LOGGING PROCEDURE AND STANDARDS IN THE TROUBLESHOOTING MANUAL.					
INSPECTOR'S SIGNATURE		DATE		OFFICE	
R. Jones SP5					
ITEM NO.	STATUS	DEFICIENCIES AND SHORTCOMINGS	CORRECTIVE ACTION	INITIALS	DATE CORRECTED
34	X	POWERPLANT WARNING LAMP STAYS ON			

**USER GUIDE
(Continued)**

NOTE
The circled number at the top left corner of each block is a step number.

3 Check the **TROUBLESHOOTING SYSTEM INDEX** to find the proper system/subsystem.

- Turn to the **TROUBLESHOOTING SYSTEM INDEX** (page 4-20).
- Find the system in which your trouble occurs.
- Find the subsystem in which your trouble occurs.

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TROUBLESHOOTING SYSTEM INDEX

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE	PAGE
• Powerplant, starting	4-24
• Powerplant, running	4-24
• Powerplant, stopping	4-24
• Final Drive	4-24
• Transmission	4-25
• Brake	4-25
• Steering	4-25
• Hull Power	4-25
• Generator/Regulator	4-25
INDICATOR SYMPTOM AND RESOURCE TABLE	PAGE
• Gauge	4-26
• Lamp	4-26
SUPPORT SYSTEM AND RESOURCE TABLE	PAGE
• Communications	4-28
• Drain Valve	4-28
• Fire Extinguisher	4-28
• Gas Particulate	4-28
• Vehicle Lighting (internal)	4-28
• Vehicle Lighting (external)	4-28
• Periscope	4-28
• Personnel Heater	4-28
• Smoke Generator	4-28

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4-20

NOTE

- Most troubleshooting procedures contain many branches (paths).
- You will not follow every possible branch.
- The branch you follow will depend on your answer to each question block.
- If your answer is no, follow this branch.
- If your answer is yes, follow this branch.

Were you able to find the proper system/subsystem in which your trouble occurs?

YES NO

4 If you have trouble locating the proper system/subsystem, check the **TROUBLESHOOTING SUBJECT INDEX** (page 4-21).

- See Step **8**.

**USER GUIDE
(Continued)**

5 Find the right Troubleshooting Procedure.

- Note the troubleshooting **SYMPTOM AND RESOURCE TABLE** listed for the **SYSTEM/SUBSYSTEM** in which your trouble occurs.
- Turn to the page number indicated for the above table.
- Find the same subsystem.
- Check the symptom titles listed under this subsystem until you find the one that describes your trouble.

Have you found the proper symptom title?

TROUBLESHOOTING SYSTEM INDEX

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE	PAGE
● Powerplant, starting	4-24
● Powerplant, running	4-24
● Powerplant, stopping	4-24
● Final Drive	4-24
● Transmission	4-20
● Brakes	4-25
● Steering	4-20
● Hull Power	4-26
● Generator/Regulator	4-20
INDICATOR SYMPTOM AND RESOURCE TABLE	PAGE
● Gauge	4-20
● Lamp	4-20
SUPPORT SYSTEM AND RESOURCE TABLE	PAGE
● Communications	4-28
● Drain Valve	4-20
● Fire Extinguisher	4-26
● Gas Particulate	4-20
● Vehicle Lighting (Internal)	4-20
● Vehicle Lighting (External)	4-20
● Periscope	4-20
● Personnel Heater	4-20
● Smoke Generator	4-20

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ACE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
		A	B	C	D
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on all other gages read normal).		X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).			X	2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).		X	4-31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X	31	2
36	Battery/Generator gage will not work (all other gages work).		X		1
37	Battery/Generator gage pointer is right and slow.		X		1
38	Battery/Generator gage pointer is yellow or left red area (Engine running).		X		2
39	Fuel level gage will not work (all other gages work).		X		2
40	All gages on gage instrument panel will not work (Engine running).		X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running).		X		2
42	Powerplant warning lamp on (Engine running - all gauges - read normal).		X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle).		X		1
44	Gas particulate indicator lamp will not light (Gas particulate filter works).		X		1
45	Personnel heater indicator lamp will not light (Personnel heater works).		X		1
46	Night vision indicator lamp will not light (IR periscope will work).		X		1

6 Notify your supervisor.

NO

7 Determine the test equipment, special tools and number of technicians required.

YES

- See Step **13**.

**USER GUIDE
(Continued)**

FROM STEP

4

8

If you cannot locate the proper system/subsystem in the SYSTEM INDEX, find an item listed in the TROUBLESHOOTING SUBJECT INDEX that pertains to your trouble.

- Turn to TROUBLESHOOTING SUBJECT INDEX (page 4-21).
- Check the subjects listed in this index until you find one that pertains to your trouble.

Can you find an item that pertains to your trouble?

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TROUBLESHOOTING SUBJECT INDEX - Continued

SUBJECT	SYMPTOM AND RESOURCE TABLE(S) - PAGE	SYMPTOM NUMBER(S)
Panel lights, gage	4-24	58
Parking brakes	4-25	23, 24
Personnel heater	4-26	70, 72
Personnel heater fuel pump	4-26	73, 74
Personnel heater indicator lamp	4-26	73, 75
Power, hull electrical	4-26	45
Powerplant	4-24, 4-25	29, 30
Powerplant warning lamp	4-26	41, 42
Precleaner, gas particulate	4-26	55, 56
Primer pump	4-24	7
Pump, engine fuel	4-24	2, 11
Pump, fuel tank electrical	4-24	5, 8
Pump, personnel heater, fuel	4-26	73, 75
Pump, primer	4-24	7
Pump, purge	4-24	7
Radio, static	4-26	49
Receptacle, slave	4-25	30
Regulator, voltage	4-25	31
Service brakes	4-25	21
Service headlights	4-24	66, 67
Shifting linkage	4-25	20
Slave receptacle	4-25	30
Smoke generator	4-26	77
Smoke generator indicator lamp	4-27	46
Starters	4-24	1, 3, 4
Stoptight	4-24, 4-29	61, 62
Steering linkage	4-25	25, 26
Tailights	4-24	64-66
Transmission	4-25	20, 21
Transmission oil pressure	4-26	34
Transmission oil temperature	4-25, 4-26	21, 35
Utility outlet	4-25	29
Valve, front drain	4-24	50
Valve, rear drain	4-24	51
Vehicle lights, external	4-24, 4-29	56-60
Vehicle lights, internal	4-24	57, 58
Voltage regulator	4-25	31
Warning lamp, powerplant	4-26	41, 42

4-21

9

Notify your supervisor.

YES

NO

**USER GUIDE
(Continued)**

10

Find the right Troubleshooting Procedure.

- Check the **SYMPTOM** and **RESOURCE TABLE** listed for the subject you have selected.
- Note the symptom number(s) listed for your subject.
- Turn to the page number indicated for the **SYMPTOM** and **RESOURCE TABLE**.

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TROUBLESHOOTING SUBJECT INDEX - Continued

SUBJECT	SYMPTOM AND RESOURCE TABLES - PAGE	SYMPTOM NUMBER(S)
Panel lights, gas	4-25	50
Parking brake	4-25	23, 24
Periscopes, infrared (IR)	4-29	70-72
Personnel lamp	4-29	73-76
Personal heater fuel pump	4-29	71, 75
Personnel heater indicator lamp	4-28	45
Power, built electrical	4-25	27, 30
Powerplant	4-26, 4-25	118, 20, 21
Powerplant warning lamp	4-26	41, 42
Problems, gas particulate	4-29	55, 56
Primer pump	4-24	7
Push button fuel	4-24	2, 11
Pump, fuel tank electrical	4-24	5, 9
Pump, serviced heater, fuel	4-29	71, 75
Pump, primer	4-24	7
Pump, purge	4-24	7
Radio, static	4-28	49
Receptacle, slave	4-25	30
Regulator, voltage	4-25	31
Service brakes	4-25	22
Service headlights	4-29	66, 67
Shifting linkage	4-25	20
Slave receptacle	4-25	30
Smoke generator	4-29	77
Smoke generator indicator lamp	4-27	48
Starter	4-24	1, 3, 4
Stoplight	4-25, 4-29	61, 62
Steering linkage	4-25	25, 26
Taillights	4-29	64-66
Transmission	4-25	20, 21
Transmission oil pressure	4-26	34
Transmission oil temperature	4-25, 4-26	21, 35
Utility outlet	4-25	29
Valve, front drain	4-28	50
Valve, rear drain	4-28	51
Vehicle lights, external	4-25, 4-29	69-69
Vehicle lights, internal	4-28	57, 58
Voltage regulator	4-25	31
Warning lamp, powerplant	4-26	41, 42

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**USER GUIDE
(Continued)**

STEP 10 CONTINUED

- Find the same symptom number(s).
- The title listed for this number is the symptom title that describes your trouble.

NOTE
If there is more than one symptom number listed, review the symptom title for each number until you find the title that describes your trouble.

Have you found the proper symptom title?

11
Notify your supervisor.

NO

- 12**
- Determine the test equipment, special tools, and number of technicians required.
 - See Step 13 .

YES

TM 5-5420-202-20-1
INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED			
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO PERSONNEL	
		A	B	C	D	
GAGE						
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal).		X		2	
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X		2	
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).		X	6, 31	2	
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X	31	2	
36	Battery/generator gage will not work (all other gages work).		X		1	
37	Battery/generator gage pointer in right red area.		X		1	
38	Battery/generator gage pointer in yellow or left red area (Engine running).		X		2	
39	Fuel level gage will not work (all other gages work).		X		1	
40	All gages on gage instrument panel will not work (Engine running).		X		1	
LAMP						
41	Powerplant warning lamp will not come on (Engine not running).		X		2	
42	Powerplant warning lamp on (Engine running - all gages read normal).		X	31	2	
43	Master battery indicator lamp will not light (There is power in vehicle).		X		1	
44	Gas particulate indicator lamp will not light (Gas particulate blower works).		X		1	
45	Personnel locator indicator lamp will not light (Personnel hoister works).		X		1	
46	Night vision indicator lamp will not light (IR periscopes will work).		X		1	

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**USER GUIDE
(Continued)**

FROM STEP

7 OR 12

13 Determine the test equipment, special tools, and number of technicians needed to perform the troubleshooting procedure.

- Locate the RESOURCES REQUIRED columns.
- Check column B to determine if you will need test equipment. Either a multimeter or a STE/ICE set can be used. You do not need both.
- Check column C to determine if you will need special tools.

NOTE

- If Column C indicates that special tools are needed, see Chapter 3, Section 1.
- Locate the same item number in this section. This will tell you which special tool is needed.

- Check column D to determine how many technicians are required to perform the procedure.

Now that you have identified the trouble; found the right troubleshooting procedure; and obtained the test equipment, special tools, and number of technicians required: What is the last step to good troubleshooting?

TM 5-5420-202-20-1

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO PERSONNEL
		A	B	C	D
GAGE					
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal).		X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).		X	7, 31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X	31	2
36	Battery/Generator gage will not work (all other gages work).		X		1
37	Battery/Generator gage pointer in right red area.		X		1
38	Battery/Generator gage pointer in yellow or left red area (Engine running).		X		2
39	Fuel level gage will not work (all other gages work).		X		2
40	All gages on gage instrument panel will not work (Engine running).		X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running).		X		2
42	Powerplant warning lamp on (Engine running - all gages read normal).		X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle).		X		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works).		X		1
45	Personnel heater indicator lamp will not light (Personnel heater works).		X		1
46	Night vision indicator lamp will not light (IR periscopes will work).		X		1

**USER GUIDE
(Continued)**

WARNING

Do not start your troubleshooting procedure until you have studied Step 16 . This step contains important information you will need to know in order to perform the procedure safely.

14 Use the troubleshooting procedure to locate, isolate, and repair the trouble.

- After studying Step 16 , you will be ready to begin your Troubleshooting Procedure.

Are you familiar with the IMPORTANT TROUBLESHOOTING INFORMATION contained in Step 16 ?

NO **YES**

TM 5-5420-202-20-1

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED			
			MULTIMETER OR TESTER	SPECIAL TOOLS REFERENCE	NO. PERSONNEL	
		A	B	C	D	
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal)		X			2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal)		X			2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal)		X	B, V		2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal)		X	U		2
36	Battery, Generator gage will not work (all other gages work)		X			1
37	Battery, generator gage pointer in right red area		X			1
38	Battery, generator gage pointer in yellow or left red area (Engine running)		X			2
39	Fuel level gage will not work (all other gages work)		X			2
40	All gages on gage instrument panel will not work (Engine running)		X			1
LAMP						
41	Powerplant warning lamp will not come on (Engine not running)		X			2
42	Powerplant warning lamp on (Engine running - all gages read normal)		X	U		2
43	Master battery indicator lamp will not light (There is power in vehicle)		X			1
44	Gas particulate indicator lamp will not light (Gas particulate blower works)		X			1
45	Personnel heater indicator lamp will not light (Personnel heater works)		X			1
46	Night vision indicator lamp will not light (IR periscopes will work)		X			1

15

- Turn to the page number indicated in column A.
- On this page you will locate the procedure that pertains to your trouble.
- Use this Detailed Troubleshooting procedure to locate, isolate, and repair the trouble.

**USER GUIDE
(Continued)**

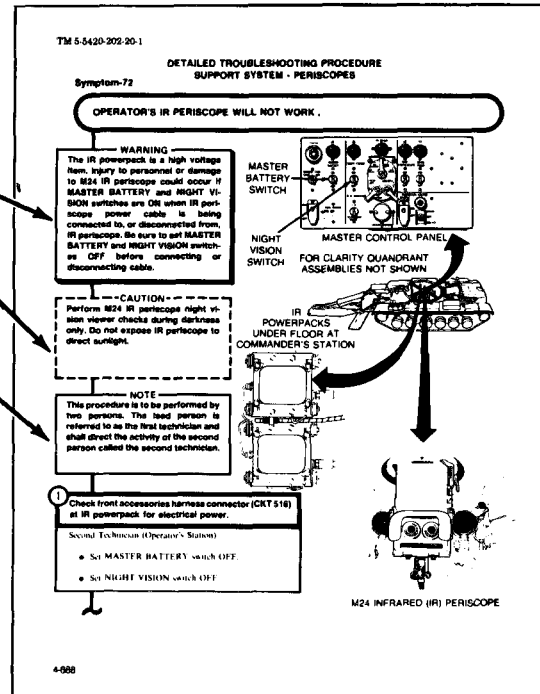
16

IMPORTANT TROUBLESHOOTING INFORMATION.

- Be sure you read every **WARNING**, **CAUTION**, and **NOTE**.
- A **WARNING** indicates possible injury to personnel. It may also include equipment damage.
- A **CAUTION** indicates possible equipment damage only.
- A **NOTE** contains information you will need to know in order to properly perform the troubleshooting procedure.

WARNING

- Be sure there is no electrical power at the cable to be disconnected or repaired.
- Before making cable repairs or disconnecting any cable, be sure **MASTER BATTERY** switch is set **OFF**.



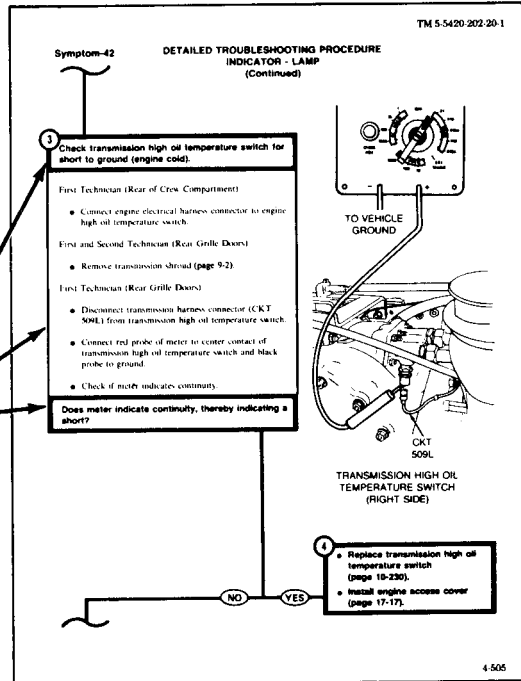
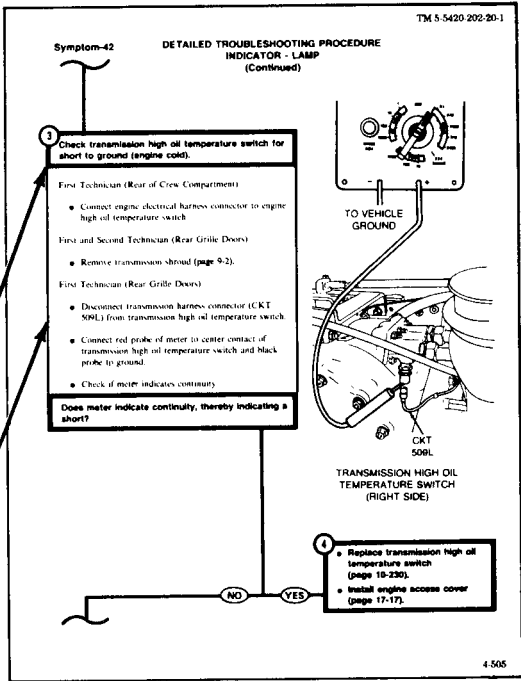
**USER GUIDE
(Continued)**

STEP **16** CONTINUED

WARNING

- Setting **MASTER BATTERY switch OFF** will not de-energize the following circuits: 49, 81, 400, 459 and 975. When working with any of the above circuits, the battery ground straps must be disconnected.
- When working with **CKT 405**, set **HEATER MASTER switch OFF**.
- Failure to de-energize any electrical circuit prior to working on it may result in serious injury to personnel and damage to equipment.

- If you are a skilled technician and already know how to perform the test or inspection called for here, you may omit the part of that step that is not shaded with heavy lines and printed in bold type.
- If you do not know how to do the test or inspection called for, you must perform every part of each step.



**USER GUIDE
(Continued)**

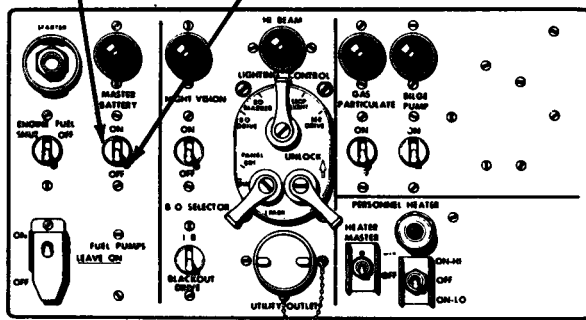
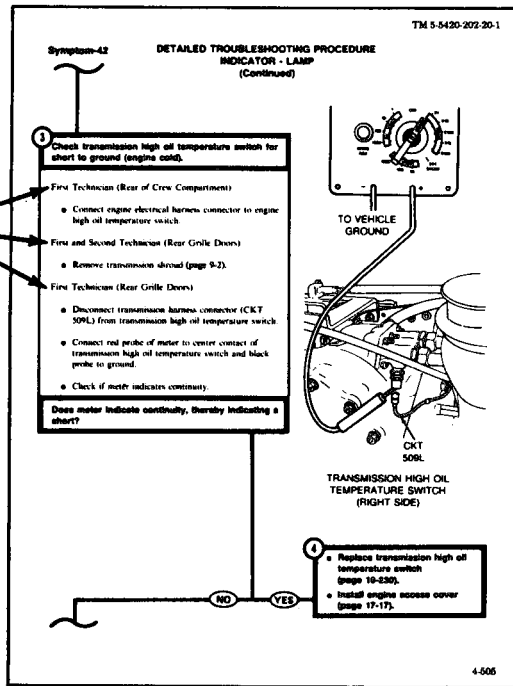
STEP 16 CONTINUED

- These locators tell you two things:
 - Which technician will do the task that follows.
 - Where this technician must be in order to do the task.

EXAMPLE: First Technician (Rear Grille Doors)

- The words printed in **BOLD TYPE** show you what you will see marked on the actual equipment you will be using.

EXAMPLE: • Set MASTER BATTERY switch OFF.

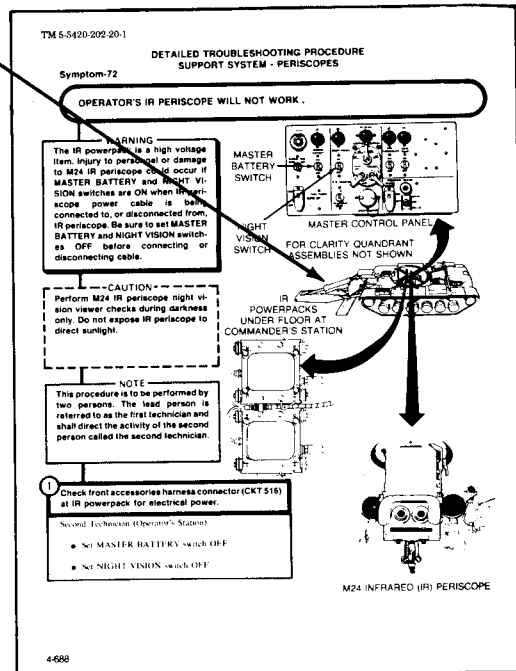
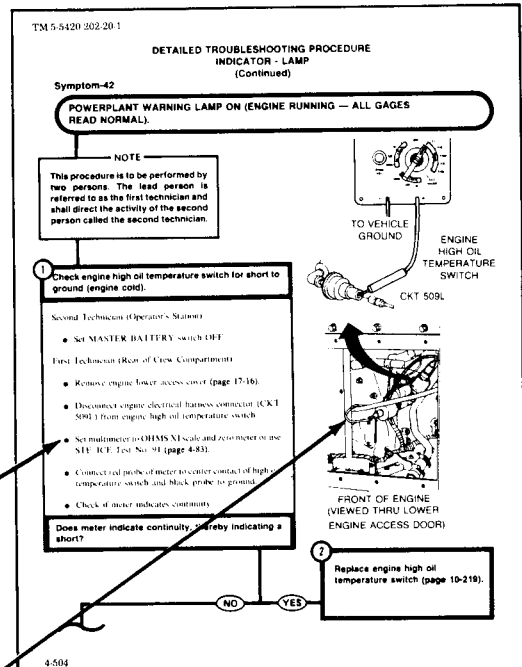


TA249898

**USER GUIDE
(Continued)**

STEP 16 CONTINUED

- Some steps call for the use of test equipment.
- If you do not know how to use this equipment (or if you have forgotten how to do the test called for) see page 4-30 for multimeter instructions or page 4-46 for STE/ICE instructions.
- A picture is included with most steps to make the task easier to understand, or show you where a particular part is located.

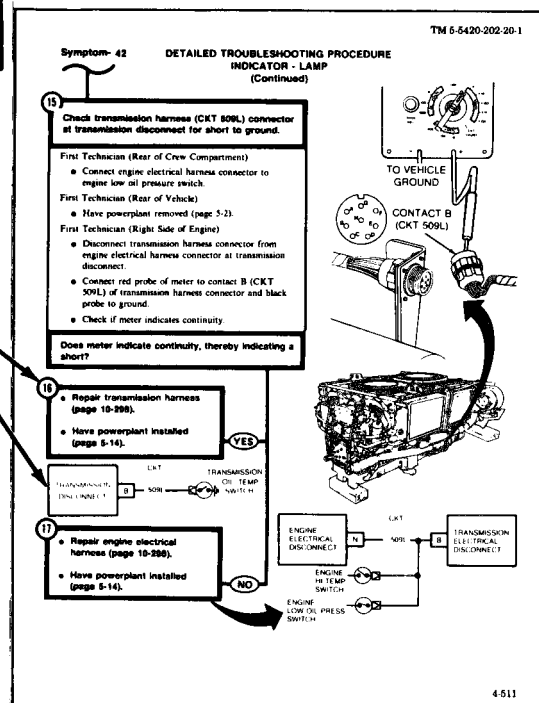
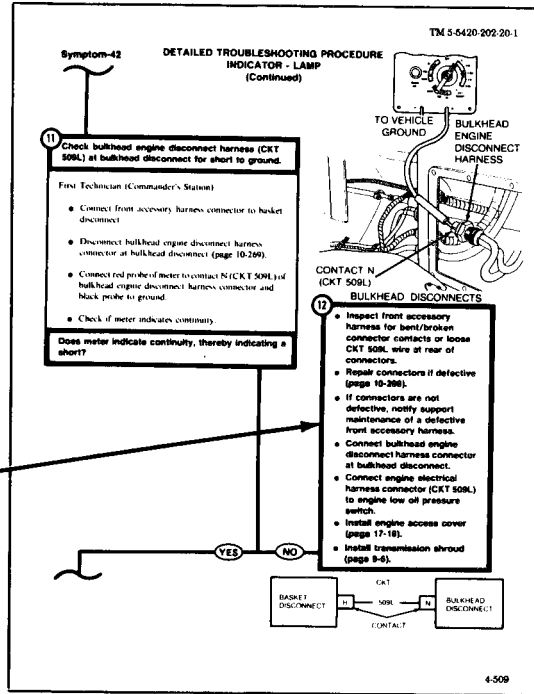


TA249899

**USER GUIDE
(Continued)**

STEP 16 CONTINUED

- When a step tells you **INSPECT** for bent/broken connector contacts or loose wires at the rear of connectors (or repair a harness) - a harness circuit diagram is included.
- This harness circuit diagram will show you which connectors to inspect/repair and where they are located.
- See page 4-18 for explanation of these harness circuit diagrams.



TA249900

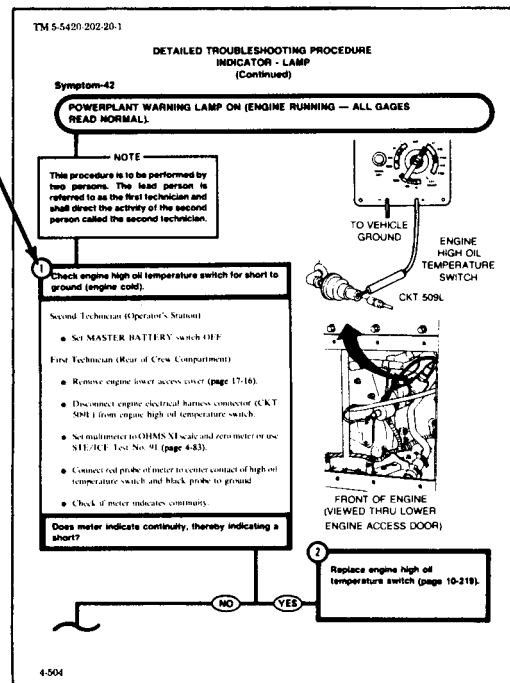
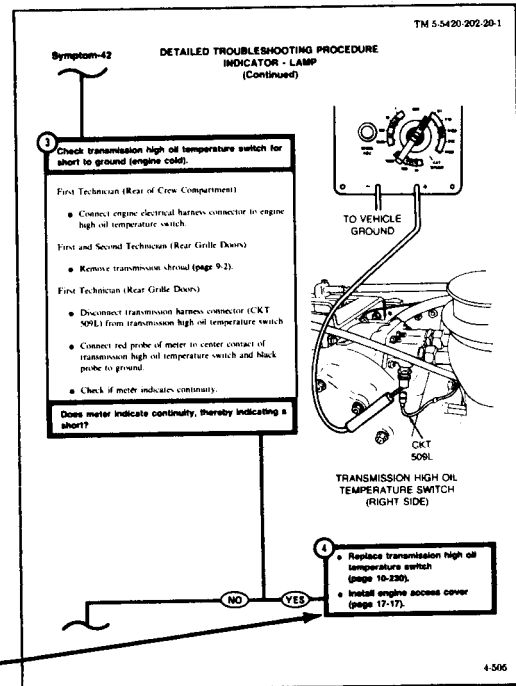
**USER GUIDE
(Continued)**

STEP 16 CONTINUED

NOTE

- For the benefit of the skilled technician, a complete wiring diagram of the vehicle hull is included in this manual.
- See Fig F0-1 for this diagram.

- After you finish any repair in a troubleshooting procedure, check to see that the trouble has been corrected.
- If the problem still exists, go back to Step 1 of the same procedure and continue troubleshooting.



TA249901

**USER GUIDE
(Continued)**

STEP 16 CONTINUED

Do you understand all the information in this USER GUIDE?

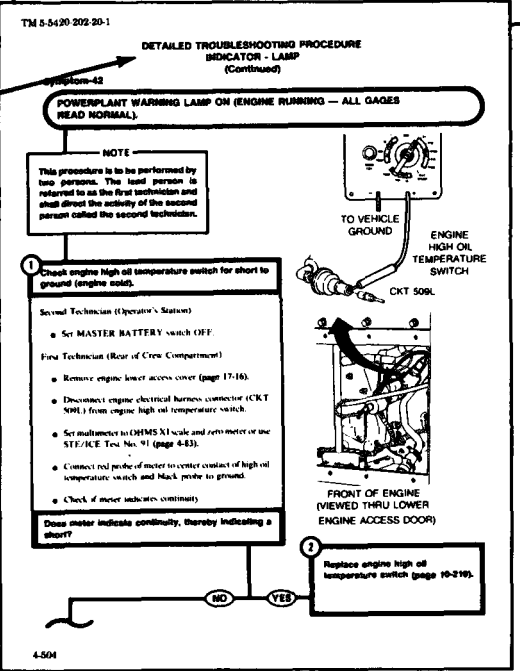
17 **Ask your supervisor to help you with the part you don't understand.**

18

- Turn to the page number indicated in column A.
- On this page you will see the procedure that pertains to your trouble.
- Use this DETAILED TROUBLESHOOTING PROCEDURE to locate, isolate and repair the trouble.

TM 5-5420-202-20-1
INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED			
			MULTIMETER OR STE/ICE		SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
			A	B		
GAGE						
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal).		X			2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X			2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).		X	6, 31		2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X	31		2
36	Battery/Generator gage will not work (all other gages work).		X			1
37	Battery/generator gage pointer in right red area.		X			1
38	Battery/generator gage pointer in yellow or left red area (Engine running).		X			2
39	Fuel level gage will not work (all other gages work).		X			1
40	All gages on gage instrument panel will not work (Engine running).		X			1
LAMP						
41	Powerplant warning lamp will not come on (Engine not running).	4-26	X			2
42	Powerplant warning lamp on (Engine running - all gages read normal).		X	31		2
43	Master battery indicator lamp will not light (There is a ground in circuit).		X			1
44	Oil temperature indicator lamp will not light (Oil particulate blower works).		X			1
45	Oil pressure indicator lamp will not light (Pressure tester works).		X			1
46	Night vision indicator lamp will not light (IR periscope will work).		X			1

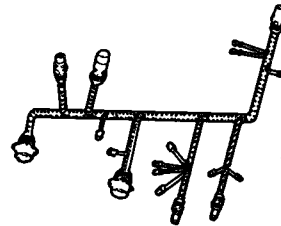


TA249902

HARNES CIRCUIT DIAGRAMS		
THIS DIAGRAM	REPRESENTS	AND LOOKS LIKE
	<p>CONTACT B AT BOTH CONNECTORS OF A MULTICONDUCTOR HARNES CARRYING CIRCUIT 10 FROM THE CONNECTOR AT BASKET DISCONNECT TO CONTACT AT MASTER CONTROL PANEL.</p>	
	<p>A BELL CONNECTOR WHICH CONNECTS TO THE TAILLIGHT HARNES. THE OTHER END IS CONNECTED TO A MULTICONDUCTOR HARNES CONNECTOR AT THE BULKHEAD DISCONNECT.</p>	
	<p>A SINGLE CONDUCTOR CABLE CARRYING CIRCUIT 2 FROM THE BULKHEAD DISCONNECT TO THE ENGINE DISCONNECT.</p>	
	<p>A CONTINUATION OF THE ABOVE CIRCUIT, ENDING AT THE GENERATOR ASSEMBLY WITH A TERMINAL LUG.</p>	
	<p>A MULTICONDUCTOR HARNES WITH CIRCUIT 415B HAVING A TIEPOINT (REPRESENTED BY THE DOT). AFTER THE TIE POINT CIRCUIT 415B TERMINATES AT TWO CONTACTS WITHIN THE SAME CONNECTOR.</p>	
	<p>FAULTS WHICH ARE NOT REPAIRABLE AT THE ORGANIZATIONAL LEVEL, INDICATED BY THE BROKEN LINE. THE NON-REPAIRABLE PORTION OF THE DIAGRAM IS INCLUDED TO ASSIST THE TECHNICIAN IN LOCATING THE COMPONENT FOR RETEST AFTER COMPLETING REPAIR ACTION.</p>	

HARNESSES CIRCUIT DIAGRAMS (Continued)		
THIS DIAGRAM	REPRESENTS	AND LOOKS LIKE
	<p>A MULTICONDUCTOR HARNESSES, HAVING A TIE POINT, AFTER WHICH THE CIRCUIT TERMINATES IN TWO DIFFERENT CONNECTORS OF THE SAME HARNESSES.</p>	
	<p>A MULTICONDUCTOR HARNESSES WITH BELL CONNECTORS AT ONE END AND MULTI-CONTACT CONNECTOR AT THE OTHER END.</p>	

MOST OF THE VEHICLE HARNESSES ARE BRANCHED



AND HAVE MANY CONNECTORS. ONLY

THE CONNECTORS ASSOCIATED WITH THE FAULT ARE SHOWN IN THE HARNESSES DIAGRAMS CONTAINED IN

THE DETAILED TROUBLESHOOTING PROCEDURES. EACH DIAGRAM IS ACCOMPANIED BY AN

ILLUSTRATION (FEMALE SOCKET CONNECTOR) OR (MALE PIN CONNECTOR) TO ASSIST YOU IN

FINDING THE CONTACT ASSOCIATED WITH THE CIRCUIT UNDER TEST. BY NOTING THE LOCATION OF THE

KEYWAY THE CIRCUIT CONTACT UNDER TEST MAY BE EASILY LOCATED.

TROUBLESHOOTING SYSTEM INDEX

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE	PAGE
● Powerplant, starting	4-24
● Powerplant, running	4-24
● Powerplant, stopping	4-24
● Final Drive	4-24
● Transmission	4-25
● Brakes	4-25
● Steering	4-25
● Hull Power	4-25
● 300 amp Generator/Regulator	4-25
● 650 amp Alternator/Regulator	4-25

INDICATOR SYMPTOM AND RESOURCE TABLE	PAGE
● G a g e	4-26
● L a m p	4-26

SUPPORT SYSTEM AND RESOURCE TABLE	PAGE
● Communications	4-28
● Drain Valve	4-28
● Fire Extinguisher	4-28
● Gas Particulate	4-28
● Vehicle Lighting (internal)	4-28
● Vehicle Lighting (external)	4-28
● Smoke Grenade Launcher	4-29
● Periscope	4-29
● Personnel Heater	4-29
● Smoke Generator	4-29

TROUBLESHOOTING SUBJECT INDEX

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Blackout marker lamp	4-29	64, 65
Blackout taillights	4-29	64, 65
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Blower motor, gas particulate	4-28	56
Blower motor, personnel heater	4-29	73, 75
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Engine fuel shutoff handle	4-24	18
Engine fuel shutoff switch	4-24	17
Engine oil consumption	4-24	16
Engine oil pressure gage	4-26	32
Engine oil temperature	4-24	15
Engine oil temperature gage	4-26	35
Exterior 1st/2nd shot handles	4-28	53
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Final drive	4-24	19
Fire extinguisher	4-28	52, 53
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Fuel pump, engine	4-24	2, 11
Fuel pump, personnel heater	4-29	73, 75
Fuel shutoff handle	4-24	18
Fuel shutoff switch	4-24	17
Fuel tank electrical fuel pump	4-24	5, 6
Fuel water separator	4-24	10

TROUBLESHOOTING SUBJECT INDEX - (Continued)

SUBJECT	SYMPTOM AND RESOURCE TABLE(S) - PAGE	SYMPTOM NUMBER(S)
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Headlights	4-29	65-68
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Heater, personnel	4-29	73-76
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Hull drain valve, rear	4-28	51
Hull power, electrical	4-25	27-30
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Indicators, gage	4-24, 4-26	15, 32-40
Indicators, lamp	4-26	41-47
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Lights, indicator	4-26	41-47
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Linkage, brake	4-25	22-24
Linkage, shifting	4-25	20
Linkage, steering	4-25	25, 26
Manifold preheaters	4-24	8,9
Master battery indicator lamp	4-26	43
Motor, air cleaner blower	4-24	12-14
Motor, gas particulate blower	4-28	56
Motor, personnel heater blower	4-29	73, 75
Night vision indicator lamp	4-25	46
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Oil pressure gage, engine	4-26	32
Oil pressure gage, transmission	4-26	34
Oil temperature, engine	4-24	15
Oil temperature gage, engine	4-26	33
Oil temperature, transmission	4-25	21
Oil temperature gage, transmission	4-26	35

TROUBLESHOOTING SUBJECT INDEX - (continued)

SUBJECT	SYMPTOM AND RESOURCE TABLE(S) - PAGE	SYMPTOM NUMBER(S)
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Pump, fuel tank electrical	4-24	5,6
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VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
POWERPLANT, STARTING		A	B	C	D
1	Engine will not crank when starter switch is pressed.	4-91	x	3, 31	2
2	Engine cranks at normal speed, but will not start (Battery/Generator gage shows in yellow area).	4-118	x		2
3	Engine cranks slowly and will not start.	4-153	x	3,31	2
4	Engine starter spins, but will not crank engine.	4-165		3, 31	1
5	One electrical fuel pump will not work.	4-168	x	3, 31	2
6	Both electrical fuel pumps will not work.	4-183	x		1
7	Primer pump will not work.	4-190			2
8	One intake manifold preheater will not work.	4-215	x		2
9	Both intake manifold preheater will not work.	4-222	x		2
10	Fuel/Water separator will not work.	4-247	x	31	2
POWERPLANT, RUNNING					
11	Engine will not run right.	4-258		31	2
12	One air cleaner blower fan will not work.	4-280	x		2
13	Both air cleaner blower fans in one air cleaner assembly will not work.	4-285	x		2
14	All air cleaner blower fans will not work.	4-289	x		2
15	Engine oil temperature gage shows high temperature (PowerPlant warning lamp on).	4-298		31, 32	2
16	Engine oil level too low (Exceeds 3.5 quarts per hour, while running).	4-302		31	2

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
POWERPLANT, RUNNING-CONTINUED		A	B	C	D
16.1	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, and dust detector filter strip indicates contamination of intake air by dust.	4-306.1			1
16.2	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, end dust detector filter strip indicates contamination of intake air by fuel.	4-306.4			1
16.3	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, and dust detector filter strip indicates contamination of intake air by soot.	4-306.6			1
16.4	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, and dust detector filter strip indicates contamination of intake air by water.	4-306.8			1
16.5	Powerplant warning and dust detector warning lights on. One (or both) dust detector pressure switch(es) tripped, and dust detector filter strip is black and wet, indicating contamination of intake air by oil.	4-306.10			1
16.6	Powerplant warning and dust detector warning lights are on (engine running-all gages read normal).	4-306.11			1

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
POWERPLANT, RUNNING - CONTINUED		A	B	C	D
16.7	Powerplant warning and dust detector warning light on, one (or both) dust detector pressure switch(es) tripped, but dust detector filter strip does not indicate contamination of intake air.	4-306.13			1
16.8	Powerplant warning and dust detector warning lights on, but dust detector pressure switch(es) not tripped.	4-306.14	X		1
16.9	Powerplant warning and dust detector warning lights not on. Dust detector pressure switch(es) not tripped. Dust ingestion is apparent by oil sample analysis or dust trails.	4-306.18			1
16.10	Powerplant warning light on, dust detector warning light off, dust detector pressure switch(es) tripped engine running.	4-306.19	X		1
16.11	Dust detector pressure switch(es) tripped, but dust detector warning light and powerplant warning light do not come on when engine is running.	4-306.21	X		1
16.12	Low power, excessive black smoke, one or both filters require frequent cleaning.	4-306.25			1
16.13	Low power, excessive black smoke.	4-306.28			1
POWERPLANT, STOPPING					
17	Engine fuel shutoff switch will not stop engine.	4-307	X		2
18	Manual fuel shutoff handle will not stop engine.	4-319			1
FINAL DRIVE					
19	Final drive leaks oil	4-321			2

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE - Continued

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNE
		A	B	C	D
TRANSMISSION					
20	Transmission will not shift properly	4-325		6, 31	2
21	Transmission oil temperature gage shows red (Powerplant warning lamp on).	4-336		6, 31	2
BRAKES					
22	Service brakes will not work right.	4-342		32	2
23	Parking brake will not release.	4-350		32	2
24	Parking brake cannot be applied.	4-353		30, 32	2
STEERING					
25	Vehicle will not steer properly.	4-363			2
26	Vehicle pivots to the left or right.	4-371			2
HULL POWER					
27	No power distribution from master relay (master battery indicator lamp will light).	4-376	X		2
28	No power in vehicle (master battery indicator lamp will not light).	4-386	X		2
29	No power at utility outlet on master control panel.	4-395	X		1
30	No power at slave receptacle (master battery lamp lights).	4-397	X		1
GENERATOR/REGULATOR					
31	300 amp Generator/regulator system is not working.	4-399	X	4, 31	2
31.1	650 amp alternator/regulating system is not working	4-414.2	X	129	2

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
		A	B	C	D
GAGE					
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal).	4-416	X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).	4-429	X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).	4-442	X	31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).	4-458	X	31	2
36	Battery/Generator gage will not work (all other gages work).	4-475	X		1
37	Battery/generator gage pointer in right red area,	4-476	X		1
38	Battery/generator gage pointer in yellow or left red area (Engine running).	4-477	X		2
39	Fuel level gage will not work (all other gages work).	4-479	X		2
40	All gages on gage instrument panel will not work (Engine running).	4-493	X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running).	4-498	X		2
42	Powerplant warning lamp on (Engine running - all gages read normal).	4-505	X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle).	4-513	X		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works).	4-514	X		1
45	Personnel heater indicator lamp will not light (Personnel heater works).	4-515	X		1
46	Night vision indicator lamp will not light (IR periscopes will work).	4-520	X		1

INDICATOR SYMPTOM AND RESOURCE TABLE - Continued

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
LAMP		A	B	C	D
47	High beam indicator lamp will not light when white service and/or B.O. service high beam lamps are on.	4-521	X		2
48	Smoke generator indicator lamp will not light (Smoke generator will make smoke).	4-531	X		1

SUPPORT SYSTEM SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES	REQUIRED	NO. PERSONNEL
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	
COMMUNICATIONS		A	B	C	D
49	Static or whining noise in radio (Electromagnetic interference EMI).	1-533			2
DRAIN VALVE					
50	Front drain valve will not work.	4-552			1
51	Rear drain valve will not work.	4-553			2
FIRE EXTINGUISHER					
52	Fixed fire extinguisher fails to operate when FIRE PULL HARD handle is pulled.	4-558			2
53	Fixed fire extinguisher fails to operate when exterior first shot or second shot handles are pulled.	4-564			2
54	Engine does not stop running when FIRE PULL HARD handle is pulled (Engine fuel shutoff switch on master control panel will work).	4-572	X		1
GAS PARTICULATE					
55	Gas particulate hose will not deliver sufficient airflow.	4-583			2
56	Gas particulate blower motor will not run.	4-585	X		2
VEHICLE LIGHTING (INTERNAL)					
57	Operator's domelight will not light.	4-593	X		1
58	Gage instrument panel lamps will not light (Panel light switch at BRIGHT).	4-597	X		2
VEHICLE LIGHTING (EXTERNAL)					
59	Lights controlled by lighting control switch will not light (panel switch at OFF, BRIGHT or DIM).	4-603	X		1
60	Panel and drive lights are very dim or will not light, with panel light switch at BRIGHT, DIM or PARK (Lights are OK with panel light switch at OFF).	4-607	X		2
61	Service stoplight will not light.	4-613	X		

SUPPORT SYSTEM SYMPTOM AND RESOURCE TABLE - Continued

SUBSYSTEM SYMPTOM No.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
VEHICLE LIGHTING (EXTERNAL)-Continued		A	B	C	D
62	Blackout stoplight will not light.	4-622	X		2
63	Blackout drive lamp will not light (IR service lamps will light).	4-630	X		2
64	Both blackout taillights and/or both blackout marker lights will not light.	4-635	X		2
65	One headlight blackout marker lamp or one taillight blackout marker lamp will not light.	4-641	X		2
66	High beam or low beam, in one service headlight lamp, will not light or service taillight will not light (Panel light switch at BRIGHT, DIM or OFF).	4-645	X		2
67	Both high beam and/or both low beam service lamps will not light (Dimmer switch in either position).	4-656	X		2
68	Both high beam or low beam IR lamps will not light.	4-664	X		1
69	IR lamps will not light.	4-668	X		2
PERISCOPES					
70	IR periscopes will not work (Night vision indicator lamp will not light)	4-682	X		1
71	IR periscopes will not work (Night vision indicator lamp will light).	4-686	X		2
72	Operator's IR periscope will not work.	4-689	X		2
PERSONNEL HEATER					
73	No heat from personnel heater.	4-693	X		2
74	Personnel heater HI/LO switch will not control heater (Blower runs in one or both ON-HI, ON-LO switch positions).	4-711	X		2
75	Personnel heater starts, works for a short time, then stops.	4-724			2
76	Exhaust fumes from personnel heater inside vehicle.	4-727			2
SMOKE GENERATOR					
77	Smoke generator will not work (No smoke or quantity of smoke is not normal).	4-729	X		2
SMOKE GRENADE LAUNCHER					
78	Grenade launcher fails to fire (Grenade Power lamp fails to light)	4-743	X		2

USE OF DIGITAL MULTIMETER

Multimeters AN/URM-105 or ME-77 C/U pictured throughout this TM are no longer used. Use digital multimeter that is part of your tool set to troubleshoot the M60A1 AVLB vehicle.

1

If a troubleshooting procedure reads one of the following instructions, set your multimeter as

- “Check if meter indicates continuity”
Use the lowest range on the multimeter
- “Check if meter indicates a short”
Use the lowest range on the multimeter
- “Check if meter indicates infinity”
Use the highest range on the multimeter
- “Set multimeter to OHMS X! scale and zero meter”
Use the lowest range on the multimeter

STANDARD TROUBLESHOOTING PRACTICES

1

- Be sure master power is off before connecting or disconnecting any electrical cable or harness unless otherwise specified.
- Anytime a connector is disconnected it should be checked for cleanliness and broken, bent, or pushed in pins. If you find missing or damaged pins, notify your supervisor.
- When instructed to make a measurement to chassis ground, ensure you make solid contact to metal surface, free of paint, grease and dirt. Connector backshells (not the coupling ring) and braided wire ground straps are reliable chassis connections.
- If testing for an intermittent condition, flex the harness and test for a reading that varies above or below the limits specified in test block.
- Continuity is defined as a 0 to 5 ohms reading on a multimeter. A buzzer or light can give a false continuity or short circuit indication when the circuit resistance is actually greater than 5 ohms. Do not use a buzzer or light without verifying the actual multimeter reading.
- The new cables and harnesses are covered by heat shrink tube so the circuit (CKT) numbers cannot be seen. Cables and harnesses are labeled with part number and the connector ends are labeled with all CKT numbers at that specific connector.

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET

USE OF SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET.

1

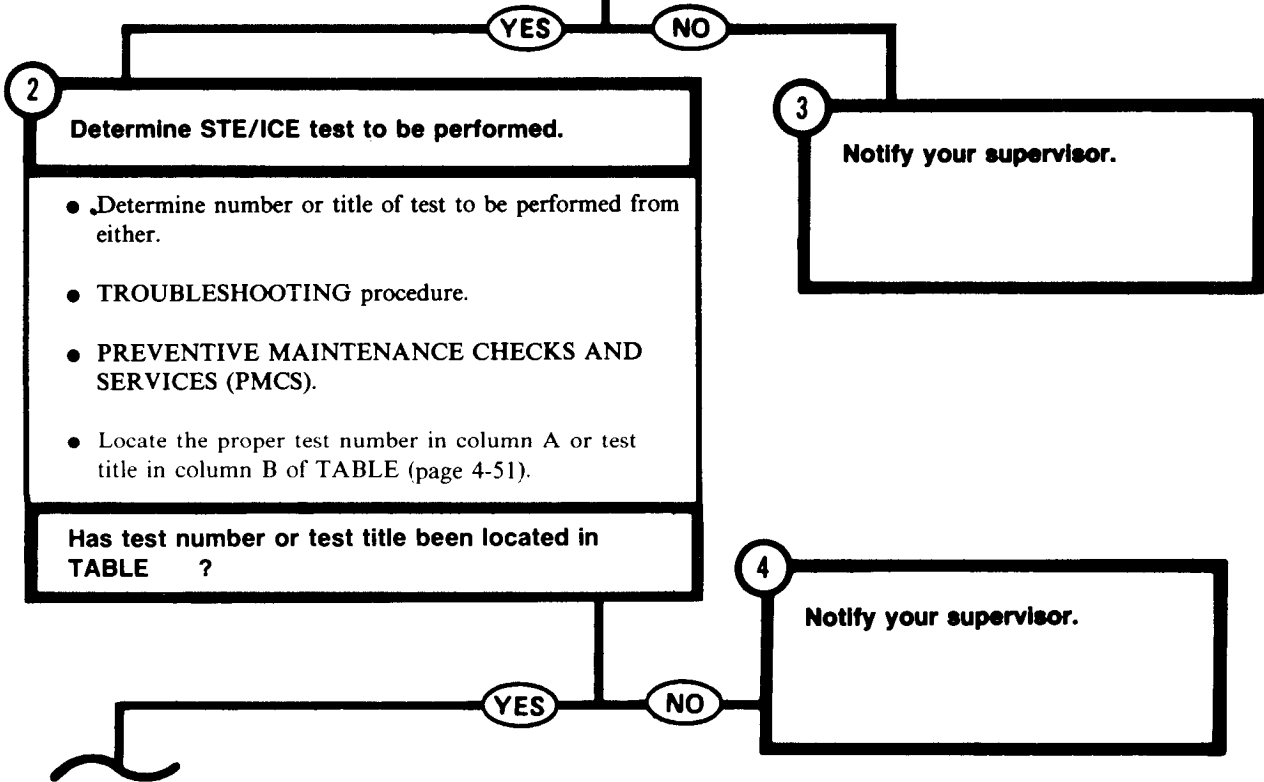
Locate SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) TEST PROCEDURE TABLE.

- Turn to TEST PROCEDURES TABLE (page 4-51).
- This table lists all the STE/ICE tests used in this manual.

Have you located the table listing the test procedures?

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

Column A	Column B	Column C
TEST NUMBER	TITLE	PAGE NUMBER
Test 13	CI Power Test	4-76
Test 14	Compression Unbalance Test	4-86
Test 50	Pressure 0-1000 PSIG Test	4-88
Test 66/60	VTM General Set-Up Confidence and Identification Test	4-55
Test 67	Charging Circuit and Battery Voltage Test	4-67
Test 72	Starter Current First Peak Test	4-70
Test 74	Starter Circuit Resistance Test	4-73
Test 77/79	Battery Condition Test	4-60
Test 89	DC Voltage Test	4-81
Test 91/92	Resistance and Continuity Test	4-83



TA249931

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

5 Locate page number of STE/ICE test to be performed.

- Once either TEST NO., column A or test TITLE column B is known, locate Page number in column C.
- Turn to page number indicated in column C, on this page you will find a procedure of how to perform (1) the desired STE/ICE test and, (2) the desired test results.

Have you located the page number of the STE/ICE test to be performed?

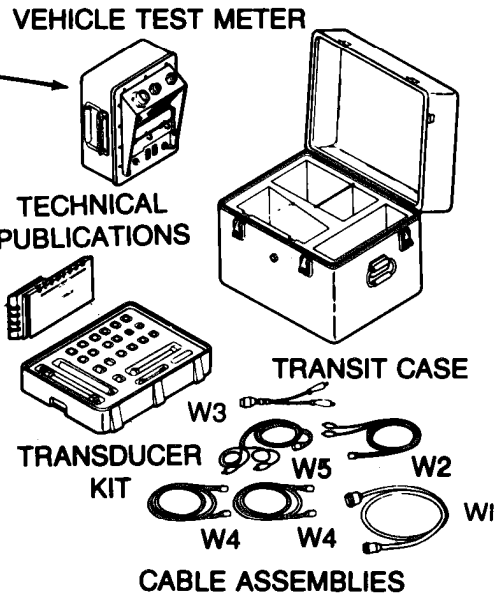
TEST PROCEDURES TABLE		
Column A	Column B	Column C
TEST NUMBER	TITLE	PAGE NUMBER
Test 13	CI Power Test	4-76
Test 14	Compression Unbalance Test	4-86
Test 30	Pressure 0-1000 PSIG Test	4-88
Test 66/60	VTM General Set-Up Confidence and Identification Test	4-55
Test 67	Charging Circuit and Battery Voltage Test	4-67
Test 72	Starter Current First Peak Test	4-70
Test 74	Starter Circuit Resistance Test	4-73
Test 77/79	Battery Condition Test	4-60
Test 89	DC Voltage Test	4-81
Test 91/92	Resistance and Continuity Test	4-83

6 Notify your supervisor.

7 Get to know your STE/ICE System.

- Check if the following STE/ICE system items are available.
- Vehicle Test Meter (VTM).
- Transducer kit.
- Cable assemblies W1 (1 each), W2 (1 each), W3 (1 each), W4 (2 each), and W5 (1 each).
- Technical publications.
- Transit case.

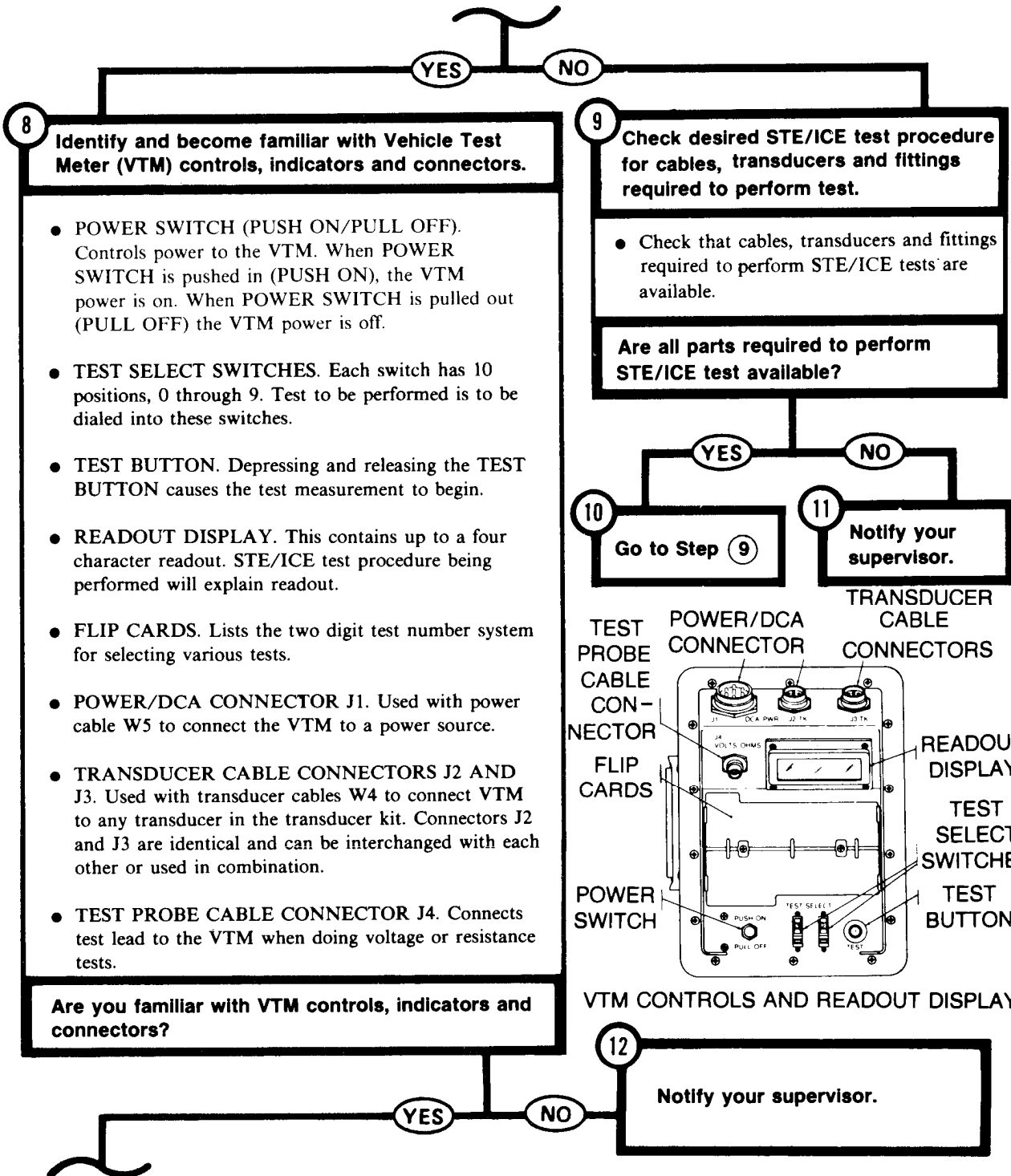
Are all STE/ICE system items available?



**SIMPLIFIED TEST EQUIPMENT INTERNAL
COMBUSTION ENGINE (STE/ICE) SYSTEM**

TA249932

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**



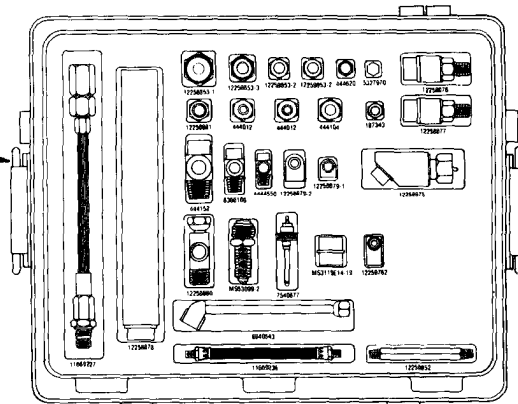
TA249933

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

13 Identify and become familiar with items in the Transducer Kit required for STE/ICE test to be performed.

- Check component list (page 4-52) for listing of items found in Transducer kit.
- Make sure all Transducer kit items that are necessary to perform desired STE/ICE test are available.

Are you familiar with Transducer kit and are all items required for STE/ICE test available?



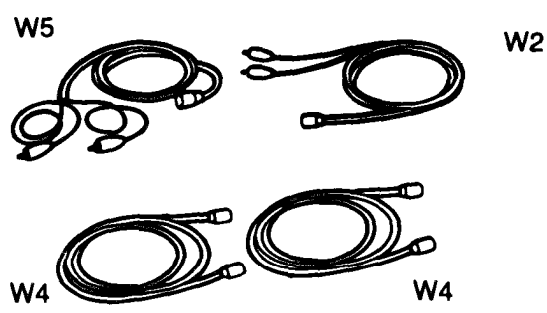
TRANSDUCER KIT

14 Notify your supervisor.

15 Identify and become familiar with the cable assemblies required for STE/ICE test to be performed.

- Test Probe Cable W2, to be connected to VTM connector J4 if required for test.
- Transducer Cables W4 (2 each), to be connected to VTM connector J2 or J3. Cables W4 may be joined together with adapter MS3119E-14-19 supplied in transducer kit, to make one long cable.
- Power Cable W5, to be connected to VTM connector J1 to supply power to the VTM.

Are you familiar with cable assemblies and are all cable assemblies required for STE/ICE test available?



CABLE ASSEMBLIES

16 Notify your supervisor.

TA249934

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

17

While performing test, an OPERATOR'S MESSAGES or ERROR MESSAGES may appear on VTM display. Locate OPERATOR'S MESSAGES and ERROR MESSAGES TABLES.

- Turn to OPERATOR'S MESSAGE TABLE (page 4-53) for meaning of OPERATOR'S MESSAGE if displayed on VTM readout display.
- Turn to ERROR MESSAGE TABLE (page 4-54) for meaning of ERROR MESSAGE if displayed on VTM readout display.

Have you located the TABLE that gives the meaning of OPERATOR'S MESSAGES or ERROR MESSAGES?

TM 5-5420-226-20-1

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

OPERATOR'S MESSAGES TABLE	
VTM Readout	Readout Explanation
8.8.8.8	A readout of 8.8.8.8 appears for 1 or 2 seconds each time the power is applied to the VTM. It means that there is power to the VTM, and that all elements of the readout display are operative.
---	A readout of --- indicates the following: (1) After power turn on it signifies that the VTM is ready for testing. (2) During a compression unbalance test it signifies testing is in progress. (3) During battery condition test it signifies battery may be in discharged state.
9.9.9.9	A readout of 9.9.9.9 indicates that the VTM is reading a test value beyond the range of its measurement capability. Either (1) the wrong test number is selected for the parameter being measured, or (2) there is fault in the calibration test, or the test head.

TM 5-5420-226-20-1

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

ERROR MESSAGES TABLE	
VTM Readout	Readout Explanation
E000	Occurs if you request the VTM for information it does not have. For example, if you request the vehicle ID and it has not been entered.
E001	It indicates that a non-existent test number has been dialed into the TEST SELECT switches.
E002	Indicates that the required transducer is not connected.
E004	Indicates that a vehicle identification number or number of cylinders information has not been entered.
E005	Indicates that the transducer offset test was not performed.

18

Notify your supervisor.

19

Locate the readout shown on the VTM display in OPERATOR'S MESSAGE TABLE or ERROR MESSAGE TABLE.

- Check OPERATOR'S MESSAGE TABLE (page 4-53) for OPERATOR'S MESSAGE readout shown on VTM display.
- Check ERROR MESSAGE TABLE (page 4-54) for ERROR MESSAGE readout shown on VTM display.

Did you locate the readout shown on VTM display in either table?

21

Continue with STE/ICE test to be performed.

20

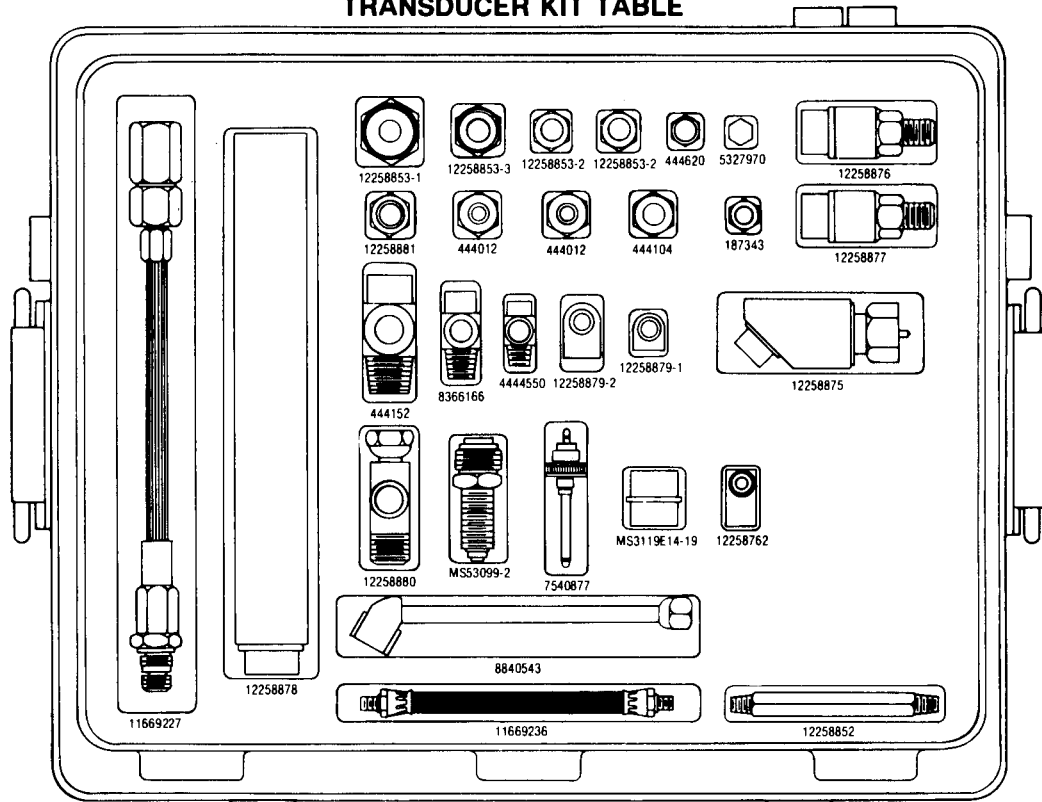
Notify your supervisor.

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

TEST PROCEDURES TABLE		
Column A	Column B	Column C
TEST NUMBER	TITLE	PAGE NUMBER
Test 13	CI Power Test	4-76
Test 14	Compression Unbalance Test	4-86
Test 50	Pressure 0-1000 PSIG Test	4-88
Test 66/60	VTM General Set-Up Confidence and Identification Test	4-55
Test 67	Charging Circuit and Battery Voltage Test	4-67
Test 72	Starter Current First Peak Test	4-70
Test 74	Starter Circuit Resistance Test	4-73
Test 77/79	Battery Condition Test	4-60
Test 89	DC Voltage Test	4-81
	Resistance and Continuity Test	4-83

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

TRANSDUCER KIT TABLE



Part Number	Qty	Item
187343	1	Male Connector, 5/16 tube to 1/4 MPT
444012	2	Adapter, 1/8 MPT to 1/4 FPT
444104	1	Coupling Reducer, 1/8 FPT to 1/4 FPT
444550	1	Street Tee, 1/8 pipe thread
444152	1	Street Tee, 1/2 pipe thread
444620	1	Hex Head Plug, 1/4 MPT
7540877	1	Ignition Adapter
8366166	1	Street Tee, 1/4 pipe thread
8840543	1	Air Chuck
5327970	1	Hex Head Plug, 1/8 MPT
11669227	1	Hose & Fitting Ass'y. (Spark Plug Adapter)
11669236	1	Hose Assembly, 1/8 MPT
12258762	1	Tee, Inverted Flare
12258852	1	Pipe Nipple, 1/8 MPT
12258853-1	1	Pipe Thread Reducer, 3/4 MPT to 1/4 FPT
12258853-2	2	Pipe Thread Reducer, 3/8 MPT to 1/4 FPT
12258853-3	1	Pipe Thread Reducer, 1/2 MPT to 1/4 FPT
12258875	1	Pulse Tachometer
12258876	1	Pressure Transducer, 0-1000 PSI
12258877	1	Pressure Transducer, -30 in. Hg to 25 PSIG
12258878	1	Current Probe
12258879-1	1	Street Elbow, 1/8 pipe thread
12258879-2	1	Street Elbow, 1/4 pipe thread
12258880	1	Fuel Line Adapter
12258881	1	Snubber
MS53099-2	1	Tachometer Drive Adapter
MS3119E14-19	1	Adapter (connector-to-connector)

TA249937

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

OPERATOR'S MESSAGES TABLE	
VTM Readout	Readout Explanation
.8.8.8.8	A readout of .8.8.8.8 appears for 1 or 2 seconds each time the power is applied to the VTM. It means that there is power to the VTM, and that all elements of the readout display are operative.
----	A readout of ---- indicates the following: <ol style="list-style-type: none"> (1) After power turn on it signifies that the VTM is ready for testing. (2) During a compression unbalance test it signifies testing is in progress. (3) During battery condition test it signifies battery may be in discharged state.
.9.9.9.9	A readout of .9.9.9.9 indicates that the VTM is reading a test value beyond the range of its measurement capability. Either (1) the wrong test number is selected for the parameter being measured, or (2) there is fault in the vehicle, (3) during battery condition test, it signifies bad connections, discharged, or bad batteries.
PASS FAIL	A PASS or FAIL readout is the result of a test that checks the condition of a component being measured. A PASS/FAIL readout means just that - the component either passes the test or fails the test.
UEH	Signal to technician to enter vehicle type identification number (VID) on the TEST SELECT switches. Vehicle ID numbers are found under TEST DATA on the flip cards, on the vehicle test cards.
GO	Signal to technician to crank engine in compression balance or first peak tests. During battery condition test, indicates weak battery in series pair of batteries being tested.
CIP	Signal to technician to apply full throttle in a CI power test.
OFF	Signal to technician to stop cranking in compression balance test or to release the accelerator in the CI power test.
CAL	Signal to the technician to release the TEST button during an offset test.
66	Numbers are used for prompting messages in several tests. They are as follows: in confidence test 66 signals the technician to dial in "99"; in CI acceleration/deceleration power test No. 12, the first numerical readout signals the technician to shut off fuel.

TA249938

**SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION
ENGINE (STE/ICE) SET
(Continued)**

ERROR MESSAGES TABLE	
VTM Readout	Readout Explanation
E000	Occurs if you request the VTM for information it does not have. For example, if you request the vehicle ID and it has not been entered.
E001	It indicates that a non-existent test number has been dialed into the TEST SELECT switches.
E002	Indicates that the required transducer is not connected.
E004	Indicates that a vehicle identification number or number of cylinders information has not been entered.
E005	Indicates that the transducer offset test was not performed.
E007	Indicates a conflict between the vehicle identification number (VID) dialed in and the number of cylinders dialed in. It may occur in response to either VID entry or number-of-cylinders entry.
E008	Indicates the VTM is not receiving the required voltage signal for the test selected. This error is related only to starter and compression balance tests.
E011	Indicates that the throttle control was operated incorrectly during power test taking too much time to either accelerate or decelerate.
E012	Indicates that the CI plus tachometer is missing.
E013	Indicates bad data were taken for the test in progress. Repeat the test one (1) time.
E018	Indicates that an engine rpm or ac frequency test was terminated automatically to protect the VTM. Termination is only after several minutes of no-signal operation. Most likely the VTM was left on the vehicle and the engine stalled.

TA249939

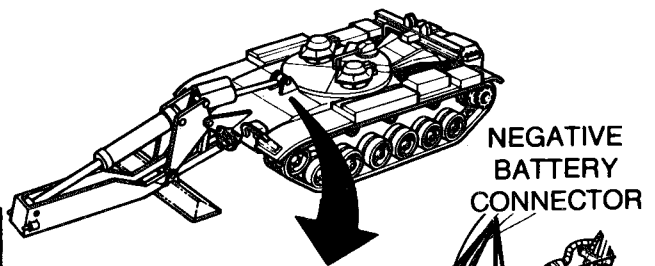
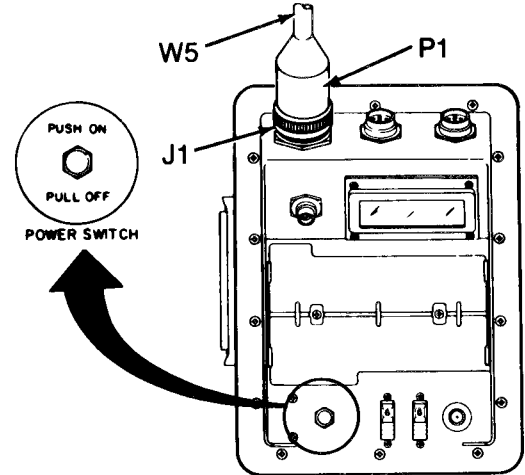
STE/ICE TEST PROCEDURES

VTM GENERAL SET UP, CONFIDENCE AND IDENTIFICATION TEST 66/60

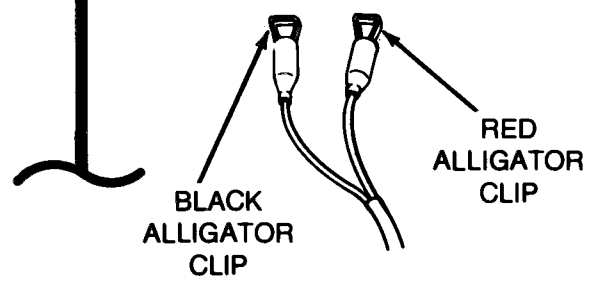
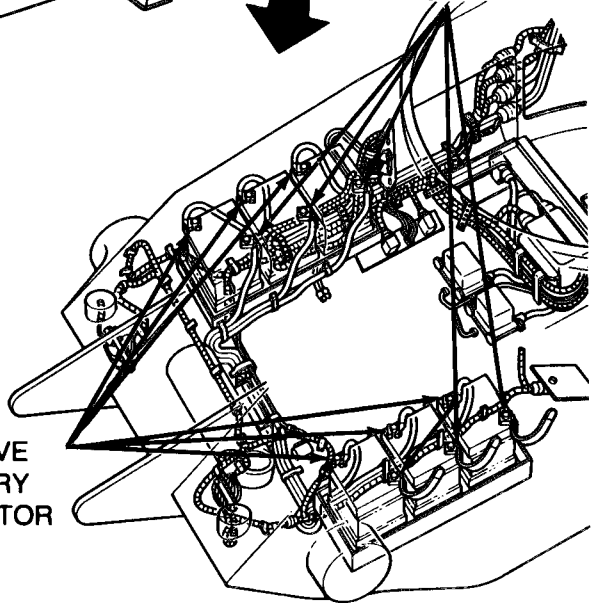
CAUTION
Do not connect or disconnect VTM while vehicle engine is running.

CAUTION
Connect P1 of power cable W5 to J1 of VTM before connecting clip leads to battery cable.

CAUTION
Observe polarity. Make sure red alligator clip of power cable W5 connects to positive (+) connector on battery and black alligator clip of power cable W5 connects to negative (-) on battery.

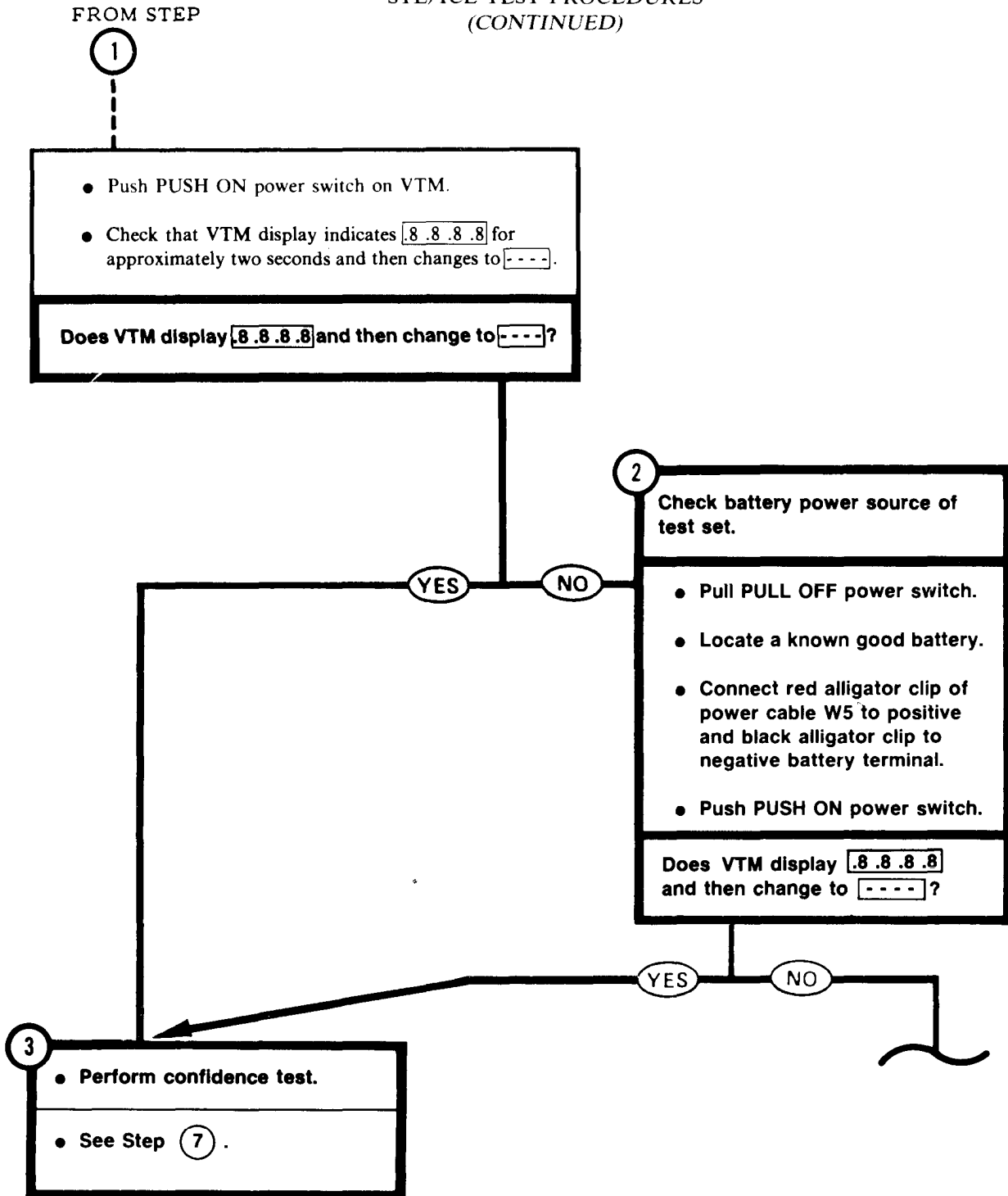


- 1 VTM general set up.**
- Pull PULL OFF power switch on VTM.
 - Connect P1 of power cable W5 to J1 on VTM.
 - Connect red alligator clip of power cable W5 to positive (+) connector on battery.
 - Connect black alligator clip of power cable W5 to negative (-) connector on battery.



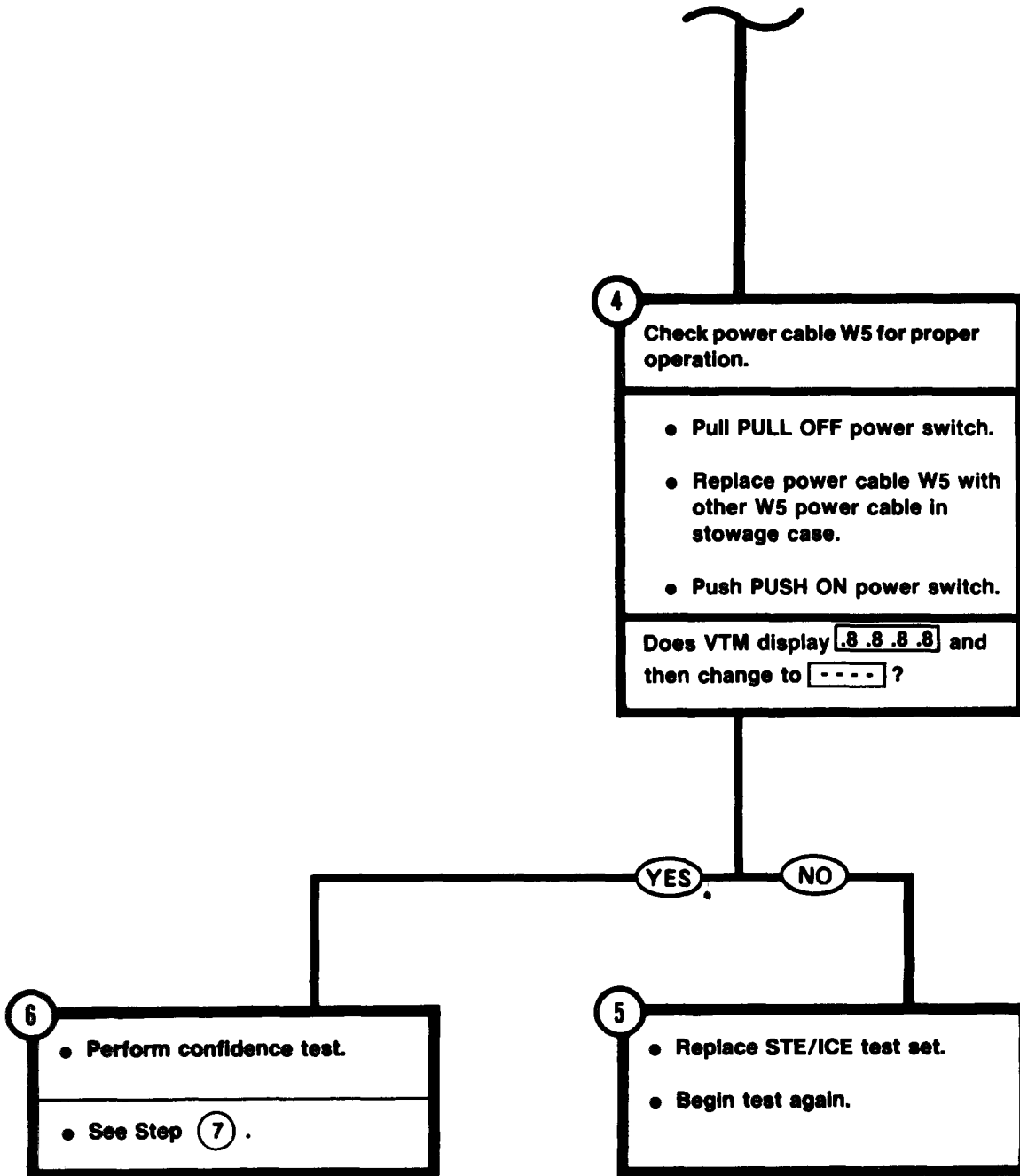
TA249940

STE/ICE TEST PROCEDURES
(CONTINUED)



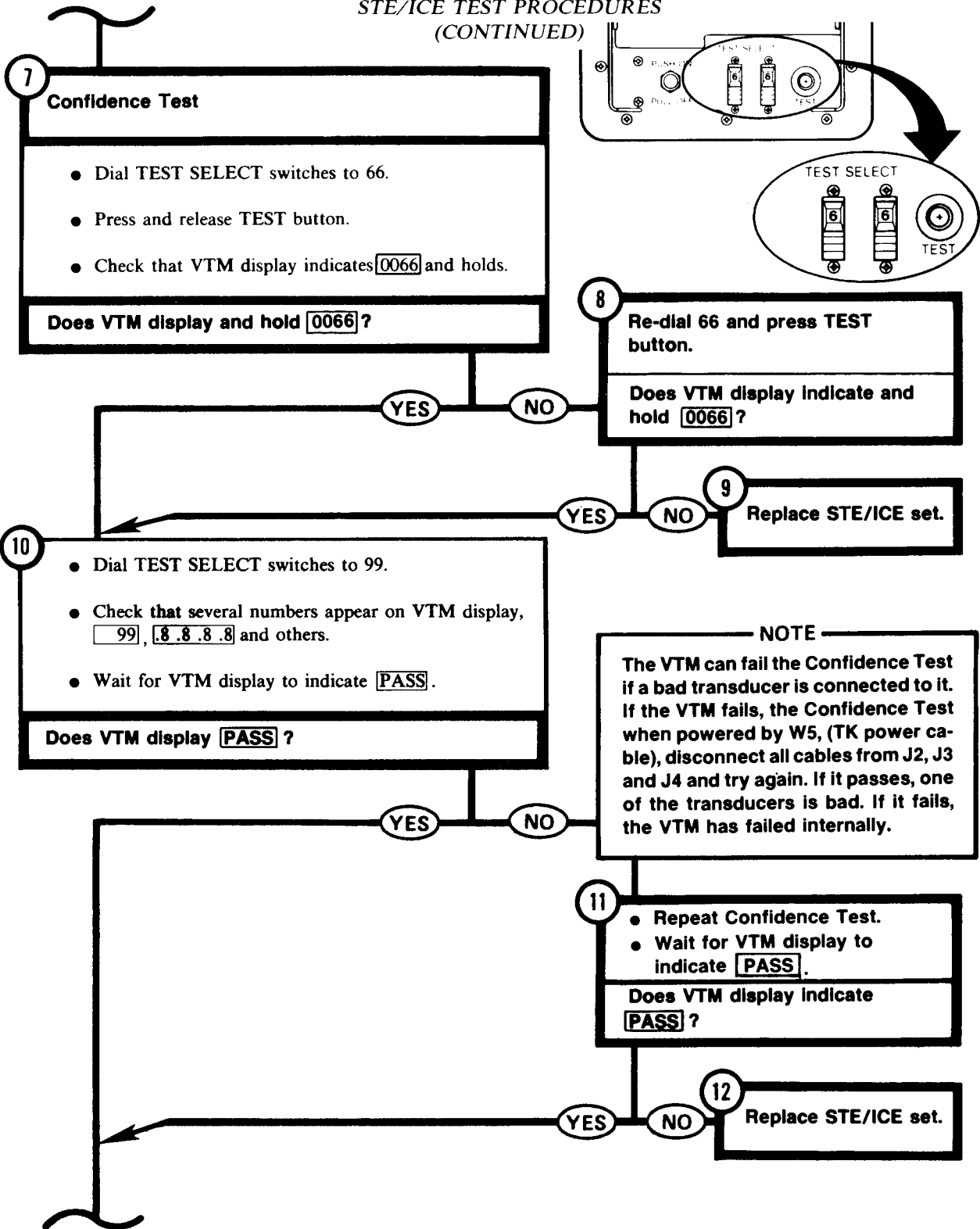
TA249941

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249942

STE/ICE TEST PROCEDURES
(CONTINUED)



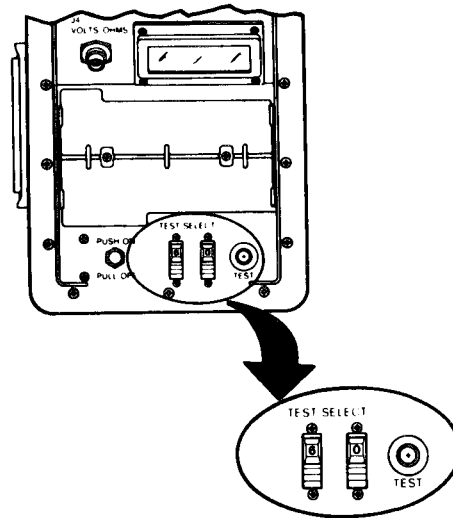
TA249943

STE/ICE TEST PROCEDURES
(CONTINUED)

13 Enter vehicle identification (VID) number.

- Dial TEST SELECT switches to 60.
- Press and release TEST button.
- VTM display will indicate **UEH**.
- Dial TEST SELECT switches to **4**.
- Press and release TEST button.
- Check that VTM display indicates **4**.

Does VTM display indicate **4**?



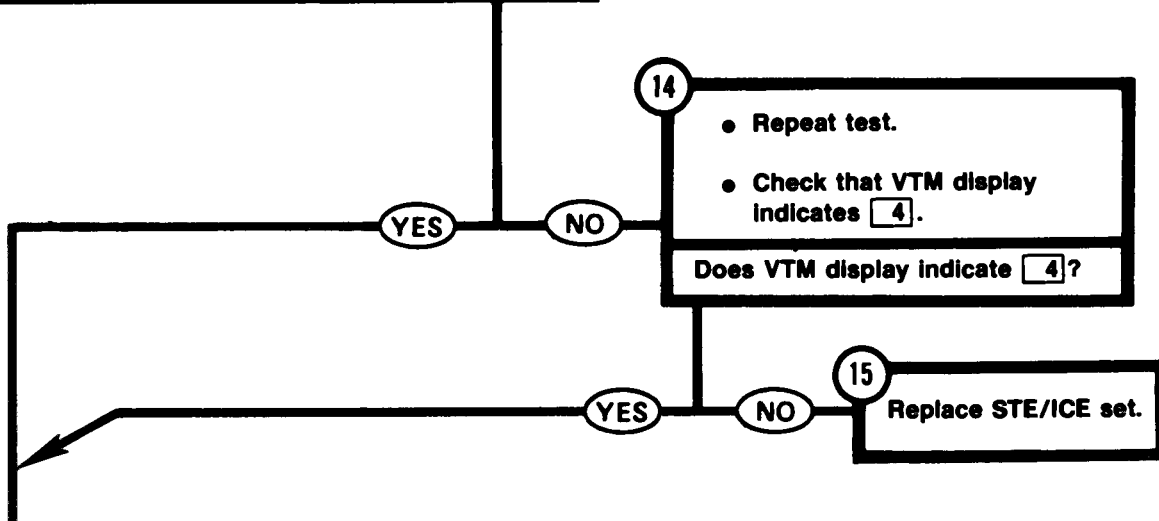
14

- Repeat test.
- Check that VTM display indicates **4**.

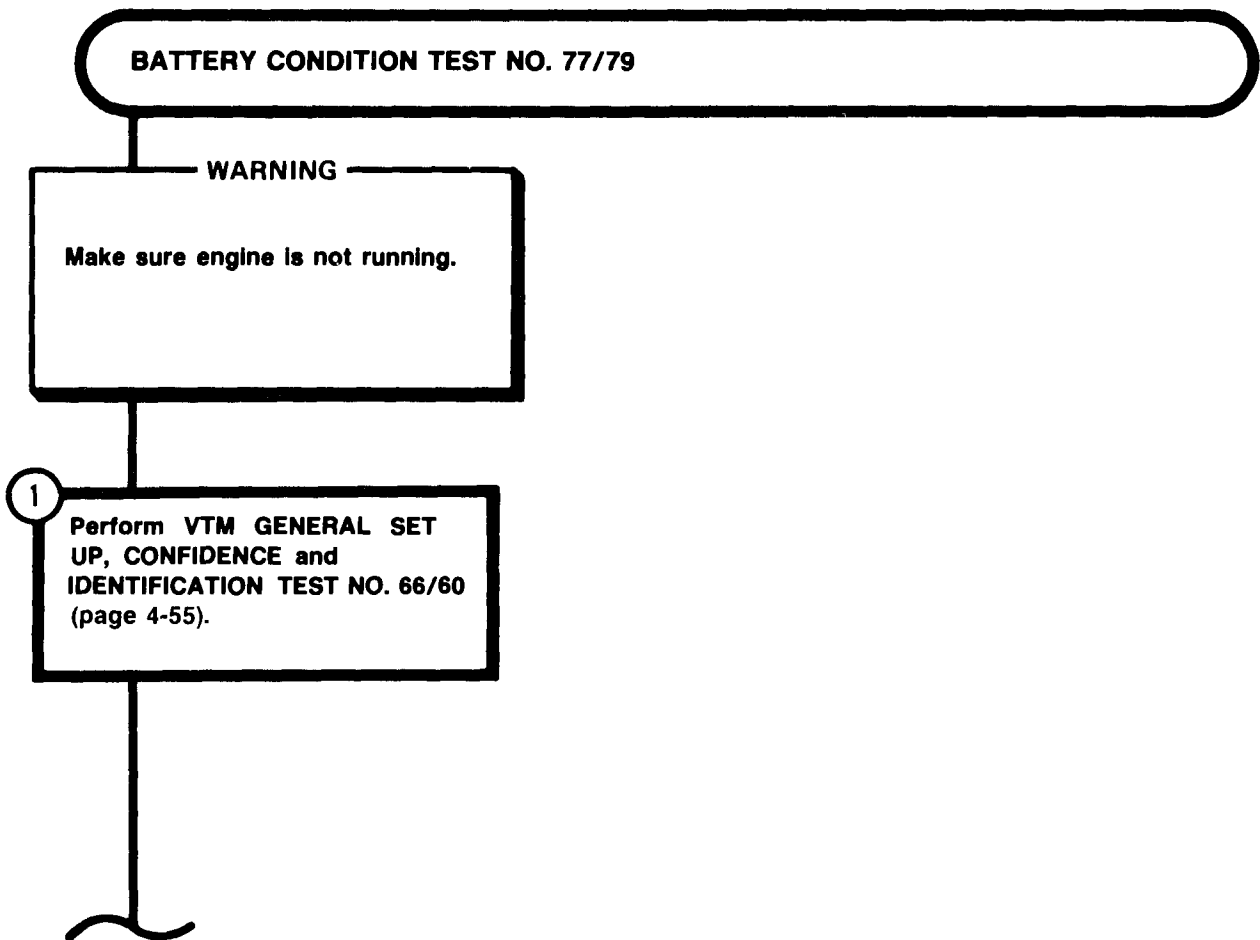
Does VTM display indicate **4**?

15 Replace STE/ICE set.

16 Proceed with STE/ICE test.



*STE/ICE TEST PROCEDURES
(CONTINUED)*



TA249945

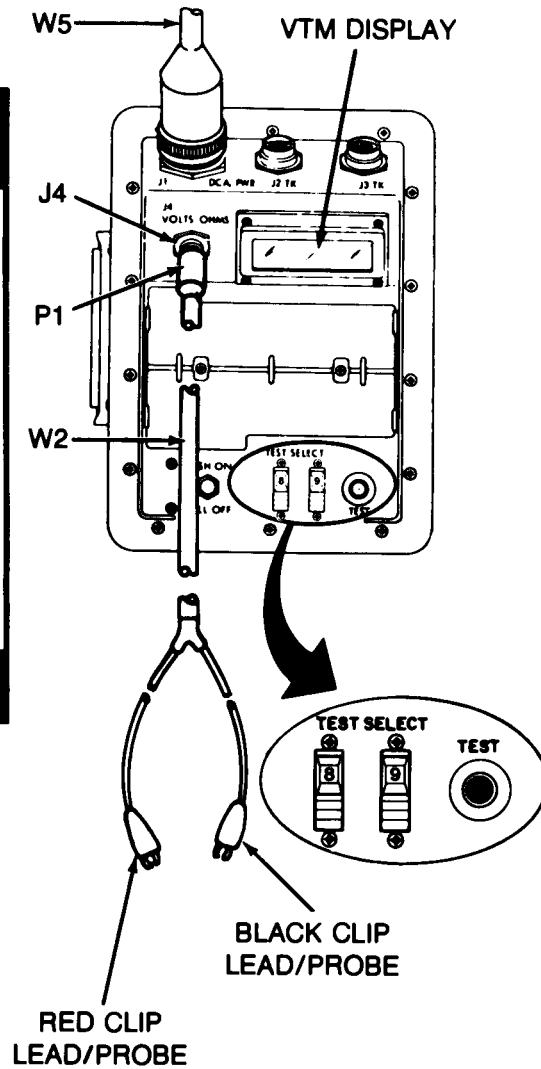
STE/ICE TEST PROCEDURES
(CONTINUED)

2

Connect test probe cable to VTM, do OFFSET test.

- Connect P1 of test probe cable W2 to J4 of VTM.
- Connect red and black clip leads/probes of cable W2 together.
- Dial TEST SELECT switches to 89.
- Press TEST button and hold until VTM display indicates **CAL**.
- Release TEST button.
- Check that offset measurement on VTM display indicates between **-6.8** to **+6.8**.

Does VTM display indicate between **-6.8 to **+6.8**?**



3

Replace STE/ICE set.

YES

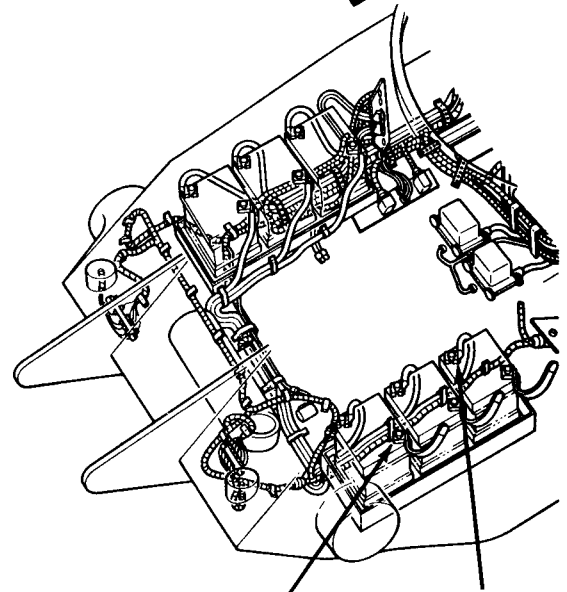
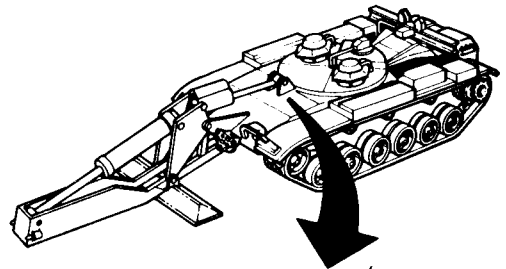
NO

STE/ICE TEST PROCEDURES
(CONTINUED)

4

Installation of clip leads/probes of cable W-2.

- Connect red clip lead/probe to positive (+) post on battery being tested.
- Connect black clip lead/probe to negative (-) terminal on battery being tested.

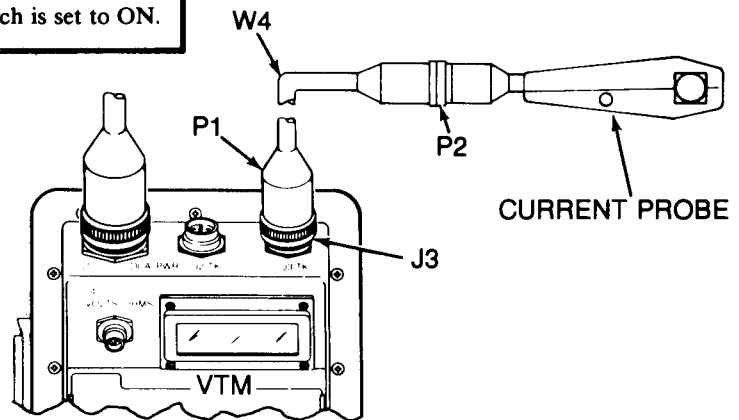


NEGATIVE POST POSITIVE POST

5

Condition current probe - Do OFFSET.

- Connect P1 of transducer cable W4 to J3 on VTM.
- Connect P2 of transducer cable W4 to connector on current probe.
- Clamp current probe around battery cable which connects series pair of batteries containing battery to be tested. Make sure current probe arrow is pointing toward negative-terminal.
- Make sure MASTER BATTERY switch is set to ON.



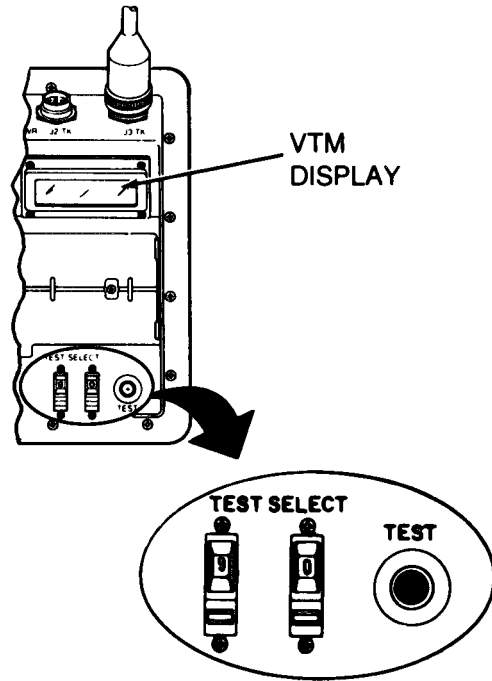
TA249947

STE/ICE TEST PROCEDURES
(CONTINUED)

FROM STEP

5

- Hold ENGINE FUEL SHUT OFF switch up and crank engine for 3 seconds by pressing STARTER switch.
- Set MASTER BATTERY switch to OFF.
- Make sure HEATER MASTER circuit breaker is set to OFF.
- Dial TEST SELECT switches to 90.
- Press TEST button and hold until VTM display indicates **CAL**.
- Release TEST button.
- Check that offset measurement on VTM display indicates between **-225** to **+225**

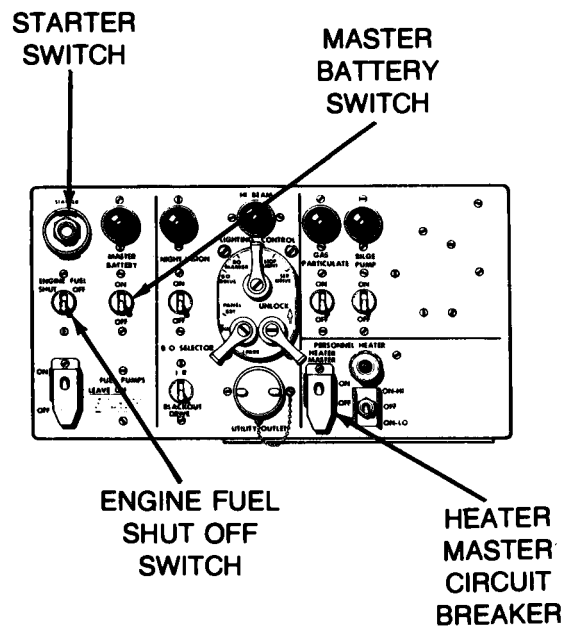


Does VTM display indicate between **-225** to **+225** ?

6 Perform OFFSET Fault Isolation (TM 9-4910-571-12 & P).

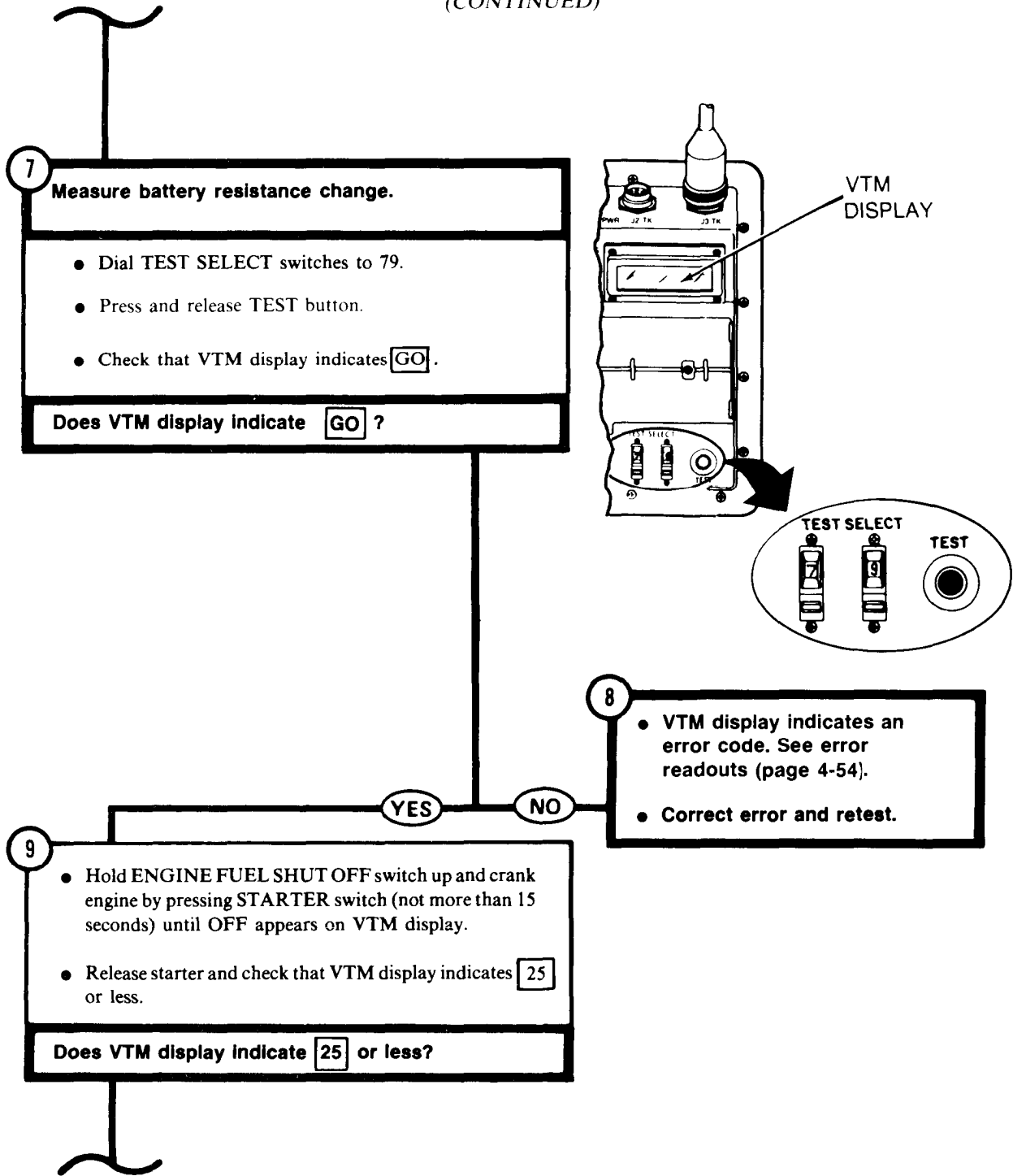
NO

YES



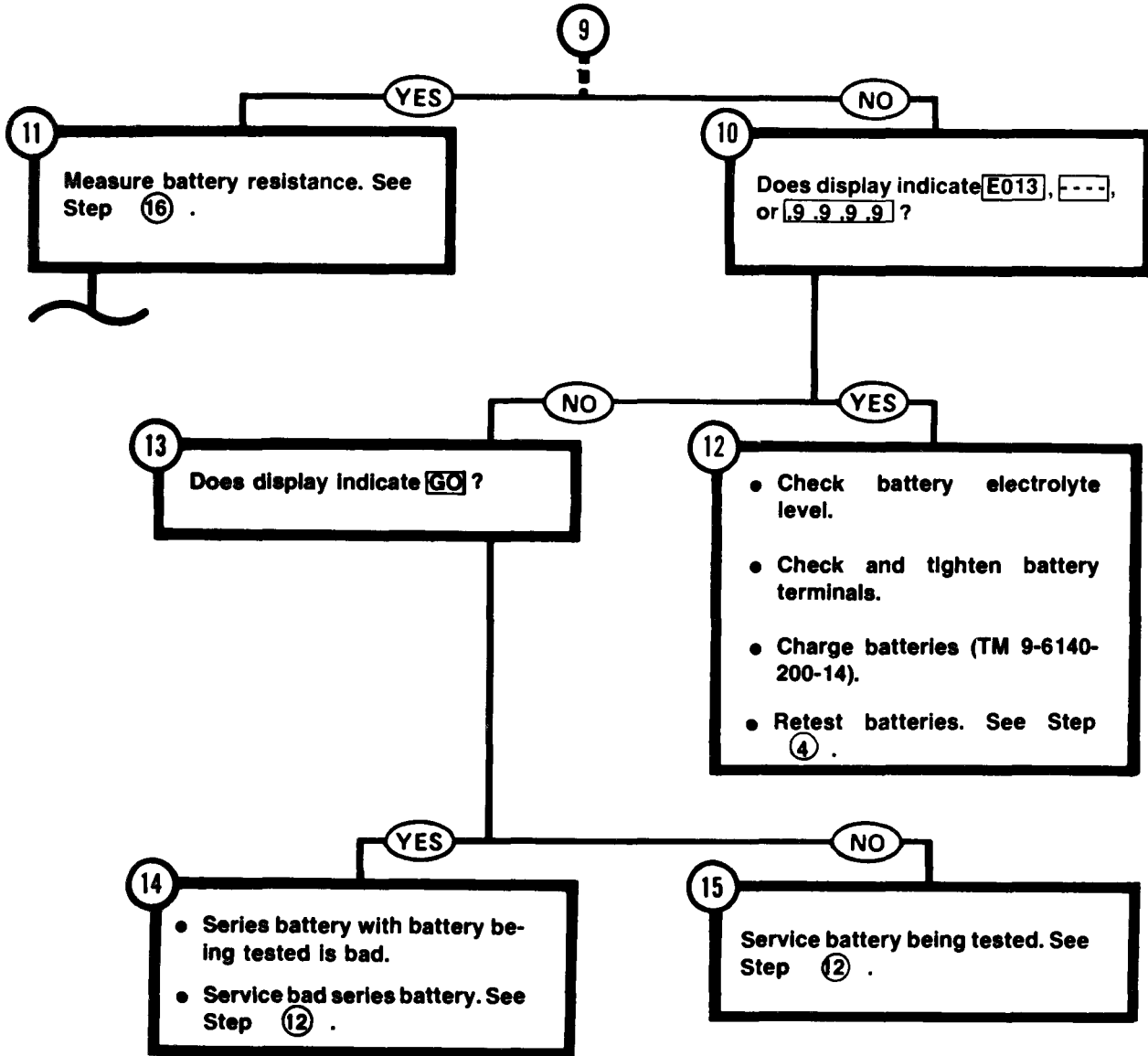
TA249948

STE/ICE TEST PROCEDURES
(CONTINUED)



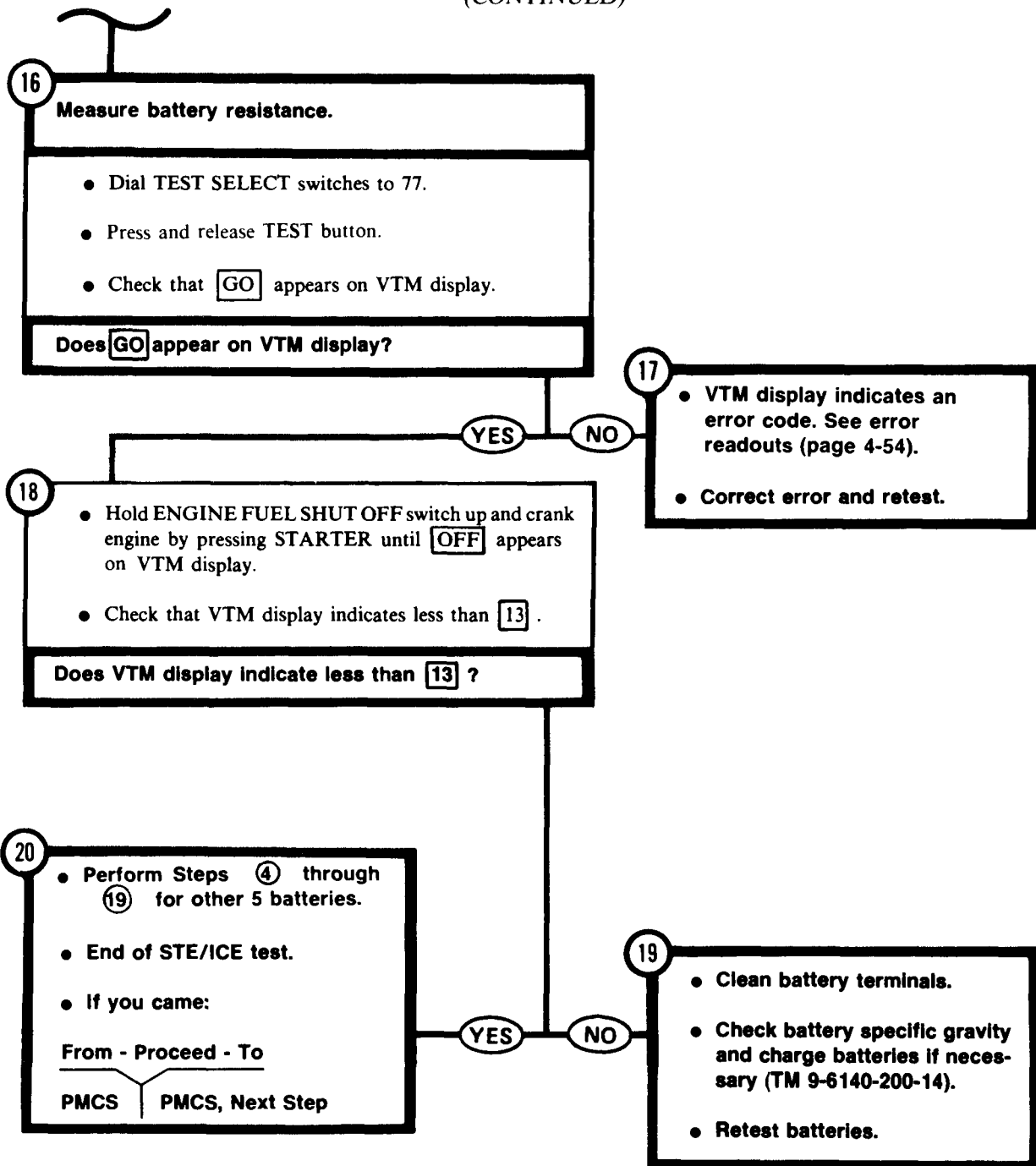
TA249949

STE/ICE TEST PROCEDURES
(CONTINUED)
FROM STEP



TA249950

STE/ICE TEST PROCEDURES
(CONTINUED)



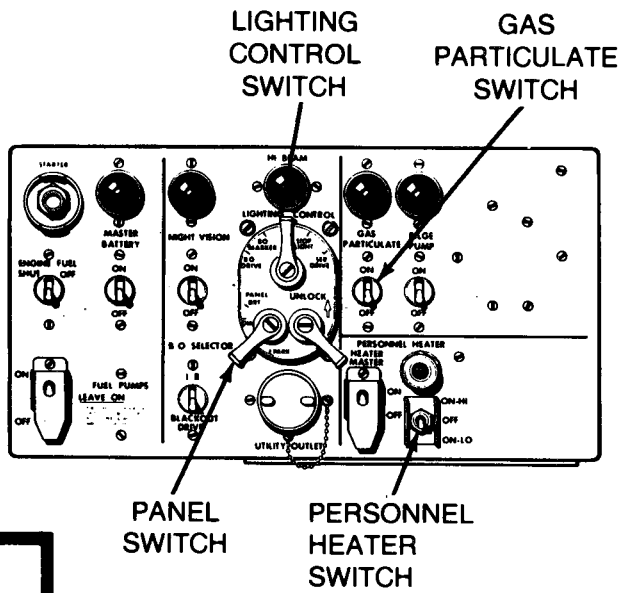
TA249951

STE/ICE TEST PROCEDURES
(CONTINUED)

CHARGING CIRCUIT AND BATTERY VOLTAGE TEST NO. 67

1
Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).

-CAUTION-
Engine must be at normal operating temperature before increasing speed to 1500 rpm.



2
Set engine RPM.

- Start engine.
- Set engine speed at 1500 rpm.
- Turn LIGHTING CONTROL switch to SERV DRIVE.
- Turn PANEL light switch to PANEL BRT.
- Set PERSONNEL HEATER switch to ON-HI.
- Set GAS PARTICULATE switch to ON.

TA249952

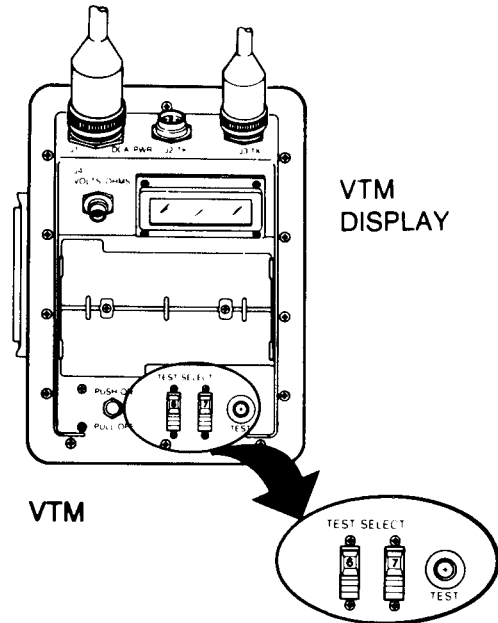
STE/ICE TEST PROCEDURES
(CONTINUED)

3

Measure battery/generator voltage.

- Dial TEST SELECT switches to 67.
- Press and release TEST button.
- Check that VTM display indicates 27 to 30 volts dc.

Does VTM display 27 to 30 volts dc?



5

Check BATT GEN Indicator.

Check if BATT GEN indicator reads in green area (charging).

Does BATT GEN indicator read in green area?

4

Check for low voltage.

See Step **8**.

6

- Turn LIGHTING CONTROL switch panel light switch to OFF.
- Set PERSONNEL HEATER switch to OFF.
- Stop engine.
- End of STE/ICE test.
- If you came:
From - Proceed - To
PMCS PMCS, Next Step

7

Go to Troubleshooting Symptom 38; BATTERY/ GENERATOR GAGE POINTER IN YELLOW OR LEFT RED AREA (ENGINE RUNNING)

STE/ICE TEST PROCEDURES
(CONTINUED)

FROM STEP

4

8

Check for low voltage.

Check if display on VTM indicates less than 27 volts dc.

Does VTM indicate less than 27 volts dc?

9

Replace voltage regulator
(page 10-18).

10

Measure battery voltage after running engine.

- Continue to run engine at 1500 rpm for 10 minutes.
- Check that VTM display indicates 27-30 volts dc.

Does VTM display indicate 27-30 volts dc?

11

Check BATT/GEN indicator.

Go to Step 5.

12

- Set LIGHTING CONTROL switch and PANEL light switch to OFF.
- Set PERSONNEL HEATER switch to OFF.
- Stop engine.
- Go to Troubleshooting Symptom 31; GENERATOR/REGULATOR SYSTEM IS NOT WORKING.

TA249954

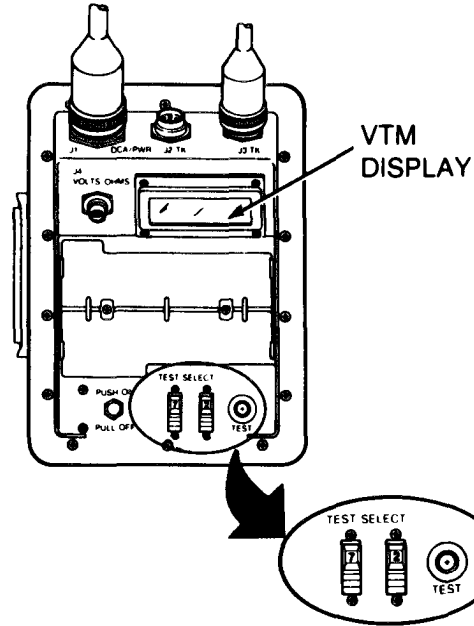
FROM STEP

STE/ICE TEST PROCEDURES
(CONTINUED)

2

- Dial TEST SELECT switches to 72.
- Press and hold TEST button until **CAL** message appears on VTM display.
- Release TEST button.
- Check that offset measurement on VTM display indicates between **-225** to **+225**.

Does VTM display indicate between -225 to +225?



YES

NO

3

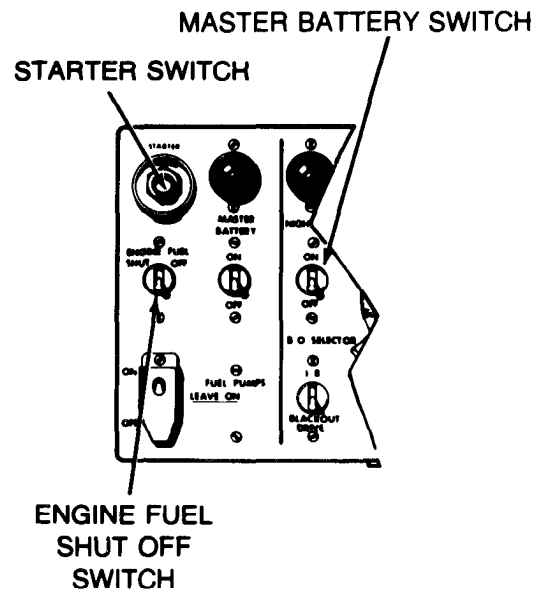
Perform OFFSET FAULT ISOLATION (TM 9-4910-571-12 & P).

4

Check starter current first peak.

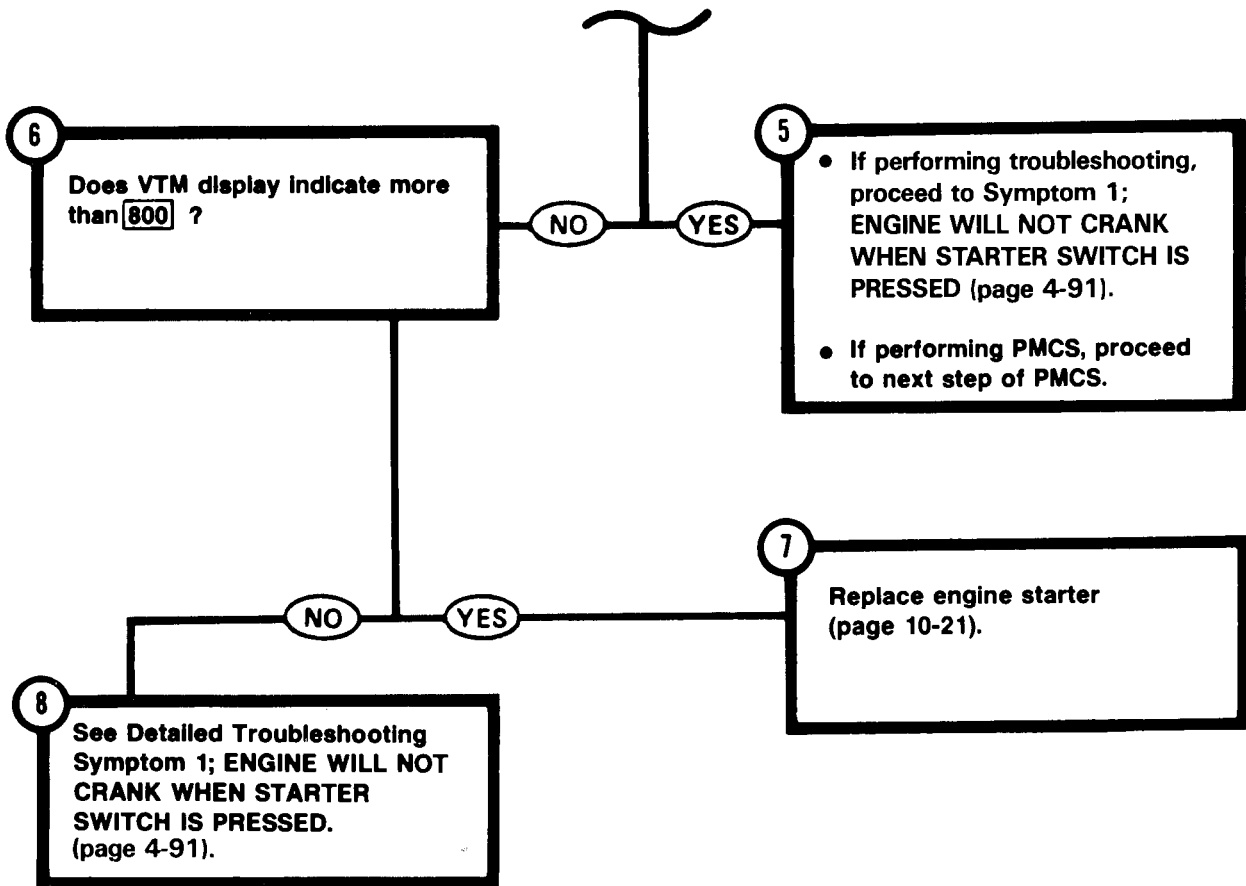
- Set MASTER BATTERY switch to ON.
- Press and release TEST button.
- When **GO** appears on VTM display, hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch until **OFF** or **E013** appears on VTM display.
- Release STARTER switch.
- Check that VTM displays a number.

Does VTM display between 460 and 800 ?



TA249956

STE/ICE TEST PROCEDURES
(CONTINUED)



STE/ICE TEST PROCEDURES
(CONTINUED)

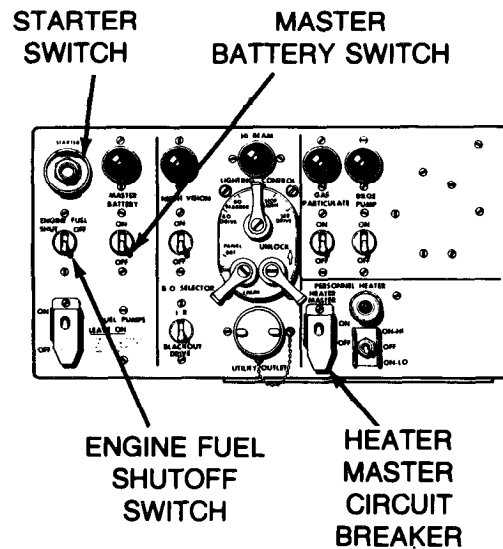
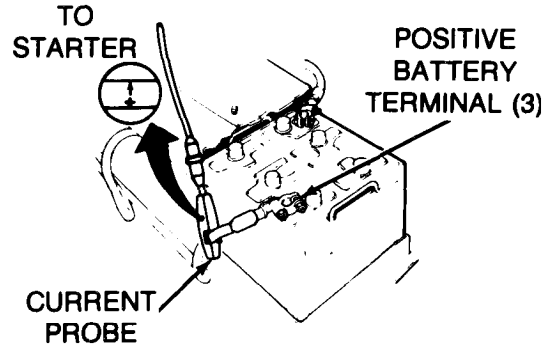
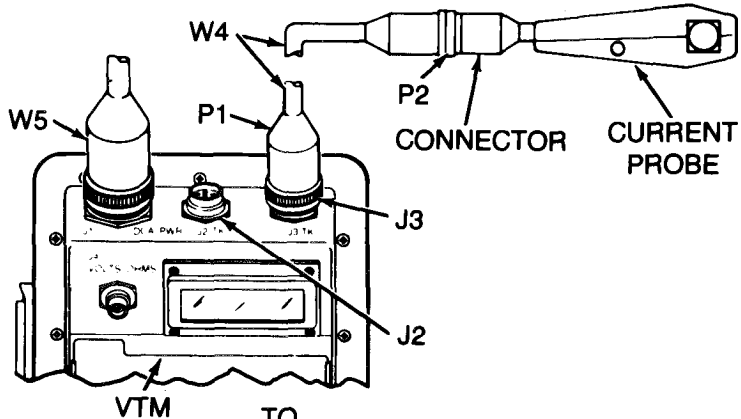
STARTER CIRCUIT RESISTANCE TEST NO. 74

WARNING
Make sure engine is not running.

1 Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).

2 Condition current probe - Do OFFSET.

- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of cable W4 to connector on current probe.
- Clamp current probe around one positive battery cable going to starter with arrow on probe pointing in direction of starter.
- Make sure MASTER BATTERY switch is set to ON.
- Hold ENGINE FUEL SHUT OFF switch up and crank engine for 3 seconds by pressing STARTER switch.
- Set MASTER BATTERY switch to OFF.
- Make sure HEATER MASTER circuit breaker is set to OFF.



TA249958

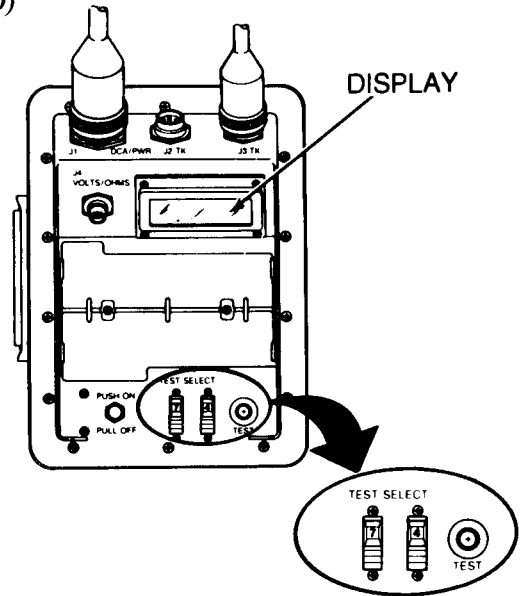
STE/ICE TEST PROCEDURES
(CONTINUED)

FROM STEP

2

- Dial TEST SELECT switches to 74.
- Press and hold TEST button until **CAL** message appears on VTM display.
- Release TEST button.
- Check that offset measurement on VTM display indicates between **-225** to **+225**.

Does VTM display indicate between **-225 to **+225** ?**



YES

NO

3

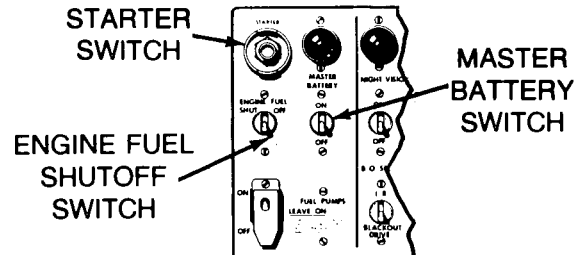
Perform OFFSET FAULT ISOLATION (TM 9-4910-571-12 & P).

4

Check starter circuit resistance.

- Set MASTER BATTERY switch to ON.
- Press and release TEST button.
- Check that VTM display indicates **GO**.

Does VTM display indicate **GO ?**



YES

NO

5

**VTM display indicates an error code. See error readouts (page 4-54).
Correct error and retest.**

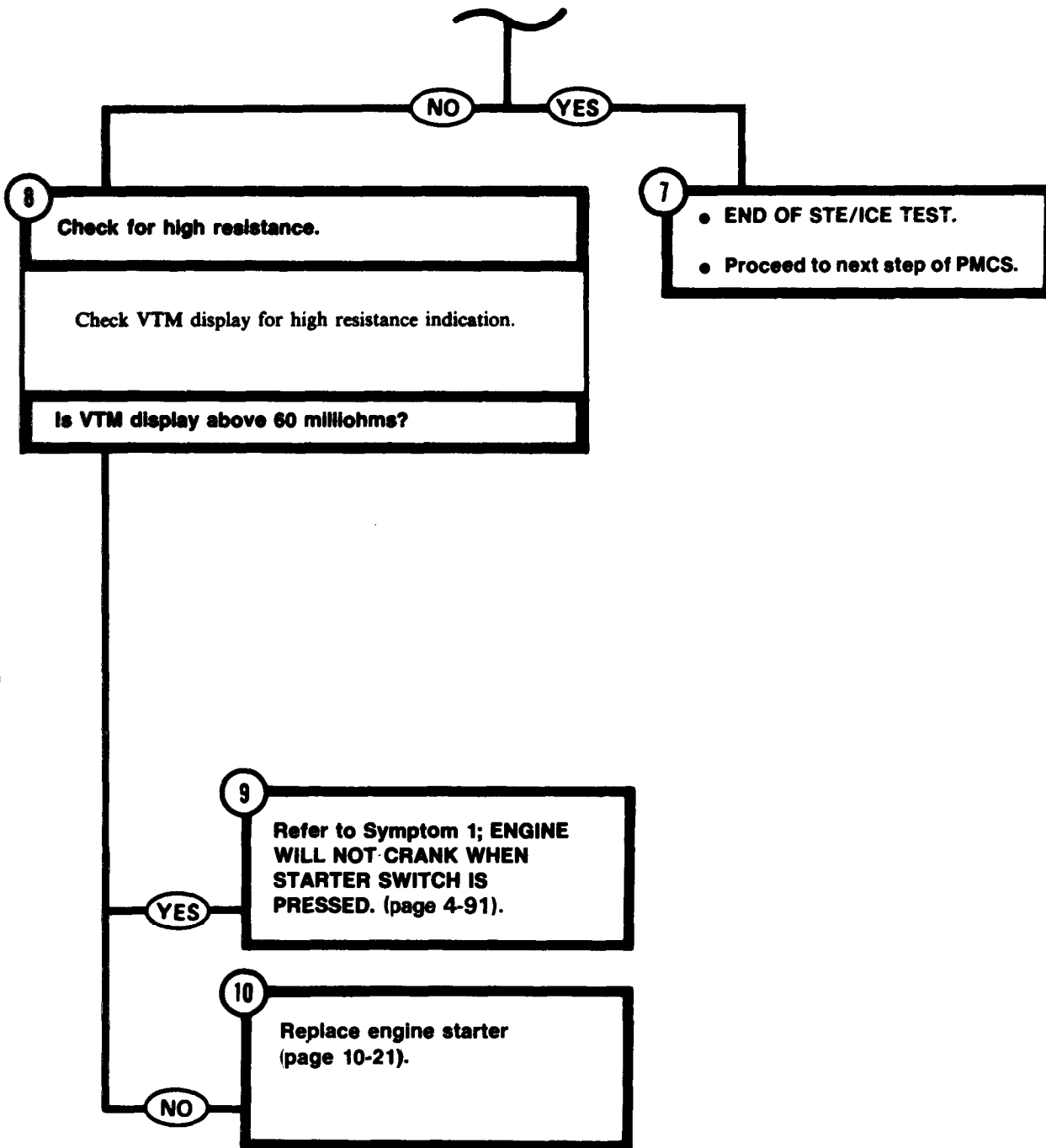
6

- Hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch until **OFF** appears on VTM display.
- Release STARTER switch and set MASTER BATTERY switch to OFF. Check that VTM display indicates between 10 and 60 milliohms.

Does VTM indicate between 10 and 60 milliohms?



STE/ICE TEST PROCEDURES
(CONTINUED)



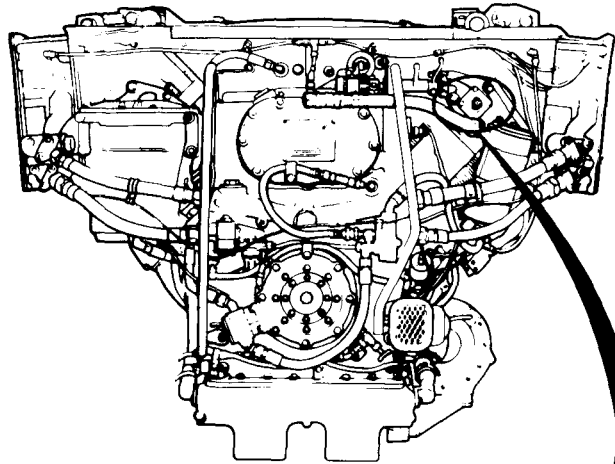
TA249960

STE/ICE TEST PROCEDURES
(CONTINUED)

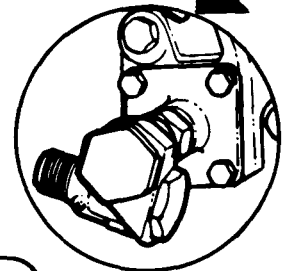
CI POWER TEST NO. 13

WARNING
Stop engine before installing pulse tachometer transducer.

CAUTION
Clean all mounting surfaces before installing pulse tachometer transducer and tachometer drive adapter to prevent entry of foreign matter that may damage engine or test equipment.

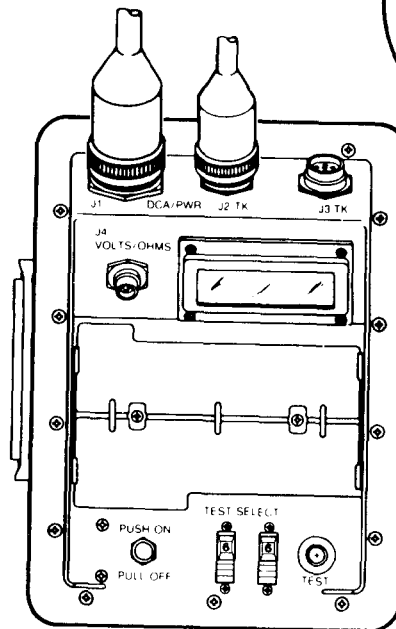
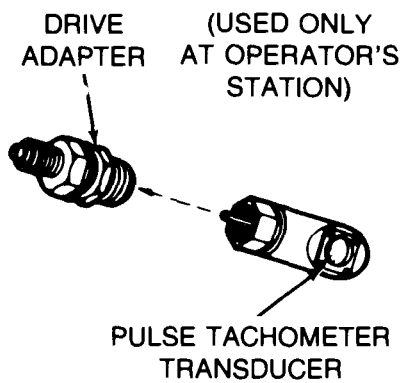


POWERPLANT REMOVED FOR CLARITY



ENGINE TACHOMETER ADAPTER

1 Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).



VTM

STE/ICE TEST PROCEDURES
(CONTINUED)

2 Where is test being performed?

At Operator's Station.

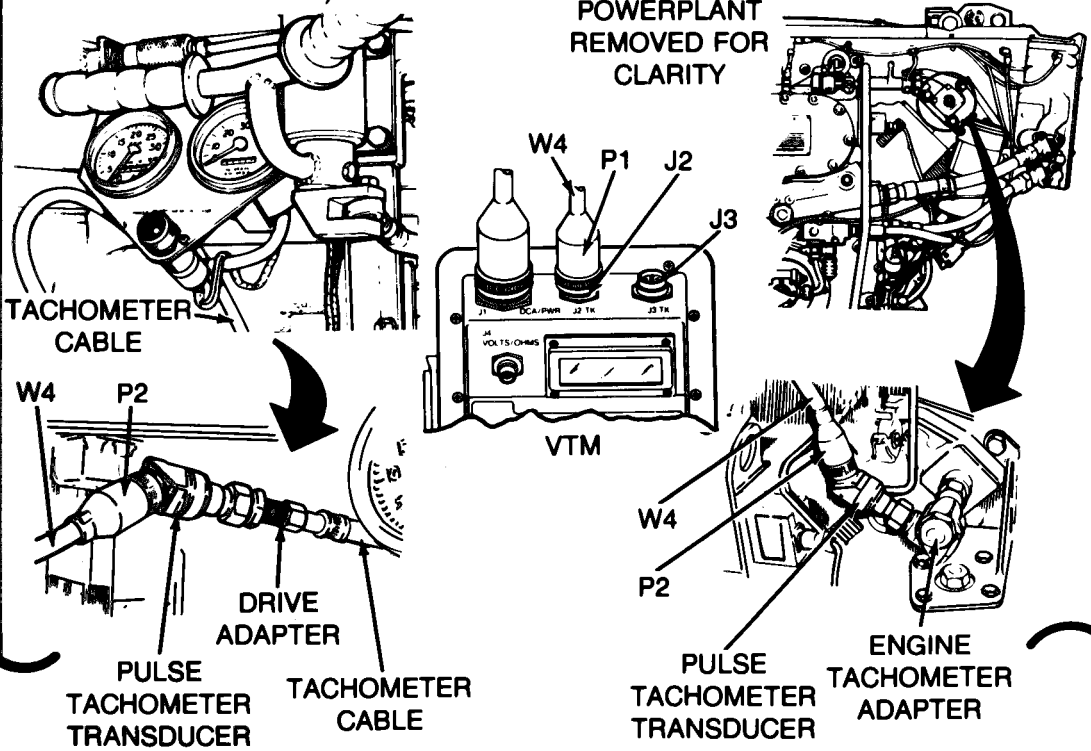
At powerplant.

- 3 Install tachometer adapter, pulse tachometer, transducer - connect cables.
- Disconnect tachometer cable from tachometer.
 - Install drive adapter onto tachometer cable.
 - Install pulse tachometer transducer onto drive adapter.
 - Connect P1 of transducer cable W4 to J2 or J3 on VTM.
 - Connect P2 of transducer cable W4 to connector on pulse tachometer.

- 3 Install pulse tachometer - connect cables.
- Open left top deck grille doors.
 - Disconnect tachometer cable from engine tachometer adapter.
 - Install pulse tachometer transducer on engine tachometer adapter.
 - Connect P1 of transducer cable W4 to J2 or J3 on VTM.
 - Connect P2 of transducer cable W4 to connector on pulse tachometer transducer.

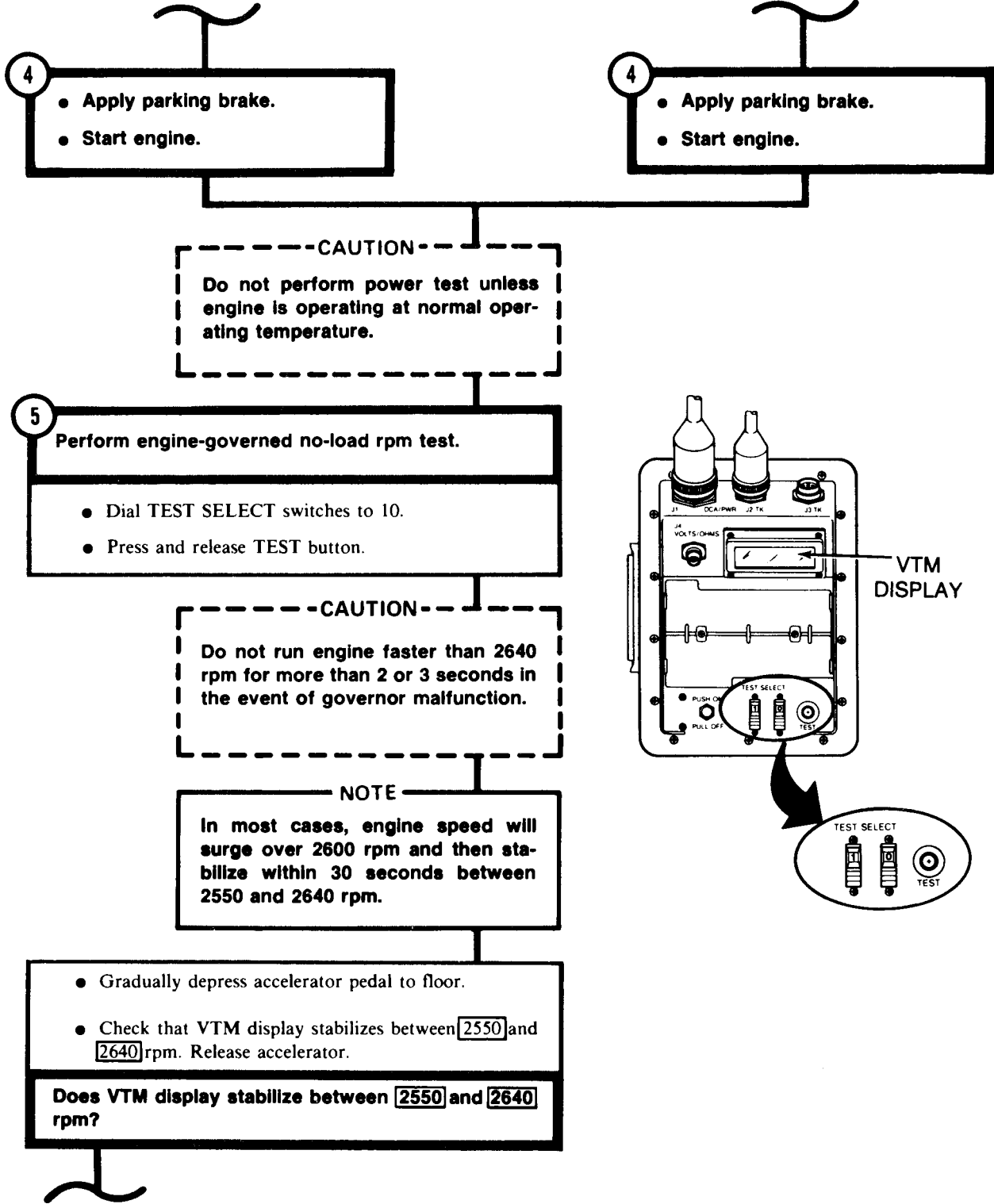
OPERATOR'S STATION)

POWERPLANT REMOVED FOR CLARITY

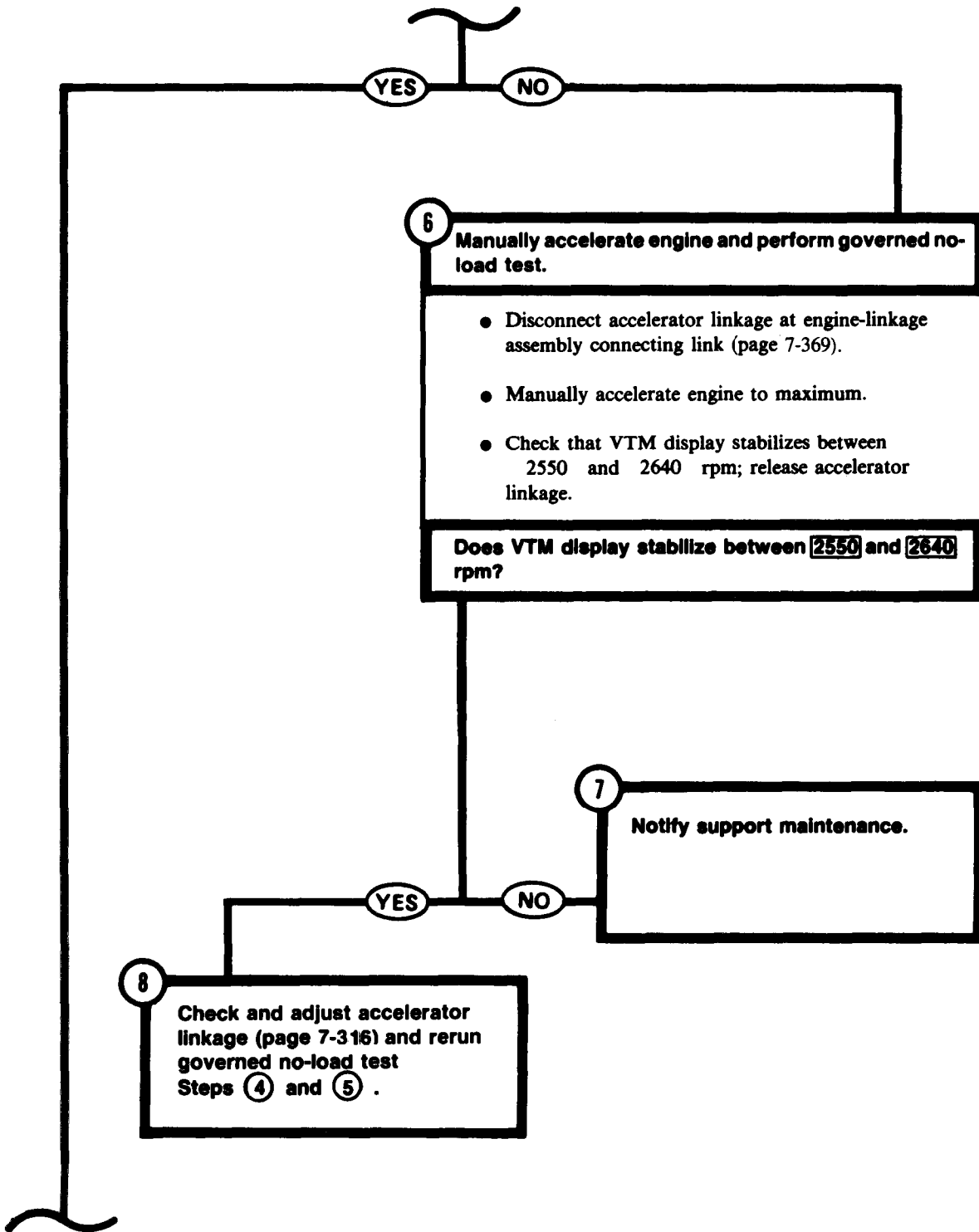


TA249962

STE/ICE TEST PROCEDURES
(CONTINUED)



STE/ICE TEST PROCEDURES
(CONTINUED)



TA249964

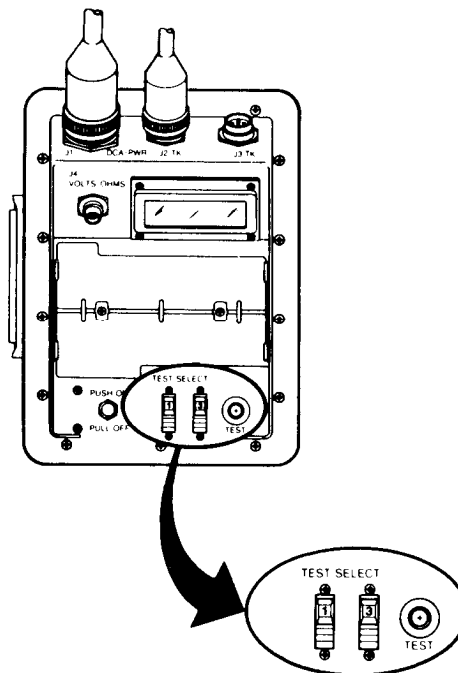
STE/ICE TEST PROCEDURES
(CONTINUED)

NOTE
Read and understand the following steps before proceeding.

9 Perform CI power test.

- Dial TEST SELECT switches to 13.
- Press and release TEST button.
- When VTM display indicates **CTP**, quickly depress accelerator pedal to floor and hold until VTM display indicates **OFF**.
- When VTM display indicates **OFF**, immediately release accelerator.
- Check that VTM display indicates **75** or more.

Does VTM display indicate **75** or more?



11

- End of STE/ICE Test.
- If you came:
From - Proceed - To
PMCS PMCS, Next Step

YES

NO

10 See Symptom 11; ENGINE WILL NOT RUN RIGHT.

STE/ICE TEST PROCEDURES
(CONTINUED)

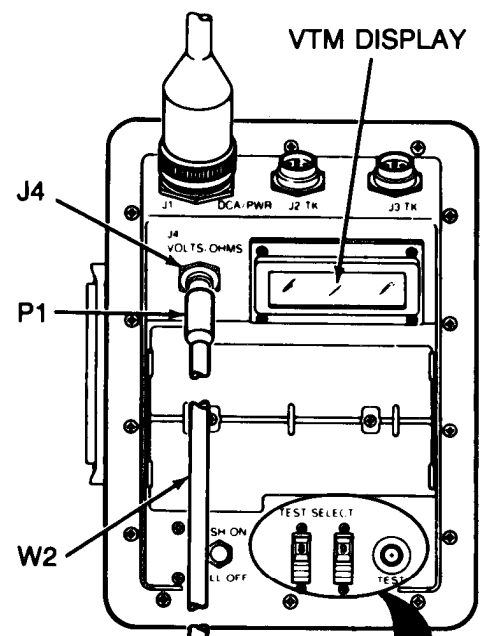
TEST 89

DC VOLTAGE TEST NO. 89

1 Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).

2 Connect test probe cable to VTM, do OFFSET test.

- Connect P1 of test probe cable W2 to J4 of VTM.
- Connect red and black clip leads/probes of cable W2 together.
- Dial TEST SELECT switches to 89.
- Press TEST button and hold until VTM display indicates **CAL**.
- Release TEST button.
- Check that offset measurement on VTM display indicates between **-6.8** to **+6.8**.



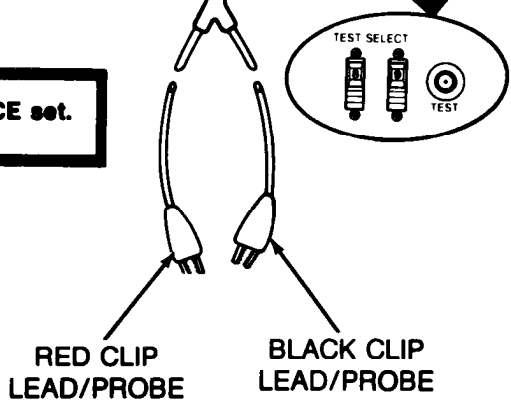
Does VTM display indicate between **-6.8** to **+6.8** ?

YES NO 3 Replace STE/ICE set.

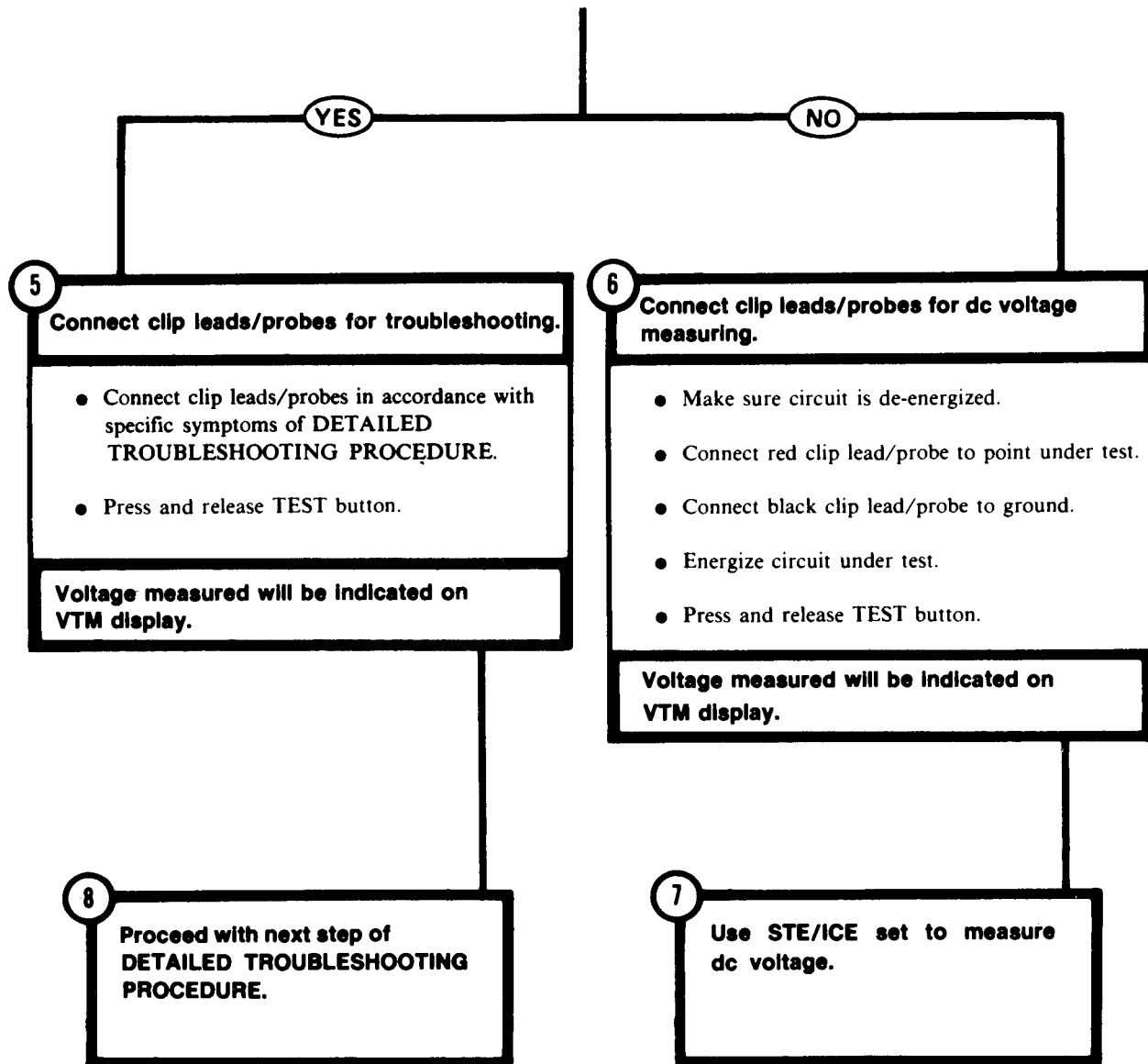
4 Determine use of STE/ICE set.

Check if STE/ICE set is to be used with DETAILED TROUBLESHOOTING PROCEDURES.

Is STE/ICE set to be used with DETAILED TROUBLESHOOTING PROCEDURES?



STE/ICE TEST PROCEDURES
(CONTINUED)



STE/ICE TEST PROCEDURES
(CONTINUED)

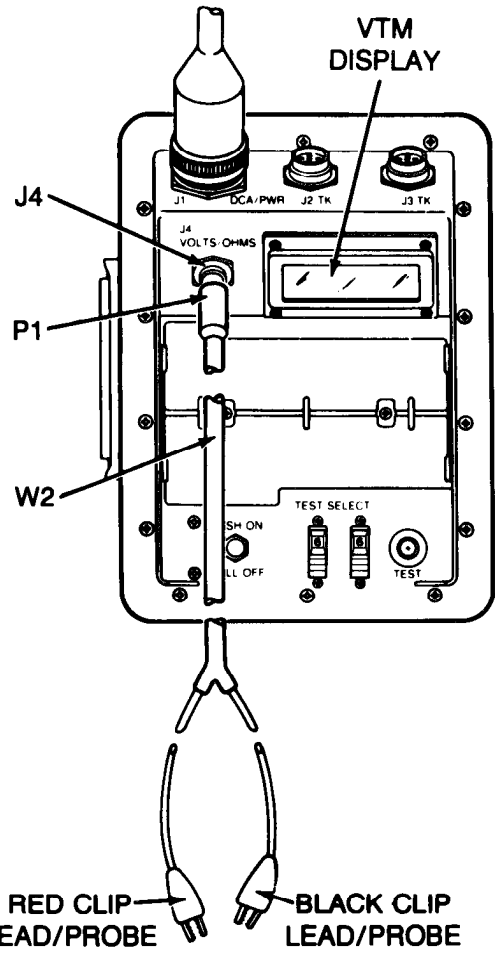
RESISTANCE AND CONTINUITY CHECK TEST NO. 91/92

1 Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).

2 Connect test probe cable to VTM.

- Connect P1 of test probe cable W2 to J4 of VTM.
- Connect red and black clip leads/probes of cable W2 together.

Is STE/ICE to be used to check continuity/0-1500 ohms resistance?



3 Continuity/0-1500 ohms resistance check.

Proceed with Step 5.

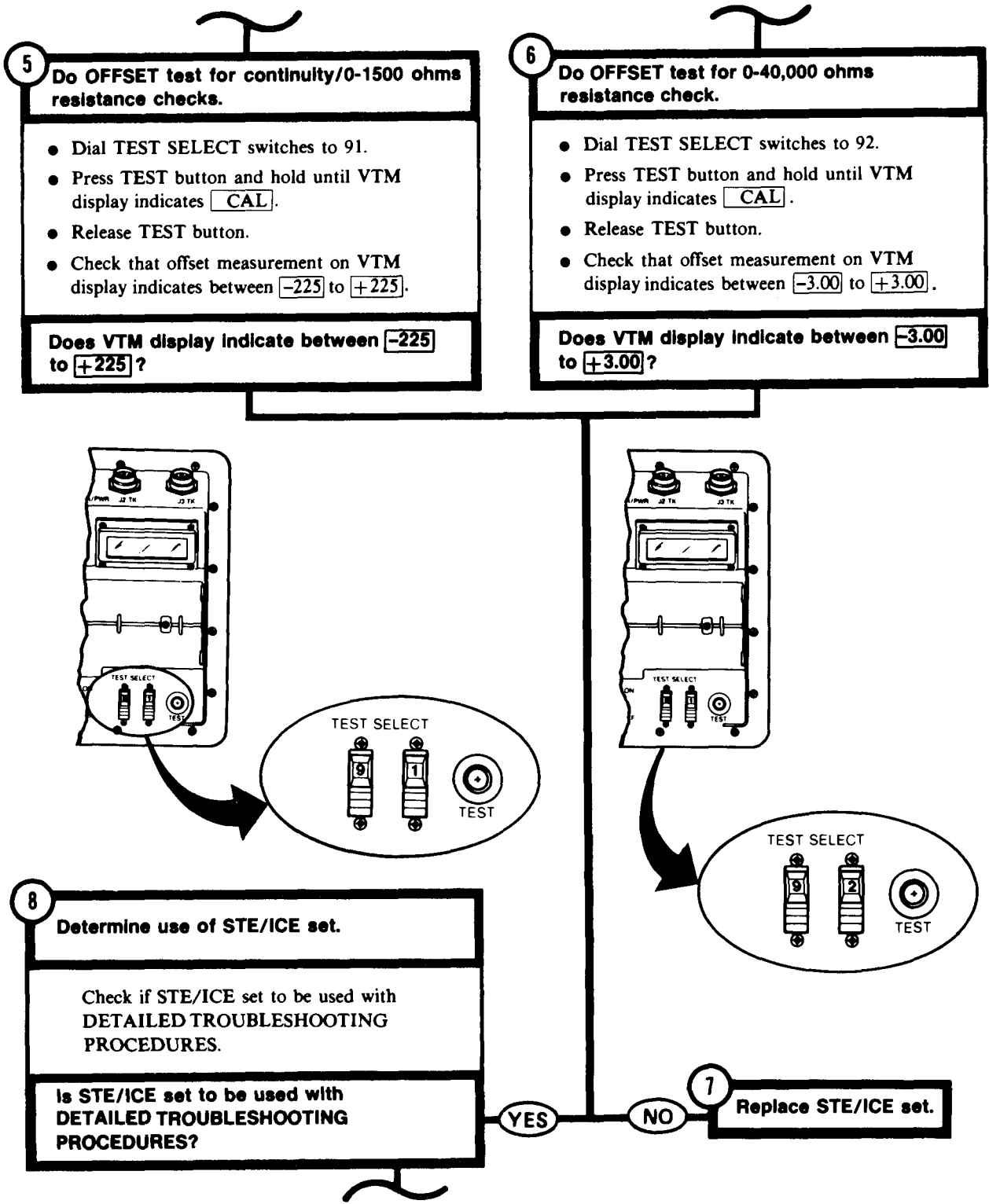
YES NO

4 0-40,000 ohms resistance check.

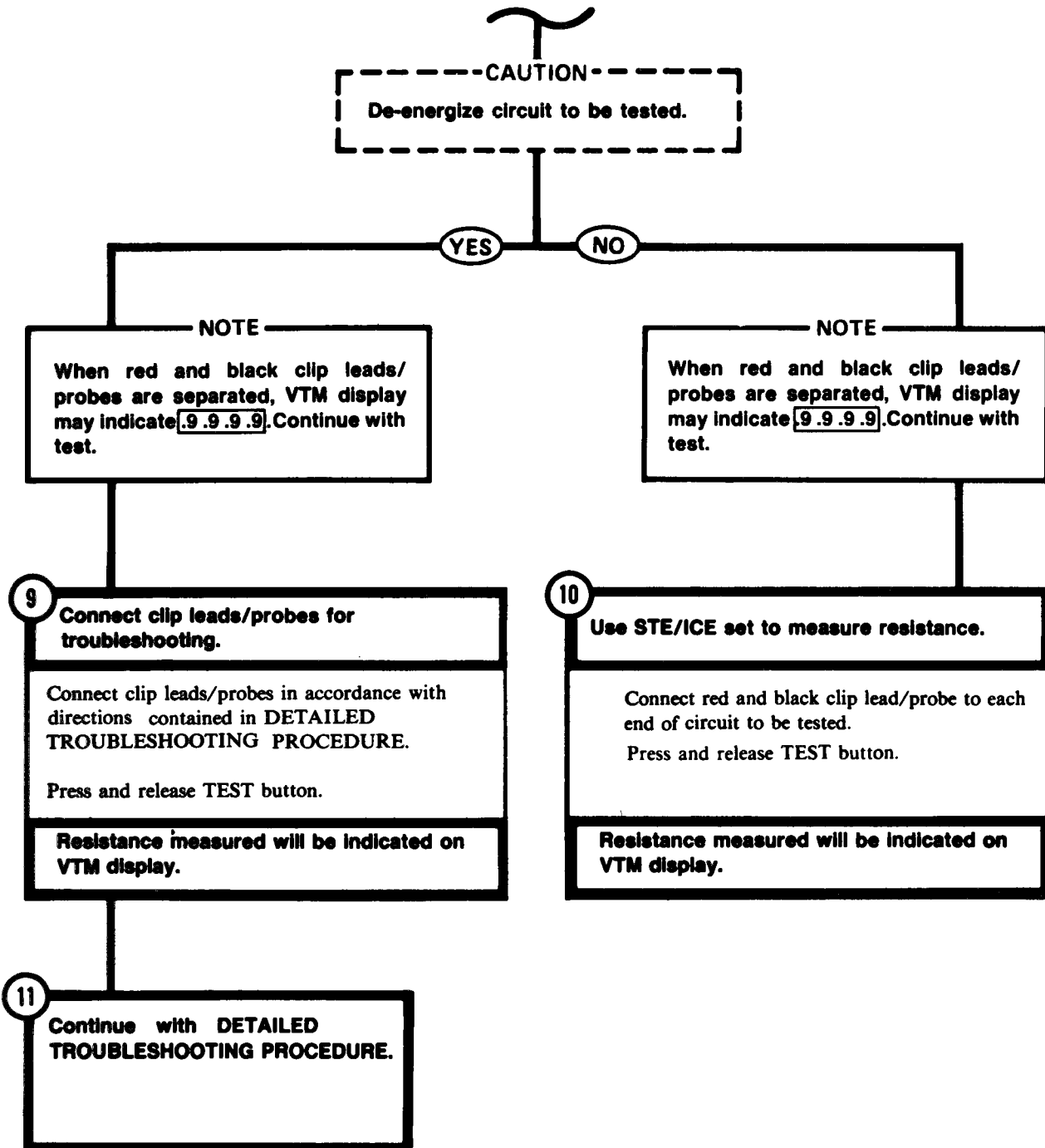
Proceed with Step 6.

TA249968

STE/ICE TEST PROCEDURES
(CONTINUED)



STE/ICE TEST PROCEDURES
(CONTINUED)



TA249970

STE/ICE TEST PROCEDURES
(CONTINUED)

COMPRESSION UNBALANCE TEST NO. 14

CAUTION
Do not perform more than 2 compression unbalance tests in a row or tank batteries may become discharged. Engine must be at normal operating temperature before performing compression unbalance test.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1
Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).

2
Condition tank-shut-off engine.
Second Technician (Driver's Compartment)

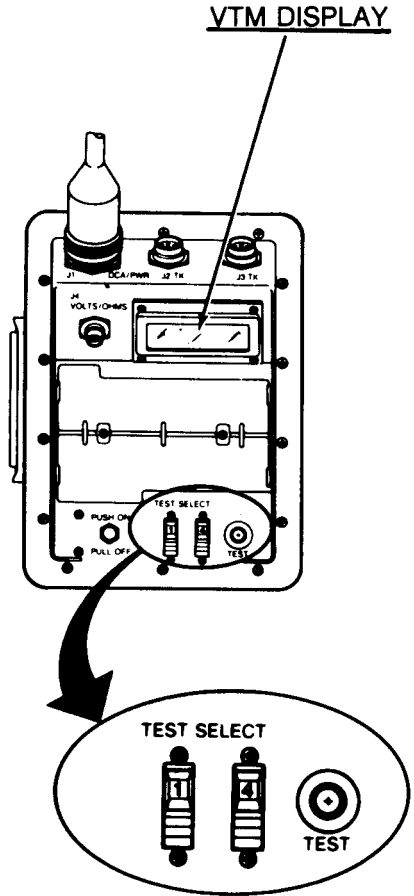
- Make sure engine is running at normal operating temperature.
- Run engine at fast idle (1500 rpm) for 2 minutes.
- Stop engine.

3
Condition STE/ICE set.
Second Technician

- Make sure MASTER BATTERY switch is ON.

 First Technician (Turret)

- Dial TEST SELECT switches to 14.
- Press then release TEST button.
- Wait for message **GO** to appear on the VTM display.



TA249971

STE/ICE TEST PROCEDURES
(CONTINUED)

NOTE
Read and understand the following steps before proceeding.

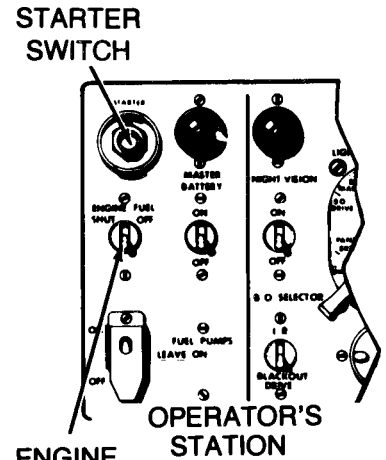
4 Perform compression unbalance test.

- VTM display will indicate **GO**

Second Technician

- Hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch and holding until VTM display indicates **----**.
- Release STARTER switch when VTM display changes from **----** to **OFF** or **EQ13**.
- Check that VTM display changes to indicate a number between **0** - **15**.

Does VTM display indicate a number between **0** - **15** ?



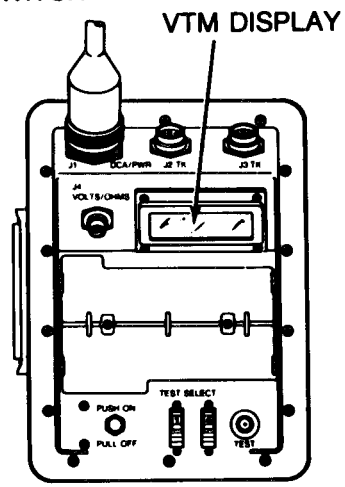
5 Does VTM display **GO ?**

YES

6

- End of STE/ICE test.
- If you came:
From - Proceed To

Symptom 1	Symptom 1 Step ①
Symptom 17	Symptom 17 Step ⑤



7 Does VTM display **FAIL ?**

YES

NO

9 Rerun compression unbalance test.

IF VTM display still indicates **FAIL**, notify support maintenance.

8

- Operator may have stopped cranking during test.
- Batteries may be discharged. Check battery electrolyte level, specific gravity and recharge batteries (TM 9-6140-200-14).

Correct problem, repeat test.

TA249972

STE/ICE TEST PROCEDURES
(CONTINUED)

PRESSURE 0-1000 PSIG TEST NO. 50

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).

NOTE

When performing the offset test, make sure engine is off and system to be tested is depressurized.

2

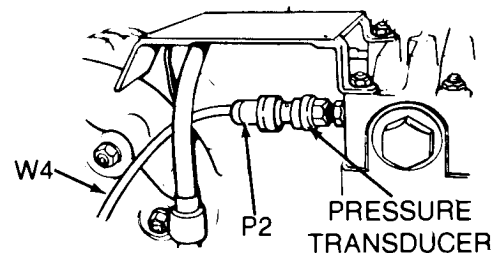
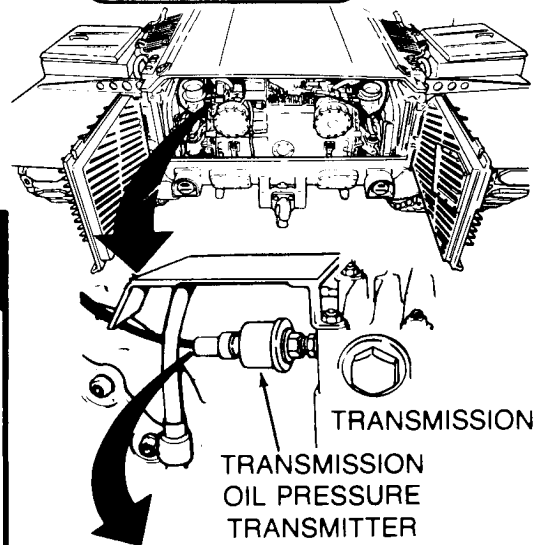
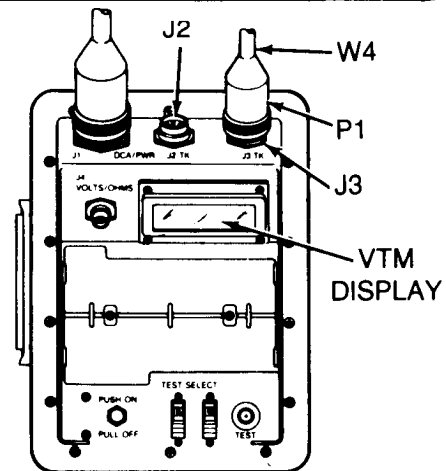
Connect test cables and pressure transducer.

First Technician (Rear Grille Doors)

- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of cable W4 to cable adapter J1 (MS3119E14-19).
- Connect P1 of second W4 cable to J1 adapter.

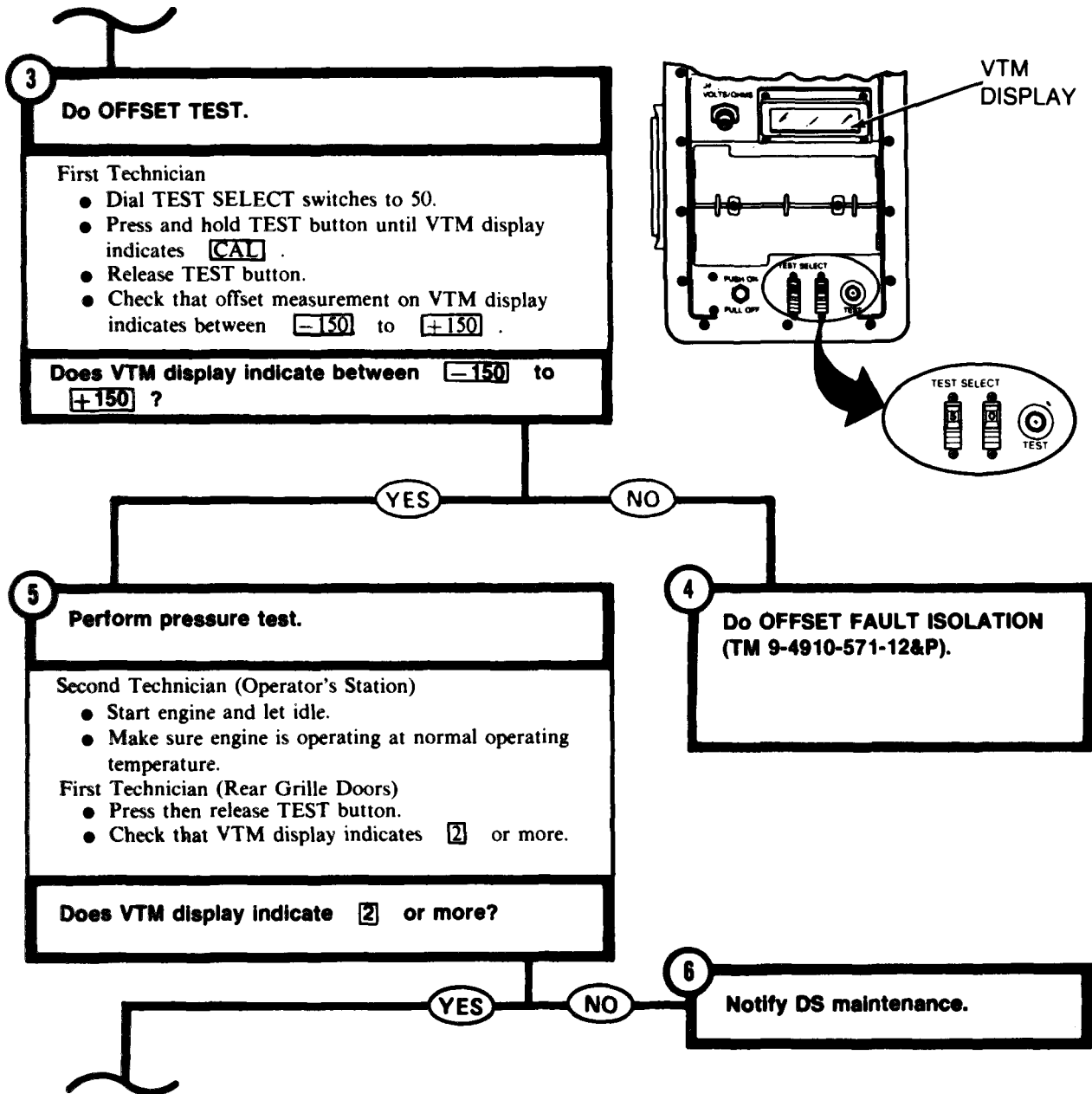
Both Technicians (Rear Grille Doors)

- Open rear grille doors.
- Remove transmission shroud (page 9-2).
- Remove transmission oil pressure transmitter (page 10-231).
- Install blue stripe 0-1000 psig pressure transducer (12258876) on transmission.
- Connect P2 of second cable W4 to connector on pressure transducer.



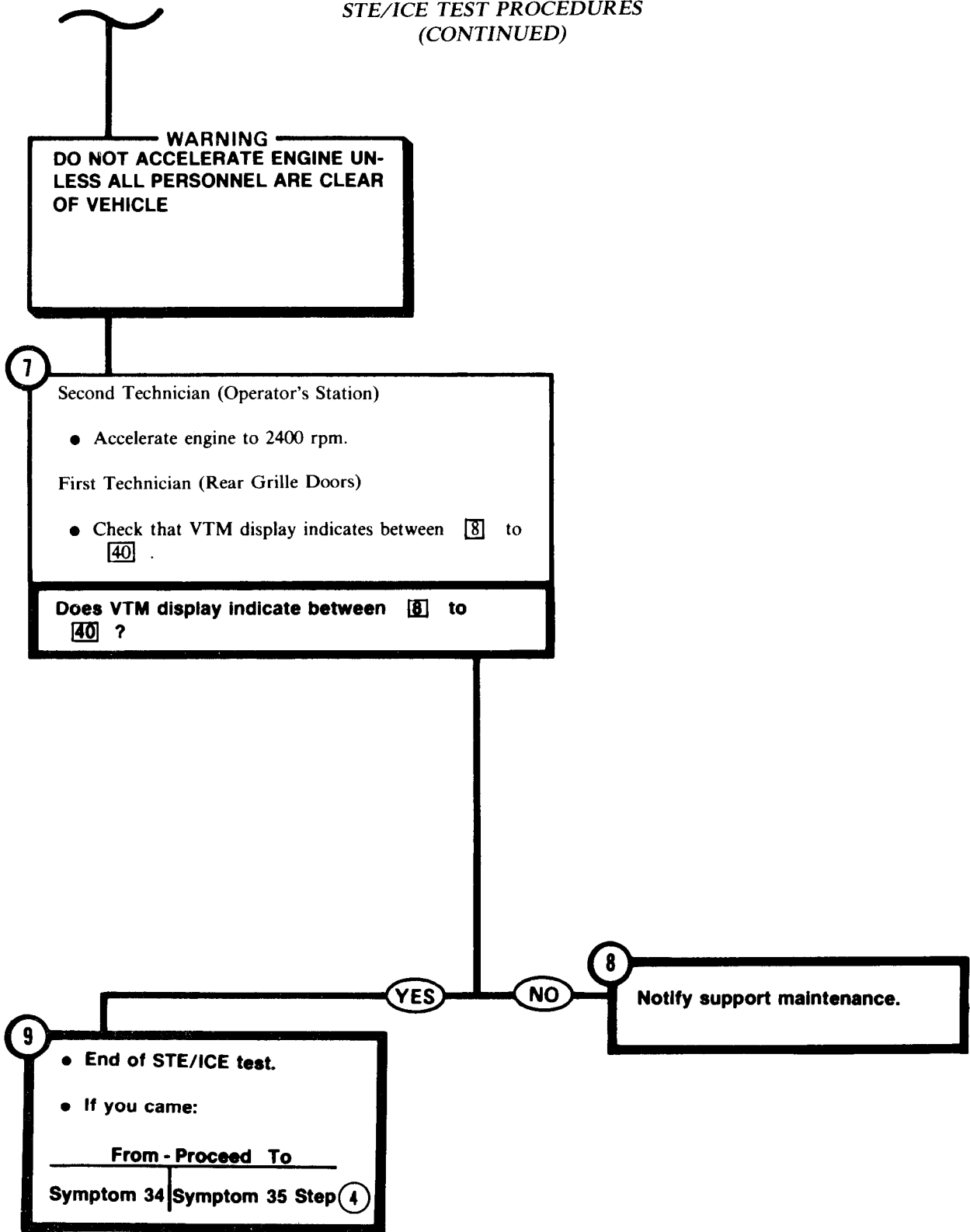
TA249973

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249974

STE/ICE TEST PROCEDURES
(CONTINUED)



TA24997

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-1

ENGINE WILL NOT CRANK WHEN STARTER SWITCH IS PRESSED.

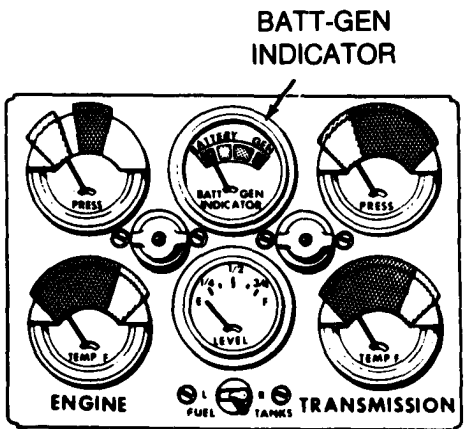
NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check for electrical power in the vehicle by observing BATT GEN INDICATOR for movement.

First Technician (Operator's Station)

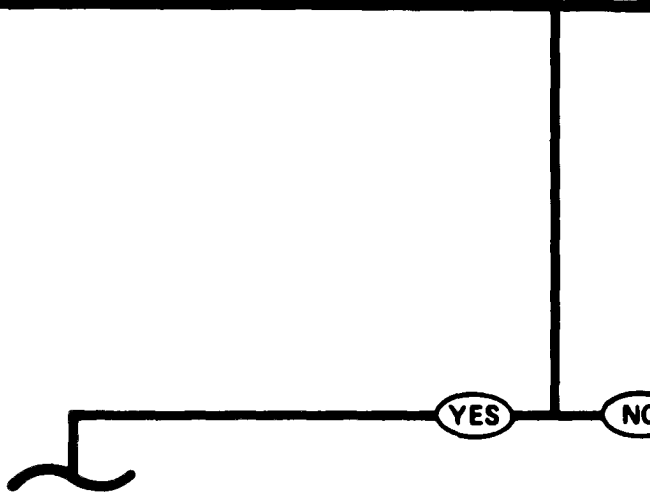
- Observe position of BATT GEN INDICATOR when MASTER BATTERY switch is OFF.
- Set MASTER BATTERY switch ON.
- Check position of BATT GEN INDICATOR.

Did the BATT GEN INDICATOR move when MASTER BATTERY switch was turned ON?



2 Check if MASTER BATTERY indicator lamp lights.

See Step **54**.



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

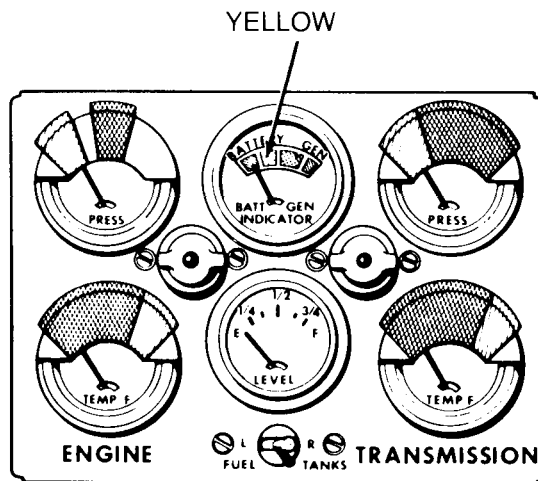
Symptom-1

3 Check BATT GEN INDICATOR gage for above mid yellow indication.

First Technician (Operator's Station)

Visually check if BATT GEN INDICATOR gage indicates above mid yellow.

Does BATT GEN INDICATOR gage indicate above mid yellow?



4

- Service batteries
TM 5-5420-226-10.
- Charge batteries (TM 9-6140-200-14).
- If STE/ICE is available, perform Test No. 77/79 BATTERY CONDITION TEST (page 4-60).

YES

NO

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

NOTE

- If STE/ICE is available, perform Test No. 72 STARTER CURRENT FIRST PEAK (page 4-70).
- If STE/ICE is not available, go to Step 5 .

5

Check for sound of starter solenoid and/or starter engaging.

Second Technician (Top Deck)

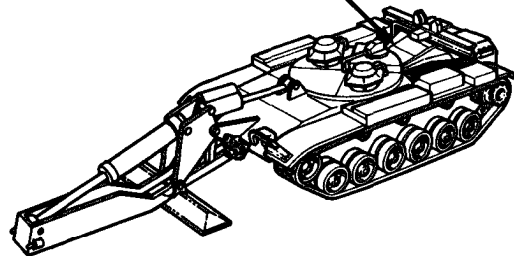
- Open right top deck grille doors.
- Listen for clicks or other noise coming from starter when starter switch is pressed.

First Technician (Operator's Station)

- Set FUEL PUMPS switch OFF.
- Press STARTER switch several times.

Is there a clicking sound, or other noise from starter when STARTER switch is pressed?

RIGHT TOP
DECK GRILLE
DOORS



6

● Check for locked engine.

● See Step 32 .

NO

YES

TA249978

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

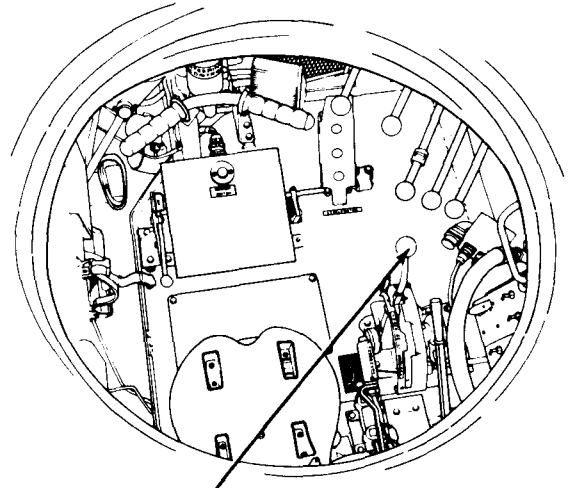
Symptom-1

7 Check for transmission shift lever to be in P (park) position.

First Technician (Operator's Station)

- Move transmission shift lever out of "P" into "H", "L", or "R" positions and return lever to "P" position.
- Attempt to start engine.

Does engine crank?



TRANSMISSION SHIFT LEVER

8 Adjust shift control linkage (page 11-52).

NO

YES

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

9

Check for electrical power at neutral shift switch.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

Second Technician (Rear Grille Doors)

- Disconnect both transmission harness connectors (CKT 14) from neutral shift switch.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to one of the two CKT 14 transmission harness connectors at neutral shift switch and black probe to ground.

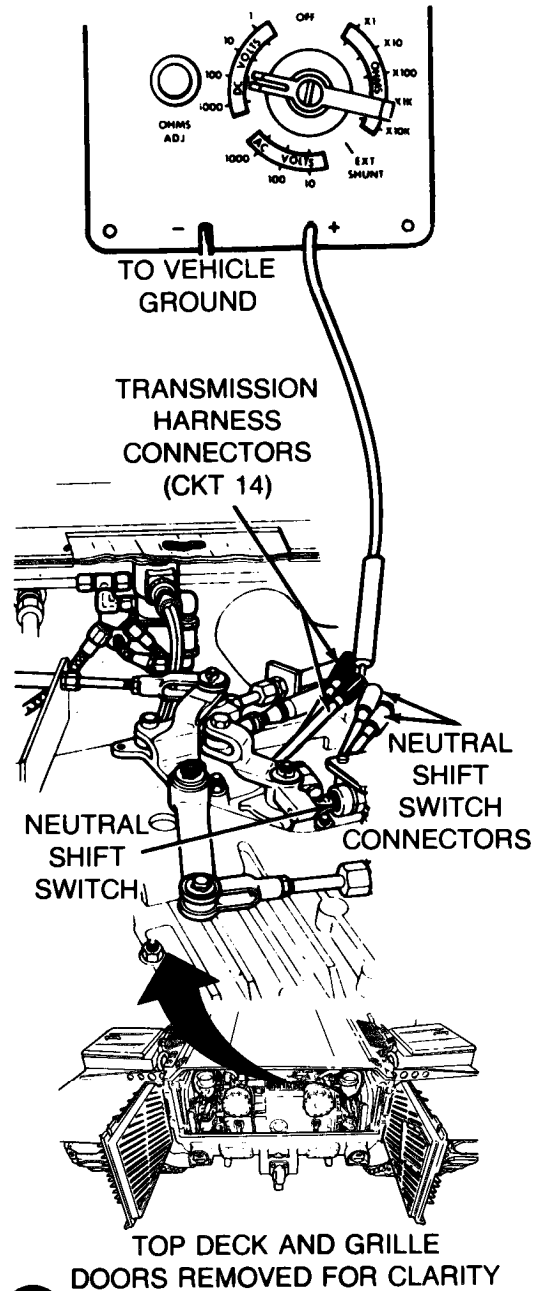
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold starter switch for about 5 seconds.

Second Technician (Rear Grille Doors)

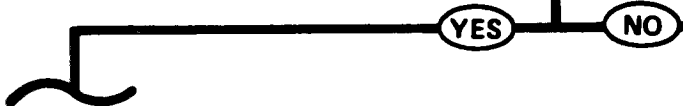
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check moving red probe of meter to other CKT 14 transmission harness connector at neutral shift switch.

Did meter indicate 18 to 30 volts dc at one of the two (CKT 14) transmission harness connectors?



10

- Check bulkhead engine disconnect harness (CKT 14) at engine disconnect for electrical power.
- See Step 35.



Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

11

Check neutral shift switch for continuity.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Rear Grille Doors)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one of the neutral shift switch connectors.
- Connect black probe to the other neutral shift switch connector.

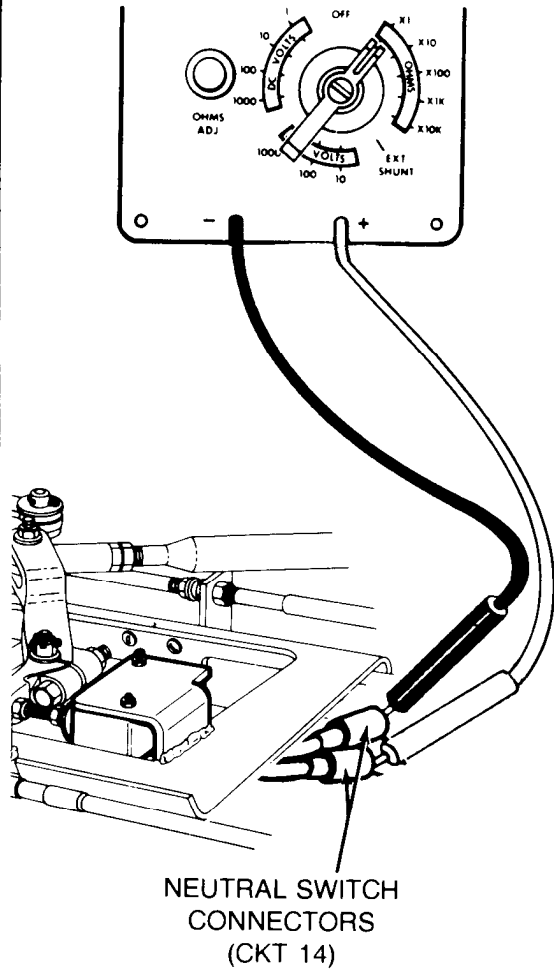
First Technician (Operator's Station)

- Move shift lever from L to N several times.

Second Technician (Rear Grille Doors)

- Check if meter indicates continuity each time the shift lever is moved to N.

Does meter indicate continuity each time the shift lever is moved to N.



12

- Adjust neutral shift switch (page 11-80).
- If switch cannot be adjusted, replace neutral shift switch (page 10-236)

YES

NO

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

WARNING

Use extreme care when working with circuit 81. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

13

Check starter feed harness (CKT 81), at engine disconnect, for electrical power.

Second Technician (Rear Grille Doors)

- Reconnect transmission harness connectors (CKT 14) to neutral shift switch connectors.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Top Deck)

- Disconnect starter feed harness connector from engine disconnect.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).

TA249982

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

STEP **13** CONTINUED

First Technician (Front of Crew Compartment)

- Reconnect three battery ground straps (page 10-268).

Second Technician (Top Deck)

- Connect red probe of meter to contact B (CKT 81) at starter feed harness connector at engine disconnect and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check moving red probe of meter to contact E (CKT 81) at starter feed harness connector.

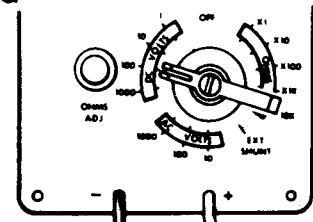
Does meter indicate 18 to 30 volts dc at contacts B and E?

YES

NO

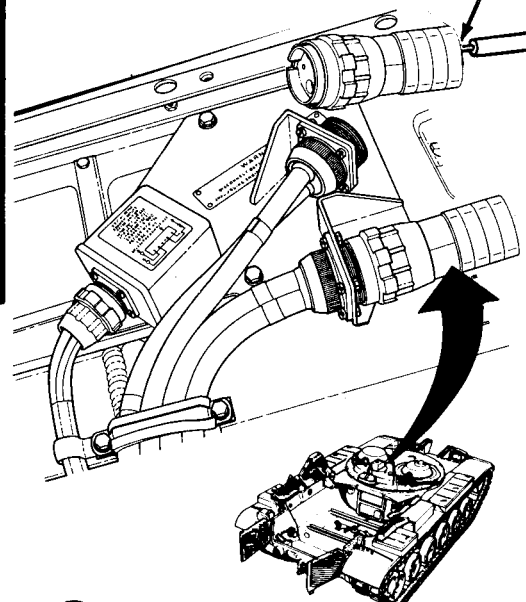
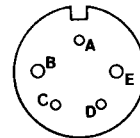
14

- Check battery cable (CKT 81) at bulkhead disconnect for electrical power.
- See Step **51**.



TO VEHICLE GROUND

CONTACTS B AND E (CKT 81)



Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

15

Check engine ground cable (CKT GND) at engine disconnect for continuity to ground.

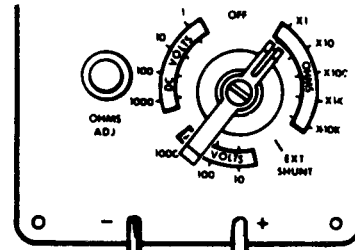
First Technician (Operator's Station)

- Disconnect three battery ground straps (page 10-268).

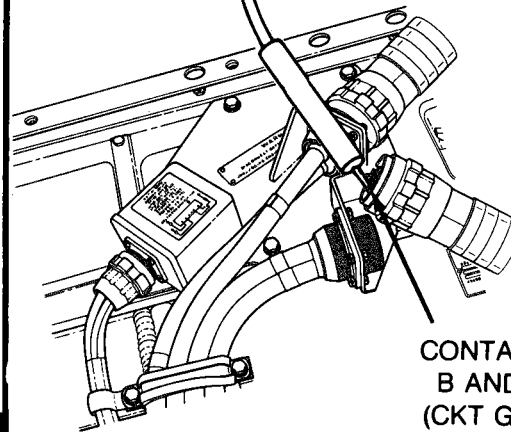
Second Technician (Top Deck)

- Reconnect starter feed harness connector to starter motor harness connector at engine disconnect.
- Disconnect engine ground cable connector from starter ground harness connector at engine disconnect.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-89).
- Connect red probe of meter to contact B (CKT GND) of engine ground cable connector and black probe to ground.
- Check if meter indicates continuity.
- Repeat above check, moving red probe to contact E (CKT GND) of ground cable connector.

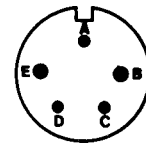
Does meter indicate continuity to ground at both connector contacts?



TO VEHICLE GROUND



CONTACTS B AND E (CKT GND)



16

Replace engine ground cable (page 10-271).

YES

NO

TA249984

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

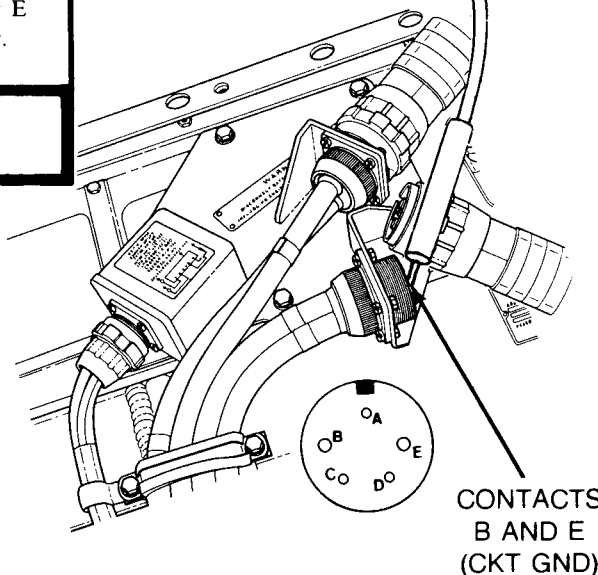
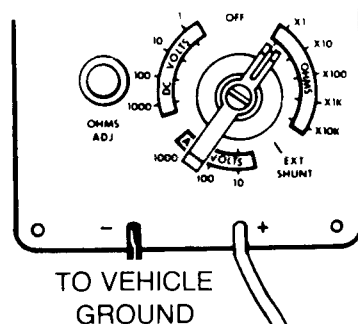
Symptom-1

17 Check starter ground harness (CKT GND) at engine disconnect for continuity to ground.

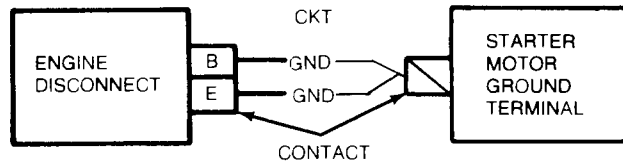
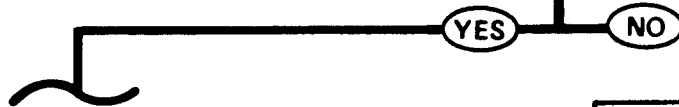
Second Technician (Top Deck)

- Connect red probe of meter to contact B (CKT GND) of starter ground harness connector at engine disconnect and black probe to ground.
- Check if meter indicates continuity.
- Repeat above check, moving red probe to contact E (CKT GND) of starter ground harness connector.

Did meter indicate continuity at both contacts B and E?



18 Repair starter ground harness (CKT GND) (page 10-298).



TA249985

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**
(Continued)

19 Check for electrical power at starter solenoid (CKT 81).

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

Both Technicians (Powerplant)

- Install ground hop kit (page 5-25). Do not start engine.

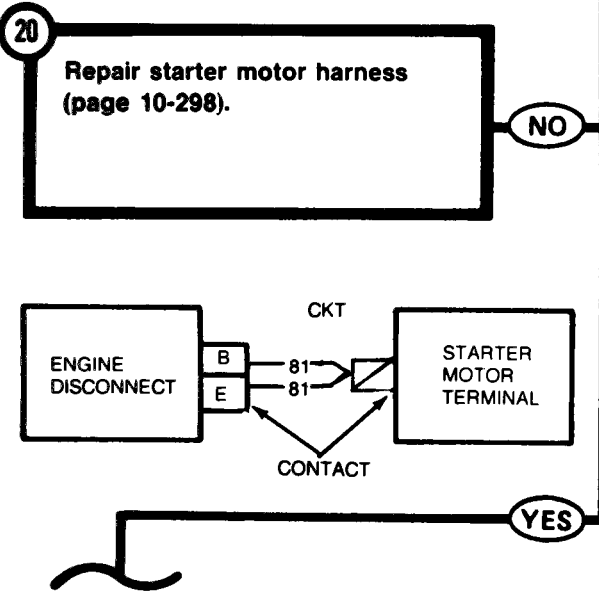
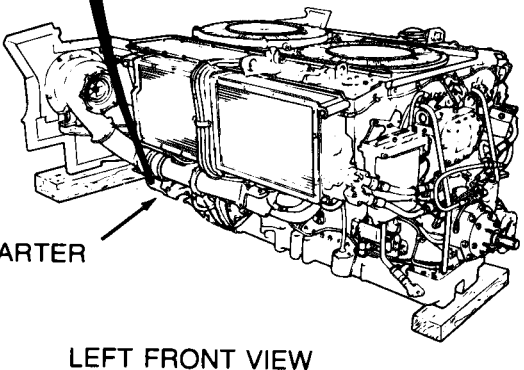
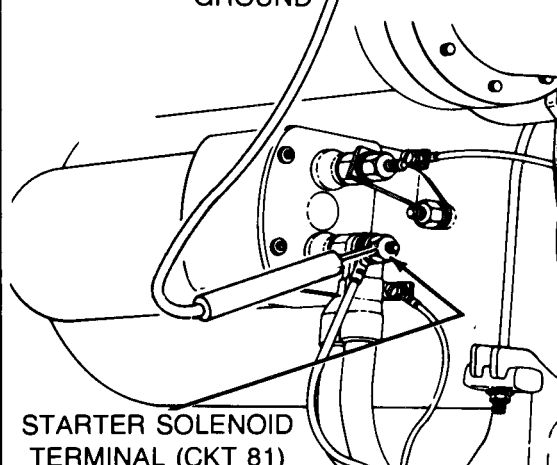
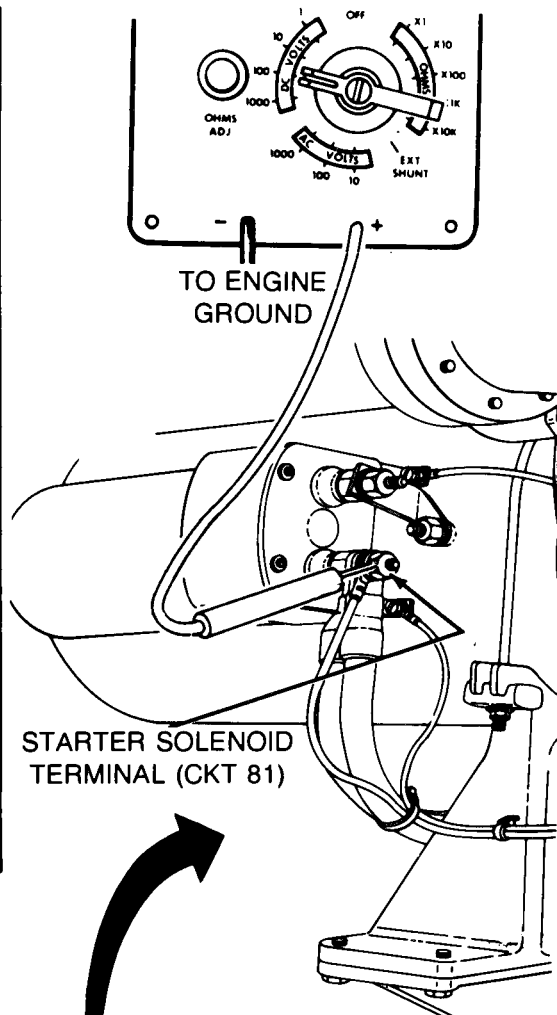
Second Technician

- Reconnect three battery ground straps (page 10-268).

First Technician (Left Side of Engine)

- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to starter solenoid terminal (CKT 81) and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



TA249986

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

21 Check terminal A of starter solenoid for electrical power.

First Technician (Left Side of Engine)

- Connect red probe of meter to terminal A at starter solenoid and black probe to ground.

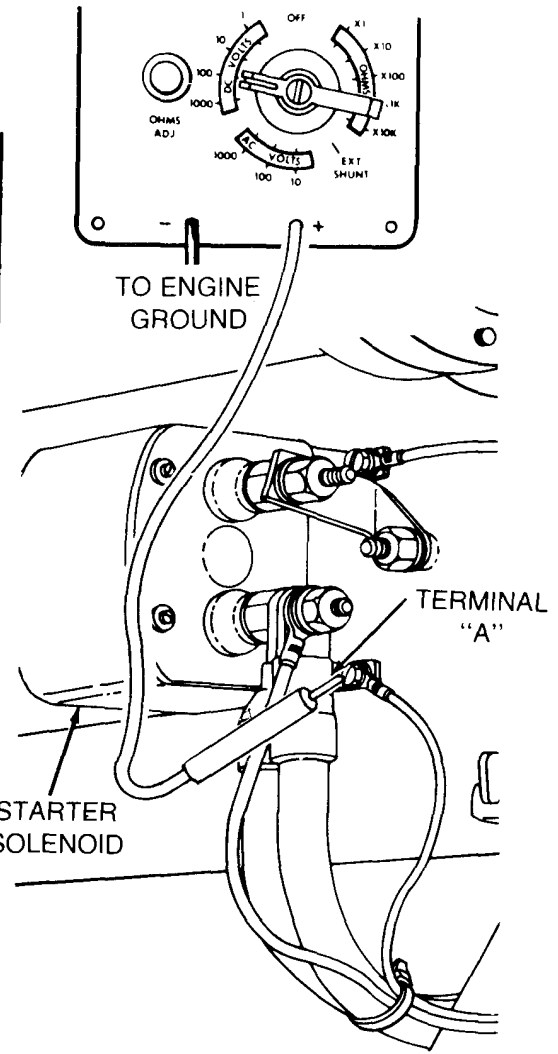
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

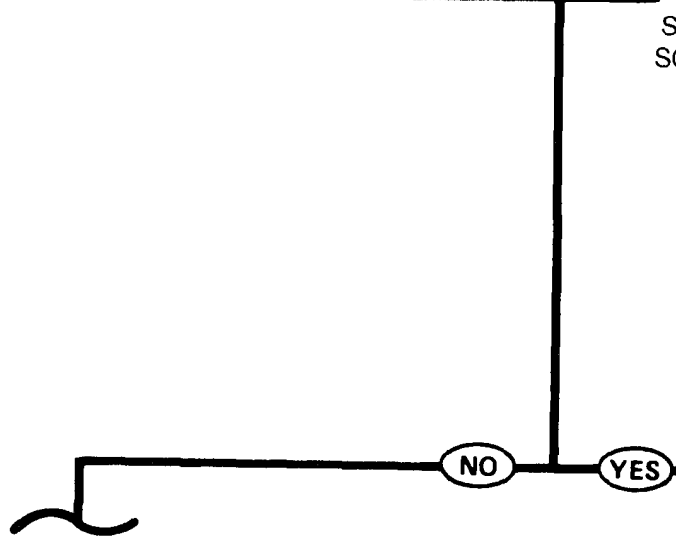
First Technician (Left Side of Engine)

- Check if meter indicates 18 to 30 volts dc when the STARTER switch is pressed.

Did meter indicate 18 to 30 volts dc?



22 Replace starter ((page 10-21)



Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

23

Check engine electrical harness (CKT 14A) for continuity between starter solenoid terminal and low voltage protection connector contact D.

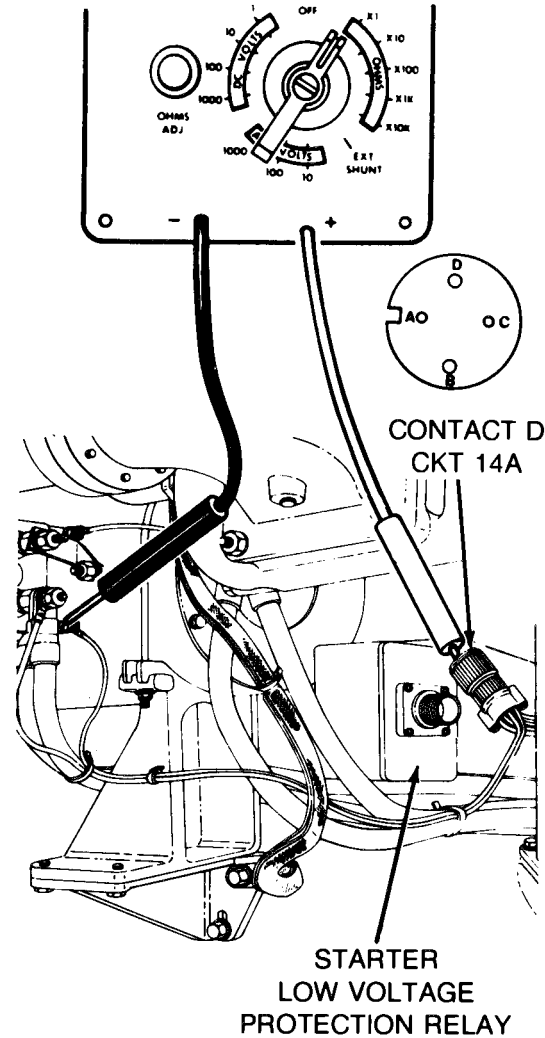
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect three battery ground straps (page 10-268).

First Technician (Left Side of Engine)

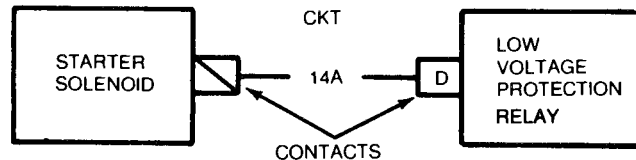
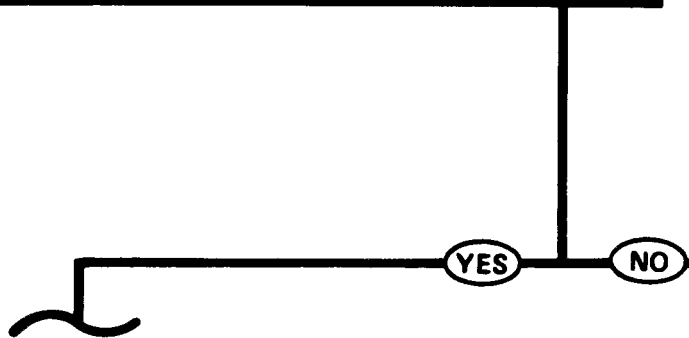
- Disconnect engine electrical harness connector from low voltage protection relay.
- Set multimeter on OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 14A) of engine harness connector at low voltage protection relay.
- Connect black probe of meter to terminal A (CKT 14A) of starter solenoid.
- Check if meter indicates continuity.

Does meter indicate continuity?



24

Repair engine electrical harness (CKT 14A) (page 10-298).



TA249988

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-1

WARNING

Use extreme care when working with circuit 14A. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

25 Check engine electrical harness (CKT 14A) at starter low voltage protection relay for electrical power.

First Technician (Left Side of Engine)

- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 14A) of engine electrical harness connector and black probe to ground.

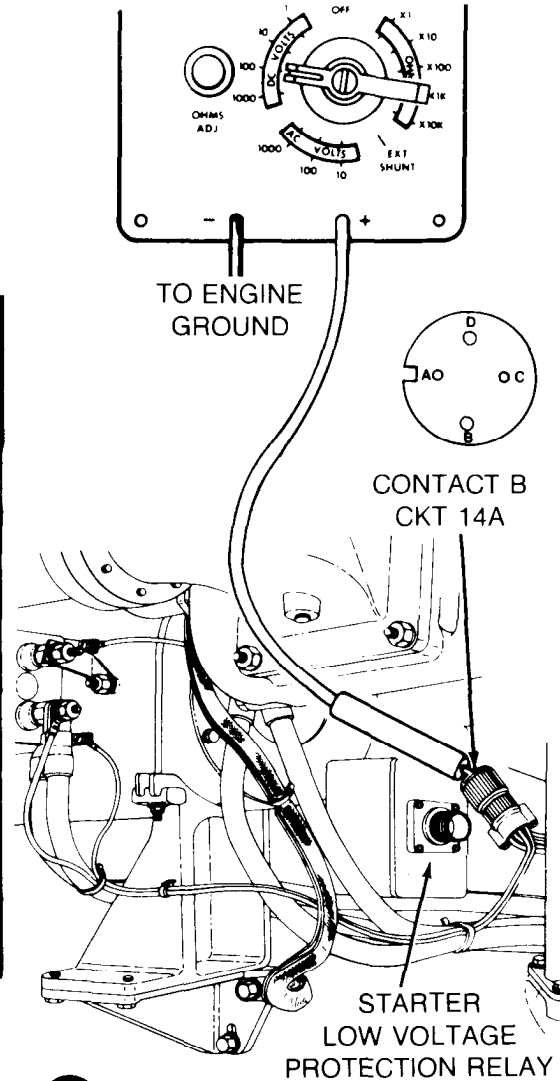
Second Technician (Operator's Station)

- Reconnect three battery ground straps (page 10-268).

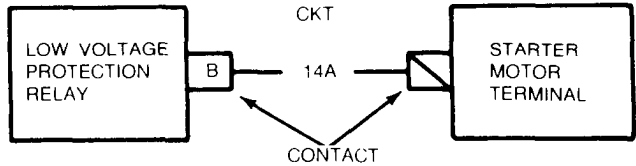
First Technician (Left Side of Engine)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



26 Repair engine electrical harness (CKT 14A) (page 10-298).



TA249989

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-1

27 Check engine electrical harness (CKT 14) at starter low voltage protection relay for electrical power.

First Technician (Left Side of Engine)

- Connect red probe of meter to contact A (CKT 14) of engine electrical harness connector and black probe to ground.

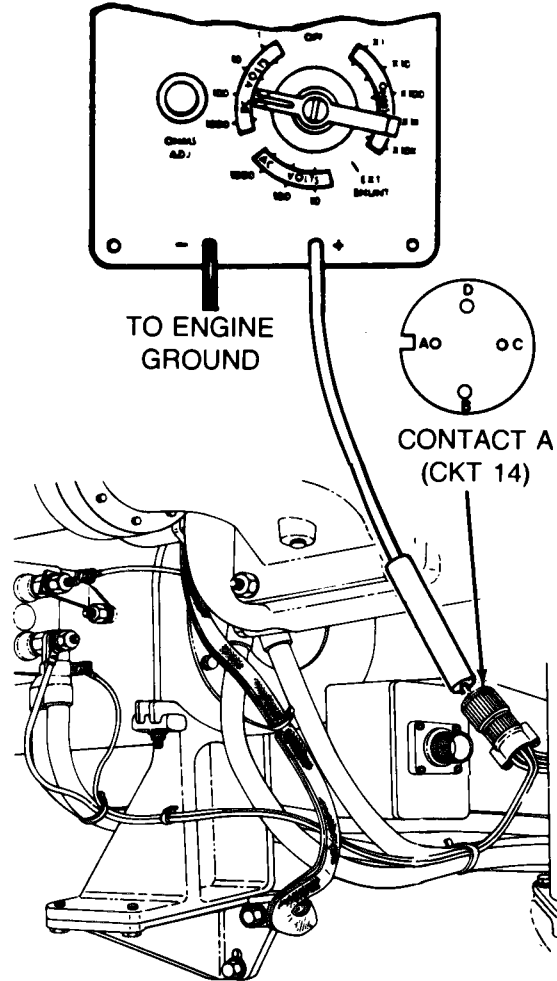
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

First Technician (Left Side of Engine)

- Check if meter indicates 18 to 30 volts dc when STARTER switch is pressed.

Did meter indicate 18 to 30 volts dc?



28 Replace low voltage protection relay (page 10-227).

YES

NO

TA249990

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

29 Check engine electrical harness (CKT 14) for continuity from connector at starter low voltage relay to connector at transmission disconnect.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Side of Engine)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact A (CKT 14) of engine electrical harness connector at starter low voltage protection relay.

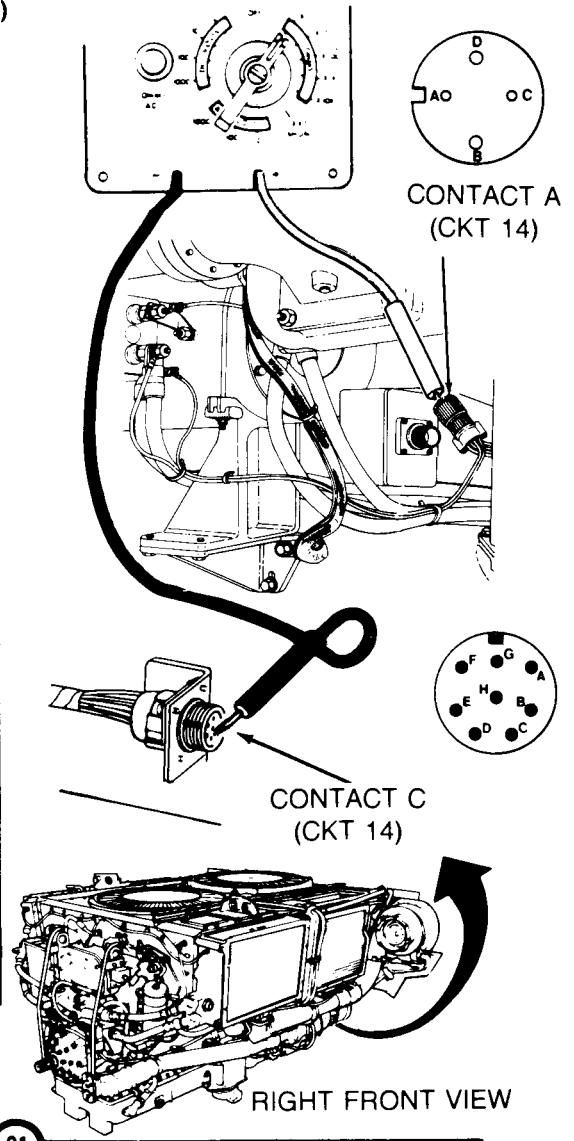
Second Technician (Right Side of Engine)

- Disconnect transmission harness connector from engine electrical harness connector at transmission disconnect.
- Connect black probe of meter to contact C of engine electrical harness connector at transmission disconnect.

First Technician (Left Side of Engine)

- Check if meter indicates continuity.

Does meter indicate continuity?

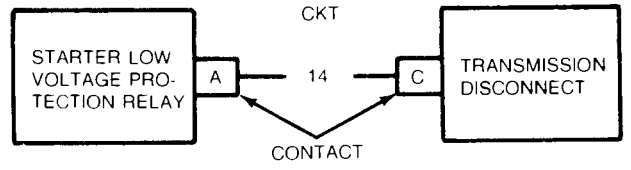
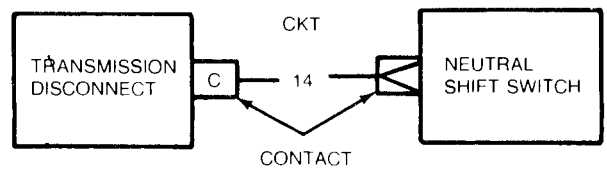


30

- Repair transmission harness (CKT 14) (page 10-298).
- Reconnect engine electrical harness connector to low voltage protection relay connector.
- Install powerplant (page 5-14).

31

- Repair engine electrical harness (CKT 14) (page 10-298).
- Install powerplant (page 5-14).



TA249991

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

6

32

Check for locked engine.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Have powerplant removed (page 5-2).

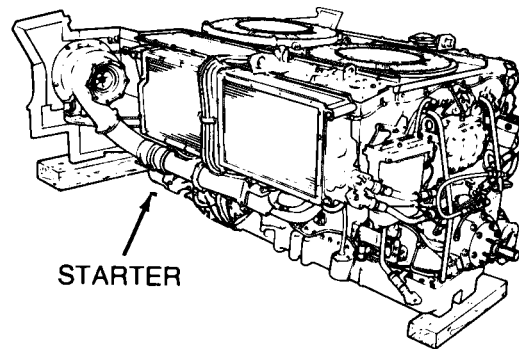
Both Technicians (Powerplant)

- Replace starter (page 10-21).
- Install ground hop kit (page 5-25). Do not start engine.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

Does engine crank?



33

Notify support maintenance of locked engine.

NO

YES

34

- Condition corrected by replacing starter.
- Have powerplant installed (page 5-14).

TA249992

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

10

35 Check bulkhead engine disconnect harness (CKT 14) at engine disconnect for electrical power.

Second Technician (Rear Grille Doors)

- Reconnect both transmission harness connectors (CKT 14) to neutral shift switch connectors.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 14) from engine electrical harness connector at engine disconnect.
- Connect red probe of meter to contact M (CKT 14) of bulkhead engine disconnect harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release starter switch.

Second Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

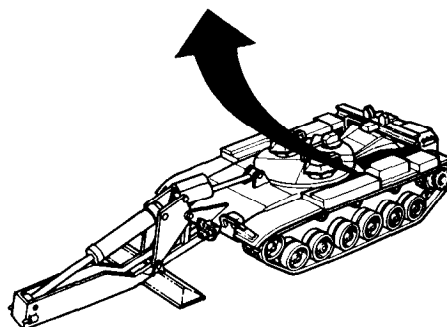
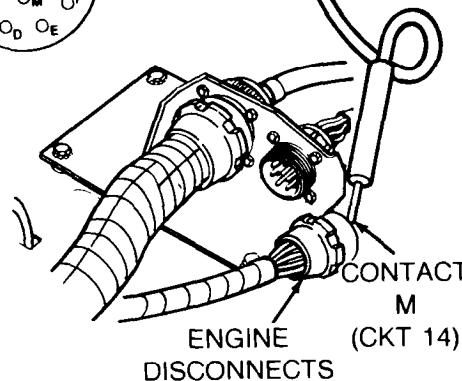
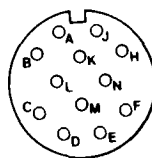
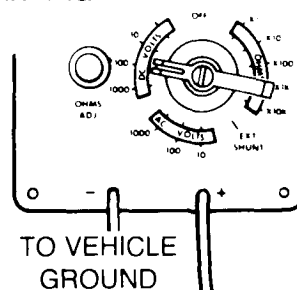
Does meter indicate 18 to 30 volts dc?

NO

YES

36 Check engine electrical harness (CKT 14) for continuity from connector at engine disconnect to connector at transmission disconnect.

See Step 48 .



Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

37 Check front accessory harness (CKT 14) at bulkhead disconnect for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Connect bulkhead engine disconnect harness connector to engine disconnect.

Both Technicians (Rear Grille Doors)

- Install transmission shroud.

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 14) from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact M (CKT 14) of front accessory harness connector at bulkhead disconnect and black probe to ground.

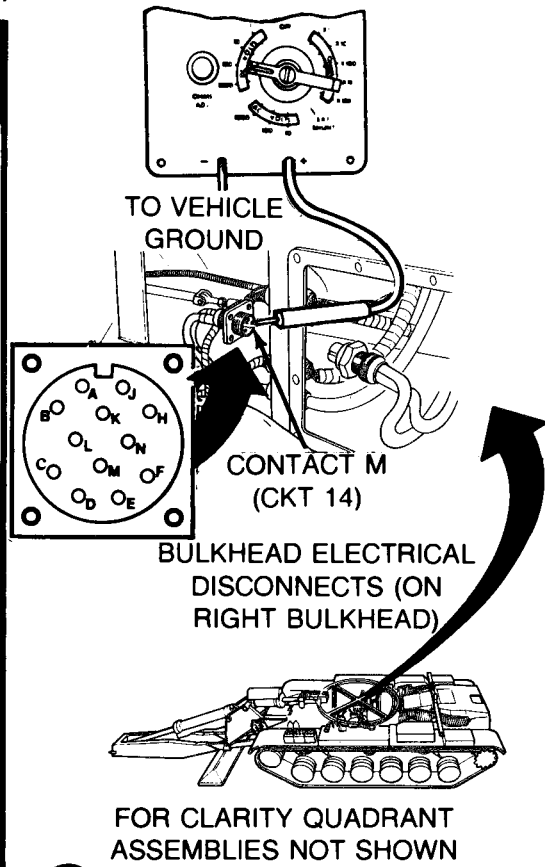
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

Second Technician (Commander's Station)

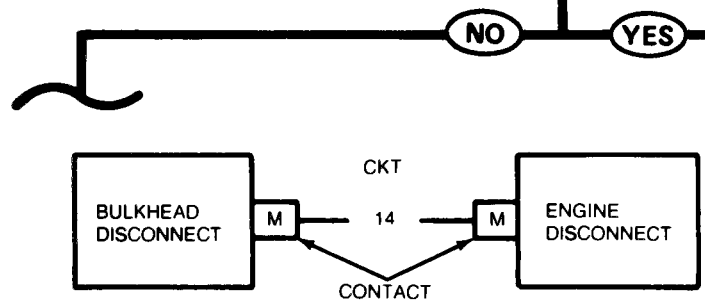
- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

Does meter indicate 18 to 30 volts dc?



38

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 14 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



TA249994

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

39 Check basket-control panel accessories harness (CKT 14) at basket disconnect for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Commander's Station)

- Displace basket-control panel accessories harness (CKT 14) at basket disconnect (page 10-269).
- Connect red probe of meter to contact J (CKT 14) of basket-control panel accessories harness connector at basket disconnect and black probe to ground.

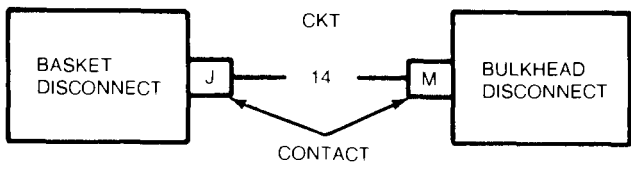
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

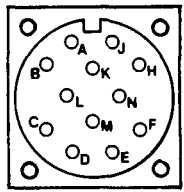
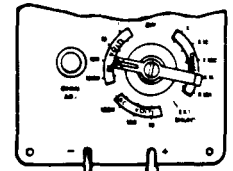
Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

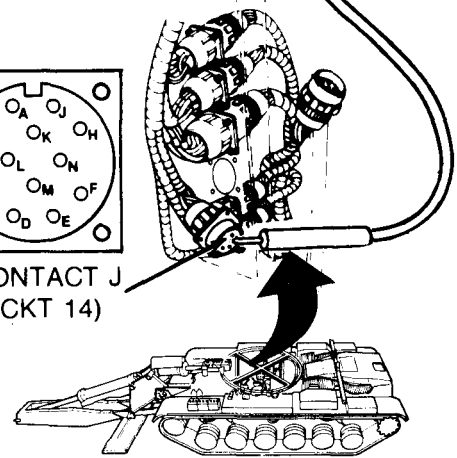
Does meter indicate 18 to 30 volts dc?



NO YES



CONTACT J (CKT 14)



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

40

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 14 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector to bulkhead disconnect (page 10-270).
- Install basket-control panel accessories harness connector at basket disconnect (page 10-270).

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

41

Check at master control panel accessories harness connector (CKT 14) for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Install basket-control panel accessories harness connector at basket disconnect (page 10-270).

First Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector (CKT 14) at master control panel.
- Connect red probe of meter to contact J (CKT 14) of master control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.
- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

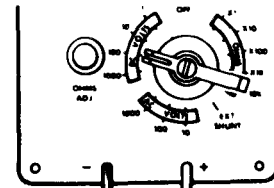
Does meter indicate 18 to 30 volts dc?

NO

YES

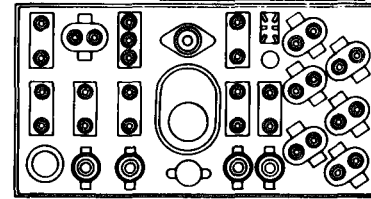
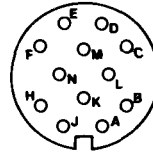
42

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 14 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Connect basket-control panel accessories harness connector to master control panel.
- Install master control panel (page 10-33).

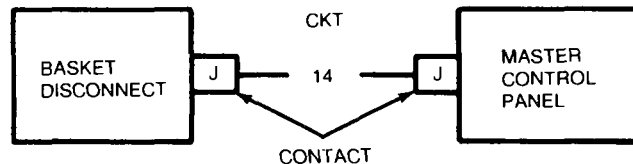


TO VEHICLE GROUND

CONTACT J (CKT 14)



MASTER CONTROL PANEL (REAR VIEW)



TA249996

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

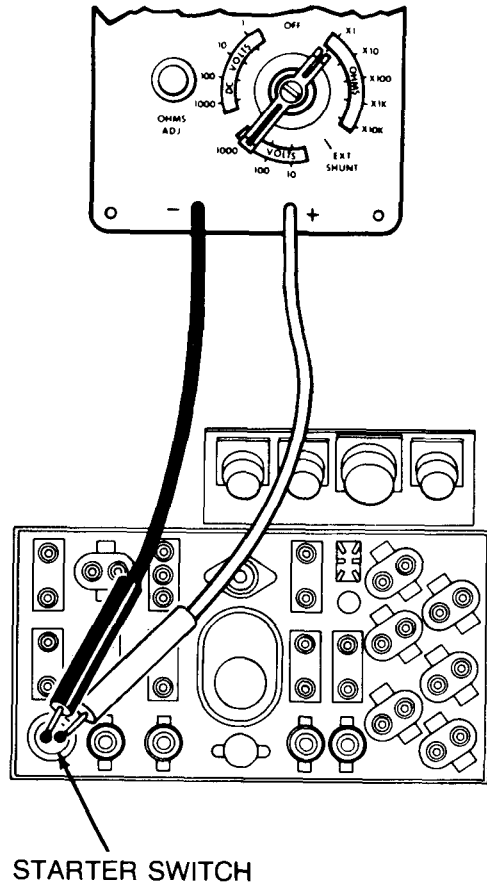
43

Check STARTER switch for continuity.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect master control panel power harness connector (CKT 14) from STARTER switch.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one contact and black probe to other contact of starter switch.
- Press and release STARTER switch.
- Check if meter indicates continuity while STARTER switch is pressed.

Does meter indicate continuity?



44

- Replace starter switch (page 10-38).
- Connect basket-control panel accessories harness connector to master control panel.

YES NO

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

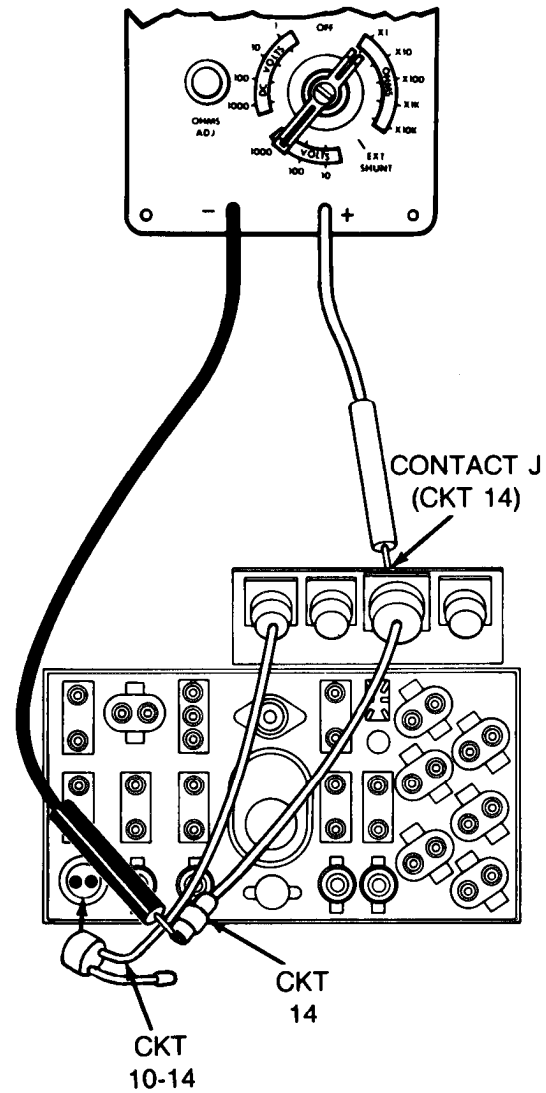
45

Check master control panel accessories harness from intermediate connector to panel connector for continuity.

First Technician (Operator's Station)

- Disconnect master control panel accessories harness intermediate connector (CKT 14) from master control panel power harness.
- Connect red probe of meter to contact J (CKT 14) of accessories harness panel connector.
- Connect black probe of meter to intermediate connector (CKT 14).
- Check if meter indicates continuity.

Does meter indicate continuity?



46

- Replace master control panel power harness (page 10-38).
- Connect basket-control panel accessories harness to master control panel.

YES

NO

47

Replace master control panel accessories harness (page 10-38).

TA249998

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

(Continued)

FROM STEP

36

48

Check engine electrical harness (CKT 14) for continuity from connector at engine disconnect to connector at transmission disconnect.

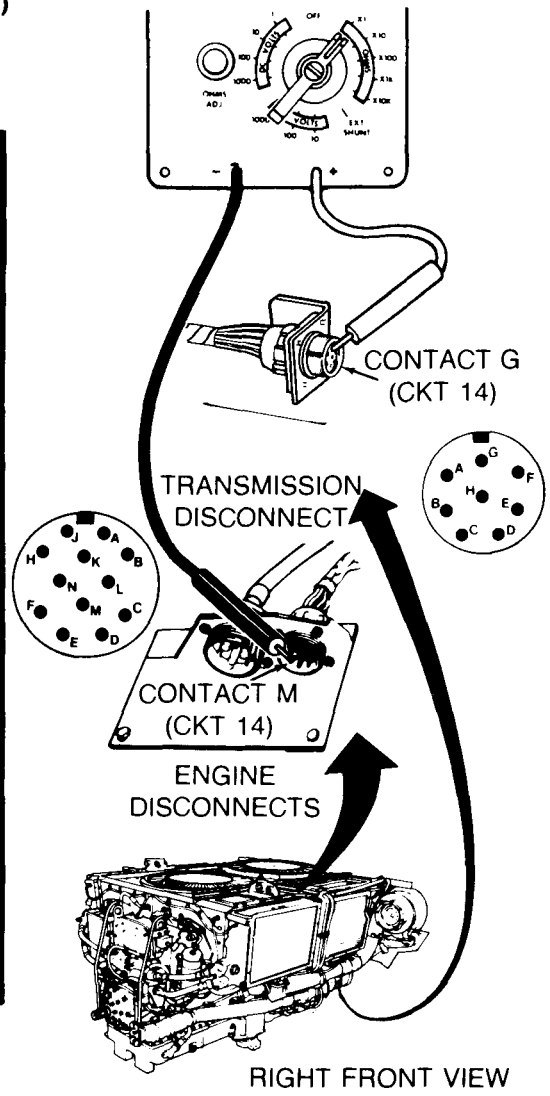
Second Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Right Side of Engine)

- Disconnect engine electrical harness connector at transmission disconnect.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 14) of engine electrical harness connector at transmission disconnect.
- Connect black probe of meter to contact M (CKT 14) of engine electrical harness connector at engine disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?



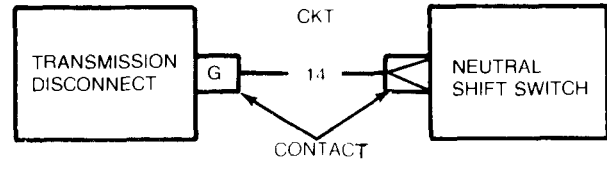
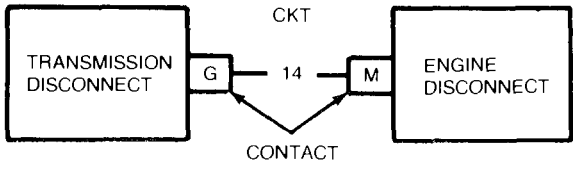
49

Repair engine electrical harness (CKT 14) (page 10-298).

50

Repair transmission harness (CKT 14) (page 10-298).

NO YES



TA249999

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

14

WARNING

Use extreme care when working with circuit 81. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

51

Check battery cable (CKT 81) at bulkhead disconnect for electrical power.

First Technician (Operator's Station)

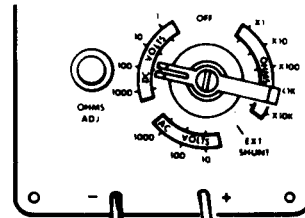
- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

- Disconnect battery cable connector from bulkhead disconnect.
- Connect red meter probe to contact B of battery cable connector at bulkhead electrical disconnect and black probe to ground.

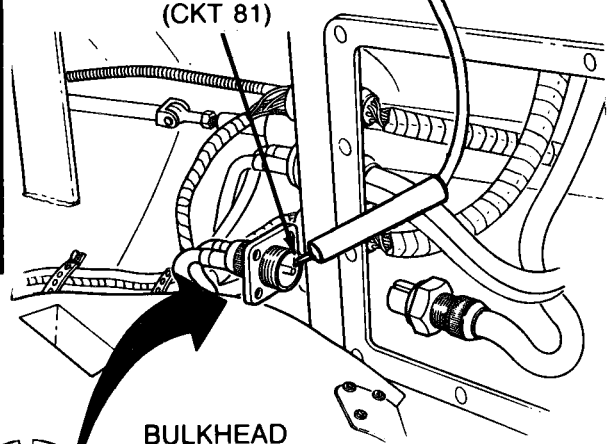
First Technician (Operator's Station)

- Reconnect three battery ground straps (page 10-268).

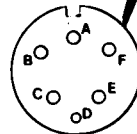


TO VEHICLE GROUND

CONTACT B AND F
(CKT 81)



BULKHEAD DISCONNECTS



TA250000

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

STEP **51** CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.
- Move red probe of meter from contact B to contact F of battery cable connector at bulkhead electrical disconnect.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc at both connector contacts?

52

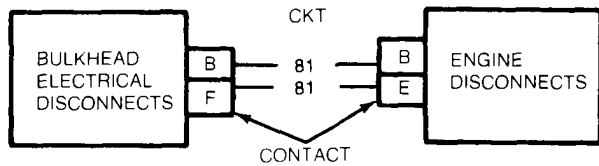
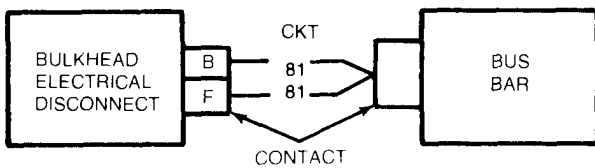
- Repair battery cable (CKT 81) (page 10-298).
- Connect starter feed harness connector at engine disconnect.

NO

53

- Repair starter feed harness (CKT 81) (page 10-298).

YES



TA250001

Symptom-1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

2

54

Check if MASTER BATTERY indicator lamp lights.

First Technician (Operator's Station)

- Check if MASTER BATTERY indicator lamp lights when MASTER BATTERY switch is set ON.

Does master battery indicator lamp light?

YES

55

See Symptom 27: NO POWER DISTRIBUTION FROM MASTER RELAY (MASTER BATTERY INDICATOR LAMP WILL LIGHT).

NO

56

See Symptom 28: NO POWER IN VEHICLE (MASTER BATTERY INDICATOR LAMP WILL NOT LIGHT).

TA250002

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-2

**ENGINE CRANKS AT NORMAL SPEED, BUT WILL NOT START
(BATTERY/GENERATOR GAGE SHOWS IN YELLOW AREA).**

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

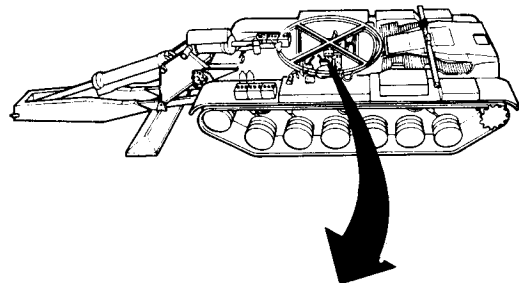
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

1 Check if manual fuel shutoff handle is in the down (ON) position.

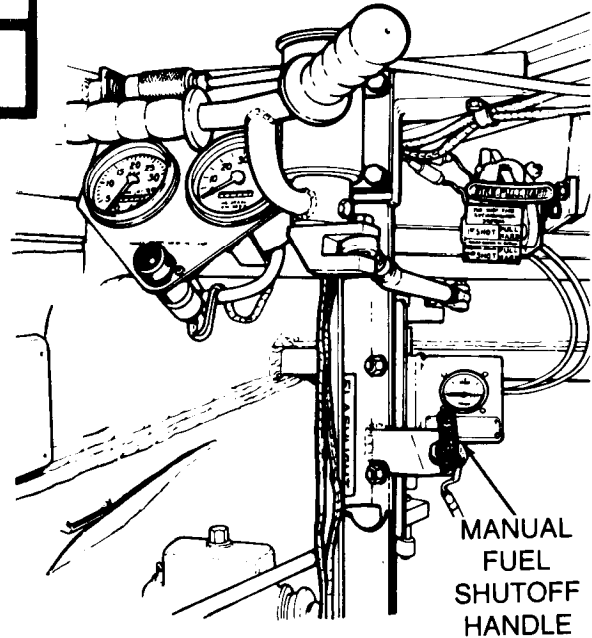
Second Technician (Operator's Station)

- Release spring latch on fuel shutoff handle.
- Operate handle several times and leave in the down (ON) position.
- Place latch over fuel shutoff handle.

Did manual fuel shutoff handle go freely to the down (ON) position?



OPERATOR'S STATION



2 See Symptom 18: MANUAL FUEL SHUTOFF HANDLE WILL NOT STOP ENGINE.

NO

YES

TA250003

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

3 Check if fuel tanks electrical fuel pumps are running.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Listen for sound of right fuel tank electrical fuel pump running.

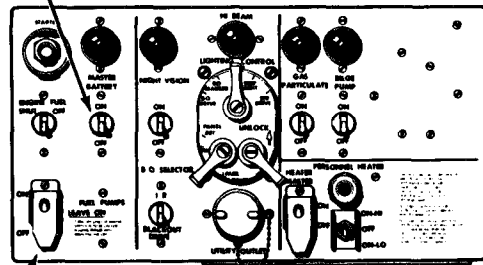
First Technician (Rear Grille Doors)

- Open rear grille doors.
- Listen for sound of left fuel tank electrical fuel pump running.

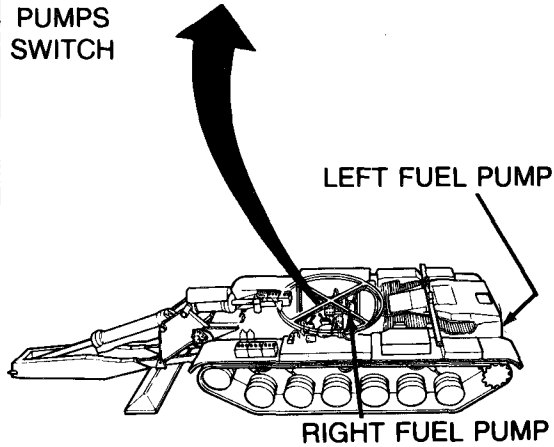
Are both fuel tanks electrical fuel pumps running?

MASTER BATTERY SWITCH

MASTER CONTROL PANEL



FUEL PUMPS SWITCH



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

4

- If only one pump is not running, See Symptom 5: ONE ELECTRICAL FUEL PUMP WILL NOT WORK.
- If both pumps are not running, See Symptom 6: BOTH ELECTRICAL FUEL PUMPS WILL NOT WORK.

YES

NO

TA250004

Symptom-2

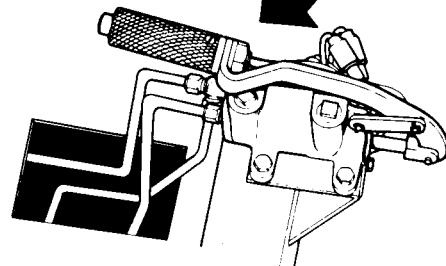
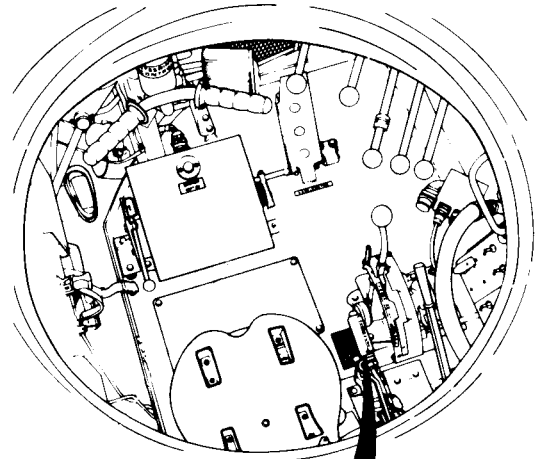
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

5 Check primer pump for back pressure.

Second Technician (Operator's Station)

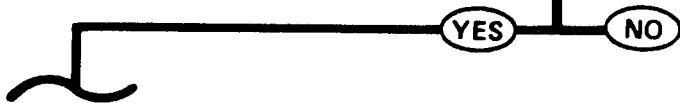
- Operate primer pump handle several times.

Does primer pump feel like it is pumping?



PRIMER PUMP

6 See Symptom 7: PRIMER PUMP WILL NOT WORK.



Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

7

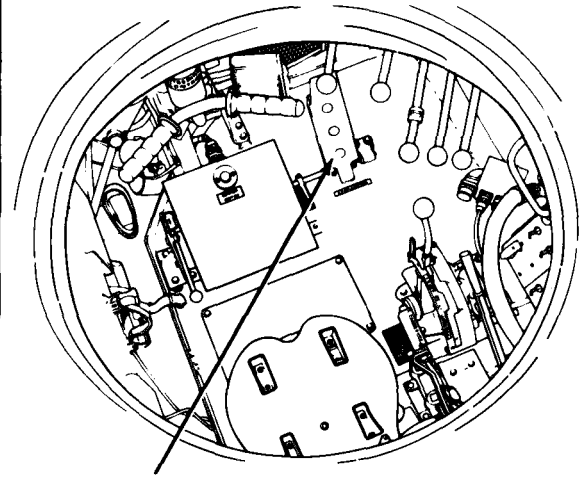
Check accelerator pedal for freedom of movement.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Press and release accelerator pedal several times.

Does accelerator pedal operate freely without binding.

OPERATOR'S STATION



ACCELERATOR PEDAL

8

- Check for binding at accelerator pedal.
- See Step (47) .

YES

NO

TA250006

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

9 Check for accelerator linkage movement at front of engine.

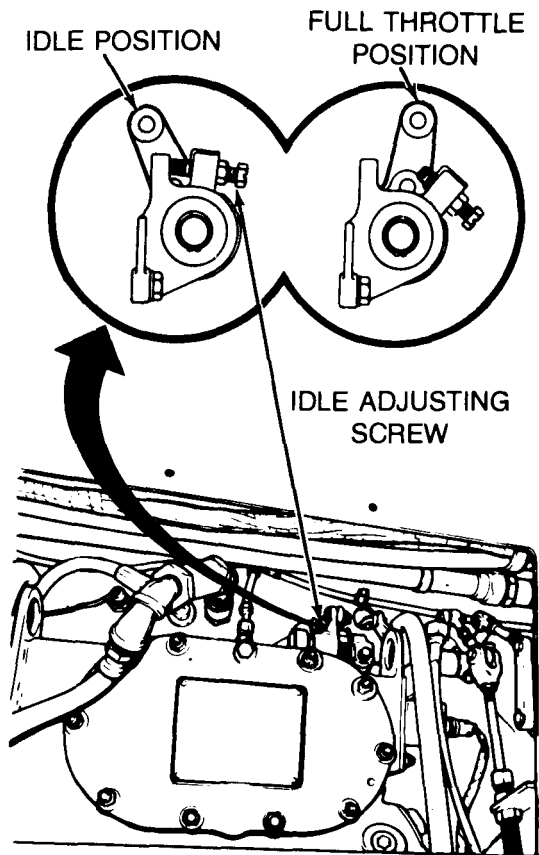
First Technician (Rear of Crew Compartment)

- Remove upper engine access panel (page 17-11).
- Observe idle adjusting screw for full movement off the stop when accelerator pedal is pressed.

Second Technician (Operator's Station)

- Press accelerator pedal all the way down and release.

Does idle adjustment screw move to full throttle position?

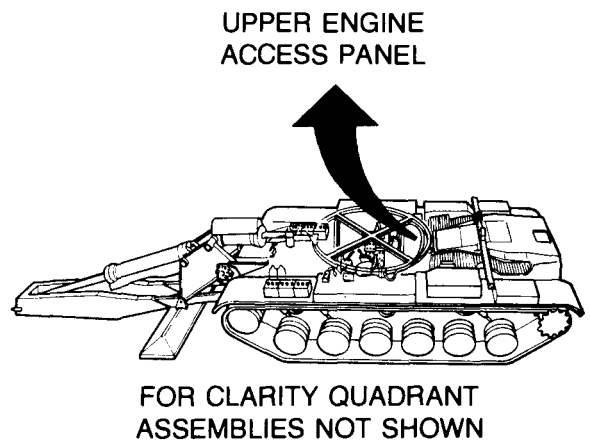


10 Check for movement of throttle stop pin at engine.

See Step **59** .

NO

YES



TA250007

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

11

Check engine fuel shutoff solenoid for operation.

First Technician (Rear of Crew Compartment)

- Listen at engine access panel for sound of fuel shutoff solenoid clicking.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch ON.
- Operate ENGINE FUEL SHUTOFF switch several times.

Does engine fuel shutoff solenoid click when ENGINE FUEL SHUTOFF switch is operated?

12

- Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch OFF).
- See Step **62** .

YES

NO

TA250008

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

13 Check for fuel flow at main fuel return line quick disconnect.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect main fuel return line quick disconnect.
- Remove quick disconnect half from fuel line coming from engine.
- Place one gallon container under open line to catch any fuel.

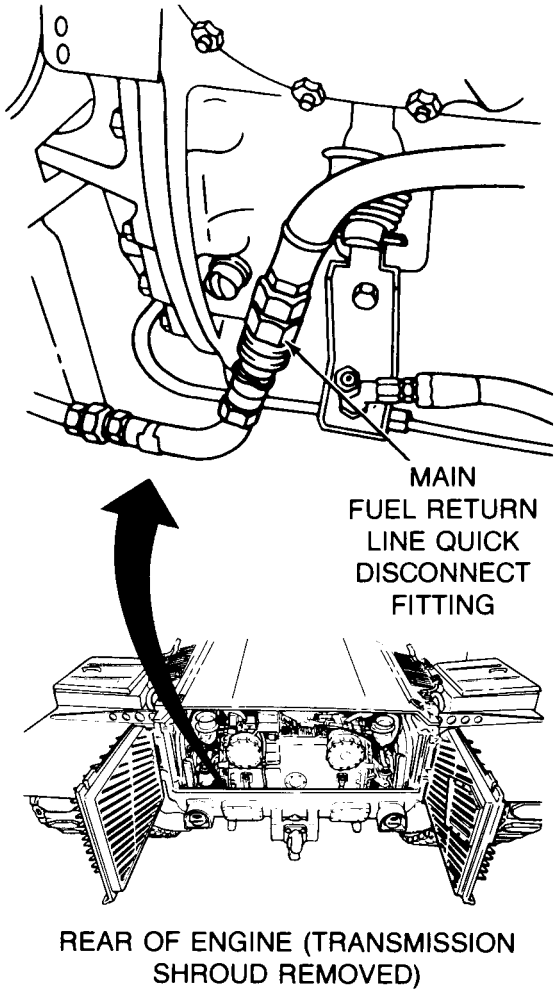
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Rear Grille Doors)

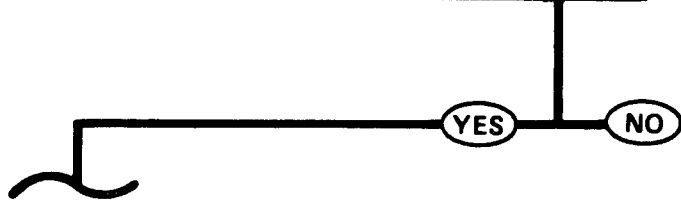
- Observe return line for free fuel flow.
- Direct second technician to set MASTER BATTERY and FUEL PUMPS switches OFF.

Does fuel flow freely from main fuel return line?



14

- Check for free fuel flow from main fuel supply line quick disconnect (located behind upper engine access panel).
- See Step 26 .

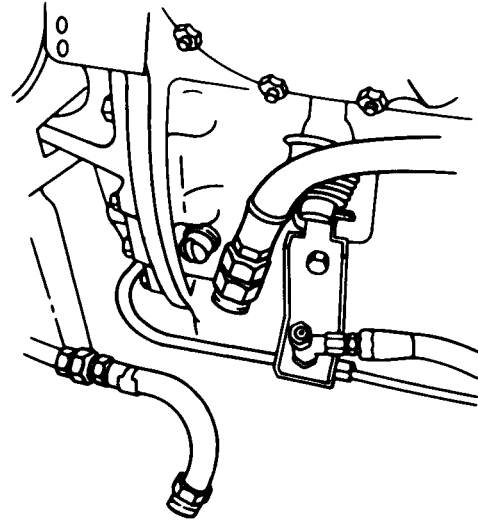


Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

NOTE

Diesel fuel containing water will be milky. The water will settle out in a short period of time.



15

Check for water in fuel.

First Technician (Rear Grille Doors)

- Place one gallon container under open fuel return line to catch fuel.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Rear Grille Doors)

- Allow container to fill with fuel then direct second technician to set MASTER BATTERY and FUEL PUMPS switches OFF.
- Observe for water (fuel is milky).

Does fuel contain water?

16

- See Symptom 10: FUEL/WATER SEPARATOR WILL NOT WORK.
- Install quick disconnect on fuel return line and connect line.

NO **YES**

TA25001

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

WARNING

Do not touch manifold heaters with bare hands.

17

Check intake manifold preheaters for operation.

Both Technicians (Rear Grille Doors)

- Install quick disconnect and connect fuel return line.
- Install transmission shroud (page 9-6).

First Technician (Top Deck)

- Open left and right top grille doors.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- At the same time, press STARTER switch, MANIFOLD PREHEAT switch, and operate PRIMER PUMP. Do not hold switches on for more than 14 seconds.

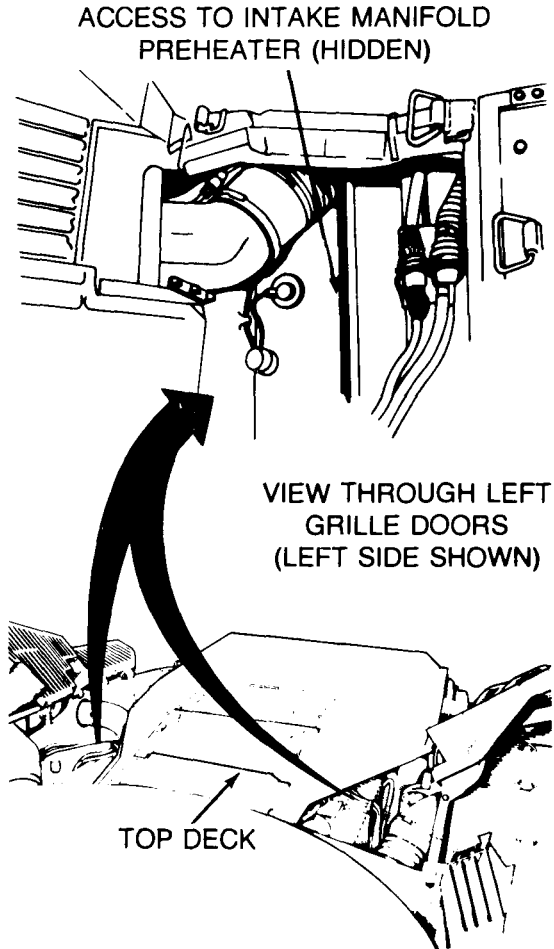
First Technician (Top Deck)

- Reach down through grille door openings and feel for heat from intake manifold preheaters.

Are both intake manifold preheaters warm?

YES

NO



18

- If both preheaters are cold, see Symptom 9: BOTH INTAKE MANIFOLD PREHEATERS WILL NOT WORK.
- If only one preheater is cold, see Symptom 8: ONE INTAKE MANIFOLD PREHEATER WILL NOT WORK.

TA250011

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

NOTE

There are two sets of air cleaning components which are the same and are located across from one another on each side of the engine.

19

Check engine air intake screens for clogging or damage.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Gain access to left air intake screen.

First Technician (Commander's Station)

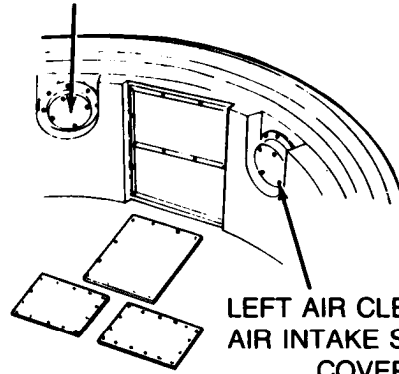
- Gain access to right air intake screen.

Both Technicians (Air Intake Screens)

- Inspect air intake screens for clogging or damage.

Are engine air intake screens clogged or damaged?

RIGHT AIR CLEANER
AIR INTAKE SCREEN
COVER



LEFT AIR CLEANER
AIR INTAKE SCREEN
COVER

REAR OF CREW COMPARTMENT

NO

YES

20

Clean engine air intake screens or replace damaged screens.

TA250012

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-2

21

Check engine air cleaner for collapsed hoses.

Both Technicians (Air Intake Screens)

- Install air intake screen covers.

Second Technician (Top Deck)

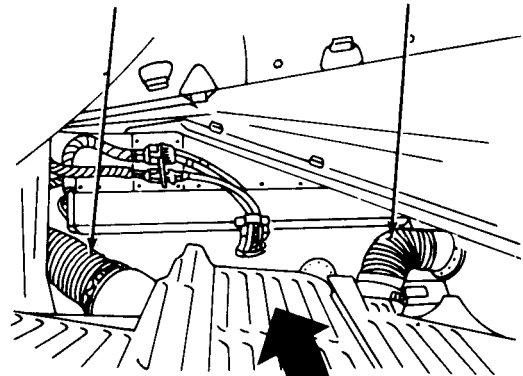
- Check both right and left intake hoses and outlet hoses for collapsing or other damage.

Are engine air cleaning hoses collapsed or damaged?

(VIEW LOOKING DOWN THROUGH LEFT TOP DECK GRILLE DOORS)

(LEFT SIDE SHOWN)

INTAKE HOSE OUTLET HOSE

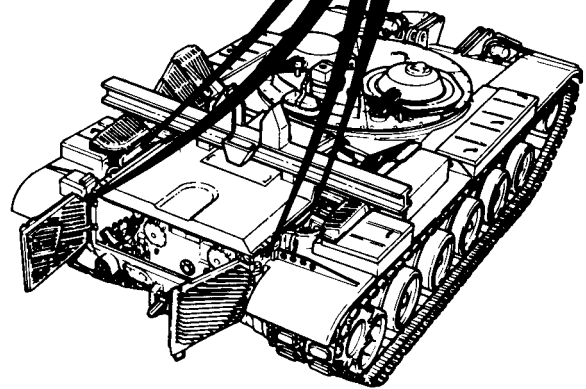


22

Replace engine air intake and/or air outlet hoses (page 7-79).

YES

NO



TA250013

Symptom-2

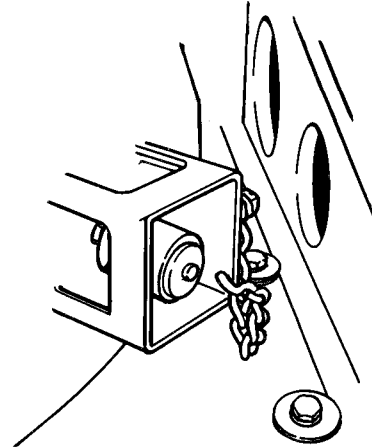
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

23 Check if engine air cleaner filters, on each side of vehicle, are clogged.

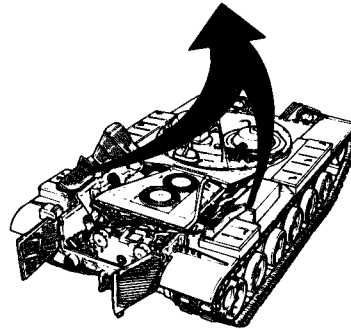
Second Technician (Top Deck)

- Check engine air cleaner restriction indicator on each side of vehicle for clogged filters (TM 5-5420-202-20).

Are engine air cleaner filters clogged?



AIR CLEANER RESTRICTION INDICATOR
(LEFT SIDE SHOWN)



25 Notify support maintenance that engine cranks but will not start.

NO YES

24 Remove and service engine air cleaner filters (page 7-91).

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

14

26

Check for free fuel flow from main fuel supply line quick disconnect (located behind upper engine access panel).

First Technician (Rear Grille Doors)

- Install quick disconnect and connect fuel return line.

First Technician (Rear of Crew Compartment)

- Disconnect main fuel line quick disconnect.
- Place a suitable container under the line to catch any fuel.
- Push in (and hold) on the center of the female quick disconnect.

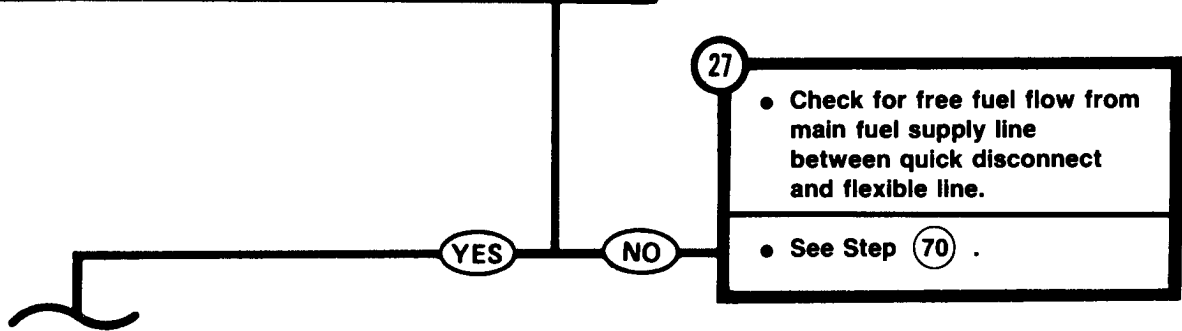
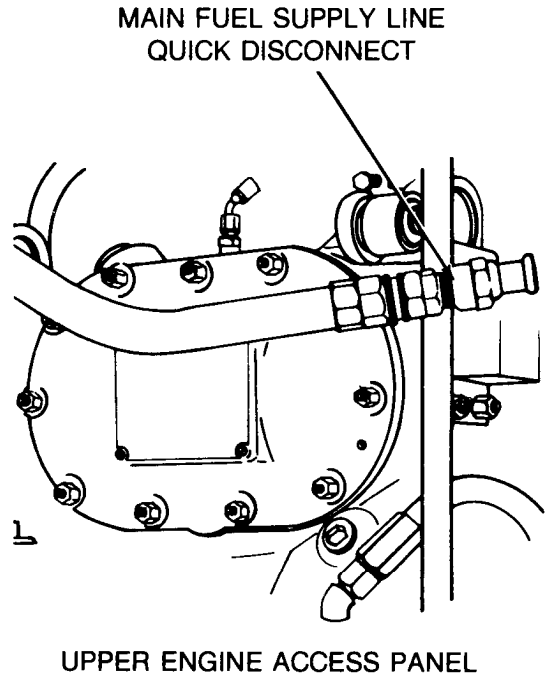
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch on for approximately 10 seconds then set FUEL PUMPS switch OFF.

First Technician (Rear of Crew Compartment)

- Check for free fuel flow from main fuel line quick disconnect.

Did fuel flow freely from main fuel line quick disconnect?



Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

28 Check for free fuel flow from primary fuel filter bleed valve.

First Technician (Rear of Crew Compartment)

- Connect main fuel line quick disconnect.
- Loosen bleed valve on primary fuel filter.

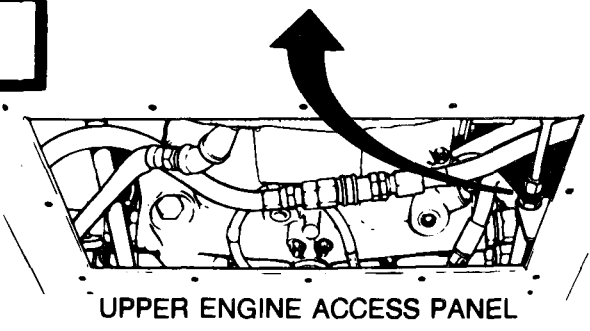
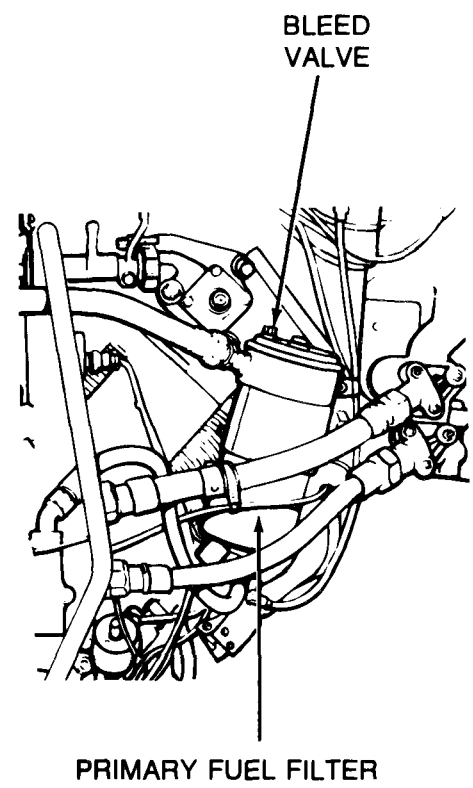
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

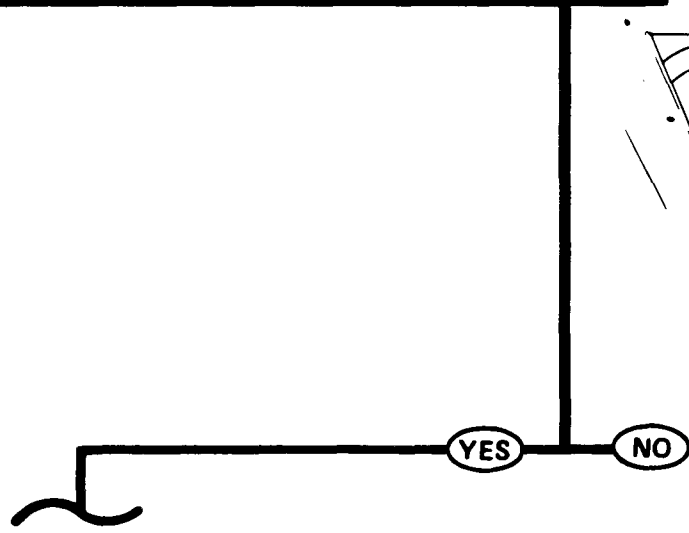
- Check for free fuel flow from primary fuel filter bleed valve.

Did fuel flow freely from primary fuel filter bleed valve?



29

- Check for free fuel flow to primary fuel filter.
- See Step **77** .



Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

30 Check for free fuel flow to the inlet side of the backflow valve.

First Technician (Rear of Crew Compartment)

- Tighten primary fuel filter bleed valve.
- Remove lower engine access panel (page 17-13).
- Disconnect main fuel line from backflow valve inlet (page 7-25).
- Place a container or rags under main fuel line to catch any fuel.

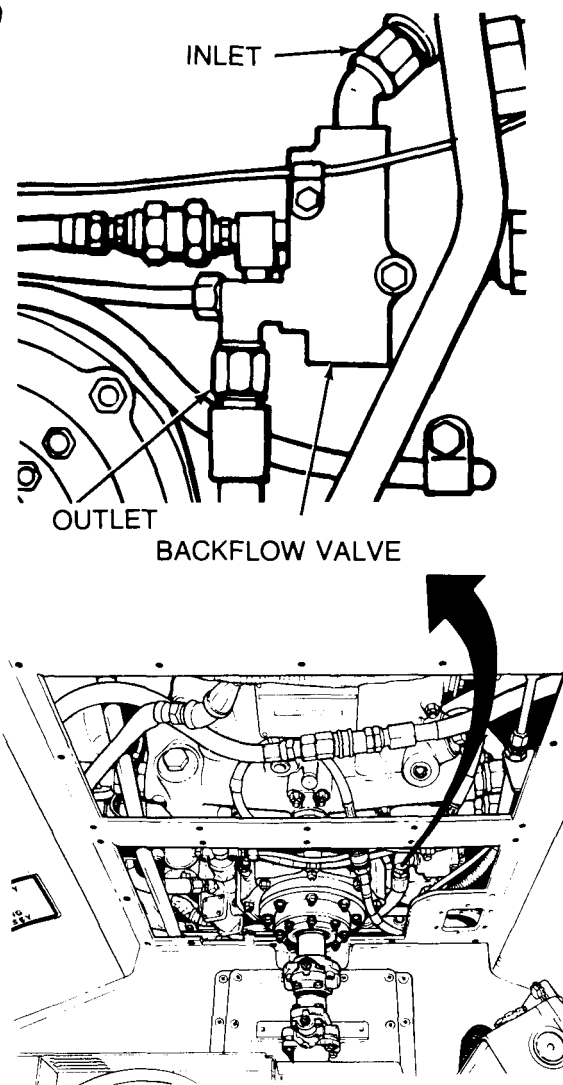
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Check for free fuel flow from main fuel line.

Did fuel flow freely from main fuel line to the backflow valve?



31

- Clear line between primary fuel filter and backflow valve by blowing with compressed air.
- Connect main fuel line to backflow valve inlet (page 7-27).
- If this does not work, replace fuel line (page 7-40).



TA250017

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

32 Check for free fuel flow at outlet side of backflow valve.

First Technician (Rear of Crew Compartment)

- Connect main fuel line from primary fuel filter to backflow valve.
- Disconnect main fuel line at outlet side of backflow valve.
- Place a container or rags under the open fuel line to catch any fuel.

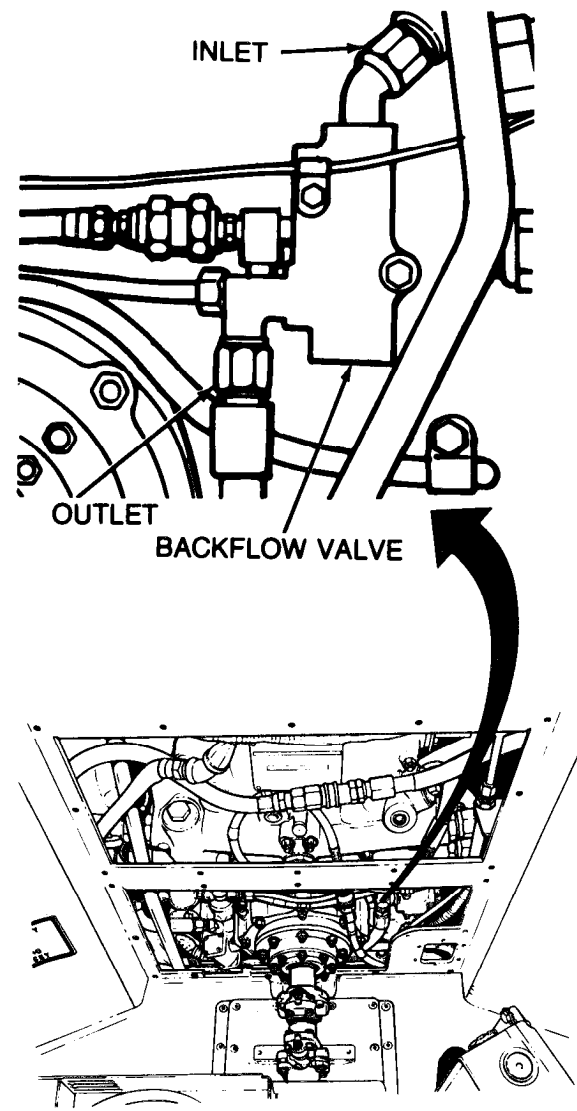
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

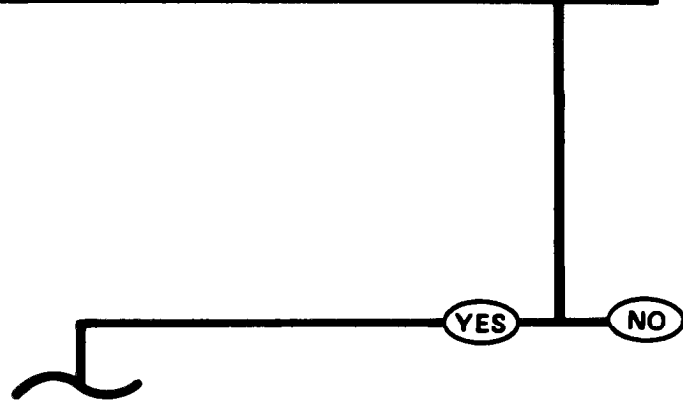
First Technician (Rear of Crew Compartment)

- Check for free fuel flow from backflow valve.

Did fuel flow freely from outlet side of the backflow valve?



33 Replace backflow valve (page 7-25).



Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

34 Check main fuel line between backflow valve and engine fuel pump for leaks.

First Technician (Rear of Crew Compartment)

- Connect main fuel line to outlet side of backflow valve.

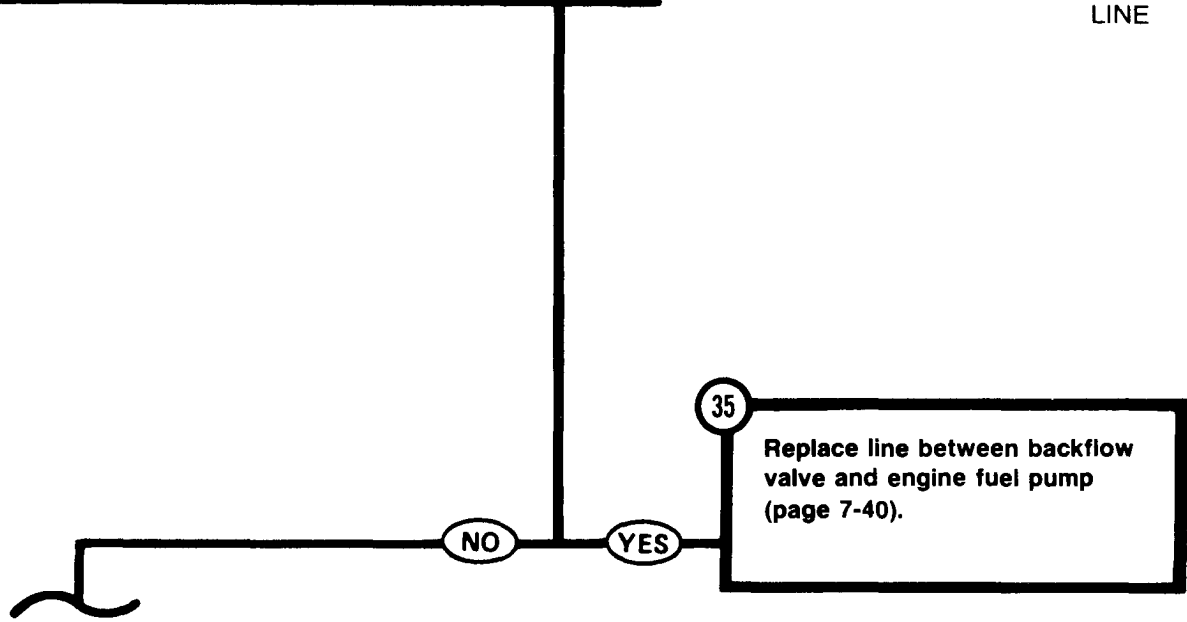
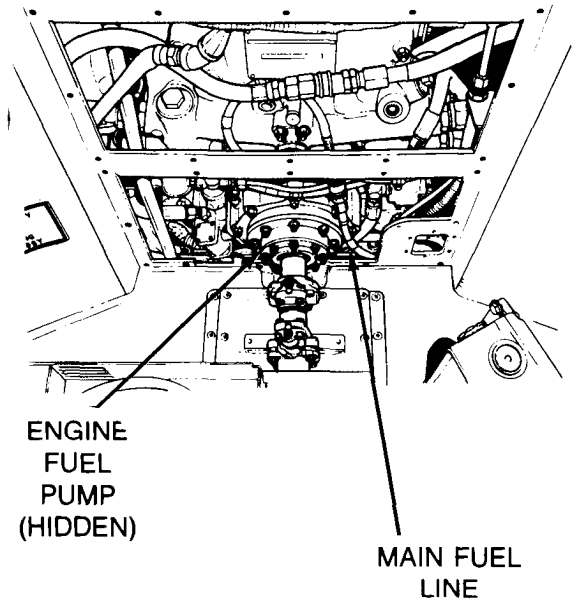
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Rear of Crew Compartment)

- Check for leaks in main fuel line to engine fuel pump.

Is main fuel line to engine fuel pump leaking?



Symptom-2

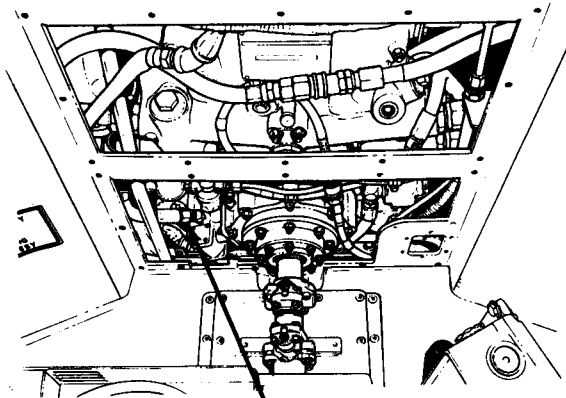
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

36 Check for fuel leaks in fuel line from engine fuel pump to fuel-water separator.

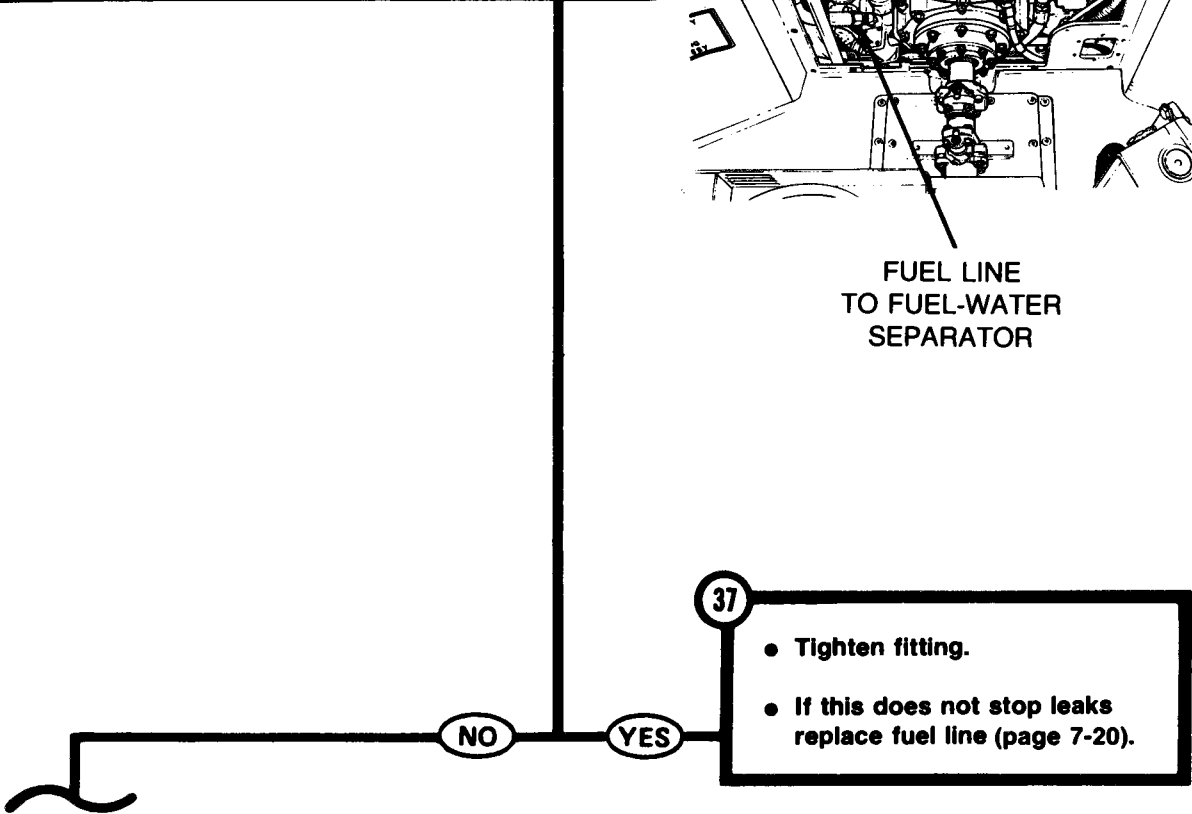
First Technician (Rear of Crew Compartment)

Check flexible hose line from engine fuel pump to fuel-water separator for leaks at fittings and hose.

Is fuel line between fuel water separator and engine fuel pump leaking?



FUEL LINE
TO FUEL-WATER
SEPARATOR



37

- Tighten fitting.
- If this does not stop leaks replace fuel line (page 7-20).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-2

38

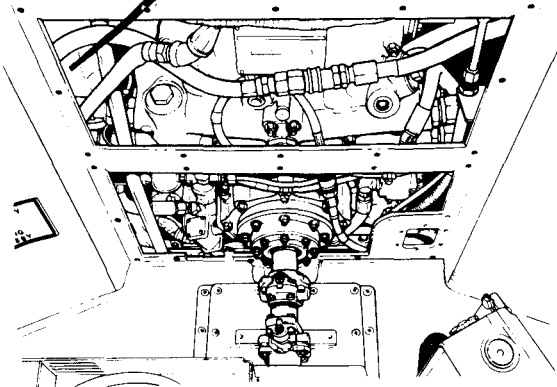
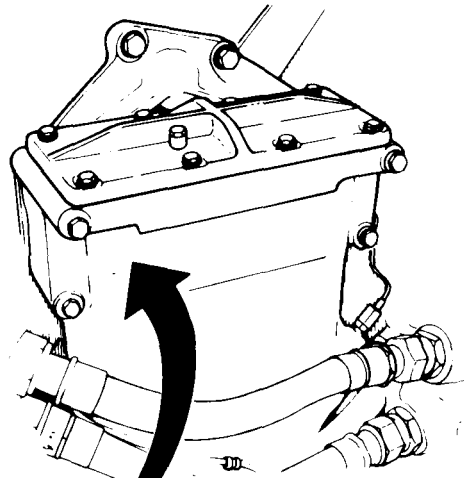
Check for fuel leaks at fuel water separator.

First Technician (Rear of Crew Compartment)

- Check fuel water separator cover for cracks, and fuel leaks at line connections.

Does fuel-water separator leak?

FUEL-WATER SEPARATOR



39

- Tighten leaking fittings.
- If the fuel water separator is cracked, replace (page 7-187).

NO YES

Symptom-2

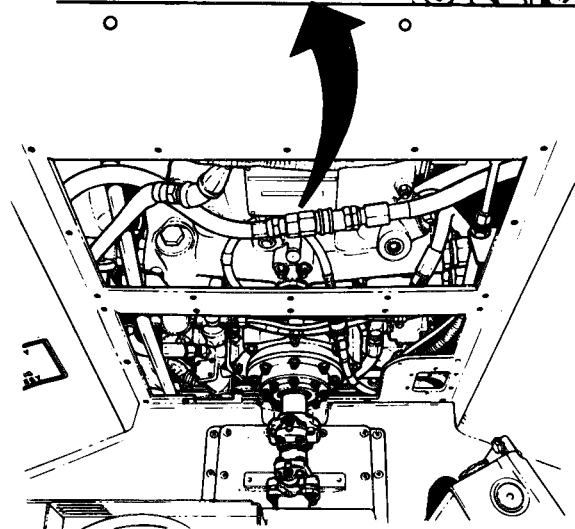
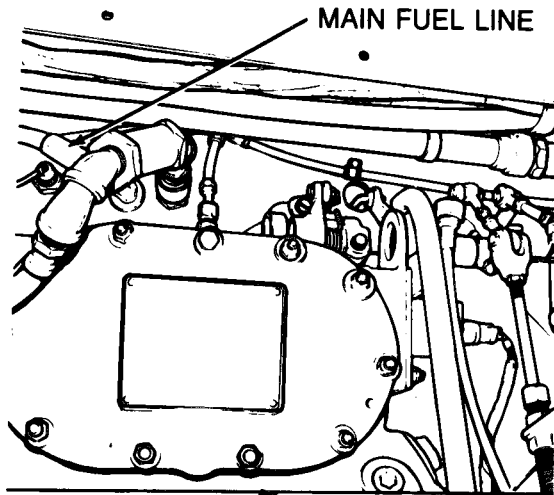
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

40 Check fuel line between fuel-water separator and engine shroud for leaks.

First Technician (Rear of Crew Compartment)

- Check flexible hose line between fuel water separator and front shroud on engine for leaks at connections and in the line.

Is fuel line leaking?



41

- Tighten leaking fittings.
- If line is leaking, replace (page 7-223).

NO

YES

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

42 Check main fuel line from front of engine to fuel injector pump for leaks.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set FUEL PUMPS switch OFF.

First Technician (Rear of Vehicle)

- Remove engine cooling fans (page 9-55).

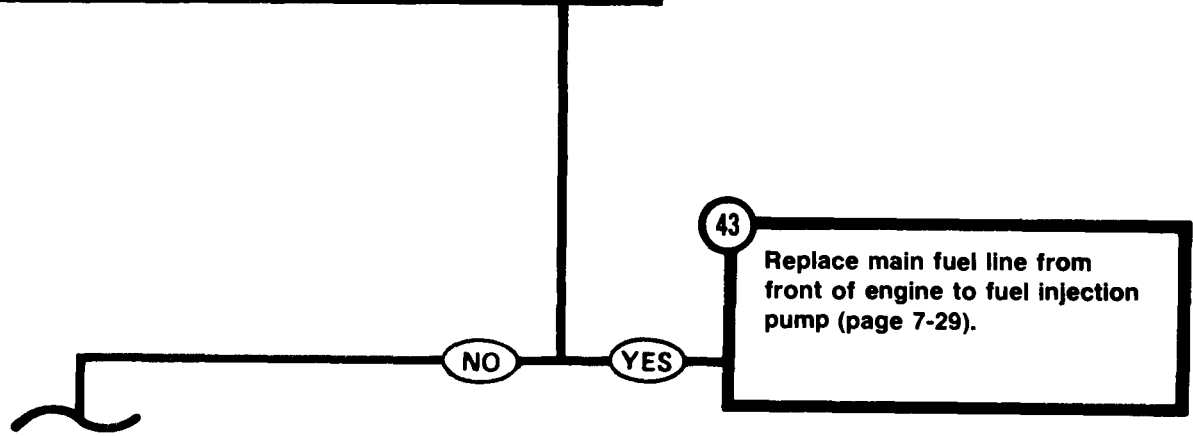
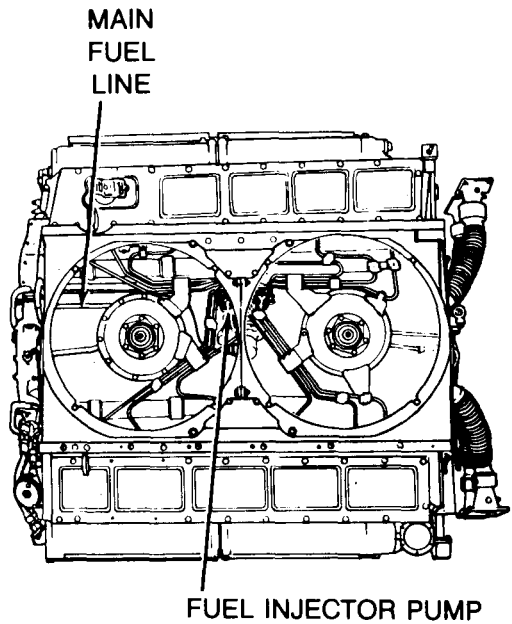
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Top of Engine)

- Check for leaks in main fuel line from front of engine to fuel injection pump.

Is main fuel line leaking?



Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

44 Check main fuel return line from fuel injector pump to back of engine for leaks.

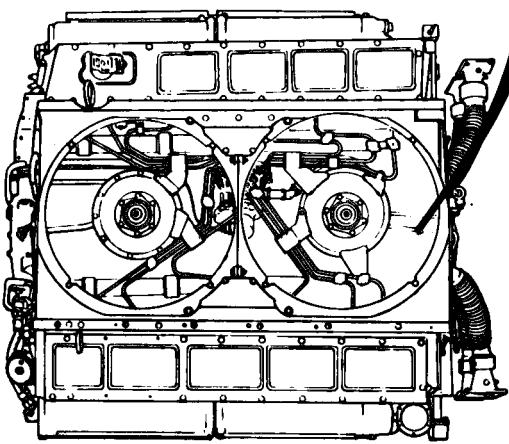
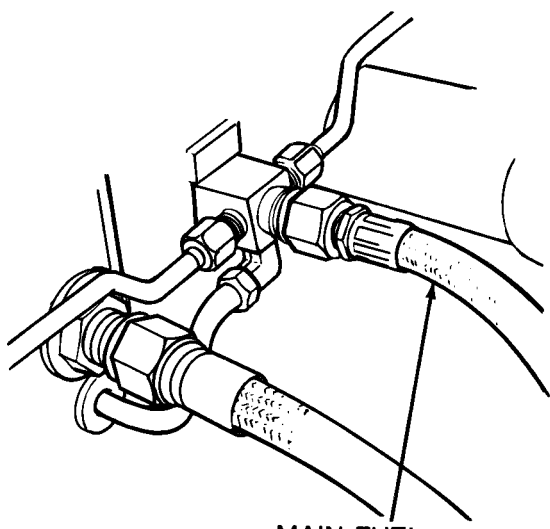
First Technician (Top Deck)

- Inspect main fuel return line between fuel injector pump and rear shroud for leaks.

Second Technician (Operator's Station)

- After leak check is complete, set MASTER BATTERY switch OFF.

Is main fuel return line leaking?



VIEW FROM LEFT SIDE OF VEHICLE

45 Replace main fuel return line between fuel injector pump and rear shroud on engine (page 7-29).

- Install engine cooling fans (page 9-57).

YES

46

- Replace main fuel return line from engine shroud to hose of quick disconnect (page 7-52).
- Install engine cooling fans (page 9-57).

NO

TA250024

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

8

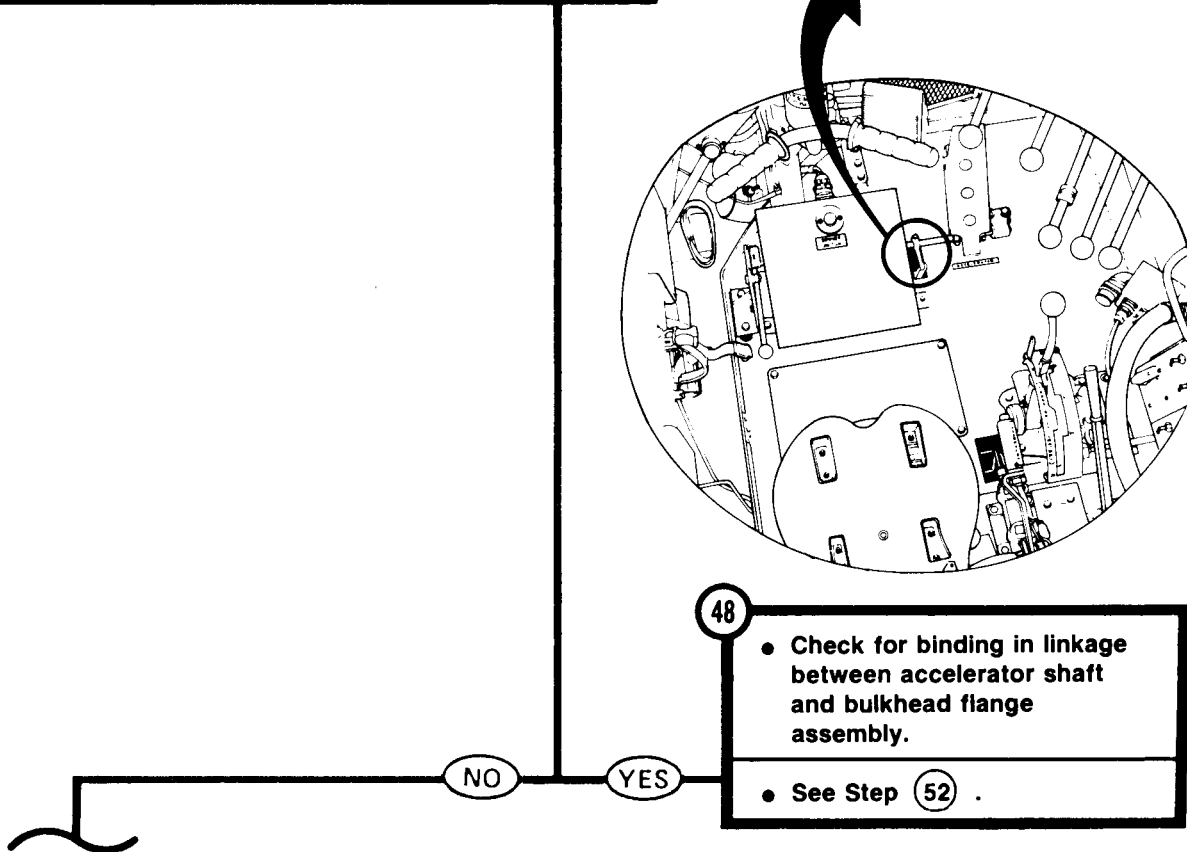
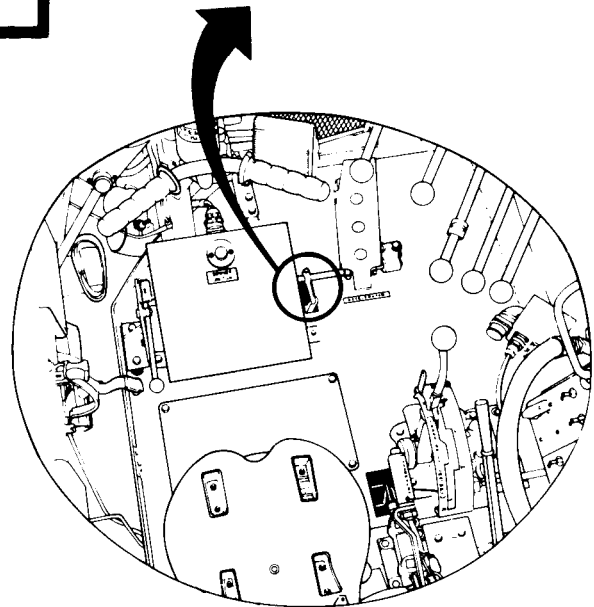
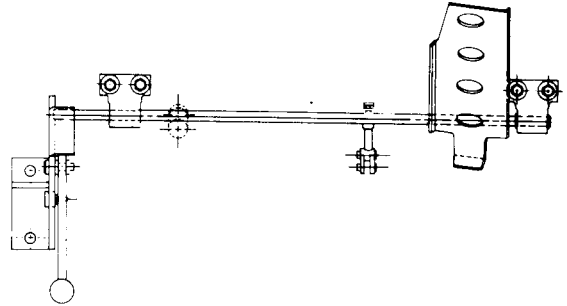
47

Check for binding at accelerator pedal.

Second Technician (Operator's Station)

- Disconnect connecting link from link on accelerator shaft.
- Move accelerator up and down by hand.

Does accelerator pedal move freely without binding?



48

- Check for binding in linkage between accelerator shaft and bulkhead flange assembly.
- See Step 52 .

TA250025

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

49 Check alignment at accelerator shaft and housing assemblies.

Second Technician (Operator's Station)

- Visually check for proper alignment of accelerator shaft and housing assemblies.

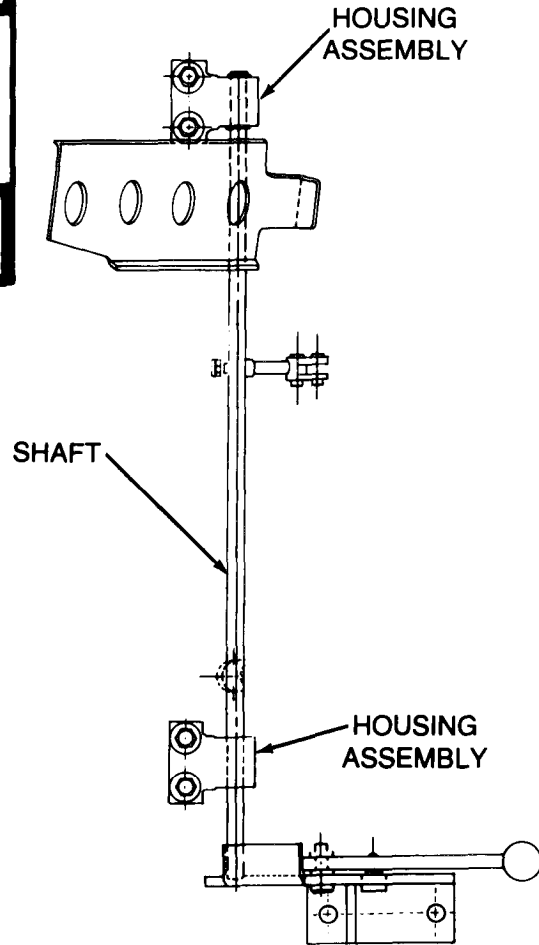
Are housing assemblies and accelerator shaft properly aligned?

50

- Aline housing assemblies and accelerator shaft.
- Connect connecting link to link on accelerator shaft.

51

- Replace binding housing assembly or damaged accelerator shaft.
- Connect connecting link to link on accelerator shaft.



TA250026

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

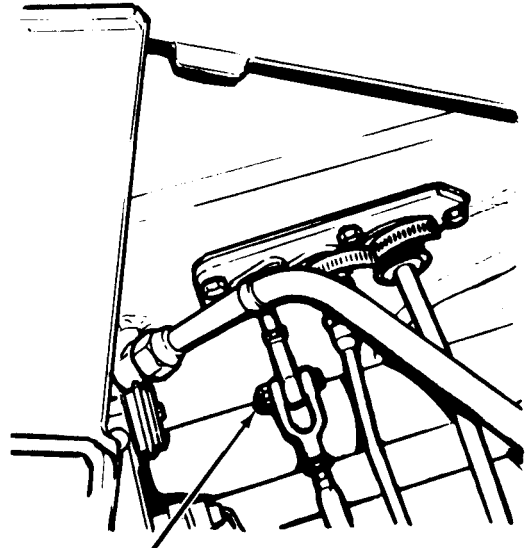
48

52 **Check for binding in linkage between accelerator shaft and bulkhead flange assembly.**

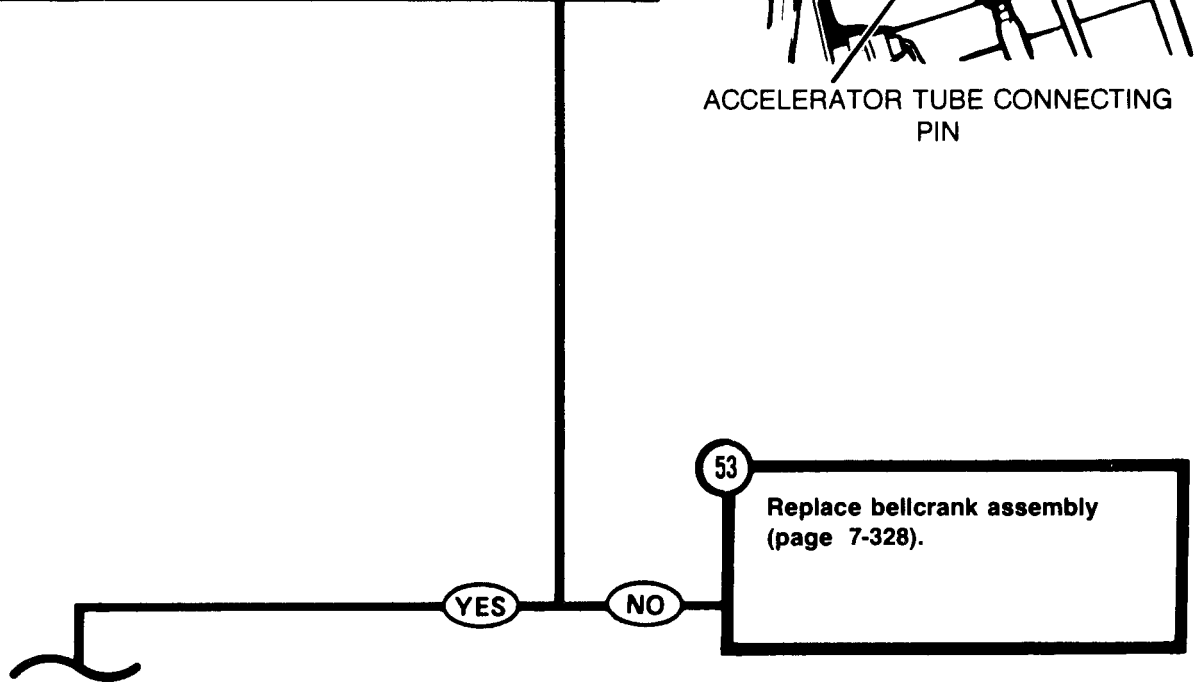
Second Technician (Operator's Station)

- Connect connecting link to link on accelerator shaft.
- Remove left-hand floor access cover (page 17-8).
- Remove pin connecting accelerator tubes at bulkhead.
- Press accelerator pedal down and release.

Does accelerator pedal move freely without binding?



ACCELERATOR TUBE CONNECTING PIN



53 **Replace bellcrank assembly (page 7-328).**

Symptom-2

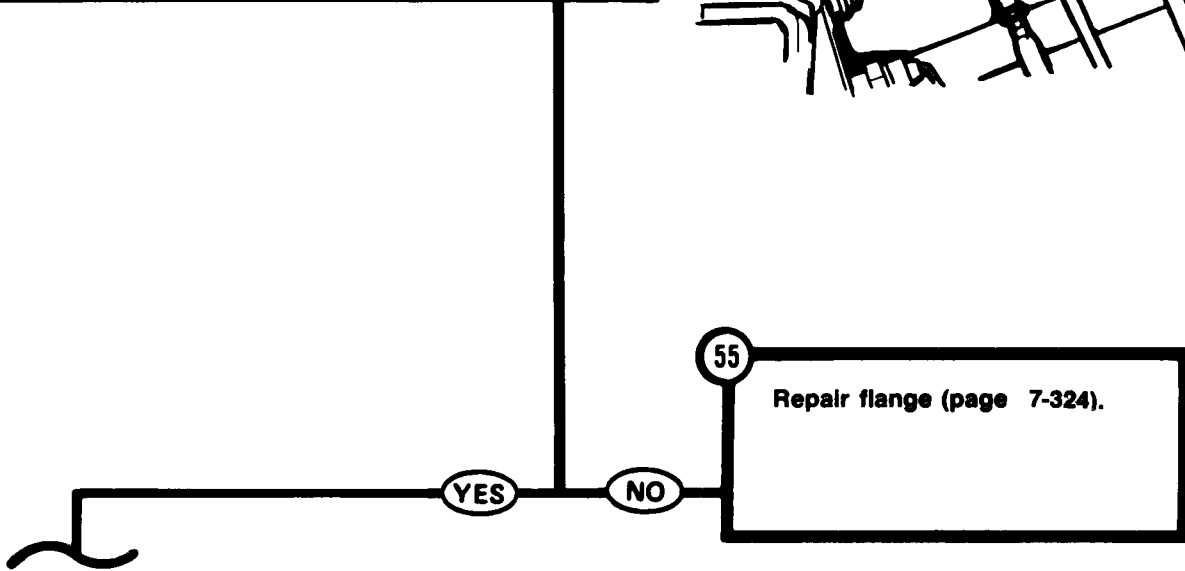
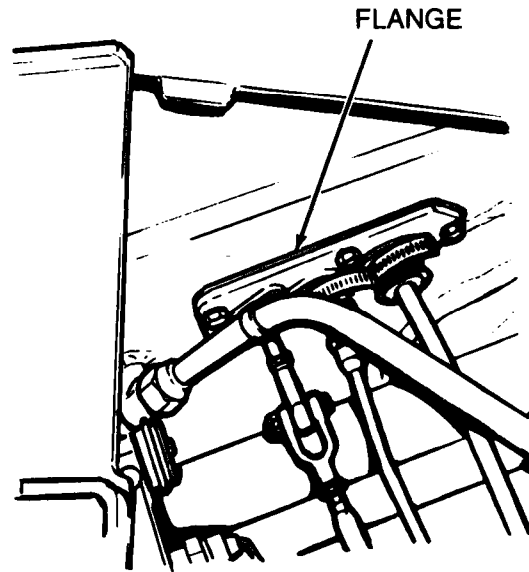
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

54 Check for binding in flange at engine compartment bulkhead.

Second Technician (Operator's Station)

- Install pin connecting accelerator tubes at bulkhead.
- Lock accelerator pedal in full down position.
- Remove nuts holding flange to bulkhead (page 7-324).
- Slide flange forward on accelerator tube.

Does flange move freely on the tube after it is out of the bulkhead?



55 Repair flange (page 7-324).

TA250028

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

56 Check for binding in accelerator linkage between bulkhead and engine.

Second Technician (Operator's Station)

- Reinstall flange (page 7-326).

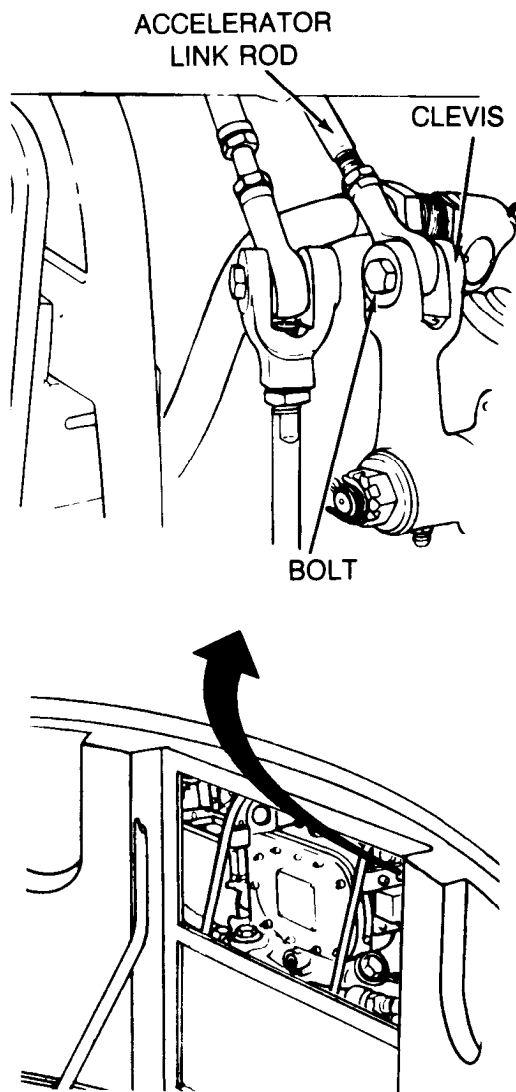
First Technician (Rear of Crew Compartment)

- Remove engine upper access panel (page 17-11).
- Disconnect link rod by removing bolt from clevis.

Second Technician (Operator's Station)

- Press and release accelerator pedal.

Does accelerator pedal move freely without binding?



57

- Notify support maintenance of accelerator linkage problem between bulkhead floor and engine.
- Connect accelerator link rod to clevis.
- Install engine upper access panel (page 17-12).

NO

58

- Notify support maintenance of accelerator linkage problem on engine.
- Connect accelerator link rod to clevis.
- Install engine upper access panel (page 17-12).

YES

TA250029

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

10

59

Check for movement of throttle stop pin at engine.

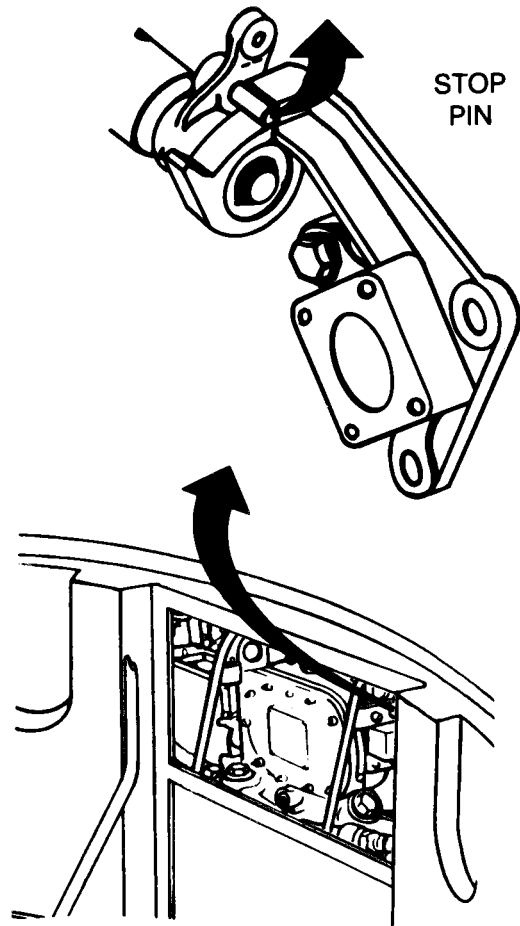
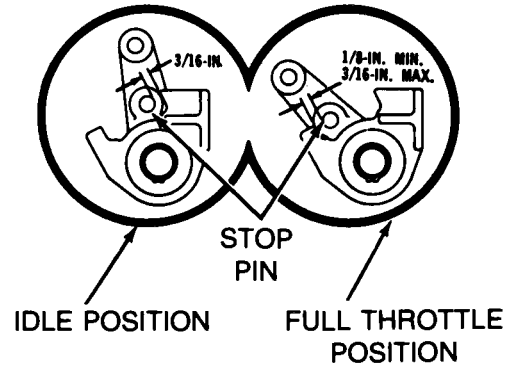
Second Technician (Operator's Station)

- Press accelerator pedal all the way down and release.

First Technician (Rear of Crew Compartment)

- Check position of stop pin at idle and at full throttle.

Does stop pin move to specified positions?



60

Adjust accelerator linkage to get correct throttle stop pin specifications (page 7-316).

NO

61

Notify support maintenance of problem with throttle crossover shaft.

YES

TA250030

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

12

62

Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch OFF).

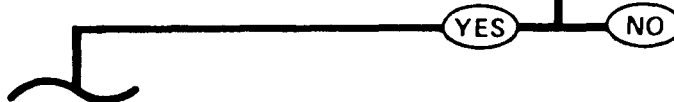
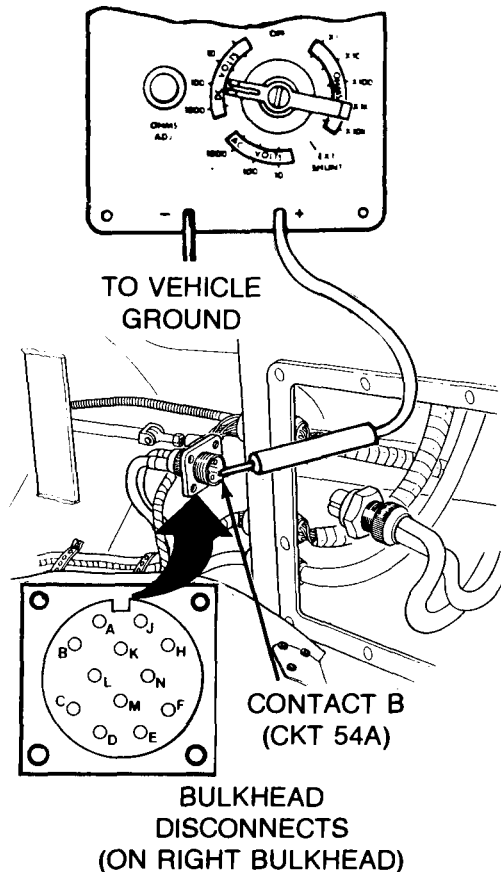
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace front accessory harness from bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



63

- Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch ON).
- See Step 67 .

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

64 Check fire extinguisher fuel shutoff switch for continuity (internal short).

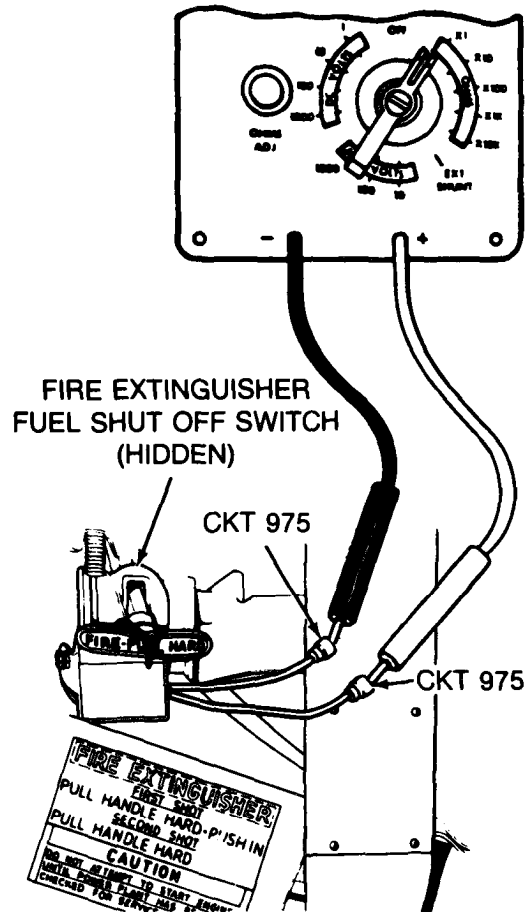
First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Install engine upper access panel (page 17-12).

Second Technician (Operator's Station)

- Disconnect front accessory harness connectors (CKT 975) from fire extinguisher fuel shutoff switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect one probe of meter to each disconnected fuel shutoff switch connector.
- Check if meter indicates continuity.

Did meter indicate continuity, thereby indicating a shorted switch?



65

- Replace fire extinguisher and fuel shutoff relay (page 10-141).
- Connect front accessory harness connectors to fire extinguisher fuel shutoff switch.

NO

66

Replace fuel shutoff switch (page 20-28).

YES

TA250032

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

63

67 Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch ON).

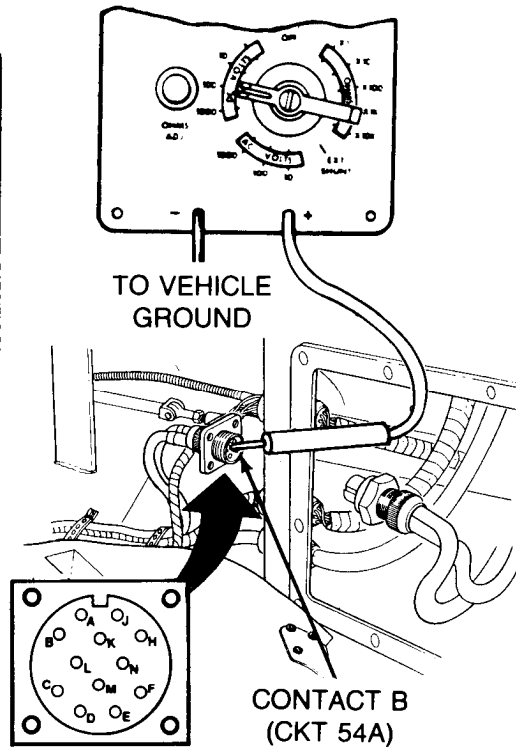
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



**BULKHEAD DISCONNECTS
(ON RIGHT BULKHEAD)**

68

- Notify support maintenance of inoperative fuel shutoff solenoid.
- Install engine access panel (page 17-12).
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

NO YES

69

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Replace fuel shutoff switch (page 20-28).
- Install engine access panel (page 17-12).

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

27

70 Check for free fuel flow from main fuel supply line between quick disconnect and flexible line.

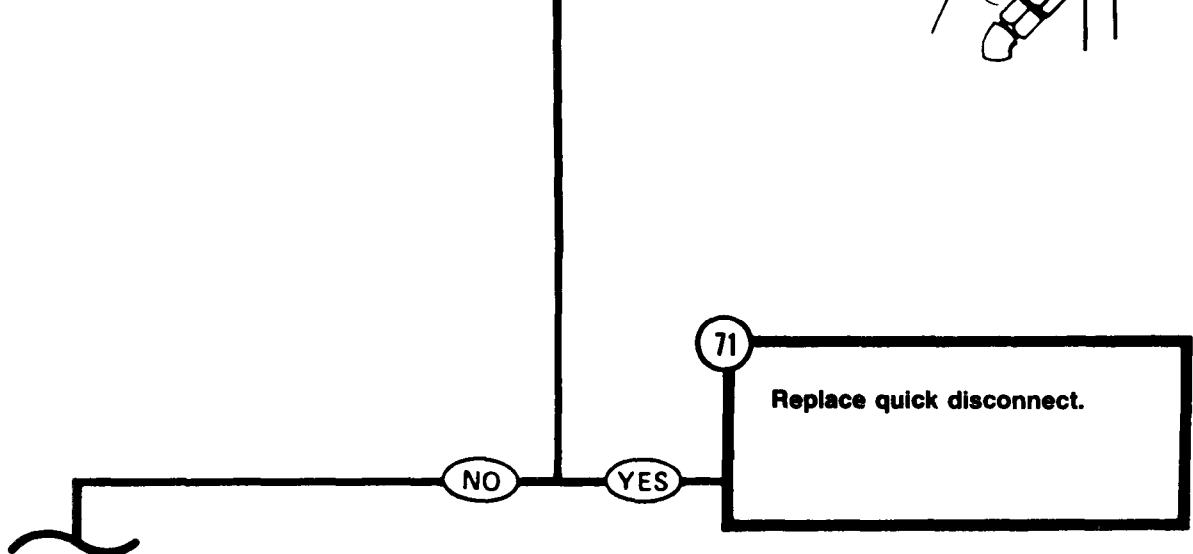
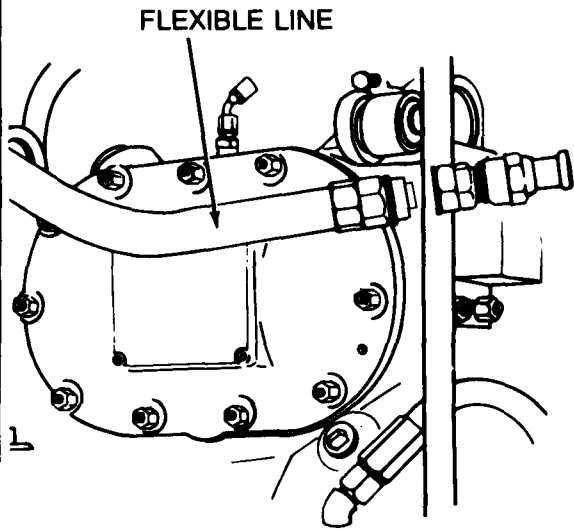
First Technician (Rear of Crew Compartment)

- Remove female quick disconnect half from flexible line.
- Place a suitable container under open line to catch any fuel.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for approximately 10 seconds, then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely from flexible line?



Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

72 **Check for free fuel flow from main fuel line at connection between tubing and flexible hose.**

First Technician (Top Deck)

- Have powerplant removed (page 5-2).

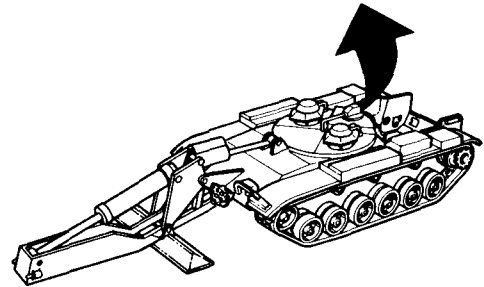
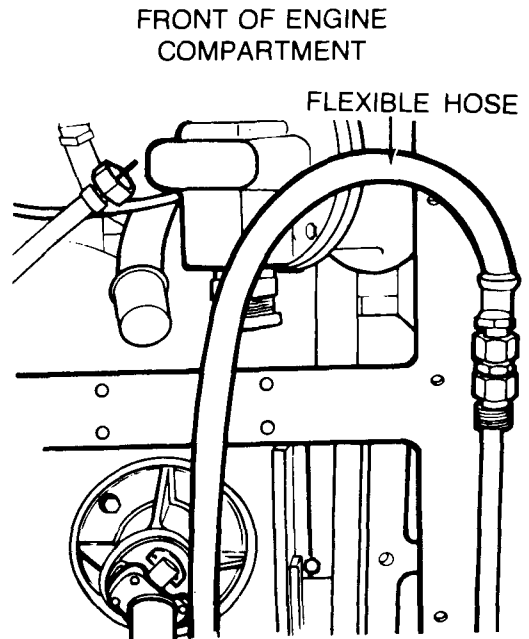
First Technician (Engine Compartment)

- Disconnect flexible hose from metal fuel supply line.
- Place a suitable container or rags under fuel line to catch any fuel.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds, then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

Did fuel flow freely from metal fuel supply line?



73

- Clear clogged flexible hose by blowing with compressed air.
- Install female quick disconnect half to flexible hose.
- Connect flexible hose to metal fuel supply line.
- If this does not work, replace flexible hose.

NO

YES

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

74

Check for free fuel flow from tee on main fuel supply line in engine compartment.

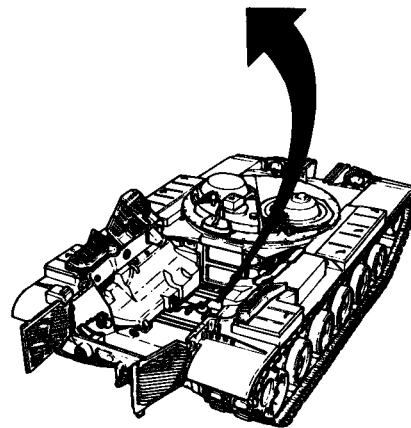
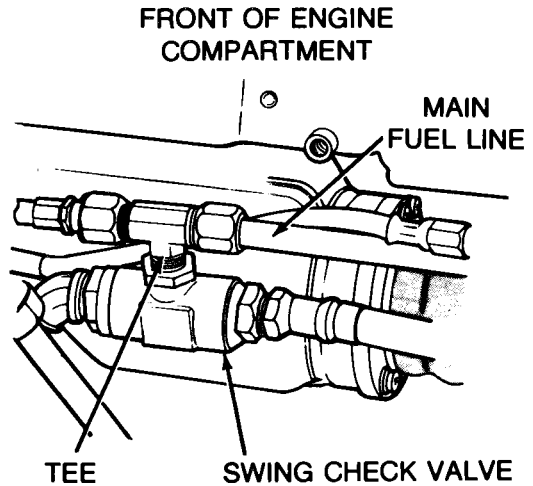
First Technician (Engine Compartment)

- Reconnect flexible hose to metal fuel supply line.
- Install female quick disconnect half to flexible line.
- Disconnect main fuel line at tee in main fuel line.
- Place a container or rags under open fitting to catch any fuel.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for a few seconds, then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

Did fuel flow freely from tee of main fuel supply line?



75

Replace swing check valve (page 7-294).

NO

YES

76

- Clear clogged metal fuel supply line by blowing with compressed air.
- Connect main fuel line.
- If this does not work, replace metal fuel supply line.

Symptom-2

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

29

77 Check for free fuel flow to primary fuel filter.

First Technician (Rear of Crew Compartment)

- Remove primary fuel filter element (page 7-187).

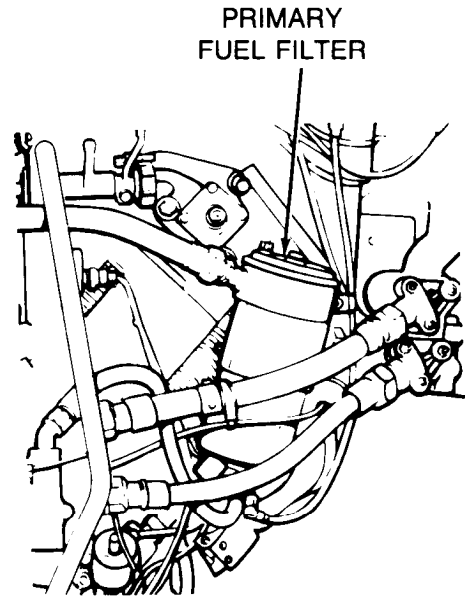
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds, then set FUEL PUMPS switch OFF.

First Technician (Rear of Crew Compartment)

- Check for fuel flowing into primary fuel filter.

Did fuel flow into primary fuel filter with element removed?



78

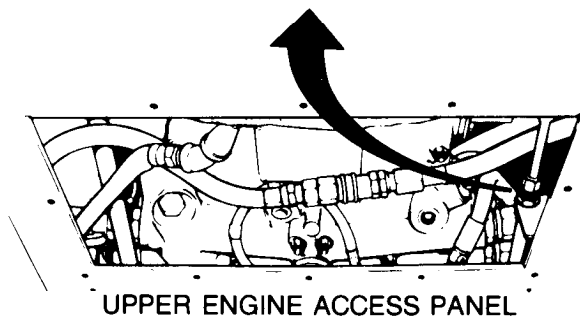
- Clear flexible line to primary fuel filter by blowing with compressed air.
- If this does not work, replace flexible line (page 7-193).
- Tighten primary fuel filter bleed valve.

NO

79

- Replace primary fuel filter element (page 7-187).
- Tighten primary fuel filter bleed valve.

YES



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-3

ENGINE CRANKS SLOWLY AND WILL NOT START.

NOTE

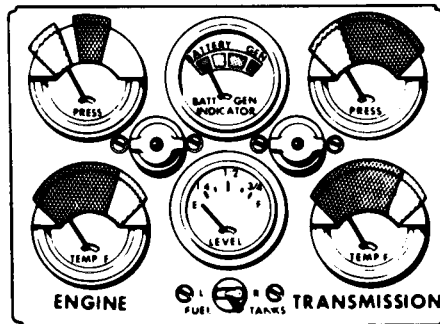
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check BATT GEN INDICATOR gage for above mid yellow indication.

Second Technician (Operator's Station)

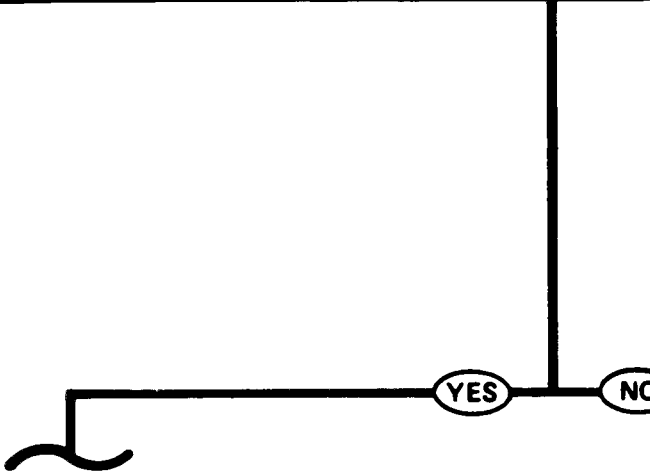
- Set MASTER BATTERY switch ON.
- Visually check if BATT GEN INDICATOR gage indicates above mid yellow.
- Set MASTER BATTERY switch OFF.

Does BATT GEN INDICATOR gage indicate above mid yellow?



2

- Service batteries (TM 5-5420-226-10).
- Charge batteries (TM 9-6140-200-14).
- If STE/ICE is available, perform Test No. 77/79: BATTERY CONDITION TEST (page 4-60).

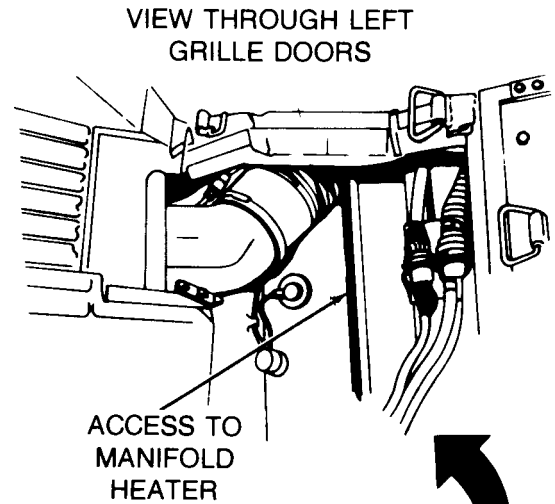


**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-3

NOTE
If outside air temperature is above 40°, go to Step 5.

WARNING
Do not touch manifold preheaters with bare hands.



3 Check manifold preheaters for heat.

First Technician (Top Deck)

- Open left and right top deck grille doors.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- At the same time, press STARTER BUTTON, PREHEAT SWITCH and operate primer pump. Do not hold switches on for more than 14 seconds.

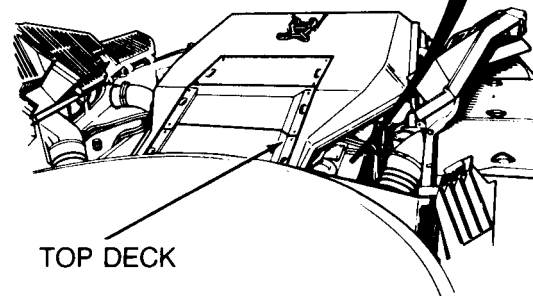
First Technician (Top Deck)

- Reach through grille door opening and feel for heat from manifold preheater (left and right side).
- Check if heat comes from both manifold preheaters.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Does heat come from both manifold preheaters?



4

- If both preheaters are cold, See Symptom 9: BOTH INTAKE MANIFOLD PREHEATERS WILL NOT WORK.
- If only one preheater is cold, See Symptom 8: ONE INTAKE MANIFOLD PREHEATER WILL NOT WORK.



Symptom-3

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

NOTE

If STE/ICE is available, perform Test No. 74, STARTER CIRCUIT RESISTANCE (page 4-73) before doing Step 5.

5

Check battery slave cable connector (CKT 81) at bulkhead disconnect for loose corroded or damaged wires and/or connector contacts.

Second Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Commander's Station)

- Displace battery slave cable connector (CKT 81) from bulkhead disconnect (page 10-269).
- Check battery slave cable connector (CKT 81) for loose, corroded or damaged wires and/or contacts.

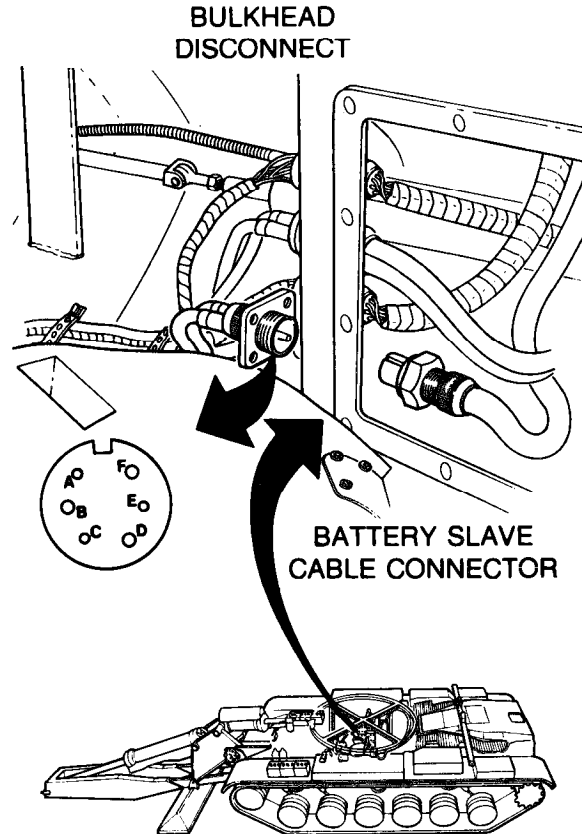
Does connector have loose, corroded or damaged wires and/or contacts?

NO

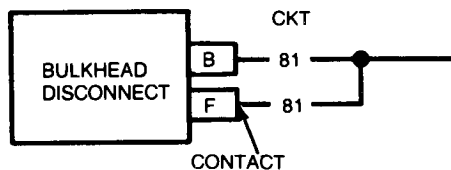
YES

6

- Repair battery slave cable (page 10-298).



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250040

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

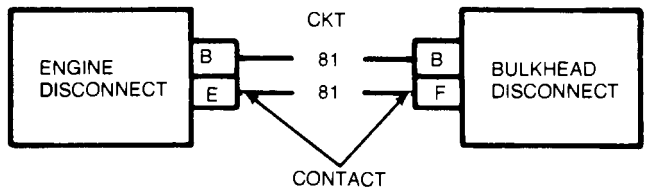
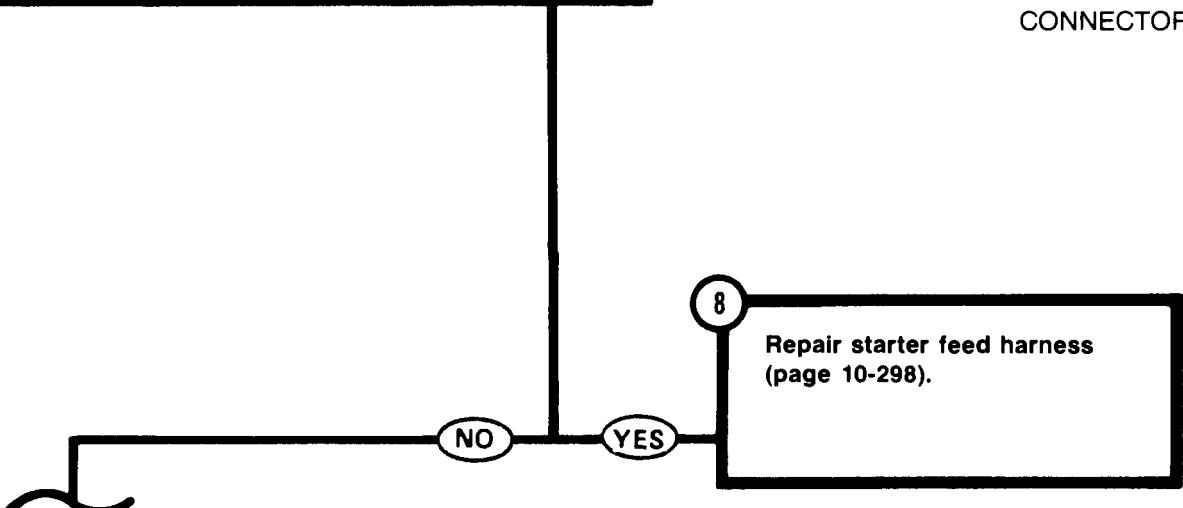
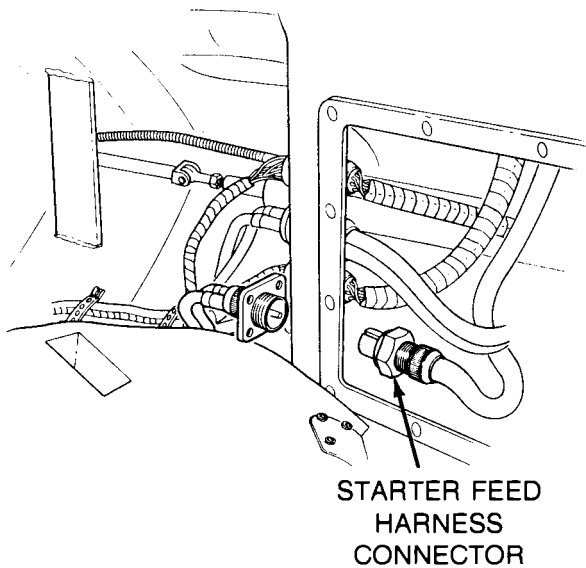
Symptom-3

7 Check starter feed harness connector (CKT 81) at bulkhead disconnect for loose, corroded or damaged wires and/or contacts.

First Technician (Commander's Station)

- Check starter feed harness connector (CKT 81) at bulkhead disconnect for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or contacts?



TA250041

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-3

9 Check starter feed harness connector (CKT 81) at engine disconnect for loose, corroded or damaged wires and/or contacts.

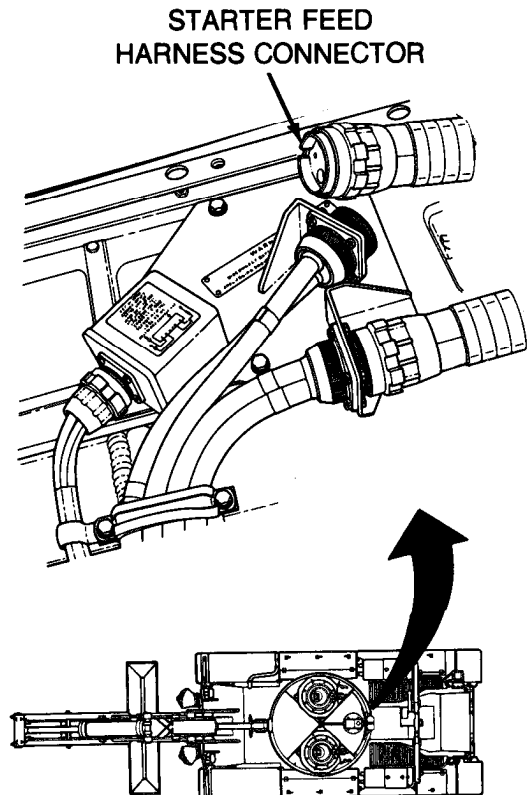
First Technician (Commander's Station)

- Install battery slave cable at bulkhead disconnect (page 10-270).

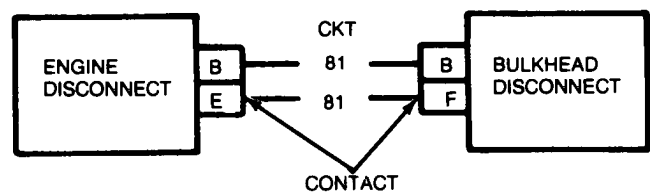
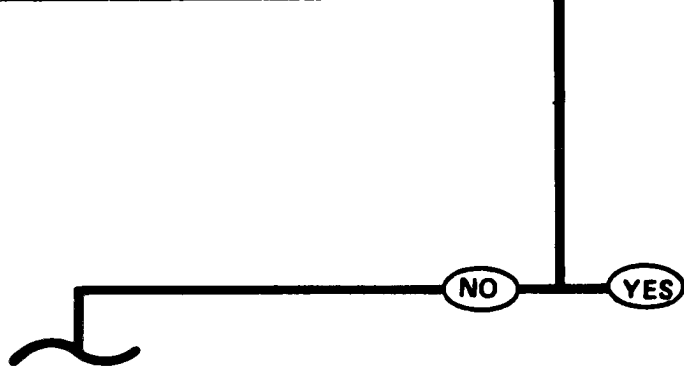
First Technician (Top Deck)

- Open right top deck grille doors.
- Disconnect starter feed harness connector (CKT 81) from engine disconnect.
- Check starter feed harness connector for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or contacts?



10 Repair starter feed harness (page 10-298).



TA250042

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-3

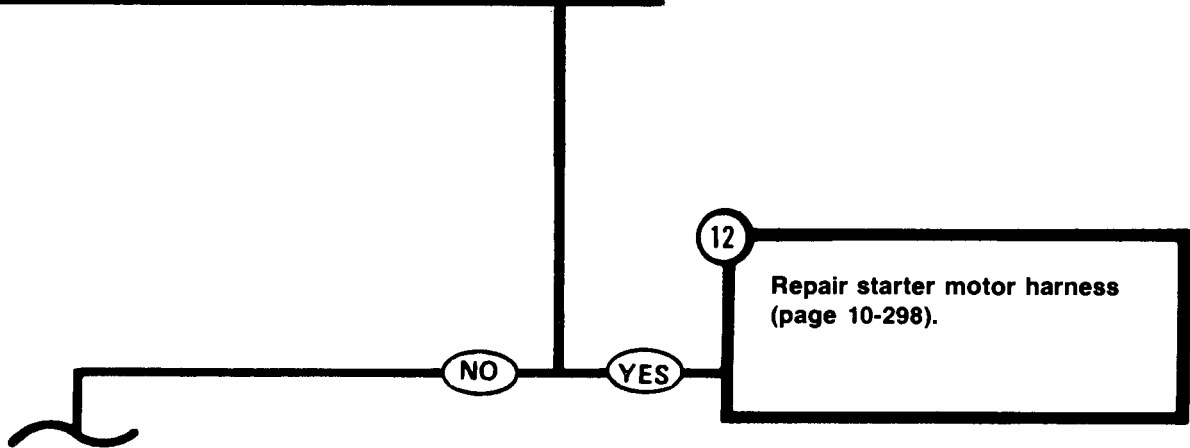
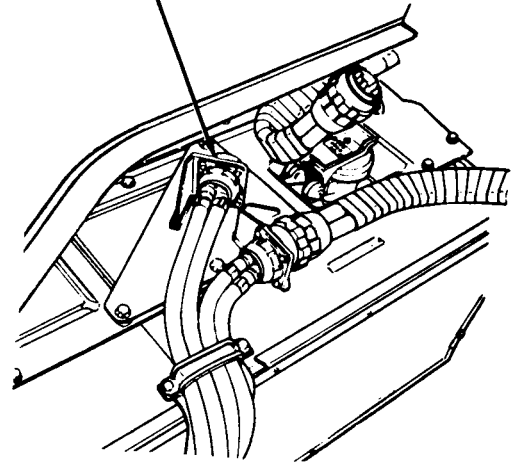
11 Check starter motor harness connector (CKT 81) at engine disconnect for loose, corroded or damaged wires and/or contacts.

First Technician (Top Deck)

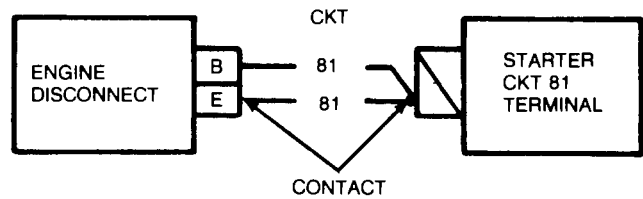
- Check starter motor harness connector (CKT 81) at engine disconnect for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or loose contacts?

STARTER MOTOR
HARNESS RECEPTACLE



12 Repair starter motor harness (page 10-298).



TA250043

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

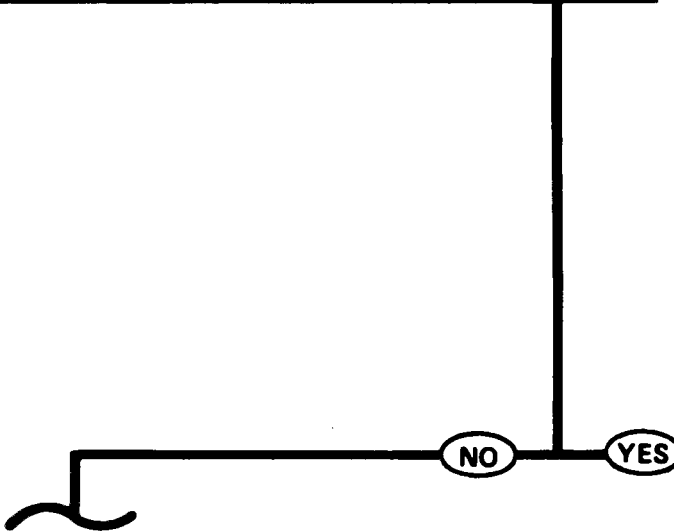
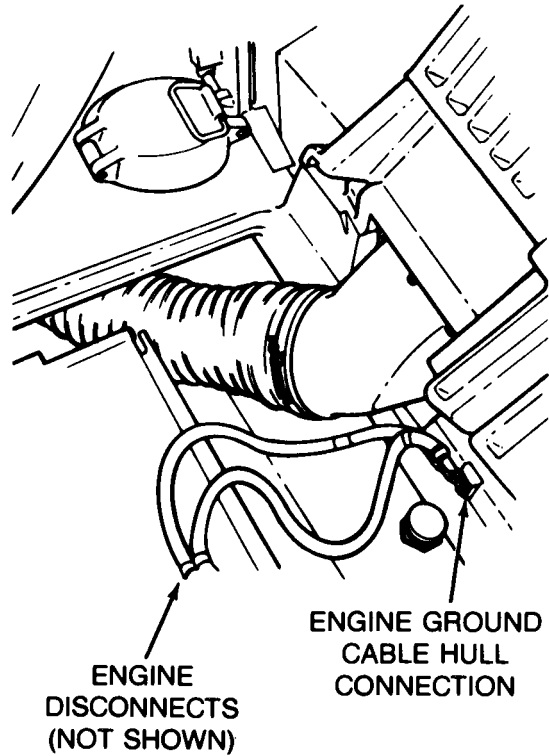
Symptom-3

13 Check engine ground cable (CKT GND) for loose, corroded or damaged wires and/or terminals at hull connection.

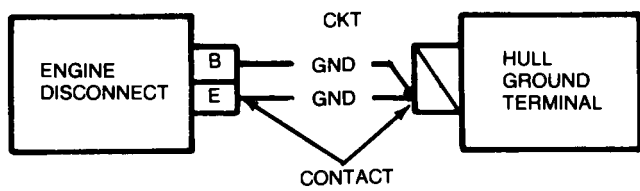
First Technician (Top Deck)

- Connect starter feed harness to engine disconnect.
- Check engine ground cable (CKT GND) for loose, corroded or damaged wires and/or terminals at hull connection.

Does cable have loose, corroded or damaged wires and/or terminals at hull connection?



14 Replace engine ground cable (page 10-271).



TA250044

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

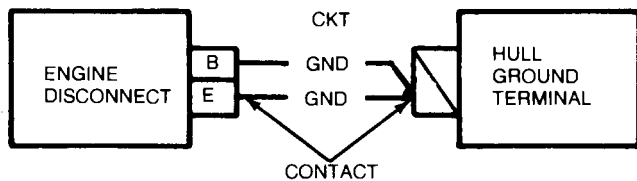
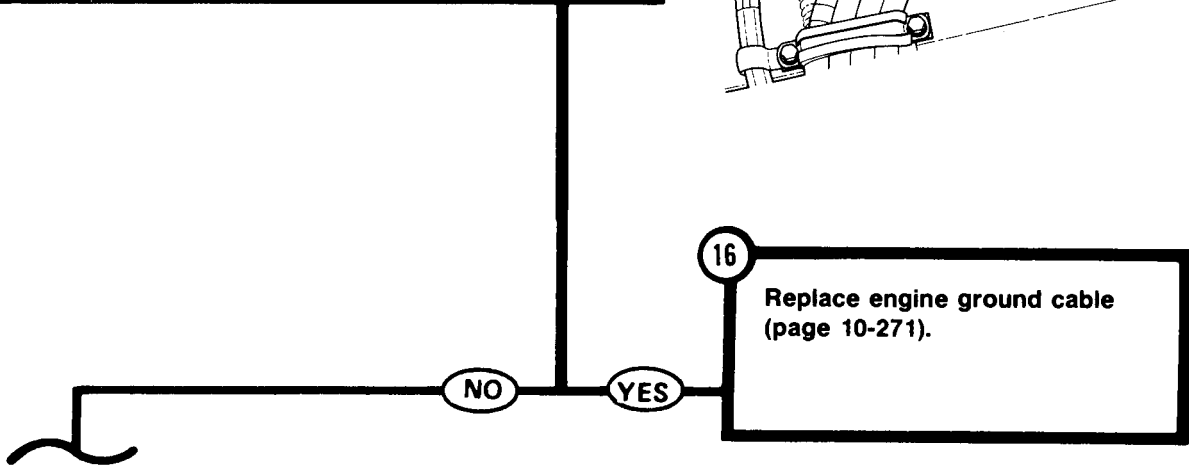
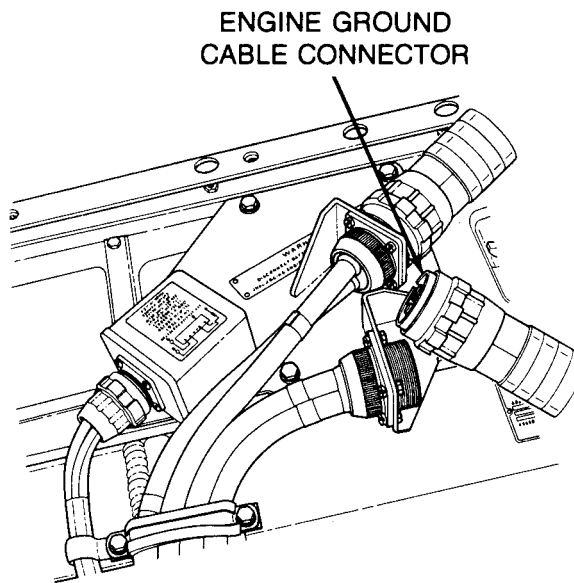
Symptom-3

15 Check engine ground cable connector (CKT GND) at engine disconnect for loose, corroded or damaged wires and/or contacts.

First Technician (Top Deck)

- Disconnect engine ground cable connector (CKT GND) from engine disconnect.
- Check engine ground cable connector (CKT GND) for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or contacts?



TA250045

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

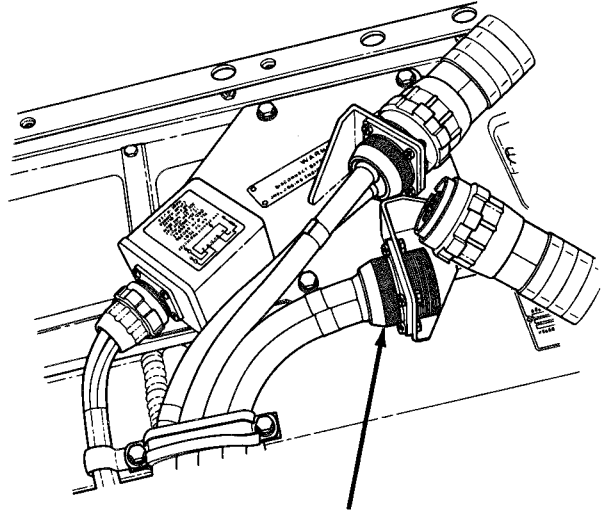
Symptom-3

17 Check starter ground harness (CKT GND) connector at engine disconnect for loose, corroded or damaged wires and/or contacts.

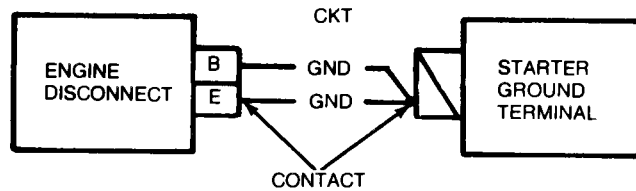
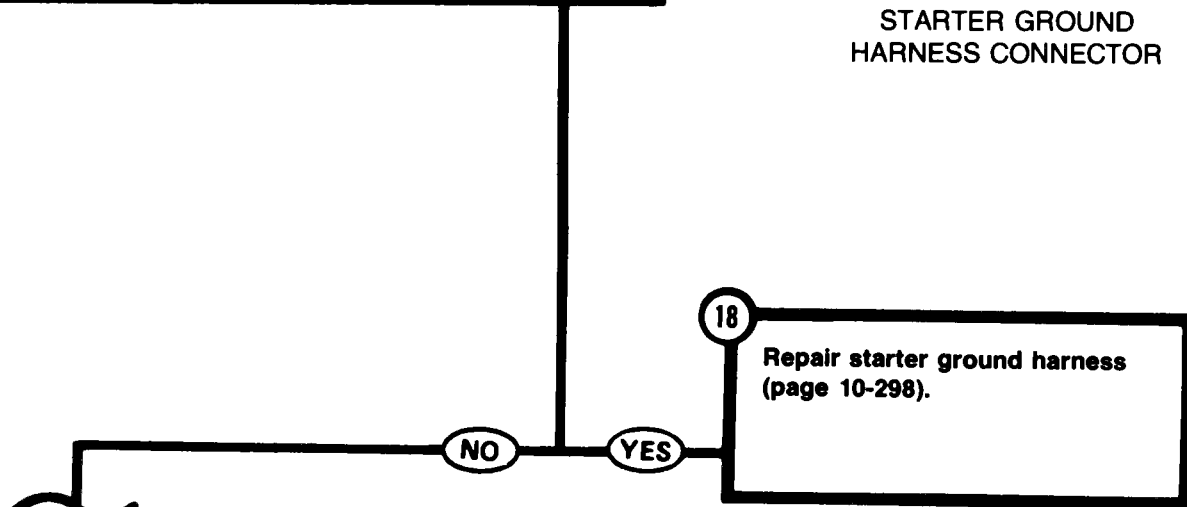
First Technician (Top Deck)

- Check starter ground harness (CKT GND) connector for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or contacts?



**STARTER GROUND
HARNESS CONNECTOR**



TA250046

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-3

19 Check starter motor harness (CKT 81) at starter solenoid terminals for loose, corroded or damaged wires and terminal connectors.

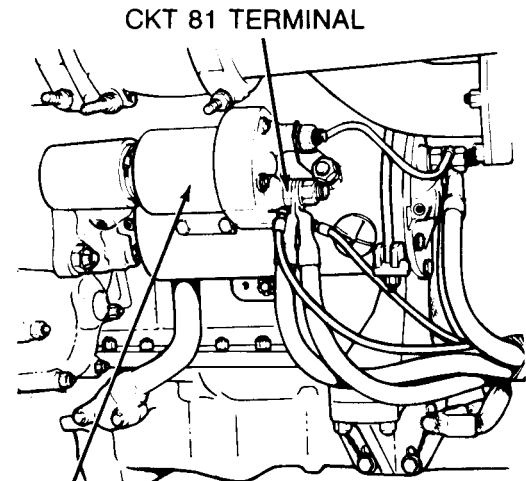
First Technician (Top Deck)

- Have powerplant removed (page 5-2).

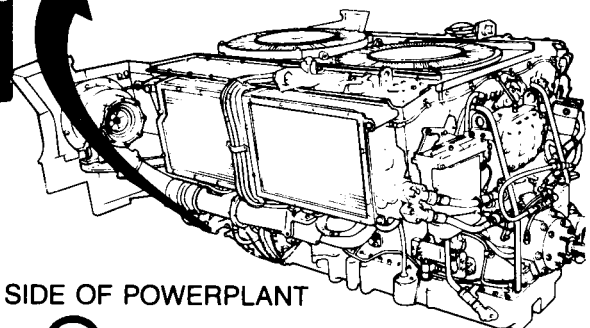
First Technician (Left Side of Powerplant)

- Check starter motor harness (CKT 81) at starter solenoid terminal for loose, corroded or damaged wires and/or terminal connectors.

Does harness have loose, corroded or damaged wires and/or terminal connectors?

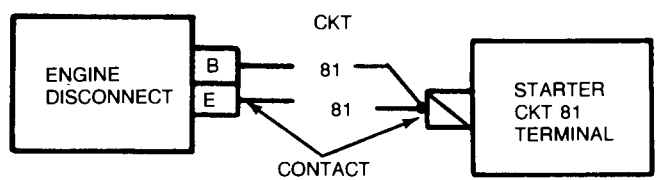


STARTER SOLENOID



20 Repair starter motor harness (page 10-298).

NO YES



TA250047

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

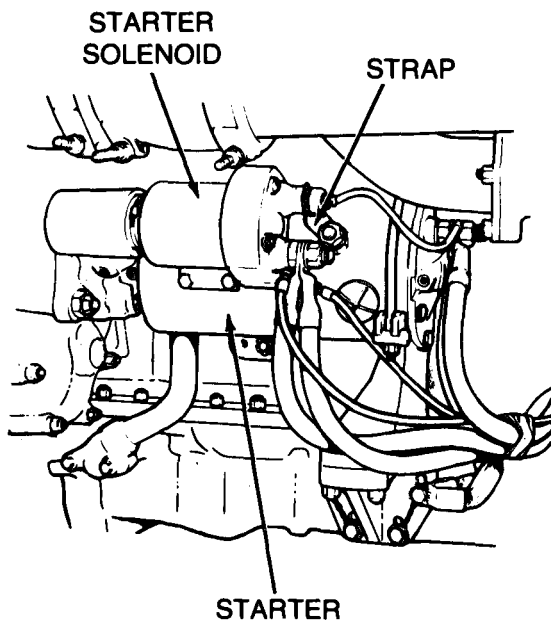
Symptom-3

21 Check strap between starter solenoid and starter for loose connections and corrosion.

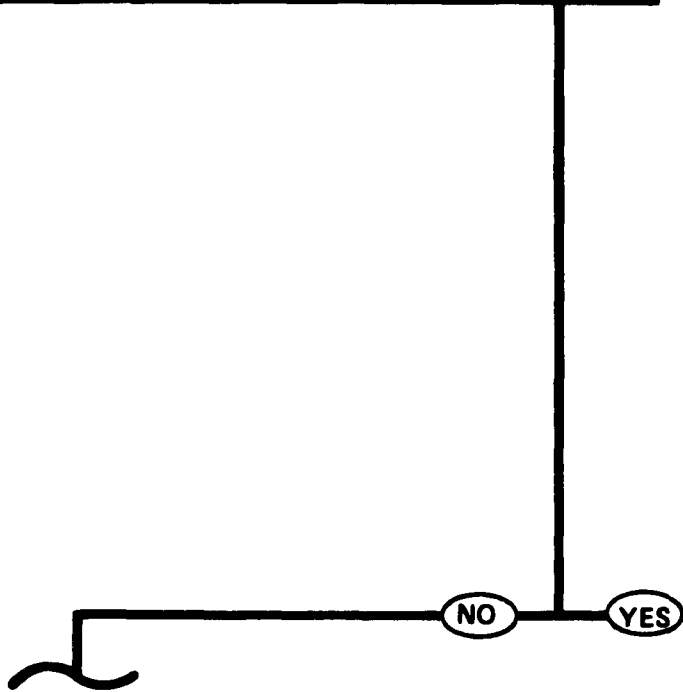
First Technician (Left Side of Powerplant)

- Check strap between starter motor and solenoid for loose connections and corrosion.

Does strap have loose connections or corrosion?



22 Clean and tighten strap.



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

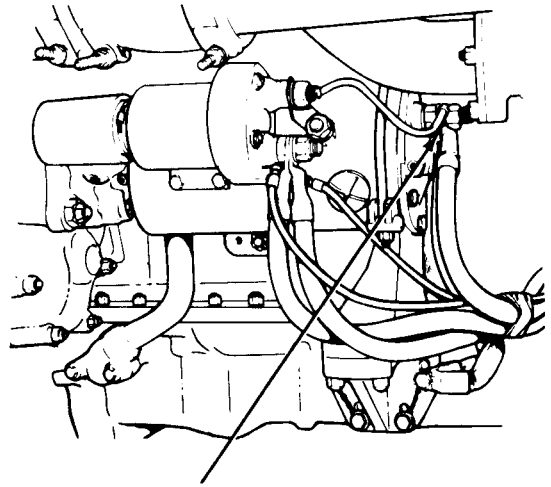
Symptom-3

23 Check starter ground harness (CKT GND) at starter for loose, corroded or damaged wires and/or terminal connectors.

First Technician (Left Side of Powerplant)

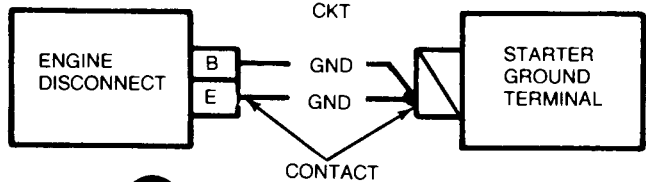
- Check starter ground harness (CKT GND) at starter for loose, corroded or damaged wires and/or terminal connectors.

Does harness have loose, corroded or damaged wires and/or terminal connectors?



STARTER GROUND TERMINAL

24 Repair starter ground harness (page 10-298).

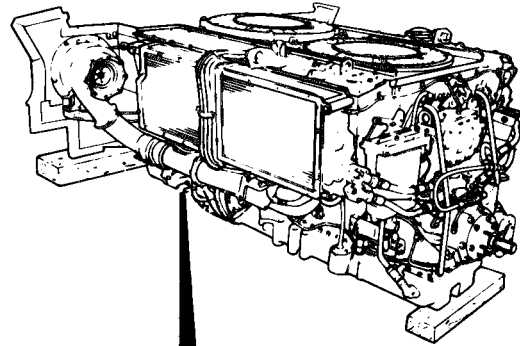


25 Replace starter (page 10-21).

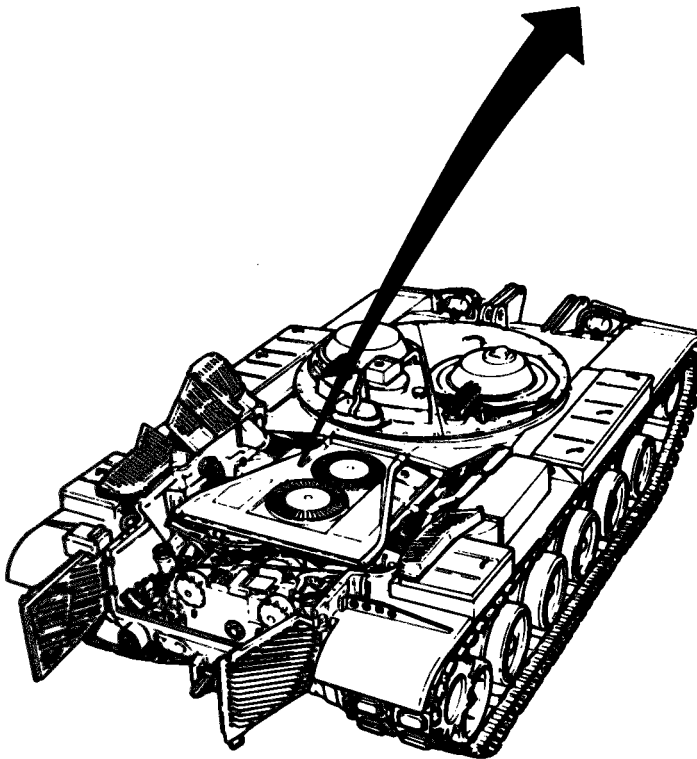
Symptom-4 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING

ENGINE STARTER SPINS, BUT WILL NOT CRANK ENGINE.

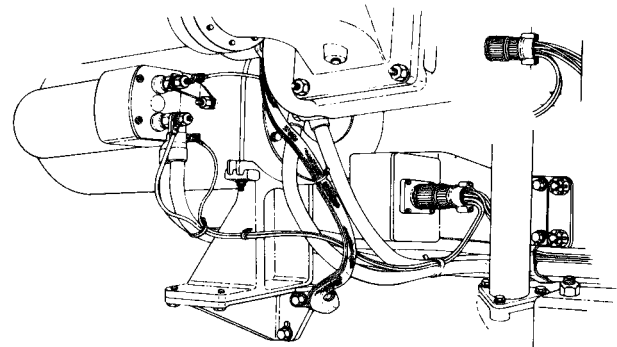
LOCATOR VIEWS:



POWERPLANT



**FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN**



STARTER ASSEMBLY

TA250050

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-4

ENGINE STARTER SPINS, BUT WILL NOT CRANK ENGINE.

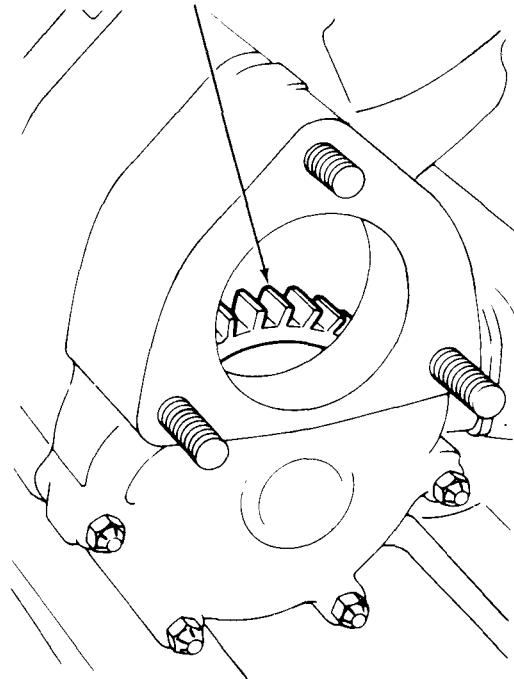
1 Check starter driven gear on the engine for damaged and broken teeth.

Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).
- Remove starter (page 10-21).
- Look through the opening in the starter adapter at the starter driven gear.

Does the starter driven gear have damaged or broken teeth?

STARTER DRIVEN GEAR



STARTER ADAPTER

2 Notify support maintenance of damaged starter driven gear.

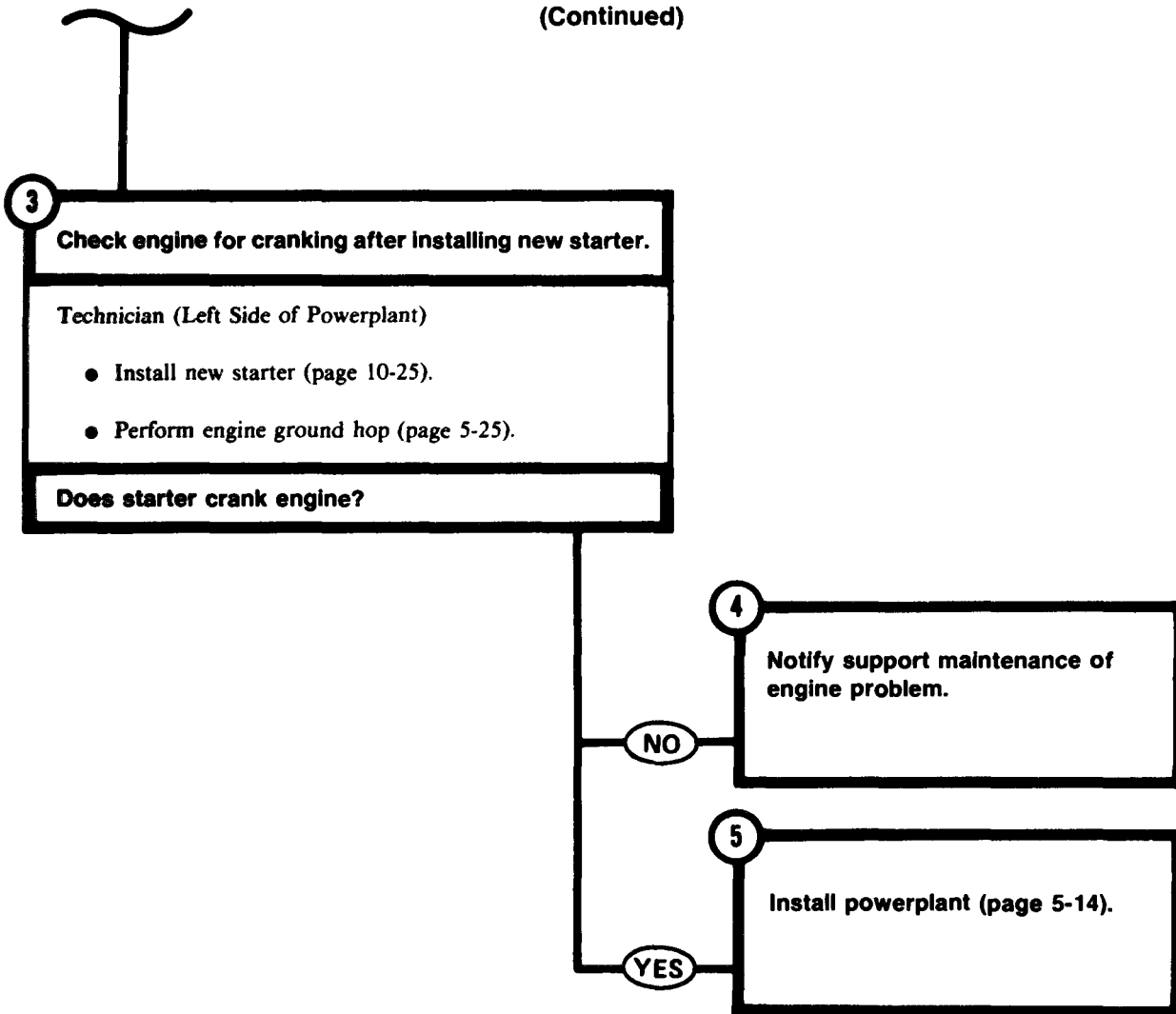
NO

YES

TA250051

Symptom-4

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**



TA250052

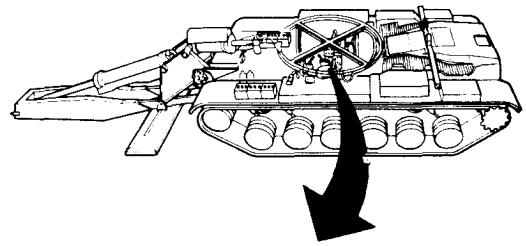
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-5

ONE ELECTRICAL FUEL PUMP WILL NOT WORK.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



1

Check for fuel pump not running.

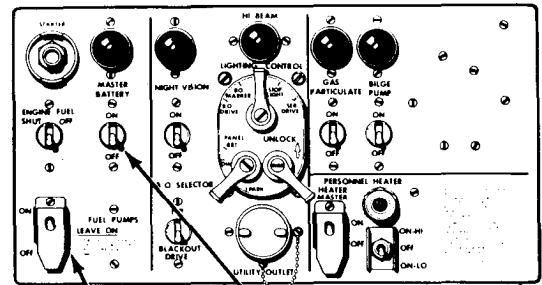
First Technician (Rear Grille Doors)

- Listen for sound of left fuel tank fuel pump running when switches are turned ON.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Listen for sound of right fuel tank fuel pump running.
- Determine which fuel pump is not running; then set MASTER BATTERY switch OFF.

Which fuel pump was not running?

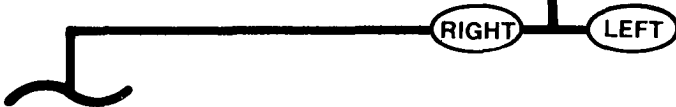


FUEL PUMPS SWITCH

MASTER BATTERY SWITCH

2

- Check front accessory harness (CKT 76) at bulkhead disconnect for electrical power to left fuel tank fuel pump.
- See Step **18**



Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

3

Check front accessory harness (CKT 76) at bulkhead disconnect for electrical power to right fuel tank fuel pump.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 76) to engine disconnect harness at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact K (CKT 76) of front accessory harness connector at bulkhead disconnect and black probe to ground.

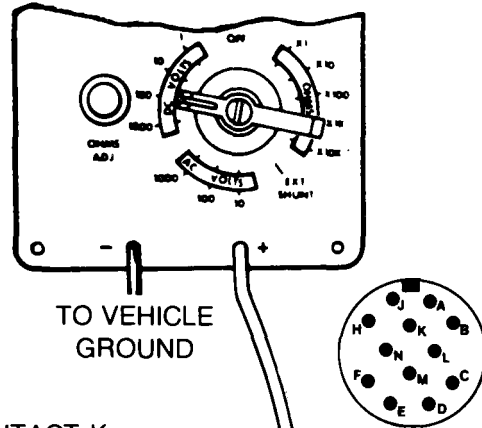
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

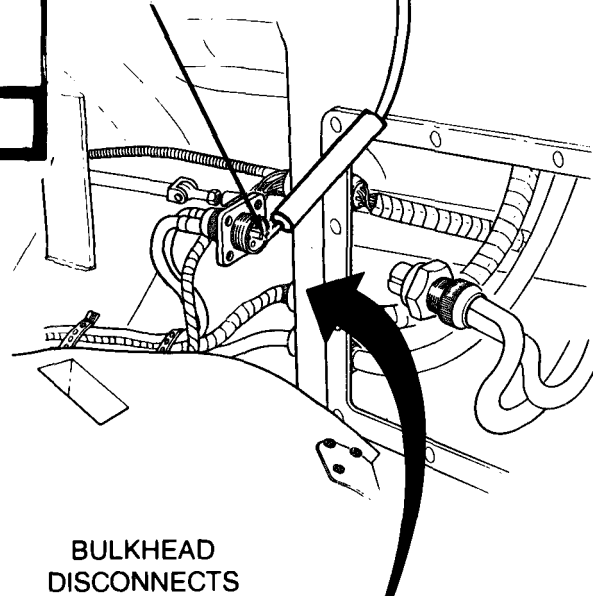
First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

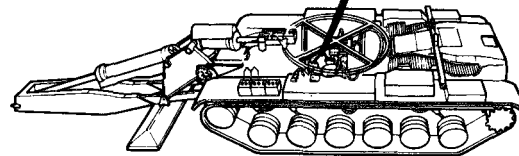
Does meter indicate 18 to 30 volts dc?



**CONTACT K
(CKT 76)**



**BULKHEAD
DISCONNECTS**



**FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN**

4

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector to bulkhead disconnect (page 10-270).

NO

BULKHEAD DISCONNECT — **CONTACT K** — **76** — **FRONT ACCESSORY HARNESS (CKT 76) TIE POINT**

YES

TA250054

Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

5 Check engine disconnect harness (CKT 76) at right fuel pump connector for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnect (page 10-270).

First Technician (Rear of Crew Compartment)

- Remove right fuel tank access panel(TM 5-5420-202-34)
- Disconnect engine disconnect harness connector (CKT 76) from capacitor connector and housing assembly at right fuel tank fuel pump.
- Connect red probe of meter to CKT 76 of engine disconnect harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

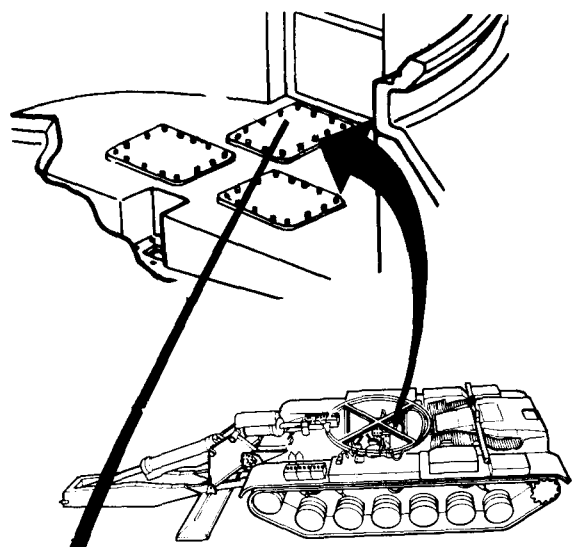
First Technician (Crew Compartment)

- Check if meter indicates 18 to 30 volts dc.

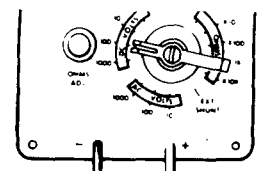
Does meter indicate 18 to 30 volts dc?

6

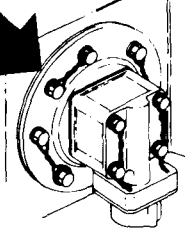
- Inspect engine disconnect harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective engine disconnect harness.
- Connect engine disconnect harness connector (CKT 76) to capacitor and housing assembly at right fuel tank fuel pump.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

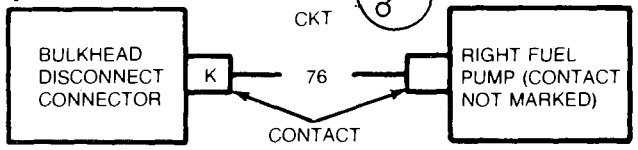


TO VEHICLE GROUND



CAPACITOR AND HOUSING ASSEMBLY

CKT 76



NO

YES

Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

7

Check circuit 76 for continuity from connector contact to capacitor lead connector.

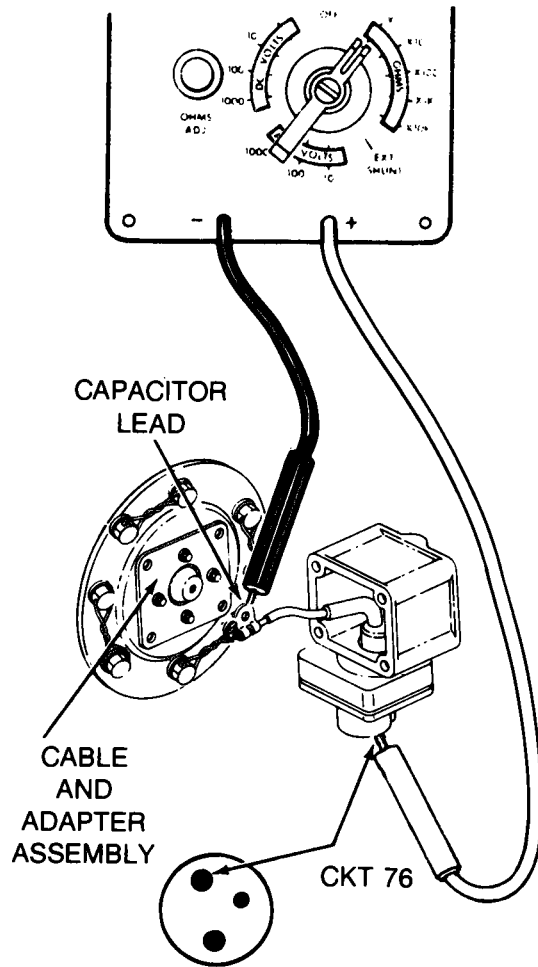
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Remove capacitor and housing assembly from cable and adapter assembly (page 10-326).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to capacitor and housing assembly connector contact (CKT 76).
- Connect black probe of meter to capacitor lead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



8

Repair capacitor and housing assembly (page 10-326).

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-5

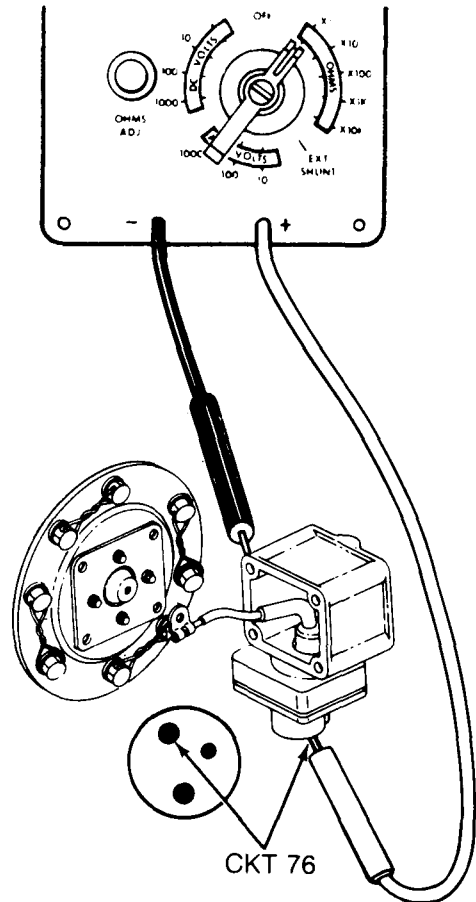
9

Check capacitor lead for internal short.

First Technician (Rear of Crew Compartment)

- Connect red probe of meter to capacitor and housing assembly connector contact (CKT 76).
- Connect black probe of meter to outside of the capacitor and housing assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



10

Repair capacitor and housing assembly (page 10-326).

NO

YES

Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**
(Continued)

WARNING

Do not smoke or allow flames or sparks within area while draining tanks. Have manned fire extinguisher present.

11

Check for continuity from adaptor assembly to fuel pump connector.

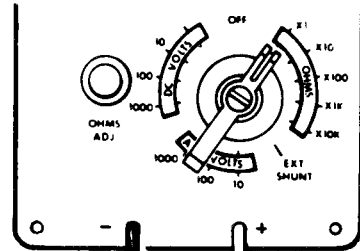
Second Technician (Rear Under Side of Hull)

- Isolate and drain right fuel tank (page 7-184).

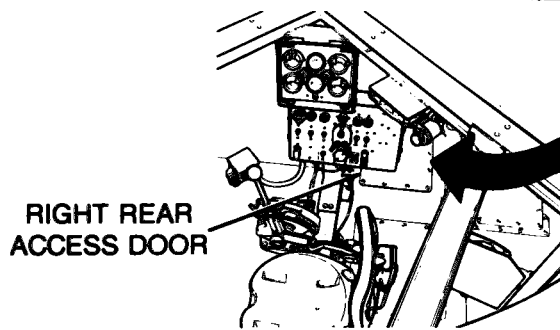
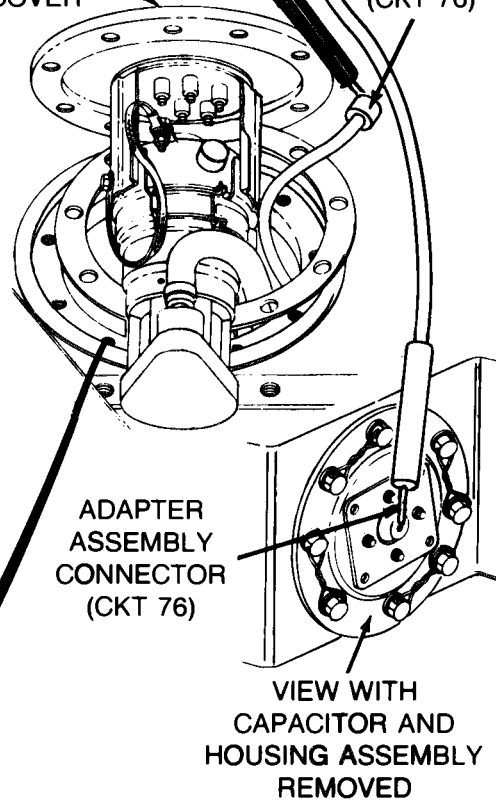
First Technician (Rear of Crew Compartment)

- Remove right rear access plate (TM 5-5420-202-34)
- Remove right fuel pump access cover (page 7-5).
- Disconnect electrical cable from fuel pump.
- Connect black probe of meter to cable connector (CKT 76).
- Connect red probe of meter to cable and adapter assembly (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?



FUEL PUMP ACCESS COVER CABLE CONNECTOR (CKT 76)



RIGHT REAR ACCESS DOOR

12

Replace cable and adapter assembly (page 10-326).

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-5

13 Check adapter assembly cable for short to ground.

First Technician (Rear of Crew Compartment)

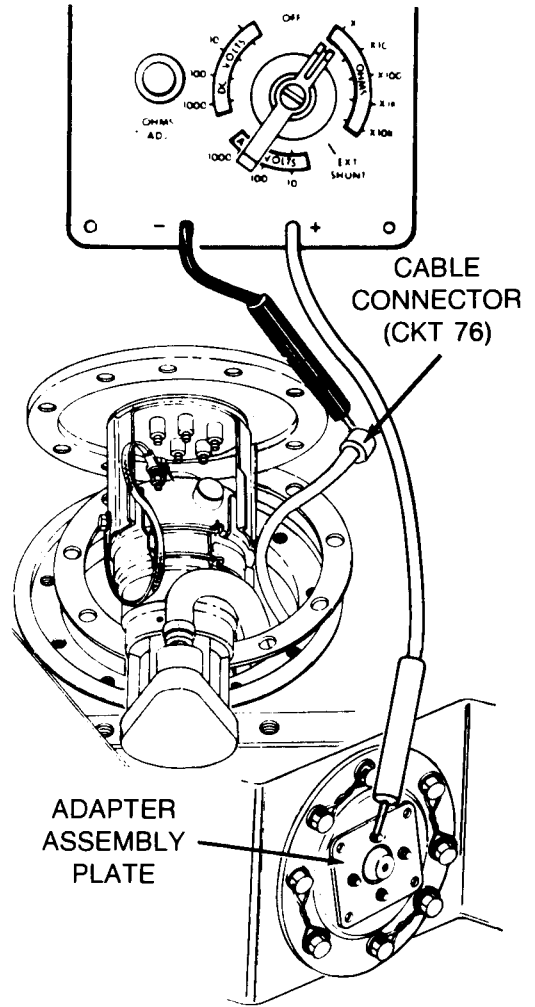
- Connect red probe of meter to adapter assembly plate.
- Connect black probe to cable connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?

14 Replace cable and adapter assembly (page 10-316).

YES

NO



TA250059

Symptom-5

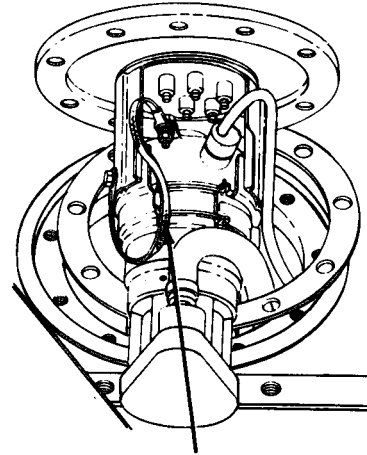
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

15 Check ground strap on fuel pump for tightness at attaching points.

First Technician (Rear of Crew Compartment)

- Check if connections are tight at each end of ground strap.

Are ground strap connections loose?



GROUND STRAP

YES

16

- Tighten ground strap connections.
- Install capacitor and housing assembly (page 10-318).

NO

17

- Replace right fuel tank fuel pump (page 7-5).
- Install capacitor and housing assembly (page 10-318).

Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

2

18 Check front accessory harness (CKT 76) at bulkhead disconnect for electrical power to left fuel tank fuel pump.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 76) from rear accessory harness at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact K (CKT 76) of front accessory harness connector at bulkhead disconnect and black probe to ground.

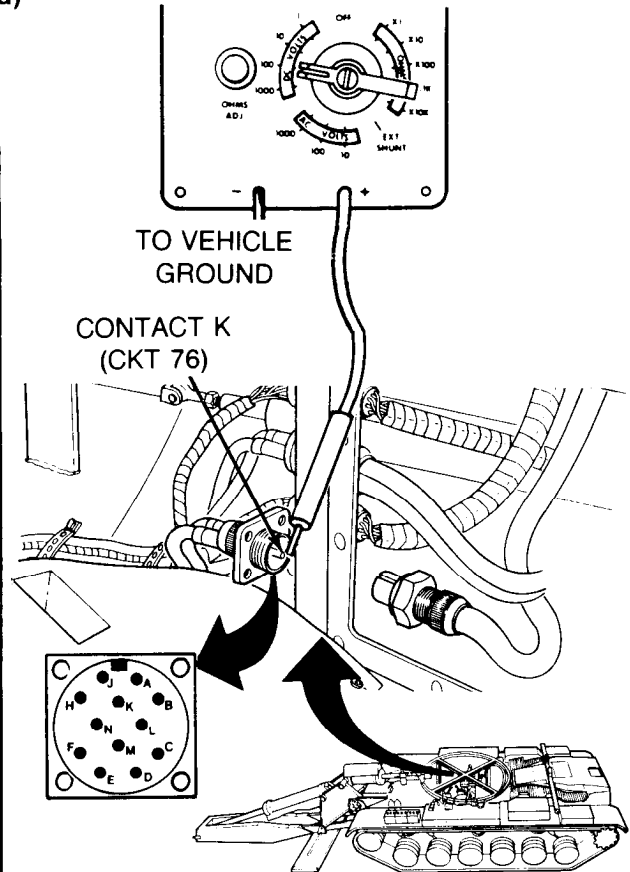
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

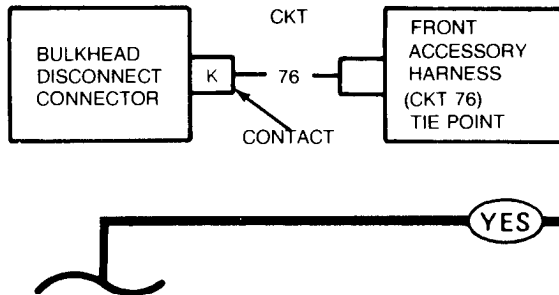
Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

19

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector to bulkhead disconnect (page 10-270).



Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

20

Check rear accessory harness (CKT 76) at left fuel pump connector for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnect (page 10-270).

First Technician (Outside Vehicle)

- Have powerplant removed (page 5-2).
- Disconnect rear accessory harness connector (CKT 76) from capacitor connector and housing assembly at left fuel tank fuel pump.
- Connect red probe of meter to CKT 76 of rear accessory harness connector and black probe to ground.

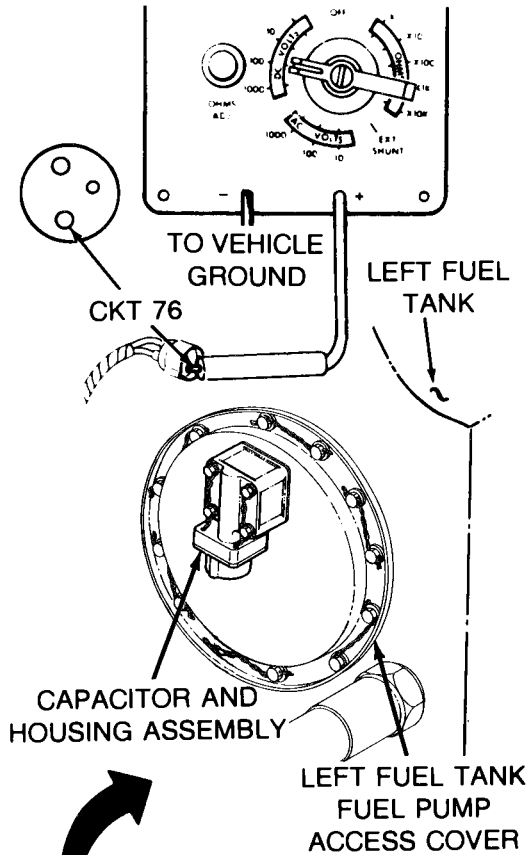
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Engine Compartment)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

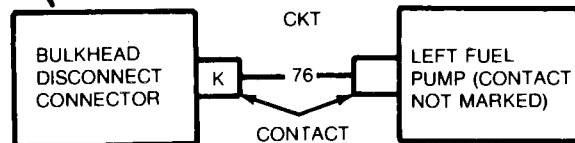


21

- Inspect rear accessory harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective rear accessory harness.
- Connect rear accessory harness connector to left fuel pump.
- Install powerplant (page 5-14).

NO
YES

LEFT FUEL TANK (ENGINE REMOVED)



TA250062

Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

22

Check circuit 76 for continuity from connector contact to capacitor lead connector.

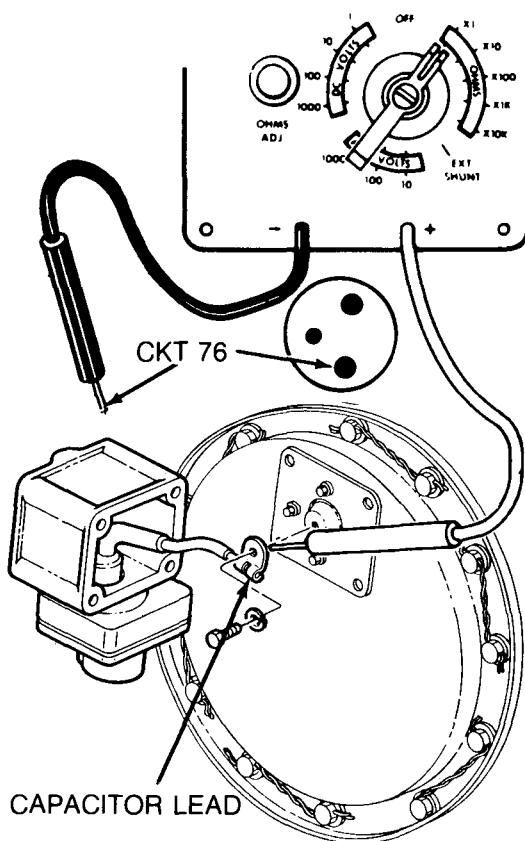
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Engine Compartment)

- Remove capacitor connector and housing assembly from cable and adapter assembly (page 10-326).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to capacitor lead connector.
- Connect black probe of meter to capacitor and housing assembly connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?



23

Repair capacitor and housing assembly (page 10-326).

YES

NO

Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

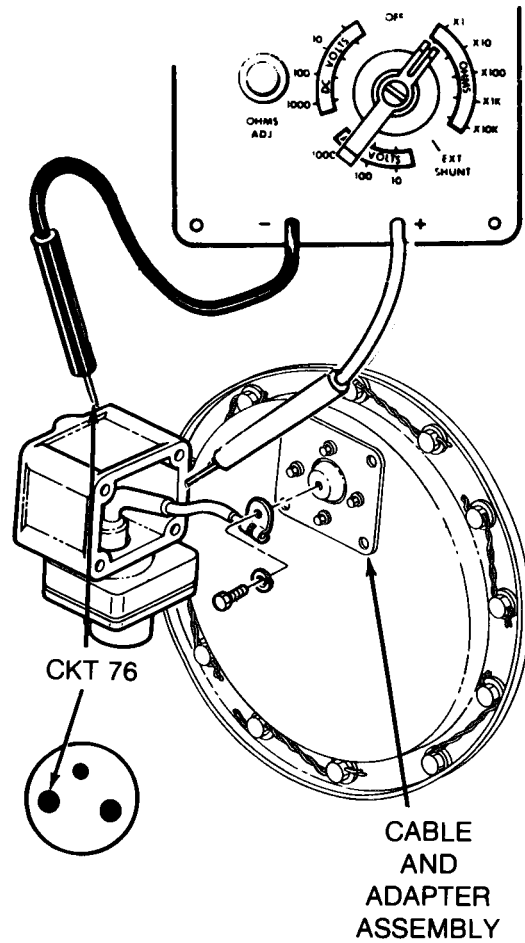
24

Check capacitor lead for internal short.

First Technician (Engine Compartment)

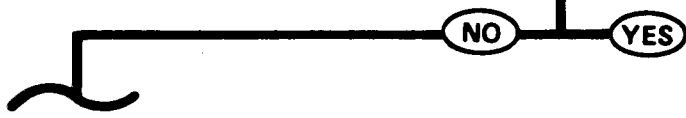
- Connect red probe of meter to outside of capacitor and housing assembly.
- Connect black probe of meter to capacitor and housing assembly connector contact (CKT 76).
- Check if multimeter indicates continuity.

Does multimeter indicate continuity?



25

Repair capacitor and housing assembly (page 10-326).



Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

26 Check for continuity from adaptor assembly to fuel pump connector.

Second Technician (Rear Underside of Hull)

- Isolate and drain left fuel tank (page 7-184).

CAUTION

Remove debris, if any, to prevent it from entering fuel tank which could clog pump and fuel lines.

First Technician (Engine Compartment)

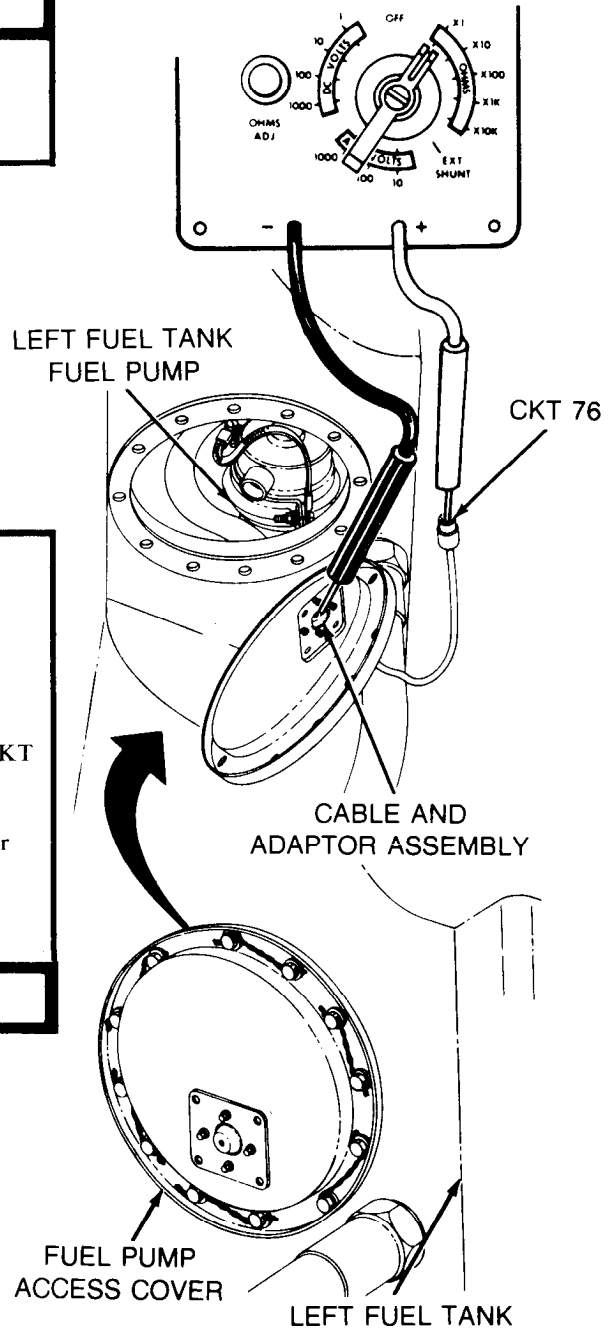
- Remove fuel pump access cover (page 7-9).
- Disconnect electrical cable from fuel pump.
- Connect red probe of meter to cable connector (CKT 76).
- Connect black probe of meter to cable and adapter assembly connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?

27 Replace cable and adapter assembly (page 10-321).

NO

YES



Symptom-5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

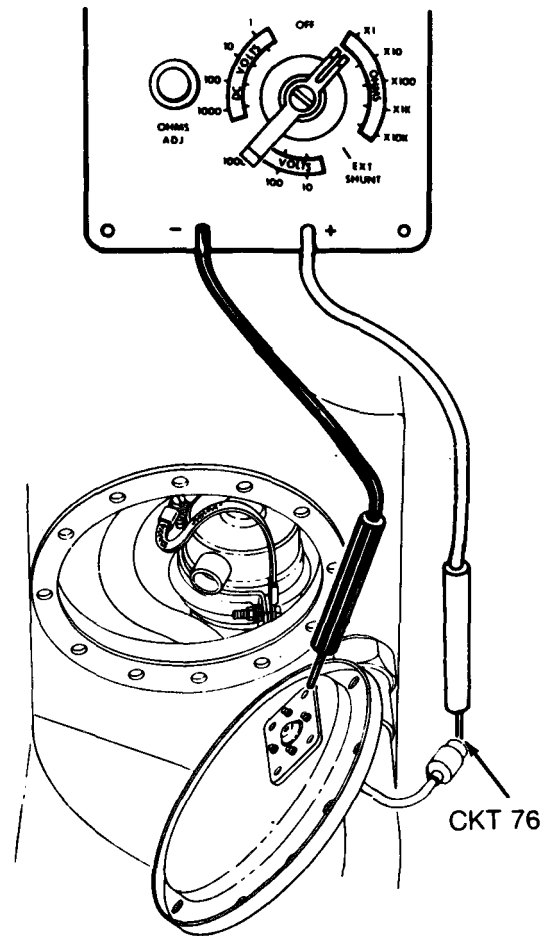
28

Check adapter assembly cable for short to ground.

First Technician (Engine Compartment)

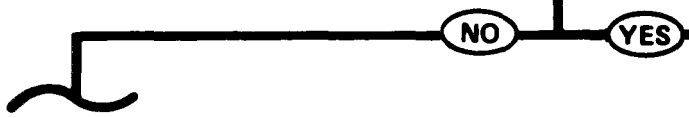
- Connect red probe of meter to cable connector (CKT 76).
- Connect black probe of meter to adapter assembly plate.
- Check if meter indicates continuity.

Does meter indicate continuity?



29

Replace cable and adapter assembly (page 10-321).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

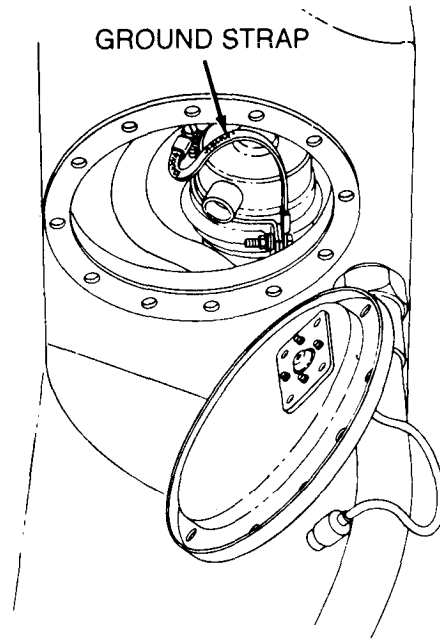
Symptom-5

30 Check ground strap on fuel pump for tightness at attaching points.

First Technician (Engine Compartment)

- Check if connections are tight at each end of ground strap.

Are ground strap connections loose?



YES

31

- Tighten ground strap connections.
- Install capacitor and housing assembly (page 10-324).

NO

32

- Replace left fuel tank fuel pump (page 7-11).
- Install capacitor and housing assembly (page 10-324).

TA250067

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-6

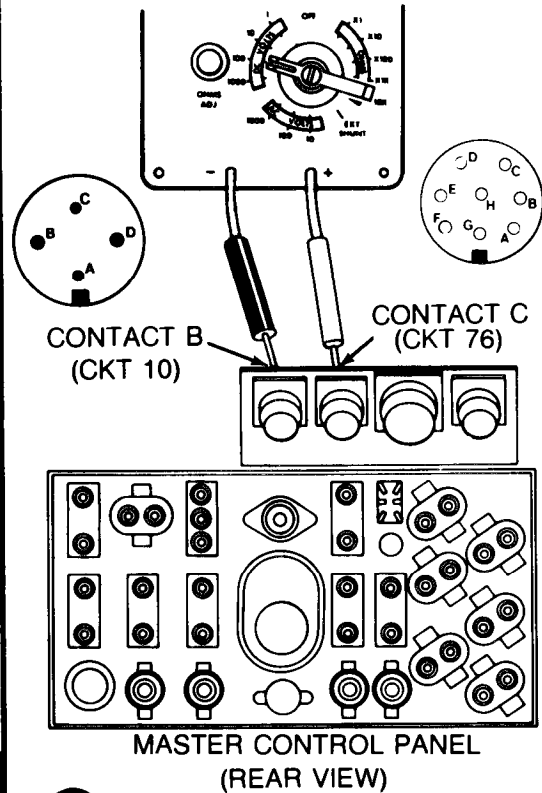
BOTH ELECTRICAL FUEL PUMPS WILL NOT WORK.

1 Check master control panel starting harness (CKT 76) for continuity.

Technician (Operator's Station)

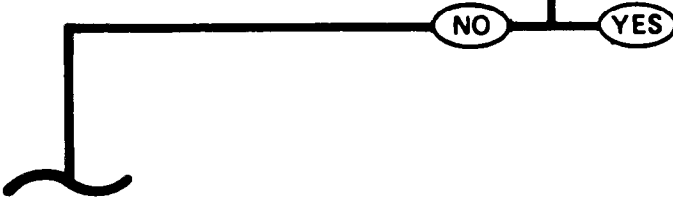
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel starting harness from master control panel.
- Disconnect basket-control panel power harness from master control panel.
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to master control panel starting harness panel connector contact C (CKT 76).
- Connect black probe of meter to master control panel power harness panel connector contact B (CKT 10).
- Set FUEL PUMPS switch ON.
- Check if meter indicates continuity.

Does meter indicate continuity?



2

- Check basket-control panel starting harness (CKT 76) for continuity.
- See Step 12 .



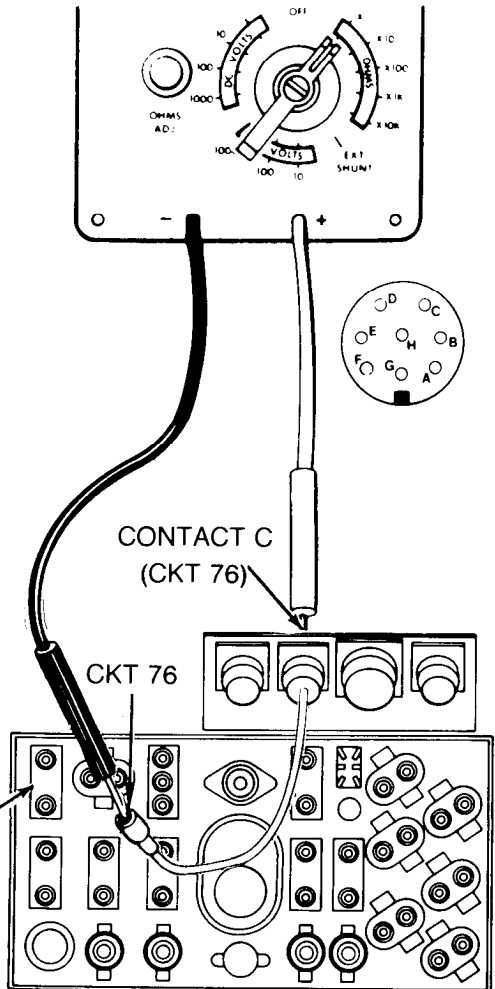
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-6

3 Check master control panel starting harness (CKT 76) for continuity from FUEL PUMPS switch to panel connector contact C.

- Connect basket-control panel power harness connector to master control panel.
- Disconnect master control panel starting harness connector (CKT 76) from FUEL PUMPS switch.
- Connect black probe of meter to starting harness connector (CKT 76) at FUEL PUMPS switch.
- Connect red probe of meter to contact C at master control panel starting harness connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?



4 Replace master control panel starting harness (page 10-97).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

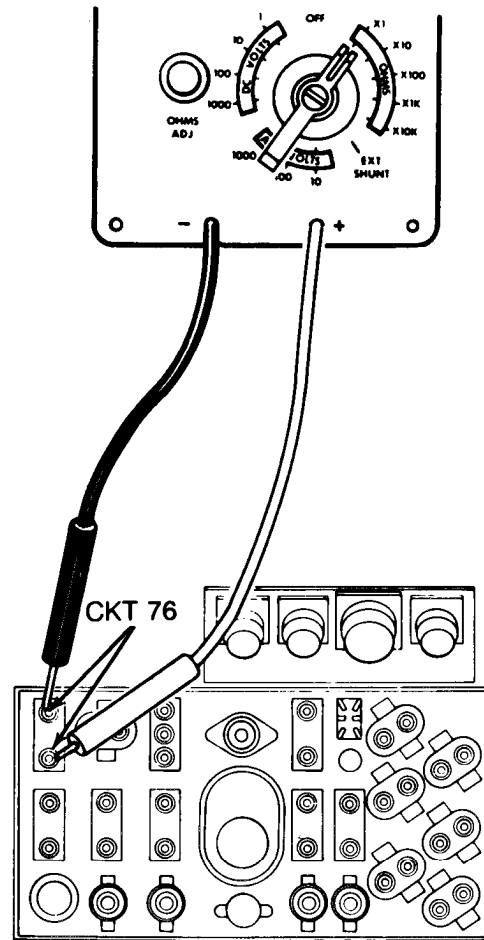
Symptom-6

5

Check FUEL PUMPS switch for continuity.

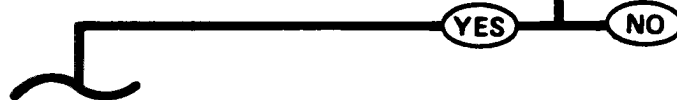
- Connect basket-control panel starting harness to the master control panel.
- Disconnect other FUEL PUMPS switch connector (CKT 76) from fuel shut off harness connector.
- Connect meter probes to both connectors of FUEL PUMPS switch (CKTs 76).
- Check if meter indicates continuity.

Does meter indicate continuity?



6

**Replace FUEL PUMPS switch
(page 10-47).**



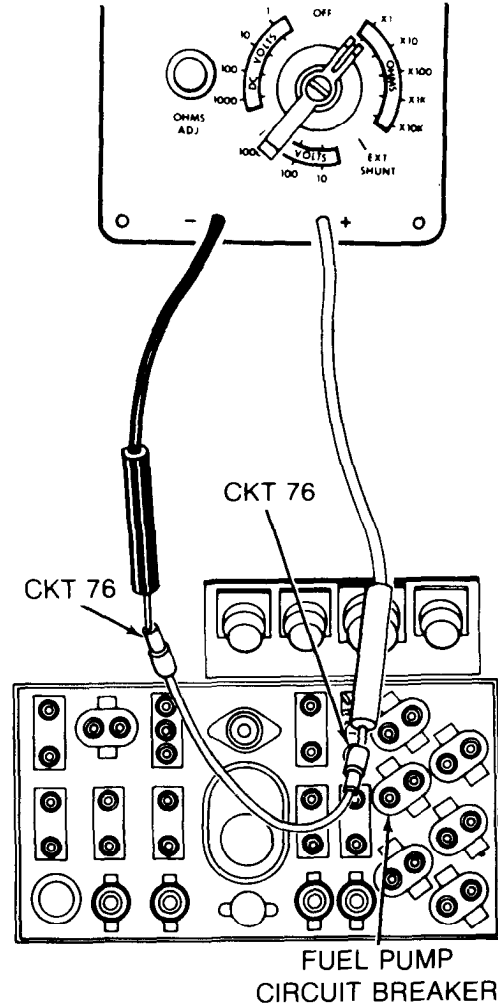
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-6

7 Check master control panel fuel shut off harness (CKT 76) for continuity from FUEL PUMPS switch to fuel pumps circuit breaker.

- Remove harness junction at fuel pumps circuit breaker from mounting.
- Disconnect fuel shutoff harness connector (CKT 76) from fuel pumps circuit breaker.
- Connect red probe of meter to fuel shut off harness connector (CKT 76) at fuel pumps circuit breaker.
- Connect black probe of meter to fuel shut off harness connector (CKT 76) at FUEL PUMPS switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



8 Replace master control panel fuel shut off harness (page 10-109).

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

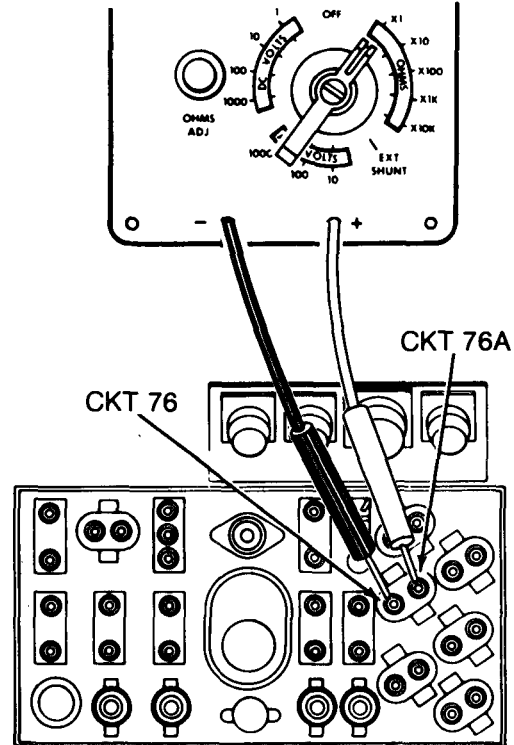
Symptom-6

9

Check FUEL PUMPS circuit breaker for continuity.

- Reconnect master control panel fuel shutoff harness to FUEL PUMPS switch.
- Reconnect master control panel starting harness to FUEL PUMPS switch.
- Disconnect CKT 76A connector from fuel pumps circuit breaker.
- Connect red probe of meter to CKT 76A connector on fuel pump circuit breaker.
- Connect black probe of meter to CKT 76 connector on fuel pumps circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



10
Replace fuel pump circuit breaker (page 10-70).

11

- Replace master control panel power harness (page 10-97).
- Reconnect CKT 76 connector to fuel pump circuit breaker.

Symptom-6
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

2

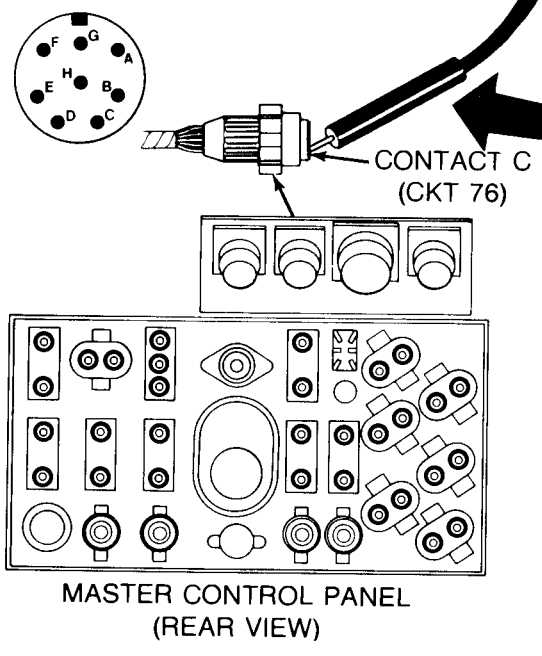
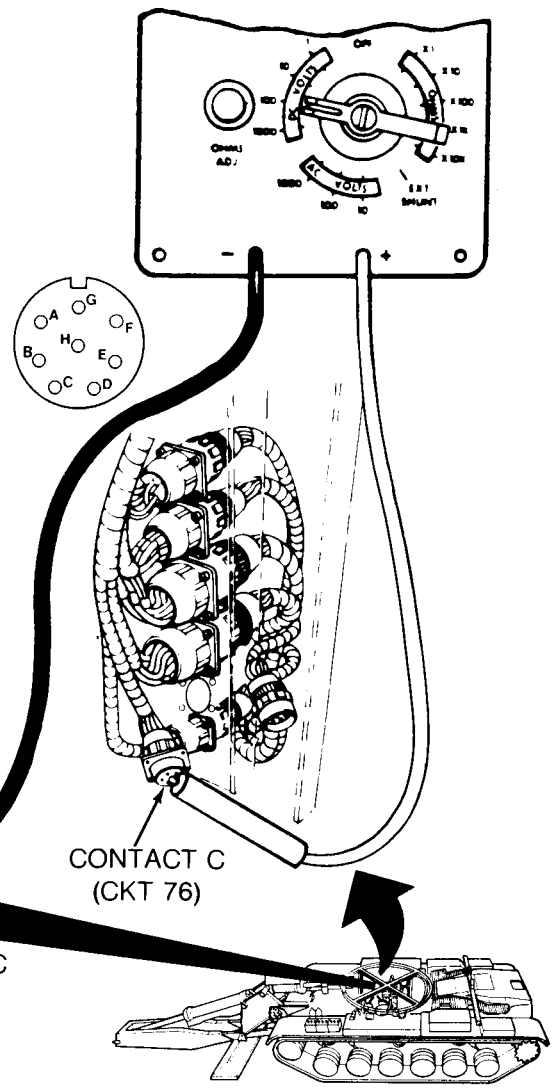
12 Check basket-control panel starting harness (CKT 76) for continuity.

- Reconnect basket-control panel power harness to master control panel.
- Connect black probe of meter to contact C (CKT 76) of basket-control panel starting harness connector at master control panel.

Technician (Commander's Station)

- Displace basket-control panel starting harness (CKT 76) from basket disconnect.
- Connect red probe of meter to basket-control panel starting harness connector contact C (CKT 76) at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?



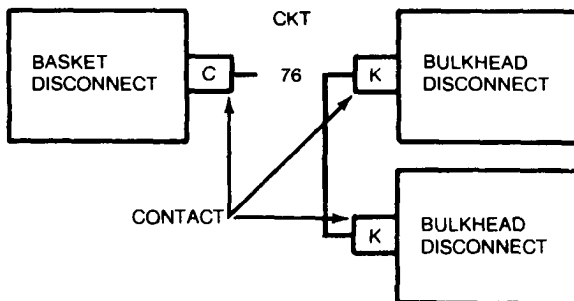
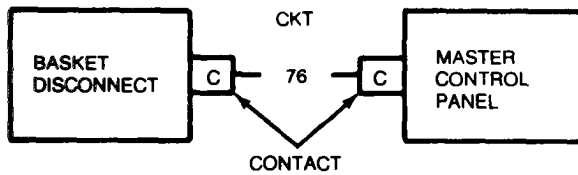
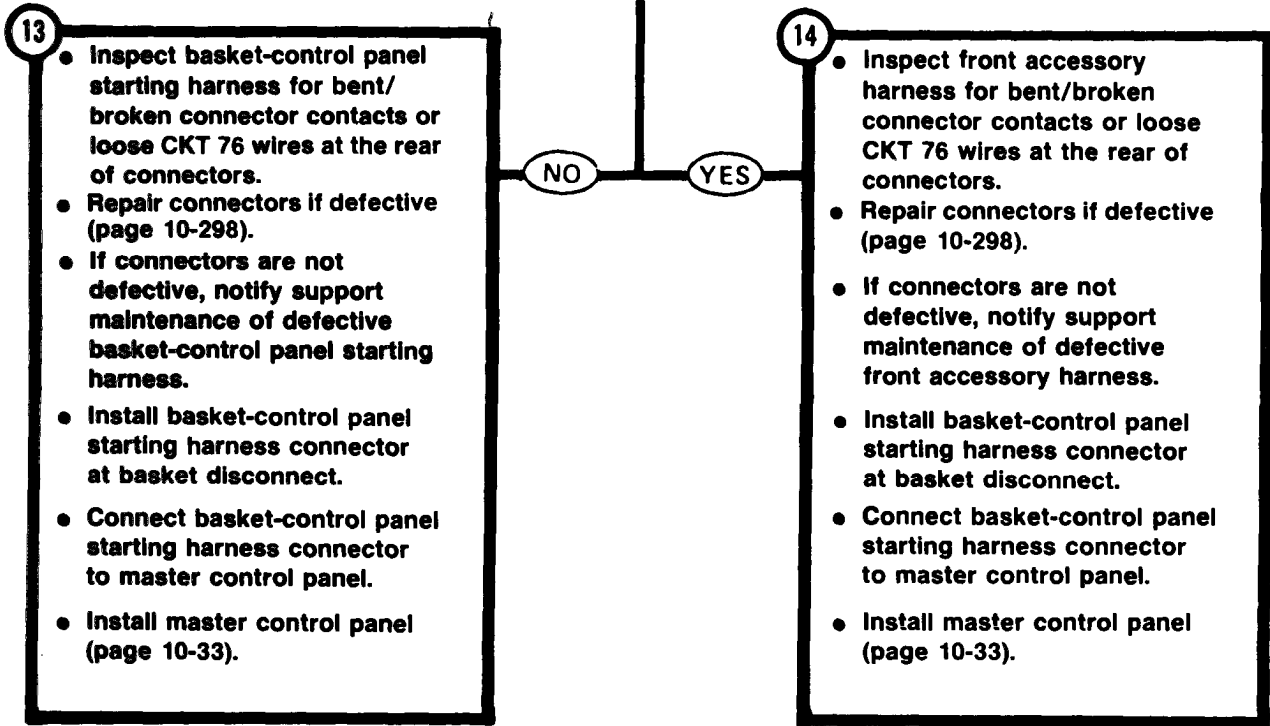
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250073

Symptom-6

DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - POWERPLANT, STOPPING
 (Continued)

STEP 12 CONTINUED



TA250074

DETAILED TROUBLESHOOTING PROCEDURE VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-7

PRIMER PUMP WILL NOT WORK.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

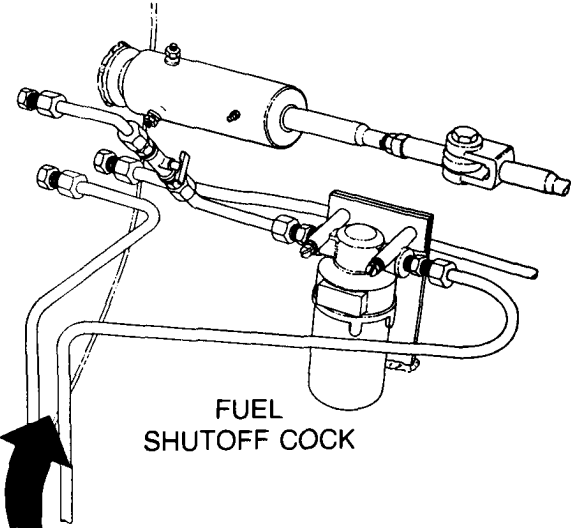
1

Check if fuel shutoff cock is open.

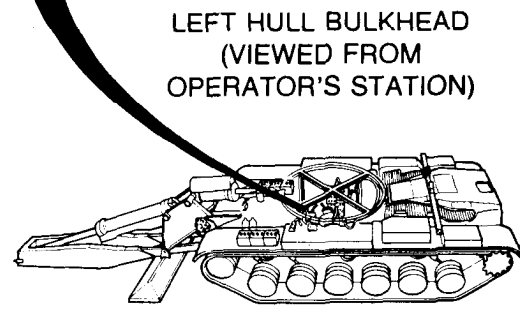
Second Technician (Operator's Station)

- Check if fuel shutoff cock is open by rotating counterclockwise.

Is fuel shutoff cock open?



FUEL SHUTOFF COCK



**LEFT HULL BULKHEAD
(VIEWED FROM
OPERATOR'S STATION)**

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

2

Open fuel shutoff cock.

YES

NO

TA250075

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

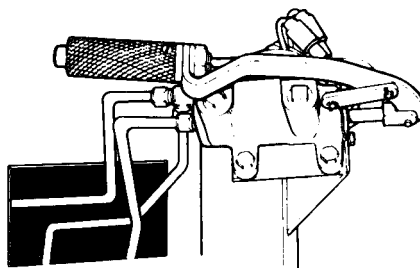
3

Check primer pump back pressure.

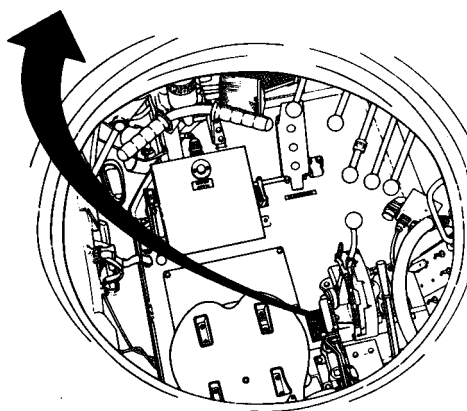
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Operate primer pump several times, then set FUEL PUMPS switch OFF.

Does pressure required to operate primer pump become too hard?



PRIMER PUMP



4

- Check for free fuel flow from primer pump pressure line at left hull bulkhead.
- See Step **21** .

NO YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

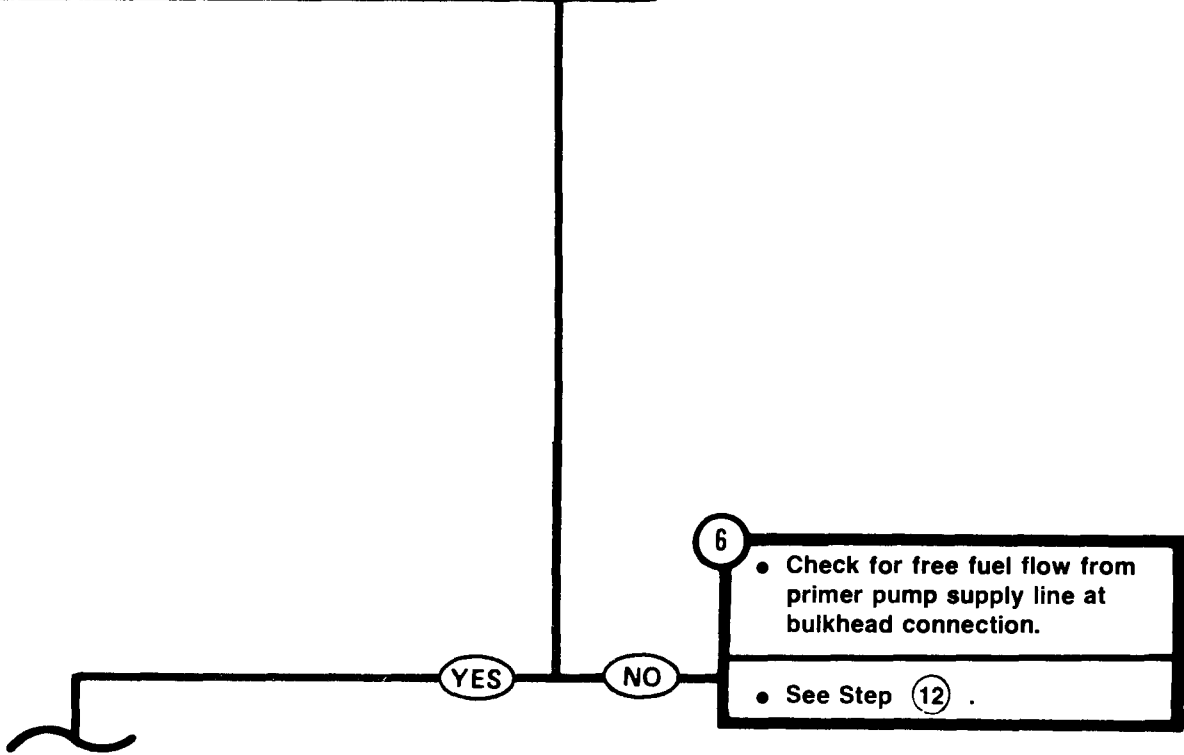
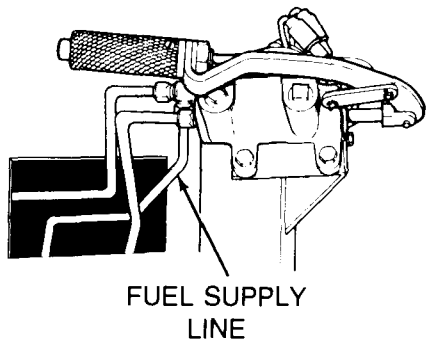
Symptom-7

5 Check for free fuel flow from fuel inlet line at primer pump.

Second Technician (Operator's Station)

- Disconnect fuel supply line at primer pump inlet.
- Place a container under open line to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from fuel supply line?



6

- Check for free fuel flow from primer pump supply line at bulkhead connection.
- See Step **12** .

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

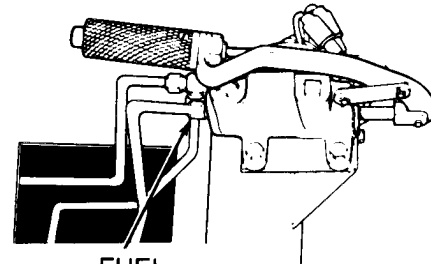
Symptom-7

7 Check for free fuel flow at primer pump pressure line outlet.

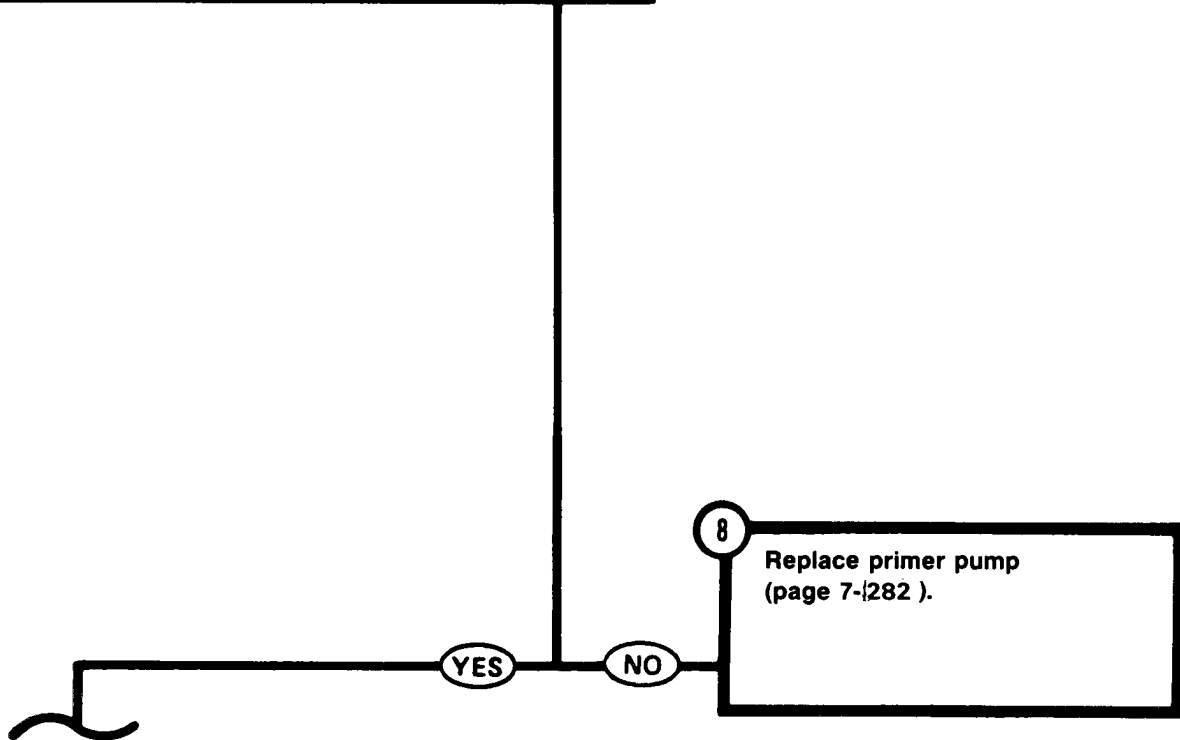
Second Technician (Operator's Station)

- Connect fuel supply line to primer pump.
- Disconnect pressure fuel line at primer pump.
- Place a container under primer pump to catch any fuel coming out.
- Set FUEL PUMPS switch ON, operate primer pump, then set switch OFF.

Does fuel spurt freely from primer pump outlet?



FUEL
PRESSURE
LINE



TA250078

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

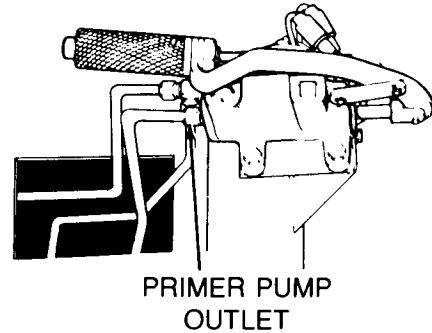
Symptom-7

9 Check primer pump operation with primer pump outlet plugged.

Second Technician (Operator's Station)

- Install a plug in primer pump outlet opening.
- Operate primer pump.

Does primer pump become hard to operate and lock up?



NO **10** Replace primer pump (page 7-282).

YES **11**

- Remove plug from primer pump outlet.
- Connect pressure fuel line at primer pump.
- Check for free fuel flow from primer pump pressure line at left hull bulkhead.

- See Step **21** .

TA250079

Symptom-7

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

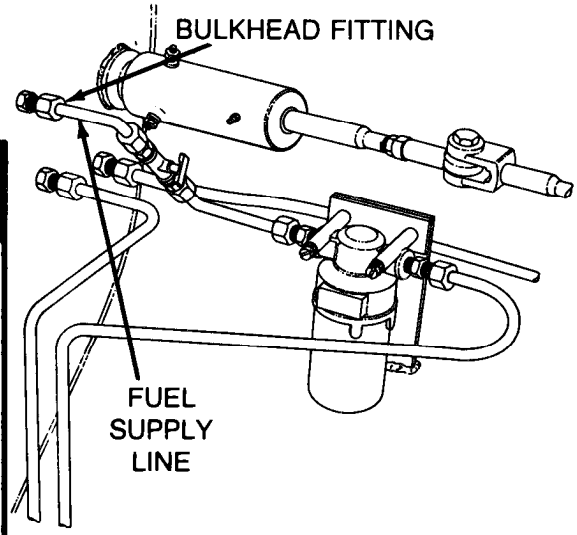
6

12 Check for free fuel flow from primer pump supply line at bulkhead connection.

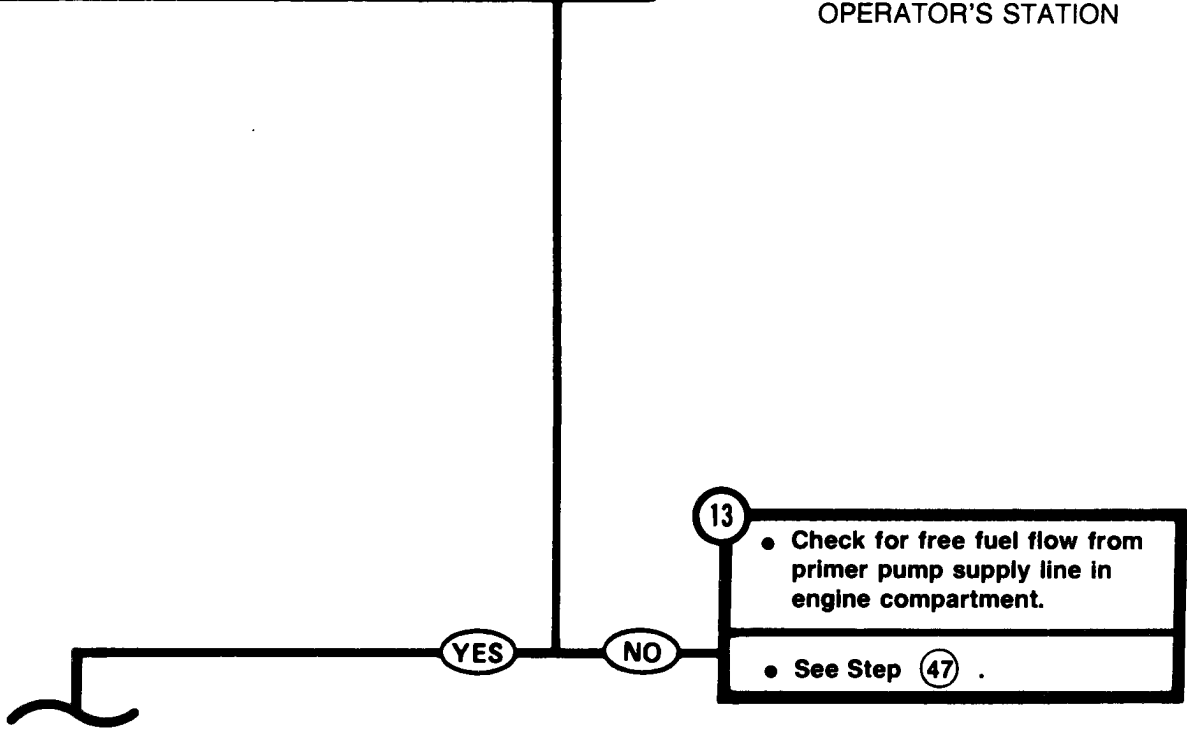
Second Technician (Operator's Station)

- Connect fuel supply line to primer pump.
- Disconnect fuel supply line at bulkhead fitting.
- Place a container under open line to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from bulkhead fitting?



LEFT HULL BULKHEAD
VIEWED FROM
OPERATOR'S STATION



13

- Check for free fuel flow from primer pump supply line in engine compartment.
- See Step 47 .

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

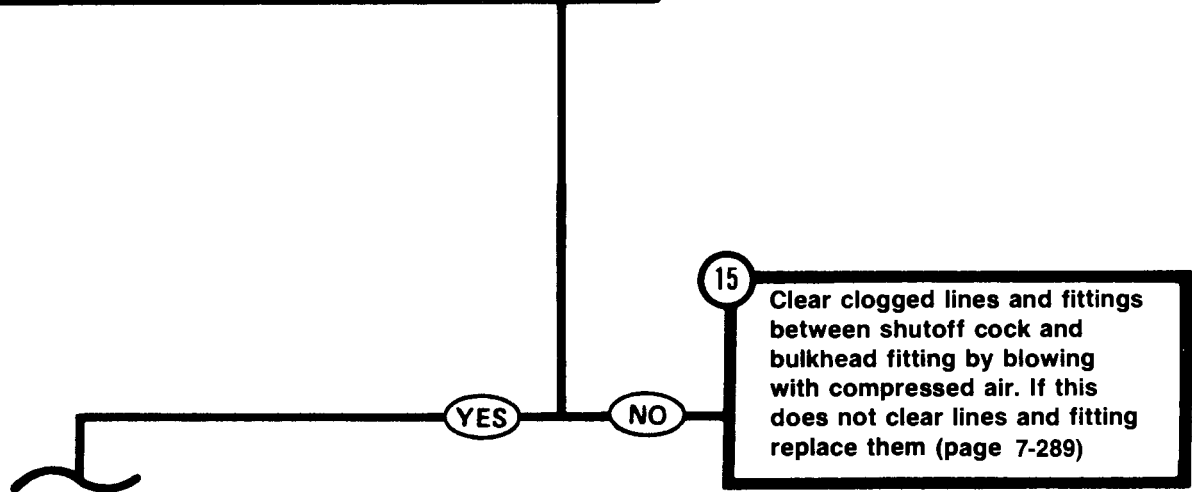
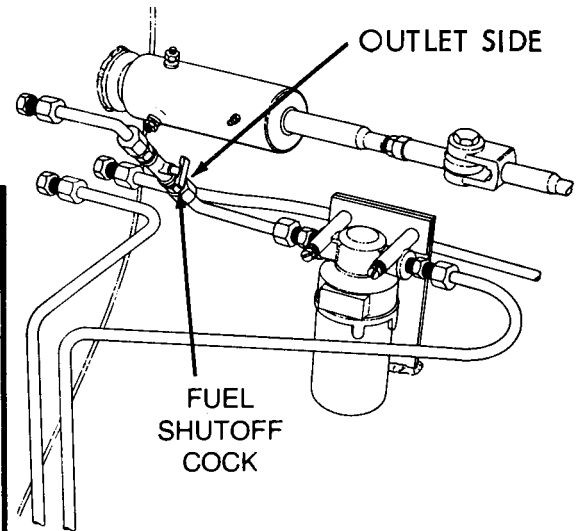
Symptom-7

14 Check for free fuel flow from outlet connection at fuel shutoff cock.

Second Technician (Operator's Station)

- Connect fuel supply line at bulkhead fitting.
- Disconnect fuel supply line at outlet side of fuel shutoff cock.
- Place container or rags under connection to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow from fuel shutoff cock?



15 Clear clogged lines and fittings between shutoff cock and bulkhead fitting by blowing with compressed air. If this does not clear lines and fitting replace them (page 7-289)

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

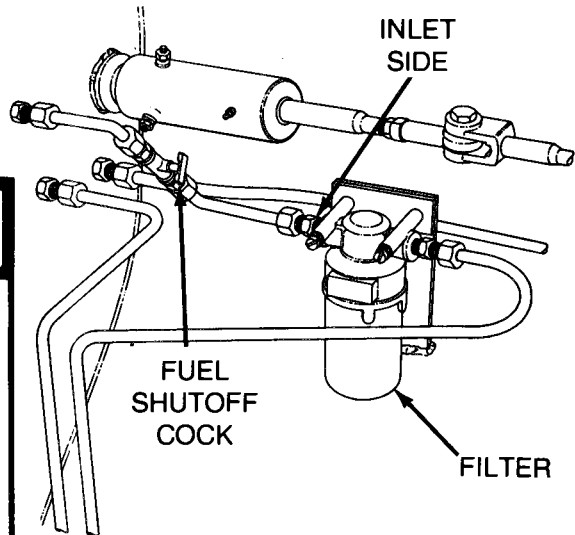
Symptom-7

16 Check for free fuel flow from line leading to inlet side of fuel filter.

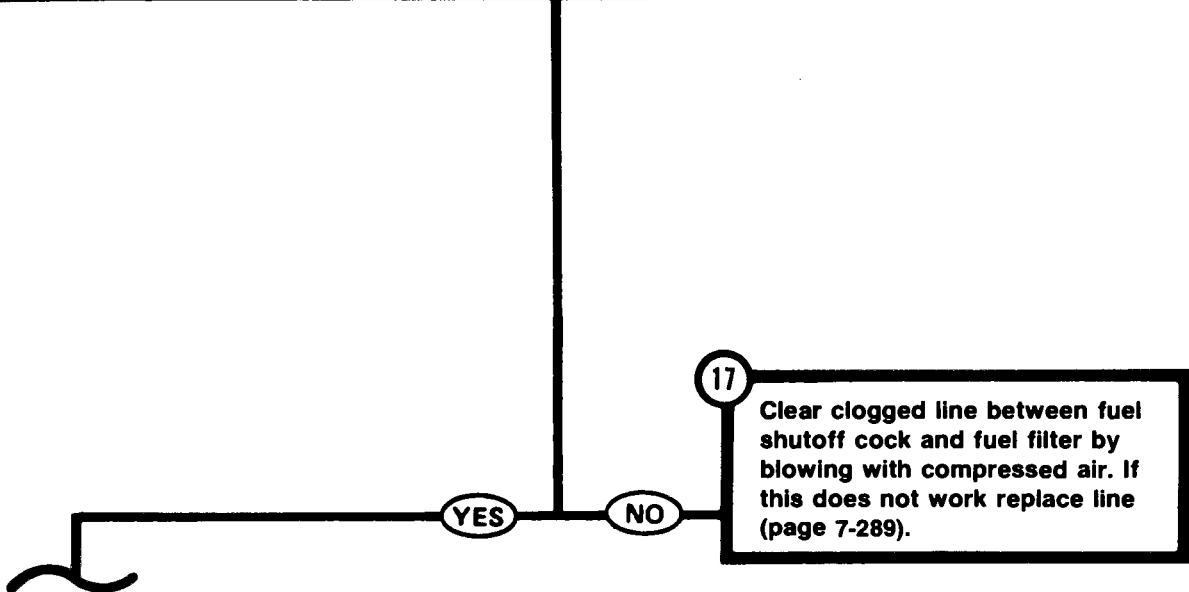
Second Technician (Operator's Station)

- Connect fuel supply line to outlet side of shutoff cock.
- Disconnect fuel supply line from inlet side of fuel filter.
- Place a container or rags under line to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from disconnected line at fuel filter?



LEFT HULL BULKHEAD
(VIEWED FROM
OPERATOR'S STATION)



17 Clear clogged line between fuel shutoff cock and fuel filter by blowing with compressed air. If this does not work replace line (page 7-289).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

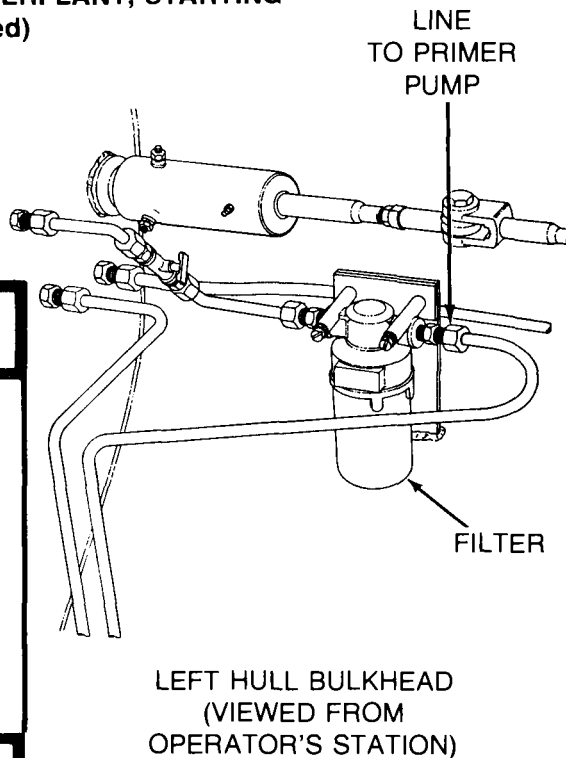
Symptom-7

18 Check for free fuel flow at fuel filter outlet.

Second Technician (Operator's Station)

- Connect fuel supply line to inlet side of fuel filter.
- Disconnect line from fuel filter to primer pump at fuel filter.
- Place a container or rags under fitting to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from fuel filter outlet?



19 Replace fuel filter element (page 7-231).

NO

YES

20 Clear clogged line between fuel filter and primer pump by blowing with compressed air. If this does not work, replace line (page 7-289).

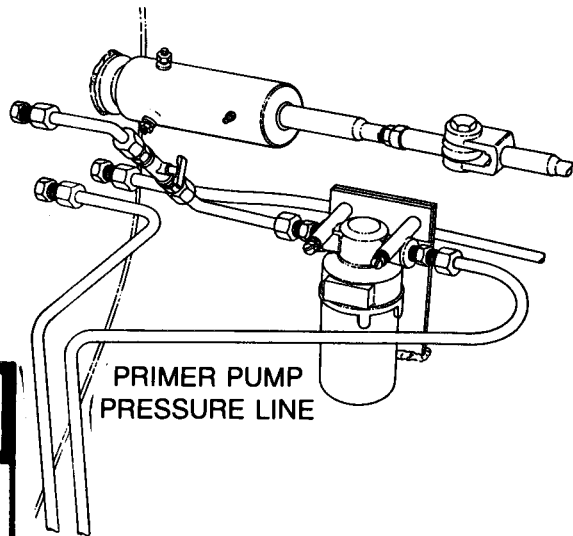
Symptom-7

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

4 OR 11

WARNING
Wear goggles to protect eyes from spraying fuel. Fuel pressure in primer pump pressure line may reach 200 psi.



PRIMER PUMP PRESSURE LINE

LEFT HULL BULKHEAD
(VIEWED FROM OPERATOR'S STATION)

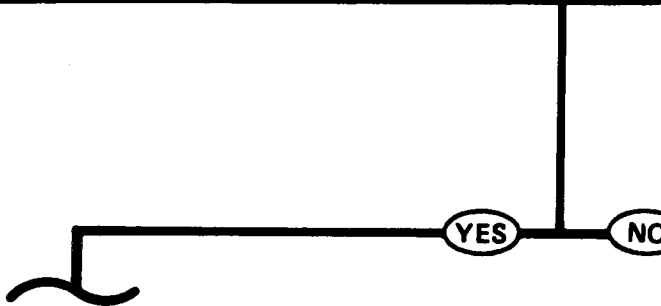
21 Check for free fuel flow from primer pump pressure line at left hull bulkhead.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect primer pump pressure line at bulkhead fitting.
- Place a container under line to catch any fuel.
- Operate primer pump.

Does fuel flow freely from primer pump pressure line at bulkhead?

22 Clear clogged line between primer pump and fitting at left hull bulkhead by blowing with compressed air. If this does not work, replace line (page 7-305!).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-7

23

Check for free fuel flow from primer pump pressure line at quick disconnect in engine compartment.

Second Technician (Operator's Station)

- Connect primer pump pressure line at bulkhead fitting.

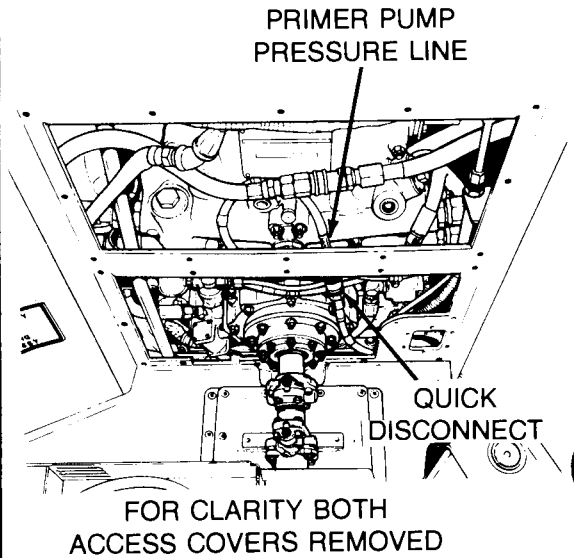
First Technician (Rear of Crew Compartment)

- Remove upper engine access cover (page 17-11).
- Separate primer pump pressure line at quick disconnect.
- Push on female end of quick disconnect with a punch or phillips screwdriver.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from primer pump pressure line at quick disconnect?



YES

NO

24

Clear clogged line between quick disconnect and left hull bulkhead by blowing with compressed air. If this does not work, notify support maintenance.

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

25 Check for free fuel flow from primer pump pressure line at backflow valve.

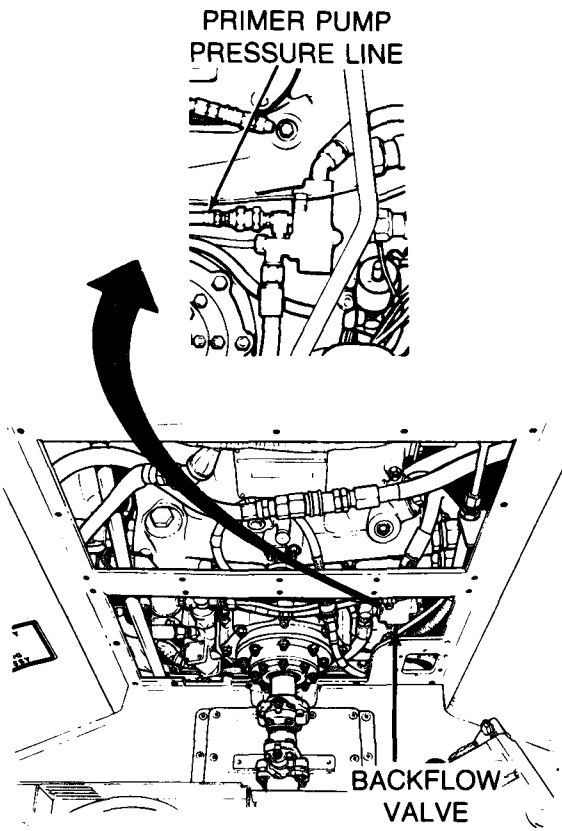
First Technician (Rear of Crew Compartment)

- Connect primer pump pressure line quick disconnect.
- Remove lower engine access cover (page 17-13).
- Disconnect primer pump pressure line at backflow valve (page 7-25).
- Place a container under line to catch any fuel.

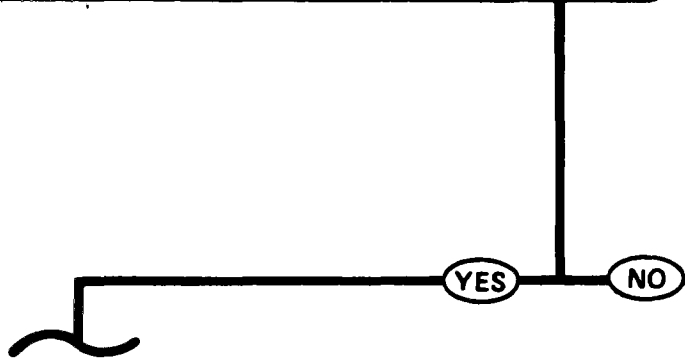
Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from line at backflow valve?



26 Clear clogged line between quick disconnect and the backflow valve by blowing with compressed air. If this does not work, replace line (page 7-40).



TA250086

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-7

27 Check for free fuel flow between engine fuel pump and backflow valve.

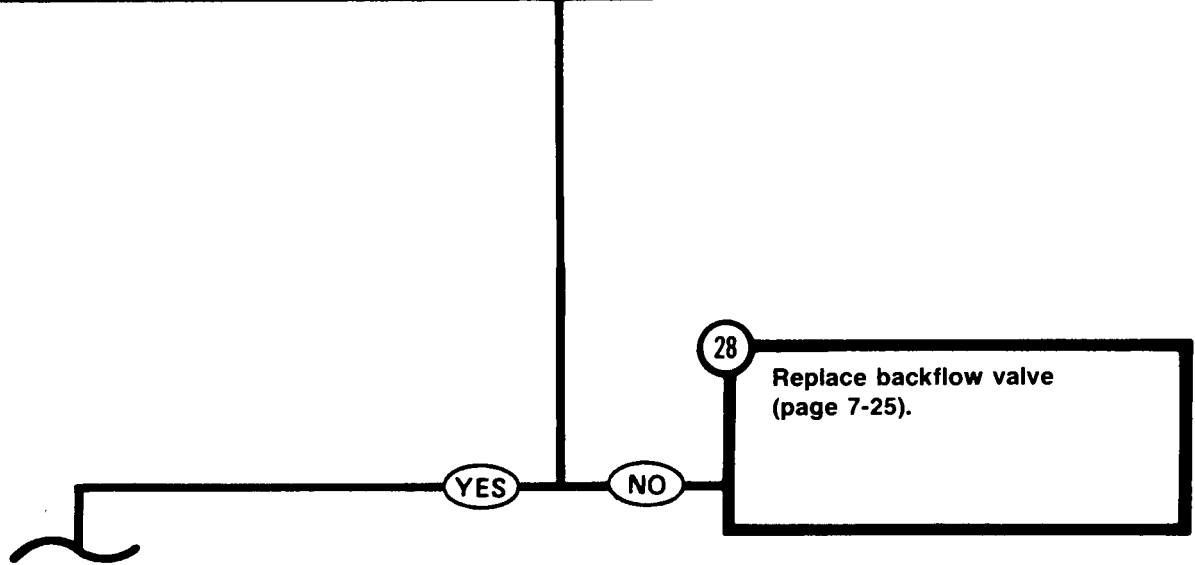
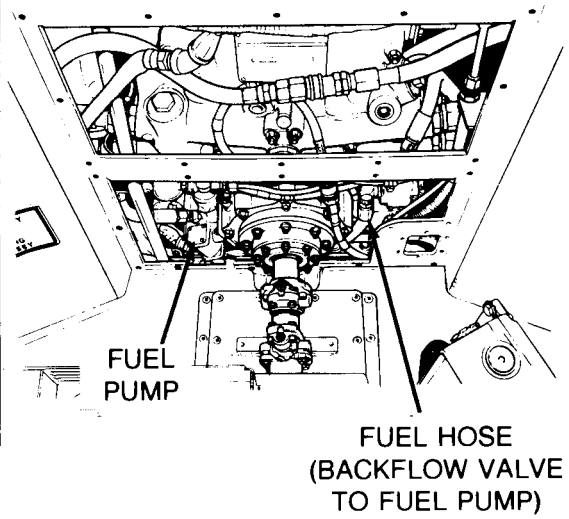
First Technician (Rear of Crew Compartment)

- Connect primer pump pressure line at backflow valve valve.
- Disconnect hose between backflow valve and engine fuel pump at backflow valve.
- Place a container under hose to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from backflow valve?



28 Replace backflow valve (page 7-25).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

29 Check for free fuel flow at inlet side of engine fuel pump.

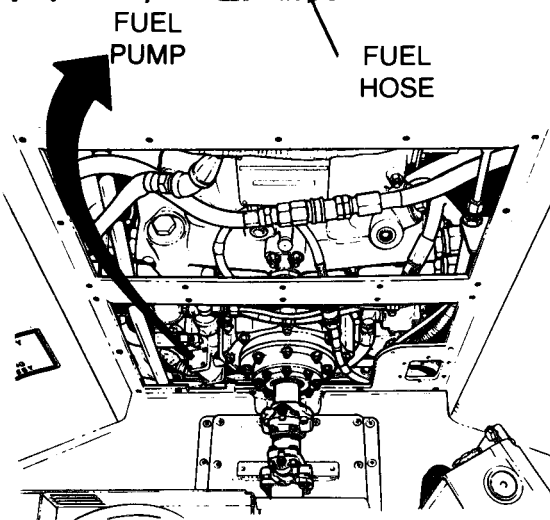
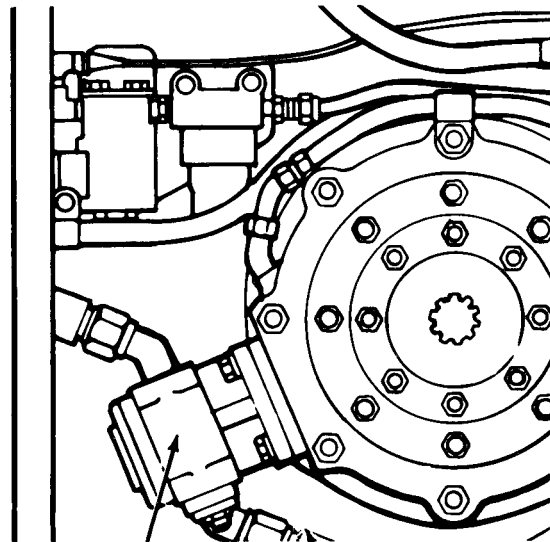
First Technician (Rear of Crew Compartment)

- Connect fuel hose to backflow valve.
- Loosen fuel hose from backflow valve to fuel pump at fuel pump.
- Place a container under hose to catch any fuel.

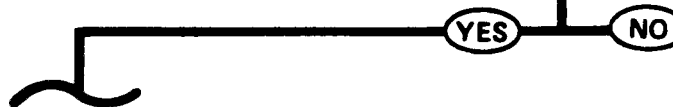
Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from hose at engine fuel pump?



30 Clear clogged hose between backflow valve and engine fuel pump by blowing with compressed air. If this does not work, replace hose (page 7-37).



TA250088

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

31 Check for free fuel flow at outlet side of engine fuel pump.

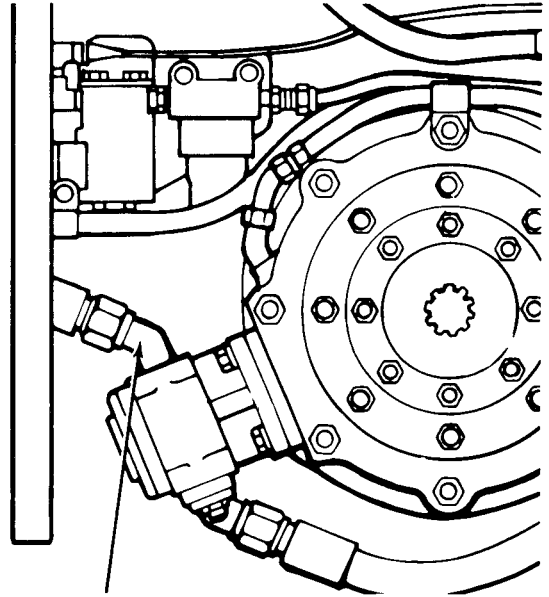
First Technician (Rear of Crew Compartment)

- Tighten hose between backflow valve and engine fuel pump.
- Disconnect hose between engine fuel pump and fuel water separator at fuel pump.
- Place a container under engine fuel pump to catch any fuel.

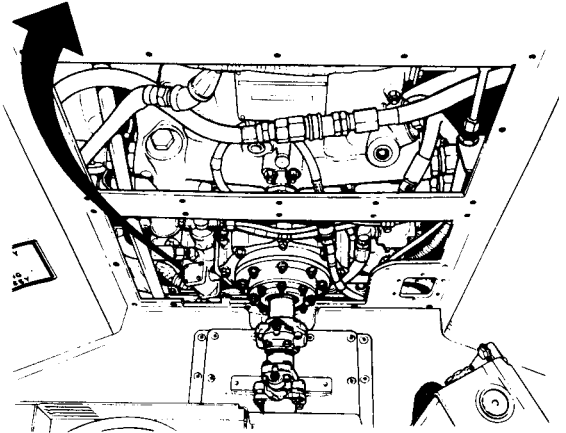
Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from outlet side of engine fuel pump?



FUEL PUMP OUTLET



32 Replace engine fuel pump (page 7-37).

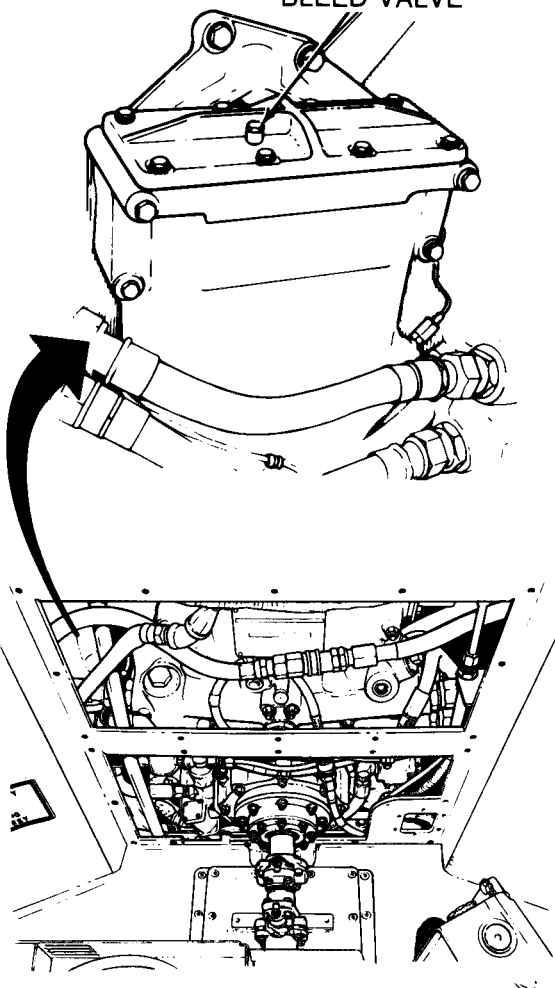
YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

FUEL-WATER SEPARATOR

BLEED VALVE



33

Check for free fuel flow at fuel water separator.

First Technician (Rear of Crew Compartment)

- Connect fuel hose between engine fuel pump and fuel water separator.
- Loosen bleed valve on top of fuel water separator.

Second Technician (Operator's Station)

- Operate primer pump several times.

Does fuel flow freely from fuel water separator bleed valve?

FRONT OF ENGINE
(ACCESS COVERS REMOVED)

34

Clear clogged hose between engine fuel pump and fuel water separator by blowing with compressed air. If this does not work, replace hose (page 7-34).

YES

NO

TA250090

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

35 Check main fuel hose from fuel water separator to engine for free fuel flow.

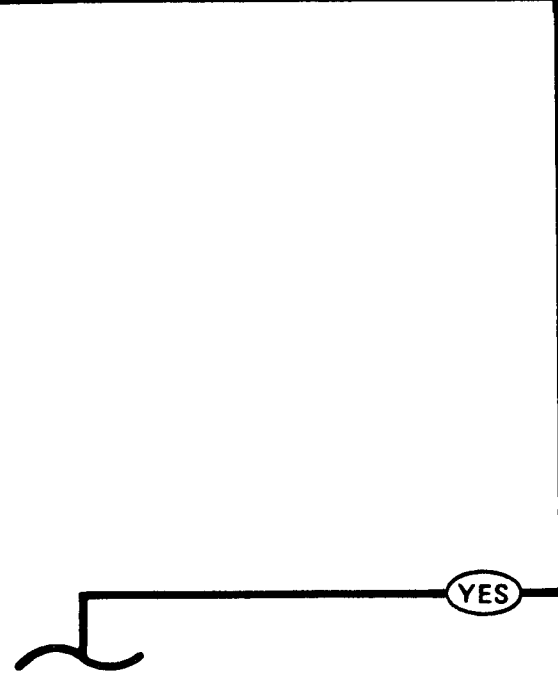
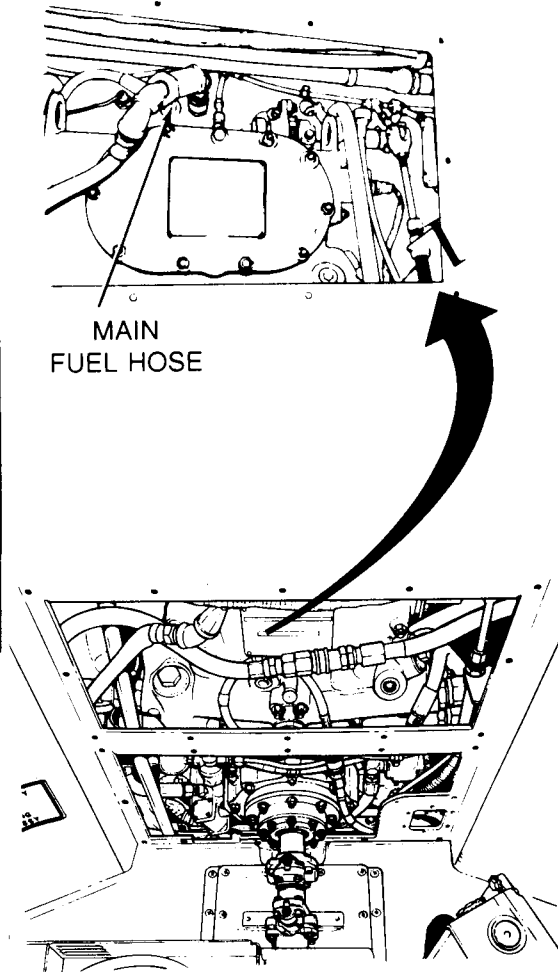
First Technician (Rear of Crew Compartment)

- Tighten bleed valve on top of fuel water separator.
- Disconnect fuel hose from fuel water separator at top of engine.
- Place a container under disconnected hose to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from main fuel hose at top of engine?



36 Clear hose between fuel water separator and engine by blowing with compressed air. If this does not work, replace hose (page 7-29).

TA250091

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

37 Check for free fuel flow at engine fuel return hose quick disconnect.

First Technician (Rear of Crew Compartment)

- Connect fuel hose from fuel water separator to engine.
- Install engine acces covers (page 17-12).

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

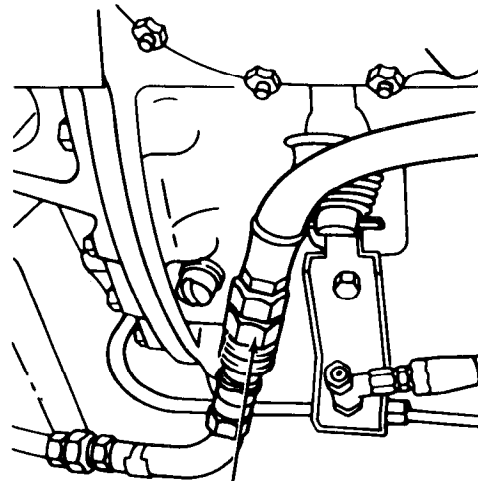
First Technician (Rear Grille Doors)

- Separate main fuel return hose quick disconnect.
- Place a container under disconnected hose to catch any fuel.
- Using a punch or phillips screwdriver, press in on female end of quick disconnect.

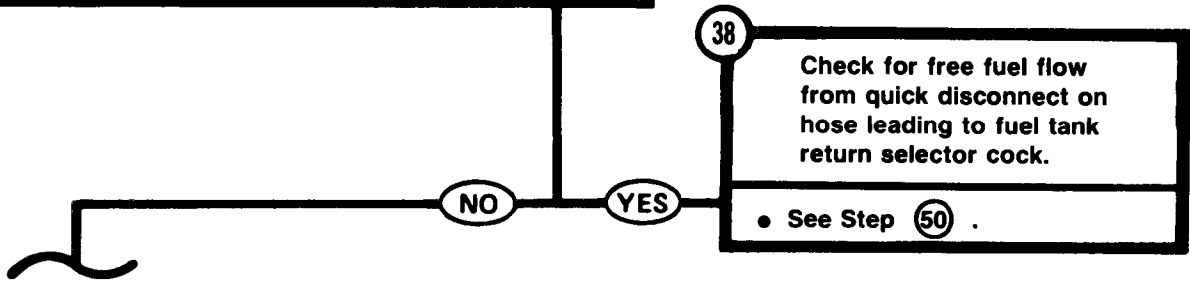
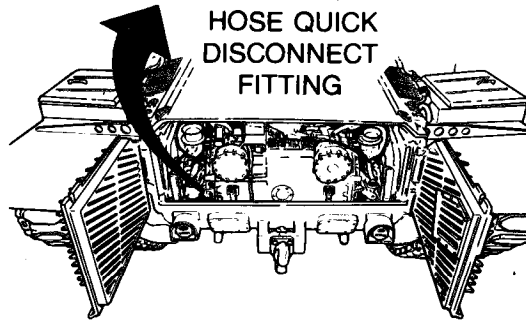
Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from quick disconnect?



**MAIN
FUEL RETURN
HOSE QUICK
DISCONNECT
FITTING**



38 Check for free fuel flow from quick disconnect on hose leading to fuel tank return selector cock.

- See Step **50**.

TA250092

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

39 Check for free fuel flow from main fuel return line at top of engine.

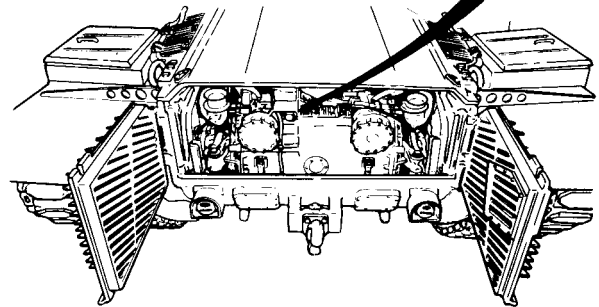
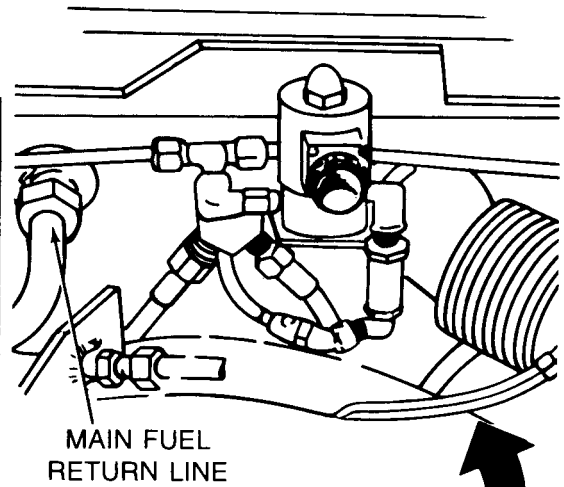
First Technician (Rear Grille Doors)

- Loosen connection in main fuel return line at top of engine.
- Place a container under loose connection to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from loose connection?



40

- Check for free fuel flow from main fuel return outlet at injector pump.
- See Step **44** .

YES

NO

TA250093

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-7

41 Check for free fuel flow at connection between main fuel return line tubing and flexible hose leading to quick disconnect.

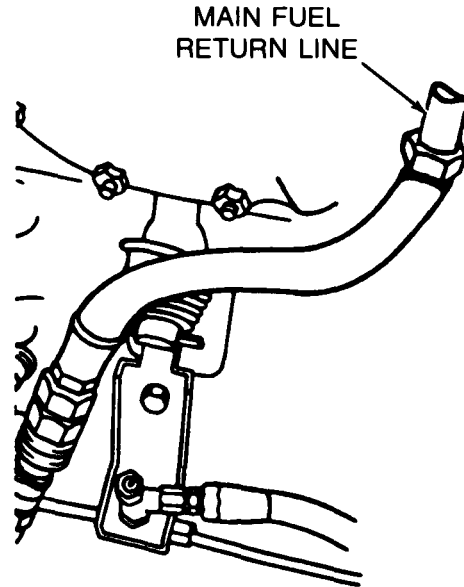
First Technician (Rear Grille Doors)

- Connect main fuel return line quick disconnect.
- Tighten main fuel return connection at top of engine.
- Loosen connection between main fuel return line and flexible hose.
- Place a container under loose connection to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from loose connection?



42 Clear clogged line between top of engine and flexible hose by blowing with compressed air. If this does not work replace line (page 7-286).

NO YES

43 Clear clogged hose by blowing with compressed air. If this does not work, replace flexible hose (page 7-219).

TA250094

Symptom-7
FROM STEP

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

40

44 Check for free fuel flow from main fuel return outlet at injector pump.

First Technician (Rear Grille Doors)

- Connect main fuel return line quick disconnect.

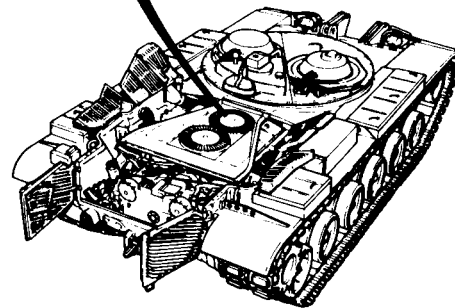
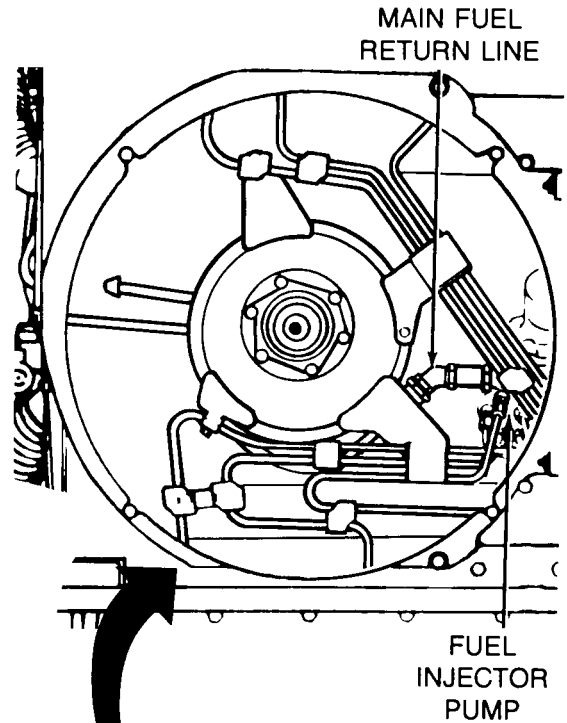
Both Technicians (Top Deck)

- Remove engine cooling fans (page 9-55).
- Disconnect main fuel return line at injector pump.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from injector pump return outlet?



45

- Clear clogged fuel supply line between front of engine and inlet side of fuel injector pump by blowing with compressed air. If this does not work, replace line (page 7-29).
- Tighten connection in main fuel return line at top of engine.

NO

46

Clear clogged fuel return line between injector pump and the rear of engine by blowing with compressed air. If this does not work, replace line.

YES

TA250095

Symptom-7

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

13

47 Check for free fuel flow from primer pump supply line in engine compartment.

Second Technician (Operator's Station)

- Connect fuel supply line to bulkhead fitting.

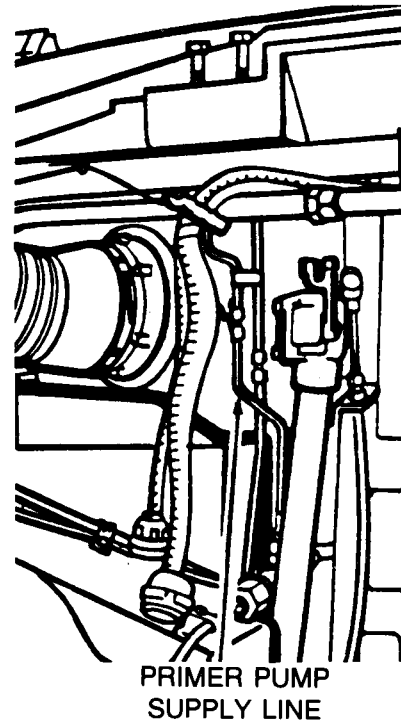
Both Technicians (Top Deck)

- Have powerplant removed (page 5-2).
- Disconnect primer pump supply line at inline connection.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from primer pump supply line in engine compartment?



48 Clear line between inline connector and main fuel supply by blowing with compressed air. If this does not work, replace line.

NO

YES

49 Clear line between inline connector in engine compartment and left hull bulkhead by blowing with compressed air. If this does not work, notify support maintenance.

Symptom-7

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

38

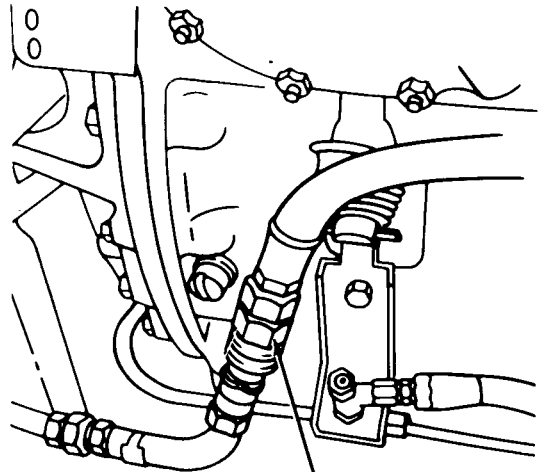
50 Check for free fuel flow from quick disconnect on hose leading to fuel tank return selector cock.

NOTE
Fuel tanks must be full to perform this check.

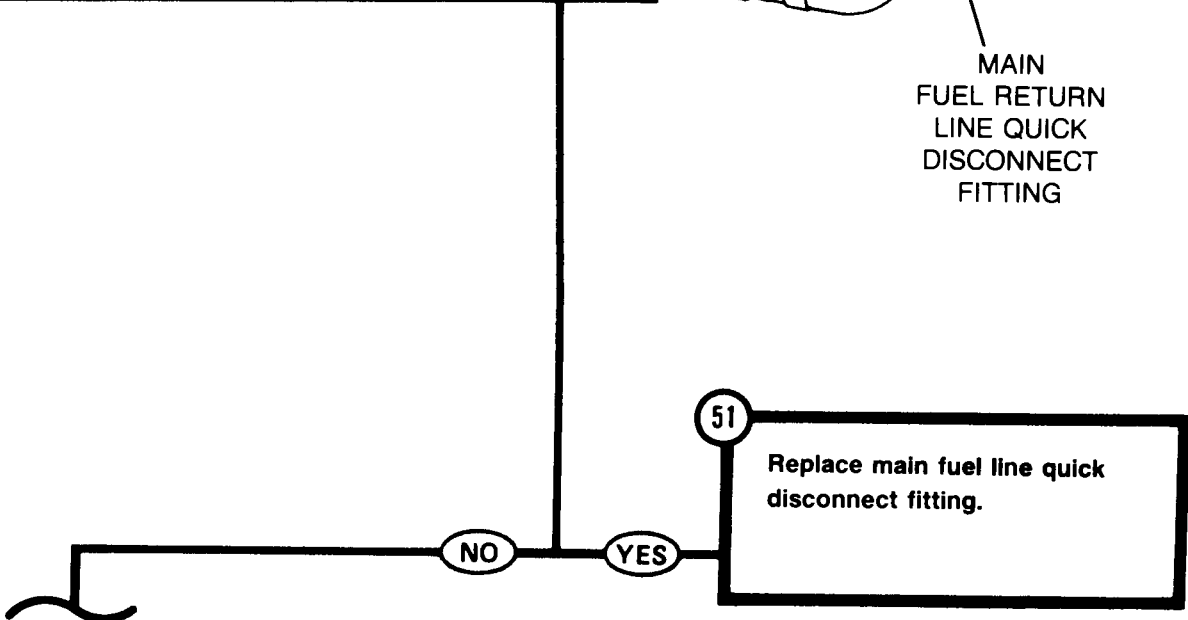
First Technician (Rear Grille Doors)

- Holding line as low as possible - push in on main fuel line quick disconnect with a punch or phillips screwdriver.

Does fuel flow freely from quick disconnect?



MAIN FUEL RETURN LINE QUICK DISCONNECT FITTING



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

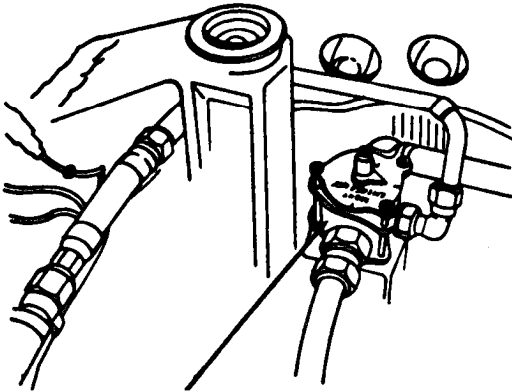
Symptom-7

52 Check engine fuel return tank selector cock for proper position.

First Technician (Rear Grille Doors)

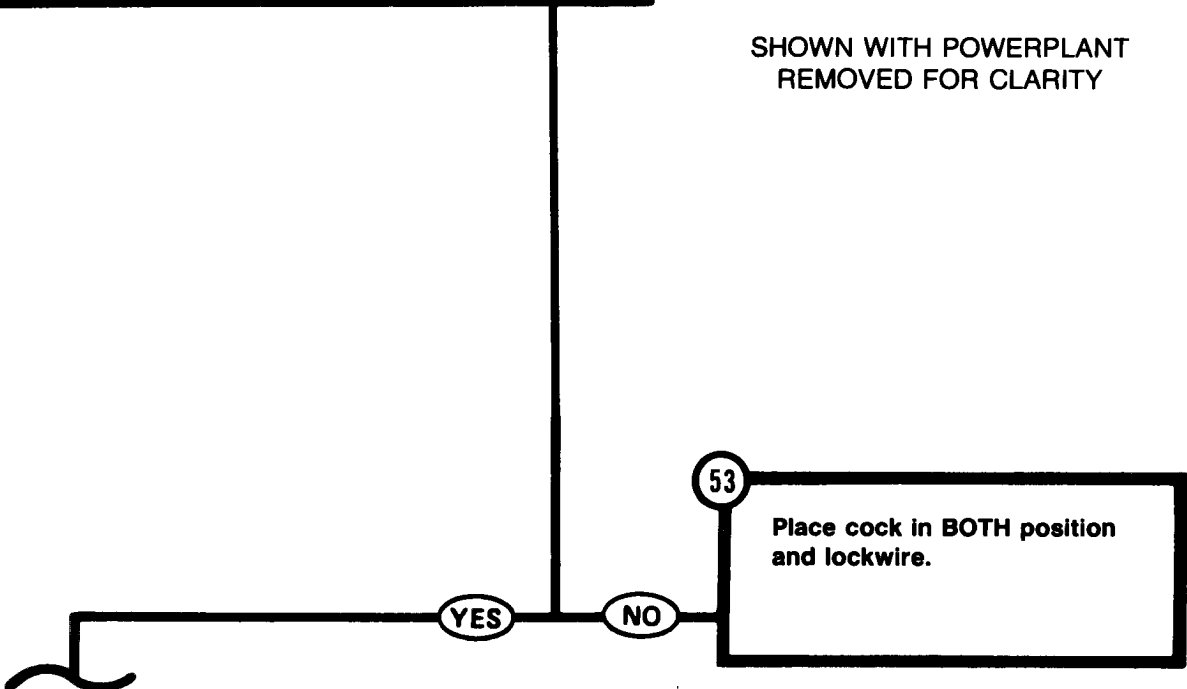
- Connect main fuel return line quick disconnect.
- Observe selector cock for BOTH position.

Is return tank selector cock wired in BOTH position?



FUEL RETURN
SELECTOR COCK

SHOWN WITH POWERPLANT
REMOVED FOR CLARITY



53 Place cock in BOTH position and lockwire.

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

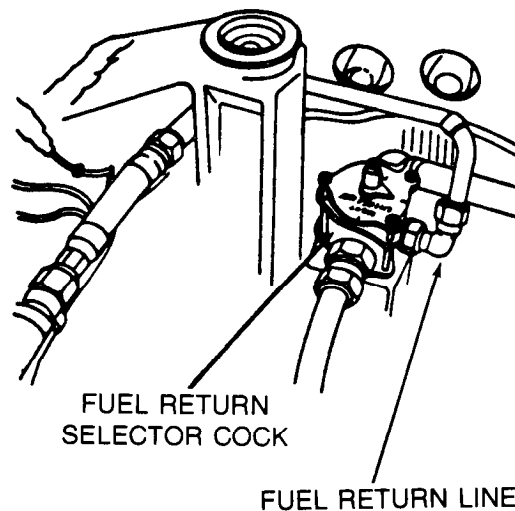
Symptom-7

54 Check for free fuel flow at inlet side on engine fuel return tank selector cock.

First Technician (Rear Grille Doors)

- Loosen engine fuel return line at tank selector cock.

Does fuel flow from loose connection?



55 Clear clogs from return line between quick disconnect and tank selector by blowing with compressed air. If this does not work, replace line.

NO

YES

56 Replace engine fuel return tank selector cock (page 7-163).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-8

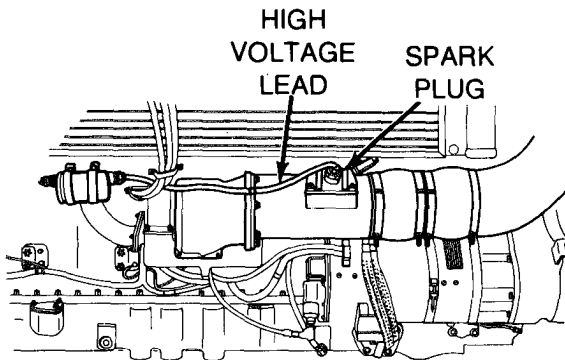
ONE INTAKE MANIFOLD PREHEATER WILL NOT WORK.

WARNING

When power is on, keep hands away from high voltage ignition lead. Contact with high voltage output can cause injury or death.

NOTE

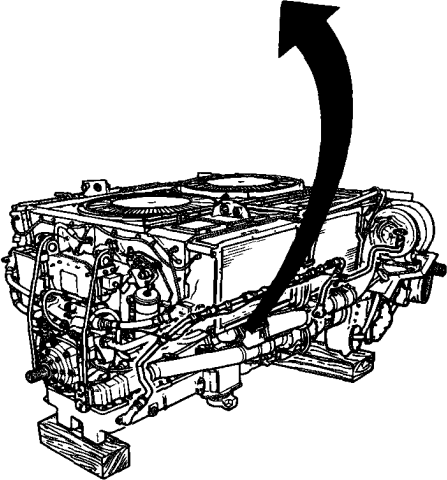
This procedure is to be performed by two persons. The lead person shall be referred to as the first technician and shall direct the activity of the second person called the second technician.



(RIGHT SIDE OF ENGINE SHOWN)

1 Check for electrical power to manifold preheater spark plug.

- Second Technician (Operator's Station)**
- Set MASTER BATTERY switch OFF.
- First Technician (Top Deck)**
- Have powerplant removed (page 5-2).
- First Technician (Powerplant)**
- Ground hop powerplant (page 5-25). Do not start engine.
 - Disconnect high voltage ignition lead from spark plug of cold manifold preheater.
 - Place disconnected end of high voltage ignition lead 1/4 inch from engine ground.
 - Check if disconnected end of high voltage ignition lead arcs to ground when STARTER and manifold preheater switches are pressed.



TA25010

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-8
STEP 1 CONTINUED

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

-CAUTION-
Do not hold STARTER switch closed for more than 14 seconds.

- Press STARTER and PREHEAT switches at the same time, hold on for approximately 10 seconds, then release.
- Set MASTER BATTERY switch OFF.

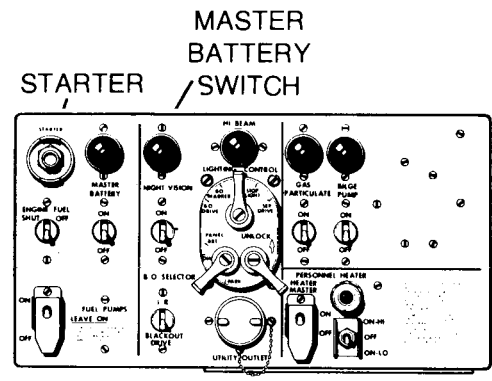
Did voltage arc to ground from high voltage ignition lead?

2

- Check for electrical power to manifold heater ignition unit (CKT 486).
- See Step 6.

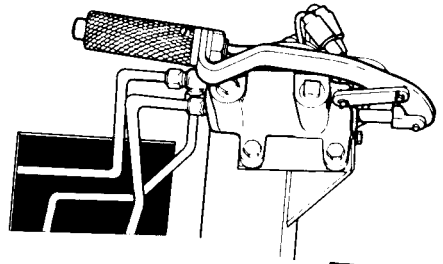
NO

YES

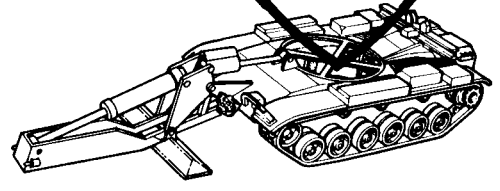


MASTER CONTROL PANEL

MANIFOLD PREHEAT SWITCH



PRIMER PUMP



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250101

Symptom-8

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

3 Check if fuel is being supplied to spark plug of cold manifold heater.

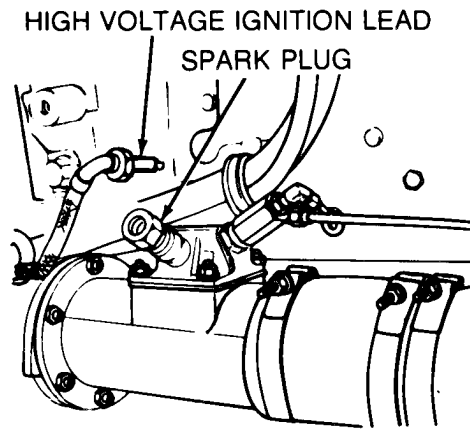
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Hold ENGINE FUEL SHUT OFF switch in OFF position.
- At the same time, press STARTER and PREHEAT switches and operate primer pump for approximately 10 seconds, then release.
- Set MASTER BATTERY switch OFF.

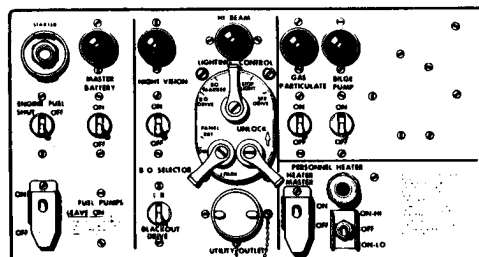
First Technician (Powerplant)

- Remove spark plug from cold manifold heater (page 7-275).
- Check electrodes of spark plug for presence of fuel.

Is spark plug wet with fuel?



MANIFOLD HEATER
(RIGHT SIDE OF ENGINE)
(LEFT SIDE SIMILAR)



ENGINE FUEL SHUT OFF SWITCH
FUEL PUMPS SWITCH
MASTER CONTROL PANEL

4 Replace manifold heater spark plug (page 7-275).

5 Check if fuel is being supplied to manifold heater nozzle.

See Step **13**.



TA250102

Symptom-8

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

2

6 Check for electrical power to manifold heater ignition unit (CKT 486).

First Technician (Powerplant)

- Disconnect engine electrical harness connector from manifold heater ignition unit at cold manifold heater.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 486) of engine electrical harness connector at manifold heater ignition unit and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press STARTER and preheat switches at the same time, hold on for approximately 10 seconds, then release.

First Technician (Powerplant)

- Check if meter indicates 18 to 30 volts dc.

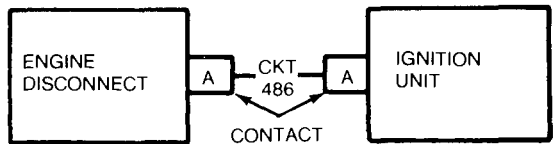
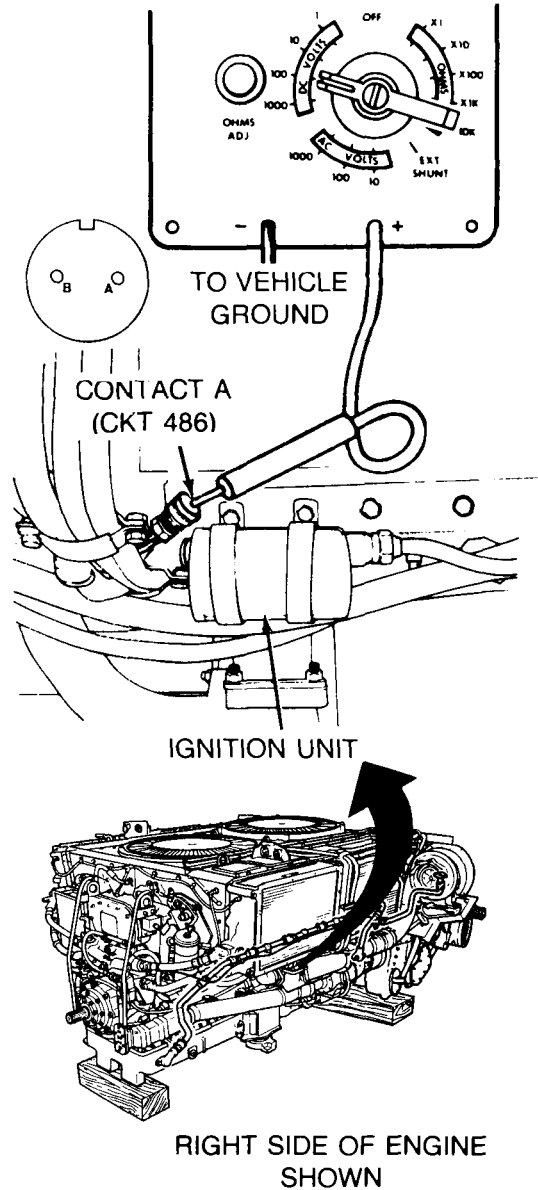
Does meter indicate 18 to 30 volts dc?

7

- Repair engine electrical harness (CKT 486) (page 10-298).
- Connect high voltage ignition lead to spark plug.

NO

YES



TA250103

Symptom-8

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

8 Check engine electrical harness (CKT GND) for continuity.

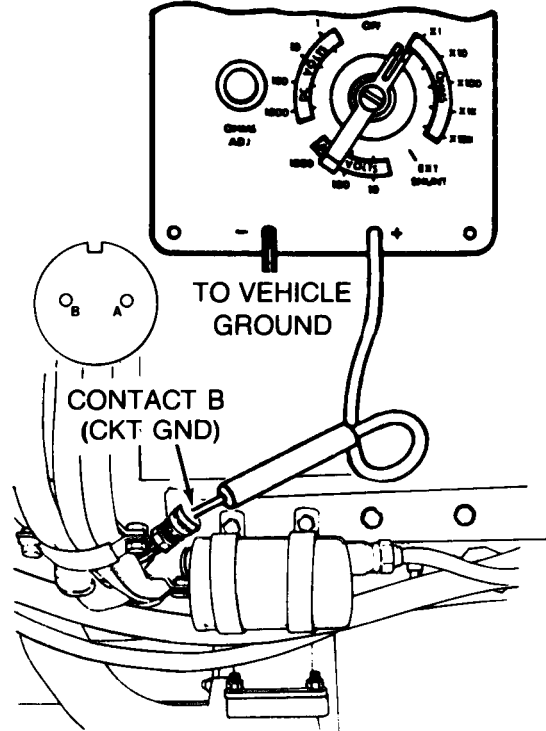
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Powerplant)

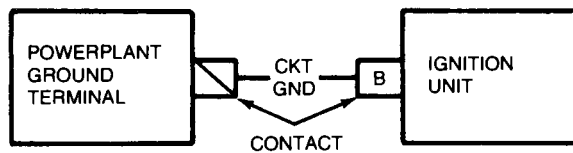
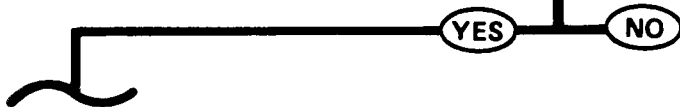
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of engine electrical harness connector at manifold heater ignition unit and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



9

- Repair engine electrical harness (CKT GND).
- Connect high voltage ignition lead to spark plug.



TA250104

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-8

10 Check high voltage ignition lead for short to ground.

First Technician (Powerplant)

- Connect engine electrical harness connector to manifold heater ignition unit at cold manifold heater.
- Disconnect high voltage ignition lead from manifold heater ignition unit at cold manifold heater (keep this lead).
- Disconnect high voltage ignition lead from manifold heater ignition unit and spark plug at manifold heater on opposite side of engine and connect it to ignition unit and spark plug of cold manifold heater.

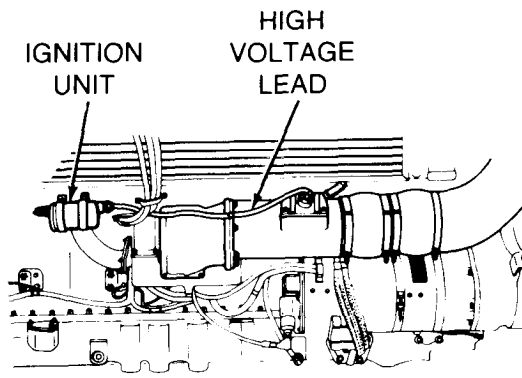
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press STARTER and preheat switches at the same time, hold on for approximately 10 seconds, then release.

First Technician (Powerplant)

- Check if heat can be felt from manifold heater.

Did manifold heater get hot?



(RIGHT SIDE OF ENGINE SHOWN)

11 Replace high voltage ignition lead (page 7-267).

12

- Replace manifold heater ignition unit (page 7-267).
- Install high voltage ignition lead to manifold heater without a lead.



Symptom-8

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

5

13 Check if fuel is being supplied to manifold heater nozzle.

First Technician (Powerplant)

- Connect high voltage ignition lead to spark plug of cold manifold preheater.
- Disconnect manifold heater fuel inlet line at manifold heater which is not working.

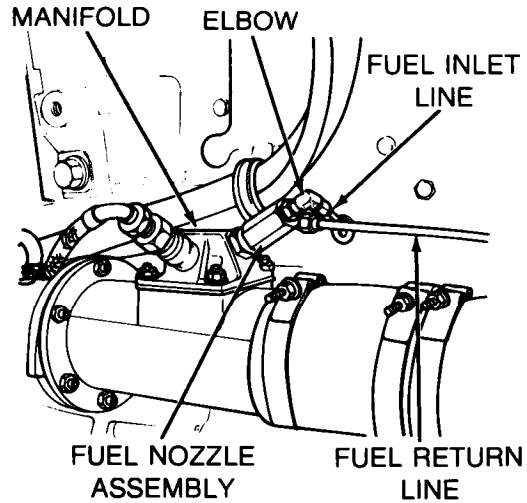
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time, press STARTER and preheat switches and operate primer pump for approximately 10 seconds, then release.

First Technician (Powerplant)

- Check for free fuel flow, at disconnected inlet line, while primer pump is being operated.

Is fuel being supplied to manifold heater nozzle?



MANIFOLD HEATER
(RIGHT SIDE OF ENGINE SHOWN)

14 Replace fuel line from solenoid valve to manifold heater nozzle (page 7-241).

NO YES

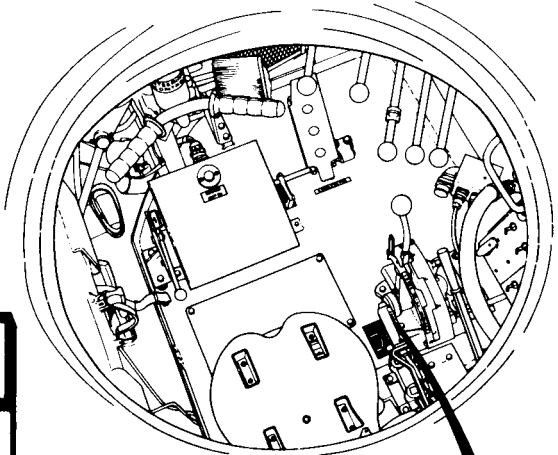
15 Replace manifold heater nozzle (page 7-281).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

Symptom-9

BOTH INTAKE MANIFOLD PREHEATERS WILL NOT WORK

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



OPERATOR'S STATION

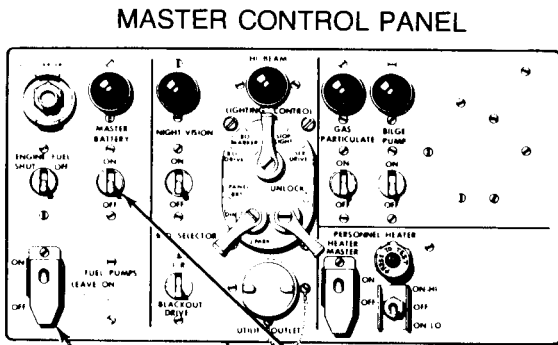
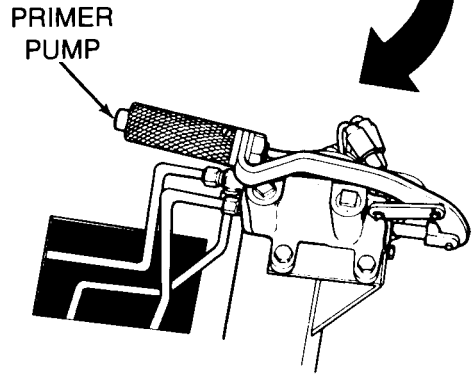
1

Check primer pump for back pressure.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Operate primer pump several times.

Does primer pump build up normal back pressure?



FUEL PUMPS SWITCH

MASTER BATTERY SWITCH

2

See Symptom 7: PRIMER PUMP WILL NOT WORK.

YES

NO

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**
(Continued)

CAUTION

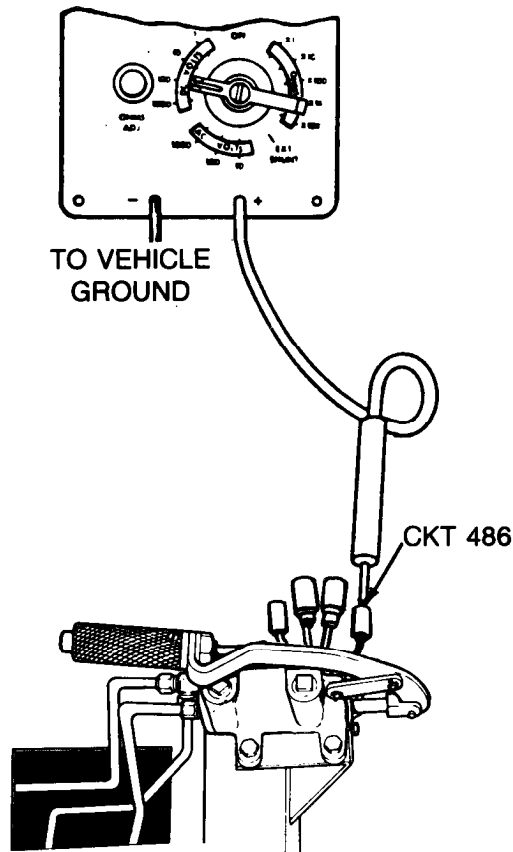
Do not press STARTER button for more than 14 seconds.

3

Check basket-control panel starting harness (CKT 486) at manifold preheat switch connector for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Place manual fuel shutoff handle in OFF (out) position.
- Disconnect both harness connectors (CKT 486) from preheat switch at primer pump.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to one of the connectors (CKT 486) at manifold preheat switch and black probe to ground.
- Set MASTER BATTERY switch ON.
- Press STARTER button for about 10 seconds, then release.
- Check if meter indicates 10 to 30 volts dc.
- Repeat above check moving red probe of meter to other connector (CKT 486) at manifold preheat switch.
- Place manual fuel shutoff handle in ON (down) position.



Did meter indicate 18 to 30 volts dc at one of the connectors?

NO

YES

4

- Check manifold preheat switch for continuity.
- See Step 12 .

TA250108

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

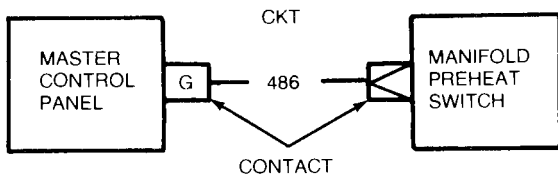
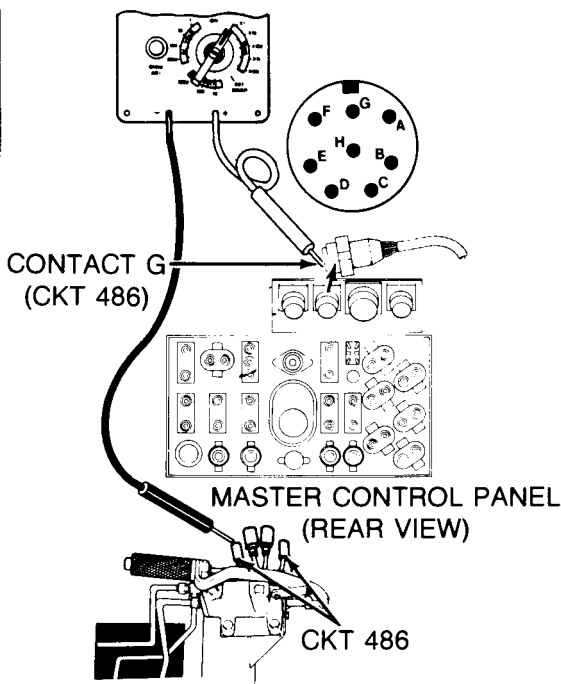
5

Check basket-control panel starting harness (CKT 486) from master control panel to primer pump for continuity.

First Technician (Operator's Station)

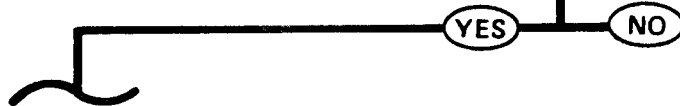
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel starting harness connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 486) of basket-control panel starting harness connector at master control panel.
- Connect black probe of meter to first one (CKT 486) lead at primer pump and then to other lead.
- Check if meter indicates continuity at one of leads (CKT 486) at primer pump.

Did multimeter indicate continuity at one of the two (CKT 486) leads at the primer pump?



6

- Inspect basket-control panel starting harness for bent/broken connector contacts or loose (CKT 486) wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.
- Connect basket-control panel starting harness connectors to primer pump and master control panel.
- Install master control panel (page 10-33).



Symptom-9

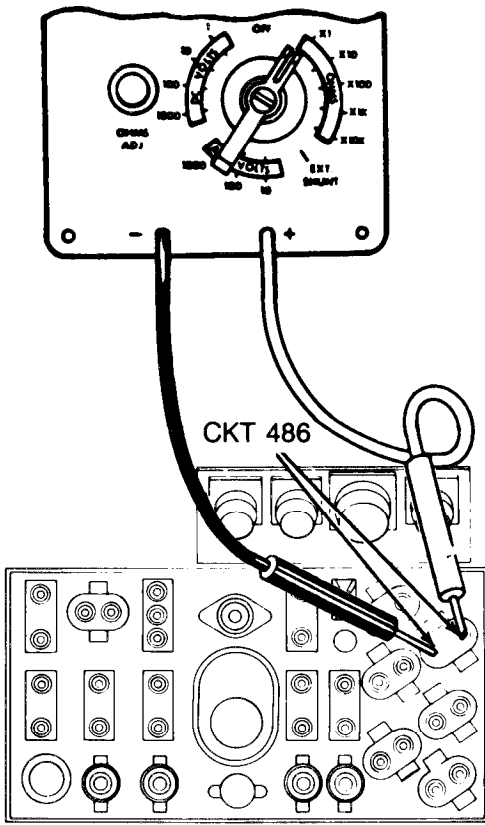
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

7 Check manifold preheat circuit breaker (CKT 486) for continuity.

First Technician (Operator's Station)

- Connect basket-control panel starting harness connectors to preheat switch at primer pump.
- Disconnect electrical lead connectors (CKT 486) from manifold preheat circuit breaker on master control panel.
- Connect red probe of meter to one circuit breaker contact and black probe to other circuit breaker contact.
- Check if meter indicates continuity.

Did meter indicate continuity?



8

- Connect basket-control panel starting harness connector to master control panel.
- Replace manifold preheat circuit breaker (page 10-70).

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

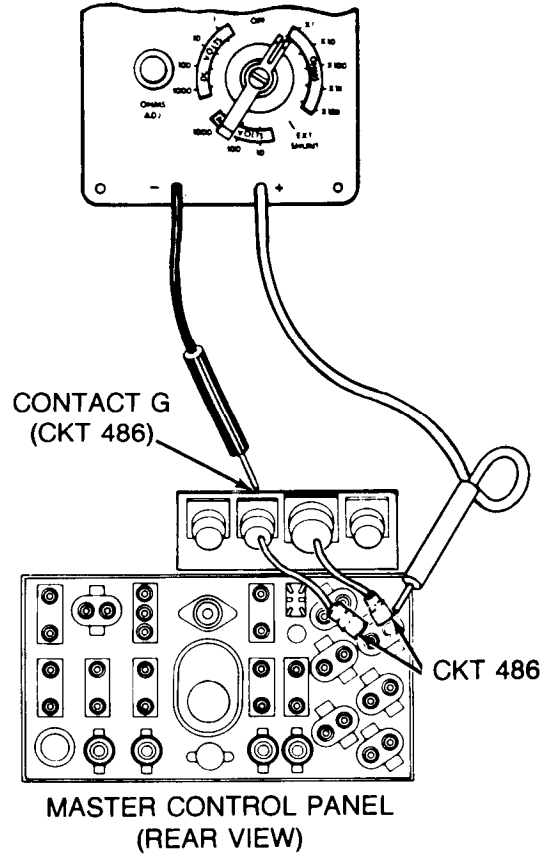
Symptom-9

9 Check control panel starting harness (CKT 486) from connector at control panel to connector at manifold pre-heat circuit breaker for continuity.

First Technician (Operator's Station)

- Connect black probe of meter to contact G (CKT 486) of starting harness connector at master control panel.
- Connect red probe of meter to first one (CKT 486) lead at manifold preheat circuit breaker and then to other lead.
- Check if meter indicates continuity at one of leads (CKT 486) at manifold preheat circuit breaker.

Did meter indicate continuity at one of the two (CKT 486) leads at manifold preheat circuit breaker?



10

- Connect control panel starting harness connector to manifold preheat circuit breaker.
- Replace control panel accessories harness (page 10-91).

YES

NO

11

- Connect control panel accessories harness connector to manifold preheat circuit breaker.
- Replace control panel starting harness (page 10-97).

Symptom-9
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

4

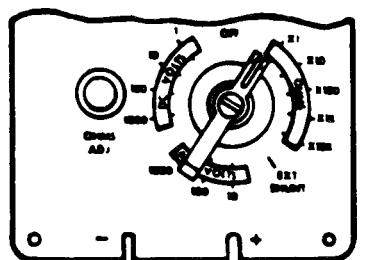
12

Check manifold preheat switch for continuity.

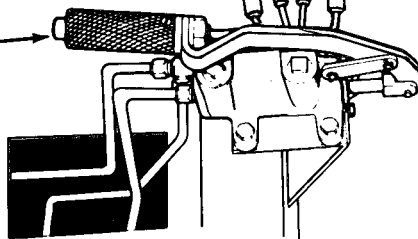
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one manifold preheat switch connector and black probe to other manifold preheat switch connector.
- Press and hold manifold preheat switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



MANIFOLD
PREHEAT
SWITCH



13

Replace primer pump
(page 7-282).

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-9

---CAUTION---
Do not hold STARTER button and preheat switch ON for more than 14 seconds.

14 Check bulkhead engine disconnect harness (CKT 486) at engine disconnect for electrical power.

Second Technician (Top Deck)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector from engine disconnect.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 486) of bulkhead engine disconnect harness connector at engine disconnect and black probe to ground.

First Technician (Operator's Station)

- Reconnect both basket-control panel starting harness connectors to preheat switch at primer pump.
- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch for about 10 seconds then release.

Second Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc.

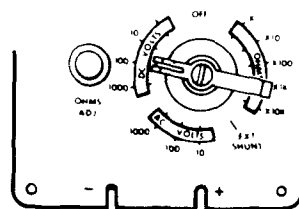
Did meter indicate 18 to 30 volts dc?

NO

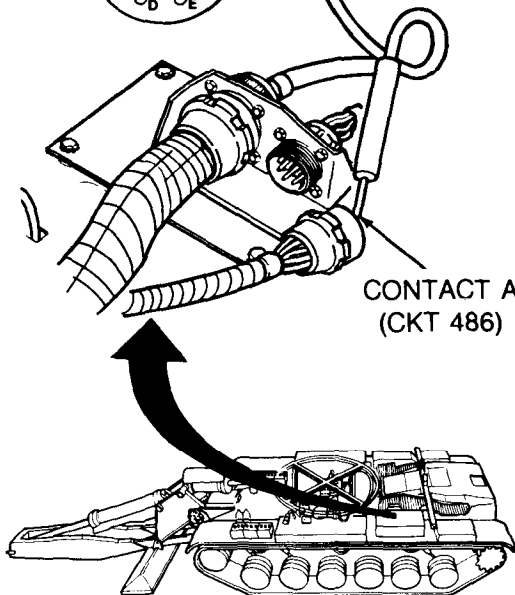
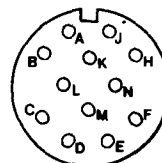
YES

15

- Check manifold heater fuel supply solenoid for operation.
- See Step 21 .



TO VEHICLE GROUND



CONTACT A (CKT 486)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

16 Check front accessory harness (CKT 486) at bulkhead disconnect for electrical power.

First Technician (Operator's Station)

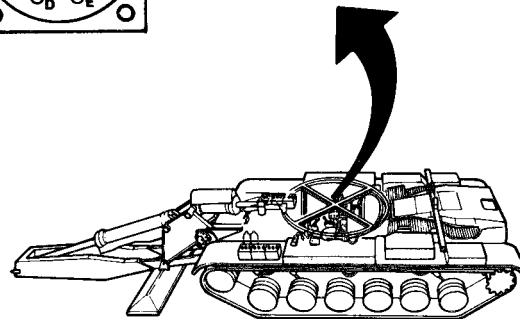
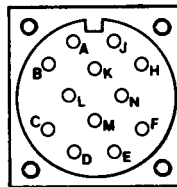
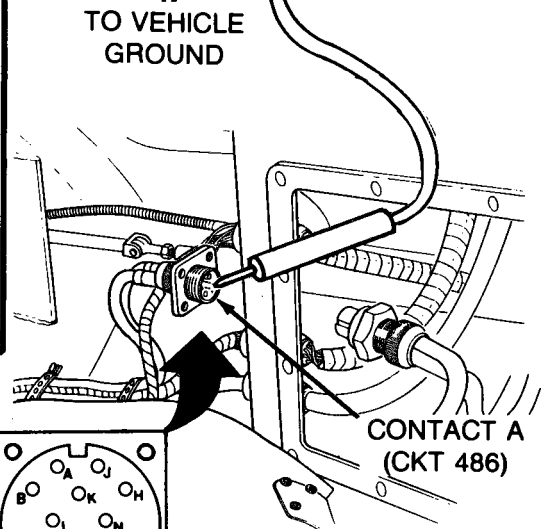
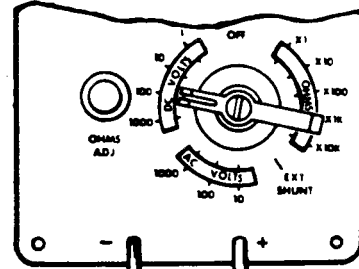
- Set MASTER BATTERY switch OFF.

Second Technician (Commander's Station)

- Displace front accessory harness connector at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact A (CKT 486) of front accessory harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch and hold for about 10 seconds, then release.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250114

Symptom-9

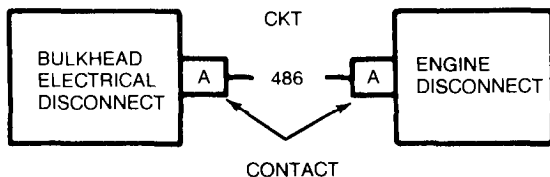
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**
(Continued)

STEP 16 CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Did meter indicate 18 to 30 volts dc?



17

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 486 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Connect bulkhead engine disconnect harness connector to engine disconnect.
- Close left top deck grille doors.

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

18 Check basket-control panel starting harness (CKT 486) from basket disconnect to preheat switch for continuity.

First Technician (Operator's Station)

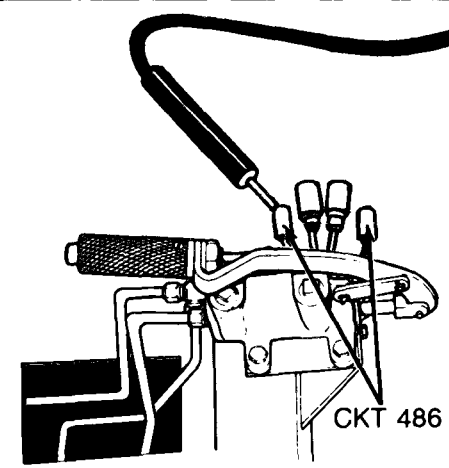
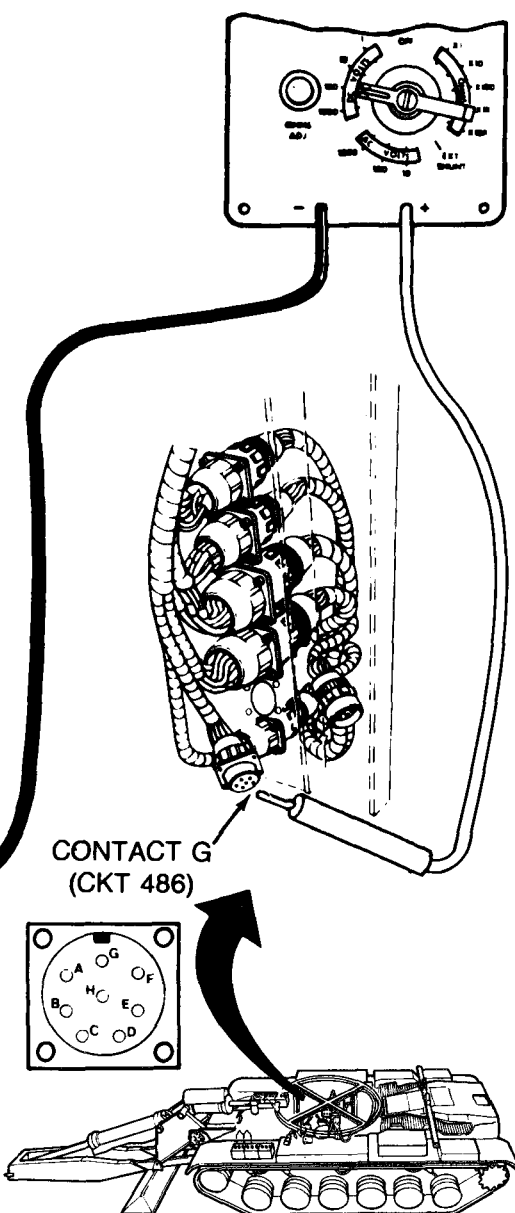
- Set MASTER BATTERY switch OFF.
- Disconnect both harness connectors (CKT 486) from preheat switch at primer pump.

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-control panel starting harness connector (CKT 486) at basket disconnect.
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 486) of basket-control panel starting harness connector at basket disconnect.

First Technician (Operator's Station)

- Connect black probe of meter to first one (CKT 486) lead at primer pump and then to other lead.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

STEP **18** CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates continuity at one lead at primer pump.

Did meter indicate continuity at one of the two (CKT 486) leads at the primer pump?

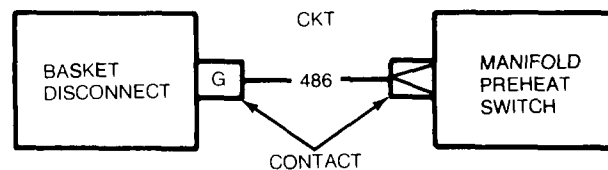
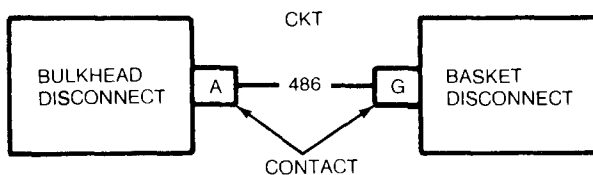
19

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 486 wires at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-control panel starting harness connector at basket disconnect.
- Connect basket-control panel starting harness connectors to preheat switch.
- Connect bulkhead engine disconnect harness connector at engine disconnect.

20

- Inspect basket-control panel starting harness for bent/broken connector contacts or loose CKT 486 wires at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.
- Install basket-control panel starting harness connector at basket disconnect.
- Connect basket-control panel starting panel harness connectors to preheat switch.
- Connect bulkhead engine disconnect harness connector to engine disconnect.

YES NO



TA250117

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

15

21 Check manifold heater fuel supply solenoid for operation.

First Technician (Operator's Station)

- Set **MASTER BATTERY** switch OFF.

Second Technician (Top Deck)

- Connect bulkhead engine disconnect harness connector at engine disconnect.
- Close left top deck grille doors.

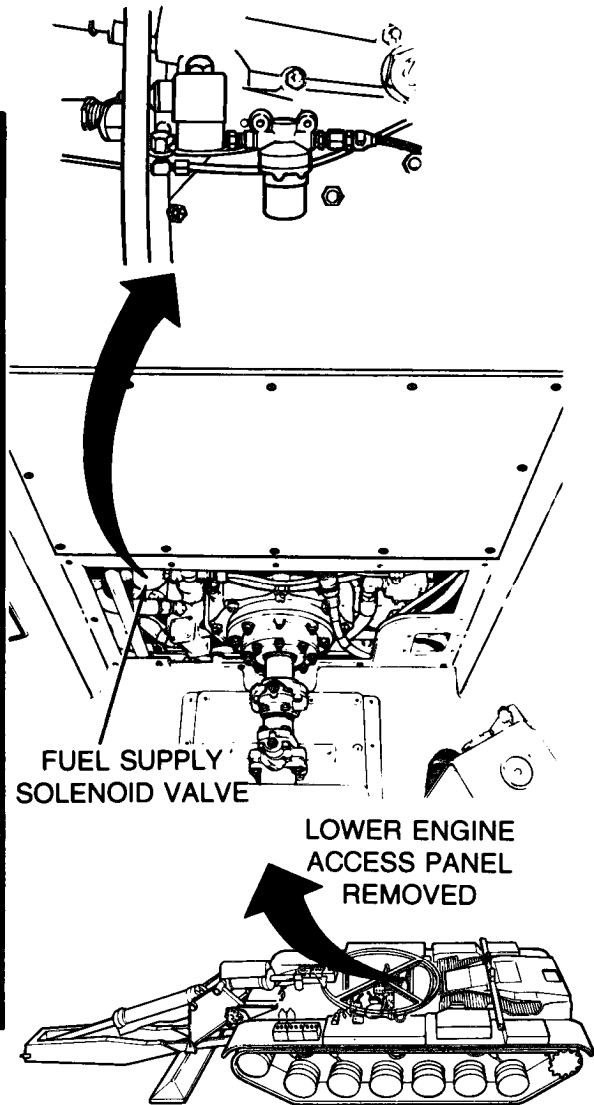
Second Technician (Rear of Crew Compartment)

- Remove lower engine access panel (page 7-16).
- Listen for manifold heater fuel supply solenoid to click when first technician operates switches.

First Technician (Operator's Station)

- Set **MASTER BATTERY** switch ON.
- At the same time press and release **STARTER** button and manifold preheat switch several times.
- Set **MASTER BATTERY** switch OFF.

Did manifold heater fuel supply solenoid click when manifold preheat switch was pressed?



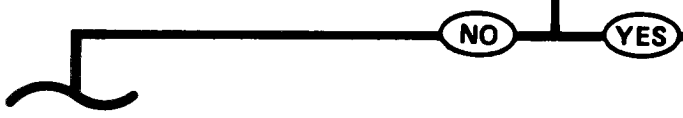
FUEL SUPPLY SOLENOID VALVE

LOWER ENGINE ACCESS PANEL REMOVED

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

22

- Check for free fuel flow at outlet of manifold heater solenoid valve.
- See Step **28** .



Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

23 Check engine electrical harness connector (CKT 486) at manifold heater fuel supply solenoid for electrical power.

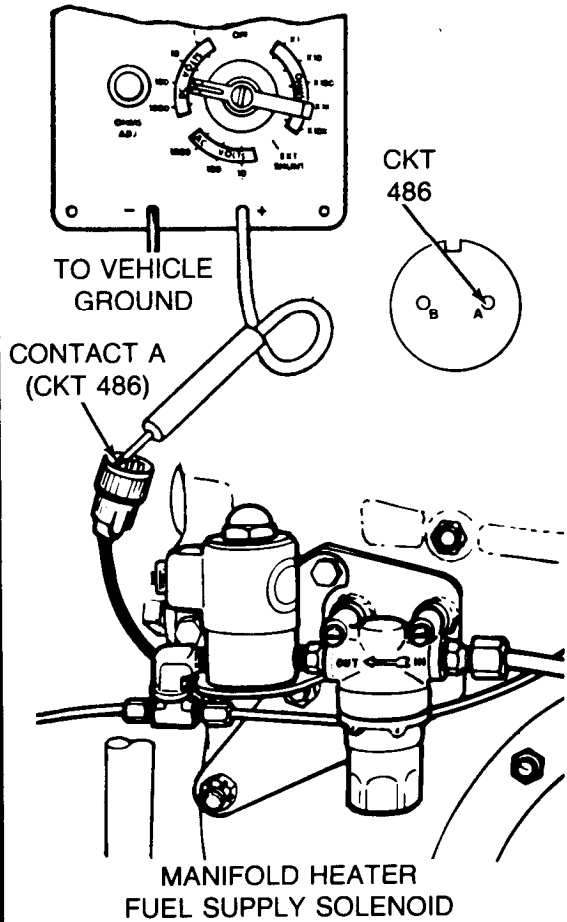
Second Technician (Rear of Crew Compartment)

- Disconnect engine electrical harness connector from manifold heater fuel supply solenoid connector.
- Connect red probe of meter to contact A (CKT 486) of engine electrical harness connector and black probe to ground.
- Observe meter for voltage indication when first technician operates switches.

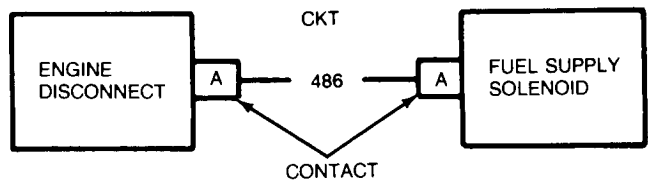
First Technician (Operator's Station)

- Place manual fuel shutoff in the OFF (out) position.
- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch for about 10 seconds, then release.
- Place manual fuel shutoff switch in the ON (in) position.

Does meter indicate 18 to 30 volts dc?



24 Repair engine electrical harness (CKT 486) (page 10-298).



Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

25 Check engine electrical harness, at connector to manifold heater fuel supply solenoid, for continuity from CKT GND to vehicle ground.

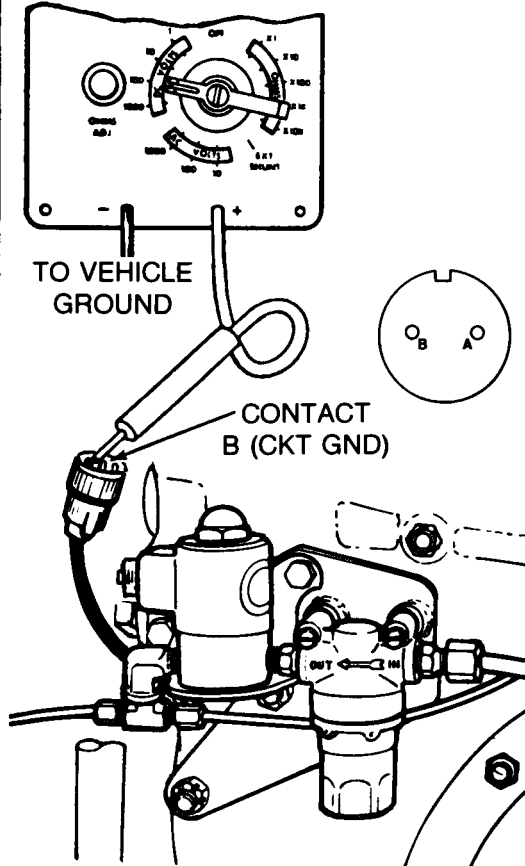
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Rear of Crew Compartment)

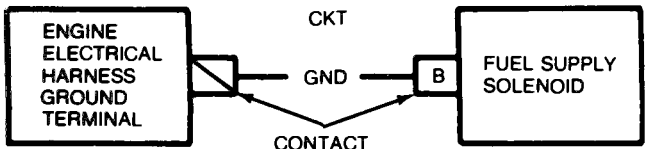
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of engine electrical harness connector at manifold heater fuel supply solenoid and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



26 Replace manifold heater fuel supply solenoid (page 7-241).

27 Repair engine electrical harness (CKT GND) (page 10-298).



TA250120

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

FROM STEP

22

28

Check for free fuel flow at outlet of manifold heater solenoid valve.

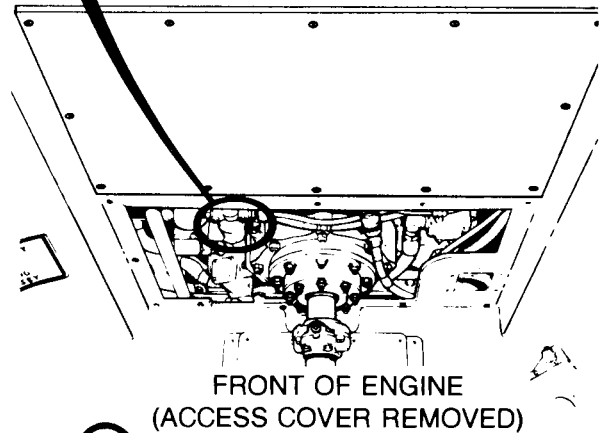
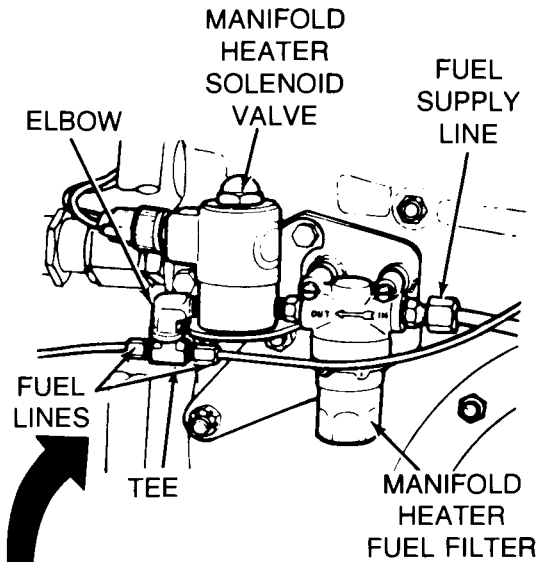
Second Technician (Rear of Crew Compartment)

- Disconnect one of the fuel lines from tee at manifold heater solenoid valve outlet port.
- Place a container under tee to catch any fuel.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Operate primer pump while pressing STARTER and manifold preheat switches.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely from outlet of manifold heater solenoid valve?



29

Check manifold heater fuel return solenoid for operation.

See Step 35 .

NO

YES

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**
(Continued)

30 Check for free fuel flow at inlet to manifold heater fuel filter.

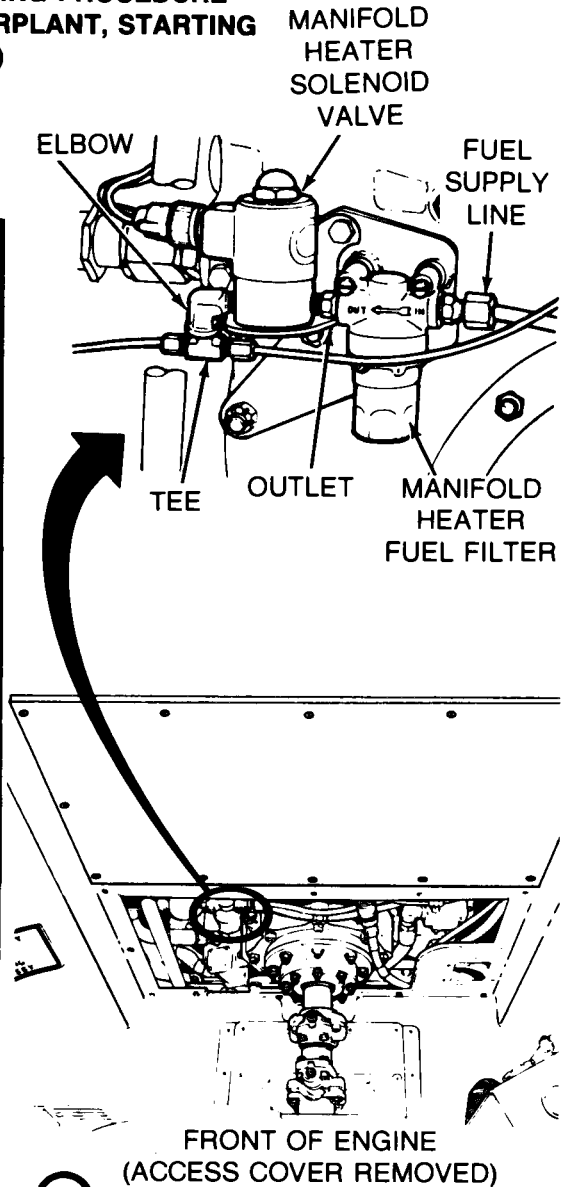
Second Technician (Rear of Crew Compartment)

- Connect fuel line to tee at manifold heater solenoid valve.
- Disconnect fuel supply line to manifold heater fuel filter.
- Place a container under fuel supply line to catch any fuel coming out.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Operate primer pump.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely from disconnected line?



31

- Clear clogged line between the backflow valve and fuel filter by blowing with compressed air. If this does not work, replace the line (page 7-256).

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-9

32 Check for free fuel flow at outlet of manifold heater fuel filter.

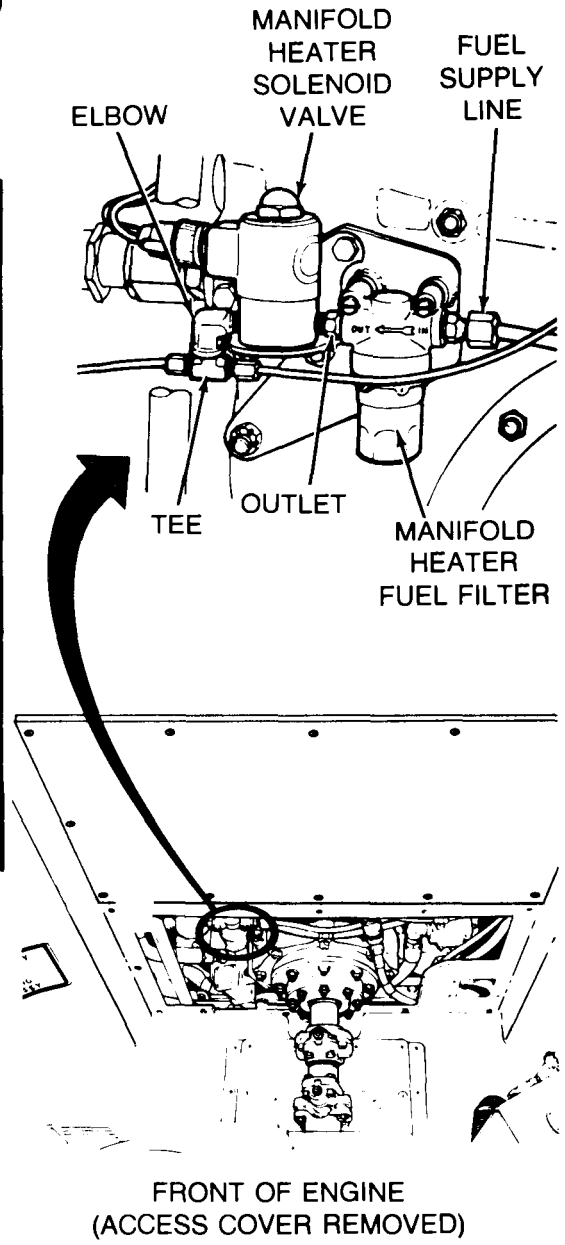
Second Technician (Rear of Crew Compartment)

- Connect fuel supply line to manifold heater fuel filter.
- Disconnect manifold heater solenoid valve from manifold heater fuel filter.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Operate primer pump.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely at outlet of manifold heater fuel filter?



33 Replace manifold heater solenoid valve (page 7-270).

34 Replace manifold heater fuel filter element (page 7-231).

YES NO

**Symptom-9
FROM STEP**

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

29

WARNING
After disconnecting ground straps, do not allow them to contact any metal surface.

35

Check manifold heater fuel return solenoid for operation.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

- Connect fuel line to tee at manifold heater solenoid valve.
- Displace battery slave cable connector from starter feed harness connector at bulkhead disconnect (page 10-298).

First Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time press STARTER button, and press manifold preheat switch several times, then release.

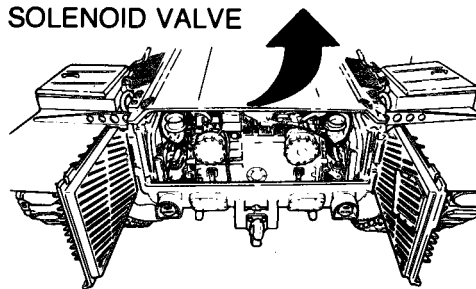
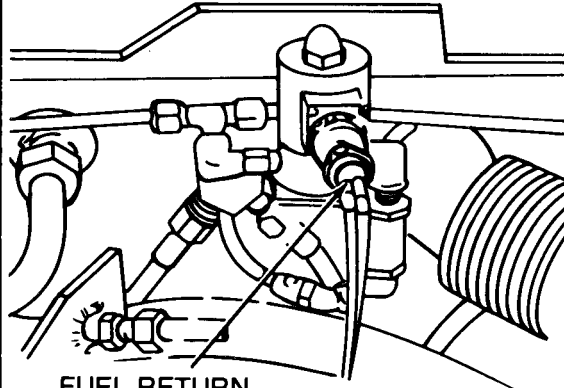
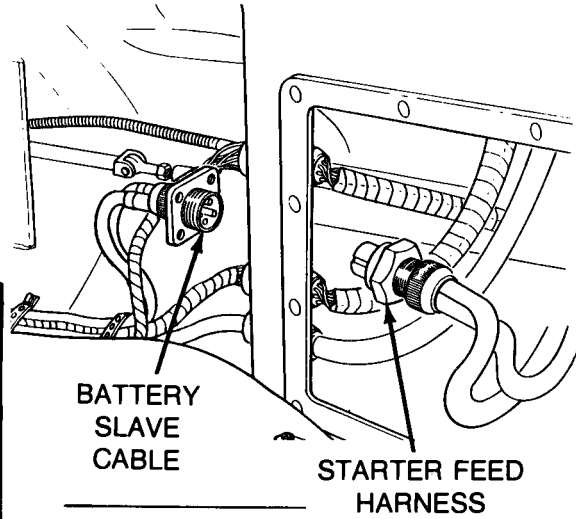
Second Technician (Rear Grille Doors)

- Listen for manifold heater fuel return solenoid to click when preheat switch is pressed.

Does manifold heater fuel return solenoid click?

NO

YES



36

- Check for electrical power at manifold heater spark plug connectors.
- See Step 47 .

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-9

37 Check transmission harness connector (CKT 486) at manifold heater fuel return solenoid for electrical power.

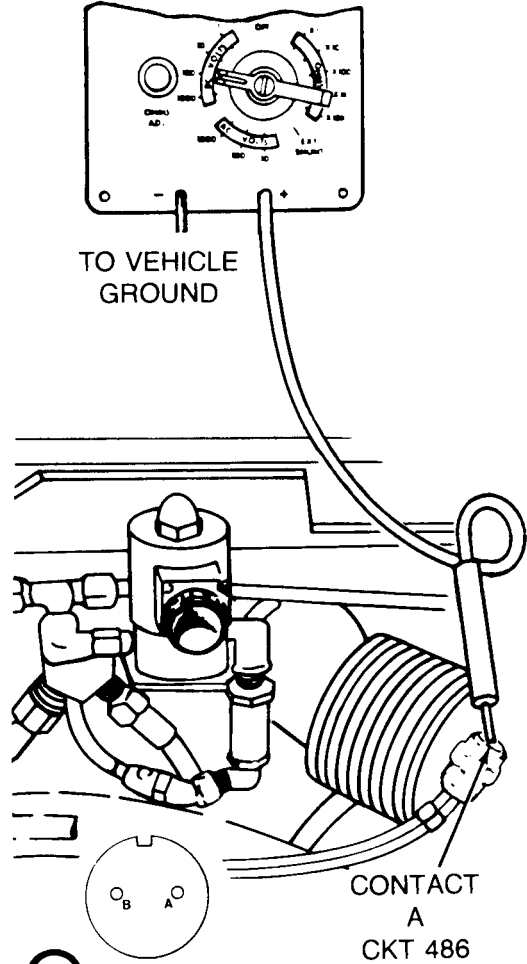
Second Technician (Rear Grille Doors)

- Disconnect transmission harness connector from manifold heater fuel return solenoid connector.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 486) of transmission harness connector at manifold fuel return solenoid and black probe to ground.

First Technician (Operator's Station)

- At the same time press STARTER button and manifold preheat switch, then release.

Did meter indicate 18 to 30 volts dc?



38

- Check transmission harness (CKT 486) for continuity from connector at transmission disconnect to connector at manifold heater fuel return solenoid.

● See Step **44** .

YES

NO

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
 (Continued)

39

Check transmission harness, at connector to manifold heater fuel return solenoid, for continuity from CKT GND to vehicle ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

- Install battery slave harness connector at bulkhead disconnect (page 10-270).

First Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).

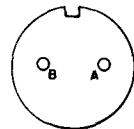
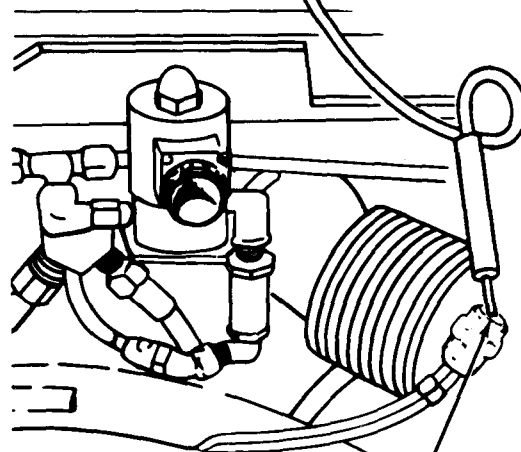
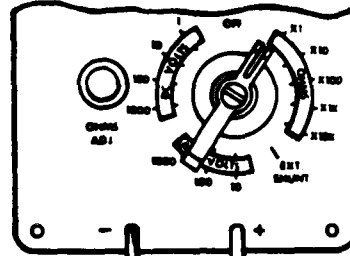
Second Technician (Rear Grille Doors)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of transmission harness connector at manifold heater fuel return solenoid and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

NO

YES



CONTACT B
 (CKT GND)

40

Replace manifold heater fuel return solenoid (page 7-270).

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

41 Check engine electrical harness ground (CKT GND) circuit for continuity at transmission disconnect.

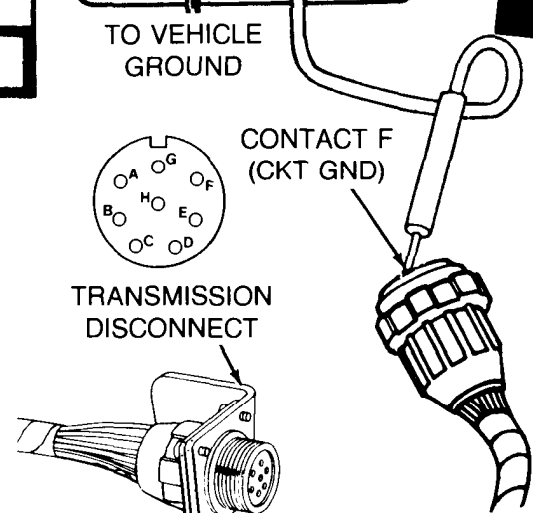
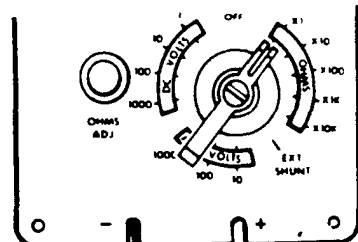
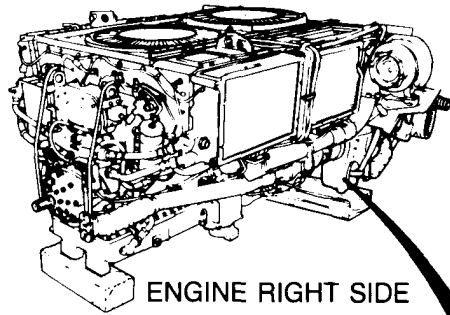
Second Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

Second Technician (Right Side of Engine)

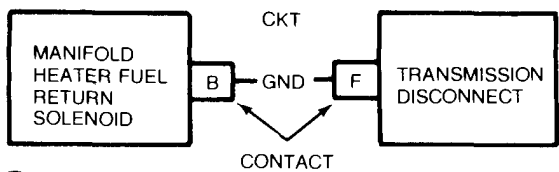
- Disconnect engine electrical harness connector from transmission harness connector at transmission disconnect.
- Connect red probe of meter to contact F (CKT GND) of transmission harness connector at transmission disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



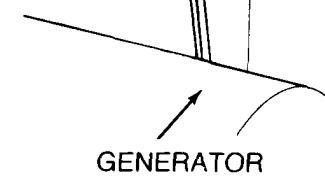
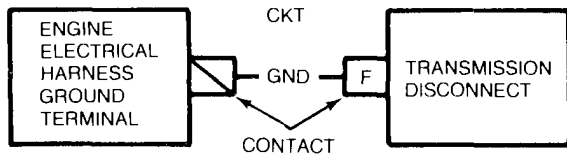
42 Repair transmission harness (CKT GND) (page 7-276).

YES



43 Repair engine electrical harness (CKT GND) (page 7-276).

NO



TA250127

Symptom-9

FROM STEP

38

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

44 Check transmission harness (CKT 486) for continuity from connector at transmission disconnect to connector at manifold heater fuel return solenoid.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Front of Crew Compartment)

- Disconnect 3 battery ground straps (page 10-268).

Second Technician (Commander's Station)

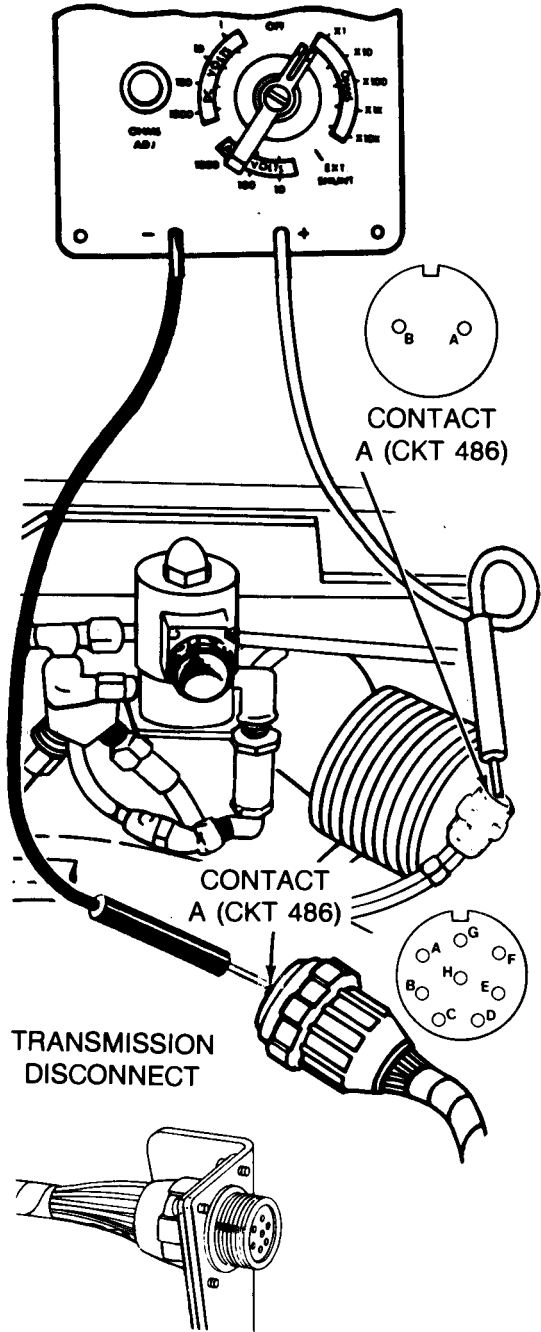
- Install battery slave cable connector at bulkhead disconnect (page 10-270).

Second Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

Second Technician (Right Side of Engine)

- Disconnect engine electrical harness connector from transmission harness connector at transmission disconnect.



TA250128

Symptom-9

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

(Continued)

STEP **44** CONTINUED

- Set multimeter to OHMS X1 scale and “zero” meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact A (CKT 486) of transmission harness connector at manifold heater fuel return solenoid.
- Connect black probe of meter to contact A (CKT 486) of transmission harness connector at transmission disconnect.
- Check if meter indicates continuity.

Does multimeter indicate continuity?

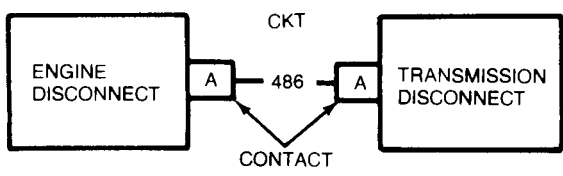
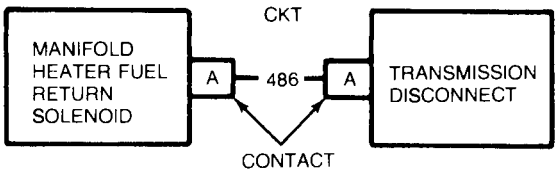
45

Repair transmission harness (CKT 486) (page 7-276).

46

Repair engine electrical harness CKT 486 (page 7-276).

NO **YES**



Symptom-9
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

36

WARNING

Stay clear of high voltage ignition wires. Contact with high voltage can cause injury or death.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

47

Check for electrical power at manifold heater spark plug connectors.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

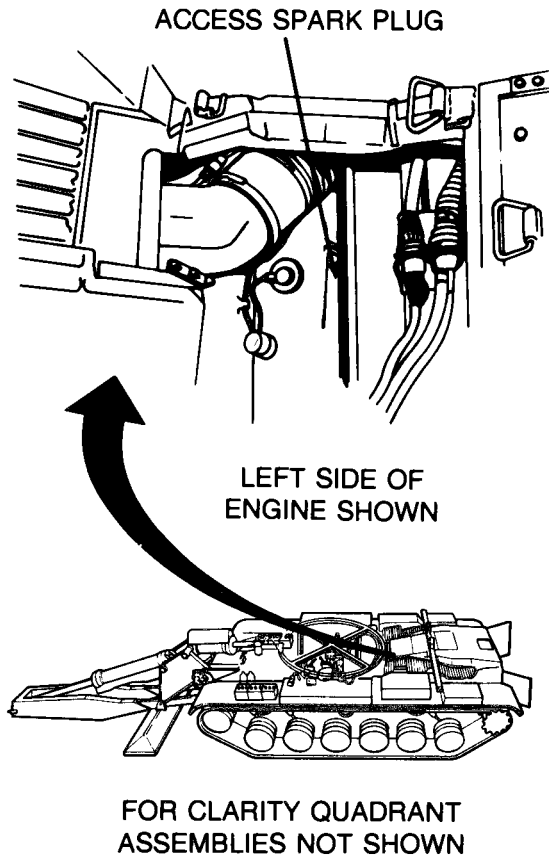
- Install battery slave cable connector at bulkhead disconnect (page 10-270).

First Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).

Second Technician (Top Deck)

- Open left and right top deck grille doors.
- Disconnect right and left manifold heater spark plug ignition wires and lay loose ends 1/4 inch from vehicle ground.



TA250130

Symptom-9 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
 STEP **47** CONTINUED **(Continued)**

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch and hold for about 10 seconds, then release.

Second Technician (Top Deck)

- Check for arcing from ignition wires to ground when STARTER button and manifold preheat switch are pressed.

Did power arc to ground from high tension ignition leads?

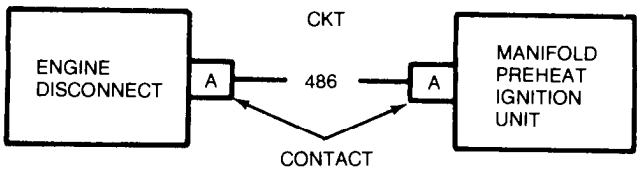
48

- Connect left and right manifold heater ignition wires to spark plugs.
- Install engine lower access cover (page 7-14).
- See Symptom 2: ENGINE CRANKS AT NORMAL SPEED, BUT WILL NOT START (BATTERY/ GENERATOR GAGE SHOWS IN YELLOW AREA).

49

Repair engine electrical harness (CKT 486) (page 7-276).

YES NO



TA250131

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING****Symptom-10****FUEL WATER SEPARATOR WILL NOT WORK.****NOTE**

- To provide troubleshooting for malfunctions discovered during vehicle operation or fuel water separator operational check, this procedure is divided into three malfunctions as follows:
- If fuel water separator will not drain SEE STEP ① .
- If fuel water separator will not stop draining SEE STEP ⑱ .
- If fuel water separator automatic drain exceeds 21 seconds and then stops replace control assembly (page 7-194).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

TA250132

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

1

Check for fuel flow from manual drain valve.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).
- Install ground hop kit (page 5-25). Do not start engine.

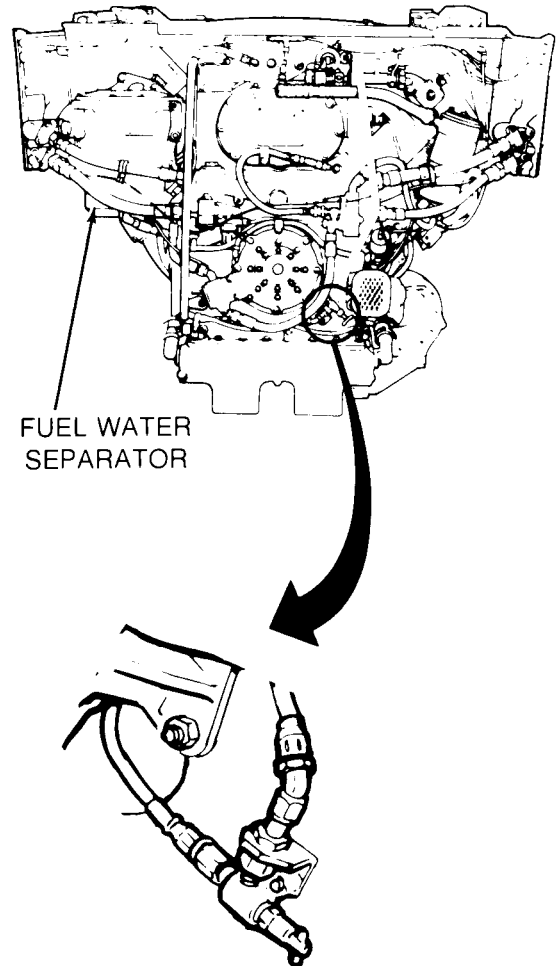
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

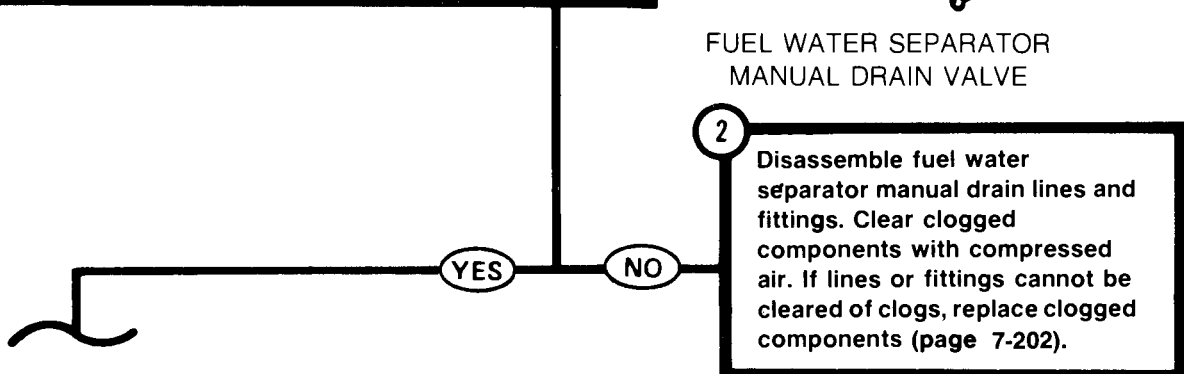
First Technician (Front of Engine)

- Place suitable container under fuel water separator drain.
- Open fuel water separator manual drain valve.
- Check if fuel drains from water separator.
- Close fuel water separator manual drain valve.

Does fuel drain from manual fuel drain?



FUEL WATER SEPARATOR
MANUAL DRAIN VALVE



TA250133

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

WARNING

Do not allow fuel to overflow container. Should container start to overflow disconnect ground hop fuel supply line.

3

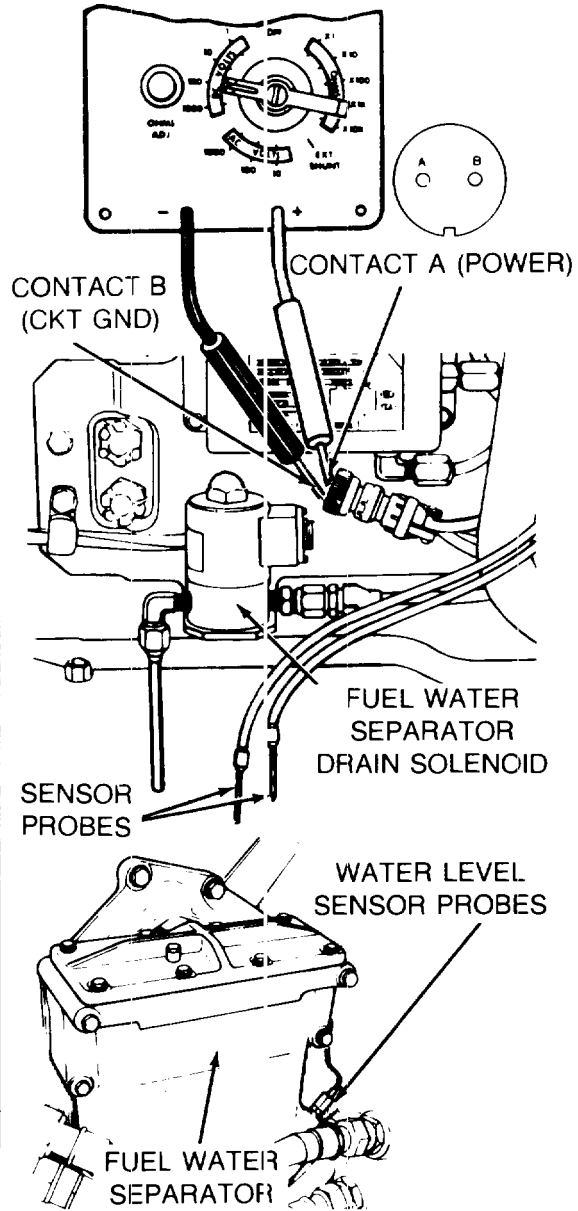
Check fuel water separator harness for electrical power at solenoid connector.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Engine)

- Disconnect ground hop fuel supply line from engine.
- Remove two probes and adapters from fuel water separator (page 7-190).
- Install 1/8 inch pipe plugs in adapter openings.
- Place suitable container under drain line.
- Connect ground hop fuel supply line to engine.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect harness from fuel water separator drain solenoid.
- Connect red probe of meter to contact A and black probe to contact B of the harness connector.



TA250134

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

STEP **3** CONTINUED

(Continued)

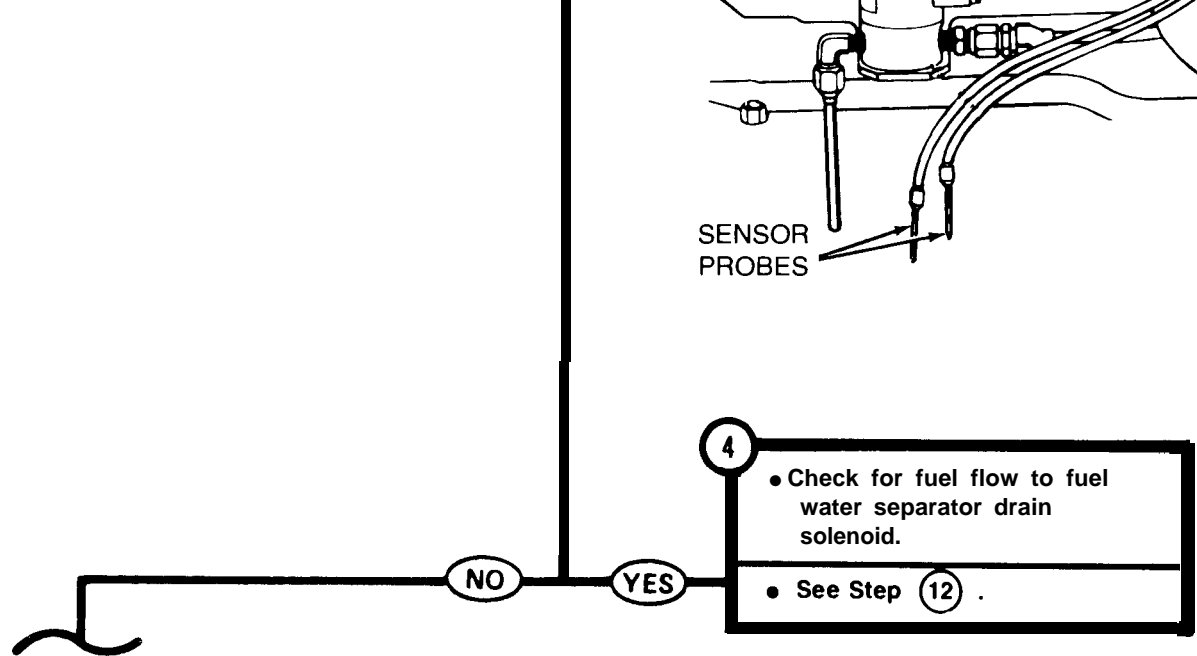
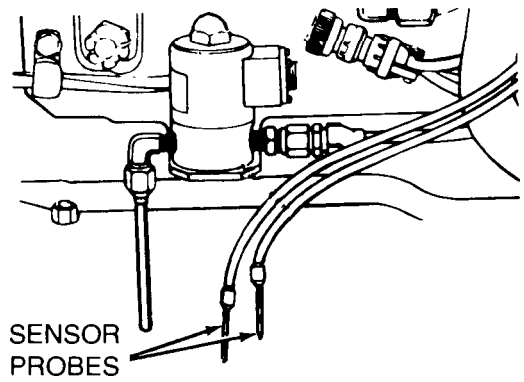
Second Technician (Operator's Station)

- Start engine,

First Technician (Front of Engine)

- Ground both fuel water separator probes against the engine case.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4

- Check for fuel flow to fuel water separator drain solenoid.

• See Step **12** .

TA250135

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

5

Check fuel water separator harness for continuity between solenoid connector contact A and control assembly connector contact A.

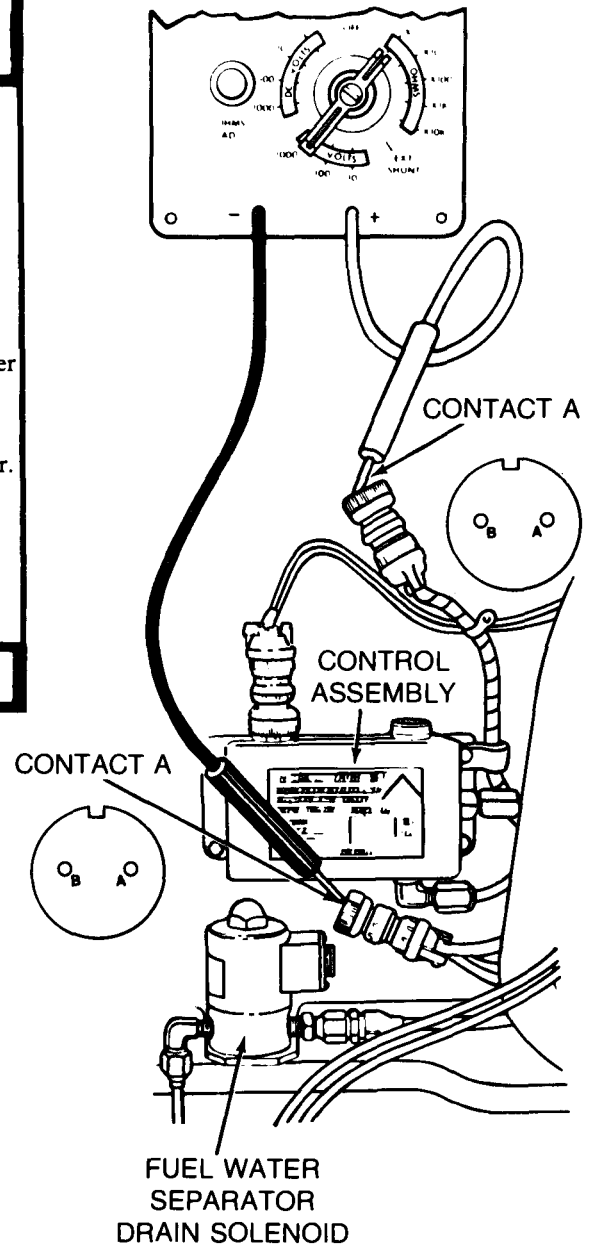
Second Technician (Operator's Station)

- Stop engine.

First Technician (Front of Engine)

- Disconnect fuel water separator harness from control assembly.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE test No. 91 (page 4-83).
- Connect red probe of meter to contact A of fuel water separator harness, control assembly connector.
- Connect black probe of meter to contact A of fuel water separator harness solenoid connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



6

- Replace harness between control assembly and solenoid.
- Install probes in separator (page 7-192).

NO

YES

TA250136

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom 10

7

Check fuel water separator harness for continuity between solenoid connector contact B and control assembly connector contact B.

First Technician (Front of Engine)

- Connect red probe of meter to contact B of fuel water separator harness, control assembly connector.
- Connect black probe of meter to contact B of fuel water separator harness, solenoid connector.
- Check if meter indicates continuity.

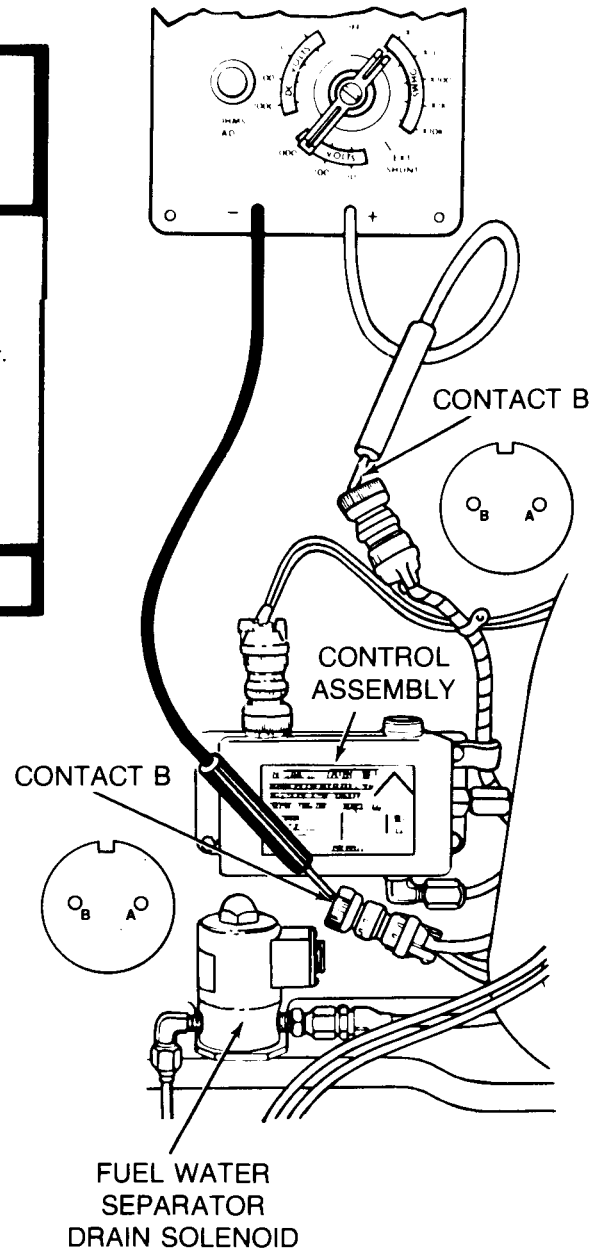
Does meter indicate continuity?

8

- Replace harness between control assembly and solenoid.
- Install probes in separator (page 7-192).

NO

YES



TA250137

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

0.1 Check engine harness for electrical power at control assembly connector.

First Technician (Front of Engine)

- Connect fuel water separator harness to control assembly and solenoid.
- Disconnect engine electrical harness from control assembly.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A and black probe to contact B of engine harness connector.

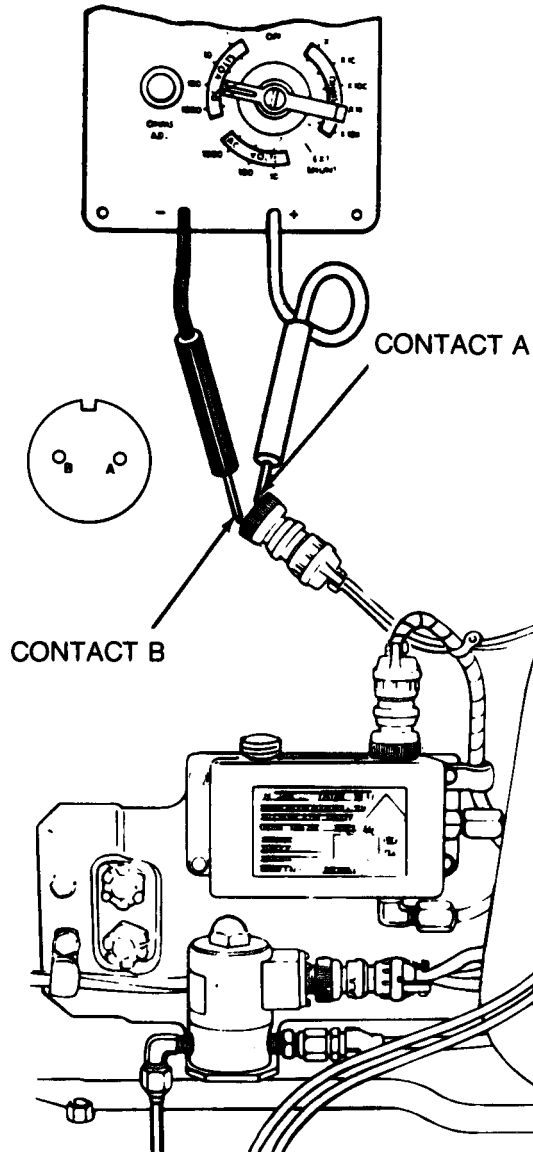
Second Technician (Operator's Station)

- Start engine.

First Technician (Front of Engine)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



0.2 Replace fuel water separator control assembly (page 7-194).

NO YES

TA250138

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

Symptom-10

9 Check engine electrical harness from connector at fuel water separator control to engine ground for continuity.

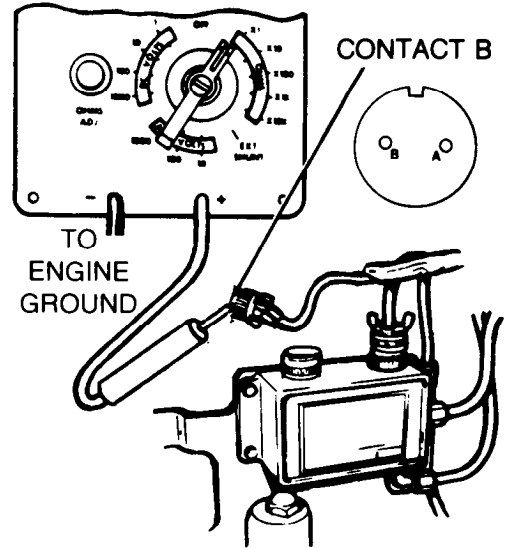
Second Technician (Operator's Station)

- Stop engine.

First Technician (Front of Engine)

- Install probes in fuel water separator (page 7-190).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of engine electrical harness connector at fuel water separator control and black probe to ground.
- Check if meter indicates continuity.

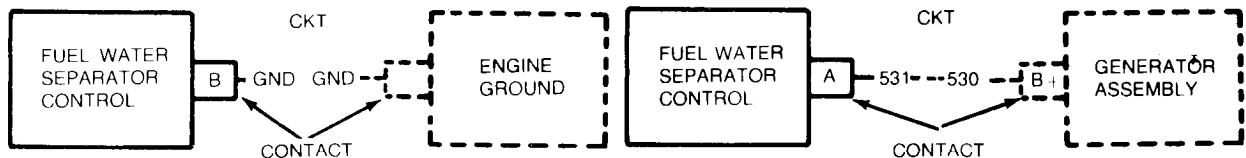
Does meter indicate continuity?



10 Repair engine electrical harness CKT GND (page 10-276).

NO YES

11 Repair engine electrical harness CKT 531 (page 10-276).



TA250139

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING**

(Continued)

FROM STEP

4

12 Check for fuel flow to fuel water separator drain solenoid.

Second Technician (Operator's Station)

- Stop engine.

First Technician (Front of Engine)

- Disconnect fuel line to fuel water separator drain solenoid.

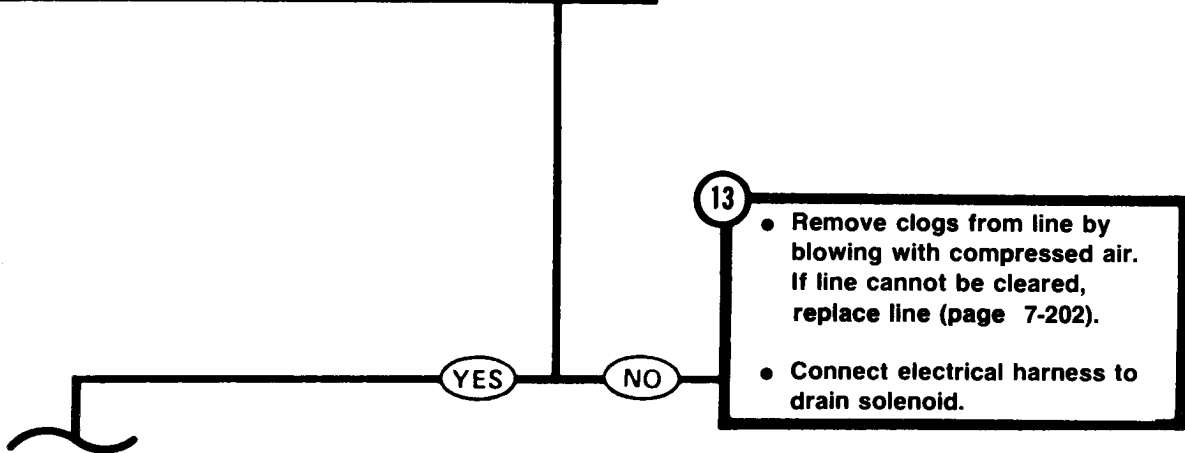
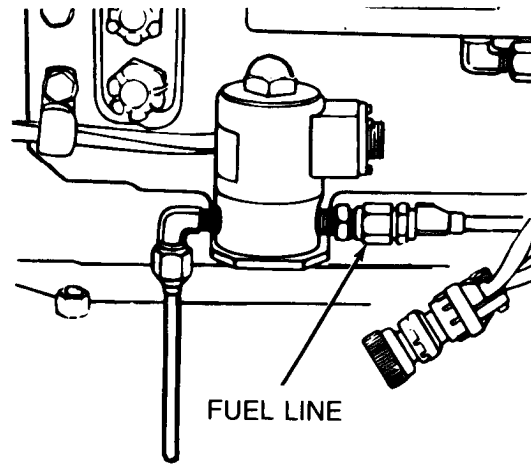
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON, for a few seconds, then OFF.

First Technician (Front of Engine)

- Check if fuel flows from disconnected line.

Does fuel flow from the disconnected line?



13

- Remove clogs from line by blowing with compressed air. If line cannot be cleared, replace line (page 7-202).
- Connect electrical harness to drain solenoid.

TA250140

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

14 Check drain line from fuel water separator solenoid for clogs.

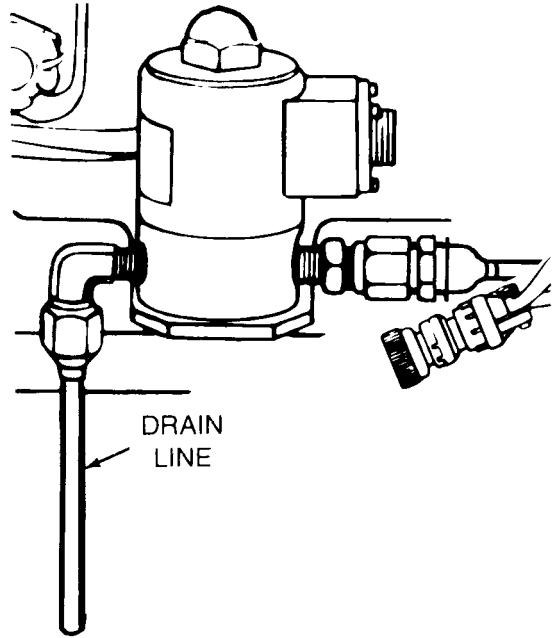
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Engine)

- Remove drain line from fuel water separator drain solenoid.
- Using compressed air, blow through drain line.
- Check if air flows through drain line.

Does air flow through drain line?



15

- Replace drain line from fuel water separator solenoid (page 7-202).
- Connect electrical harness to drain solenoid.

NO

YES

16 Replace fuel water separator drain solenoid (page 7-199).

Symptom-10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

17 Check if fuel stops draining when wiring harness to solenoid is disconnected.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).
- Install ground hop kit (page 5-25). Do not start engine.

First Technician (Front of Engine)

- Disconnect harness from fuel water separator drain solenoid.

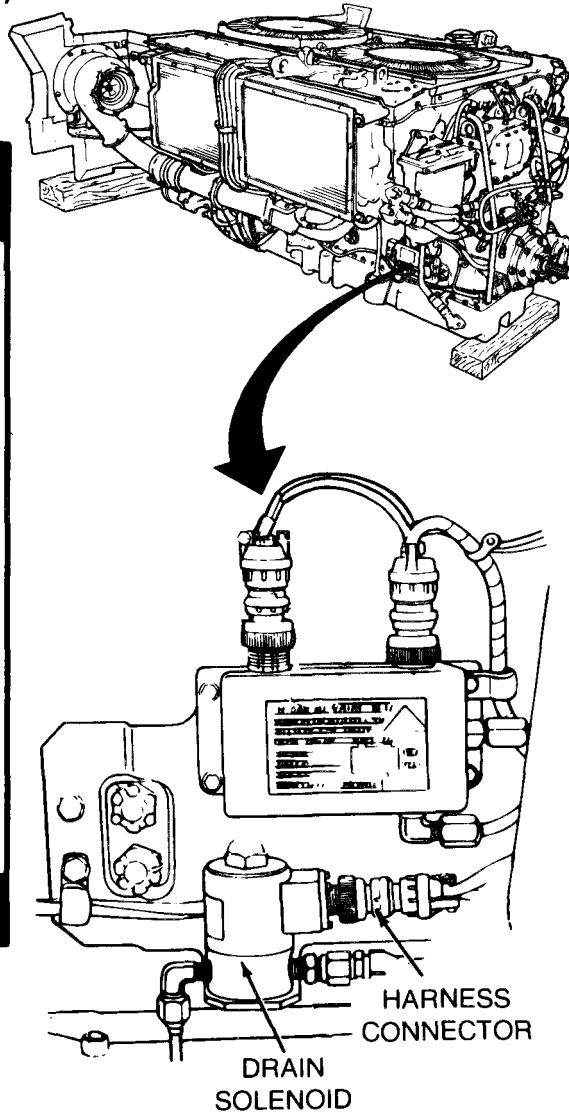
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Front of Engine)

- Check if fuel flows from solenoid drain line.

Does fuel flow from solenoid drain line?



18 Replace fuel water separator drain solenoid (page 7-199).

YES

NO

19

- Replace fuel water separator control assembly (page 7-194).
- Connect electrical harness to drain solenoid.

TA250142

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

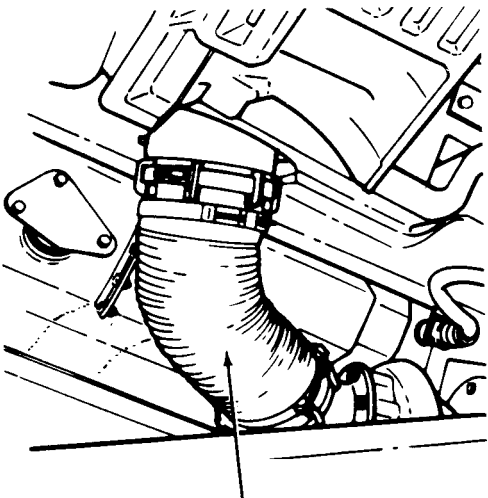
Symptom-11

ENGINE WILL NOT RUN RIGHT.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE

- If STE/ICE is available, perform Test No. 14: Compression Unbalance (page 4-86).
- If STE/ICE is not available, go to Step ①.



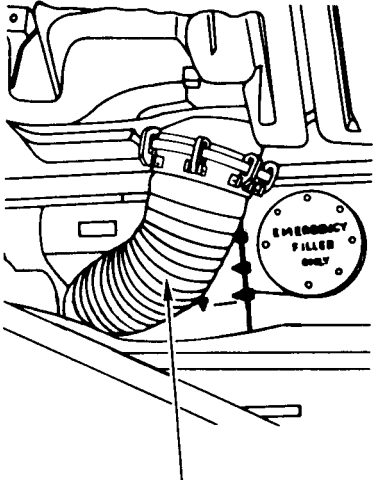
AIR INTAKE HOSE
(RIGHT SIDE SHOWN)

① Check engine air intake and outlet hoses for damage.

Both Technicians (Top Deck)

- Open top deck grille doors on both sides of vehicle.
- Check left and right side air intake hoses and outlet hoses for damage.

Are air intake or outlet hoses damaged?



AIR OUTLET HOSE
(LEFT SIDE SHOWN)

② Replace damaged intake (page 7-64), or outlet hoses (page 7-79).

YES

NO

TA250143

Symptom-11

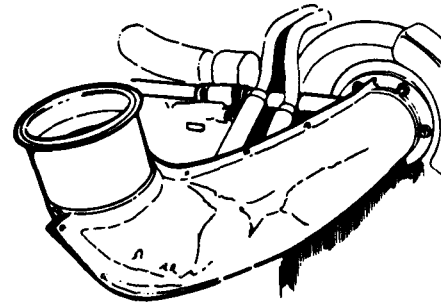
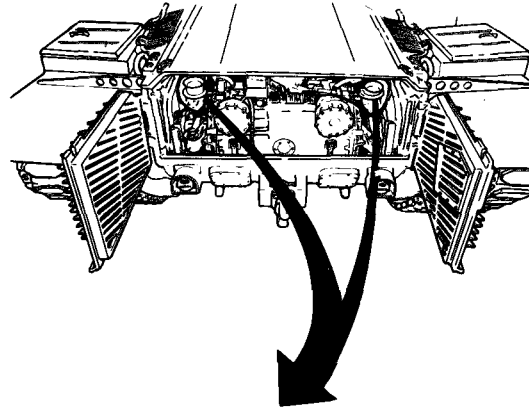
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

3 Check right and left exhaust pipes for restrictions or damage.

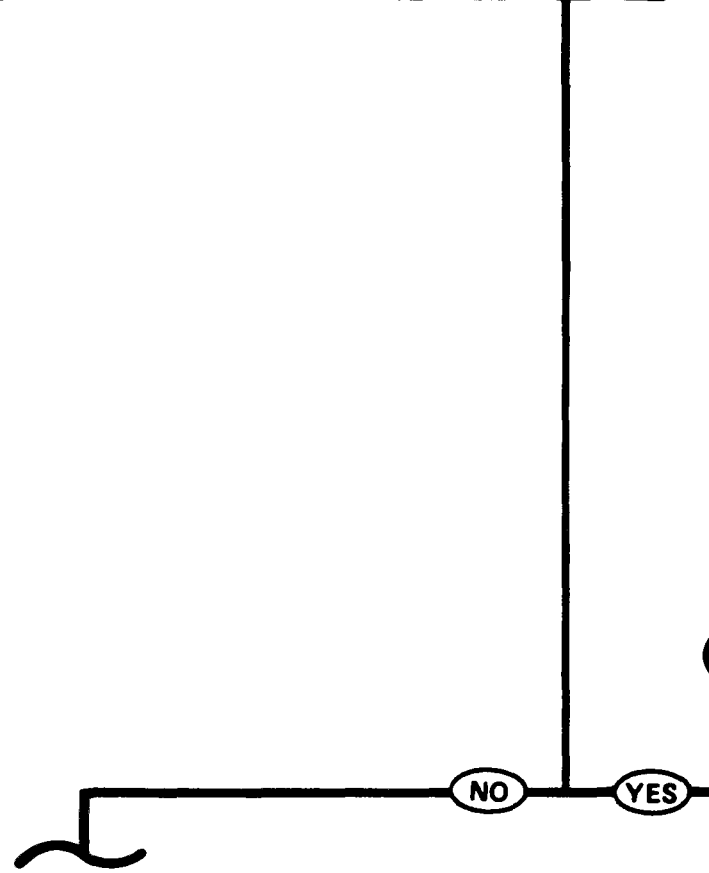
Both Technicians (Rear of Vehicle)

- Remove transmission shroud (page 9-2).
- Check right and left exhaust pipes for restriction or damage.

Are exhaust pipes restricted or damaged?



EXHAUST PIPE
(RIGHT SIDE SHOWN)



4 Remove restrictions. If restrictions cannot be removed, replace damaged exhaust pipes. Left side (page 8-5). Right side (page 8-9).

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

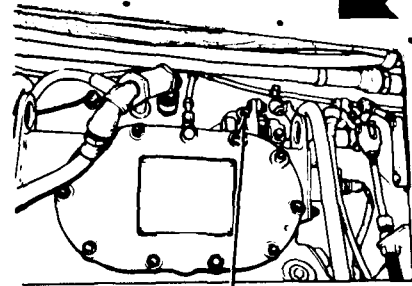
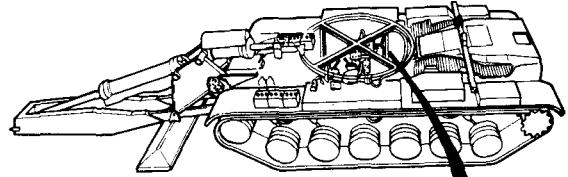
FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

5 Check engine idle adjustment.

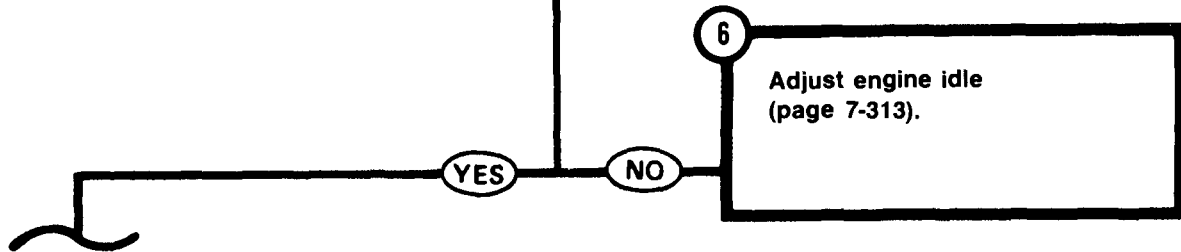
First Technician (Rear of Crew Compartment)

- Remove engine upper access panel (page 17-11).
- Check if engine idle screw is properly adjusted (page 7-313).

Is engine idle properly adjusted?



ENGINE IDLE
ADJUSTING SCREW



Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

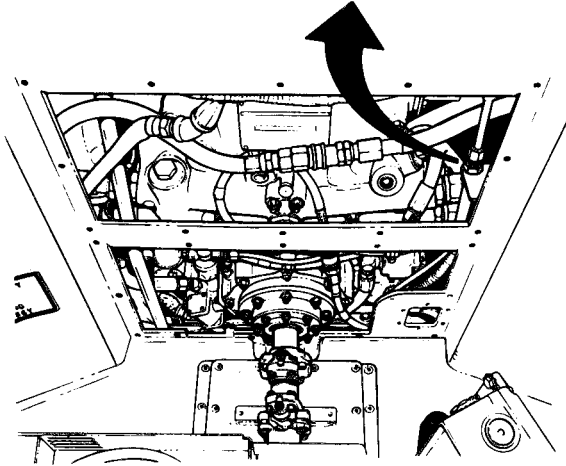
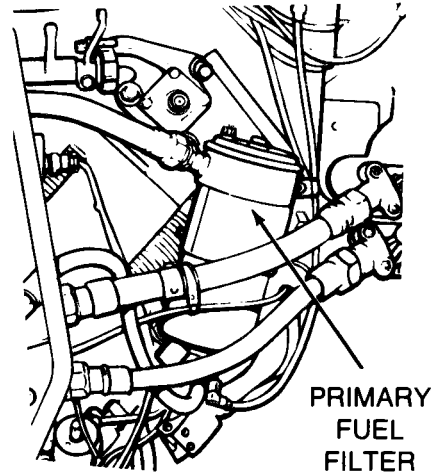
7

Check primary fuel filter for contamination.

First Technician (Rear of Crew Compartment)

- Remove primary fuel filter element and check filter element for contamination (page 7-187).

Is primary fuel filter contaminated?



8

**Service primary fuel filter
(page 7-174).**

NO

YES

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

9

Check if electric fuel pumps work.

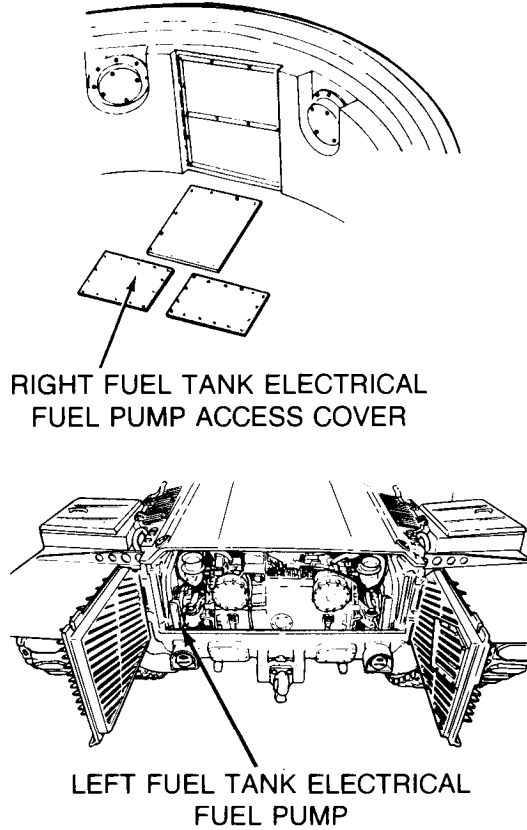
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Listen for sound of right electric fuel pump running.

First Technician (Rear Grille Doors)

- Open rear grille doors.
- Listen for sound of left electric fuel pump running.

Do electric fuel pumps work?



10

See Symptom 5: ONE ELECTRIC FUEL PUMP WILL NOT WORK, or Symptom 6: BOTH ELECTRIC FUEL PUMPS WILL NOT WORK.

YES

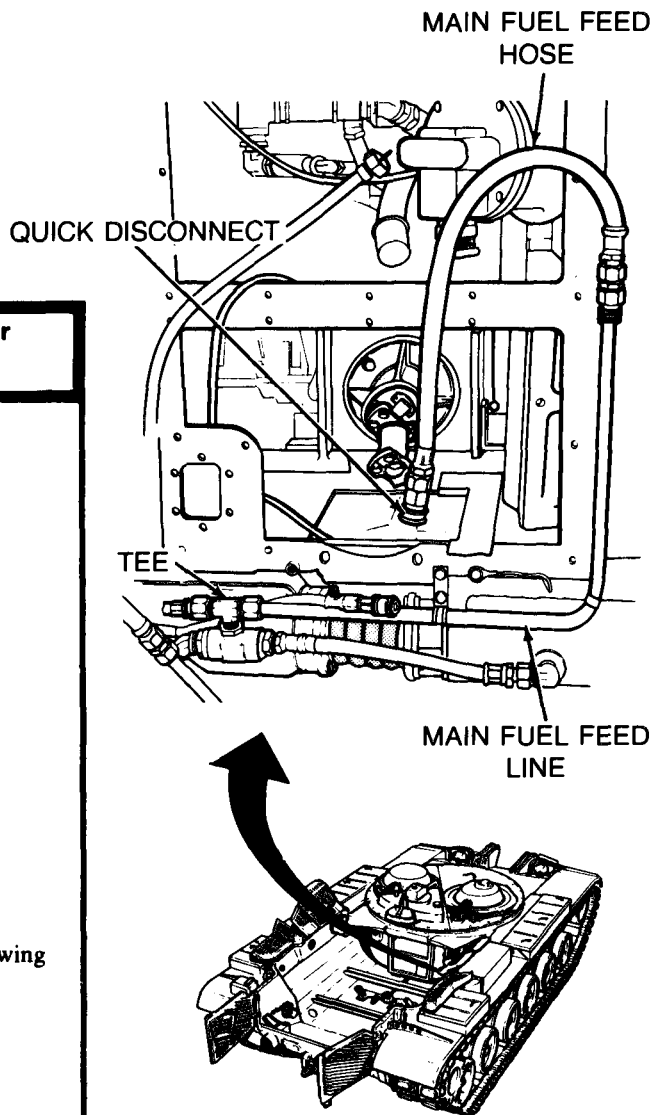
NO

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

NOTE
Step 11 locator views continued on page 4-265.

- 11** Check fuel lines, backflow valve and filters for leaks or damage.
- Second Technician (Operator's Station)
- Set FUEL PUMPS switch OFF.
 - Set MASTER BATTERY switch OFF.
- Both Technicians (Outside Vehicle)
- Have powerplant removed (page 5-2).
 - Install ground hop kit (page 5-25).
- Second Technician (Operator's Station)
- Start engine.
- First Technician (Front of Engine)
- With the engine idling, visually check the following for leaks or damage:
 - Main fuel feed line.
 - Main fuel feed hose.
 - Quick disconnects.
 - Primary fuel filter inlet hose
 - Primary fuel filter housing.
 - Primary fuel filter outlet hose.



TA250148

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

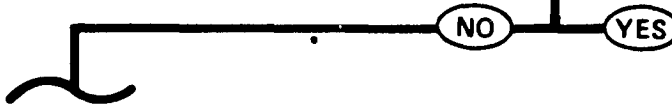
STEP 11 CONTINUED

- Backflow valve.
- Backflow valve outlet hose.
- Fuel water separator inlet hose.
- Fuel water separator.
- Fuel water separator outlet hose.

Are lines or hoses leaking or damaged?

12

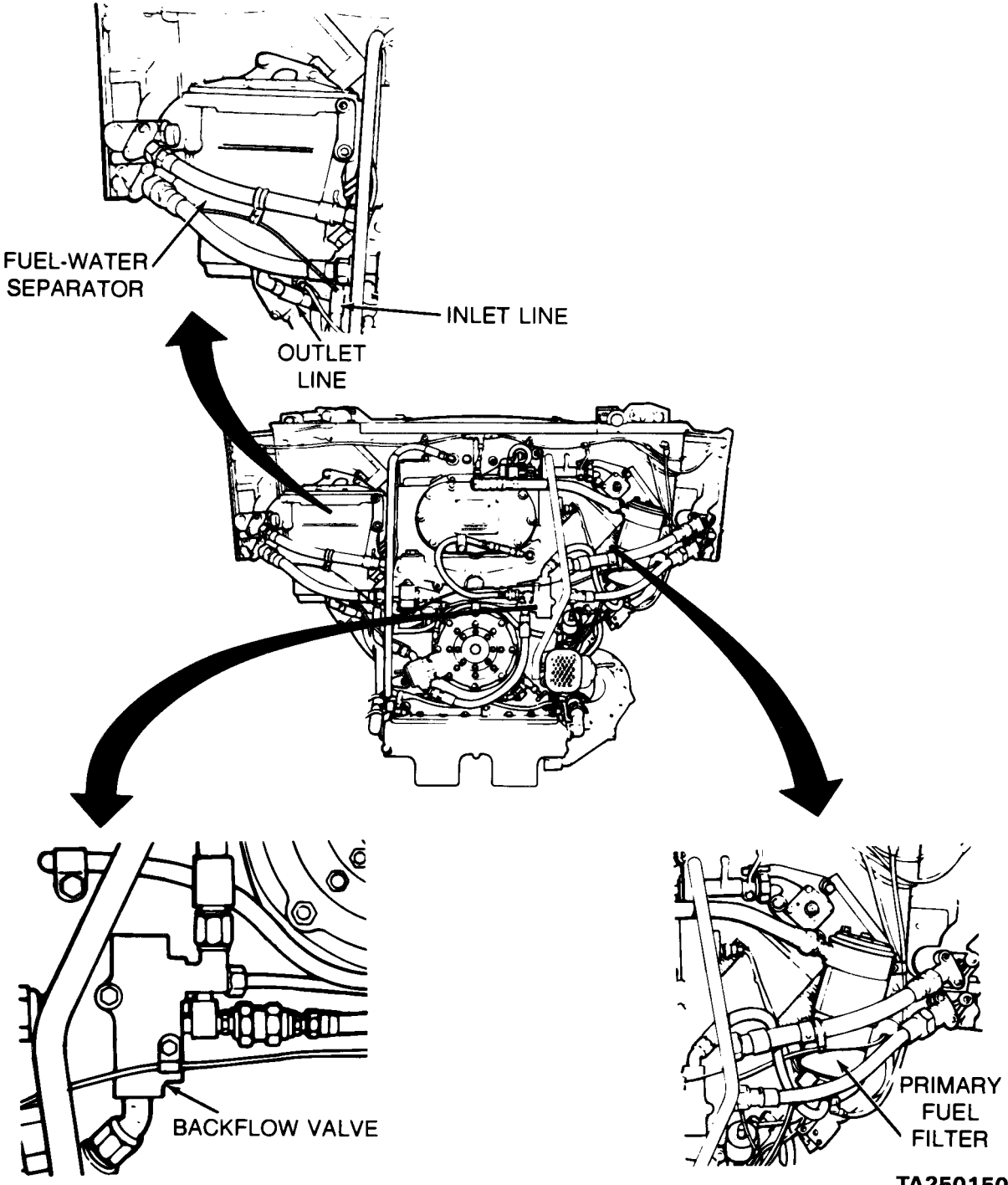
- Tighten leaking connections.
- If connections are still leaking or any parts are damaged, replace the following as necessary:
 - Main fuel feed line (page 7-294).
 - Main fuel feed hose (page 7-223).
 - Quick disconnect.
 - Primary fuel filter inlet hose (page 7-173).
 - Primary fuel filter housing (page 7-177).
 - Primary fuel filter outlet hose (page 7-40).
 - Backflow valve assembly (page 7-25).
 - Backflow valve outlet hose (page 7-40).
 - Fuel water separator inlet hose (page 7-20).
 - Fuel water separator outlet hose (page 7-34).



Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

Step 11 - Locator Views



TA250150

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

13 Check low pressure fuel line assembly (fuel injector pump inlet to bulkhead elbow) for leaks or damage.

Both Technicians (Top of Engine)

- Remove front cooling fan (page 9-55).

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON.
- Set MASTER BATTERY switch ON.

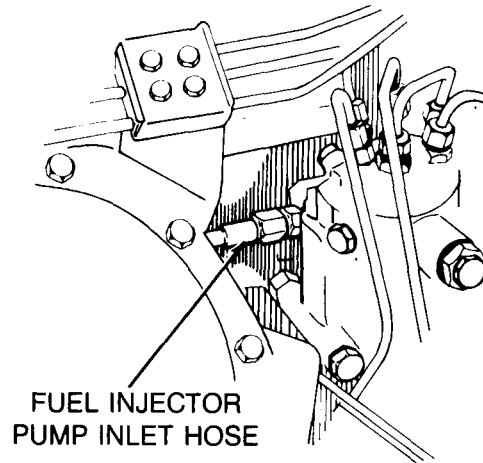
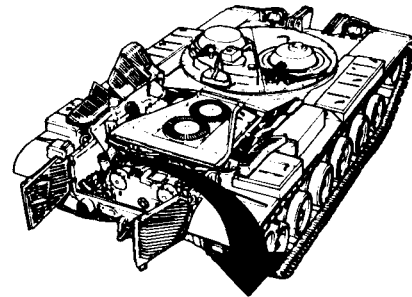
First Technician (Top of Engine)

- Check the fuel injector pump inlet line assembly for leaks, or damage.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch OFF.

Is the fuel injector pump inlet line leaking or damaged?



14

- Tighten loose connections
- Replace damaged fuel injector pump inlet line assembly (page 7-29).

NO

YES

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

15 Check for fuel flow at inlet side of fuel injector pump.

First Technician (Top of Engine)

- Disconnect line at inlet side of fuel injector pump and place disconnected end in suitable container.

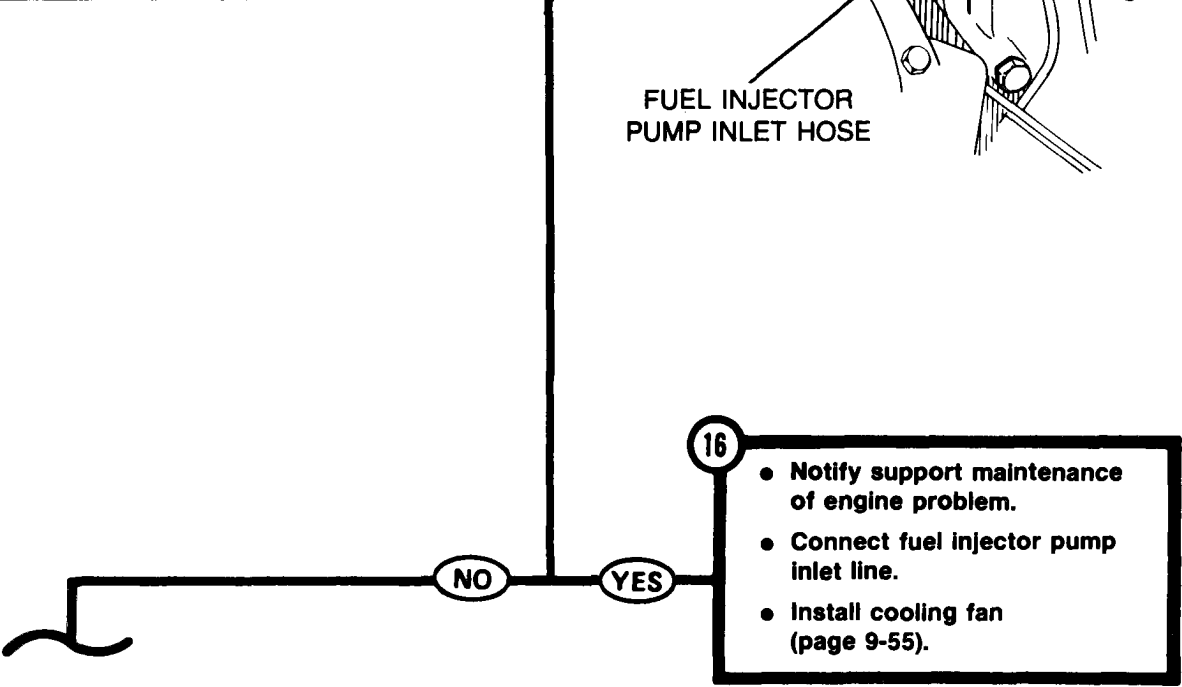
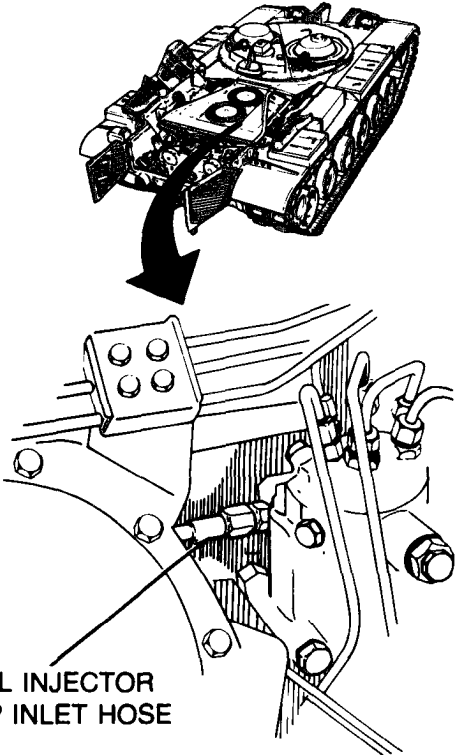
Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON, for a few seconds, then OFF.

First Technician (Top of Engine)

- Check if fuel flows freely into container.

Does fuel flow freely?



Symptom-11

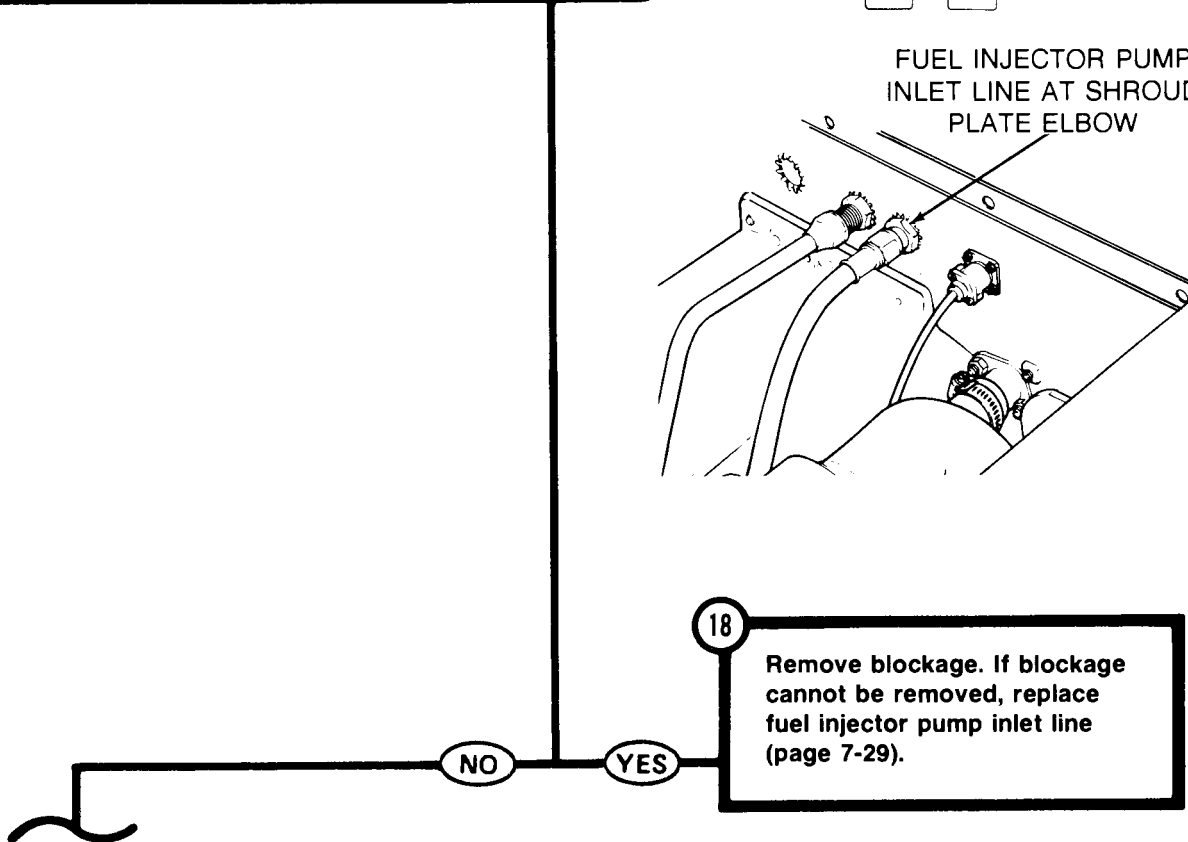
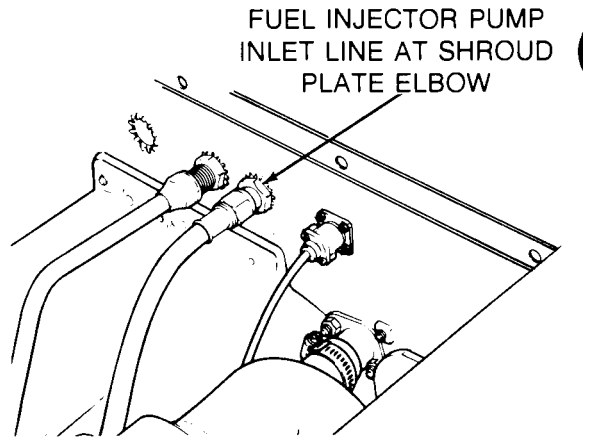
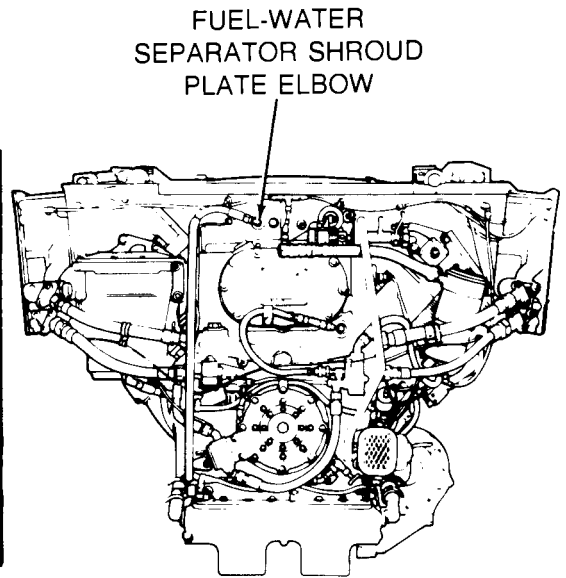
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

17 Check fuel injector pump inlet hose for blockage.

First Technician (Top of Engine)

- Disconnect fuel injector pump inlet line at the shroud plate elbow.
- Blow through hose with compressed air to check if line is blocked.

Is line blocked?



18 Remove blockage. If blockage cannot be removed, replace fuel injector pump inlet line (page 7-29).

TA250153

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

19 Check for fuel flow at shroud plate elbow.

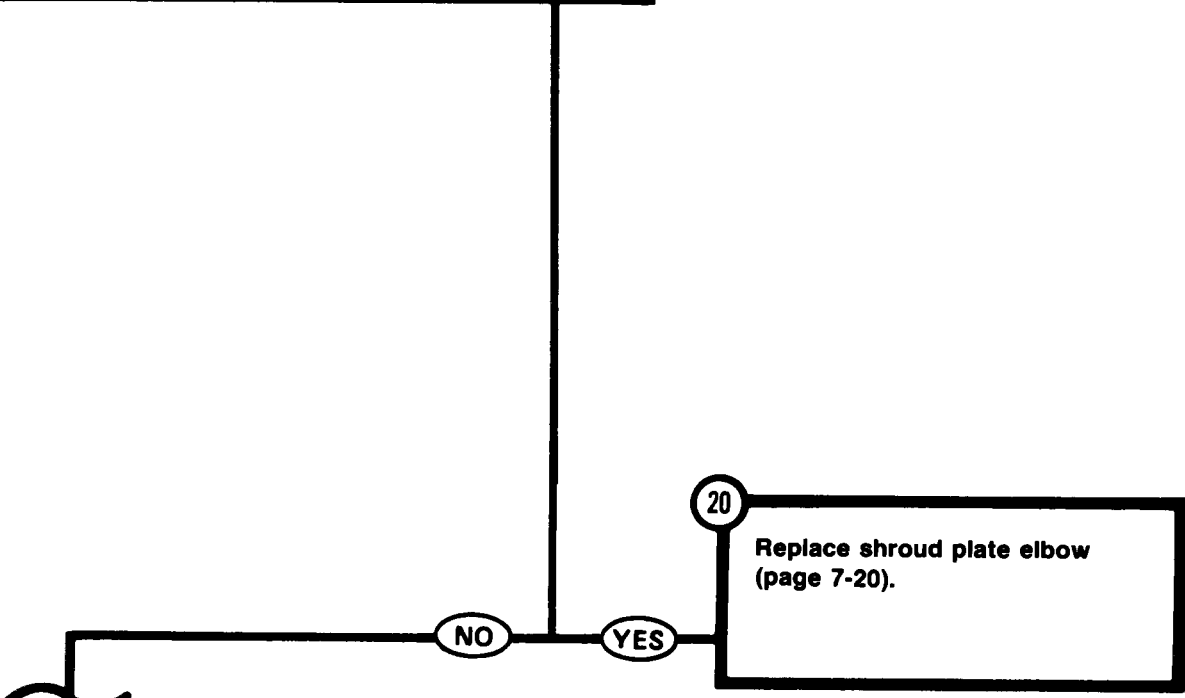
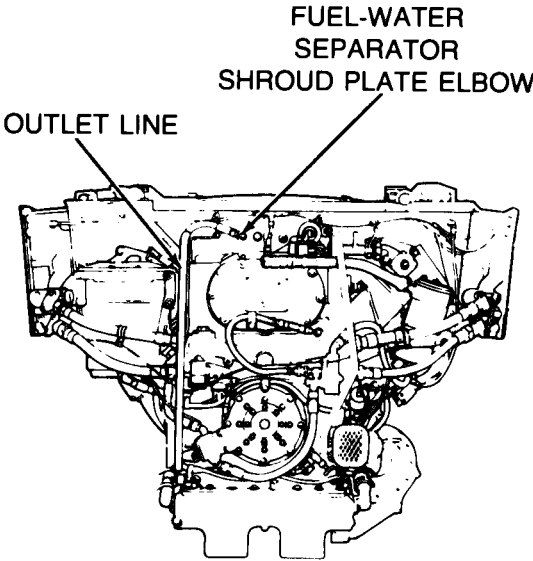
First Technician (Front of Engine)

- Disconnect fuel water separator outlet hose from shroud plate elbow.
- Place hose in suitable container.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON, for a few seconds, then OFF.
- Check if fuel flows freely into container.

Does fuel flow freely?



20 Replace shroud plate elbow (page 7-20).

TA250154

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

21 Check if fuel-water separator outlet hose is blocked.

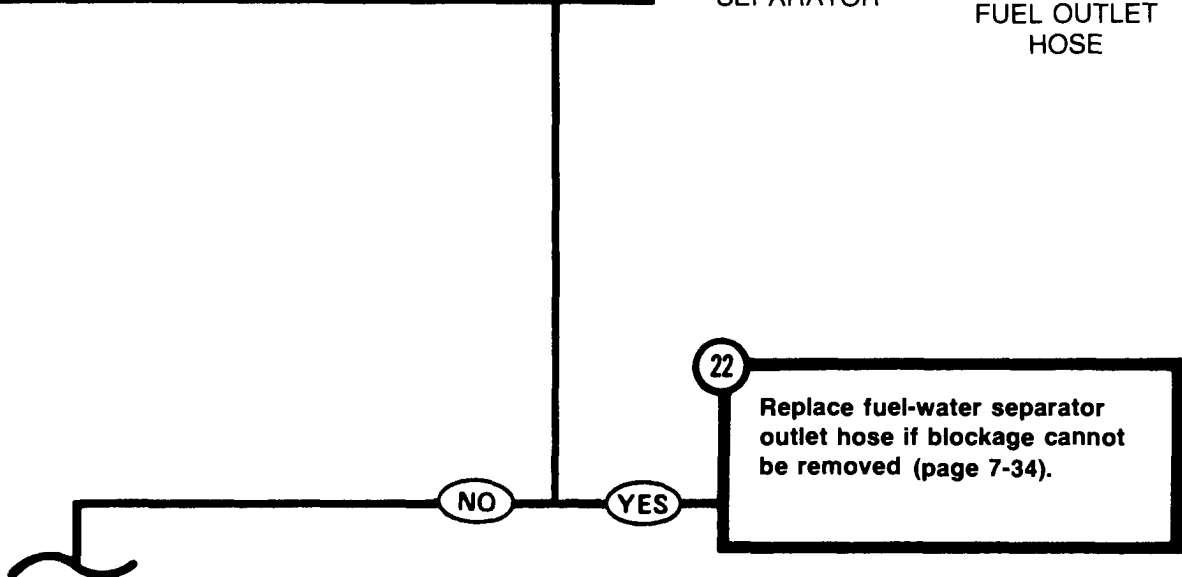
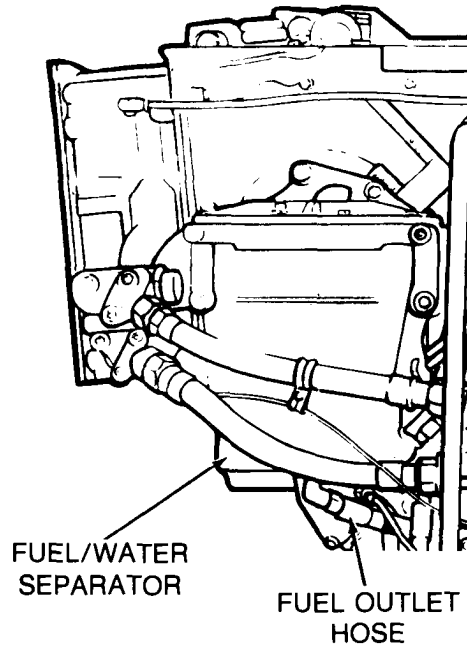
Both Technicians (Top of Engine)

- Connect fuel injector inlet line.
- Install front cooling fan (page 9-57).

First Technician (Front of Engine)

- Place suitable container under fuel-water separator.
- Disconnect fuel-water separator outlet hose from fuel-water separator.
- Using compressed air, check if hose is blocked.

Is hose blocked?



TA250155

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

23 Check for fuel flow at fuel water separator inlet hose.

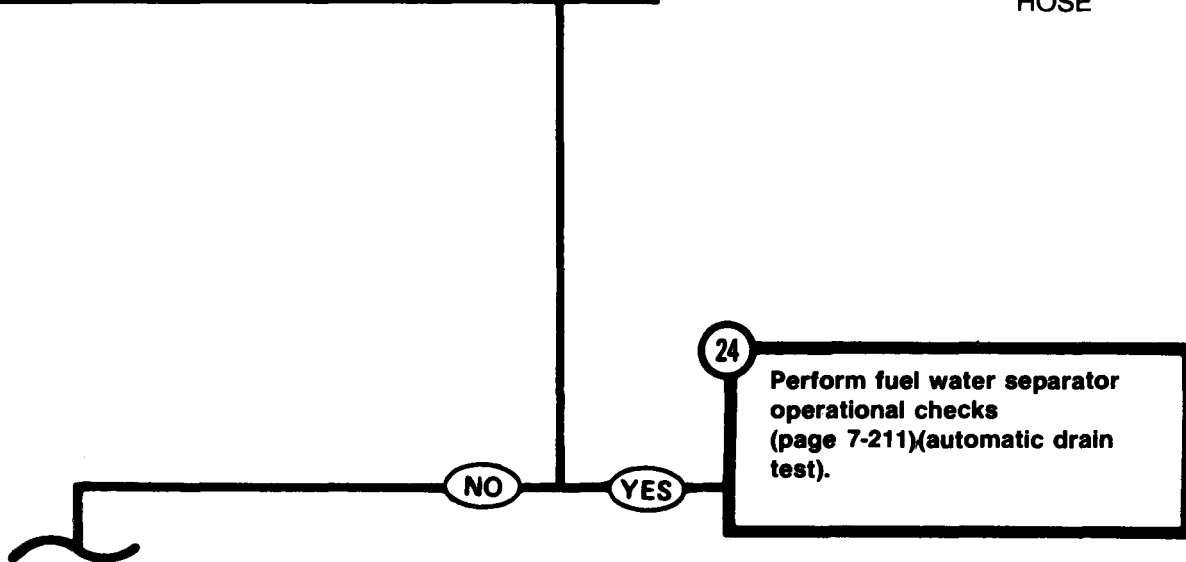
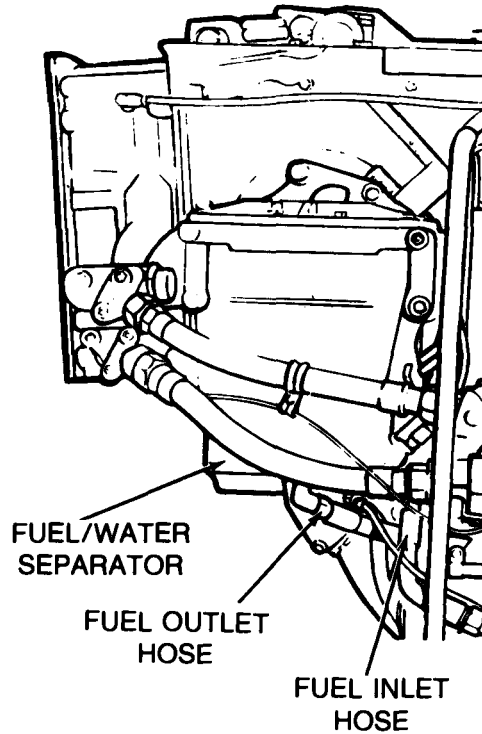
First Technician (Front of Engine)

- Connect fuel water separator outlet hose to shroud plate elbow and to fuel water separator.
- Disconnect fuel water separator inlet hose from fuel water separator.
- Place end of hose in suitable container.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for a few seconds, then OFF.
- Check if fuel flows freely into container.

Does fuel flow freely?



24 Perform fuel water separator operational checks (page 7-211)(automatic drain test).

TA250156

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

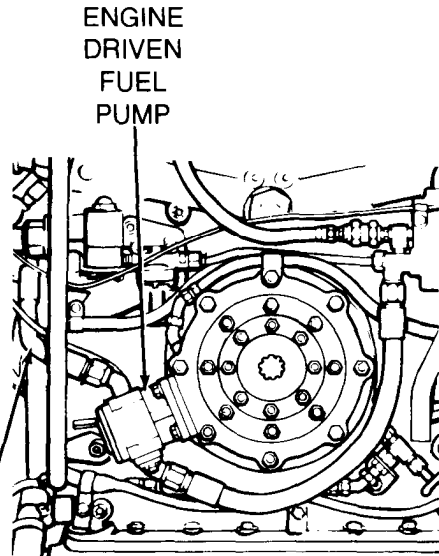
25

Check if fuel-water separator inlet hose is blocked.

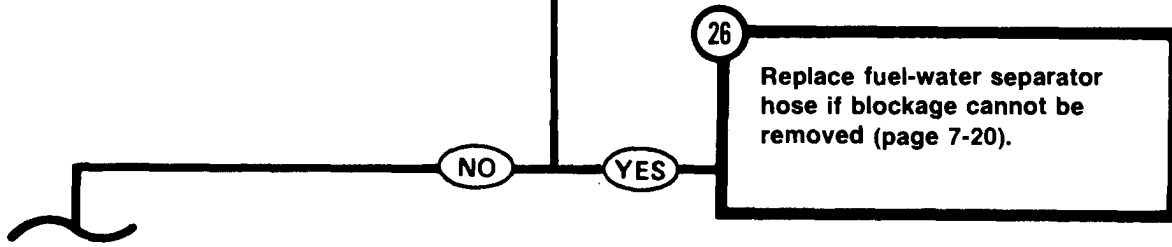
First Technician (Front of Engine)

- Disconnect fuel-water separator inlet hose from engine driven fuel pump.
- Using compressed air, check if hose is blocked.

Is hose blocked?



FUEL WATER - SEPARATOR INLET HOSE



TA250157

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

27 Check for fuel flow on inlet side of engine driven fuel pump.

First Technician (Front of Engine)

- Connect fuel-water separator inlet hose to engine driven fuel pump and fuel-water separator.
- Disconnect fuel backflow valve outlet hose from engine driven fuel pump.
- Place suitable container under hose.

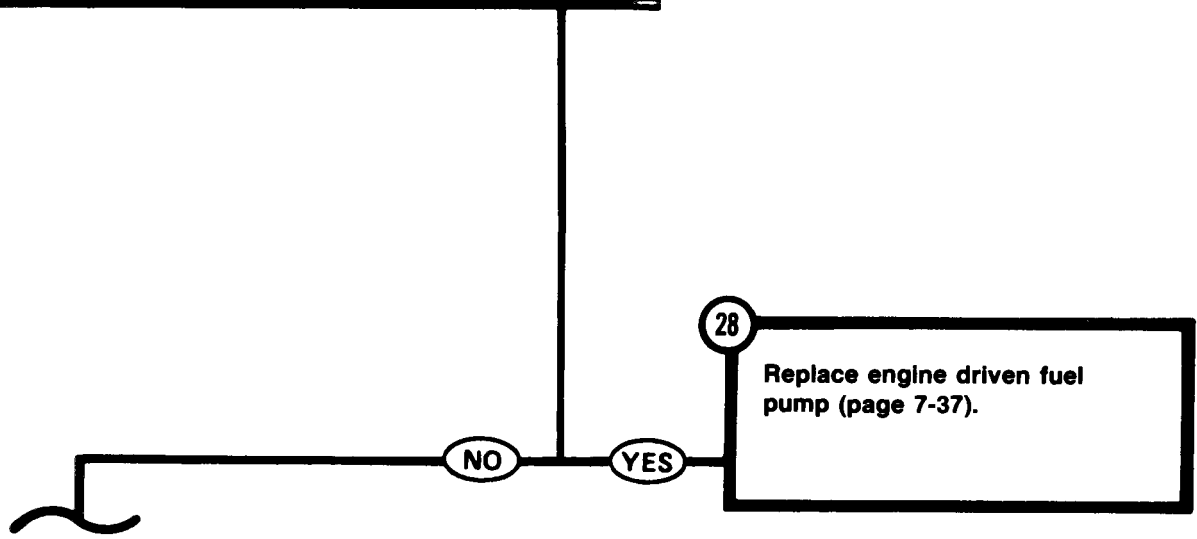
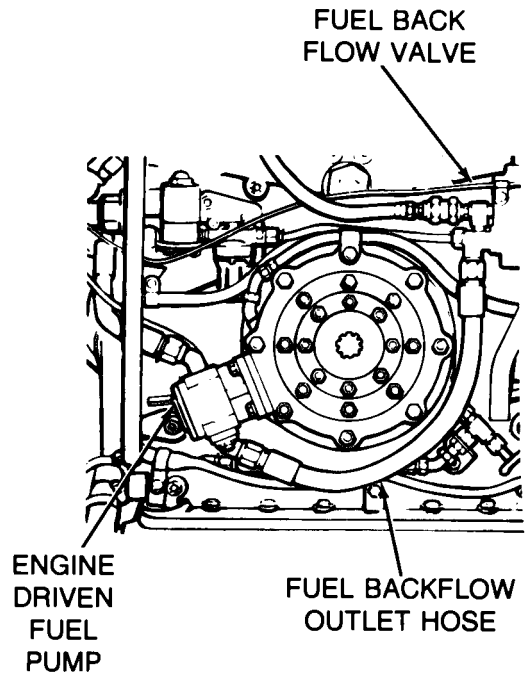
Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for a few seconds, then OFF.

First Technician (Front of Engine)

- Check if fuel flows freely into container.

Does fuel flow freely?



28 Replace engine driven fuel pump (page 7-37).

TA250158

Symptom-11

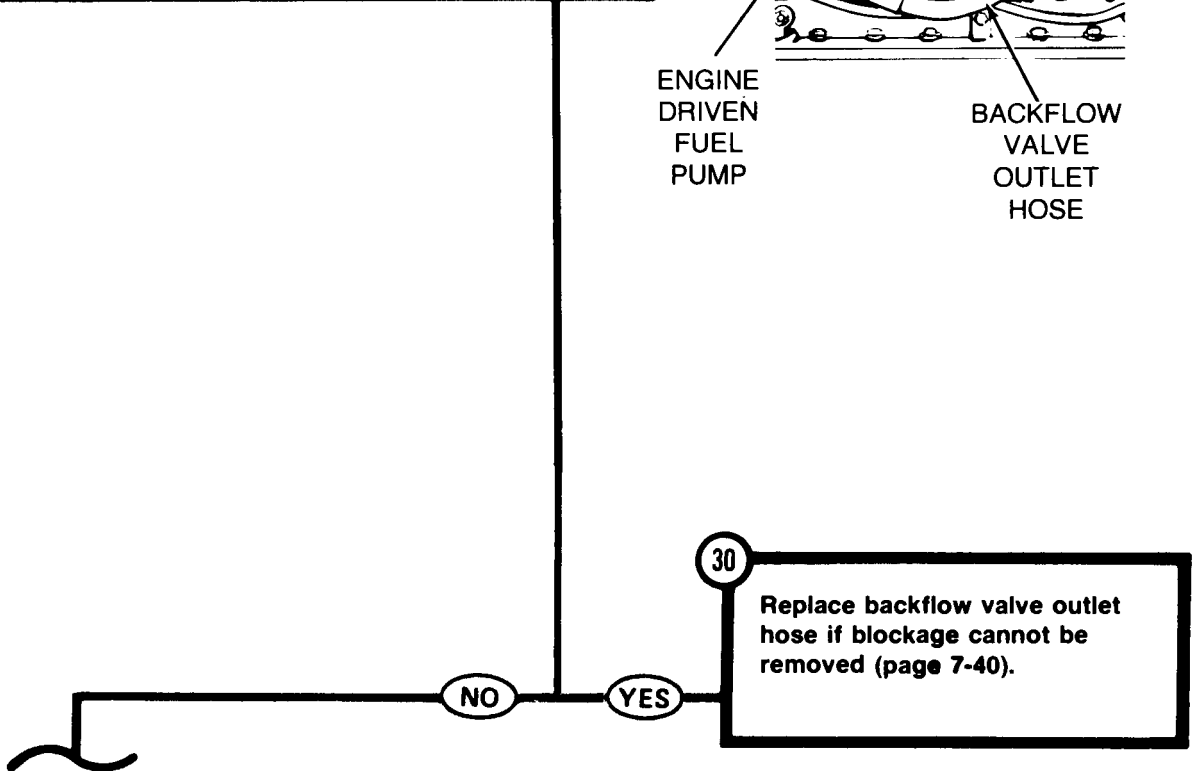
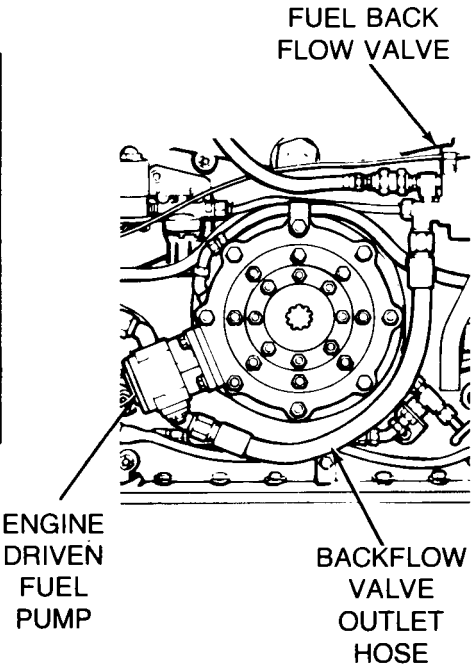
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

29 Check backflow valve outlet hose for blockage.

First Technician (Front of Engine)

- Disconnect backflow valve outlet hose from backflow valve.
- Blow air thru backflow valve outlet hose.

Is backflow valve outlet hose blocked?



30 Replace backflow valve outlet hose if blockage cannot be removed (page 7-40).

Symptom-11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

31 Check for fuel flow at inlet side of fuel backflow valve.

First Technician (Front of Engine)

- Disconnect primary fuel filter outlet hose from backflow valve inlet.
- Place suitable container under hose.

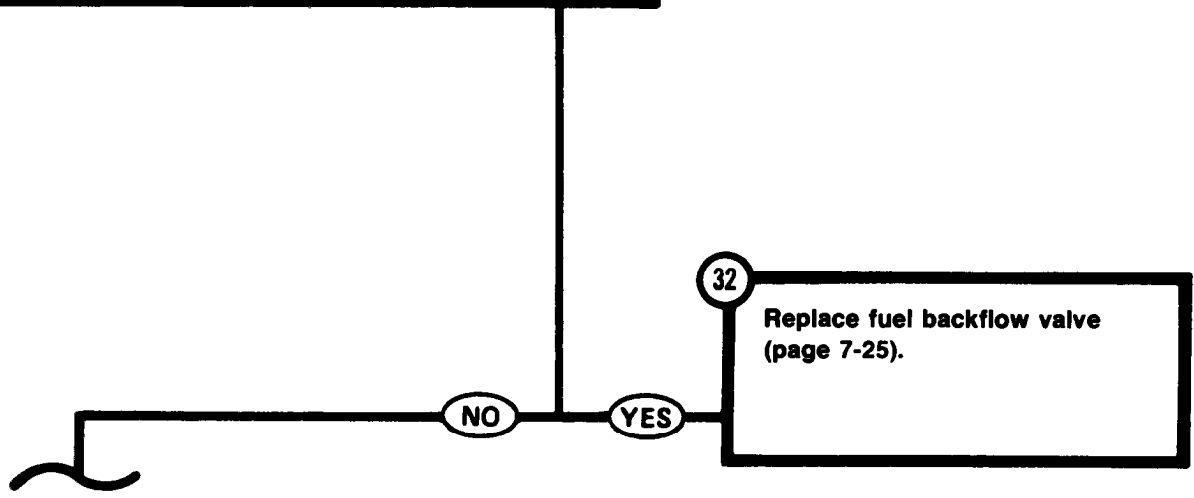
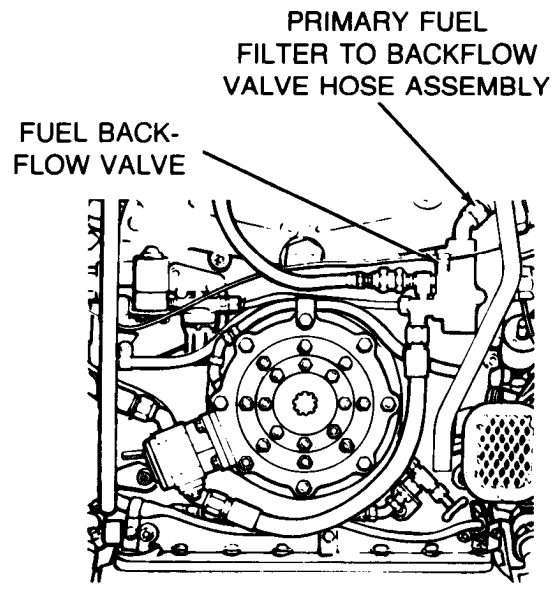
Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for a few seconds, then OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Front of Engine)

- Check if fuel flows freely into container.

Does fuel flow freely?



32 Replace fuel backflow valve (page 7-25).

TA250160

Symptom-11

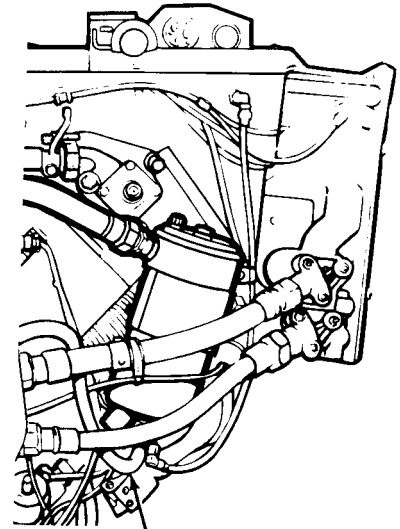
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

33 Check if primary fuel filter outlet hose is blocked or defective.

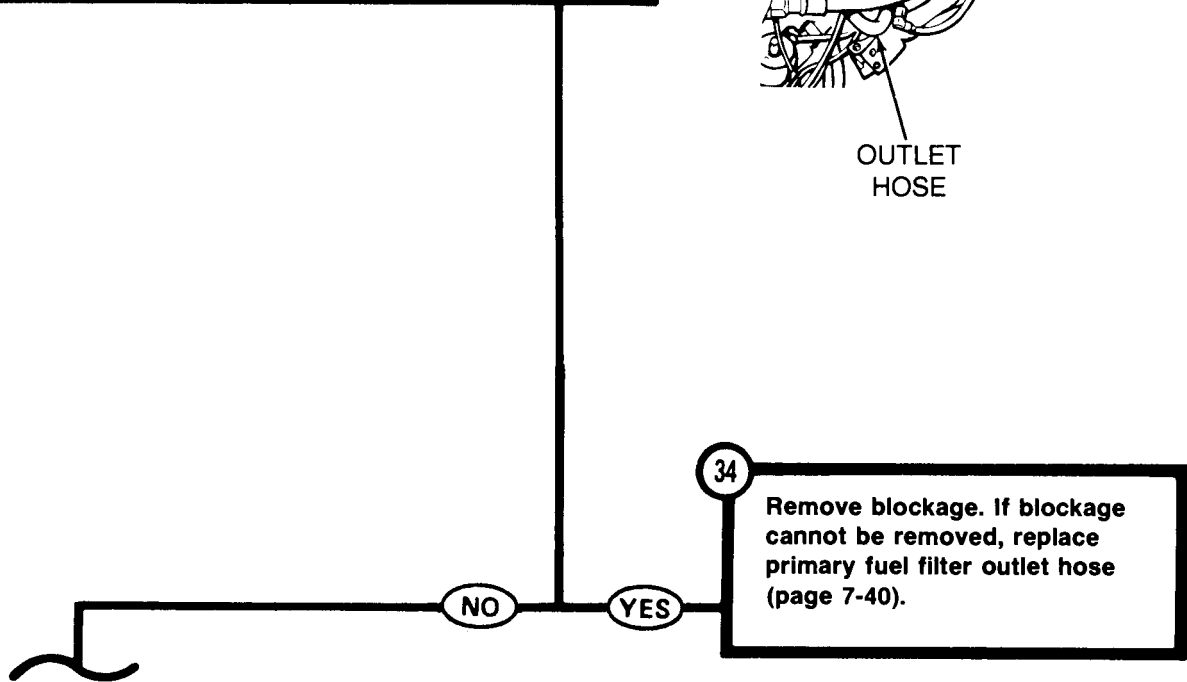
First Technician (Front of Engine)

- Install backflow valve outlet hose.
- Place suitable container under primary fuel filter.
- Disconnect primary fuel filter outlet hose from primary fuel filter body.
- Using compressed air, check if hose is blocked.

Is hose blocked?



OUTLET HOSE



34 Remove blockage. If blockage cannot be removed, replace primary fuel filter outlet hose (page 7-40).

Symptom-11

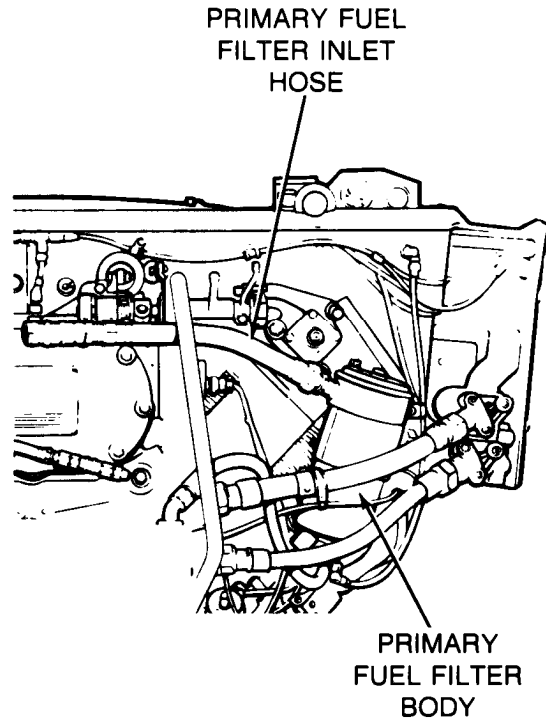
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

35 Check if primary fuel filter inlet hose assembly is defective.

First Technician (Front of Engine)

- Install primary fuel filter outlet hose assembly.
- Disconnect primary fuel filter inlet hose from filter body.
- Disconnect primary fuel filter inlet hose at quick disconnect.
- Remove male end of quick disconnect from primary fuel filter inlet hose.
- Using compressed air, check to see if hose is blocked.

Is primary fuel filter inlet hose blocked?



36 Replace primary fuel filter inlet hose if blockage cannot be removed (page 7-173).

YES

NO

TA250162

Symptom-11

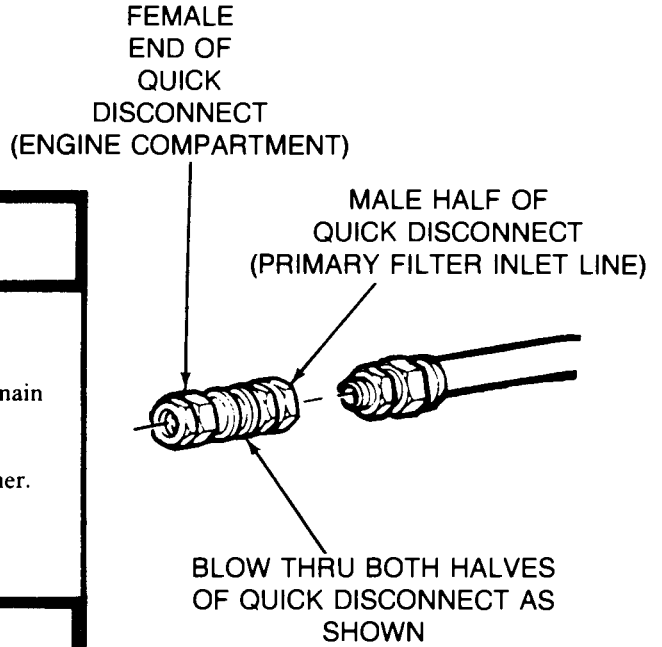
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

37 Check quick disconnect for proper operation.

Second Technician (Inside Hull)

- Remove female half of quick disconnect from main fuel feed hose.
- Connect both halves of quick disconnect together.
- Using pressurized air, check to see if quick disconnect is blocked.

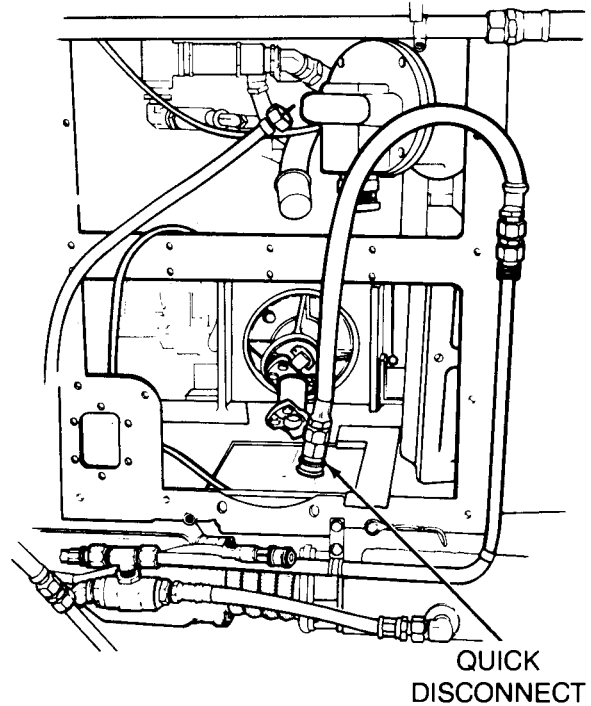
Is quick disconnect blocked?



38 Replace quick disconnect if blockage cannot be removed.

YES

NO



TA250163

Symptom-11

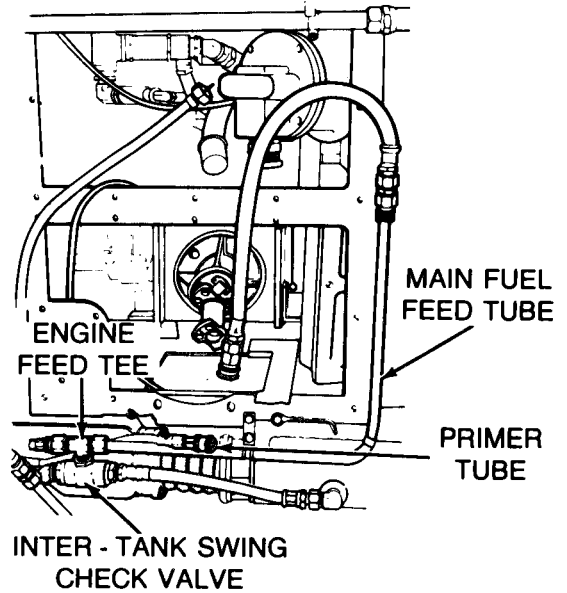
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

39 Check fuel lines from main fuel hose to right and left fuel tanks.

Both Technicians (Engine)

- Connect primary fuel filter hose to primary fuel filter body.
- Connect male half of quick disconnect to primary fuel filter hose.
- Drain both fuel tanks (page 7-184).
- Remove the following lines/valves and check for blockage by using compressed air:
 - Main fuel feed tube
 - Engine fuel feed primer tube
 - Engine feed tee
 - Inter-tank swing check valve

Are any lines or valves blocked?



40

- Install all lines, tubes and check valve.
- Install powerplant (page 5-14).
- Fill fuel tanks (TM 5-5420-202-10).
- Notify support maintenance of engine problem.

NO YES

41

- If blockage cannot be removed, replace the following parts as necessary:
 - Main fuel feed tube (page 7-294).
 - Engine feed fuel primer tube (page 7-294).
 - Engine feed tee (page 7-294).
 - Inter-tank swing check valve (page 7-228).
- Install all lines, tubes and check valve.
- Install powerplant (page 5-14).
- Fill fuel tanks (TM 5420-202-10).

TA250164

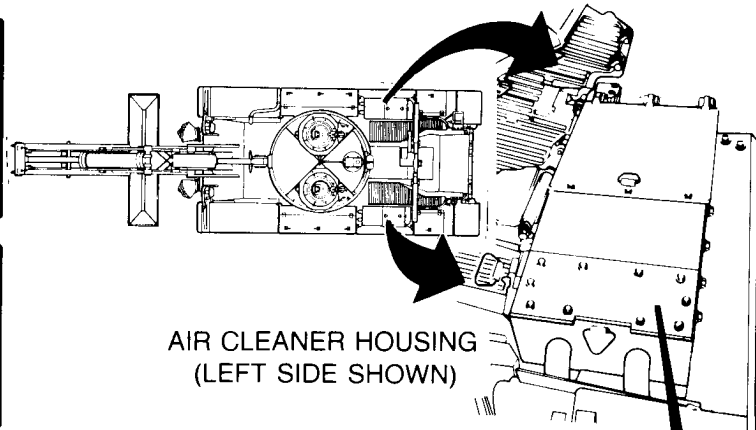
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-12

ONE AIR CLEANER BLOWER FAN WILL NOT WORK.

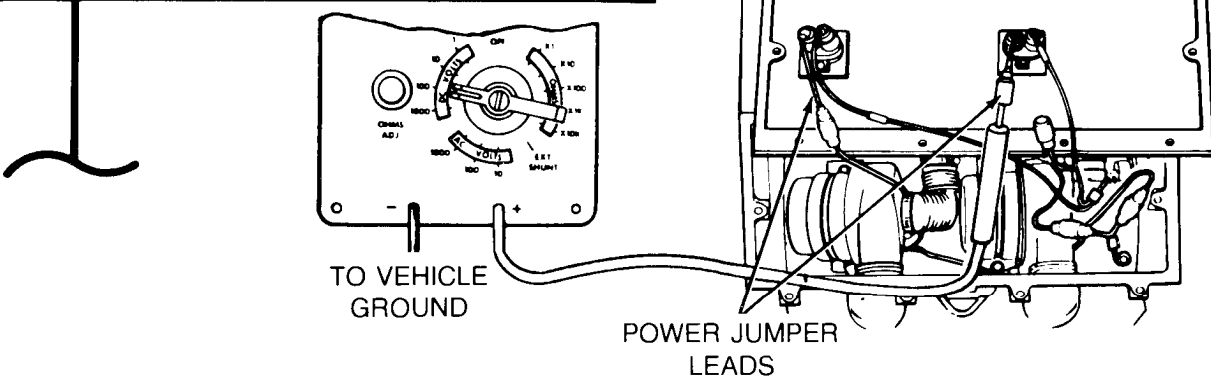
NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE
This procedure is the same for both left and right air cleaners.



1 Check air cleaner fan motor power jumper lead at inoperative fan motor for electrical power.

- Second Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
- First Technician (Disabled Air Cleaner)
- Remove air cleaner motor cover (page 7-98).
 - Disconnect air cleaner fan motor power jumper lead from fan motor electrical lead connector.
 - Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).



TA250165

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-12

3 Check air cleaner fan motor power jumper lead for continuity.

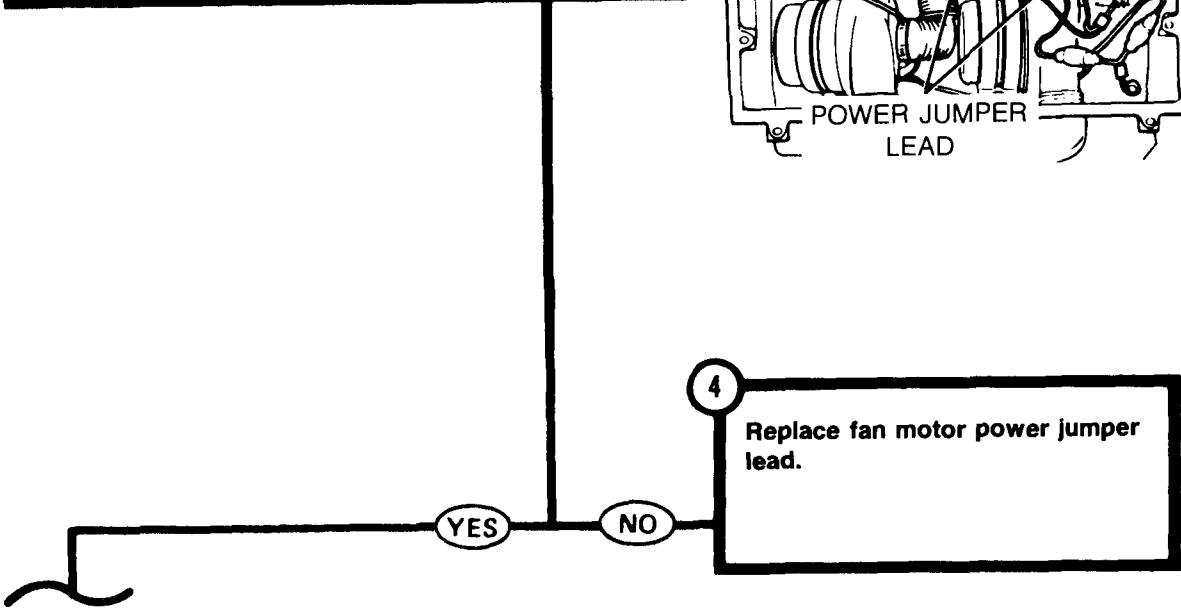
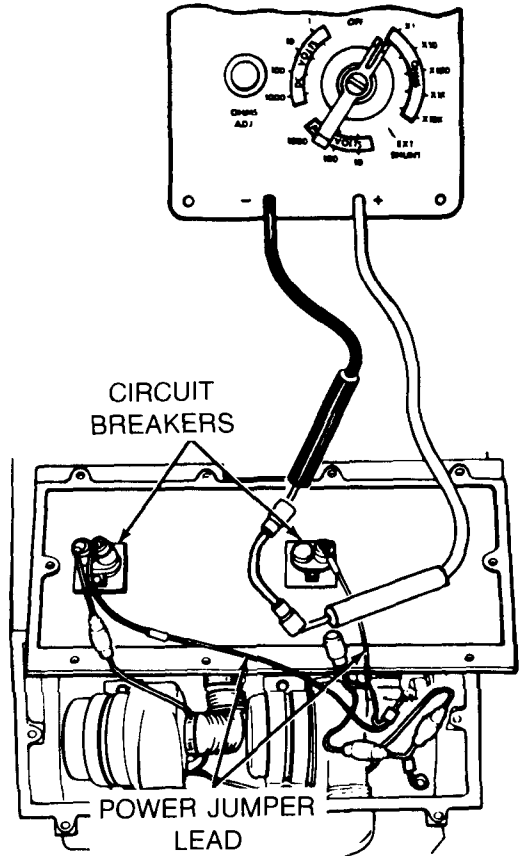
Second Technician (Operator's Station)

- Stop engine.

First Technician (Air Cleaner)

- Disconnect air cleaner fan motor power jumper lead from fan motor circuit breaker.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect meter probes to connector contact at each end of power jumper lead.
- Check if meter indicates continuity.

Does meter indicate continuity?



Symptom-12

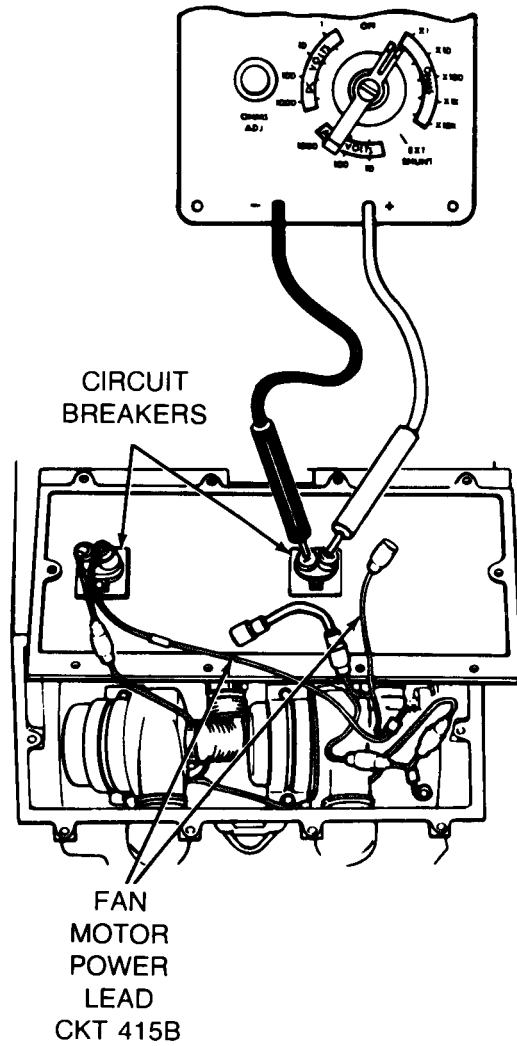
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

5 Check fan motor circuit breaker for continuity.

First Technician (Air Cleaner)

- Disconnect fan power lead (CKT 415B) from circuit breaker of inoperative fan motor.
- Connect probes of meter to contacts of circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



6

- Replace fan motor circuit breaker (page 7-109).

NO YES

7

- Replace air cleaner fan motor power lead (page 7-76).
- Connect power jumper lead to circuit breaker and motor lead.

Symptom-12

DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - POWERPLANT, RUNNING
 (Continued)

FROM STEP

2

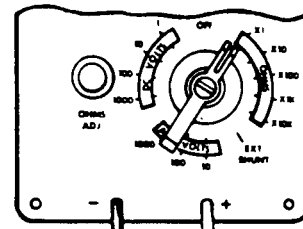
8

Check fan motor ground lead for continuity.

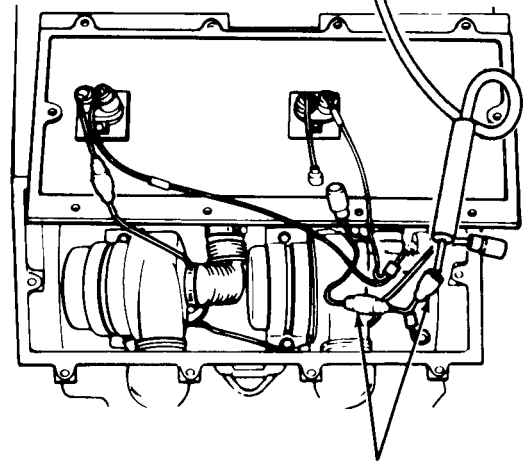
First Technician (Air Cleaner)

- Disconnect air cleaner fan ground lead connector from inoperative fan motor.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to ground lead connector contact and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



TO VEHICLE
GROUND



GROUND LEAD CONNECTORS

9

- Replace fan motor ground lead (page 7-110).
- Connect fan motor jumper lead to fan motor electrical lead.

NO

YES

10

Replace air cleaner fan motor (page 7-102).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING**

Symptom-13

**BOTH AIR CLEANER BLOWER FANS IN ONE AIR CLEANER ASSEMBLY
WILL NOT WORK.**

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check rear accessory harness (CKT 415B), at inoperative air cleaner for electrical power.

First Technician (Top Deck)

- Open top deck grille doors at inoperative air cleaner.
- Disconnect rear accessory harness connector (CKT 415B) at inoperative air cleaner.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 415B) at inoperative air cleaner and black probe to ground.

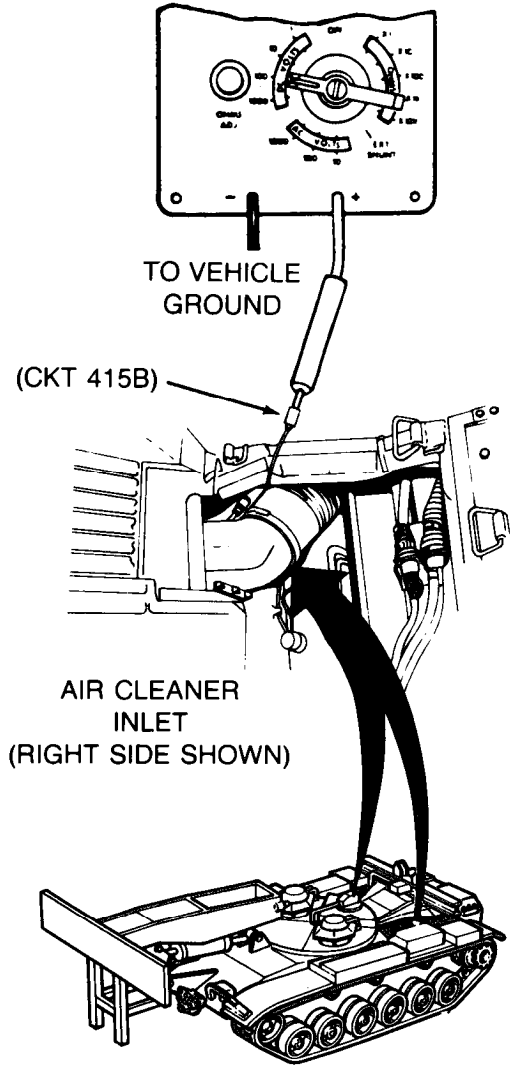
Second Technician (Operator's Station)

- Start engine and run at idle.

First Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2 Check front accessory harness (CKT 415B) at bulkhead disconnect for electrical power.

See Step **6** .



TA250170

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-13

3 Check air cleaner fan motor power harness for continuity.

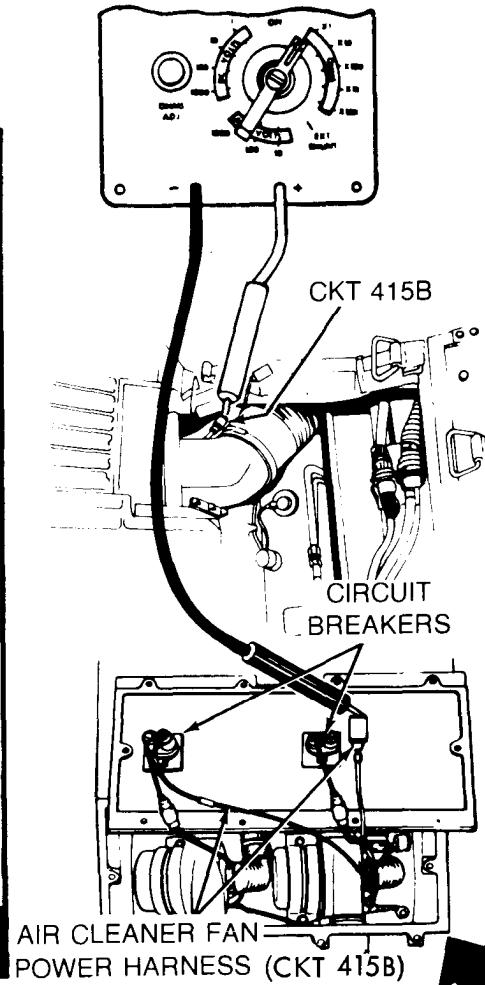
Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck)

- Remove fan motor cover from inoperative air cleaner (page 7-103).
- Disconnect fan motor power harness connector from one of the circuit breakers.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to fan motor power harness (CKT 415B) at rear accessory harness connector.
- Connect black probe of meter to fan motor power harness (CKT 415B) at circuit breaker connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



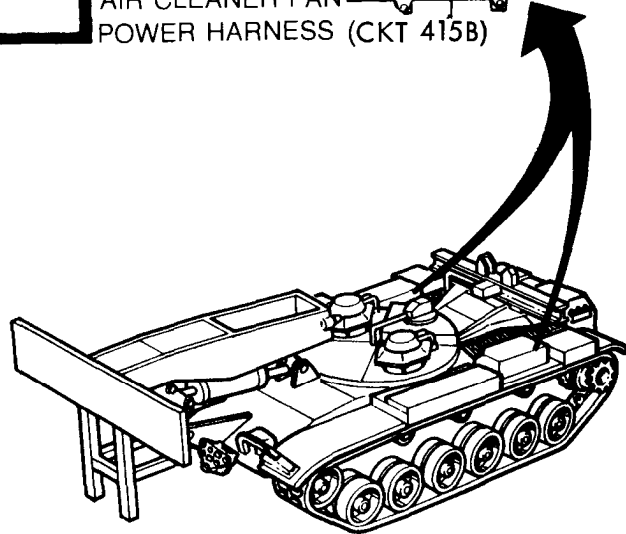
4 Replace fan motor power harness (page 7-76).

NO

5

- Replace fan ground electrical lead (page 7-110)
- Connect fan motor power harness to rear accessory harness and to circuit breaker.

YES



TA250171

Symptom-13
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

2

6

Check front accessory harness (CKT 415B) at bulkhead disconnect for electrical power.

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck)

- Reconnect rear accessory harness connector (CKT 415B) at inoperative air cleaner.
- Close top deck grille doors.

First Technician (Commander's Station)

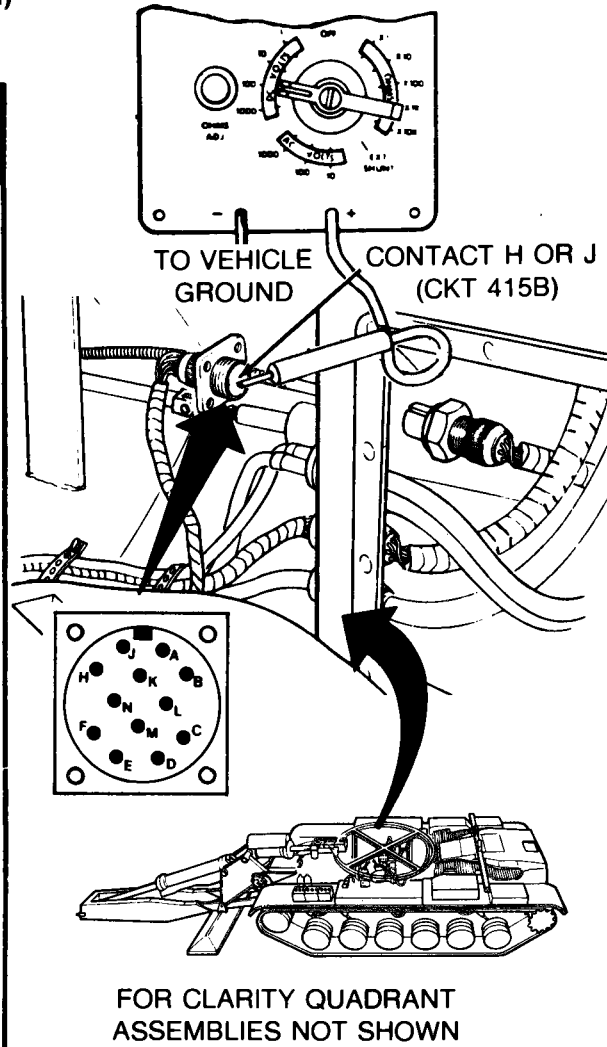
- Displace front accessory harness connector (CKT 415B) at bulkhead disconnect (page 10-269).
- If right air cleaner is inoperative, connect red probe of meter to contact H (CKT 415B) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- If left air cleaner is inoperative, connect red probe of meter to contact J (CKT 415B) of front accessory harness connector at bulkhead disconnect and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.



Symptom-13

STEP **6** CONTINUED

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Second Technician (Operator's Station)

- Stop engine.

Did meter indicate 18 to 30 volts dc?

7

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 415B wires at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective front accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

NO YES

8

- Inspect rear accessory harness for bent/broken connector contacts or loose CKT 415B wires at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective rear accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



TA250173

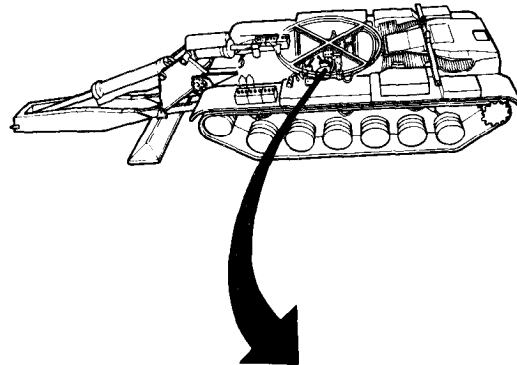
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING**

Symptom-14

ALL AIR CLEANER BLOWER FANS WILL NOT WORK

NOTE
This procedure is to be performed by two persons. The lead person shall be referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

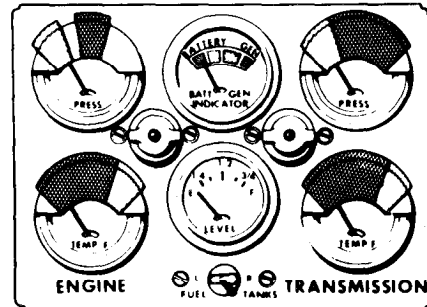


1 Check if BATT/GEN INDICATOR pointer is in green area.

Second Technician (Operator's Station)

- Start engine.
- Check if BATT/GEN INDICATOR gage pointer is in green area.
- Stop engine.

Was BATT/GEN INDICATOR gage pointer in green area?



INSTRUMENT PANEL

2 See Symptom 31: GENERATOR/REGULATOR SYSTEM IS NOT WORKING.

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-14

NOTE
If your vehicle does not have a smoke generator, go to Step 5.

3 Check air cleaner fan motors without smoke generator switch harness installed.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove right-hand floor access cover (page 17-7).
- Disconnect smoke generator switch harness from air cleaner blower relay and front accessory harness.
- Connect front accessory harness (CKT 415A) to air cleaner blower relay.

Second Technician (Operator's Station)

- Start engine.

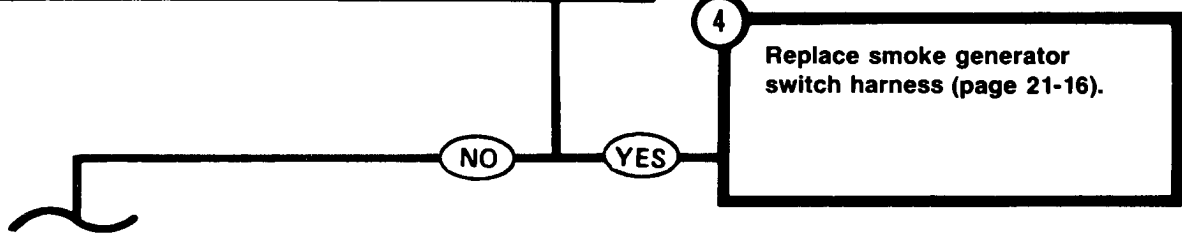
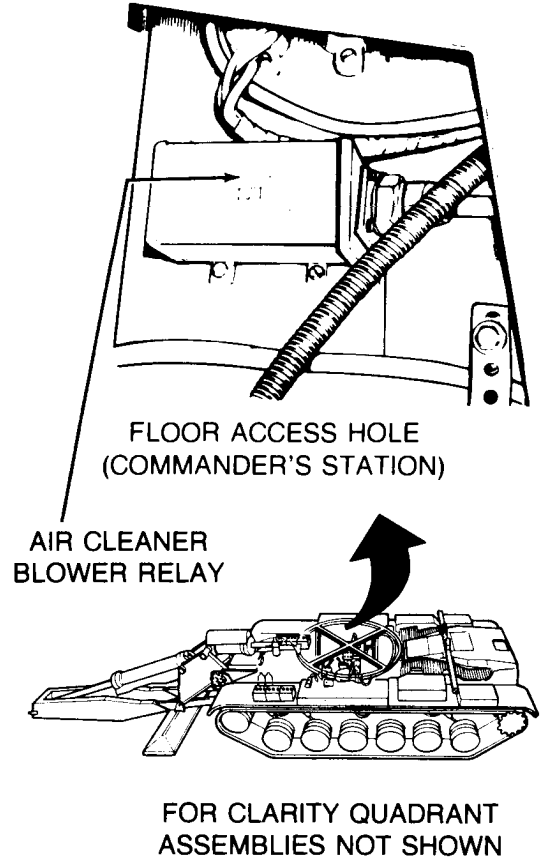
First Technician (Air Cleaner)

- Check air cleaner fan motors for operation.

Second Technician (Operator's Station)

- Stop engine.

Are air cleaner fan motors operating?



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-14

5 **Check front accessory harness connector (CKT 415A) at air cleaner blower relay for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove right-hand floor access cover if not already removed (page 17-7).
- Disconnect front accessory harness connector (CKT 415A) from air cleaner blower relay.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 415A) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

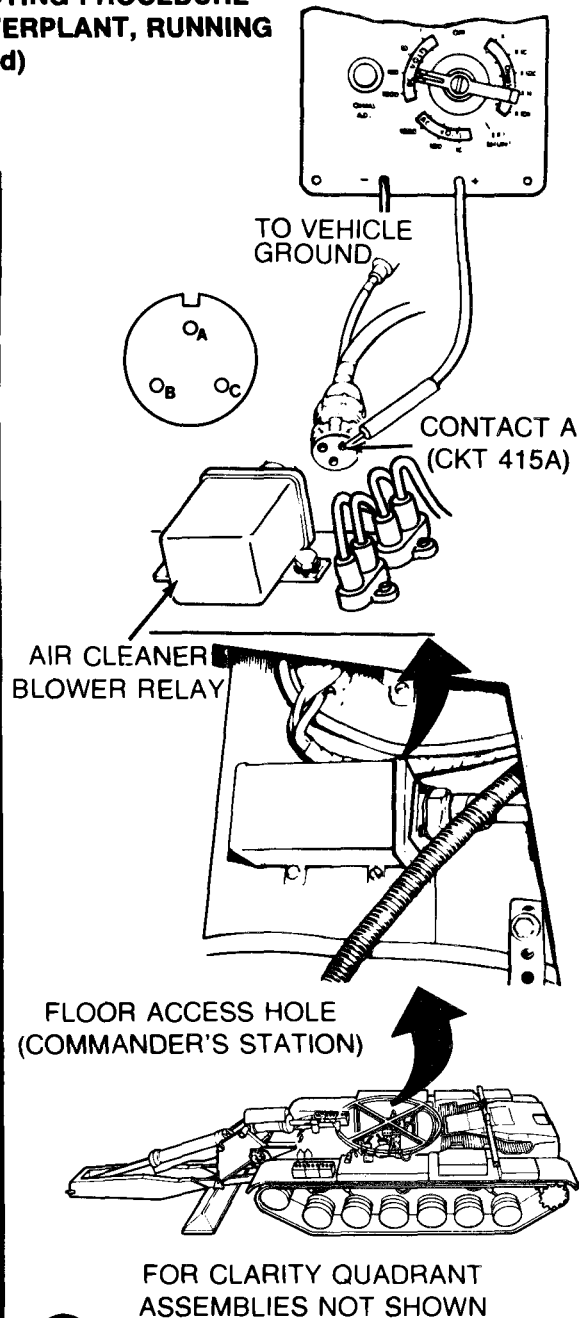
First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Second Technician (Operator's Station)

- Stop engine.
- Set MASTER BATTERY switch OFF.

Did meter indicate 18 to 30 volts dc?



6

- Check voltage regulator connector from pin A to pin H for continuity.
- See Step 15 .



TA250176

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-14

7 Check front accessory harness (CKT 415) at air cleaner blower relay for electrical power.

First Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 415) of front accessory harness connector and black probe to ground.

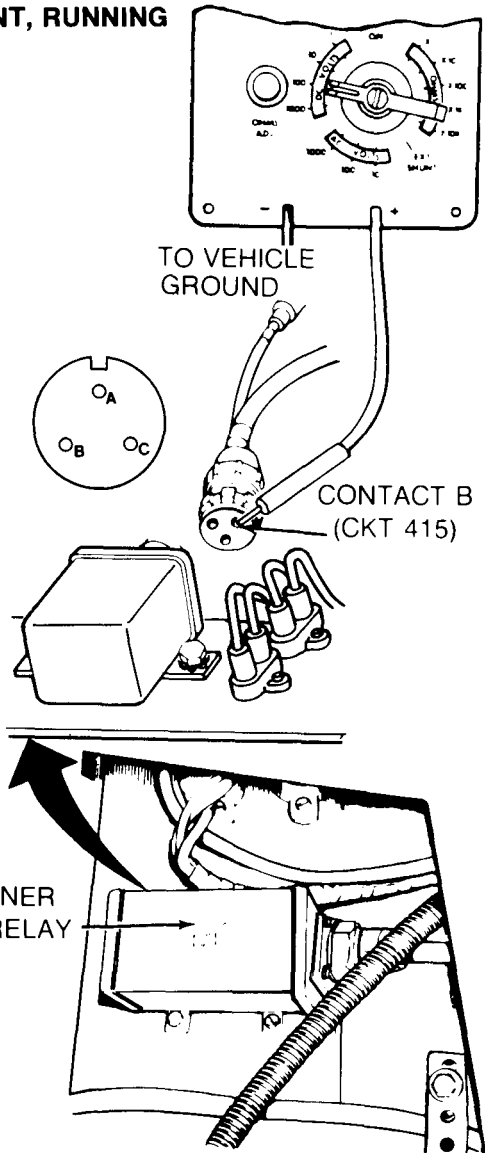
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



8

- Check hull power harness at intermediate connector (CKT 415) for electrical power.
- See Step 12 .

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-14

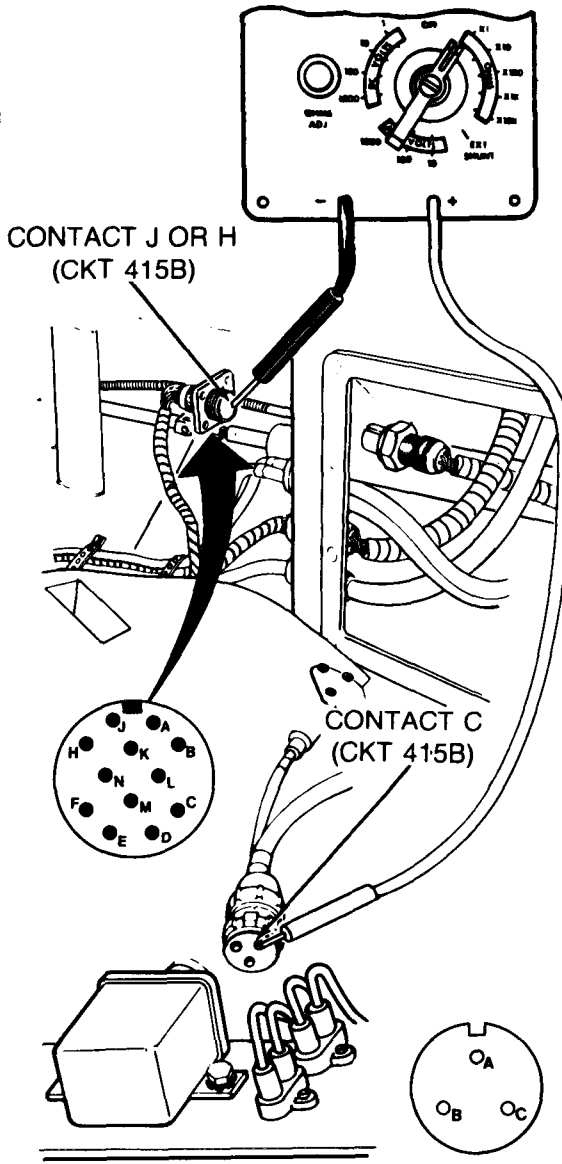
9 Check front accessory harness (CKT 415B) from air cleaner blower relay to bulkhead disconnect for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 415B) from bulkhead disconnect (page 10-269).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to front accessory harness connector contact C (CKT 415B) at air cleaner blower relay.
- Connect black probe of meter to front accessory harness connector contact J or H (CKT 415B) at bulkhead disconnect.



TA250178

Symptom-14

STEP **9** CONTINUED

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

● Check if meter indicates continuity.

Does meter indicate continuity?

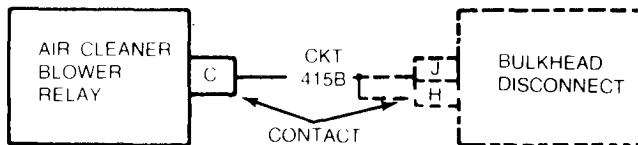
10

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 415B wires at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective front accessory harness.
- If installed, connect smoke generator switch harness to blower motor relay.
- Connect front accessory harness connector to smoke generator switch harness, or to air cleaner blower relay if smoke generator is not installed.
- Install floor access cover (page 17-7).
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

NO **YES**

11

- Replace air cleaner blower relay (page 10-163).
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



TA250179

Symptom-14
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

8

12

Check hull power harness at intermediate connector (CKT 415) for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

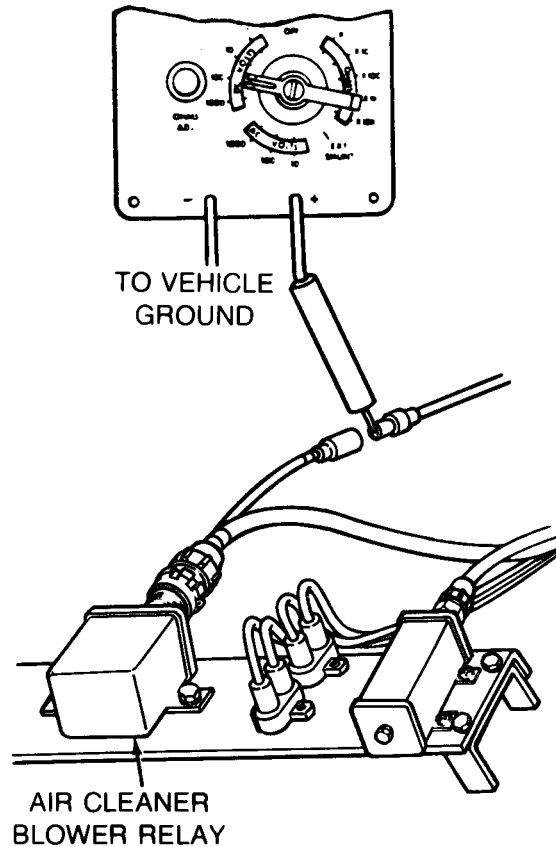
First Technician (Commander's Station)

- If installed, connect smoke generator switch harness to air cleaner blower relay.
- Connect front accessory harness connector to smoke generator switch harness, or to air cleaner blower relay if smoke generator is not installed.
- Disconnect hull power harness (CKT 415) from front accessory harness at intermediate connector.
- Connect red probe of meter to hull power harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)



TA250180

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-14

STEP **12** CONTINUED

• Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

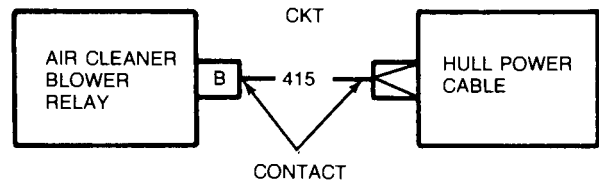
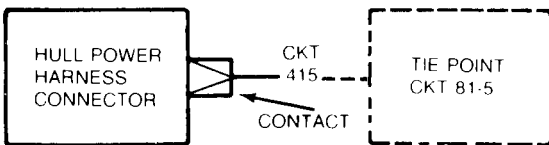
13

- Inspect hull power harness for bent/broken connector contacts or loose CKT 415 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective hull power harness.
- Connect front accessory harness connector to hull power harness connector.
- Install floor access cover (page 17-7).

NO YES

14

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 415 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness connector to hull power harness connector.
- Install floor access cover (page 17-7).



TA250181

Symptom-14
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

6

15

Check voltage regulator connector from pin A to pin H for continuity.

First Technician (Commander's Station)

- If installed, connect smoke generator switch harness to air cleaner blower relay.
- Reconnect front accessory harness to smoke generator switch harness, or to air cleaner blower relay if smoke generator is not installed.
- Disconnect front accessory harness connector (CKT 1, 2, 415A, 478) from voltage regulator.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-85).
- Connect red probe of meter to contact A of voltage regulator connector.
- Connect black probe of meter to contact H of voltage regulator connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

16

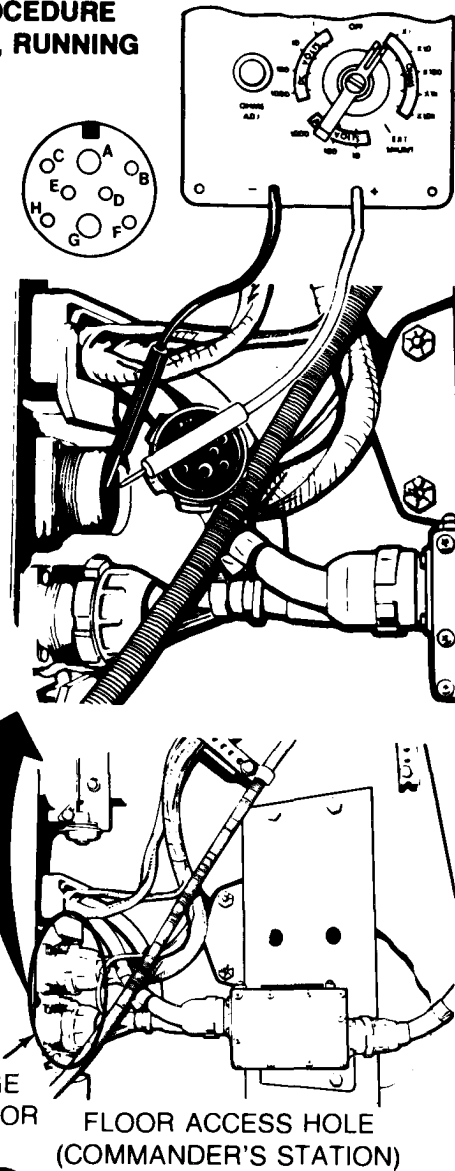
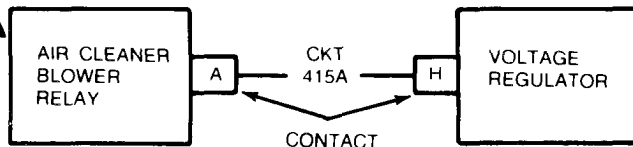
- Inspect front accessory harness for bent/broken connector contacts or loose CKT 415A wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Reconnect front accessory harness connector to voltage regulator.
- Install floor access cover (page 17-7).

YES

NO

17

Replace voltage regulator
(page 10-18).

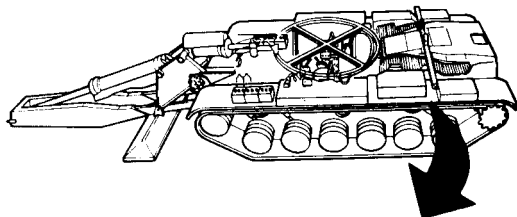


**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING**

Symptom-15

ENGINE OIL TEMPERATURE GAGE SHOWS HIGH TEMPERATURE (POWERPLANT WARNING LAMP ON).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1
Check right and left engine oil coolers for leaks.

First Technician (Top Deck)

- Open left and right top deck grille doors.

Second Technician (Operator's Station)

- Start engine.

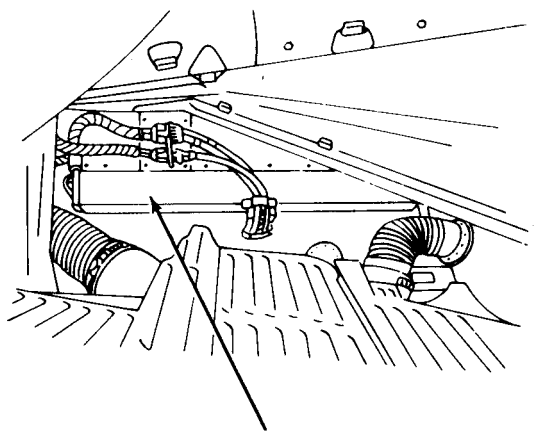
First Technician (Top Deck)

- Visually check area around right and left oil coolers for leaks.

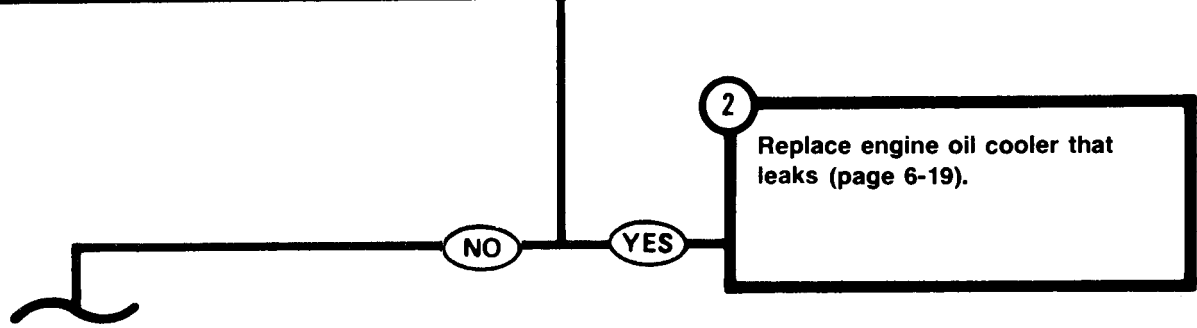
Second Technician (Operator's Station)

- Stop engine.

Is either engine oil cooler leaking?



**ENGINE OIL COOLER
(VIEW LOOKING DOWN THROUGH LEFT TOP DECK GRILLE DOORS)**



Symptom-15

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3

Check engine oil cooler lines for leaks or damage.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Ground hop powerplant (page 5-25).

Second Technician (Operator's Station)

- Start engine.

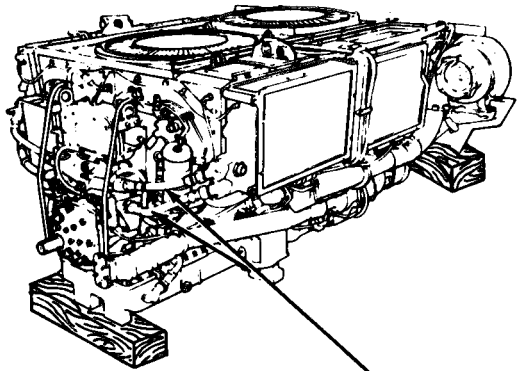
First Technician (Left and Right Side of Powerplant)

- Visually check engine oil cooler lines for damage or leaks.

Second Technician (Operator's Station)

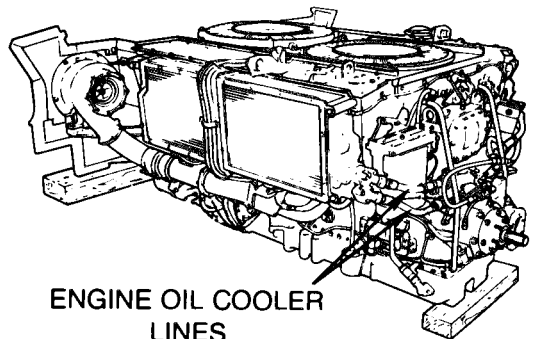
- Stop engine.

Are any engine oil cooler lines leaking or damaged?



ENGINE OIL COOLER LINES

RIGHT FRONT VIEW

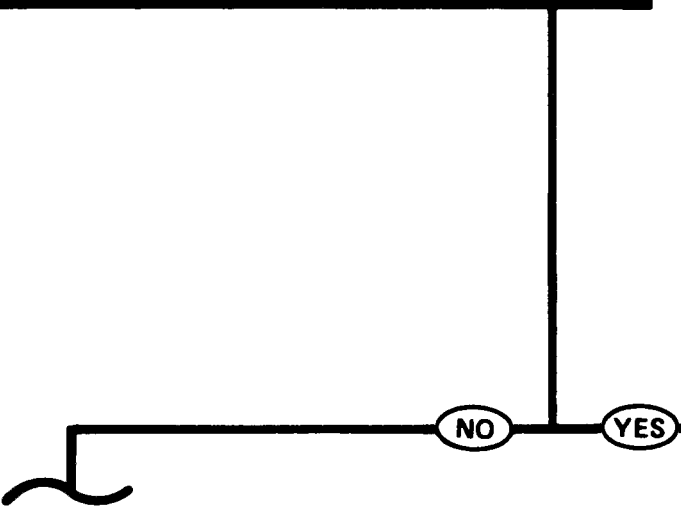


ENGINE OIL COOLER LINES

LEFT FRONT VIEW

4

Replace defective oil cooler lines (page 6-50).



Symptom-15

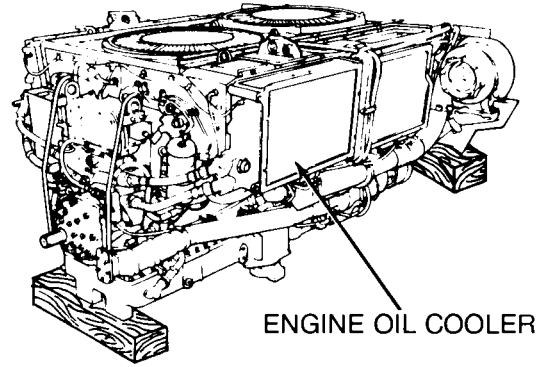
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

5 Check engine oil coolers and screens for clogged cores or dirty condition.

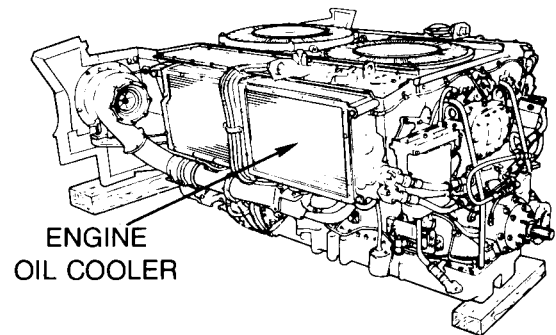
First Technician (Powerplant)

- Remove left and right engine oil coolers screens (page 6-51).
- Shine light through cores and screens.
- Check for clogged or dirty condition.

Are engine oil coolers and screens clean?



RIGHT FRONT VIEW



LEFT FRONT VIEW

6 Clean engine oil coolers (page 6-48) and screens.

YES

NO

Symptom-15

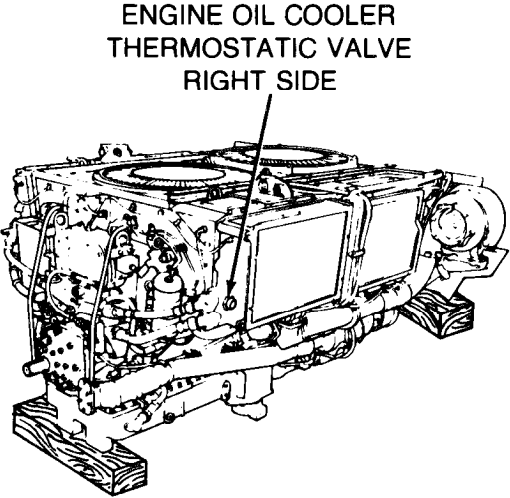
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

7 Check if right side and left side engine oil cooler thermostatic valves operate correctly.

First Technician (Powerplant)

- Remove right side and left side engine oil cooler thermostatic valves (page 6-15).
- Test both thermostatic valves (page 6-17).

Do both thermostatic valves pass test?



(POWERPLANT RIGHT SIDE)

8 Replace defective thermostatic valve (page 6-15).

9

- Notify support maintenance of engine problem.
- Install powerplant (page 5-14).

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING**

Symptom-16

ENGINE OIL LEVEL TOO LOW (EXCEEDS 3.5 QUARTS PER HOUR WHILE RUNNING).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

Check right and left engine oil coolers for leaks.

First Technician (Top Deck)

- Open left and right top deck grille doors.

Second Technician (Operator's Station)

- Start engine.

First Technician (Top Deck)

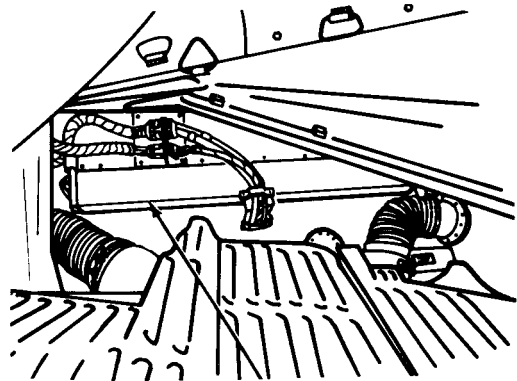
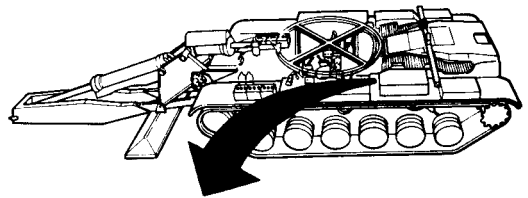
- Visually check area around right and left oil coolers for leaks.

Second Technician (Operator's Station)

- Stop engine.

Is either engine oil cooler leaking?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



LEFT ENGINE OIL COOLER
(VIEW LOOKING DOWN THROUGH LEFT TOP DECK GRILLE DOORS)

2

Replace engine oil cooler that leaks (page 6-19).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-16

3

Check engine oil filter cover and engine drain valve for leaks.

First Technician (Rear of Crew Compartment)

- Remove engine upper access cover (page 17-11).

Second Technician (Operator's Station)

- Start engine.

First Technician (Rear of Crew Compartment)

- Check for leaks at engine oil filter cover and drain valve.

Second Technician (Operator's Station)

- Stop engine.

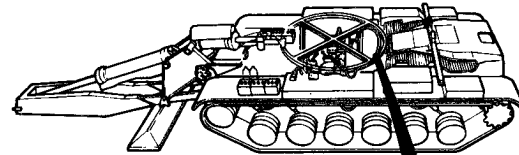
Is there leakage at the engine oil filter cover or drain valve?

4

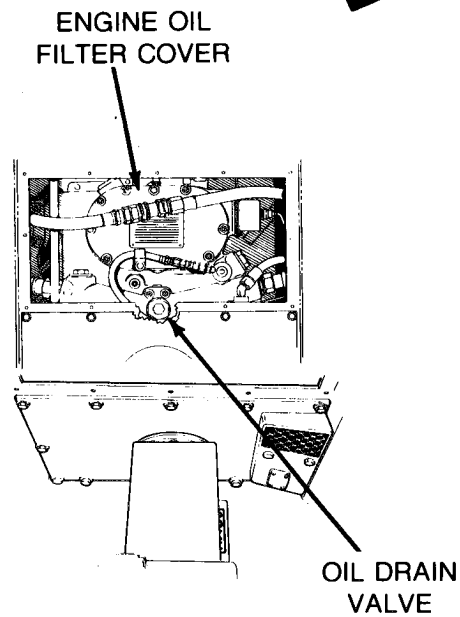
- Replace engine oil filter cover gasket (page 6-76).
- Tighten engine oil drain valve.

YES

NO



FOR CLARITY
QUADRANT ASSEMBLIES
NOT SHOWN



FRONT OF ENGINE—VIEWED FROM
REAR OF CREW COMPARTMENT
(UPPER ACCESS COVER REMOVED)

TA250188

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

Symptom-16

NOTE

If STE/ICE is available, perform Test No. 14 COMPRESSION UNBALANCE (page 4-86).

If STE/ICE is not available, go to Step ⑤ .

⑤

Check for leaks at fan drive oil seals.

First and Second Technician (Top Deck)

- Remove engine cooling fans (page 9-55).
- Install fan rotor hub spacers (Item 2, Chapter 3, Section I)(page 5-38).

Second Technician (Operator's Station)

- Start engine.

First Technician (Top of Engine)

- Check for oil leaks around both fan drive oil seals.

Second Technician (Operator's Station)

- Stop engine.

Is either engine fan drive oil seal leaking?

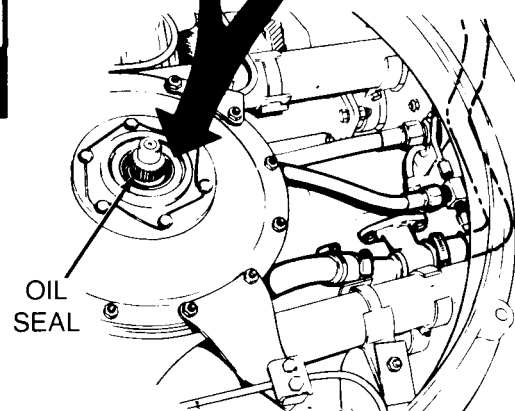
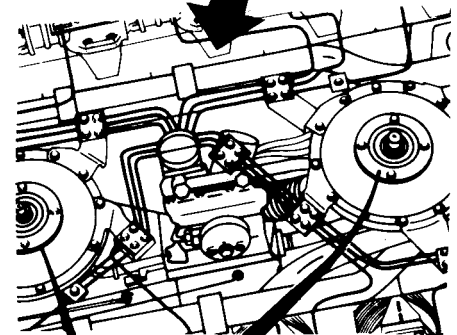
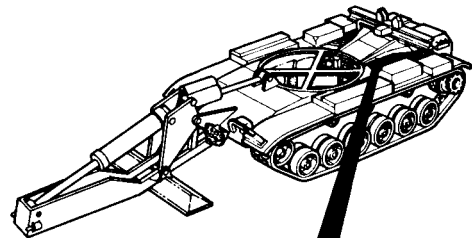
⑥

- Remove fan rotor hub spacers (page 5-39).
- Replace defective fan drive oil seals (page 9-59).

YES

NO

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



Symptom-16

DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - POWERPLANT, RUNNING
 (Continued)

NOTE

Locator views continued on next page.

7

Check oil lines, tubes, plugs and thermostatic valves for leaks or damage.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).
- Ground hop powerplant (page 5-25).

Second Technician (Operator's Station)

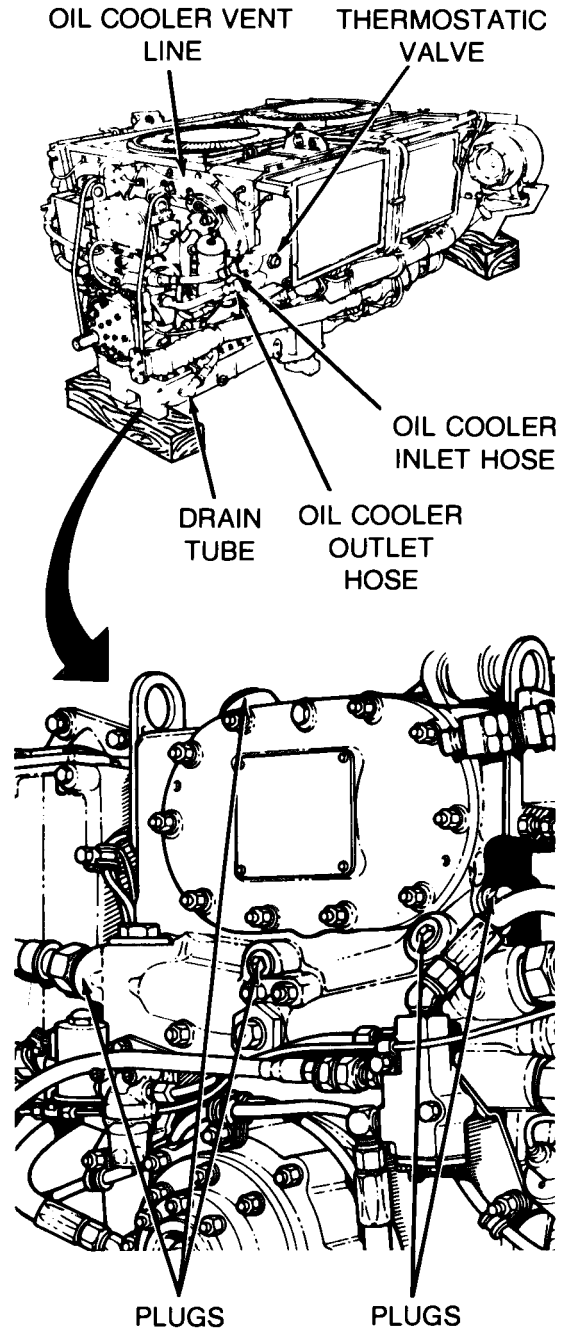
- Start engine.

First Technician (Powerplant)

- With engine idling, visually check the following for leaks and damage:
 - Left and right oil cooler inlet and outlet lines.
 - Left and right drain tubes.
 - Oil cooler vent line.
 - Plugs.
 - Engine oil filler tube.
 - Oil cooler thermostatic valves.
 - Engine oil drain plug.

Second Technician (Operator's Station)

- Stop engine.



TA250190

Symptom-16

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

STEP 7 CONTINUED

Are any of the oil lines, tubes, drain plugs, or thermostatic valves leaking or damaged?

8

● If leaking or damaged, replace:

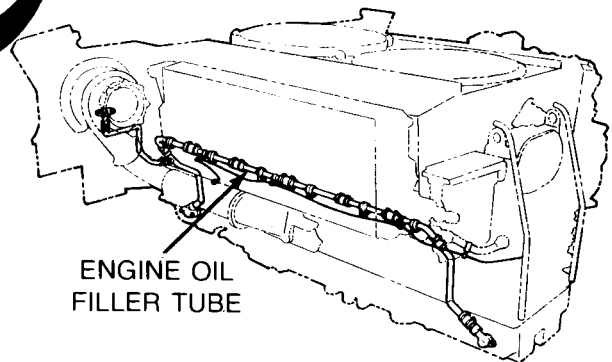
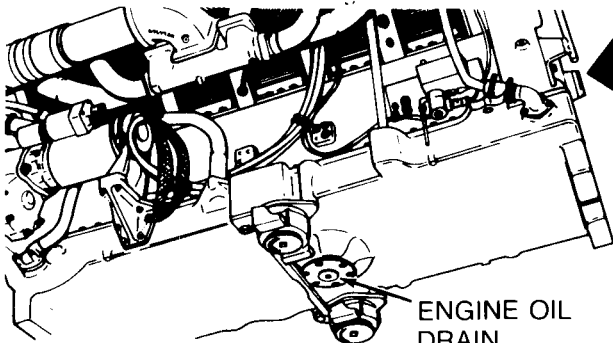
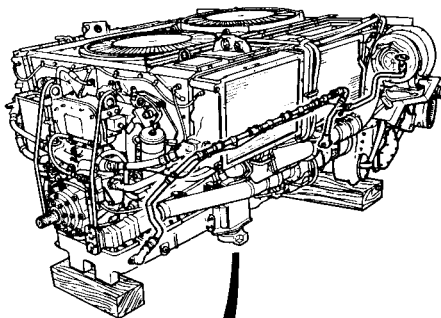
- Oil cooler inlet lines and outlet lines (page 6-51).
- Drain tubes (page 6-135).
- Oil cooler vent line plugs (page 6-61).
- Engine oil filler tube (page 6-88).
- Engine oil drain plug (page 6-12).
- Oil cooler thermostatic valve spacer ring (page 6-15).
- Remove fan motor hub spacers.
- Install cooling fans (page 9-57).
- Install powerplant (page 5-14).

YES

NO

9

- Remove fan rotor hub spacers. (page 5-39).
- Install cooling fans (page 9-57).
- Install powerplant (page 5-14).
- Notify support maintenance that engine uses too much oil.



TA250191

Symptom 16.1

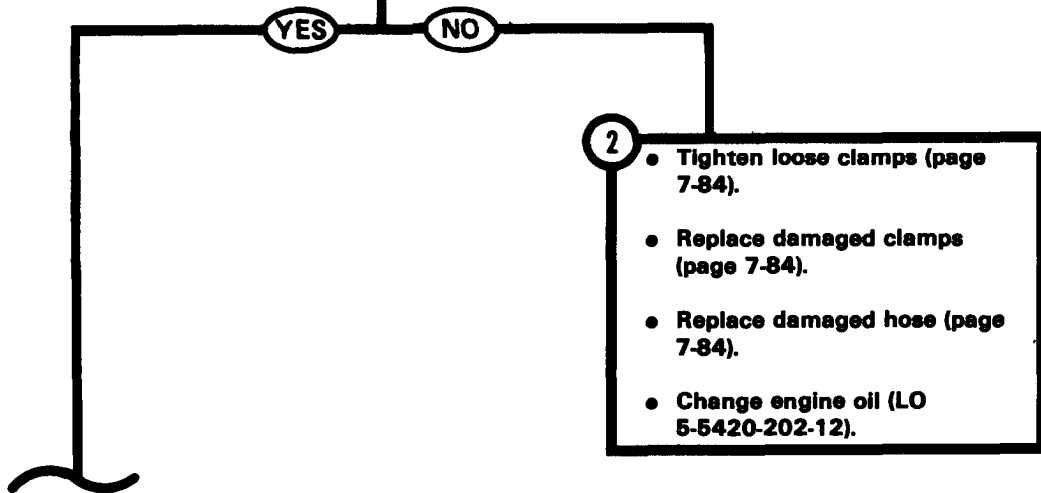
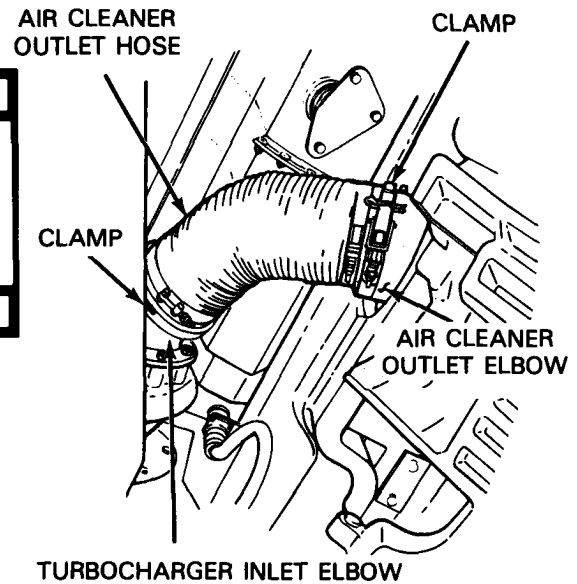
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY DUST.

1 Check air cleaner outlet hose assembly.

- Inspect for loose or damaged clamps at both ends of hose assembly.
- Inspect hose for damage.

Are outlet hose assembly and clamps serviceable?



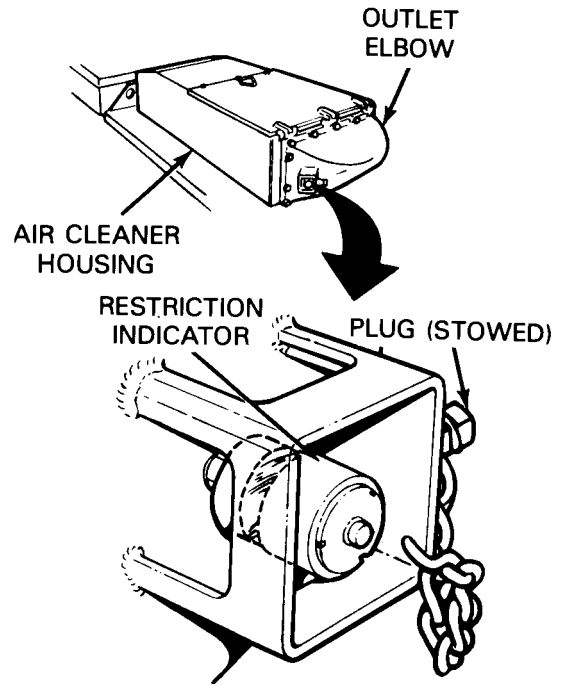
Symptom 16.1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 Check air cleaner outlet elbow.

- Check for presence of restriction indicator or plug.
- Check for presence of gasket between housing and outlet elbow.
- Check elbow for holes or cracks.

Is air cleaner outlet elbow serviceable?



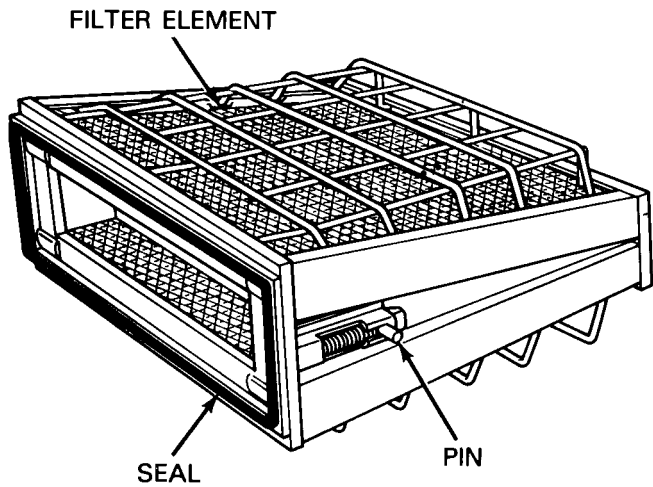
NO YES

4 Replace air cleaner outlet elbow (page 7-101).

5 Check air cleaner filter element.

- Remove air cleaner filter element (page 7-96).
- Check filter element for tears or holes.
- Check seal for tears, gaps, or hardness.
- Check spring loaded pin for damage.

Is air cleaner filter element serviceable?



YES NO

6

- Replace air cleaner filter element (page 7-96).
- Change engine oil (LO 5-5420-202-12).

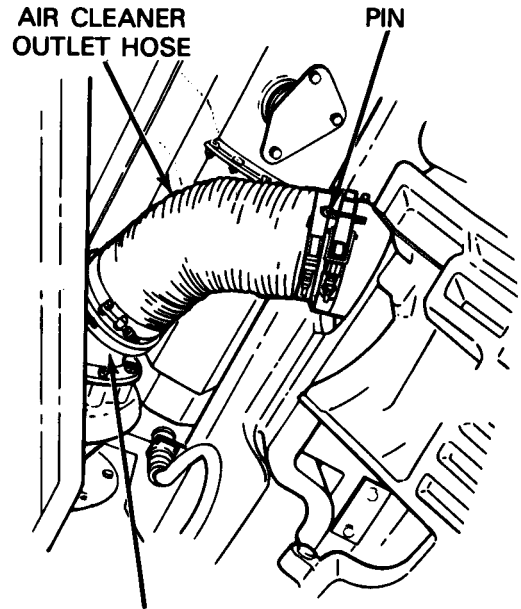
Symptom 16.1

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

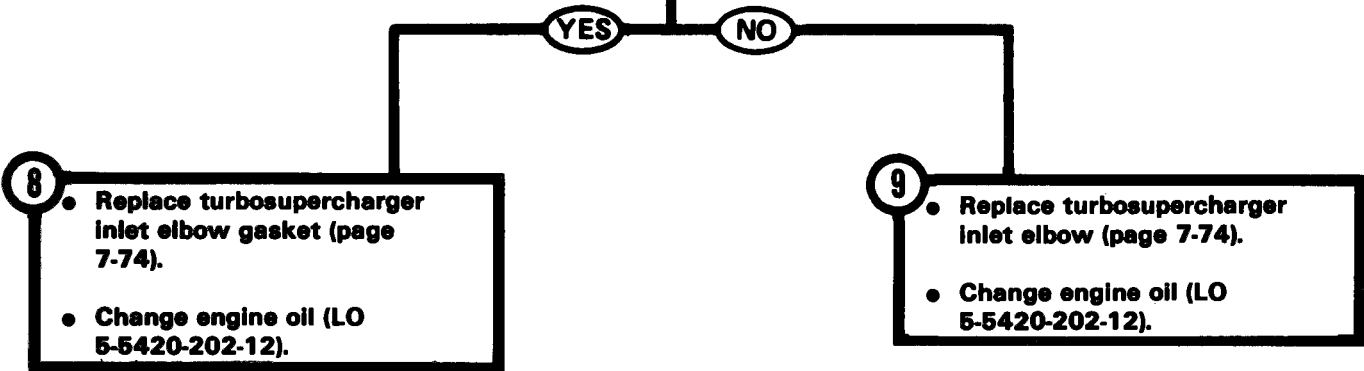
7 Check turbosupercharger inlet elbow.

- Check for holes or cracks.
- Check for security.

Is turbosupercharger elbow serviceable?



TURBOCHARGER INLET ELBOW



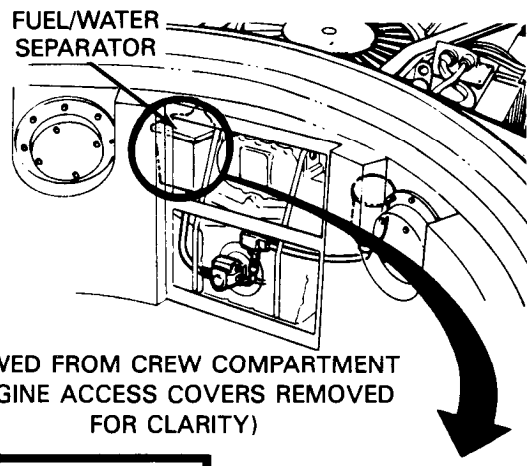
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY FUEL.

1 Check fuel water separator bleed cap.

- Remove engine access cover.
- Inspect fuel/water separator bleed cap for security.

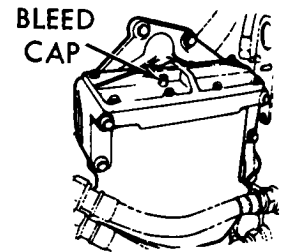
Is fuel water separator bleed cap leaking or loose?



YES **NO**

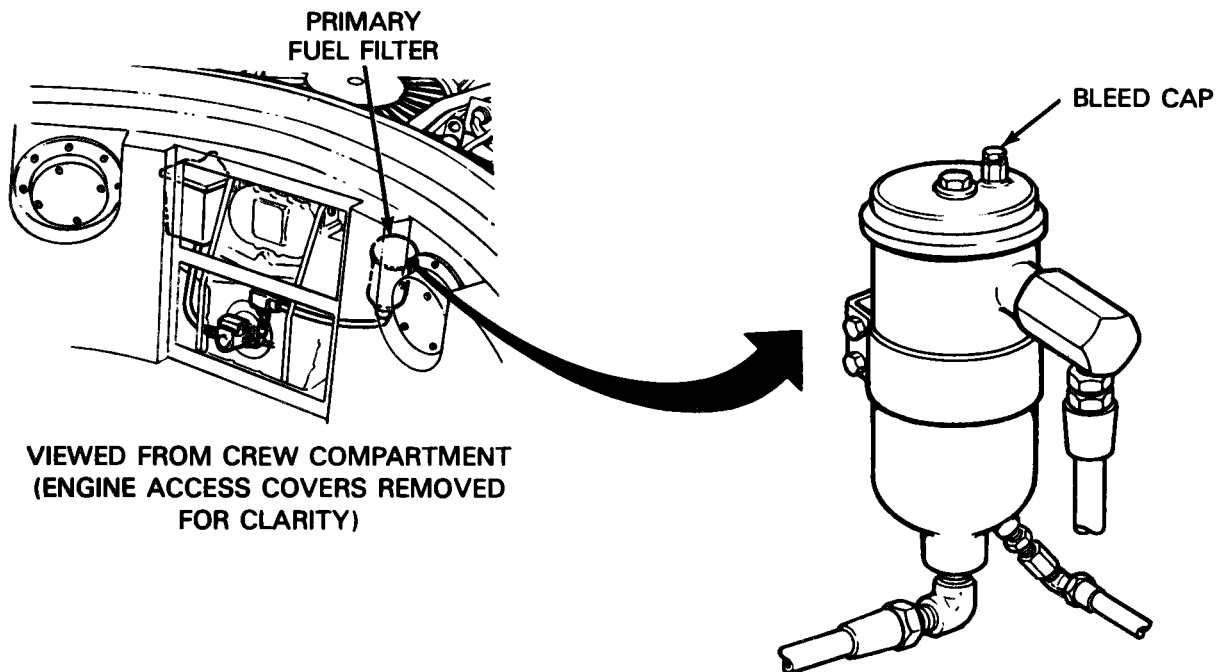
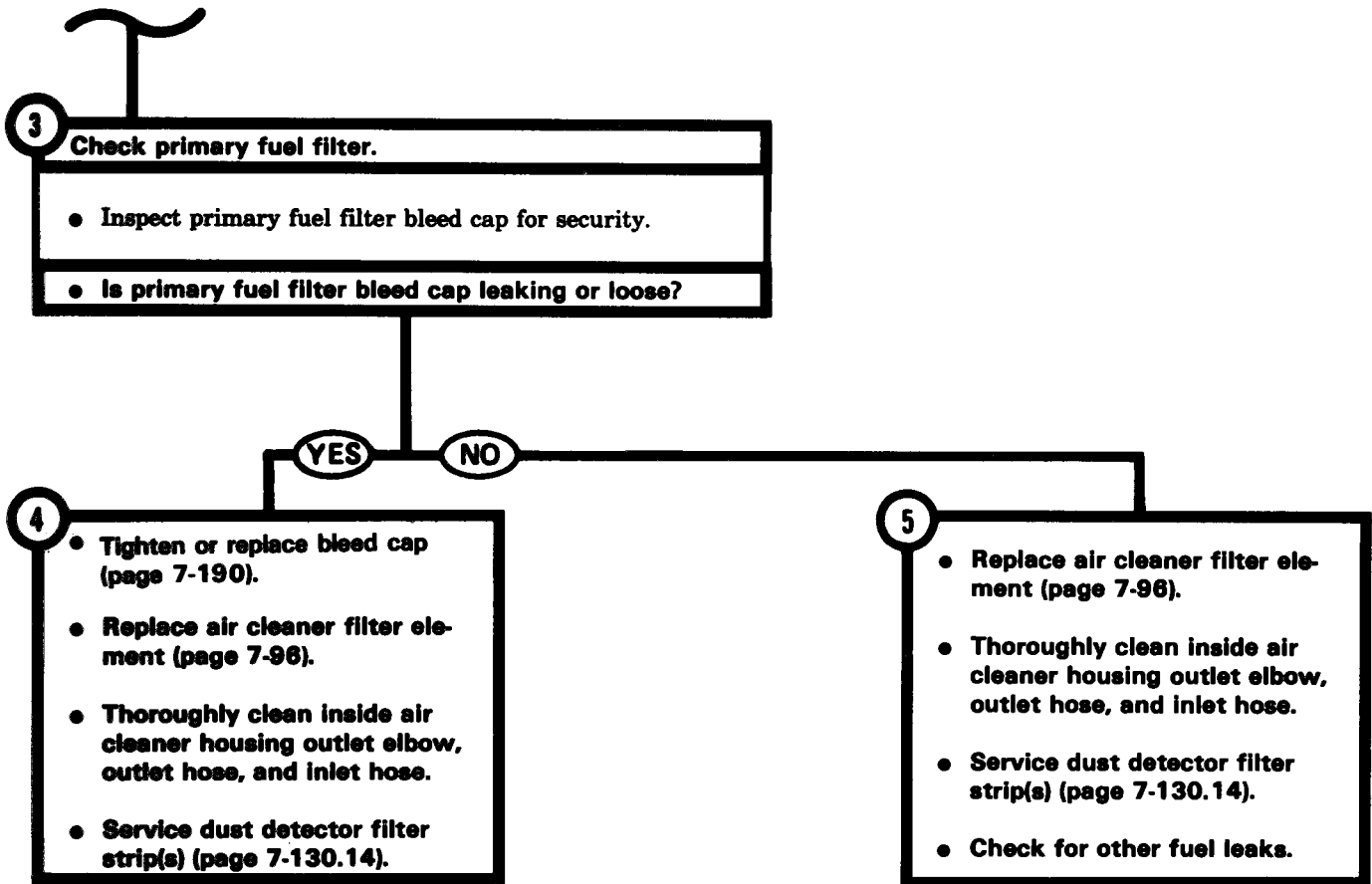
2

- Tighten or replace bleed cap (page 7-190).
- Replace air cleaner filter element (page 7-96).
- Thoroughly clean inside air cleaner housing outlet elbow and outlet hose.
- Service dust detector filter strip(s) (page 7-130.14).



Symptom 16.2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



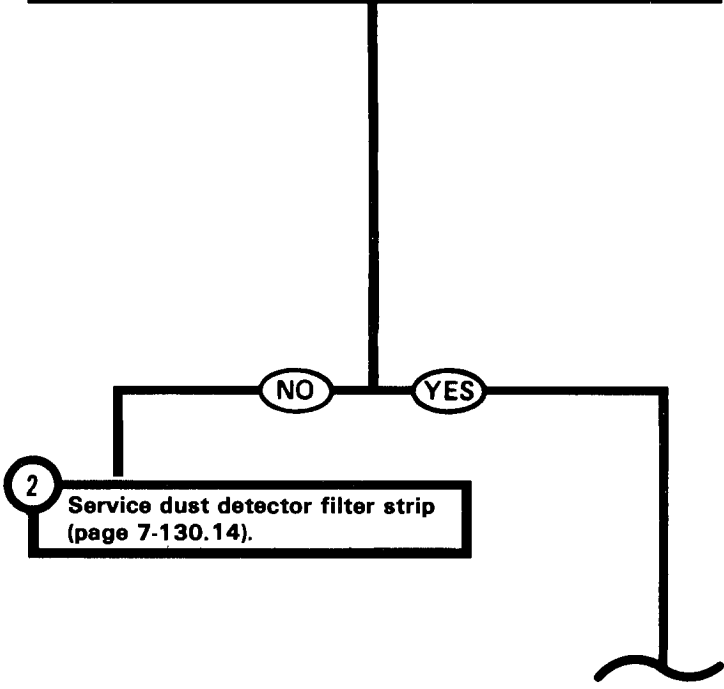
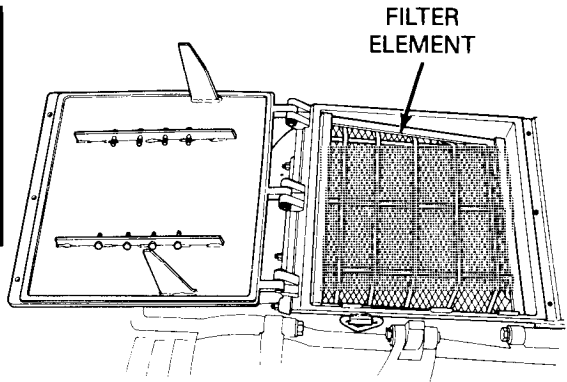
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY SOOT.

1 Check air cleaner filter elements.

- Remove air cleaner filter element (page 7-96).
- Inspect air cleaner filter element.

Does element show evidence of soot or charring?



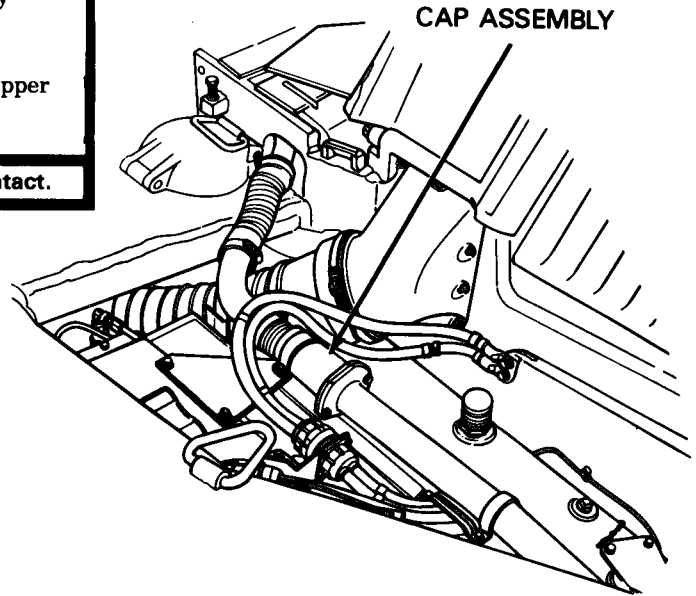
Symptom 16.3

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

3 Replace or clean air cleaner element (page 7-96).

- Remove cap assembly (Check valve) (page 8-14).
- Tilt cap assembly (check valve) side to side to verify flapper valve is free.
- Look inside cap assembly (check valve) to verify flapper valve is not damaged or missing.

Is cap assembly (check valve) flapper valve free and intact.



YES

NO

4 Install cap assembly (check valve) (page 8-16).

5 Replace cap assembly (check valve) (page 8-16).

Symptom 16.4

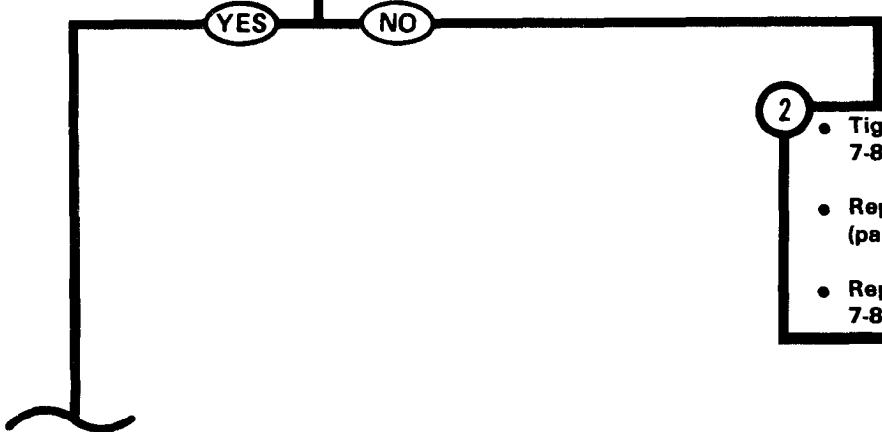
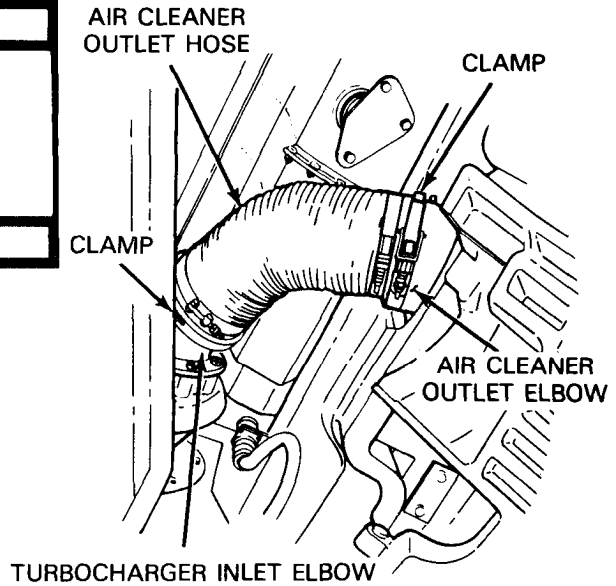
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY WATER.

1 Check air cleaner outlet hose assembly.

- Inspect for loose or damaged clamps at both ends of hose assembly.
- Inspect hose for damage.

Are outlet hose assembly and clamps serviceable?



2

- Tighten loose clamps (page 7-84).
- Replace damaged clamps (page 7-84).
- Replace damaged hose (page 7-84).

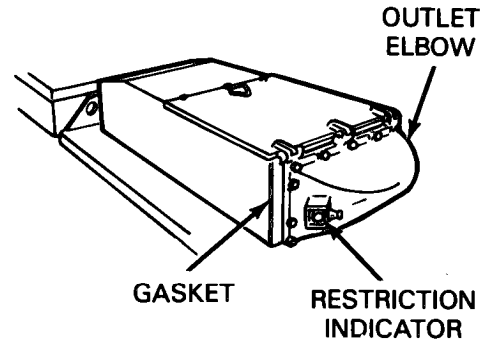
Symptom 16.4

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

3 Check air cleaner outlet elbow.

- Check elbow for holes or cracks.
- Check for presence of gasket between housing and elbow.
- Check for presence of restriction indication or plug.

Is air cleaner elbow serviceable?



YES

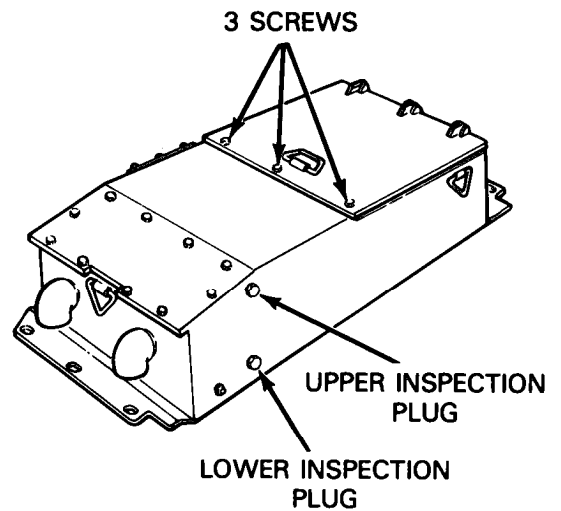
NO

4 Check air cleaner housing.

- Remove lower inspection plug.
- Shine light in plug hole.
- Check precleaner for water accumulation.

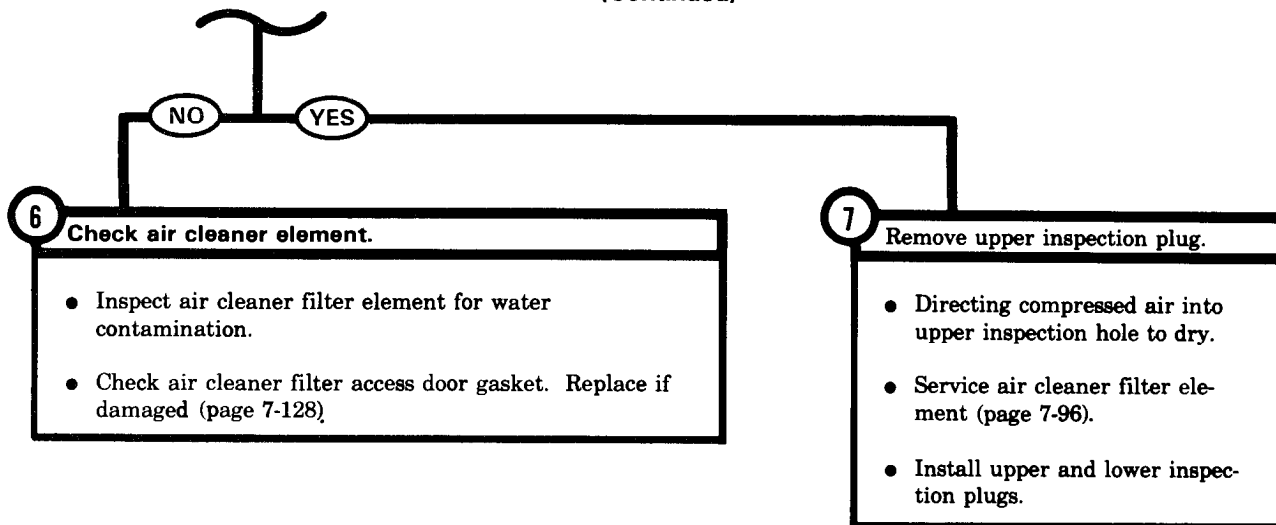
Does precleaner contain water?

5 Replace air cleaner outlet elbow (page 7-101).



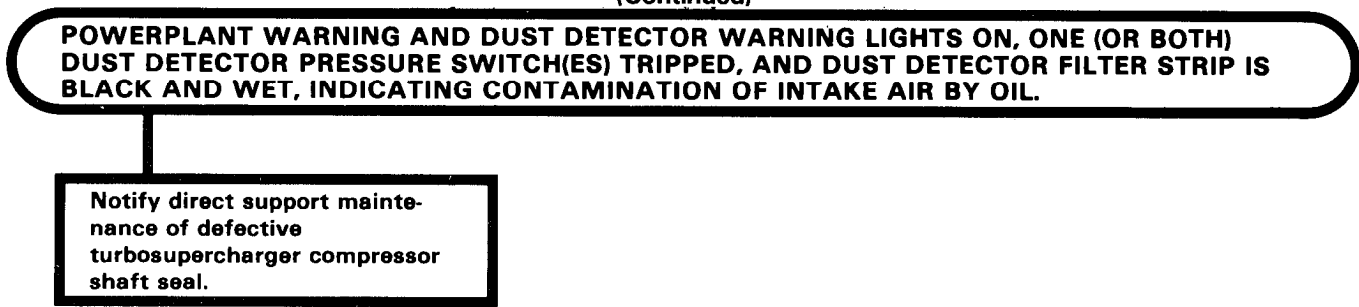
Symptom 16.4

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**



Symptom 16.5

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**



Symptom 16.6

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

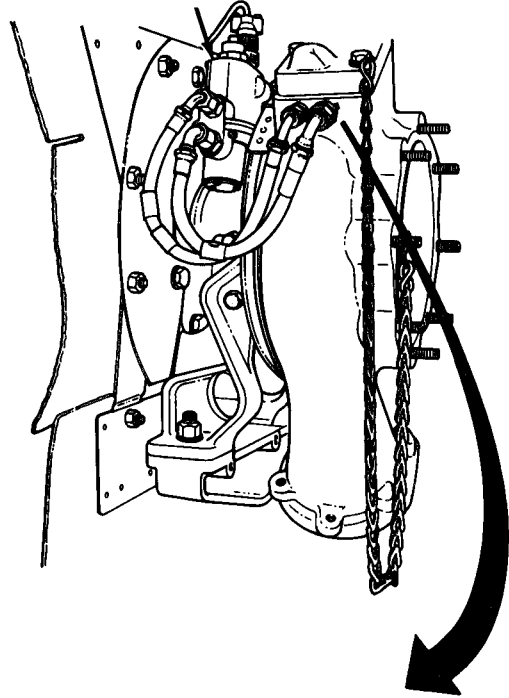
POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ARE ON (ENGINE RUNNING - ALL GAGES READ NORMAL).

1 Check dust detector pressure switch(es) for tripped condition.

- Open top deck grille doors (TM 5-5420-202-10).
- Check dust detector switch(es).

Is dust detector pressure switch(es) tripped?

DUST DETECTOR PRESSURE SWITCH

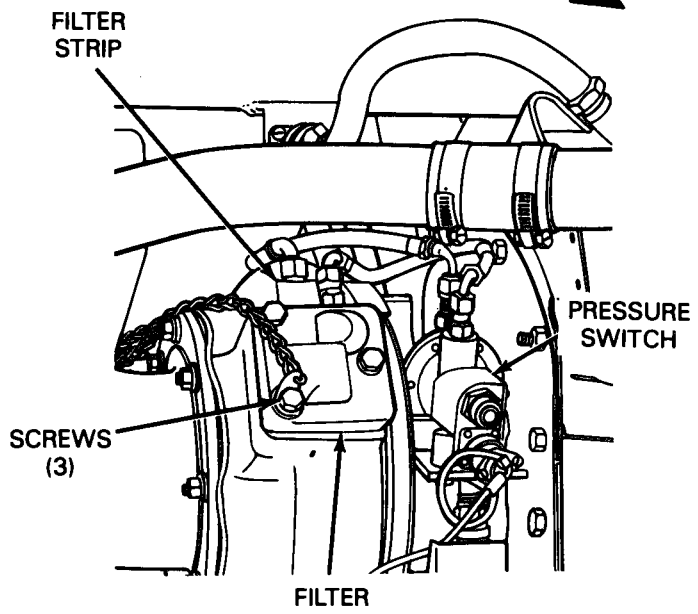


2 Go to symptom 16.8.

3 Check filter strip on dust detector.

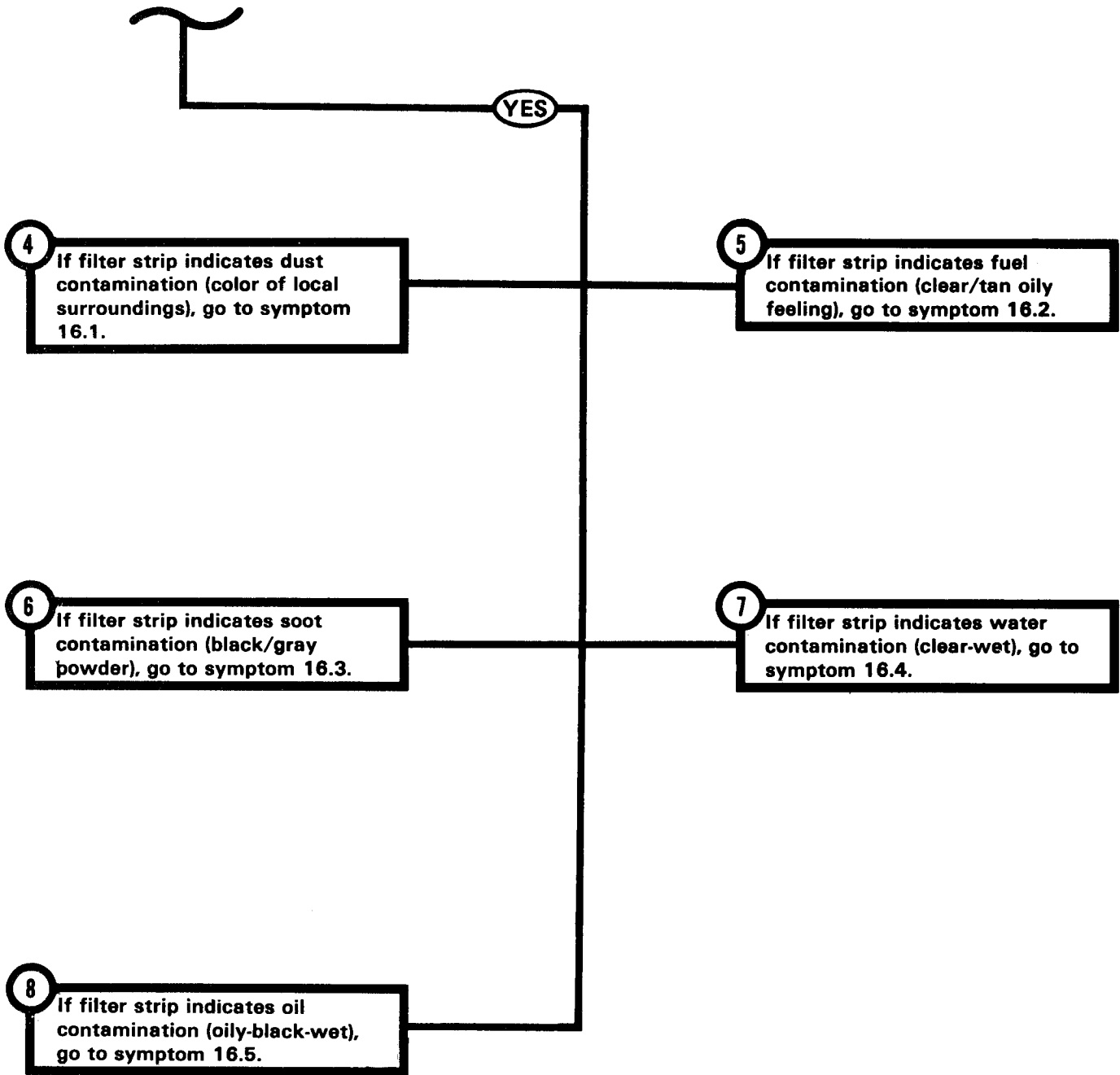
- Loosen three screws.
- Pull out approximately three inches of filter strip.
- Cut filter strip, leaving approximately one inch sticking out of filter.
- Tighten three screws.

Does filter strip indicate contamination?



Symptom-16.6

**DETAILED TROUBLESHOOTING PROCEDURE
TANK OPERATION - POWERPLANT, RUNNING
(Continued)**

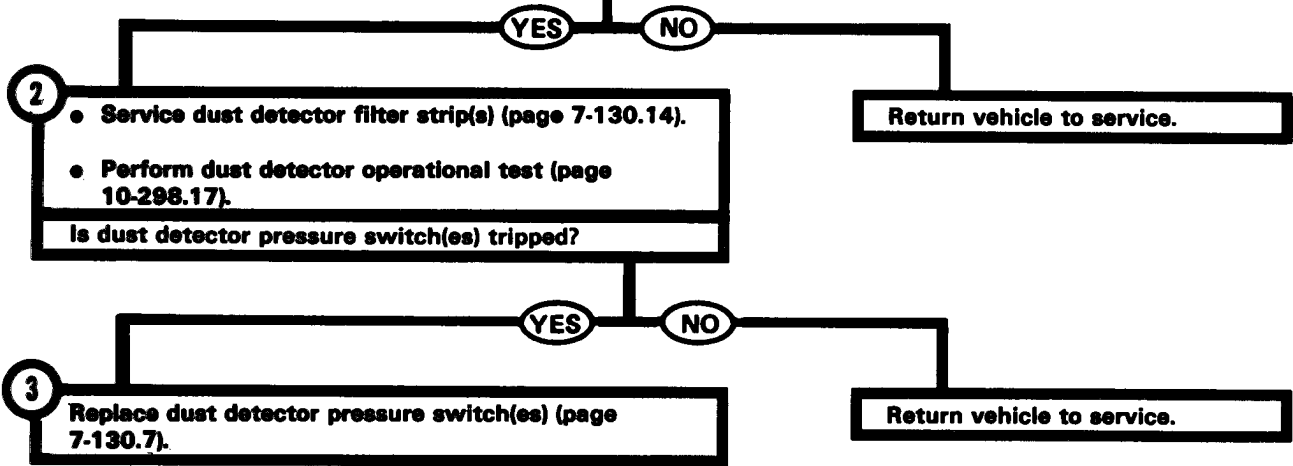
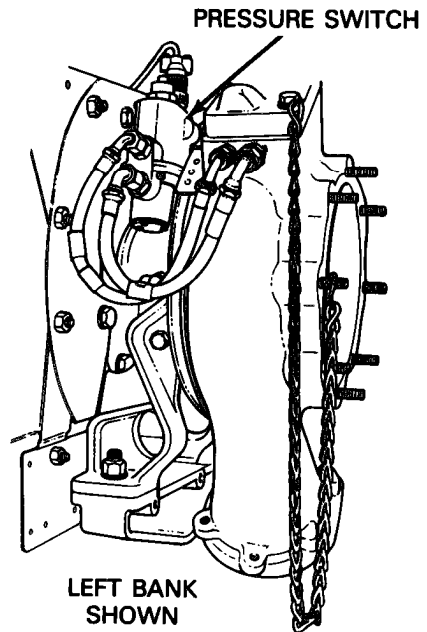


POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHT ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, BUT DUST DETECTOR FILTER STRIP DOES NOT INDICATE CONTAMINATION OF INTAKE AIR.

1 Check dust detector pressure switch(es).

- Press plastic cap on pressure switch to reset switch(es).
- Perform engine stall test (page 5-33).
- Check indicators on pressure switch(es).

Is dust detector pressure switch(es) tripped?



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

**POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, BUT DUST
DETECTOR PRESSURE SWITCH(ES) NOT TRIPPED.**

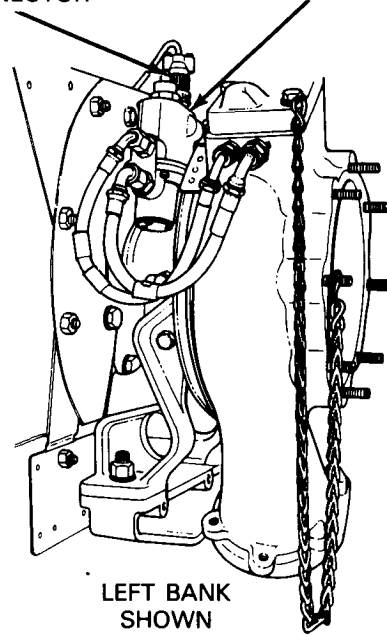
1 Check pressure switches for continuity.

- Set master switch to OFF.
- Disconnect connector (P) of engine wiring harness 12314608 (circuit 510 L) from right and left dust detector pressure switches.
- Set multimeter to read ohms X1.
- Check continuity across each switch terminal.

Does continuity exist across switch terminal?

HARNESS
12314608
CONNECTOR

DUST DETECTOR
PRESSURE SWITCH



YES NO

2 Replace dust detector pressure switches (page 7-130.7).

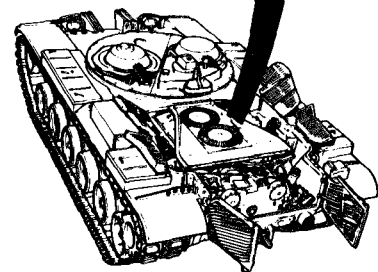
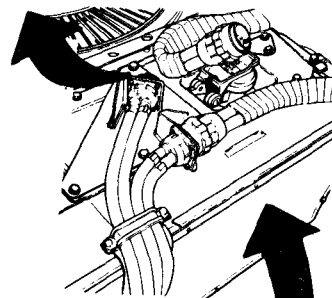
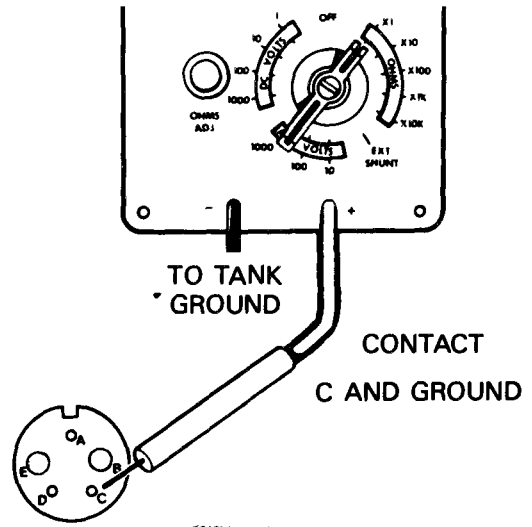
Symptom 16.8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 Check engine wiring harness 12314608 at engine disconnect.

- Disconnect starter connector at engine disconnect.
- Set multimeter to read ohms X1.
- Check harness at engine disconnect by checking continuity between pin C and ground.

Does continuity exist between pin C and ground?

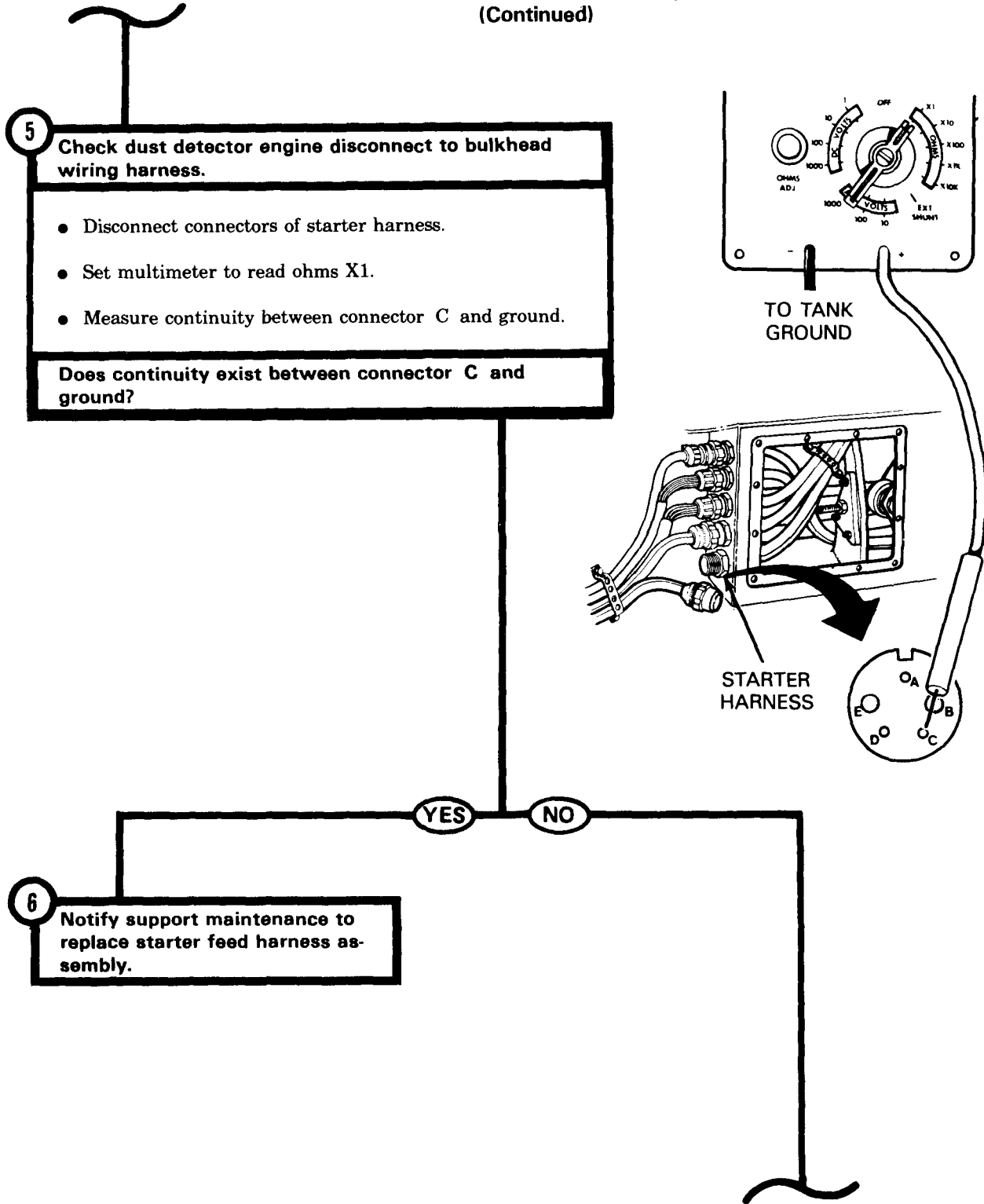


YES **NO**

4 ● Replace engine wiring harness (page 10-298).

Symptom 16.8

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**



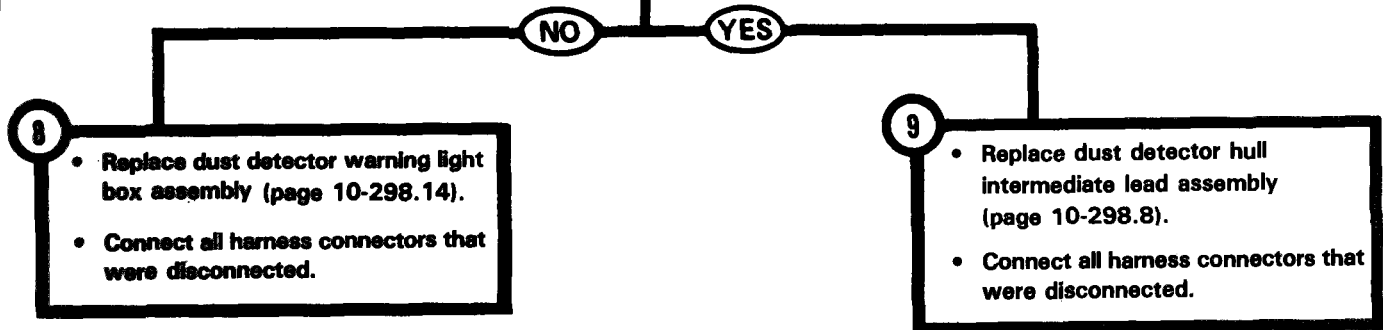
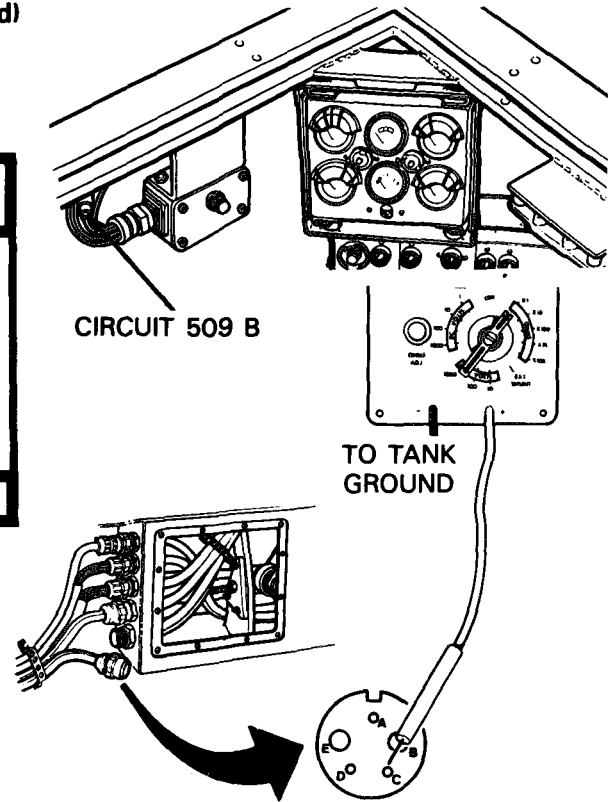
Symptom 16.8

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

7 Check bulkhead to dust detector warning box lead (12325928).

- Disconnect dust detector lead assembly connector (circuit 509 B) at dust detector warning light box.
- Set multimeter to read ohms X1.
- Measure continuity between connector C and ground.

Does continuity exist between pin C and ground?



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

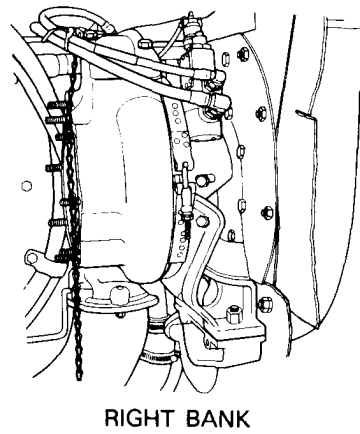
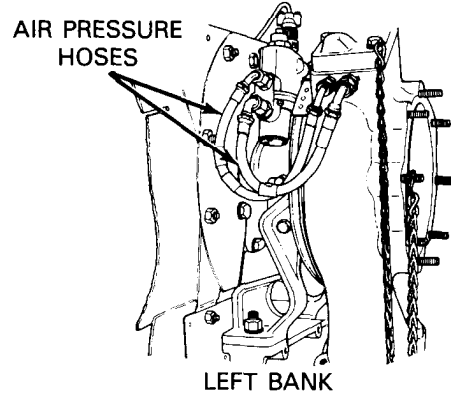
POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS NOT ON. DUST DETECTOR PRESSURE SWITCH(ES) NOT TRIPPED. DUST INGESTION IS APPARENT BY OIL SAMPLE ANALYSIS OR DUST TRAILS.

1 Service dust detector filter strip (page 7-130.14).

2 Check air pressure hoses on both sides of engine.

- Check air pressure hoses for cracks, breaks, and proper connections.
- Remove air pressure hoses and check for blockage (page 7-130.16).

Is any air pressure hose(s) damaged, blocked or improperly connected?



3

- Replace any defective air pressure hose(s) (page 7-130.17).
- Install any serviceable hoses (page 7-130.17).
- Check for proper connection (page 7-130.17).

4

- Install air pressure hoses (page 7-130.17).
- Perform dust detector operational test (page 10-298.17).

Are dust detector pressure switches serviceable?

5 Replace dust detector pressure switch(es) (page 7-130.8).

6

- Change engine oil and filter (LO 5-5420-202-10).
- Run engine 10 hours, sample oil and submit to AOAP laboratory.

Symptom 16.10

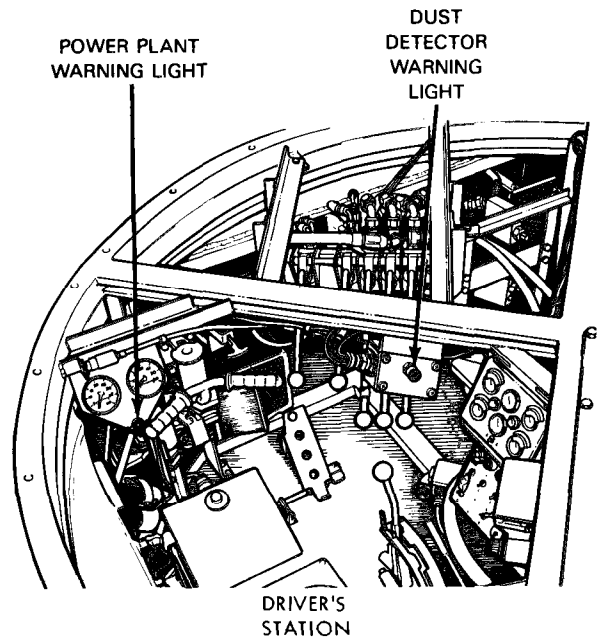
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

POWERPLANT WARNING LIGHT ON, DUST DETECTOR WARNING LIGHT OFF, DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, ENGINE RUNNING.

1 Check dust detector warning light box.

- Shut down engine.
- Press dust detector warning light to test.

Does dust detector warning lamp light?



YES

2

- Replace dust detector warning light box (page 10-298.14).

NO

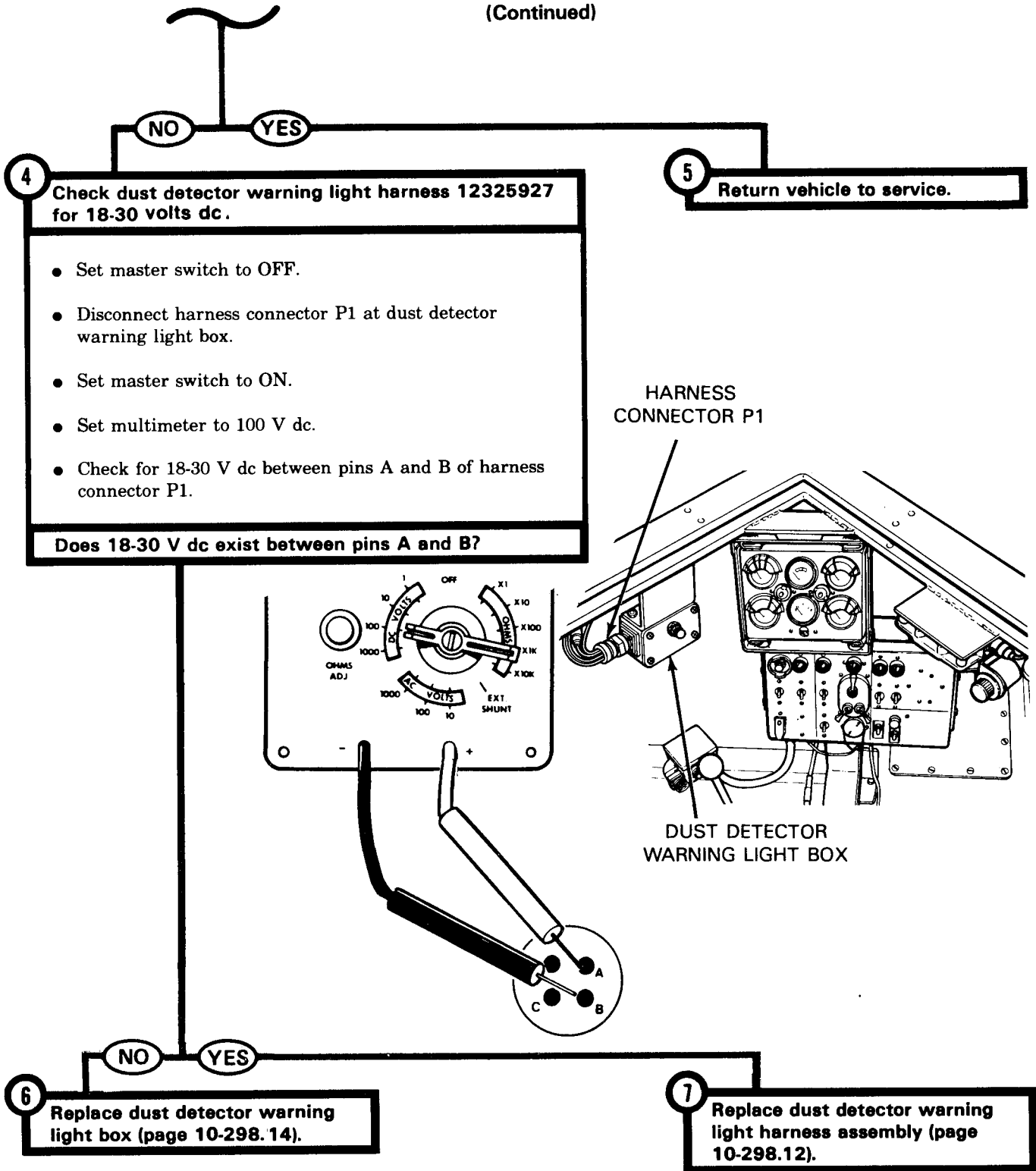
3

- Replace lamp (TM 5-5420-202-10).
- Press dust detector warning light to test.

Does dust detector warning lamp light?

Symptom 16.10

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**



Symptom 16.11

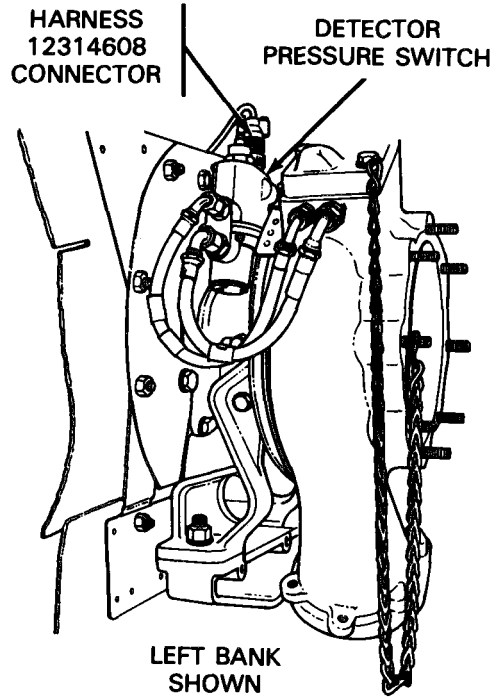
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, BUT DUST DETECTOR WARNING LIGHT AND POWERPLANT WARNING LIGHT DO NOT COME ON WHEN ENGINE IS RUNNING.

1 Check pressure switches for continuity.

- Set master switch to OFF.
- Disconnect connector of engine wiring harness 12314608 (circuit 510 L) from right and left dust detector pressure switches.
- Set multimeter to read ohms X1.
- Check for continuity across each switch terminal.

Does continuity exist across switch terminal?

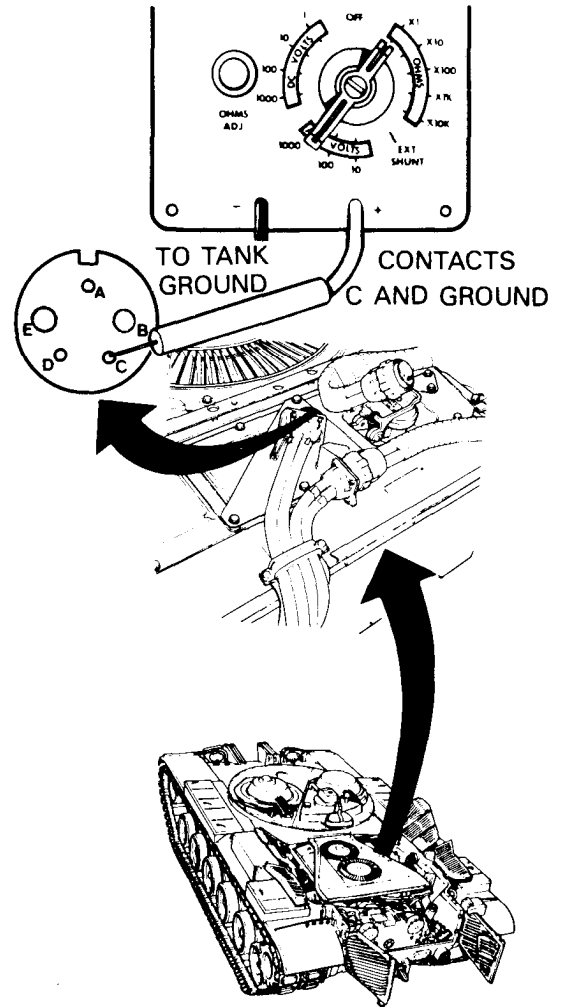
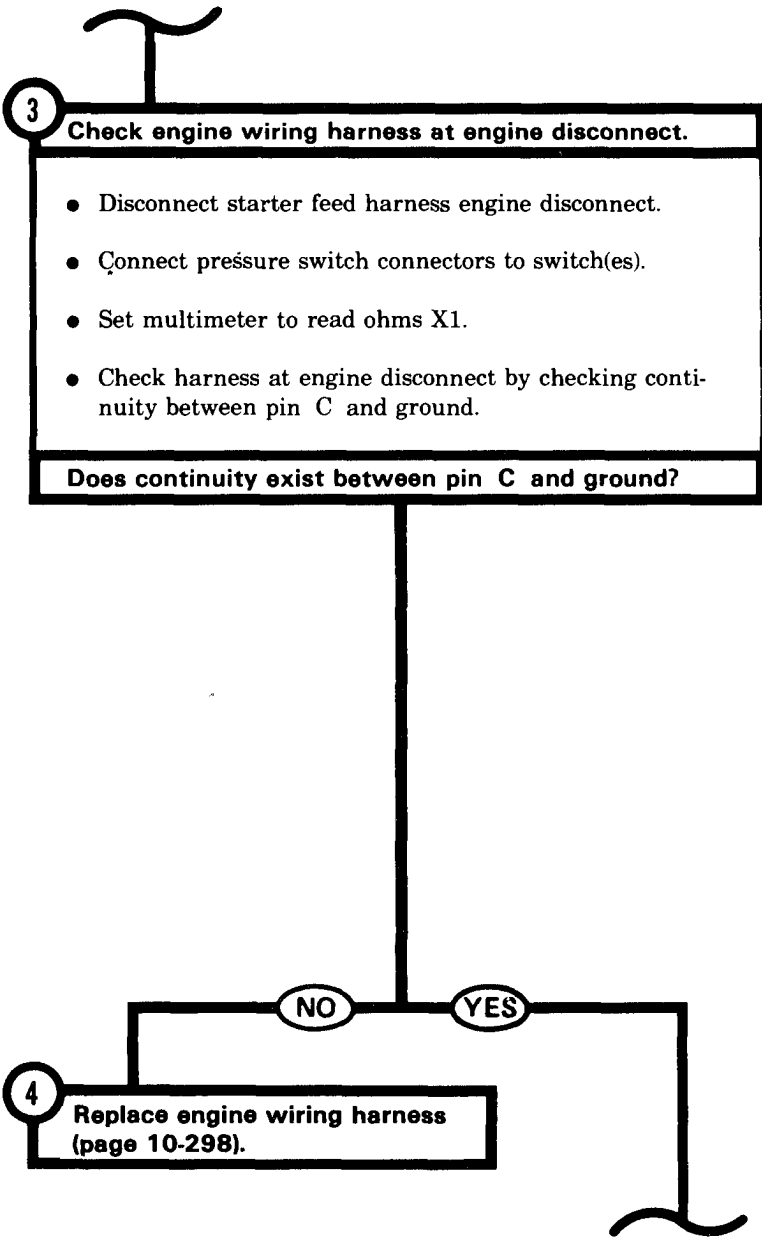


NO **YES**

2 Replace dust detector pressure switch(es) (page 7-130.7).

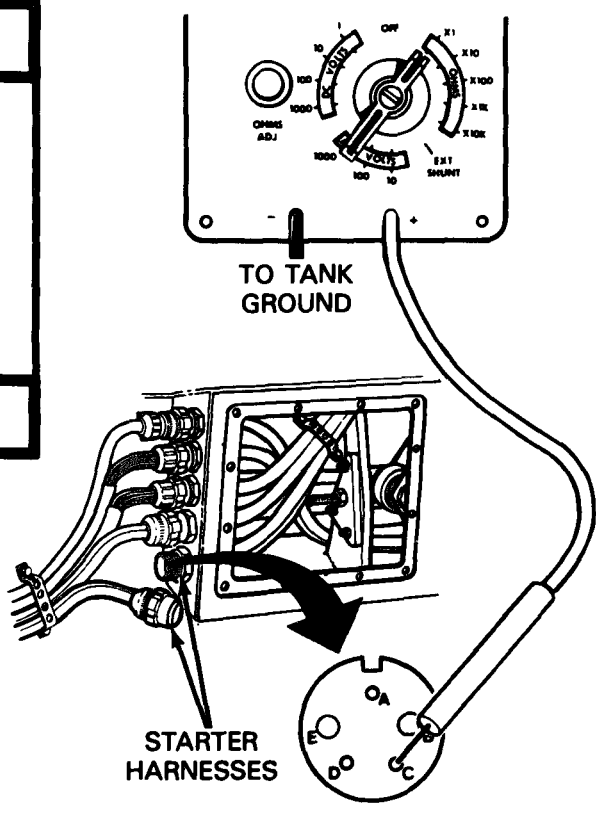
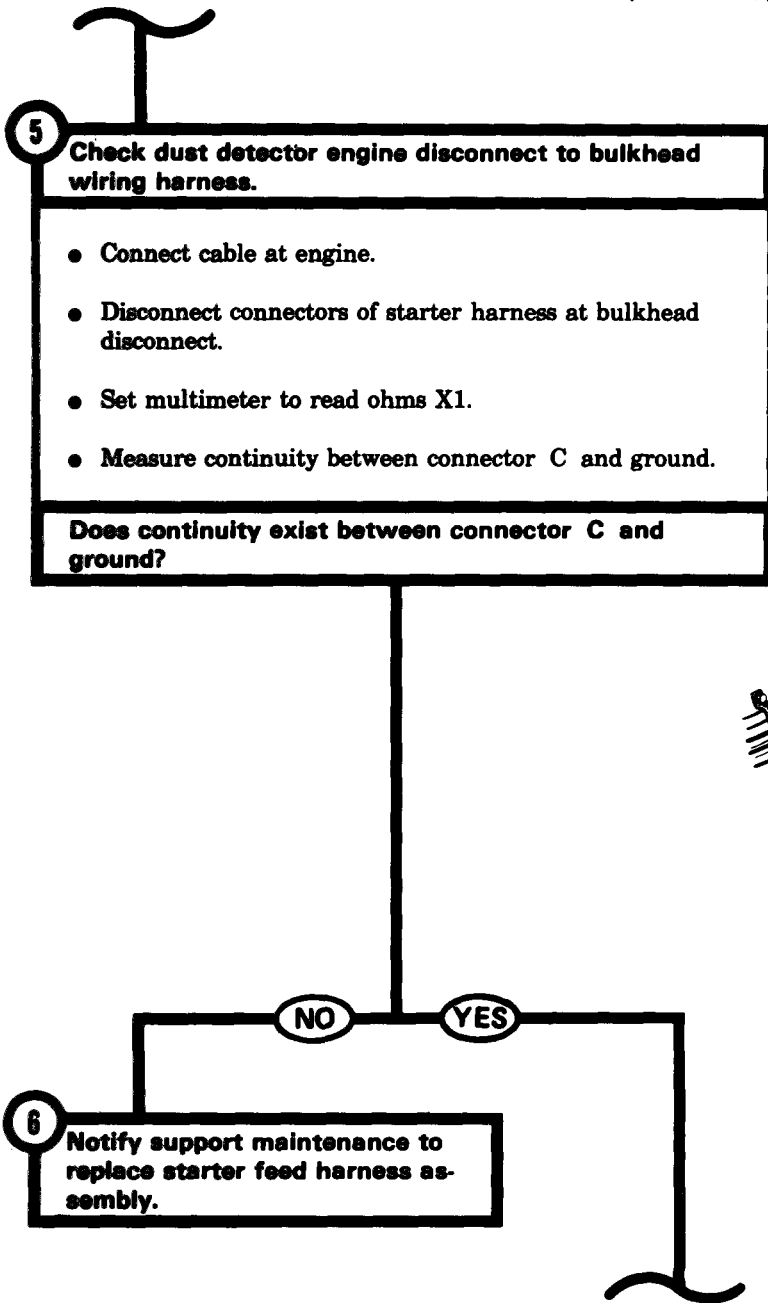
Symptom 16.11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**



Symptom 16.11

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**



Symptom 16.11

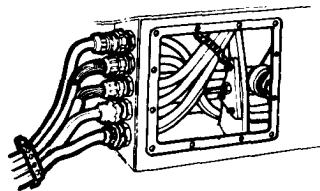
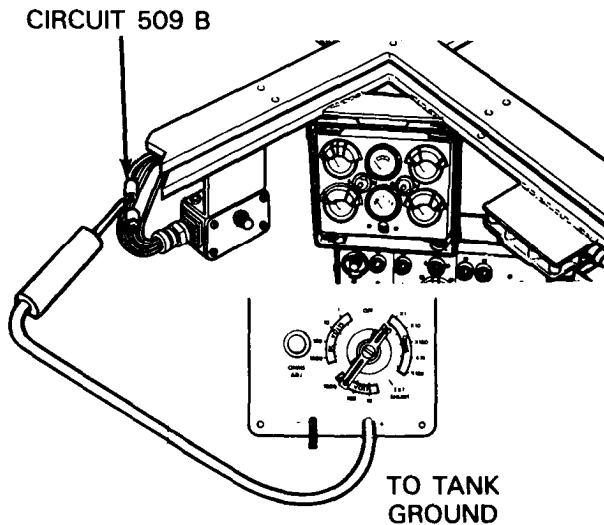
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

7

Check hull intermediate lead assembly.

- Connect starter cable at bulkhead.
- Disconnect dust detector lead assembly connector (circuit 509 B) at dust detector warning light box.
- Set multimeter to read ohms X1.
- Measure continuity between dust detector lead assembly connector and ground.

Does continuity exist between lead and ground?



NO

8

- Replace dust detector hull intermediate lead assembly (page 10-298.8).
- Connect all harness connectors that were disconnected.

YES

9

- Replace dust detector warning light box assembly (page 10-298.14).
- Connect all harness connectors that were disconnected.

Symptom 16.12

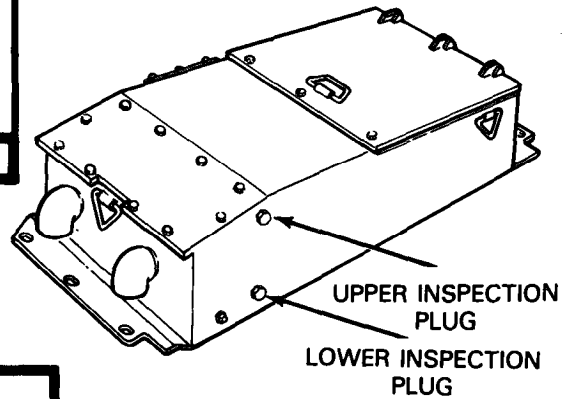
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

LOW POWER, EXCESSIVE BLACK SMOKE, ONE OR BOTH FILTERS REQUIRE FREQUENT CLEANING.

1 Inspect air cleaner section for accumulation of foreign matter.

- Remove inspection plugs.
- Shine light into lower inspection hole.

Does pre-cleaner section contain foreign matter?



NO YES

2 Inspect air cleaner filter element access door gasket.

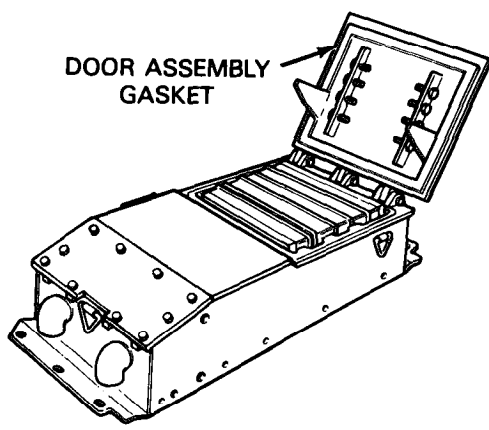
Open air cleaner door (page 7-128) and inspect gasket for dust leakage (page 7-129).

Is door gasket leaking?

YES NO

3 Replace door gasket (page 7-128).

4 Replace air cleaner filter element (page 7-96).



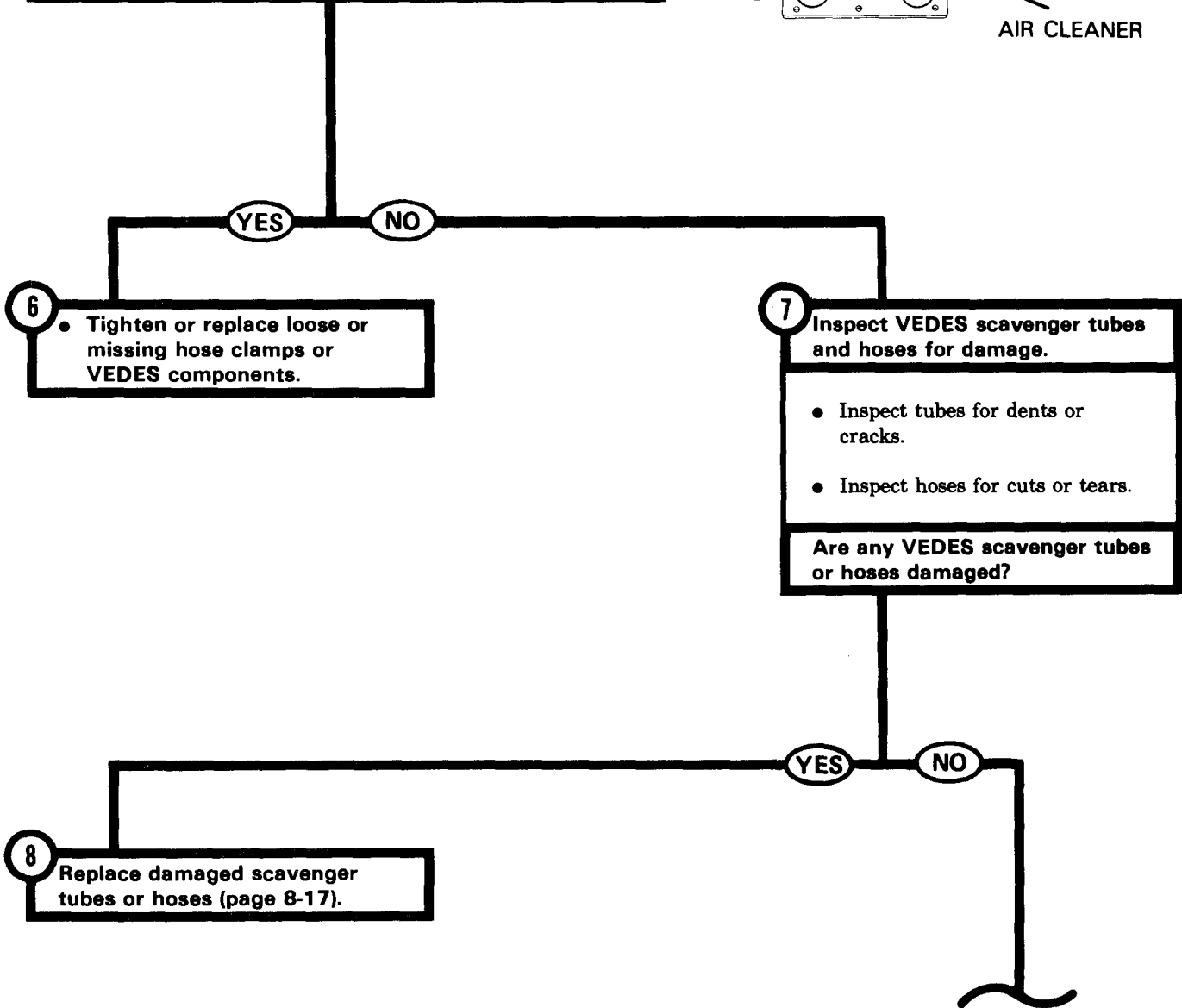
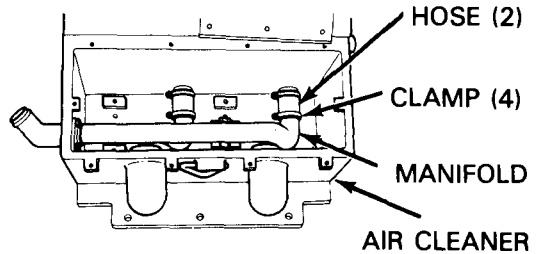
Symptom 16.12

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

5 Clean pre-cleaner section of air cleaner.

Check for loose or missing VEDES components.

Are hose clamps loose or any VEDES components missing?



6

- Tighten or replace loose or missing hose clamps or VEDES components.

7 Inspect VEDES scavenger tubes and hoses for damage.

- Inspect tubes for dents or cracks.
- Inspect hoses for cuts or tears.

Are any VEDES scavenger tubes or hoses damaged?

8 Replace damaged scavenger tubes or hoses (page 8-17).

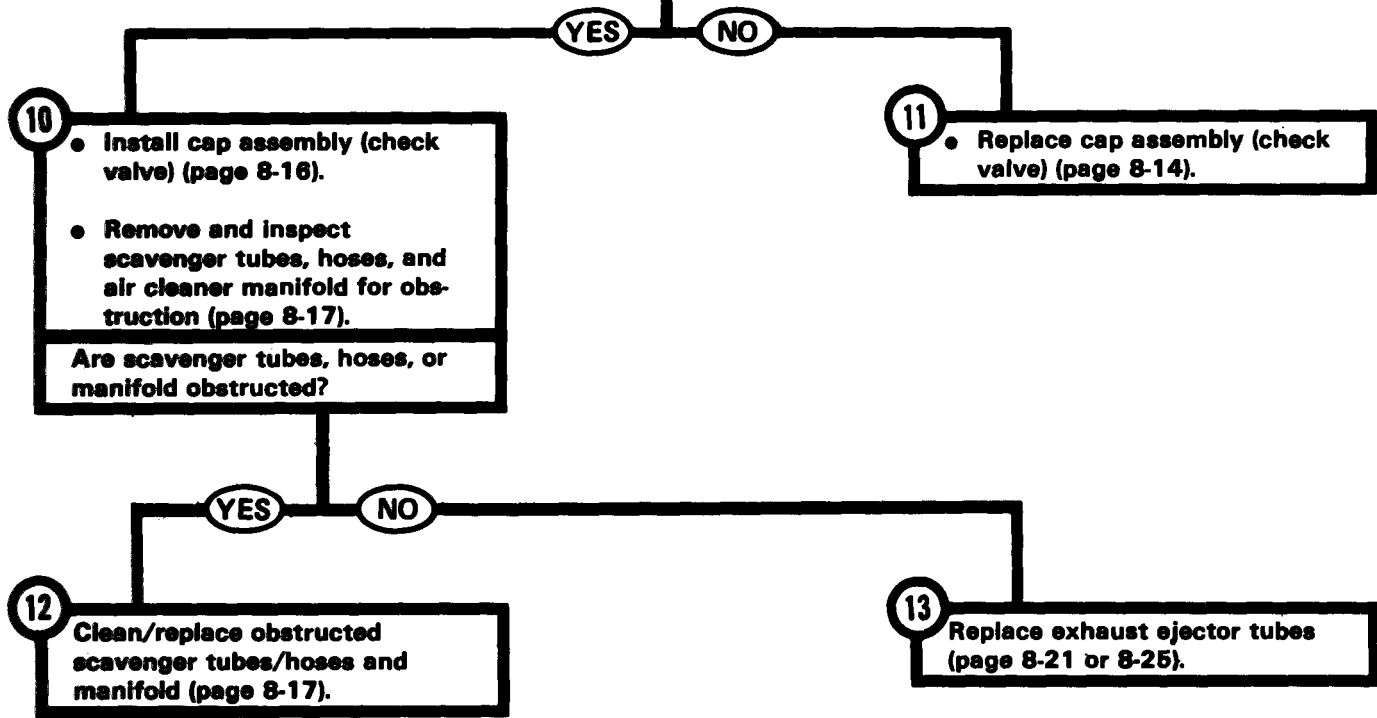
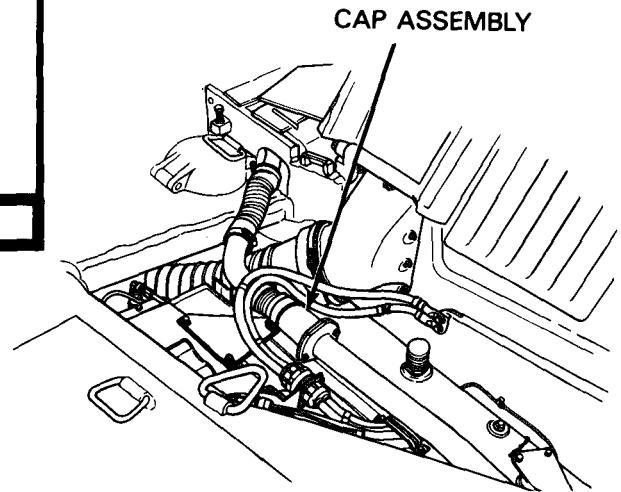
Symptom 16.12

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)**

9 Check cap assembly (check valve) for proper operation.

- Remove cap assembly (check valve) (page 8-14).
- Tilt cap assembly (check valve) side to side to verify flapper is free.
- Look inside cap assembly (check valve) to see that flapper is not damaged or missing.

Is cap assembly (check valve) operating properly?



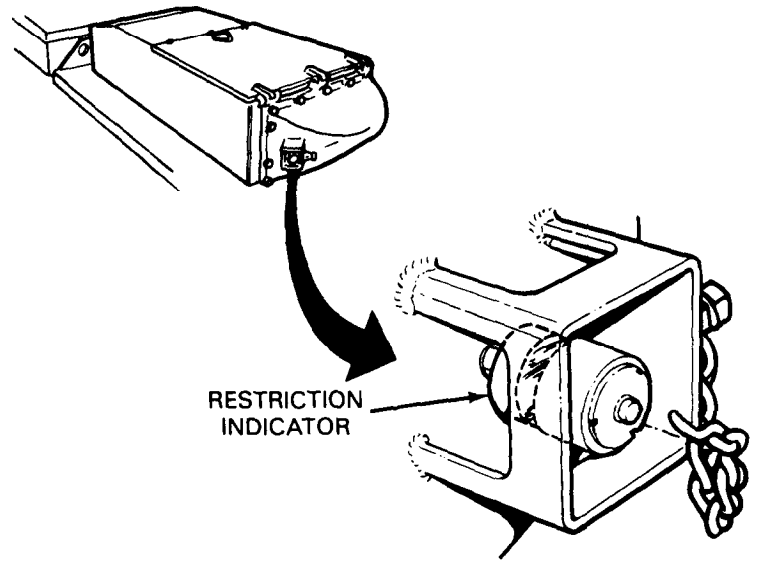
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

LOW POWER, EXCESSIVE BLACK SMOKE.

1

- Check right and left restriction indicators and note reading.

Does indicator read 30 or more?



YES NO

2

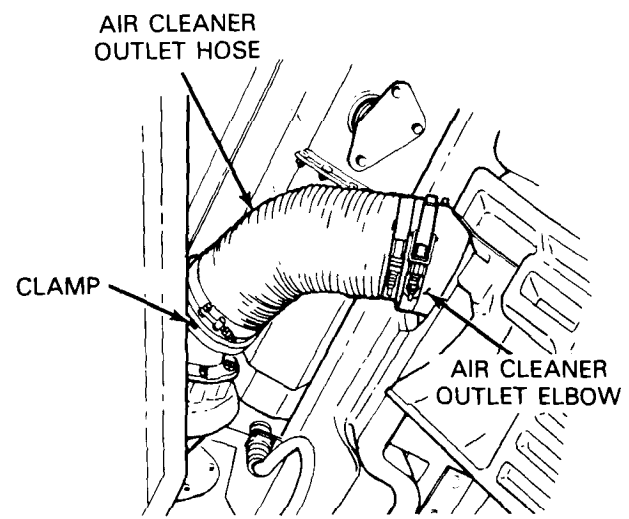
Service air cleaner filter elements on both sides of tank (page 7-96).

3

Check air cleaner outlet hoses.

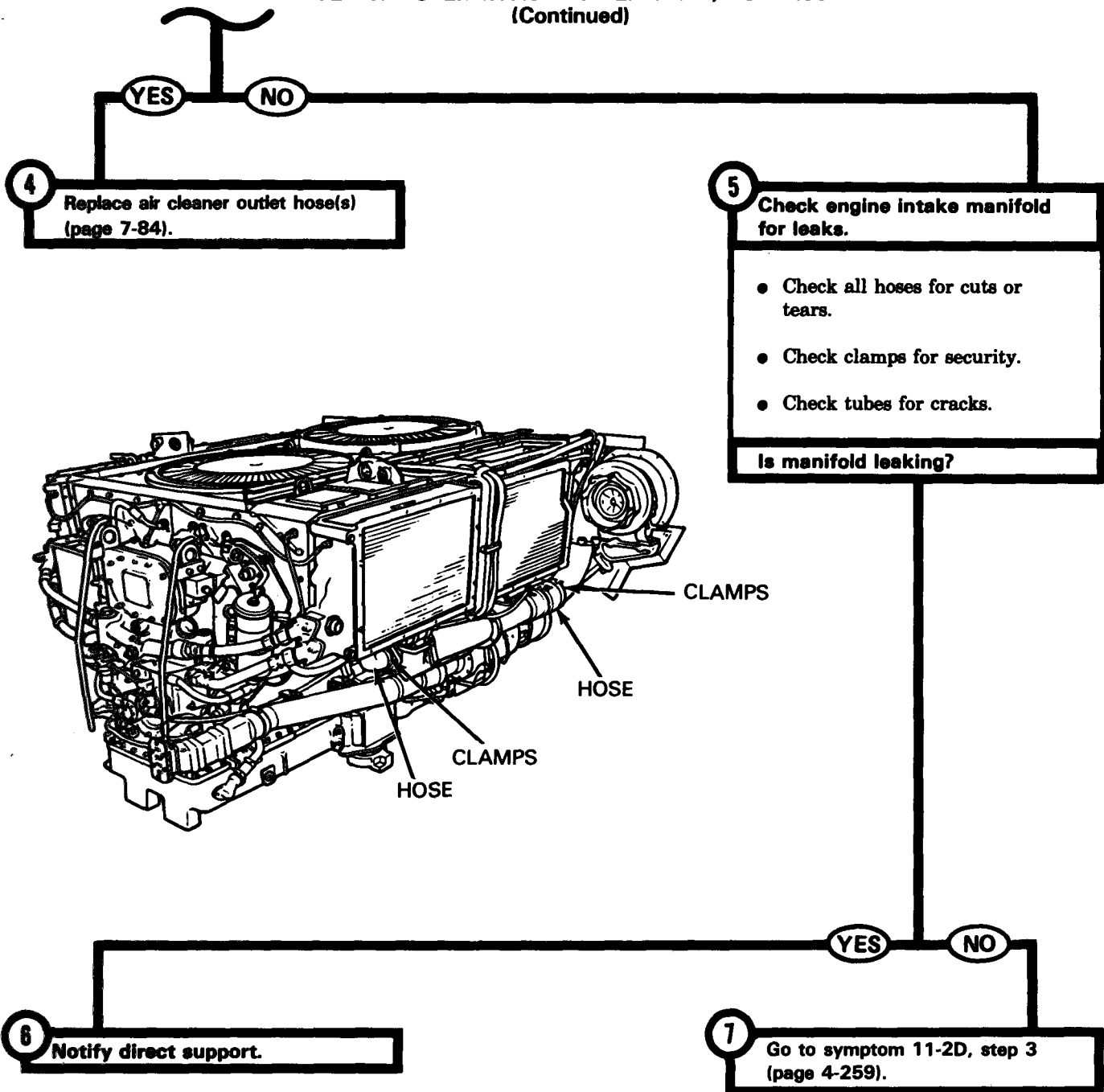
- Open top deck grille doors.
- Inspect air cleaner outlet hoses.

Is either air cleaner outlet hose damaged?



Symptom 16.13

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



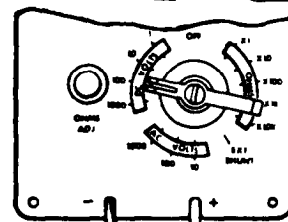
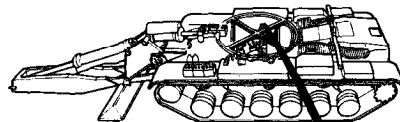
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING**

Symptom-17

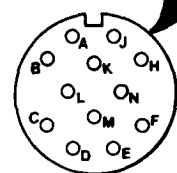
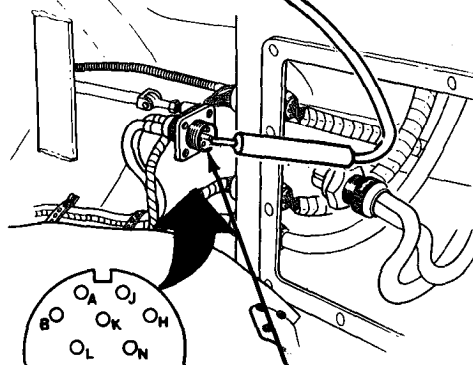
ENGINE FUEL SHUT OFF SWITCH WILL NOT STOP ENGINE.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TO VEHICLE GROUND



CONTACT B (CKT 54A)

BULKHEAD DISCONNECTS

1 Check front accessory harness connector (CKT 54A) at bulkhead disconnect for electrical power.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 54A) from bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 54A) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc while switch is in up position.

Does meter indicate 18 to 30 volts dc?

YES

NO

2 ● Check basket-control panel starting harness connector (CKT 54A) at basket disconnect for electrical power.

- See Step 10 .

Symptom-17

DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - POWERPLANT, STOPPING
 (Continued)

3

Check bulkhead engine disconnect harness (CKT 54A) at engine disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnect (page 10-270).

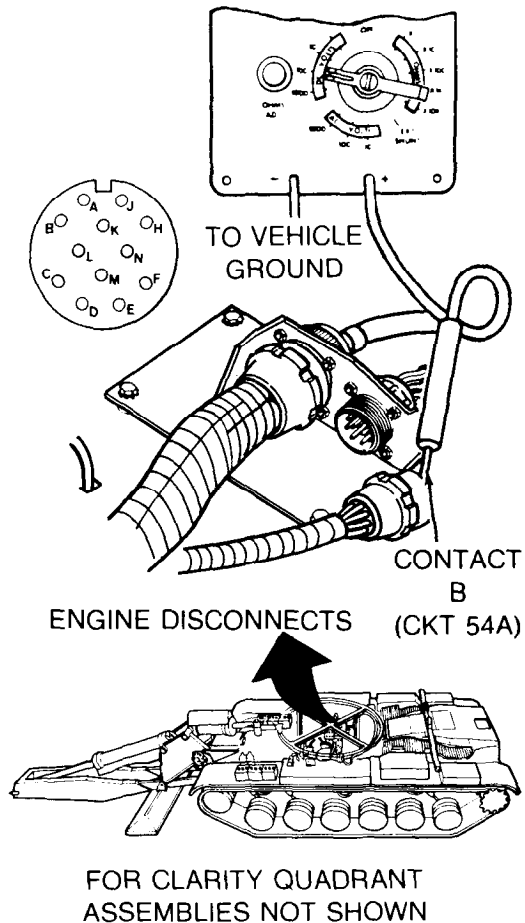
First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnect.
- Disconnect bulkhead engine disconnect harness (CKT 54A) from engine disconnect.
- Connect red probe of meter to contact B (CKT 54A) of bulkhead engine disconnect harness connector and black probe to ground.

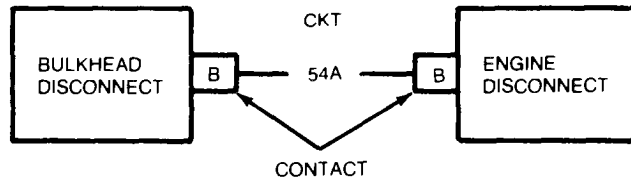
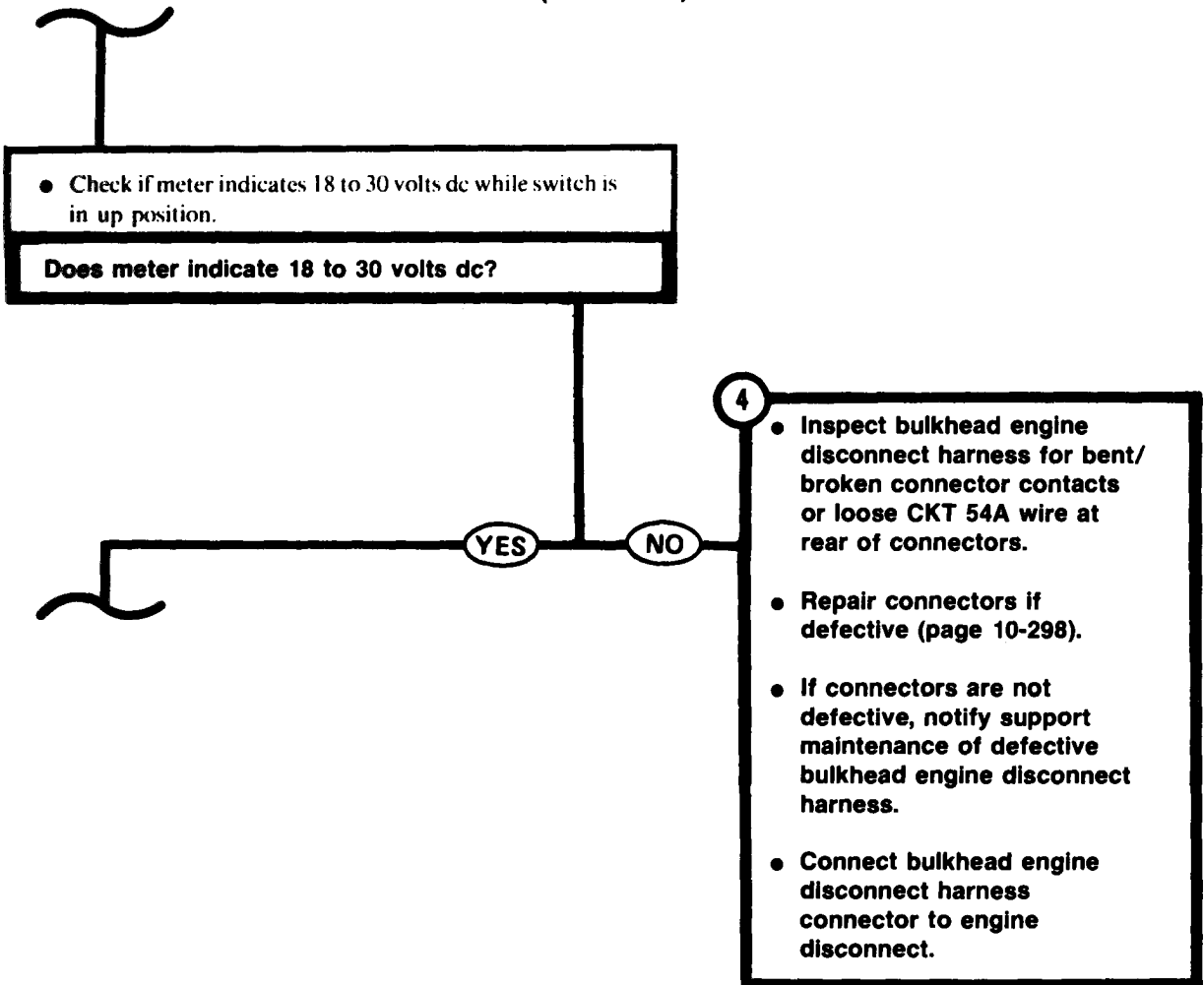
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Left Top Deck)



Symptom-17 **DETAILED TROUBLESHOOTING PROCEDURE**
STEP 3 CONTINUED **VEHICLE OPERATION - POWERPLANT, STOPPING**
(Continued)



TA250194

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

Symptom-17

5 Check engine electrical harness (CKT 54A) at front of engine for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Top Deck)

- Connect bulkhead engine disconnect harness to engine disconnect.

First Technician (Rear of Crew Compartment)

- Remove engine upper access cover (page 17-11).
- Disconnect engine electrical harness (CKT 54A) from fuel shut off solenoid lead connector.
- Connector red probe of meter to center contact of engine harness connector (CKT 54A), and black probe to ground.

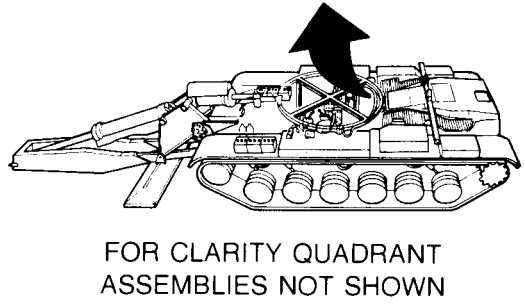
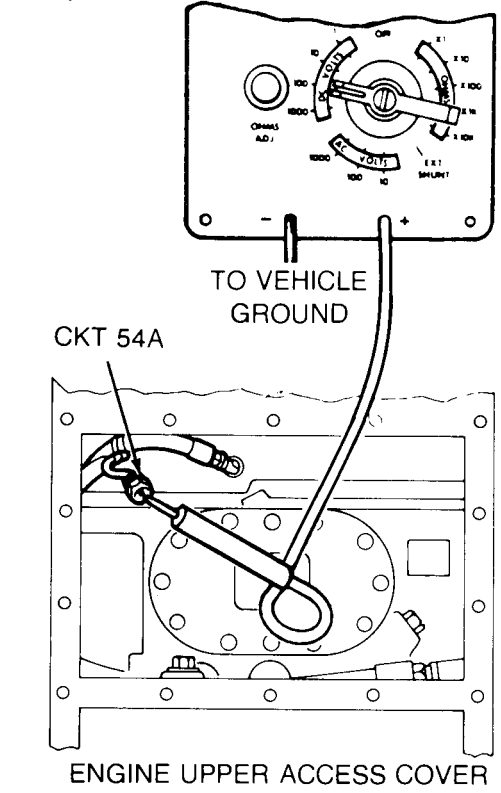
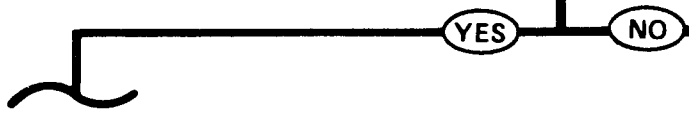
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Rear of Crew Compartment)

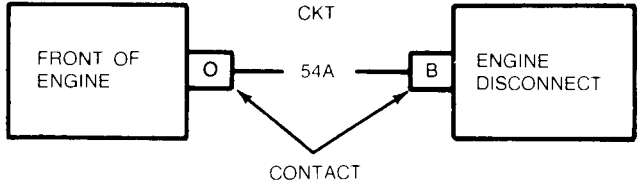
- Check if meter indicates 18 to 30 volts dc while switch is in up position.

Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

6 Repair engine electrical harness (page 10-298).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

Symptom-17

7 Check fuel shut off solenoid lead (CKT 54A) at fuel shut off solenoid for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Reconnect engine electrical harness (CKT 54A) to fuel shut off solenoid lead connector.

First Technician (Top Deck)

- Have top deck removed (page 16-21).
- Remove front engine cooling fan (page 9-55).

First Technician (Engine)

- Disconnect fuel shutoff solenoid electrical lead (CKT 54A) from fuel shut off solenoid.
- Connect red probe of meter to center contact of solenoid electrical lead connector and black probe to ground

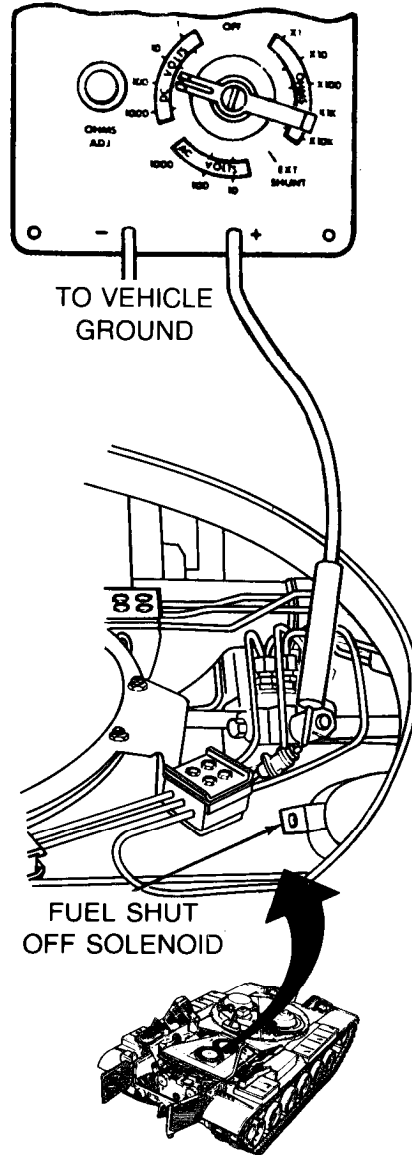
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc while switch is in up position.

Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

8 Replace fuel shut off solenoid lead (page 20-27).

NO YES

9 Notify support maintenance of defective fuel shut off solenoid/ fuel injection pump.

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

SYMPTOM-17
FROM STEP

2

10 Check front accessory harness (CKT 54A) from connector at bulkhead disconnect to connector at basket disconnect for continuity.

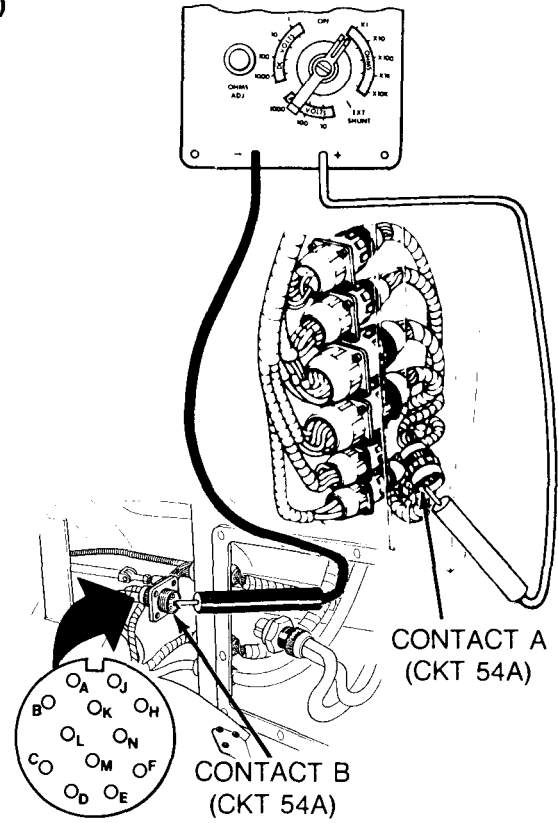
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

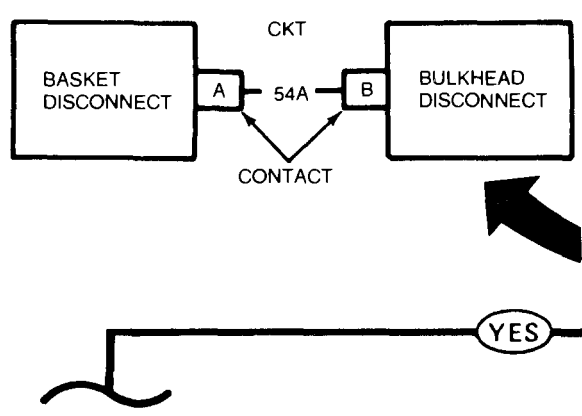
- Disconnect front accessory harness connector (CKT 54A) at basket disconnect.
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact A (CKT 54A) of front accessory harness connector at basket disconnect.
- Connect black probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity.

Does meter indicates continuity?



11

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 54A wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness connector at basket disconnect.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

Symptom-17

12

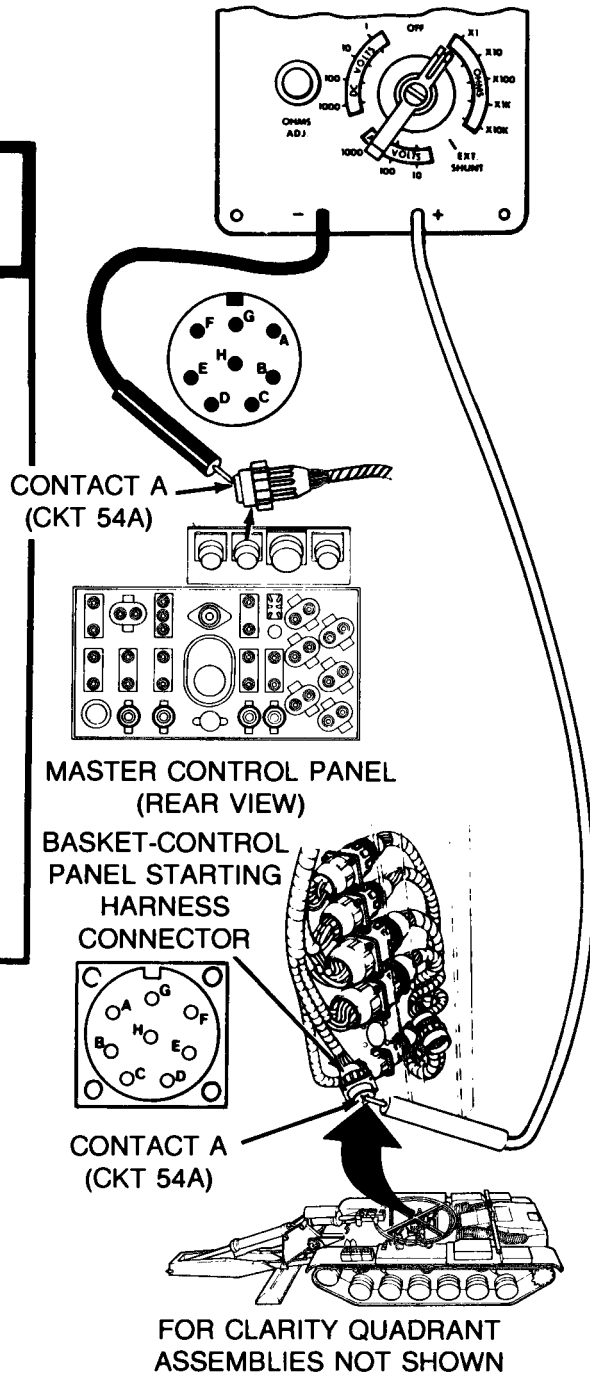
Check basket-control panel starting harness (CKT 54A) for continuity.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-control panel starting harness connector at basket disconnect.
- Connect red probe of meter to contact A (CKT 54A) of basket-control panel harness connector at basket disconnect.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel starting harness connector from master control panel.
- Connect black probe of meter to contact A (CKT 54A) of basket-control panel harness connector at master control panel.



TA250198

Symptom-17

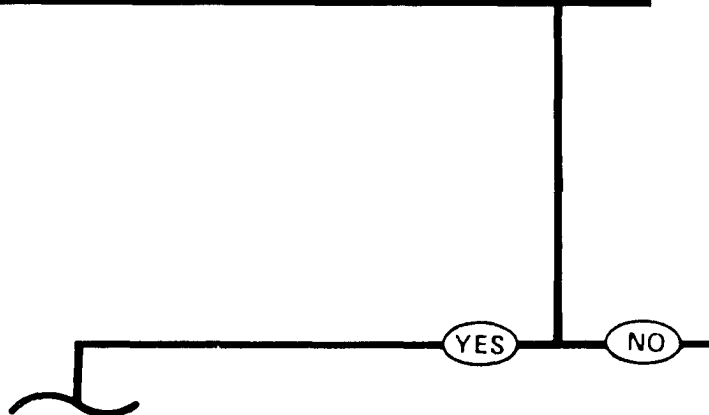
DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - POWERPLANT, STOPPING
 (Continued)

STEP 12 CONTINUED

First Technician (Commander's Station)

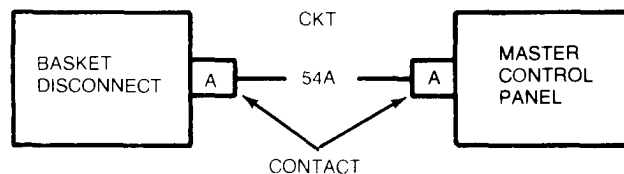
- Check if meter indicates continuity.

Does meter indicate continuity?



13

- Inspect basket-control panel starting harness for bent/ broken connector contacts or loose CKT 54A wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.
- Install basket-control panel starting harness connector at basket disconnect (page 10-270).
- Connect basket-control panel starting harness connector to master control panel.
- Install master control panel (page 10-33).



TA250199

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

Symptom-17

14 Check ENGINE FUEL SHUT OFF switch for continuity.

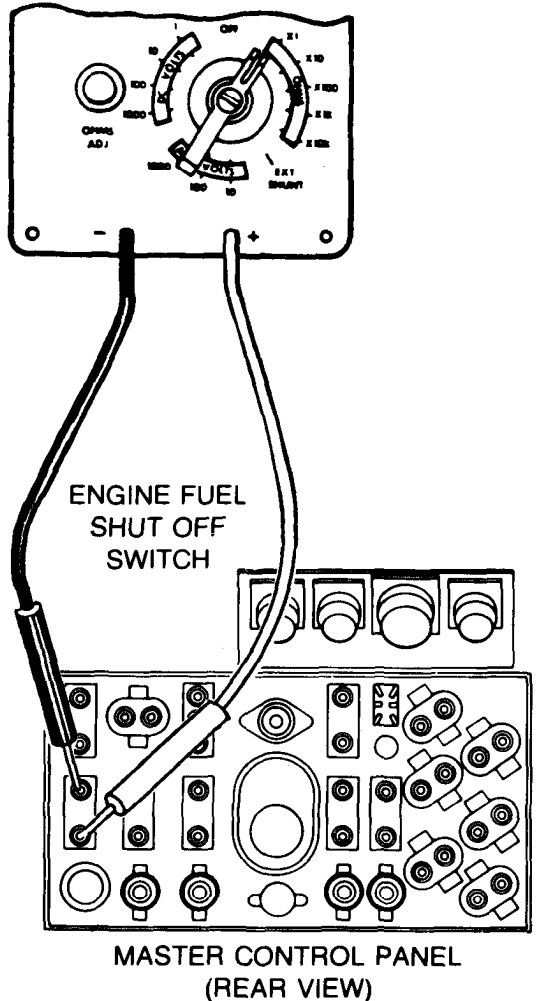
First Technician (Commander's Station)

- Install basket-control panel starting harness connector at basket disconnect.

Second Technician (Operator's Station)

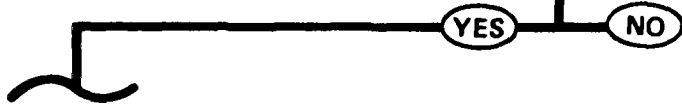
- Connect basket-control panel starting harness connector to master control panel.
- Disconnect two connectors (CKT 54 and 54A) from ENGINE FUEL SHUT OFF switch.
- Connect red probe of meter to one contact of ENGINE FUEL SHUT OFF switch.
- Connect black probe of meter to other contact of ENGINE FUEL SHUT OFF switch.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.
- Check if meter indicates continuity while switch is in up position.

Does meter indicate continuity?



15

- Replace ENGINE FUEL SHUTOFF switch (page 10-47).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

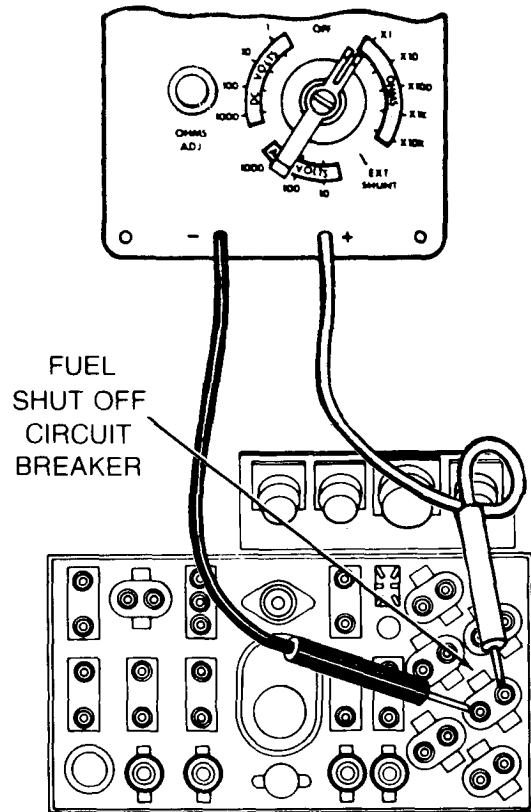
Symptom - 17

16 Check fuel shut off circuit breaker for continuity.

Second Technician (Operator's Station)

- Disconnect two (CKT 54) connectors from fuel shut off circuit breaker.
- Connect red probe of meter to one contact of circuit breaker.
- Connect black probe of meter to other contact of circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



17

- Replace fuel shut off circuit breaker (page 10-165).
- Reconnect two connectors (CKT 54A and 54) to engine fuel shut off switch.

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

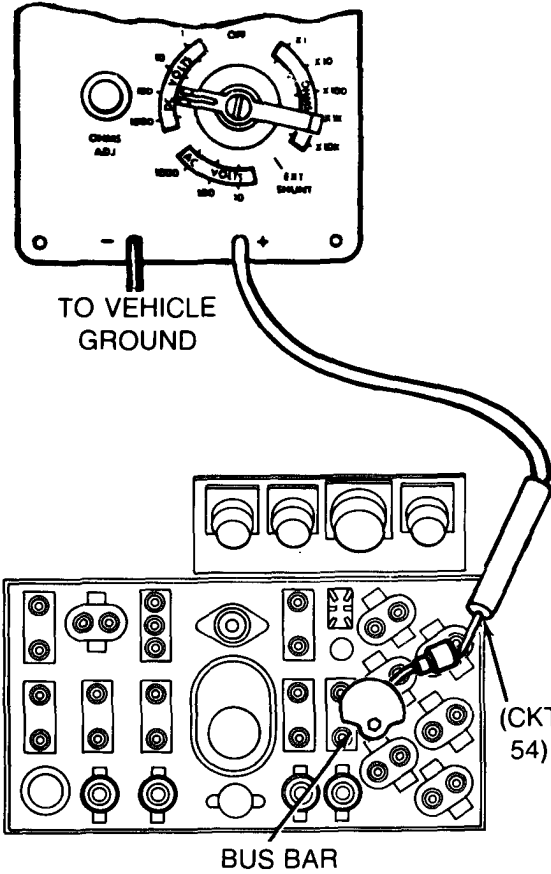
Symptom-17

18 Check CKT 54 input to fuel shut off circuit breaker for electrical power.

Second Technician (Operator's Station)

- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to CKT 54 connector coming from bus bar.
- Connect black probe of meter to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



19

- Replace master control panel power harness (page 10-101).
- Connect CKT 54 and 54A to ENGINE FUEL SHUT OFF switch.
- Connect CKT 54 connectors to fuel shut off circuit breaker.

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)**

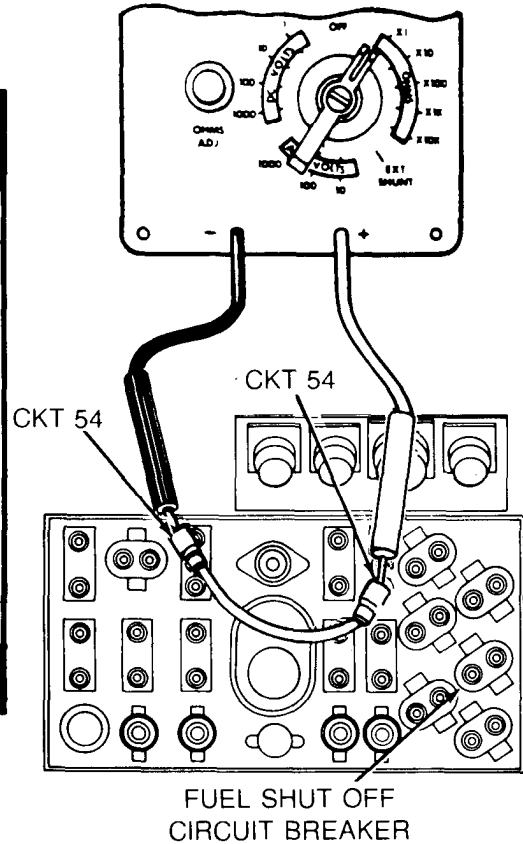
Symptom-17

20 Check fuel shut off harness (CKT 54) for continuity from ENGINE FUEL SHUT OFF switch to fuel shut off circuit breaker.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to fuel shut off harness connector (CKT 54) at circuit breaker.
- Connect black probe of meter to fuel shut off harness connector (CKT 54) at switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



22

- Replace master control panel starting harness (page 10-97).
- Reconnect fuel shutoff harness (CKT 54) to circuit breaker and to ENGINE FUEL SHUT OFF switch.
- Reconnect master control panel power harness (CKT 54) to circuit breaker.

YES NO

21

- Replace master control panel fuel shut off harness (page 10-109).
- Reconnect master control panel power harness (CKT 54) to circuit breaker.
- Reconnect CKT 54A connector to ENGINE FUEL SHUT OFF switch.

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING**

Symptom-18

MANUAL FUEL SHUTOFF HANDLE WILL NOT STOP ENGINE.

1 Check if clevis pin connecting fuel shutoff cable to fuel shutoff lever on engine is installed.

Technician (Rear of Crew Compartment)

- Remove upper engine access cover (page 17-11).
- Check if clevis pin connecting fuel shutoff cable to fuel shutoff lever on engine is installed.

Is clevis pin installed?

2

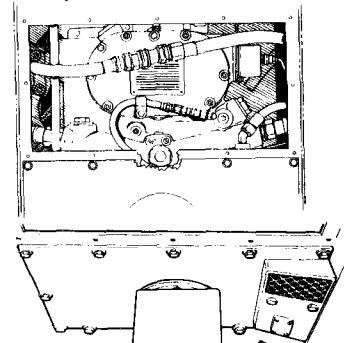
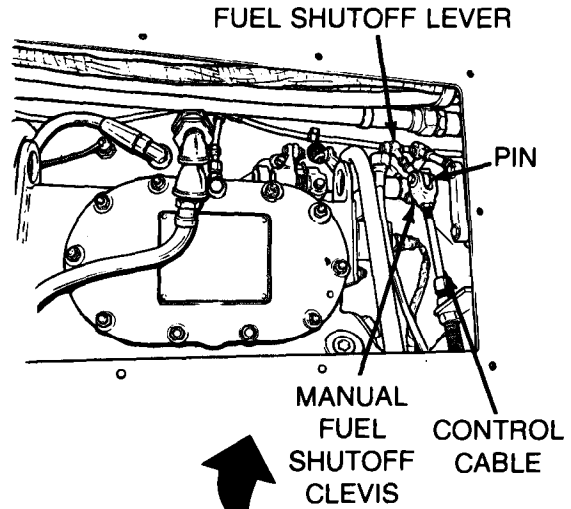
- Install upper engine access cover (page 17-12).
- Notify support maintenance of fuel shutoff problem.

YES

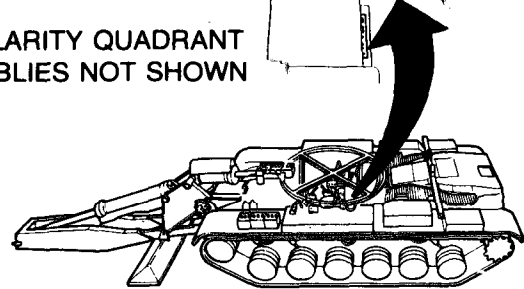
3

- Install clevis pin.

NO



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

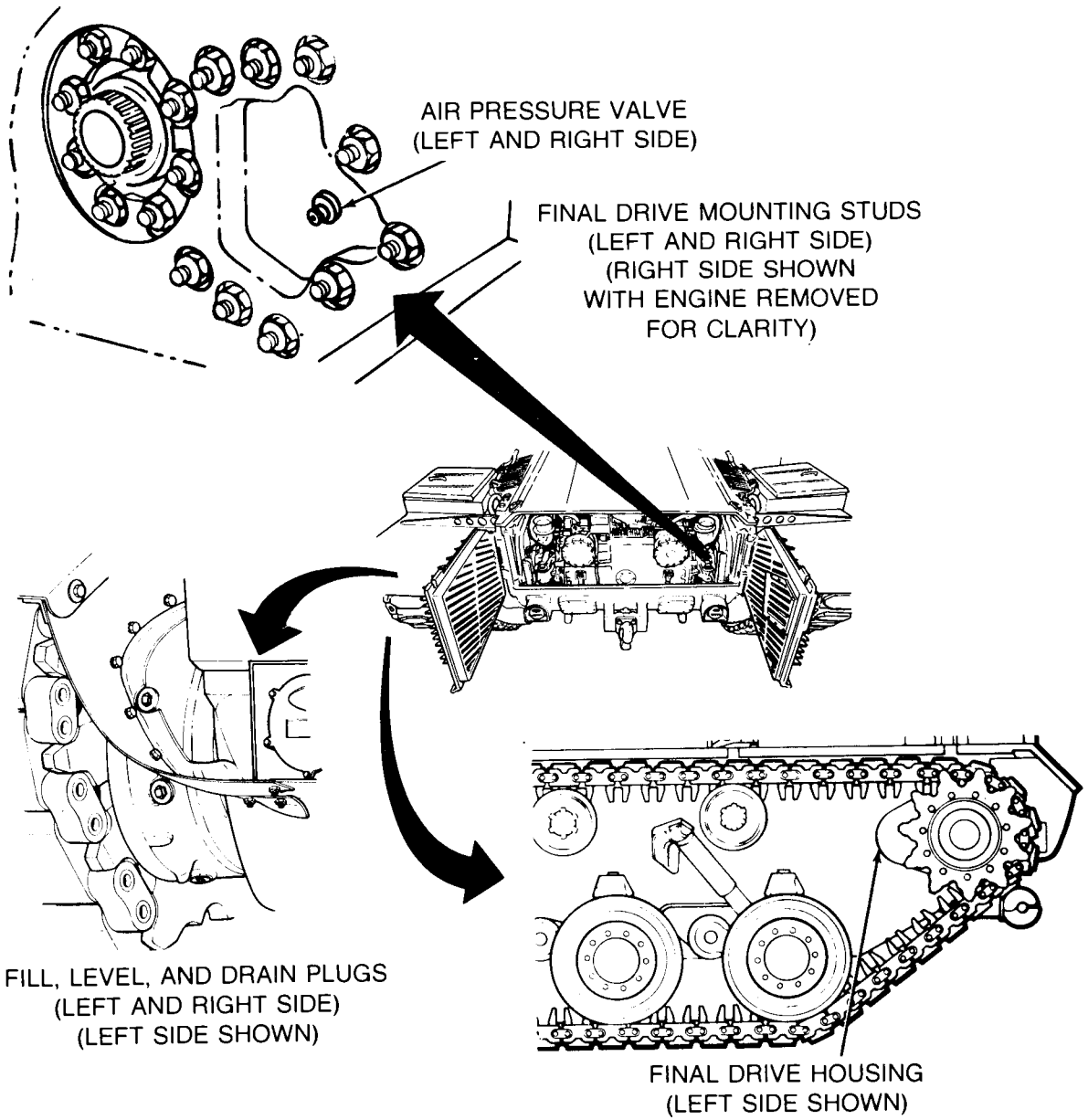


**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE**

Symptom-19

FINAL DRIVE LEAKS OIL.

LOCATOR VIEWS:



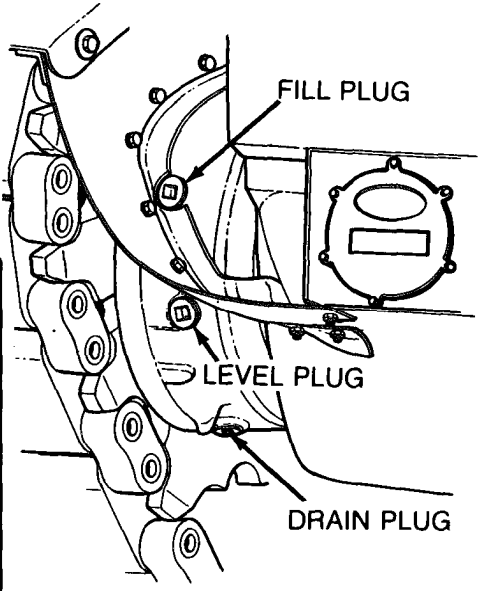
TA250205

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)**

Symptom-19

FINAL DRIVE LEAKS OIL

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



REAR OF FINAL DRIVE

NOTE
LEFT AND RIGHT FINAL DRIVE ARE THE SAME (LEFT SIDE SHOWN)

1 Check final drive housing for loose or missing fill, level, and drain plugs.

Both Technicians (Rear of Vehicle)

- Remove oil and dirt from rear of leaking final drive housing.
- Visually check final drive housing fill, level, and drain plugs for missing or loose plugs.

Are fill, level, and drain plugs in place and tight?

2

- Tighten fill, level, and drain plugs.
- Replace missing or damaged fill, level, and drain plugs (page 12-9).
- Service final drive (LO5-5420-202-12).



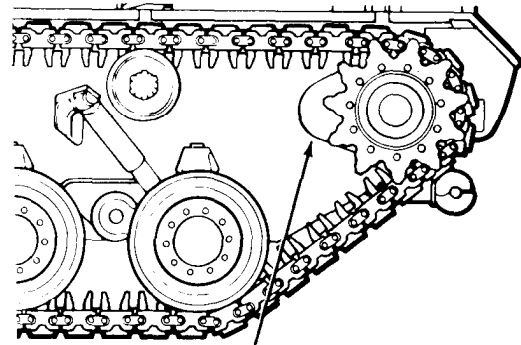
Symptom-19

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)**

3 Check outside of final drive housing for cracks or other damage.

- Be sure that entire final drive housing has been cleaned and free of oil and dirt.
- Visually check leaking final drive housing for cracks or other damage.

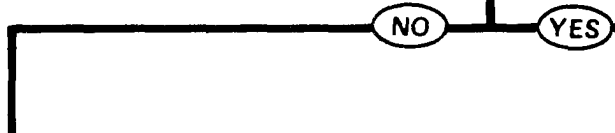
Is outside of final drive housing cracked or damaged?



FINAL DRIVE HOUSING

NOTE
Final drive may be equipped with an air pressure valve or vent tubing system.

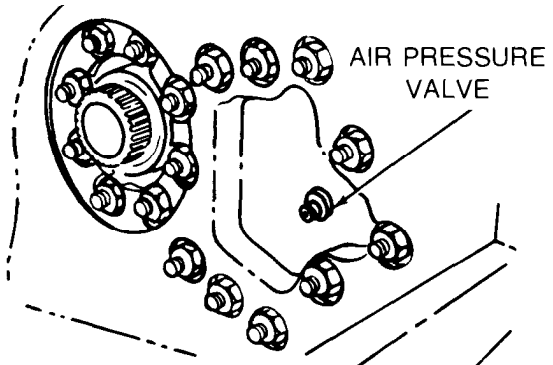
4 Replace final drive (page 12-2).



5 Check final drive air pressure valve for operation.

- Remove transmission shroud (page 9-2).
- Check leaking final drive air pressure valve by manually turning spring-loaded cap in one direction then in the other.

Does air pressure valve cap operate freely?



ENGINE REMOVED FOR CLARITY

6

- Check final drive input shaft adapter seal for leaks.
- See step 10.

7

- Replace pressure valve (page 12-6).
- Service final drive (LO 5-5420-202-12).



DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - FINAL DRIVE
 (Continued)

Symptom-19

8

Check final drive vent tubing system for damage.

Both Technicians

- Remove transmission shroud (page 9-20).

Second Technician (Top Deck)

- Open left top deck grill doors.
- Visually check the following for damage:
 - Steel tubing (A) from fitting (B) to tee fitting (C).
 - Steel tubing (D) from tee fitting (C) to reducer fitting (E).

First Technician (Rear of Vehicle)

- Visually check the following for damage:
 - Steel tubing (F) from reducer fitting (E) to tee fitting (G).
 - Plastic tubing (H) from tee fitting (G) to elbow fitting (J).

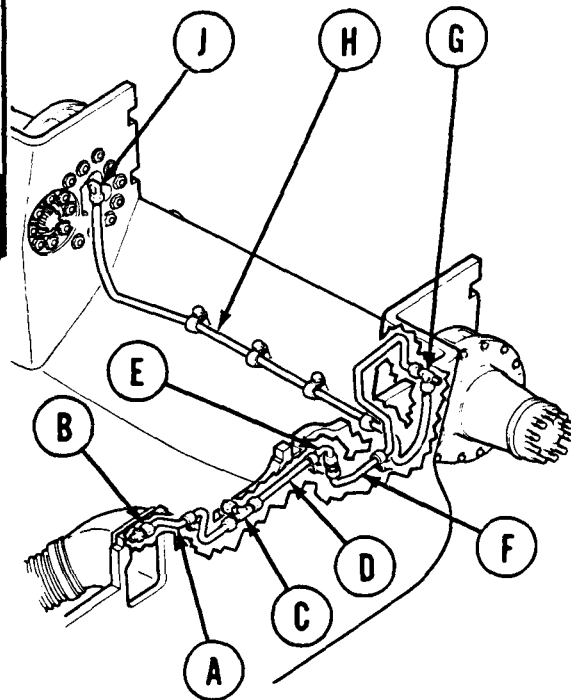
Is vent tubing or fittings, cracked, crimped, or broken?

9

- **Replace damaged tubing and/or fittings.**

YES

NO



TA250208

Symptom-19

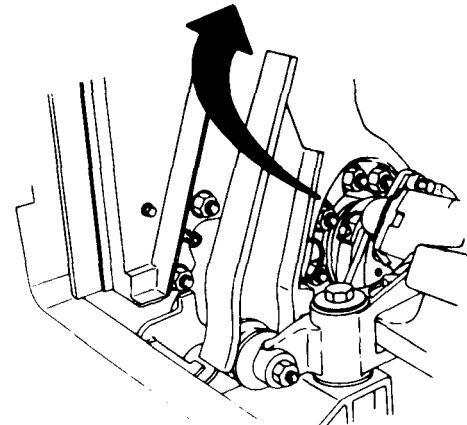
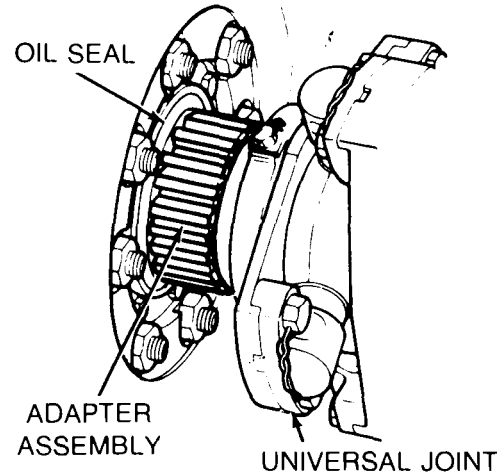
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)**

ADAPTER ASSEMBLY IS A GEAR,
ONLY SEEN IF FINAL DRIVE IS
DISCONNECTED FROM UNIVERSAL JOINT

10 Check final drive input shaft adapter seal for leaks.

- Remove input adapter assembly from leaking final drive (page 12-7).
- Check for oil leak around the input shaft oil seal of the leaking housing.

Is input shaft oil seal leaking?



12 Replace final drive assembly (page 12-2).

NO YES

11

- Replace final drive input shaft oil seal (page 12-7).
- Service final drive LO5-5420-202-12).

TA250209

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION

TRANSMISSION WILL NOT SHIFT PROPERLY.

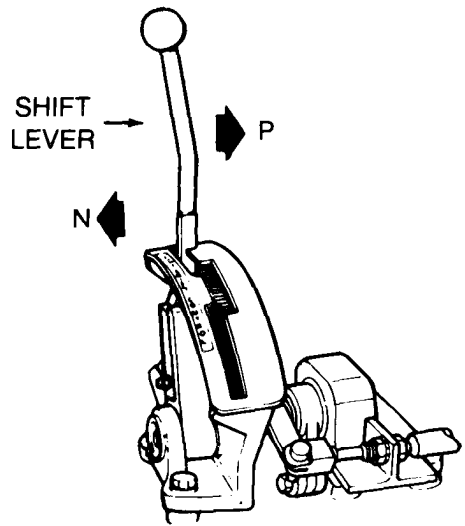
NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check shifting control linkage for binding.

Second Technician (Operator's Station)

- Move the shift lever from Neutral (N) to Reverse (R) several times.
- Check shifting linkage for binding while shifting transmission.

Does shifting control linkage bind?



2 Check shifting control linkage adjustment.

- See Step **23**.

3 Check shifting control hand lever pivot base assembly for binding or obstruction.

- See Step **4**.

Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

FROM STEP

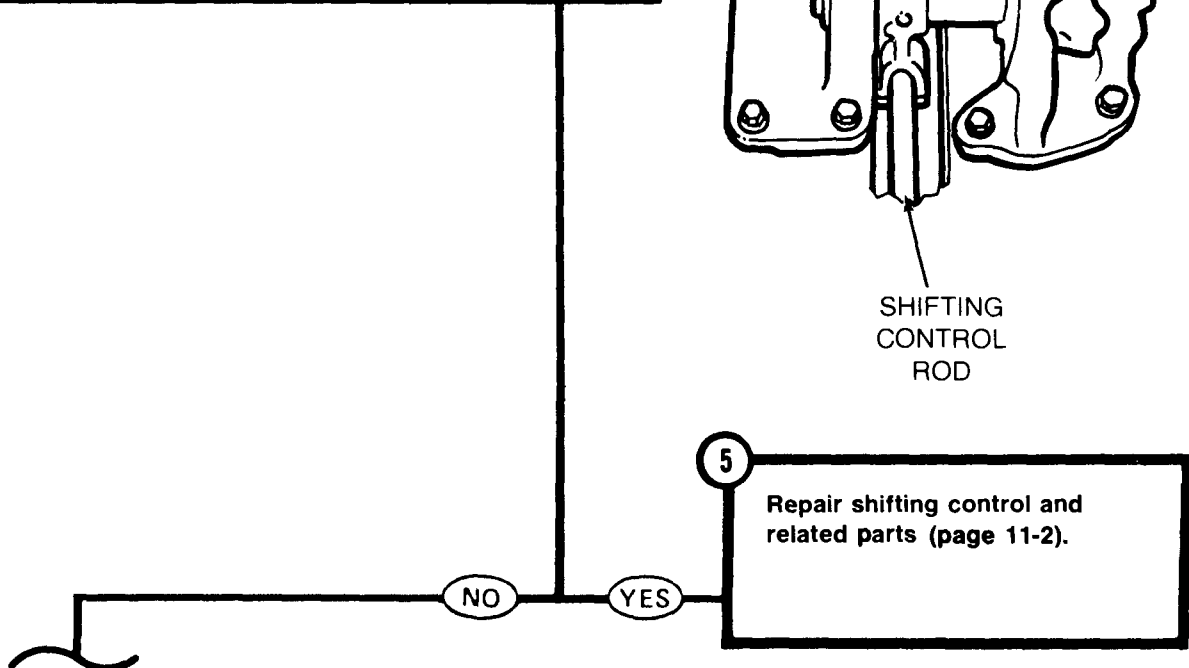
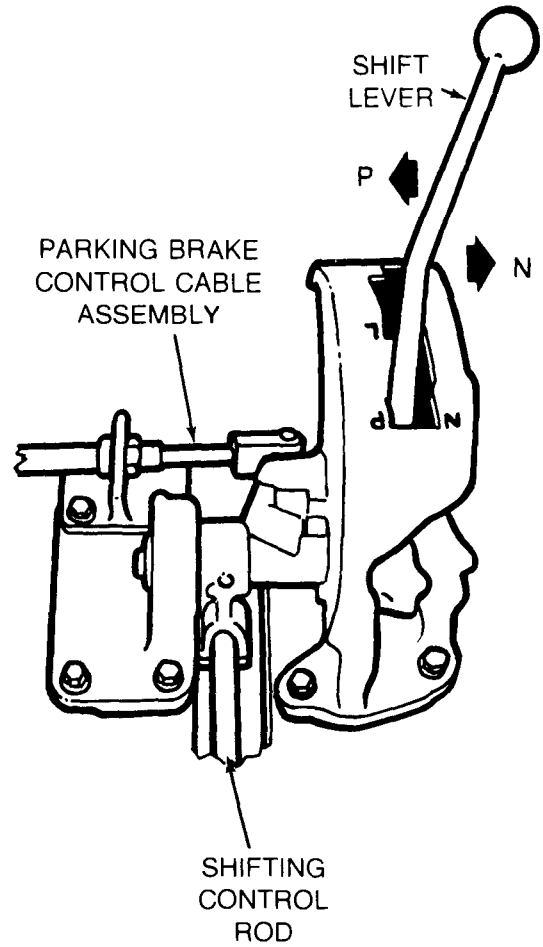
3 or 25

4 Check shifting control hand lever pivot base assembly for binding or obstruction.

Second Technician (Operator's Station)

- Disconnect shifting control rod from shifting control rod lever pivot base assembly (page 11-2).
- Disconnect parking brake control cable assembly (page 13-19).
- Move shift from Park (P) through Reverse (R) several times.
- Check shifting control hand lever and pivot base assemblies for binding or obstruction, while moving shift lever.

Is shifting control lever and pivot base assembly obstructed or binding?



Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

6 Check shifting control forward inboard link assembly for binding or obstruction.

Second Technician (Operator's Station)

- Reconnect shifting control rod to shifting control rod lever pivot base assembly (page 11-2).

First Technician (Front of Crew Compartment)

- Disconnect shifting control rod from forward inboard link assembly (page 11-16).

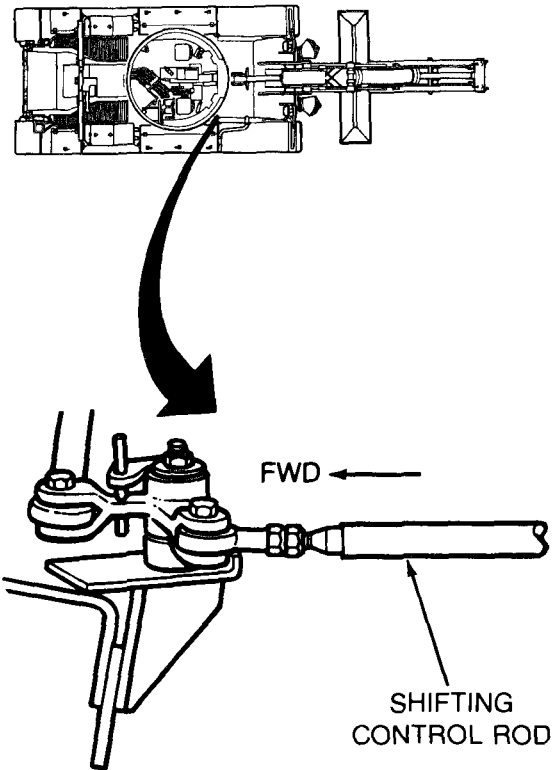
Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times.

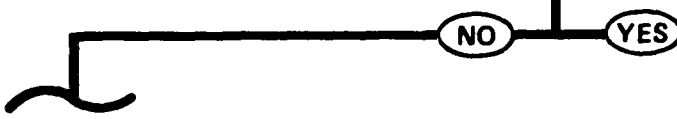
First Technician (Front of Crew Compartment)

- Check forward inboard link assembly for binding or obstruction while moving shift lever.

Is bulkhead link assembly binding or obstructed?



7 Notify support maintenance of binding forward inboard link assembly.



TA250212

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

8

Check the forward outboard link assembly for binding or obstruction.

First Technician (Front of Crew Compartment)

- Connect shifting control rod to forward inboard link assembly (page 11-16).

First Technician (Commander's Station)

- Disconnect shifting control rod from forward outboard link assembly (page 11-18).

Second Technician (Operator's Station)

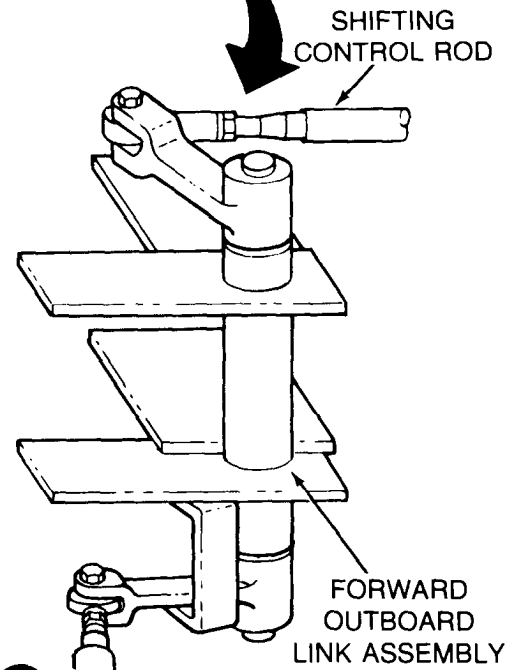
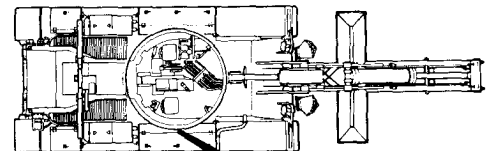
- Move shifting lever from Park (P) through Reverse (R) several times.

First Technician (Commander's Station)

- Check forward outboard link assembly for binding or obstruction while moving shift lever.

Is forward outboard link assembly obstructed or binding?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



9

Notify support maintenance of binding forward outboard link assembly.

NO

YES

Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

10

Check shifting control rod for binding or obstruction.

First Technician (Commander's Station)

- Reconnect shifting control rod to forward outboard link assembly (page 11-19).

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).
- Remove connecting link control box cover (page 11-41).
- Disconnect forward shifting control rod from connecting link assembly (page 11-41).

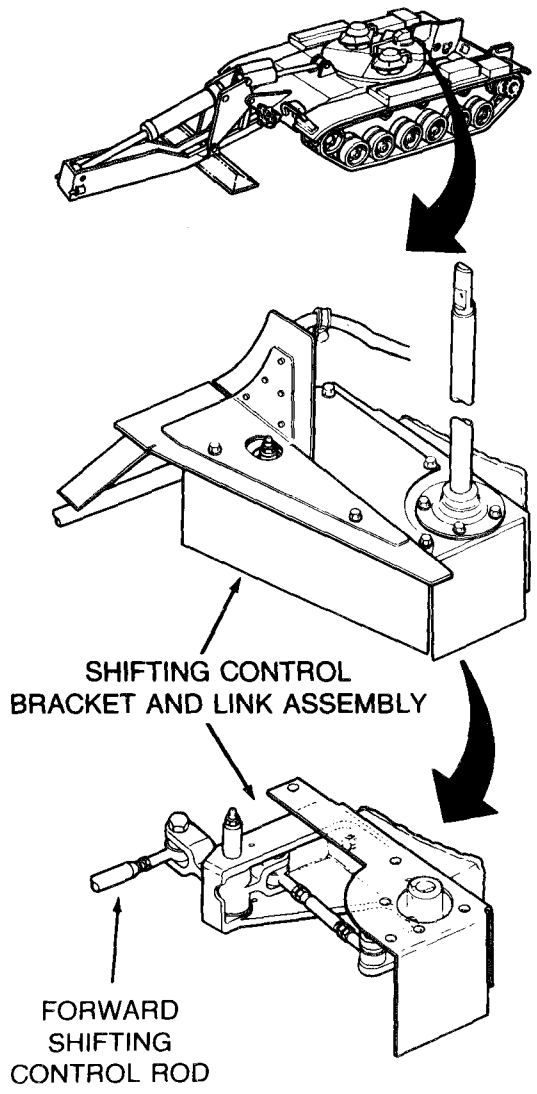
Second Technician (Operator's Station)

- Move shift lever from Neutral (N) through Reverse (R) several times and check forward shifting control rod for binding.

First Technician (Rear of Vehicle)

- Check forward shifting control rod for obstruction.

Is forward shifting control rod obstructed or binding?



11

Notify support maintenance of binding or obstructed forward shifting control rod.



TA250214

Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

12 Check connecting link assembly for binding or obstruction.

First Technician (Rear of Vehicle)

- Connect forward shifting control rod to connecting link assembly (page 11-41).
- Disconnect shifting control rod from connecting link assembly (page 11-41).

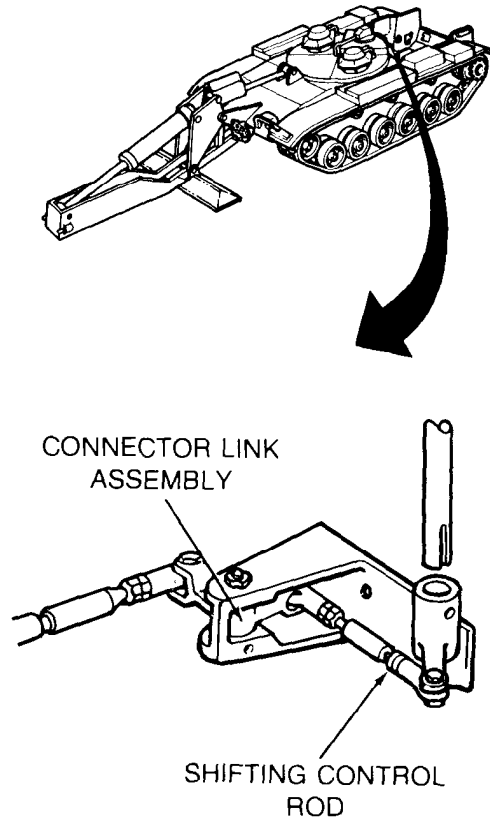
Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times and check connecting link assembly for binding.

First Technician (Rear of Vehicle)

- Check connecting link assembly for obstruction.

Is connecting link assembly obstructed or binding?



13 Remove, disassemble and inspect connecting link assembly (page 11-41).

NO

YES

Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

14 Check lever and bracket assembly for binding or obstruction.

First Technician (Rear of Vehicle)

- Connect shifting control rod to connecting link assembly (page 11-41).
- Install connecting link control box cover (page 11-41).
- Have powerplant installed (page 5-2).
- Disconnect shifting control rod from lever and bracket assembly (page 11-34).

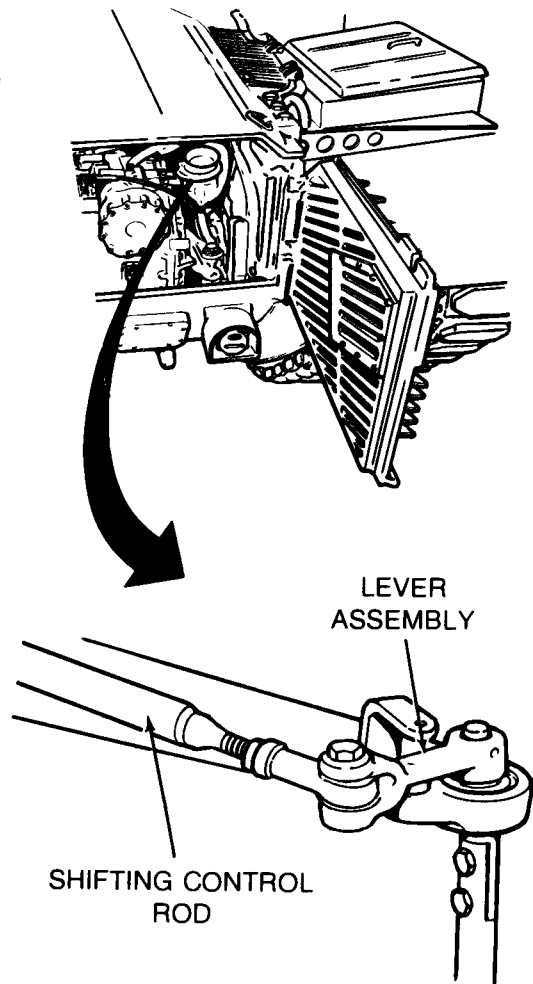
Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times and check for binding.

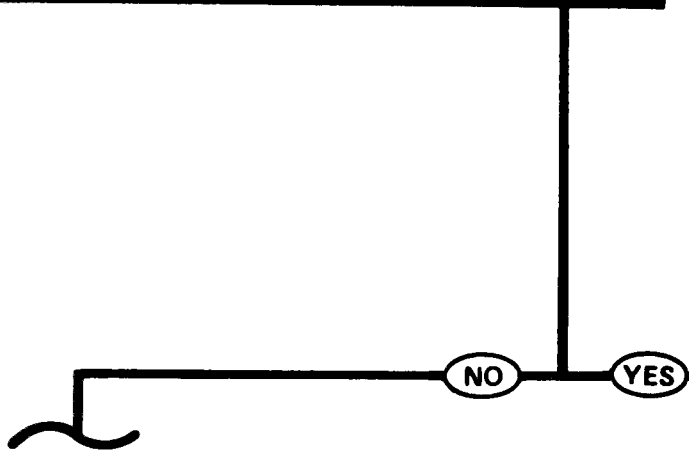
First Technician (Rear of Vehicle)

- Check lever assembly for obstruction.

Is lever and bracket assembly obstructed or binding?



15 Remove, disassemble and inspect lever and bracket assembly (page 11-41).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

Symptom-20

16 Check shifting control rod and lever assembly for binding or obstruction.

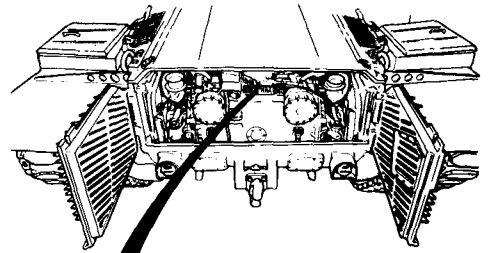
First Technician (Rear of Vehicle)

- Connect shifting control rod to lever and bracket assembly (page 11-34).

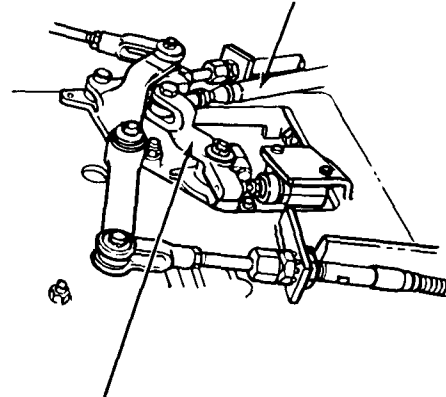
Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times.
- Check shifting control lever assembly for obstruction or binding.
- Connect parking brake control lever assembly (page 13-90).

Is shifting control lever assembly obstructed or binding?



SHIFTING CONTROL ROD



LEVER ASSEMBLY

17 Remove, disassemble and inspect shifting control rod lever assembly (page 11-34).

NO

YES

Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

18

Check service brake for proper adjustment.

Both Technicians (Outside Vehicle)

- Block tracks to prevent movement of vehicle.

First Technician (Rear of Vehicle)

- Remove brake access covers (page 16-36).
- Remove lockwires and plugs from brake inspection holes located in transmission rear housing left and right side.

Second Technician (Operator's Station)

- Depress brake pedal and observe that pressure gage indicates 750 to 900 psi and keep depressed.

First Technician (Rear of Vehicle)

- Check if index line marked "A" (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

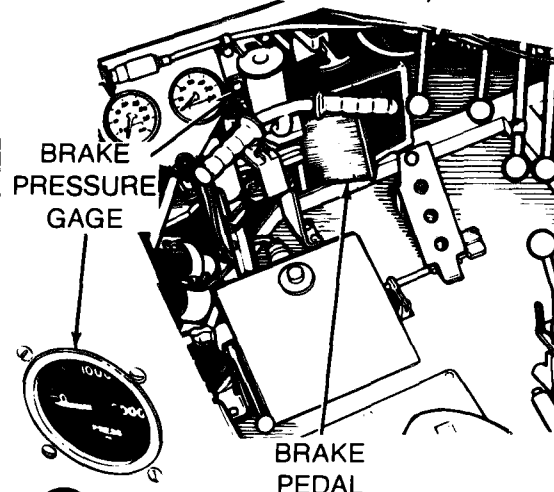
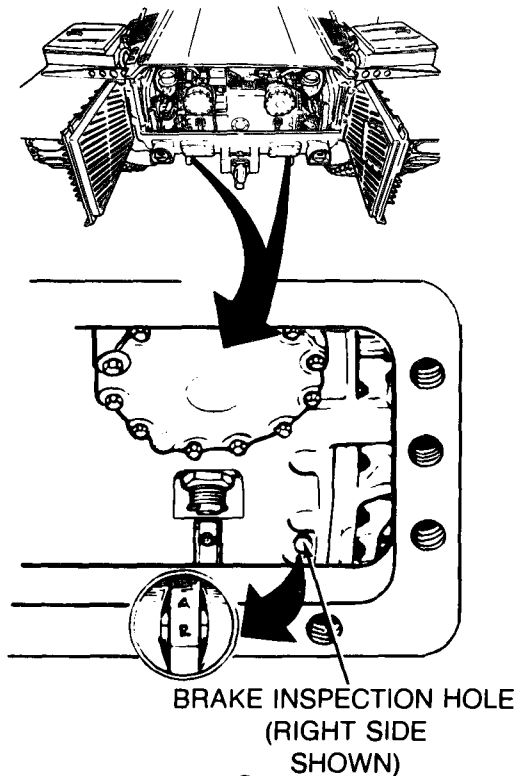
Second Technician (Operator's Station)

- Release brakes.

First Technician (Rear of Vehicle)

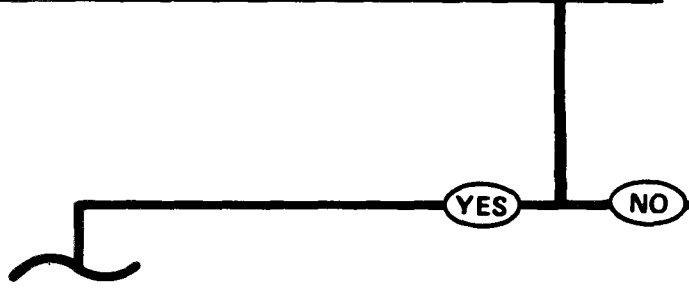
- Check if index line marked "R" (Released) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Are brakes properly adjusted?

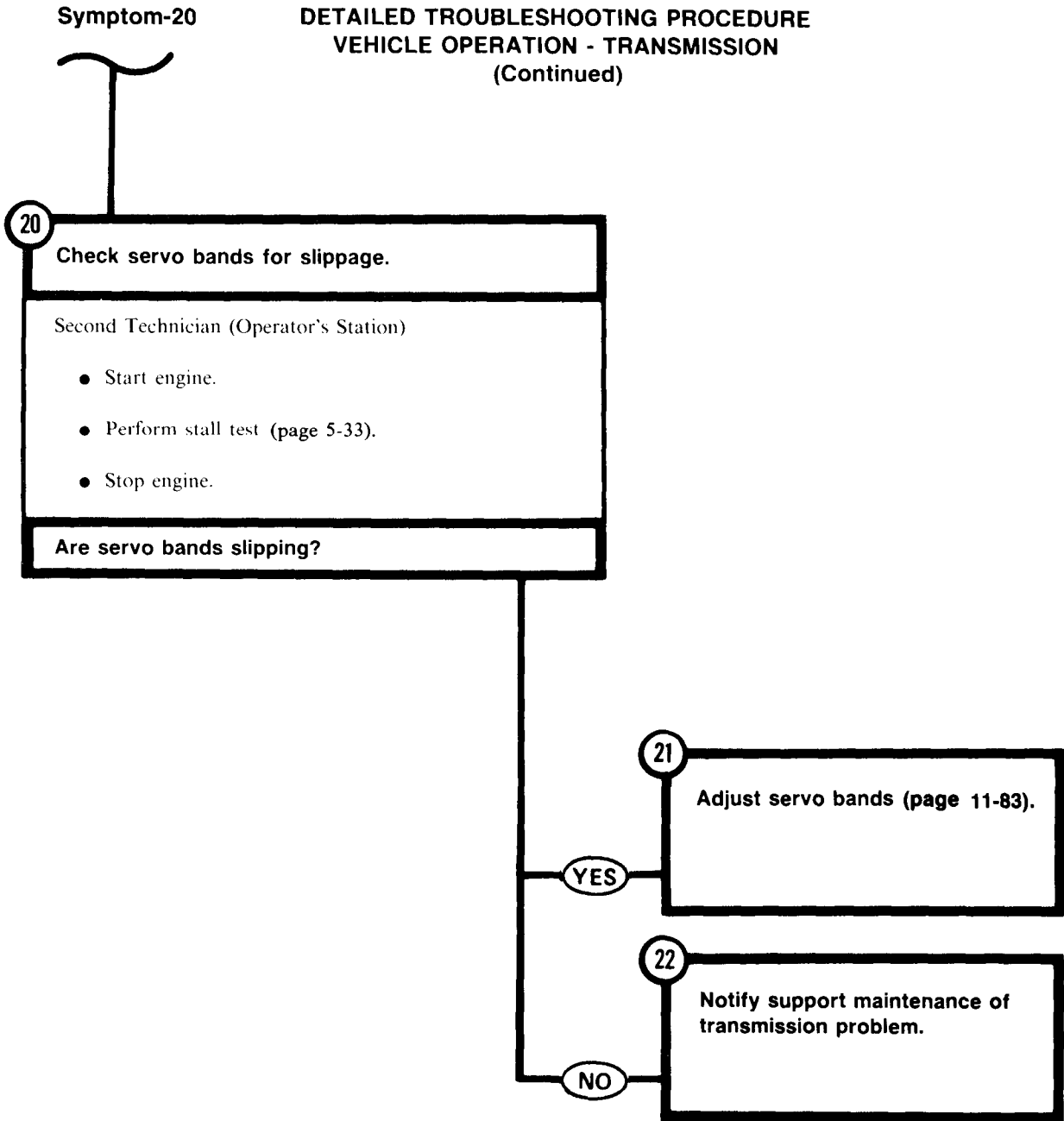


19

Adjust service brakes (page 13-78).



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**



Symptom-20

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

FROM STEP

2

23 Check shifting control linkage adjustment.

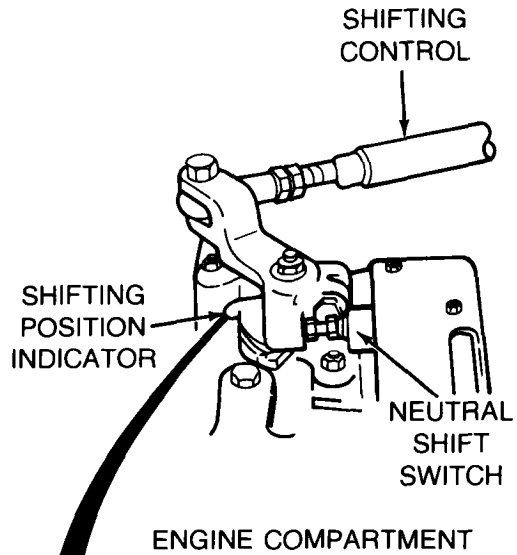
Second Technician (Operator's Station)

- Place transmission shifting control lever in N (Neutral) position.

First Technician (Rear of Vehicle)

- Check shifting position indicator at top rear of transmission and observe that position indicator is in the forward dot, designated NEUTRAL.

Is shifting position indicator in NEUTRAL?



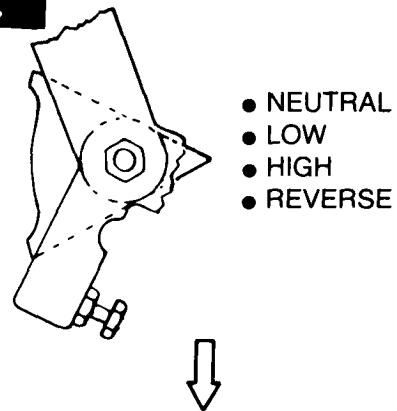
24 Adjust shifting control linkage (page 11-52).

NO

25 ● Check shifting control hand lever pivot base assembly for binding or obstruction.

● See Step 4 .

YES



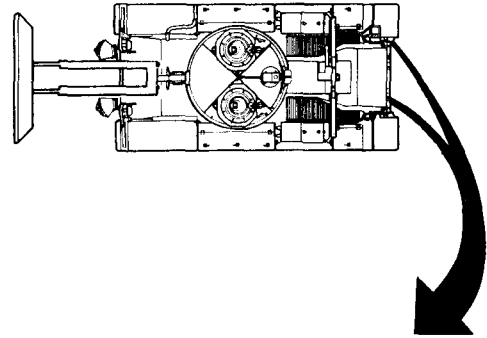
TA250220

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION**

Symptom-21

**TRANSMISSION OIL TEMPERATURE GAGE SHOWS RED
(POWERPLANT WARNING LAMP ON).**

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check right and left outer and inner transmission oil lines for leaks.

First and Second Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

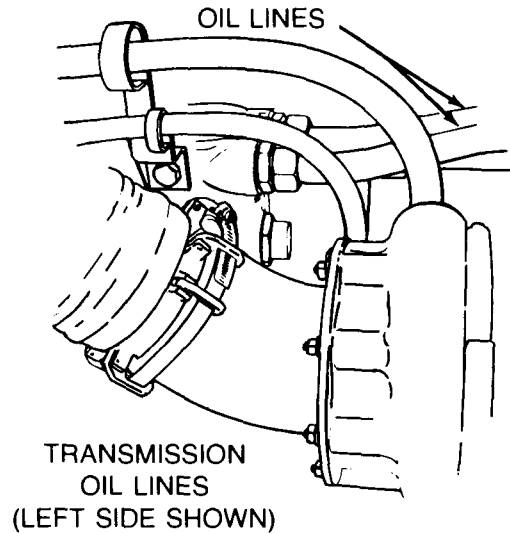
Second Technician (Operator's Station)

- Start engine.

First Technician (Rear Grille Doors)

- Visually check right and left outer and inner oil lines for leaks or damage.

Are transmission oil lines leaking or damaged?



NO

YES

2

- Tighten leaking oil lines
- Replace damaged oil lines
- Install transmission shroud (page 9-6).

Symptom-21

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

FOR CLARITY TOP DECK
NOT SHOWN

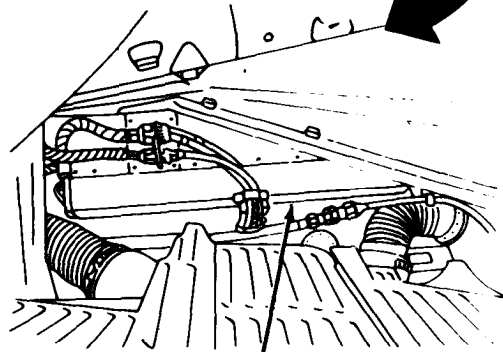
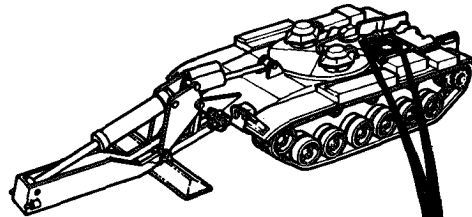
3

Check right and left transmission oil coolers for leaks.

First Technician (Top Deck)

- Open left and right top deck grille doors.
- Visually check left and right transmission oil coolers for leaks.
- Stop engine.

Are transmission oil coolers leaking?



TRANSMISSION OIL COOLER
(LEFT SIDE SHOWN)

4

**Replace leaking oil cooler
(page 6-19).**

NO

YES

TA250222

Symptom-21

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

5

Check service brakes for proper adjustment.

Both Technicians (Rear Grille Doors)

- Remove plugs from both left and right brake inspection holes.

Second Technician (Operator's Station)

- Press brake pedal and hold when pressure of 750 to 900 psi is reached.

First Technician (Rear Grille Doors)

- Check if index line marked A (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Second Technician (Operator's Station)

- Release brakes.

First Technician (Rear Grille Doors)

- Check if index line marked R (Released) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

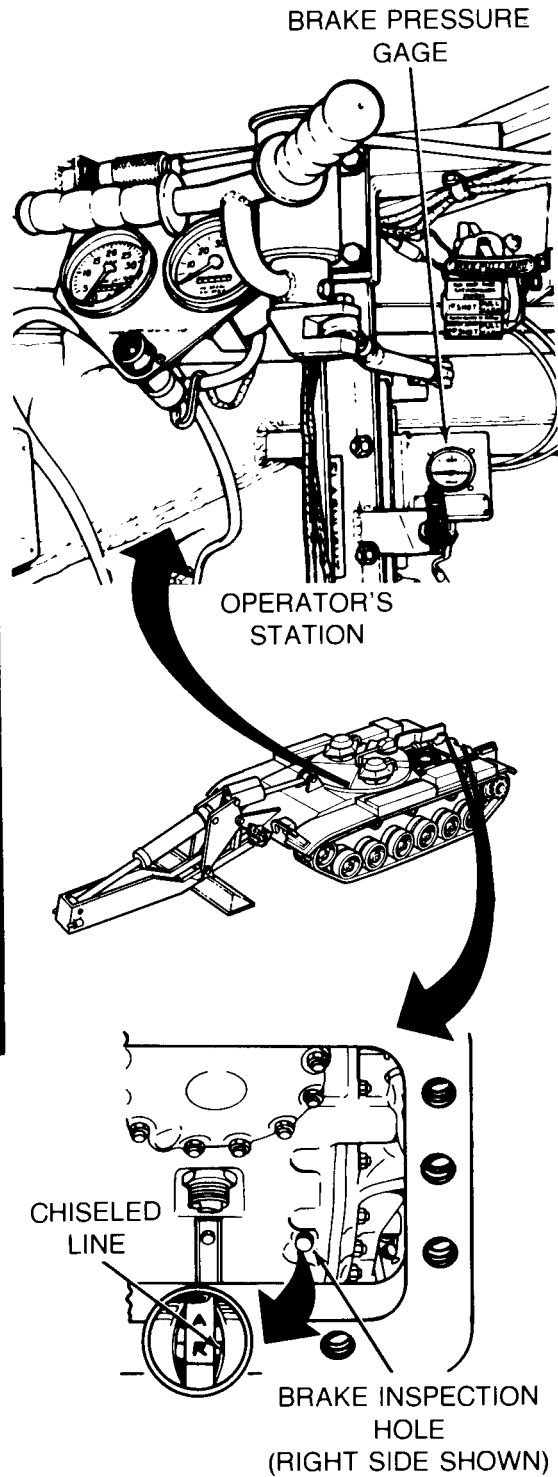
Are service brakes properly adjusted?

6

- Adjust service brakes (page 13-78).
- Close left and right top deck grille doors.

NO

YES



TA250223

Symptom-21

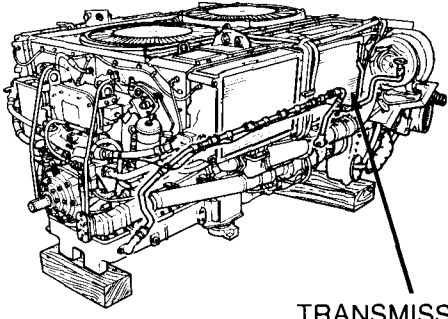
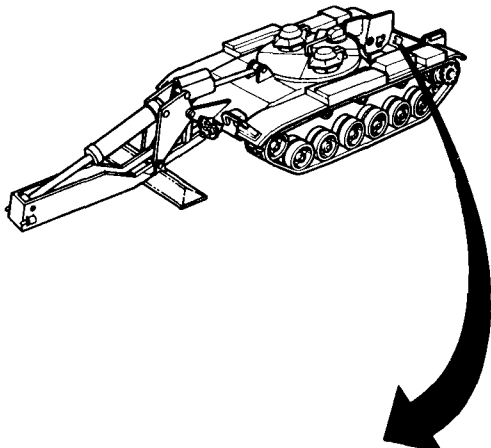
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

9 Check transmission oil coolers for clogged cores and screens.

Both Technicians (Outside Vehicle)

- Have powerplant removed (page 5-2).
- Remove oil cooler screens (page 6-53).
- Shine light through cores and screens.
- Check oil cooler cores and screens for clogged or dirty condition.

Are transmission oil cooler screens and cores clean?



TRANSMISSION OIL COOLER

(POWERPLANT - RIGHT SIDE)

10

- Clean transmission oil cooler screens and cores (page 6-48).

YES

NO

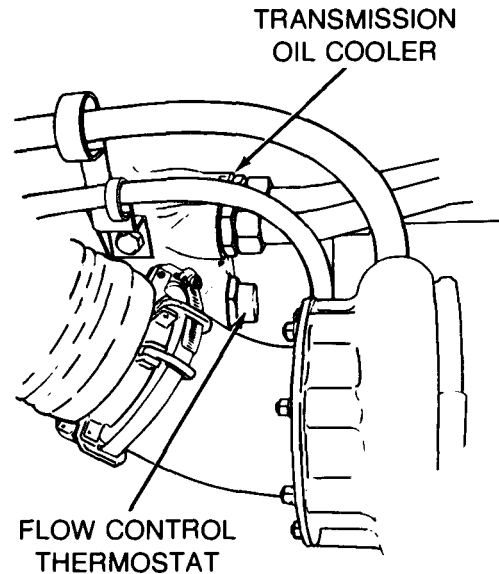
Symptom-21

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)**

11 Check if transmission oil cooler flow control thermostatic bypass valves work.

- Install oil cooler screens (page 6-54).
- Remove right and left transmission oil cooler flow control thermostats (page 6-25 and 6-32).
- Check both thermostats for proper operation (page 6-28).

Do both flow control thermostatic bypass valves work?



NO

12

- Replace defective control thermostatic bypass valve (page 6-29).

YES

13

- Notify support maintenance of transmission oil temperature problem.
- Have powerplant installed (page 5-14).

TA250226

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES**

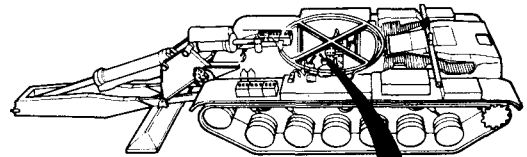
Symptom-22

SERVICE BRAKES WILL NOT WORK RIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



1

Check fluid level in master cylinder.

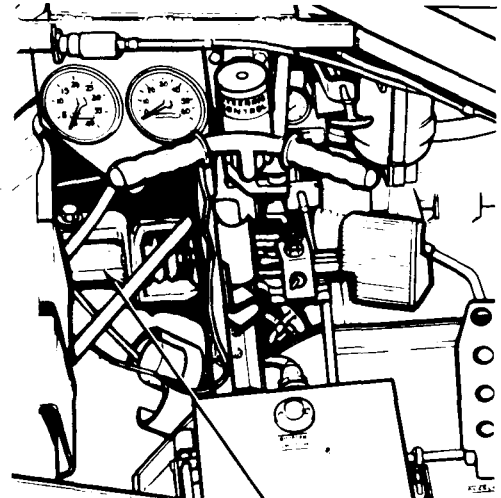
Both Technicians (Outside Vehicle)

- Block tracks front and rear to prevent movement of vehicle.

First Technician (Operator's Station)

- Remove master cylinder cap.
- Check fluid in master cylinder for proper level. Hydraulic fluid level should be within 1/4 inch from top of master cylinder.

Is fluid level within 1/4 inch from top of master cylinder?



MASTER CYLINDER

2

- Service master cylinder (LO5-5420-226-12).
- Check master cylinder for leaks.
- See Step **10**.



Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

3

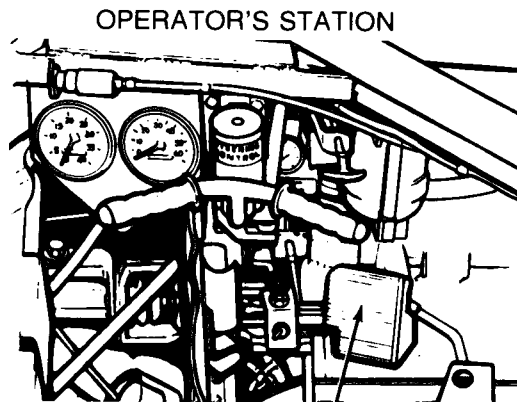
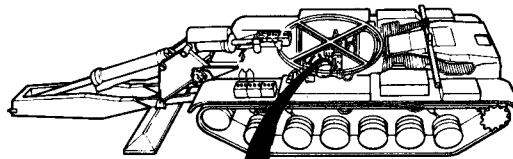
Check for air in brake system.

First Technician (Operator's Station)

- Install master cylinder cap.
- Place shift control lever in N (neutral) position.
- Press brake pedal several times and hold.
- Check that brake pedal feels firm - not soft or "spongy".

Does brake pedal feel firm?

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN



4

- Bleed brake system (page 13-86).

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

Symptom-22

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

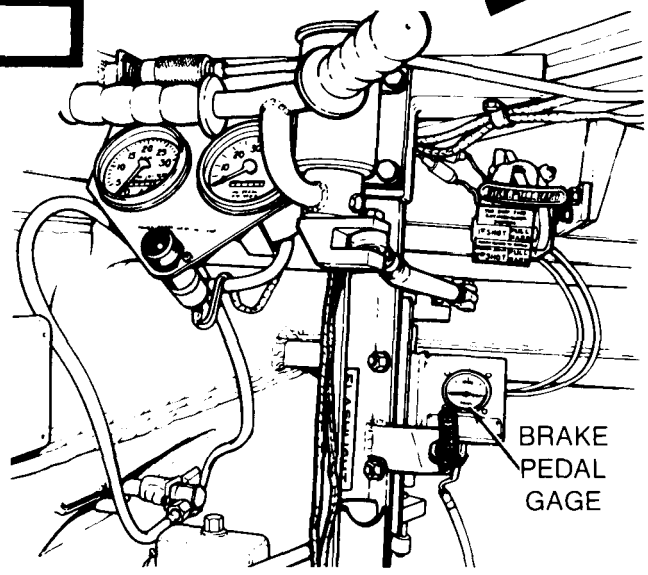
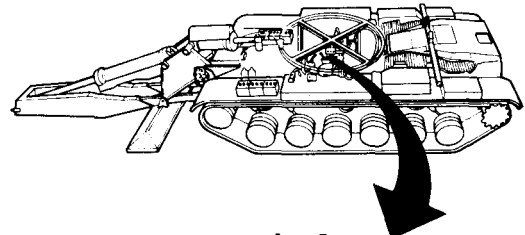
5

Check brake pedal linkage for proper adjustment.

First Technician (Operator's Station)

- Press brake pedal several times and observe that gage reads 750 psi to 900 psi.

Is brake pedal linkage properly adjusted?



6

**Adjust brake pedal linkage
(page 13-78).**

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

Symptom-22

7

Check service brakes for proper adjustment.

Both Technicians (Rear Grille Doors)

- Remove transmission access covers (page 16-34).
- Remove lockwires and plugs from both right and left brake inspection holes.

First Technician (Operator's Station)

- Press brake pedal and observe pressure gage indicates 750-900 psi and keep pressed.

Second Technician (Brake Inspection Holes)

- Check if index line marked A (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

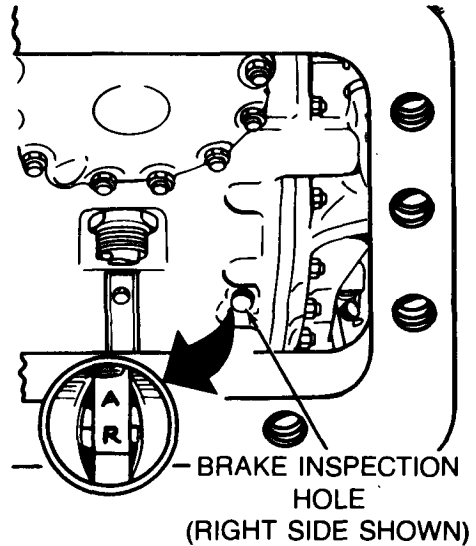
First Technician (Operator's Station)

- Release brakes.

Second Technician (Brake Inspection Holes)

- Check if index line marked "R" (Released) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Are service brakes properly adjusted?



UNDER REAR GRILLE DOORS

8

Adjust service brakes (page 13-78).

NO YES

9

- Notify support maintenance of service brake problem.
- Install plugs in both right and left brake inspection holes and lockwire.

TA250230

Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

FROM STEP

2

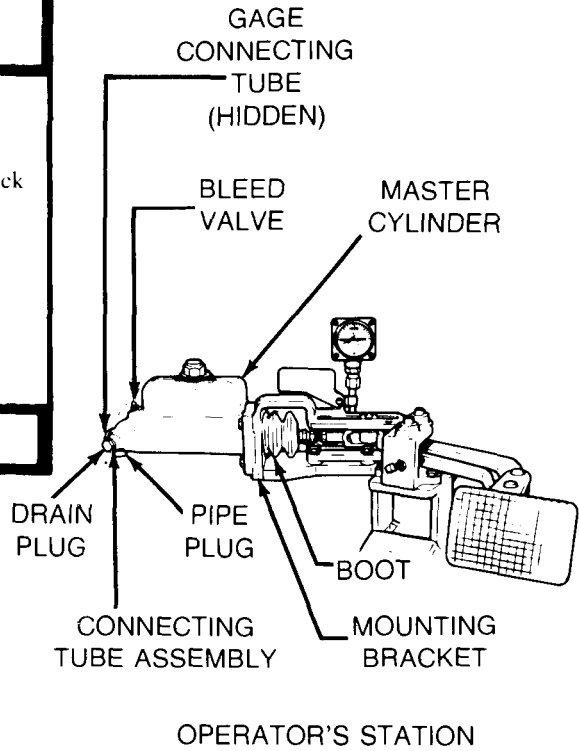
10

Check master cylinder for leaks.

First Technician (Operator's Station)

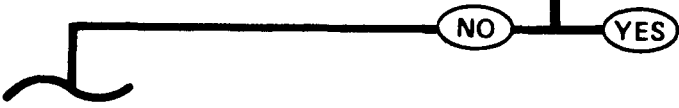
- Apply 750-900 psi pressure to brake system and check indicator needle for loss of pressure.
- Check master cylinder assembly for leaks at the mounting bracket boot, drain plug, bleeder valve, pipe plug and connecting tube assembly.

Is master cylinder leaking?



11

Replace leaking master cylinder (page 13-2).



Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

12 Check brake hydraulic lines from master cylinder along bulkhead to back of transmission for leaks or damage.

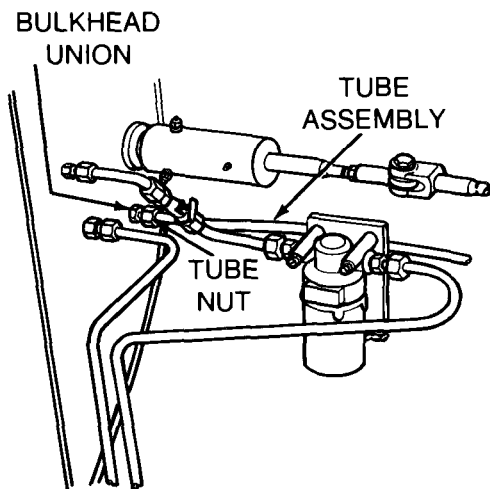
First Technician (Operator's Station)

- Visually check brake hydraulic line from master cylinder along bulkhead for loose connections or damage.
- Visually check hydraulic lines and fittings from bulkhead to engine compartment for leaks or damage.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).
- Visually check hydraulic lines and fittings at rear of transmission for leaks or damage.

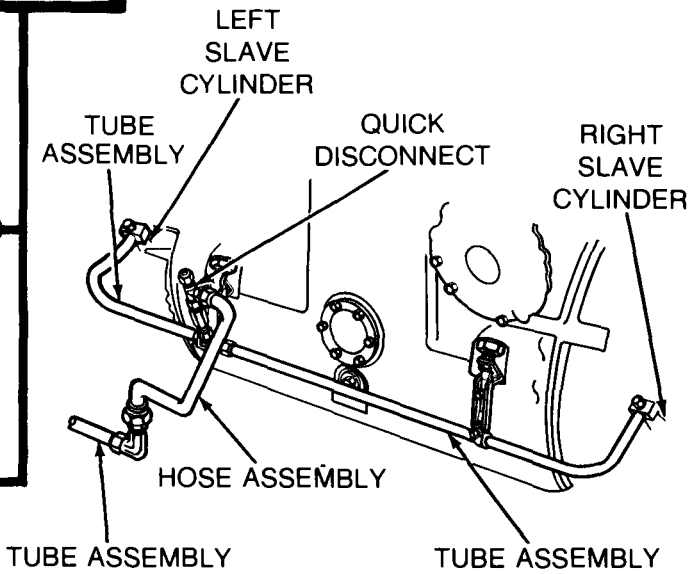
Are hydraulic lines and fittings leaking or damaged?



13 Replace leaking or damaged hydraulic lines and fittings.

YES

NO



TA250232

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

Symptom-22

14 Check left and right slave cylinders and lower hydraulic lines for leaks or damage.

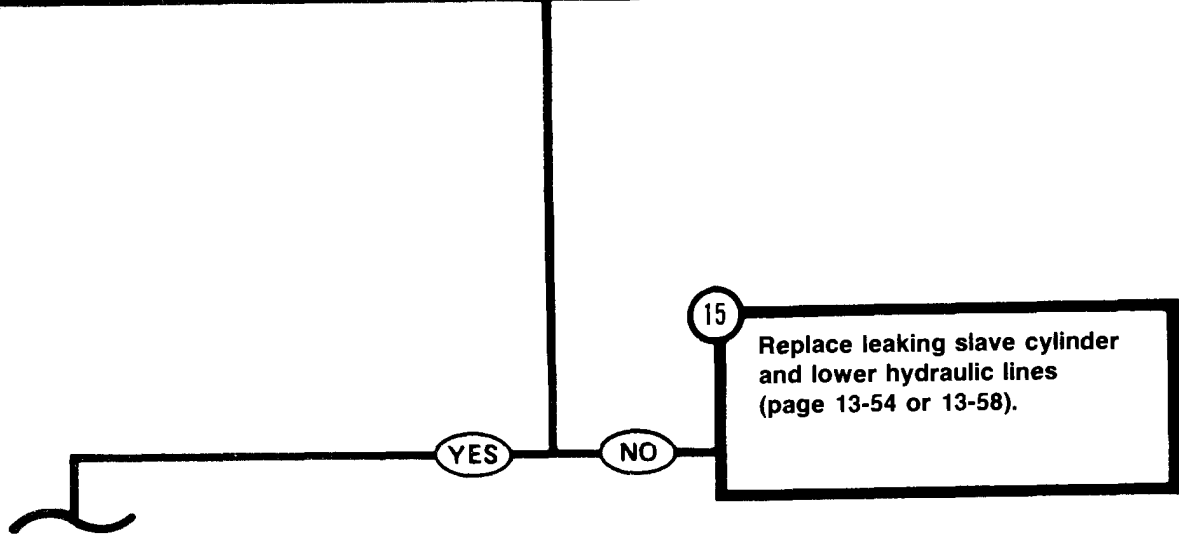
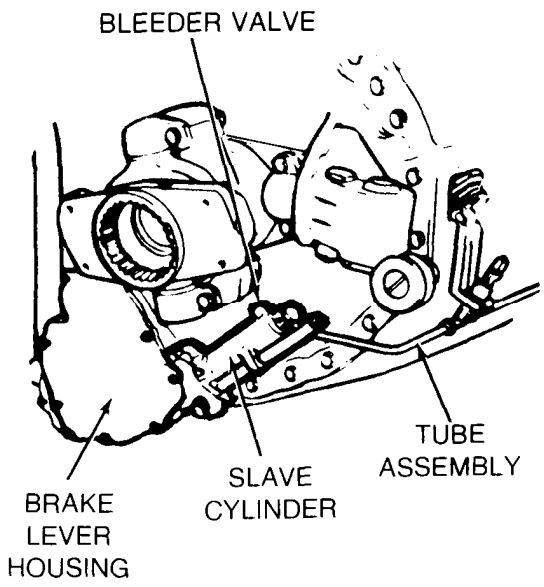
First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Check left and right slave cylinders for leaks at bleeder valve, plug assembly and connecting tube assemblies.
- Remove drain plug from bottom of brake lever housing and check for evidence of brake fluid, indicating leaking cylinder at preformed packing.

Are slave cylinders or lower lines leaking or damaged?



15 Replace leaking slave cylinder and lower hydraulic lines (page 13-54 or 13-58).

Symptom-22

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

16 Check for movement of brake application lever and damaged parts.

First Technician (Powerplant)

- Remove left and right brake housing covers from side of transmission (page 13-65).
- Visually inspect brake application levers for broken and damaged parts.
- Using a pry bar, move brake application levers counterclockwise and check if brake apply shaft moves.

Is brake application lever broken or damaged?

17

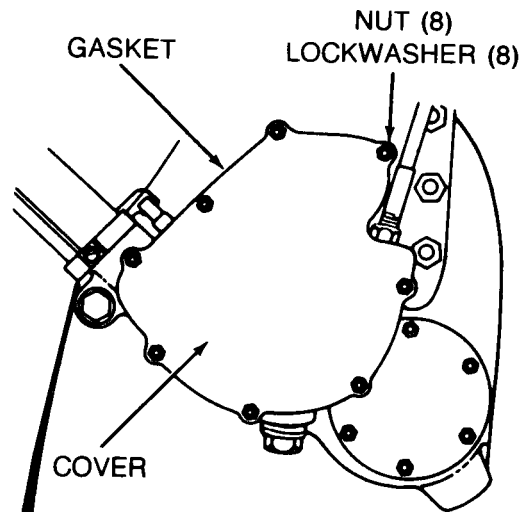
- Repair brake control housing assembly (page 13-64).
- Have powerplant installed (page 5-14).

YES

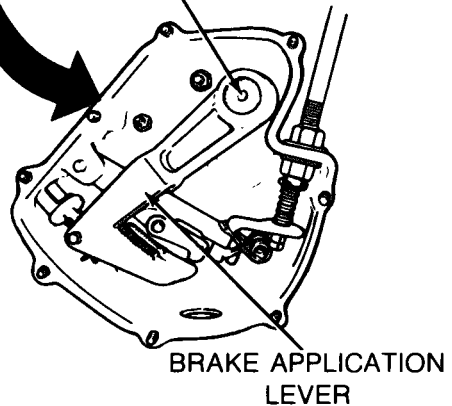
18

- Install brake control housing covers (page 13-77).
- Have powerplant installed (page 5-14).
- Notify support maintenance of service brake problem.

NO



TRANSMISSION
BRAKE APPLY SHAFT



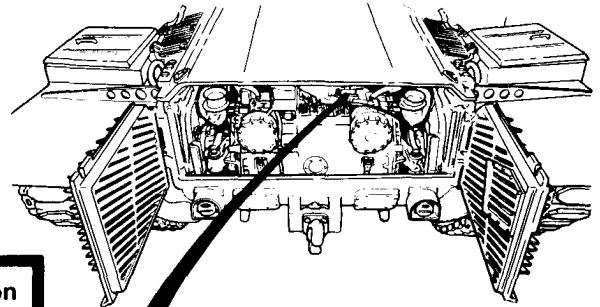
TA250234

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES**

Symptom-23

PARKING BRAKE WILL NOT RELEASE.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check if parking brakes will release by using prybar on bellcrank.

Both Technicians (Outside Vehicle)

- Block tracks to prevent movement of vehicle.

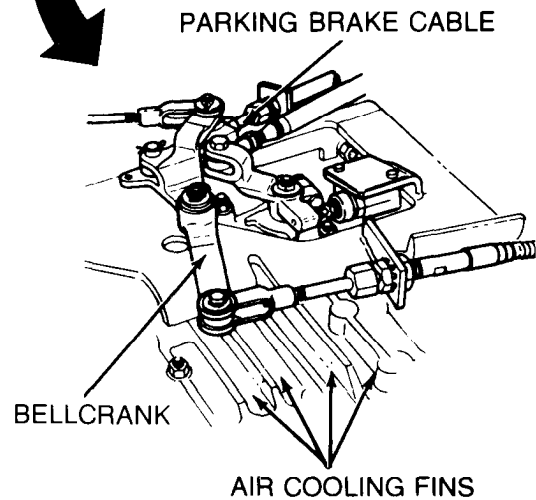
Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect parking brake cable at bellcrank on top of transmission (page 13-110).
- Attempt to release brakes by carefully using short prybar on the bellcrank at air cooling fin (DO NOT USE EXCESSIVE FORCE).

Did parking brakes release?



2

- Malfunction corrected.
- Connect parking brake cable (page 13-119).
- Adjust parking brake cable (page 13-126).



TA250235

Symptom-23

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

3

Check service brakes for proper adjustment.

First Technician (Rear Grille Doors)

- Remove lockwires and plugs (one located on each side of transmission rear housing) from brake inspection holes.

Second Technician (Operator's Station)

- Press brake pedal and hold when pressure of 750 to 900 psi is reached.

First Technician (Rear Grille Doors)

- Check if index line marked "A" (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

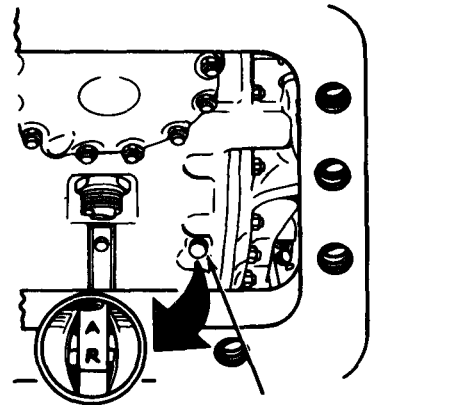
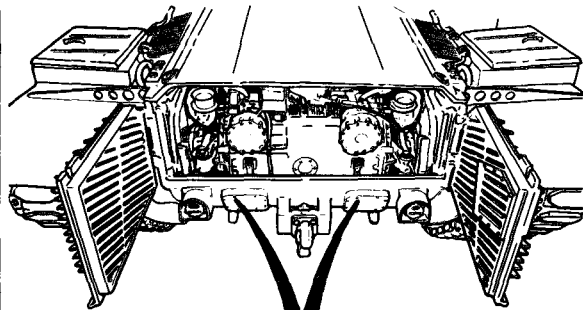
Second Technician (Operator's Station)

- Release brakes.

First Technician (Rear Grille Doors)

- Check if index line marked "R" (Released) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Are service brakes properly adjusted?



**BRAKE INSPECTION HOLE
(RIGHT SIDE SHOWN)**

4

- Adjust service brakes (page 13-78).
- Connect parking brake cable (page 13-119).

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

Symptom-23

5 Check if parking brake locking pawls are in the released position.

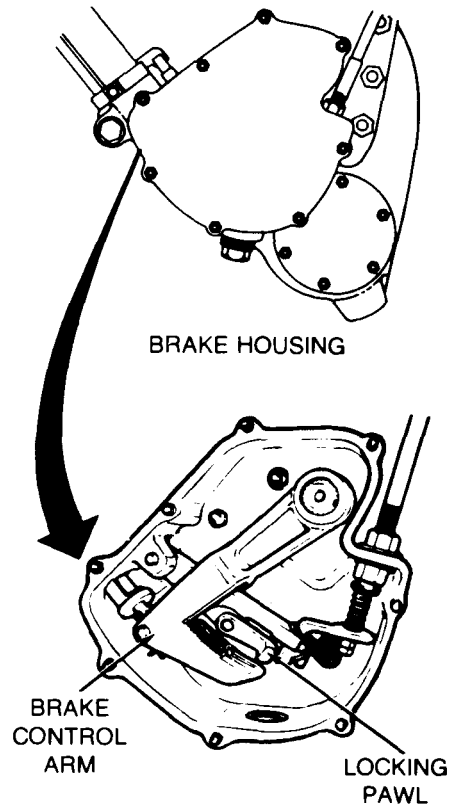
First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Remove left and right brake housing covers from side of transmission (page 13-65).
- Check if locking pawls are released from left side and right side brake control arms.

Are both locking pawls released from brake control arms?



YES → **6** See Symptom 22: SERVICE BRAKES WILL NOT WORK RIGHT (page 4-342).

NO → **7** Repair parking brakes housing assembly (page 13-64).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES**

Symptom-24

PARKING BRAKES CANNOT BE APPLIED.

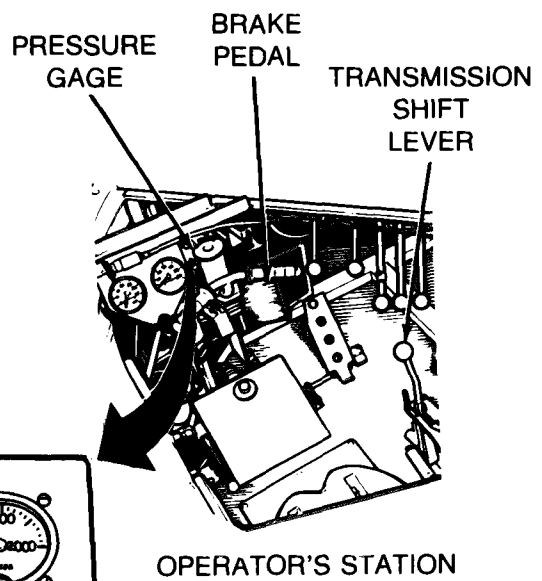
NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1
Check service brake system pressure.

Second Technician (Operator's Station)

- Move transmission shift lever to park (P) position.
- Press brake pedal and observe pressure gage reading of 750 to 900 psi.

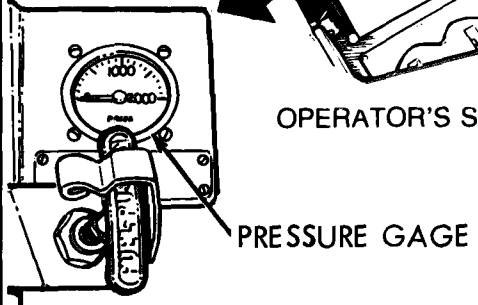
Is brake system pressure 750 to 900 psi?



2
See Symptom 22: SERVICE BRAKES WILL NOT WORK RIGHT (page 4-342).

NO

YES



Symptom-24

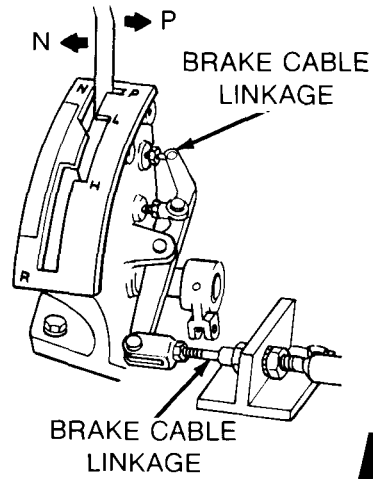
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

3 Check shifting control hand lever base assembly for damage or improper operation.

Second Technician (Operator's Station)

- Move transmission shift lever to the left and right from park (P) to neutral (N) position.
- Check parking brake cable and linkage for disconnects or damage.

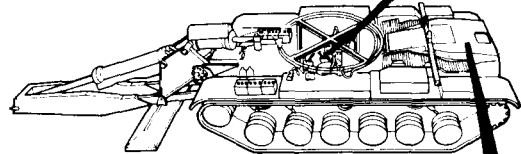
Is parking brake cable and linkage disconnected or damaged?



4

- Connect disconnected linkage or brake control cable. If not disconnected, remove and inspect shifting control hand lever base assembly and replace damaged parts (page 11-2).

YES



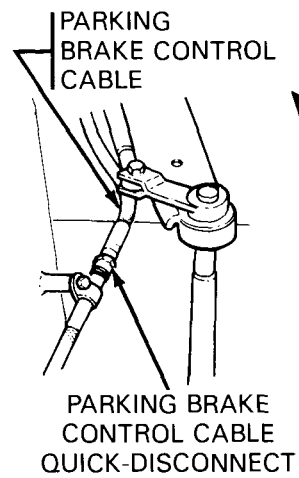
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

5

First Technician (Rear Grille Doors)

- If vehicle has one piece brake control cable, see step 9.
- If vehicle has two piece brake control cable, see step 12.

NO



TA250239

DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION - BRAKES
 (Continued)

Symptom-24

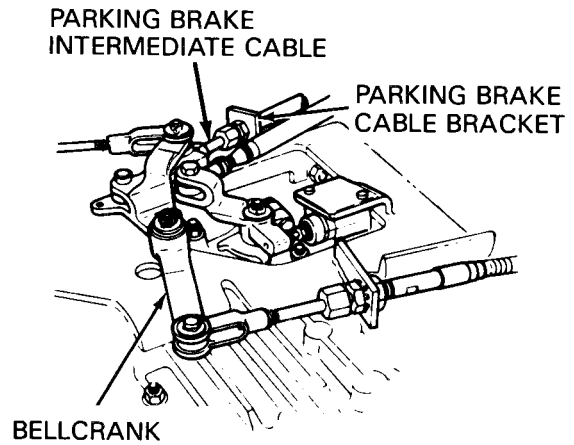
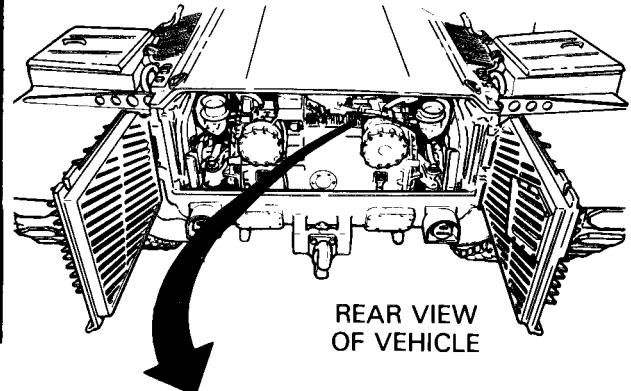
6

Check parking brake cable and linkage at bellcrank for disconnects or damage.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

Is parking brake cable and linkage disconnected or damaged?



YES

7

- Connect disconnected linkage or brake control cable. If not disconnected, remove and inspect parking brake control assembly (page 13-110) and replace damaged parts

NO

8

Go to block 9.

TA250240

Symptom-24

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

9 Check for smooth movement of parking brake control cable assembly in operator's station.

Both Technicians (Rear Grille Doors)

- Remove parking brake cable control assembly from bell crank assembly (page 13-110).
- Remove parking brake cable bracket from transmission (page 13-110).

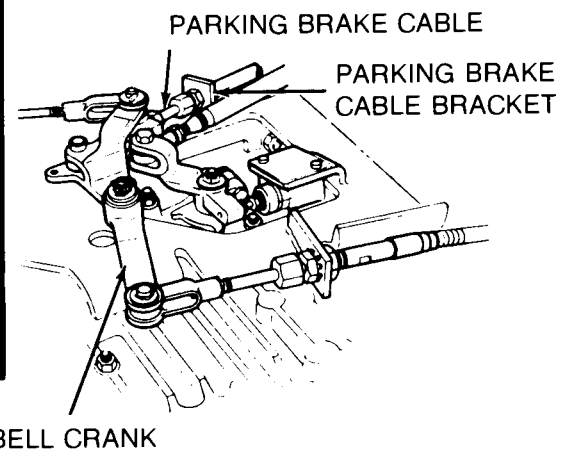
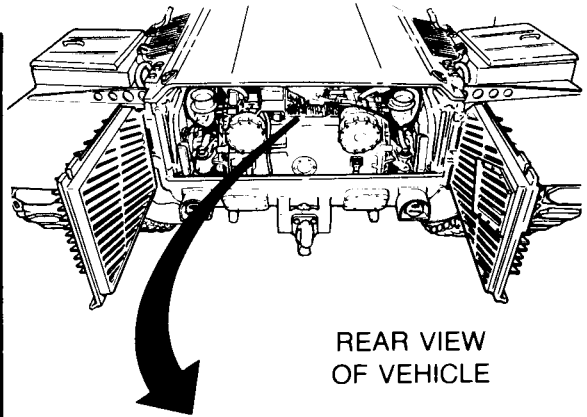
Second Technician (Operator's Station)

- Move shift lever from the neutral (N) to park (P) positions several times.

First Technician (Rear of Vehicle)

- Check movement of parking brake control assembly at disconnected bell crank while transmission shift lever is being operated.

Does parking brake cable control assembly operate smoothly?



11

- Check bellcrank assembly for proper operation.
- See step 17.

YES

10 Remove and inspect parking brake control assembly (page 13-107), remove cause of binding (rust or burrs), or replace damaged parts.

NO

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

Symptom-24

12 Check for smooth movement of parking brake control cable assembly at quick-disconnect.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-20).
- Disconnect parking brake cable quick-disconnect.

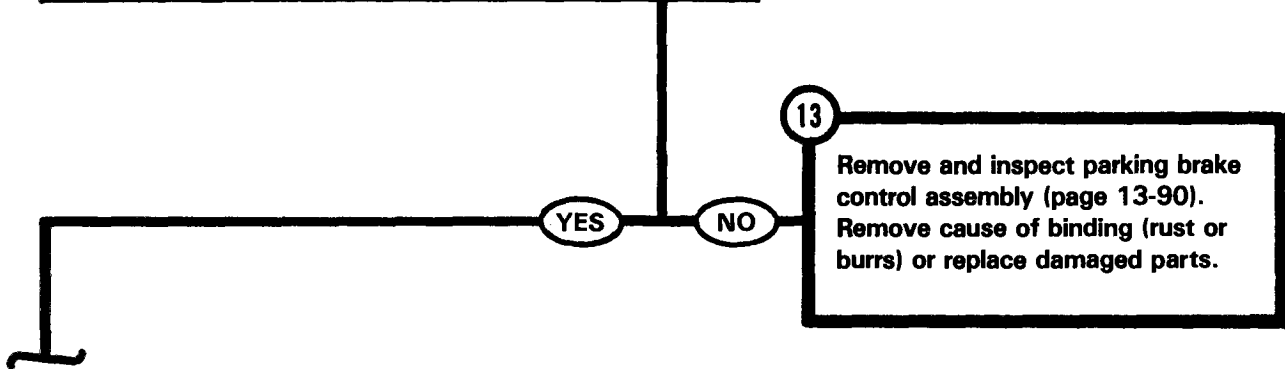
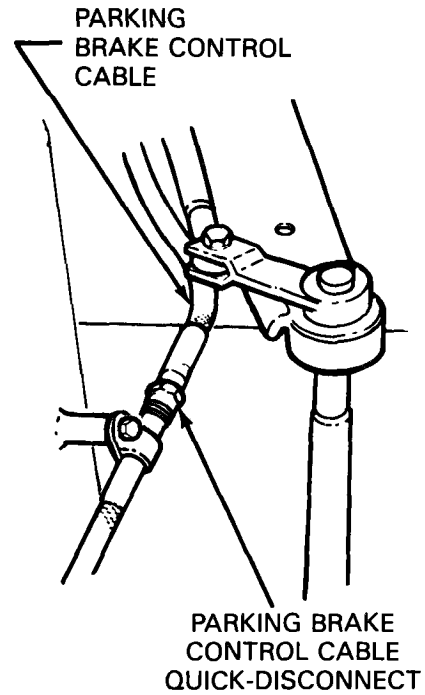
Second Technician (Driver's Station)

- Move shift lever from neutral (N) to park (P) positions several times.

First Technician (Rear of Vehicle)

- Check that quick-disconnect is not damaged and that parking cable moves freely at quick-disconnect while transmission shift lever is being operated.

Is quick disconnect free of damage and does cable move smoothly without binding?



13 Remove and inspect parking brake control assembly (page 13-90). Remove cause of binding (rust or burrs) or replace damaged parts.

TA250242

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

Symptom-24

14 Check for smooth movement of parking brake intermediate cable assembly at bellcrank.

First Technician (Rear Grille Doors)

- Connect parking brake cable quick-disconnect.
- Remove parking brake intermediate cable from bellcrank assembly (page 13-128).
- Remove parking brake cable bracket from transmission (page 13-128).

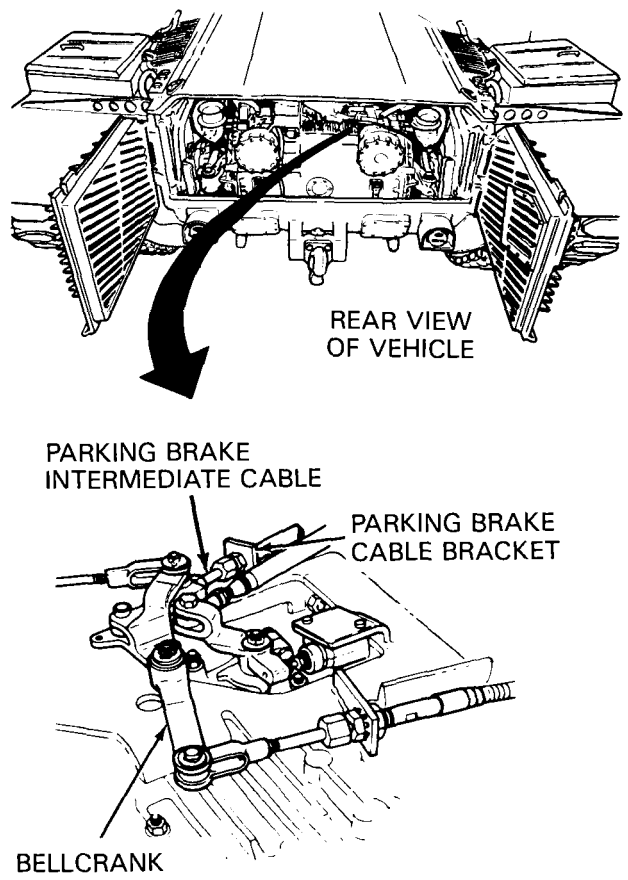
Section Technician (Driver's Compartment)

- Move shift lever from the "N" (neutral) to "P" (park) positions several times.

First Technician (Rear of Vehicle)

- Check movement of parking brake intermediate cable at disconnected bellcrank while transmission shift lever is being operated.

Does parking brake intermediate cable operate smoothly?



16

- Check bellcrank assembly for proper operation.
- See step 17.

YES NO

15

Remove and inspect intermediate cable (page 13-128). Remove cause of binding (rust or burrs), or replace damaged parts.

Symptom-24

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

17 Check bellcrank assembly for proper operation.

First Technician (Rear of Vehicle)

- Remove both right and left parking brake control assemblies in engine compartment from bell crank (page 13-110).
- Install parking brake intermediate cable on bell crank (page 13-131).
- Install parking brake cable bracket to transmission (page 13-119).

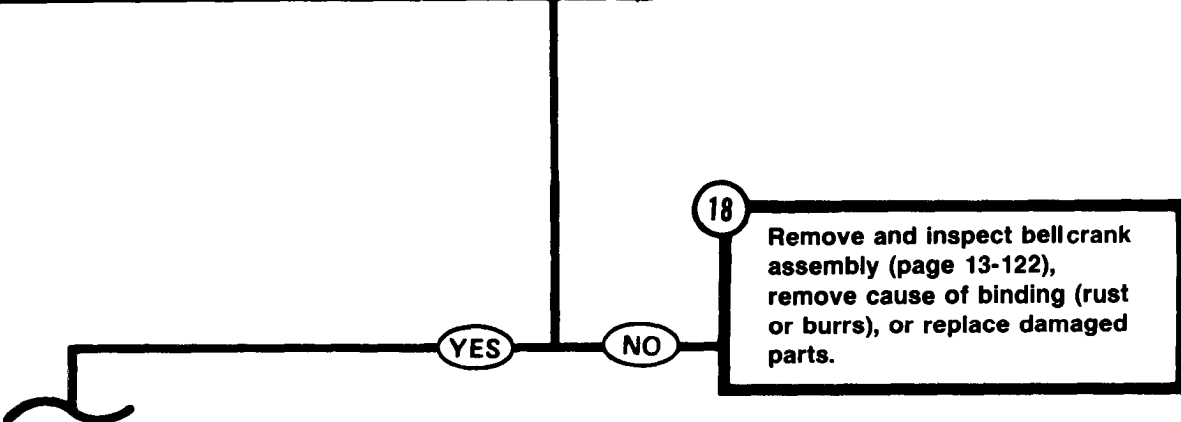
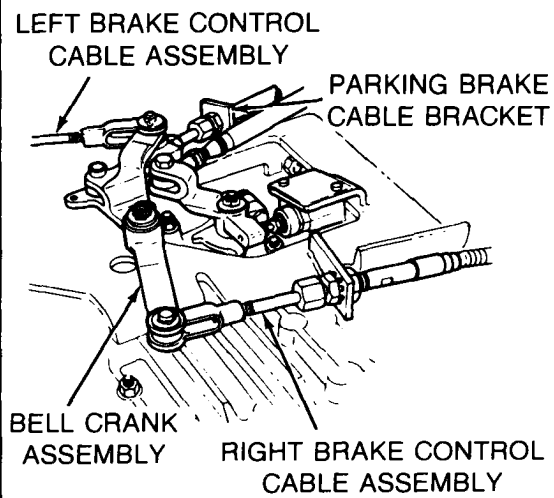
Second Technician (Operator's Station)

- Move shift lever from neutral (N) to park (P) positions several times.

First Technician (Rear of Vehicle)

- Check movement of bell crank assembly while shift lever is being operated.

Does bell crank assembly operate smoothly?



18 Remove and inspect bellcrank assembly (page 13-122), remove cause of binding (rust or burrs), or replace damaged parts.

Symptom-24

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATOR - BRAKES
(Continued)**

19 Check for smooth movement of parking brake cable assembly inside right brake housing.

Both Technicians (Outside Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Right Side of Transmission)

- Remove right side brake housing cover (page 13-65).

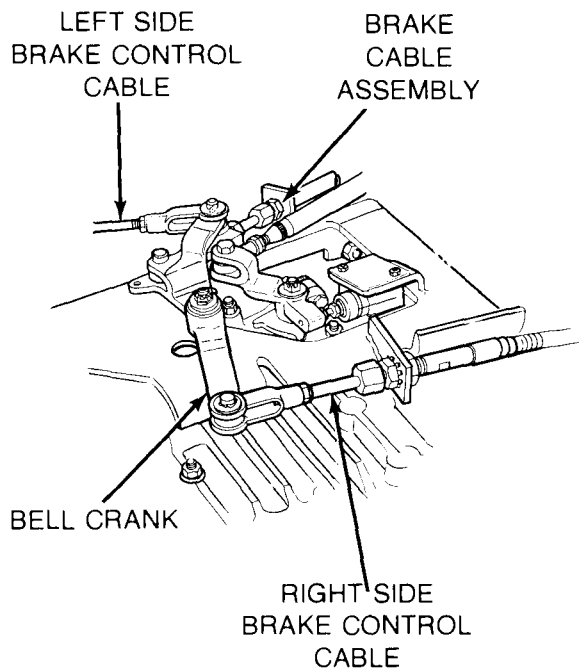
Second Technician (Top of Transmission)

- Connect right side brake control cable to bellcrank (page 13-119).
- Using small prybar, move bellcrank to the right and then to the left.

First Technician (Right Side of Transmission)

- Observe movement of right parking brake control cable assembly while bell crank is being moved right and left.

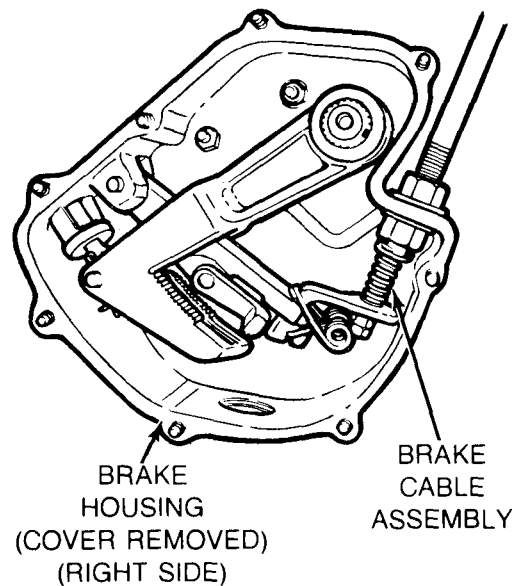
Does parking brake cable assembly move smoothly?



20 Replace defective parking brake cable assembly from bell crank to brake housing (page 13-107).

NO

YES



TA250245

Symptom-24

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)**

21 Check for smooth movement of parking brake cable assembly inside left brake housing.

First Technician (Left Side of Transmission)

- Remove left side brake housing cover (page 13-65).

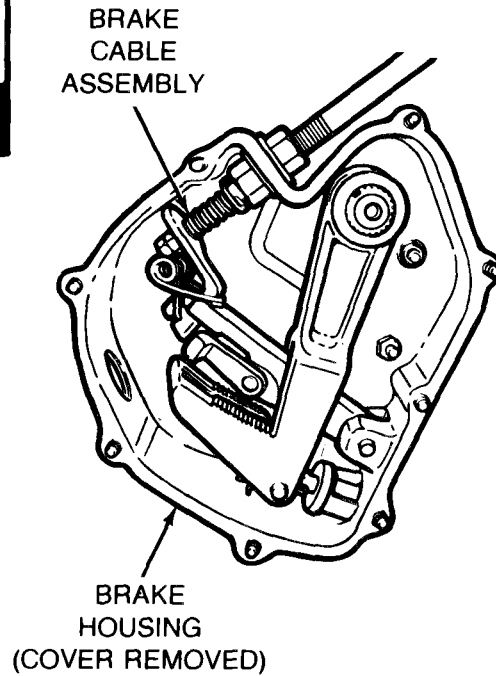
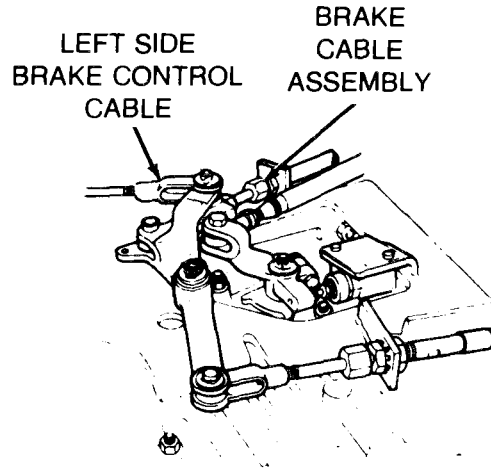
Second Technician (Top of Transmission)

- Connect left side brake control cable to bellcrank (page 13-119).
- Using small pry bar, move bellcrank to the left and then to the right.

First Technician (Left Side of Transmission)

- Observe movement of left parking brake control cable assembly while bell crank is being moved left and right.

Does parking brake cable assembly move smoothly?



22 Replace defective parking brake cable assembly from bell crank to brake housing (page 13-107).

NO

YES

TA250246

Symptom-24

DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATIONS - BRAKES
 (Continued)

23 Check brake control arm and locking pawl for proper operation.

First Technician First Right and Then Left (Sides of Transmission)

- Using brake application tools, set left and right brakes in applied position. (page 5-33)

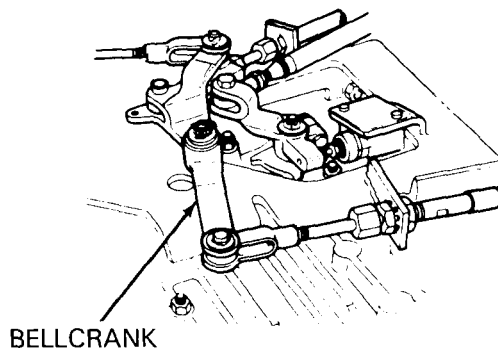
Second Technician (Top of Transmission)

- Using pry bar, move bell crank

First Technician (Sides of Transmission)

- Check that left and right locking pawl engages associated brake control arm.

Do locking pawls engage brake control arms?

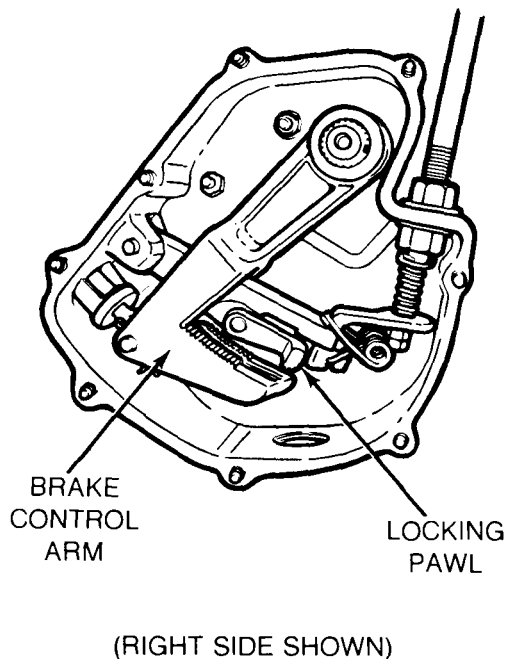


24 Repair brake control housing assembly (page 13-64).

NO

25 Notify support maintenance of brake problem.

YES



TA250247

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING

VEHICLE WILL NOT STEER PROPERLY

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

Check steering control linkage for binding.

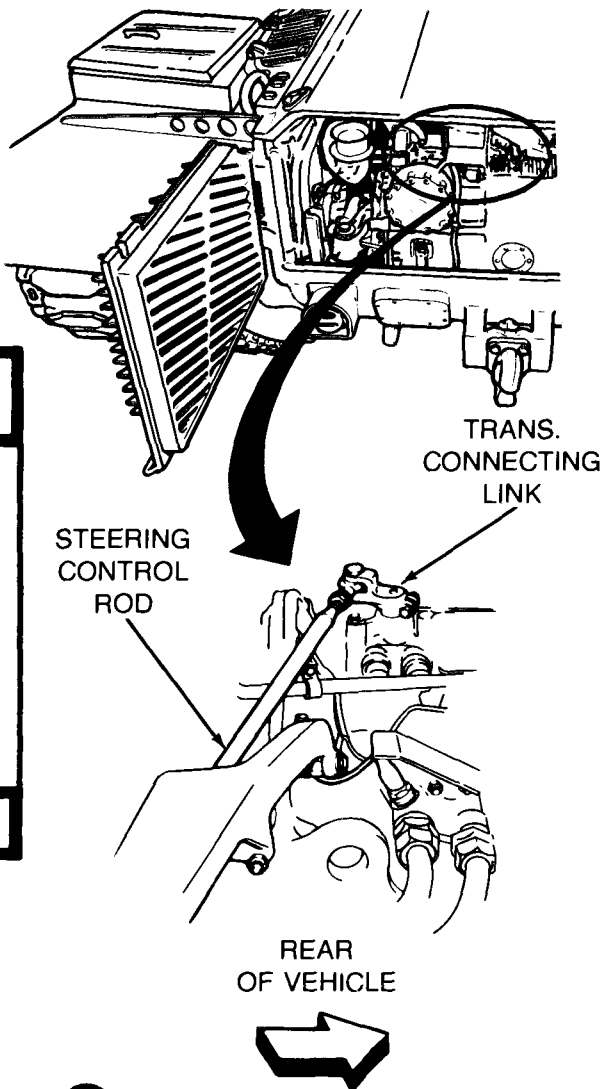
Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).
- Disconnect steering control rod from transmission connecting link (page 15-26).

Second Technician (Operator's Station)

- Move steering control handle right and left.

Does steering control linkage bind?



2

- Check steering control position indicator for proper indications.
- See Step **(16)** .



TA250248

Symptom-25

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

3 Check steering control handle assembly for binding or obstruction.

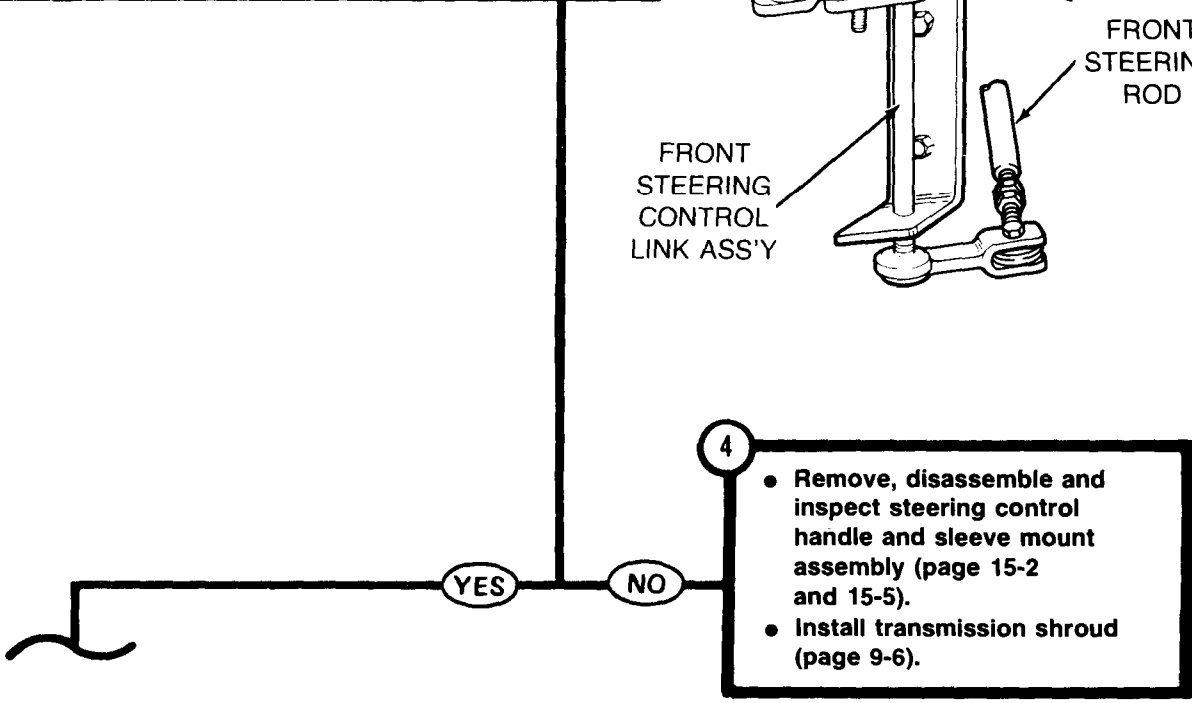
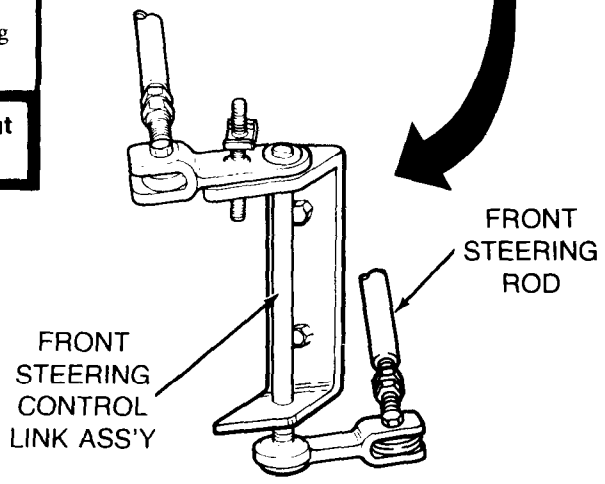
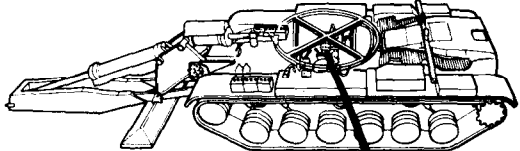
First Technician (Rear Grille Doors)

- Connect steering control rod to transmission connecting link assembly (page 15-27).

Second Technician (Operator's Station)

- Disconnect front steering control rod from front steering control link assembly (page 15-12).
- While holding disconnected control rod move steering control handle right and left.

Does steering control handle move smoothly without binding?



TA250249

Symptom-25

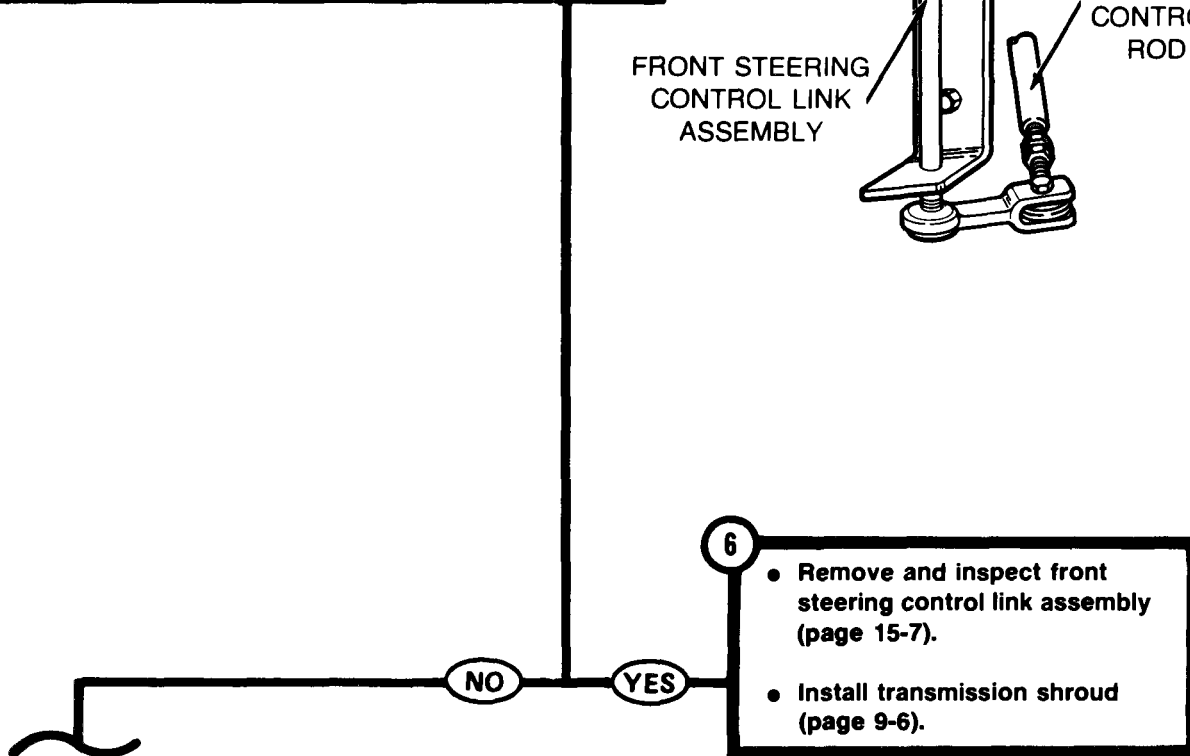
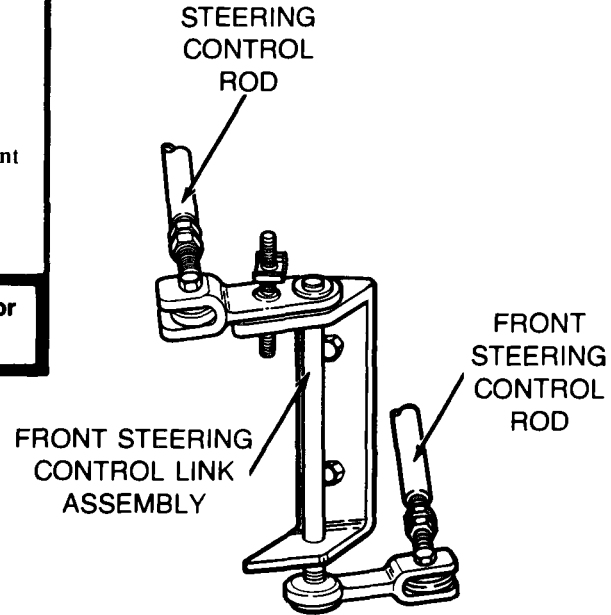
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**

5 Check front steering control link assembly for binding or obstruction.

Second Technician (Operator's Station)

- Connect front steering control rod to front steering control link assembly (page 15-14).
- Disconnect steering control rod from bottom of front steering control link assembly (page 15-12).
- Move steering control handle right and left.

Is front steering control link assembly obstructed or binding?



TA250250

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**

Symptom-25

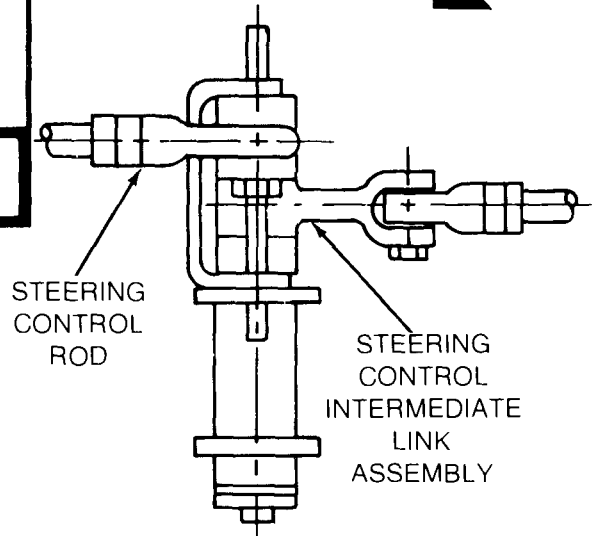
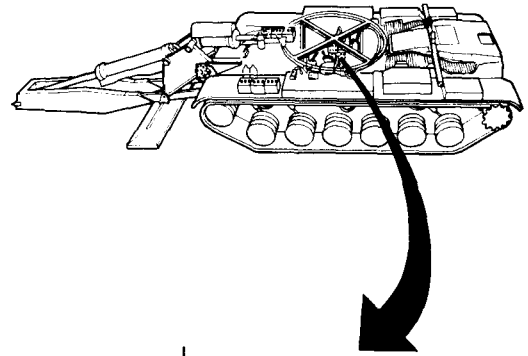
7 Check steering control intermediate link assembly for binding or obstruction.

Second Technician (Operator's Station)

- Connect steering control rod to bottom of front steering control link assembly (page 15-14).
- Disconnect steering control rod from aft side of steering control intermediate link assembly (page 15-23).
- Move steering control handle right and left.

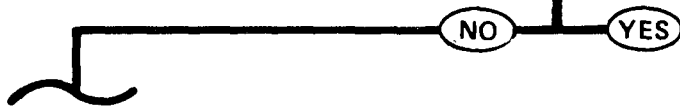
Is steering control intermediate link assembly obstructed or binding?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



8

- Notify support maintenance if intermediate link assembly is binding.
- Remove any obstruction.
- Connect steering control rod to intermediate link assembly (page 15-25).
- Install transmission shroud (page 9-6).



Symptom-25

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**

FOR CLARITY TOP
DECK NOT SHOWN

9 **Check lower connecting rod for binding or obstruction.**

Second Technician (Operator's Station)

- Connect steering control rod to aft side of steering control intermediate link assembly (page 15-25).

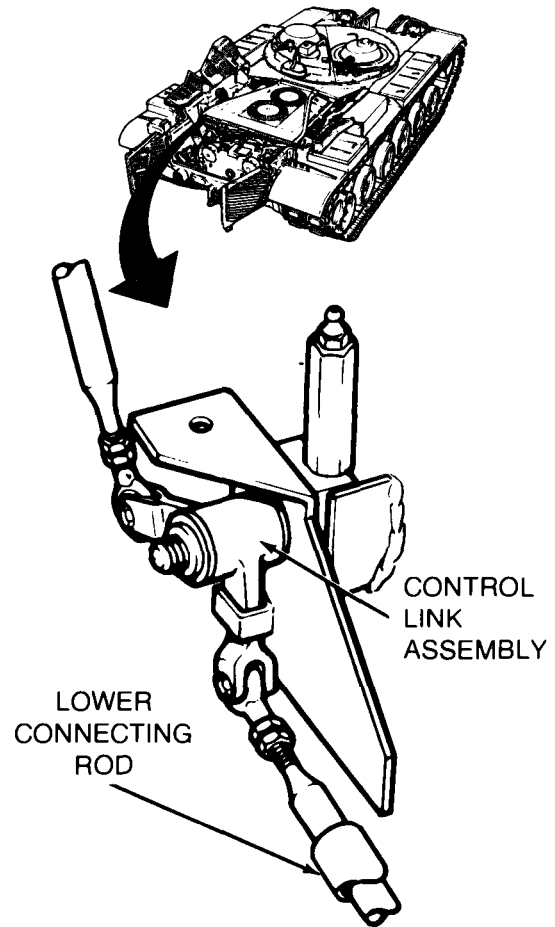
First Technician (Top Deck)

- Open left rear top deck grille door.
- Remove inboard shield face from connecting link assembly (page 15-31).
- Disconnect connector rod from lower side of connector link assembly (page 15-31).

Second Technician (Operator's Station)

- Move steering control handle right and left

Is lower connecting rod obstructed or binding?



INBOARD SHIELD FACE
REMOVED FOR CLARITY

10

- Notify support maintenance of steering control linkage problem.
- Reconnect connector rod to lower side of connector link assembly.
- Install inboard shield face (page 15-32).
- Install transmission shroud (page 9-6).

NO YES

TA250252

Symptom-25

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**

11 Check connecting link assembly for binding or obstruction.

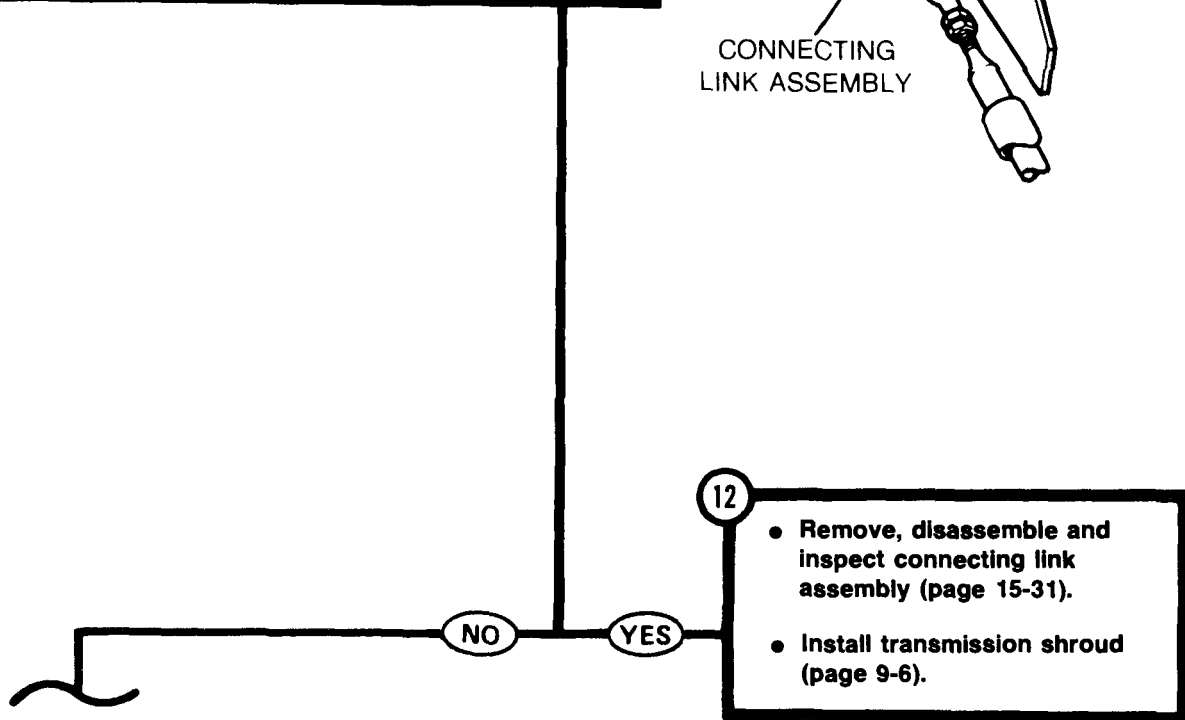
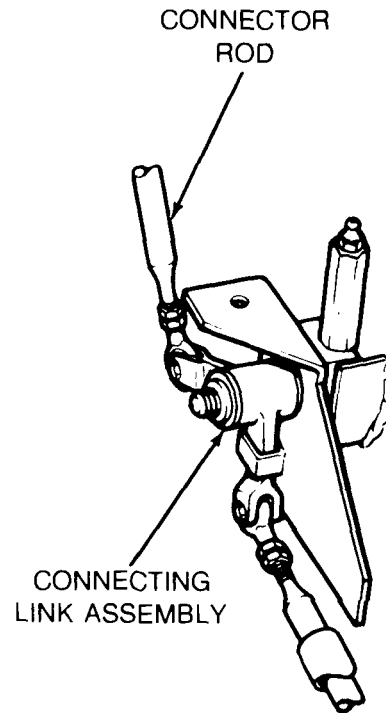
First Technician (Top Deck)

- Connect connector rod to lower side of connector link assembly (page 15-32).
- Disconnect connector rod from upper side of connector link assembly (page 15-31).

Second Technician (Operator's Station)

- Move steering control handle right and left.

Is connecting link assembly obstructed or binding?



TA250253

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

13 Check riser connecting link assembly for binding or obstruction.

First Technician (Top Deck)

- Connect connector rod to upper side of connecting link assembly (page 15-32).
- Install shield face on connecting link assembly (page 15-32).

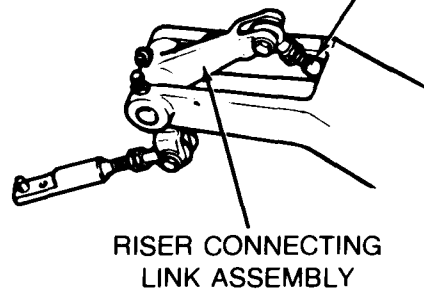
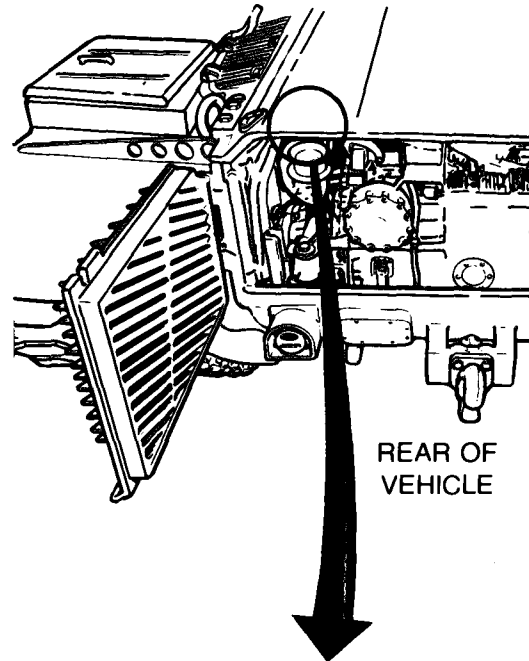
First Technician (Rear Grille Doors)

- Disconnect shifting control rod from upper side of riser connecting link assembly. (page 15-36).

Second Technician (Operator's Station)

- Move steering control handle right and left.

Is riser connecting link assembly obstructed or binding?



14

- Remove, disassemble and inspect the riser connecting link assembly (page 15-36).

YES

NO

15

- Notify support maintenance of steering problem.
- Connect shifting control rod to upper side of riser connecting link assembly (page 15-38).
- Install transmission shroud (page 9-6).

TA250254

Symptom-25
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

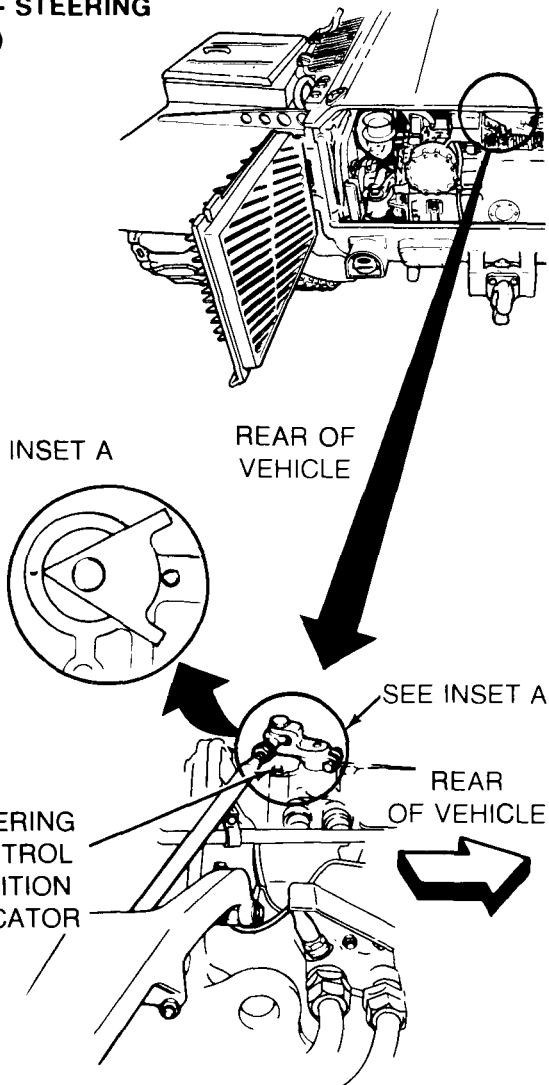
2

16 Check steering control position indicator for proper indications.

First Technician (Top Deck)

- Check steering position indicator on top of transmission. Indicator should point to center dimple.
- Move steering control valve link assembly to the right.
- Check that indicator points to (R).
- Move steering control valve link assembly to the left.
- Check that indicator points to (L).

Does steering position indicator show proper indications?



17

- Adjust steering control linkage (page 15-31).
- Connect steering control rod to transmission connecting link (page 15-38).

YES NO

18

- Notify support maintenance of steering problem.
- Connect steering control rod to transmission connecting link (page 15-38).
- Install transmission shroud (page 9-6).

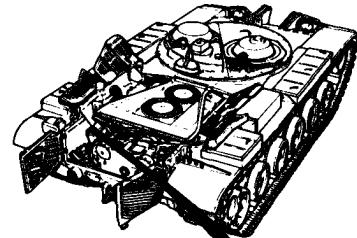
TA250255

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING**

Symptom-26

VEHICLE PIVOTS TO THE LEFT OR RIGHT.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



FOR CLARITY SHOWN WITH
BACK DECK REMOVED

1 Check steering position indicator for correct indications.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- With steering control not applied, check steering position indicator to see that it points to the center dimple.

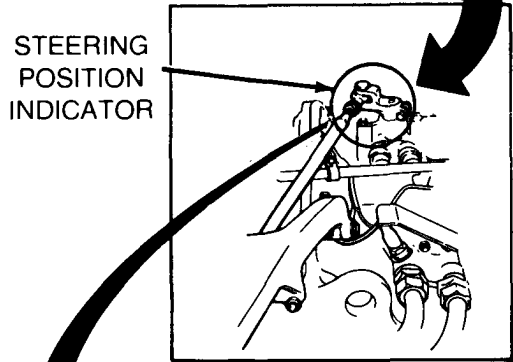
Second Technician (Operator's Station)

- Move steering control to the right and to the left.

First Technician (Rear Grille Doors)

- Check that position indicator moves to L then to R.

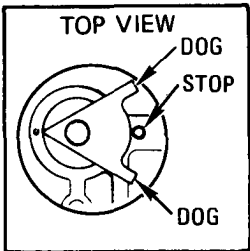
Does steering position indicator show correct position?



2 See Symptom 25: VEHICLE WILL NOT STEER PROPERLY.

NO

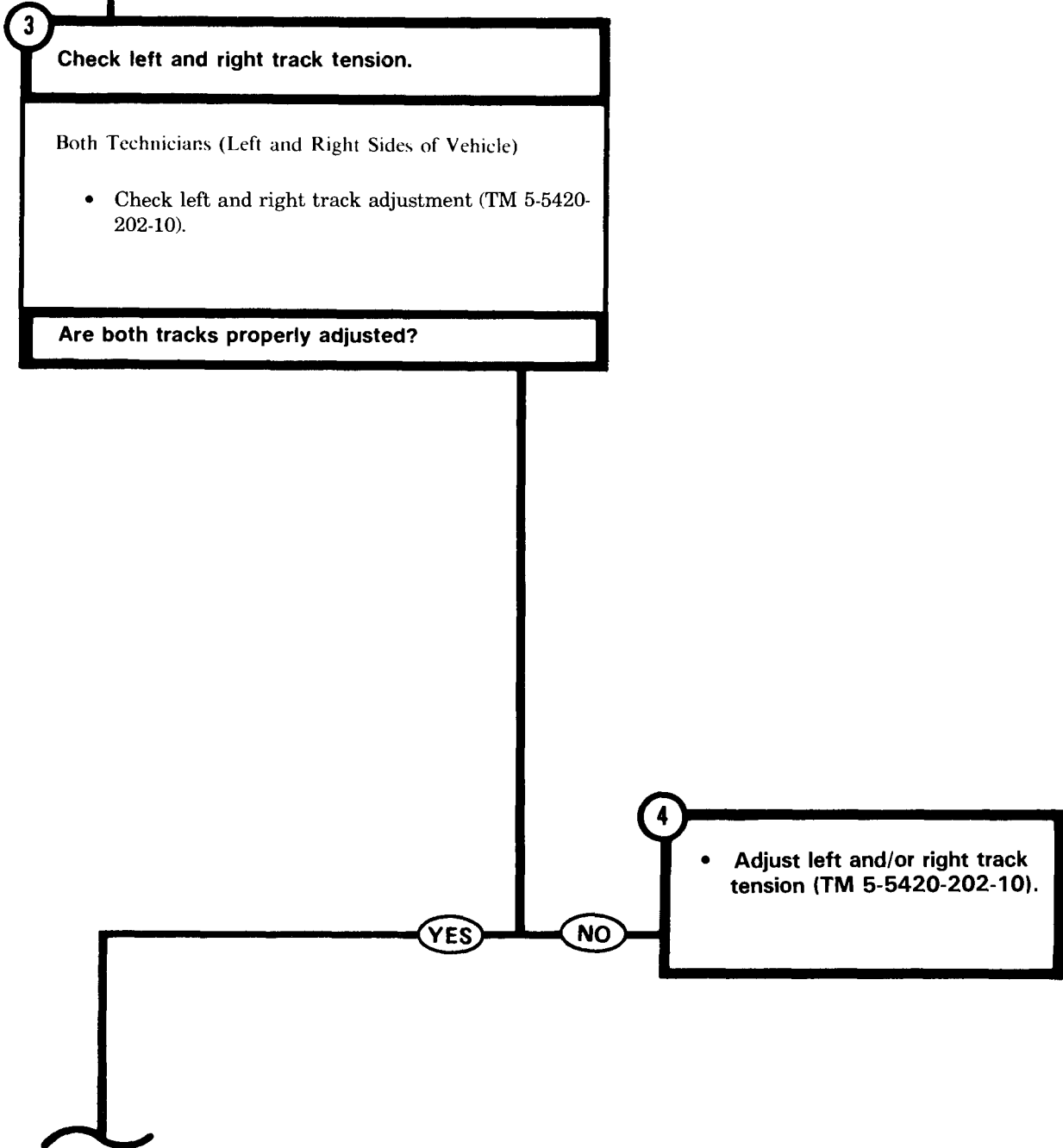
YES



TA250256

Symptom-26

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**



TA250257

Symptom-26

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)**

5

Check service brake for adjustment.

Both Technicians (Left and Right Side of Vehicle)

- Block tracks to prevent movement of vehicle.

First Technician (Rear Grille Doors)

- Remove lockwires and plugs (one located on each side of transmission rear housing) from brake inspection holes.

Second Technician (Operator's Station)

- Press brake pedal and hold when pressure of 750 to 900 psi is reached.

First Technician (Rear Grille Doors)

- Check if index line marked "A" (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Second Technician (Operator's Station)

- Release brakes.

First Technician (Rear Grille Doors)

- Check if index line marked "R" (Released) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Are service brakes properly adjusted?

6

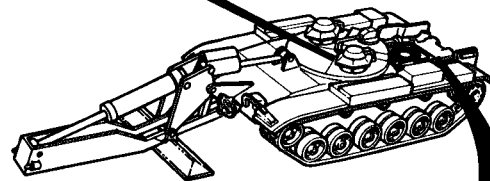
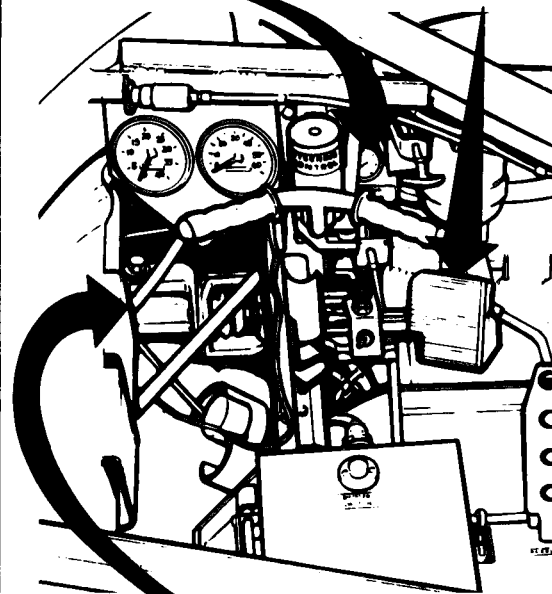
- **Adjust service brakes (page 13-78).**

NO

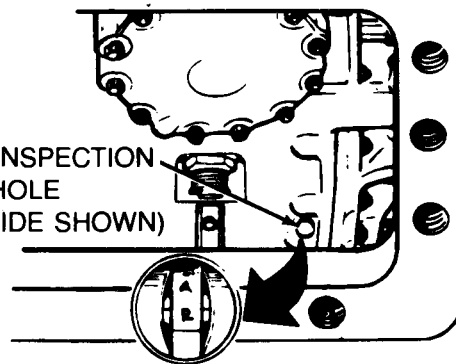
YES

BRAKE PRESSURE
GAGE

BRAKE
PEDAL



BRAKE INSPECTION
HOLE
(RIGHT SIDE SHOWN)



TA250258

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

Symptom-26

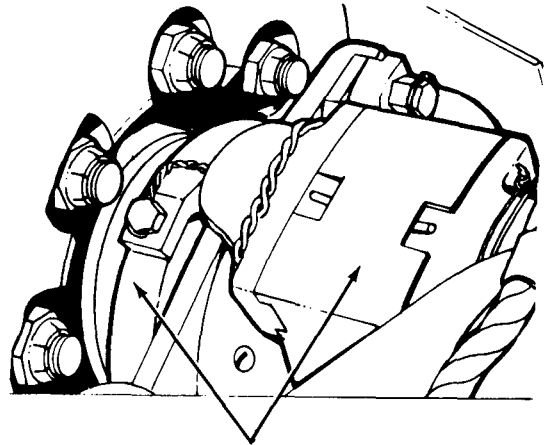
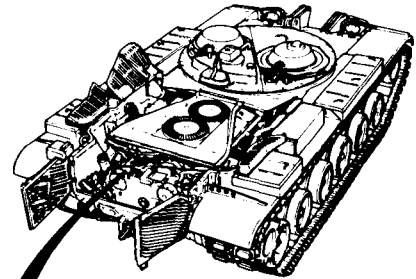
7

Check universal joints for damage.

Both Technicians (Rear Grille Doors)

- Install plugs in brake inspection holes and lockwire.
- Remove left or right universal joint (page 12-15).
- Disassemble universal joint (page 12-22).
- Check universal joint for excessive wear, broken parts, or other damage.

Are universal joints worn, broken or damaged?



8

- Replace universal joint (page 12-18).

YES

NO

TA250259

Symptom-26

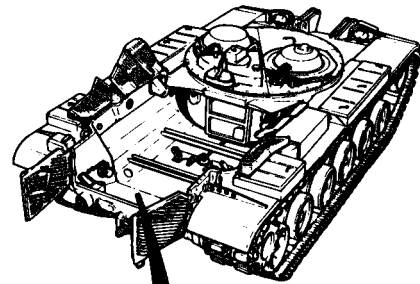
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

9 Check final drive input shafts for breaks or damage.

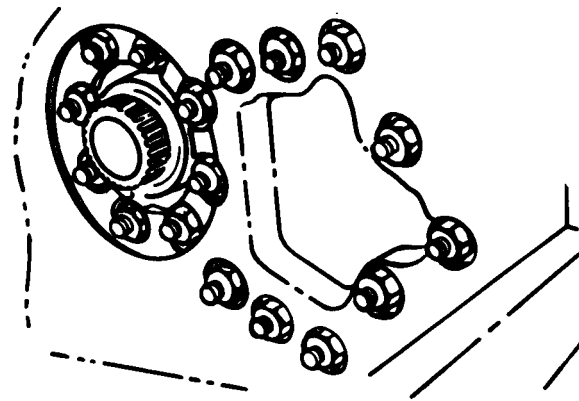
Both Technicians (Rear Grille Doors)

- Remove right or left input shaft adapter (page 12-7).
- Check final drive input shaft for broken or damaged condition.

Is final drive input shaft broken or damaged?



INPUT SHAFT ADAPTER



FINAL DRIVE INPUT SHAFT
(RIGHT SIDE SHOWN
POWERPLANT REMOVED
FOR CLARITY)

10

- Replace final drive (page 12-2).

YES

11

- Install input shaft adapter (page 12-8).
- Install universal joint (page 12-18).
- Notify support maintenance of steering problem.

NO

TA250260

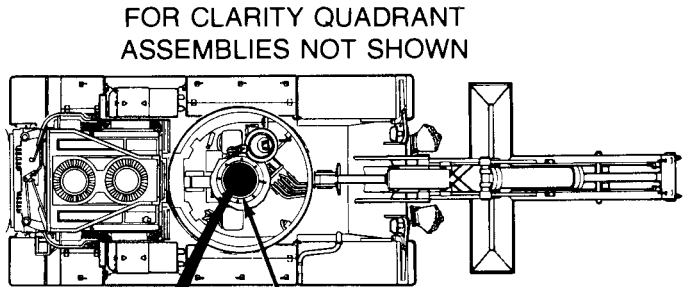
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION-HULL POWER**

Symptom-27

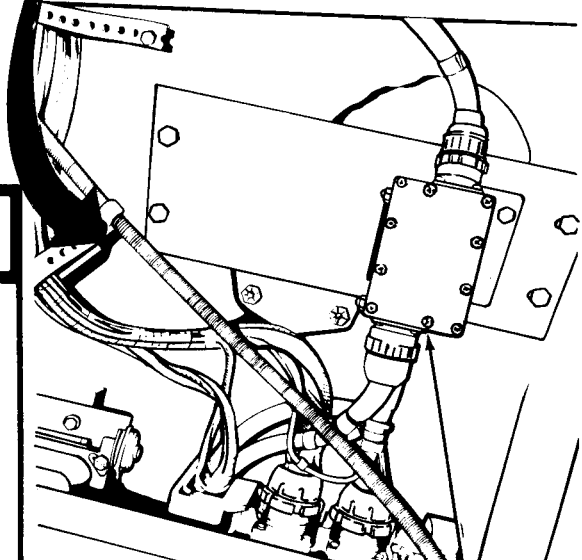
**NO POWER DISTRIBUTION FROM MASTER RELAY
(MASTER BATTERY INDICATOR LAMP WILL LIGHT).**

WARNING
Use extreme care when working with circuit 81. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



MASTER RELAY
(UNDER FLOOR ACCESS COVER)



MASTER RELAY
FOR CLARITY ACCESS COVER REMOVED

1 Listen for clicking sound from MASTER RELAY when MASTER BATTERY switch is set ON.

- Second Technician (Operator's Station)
- Set MASTER BATTERY switch ON.
 - If master relay is working, a click should be heard from master relay.
 - Set MASTER BATTERY switch OFF and ON several times, listening for clicking sound.

Can clicking sound be heard?

YES

NO

2

- Check for electrical power to coil of master relay (CKT 459A).
- See Step 8 .

Symptom-27

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

3 Check for electrical power at output of MASTER RELAY (CKT 81-5).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove floor access cover (page 17-7).
- Disconnect hull power harness connector (CKT 81-5) from master relay.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to center contact of master relay connector (CKT 81-5) and black probe to ground.

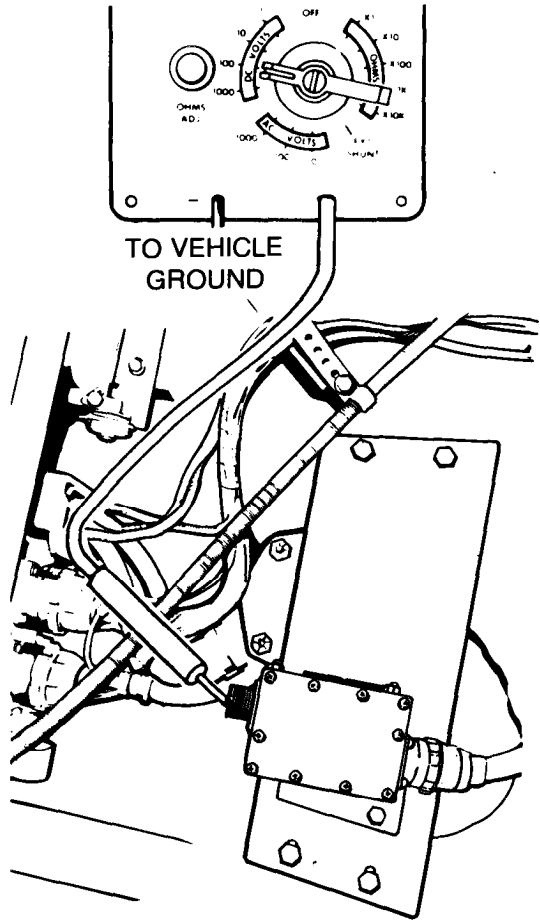
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4

- Check hull power harness (CKT 10) at basket disconnect for electrical power.
- See Step **17**

NO YES

TA250262

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

Symptom-27

5 Check for electrical power at input to MASTER RELAY (CKT 81).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

WARNING
After disconnecting ground straps, do not allow them to contact any metal surface.

Second Technician (Front of Crew Compartment)

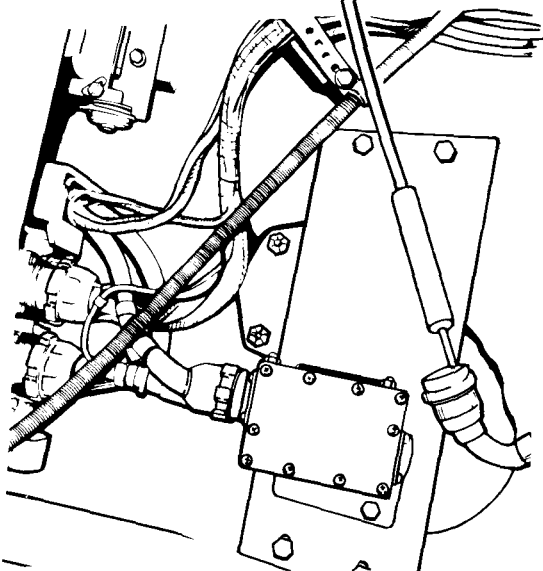
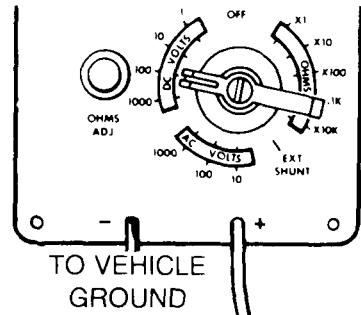
- Disconnect three battery ground straps (page 10-268).

First Technician (Commander's Station)

- Connect hull power harness connector to master relay.
- Disconnect battery cable connector (CKT 81) from master relay.
- Connect red probe of meter to center contact of battery cable connector (CKT 81) and black probe to ground.

Second Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).

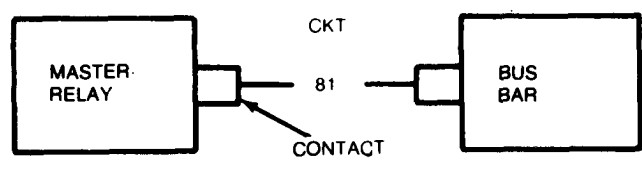
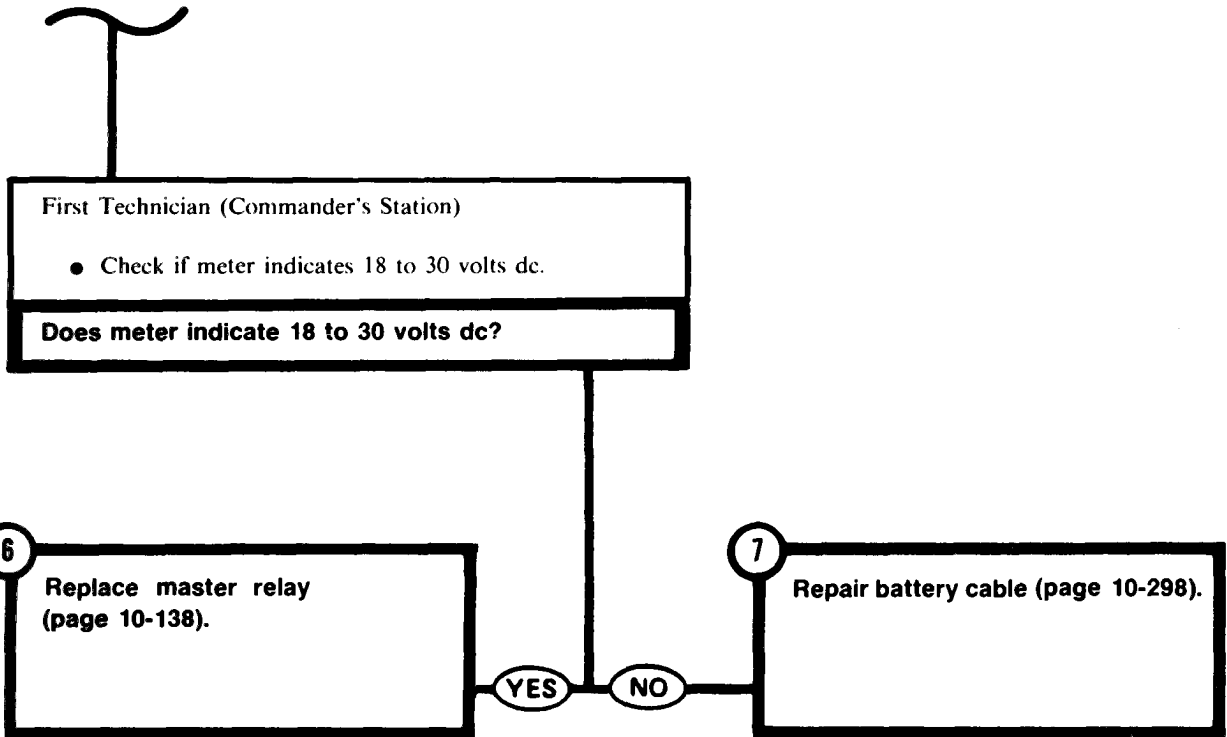


OUTPUT CONNECTOR (CKT 81-5)

Symptom-27

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)**

STEP 5 CONTINUED



TA250264

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

Symptom-27
FROM STEP

2

8

Check for electrical power to coil of master relay (CKT 459A).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove floor access cover (page 17-7).
- Disconnect reverse polarity protection device connector (CKT 459A) from master relay.
- Set meter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to center contact of reverse polarity protection device connector (CKT 459A) and black probe to ground.

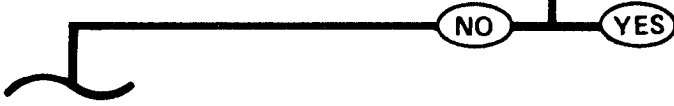
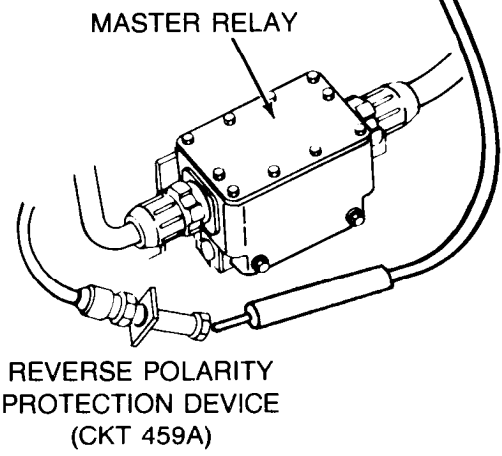
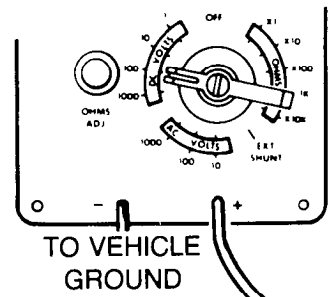
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



9

Replace master relay (page 10-138).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

Symptom-27

10 Check front accessory harness connector (CKT 459A) at reverse polarity protection device for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Reconnect reverse polarity protection device to master relay.
- Disconnect front accessory harness connector (CKT 459A) from reverse polarity protection device.
- Connect red probe of meter to center contact of front accessory harness connector (CKT 459A) and black probe to ground.

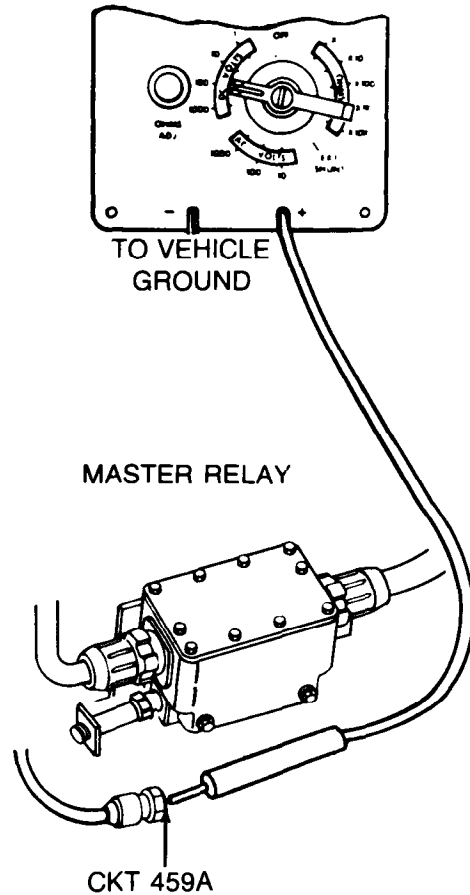
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicates 18 to 30 volts dc?



11

- Replace reverse polarity protection device (page 10-139).



TA250266

Symptom-27

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

12 Check basket-control panel starting harness connector (CKT 459A) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace basket-control panel starting harness connector (CKT 459A) at basket disconnect.
- Connect red probe of meter to contact E (CKT 459A) of basket-control panel starting harness connector and black probe to ground.

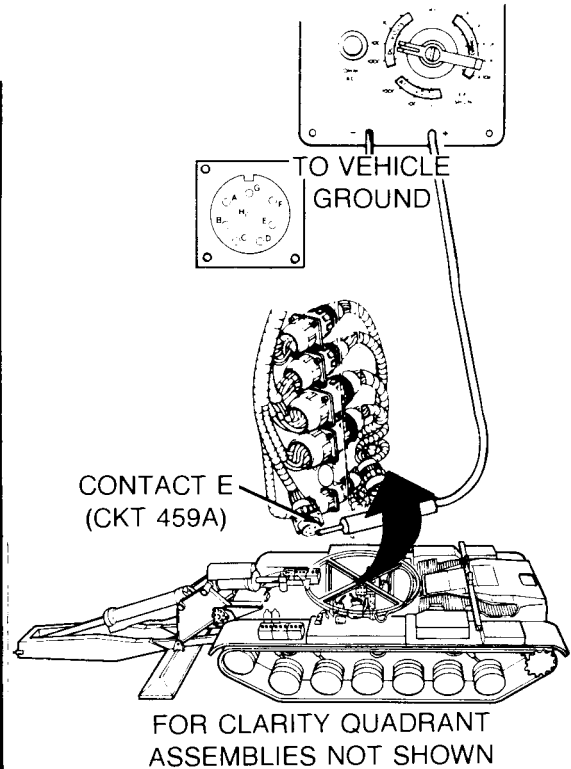
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

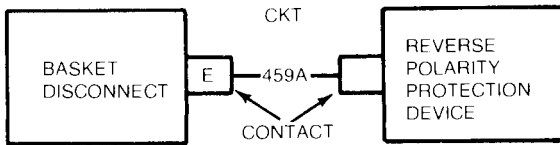
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



13

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 459A wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-control panel starting harness connector to basket disconnect.
- Connect front accessory harness connector to reverse polarity protection device.
- Install floor access cover (page 17-7).



NO YES

TA250267

Symptom-27

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

14 Check starting harness connector (CKT 459A) at master control panel for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).

First Technician (Commander's Station)

- Install basket-control panel starting harness at basket disconnect.
- Connect front accessory harness connector (CKT 459A) to master relay.
- Install floor access cover (page 17-7).

Second Technician (Operator's Station)

- Disconnect basket-control panel starting harness connector (CKT 459A) from master control panel.
- Connect red probe of meter to contact E (CKT 459A) of control panel starting harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

15

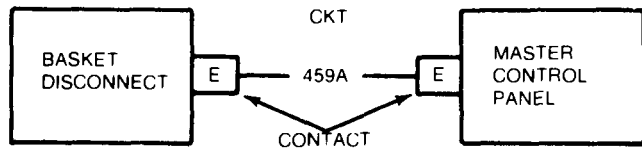
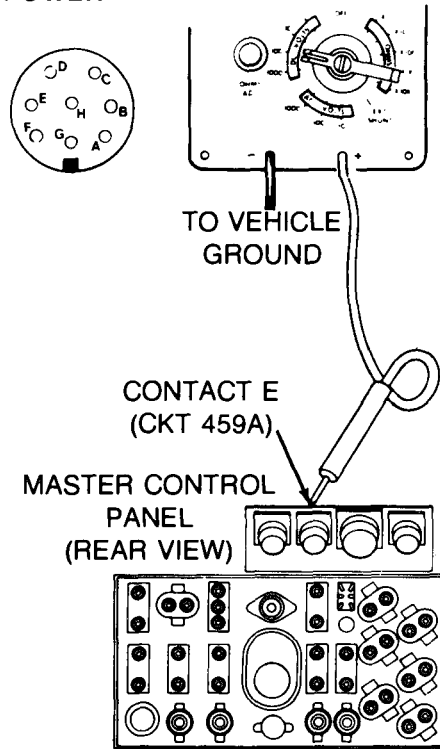
- Replace master control panel starting harness (page 10-97).
- Connect basket-control panel starting harness connector at master control panel.
- Install master control panel (page 10-33).

NO

YES

16

- Inspect basket-control panel starting harness for bent/broken connector contacts or loose CKT 459A wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.
- Install master control panel (page 10-33).



TA250268

Symptom-27

FROM STEP

4

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

17 Check hull power harness (CKT 10) for continuity.

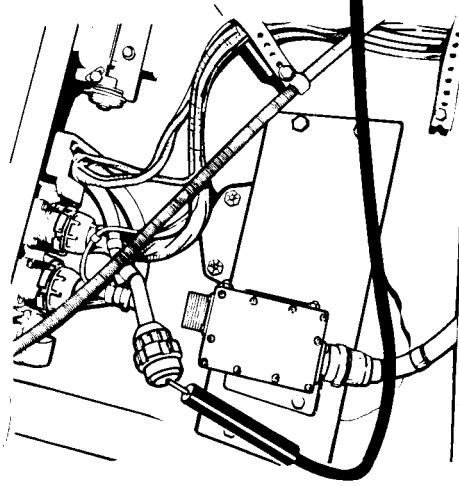
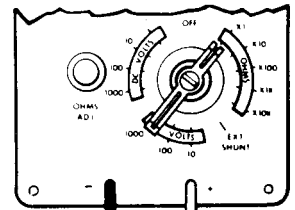
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Disconnect hull power harness connector (CKT 10) from basket disconnect.
- Connect red probe of meter to contact B (CKT 10) of hull power harness connector at basket disconnect.
- Connect black probe of meter to center contact of hull power harness connector (CKT 81-5) at master relay.
- Check if meter indicates continuity.

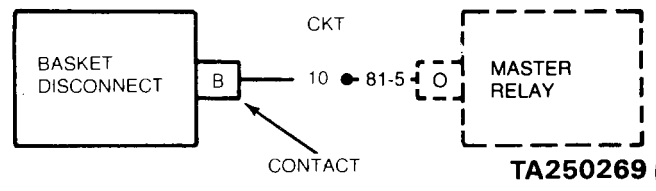
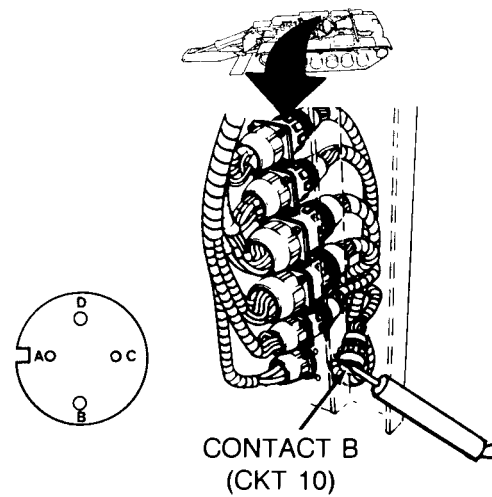
Does meter indicate continuity?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

18

- Inspect hull power harness for bent/broken connector contacts or loose CKT 10 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective hull power harness.
- Connect hull power harness connector to basket disconnect and master relay.
- Install floor access cover (page 17-7).



TA250269

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - INDICATORS
(Continued)**

Symptom-27

19

Check basket-control panel power harness (CKT 10) for continuity.

First Technician (Commander's Station)

- Connect hull power harness to master relay.
- Replace floor access cover (page 17-7).
- Displace basket-control panel power harness connector at basket disconnect.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel power harness connector (CKT 10) at master control panel.
- Connect red probe of meter to contact B (CKT 10) of basket-control panel power harness connector at master control panel.

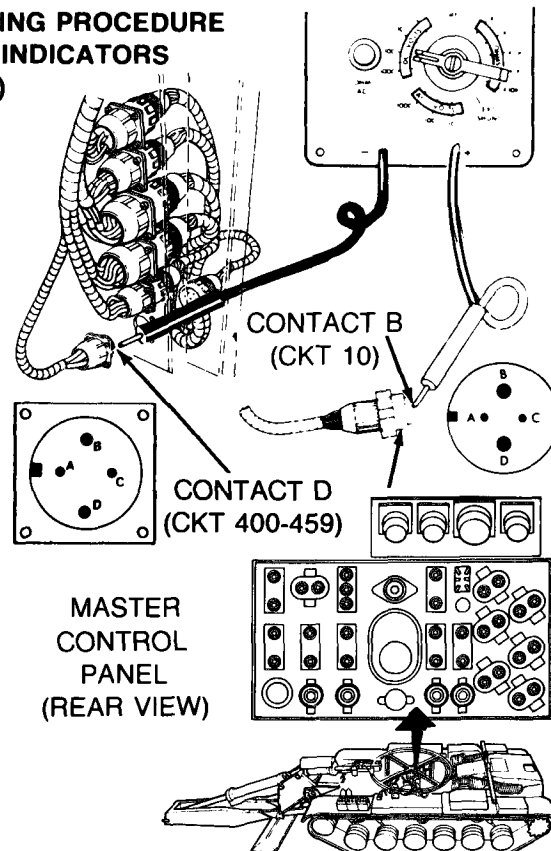
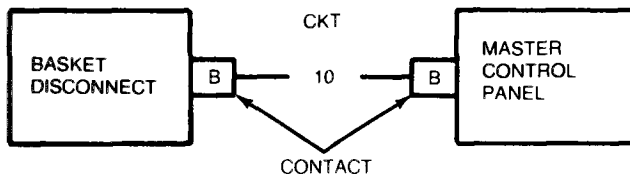
First Technician (Commander's Station)

- Connect black probe of meter to contact B (CKT 10) of basket-control panel power harness connector at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

20

Replace master control panel power harness (page 10-97).



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

21

- Inspect basket-control panel power harness for bent/broken connector contacts or loose CKT 10 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel power harness.
- Connect basket-control panel power harness connector to master control panel.
- Reinstall master control panel (page 10-33).
- Install basket-control panel power harness at basket disconnect.

TA250270

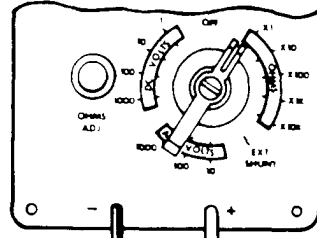
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

Symptom-28

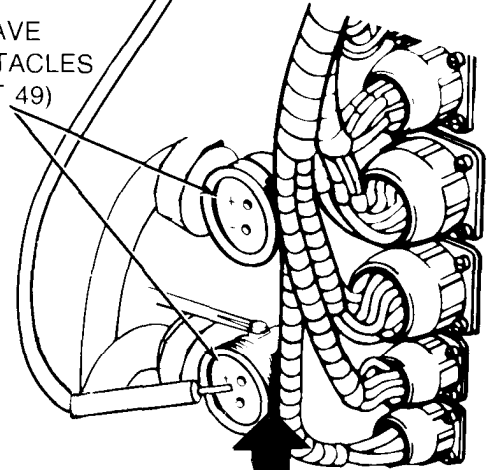
NO POWER IN VEHICLE (MASTER BATTERY INDICATOR LAMP WILL NOT LIGHT).

WARNING
Use extreme care when working with circuit 49. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



SLAVE RECEPTACLES (CKT 49)



1
Check CKT 49 at slave receptacle for electrical power.

- First Technician (Commander's Station)
- Displace protective cap from one slave receptacle.
 - Set multimeter to measure 18 to 30 volts dc. or use STE/ICE Test No. 89 (page 4-81).

WARNING
Do not allow red probe of meter to touch positive (+) contact and outer surface of slave receptacle at the same time.

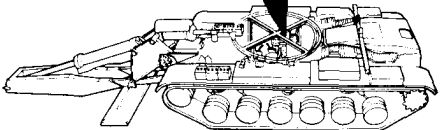
- Connect red probe of meter to positive (+) contact (CKT 49) of slave receptacle and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

NO

- 2**
- Service batteries (page 10-258).
 - Charge batteries (TM 9-6140-200-14).
 - Install slave receptacle protective cap.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250271

Symptom-28

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
 (Continued)

WARNING

Use extreme care when working with circuit 459. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

3

Check MASTER BATTERY switch for continuity.

First Technician (Commander's Station)

- Install slave receptacle protective cap.
- Disconnect three battery ground straps (page 10-268).

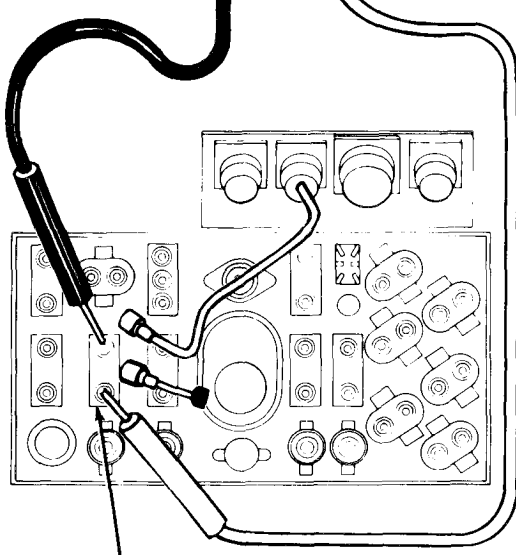
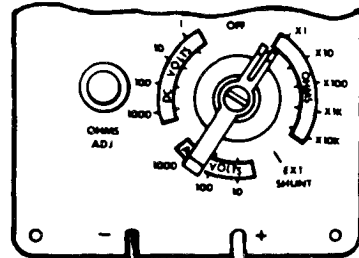
Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Set MASTER BATTERY switch ON.
- Disconnect control panel power harness connector (CKT 459) from MASTER BATTERY switch.
- Disconnect control panel starting harness connector (CKT 459A) from MASTER BATTERY switch.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one contact of MASTER BATTERY switch.
- Connect black probe of meter to other contact of MASTER BATTERY switch.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

NO



MASTER BATTERY SWITCH

MASTER CONTROL PANEL (REAR VIEW)

4

- Replace MASTER BATTERY switch (page 10-43).
- Connect three battery ground straps (page 10-268).

TA250272

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

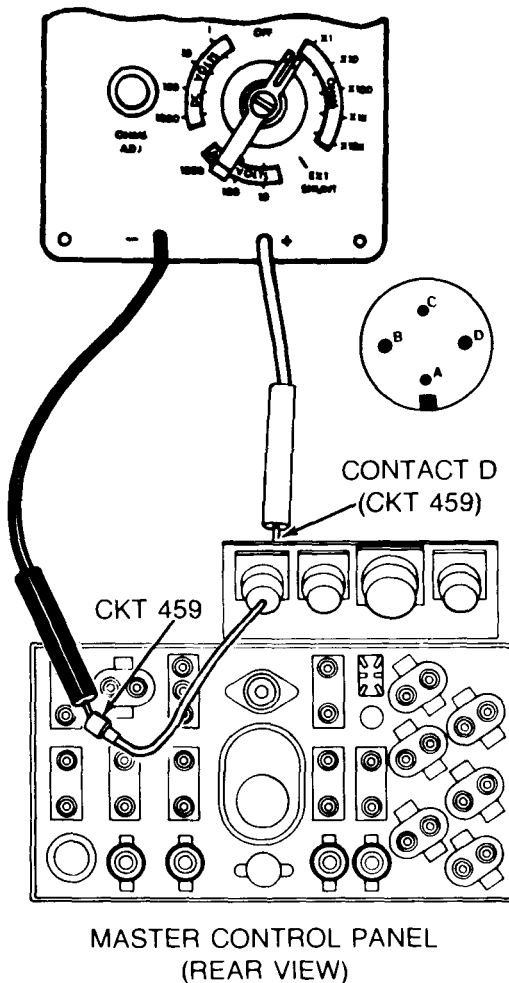
Symptom-28

5 Check CKT 459 in control panel power harness for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect basket-control panel power harness connector from master control panel.
- Connect red probe of meter to contact D (CKT 459) of control panel power harness panel connector.
- Connect black probe of meter to control panel power harness connector at MASTER BATTERY switch (CKT 459).
- Check if meter indicates continuity.

Does meter indicate continuity?



YES NO

6

- Replace control panel power harness (page 10-101).
- Connect control panel starting harness connector to MASTER BATTERY switch.
- Connect three battery ground straps (page 10-268).

TA250273,

Symptom-28

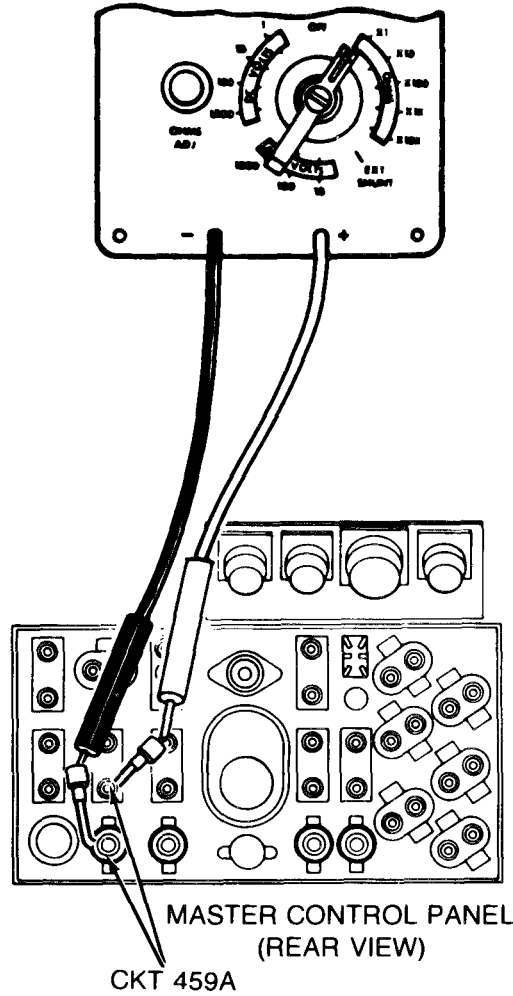
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

7 Check CKT 459A in control panel starting harness for continuity.

Second Technician (Operator's Station)

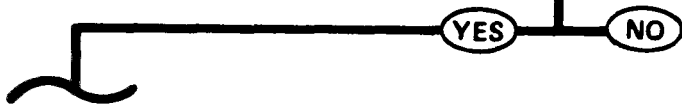
- Disconnect control panel starting harness connector (CKT 459A) from MASTER BATTERY indicator lamp.
- Connect red probe of meter to control panel starting harness connector (CKT 459A) at MASTER BATTERY switch.
- Connect black probe of meter to control panel starting harness connector (CKT 459A) at MASTER BATTERY indicator lamp.
- Check if meter indicates continuity.

Does meter indicate continuity?



8

- Replace control panel starting harness (page 10-97).
- Reconnect basket-control panel power harness to master control panel.
- Connect control panel power harness connector to MASTER BATTERY switch.
- Connect three battery ground straps (page 10-268).



TA250274

Symptom-28

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

9

Check master relay circuit breaker for continuity.

Second Technician (Operators Station)

- Connect control panel starting harness connector (CKT 459A) to MASTER BATTERY indicator lamp.
- Connect control panel starting harness connector (CKT 459A) to MASTER BATTERY switch.
- Connect control panel power harness connector (CKT 459) to MASTER BATTERY switch.

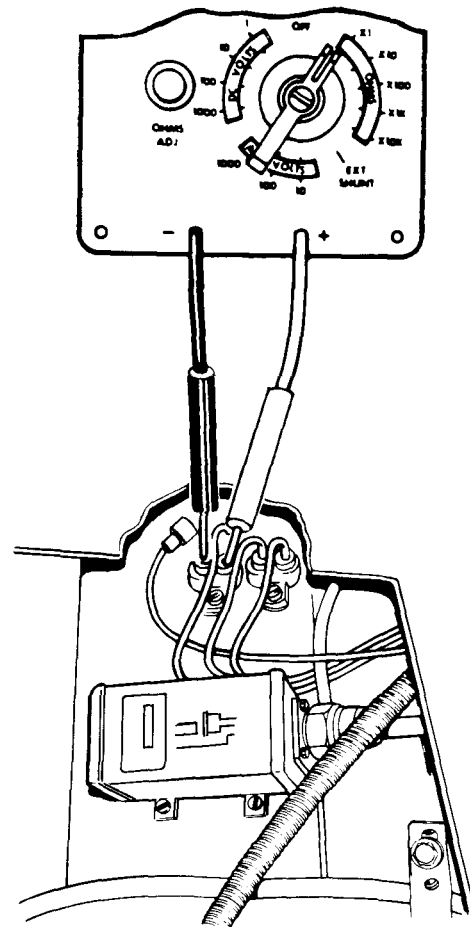
First Technician (Commander's Station)

- Remove floor access cover located in front of commander's seat (page 17-7).
- Disconnect both hull power harness connectors (CKT 400-459) from master relay circuit breaker.
- Connect red probe of meter to one contact of master relay circuit breaker.
- Connect black probe of meter to other contact of master relay circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

NO



10

- Replace master relay circuit breaker (page 10-165).
- Connect basket-control panel power harness connector to master control panel.
- Connect three battery ground straps (page 10-268).
- Install master control panel (page 10-33).

T A 2 5 0 2 7 5

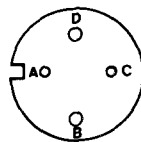
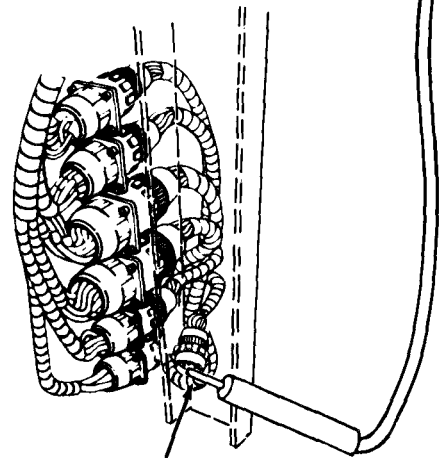
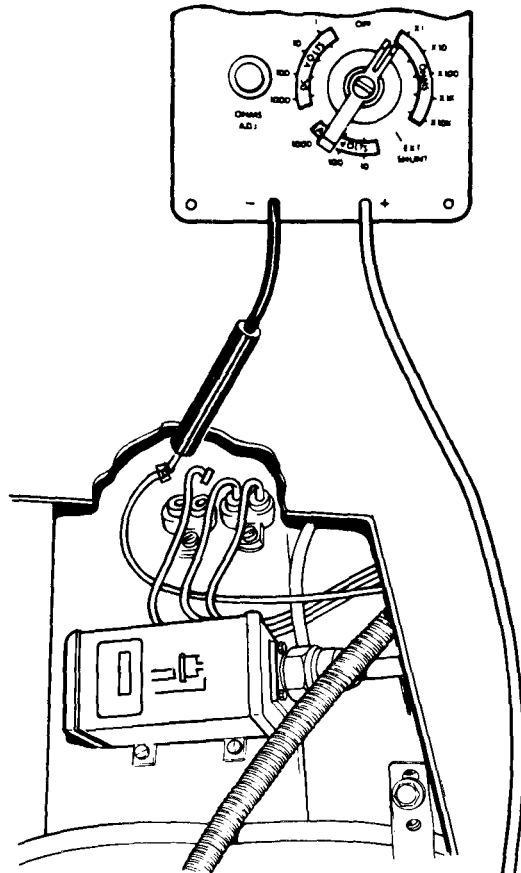
Symptom-28

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

11 Check hull power harness (CKT 400-459) from master relay circuit breaker to basket disconnect for continuity.

First Technician (Commander's Station)

- Disconnect hull power harness connector (CKT 400-459) from basket disconnect.
- Connect red probe of meter to contact D (CKT 400-459) of hull power harness connector at basket disconnect.
- Connect black probe of meter to one CKT 400-459 connector at master relay circuit breaker.
- Check if meter indicates continuity.
- Move black probe of meter to other CKT 400-459 connector at master relay circuit breaker.



CONTACT D
(CKT 400-459)

TA250276

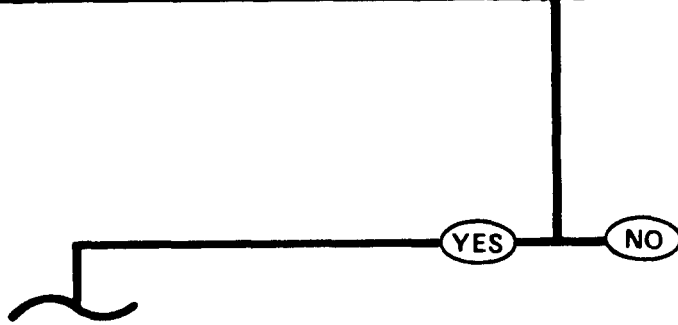
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

Symptom-28

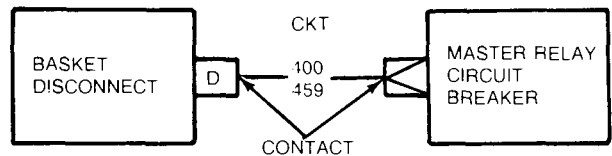
STEP **11** CONTINUED

• Check if meter indicates continuity.

Does meter indicate continuity at one of the harness connectors to master relay circuit breaker?



- 12**
- Inspect hull power harness for bent/broken connector contacts or loose CKT 400-459 wire at rear of connectors.
 - Repair connectors if defective (page 10-298).
 - If connectors are not defective notify support maintenance of bad hull power harness.
 - Connect hull power harness connectors to master relay circuit breaker.
 - Install floor access cover (page 17-7).
 - Connect basket-control panel power harness to master control panel.
 - Connect hull power harness connector to basket disconnect.
 - Connect three battery ground straps (page 10-268).
 - Install master control panel (page 10-33).



TA250277 |

Symptom-28

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

13

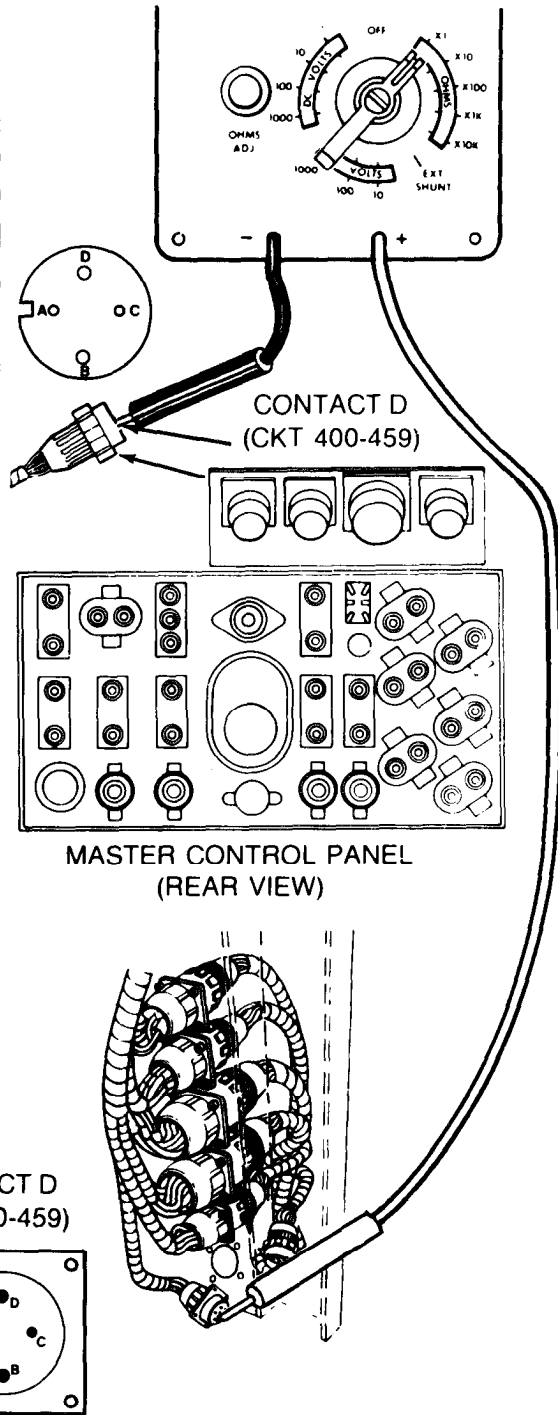
Check basket-control panel power harness (CKT 400-459) from connector at basket disconnect to connector at master control panel for continuity.

Second Technician (Operator's Station)

- Connect black probe of meter to contact D (CKT 400-459) of basket-control panel power harness connector at master control panel.

First Technician (Commander's Station)

- Displace basket-control panel power harness connector (CKT 400-459) at basket disconnect.
- Connect red probe of meter to contact D (CKT 400-459) of basket-control panel harness connector at basket disconnect.



TA250278

Symptom-28

STEP **13** CONTINUED

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

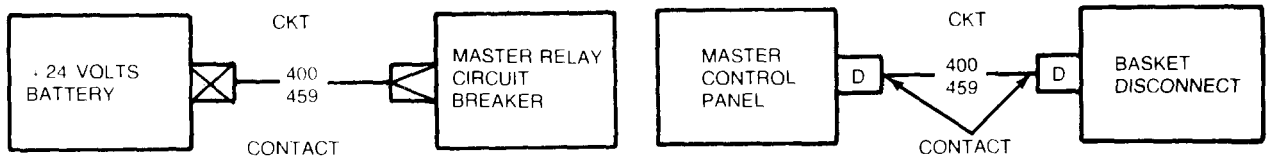
● Check if meter indicates continuity.

Does meter indicate continuity?

- 14**
- Inspect hull power harness from battery to master relay circuit breaker for bent/broken connector contacts or loose CKT 400-459 wire at rear of connectors.
 - Repair connectors if defective (page 10-298).
 - If connectors are not defective, notify support maintenance of bad hull power harness.
 - Connect hull power harness connectors to master relay circuit breaker.
 - Install floor access cover (page 17-7).
 - Connect three battery ground straps (page 10-268).
 - Install basket-control panel power harness connector at basket disconnect.
 - Connect basket-control panel power harness connector to master control panel.
 - Install master control panel (page 10-33).

YES **NO**

- 15**
- Inspect basket-control panel power harness for bent/broken connector contacts or loose CKT 400-459 wire at rear of connectors.
 - Repair connectors if defective (page 10-298).
 - If connectors are not defective, notify support maintenance of bad basket-control panel power harness.
 - Connect hull power harness connectors to master relay circuit breakers.
 - Install floor access cover (page 17-7).
 - Install basket-control panel power harness connector at basket disconnect.
 - Connect basket-control panel power harness connector to master control panel.
 - Install master control panel (page 10-33).
 - Connect three battery ground straps (page 10-268).



TA250279

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

Symptom-29

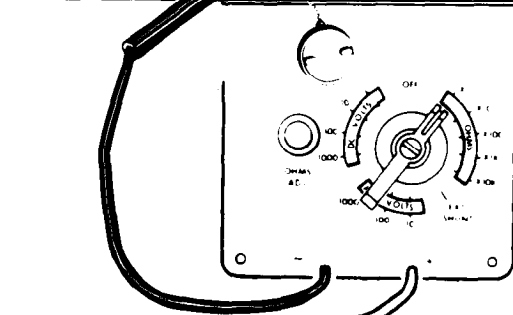
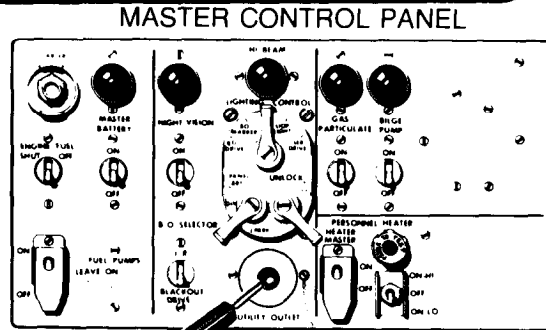
NO POWER AT UTILITY OUTLET ON MASTER CONTROL PANEL.

1 Check from connector at utility outlet circuit breaker (CKT 37) to UTILITY OUTLET for continuity.

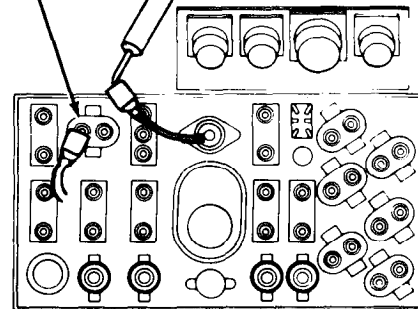
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Unscrew cap from UTILITY OUTLET.
- Disconnect UTILITY OUTLET lead (CKT 37) from utility outlet circuit breaker.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to UTILITY OUTLET lead disconnected from circuit breaker.
- Connect black probe to center contact of UTILITY OUTLET at front of master control panel.
- Check if meter indicates continuity.

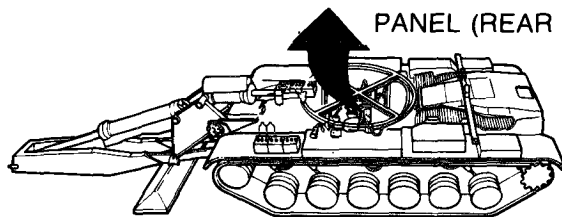
Does meter indicate continuity?



UTILITY OUTLET
CIRCUIT BREAKER



MASTER CONTROL
PANEL (REAR VIEW)



FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

2 Replace UTILITY OUTLET assembly (page 10-60).

NO

YES

TA250280

Symptom-29

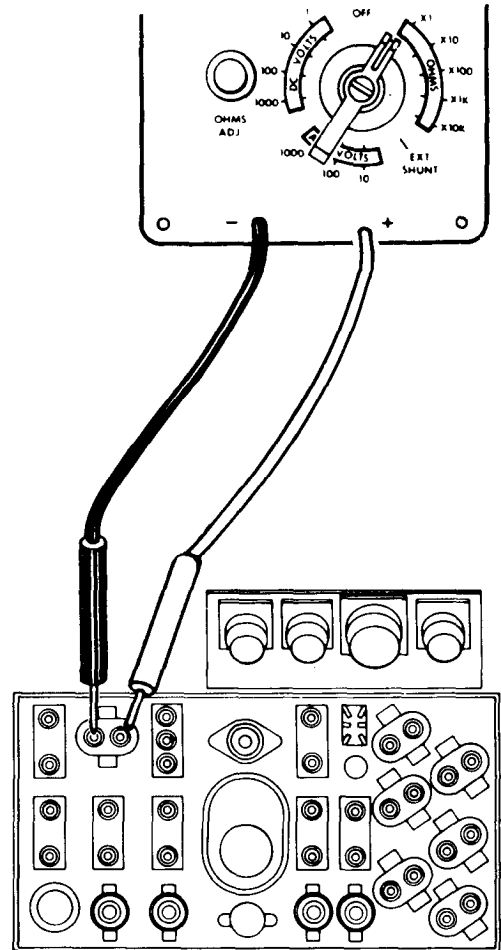
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

3 Check utility outlet circuit breaker for continuity.

Technician (Operator's Station)

- Replace cap on UTILITY OUTLET.
- Disconnect master control panel power harness connector (CKT 37) from utility outlet circuit breaker.
- Connect one meter probe to each disconnected utility outlet circuit breaker connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



4

- Replace master control panel power harness (page 10-101).
- Reconnect UTILITY OUTLET lead (CKT 37) to utility outlet circuit breaker.

YES NO

5 Replace utility outlet circuit breaker (page 10-70).

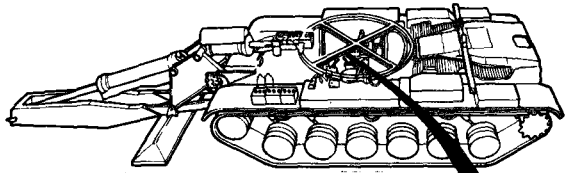
TA250281

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER**

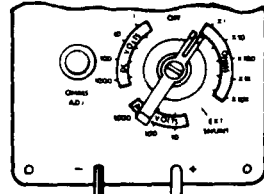
Symptom-30

NO POWER AT SLAVE RECEPTACLE (MASTER BATTERY LAMP LIGHTS).

CAUTION
Do not touch positive (+) socket of slave receptacle with multimeter probes when multimeter is set on OHMS scale. The positive (+) socket may be either the upper or lower socket.

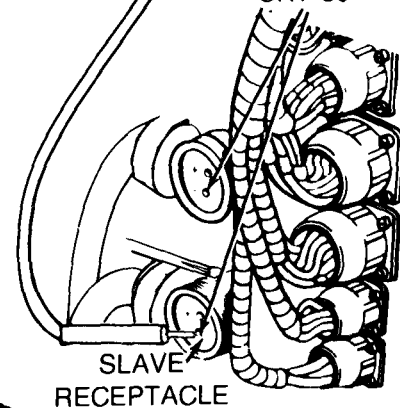


FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TO VEHICLE GROUND

SLAVE RECEPTACLE
CKT 50



SLAVE RECEPTACLE

1

Check battery slave cable (CKT 50-GROUND) for continuity from negative socket (-) of slave receptacle to ground.

Technician (Commander's Station)

- Displace protective cap from defective slave receptacle.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to negative socket (-) of slave receptacle (CKT 50) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

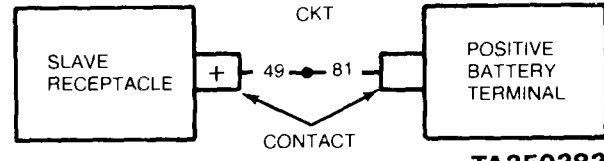
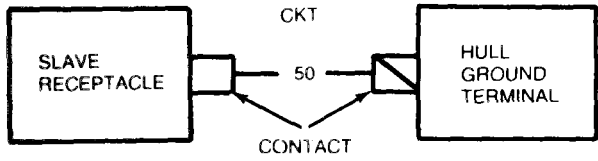
2

Repair battery slave cable (CKT 50) (page 10-298).

3

Repair battery slave cable (CKT 49) (page 10-298).

NO YES



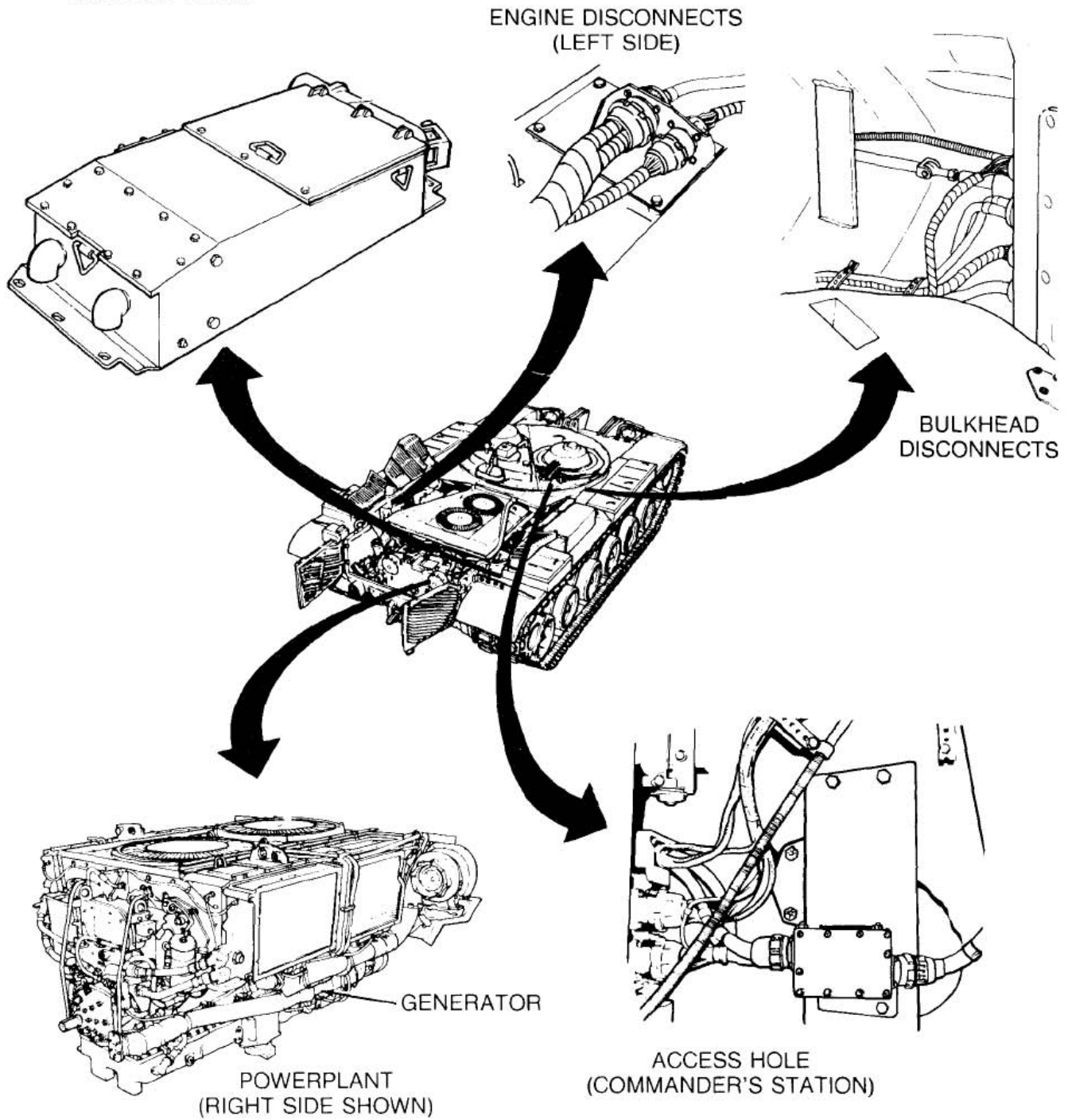
TA250282

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

Symptom-31

300 AMP GENERATOR/REGULATOR SYSTEM IS NOT WORKING

LOCATOR VIEWS:



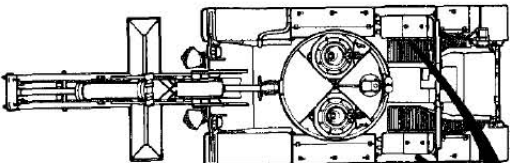
TA250283

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

Symptom-31

300 AMP GENERATOR/REGULATOR SYSTEM IS NOT WORKING

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1

Check if air cleaner blower motors work.

Second Technician (Operator's Station)

- Start engine.

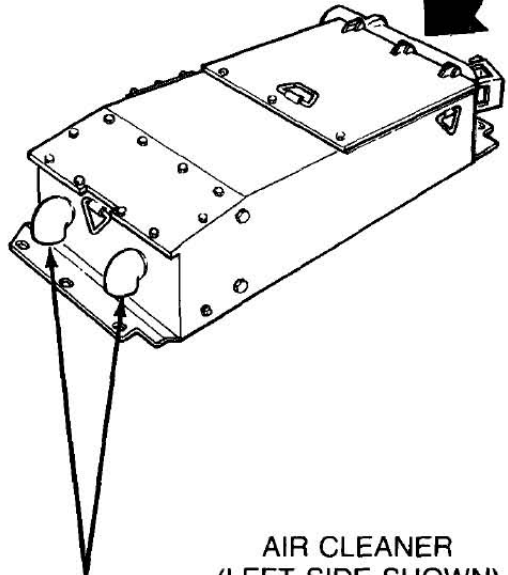
First Technician (Outside Vehicle)

- Check to see if air exhaust can be felt at any of the four blower motor exhaust elbows.

Second Technician (Operator's Station)

- Stop Engine.
- Set MASTER BATTERY switch OFF.

Are any air cleaner blower motors working?



AIR CLEANER
(LEFT SIDE SHOWN)

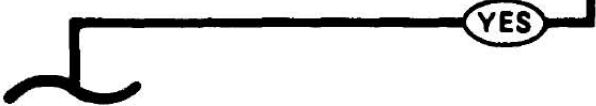
BLOWER MOTOR
EXHAUST ELBOWS

2

- Check CKT 1 from connector at voltage regulator to connector at engine disconnect for continuity.

NO

- See Step **8**.



TA250284

Symptom-31

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

3 Check voltage regulator lead from regulator to vehicle ground for continuity.

First Technician (Commander's Station)

- Remove right-hand floor access cover (page 7-9).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91) (page 4-83).
- Connect red probe of meter to voltage regulator lead connected to voltage regulator and black probe to ground.
- Check if meter indicates continuity.

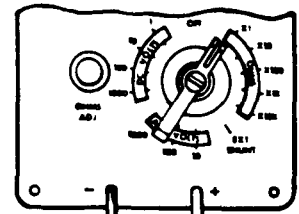
Does meter indicate continuity?

4

- Clean and tighten loose voltage regulator lead connections.
- If connections are not loose, replace damaged voltage regulator lead (page 10-18).

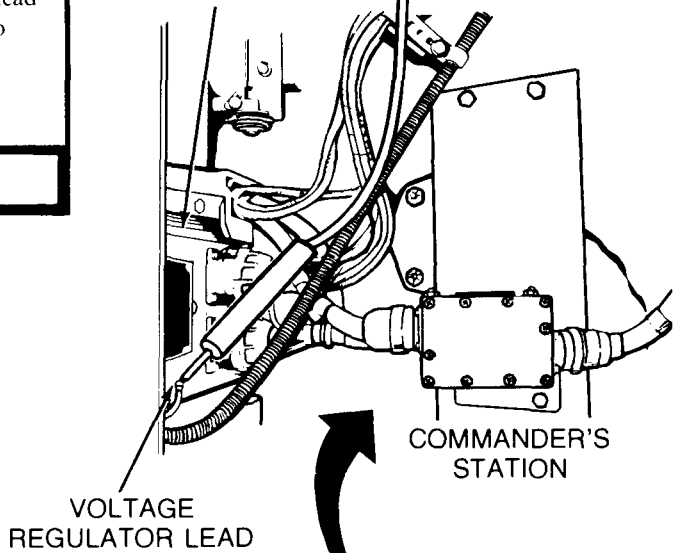
NO

YES



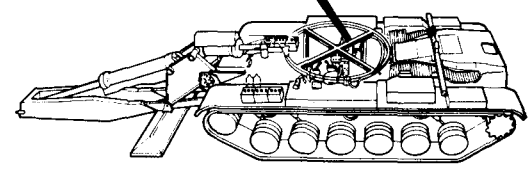
TO VEHICLE GROUND

VOLTAGE REGULATOR



COMMANDER'S STATION

VOLTAGE REGULATOR LEAD



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250285

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

5 Check hull power harness (CKT 5) at voltage regulator for electrical power.

First Technician (Commander's Station)

- Disconnect hull power harness connector (CKT 5) from voltage regulator.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A of hull power harness connector and black probe to ground.

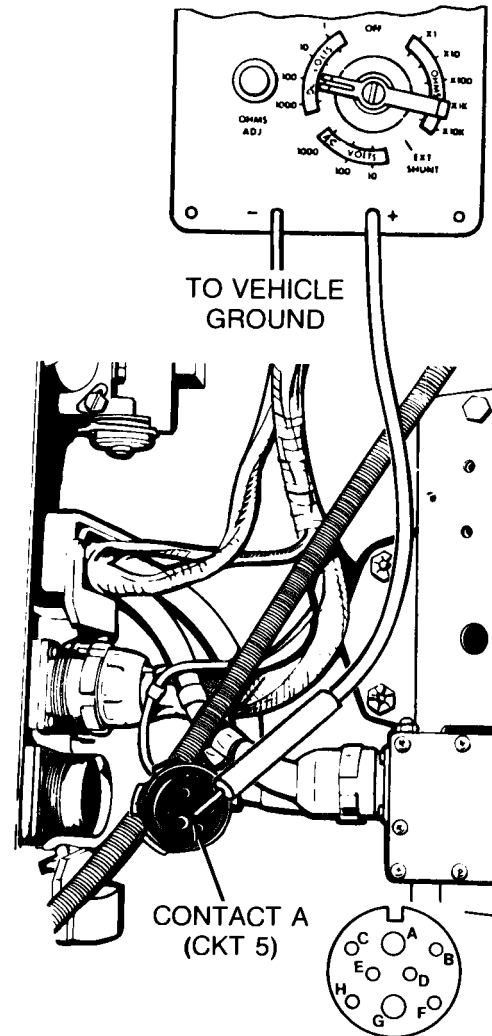
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

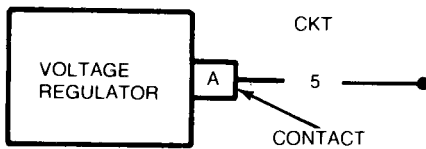
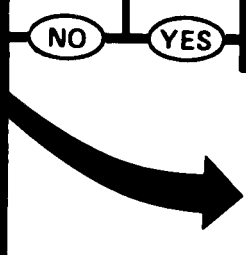
Does meter indicate 18 to 30 volts dc?



6

- Inspect HULL POWER harness for bent/broken connector contact or loose CKT 5 wire at rear of connector.
- Repair connector if defective (page 10-298).
- If connector is not defective, notify support maintenance of a defective hull power harness.
- Connect hull power harness connector to voltage regulator.
- Install floor access cover (page 17-7).

7 Replace voltage regulator (page 10-18).



TA250286

Symptom-31

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

FROM STEP

2

8

Check CKT 1 from connector at voltage regulator to connector at engine disconnect for continuity.

Second Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector from engine disconnect.
- Connect jumper wire from contact C (CKT 1) of bulkhead engine disconnect harness connector to vehicle ground.

First Technician (Commander's Station)

- Remove right-hand floor access cover (page 17-7).
- Disconnect front accessory harness connector (CKTS 1, 2, 415A, 478) from voltage regulator.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 1) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

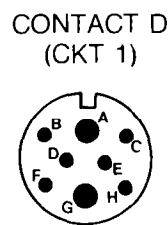
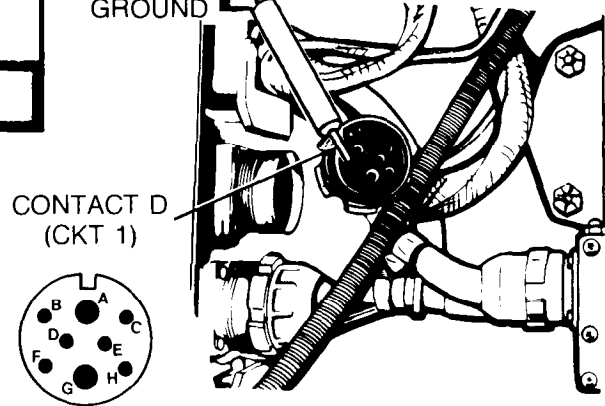
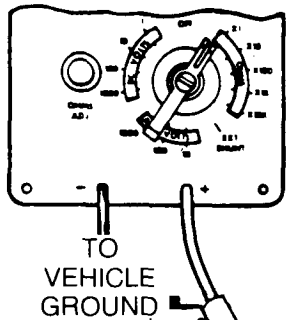
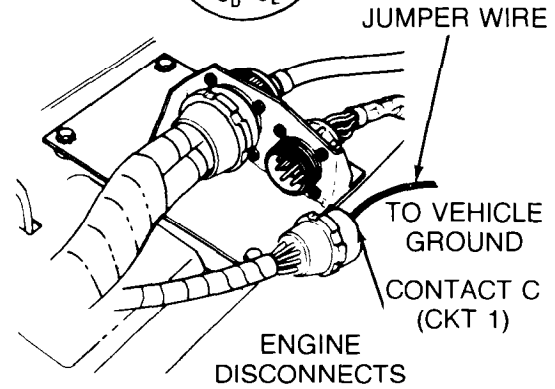
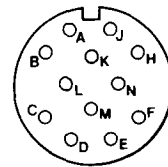
9

Check front accessory harness (CKT 1) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

See Step 25 .

NO

YES



Symptom-31

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

10 Check CKT 478 from connector at voltage regulator to connector at engine disconnect for continuity.

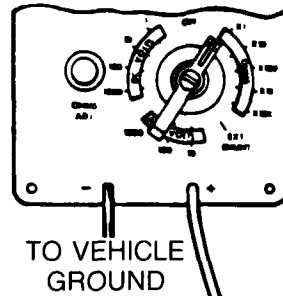
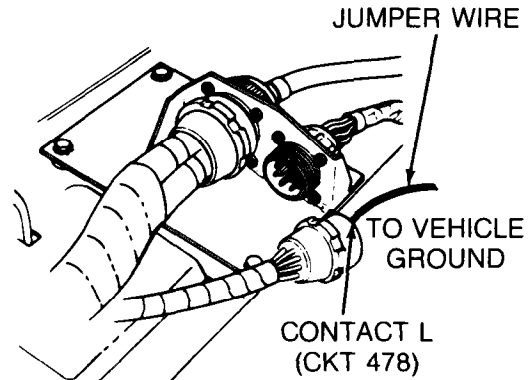
Second Technician (Left Top Deck Grille Doors)

- Move jumper wire at bulkhead engine disconnect harness connector from contact C to contact L (CKT 478).

First Technician (Commander's Station)

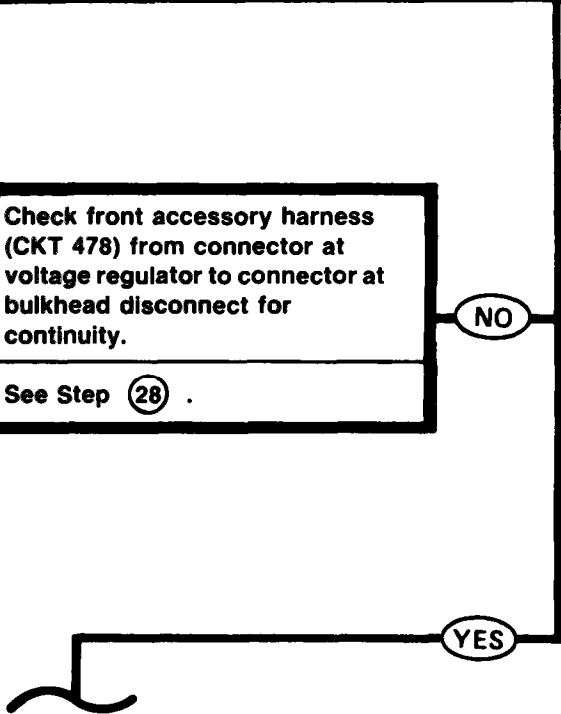
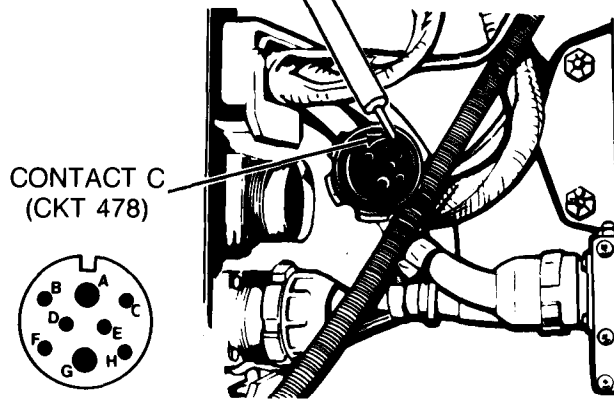
- Connect red probe of meter to contact C (CKT 478) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



11 Check front accessory harness (CKT 478) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

See Step **28**.



TA250288

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

Symptom-31

12 Check CKT 2 from connector at voltage regulator to connector at engine disconnect for continuity.

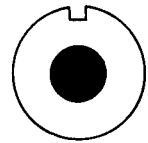
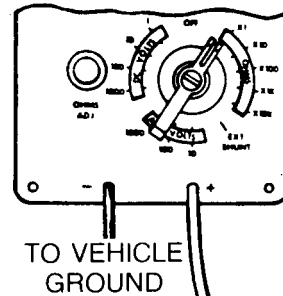
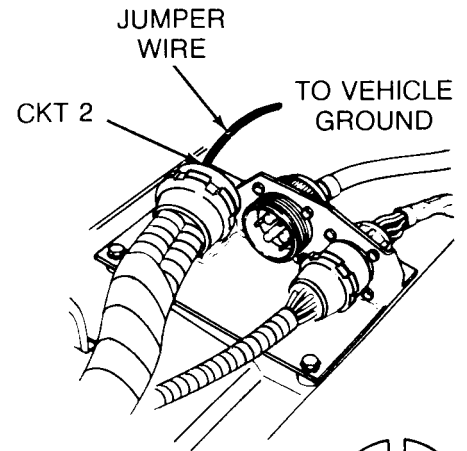
Second Technician (Left Top Deck Grille Doors)

- Connect bulkhead engine disconnect harness connector to engine disconnect.
- Disconnect power relay cable connector (CKT 2) from engine disconnect.
- Connect jumper wire from center contact (CKT 2) of power relay cable connector to vehicle ground.

First Technician (Commander's Station)

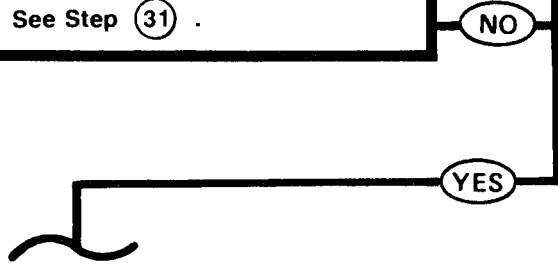
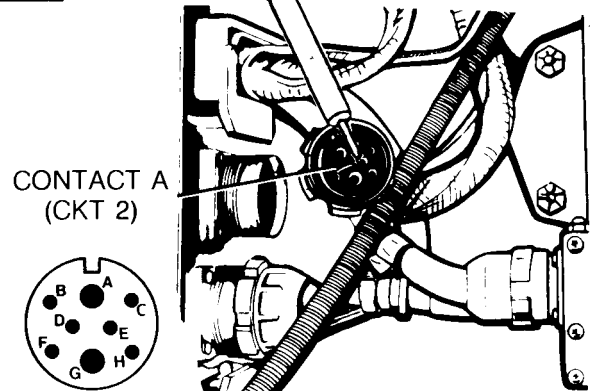
- Connect red probe of meter to contact A (CKT 2) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



13 Check front accessory harness (CKT 2) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

See Step **31**.



TA250289

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

14 Replace voltage regulator and check if BATT/GEN INDICATOR pointer is in green area.

First Technician (Commander's Station)

- Replace voltage regulator (page 10-18).

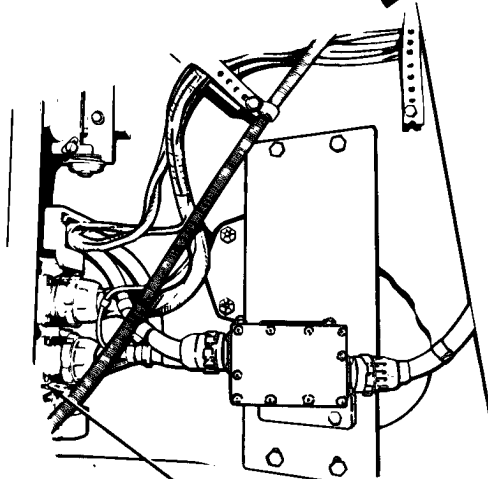
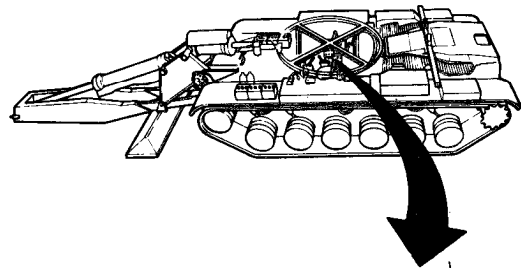
Second Technician (Left Top Deck Grille Doors)

- Connect power relay cable connector to engine disconnect.

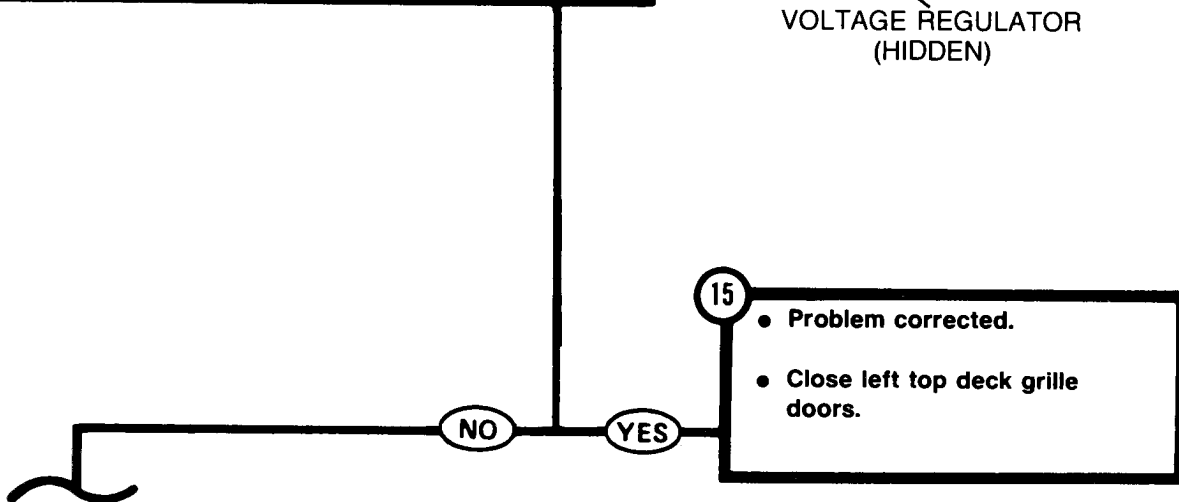
Second Technician (Operator's Station)

- Start engine.
- Check if BATT GEN INDICATOR pointer is in green area.
- Stop engine.
- Set MASTER BATTERY switch OFF.

Was BAT GEN INDICATOR pointer in green area?



VOLTAGE REGULATOR
(HIDDEN)



15

- Problem corrected.
- Close left top deck grille doors.

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

16

Check engine electrical harness (CKT 1) from connector at engine disconnect to terminal A on generator.

First Technician (Commander's Station)

- Remove new voltage regulator just installed and reinstall old voltage regulator.

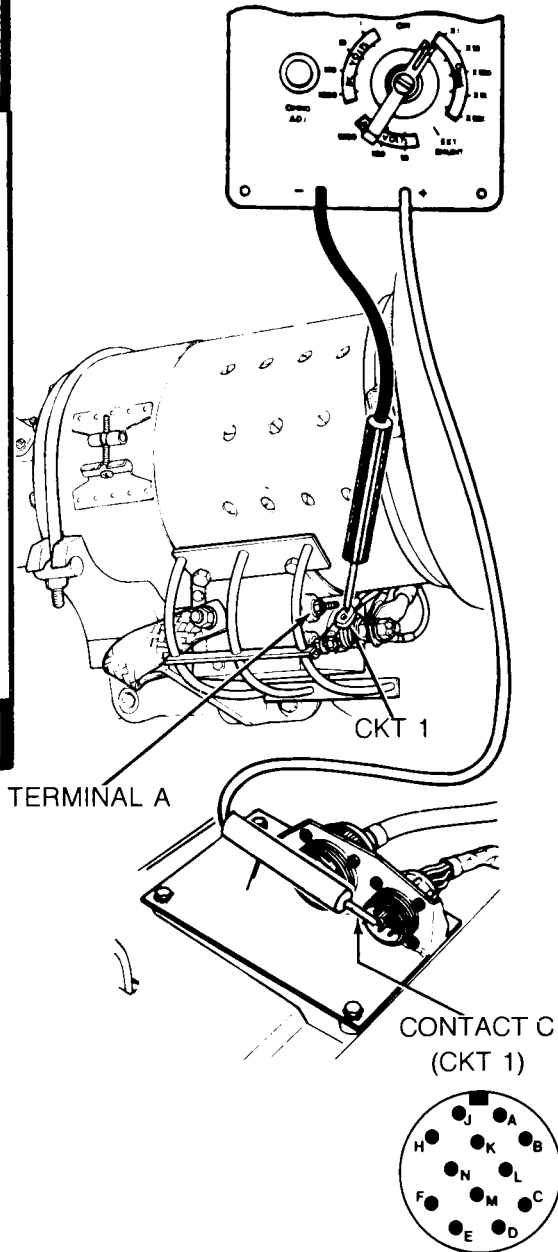
First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

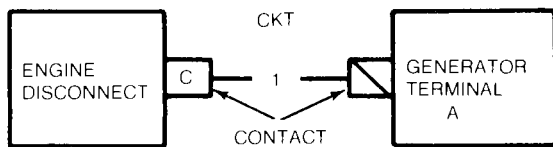
- Connect red probe of meter to contact C (CKT 1) of engine electrical harness connector at engine disconnect.
- Disconnect engine electrical harness terminal connector (CKT 1) from terminal A of generator.
- Connect black probe of meter to terminal connector (CKT 1) of engine electrical harness.
- Check if meter indicates continuity.

Does meter indicate continuity?



17

Repair engine electrical harness (page 10-298).



YES

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

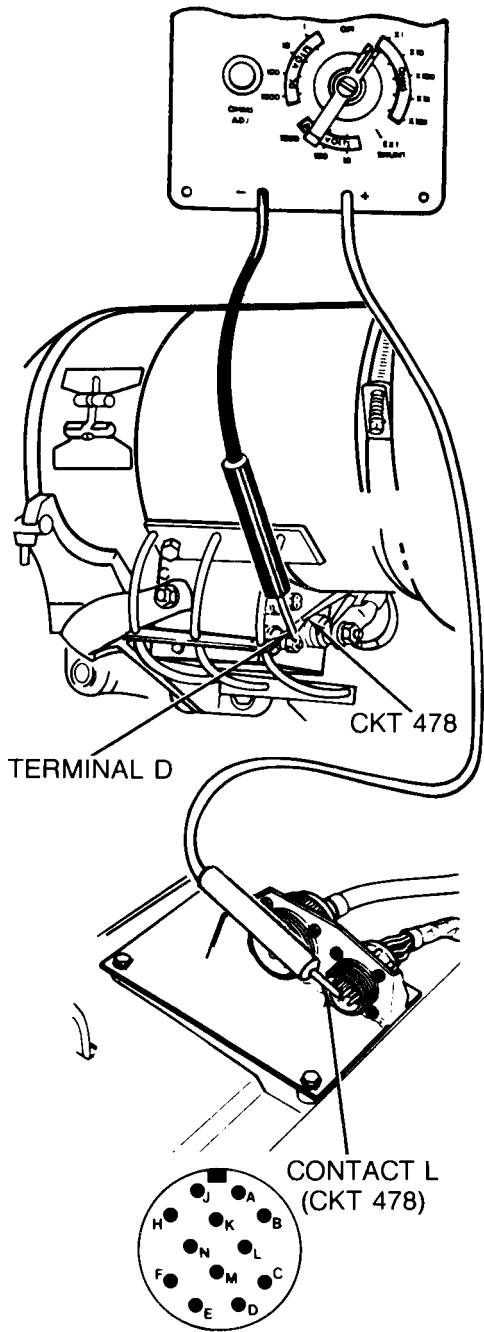
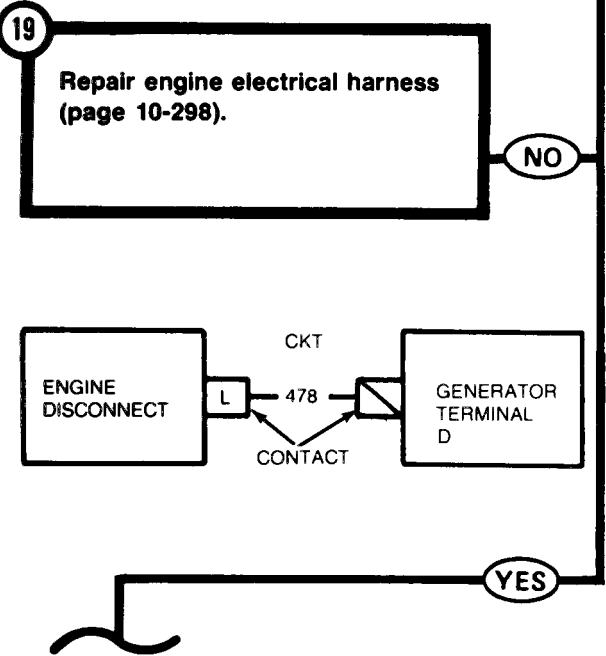
18

Check engine electrical harness (CKT 478) from connector at engine disconnect to terminal D on generator.

First Technician (Powerplant)

- Connect red probe of meter to contact L (CKT 478) of engine electrical harness connector at engine disconnect.
- Connect black probe of meter to terminal D (CKT 478) on generator.
- Check if meter indicates continuity.

Does meter indicate continuity?



TA250292

Symptom-31

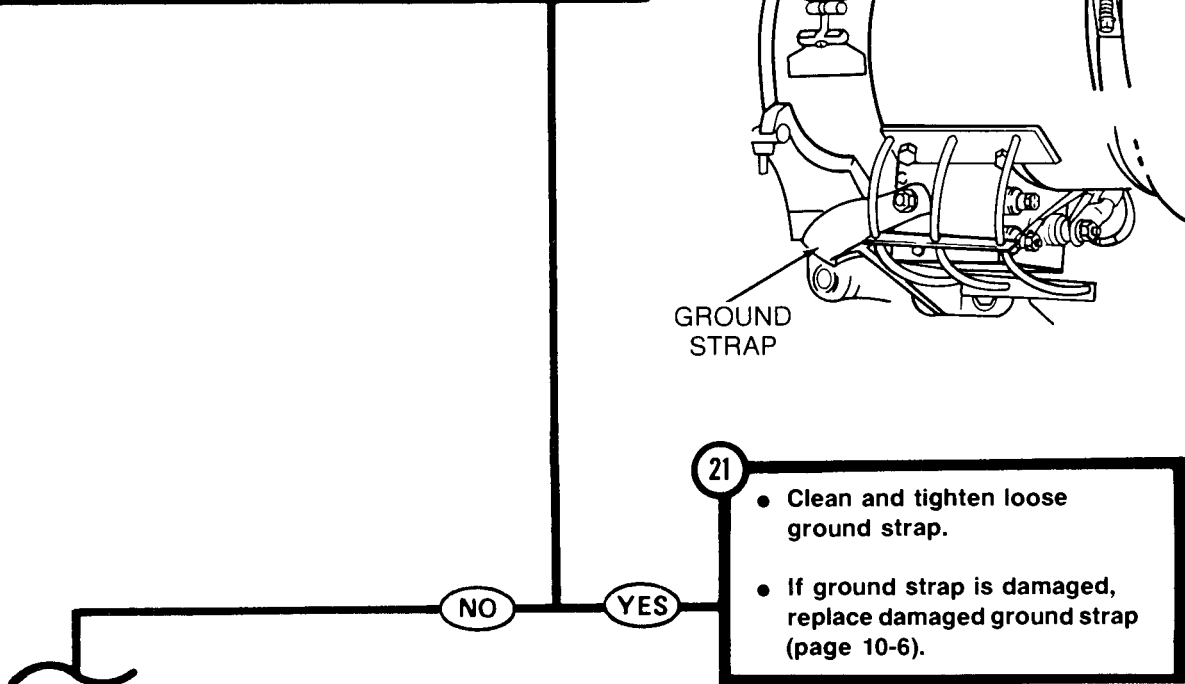
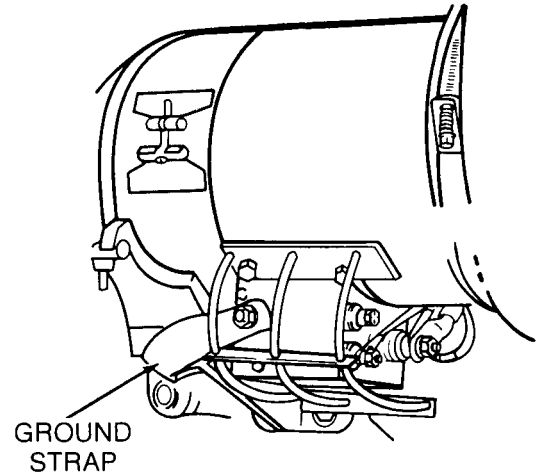
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

20 Check for loose ground strap connections or damaged ground strap on generator.

First Technician (Powerplant)

- Connect CKT 1 terminal lug to terminal A of generator.
- Check if ground strap connections are loose.
- Check ground strap for damage.

Is ground strap loose or damaged?



Symptom-31

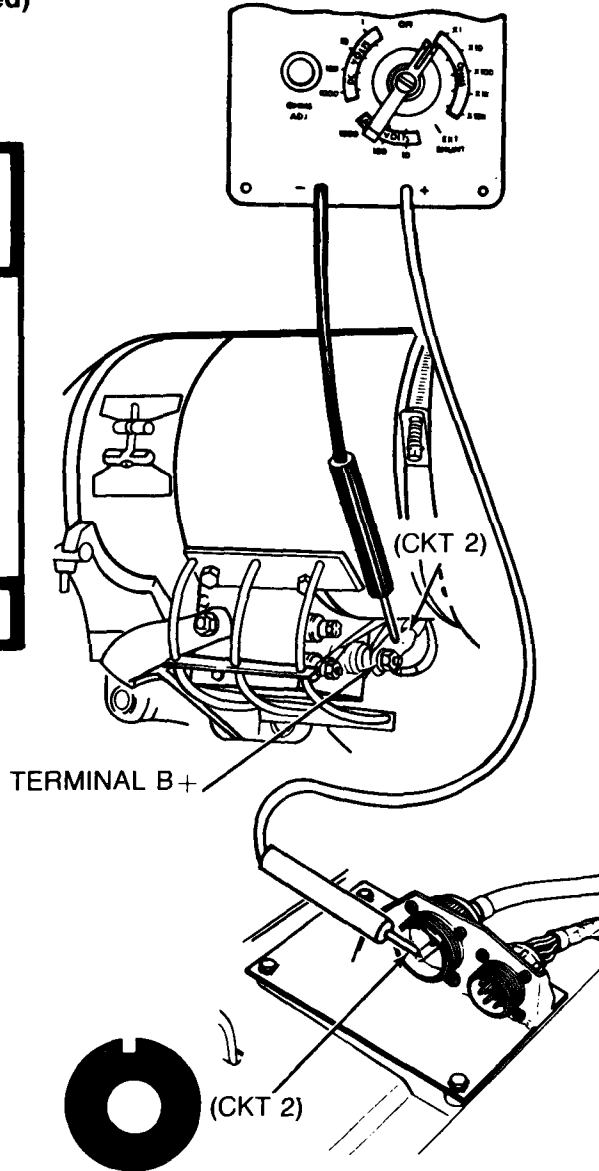
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

22 Check generator lead (CKT 2) from connector at engine disconnect to terminal B+ on generator for continuity.

First Technician (Powerplant)

- Connect red probe of meter to center contact (CKT 2) of generator lead assembly connector at engine disconnect.
- Connect black probe of meter to terminal B (CKT 2) on generator.
- Check if meter indicates continuity.

Does meter indicate continuity?

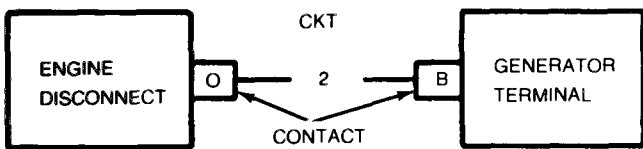


23

- Repair generator lead (page 10-298).
- Have powerplant installed (page 5-14).

24

- Replace generator/blower assembly (page 10-6).
- Have powerplant installed (page 5-14).



TA250294

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP

9

25

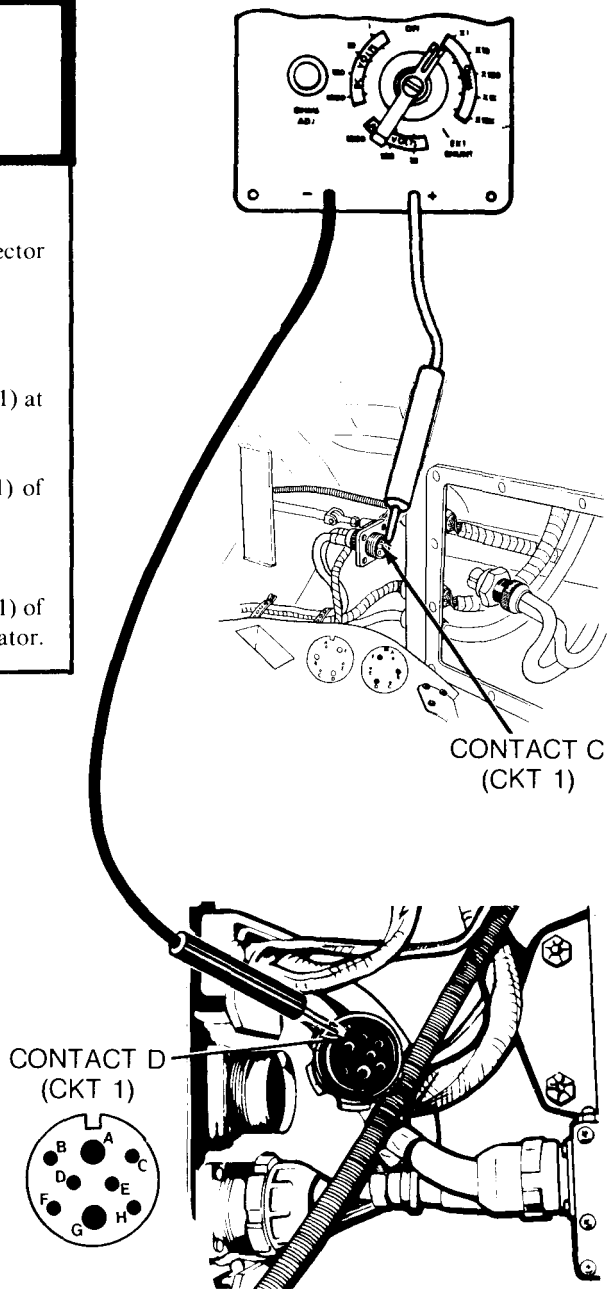
Check front accessory harness (CKT 1) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

Second Technician (Left Top Deck Grille Doors)

- Connect bulkhead engine disconnect harness connector to engine disconnect.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 1) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact C (CKT 1) of front accessory harness connector at bulkhead disconnect.
- Connect black probe of meter to contact D (CKT 1) of front accessory harness connector at voltage regulator.

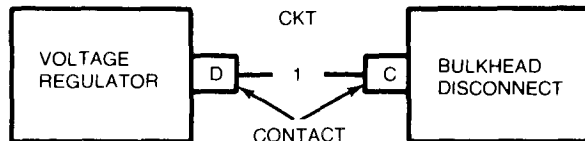
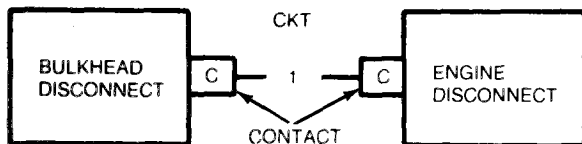
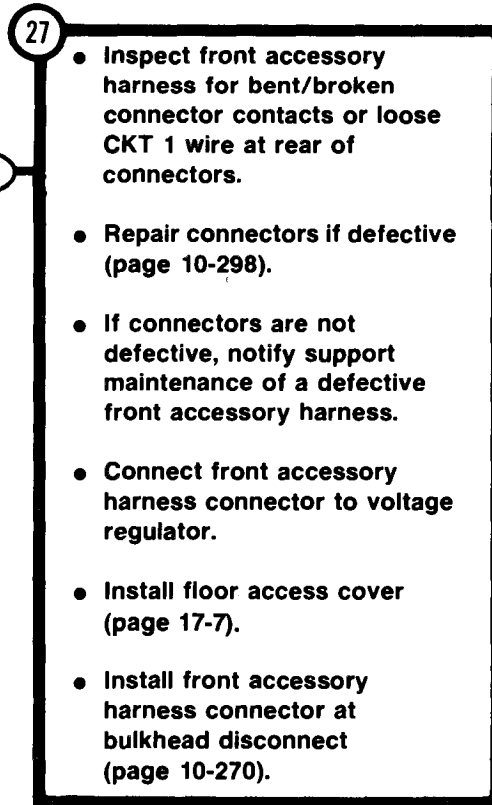
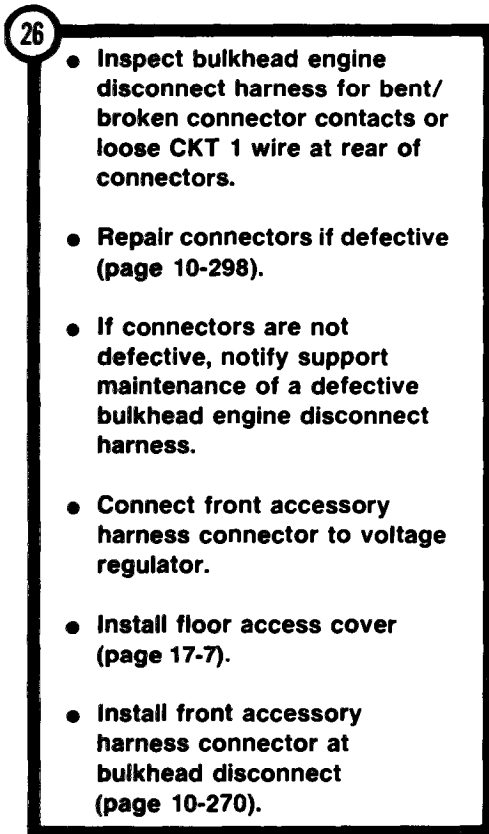
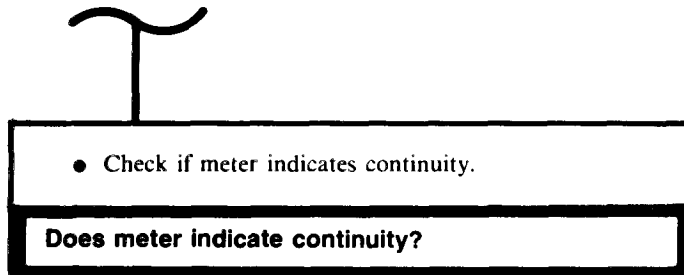


TA250295

Symptom-31

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

STEP **25** CONTINUED



TA250296

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP

11

28

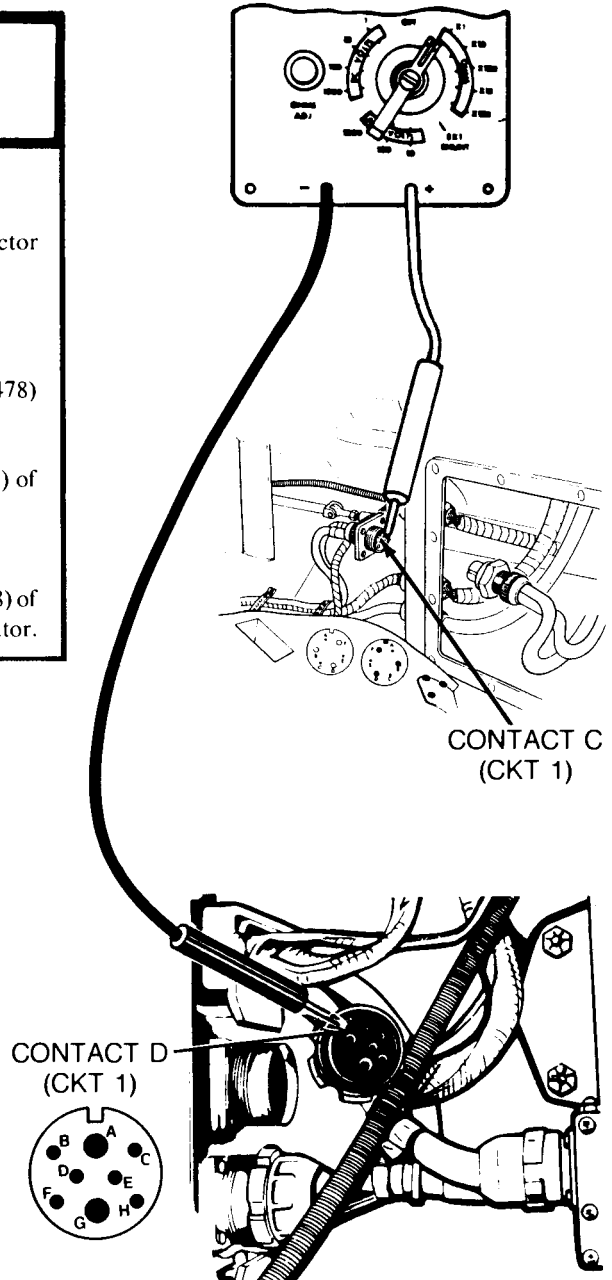
Check front accessory harness (CKT 478) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

Second Technician (Left Top Deck Grille Doors)

- Connect bulkhead engine disconnect harness connector to engine disconnect.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 478) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact L (CKT 478) of front accessory harness connector at bulkhead disconnect.
- Connect black probe of meter to contact C (CKT 478) of front accessory harness connector at voltage regulator.



TA250297 (

Symptom-31

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)**

STEP **28** CONTINUED

● Check if meter indicates continuity.

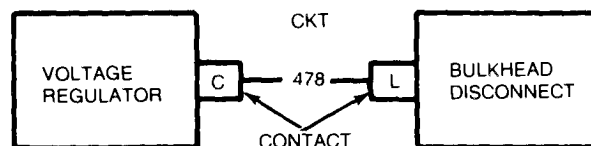
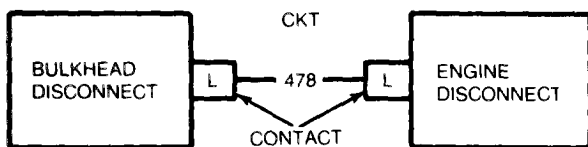
Does meter indicate continuity?

29

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 478 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Connect front accessory harness connector to voltage regulator.
- Install floor access cover (page 17-7).
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

30

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 478 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness connector to voltage regulator.
- Install floor access cover (page 17-7).
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



TA250298

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP

13

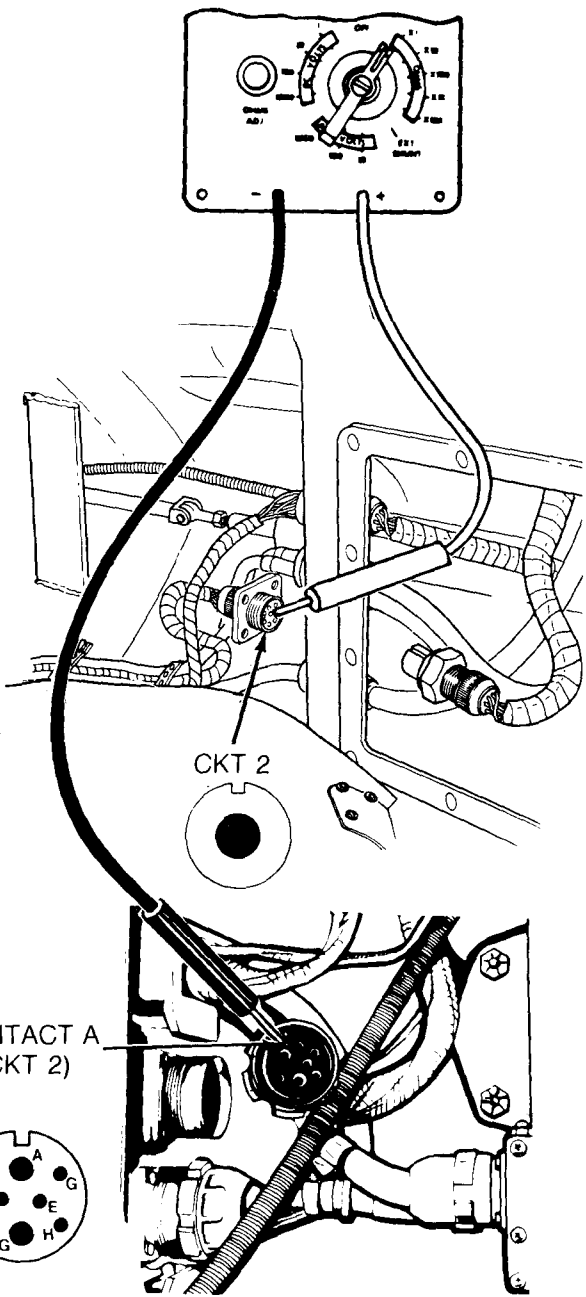
31 Check front accessory harness (CKT 2) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

Second Technician (Left Top Deck Grille Doors)

- Reconnect power relay cable connector to engine disconnect.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 2) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact (CKT 2) of front accessory harness connector at bulkhead disconnect.
- Connect black probe of meter to contact A (CKT 2) of front accessory harness connector at voltage regulator.

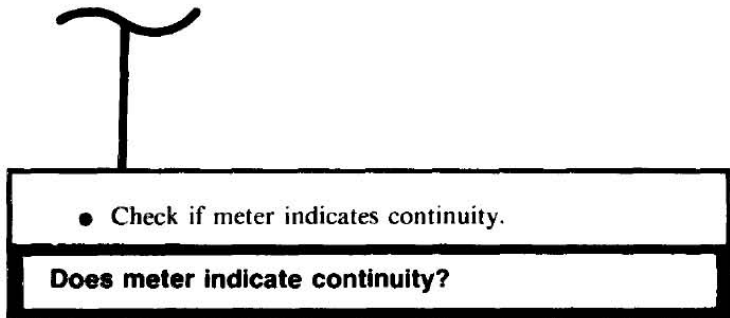


TA250299

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

STEP 31 CONTINUED



32

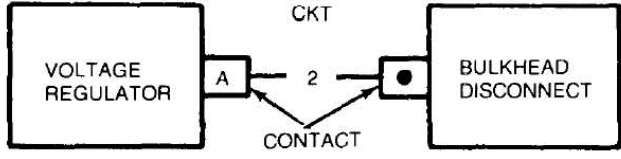
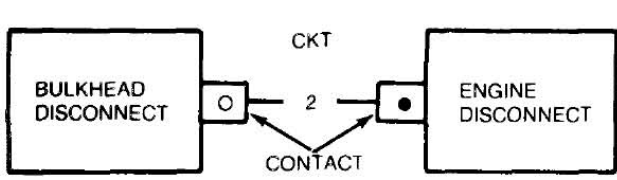
- Inspect power relay cable for bent/broken connector contacts or loose CKT 2 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective power relay cable.
- Connect front accessory harness connector to voltage regulator.
- Install floor access cover (page 17-7).
- Install both front accessory harness connectors at bulkhead disconnect (page 10-270).

YES

NO

33

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 2 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness connector to voltage regulator.
- Install floor access cover (page 17-7).
- Install both front accessory harness connectors at bulkhead disconnect (page 10-270).



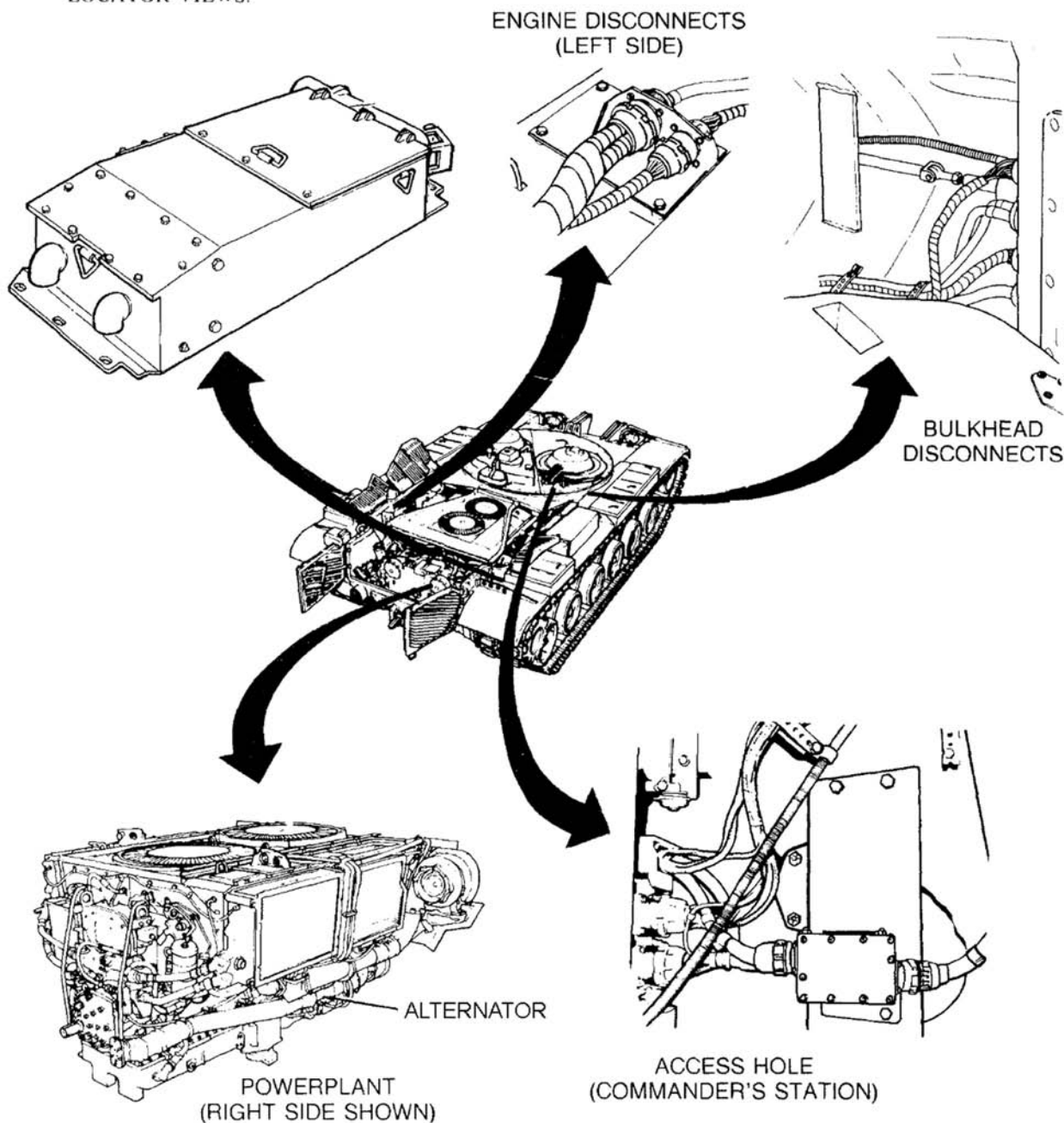
TA250300

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

650 AMP ALTERNATOR/REGULATOR IS NOT WORKING

LOCATOR VIEWS:



TA250283

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

650 AMP ALTERNATOR/REGULATOR IS NOT WORKING - Continued

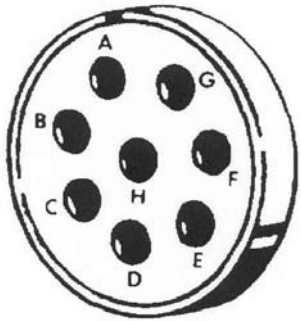
CAUTION

With engine running, do not disconnect generator harness at engine disconnect or bulkhead.

NOTE

This procedure is to be performed by two persons. The lead is referred to as the first technician and shall direct the activity of the second person called the second technician.

AT VOLTAGE REGULATOR



**12326542
(1,1A, 532, 533, 534)**

- 1**
- Second Technician (Operator's Station)
- Stop engine.
 - Set MASTER BATTERY switch OFF.
- First Technician (Commander's Station)
- Remove commander's floor plate (page 17-9).
 - Disconnect harness 12326542 connector (1, 1A, 532, 533, 534) from voltage regulator.
 - Connect "T" harness (page 3-4, Item 38) to harness 12326542 connector (1, 1A, 532, 533, 534) removed from voltage regulator.



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

NOTE

To ensure overvoltage protection circuit breaker on voltage regulator is in the ON (UP) position, turn the overvoltage circuit breaker to the OFF (DOWN) position, then to the ON (UP) position.

2

Check continuity from socket C of the test harness to vehicle chassis (GROUND).

First Technician (Commander's Station)

- Set multimeter to lowest range.
- Set circuit breaker on voltage regulator to ON.
- Connect "T" harness to voltage regulator.
- Connect red probe of meter to "T" harness socket C and black probe to ground.
- Check if meter indicates continuity.

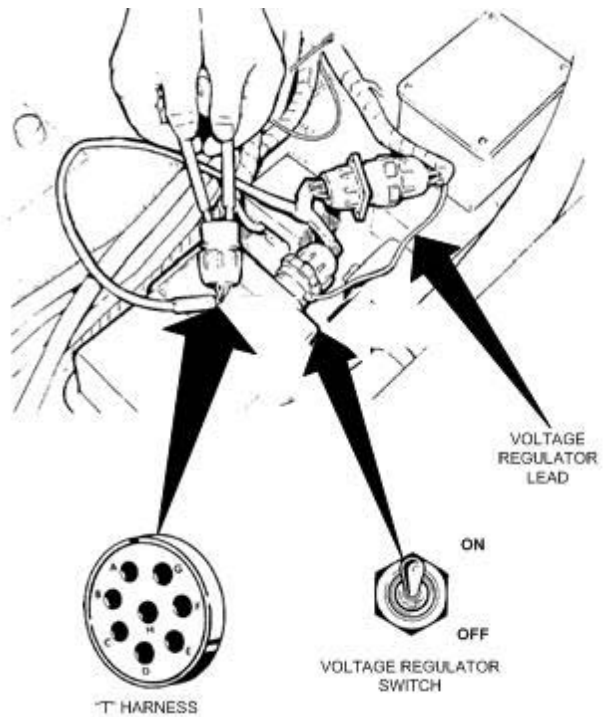
Does meter indicate continuity?

3

- Clean and tighten loose voltage regulator lead connections.
- If connections are not loose, replace harness 12326542 (page 10-1).

NO

YES



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

4

Check CKT 1A at voltage regulator for electrical power.

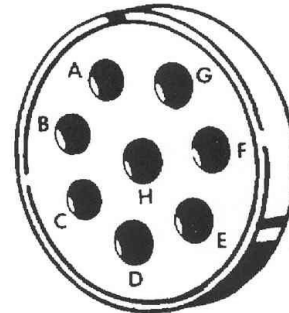
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMP switch ON.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket A (+) and black probe to socket C (-).
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



"T" HARNESS

5

Check CKT 1A from connector at voltage regulator to connector at master control panel.

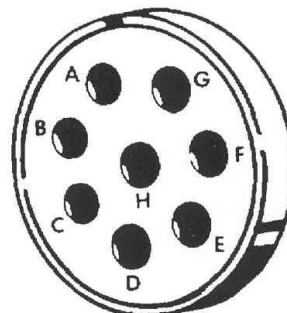
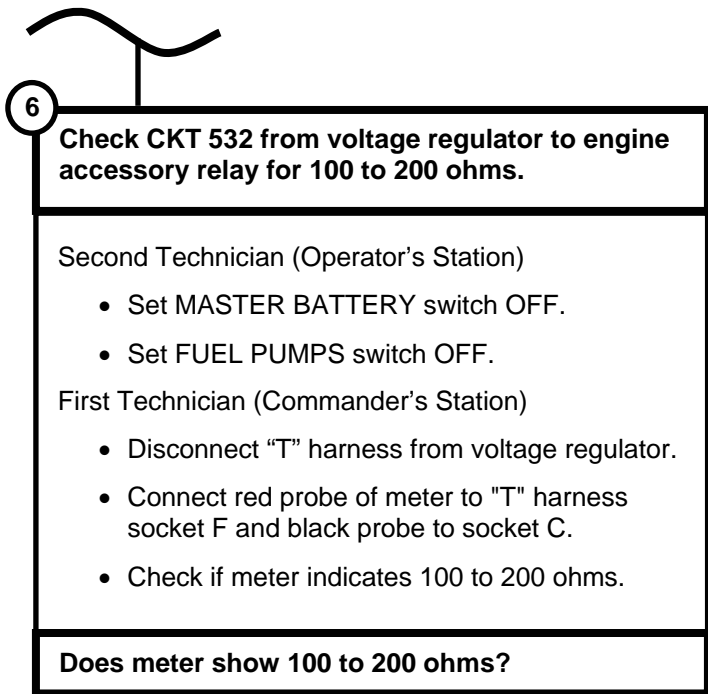
- See step 59.

NO

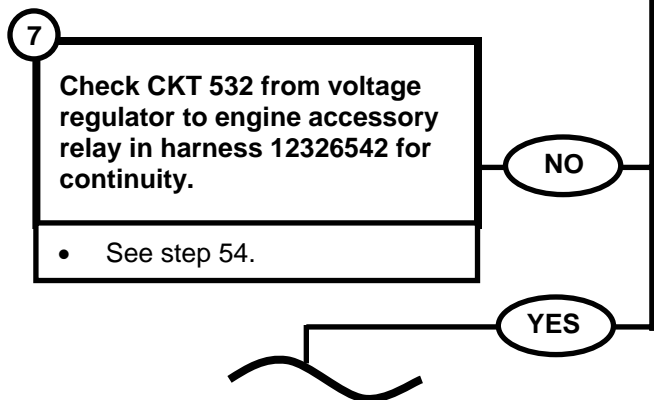
YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1



"T" HARNESS



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

8

Check for electrical power at pin B of bulkhead connector.

Second Technician (Operator's Station)

- Disconnect three battery ground cable assemblies (page 10-268).

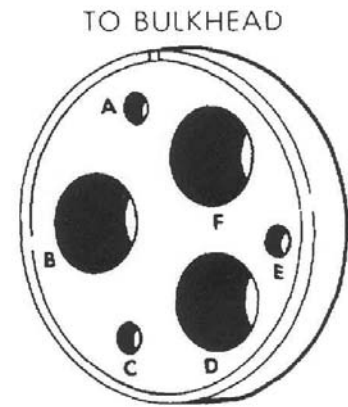
First Technician (Commander's Station)

- Displace front accessory harness 12326539 connector (CKT 2) at bulkhead disconnect (page 10-269).

Second Technician (Operator's Station)

- Connect three battery ground cables assemblies (page 10-268).
- Connect red probe of meter to socket B on bulkhead disconnect harness 12326699 and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



12326699

9

- Repair/replace harness 12326539 (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

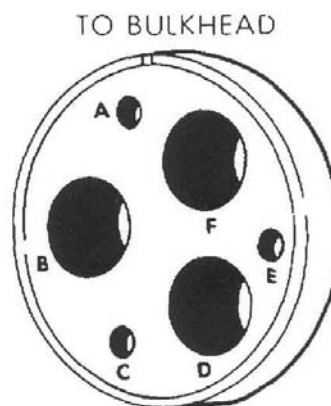
10

Check for electrical power at pin F of bulkhead connector.

First Technician (Commander's Station)

- Connect red probe of meter to socket F on bulkhead disconnect harness 12326699 and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



12326699

11

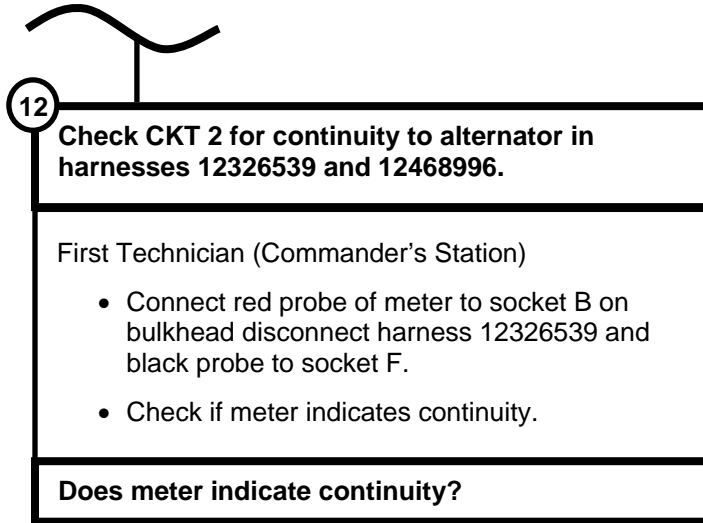
- Repair/replace harness 12326539 (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

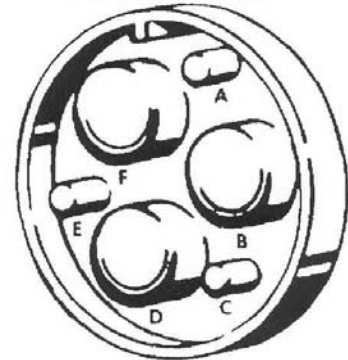
YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

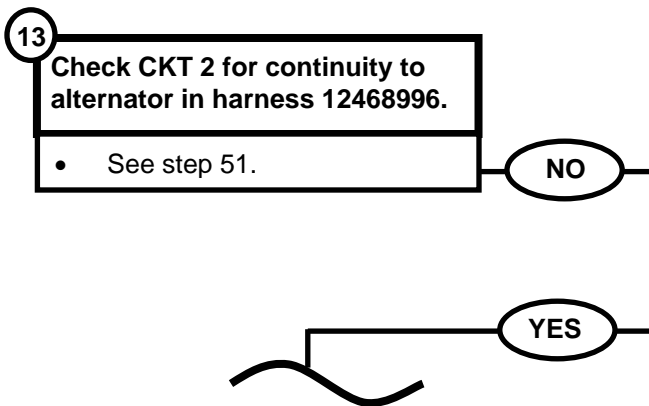
Symptom-31.1



AT BULKHEAD



12326539



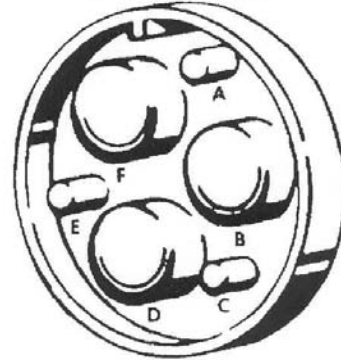
**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

CAUTION

Prior to performing a resistance check of the generator, discharge the radio interference suppressor. Use an insulated piece of wire, place one end on pin F and ground the other end of the wire to the vehicle chassis. This procedure may have to be repeated several times to completely drain the suppressor. When no voltage is indicated between pin F and ground, then it is safe to perform the resistance check.

AT BULKHEAD



12326539

14 Check for shorted diodes in alternator.

First Technician (Commander's Station)

- Connect red probe of meter to pin B on bulkhead disconnect harness 12326539 and black probe to ground.
- Check if meter indicates infinite resistance.

Does meter indicate infinite resistance?

15

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

16

Check CKT 2 for open diode in alternator.

First Technician (Commander's Station)

- Set multimeter to diode scale.
- Connect black probe of meter to pin B on bulkhead disconnect harness 12326539 and red probe to ground.
- Check if meter indicates 0.3 to 0.8 volts dc.

Does meter indicate 0.3 to 0.8 volts dc?



12326539

17

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

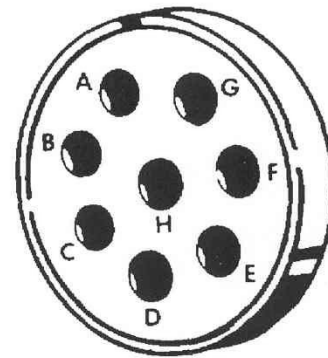
Symptom-31.1

18 Check CKT 1 from voltage regulator to alternator for 100 to 200 ohms.

First Technician (Commander's Station)

- Set multimeter to resistance scale.
- Connect red probe of meter to "T" harness socket E and black probe of to ground.
- Check if meter shows 100 to 200 ohms.

Does meter show 100 to 200 ohms?



"T" HARNESS

19 Check CKT 1 for continuity in harnesses 12326542, 12326538 and 12468994.

- See step 43.

NO

YES

20 Check CKT 534 from voltage regulator to alternator for 100 to 200 ohms.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket B and black probe to ground.
- Check if meter shows 100 to 200 ohms.

Does meter show 100 to 200 ohms?

21 Check CKT 534 for continuity in harnesses 12326542, 12326538 and 12468994.

- See step 35.

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

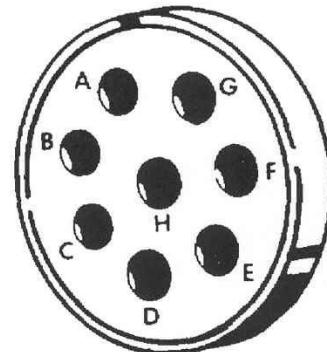
22

Check CKT 533 for open diode in alternator.

First Technician (Commander's Station)

- Set multimeter to diode scale.
- Connect black probe of meter to "T" harness socket D and red probe to ground.
- Check if meter indicates 0.2 to 0.5 volts dc.

Does meter indicates 0.2 to 0.5 volts dc?



"T" HARNESS

23

Check CKT 533 for continuity in harnesses 12326542, 12326538 and 12468994.

- See step 35.

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

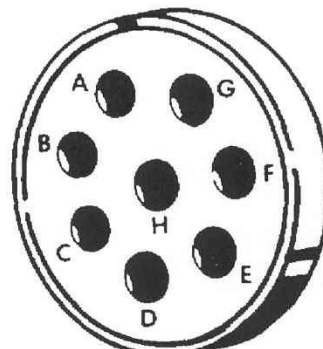
24

Check for shorted diodes in alternator.

First Technician (Commander's Station)

- Set multimeter to resistance scale.
- Connect black probe of meter to "T" harness socket D and red probe to ground.
- Check if meter indicates infinite resistance.

Does meter indicate infinite resistance?



"T" HARNESS

25

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269)
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9)

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

26

Check CKT 1 at voltage regulator for 18 to 26 volts dc.

Second Technician (Operator's Station)

- Disconnect three battery ground cable assemblies (page 10-268).

First Technician (Commander's Station)

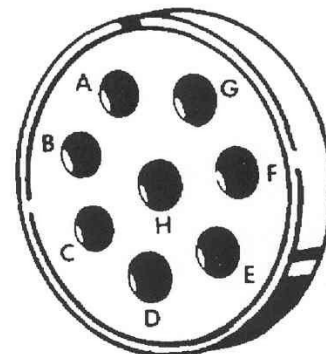
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).

Second Technician (Operator's Station)

- Connect three battery ground cables assemblies (page 10-268).

First Technician (Commander's Station)

- Connect "T" harness to voltage regulator.
- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Connect red probe of meter to "T" harness socket E and black probe to socket C.
- Check if meter indicates 18 to 26 volt dc.



"T" HARNESS

Does meter indicate 18 to 26 volt dc?

27

- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

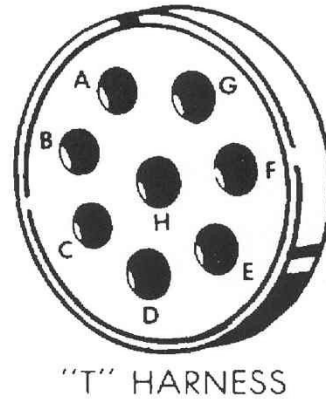
28

Check CKT 1A at voltage regulator for 25 to 30 volts dc.

Second Technician (Operator's Station)

- Start Engine.
- Set Idle speed to 750 RPM.
- Turn OFF all lights, ventilator blowers and radio equipment.
- Connect red probe of meter to "T" harness socket A and black probe socket C.
- Check if meter indicates 25 to 30 volt dc.

Does meter indicate 25 to 30 volts dc?



29

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

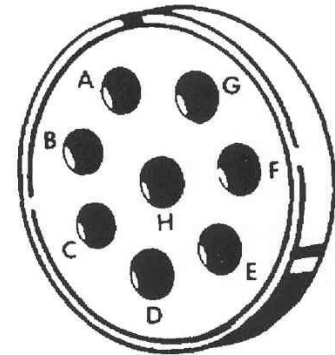
30

Check CKT 1 at voltage regulator for 1 to 5 volts dc.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket E and black probe to socket C.
- Check if meter indicates 1 to 5 volt dc.

Does meter indicate 1 to 5 volt dc?



"T" HARNESS

31

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

NO

YES

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

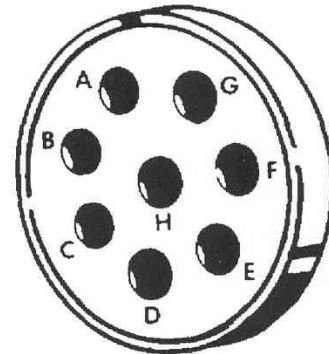
Symptom-31.1

32 Check CKT 532 at voltage regulator for 24 to 29 volts dc.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket F and black probe to socket C.
- Check if meter indicates 24 to 29 volt dc.

Does meter indicate 24 to 29 volts dc?



"T" HARNESS

33

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

NO

YES

34

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace alternator (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

FROM STEPS 21 & 23

35

Check CKTs 533 and 534 for continuity in harnesses 12326542 and 12326538.

Second Technician (Left Top Deck Grille Doors)

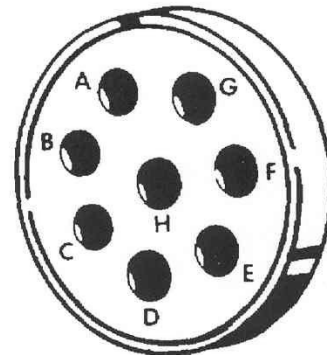
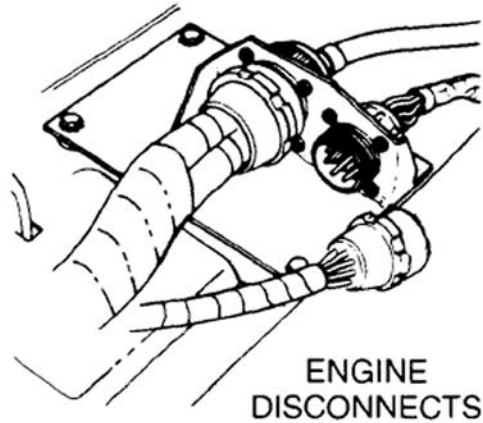
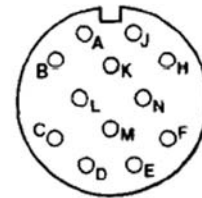
- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness 12326538 connector from engine disconnect harness 12468994.
- Connect jumper wire from contact C (CKT 533) of bulkhead engine disconnect harness 12326538 connector to contact L (CKT 534).

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket B and black probe to socket D.
- Check if meter indicates continuity.

Does meter indicate continuity?

12326538



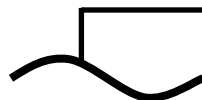
36

Check CKTs 533 and 534 for continuity in harness 12326542.

- See step 40.

NO

YES



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

37

Check engine electrical harness (CKTs 533 and 534) from connector at engine disconnect to J1 on alternator.

First Technician (Top Deck)

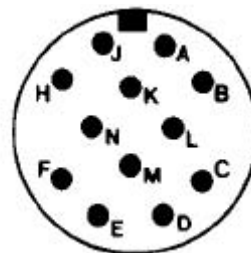
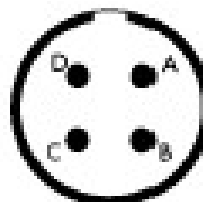
- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Disconnect harness 12468994 from J1 of alternator.
- Connect jumper wire from contact A (CKT 533) of harness 12468994 to contact B (CKT 534).
- Connect red probe of meter to socket C of engine disconnect harness 12468994 connector and black probe to socket L.
- Check if meter indicates continuity.

Does meter indicate continuity?

12468994



12468994

38

- Replace engine electrical harness 12468994 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

39

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

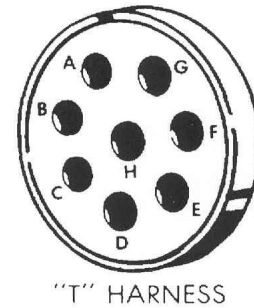
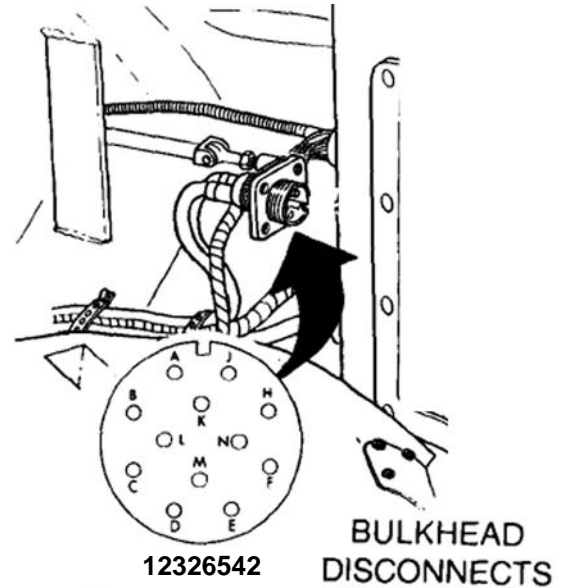
FROM STEP 36

40 Check CKTs 533 and 534 for continuity in harness 12326542.

First Technician (Commander's Station)

- Displace front accessory harness 12326538 connector at bulkhead disconnect (page 10-269).
- Connect jumper wire from contact C (CKT 534) of harness 12326542 to contact L (CKT 533).
- Connect red probe of meter to "T" harness socket B and black probe to socket D.
- Check if meter indicates continuity.

Does meter indicate continuity?



41

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).

NO

YES

42

- Replace harness 12326538 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9)

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

FROM STEP 19

43

Check CKT 1 for continuity in harnesses 12326542 and 12326538.

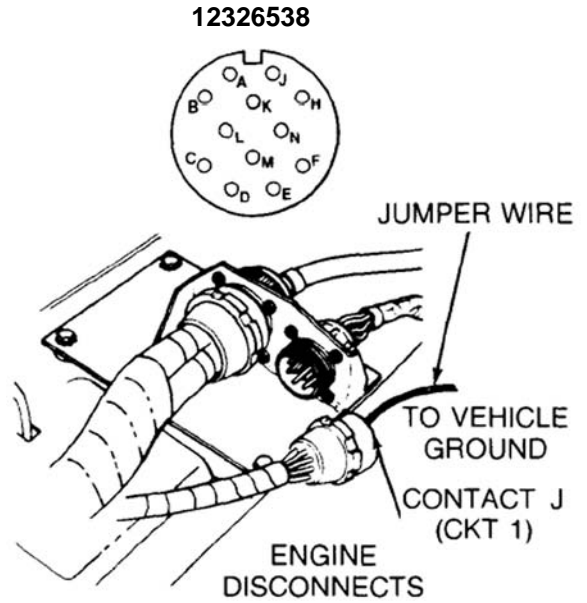
Second Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness 12326538 connector from engine disconnect.
- Connect jumper wire from contact J (CKT 1) of bulkhead engine disconnect harness 12326538 connector to ground.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket E and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



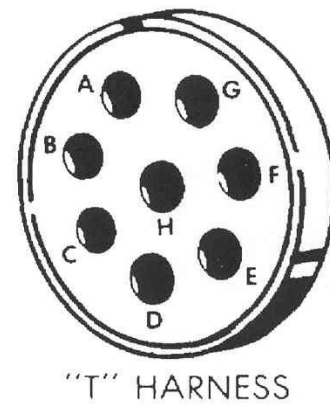
44

Check CKT 1 for continuity in harness 12326542.

- See step 48.

NO

YES



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

45

Check engine electrical harness (CKT 1) from connector at engine disconnect to J2 on alternator.

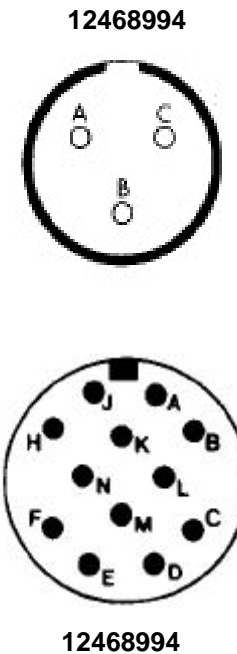
First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

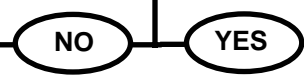
- Disconnect harness 12468994 from J2 of alternator.
- Connect jumper wire from contact C (CKT 1) of harness 12468994 to ground.
- Connect red probe of meter to socket J of engine disconnect harness 12468994 and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



46

- Replace engine electrical harness 12468994 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).



47

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

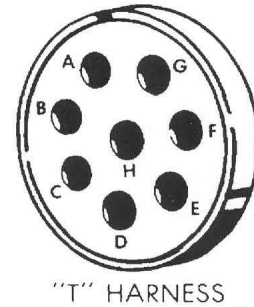
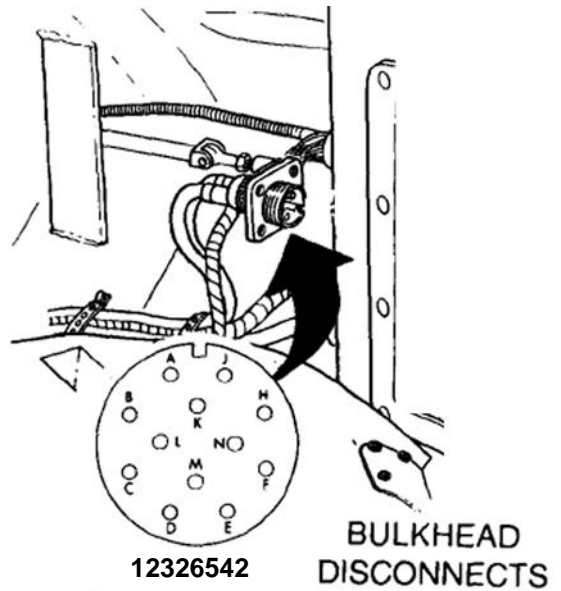
FROM STEP 44

48 Check CKT 1 for continuity in harness 12326542.

First Technician (Commander's Station)

- Displace front accessory harness connector (12326538) at bulkhead disconnect (page 10-269).
- Connect jumper wire from contact J (CKT 1) of harness 12326542 to ground.
- Connect red probe of meter to "T" harness socket E and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



49

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Connect bulkhead engine disconnect harness 12326538 connector to engine disconnect.
- Close left top deck grille doors.

NO

YES

50

- Replace harness 12326538 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

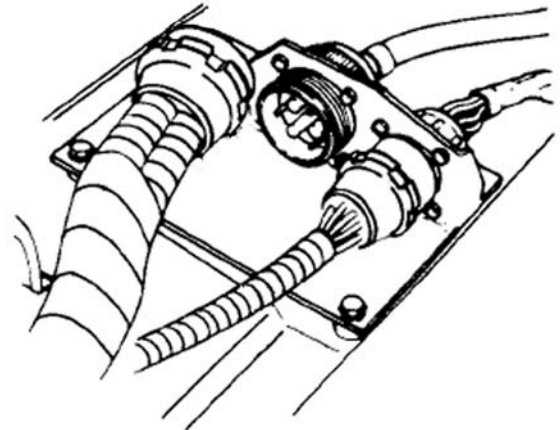
FROM STEP 13

51 Check CKT 2 for continuity to alternator in harness 12468996.

First Technician (Commander's Station)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness 12326539 connector from engine disconnect.
- Connect red probe of meter to socket B on engine disconnect and black probe to socket F.
- Check if meter indicates continuity.

Does meter indicate continuity?



AT BULKHEAD



12326539

52

- Replace harness 12468996 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

53

- Replace harness 12326539 (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEP 7

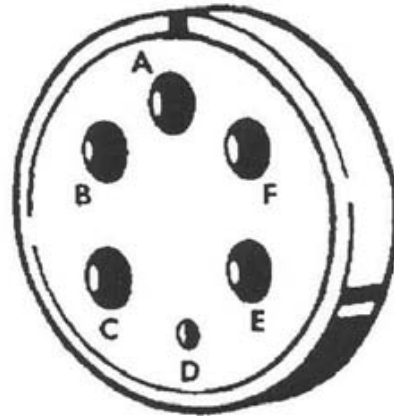
54

Check CKT 532 from voltage regulator to engine accessory relay in harness 12326542 for continuity.

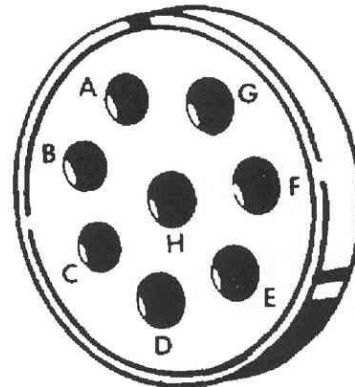
First Technician (Commander's Station)

- Disconnect harness 12326542 from engine accessory relay.
- Connect red probe of meter to pin F of harness 12326542 that was removed from accessory relay.
- Connect black probe of meter to "T" harness socket F.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326542



"T" HARNESS

55

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).

NO

YES



DETAILED TROUBLESHOOTING PROCEDURE
 VEHICLE OPERATION – HULL POWER
 (Continued)

Symptom-31.1

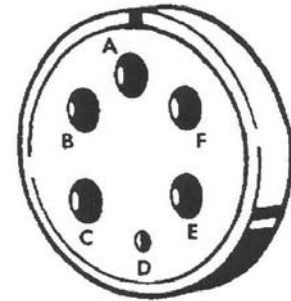
56

Check ground wire from voltage regulator in harness 12326542 for continuity.

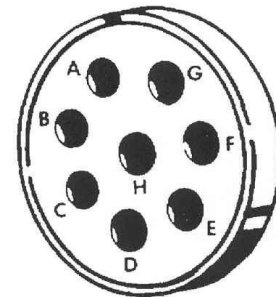
First Technician (Commander's Station)

- Connect red probe of meter to pin D of harness 12326542 that was removed from accessory relay.
- Connect black probe of meter to "T" harness socket C.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326542



"T" HARNESS

57

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).

NO

YES

58

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace accessory relay (page 10-1).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

FROM STEP 5

59

Check CKT 1A from connector at voltage regulator to connector at master control panel.

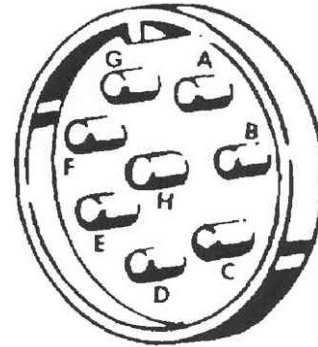
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness 12326536 (1A, 76, 54A, 459A, 486) from master control panel.
- Connect black probe of meter to 12326536 (1A, 76, 54A, 459A, 486) pin D.

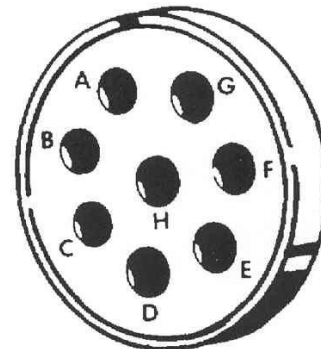
First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket A.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326536 (1A, 76, 54A, 459A, 486)



"T" HARNESS

60

Check CKT 1A from connector at disconnect panel to connector at master control

- See step 66.

NO

YES



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

61

Check CKT 1A from master control panel pin D to fuel pump switch terminal.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Connect red probe of meter to master control panel connector socket D.
- Connect black probe of meter to harness 12326547 terminal at the fuel pump switch.
- Check if meter indicates continuity.

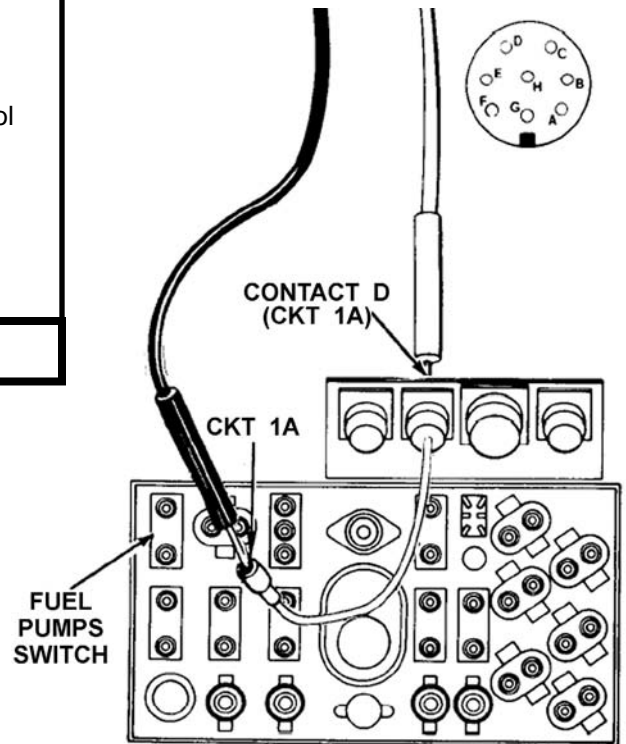
Does meter indicate continuity?

62

- Replace master control panel starting harness (page 10-97).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES



**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

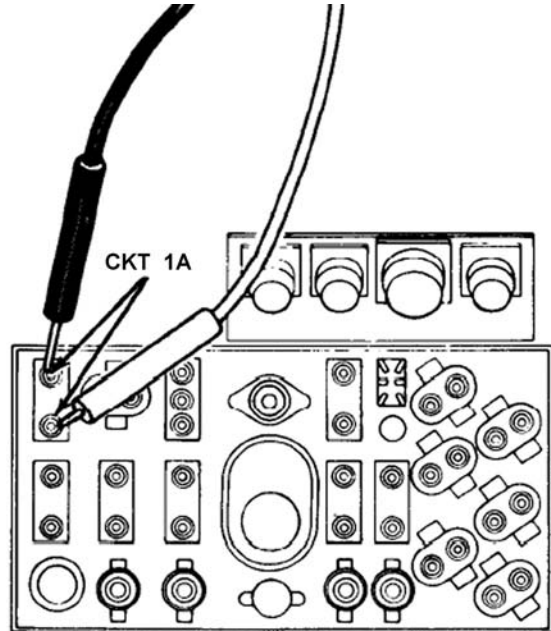
63

Check continuity of CKT 1A across fuel pump switch.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch to ON.
- Connect black probe of meter to harness 12326547 terminal at the fuel pump switch.
- Connect red probe of meter to wire 37 terminal at the fuel pump switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



64

- Replace FUEL PUMPS switch (page 10-47).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

65

- Replace wire 1A (page 10-38)
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

**DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)**

Symptom-31.1

FROM STEP 60

66

Check CKT 1A from connector at disconnect plate to connector at master control panel.

First Technician (Commander's Station)

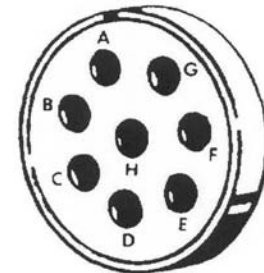
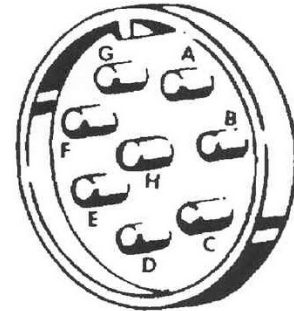
- Disconnect harness 12326536 (1A, 76, 54A, 459A, 486) from disconnect plate.
- Connect red probe of meter to 12326536 (1A, 76, 54A, 459A, 486) pin D.

Second Technician (Operator's Station)

- Connect black probe of meter to 12326536 (1A, 76, 54A, 459A, 486) pin D.
- Check if meter indicates continuity.

Does meter indicate continuity?

12326536 (1A, 76, 54A, 459A, 486)



12326536 (1A, 76, 54A, 459A, 486)

67

- Replace harness 12326536 (1A, 76, 54A, 459A, 486) (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

68

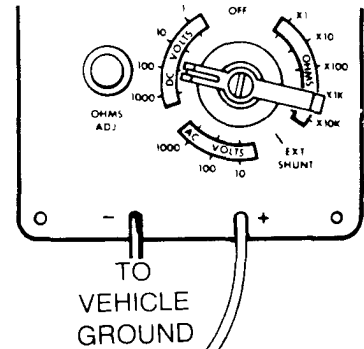
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace harness 12326542 (page 10-1).
- Connect harness 12326536 (1A, 76, 54A, 459A, 486) to disconnect plate.
- Connect harness 12326536 (1A, 76, 54A, 459A, 486) to master control panel.

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

Symptom-32

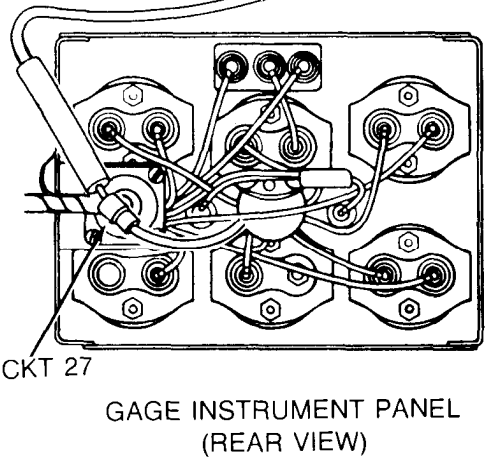
ENGINE OIL PRESSURE GAGE WILL NOT SHOW PRESSURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check gage instrument panel harness (CKT 27) for electrical power at ENGINE PRESS indicator gage.

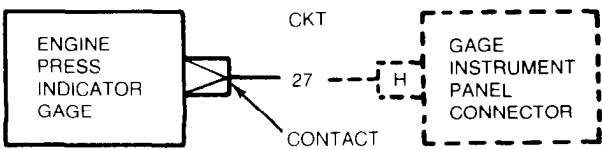
- First Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
 - Displace gage instrument panel (page 10-111).
 - Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
 - Disconnect gage instrument panel harness connector (CKT 27) from ENGINE PRESS indicator gage.
 - Connect red probe of meter to gage instrument panel harness connector (CKT 27) at ENGINE PRESS indicator gage and black probe to ground.
 - Set MASTER BATTERY switch ON.
 - Check if meter indicates 18 to 30 volts dc.



Does meter indicate 18 to 30 volts dc?



2 Repair gage instrument panel harness (page 298).



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

Symptom-32

3

Check engine oil pressure transmitter for short to ground with engine running.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect gage instrument panel harness connector (CKT 27) to ENGINE PRESS indicator gage.

Second Technician (Rear of Crew Compartment)

- Remove engine lower access cover (page 17-13).
- Disconnect engine electrical harness connector (CKT 36) from engine oil pressure transmitter.

First Technician (Operator's Station)

- Start engine.

Second Technician (Rear of Crew Compartment)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to engine oil pressure transmitter contact and black probe to ground.
- Check if meter indicates continuity.

First Technician (Operator's Station)

- Stop engine.

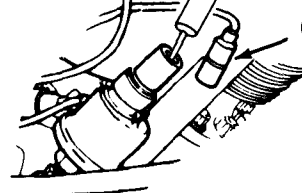
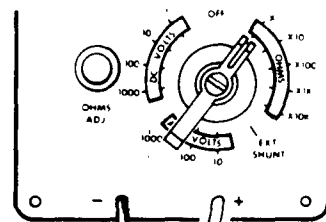
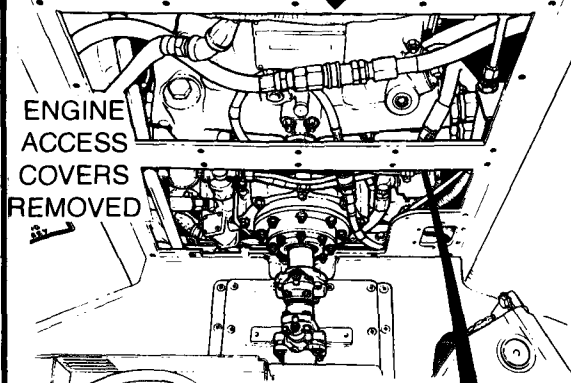
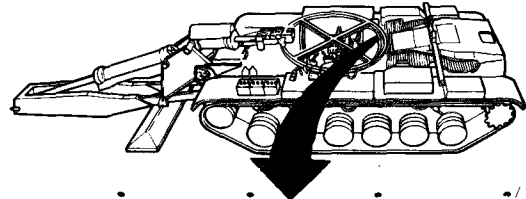
Did meter indicate continuity, thereby indicating a short?

NO

YES

4

- Replace engine oil pressure transmitter (page 10-221).
- Install gage instrument panel (page 10-112).



CIRCUIT 36

ENGINE OIL
PRESSURE
TRANSMITTER

TA250302

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

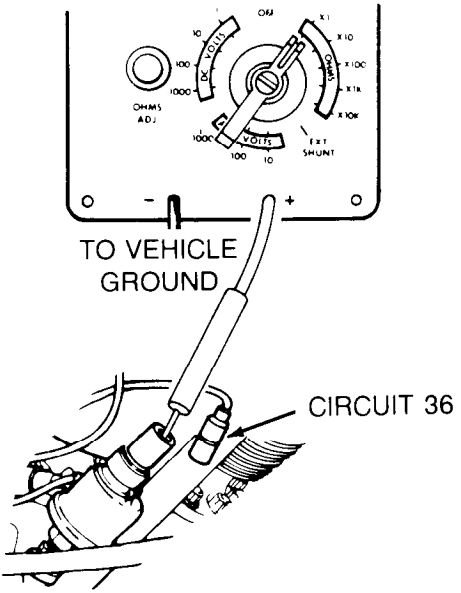
Symptom-32

5 Check engine oil pressure transmitter for continuity to ground with engine not running.

Second Technician (Rear of Crew Compartment)

- Connect red probe of meter to engine oil pressure transmitter contact (CKT 36) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



6

- Replace engine oil pressure transmitter (page 10-221).
- Install gage instrument panel (page 10-112).

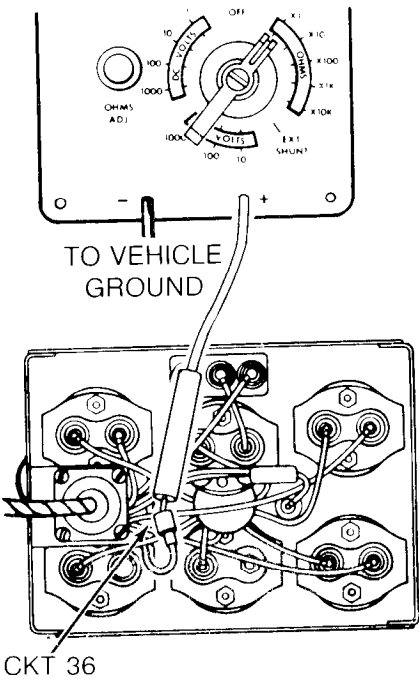
NO YES

7 Check oil pressure indication circuit (CKT 36) at ENGINE PRESS indicator gage for short to ground.

First Technician (Operator's Station)

- Disconnect gage instrument panel harness connector (CKT 36) from ENGINE PRESS indicator gage.
- Connect red probe of meter to gage panel harness connector (CKT 36) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



YES NO

8

- Check gage instrument panel harness (CKT 36) for short to ground.
- See Step 20 .

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-32

9 Check CKT 36 for continuity from engine oil pressure transmitter to ENGINE PRESS indicator gage.

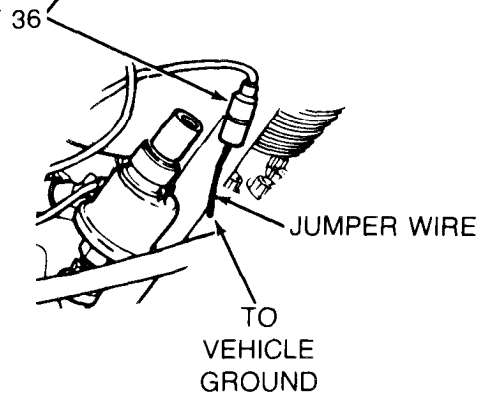
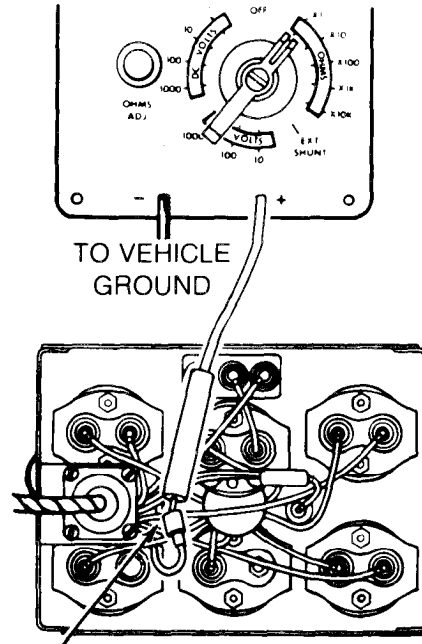
Second Technician (Rear of Crew Compartment)

- Connect jumper wire from engine electrical harness connector (CKT 36) at engine oil pressure transmitter to ground.

First Technician (Operator's Station)

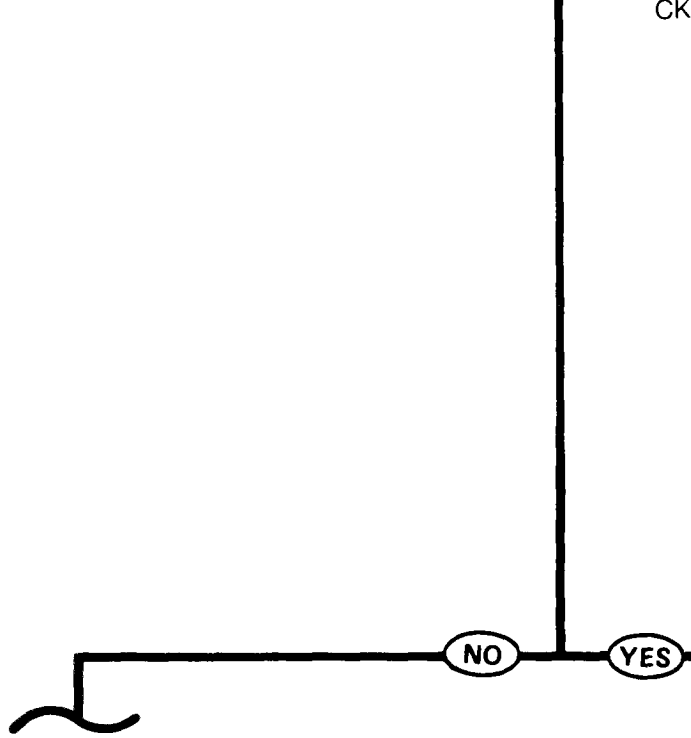
- Connect red probe of meter to gage instrument panel harness connector (CKT 36) at ENGINE PRESS indicator gage and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



10

- Replace ENGINE PRESS indicator gage (page 10-117).
- Correct engine electrical harness connector to engine oil pressure transmitter.
- Install engine lower access cover (page 17-15).



TA250304

Symptom-32

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

11 Check gage instrument panel harness (CKT 36) for continuity from connector at ENGINE PRESS indicator gage to connector on instrument panel.

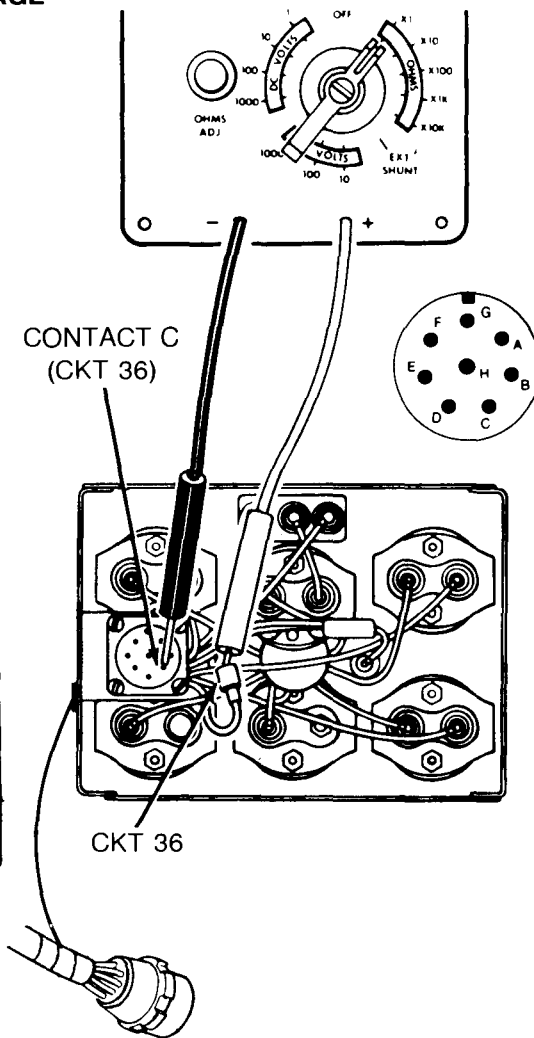
Second Technician (Rear of Crew Compartment)

- Reconnect engine electrical harness connector to engine oil pressure transmitter.
- Install engine lower access cover (page 17-15)..

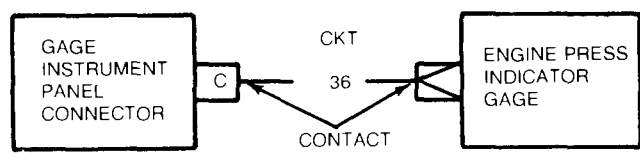
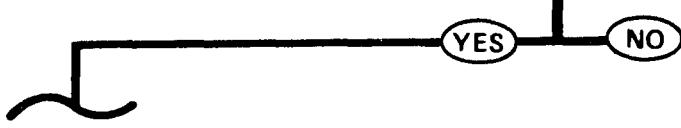
First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to gage instrument panel harness connector (CKT 36) at ENGINE PRESS indicator gage.
- Connect black probe of meter to contact C (CKT 36) of gage instrument panel connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



12 Repair gage instrument panel harness (page 10-298).



Symptom-32

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

13 Check basket-indicator panel harness (CKT 36) for continuity from connector at basket disconnect to connector at instrument panel.

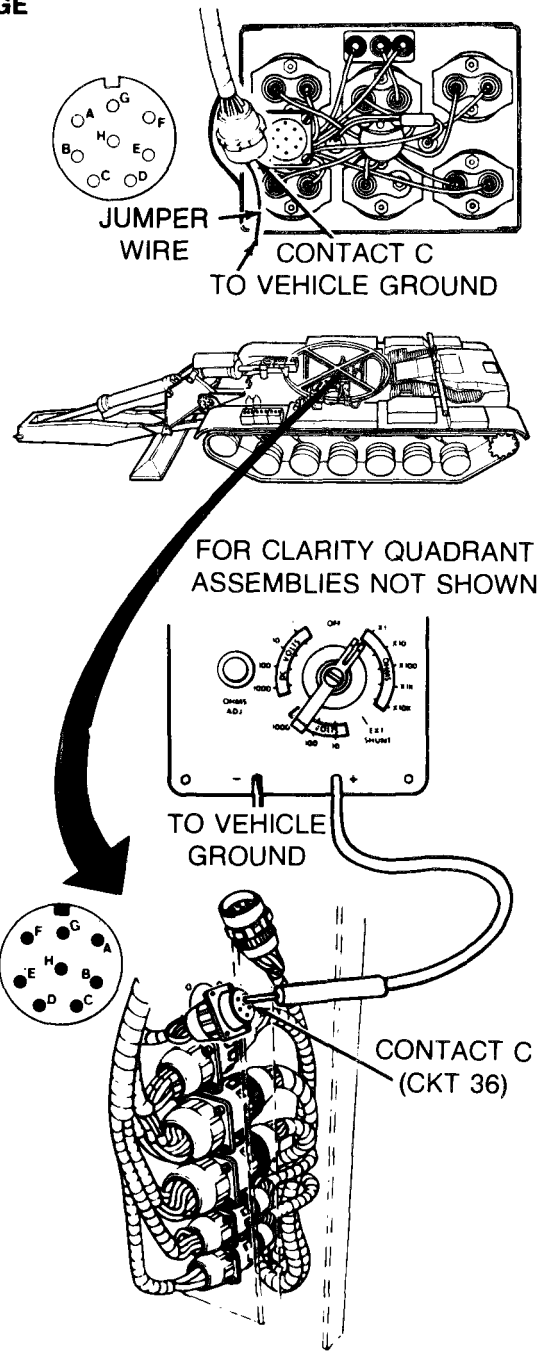
First Technician (Operator's Station)

- Reconnect gage instrument panel harness connector (CKT 36) to ENGINE PRESS indicator gage.
- At instrument panel connect jumper wire from contact C (CKT 36) of basket-indicator panel harness connector to ground.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 36) at basket disconnect.
- Connect red probe of meter to contact C (CKT 36) of basket-indicator panel harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

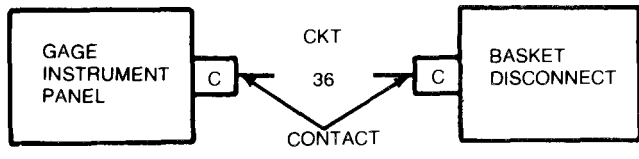


14

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Install basket-indicator panel harness connector at basket disconnect.
- Install gage instrument panel (page 10-112).

NO

YES



TA250306

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-32

15 Check front accessory harness (CKT 36) from connector at basket disconnect to connector at bulkhead disconnect for continuity.

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 36) at bulkhead disconnect (page 10-269).
- Connect black probe of meter to contact C (CKT 36) of front accessory harness connector at basket disconnect.
- Connect red probe of meter to contact F (CKT 36) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity.

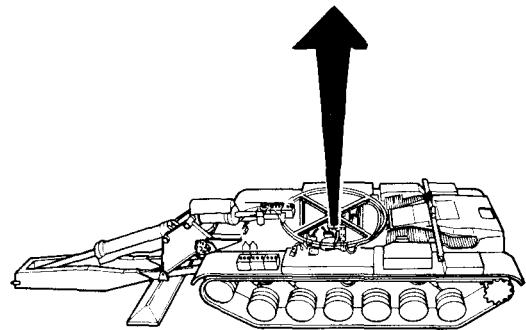
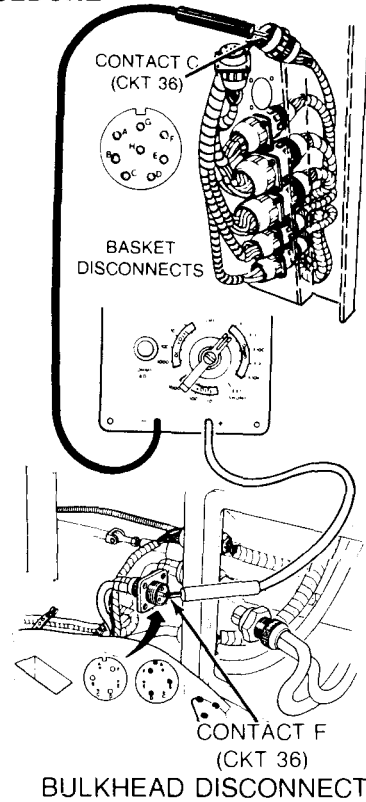
Does meter indicate continuity?

16

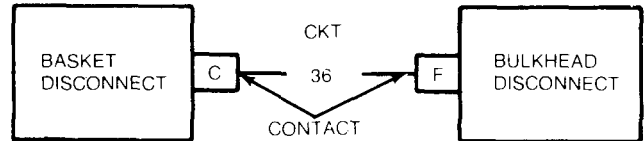
- Inspect front accessory harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Install basket-indicator panel harness connector at basket disconnect.
- Install gage instrument panel (page 10-112).

NO

YES



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-32

17

Check bulkhead engine disconnect harness (CKT 36) for continuity from connector at bulkhead disconnect to connector at engine disconnect.

First Technician (Operator's Station)

- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

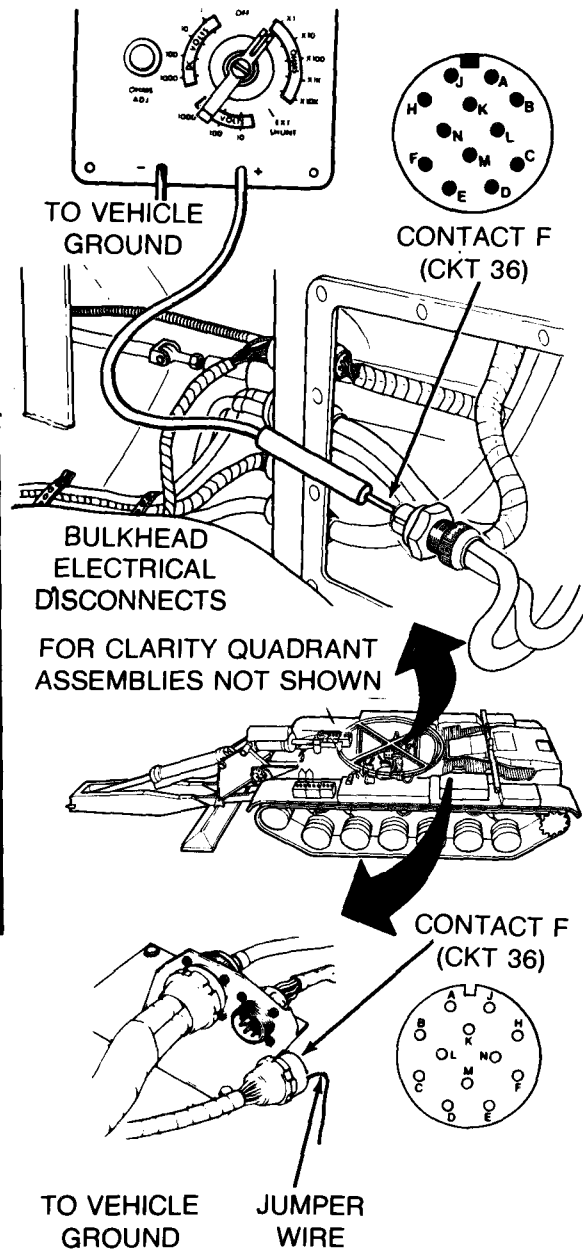
- Install basket-indicator panel harness connector at basket disconnect (page 10-270).

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector at engine disconnect.
- At engine disconnect, connect jumper wire from contact F (CKT 36) of bulkhead engine disconnect harness connector to ground.

Second Technician (Commander's Station)

- Connect red probe of meter to contact F (CKT 36) of bulkhead engine disconnect harness connector at bulkhead disconnect and black probe to ground.



TA250308

Symptom-32
STEP 17 CONTINUED

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

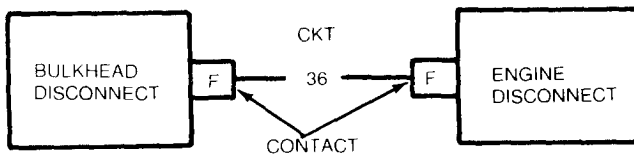
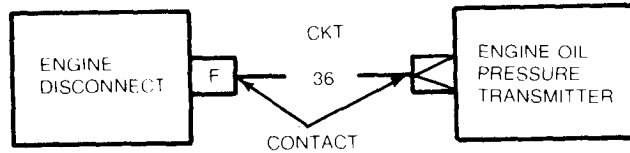
• Check if meter indicates continuity.

Does meter indicate continuity?

- 18**
- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.
 - Repair connectors if defective (page 10-298).
 - If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
 - Connect bulkhead engine disconnect harness connector at engine disconnect.
 - Install front accessory harness connector at bulkhead disconnect (page 10-270).

NO YES

- 19**
- Repair engine electrical harness (page 10-298).
 - Install front accessory harness connector at bulkhead disconnect (page 10-270).



Symptom-32
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

8

20 Check gage instrument panel harness (CKT 36) for short to ground.

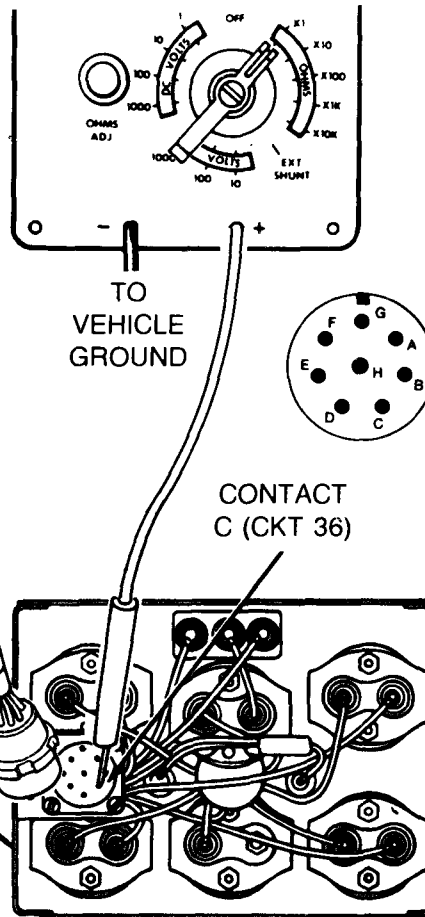
Second Technician (Rear of Crew Compartment)

- Connect engine electrical harness connector to engine oil pressure transmitter.
- Install engine lower access cover (page 17-14).

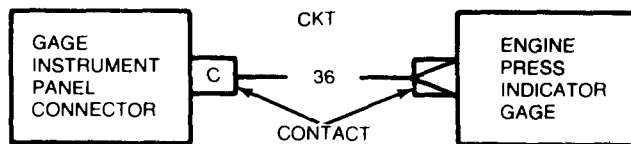
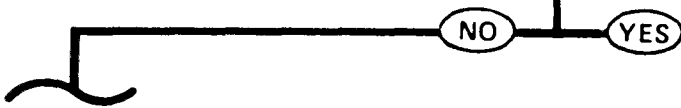
First Technician (Operator's Station)

- Connect gage instrument panel harness connector to ENGINE PRESS indicator gage.
- Disconnect basket-indicator panel harness connector (CKT 36) from gage instrument panel.
- Connect red probe of meter to contact C (CKT 36) of gage instrument panel harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



21 Repair gage instrument panel harness (page 10-298).



TA250310

Symptom-32

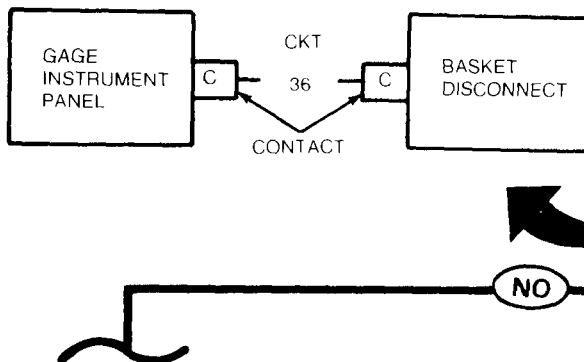
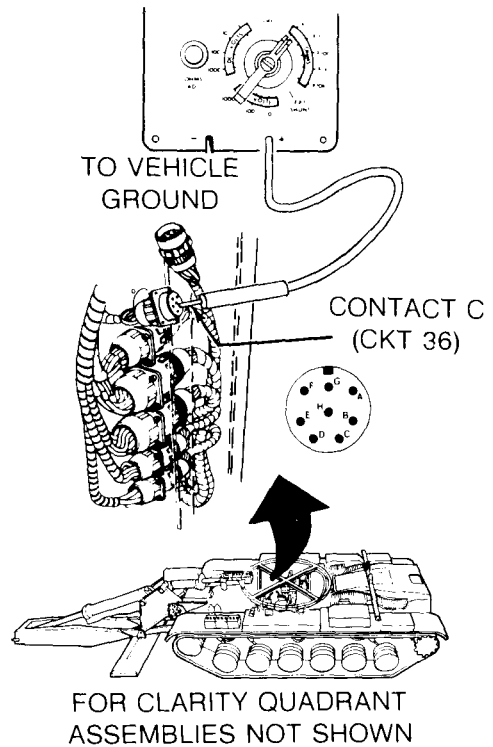
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

22 Check basket-indicator panel harness (CKT 36) at basket disconnect for short to ground.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 36) at basket disconnect.
- Connect red probe of meter to contact C (CKT 36) of basket-indicator panel harness connector at basket disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



23

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Install basket-indicator panel harness connector at basket disconnect.
- Install gage instrument panel (page 10-112).

NO YES

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-32

24 Check front accessory harness (CKT 36) for short to ground.

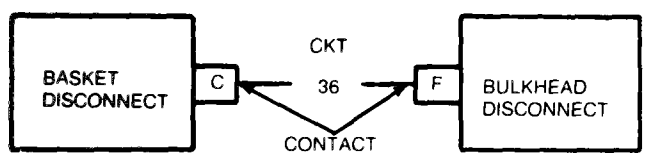
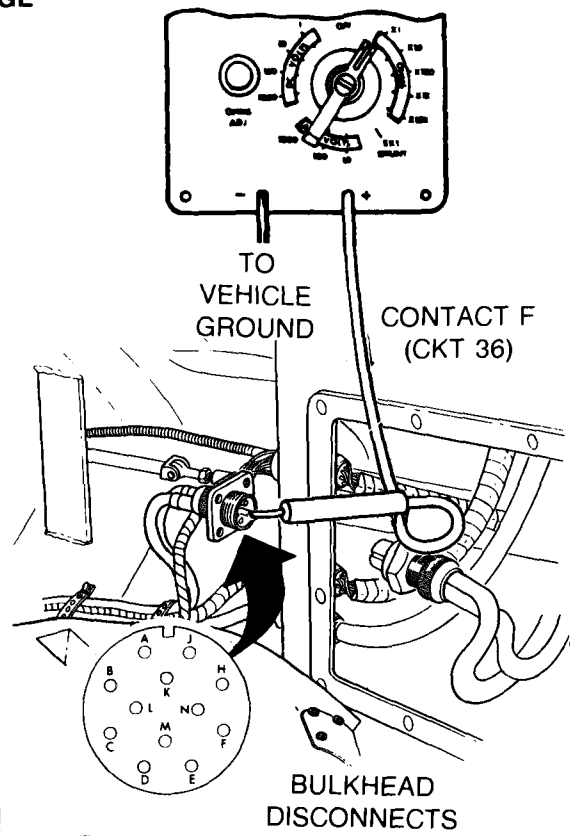
First Technician (Operator's Station)

- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

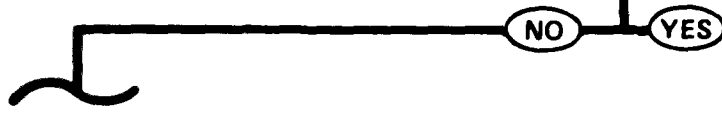
- Install basket-indicator panel harness connector at basket disconnect.
- Displace front accessory harness connector (CKT 36) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact F (CKT 36) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



25

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a bad front accessory harness.
- Install front accessory harness connector at bulkhead disconnect.



TA250312

Symptom-32

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

26 Check bulkhead engine disconnect harness (CKT 36) for short to ground.

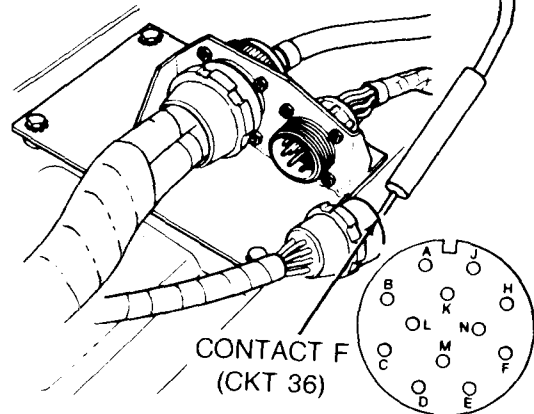
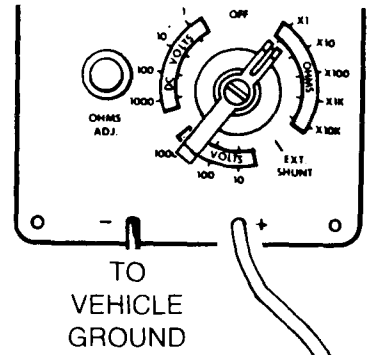
Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 36) at engine disconnect.
- Connect red probe of meter to contact F (CKT 36) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?

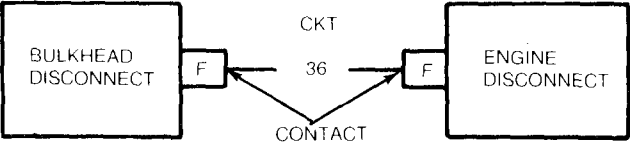
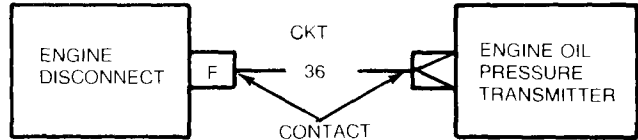


27

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Reconnect bulkhead engine disconnect harness connector at engine disconnect.

28

- Repair engine electrical harness (page 10-298).



TA250313

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE**

Symptom-33

ENGINE OIL TEMPERATURE GAGE SHOWS HIGH OR NO TEMPERATURE (POWER-PLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

NOTE

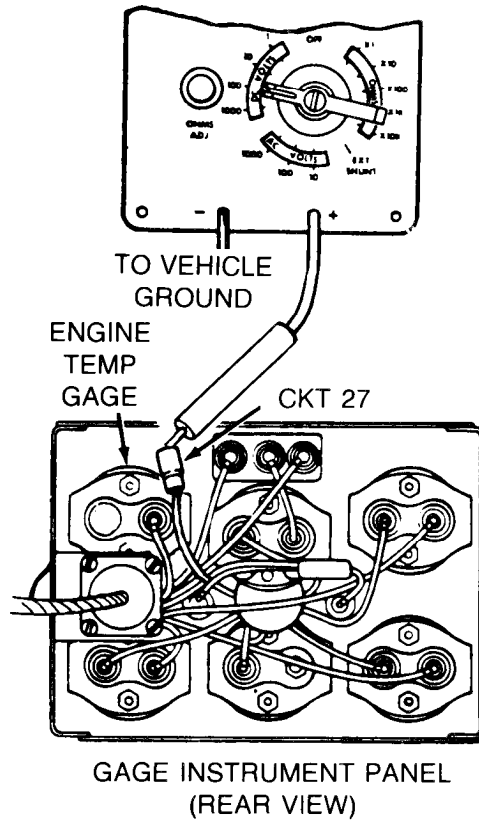
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check gage instrument panel harness (CKT 27) at ENGINE TEMP indicator gage for electrical power.

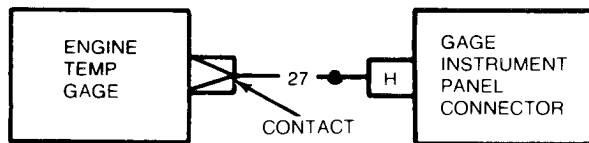
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect gage instrument panel harness connector (CKT 27) from ENGINE TEMP indicator gage.
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to vehicle ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2 Repair gage instrument panel harness (page 10-298).



TA250314

Symptom-33

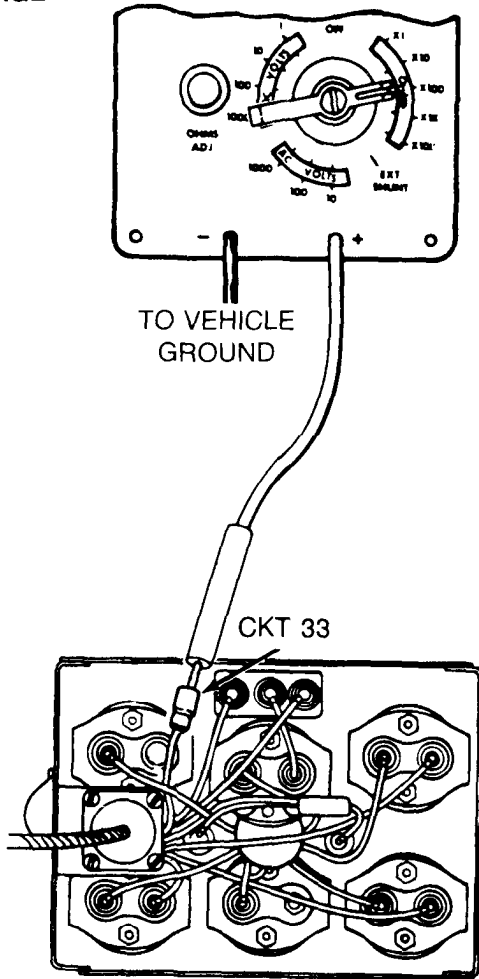
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

NOTE
This check is to be performed with engine cold.

3 Check circuit 33 for proper resistance from gage instrument panel harness connector through engine oil temperature transmitter (engine cold).

- First Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
 - Reconnect gage instrument panel harness connector (CKT 27) to ENGINE TEMP indicator gage.
 - Set multimeter to OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
 - Disconnect gage instrument panel harness connector (CKT 33) from ENGINE TEMP indicator gage.
 - Connect red probe of meter to gage instrument panel harness connector (CKT 33) and black probe to ground.
 - Check if meter indicates less than 2000 OHMS or more than 2000 OHMS.

Does meter indicate less than or more than 2000 OHMS?



4

- Check engine oil temperature transmitter for proper resistance.
- See Step 10 .



Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

5 Check circuit 33 for continuity from gage instrument panel harness connector to engine electrical harness connector at engine oil temperature transmitter.

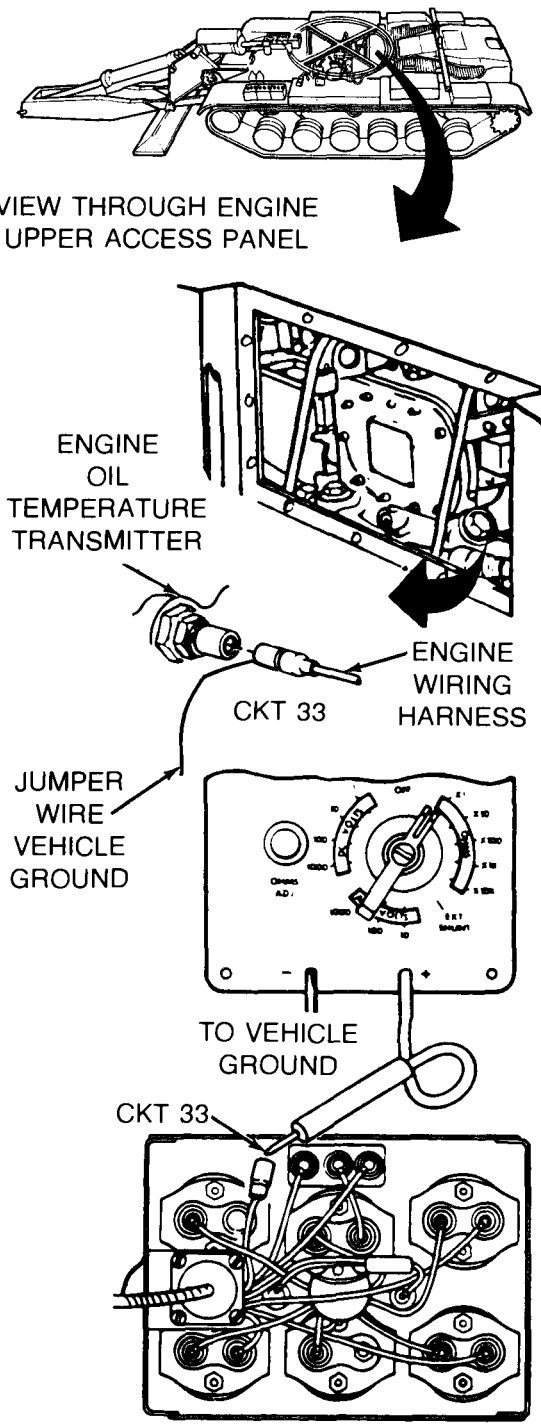
Second Technician (Crew Compartment)

- Remove engine upper access cover (page 17-11).
- Disconnect engine electrical harness connector (CKT 33) from engine oil temperature transmitter.
- Connect jumper wire from electrical harness connector (CKT 33) to ground.

First Technician (Operator's Station)

- Set multimeter to OHMS XI scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector (CKT 33) at ENGINE TEMP indicator gage and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



6 Check gage instrument panel harness (CKT 33) for continuity from connector at ENGINE TEMP indicator gage to connector on instrument panel.

- See Step 21 .

NO

YES

TA250316

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

NOTE
This check is to be performed with engine warm.

7 Check engine oil temperature transmitter for proper resistance.

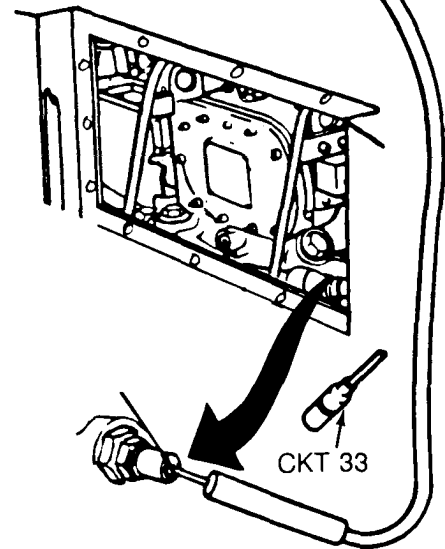
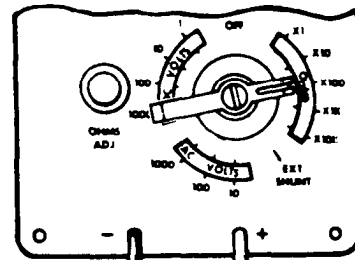
First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 33) to ENGINE TEMP indicator gage.
- Start engine and allow to warm up completely.
- Stop engine.

Second Technician (Crew Compartment)

- Set multimeter OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Connect red probe of meter to contact of engine oil temperature transmitter and black probe to ground.
- Check meter for indication of more than or less than 2600 OHMS.

Does meter indicate more than or less than 2600 OHMS?



8

- Replace engine oil temperature transmitter (page 10-224).
- Install gage instrument panel (page 10-112).

MORE

LESS

9

- Replace ENGINE TEMP indicator gage (page 10-125).
- Install upper engine access cover (page 17-12).

Symptom-33
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

4

10 Check engine oil temperature transmitter for proper resistance.

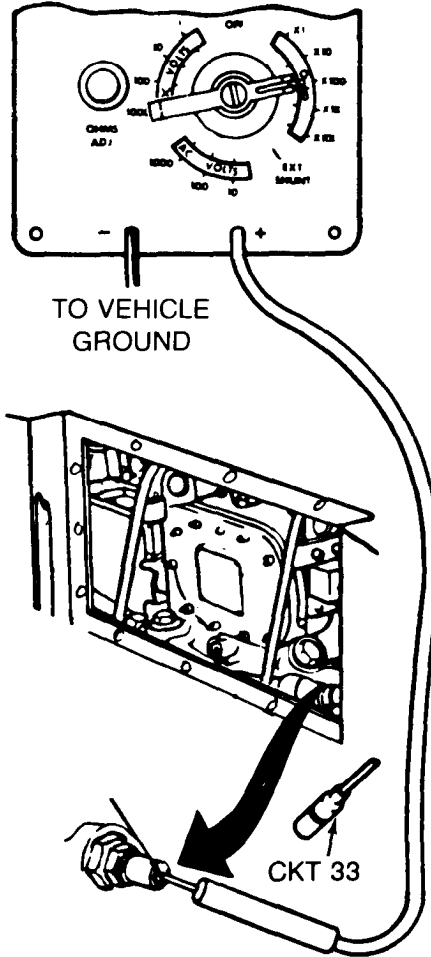
First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 33) to ENGINE TEMP indicator gage.

Second Technician (Crew Compartment)

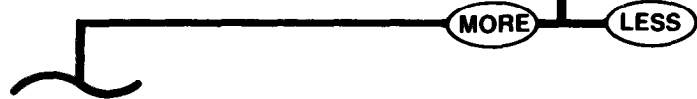
- Remove engine upper access cover (page 17-11).
- Disconnect engine electrical harness connector (CKT 33) from engine oil temperature transmitter.
- Connect red probe of meter to contact of engine oil temperature transmitter and black probe to ground.
- Check if meter indicates more than or less than 2000 OHMS.

Does meter indicate more than or less than 2000 OHMS?



11

- Replace engine oil temperature transmitter (page 10-224).
- Install gage instrument panel (page 10-112).



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-33

12 Check gage instrument panel harness (CKT 33) for short to ground.

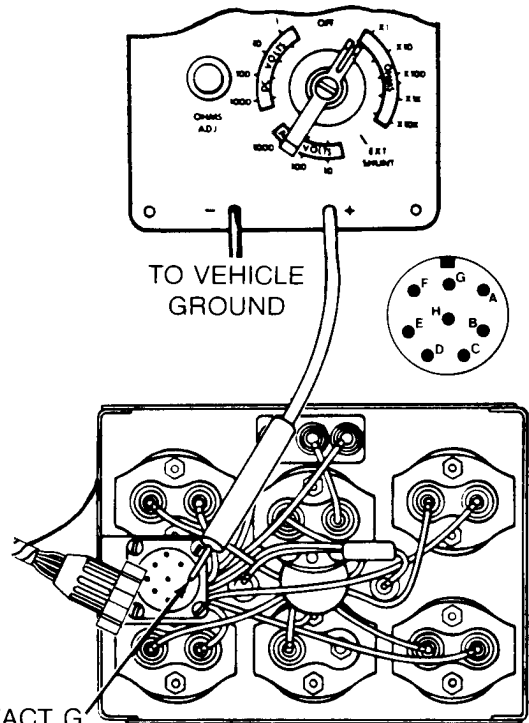
Second Technician (Crew Compartment)

- Connect engine electrical harness connector to engine oil temperature transmitter.
- Install engine upper access cover (page 17-12).

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to OHMS XI scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 33) of gage instrument panel harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?

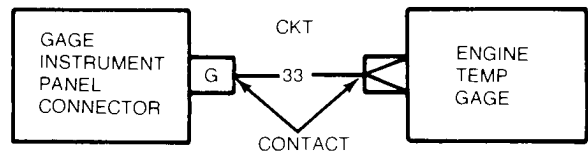


CONTACT G (CKT 33)

13 Repair gage instrument panel harness (page 10-298).

YES

NO



TA250319

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

14

Check basket-indicator panel harness at basket disconnect for short to ground.

First Technician (Operator's Station)

- Connect basket-instrument panel harness connector to gage indicator panel.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 33) at basket disconnect.
- Connect red probe of meter to contact G (CKT 33) of basket-indicator panel harness connector and black probe to ground.
- Check if meter indicates continuity.

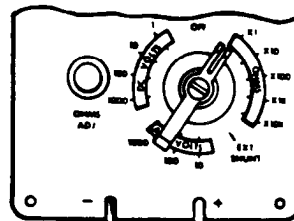
Does meter indicate continuity, thereby indicating a short?

15

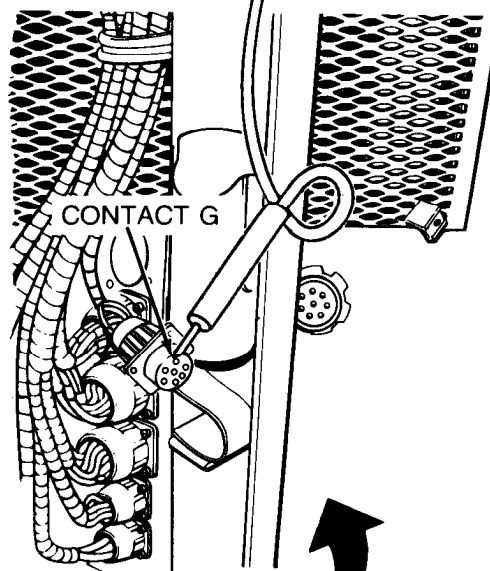
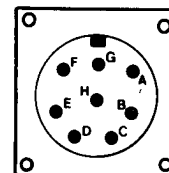
- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket to indicator panel harness.
- Connect gage instrument panel harness connector to ENGINE TEMP indicator gage.
- Install gage instrument panel (page 10-112).

YES

NO

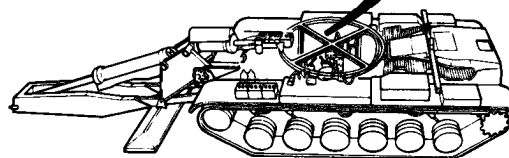


TO VEHICLE GROUND

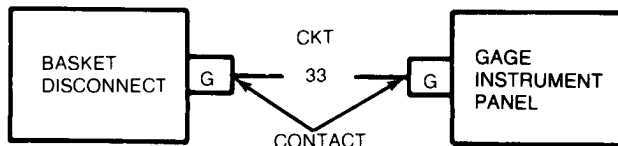


CONTACT G

BASKET DISCONNECTS



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250320

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

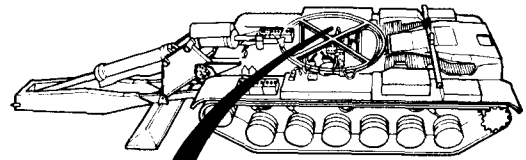
16

Check front accessory harness (CKT 33) at bulkhead disconnect for short to ground.

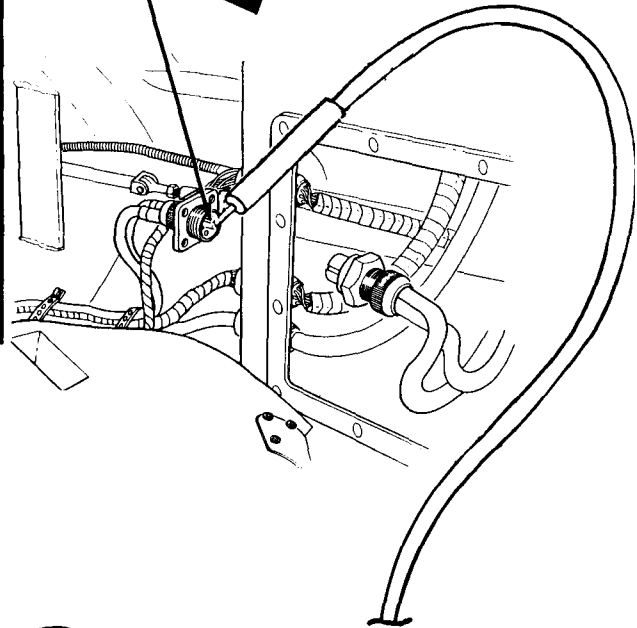
Second Technician (Commander's Station)

- Install basket-indicator panel harness (CKT 33) at basket disconnect.
- Displace front accessory harness connector at bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact H (CKT 33) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



CONTACT H
(CKT 33)

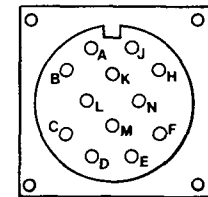
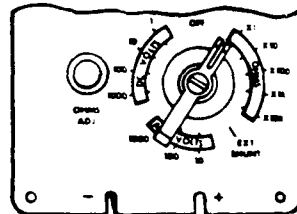


17

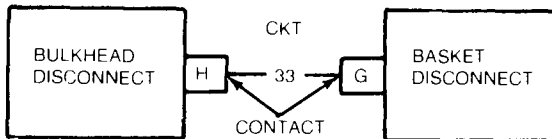
- Inspect front accessory harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Connect gage instrument panel harness connector to ENGINE TEMP indicator gage.
- Install gage instrument panel (page 10-112).

YES

NO



TO VEHICLE
GROUND



TA250321

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

18

Check bulkhead engine disconnect harness (CKT 33) at engine disconnect for short to ground.

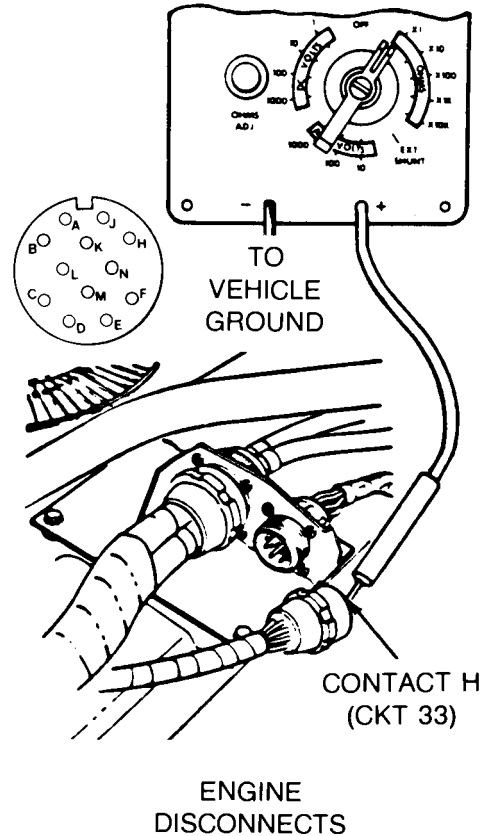
Second Technician (Commander's Station)

- Reinstall front accessory harness connector at bulkhead disconnects (page 10-270).

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector at engine disconnects.
- Connect red probe of meter to contact H (CKT 33) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity to ground, thereby indicating a short?



19

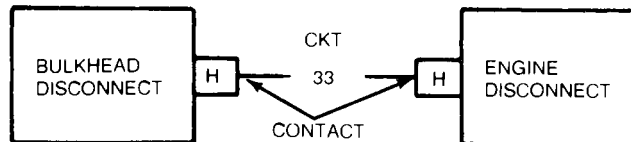
- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Reconnect bulkhead engine disconnect harness connector to engine disconnect.

YES

NO

20

Repair engine electrical harness (page 10-298).



TA250322

Symptom-33
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

6

21 Check gage instrument panel harness (CKT 33) for continuity from connector at ENGINE TEMP indicator gage to connector on instrument panel.

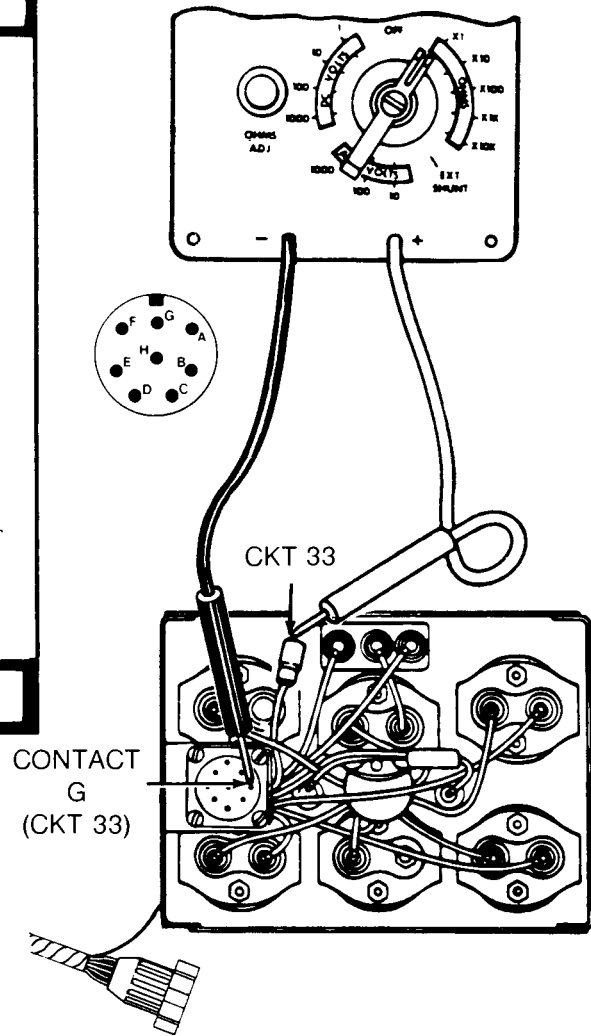
Second Technician (Crew Compartment)

- Reconnect engine electrical harness connector (CKT 33) to engine oil temperature transmitter.
- Install engine upper access cover (page 17-12).

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to gage instrument panel harness connector (CKT 33) at ENGINE TEMP indicator gage.
- Connect black probe of meter to contact G (CKT 33) of gage instrument panel connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



22 Repair gage instrument panel harness (page 10-298).

YES

NO

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

23 Check basket-indicator panel harness (CKT 33) for continuity from connector to gage instrument panel to connector at basket disconnect.

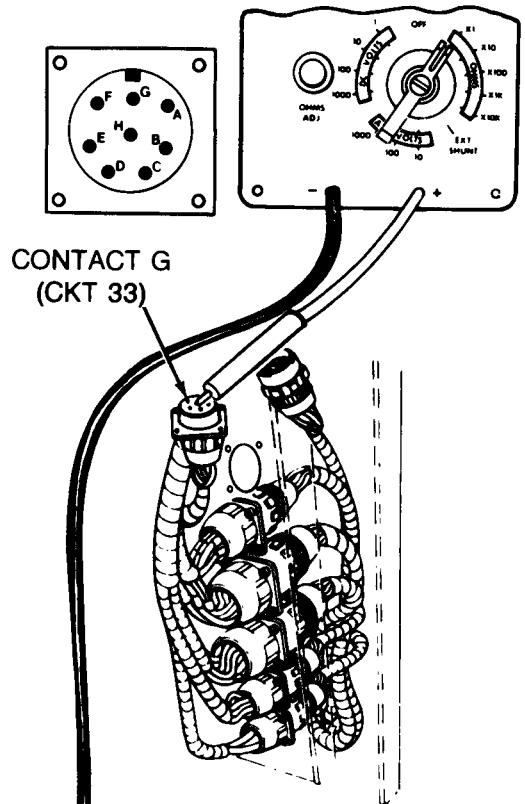
First Technician (Operator's Station)

- Reconnect gage instrument panel harness (CKT 33) to ENGINE TEMP indicator gage.
- Connect black probe of meter to contact G (CKT 33) of basket-indicator panel harness connector at gage instrument panel.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 33) from basket disconnects.
- Connect red probe meter to contact G (CKT 33) of basket-indicator panel harness connector at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

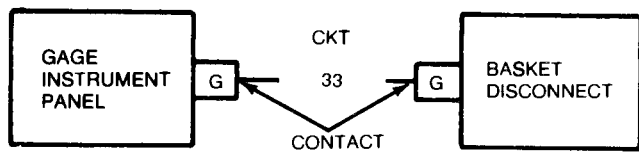
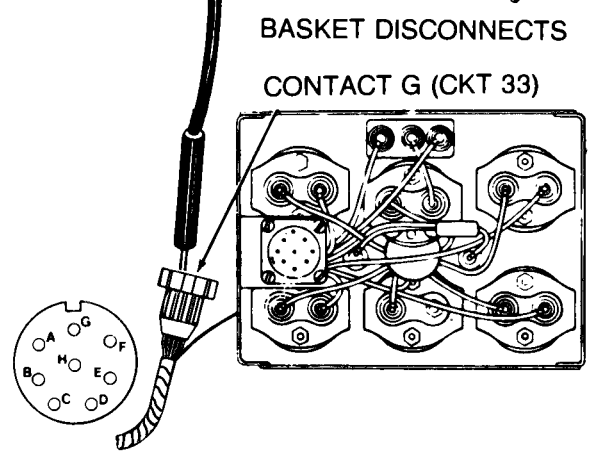


24

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective notify support maintenance of a defective basket-indicator panel harness.
- Install gage instrument panel (page 10-112).
- Install basket-indicator panel harness connector at basket disconnect.

NO

YES



TA250324

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

25 Check front accessory harness (CKT 33) for continuity from connector at basket disconnect to connector at bulkhead disconnect.

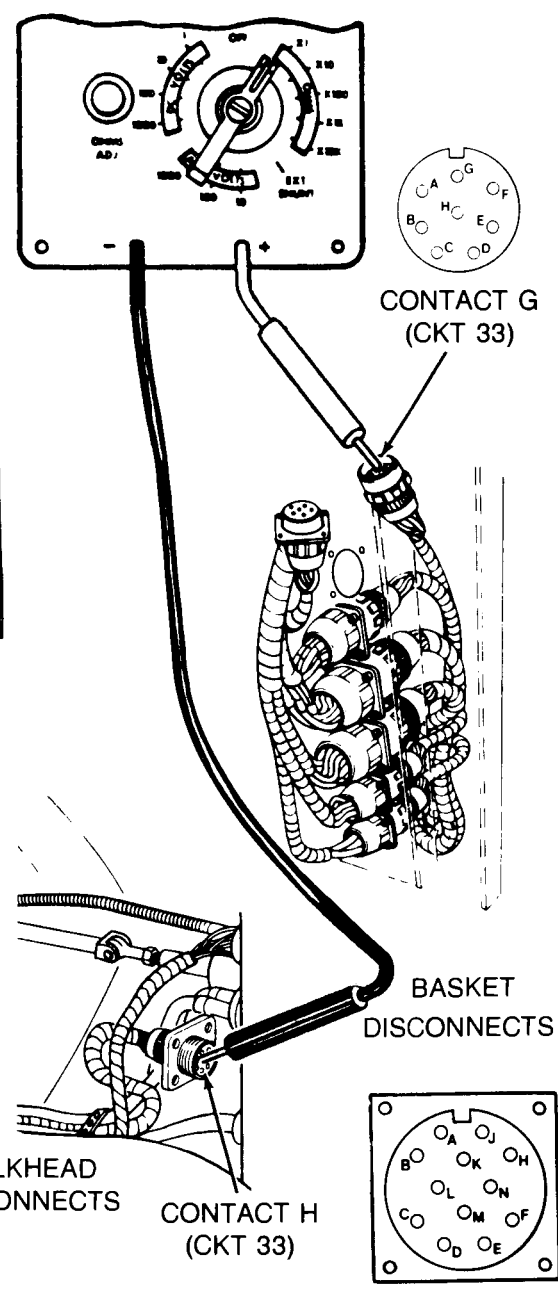
First Technician (Operator's Station)

- Reconnect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 33) at bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact G (CKT 33) of front accessory harness connector at basket disconnect.
- Connect black probe of meter to contact H (CKT 33) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

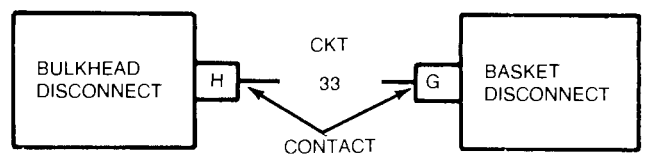


26

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Install basket-indicator panel harness connector at basket disconnect.

NO

YES



Symptom-33

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

27 Check bulkhead engine disconnect harness (CKT 33) for continuity from connector at bulkhead disconnect to connector at engine disconnect.

Second Technician (Commander's Station)

- Install basket-indicator panel harness connector at basket-disconnect.

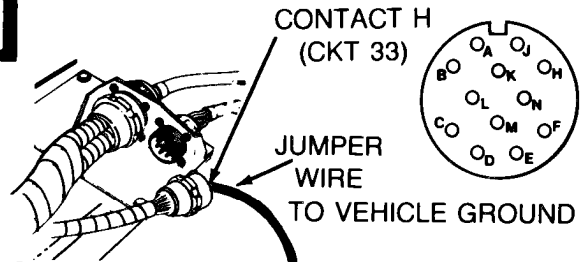
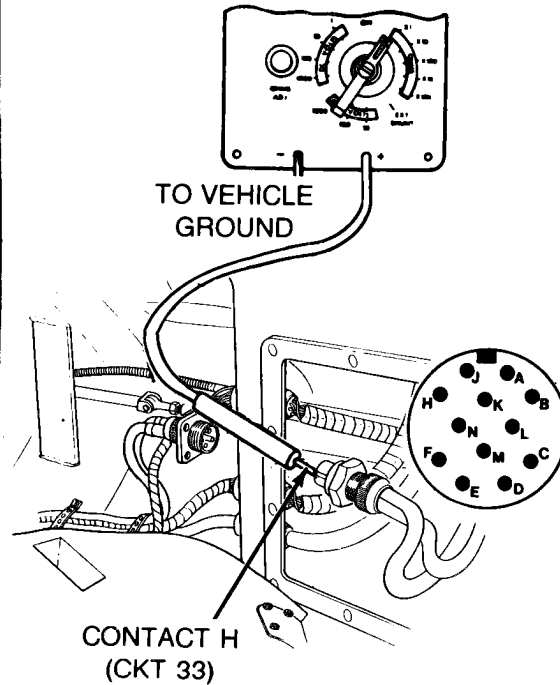
First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 33) at engine disconnects.
- At engine disconnect, connect jumper wire from contact H (CKT 33) of bulkhead engine disconnect harness connector to ground.

Second Technician (Commander's Station)

- Connect red probe of meter to contact H (CKT 33) of bulkhead engine disconnect harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



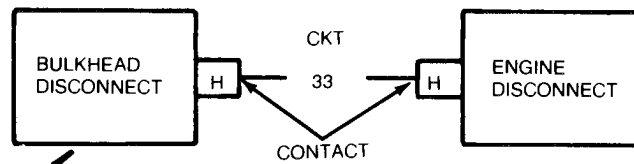
28

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Install front accessory harness connector at bulkhead disconnects (page 10-270).
- Connect bulkhead engine disconnect harness connector to engine disconnect.

NO YES

29

- Repair engine electrical harness (page 10-298).
- Install front accessory harness connector at bulkhead disconnects (page 10-270).



TA250326

DETAILED TROUBLESHOOTING PROCEDURE INDICATOR - GAGE

Symptom-34

**TRANSMISSION OIL PRESSURE GAGE SHOWS NO PRESSURE
(ENGINE RUNNING - ALL OTHER GAGES READ NORMAL).**

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

Check transmission for full oil level.

First Technician (Top Deck)

- Open left top deck grille doors (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Start engine.

First Technician (Top Deck)

- Check transmission oil level (TM 5-5420-202-10).

Is transmission full of oil?

2

- Check oil coolers for evidence of leaks.
- See Step **19** .

3

- Check for transmission oil pressure of 4 to 40 psi.
- See Step **4** .

NO

YES

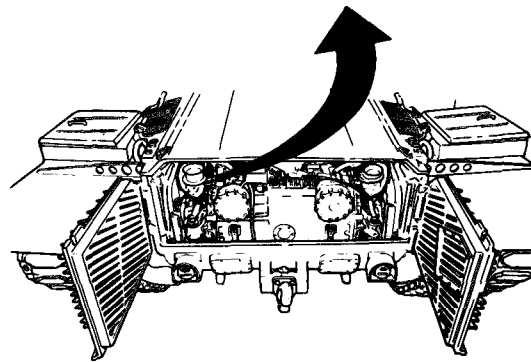
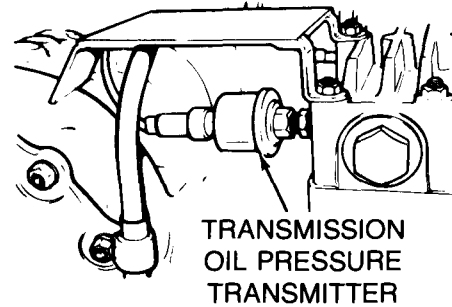
Symptom-34
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

3 OR 22

WARNING

Do not operate engine above idle when personnel are working between rear grille doors.



4 Check for transmission oil pressure of 4 to 40 psi.

Second Technician (Operator's Station)

- Stop engine.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 321) from transmission oil pressure transmitter.
- Remove oil pressure transmitter (page 10-231).
- If STE/ICE is available, install STE/ICE pressure test fittings in transmission and perform Test No. 50: pressure 0-1000 psig. (page 4-88).
- If STE/ICE is not available, install pressure gage (P/N 7950330) in transmission.

Second Technician (Operator's Station)

- Start engine.

First Technician (Rear Grille Doors)

- Check if STE/ICE or gage indicates 4 to 40 psi with engine running.

Does meter/gage indicate 4 to 40 psi?

5

- Stop engine.
- Remove pressure test equipment from transmission.
- Install oil pressure transmitter (page 10-232).
- Connect transmission harness connector to oil pressure transmitter.
- Install transmission shroud (page 9-6).
- Notify support maintenance of transmission problem.

YES

NO

TA250328

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-34

6 Check transmission harness connector (CKT 321) for electrical power at oil pressure transmitter connector.

Second Technician (Operator's Station)

- Stop engine.

First Technician (Rear Grille Doors)

- Set multimeter to measure 10 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to transmission harness oil pressure transmitter connector and black probe to ground.

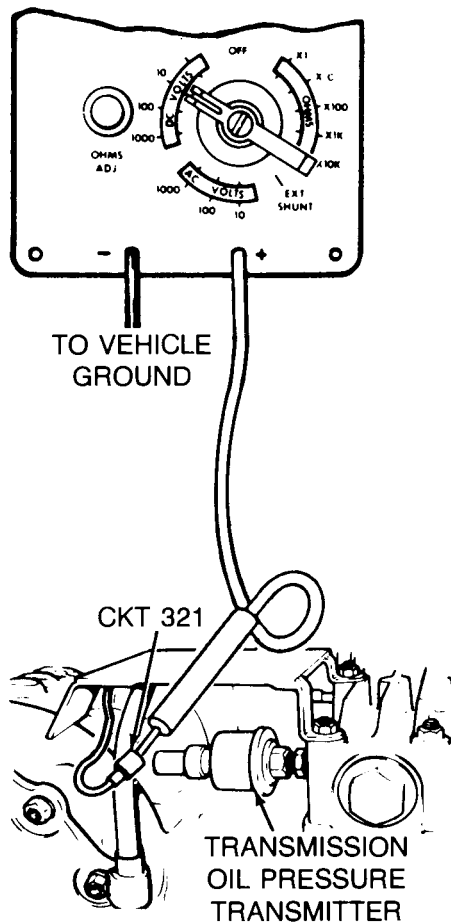
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Rear Grille Doors)

- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



7 Replace transmission oil pressure transmitter (page 10-231).



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-34

8 Check front accessory harness connector (CKT 321) for electrical power at bulkhead disconnect.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear Grille Doors)

- Remove pressure test equipment from transmission.
- Install transmission pressure transmitter on transmission (page 10-232).
- Connect transmission harness connector (CKT 321) to oil pressure transmitter.

First Technician (Commander's Station)

- Displace front accessory harness connector from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact D (CKT 321) of front accessory harness connector and black probe to ground.

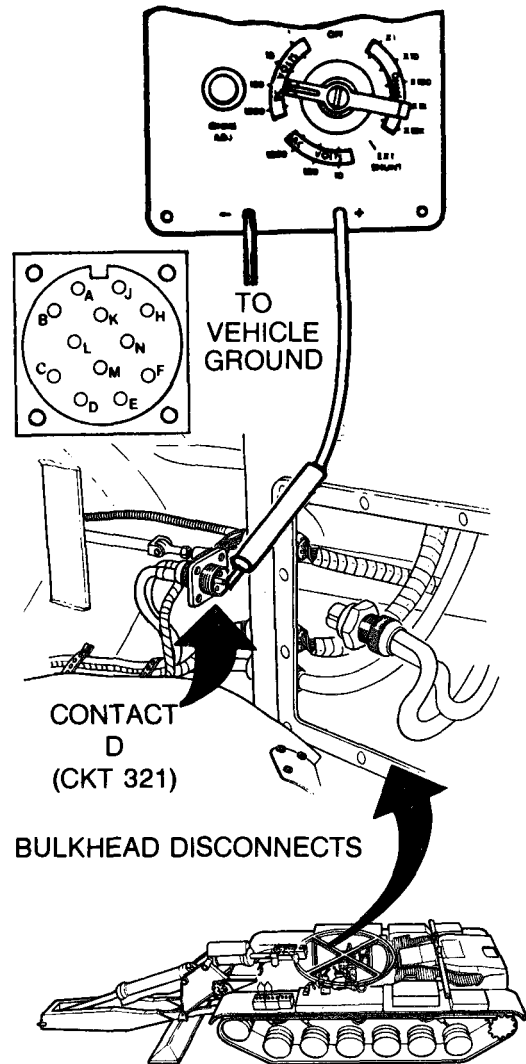
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

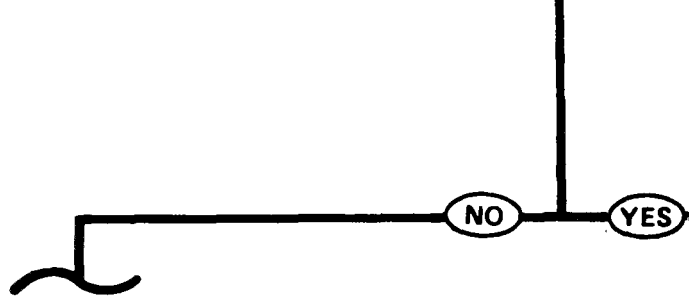
- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



9

- Check bulkhead engine disconnect harness (CKT 321) for continuity from connector at engine disconnect to connector at bulkhead disconnect.
- See Step 24 .



TA250330

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-34

10 Check basket-indicator panel harness connector (CKT 321) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 321) at basket disconnect (page 10-269).
- Connect red probe of meter to contact A (CKT 321) of basket-indicator panel harness connector and black probe to ground.

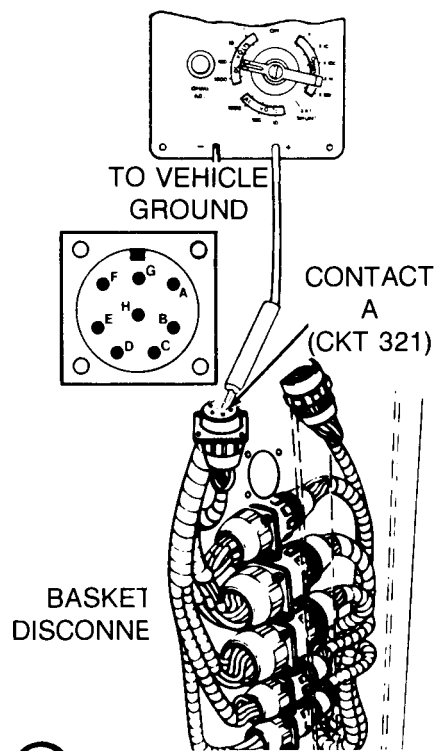
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

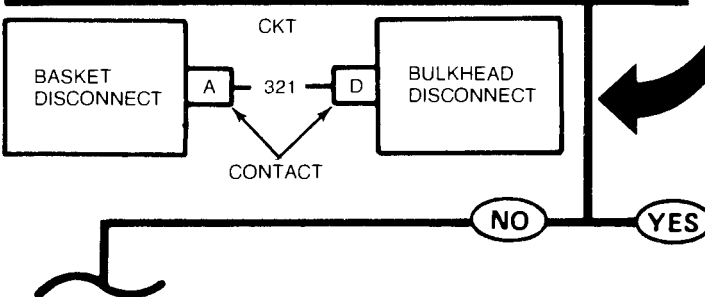
- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



11

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 321 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install transmission shroud (page 9-6).
- Install front accessory harness connector at basket disconnect.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-34

12 Check gage instrument panel harness (CKT 27) for electrical power at TRANSMISSION PRESS indicator gage.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

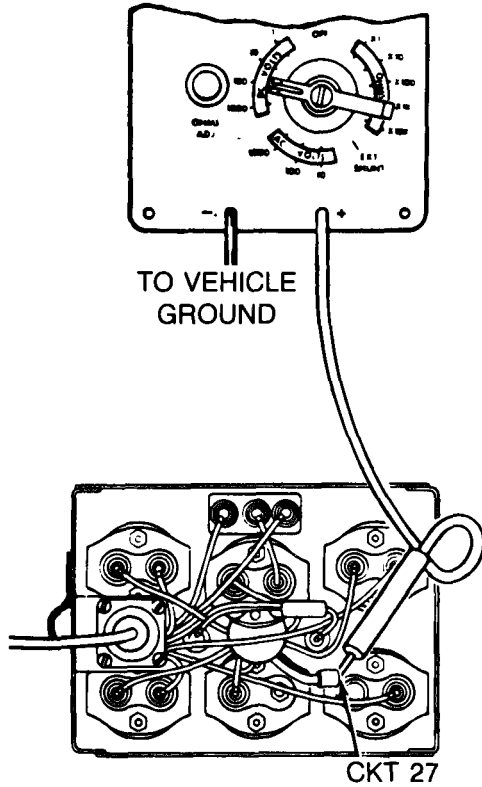
First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

Second Technician (Operator's Station)

- Displace gage instrument panel (page 10-111).
- Disconnect gage instrument panel harness connector (CKT 27) from TRANSMISSION PRESS indicator gage.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

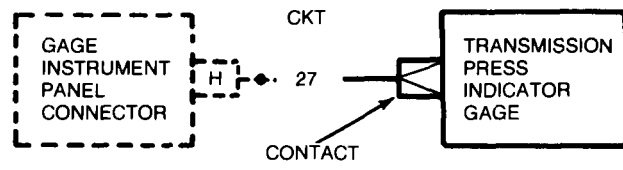
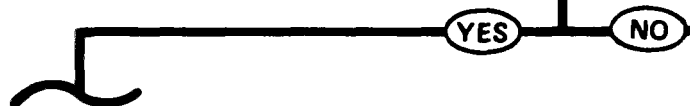
Does meter indicate 18 to 30 volts dc?



GAGE INSTRUMENT PANEL
(REAR VIEW)

13

- Repair gage instrument panel harness (page 10-298).
- Install basket-indicator panel harness connector (CKT 321) at basket disconnect.
- Install transmission shroud (page 9-6).



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

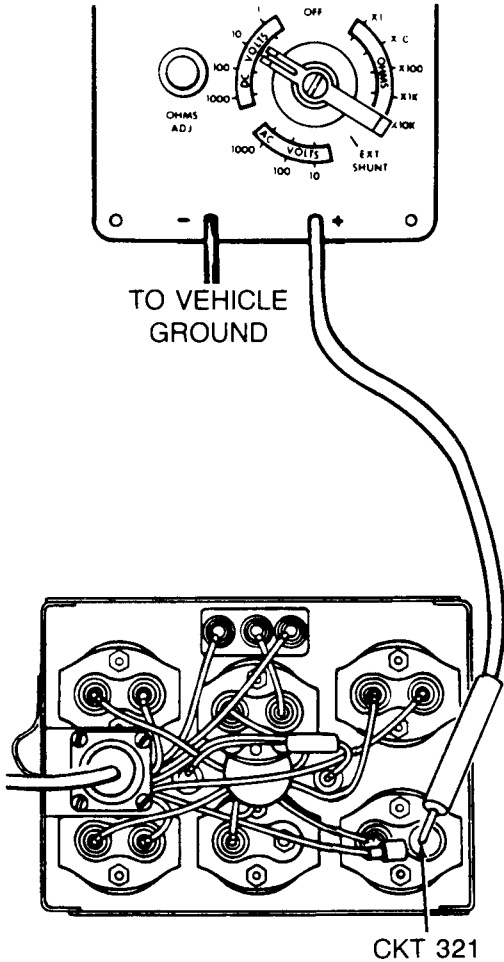
Symptom-34

14 Check transmission oil pressure gage for electrical power at CKT 321 connector.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gage instrument panel harness connector (CKT 27) to TRANSMISSION PRESS gage.
- Disconnect gage instrument panel harness (CKT 321) from TRANSMISSION PRESS gage.
- Set multimeter to measure 10 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to CKT 321 connector on gage and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



YES → [End of Procedure]

NO → **15**

- Replace transmission oil pressure gage (page 10-121).
- Install basket-indicator panel harness connector (CKT 321) at basket disconnect.
- Install transmission shroud (page 9-6).

Symptom-34

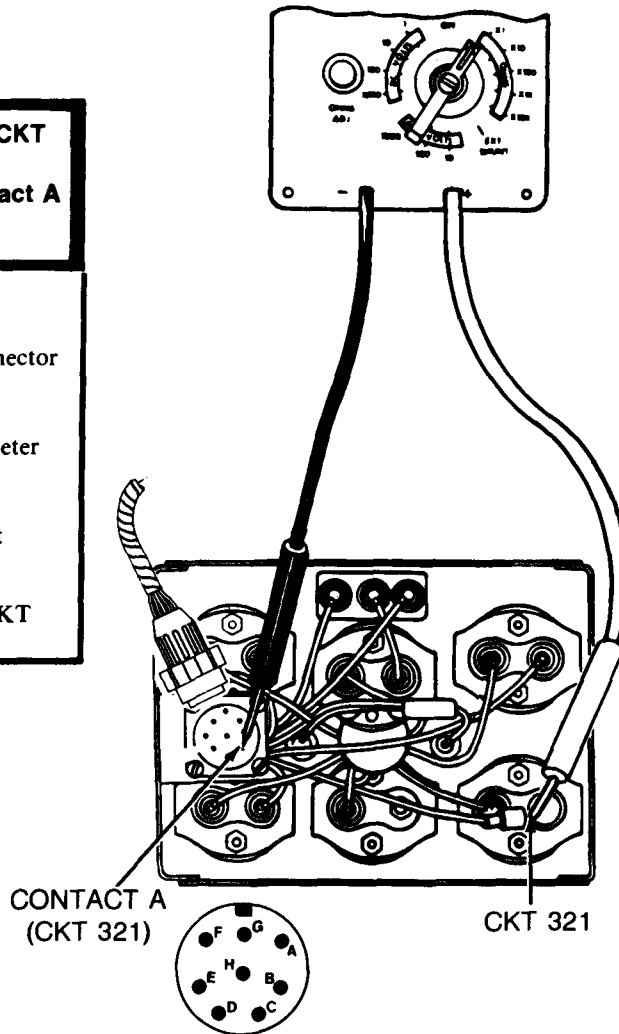
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

16

Check gage instrument panel wiring harness (CKT 321) for continuity from connector to TRANSMISSION PRESS indicator gage to contact A of gage instrument panel connector.

Second Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel wiring harness connector (CKT 321).
- Connect black probe of meter to contact A (CKT 321) of gage instrument panel connector.



TA250334

Symptom-34

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
 (Continued)

STEP 16 CONTINUED

• Check if meter indicates continuity.

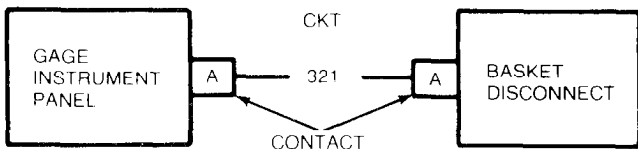
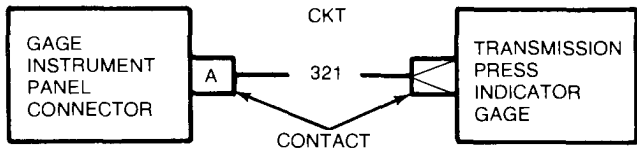
Does meter indicate continuity?

17

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 321 wire at rear of connectors.
- Repair connectors if defective. (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Connect gage instrument panel harness connector (CKT 321) to TRANSMISSION PRESS indicator gage.
- Install basket-indicator panel harness connector (CKT 321) to basket disconnect.
- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).
- Install transmission shroud (page 9-6).

18

- Repair gage instrument panel harness (page 10-298).
- Install basket-indicator panel harness connector (CKT 321) to basket disconnects.
- Install transmission shroud (page 9-6).



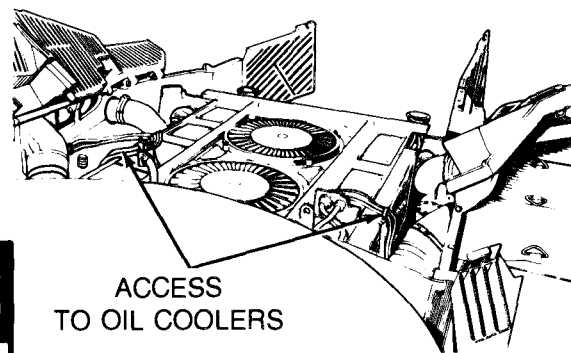
TA250335

Symptom-34
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

2

NOTE
Locator views for Step 19 are continued on next page.



19

Check oil coolers for evidence of leaks.

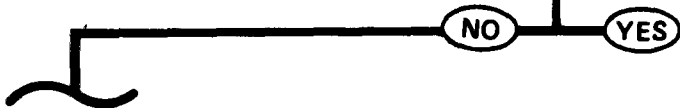
First Technician (Top Deck)

- Add oil to transmission as required (LO 5-5420-226-12).
- Visually check for evidence of oil leaks around both left and right oil coolers.

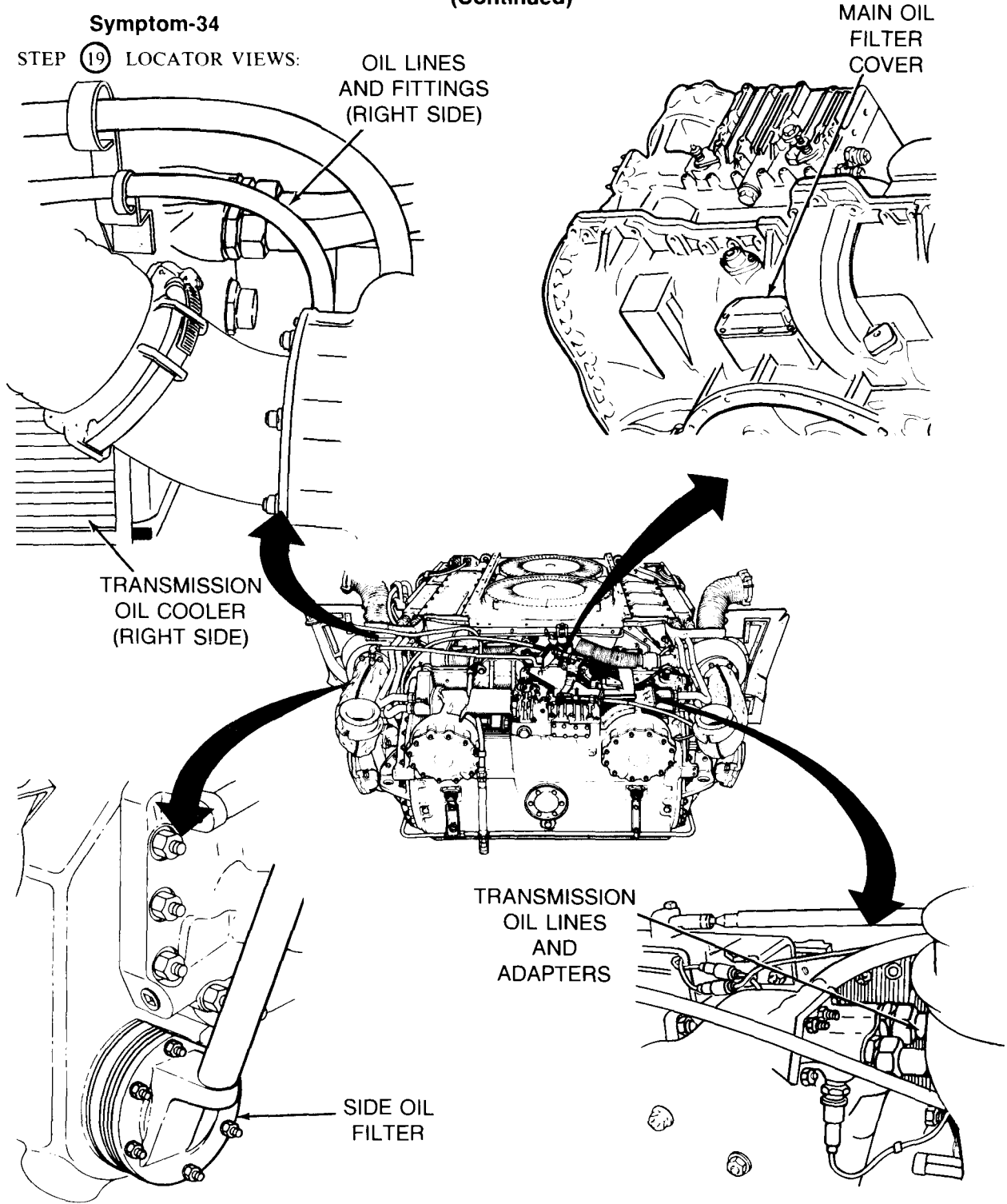
Is there evidence of oil leaks around oil coolers?

20

- Remove powerplant and check transmission components listed below for leaks.
- Tighten leaking connections.
- If connections are still leaking, repair or replace the following as necessary:
 - Left oil cooler (page 6-38).
 - Right oil cooler (page 6-38).
 - Oil lines and/or connections to left oil cooler (page 6-68).
 - Oil lines and/or connections to right oil cooler (page 6-64).
 - Connections or gaskets at left and right transmission adapters (page 6-64 and 6-68).
 - Main oil filter cover gasket (page 11-89).
 - Side oil filter gasket (page 11-96).



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**



TA250337

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

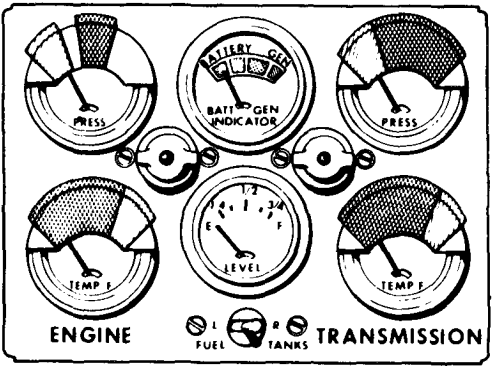
Symptom-34

21 Check if transmission oil pressure gage indicates pressure.

Second Technician (Operator's Station)

- Check TRANSMISSION PRESS gage for indication of pressure.
- Stop engine.

Does gage indicate transmission oil pressure?



GAGE INSTRUMENT PANEL

NO

22

- Check for transmission oil pressure of 4 to 40 psi.

See Step **4** .

YES

23

- Stop engine.
- Problem corrected.
- Close top deck grille doors.

Symptom-34
FROM STEP

9

24 Check bulkhead engine disconnect harness (CKT 321) for continuity from connector at engine disconnect to connector at bulkhead disconnect.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

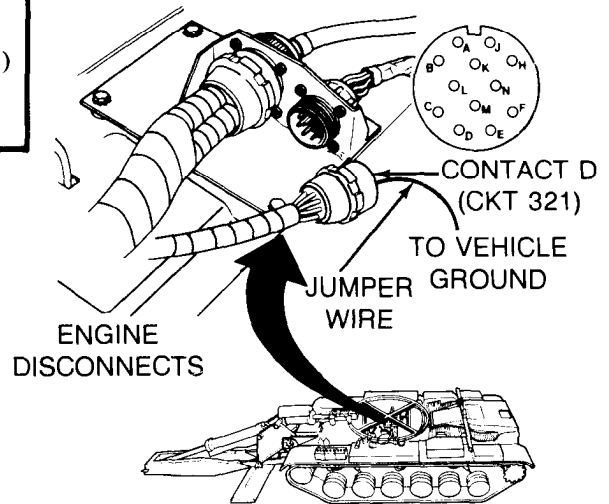
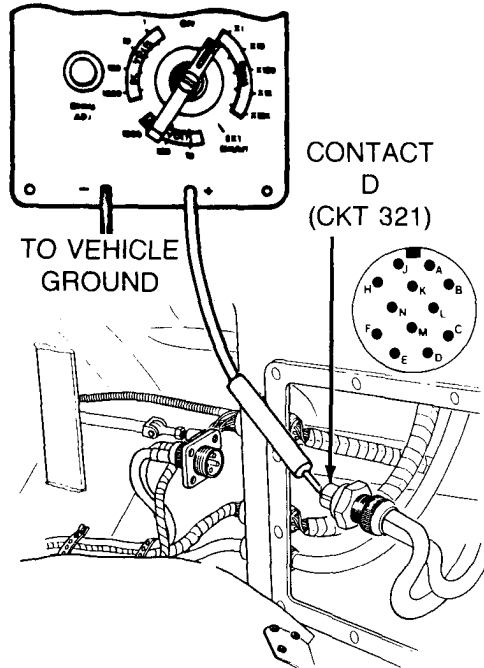
Second Technician (Top Deck)

- Disconnect bulkhead engine disconnect harness connector (CKT 321) from engine disconnect.
- Connect jumper wire from contact D (CKT 321) of bulkhead engine disconnect harness connector to ground.

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 321) of bulkhead engine disconnect harness connector at bulkhead disconnect and black probe to ground.

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

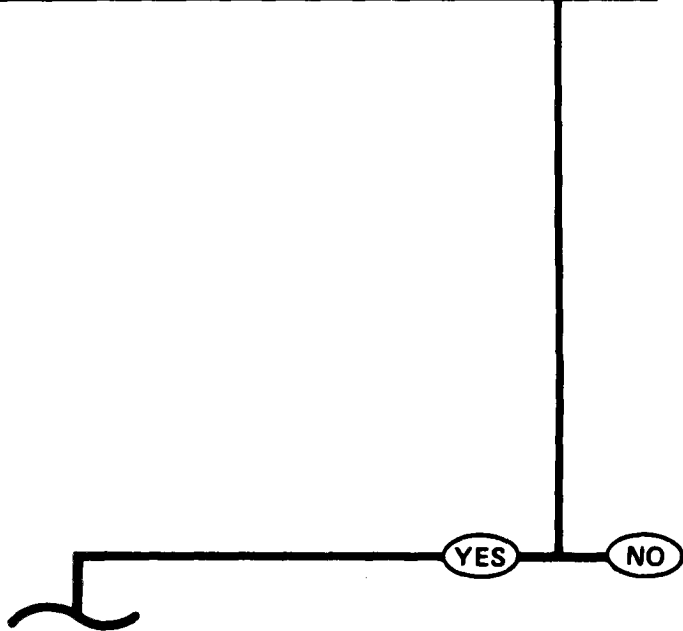
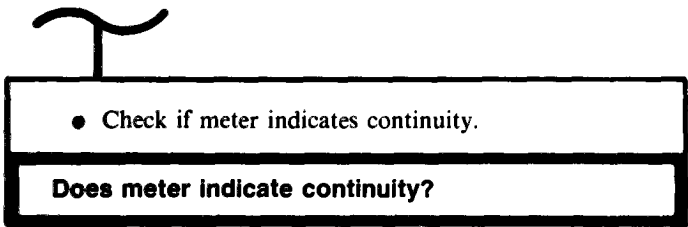


TA250339

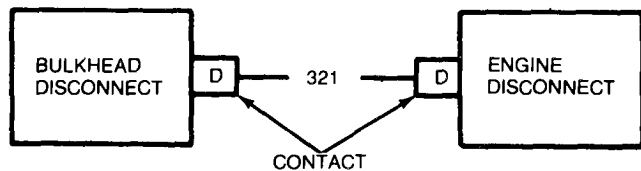
Symptom-34

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

STEP **24** CONTINUED



- 25**
- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 321 wire at rear of connectors.
 - Repair connectors if defective. (page 10-298).
 - If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
 - Connect bulkhead engine disconnect harness to engine disconnects.
 - Install front accessory harness connector (CKT 321) to bulkhead disconnects (page 10-270).
 - Install transmission shroud (page 9-6).



TA250340

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-34

26

Check transmission harness (CKT 321) for continuity from connector at transmission disconnect to connector at transmission oil pressure transmitter.

First Technician (Commander's Station)

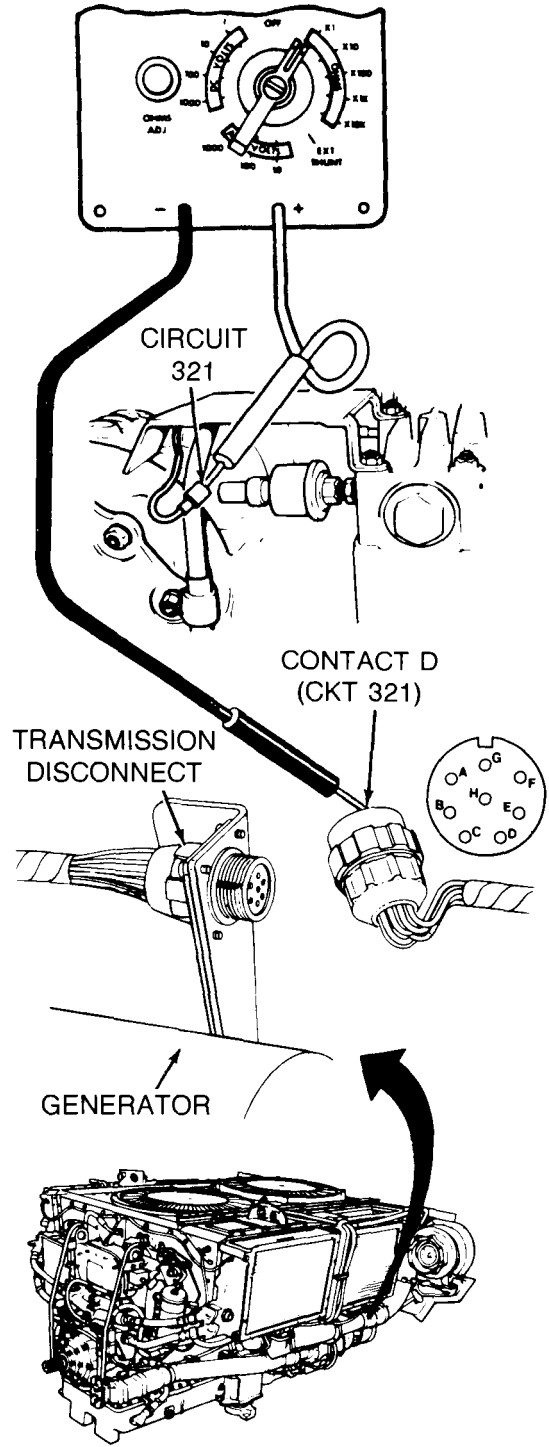
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Disconnect transmission harness connector (CKT 321) from transmission oil pressure transmitter.
- Disconnect transmission harness connector from engine electrical harness connector at transmission disconnect.
- Connect black probe of meter to contact D (CKT 321) of transmission harness connector at transmission disconnect.
- Connect red probe of meter to transmission wiring harness connector (CKT 321) at transmission oil pressure transmitter.



TA250341

Symptom-34

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

STEP 26 CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

27

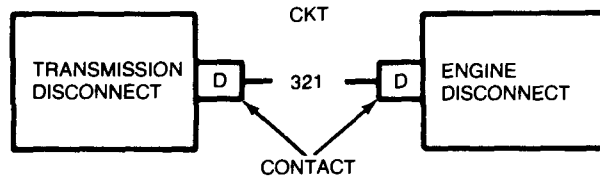
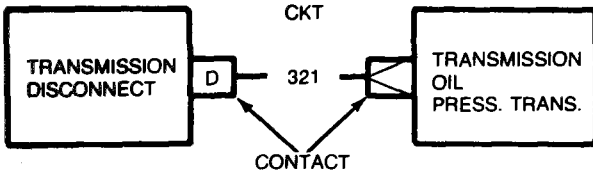
Repair transmission harness
(page 10-298).

NO

YES

28

- Repair engine electrical harness (page 10-298).
- Connect transmission harness connector (CKT 321) to transmission oil pressure transmitter.



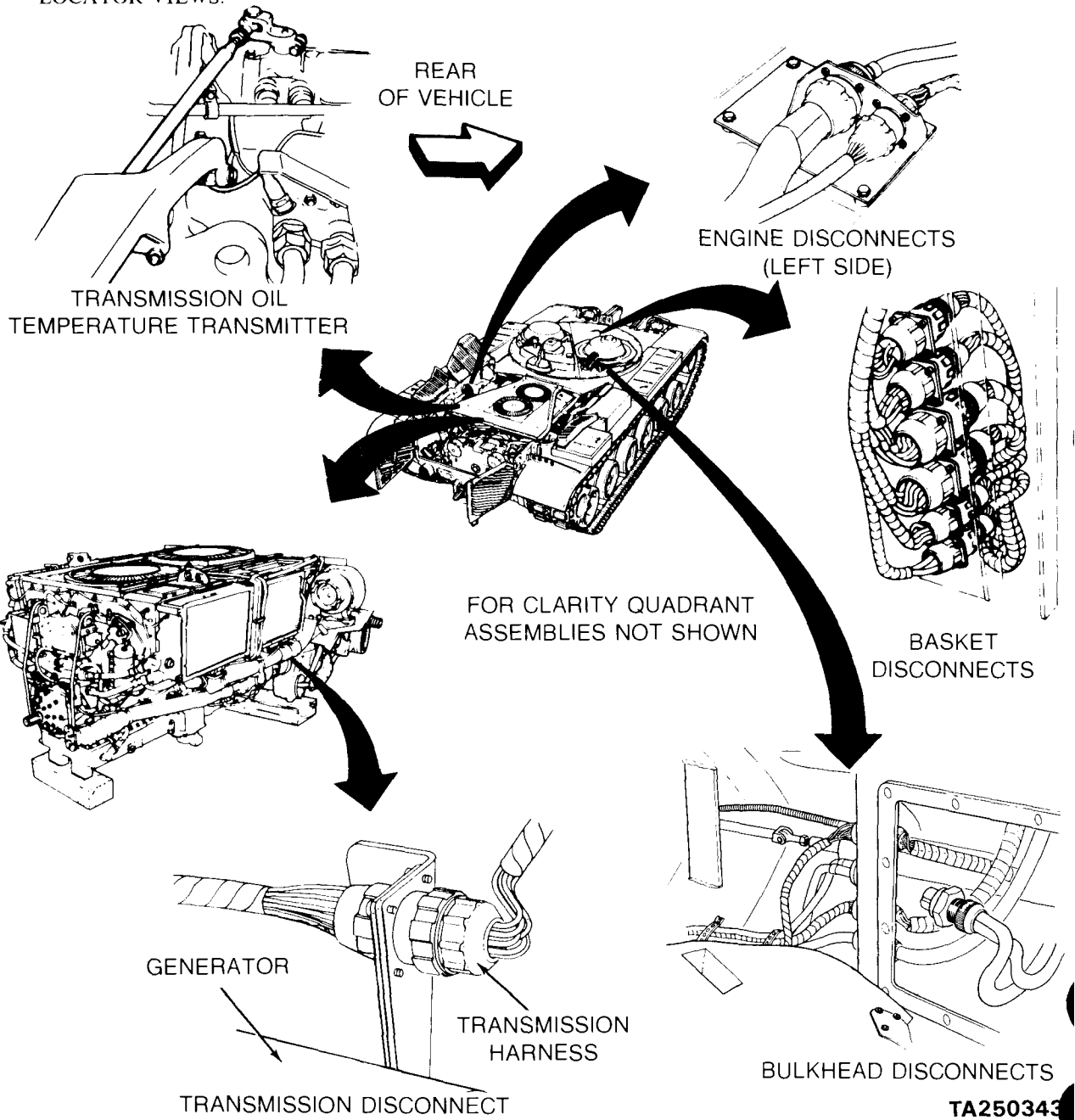
TA250342

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

TRANSMISSION OIL TEMPERATURE GAGE SHOWS HIGH OR NO TEMPERATURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

LOCATOR VIEWS:



TA250343

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-35

TRANSMISSION OIL TEMPERATURE GAGE SHOWS HIGH OR NO TEMPERATURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

Check gage instrument panel harness (CKT 27) at TRANSMISSION TEMP indicator gage for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect gage instrument panel harness connector (CKT 27) from TRANSMISSION TEMP indicator gage.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

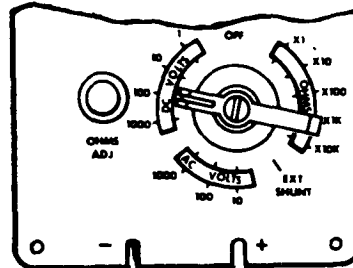
Does meter indicate 18 to 30 volts dc?

YES

NO

2

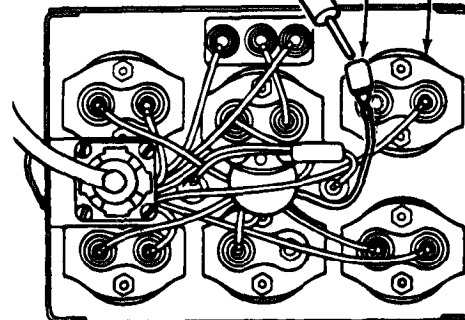
Repair gage instrument panel harness (CKT 27) (page 10-298).



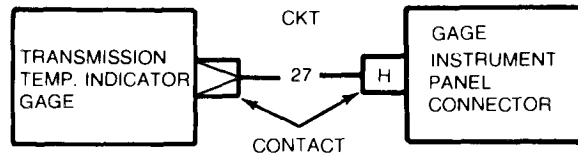
TO VEHICLE GROUND

TRANSMISSION TEMP INDICATOR GAGE

CKT 27



GAGE INSTRUMENT PANEL (REAR VIEW)



TA250344

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-35

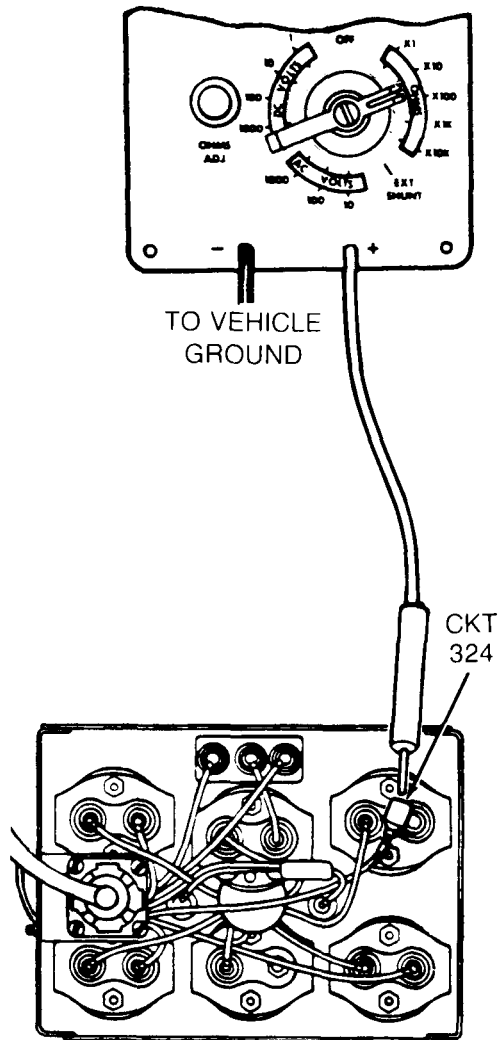
NOTE
Transmission oil must cool before proceeding.

3 Check CKT 324 at TRANSMISSION TEMP indicator gage for proper resistance of transmission oil temperature transmitter.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gage instrument panel harness connector (CKT 27) to TRANSMISSION TEMP indicator gage.
- Disconnect gage instrument panel harness connector (CKT 324) from TRANSMISSION TEMP indicator gage.
- Set multimeter to OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector (CKT 324) and black probe to ground.
- Check if meter indicates more than 2 000 OHMS or less than 2 000 OHMS.

Does meter indicate more than or less than 2 000 OHMS?



4

- Check transmission oil temperature transmitter for proper resistance.
- See Step 10 .

MORE

LESS

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

5

Check CKT 324 from TRANSMISSION TEMP indicator gage connector to transmission oil temperature transmitter connector for continuity.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

Second Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect one end of jumper wire to transmission harness connector (CKT 324) and other end of ground.

First Technician (Operator's Station)

- Set multimeter OHMS X1 scale "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector (CKT 324) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

6

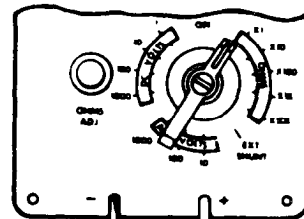
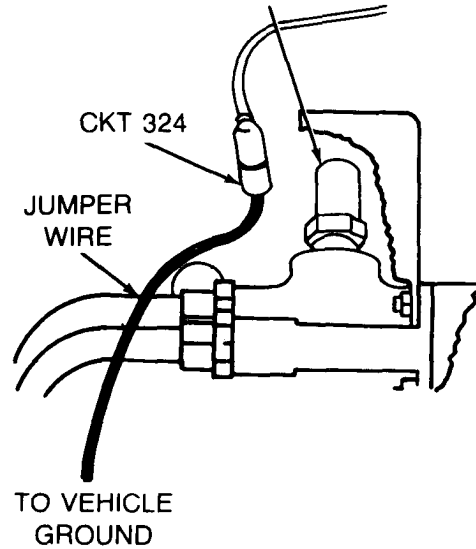
- Check gage instrument panel harness (CKT 324) for continuity.

NO

- See Step 23 .

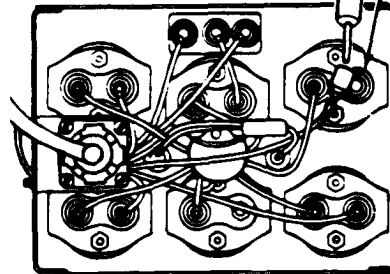
YES

TRANSMISSION OIL TEMPERATURE TRANSMITTER



TO VEHICLE GROUND

CKT 324



TA250346

Symptom-35

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

NOTE
This check is to be performed with transmission completely warmed up.

7 Check transmission oil temperature transmitter for proper resistance.

First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 324) to TRANSMISSION TEMP indicator gage.
- Install gage instrument panel (page 10-112).

Second Technician (Rear Grille Doors)

- Remove jumper wire connected between transmission harness connector (CKT 324) and ground.
- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

Both Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Operator's Station)

- Start engine and allow to warm up completely.
- Drive vehicle in all shift ranges making frequent stops and turns to completely warm up transmission.

Symptom-35

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

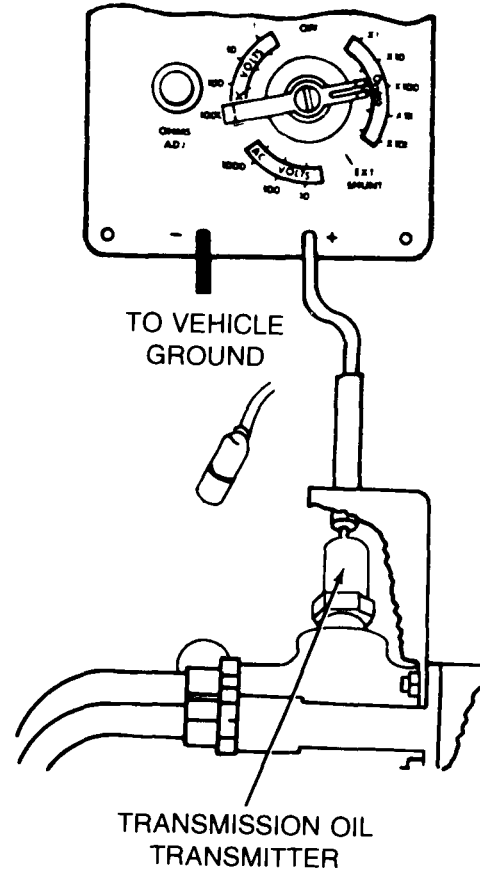
STEP 7 CONTINUED

- Stop engine.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).
- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Set multimeter to OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Connect red probe of meter to center contact of transmission oil temperature transmitter and black probe to ground.
- Check if meter indicates less than 2600 OHMS or more than 2600 OHMS.

Does meter indicate less than or more than 2600 OHMS?



8
Replace transmission oil temperature transmitter (page 10-234).

MORE LESS

9

- Replace TRANSMISSION TEMP indicator gage (page 10-130).
- Connect transmission wiring harness connector (CKT 324) to transmission oil temperature transmitter.
- Install transmission shroud (page 9-6).

TA250348

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-35
FROM STEP

4

10 Check transmission oil temperature transmitter for proper resistance.

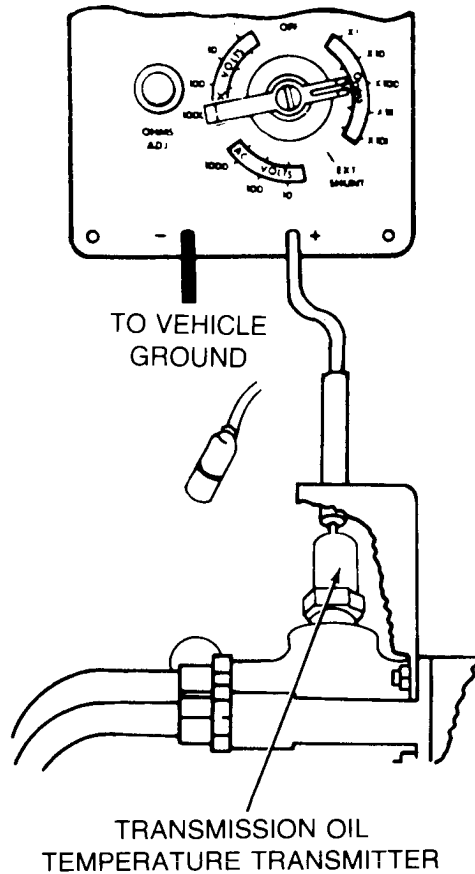
Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect red probe of meter to center contact of transmission oil temperature transmitter and black probe to ground.
- Check if meter indicates more than 2000 OHMS or less than 2000 OHMS.

Does meter indicate more than or less than 2000 OHMS?



11

- Replace transmission oil temperature transmitter (page 10-234).
- Reconnect gage instrument panel harness connector (CKT 324) to TRANSMISSION TEMP indicator gage.
- Install gage instrument panel (page 10-112).

MORE

LESS

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

12

Check gage instrument panel harness (CKT 324) for short to ground.

Second Technician (Rear Grille Doors)

- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

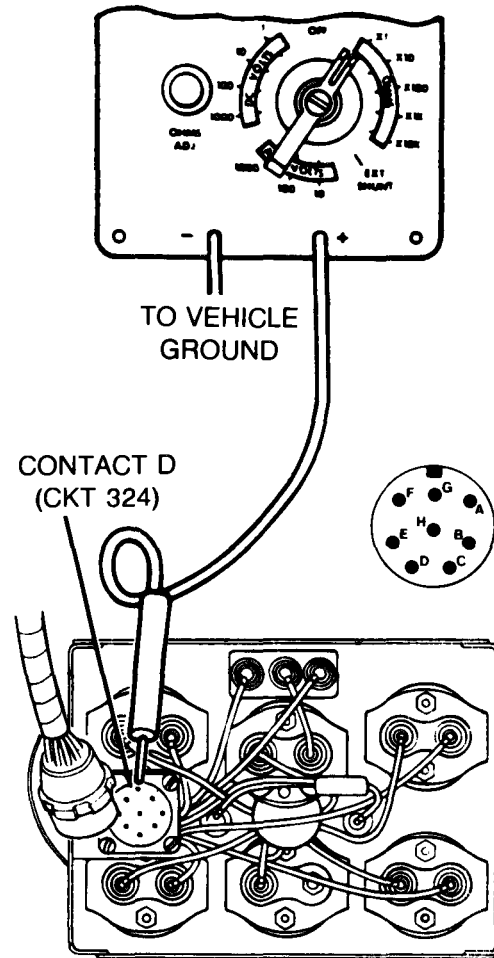
Both Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Operator's Station)

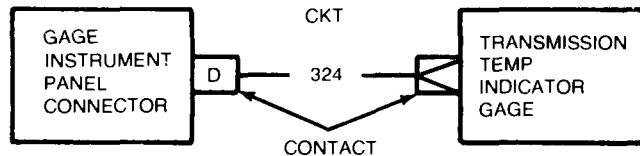
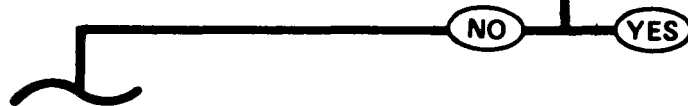
- Disconnect basket-indicator panel harness connector from gage instrument panel connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector contact D (CKT 324) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?



13

Repair gage instrument panel wiring harness (CKT 324) (page 10-298).



TA250350

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

14 Check basket-indicator panel harness (CKT 324) for short to ground.

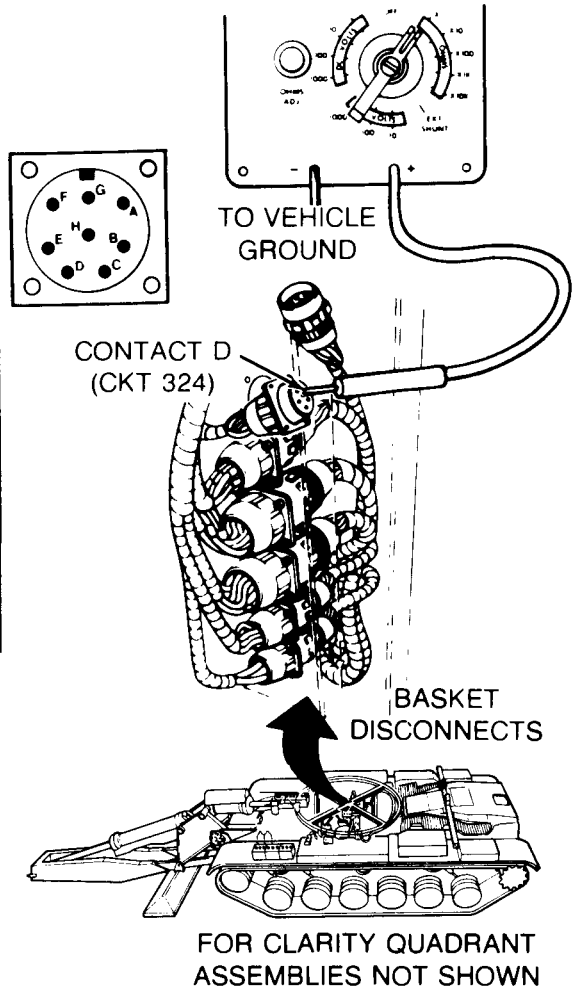
First Technician (Operator's Station)

- Connect gage instrument panel harness (CKT 324) to TRANSMISSION TEMP indicator gage.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector from basket disconnect.
- Connect red probe of meter to contact D (CKT 324) of basket-indicator panel harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?

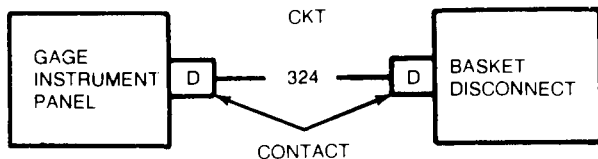


15

- Inspect basket-indicator panel harness for bent or broken connector contacts or loose CKT 324 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad basket-indicator panel harness.
- Install basket-indicator panel harness connector at basket disconnect.
- Connect basket-indicator panel harness connector to gage instrument panel connector.
- Install gage instrument panel (page 10-112).

YES

NO



TA250351

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

16 Check front accessory harness (CKT 324) for short to ground.

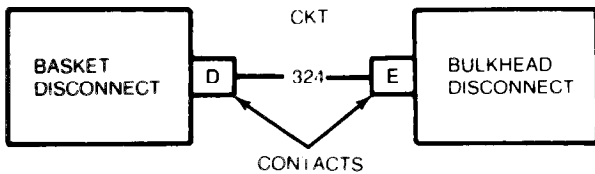
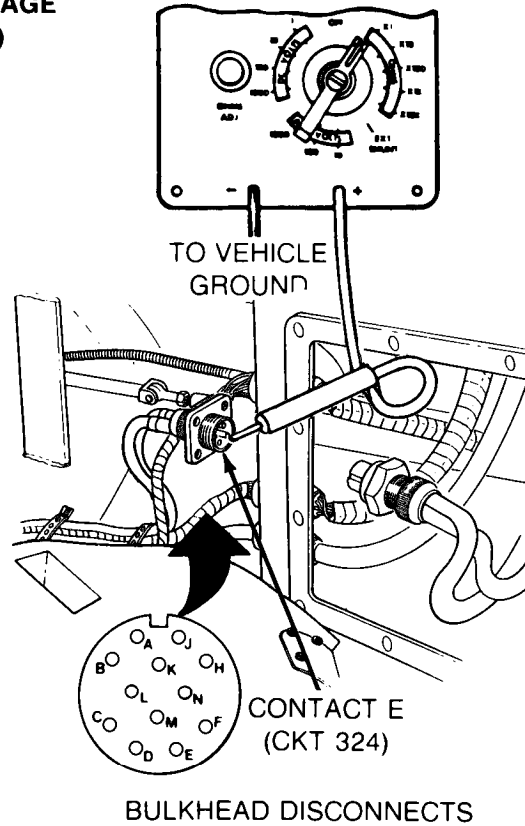
First Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

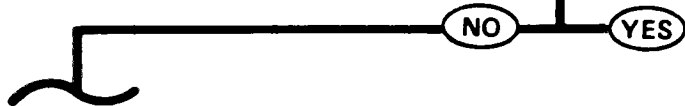
- Displace front accessory harness connector from bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact E (CKT 324) of front master harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?



17

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 324 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install front accessory harness connector to bulkhead disconnect (page 10-270).
- Install front accessory harness connector to basket disconnect.



TA250352

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-35

18 Check bulkhead engine disconnect harness (CKT 324) for short to ground.

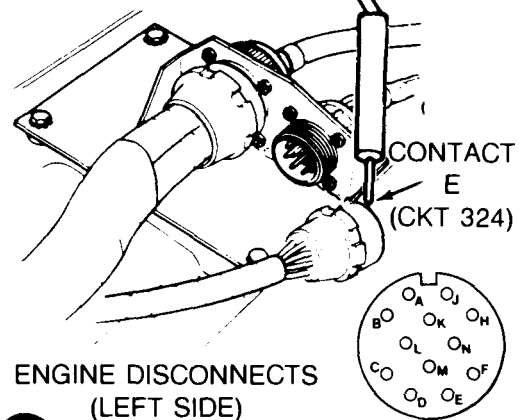
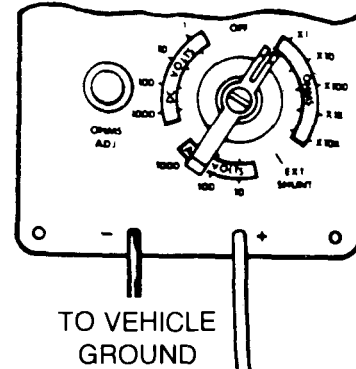
Second Technician (Commander's Station)

- Install basket-indicator panel harness connector at basket disconnects.

First Technician (Left Top Deck Grille Doors)

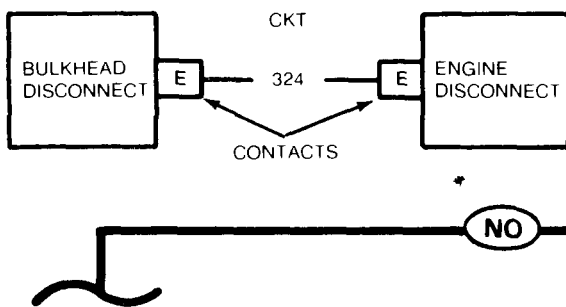
- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector from engine disconnects.
- Connect red probe of meter to contact E (CKT 324) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?



19

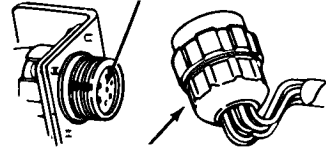
- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 324 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Connect bulkhead engine disconnect harness to engine disconnect.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



Symptom-35

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

**ENGINE ELECTRICAL
WIRING HARNESS CONNECTOR**



**TRANSMISSION WIRING
HARNESS CONNECTOR**

20 Check transmission harness (CKT 324) for short to ground.

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

Both Technicians (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Powerplant-Generator Side)

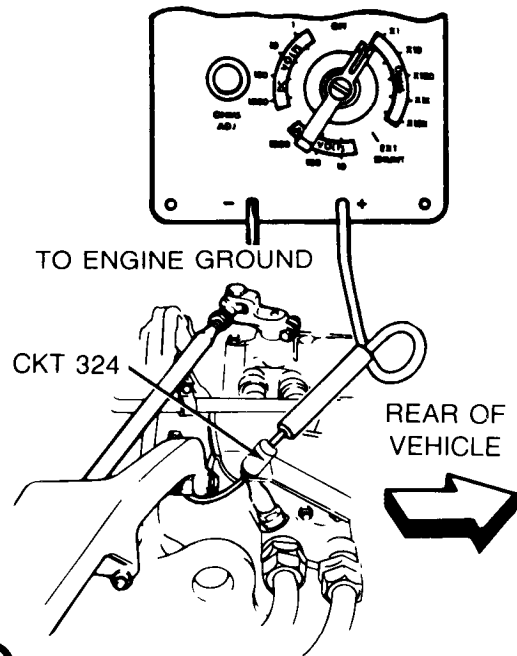
- Disconnect transmission harness connector from transmission disconnect (above generator).

Second Technician (Rear of Powerplant)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect red probe of meter to transmission harness connector (CKT 324) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?

TRANSMISSION DISCONNECT

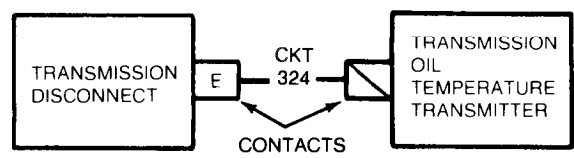
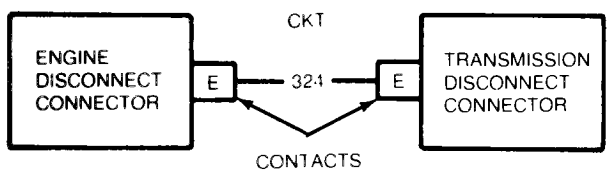


21

- Repair engine electrical harness (CKT 324) (page 10-298).
- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

NO **YES**

22 Repair transmission harness (CKT 324) (page 10-298).



TA250354

Symptom-35

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

FROM STEP

6

23 Check gage instrument panel harness (CKT 324) for continuity.

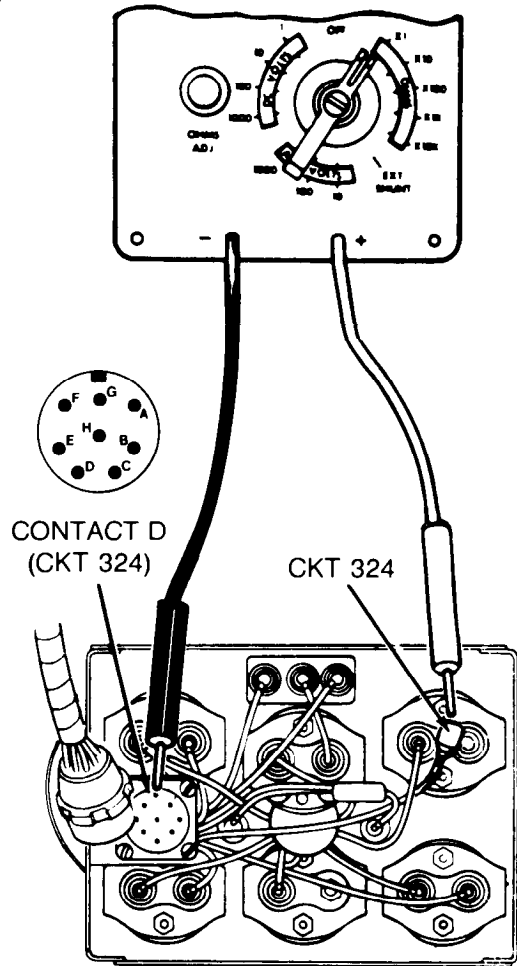
Second Technician (Rear Grille Doors)

- Remove jumper wire connected between transmission harness connector (CKT 324) and ground.
- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

First Technician (Operator's Station)

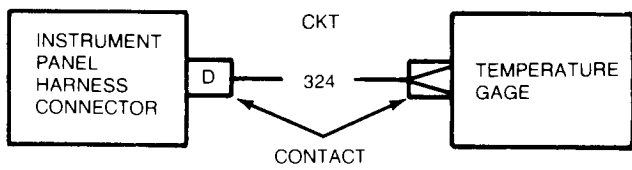
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to gage instrument panel harness connector (CKT 324) at TRANSMISSION TEMP indicator gage.
- Connect black probe of meter to contact D (CKT 324) of gage instrument panel connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



24

- Repair gage instrument panel harness (CKT 324) (page 10-298).
- Install transmission shroud (page 9-6).



Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

25 Check basket-indicator panel harness (CKT 324) for continuity.

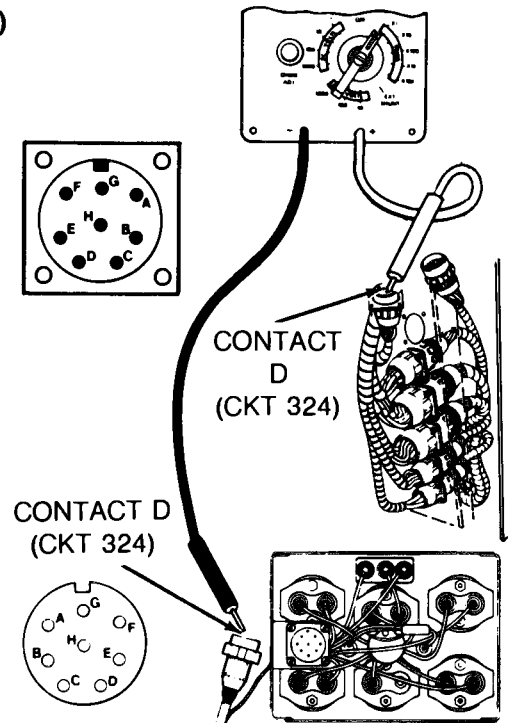
Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 324) at basket disconnect.
- Connect red probe of meter to contact D (CKT 324) of basket-indicator panel harness connector at basket disconnect.

First Technician (Operator's Station)

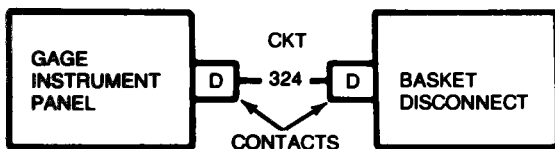
- Connect gage instrument panel harness connector (CKT 324) to TRANSMISSION TEMP indicator gage.
- Connect black probe of meter to contact D (CKT 324) of basket-indicator panel harness connector at gage instrument panel.
- Check if meter indicates continuity.

Does meter indicate continuity?



26

- Inspect basket-indicator panel harness for bent or broken connector contacts or loose CKT 324 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad basket-indicator panel harness.
- Install basket-indicator panel harness connector at basket disconnect.
- Connect basket-indicator panel harness connector at gage instrument panel.
- Install gage instrument panel (page 10-112).
- Install transmission shroud (page 9-6).



YES NO

Symptom-35

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

27

Check front accessory harness (CKT 324) for continuity.

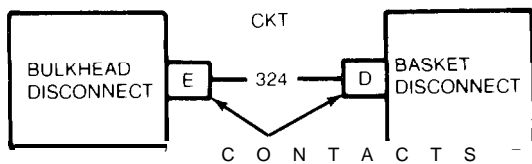
First Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

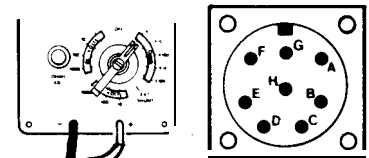
- Displace front accessory harness connector (CKT 324) from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact D (CKT 324) of front accessory harness connector at basket disconnect
- Connect black probe of meter to contact E (CKT 324) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity,

Does meter indicate continuity?

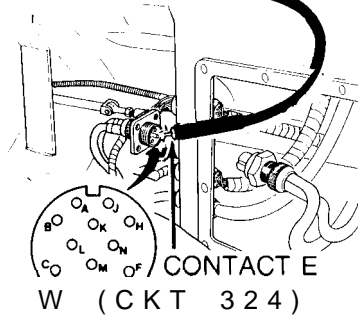


YES

NO



CONTACT D
(CKT 324)



28

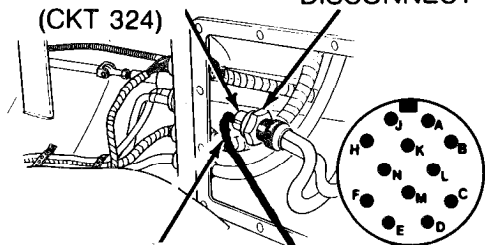
- Inspect accessory harness for bent/broken connector contacts or loose CKT 324 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install transmission shroud (page 9-6).
- Install front accessory harness connector at basket disconnect.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

TA250357

Symptom-35

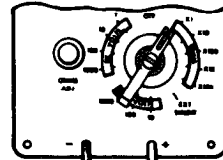
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE CONTACT E
(Continued)**

**BULKHEAD
DISCONNECT**

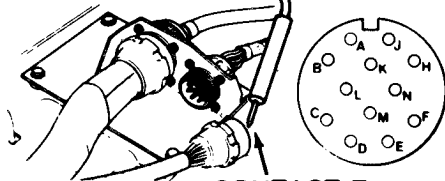


**JUMPER
WIRE**

**TO VEHICLE
GROUND**



**TO VEHICLE
GROUND**



**ENGINE
DISCONNECT CONTACT E
(CKT 324)**

29

Check bulkhead engine disconnect harness (CKT 324) for continuity.

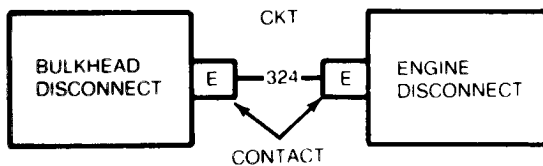
Second Technician (Commander's Station)

- Install basket-indicator panel harness connector at basket disconnect.
- Connect one end of jumper wire to contact E (CKT 324) of bulkhead engine disconnect harness connector at bulkhead disconnect and other end of jumper wire to ground.

Second Technician (Top Deck)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector from engine disconnects.
- Connect red probe of meter to contact E (CKT 324) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

30

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 324 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Install transmission shroud (page 9-6).
- Connect bulkhead engine disconnect harness to engine disconnect.
- Install front accessory harness connector at bulkhead disconnect (page 10-298).

TA250358

Symptom-35

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

31

Check transmission harness (CKT 324) for continuity.

Second Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnects (page 10-270).

Both Technicians (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Powerplant-Generator Side)

- Disconnect transmission harness connector from transmission disconnect (above generator).

Second Technician (Rear of Engine)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect red probe of meter to contact E (CKT 324) of transmission harness connector.
- Connect black probe of meter to transmission harness connector (CKT 324) at transmission oil temperature transmitter.
- Check if meter indicates continuity.

Does meter indicate continuity?

32

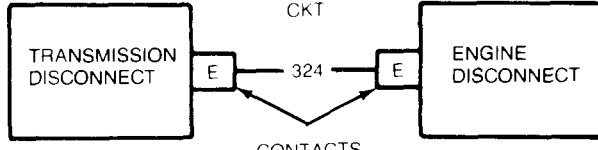
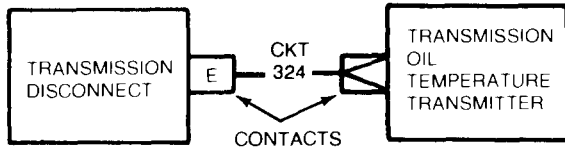
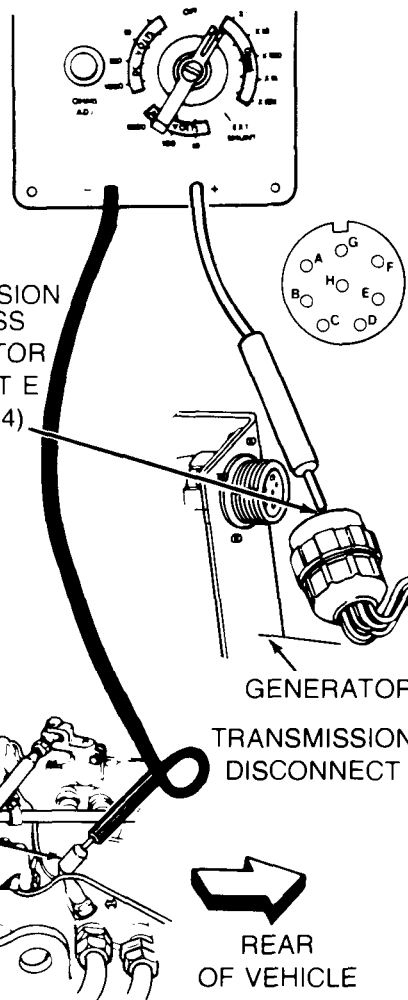
Repair transmission harness (CKT 324) (page 10-298).

NO

YES

33

- Repair engine electrical harness (CKT 324) (page 10-298).
- Connect Transmission harness connector (CKT 324) to transmission oil temperature transmitter.



**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE**

Symptom-36

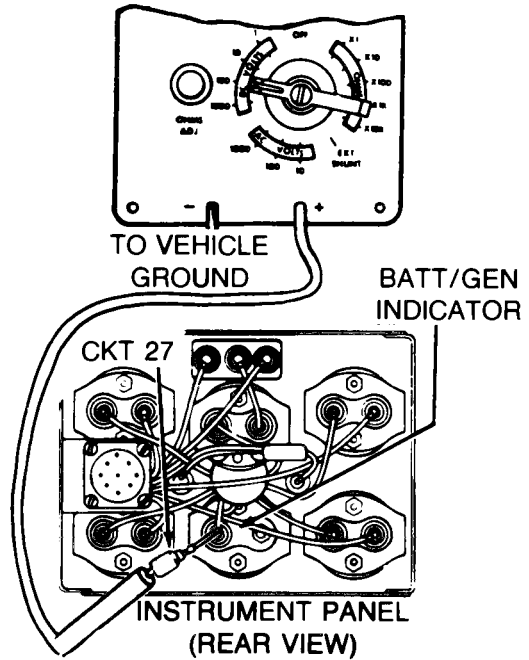
BATTERY/GENERATOR GAGE WILL NOT WORK (ALL OTHER GAGES WORK).

1 Check for electrical power at BATT GEN INDICATOR input (CKT 27).

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect gage instrument panel harness connector (CKT 27) from BATT GEN INDICATOR connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

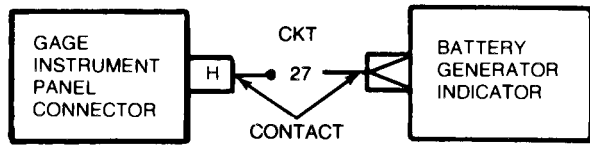
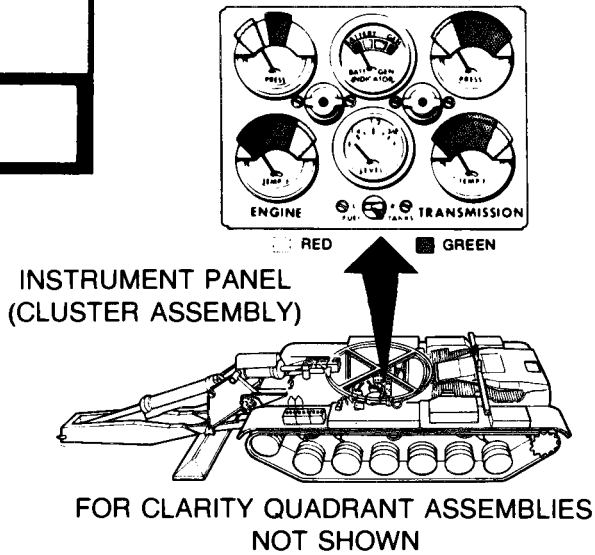


2 Replace gage instrument panel harness (page 10-134).

NO

3 Replace BATT GEN INDICATOR (page 10-119).

YES

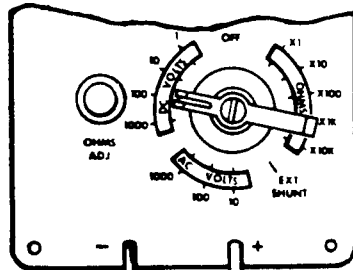


TA250360

**Symptom-37 DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE**

BATTERY/GENERATOR GAGE POINTER IN RIGHT RED AREA.

NOTE
Units with STE/ICE perform Test No. 67, Charging Circuit and Battery Voltage Test. Units without STE/ICE proceed to Step 1 .



1 With engine running, check voltage output at slave receptacle.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Technician (Commander's Station)

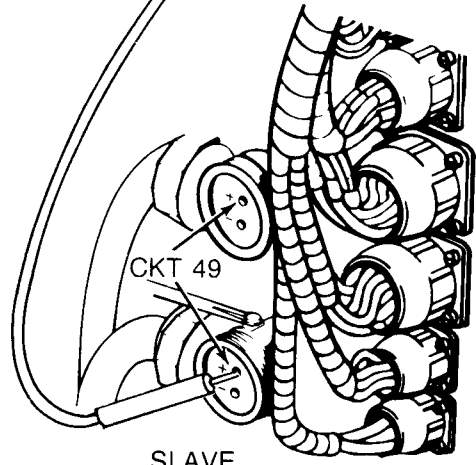
- Set multimeter to measure 25 to 35 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Displace protective cap from slave receptacle.
- Connect red probe of meter to positive (+) socket (CKT 49) of slave receptacle and black probe to ground.

Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Start engine.
- Check if meter indicates 25 to 30 volts dc.
- Stop engine.

Did meter indicate more than 30 volts dc?

TO VEHICLE GROUND



SLAVE RECEPTACLE

2

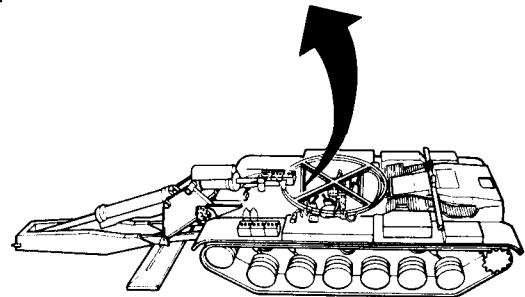
- Replace BATT GEN indicator (page 10-119).
- Install protective cap on slave receptacle.

ON

3

- Replace voltage regulator (page 10-18).
- Install protective cap on slave receptacle.

YES



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250361

Symptom-38

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGES

BATTERY/GENERATOR GAGE POINTER IN YELLOW OR LEFT RED AREA (ENGINE RUNNING).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check for 27 to 30 volts dc at slave receptacle - engine running.

First Technician (Commander's Station)

- Displace protective cap at one slave receptacle.
- Set multimeter to measure 27 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to positive (+) contact (CKT 49) of slave receptacle and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Check if meter indicates 27 to 30 volts dc.

Does meter indicate 27 to 30 volts dc?

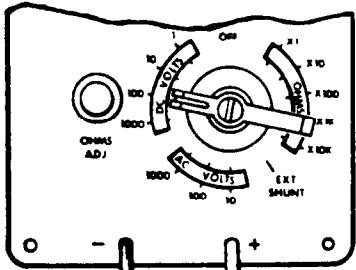
2

- Stop engine and see Symptom 36: BATT/GEN GAGE WILL NOT WORK (ALL OTHER GAGES WORK).

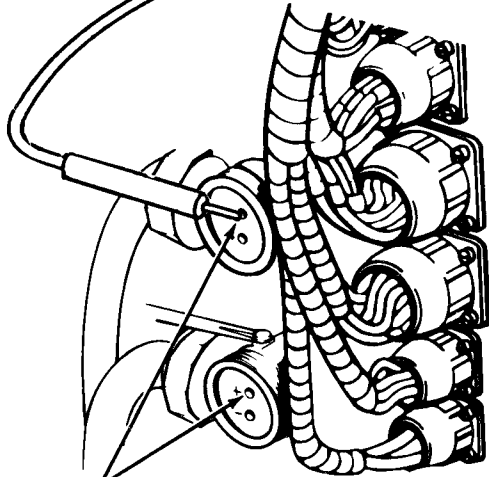
YES

- Install protective cap on slave receptacle.

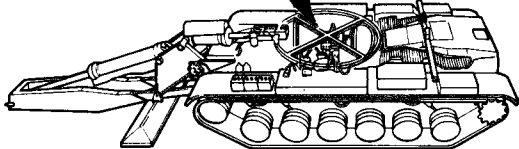
NO



TO VEHICLE GROUND



SLAVE RECEPTACLES (CKT 49)



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250362

Symptom-38

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGES
(Continued)**

3 Check BATT/GEN gauge pointer position after resetting over voltage circuit breaker on regulator - engine running.

First Technician (Commander's Station)

- Install protective cap on slave receptacle.
- Remove floor access cover in front of commander's seat (page 17-7).
- Push over-voltage circuit breaker reset pushbutton.

Second Technician (Operator's Station)

- Accelerate engine to 1600 RPM momentarily then reduce engine speed to 700-750 RPM.
- Observe BATT/GEN indicator on instrument panel for generator charging condition.

Is BATT/GEN gage pointer in green area?

4

- Stop engine.
- Momentary over-voltage condition corrected.
- Install floor access cover (page 17-7).

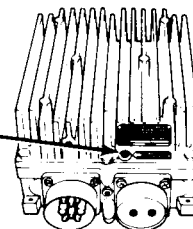
YES

5

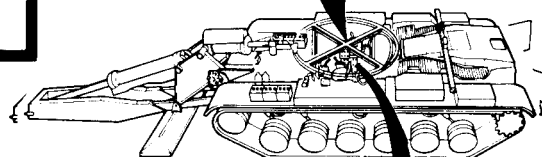
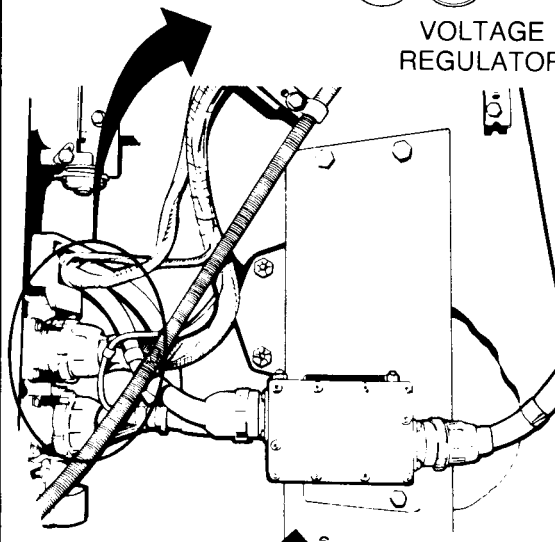
- Generator is not charging the batteries.
- Stop engine and see Symptom 31: GENERATOR/REGULATOR SYSTEM IS NOT WORKING.

NO

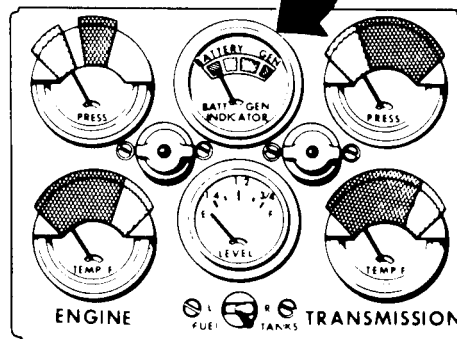
OVER-VOLTAGE
CIRCUIT BREAKER
RESET
PUSHBUTTON



VOLTAGE
REGULATOR



FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN



REL GREEN

INSTRUMENT PANEL
(CLUSTER ASSEMBLY)

TA250363 |

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE**

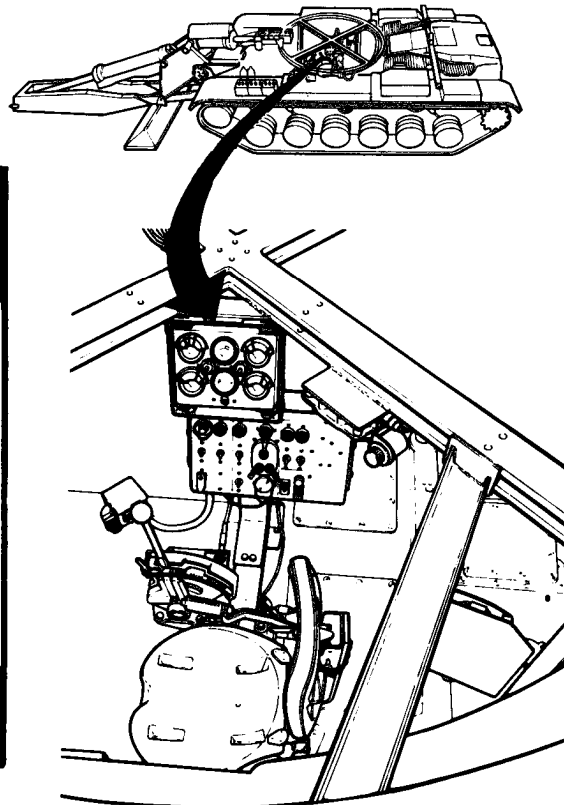
Symptom-39

FUEL LEVEL GAGE WILL NOT WORK (ALL OTHER GAGES WORK).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



1 Check if FUEL TANKS LEVEL indicator gage gives wrong indications for both left (L) and right (R) fuel tank.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL TANKS selector switch to L.
- Read FUEL TANKS LEVEL indicator gage.
- Set FUEL TANKS selector switch to R.
- Read FUEL TANKS LEVEL indicator gage.

Does FUEL TANKS LEVEL indicator gage give wrong indications for both L and R fuel tanks?

2

- Check FUEL TANKS selector switch for continuity through circuit that indicated wrong (CKT 30 for left fuel tank, CKT 31 for right fuel tank).
- See Step **10**.



TA250364

Symptom-39

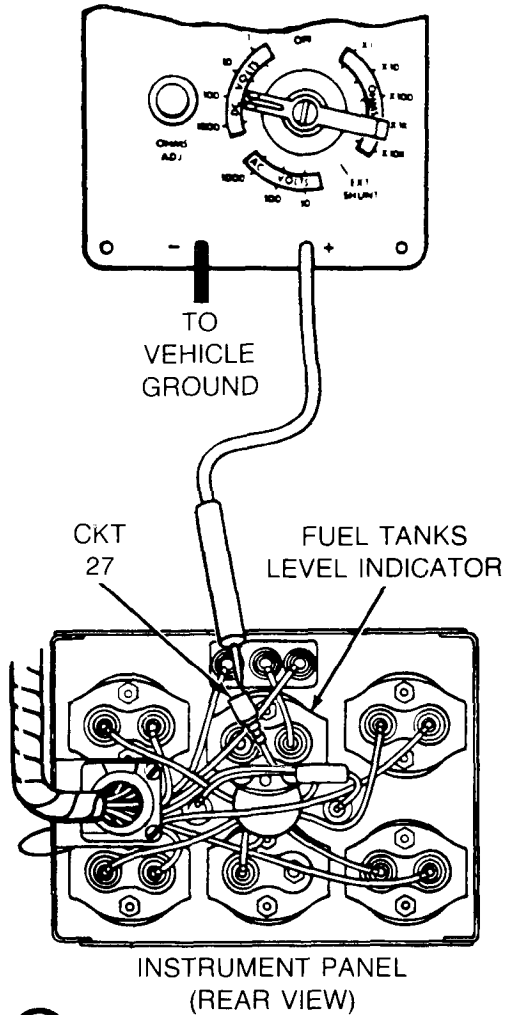
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

3 Check gage instrument panel harness connector (CKT 27) at FUEL TANKS LEVEL indicator gage for electrical power.

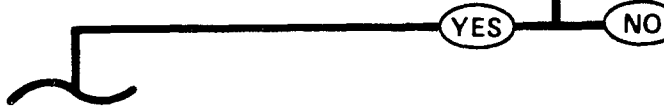
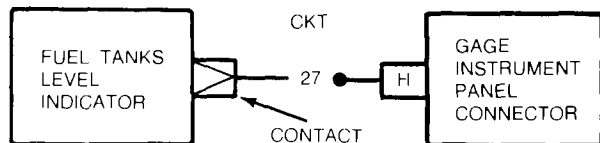
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Set meter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect gage instrument panel harness connector (CKT 27) from FUEL TANKS LEVEL indicator.
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4 Repair gage instrument panel harness (page 10-298).



TA250365

Symptom-39

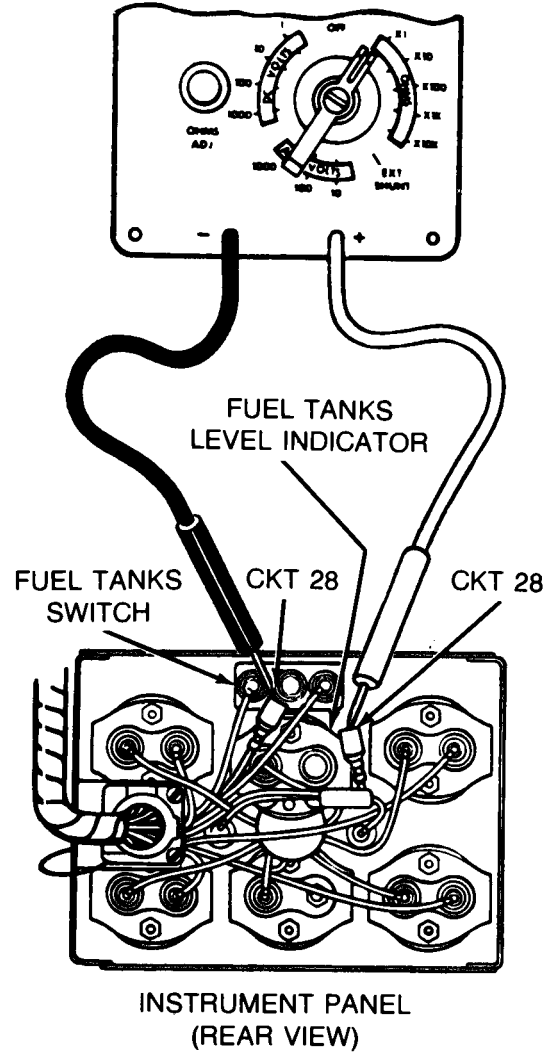
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

5 Check fuel tanks selector switch cable (CKT 28) for continuity.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect gage instrument panel harness connector (CKT 27) to FUEL TANKS LEVEL indicator.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Disconnect fuel tanks selector switch cable (CKT 28) from FUEL TANKS LEVEL indicator and FUEL TANKS selector switch.
- Connect one probe of meter to each end of fuel tanks selector switch cable (CKT 28).
- Check if meter indicates continuity.

Does meter indicate continuity?



6 Replace fuel tanks selector switch cable (page 10-138).

YES NO

Symptom-39

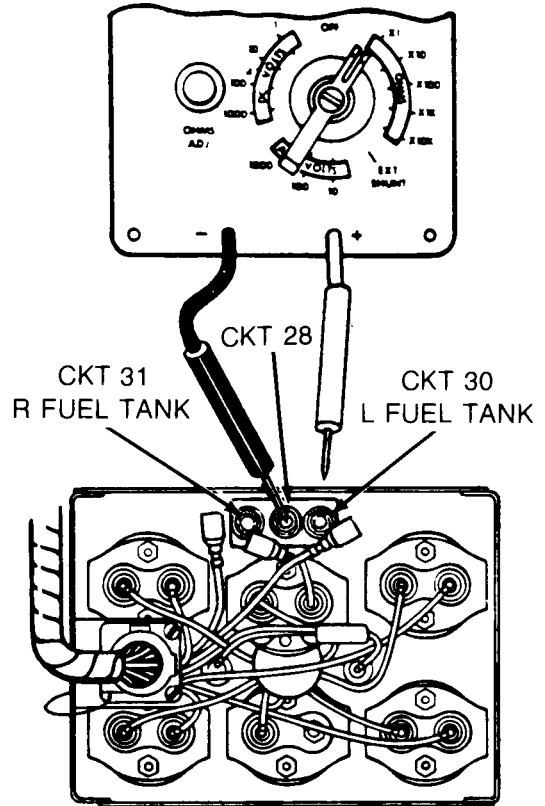
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

7 Check FUEL TANKS selector switch for continuity.

First Technician (Operator's Station)

- Reconnect fuel tanks selector switch cable (CKT 28) to FUEL TANKS LEVEL indicator.
- Connect black probe of meter to center connector of FUEL TANKS selector switch (CKT 28).
- Disconnect either CKT 30 or CKT 31 from FUEL TANKS selector switch.
- Connect red probe of meter to gage instrument panel harness connector of circuit disconnected in above step.
- Set FUEL TANKS selector switch to circuit being checked (L for CKT 30, R for CKT 31).
- Check if meter indicates continuity.

Does meter indicate continuity?



8 Replace FUEL TANKS selector switch (page 10-132).

NO

YES

9

- Replace FUEL TANKS LEVEL indicator (page 10-127).
- Reconnect CKT 28 and CKT 30 or CKT 31 connectors to FUEL TANKS selector switch.

Symptom-39

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

FROM STEP

2

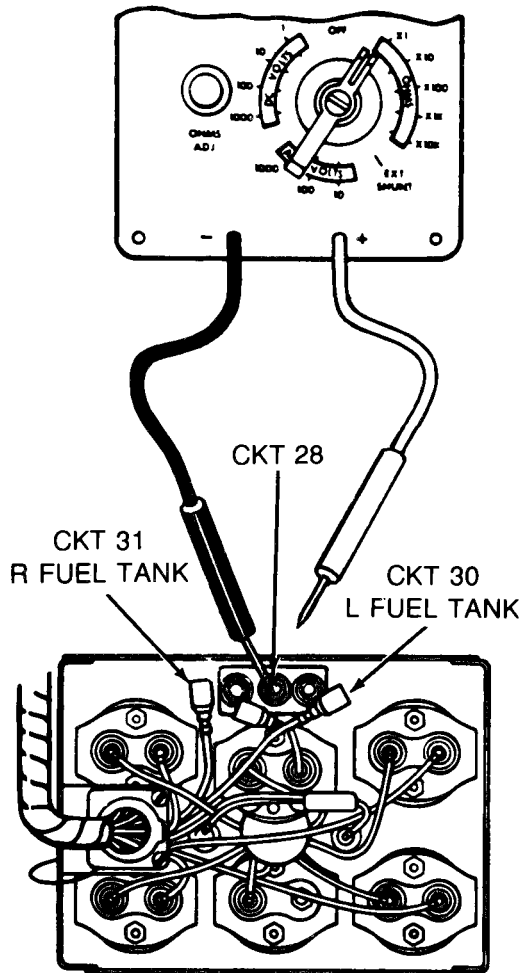
10

Check FUEL TANKS selector switch for continuity through circuit that indicated wrong (CKT 30 for left fuel tank, CKT 31 for right fuel tank).

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect fuel tanks selector switch cable (CKT 28) from FUEL TANKS selector switch.
- Set FUEL TANKS selector switch to circuit being checked (L for CKT 30, R for CKT 31).
- Disconnect gage instrument panel harness connector of CKT 30 or CKT 31 (as indicated by fault in Step 1) from FUEL TANKS selector switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector of circuit disconnected in above step.
- Connect black probe of meter to center connector of FUEL TANKS selector switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



11

Replace FUEL TANKS selector switch (page 10-132).

YES

NO

TA250368

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

12 Check CKT 30 or CKT 31 for continuity from FUEL TANKS selector switch to proper fuel tank liquid quantity transmitter.

Second Technician (Right or Left Top Deck Grille Doors)

- Open top deck grille doors to gain access to fuel tank liquid quantity transmitter of suspected circuit (left fuel tank for CKT 30, right fuel tank for CKT 31).
- Disconnect rear accessory harness connector from fuel tank liquid quantity transmitter.
- Connect one end of jumper wire to connector disconnected from transmitter and other end to ground.

First Technician (Operator's Station)

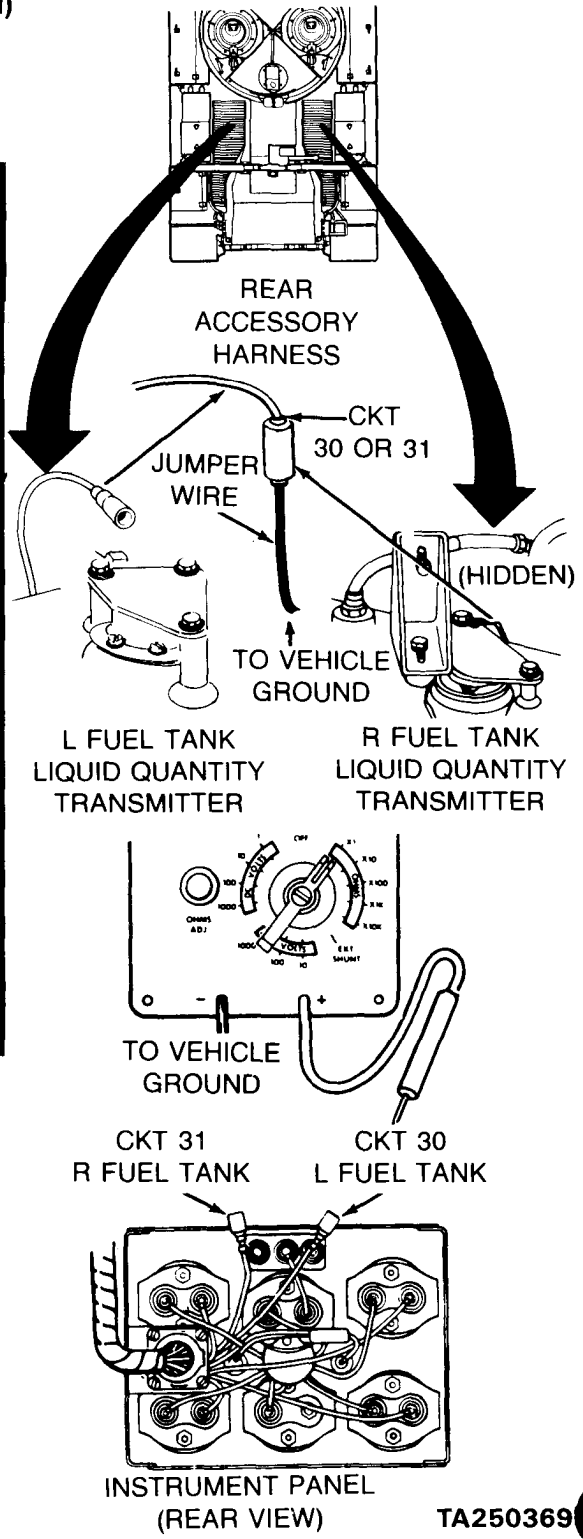
- Connect fuel tanks selector switch cable (CKT 28) to FUEL TANKS selector switch.
- Connect red probe of meter to connector of suspected circuit (CKT 30 or CKT 31) at instrument panel and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

13

- Check gage instrument panel harness (CKT 30 or CKT 31) for continuity from connector at FUEL TANKS selector switch to gage instrument panel connector.

• See Step 23 .



TA250369

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

14 Check CKT 30 or CKT 31 at FUEL TANKS selector switch for short to ground.

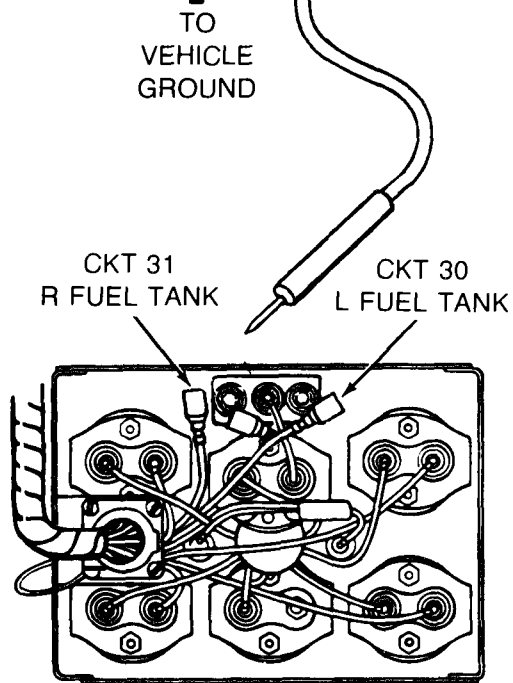
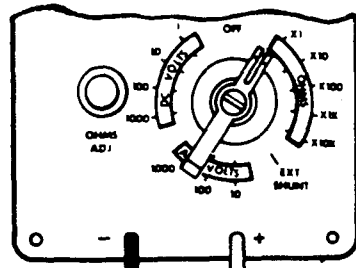
Second Technician (Right or Left Top Deck Grille Doors)

- Remove jumper wire from rear accessory harness connector at fuel tank liquid quantity transmitter.

First Technician (Operator's Station)

- Connect red probe of meter to connector of suspected circuit (CKT 30 or CKT 31) at instrument panel and black probe to ground.
- Check if meter indicates less than infinite resistance.

Does meter indicate less than infinite resistance, thereby indicating a short?



15

- Replace fuel tank liquid quantity transmitter (page 7-126).
- Connect gage instrument panel harness connector (CKT 30 or CKT 31) to FUEL TANKS selector switch.

YES NO

TA250370

Symptom-39

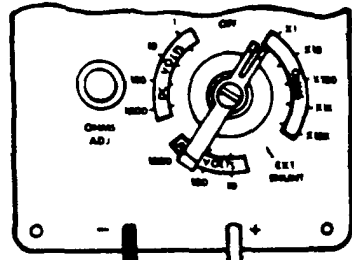
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

16 Check gage instrument panel harness (CKT 30 or CKT 31) for short to ground.

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to connector of suspected circuit (CKT 30 or CKT 31) at instrument panel and black probe to ground.
- Check if meter indicates less than infinite resistance.

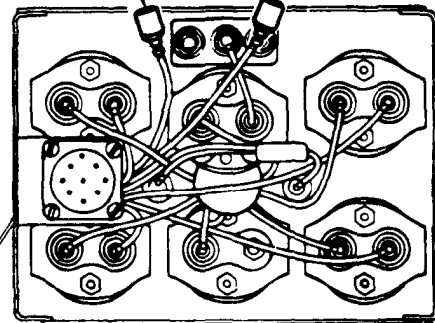
Does meter indicate less than infinite resistance, thereby indicating a short?



TO VEHICLE
GROUND

CKT 31
R FUEL TANK

CKT 30
L FUEL TANK

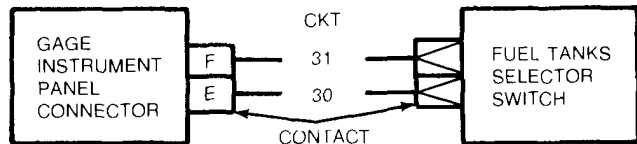


17

- Repair gage instrument panel harness (page 10-298).
- Connect rear accessory harness connector (CKT 30 or CKT 31) to fuel tank liquid quantity transmitter.

NO

YES



TA250371

Symptom-39

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

18 Check basket-indicator panel harness (CKT 30 or CKT 31) at basket disconnect for short to ground.

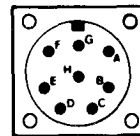
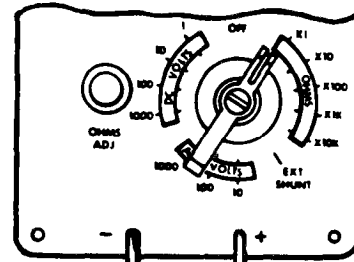
First Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Connect CKT 30 or CKT 31 to FUEL TANKS selector switch.

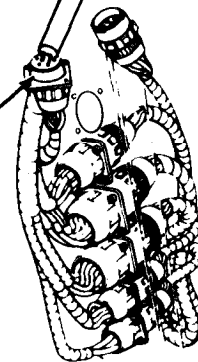
Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 30, 31) from basket disconnect.
- Connect red probe of meter to contact of suspected circuit in basket-indicator panel harness connector at basket disconnect (F for CKT 31, E for CKT 30) and black probe to ground.
- Check if meter indicates less than infinite resistance.

Does meter indicate less than infinite resistance, thereby indicating a short?



CONTACTS
E (CKT 30)
F (CKT 31)

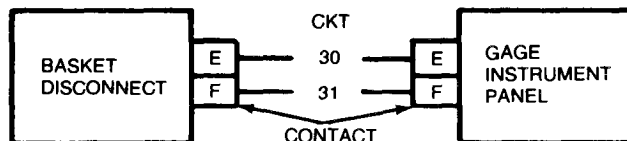


19

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket indicator panel harness.
- Connect rear accessory harness connectors (CKT 30 or 31) to fuel tank liquid quantity transmitter.

NO

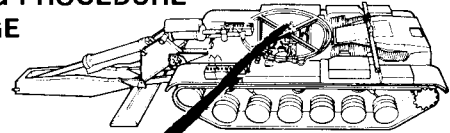
YES



TA250372

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

20

Check front accessory harness (CKT 30 or CKT 31) for short to ground.

Second Technician (Commander's Station)

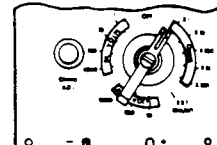
- Install basket-indicator panel harness connector at basket disconnect.

First Technician (Operator's Station)

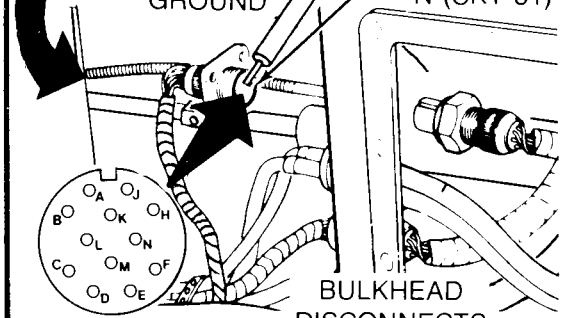
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 30, 31) at bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact of suspected circuit in front accessories harness connector (M for CKT 30, left tank; or N for CKT 31, right tank) and black probe to ground.
- Check if meter indicates less than infinite resistance.



TO VEHICLE GROUND
CONTACTS
M (CKT 30)
N (CKT 31)



BULKHEAD DISCONNECTS

Does meter indicate less than infinite resistance, thereby indicating a short?

21

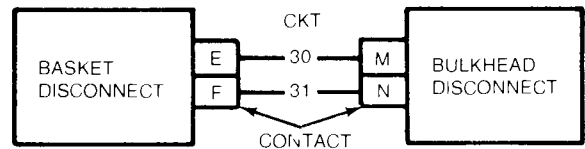
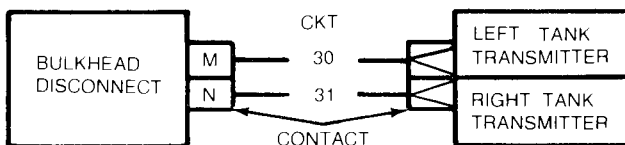
- Inspect rear accessory harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective rear accessory to bulkhead harness.

NO

YES

22

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect rear accessory harness connector (CKT 30 or 31) to fuel tank liquid quantity transmitter.



TA250373

Symptom-39

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

FROM STEP

13

23 Check gage instrument panel harness (CKT 30 or CKT 31) for continuity from connector at FUEL TANKS selector switch to gage instrument panel connector.

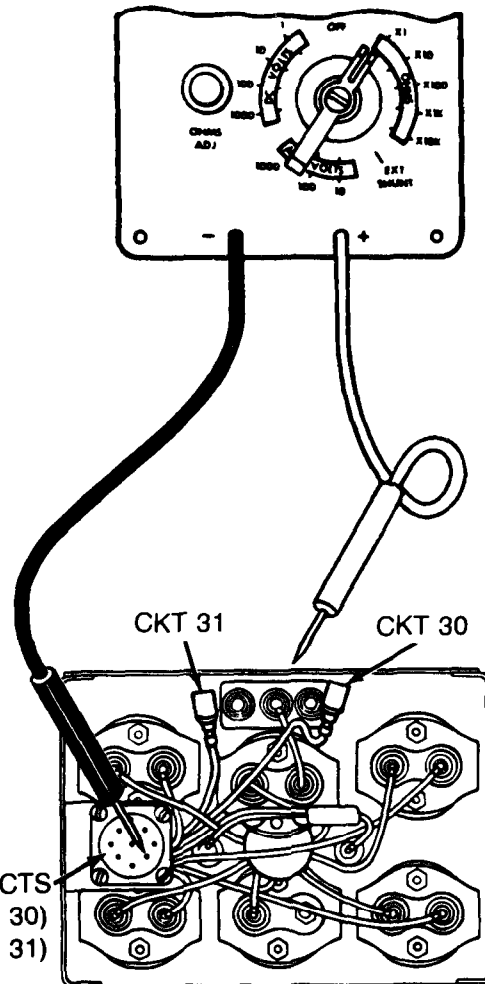
Second Technician (Right or Left Top Deck Grille Doors)

- Connect rear accessory harness connector (CKT 30 or 31) to fuel tank liquid quantity transmitter.

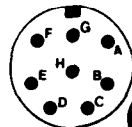
First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel harness connector.
- Connect red probe of meter to connector of faulty circuit (CKT 30 or CKT 31) disconnected from FUEL TANKS selector switch.
- Connect black probe to gage instrument panel connector contact E (CKT 30) or contact F (CKT 31).
- Check if meter indicates continuity.

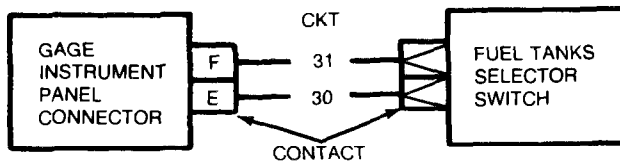
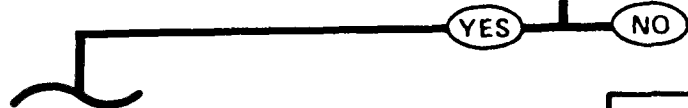
Does meter indicate continuity?



CONTACTS
E (CKT 30)
F (CKT 31)



24 Repair gage instrument panel harness (page 10-298).



TA250374

Symptom-39

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

25 Check basket-indicator panel harness (CKT 30 or CKT 31) for continuity from connector at basket disconnect to gage instrument panel connector.

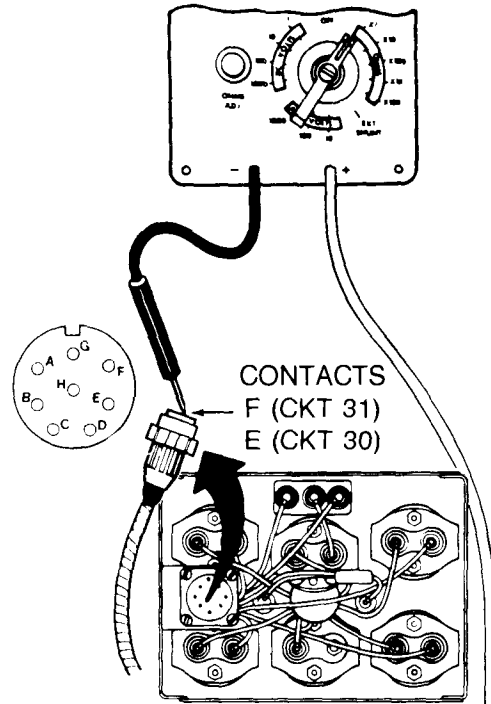
First Technician (Operator's Station)

- Connect CKT 30 or CKT 31 to FUEL TANKS selector switch.

Second Technician (Commander's Station)

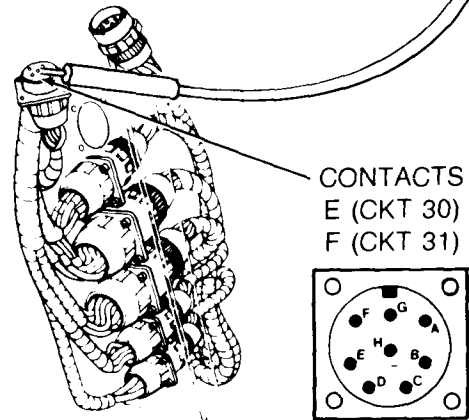
- Displace basket-indicator panel harness connector (CKT 30, 31) from basket disconnect.
- Connect red probe of meter to contact of faulty circuit (E for CKT 30; F for CKT 31) on basket-indicator panel harness connector at basket disconnect.
- Connect black probe to contact of suspected circuit in basket-indicator panel harness connector at instrument panel (E for CKT 30; F for CKT 31).
- Check if meter indicates continuity.

Does meter indicate continuity?

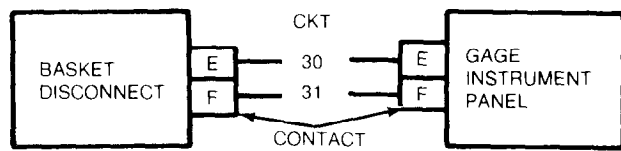


26

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Install basket-indicator panel harness at basket disconnect.



NO **YES**



Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

27

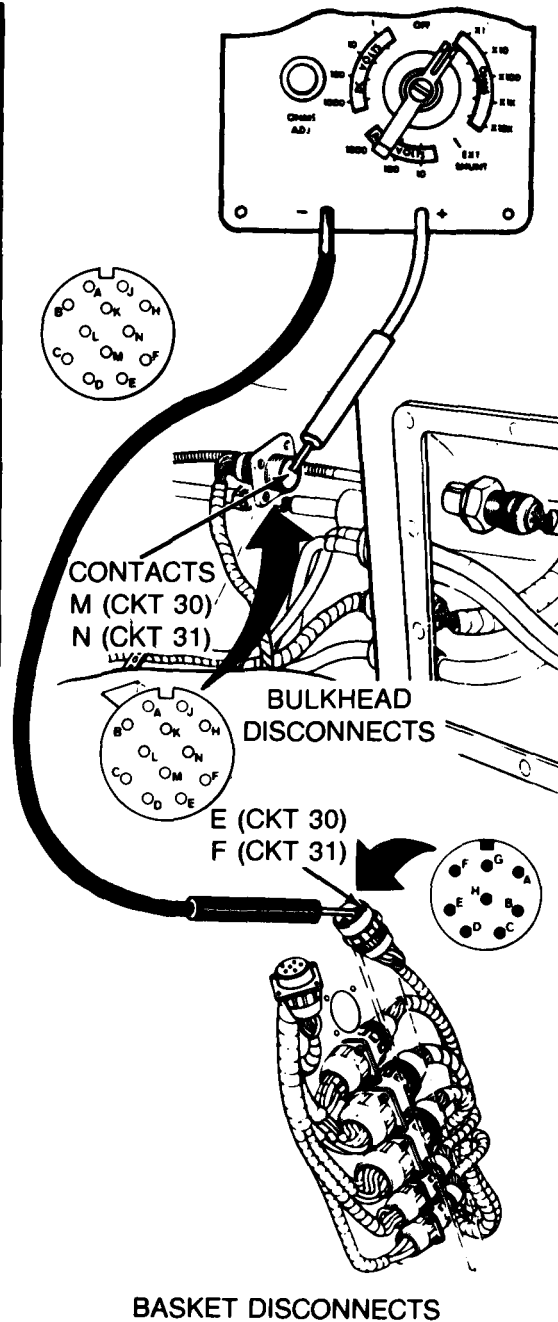
Check front accessory harness (CKT 30 or CKT 31) for continuity from connector at bulkhead disconnect to basket disconnect.

First Technician (Operator's Station)

- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact of faulty circuit (M for CKT 30; N for CKT 31) in front accessory harness connector at bulkhead electrical disconnect.
- Connect black probe of meter to contact of faulty circuit (E for CKT 30; F for CKT 31) in front accessory harness connector at basket disconnect.

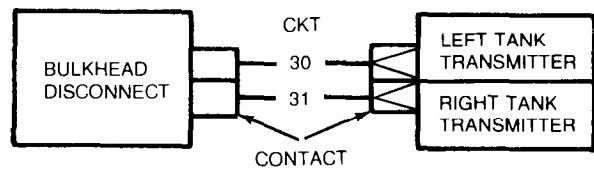
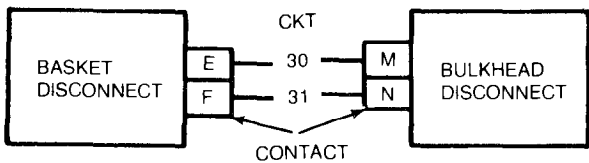
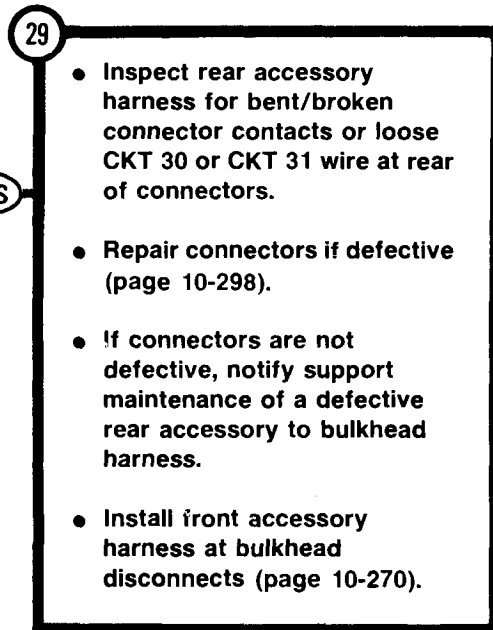
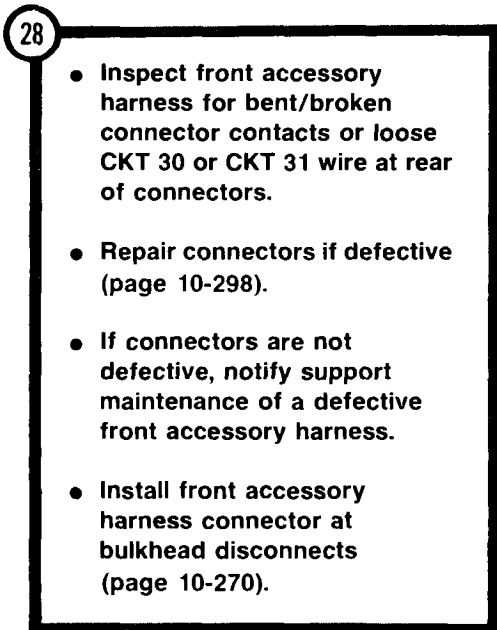
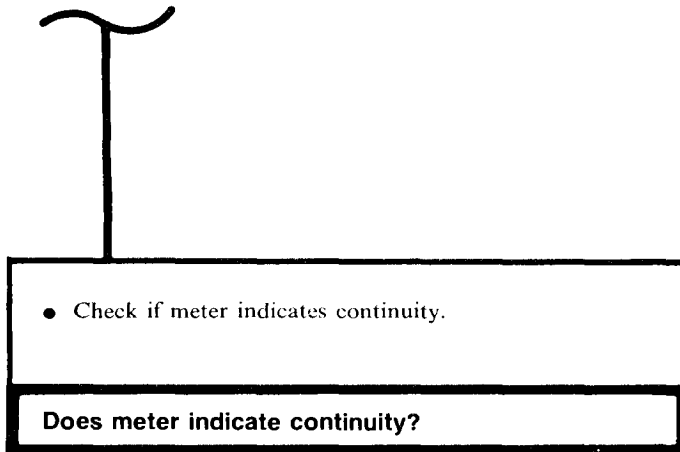


TA250376

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

STEP (27) CONTINUED



TA250377

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE**

Symptom-40

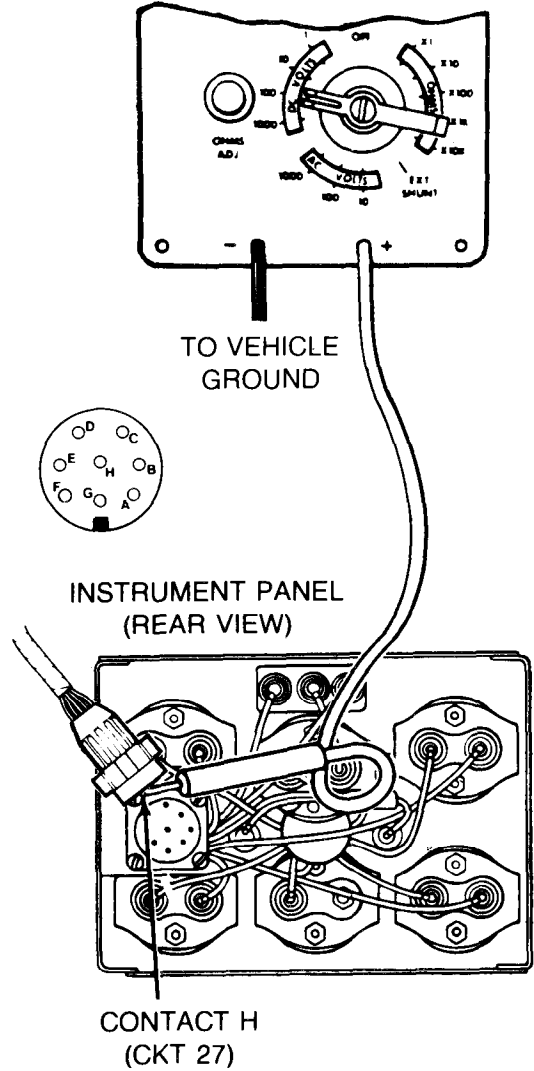
ALL GAGES ON GAGE INSTRUMENT PANEL WILL NOT WORK (ENGINE RUNNING).

1 Check basket-indicator panel harness connector (CKT 27) at gage instrument panel for electrical power.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact H (CKT 27) of basket-indicator panel harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2 Repair gage instrument panel harness (page 10-298).



TA250378

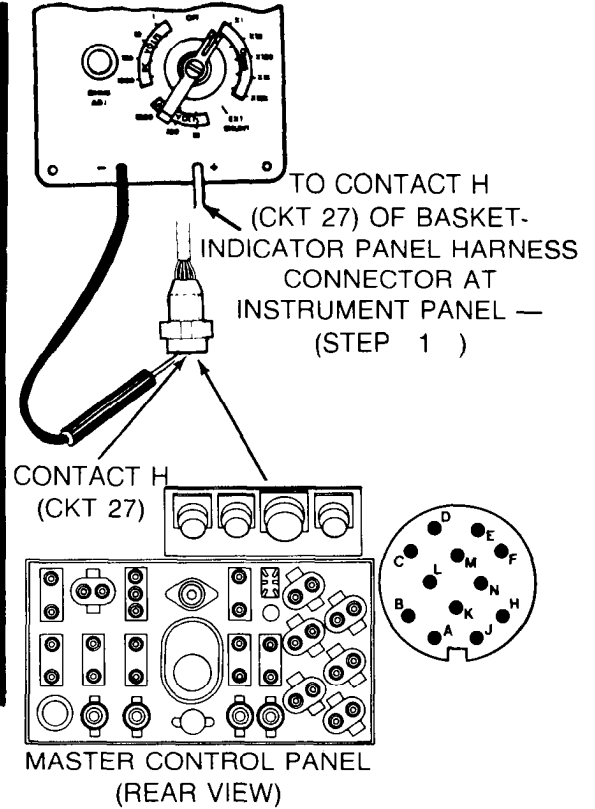
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

Symptom-40

3 Check basket-indicator panel harness (CKT 27) for continuity from connector at instrument panel to connector at master control panel.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Check that red probe of meter is still connected to contact H (CKT 27) of basket-indicator panel harness connector at instrument panel (Step 1).
- Connect black probe to contact H (CKT 27) of basket-control panel accessories harness connector.



TA250379

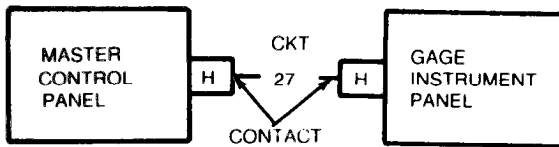
Symptom-40

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

STEP 3 CONTINUED

● Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

4

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 27 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad basket-indicator panel harness.
- Connect basket-control panel accessories harness connector to master control panel.
- Install master control panel (page 10-33).
- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).

TA250380

Symptom-40

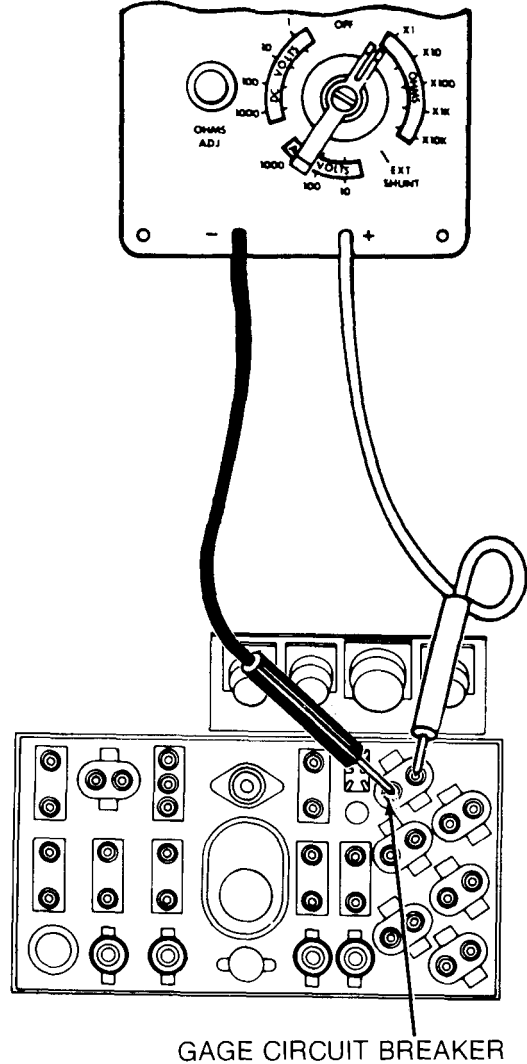
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

5 Check gage circuit breaker in master control panel for continuity.

Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and displace connector from master control panel.
- Disconnect two electrical leads (CKT 27) from gage circuit breaker on master control panel.
- Connect one meter probe to each circuit breaker contact.
- Check if meter indicates continuity.

Does meter indicate continuity?



6

- Replace gage circuit breaker (page 10-70).
- Connect basket-control panel accessories harness connector to master control panel.

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)**

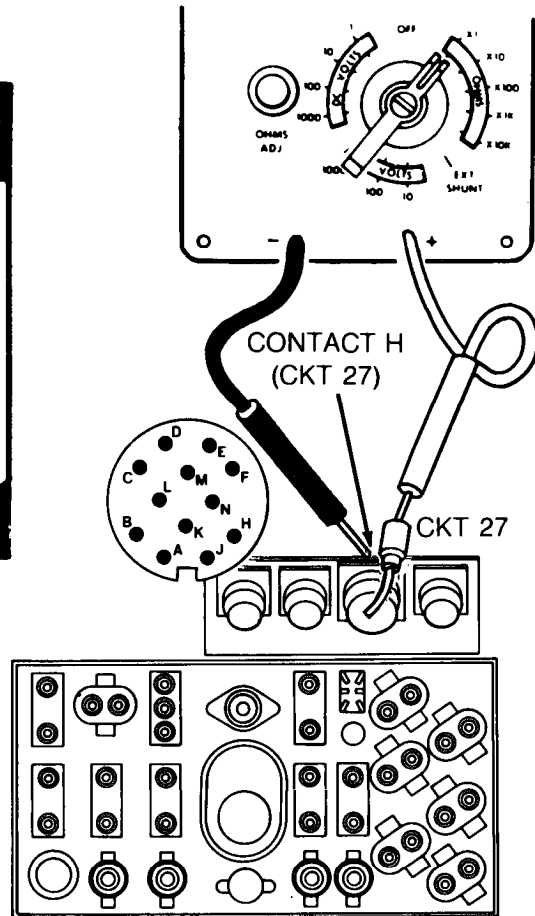
Symptom-40

7 Check accessories harness (CKT 27) for continuity from panel connector to gage circuit breaker.

Technician (Operator's Station)

- Connect red probe of meter to accessories harness connector (CKT 27) at gage circuit breaker.
- Connect black probe to contact H (CKT 27) of accessories harness panel connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



8

- Replace master control panel power harness (page 10-101).
- Install control panel accessories harness connector to master control panel.
- Connect basket-control panel accessories harness connector to master control panel.

YES NO

9 Replace master control panel accessories harness (page 10-91).

TA250382

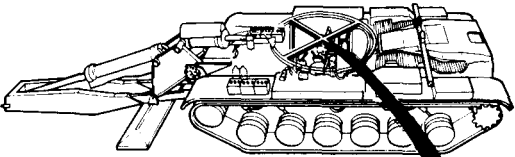
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

Symptom-41

POWERPLANT WARNING LAMP WILL NOT COME ON (ENGINE NOT RUNNING).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

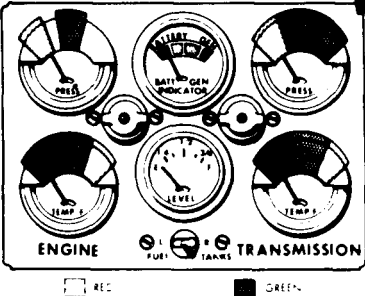


1 Check if indicator gages on gage instrument panel work normally with engine running.

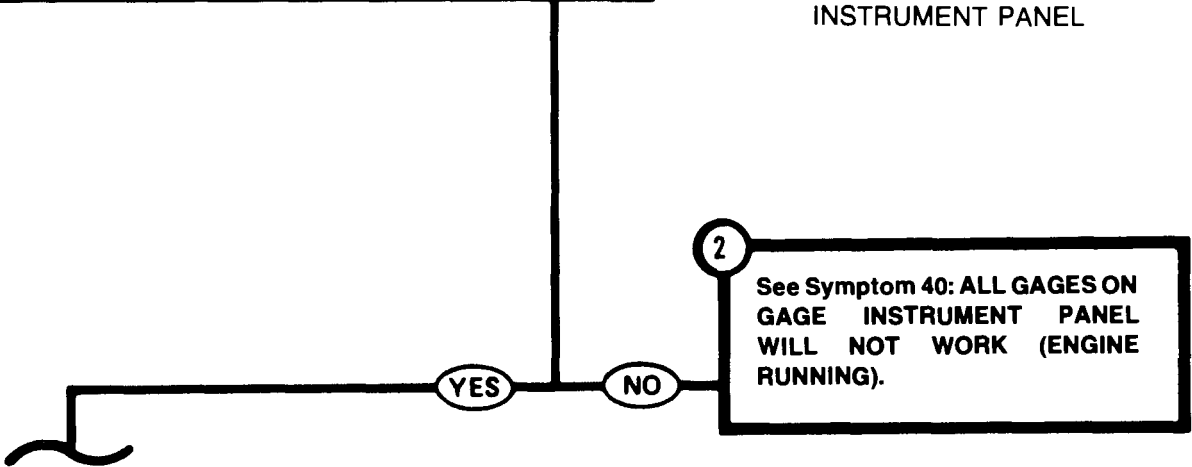
Second Technician (Operator's Station)

- Start engine.
- Check if indicators on gage instrument panel work normally.
- Stop engine.

Do indicator gages work normally with engine running?



INSTRUMENT PANEL



Symptom-41

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

3

Check front accessory harness (CKT 509L) at bulkhead disconnect for electrical power.

First Technician (Commander's Station)

- Displace front accessory harness connector at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. '89 (page 4-81).
- Connect red probe of meter to contact N (CKT 509L) of front accessory harness connector at bulkhead disconnect and black probe to ground.

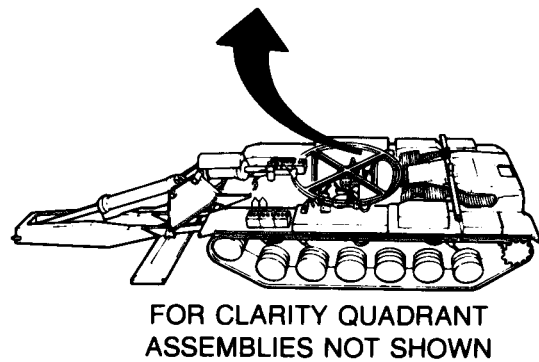
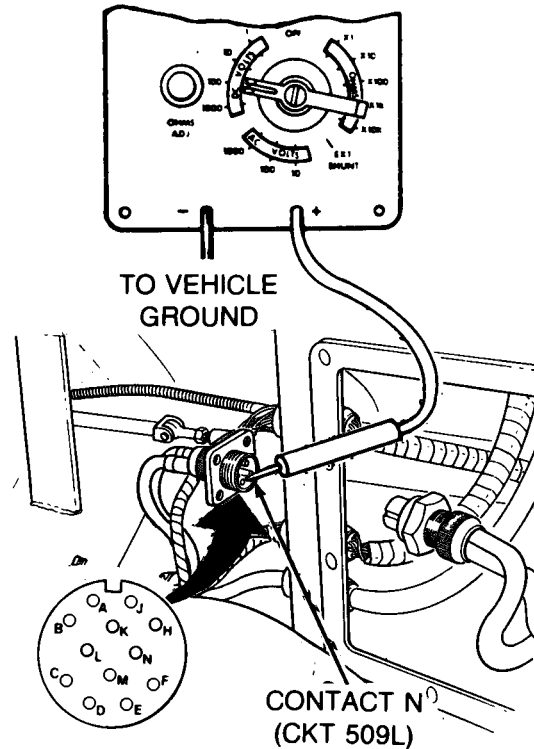
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4

Check basket-indicator panel harness (CKT 509L) at basket disconnect for electrical power.

- See Step 10 .

YES

NO

TA250384

Symptom-41

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

5 Check engine electrical harness (CKT 509L) at engine low oil pressure switch for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Remove lower engine access cover (page 17-13).
- Disconnect engine electrical harness connector (CKT 509L) from engine low oil pressure switch.
- Connect red probe of meter to center contact of engine electrical harness connector and black probe to ground.

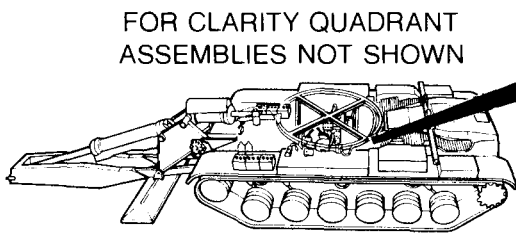
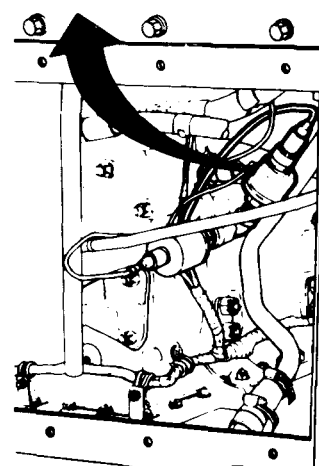
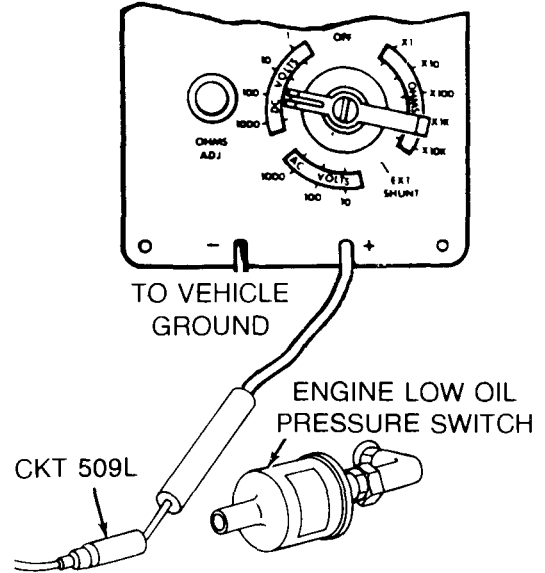
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc.?



LOWER ENGINE ACCESS PANEL

6 Replace engine low oil pressure switch (page 10-242).

NO

YES

Symptom-41

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

7

Check engine accessory control harness (CKT 509L) at engine disconnect for electrical power.

First Technician (Rear of Crew Compartment)

- Reconnect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 509L) at engine disconnect.
- Connect red probe of meter to contact N (CKT 509L) of bulkhead engine disconnect harness connector and black probe to ground.

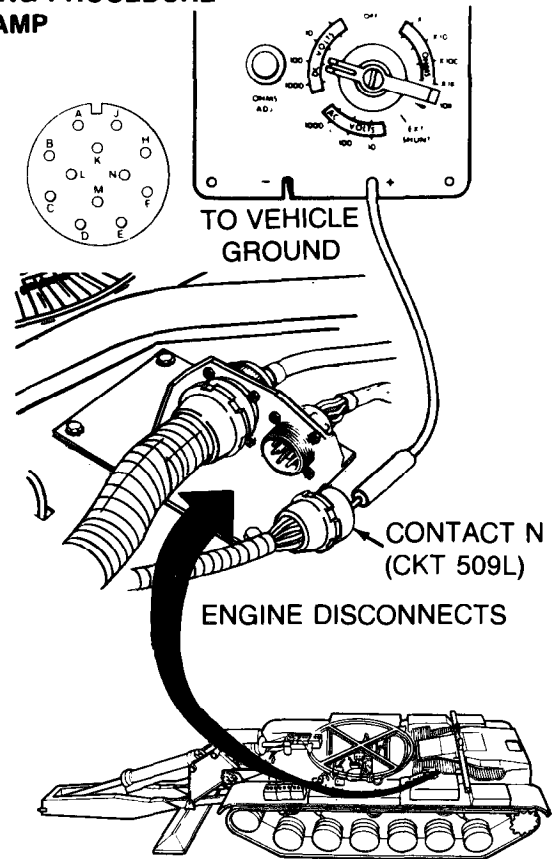
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Left Top Deck Grille Doors)

- Check if meter indicates 18 to 30 volts dc?

Does meter indicate 18 to 30 volts dc?



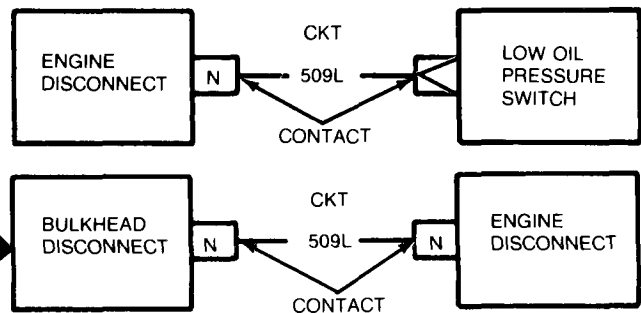
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

8

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Connect bulkhead engine disconnect harness connector at engine disconnect.

9

Repair engine electrical harness (CKT 509L) (page 10-298).



TA250386

Symptom-41

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

FROM STEP

4

10 Check basket-indicator panel harness (CKT 509L) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Reinstall front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-indicator panel harness connector (CKT 509L) at basket disconnect.
- Connect red probe of meter to contact H (CKT 509L) of basket-indicator panel harness connector and black probe to ground.

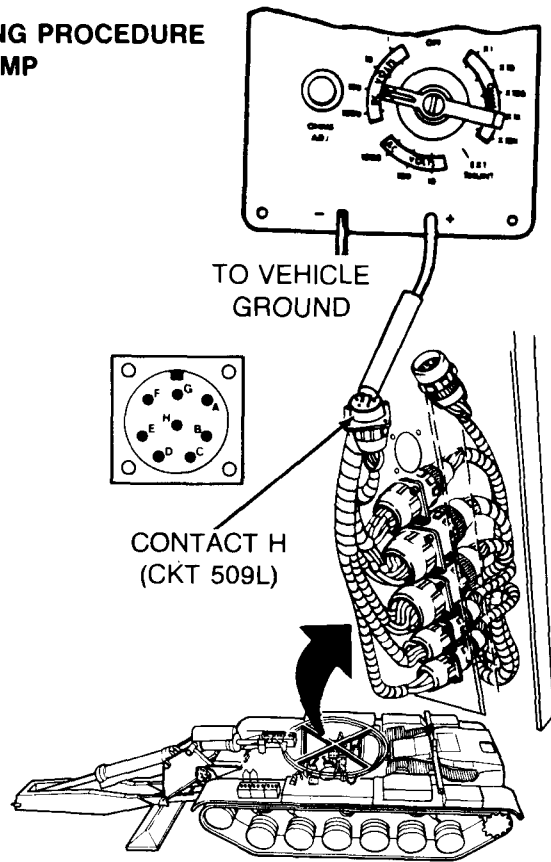
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

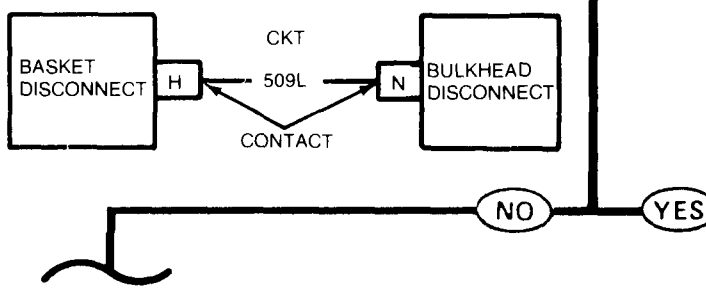
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



11

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-indicator panel harness connector at basket disconnect.



Symptom- 41

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

12 Check POWERPLANT WARNING LAMP for continuity.

Second Technician's (Operator's Station)

- Set MASTER BATTERY switch OFF.

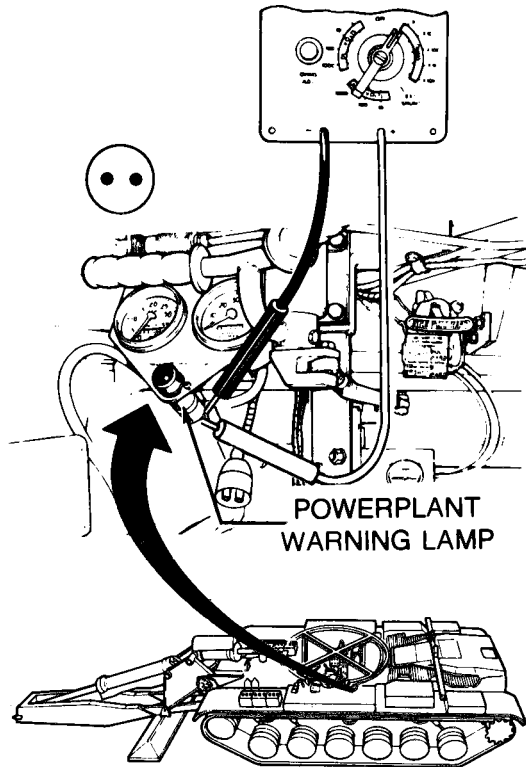
First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

Second Technician (Operator's Station)

- Disconnect front accessory harness connector from POWERPLANT WARNING LAMP connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect two probes of meter to the two contacts of POWERPLANT WARNING LAMP connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

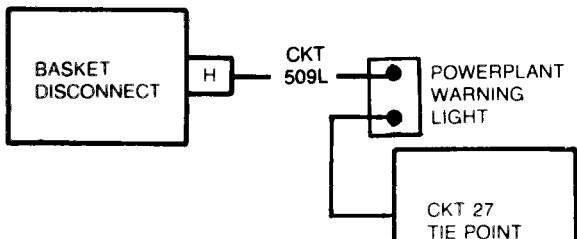
13 Replace POWERPLANT WARNING LAMP assembly (page 10-189).

NO

YES

14

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Connect front accessory harness connector to POWERPLANT WARNING LAMP.



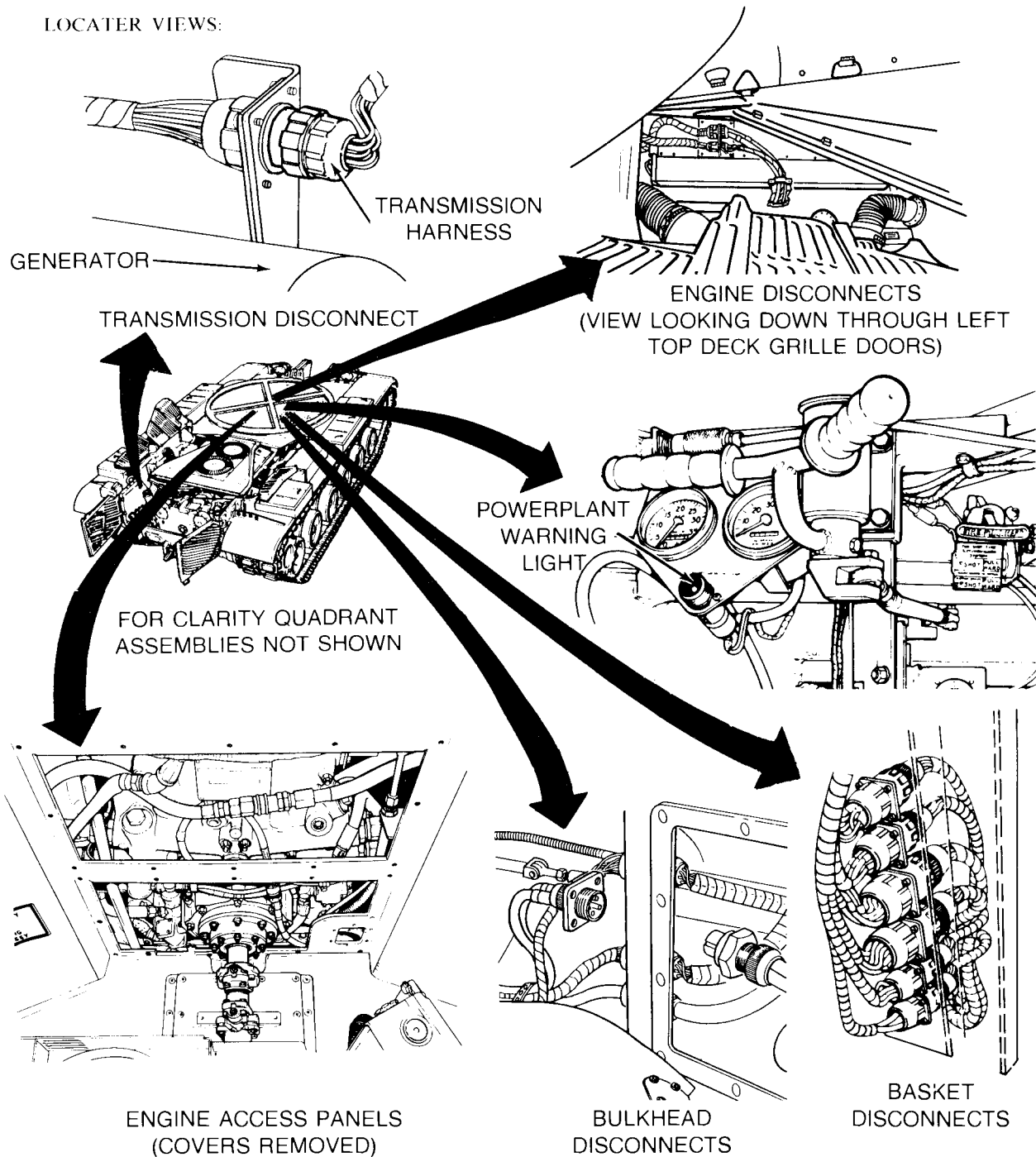
TA250388

DETAILED TROUBLESHOOTING PROCEDURE INDICATOR - LAMP

Symptom-42

POWERPLANT WARNING LAMP ON (ENGINE RUNNING — ALL GAGES READ NORMAL).

LOCATER VIEWS:



TA250389 |

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom-42

POWERPLANT WARNING LAMP ON (ENGINE RUNNING — ALL GAGES READ NORMAL).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check engine high oil temperature switch for short to ground (engine cold).

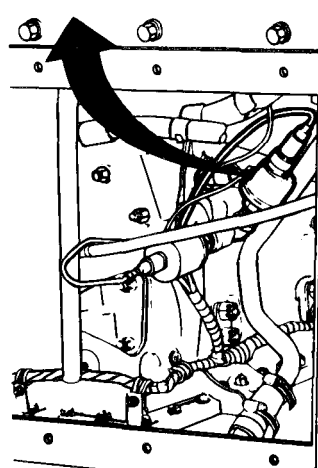
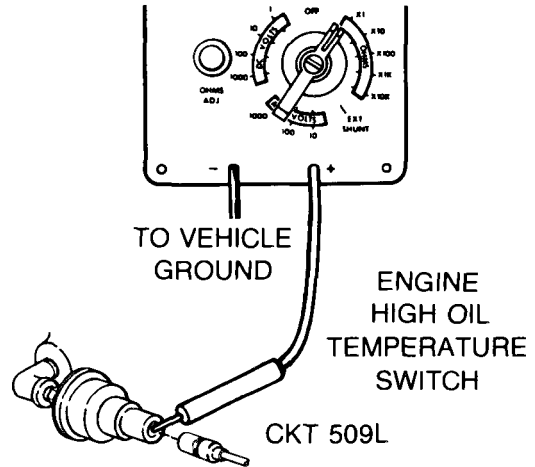
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Remove engine lower access cover (page 17-13).
- Disconnect engine electrical harness connector (CKT 509L) from engine high oil temperature switch.
- Set multimeter to OHMS XI scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to center contact of high oil temperature switch and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



FRONT OF ENGINE
(VIEWED THRU LOWER
ENGINE ACCESS DOOR)

2 Replace engine high oil temperature switch (page 10-219).



Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE INDICATOR - LAMP (Continued)

3 Check transmission high oil temperature switch for short to ground (engine cold).

First Technician (Rear of Crew Compartment)

- Connect engine electrical harness connector to engine high oil temperature switch.

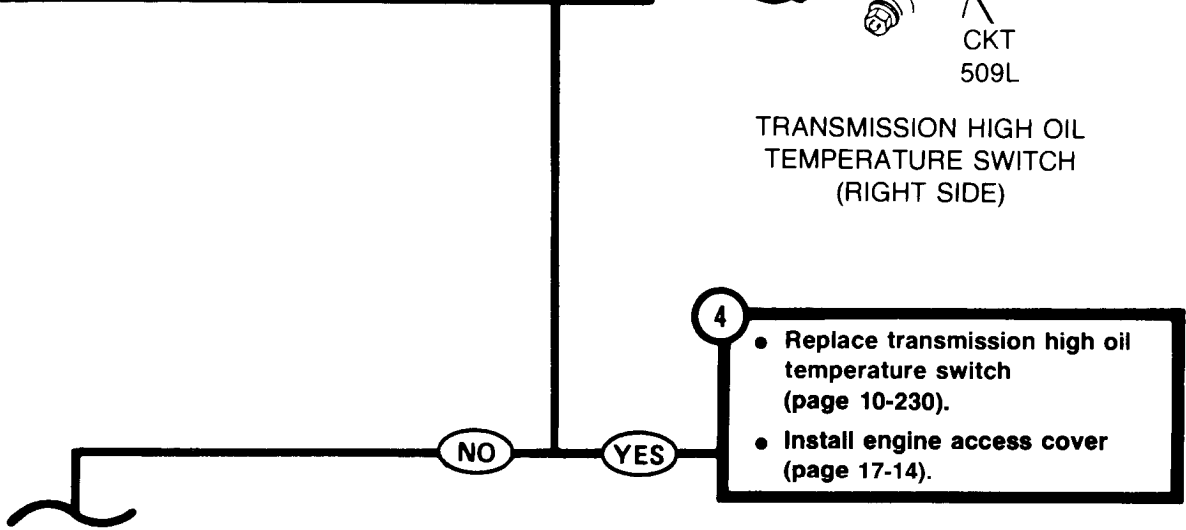
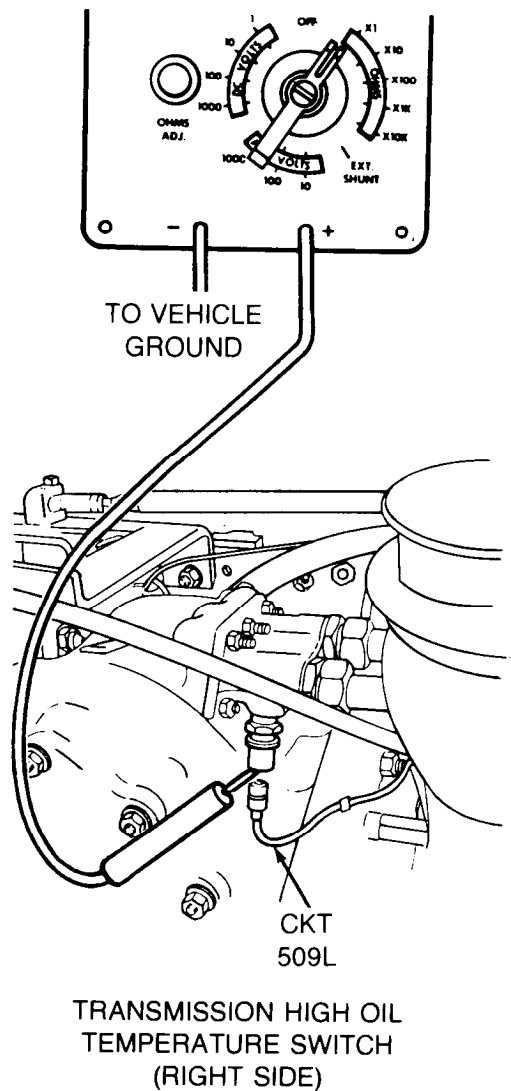
First and Second Technician (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 509L) from transmission high oil temperature switch.
- Connect red probe of meter to center contact of transmission high oil temperature switch and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



TA250391

Symptom-42

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

5

Check engine low oil pressure switch for short to ground.

First Technician (Rear Grille Doors)

- Reconnect transmission harness connector to transmission high oil temperature switch.

First Technician (Rear of Crew Compartment)

- Disconnect engine electrical harness connector (CKT 509L) from engine low oil pressure switch.
- Connect red probe of meter to center contact of engine low oil pressure switch and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

First Technician (Rear of Crew Compartment)

- Check if meter indicates continuity.

Second Technician (Operator's Station)

- Stop engine.

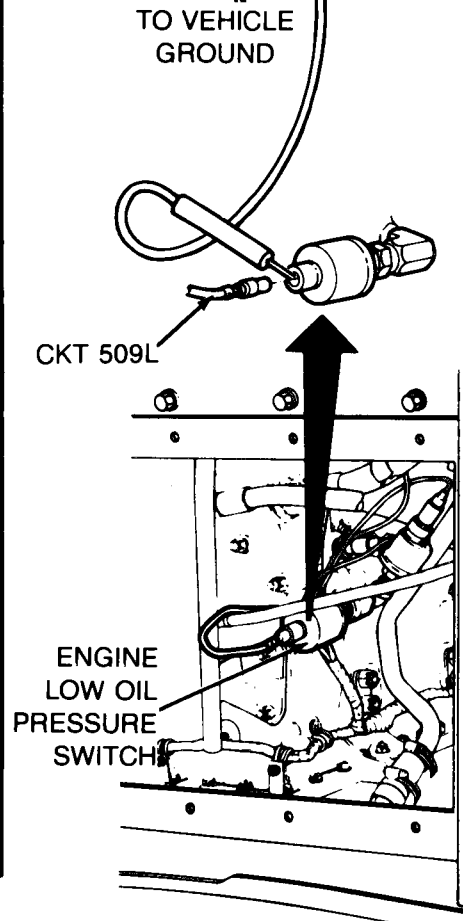
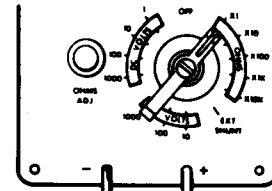
Did meter indicate continuity, thereby indicating a short?

NO

YES

6

- Replace engine low oil pressure switch (page 10-242).
- Install transmission shroud (page 9-6).



TA250392

Symptom-42

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

7 Check basket-indicator panel harness (CKT 509L) at connector to powerplant warning light for short to ground.

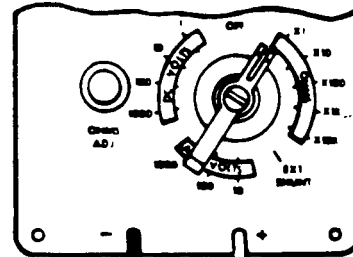
Second Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector (CKT 27) from master control panel.
- Disconnect basket-indicator panel harness connector (CKT 509L) from powerplant warning light assembly.
- Connect red probe of meter to one of the contacts in basket-indicator panel harness connector (CKT 509L) and black probe to ground.
- Check if meter indicates continuity.
- Repeat check moving red probe of meter to other contact in basket-indicator panel harness connector.

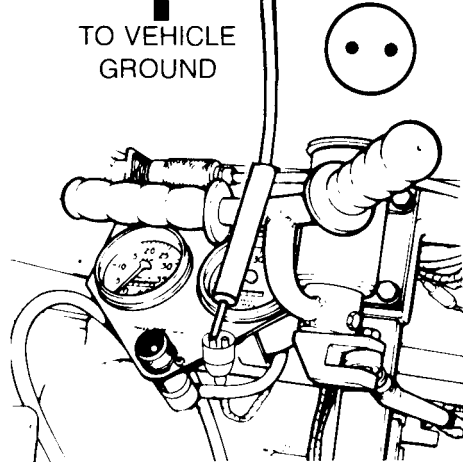
Does meter indicate continuity during either check, thereby indicating a short?

YES

NO



TO VEHICLE
GROUND



POWERPLANT WARNING LIGHT

- 8**
- Replace powerplant warning lamp socket (page 10-189).
 - Connect basket-control panel accessories harness connector to master control panel.
 - Install master control panel (page 10-33).
 - Connect basket-indicator panel harness connector to gage instrument panel.
 - Connect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.
 - Install engine access cover (page 17-15).
 - Install transmission shroud (page 9-6).

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

9 Check front accessory harness (CKT 509L) at basket disconnect for short to ground.

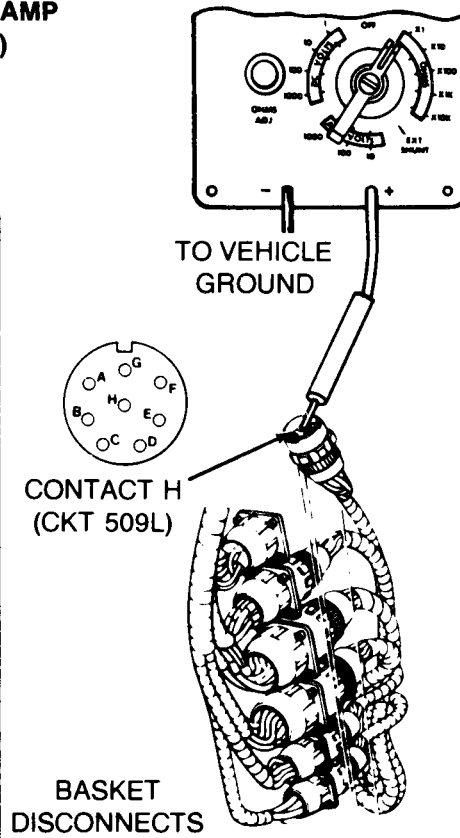
Second Technician (Operator's Station)

- Connect basket-control panel accessories harness connector to master control panel.
- Install master control panel (page 10-33).
- Connect basket-indicator panel harness connector to gage instrument panel.
- Reconnect basket-indicator panel harness connector to powerplant warning light assembly.

First Technician (Commander's Station)

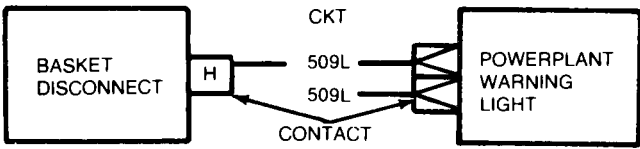
- Disconnect front accessory harness connector (CKT 509L) from basket disconnect.
- Connect red probe of meter to contact H (CKT 509L) of front accessory harness connector at basket disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?



10

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Connect front accessory harness connector to basket disconnect.



TA250394

Symptom-42

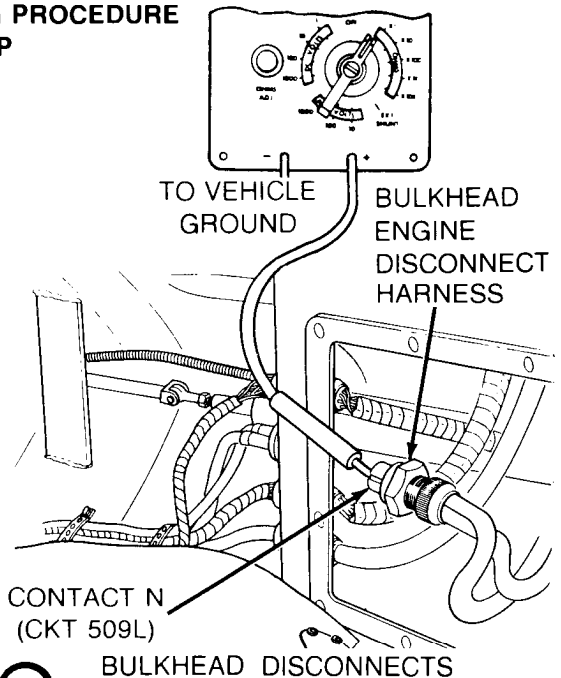
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

11 Check bulkhead engine disconnect harness (CKT 509L) at bulkhead disconnect for short to ground.

First Technician (Commander's Station)

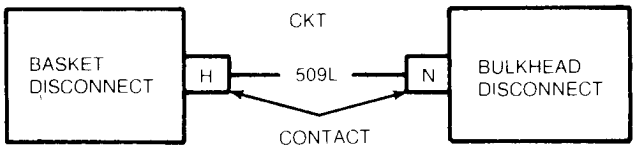
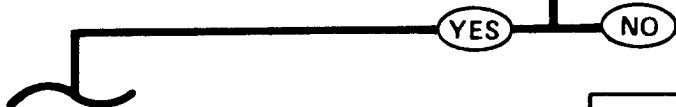
- Connect front accessory harness connector to basket disconnect.
- Disconnect bulkhead engine disconnect harness connector at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact N (CKT 509L) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



12

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect bulkhead engine disconnect harness connector at bulkhead disconnect.
- Connect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.
- Install engine access cover (page 17-15).
- Install transmission shroud (page 9-6).



TA250395

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

13 Check engine electrical harness (CKT 509L) connector at engine disconnect for short to ground.

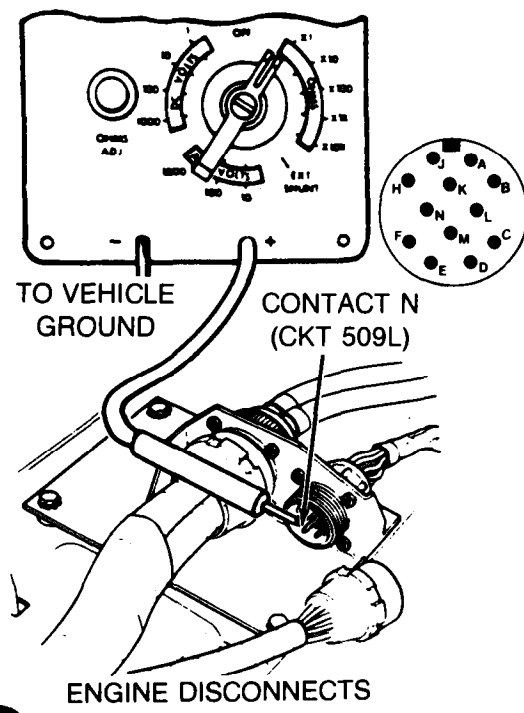
First Technician (Commander's Station)

- Connect bulkhead engine disconnect harness connector at bulkhead disconnect (page 10-269).

Second Technician (Left Top Deck Grille Doors)

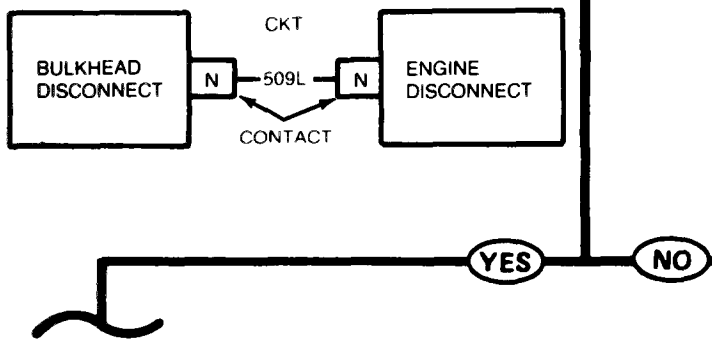
- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector at engine disconnect.
- Connect red probe of meter to contact N (CKT 509L) of engine electrical harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



14

- Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.
- Connect bulkhead engine disconnect harness at engine disconnect.
- Connect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.
- Install engine access cover (page 17-15).
- Install transmission shroud (page 9-6).



TA250396

Symptom- 42

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

15

Check transmission harness (CKT 509L) connector at transmission disconnect for short to ground.

First Technician (Rear of Crew Compartment)

- Connect engine electrical harness connector to engine low oil pressure switch.

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Right Side of Engine)

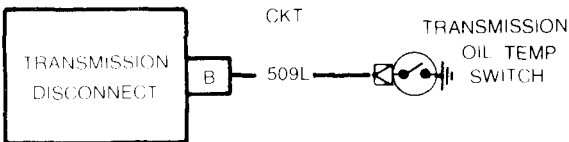
- Disconnect transmission harness connector from engine electrical harness connector at transmission disconnect.
- Connect red probe of meter to contact B (CKT 509L) of transmission harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?

16

- Repair transmission harness (page 10-298).
- Have powerplant installed (page 5-14).

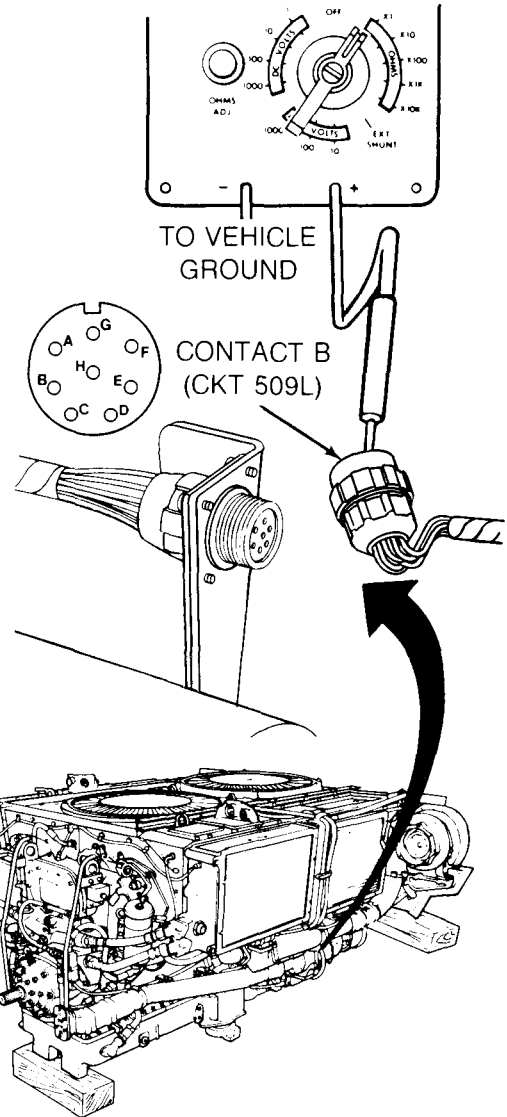
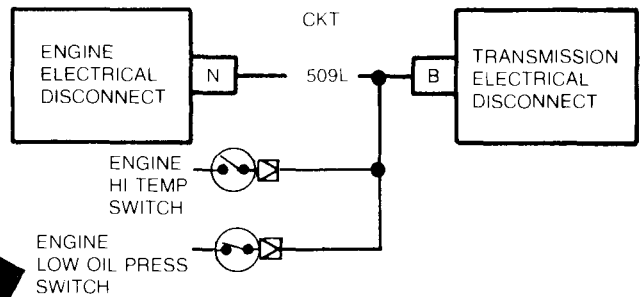
YES



17

- Repair engine electrical harness (page 10-298).
- Have powerplant installed (page 5-14).

NO



TA250397

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

Symptom-43

MASTER BATTERY INDICATOR LAMP WILL NOT LIGHT (THERE IS POWER IN VEHICLE).

1 Check continuity between **MASTER BATTERY** switch and **MASTER BATTERY** indicator lamp (CKT 459A).

Technician (Operator's Station)

- Set **MASTER BATTERY** switch OFF.
- Displace master control panel (page 10-33).
- Disconnect starting harness lead (CKT 459A) from **MASTER BATTERY** switch.
- Disconnect starting harness lead (CKT 459A) from **MASTER BATTERY** indicator lamp socket.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect one meter probe to each of the disconnected starting harness leads.
- Check if meter indicates continuity.

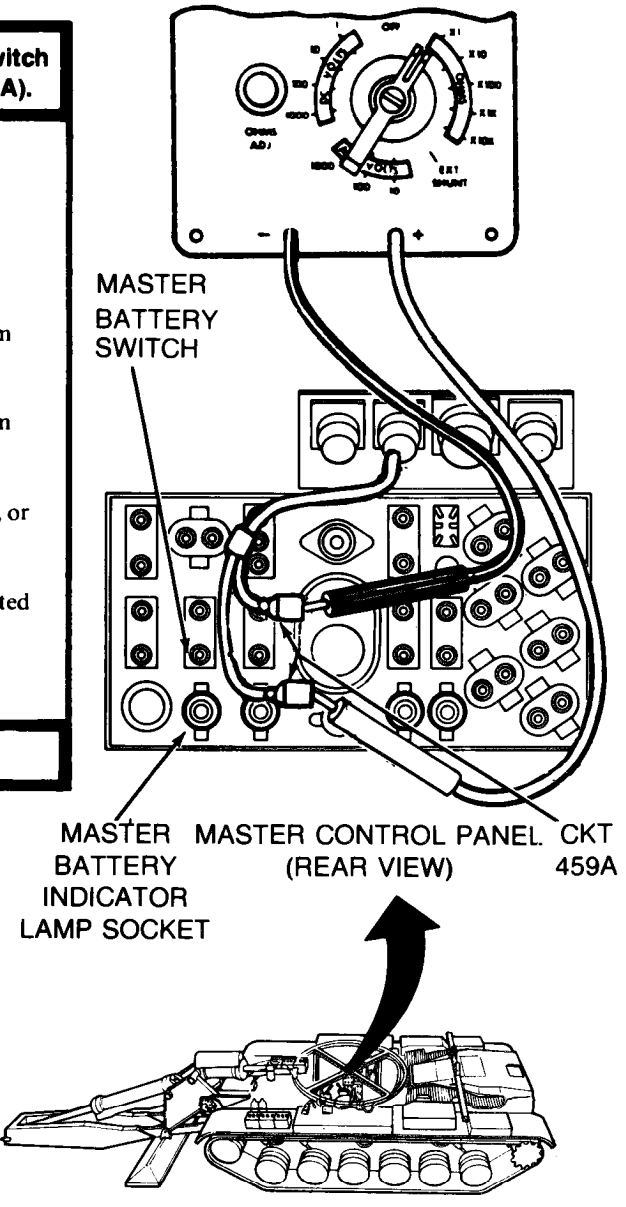
Does meter indicate continuity?

2 Replace starting harness (page 10-274).

NO

3 Replace **MASTER BATTERY** indicator lamp socket (page 10-43).

YES



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250398

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

Symptom-44

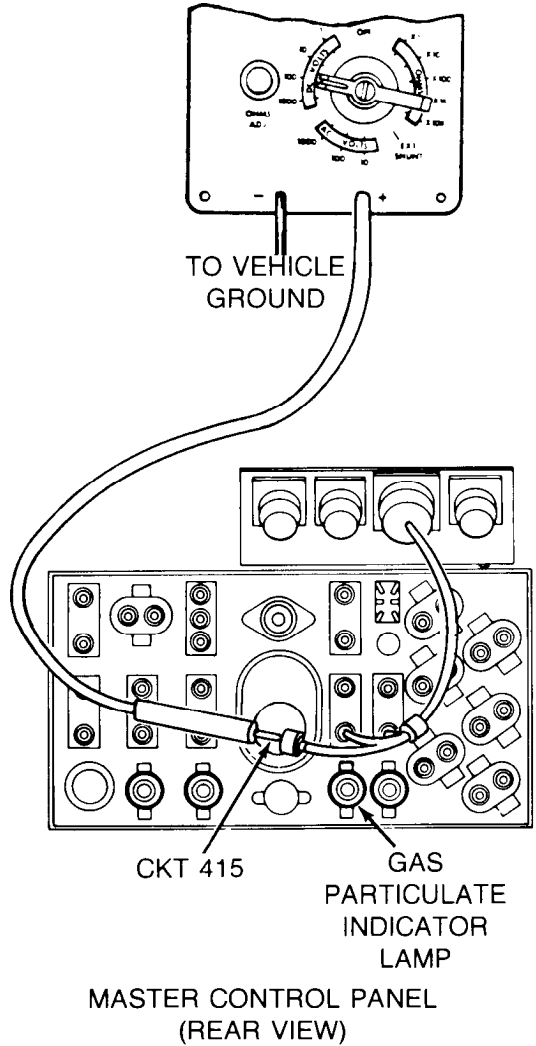
GAS PARTICULATE INDICATOR LAMP WILL NOT LIGHT (GAS PARTICULATE BLOWER WORKS).

1 Check for electrical power to gas particulate indicator lamp.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness connector (CKT 415) from gas particulate indicator lamp.
- Set multimeter to indicate 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to master control panel accessories harness connector (CKT 415) and black probe to ground.
- Set GAS PARTICULATE switch ON.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2 Replace gas particulate indicator assembly (page 10-62).

3 Replace master control panel accessories harness (page 10-91).

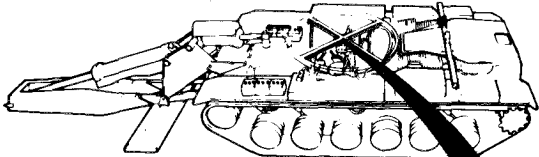
YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

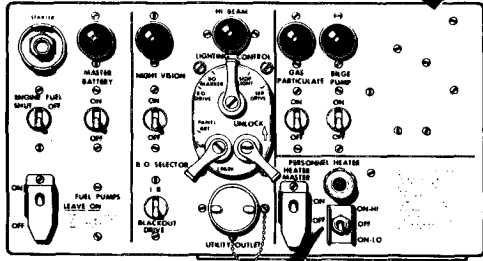
Symptom-45

**PERSONNEL HEATER INDICATOR LAMP WILL NOT LIGHT
(PERSONNEL HEATER WORKS).**

WARNING
Use extreme care when working with circuit 400. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

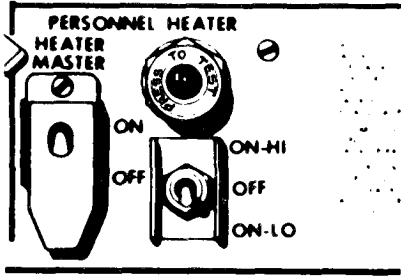


1 Check if PERSONNEL HEATER indicator lamp lights during PRESS TO TEST check.

Technician (Operator's Station)

- If heater is running, set PERSONNEL HEATER HI/LO switch OFF and wait 5 minutes for completion of heater purge cycle.
- If heater is not running, check that HEATER MASTER switch is ON.
- Push in PERSONNEL HEATER indicator lamp.

Does indicator lamp light?



MASTER CONTROL PANEL

2

- Check for electrical power at PERSONNEL HEATER indicator lamp terminal 3 (CKT 405).
- See Step (6) .



TA250400

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

Symptom-45

3 Check CKT 407 for continuity from indicator lamp (terminal 2) to personnel heater HI/LO switch (terminal 2).

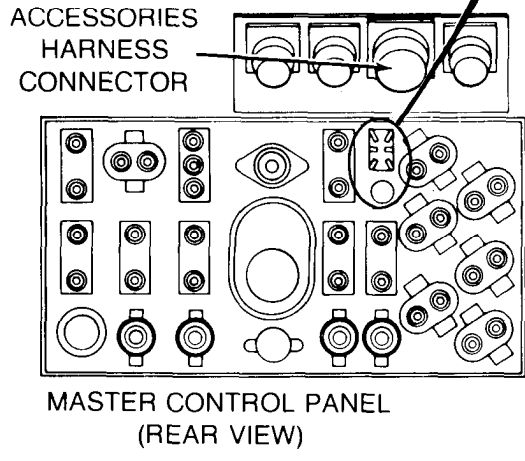
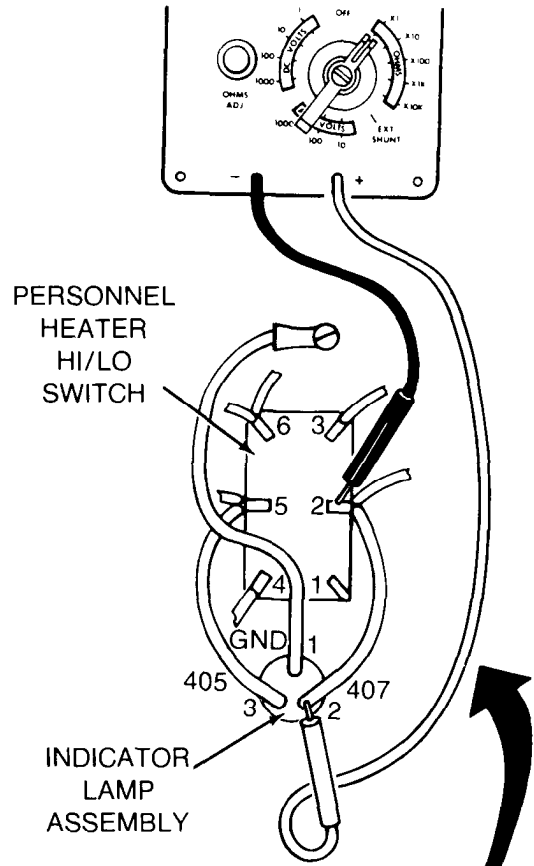
Technician (Operator's Station)

- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness from master control panel.
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to terminal 2 of indicator lamp assembly (CKT 407).
- Connect black probe of meter to terminal 2 of PERSONNEL HEATER HI/LO switch (CKT 407).
- Check if meter indicates continuity.

Does meter indicate continuity

4 Replace personnel heater indicator lamp electrical lead (CKT 407) (CKT 407). NO

5 Replace personnel heater indicator lamp socket (page 10-77). YES



TA250401

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

**Symptom-45
FROM STEP**

2

WARNING

Use extreme care when working with circuit 400. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

6

Check for electrical power at PERSONNEL HEATER indicator lamp terminal 3 (CKT 405).

Technician (Operator's Station)

- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness from master control panel.
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and displace connector from master control panel.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-83).
- Connect red probe of meter to terminal 3 of personnel heater indicator lamp assembly (CKT 405) and black probe to ground.
- Set HEATER MASTER switch ON.
- Check if meter indicates 18 to 30 volts dc.

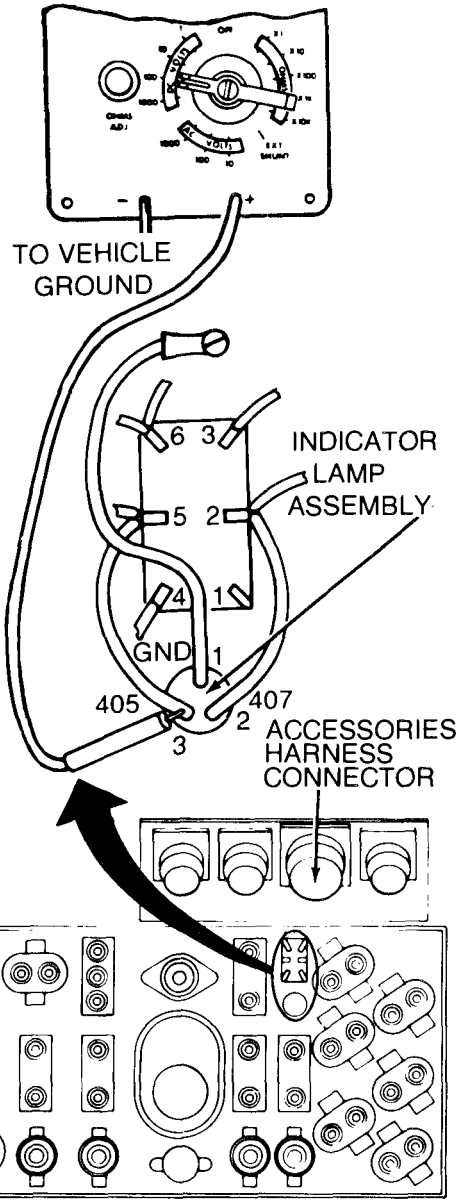
Does meter indicate 18 to 30 volts dc?

YES

NO

7

Replace personnel heater indicator lamp electrical lead (CKT 405).



Symptom-45

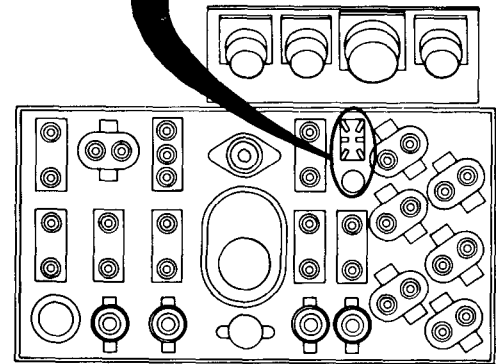
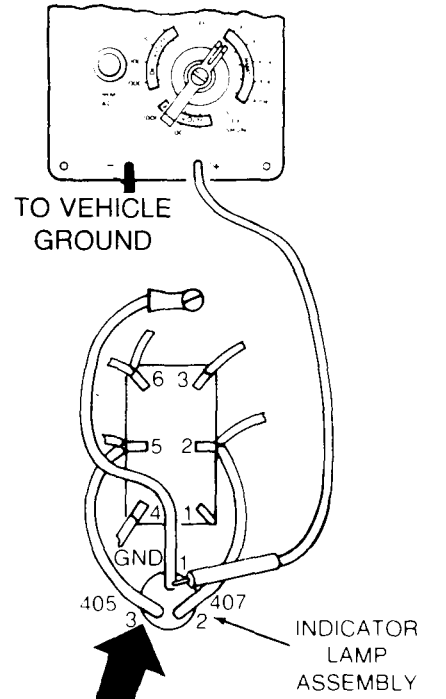
DETAILED TROUBLESHOOTING PROCEDURE INDICATOR - LAMP (Continued)

8 Check personnel heater indicator lamp ground lead for continuity to ground.

Technician (Operator's Station)

- Set HEATER MASTER switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to terminal 1 of personnel heater indicator lamp assembly (CKT GND) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



9 Replace personnel heater indicator lamp socket (page 10-77).

NO YES

TA250403

Symptom- 45

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

10 Check personnel heater indicator lamp ground lead for proper connection.

Technician (Operator's Station)

- Check if personnel heater indicator lamp assembly ground connection is loose or dirty.

Is ground connection loose or dirty?

11

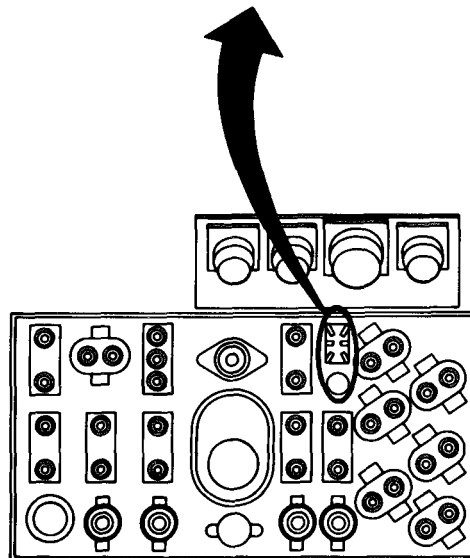
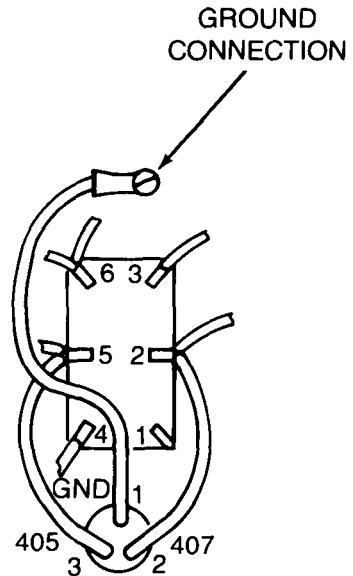
- Clean and tighten loose ground connection.
- Install master control panel (page 10-33).

YES

12

- Replace personnel heater indicator lamp ground lead
- Install master control panel (page 10-33).

NO



TA250404

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

Symptom-46

NIGHT VISION INDICATOR LAMP WILL NOT LIGHT (IR PERISCOPES WILL WORK)

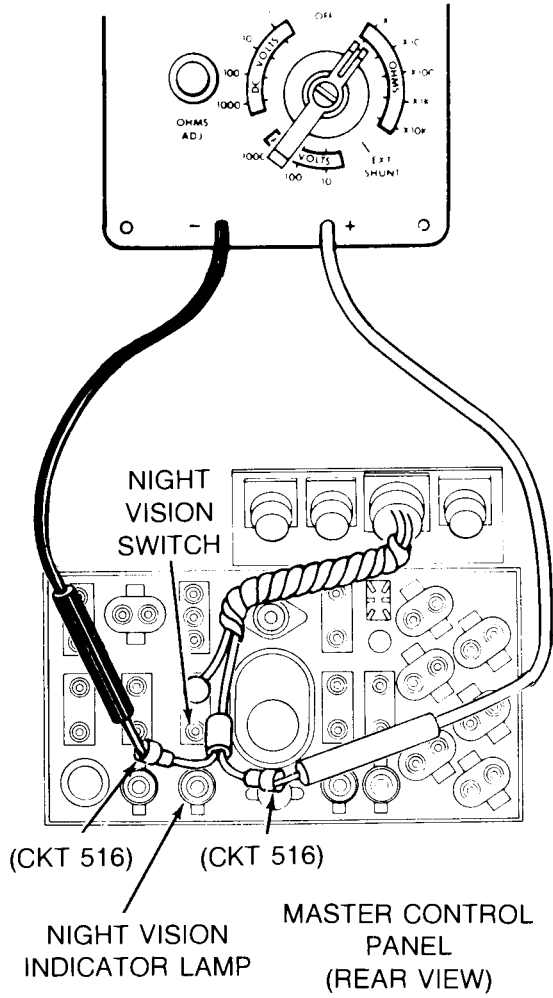
1

Check master control panel accessories harness (CKT 516) for continuity from NIGHT VISION switch to indicator lamp.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF
- Set NIGHT VISION switch OFF.
- Displace master control panel (page 10-33).
- Disconnect connectors (CKT 516) from indicator lamp and NIGHT VISION switch.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Place red probe of meter to indicator light cable connector and black probe to NIGHT VISION switch cable connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



2

Replace master control panel accessories harness (page 10-91).

NO YES

3

Replace NIGHT VISION indicator lamp socket (page 10-50).

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

Symptom-47

**HIGH BEAM INDICATOR LAMP WILL NOT LIGHT WHEN
WHITE SERVICE AND/OR B.O. SERVICE HIGH BEAM LAMPS ARE ON.**

NOTE

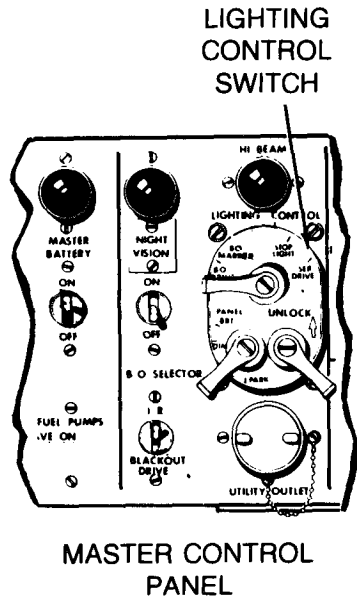
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check if HI BEAM indicator lamp will light when B.O. service lamps are on.

Second Technician (Operator's Station)

- Turn LIGHTING CONTROL switch lever to B.O. DRIVE.
- Set B.O. SELECTOR switch to IR.
- Set MASTER BATTERY switch ON.
- Check if HI BEAM indicator lamp is lit.
- Press and release foot DIMMER SWITCH.
- Check if HIGH BEAM indicator lamp is lit.

Is HI BEAM indicator lamp lit?



YES

NO

2

- Check if HI BEAM indicator lamp will light when white service lamps are on.
- See Step **10**.

TA250406

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

Symptom-47

3 Check master control panel accessories harness (CKT 519), at connector to HI BEAM indicator lamp, for electrical power (white service lamps).

Second Technician (Operator's Station)

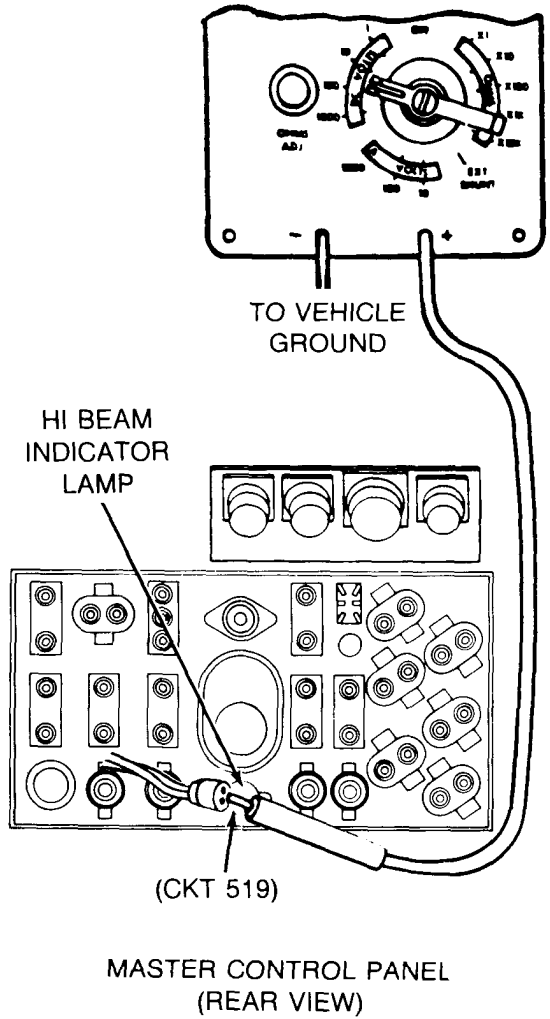
- Set MASTER BATTERY switch OFF.
- Turn LIGHTING CONTROL switch lever to SER DRIVE.
- Set PANEL light switch to BRT.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness connector from HI BEAM indicator lamp.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to one of the master control panel accessory harness connector contacts (CKT 519) at HI BEAM indicator lamp and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check on other contact of master control panel accessories harness connector (CKT 519) at HI BEAM indicator lamp.

Does meter indicate 18 to 30 volts dc at either contact?

NO

YES

4 Replace high beam indicator lamp assembly (page 10-54).



Symptom-47

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

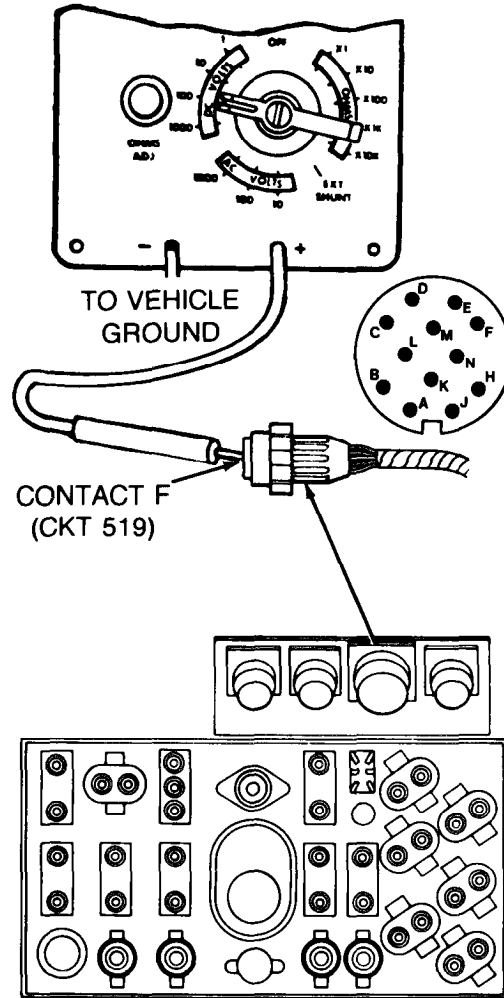
5

Check contact F of basket-control panel accessories harness connector (CKT 519) at master control panel for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect master control panel accessories harness connector to HI BEAM indicator lamp.
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact F (CKT 519) of basket-control panel accessories harness connector at master control panel and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc at either foot DIMMER SWITCH position?



NO

YES

6

Replace master control panel accessories harness (page 10-91).

Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

7

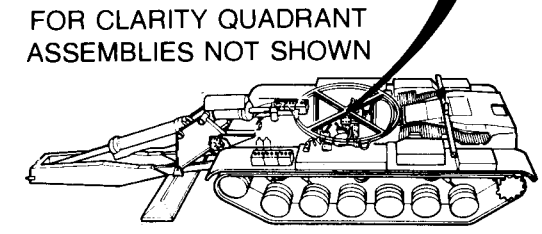
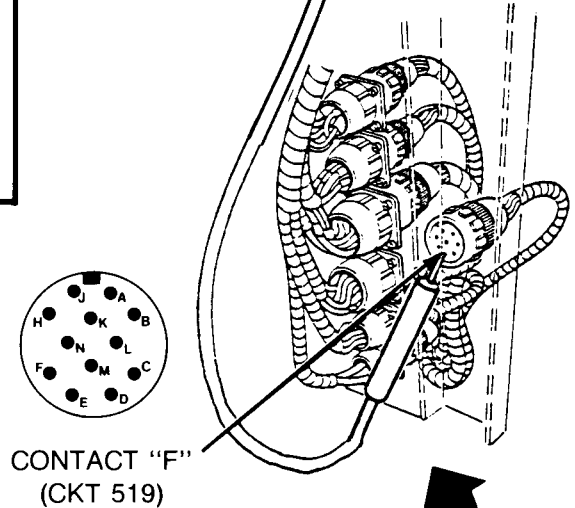
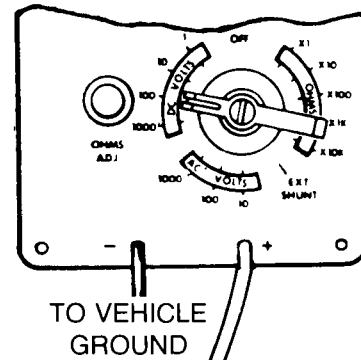
Check contact F of front accessory harness connector (CKT 519) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect basket-control panel accessories harness connector to master control panel.

First Technician (Commander's Station)

- Disconnect front accessory harness connector (CKT 519) from basket disconnect.
- Connect red probe of meter to contact F (CKT 519) of front accessory connector at basket disconnect and black probe to ground.



TA250409

Symptom-47

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

STEP **7** CONTINUED

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.

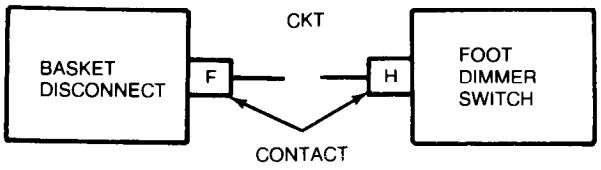
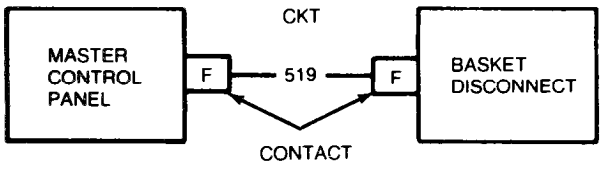
Does meter indicate 18 to 30 volts dc at either foot DIMMER SWITCH position?

8

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Connect front accessory harness connector to basket disconnect.

9

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness connector to basket disconnect.



TA250410

Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

FROM STEP

2

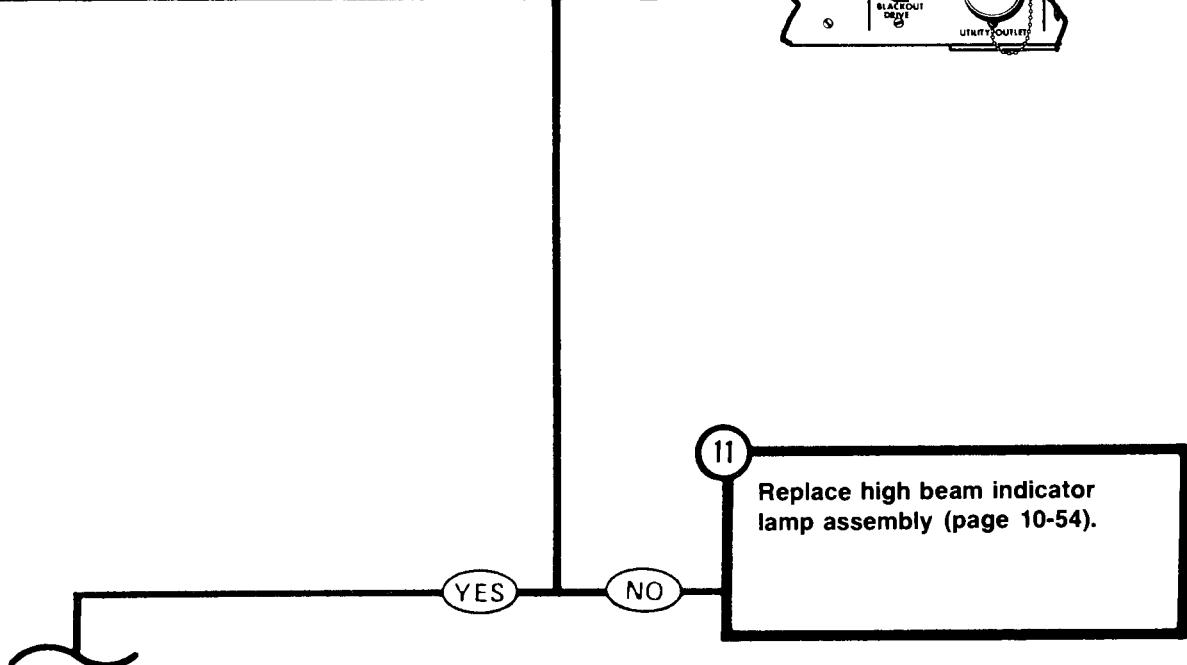
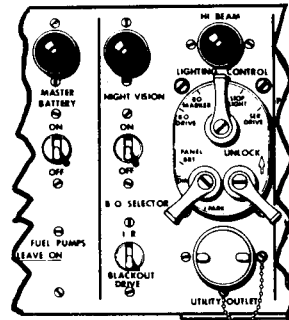
10

Check if HI BEAM indicator lamp will light when white service lamps are on.

Second Technician (Operator's Station)

- Turn LIGHTING CONTROL switch to SER DRIVE.
- Set PANEL switch to BRT.
- Visually check if HI BEAM indicator lamp is lit.
- Press and release foot DIMMER SWITCH.
- Visually check if HI BEAM indicator lamp is lit.

Is HI BEAM indicator lamp lit?



11

Replace high beam indicator lamp assembly (page 10-54).

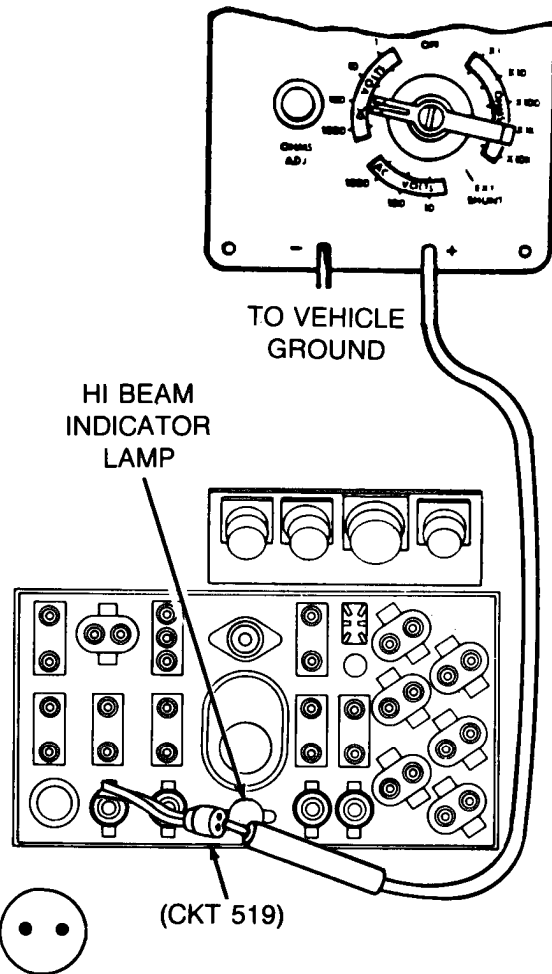
Symptom-47

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

12 Check master control panel accessories harness (CKT 519), at connector to HI BEAM indicator lamp, for electrical power (B.O. service lamps).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Turn LIGHTING CONTROL switch lever to B.O. DRIVE.
- Set B.O. SELECTOR switch to IR.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness connector from HI BEAM indicator lamp.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89. (page 4-81).
- Connect red probe of meter to one of the master control panel accessories harness connector contacts (CKT 519) at HI BEAM indicator lamp and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check on other contact of master control panel accessories harness connector (CKT 519) at HI BEAM indicator lamp.



Does meter indicate 18 to 30 volts dc at either contact?

NO YES

13 Replace high beam indicator lamp assembly (page 10-54).

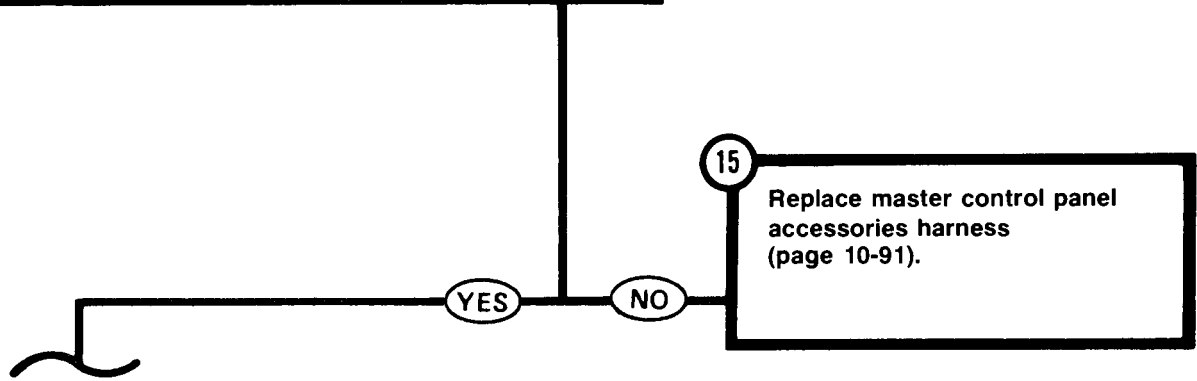
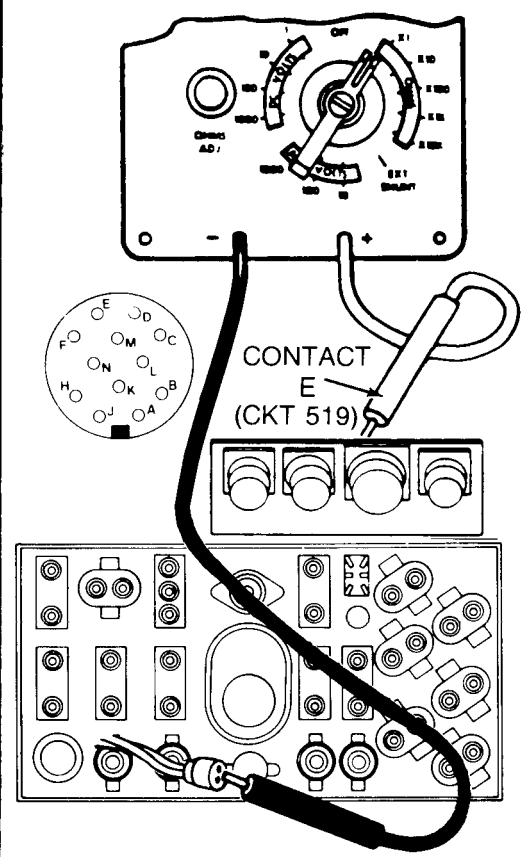
Symptom-47

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

14 Check master control panel accessories harness (CKT 519) for continuity from contact E of master control panel connector to contacts of connector at HI BEAM indicator lamp.

- Set MASTER BATTERY switch OFF.
- Disconnect basket control panel accessories harness connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact E (CKT 519) of master control panel accessories harness connector to master control panel.
- Connect black probe of meter to one of the master control panel accessories harness connector contacts (CKT 519) at HI BEAM indicator lamp.
- Check if meter indicates continuity.
- Repeat above check on other contact of master control panel accessories harness connector (CKT 519) at HI BEAM indicator lamp.

Does meter indicate continuity at either contact?



15 Replace master control panel accessories harness (page 10-91).

Symptom-47

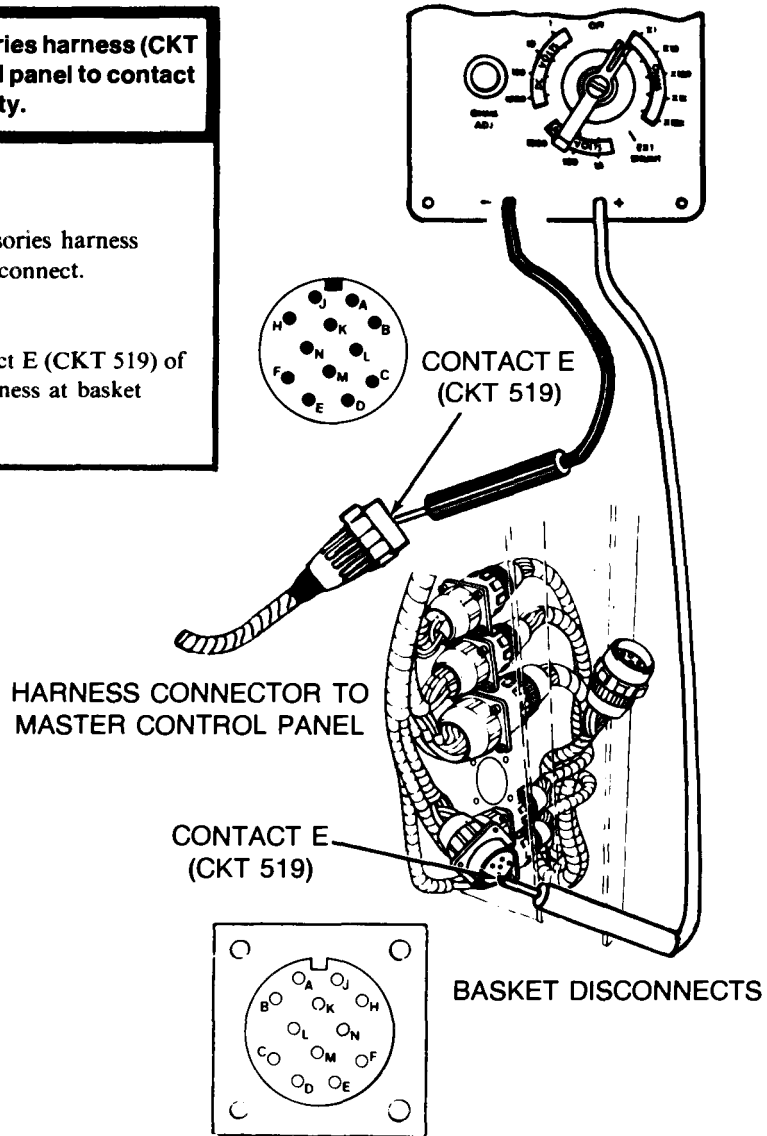
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

16

Check basket control panel accessories harness (CKT 519) from contact E at master control panel to contact E at basket disconnect for continuity.

First Technician (Commander's Station)

- Displace basket-control panel accessories harness connect or (CKT 519) at basket disconnect.
- Connect red probe of meter to contact E (CKT 519) of basket-control panel accessories harness at basket disconnect.



TA250414

Symptom- 47

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

STEP **16** CONTINUED

Second Technician (Operator's Station)

- Connect black probe of meter to contact E (CKT 519) of basket-control panel accessories harness at master control panel.
- Check if meter indicates continuity.

Does meter indicate continuity?

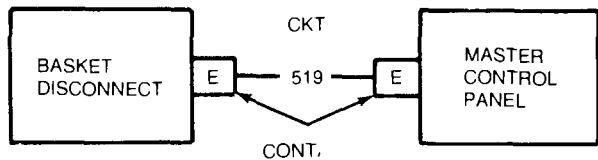
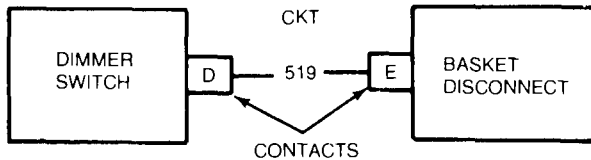
17

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-control panel accessories harness connector at basket disconnect.
- Connect basket-control panel accessories harness to master control panel.
- Install master control panel (page 10-33).

YES NO

18

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness
- Connect basket-control panel accessories harness connector to master control panel.
- Install master control panel (page 10-33).
- Install basket control panel accessories harness connector at basket disconnect.



TA250415

Symptom-48

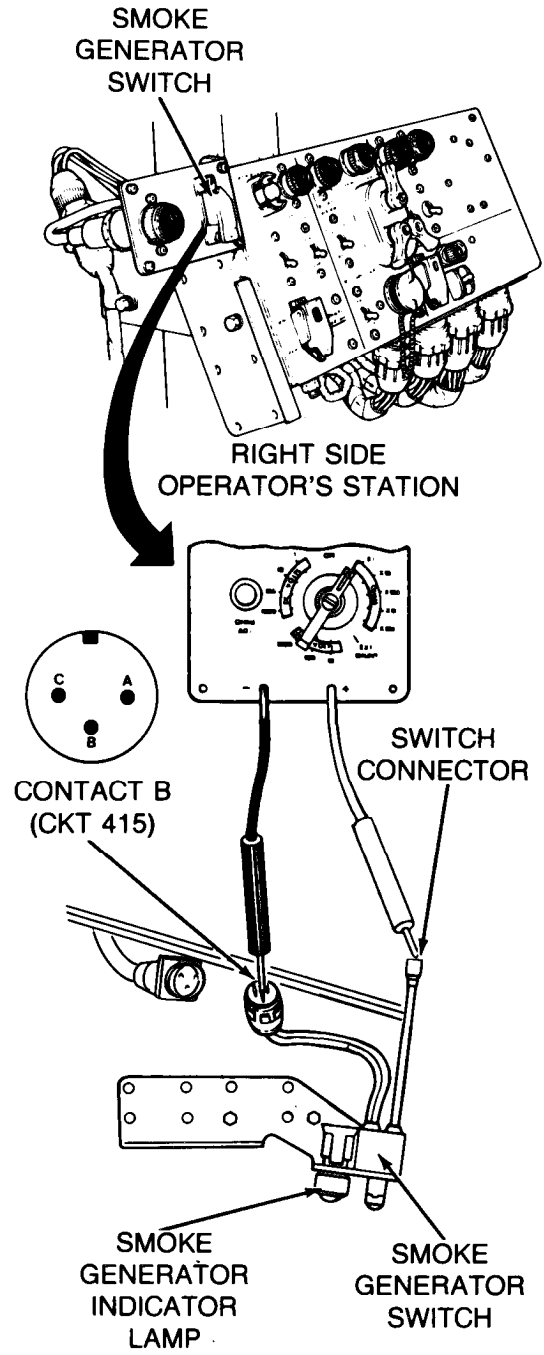
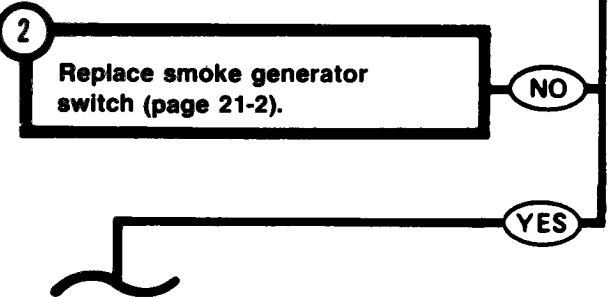
**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP**

**SMOKE GENERATOR INDICATOR LAMP WILL NOT LIGHT
(SMOKE GENERATOR WILL MAKE SMOKE).**

1 Check smoke generator switch assembly for continuity.

- Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
 - Set SMOKE GENERATOR switch OFF.
 - Disconnect SMOKE GENERATOR switch connector from SMOKE GENERATOR indicator lamp.
 - Disconnect SMOKE GENERATOR switch assembly connector from SMOKE GENERATOR switch harness connector.
 - Set SMOKE GENERATOR switch ON.
 - Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
 - Connect red probe of meter to SMOKE GENERATOR switch connector.
 - Connect black probe of meter to contact B (CKT 415) of SMOKE GENERATOR switch assembly connector.
 - Check if meter indicates continuity.

Does meter indicate continuity?



TA250416

**DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)**

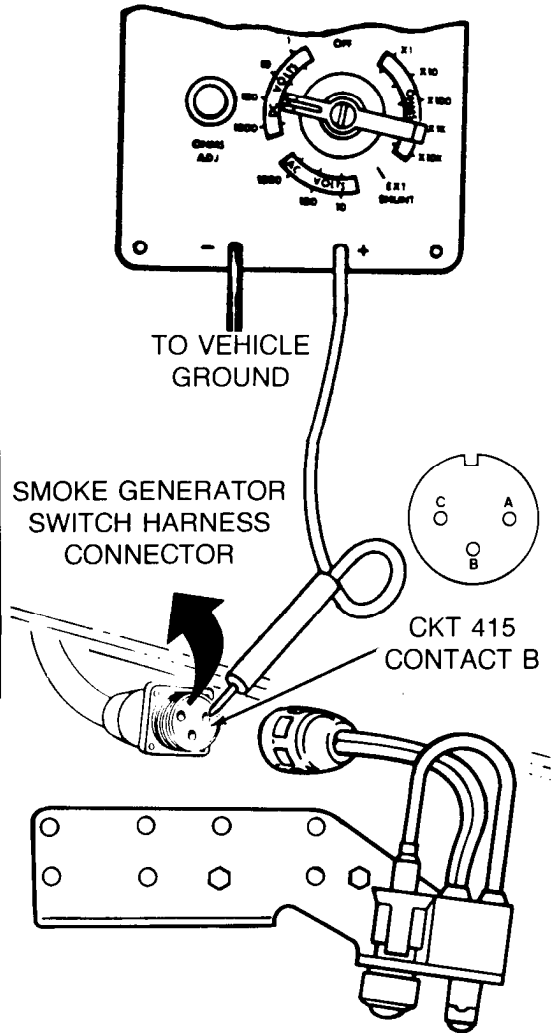
Symptom-48

3 Check smoke generator switch harness (CKT 415) for electrical power.

Technician (Operator's Station)

- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 415) of smoke generator switch harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4

- Repair smoke generator switch harness (page 10-298).
- Connect SMOKE GENERATOR switch connector to SMOKE GENERATOR indicator lamp.

NO

YES

5 Replace indicator lamp socket (page 21-5).

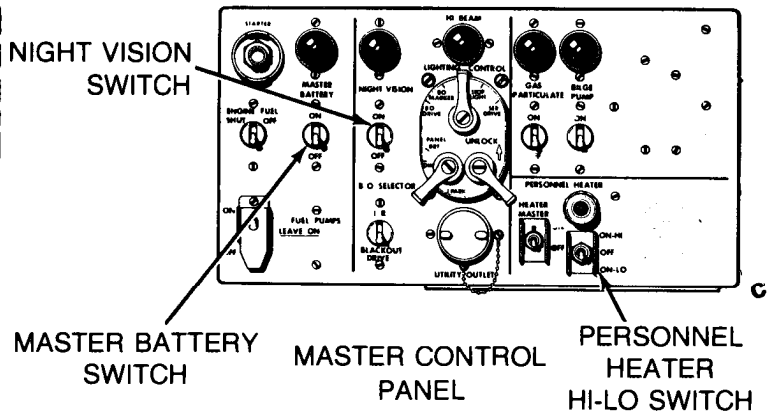
Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS

STATIC OR WHINING NOISE IN RADIO. (ELECTROMAGNETIC INTERFERENCE - EMI)

CAUTION
Turn off radio set (TM5-5420-202-10) before starting engine to prevent possible damage to communications equipment.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1

Check if static is caused by vehicle electrical equipment (vehicle not moving).

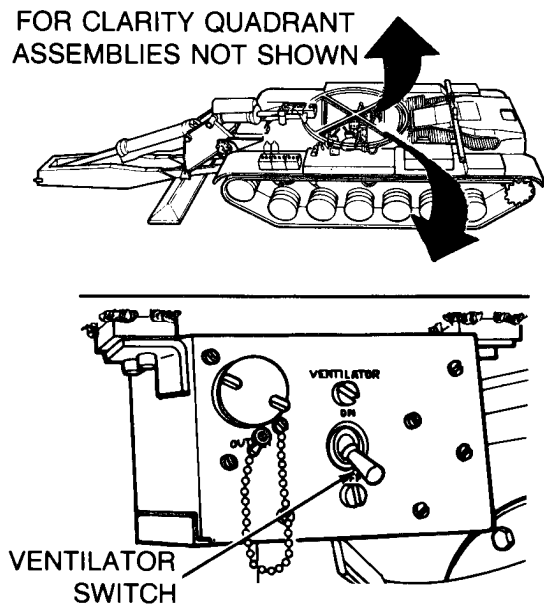
Second Technician (Operator's Station)

- Start engine.
- Set PERSONNEL HEATER HI/LO switch ON - LO.
- Check that LIGHTING CONTROL switch is OFF.
- Set NIGHT VISION switch ON.
- Set VENTILATOR switch ON.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Can static be heard when vehicle electrical equipment is operating - vehicle not moving?



2

- EMI is a result of vehicle movement - check if static is caused by broken or missing static springs in support rollers.
- See Step 14 .



TA250418

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

Symptom-49

3 Check if static is caused by ventilating blower motor.

Second Technician (Operator's Station)

- Set VENTILATOR switch OFF (TM 5-5420-202-10).

First Technician (Commander's Station)

- Listen for static in radio helmet.

Did static stop when VENTILATOR switch was shut off?

4

- Stop engine.
- Turn off radio set (TM 5-5420-202-10).
- Set PERSONNEL HEATER HI/LO switch OFF.
- Set NIGHT VISION switch OFF.
- Replace ventilating blower assembly (TM 5-5420-228-24).

NO

YES

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

5 Check if static is caused by infrared (IR) powerpacks.

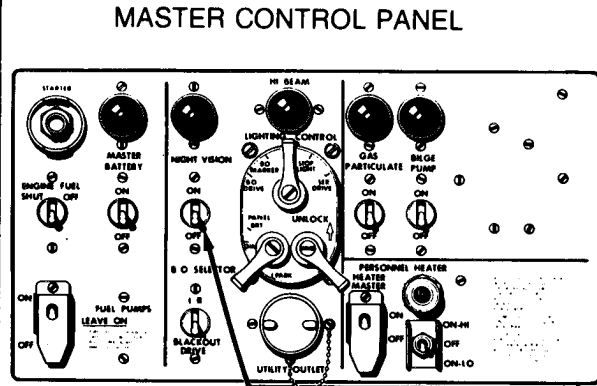
Second Technician (Operator's Station)

- Set NIGHT VISION switch OFF.

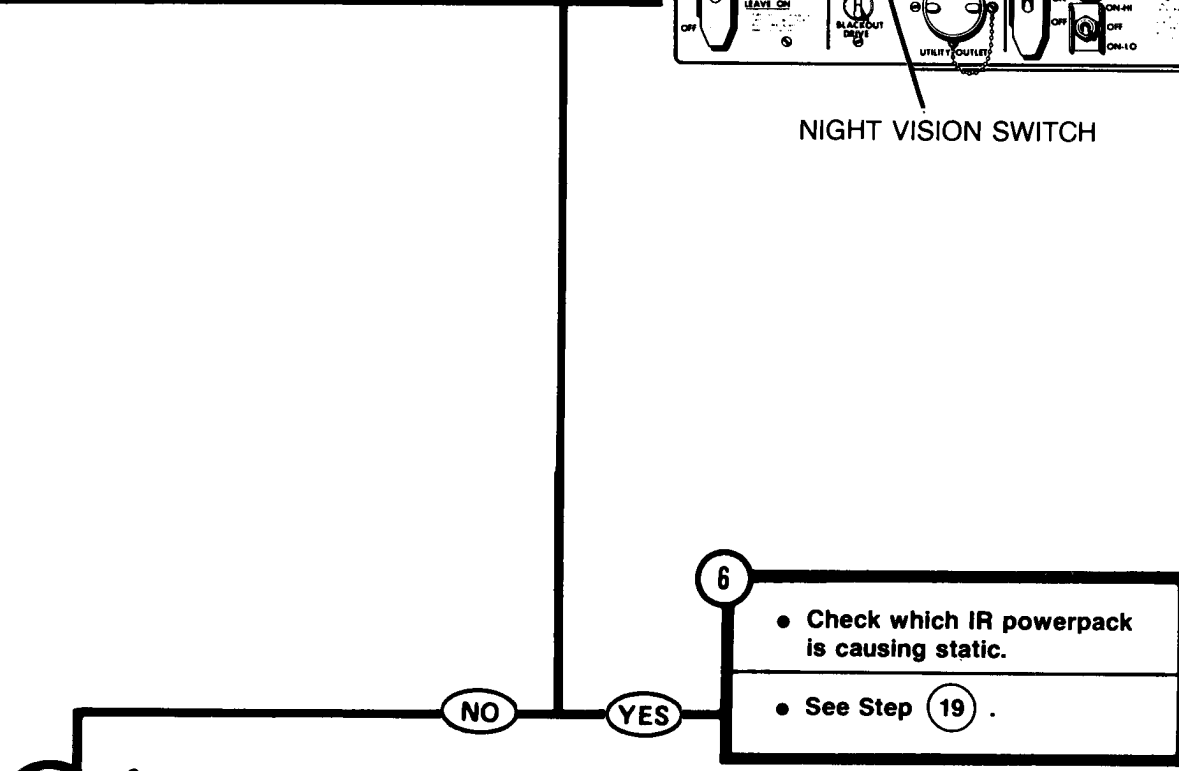
First Technician (Commander's Station)

- Wait two or three minutes for high voltage present inside IR powerpacks to discharge, then listen for static in radio helmet.

Did static stop when IR powerpacks were shut off?



NIGHT VISION SWITCH



Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

7

Check if static is a result of engine running.

Second Technician (Operator's Station)

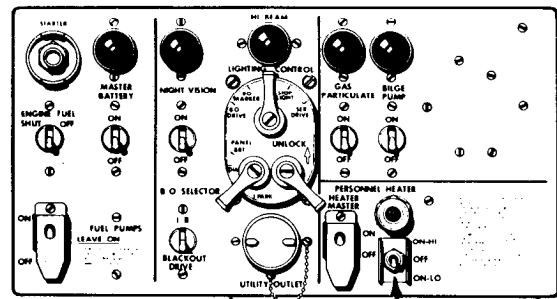
- Stop engine but do not set MASTER BATTERY, HEATER MASTER, PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- Listen for static in radio helmet.

Did static stop when engine was shut off (thereby stopping air cleaner blower motors and generator)?

MASTER CONTROL PANEL



PERSONNEL HEATER HI-LO SWITCH

8

- Check if static is caused by air cleaner blower motors.
- See Step **25**.

NO **YES**

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

9

Check if static is caused by personnel heater.

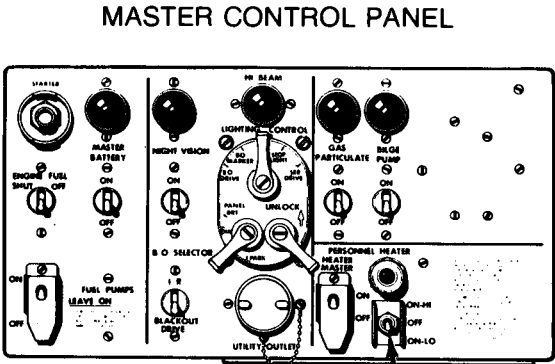
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- After personnel heater blower motor stops running (about 5 minutes) listen for static in radio helmet.

Did static stop when personnel heater was shut off?



NO

YES

10

- Check if static is caused by personnel heater fuel pump.
- See Step **40**.

Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

11 Check if static is caused by fuel tanks electrical fuel pumps.

Second Technician (Commander's Station)

- Set FUEL PUMPS switch OFF.

First Technician (Commander's Station)

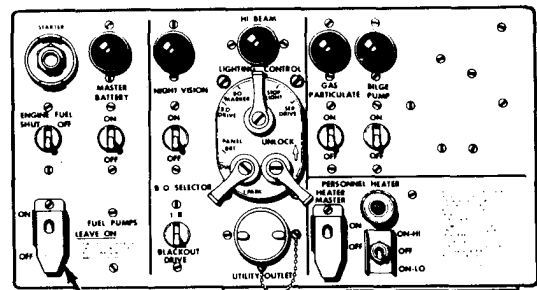
- Listen for static in radio helmet.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON.

Did static stop while fuel pumps were shut off?

MASTER CONTROL PANEL



FUEL PUMPS SWITCH

12

- Check if static is caused by right fuel tank electrical fuel pump.
- See Step **43**.

YES

NO

13

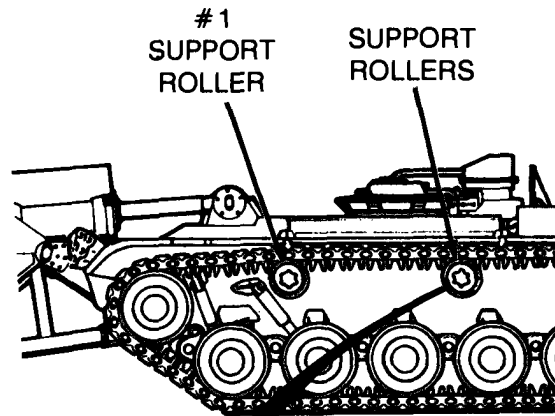
- Turn off radio set (TM 5-5420-202-10).
- Notify support maintenance of EMI problem.

Symptom-49
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

2

NOTE
Number one support roller on left side of vehicle is used to drive speedometer. It does not have a static spring.



14 **Check if static is caused by broken or missing static springs in support rollers.**

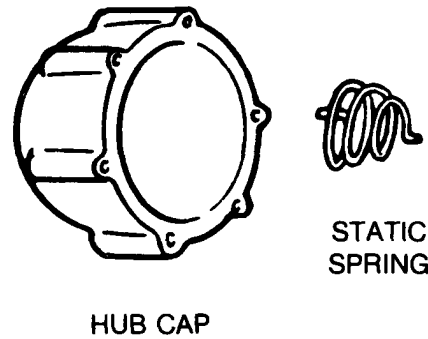
Second Technician (Operator's Station)

- Stop engine.

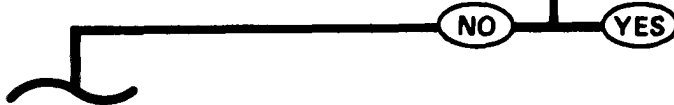
Both Technicians (Left and Right Side of Vehicle)

- Remove hub caps from support rollers (page 14-36).
- Check for broken and missing static springs.

Are any static springs broken or missing?



15 **Replace broken and missing static springs.**



Symptom-49

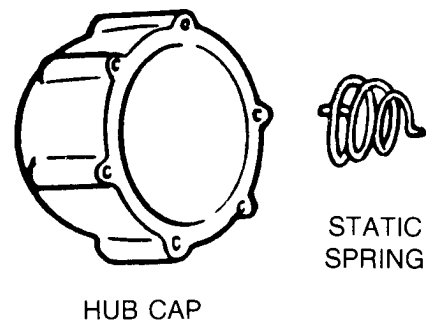
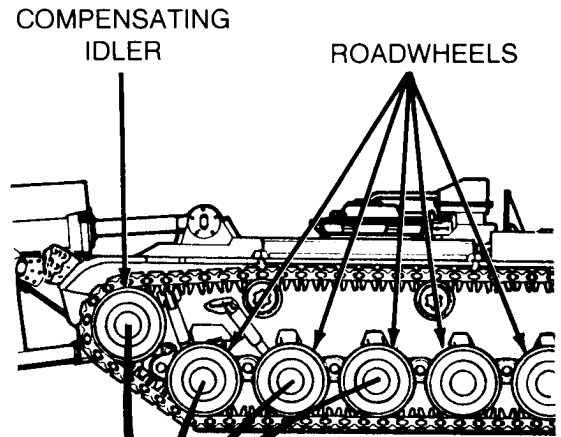
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

16 Check if static is caused by broken or missing static springs in roadwheels and compensating idler.

Both Technicians (Left and Right Sides of Vehicle)

- Install hub caps on support rollers (page 14-42).
- Remove hub caps from roadwheels and compensating idlers (page 14-2).
- Check for broken and missing static springs.

Are any static springs broken or missing?



17

- Notify support maintenance of EMI problem.
- Install hubcaps (page 14-4).

NO YES

18 Replace broken and missing static springs.

Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

FROM STEP

6

19

Check which IR powerpack is causing static.

Second Technician (Operator's Station)

- Stop engine.
- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-20).
- Remove right hand floor access cover (page 17-7).
- Disconnect front accessory harness connector (CKT 516) from one of the IR power packs.

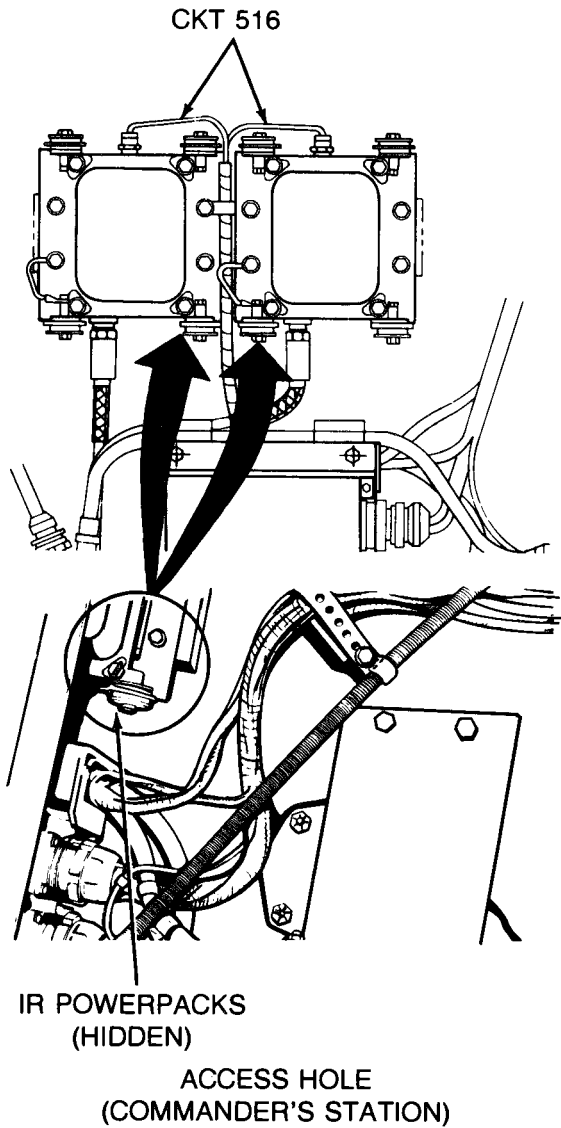
Second Technician (Operator's Station)

- Set NIGHT VISION switch ON.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when first IR powerpack was disconnected?



20

- Static caused by first IR powerpack - check if static is caused by defective ground strap on IR powerpack.

● See Step 22 .

YES NO

21

- Static caused by second IR powerpack - check if static is caused by defective ground strap on IR powerpack.

● See Step 22 .

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP

20 OR 21

NOTE
This step is to be performed on the IR powerpack causing static. Procedure is the same for both IR powerpacks.

22 Check if static is caused by defective ground strap on IR powerpack.

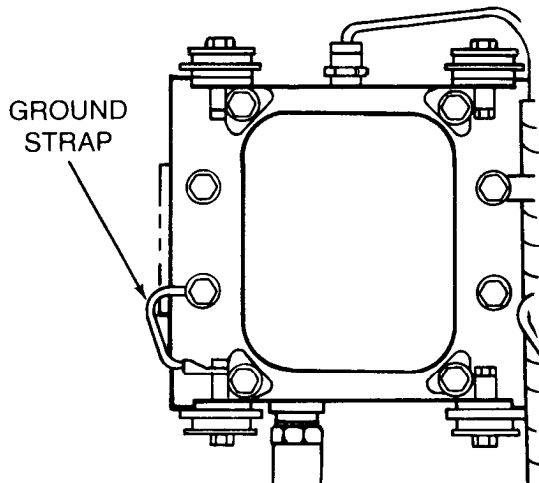
Second Technician (Operator's Station)

- Set NIGHT VISION switch OFF.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).
- Connect front accessory harness connector to IR powerpack.
- Check infrared powerpack for loose ground strap connections or damaged ground strap.

Is ground strap connection loose or ground strap damaged?



INFRARED POWERPACK
(1 OF 2)

23

- Clean and tighten loose ground strap connections. If ground strap connection is not loose, replace damaged ground strap (page 10-152).

YES NO

24 Replace infrared powerpack (page 10-152).

Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

FROM STEP

8

25

Check if static is caused by air cleaner blower motors.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-226-10).

First Technician (Top Deck)

- Open top deck grille doors to gain access to left and right air cleaner assemblies.
- Disconnect rear accessory to bulkhead harness connectors (CKT 415B) from the left and right air cleaner assemblies.

Second Technician (Operator's Station)

- Start engine.
- Set PERSONNEL HEATER HI/LO switch OFF.

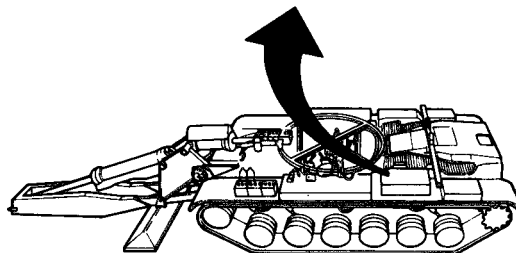
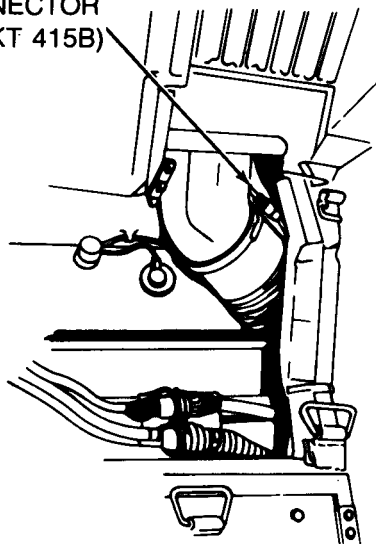
First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-226-10).
- Listen for static in radio helmet.

Did static stop when air cleaner blowers were disconnected (engine running)?

OPEN TOP DECK GRILLE DOORS
(LEFT SIDE)

CONNECTOR
(CKT 415B)



FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

26

- Check if static is caused by left air cleaner assembly.
- See Step 32 .

NO

YES

Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

27

Check if static is caused by generator.

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck)

- Reconnect rear accessory to bulkhead harness connectors to left and right air cleaner assemblies.
- Close top deck grille doors.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Start engine.

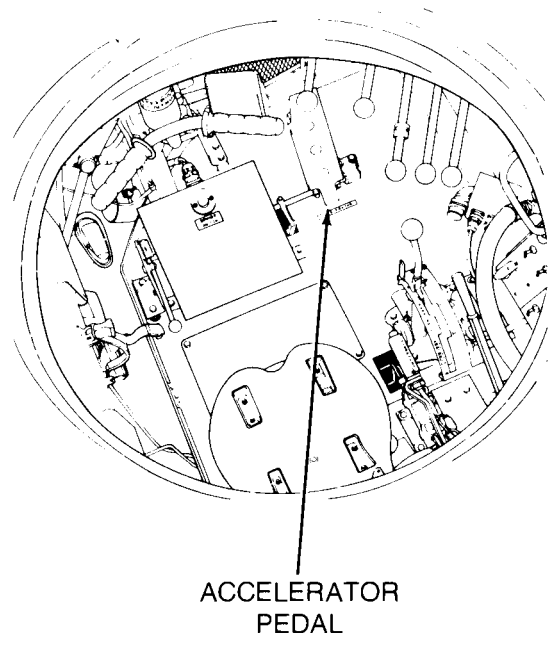
First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Second Technician (Operator's Station)

- Press accelerator pedal for a few seconds and release.

Does static sound like a whining noise that changes with engine speed?



28

- Turn off radio set (TM 5-5420-202-10).
- Stop engine.
- Notify support maintenance of EMI problem.



Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

29

Check if static is caused by defective ground strap on generator.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Stop engine.

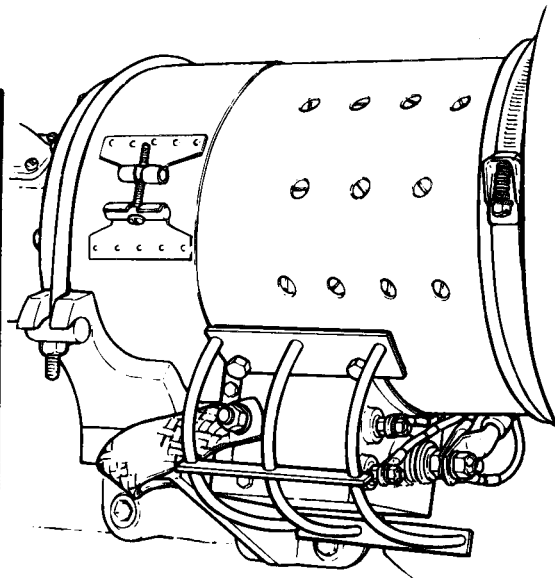
Both Technicians (Top Deck)

- Have powerplant removed (page 5-2).

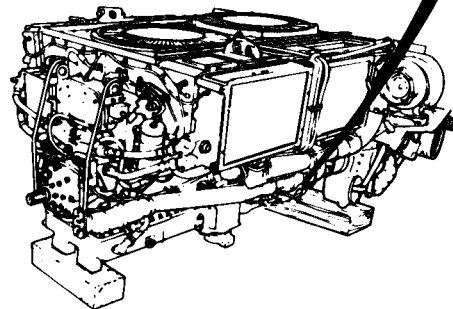
First Technician (Powerplant, Generator Side)

- Check generator for loose ground strap connections or damaged ground strap.

Are ground strap connections loose or ground strap damaged?



GROUND STRAP GENERATOR



POWERPLANT

30

Replace generator (page 10-6).

NO

31

Clean and tighten loose ground strap connection. If ground strap connections are not loose, replace damaged ground straps.

YES

Symptom-49
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

26

32

Check if static is caused by left air cleaner assembly.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck Grille Doors)

- Connect connector (CKT 415B) at left air cleaner assembly.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.
- Turn off radio set (TM 5-5420-202-10).

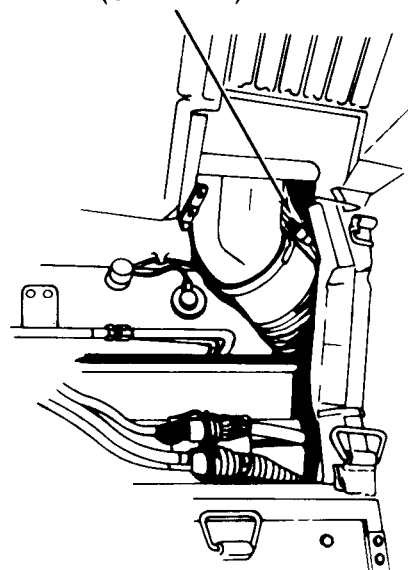
Second Technician (Operator's Station)

- Stop engine.

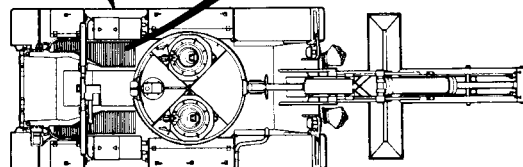
First Technician (Top Deck Grille Doors, Right Side)

OPEN TOP DECK GRILLE DOORS
(LEFT SIDE)

CONNECTOR
(CKT 415B)



LEFT AIR
CLEANER
ASSEMBLY



RIGHT AIR
CLEANER
ASSEMBLY

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

STEP **32** CONTINUED

● Connect connector (CKT 415B) at right air cleaner assembly.

● Close top deck grille doors.

Did static start when left air cleaner assembly was connected?

33

● Static caused by left air cleaner assembly - check if static is caused by loose ground connections.

● See Step **35** .

YES

NO

34

● Static caused by right air cleaner assembly - check if static is caused by loose ground connections.

● See Step **35** .

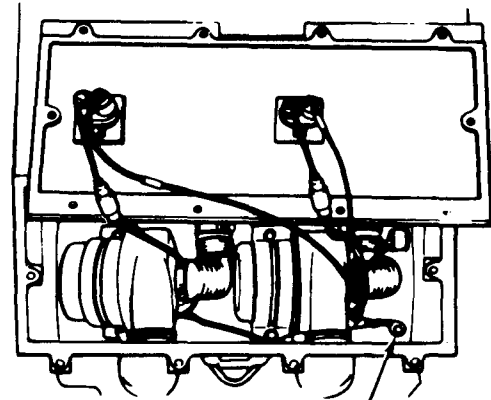
Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP

33 or 34

NOTE
This step is to be performed on the air cleaner assembly causing static. Electrical connections are the same on both left and right air cleaner assemblies.



35

Check if static is caused by loose ground connection.

First Technician (Air Cleaner Assembly Causing Static)

- Remove cover from air cleaner housing (page 7-98).
- Check if ground connection is loose.

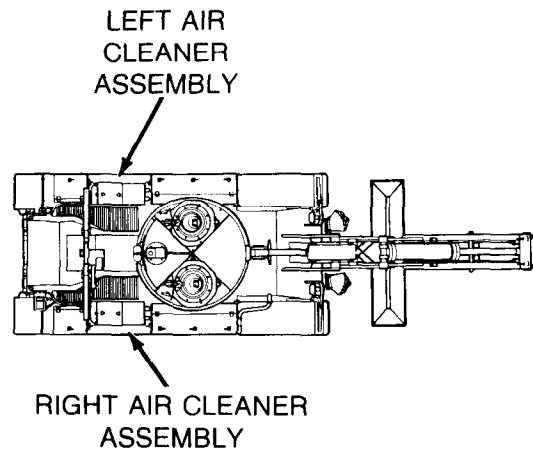
Is ground connection loose?

36

- Clean and tighten loose ground connection.
- Install air cleaner housing cover (page 7-100).

YES

NO



Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

37 Check if static is caused by left air cleaner centrifugal fan motor.

First Technician (Air Cleaner Assembly Causing Static)

- Disconnect fan motor power jumper lead connector (left side).

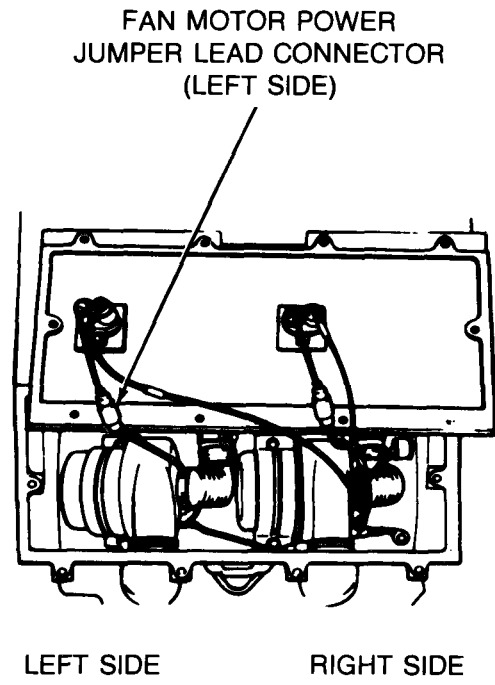
Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when left air cleaner centrifugal fan motor was disconnected?



38

- Replace air cleaner centrifugal fan motor (left side) (page 7-102).
- Turn off radio set.

YES

39

- Replace air cleaner centrifugal fan motor (right side) (page 7-102).
- Turn off radio set.

NO

The flowchart continues from step 37. A vertical line descends from the 'Did static stop...' question. A horizontal line branches off to the left, leading to step 38. From the bottom of step 38, a vertical line goes down to a 'YES' oval. From the bottom of step 39, a vertical line goes down to a 'NO' oval. Both 'YES' and 'NO' ovals have lines that merge back into the main vertical line, which then continues downwards.

Symptom-49

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)**

FROM STEP

10

40 Check if static is caused by personnel heater fuel pump.

First Technician (Front of Crew Compartment)

- Disconnect heater to basket disconnect harness connector from personnel heater fuel pump (CKT 402).

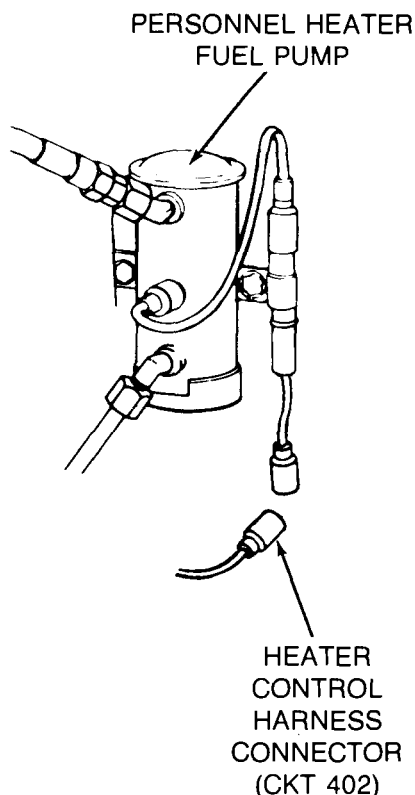
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-LO.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when personnel heater fuel pump was disconnected?



41

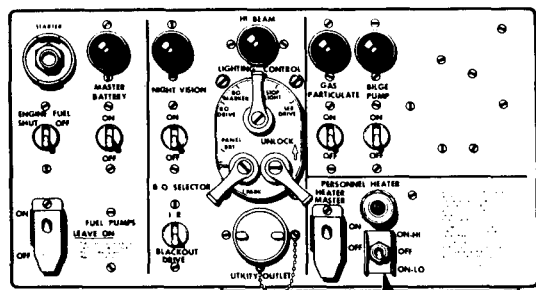
- Connect heater control harness (CKT 402) at fuel pump.
- Replace personnel heater (page 18-2).
- Turn off radio set.

NO

42

- Replace personnel heater fuel pump (page 18-23).
- Turn off radio set.

YES



MASTER CONTROL PANEL
PERSONNEL HEATER HI-LO SWITCH

Symptom-49
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

12

43 Check if static is caused by right fuel tank electrical fuel pump.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).
- Remove right-hand floor access cover (page 17-7).
- Remove access cover for right fuel pump radio interference suppression capacitor and housing assembly (page 10-316).
- Disconnect electrical connector from capacitor and housing assembly.

Second Technician (Operator's Station)

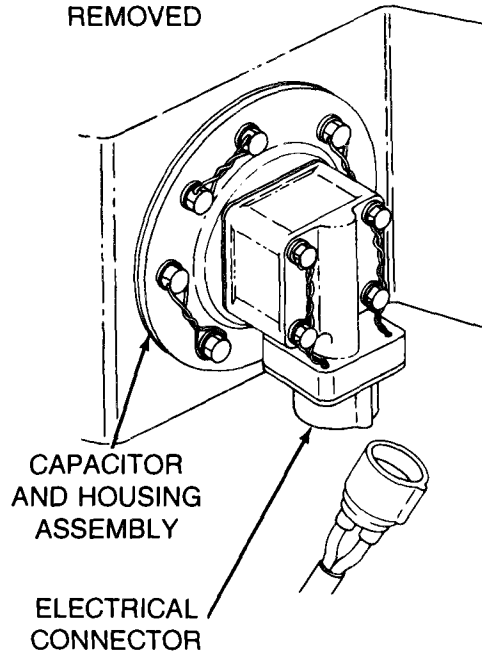
- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when right fuel tank electrical fuel pump was disconnected?

ACCESS COVER
REMOVED



44

- Turn off radio set (TM 5-5420 202-10).
- Replace right fuel tank fuel pump radio interference suppression capacitor and housing assembly (page 10-316).

YES NO

45

- Connect electrical connector to capacitor and housing assembly.
- Install capacitor and housing assembly access cover.
- Install floor access cover (page 17-7).
- Turn off radio set (TM 5-5420-202-10).
- Replace left fuel tank fuel pump radio interference suppression capacitor and housing assembly (page 10-326).

Symptom-50

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES

FRONT HULL DRAIN VALVE WILL NOT WORK.

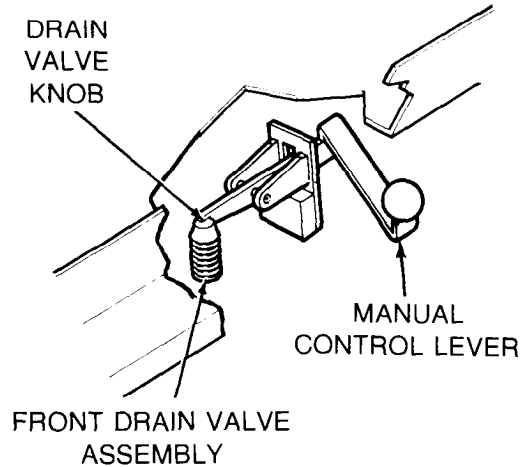
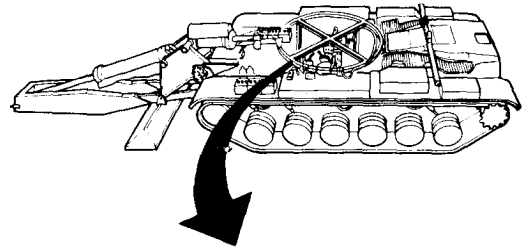
1 Check front drain valve and valve cage for binding or obstruction.

Technician (Front of Crew Compartment)

- Press down on front drain valve knob with thumbs and release.
- Repeat above step 3 or 4 times.
- Check if valve moves freely between CLOSED and OPEN positions and returns to CLOSED position when released.
- Check if valve is not obstructed from closing by foreign matter in valve.

Is valve binding or obstructed?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



2

- Remove, clean, and inspect front drain valve assembly (page 17-18).

YES

NO

3

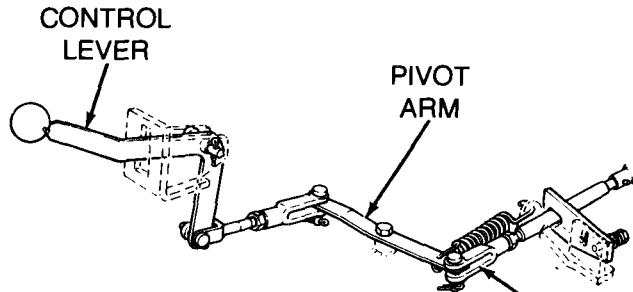
- Remove control lever (page 17-18).
- Clean control lever if rusted or corroded.
- Replace control lever if damaged (page 17-18).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES**

Symptom-51

REAR DRAIN VALVE WILL NOT WORK.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

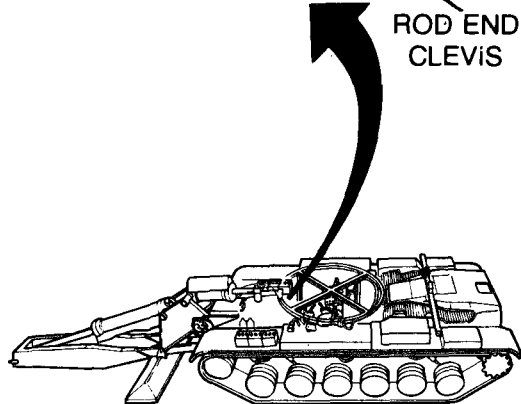


1 Check engine compartment drain valve control lever for binding.

Second Technician (Front of Crew Compartment)

- Disconnect rod end clevis from pivot arm (page 17-32).
- Operate rear hull drain valve control lever between OPEN and CLOSE positions.
- Check control lever and bracket for binding or obstruction.

Is drain valve control handle binding or obstructed?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

2 Remove, disassemble and inspect rear drain valve control lever assembly (page 17-57).

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)**

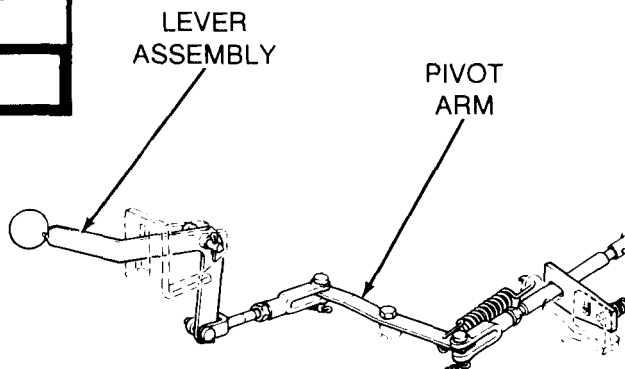
Symptom-51

3 Check rear drain valve control lever and pivot arm for damaged or missing parts.

Second Technician (Front of Crew Compartment)

- Visually check lever assembly for damaged or missing parts.
- Visually check pivot arm for damaged or missing parts.

Are any parts missing or damaged?



NO

YES

4

- Replace damaged or missing parts.
- Reconnect rod end clevis to pivot arm.

TA250439

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)**

Symptom-51

5 Check rear drain valve connecting rods for obstructions.

Second Technician (Front of Crew Compartment)

- Connect rod end clevis to pivot arm (page 17-36).

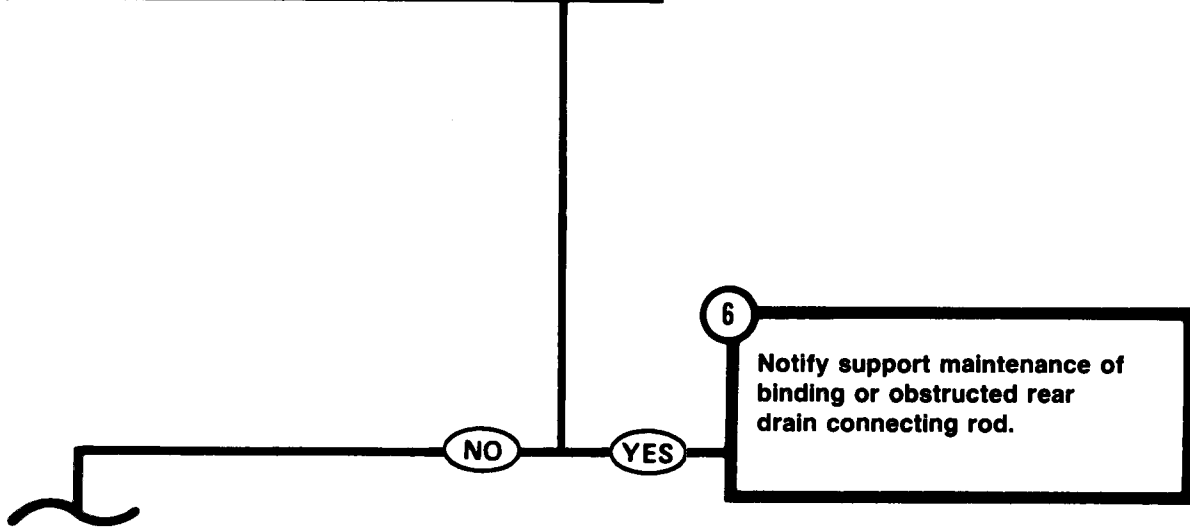
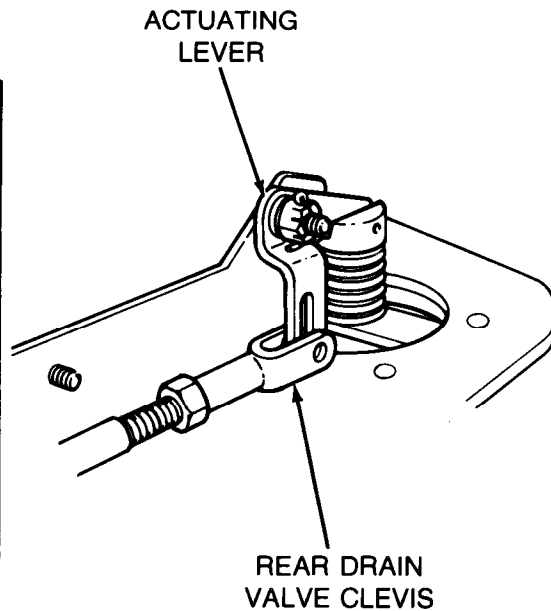
First Technician (Engine Compartment)

- Disconnect rear drain valve clevis from actuating lever (page 17-48).

Second Technician (Front of Crew Compartment)

- Move valve control lever between OPEN and CLOSE positions and check for binding or obstruction.

Is connecting rod obstructed?



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)**

Symptom-51

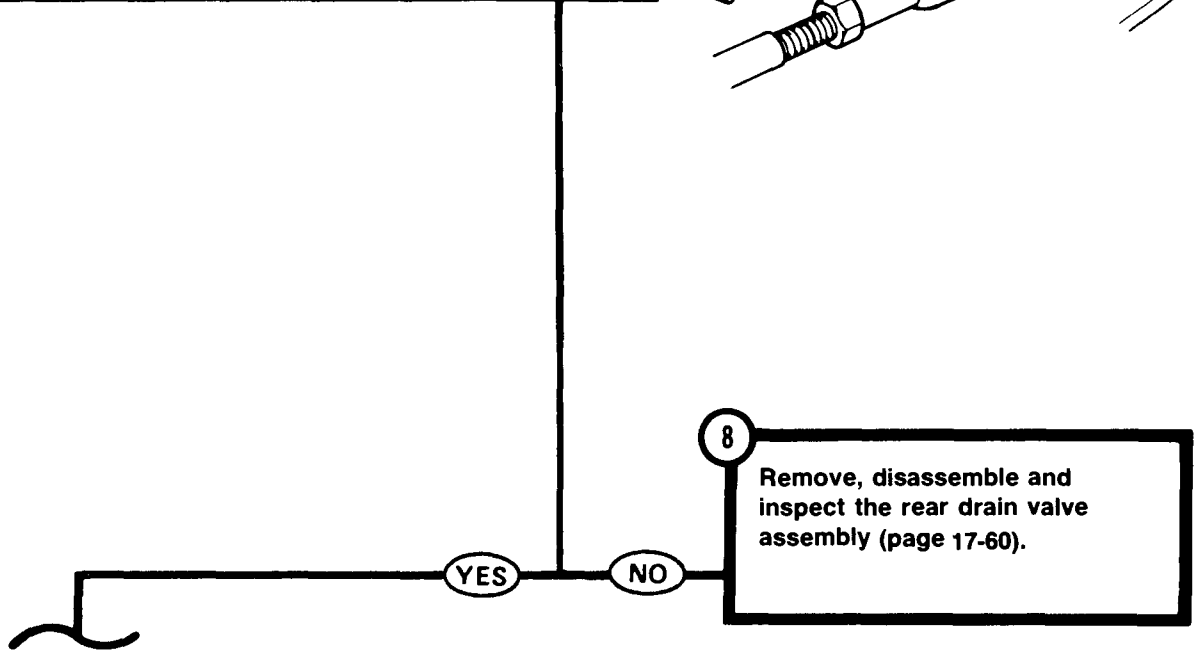
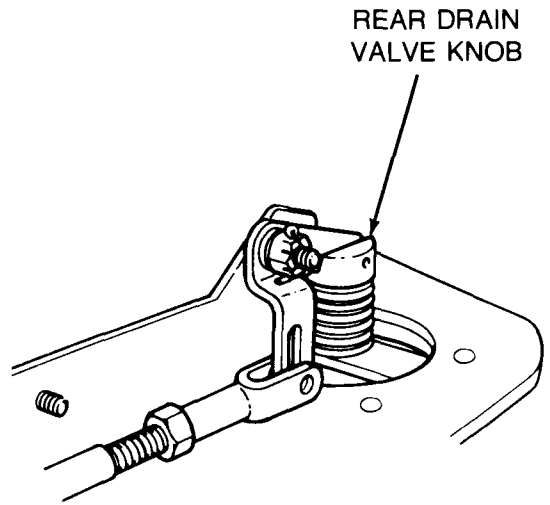
7

Check that rear drain valve will open and close.

First Technician (Engine Compartment)

- Press down rear drain valve knob with thumbs and release.
- Repeat two or three times and check if rear drain valve is moving freely.

Will rear drain valve open and close?



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)**

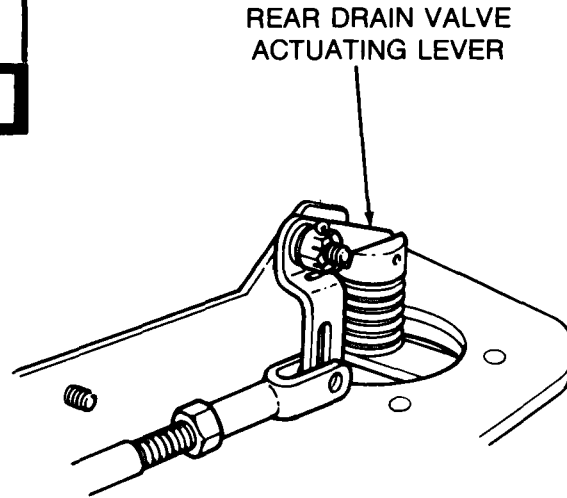
Symptom-51

9 Check that rear drain valve actuating lever is not obstructed.

First Technician (Engine Compartment)

- Operate rear drain valve by moving actuating lever by hand.
- Check if actuating lever moves freely.

Is actuating lever binding or obstructed?



10 Remove, disassemble and inspect rear drain valve actuating lever (page 17-57).

NO

11 Perform rear drain valve linkage adjustment (page 17-65).

YES

TA250442

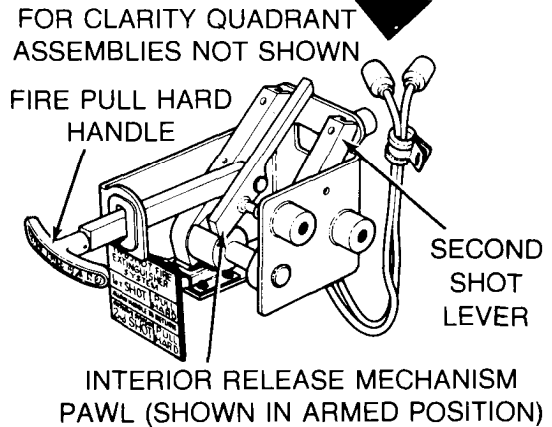
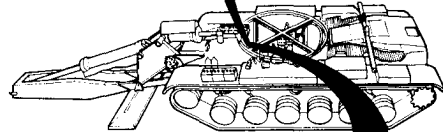
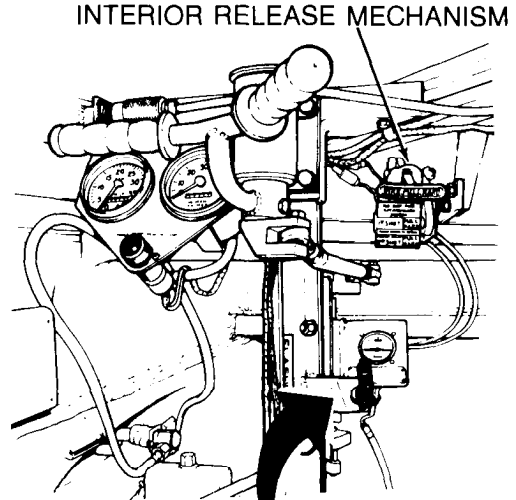
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS**

Symptom-52

FIXED FIRE EXTINGUISHER FAILS TO OPERATE WHEN FIRE PULL HARD HANDLE IS PULLED

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE
Two different control valves have been used on the fire extinguisher. Although different in appearance check out is identical.



1 Check interior release mechanism for binding in first shot cycle.

- First Technician (Operator's Station)
- Remove interior release mechanism (page 20-23).
 - Arm release mechanism if not armed for first shot, by pulling FIRE PULL HARD handle all the way out, holding pawl down and pushing handle all the way in.
 - Pull interior FIRE PULL HARD handle and observe action of interior release mechanism, pawl should go into the vertical position. Hold second shot lever to make sure it does not move.
 - Push FIRE PULL HARD handle in all the way.

Did first shot mechanism work freely without binding?

2 Repair interior release mechanism (page 20-28).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

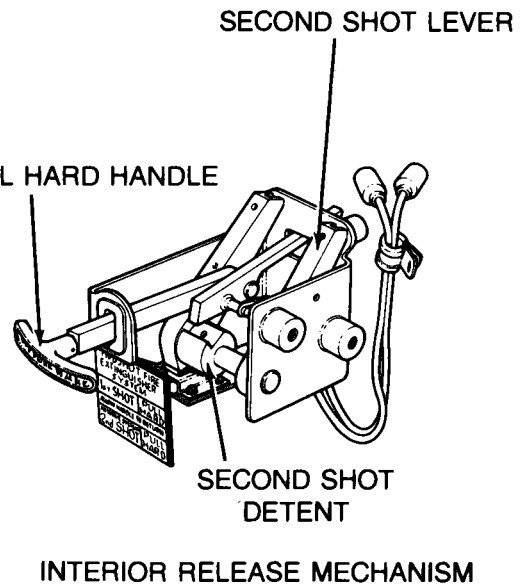
Symptom-52

3 Check interior release mechanism for binding in second shot position.

First Technician (Operator's Station)

- Check if mechanism is ready for second shot with bottom part of pawl in second shot detent.
- Pull FIRE PULL HARD handle and observe action of second shot mechanism, second shot lever should move as handle is pulled.

Did second shot mechanism work freely without binding?



4 Repair interior release mechanism (page 20-28).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

Symptom-52

5 Check first shot control valve for extension of pin by using handle on control valve.
First Technician (Operator's Station)

NOTE

Do not install lead seals on interior release mechanism at this time.

- Install interior release mechanism (page 20-25).
- Second Technician (Front of Crew Compartment)
- Disconnect both control valves (page 20-2).
 - Return first shot control valve to SET position, if not in SET position, by aligning arrow on shaft with arrow on control valve.
 - Remove safety pin and rotate handle on valve clockwise until it stops.
 - Observe pin at the bottom of the valve for extension of 1/8 inch (.3175 cm).

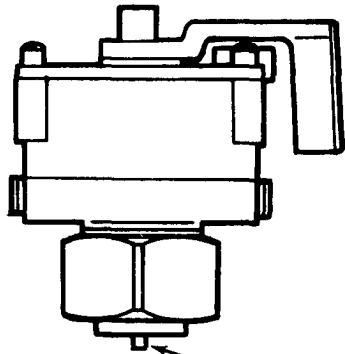
Did the valve operate freely and extend the pin?

6

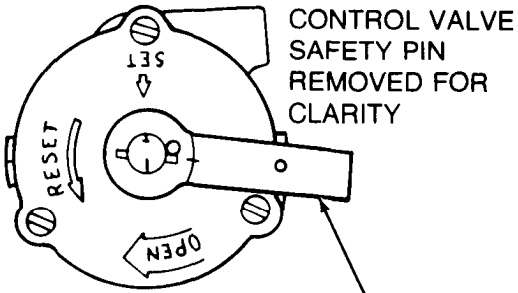
- Repair first shot control valve (page 20-50).
- Install safety wire and lead seal on interior release

NO

YES



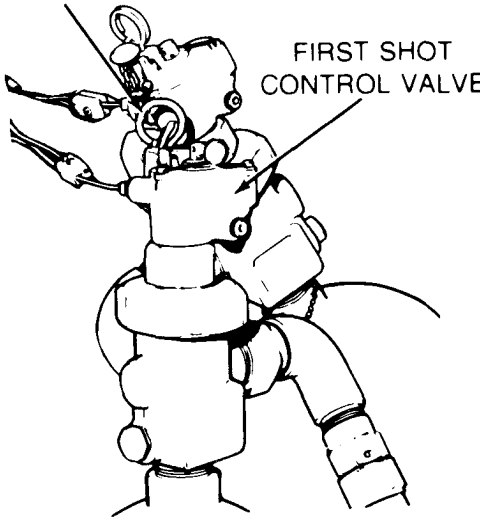
PIN



CONTROL VALVE SAFETY PIN REMOVED FOR CLARITY

HANDLE

CONTROL VALVE SAFETY PIN



FIRST SHOT CONTROL VALVE

Symptom-52

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

-CAUTION-
Do not engage control valve mounting nut to cylinder while doing this check.

7 Check operation of first shot control valve when FIRE PULL HARD handle is pulled.

Second Technician (Front of Crew Compartment)

- Return first shot control valve to set position.
- Hold control valve away from and above first shot cylinder.

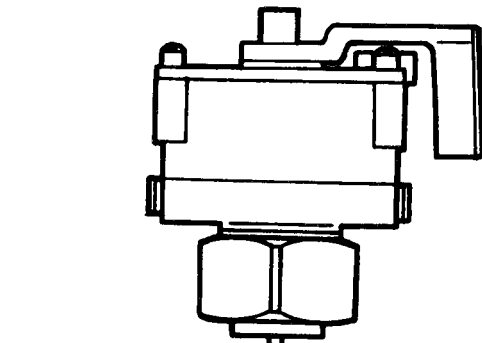
First Technician (Operator's Station)

- Pull FIRE PULL HARD handle.

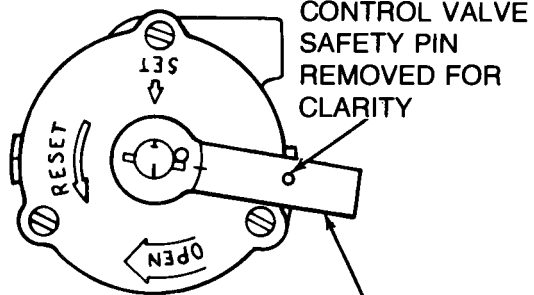
Second Technician (Front of Crew Compartment)

- Check if pin in control valve did extend.

Did pin in control valve extend?



PIN



CONTROL VALVE SAFETY PIN REMOVED FOR CLARITY

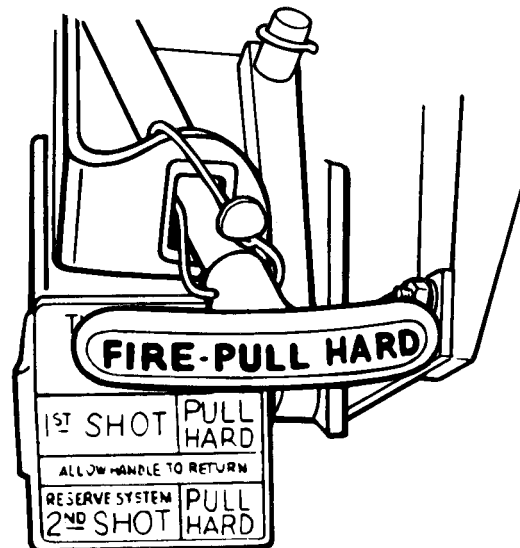
HANDLE

8

- Replace first shot control cable between interior release mechanism and control valve (page 20-16).
- Install safety wire and lead seal on interior release mechanism

NO

YES



TA250446

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

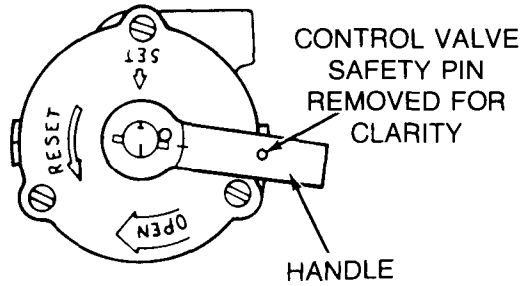
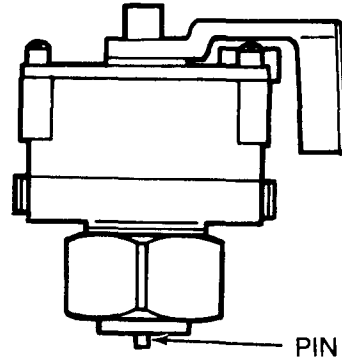
Symptom-52

9 Check second shot control valve for extension of pin when control valve handle is turned.

Second Technician (Front of Crew Compartment)

- Return second shot control valve to SET position, if not in SET position.
- Remove control valve safety pin and turn handle on valve clockwise until it stops.
- Check if pin on bottom of control valve extends 1/8 inch (.3175 cm).

Did control valve operate freely and extend the pin 1/8 inch (.3175 cm)?



10

- Repair second shot control valve (page 20-50).
- Install safety wire and lead seal on interior release mechanism.

NO

YES

CONTROL VALVE SAFETY PIN

SECOND SHOT CONTROL VALVE



Symptom-52

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

--CAUTION--
Do not engage control valve mounting nut to cylinder while doing this check.

11 Check operation of second shot control valve when FIRE PULL HARD handle is pulled.

Second Technician (Front of Crew Compartment)

- Return second shot control valve to set position.
- Hold control valve in position above second shot cylinder.

First Technician (Operator's Station)

- Pull FIRE PULL HARD handle.

Second Technician (Front of Crew Compartment)

- Check if pin in control valve did extend.
- Return first and second shot control valves to SET position.

First Technician (Operator's Station)

- Arm release mechanism for first shot.

Did pin in the control valve extend?

13

- Replace fire extinguisher cylinders (page 20-52).
- Install safety wire and lead seals on interior release mechanism
- Install safety wire and lead seals on first shot and second shot control valves

YES NO

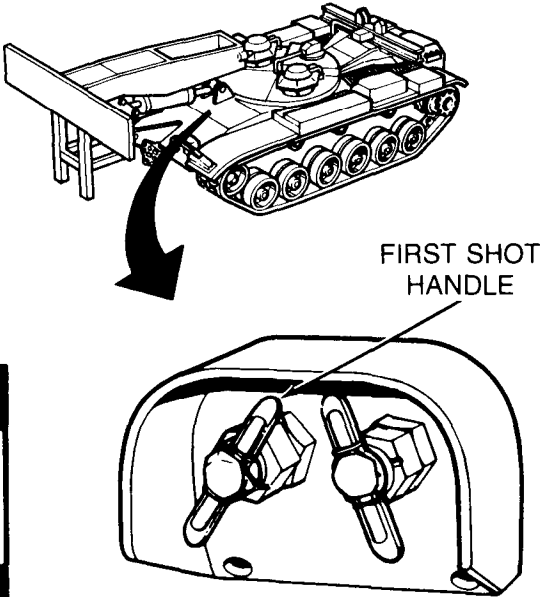
12 Replace second shot cable between FIRE PULL HARD handle and control valve (page 20-16).

**Symptom-53 DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS**

FIXED FIRE EXTINGUISHER FAILS TO OPERATE WHEN EXTERIOR FIRST SHOT OR SECOND SHOT HANDLES ARE PULLED.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE
Two different control valves have been used on the fire extinguisher. Although different in appearance check out is identical.



1 Check if second shot handle was pulled.
Second Technician (Front of Vehicle)

- Visually check second shot handle for broken safety seal.

Was second shot handle pulled?

2 See Step 12 .

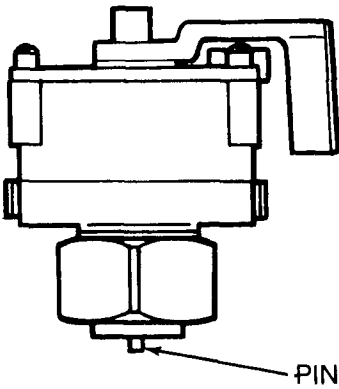
3 Check first shot exterior handle for operation.
First Technician (Front of Crew Compartment)

- Disconnect first shot control valve (page 20-2).
- Hold control valve away from and above first shot cylinder.

Second Technician (Front of Vehicle)

- Pull first shot exterior handle.
- Check if first shot handle operates freely.

Did first shot exterior handle operate freely?



4 Replace cable between first shot exterior handle and first shot control valve (page 20-16).

Symptom-53

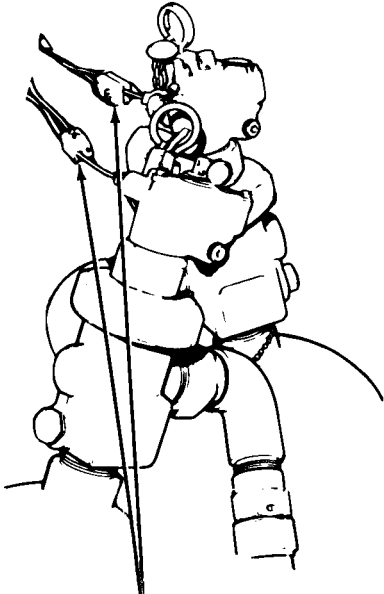
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

5 Check first shot exterior cable connections at control valve for tightness.

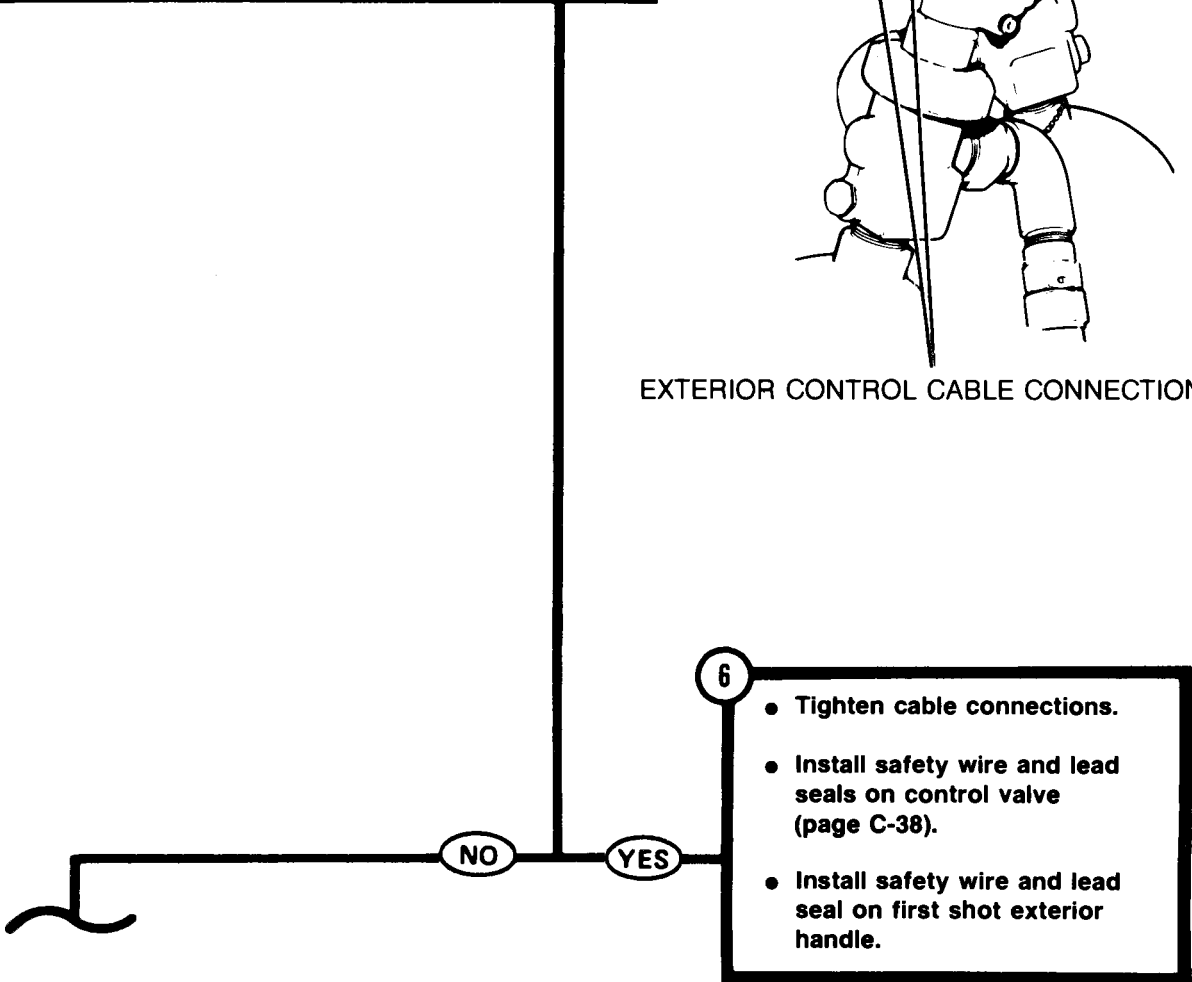
First Technician (Front of Crew Compartment)

- Hold control valve and pull hard on cables and cable connections to see if they are loose.

Are cable connections loose?



EXTERIOR CONTROL CABLE CONNECTIONS



6

- Tighten cable connections.
- Install safety wire and lead seals on control valve (page C-38).
- Install safety wire and lead seal on first shot exterior handle.

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

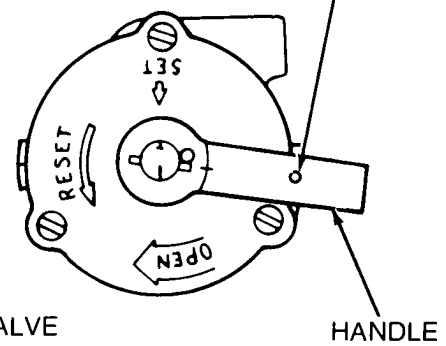
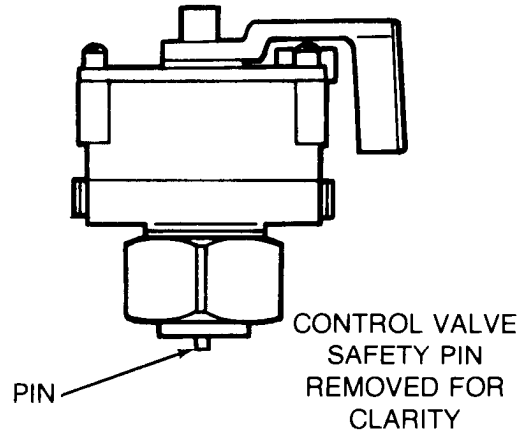
Symptom-53

7 Check first shot control valve for extension of pin by using handle on control valve.

First Technician (Front Crew Compartment)

- Return first shot control valve to SET position.
- Remove safety pin and rotate handle on valve clockwise until it stops.
- Observe pin at the bottom of the valve for extension of 1/8 inch (.3175 cm).

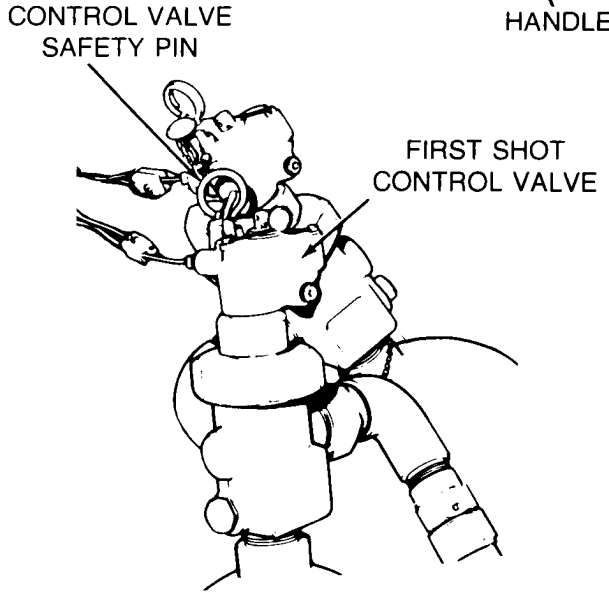
Did the valve operate freely and extend the pin?



8

- Repair first shot control valve (page 20-50).
- Install safety wire and lead seal on first shot exterior handle.

NO



YES

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

CAUTION
Do not engage control valve mounting nut to cylinder while doing this check.

9 Check operation of first shot control valve when exterior first shot handle is pulled.

First Technician (Front of Crew Compartment)

- Return first shot control valve to set position.
- Hold control valve away from and above first shot cylinder.

Second Technician (Front of Vehicle)

- Pull first shot exterior handle.

First Technician (Front of Crew Compartment)

- Check if pin in control valve did extend.

Did pin in control valve extend?

10

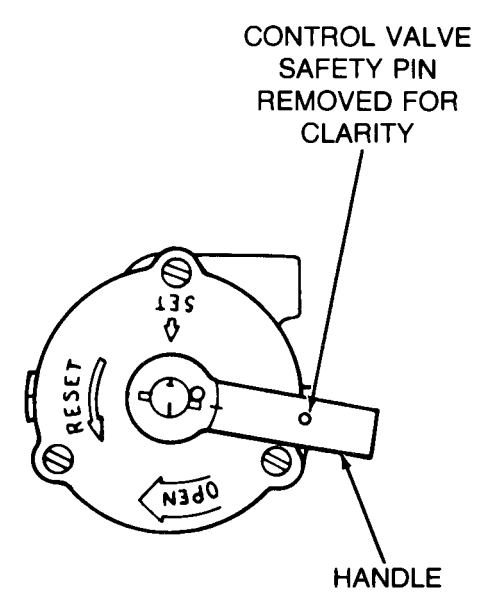
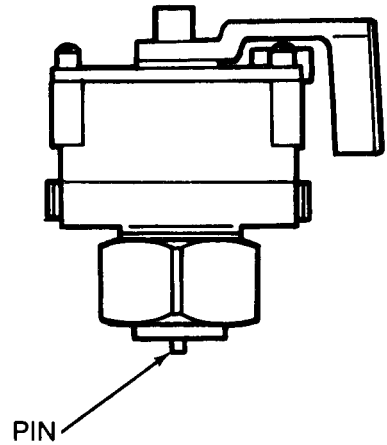
- Repair first shot control valve (page 20-50).
- Install safety wire and lead seals on first shot exterior handle.

NO

11

- Replace fire extinguisher cylinder (page 20-52).
- Install safety wire and lead seal on first shot exterior handle.
- Install safety wire and lead seals on first shot control valve.

YES



TA250452

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

FROM STEP

2

12

Check second shot exterior handle for operation.

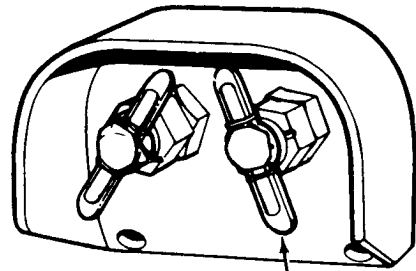
First Technician (Front of Crew Compartment)

- Disconnect second shot control valve (page 20-2).
- Hold control valve away from and above second shot cylinder.

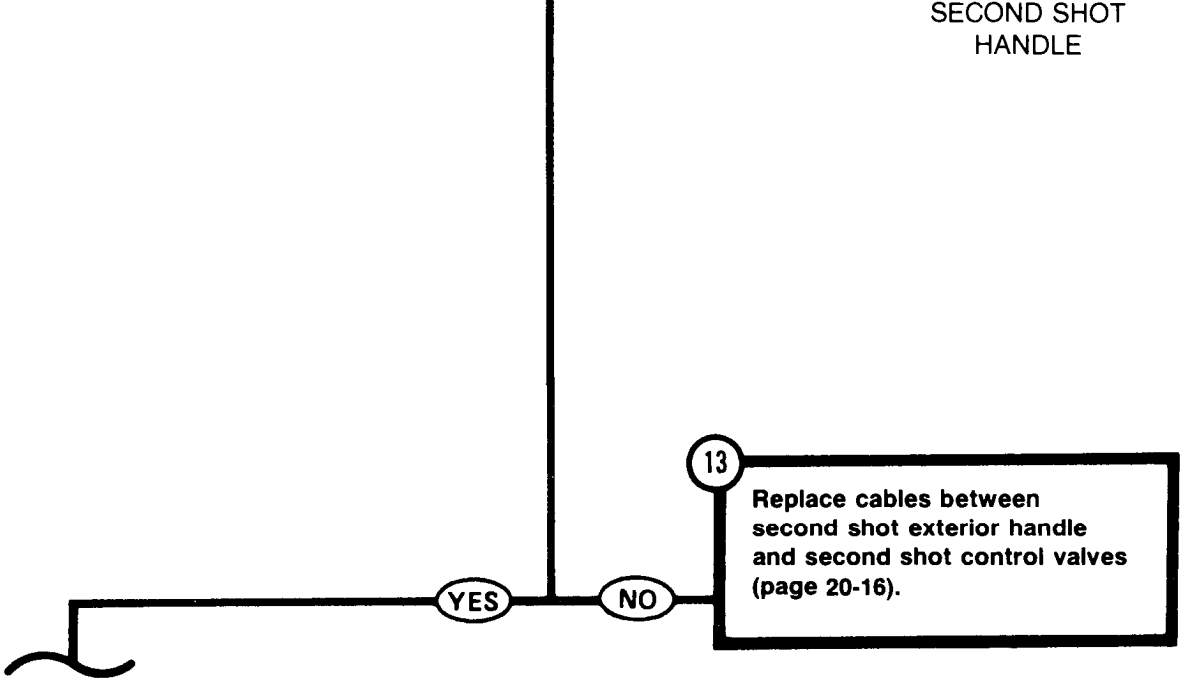
Second Technician (Front of Vehicle)

- Pull second shot exterior handle.
- Check if second shot exterior handle operates freely.

Did second shot exterior handle operate freely?



SECOND SHOT
HANDLE



Symptom-53

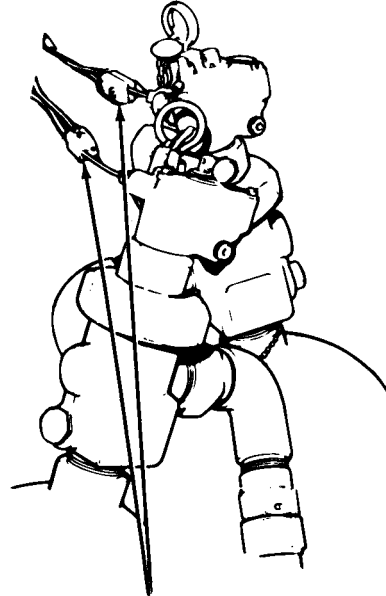
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

14 Check second shot exterior cable connections at control valve for tightness.

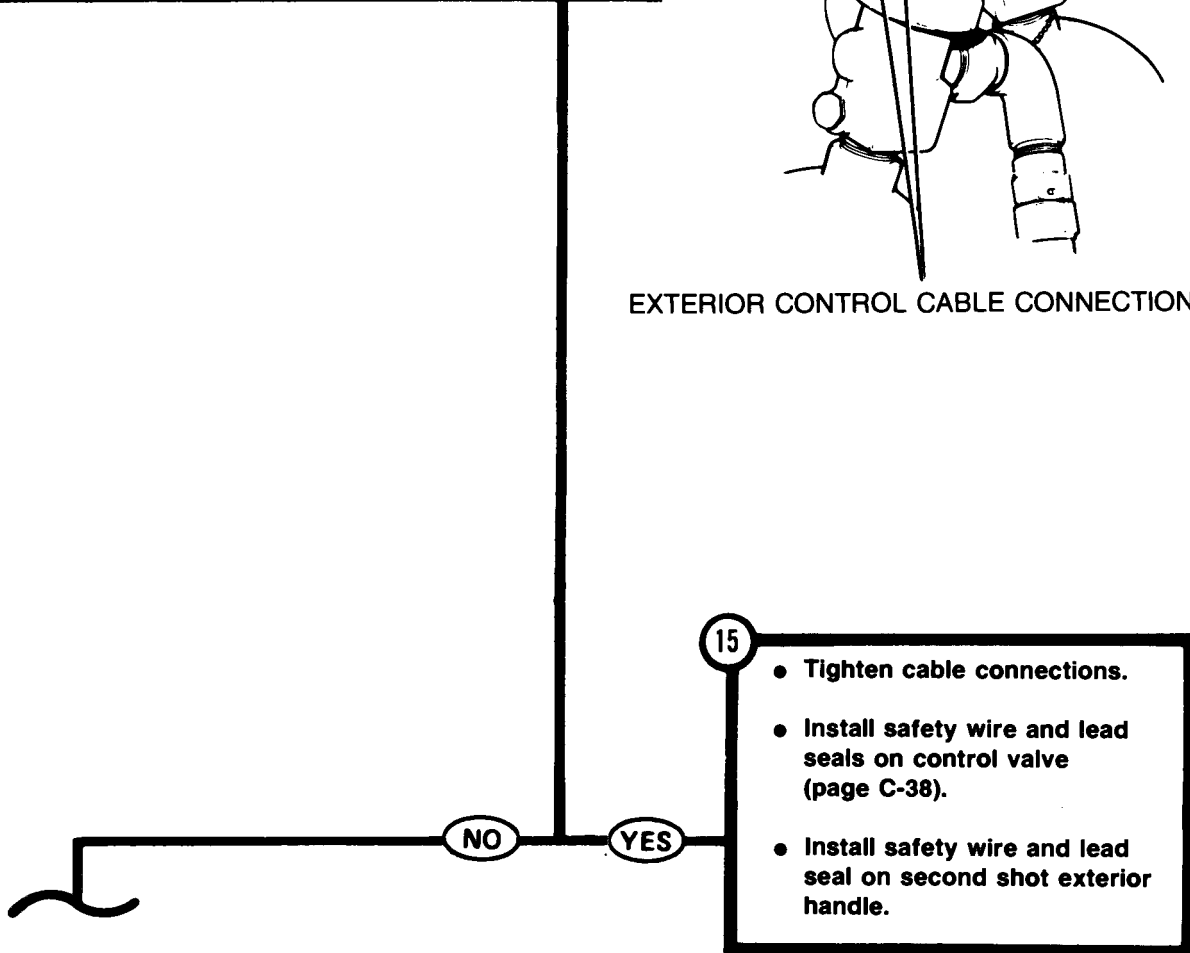
First Technician (Front of Crew Compartment)

- Hold control valve and pull hard on cables and cable connections to see if they are loose.

Are cable connections loose?



EXTERIOR CONTROL CABLE CONNECTIONS



15

- Tighten cable connections.
- Install safety wire and lead seals on control valve (page C-38).
- Install safety wire and lead seal on second shot exterior handle.

TA250454

Symptom-53

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)**

16 Check second shot control valve for extension of pin by using handle on control valve.

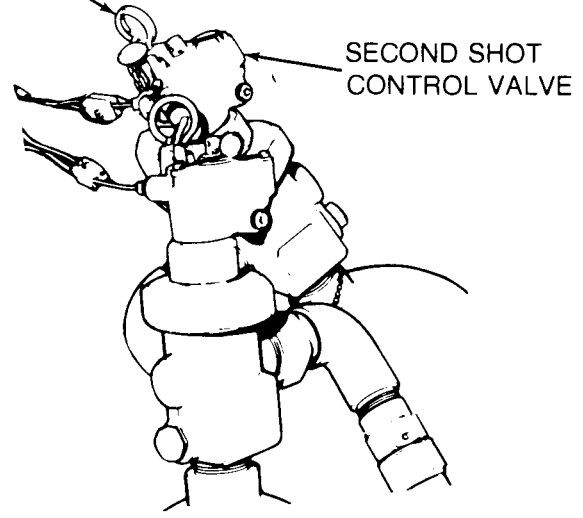
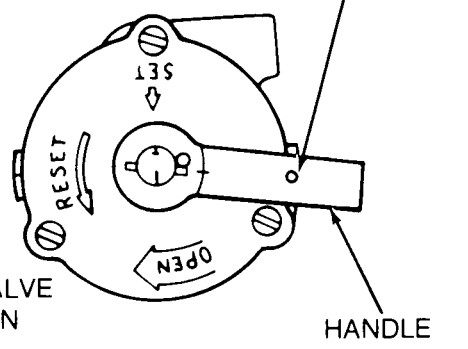
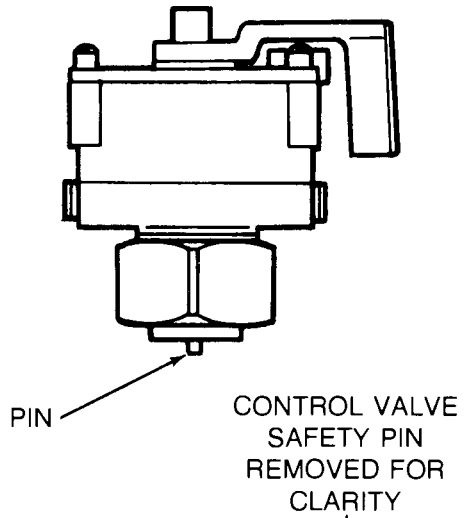
First Technician (Front of Crew Compartment)

- Return second shot control valve to SET position.
- Remove safety pin and rotate handle on valve clockwise until it stops.
- Observe pin at the bottom of the valve for extension of 1/8 inch.

Did the valve operate freely and extend the pin?

17

- Repair second shot control valve (page 20-50).
- Install safety wire and lead seal on second shot exterior handle.



Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

CAUTION
Do not engage control valve mounting nut to cylinder while doing this check.

18 Check operation of second shot control valve when exterior second shot handle is pulled.

First Technician (Front of Crew Compartment)

- Return second shot control valve to SET position.
- Hold valve away from and above second shot cylinders.

Second Technician (Front of Vehicle)

- Pull second shot exterior handle.

First Technician (Front of Crew Compartment)

- Check if pins in control valves did extend.

Did pins in control valves extend?

19

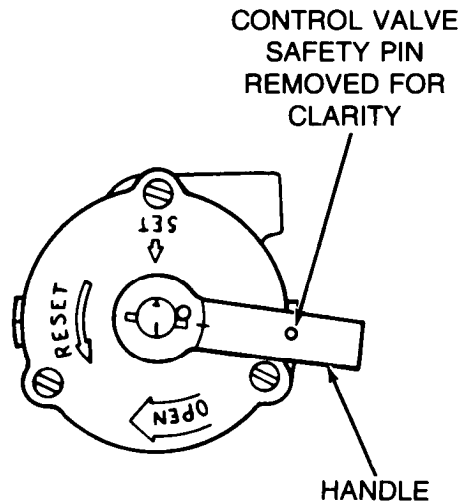
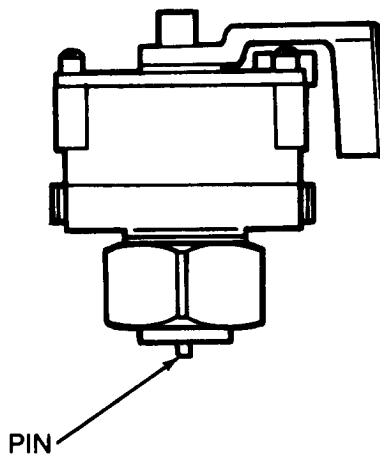
- Repair second shot control valve (page 20-50).
- Install safety wire and lead seal on second shot exterior handle.

NO

20

- Replace fire extinguisher cylinder (page 20-52).
- Install safety wire and lead seal on second shot exterior handle.
- Install safety wire and lead seal on second shot control valve.

YES



DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER

Symptom-54

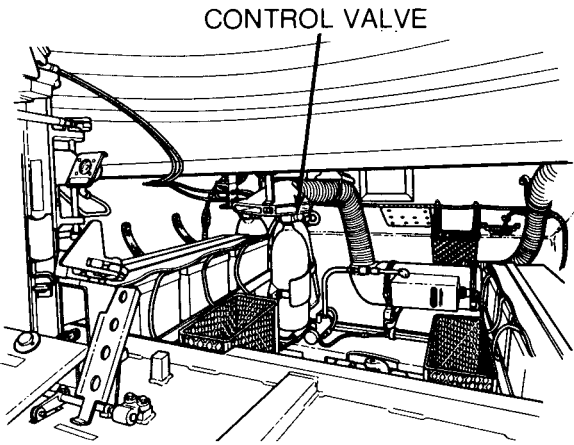
ENGINE DOES NOT STOP RUNNING WHEN FIRE PULL HARD HANDLE IS PULLED (ENGINE FUEL SHUT OFF SWITCH ON MASTER CONTROL PANEL WILL WORK).

CAUTION

The control valve on each of three fire extinguisher cylinders must be removed to avoid firing system.

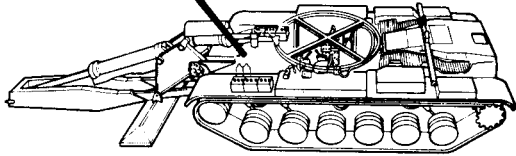
NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



FRONT OF CREW COMPARTMENT

- 1** Listen for fire extinguisher relay to work when FIRE-PULL HARD interior control handle is pulled.
- Second Technician (Front of Crew Compartment)
- Remove control valves from each of three fire extinguisher cylinders (page 20-2).



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

Symptom-54

STEP **1** CONTINUED

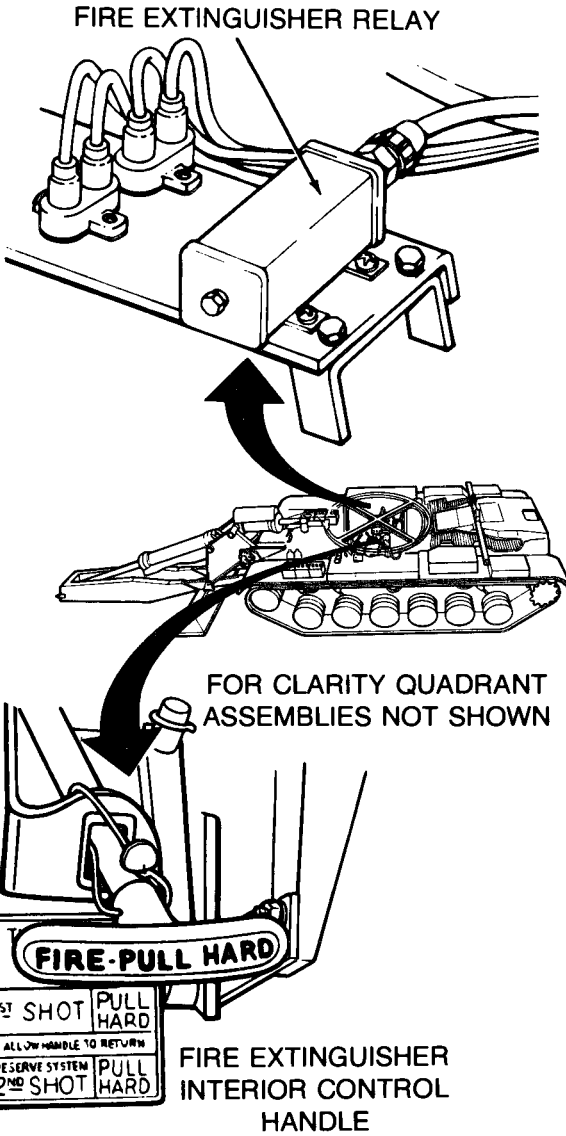
First Technician (Commander's Station)

- Remove right-hand floor access cover (page 17-7).
- Listen for click sound from fire extinguisher relay when **FIRE-PULL HARD** interior control handle is pulled and another click 10 seconds later.

Second Technician (Operator's Station)

- Pull **FIRE-PULL HARD** interior control handle and release it.

Did relay close and stay closed for a minimum of 10 seconds?



2

- Check front accessory harness (CKT 975A, 54A) for continuity from bulkhead connector to connector at fire extinguisher relay.

● See Step **10** .

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

Symptom-54

3 Check front accessory harness (CKT 975) at fire extinguisher relay for electrical power.
Second Technician (Front of Crew Compartment)

WARNING

When disconnected, do not allow battery ground straps to come into contact with any metal surface.

- Disconnect three battery ground straps (page 10-268).

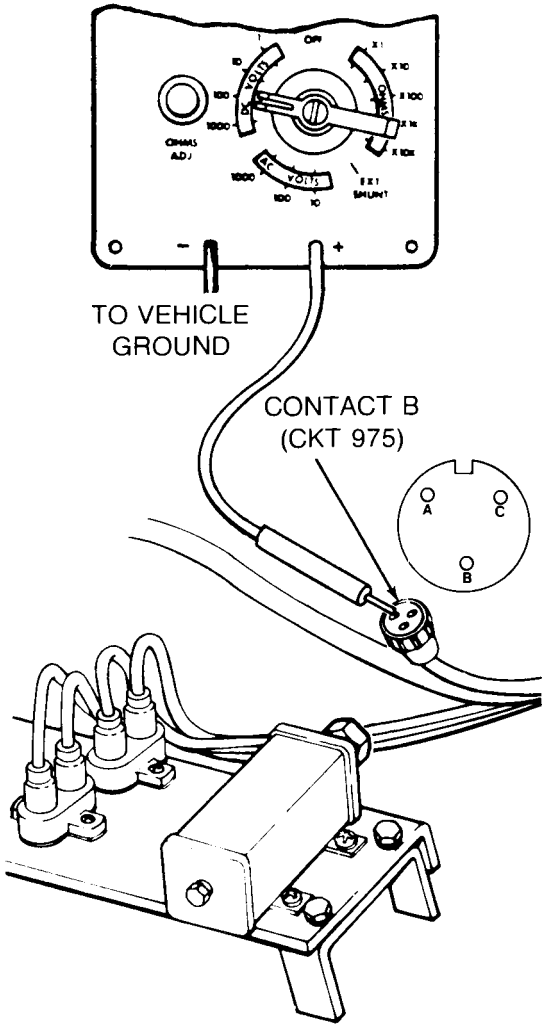
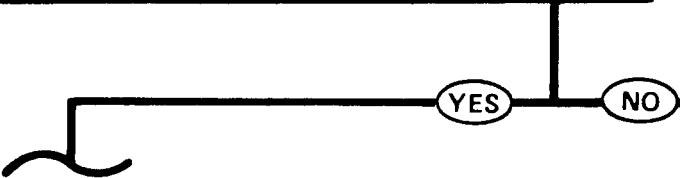
First Technician (Commander's Station)

WARNING

Use extreme care when working with circuit 975. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

- Disconnect front accessory harness connector from fire extinguisher relay.
- Connect battery ground straps (page 10-268).
- Connect red probe of meter to contact B (CKT 975) at front accessory harness connector for fire extinguisher relay and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4

- Check fire extinguisher relay circuit breaker for continuity.

See Step 13 .

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

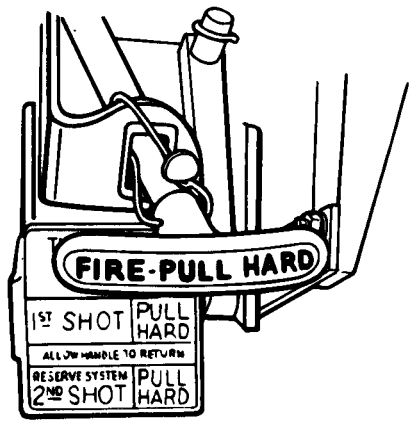
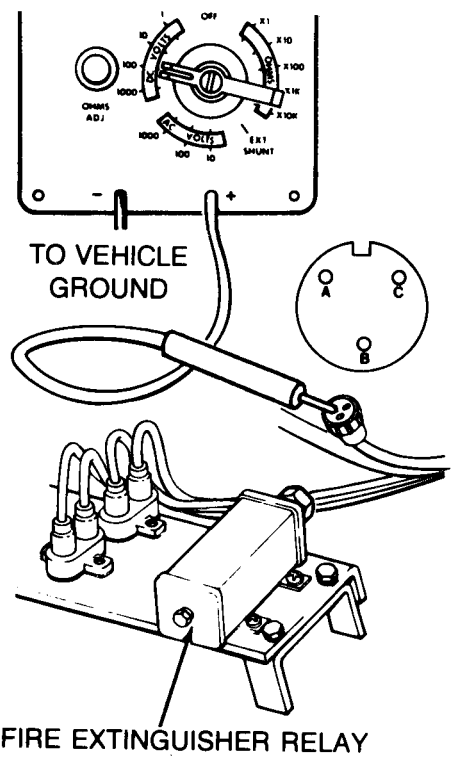
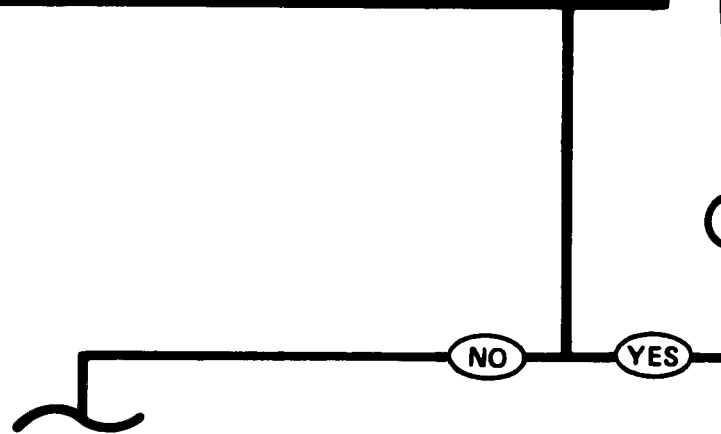
Symptom-54

5 Check contact C (CKT 975) of front accessory harness connector at fire extinguisher relay for electrical power.
First Technician (Commander's Station)

WARNING
Use extreme care when working with circuit 975. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

- Connect red probe of meter to contact C (CKT 975) at front accessory harness connector for fire extinguisher relay and black probe to ground.
 - Check if meter indicates 18 to 30 volts dc when FIRE-PULL HARD interior control handle is pulled.
- Second Technician (Operator's Station)
- Slowly pull FIRE-PULL HARD interior control handle to close microswitch located in handle release mechanism.

Does meter indicate 18 to 30 volts dc?



6 Replace fire extinguisher relay (page 10-158).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

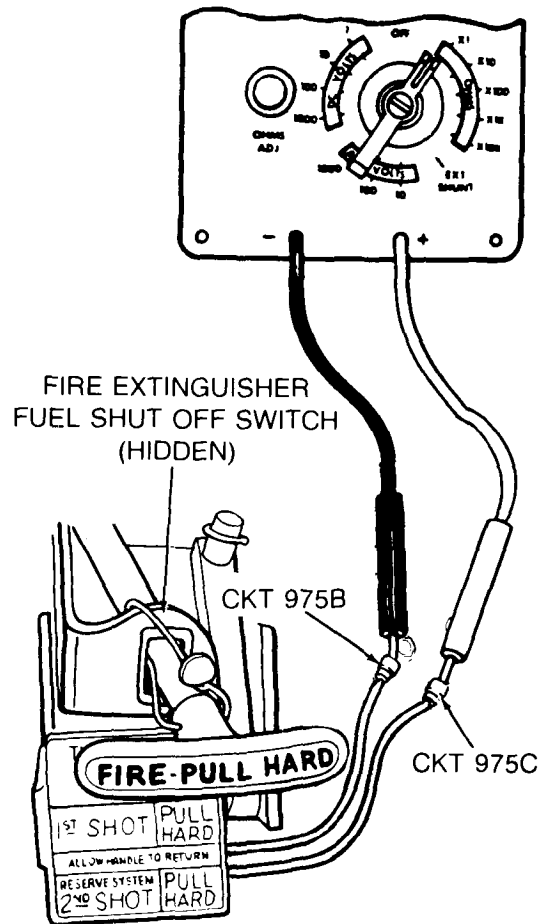
Symptom-54

7 Check fire extinguisher fuel shut off switch for continuity.
Second Technician (Front of Crew Compartment)

WARNING

When disconnected, do not allow battery ground straps to come into contact with any metal surface.

- Disconnect three battery ground straps (page 10-268).
- First Technician (Commander's Station)
- Connect front accessory harness connector to fire extinguisher relay.
- Second Technician (Operator's Station)
- Disconnect two connectors (CKT 975) from fire extinguisher fuel shut off switch leads.
 - Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
 - Connect probes of meter to contacts of switch leads.



Symptom-54

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

STEP **7** CONTINUED

- Slowly pull FIRE-PULL HARD interior control handle to close microswitch located in handle release mechanism.
- Check if meter indicates continuity when fire extinguisher handle is pulled.

Does meter indicate continuity?

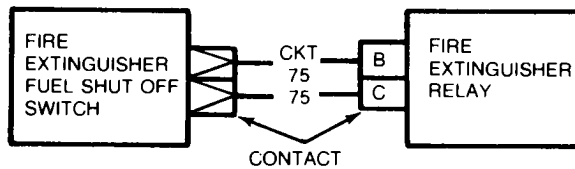
8

- Adjust FIRE PULL HARD handle to close microswitch (page 20-39).
- If this does not correct the problem, replace switch (page 20-29).

NO YES

9

- Inspect front accessory harness for bent or broken connector contacts or loose CKT 975 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad front accessory harness.
- Connect two connectors (CKT 975) to fire extinguisher fuel shutoff switch leads.
- Connect three battery ground straps (page 10-268).



TA250462

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

Symptom-54

FROM STEP

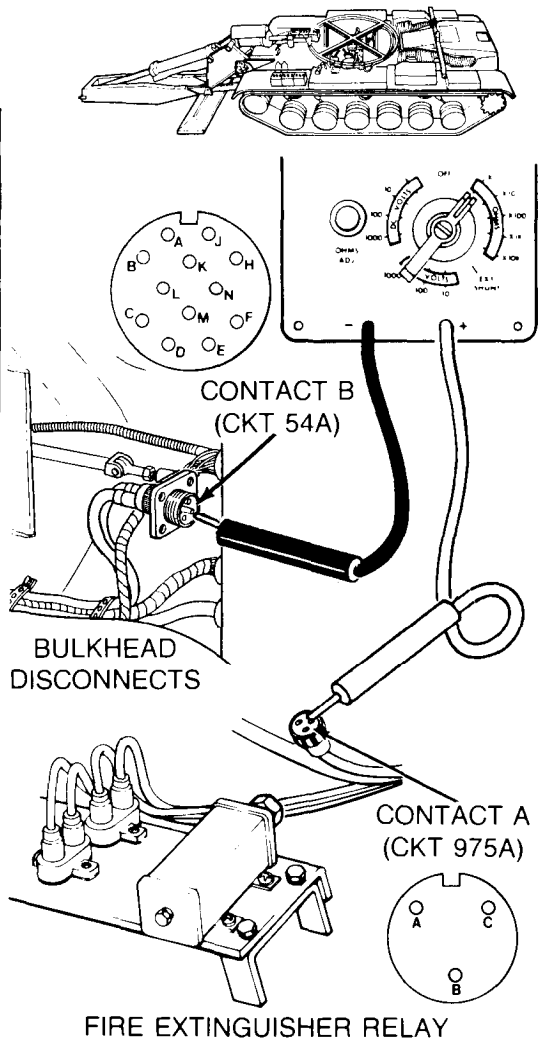
2

10 Check front accessory harness (CKT 975A, 54A) for continuity from bulkhead connector to connector at fire extinguisher relay.

WARNING
When disconnected, do not allow battery ground straps to come into contact with any metal surface.

- Second Technician (Front of Crew Compartment)
- Disconnect three battery ground straps (page 10-268).
- First Technician (Commander's Station)
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
 - Displace front accessory harness connector (CKT 54A) from bulkhead disconnect (page 10-269).
 - Disconnect front accessory harness connector from fire extinguisher relay.
 - Connect black probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

Symptom-54

STEP **10** CONTINUED

- Connect red probe of meter to contact A (CKT 975A) at front accessory harness connector to fire extinguisher relay.
- Check if meter indicates continuity.

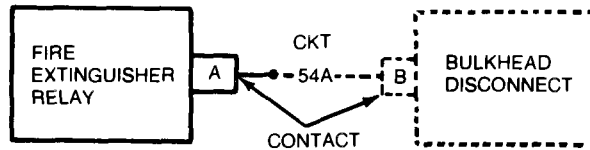
Does meter indicate continuity?

11

- Inspect front accessory harness for bent or broken connector contacts or loose CKT 975A/54A wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad front accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Connect front accessory harness connector at fire extinguisher relay.
- Connect three battery ground straps (page 10-268).

12

- Replace fire extinguisher relay (page 10-158).
- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Connect three battery ground straps (page 10-268).



TA250464

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

Symptom-54
FROM STEP

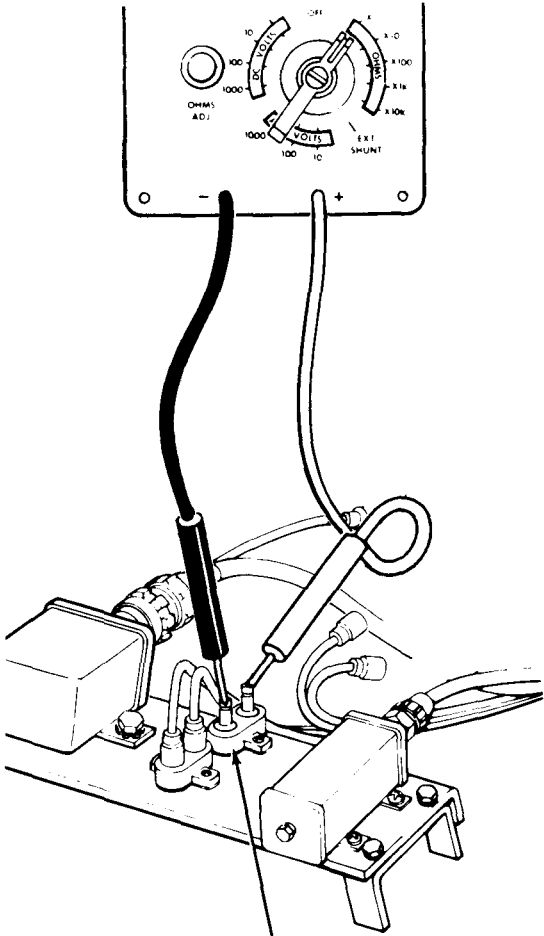
4

13 Check fire extinguisher relay circuit breaker for continuity.
Second Technician (Front of Crew Compartment)

WARNING
When disconnected, do not allow battery ground straps to come into contact with any metal surface.

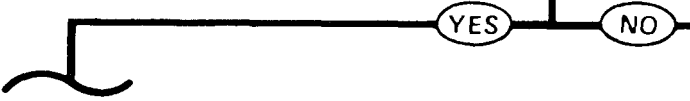
- Disconnect three battery ground straps (page 10-268).
- First Technician (Commander's Station)
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
 - Disconnect two harness connectors (CKT 975) from fire extinguisher relay circuit breaker.
 - Connect red probe of meter to one contact and black probe to other contact of fire extinguisher relay circuit breaker.
 - Check if meter indicates continuity.

Does meter indicate continuity?



FIRE EXTINGUISHER
RELAY CIRCUIT BREAKER

14 Replace fire extinguisher relay circuit breaker (page 10-165).



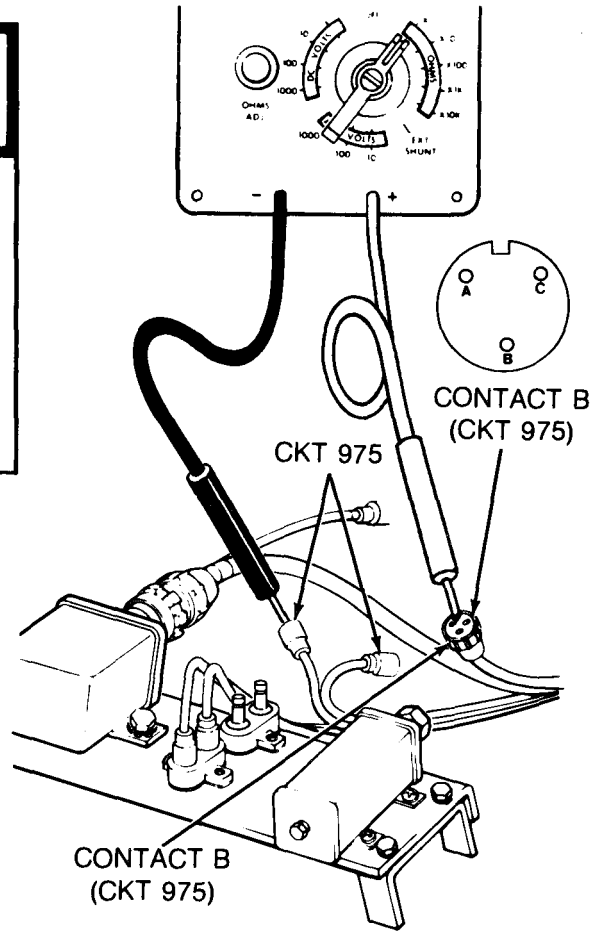
Symptom-54

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

15 Check front accessory harness from contact B (CKT 975) of connector at fire extinguisher relay to connector at fire extinguisher relay circuit breaker.

First Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 975) of front accessory harness connector at fire extinguisher relay.
- Connect black probe of meter to one connector (CKT 975) at fire extinguisher relay circuit breaker.
- Check if meter indicates continuity.



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)**

Symptom-54

STEP **15** CONTINUED

- Repeat above check from other harness connector (CKT 975) at fire extinguisher relay circuit breaker to contact B (CKT 975) of connector at fire extinguisher relay.
- Check if meter indicates continuity.

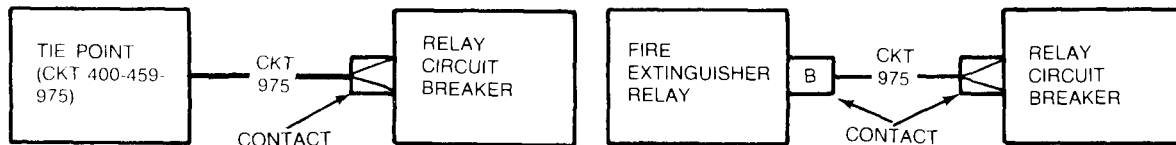
Does meter indicate continuity at one of the two connectors (CKT 975) to the fire extinguisher relay circuit breaker?

16

- Inspect hull power harness for bent or broken connector contacts or loose CKT 975 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad hull power harness.
- Connect front accessory harness connector to fire extinguisher relay.
- Connect two harness connectors to fire extinguisher relay circuit breaker.
- Connect three battery ground straps (page 10-268).

17

- Inspect front accessory harness for bent or broken connector contacts or loose CKT 975 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad front accessory wiring harness.
- Connect front accessory harness connector to fire extinguisher relay.
- Connect two harness connectors to fire extinguisher relay circuit breaker.
- Connect three battery ground straps (page 10-268).



TA250467

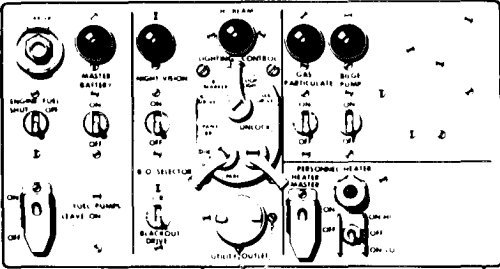
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE

Symptom-55

GAS PARTICULATE HOSE WILL NOT DELIVER SUFFICIENT AIRFLOW.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

MASTER CONTROL PANEL



1

Check if gas particulate blower motor works.

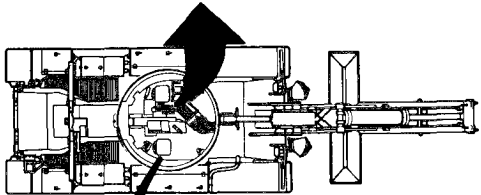
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.

First Technician (Commander's Station)

- Listen for sound of blower motor running.

Does blower motor work?



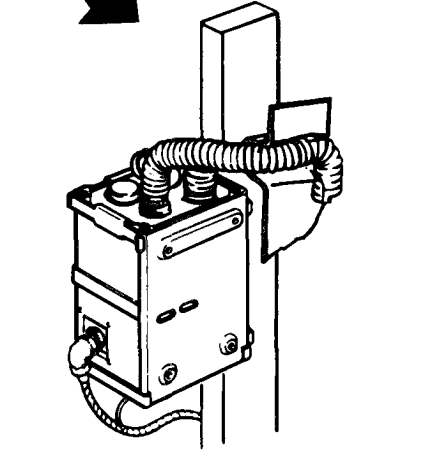
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

2

See Symptom 56: GAS PARTICULATE BLOWER MOTOR WILL NOT RUN.

NO

YES



PRECLEANER AND PARTICULATE FILTER UNIT

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

Symptom-55

WARNING
Unit commander or senior officer in charge of maintenance personnel assigned to remove and dispose of contaminated gas filters must prescribe necessary clothing (TM10-277) to be worn during this operation. He must also prescribe necessary safety measures that must be followed including decontamination operation that must be performed before new gas filters are installed (TM3-220).

3 Check for restricted airflow at gas particulate filter air outlet.

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.

First Technician (Commander's Station)

- Disconnect faulty air hose from gas particulate precleaner.

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch ON.

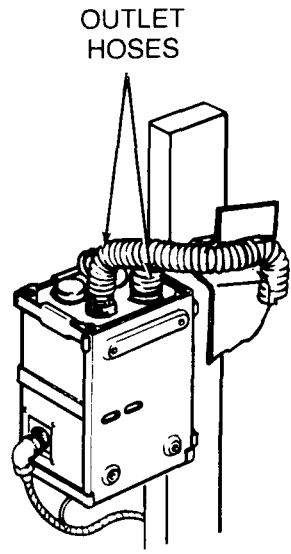
First Technician (Commander's Station)

- Hold hand over filter unit outlet to air hose and check for free airflow.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set GAS PARTICULATE switch OFF.

Is there free airflow from filter unit?



PRECLEANER AND PARTICULATE FILTER UNIT

4 Service gas particulate filter unit.

NO

5

- Remove blockage from faulty air hose.
- If blockage cannot be removed replace faulty air hose.

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE

Symptom-56

GAS PARTICULATE BLOWER MOTOR WILL NOT RUN

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

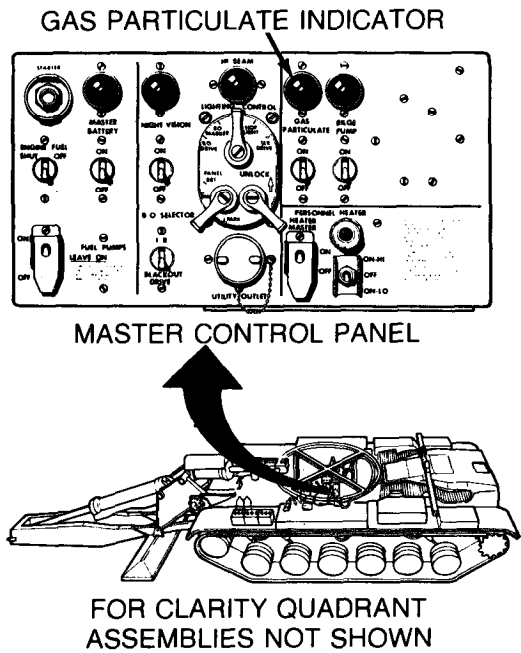
1

Check if GAS PARTICULATE indicator lamp will light.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.
- Visually check if GAS PARTICULATE indicator lamp is LIT.

Is GAS PARTICULATE indicator lamp lit?



2

- Check master control panel harness connector (CKT 920) at input to gas particulate circuit breaker for electrical power.

● See Step **11**.



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)**

Symptom-56

3 Check basket-control panel accessories harness (CKT 415D) for electrical power to precleaner and gas particulate filter.

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Disconnect basket-control panel accessories harness connector (CKT 415D) from precleaner and gas particulate filter assembly.
- Set multimeter to measure 18 to 30 volts dc. or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact of basket-control panel accessories harness connector (CKT 415D) and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

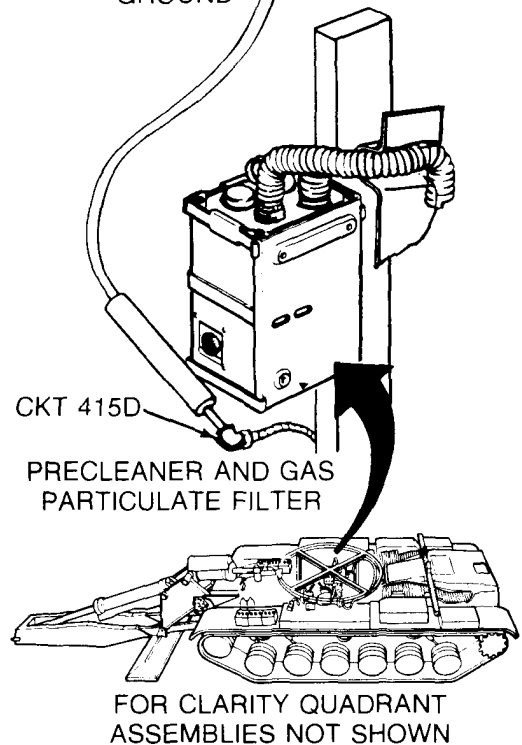
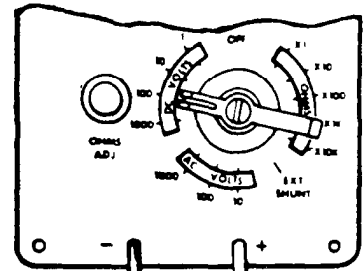
Does meter indicate 18 to 30 volts dc?

YES

NO

4

- Check master control panel accessories harness (CKT 415D) at panel connector for electrical power.
- See Step **8** .



Symptom-56

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

5 Check continuity of ground strap at precleaner and gas particulate filter.

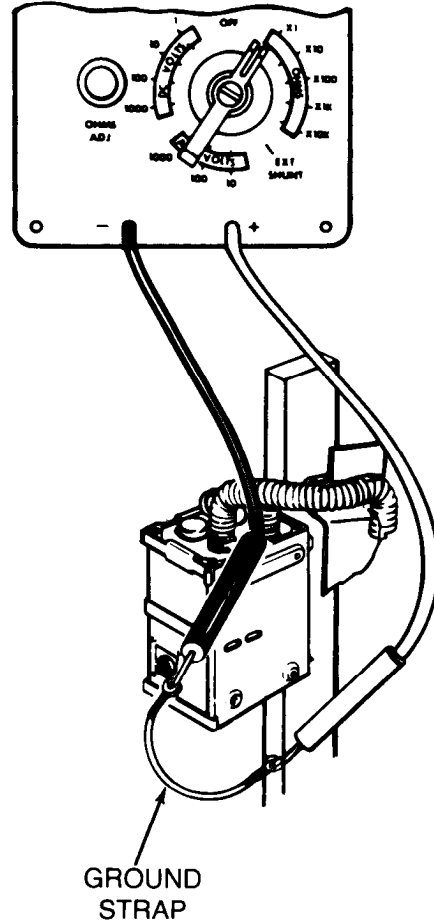
Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Connect front accessory harness connector (CKT 415D) to precleaner and gas particulate filter.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-81).
- Connect one meter probe to each end of ground strap.
- Check if meter indicates continuity.

Does meter indicate continuity.



6

- Clean and tighten loose ground strap connections.
- If connections are not loose, replace damaged ground strap.

NO YES

7 Replace precleaner and gas particulate filter assembly.

Symptom-56

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

FROM STEP

4

8 Check master control panel accessories harness (CKT 415D) at panel connector for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set GAS PARTICULATE switch OFF.

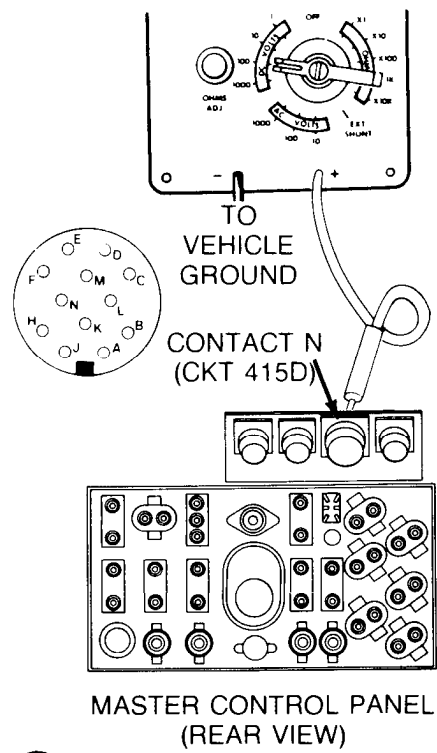
First Technician (Commander's Station)

- Connect basket-control panel accessories harness connector (CKT 415D) to precleaner and gas particulate filter.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact N (CKT 415D) of master control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.
- Check if meter indicates 18 to 30 volts dc.

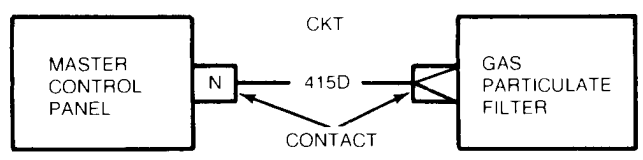
Does meter indicate 18 to 30 volts dc?



10

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 415D at rear of connectors.
- Repair connector if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Connect basket-control panel accessories harness connector to master control panel.
- Install master control panel (page 10-33).

9 Replace master control panel accessories harness (page 10-91).



Symptom-56

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)**

FROM STEP

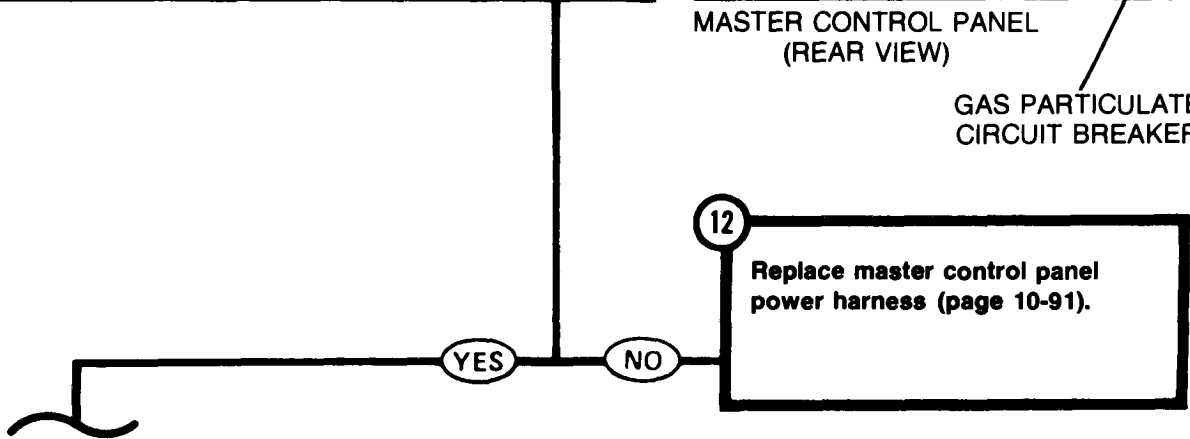
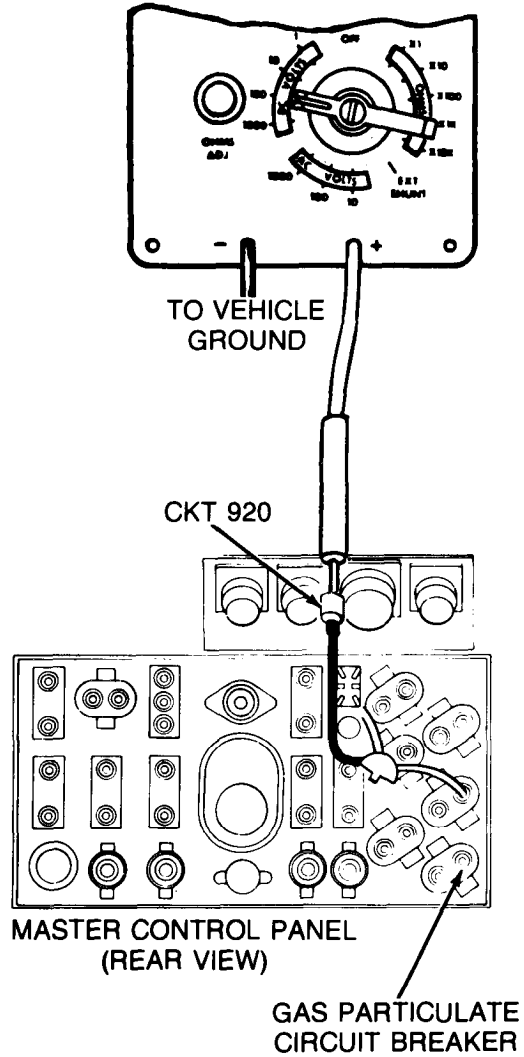
2

11 Check master control panel harness connector (CKT 920) at input to gas particulate circuit breaker for electrical power.

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect master control panel harness connector (CKT 920) from gas particulate circuit breaker.
- Set multimeter to measure 18 to 30 volts dc. or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to master control panel harness connector (CKT 920) at gas particulate circuit breaker and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

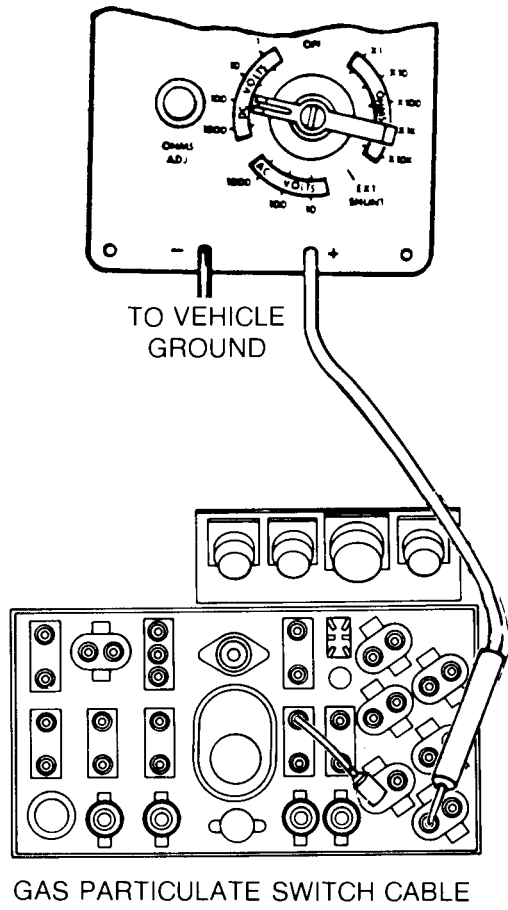
Symptom-56

13 Check output side of gas particulate circuit breaker for electrical power.

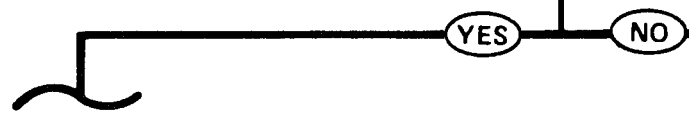
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF
- Connect master control panel harness connector to gas particulate circuit breaker.
- Disconnect gas particulate switch cable from gas particulate circuit breaker.
- Connect red probe of meter to outlet side of gas particulate circuit breaker and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



14 Replace gas particulate circuit breaker (page 10-70).



Symptom-56

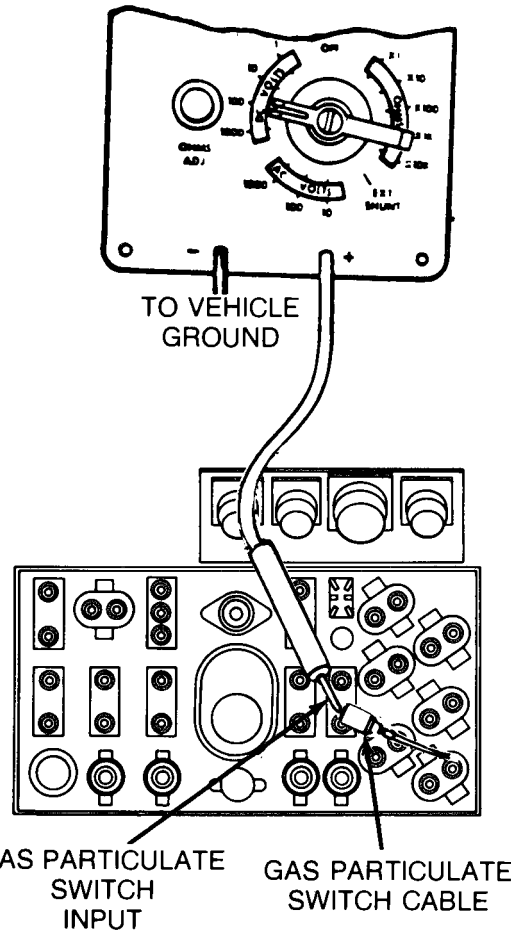
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

15 Check gas particulate switch cable at connector to gas particulate switch for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gas particulate switch cable to gas particulate circuit breaker.
- Disconnect gas particulate switch cable from gas particulate switch.
- Connect red probe of meter to disconnected end of gas particulate switch cable and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 dc.

Does meter indicate 18 to 30 dc?



16 Replace gas particulate switch cable (page 10-108).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)**

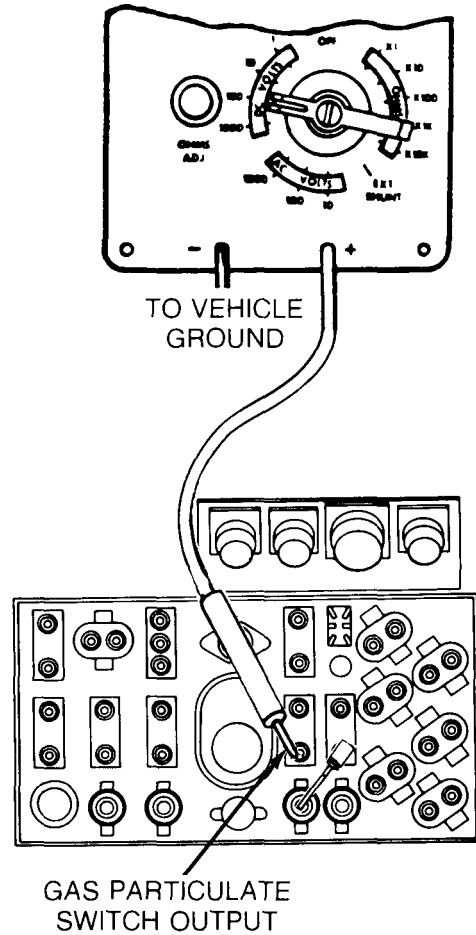
Symptom-56

17 Check output side of gas particulate switch for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gas particulate switch cable to GAS PARTICULATE switch.
- Disconnect master control panel accessories harness connector (CKT 415) from GAS PARTICULATE switch.
- Connect red probe of meter to output side of GAS PARTICULATE switch (CKT 415) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.
- Check if meter indicates 18 to 30 volts.

Does meter indicate 18 to 30 volts?



18 Replace gas particulate switch (page 10-62).

19 Replace master control panel accessories harness (page 10-91).

NO YES

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-57

OPERATOR'S DOMELIGHT WILL NOT LIGHT.

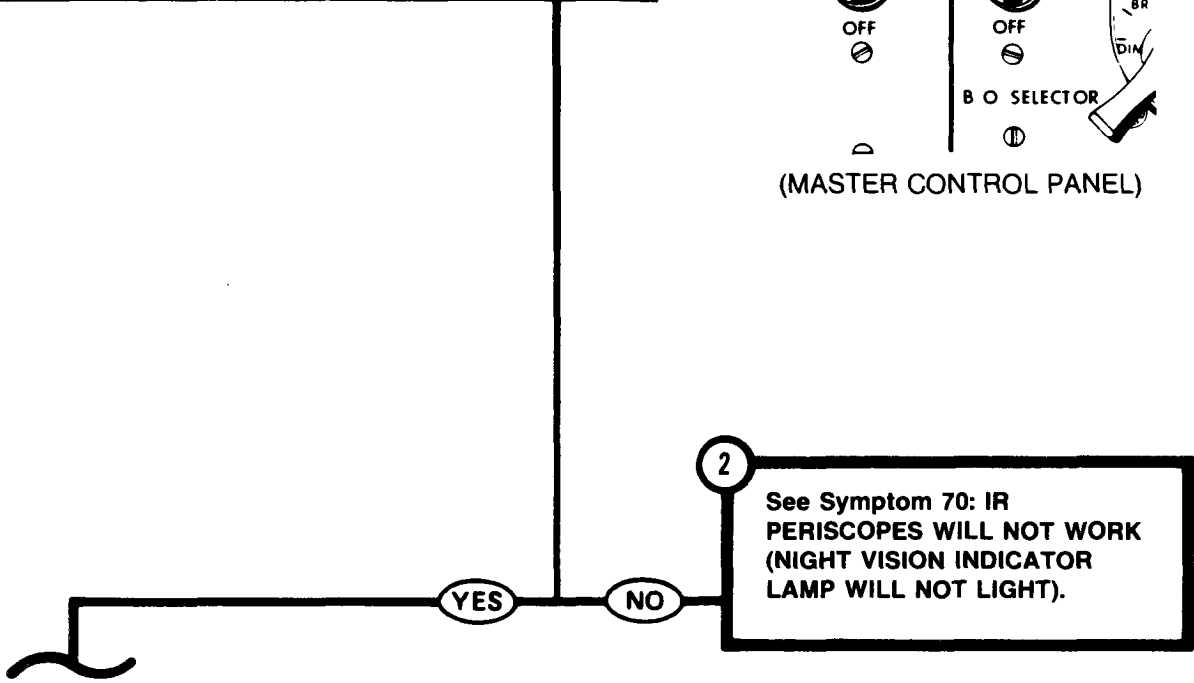
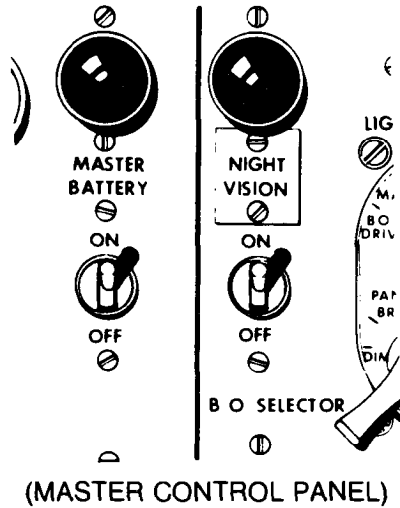
1

Check if NIGHT VISION indicator lamp will light.

Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.
- Check if NIGHT VISION indicator lamp lights.

Does NIGHT VISION indicator lamp light?



Symptom-57

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

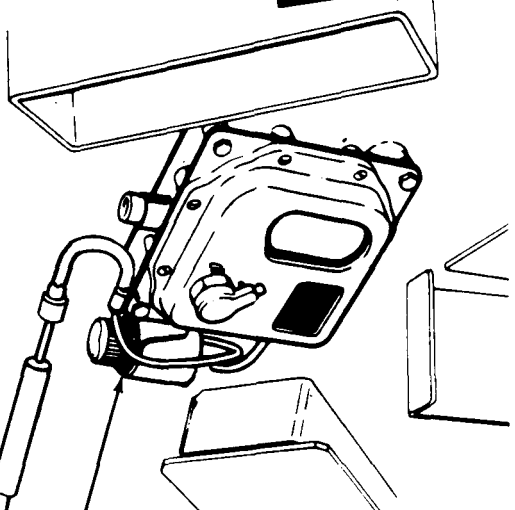
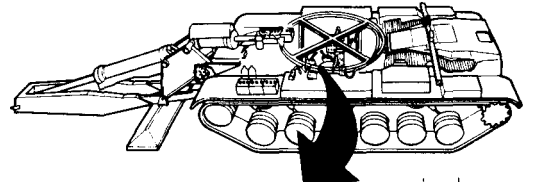
FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

3 Check lead from variable resistor at domelight connector for electrical power.

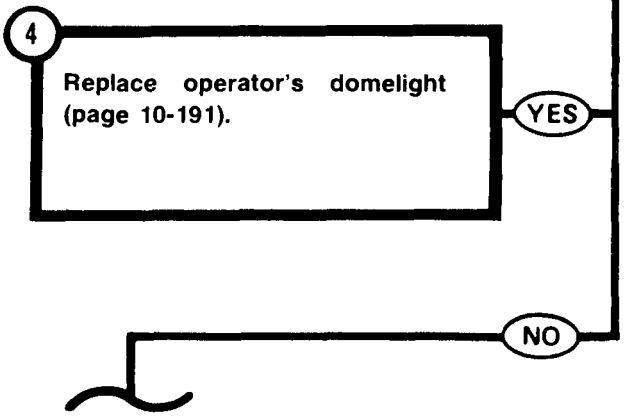
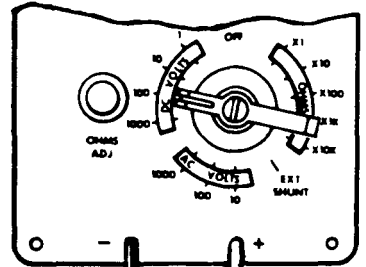
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set NIGHT VISION switch OFF.
- Disconnect variable resistor lead connector from domelight connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to center contact of variable resistor lead connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



VARIABLE RESISTOR OPERATOR'S DOMELIGHT



TA250479

Symptom-57

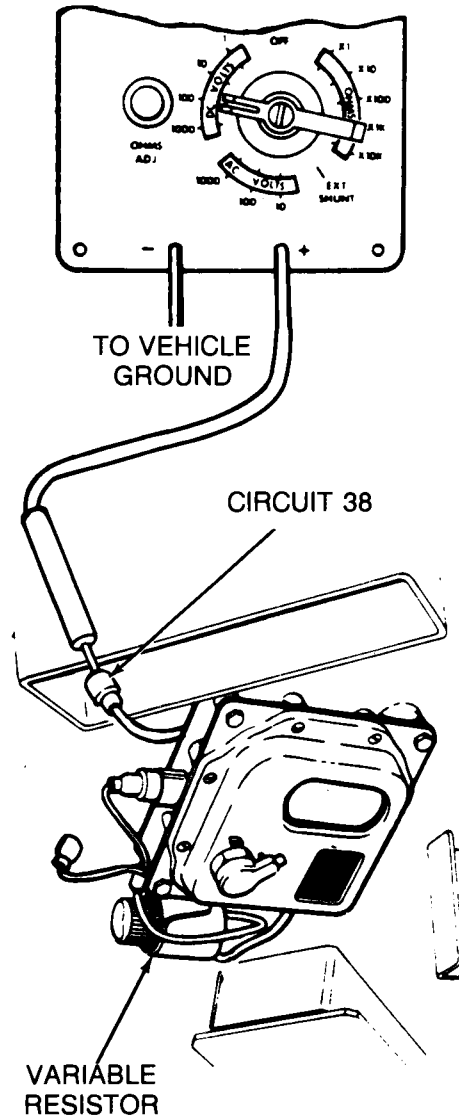
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

5 Check basket-control panel accessories harness (CKT 38) at variable resistor lead for electrical power.

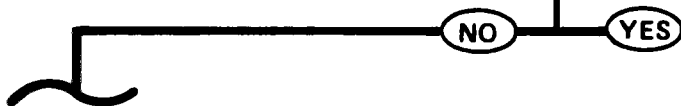
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect variable resistor lead connector to domelight connector.
- Disconnect basket-control panel accessories harness connector (CKT 38) from variable resistor lead connector.
- Connect red probe of meter to basket-control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



6 Replace variable resistor assembly (page 10-201).



TA250480

Symptom-57

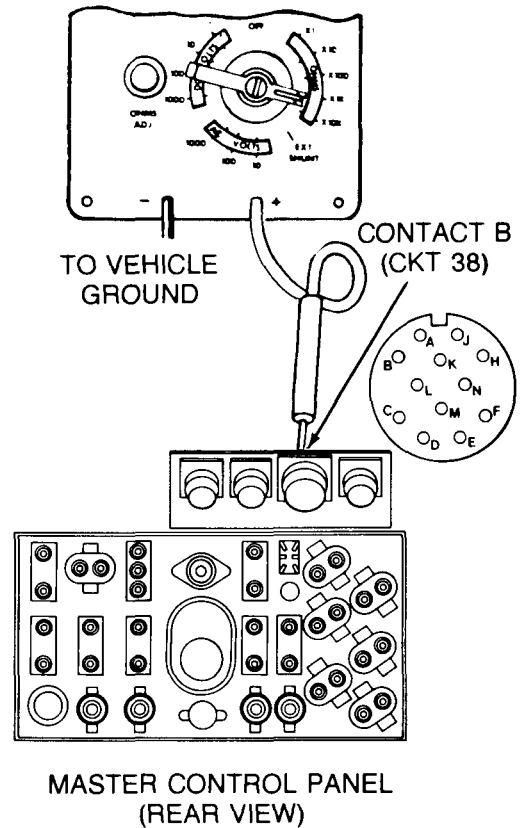
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

7 Check for electrical power at master control panel accessories harness (CKT 38) panel connector.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect basket-control panel accessories harness connector (CKT 38) to variable resistor lead connector.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact B (CKT 38) of master control panel accessories harness panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

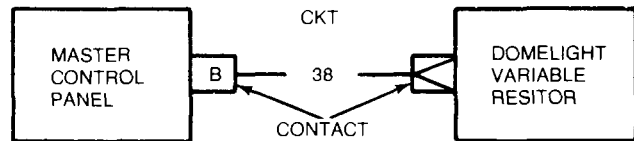


9

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 38 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Install basket-control panel accessories harness to master control panel.
- Install master control panel (page 10-33).

YES NO

8 Replace master control panel accessories harness (page 10-91).



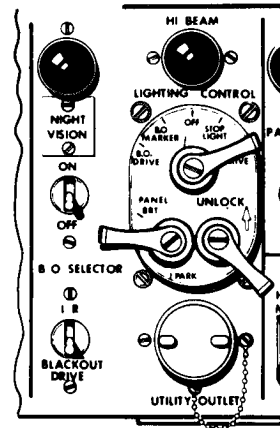
TA250481

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

Symptom-58

GAGE INSTRUMENT PANEL LAMPS WILL NOT LIGHT (PANEL LIGHT SWITCH AT BRIGHT).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



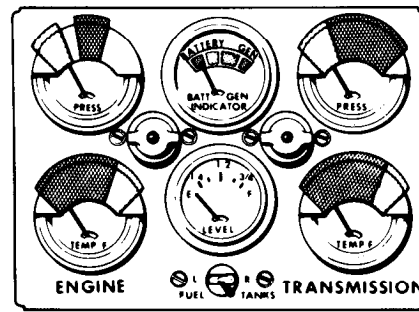
MASTER CONTROL PANEL

1 Check if gage instrument panel lamps will light with PANEL LIGHT switch at DIM.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn ON-OFF lever to SER DRIVE and turn PANEL lever to DIM.
- Visually check if gage instrument panel lamps are lit.

Are gage instrument panel lamps lit?



GAGE INSTRUMENT PANEL

2 Replace LIGHTING CONTROL switch (page 10-54).



TA250482

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-58

3

Check if service stoplight will light.

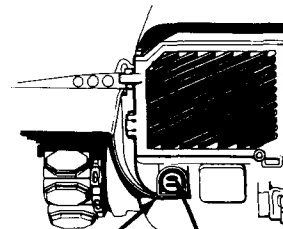
First Technician (Operator's Station)

- On **LIGHTING CONTROL** switch, turn **ON-OFF** lever to **STOPLIGHT** and turn **PANEL** lever to **BRT.**
- Step on brake pedal and keep it pressed.

Second Technician (Rear Grille Doors)

- Visually check if service stoplight is working.

Does service stoplight light?



LEFT TAILLIGHT

SERVICE STOPLIGHT

4

Replace LIGHTING CONTROL switch (page 10-54).

YES

NO

Symptom-58

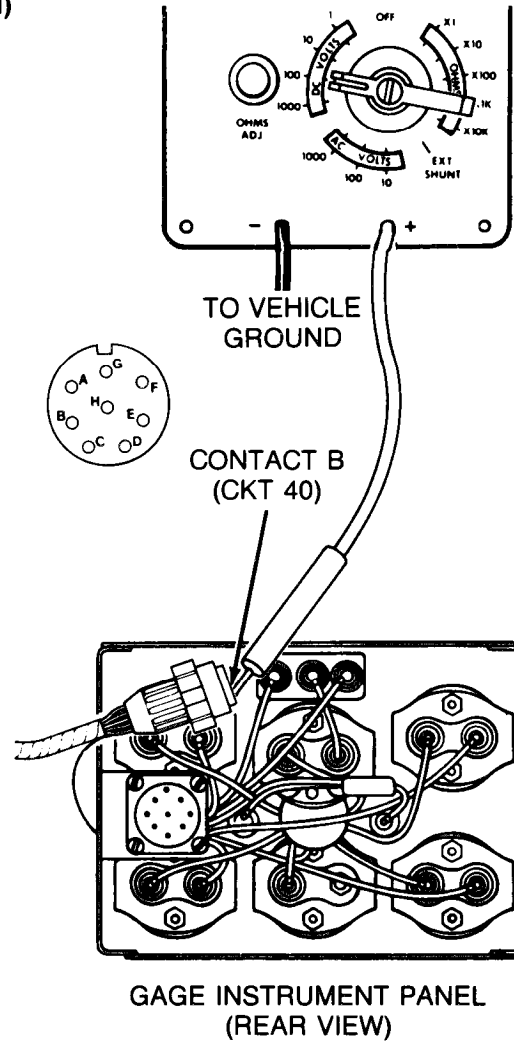
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5 Check basket indicator panel harness (CKT 40) at gage instrument panel for electrical power.

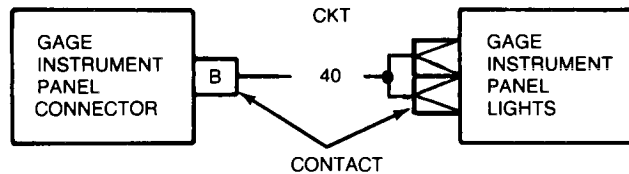
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 40) of basket-indicator panel harness connector at gage instrument panel and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts.

Does meter indicate 18 to 30 volts?



6 Repair gage instrument panel harness (CKT 40) (page 10-298).



TA250484

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-58

7 Check front accessories harness (CKT 40) at basket disconnect for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

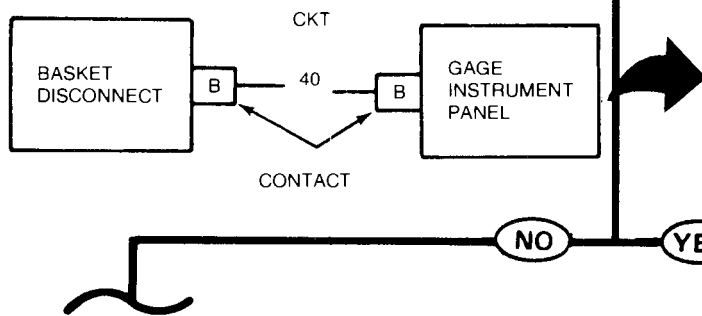
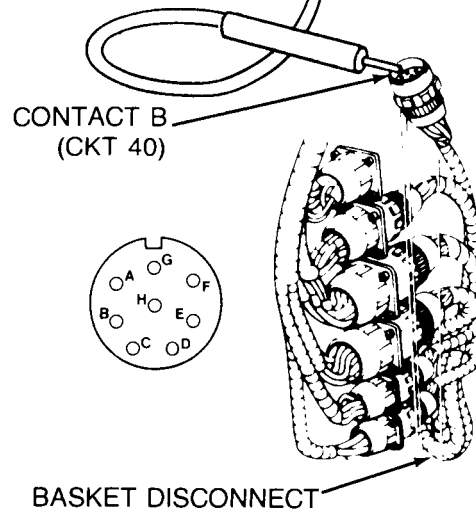
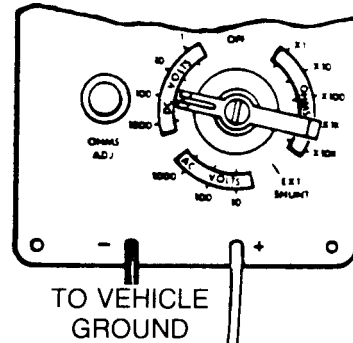
Second Technician (Commander's Station)

- Disconnect front accessory harness connector (CKT 40) from basket-indicator panel harness connector at basket disconnect.
- Connect red probe of meter to contact B (CKT 40) of front accessory harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



8

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Install gage instrument panel (page 10-112).

TA250485

Symptom-58

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

9 Check basket-light switch harness (CKT 40) for power at basket disconnect.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Install gage instrument panel (page 10-112).

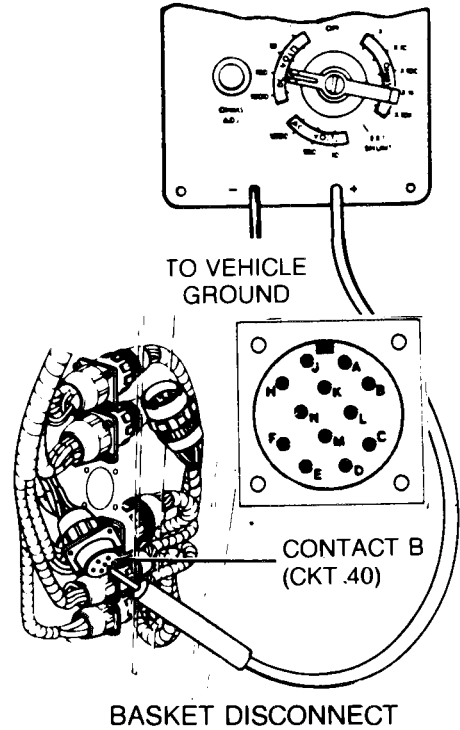
Second Technician (Commander's Station)

- Connect front accessory harness connector to basket disconnect.
- Displace basket-light switch harness connector at basket disconnect.
- Connect red probe of meter to contact B (CKT 40) of basket-light switch harness connector at basket disconnect, and the black probe to ground.

First Technician (Operator's Station)

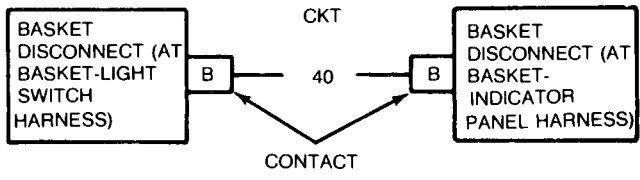
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



10

- Inspect front accessories harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessories harness.
- Install basket-light switch harness connector at basket disconnect.



TA250486

Symptom-58

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

11 Check basket-light switch harness (CKT 40) for continuity from connector at LIGHTING CONTROL switch to basket disconnect.

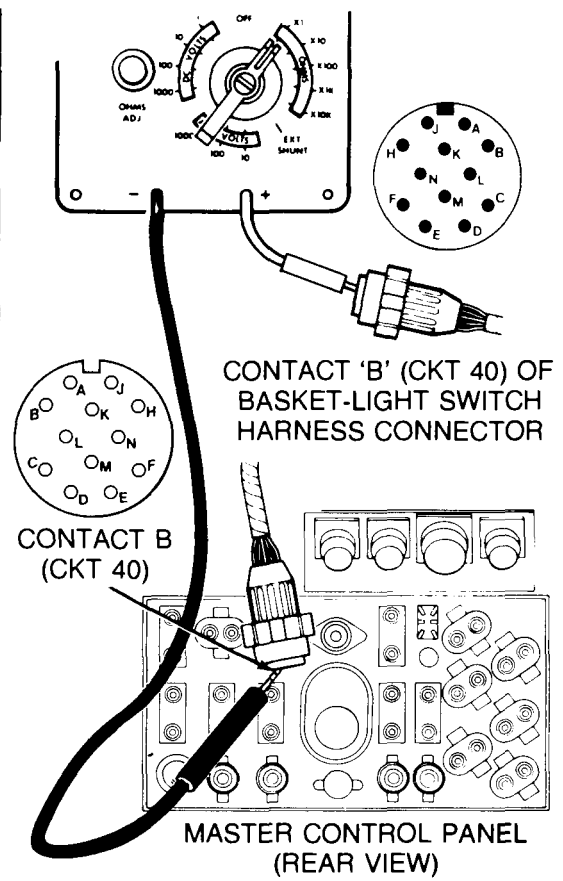
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect black probe of meter to contact B (CKT 40) of basket-light switch harness connector at LIGHTING CONTROL switch.

Second Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 40) of basket-light switch harness connector at basket-disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

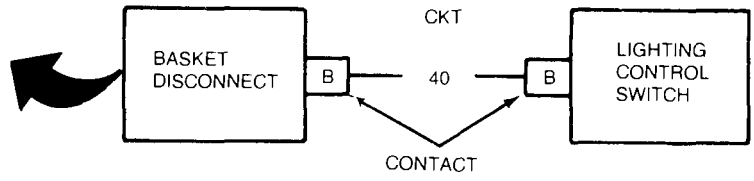


12

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
- Install master control panel (page 10-33).
- Install basket-light switch harness connector at basket disconnect.

13

- Replace LIGHTING CONTROL switch (page 10-54).
- Install basket-light switch harness connector at basket disconnect.



TA250487

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

Symptom-59

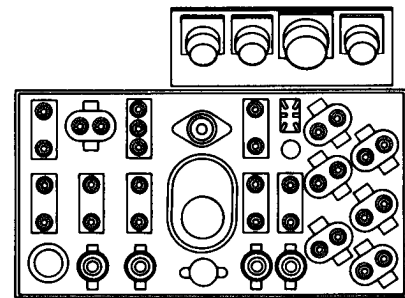
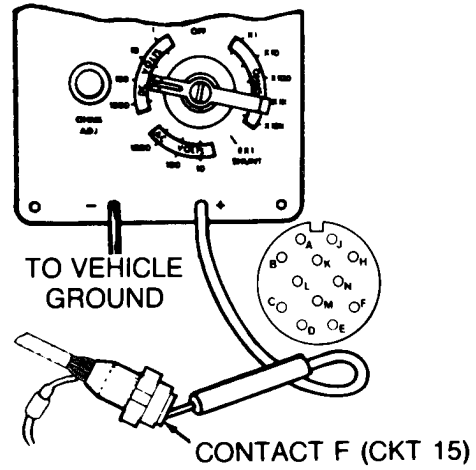
LIGHTS CONTROLLED BY LIGHTING CONTROL SWITCH WILL NOT LIGHT (PANEL SWITCH AT OFF, BRIGHT, OR DIM).

1 Check basket-light switch harness (CKT 15) at LIGHTING CONTROL switch for electrical power.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact F (CKT 15) of harness connector. Connect black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2

- Check basket-light switch harness (CKT 15) for continuity from intermediate connector to connector at LIGHTING CONTROL switch.

- See Step 6 .



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

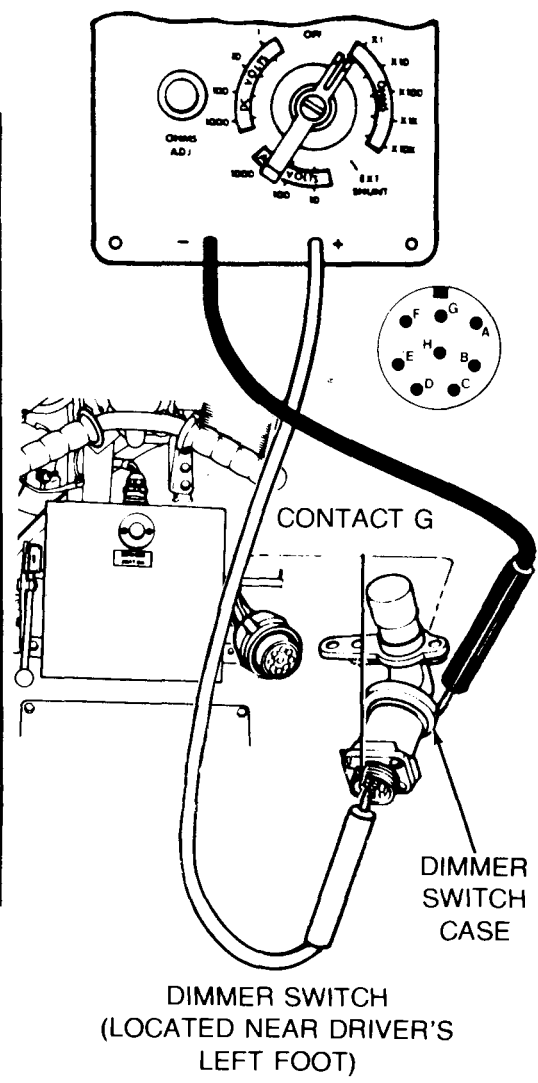
Symptom-59

3 Check foot DIMMER SWITCH (CKT 16) for internal short.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-171).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 16) of foot DIMMER SWITCH connector and black probe to case of foot DIMMER SWITCH.
- Operate foot DIMMER SWITCH in both HIGH and LOW BEAM positions.
- Check if meter indicates less than infinite resistance in either foot DIMMER SWITCH position.

Does meter indicate less than infinite resistance, thereby indicating a short?



4 Replace LIGHTING CONTROL switch (page 10-54).

5 Replace foot DIMMER SWITCH (page 10-171).

NO YES

Symptom-59
FROM STEP

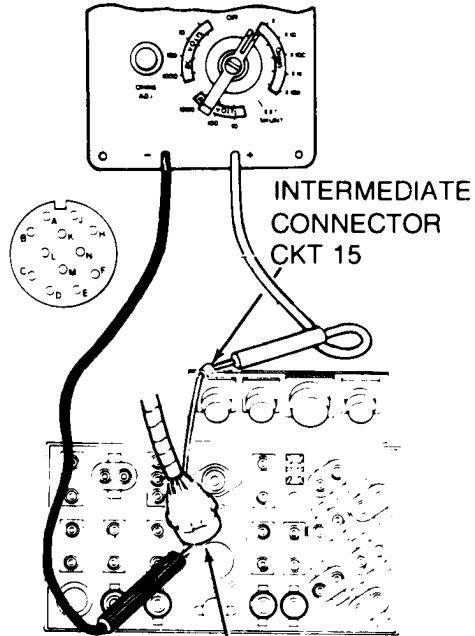
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

2

6 Check basket-light switch harness (CKT 15) for continuity from intermediate connector to connector at LIGHTING CONTROL switch.

- Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
 - Disconnect basket-light switch harness intermediate connector (CKT 15) from master control panel power harness connector.
 - Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
 - Connect red probe of meter to center contact of basket-light switch harness (CKT 15) intermediate connector at LIGHTING CONTROL switch.
 - Connect black probe of meter to contact F (CKT 15) of basket-light switch harness connector at LIGHTING CONTROL switch.
 - Check if meter indicates continuity.

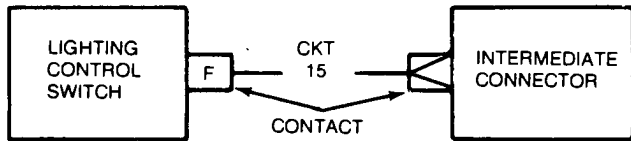
Does meter indicate continuity?



- 8**
- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 15 wire at rear of connectors.
 - Repair connectors if defective (page 10-298).
 - If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
 - Install master control panel (page 10-33).

7 Replace master control panel power harness (page 10-101).

YES NO



TA250490

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-60

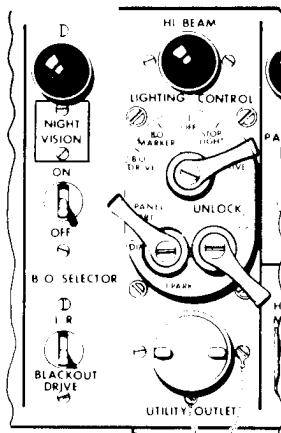
PANEL AND DRIVE LIGHTS ARE VERY DIM OR WILL NOT LIGHT WITH PANEL LIGHT SWITCH AT BRIGHT, DIM, OR PARK (LIGHTS ARE OK WITH PANEL LIGHT SWITCH AT OFF).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

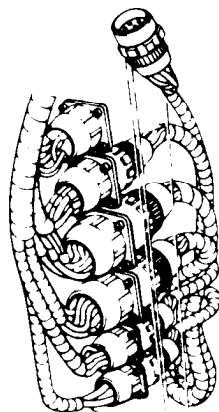
1 Check if vehicle lights work after disconnecting front accessory harness connector (CKT 40) from basket-indicator panel harness connector at basket disconnect.

- First Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
 - Disconnect front accessory harness connector (CKT 40) from basket-indicator panel harness connector at basket disconnect (top connector).
 - Set MASTER BATTERY switch ON.
 - On LIGHTING CONTROL switch, turn ON-OFF lever to SER DRIVE and turn PANEL lever to BRT.
- Second Technician (Front of Vehicle)
- Visually check if service lights are working properly

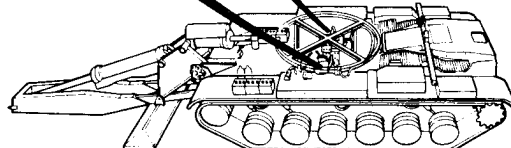
Are vehicle lights working properly?



MASTER CONTROL PANEL



BASKET DISCONNECTS



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

2 Check front accessory harness (CKT 40) at basket disconnect for short to ground.

- See Step 10 .



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-60

3 Check if vehicle lights work after disconnecting basket-indicator panel harness connector from gage instrument panel.

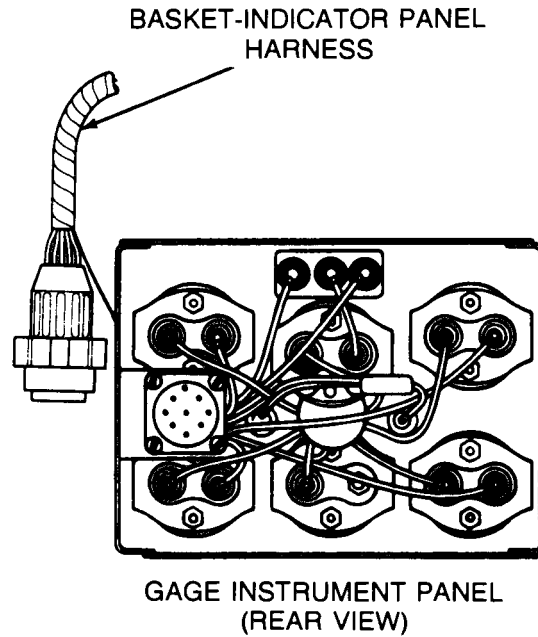
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect front accessory harness connector to basket-indicator panel harness connector at basket disconnect.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

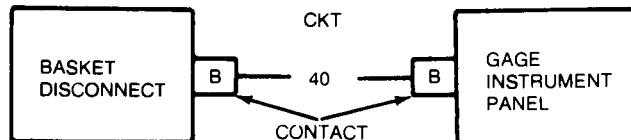
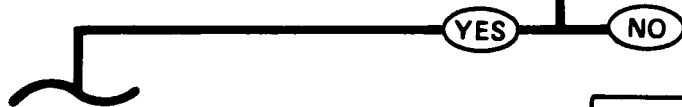
- Visually check if service lights are working properly.

Are vehicle lights working properly?



4

- Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.
- Install gage instrument panel (page 10-112).



TA250492

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-60

5 Check if vehicle lights work after disconnecting gage instrument panel harness connectors (CKT 40) from both panel lights.

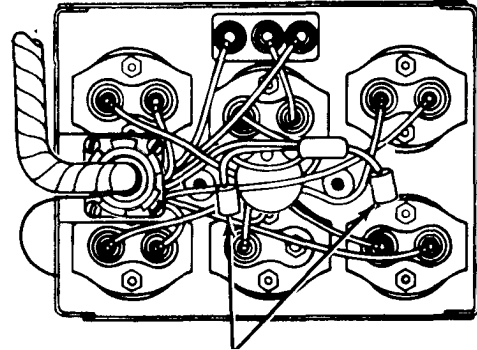
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect basket-indicator panel harness connector to gage instrument panel harness connector.
- Disconnect gage instrument panel harness connectors (CKT 40) from both panel lights.
- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

- Visually check if service lights are working properly.

Are vehicle lights working properly?



PANEL LIGHT CONNECTORS

6 Repair gage instrument panel harness (CKT 40) (page 10-298).

YES

NO

Symptom-60

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 Check if vehicle lights work after reconnecting gage instrument panel harness connector (CKT 40) to one of the panel lights.

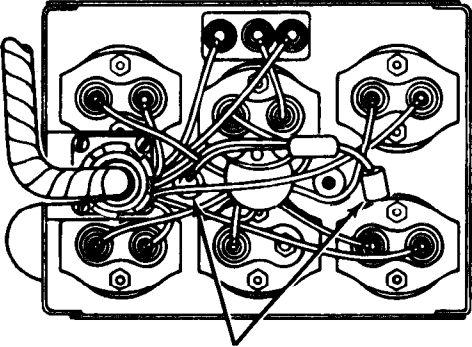
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gage instrument panel harness connector (CKT 40 to one of the panel lights).
- Set MASTER BATTERY switch ON.

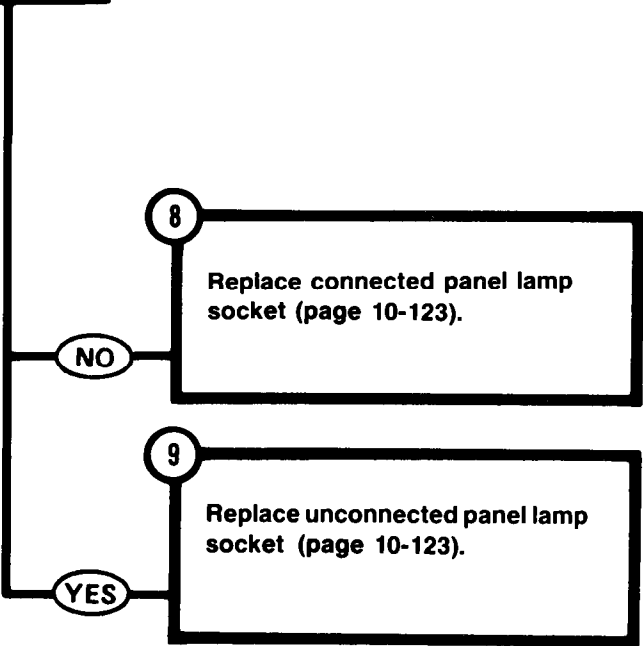
Second Technician (Front of Vehicle)

- Visually check if service lights are working properly.

Are vehicle lights working properly?



PANEL LIGHT CONNECTORS



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-60
FROM STEP

2

10 Check front accessory harness (CKT 40) at basket disconnect for short to ground.

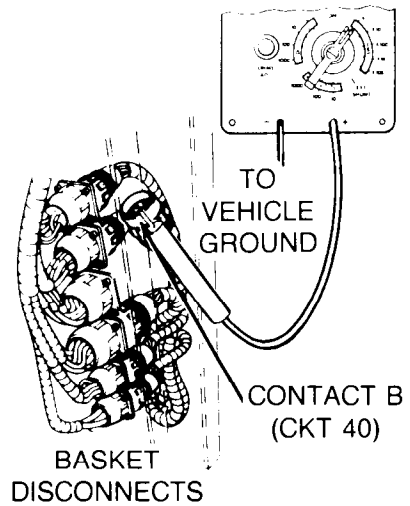
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.

Second Technician (Commander's Station)

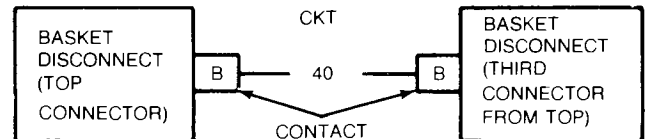
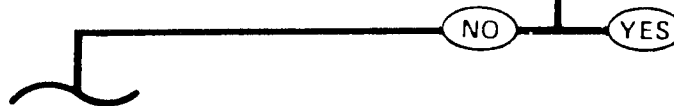
- Reconnect front accessory harness connector to basket-indicator panel harness connector at basket disconnect.
- Disconnect front accessory harness connector (CKT 40) from basket-light switch harness connector at basket disconnect (third connector from top).
- Set ohmmeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-81).
- Connect red probe of meter to contact B (CKT 40) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



11

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness connector to basket-light switch harness connector at basket disconnect.
- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).



Symptom-60

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

12

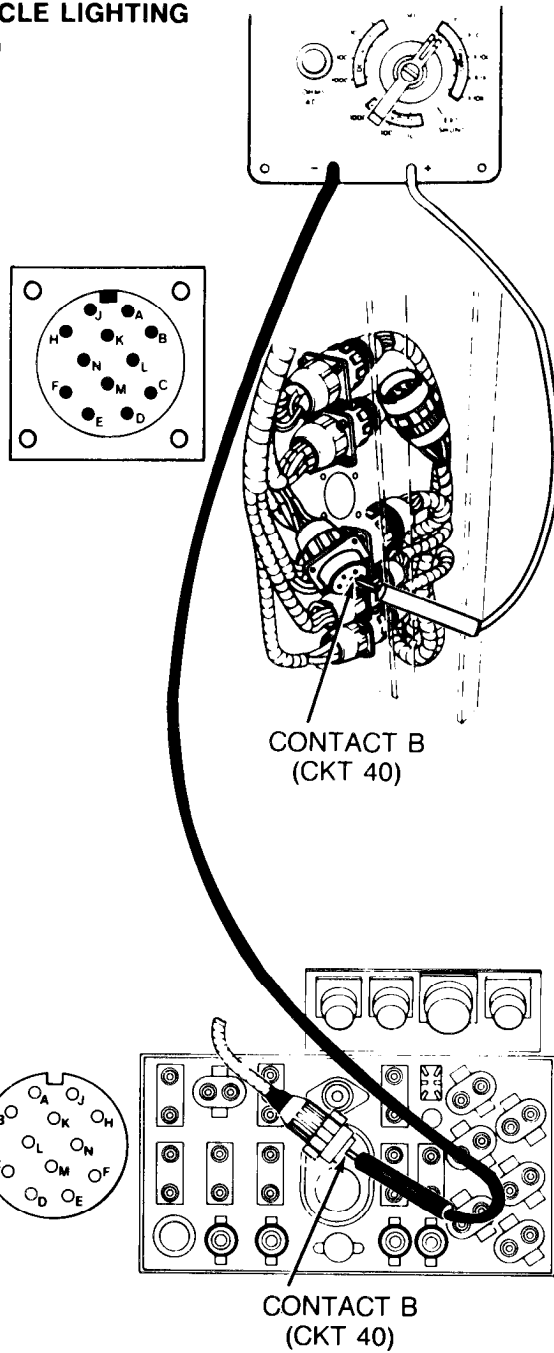
Check basket-light switch harness (CKT 40) from connector at basket disconnect to connector at LIGHTING CONTROL switch for continuity.

First Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.
- Connect black probe of meter to contact B (CKT 40) of basket-light switch harness connector at LIGHTING CONTROL switch.

Second Technician (Commander's Station)

- Displace basket-light switch harness connector (CKT 40) at basket disconnect (page 10-269).
- Connect red probe of meter to contact B (CKT 40) of basket-light switch harness connector at basket disconnect.



TA250496

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-60

STEP **(12)** CONTINUED

First Technician (Operator's Station)

- Check if meter indicates continuity.

Does meter indicate continuity?

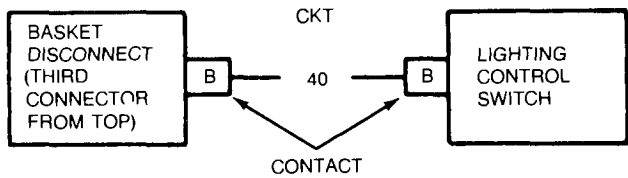
(13)

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
- Install basket-light switch harness connector at basket disconnect.
- Connect basket-light switch harness connector to LIGHTING CONTROL SWITCH.
- Install master control panel (page 10-33).

NO **YES**

(14)

- Replace LIGHTING CONTROL switch (page 10-54).
- Install basket-light switch harness connector at basket disconnect.

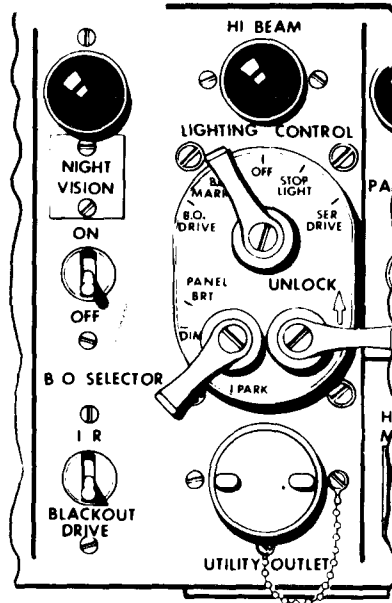


**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

Symptom-61

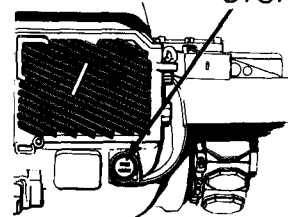
SERVICE STOPLIGHT WILL NOT LIGHT.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



MASTER CONTROL PANEL

B.O. STOPLIGHT



RIGHT TAILLIGHT

1

Check if B.O. stoplight will light.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch turn LIGHTING CONTROL lever to B.O. MARKER.
- Press and hold brake pedal.

First Technician (Rear Grille Doors)

- Visually check if B.O. stoplight lights when brake pedal is pressed.

Does B.O. stoplight light?

2

- Check stoplight switch at brake master cylinder for continuity.
- See Step **12** .



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-61

3 Check rear accessory harness (CKT 22) at left taillight assembly for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect rear accessory harness connector (CKT 22) from left taillight assembly.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 22) and black probe to vehicle ground.

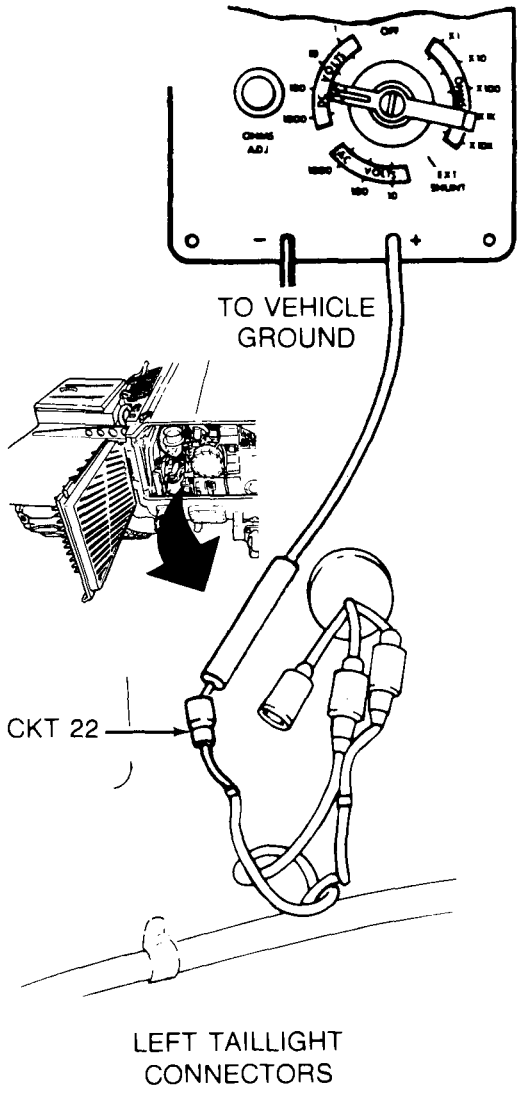
Second Technician (Operator's Station)

- On LIGHTING CONTROL switch, turn LIGHTING CONTROL lever to STOPLIGHT.
- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

Does meter indicate 18 to 30 volts dc?



4 Replace socket and wiring assembly in left taillight (page 10-298).



TA250499

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-61

5 **Check front accessory harness (CKT 22) at bulkhead disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear Grille Doors)

- Reconnect rear accessory harness connector (CKT 22) to left taillight assembly.

First and Second Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Commander's Station)

- Displace front accessory harness connector from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact B (CKT 22) of front accessory harness connector and black probe to ground.

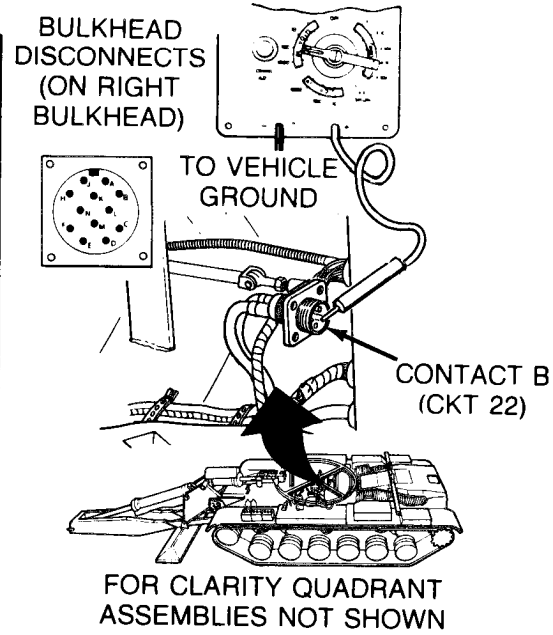
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Commander's Station)

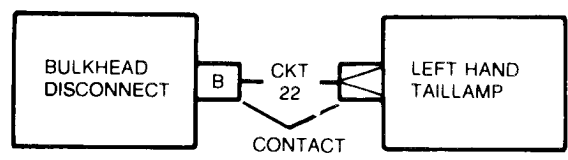
- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

Does meter indicate 18 to 30 volts dc?



6

- Inspect rear accessory harness for bent/broken connector contacts or loose CKT 22 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective rear accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



TA250500

Symptom-61

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

7 Check basket-light switch harness (CKT 22) at basket disconnect for electrical power.

Second Technician (Operator's Station)

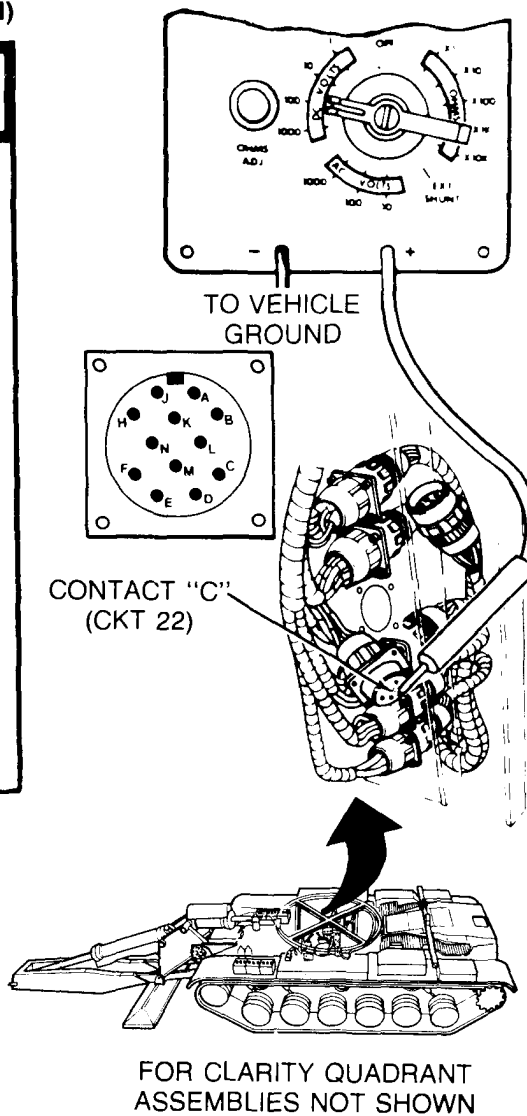
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-light switch harness connector (CKT 22) at basket disconnect.
- Connect red probe of meter to contact "C" (CKT 22) of basket-light switch harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.



TA250501

Symptom-61

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

STEP **7** CONTINUED

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

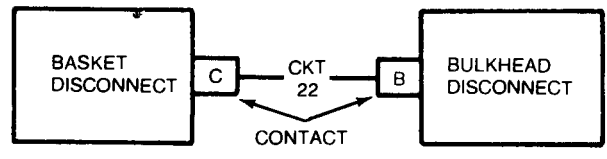
Does meter indicate 18 to 30 volts dc?

8

- Inspect front accessories harness for bent/broken connector contacts or loose CKT 22 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessories harness.
- Install basket-light switch harness connector at basket disconnect.

YES

NO



TA250502

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-61

9 Check basket-light switch harness (CKT 22) for continuity from basket disconnect to connector at LIGHTING CONTROL switch.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector on master control panel.

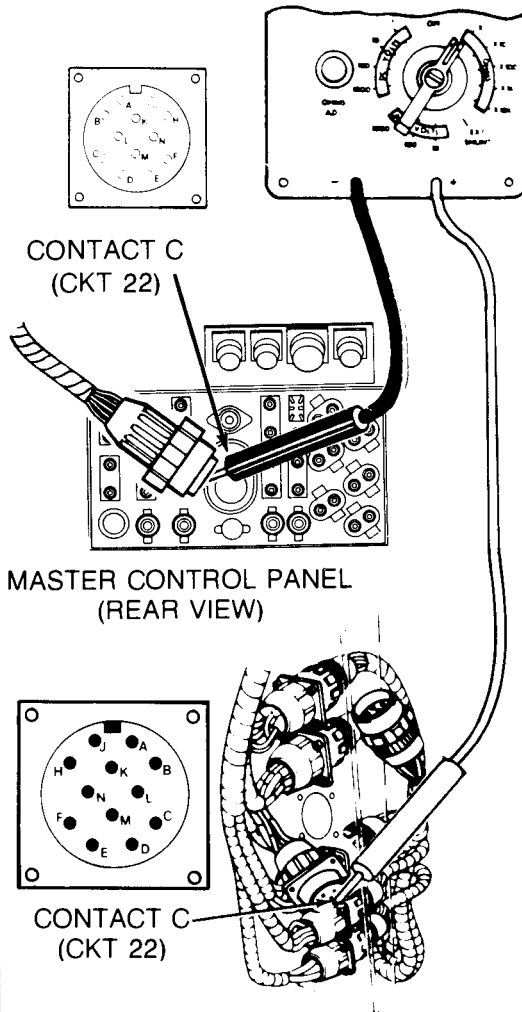
First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).

Second Technician (Operator's Station)

- Connect black probe of meter to contact C (CKT 22) of basket-light switch harness connector at LIGHTING CONTROL switch.

First Technician (Commander's Station)



Symptom-61

STEP **9** CONTINUED

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

- Connect red probe of meter to contact C (CKT 22) of basket-light switch harness connector at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

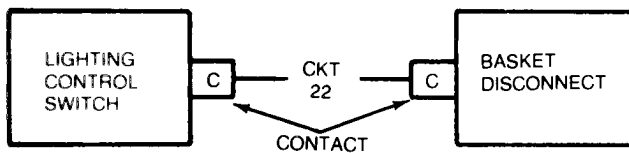
10

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 22 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective basket-light switch harness.
- Connect basket-light switch harness connector to lighting control switch.
- Install basket-light switch harness connector at basket disconnect.
- Install master control panel (page 10-33).

11

- Replace LIGHTING CONTROL switch (page 10-54).
- Install basket-light switch harness connector at basket disconnect.

NO YES



TA250504

Symptom-61

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP

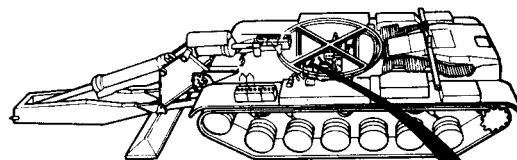
2

12 Check stoplight switch at brake master cylinder for continuity.

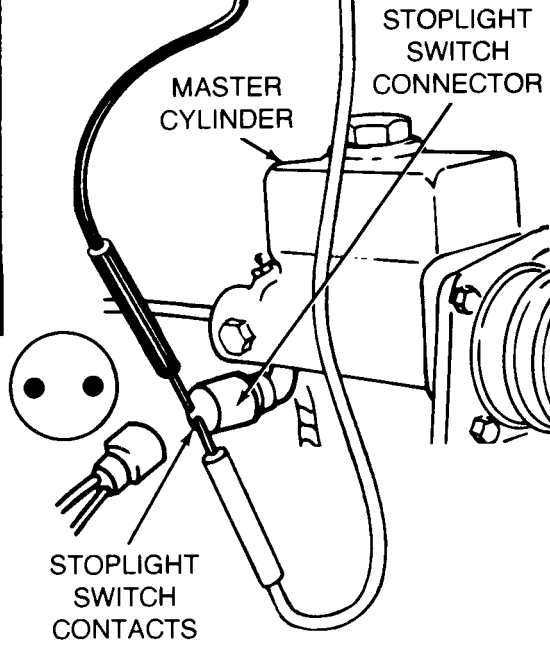
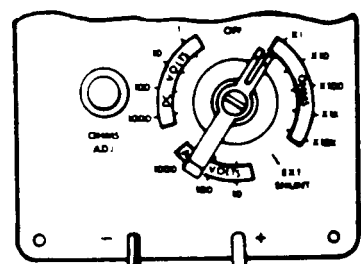
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect basket-light switch harness connector (CKT 75) from master cylinder stoplight switch.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 10-83).
- Connect two probes of meter to the two contacts of stoplight switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

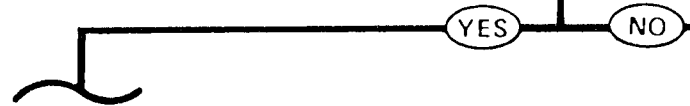
Does meter indicate continuity?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

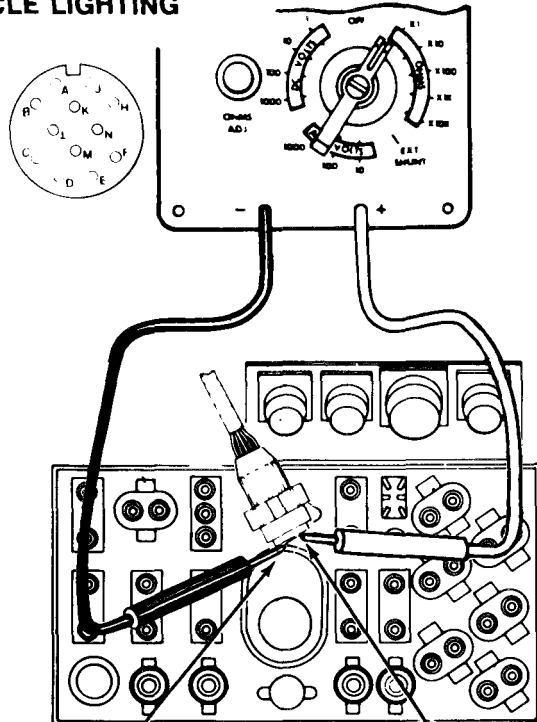


13 Replace stoplight switch (page 13-31).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-61



CONTACT A CONTACT K
MASTER CONTROL PANEL
(REAR VIEW)

14 Check basket-light switch harness (CKT 75) connector at LIGHTING CONTROL switch for continuity from contact A to contact K.

Second Technician (Operator's Station)

- Connect basket-light switch harness connector to master cylinder stoplight switch.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector on master control panel.
- Connect two probes of meter to contacts A and K (CKT 75) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

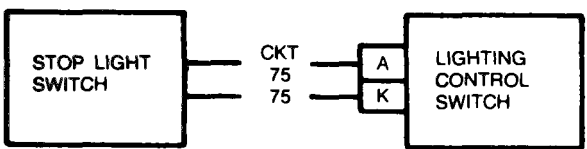
Does meter indicate continuity?

15 Replace LIGHTING CONTROL switch (page 10-54).

YES NO

16

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 75 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective basket-light switch harness.
- Connect basket-light switch harness to LIGHTING CONTROL switch.
- Install master control panel (page 10-33).



TA250506

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-62

BLACKOUT STOPLIGHT WILL NOT LIGHT.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

Check if service stoplight will light.

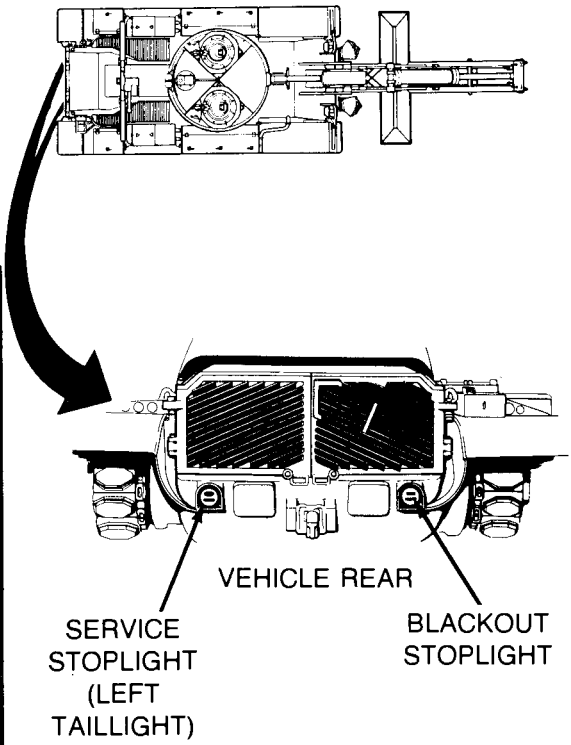
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn LIGHTING CONTROL lever to STOPLIGHT.
- Press and hold brake pedal.

First Technician (Rear Grille Doors)

- Visually check if service stoplight lights when brake pedal is pressed.

Does service stoplight light?



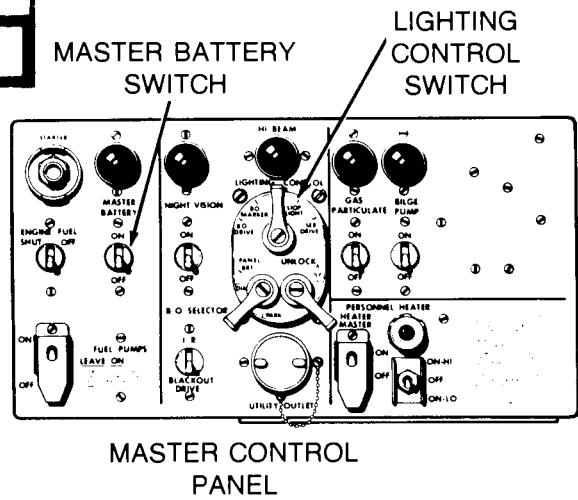
2

- Check stoplight switch at brake master cylinder for continuity.

NO

- See Step 12.

YES



Symptom-62

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

3 Check rear accessory harness (CKT 23) at right taillight assembly for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technician (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect rear accessory harness connector (CKT 23) from right taillight assembly.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 23) and black probe to ground.

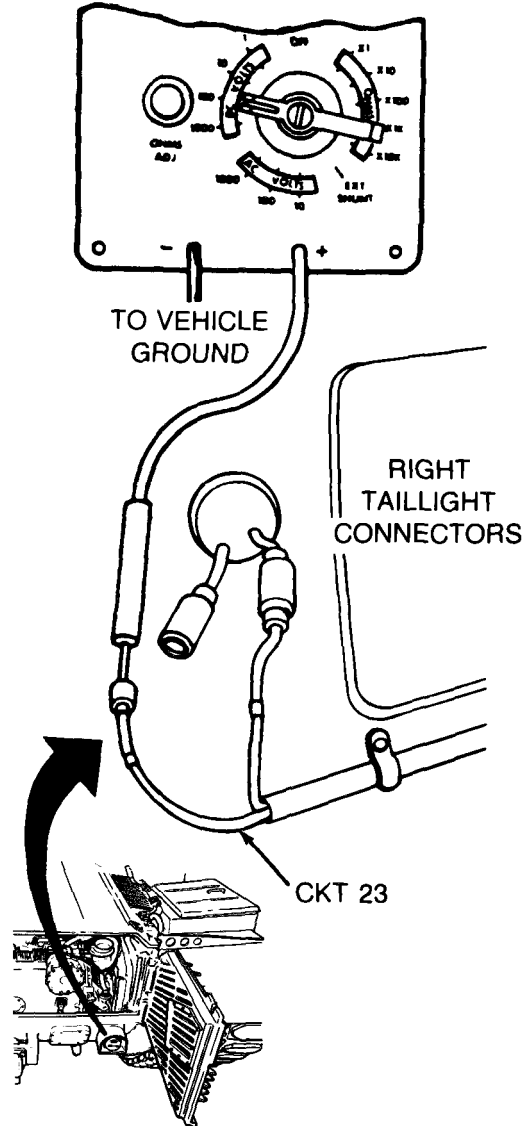
Second Technician (Operator's Station)

- On LIGHTING CONTROL switch turn LIGHTING CONTROL lever to B.O. MARKER.
- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

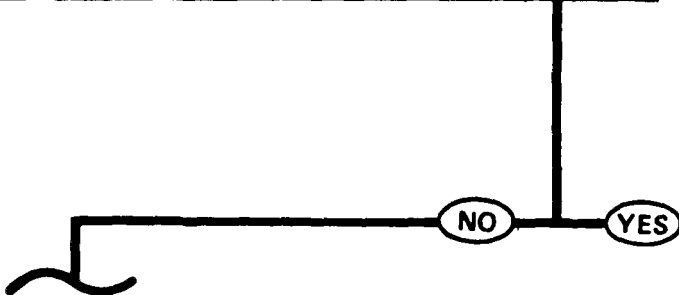
First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

Does meter indicate 18 to 30 volts dc?



4 Replace socket and wiring assembly in right taillight (page 10-298).



Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5 Check front accessory harness (CKT 23) at bulkhead disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Rear Grille Doors)

- Connect rear accessory harness (CKT 23) to right taillight assembly.

First and Second Technician (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 23) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact C (CKT 23) of front accessory harness connector and black probe to ground.

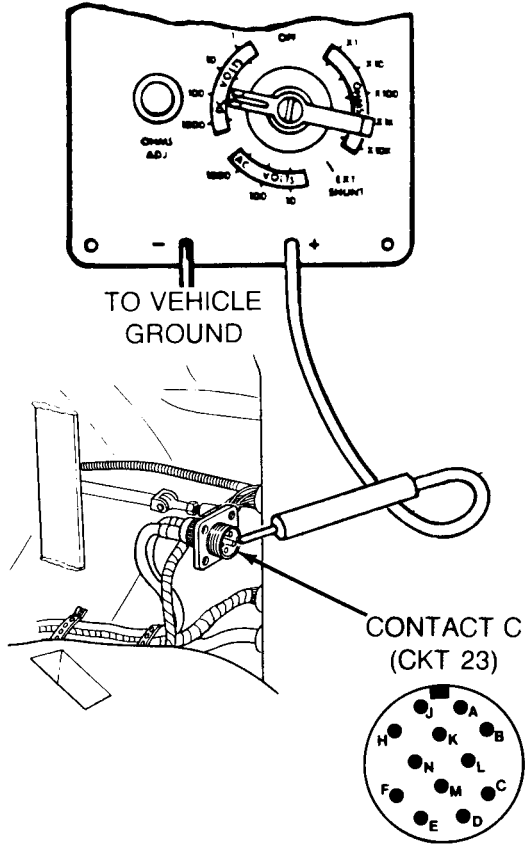
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

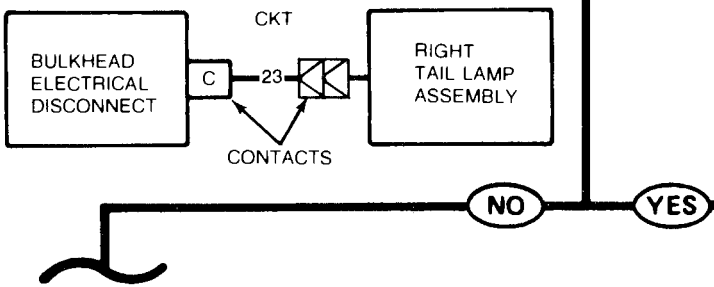
Does meter indicate 18 to 30 volts dc?



BULKHEAD DISCONNECTS AT COMMANDER'S STATION

6

- Inspect rear accessory harness for bent/broken connector contacts or loose CKT 23 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective rear accessory harness.
- Install front accessory harness connector at bulkhead disconnects (page 10-270).



Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 Check basket-light switch harness (CKT 23) at the basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector (CKT 23) at bulkhead disconnect (page 10-270).
- Displace basket-light switch harness connector (CKT 23) at basket disconnect.
- Connect red probe of meter to contact N (CKT 23) of basket-light switch harness connector and black probe to ground.

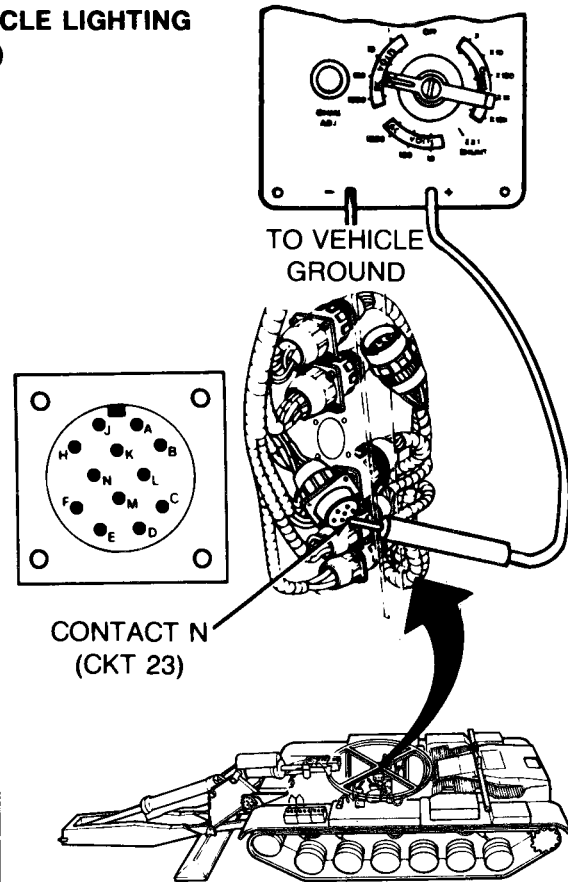
Second Technician (Commander's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc while the brake pedal is pressed.

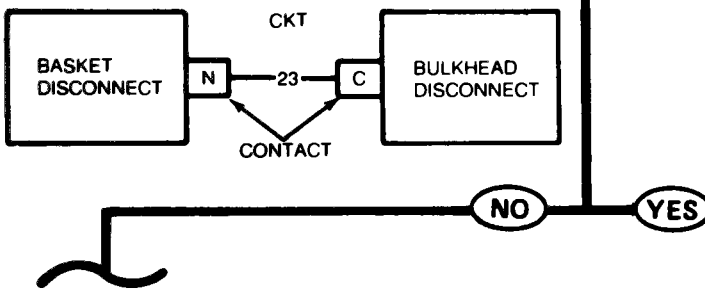
Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

8

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 23 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-light switch harness connector at basket disconnect.



Symptom-62

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

9

Check basket-light switch harness (CKT 23) for continuity from basket disconnect to connector at LIGHTING CONTROL switch.

Second Technician (Operator's Station)

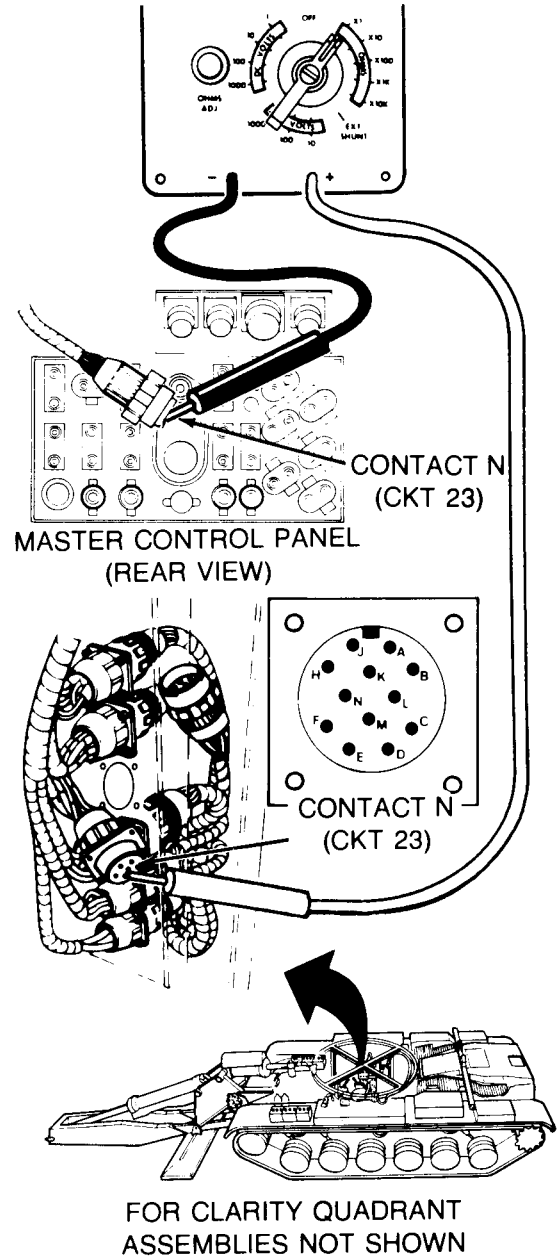
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch on master control panel.

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-81).

Second Technician (Operator's Station)

- Connect red probe of meter to contact N (CKT 23) of basket-light switch harness connector at LIGHTING CONTROL switch.



TA250511

Symptom-62

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

STEP **9** CONTINUED

First Technician (Commander's Station)

- Connect black probe of meter to contact N (CKT 23) of basket-light switch harness connector at basket disconnect.
- Check if meter indicates continuity.

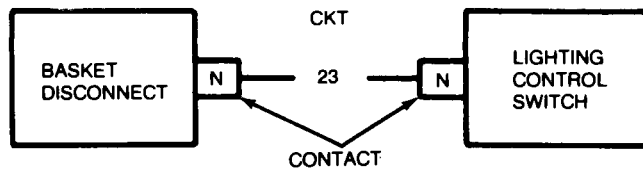
Does meter indicate continuity?

10

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 23 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective basket-light switch harness.
- Install basket-light switch harness connector at basket disconnect.
- Connect basket-light switch harness connector to LIGHTING CONTROL switch.
- Install master control panel (page 10-33).

11

- Replace LIGHTING CONTROL switch (page 10-54).
- Install basket-light switch harness connector at basket disconnect.



TA250512

Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

(Continued)

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

FROM STEP

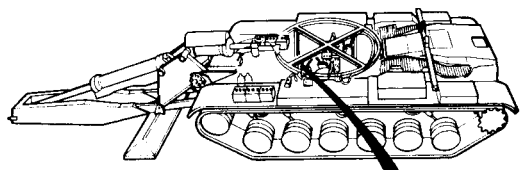
2

12 Check stoplight switch at brake master cylinder for continuity.

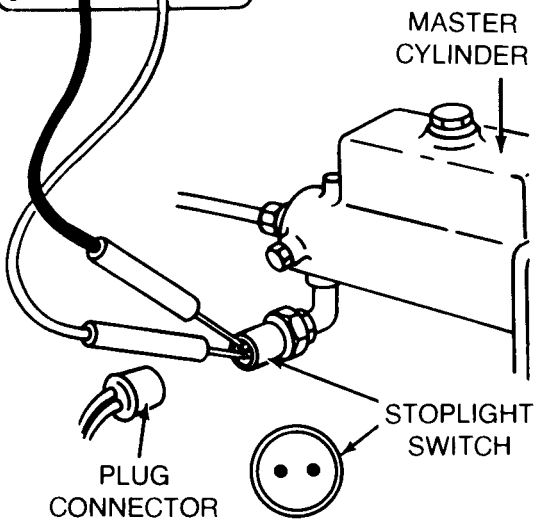
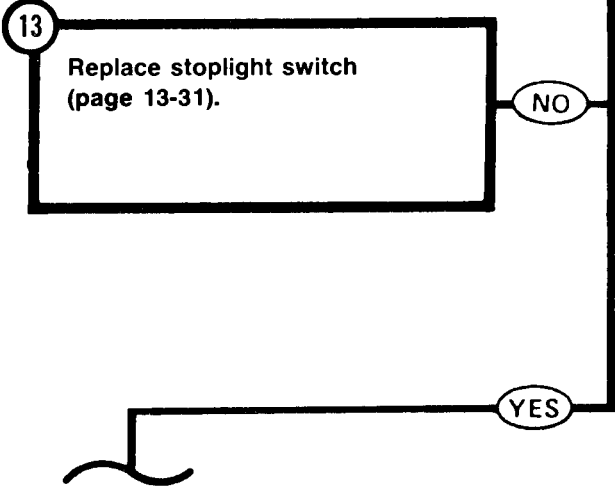
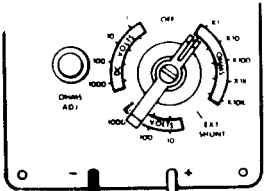
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect basket-light switch harness connector from master cylinder stoplight switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect two probes of meter to the two contacts of stoplight switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

Does meter indicate continuity?



MASTER CYLINDER



TA250513

Symptom-62

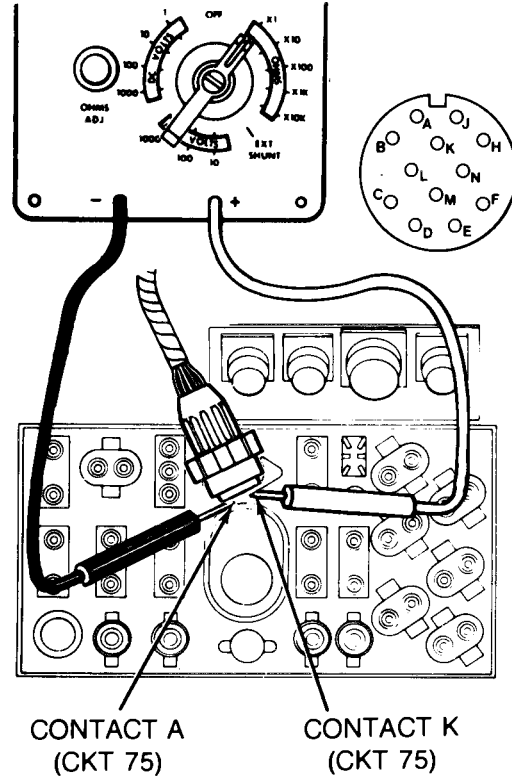
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

14 Check basket-light switch harness (CKT 75) connector at LIGHTING CONTROL switch for continuity from contact A to contact K.

Second Technician (Operator's Station)

- Connect basket-light switch harness connector to master cylinder stoplight switch.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch on master control panel.
- Connect probes of meter to contacts A and K (CKT 75) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

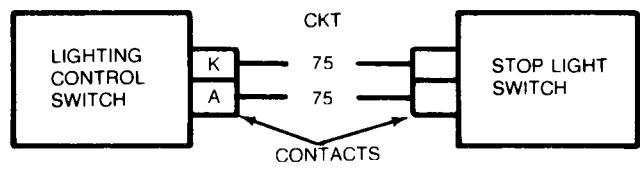
Does meter indicate continuity?



15 Replace LIGHTING CONTROL switch (page 10-54).

16

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 75 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective basket-light switch harness.
- Install master control panel (page 10-33).



TA250514

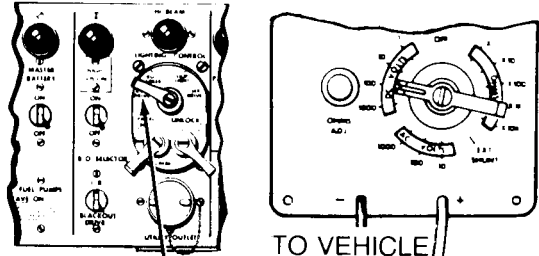
Symptom-63

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

BO DRIVE LAMP WILL NOT LIGHT (IR SERVICE LAMPS WILL LIGHT).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

MASTER CONTROL PANEL



1 Check left headlight base harness (CKT 19) connector for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set BO SELECTOR switch to BLACKOUT DRIVE.
- Turn LIGHTING CONTROL switch lever to BO DRIVE.

First Technician (Left Front of Vehicle)

- Disconnect left headlight assembly from dual base harness connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact G (CKT 19) of dual base harness connector and black probe to ground.

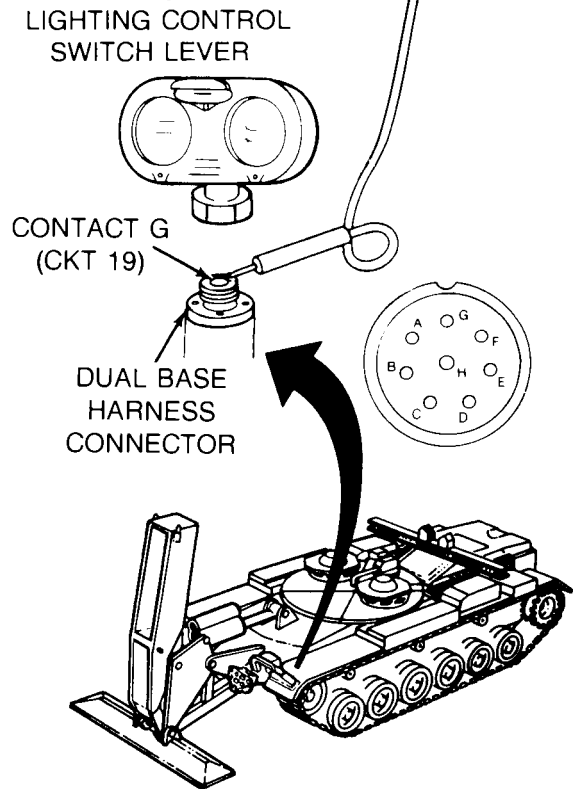
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

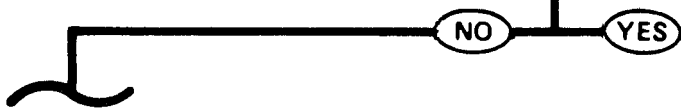
First Technician (Left Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2 Replace left headlight assembly (page 10-172).



Symptom-63

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

3 Check front accessory harness (CKT 19) at connector to headlight base harness for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Front of Vehicle)

- Connect left headlight assembly to dual base harness connector.

Second Technician (Operator's Station)

- Disconnect connector (CKT 19) of front accessory harness from headlight base harness (located inside crew compartment).
- Connect red probe of meter to front accessory harness connector (CKT 19) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

4 Repair left headlight base harness (page 10-186).

YES

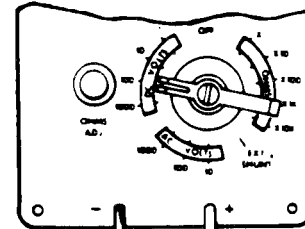
LEFT HEADLIGHT BASE CONN.

G

19

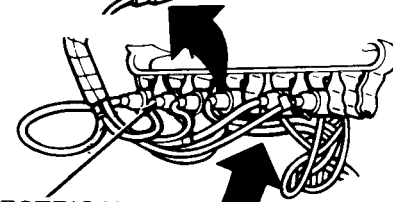
BASE HARNESS CONNECTOR

NO

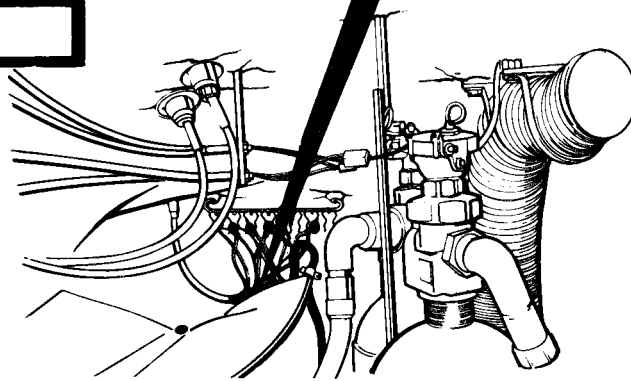


TO VEHICLE GROUND

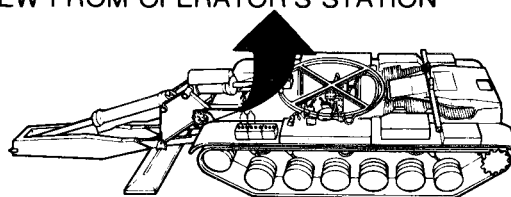
CKT 19



ELECTRICAL CONNECTORS



VIEW FROM OPERATOR'S STATION



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250516

Symptom-63

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

5 Check basket-control panel accessories harness (CKT 14) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect connector (CKT 19) of front accessory harness to headlight base harness.

First Technician (Commander's Station)

- Displace basket-control panel accessories harness (CKT 19) from basket disconnect.
- Connect red probe of meter to contact D (CKT 19) of basket-control panel accessories harness connector and black probe to ground.

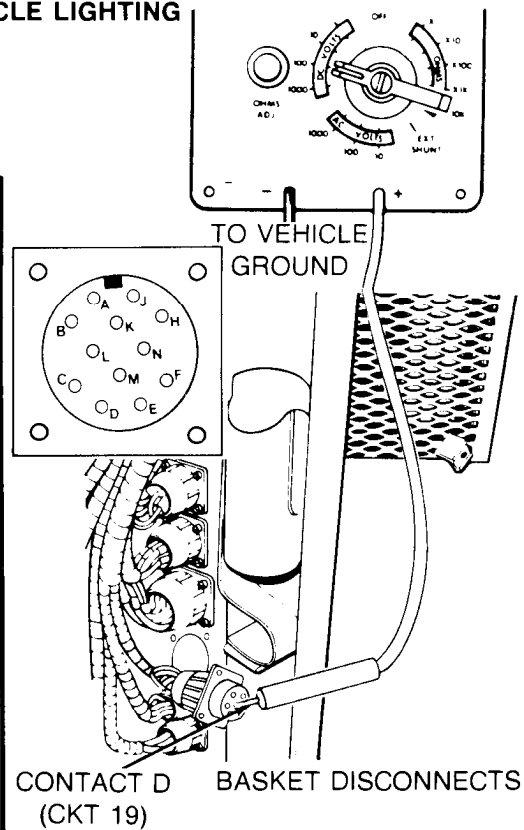
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

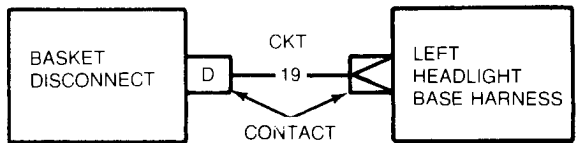
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



6

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 19 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-control panel accessories harness connector at basket disconnect.



Symptom-63

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7

Check master control panel accessories harness (CKT 19) panel connector for electrical power.

Second Technician (Operator's Station).

- Set MASTER BATTERY switch OFF.

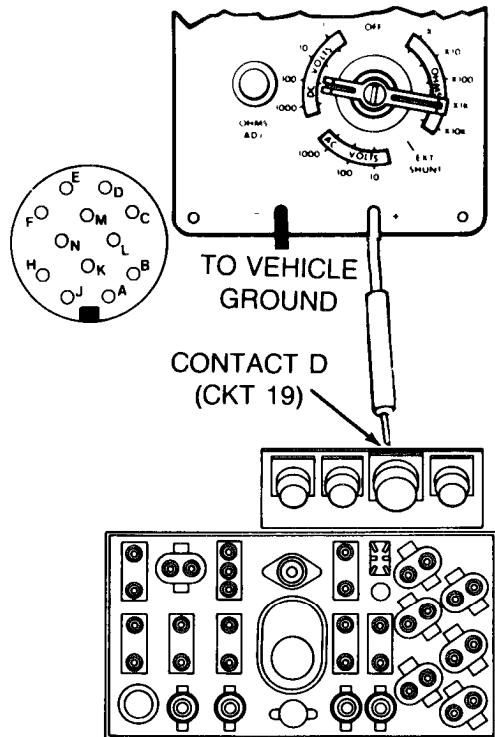
First Technician (Operator's Station)

- Install basket-control panel accessories harness connector at basket disconnect.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact D (CKT 19) of master control panel accessories harness panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

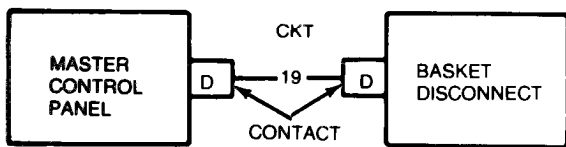
Does meter indicate 18 to 30 volts dc?



MASTER CONTROL PANEL
(REAR VIEW)

8

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 19 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Install basket-control panel accessories harness connector at basket disconnect.
- Install master control panel (page 10-33).



NO

YES

Symptom-63

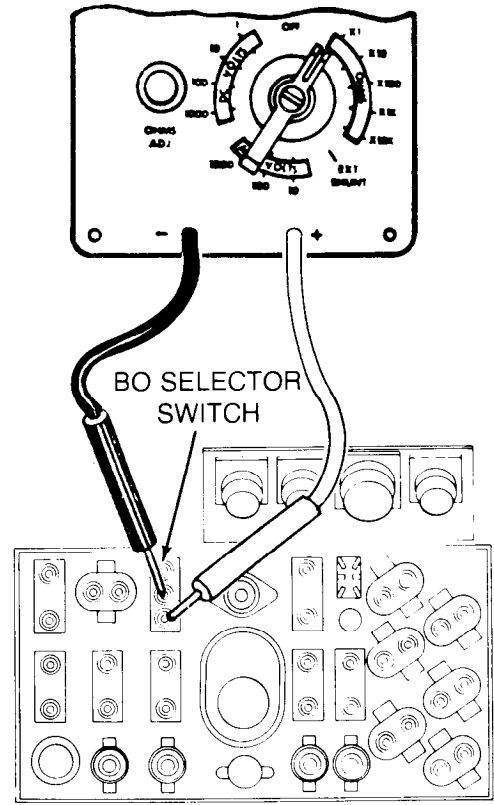
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

9 Check BO SELECTOR switch for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect basket-control panel accessories harness connector to master control panel.
- Disconnect two connectors (CKT 19) from BO SELECTOR switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect probes of meter to contacts (CKT 19) of BO SELECTOR switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



10 Replace master control panel accessories harness (page 10-91).

11 Replace BO SELECTOR switch (page 10-58).

YES

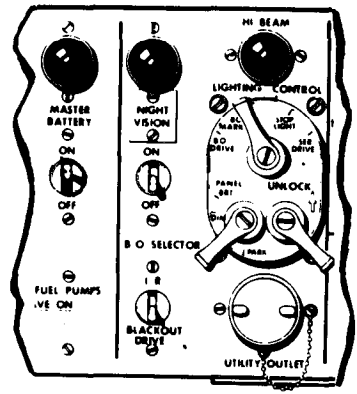
NO

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

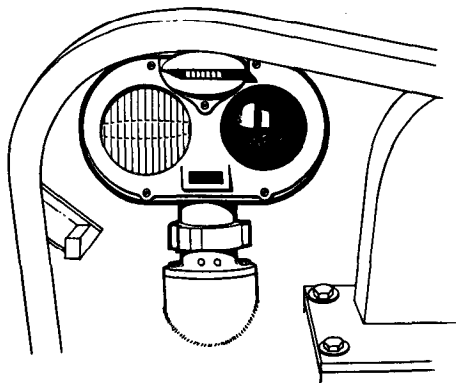
Symptom-64

BOTH BLACKOUT TAILLIGHTS AND/OR BOTH BLACKOUT MARKER LIGHTS WILL NOT LIGHT.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



MASTER CONTROL PANEL



**BLACKOUT MARKER LAMP
(LEFT SIDE SHOWN)**

1 Check if both blackout marker lamps will light.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Turn LIGHTING CONTROL switch to B.O. MARKER.

First Technician (Front of Vehicle)

- Visually check if blackout marker lamps on both headlights are lit.

Are B.O. marker lamps in both headlight assemblies lit?

2

- Check front accessory harness connector (CKT 24) at bulkhead disconnect for electrical power.
- See Step 10



TA250520

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-64

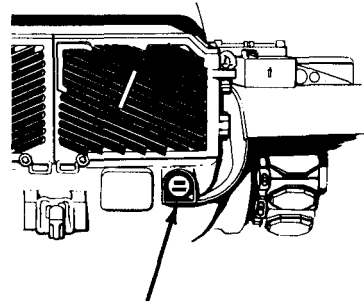
3

Check if both blackout taillights will light.

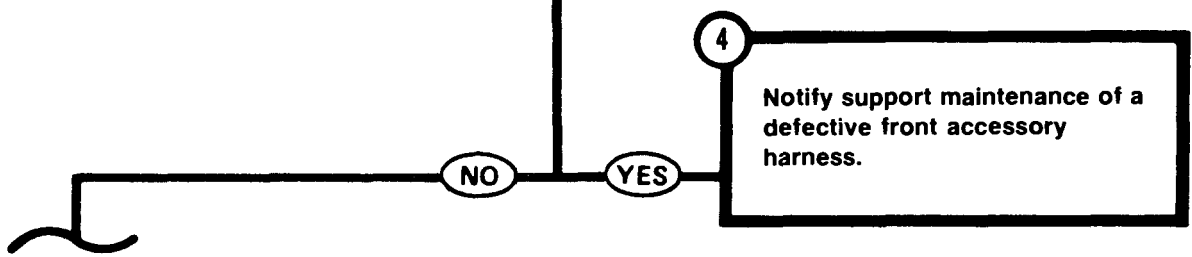
First Technician (Rear of Vehicle)

Visually check if both blackout taillight lamps are lit.

Are blackout taillight lamps in both taillight assemblies lit?



**BLACKOUT TAILLIGHT
(RIGHT SIDE SHOWN)**



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-64

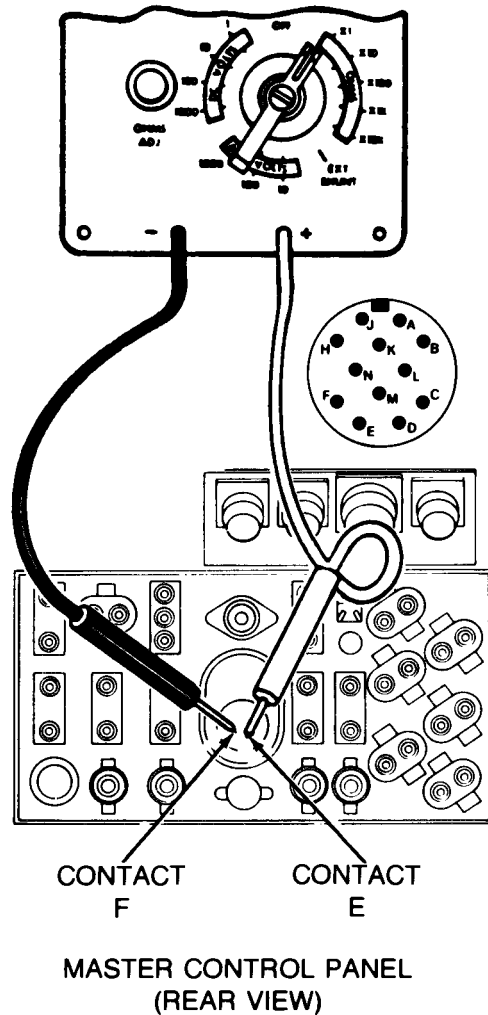
5

Check LIGHTING CONTROL switch for continuity from connector contact E to connector contact F (CKT 20-24).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact E of LIGHTING CONTROL switch.
- Connect black probe of meter to contact F of LIGHTING CONTROL switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



6

Replace LIGHTING CONTROL switch (page 10-54).

YES

NO

Symptom-64

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

7 Check basket-light switch harness (CKT 20-24) from LIGHTING CONTROL switch to basket disconnect for continuity.

First Technician (Commander's Station)

- Displace basket-light switch harness connector (CKT 20-24) from basket disconnect.
- Connect red probe of meter to contact E (CKT 20-24) of basket-light switch harness connector at basket disconnect.

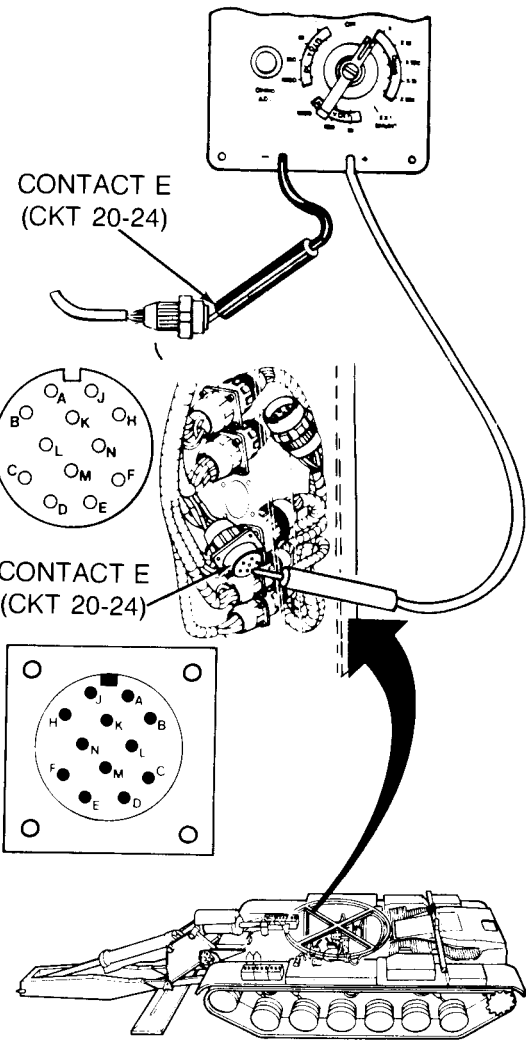
Second Technician (Operator's Station)

- Connect black probe to contact E (CKT 20-24) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Check if meter indicates continuity.

Does meter indicate continuity.

8

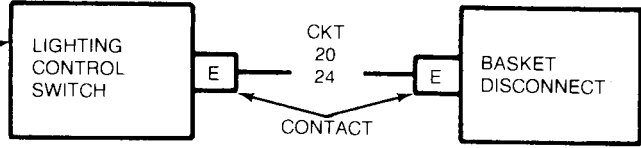
- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 20-24 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
- Install basket-light switch harness connector at basket disconnect.
- Connect basket-light switch harness connector to LIGHTING CONTROL switch.
- Install master control panel (page 10-33).



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

9 Replace LIGHTING CONTROL switch (page 10-54).

NO YES



Symptom-64

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

FROM STEP

2

10 Check front accessory harness connector (CKT 24) at bulkhead disconnect for electrical power.

Second Technician (Operator's Station)

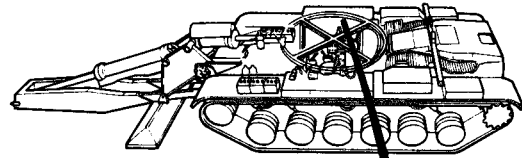
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

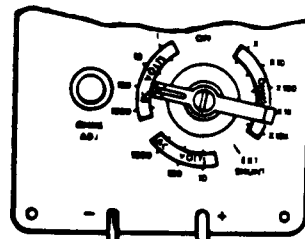
- Displace front accessory harness connector (CKT 24) at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact D (CKT 24) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

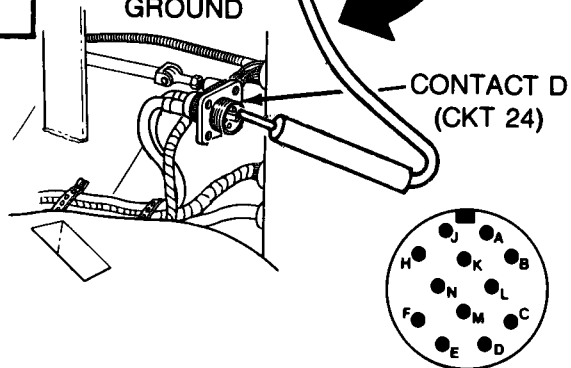
- Set MASTER BATTERY switch ON.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TO VEHICLE GROUND



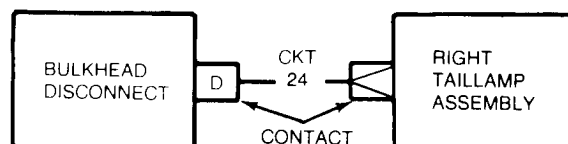
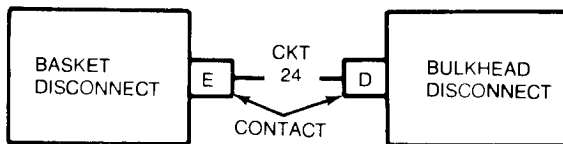
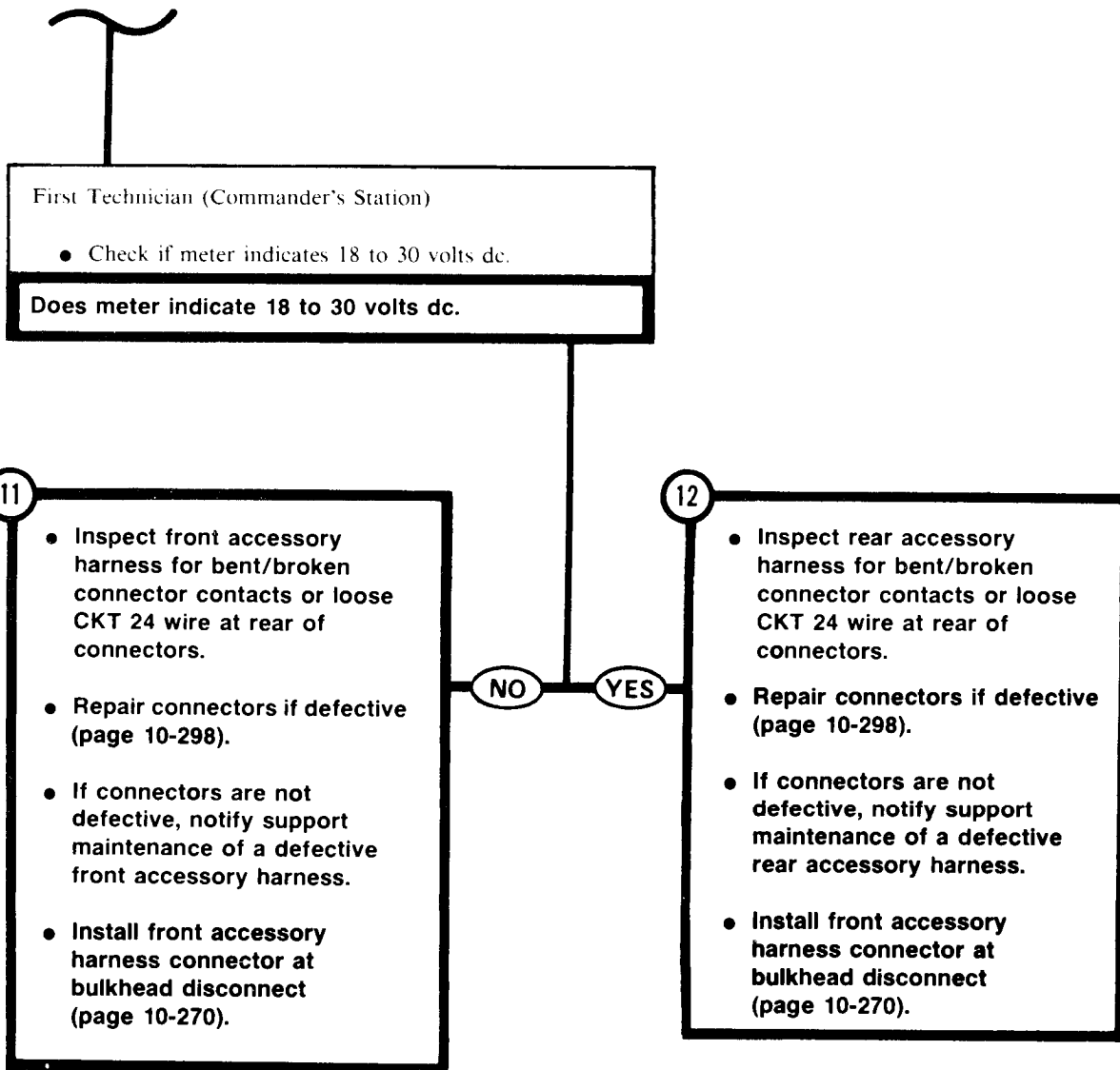
BULKHEAD DISCONNECTS
(COMMANDER'S STATION)

TA250524

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-64

STEP **10** CONTINUED



TA250525

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

Symptom-65

ONE HEADLIGHT BLACKOUT MARKER LAMP OR ONE TAILLIGHT BLACKOUT MARKER LAMP WILL NOT LIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check if one headlight blackout marker lamp or one taillight blackout marker lamp is not working.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn LIGHTING CONTROL lever to B.O. MARKER.

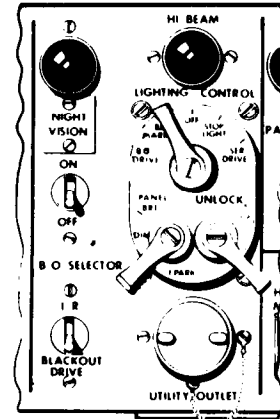
First Technician (Front of Vehicle)

- Visually check headlights to see if one blackout marker lamp is not lit.

First Technician (Rear of Vehicle)

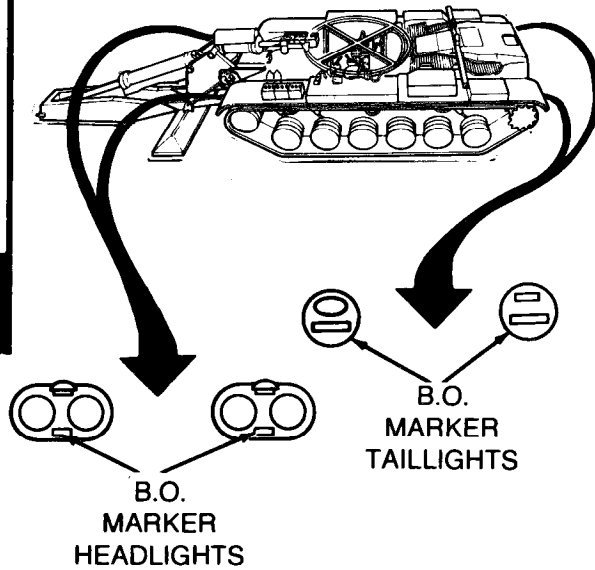
- Visually check taillights to see if one blackout marker lamp is not lit.

Is one headlight blackout marker lamp or one taillight blackout marker lamp not lit?



**MASTER CONTROL
PANEL**

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN



2

- Check headlight base harness connector (CKT 20), at headlight assembly that does not work, for electrical power.
- See Step 6.

HEAD LIGHT

TAIL LIGHT

TA250526

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-65

3 Check rear accessory harness (CKT 24) at taillight that does not work for electrical power.

- Second Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.
- First and Second Technicians (Rear Grille Doors)
- Remove transmission shroud (page 9-2).
- First Technician (Rear Grille Doors)
- Disconnect rear accessory harness connector (CKT 24) from taillight assembly that does not work.
 - Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
 - Connect red probe of meter to rear accessory harness (CKT 24) connector and black probe to ground.
- Second Technician (Operator's Station)
- Set MASTER BATTERY switch ON.
- First Technician (Rear Grille Doors)
- Check if meter indicates 18 to 30 volts dc.

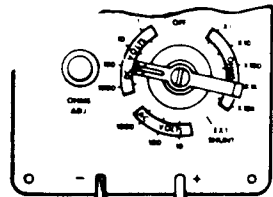
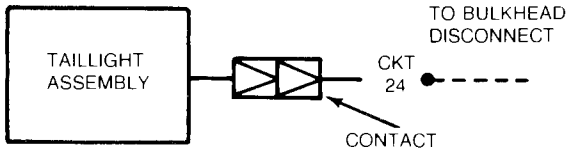
Does meter indicate 18 to 30 volts dc?

4 Replace socket and wiring assembly (page 10-298).

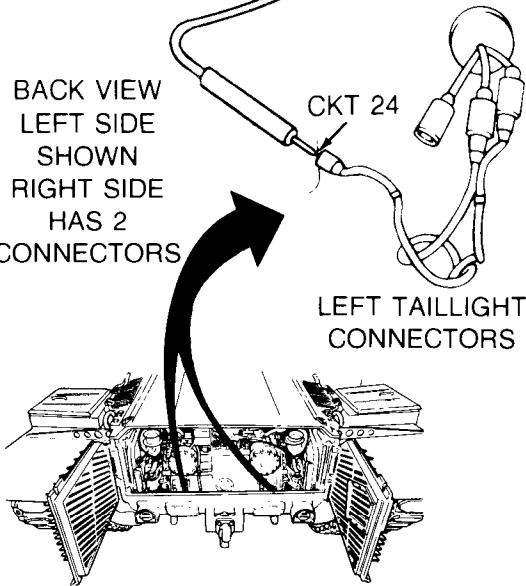
YES NO

5

- Inspect rear accessory harness for bent/broken connector contact or loose CKT 24 wire at rear of connector.
- Repair connector if defective (page 10-298).
- If connector is not defective, notify support maintenance of a defective rear accessory harness.
- Connect rear accessory harness connector (CKT 24) to taillight assembly.
- Install transmission shroud (page 9-6).



BACK VIEW
LEFT SIDE
SHOWN
RIGHT SIDE
HAS 2
CONNECTORS



Symptom-65

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP

2

6 Check headlight base harness connector (CKT 20), at headlight assembly that does not work, for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Vehicle)

- Remove headlight assembly that does not work (page 10-172).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact F (CKT 20) of headlight base harness connector and black probe to ground.

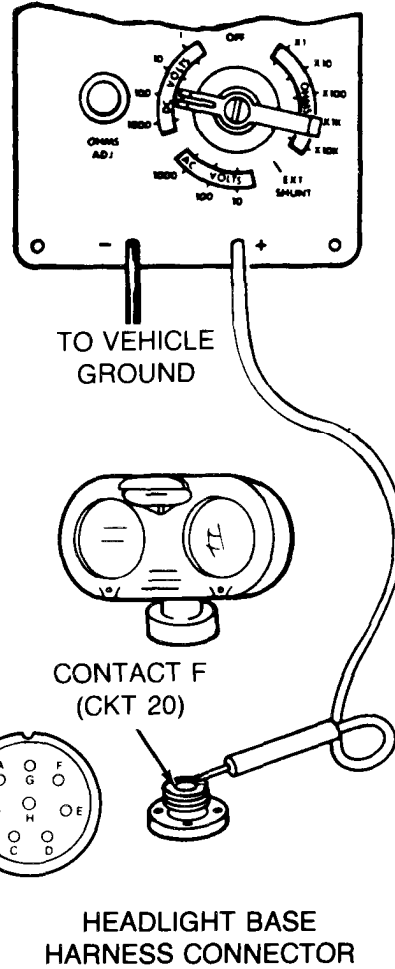
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



7 Replace headlight assembly (page 10-172).



Symptom-65

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

8 Check front accessory harness (CKT 20) at headlight base harness to headlight assembly that does not work, for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

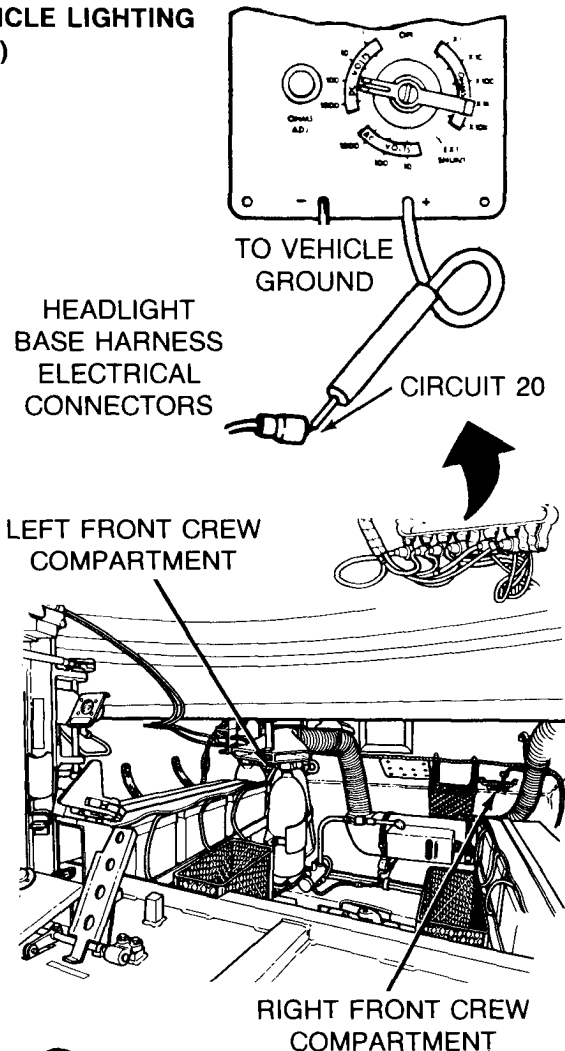
First Technician (Front of Vehicle)

- Connect headlight assembly to headlight base harness connector.

Second Technician (Front of Crew Compartment)

- Disconnect connector (CKT 20) of front accessory harness from headlight base harness, of defective headlight.
- Connect red probe of meter to front accessory harness (CKT 20) connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



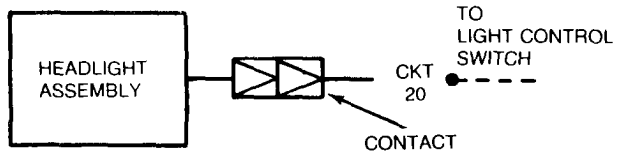
9

- Repair headlight base harness (CKT 20) (page 10-186).

YES NO

10

- Inspect front accessory harness for bent/broken connector contact or loose CKT 20 wire at rear of connector.
- Repair connector if defective (page 10-298).
- If connector is not defective, notify support maintenance of defective front accessory harness.
- Connect front accessory harness to headlight base harness.



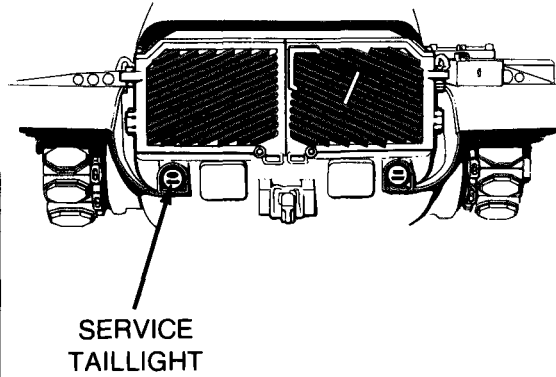
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

Symptom-66

HIGH BEAM OR LOW BEAM, IN ONE SERVICE HEADLIGHT LAMP WILL NOT LIGHT, OR SERVICE TAILLIGHT WILL NOT LIGHT (PANEL LIGHT SWITCH, AT BRIGHT, DIM, OR OFF).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1

Check if service taillight will light.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set LIGHTING CONTROL switch to SER DRIVE and PANEL switch to BRT.

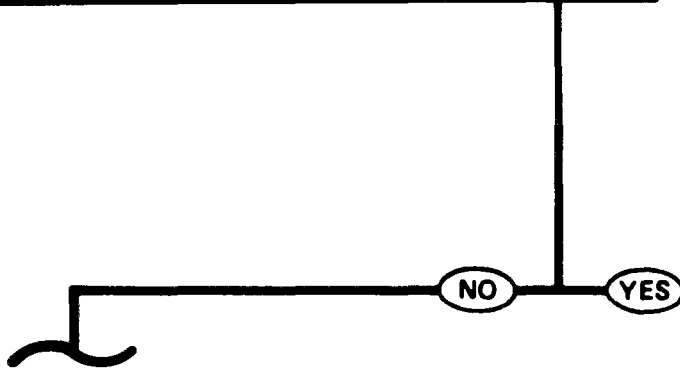
Second Technician (Rear of Vehicle)

- Visually check if service taillight is working.

Does service taillight light?

2

- Check if high beam or low beam in bad service headlight lamp will not light.
- See Step **12**



Symptom-66

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

3 Check rear accessory harness connector (CKT 21) at left taillight for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect rear accessory harness connector (CKT 21) from left taillight assembly.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 21) and black probe to vehicle ground.

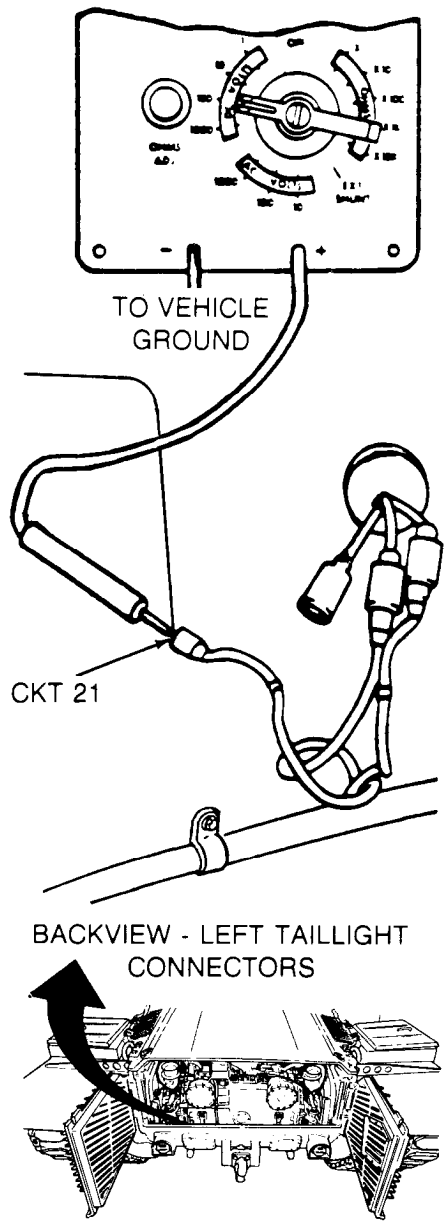
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

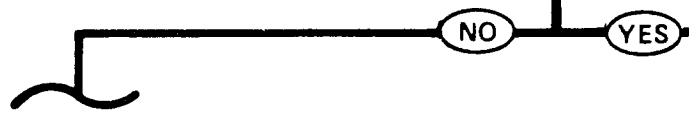
First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



4 Replace socket and wiring assembly in left taillight (page 10-207).



Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5 Check front accessory harness connector (CKT 21) at bulkhead disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear Grille Doors)

- Connect rear accessory harness connector (CKT 21) to left taillamp assembly.

First and Second Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 21) from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact A (CKT 21) of front accessory harness connector at bulkhead disconnect, and black probe to ground.

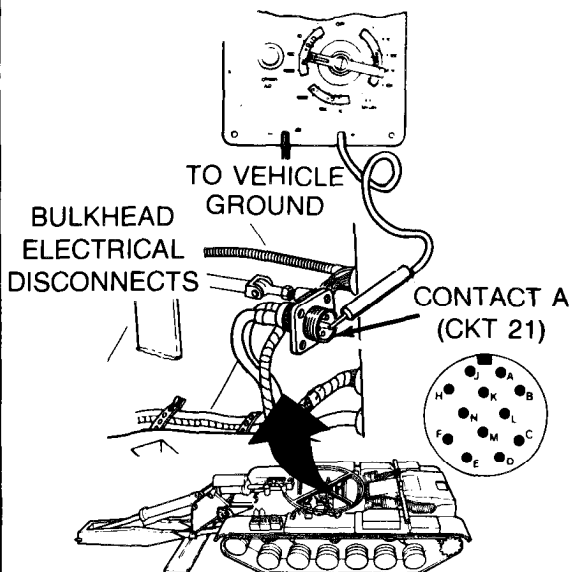
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

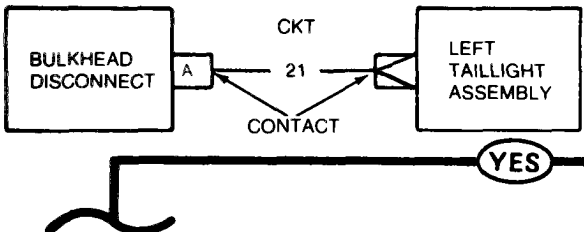
Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

6

- Inspect rear accessory harness for bent/broken connector contacts or loose CKT 21 wire at rear of connectors.
- Repair connectors if defective. (page 10-298).
- If connectors are not defective, notify support maintenance of a defective rear accessory harness.
- Install front accessory harness connector at bulkhead disconnect (page 10-270).



Symptom-66

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

7 Check basket-light switch harness connector (CKT 21) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-light switch harness connector from basket disconnect.
- Connect red probe of meter to contact "H" (CKT 21) of basket-control panel harness connector at basket disconnect, and black probe to ground.

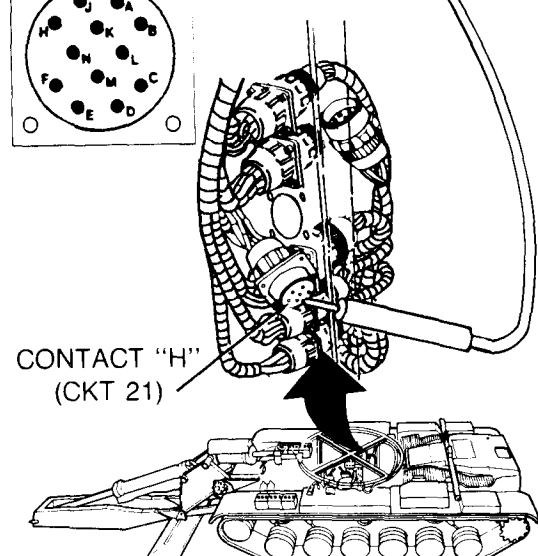
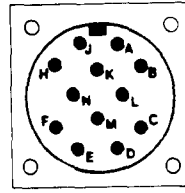
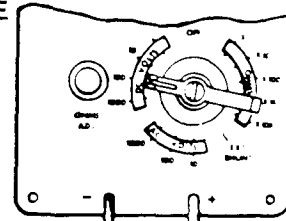
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

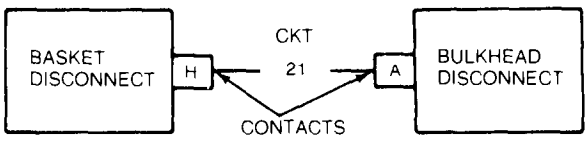
Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

8

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 21 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessories harness.
- Install basket-light switch harness connector at basket disconnect.



Symptom-66

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

9

Check basket-light switch harness (CKT 21) for continuity from connector at basket disconnect to connector at LIGHTING CONTROL switch.

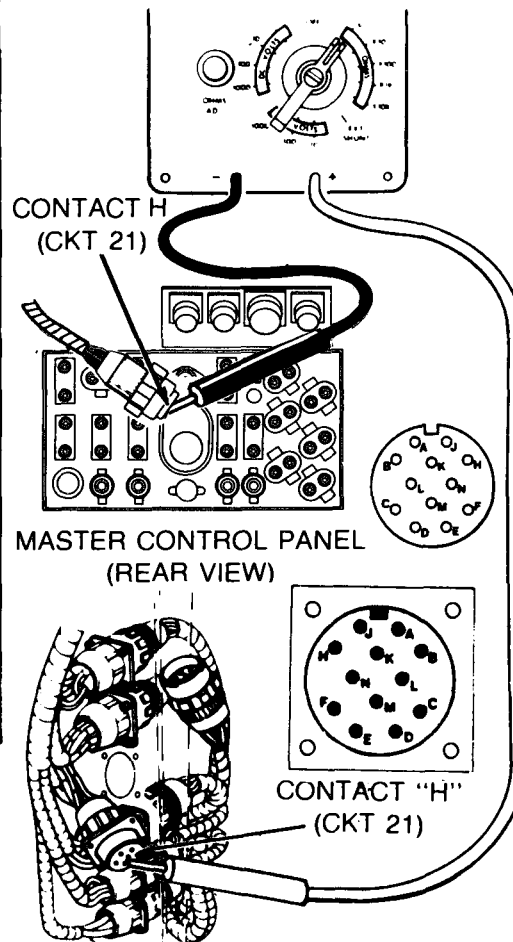
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket light switch harness connector from LIGHTING CONTROL switch on master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect black probe of meter to contact H (CKT 21) of basket-light switch harness connector at LIGHTING CONTROL switch.

First Technician (Commander's Station)

- Connect red probe of meter to contact H (CKT 21) of basket-light switch harness connector at basket disconnect.

Second Technician (Operator's Station)



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-66

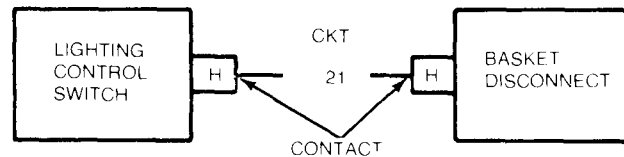
STEP **9** CONTINUED

• Check if meter indicates continuity.

Does meter indicate continuity?

- 10**
- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 21 wire at rear of connectors.
 - Repair connectors if defective (page 10-298).
 - If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
 - Connect basket-light switch harness connector to LIGHTING CONTROL switch at master control panel.
 - Install basket-light switch harness connector at basket disconnect.
 - Install master control panel (page 10-33).

- 11**
- Replace LIGHTING CONTROL switch (page 10-54).
 - Install basket-light switch harness connector at basket disconnect.



TA250535

Symptom-66

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

FROM STEP

2

12 Check if high beam or low beam in bad service headlight lamp will not light.

Second Technician (Front of Vehicle)

- Visually check if high beam or low beam in service headlight lamp will not light.

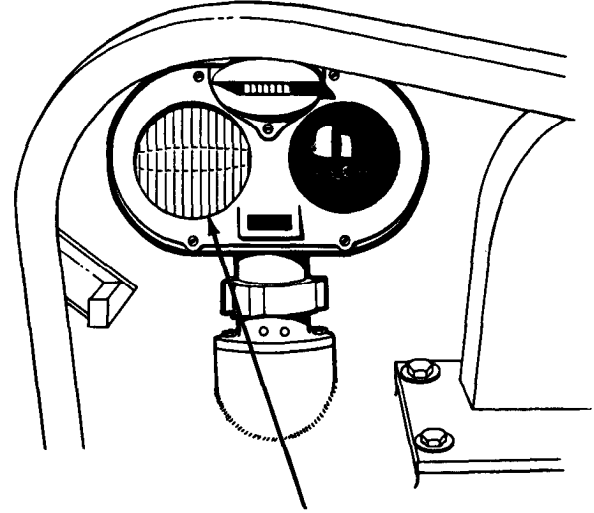
First Technician (Operator's Station)

- Press and release foot DIMMER SWITCH.

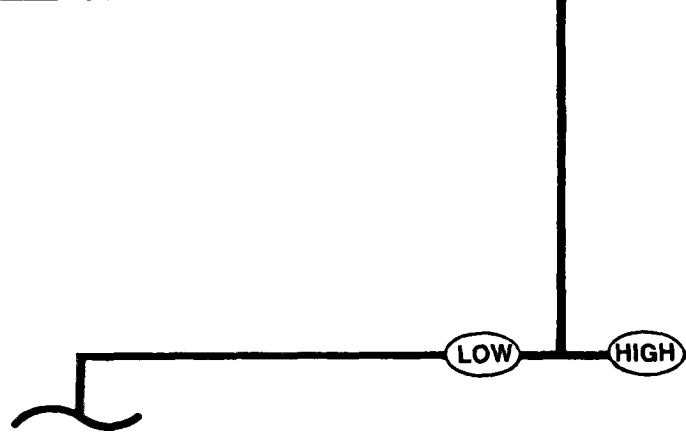
Second Technician (Front of Vehicle)

- Visually check if high beam or low beam in service headlight lamp will not light.

Which beam in service headlight lamp does not light?



SERVICE HEADLIGHT LAMP
(LEFT SIDE SHOWN)



13

- Check dual headlight base harness connector (CKT 17) at bad service headlight for electrical power.
- See Step 19 .

Symptom-66

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**
(Continued)

14 Check dual headlight base harness (CKT 18) connector at bad service headlight for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Remove headlight assembly of bad service lamp (page 10-172).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 18) of dual headlight base harness connector and black probe to ground.

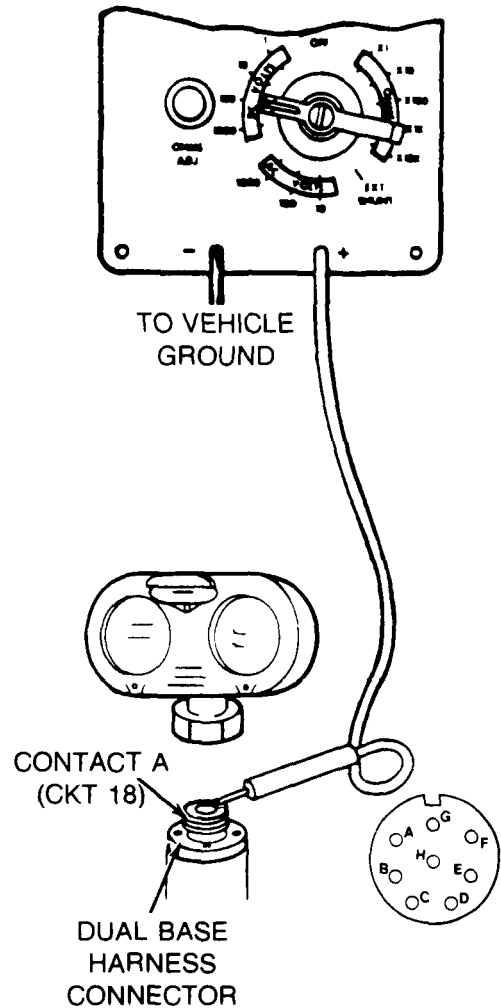
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts?



15 Replace bad headlight assembly (page 10-172).

NO YES

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
 (Continued)

FOR CLARITY QUADRANT
 ASSEMBLIES NOT SHOWN

NOTE

If the problem is with the left side service lamp check the left side intermediate connectors. If the problem is with the right side service lamp, check the right side intermediate connectors.

16 Check front accessory harness (CKT 18) at intermediate connector for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Install headlight assembly (page 10-172).

Second Technician (Front of Crew Compartment)

- Disconnect intermediate connector (CKT 18) of front accessory harness from dual headlight base harness connector of bad service lamp.
- Connect red probe of meter to front accessory harness connector (CKT 18) of bad service lamp and black probe to ground.

First Technician (Operator's Station)

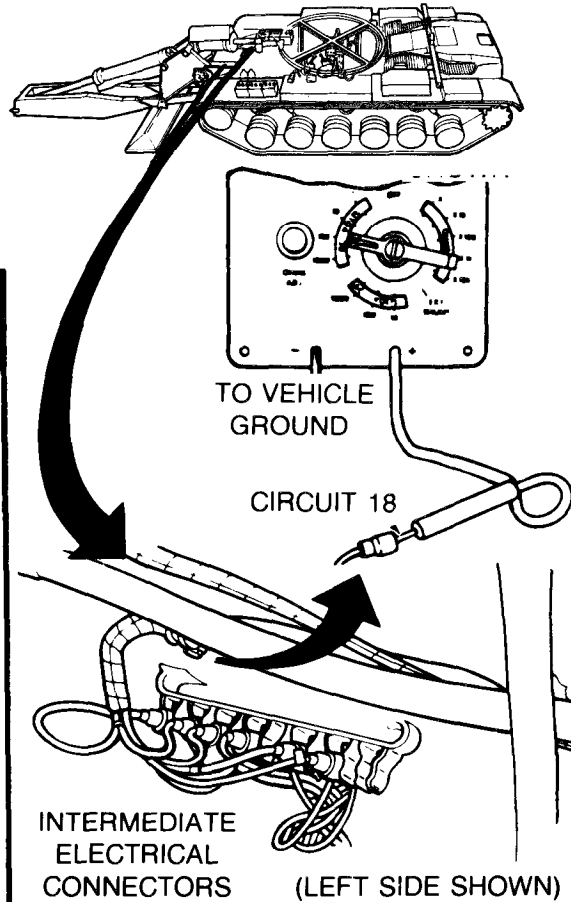
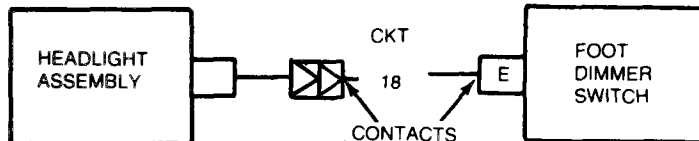
- Set MASTER BATTERY switch ON.
- Second Technician (Front of Crew Compartment)
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

17 Repair dual headlight base harness (page 10-298).

YES

NO



18

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 18 wire at rear of connectors.

- Repair connectors if defective. (page 10-298).

- If connectors are not defective, notify support maintenance of a defective front accessory harness.

- Connect front accessory harness intermediate connector.

Symptom-66

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

FROM STEP

13

19 **Check dual headlight base harness connector (CKT 17) at bad service headlight for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Remove headlight assembly of bad service lamp (page 10-172).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 17) of dual headlight base harness connector and black probe to ground.

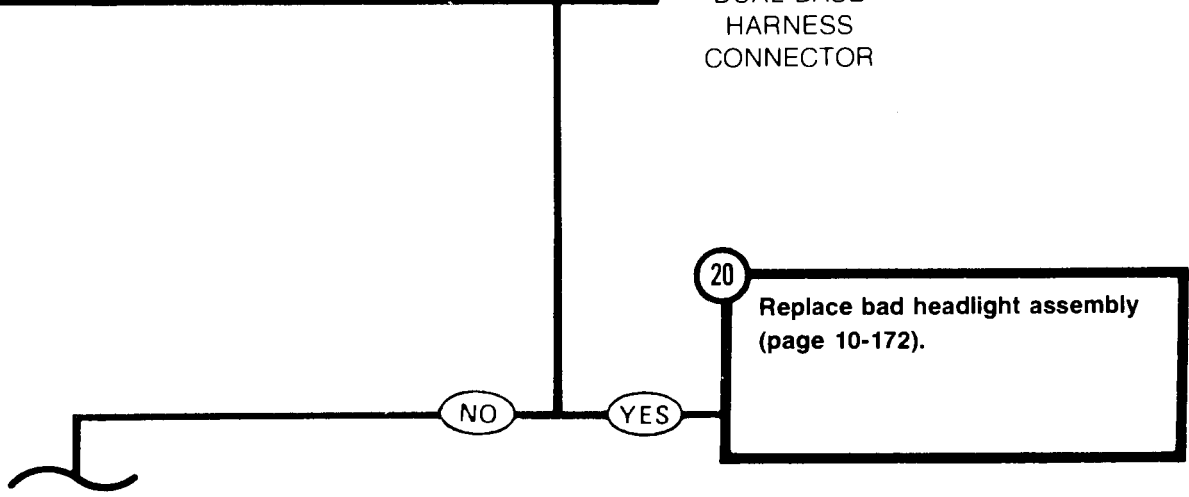
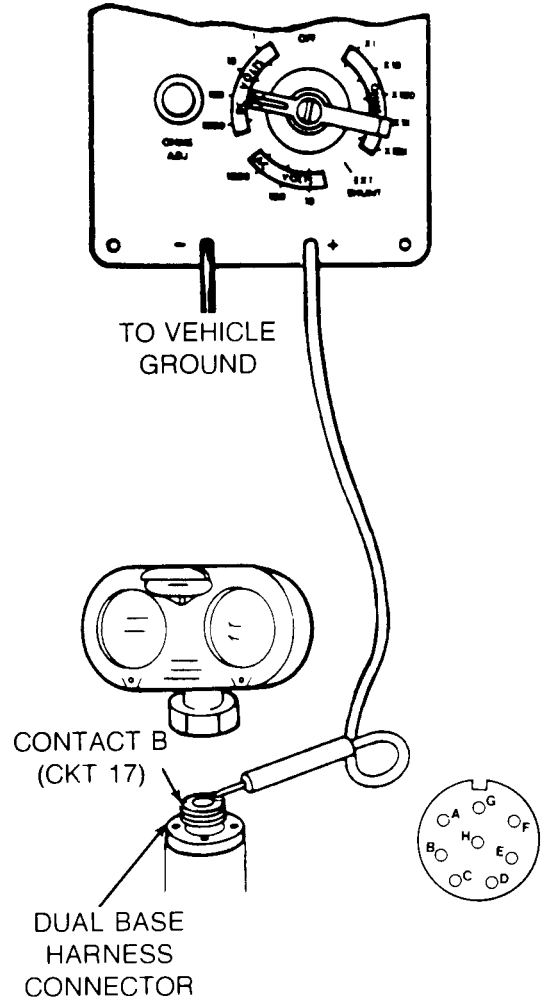
First Technician (Operator's Station)

- Set MASTER BATTERY switch to ON.

Second Technician (Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

(Continued)

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

NOTE
If the problem is with the left side service lamp check the left side intermediate connectors. If the problem is with the right side service lamp, check the right side intermediate connectors.

21 Check front accessory harness (CKT 17) at intermediate connector for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Install headlight assembly (page 10-172).

Second Technician (Front of Crew Compartment)

- Disconnect intermediate connector (CKT 17) of front accessory harness from dual headlight base harness connector of bad service lamp.
- Connect red probe of meter to front accessory harness connector (CKT 17) of bad service lamp and black probe to ground.

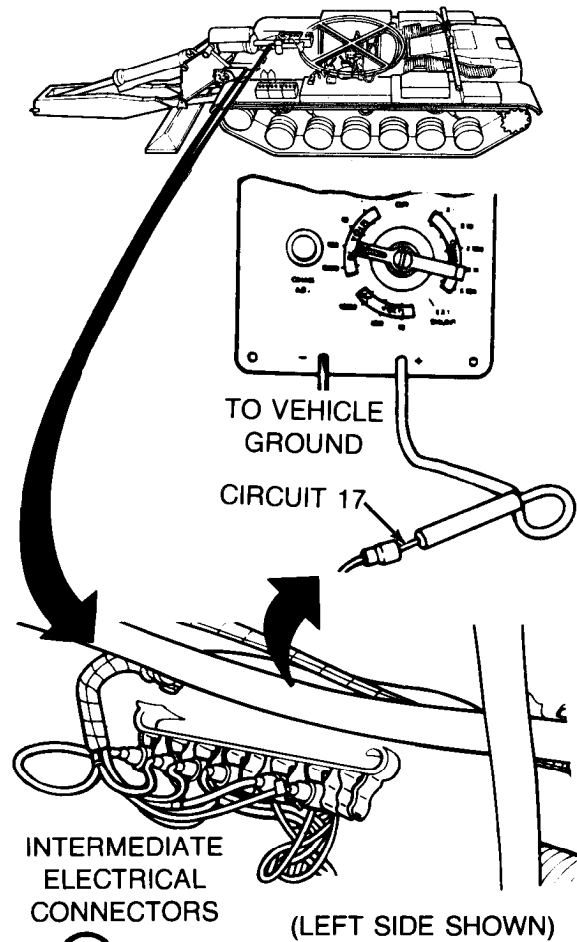
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

Second Technician (Front of Crew Compartment)

- Check if meter indicates 18 to 30 volts dc.

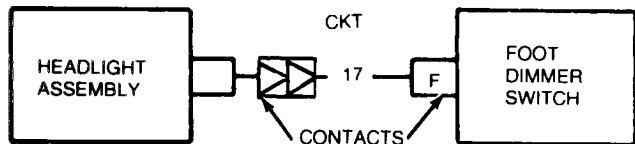
Does meter indicate 18 to 30 volts dc?



22 Repair dual headlight base harness (page 10-298).

23

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 17 wire at rear of connectors.
- Repair connectors if defective.
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Connect front accessory harness intermediate connector.



TA250540

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING**

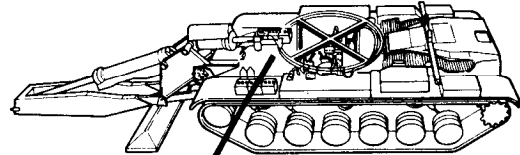
Symptom-67

BOTH HIGH BEAM AND/OR BOTH LOW BEAM SERVICE LAMPS WILL NOT LIGHT (DIMMER SWITCH IN EITHER POSITION).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

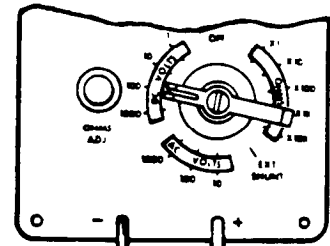
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



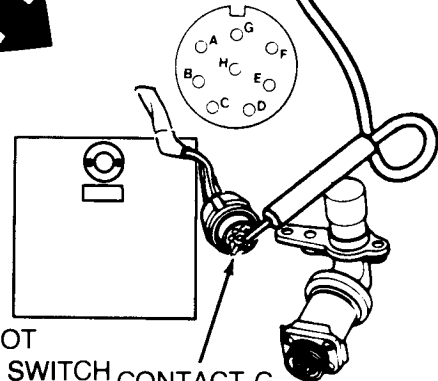
1 Check front accessory harness (CKT 16) at foot DIMMER SWITCH for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-169).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact G (CKT 16) of front accessory harness connector at foot DIMMER SWITCH and black probe to ground.
- Set LIGHTING CONTROL switch to SER DRIVE and PANEL light switch to BRT.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.



TO VEHICLE GROUND



FOOT DIMMER SWITCH CONTACT G (CKT 16)

Does meter indicate 18 to 30 volts dc?

YES

NO

2

- Check basket-light switch harness connector (CKT 16) at basket disconnect for electrical power.
- See Step 10 .

Symptom-67

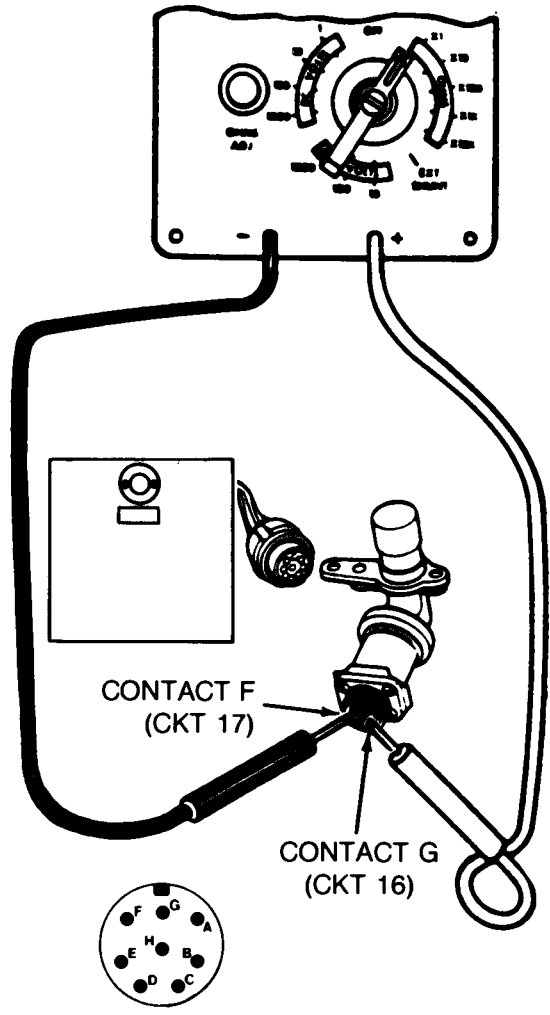
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

3 Check foot DIMMER SWITCH for continuity from contact F to contact G in both switch positions.

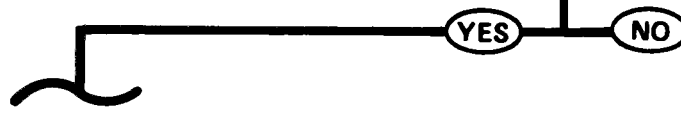
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 16) of foot DIMMER SWITCH.
- Connect black probe of meter to contact F (CKT 17) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



4 Replace foot DIMMER SWITCH (page 10-169).



DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

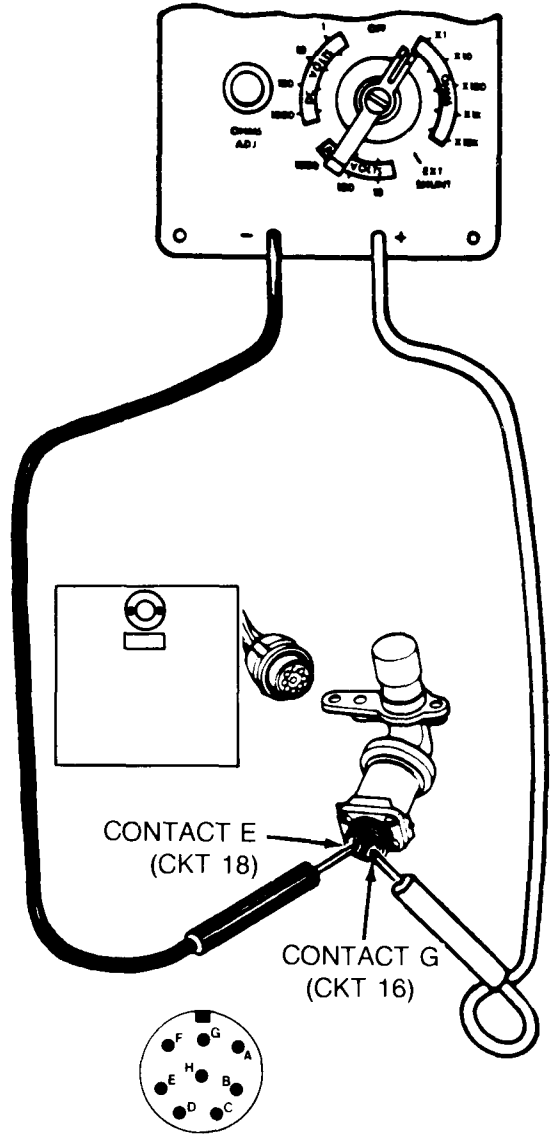
Symptom-67

5 Check foot DIMMER SWITCH for continuity from contact E to contact G in both switch positions.

Second Technician (Operator's Station)

- Connect red probe of meter to contact G (CKT 16) of foot DIMMER SWITCH.
- Connect black probe of meter to contact E (CKT 18) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



YES

NO

6 Replace foot DIMMER SWITCH (page 10-169).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-67

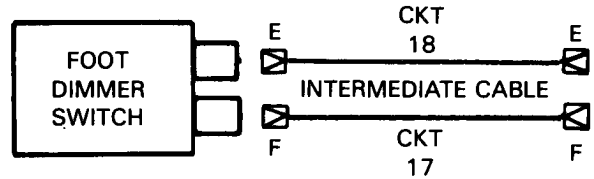
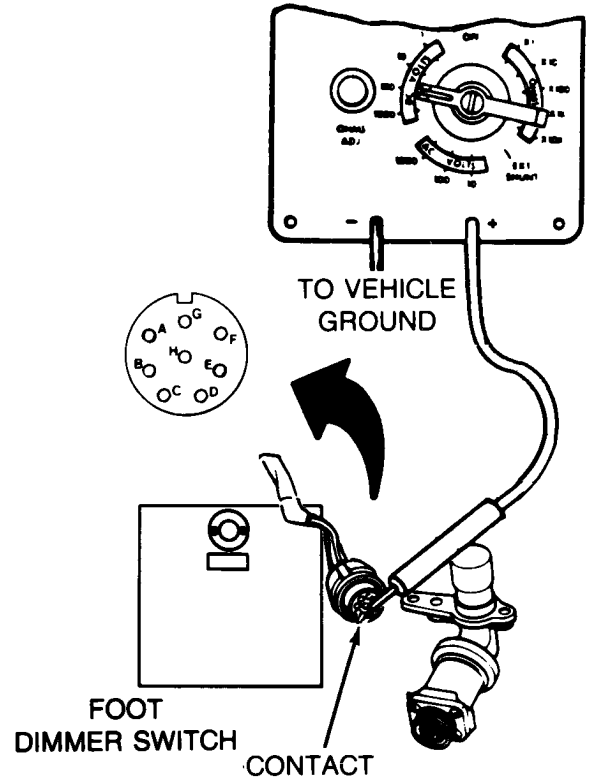
7

Check continuity of CKT 17 and CKT 18 in intermediate cable.

Second Technician (Operator's Station)

- Connect red probe of meter to contact F (CKT 17) of foot DIMMER SWITCH cable connector.
- Connect black probe of meter to contact F (CKT 17) of intermediate cable connector.
- Check if meter indicates continuity.
- Connect red probe of meter to contact E (CKT 18) of foot DIMMER SWITCH cable connector.
- Connect black probe of meter to contact E (CKT 18) of intermediate cable connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



8

- Inspect front accessory harness (CKT 17 for high beam or CKT 18 for low beam) for bent/broken connector contacts or loose CKT 17/18 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install foot DIMMER SWITCH (page 10-170).

YES NO

9

Repair intermediate cable (page 10-298).

TA250544

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-67

FROM STEP



10 Check basket-light switch harness connector (CKT 16) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Install foot DIMMER SWITCH.

First Technician (Commander's Station)

- Displace basket-light switch harness connector (CKT 16) at basket disconnect (page 10-269).
- Connect red probe of meter to contact M (CKT 16) of basket-light switch harness connector and black probe to ground.

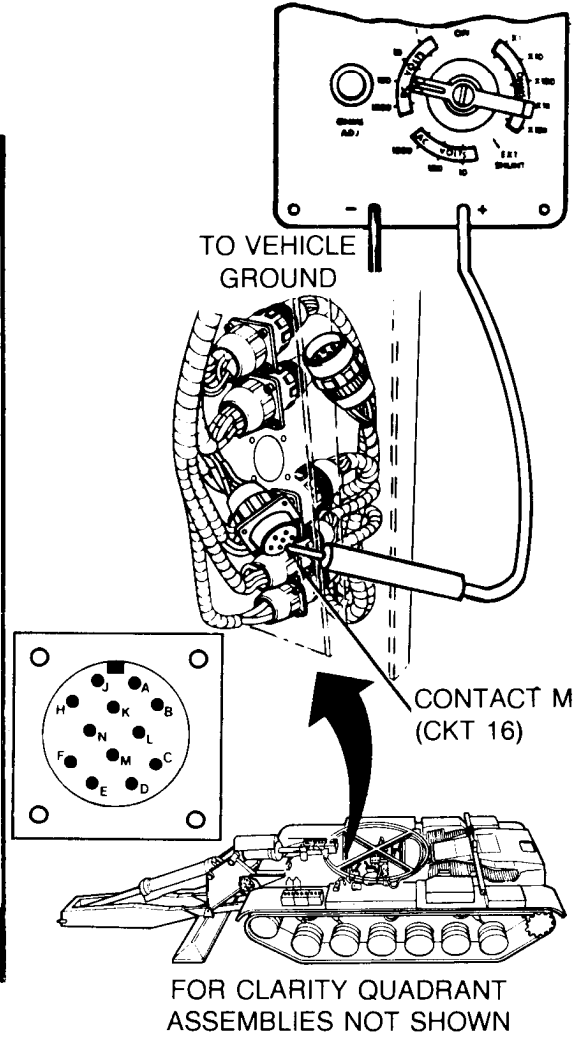
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



• See step 14.

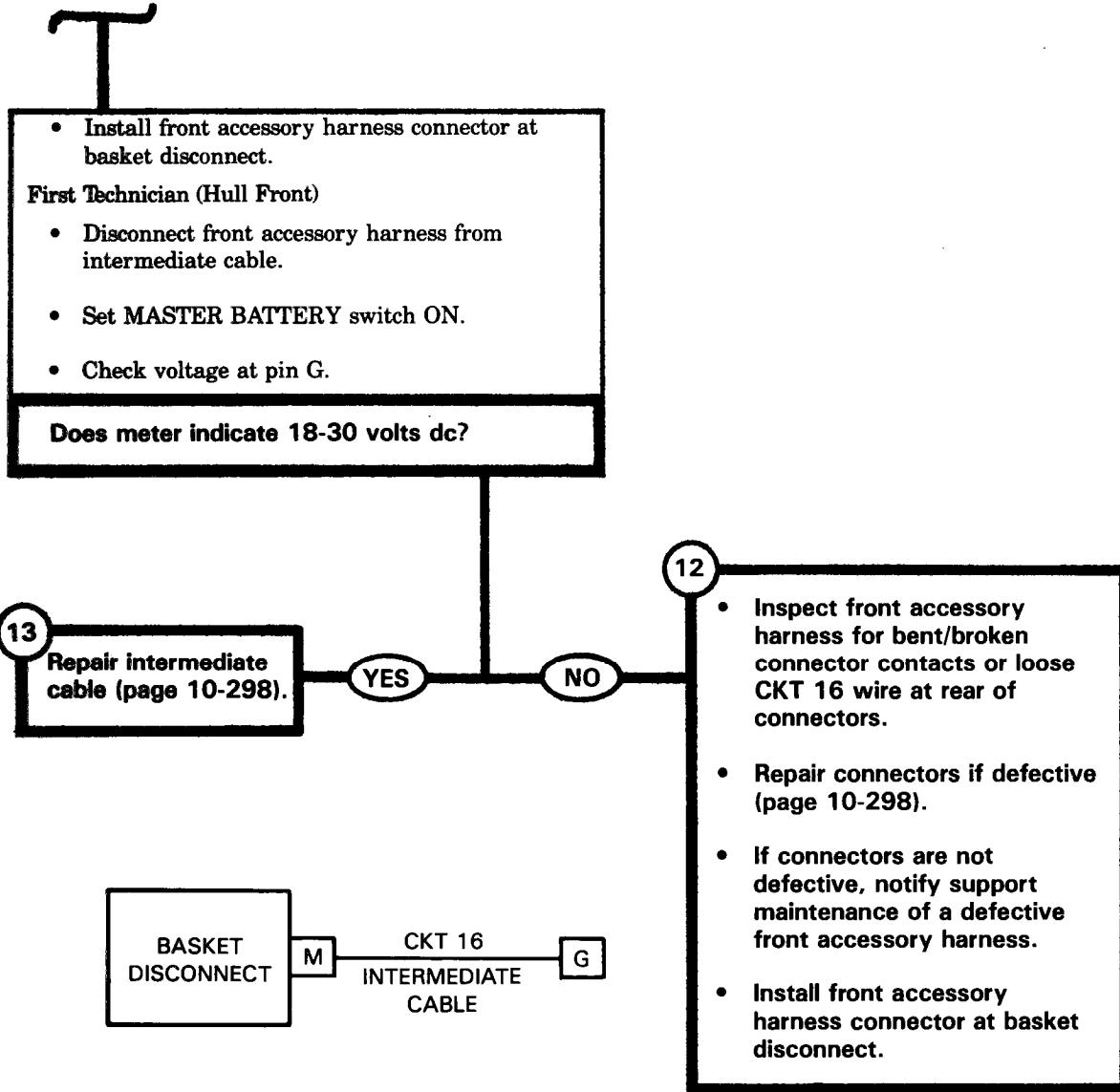
Check CKT 16 at intermediate cable.

- Set master battery switch OFF.

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-67

STEP 11 CONTINUED



TA250546

Symptom-67

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

FROM STEP

10

14

Check basket-light switch harness (CKT 16) from connector at basket disconnect to connector at LIGHTING CONTROL switch for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.

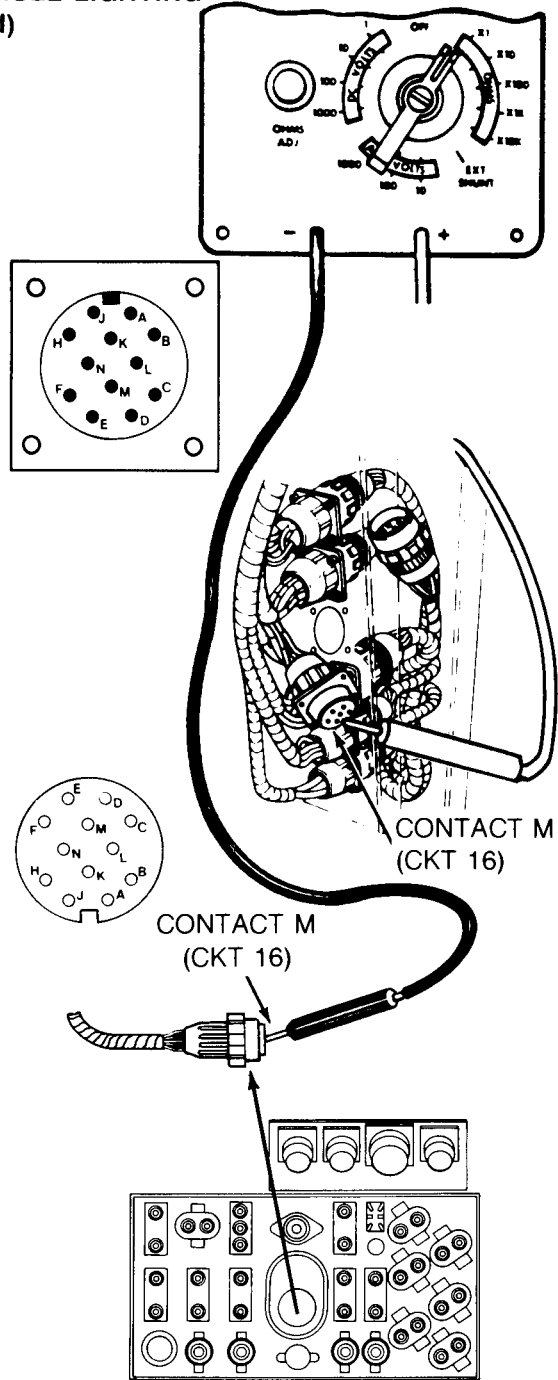
First Technician (Commander's Station)

Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).

- Connect red probe of meter to contact M (CKT 16) of basket-light switch harness connector at basket disconnect.

Second Technician (Operator's Station)

- Connect black probe of meter to contact M (CKT 16) of basket-light switch harness connector at LIGHTING CONTROL switch.



TA250547

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

Symptom-67

STEP **12** CONTINUED

First Technician (Commander's Station).

- Check if meter indicates continuity.

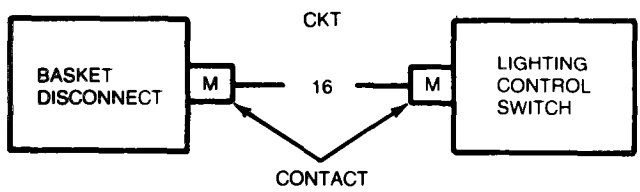
Does meter indicate continuity?

15

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 16 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
- Connect basket-light switch harness connector to LIGHTING CONTROL switch.
- Install master control panel (page 10-33).
- Install basket-light switch harness connector at basket disconnect.

16

- Replace LIGHTING CONTROL switch (page 10-54).
- Connect basket-light switch harness connector at LIGHTING CONTROL switch.
- Install master control panel (page 10-33).
- Install basket-light switch harness connector at basket disconnect.



TA250548

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-68

BOTH HIGH BEAM OR BOTH LOW BEAM IR LAMPS WILL NOT LIGHT.

WARNING
Do not look into IR lamps to see if they are on—severe eye damage may result.

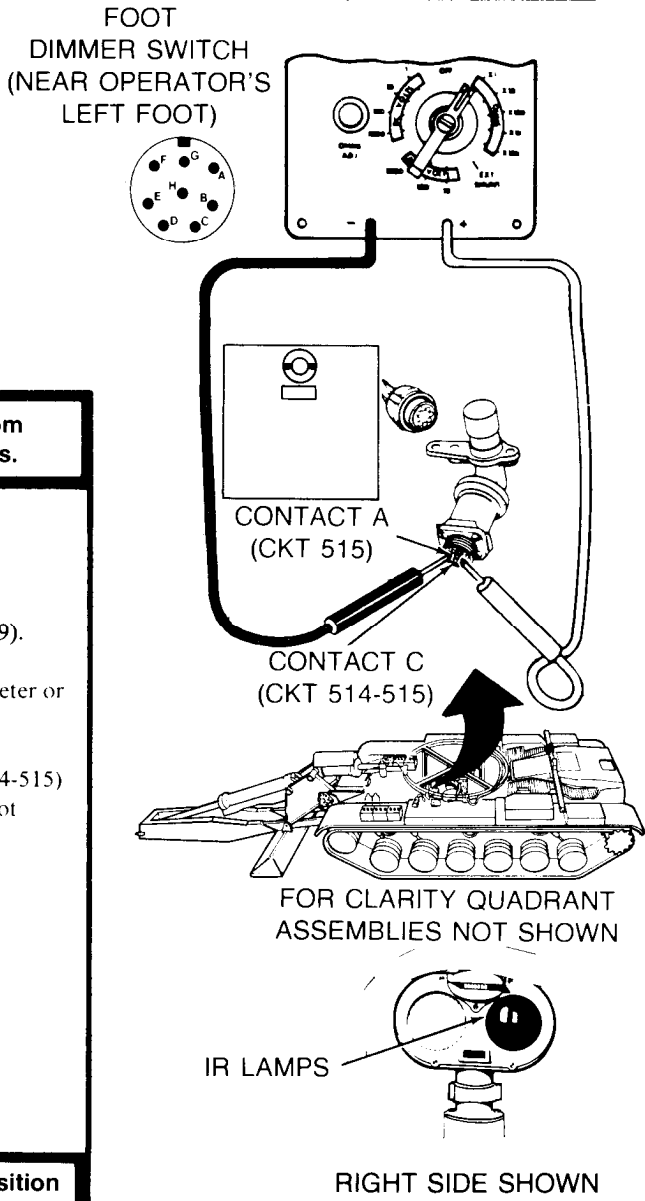
NOTE
To check if IR lamps are working, place hand over the lens. The lens will be warm when IR lamp is on.

1 Check foot DIMMER SWITCH for continuity from contact A to contact C in both switch positions.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-169).
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact C (CKT 514-515) and black probe to contact A (CKT 515) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



2 Replace foot DIMMER SWITCH (page 10-170).

YES NO

Symptom-68

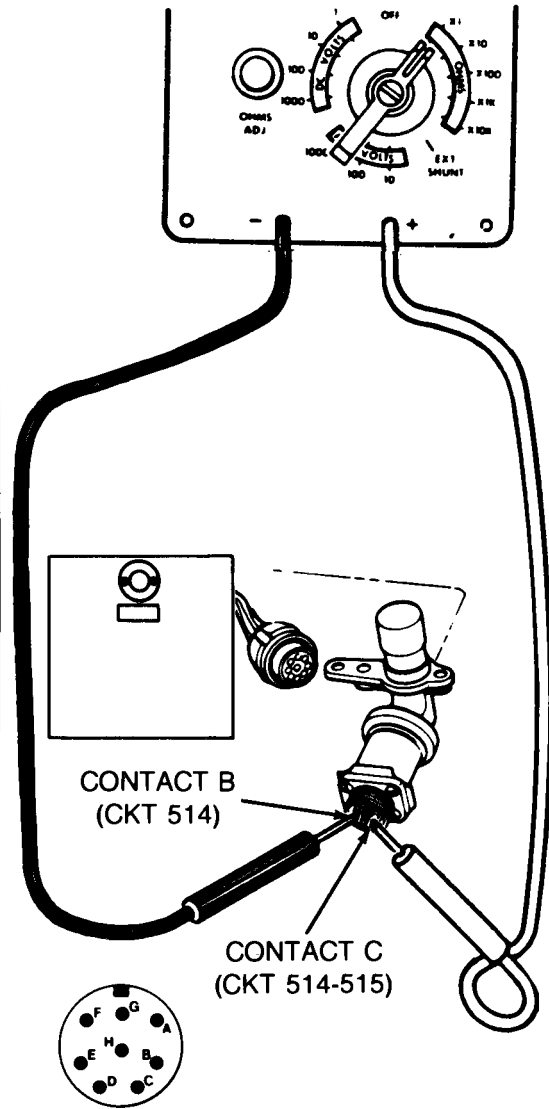
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

3 Check foot DIMMER SWITCH for continuity from contact B to contact C in both switch positions.

Technician (Operator's Station)

- Connect red probe of meter to contact C (CKT 514-515) of foot DIMMER SWITCH.
- Connect black probe of meter to contact B (CKT 514) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



4 Replace foot DIMMER SWITCH (page 10-169).



Symptom-68

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5

Check foot dimmer intermediate harness (CKT 514) for continuity from intermediate connector to contact B of connector to contact B of foot DIMMER SWITCH.

Technician (Operator's Station)

- Connect red probe of meter to intermediate harness connector contact B (CKT 514).
- Connect black probe of meter to contact B (CKT 514) of front accessory harness connector at foot DIMMER SWITCH.
- Check if meter indicates continuity.

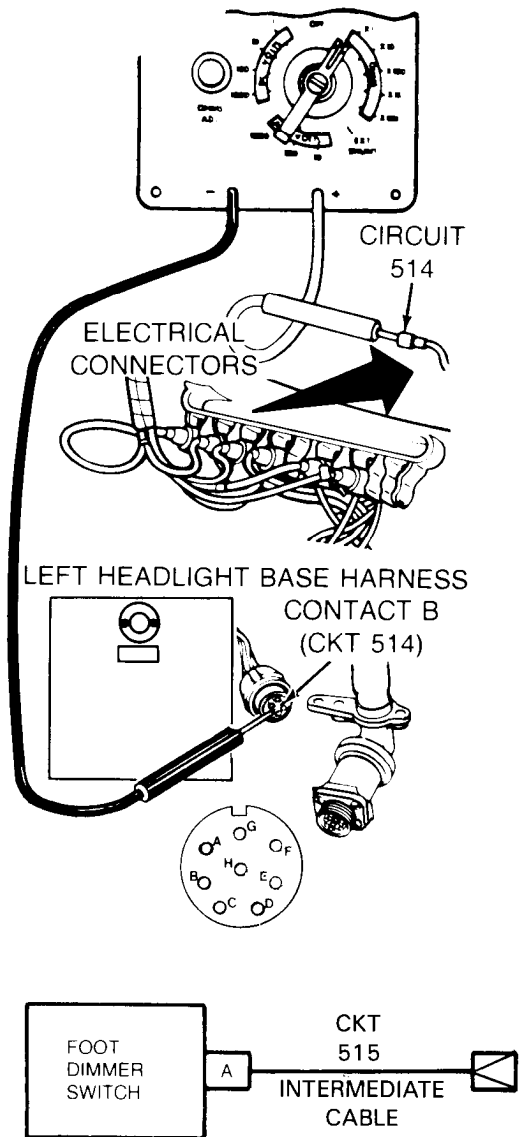
Does meter indicate continuity?

YES

NO

6

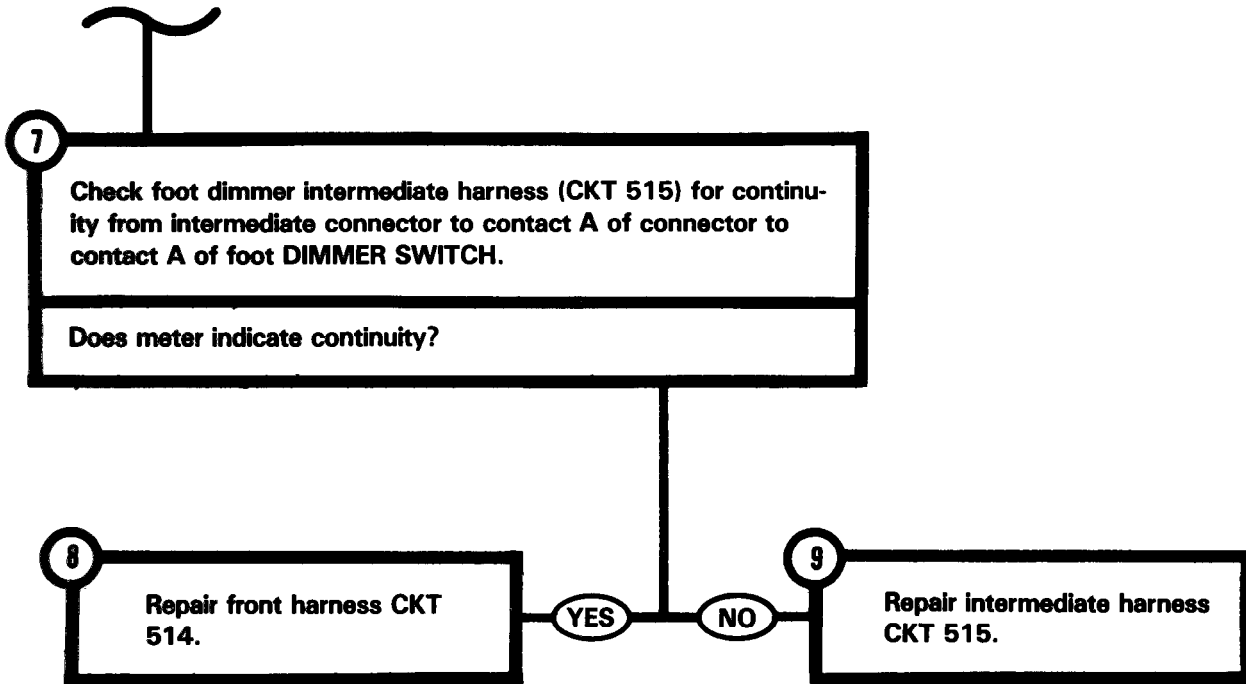
Repair foot dimmer intermediate harness CKT514.



TA250551

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM-VEHICLE LIGHTING
(Continued)

Symptom-68



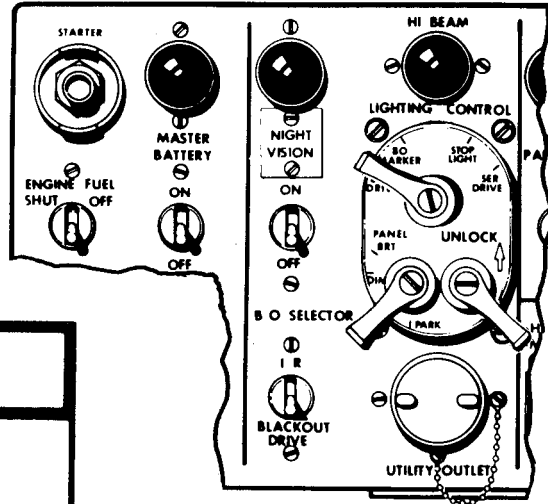
TA250552

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-69

IR LAMPS WILL NOT LIGHT (HIGH OR LOW)

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



MASTER CONTROL PANEL

1

Check if B.O. drive lamp will light.

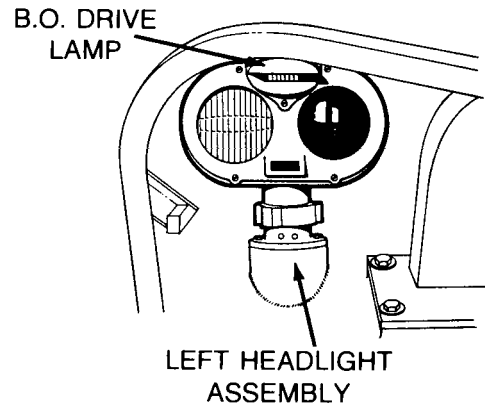
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Turn LIGHTING CONTROL switch to B.O. DRIVE.
- Set BO SELECTOR switch to BLACKOUT DRIVE.

Second Technician (Front of Vehicle)

- Visually check if B.O. drive lamp is lit.

Does B.O. drive lamp light?



LEFT HEADLIGHT ASSEMBLY

2

- Check if gage instrument panel lamps will light.
- See Step **10**.



Symptom-69

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

3 Check foot DIMMER SWITCH Connector CKT (514-515) for electrical power.

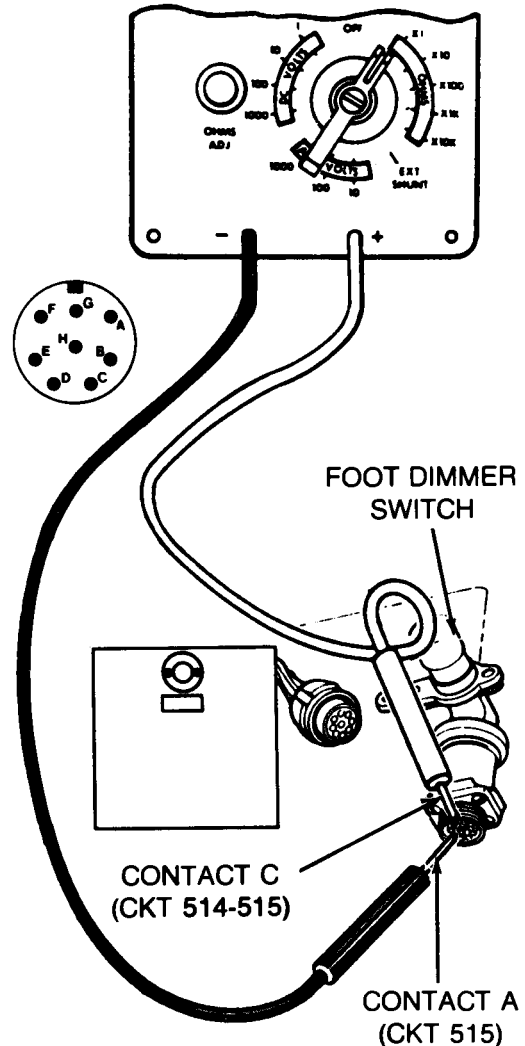
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-169).
- Set multimeter to measure 18 to 30 Vdc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT514-515) and black probe to ground.
- Set master battery switch ON.
- Check if meter indicates 18-30 Vdc.

Does meter indicate 18-30 Vdc?

YES NO

4 Replace foot DIMMER SWITCH (page 10-169).



TA250554

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5 Check master control panel accessories harness (CKT 514-515) at panel connector for electrical power.

First Technician (Operator's Station)

- Install foot DIMMER SWITCH (page 10-170).
- Set B.O. SELECTOR switch to IR.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect three battery ground straps (page 10-268).
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT 514-515) of master control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

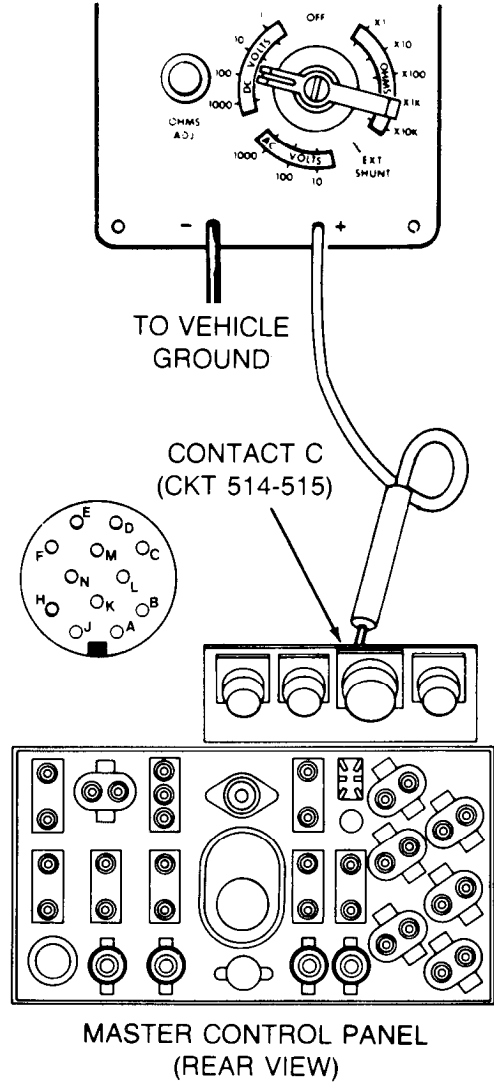
Does meter indicate 18 to 30 volts dc?

6 Check basket-control panel accessories harness (CKT 514-515) at basket disconnect for electrical power.

See Step **26**.

YES

NO



TA250555

Symptom-69

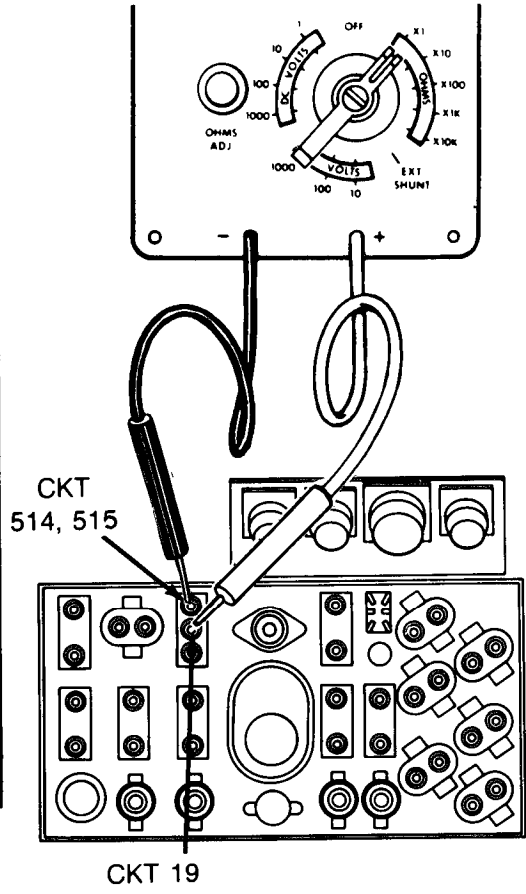
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 Check B.O. SELECTOR switch for continuity (switch in IR position).

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect master control panel accessories harness connectors (CKT 514-515 and CKT 19) from B.O. SELECTOR switch.
- Set multimeter to OHMS X1 scale, and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to center contact and black probe to top contact of B.O. SELECTOR switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



8

- Replace B.O. SELECTOR switch (page 10-58).
- Connect basket-control panel accessories harness to master control panel.

9

Replace master control panel accessories harness (page 10-91).

TA250556

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP

2

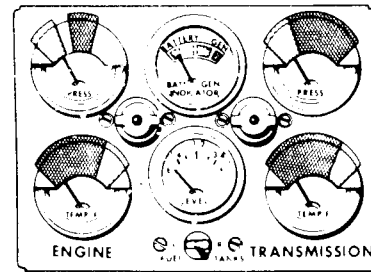
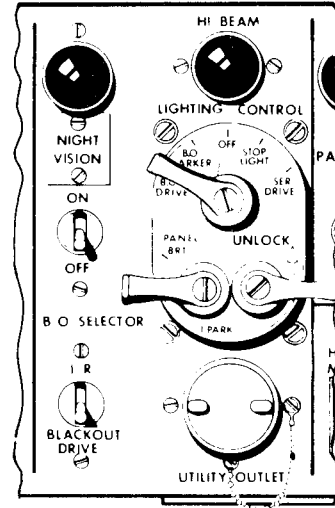
10

Check if gage instrument panel lamps will light.

First Technician (Operator's Station)

- Set LIGHTING CONTROL PANEL switch to DIM.
- Visually check if gage indicator panel lamps are lit.

Do gage instrument panel lamps light?



GAGE INSTRUMENT PANEL

11

Replace LIGHTING CONTROL switch (page 10-54).

YES

NO

Symptom-69

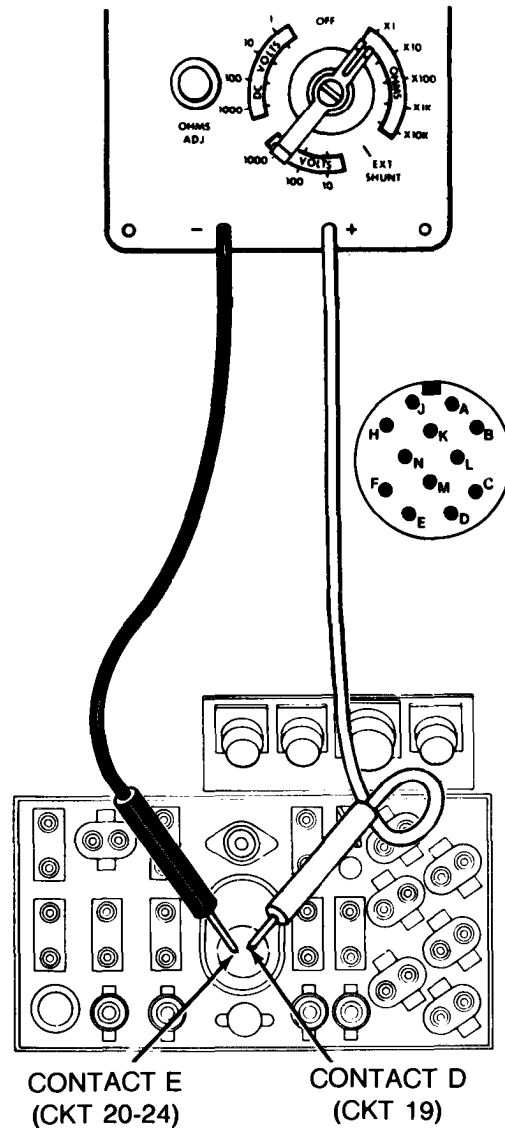
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

12 Check LIGHTING CONTROL switch for continuity between contacts D and E.

First Technician (Operator's Station)

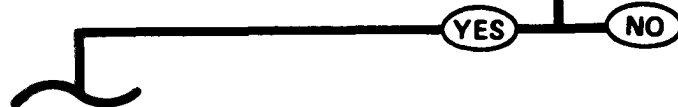
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector on master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 19) and black probe to contact E (CKT 20-24) of LIGHTING CONTROL switch connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL (REAR VIEW)

13 Replace LIGHTING CONTROL switch (page 10-54).



Symptom-69

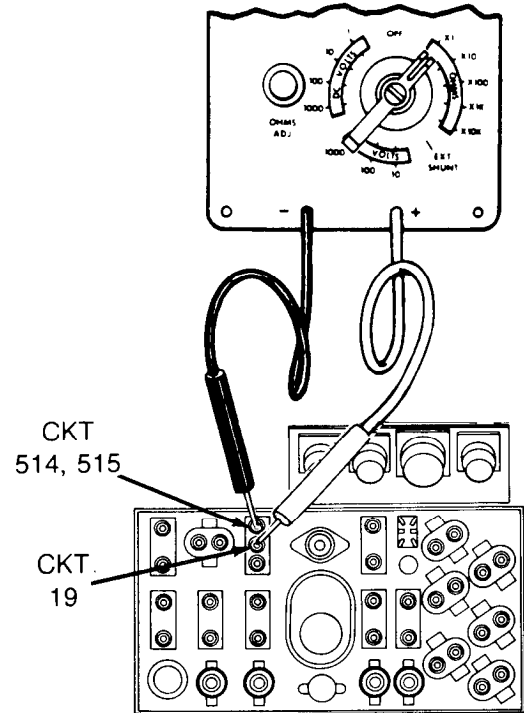
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

14 Check B.O. SELECTOR switch for continuity (switch in IR position).

First Technician (Operator's Station)

- Set B.O. SELECTOR switch to IR.
- Disconnect master control panel accessories harness connector (CKT 514-515) from B.O. SELECTOR switch.
- Disconnect basket-light switch harness connector (CKT 19) from B.O. SELECTOR switch.
- Connect red probe of meter to center contact and black probe to top contact of B.O. SELECTOR switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



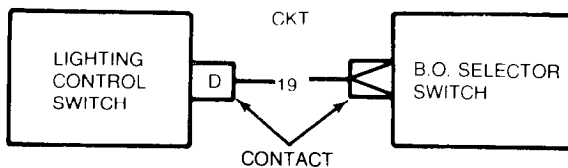
15

- Replace B.O. SELECTOR switch (page 10-58).
- Connect basket-light switch harness connector to master control panel.

NO YES

16

- Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 19 wire at rear of connectors (CKT 19) from B.O. SELECTOR switch to LIGHTING CONTROL switch.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-light switch harness.
- Connect basket-light switch harness connector to LIGHTING CONTROL switch.
- Install master control panel (page 10-33).



TA250559

Symptom-69

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

FROM STEP

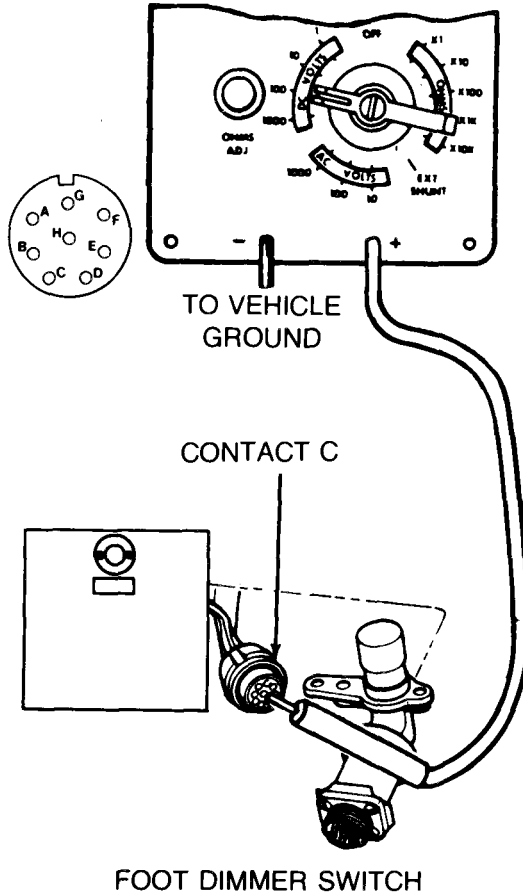
4

17 Check front accessory harness (CKT 514-515) at connector to foot DIMMER SWITCH for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set B.O. SELECTOR switch to IR.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT 514-515) of front accessory harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



18 Replace foot DIMMER SWITCH (page 10-169).



Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

19 Check basket-control panel accessories harness connector (CKT 514-515) at basket disconnect for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

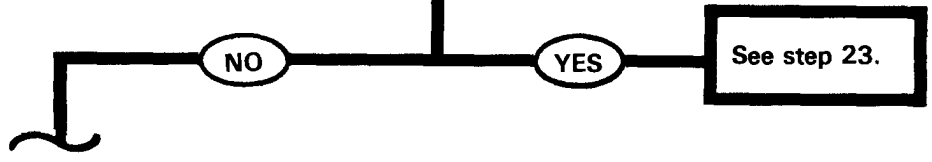
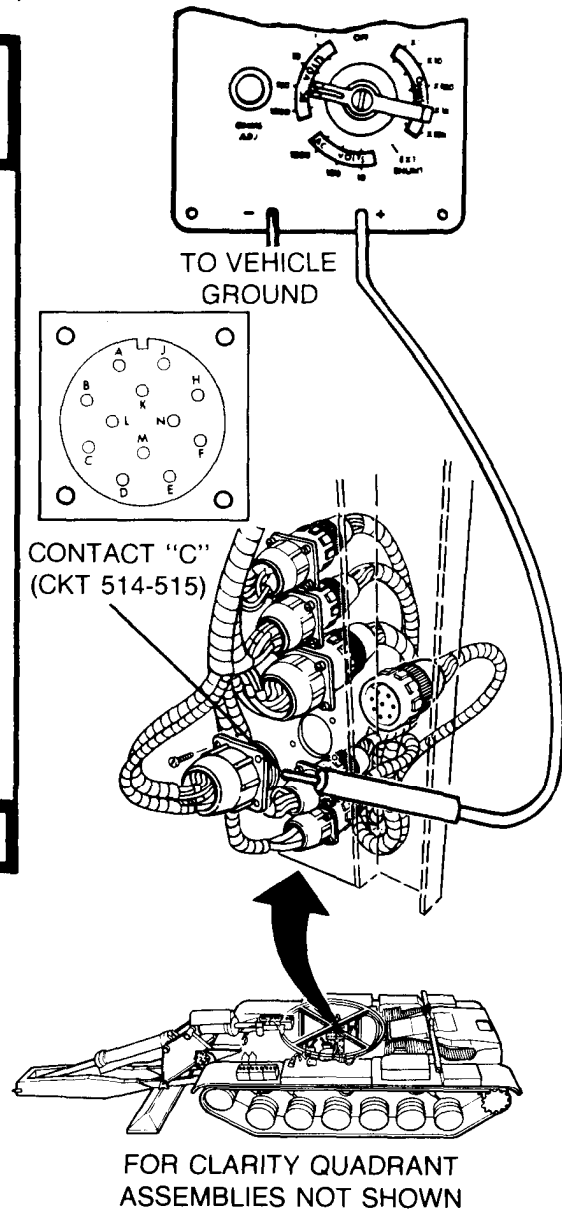
Second Technician (Commander's Station)

- Displace basket-control panel accessories harness connector from basket disconnect.
- Connect red probe of meter to contact "C" (CKT 514-515) of basket-control panel accessories harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-69

20

Check CKT 514-515 of intermediate cable for continuity.

First Technician (Operators Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHM X1 scale and "ZERO" meter or use STE/ICE Test No. 91 (page 4-83).
- Disconnect intermediate cable connector (CKT514-515) from basket control panel accessories harness on master control panel.
- Connect red probe of meter to contact C (CKT 514-515) on basket- control panel accessories harness at control panel.

Second Technician (Commanders Station)

- Connect black probe of meter to contact C (CKT 514-515) of intermediate cable connector at basket disconnect.
- Check if meter indicates continuity

Does meter indicate continuity?

YES

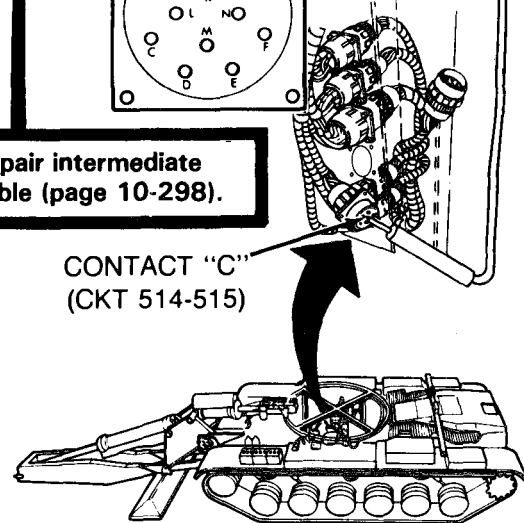
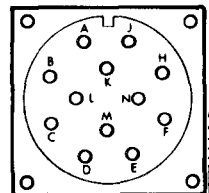
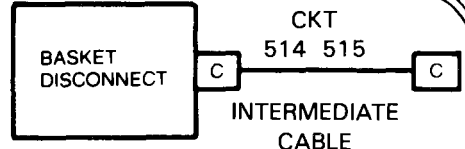
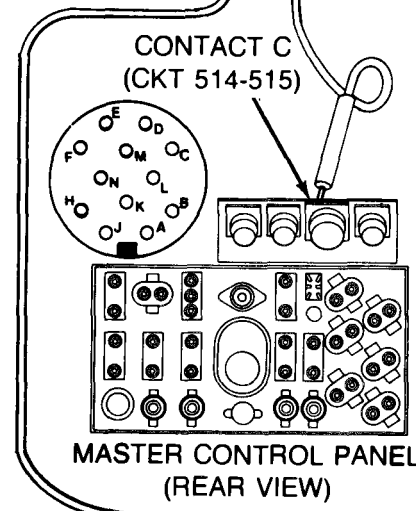
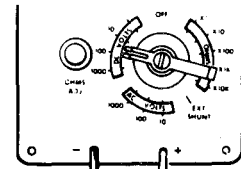
NO

21

- Inspect front accessories harness for bent/broken connector contacts or loose CKT 514-515 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-control panel accessories harness connector to basket disconnect.

22

Repair intermediate cable (page 10-298).



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250562

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**

**Symptom-69
FROM STEP**

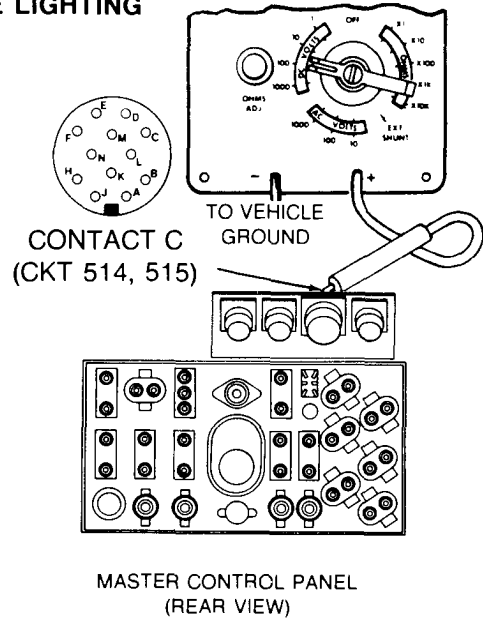
19

23 Check master control panel accessories harness (CKT 514-515) panel connector for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect front accessory harness connector from master control panel.
- Connect red probe of meter to contact C (CKT 514-515) of master control panel accessories harness panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc?

Does meter indicate 18 to 30 volts dc?

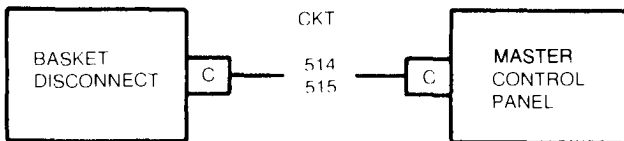


24

- Replace master control panel accessories harness (page 10-91).
- Install basket-control panel accessories harness at basket disconnect.

25

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 514-515 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Connect basket-control panel accessories harness to master control panel.
- Install master control panel (page 10-33).
- Install basket-control panel accessories harness connector at basket-disconnect.



Symptom-69
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

6

26 Check basket-control panel accessories harness (CKT 514-515) at basket disconnect for electrical power.

First Technician(Operator's Station)

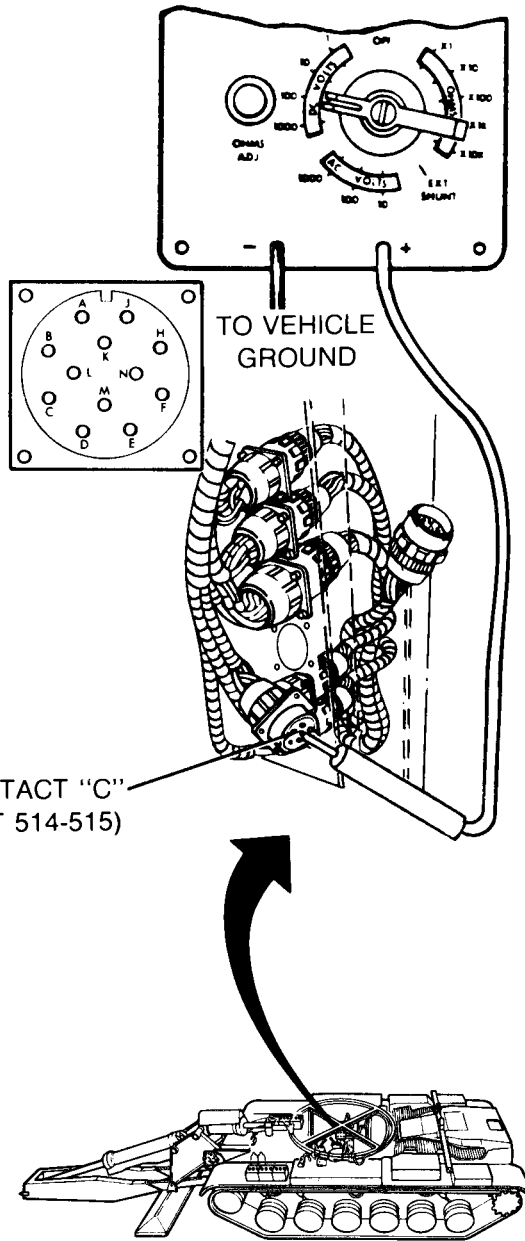
- Connect basket-control panel accessories harness connector to master control panel.

Second Technician (Commander's Station)

- Displace basket-control panel accessories harness connector from basket disconnect (page 10-269).
- Connect red probe of meter to contact "C" (CKT 514-515) of basket-control panel accessories harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.



FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN

TA250564

Symptom-69

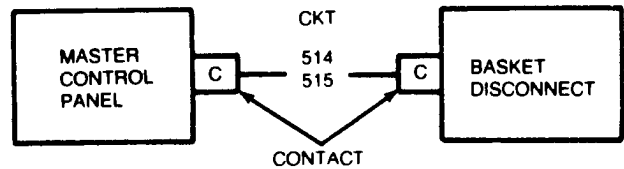
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

STEP 26 CONTINUED

Second Technician (Commander's Station)

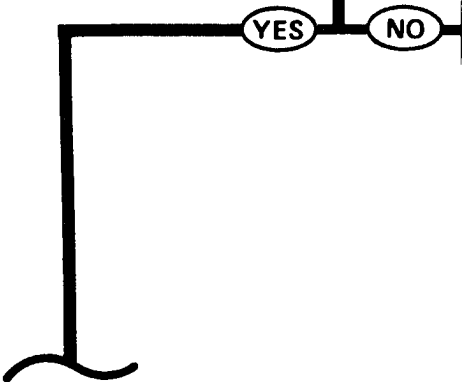
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



27

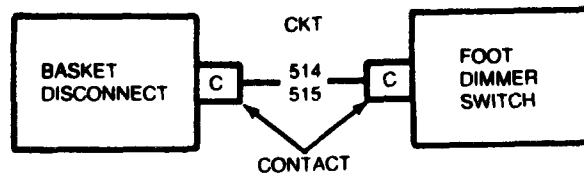
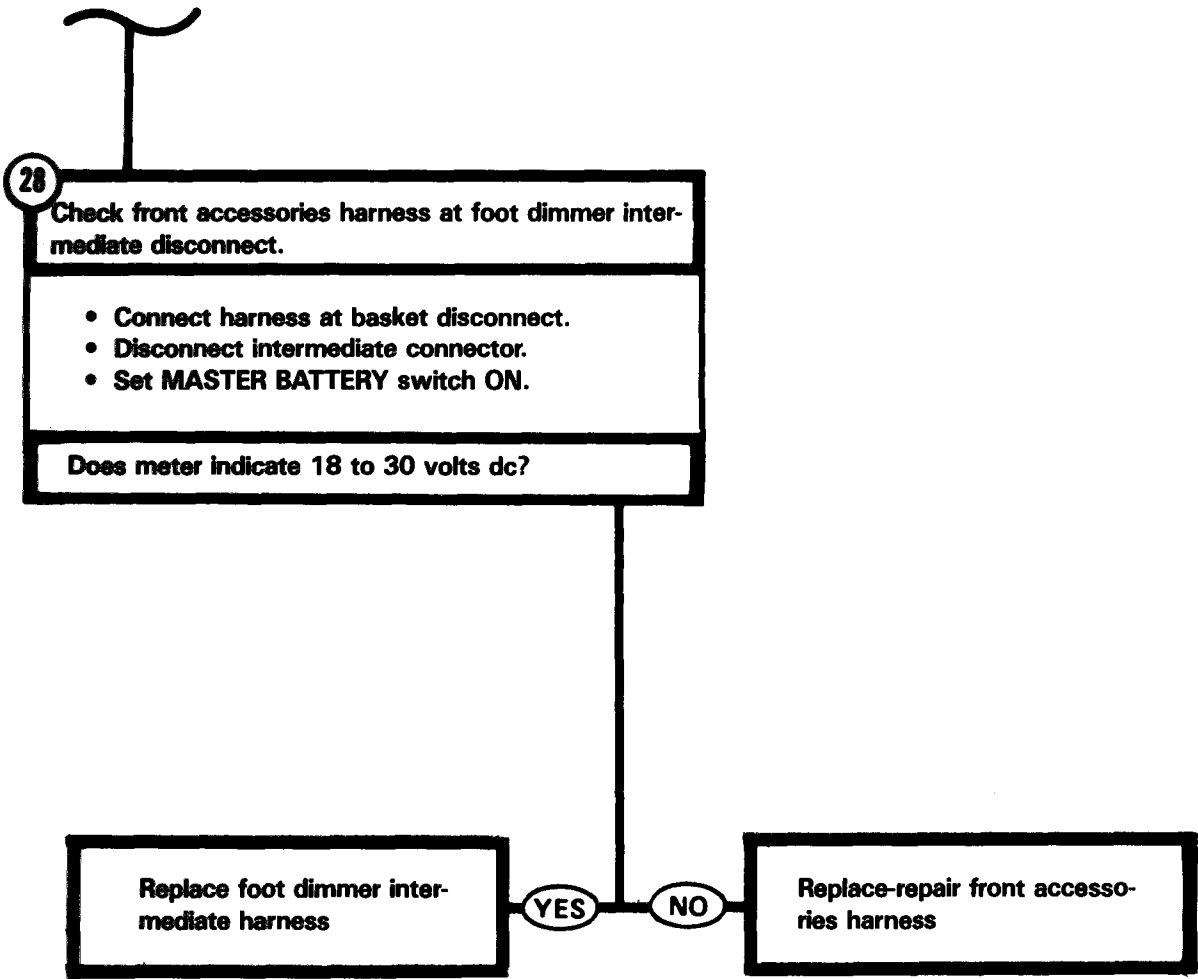
- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 514-515 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective notify support maintenance of a defective basket-control panel accessories harness.
- Install basket-control panel accessories harness connector at basket disconnect.
- Install master control panel (page 10-33).



TA250565

Symptom-69

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)**



TA250566

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES

Symptom-70

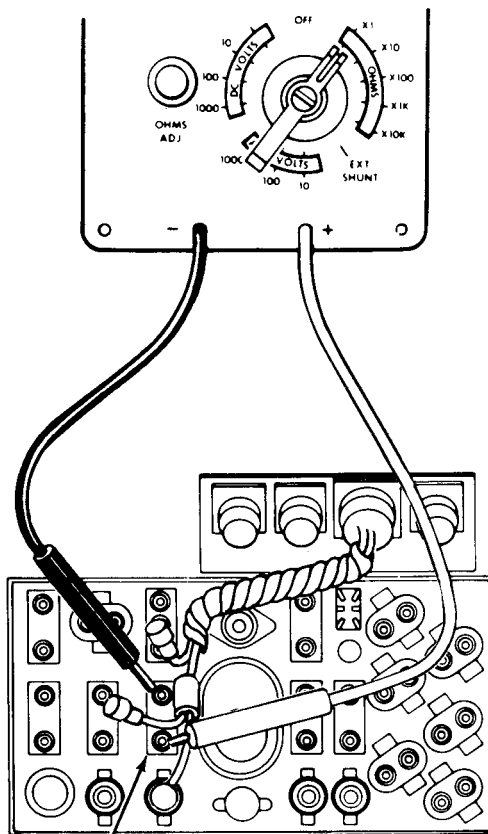
**IR PERISCOPES WILL NOT WORK
(NIGHT VISION INDICATOR LAMP WILL NOT LIGHT)**

1 Check NIGHT VISION switch in master control panel for continuity.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set NIGHT VISION switch OFF.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness leads (CKT 516) from NIGHT VISION switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Set NIGHT VISION switch ON.
- Connect red probe of meter to one contact of NIGHT VISION switch.
- Connect black probe of meter to the other contact of NIGHT VISION switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL
(REAR VIEW)

NIGHT VISION
SWITCH

2
**Replace NIGHT VISION switch
(page 10-50).**

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

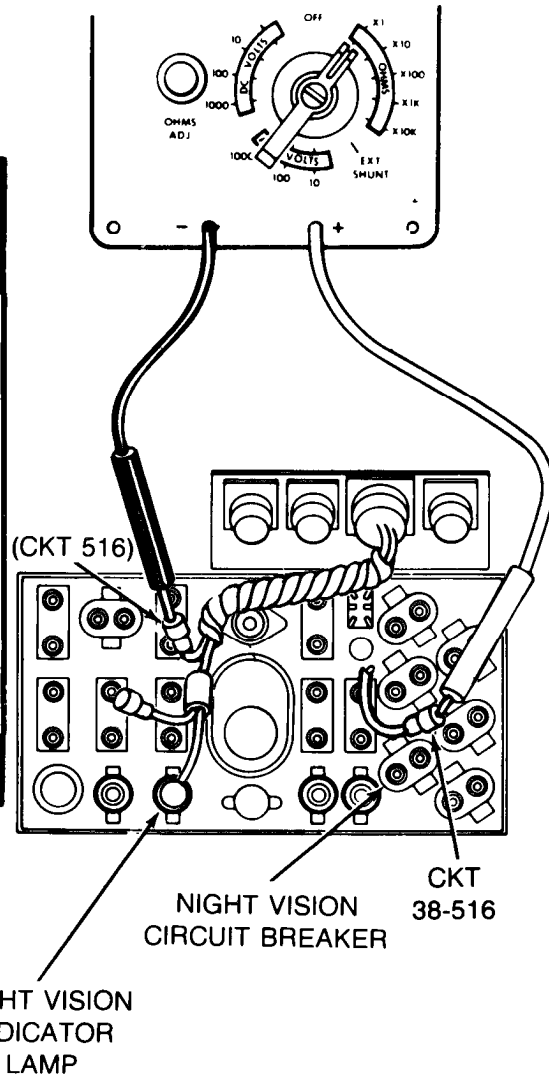
Symptom-70

3 Check master control panel accessories harness for continuity between NIGHT VISION circuit breaker (CKT 38-516) and NIGHT VISION switch (CKT 516).

Technician (Operator's Station)

- Disconnect master control panel accessories harness lead (CKT 38-516) from night vision circuit breaker.
- Connect black probe of meter to accessories harness lead (CKT 516) at NIGHT VISION switch connector which does not feed to the NIGHT VISION indicator lamp.
- Connect red probe of meter to accessories harness lead (CKT 38-516) at circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



4 Replace master control panel accessories harness (page 10-91).

YES NO

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

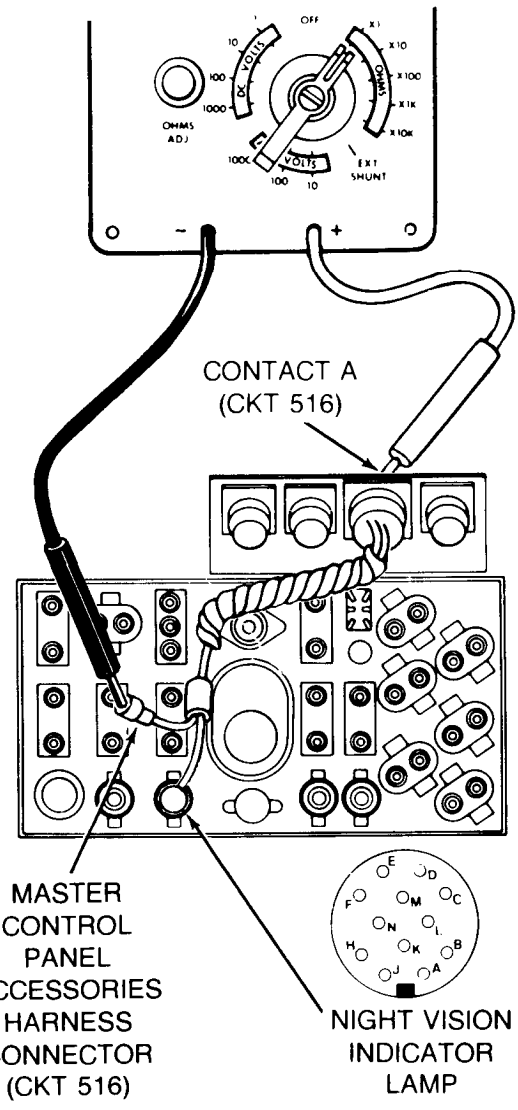
Symptom-70

5 Check master control panel accessories harness (CKT 516) for continuity between panel connector and NIGHT VISION switch.

Technician (Operator's Station)

- Disconnect basket-control panel accessories harness connector at master control panel.
- Connect red probe of meter to contact A (CKT 516) of master control panel accessories harness connector.
- Connect black probe of meter to master control panel accessories harness connector (CKT 516) at NIGHT VISION switch which feeds to the NIGHT VISION indicator lamp.
- Check if meter indicates continuity.

Does meter indicate continuity?



6 Replace master control panel accessories harness (page 10-91).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPE
(Continued)**

Symptom-70

7

Check night vision circuit breaker for continuity.

Technician (Operator's Station)

- Connect master control panel accessories harness leads (CKT 516) to NIGHT VISION switch.
- Disconnect master control panel wiring harness lead (CKT 38-516A) from night vision circuit breaker.
- Connect red probe of meter to one contact of circuit breaker.
- Connect black probe of meter to other contact of circuit breaker.
- Check if meter indicates continuity.

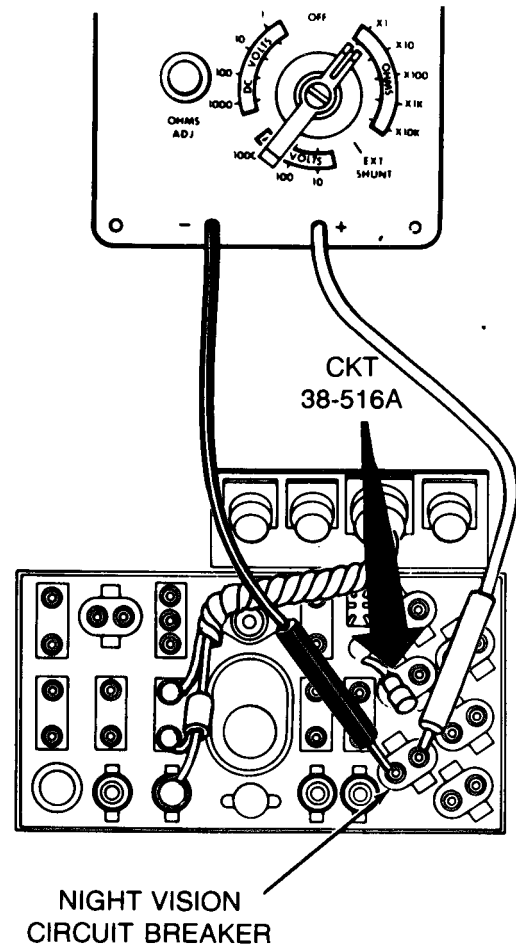
Does meter indicate continuity?

8

- Replace night vision circuit breaker (page 10-70).
- Connect basket-control panel accessories harness connector to master control panel.

9

- Replace master control panel power wiring harness (page 10-101).
- Connect basket-control panel accessories harness connector to master control panel.
- Connect master control panel accessories harness lead (CKT 38-516) to night vision circuit breaker.



TA250570

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES**

Symptom-71

BOTH IR PERISCOPES WILL NOT WORK (INDICATOR LAMP WILL LIGHT).

NOTE

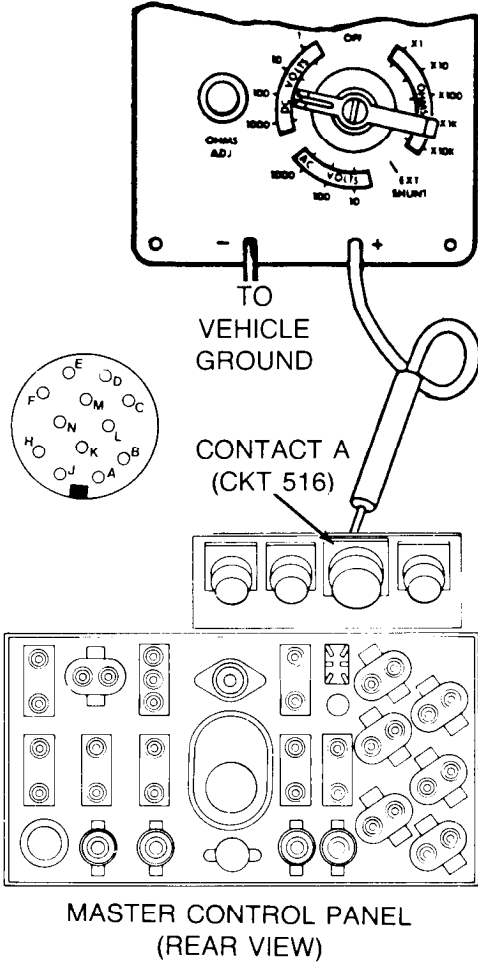
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check master control panel accessories harness connector (CKT 516) for electrical power.

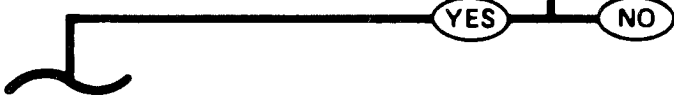
Second Technician (Operator's Station)

- Set NIGHT VISION switch OFF.
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector (CKT 516) from master control panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 516) of master control panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2 Replace master control panel accessories harness (page 10-91).



Symptom-71

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

3 Check basket-control panel accessories harness (CKT 516) for electrical power.

Second Technician (Operator's Station)

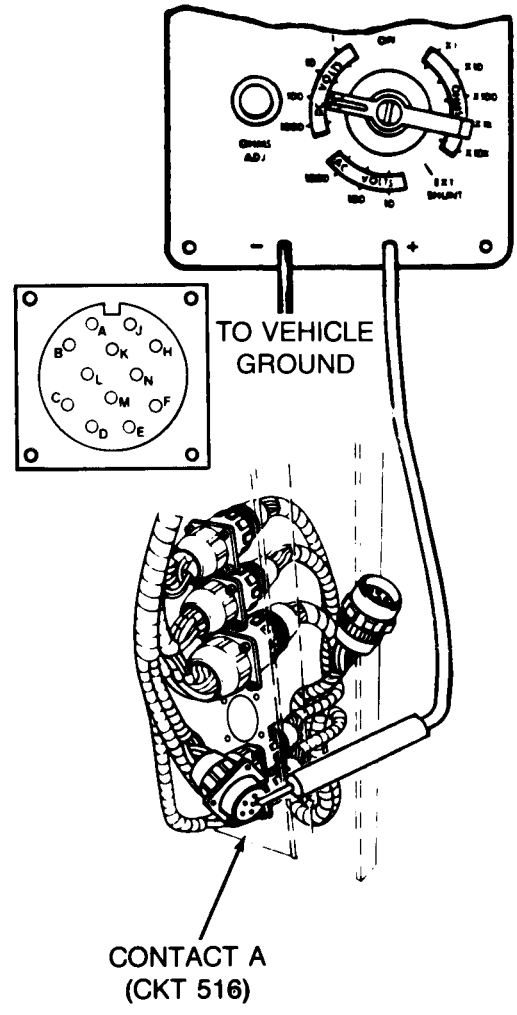
- Set NIGHT VISION switch OFF.
- Set MASTER BATTERY switch OFF.
- Connect basket-control panel accessories harness connector (CKT 516) to master control panel.

First Technician (Commander's Station)

- Displace basket-control panel accessories harness (CKT 516) at basket disconnect.
- Connect red probe of meter to contact A (CKT 516) of basket-control panel accessories harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.



TA250572

Symptom-71

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

STEP 3 CONTINUED

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

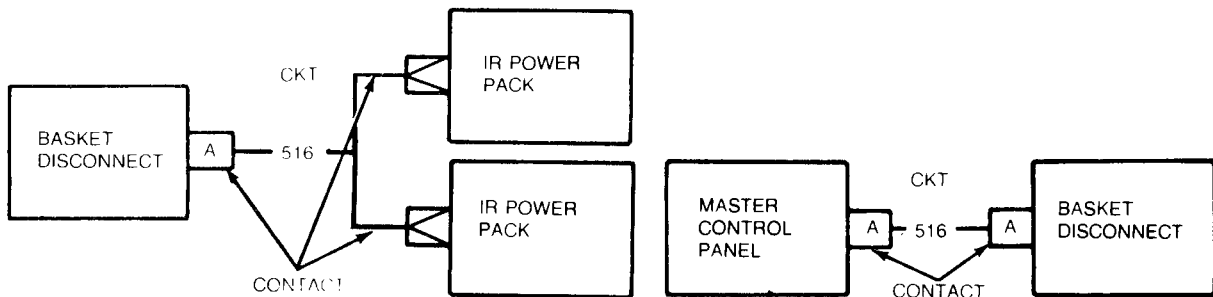
4

- Inspect front accessory harness for bent/broken connector contacts or loose CKT 516 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessory harness.
- Install basket-control panel accessories harness connector at basket disconnect (page 10-270).
- Install master control panel (page 10-33).

YES NO

5

- Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 516 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.
- Install basket-control panel accessories harness connector at basket disconnect (page 10-270).
- Install master control panel (page 10-33).



TA250573

Symptom-72
STEP 1 CONTINUED

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

First Technician (Commander's Station)

- Remove floor access cover (at Commander's feet) (page 17-7).
- Disconnect front accessories harness connector (CKT 516) from IR powerpack input connector of defective IR periscope.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to front accessories harness connector (CKT 516) and black probe to ground.

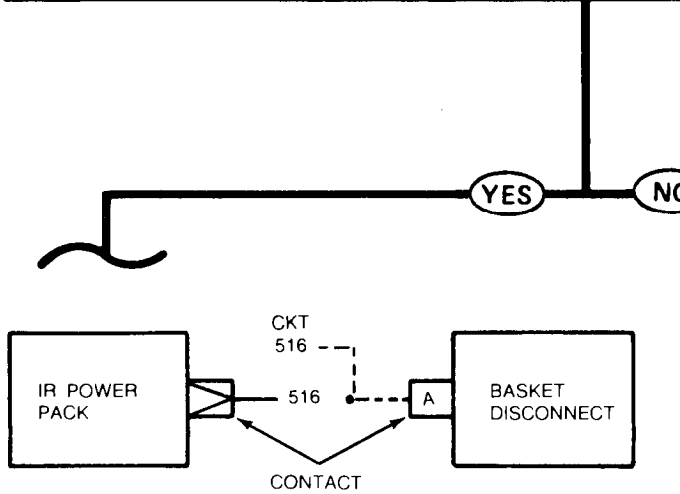
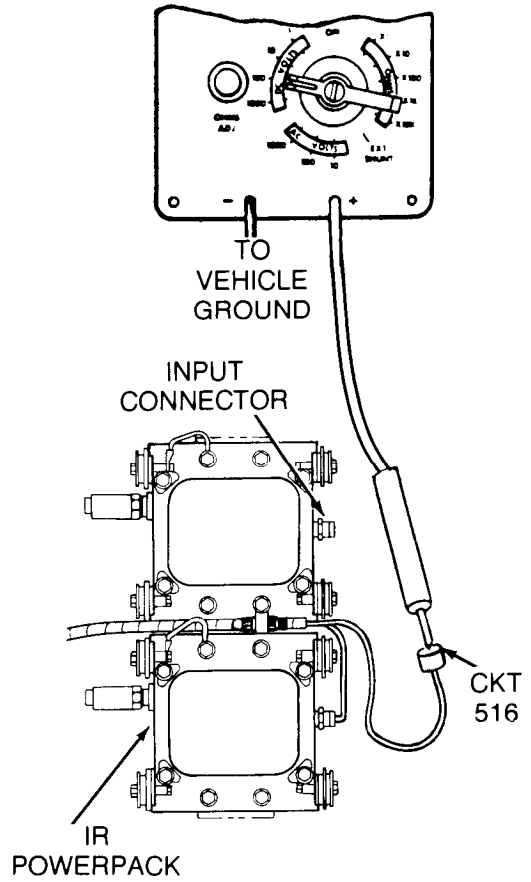
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



2

- Inspect front accessories harness for bent/broken connector contacts or loose CKT 516 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective front accessories harness.
- Reconnect front accessories harness connector to IR powerpack.
- Install floor access cover (page 17-7).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

Symptom-72

WARNING
Wait two minutes after night vision switch is turned off before disconnecting IR periscope power cable. (High voltage is present at power cable for a few minutes after night vision switch is set OFF.)

3 Check IR periscope power cable (CKT 517) for continuity.

Second Technician (Operator's Station)

- Set NIGHT VISION switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect IR periscope power cable connector (CKT 517) from IR periscope.

First Technician (Commander's Station)

- Reconnect front accessories harness connector (CKT 516) to IR powerpack input connector.
- Disconnect IR periscope power cable connector (CKT 517) from IR powerpack output connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact at powerpack end of IR power cable.

Second Technician (Operator's Station)

- Connect black probe to periscope end of IR power cable.

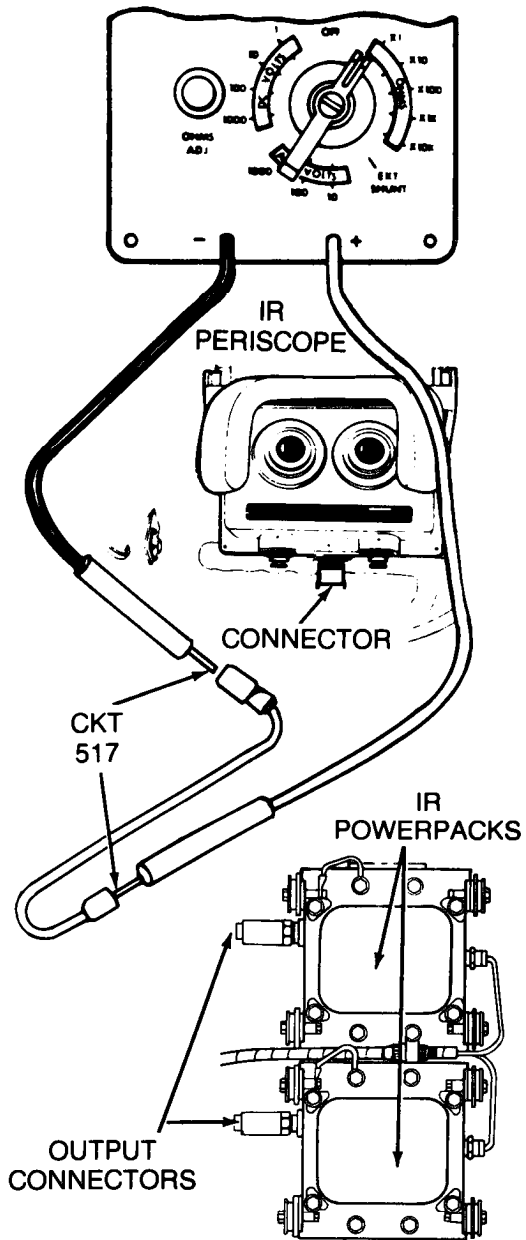
First Technician (Commander's Station)

- Check if meter indicates continuity.

Does meter indicate continuity?

YES

NO



4

- Notify support maintenance of bad IR periscope power cable.
- Connect IR periscope power cable to IR powerpack and IR periscope.

TA250576

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)**

Symptom-72

5 Check operation of IR periscope by substituting it with a serviceable unit.

Second Technician (Operator's Station)

- Obtain and install serviceable IR periscope (TM 5-5420-202-10).

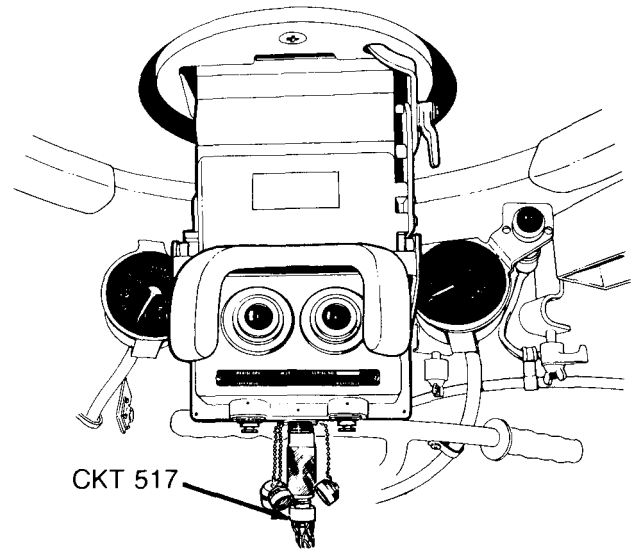
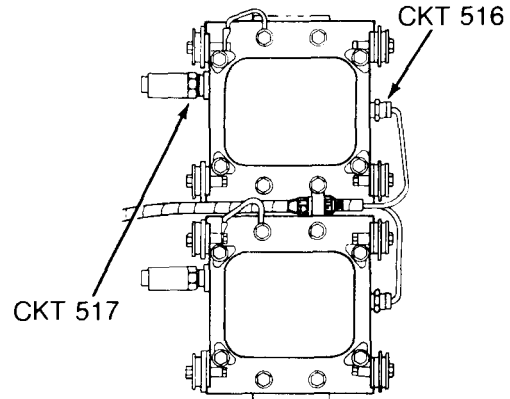
First Technician (Commander's Station)

- Connect IR periscope power cable (CKT 517) to IR powerpack.

Second Technician (Operator's Station)

- Connect IR periscope power cable (CKT 517) to IR periscope.
- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.
- Operate IR periscope (TM 5-5420-202-10).
- Check for clear image while looking through periscope eyepiece.

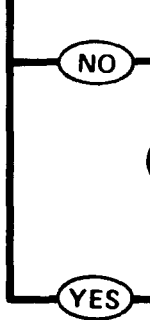
Can clear image be seen through eyepiece?



6 Replace unserviceable IR powerpack (page 10-152).

7

- Original IR periscope is unserviceable. Replace unserviceable IR periscope (page 10-152).
- Install floor access cover (page 17-7).



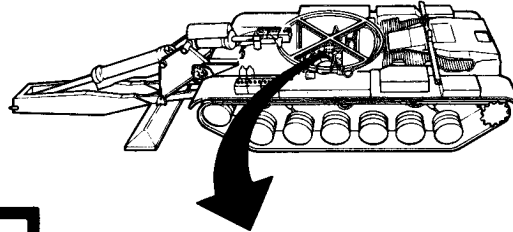
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER**

Symptom-73

NO HEAT FROM PERSONNEL HEATER.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



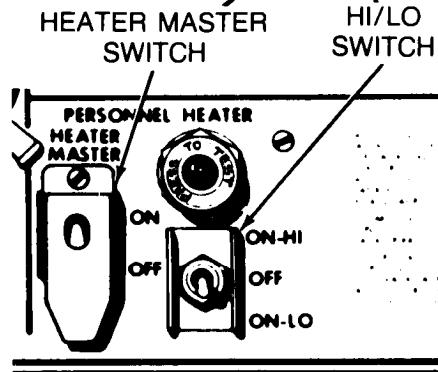
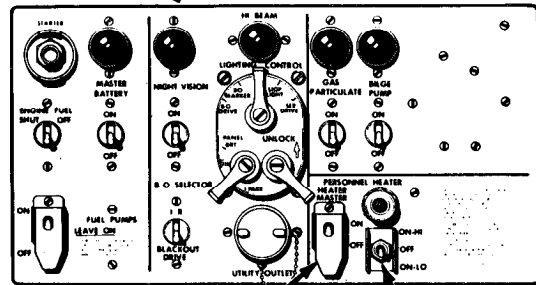
1

Check if personnel heater blower motor is working.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Listen for sound of personnel heater blower motor running.
- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Listen for sound of personnel heater blower motor.

Can personnel heater blower motor be heard?



MASTER CONTROL PANEL

2

Check if PRESS TO TEST indicator lights.

See Step **23**.



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

Symptom-73

NOTE

Step ③ seems to be a repeat of Steps ① and ②, however, it is necessary to satisfy the 3 possible conditions.

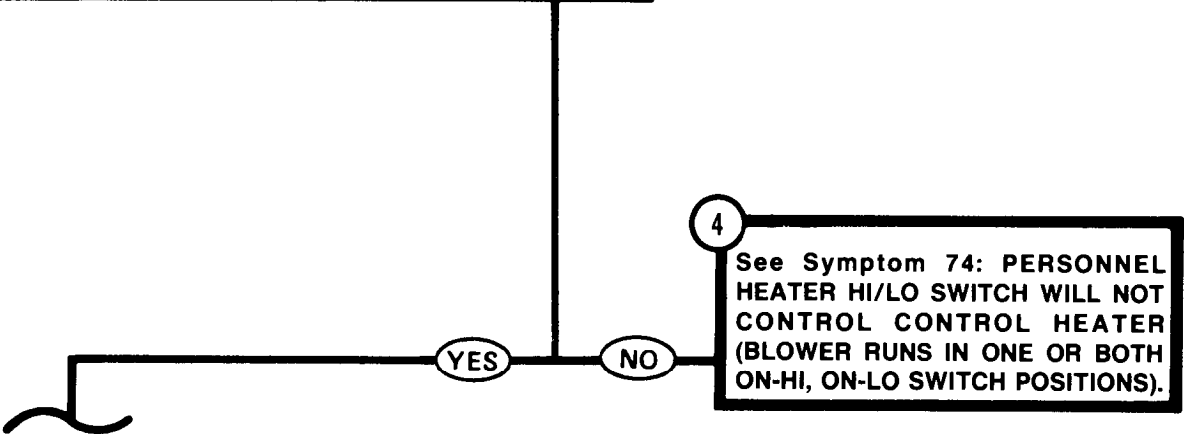
1. Both HI and LO do not work.
2. Only HI or only LO works.
3. Both HI and LO work.

3 Check if personnel heater blower motor is working in both HI and LO switch positions.

Second Technician (Operator's Station)

- Listen for sound of personnel heater blower motor when HI/LO switch is set ON-HI.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Listen for sound of personnel heater blower motor.

Can personnel heater blower motor be heard in both ON-HI and ON-LO switch positions?



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

Symptom-73

5

Check for fuel flow to personnel heater.

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Personnel Heater)

- Disconnect quick disconnect at personnel heater (push quick disconnect toward right side of vehicle while pulling fuel line connector away from heater).

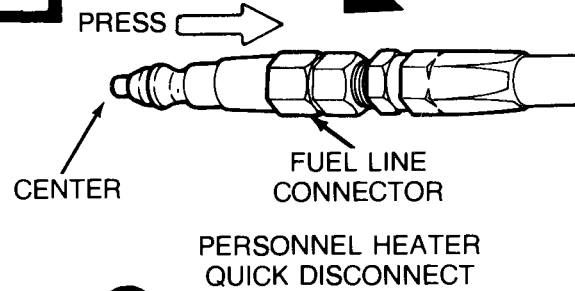
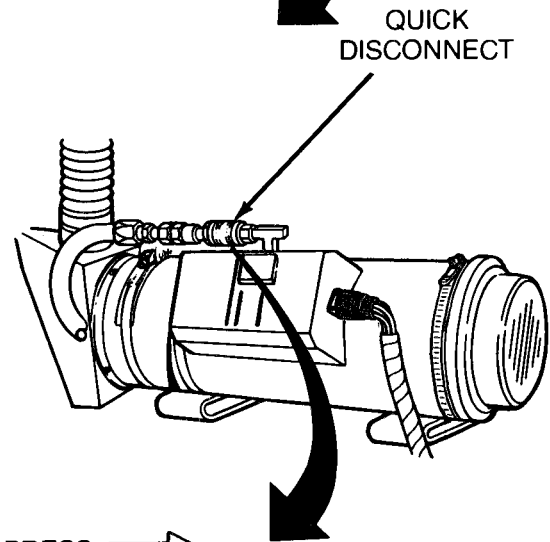
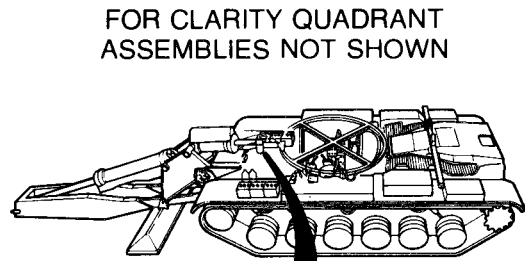
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-LO.

First Technician (Personnel Heater)

- Hold fuel line connector over suitable container and check for fuel flow.

Does fuel flow from fuel line?



6

- Check fuel line to personnel heater fuel pump for damage.
- See Step 16 .

YES

NO

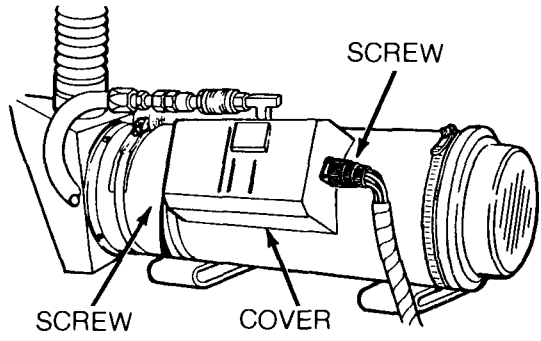
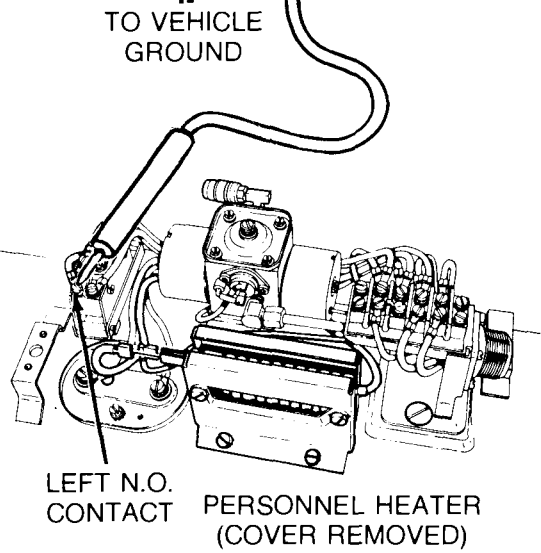
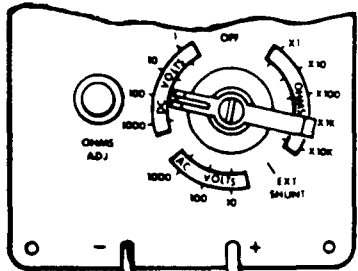
Symptom-73

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

7 Check for electrical power at the left N.O. contact on the flame detector switch.

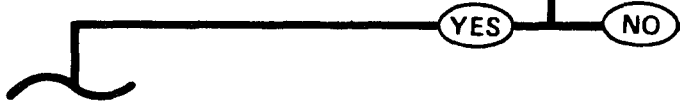
- Second Technician (Operator's Station)
- Set HEATER MASTER switch OFF.
- First Technician (Personnel Heater)
- Loosen two screws and remove personnel heater cover.
 - Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
 - Connect red probe of meter to the left N.O. contact on the flame detector switch and black probe to ground.
- Second Technician (Operator's Station)
- Set HEATER MASTER switch ON.
- First Technician (Commander's Station)
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



8

- Set HEATER MASTER switch OFF
- Set PERSONNEL HEATER HI/LO switch OFF.
- Install personnel heater cover.
- Replace personnel heater (page 18-2).



Symptom-73

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

9 Check for electrical power at right N.O. contact on the flame detector switch.

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Connect red probe of meter to the right N.O. contact on the flame detector switch and black probe to ground.

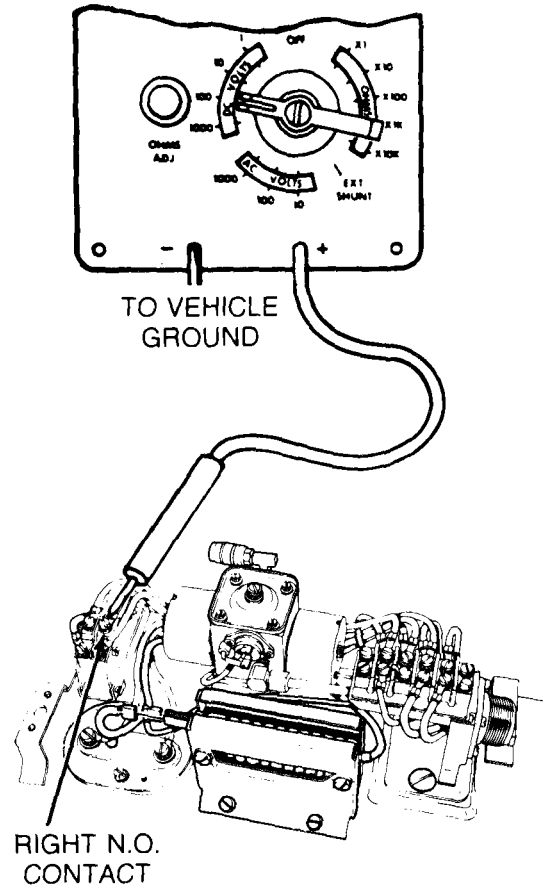
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.

First Technician (Personnel Heater)

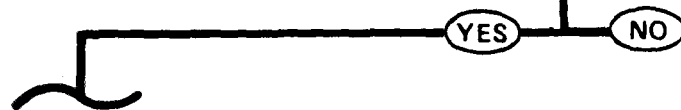
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



10

- Set HEATER MASTER switch OFF.
- Set PERSONNEL HEATER HI/LO switch OFF.
- Replace flame detector switch (TM 9-2540-205-24&P).
- Connect personnel heater fuel line quick disconnect.



Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

11 Check for electrical power at white wire connector of ignition control unit.

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Connect red probe of meter to the white wire connector of ignition control unit and black probe to ground.

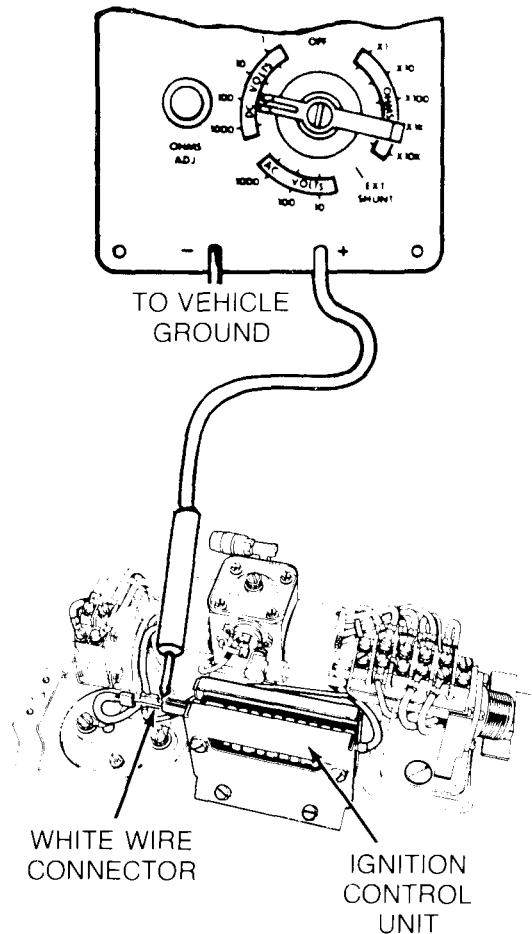
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.

First Technician (Personnel Heater)

- Check if meter indicates 8 to 10 volts dc.

Does meter indicate 8 to 10 volts dc?



12

- Set HEATER MASTER switch OFF.
- Set PERSONNEL HEATER HI/LO switch OFF.
- Replace ignition control unit (TM 9-2540-205-24&P).
- Connect personnel heater fuel line quick disconnect.

YES NO

Symptom-73

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

13 Replace igniter and check heater for proper operation.

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.

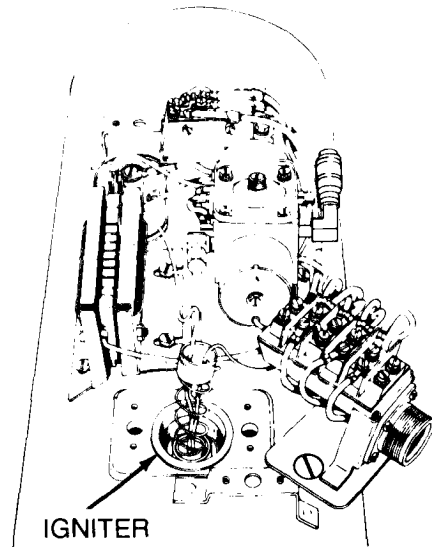
First Technician (Personnel Heater)

- Replace igniter (TM 9-2540-205-24&P).
- Connect personnel heater fuel line quick disconnect.

Second Technician (Operator's Station)

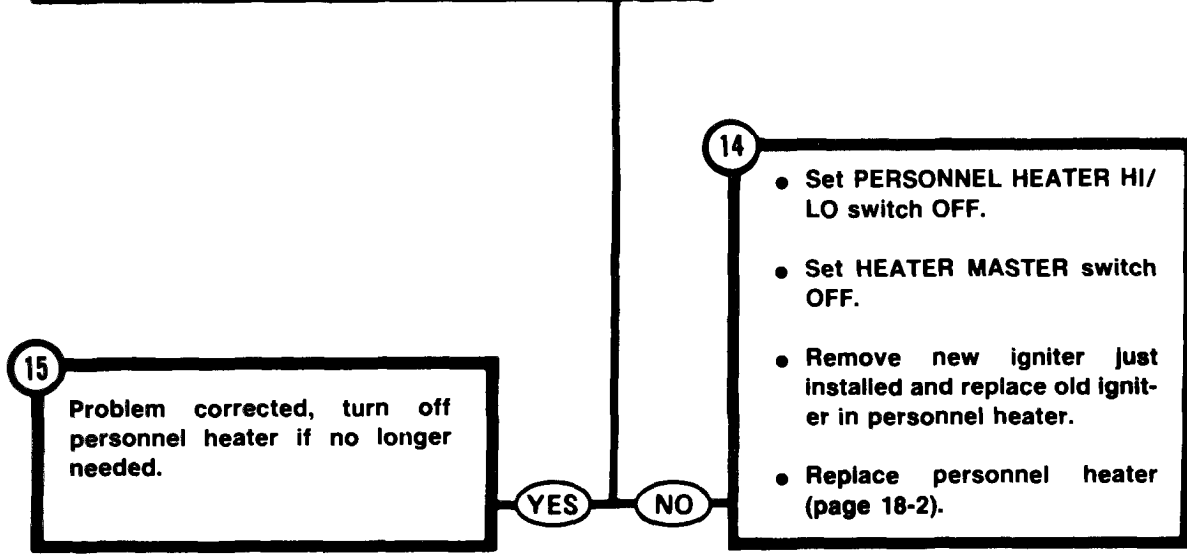
- Operate personnel heater (TM 5-5420-202-10).

Does personnel heater operate correctly?



IGNITER

PERSONNEL HEATER
(IGNITER REPLACEMENT)



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

Symptom-73
FROM STEP

6

16 Check fuel line to personnel heater fuel pump for damage.

Second Technician (Operator's Station)

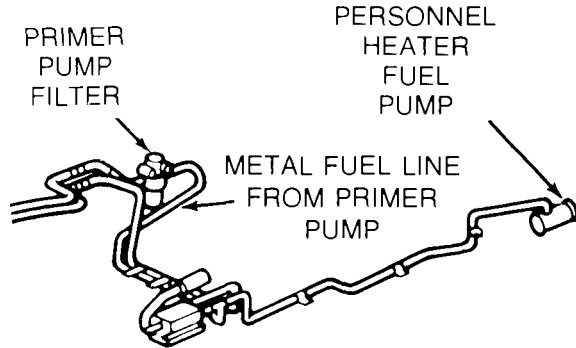
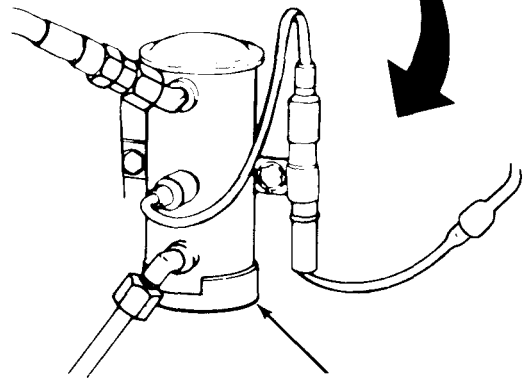
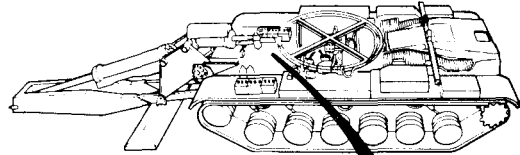
- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Check metal fuel line from primer pump to personnel heater for damage.

Is fuel line damaged?

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN



17

- Replace fuel line from primer pump to personnel heater fuel pump (page 7-289).
- Connect fuel line quick disconnect at personnel heater.

NO YES

TA250585

Symptom-73

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

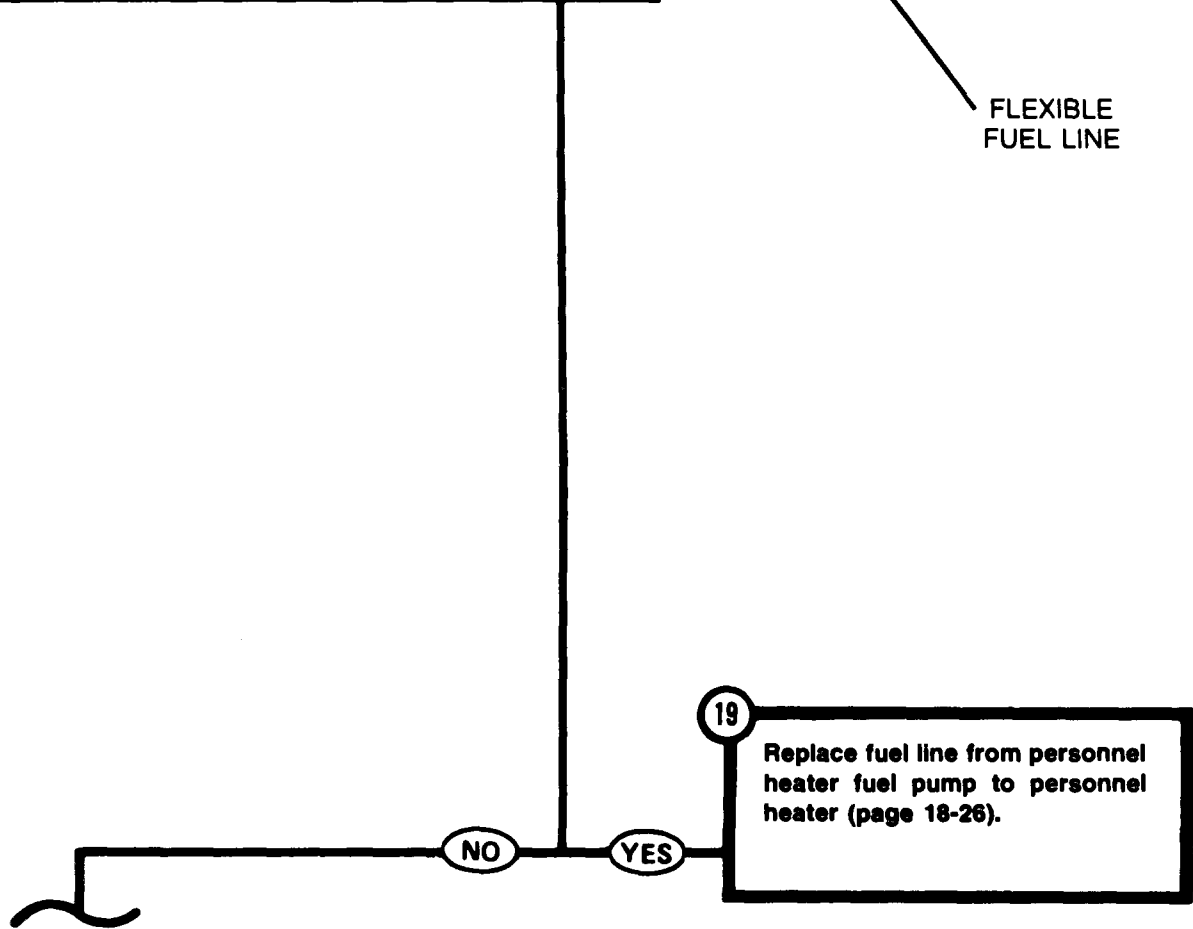
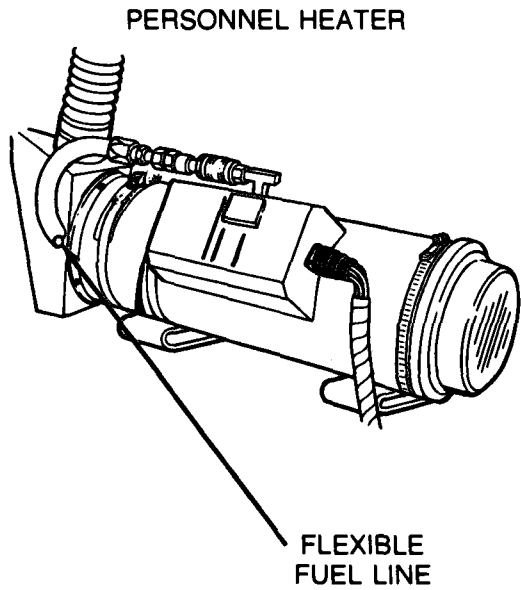
18

Check fuel line to personnel heater for damage.

First Technician (Personnel Heater)

- Check flexible fuel line from personnel heater fuel pump to personnel heater for damage.

Is fuel line damaged?



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

Symptom-73

20 Check for electrical power at personnel heater fuel pump (CKT 402).

First Technician (Personnel Heater)

- Disconnect harness connector in personnel heater fuel pump power lead.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to harness connector (CKT 402) and black probe to ground.

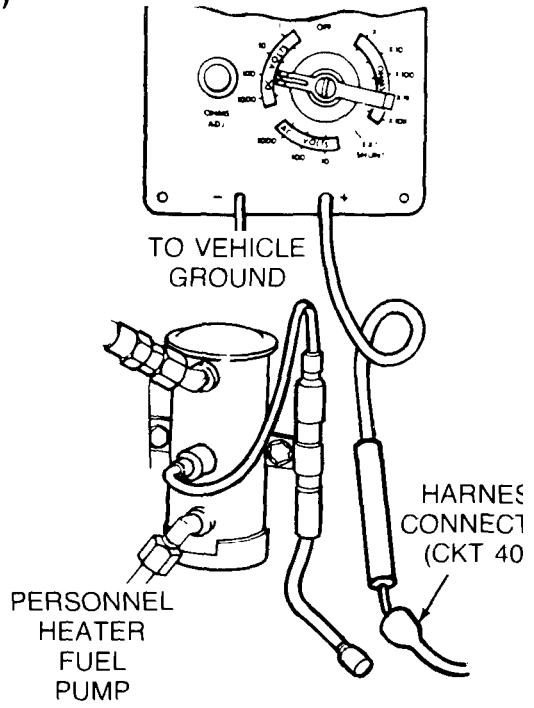
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.

First Technician (Personnel Heater)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



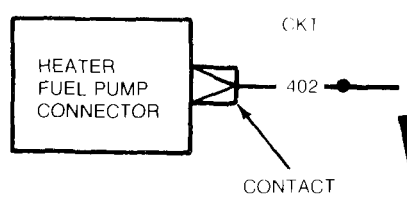
22

- Set PERSONNEL HEATER HI/LO switch OFF.
- Replace personnel heater fuel pump (page 18-24).
- Connect fuel line quick disconnect at personnel heater.

YES NO

21

- Set PERSONNEL HEATER HI/LO switch OFF.
- Inspect heater to basket disconnect harness for bent/broken connector contact or loose CKT 402 wire at rear of connector.
- Repair connector if defective (page 10-298).
- If connector is not defective, notify support maintenance of defective heater to basket disconnect harness.
- Connect CKT 402 connector at fuel pump.
- Connect fuel line quick disconnect at personnel heater.



TA250587

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

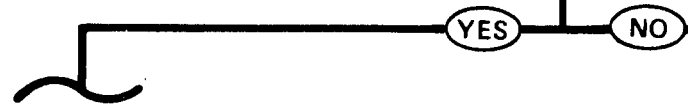
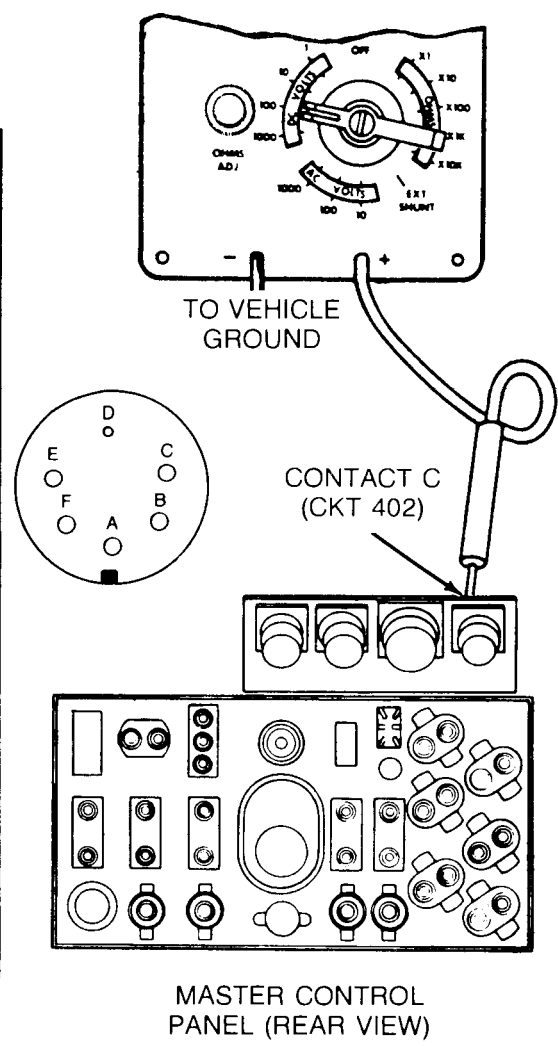
Symptom-73

25 Check for electrical power at contact C (CKT 402) of control panel heater harness connector.

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel heater harness at master control panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to panel connector contact C (CKT 402) and black probe to ground.
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



26 Check control panel heater harness for continuity from panel connector contact C (CKT 402) to PERSONNEL HEATER HI/LO switch terminal 6 (CKT 402).

- See Step 39 .

Symptom-73

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

27 Check basket-control panel heater harness connector (CKT 402) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Connect basket-control panel heater harness connector to master control panel connector.
- Install master control panel (page 10-33).

First Technician (Commander's Station)

- Displace basket-control panel heater harness connector (CKT 402) from basket disconnect.
- Connect red probe of meter to contact C (CKT 402) of basket-control panel heater harness connector and black probe to ground.

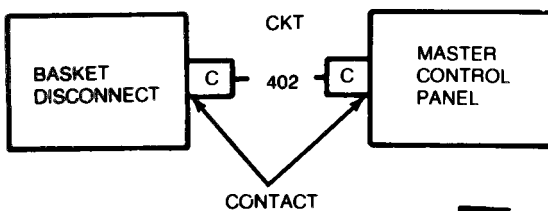
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-HI.

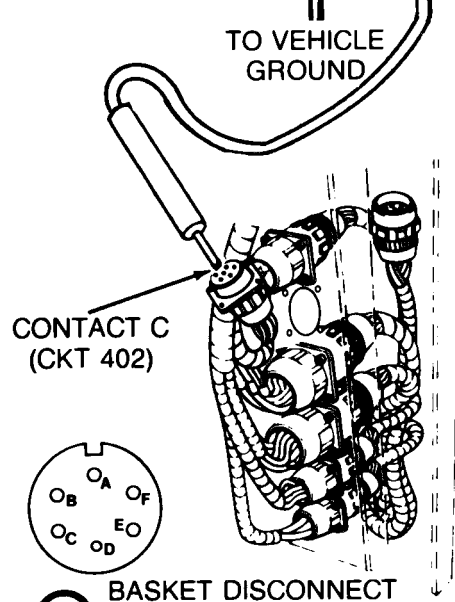
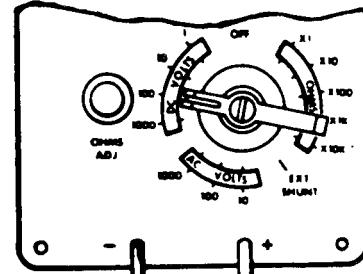
First Technician (Commander's Station)

- Check if meter indicates 18-30 volts dc.

Does meter indicate 18-30 volts dc?



YES NO



28

- Set PERSONNEL HEATER HI/LO switch OFF.

- Inspect basket-control panel heater harness for bent/broken connector contacts or loose CKT 402 wire at rear of connectors.

- Repair connectors if defective (page 10-298).

- If connectors are not defective notify support maintenance of bad basket-control panel heater harness.

- Install basket-control panel heater harness connector at basket disconnect.

TA250590

Symptom-73

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

29 Check for electrical power at heater to basket disconnect harness connector, contact C (CKT 402).

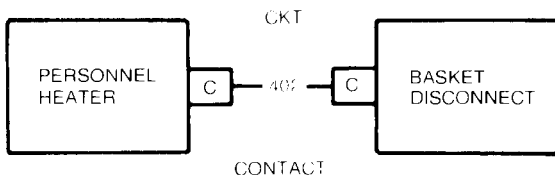
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

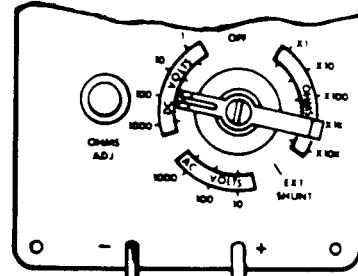
- Install basket-control panel heater harness at basket disconnect.
- Disconnect heater to basket disconnect harness at personnel heater.
- Connect red probe of meter to harness connector contact C (CKT 402) and black probe to ground.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

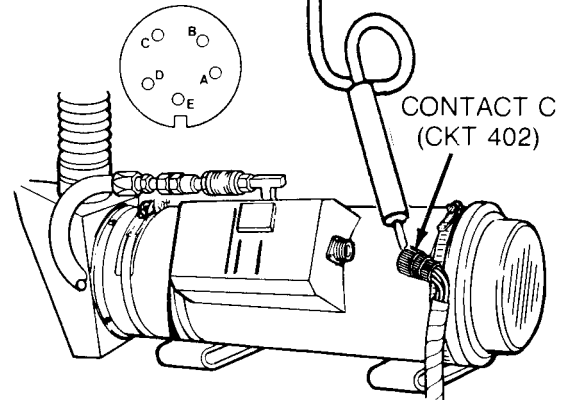


YES

NO



TO VEHICLE
GROUND



PERSONNEL HEATER

30

- Set PERSONNEL HEATER HI/LO switch OFF.
- Inspect heater to basket disconnect harness for bent/broken connector contacts or loose CKT 402 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad heater to basket disconnect harness.
- Connect heater to basket disconnect harness connector to personnel heater.

TA250591

Symptom-73

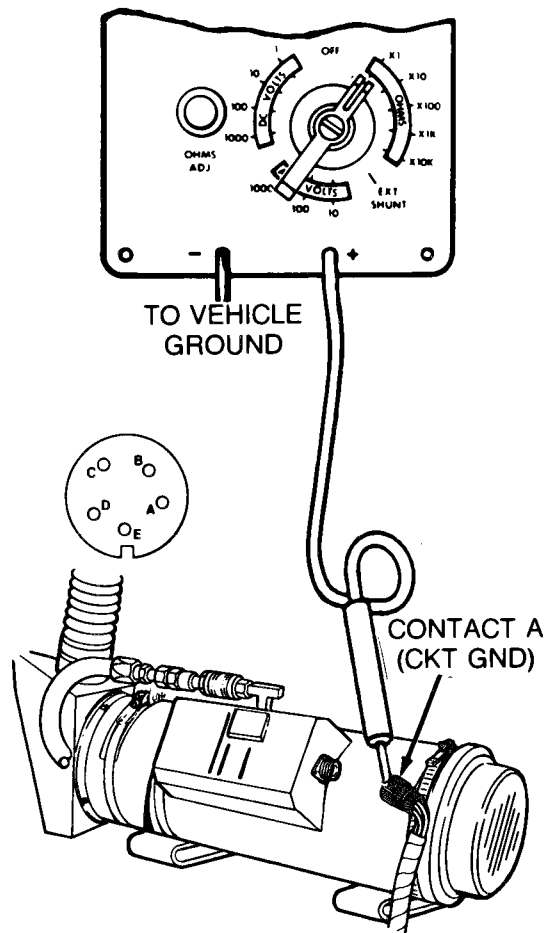
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

31 Check heater to basket disconnect harness connector for continuity to ground at contact A (CKT GND).

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to heater to basket disconnect harness connector contact A (CKT GND) and black probe to ground.
- Check if meter indicates continuity.

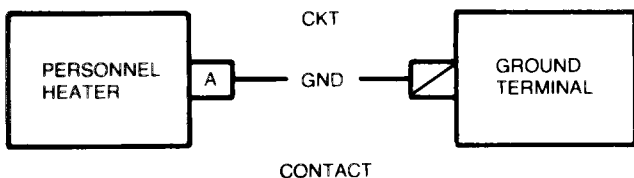
Does meter indicate continuity?



32

- Inspect heater to basket disconnect harness for bent/broken connector contacts or loose CKT GND wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of bad heater to basket disconnect harness.
- Connect heater to basket disconnect harness connector to personnel heater.

NO **YES** **33** Replace personnel heater (page 18-2).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

Symptom-73
FROM STEP

24

34 Check master control panel power harness (CKT 400) for continuity.

Second Technician (Operator's Station)

- Set PERSONNEL HEATER switch OFF.
- Set HEATER MASTER switch OFF.

WARNING
After disconnecting ground straps, do not allow them to contact any metal surface.

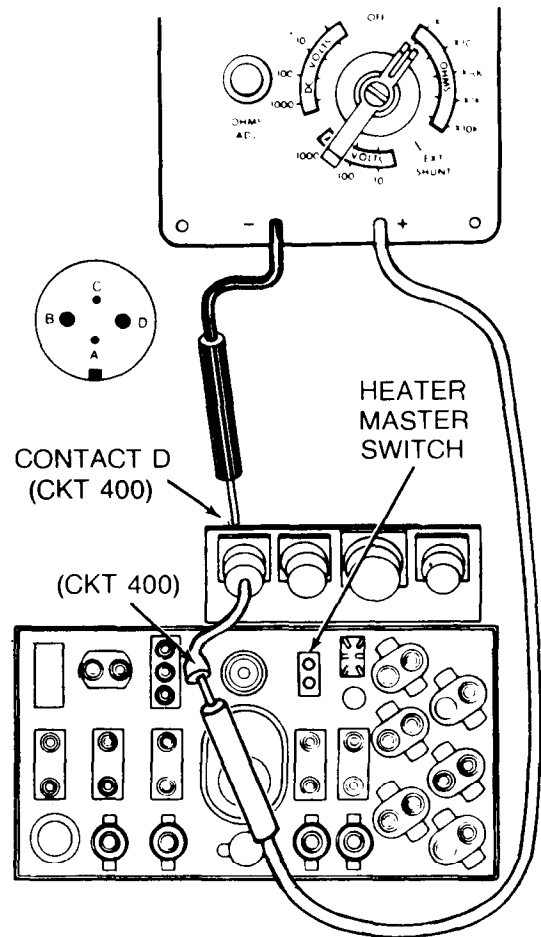
First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel power harness connector. (CKT 400-459) from master control panel.
- Disconnect basket-control panel starting harness connector from master control panel.
- Remove 4 screws, nuts and washers from master control panel starting harness connector and unmount connector from master control panel.
- Disconnect control panel power harness connector (CKT 400) at HEATER MASTER switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to control panel power harness connector (CKT 400) at HEATER MASTER switch.
- Connect black probe of meter to control panel power harness connector D (CKT 400).
- Check if meter indicates continuity.

Does meter indicate continuity?



35

- Replace master control panel power harness (page 10-101).
- Install control panel starting harness connector in master control panel.
- Connect basket-control panel starting harness connector to master control panel.
- Connect three battery ground straps (page 10-268).

Symptom-73

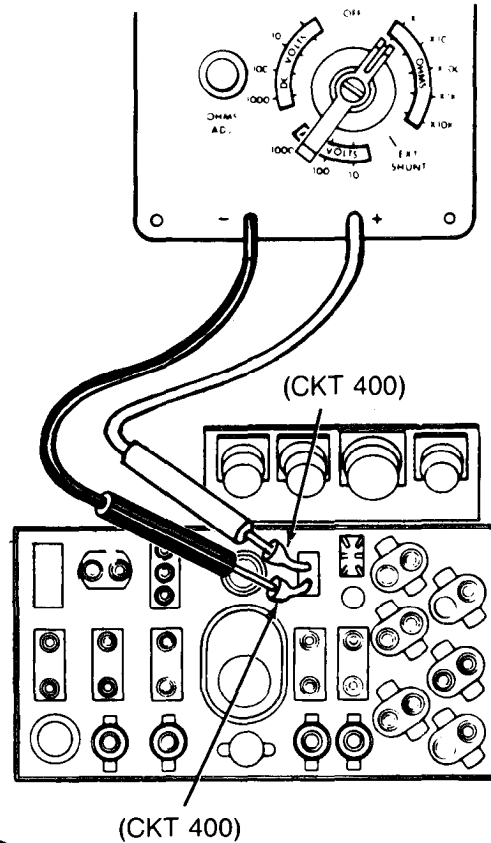
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

36 Check HEATER MASTER switch for continuity.

Second Technician (Operator's Station)

- Disconnect control panel heater harness connector (CKT 400, 405) at HEATER MASTER switch.
- Set HEATER MASTER switch ON.
- Connect red probe of meter to one connector of HEATER MASTER switch and black probe to other switch connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



37

- Replace HEATER MASTER switch (page 10-77).
- Connect basket-control panel power harness at master control panel.
- Connect 3 battery ground straps (page 10-268).

NO YES

38

- Replace master control panel heater harness (page 10-85).
- Connect control panel harness connectors at HEATER MASTER switch.
- Connect basket-control panel power harness at master control panel.
- Install control panel starting harness connector in master control panel.
- Connect basket-control panel starting harness connector to master control panel.
- Connect 3 battery ground straps (page 10-268).

TA250594

Symptom-73
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

26

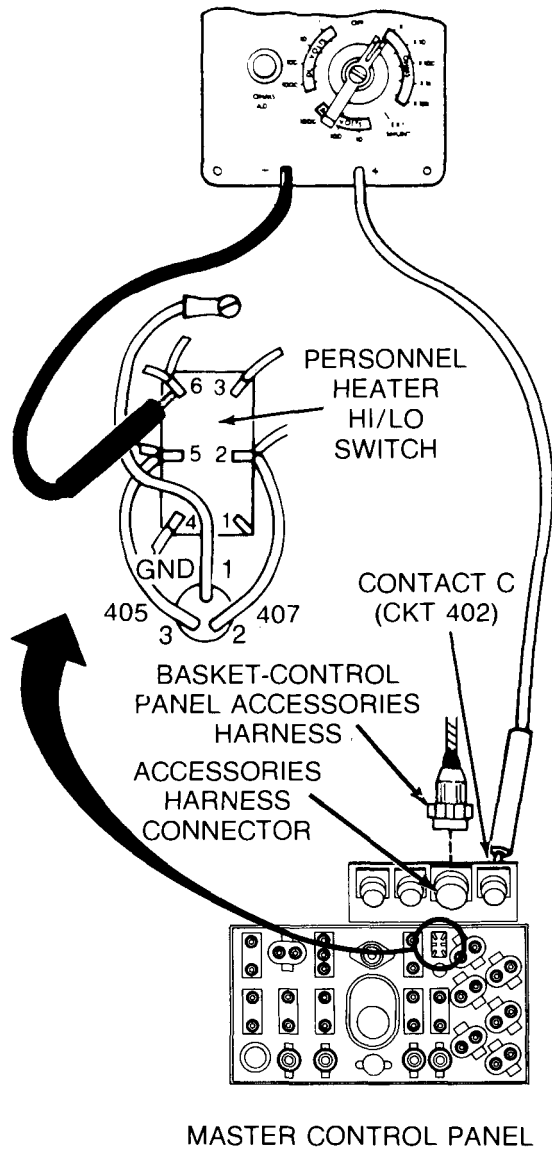
39

Check control panel heater harness for continuity from panel connector contact C (CKT 402) to PERSONNEL HEATER HI/LO switch terminal 6 (CKT 402).

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Remove 4 screws, nuts, and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Connect red probe of meter to panel heater harness connector contact C (CKT 402).
- Connect black probe of meter to PERSONNEL HEATER HI/LO switch terminal 6 (CKT 402).
- Check if meter indicates continuity.

Does meter indicate continuity?



40

Replace personnel HEATER HI/LO switch (page 10-77).

41

Replace master control panel heater harness (page 10-85).

YES NO

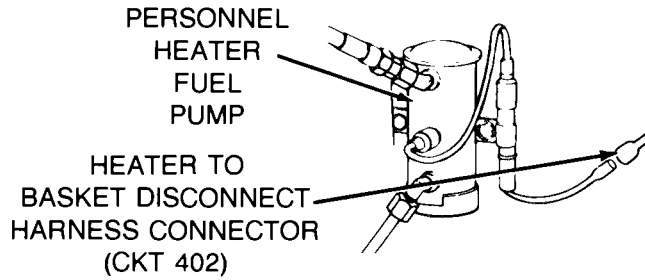
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER**

Symptom-74

**PERSONNEL HEATER HI/LO SWITCH WILL NOT CONTROL HEATER
(BLOWER RUNS IN ONE OR BOTH ON-HI, ON-LO SWITCH POSITIONS).**

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check for personnel heater blower running with PERSONNEL HEATER HI/LO switch in ON-LO position.

Second Technician (Operator's Station)

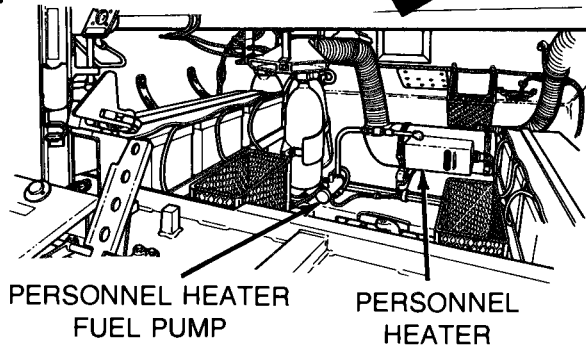
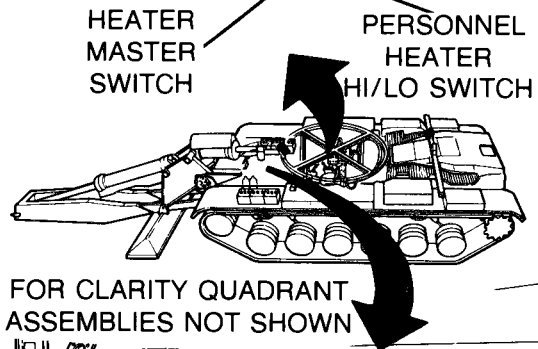
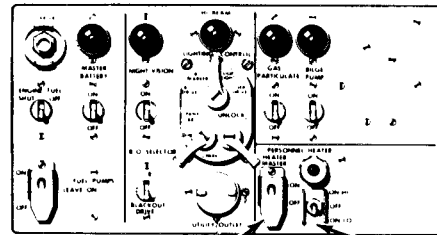
- Set HEATER MASTER switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Personnel Heater)

- Disconnect heater to basket disconnect harness connector (CKT 402) from personnel heater fuel pump.

Second Technician (Operator's Station)

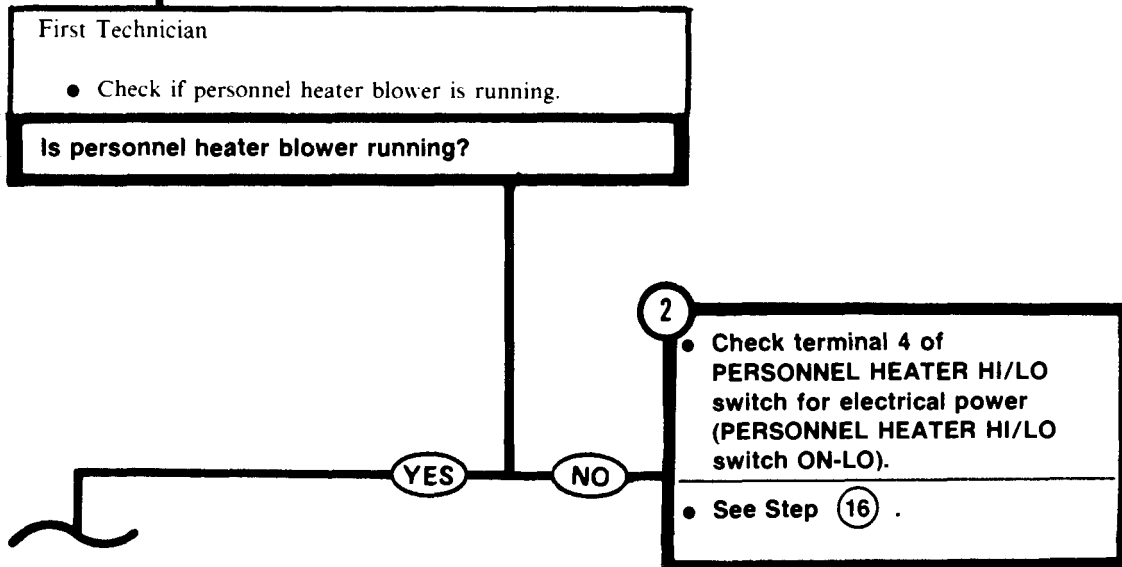
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.



Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER

STEP ① CONTINUED



Symptom-74

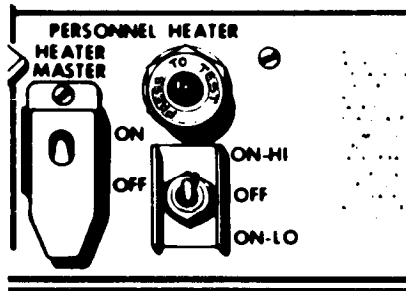
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

3 Check for personnel heater blower running with PERSONNEL HEATER HI/LO switch ON-HI position.

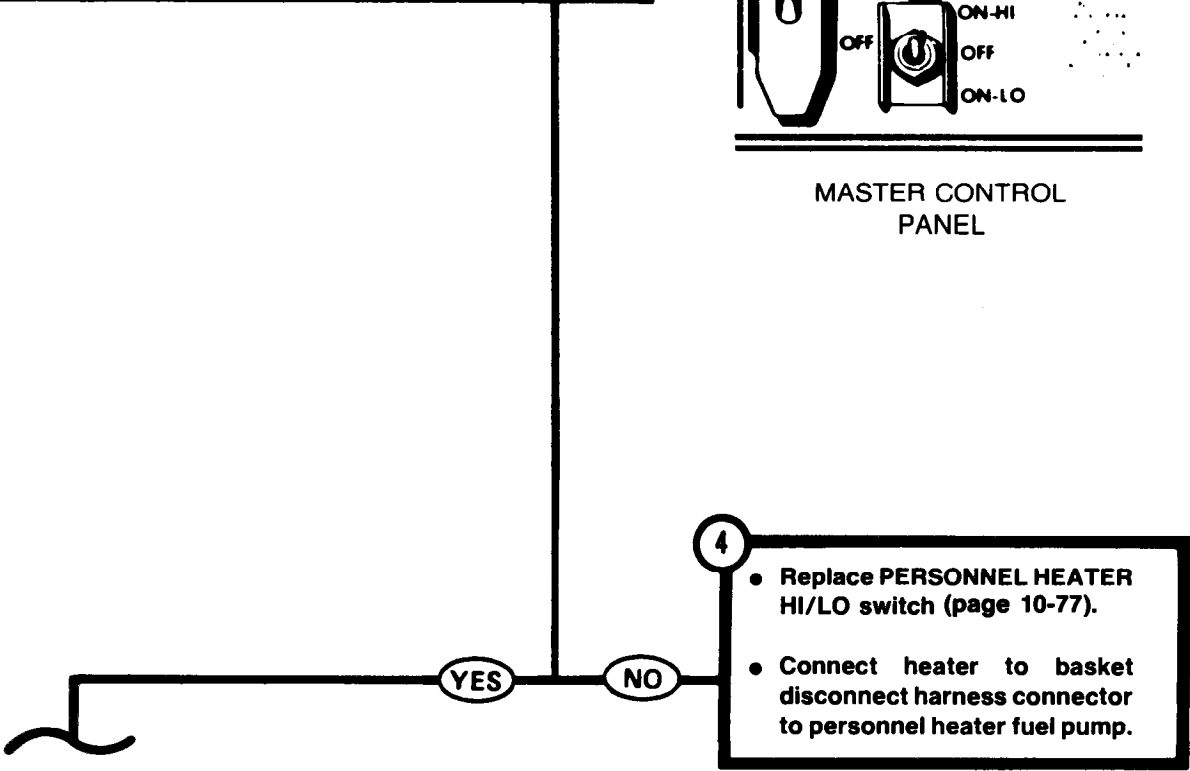
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Check if personnel heater blower motor is running.

Is personnel heater blower running?



MASTER CONTROL PANEL



4

- Replace PERSONNEL HEATER HI/LO switch (page 10-77).
- Connect heater to basket disconnect harness connector to personnel heater fuel pump.

TA250598

Symptom-74

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

5 Check heater to basket disconnect harness (CKT 405) at personnel heater for electrical power.

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Disconnect heater to basket disconnect harness connector from personnel heater.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact D (CKT 405) of heater to basket disconnect harness connector and black probe to ground.

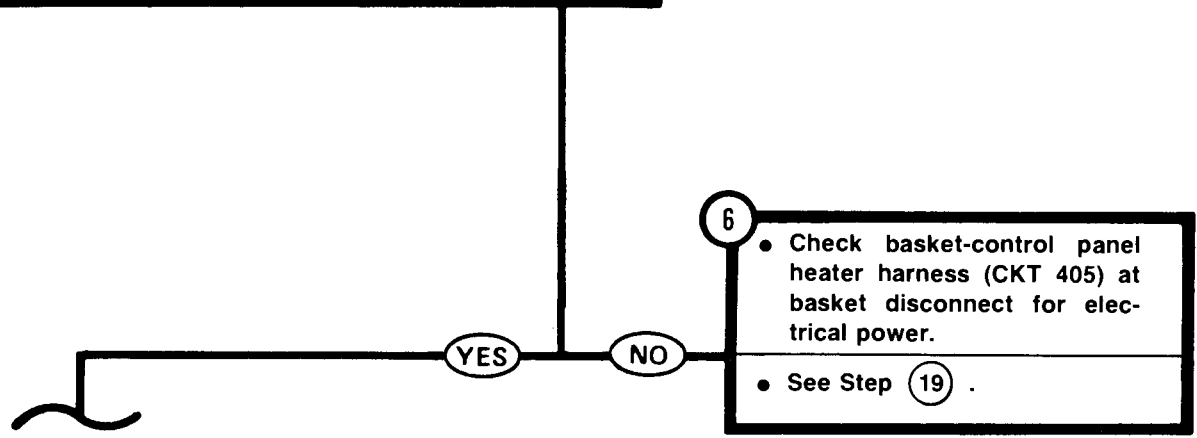
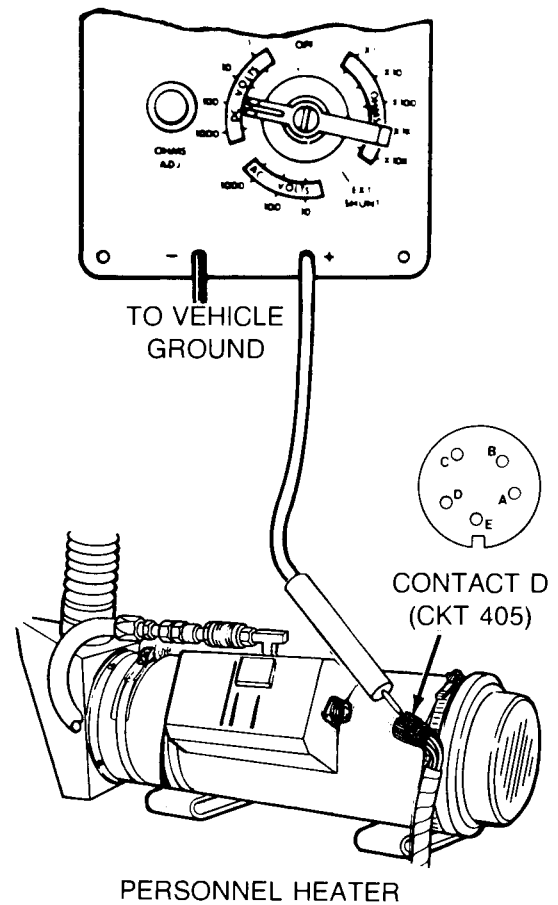
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.

First Technician (Personnel Heater)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

7 Check heater to basket disconnect harness (CKT 401) from personnel heater to basket disconnect for continuity.

Second Technician (Operator's Station)

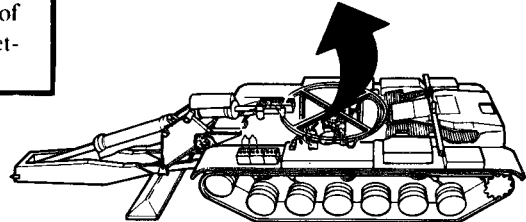
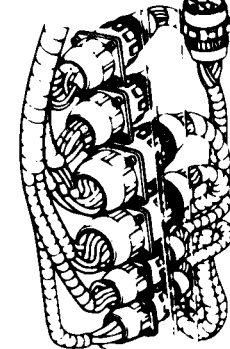
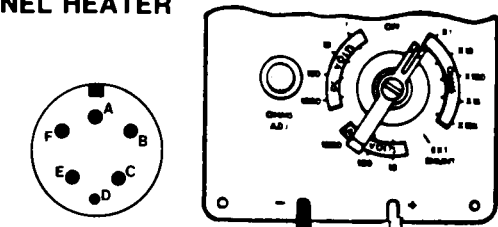
- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

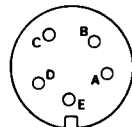
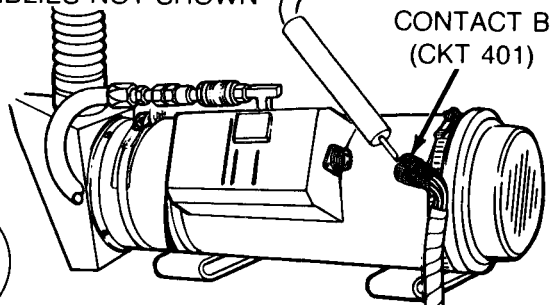
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT 401) of heater to basket disconnect harness connector at personnel heater.

First Technician (Commander's Station)

- Disconnect heater to basket disconnect harness connector (CKT 401) from basket disconnect.
- Connect black probe of meter to contact B (CKT 401) of heater to basket disconnect harness connector at basket-disconnect.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



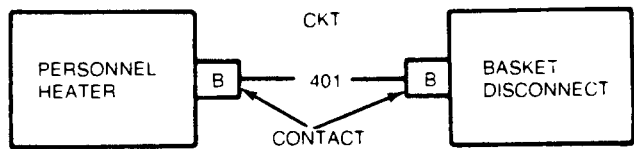
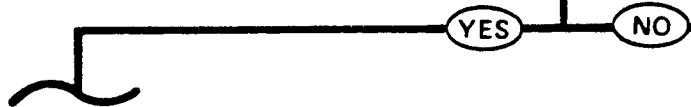
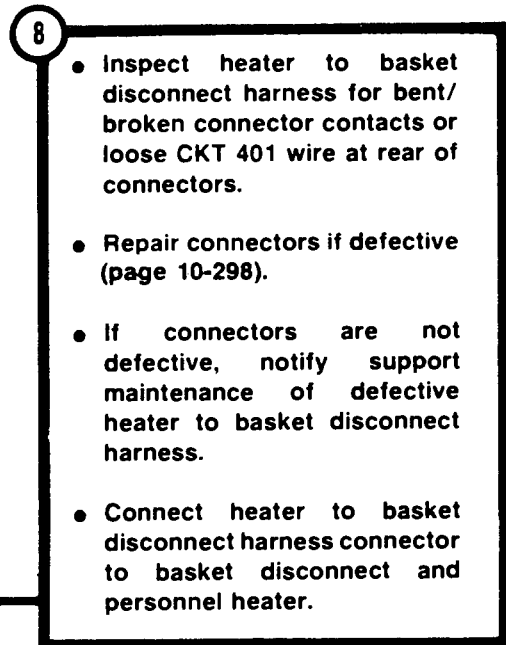
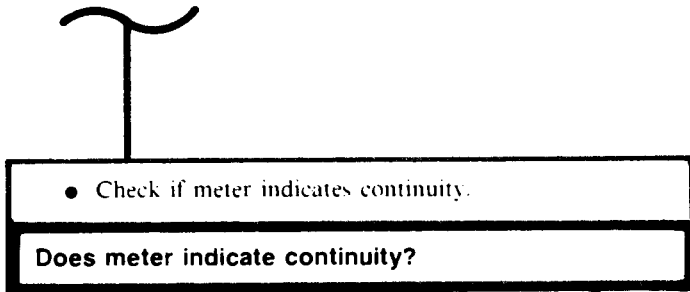
PERSONNEL HEATER

TA250600

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

STEP 7 CONTINUED



Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

9

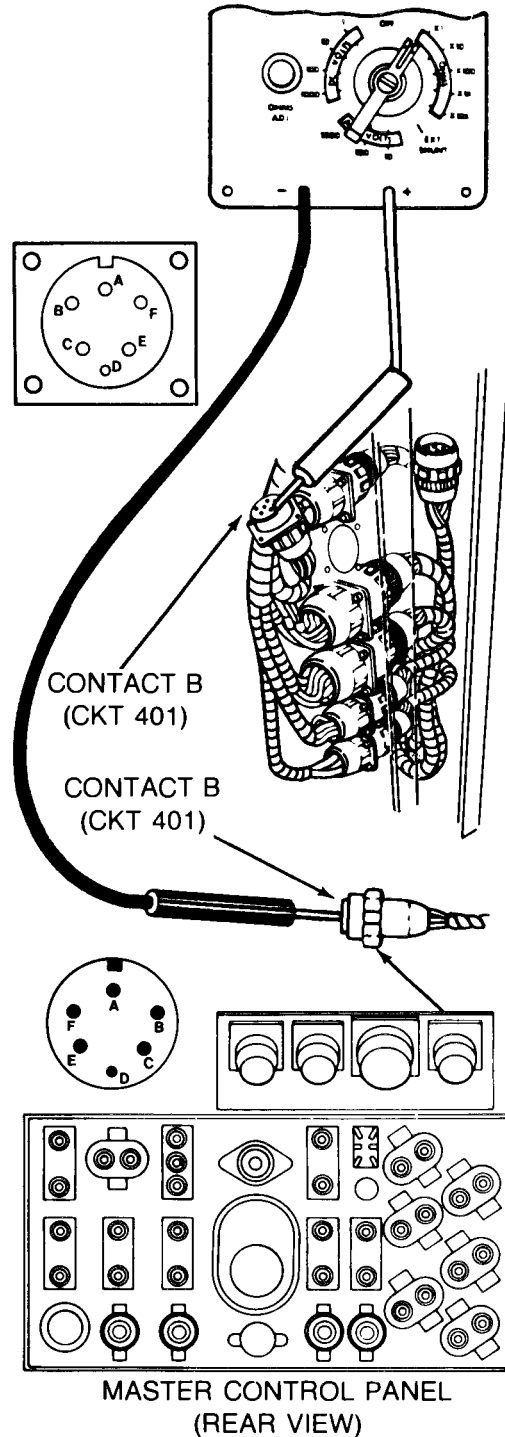
Check basket-control panel heater harness (CKT 401) from basket disconnect to master control panel for continuity.

First Technician (Commander's Station)

- Displace basket-control panel heater harness connector (CKT 401) at basket disconnect.
- Connect red probe of meter to contact B (CKT 401) of basket-control panel heater harness at basket disconnect.
- Reconnect heater to basket disconnect harness connector to personnel heater.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel heater harness connector from master control panel.
- Connect black probe of meter to contact B (CKT 401) of basket-control panel heater harness connector at master control panel.



TA250602

Symptom-74

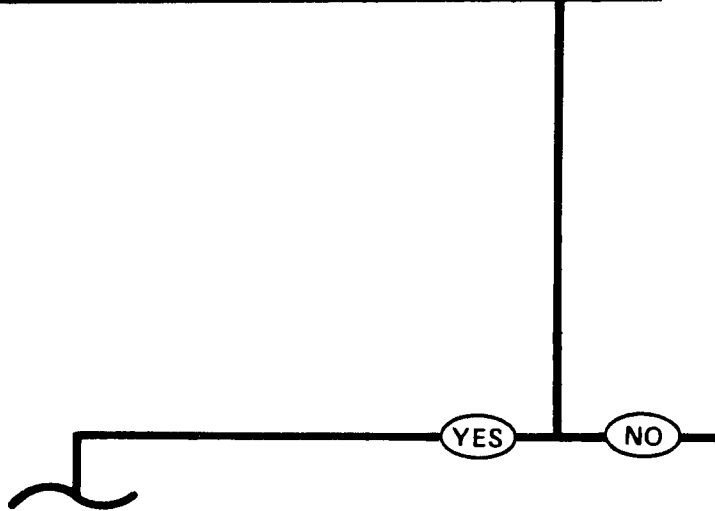
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

STEP 9 CONTINUED

First Technician (Commander's Station)

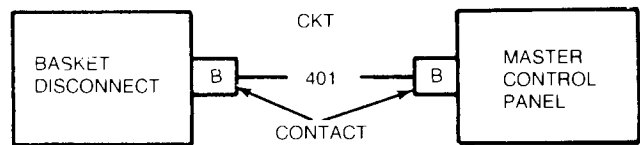
- Check if meter indicates continuity.

Does meter indicate continuity?



10

- Inspect basket-control panel heater harness for bent/broken connector contacts or loose CKT 401 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective basket-control panel heater harness.
- Connect basket-control panel heater harness connector to master control panel.
- Install master control panel (page 10-33).
- Install basket-control panel heater harness at basket disconnect.



TA250603

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

11 Check PERSONNEL HEATER HI/LO switch between terminals 2 and 3 for continuity (PERSONNEL HEATER HI/LO switch ON-HI).

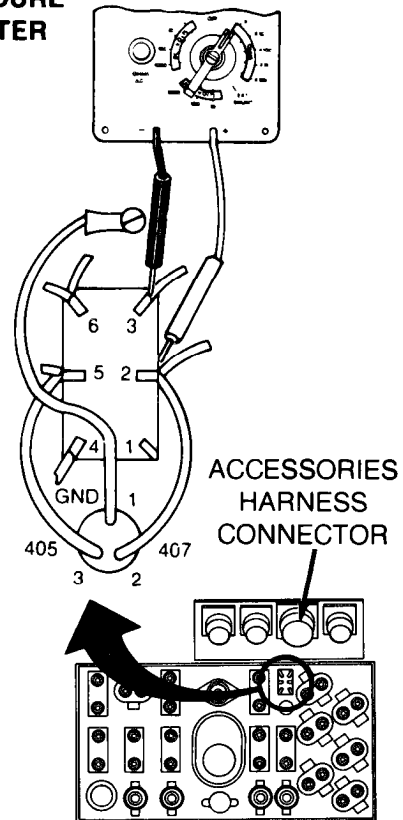
First Technician (Commander's Station)

- Install basket-control panel heater harness connector at basket disconnect.

Second Technician (Operator's Station)

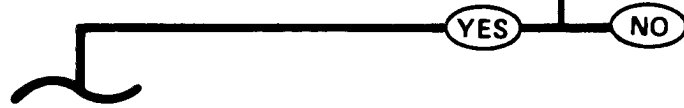
- Disconnect basket-control panel accessories harness connector from master control panel.
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Connect red probe of meter to HI/LO switch terminal 2.
- Connect black probe of meter to HI/LO switch terminal 3.
- Check if meter indicates continuity.

Does meter indicate continuity?



12

- Replace PERSONNEL HEATER HI/LO switch (page 10-77).
- Install control panel accessories harness connector in master control panel.
- Connect basket-control panel accessories harness connector to master control panel connector.
- Connect basket-control panel heater harness connector to master control panel connector.
- Install master control panel (page 10-33).
- Connect heater to basket disconnect harness connector to personnel heater fuel pump.



Symptom-74

FROM STEP

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

2

16 Check terminal 4 of PERSONNEL HEATER HI/LO switch for electrical power. (PERSONNEL HEATER HI/LO switch ON/LO).

- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness from master control panel accessories harness connector.
- Remove 4 screws, nuts, and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to PERSONNEL HEATER HI/LO switch terminal 4 and black probe to ground.
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

NO

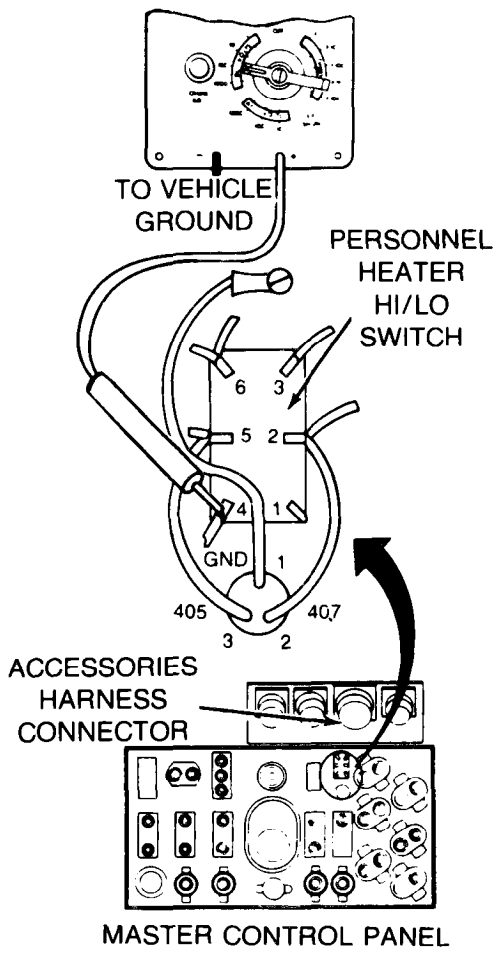
YES

17

- Replace PERSONNEL HEATER HI/LO switch (page 10-77).
- Connect personnel heater control harness connector to personnel heater fuel pump.

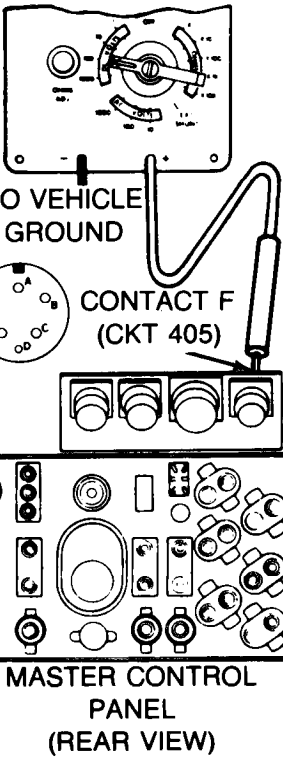
18

- Replace PERSONNEL HEATER HI/LO switch jumper lead.
- Connect personnel heater control harness connector to personnel heater fuel pump.



Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(CONTINUED)



21 Check control panel accessories harness connector (CKT 405) for electrical power.

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF

First Technician (Commander's Station)

- Reinstall basket-control panel heater harness connector at basket disconnect.

Second Technician (Commander's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel heater harness connector from master control panel.
- Connect red probe of meter to contact F (CKT 405) of control panel heater harness connector and black probe to ground.
- Set HEATER MASTER switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

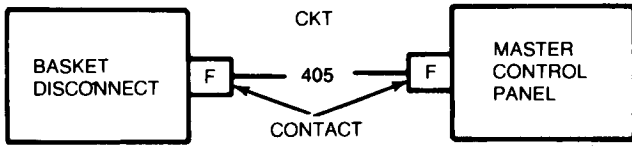
23

- Inspect basket-control panel heater harness for bent/broken connector contacts or loose CKT 405 wire at rear of connectors.
- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of defective basket-control panel heater harness.
- Connect basket-control panel heater harness to master control panel.
- Install master control panel (page 10-33).

22

- Replace master control panel personnel heater harness (page 10-85).
- Connect heater to basket disconnect harness to personnel heater fuel pump.

NO YES

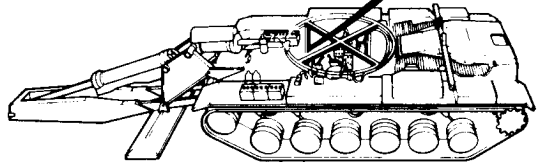
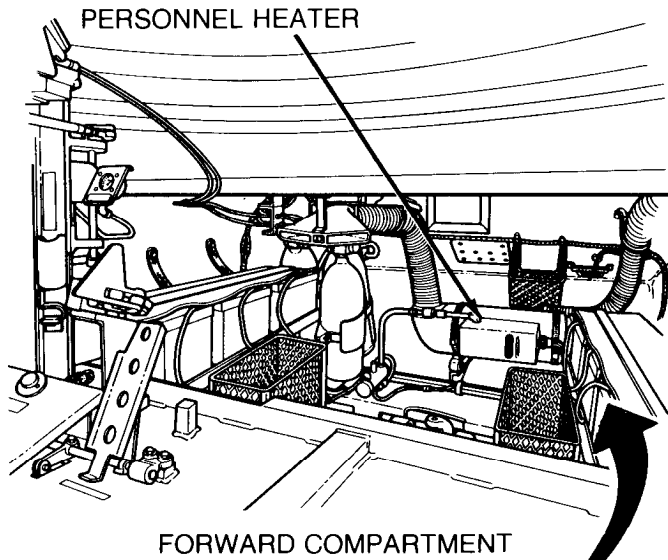


DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER

Symptom-75

PERSONNEL HEATER STARTS, WORKS FOR A SHORT TIME, THEN STOPS.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check personnel heater air intake grille for obstructions.

First Technician (Operator's Station)

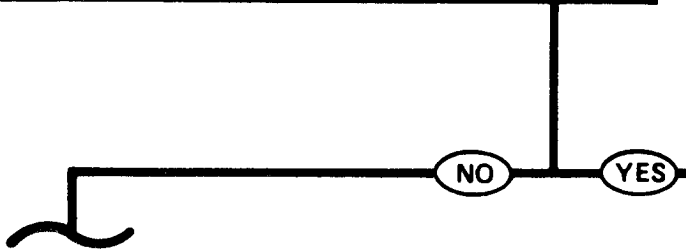
- Set PERSONNEL HEATER HI/LO switch OFF.

Second Technician (At Personnel Heater)

- Check personnel heater air intake grille for obstructions.

Is air intake grille obstructed?

2 Clear obstructions from air intake grille.



Symptom-75

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

3 Check personnel heater duct for air flow at deflector.

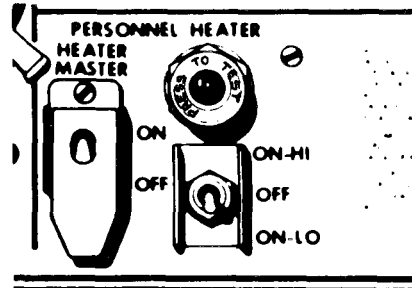
First Technician (Operator's Station)

- Check that HEATER MASTER ON/OFF switch is ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.

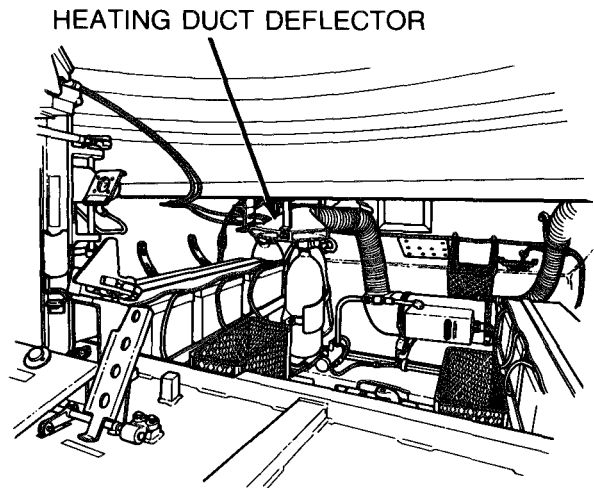
Second Technician (At Personnel Heater)

- Place hand in front of heating duct deflector and check for air flow.

Is air flow present at deflector?



MASTER CONTROL PANEL



4 Replace personnel heater (page 18-2).



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

Symptom-75

5 Check personnel heater air duct and deflector for obstructions or damage.

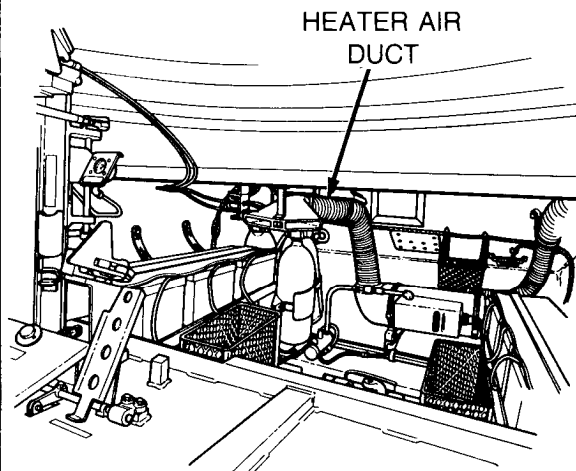
First Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

Second Technician (At Personnel Heater)

- Remove heater duct from rear of deflector.
- Look into duct opening and check for obstructions.
- Check deflector for obstructions.
- Check heater duct for crimps or other damage.

Is the air duct or deflector clogged or damaged?



6

- Remove obstructions in heater duct or deflector.
- Replace damaged heater duct or deflector.

YES

NO

7

- Replace personnel heater (page 18-2).
- Install heater duct on deflector.

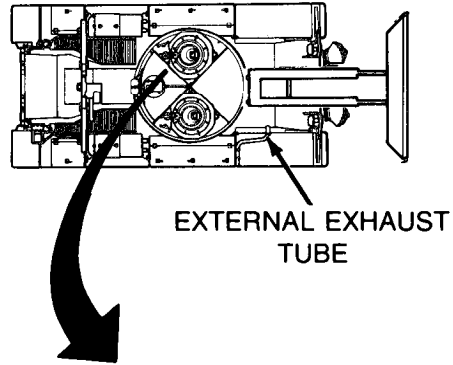
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER**

Symptom-76

EXHAUST FUMES FROM PERSONNEL HEATER INSIDE VEHICLE.

WARNING
Exposure to exhaust fumes in an enclosed area can be dangerous to your health.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check external exhaust tube for damage or obstructions.

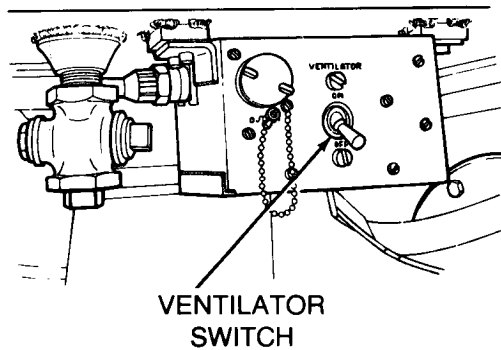
First Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set MASTER BATTERY switch ON.
- Set VENTILATOR switch ON (TM 5-5420-202-10) and allow blower motor to run until exhaust fumes are cleared from vehicle.
- Set VENTILATOR switch OFF.
- Set MASTER BATTERY switch OFF.

Second Technician (Right Front Fender)

- Look into opening of external exhaust tube and check for obstructions.
- Check external exhaust tube for damage.

Is external exhaust tube obstructed or damaged?



2

- Remove obstructions from external exhaust tube.
- If exhaust tube is not obstructed, replace damaged external exhaust tube (page 18-22).



TA250612

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)**

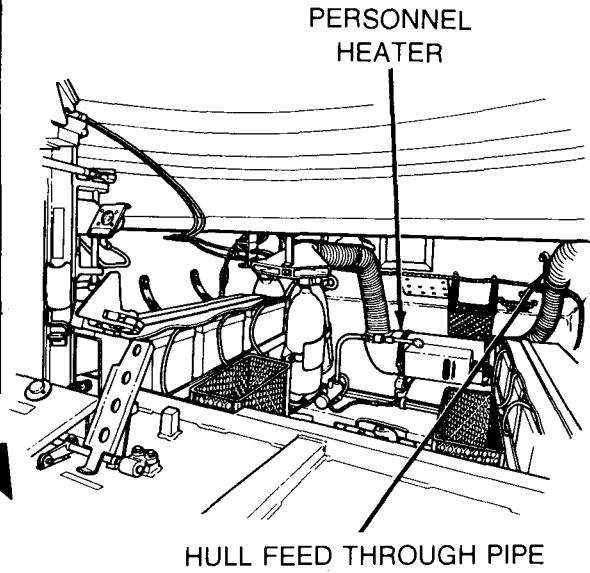
Symptom-76

3 Check for loose coupling clamps on internal exhaust pipe.

First Technician (Personnel Heater)

- Check if coupling clamp is loose at personnel heater.
- Check if coupling clamp is loose at hull feed through pipe.

Are internal exhaust pipe coupling clamps loose?

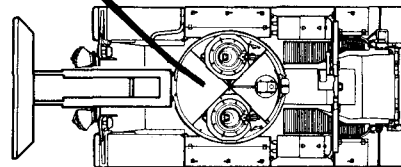


4 Tighten loose internal exhaust pipe coupling clamps.

YES

5 Replace personnel heater (page 18-2).

NO



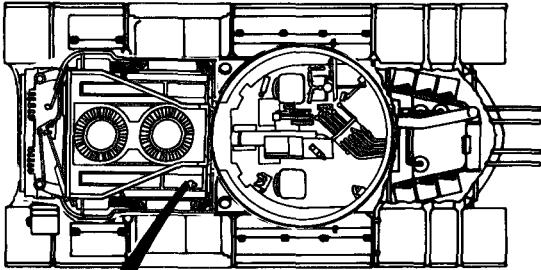
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR**

Symptom-77

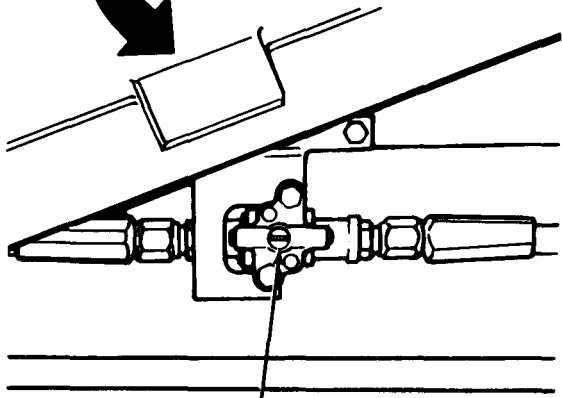
SMOKE GENERATOR WILL NOT WORK (NO SMOKE OR QUANTITY OF SMOKE IS NOT NORMAL).

WARNING
Never activate smoke generator in a building, closed area, or with personnel nearby.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



- 1** Check if smoke generator makes white smoke.
- First Technician (Top Deck)**
- Open right top deck grille doors.
 - Make sure smoke generator manual fuel shut-off valve is in open position (screw slot in line with fuel line).
- First Technician (Side of Vehicle)**
- Note wind direction.
 - Move vehicle to a safe position.



SMOKE GENERATOR MANUAL FUEL SHUT-OFF VALVE

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

STEP 1 CONTINUED

Second Technician (Operator's Station)

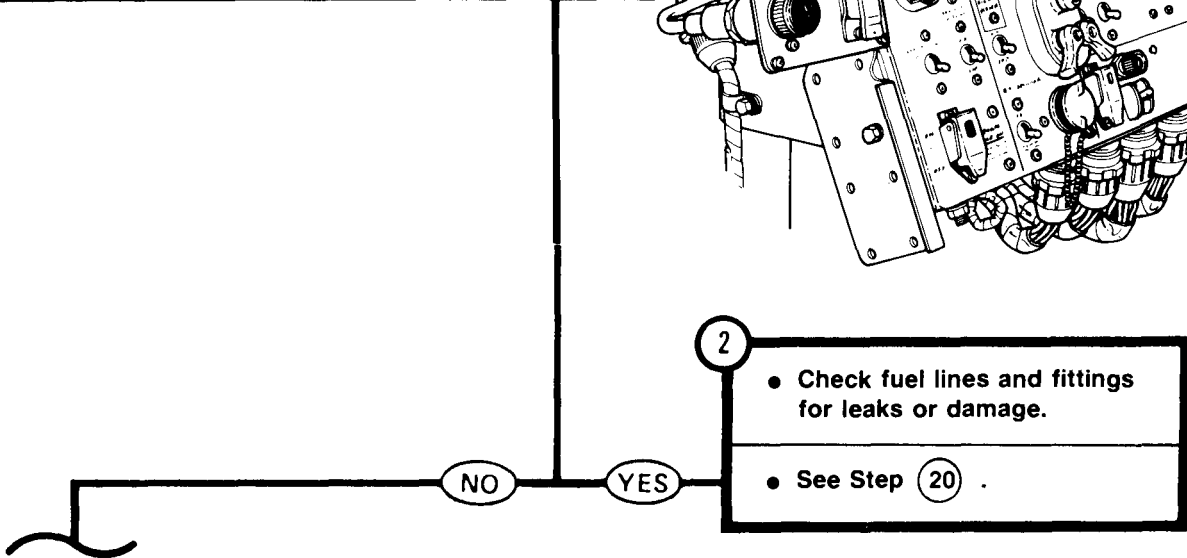
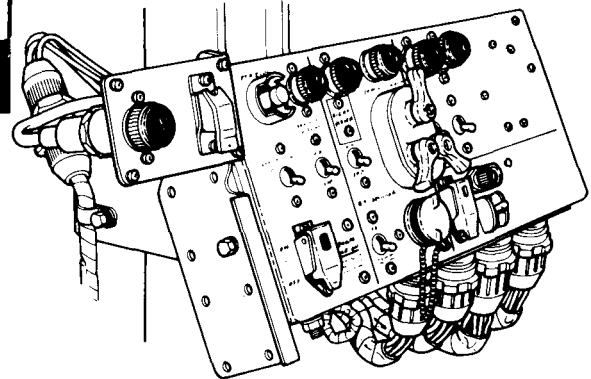
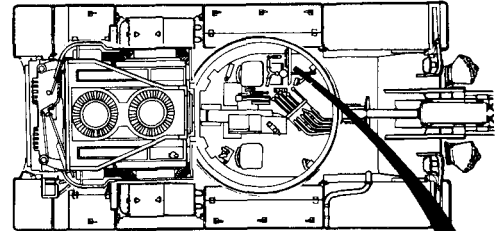
- Start engine and allow it to warm up.
- Set engine speed at 1600 rpm.
- Set SMOKE GENERATOR switch ON for ten seconds then OFF.

First Technician (Side of Vehicle)

- Look for white smoke coming from engine exhaust.

Is white smoke emitted?

FOR CLARITY QUADRANT
ASSEMBLIES NOT SHOWN



2

- Check fuel lines and fittings for leaks or damage.
- See Step 20 .

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

Symptom-77

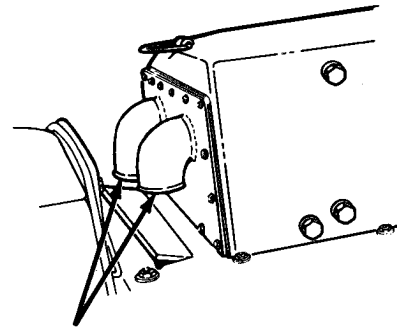
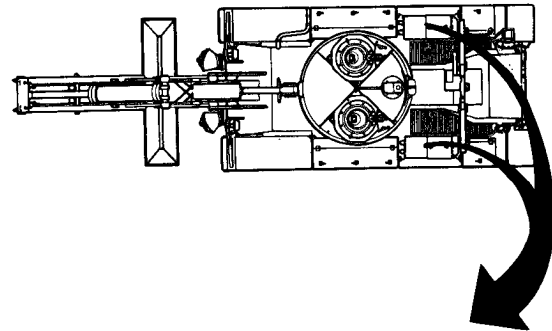
3

Check if any air cleaner blower motors are running.

First Technician (Top Deck)

- Check if air exhaust can be felt at any of the four blower motor elbows.

Are any air cleaner blower motors running?



BLOWER MOTOR
ELBOWS

AIR CLEANER
(LEFT SIDE SHOWN)

4

**Refer to Symptom No. 14: ALL
AIR CLEANER BLOWER FANS
WILL NOT WORK.**

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

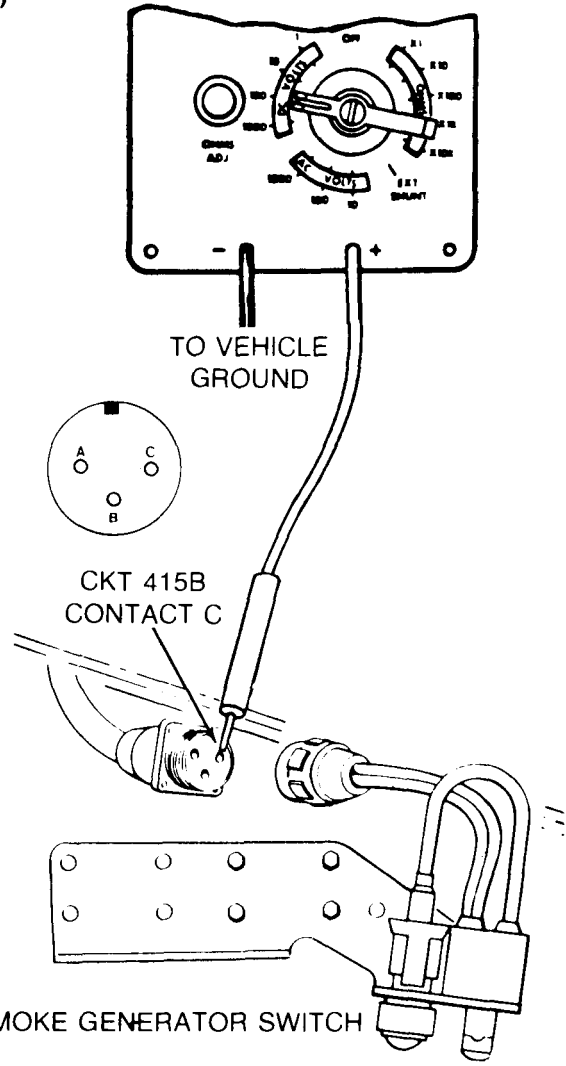
Symptom-77

5 Check smoke generator switch harness (CKT 415B) at SMOKE GENERATOR switch for electrical power.

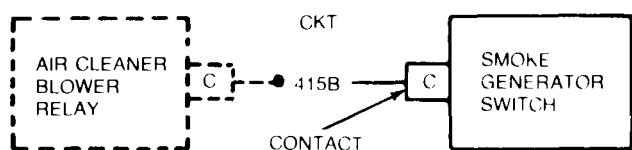
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect smoke generator switch harness connector from SMOKE GENERATOR switch connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT 415B) of smoke generator switch harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



6 Repair smoke generator switch harness (CKT 415B) (page 10-298).



TA250617

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

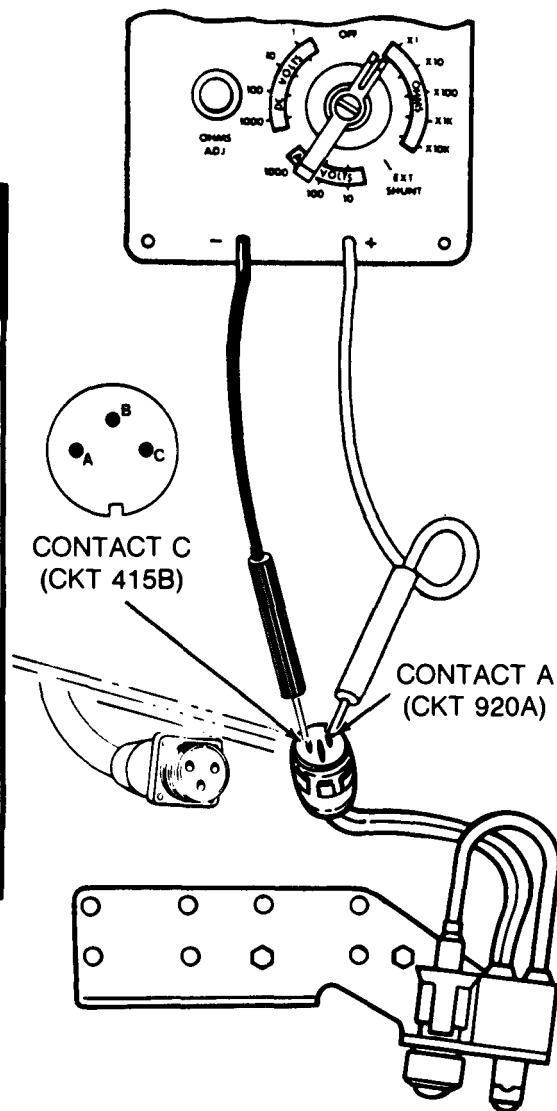
Symptom-77

7 Check SMOKE GENERATOR switch assembly connector for continuity from contact A to contact C.

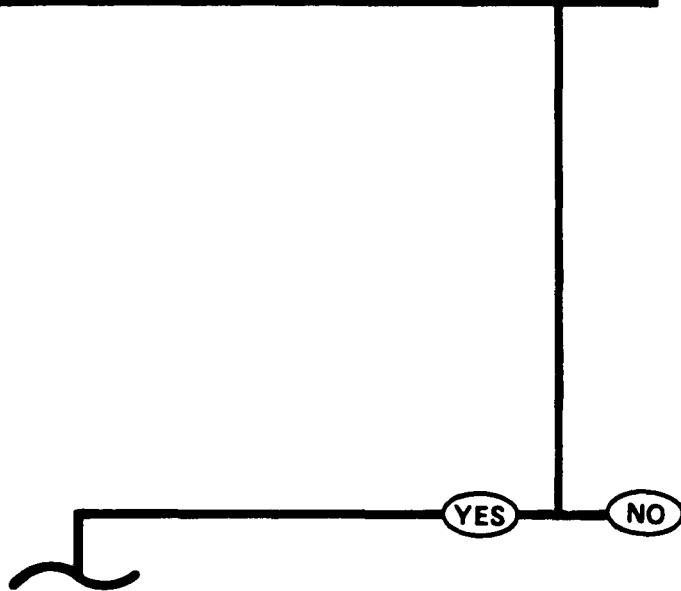
Second Technician (Operator's Station)

- Stop engine.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Set SMOKE GENERATOR switch ON.
- Connect red probe of meter to contact A of switch assembly connector.
- Connect black probe of meter to contact C of switch assembly connector.
- Check if meter indicates continuity.

Does multimeter indicate continuity?



8 Replace SMOKE GENERATOR switch assembly (page 21-2).



TA250618

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

Symptom-77

9 Check smoke generator switch harness (CKT 920A) for continuity from switch assembly to lead assembly at bulkhead disconnect.

First Technician (Commander's Station)

- Disconnect smoke generator switch harness connector from CKT 920A lead assembly connector at bulkhead disconnect.

Second Technician (Operator's Station)

- Set SMOKE GENERATOR switch OFF.
- Connect red probe of meter to smoke generator switch harness connector contact A (CKT 920A) at SMOKE GENERATOR switch.

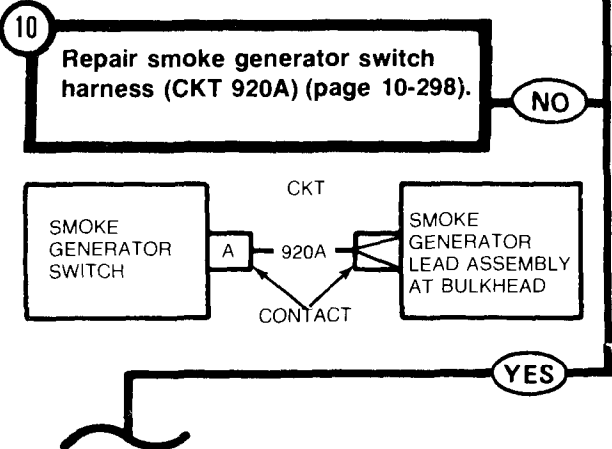
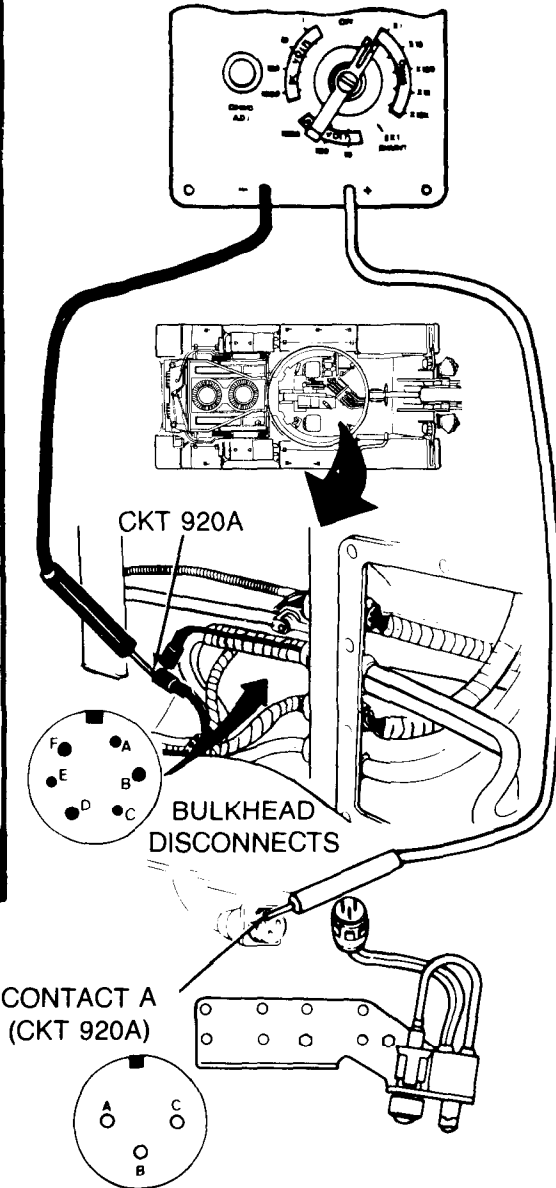
First Technician (Commander's Station)

- Connect black probe of meter to smoke generator switch harness at lead assembly (CKT 920A) at bulkhead electrical disconnect.

Second Technician (Operator's Station)

- Check if meter indicates continuity.

Does meter indicate continuity?



Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

WARNING
Use extreme care when working with circuit 81. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

WARNING
Do not allow battery ground straps to come in contact with vehicle chassis or ground while disconnected.

11 Check CKT 920A lead through starter harness connector at bulkhead electrical disconnect.

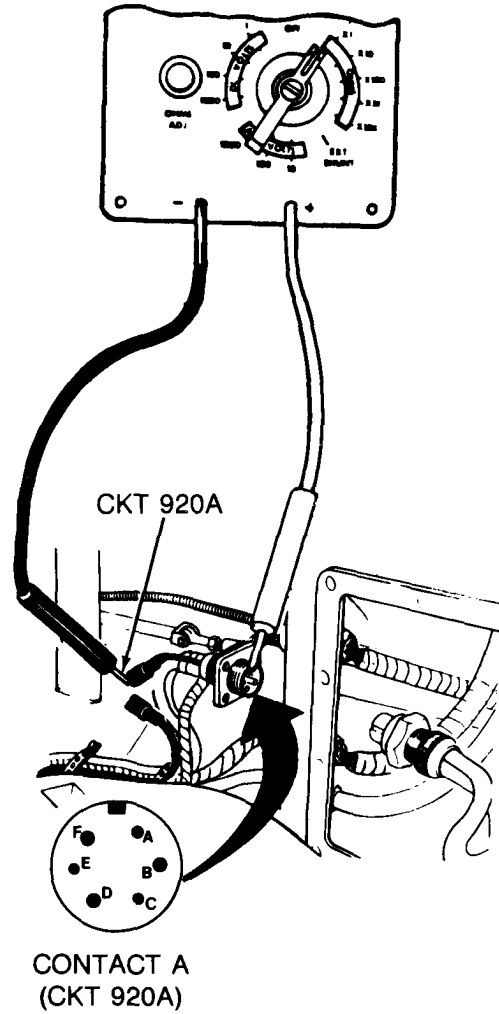
Second Technician (Operator's Station)

- Disconnect 3 battery ground straps (page 10-268).
- Reconnect smoke generator switch harness connector to switch connector.

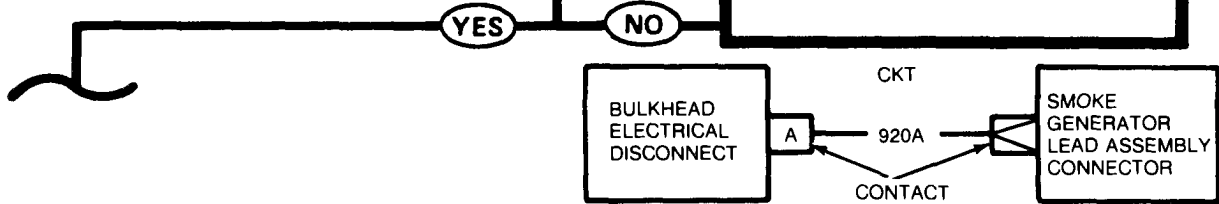
First Technician (Commander's Station)

- Disconnect starter harness from bulkhead disconnect.
- Connect red probe of meter to starter harness connector A (CKT 920A).
- Connect black probe of meter to lead assembly connector CKT 920A at bulkhead electrical disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?



12 Repair smoke generator lead assembly (page 10-298).



TA250620

Symptom-77

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

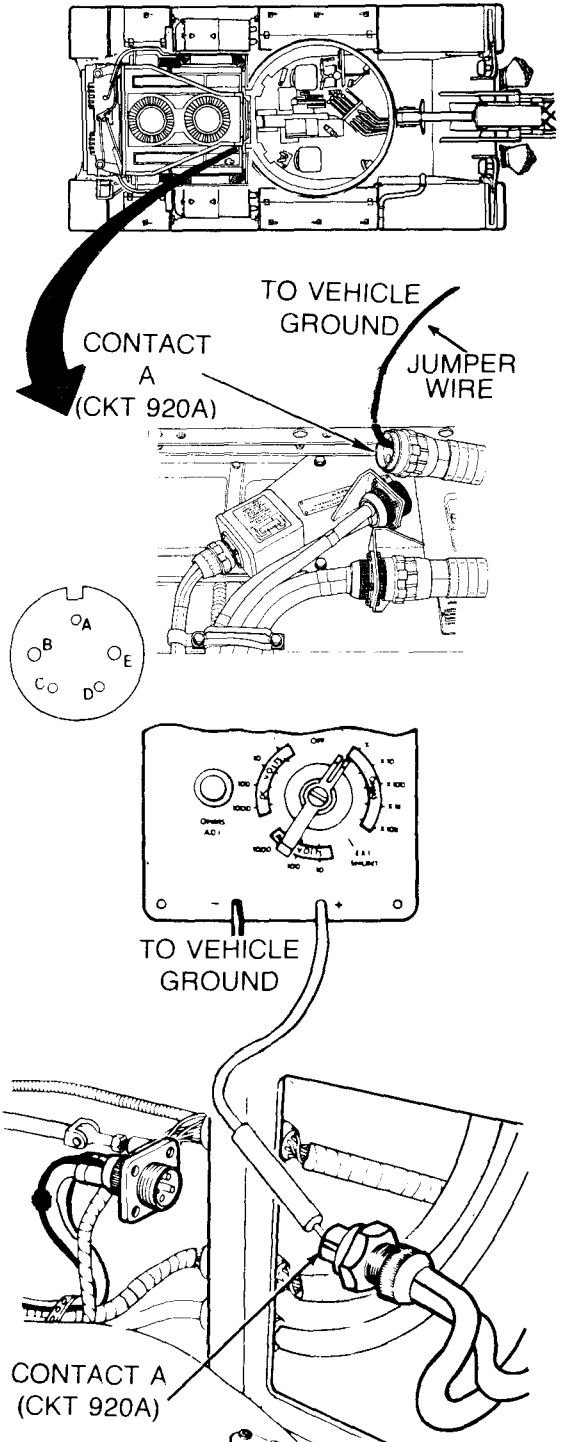
13 Check starter feed harness (CKT 920A) for continuity from bulkhead disconnect to engine disconnect.

Second Technician (Top Deck)

- Open right top deck grille doors.
- Disconnect starter feed harness connector from starter motor harness at engine disconnect.
- Connect jumper wire from starter feed harness connector contact A (CKT 920A) to ground.

First Technician (Commander's Station)

- Disconnect CKT 920A lead connector at bulkhead electrical disconnect to smoke generator harness connector.
- Connect smoke generator switch harness connector CKT 920A lead assembly connector.
- Connect red probe of meter to starter feed connector contact A (CKT 920A) at bulkhead electrical disconnect and black probe to ground.



TA250621

Symptom-77

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

STEP **13** CONTINUED

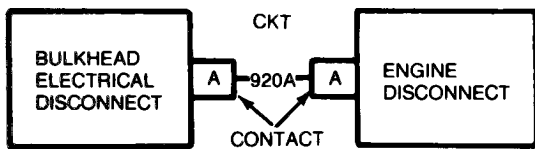
● Check if meter indicates continuity.

Does meter indicate continuity?

14 Inspect starter feed harness for bent/broken connector contacts or loose CKT 920A wire at rear of connectors.

- Repair connectors if defective (page 10-298).
- If connectors are not defective, notify support maintenance of a defective starter feed harness.
- Connect battery slave cable to bulkhead electrical disconnects.
- Connect starter feed harness connector to engine disconnect.

NO



YES

TA250622

Symptom-77

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

15 Check smoke generator engine harness (CKT 920A) for continuity from engine disconnect to both harness connectors at solenoid valves.

First Technician (Commander's Station)

- Reconnect battery slave cable to bulkhead electrical disconnect.

Both Technicians (Rear of Vehicle)

- Remove transmission shroud (page 9-2).

First Technician (Rear of Vehicle)

- Disconnect both smoke generator engine harness connectors from the solenoid valves.
- Connect red probe of meter to contact A (CKT 920A) of one smoke generator engine harness connector at solenoid valves.

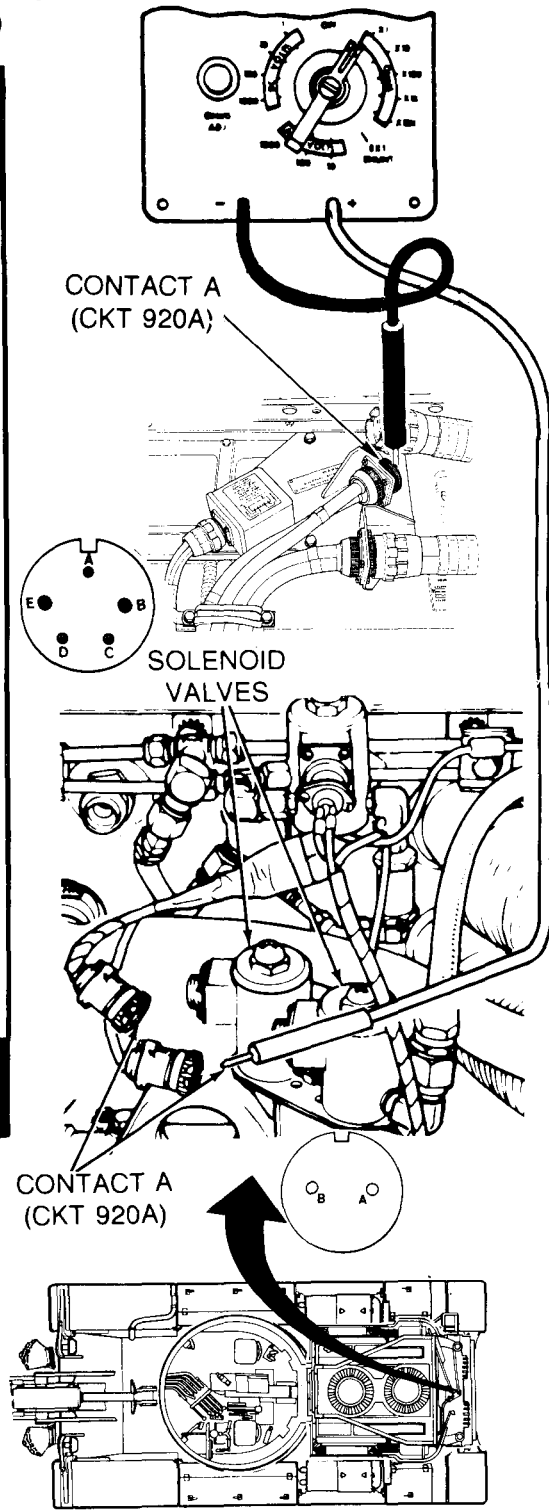
Second Technician (Top Deck)

- Connect black probe of meter to contact A (CKT 920A) of starter motor harness connector.

First Technician (Rear of Vehicle)

- Check if meter indicates continuity.
- Connect red probe of meter to contact A of other smoke generator engine harness connector at solenoid valves.
- Check if meter indicates continuity.

Does meter indicate continuity at both smoke generator engine harness connectors?



16

- Repair smoke generator engine harness (page 10-298).
- If smoke generator engine harness cannot be repaired replace starter feed harness (page 10-274).

NO

YES

TA250623

Symptom-77

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

17 Check smoke generator engine harness (CKT GND) for continuity from both harness connectors at solenoid valves to ground.

First Technician (Rear of Vehicle)

- Connect red probe of meter to contact B (CKT GND) of one smoke generator engine harness connector at solenoid valves and black probe to ground.
- Check if meter indicates continuity.
- Connect red probe of meter to contact B (CKT GND) of other smoke generator engine harness connector.
- Check if meter indicates continuity.

Does meter indicate continuity at both smoke generator engine harness connectors?

18

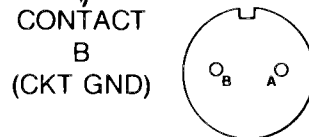
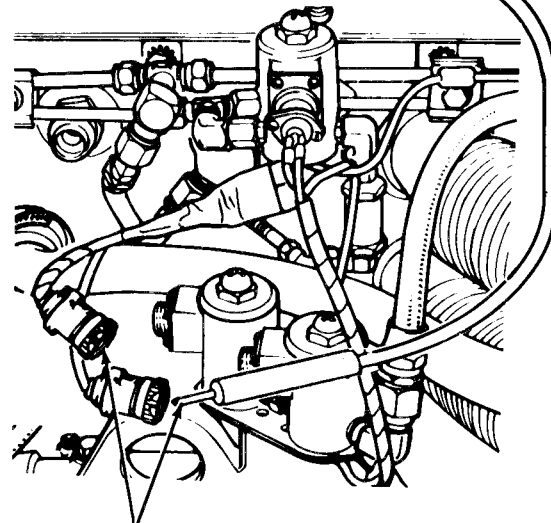
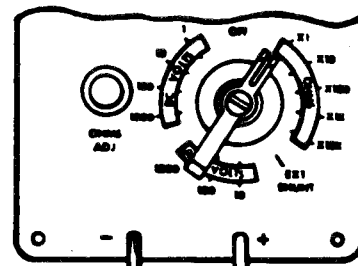
- Replace both smoke generator solenoid valves (page 21-25).
- Connect starter feed harness to starter motor harness.

YES

NO

19

- Repair smoke generator engine harness (page 10-298).
- If smoke generator engine harness cannot be repaired replace starter feed harness (page 10-274).
- Connect starter feed harness to starter motor harness.



Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

FROM STEP

2

20

Check for plugged, pinched, leaking or damaged fuel lines and fittings.

Second Technician (Operator's Station)

- Stop engine.

Both Technicians (Rear of Vehicle)

- Remove engine shroud (page 9-30).

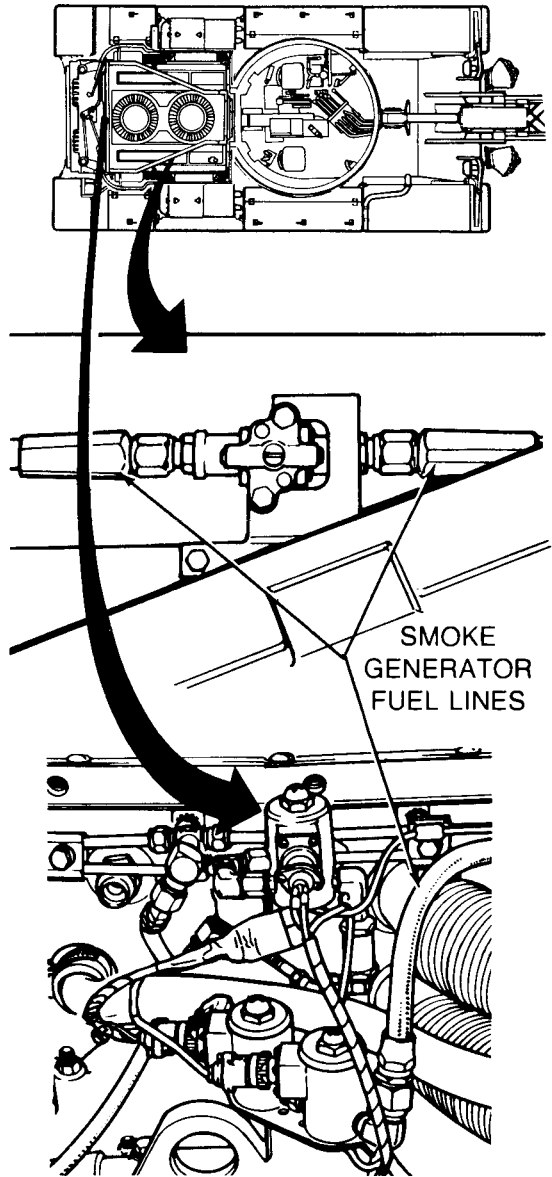
Second Technician (Operator's Station)

- Start engine.

First Technician (Top Deck)

- Check fuel lines from smoke generator solenoids to front of engine for plugged, pinched, leaking or damaged lines or fittings.

Are smoke generator fuel lines or fittings blocked, leaking or damaged?



21

- Tighten loose connections.
- Remove restrictions from lines or fittings.
- Replace damaged hoses (page 21-39).

NO YES

Symptom-77

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

22 Check smoke generator hose from solenoid valves to tee for leaks or damage.

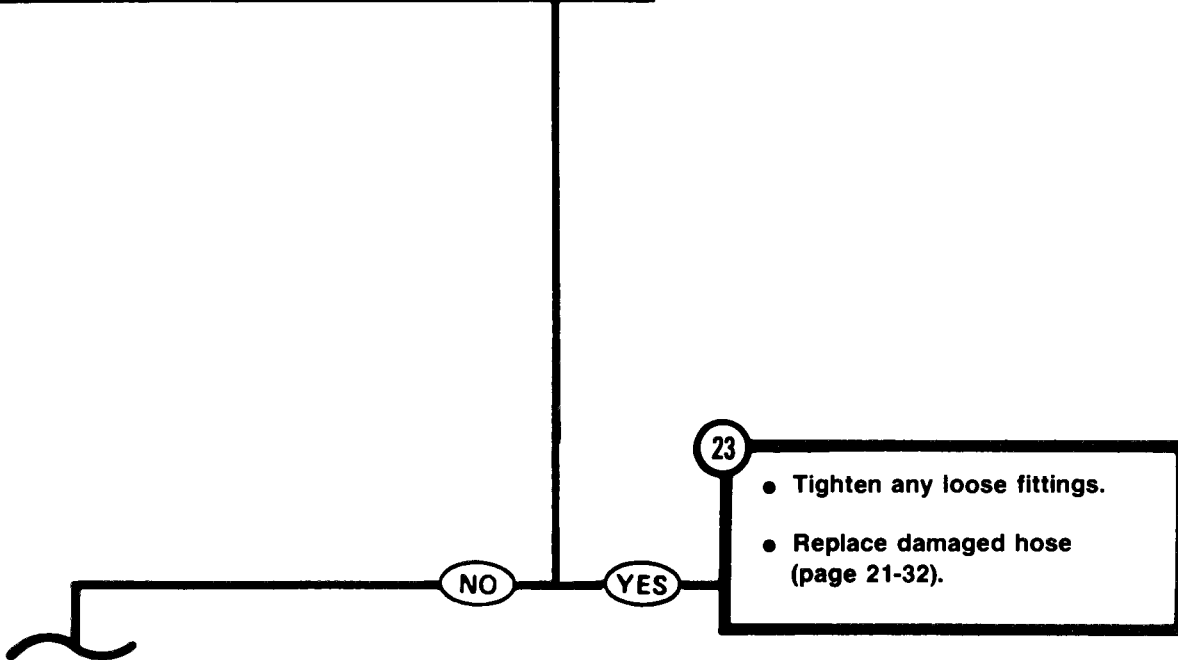
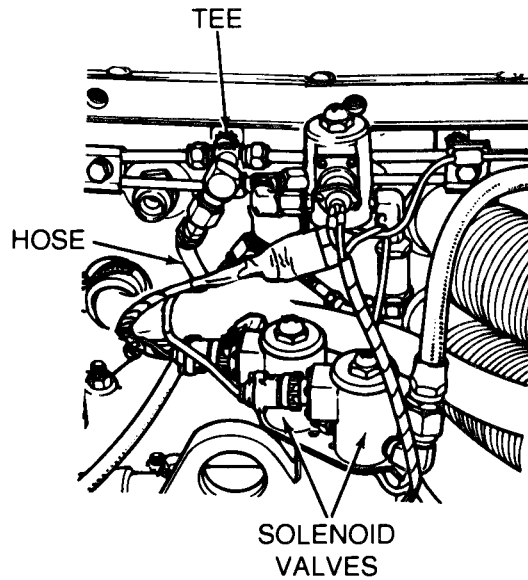
Second Technician (Operator's Station)

- Set engine speed at 1600 RPM.
- Set SMOKE GENERATOR switch ON.

First Technician (Rear of Vehicle)

- Check for leaks or damage in hose from solenoid valves to tee.

Is output hose leaking or damaged?



23

- Tighten any loose fittings.
- Replace damaged hose (page 21-32).

TA250626

Symptom-77

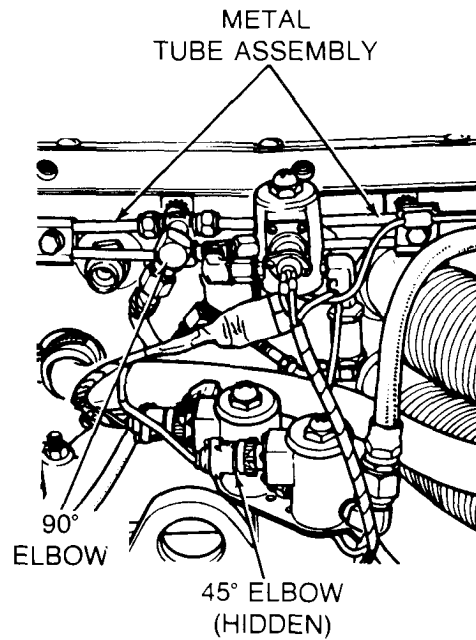
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)**

24 Check if white smoke is reduced or missing in only one exhaust.

First Technician (Side of Vehicle)

- Check amount of white smoke coming from each exhaust.

Is white smoke reduced or missing in only one exhaust?



25

- Remove tube assembly from defective side (page 21-34).
- If damaged, replace (page 21-34).
- If not damaged, run a small drill bit or stiff wire to exhaust end at tube to remove carbon or other restriction.
- Install tube assembly (page 21-37).

26

- Remove tee, 90° elbow, hose and 45° elbow (page 21-30).
- Check tee and elbows for restriction.
- Remove restriction using a small drill bit or stiff wire.
- Replace damaged parts.
- Install tee, 90° elbow hose and 45° elbow.

YES NO

TA250627

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER**

Symptom 78

GRENADE LAUNCHER FAILS TO FIRE

WARNING
To prevent injury to personnel, remove all live smoke grenades from launcher before start of troubleshooting (TM 5-5420-202-10).

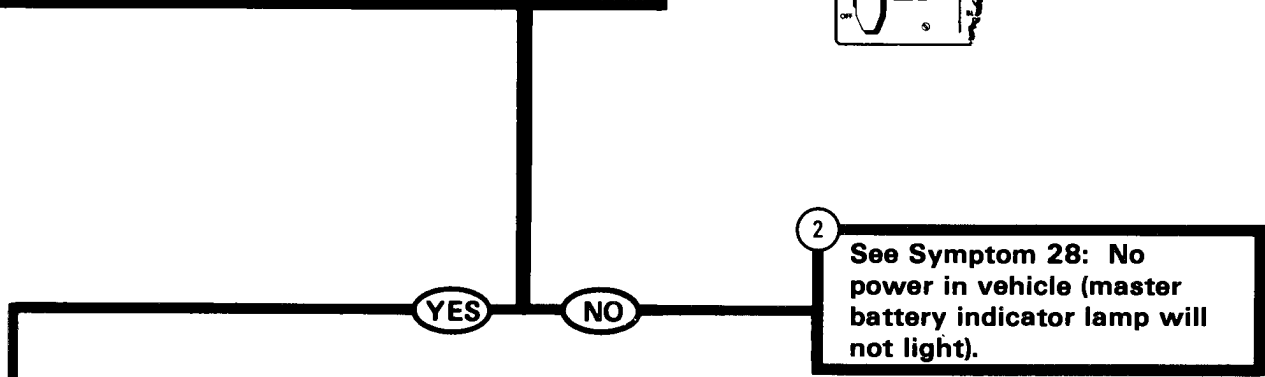
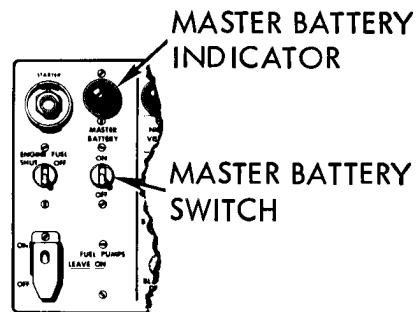
CAUTION
To prevent equipment damage, turn off power before removing covers or harness connectors and before measuring continuity or resistance.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check battery circuit.**
First Technician (Operator's station)

- Set MASTER BATTERY switch ON.
- Check if MASTER BATTERY indicator lights.

Does MASTER BATTERY indicator light?



TA250657

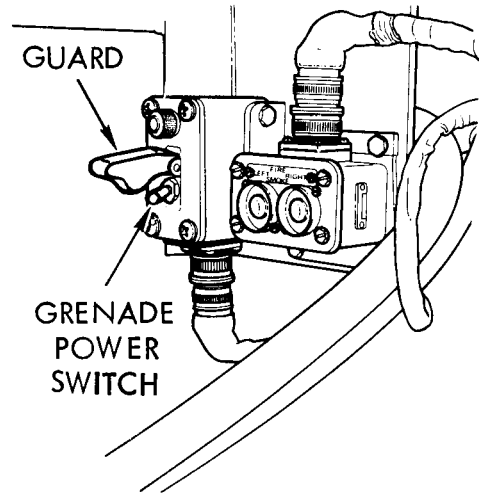
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

3 **Check GRENADE LAUNCHER circuit.**

- Lift guard over grenade power switch on power control box.
- Set GRENADE POWER switch ON.

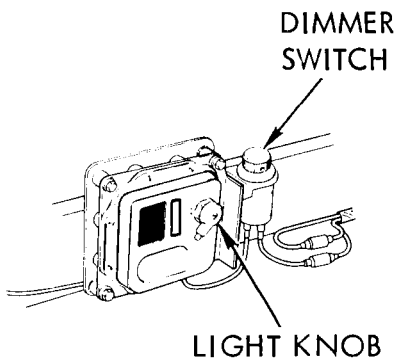
Does GRENADE POWER lamp light?



4 **Check commander's dome light for power.**

- Set GRENADE POWER switch on power control box OFF.
- Turn dimmer switch on commander's dome light fully clockwise.
- Press plunger on dome light knob and turn knob clockwise past stop. Release plunger.

Does white light light?



5

- Check firing pins in right discharger barrels 1, 2, and 5 for electrical power.
- See step 16.

6

- Check socket A of harness connector at power control box for electrical power.
- See step 10.

TA250658

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

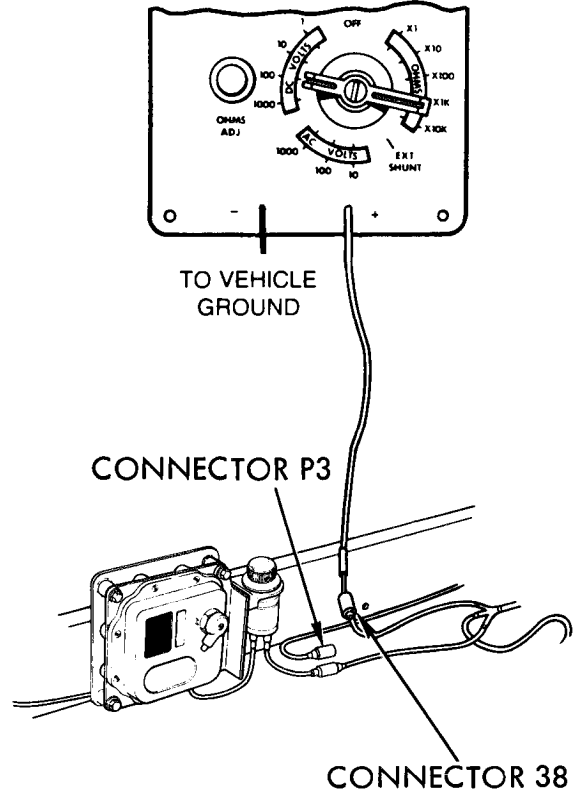
Symptom 78

7 **Check connector 38 for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness connector 38 from harness connector P3.
- Set multimeter to measure 18 to 30 volts dc.
- Set MASTER BATTERY switch ON.
- Connect red probe of meter to center contact of connector 38 and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



8 **Connect harness connectors 38 and P3.**

- Set MASTER BATTERY switch OFF.
- Connect harness connector 38 to harness connector P3.

9

- Check socket B of harness connector at master control panel for electrical power.
- See step 13.

YES **NO**

TA250659

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

FROM STEP
6 OR **8**

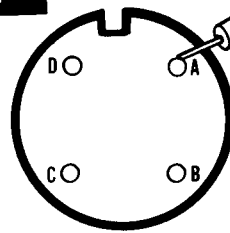
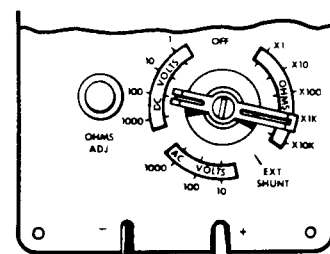
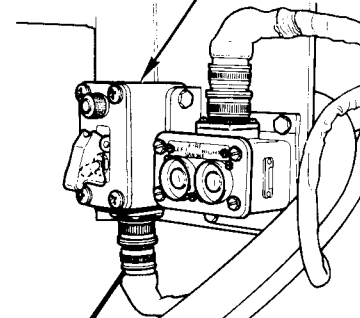
10 Check socket A of harness connector at power control box for electrical power.

First Technician (Operator's Station)

- Remove harness connector from power control box.
- Connect red probe of meter to socket A of harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

POWER CONTROL BOX



11

- Set MASTER BATTERY switch OFF.
- Replace smoke grenade power control box (page 22-2).

YES

NO

12

- Set MASTER BATTERY switch OFF.
- Replace smoke grenade crew compartment wiring harness assembly (page 22-6).

TA250660

Symptom 78
FROM STEP

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

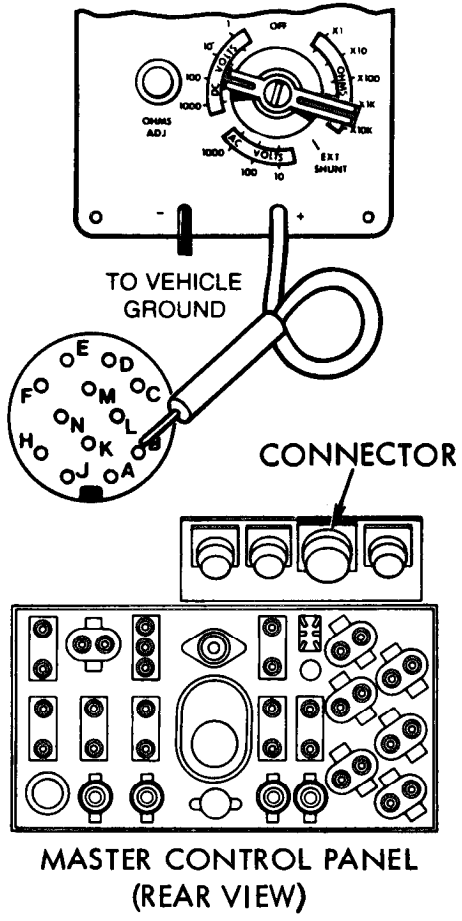
9

13 Check socket B of harness connector at master control panel for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness from connector on master control panel.
- Connect red probe of meter to socket B of connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



14

- Repair gas particulate blower and dome light wiring harness assembly (page 10-298).

YES NO

15

- Repair master control panel wiring harness (page 10-298).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

FROM STEP

5

16 Check firing pins in right discharger barrels 1, 2, and 5 for electrical power.

First Technician (Operator's Station)

- Press and hold LEFT button on pushbutton unit.

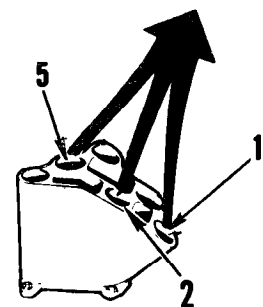
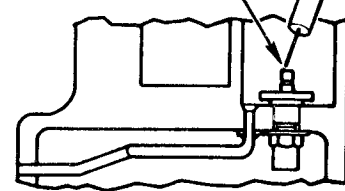
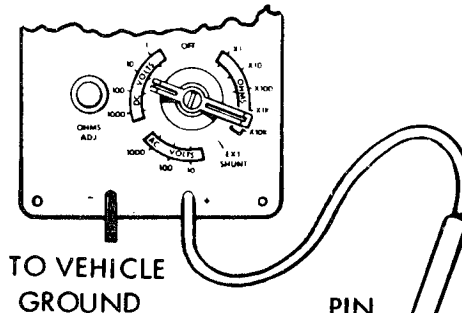
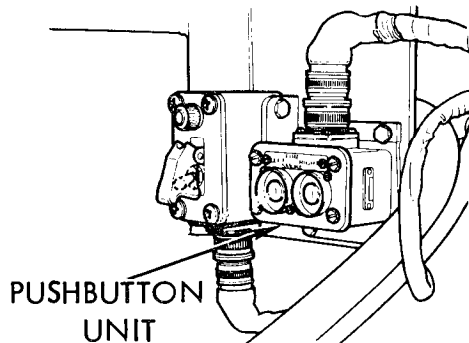
Second Technician (Right Discharger)

- Connect red probe of meter to pin in bottom of right discharger barrel 1, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 2 and 5.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?



RIGHT DISCHARGER

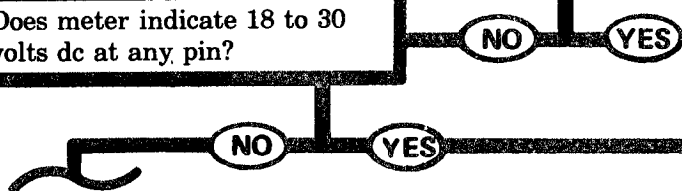
18 Check if any pin has electrical power.

Does meter indicate 18 to 30 volts dc at any pin?

17

- Check firing pins in right discharger barrels 3, 4, and 6 for electrical power.
- See step 23.

19 Replace right smoke grenade discharger (page 22-23).



TA250662

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

20 Check socket C of harness connector at right discharger for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Right Discharger)

- Disconnect harness connector from right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold LEFT button on pushbutton unit.

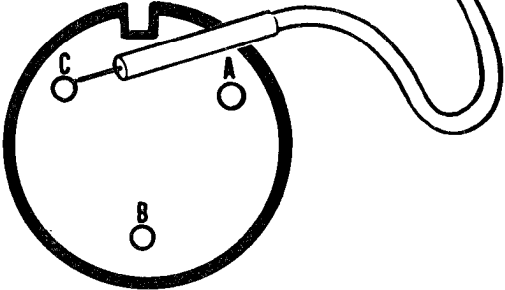
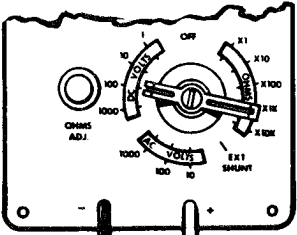
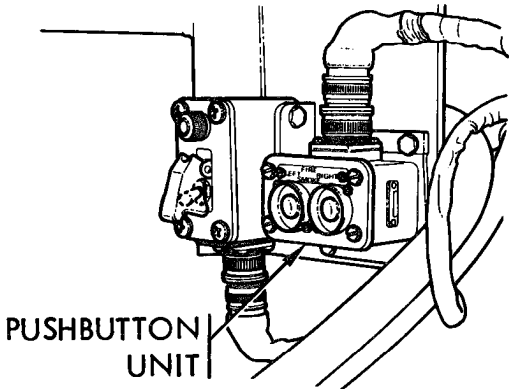
Second Technician (Right Discharger)

- Connect red probe of meter to socket C of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?



21

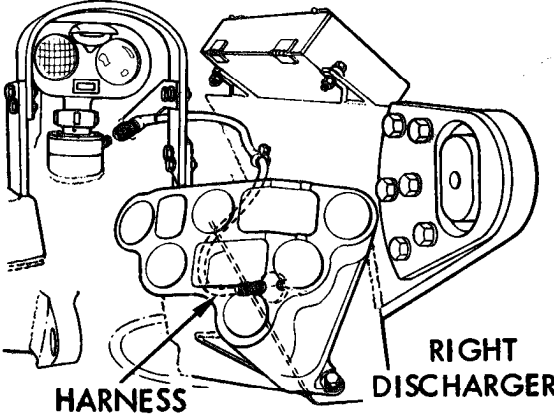
- Check firing pin in left discharger barrel number 3 for electrical power.
- See step 44.

NO

22

- Replace right smoke grenade discharger (page 22-23).

YES



TA250663

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

**Symptom 78
FROM STEP**

17

23 Check firing pins in right discharger barrels 3, 4, and 6 for electrical power.

First Technician (Operator's Station)

- Press and hold RIGHT button on pushbutton unit.

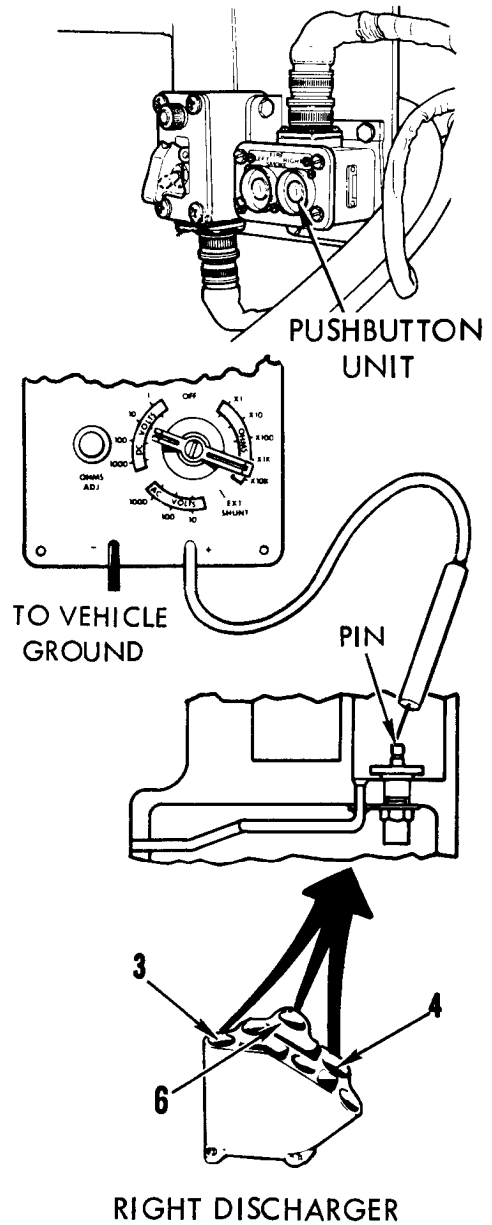
Second Technician (Right Discharger)

- Connect red probe of meter to pin in bottom of right discharger barrel 3, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 4 and 6.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?



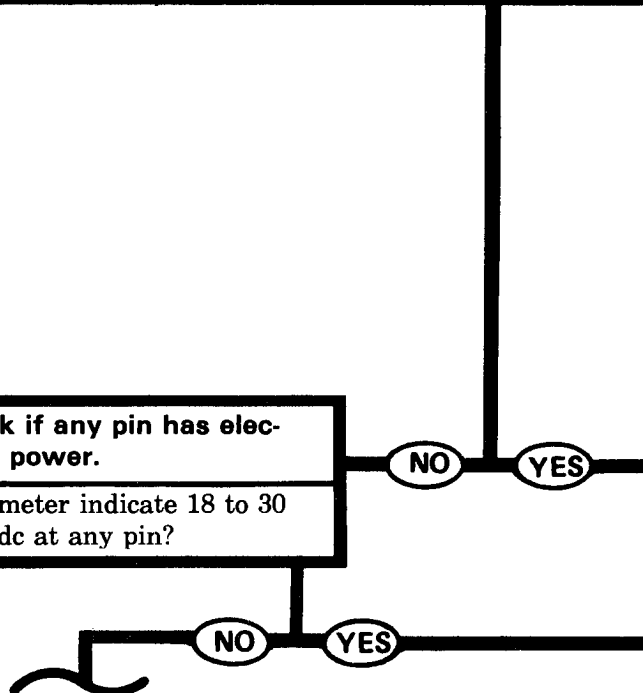
25 Check if any pin has electrical power.

Does meter indicate 18 to 30 volts dc at any pin?

24

- Check firing pins in left discharger barrels 3, 4, and 6 for electrical power.
- See step 30.

26 Replace right smoke grenade discharger (page 22-23).



TA250664

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

27 Check socket A of harness connector at right discharger for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Right Discharger)

- Disconnect harness connector from right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold RIGHT button on pushbutton unit.

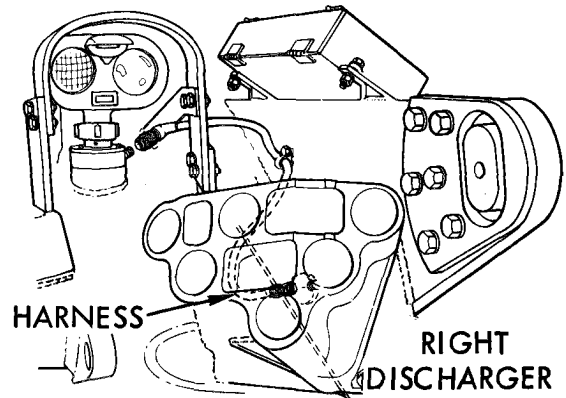
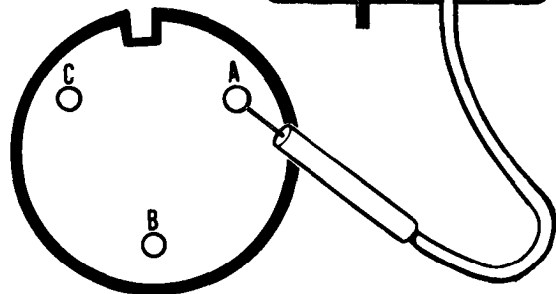
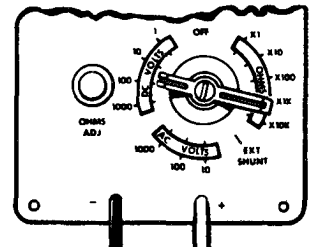
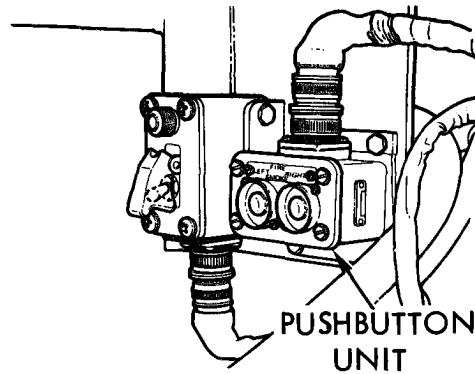
Second Technician (Right Discharger)

- Connect red probe of meter to socket A of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?



28

- Check firing pin in left discharger barrel number 1 for electrical power.
- See step 58.

NO YES

29

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace right smoke grenade discharger (page 22-23).

TA250665

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

**Symptom 78
FROM STEP**

24

30 Check firing pins in left discharger barrels 3, 4, and 6 for electrical power.

First Technician (Operator's Station)

- Press and hold LEFT button on pushbutton unit.

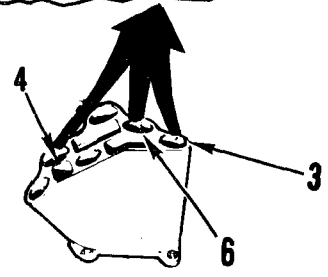
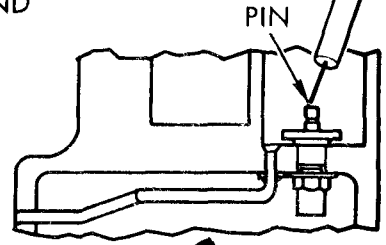
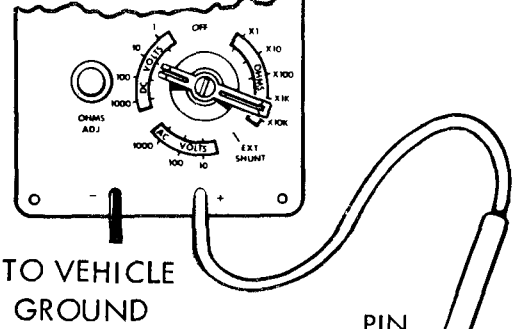
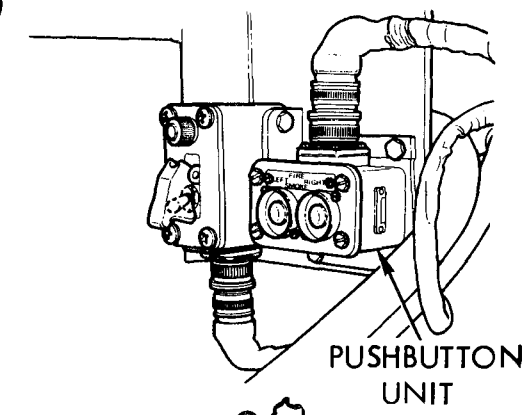
Second Technician (Left Discharger)

- Connect red probe of meter to pin in bottom of left discharger barrel 3, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 4 and 6.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?



31

- Check if any pin has electrical power.
- Does meter indicate 18 to 30 volts dc at any pin?

NO **YES**

32

- Check firing pins in left discharger barrels 1, 2, and 5 for electrical power.
- See step 37.

NO **YES**

33 Replace left smoke grenade discharger (page 22-23).

Symptom 78

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

34 Check socket A of harness connector at left discharger for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Left Discharger)

- Disconnect harness connector from left discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold LEFT button on pushbutton unit.

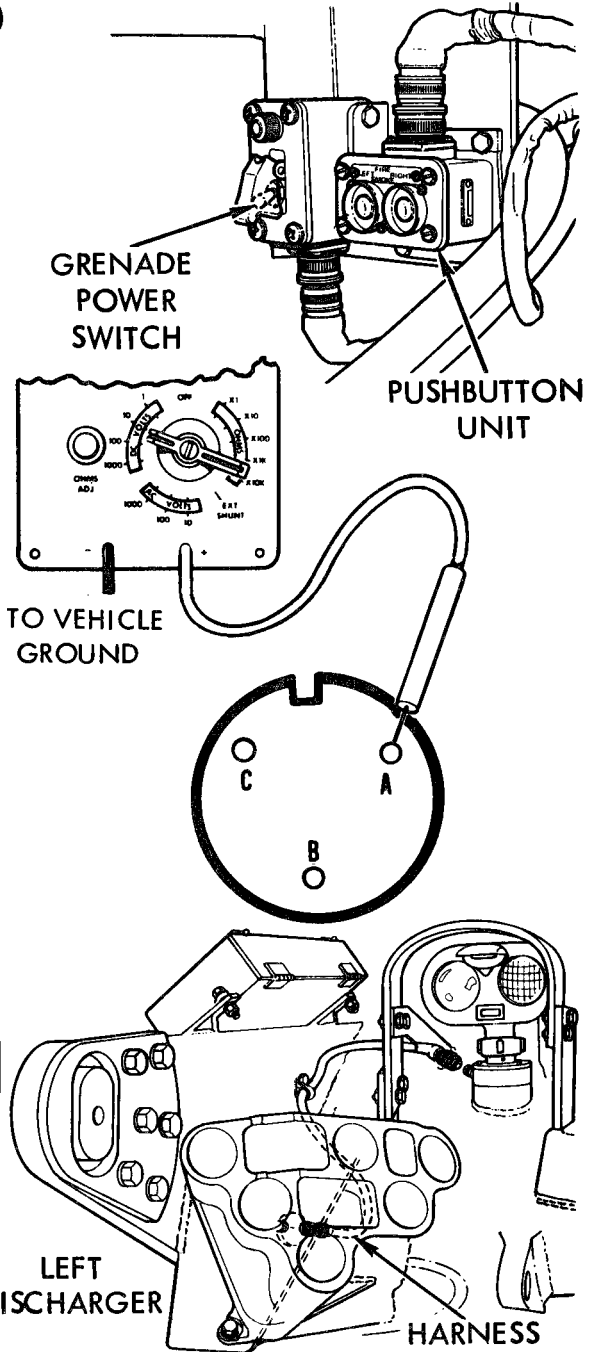
Second Technician (Left Discharger)

- Connect red probe of meter to socket A of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?



35

- Check electrical harness for continuity.
- See step 72.

NO YES

36

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace left smoke grenade discharger (page 22-23).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

FROM STEP

32

37 Check firing pins in left discharger barrels 1, 2, and 5 for electrical power.

First Technician (Operator's Station)

- Press and hold RIGHT button on pushbutton unit.

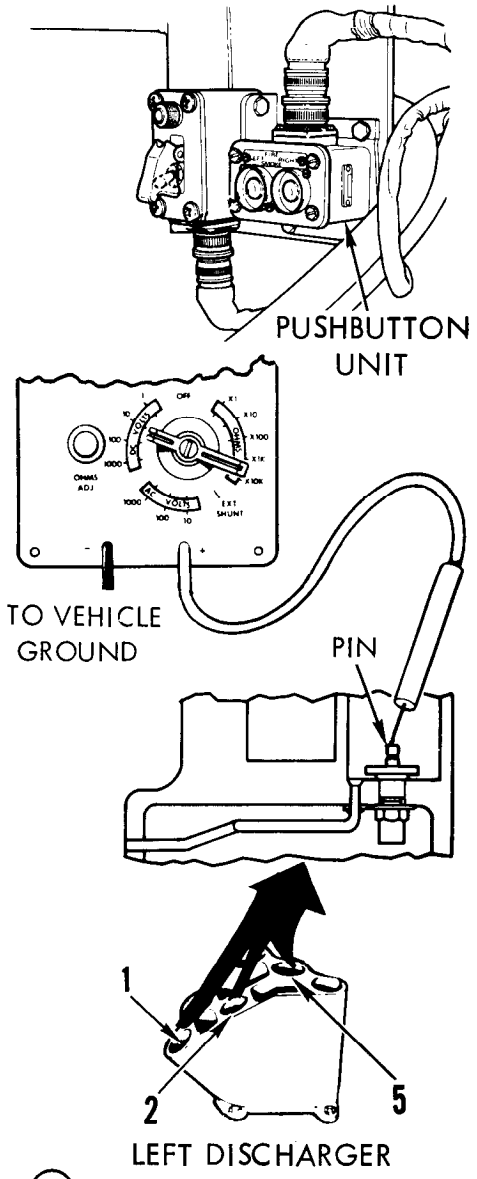
Second Technician (Left Discharger)

- Connect red probe of meter to pin in bottom of left discharger barrel 1, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 2 and 5.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?



38

- Check if any pin has electrical power.
- Does meter indicate 18 to 30 volts dc at any pin?

NO YES

39

- Return grenade launcher to service.
- Set GRENADE POWER switch on power control box OFF.
- Set MASTER BATTERY switch OFF.

Notify your supervisor.

NO YES

40 Replace left smoke grenade discharger (page 22-23).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

41 Check socket C of harness connector at left discharger for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Left Discharger)

- Disconnect harness connector from left discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold RIGHT button on pushbutton unit.

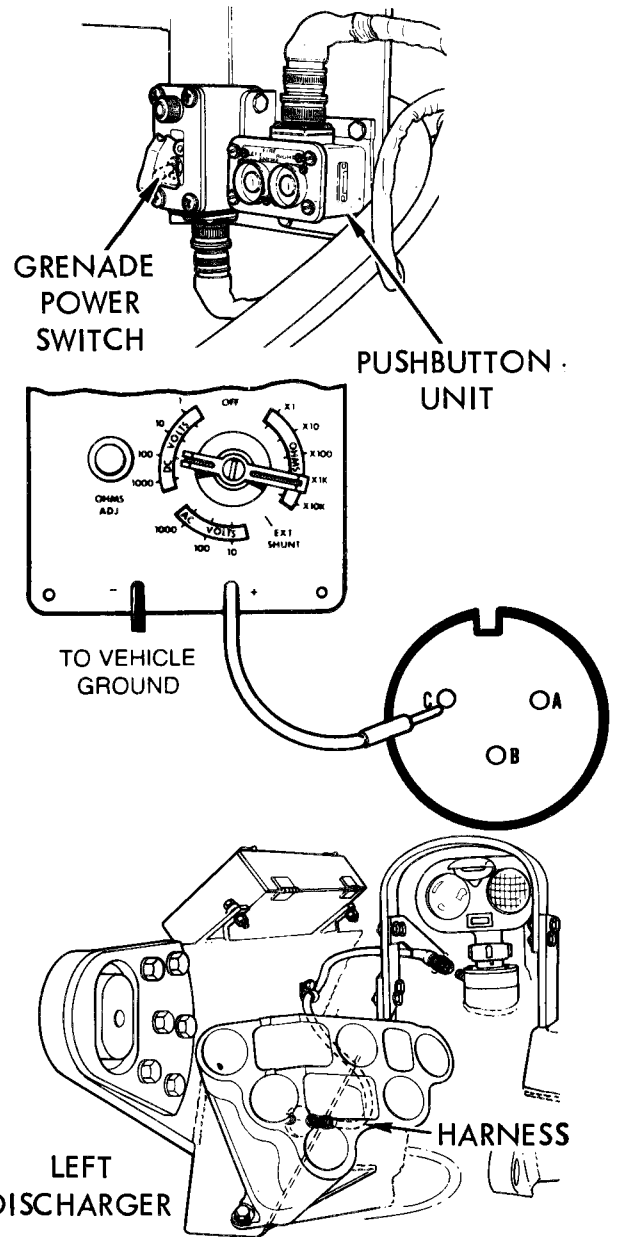
Second Technician (Left Discharger)

- Connect red probe of meter to socket C of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?



42

- Check harness for continuity between socket C of connector at left discharger and socket D of connector at pushbutton unit.

● See step 79.

NO

YES

43

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace left smoke grenade discharger (page 22-23).

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
 Symptom 78 FROM STEP (Continued)

21

44 **Check firing pin in left discharger barrel number 3 for electrical power.**

First Technician (Operator's Station)

- Press and hold LEFT button on pushbutton unit.

Second Technician (Left Discharger)

- Connect red probe of meter to pin in bottom of left discharger barrel number 3.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?

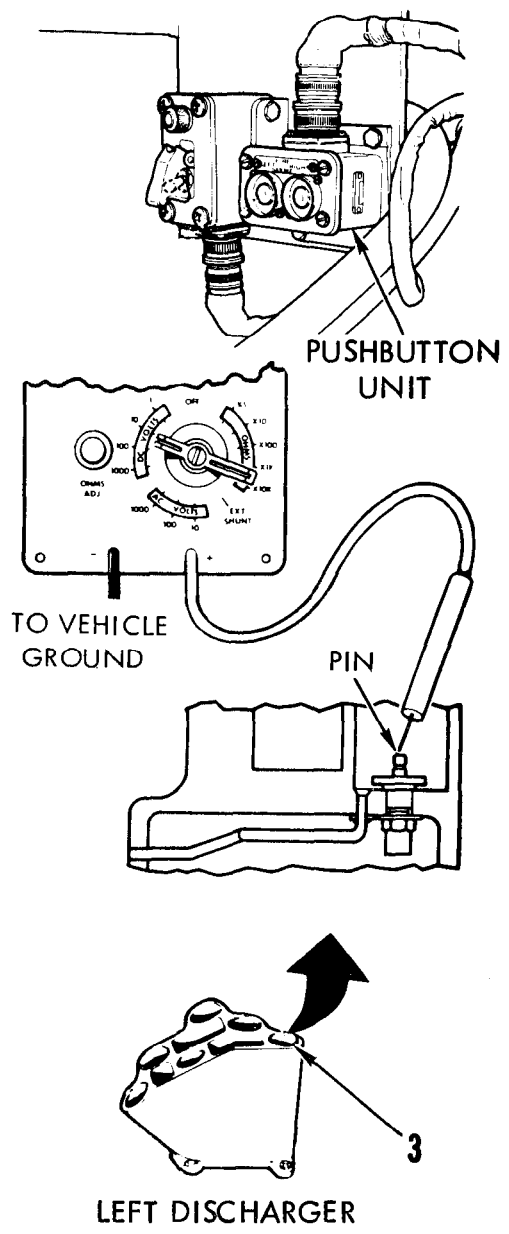
45

- Check socket F of harness connector at pushbutton unit for electrical power.

NO

- See step 53.

YES



TA250669

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

46 Check harness for continuity between socket C of connector at right discharger and socket A of connector at pushbutton unit.

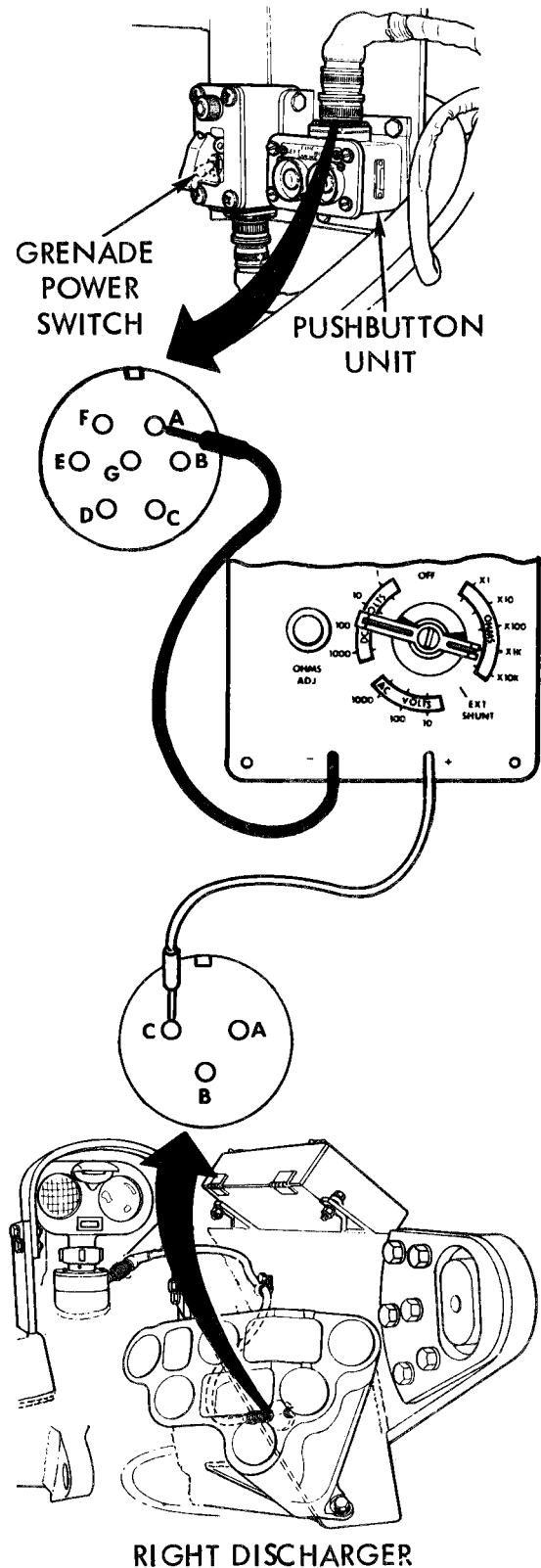
First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Remove harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket A of harness connector at pushbutton unit.

Second Technician (Right Discharger)

- Connect red probe of meter to socket C of harness connector at right discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?



47

- Connect harness connector to jack on right discharger.
- Replace smoke grenade pushbutton unit (page 22-4).

YES

NO

TA250671

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

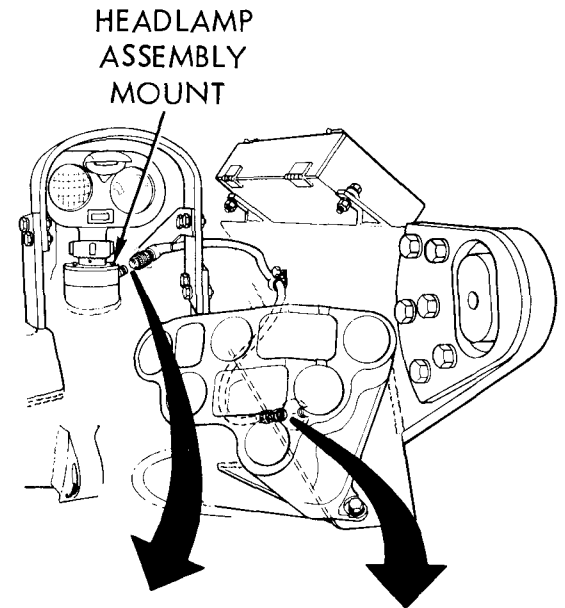
Symptom 78

48 Check for continuity between socket C of harness connector at right discharger and pin C of harness connector at headlight assembly.

Second Technician (Headlight Assembly)

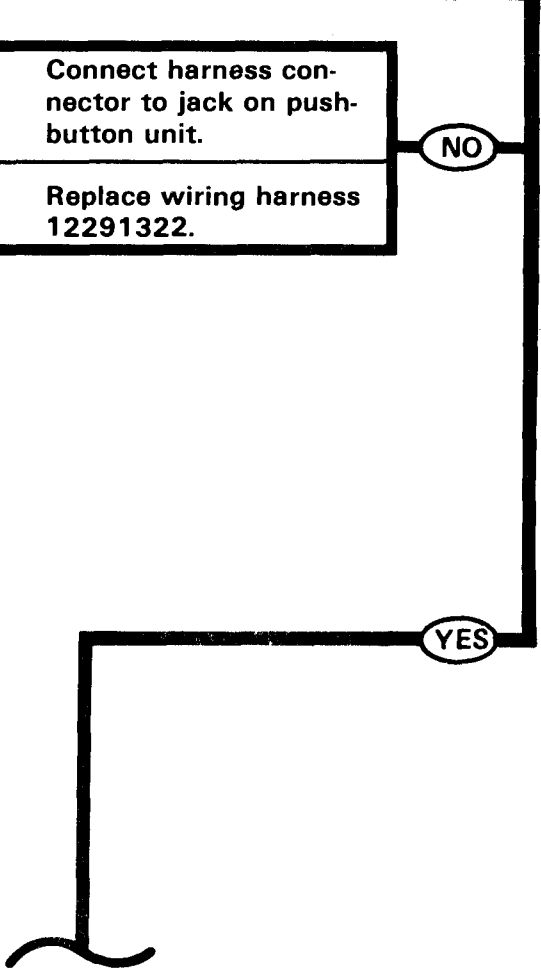
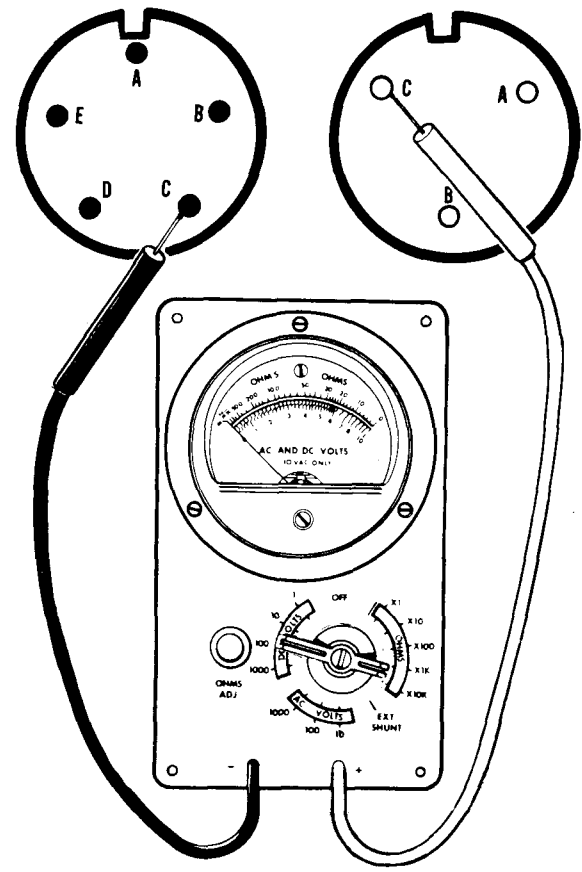
- Disconnect harness connector from receptacle on headlight assembly mount.
- Connect red probe of meter to socket C of connector at right discharger.
- Connect black probe of meter to pin C of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



49

- Connect harness connector to jack on push-button unit.
- Replace wiring harness 12291322.



TA250672

Symptom 78

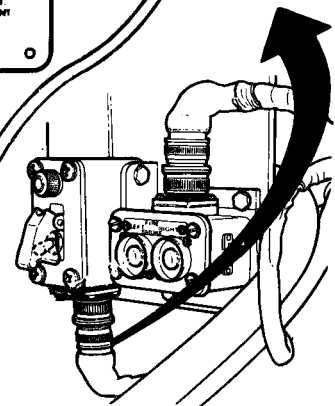
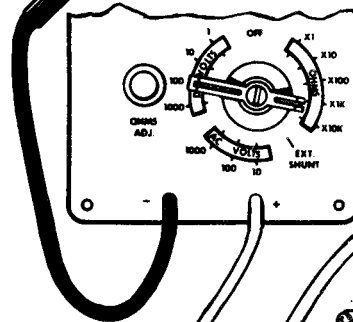
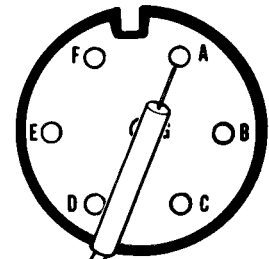
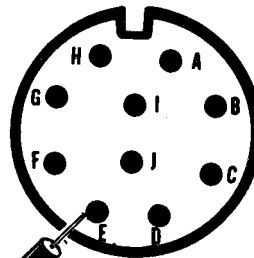
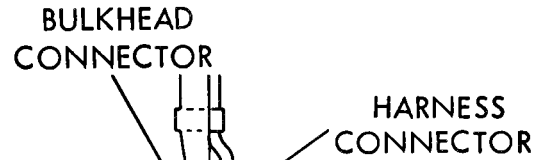
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

50 Check harness for continuity between socket A at pushbutton unit and pin E of bulkhead connector.

First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket A of harness connector at pushbutton unit.
- Connect black probe of meter to pin E of bulkhead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



51 Replace smoke grenade hull compartment wiring harness assembly (page 22-12).

YES NO

52 Replace smoke grenade crew compartment wiring harness assembly (page 22-6).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

FROM STEP

45

53 Check socket F of harness connector at pushbutton unit for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from pushbutton unit.

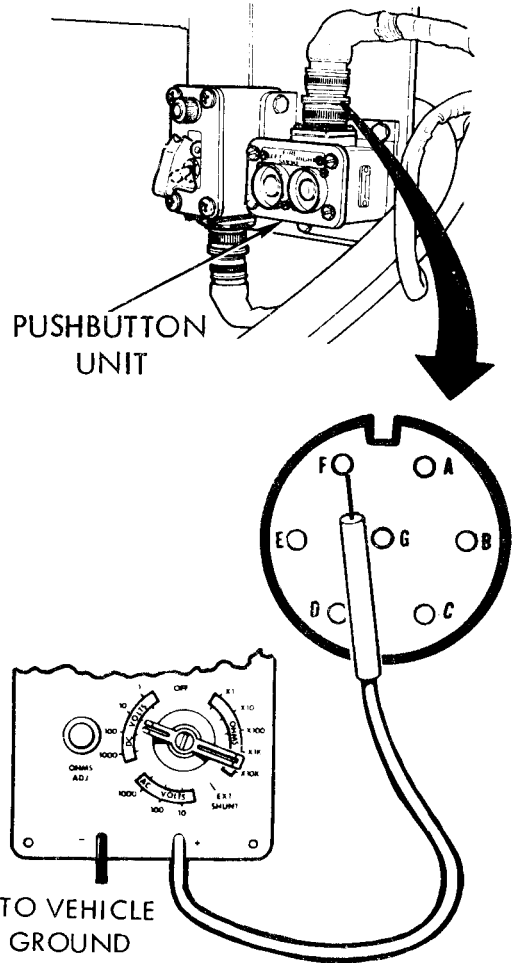
Second Technician (Right Discharger)

- Connect harness connector to right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set multimeter to measure 18 to 30 volts dc.
- Connect red probe of meter to socket F of harness connector at pushbutton unit, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

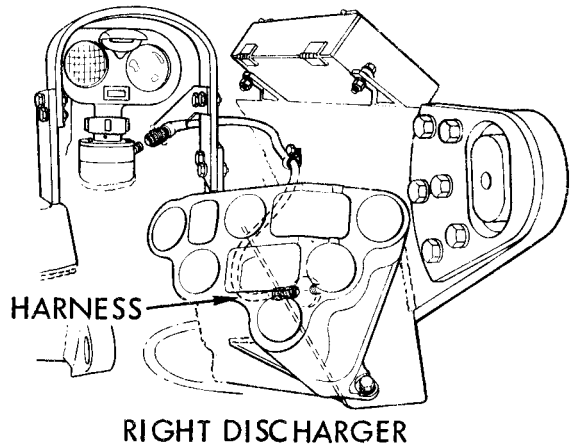


54

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace smoke grenade pushbutton unit (page 22-4).

YES

NO



TA250674

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

55 Check harness for continuity between socket F of connector at pushbutton unit and socket D of connector at grenade control box

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from grenade power control box.
- Set multimeter to OHMS XI scale and zero meter.
- Connect red probe of meter to socket F of harness connector at pushbutton unit.
- Connect black probe of meter to socket D of harness connector at grenade power control box.
- Check if meter indicates continuity.

Does meter indicate continuity?

56

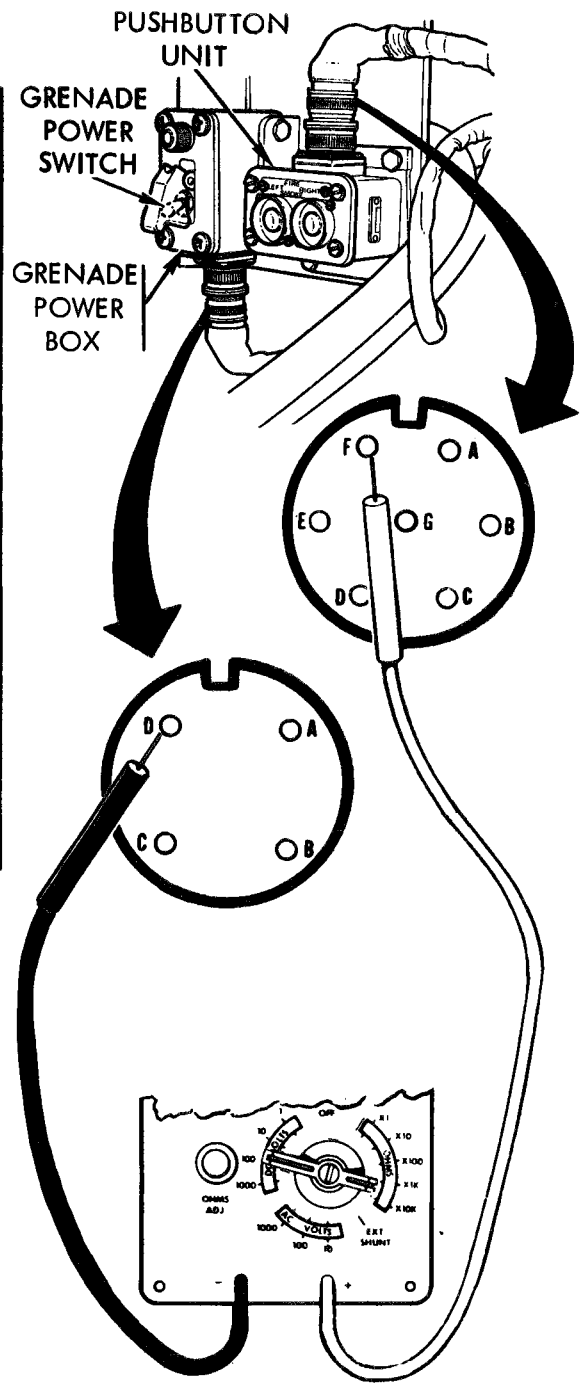
- Connect harness connector to pushbutton unit.
- Replace smoke grenade power control box (page 22-2).

YES

57

Replace smoke grenade crew compartment wiring harness assembly (page 22-6).

NO



TA250675

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78
FROM STEP

28

58 Check firing pin in left discharger barrel number 1 for electrical power.

First Technician (Operator's Station)

- Press and hold RIGHT button on pushbutton unit.

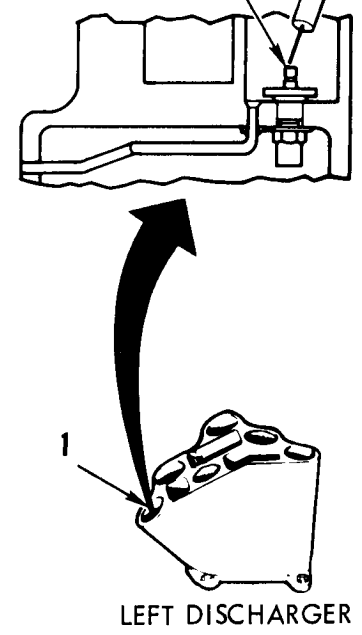
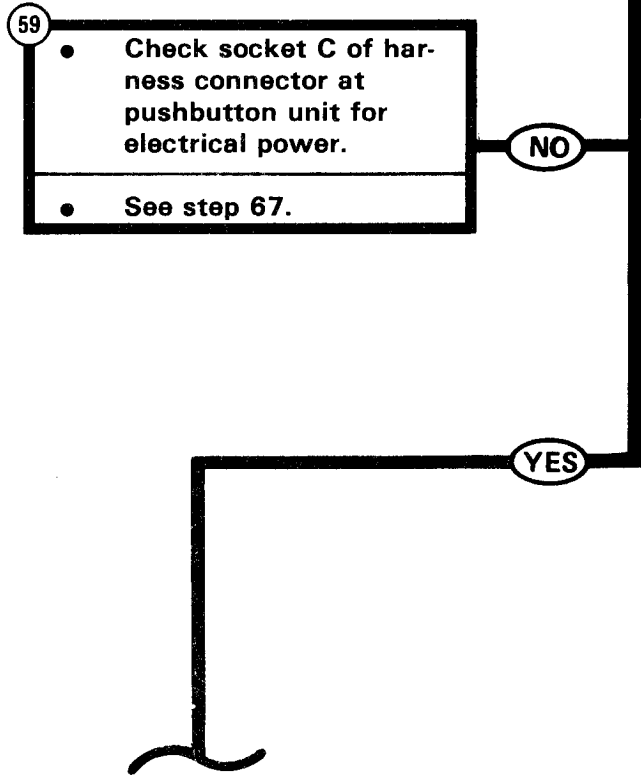
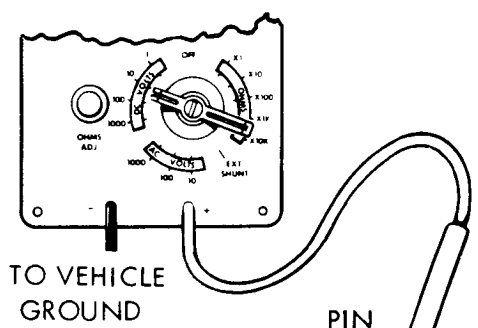
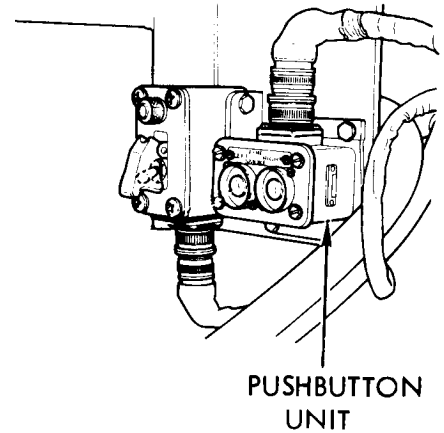
Second Technician (Left Discharger)

- Connect red probe of meter to pin in bottom of left discharger barrel number 1.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?



TA250676

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

60

Check harness for continuity between socket A of connector at right discharger and socket B of connector at pushbutton unit.

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket B of harness connector at pushbutton unit.

Second Technician (Right Discharger)

- Connect red probe of meter to socket A of harness connector at right discharger.
- Check if meter indicates continuity.

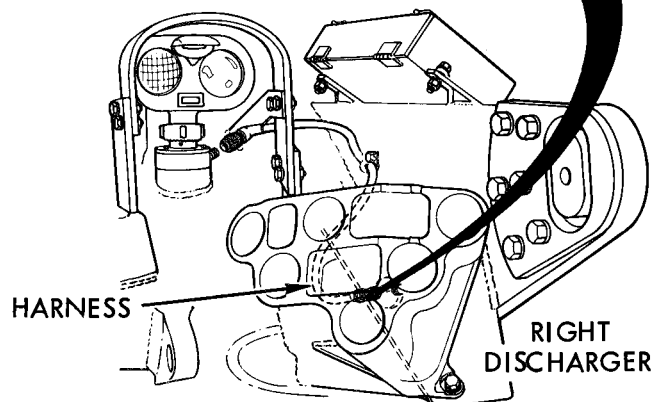
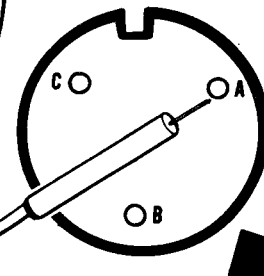
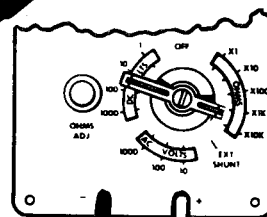
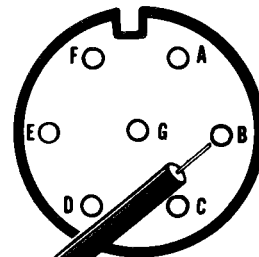
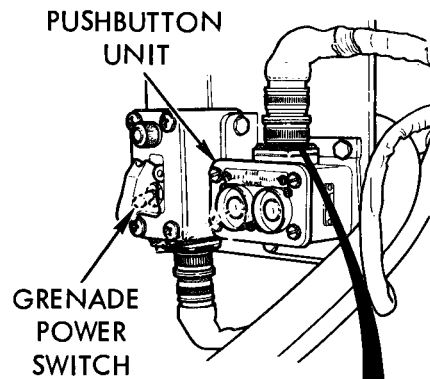
Does meter indicate continuity?

61

- Connect harness connector to receptacle on right discharger.
- Replace smoke grenade pushbutton unit (page 22-4).

YES

NO



TA250677

Symptom 78

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER**

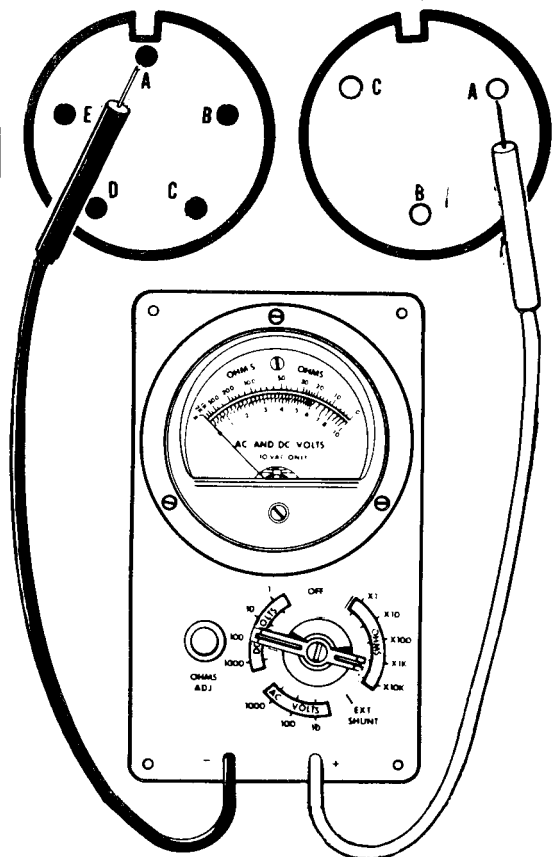
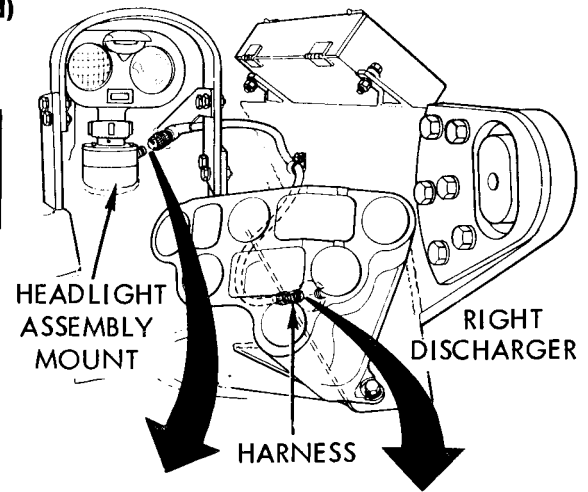
(Continued)

62 Check for continuity between socket A of harness connector at right discharger and pin A of harness connector at headlight assembly.

Second Technician (Headlight Assembly)

- Disconnect harness connector from jack on headlight assembly mount.
- Connect red probe of meter to socket A of harness connector at right discharger.
- Connect black probe of meter to pin A of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



63

- Connect harness connector to jack on push-button unit.
- Replace wiring harness 12291322.

TA250678

Symptom 78

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

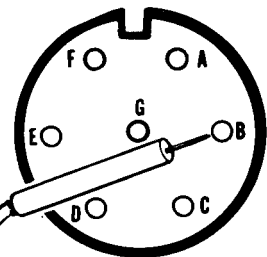
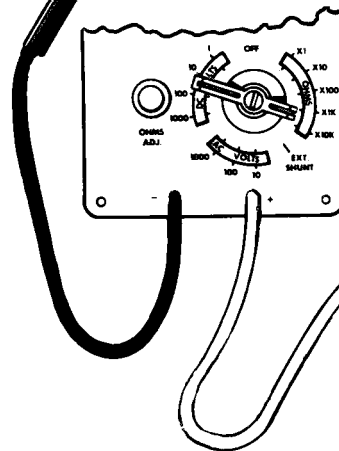
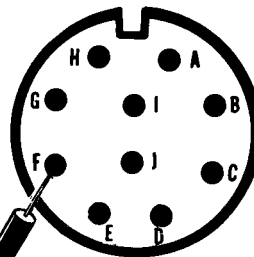
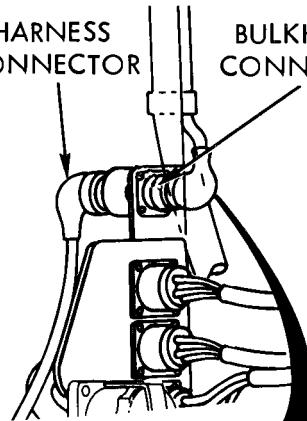
64 Check harness for continuity between socket B at pushbutton unit and pin F of bulkhead connector.

First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket B of harness connector at pushbutton unit.
- Connect black probe of meter to pin F of bulkhead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

HARNESS CONNECTOR BULKHEAD CONNECTOR

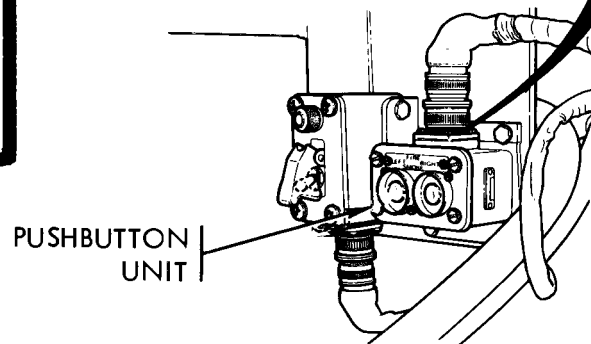


65 Replace smoke grenade hull compartment wiring harness assembly (page 22-12).

YES

66 Replace smoke grenade crew compartment wiring harness assembly (page 22-6).

NO



**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

FROM STEP

59

67 Check socket C of harness connector at pushbutton unit for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from pushbutton unit.

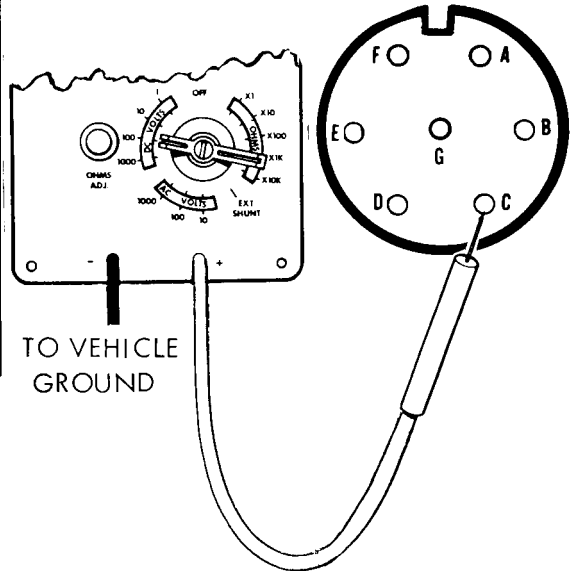
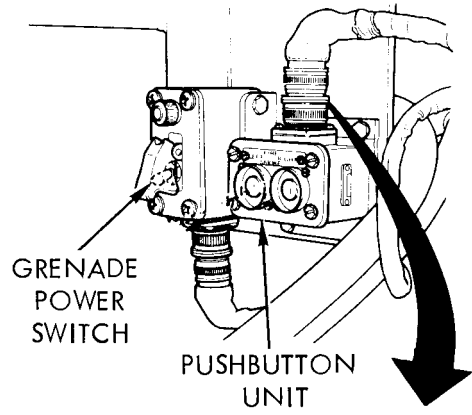
Second Technician (Right Discharger)

- Connect harness connector to right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Connect red probe of meter to socket C of harness connector at pushbutton unit and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

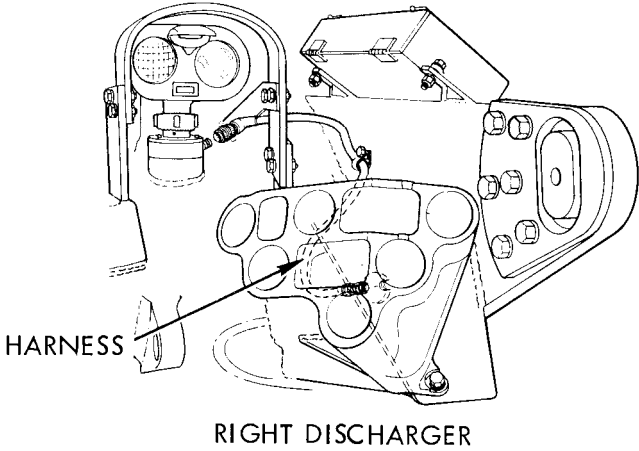


68

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace smoke grenade pushbutton unit (page 22-4).

YES

NO



Symptom 78

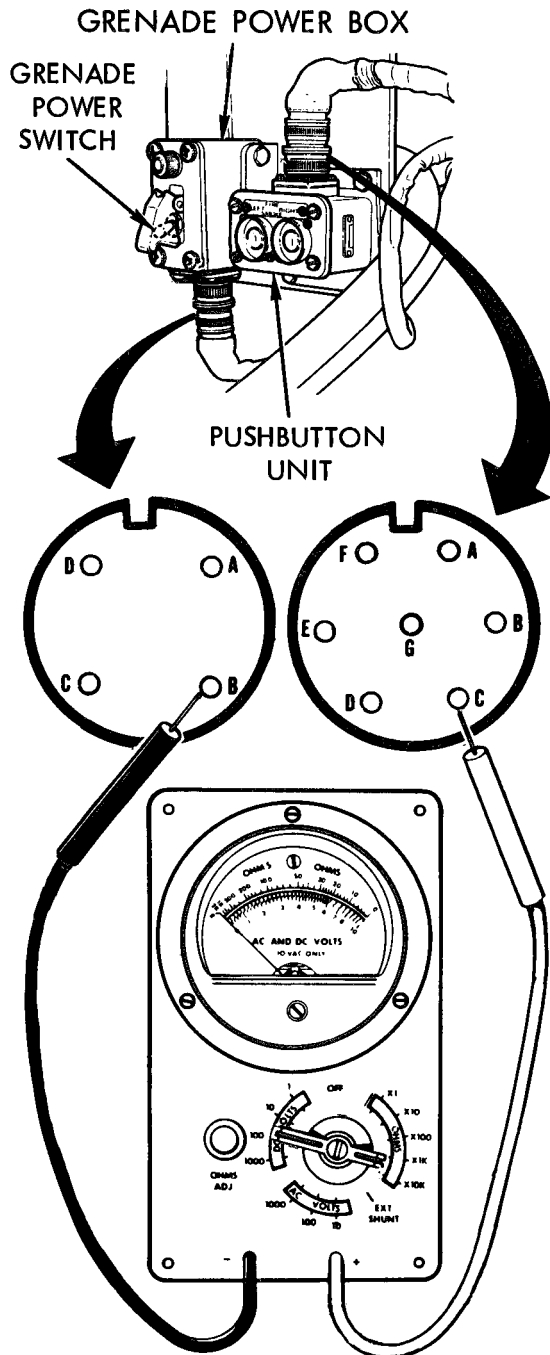
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

69 Check harness for continuity between socket C of connector at pushbutton unit and socket B of connector at grenade power box.

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from grenade power box.
- Set multimeter to OHMS XI scale and zero meter.
- Connect red probe of meter to socket C of harness connector at pushbutton unit.
- Connect black probe of meter to socket B of harness connector at grenade power box.
- Check if meter indicates continuity.

Does meter indicate continuity?



70

- Connect harness connector to pushbutton unit.
- Replace smoke grenade power control box (page 22-2).

YES NO

71 Replace smoke grenade crew compartment wiring harness assembly (page 22-6).

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER**

Symptom 78
FROM STEP

(Continued)

35

72

Check harness for continuity between socket A of connector at left discharger and socket E of connector at pushbutton unit.

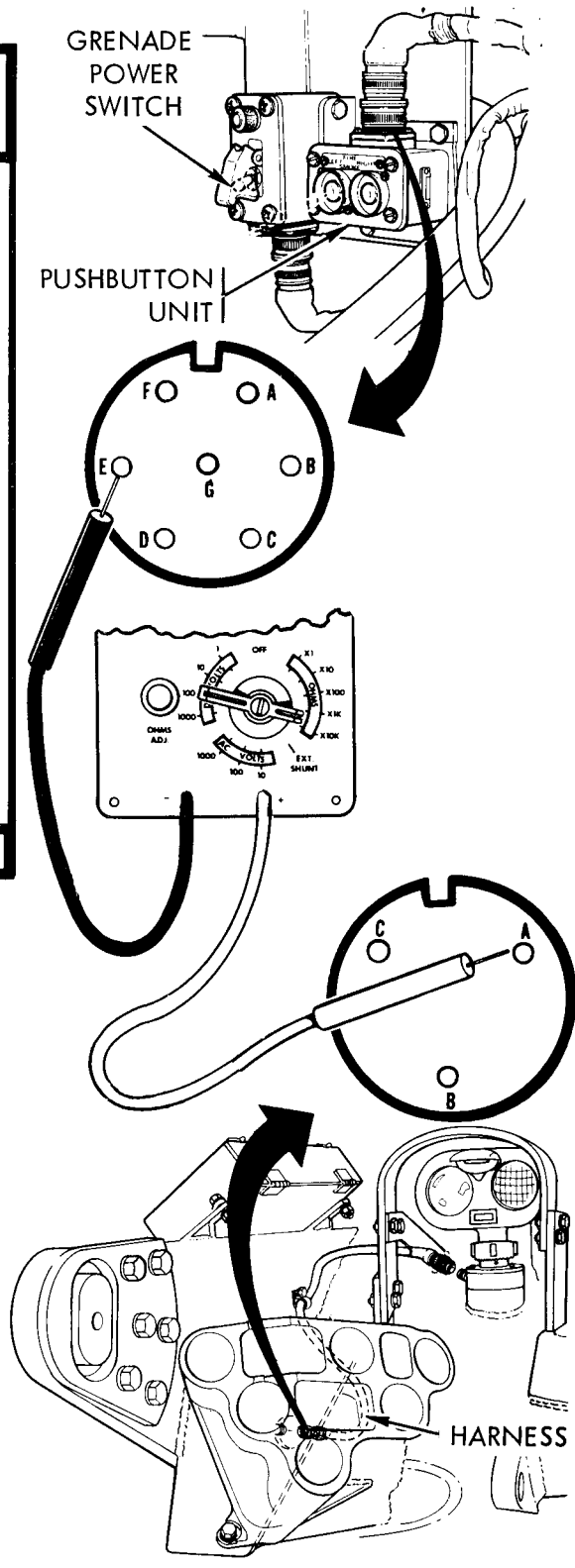
First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Remove harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket E of harness connector at pushbutton unit.

Second Technician (Left Discharger)

- Connect red probe of meter to socket A of harness connector at left discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?



73

- Connect harness connector to jack on left discharger
- Replace smoke grenade pushbutton unit (page 22-4).

YES

NO

Symptom 78

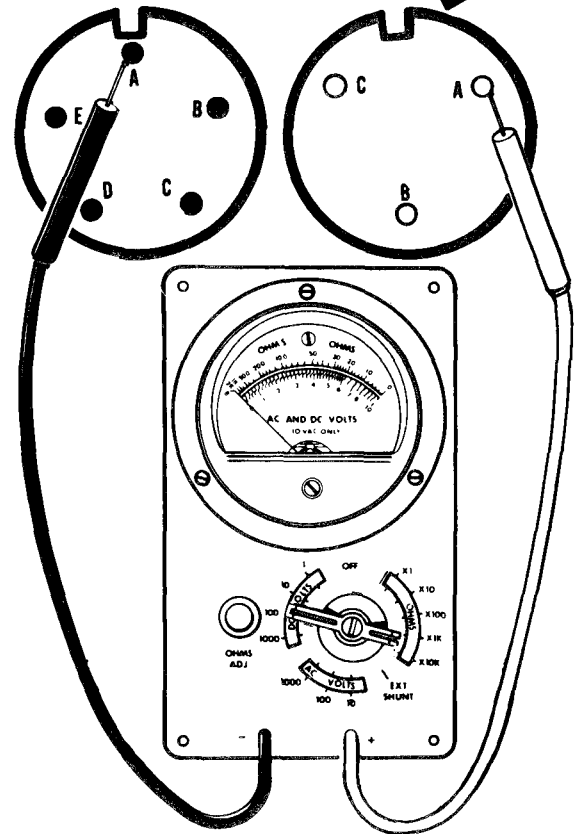
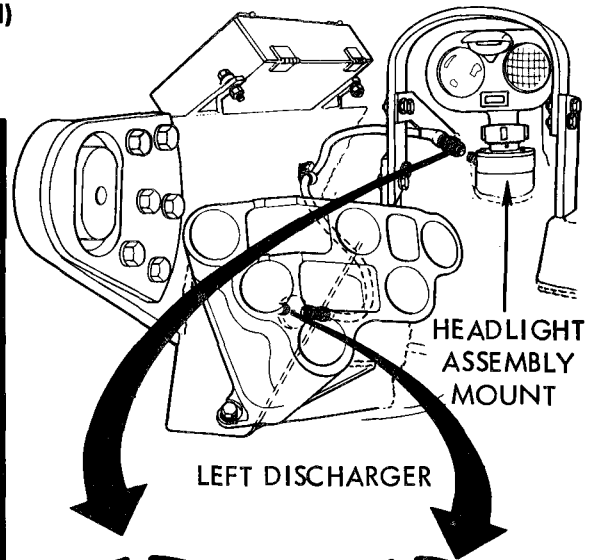
**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

74 Check for continuity between socket A of harness connector at left discharger and pin A of harness connector at headlight assembly.

Second Technician (Headlight Assembly)

- Disconnect harness connector from headlight assembly mount.
- Connect red probe of meter to socket A of connector at left discharger.
- Connect black probe of meter to pin A of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



75

- Connect harness connector to jack on push-button unit.
- Replace wiring harness 12291327.

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

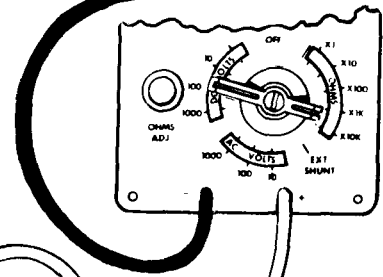
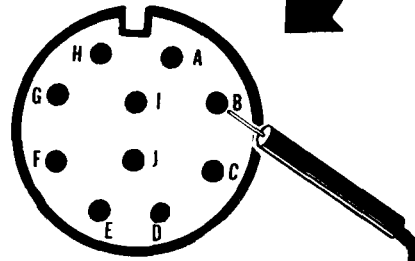
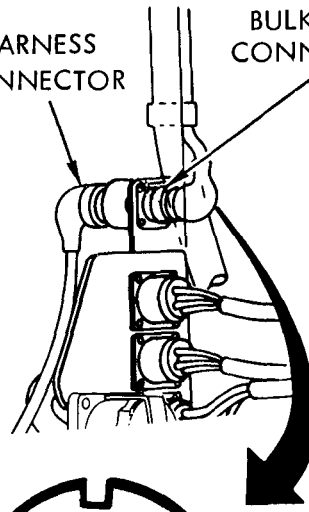
76 Check harness for continuity between socket E at pushbutton unit and pin B of bulkhead connector.

First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket E of harness connector at pushbutton unit.
- Connect black probe of meter to pin B of bulkhead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

HARNESS CONNECTOR BULKHEAD CONNECTOR

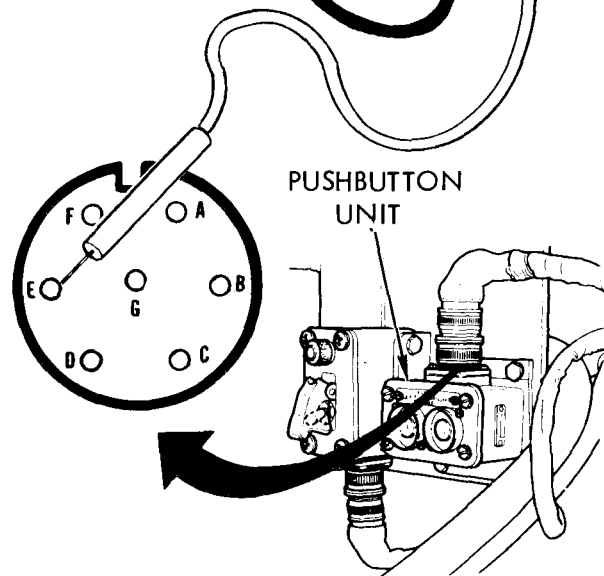


77 Replace smoke grenade hull compartment wiring harness assembly (page 22-12).

YES

78 Replace smoke grenade crew compartment wiring harness (page 22-6).

NO



TA250684

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

**Symptom 78
FROM STEP**

42

79 Check harness for continuity between socket C of connector at left discharger and socket D of connector at pushbutton unit.

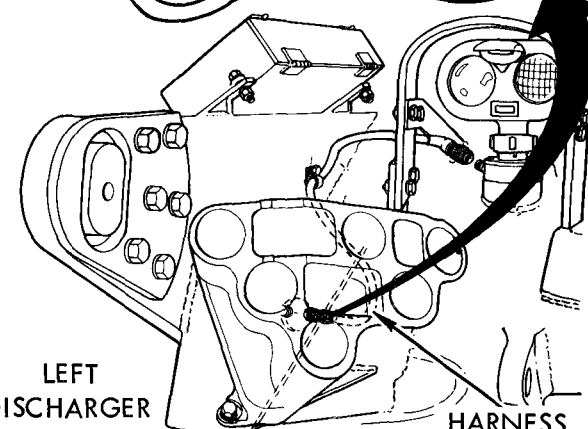
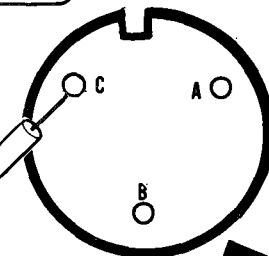
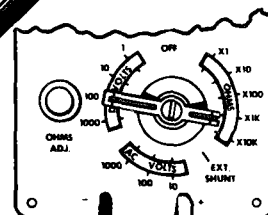
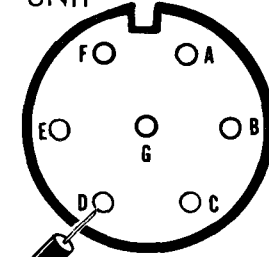
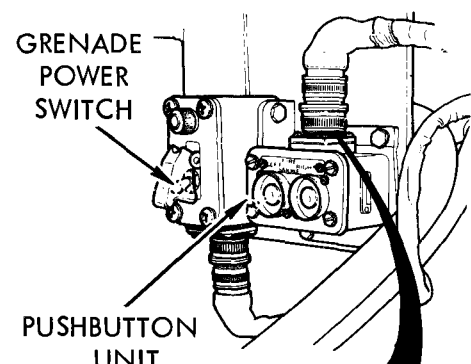
First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Remove harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket D of harness connector at pushbutton unit.

Second Technician (Left Discharger)

- Connect red probe of meter to socket C of harness connector at left discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?



80

- Connect harness connector to jack on left discharger.
- Replace smoke grenade pushbutton unit (page 22-4).

YES

NO

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

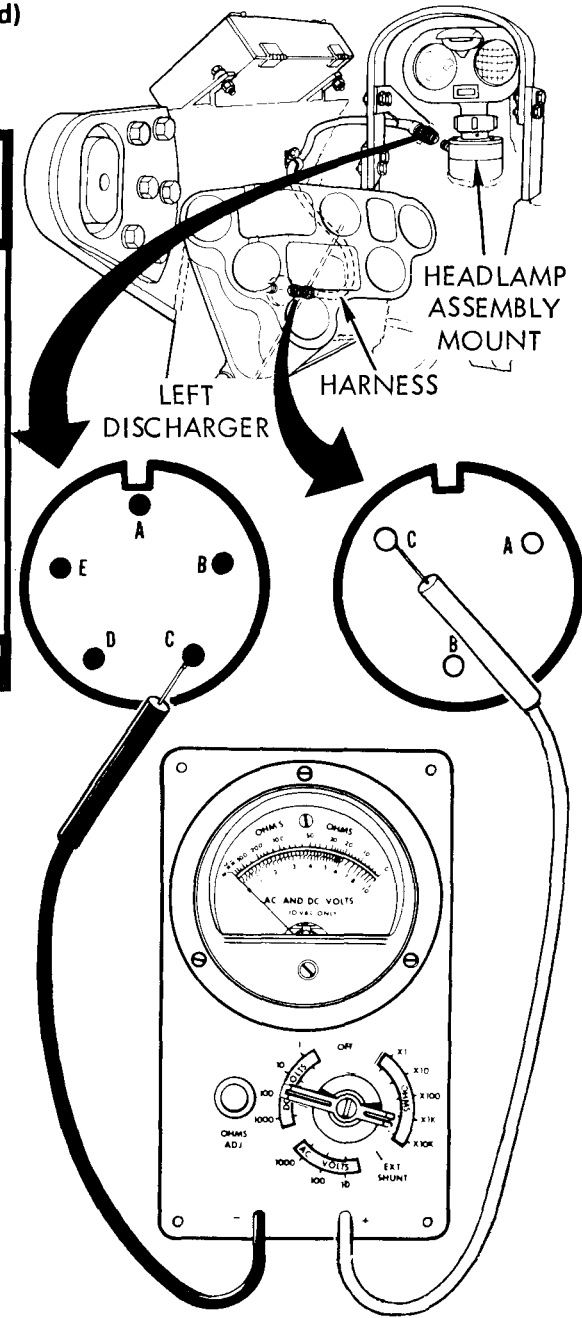
81

Check for continuity between socket C of harness connector at left discharger and pin C of harness connector at headlight assembly.

Second Technician (Headlight Assembly)

- Disconnect harness connector from headlight assembly mount.
- Connect red probe of meter to socket C of harness connector at left discharger.
- Connect black probe of meter to pin C of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



82

- **Connect harness connector to pushbutton unit.**
- **Replace wiring harness 12291327.**

YES NO

TA250686

**DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)**

Symptom 78

83 Check harness for continuity between socket D at pushbutton unit and pin C of bulkhead connector.

First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket D of harness connector at pushbutton unit.
- Connect black probe of meter to pin C of bulkhead connector.
- Check if meter indicates continuity.

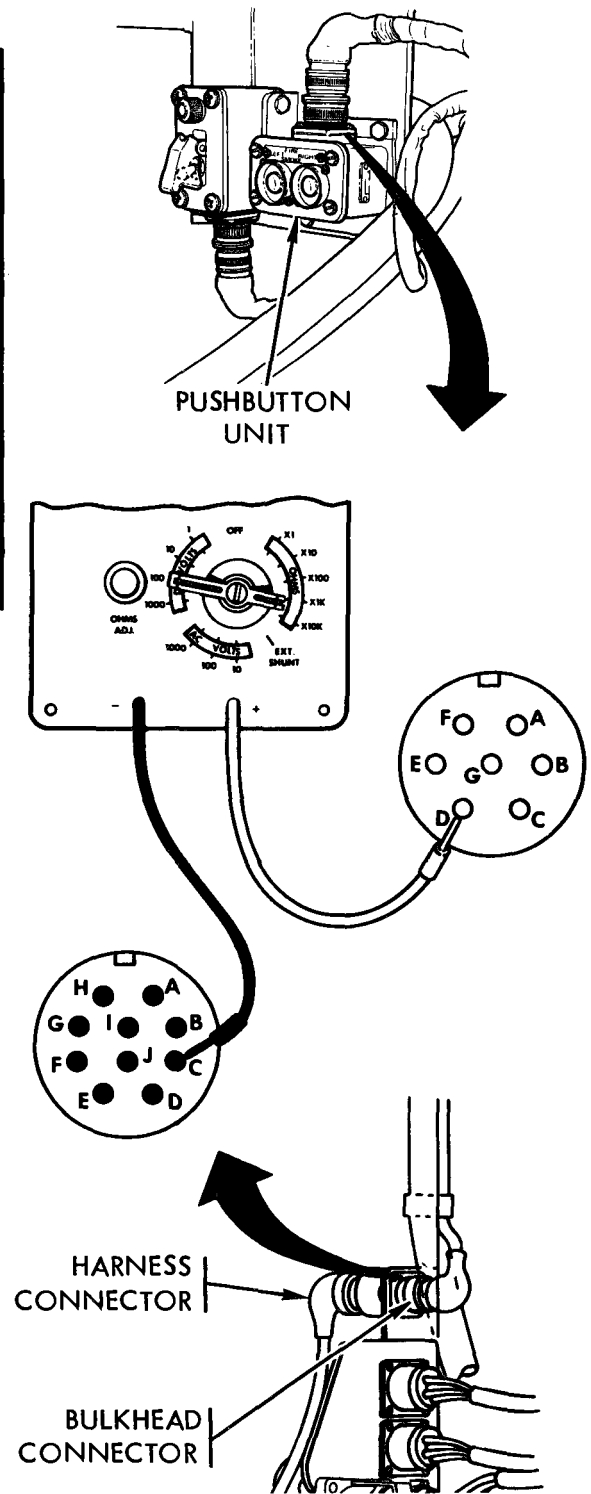
Does meter indicate continuity?

84 Replace smoke grenade hull compartment wiring harness assembly (page 22-12).

YES

85 Replace smoke grenade crew compartment wiring harness assembly (page 22-6).

NO



TA250687

By Order of the Secretary of the Army

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-37, Organizational Maintenance Requirements for Tank, Bridge Launcher, M60A1 (AVLB).

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For use of this form, see AR 25-30; the proponent agency is ODISC4.							
TO: (Forward to proponent of publication or form) (Include ZIP Code) AMSTALC-LPIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630						FROM: (Activity and location) (Include ZIP Code) Your mailing address	
PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER TM5-5420-202-20-1				DATE 25 October 1985	TITLE M60A1 Tank Chassis, Transporting for Bridge, Armored-Vehicle-Launched; Scissoring Type, Class 60		
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
	0004 00-2	4-7				Wrong POC is listed. <div style="border: 1px solid black; padding: 20px; text-align: center; font-size: 48px; font-weight: bold; transform: rotate(-10deg);">SAMPLE</div>	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
TYPED NAME, GRADE OR TITLE Your Name				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE Your Signature	

TO: <i>(Forward direct to addressee listed in publication)</i> AMSTALC-LPIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i> Your address	DATE Date you filled out this form
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PUBLICATION NUMBER TM 5-5420-202-20-1	DATE 25 October 1985	TITLE M60A1 Tank Chassis, Transporting for Bridge, Armored-Vehicle-Launched; Scissoring Type, Class 60
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE Your Name	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE Your Signature
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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
For use of this form, see AR 25-30; the proponent agency is ODISC4.							
TO: (Forward to proponent of publication or form) (Include ZIP Code) AMSTALC-LPIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

TO: <i>(Forward direct to addressee listed in publication)</i> AMSTALC-LPIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$\frac{5}{9}(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $\frac{9}{5}^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

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
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

