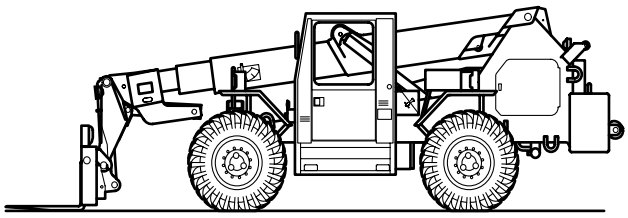
TECHNICAL MANUAL

UNIT MAINTENANCE MANUAL



ALL TERRAIN LIFTER ARMY SYSTEM (ATLAS)

10,000 LB CAPACITY

NSN 3930-01-417-2886

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1998

WARNING

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU.

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

The following precautions MUST be followed to ensure personnel are safe whenever arctic heater or engine is operated for any purpose. Otherwise, injury to personnel may result.

- DO NOT operate arctic heater or vehicle engine in enclosed area without adequate ventilation.
- BE ALERT at all times during vehicle operation for exhaust symptoms. If symptoms are present, IMMEDIATELY EVACUATE AND VENTILATE the area. Treat affected personnel as follows: expose to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE; if necessary, give artificial respiration as described in FM 4-25.1 and get medical attention.
- BE AWARE; neither the gas particulate filter unit nor field protection mask for nuclear-biological-chemical protection will protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING

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

- Keep fuel away from open flame or any spark (ignition source).
- Keep at least a B-C fire extinguisher within easy reach when working with fuel or on a fuel system.
- Do not work on fuel system when engine is hot; fuel can be ignited by a hot engine.
- Post signs that read “NO SMOKING WITHIN 50 FEET (15 m)” when working with open fuel, fuel lines or fuel tanks.

WARNING

- Do not smoke or allow flame or sparks in the vicinity while servicing, removing, or installing batteries. Never disconnect any charging unit circuit or battery circuit cable from battery when the charging unit is operating. Batteries generate hydrogen, a highly explosive gas. Severe personal injury could result.
- To avoid sparks when removing battery cables, always begin by removing negative battery cable first.

- Batteries are filled with acid electrolyte solution. Always wear protective clothing, rubber gloves, and eye protection when servicing, removing or installing batteries.

- Always check electrolyte level with engine stopped. Do not smoke when checking the battery. Do not use an exposed flame to check battery levels. Protect eyes when checking battery level.

- Do not overfill batteries so that water splashes acid from cell openings. Battery acid can cause skin irritation or burns.

WARNING

- Hydraulic oil in system can be under pressures over 3000 psi (20685 kPa) with engine OFF. ALWAYS relieve pressure in hydraulic hoses before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and attachment on ground, move control levers through all operating positions several times to relieve hydraulic pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious injury or death to personnel.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil can cause injury to personnel. Allow hydraulic oil to cool before disconnecting any hydraulic hoses.

- When working underneath boom, always support boom using blocks, jackstands, or other rigid and stable supports. Combined weight of boom and attachment is approximately 6300 lb (2857.63 kg). Failure to adequately support the boom could result in severe injury or death to personnel.

WARNING

- Dry cleaning solvent MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. The use of protective gloves and goggles is suggested. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- NOTE: P-D-680 Type II is no longer in use and has been replaced by MIL-PRF-680 Type III.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

WARNING

Personnel hearing can be PERMANENTLY DAMAGED if exposed to constant high noise levels of 85 dB (A) or greater. Wear approved hearing protection devices when operating or working within 61 ft (19 m) of vehicle when engine is running. Personnel exposed to high noise levels shall participate in a hearing conservation program in accordance with TB MED 501. Hearing loss occurs gradually but becomes permanent over time.

WARNING

Care must be exercised when lubricating front propeller U-joint and parking brake. Over lubrication could result in grease on the parking brake rotor and/or parking brake linings which could cause the brake to slip. Death or bodily injury to personnel could result.

WARNING

Use extreme care when lifting counterweight with forklift. Counterweights weigh 5800 lbs (2633.2 kg) and its center of gravity (CG) is off center. Never allow forks to tip forward. Always tie counterweight lifting eyes to the lifting forklift. Counterweight must be handled using another 10K ATLAS/10K carriage and lifted through lifting eyes located at the top of the counterweight. Keep hands or fingers out of holes for counterweight pins. Failure to comply could result in serious injury or death to personnel.

TECHNICAL MANUAL
TM 10-3930-673-20-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 30 September 2005

UNIT MAINTENANCE MANUAL

FOR

ALL TERRAIN LIFTER ARMY SYSTEM (ATLAS)
10,000 LB CAPACITY

(NSN 3930-01-417-2886)

TM 10-3930-673-20-1, dated 4 May 1998, is changed as follows:

1. Remove old pages and insert new pages.
2. New or changed material is indicated by a vertical bar in the margin.

Remove Pages	Insert Pages
a thru c/(d blank)	*a thru c/(d blank)*
	A/B (blank)
i and ii	*i and ii*
2-1 and 2-2	*2-1 and 2-2*
2-5 and 2-6	*2-5 and 2-6*
2-11 thru 2-14	*2-11 thru 2-14*
2-17 thru 2-20	*2-17 thru 2-20*
	2-22.1/(2-22.2 blank)
2-23 and 2-24	*2-23 thru 2-24.7/(2-24.8 blank)*
2-27 and 2-28	*2-27 and 2-28*
2-31 thru 2-34	*2-31 thru 2-34.4*
2-397 and 2-398	*2-397 and 2-398*
2-613 and 2-614	*2-613 and 2-614*
2-769 thru 2-770	*2-769 thru 2-770.5/(2-770.6 blank)*
2-771 and 2-772	*2-771 and 2-772*
2-807 thru 2-812	*2-807 thru 2-812*
2-817 thru 2-822	*2-817 thru 2-822*
2-825 thru 2-832	*2-825 thru 2-832*
2-835 and 2-836	*2-835 and 2-836*
2-841 and 2-842	*2-841 and 2-842*
2-845 thru 2-850	*2-845 thru 2-850*
2-853 thru 2-858	*2-853 thru 2-858*
	2-865 thru 2-913/(2-914 blank)
A-1 and A-2	*A-1 and A-2*
B-1 thru B-24	*B-1 thru B-24*
C-1 thru C-4	*C-1 thru C-4*
Index-1 thru index-10	*Index-1 thru index-10*

Remove Pages	Insert Pages
FP-5/(FP-6 blank) and FP-7/(FP-8 blank)	*FP-5/(FP-6 blank) thru FP-7/(FP-8 blank)*
Front Cover	*Front Cover*

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

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0517810

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LIST OF EFFECTIVE PAGES

NOTE

A vertical line in the outer margins of the page indicates the portion of text affected by the change.

Dates of issue for original and change pages are:

Original - 4 May 1998
Change 1 - 30 September 2005

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 74 AND TOTAL NUMBER OF CHAPTERS IS 19 CONSISTING OF THE FOLLOWING:

Page No	*Change No.	Page No.	*Change No.	Page No.	*Change No.
Cover (Back blank)	1	2-772	1	Sample 2028-2s	0
a	1	2-773 to 2-807	0	Three Blank 2028-2s	0
b	0	2-808 to 2-812	1	FP-1 to FP-3/(FP-4 blank)	0
c/(d blank)	1	2-813 to 2-817	0	FP-5 to FP-7/(FP-8 blank)	1
A/(B blank)	1	2-818 to 2-821	1	FP-9/(FP-10 blank)	0
i	1	2-822 to 2-824	0	Schmtc-1/(Schmtc-2 blank)	0
ii to xii/(xv blank)	0	2-825 to 8-829	1		
1-1 to 1-15/(1-16 blank)	0	2-830	0	Metric Conversion Chart	0
2-1	1	2-831	1	Back Cover	0
2-2 to 2-4	0	2-832 to 2-834	0		
2-5	1	2-835	1		
2-6 to 2-10	0	2-836 to 2-840	0		
2-11 to 2-13	1	2-841	1		
2-14 to 2-16	0	2-842 to 2-845	0		
2-17 to 2-18	1	2-846 to 2-849	1		
2-19	0	2-850 to 2-853	0		
2-20	1	2-854 to 2-857	1		
2-21 to 2-22	0	2-858 to 2-863/(2-864 blank)	0		
2-22.1/(2-22.2 blank)	1				
2-23 to 2-24.7/(2-24.8 blank)	1	2-865 to 2-913/(2-914 blank)	1		
2-25 to 2-26	0	A-1 to A-2	1		
2-27	1	B-1	1		
2-28 to 2-31	0	B-2 to B-3	0		
2-32 to 2-33.3	1	B-4 to B-21	1		
2-34 to 2-397	0	B-22	0		
2-398	1	B-23	1		
2-399 to 2-612	0	B-24	0		
2-613	1	C-1 to C-4	1		
2-614 to 2-769	0	D-1/(D-2 blank)	0		
2-769.0 to 2-769.5/(2-769.6 blank)	1	E-1 to E-4	0		
		F-1 to F-3/(F-4 blank)	0		
2-770 to 2-771	0	Index -1 to Index-10	1		

* Zero in this column indicates an original page.

TECHNICAL MANUAL
No. 10-3930-673-20-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 4 MAY 1998

UNIT MAINTENANCE MANUAL

FOR

ALL TERRAIN LIFTER ARMY SYSTEM (ATLAS)

10,000 LB CAPACITY

NSN 3930-01-417-2886

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS
You can help improve this manual. If you find any discrepancies or know a way to improve this TM, let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications) or DA Form 2028-2 located in the back of this manual to: Commander, US Army Tank-automotive and Armaments Command, Attn: AMSTA-AC-NML, Rock Island, IL 61299-7630. A reply will be furnished to you. You can also provide DA Form 2028-2 information to TACOM via datafax or e-mail. TACOM's datafax number is: DSN 793-0726 or (309) 782-0726. E-mail address: amsta-ac-nml@ria-ehm 2.army.mil.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT)

TABLE OF CONTENTS (CONT)

HOW TO USE THIS MANUAL

1. ABOUT YOUR MANUAL

Spend some time looking through this manual. You'll find that it has a new look, different than most of the TMs you've been using.

New features added to make this manual easier for you to use are:

a. Finding Information. These include entry features such as the thumb indexing indicators on the cover and edge of the manual. Extensive troubleshooting guides for specific systems lead directly to step-by-step directions for problem solving and maintenance tasks.

b. Illustrations. Many methods are used to make finding and fixing parts much easier. Locator illustrations with keyed text, exploded views, and cutaway diagrams make the information in this manual easier to understand and follow.

c. Keying Text With Illustrations. Instructions/text are located together with figures that illustrate the specific task you are working on. In most cases, the task steps and figures are located side by side.

This TM is organized so that information and procedures needed to perform maintenance tasks are easily located. Take a few minutes to read through this How To Use part of the manual to learn how it is put together and how to find the information you need.

2. BEFORE YOU START

a. Read and understand all warning and first aid data in the front of this manual. This data contains general shop safety practices not included in maintenance tasks.

b. Read Chapter 1 to learn more about the ATLAS purpose, capabilities and features.

3. CONTENTS OF MANUAL

a. This TM contains unit maintenance instructions at the intermediate level for the ATLAS. Included are principles of operation, fault isolation troubleshooting and corrective maintenance tasks as authorized by the Maintenance Allocation Chart (MAC).

b. This TM is made up of:

(1) *Chapters.* There are 21 chapters.

(a) Chapter 1, Introduction. This chapter contains general ATLAS information, a description of the equipment, and technical principles of operation.

(b) Chapter 2, Unit Maintenance Instructions. This chapter contains instructions of interest to intermediate level maintenance technicians on tools, equipment, preventive maintenance and troubleshooting.

(c) Chapter 3, General Maintenance Practices. This chapter contains work safety instructions, cleaning and disassembly/assembly instructions, and inspection and repair instructions.

(d) Chapter 4, Engine Maintenance. This chapter contains maintenance procedures for various engine components.

HOW TO USE THIS MANUAL (CONT)

(e) Chapter 5, Fuel System Maintenance. This chapter contains maintenance procedures for various fuel system components.

(f) Chapter 6, Exhaust System Maintenance. This chapter contains procedures for the exhaust system components.

(g) Chapter 7, Cooling System Maintenance. This chapter contains maintenance procedures for the cooling system components.

(h) Chapter 8, Electrical System Maintenance. This chapter contains maintenance procedures for various electrical system components.

(i) Chapter 9, Transmission Maintenance. This chapter contains maintenance procedures for transmission components.

(j) Chapter 10, Propeller and Drive Shaft Maintenance. This chapter contains maintenance procedures for front and rear drive shaft components.

(k) Chapter 11, Front and Rear Axle Assembly Maintenance. This chapter contains maintenance procedures for the front and rear axle assemblies.

(l) Chapter 12, Service and Parking Brake Maintenance. This chapter contains maintenance procedures for the service and parking brakes.

(m) Chapter 13, Wheel and Tire Maintenance. This chapter contains maintenance procedures for the wheels and tires.

(n) Chapter 14, Steering System Maintenance. This chapter contains maintenance procedures for various steering system components.

(o) Chapter 15, Frame and Towing Attachment Maintenance. This chapter contains maintenance procedures for the frame and towing attachments.

(p) Chapter 16, Body and Cab Maintenance. This chapter contains maintenance procedures for body and cab components.

(q) Chapter 17, Body and Chassis Accessories Maintenance. This chapter contains maintenance procedures for the body and chassis accessories.

(r) Chapter 18, Hydraulic System Maintenance. This chapter contains maintenance procedures for various hydraulic system components.

(s) Chapter 19, Gages (Non-electrical) Maintenance. This chapter contains maintenance procedures for non-electrical gages.

(t) Chapter 20, Special Kits Maintenance. This chapter contains maintenance procedures for special kits.

(u) Chapter 21, Preparation for Storage and Shipment. This chapter contains storage and shipment information.

(2) *Sections*. All chapters are further subdivided into sections. Sections allow for easier break-up of material. They are:

HOW TO USE THIS MANUAL (CONT)

(a) Chapter 1 has three sections: General Information, Equipment Description and Technical Principles of Operation.

(b) Chapter 2 has four sections: Repair Parts, Special Tools, TMDE and Support Equipment; Service Upon Receipt; Preventive Maintenance Checks and Services (PMCS); and Troubleshooting.

(c) Chapters 3 through 21 have one section each.

(3) *Paragraphs*. Paragraphs make up sections. The paragraphs have the information needed to do the job properly. Each paragraph is the start of a major topic within the chapter.

(4) *Pages*. Pages are numbered consecutively within each chapter. The first part is the chapter number followed by a dash and the consecutive page number. For example, page 3 of Chapter 2 is numbered 2-3.

(5) *Appendices*. Appendices are found in the back of the manual. They provide reference information required for maintenance.

(a) Appendix A, References. This appendix contains other information you may need to do your job.

(b) Appendix B, Maintenance Allocation Chart. This appendix designates overall authority and responsibility for maintenance functions on the ATLAS.

(c) Appendix C, Expendable/Durable Supplies and Materials List. This appendix contains information on expendable/durable items you need for maintenance.

(d) Appendix D, Illustrated List of Manufactured Items. This appendix contains information you need to make parts that are not procured.

(e) Appendix E, Torque Limits. This appendix provides general torque limits for different fasteners.

(f) Appendix F, Tool Identification List. This appendix lists the tools you need to operate and maintain the ATLAS.

(6) *Index*. The index is located in the back of the manual. It lists topics in alphabetical order and references the paragraph numbers where information on the topic can be found.

(7) *Schematics*. Schematic illustrations of the electrical and hydraulic systems.

HOW TO USE THIS MANUAL (CONT)

4. HOW TO FIND INFORMATION QUICKLY

a. Using the Front Cover. The front cover of the manual has boxed titles for major topics. At the right side of each box is a blackened area. The blackened area matches black markings on the first page of that major topic in the manual. Fan the outer edge of the manual to find the topic material.

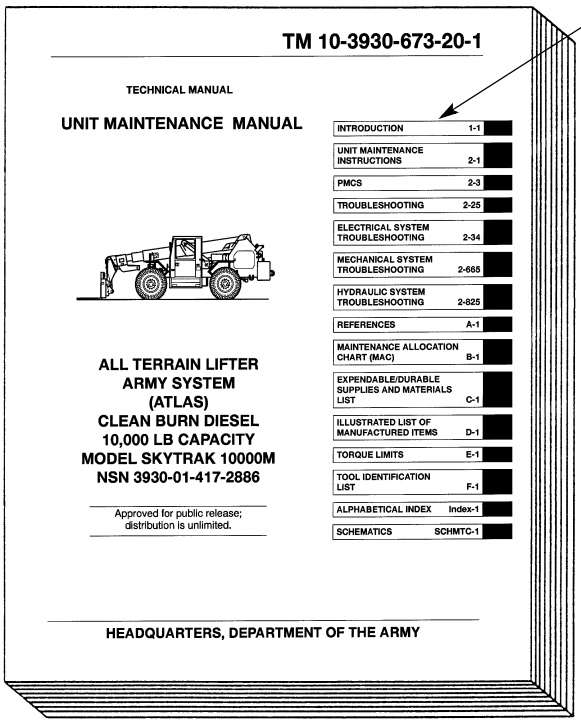
b. Using the Table of Contents. The table of contents lists all chapters, appendices, sections and other important information in this manual and the page number where each starts. The boxed-in items in the table of contents correspond to the items listed on the front cover.

c. Using Chapter Indexes. On the first page of each chapter is a numerical listing of all paragraphs in that chapter and the page number where each can be found.

d. Using Paragraph Numbers and Titles. Paragraph numbers include the chapter number. The paragraph number appears before the title of the paragraph title line. Paragraphs that are longer than one page will have the paragraph number and title continued at the top of each following left-hand page.

HOW TO USE THIS MANUAL (CONT)

THIS MAJOR TOPIC STARTS ON THIS PAGE



TM 10-3930-673-20-1

TECHNICAL MANUAL

UNIT MAINTENANCE MANUAL

ALL TERRAIN LIFTER
ARMY SYSTEM
(ATLAS)
CLEAN BURN DIESEL
10,000 LB CAPACITY
MODEL SKYTRAK 10000M
NSN 3930-01-417-2886

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

TOOLS

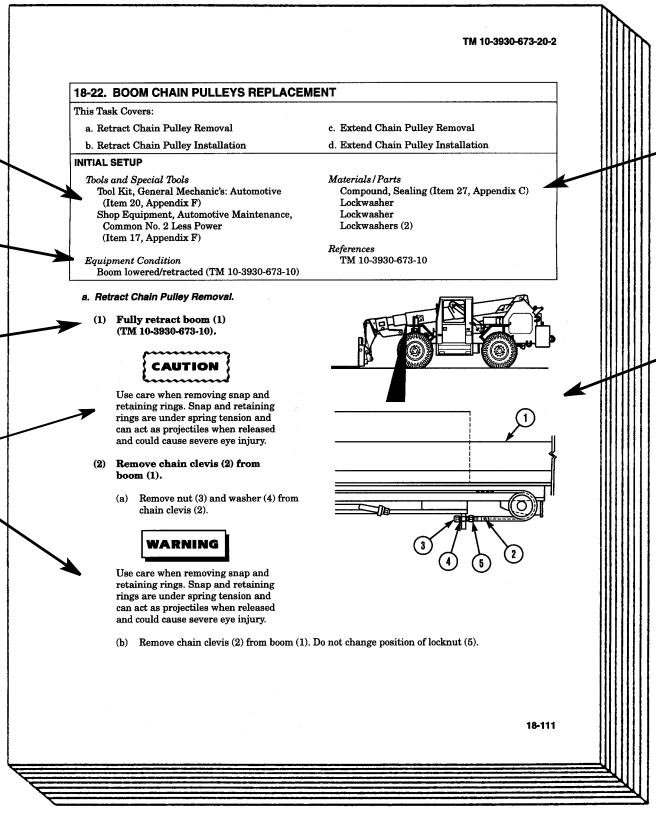
EQUIPMENT CONDITION

MAJOR STEPS

WARNINGS, CAUTIONS AND NOTES

MATERIALS/PARTS

ILLUSTRATIONS



TM 10-3930-673-20-2

18-22. BOOM CHAIN PULLEYS REPLACEMENT

This Task Covers:

a. Retract Chain Pulley Removal
b. Retract Chain Pulley Installation
c. Extend Chain Pulley Removal
d. Extend Chain Pulley Installation

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 20, Appendix F)
Shop Equipment, Automotive Maintenance, Common No. 2 Less Power (Item 17, Appendix F)

Equipment Condition
Boom lowered/retracted (TM 10-3930-673-10)

Materials/Parts
Compound, Sealing (Item 27, Appendix C)
Lockwasher
Lockwasher
Lockwashers (2)

References
TM 10-3930-673-10

a. Retract Chain Pulley Removal.

(1) Fully retract boom (1) (TM 10-3930-673-10).

CAUTION

Use care when removing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

(2) Remove chain clevis (2) from boom (1).

(a) Remove nut (3) and washer (4) from chain clevis (2).

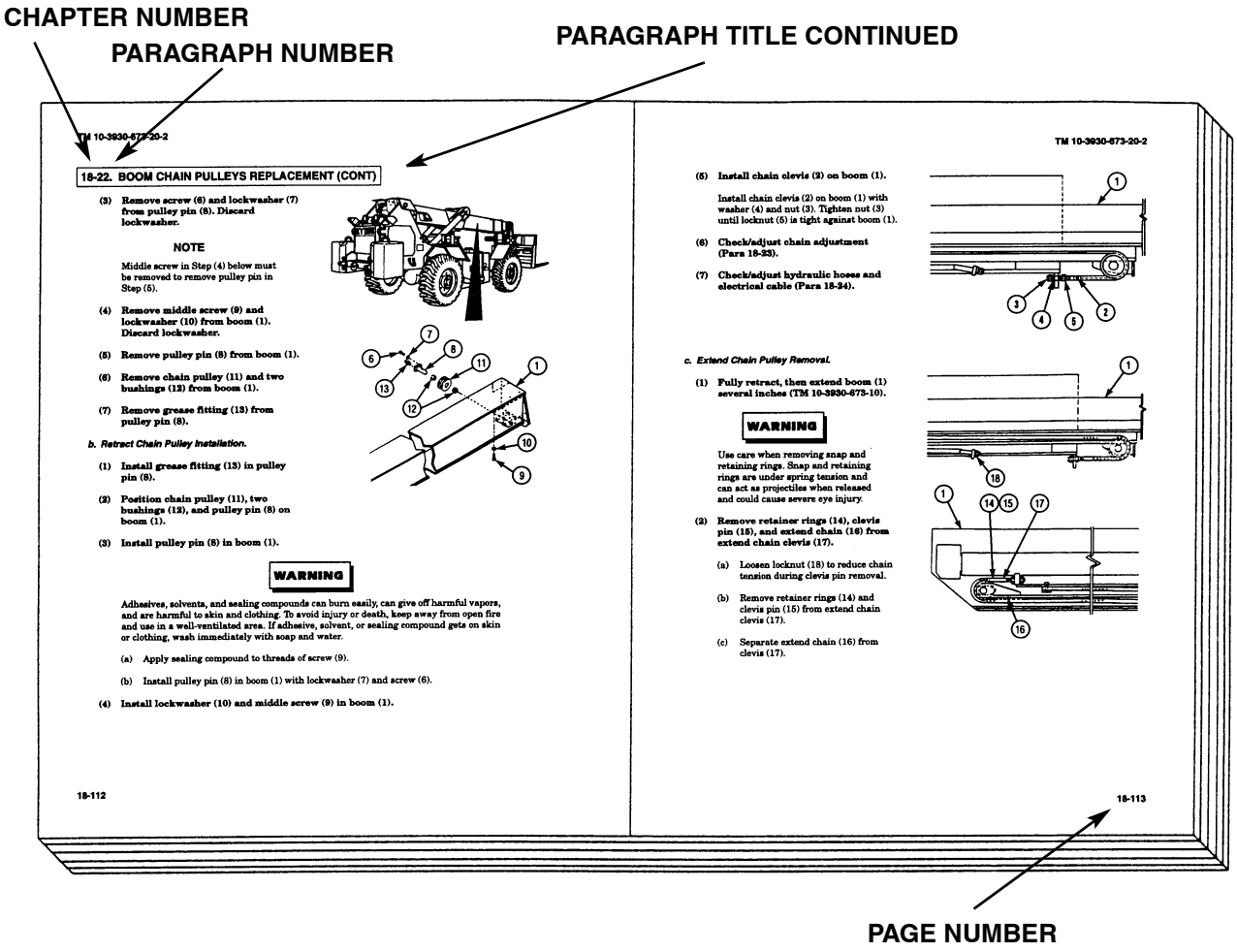
WARNING

Use care when removing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

(b) Remove chain clevis (2) from boom (1). Do not change position of locknut (5).

18-111

HOW TO USE THIS MANUAL (CONT)



5. HOW TO USE THE TROUBLESHOOTING CHARTS

Troubleshooting is divided into two parts, electrical and mechanical. An overall fault index is located at the beginning of the troubleshooting procedures and individual indexes are located at the beginning of each troubleshooting part. The fault index lists common problems that you may have with the ATLAS and the page number where each can be found.

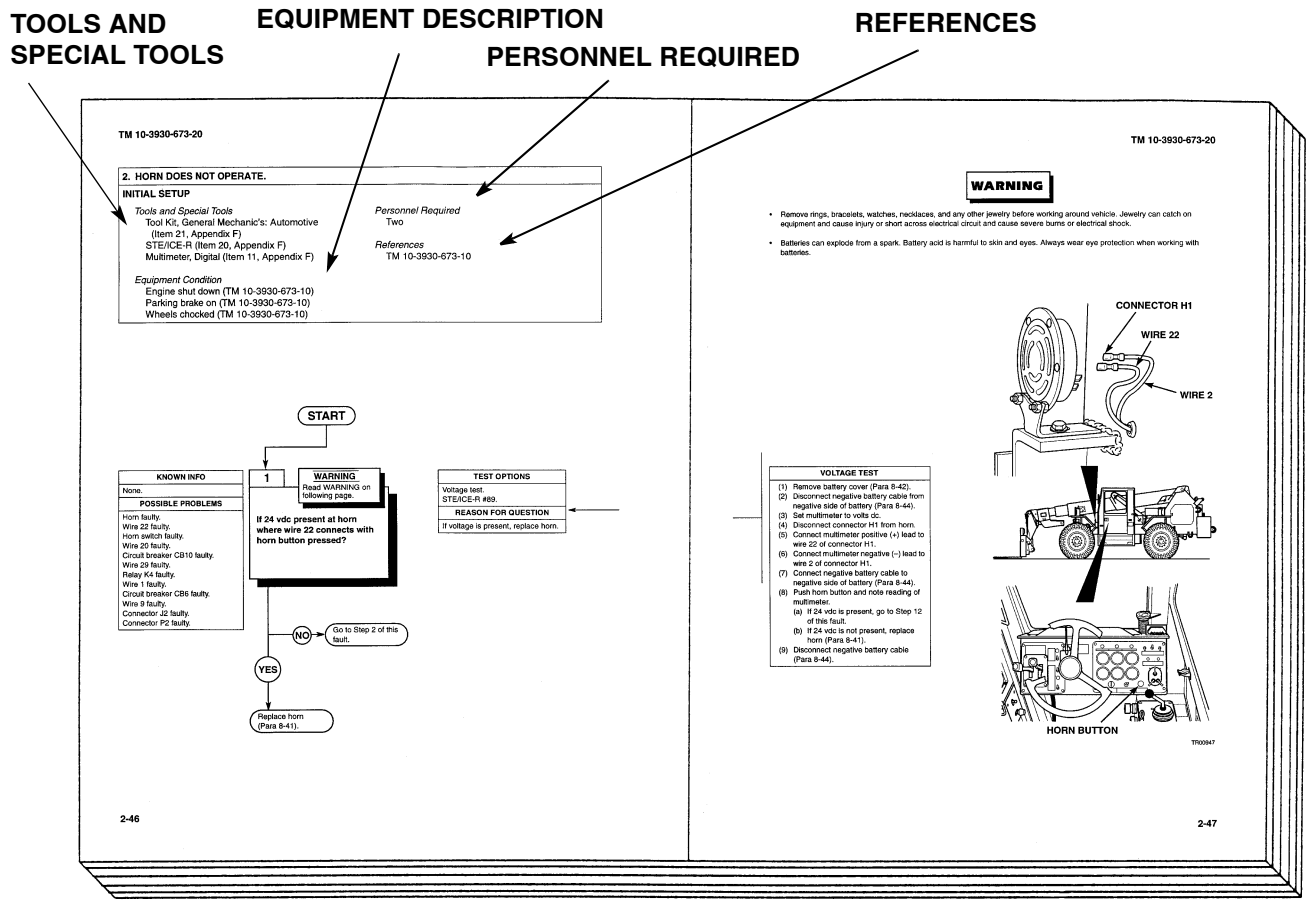
Troubleshooting procedures are divided into logic tree pages and test pages. A logic tree page is always a left-hand page facing the test page on the right. The logic tree page provides the sequence of steps required to isolate a fault to a failed component. All critical information for decision making is on the left-hand page.

A test page is always a right-hand page facing the logic tree page on the left. The test provides detailed instructions for testing the first component listed in the POSSIBLE PROBLEMS box. This test will also provide an answer for the question in the middle column. Note the arrow connecting the test on the right-hand page to the REASON FOR QUESTION. When possible, illustrations are included to provide visual details. Warnings, cautions, and notes contain additional information for testing.

Please refer to Introduction to Logic Tree Troubleshooting (Para 2-6) for additional troubleshooting instructions.

6. HOW TO USE A PROCEDURE

HOW TO USE THIS MANUAL (CONT)



Each procedure consists of two parts, an initial setup table and a task section. You must familiarize yourself with the entire maintenance procedure before beginning the maintenance task.

The initial setup table contains all or some of the following headings:

- *Tools and Special Tools* - Describes tools needed to perform the procedure.
- *Test Equipment* - Describes test equipment needed to perform the procedure.
- *Equipment Condition* - Refers to other procedures that must be performed before attempting the procedure.
- *Materials/Parts* - Describes miscellaneous materials and parts needed to perform the procedure.
- *Personnel Required* - Describes quantity of personnel needed to perform the procedure.
- *References* - Lists manuals that may be needed to perform the procedures.

7. HOW TO FIND CRITICAL INFORMATION

HOW TO USE THIS MANUAL (CONT)

Critical information in maintenance chapters has been highlighted for experienced technicians so that they may scan a task quickly and pick out the information needed without reading the entire task. This way, the level of detail needed by low-experienced technicians will not interfere with critical information.

Information of interest to experienced users is highlighted with bold letters. More detailed information is shown with roman letters.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

a. Type of Manual. This manual contains unit maintenance instructions, at the organizational level, for the ATLAS.

b. Model Number and Equipment Name. The ATLAS (All Terrain Lifter Army System) Forklift Truck is equipped with a 6,000 lb or 10,000 lb lifting carriage.

c. Purpose of Equipment. The ATLAS is designed for loading and unloading munitions and other palletized items from transport vehicles and containers. The ATLAS is also designed for use as a standard rough terrain forklift.

d. Special Limitations on Equipment. The ATLAS has no special limitations. Normal limitations such as travel speed, lift capacity, etc., are discussed in Para 1-12.

1-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS).

1-3. CORROSION PREVENTION AND CONTROL (CPC)

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

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

If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as “corrosion, rust, deterioration, and cracking” will ensure that the information is identified as a CPC problem.

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

1-4. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Demolition of materiel to prevent enemy use shall be in accordance with the requirement of TM 750-244-6 (Procedures for Destruction of Equipment to Prevent Enemy Use for U.S. Army).

1-5. PREPARATION FOR STORAGE OR SHIPMENT

Refer to Chapter 21 for all storage and shipment instructions.

1-6. QUALITY ASSURANCE/QUALITY CONTROL

Not applicable.

1-7. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS

Refer to the nomenclature cross-reference list below. This listing gives nomenclature cross-references used in this manual. The common name is in the left column and the official name is in the right.

Common Name	Official Nomenclature
ATLAS	All Terrain Lifter Army System Forklift Truck

1-8. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR’S)

If your ATLAS needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don’t like about your equipment. Let us know why you don’t like the design or performance. Put it on an SF368 (Product Quality Deficiency Report). Mail it to us at: Commander, US Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/MPA, Warren, MI 48397-5000. A reply will be furnished to you.

1-9. EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD)

The quarterly Equipment Improvement Report and Maintenance Digest TB 43-0001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations, proposed Modification Work Orders (MWOs), warranties (if applicable), actions taken on some of your DA Forms 2028-2 (Recommended Changes to Publications), and advance information which will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA PAM 310-1, Consolidated Index of Army Publications and Blank Forms, and Appendix A, References, of this manual.

Section II. EQUIPMENT DESCRIPTION

1-10. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. Purpose. The ATLAS is designed for loading and unloading munitions and other palletized items from transport vehicles and containers. Also, the ATLAS can be used as a forklift truck.

b. Equipment Characteristics, Capabilities, and Features.

(1) The ATLAS can handle boxes, palletized ammunition loads, and other palletized items from transport vehicles and containers.

(2) The vehicle frame can be tilted 9 degrees to left or right which allows vehicle to be level when traversing a sideslope.

(3) The attachment can be raised to a nearly horizontal position for loading and unloading munitions.

(4) The forks tilt, level, and sideshift to maneuver loads.

(5) With 6K carriage, lifts loads of 6,000 lbs to a height of 28 ft. With 10K carriage, lifts loads of 4,000 lbs to a height of 27.5 ft, and 10,000 lbs to a height of 17 ft.

(6) Can tow other vehicles weighing 34,000 pounds or less.

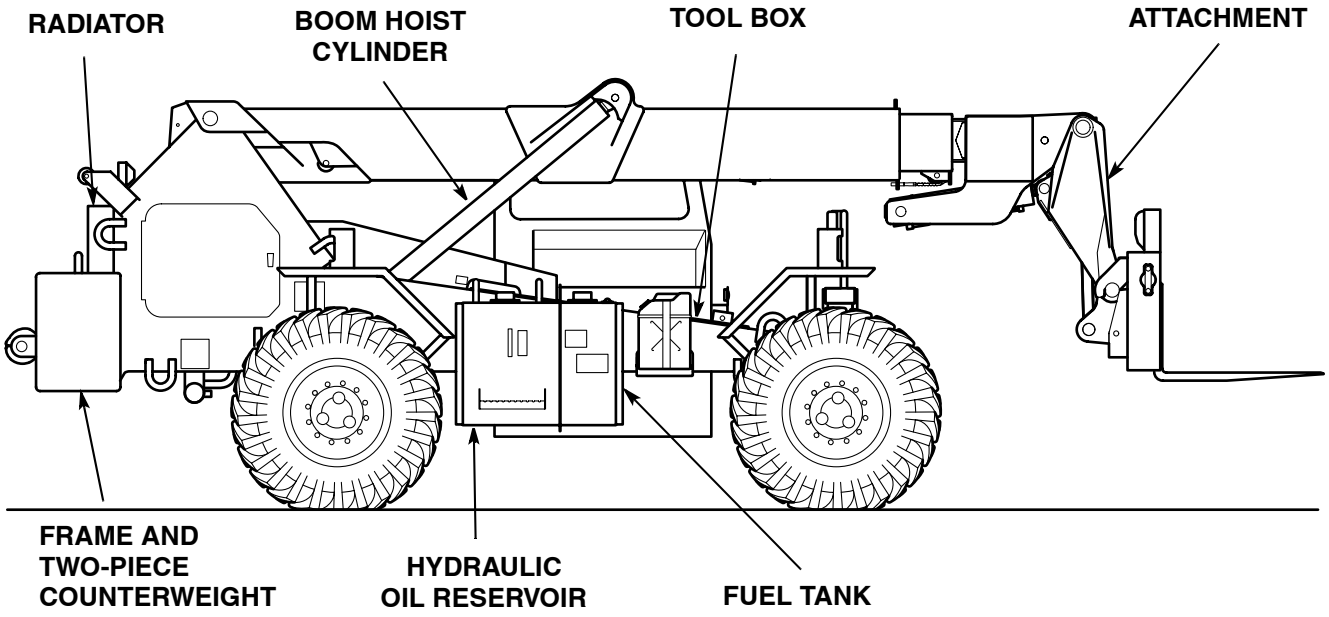
(7) The operator can select one of three steering modes: two wheel, four wheel, and crab wheel.

(8) The ATLAS is all weather operational.

(9) Can ford in up to 36 inches of water.

(10) The ATLAS can travel at a maximum speed of 23 mph over level ground with an evenly distributed load.

1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



a. Right Side View of the ATLAS.

RADIATOR. Contains coolant which provides engine cooling.

BOOM HOIST CYLINDER. Raises and lowers the boom.

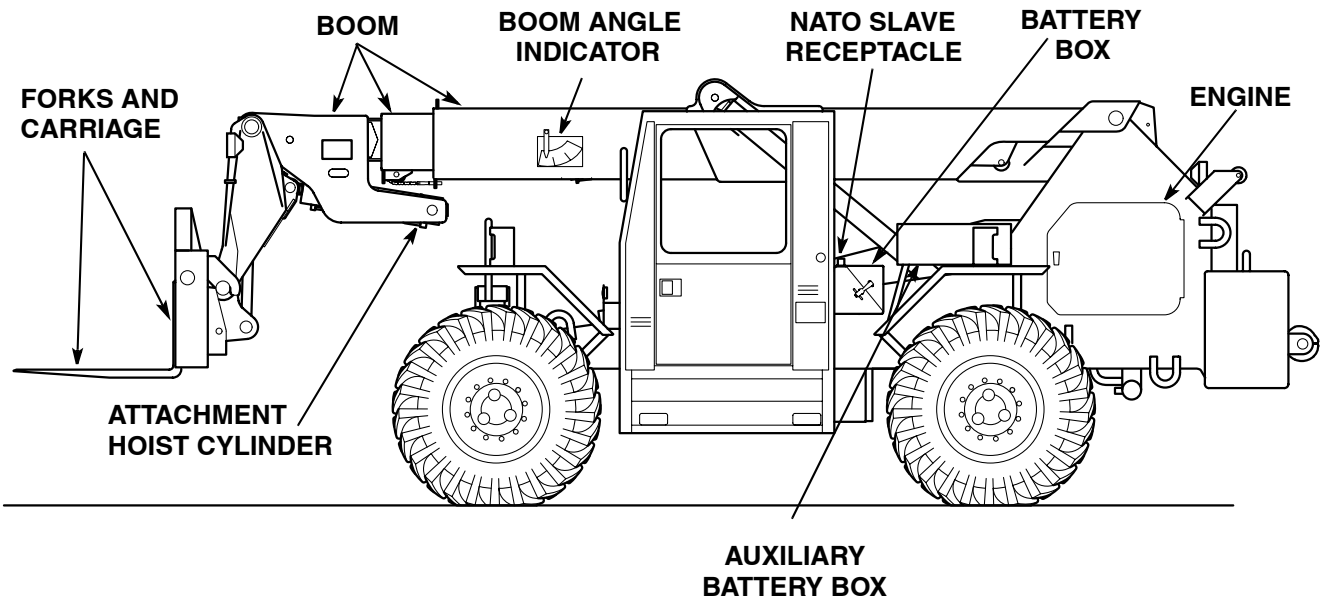
ATTACHMENT. The attachment is required for all forklift operations. The attachment can be raised to a nearly horizontal position, creating a low profile and extended reach configuration. This configuration is useful in loading and unloading munitions from transport vehicles and containers.

FUEL TANK. Contains diesel fuel or JP-8 for engine operation.

HYDRAULIC OIL RESERVOIR. Contains hydraulic fluid for the hydraulic system.

FRAME AND TWO-PIECE COUNTERWEIGHT. The frame is a heavy-duty design constructed of 1-3/16 in. thick steel plates. The frame is equipped with tie-down lugs meeting air transport specifications, tow lugs, a pintle hook, and a 5800 lb. two-piece counterweight. The counterweight is self removable so that axle loading can be adjusted to meet air transport requirements for some aircraft.

TOOL BOX. Storage area for tools and basic issue items.



b. Left Side View of the ATLAS.

FORKS AND CARRIAGE. Serve as an anchoring point of the forks. Importantly, the fork carriage is equipped with automatic fork leveling. Moving a switch will keep the forks level when raising or lowering the boom. ATLAS 6K carriage has a hinged or removable backrest. Remove the pins to tip it to the low profile position.

BOOM. The telescopic, three stage boom is constructed of welded high strength steel. The boom will retract or extend the reach and height of the forks.

BOOM ANGLE INDICATOR. Shows the angle of the boom relative to the horizon.

NATO SLAVE RECEPTACLE. Connection point for starting a disabled vehicle or for receiving starting assistance when disabled.

BATTERY BOX. Holds the batteries which provide current for the electric system.

ENGINE. Provides the necessary power to drive the transmission. The engine also contains sending units for the Simplified Test Equipment for Internal Combustion Engines (STE/ICE) diagnostics.

ATTACHMENT HOIST CYLINDER. Moves the attachment forward and back.

1-12. EQUIPMENT DATA

Table 1-1 lists data for the ATLAS.

Table 1-1. Equipment Data

ENGINE:	
Model	6BT5.9-C165
Manufacturer	Cummins
Horsepower (* 2,500 rpm)	165 hp
Number of Cylinders	6
Displacement	359 $in.^3$
Weight	930 lb
Maximum No Load rpm	2650 to 2750 rpm
TRANSMISSION:	
Model	1723
Manufacturer	Funk
Powershift	3 speed forward and reverse
Speed Range	
First Gear	0-4 mph, level surface
Second Gear	0-8 mph, level surface
Third Gear	0-23 mph, level surface
Weight	846 lb
AXLES AND BRAKES:	
Model (Front)	PSOC-205-HDB-231
Model (Rear)	PSOC-205-HDB-232
Manufacturer	Rockwell
Weight - Axle Assembly (Front or Rear)	1,650 lb
DIMENSIONS AND WEIGHT:	
Vehicle Operational Weights	
With 6K carriage	31,300 lb
With 10K carriage	32,600 lb
Roading (both carriages)	33,500 lb
Boom Assembly Weight	5,165 lb
Inner Boom Weight	1,280 lb
Intermediate Boom Weight	955 lb
Outer Boom Weight	1,950 lb
Boom Extend Cylinder	600 lb
Max Length in Carry Position:	
With 6K carriage	324.2 in.
With 10K carriage	356.3 in.
Roading	356.3 in.
Width	100.2 in.
Max Height	107 in.
Track Width (Tread)	80.3 in.
CAPACITIES:	
Fuel Tank	44 gal
Cooling System	8 gal
Hydraulic Oil Reservoir	56.6 gal

Table 1-1 Equipment Data (Cont)

CAPACITIES (CONT):
- Hydraulic System . . . . . 75 gal
- Engine Crankcase . . . . . 15 qt
- Engine Crankcase w/filter cap. . . . . 15.3 qt
- Transmission . . . . . 5.5 gal
- Transmission w/filter cap . . . . . 5.75 gal

MISCELLANEOUS:
- Max lift height with 6K carriage
  - 6,000 lb (max height) . . . . . 27 ft, 11.5 in.
- Max lift height with 10K carriage
  - 6,000 lb (max height) . . . . . 27 ft, 8 in.
  - 8,000 lb . . . . . 24 ft, 9.5 in.
  - 10,000 lb . . . . . 16 ft, 11 in.
- Boom Lift Angle (Maximum) . . . . . 45 degrees
- Max reach from load center to front tires with 6K carriage
  - (4,000 lb @ 2 ft load center) . . . . . 24 ft, 3.5 in.
- Max reach from load center to front tires with 10K carriage
  - (2,000 lb @ 4 ft load center) . . . . . 26 ft, 4 in.
- Max reach below grade with 6K carriage . . . . . 33.3 in.
- Max reach below grade with 10K carriage . . . . . 36.8 in.
- Ground Clearance . . . . . 15.2 in. min
- Curb to Curb Turning Circle (Diameter) . . . . . 27 ft, 10 in.
- Frame Oscillation . . . . . 9 degrees to the left or right
- Fording Depth (Freshwater) . . . . . 3 ft
- Travel Speed (Maximum) . . . . . 23 mph

1-13. EQUIPMENT CONFIGURATION

The ATLAS is designed for loading and unloading munitions and other palletized items from transport vehicles and containers.

The ATLAS can also be used for many standard rough terrain forklift tasks. The ATLAS can load and unload single and double stacked pallets from 20 ft (6.1 m) long ISO shipping containers. Containers can be on the ground or on trailers.

1-14. SAFETY, CARE, AND HANDLING

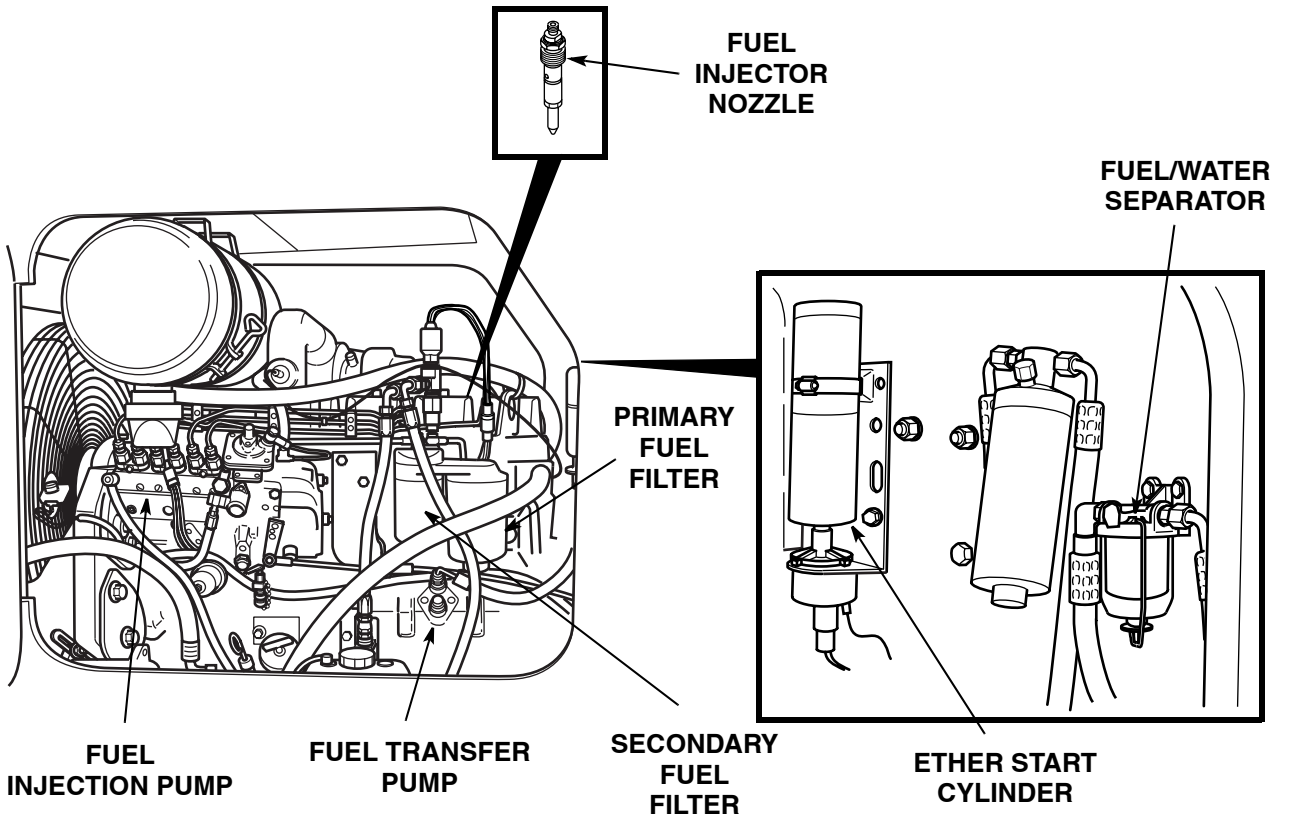
Correct servicing procedures must be followed to ensure the safety of technicians working on the ATLAS. Refer to the Safety Summary of this manual (Page a) for a list of safety precautions peculiar to this vehicle.

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-15. GENERAL

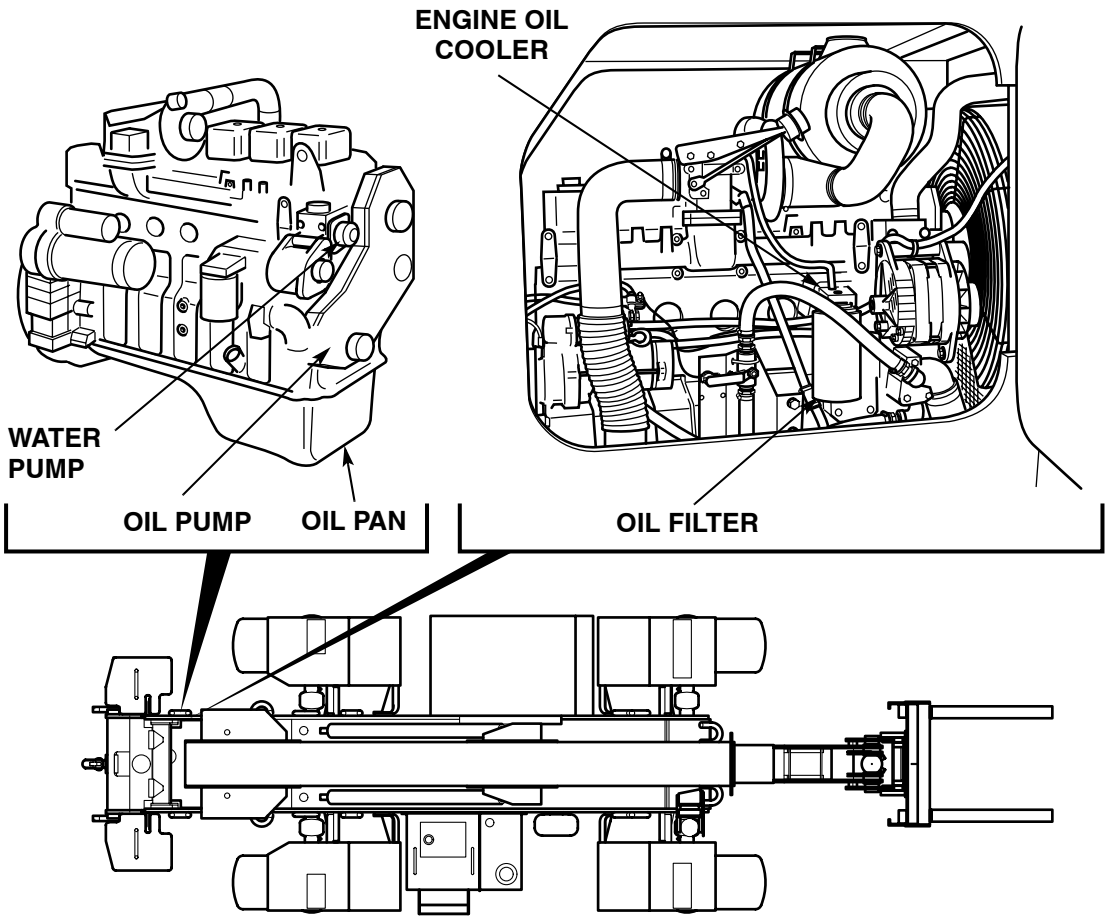
This section explains how components of the ATLAS work together. A functional description is given for the fuel system, engine lubrication system, engine cooling system, transmission lubrication and cooling systems, steering and brake system, electrical system, and hydraulic system.

1-16. ENGINE FUEL SYSTEM



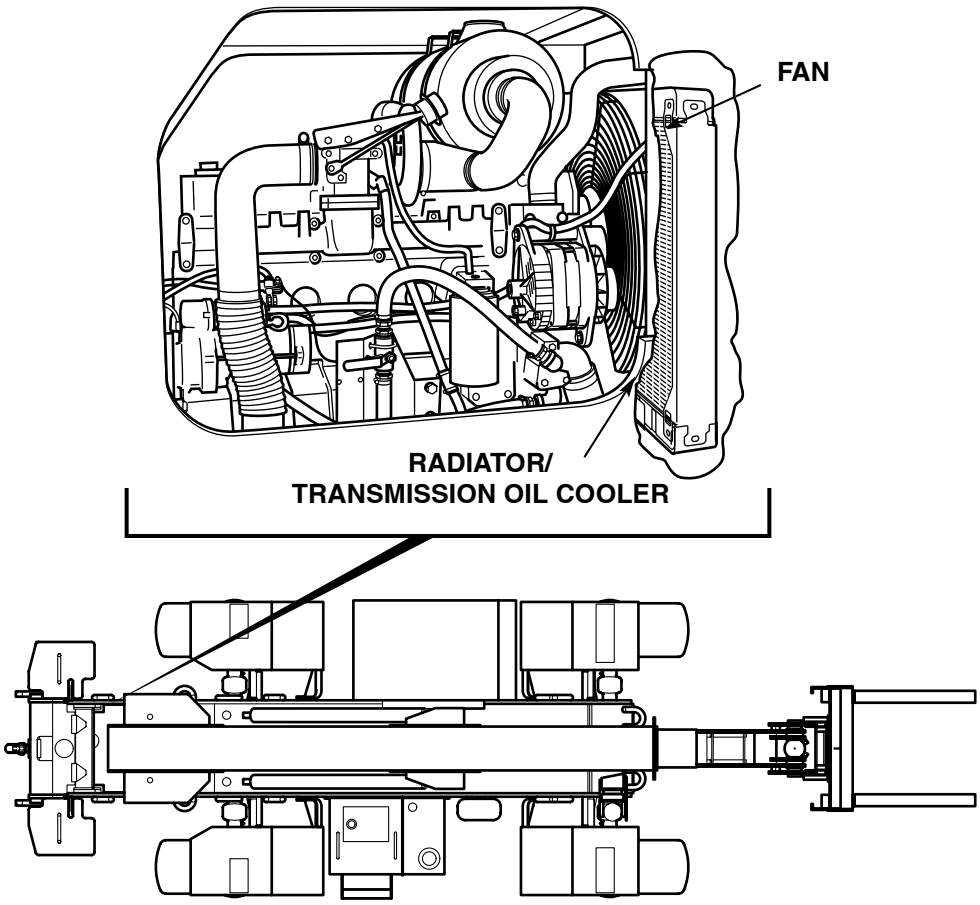
Item	Description
Fuel/Water Separator	Removes moisture from fuel.
Primary and Secondary Fuel Filters	Removes larger particles from the fuel before it reaches the injector pump.
Fuel Transfer Pump	Pulls fuel from the fuel tank through the water separator and sends it through the fuel filters to the fuel injection pump.
Fuel Injection Pump	Sends exact amount of fuel to the injector nozzles.
Fuel Injector Nozzle	Turns the stream of fuel into a fine spray which permits good combustion in the cylinder. There is one nozzle for each cylinder.
Ether Start Cylinder	Contains ether starting fluid for starting cold engine. Starting fluid is released in measured amounts by pressing the engine primer button.

1-17. ENGINE LUBRICATION SYSTEM



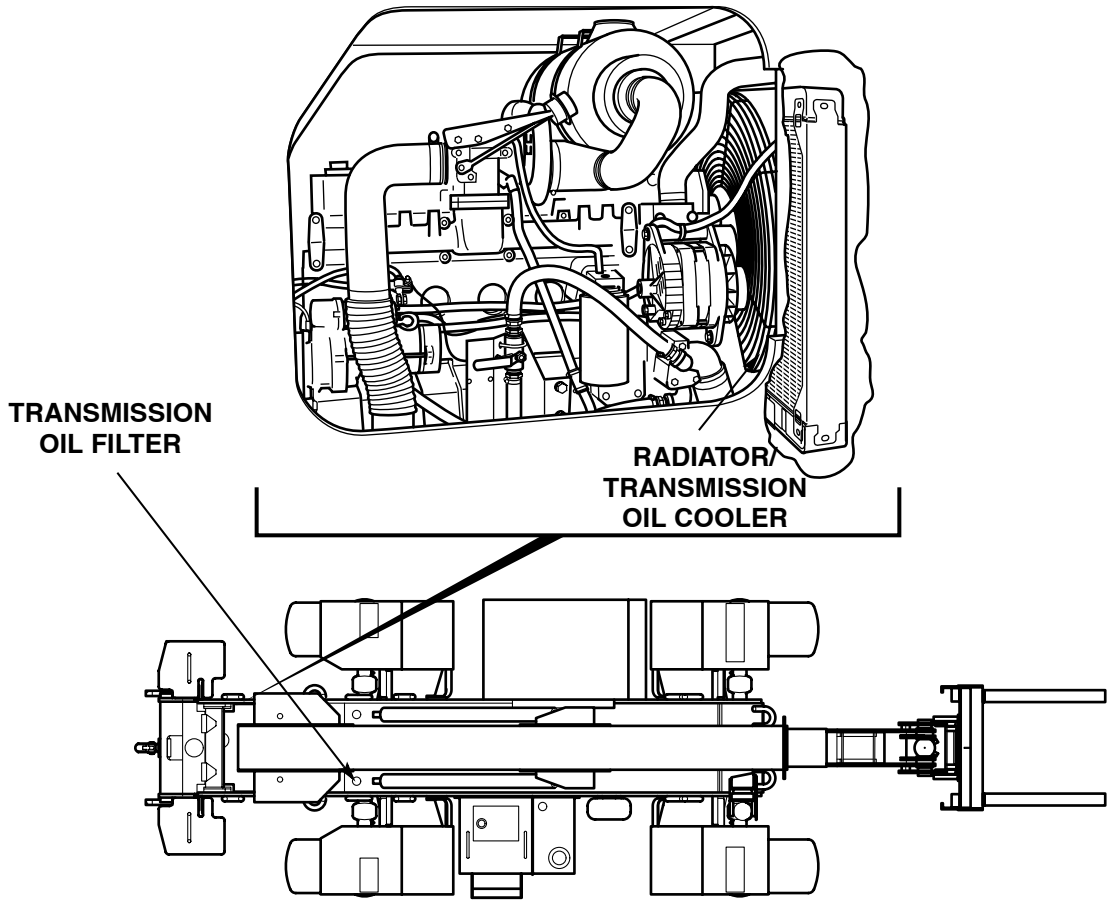
Item	Description
Oil Pump	Draws oil from the oil pan and sends it through the oil cooler, and then through the oil filter. From the filter, the oil enters the cylinder block to lubricate the engine and is then returned to the oil pan. From the filter, oil is also sent through the turbocharger and then returned to the oil pan.
Oil Pan	Contains the oil that lubricates moving parts in the engine.
Engine Oil Cooler	Engine oil flows through the plates of the oil cooler. As the oil warms, heat is transferred to the coolant which flows from the radiator. The coolant flows across the plates of the oil cooler.
Oil Filter	Removes particles from the oil which could cause damage to the internal parts of the engine.
Water Pump	Draws coolant from the radiator and sends it through the oil cooler cavity and cylinder block to cool the engine. The coolant then returns to the radiator.

1-18. ENGINE COOLING SYSTEM



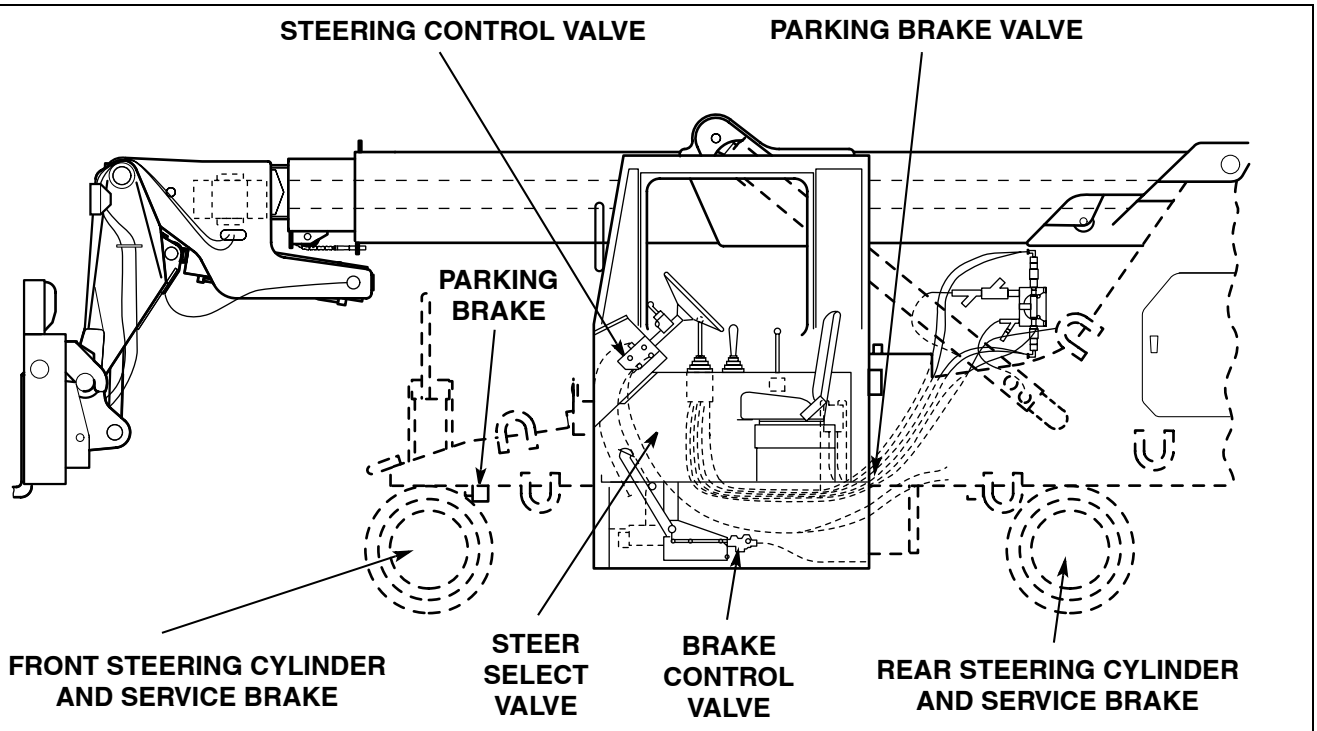
Item	Description
Fan	Turned by the engine drive belt, the fan creates air flow through the radiator to lower the temperature of the coolant as it passes through the radiator.
Radiator	ATLAS uses an overflow cooling system. The system is full when 2 quarts of coolant are visible in the overflow bottle. Coolant, which is added through a filler cap, circulates through the radiator to be cooled after leaving the cylinder block.

1-19. TRANSMISSION LUBRICATION AND COOLING SYSTEMS



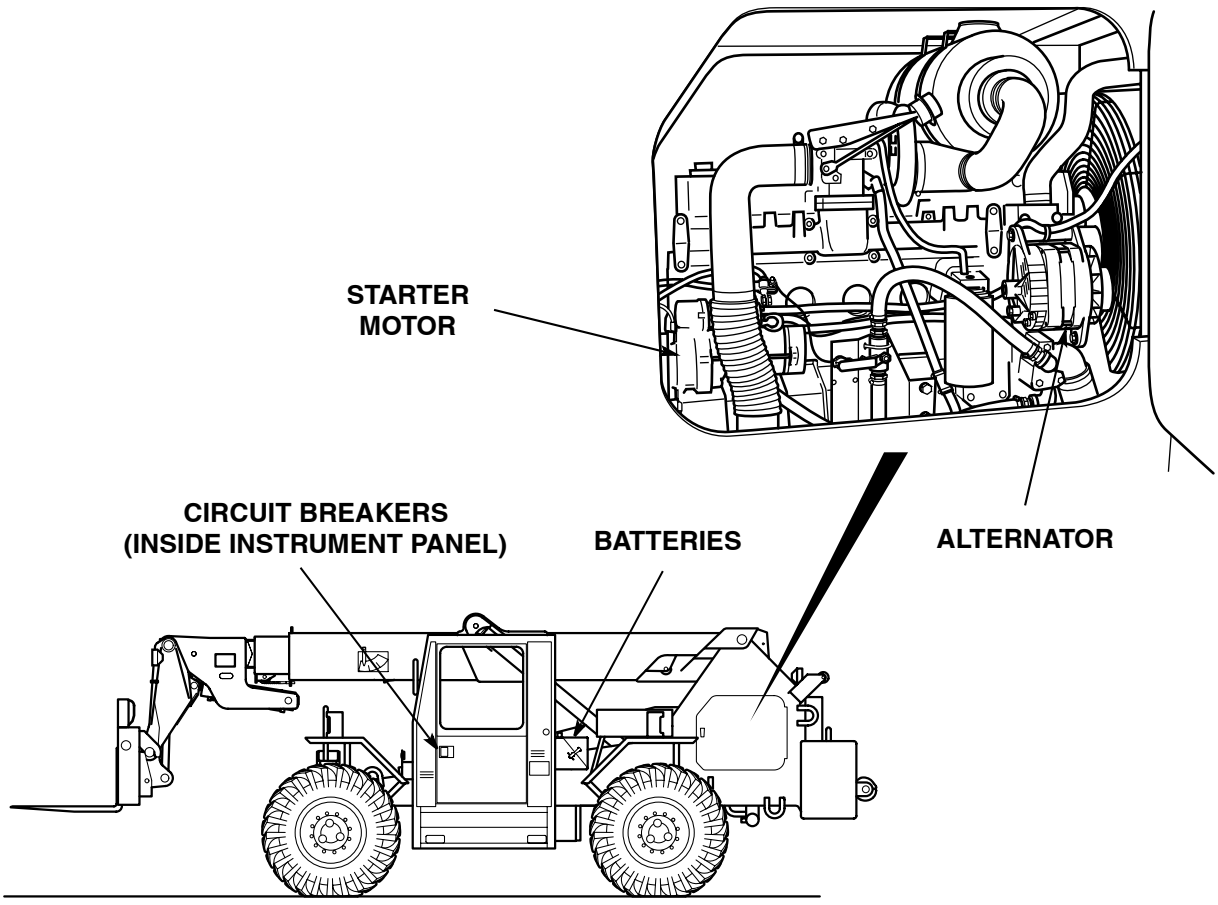
Item	Description
Transmission Oil Filter	Located on vehicle right side, just above the boom hoist cylinder on the engine bulkhead. Removes particles in the oil which could damage internal components of the transmission. A pump inside the transmission produces oil flow through the filter, transmission, and oil cooler.
Transmission Oil Cooler	Located in the bottom of the radiator. Oil is drawn through the cooler by the transmission. Coolant from the radiator is circulated across the cooler to lower transmission oil temperature.

1-20. STEERING AND BRAKE SYSTEM



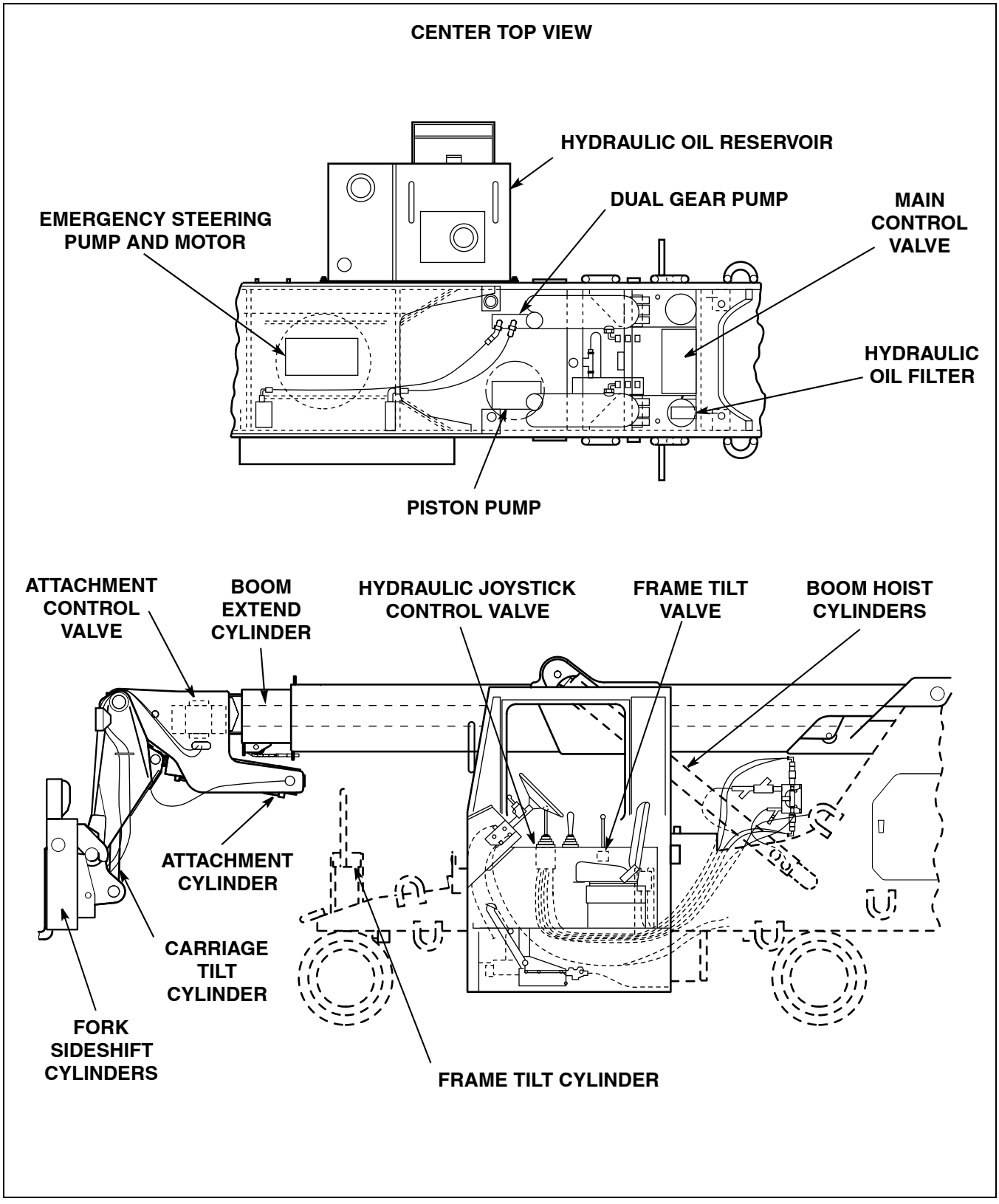
Item	Description
Steering Cylinders	A steering cylinder is mounted at both ends of each axle and controlled by the steering wheel.
Steering Control Valve	Connected directly to the steering wheel and located behind the instrument access panel. Controls the steering function by directing the flow of hydraulic fluid to the cylinders.
Steer Select Valve	Mounted in the frame. Allows the selection of two wheel, four wheel, or crab steering through the steer select control, a three position switch.
Brake Control Valve	Located under the cab. Provides a priority flow to the brake system. Excess flow is directed by the priority valve to the frame tilt system.
Service Brakes	Dry disc, caliper type brakes are mounted on all four wheels. Brakes are hydraulically actuated by pressing the brake or transmission disconnect pedals. An accumulator in the braking system enables a limited number of stops without engine power.
Parking Brake	A spring applied and hydraulically released dry disc brake mounted on the input shaft at the front axle. A switch in the cab engages and disengages the parking brake.
Parking Brake Valve	Mounted on frame cross piece. Controls application/release of hydraulic fluid pressure to the parking brake.

1-21. ELECTRICAL SYSTEM



Item	Description
Batteries	Provide power for the electrical circuits. Two 12 volt batteries are connected in series to provide starting power.
Alternator	The 24 volt, 70 amp alternator, an integral part of the charging circuit, provides current to charge the batteries when the engine is running.
Starter Motor	Part of the starting circuit, the starter motor is used to turn the engine flywheel fast enough to start the engine.
Circuit Breakers	Located inside instrument panel. Switches that open the battery circuit if there is a shorted, grounded wire or excessive current draw by a defective component in the corresponding circuit. When the circuit is open, no current will flow through the electrical system. Circuit breakers will automatically reset once they cool. If a breaker continually trips, the electrical system requires repair.

1-22. HYDRAULIC SYSTEM



Item	Description
Hydraulic Oil Reservoir	Contains oil for the entire hydraulic system.
Hydraulic Oil Filter	Removes smaller harmful particles from the oil before the oil returns to the reservoir.
Main Control Valve	Located on the engine compartment bulkhead of the main frame (near back of transmission). Operated by the hydraulic joystick control valve to control: boom hoist/ lower and extend/retract.
Attachment Control Valve	Mounted on the attachment and controlled by an electrical joystick. Controls the three attachment functions: hoist/lowering, fork tilt, and fork sideshift.
Frame Tilt Valve	Mounted inside the console located to the right of the operator's seat. Controls the tilting of the vehicle frame. Operated by frame tilt control lever.
Hydraulic Joystick Control Valve	Located on the side console in the cab. Controls the following boom functions: raise, lower. extend, and retract.
Dual Gear Pump	Mounted to and driven by the transmission to supply hydraulic oil flow. This two section pump supplies hydraulic fluid for the following functions: boom hoist, boom extend, steering, brakes, and frame tilt.
Piston Pump	Mounted to and driven by the transmission. This pump supplies hydraulic fluid for the following functions: attachment hoist, fork tilt, left and right fork control, and side shift control.
Emergency Steering Pump and Motor	Located in the vehicle frame forward of the transmission. Supplies 5 gpm of emergency flow to the steering system whenever the starter-run control switch is on and there is a loss of hydraulic oil pressure. The pump is driven by an electric motor.
Fork Sideshift Cylinders	Two cylinders controlled by the electric joystick. Both cylinders can be operated at the same time to sideshift forks left or right or move forks together or apart. Cylinders can also be operated individually.
Carriage Tilt Cylinder	Operated by the electric joystick. Moving the lever to the right causes the cylinder to extend and the fork tips to lower. Moving the lever to the left causes cylinder to retract and the fork tips to raise.
Attachment Cylinder	This cylinder is controlled by the attachment control joystick. When the lever is pushed forward, the cylinder will retract. When the lever is pulled back, the cylinder will extend and raise the attachment.
Boom Extend Cylinder	This cylinder is controlled by the hydraulic joystick. Moving the lever to the right extends the cylinder. Moving the lever to the left retracts the cylinder.
Frame Tilt Cylinder	This cylinder is controlled by the frame tilt control joystick. When the lever is moved forward, the cylinder extends and tilts the vehicle to the left. Moving the lever back causes the cylinder to retract and tilt the frame to the right.
Boom Hoist Cylinders	Two cylinders controlled by the boom hoist control joystick. When the lever is moved forward, the cylinders retract and the boom lowers. Moving the lever backward causes the cylinders to extend and the boom to raise.

CHAPTER 2
UNIT MAINTENANCE INSTRUCTIONS

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

2-1. COMMON TOOLS AND EQUIPMENT

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

2-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

For authorized special tools, TMDE and support equipment refer to the RPSTL and maintenance allocation chart (Appendix B) pertaining to organizational maintenance for this equipment.

2-3. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list (RPSTL) TM 10-3930-673-24P covering organizational maintenance for this equipment.

Section II. SERVICE UPON RECEIPT

2-4. SERVICE UPON RECEIPT OF MATERIEL

a. Remove any plastic tape, wrapping paper or any other shipping and protective items.

WARNING

Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is l38° F (58° C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.

b. Clean any exposed metal parts coated with rust preventive compound. Remove compound with cleaning solvent.

c. Read and follow all instructions contained in DD Form 1397 attached to the ATLAS.

d. Inspect equipment for damage incurred during shipping. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

e. Check equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with DA Pam 738-750.

f. Clean all exterior surfaces.

g. Touch up any paint scratches.

2-5. PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT

a. Perform the operator preventive maintenance checks and services (PMCS) contained in TM 10-3930-673-l0.

b. Perform the organizational preventive maintenance checks and services (PMCS) contained in Table 2-1.

c. Lubricate all points as shown in the TM 10-3930-673-l0 PMCS and the TM 10-3930-673-20 PMCS regardless of interval.

d. Schedule the next preventive maintenance checks and services (PMCS) on DD Form 314, Preventive Maintenance Schedule and Record.

e. Report all deficiencies on DA Form 2407 if the deficiencies appear to involve unsatisfactory design.

f. Check that all decals and plates are on vehicle.

g. Make sure vehicle is ready for operation; remove all warning tags.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-6. GENERAL

To make sure that your vehicle is ready for operation at all times, inspect it systematically so that you can discover any defects and have them corrected before they result in serious damage or failure. The charts on the next few pages contain your unit PMCS. The item numbers indicate the sequence of minimum inspection requirements. If you're operating the vehicle and notice something wrong which could damage the equipment if you continue operation, stop operation immediately.

Record all deficiencies and shortcomings, along with the corrective action taken, on DA Form 2404. The Item Number column is the source for the numbers used on the TM Number column on DA Form 2404.

2-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. The item numbers of the table indicate the sequence of PMCS. Perform at intervals shown below:

(1) Do your (W) PREVENTIVE MAINTENANCE weekly.

(2) Do your (Q) PREVENTIVE MAINTENANCE quarterly (every three months).

(3) Do your (S) PREVENTIVE MAINTENANCE semiannually (every six months).

(4) Do your (A) PREVENTIVE MAINTENANCE annually (once every year).

b. If something doesn't work, troubleshoot it according to the instructions in this manual or notify your supervisor.

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

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

WARNING

- Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is l38° F (58° C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.

- Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personnel protective equipment (goggles/shield/ gloves, etc.) or injury to personnel could result.

(1) Keep it clean: Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent to clean metal surfaces. Use soap and water when you clean rubber or plastic material.

2-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONT)

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

(3) Welds: Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to Direct Support.

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

(5) Hoses and fluid lines: Look for wear, damage and leaks. Make sure clamps and fittings are tight. Wet spots show leaks, or course, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten the fitting or connector. If something is broken or worn out, either correct it or report it to Direct Support Maintenance (see Maintenance Allocation Chart, Appendix B).

2-8. LEAKAGE DEFINITIONS FOR UNIT PMCS

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

LEAKAGE DEFINITIONS FOR UNIT PMCS

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

CAUTION

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

NOTE

Change the interval if your lubricants/elements are contaminated or if you are operating the equipment under adverse operating conditions, including longer-than-usual operating hours.

2-9. LUBRICATION INSTRUCTIONS

a. Lubrication instructions are contained in the PMCS table. All lubrication instructions are mandatory.

b. Engine and Transmission oil must be sampled at 50 hours of operation or 90 days, whichever occurs first, for Active Army Units. Reserve and National Guard activities will use 50 hours or 180 days, whichever occurs first, as prescribed interval. Hydraulic fluid will be sampled once a year. Sampling will be performed as prescribed by DA PAM 738-750.

2-10. PMCS COLUMN DESCRIPTION

a. Item Number - The order that PMCS should be performed, and also used as a source of item numbers for the TM Number column on DA Form 5988-E Equipment Inspection and Maintenance (Electronic) worksheet when recording results of PMCS.

b. Interval - Tells when each check is to be performed.

c. Item To Be Inspected - Lists the checks to be performed.

d. Procedures - Description of the procedure by which the check is to be performed.

e. During adverse weather or abnormal dusty conditions, lubrication may require daily servicing.

f. Lubricate axles, steering gear, propeller shafts, and towing pintle after fording operations.

NOTE

Perform Operator PMCS prior to or in conjunction with Organizational PMCS if:

- There is a delay between the daily operation and the Organizational PMCS.
- Regular operator is not assisting/participating.

2-10.1 PMCS INITIAL SETUP

a. General - This paragraph lists tools, materials, and personnel required for Organizational PMCS and lubrication.

b. Tools.

(1) Shop equipment, common no. 1

(2) Tool kit, general mechanic's

c. Materials.

(1) Antifreeze

(2) Grease, GAA

(3) Oil, lubricating, OE/HDO-10, OE/HDO-15/40, OEA

(4) Oil lubricating, gear, GO-80/90

(5) Rags, wiping

d. Personnel.

(1) Driver/operator

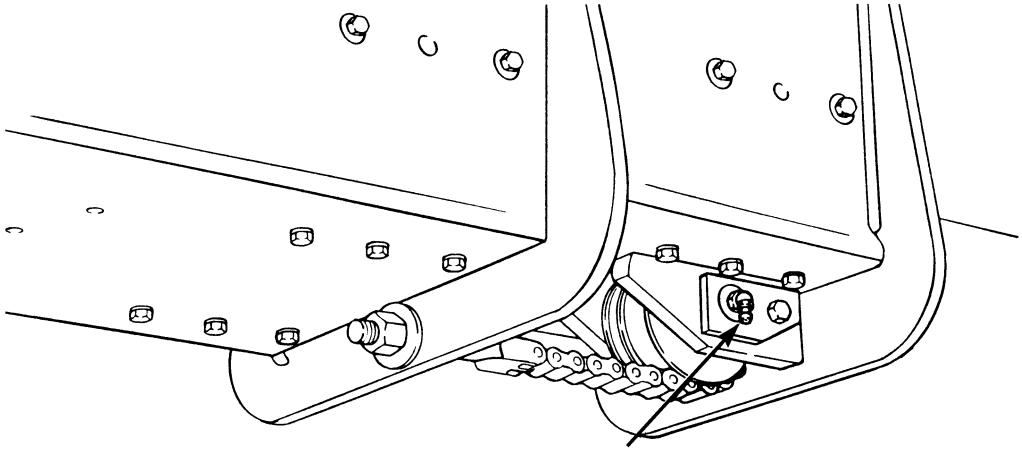
(2) Mechanic

Table 2-1. Unit Preventive Maintenance Checks and Services

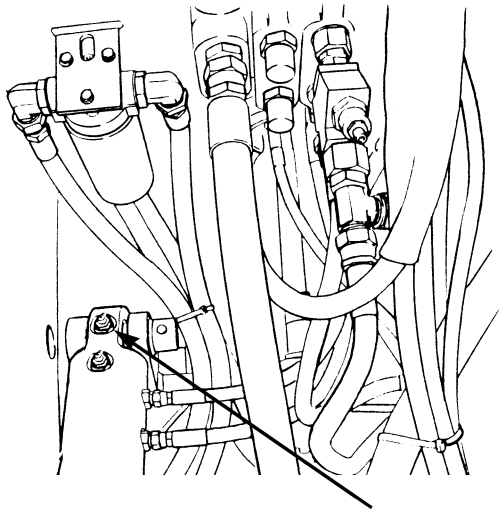
Item No.	Interval	Location Item to Check/ Service	Procedure
			CAUTION The following new vehicle (break-in) maintenance is required on the ATLAS to prevent damage to the equipment and maintain the warranty. THE FOLLOWING ITEMS MUST BE CHANGED AFTER THE FIRST 20 HOURS OF OPERATION: – Transmission oil and transmission oil filter element (refer to Para 9-6). THE FOLLOWING ITEMS MUST BE CHANGED AFTER THE FIRST 50 HOURS OF OPERATION: – Planetary gear oil (refer to Para 11-3). – Differential oil (refer to Para 11-2). – Hydraulic oil filter element (refer to Para 18-27). – Engine oil and engine oil filter element (refer to Para 4-2). THE FOLLOWING ITEMS MUST BE CHECKED AND ADJUSTED IF NECESSARY AFTER THE FIRST 100 HOURS OF OPERATION: – Boom electrical cable tension (refer to Para 18-24). – Boom hydraulic hose tension (refer to Para 18-24).

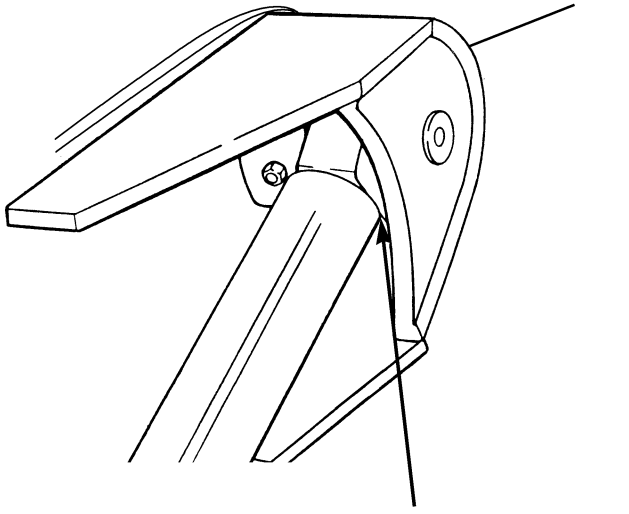
Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

Item No.	Interval	Location Item to Check/ Service	Procedure
1		Boom Assembly Front	



	Quarterly		Lubricate boom retract chain sheave with GAA as required.





	Weekly		Lubricate boom hoist cylinder pins (4 places) with GAA as required. Raise boom to approximately 15° for access.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

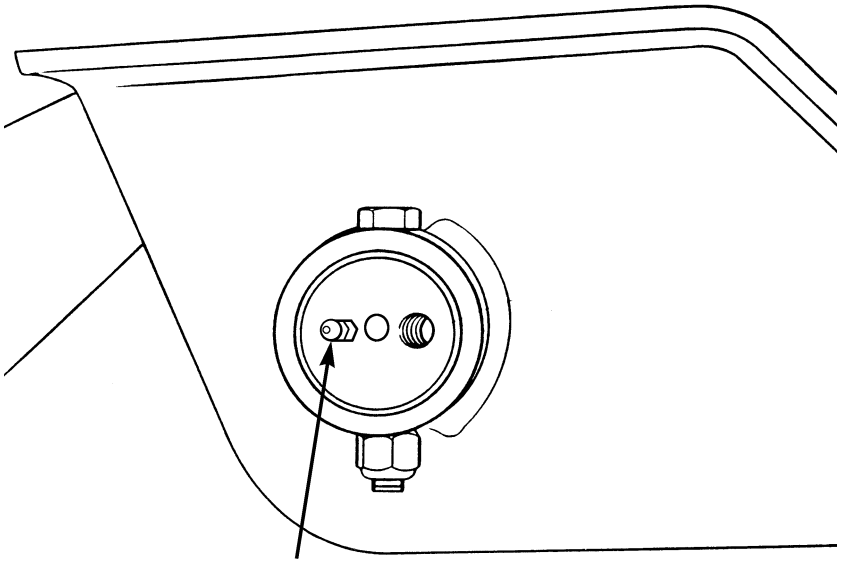
Item No.	Interval	Location Item to Check/ Service	Procedure
		 LUBE POINTS (GAA) (2 PLACES)	
	Quarterly		Lubricate boom pivot pins (2 places) with GAA as required.
2		Boom Chain	Check boom chain tension. With the boom fully extended in a horizontal position, measure the retract chain sag at the middle of the intermediate boom section. Chain sag should be approximately 3-1/4 to 3-1/2 inches from the top of the chain to the bottom of the boom. Refer to Para 18-23 if chain requires adjustment.
3	Quarterly	Boom Electrical Cable and Hydraulic Hoses	Check cable and hose adjustment. Refer to Para 18-24 for adjustment procedures.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

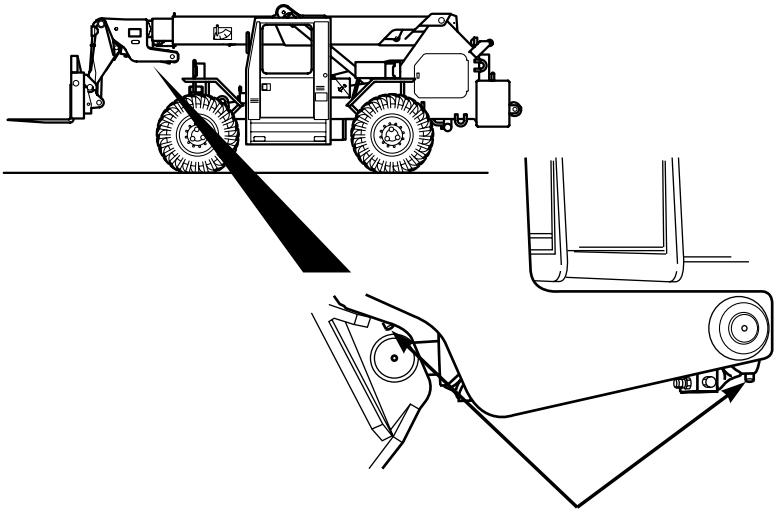
Item No.	Interval	Location Item to Check/ Service	Procedure
4		Boom Hoist and Attachment	
		 **LUBE POINTS (GAA) (2 PLACES)**	
	Weekly		Lubricate daily during periods of high cycling or high loading. Lubricate hoist cylinder pivot pins (2 places) with GAA as required.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

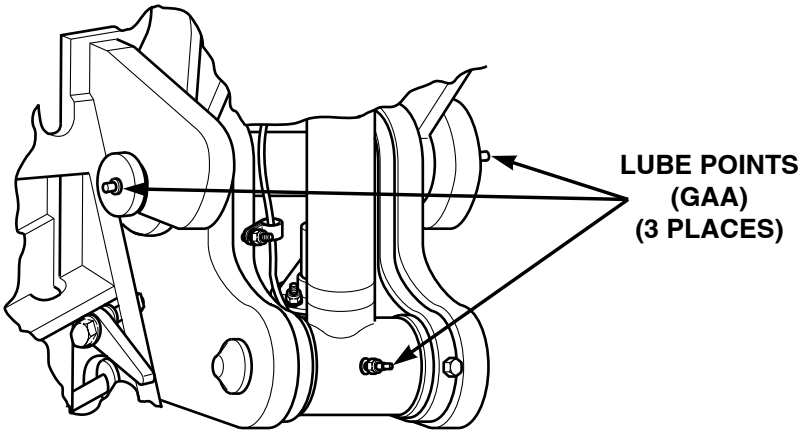
Item No.	Interval	Location Item to Check/ Service	Procedure
			
	Weekly		Do not stand under the attachment and carriage assembly during lubrication servicing. Failure to comply may result in serious injury or death to personnel. Lubricate daily during periods of high cycling or high loading. Lubricate carriage tilt cylinder rod end pin with GAA as required. To access carriage lube points and tilt cylinder lower points, raise fork assembly 48 inches (122 cm) and tilt carriage assembly forward 90°. To access tilt cylinder rod end pin, place level fork/carriage assembly firmly on the ground.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

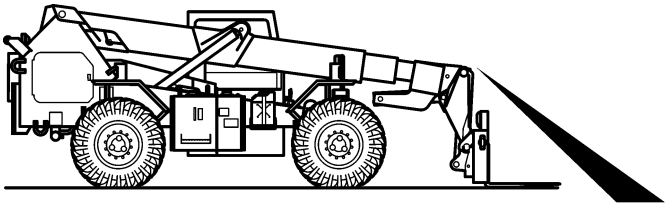
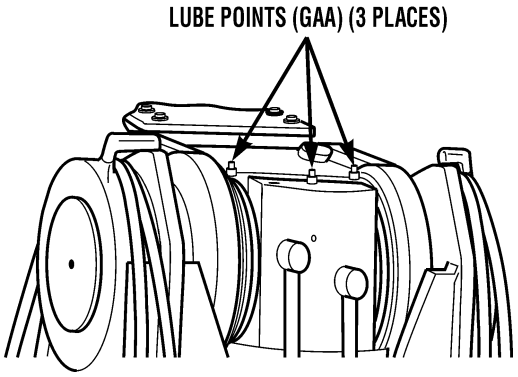
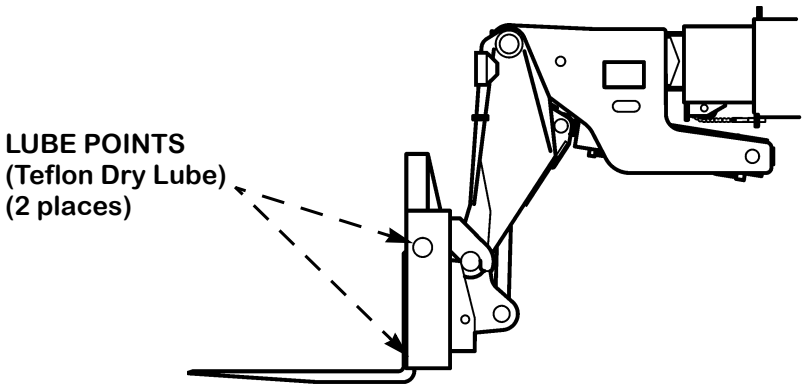
Item No.	Interval	Location Item to Check/ Service	Procedure
		 	
			Lubricate daily during periods of high cycling or high loading.
	Weekly		Lubricate attachment pivot pin with GAA as required.
			
4.1	Weekly	Fork Shaft and Fork Wear Pad Sliding Surface	Clean and lubricate as follows: a. Wipe exposed area of fork shaft and sliding surface of two wear pads with clean cloth. Use nylon bristle brush to remove any corrosion or dirt build-up. b. Apply light coat of teflon dry lube (Item 15.1, Appendix C). to fork shaft and wear pad sliding surface. c. Move forks left or right to expose remaining area of fork shaft. d. Apply dry lube to exposed area.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

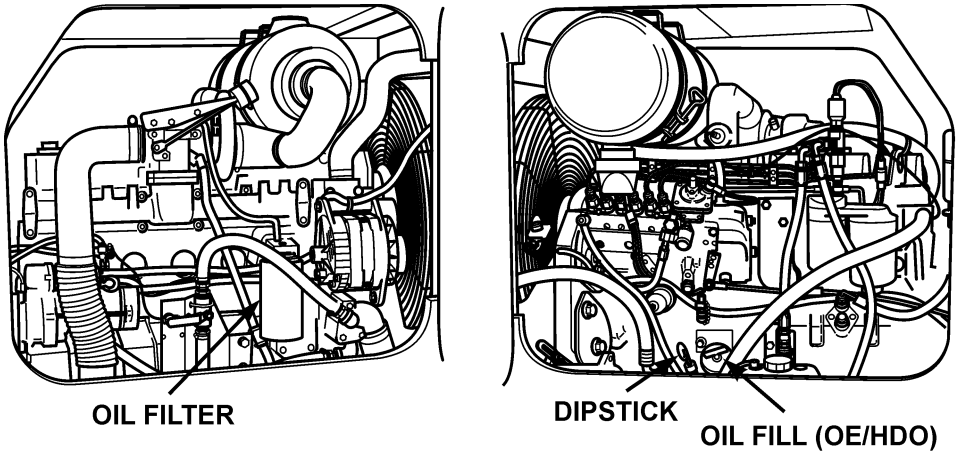
Item No.	Interval	Location Item to Check/ Service	Procedure
			e. Move forks fully left and right several times. f. Apply another light coat of teflon dry lube to fork shaft and wear pad sliding surface.
5	Quarterly	Wear Pad Screws	Check for loose, missing, bent or broken wear pad screws. Refer to Para 18-16 for correct tightening procedure.
		Fork Bushings and Wear Pads	Check fork bushings and wear pads for excessive wear and obvious damage. Replace wear pads when worn to less than 3/8 of an inch. Refer to Para 18-17 for replacement instructions.
6		Engine Assembly	
			
	Quarterly		Change engine oil based on the Army Oil Analysis Program (AOAP).
	Semiannually		Check engine drive belt for wear. Firmly press the belt midway between its longest span. Maximum deflection should be 3/8 to 1/2 inch. If drive belt is worn or stretched, refer to Para 7-9 for drive belt replacement. Drive belt tension is not adjustable.
7	Semiannually	Engine Mounts	Check engine mounts for cracks, deterioration and damage.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

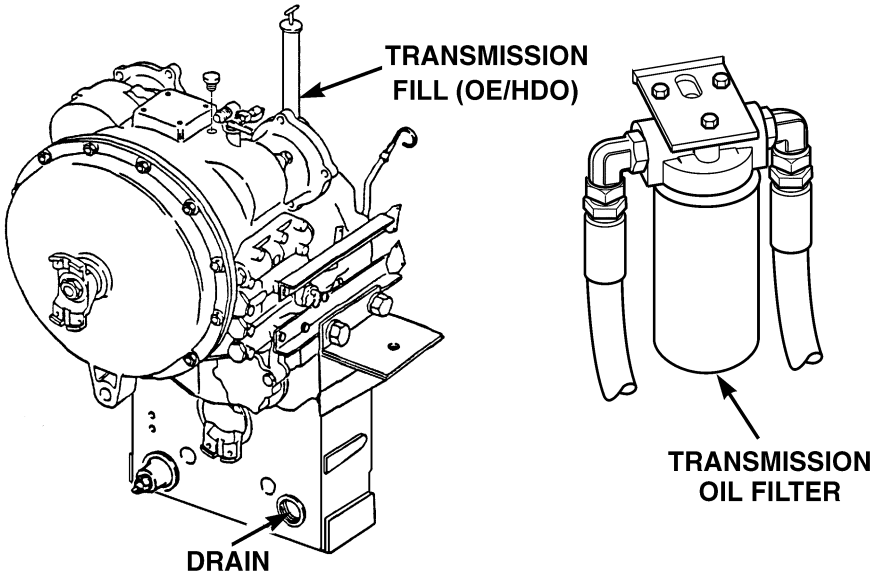
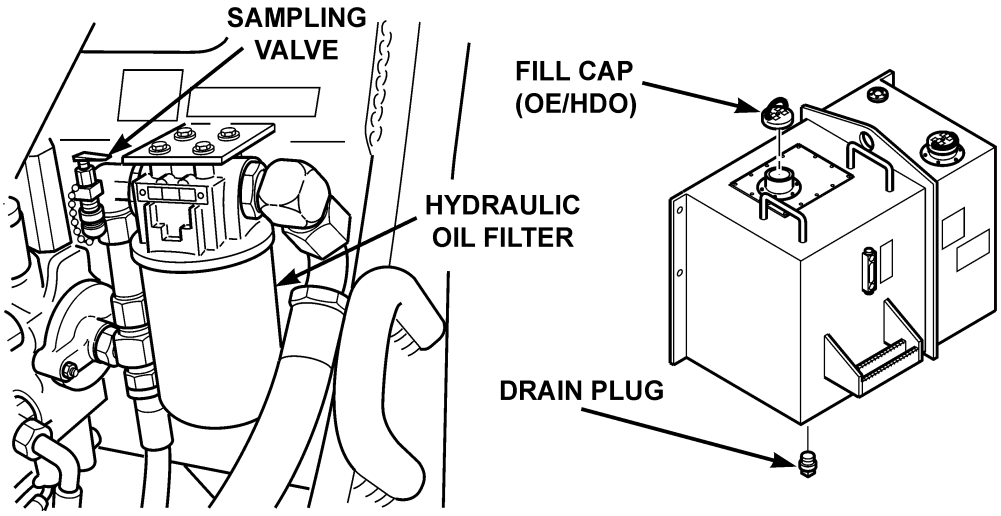
Item No.	Interval	Location Item to Check/ Service	Procedure
8		Transmission and Hydraulic System	
			
	Semiannually		Change transmission oil.
			
	Annually		Change hydraulic system oil and hydraulic oil filter every 1000 hours of operation. Refer to Para 18-27 for filter procedure and Table 2-2 for oil SAE by expected temperature.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

Item No.	Interval	Location Item to Check/ Service	Procedure
9	Daily	Batteries	**WARNING** Do not smoke or allow any flame or spark in the vicinity while checking or filling the batteries. The batteries generate hydrogen gas, a highly explosive gas. Severe personal injury could result.
	Daily		Test batteries to determine cell condition. Replace or add electrolyte (if necessary) and recharge. Refer to TM 9-6l40-200-l4.
10		Service Brakes	
	Weekly		Lubricate brake pedal and transmission disconnect pedal countershaft with GAA as required. Lubrication points are under cab.
	Quarterly		Check brake pads for wear. Pads should not be allowed to wear below 1/8 inch in thickness. Refer to Para 12-5 for wear pad replacement procedures.
	Quarterly		Check brake rotors for grooves, discoloration, cracks, and warpage.

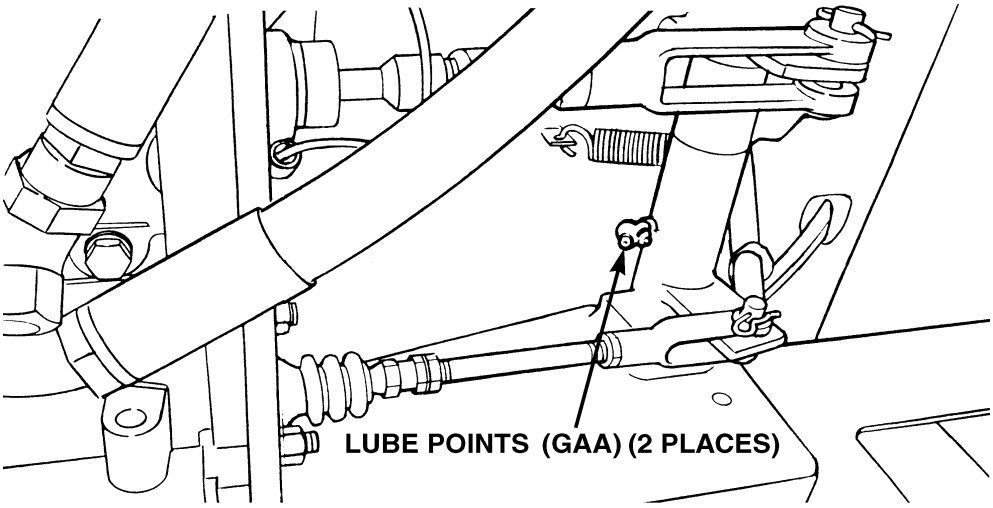


Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

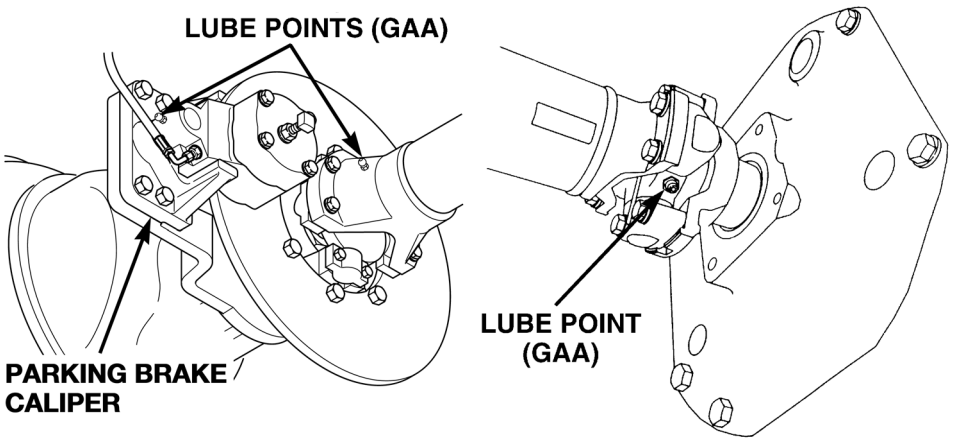
Item No.	Interval	Location Item to Check/ Service	Procedure
11		Propeller Shafts	**WARNING** Care must be exercised when lubricating front propeller U-joint and parking brake. Over lubrication could result in grease on the parking brake rotor and/or parking brake linings which could cause the brake to slip. Death or bodily injury to personnel could result.
			
	Semiannually		Lubricate front propeller shaft slip joint and u-joints (3 places) with GAA as required. Lubricate parking brake with GAA as required.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

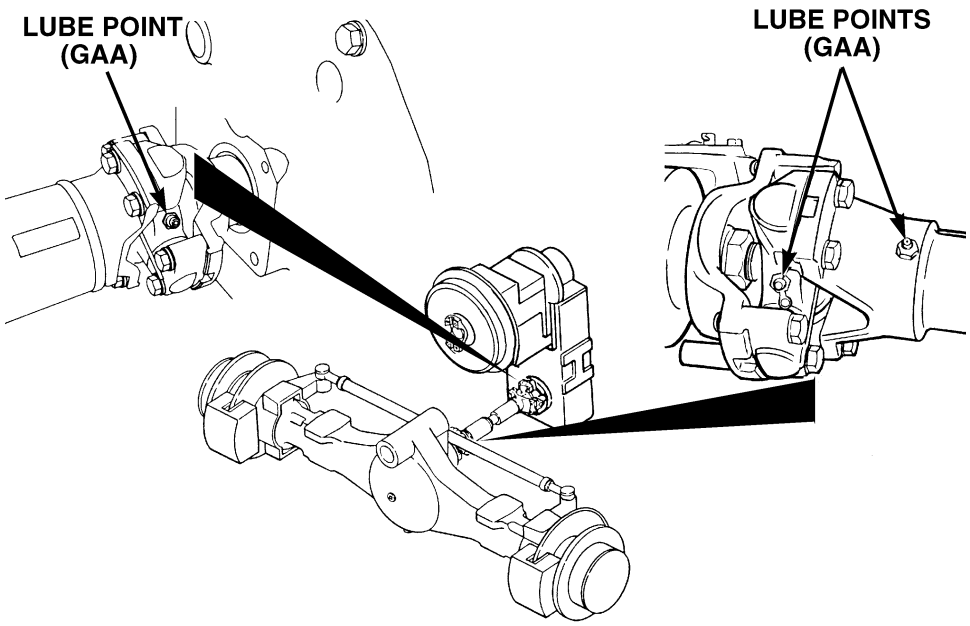
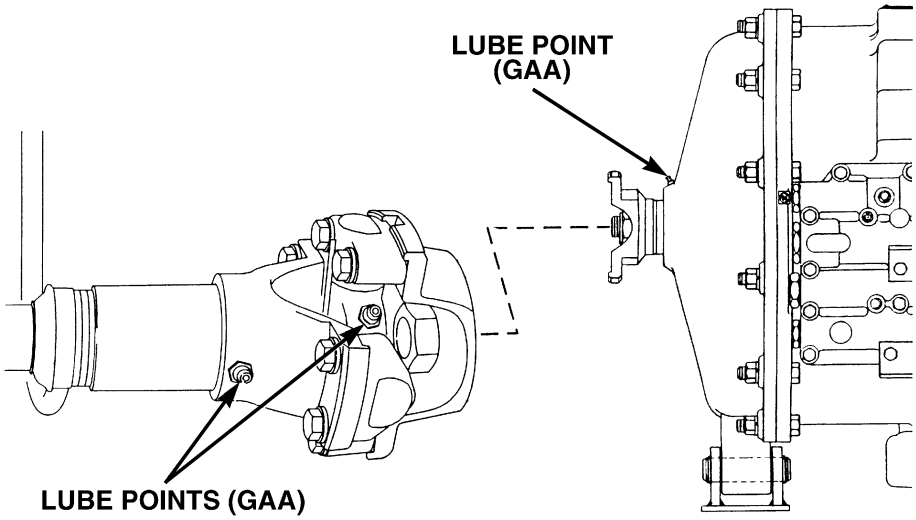
Item No.	Interval	Location Item to Check/ Service	Procedure
			
			Lubricate rear propeller shaft slip joint and u-joints (3 places) with GAA as required.
			
	Quarterly		Lubricate transmission input shaft bearing, slip joint, and u-joint (3 places) with GAA as required.
	Quarterly		Check all propeller shaft universal joints for excessive vibration or noise. Refer to Para 10-2 for replacement procedures.
12		Boom Assembly Rear	

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

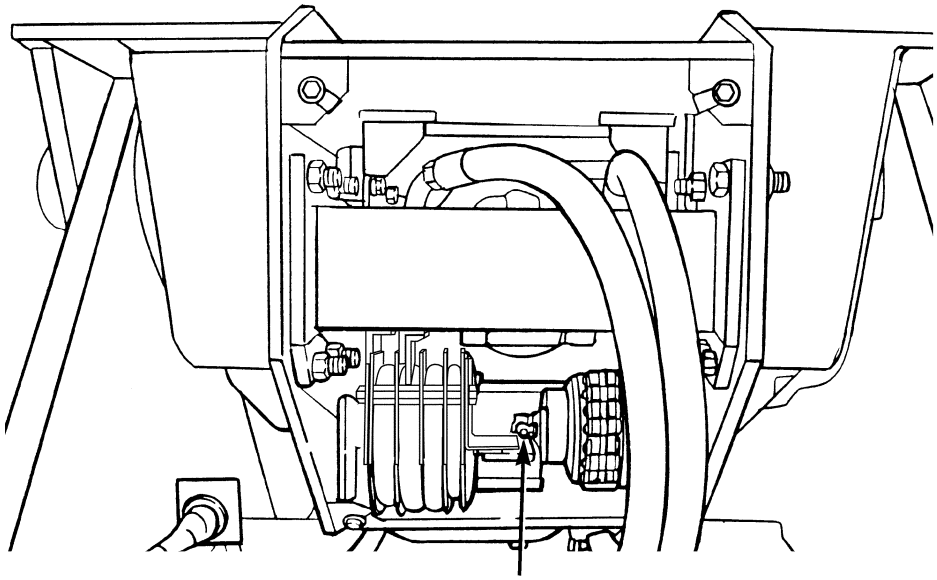
Item No.	Interval	Location Item to Check/ Service	Procedure
		 LUBE POINT (GAA)	
	Quarterly		Lubricate boom extend chain sheave with GAA as required.
	Semiannually		Remove rear boom cover and check all visible boom wear pads (front and rear). Refer to Para 18-20 for inspection procedures.
13	Annually	Truck, Forklift	Perform annual safety inspection in accordance with TB 43-0142, Safety Inspection and Testing of Lifting Devices.
14	Quarterly	Coolant Mixture Check	Check for 50-50 mix of ethylene glycol and clean water. Refer to MIL-A-46153. If necessary, drain and refill engine cooling system. Refer to Para 7-2.
15	Semiannually	Fuel Filters	Replace primary and secondary engine fuel filters. Refer to Para 5-15.
16	Weekly	Wheels and Tires	Check wheel nuts for proper torque (330 +/- 5 lb-ft [637.2 +/- 7 Nm]). Check tires for proper inflation pressures (front tires: 65 psi, rear tires 65 psi).
17		Axle Carrier	

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

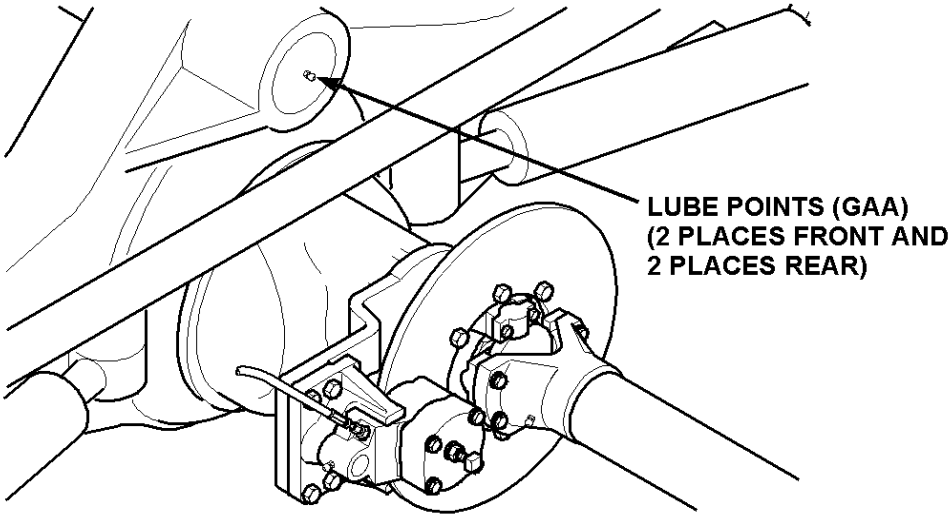
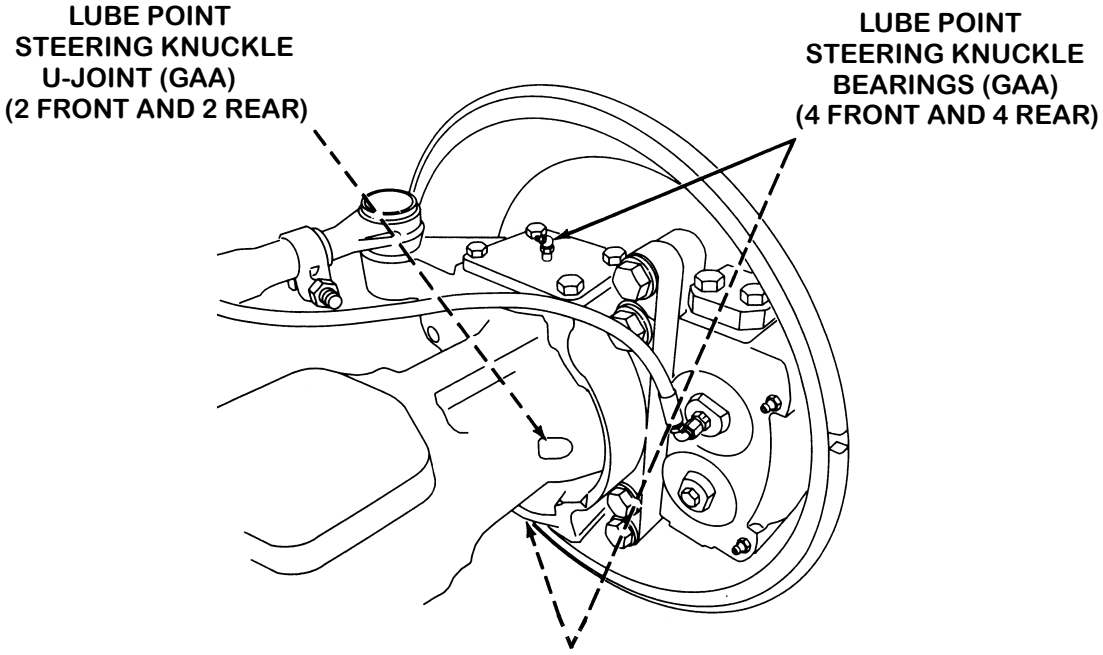
Item No.	Interval	Location Item to Check/ Service	Procedure
			
	Weekly		Lubricate axle carrier pins (2 front and 2 rear) with GAA as required.
			
	Quarterly		Lubricate steering knuckle bearing and u-joint (6 front and 6 rear) with GAA as required. Vehicle may have to be moved forward or backward to align grease fitting with access hole. If fitting is aligned with access hole but grease gun will not go on fitting, turn wheels right or left until grease gun fits.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

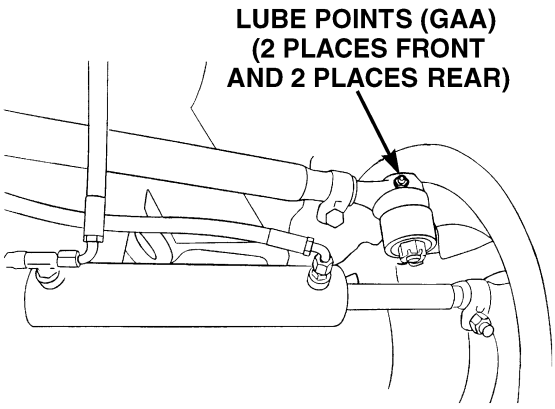
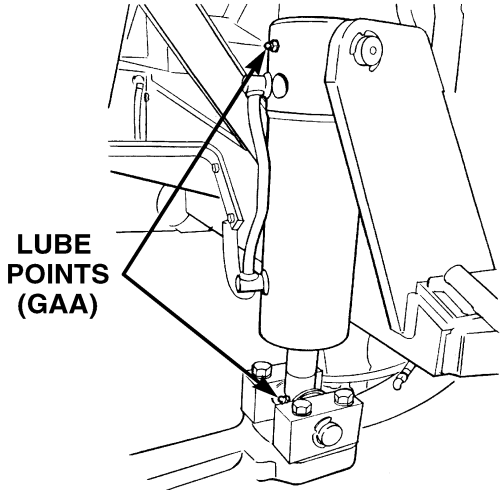
Item No.	Interval	Location Item to Check/ Service	Procedure
			
	Weekly		Lubricate tie rod ends (4 places) with GAA as required.
			
	Weekly		Lubricate frame tilt cylinder pins (2 places) with GAA as required.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

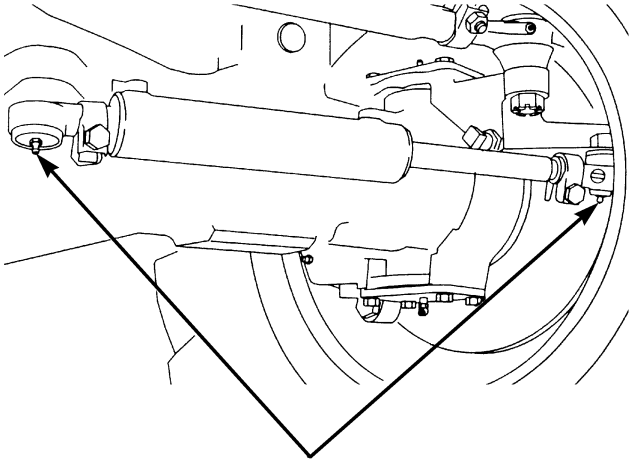
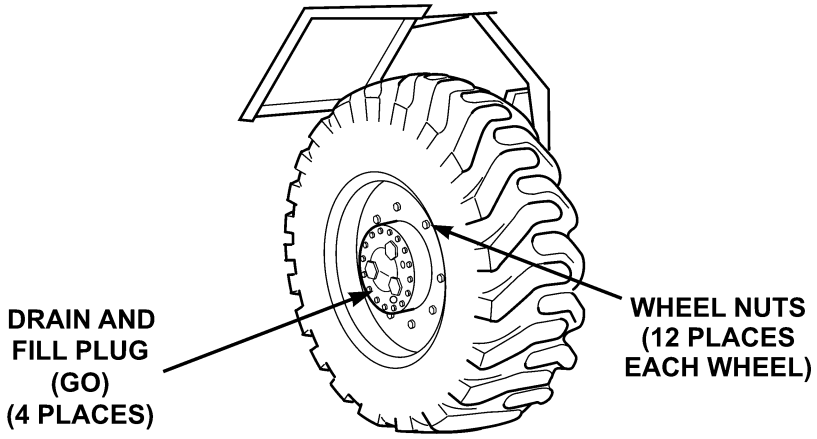
Item No.	Interval	Location Item to Check/ Service	Procedure
			 LUBE POINTS (GAA) (8 PLACES)
	Weekly		Lubricate steering cylinders (4 front and 4 rear) with GAA as required.
			 DRAIN AND FILL PLUG (GO) (4 PLACES) WHEEL NUTS (12 PLACES EACH WHEEL)
	Quarterly		Lubricate planetary hubs (4 places). Refer to Table 2-2 for oil SAE by expected temperature.
	Quarterly	Wheel Nuts	Ensure all wheel nuts are installed and tightened to correct torque value of 330+/- 5 lb-ft (637.2 +/-7 Nm).

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

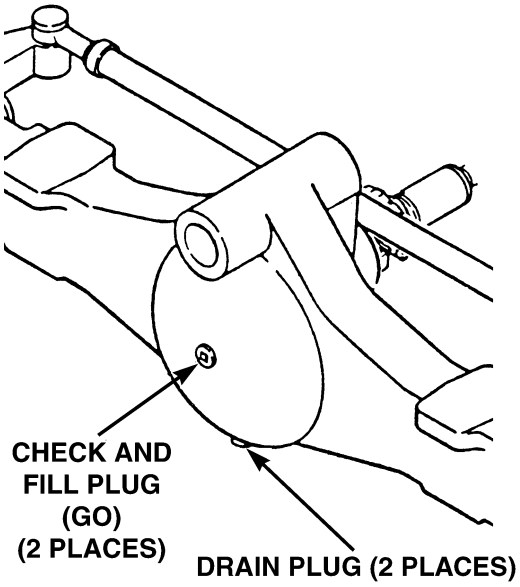
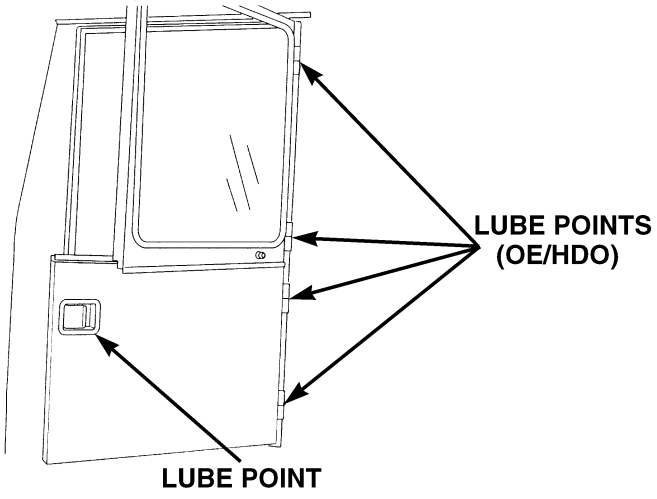
Item No.	Interval	Location Item to Check/ Service	Procedure
			
	Quarterly		Lubricate differential (front and rear). Check oil levels while vehicle is level. Oil should be to bottom of check and fill hole. Refer to Para 11-2 for procedure and Table 2-2 for oil SAE by expected temperature.
18		Body/Frame	
			
	Weekly		Lubricate cab door hinges and latches with OE/HDO using a hand oiler as required.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

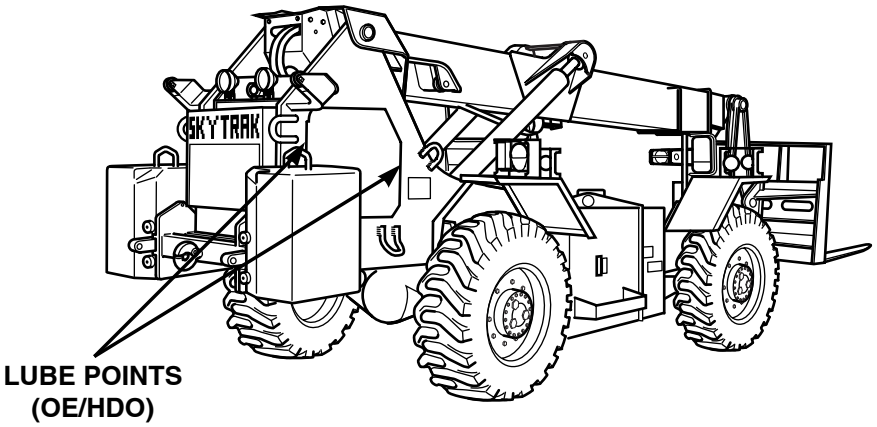
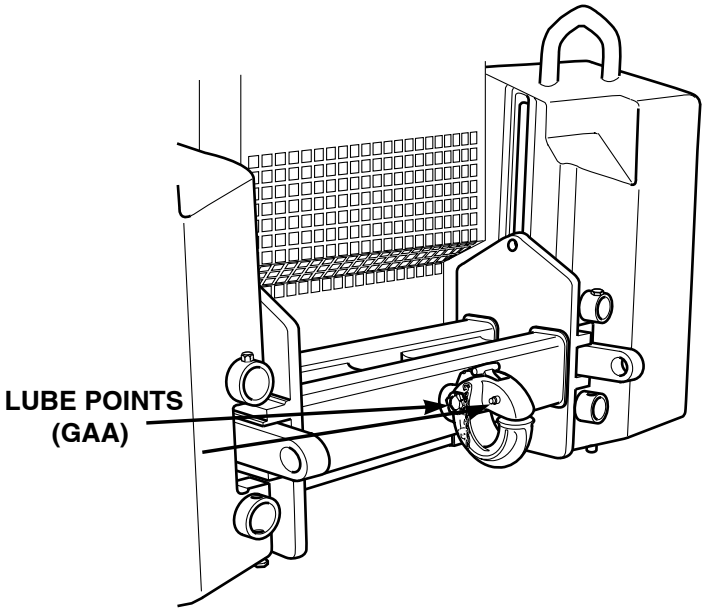
Item No.	Interval	Location Item to Check/ Service	Procedure
		 LUBE POINTS (OE/HDO) (BOTH SIDES)	
	Weekly		Lubricate engine access door hinges and latches with OE/HDO using a hand oiler as required.
		 LUBE POINTS (GAA)	
	Quarterly		Lubricate towing pintle with GAA (2 places) as required.

Table 2-1. Unit Preventive Maintenance Checks and Services (Continued)

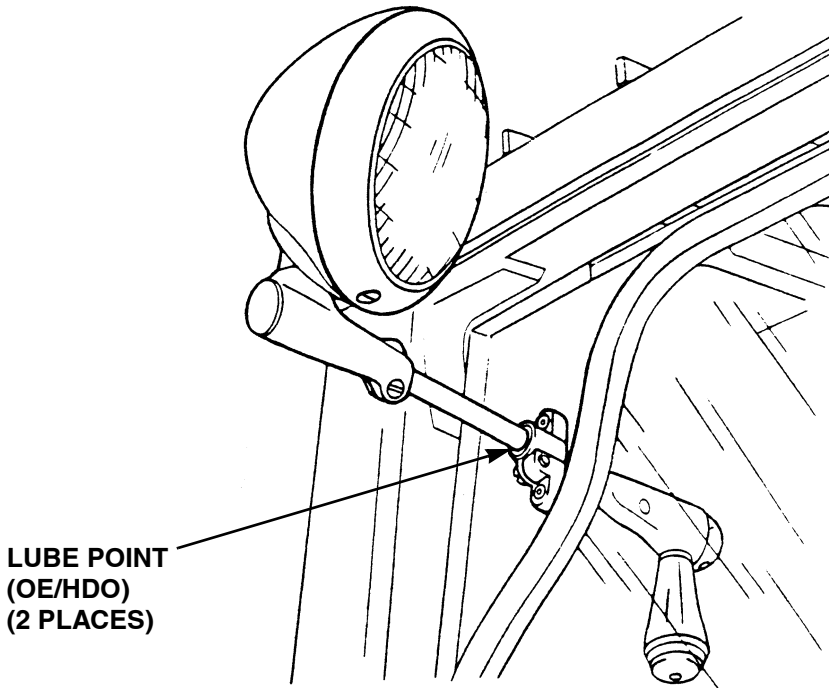
Item No.	Interval	Location Item to Check/ Service	Procedure
			
	Quarterly		Lubricate shaft and bushing of each of two spotlights with OE/HDO using hand oiler as required.

Table 2-2. Lubricating Instructions

KEY								
LUBRICANTS		**CAPACITIES**	**EXPECTED TEMPERATURES**					**INTER-VALS**
			Above –10°F (Above –23°C)	**Below –10°F (Below –23°C)**	**Above +40°F (Above +4°C)**	**Below +40°F (Below +4°C)**		
OE/HDO (MIL-L-2104)	LUBRICATING OIL, Engine						For Arctic Operation Refer to FM 9-207	Intervals given are in hours of normal operation See LO 10-3930-673-12
	Engine Crankcase	15 qt (14 l)			OE/HDO 15/40	OEA		
	Oil Can Points							
	Transmission	5.5 gal (20.8 l)	OE/HDO 10	OEA				
	Transmission Disconnect Master Cylinder	As Req.	OE/HDO 10	OEA				
	Hydraulic System	56.6 gal (214.2 l)			OE/HDO 10	OE/HDO 10		
OEA (MIL-L-46167)	Oil, Engine, Arctic							
GO (MIl-L-2105)	LUBRICATING OIL, Gear, Multipurpose	10.6 qt (10 l) (each)			GO 80/90	GO 80/90		
	Differential							
	Planetary Hubs	2.7 qt (2.6 l) (each)			GO 80/90	GO 80/90		
GAA (MIL-G-10924)	TEFLON DRY LUBE, Fork Shaft and Fork Wear Pad Sliding Surface	As Req.	GAA ALL TEMPERATURES					
	GREASE, Automotive and Artillery Carriage Tilt Cylinder & Carriage Pivot Pins	As Req.						
	MLRS Hoist Cylinder & MLRS Attachment Pivot Pins	As Req.						
	Propeller Shaft Slip Joints & U-Joints	As Req.						
	Tie Rod Ends	As Req.						
	Axle Carrier Pins	As Req.						
	Steering Knuckle Bearings & Joints	As Req.						

Table 2-2. Lubricating Instructions (Continued)

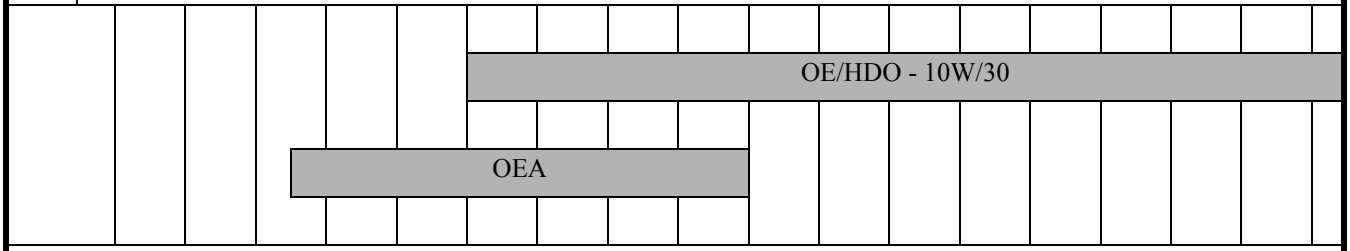
KEY								
LUBRICANTS		CAPACITIES	EXPECTED TEMPERATURES					INTER-VALS
			Above –10°F (Above –23°C)	Below –10°F (Below –23°C)	Above +40°F (Above +4°C)	Below +40°F (Below +4°C)		
	Brake Pedal & Transmission Disconnect Pedal Counter Shaft	As Req.	GAA ALL TEMPERATURES				For Arctic Operation Refer to FM 9-207	
	Transmission Input Shaft Bearing, Slip Joint & U-Joint	As Req.						
	Boom Extend & Boom Retract Chain Sheaves	As Req.						
	Boom Pivot & Boom Hoist Cylinder Pins	As Req.						
	Frame Tilt Cylinder Pins	As Req.						
	Steering Cylinders	As Req.						

NOTES

1. LUBRICATION. During adverse weather or abnormal dusty conditions, lubrication may require daily servicing.
2. The lubricating points for the brake pedal and transmission disconnect pedal counter shaft are located under the cab (GAA).
3. Lubricate all hinges and door latches with a hand oiler (OE/HDO).
4. Check the differential oil levels while vehicle is on a level surface. Oil should be to the bottom of the check and fill hole (GO or GAA).
5. Lubricate after fording operations (GAA).
6. **WARNING – Do not stand under the attachment and carriage assembly during lubrication services.** To lube the carriage lube points and tilt cylinder lower points, raise the fork assembly 48 in. (122 cm) and tilt the carriage assembly forward 90°. To lube the tilt cylinder's head pivot pin, place the level forks/ carriage firmly on the ground (GAA).
7. During adverse weather, dusty or sand conditions, change transmission oil and filter element at 250 hour intervals. For normal off-highway operation, for operation under rapid change in ambient temperature, or for operation in presence of chemical fumes, change at 375 hour intervals. Use MIL-L-2104 hydraulic transmission fluid when operating the vehicle in temperatures above –10°F (–23°C), and MIL-L-46167 transmission fluid when operating in temperatures below –10°F (–23°C).
8. To lube the steering knuckle joint, the vehicle may have to be moved forward or backwards to align grease fitting with access hole. If the fitting is aligned with the access hole but grease gun will not go on fitting, turn the wheels right or left until grease gun fits on grease fitting (GAA).
9. Raise the boom to approximately 15° to lubricate the boom hoist cylinder pins (GAA).
10. Drain hydraulic reservoir every 2000 hours. Change hydraulic oil filter and add oil (OE/HDO) to reservoir until oil is visible in sight gage. Operate hydraulic system and check oil level again.

CHART A. ENGINE

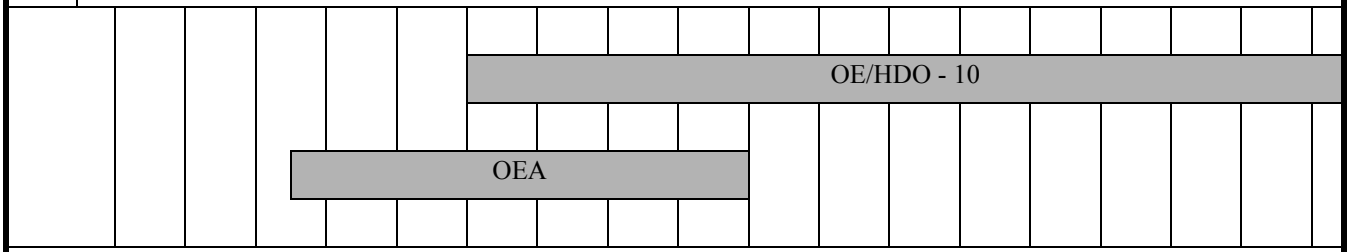
EXPECTED TEMPERATURE																			
°F	–50	–40	–30	–20	–10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	–46	–40	–34	–29	–23	–18	–12	–7	–1	4	10	16	21	27	32	38	43	49



LUBRICANTS: OE/HDO LUBRICATING OIL, ICE, TACTICAL (MIL-L-2104)
OEA LUBRICATING OIL, ICE, ARCTIC (MIL-L-46167) *See Note 2a

CHART B. TRANSMISSION/HYDRAULIC

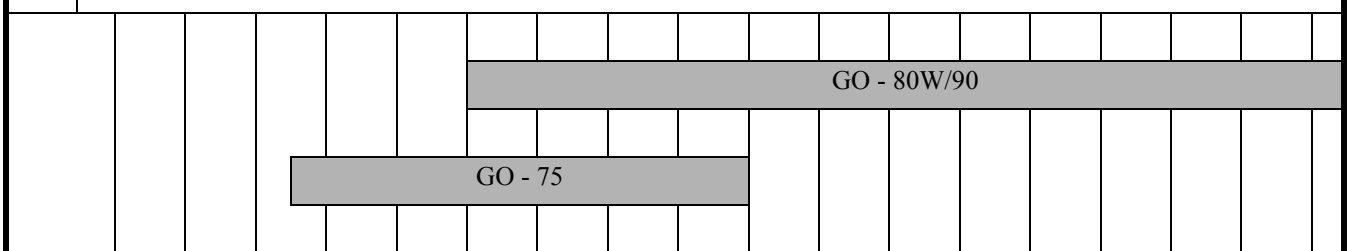
EXPECTED TEMPERATURE																			
°F	–50	–40	–30	–20	–10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	–46	–40	–34	–29	–23	–18	–12	–7	–1	4	10	16	21	27	32	38	43	49



LUBRICANTS: OE/HDO LUBRICATING OIL, ICE, TACTICAL (MIL-L-46152)
*See Notes 3a, 3b, and 3c

CHART C. DIFFERENTIAL

EXPECTED TEMPERATURE																			
°F	–50	–40	–30	–20	–10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	–46	–40	–34	–29	–23	–18	–12	–7	–1	4	10	16	21	27	32	38	43	49



LUBRICANTS: LUBRICATING OIL, GEAR, MULTIPURPOSE (MIL-L-2105)
*See Notes 5a through 5d

LUBRICANT • INTERVAL

ENGINE DOOR HINGES

Lubricate. (O) OE/HDO 50HRS
(See Note 7a)

CAB DOOR HINGES AND LATCHES

Lubricate. (O) OE/HDO 50HRS
(See Note 7a)

FRAME TILT CYLINDERS

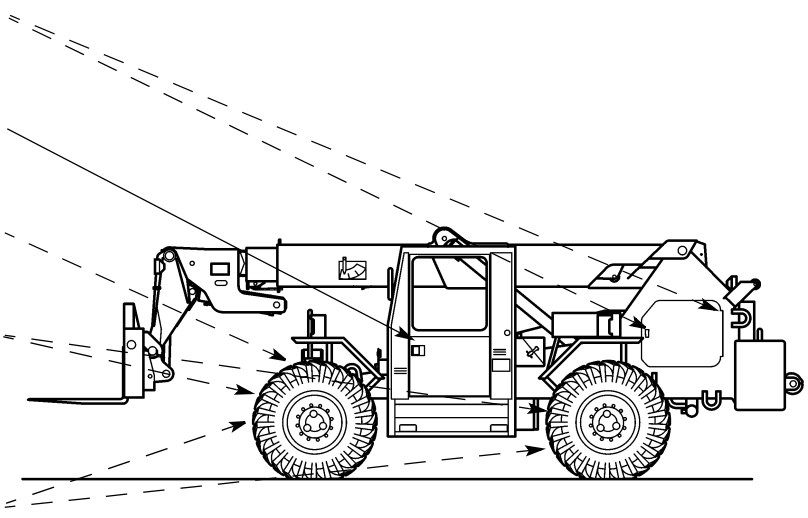
Lubricate. (O) GAA 50HRS
(See Notes 1a and 1c)

STEERING CYLINDER

Lubricate. (O) GAA 50HRS
(See Notes 1a and 6c)
(2 Places, 2 Front and 2 Rear)

TIE ROD ENDS

Lubricate. (O) GAA 50HRS
(See Notes 6b) (4 Places, 2 Front 2 Rear)



ATTACHMENT PIVOT PIN

Lubricate. (O) GAA 50HRS
(See Notes 1a and 1d)

HOIST CYLINDER PIVOT PINS

Lubricate. (O) GAA 50HRS
(See Notes 1a and 1d)

CARRIAGE TILT CYLINDER

Lubricate. (O) GAA 50HRS
(See Note 1c)
(3 Places)

BOOM HOIST CYLINDER PINS

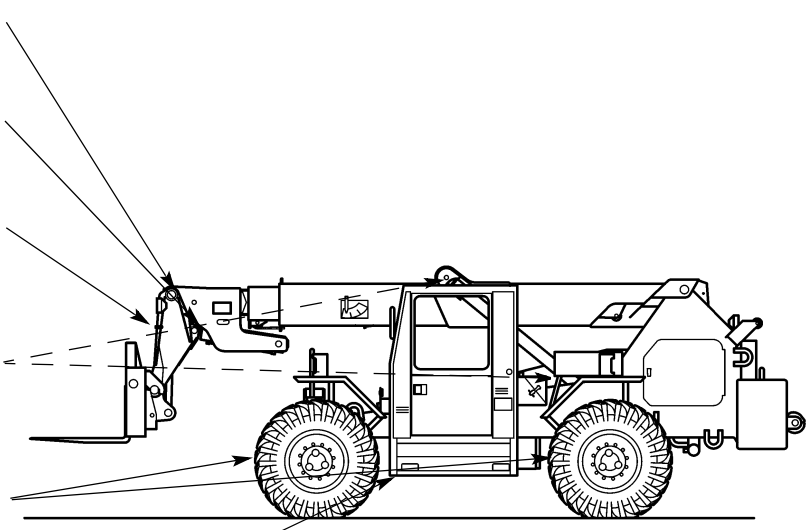
Lubricate. (O) GAA 50HRS
(See Note 1c)
(2 Places)

AXLE CARRIER PINS

Lubricate. (O) GAA 50HRS
(2 Front & 2 Rear)
(See Notes 1a and 1d)

BRAKE PEDAL AND TRANSMISSION DISCONNECT PEDAL

Lubricate. (O) GAA 50HRS
(See Note 7b)



BOOM PIVOT PINS

Lubricate. (O) (2 Places) (See Note 1d) GAA 250HRS

BOOM EXTEND CHAIN SHEAVE

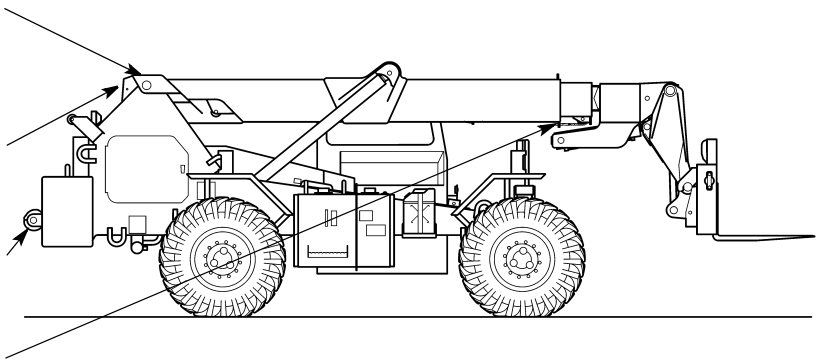
Lubricate. (O) (See Note 1b) GAA 250HRS

TOWING PINTLE

Lubricate. (O) (2 Places) GAA 250HRS

BOOM RETRACT CHAIN SHEAVE

Lubricate. (O) (See Note 1b) GAA 250HRS



PLANETARY WHEEL ENDS

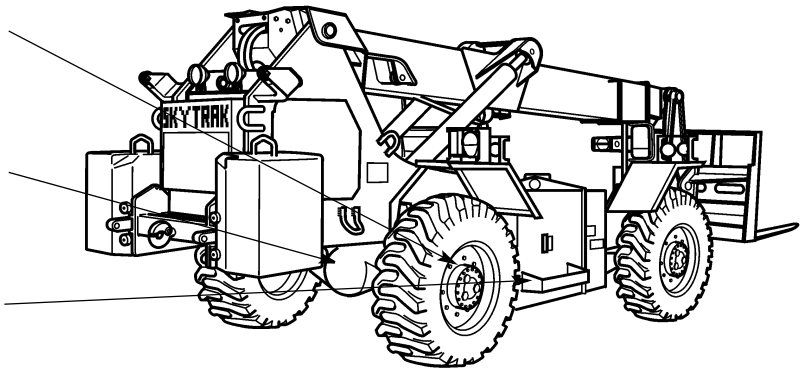
Lubricate. (O) (4 Places) (See Note 5d) 80W90 250HRS

DIFFERENTIAL FRONT AND REAR

Lubricate. (O) (See Note 5a) 80W90 250HRS

HYDRAULIC SYSTEM

Lubricate. (O) (See Notes 8a through 8d) OE/HDO 10 2000HRS



TRANSMISSION AND TRANSMISSION FILTER

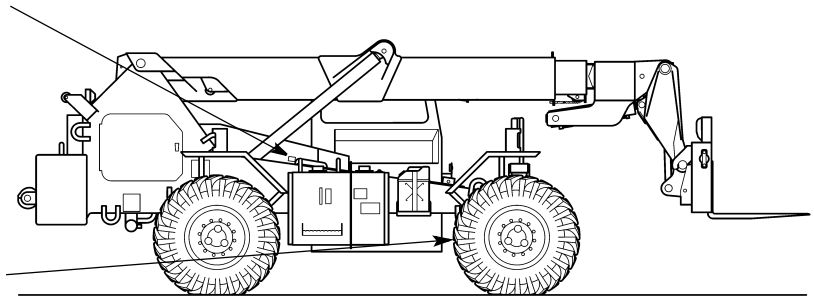
Lubricate. (O) (See Notes 3a, 3b and 3c) OE/HDO 250HRS

TRANSMISSION INPUT SHAFT

Lubricate. (O) (See Note 3d) GAA 250HRS

STEERING KNUCKLE

Lubricate. (O) (6 Front and 6 Rear) (See Note 6a) GAA 250HRS



ENGINE AND OIL FILTER

Lubricate. (O) (See Notes 2a and 2b and 8a through 8d and View 22.) — 10W30 — AOAP

FRONT PROPELLER SHAFT

Lubricate. (O) (See Note 5b and View 23.) — GAA — 500HRS

PARKING BRAKE CALIPER

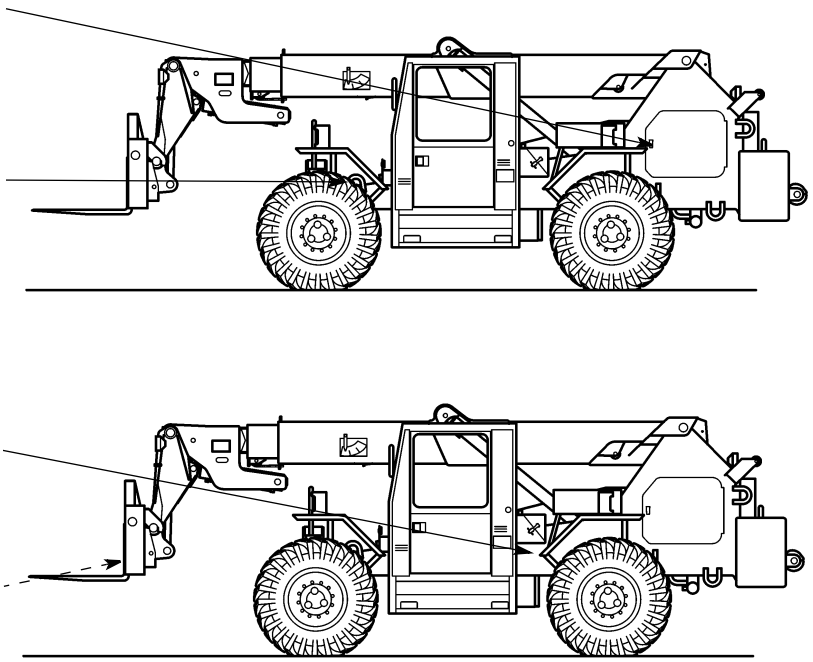
Lubricate. (O) (See Note 10 and View 23.) — GAA — 500HRS

REAR PROPELLER SHAFT SLIP JOINT

Lubricate. (O) (3 Places) (See Note 5c and View 24.) — GAA — 500HRS

FORK SHAFT AND FORK WEAR PADS

Lubricate (O) (See Note 11 and View 28) — DRY LUBE — Weekly



FUEL TANK

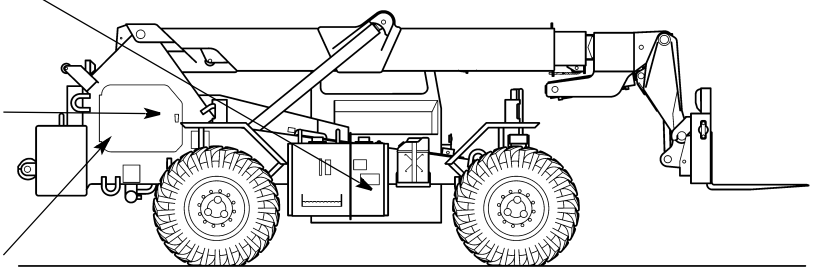
Drain Sediment. (O) (See Notes 4a, 4d and 4e and View 25.) — OC

FUEL/WATER SEPARATOR

Drain. (C) (See Note 4c and View 26.) — OC

FUEL FILTERS

Change. (O) (See Note 4b and View 27.) — 500HRS



NOTES

1. CHASSIS AND MAST.

WARNING

Do not start engine or move forklift when anyone is working on vehicle. Severe injury or death to personnel could result.

WARNING

Personnel hearing can be PERMANENTLY DAMAGED if exposed to constant high noise levels of 85 dB (A) or greater. Wear approved hearing protection devices when working within 46 ft (14 m) of vehicle. Personnel exposed to high noise levels shall participate in a hearing conservation program in accordance with TB MED 501. Hearing loss occurs gradually but becomes permanent over time.

NOTE

If an air-operated grease gun does not purge the fitting, use a hand-operated grease gun. If the part does not purge, remove and clean fitting, install fitting, and grease again. If part still does not purge, refer to maintenance task for that component.

a. Purging of Lubricant. When using a grease gun, apply lubricant to the fitting until clean lubricant squeezes out of the part being lubricated.

b. Boom Chain Sheave and Chains. Clean off dirt and debris before lubricating chains. Coat chains and connections liberally.

c. Hoist Cylinder and Tilt Cylinder. Apply grease with pneumatic grease gun only. Lubricate daily during periods of high cycling or high loading.

d. Pivot Pins. Apply grease with pneumatic grease gun only.

2. ENGINE.

a. Crankcase. Check oil level with forklift parked on level ground and the engine off and cool (TM 10-3930-673-10). Do not overfill crankcase. Refer to TM 10-3930-673-20-2, remove plug and drain crankcase. Change engine oil and filter based on Recommendation from The Army Oil Analysis Program.

b. Engine Oil Filter. After installing new filter, fill crankcase, operate engine five minutes, and check filter for leaks. Shut off engine, check crankcase level, and fill to FULL mark.

3. TRANSMISSION.

a. Transmission Housing. Check oil level with forklift parked on level ground (TM 10-3930-673-10). After running engine for 2 minutes, check transmission oil level with engine running. Drain housing after running transmission in neutral until transmission temperature is between 160 and 190 degrees F (71.1 and 87.8 degrees C). Refer to TM 10-3930-673-20-2, remove plug and drain transmission and refilling.

b. Transmission Oil Filter. After installing new filter, fill housing, operate engine five minutes, and check filter for leaks. Shut off engine, check housing level, and fill to FULL mark.

c. Transmission Strainer. Refer to TM 10-3930-673-20-2, remove and clean the strainer after each oil change.

d. Transmission Input Shaft. Lubricate transmission input shaft bearing, slip joint and u-joint (3 places) with GAA as required.

4. FUEL SYSTEM.

a. Fuel Tank Strainer. Refer to TM 10-3930-673-20-2, remove fuel cap and strainer and clean with drycleaning solvent.

b. Fuel Filter. Fill replacement filter with fuel, and refer to TM 10-3930-673-20-2 to bleed fuel system.

c. Fuel/Water Separator. Clean canister during each filter change. Refer to TM 10-3930-673-10 for procedure.

d. Fuel Tank. Drain fuel tank only when fuel is contaminated.

e. Fuel Tank. To drain the fuel tank, remove drain plug from drain located on bottom of tank.

5. DRIVE AXLE.

a. Initial oil change in new drive axles must be done after the first 100 hours of operation. Quarterly thereafter, check to ensure gear lube 80W90 is full to the bottom of the check and fill plug, fill accordingly.

b. Lubricate front propeller shaft slip joint and u-joints (3 places) with GAA as required but at least semiannually.

c. Lubricate rear propeller shaft slip joint and u-joints (3 places) with GAA as required but at least semiannually.

d. Planetary wheel ends are filled from vendor. Rotate hub until oil level line is horizontal. Oil level should be filled to bottom of the inspection hole. Change after 2000 hours. Refer to TM 10-3039-673-20-2.

6. STEERING.

a. Lubricate steering knuckle bearings and u-joint (6 front and 6 rear) with GAA as required or at least quarterly. Vehicle may have to be moved forward or backward to align grease fitting with access hole. If fitting is aligned with access hole but grease gun will not go on fitting, turn wheel right or left until grease gun fits.

b. Lubricate tie rod ends (4 places) with GAA as required.

c. Lubricate steering cylinders (2 front and 2 rear) with GAA as required.

7. OIL CAN POINTS.

a. Lubricate doors, side panels, engine cover hinges, locks, and pivot points as required with hand oiler (OE/HDO). Lubricate door locks and latches with lubricant cleaner.

b. Lubricate linkage at connections and friction points liberally.

8. HYDRAULIC SYSTEM.

a. Hydraulic Oil Check. Check oil level with vehicle parked on level ground. Carriage must be fully lowered on the ground. Oil level is low when touching the bottom of tank strainer.

b. Hydraulic System Oil. If hydraulic system oil becomes contaminated, immediately change oil and filter.

c. Hydraulic Tank. Change hydraulic system oil and hydraulic oil filter after every 2000 hours of operation. Refer to TM 10-3930-673-20-2, remove plug and drain hydraulic tank.

d. Hydraulic Tank Strainer. Refer to TM 10-3930-673-20-2, remove hydraulic cap and strainer. Check to ensure that no holes, tears or damage to the cap or strainer exist before refilling. Clean or replace as necessary.

9. BRAKE SYSTEM.

WARNING

Care must be exercised when lubricating front propeller U-joint and parking brake. Over lubrication could result in grease on the parking brake rotor and/or parking brake linings which could cause the brake to slip. Death or bodily injury to personnel could result.

Park brake should be greased with GAA as required and at least semiannually.

10. FORK SHAFT AND FORK WEAR PADS.

Before applying teflon dry lube to fork shaft and fork wear pads, clean with dry rag. Remove any corrosion with nylon bristle brush. Do not use solvent or steam.

Section IV. TROUBLESHOOTING

2-11. GENERAL

The Troubleshooting Fault Indexes (Table 2-4, Table 2-7, and Table 2-8) list the systems covered in this section. Refer to the individual System Fault Index tables for the most common failures experienced during operation of the forklift. Find the symptom that is closest to the symptom your forklift has and refer to that fault for the troubleshooting procedures. This manual cannot list all malfunctions that may occur, nor can it list all tests, inspections and corrective actions. Obvious mechanical failures and damage are not covered. If a malfunction is not listed or is not corrected by the corrective actions described, notify your supervisor.

2-12. TROUBLESHOOTING PROCEDURES

Troubleshooting is divided into three main sections:

a. Electrical Troubleshooting, Para 2-15. Para 2-15 details common electrical malfunctions which may occur during the operation of the ATLAS. This section includes troubleshooting procedures for the battery charging system, cab electrical components, attachment group, and other electrical subsystems. Table 2-4 lists the symptoms covered.

b. Mechanical Troubleshooting, Para 2-16. Para 2-16 details common mechanical malfunctions which may occur during the operation of the ATLAS. This section includes troubleshooting procedures for the engine, steering, and brakes. Table 2-7 lists the symptoms covered.

c. Hydraulic Troubleshooting, Para 2-17. Para 2-17 details common hydraulic malfunctions which may occur during the operation of the ATLAS. This section includes troubleshooting procedures for the hydraulic pumps, valves, and cylinders. Table 2-8 lists the symptoms covered.

2-13. INTRODUCTION TO LOGIC TREE TROUBLESHOOTING

a. Page Layout. Troubleshooting procedures are divided into logic tree pages and test pages.

(1) A logic tree page is always a left-hand page, facing the test page on the right. The logic tree page provides the sequence of steps required to isolate a fault to a failed component. All critical information for decision making is on the left-hand page. Each logic tree page contains the following information:

(a) **INITIAL SETUP** – This box is located only on the first logic tree page of a fault. INITIAL SETUP lists tools, materials, references, personnel and equipment needed to troubleshoot the fault.

(b) **KNOWN INFO** – This box is located in the top left-hand column. KNOWN INFO lists conditions and information that will eliminate specific components as the cause of the fault.

(c) **POSSIBLE PROBLEMS** – This box is located directly below KNOWN INFO. All of the system components that could cause a fault are listed in the POSSIBLE PROBLEMS box. The first component listed in the POSSIBLE PROBLEMS box is the one that will be tested at that step in the logic sequence. When one of the components is tested and found to be operational, it is entered at the bottom of the KNOWN INFO box as OK.

2-13. INTRODUCTION TO LOGIC TREE TROUBLESHOOTING (CONT)

(d) **QUESTION** – Each question, located in the middle column, refers to the first possible problem listed in POSSIBLE PROBLEMS. If the answer to the question is YES, proceed to the next step. If the answer is NO, follow the NO arrow to obtain directions for correcting the problem. If the step contains a WARNING or CAUTION message, a small shadow box is printed above the question. Text for WARNINGS and CAUTIONS is on the following right-hand page.

(e) **TEST OPTIONS** – This box is located in the right-hand column and lists the test(s) to be performed.

(f) **REASON FOR QUESTION** – This box is located directly below TEST OPTIONS. It explains the purpose for the question in the middle column.

(2) A test page is always a right-hand page, facing the logic tree page on the left. The test provides detailed instructions for testing the first component listed in the POSSIBLE PROBLEMS box. This test will also provide an answer for the question in the middle column. Note the arrow connecting the test on the right-hand page to the REASON FOR QUESTION. When possible, illustrations are included to provide visual details. Warnings, cautions, and notes contain additional information for testing.

b. How to Begin Troubleshooting.

(1) Determine the symptom or condition that indicates a problem or failure. Troubleshooting is divided into symptoms peculiar to a system or a component, for example: hydraulic system or engine. Refer to the Troubleshooting Fault Index (Table 2-3).

(2) Go to the referenced page to begin troubleshooting. Open the manual flat so both the left-hand and right-hand pages are displayed before you. The information on both pages is important to resolve the problem or failure. However, the experienced technician can follow the left-hand page instructions and refer to the right-hand page when necessary.

(3) Follow the diagnostic procedure. Answer question No. 1 on the left-hand page and follow the YES or NO path to either the remedy or the next question. If necessary, look on the right-hand page for test instructions and illustrations.

(4) Observe warnings, cautions and notes. The formatting symbols used in this manual for warnings, cautions and notes are as follows:

WARNING

This is the symbol for a warning statement. If you see the word WARNING above a question on the left-hand page, look on the right hand page for the text of the message. WARNINGS describe a situation which could cause severe injury or death to personnel.

CAUTION

This is the symbol for a caution statement. If you see the word CAUTION above a question on the left-hand page, look on the right-hand page for the text of the message. CAUTIONS describe a situation which could cause damage to equipment.

NOTE

This is the symbol for a note. Notes are located directly above the test to which they refer. Notes provide additional information for performing a test.

NOTE

This is the symbol for a note. Notes are located directly above the test to which they refer. Notes provide additional information for performing a test.

(5) Before taking any action to diagnose a malfunction, follow the guidelines below:

(a) Question the vehicle operator to obtain any information that might help you determine the cause of the problem.

(b) Use all your senses (especially your common sense) to observe and locate troubles.

(c) Never overlook the possibility that the problem could be of simple origin - you may be able to fix it with minor adjustments.

(d) Isolate the system where the malfunction occurs, then locate the defective component within the system.

(e) Use the test instruments specified to help you isolate the problem.

2-14. GENERAL TROUBLESHOOTING INSTRUCTIONS

NOTE

The troubleshooting makes use of the Simplified Test Equipment for Internal Combustion Engines-Reprogrammable (STE/ICE-R) and conventional methods for testing and fault isolation.

a. Simplified Test Equipment for Internal Combustion Engines - Reprogrammable (STE/ICE-R).

STE/ICE-R tests are incorporated into the standard troubleshooting test to aid in fault isolation. The STE/ICE-R acts as a conventional digital multimeter to measure voltage, current, and resistance. It can also measure pressure, speed, compression unbalance, engine power, and some specialized battery and starter evaluations. The STE/ICE-R is powered by the forklift battery. The complete system includes a test meter (VTM), cables, transit case, and technical publications. The STE/ICE-R can make TK mode measurements while connected to the batteries. STE/ICE-R tests are referenced. Certain tests require use of a transducer from the STE/ICE-R Additional Authorized List (AAL). For STE/ICE-R Vehicle System Diagnostic Checks, refer to Para 2-18.

b. General Electrical Troubleshooting Procedures.

WARNING

Remove rings, bracelets, wristwatches, neck chains, etc., before working on any vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Use proper sized test leads when checking for resistance, continuity, or voltage at connectors or damage to equipment can result.

2-14. GENERAL TROUBLESHOOTING INSTRUCTIONS (CONT)

NOTE

- The piece of electrical test equipment used will be referred to as the “multimeter.” The multimeter's red test lead will be referred to as the “positive (+) multimeter lead.” The multimeter's black test lead will be referred to as the “negative (-) multimeter lead.”
- If your multimeter does not operate in the way described in the following steps, learn how it operates before performing troubleshooting.
- Multimeter leads must remain in contact with the circuit being tested for a minimum of three seconds to obtain a reading.

(1) Resistance and Continuity Measurements.

(a) Connect positive (+) multimeter lead to multimeter VOLT-OHM connector. Connect negative multimeter lead to multimeter COM connector. When the multimeter leads are separated or are measuring a circuit with no continuity, the multimeter will indicate “OL” (Over Limit) on its display. When multimeter leads are connected together, multimeter should display “0,” indicating a continuous circuit with no (zero) resistance.

(b) Set multimeter function/range switch to the desired ohm position. If the amount of the expected resistance is not known, set the switch to the highest range, then reduce until a satisfactory reading is obtained. If only continuity is to be checked, without regard to resistance, set the multimeter function/range switch to the highest ohm range.

(c) Always turn the main power switch to the OFF position before connecting multimeter leads to a circuit unless instructed to do otherwise in the troubleshooting procedure.

(d) Connect multimeter leads to the circuit being checked. The multimeter leads must only contact the point of measurement to ensure an accurate reading.

(e) Read the resistance value displayed on the multimeter.

(f) Disconnect multimeter leads from circuit.

(g) Turn off multimeter.

(2) Voltage Measurements. The forklift is equipped with a 24-volt electrical system. Troubleshooting procedures will reference 24 VDC measurements; however, these values can vary depending on battery conditions and if the engine is running or not. If battery voltages are below 12 VDC, charge batteries.

(a) Connect positive (+) multimeter lead to multimeter VOLT-OHM connector. Connect negative (–) multimeter lead to multimeter COM connector.

(b) Set the function/range switch to the setting closest to, but not below, 24 VDC. If multimeter is equipped with a DC-AC switch, set the switch to the DC position.

(c) Always turn the main power switch to the OFF position before connecting multimeter leads to a circuit unless instructed to do otherwise in the troubleshooting procedure.

(d) Connect the positive (+) multimeter lead to the circuit being tested. Connect the negative (–) multimeter lead to a known good ground.

(e) Set main power switch to the ON position and operate any other controls necessary to energize the circuit being tested.

(f) Read the voltage value displayed on the multimeter.

(g) Set the main power switch to the OFF position. Return other controls to their "at rest" positions.

(h) Disconnect multimeter leads from circuit.

(i) Turn off multimeter.

(3) General Relay Troubleshooting Procedure. The following general relay troubleshooting procedure applies to most relays that are pushed into a receptacle and do not require any attaching hardware.

(a) Pull relay out of receptacle just enough for the relay terminals to make contact with receptacle terminals. Leave about 1/4 to 3/8 in. (6.35 to 9.53 mm) space between the relay and the receptacle to insert a multimeter lead and make contact with the terminal listed in the troubleshooting test.

(b) Perform necessary test.

(4) General Wiring Harness Short Test. The following procedure applies to any wiring harness suspected of being shorted. Refer to electrical schematics during this procedure.

(a) Connect positive (+) multimeter lead to multimeter VOLT-OHM connector. Connect negative (–) multimeter lead to multimeter COM connector. When the multimeter leads are separated or are measuring a circuit with no continuity, the multimeter will indicate "OL" (Over Limit) on its display. When multimeter leads are connected together, multimeter should display "0," indicating a continuous circuit with no (zero) resistance. Wires in a harness that are not purposely joined or connected at a component should not have continuity (multimeter indicates "OL").

(b) Set multimeter function/range switch to the highest OHM range.

(c) Disconnect harness connector.

(d) Connect positive (+) multimeter lead to harness connector terminal of suspected wire.

(e) Connect negative (–) multimeter lead to each of the remaining harness connector terminals. If multimeter does not display "OL," and is displaying a resistance value of zero or higher, this indicates a continuous circuit. Refer to the electrical schematic before repairing wires or replacing wiring harness to determine that the wires making a continuous circuit are not purposely joined or are not connected intentionally at a component.

(f) Disconnect multimeter leads from connector.

(g) Turn off multimeter.

2-14. GENERAL TROUBLESHOOTING INSTRUCTIONS (CONT)

c. Abbreviations and Commonly Used Terms.

CB = circuit breaker
J = jack
K = relay
P = plug
VDC = volts direct current

Table 2-3. Troubleshooting Index

Table 2-3. Troubleshooting Index (Continued)

Table 2-3. Troubleshooting Index (Continued)

2-14.1. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK

(a) **General.** This section contains information and tests which may be used with STE/ICE-R (Simplified Test Equipment for Internal Combustion Engines-Reprogrammable) to locate malfunctions that may occur in the vehicle. The tests can be used during troubleshooting, corrective maintenance, and after routine adjustments.

NOTE

Throughout this troubleshooting section, various STE/ICE-R test are referenced as part of the troubleshooting process. In many cases, there is a comparable MSD/SPORT test that can be performed in lieu of the STE/ICE-R test.

The STE/ICE-R system is primarily used in conjunction with the vehicle electrical system. The test cannot cover all possible malfunctions that may occur. If a particular malfunction is not discussed, refer to the troubleshooting tables.

NOTE

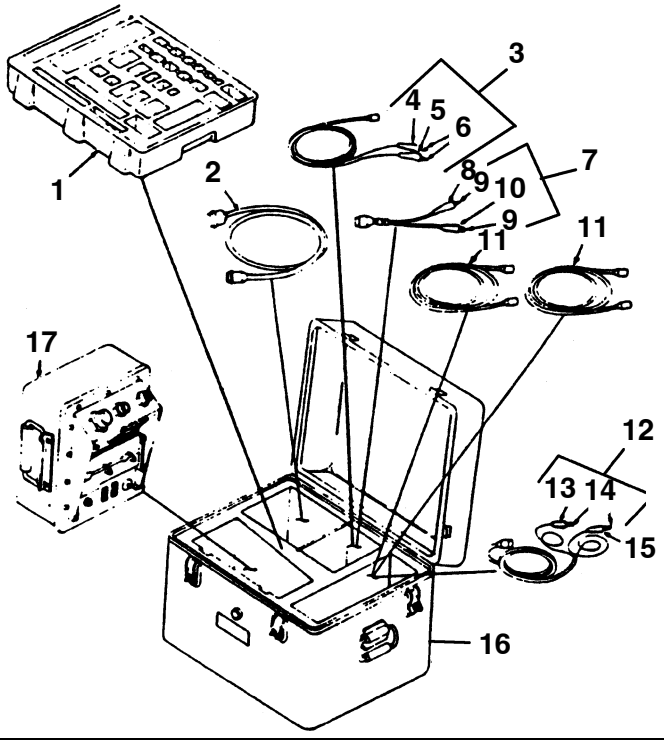
Refer to page 2-917 for a copy of the vehicle STE/ICE-R test card.

(b) **Description and Operation.** STE/ICE-R is portable and operates off of the vehicle's 24 volt system. The STE/ICE-R kit consists of the following items: Refer to the figures below and on page 2-866.

- Vehicle Test Meter (VTM)
- Transducer Kit (TK)
- Four Electrical Cables (W1, W2, W3, and W4)
- Transit Case
- Technical Publications

STE/ICE-R KIT

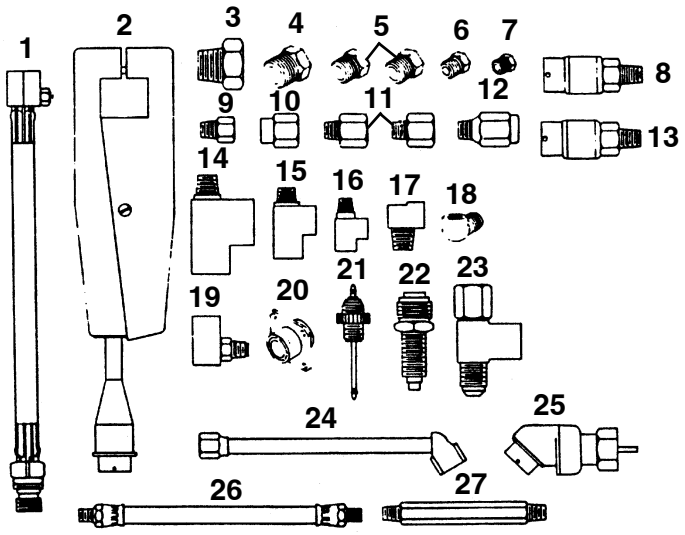
1. Tray, Transducer Kit
2. Cable Assembly, Power W1
3. Cable Assembly, Special W2
4. Shell, Electrical Connector
5. Shell, Electrical Connector
6. Clip, Electrical
7. Cable Assembly, Special W3
8. Shell, Electrical Connector
9. Clip, Electrical
10. Shell, Electrical Connector
11. Cable Assembly, Power W4
12. Cable Assembly, Power W5
13. Shell, Electrical Connector
14. Clip, Electrical
15. Shell, Electrical Connector
16. Case, Test Set
17. STE/ICE-R Test Meter



2-14.1. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)

TRANSDUCER KIT CONTENTS

1. Hose Assembly, TK10
2. Prod, Test TK11
3. Reducer, Pipe TK12
4. Reducer, Pipe TK13
5. Reducer, Pipe TK14
6. Plug, Pipe TK15
7. Plug, Pipe TK16
8. Transducer (Blue) 0 to 1,000 psi TK17
9. Adapter, Straight TK18
10. Reducer, Pipe TK19
11. Reducer, Pipe TK20
12. Dampener, Fluid TK21
13. Transducer (Red) -30 in. he to 25 psi TK22
14. Tee, Pipe TK23
15. Tee, Pipe TK24
16. Tee, TK25
17. Elbow, Pipe TK26
18. Elbow, Pipe TK27
19. Tee, Pipe to Tube TK28
20. Adapter, Connector TK29
21. Adapter, Connector TK30
22. Adapter, Speedometer, TK31
23. Tee, Pipe to Fuel Line TK32
24. Chuck, Inflating TK33
25. Tachometer, Pulse TK34
26. Hose Assembly TK35
27. Nipple, Pipe TK36



Refer to the manual provided with the STE/ICE-R kit for description and operation of the VTM and the TK.

(c) **STE/ICE-R Testing Procedures.** The vehicle test procedures consist of two test sequences; GO-Chain Sequences and NO-GO-Chain Sequences. A GO-Chain sequence is a logical sequence of tests performed to determine the general condition of the vehicle. If the vehicle fails any of the GO-Chain tests, the test will direct the user to a specific NO-GO test for further testing. The NO-GO tests are used to isolate what is wrong with the vehicle.

The GO and NO-GO-Chain Sequences are presented as an illustrated flowchart with test branching controlled by YES and NO decisions. Generally, a YES determination leads to the next test; a NO determination leads to NO-GO testing and corrective action.

When the VTM interfaces with the vehicle through the Diagnostic Connector Assembly (DCA) the test is titled DCA Mode Testing. If the VTM interfaces with the vehicle through the use of the transducer kit (TK), the test is titled TK Mode Testing. The DCA and TK testing modes can be used at the same time.

Always Follow The Following Rules When Using the GO-Chain Test Sequence:

(1) Always start at GO1. Never enter the middle of a GO or NO-GO testing sequence unless directed by the flow chart.

(2) Follow each instruction in a GO-Chain Test Sequence. Do not skip any instructions or procedures.

(3) If a particular test is failed in a GO-Chain test sequence, proceed to the indicated NO-GO-Chain test sequence or to a higher level of maintenance.

(4) After correcting a vehicle problem, repeat the testing beginning at GO1.

(5) Each GO Chain testing sequence depends upon the completion of the previous test. Do not skip any tests.

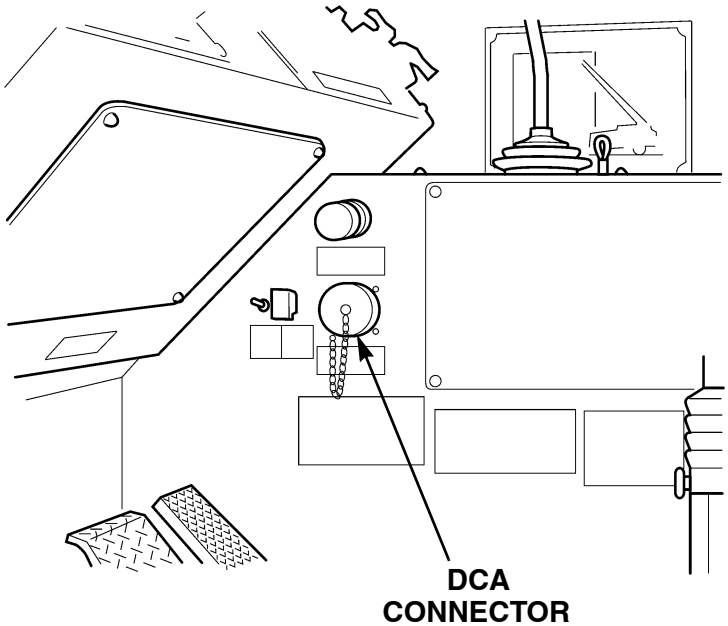
Use the GO, NO-GO flow charts for testing. As you become more familiar with the test procedures, you can use the Vehicle Test Cards as your sole reference. The flip cards on the VTM can also be used as you become familiar with the vehicle and STE/ICE-R equipment.

Prior to testing, make the following pre-test inspections:

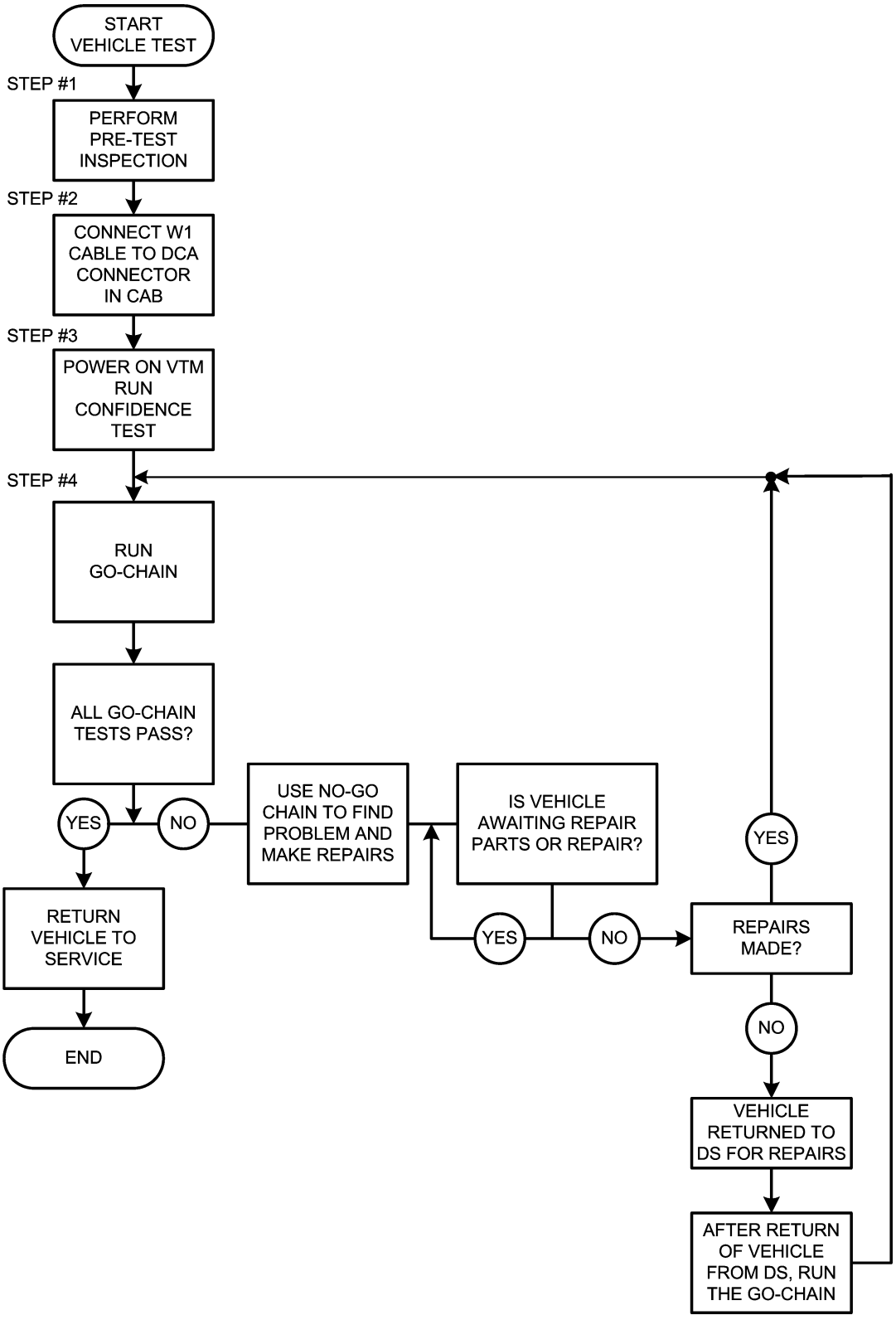
- Check drive belt for proper tension. Replace cracked or frayed belt.
- Check for proper engine oil level. Add oil as necessary.
- Check that the fuel tank has enough fuel for testing.
- Check for proper engine coolant level. Add coolant as necessary.
- Check that the batteries are in good condition. Check for low electrolyte level and add distilled water as required.
- Check that emergency steering pump is turned off when required by test.

VEHICLE DIAGNOSTIC CONNECTOR ASSEMBLY (DCA)

The DCA connector of the vehicle is located on the panel to the right of the vehicle operator. Refer to the figure below for vehicle DCA location.



2-14.1. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



2-14.2. INTERNAL COMBUSTION ENGINE (ICE) TEST INFORMATION

(6) **General Information.**

(a) The Soldier's Portable On-system Repair Tool (SPORT) and the Maintenance Support Device (MSD) have preloaded computer based training. This training provides information on operation and maintaining the SPORT and MSD.

(b) All before operation PMCS should be performed prior to use.

(c) Information on connection to vehicles is provided in the Internal Combustion Engine (ICE) software.

(7) **SPORT-ICE.**

(a) Power up the SPORT

(b) Perform before operation PMCS

(c) Select the icon labeled "ICE Testing" from the desktop to launch the ICE software.

(d) SPORT- ICE main menu screen will be displayed. Select SPORT-ICE tests.

(e) Select the appropriate vehicle from the "Vehicle Selection Menu." A screen indicating connection instructions will be displayed. Follow connection instructions and select OK. A screen listing all available vehicle ICE tests will be displayed.

(f) Enter desired test number indicated in TM reference and follow all connection and testing instructions.

(8) **MSD-ICE.**

(a) Power up the MSD

(b) Perform before operation PMCS

(c) Select the icon labeled "ICE Testing" from the desktop to launch the ICE software.

(d) Select the appropriate tester hardware that you will be using.

(e) ICE main menu screen will be displayed. Select ICE tests.

(f) Select the appropriate vehicle from the "Vehicle Selection Menu." A screen indicating connection instructions will be displayed. Follow connection instructions and select OK. A screen listing all available vehicle ICE tests will be displayed.

(g) Enter desired test number indicated in TM reference and follow all connection and testing instructions.

2-15. ELECTRICAL SYSTEM TROUBLESHOOTING

This paragraph covers electrical system troubleshooting. The Electrical System Fault Index, Table 2-4, lists faults for the electrical system of the ATLAS. Refer to schematics found at the end of this volume when performing test and corrective actions.

Table 2-4. Electrical System Fault Index

Table 2-4. Electrical System Fault Index

1. 24 VDC CIRCUITS DO NOT OPERATE.

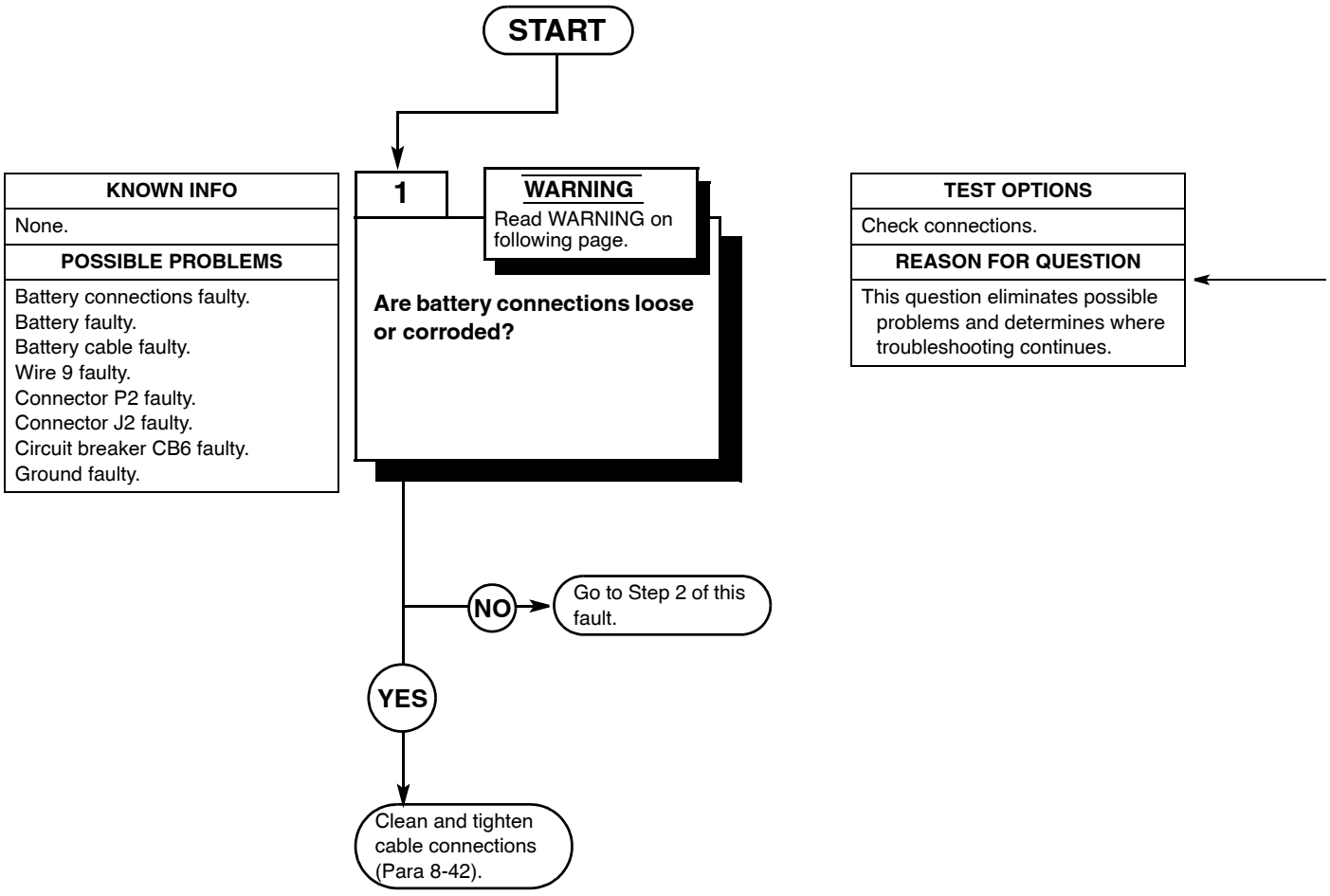
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

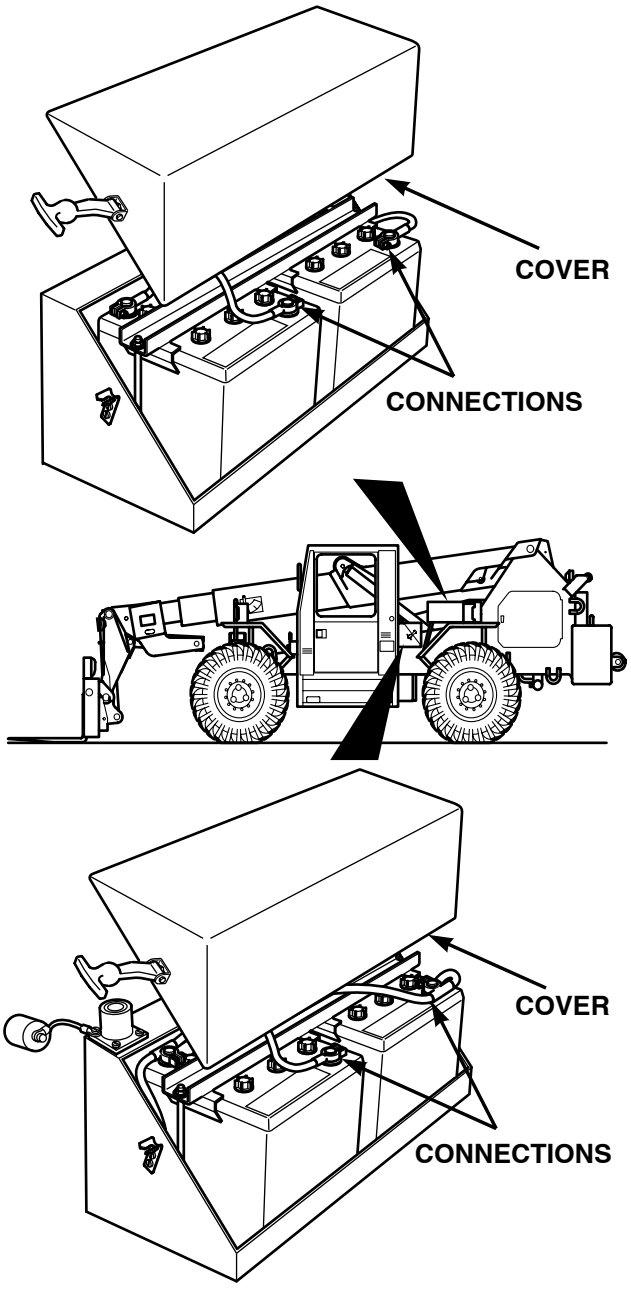
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

CHECK CONNECTIONS
(1) Remove battery cover (Para 8-42). (2) Check for loose or corroded connections. (a) If loose or corroded, clean and tighten cable connections (Para 8-42). (b) If not loose or corroded, go to Step 2 of this fault. (3) Install battery cover (Para 8-42).



1. 24 VDC CIRCUITS DO NOT OPERATE (CONT).

KNOWN INFO
Battery connections OK.
POSSIBLE PROBLEMS
Battery faulty. Battery cable faulty. Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Ground faulty.

2

Is 24 vdc present at positive cable of battery?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, 24 vdc circuits will not operate.

NO → Service battery or replace battery (Para 8-42).

YES

KNOWN INFO
Battery connections OK. Battery OK.
POSSIBLE PROBLEMS
Battery cable faulty. Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Ground faulty.

3

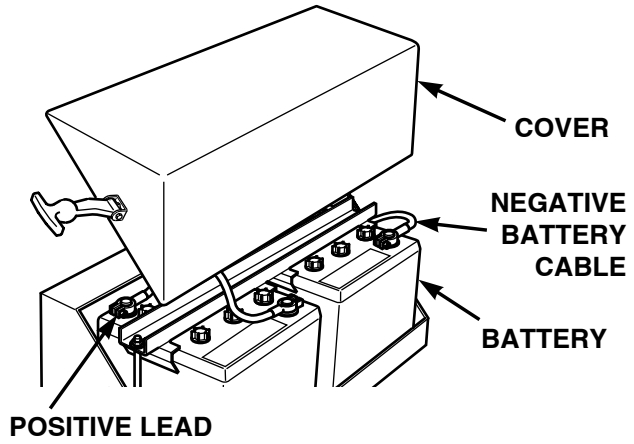
Is 24 vdc present on positive battery cable at starter motor solenoid?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, battery cable faulty.

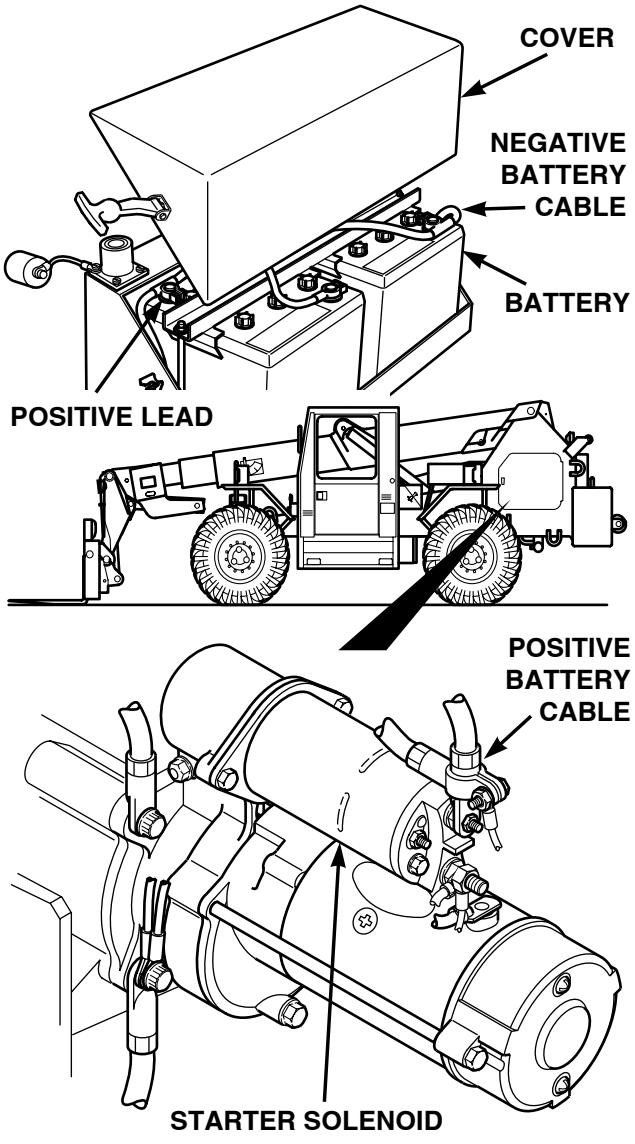
NO → Repair battery cable (Para 8-44).

YES

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect multimeter positive lead (+) to positive lead of battery. (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, service battery or replace battery (Para 8-42).



VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to starter motor solenoid where positive battery cable connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, repair battery cable (Para 8-44). (6) Disconnect negative battery cable from negative side of battery (Para 8-44).



1. 24 VDC CIRCUITS DO NOT OPERATE (CONT).

KNOWN INFO
Battery connections OK. Battery OK. Battery cable OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Ground faulty.

4

Is 24 vdc present on wire 9 at connector P2-1?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 8 of this fault.

YES

KNOWN INFO
Battery connections OK. Battery OK. Battery Cable OK. Connector P2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Ground faulty.

5

Is 24 vdc present on wire 9 at circuit breaker CB6?

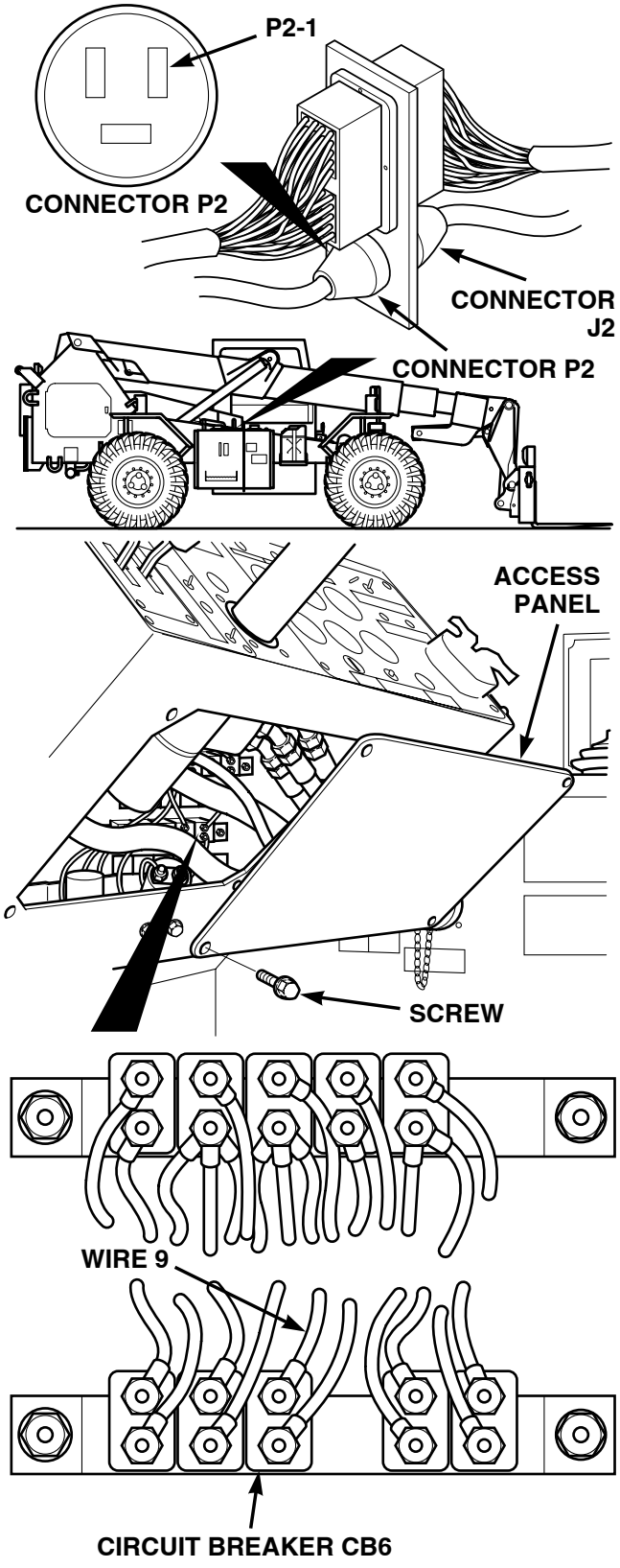
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 7 of this fault.

YES

VOLTAGE TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to connector P2-1. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 8 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-44). (7) Connect connector J2 to connector P2.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, go to Step 7 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-44).



1. 24 VDC CIRCUITS DO NOT OPERATE (CONT).

KNOWN INFO
Battery connections OK. Battery OK. Battery cable OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Ground faulty.

6

Is 24 vdc present on wire 1 at circuit breaker CB6?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 faulty.

NO → Replace circuit breaker CB6 (Para 8-11).

YES

KNOWN INFO
Battery connections OK. Battery OK. Battery cable OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Ground faulty.

7

Is continuity present on wire 9 between circuit breaker CB6 and connector J2-1?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 faulty.

NO → Repair wire 9 or connector J2 (Para 8-48).

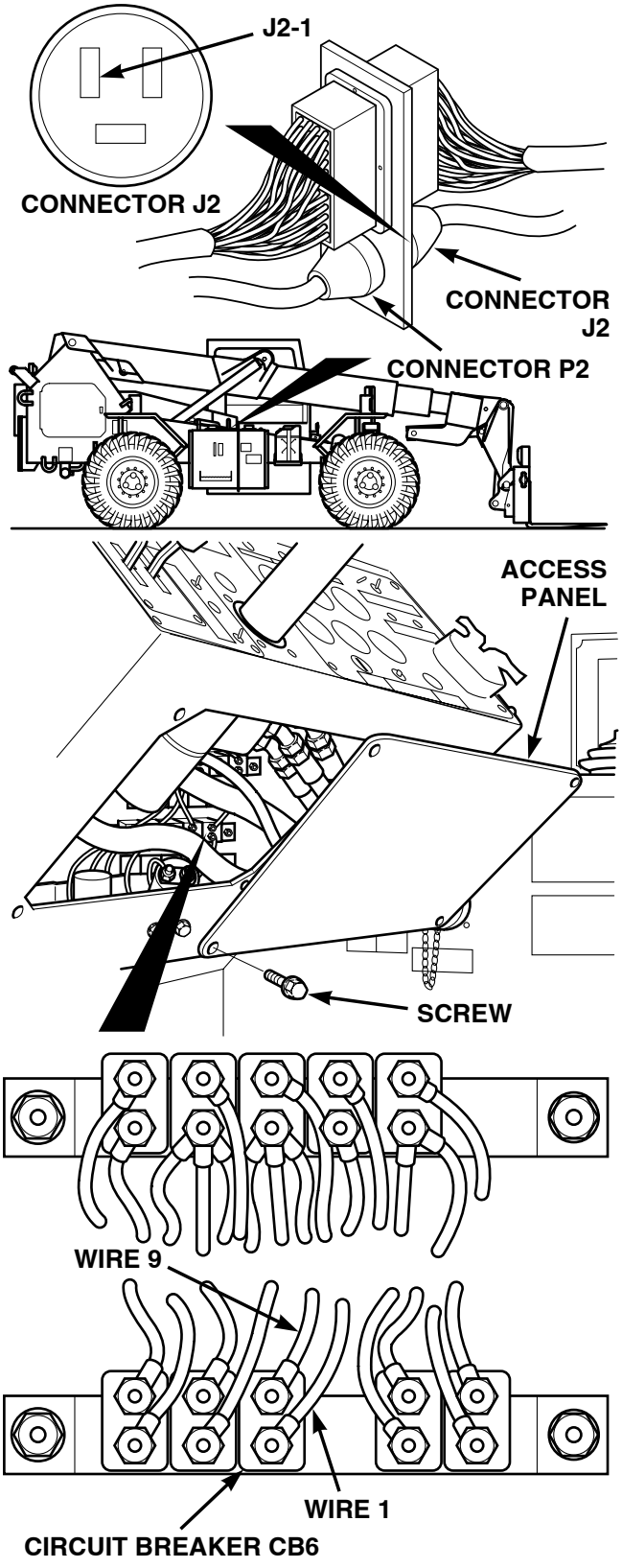
YES

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to wire 1 where wire 1 connects to circuit breaker CB6.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-44).
  (a) If 24 vdc is present, go to Step 7 of this fault.
  (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11).

CONTINUITY TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-44).
(2) Disconnect connector J2 from connector P2.
(3) Set multimeter to ohms.
(4) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to circuit breaker CB6.
(5) Connect multimeter negative lead (–) to connector J2-1.
  (a) If continuity is present, go to Step 8 of this fault.
  (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48).
(6) Install access panel and four screws to secure access panel.



1. 24 VDC CIRCUITS DO NOT OPERATE (CONT).

KNOWN INFO
Battery connections OK. Battery OK. Battery cable OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Ground faulty.

8

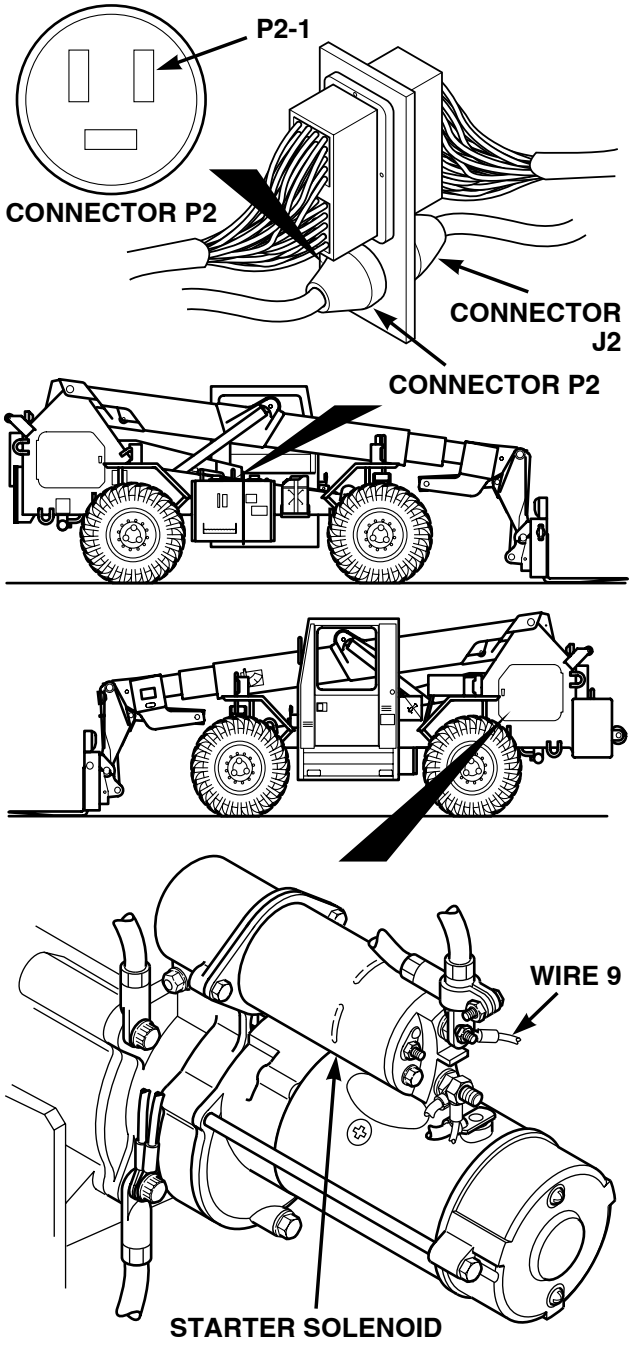
Is continuity present on wire 9 between starter motor solenoid and connector P2-1?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 faulty.

NO → Repair wire 9 or connector P2 (Para 8-49).

YES → Replace alternator (Para 8-2).

CONTINUITY TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, replace alternator (Para 8-2). (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49). (5) Connect connector J2 to connector P2. (6) Connect negative battery cable to negative side of battery (Para 8-44). (7) Install battery cover (Para 8-42).



2. HORN DOES NOT OPERATE.

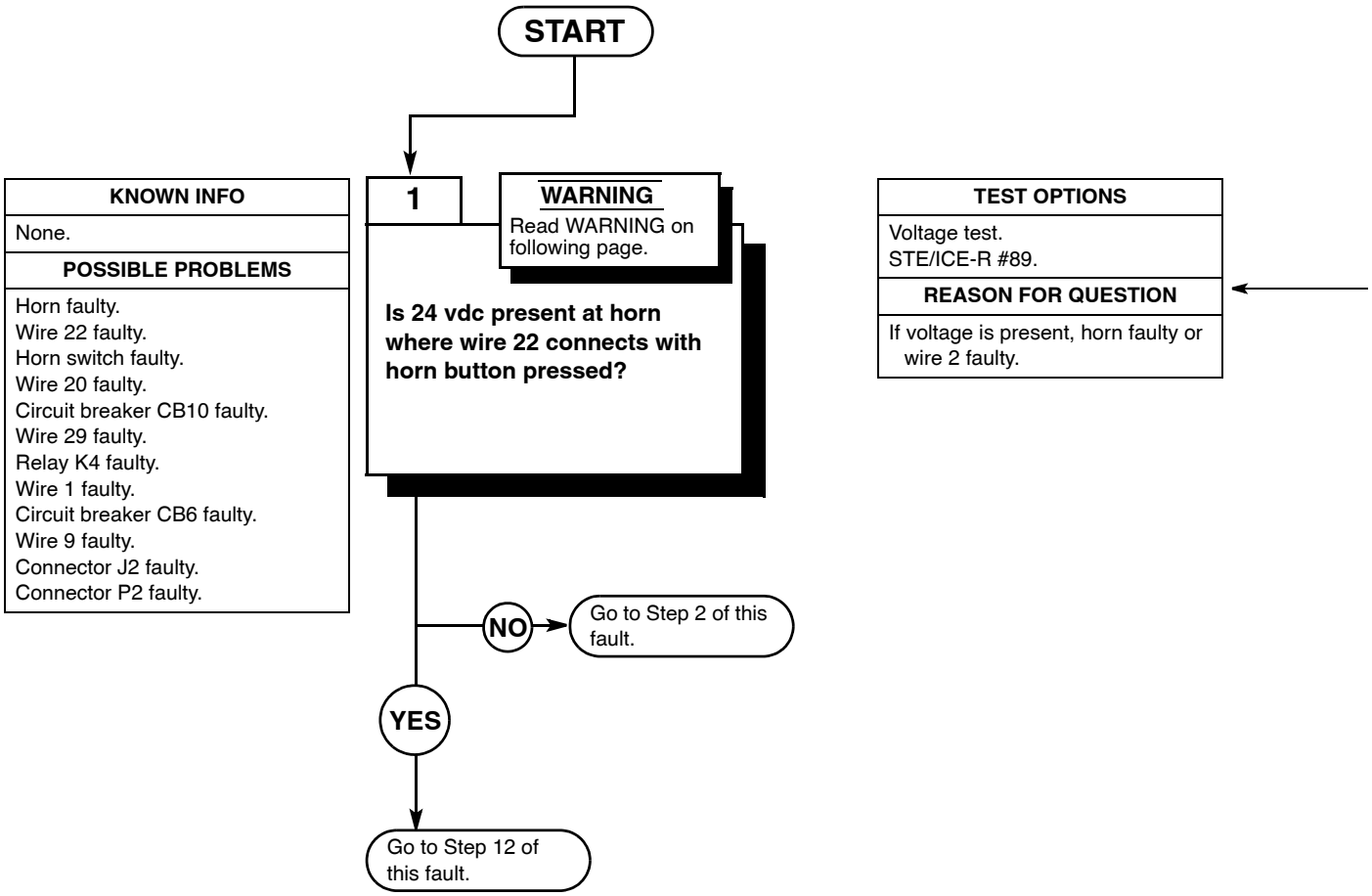
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Personnel Required
Two

References
TM 10-3930-673-10

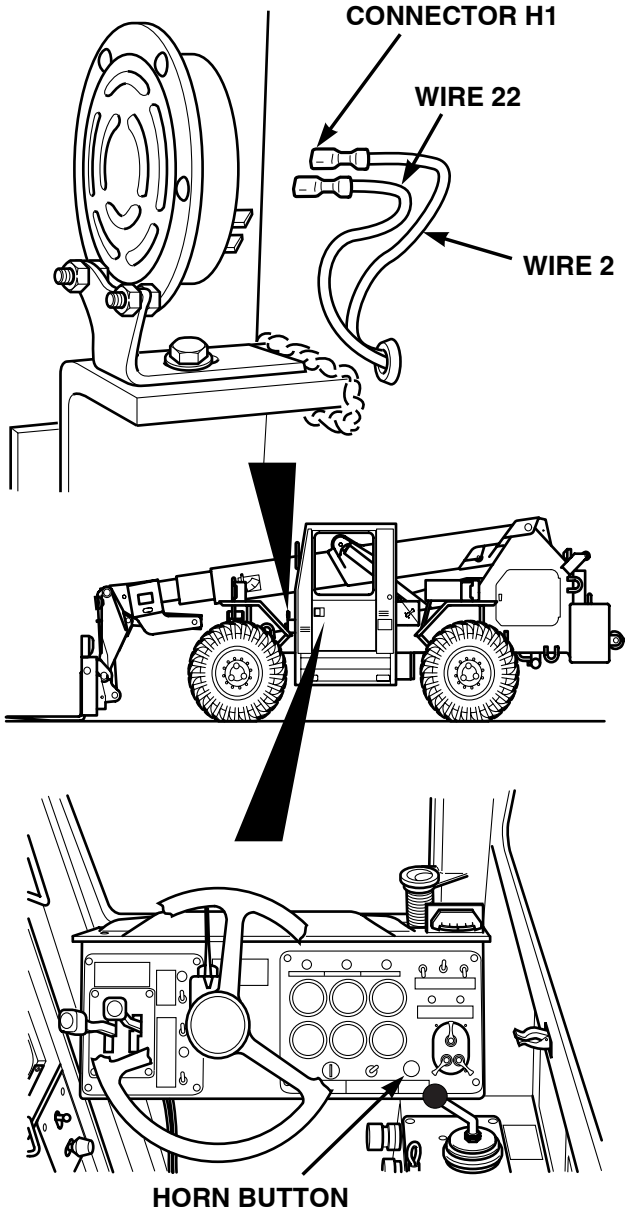
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Batteries can explode from a spark. Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-44). (3) Set multimeter to volts dc. (4) Disconnect connector H1 from horn. (5) Connect multimeter positive (+) lead to wire 22 of connector H1. (6) Connect multimeter negative (–) lead to known good ground. (7) Connect negative battery cable to negative side of battery (Para 8-44). (8) Push horn button and note reading of multimeter. (a) If 24 vdc is present, go to Step 12 of this fault. (b) If 24 vdc is not present, go to Step 2 of this fault. (9) Disconnect negative battery cable (Para 8-44).



2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK.
POSSIBLE PROBLEMS
Wire 22 faulty. Horn switch Faulty. Wire 20 faulty. Circuit breaker CB10 faulty. Wire 29 faulty. Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

2

Is 24 vdc present at horn switch where wire 22 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, wire 22 faulty.

NO → Go to Step 3 of this fault.

YES → Repair wire 22 (Para 8-48).

KNOWN INFO
Horn OK. Wire 22 OK.
POSSIBLE PROBLEMS
Horn switch Faulty. Wire 20 faulty. Circuit breaker CB10 faulty. Wire 29 faulty. Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

3

Is 24 vdc present at horn switch where wire 20 connects?

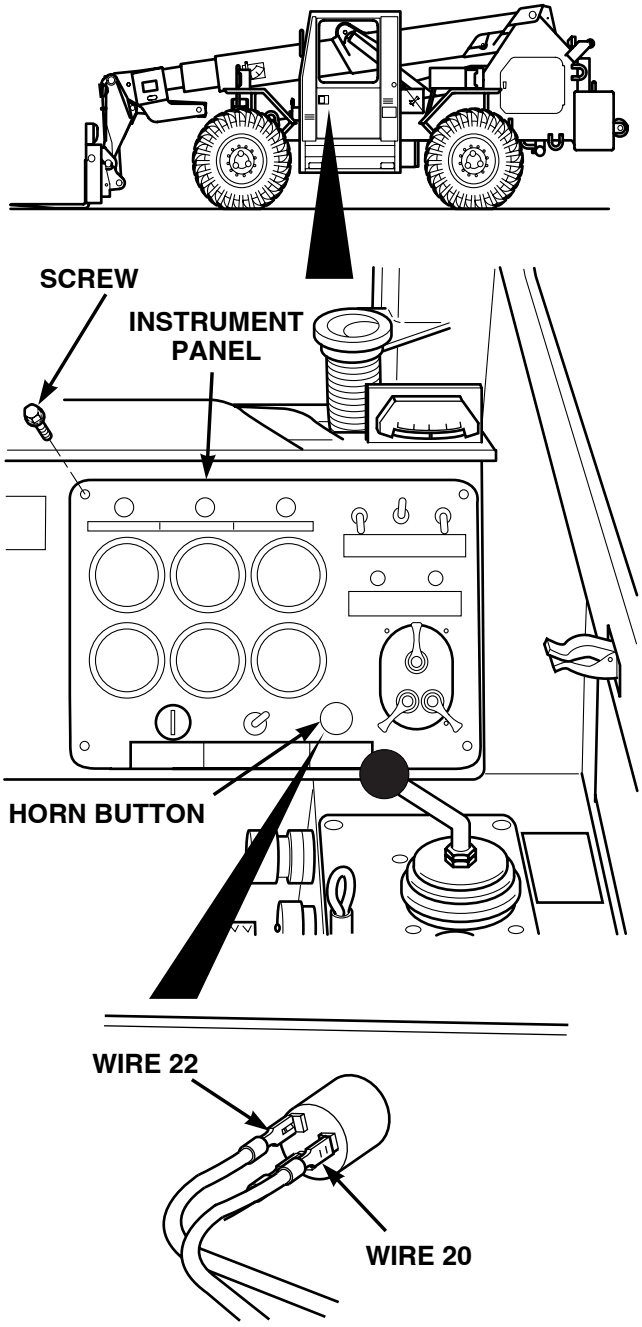
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, horn switch faulty.

NO → Go to Step 4 of this fault.

YES → Replace horn switch (Para 8-7).

VOLTAGE TEST
(1) Remove four screws and instrument panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive (+) lead to horn switch where wire 22 connects. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable (Para 8-44). (6) Press horn switch and note reading of multimeter. (a) If 24 vdc is not present, go to Step 3 of this fault. (b) If 24 vdc is present, repair wire 22 (Para 8-48). (7) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to horn switch where wire 20 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 4 of this fault. (b) If 24 vdc is present, replace horn switch (Para 8-7). (5) Disconnect negative battery cable (Para 8-44). (6) Install instrument panel and four screws.



2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK.
POSSIBLE PROBLEMS
Wire 20 faulty. Circuit breaker CB10 faulty. Wire 29 faulty. Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

4

Is 24 vdc present at circuit breaker CB10 where wire 20 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, wire 20 faulty.

NO → Go to Step 5 of this fault.

YES → Repair wire 20 (Para 8-48).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK.
POSSIBLE PROBLEMS
Circuit breaker CB10 faulty. Wire 29 faulty. Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

5

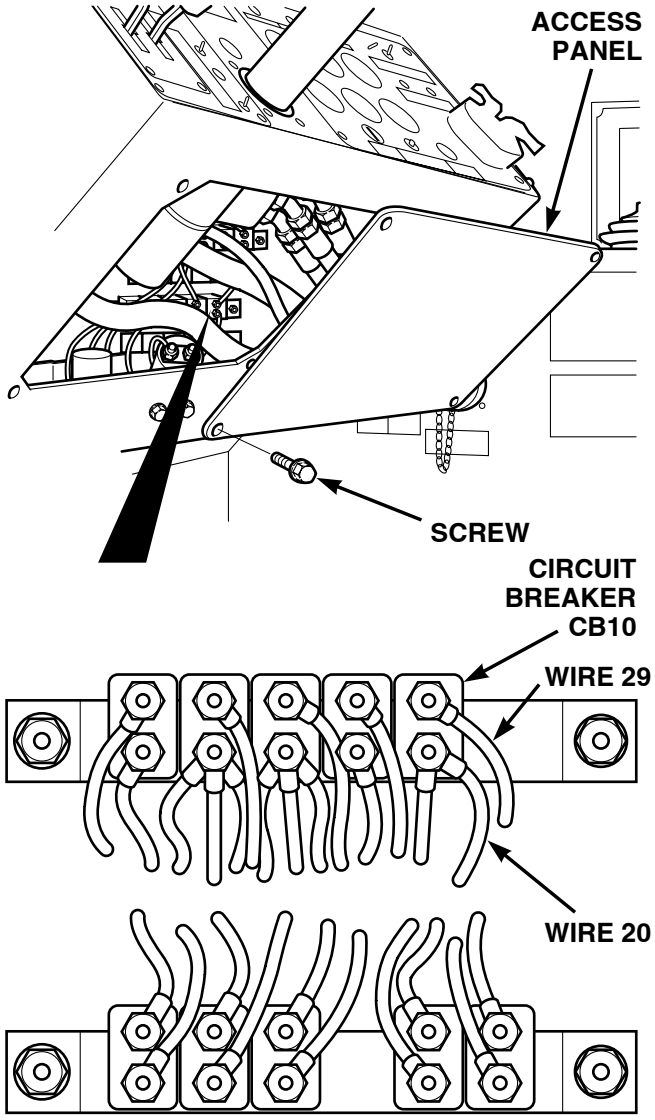
Is 24 vdc present at circuit breaker CB10 where wire 29 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, circuit breaker CB10 faulty.

NO → Go to Step 6 of this fault.

YES → Replace circuit breaker CB10 (Para 8-11).

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive (+) lead to circuit breaker CB10 where wire 20 connects. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 5 of this fault. (b) If 24 vdc is present, repair wire 20 (Para 8-48). (6) Disconnect negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB10 where wire 29 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 6 of this fault. (b) If 24 vdc is present, replace circuit breaker CB10 (Para 8-11). (5) Disconnect negative battery cable (Para 8-44).

2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK.
POSSIBLE PROBLEMS
Wire 29 faulty. Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

6

Is 24 vdc present at relay K4 where wire 29 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, wire 29 faulty.

NO → Go to Step 7 of this fault.

YES → Repair wire 29 (Para 8-48).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK.
POSSIBLE PROBLEMS
Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

7

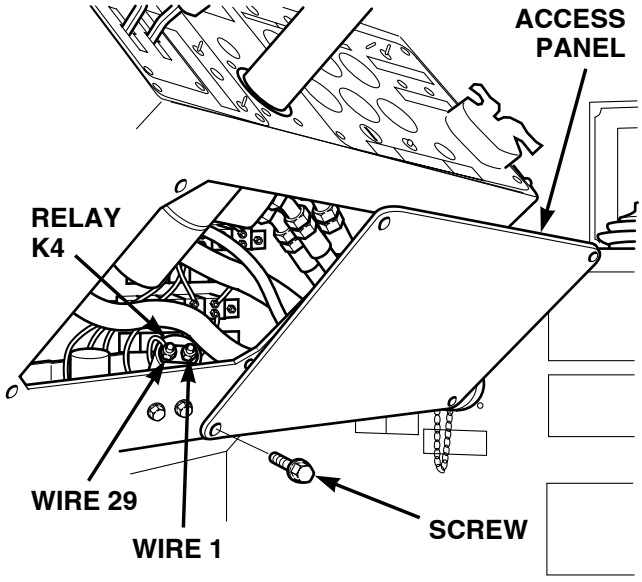
Is 24 vdc present at relay K4 where wire 1 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, relay K4 faulty.

NO → Go to Step 8 of this fault.

YES → Replace relay K4 (Para 8-23).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K4 where wire 29 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 7 of this fault. (b) If 24 vdc is present, repair wire 29 (Para 8-48). (5) Disconnect negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K4 where wire 1 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 8 of this fault. (b) If 24 vdc is present, replace relay K4 (Para 8-23). (5) Disconnect negative battery cable (Para 8-44).

2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Circuit breaker CB6 faulty. Connector J2 faulty. Connector P2 faulty.

8

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, repair wire 1.

NO → Go to Step 9 of this fault.

YES → Repair wire 1 (Para 8-48).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

9

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

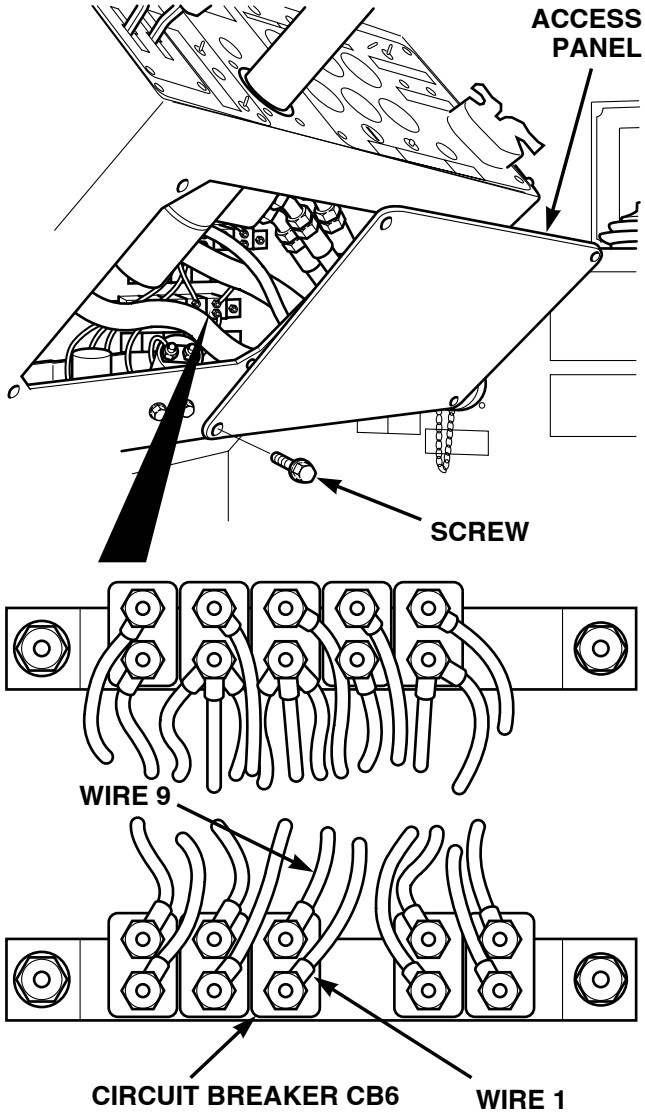
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, replace circuit breaker CB6.

NO → Go to Step 10 of this fault.

YES → Replace circuit breaker CB6 (Para 8-11).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 9 of this fault. (b) If 24 vdc is present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB6 where wire 9 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 10 of this fault. (b) If 24 vdc is present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable (Para 8-44).



2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

10

Is 24 vdc present on connector J2-1?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 11 of this fault.

YES → Go to Step 15 of this fault.

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

11

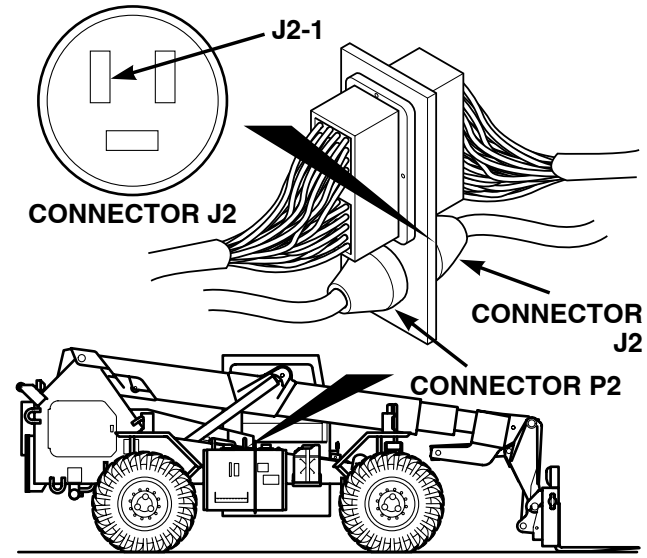
Is 24 vdc present at starter solenoid where wire 9 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

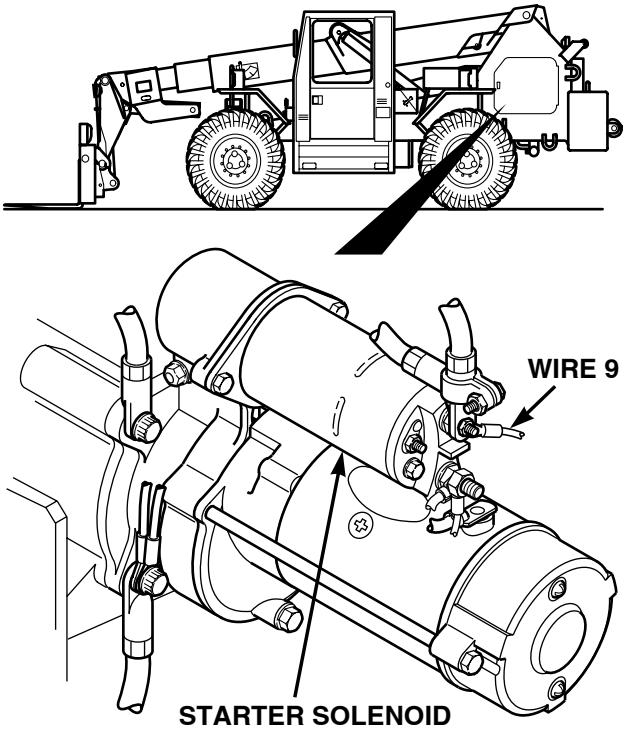
NO → Go to Step 16 of this fault.

YES → Go to Step 13 of this fault.

VOLTAGE TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to volts dc. (3) Connect multimeter positive (+) lead to connector J2-1. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 11 of this fault. (b) If 24 vdc is present, go to Step 15 of this fault. (6) Disconnect negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) to starting motor solenoid where wire 9 connects. (3) Connect multimeter negative (–) to known good ground. (4) Connect negative battery cable (Para 8-44). (a) If 24 vdc is not present, go to Step 13 of this fault. (b) If 24 vdc is present, go to Step 16 of this fault. (5) Disconnect negative battery cable (Para 8-44).



2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Horn faulty. Wire 22 faulty. Horn switch faulty. Wire 20 faulty. Circuit breaker CB10 faulty. Wire 29 faulty. Relay K4 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty. Wire 2 faulty.

12

Is continuity present on wire 2 between negative (–) battery cable and wire 2 on horn?

NO → Go to Step 13 of this fault.

YES → Replace horn (Para 8-41).

TEST OPTIONS
Continuity test. STE/ICE #91.
REASON FOR QUESTION
If continuity is present, horn faulty.

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty. Wire 2 faulty.

13

Is continuity present on wire 2 between connector P2-2 and wire 2 on horn?

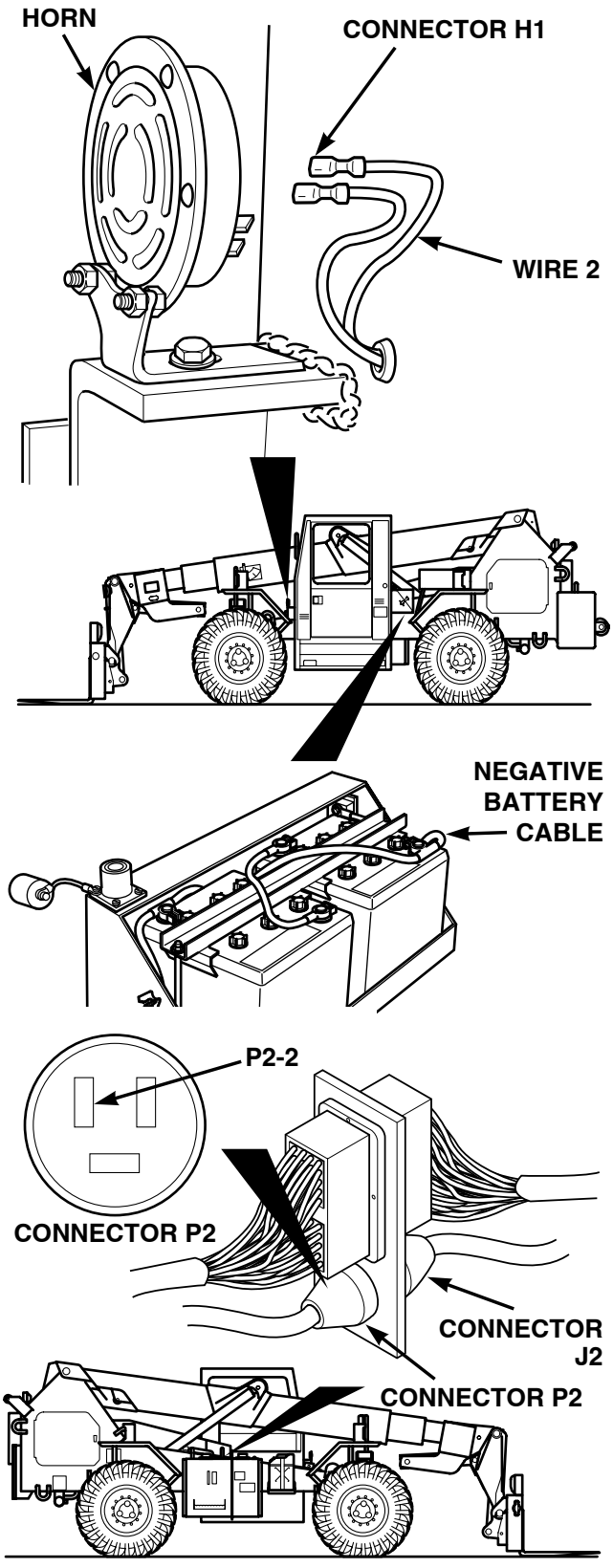
NO → Repair wire 2 (Para 8-49).

YES →

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, repair wire 2.

CONTINUITY TEST
(1) Disconnect connector H1 from horn. (2) Set multimeter to ohms. (3) Connect multimeter positive (+) lead to wire 2 at horn. (4) Connect multimeter negative (–) lead to negative battery cable. (a) If continuity is not present, go to Step 13 of this fault. (b) If continuity is present, replace horn (Para 8-41).

CONTINUITY TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to ohms. (3) Connect multimeter positive (+) lead to wire 2 at horn connector H1. (4) Connect multimeter negative (–) lead to connector P2-2. (a) If continuity is not present, repair wire 2 (Para 8-49). (b) If continuity is present, go to Step 14 of this fault.



2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK. Circuit breaker CB6 OK. Connector J2-1 OK. Connector P2-1 OK.
POSSIBLE PROBLEMS
Connector J2-2 faulty. Connector P2-2 faulty. Wire 2 faulty.

14

Is continuity present on wire 2 between connector J2-2 and negative battery cable?

NO → Repair connector J2 (Para 8-48).

YES → Replace horn (Para 8-41).

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Connector P2 faulty. Wire 9 faulty.

15

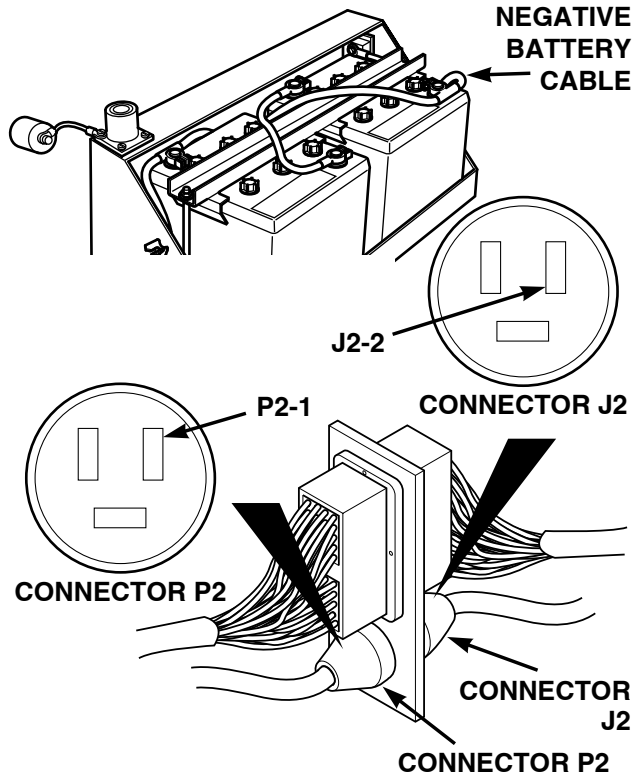
Is continuity present on wire 9 between connector P2-1 and wire 9, where wire 9 connects to circuit breaker CB6?

NO → Repair wire 9 or connector P2 (Para 8-49).

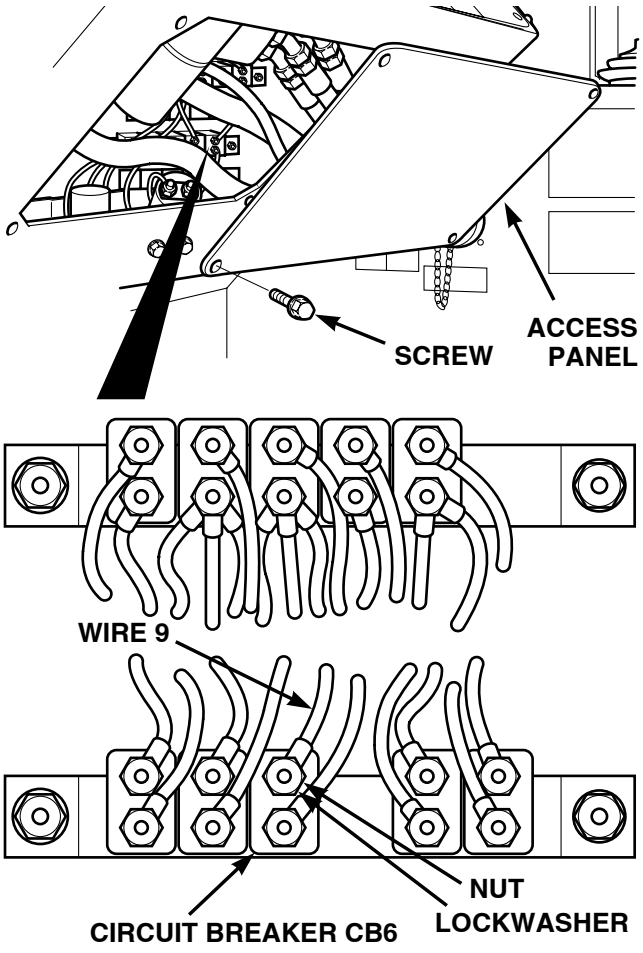
YES →

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive (+) lead to connector J2-2. (3) Connect multimeter negative (–) lead to negative battery cable. (a) If continuity is not present, repair connector J2 and perform Step (4) below. (b) If continuity is present, replace horn and perform Step (4) below. (4) Connect connector J2 to connector P2 and negative battery cable to negative side of battery (Para 8-44).



CONTINUITY TEST
(1) Disconnect negative battery cable (Para 8-44). (2) Disconnect connector J2 from connector P2. (3) Remove one nut and lockwasher from wire 9 at circuit breaker CB6. (4) Connect multimeter positive (+) lead to wire 9. (5) Connect multimeter negative (–) lead to connector P2-1. (a) If continuity is not present, repair wire 9 or connector P2 and perform Step (6) and Step (7) below. (b) If continuity is present, go to Step 16 of this fault. (6) Connect connector J2 to connector P2 and negative battery cable to negative side of battery (Para 8-44). (7) Connect wire 9 to circuit breaker CB6 and install lockwasher and nut. (8) Install access panel and four screws.



2. HORN DOES NOT OPERATE (CONT).

KNOWN INFO
Horn OK. Wire 22 OK. Horn switch OK. Wire 20 OK. Circuit breaker CB10 OK. Wire 29 OK. Relay K4 OK. Wire 1 OK. Circuit breaker CB6 OK. Connector P2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Wire 9 faulty.

16

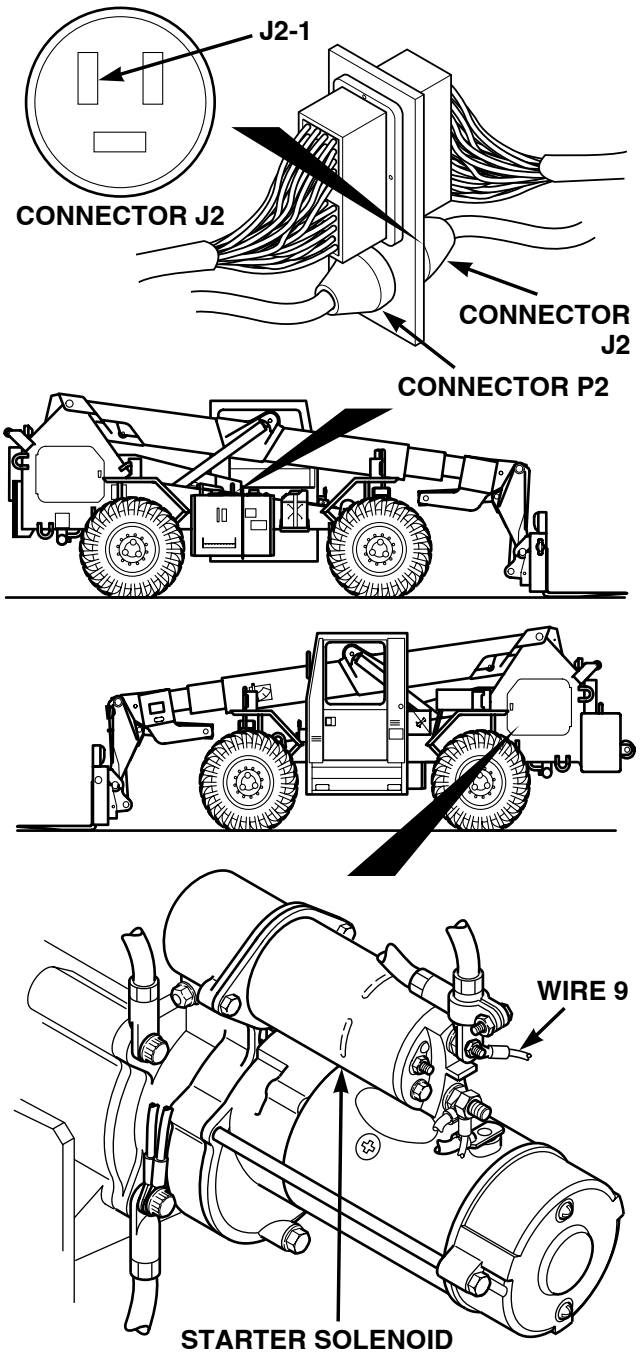
Is continuity present on wire 9 between connector J2-1 and where wire 9 connects to starter solenoid?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service or replace batteries (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2-1 faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive (+) lead to connector J2-1. (3) Connect multimeter negative (–) lead to wire 9 at starting motor solenoid. (a) If continuity is not present, repair connector J2 or wire 9. (b) If continuity is present, go to Step 11 of this fault and perform Step (4) and Step (5) below. (4) Connect connector J2 to connector P2 and negative battery cable to negative side of battery (Para 8-44). (5) Connect wire 9 to circuit breaker CB5 and install lockwasher and nut. (6) Install battery cover (Para 8-42).



3. BACK-UP ALARM DOES NOT OPERATE.

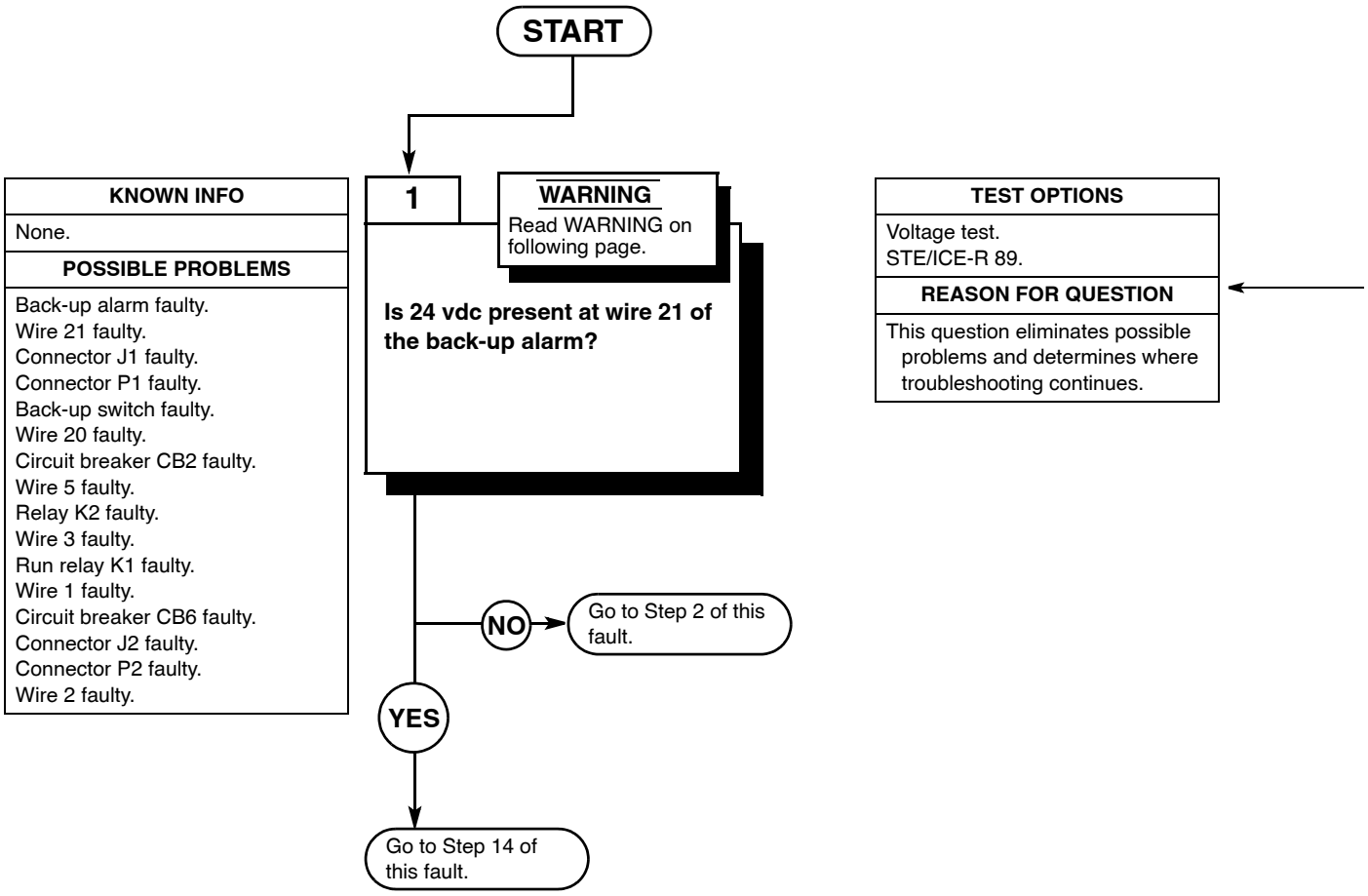
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Personnel Required
Two

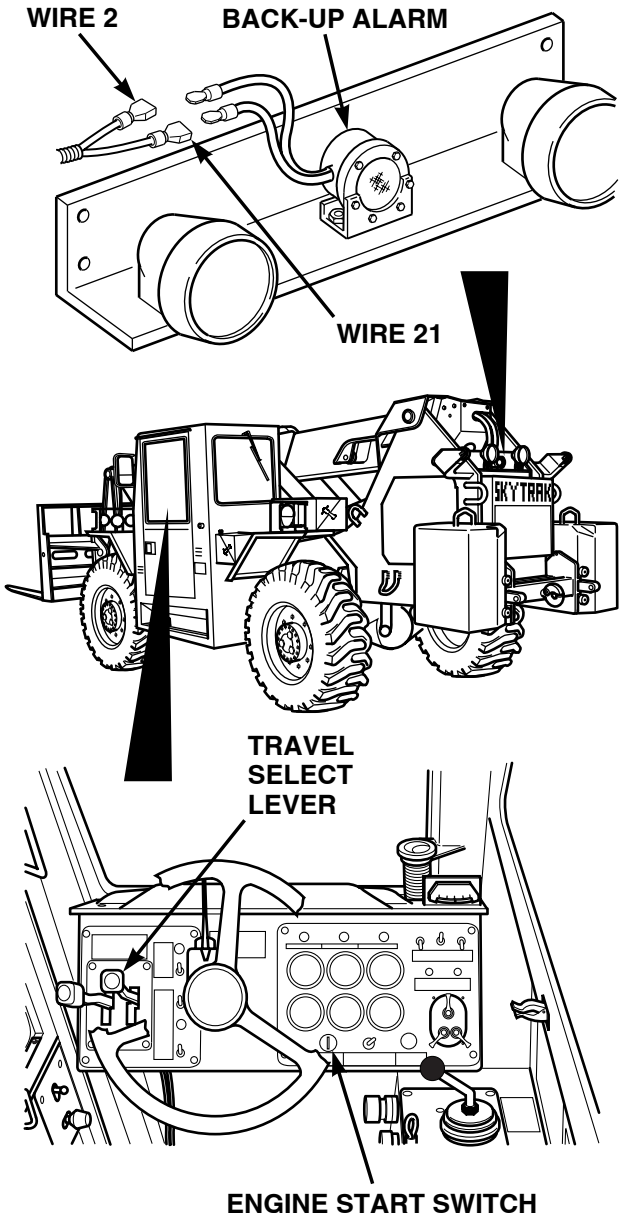
References
TM 10-3930-673-10

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Auxiliary fuel shut-off switch OFF
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.



VOLTAGE TEST

(1) Remove battery cover (Para 8-44).
(2) Disconnect negative battery cable from negative side of battery (Para 8-44).
(3) Disconnect wire 21 and wire 2 from back-up alarm.
(4) Set multimeter to volts dc.
(5) Connect multimeter positive (+) lead to known good ground.
(6) Connect multimeter negative (–) lead to known good ground.
(7) Connect negative battery cable (Para 8-44).
(8) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(9) Place travel select lever in reverse “R” position (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 14 of this fault.
  (b) If 24 vdc is not present, go to Step 2.
(10) Place travel select lever in neutral “N” position (TM 10-3930-673-10).
(11) Turn engine start switch to OFF position (TM 10-3930-673-10).

3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK.
POSSIBLE PROBLEMS
Wire 21 faulty. Connector J1 faulty. Connector P1 faulty. Back-up switch faulty. Wire 20 faulty. Circuit breaker CB2 faulty. Wire 5 faulty. Relay K2 faulty. Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Connector J2 faulty. Connector P2 faulty.

2

Is 24 vdc present at back-up switch where wire 21 connects?

NO → Go to Step 3 of this fault.

YES → Go to Step 17 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK.
POSSIBLE PROBLEMS
Back-up switch faulty. Wire 20 faulty. Circuit breaker CB2 faulty. Wire 5 faulty. Relay K2 faulty. Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Connector J2 faulty. Connector P2 faulty.

3

Is 24 vdc present at back-up switch where wire 20 connects?

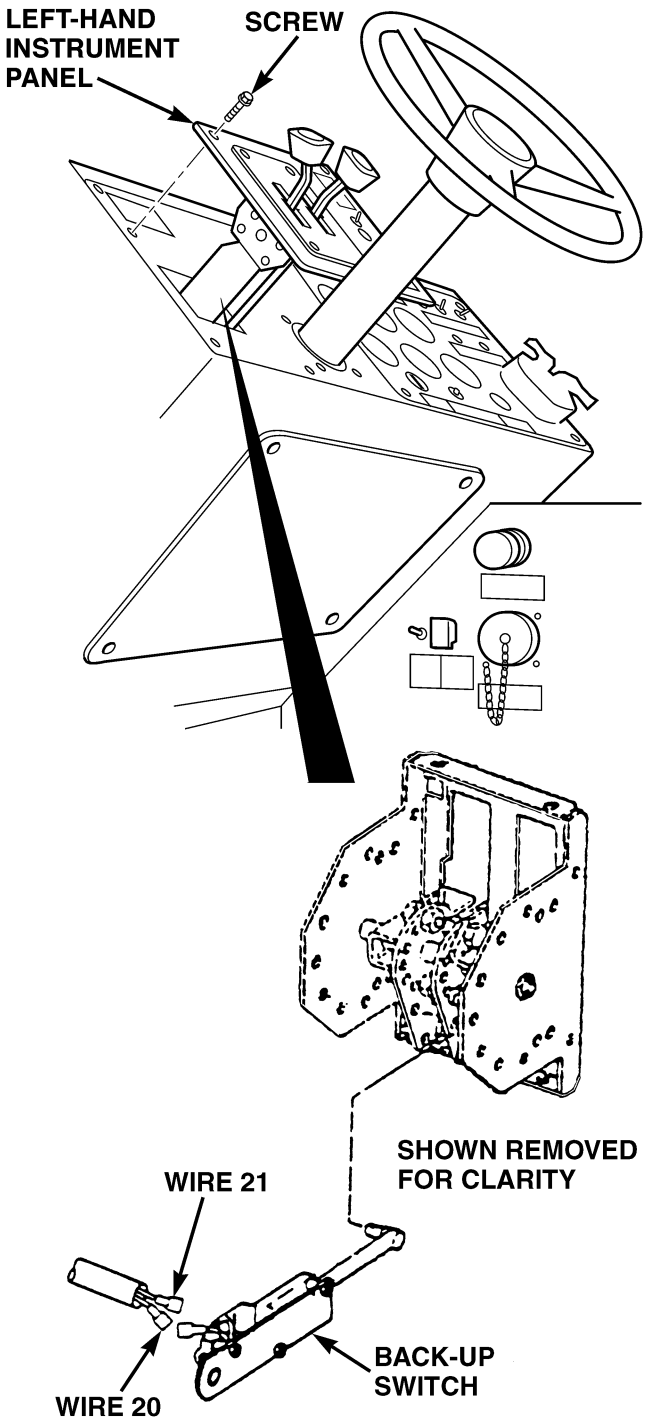
NO → Go to Step 4 of this fault.

YES → Replace back-up switch (Para 8-40).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, back-up switch faulty.

VOLTAGE TEST
(1) Remove four screws from left-hand instrument panel and lift selector panel out to get to back-up alarm switch. (2) Disconnect negative battery cable (Para 8-44). (3) Disconnect wire 21 from back-up switch. (4) Set multimeter to volts dc. (5) Connect multimeter positive (+) lead to wire 21 where wire 21 connects to back-up switch. (6) Connect multimeter negative (–) lead to known good ground. (7) Connect negative battery cable (Para 8-44). (8) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (9) Place travel select lever in reverse “R” position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 17 of this fault. (b) If 24 vdc is not present, go to Step 3 of this fault. (10) Turn engine start switch to OFF position (TM 10-3930-673-10). (11) Place travel select lever in neutral “N” position (TM 10-3930-673-10). (12) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Disconnect wire 20 from back-up switch. (2) Set multimeter to volts dc. (3) Connect multimeter positive (+) lead to wire 20. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable (Para 8-44). (6) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, replace back-up switch (Para 8-40). (b) If 24 vdc is not present, go to Step 4 of this fault. (7) Turn engine start switch to OFF position engine start switch (TM 10-3930-673-10). (8) Disconnect negative battery cable (Para 8-44).



3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK.
POSSIBLE PROBLEMS
Wire 20 faulty. Circuit breaker CB2 faulty. Wire 5 faulty. Relay K2 faulty. Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Connector J2 faulty. Connector P2 faulty.

4

Is 24 vdc present at circuit breaker CB2 where wire 20 connects?

NO → Go to Step 5 of this fault.

YES → Repair wire 20 (Para 8-48).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, wire 20 faulty.

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK.
POSSIBLE PROBLEMS
Circuit breaker CB2 faulty. Wire 5 faulty. Relay K2 faulty. Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

5

Is 24 vdc present at circuit breaker CB2 where wire 5 connects?

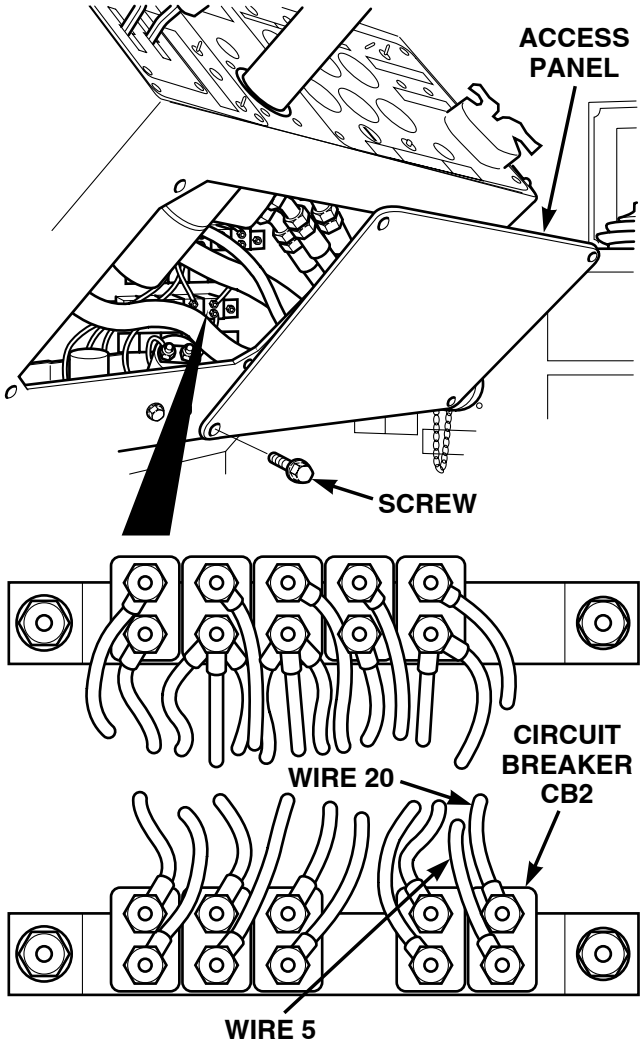
NO → Go to Step 6 of this fault.

YES → Replace circuit breaker CB2 (Para 8-11).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, circuit breaker CB2 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Remove four screws and access panel. (3) Connect multimeter positive (+) lead to circuit breaker CB2 where wire 20 connects. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (6) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 20 (Para 8-48). (b) If 24 vdc is not present, go to Step 5 of this fault. (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB2 where wire 5 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, replace circuit breaker CB2 (Para 8-11). (b) If 24 vdc is not present, go to Step 6 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).



3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK.
POSSIBLE PROBLEMS
Wire 5 faulty. Relay K2 faulty. Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

6

Is 24 vdc present at relay K2 where wire 5 connects?

NO → Go to Step 7 of this fault.

YES → Repair wire 5 (Para 8-48).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, wire 5 faulty.

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK.
POSSIBLE PROBLEMS
Relay K2 faulty. Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

7

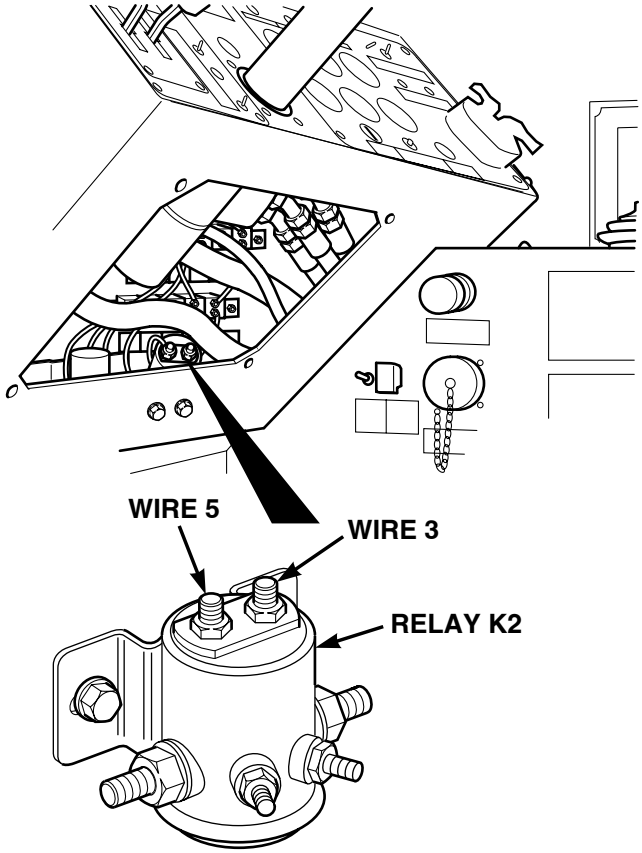
Is 24 vdc present at relay K2 where wire 3 connects?

NO → Go to Step 8 of this fault.

YES → Replace relay K2 (Para 8-23).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, relay K2 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K2 where wire 5 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 5 (Para 8-48). (b) If 24 vdc is not present, go to Step 7 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K2 where wire 3 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, replace relay K2 (Para 8-23). (b) If 24 vdc is not present, go to Step 8 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).

3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

8

Is 24 vdc present at relay K1 (run relay) where wire 3 connects?

NO → Go to Step 9 of this fault.

YES → Repair wire 3 (Para 8-48).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, wire 3 faulty.

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Run relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

9

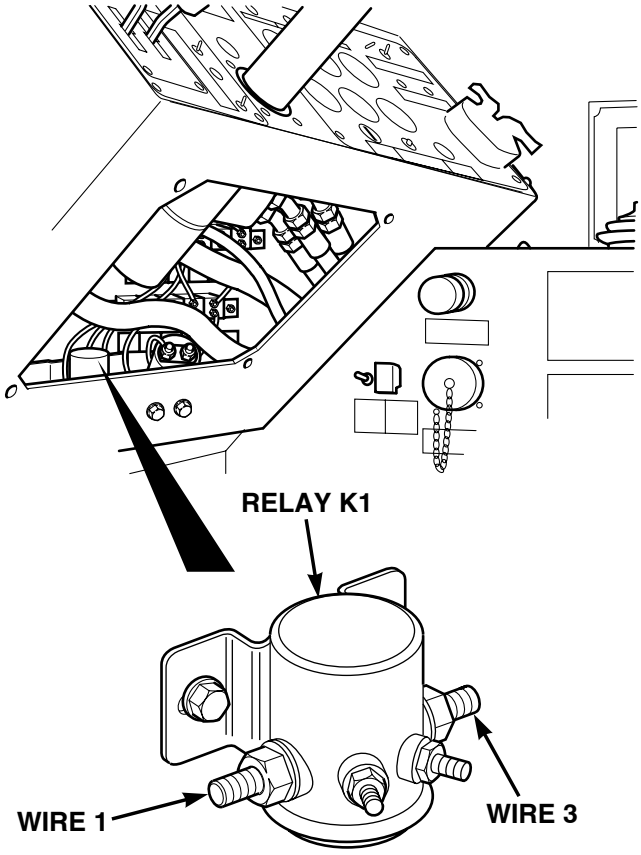
Is 24 vdc present at relay K1 where wire 1 connects?

NO → Go to Step 10 of this fault.

YES → Replace relay K1 (Para 8-23).

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, relay K1 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K1 where wire 3 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 3 (Para 8-48). (b) If 24 vdc is not present, go to Step 9 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K1 where wire 1 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, replace relay K1 (Para 8-23). (b) If 24 vdc is not present, go to Step 10 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).

3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Circuit breaker CB6 faulty. Connector J2 faulty. Connector P2 faulty.

10

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, wire 1 faulty.

NO → Go to Step 11 of this fault.

YES → Repair wire 1 (Para 8-48).

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Connector J2 faulty. Connector P2 faulty.

11

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

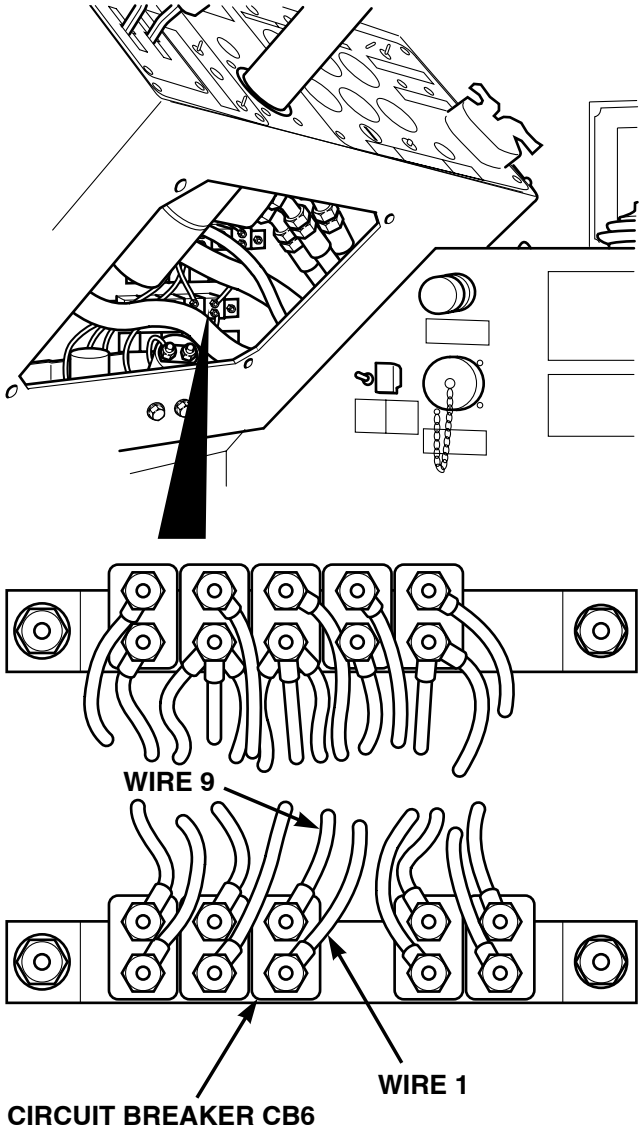
TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
If 24 vdc is present, circuit breaker CB6 faulty.

NO → Go to Step 12 of this fault.

YES → Replace circuit breaker CB6 (Para 8-11).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, repair wire 1 (Para 8-48). (b) If 24 vdc is not present, go to Step 11 of this fault. (5) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB6 where wire 9 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, replace circuit breaker CB6 (Para 8-11). (b) If 24 vdc is not present, go to Step 12 of this fault. (5) Disconnect negative battery cable (Para 8-44).



3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Connector P2 faulty. Wire 9 faulty.

12

Is 24 vdc present at connector P2-1?

NO → Repair connector P2 or wire 9 (Para 8-49).

YES → Go to Step 19 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Back-up alarm OK. Connector J1 OK. Connector P1 OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Connector P2 faulty. Wire 9 faulty.

13

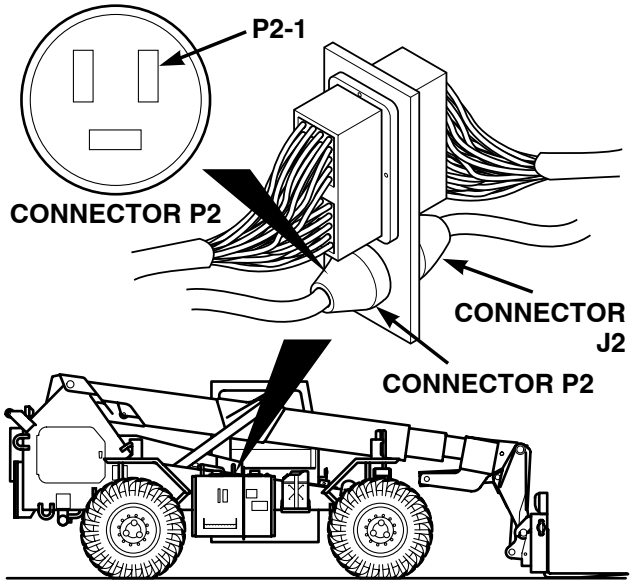
Is 24 vdc present at starter motor solenoid where wire 9 connects?

NO → Service or replace battery cable (Para 8-44).

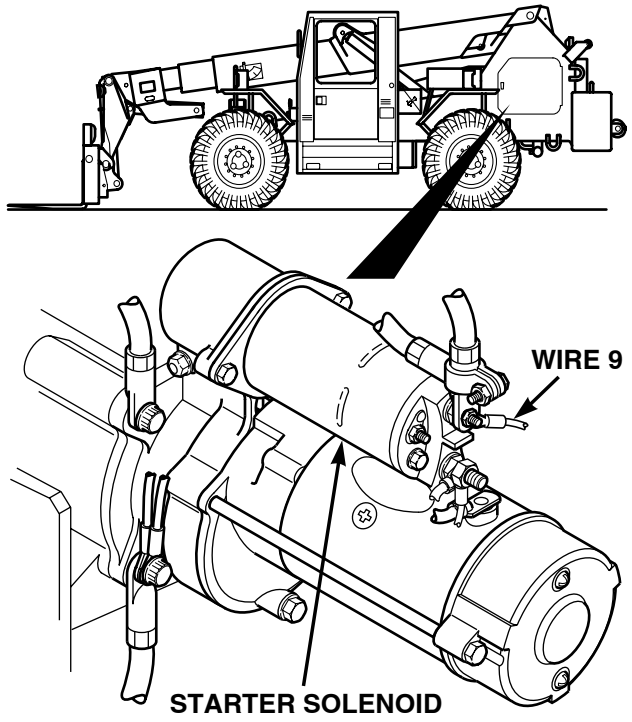
YES → Go to Step 20 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R 89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to volts dc. (3) Connect multimeter positive (+) lead to connector P2-1. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 19 of this fault. (b) If 24 vdc is not present, repair connector P2 or wire 9 (Para 8-49). (6) Connect connector J2 to connector P2.



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to wire 9 where wire 9 connects to starter motor solenoid. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 20 of this fault. (b) If 24 vdc is not present, service or replace battery cable (Para 8-44). (5) Disconnect negative battery cable (Para 8-44).



3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J2 faulty. Connector P2 faulty. Wire 2 faulty.

14

Is continuity present on wire 2 between negative battery cable and wire 2 at back-up alarm?

NO → Go to Step 15 of this fault.

YES → Replace back-up alarm (Para 8-39).

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is present, back-up alarm faulty.

KNOWN INFO
Back-up alarm OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J2 faulty. Connector P2 faulty. Wire 2 faulty.

15

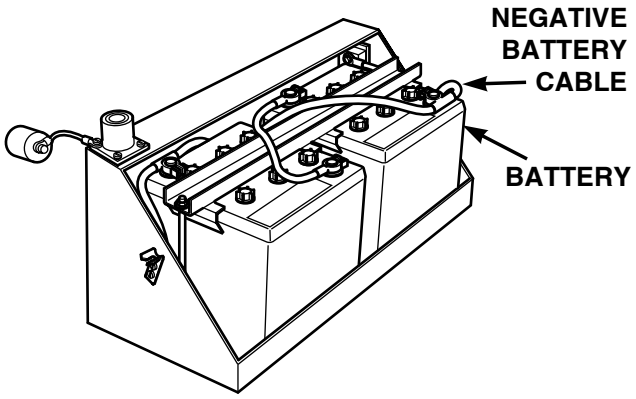
Is continuity present on wire 2 between connector J2-2 and wire 2 on back-up alarm?

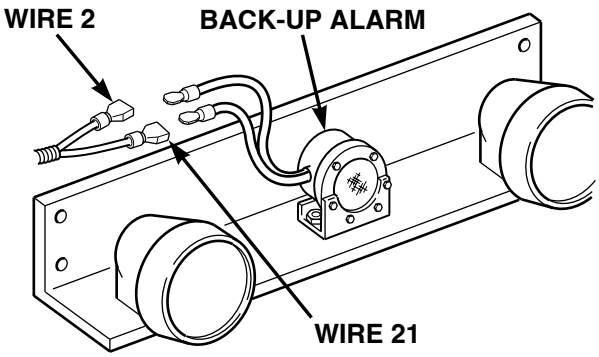
NO → Repair connector J2 or wire 2 (Para 8-48).

YES →

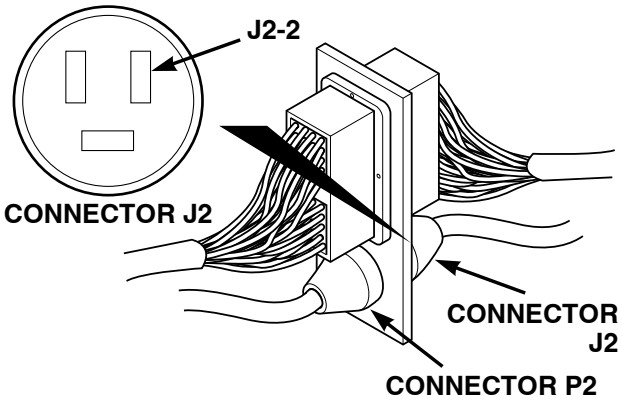
TEST OPTIONS
Continuity test. STE/ICE-R 91.
REASON FOR QUESTION
If continuity is not present, repair wire 2 or connector J2.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive (+) lead to negative cable at battery. (3) Connect multimeter negative (–) lead to wire 2 at back of back-up alarm. (a) If continuity is present, replace back-up alarm (Para 8-39). (b) If continuity is not present, go to Step 15 of this fault.





CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive (+) lead to connector J2-2. (4) Connect multimeter negative (–) lead to wire 2 where it connects to back-up alarm. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 2 or connector J2 (Para 8-48).



3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Circuit breaker CB6 OK. Wire 9 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Connector P1 faulty. Connector J1 faulty. Connector J2 faulty. Connector P2 faulty. Wire 2 faulty.

16

Is continuity present on wire 2 between connector P2-2 and negative battery cable?

NO → Repair wire 2 or connector P2 (Para 8-49).

YES → Replace back-up alarm (Para 8-39).

TEST OPTIONS
Continuity test. STE/ICE-R 91.
REASON FOR QUESTION
If continuity is not present, wire 2 or connector P2 faulty.

KNOWN INFO
Back-up alarm OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Circuit breaker CB6 OK. Wire 9 OK. Connector J2 OK. Connector P2 OK. Wire 2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Connector P2 faulty. Wire 21 faulty.

17

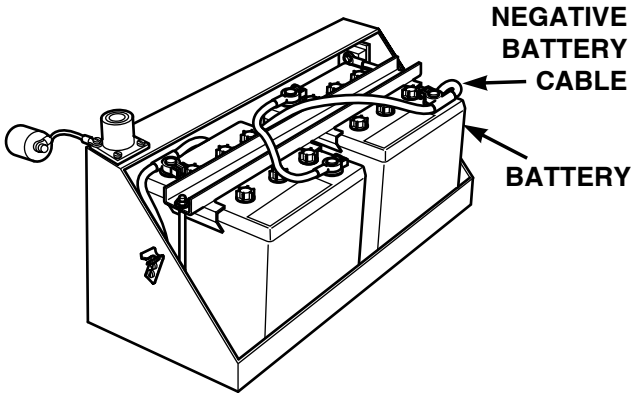
Is continuity present on wire 21 between connector J1-19 and where wire 21 connects at back-up switch?

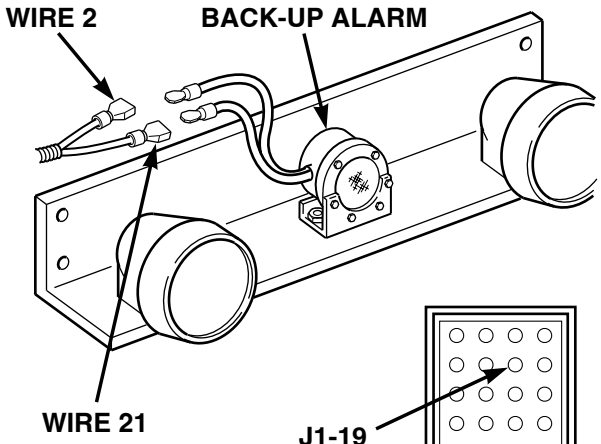
NO → Repair wire 21 or connector J1 (Para 8-48).

YES →

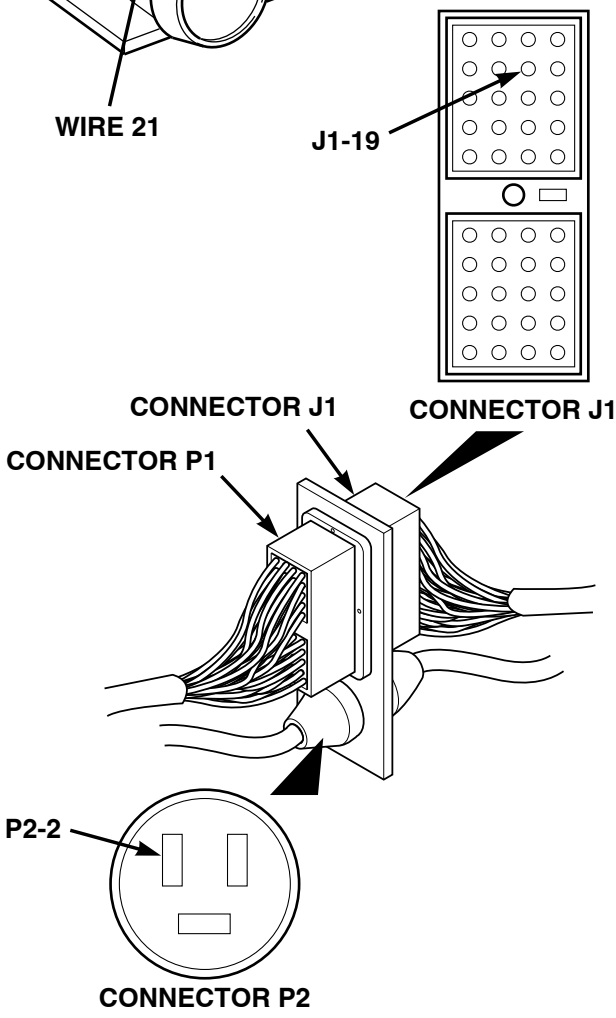
TEST OPTIONS
Continuity test. STE/ICE-R 91.
REASON FOR QUESTION
If continuity is not present, wire 21 or connector J1 faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive (+) lead to negative battery cable. (3) Connect multimeter negative (–) lead to connector P2-2. (a) If continuity is present, replace back-up alarm (Para 8-39). (b) If continuity is not present, repair wire 2 or connector P2 (Para 8-49). (4) Connect connector J2 to connector P2.





CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J1 from connector P1. (3) Connect multimeter positive (+) lead to connector J1-19. (4) Connect multimeter negative (–) lead to wire 21 where wire 21 connects to back-up switch. (a) If continuity is present, go to Step 18 of this fault. (b) If continuity is not present, repair wire 21 or connector J1 (Para 8-48).



3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Circuit breaker CB6 OK. Wire 9 OK. Connector J2 OK. Connector P2 OK. Wire 2 OK. Connector J1 OK.
POSSIBLE PROBLEMS
Connector P1 faulty. Wire 21 faulty.

18

Is continuity present on wire 21 between connector P1-19 and where wire 21 connects to back-up alarm?

NO → Repair wire 21 or connector P1 (Para 8-49).

YES → Go to Step 3 of this fault.

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 21 or connector P1 faulty.

KNOWN INFO
Back-up alarm OK. Connector J1 OK Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Connector P2 faulty. Wire 9 faulty.

19

Is continuity present between connector J2-1 and wire 9 at circuit breaker CB6?

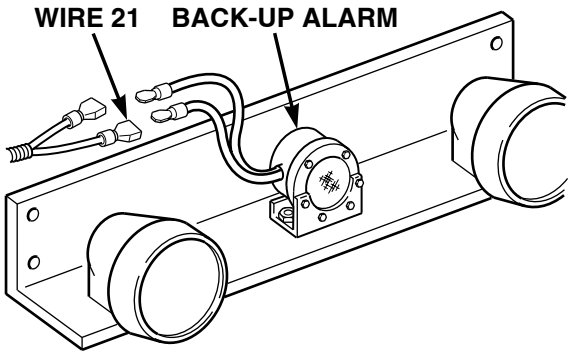
NO → Replace wire 9 or connector J2 (Para 8-48).

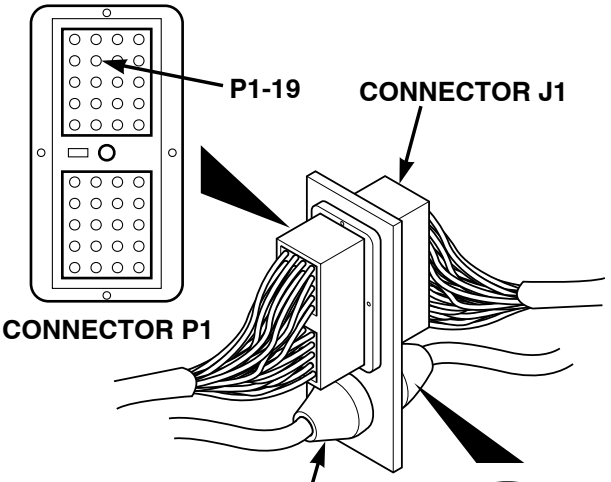
YES →

TEST OPTIONS
Continuity test.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 faulty.

CONTINUITY TEST

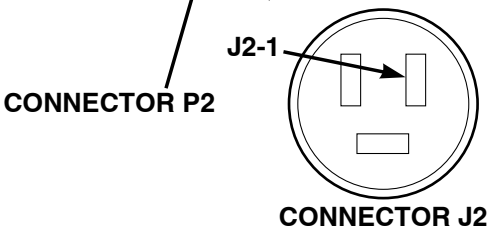
(1) Set multimeter to ohms.
(2) Connect multimeter positive (+) lead to connector P1-19.
(3) Connect multimeter negative (–) lead to wire 21 where wire 21 connects at back-up alarm.
  (a) If continuity is present, go to Step 3 of this fault.
  (b) If continuity is not present, repair wire 21 or connector P1 (Para 8-49).
(4) Connect connector J1 to connector P1.

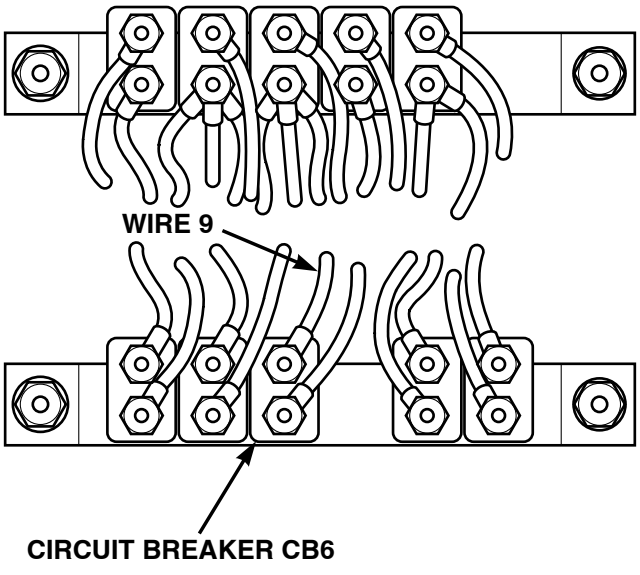




CONTINUITY TEST

(1) Disconnect connector J2 from connector P2.
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to connector J2-1.
(4) Connect multimeter negative lead (–) to wire 9.
  (a) If continuity is present, go to Step 20 of this fault.
  (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48).
(5) Install access panel and four screws to secure access panel.





3. BACK-UP ALARM DOES NOT OPERATE (CONT).

KNOWN INFO
Back-up alarm OK. Connector J1 OK Wire 21 OK. Back-up switch OK. Wire 20 OK. Circuit breaker CB2 OK. Wire 5 OK. Relay K2 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Wire 9 faulty.

20

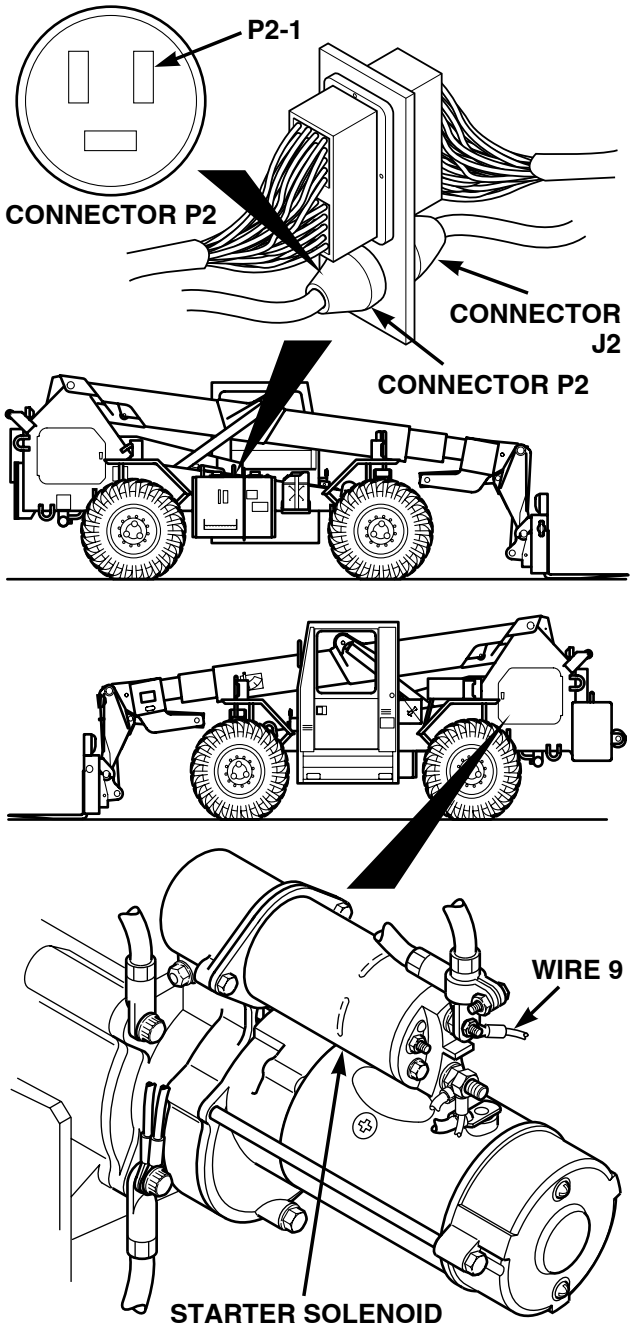
Is continuity present between starter motor solenoid wire 9 and connector P2-1?

NO → Replace wire 9 or connector P2 (Para 8-49).

YES → Service or replace batteries (Para 8-42).

TEST OPTIONS
Continuity test.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to starter motor solenoid where wire 9 connects. (3) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49). (4) Connect connector J2 to connector P2. (5) Install battery cover (Para 8-42).



4. CAB DEFROSTER FAN(S) DO NOT OPERATE.

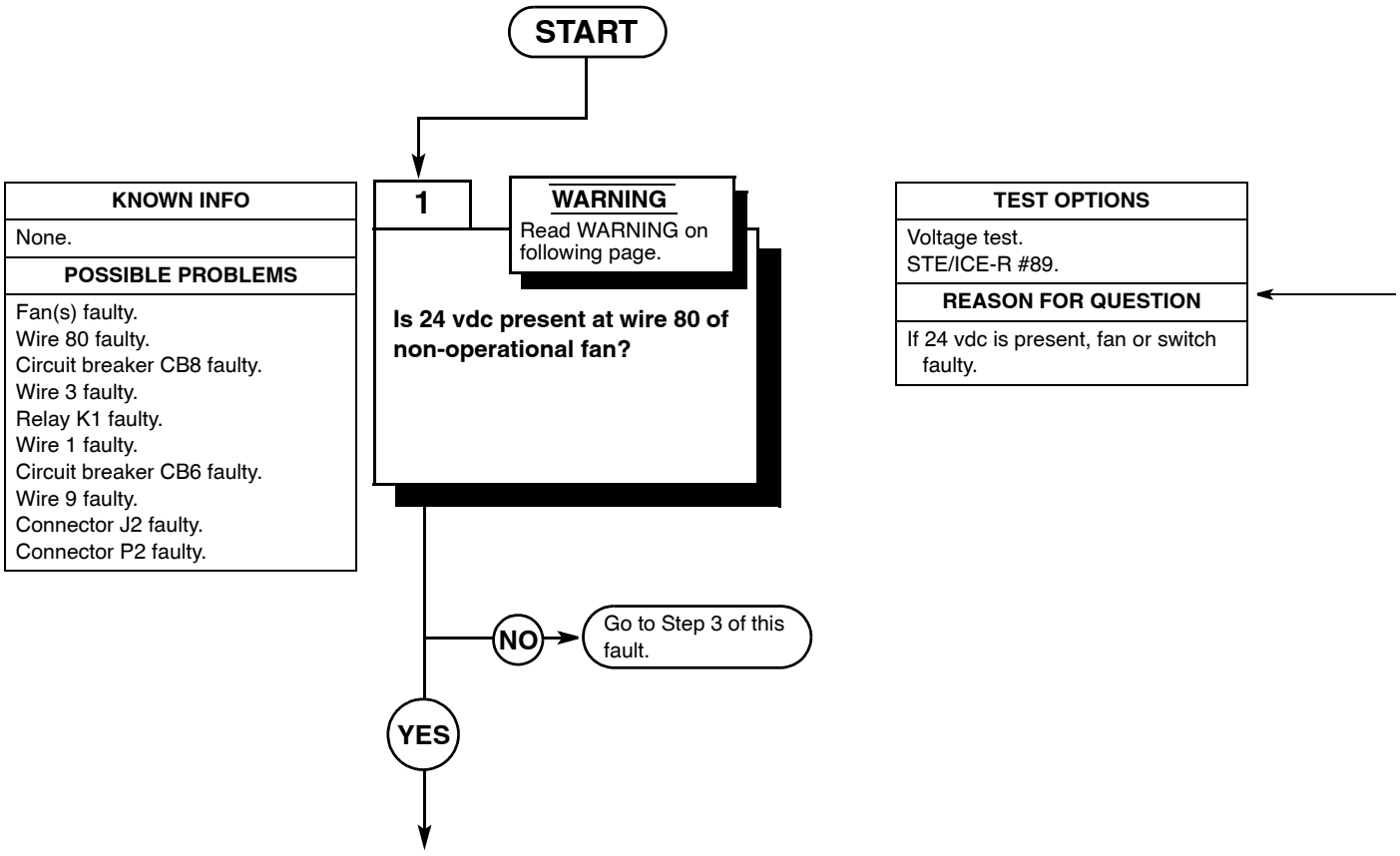
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Personnel Required
Two

References
TM 10-3930-673-10

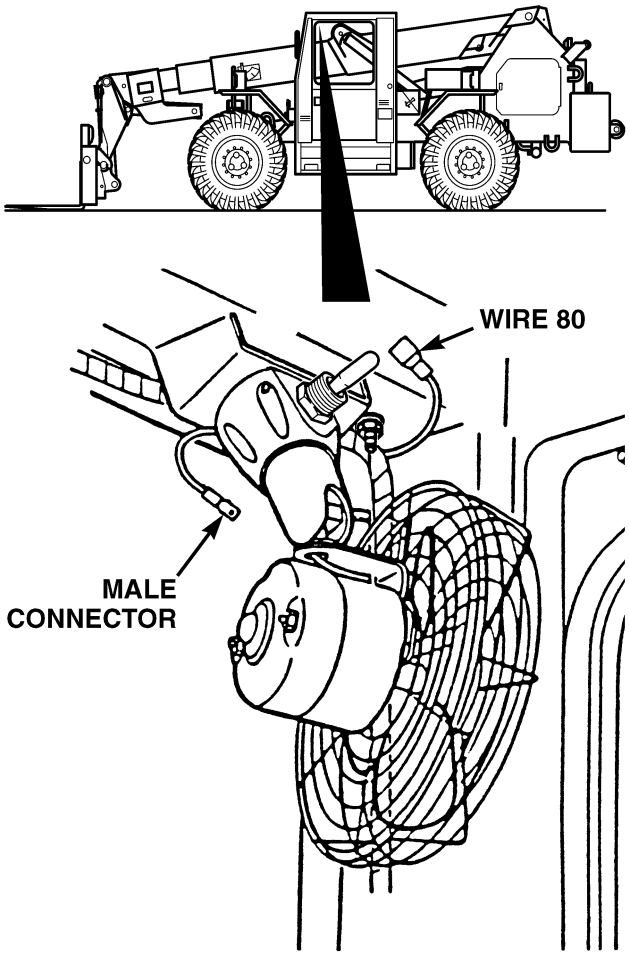
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Auxiliary fuel shut-off switch OFF
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

- Remove rings, bracelets, watches, necklace, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove battery cover(s) (Para 8-44). (2) Disconnect negative battery cable from negative side of battery (Para 8-44). (3) Disconnect wire 80 female connector from male connector. (4) Set multimeter to volts dc. (5) Connect multimeter positive (+) lead to wire 80 female end. (6) Connect multimeter negative (–) lead to known good ground. (7) Connect negative battery cable to negative side of battery (Para 8-44). (8) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 2 of this fault. (b) If 24 vdc is not present, go to Step 3 of this fault. (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable (Para 8-44).



4. CAB DEFROSTER FAN(S) DO NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Fan(s) faulty. Wire 80 faulty. Circuit breaker CB8 faulty. Wire 3 faulty. Relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

2

Is continuity present between fan ground and fan guard?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, fan faulty.

NO → Replace faulty fan (Para 17-6).

YES

KNOWN INFO
Fan OK. Ground OK.
POSSIBLE PROBLEMS
Wire 80 faulty. Circuit breaker CB8 faulty. Wire 3 faulty. Relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

3

Is 24 vdc present at circuit breaker CB8 where wire 80 connects?

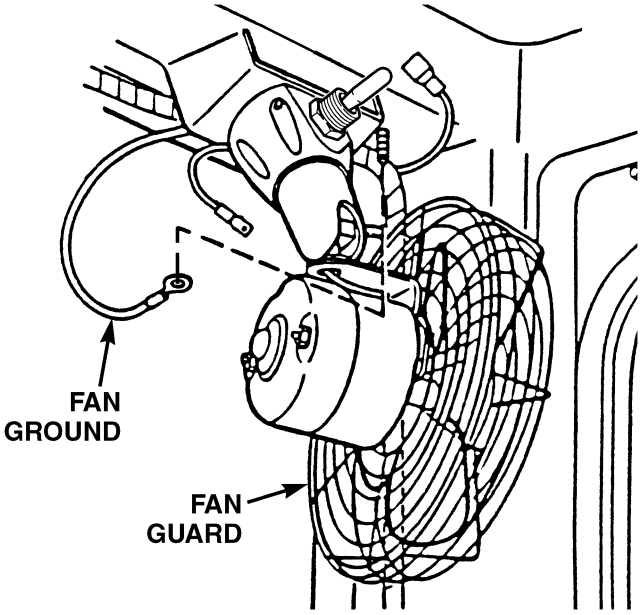
TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is present, wire 80 faulty.

NO → Go to Step 4 of this fault.

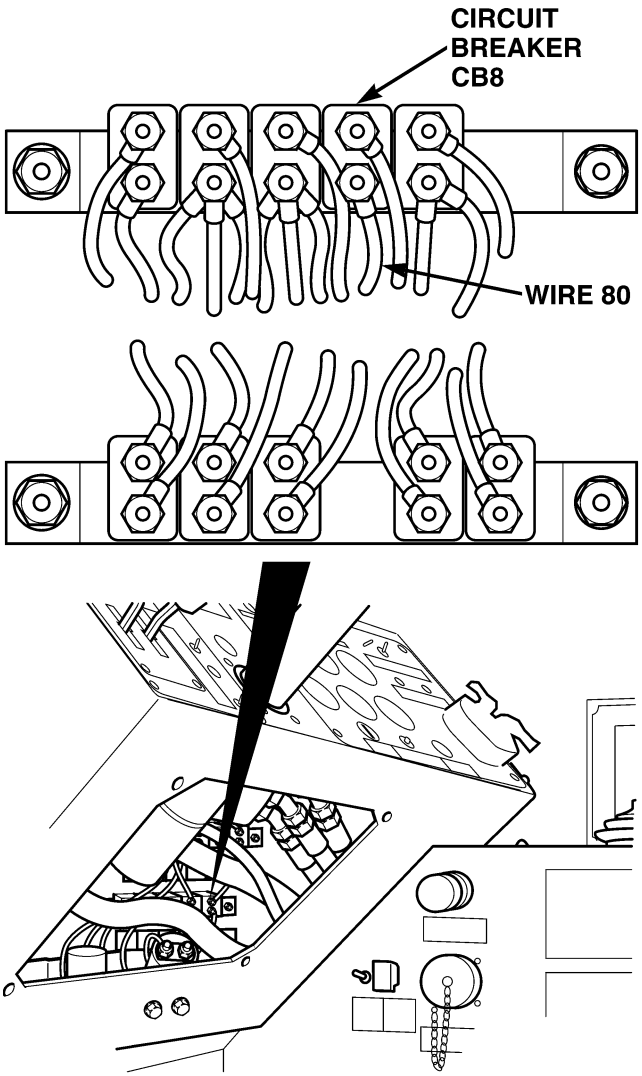
YES

Repair wire 80 (Para 8-48).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive (+) lead to fan ground. (3) Connect multimeter negative (–) lead to fan guard. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, replace faulty fan (Para 17-6).



VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive (+) lead to circuit breaker CB8 where wire 80 connects. (4) Connect multimeter negative (–) lead to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (6) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 80 (Para 8-48). (b) If 24 vdc is not present, go to Step 4 of this fault. (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable (Para 8-42).



4. CAB DEFROSTER FAN(S) DO NOT OPERATE (CONT).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK.
POSSIBLE PROBLEMS
Circuit breaker CB8 faulty. Wire 3 faulty. Relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

4

Is 24 vdc present at circuit breaker CB8 where wire 3 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is present, circuit breaker CB8 faulty.

NO → Go to Step 5 of this fault.

YES → Replace circuit breaker CB8 (Para 8-11).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

5

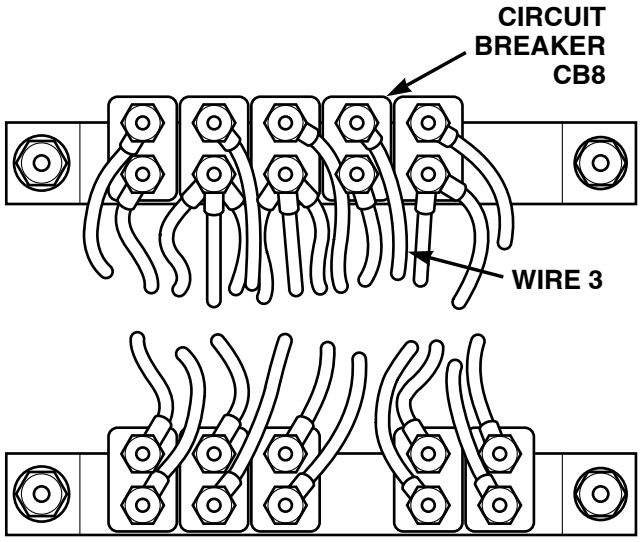
Is 24 vdc present at relay K1 (run relay) where wire 3 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is present, wire 3 faulty.

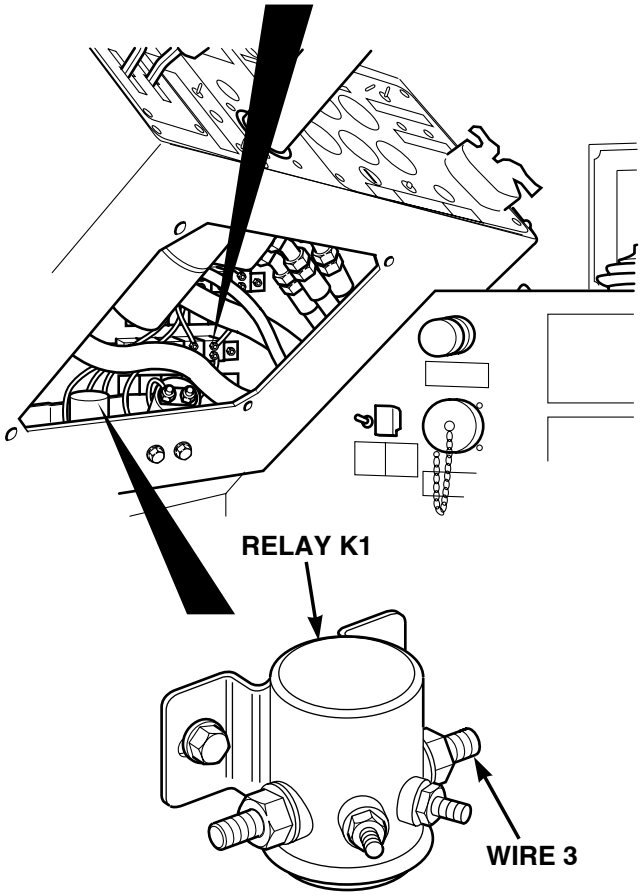
NO → Go to Step 6 of this fault.

YES → Repair wire 3 (Para 8-48).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB8 where wire 3 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, replace faulty circuit breaker CB8 (Para 8-11). (b) If 24 vdc is not present, go to Step 5 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K1 where wire 3 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch ON, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 3 (Para 8-48). (b) If 24 vdc is not present, go to Step 6 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable (Para 8-44).



4. CAB DEFROSTER FAN(S) DO NOT OPERATE (CONT).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Relay K1 faulty. Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

6

Is 24 vdc present at relay K1 where wire 1 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is present, relay K1 faulty.

NO → Go to Step 7 of this fault.

YES → Replace relay K1 (Para 8-23).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK. Relay K1 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

7

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

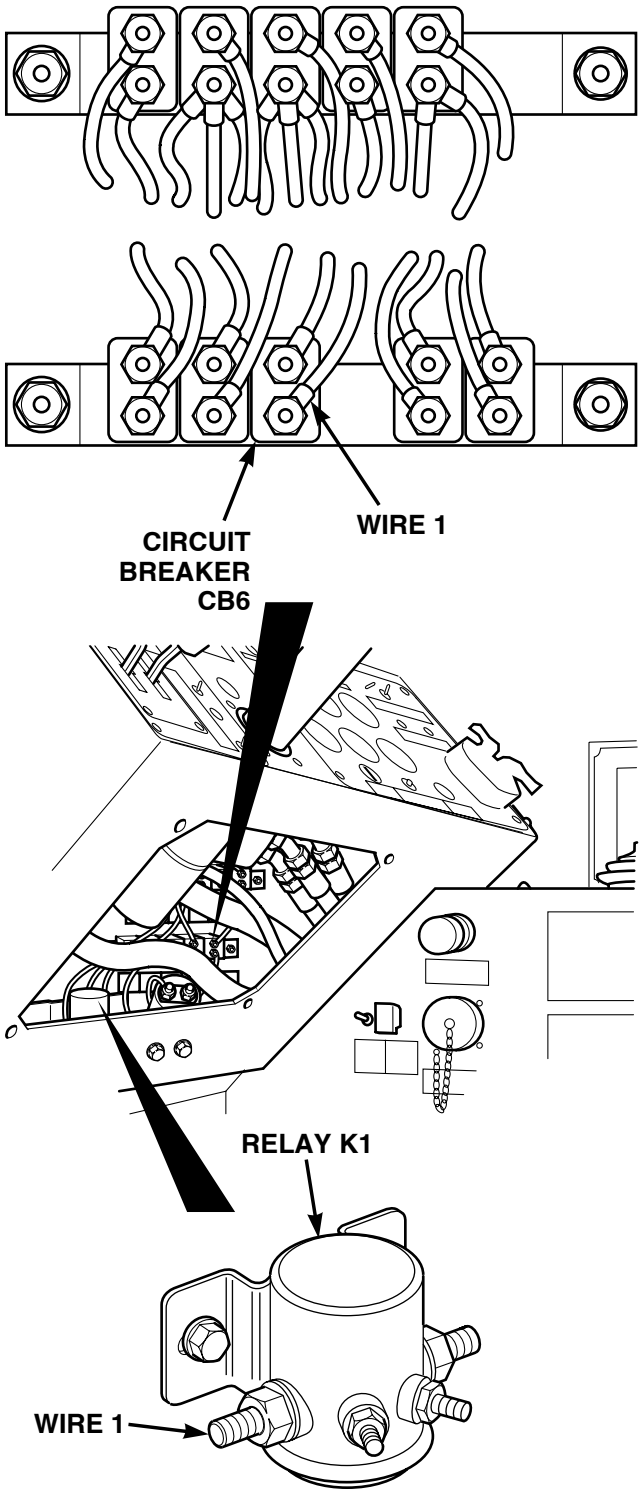
TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is present, wire 1 faulty.

NO → Go to Step 8 of this fault.

YES → Repair wire 1 (Para 8-48).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to relay K1 where wire 1 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, replace relay K1 (Para 8-23). (b) If 24 vdc is not present, go to Step 7 of this fault. (5) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, repair faulty wire 1 (Para 8-48). (b) If 24 vdc is not present, go to Step 8 of this fault. (5) Disconnect negative battery cable (Para 8-44).



4. CAB DEFROSTER FAN(S) DO NOT OPERATE (CONT).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

8

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 9 of this fault.

YES → Replace circuit breaker CB6 (Para 8-11).

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is present, circuit breaker CB6 faulty.

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

9

Is 24 vdc present at connector J2-1?

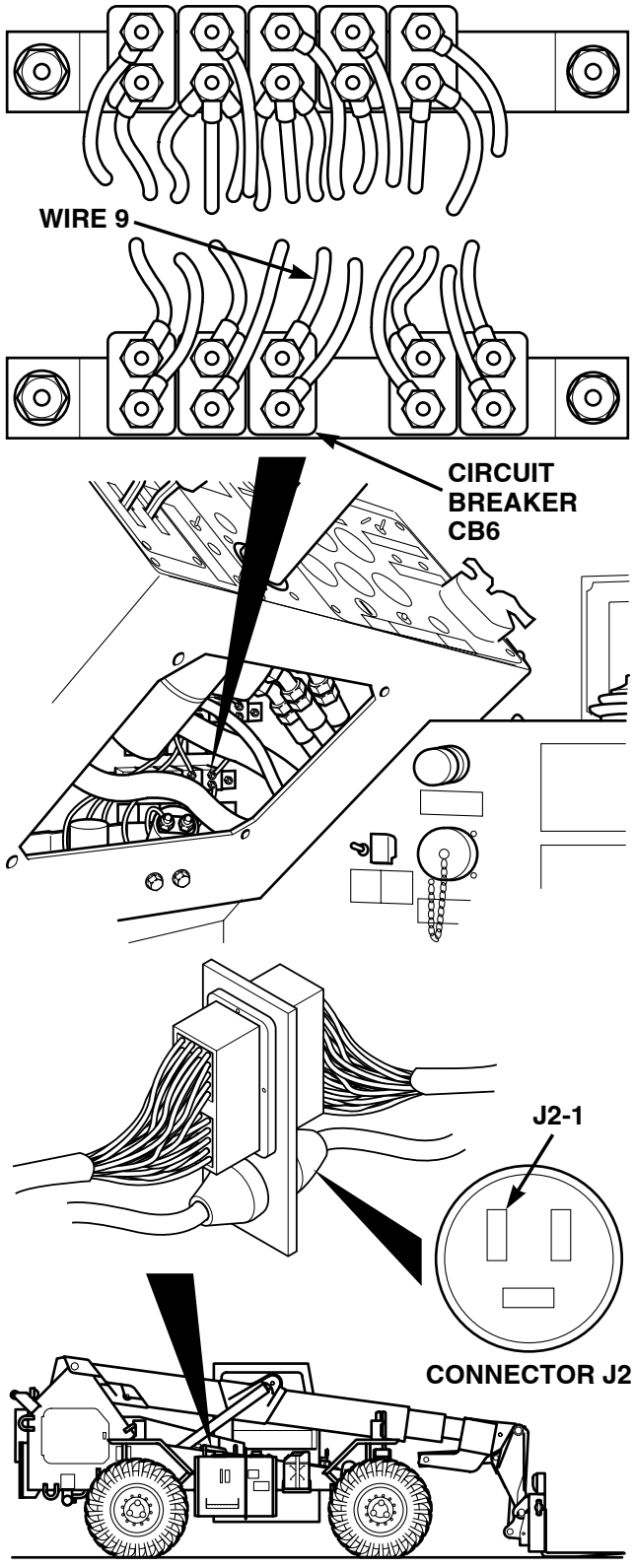
NO → Go to Step 10 of this fault.

YES → Go to Step 11 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to circuit breaker CB6 where wire 9 connects. (3) Connect multimeter negative (–) lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, replace circuit breaker CB6 (Para 8-11). (b) If 24 vdc is not present, go to Step 9 of this fault. (5) Disconnect negative battery cable (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive (+) lead to connector J2-1. (3) Connect multimeter negative (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, go to Step 10 of this fault. (5) Disconnect negative battery cable (Para 8-44).



4. CAB DEFROSTER FAN(S) DO NOT OPERATE (CONT).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

10

Is 24 vdc present at starter motor solenoid where wire 9 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Service or replace battery cable (Para 8-42)

YES → Go to Step 12 of this fault.

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector P2 faulty. Connector J2 faulty.

11

Is continuity present on wire 9 between connector P2-1 and wire 9, where wire 9 connects to starter motor solenoid?

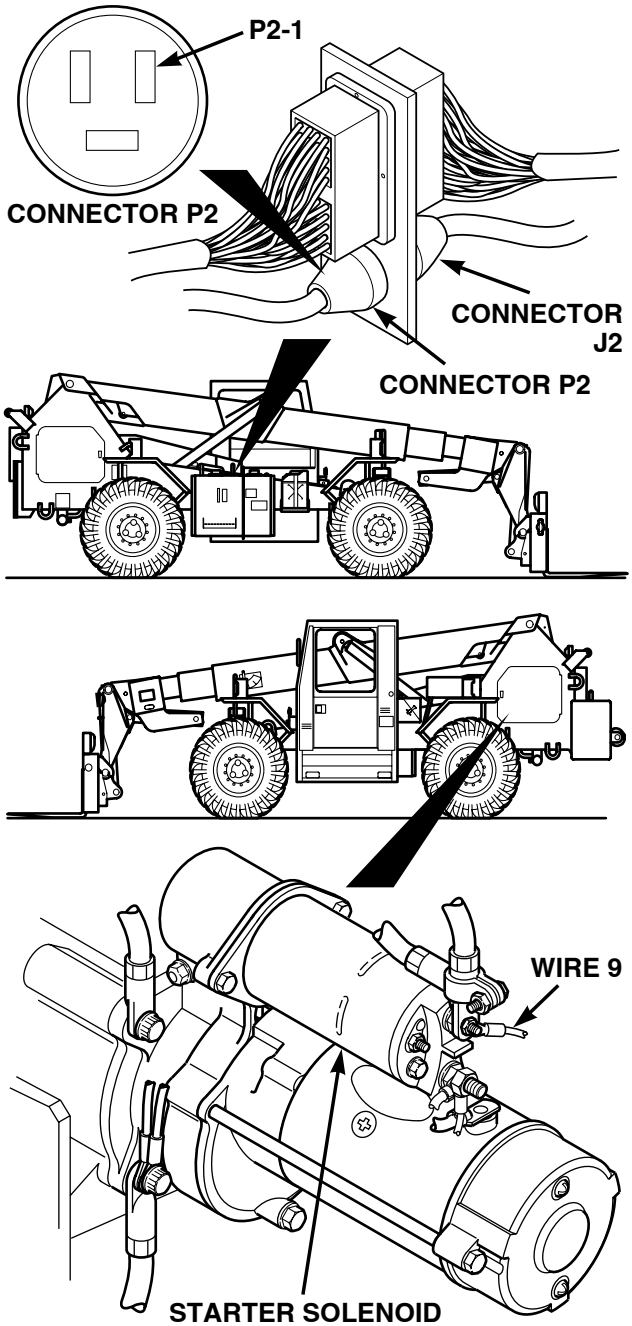
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 faulty.

NO → Repair P2 or wire 9 (Para 8-49).

YES →

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead to starter motor solenoid where wire 9 connects. (3) Connect multimeter negative lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 12 of this fault. (b) If 24 vdc is not present, service battery cable (Para 8-42). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).

CONTINUITY TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to ohms. (3) Connect multimeter positive (+) lead to connector P2-1. (4) Connect multimeter negative (–) lead to wire 9 where it connects to starter motor solenoid. (a) If continuity is present, go to Step 12 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49). (5) Connect connector J2 to connector P2.



4. CAB DEFROSTER FAN(S) DO NOT OPERATE (CONT).

KNOWN INFO
Fan OK. Ground OK. Wire 80 OK. Circuit breaker CB8 OK. Wire 3 OK. Relay K1 OK. Wire 1 OK. Circuit breaker CB6 OK. Connector P2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty.

12

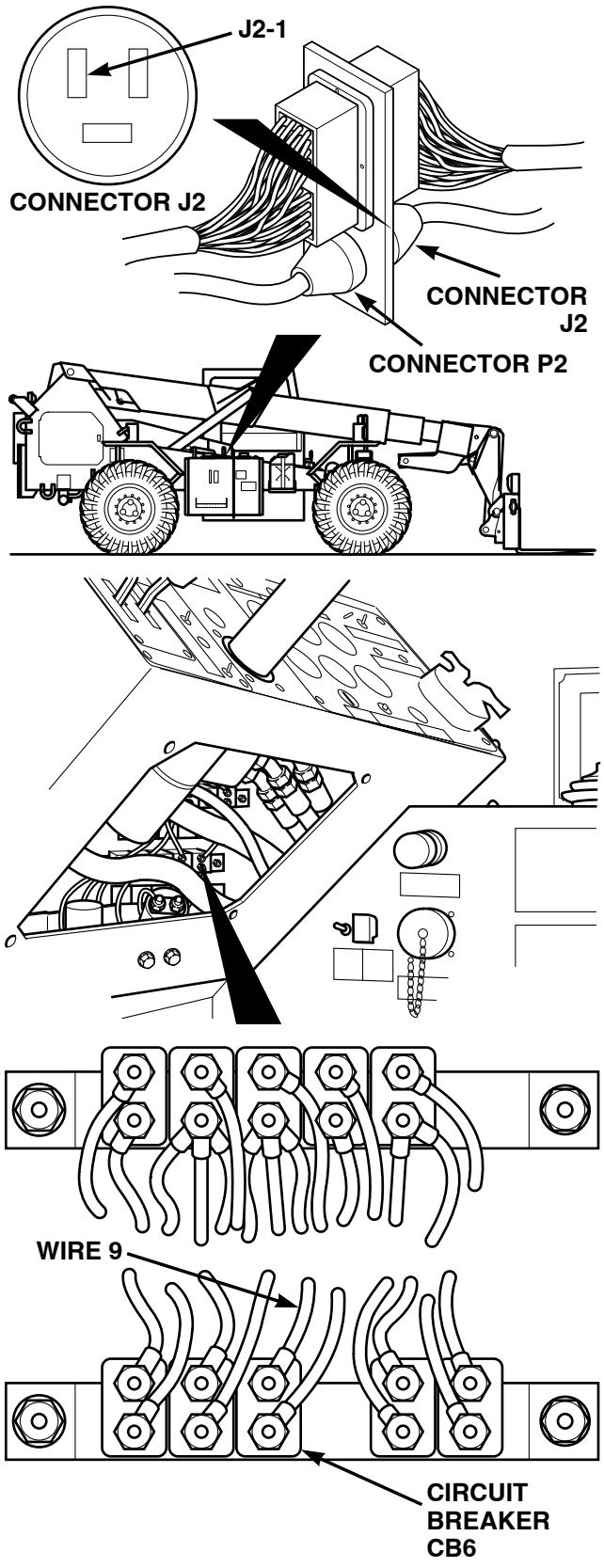
Is continuity present on wire 9 between connector J2 and where wire 9 connects to circuit breaker CB6?

TEST OPTIONS
Continuity test.
REASON FOR QUESTION
If continuity is not present, connector J2 or wire 9 faulty.

NO → Repair connector J2 (Para 8-48) or wire 9.

YES → Service or replace batteries (Para 8-42).

CONTINUITY TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to ohms. (3) Connect multimeter positive (+) lead to connector J2-1. (4) Connect multimeter negative (–) lead to wire 9 where wire 9 connects to circuit breaker CB6. (a) If continuity is present, service or replace batteries (Para 8-42). (b) If continuity is not present, repair connector J2 or wire 9 (Para 8-48). (5) Connect connector J2 to connector P2. (6) Install access panel and four screws. (7) Install battery cover (Para 8-42).



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE.

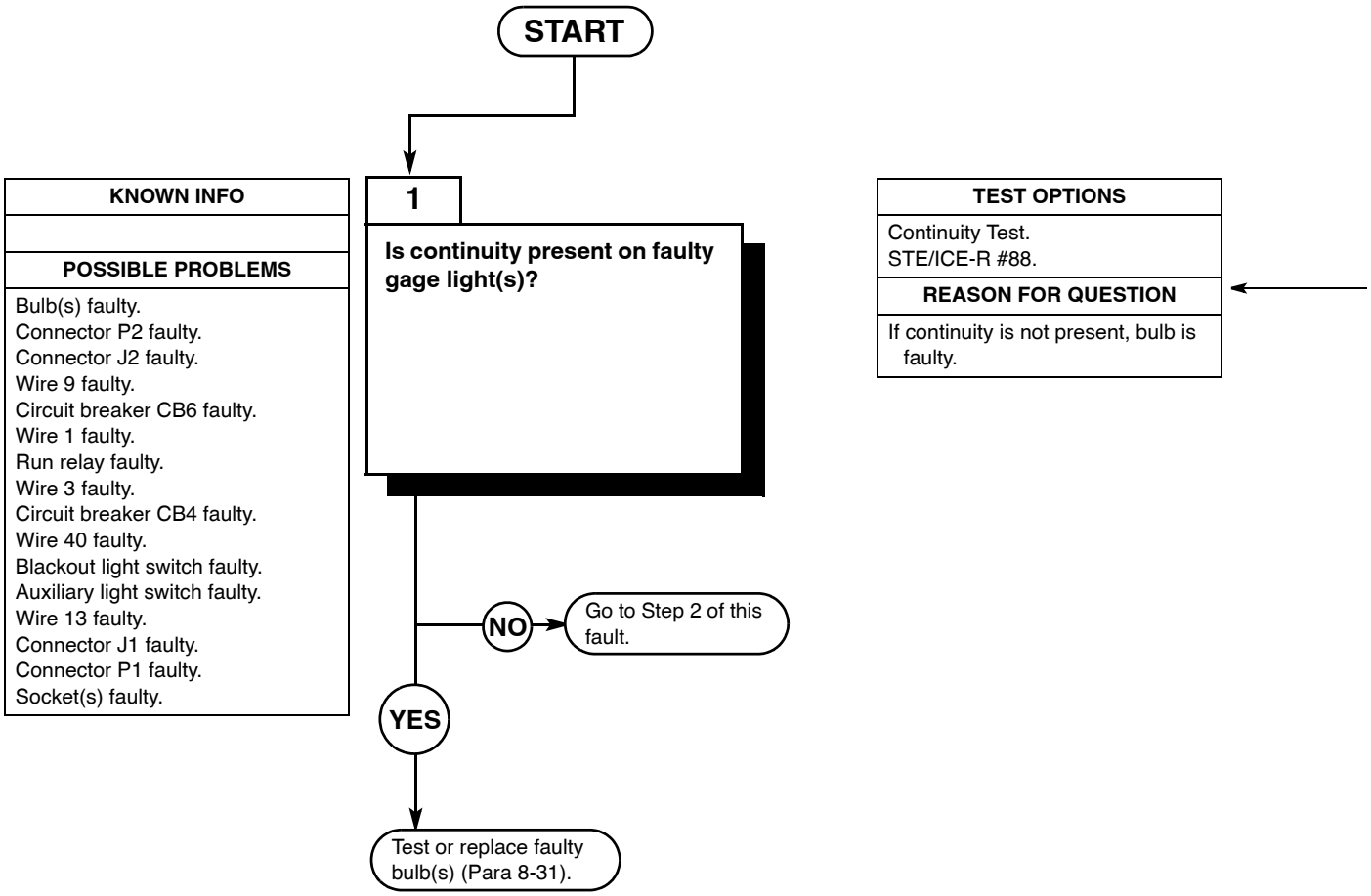
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

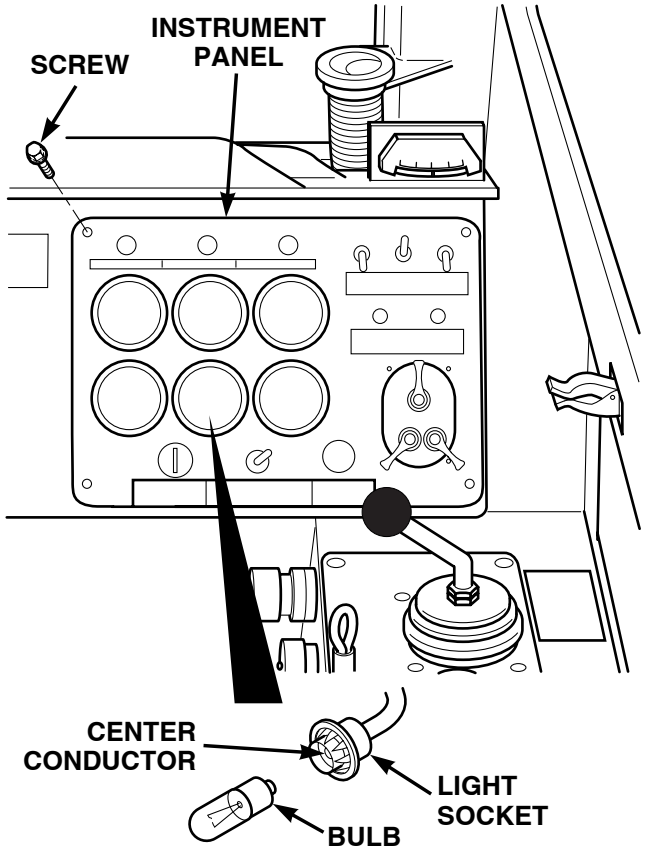
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove four screws and instrument panel. (2) Raise instrument panel out to reach faulty bulb. (3) Remove bulb from faulty gage light (Para 8-6). (4) Set multimeter to ohms. (5) Connect multimeter positive lead (+) to center conductor. (6) Connect multimeter negative lead (–) to outside conductor ground. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace the bulb (Para 8-6).



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at faulty gage light socket?

NO → Go to Step 3 of this fault.

YES → Go to Step 14 of this fault.

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

3

Is 24 vdc present at the starter motor solenoid where wire 9 connects?

NO → Service or replace battery cable (Para 8-42).

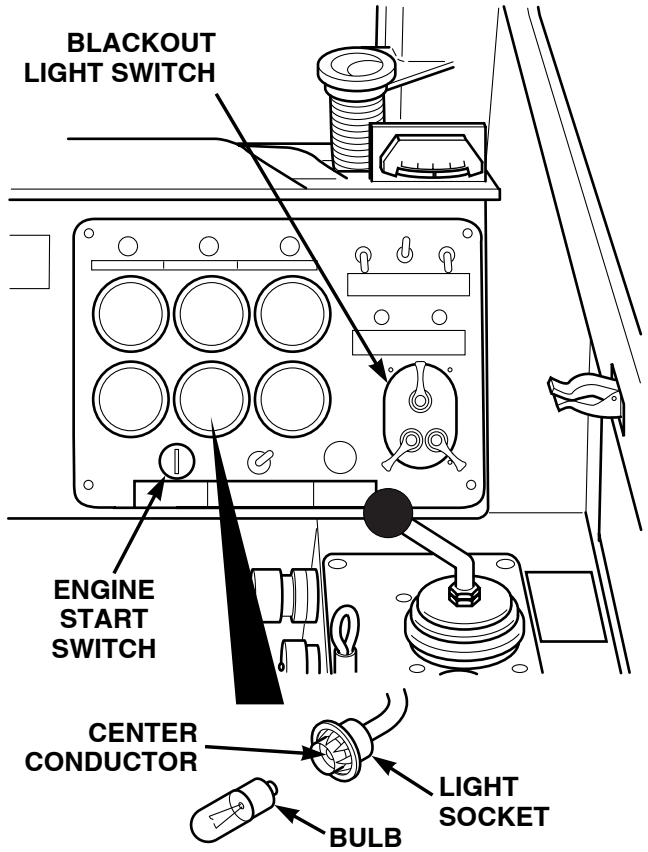
YES →

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, service or replace battery cable.

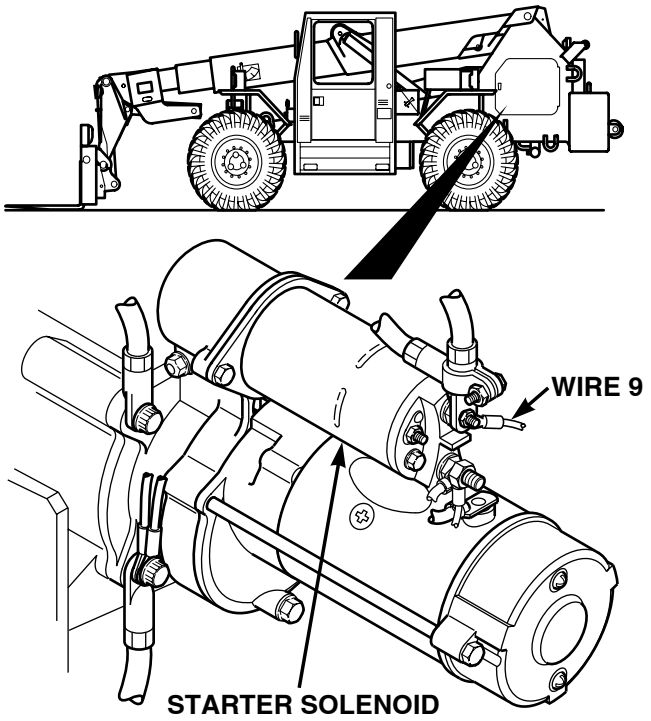
WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to center conductor of faulty socket. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (5) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, go to Step 3 of this fault. (6) Turn blackout light switch to OFF position (TM 10-3930-673-10). (7) Turn engine start switch to OFF position (TM 10-3930-673-10).



VOLTAGE TEST
(1) Remove battery covers (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-44). (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to the starter motor solenoid where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, service or replace battery cable (Para 8-42). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

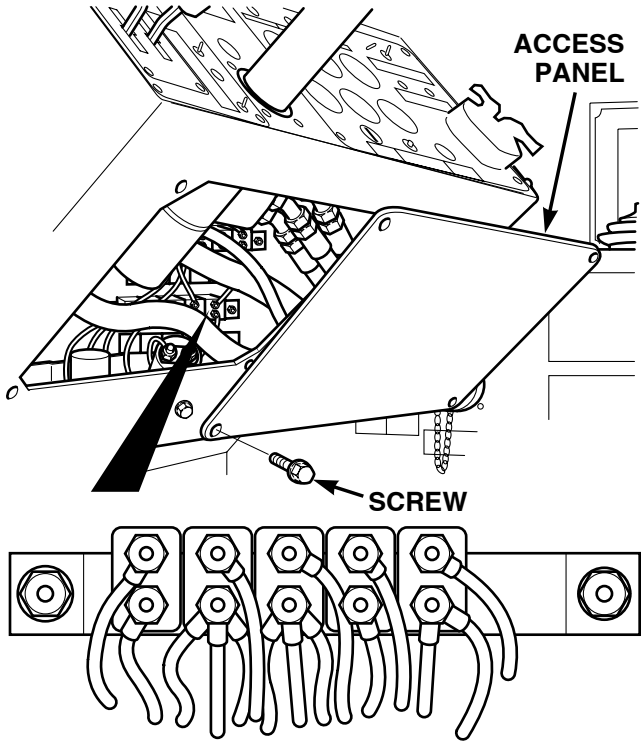
Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

NO → Replace circuit breaker CB6 (Para 8-11)

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 is faulty.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-44).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect the multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).

5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

6

Is 24 vdc present at run relay where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, wire 1 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

7

Is 24 vdc present at run relay where wire 3 connects?

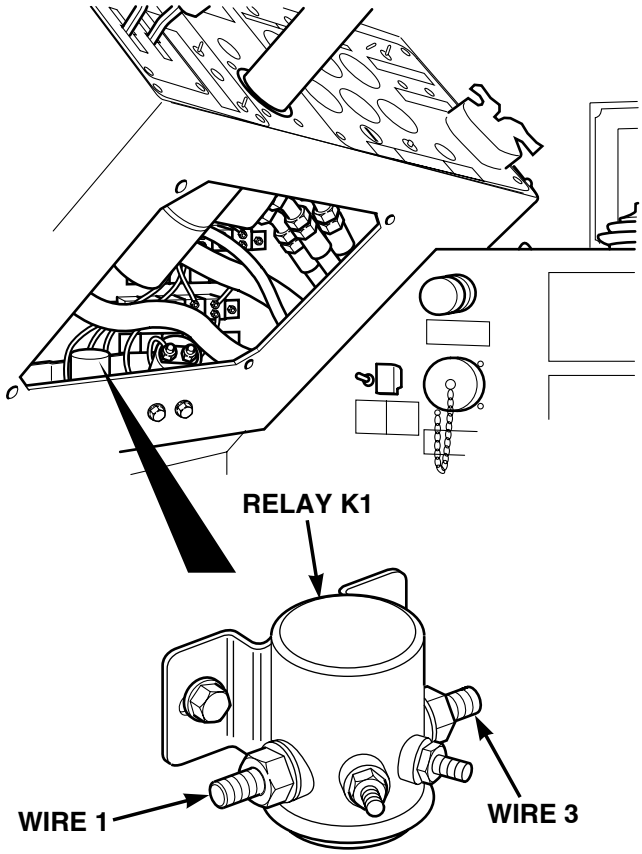
NO → Replace run relay (Para 8-23).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, run relay is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to the run relay where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (6) (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-44).



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

8

Is 24 vdc present at circuit breaker CB4 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, wire 3 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

9

Is 24 vdc present at circuit breaker CB4 where wire 40 connects?

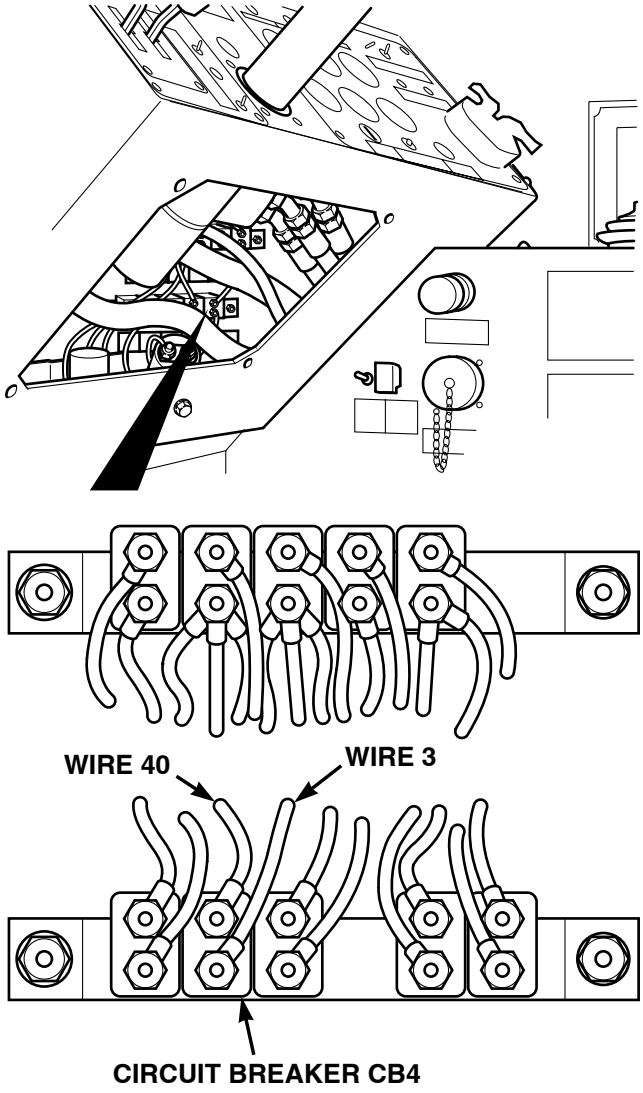
NO → Replace circuit breaker CB4 (Para 8-11).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB4 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (para 8-44).



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

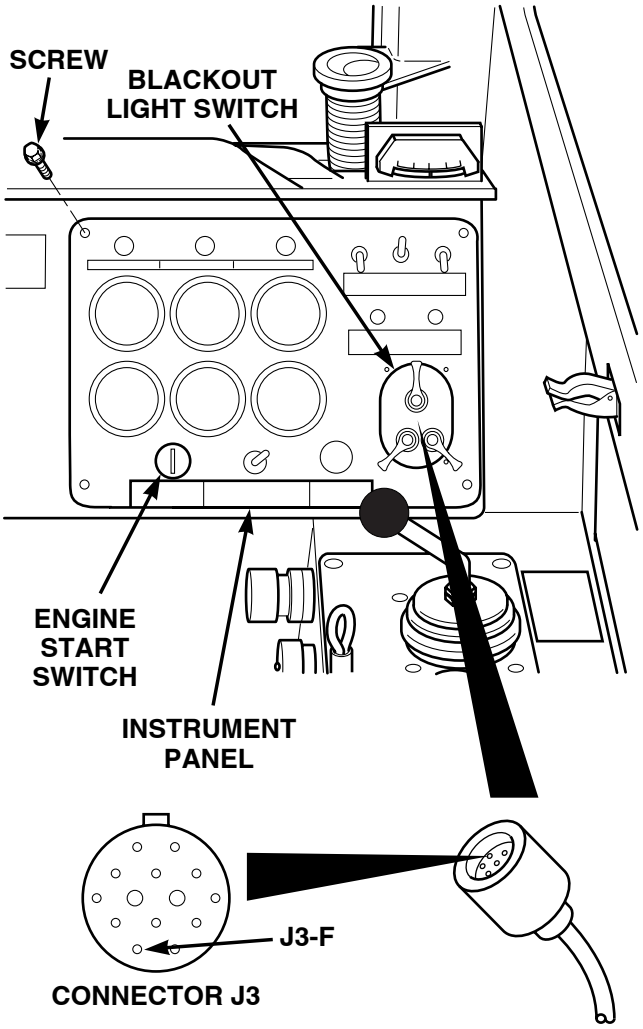
Is 24 vdc present at connector J3-F where wire 40 connects?

NO → Repair wire 40 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, wire 40 is fautly.

VOLTAGE TEST
(1) Remove connector J3 from blackout light switch. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to connector J3-F where wire 40 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 40 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-44). (9) Connect connector J3 to blackout light switch.



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

11

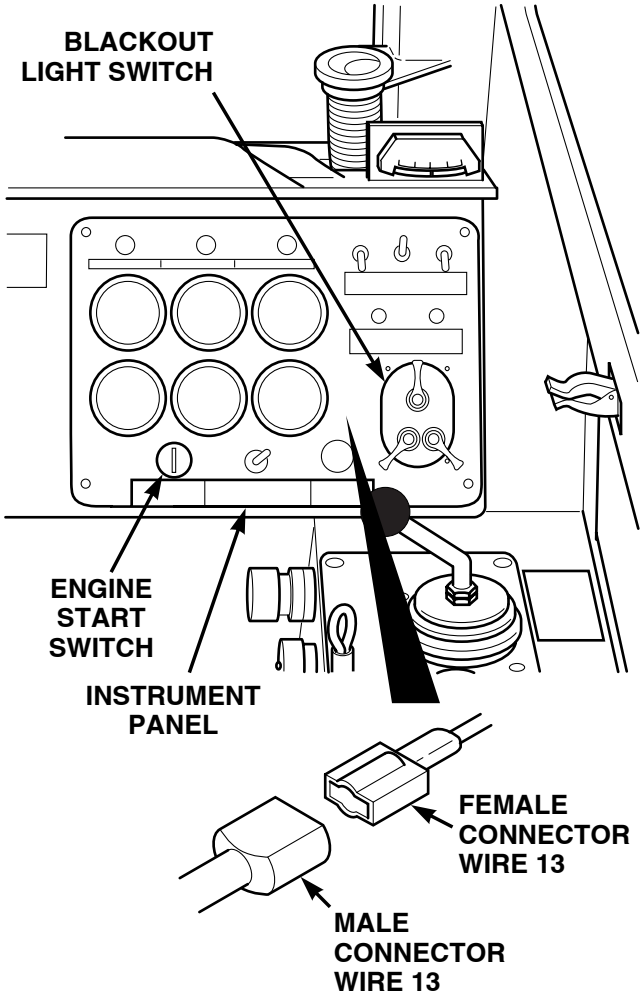
Is 24 vdc present at female connector where wire 13 connects?

NO → Go to Step 12 of this fault.

YES → Go to Step 13 of this fault.

TEST OPTIONS
Voltage Test. STE/ICE-R #89
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Remove gage light from instrument panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to female connector where wire 13 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, go to Step 12 of this fault. (8) Turn blackout light switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position, (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-44). (11) Connect female to male connector for wire 13.



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Auxiliary light switch faulty. Wire 13 faulty. Socket(s) faulty.

12

Is continuity present between connector J3-B and wire 13 female connector?

TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, blackout control switch or wire 13 are faulty.

NO → Repair wire 13 (Para 8-48).

YES → Replace blackout light switch (Para 8-13).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Auxiliary light switch OK. Wire 13 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Socket(s) faulty.

13

Is continuity present between gage light center conductor and wire 13 male connector?

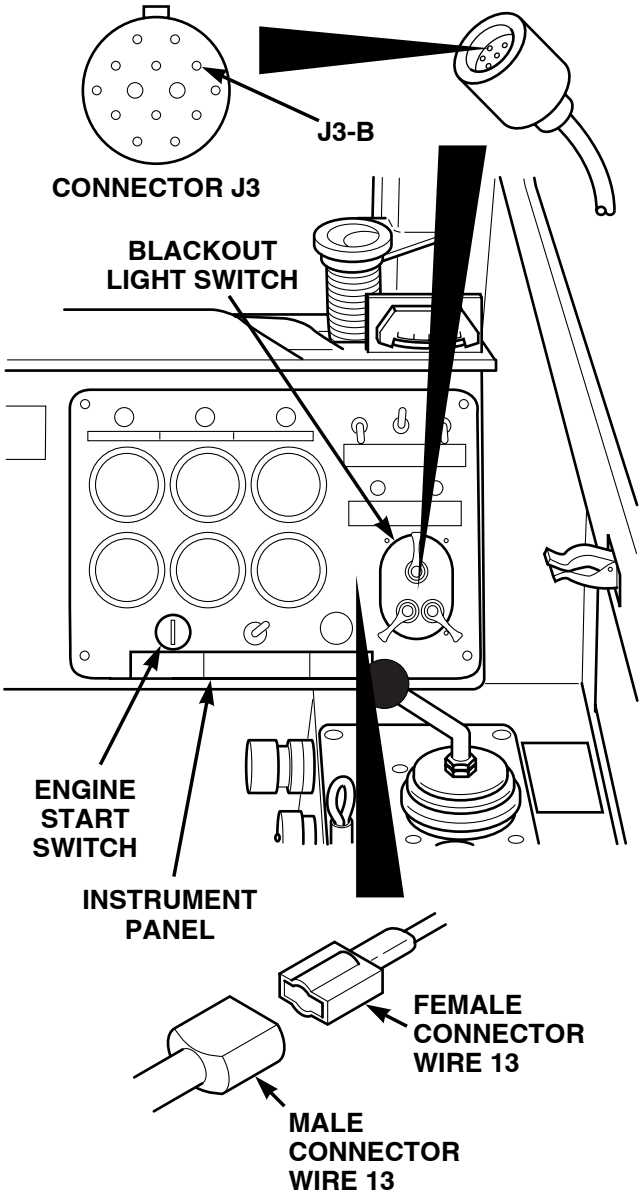
TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, gage light socket is faulty.

NO → Replace gage light socket (Para 8-6).

YES →

CONTINUITY TEST
(1) Remove connector J3 from blackout light switch. (2) Disconnect female from male connector on wire 13. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to connector J3-B where wire 13 connects. (5) Connect multimeter negative lead (–) to female connector of wire 13. (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 13 (Para 8-48). (6) Connect connector J3 to blackout light switch. (7) Connect female to male connector of wire 13.

CONTINUITY TEST
(1) Disconnect female from male connector on wire 13. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to socket center conductor where wire 13 connects. (4) Connect multimeter negative lead (–) to male connector of wire 13. (a) If continuity is present, go to Step 14 of this fault. (b) If continuity is not present, replace gage light socket (Para 8-6). (5) Connect female to male connector of wire 13.



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 13 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Socket(s) faulty. Faulty Ground

14

Is spacing of grounding fins correct for proper ground?

NO → Adjust grounding fins (Para 8-6).

YES → Replace bulb (Para 8-6).

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If grounding fins are not evenly spread out and applying pressure to side of gage, adjust for proper fit for ground.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 13 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Fautly Wire 9 Faulty Connector J2 Faulty Connector P2

15

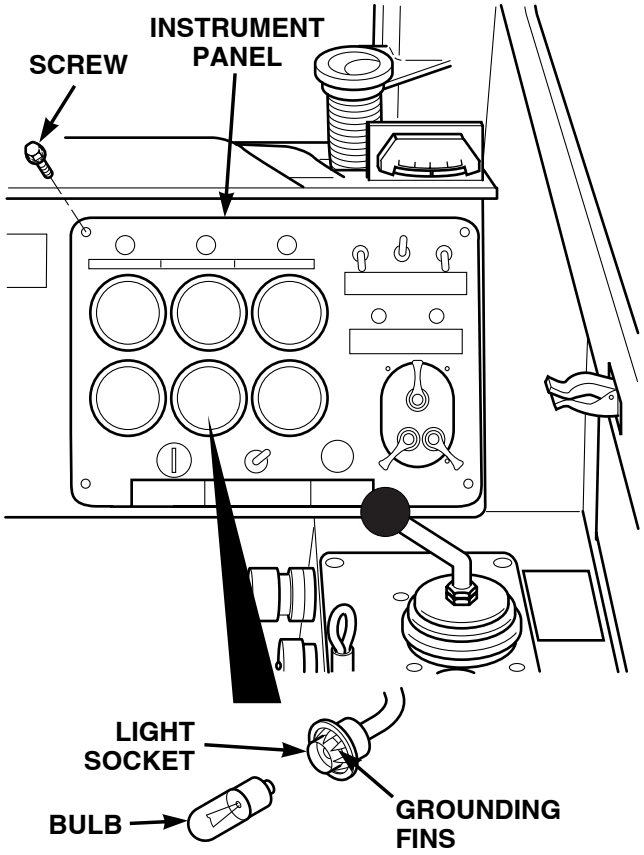
Is continuity present on wire 9 between starter motor solenoid and connector P2-1?

NO → Repair wire 9 or connector P2 (Para 8-49).

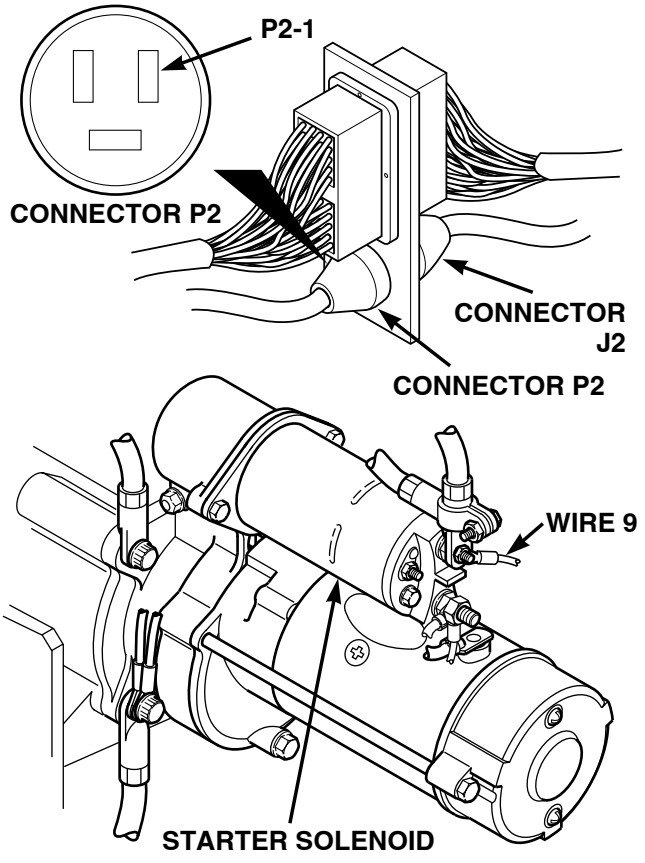
YES →

TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 are faulty.

VISUAL INSPECTION
(1) Lift instrument panel out to remove gage light from gage. (a) If grounding fins fit properly, replace bulb (Para 8-6). (b) If grounding fins are not fitting properly, adjust by performing Steps (2) and (3) below. (2) Remove bulb from socket. (3) Use small common screwdriver to adjust ground fins inward or outward for proper fit. (4) Connect female to male connector. (5) Install gage light into gage. (6) Install instrument panel and four screws.



CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).



5. INSTRUMENT PANEL GAGE LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 13 OK. Socket(s) OK. Connector P2 OK.
POSSIBLE PROBLEMS
Fautly Wire 9 Faulty Connector J2

16

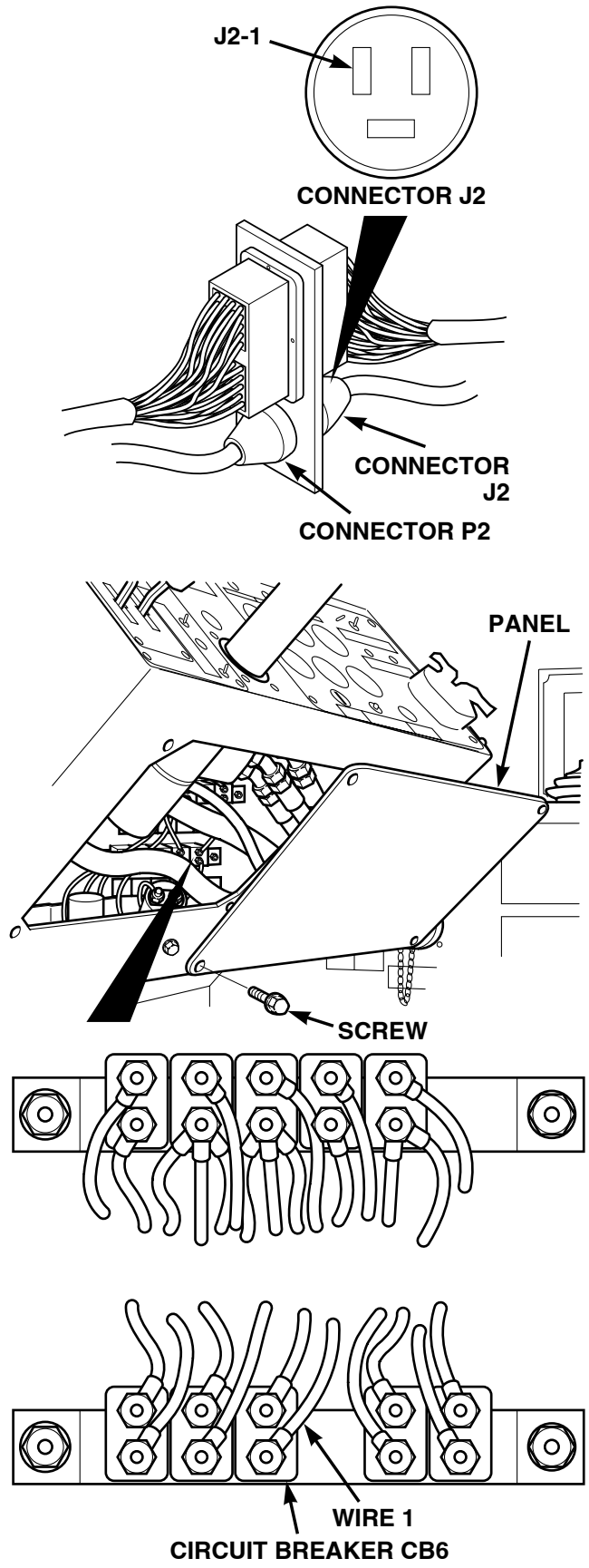
Is continuity present between circuit breaker CB6 where wire 9 connects and connector J2?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 are faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (4) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48). (5) Install access panel and four screws to secure access panel. (6) Connect connector P2 to connector J2. (7) Install battery cover (Para 8-42).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE.

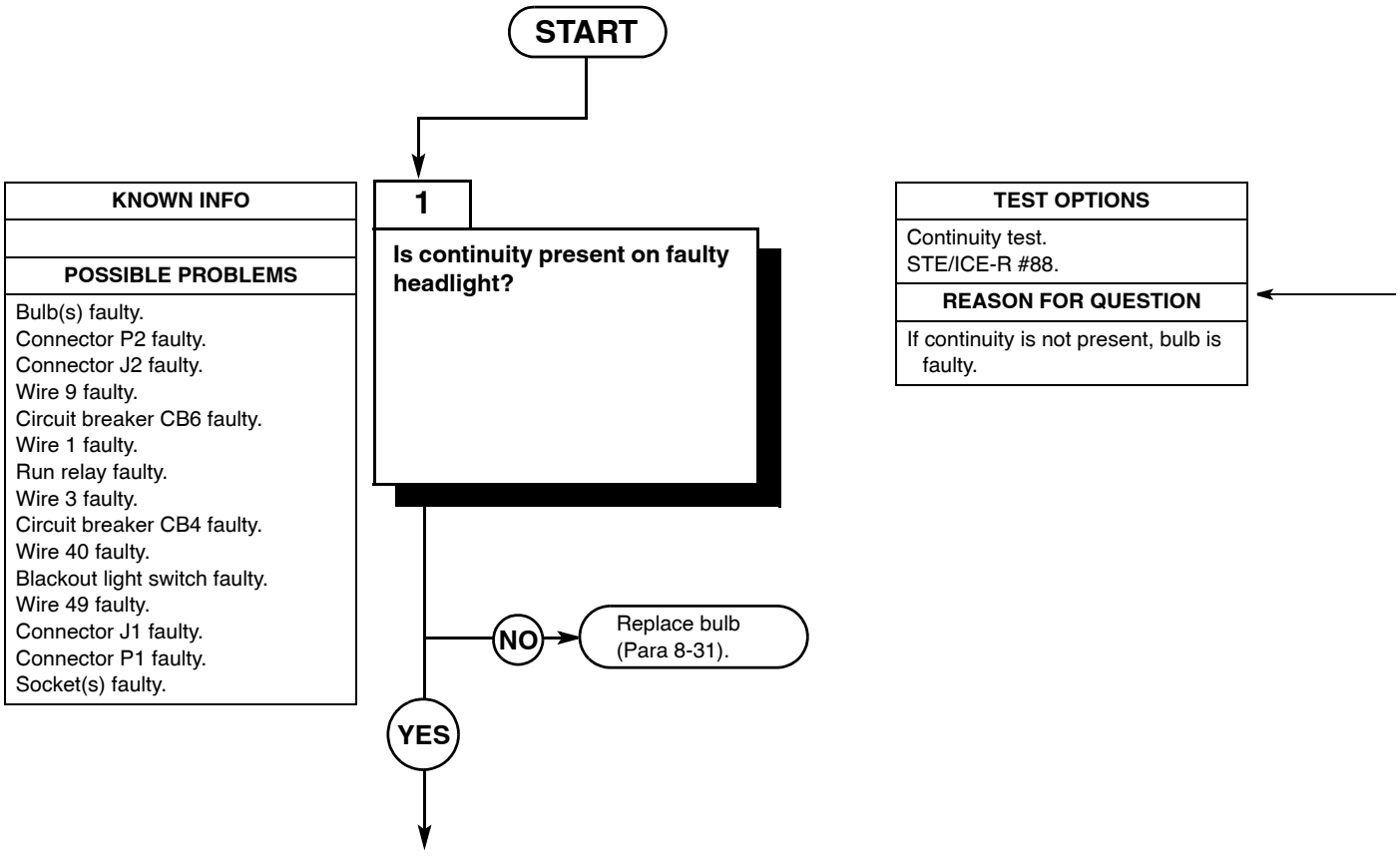
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

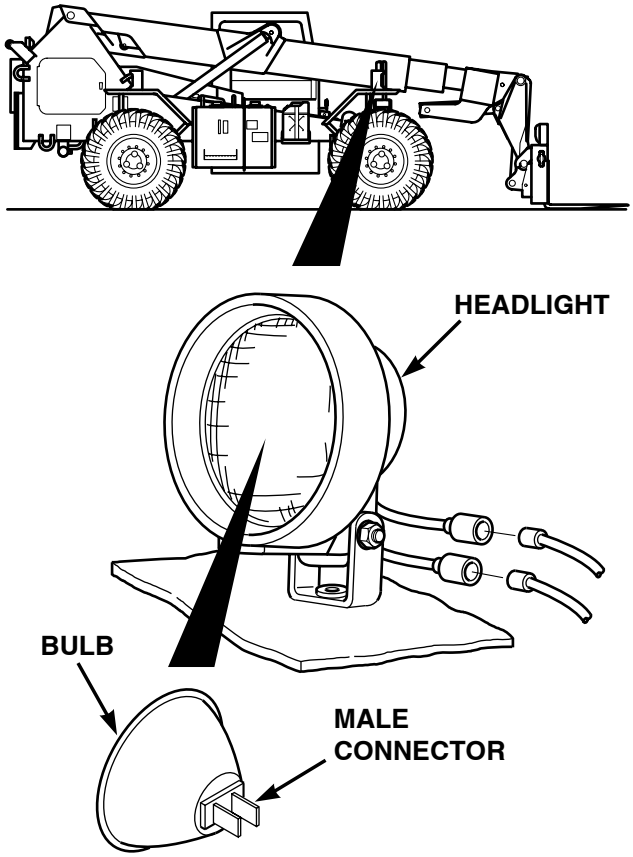
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove bulb from faulty headlight (Para 8-31). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to male connector. (4) Connect multimeter negative lead (–) to other male connector. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace bulb (Para 8-31).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at headlight socket?

NO → Go to Step 3 of this fault.

YES → Go to Step 14 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

3

Is 24 vdc present at starter motor solenoid where wire 9 connects?

NO → Service or replace battery cable (Para 8-42).

YES →

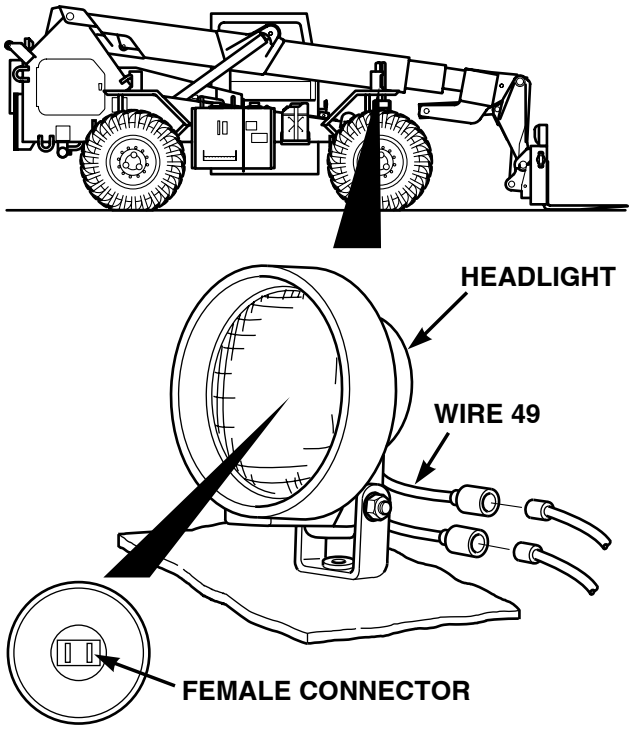
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, service or replace battery cable.

WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

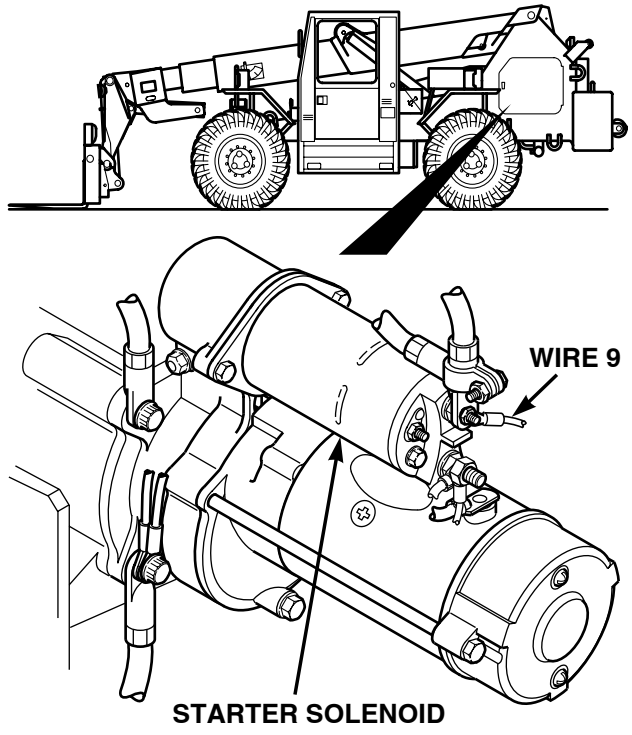
VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to female connector of faulty socket where wire 49 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 14 of this fault.
  (b) If 24 vdc is not present, go to Step 3 of this fault.
(6) Turn blackout light switch OFF position (TM 10-3930-673-10).
(7) Turn engine start switch to OFF position, (TM 10-3930-673-10).



VOLTAGE TEST

(1) Remove battery covers (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to starter motor solenoid where wire 9 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, service or replace battery cable (Para 8-42).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present on circuit breaker CB6 where wire 9 connects?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

Is 24 vdc present on circuit breaker CB6 where wire 1 connects?

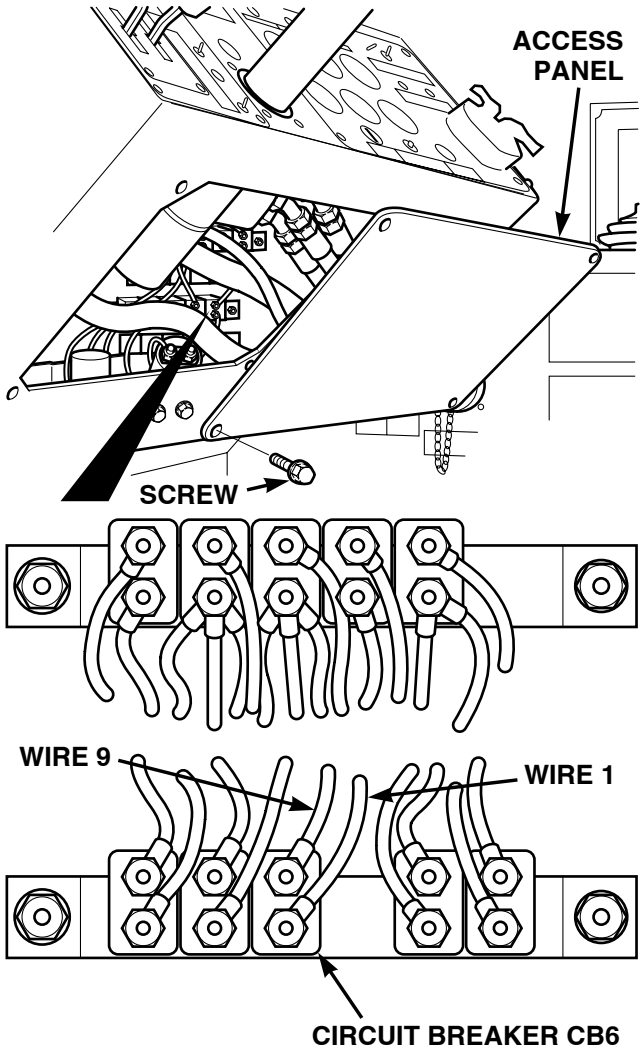
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 is faulty.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

6

Is 24 vdc present at the run relay where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 1 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

7

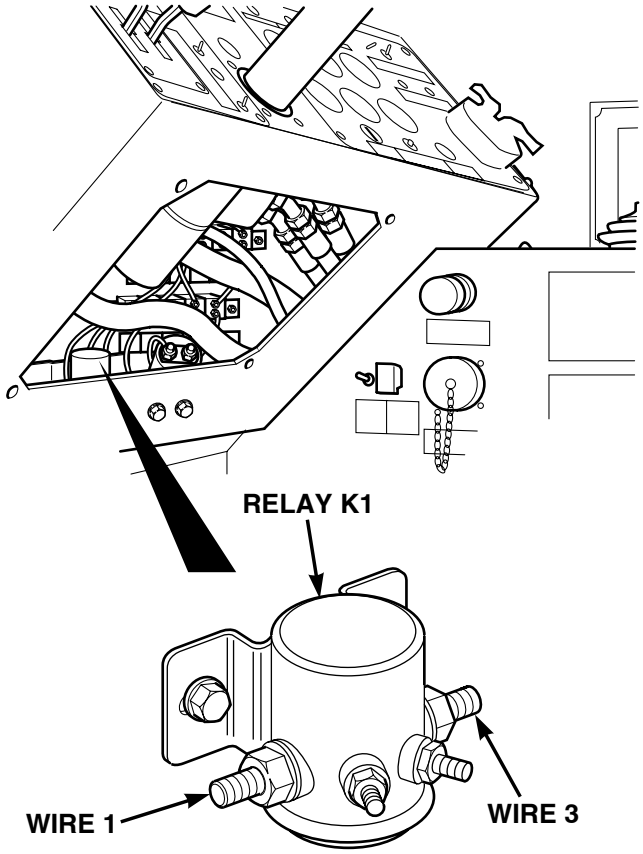
Is 24 vdc present at the run relay where wire 3 connects?

NO → Replace run relay (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, run relay is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

8

Is 24 vdc present at circuit breaker CB4 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 3 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

9

Is 24 vdc present at circuit breaker CB4 where wire 40 connects?

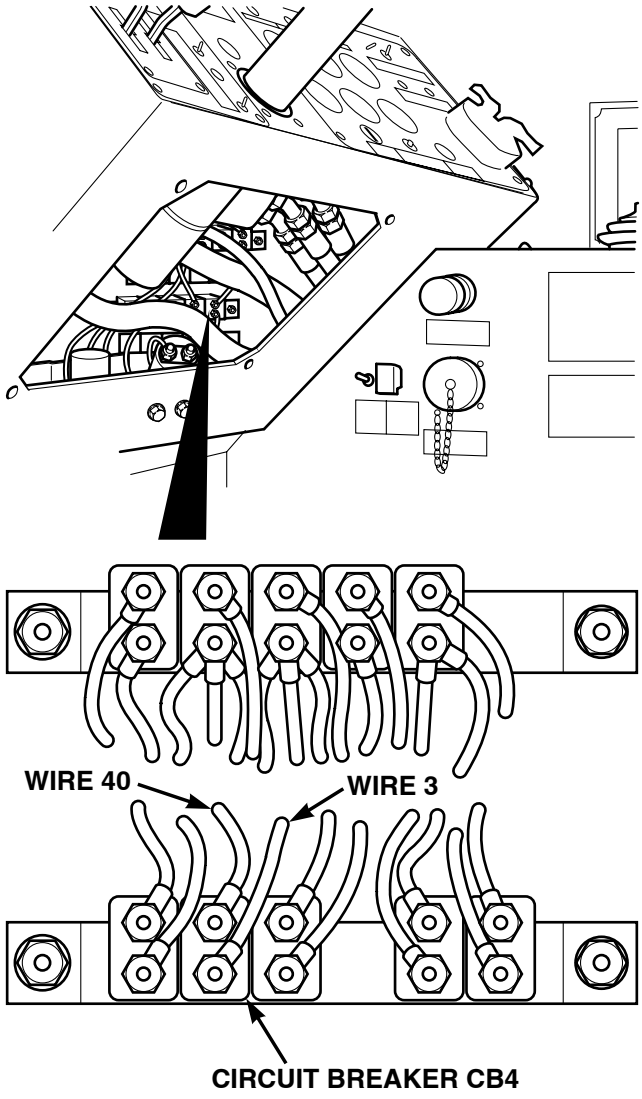
NO → Replace circuit breaker CB4 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB4 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

Is 24 vdc present at connector J3-F where wire 40 connects?

NO → Repair wire 40 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #88.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

11

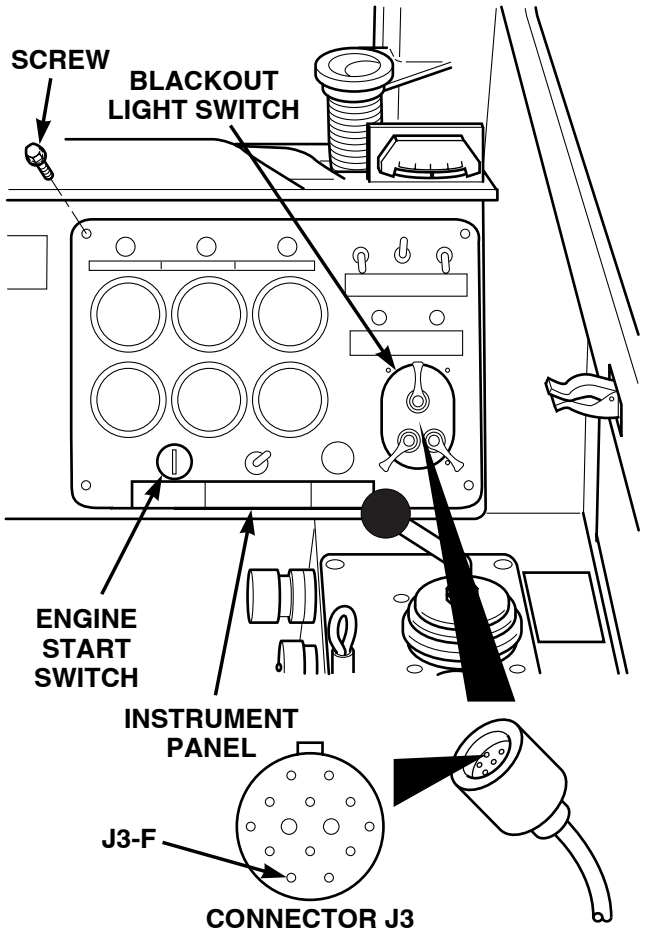
Is 24 vdc present at connector J1-2 where wire 49 connects?

NO → Go to Step 12 of this fault.

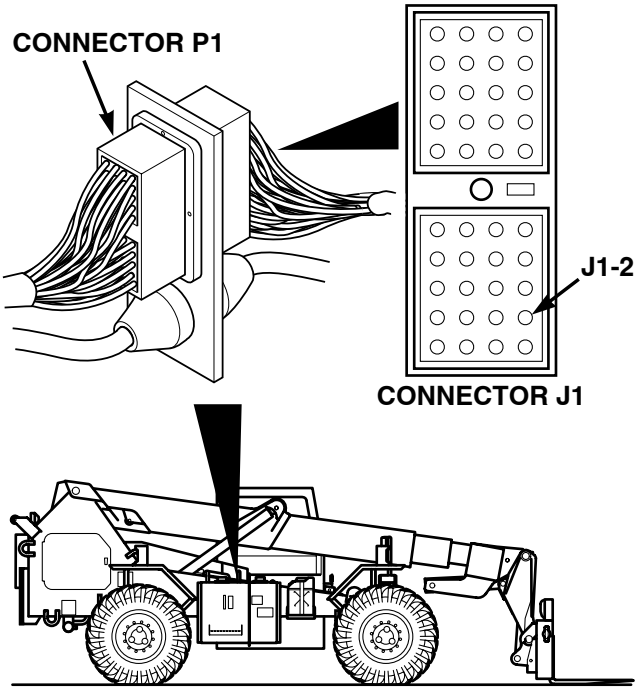
YES → Go to Step 13 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout light switch or wire 49 are faulty.

VOLTAGE TEST
(1) Remove four screws from instrument panel.
(2) Lift instrument panel out to remove connector J3 from blackout light switch.
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to connector J3-F where wire 40 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
(7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 11 of this fault.
(b) If 24 vdc is not present, repair wire 40 (Para 8-48).
(8) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).
(10) Lift instrument panel out to connect connector J3 to blackout light switch.
(11) Install four screws to secure instrument panel.



VOLTAGE TEST
(1) Set multimeter to volts dc.
(2) Disconnect connector J1 from connector P1.
(3) Connect multimeter positive lead (+) to connector J1-2 where wire 49 connects.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 13 of this fault.
(b) If 24 vdc is not present, go to Step 12 of this fault.
(8) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

12

Is continuity present between connector J3-M and connector J1-2?

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, blackout light switch or wire 49 is faulty.

NO → Repair wire 49 (Para 8-48).

YES → Replace blackout light switch (Para 8-13).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK.
POSSIBLE PROBLEMS
Wire 49 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

13

Is 24 vdc present at headlight male connector where wire 49 connects?

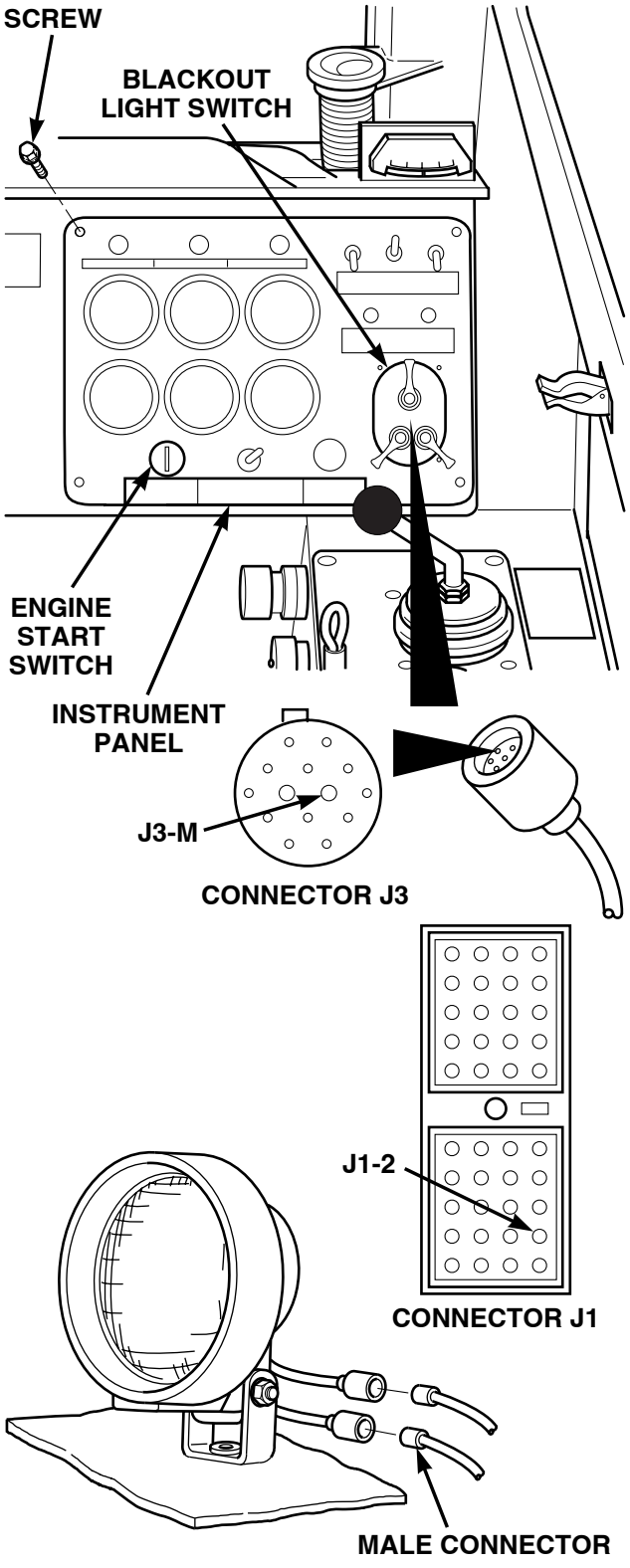
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 49 is faulty.

NO → Repair wire 49 (Para 8-48).

YES →

CONTINUITY TEST
(1) Remove four screws from instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Disconnect connector J1 from connector P1. (4) Set multimeter to ohms. (5) Connect multimeter positive lead (+) to connector J3-M where wire 49 connects. (6) Connect multimeter negative lead (–) to connector J1-2 where wire 49 connects. (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 49 (Para 8-48). (7) Lift instrument panel out to connect connector J3 to blackout light switch. (8) Connect connector J1 to connector P1. (9) Install four screws to secure instrument panel.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to headlight male connector where wire 49 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, repair wire 49 (Para 8-48). (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 49 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Socket(s) faulty. Ground faulty.

14

Is continuity present between headlight socket female conductor ground (wire 2) and ground cable?

NO → Repair wire 2 (Para 8-49).

YES → Replace bulb (Para 8-31).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present wire 2 ground or headlight socket is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 49 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

15

Is continuity present between starter motor solenoid and connector P2-1?

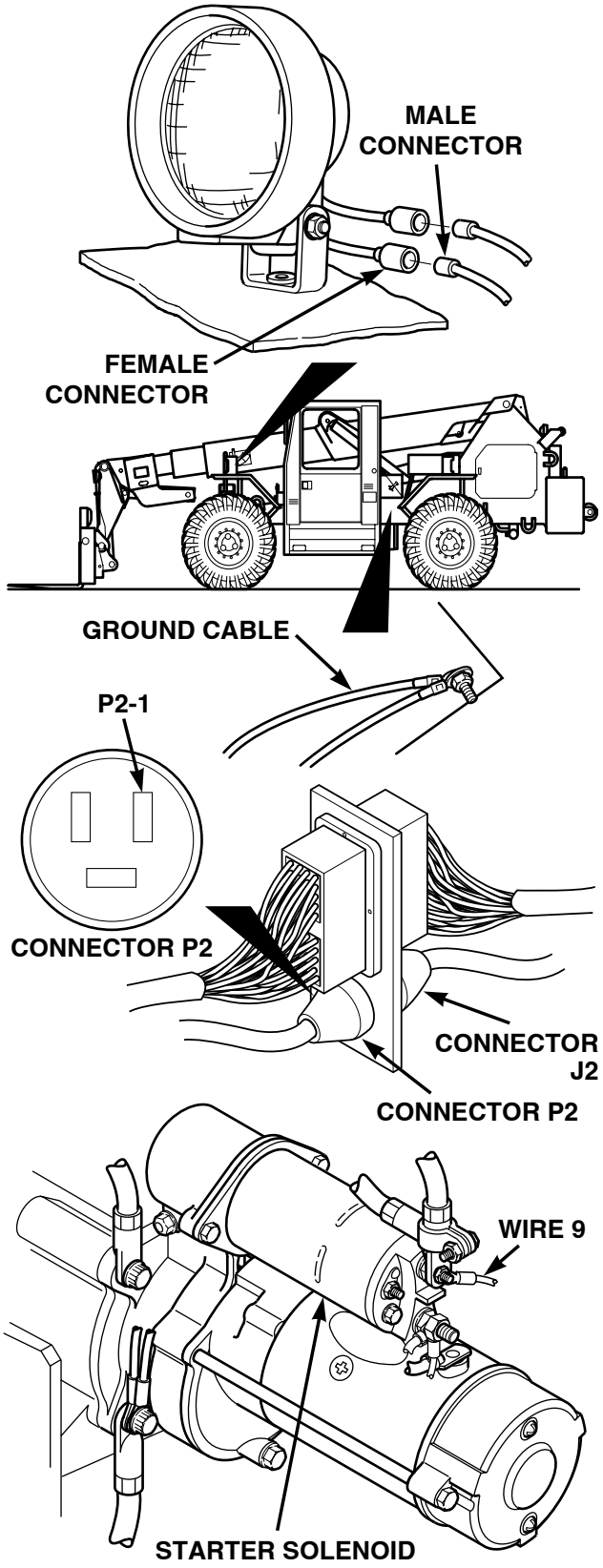
NO → Repair wire 9 or connector P2 (Para 8-49).

YES →

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present wire 9 or connector P2 are faulty.

CONTINUITY TEST
(1) Disconnect ground female connector from male ground connector. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground female connector at headlight socket. (4) Connect multimeter negative lead (–) to ground cable. (a) If continuity is present, replace bulb (Para 8-31). (b) If continuity is not present, repair wire 2 (Para 8-49). (5) Connect ground female connector to male connector.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).



6. ONE OR BOTH HEADLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 49 OK. Socket(s) OK. Connector P2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty.

16

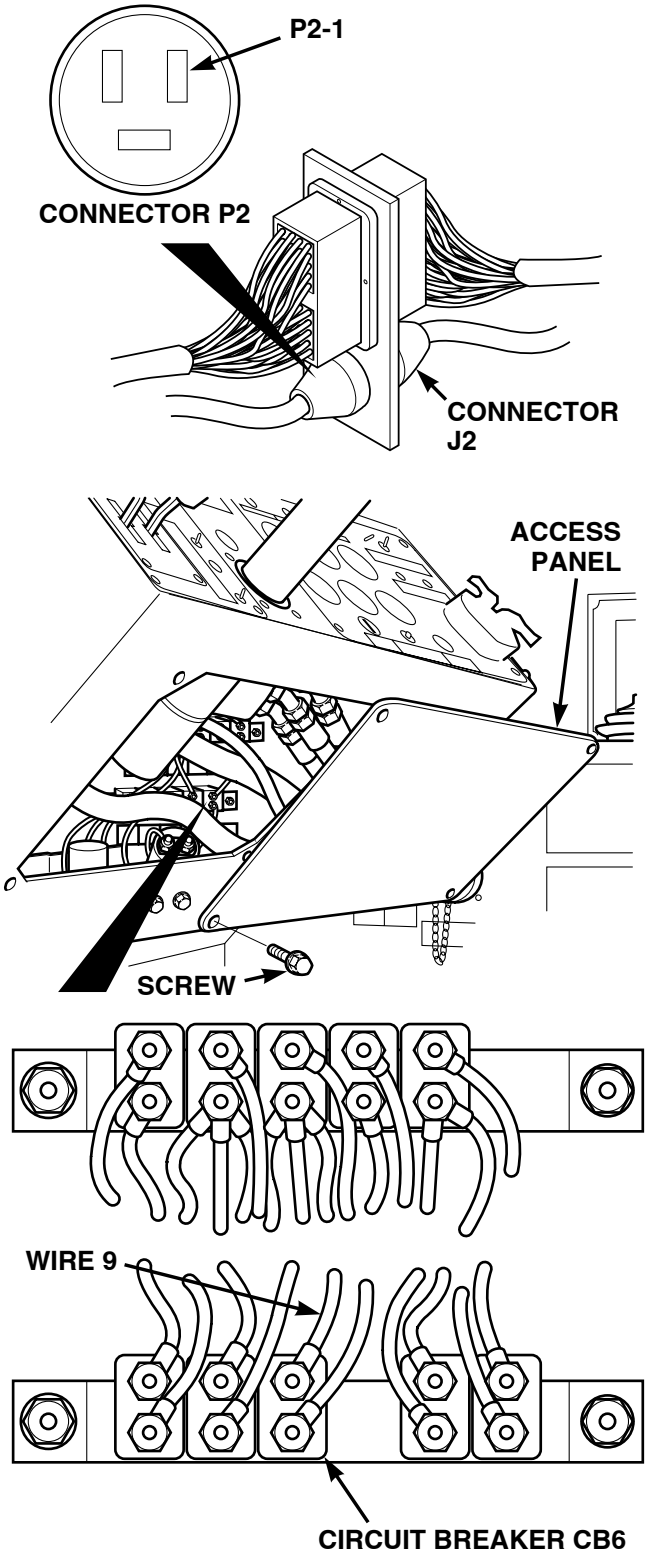
Is continuity present between circuit breaker CB6 and connector J2?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 is faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (3) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, service battery (Para 8-42). (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48). (4) Install access panel and four screws. (5) Connect negative battery cable to negtive side of battery. (6) Install battery covers (Para 8-42). (7) Connect connector J2 to connector P2.



7. STOPLIGHT(S) DO NOT OPERATE.

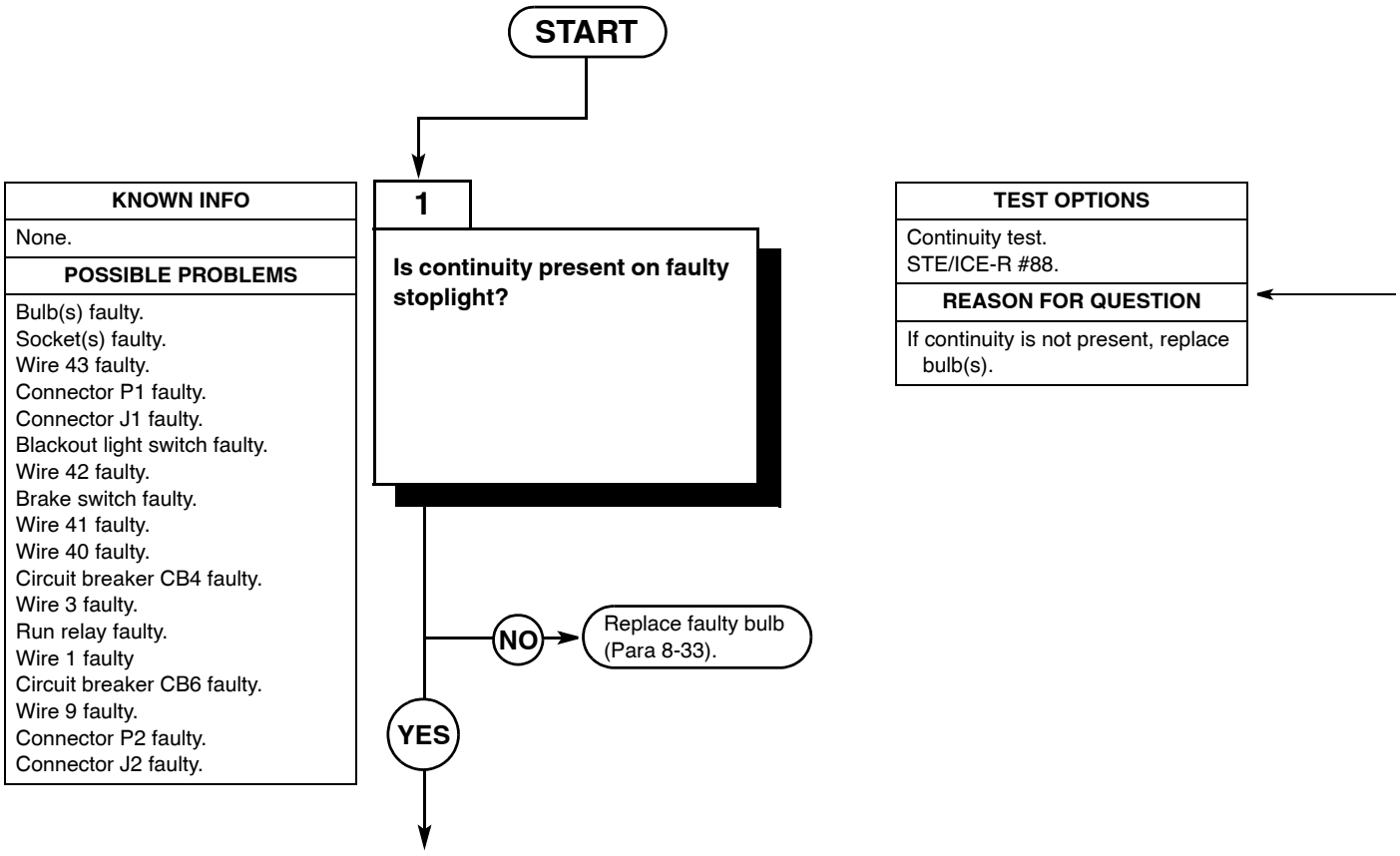
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

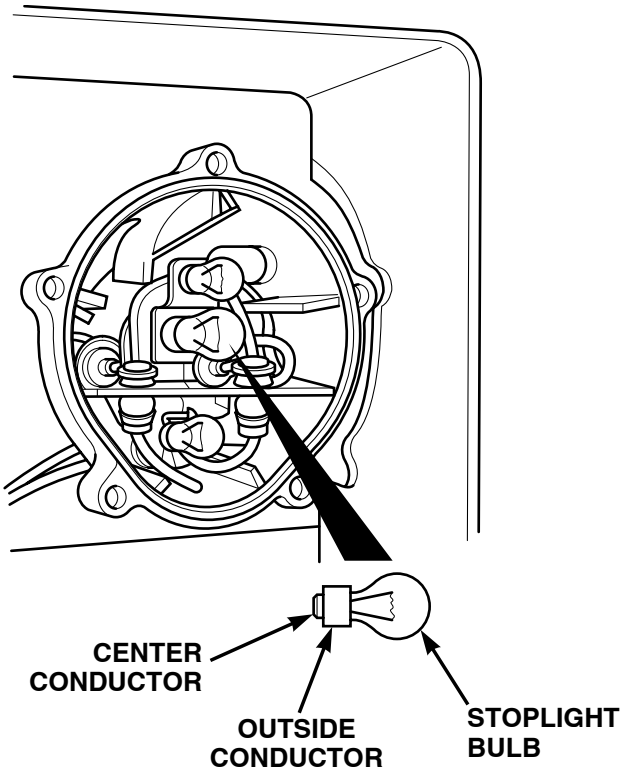
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

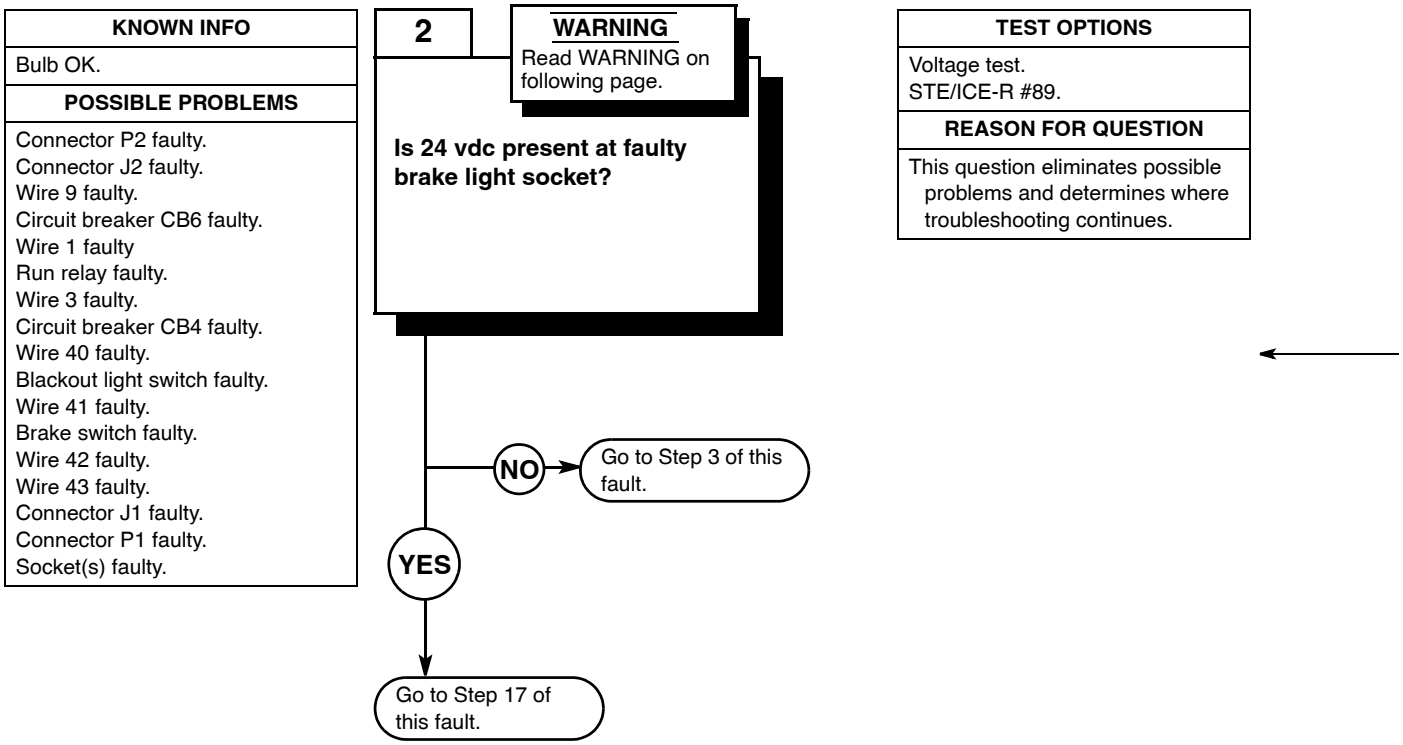
References
TM 10-3930-673-10
TM 9-4910-571-12&P

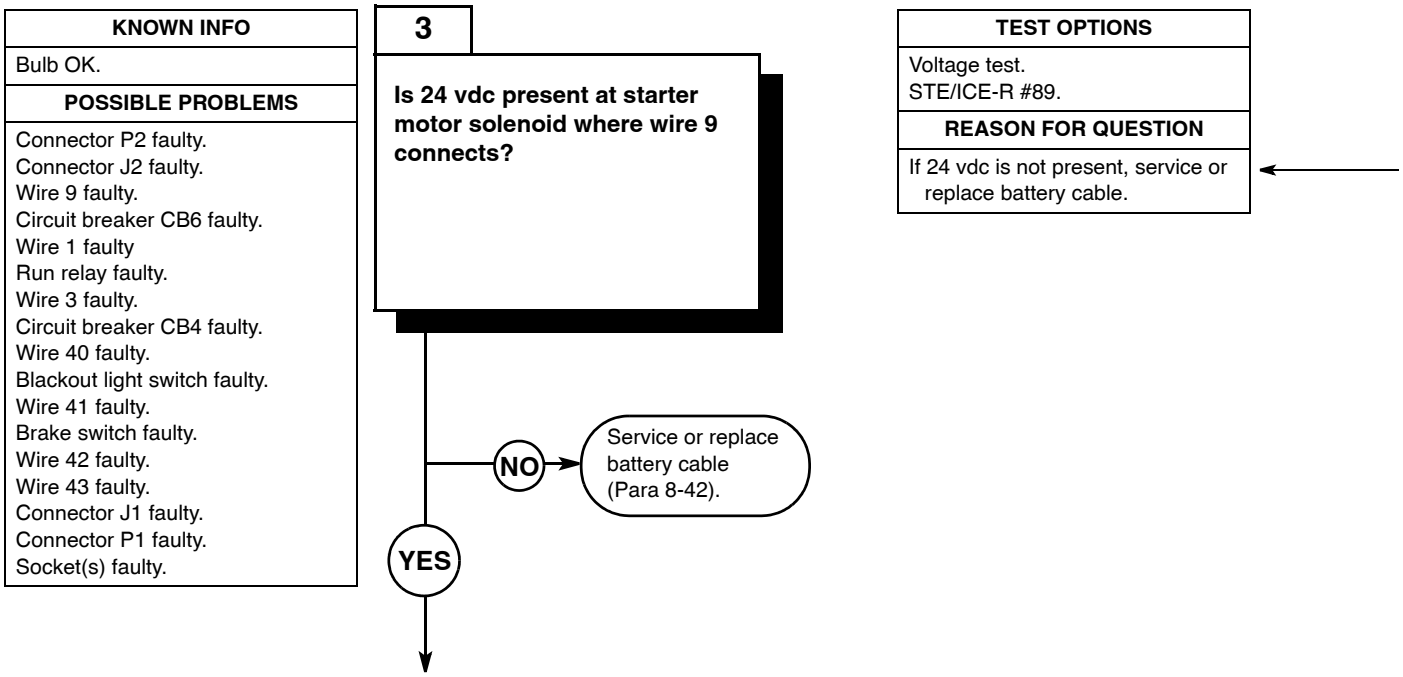


CONTINUITY TEST
(1) Remove bulb from faulty stoplight (Para 8-33). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to center conductor of bulb. (4) Connect multimeter negative lead (–) to outside conductor of bulb. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace bulb (Para 8-33).



7. STOPLIGHT(S) DO NOT OPERATE (CONT).



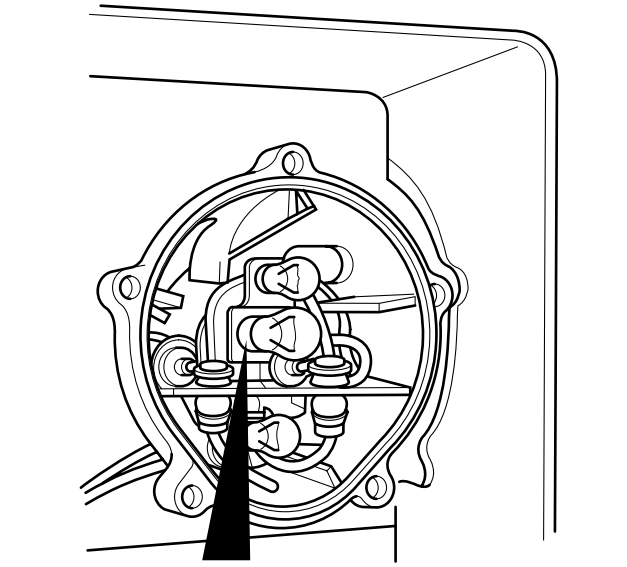


WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

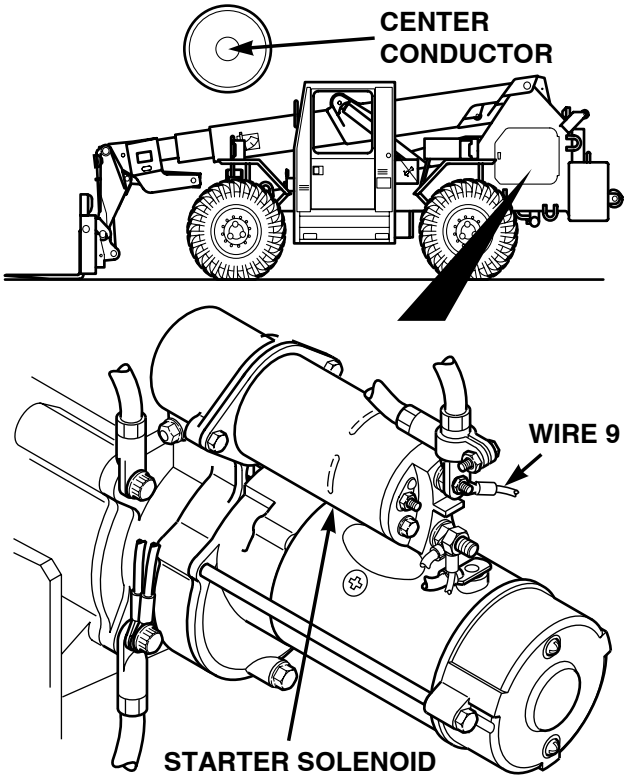
VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to center conductor of faulty socket.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(5) Turn blackout light switch to STOP LIGHT position (TM 10-3930-673-10).
(6) Depress brake pedal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 17 of this fault.
  (b) If 24 vdc is not present, go to Step 3 of this fault.
(7) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(8) Turn blackout light to OFF position (TM 10-3930-673-10).



VOLTAGE TEST

(1) Remove battery covers (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to the starter motor solenoid where wire 9 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, service or replace battery cable (Para 8-42).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



7. STOPLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 18 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

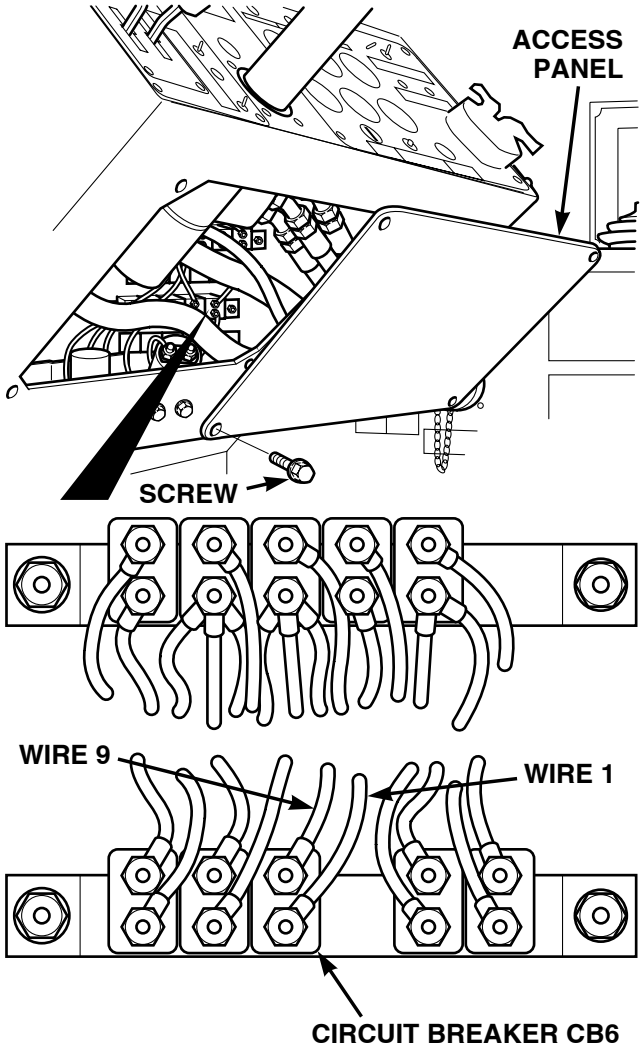
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Remove four screws and access panel. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 18 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).



7. STOPLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

6

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 1 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

7

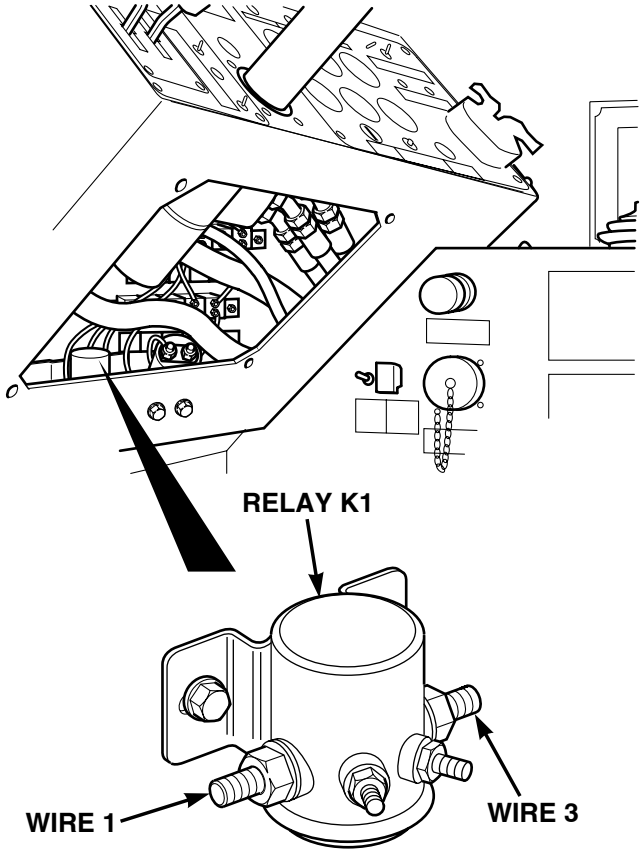
Is 24 vdc present at run relay K1 where wire 3 connects?

NO → Replace run relay (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, run relay faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to the run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).

7. STOPLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

8

Is 24 vdc present at circuit breaker CB4 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 3 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

9

Is 24 vdc present at circuit breaker CB4 where wire 40 connects?

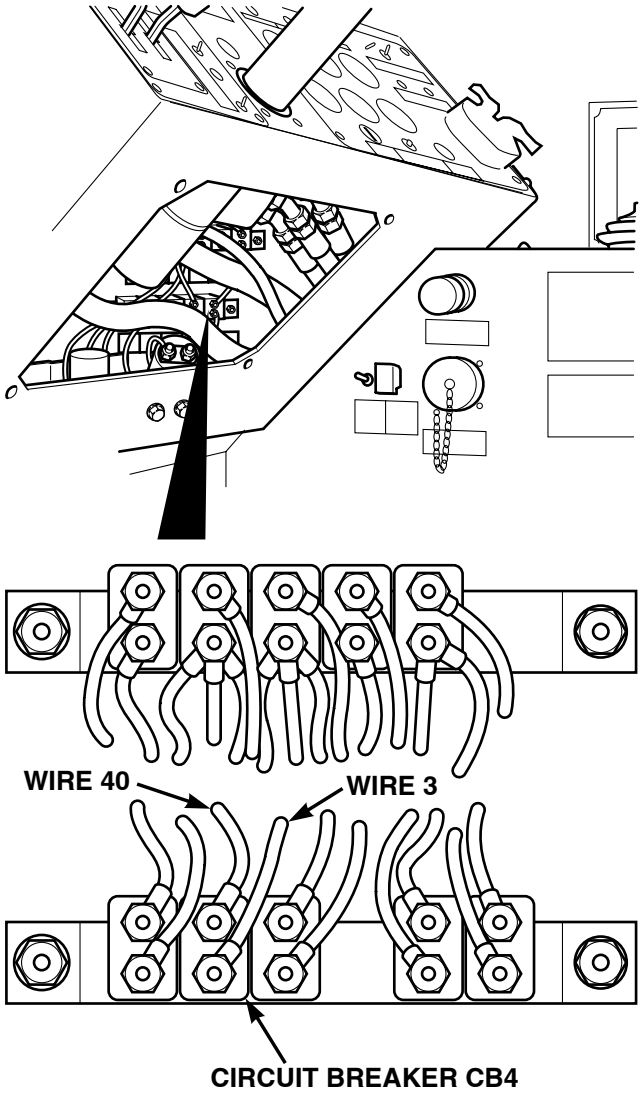
NO → Replace circuit breaker CB4 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB4 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



7. STOPLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

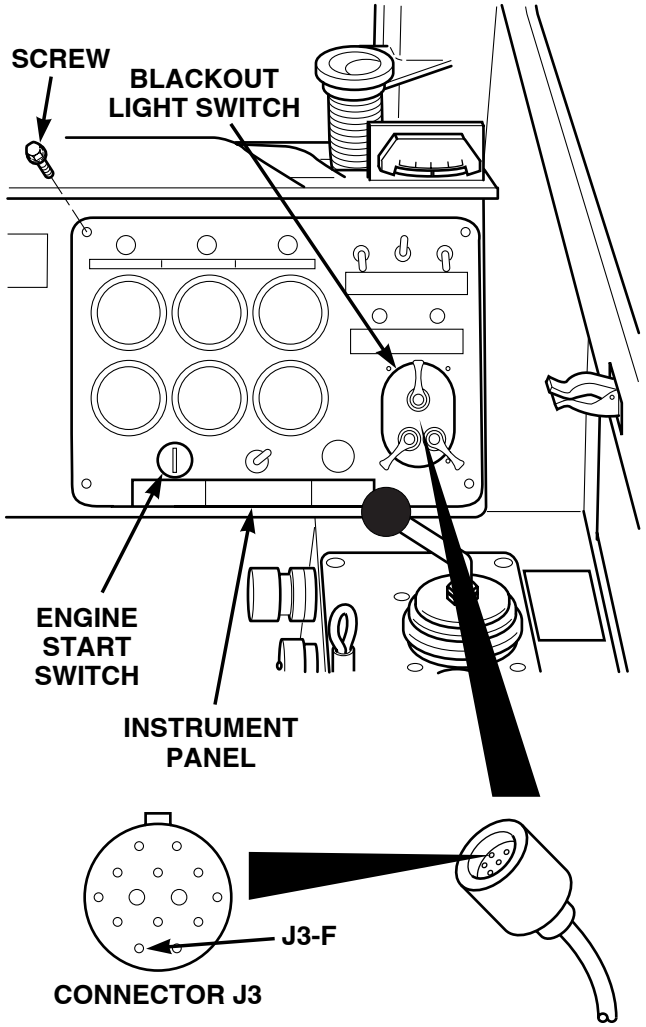
Is 24 vdc present at connector J3-F (wire 40)?

NO → Repair wire 40 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 faulty.

VOLTAGE TEST
(1) Remove four screws from instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector J3-F (wire 40). (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 40 (Para 8-48). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Lift instrument panel out to connect connector J3 to blackout light switch.



7. STOPLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

11

Is 24 vdc present at brake light switch where wire 41 connects?

NO → Go to Step 12 of this fault.

YES → Go to Step 13 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout lighting switch or wire 41 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 43 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

12

Is continuity present between connector J3-A and brake light switch?

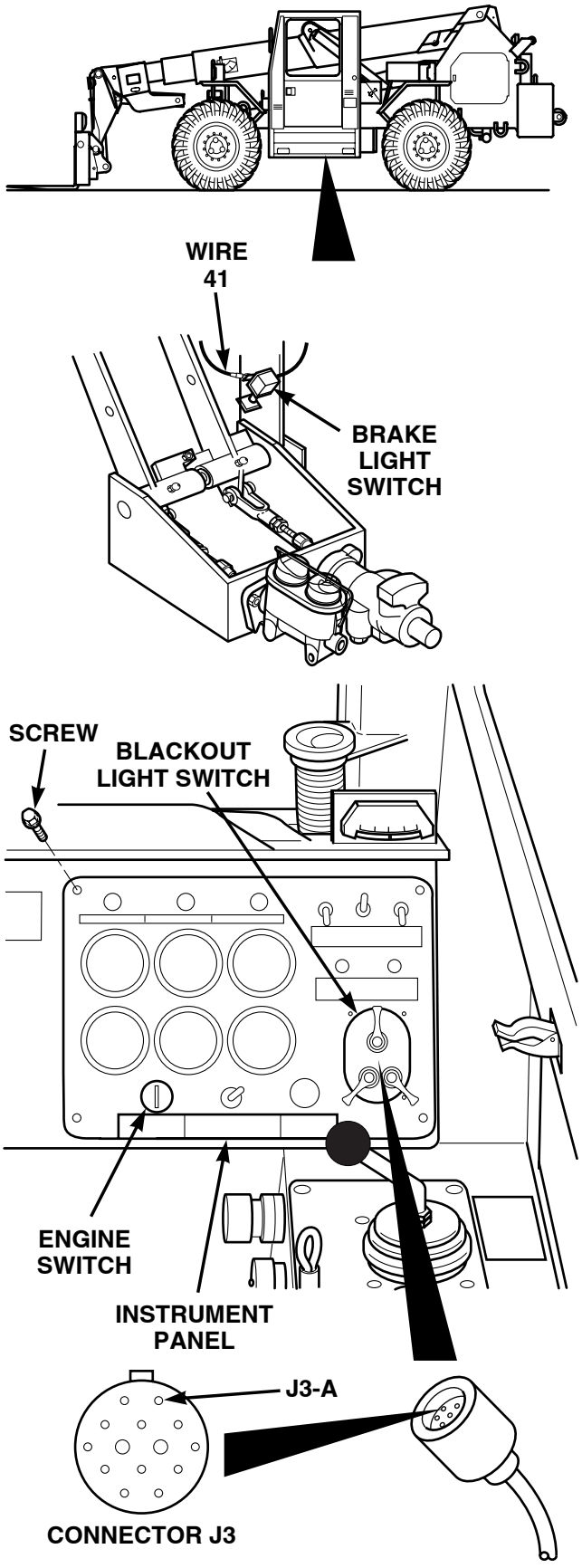
NO → Repair wire 41 (Para 8-48).

YES → Replace blackout control switch (Para 8-13).

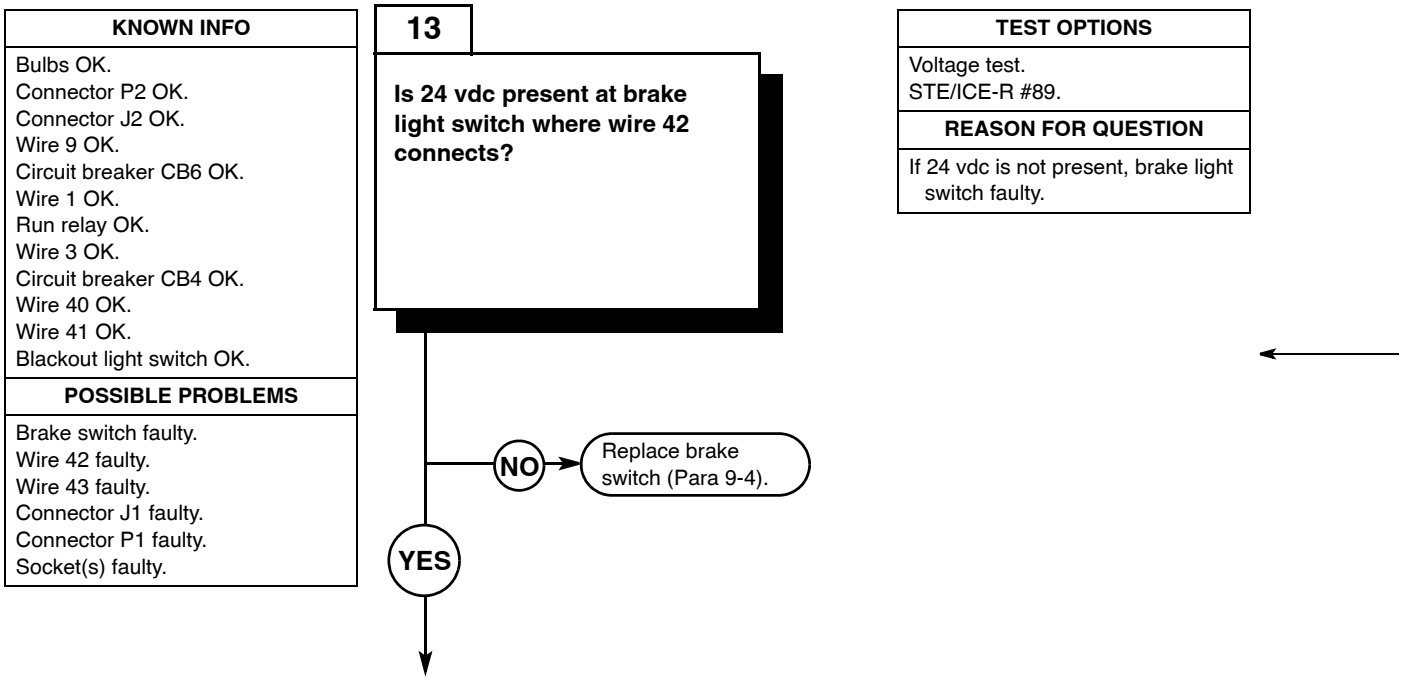
TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 41 faulty.

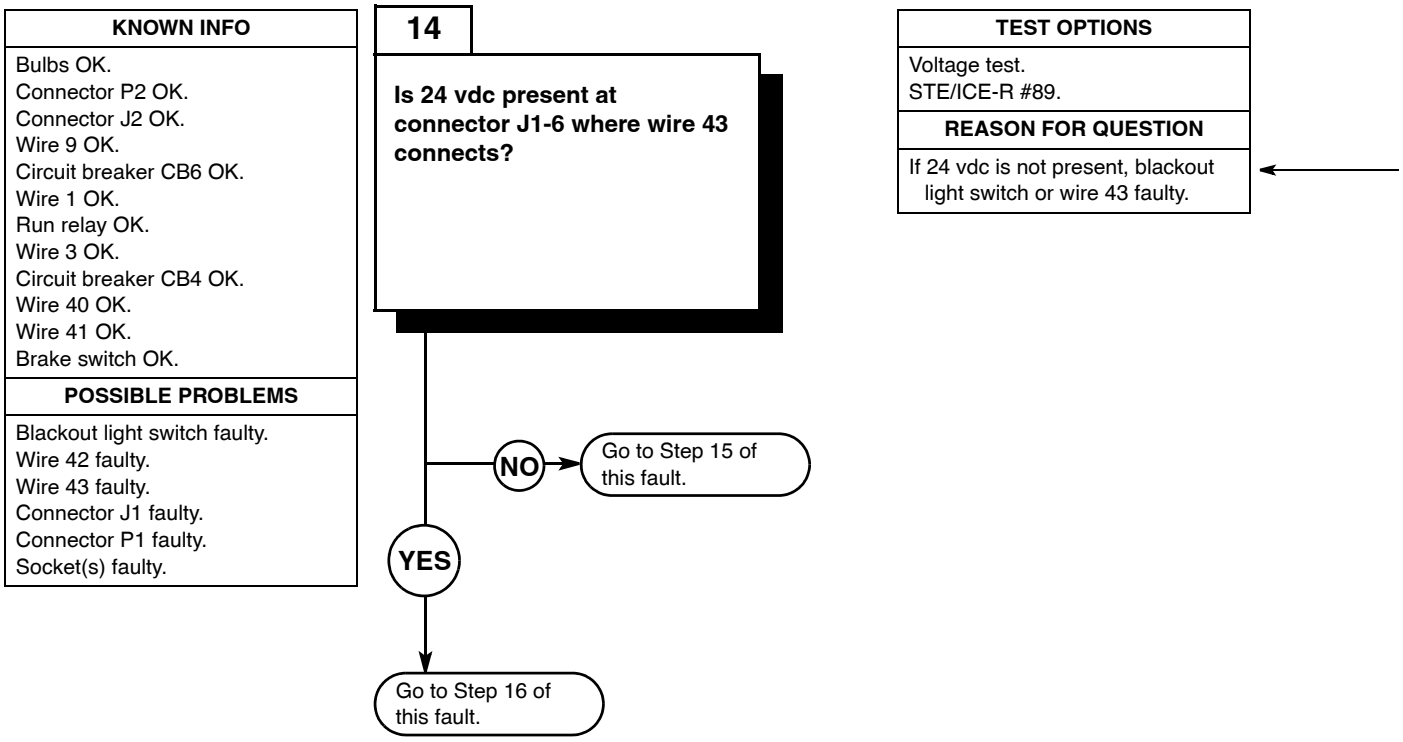
VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to brake switch where wire 41 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout lighting switch to BRAKE LIGHT position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, go to Step 12 of this fault. (7) Turn blackout lighting switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).

CONTINUITY TEST
(1) Lift instrument panel out to remove connector J3 from blackout light switch. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to connector J3-A (wire 41). (4) Connect multimeter negative lead (–) to brake light switch where wire 41 connects. (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 41 (Para 8-48). (5) Lift instrument panel out to connect connector J3 to blackout light switch. (6) Install four screws to secure instrument panel.

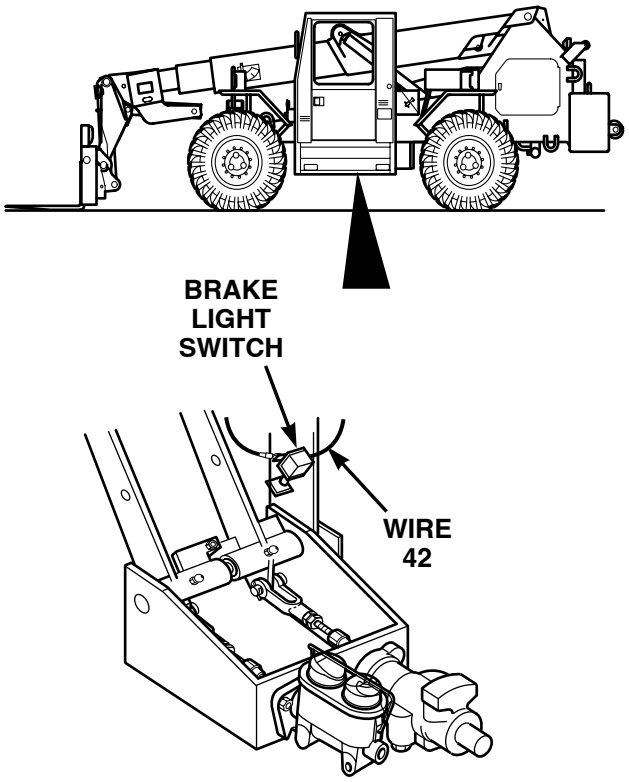


7. STOPLIGHT(S) DO NOT OPERATE (CONT).

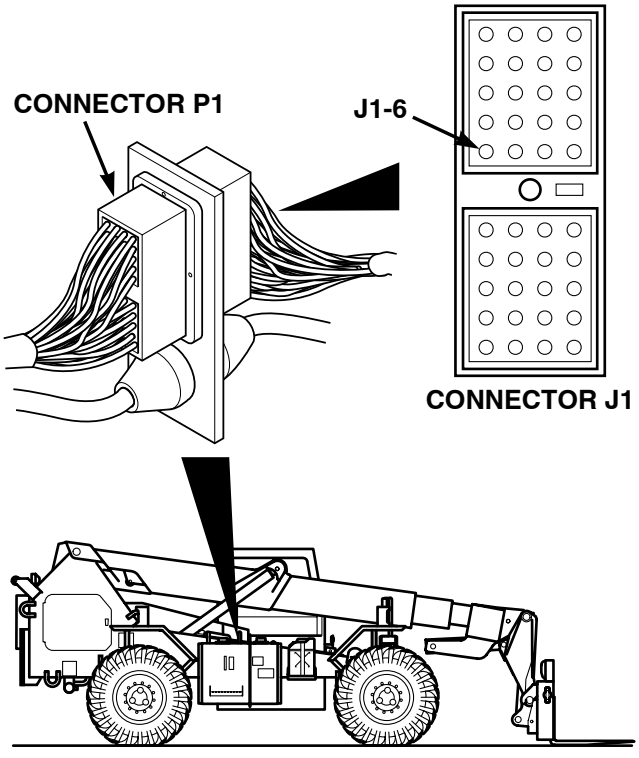




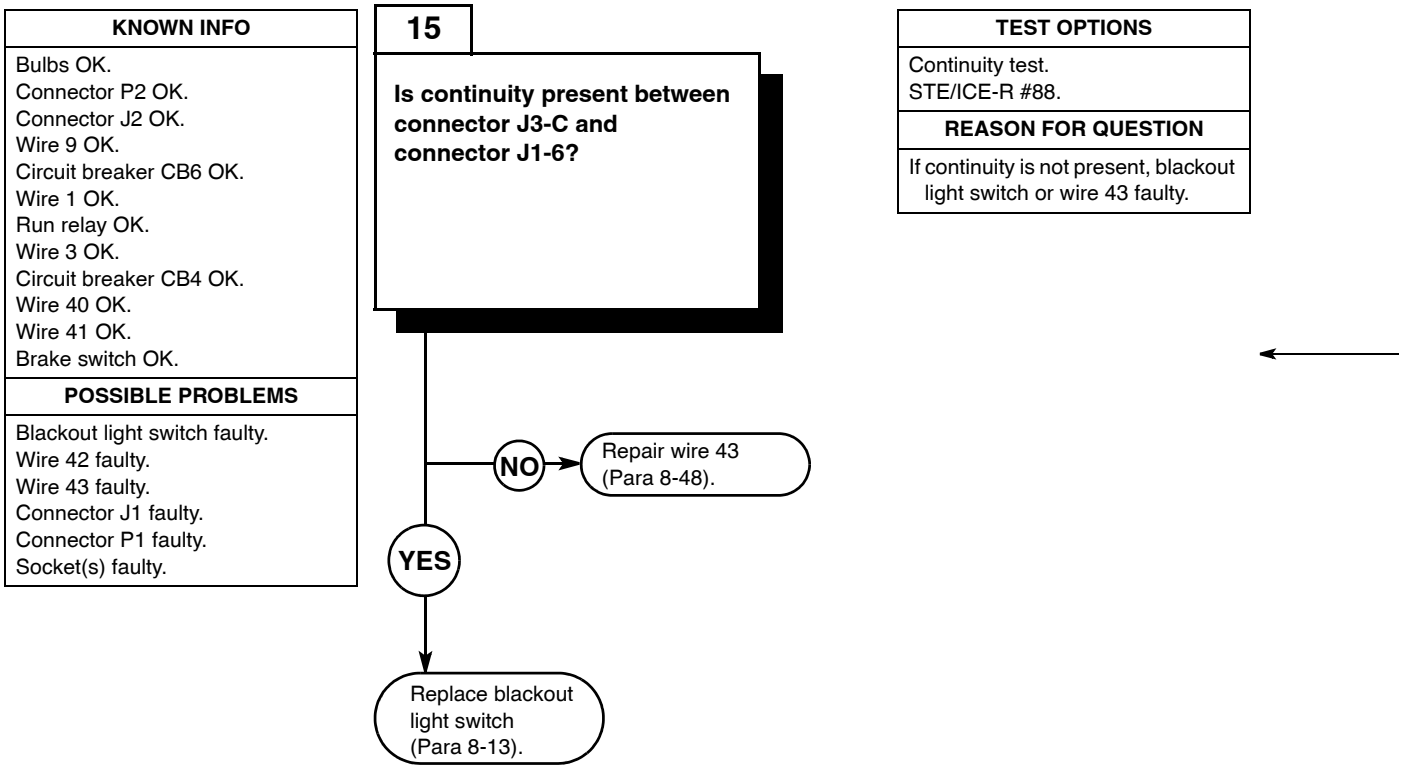
VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to brake light switch where wire 42 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to BRAKE LIGHT position (TM 10-3930-673-10). (7) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, replace brake light switch (Para 8-17). (8) Turn blackout lighting switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position, (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).

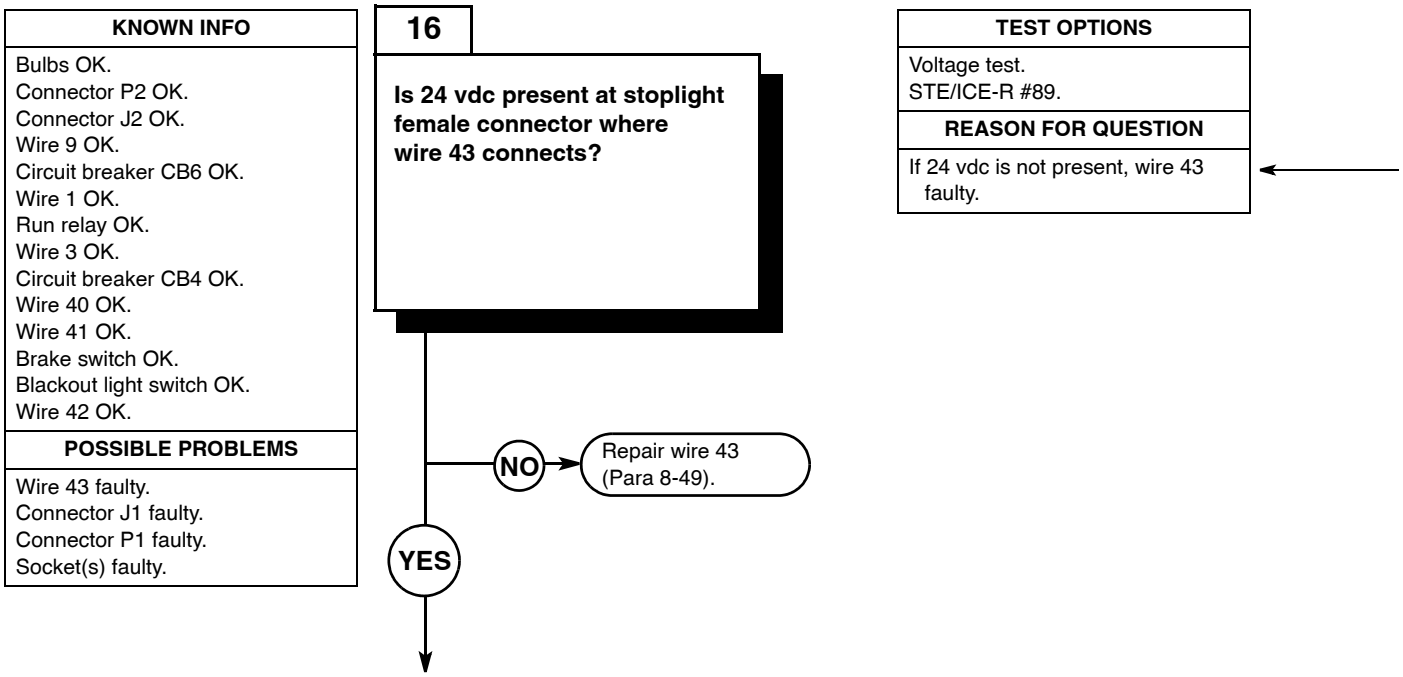


VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect connector J1 from connector P1. (3) Connect multimeter positive lead (+) to connector J1-6 where wire 43 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn blackout light switch to BRAKE LIGHT position (TM 10-3930-673-10). (8) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 16 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (9) Turn blackout light switch to OFF position (TM 10-3930-673-10). (10) Turn engine start switch to OFF position, (TM 10-3930-673-10). (11) Disconnect negative battery cable from negative side of battery (Para 8-42).



7. STOPLIGHT(S) DO NOT OPERATE (CONT).



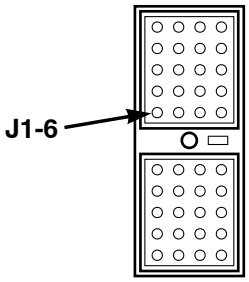


CONTINUITY TEST

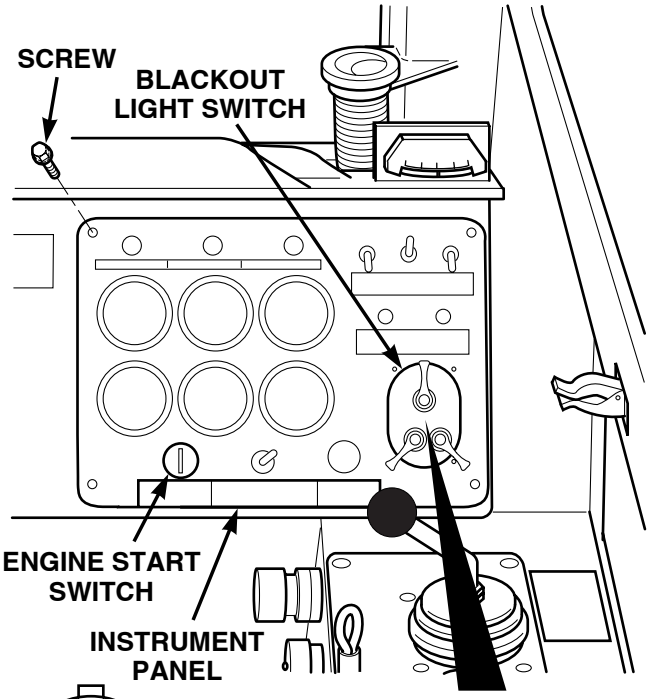
(1) Remove four screws from instrument panel.
(2) Lift instrument panel out to remove connector J3 from blackout lighting switch.
(3) Set multimeter to ohms.
(4) Connect multimeter positive lead (+) to connector J1-6 where wire 43 connects.
(5) Connect multimeter negative lead (–) to blackout light switch J3-C where wire 43 connects.
  (a) If continuity is present, replace blackout lighting switch (Para 8-13).
  (b) If continuity is not present, repair wire 43 (Para 8-49).
(6) Lift instrument panel out to connect connector J3 to blackout control switch.
(7) Install four screws to secure instrument panel.
(8) Connect connector J1 to connector P1.

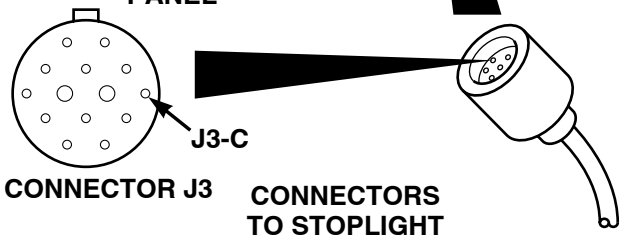
VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to female connector where wire 43 connects to stoplight.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Turn blackout light switch to BRAKE LIGHT position (TM 10-3930-673-10).
(7) Depress brake pedal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 17 of this fault.
  (b) If 24 vdc is not present, repair wire 43 (Para 8-49).
(8) Turn blackout lightiswitch to OFF position (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).



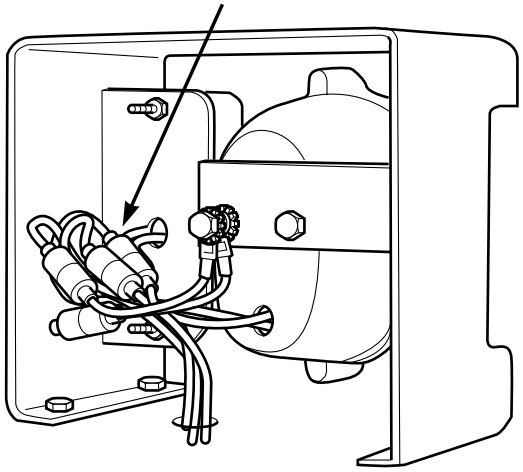
CONNECTOR J1



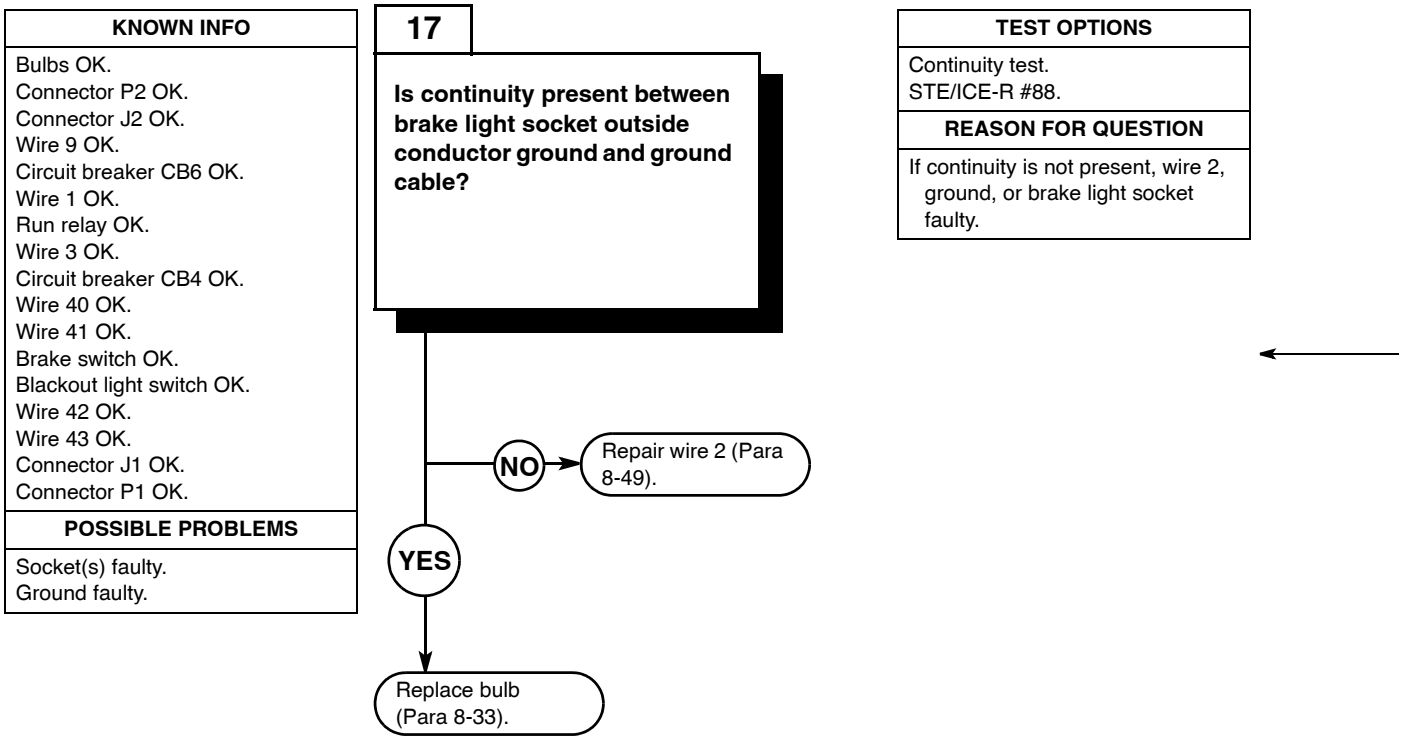


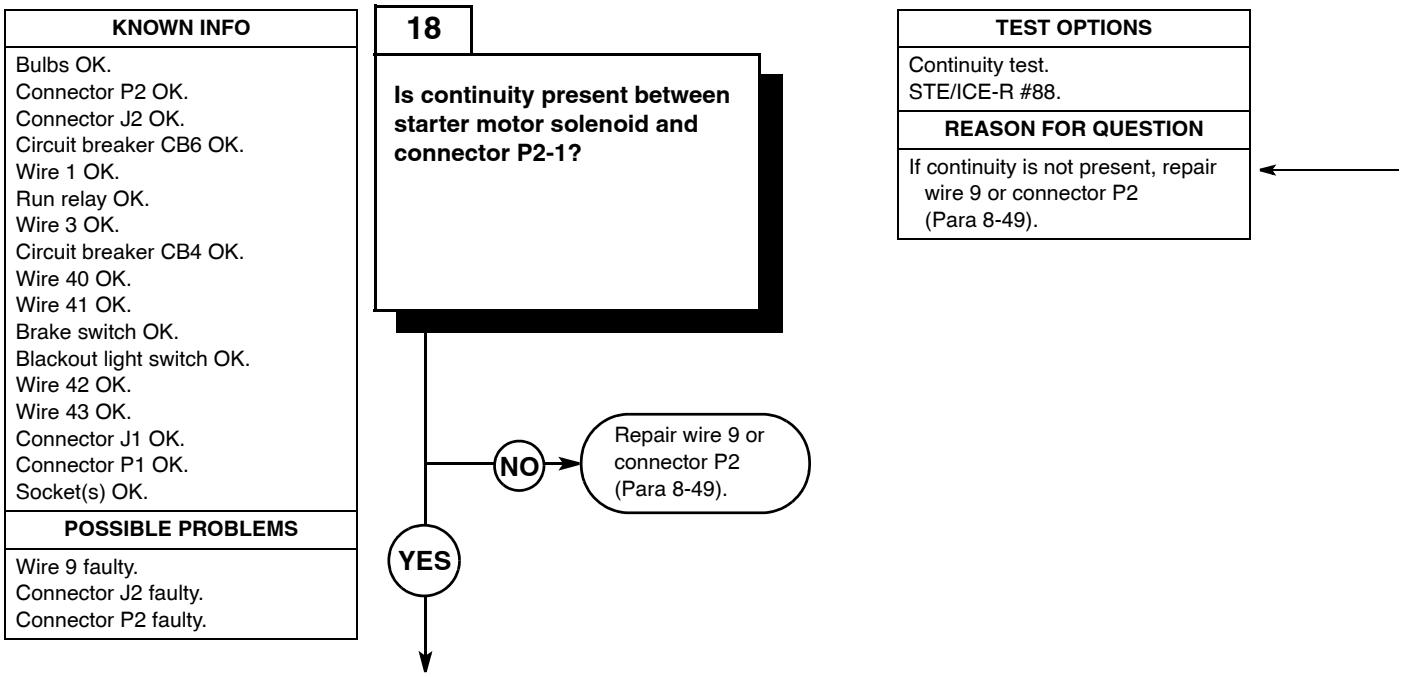
CONNECTOR J3

CONNECTORS TO STOPLIGHT



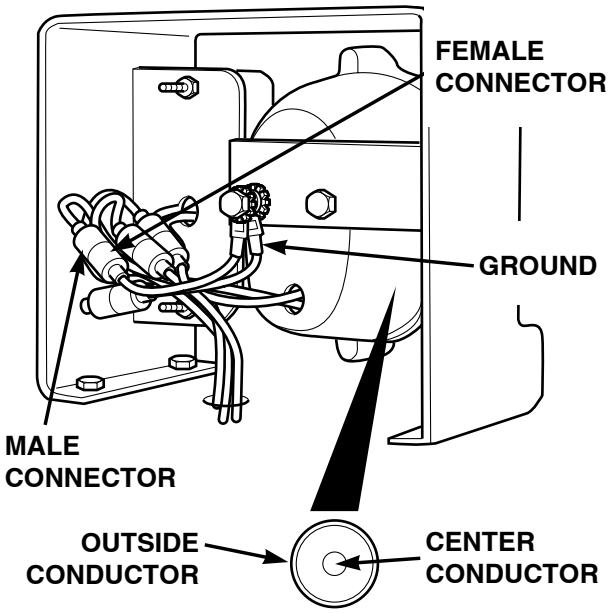
7. STOPLIGHT(S) DO NOT OPERATE (CONT).





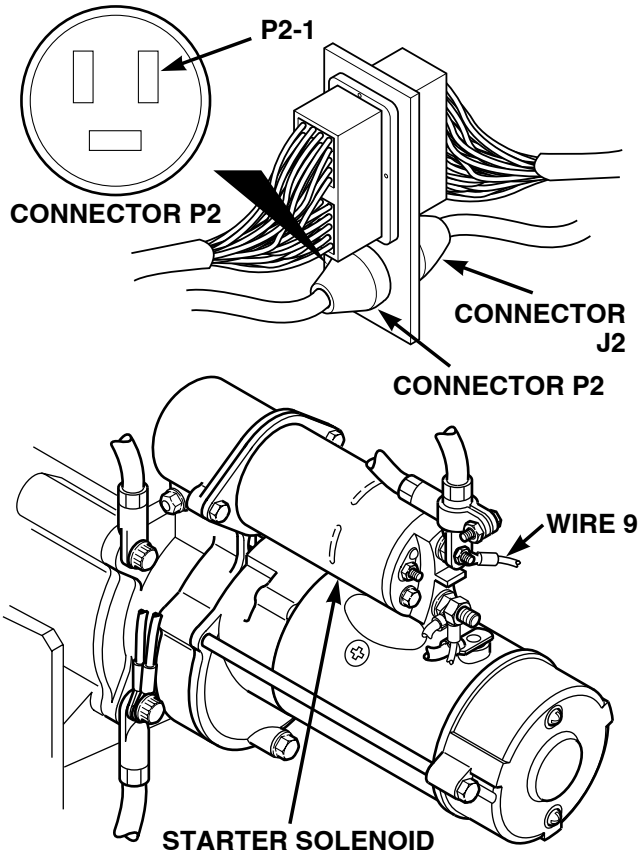
CONTINUITY TEST

(1) Disconnect ground female connector from male ground connector.
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to ground outside conductor at brake light socket.
(4) Connect multimeter negative lead (–) to ground cable.
  (a) If continuity is present, replace bulb (Para 8-33).
  (b) If continuity is not present, repair wire 2 (Para 8-49) or replace brake light socket (Para 8-33).
(5) Connect ground female connector to male connector.



CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Disconnect connector J2 from connector P2.
(3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid.
(4) Connect multimeter negative lead (–) to connector P2-1.
  (a) If continuity is present, go to Step 19 of this fault.
  (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).



7. STOPLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulb OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK. Blackout light switch OK. Wire 42 OK. Wire 43 OK. Connector J1 OK. Connector P1 OK. Socket(s) OK. Connector P2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty.

19

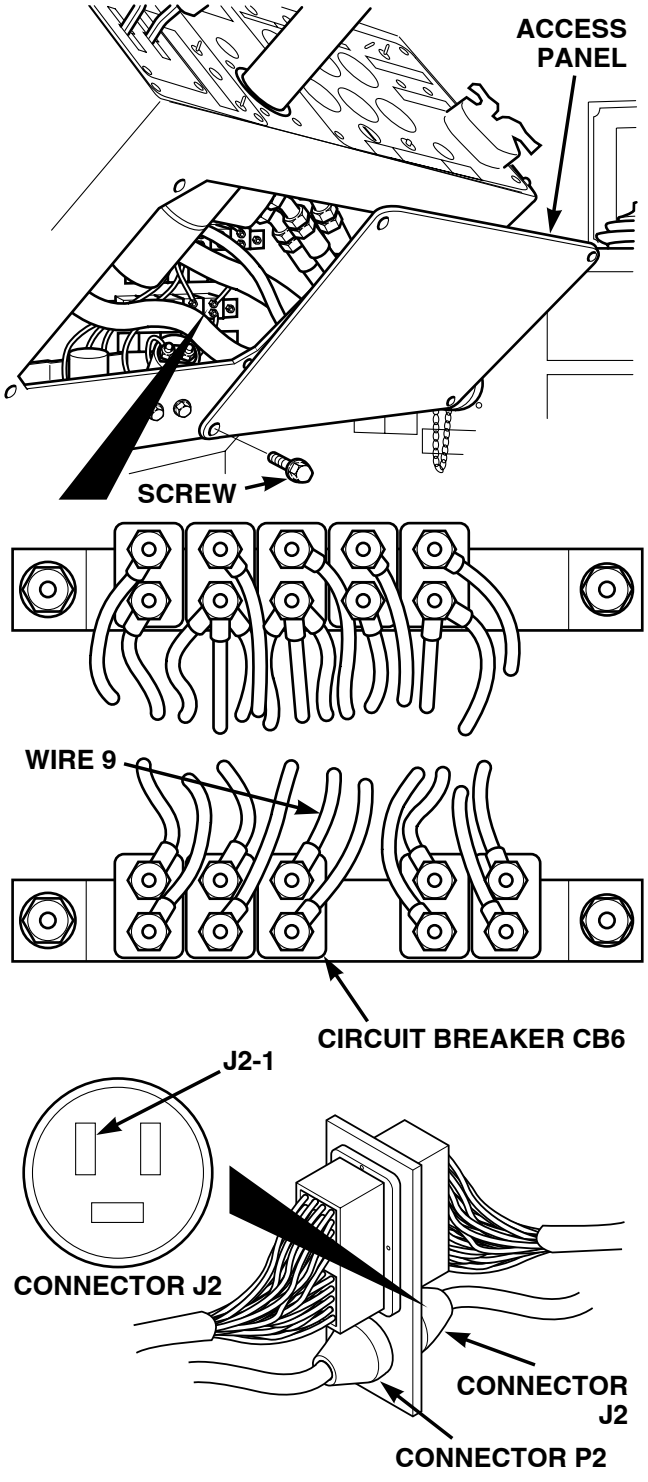
Is continuity present between circuit breaker CB6 and connector J2?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair wire 9 or connector J2 (Para 8-48).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (3) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, go to Step 18 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-48). (4) Install access panel and four screws to secure access panel. (5) Connect connector J2 to connector P2.



8. TAILLIGHT(S) DO NOT OPERATE.

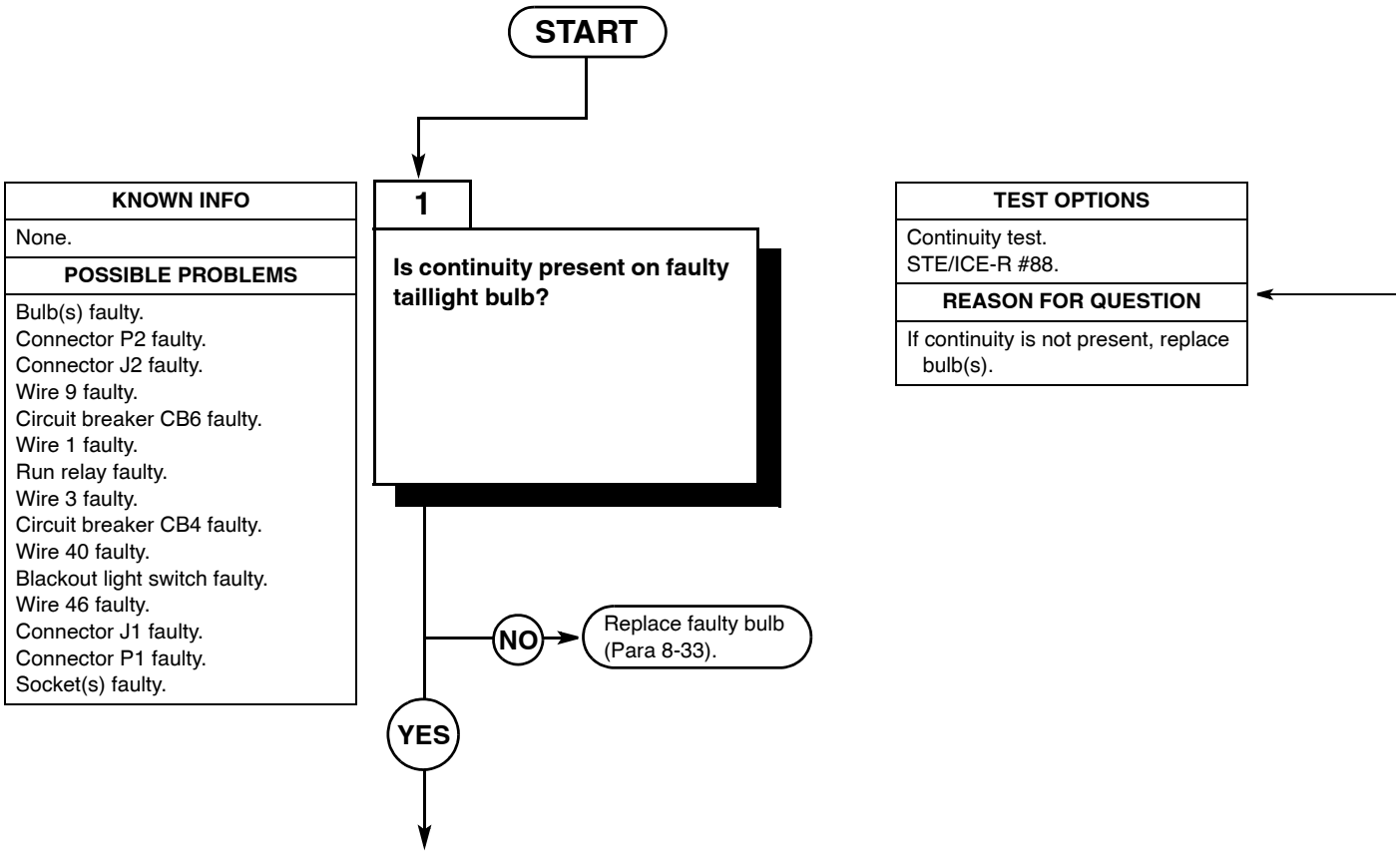
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

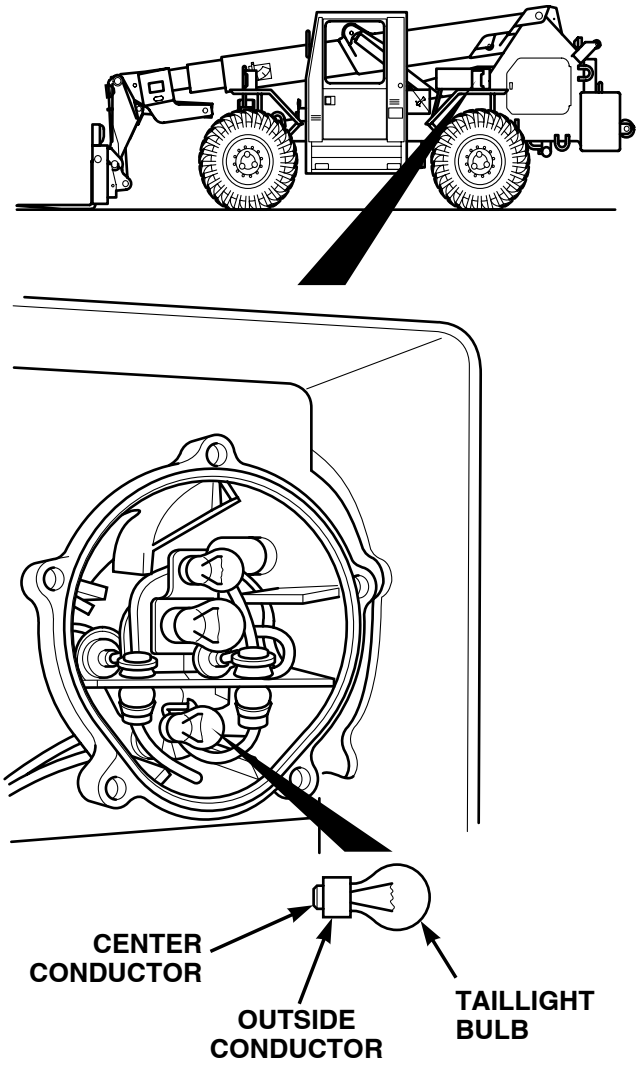
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove bulb from faulty taillight (Para 8-33). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to center conductor. (4) Connect multimeter negative lead (–) to outside conductor. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace faulty bulb (Para 8-33).



8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulb OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at faulty taillight socket?

NO → Go to Step 3 of this fault.

YES → Go to Step 14 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

3

Is 24 vdc present at starter motor solenoid where wire 9 connects?

NO → Service or replace battery cable (Para 8-42).

YES →

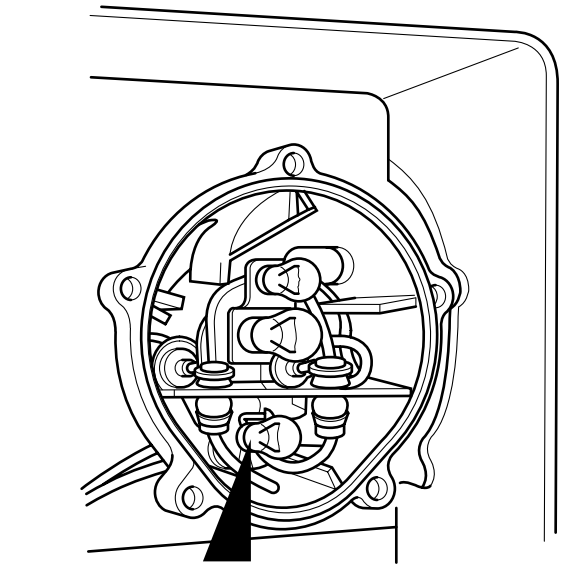
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, service or replace battery cable.

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

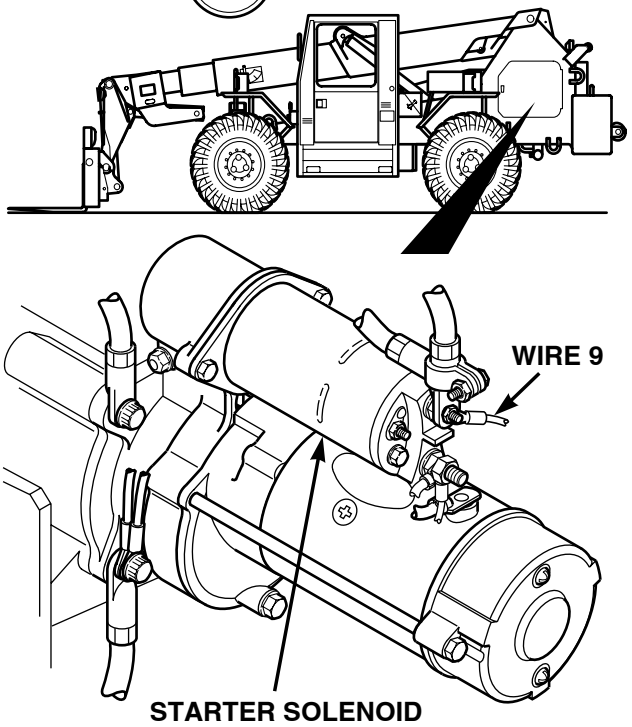
VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to center conductor of faulty socket.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Depress brake pedal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 14 of this fault.
  (b) If 24 vdc is not present, go to Step 3 of this fault.
(7) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(8) Turn engine start switch to OFF position, (TM 10-3930-673-10).



VOLTAGE TEST

(1) Remove battery covers (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to starter motor solenoid where wire 9 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, service or replace battery cable (Para 8-42).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

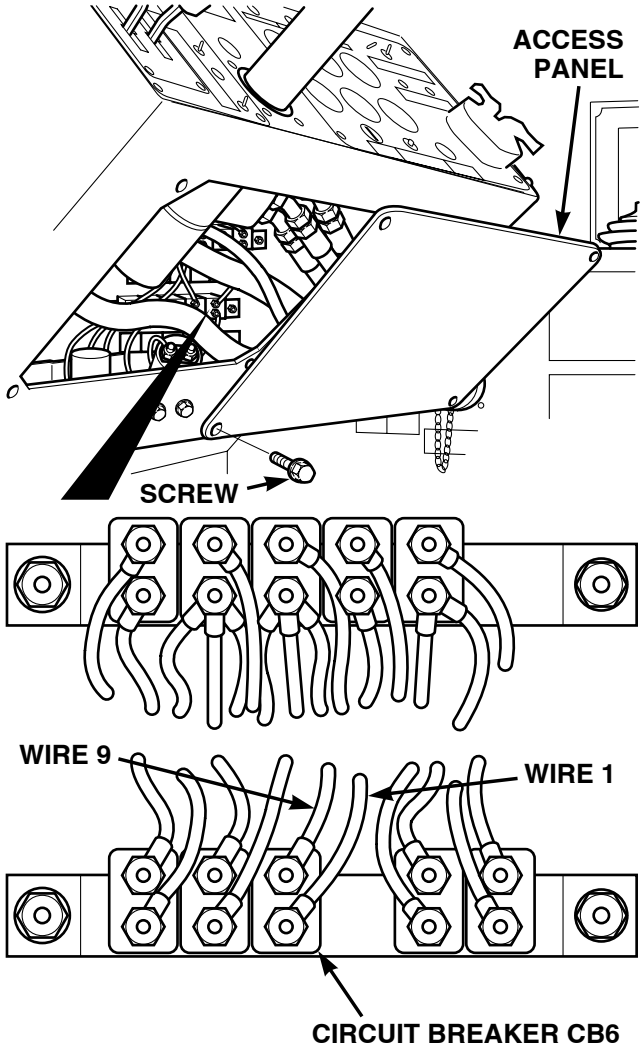
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 faulty.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Disconnect connector J2 from connector P2. (4) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

6

Is 24 vdc present at run relay where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 1 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

7

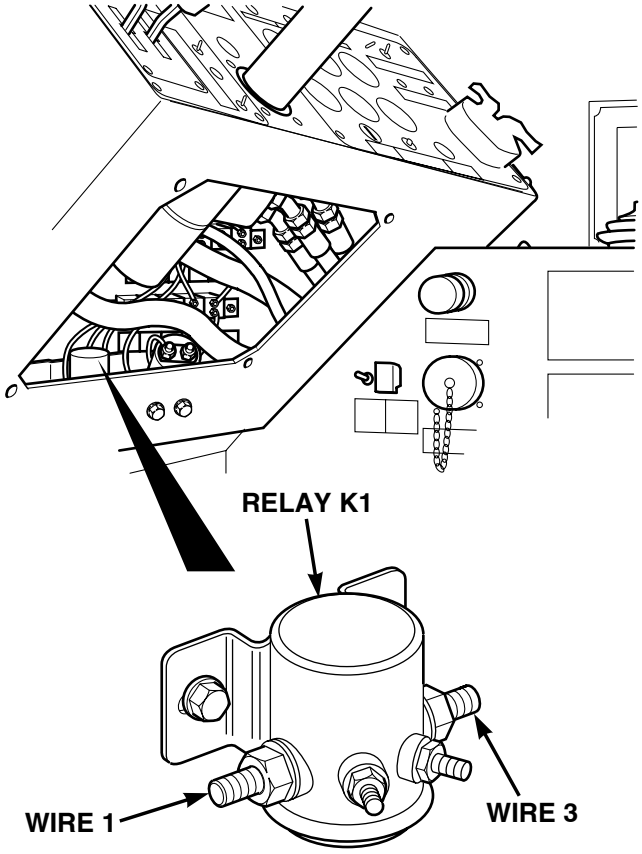
Is 24 vdc present at run relay where wire 3 connects?

NO → Replace run relay (Para 8-23).

YES

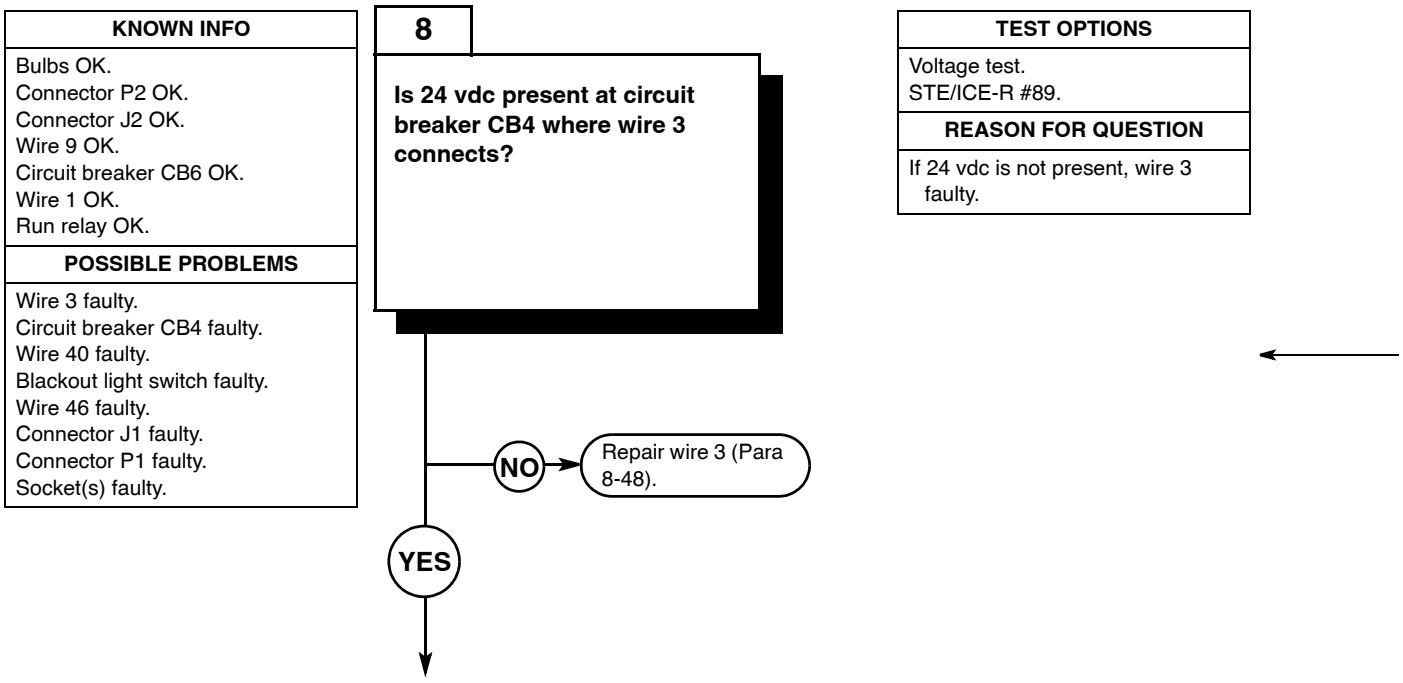
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, run relay faulty.

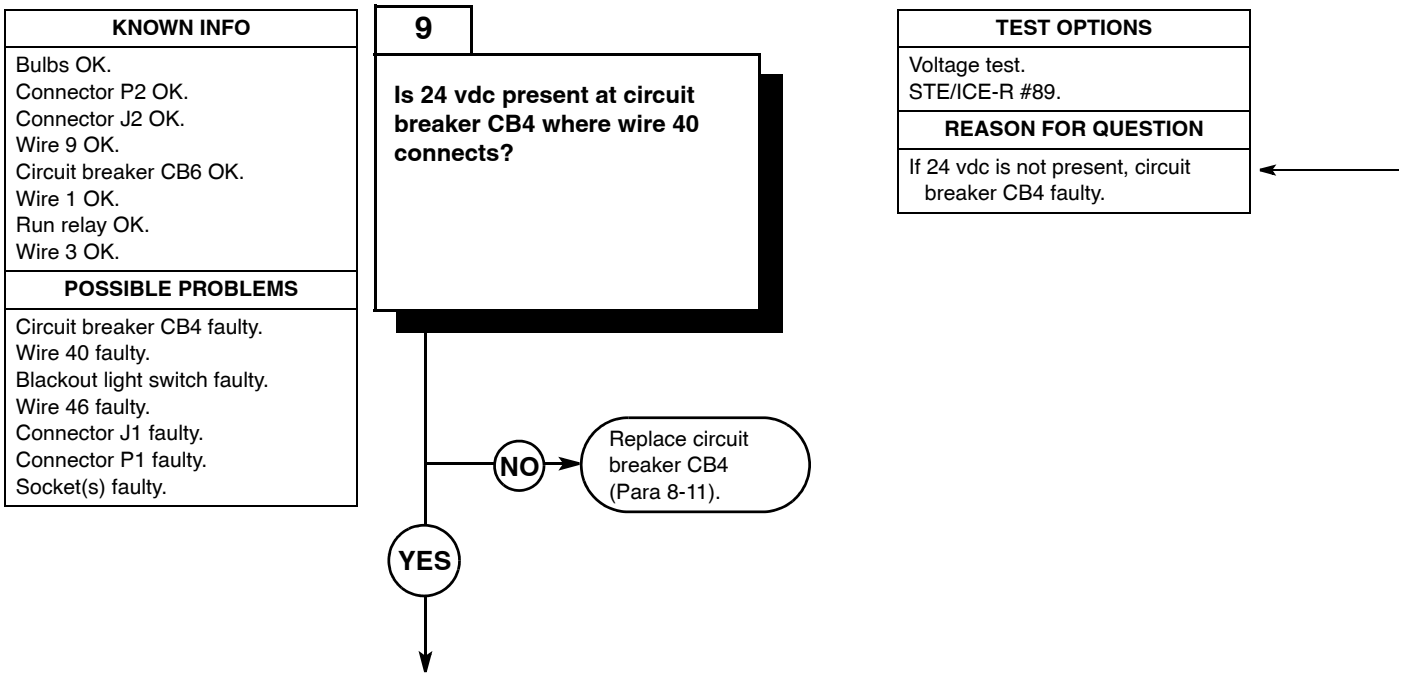
VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

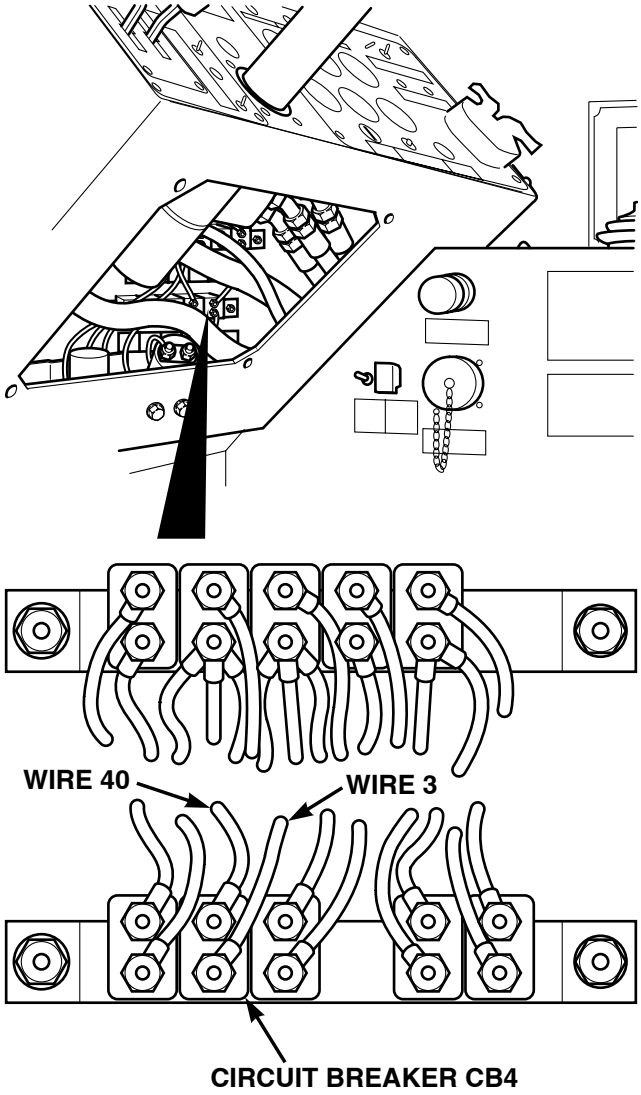
8. TAILLIGHT(S) DO NOT OPERATE (CONT).





VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

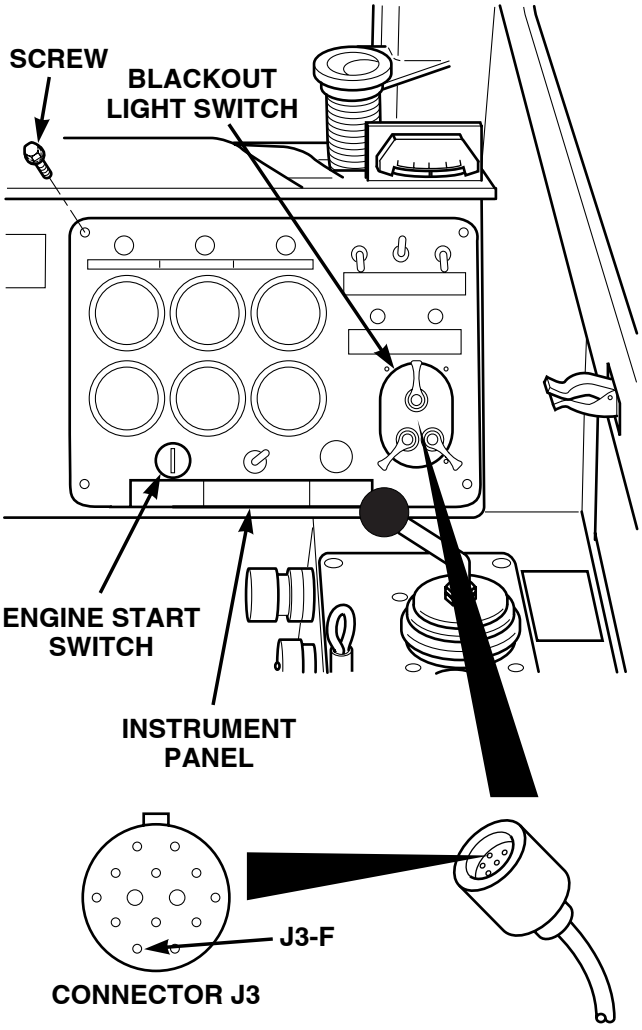
Is 24 vdc present at connector J3-F (wire 40)?

NO → Repair wire 40 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 faulty.

VOLTAGE TEST
(1) Remove four screws from instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector J3-F (wire 40). (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 40 (Para 8-48). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Lift instrument panel out to connect connector J3 to blackout light switch. (11) Install instrument panel and four screws.



8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

11

Is 24 vdc present at connector J1-8 (wire 46)?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout light switch or wire 46 faulty.

NO → Go to Step 12 of this fault.

YES → Go to Step 13 of this fault.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

12

Is continuity present between connector J3-H and connector J1-8?

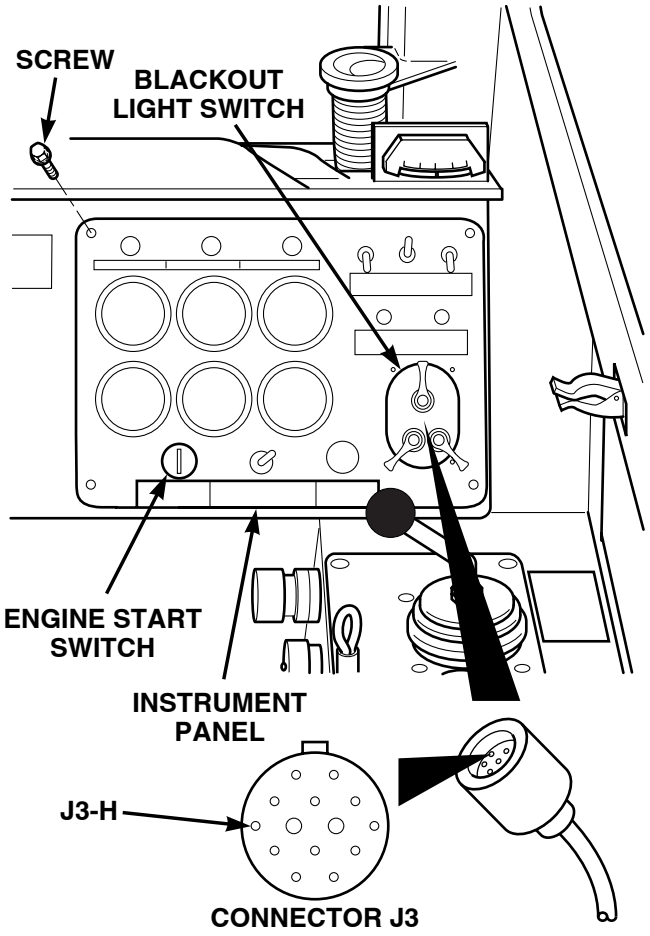
TEST OPTIONS
Continuity test. STE/ICER #88.
REASON FOR QUESTION
If continuity is not present, blackout control switch or wire 46 faulty.

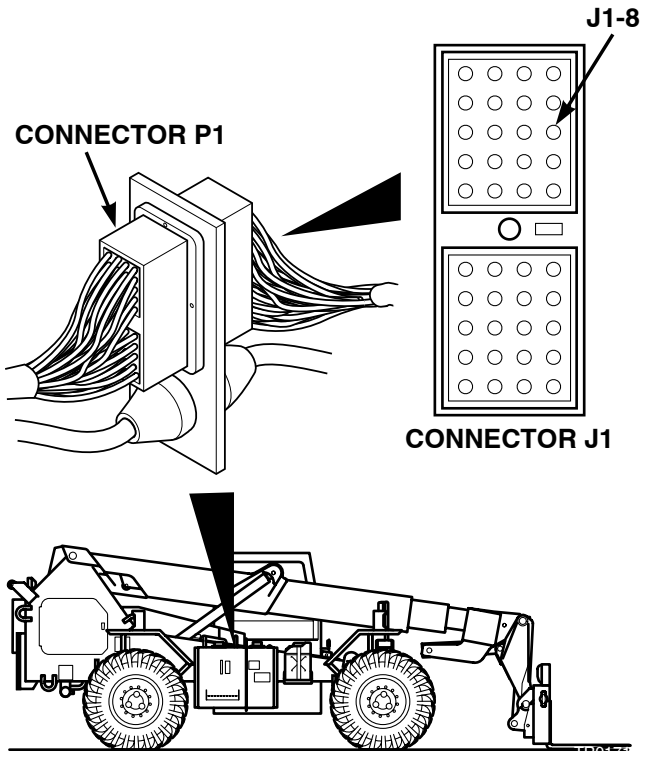
NO → Repair wire 46 (Para 8-48).

YES → Replace blackout light switch (Para 8-13).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect connector J1 from connector P1. (3) Connect multimeter positive lead (+) to connector J1-8 (wire 46). (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, go to Step 12 of this fault. (8) Turn blackout light switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position, (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).

CONTINUITY TEST
(1) Remove four screws and instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Disconnect connector J1 from connector P1. (4) Set multimeter to ohms. (5) Connect multimeter positive lead (+) to connector J3-H (wire 46). (6) Connect multimeter negative lead (–) to connector J1-8 (wire 46). (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 46 (Para 8-48). (7) Lift instrument panel out to connect connector J3 to blackout light switch. (8) Connect connector J1 to connector P1. (9) Install instrument panel and four screws.





8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK.
POSSIBLE PROBLEMS
Wire 46 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

13

Is 24 vdc present at taillight female connector where wire 46 connects?

NO → Repair wire 46 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 46 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 46 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS

14

Is continuity present between taillight socket outside conductor ground and ground cable?

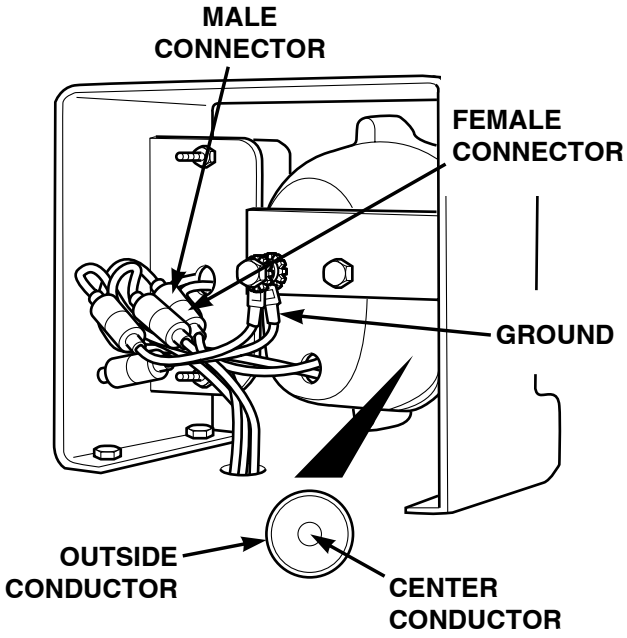
NO → Repair wire 2 (Para 8-49).

YES → Replace bulb (Para 8-33).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 2 ground or brake light socket faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to taillight female connector where wire 46 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, repair wire 46 (Para 8-48). (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).

CONTINUITY TEST
(1) Disconnect ground female connector from male ground connector. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground outside conductor at taillight socket. (4) Connect multimeter negative lead (–) to ground cable. (a) If continuity is present, replace bulb (Para 8-33). (b) If continuity is not present, repair wire 2 (Para 8-49) or replace blackout brake light socket (Para 8-13).



8. TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 46 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

15

Is continuity present between starter motor solenoid and connector P2-1?

NO → Repair wire 9 or connector P2 (Para 8-49).

YES → Go to Step 16 of this fault.

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair wire 9 or connector P2 (Para 8-49).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 46 OK. Socket(s) OK. Connector P2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty.

16

Is continuity present between circuit breaker CB6 and connector J2?

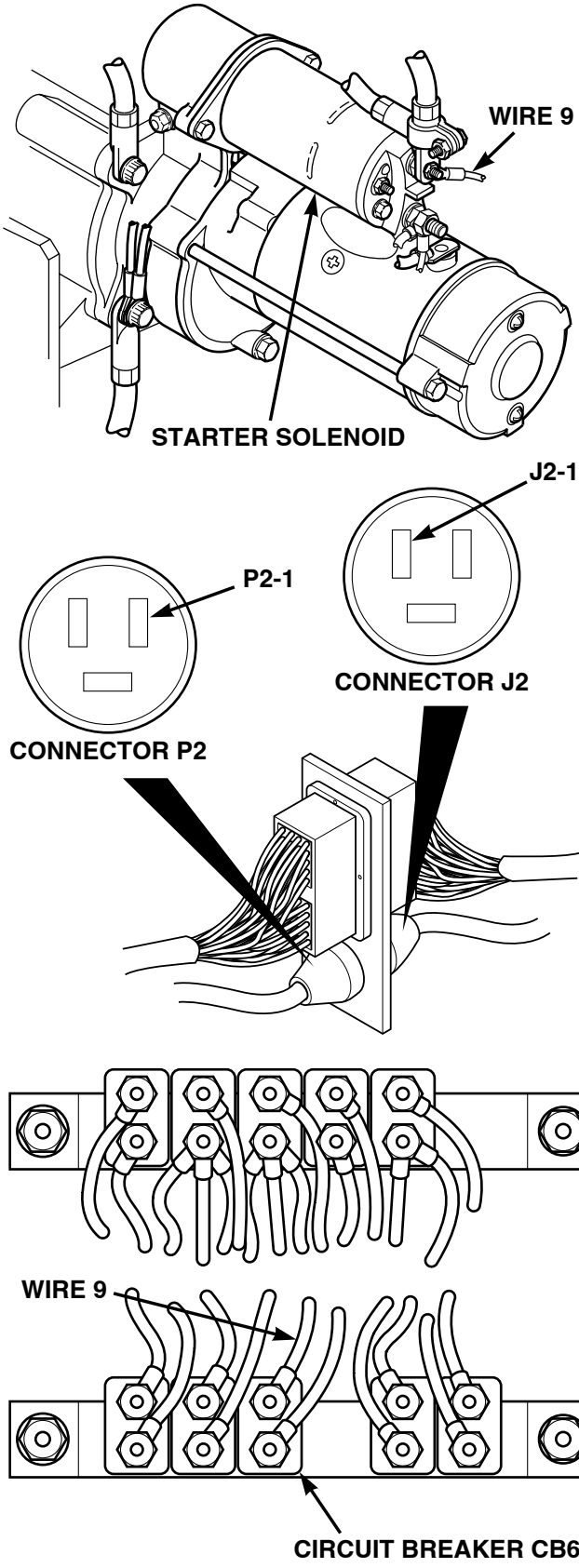
NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service battery (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair wire 9 or connector J2 (Para 8-48).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (4) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, Repair wire 9 or connector J2 (Para 8-48). (5) Install access panel and four screws. (6) Connect negative battery cable to negative side of battery. (7) Install battery cover (Para 8-42).



9. PARKING LIGHTS DO NOT OPERATE.

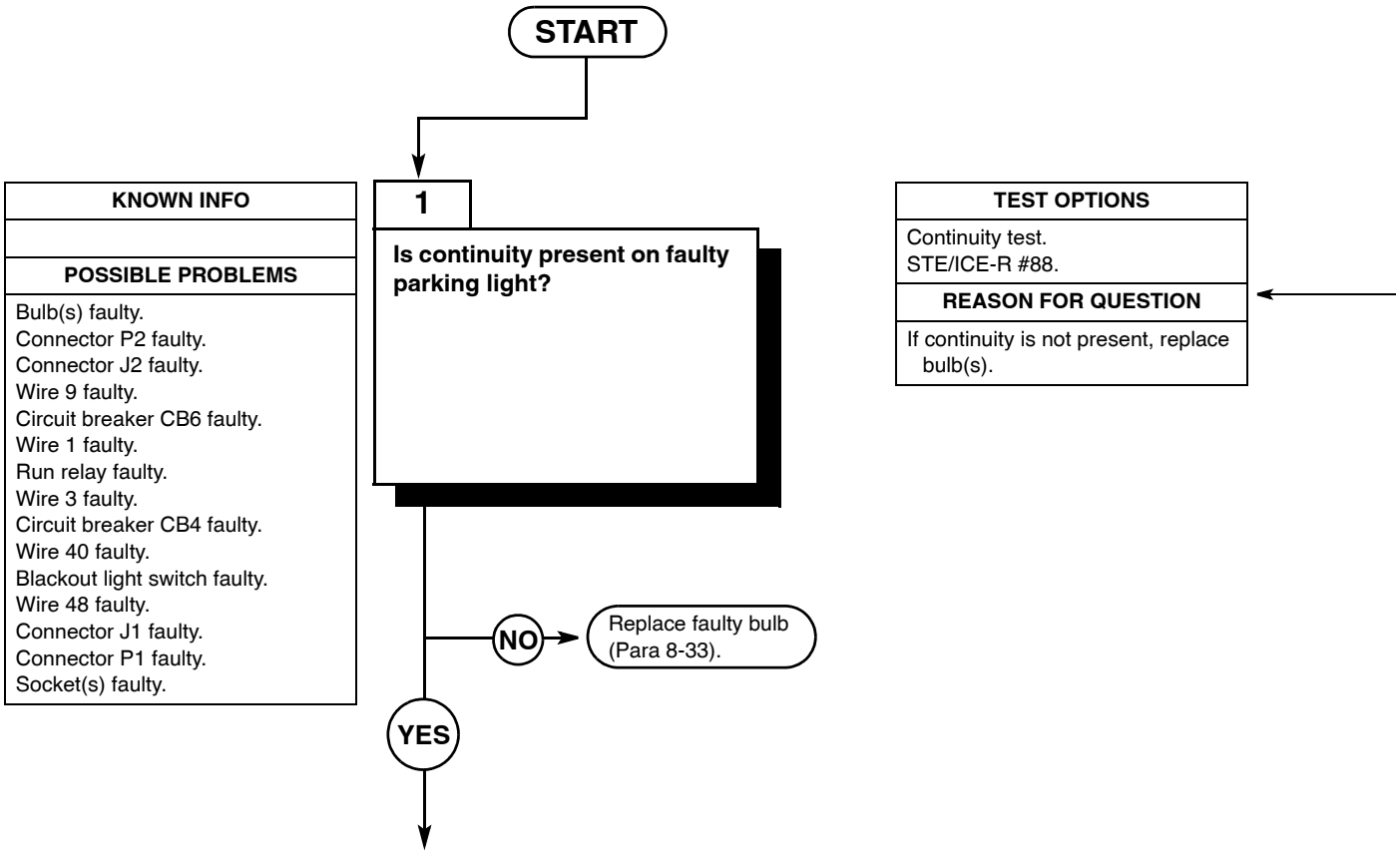
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

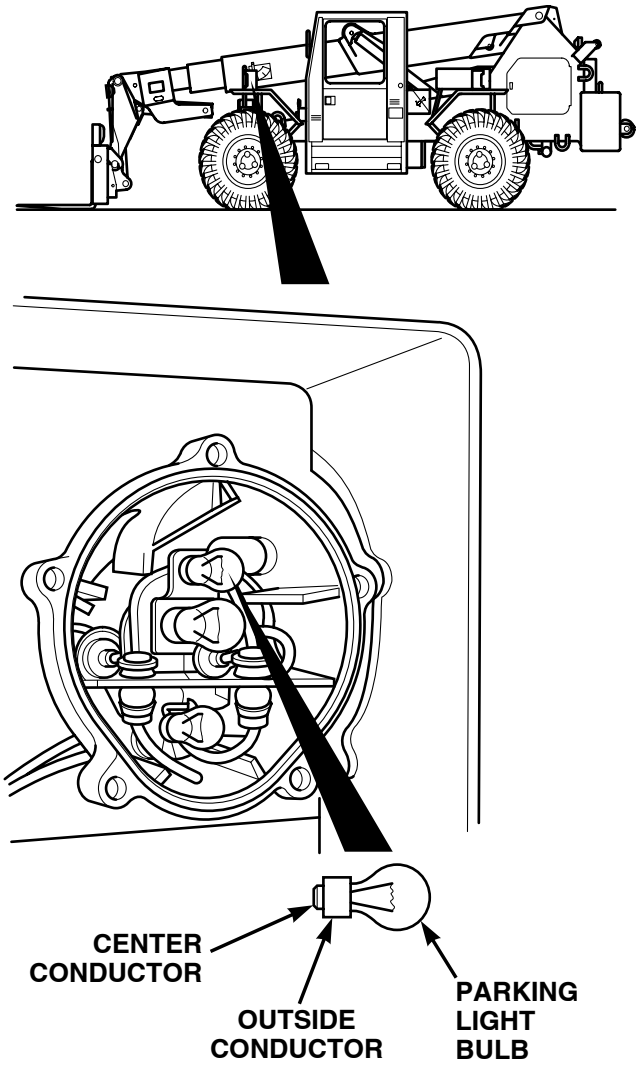
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove bulb from faulty parking light (Para 8-33). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to center conductor of bulb. (4) Connect multimeter negative lead (–) to outside conductor of bulb. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace bulb (Para 8-33).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at faulty parking light socket?

NO → Go to Step 3 of this fault.

YES → Go to Step 14 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

3

Is 24 vdc present at the starter motor solenoid where wire 9 connects?

NO → Service or replace battery cable (Para 8-42).

YES →

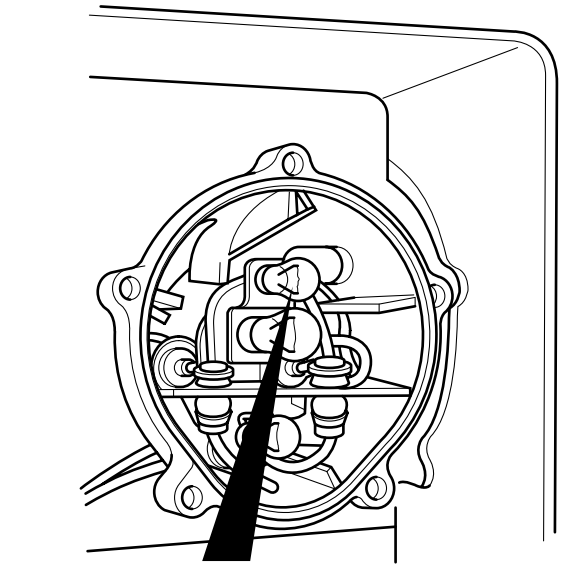
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, service or replace battery cable.

WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

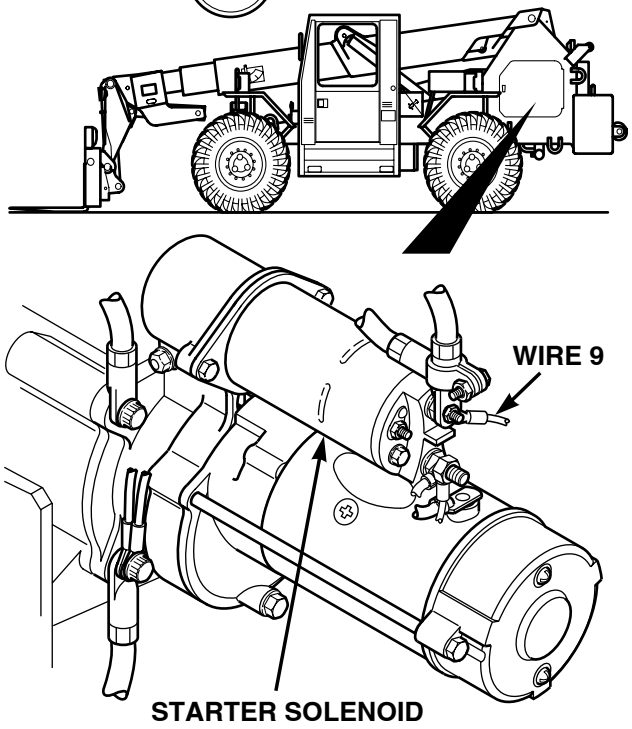
VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to center conductor of faulty socket.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10).
(7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(8) Connect negative battery cable to negtive side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 14 of this fault.
  (b) If 24 vdc is not present, go to Step 3 of this fault.
(9) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(10) Turn engine start switch to OFF position, (TM 10-3930-673-10).



VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Connect multimeter positive lead (+) to the starter motor solenoid where wire 9 connects.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, service battery cable (Para 8-42).
(6) Disconnect negative battery cable from negative side of battery (Para 8-42).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

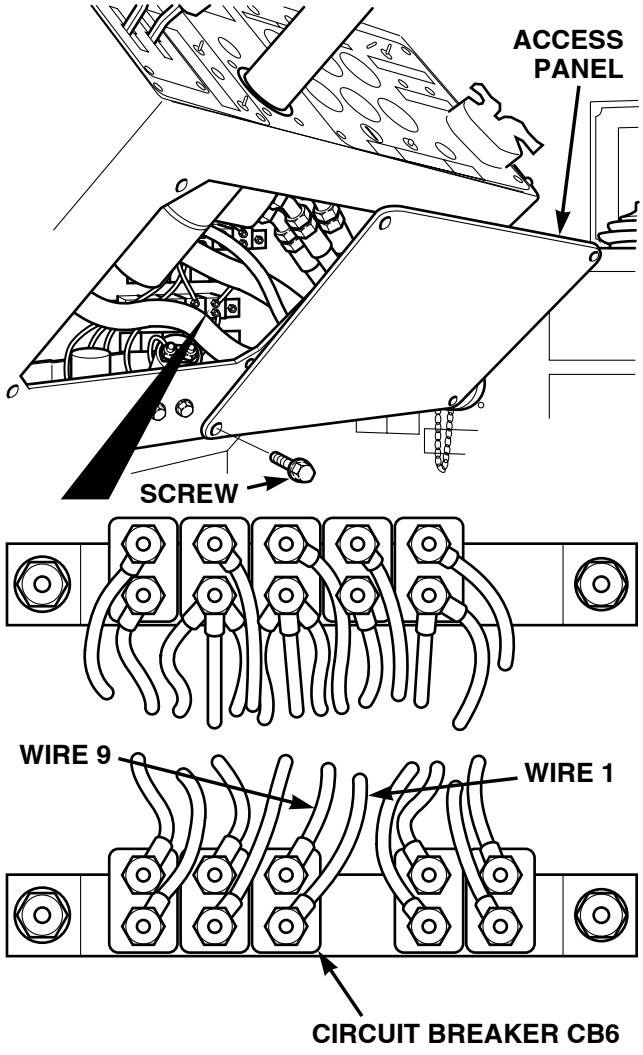
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 is faulty.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect the multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

6

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 1 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

7

Is 24 vdc present at run relay where wire 3 connects?

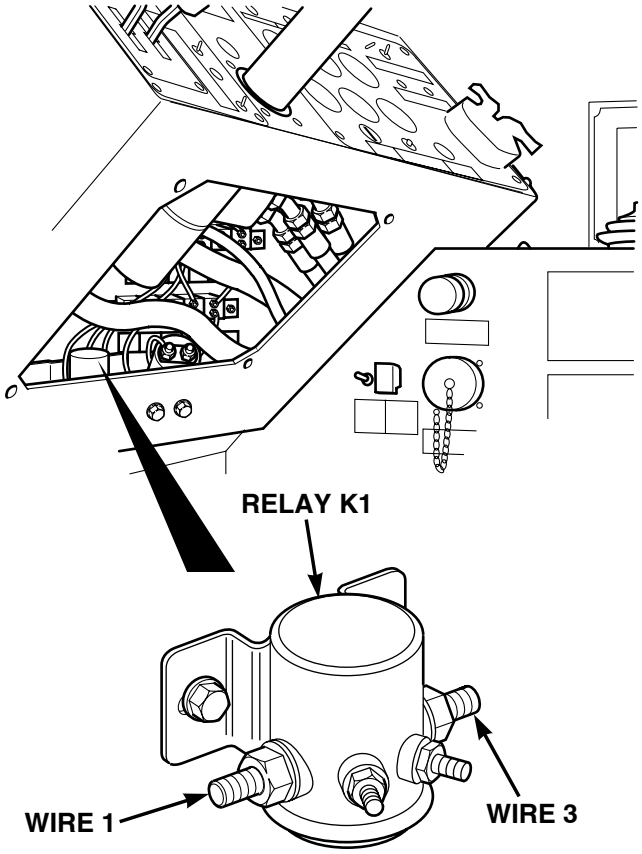
NO → Replace run relay K1 (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, run relay K1 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

8

Is 24 vdc present at circuit breaker CB4 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 3 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

9

Is 24 vdc present at circuit breaker CB4 where wire 40 connects?

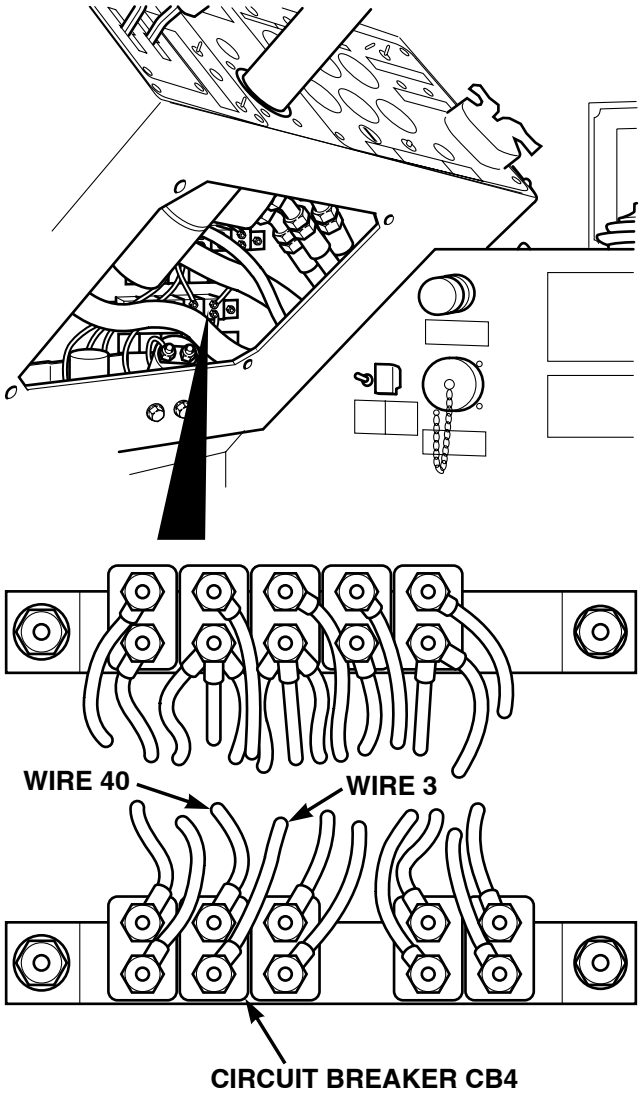
NO → Replace circuit breaker CB4 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB4 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

Is 24 vdc present at connector J3-F (wire 40)?

NO → Repair wire 40 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

11

Is 24 vdc present at connector J1-4 (wire 48)?

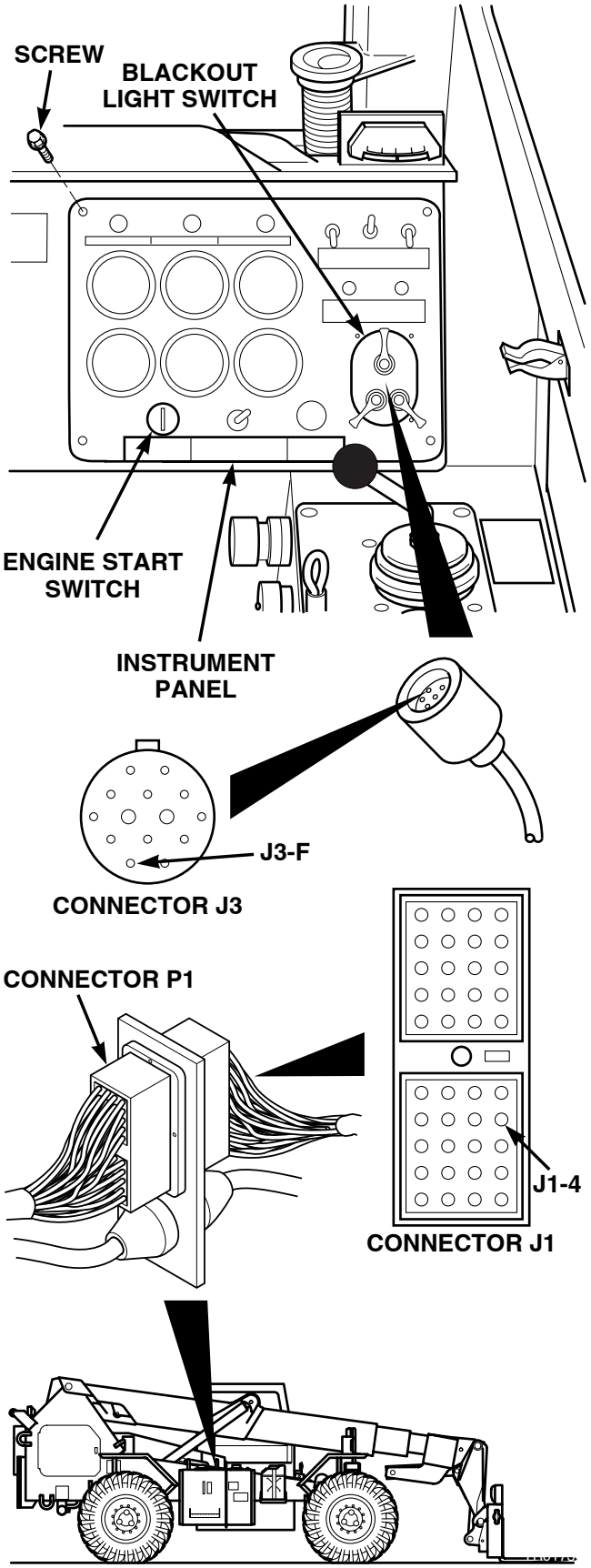
NO → Go to Step 12 of this fault.

YES → Go to Step 13 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout light switch or wire 48 are faulty.

VOLTAGE TEST
(1) Remove four screws from instrument panel.
(2) Lift instrument panel out to remove connector J3 from blackout light switch.
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to connector J3-F (wire 40).
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
(7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 11 of this fault.
(b) If 24 vdc is not present, repair wire 40 (Para 8-48).
(8) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).
(10) Lift instrument panel out to connect connector J3 to blackout light switch.
(11) Install instrument panel and four screws to secure instrument panel.

VOLTAGE TEST
(1) Set multimeter to volts dc.
(2) Disconnect connector J1 from connector P1.
(3) Connect multimeter positive lead (+) to connector J1-4 (wire 48).
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 13 of this fault.
(b) If 24 vdc is not present, go to Step 12 of this fault.
(8) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

12

Is continuity present between connector J3-L and connector J1-4?

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 48 is faulty.

NO → Repair wire 48 (Para 8-49).

YES → Replace blackout light switch (Para 8-13).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK.
POSSIBLE PROBLEMS
Wire 48 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

13

Is 24 vdc present at parking light female connector where wire 48 connects?

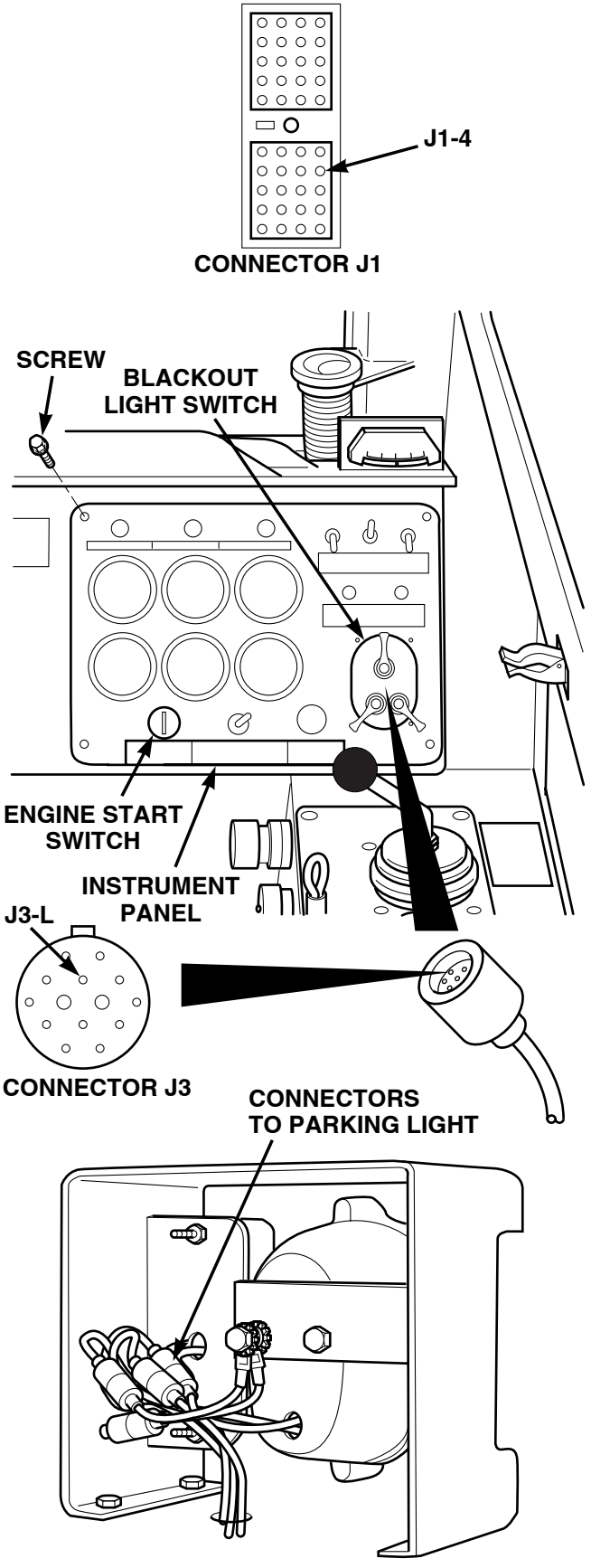
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 48 is faulty.

NO → Repair wire 48 (Para 8-49).

YES →

CONTINUITY TEST
(1) Remove four screws from instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to connector J3-L (wire 48). (5) Connect multimeter negative lead (–) to connector J1-4 (wire 48). (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 48 (Para 8-49). (6) Lift instrument panel out to connect connector J3 to blackout light switch. (7) Connect connector J1 to connector P1. (8) Install instrument panel and four screws to secure instrument panel.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to parking light female connector where wire 48 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to SER. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, repair wire 48 (Para 8-49). (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Connect female connector to male connector for parking light.



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 48 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Socket(s) faulty.

14

Is continuity present between parking light socket outside conductor ground and ground cable?

NO → Repair wire 2 (Para 8-49).

YES → Replace bulb (Para 8-33).

TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, wire 2 ground or brake light socket is faulty.

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 48 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J1 faulty. Connector P1 faulty.

15

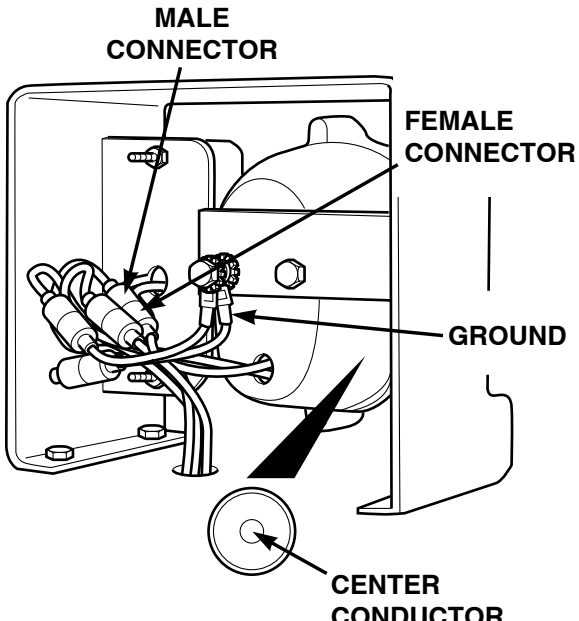
Is continuity present between starter motor solenoid and connector P2-1?

NO → Repair wire 9 or connector P2 (Para 8-49).

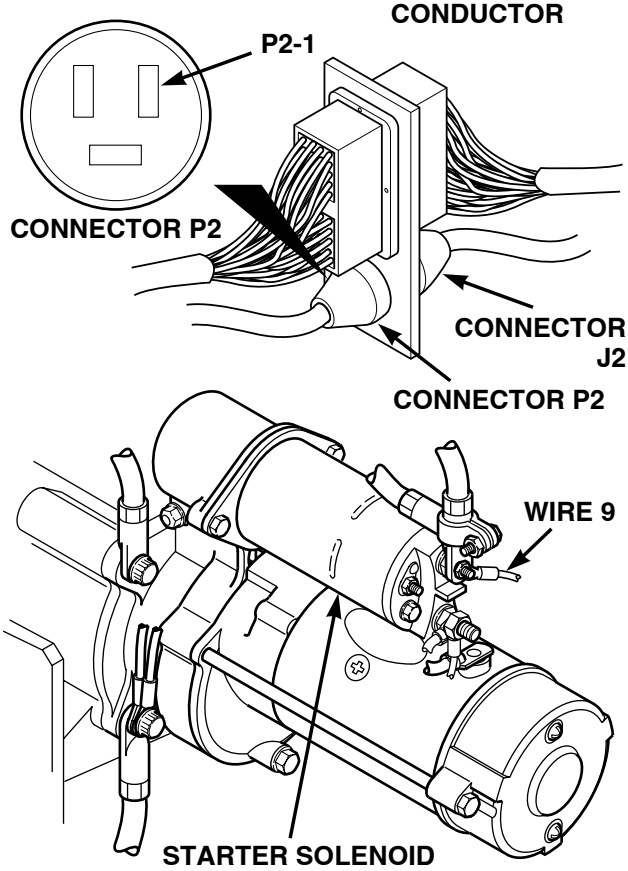
YES →

TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 is faulty.

CONTINUITY TEST
(1) Disconnect ground female connector from male ground connector. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground outside conductor at parking light socket. (4) Connect multimeter negative lead (–) to ground cable. (a) If continuity is present, replace bulb (Para 8-33). (b) If continuity is not present, repair wire 2 (Para 8-49). (5) Connect ground female connector to ground male connector.



CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).



9. PARKING LIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb(s) OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 48 OK. Socket(s) OK. Connector P1 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J1 faulty.

16

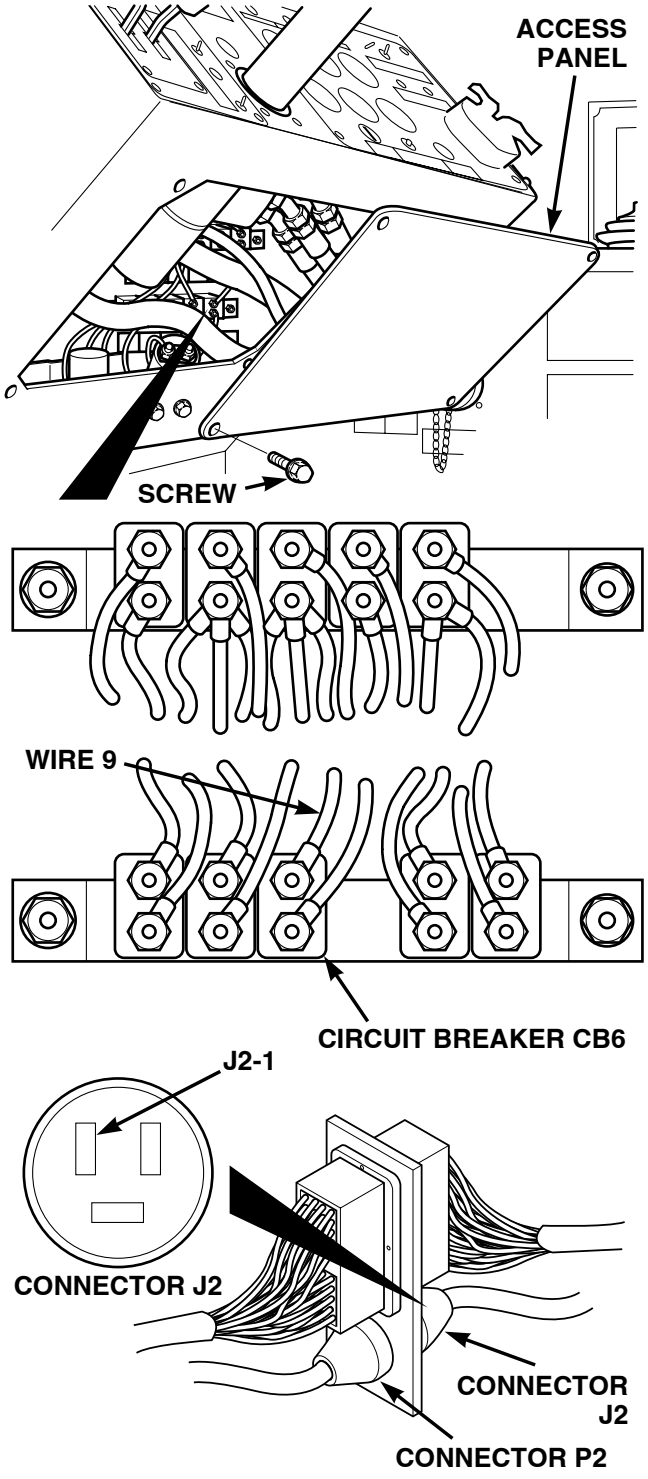
Is continuity present between circuit breaker CB6 and connector J2?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity Test. STE/ICE-R #88
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 are faulty.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (3) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair relay wire 9 or connector J2 (Para 8-48). (4) Connect connector J2 to connector P2. (5) Install access panel and four screws to secure access panel. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Install battery cover (Para 8-42).



10. ALL TURN SIGNALS DO NOT OPERATE.

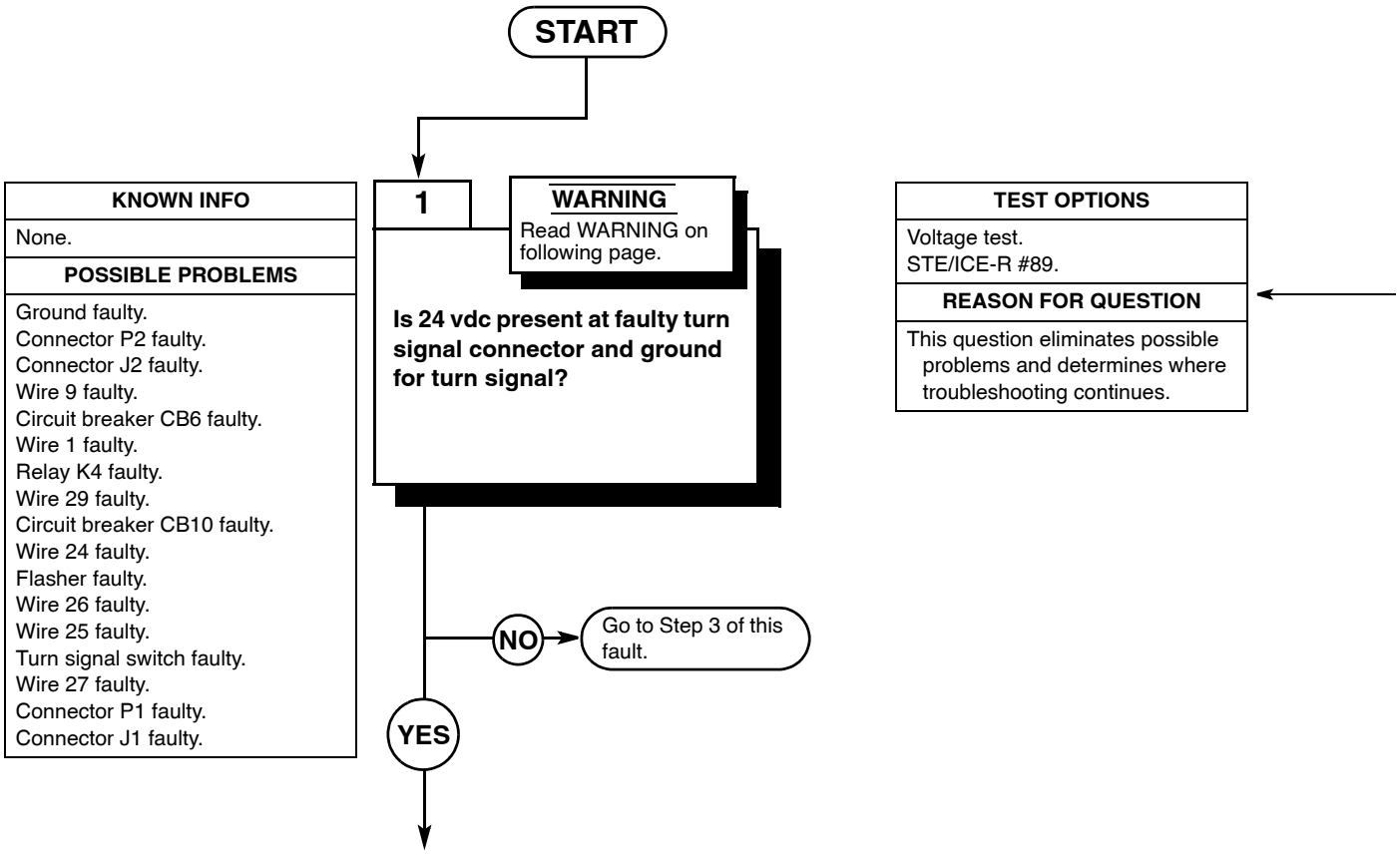
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

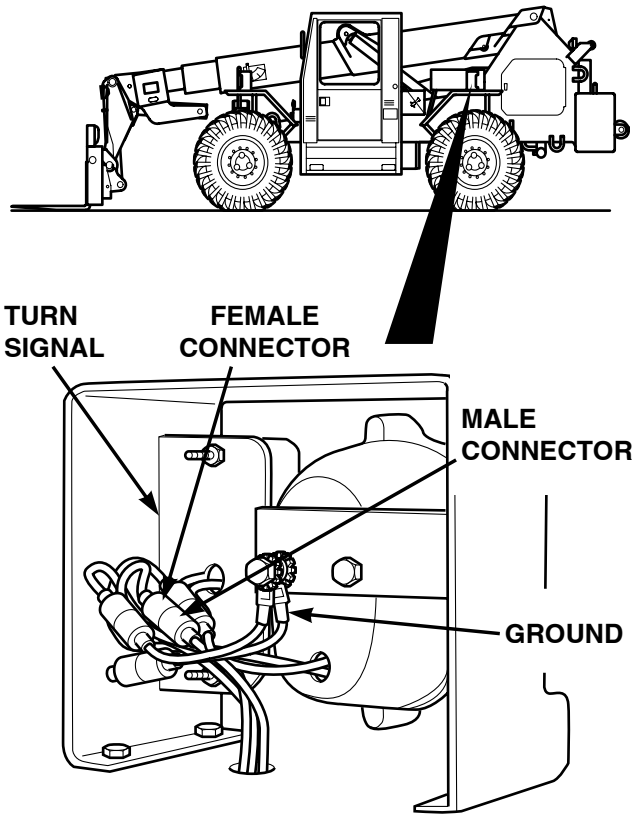
Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

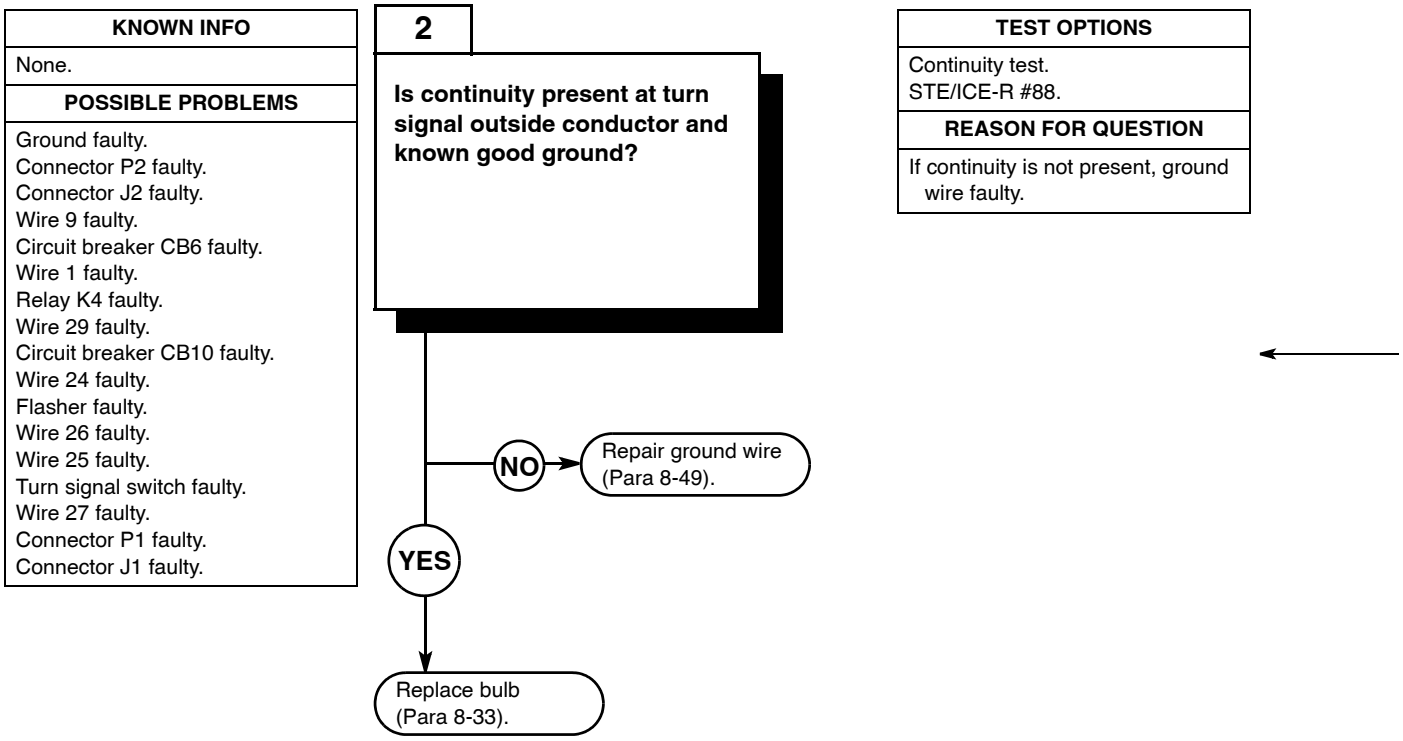
- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

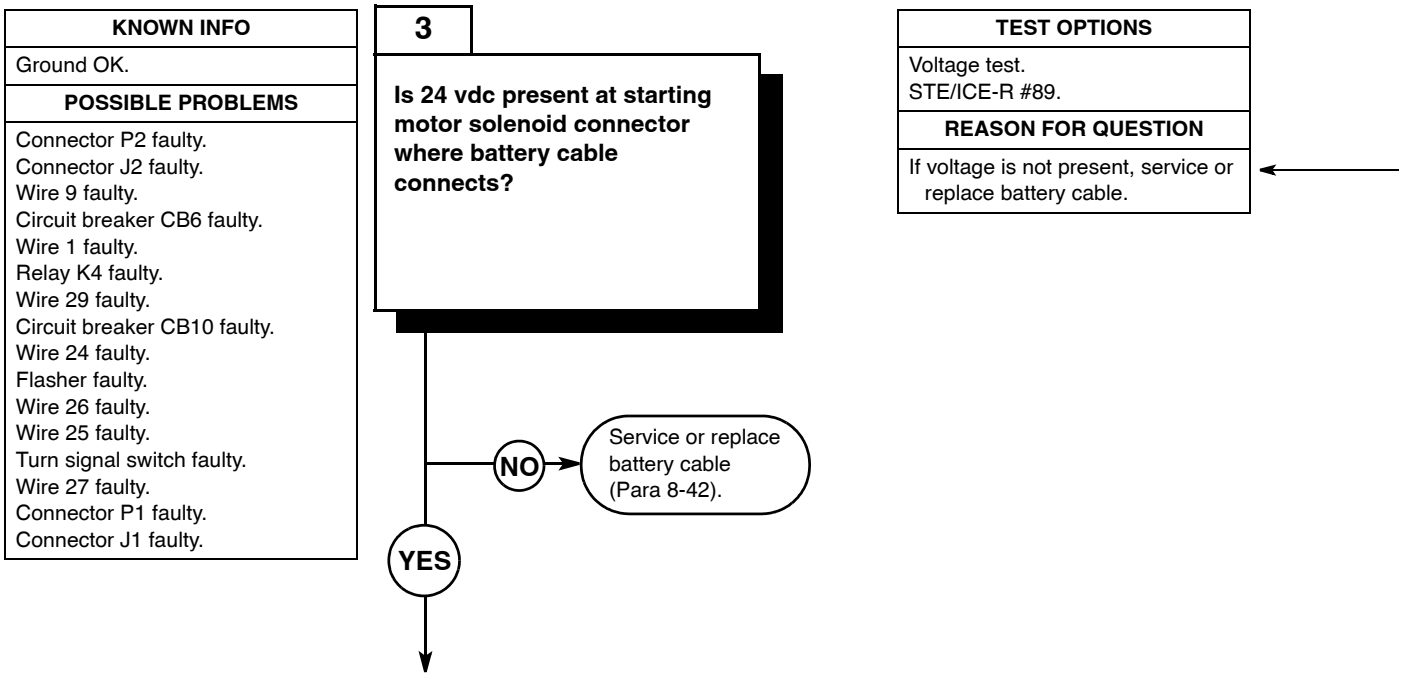


VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to female connector at faulty turn signal.
(5) Connect multimeter negative lead (–) to ground for turn signal.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
(7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 2 of this fault.
  (b) If 24 vdc is not present, go to Step 3 of this fault.
(8) Turn engine start switch to OFF position (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).

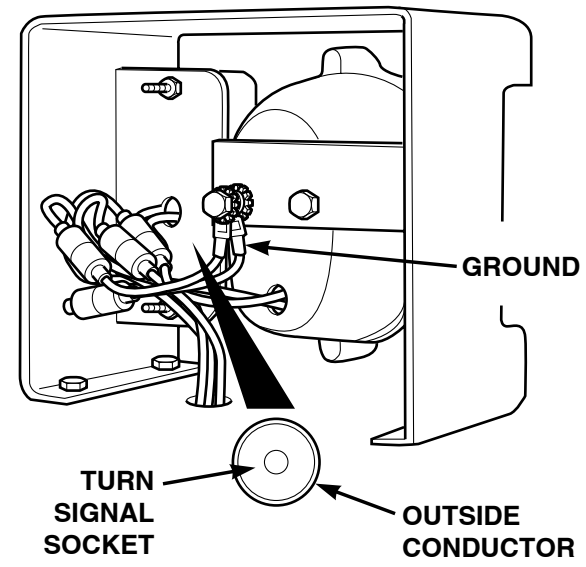
10. ALL TURN SIGNALS DO NOT OPERATE (CONT).





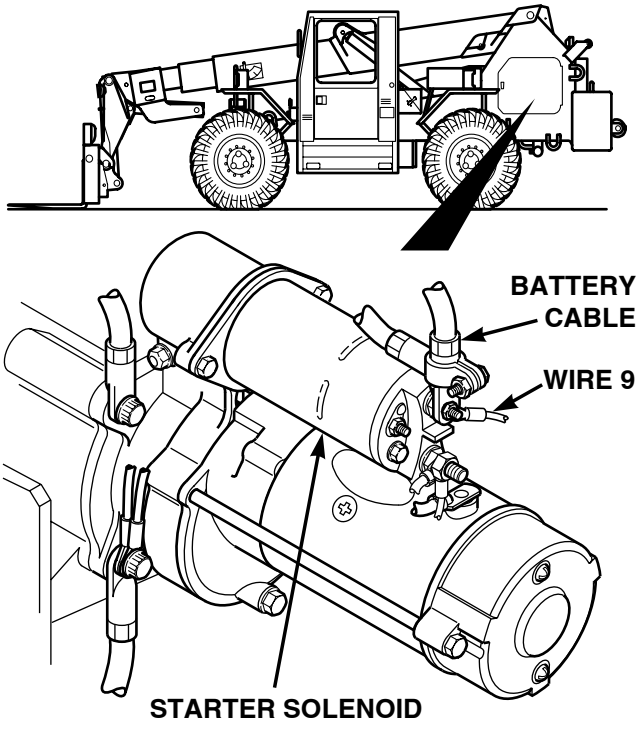
CONTINUITY TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to outside conductor at faulty turn signal.
(4) Connect multimeter negative lead (–) to turn signal ground.
  (a) If continuity is present, replace bulb (Para 8-33).
  (b) If continuity is not present, repair ground wire (Para 8-49).



VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Connect multimeter positive lead (+) to starting motor solenoid where battery cable connects.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, go to service battery cable (Para 8-42).
(6) Disconnect negative battery cable from negative side of battery (Para 8-42).



10. ALL TURN SIGNALS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Relay K4 faulty. Wire 29 faulty. Circuit breaker CB10 faulty. Wire 24 faulty. Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

4

Is 24 vdc present at connector P2-1 and known good ground?

NO → Repair wire 9 or connector P2 (Para 8-49).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at P2-1, wire 9 and/or connector P2 faulty.

KNOWN INFO
Ground OK. Connector P2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Relay K4 faulty. Wire 29 faulty. Circuit breaker CB10 faulty. Wire 24 faulty. Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

5

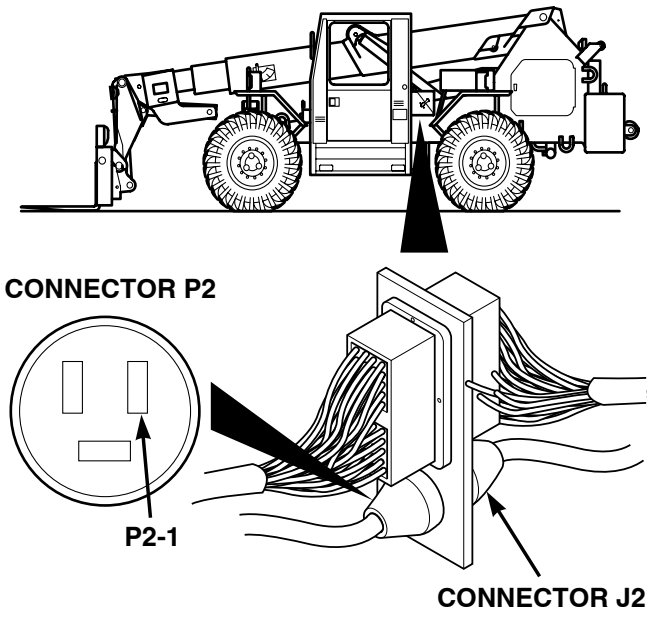
Is 24 vdc present at circuit breaker CB6 where wire 9 connects and known good ground?

NO → Repair wire 9 or connector J2 (Para 8-48).

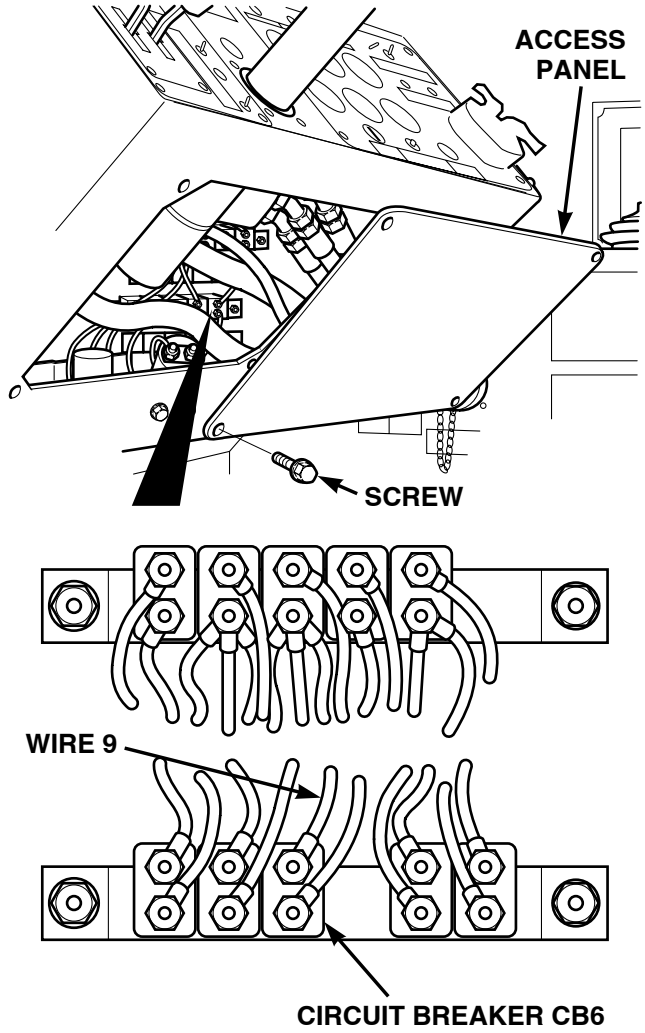
YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at circuit breaker CB6, wire 9 and/or connector J2 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to connector P2-1. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable from negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, repair wire 9 and/or connector P2 (Para 8-49). (6) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, repair wire 9 and/or connector J2 (Para 8-48). (6) Disconnect negative battery cable from negative side of battery (Para 8-42).



10. ALL TURN SIGNALS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Relay K4 faulty. Wire 29 faulty. Circuit breaker CB10 faulty. Wire 24 faulty. Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

6

Is 24 vdc present at circuit breaker CB6 where wire 1 connects and known good ground?

NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at circuit breaker CB6 where wire 1 connects, circuit breaker CB6 faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Relay K4 faulty. Wire 29 faulty. Circuit breaker CB10 faulty. Wire 24 faulty. Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

7

Is 24 vdc present at relay K4 where wire 1 connects and known good ground?

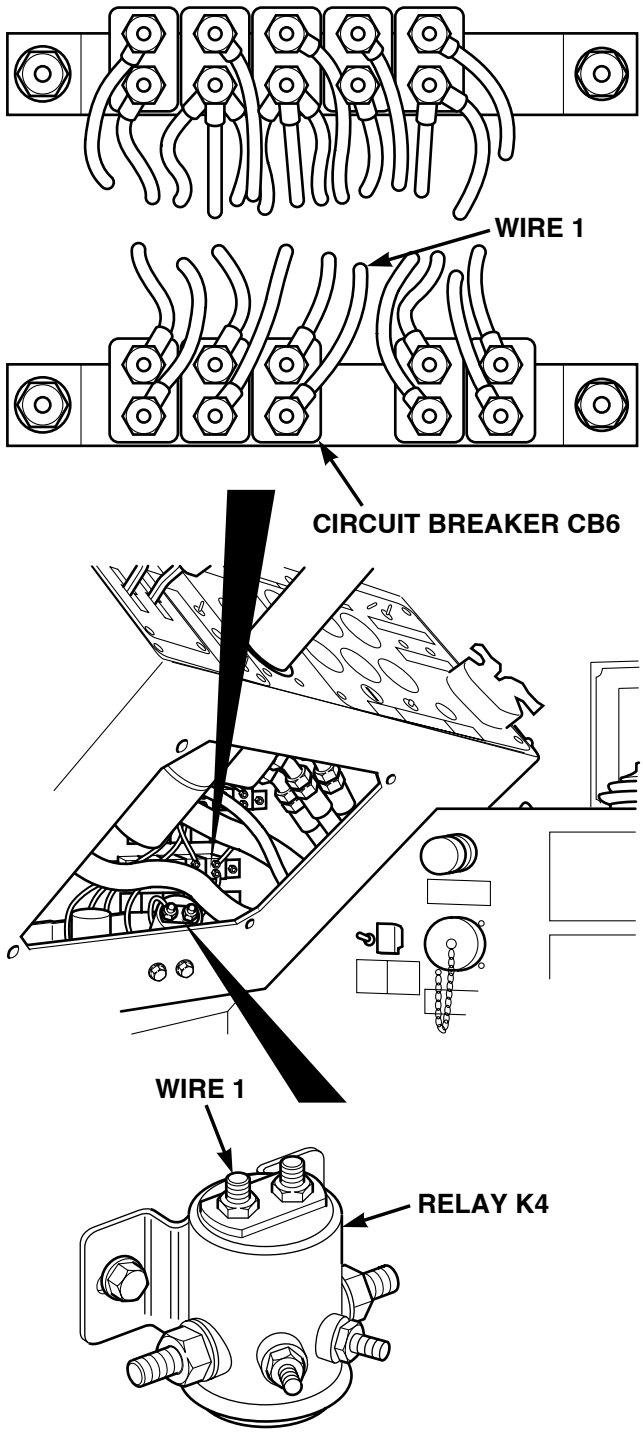
NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at relay K4 where wire 1 connects, wire 1 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to relay K4 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).



10. ALL TURN SIGNALS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Relay K4 faulty. Wire 29 faulty. Circuit breaker CB10 faulty. Wire 24 faulty. Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

8

Is 24 vdc present at relay K4 where wire 29 connects and known good ground?

NO → Replace relay K4 (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at relay K4 where wire 29 connects, relay K4 faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Relay K4 OK.
POSSIBLE PROBLEMS
Wire 29 faulty. Circuit breaker CB10 faulty. Wire 24 faulty. Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

9

Is 24 vdc present at circuit breaker CB10 where wire 29 connects and known good ground?

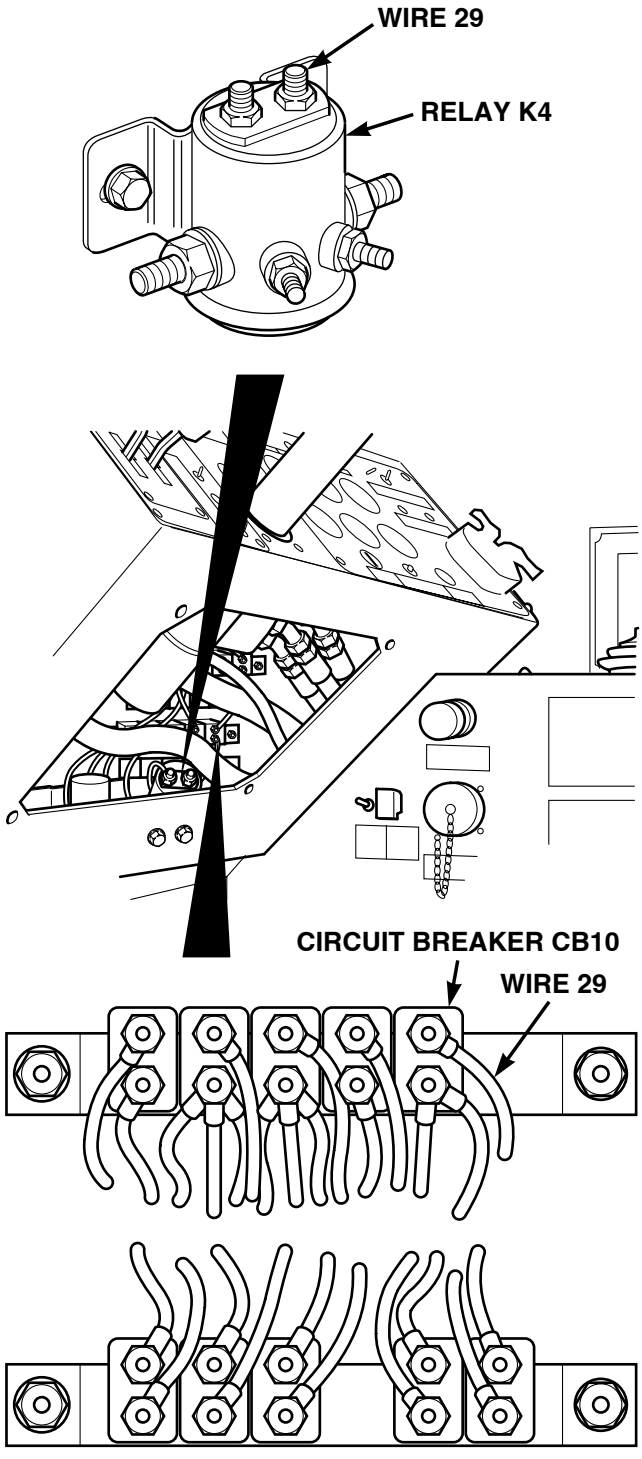
NO → Repair wire 29 (Para 8-48).

YES

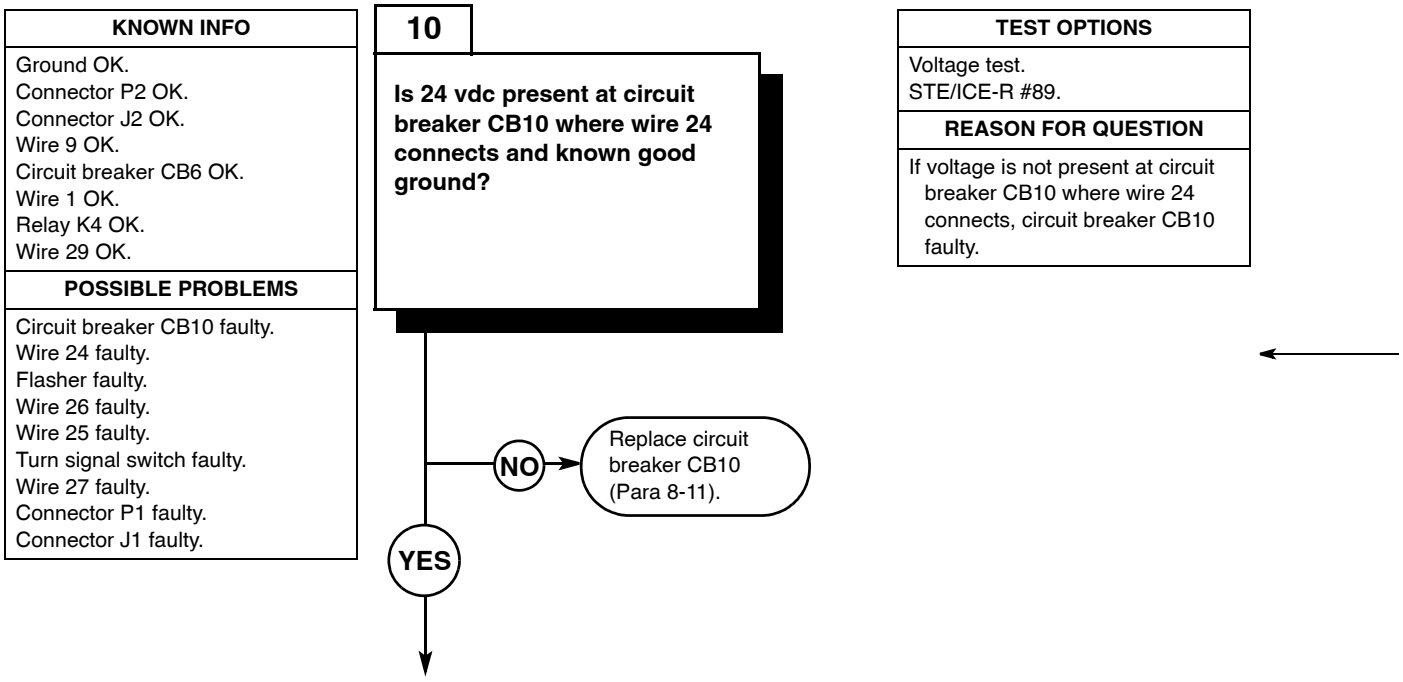
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at circuit breaker CB10 where wire 29 connects, wire 29 faulty.

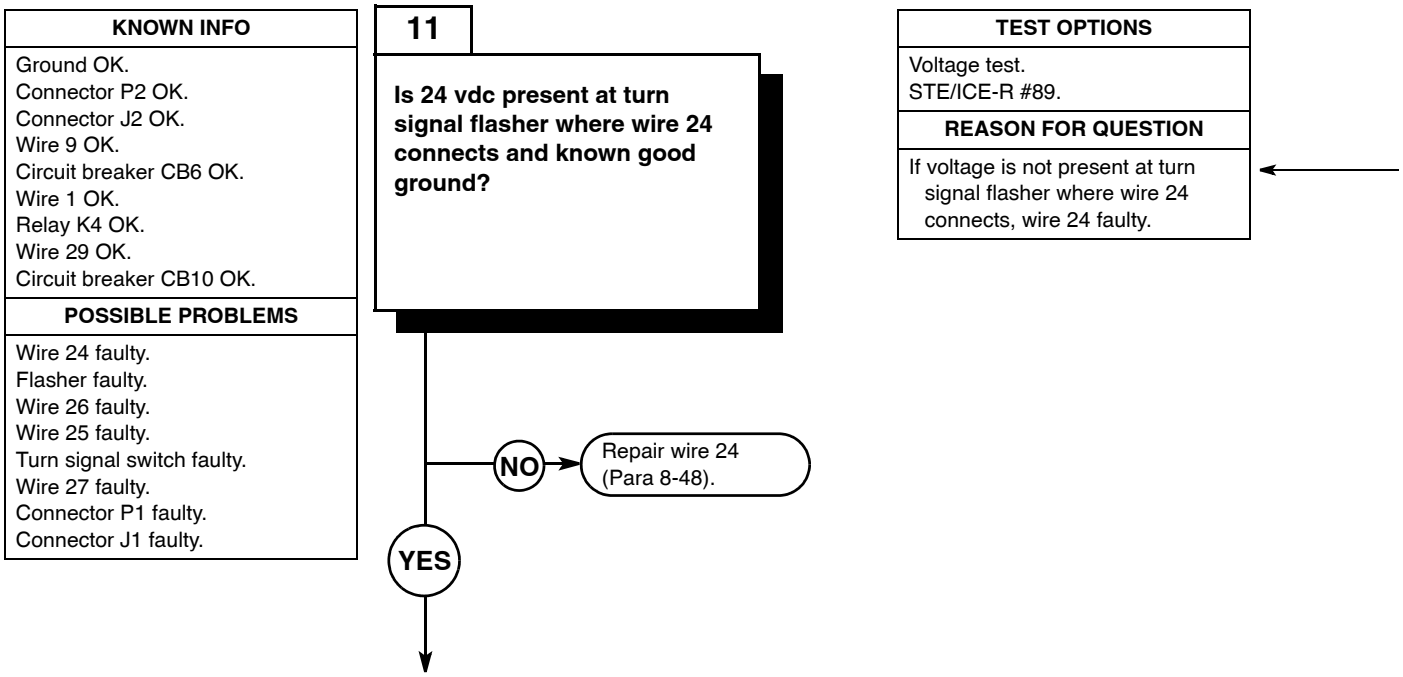
VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to relay K4 where wire 29 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, replace relay K4 (Para 8-23). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB10 where wire 29 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, repair wire 29 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).



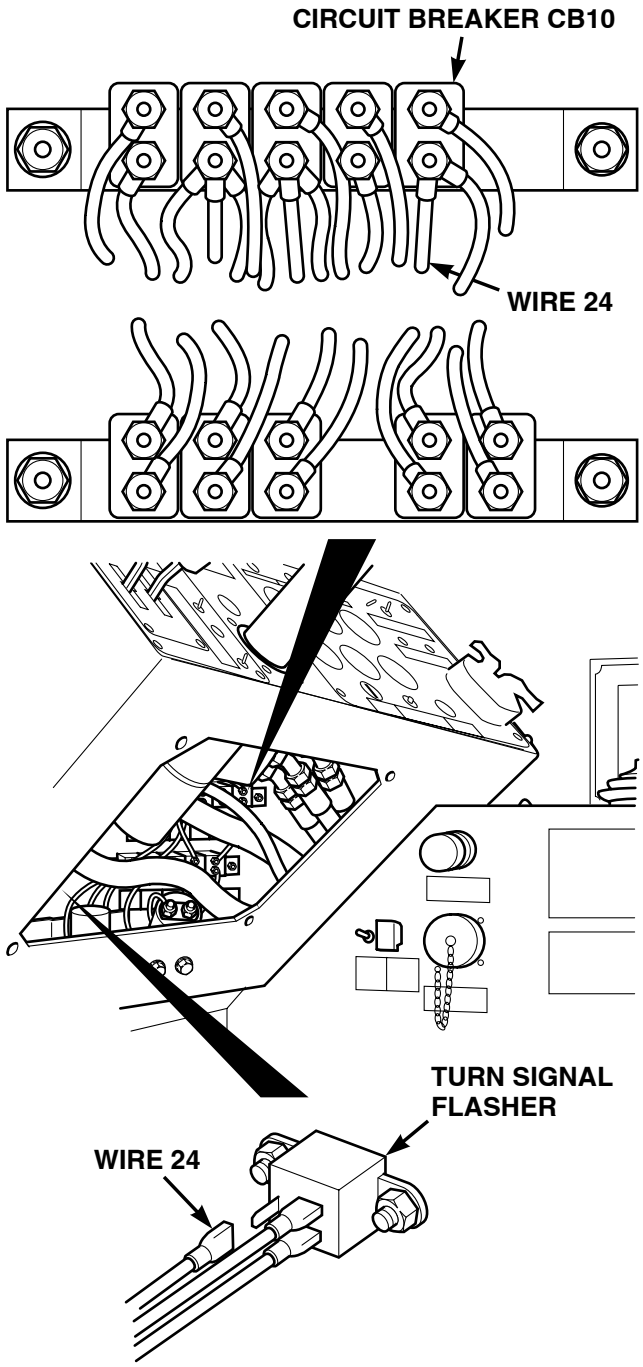
10. ALL TURN SIGNALS DO NOT OPERATE (CONT).





VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB10 where wire 24 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB10 (Para 8-11). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to turn signal flasher where wire 24 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 12 of this fault. (b) If 24 vdc is not present, repair wire 24 (Para 8-48). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



10. ALL TURN SIGNALS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Relay K4 OK. Wire 29 OK. Circuit breaker CB10 OK. Wire 24 OK.
POSSIBLE PROBLEMS
Flasher faulty. Wire 26 faulty. Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

12

Is 24 vdc present at turn signal flasher where wire 26 or 25 connect and known good ground?

NO → Replace turn signal flasher (Para 8-24).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at turn signal flasher where wire 26 or 25 connects, turn signal flasher faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Relay K4 OK. Wire 29 OK. Circuit breaker CB10 OK. Wire 24 OK. Turn signal flasher OK.
POSSIBLE PROBLEMS
Wire 25 faulty. Wire 26 faulty. Turn signal switch faulty.

13

Is 24 vdc present at turn signal switch wire 26 or 25 connect and known good ground?

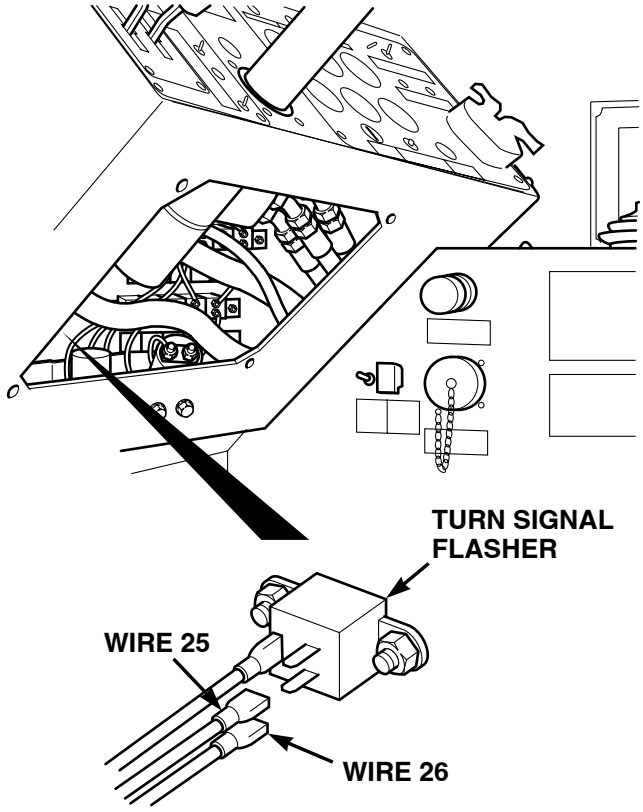
NO → Repair wire 25 or wire 26 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at turn signal switch where wire 26 or 25 connects, wire 25 or wire 26 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Disconnect wire 25 or 26 from turn signal flasher. (4) Connect multimeter positive lead (+) to male blade connector of flasher where wire 25 or wire 26 connect. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (8) Turn on turn signal for appropriate turn signal wire (right wire 26, left wire 25 [TM 10-3930-673-10]). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, replace turn signal flasher (Para 8-24). (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42). (11) Connect wire 25 or 26 to turn signal flasher.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect wire 25 or 26 from turn signal flasher. (3) Connect multimeter positive lead (+) to female blade receptacle of wire 25 or wire 26. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn on turn signal for appropriate turn signal wire (right wire 26, left wire 25 [TM 10-3930-673-10]). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, repair wire 25 or wire 26 (Para 8-48). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Connect wire 25 or 26 to turn signal flasher.



10. ALL TURN SIGNALS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Relay K4 OK. Wire 29 OK. Circuit breaker CB10 OK. Wire 24 OK. Turn signal flasher OK. Wire 25 OK. Wire 26 OK.
POSSIBLE PROBLEMS
Turn signal switch faulty.

14

Is 24 vdc present at wire 27 or wire 28 male blade connector and known good ground?

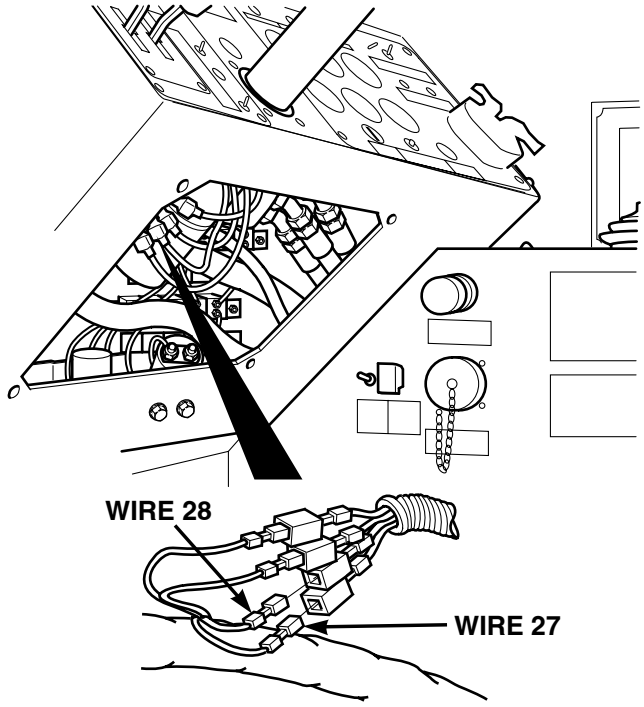
NO → Replace turn signal switch (Para 8-12).

YES → Repair wire 27 or wire 28 (Para 8-48).

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at wire 27 or wire 28, turn signal switch faulty.

VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Disconnect wire 27 or 28 from turn signal switch.
(4) Connect multimeter positive lead (+) to male blade connector of wire 27 or wire 28.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
(7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(8) Turn on turn signal for appropriate turn signal wire (right wire 28, left wire 27 [TM 10-3930-673-10]).
    (a) If 24 vdc is present, repair wire 27 or wire 28.
    (b) If 24 vdc is not present, replace turn signal switch (Para 8-12).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).
(11) Connect wire 27 or 28 to turn signal switch.
(12) Install access panel and four screws.
(13) Connect negative battery cable to negative side of battery (Para 8-42).
(14) Install battery cover (Para 8-42).



11. LEFT TURN SIGNAL DOES NOT OPERATE.

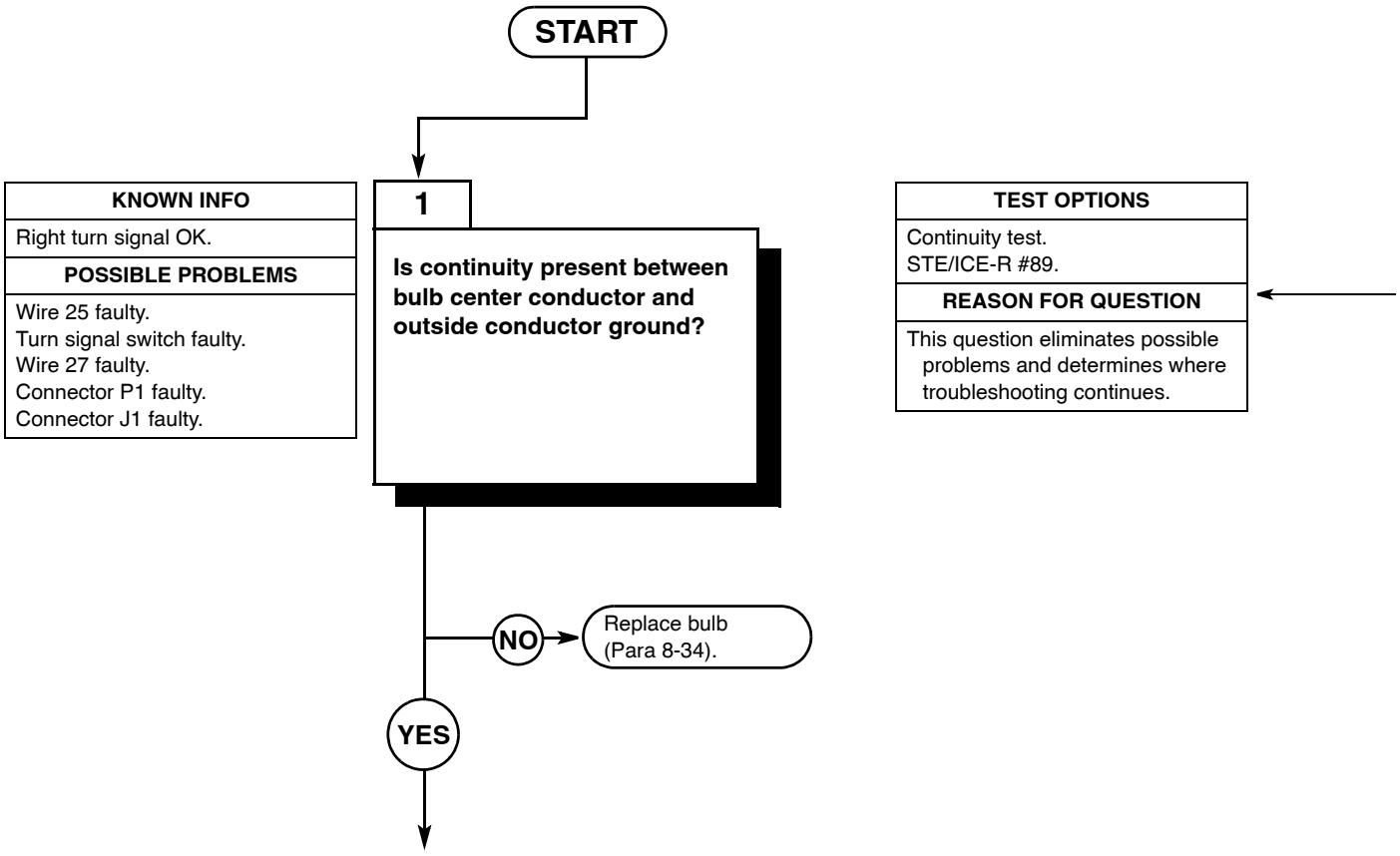
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

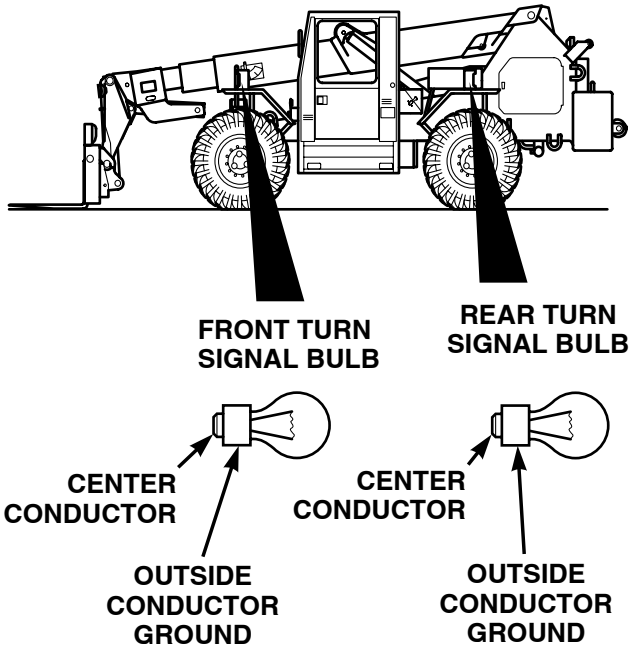
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove turn signal bulb from faulty turn signal assembly (Para 8-34). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to bulb center conductor. (4) Connect multimeter negative lead (–) to outside conductor ground. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace bulb (Para 8-34).



11. LEFT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO
Right turn signal OK.
POSSIBLE PROBLEMS
Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at turn signal flasher where wire 25 connects and known good ground?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Replace turn signal flasher (Para 8-24).

YES

KNOWN INFO
Right turn signal OK.
POSSIBLE PROBLEMS
Wire 25 faulty. Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

3

Is 24 vdc present at turn signal switch where wire 25 connects and known good ground?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at turn signal switch where wire 25 connects, wire 25 faulty.

NO → Repair wire 25 (Para 8-48).

YES

WARNING

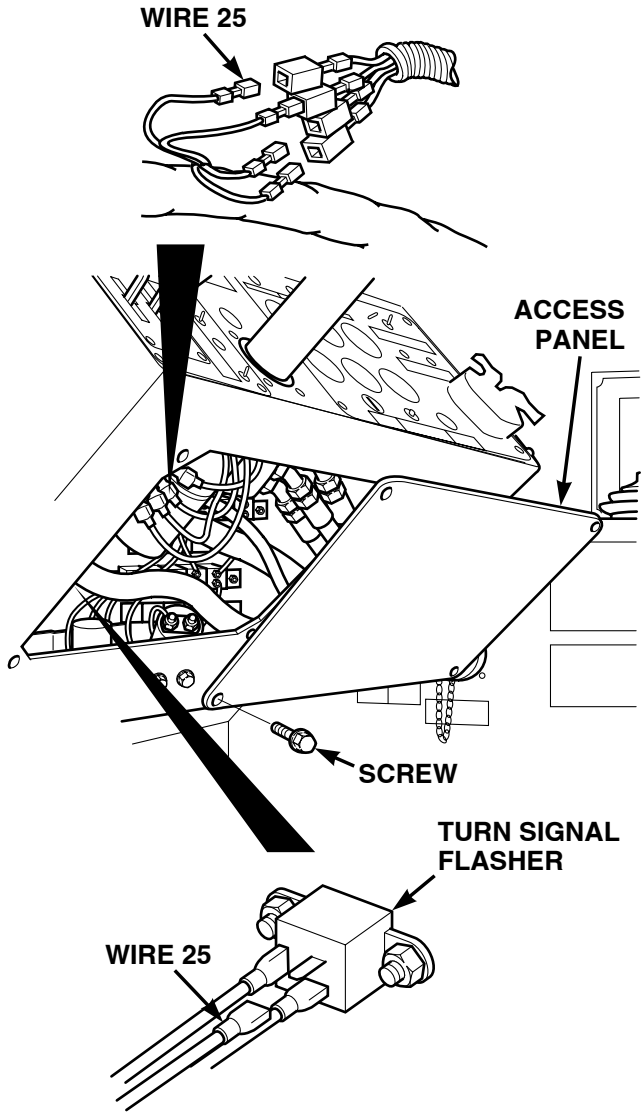
- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws and access panel.
(4) Set multimeter to volts dc.
(5) Connect multimeter positive lead (+) to turn signal flasher male blade connector where wire 25 connects.
(6) Connect multimeter negative lead (–) to known good ground.
(7) Connect negative battery cable to negative side of battery (Para 8-42).
(8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(9) Turn ON left turn signal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 3 of this fault.
  (b) If 24 vdc is not present, replace turn signal flasher (Para 8-24).
(10) Turn OFF left turn signal (TM 10-3930-673-10).
(11) Turn engine start switch to OFF position (TM 10-3930-673-10).
(12) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to turn signal switch where wire 25 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Turn ON left turn signal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, repair wire 25 (Para 8-48).
(7) Turn OFF left turn signal (TM 10-3930-673-10).
(8) Turn engine start switch to OFF position (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).



11. LEFT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO
Right turn signal OK. Wire 25 OK.
POSSIBLE PROBLEMS
Turn signal switch faulty. Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

4

Is 24 vdc present at turn signal switch where wire 27 connects and known good ground?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at turn signal switch where wire 27 connects, turn signal switch faulty.

NO → Replace turn signal switch (Para 8-12).

YES

KNOWN INFO
Right turn signal OK. Wire 25 OK. Turn signal switch OK.
POSSIBLE PROBLEMS
Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

5

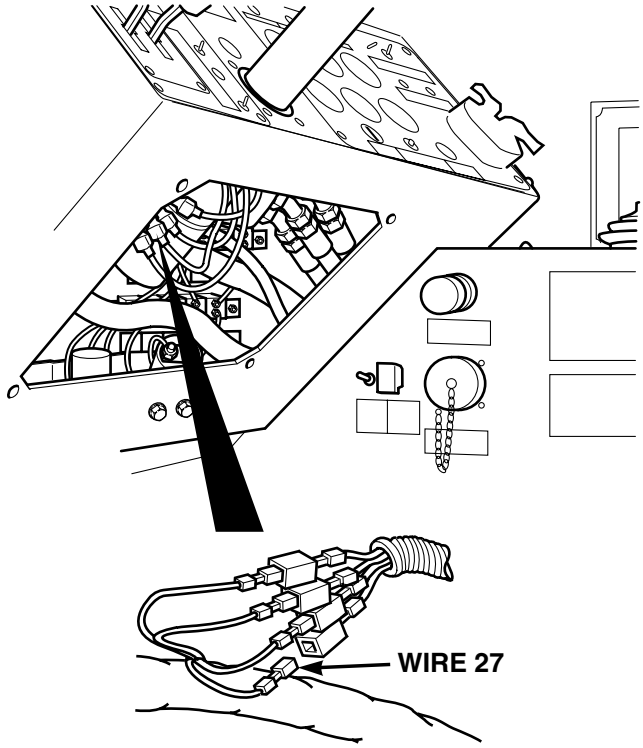
Is 24 vdc present at turn signal socket center conductor?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

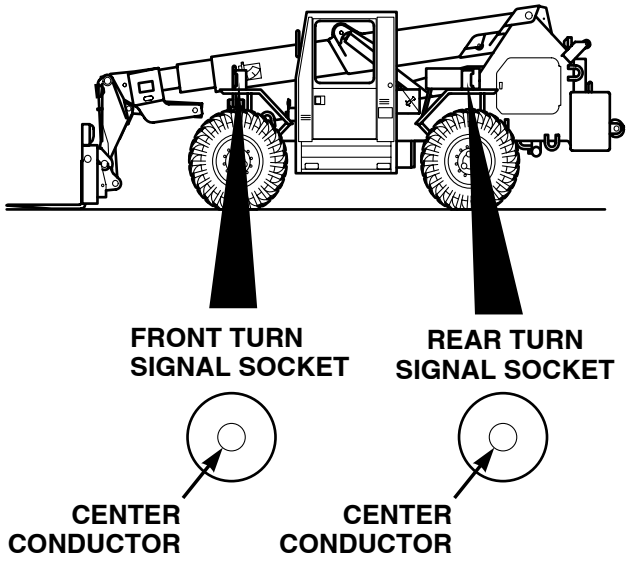
NO → Go to Step 7 of this fault.

YES

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Connect multimeter positive lead (+) to turn signal switch male blade connector where wire 27 connects.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn ON left turn signal (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 5 of this fault.
(b) If 24 vdc is not present, replace turn signal switch (Para 8-12).
(8) Turn OFF left turn signal (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to turn signal socket center conductor.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Turn ON left turn signal (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 6 of this fault.
(b) If 24 vdc is not present, go to Step 7 of this fault.
(7) Turn OFF left turn signal (TM 10-3930-673-10).
(8) Turn engine start switch to OFF position (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).



11. LEFT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO
Right turn signal OK. Wire 25 OK. Turn signal switch OK.
POSSIBLE PROBLEMS
Wire 27 faulty. Connector J1 faulty. Connector P1 faulty.

6

Is continuity present between turn signal switch wire 27 and connector J1-9?

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair connector J1 or wire 27 (Para 8-48).

NO → Repair wire 27 or connector J1 (Para 8-48).

YES ↓

KNOWN INFO
Right turn signal OK. Wire 25 OK. Turn signal switch OK.
POSSIBLE PROBLEMS
Wire 27 faulty. Connector P1 faulty. Connector J1 faulty.

7

Is continuity present between turn signal socket center conductor and connector P1-9?

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair connector P1 or wire 27 (Para 8-49).

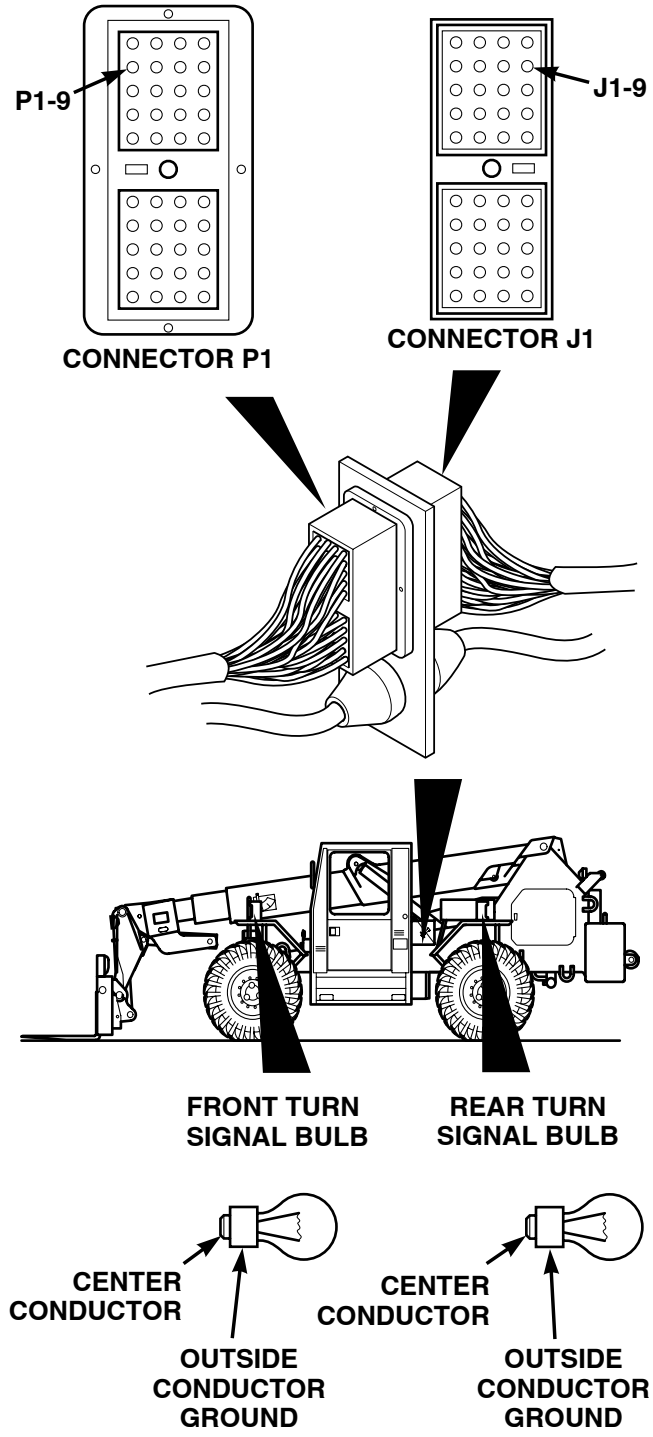
NO → Repair wire 27 or connector P1 (Para 8-49).

YES ↓

Replace bulb (Para 8-33).

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Disconnect connector J1 from connector P1. (4) Connect multimeter positive lead (+) to turn signal switch wire 27. (5) Connect multimeter negative lead (–) to connector J1-9. (a) If continuity is present, go to Step 7 of this fault. (b) If continuity is not present, repair connector J1 or wire 27 (Para 8-48).

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to turn signal socket center conductor. (4) Connect multimeter negative lead (–) to connector J1-9. (a) If continuity is present, replace bulb (Para 8-33). (b) If continuity is not present, repair connector P1 or wire 27 (Para 8-49). (5) Connect connector J1 to connector P1. (6) Install four screws to secure access panel. (7) Connect negative battery cable to negative side of battery (Para 8-42). (8) Install battery cover (Para 8-42).



12. RIGHT TURN SIGNAL DOES NOT OPERATE.

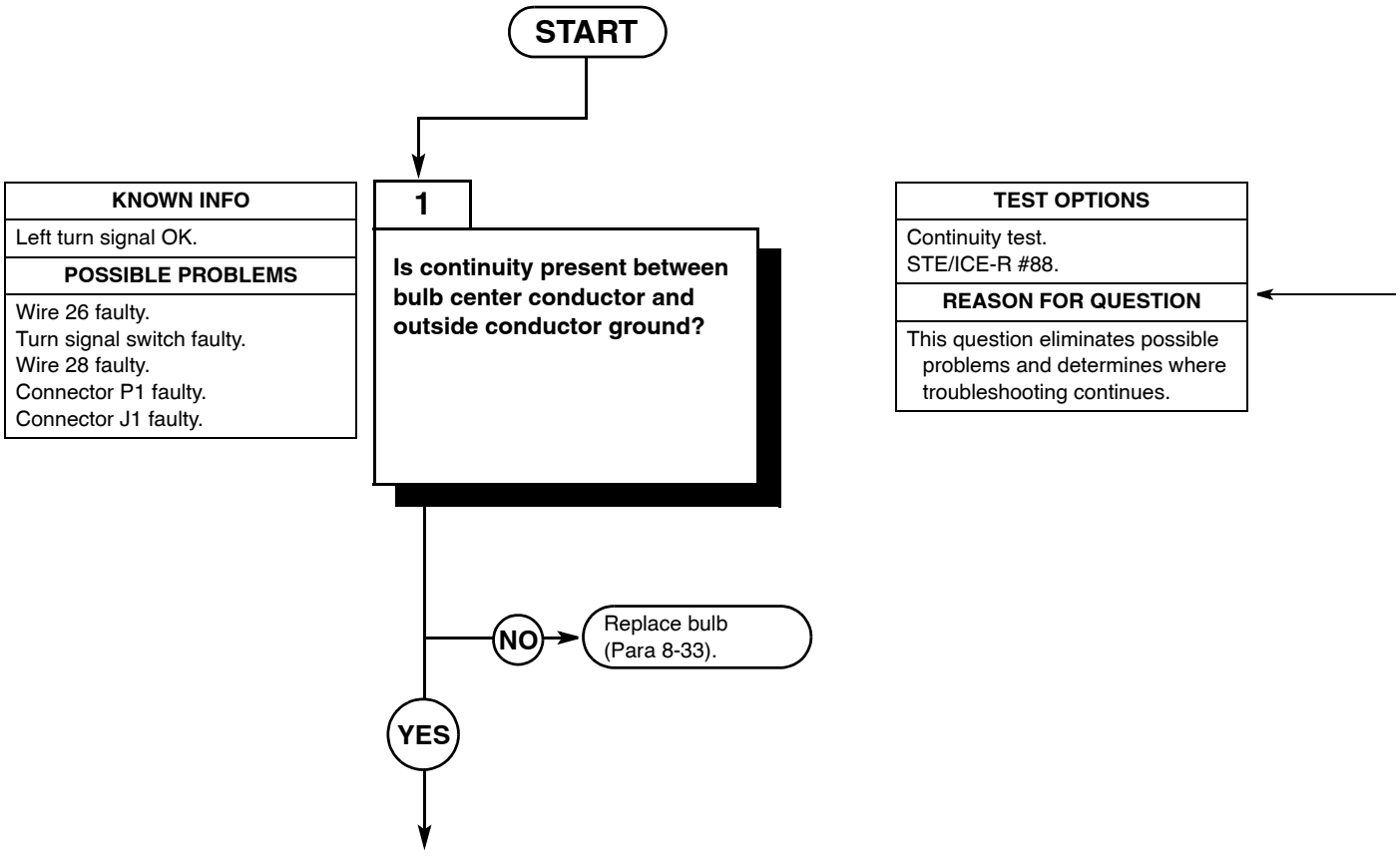
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

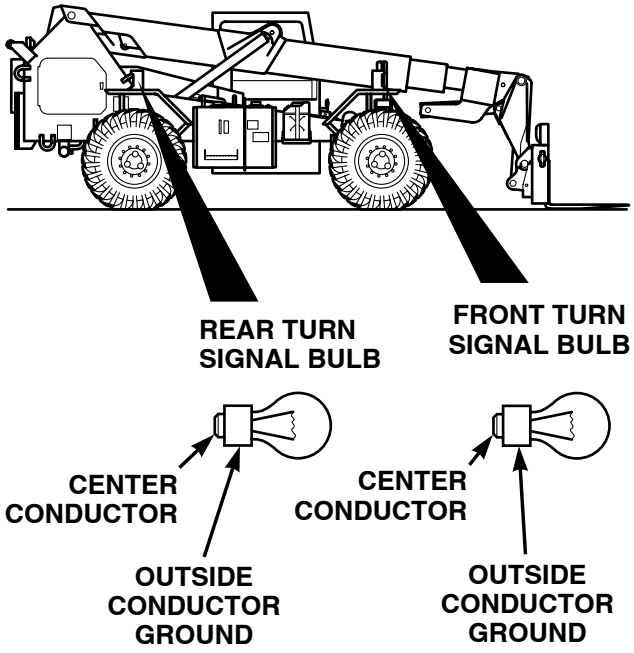
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove turn signal bulb from faulty turn signal assembly (Para 8-33). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to bulb center conductor. (4) Connect multimeter negative lead (–) to outside conductor ground. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace bulb (Para 8-33).



12. RIGHT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO
Left turn signal OK.
POSSIBLE PROBLEMS
Wire 26 faulty. Turn signal switch faulty. Wire 28 faulty. Connector P1 faulty. Connector J1 faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at turn signal flasher where wire 26 connects and known good ground?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Replace turn signal flasher (Para 8-24).

YES

KNOWN INFO
Left turn signal OK.
POSSIBLE PROBLEMS
Wire 26 faulty. Turn signal switch faulty. Wire 28 faulty. Connector P1 faulty. Connector J1 faulty.

3

Is 24 vdc present at turn signal switch where wire 26 connects and known good ground?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at turn signal switch where wire 26 connects, wire 26 faulty.

NO → Repair wire 26 (Para 8-48).

YES

WARNING

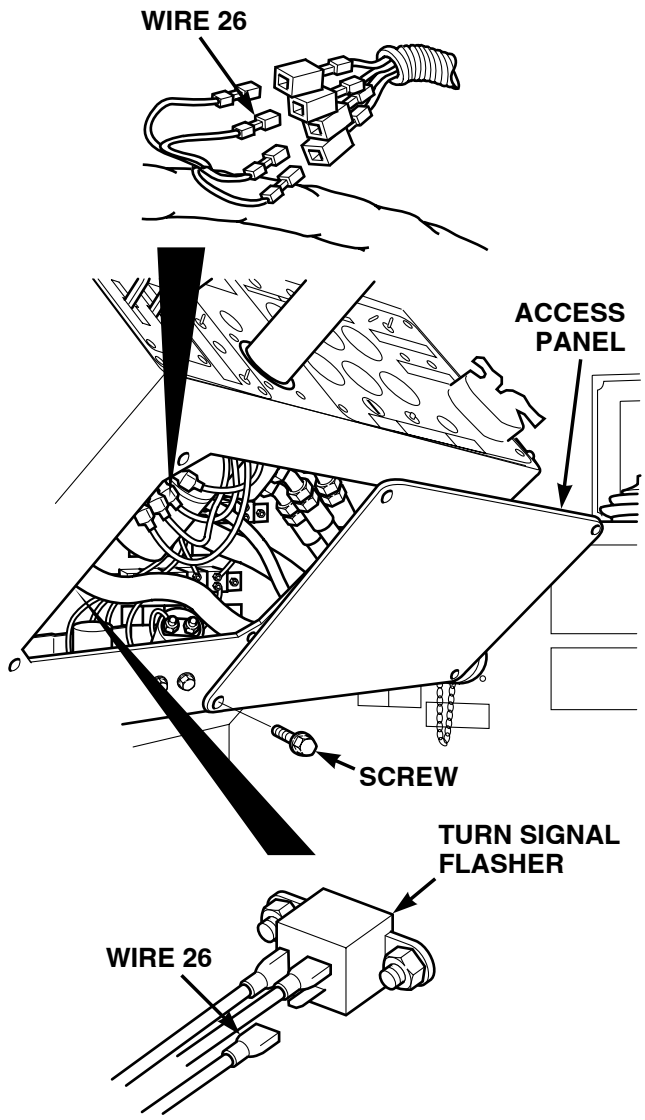
- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws and access panel.
(4) Set multimeter to volts dc.
(5) Connect multimeter positive lead (+) to turn signal flasher male blade connector where wire 26 connects.
(6) Connect multimeter negative lead (–) to known good ground.
(7) Connect negative battery cable to negative side of battery (Para 8-42).
(8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(9) Turn ON right turn signal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 3 of this fault.
  (b) If 24 vdc is not present, replace turn signal flasher (Para 8-24).
(10) Turn OFF right turn signal (TM 10-3930-673-10).
(11) Turn engine start switch to OFF position (TM 10-3930-673-10).
(12) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to turn signal switch where wire 26 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Turn ON right turn signal (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 4 of this fault.
  (b) If 24 vdc is not present, repair wire 26 (Para 8-48).
(7) Turn OFF right turn signal (TM 10-3930-673-10).
(8) Turn engine start switch to OFF position (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).



12. RIGHT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO
Left turn signal OK. Wire 26 OK.
POSSIBLE PROBLEMS
Turn signal switch faulty. Wire 28 faulty. Connector P1 faulty. Connector J1 faulty.

4

Is 24 vdc present at turn signal switch where wire 28 connects and known good ground?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at turn signal switch where wire 28 connects, turn signal switch faulty.

NO → Replace turn signal switch (Para 8-12).

YES

KNOWN INFO
Left turn signal OK. Wire 26 OK. Turn signal switch OK.
POSSIBLE PROBLEMS
Wire 28 faulty. Connector P1 faulty. Connector J1 faulty.

5

Is 24 vdc present at turn signal socket center conductor?

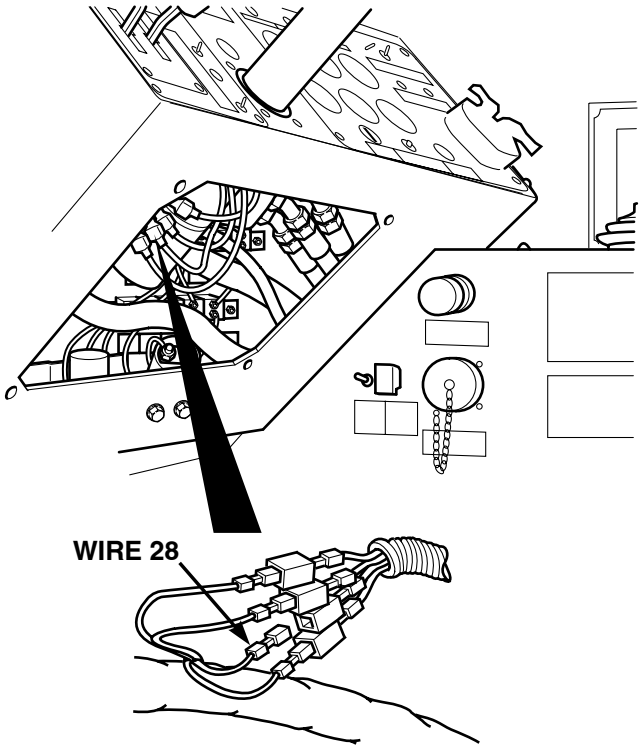
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 6 of this fault.

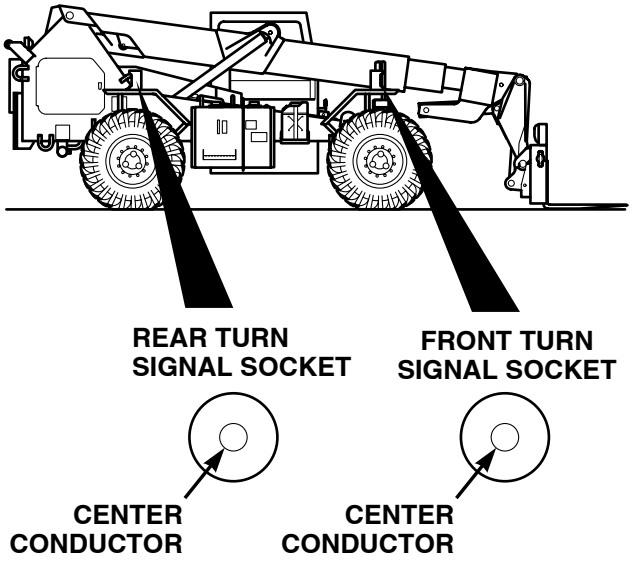
YES

Replace bulb (Para 8-33).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to turn signal switch male blade connector where wire 28 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn ON right turn signal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, replace turn signal switch (Para 8-12). (7) Turn OFF right turn signal (TM 10-3930-673-10). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to turn signal socket center conductor. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn ON right turn signal (TM 10-3930-673-10). (a) If 24 vdc is present, replace bulb (Para 8-33). (b) If 24 vdc is not present, go to Step 7 of this fault. (7) Turn OFF right turn signal (TM 10-3930-673-10). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



12. RIGHT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO
Left turn signal OK. Wire 26 OK. Turn signal switch OK.
POSSIBLE PROBLEMS
Wire 28 faulty. Connector J1 faulty. Connector P1 faulty.

6

Is continuity present between turn signal switch wire 28 and connector J1-26?

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair connector J1 or wire 28 (Para 8-48).

NO → Repair wire 28 or connector J1 (Para 8-48).

YES

KNOWN INFO
Left turn signal OK. Wire 26 OK. Turn signal switch OK.
POSSIBLE PROBLEMS
Wire 28 faulty. Connector P1 faulty. Connector J1 faulty.

7

Is continuity present between turn signal socket center conductor and connector P1-26?

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair connector P1 or wire 28 (Para 8-49).

NO → Repair wire 28 or connector P1 (Para 8-49).

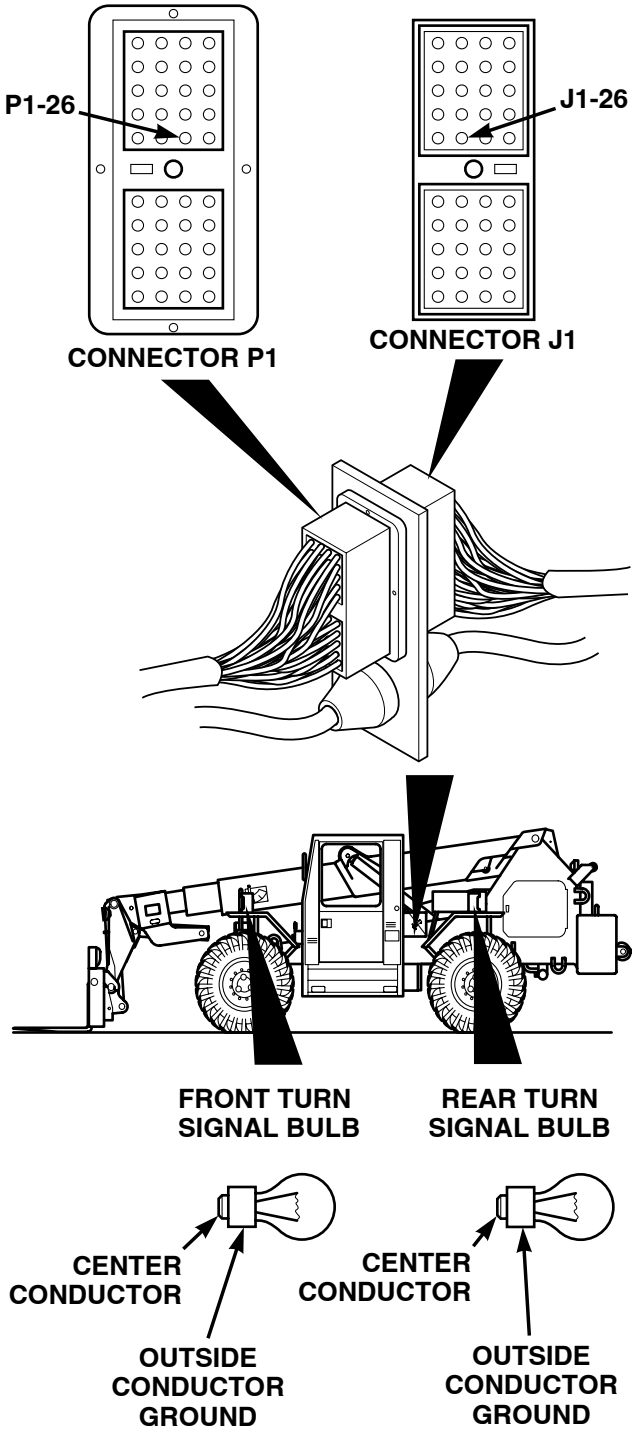
YES → Replace bulb (Para 8-33).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Disconnect connector J1 from connector P1.
(3) Connect multimeter positive lead (+) to turn signal switch wire 28.
(4) Connect multimeter negative lead (–) to connector J1-26.
  (a) If continuity is present, go to Step 7 of this fault.
  (b) If continuity is not present, repair connector J1 or wire 28 (Para 8-48).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect multimeter positive lead (+) to turn signal socket center conductor.
(3) Connect multimeter negative lead (–) to connector P1-26.
  (a) If continuity is present, replace bulb (Para 8-33).
  (b) If continuity is not present, repair connector P1 or wire 28 (Para 8-49).
(4) Connect connector J1 to connector P1.
(5) Install four screws to secure access panel.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
(7) Install battery cover (Para 8-42).



13. ALL FLOODLIGHTS DO NOT OPERATE.

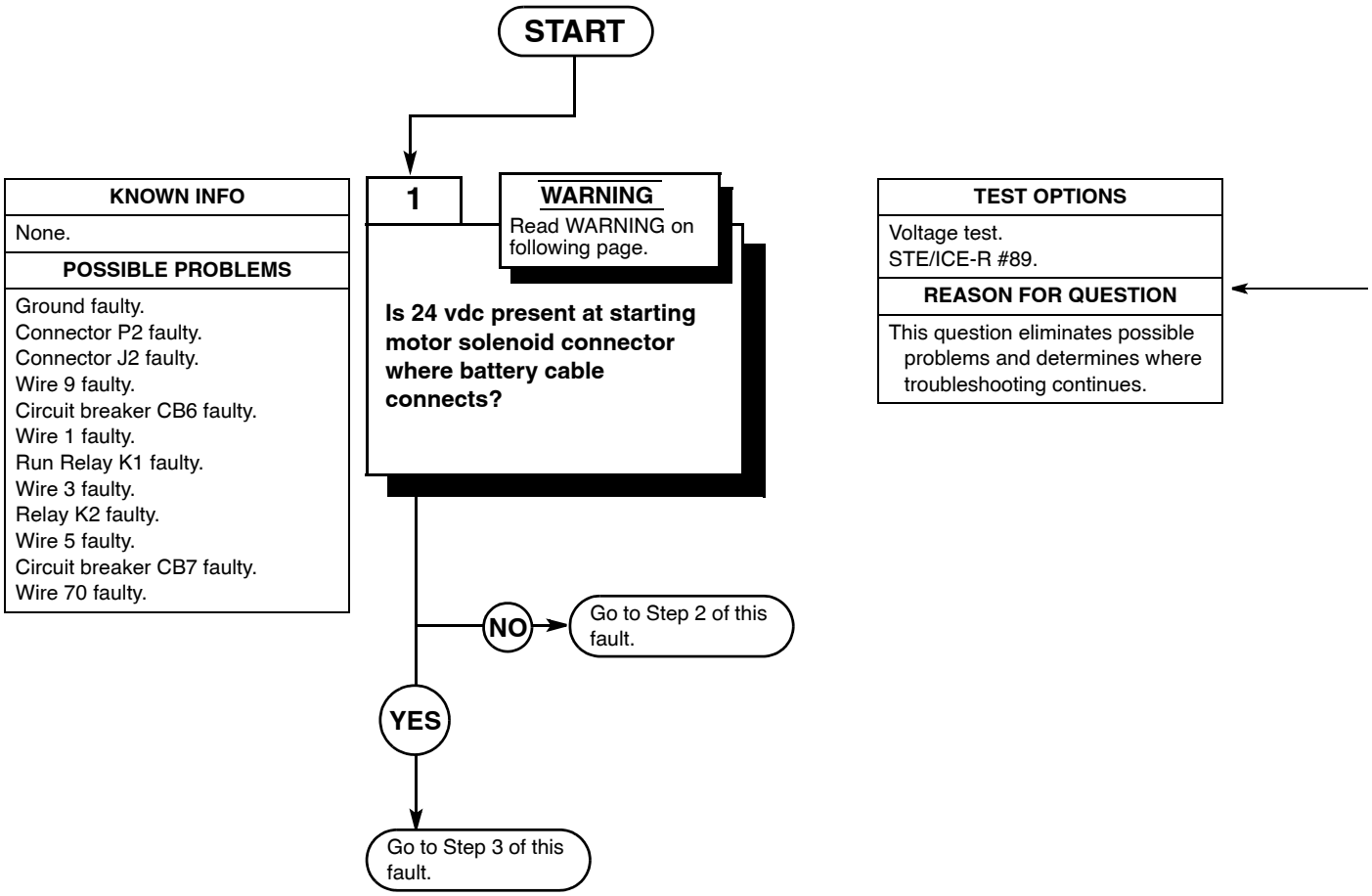
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

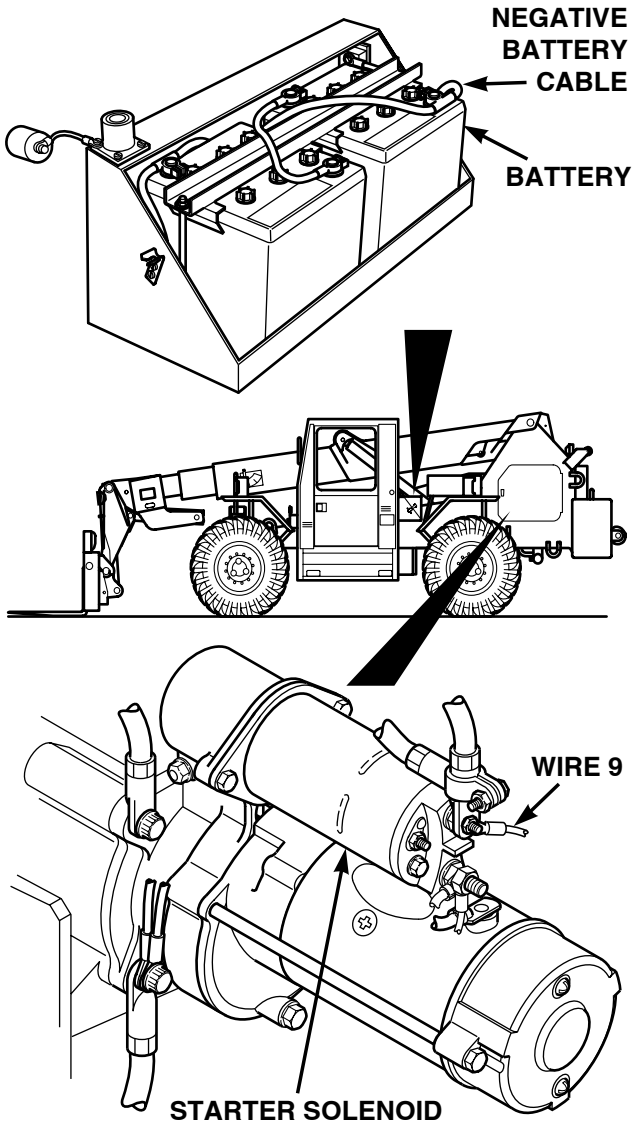
Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.



VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-44).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to starting motor solenoid where wire 9 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-44).
  (a) If 24 vdc is present, go to Step 3 of this fault.
  (b) If 24 vdc is not present, go to Step 2 of this fault.
(7) Disconnect negative battery cable from negative side of battery (Para 8-44).

13. ALL FLOODLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run Relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

2

Is continuity present on negative battery cable?

NO → Repair negative battery cable (Para 8-44).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, negative battery cable faulty.

KNOWN INFO
Ground OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run Relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

3

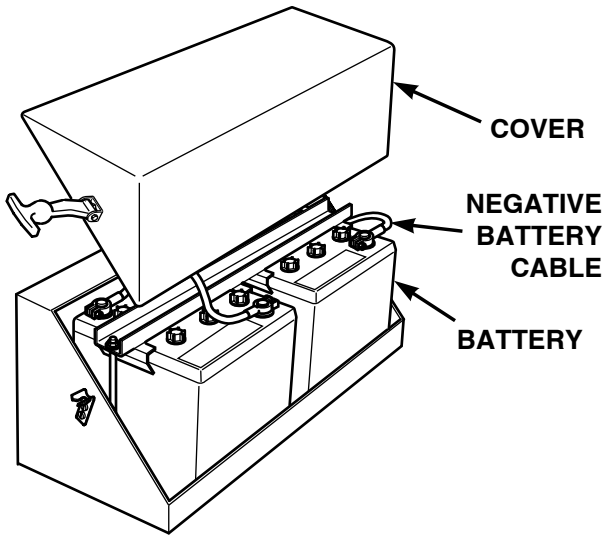
Is 24 volts dc present at connector P2 where wire 9 connects?

NO → Repair wire 9 or connector P2 (Para 8-49).

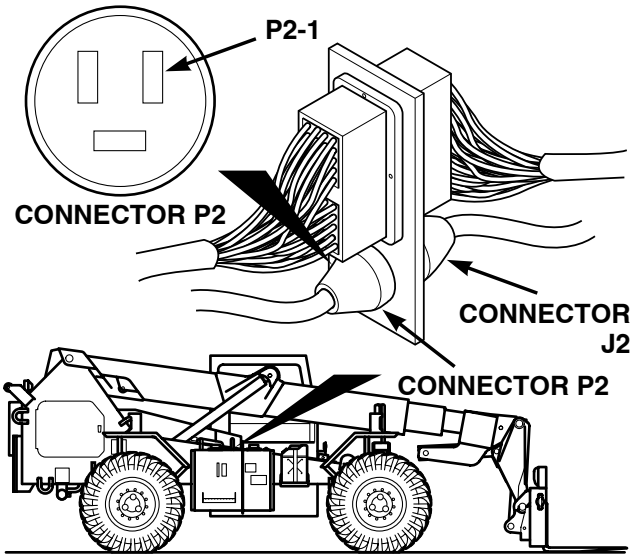
YES →

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present at P2-1, wire 9 or connector P2 (Para 8-49) faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to end of negative battery cable. (4) Connect multimeter negative lead (–) to other end of negative battery cable. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Disconnect connector J2 from connector P2. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector P2-1 where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (3) (Para 8-44). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector P2 (Para 8-49). (7) Connect connector J2 to connector P2.



13. ALL FLOODLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run Relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 faulty or connector J2 (Para 8-48).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run Relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

5

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

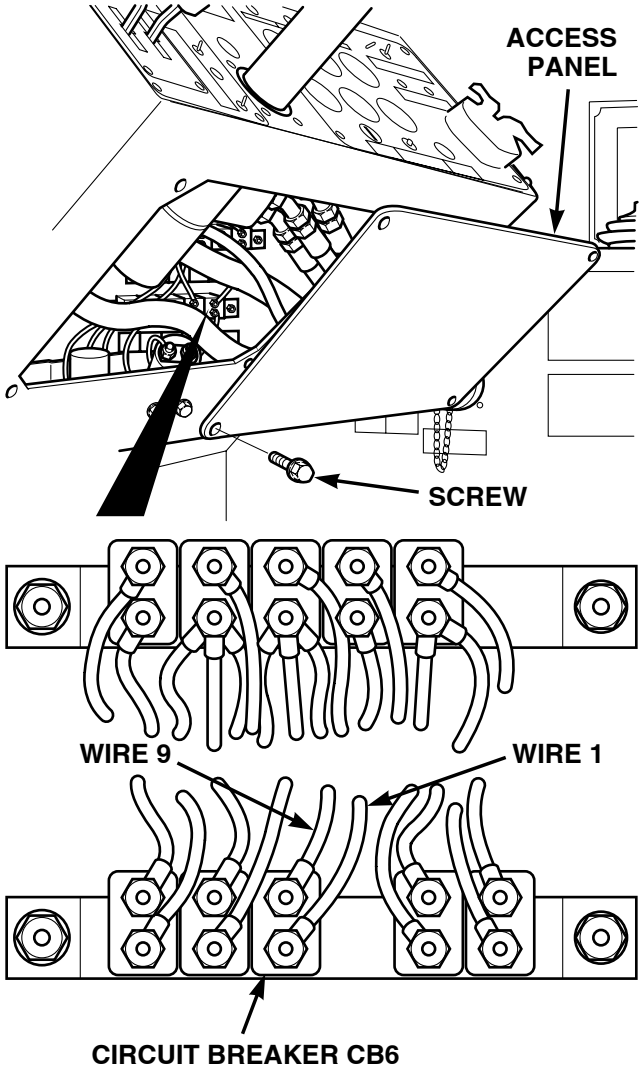
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Remove four screws and access panel. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector J2 (Para 8-48). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).



13. ALL FLOODLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run Relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

6

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 1 faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run Relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

7

Is 24 vdc present at run relay K1 where wire 3 connects?

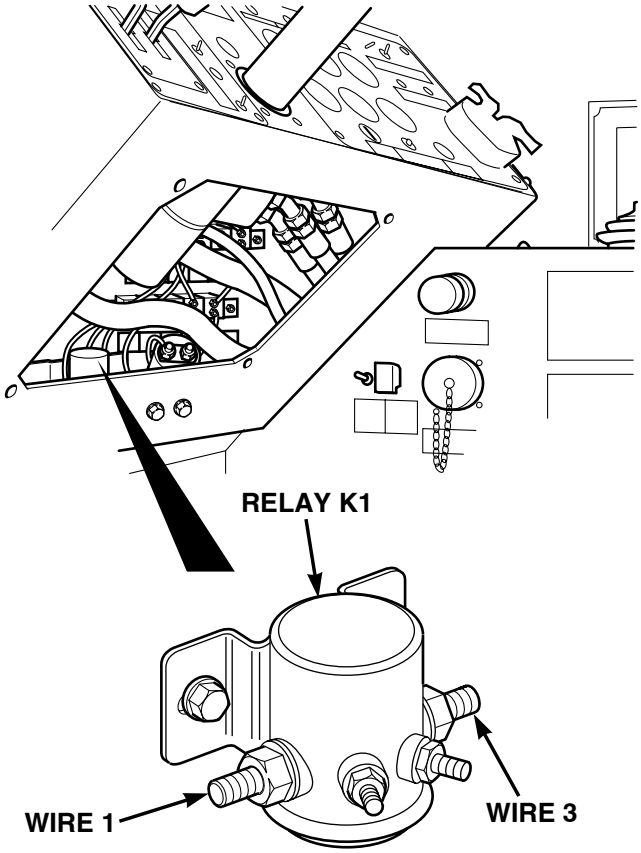
NO → Replace run relay (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, run relay K1 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to know good ground. (4) Connect negative battery cable from negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-39390-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



13. ALL FLOODLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run Relay K1 OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

8

Is 24 vdc present at relay K2 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 3 faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run Relay K1 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

9

Is 24 vdc present at relay K2 where wire 5 connects?

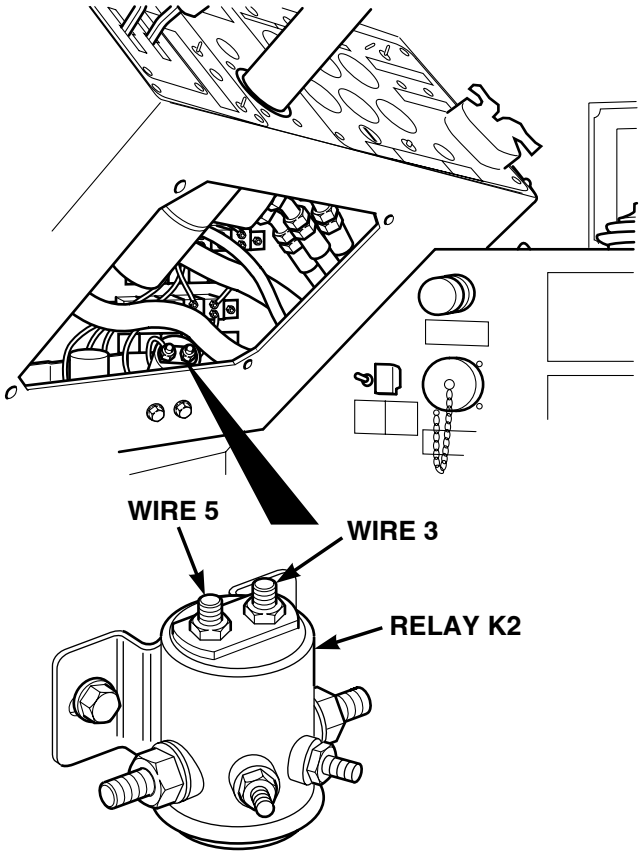
NO → Replace relay K2 (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, relay K2 faulty.

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to relay K2 where wire 3 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-44).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 9 of this fault.
    (b) If 24 vdc is not present, repair wire 3 (Para 8-48).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-44).



VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to relay K2 where wire 5 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-44).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 10 of this fault.
    (b) If 24 vdc is not present, replace relay K2 (Para 8-23).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-44).

13. ALL FLOODLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run Relay K1 OK. Wire 3 OK. Relay K2 OK.
POSSIBLE PROBLEMS
Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty.

10

Is 24 vdc present at circuit breaker CB7 where wire 5 connects?

NO → Repair wire 5 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 5 faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run Relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK.
POSSIBLE PROBLEMS
Circuit breaker CB7 faulty. Wire 70 faulty.

11

Is 24 vdc present at circuit breaker CB7 where wire 70 connects?

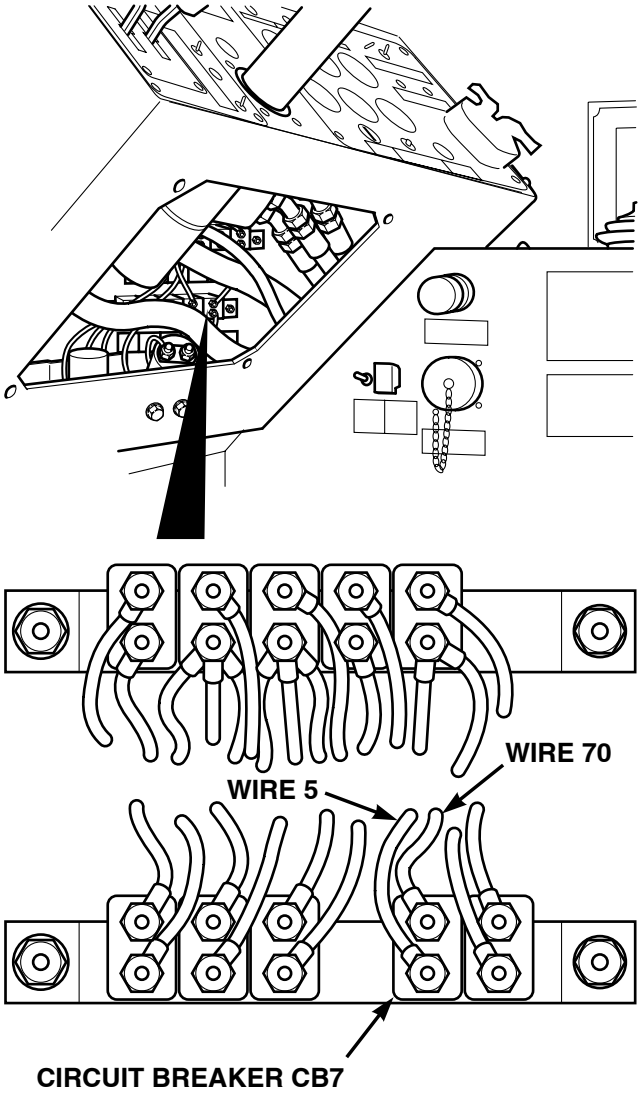
NO → Replace circuit breaker CB7 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB7 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 5 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 5 (Para 8-48). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 70 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 12 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB7 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



13. ALL FLOODLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run Relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK.
POSSIBLE PROBLEMS
Wire 70 faulty.

12

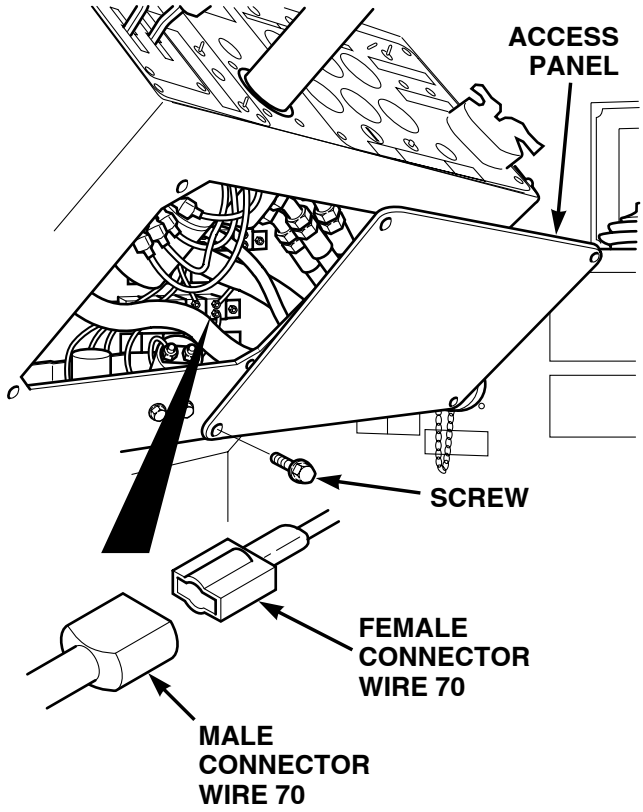
Is 24 vdc present at male connector for wire 70?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, male or female connector for wire 70 faulty.

NO → Repair wire 70 and/or male connector for wire 70 (Para 8-48).

YES → Repair wire 70 and/or female connector for wire 70 (Para 8-48).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to male connector for wire 70. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative batter cable from negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 70 and/or female connector for wire 70 (Para 8-48). (b) If 24 vdc is not present, repair wire 70 and/or male connector for wire 70 (Para 8-48). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Install access panel and four screws to secure access panel. (8) Install battery cover (Para 8-42).



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE.

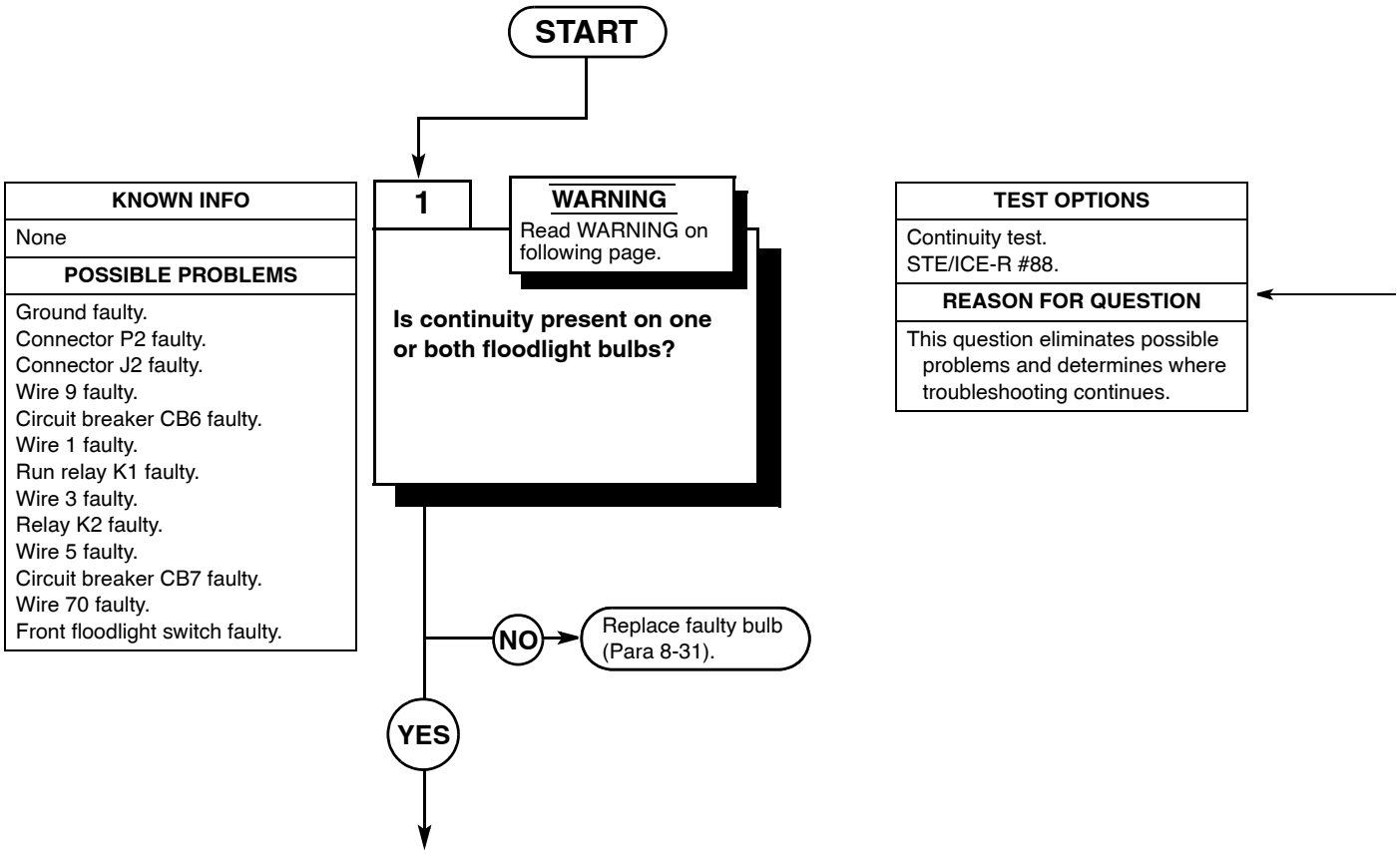
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

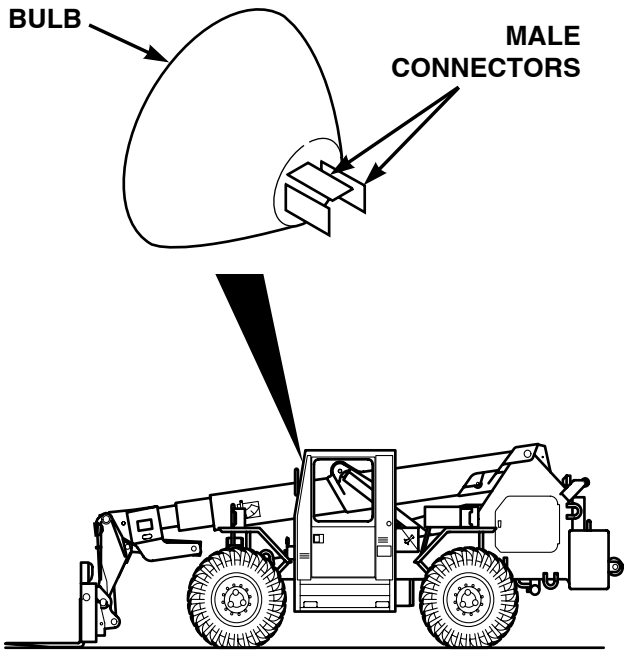
Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.



CONTINUITY TEST
(1) Remove bulb from faulty floodlight. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to male connector of bulb. (4) Connect multimeter negative lead (–) to other male connector of bulb. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace faulty bulb (Para 8-31).

14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
None
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

2

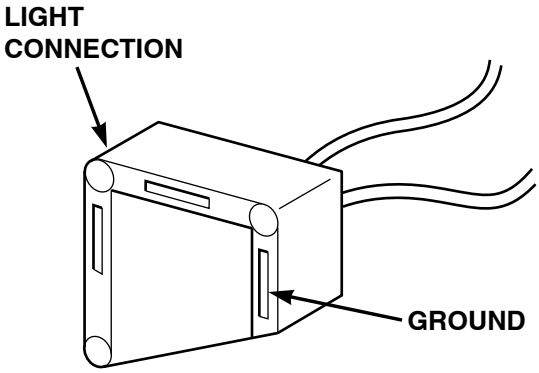
Is continuity present between ground of light connection and known good ground?

NO → Repair connection and/or light ground wire.

YES

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, light connection and/or ground faulty.

CONTINUITY TEST
(1) Remove bulb from faulty floodlight. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground of light connection. (4) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, repair light connection and/or light ground wire.



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
None
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

3

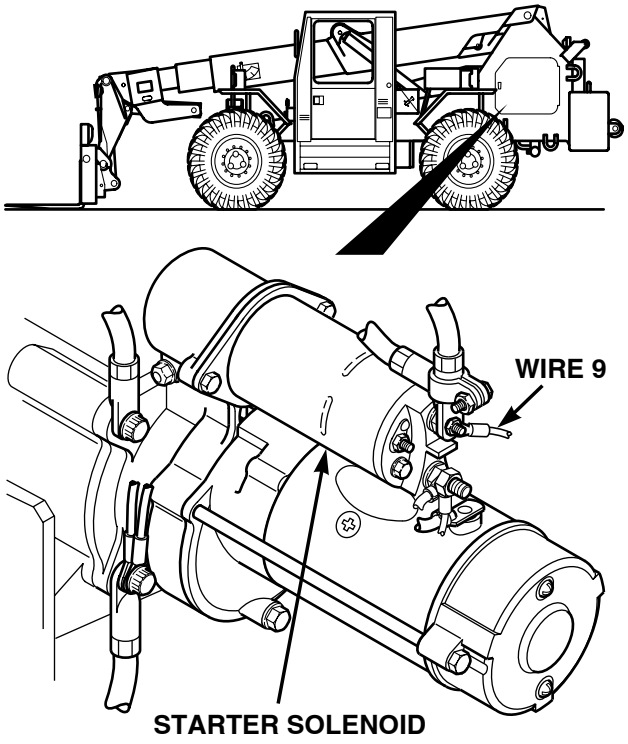
Is 24 vdc present at starting motor solenoid where battery cable connects?

NO → Go to Step 4 of this fault.

YES → Go to Step 5 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-44). (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to starting motor solenoid where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 4 of this fault.



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

4

Is continuity present on negative battery cable?

NO → Repair negative battery cable (Para 8-44).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, negative battery cable is faulty.

KNOWN INFO
Ground OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

5

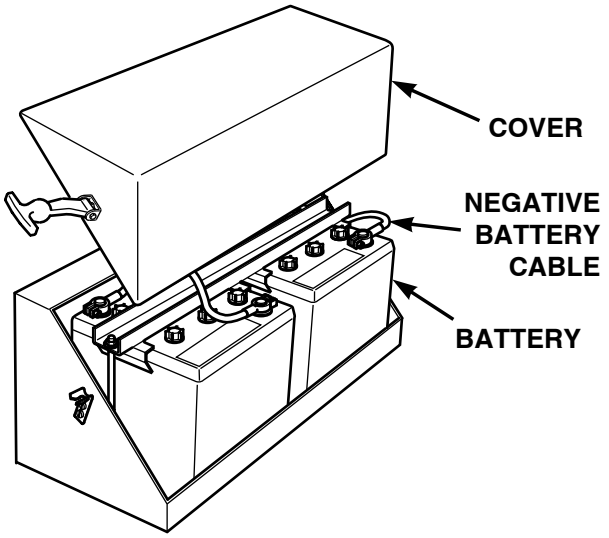
Is 24 vdc present at connector P2 where wire 9 connects?

NO → Repair wire 9 or connector P2 (Para 8-49).

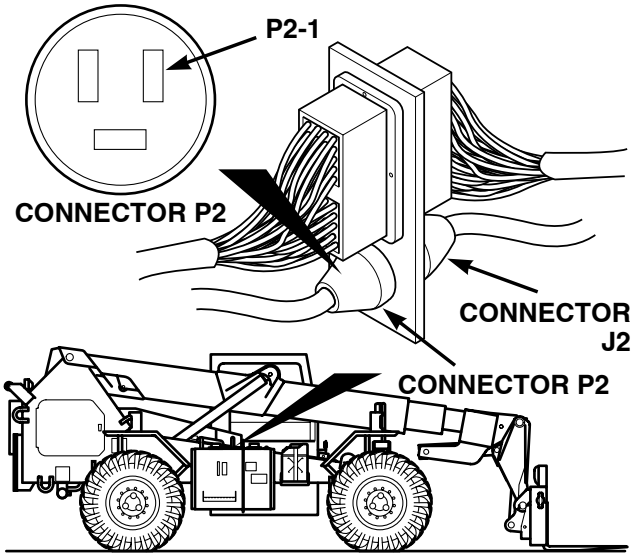
YES →

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector P2 is faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to end of negative battery cable. (4) Connect multimeter negative lead (–) to other end of negative battery cable. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, replace negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to connector P2-1 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector P2 (Para 8-49). (6) Disconnect negative battery cable from negative side of battery (Para 8-44). (7) Connect connector J2 to connector P2.



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

6

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector J2 are faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

7

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

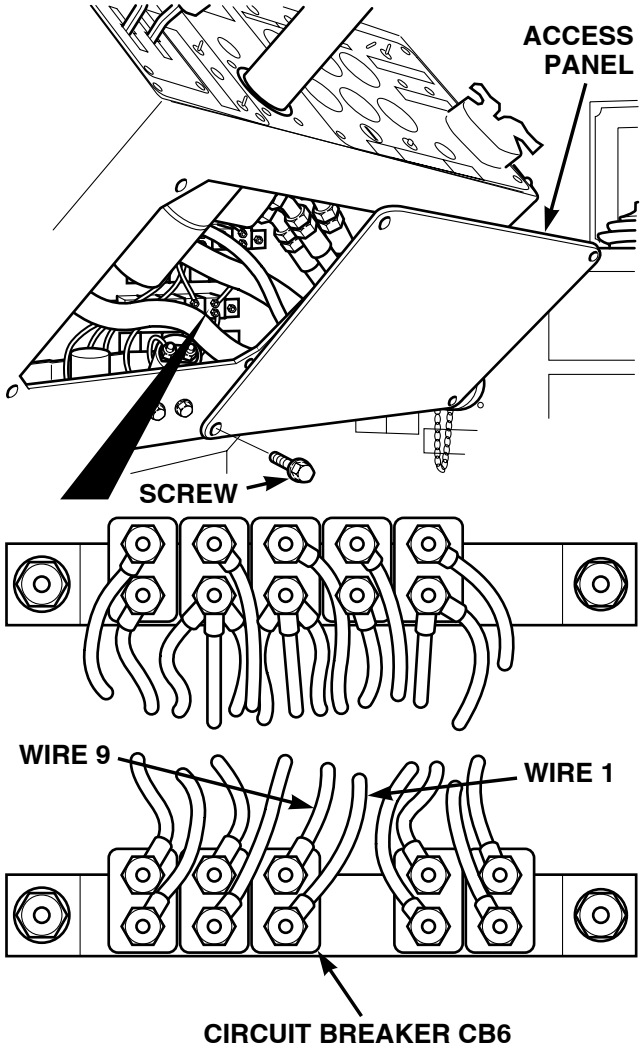
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 is faulty.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector J2 (Para 8-48). (6) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

8

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 1 faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

9

Is 24 vdc present at run relay K1 where wire 3 connects?

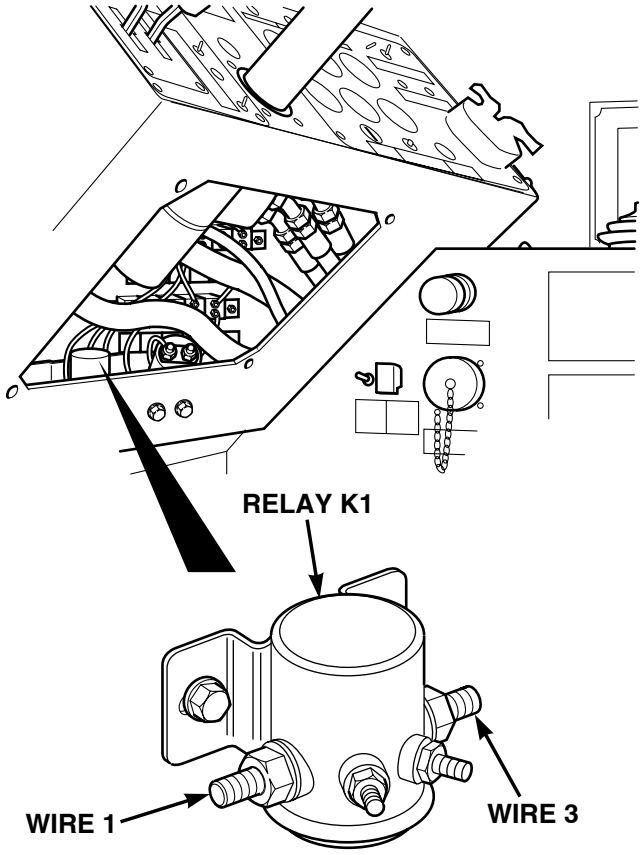
NO → Replace run relay K1 (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, run relay K1 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace run relay K1 (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

10

Is 24 vdc present at relay K2 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 3 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

11

Is 24 vdc present at relay K2 where wire 5 connects?

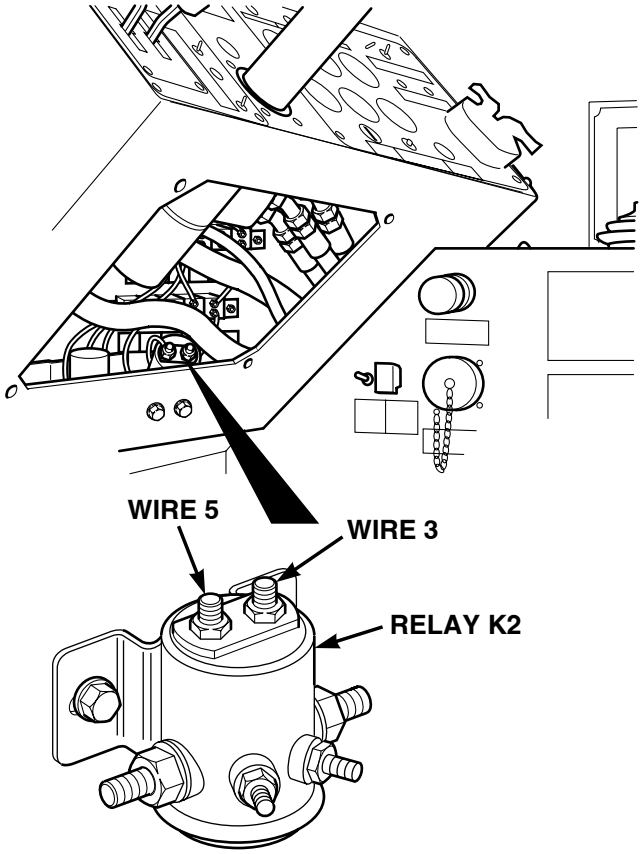
NO → Replace relay K2 (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, relay K2 is faulty.

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to relay K2 where wire 3 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-44).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 11 of this fault.
    (b) If 24 vdc is not present, repair wire 3 (Para 8-48).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-44).



VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to relay K2 where wire 5 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-44).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 12 of this fault.
    (b) If 24 vdc is not present, replace relay K2 (Para 8-23).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-44).

14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK.
POSSIBLE PROBLEMS
Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

12

Is 24 vdc present at circuit breaker CB7 where wire 5 connects?

NO → Repair wire 5 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 5 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK.
POSSIBLE PROBLEMS
Circuit breaker CB7 faulty. Wire 70 faulty. Front floodlight switch faulty.

13

Is 24 vdc present at circuit breaker CB7 where wire 70 connects?

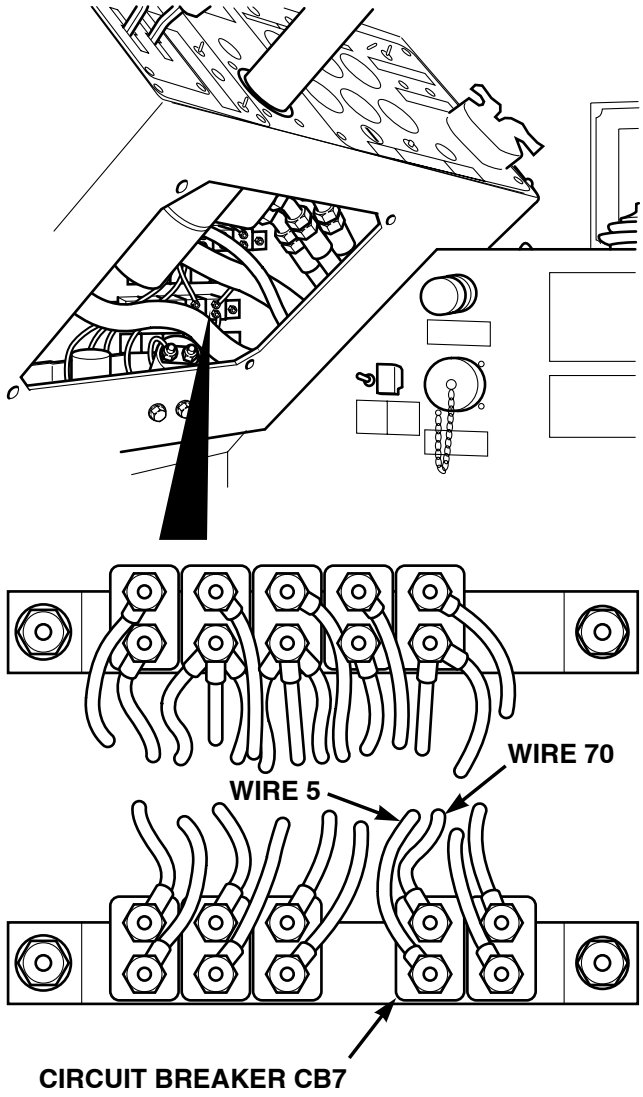
NO → Replace circuit breaker CB7 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB7 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 5 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, repair wire 5 (Para 8-48). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 70 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB7 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44). (8) Install access panel and four screws to secure access panel.



14. FRONT FLOODLIGHT (OR FORWARD) DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK.
POSSIBLE PROBLEMS
Wire 70 faulty. Front floodlight switch faulty.

14

Is 24 vdc present at front floodlight switch where wire 70 connects?

NO → Repair wire 70 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 70 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK. Wire 70 OK.
POSSIBLE PROBLEMS
Front floodlight switch faulty.

15

Is 24 vdc present at front floodlight switch where wire 72 connects?

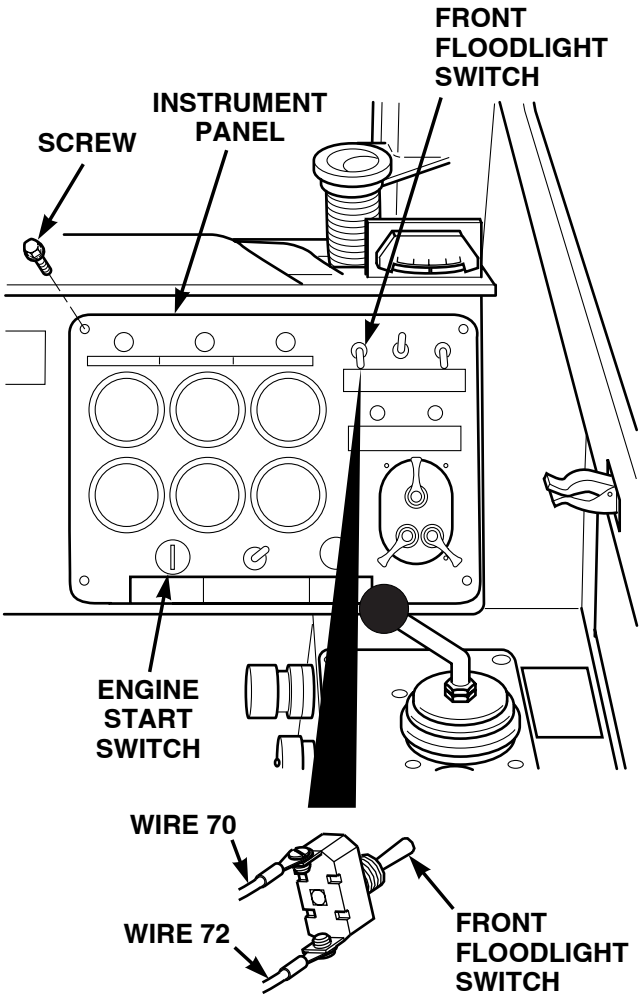
NO → Replace front floodlight switch (Para 8-7).

YES → Repair wire 72 (Para 8-48).

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, front floodlight switch is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Remove four screws and instrument panel. (3) Lift instrument panel out to get to male connector at floodlight switch. (4) Connect multimeter positive lead (+) to male connector for wire 70. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-44). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 15 of this fault. (b) If 24 vdc is not present, repair wire 70 (Para 8-48). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Lift instrument panel out to get to front floodlight switch where wire 72 connects to front floodlight switch. (3) Connect multimeter positive lead (+) to front floodlight switch where wire 72 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 72 (Para 8-48). (b) If 24 vdc is not present, replace floodlight switch (Para 8-7). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Install instrument panel and four screws to secure instrument panel. (9) Install battery cover (Para 8-42).



15. BOOM FLOODLIGHT DOES NOT OPERATE.

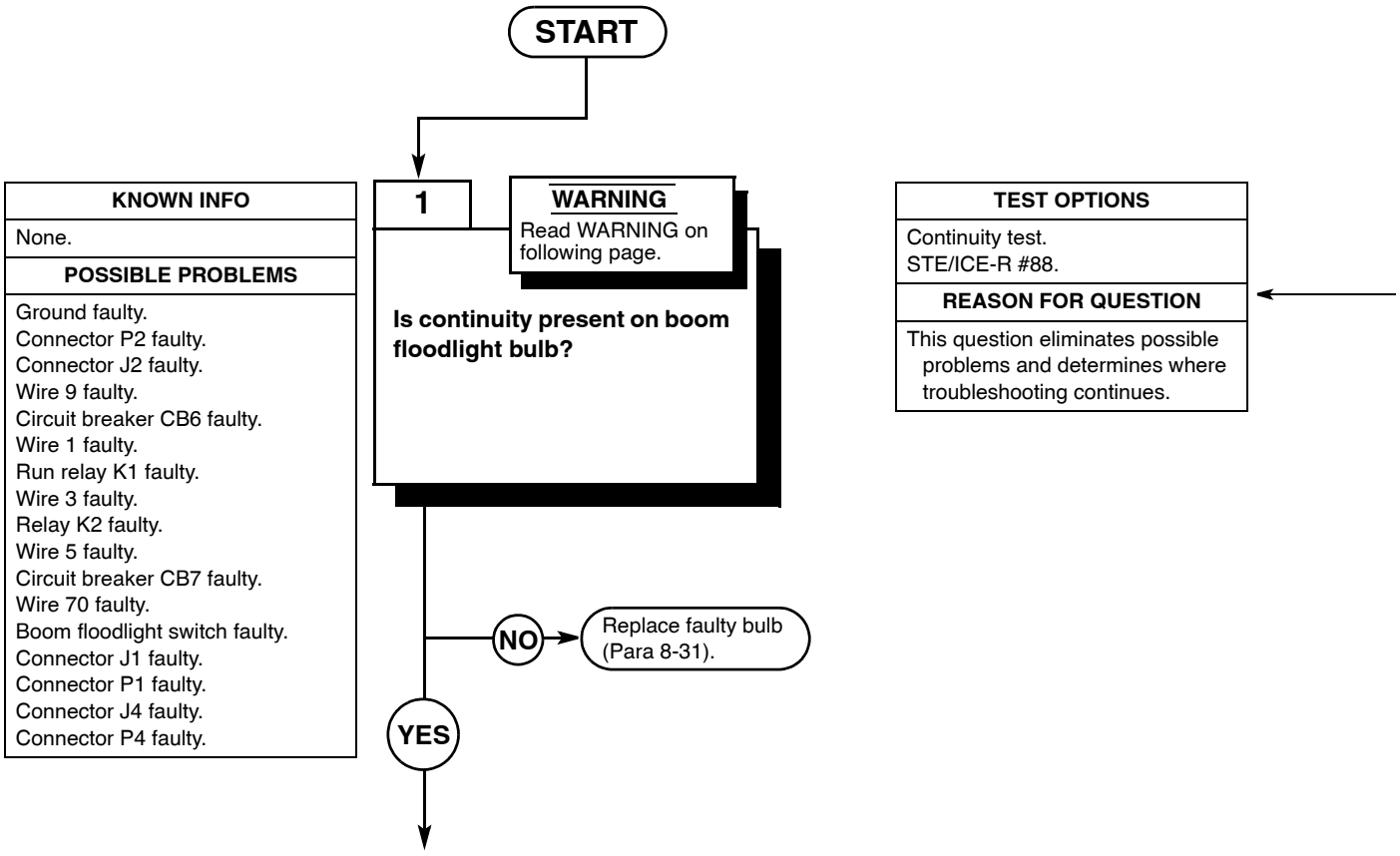
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

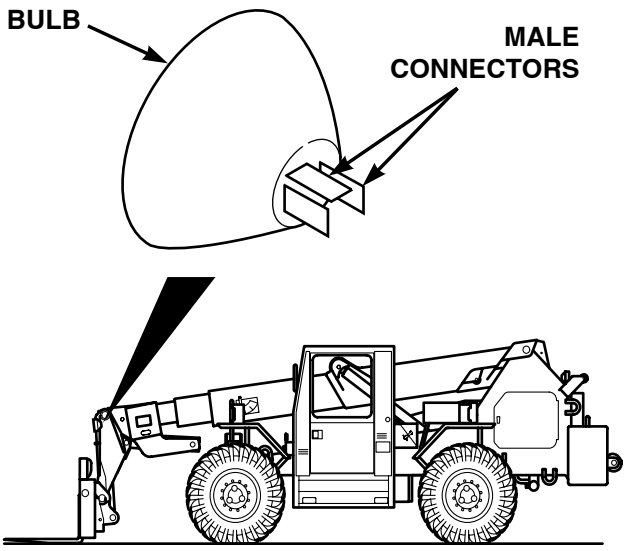
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

CONTINUITY TEST
(1) Remove bulb from boom floodlight. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to male connector of bulb. (4) Connect multimeter negative lead (–) to other male connector of bulb. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace faulty bulb (Para 8-31).



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

2

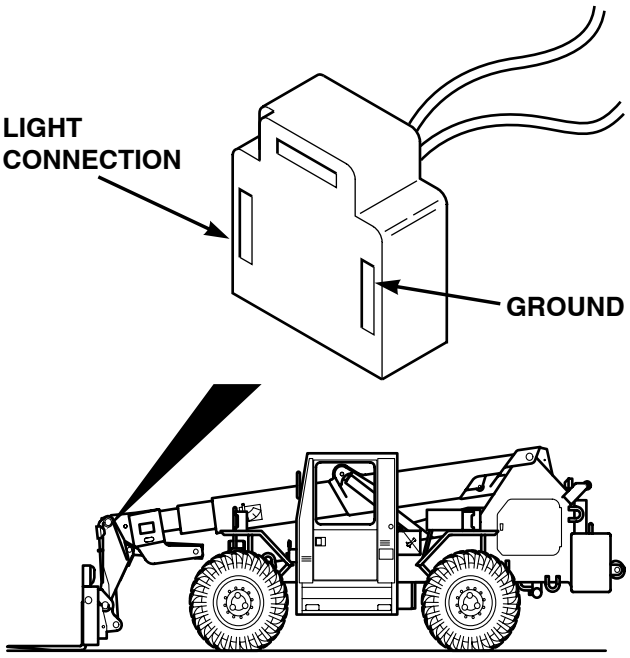
Is continuity present between ground of light connection and known good ground?

NO → Repair connection and/or light ground wire.

YES

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is no present, light connection and/or ground faulty.

CONTINUITY TEST
(1) Remove bulb from boom floodlight. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground of light connection. (4) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, repair light connection and/or light ground wire.



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

3

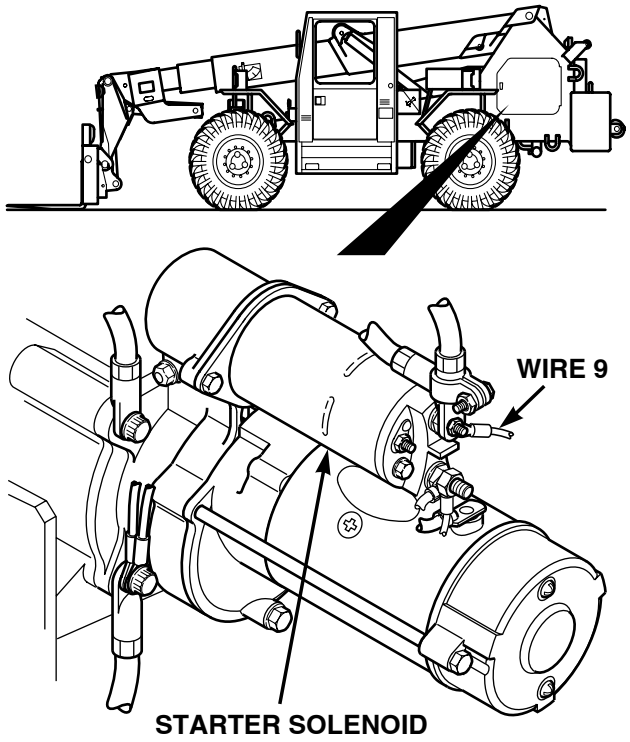
Is 24 vdc present at starting motor solenoid where battery cable connects?

NO → Go to Step 4 of this fault.

YES → Go to Step 5 of this fault.

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to starting motor solenoid where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 4 of this fault. (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

4

Is continuity present on negative battery cable?

NO → Repair negative battery cable (Para 8-42).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity Test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, negative battery cable is faulty.

KNOWN INFO
Ground OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

5

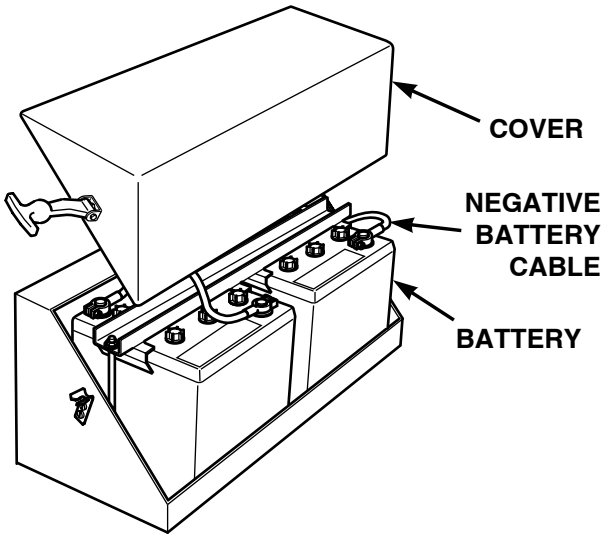
Is 24 volts dc present at connector P2 where wire 9 connects?

NO → Repair wire 9 or connector P2 (Para 8-49).

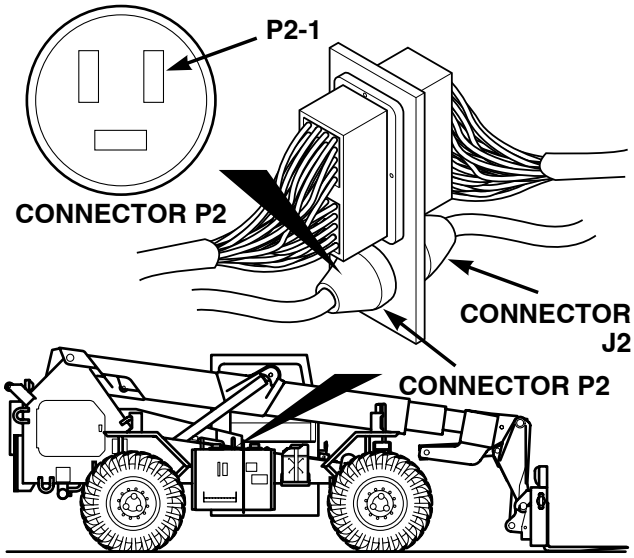
YES →

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector P2 are faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to end of negative battery cable. (4) Connect multimeter negative lead (–) to other end of negative battery cable. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J2 from connector P2. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector P2-1 where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector P2 (Para 8-49). (7) Disconnect negative battery cable from negative side of battery (Para 8-42). (8) Connect connector J2 to connector P2.



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

6

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector J2 are faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

7

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

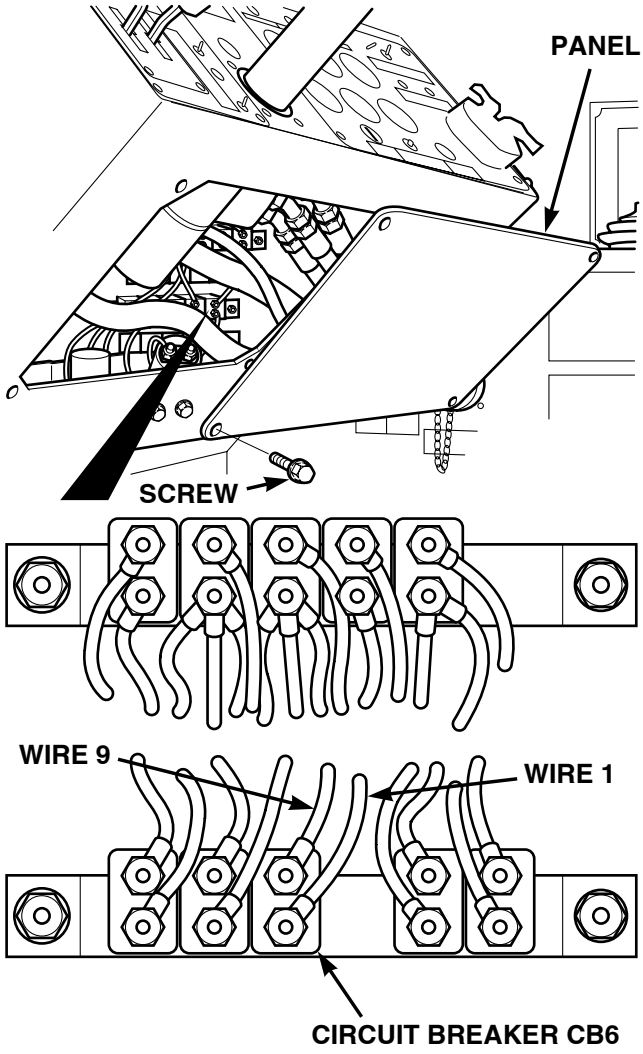
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Remove four screws and access panel. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable from negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector J2 (Para 8-48). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable from negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

8

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 1 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

9

Is 24 vdc present at run relay K1 where wire 3 connects?

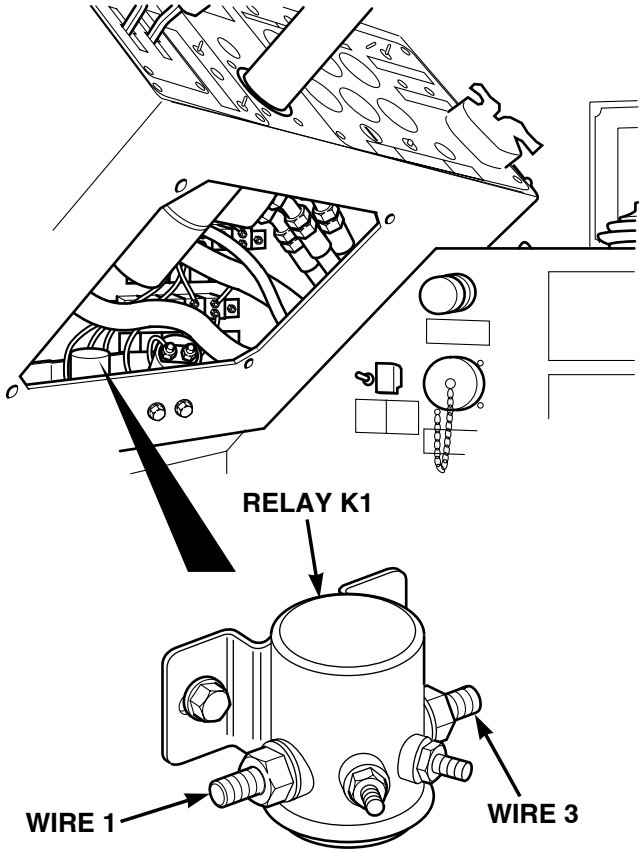
NO → Replace run relay K1 (Para 8-23).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, run relay K1 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable from negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable from negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace run relay K1 (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

10

Is 24 vdc present at relay K2 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 3 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

11

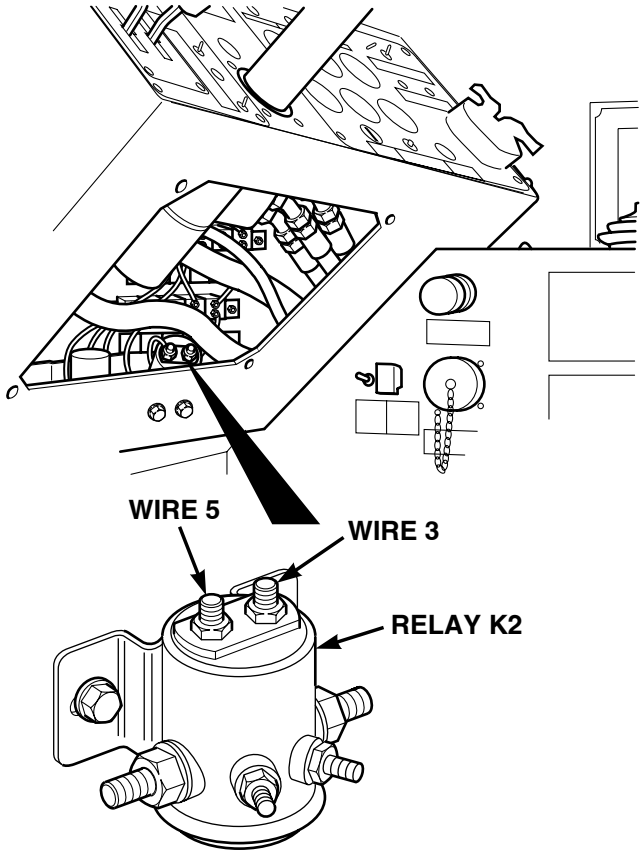
Is 24 vdc present at Relay K2 where wire 5 connects?

NO → Replace relay K2 (Para 8-23).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, relay K2 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to relay K2 where wire 3 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable from negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to relay K2 where wire 5 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable from negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 12 of this fault. (b) If 24 vdc is not present, replace relay K2 (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK.
POSSIBLE PROBLEMS
Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

12

Is 24 vdc present at circuit breaker CB7 where wire 5 connects?

NO → Repair wire 5 (Para 8-48).

YES

TEST OPTIONS
Voltage Test STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 5 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK.
POSSIBLE PROBLEMS
Circuit breaker CB7 faulty. Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

13

Is 24 vdc present at circuit breaker CB7 where wire 70 connects?

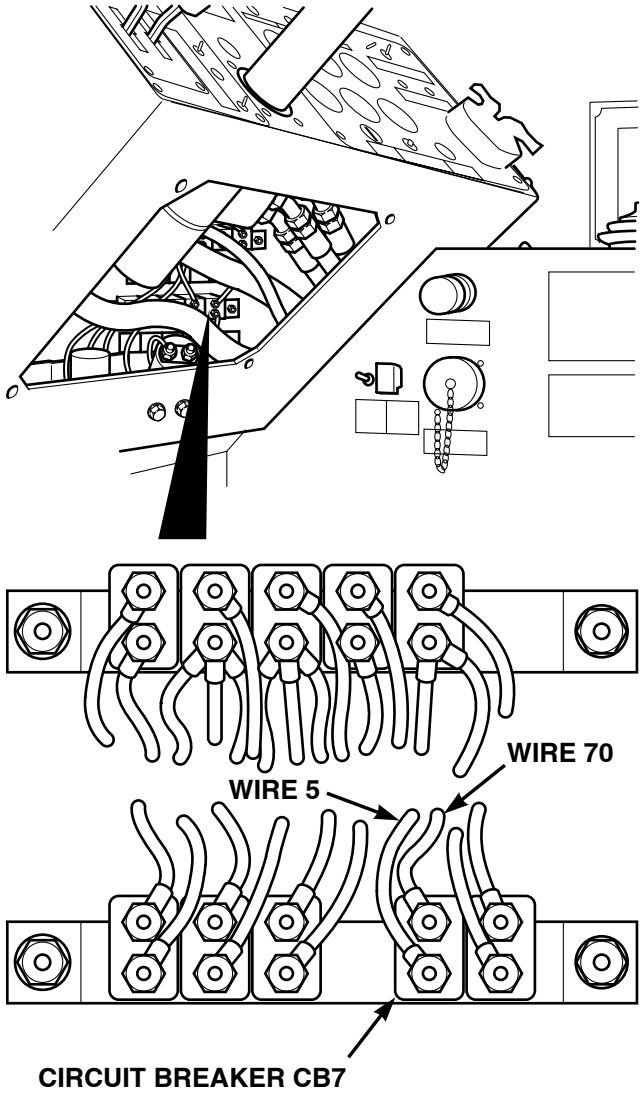
NO → Replace circuit breaker CB7 (Para 8-11).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB7 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 5 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable from negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, repair wire 5 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 70 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable from negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB7 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42). (8) Install access panel and four screws.



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK.
POSSIBLE PROBLEMS
Wire 70 faulty. Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

14

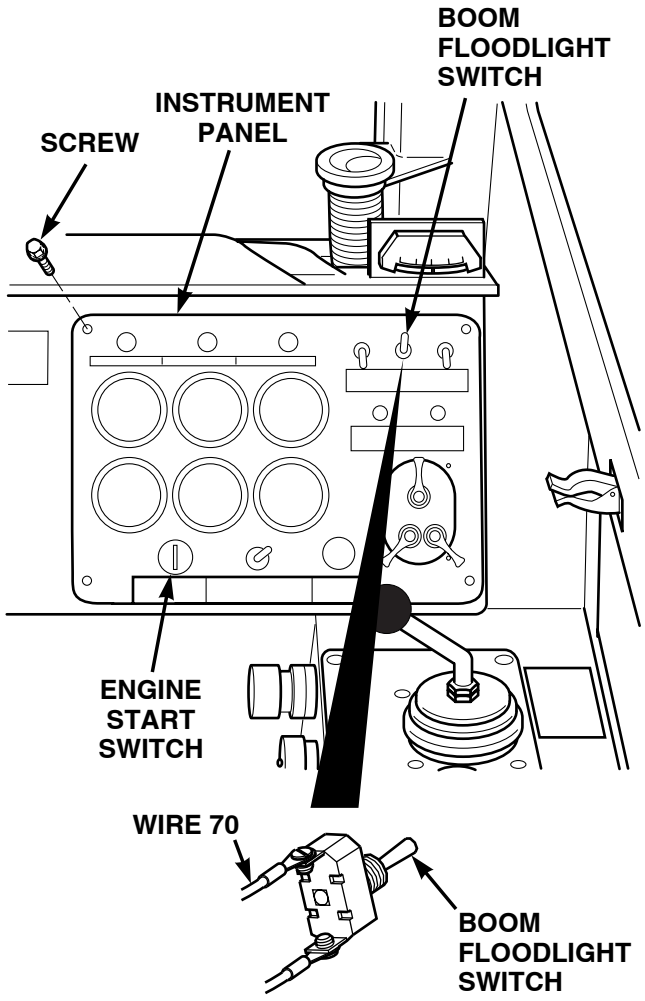
Is 24 vdc present at boom floodlight switch where wire 70 connects?

NO → Repair wire 70 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 70 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Remove four screws and instrument panel.
(4) Lift instrument panel out to get to boom floodlight switch.
(5) Connect multimeter positive lead (+) to boom floodlight switch where wire 70 connects.
(6) Connect multimeter negative lead (–) to known good ground.
(7) Connect negative battery cable from negative side of battery (Para 8-42).
(8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(9) Turn boom floodlight switch to ON position (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 15 of this fault.
(b) If 24 vdc is not present, repair wire 70 (Para 8-48).
(10) Turn boom floodlight switch to OFF position (TM 10-3930-673-10).
(11) Turn engine start switch to OFF position (TM 10-3930-673-10).
(12) Disconnect negative battery cable from negative side of battery (Para 8-42).



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK. Wire 70 OK.
POSSIBLE PROBLEMS
Boom floodlight switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

15

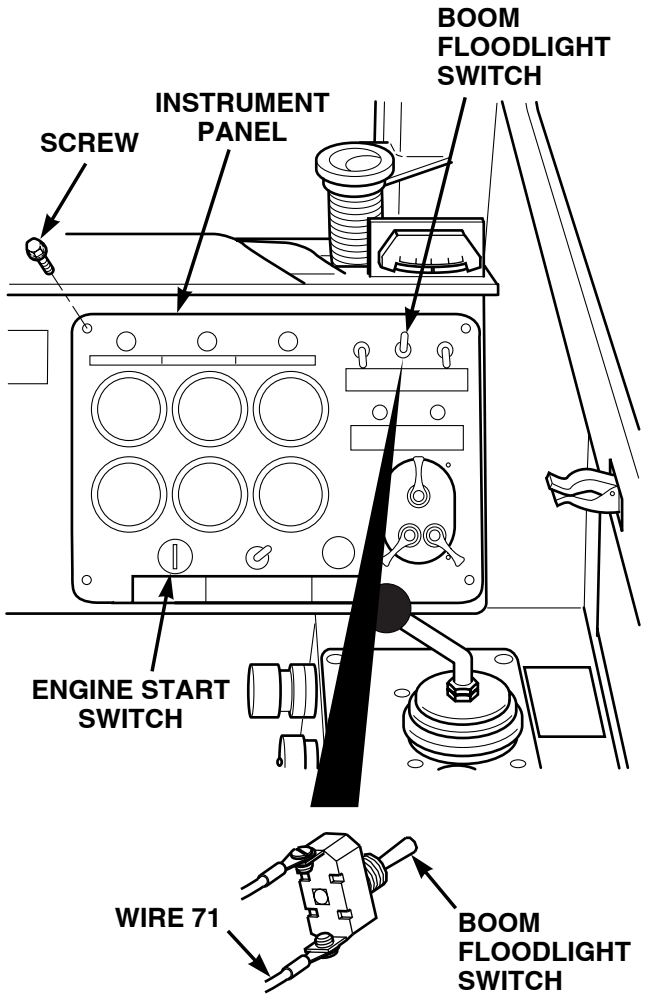
Is 24 vdc present at boom floodlight switch where wire 71 connects?

NO → Replace boom floodlight switch (Para 8-7).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, boom floodlight switch is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Lift instrument panel out to get to boom floodlight switch where wire 71 connects. (4) Connect multimeter positive lead (+) to boom floodlight switch where wire 71 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable from negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 16 of this fault. (b) If 24 vdc is not present, replace boom floodlight switch (Para 8-7). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Install instrument panel and four screws.



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK. Wire 70 OK. Boom floodlight switch OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty.

16

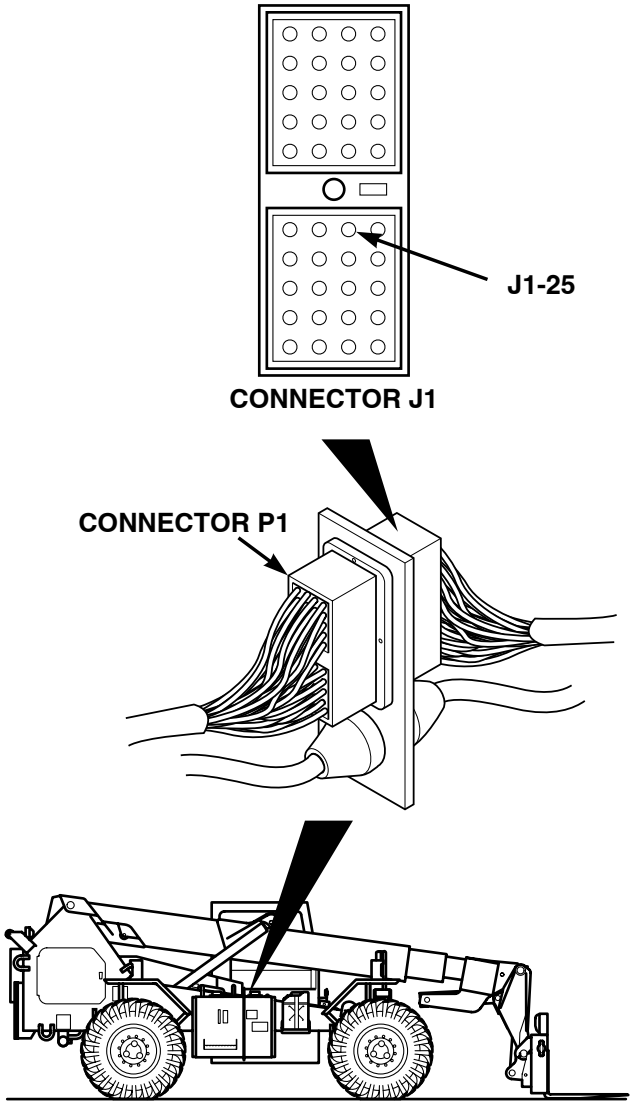
Is 24 vdc present at connector J1-25 where wire 71 connects?

NO → Repair wire 71 or connector J1 (Para 8-48).

YES

TEST OPTIONS
Voltage Test STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 71 or connector J1 are faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Disconnect connector J1 from connector P1. (4) Connect multimeter positive lead (+) to connector J1-25 where wire 71 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable from negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (8) Turn boom floodlight switch to ON position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 17 of this fault. (b) If 24 vdc is not present, repair wire 71 or connector J1 (Para 8-48). (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).



15. BOOM FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK. Wire 70 OK. Boom floodlight switch OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Connector J4 faulty. Connector P4 faulty.

17

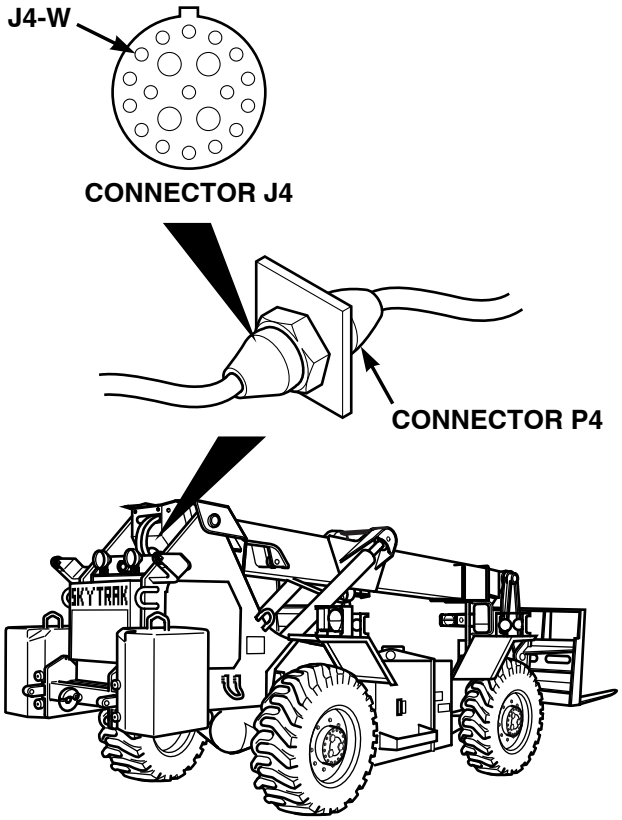
Is 24 vdc present at connector J4-W where wire 71 connects?

NO → Repair wire 71 or connector J4 (Para 8-50).

YES → Repair wire 71 or connector P4 (Para 8-50).

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 71 or connector J4 are faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Disconnect connector J4 from connector P4.
(4) Connect multimeter positive lead (+) to connector J4-W where wire 71 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable from negative side of battery (Para 8-42).
(7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(8) Turn boom floodlight switch to ON position (TM 10-3930-673-10).
(a) If 24 vdc is present, repair wire 71 or P4 connector (Para 8-50).
(b) If 24 vdc is not present, repair wire 71 or connector J4 (Para 8-50).
(9) Turn boom floodlight switch to OFF position (TM 10-3930-673-10).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).
(12) Connect connector J4 to connector P4.
(13) Connect negative battery cable to negative side of battery (Para 8-42).
(14) Install battery cover (Para 8-42).



16. REAR FLOODLIGHT DOES NOT OPERATE.

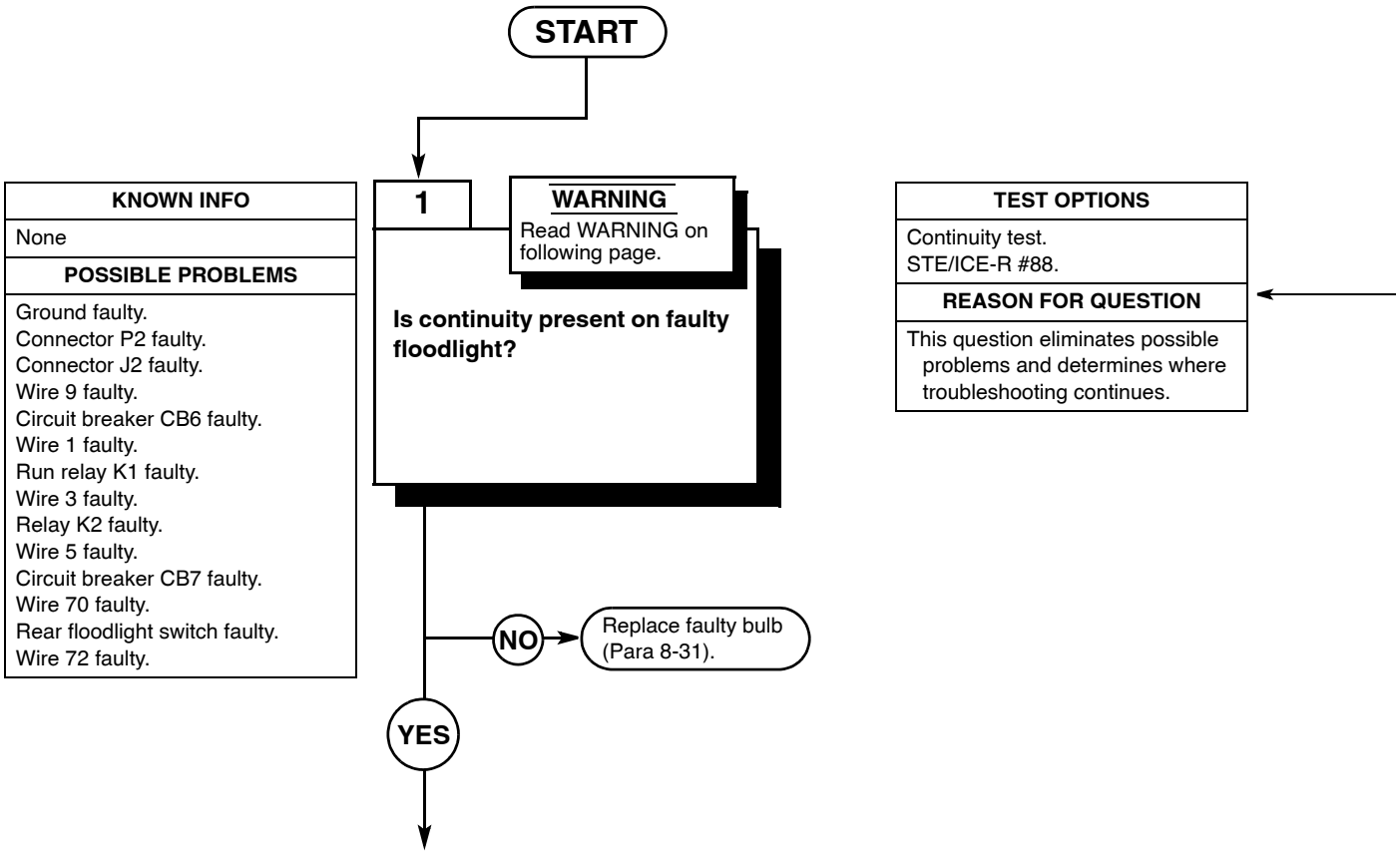
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

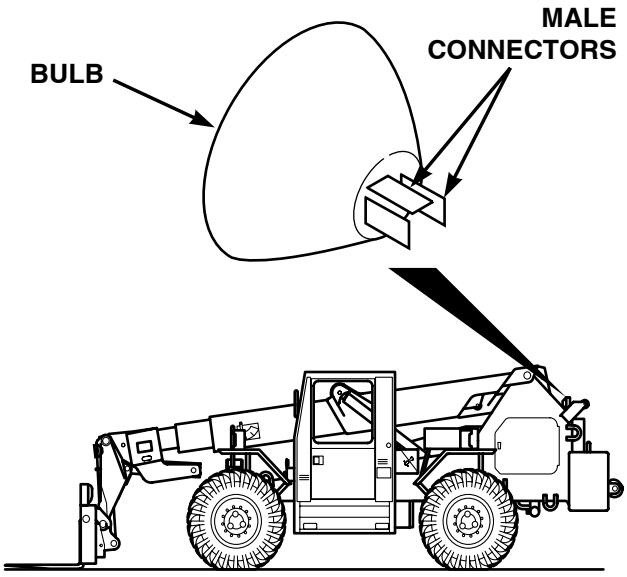
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

CONTINUITY TEST
(1) Remove bulb from faulty floodlight. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to male connector of bulb. (4) Connect multimeter negative lead (–) to other male connector of bulb. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace faulty bulb (Para 8-31).



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
None
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

2

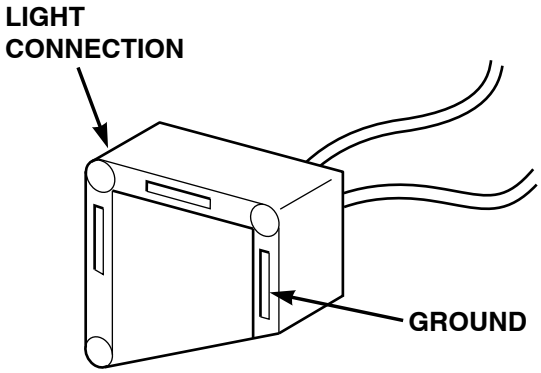
Is continuity present between ground of light connection and known good ground?

NO → Repair connection and/or light ground wire.

YES

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, light connection and/or ground faulty.

CONTINUITY TEST
(1) Remove bulb from faulty floodlight. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground of light connection. (4) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, repair light connection and/or light ground wire.



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
None
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

3

Is 24 vdc present at starting motor solenoid where wire 9 connects?

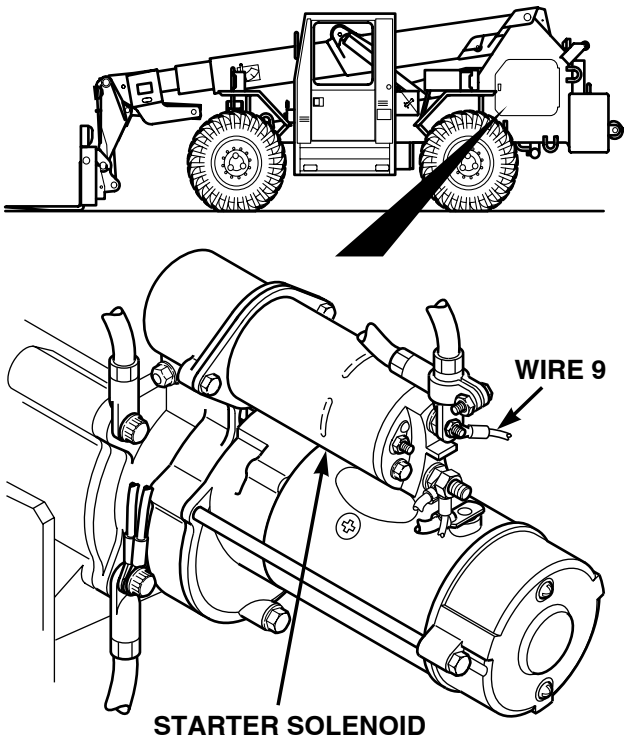
NO → Go to Step 4 of this fault.

YES → Go to Step 5 of this fault.

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST

(1) Remove battery cover.
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to starting motor solenoid where wire 9 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
    (a) If 24 vdc is present, go to Step 5 of this fault.
    (b) If 24 vdc is not present, go to Step 4 of this fault.



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
POSSIBLE PROBLEMS
Ground faulty. Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

4

Is continuity present on negative battery cable?

NO → Repair negative battery cable (Para 8-44).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity Test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, negative battery cable is faulty.

KNOWN INFO
Ground OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

5

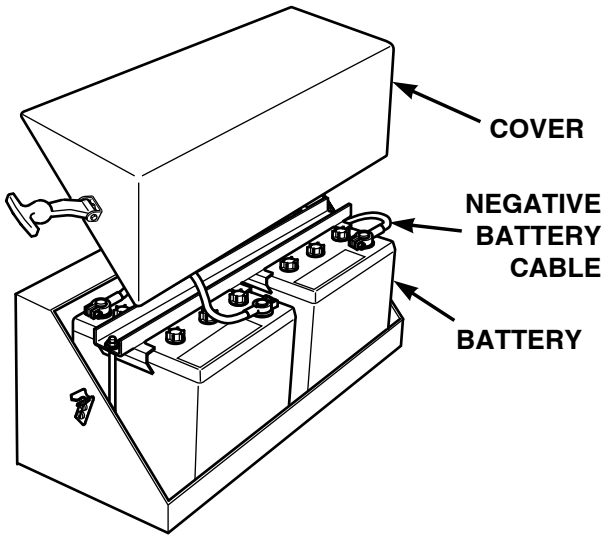
Is 24 vdc present at connector P2 where wire 9 connects?

NO → Repair wire 9 or connector P2 (Para 8-49)

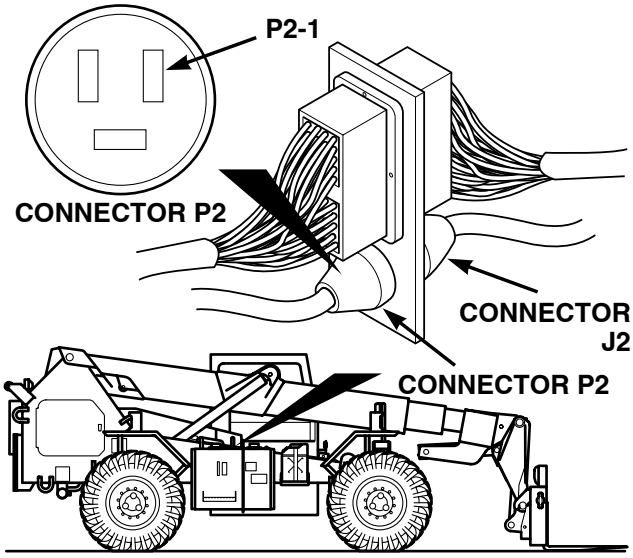
YES →

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector P2 is faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to end of negative battery cable. (4) Connect multimeter negative lead (–) to other end of negative battery cable. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair negative battery cable (Para 8-44).



VOLTAGE TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to connector P2-1 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector P2 (Para 8-49). (6) Disconnect negative battery cable from negative side of battery (Para 8-42). (7) Connect connector J2 to connector P2.



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK.
POSSIBLE PROBLEMS
Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

6

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector J2 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

7

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

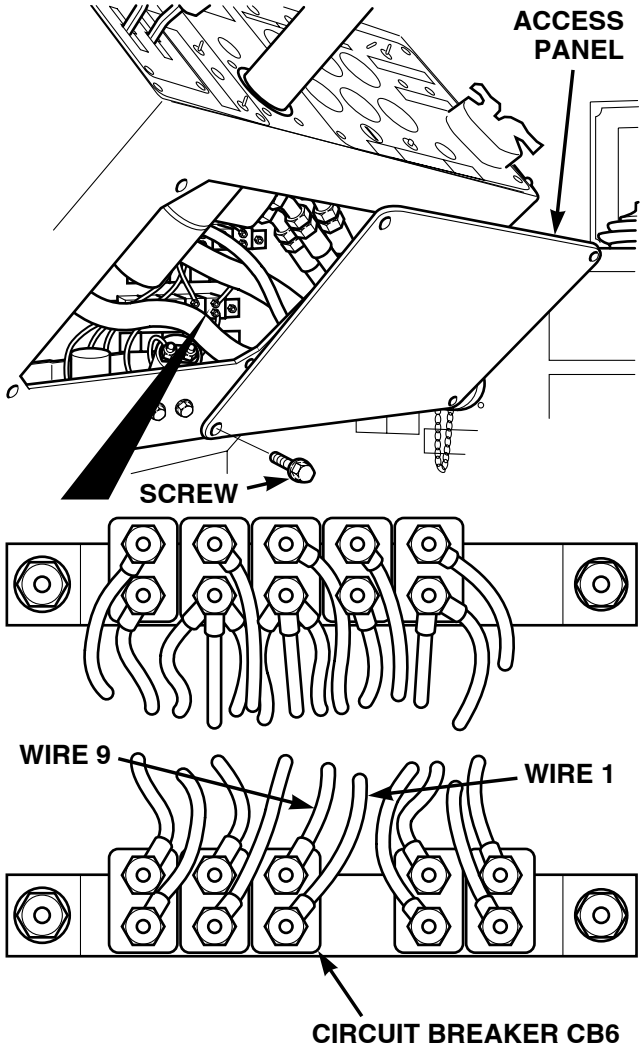
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 is faulty.

VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 9 or connector J2 (Para 8-48). (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

8

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 1 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay K1 faulty. Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

9

Is 24 vdc present at run relay K1 where wire 3 connects?

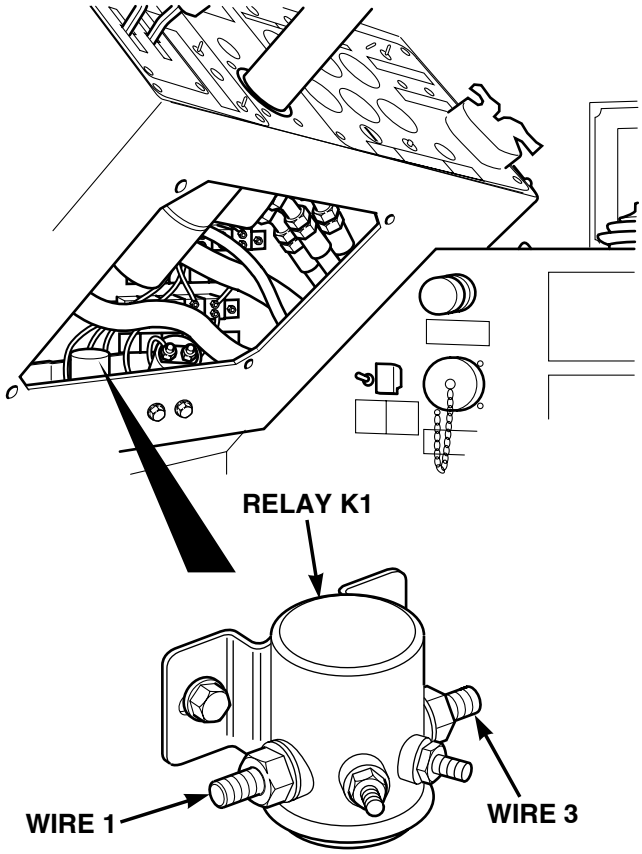
NO → Replace run relay K1 (Para 8-23).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, run relay K1 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace run relay K1 (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

10

Is 24 vdc present at relay K2 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 3 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Relay K2 faulty. Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

11

Is 24 vdc present at relay K2 where wire 5 connects?

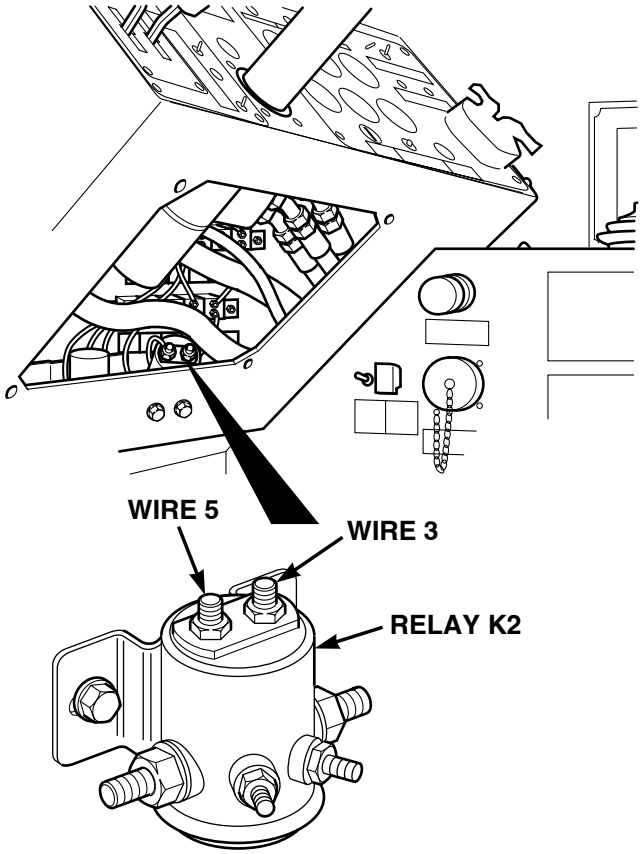
NO → Replace relay K2 (Para 8-23).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, relay K2 is faulty.

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to relay K2 where wire 3 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 11 of this fault.
    (b) If 24 vdc is not present, repair wire 3 (Para 8-48).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to relay K2 where wire 5 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 12 of this fault.
    (b) If 24 vdc is not present, replace relay K2 (Para 8-23).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).

16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK.
POSSIBLE PROBLEMS
Wire 5 faulty. Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

12

Is 24 vdc present at circuit breaker CB7 where wire 5 connects?

NO → Repair wire 5 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 5 is faulty.

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK.
POSSIBLE PROBLEMS
Circuit breaker CB7 faulty. Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

13

Is 24 vdc present at circuit breaker CB7 where wire 70 connects?

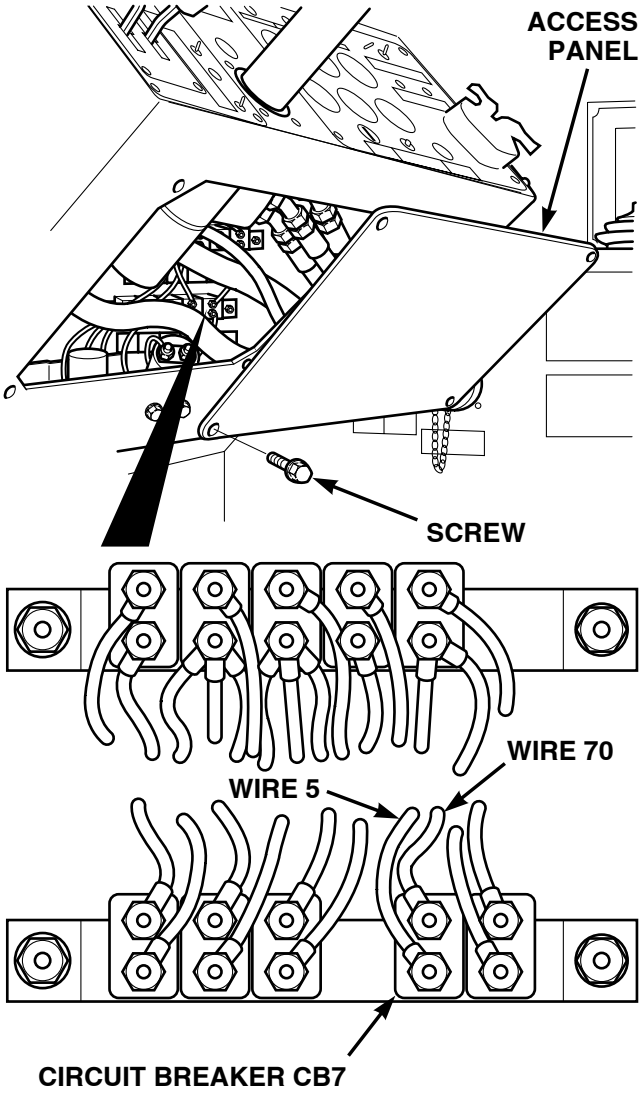
NO → Replace circuit breaker CB7 (Para 8-11).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB7 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 5 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, repair wire 5 (Para 8-48). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB7 where wire 70 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB7 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42). (8) Install access panel and four screws to secure access panel.



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK.
POSSIBLE PROBLEMS
Wire 70 faulty. Rear floodlight switch faulty. Wire 72 faulty.

14

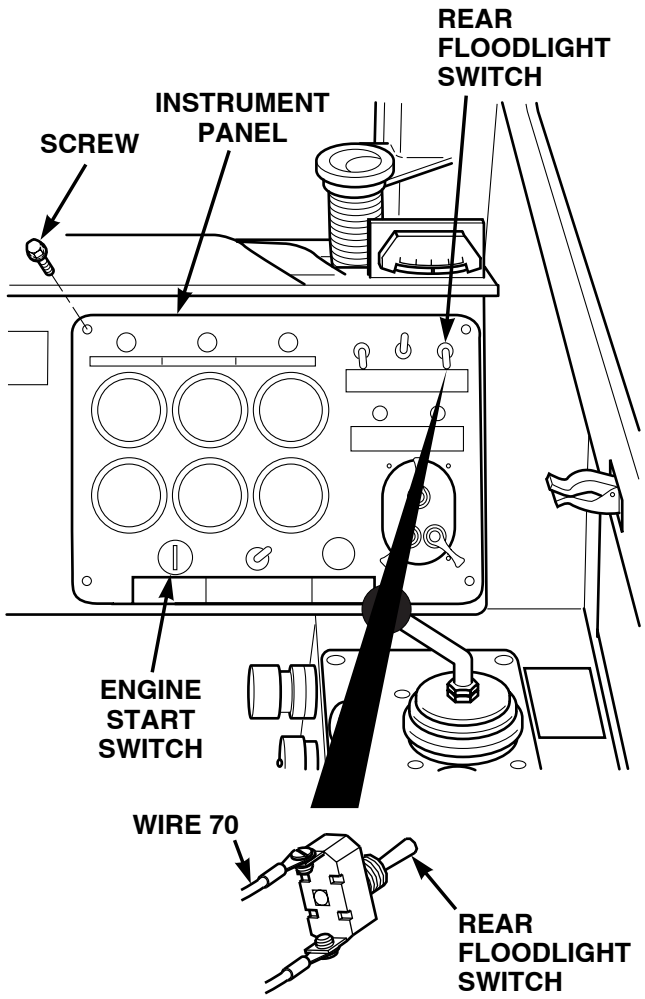
Is 24 vdc present at rear floodlight switch where wire 70 connects?

NO → Repair wire 70 (Para 8-48).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 70 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Remove four screws from instrument panel. (3) Lift instrument panel out to get to rear floodlight switch where wire 70 connects. (4) Connect multimeter positive lead (+) to rear floodlight switch where wire 70 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 15 of this fault. (b) If 24 vdc is not present, repair wire 70 (Para 8-48). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



16. REAR FLOODLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Ground OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay K1 OK. Wire 3 OK. Relay K2 OK. Wire 5 OK. Circuit breaker CB7 OK. Wire 70 OK.
POSSIBLE PROBLEMS
Rear floodlight switch faulty. Wire 73 faulty.

15

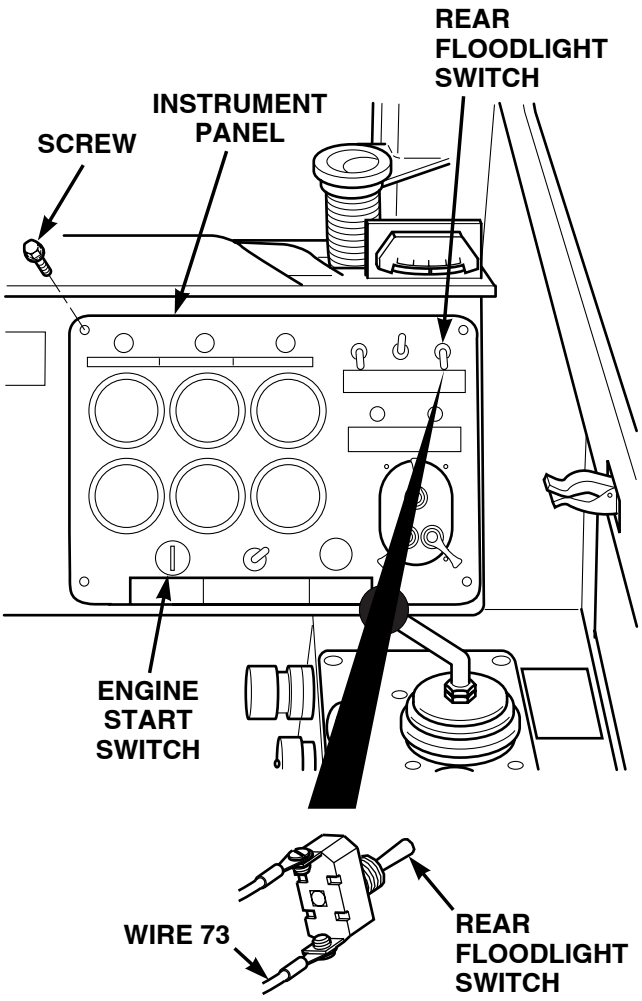
Is 24 vdc present at rear floodlight switch where wire 73 connects?

NO → Replace rear floodlight switch (Para 8-7).

YES → Repair wire 73 (Para 8-48).

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, rear floodlight switch is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc.
(2) Lift instrument panel out to get to rear floodlight switch where wire 73 connects.
(3) Connect multimeter positive lead (+) to rear floodlight switch where wire 73 connects.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn rear floodlight switch to ON position (TM 10-3930-673-10).
(a) If 24 vdc is present, repair wire 73 (Para 8-48).
(b) If 24 vdc is not present, replace rear floodlight switch (Para 8-7).
(8) Turn rear floodlight switch to OFF position (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).
(10) Install four screws to secure instrument panel.
(11) Install battery cover (Para 8-42).



17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE.

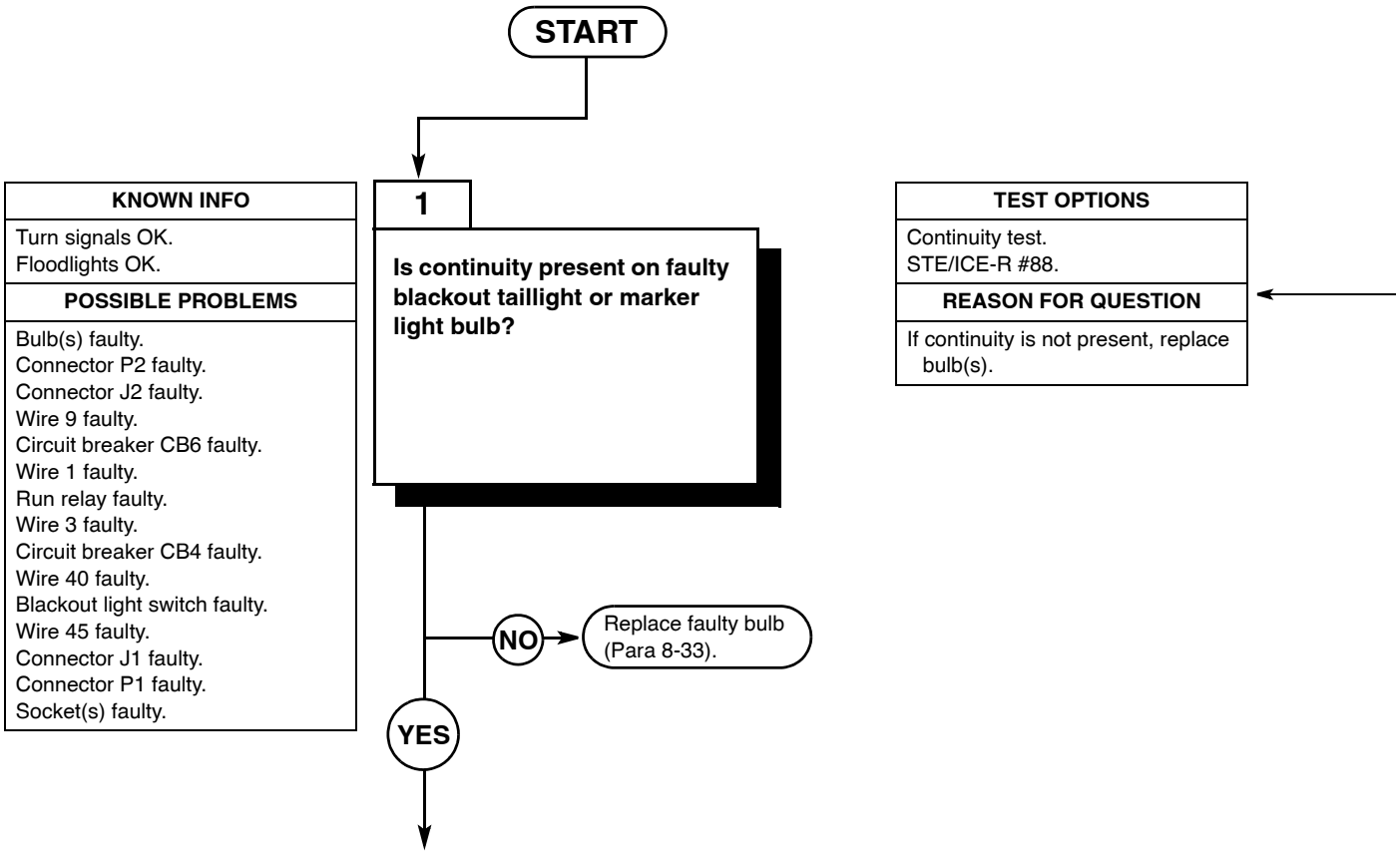
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

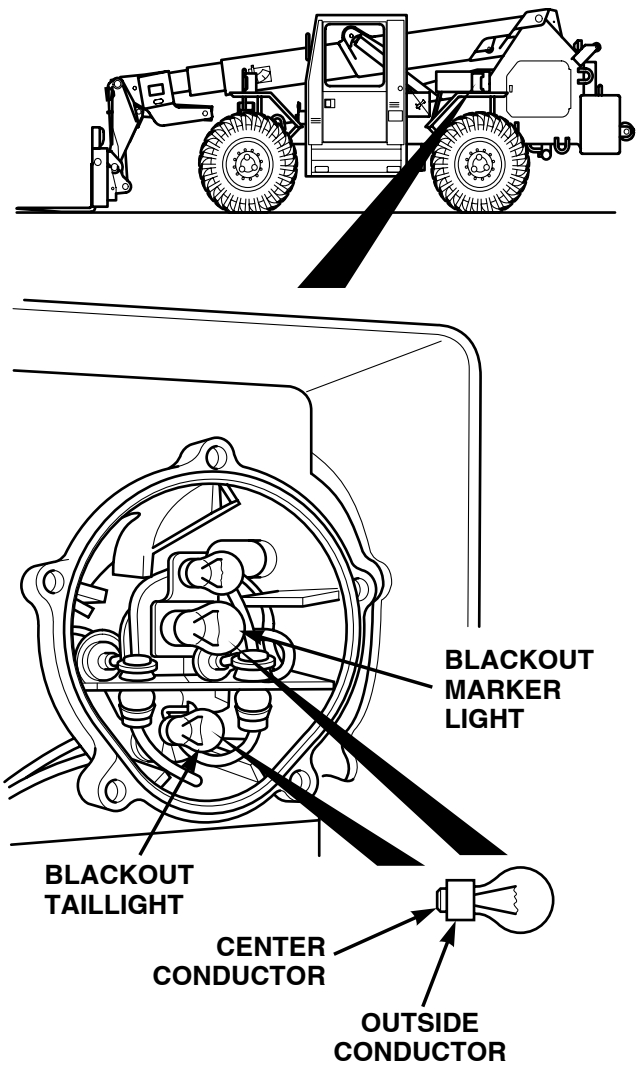
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

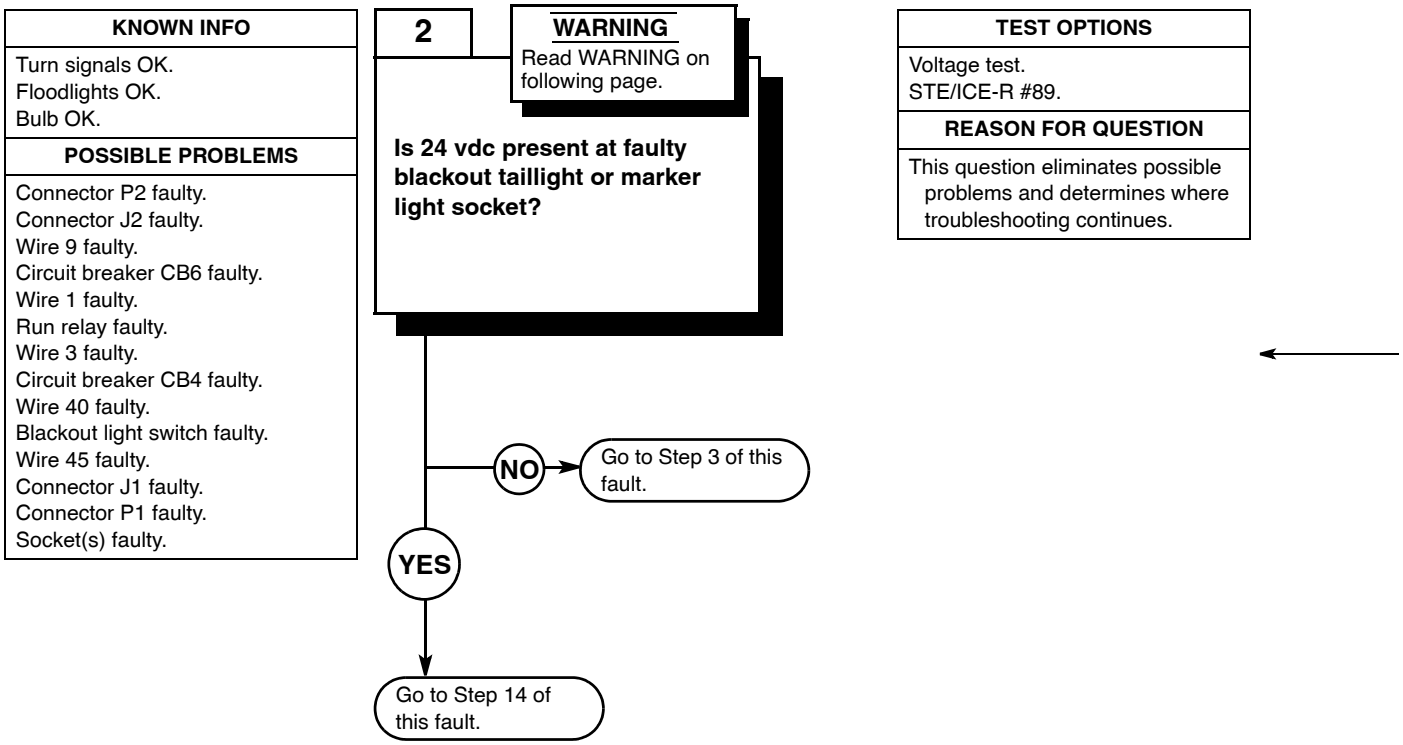
References
TM 10-3930-673-10
TM 9-4910-571-12&P

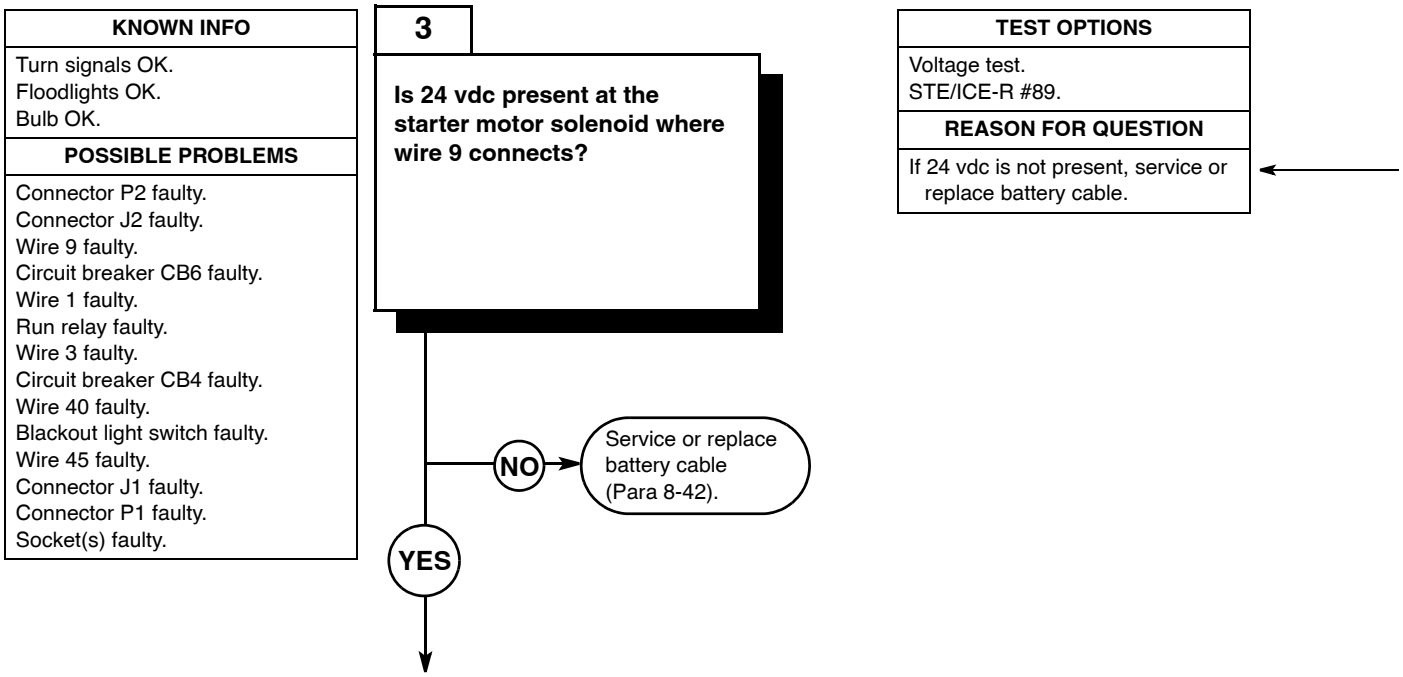


CONTINUITY TEST
(1) Remove bulb from faulty blackout taillight or marker light (Para 8-33). (2) Set the multimeter to ohms. (3) Connect multimeter positive lead (+) to the center conductor. (4) Connect multimeter negative lead (–)to the outside conductor. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace bulb (Para 8-33).



17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).



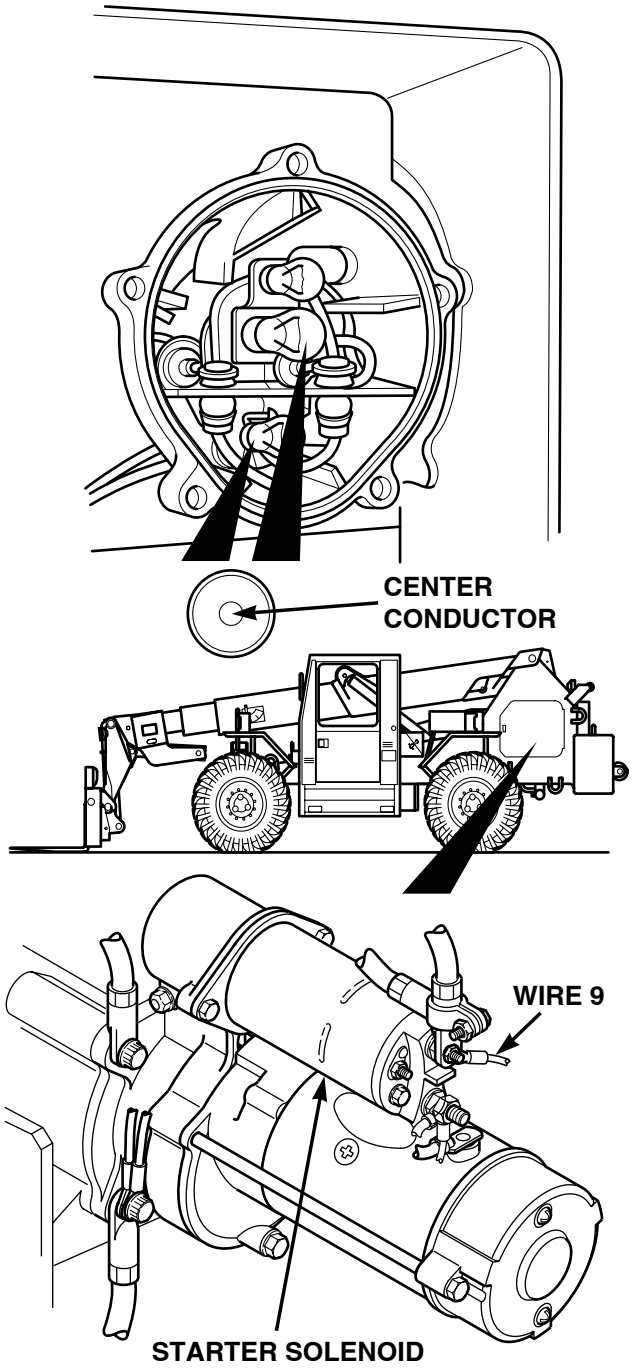


WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to center conductor of faulty socket. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn blackout light switch to BLACKOUT DRIVE position (TM 10-3930-673-10). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, go to Step 3 of this fault. (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10).

VOLTAGE TEST
(1) Remove battery covers (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to the starter motor solenoid where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, service or replace battery cable (Para 8-42). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Turn signals OK. Floodlights OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 45 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Turn signals OK. Floodlights OK. Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 45 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

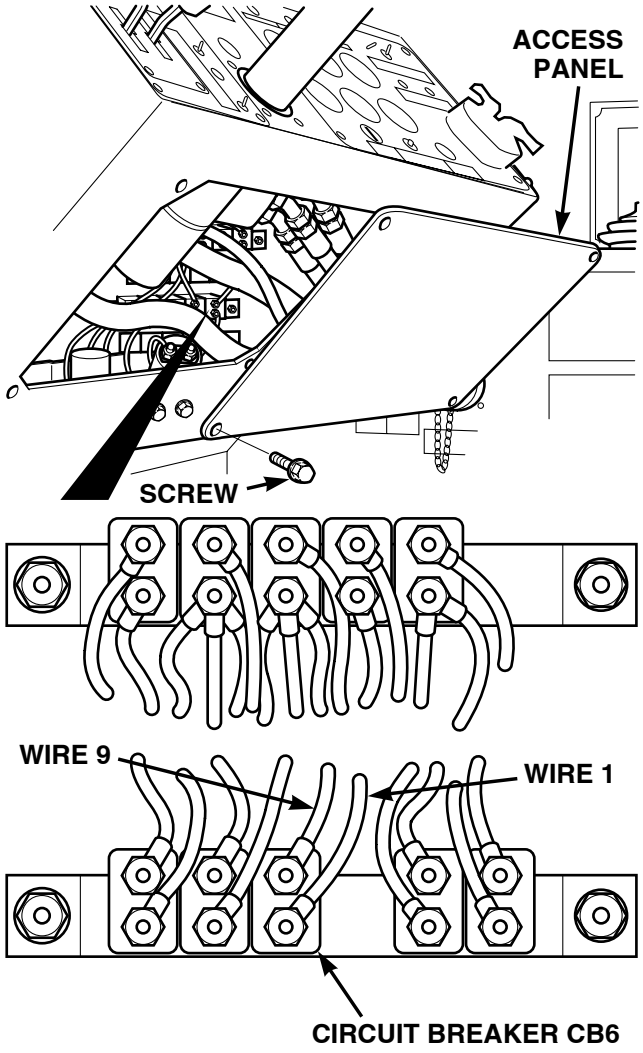
NO → Replace circuit breaker CB6 (Para 8-11).

YES

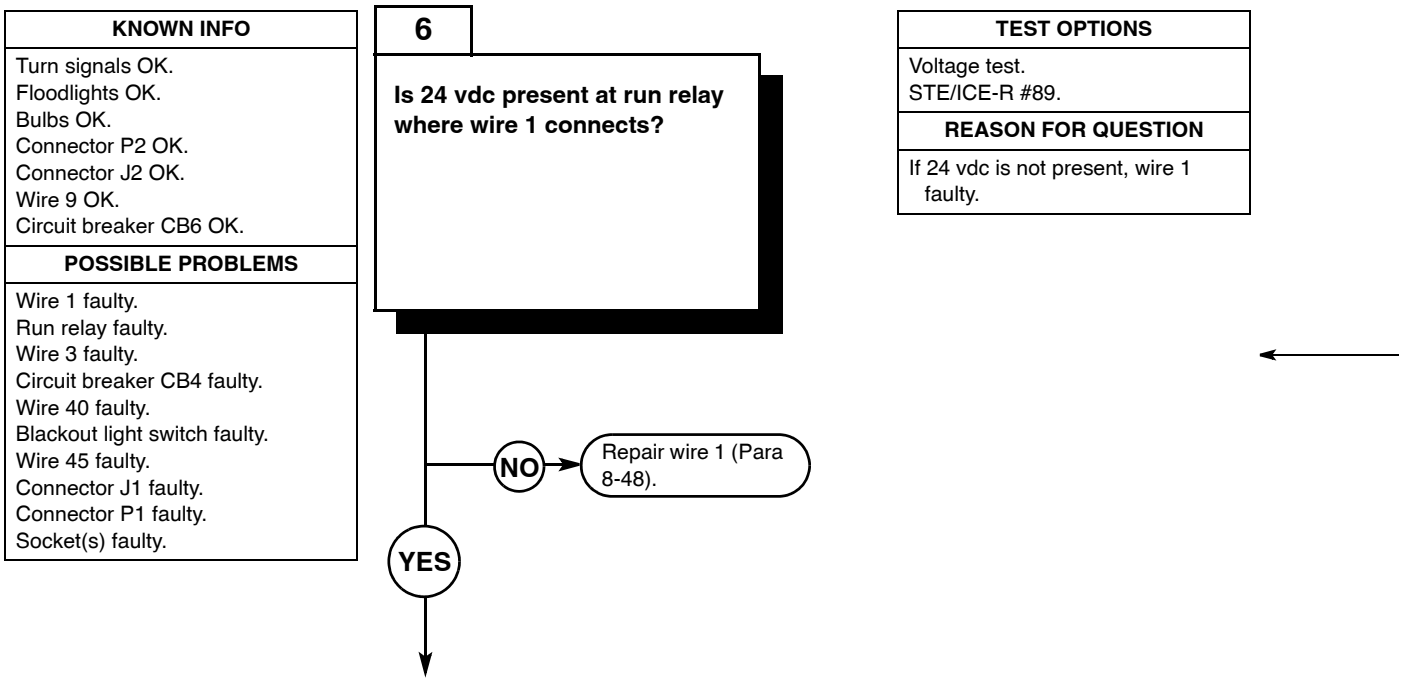
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 faulty.

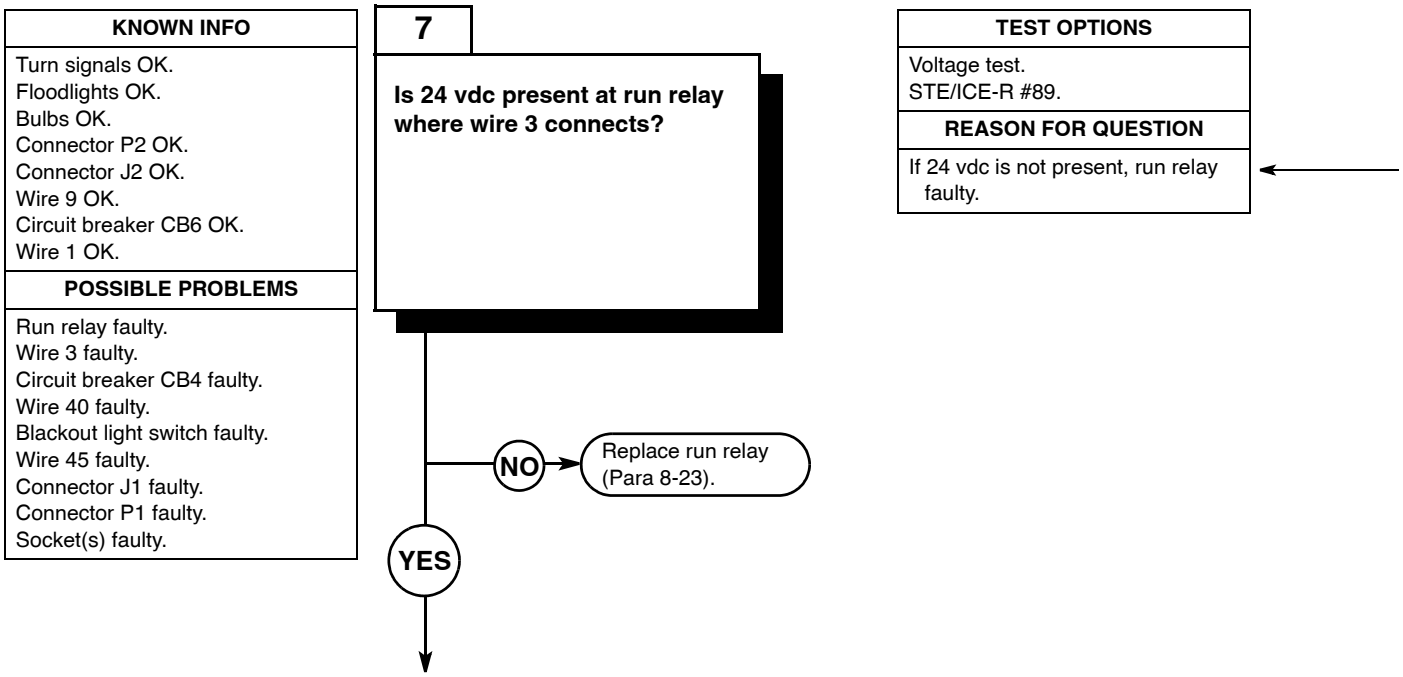
VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect the multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



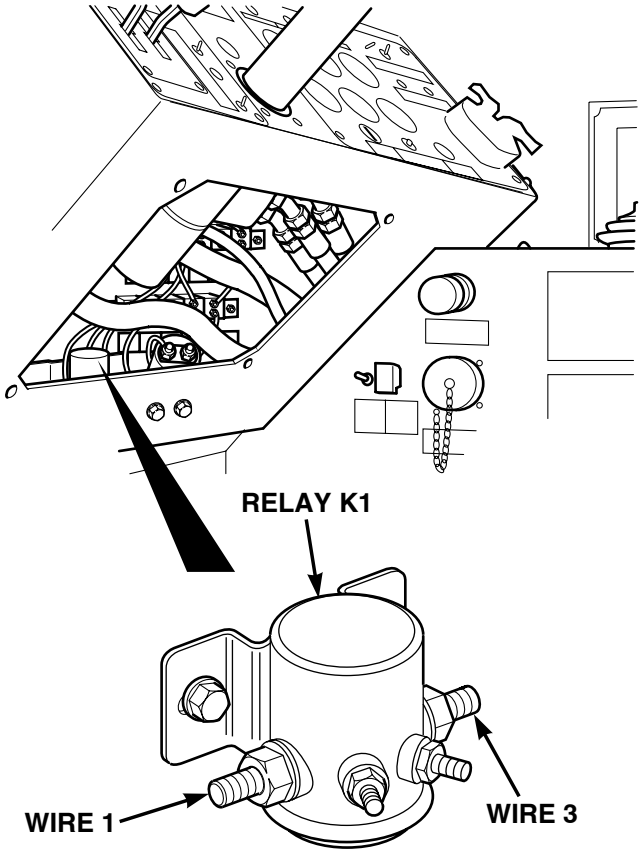
17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).





VOLTAGE TEST

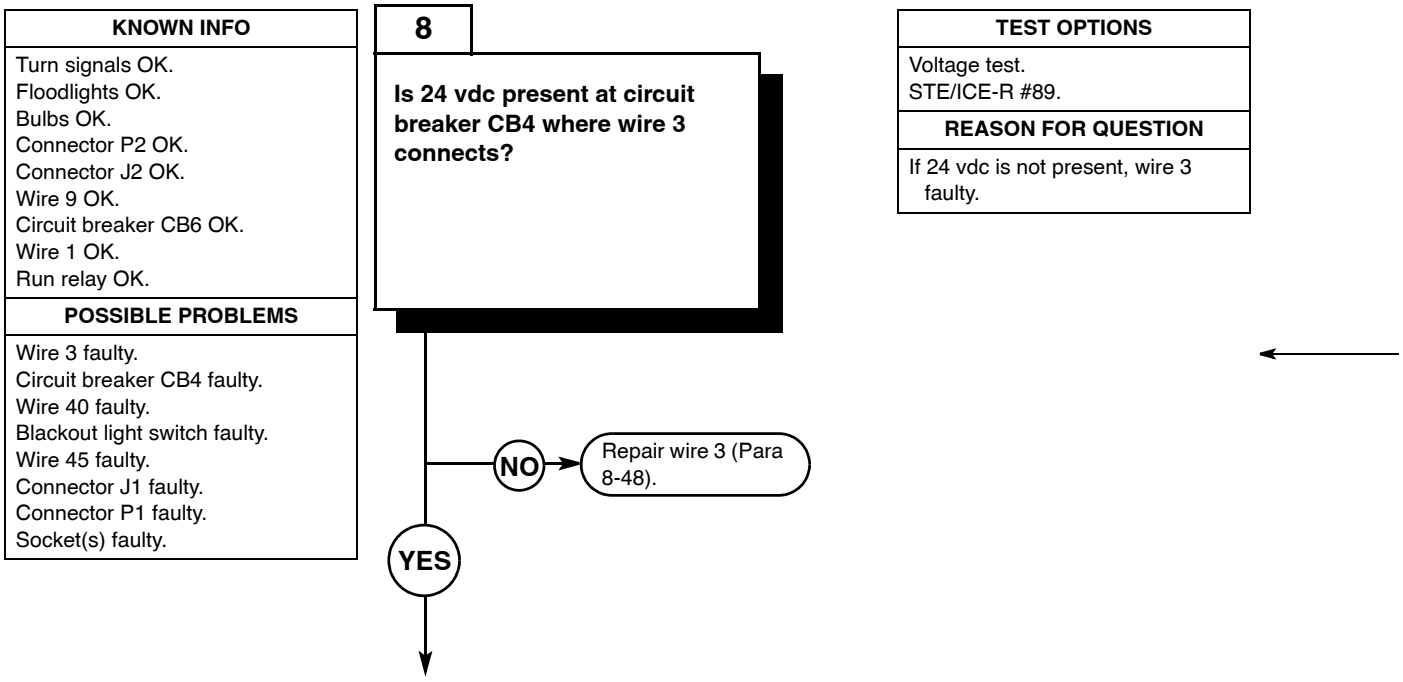
(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to run relay where wire 1 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 7 of this fault.
  (b) If 24 vdc is not present, repair wire 1 (Para 8-48).
(5) Disconnect negative battery cable from negative side of battery (Para 8-42).

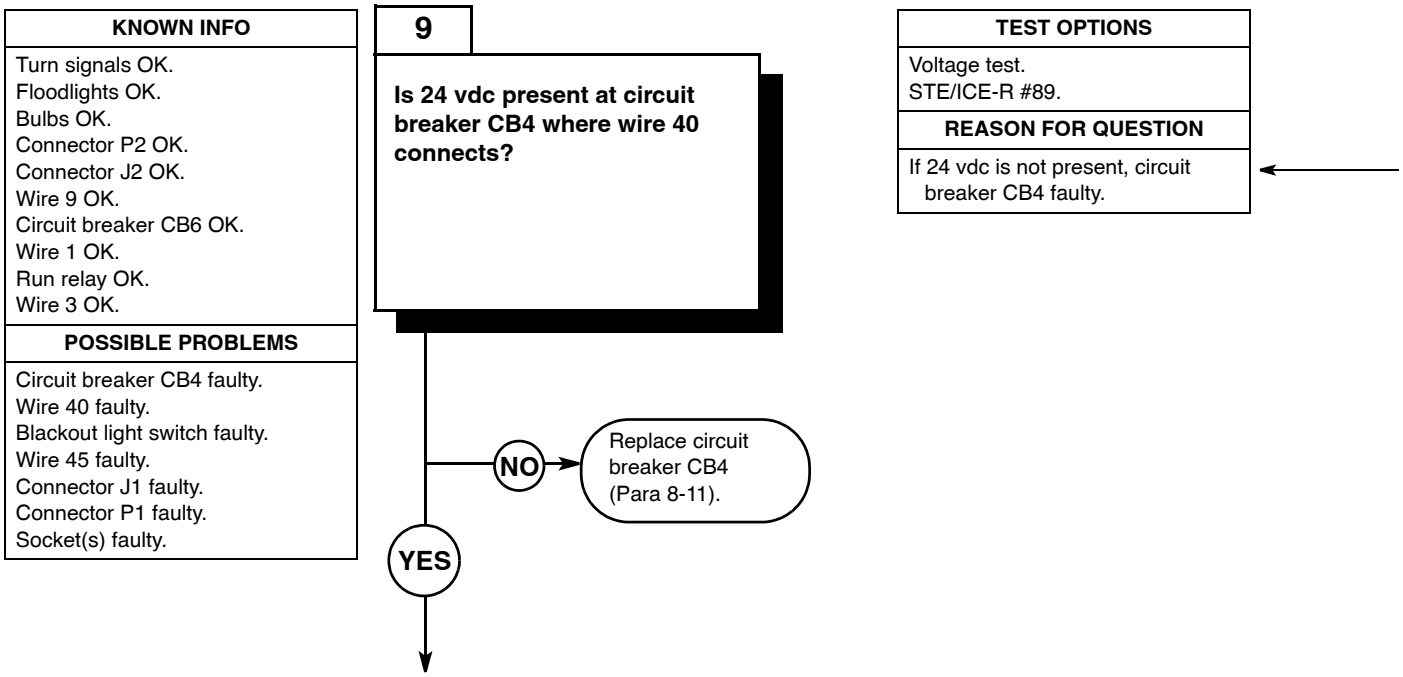


VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to the run relay where wire 3 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 8 of this fault.
  (b) If 24 vdc is not present, replace run relay (Para 8-23).
(6) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).

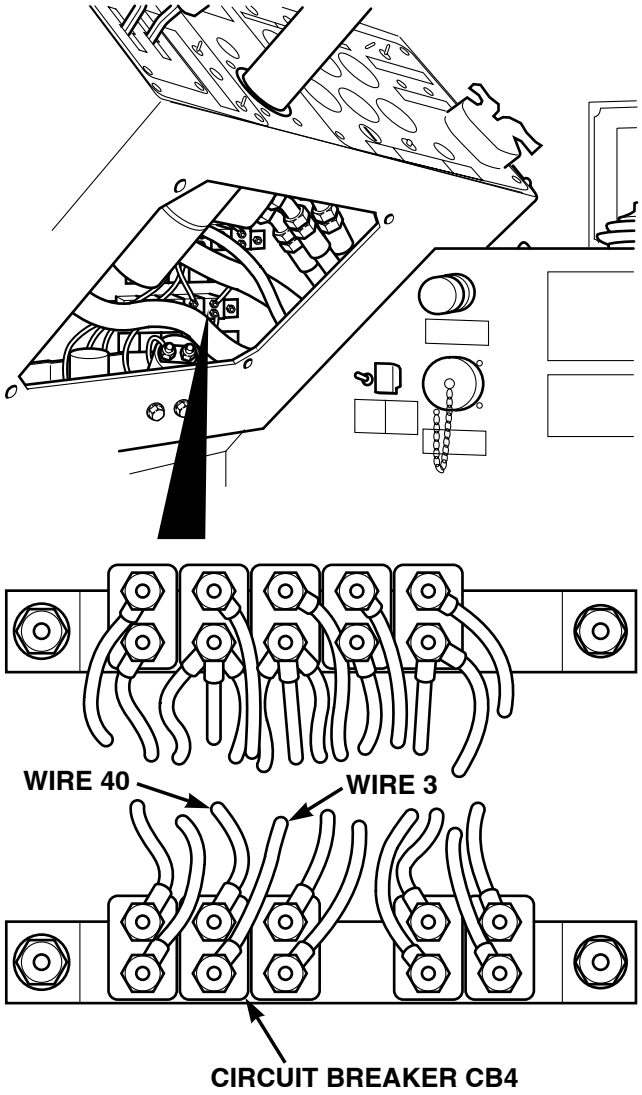
17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).





VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Turn signals OK. Floodlights OK. Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 45 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

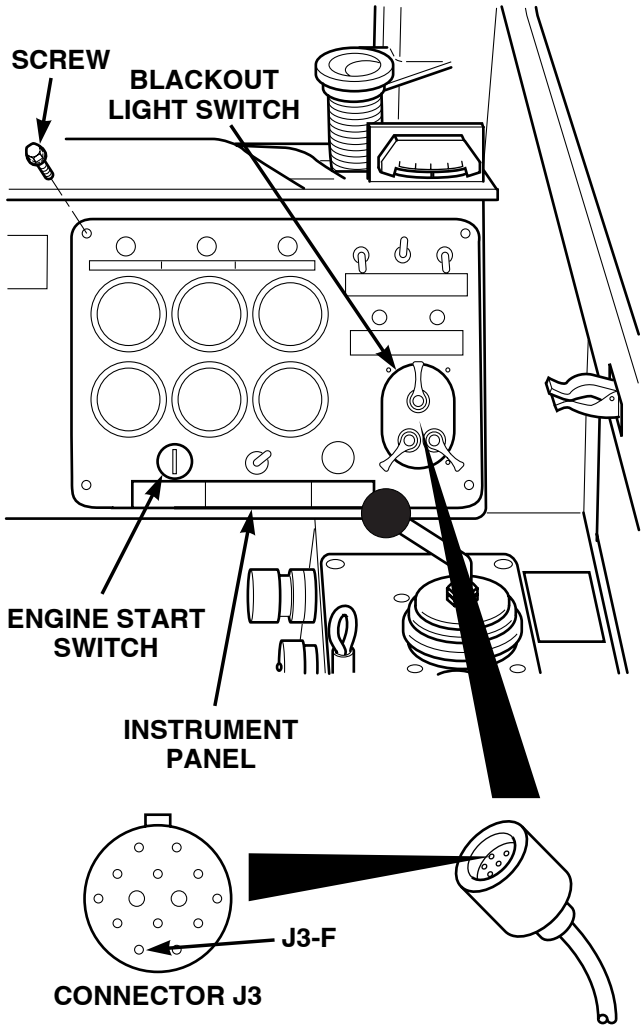
Is 24 vdc present at connector J3-F (wire 40)?

NO → Repair wire 40 (Para 8-48).

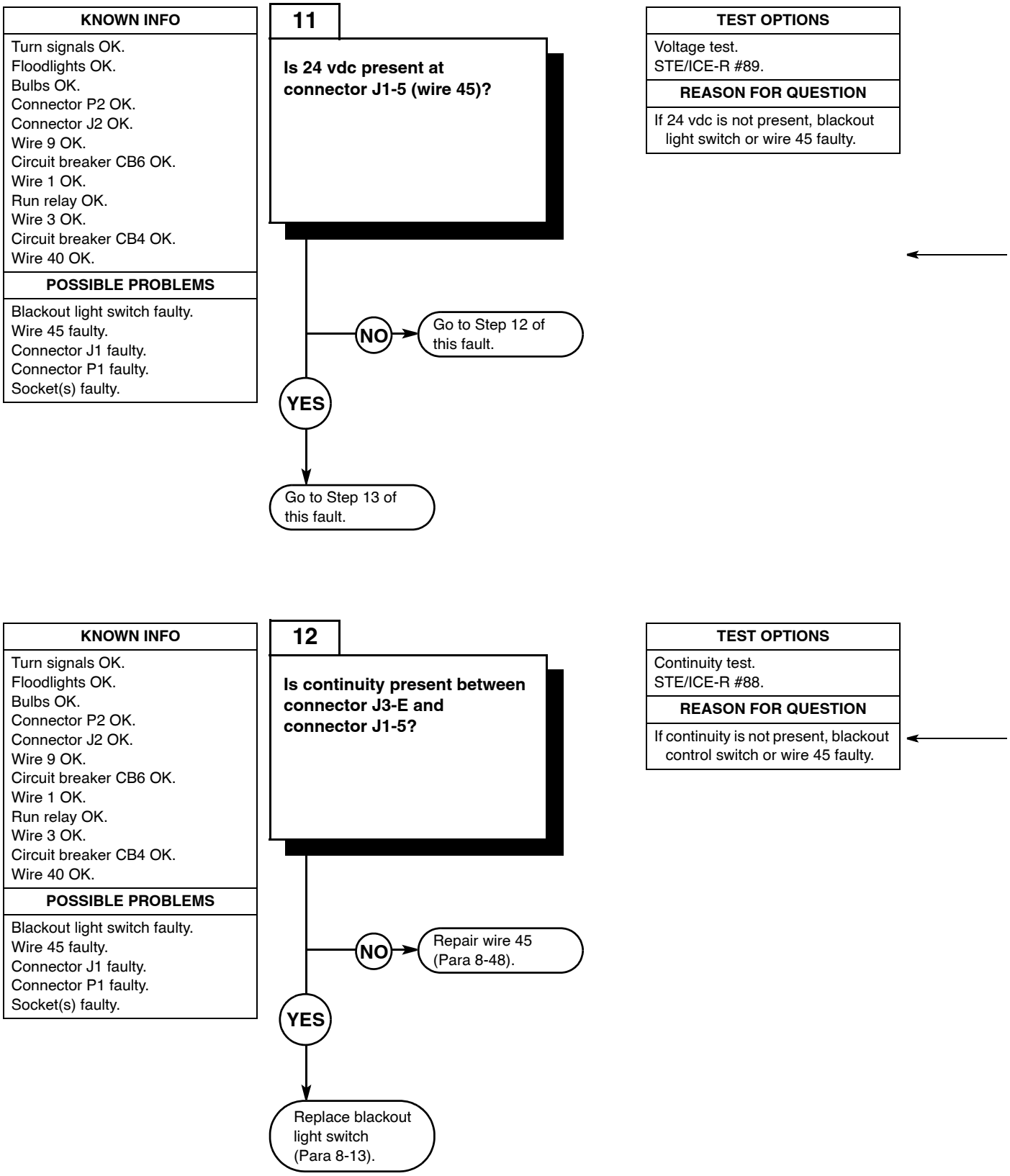
YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 faulty.

VOLTAGE TEST
(1) Remove four screws and instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector J3-F (wire 40). (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 40 (Para 8-48). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Lift instrument panel out to connect connector J3 to blackout light switch. (11) Install instrument panel and four screws.

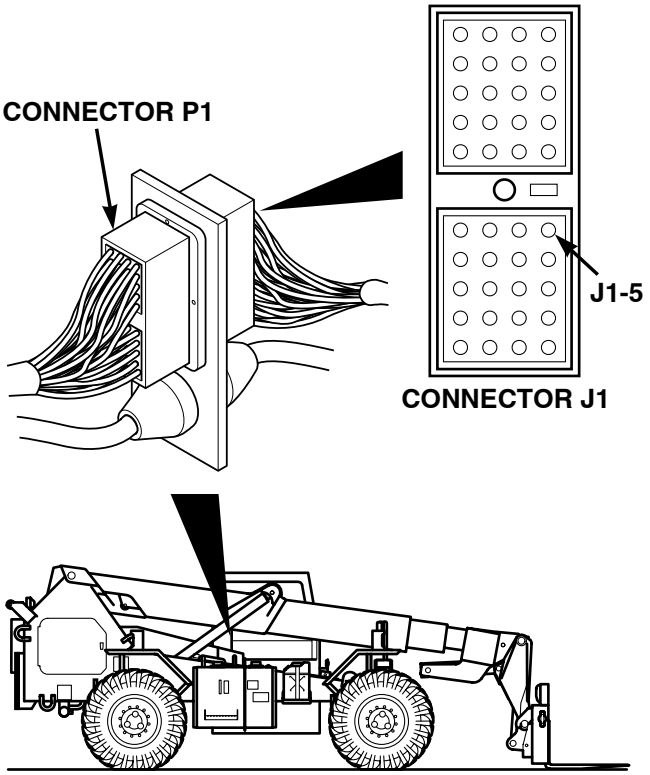


17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).



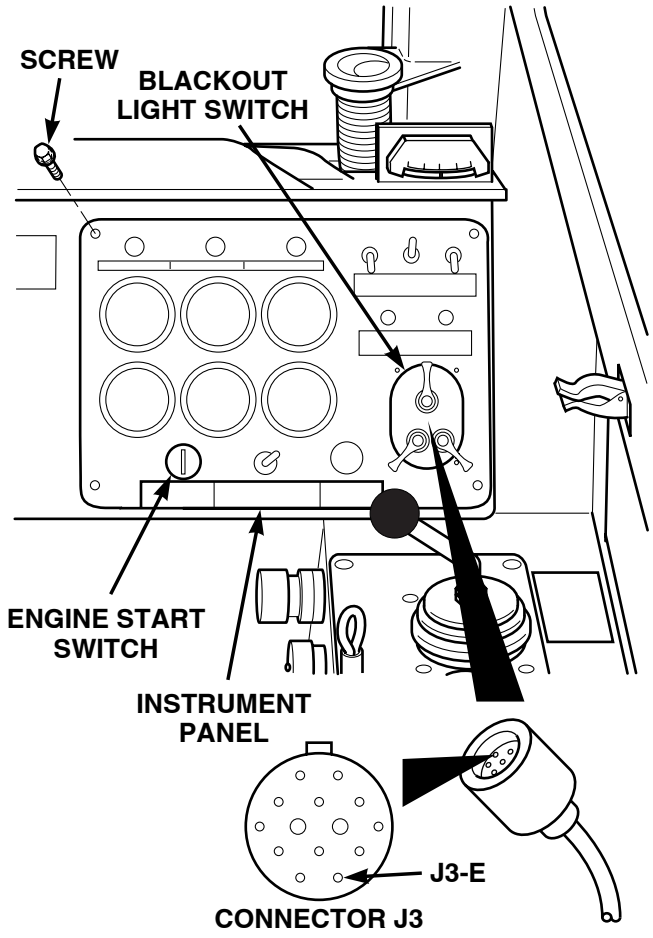
VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Disconnect connector J1 from connector P1.
(3) Connect multimeter positive lead (+) to connector J1-5 (wire 45).
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn blackout light switch to B. O. MARKER position (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 13 of this fault.
  (b) If 24 vdc is not present, go to Step 12 of this fault.
(8) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).

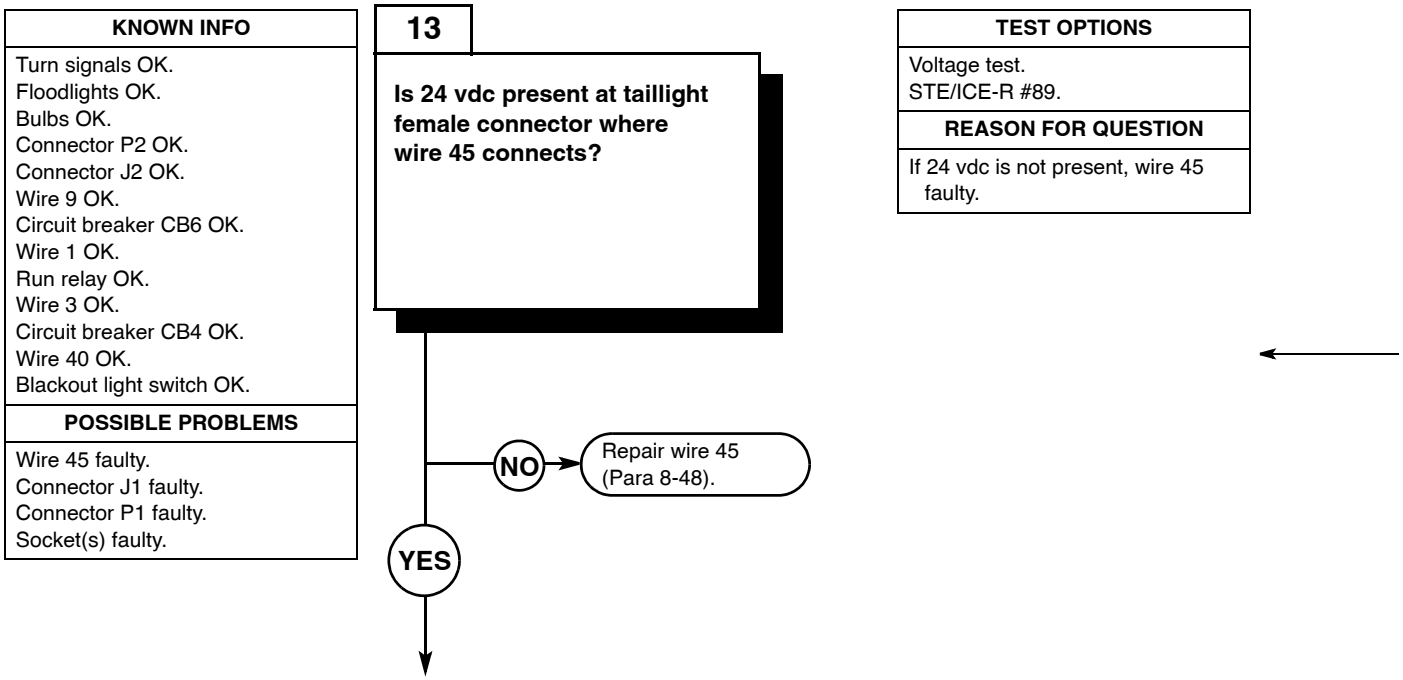


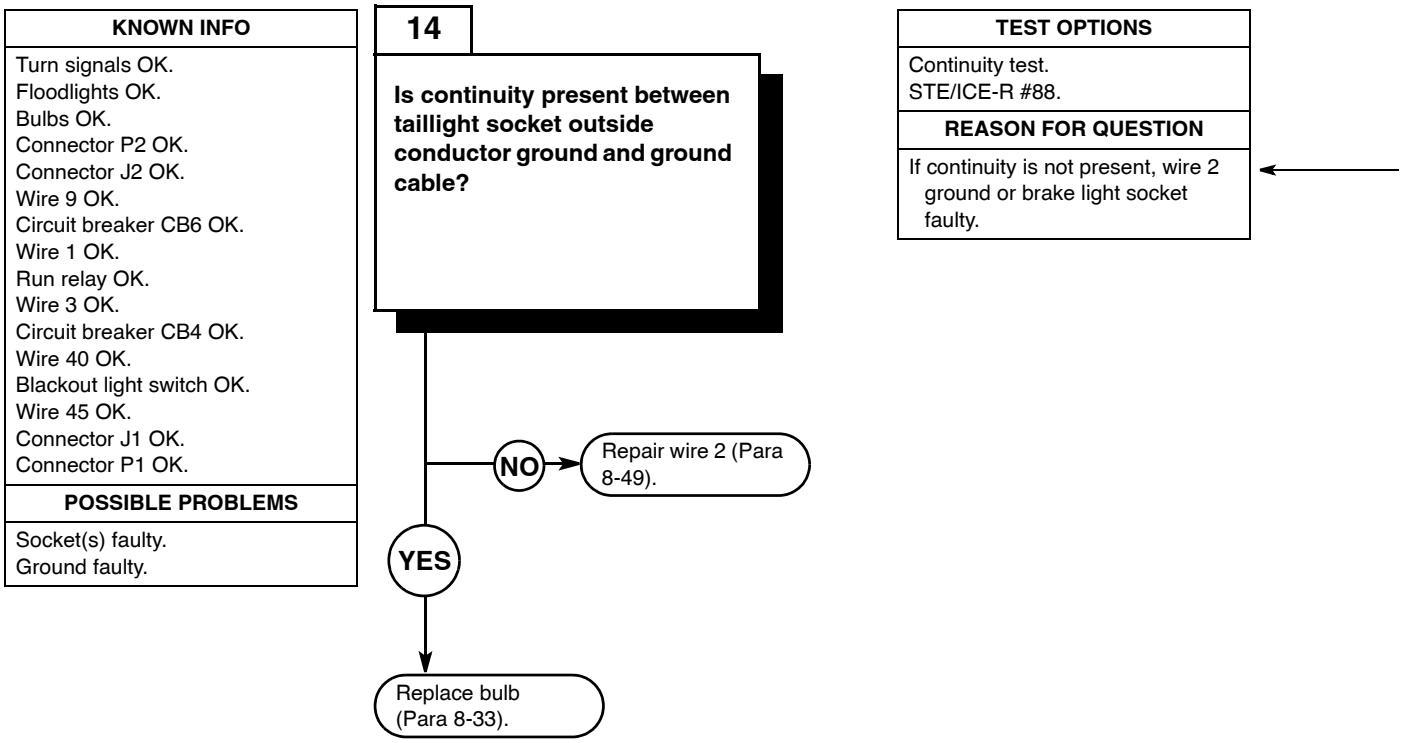
CONTINUITY TEST

(1) Remove four screws and instrument panel.
(2) Lift instrument panel out to remove connector J3 from blackout light switch.
(3) Disconnect connector J1 from connector P1.
(4) Set multimeter to ohms.
(5) Connect multimeter positive lead (+) to connector J3-E (wire 45).
(6) Connect multimeter negative lead (–) to connector J1-5 (wire 45).
  (a) If continuity is present, replace blackout light switch (Para 8-13).
  (b) If continuity is not present, repair wire 45 (Para 8-48).
(7) Lift instrument panel out to connect connector J3 to blackout light switch.
(8) Connect connector J1 to connector P1.
(9) Install instrument panel and four screws.



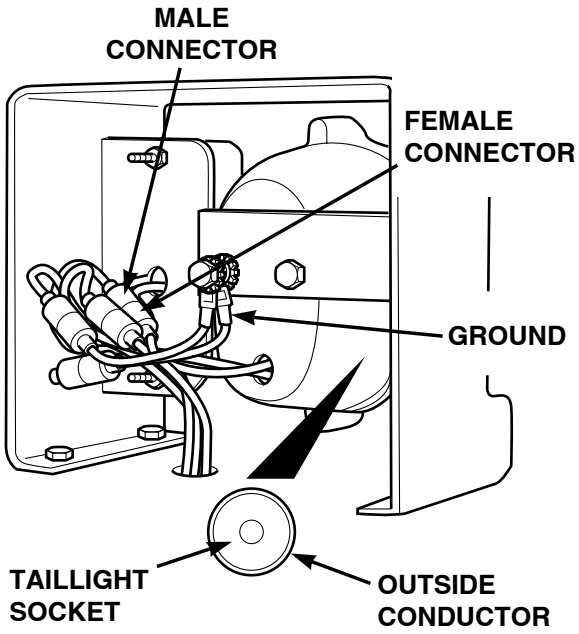
17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).



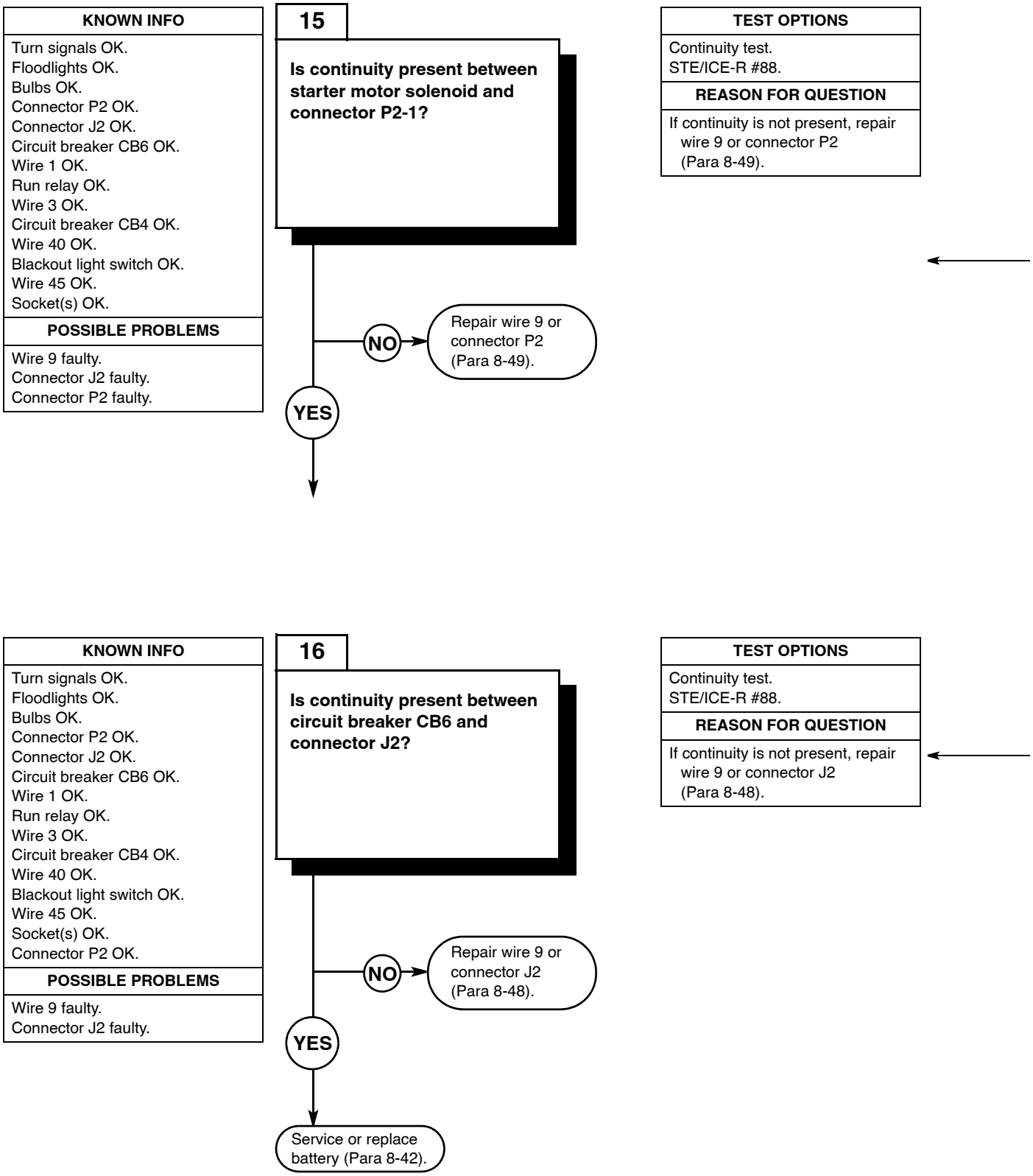


VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to tail light female connector where wire 45 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to B. O. MARKER position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, repair wire 45 (Para 8-48). (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).

CONTINUITY TEST
(1) Disconnect ground female connector from male ground connector. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground outside conductor at taillight socket. (4) Connect multimeter negative lead (–) to ground cable. (a) If continuity is present, replace bulb (Para 8-33). (b) If continuity is not present, repair wire 2 (Para 8-49) or replace blackout tail or marker light socket (Para 8-33).

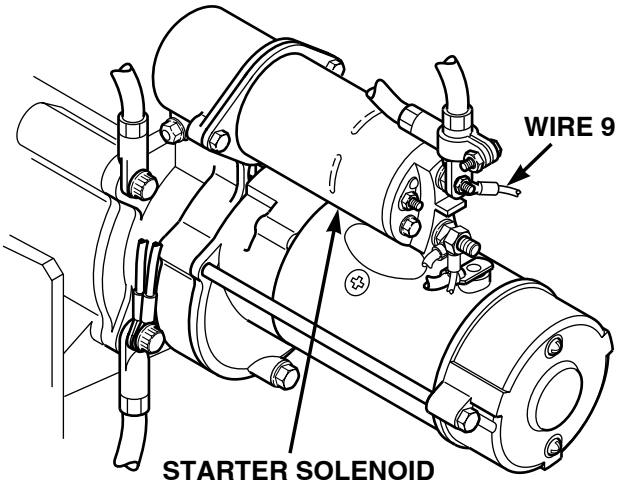


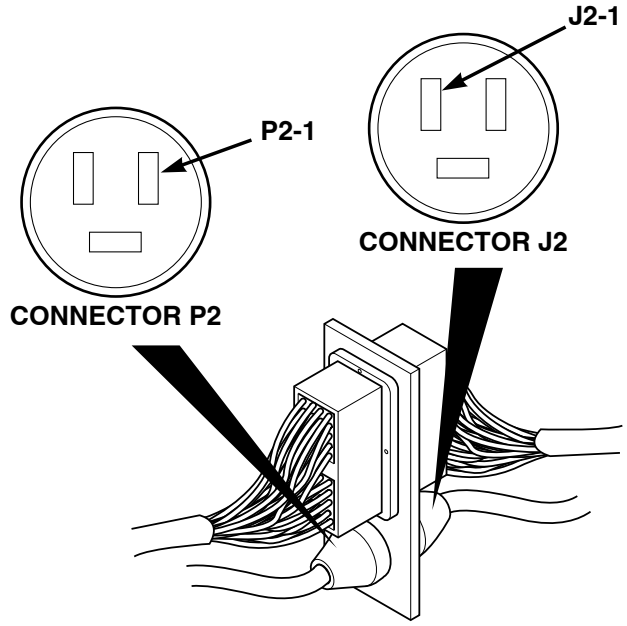
17. BLACKOUT MARKER LIGHT(S) AND/OR TAILLIGHT(S) DO NOT OPERATE (CONT).

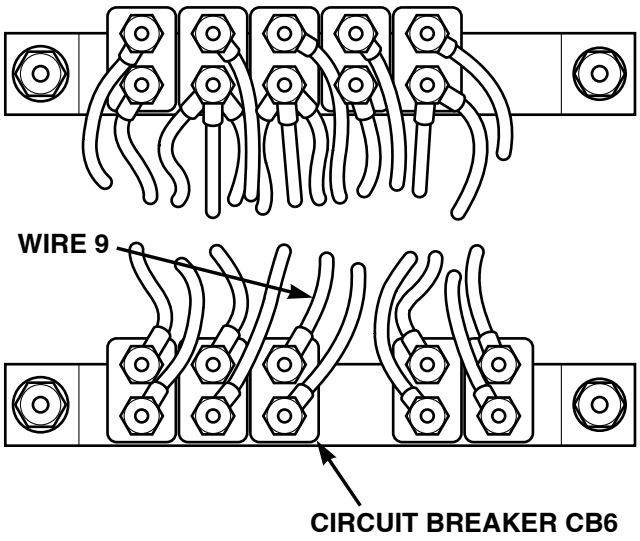


CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (4) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48). (5) Install access panel and four screws. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Install battery cover (Para 8-42).







18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE.

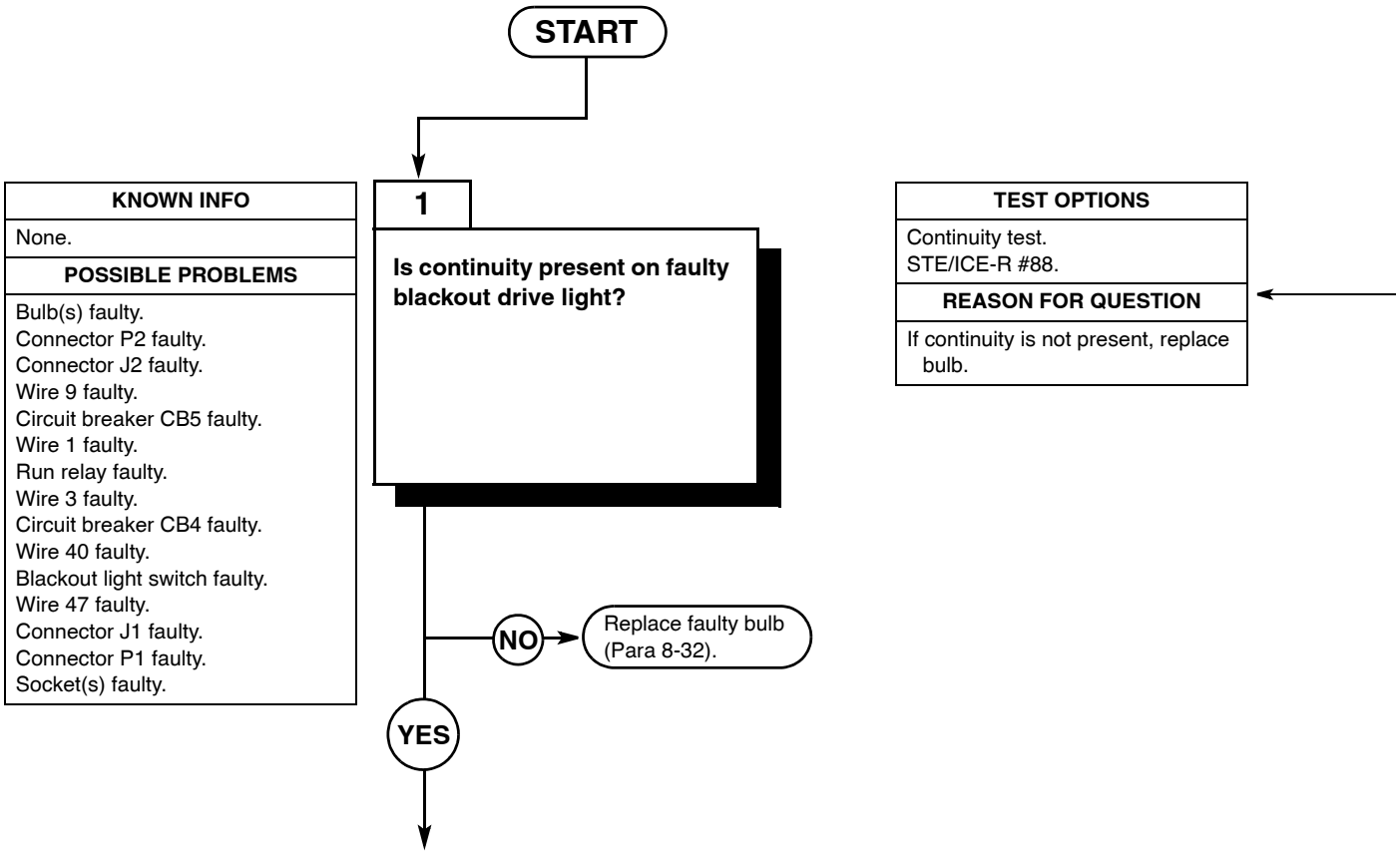
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

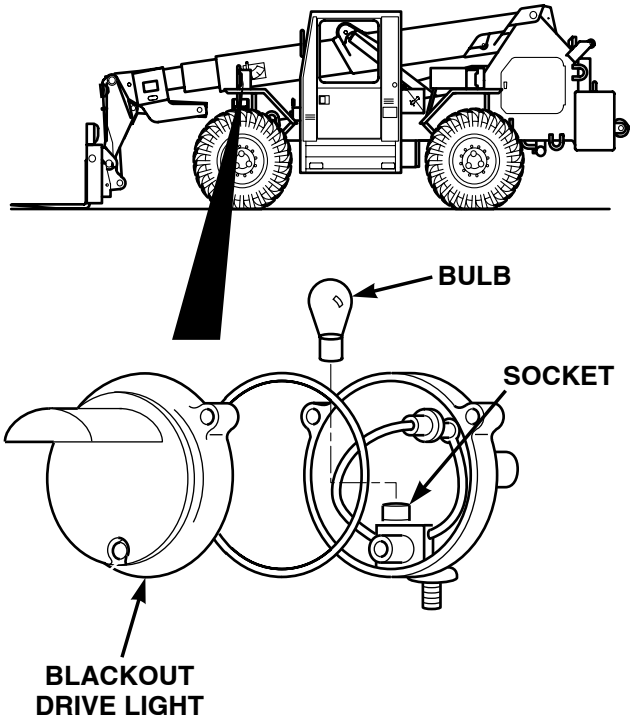
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

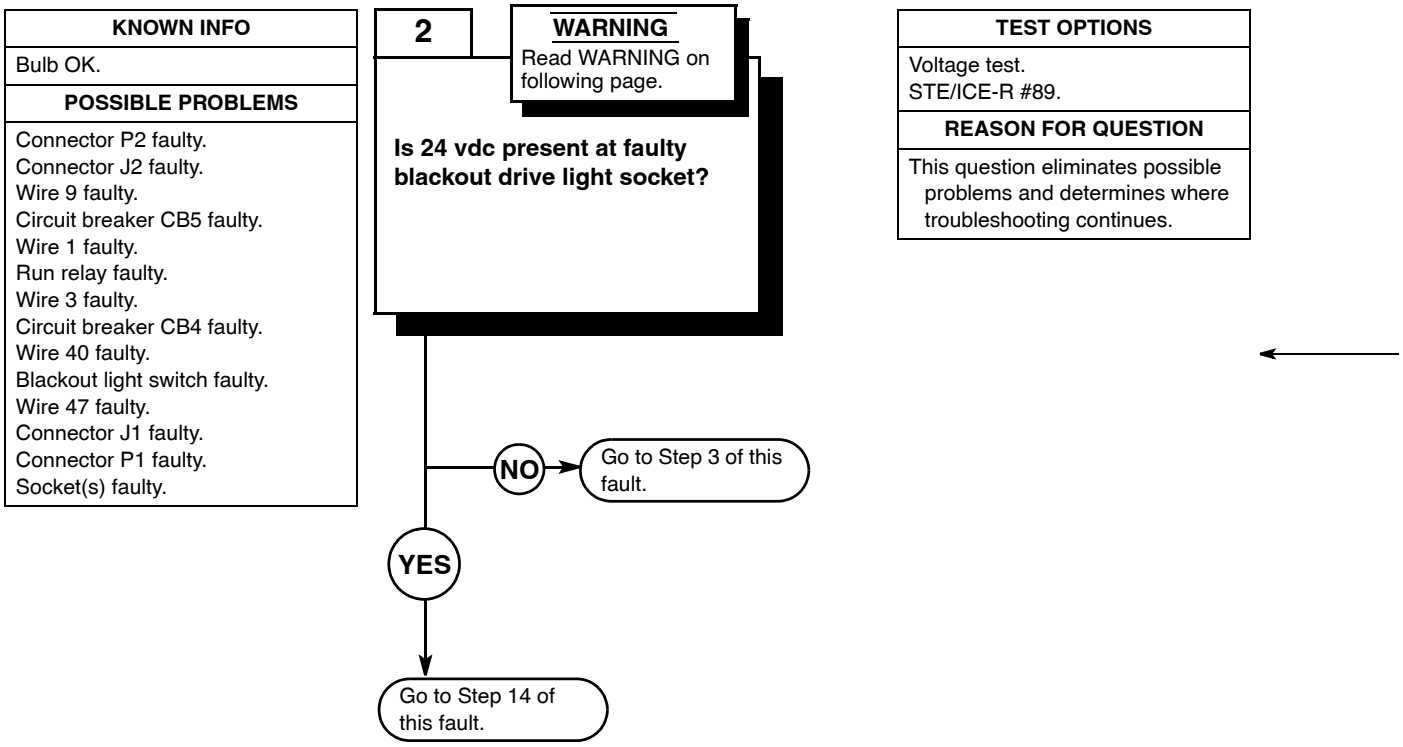
References
TM 10-3930-673-10
TM 9-4910-571-12&P

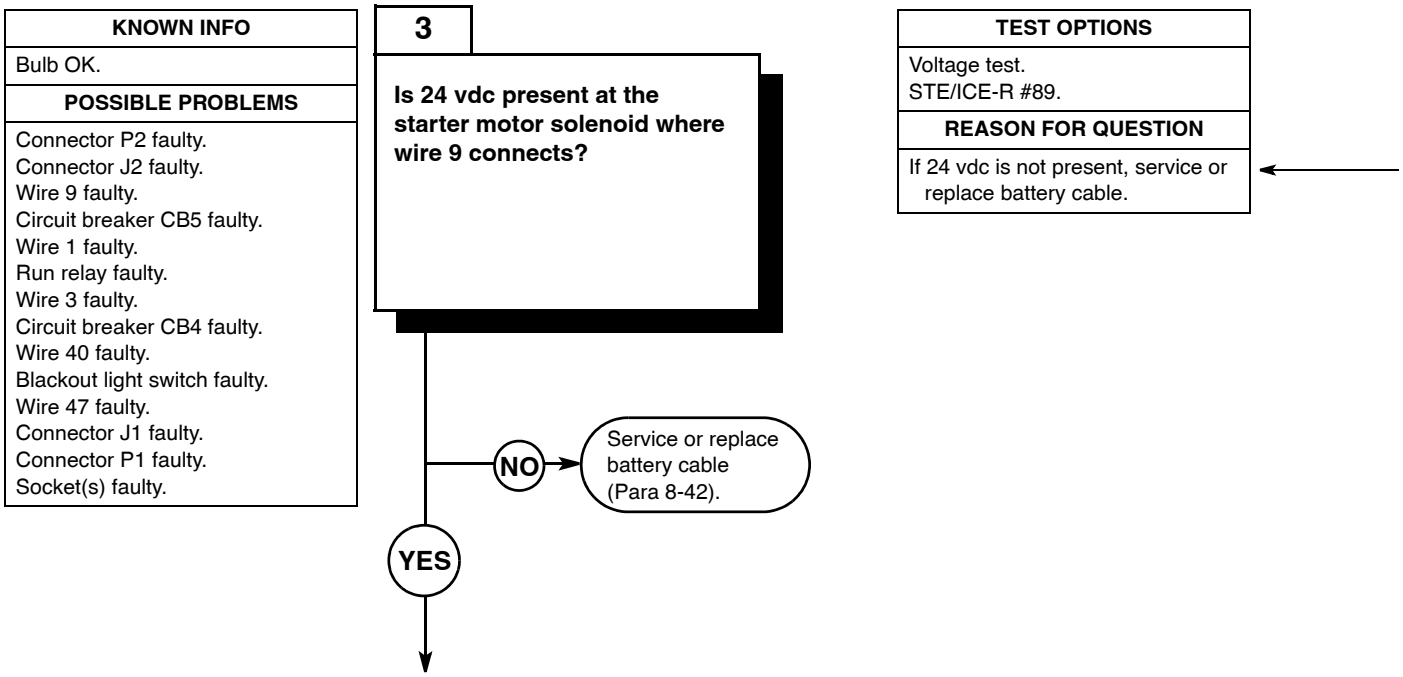


CONTINUITY TEST
(1) Remove bulb from faulty blackout drive light (Para 8-32). (2) Set the multimeter to ohms. (3) Connect multimeter positive lead (+) to the center conductor. (4) Connect multimeter negative lead (–) to the outside conductor. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace faulty bulb (Para 8-32).



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).



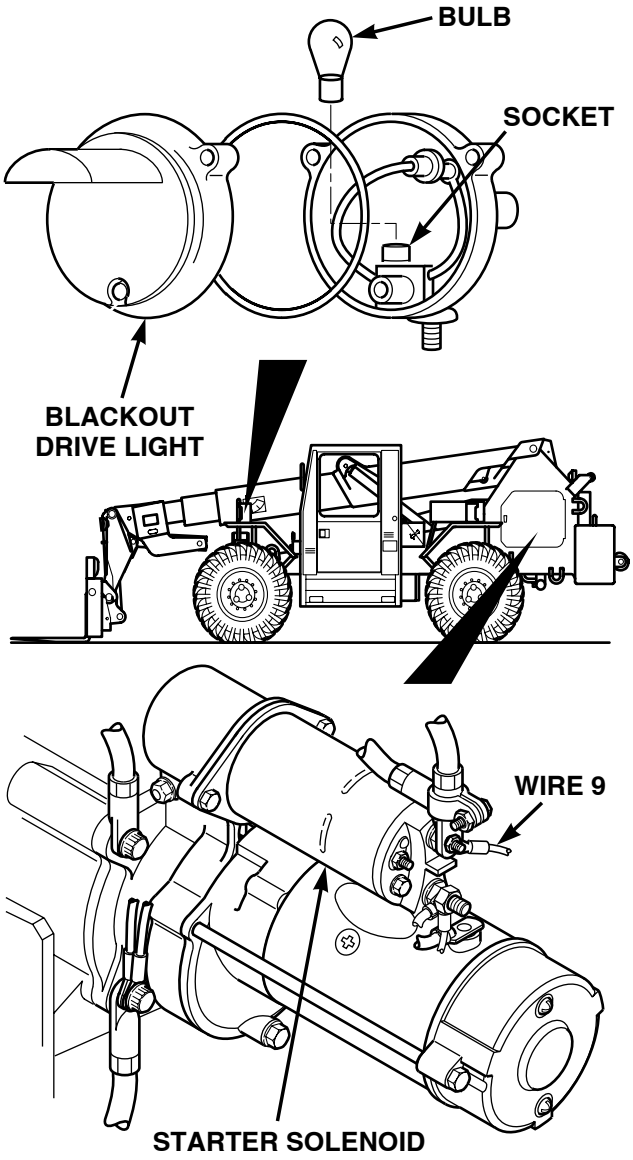


WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to center conductor of faulty socket. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, go to Step 3 of this fault. (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10).

VOLTAGE TEST
(1) Remove battery covers (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to the starter motor solenoid where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, service or replace battery cable (Para 8-42). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB5 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 47 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 is connected?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB5 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 47 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

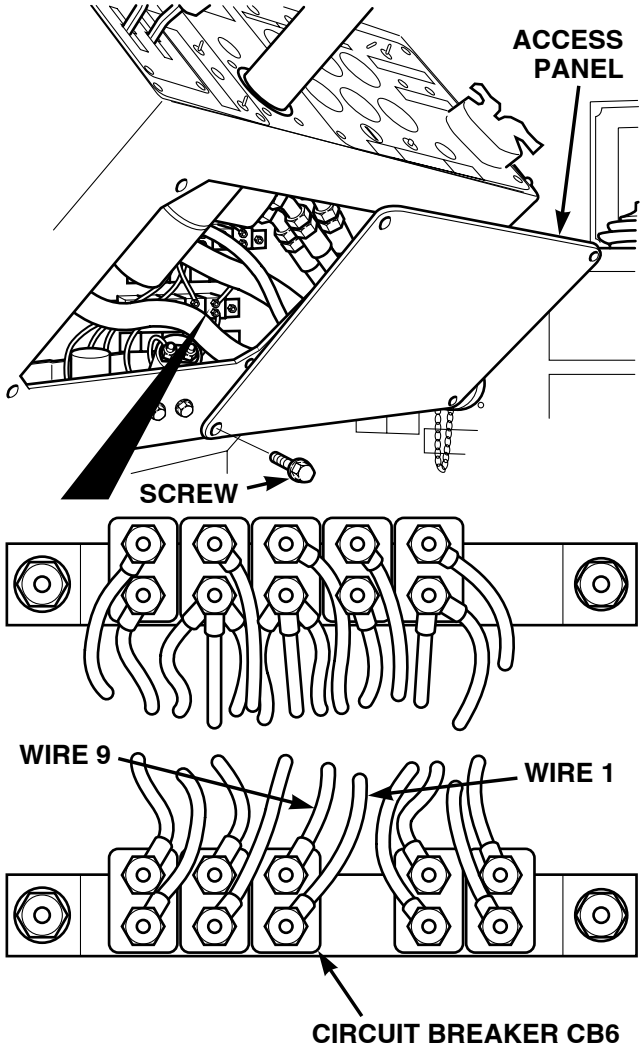
Is 24 vdc present at circuit breaker CB6 where wire 1 is connected?

NO → Replace circuit breaker CB6 (Para 8-11).

YES

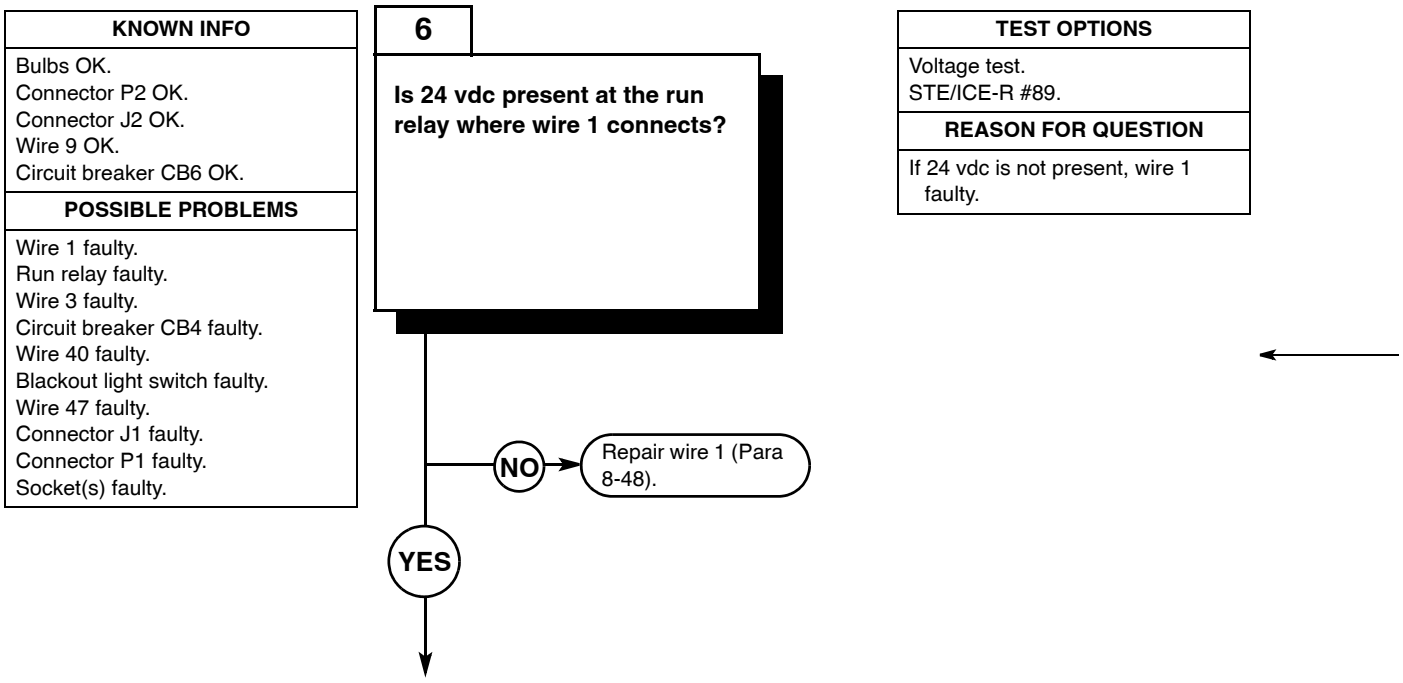
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 faulty.

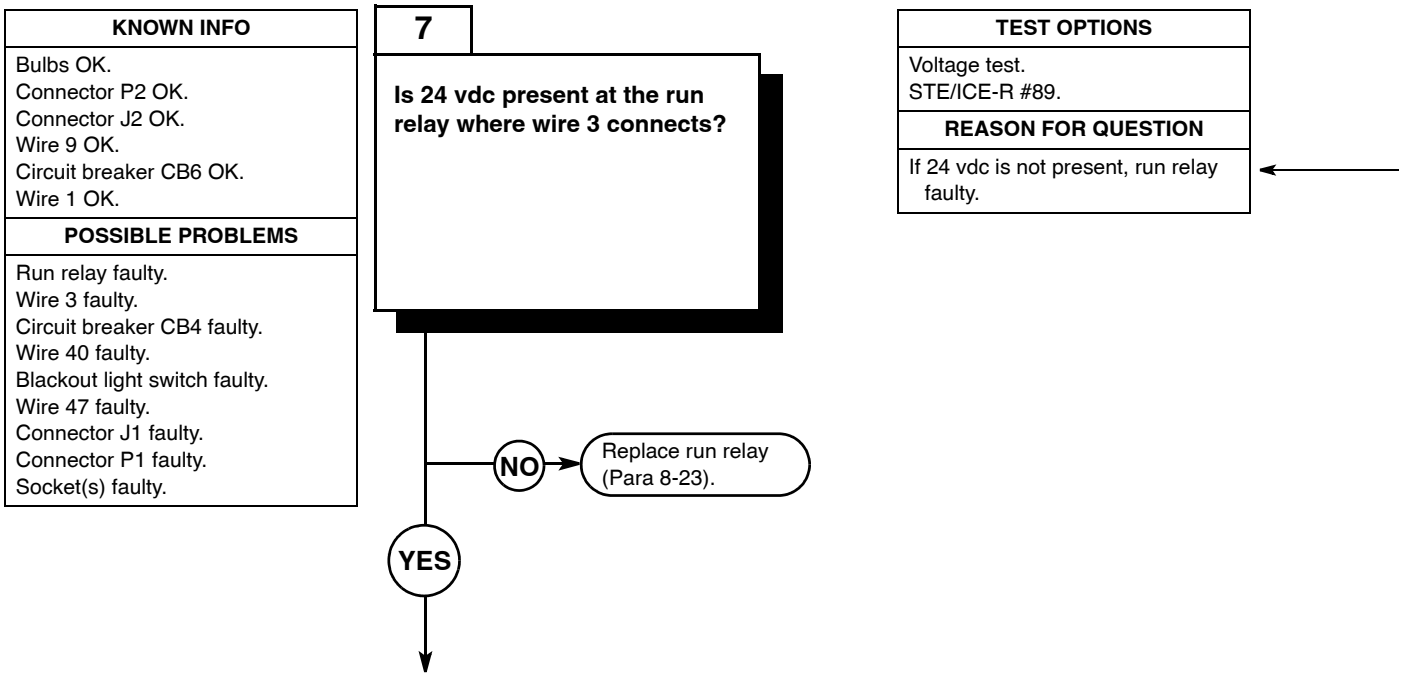
VOLTAGE TEST
(1) Remove four screws and access panel. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 15 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-42).



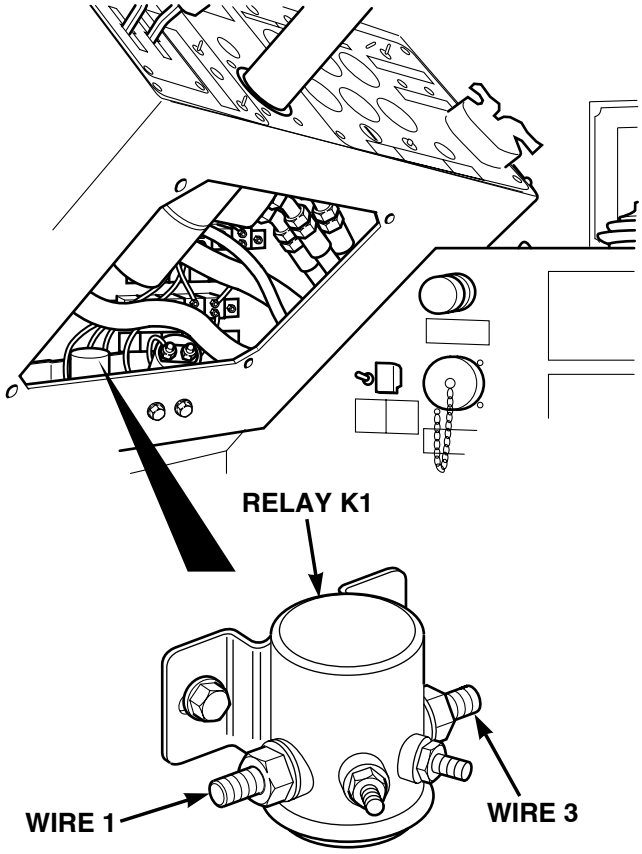
VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect the multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-44).

18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).



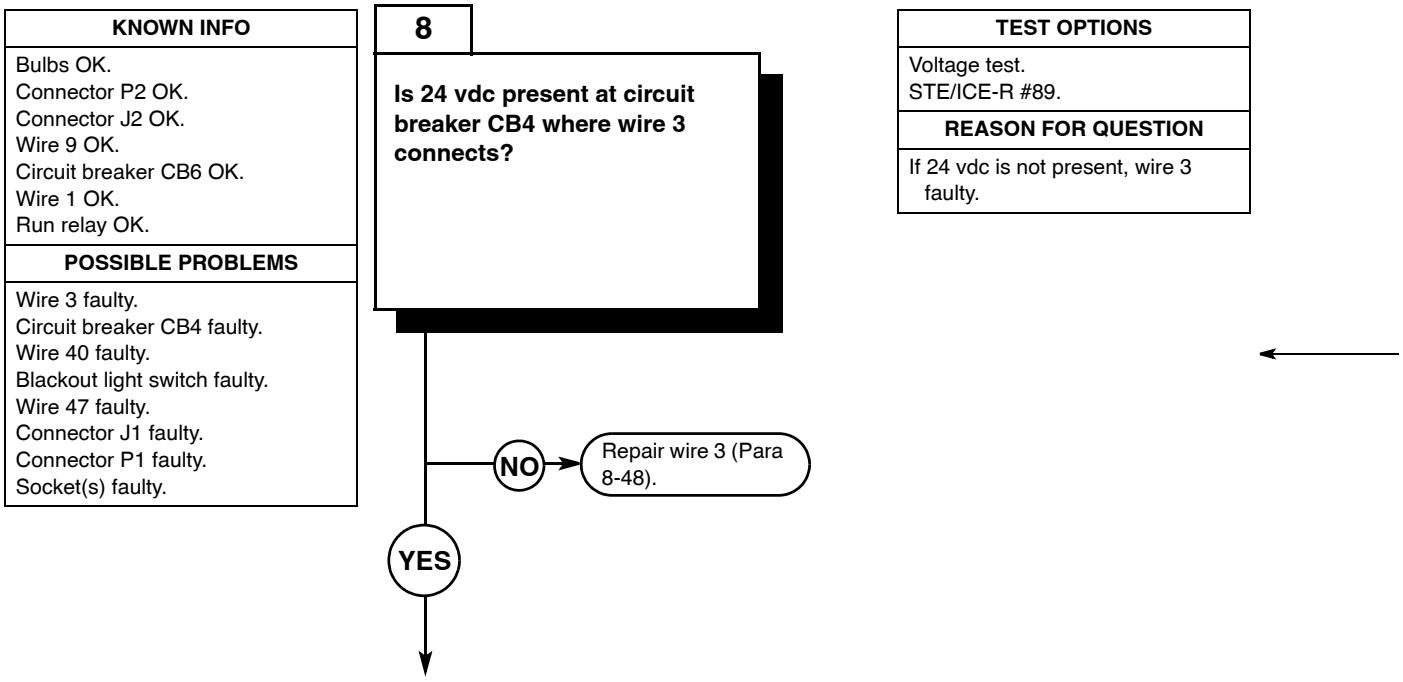


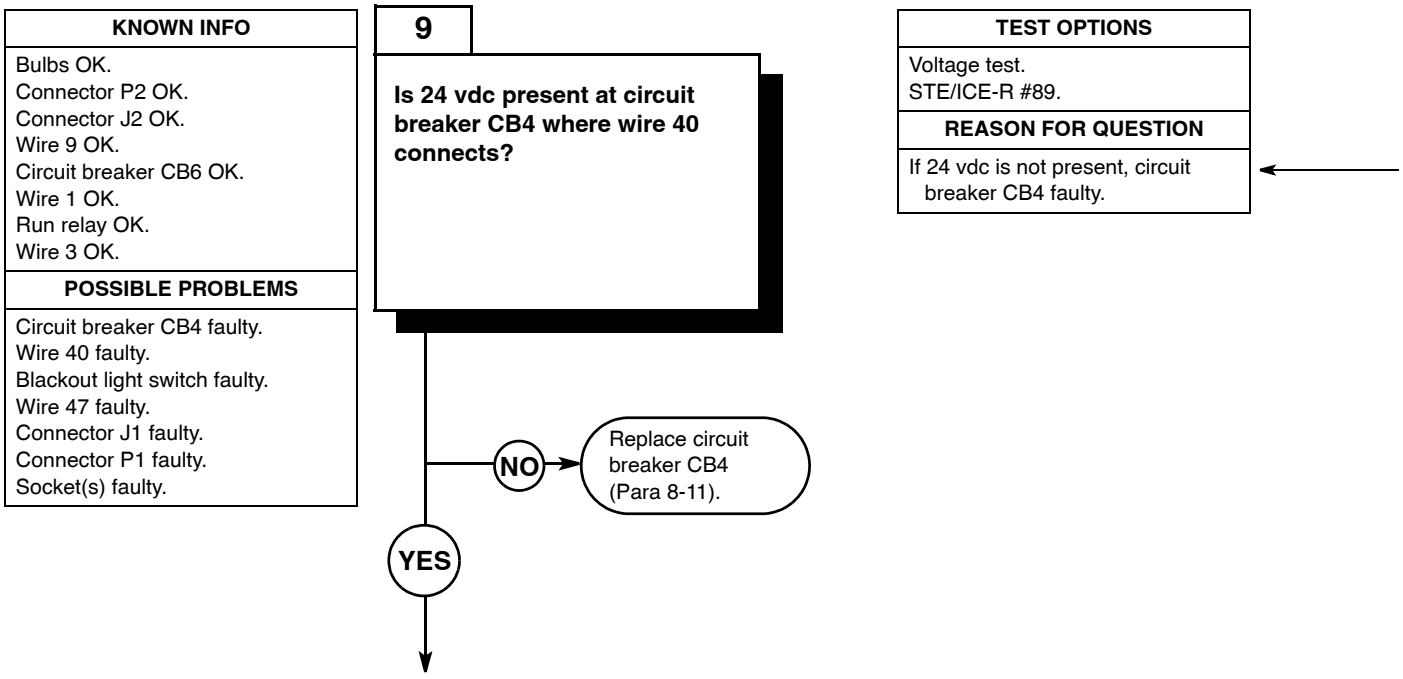
VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to the run relay where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

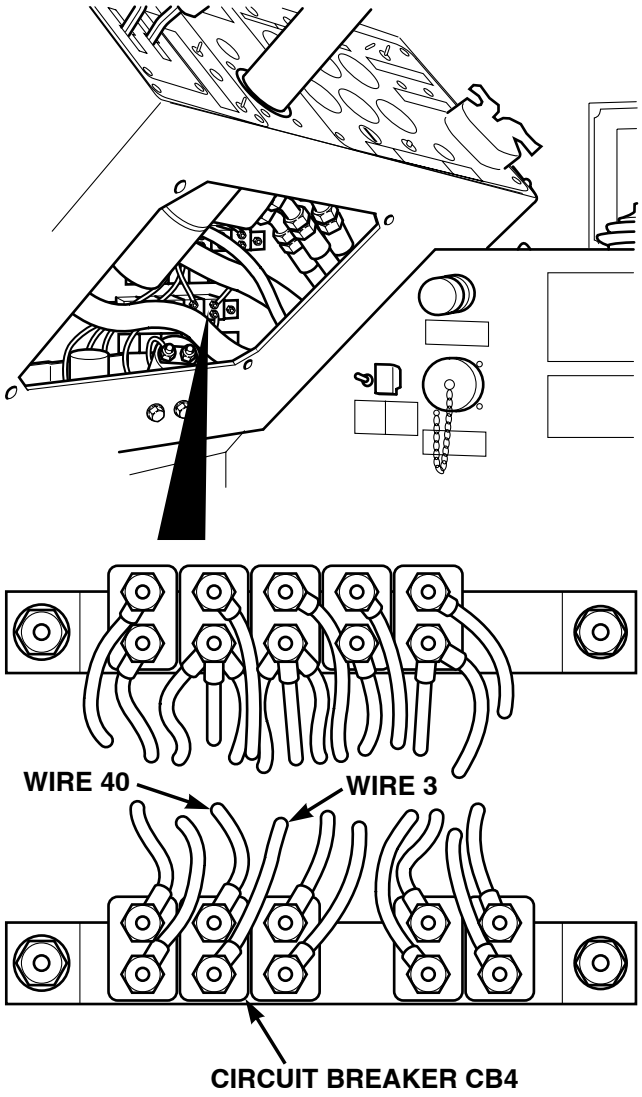
18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).





VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 47 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

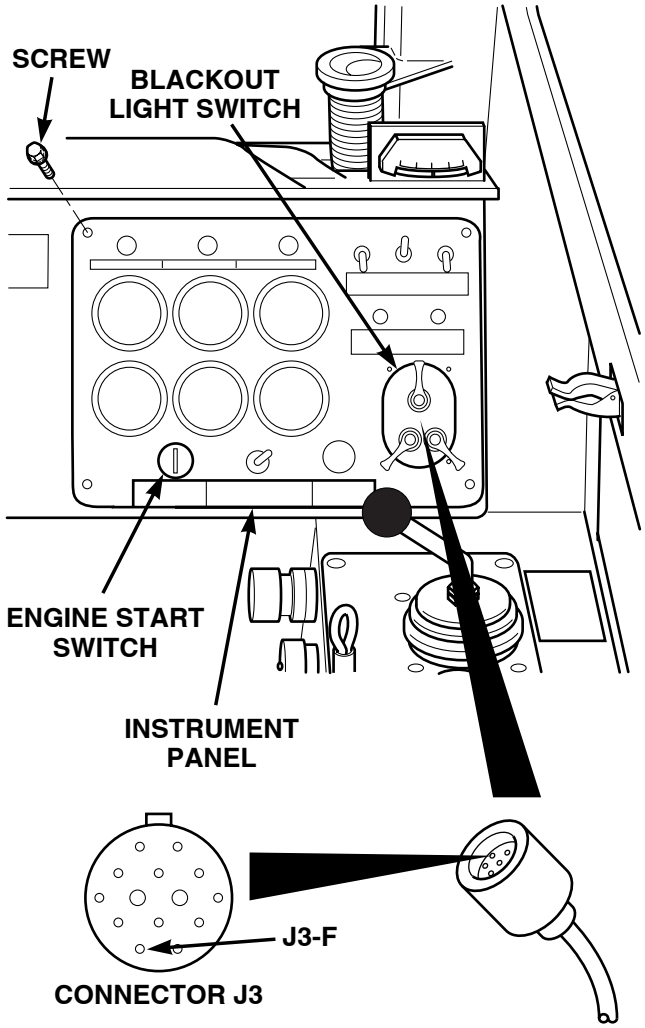
Is 24 vdc present at connector J3-F (wire 40)?

NO → Repair wire 40 (Para 8-48).

YES

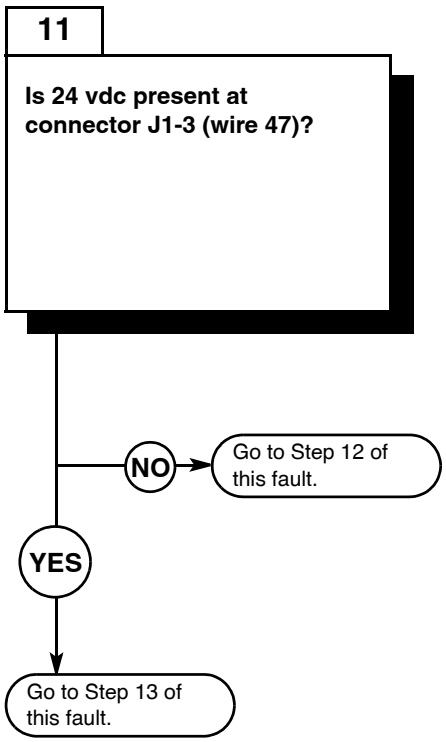
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 faulty.

VOLTAGE TEST
(1) Remove four screws from instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector J3-F (wire 40). (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 40 (Para 8-48). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Lift instrument panel out to connect connector J3 to blackout light switch). (11) Install four screws to secure instrument panel.



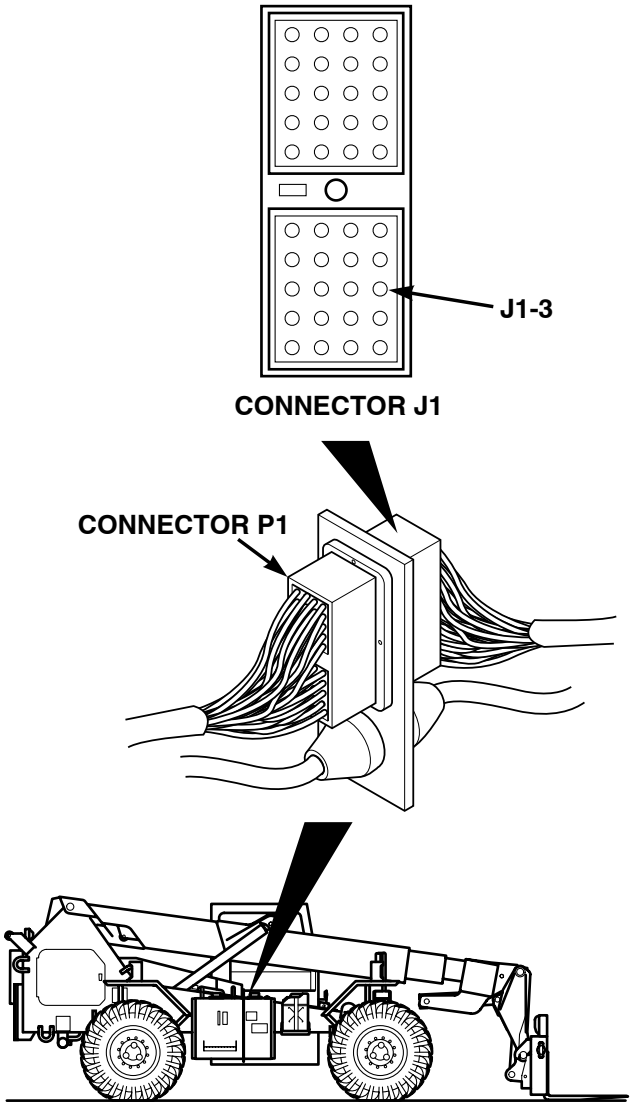
18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 47 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.



TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout light switch or wire 47 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect connector J1 from connector P1. (3) Connect multimeter positive lead (+) to connector J1-3 (wire 47). (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 13 of this fault. (b) If 24 vdc is not present, go to Step 12 of this fault. (8) Turn blackout light switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position, (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 47 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

12

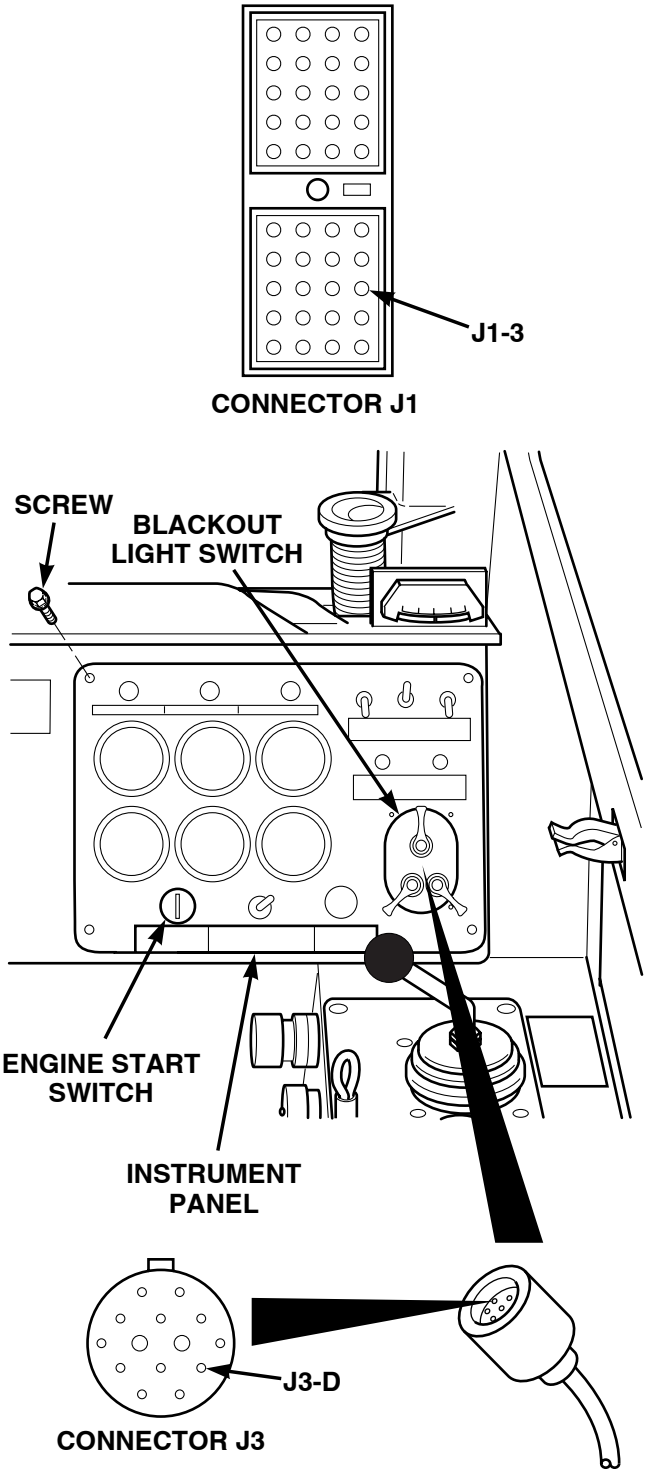
Is continuity present between connector J3-D and connector J1-3?

NO → Repair wire 47 (Para 8-48).

YES → Replace blackout light switch (Para 8-13).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, blackout control switch or wire 47 faulty.

CONTINUITY TEST
(1) Remove four screws from instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Disconnect connector J1 from connector P1. (4) Set multimeter to ohms. (5) Connect multimeter positive lead (+) to connector J3-D (wire 47). (6) Connect multimeter negative lead (–) to connector J1-3 (wire 47). (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 47 (Para 8-48). (7) Lift instrument panel out to connect connector J3 to blackout light switch. (8) Connect connector J1 to connector P1. (9) Install four screws to secure instrument panel.



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK.
POSSIBLE PROBLEMS
Wire 47 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

13

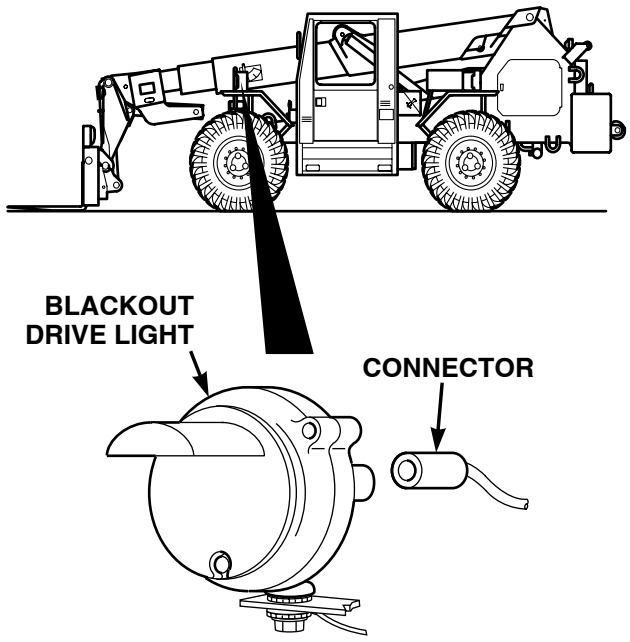
Is 24 vdc present at blackout drive light female connector where wire 47 connects?

NO → Repair wire 47 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 47 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to blackout drive light female connector where wire 46 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, repair wire 47 (Para 8-48). (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 47 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Socket(s) faulty. Ground faulty.

14

Is continuity present between blackout drive light socket outside conductor ground and ground cable?

NO → Repair wire 2 (Para 8-49).

YES → Replace bulb (Para 8-32).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 2 ground or brake light socket faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Blackout light switch OK. Wire 47 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

15

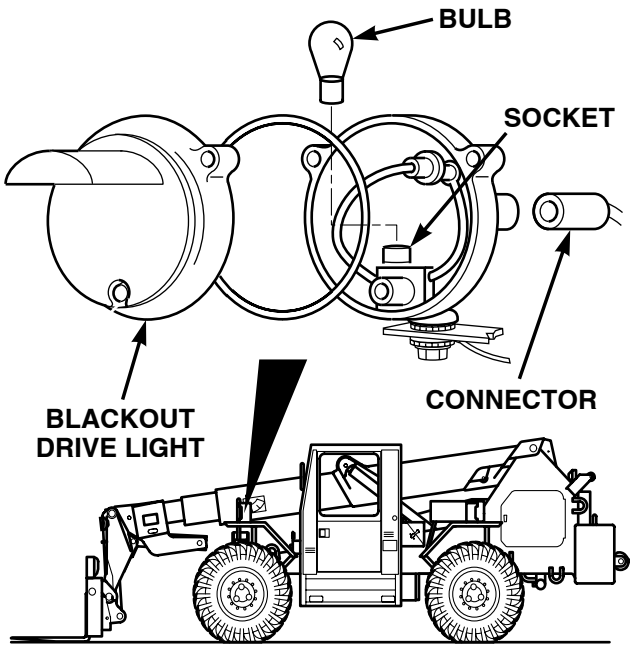
Is continuity present between starter motor solenoid and connector P2-1?

NO → Repair wire 9 or connector P2 (Para 8-49).

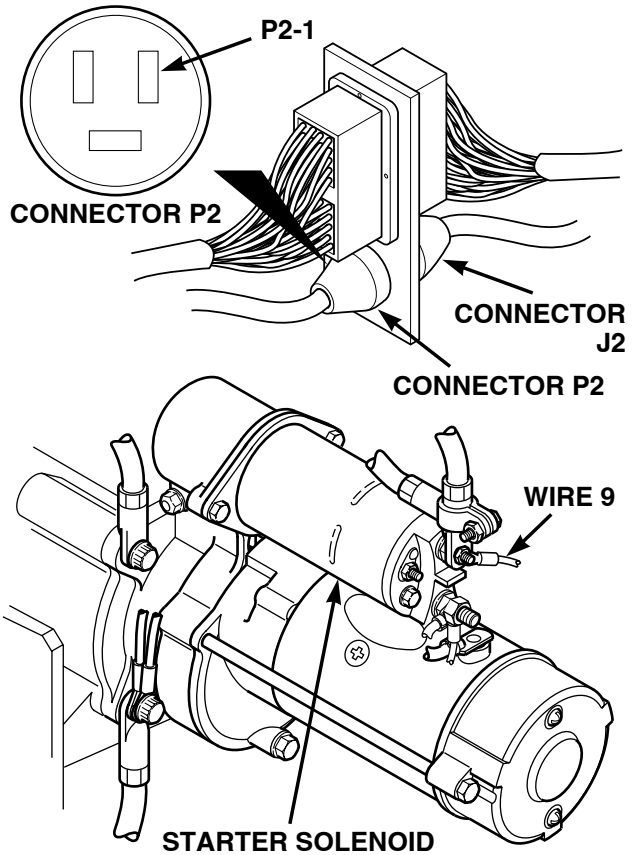
YES → Go to Step 16 of this fault.

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair wire 9 or connector P2 (Para 8-49).

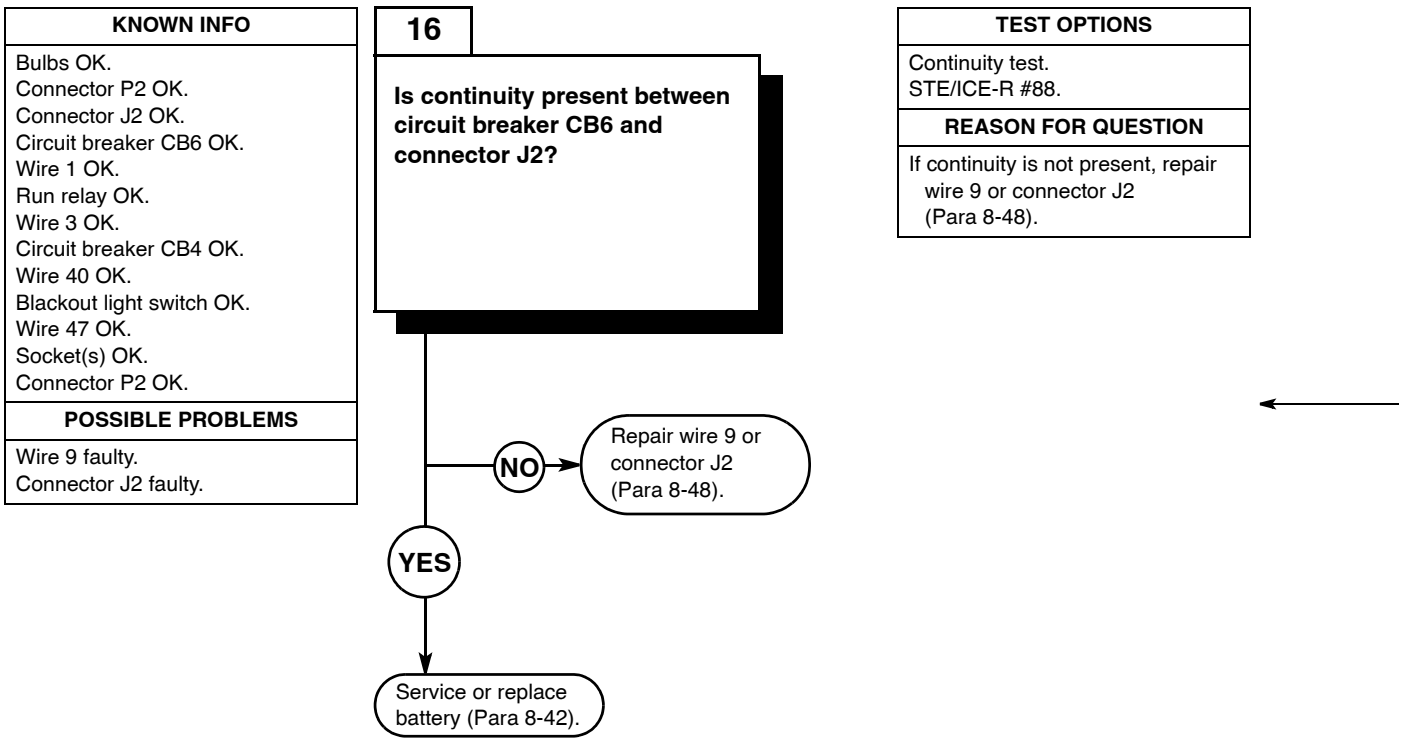
CONTINUITY TEST
(1) Disconnect ground female connector from male ground connector. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground outside conductor at blackout drive light socket. (4) Connect multimeter negative lead (–) to ground cable. (a) If continuity is present, replace bulb (Para 8-32). (b) If continuity is not present, repair wire 2 (Para 8-49) or replace blackout brake light socket (Para 8-32).



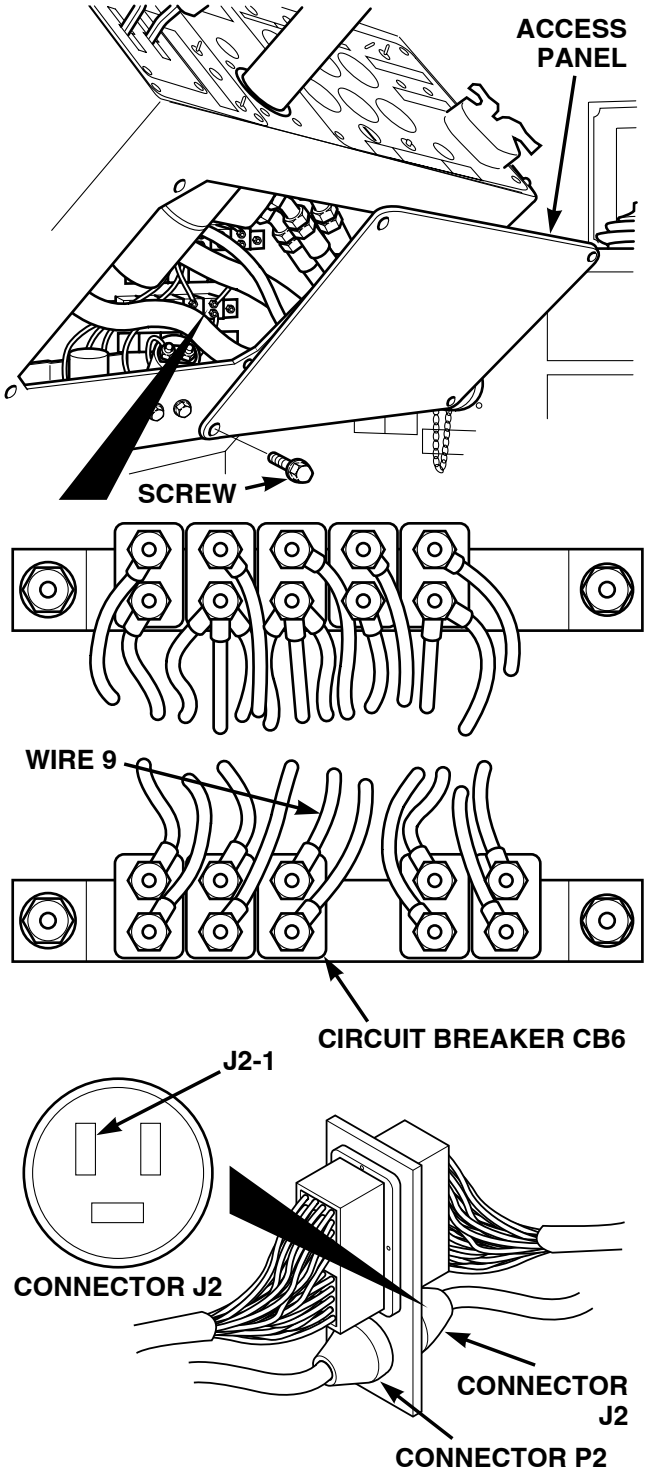
CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).



18. BLACKOUT DRIVE LIGHT(S) DO NOT OPERATE (CONT).



CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (4) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-48). (5) Install access panel and four screws. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Install battery cover (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE.

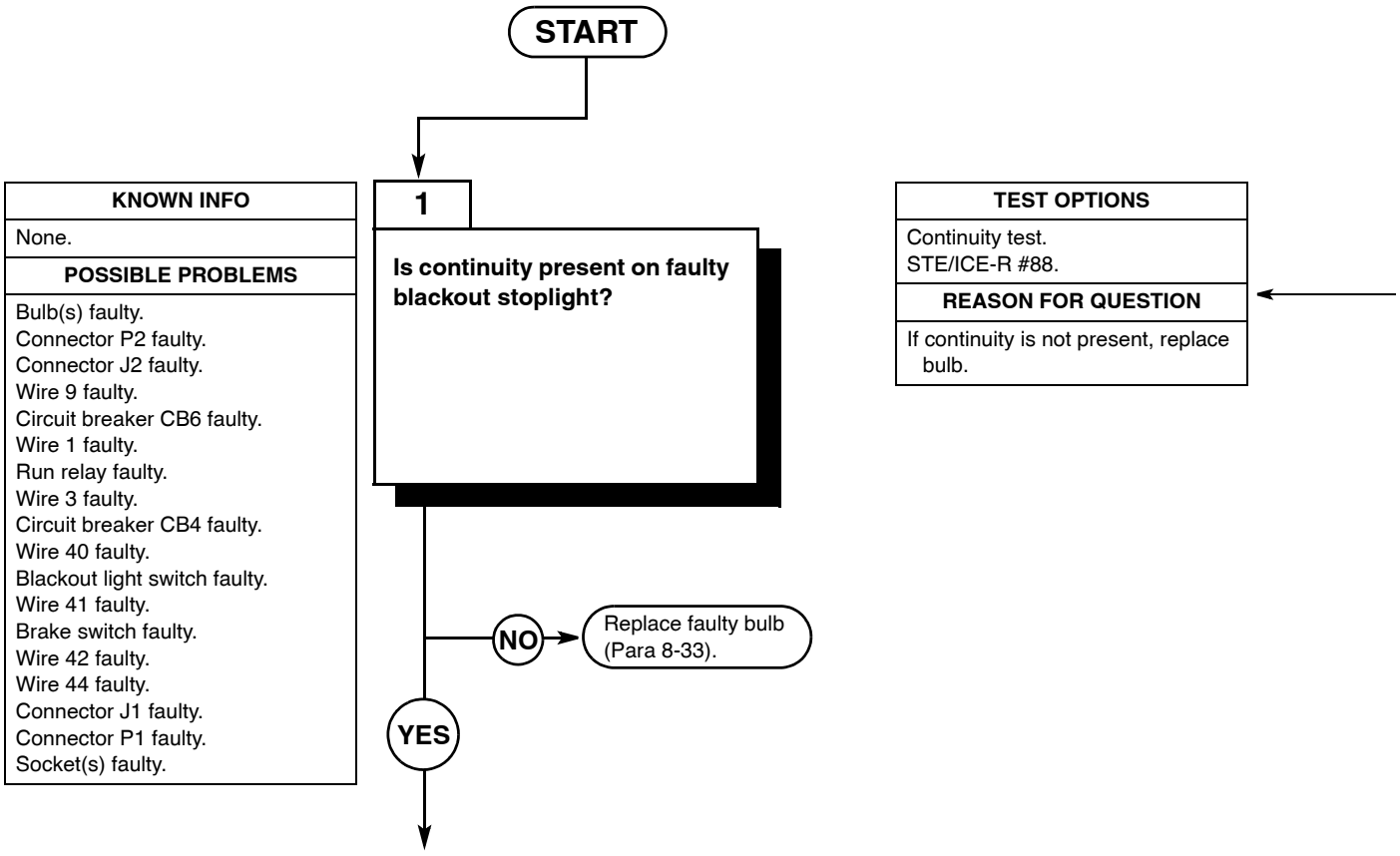
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

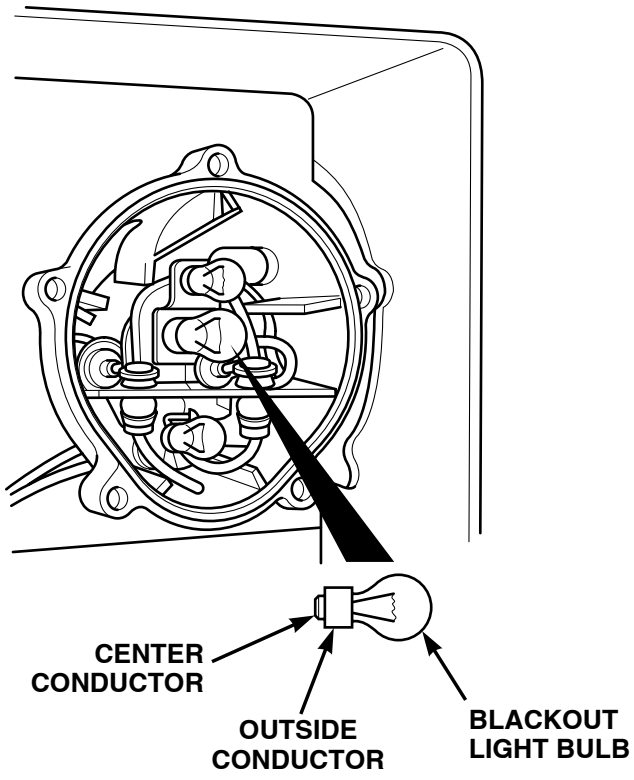
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



CONTINUITY TEST
(1) Remove bulb from faulty blackout stop light (Para 8-33). (2) Set the multimeter to ohms. (3) Connect multimeter positive lead (+) to the center conductor. (4) Connect multimeter negative lead (–) to the outside conductor. (a) If continuity is present, go to Step 2 of this fault. (b) If continuity is not present, replace faulty bulb (Para 8-33).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulb OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at faulty blackout brake light socket?

NO → Go to Step 3 of this fault.

YES → Go to Step 17 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulb OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

3

Is 24 vdc present at starter motor solenoid where wire 9 connects?

NO → Service or replace battery cable (Para 8-42).

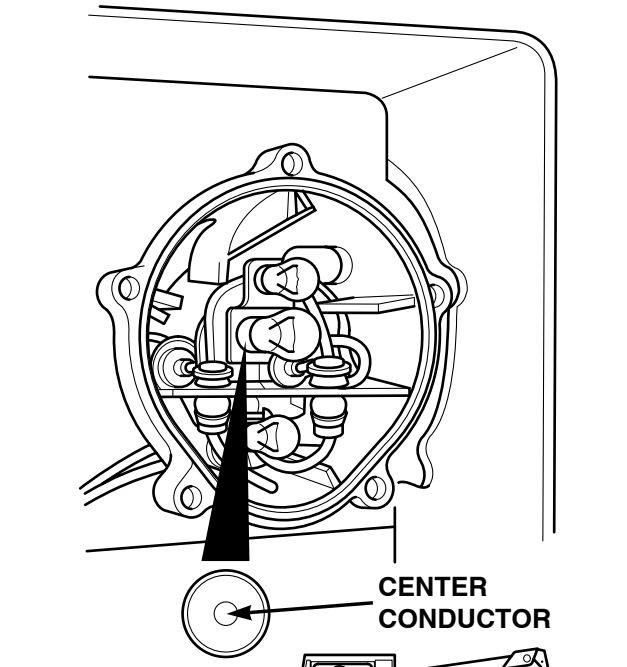
YES →

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, service or replace battery cable.

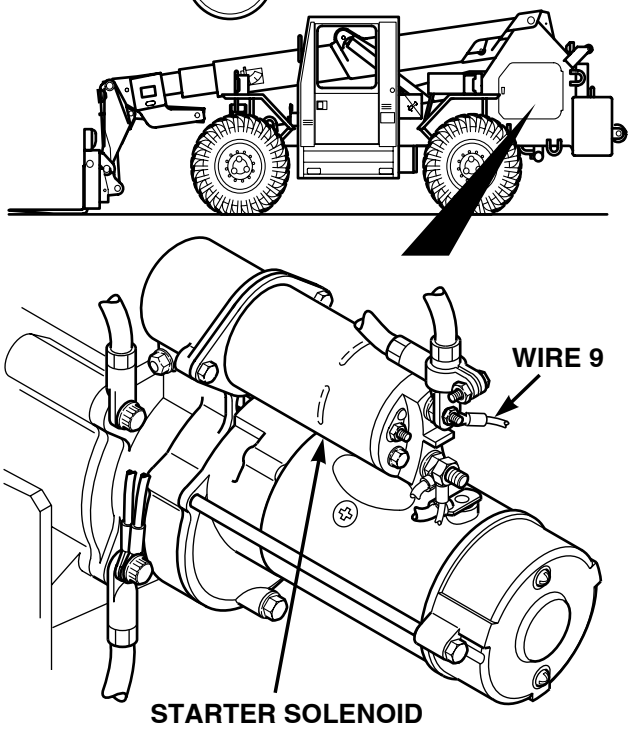
WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to center conductor of faulty socket. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 17 of this fault. (b) If 24 vdc is not present, go to Step 3 of this fault. (7) Turn blackout light switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10).



VOLTAGE TEST
(1) Remove battery covers (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to starter motor solenoid where wire 9 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, service or replace battery cable (Para 8-42). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

4

Is 24 vdc present at circuit breaker CB6 where wire 9 connects?

NO → Go to Step 18 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

5

Is 24 vdc present at circuit breaker CB6 where wire 1 connects?

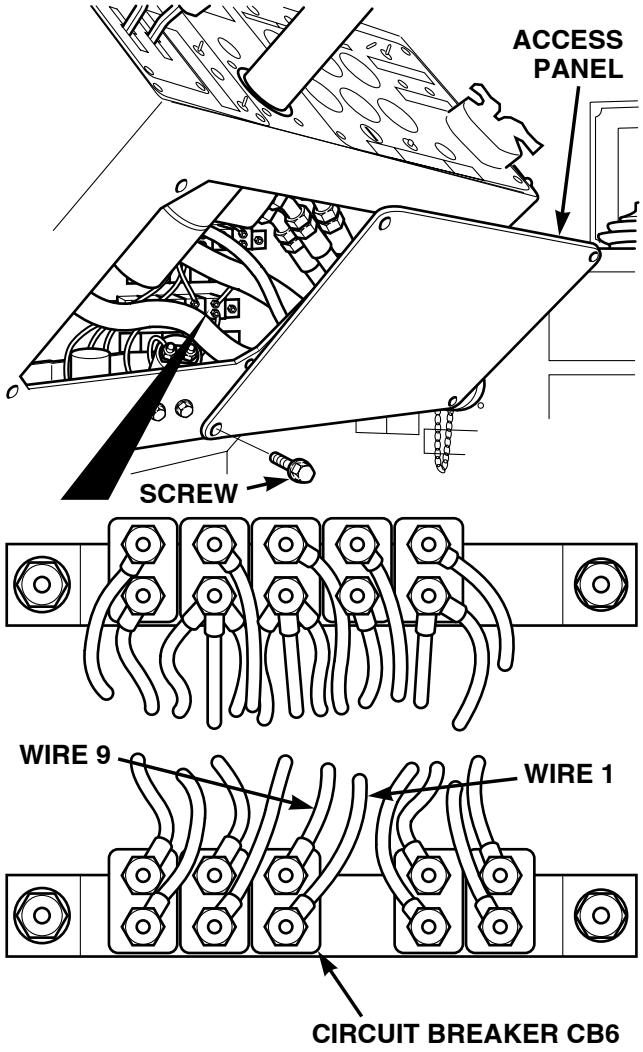
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB6 faulty.

VOLTAGE TEST
(1) Remove access panel and four screws. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to circuit breaker CB6 where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 18 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect the multimeter positive lead (+) to circuit breaker CB6 where wire 1 connects. (3) Connect multimeter negative lead (–) to a known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

6

Is 24 vdc present at run relay K1 where wire 1 connects?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 1 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

7

Is 24 vdc present at run relay K1 where wire 3 connects?

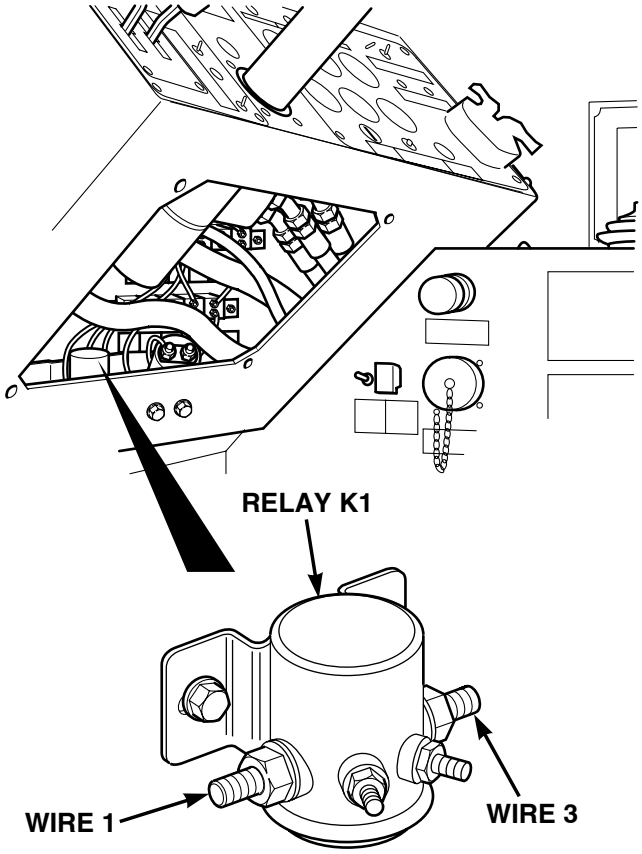
NO → Replace run relay K1 (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, run relay K1 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 1 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to run relay K1 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

8

Is 24 vdc present at circuit breaker CB4 where wire 3 connects?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 3 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB4 faulty. Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

9

Is 24 vdc present at circuit breaker CB4 where wire 40 connects?

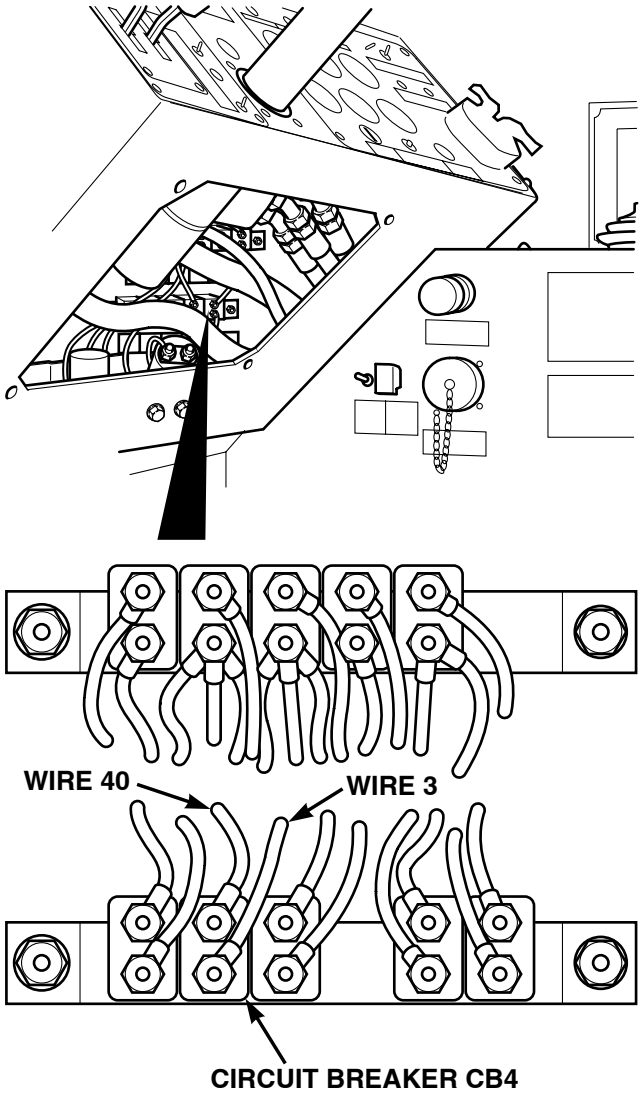
NO → Replace circuit breaker CB4 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, circuit breaker CB4 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 3 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB4 where wire 40 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB4 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK.
POSSIBLE PROBLEMS
Wire 40 faulty. Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

10

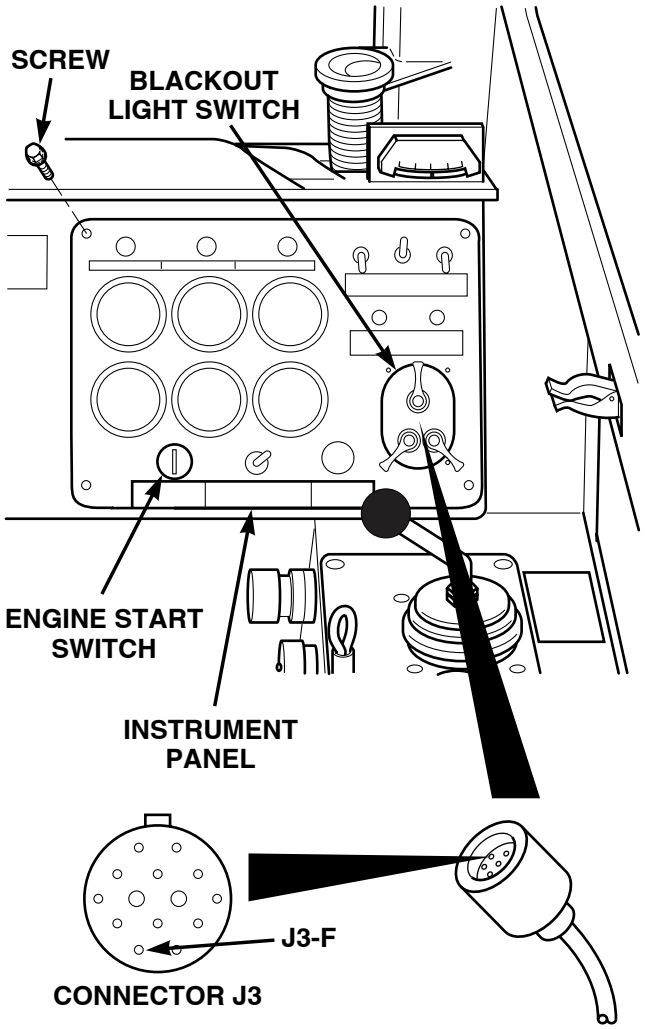
Is 24 vdc present at connector J3-F (wire 40)?

NO → Repair wire 40 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 40 faulty.

VOLTAGE TEST
(1) Remove four screws and instrument panel. (2) Lift instrument panel out to remove connector J3 from blackout light switch. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to connector J3-F (wire 40). (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 11 of this fault. (b) If 24 vdc is not present, repair wire 40 (Para 8-48). (8) Turn engine start switch to OFF position, (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Connect connector J3 to blackout light switch.



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

11

Is 24 vdc present at brake light switch where wire 41 connects?

NO → Go to Step 12 of this fault.

YES → Go to Step 13 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout light switch or wire 41 faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 41 faulty. Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

12

Is continuity present between connector J3-A and brake light switch?

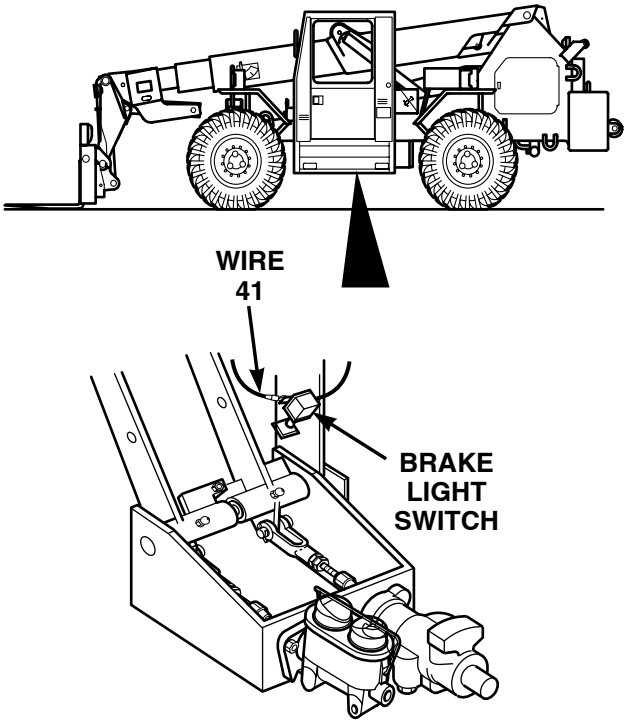
NO → Repair wire 41 (Para 8-48).

YES → Replace blackout light switch (Para 8-13).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, blackout light switch or wire 41 faulty.

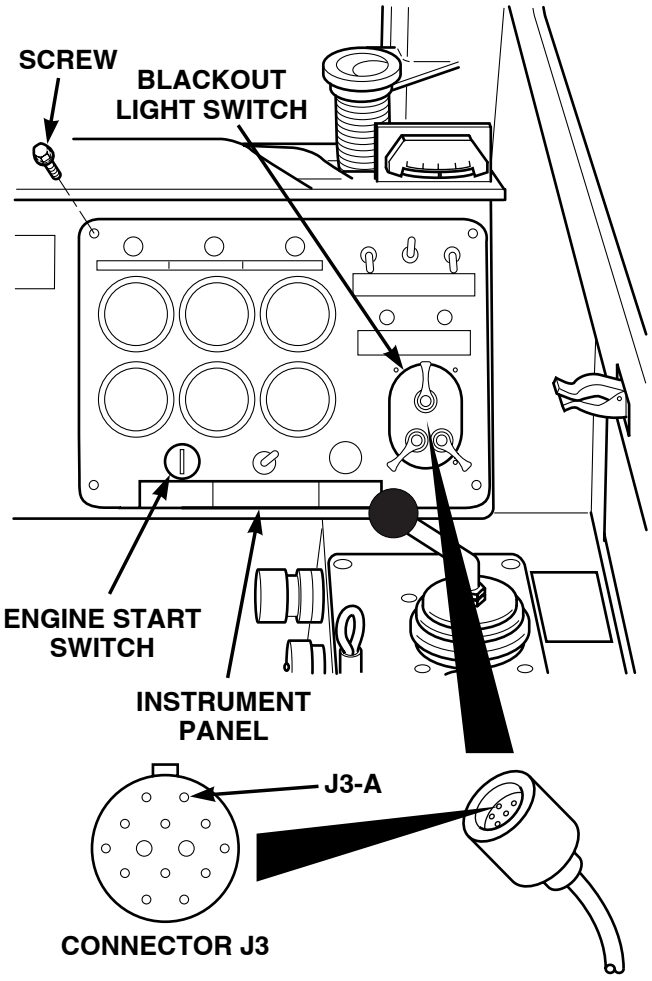
VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to brake light switch where wire 41 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 13 of this fault.
  (b) If 24 vdc is not present, go to Step 12 of this fault.
(7) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(8) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(9) Disconnect negative battery cable from negative side of battery (Para 8-42).



CONTINUITY TEST

(1) Lift instrument panel out to remove connector J3 from blackout light switch.
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to connector J3-A (wire 41).
(4) Connect multimeter negative lead (–) to brake switch where wire 41 connects.
  (a) If continuity is present, replace blackout light switch (Para 8-13).
  (b) If continuity is not present, repair wire 41 (Para 8-48).
(5) Connect connector J3 to blackout light switch.



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Blackout light switch OK.
POSSIBLE PROBLEMS
Brake switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

13

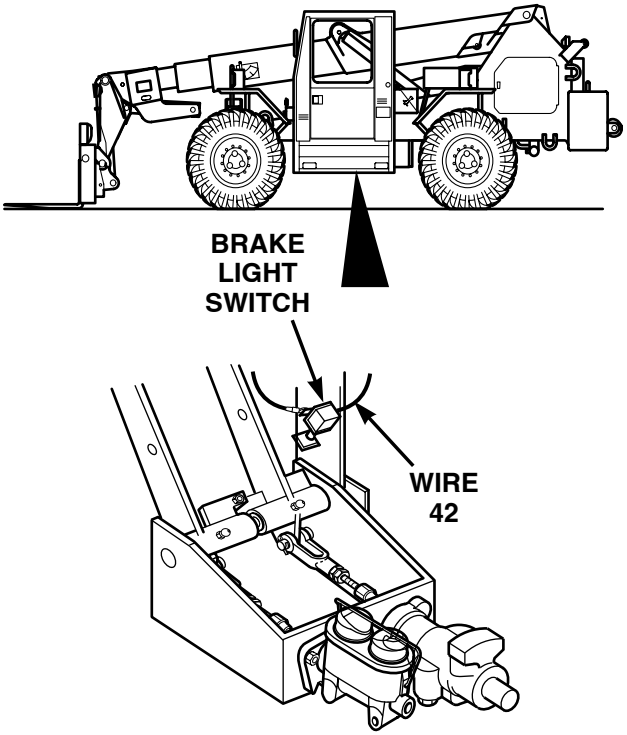
Is 24 vdc present at brake light switch where wire 42 connects?

NO → Replace brake light switch (Para 8-17).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, brake light switch faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to brake switch where wire 42 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10). (7) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 14 of this fault. (b) If 24 vdc is not present, replace brake light switch (Para 8-17). (8) Turn blackout light switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position, (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

14

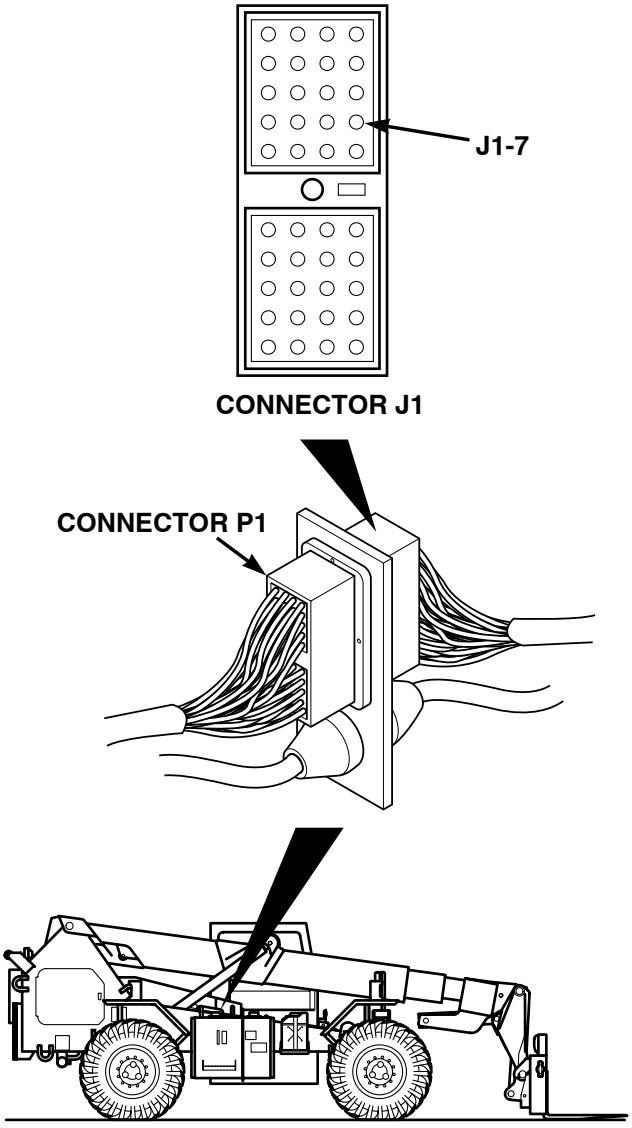
Is 24 vdc present at connector J1-7 (wire 44)?

NO → Go to Step 15 of this fault.

YES → Go to Step 16 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, blackout light switch or wire 44 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc.
(2) Disconnect connector J1 from connector P1.
(3) Connect multimeter positive lead (+) to connector J1-7 (wire 44).
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn blackout light switch to B. O. DRIVE position (TM 10-3930-673-10).
(8) Depress brake pedal (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 16 of this fault.
(b) If 24 vdc is not present, go to Step 15 of this fault.
(9) Turn blackout light switch to OFF position (TM 10-3930-673-10).
(10) Turn engine start switch to OFF position, (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).
(12) Connect connector J1 to connector P1.



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK.
POSSIBLE PROBLEMS
Blackout light switch faulty. Wire 42 faulty. Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

15

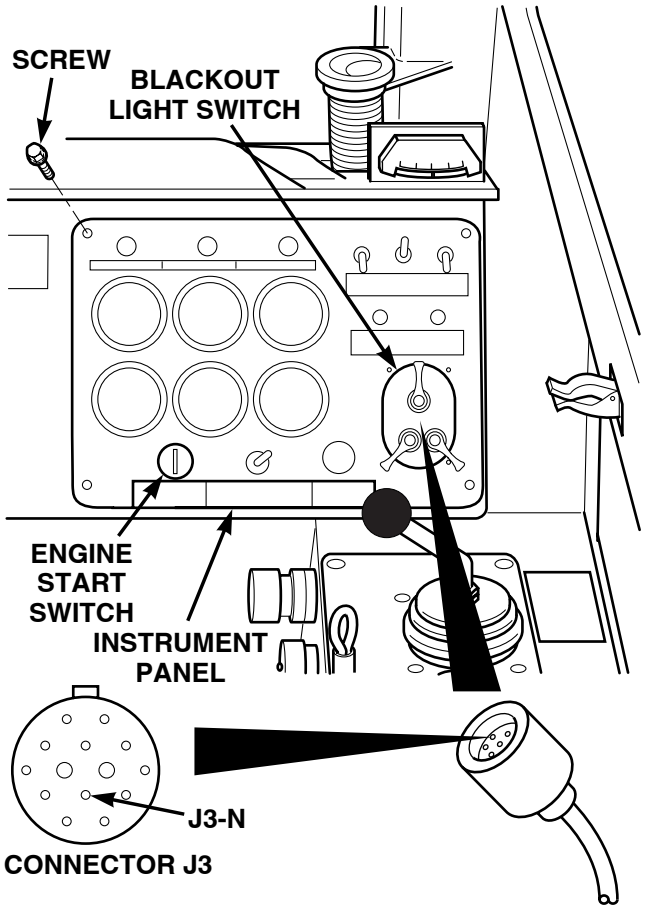
Is continuity present between connector J3-N and connector J1-7?

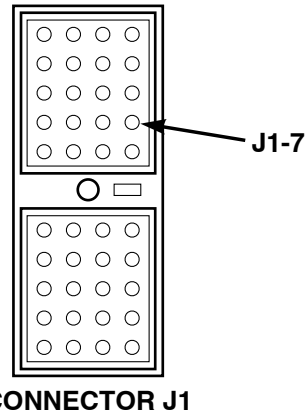
NO → Repair wire 44 (Para 8-48).

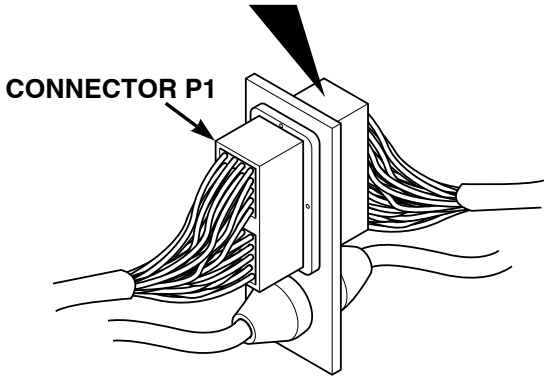
YES → Replace blackout light switch (Para 8-13).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 44 faulty.

CONTINUITY TEST
(1) Lift instrument panel out to remove connector J3 from blackout lighting switch. (2) Disconnect connector J1 from connector P1. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to connector J1-7 (wire 44). (5) Connect multimeter negative lead (–) to blackout light switch J3-N (wire 44). (a) If continuity is present, replace blackout light switch (Para 8-13). (b) If continuity is not present, repair wire 44 (Para 8-48). (6) Connect connector J3 to blackout control switch. (7) Install four screws and instrument panel. (8) Connect connector J1 to connector P1.







19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK. Blackout light switch OK. Wire 42 OK.
POSSIBLE PROBLEMS
Wire 44 faulty. Connector J1 faulty. Connector P1 faulty. Socket(s) faulty.

16

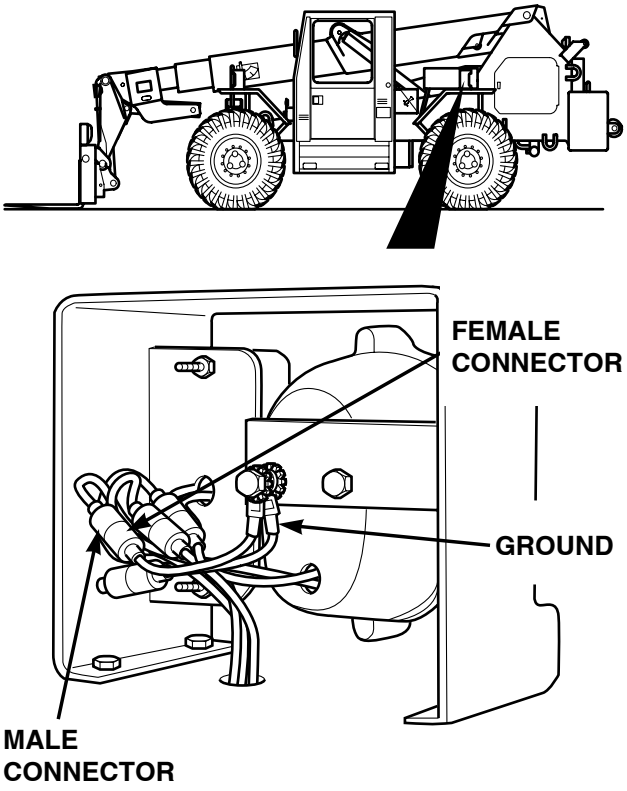
Is 24 vdc present at blackout stoplight female connector where wire 44 connects?

NO → Repair wire 44 (Para 8-49).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 44 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to blackout stop light female connector where wire 44 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn blackout light switch to B. O DRIVE position (TM 10-3930-673-10). (7) Depress brake pedal (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 17 of this fault. (b) If 24 vdc is not present, repair wire 44 (Para 8-49). (8) Turn blackout light switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position, (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).



19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Wire 9 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK. Blackout light switch OK. Wire 42 OK. Wire 44 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Socket(s) faulty. Ground faulty.

17

Is continuity present between blackout brake light socket outside conductor ground and ground cable?

NO → Repair wire 2 (Para 8-49).

YES → Replace bulb (Para 8-33).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, wire 2 ground or brake light socket faulty.

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK. Blackout light switch OK. Wire 42 OK. Wire 44 OK. Connector J1 OK. Connector P1 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty. Connector P2 faulty.

18

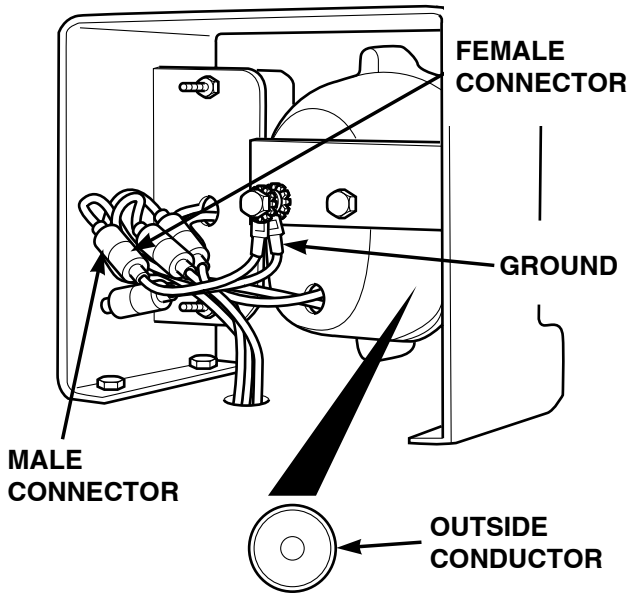
Is continuity present between starter motor solenoid and connector P2-1?

NO → Repair wire 9 or connector P2 (Para 8-49).

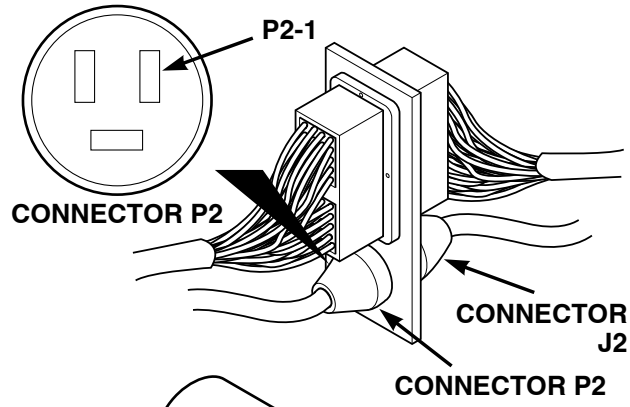
YES →

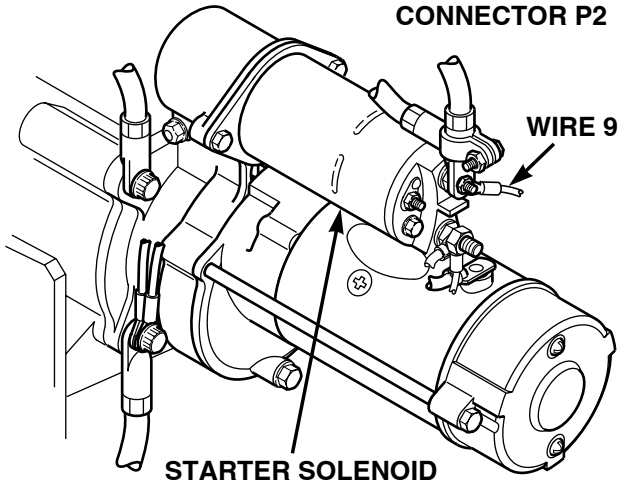
TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair wire 9 or connector P2 (Para 8-49).

CONTINUITY TEST
(1) Disconnect ground female connector from male ground connector. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to ground outside conductor at brake light socket. (4) Connect multimeter negative lead (–) to ground cable. (a) If continuity is present, replace bulb (Para 8-33). (b) If continuity is not present, repair wire 2 (Para 8-49) or replace blackout brake light socket (Para 8-33). (5) Connect ground female connector to male ground connector.



CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 19 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49). (5) Connect connector J2 to connector P2.





19. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO
Bulbs OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB4 OK. Wire 40 OK. Wire 41 OK. Brake switch OK. Blackout light switch OK. Wire 42 OK. Wire 44 OK. Connector J1 OK. Connector P1 OK. Socket(s) OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector J2 faulty.

19

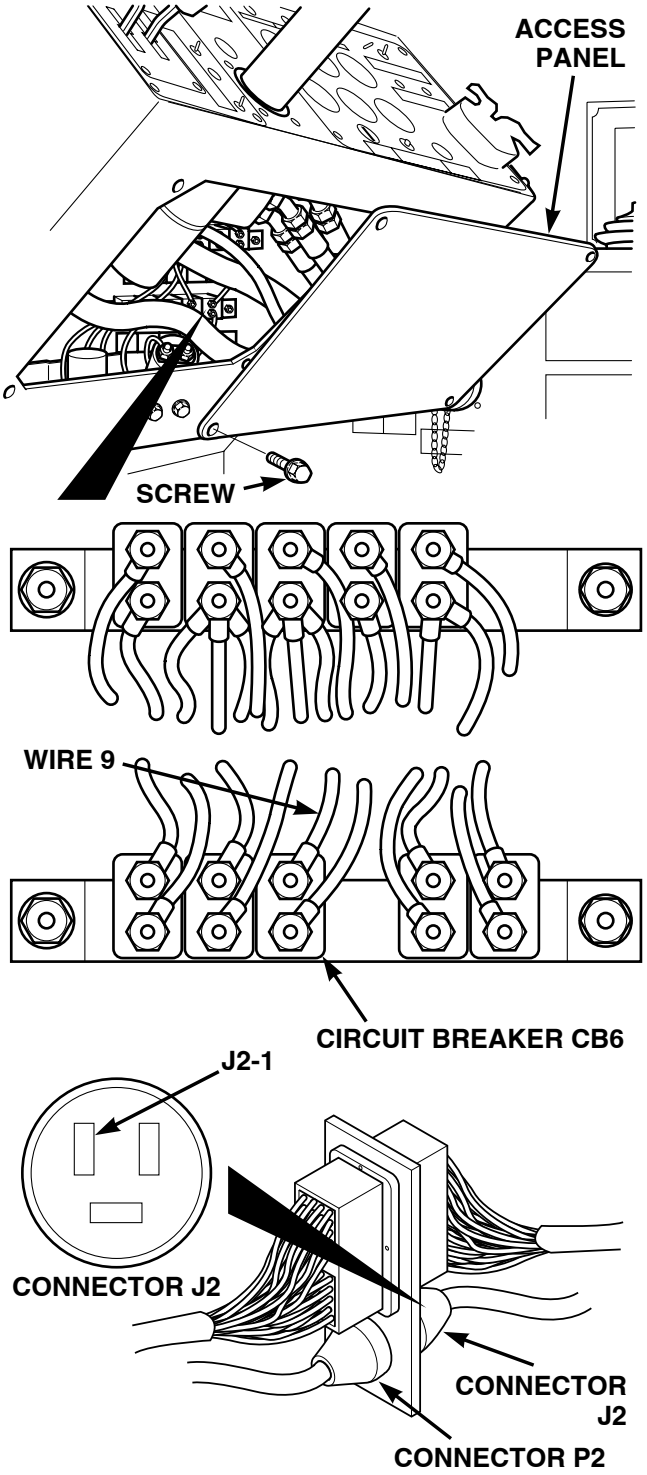
Is continuity present between circuit breaker CB6 and connector J2?

NO → Repair wire 9 or connector J2 (Para 8-48).

YES → Service or replace battery (Para 8-42).

TEST OPTIONS
Continuity test. STE/ICE-R #88.
REASON FOR QUESTION
If continuity is not present, repair wire 9 or connector J2 (Para 8-48).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead (+) to wire 9 at circuit breaker CB6. (4) Connect multimeter negative lead (–) to connector J2-1 (4). (a) If continuity is present, go to Step 18 of this fault (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48). (5) Install access panel and four screws. (6) Connect connector J2 to connector P2. (7) Connect negative battery cable to negative side of battery (Para 8-42). (8) Install battery cover (Para 8-42).



20. PARKING BRAKE INDICATOR LIGHT DOES NOT OPERATE.

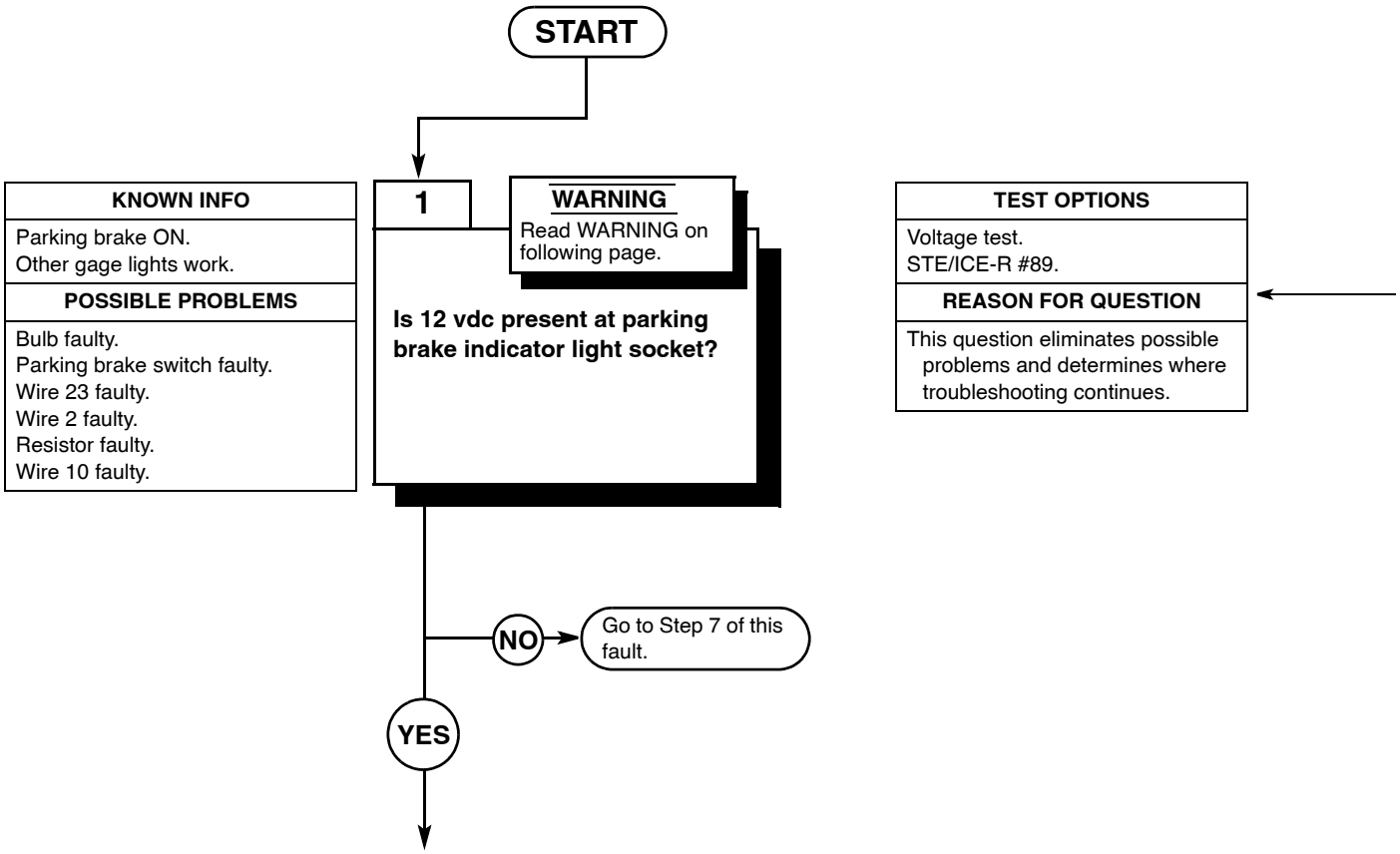
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

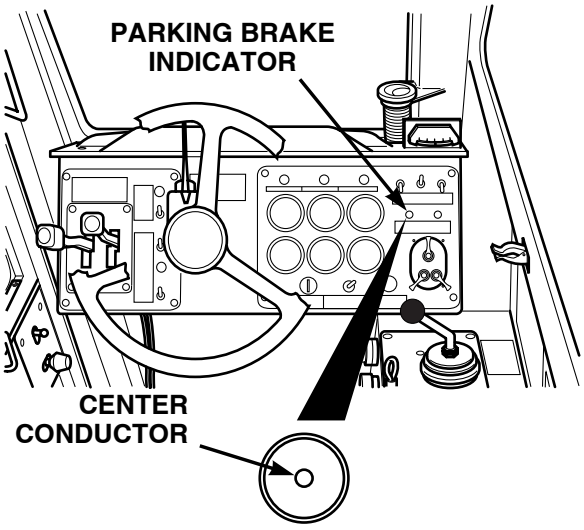
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove lens/bulb from parking brake indicator. (2) Set multimeter to volts dc. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect multimeter positive lead (+) to center conductor of parking brake indicator light socket. (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 12 vdc is present, go to Step 2 of this fault. (b) If 12 vdc is not present, go to Step 7 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10).



20. PARKING BRAKE INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Parking brake ON. Other gage lights work.
POSSIBLE PROBLEMS
Bulb faulty. Parking brake switch faulty. Wire 23 faulty. Wire 2 faulty.

2

Is continuity present across parking brake lens/bulb?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, replace bulb.

NO → Replace faulty bulb (Para 8-9).

YES

KNOWN INFO
Parking brake ON. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Parking brake switch faulty. Wire 23 faulty. Wire 2 faulty.

3

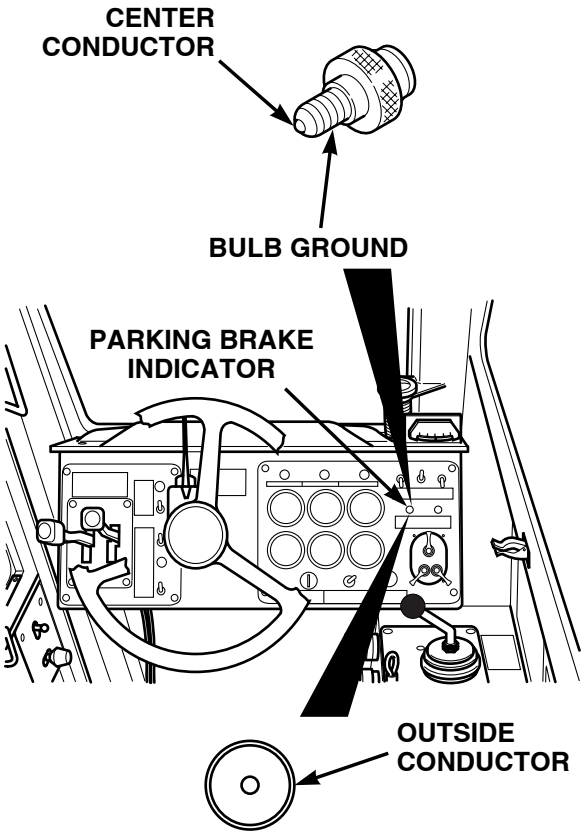
Is continuity present between parking brake indicator outside conductor and known good ground while parking brake switch is on?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
This question determines where troubleshooting continues.

NO → Go to Step 4 of this fault.

YES → Go to Step 1 of this fault.

CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to center conductor of bulb. (3) Connect multimeter negative lead (–) to bulb ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, replace lens/bulb (Para 8-9).



CONTINUITY CHECK
(1) Turn parking brake switch ON. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to outside conductor of parking brake indicator. (4) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, replace lens/bulb (Para 8-9). (b) If continuity is not present, go to Step 4 of this fault.

20. PARKING BRAKE INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Parking brake ON. Other gage lights work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Parking brake switch faulty. Wire 23 faulty. Wire 2 faulty.

4

Is continuity present across parking brake switch while parking brake switch is turned ON?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, parking brake switch is faulty.

NO → Replace parking brake switch (Para 8-7).

YES

KNOWN INFO
Parking brake ON. Other gages work. 12 vdc present at socket. Bulb OK. Parking brake switch OK.
POSSIBLE PROBLEMS
Wire 23 faulty. Wire 2 faulty.

5

Is continuity present across wire 23?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present across wire, wire is faulty.

NO → Replace or repair wire 23 (Para 8-48).

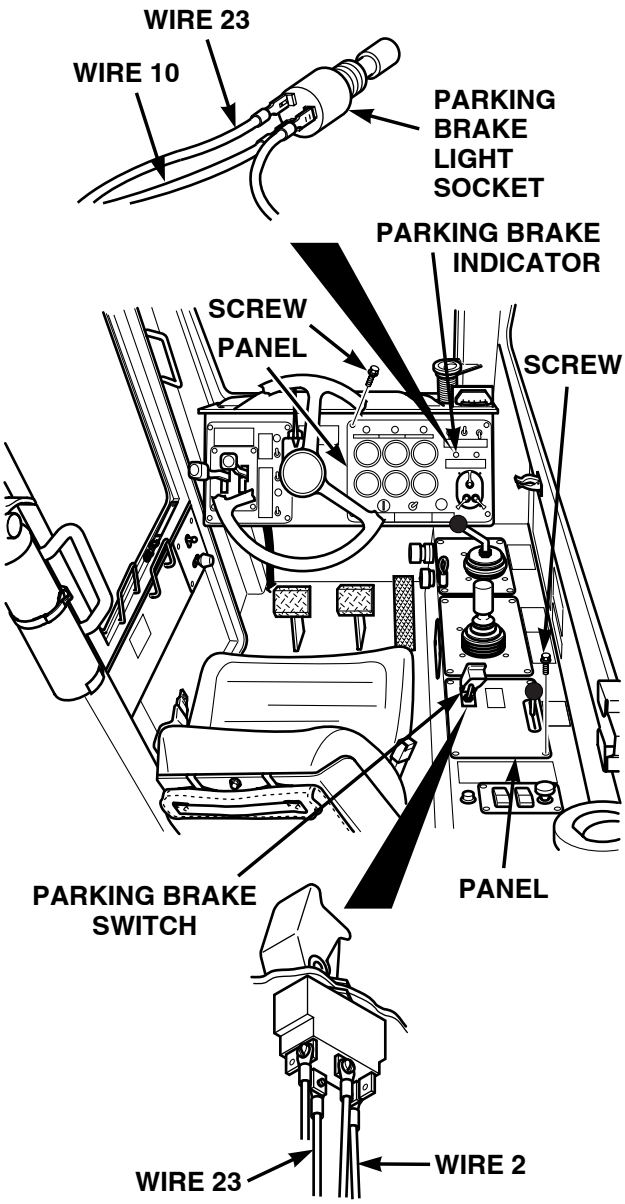
YES

CONTINUITY CHECK

(1) Remove four screws and panel.
(2) Turn parking brake switch ON.
(3) Connect multimeter positive lead (+) to wire 23 at parking brake switch terminal.
(4) Connect multimeter negative (–) lead to wire 2 at parking brake switch terminal.
  (a) If continuity is not present, replace parking brake switch (Para 8-7).
  (b) If continuity is present, go to Step 5 of this fault.

CONTINUITY CHECK

(1) Remove four screws and panel.
(2) Connect multimeter positive lead (+) to wire 23 at parking brake indicator terminal.
(3) Connect multimeter negative lead (–) to wire 23 at parking brake light switch terminal.
  (a) If continuity is not present, replace wire 23 (Para 8-48).
  (b) If continuity is present, go to Step 6 of this fault.



20. PARKING BRAKE INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Parking brake ON. Other gages work. 12 vdc present at socket. Bulb OK. Parking brake switch OK. Wire 23 OK.
POSSIBLE PROBLEMS
Wire 2 faulty.

6

Is continuity present between wire 2 at parking brake switch and known good ground?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire is faulty.

NO → Replace or repair wire 2 (Para 8-48).

YES → Repeat Step 3 through Step 6 of this fault.

KNOWN INFO
Parking brake ON. Other gages work. 12 vdc not measured at socket.
POSSIBLE PROBLEMS
Resistor faulty. Wire 10 faulty.

7

Are 1500 ohms present across resistor?

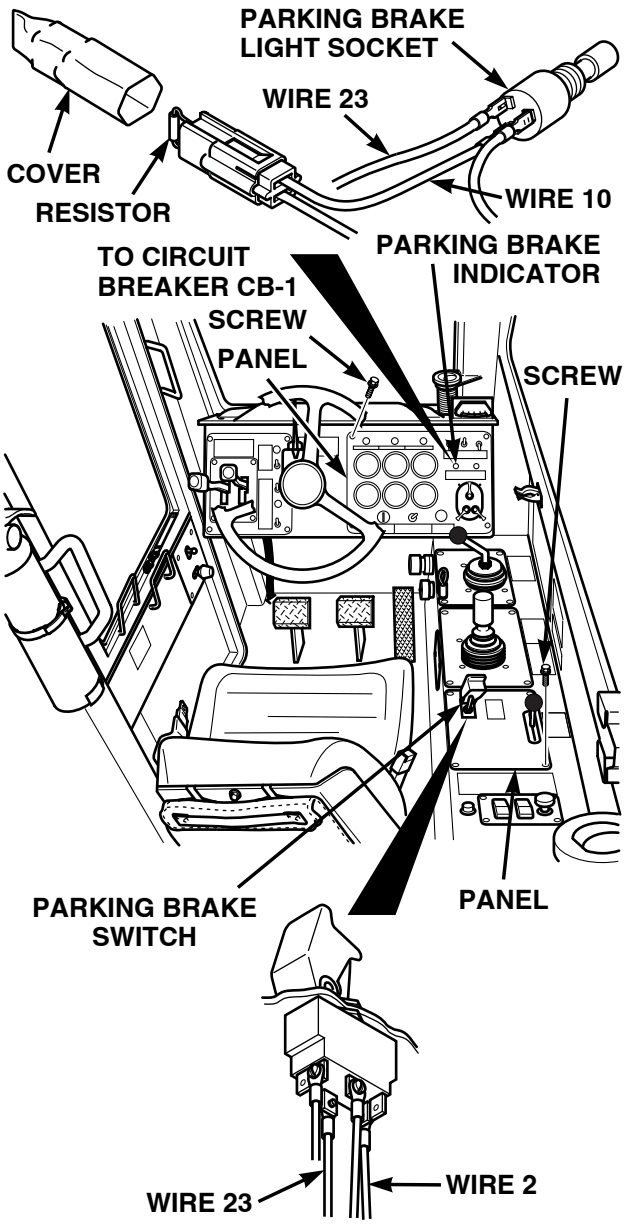
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If 1500 ohms are not measured, resistor is faulty.

NO → Replace resistor (Para 8-9).

YES → Repair or replace wire 10 (Para 8-48).

CONTINUITY CHECK
(1) Connect multimeter positive lead (+) to wire 2 at parking brake switch terminal. (2) Connect multimeter negative lead (–) to known good ground. (a) If continuity is not present, repair or replace wire 2 (Para 8-48). (b) If continuity is present, repeat Step 3 through Step 6 of this fault.

RESISTANCE TEST
(1) Remove cover and disconnect resistor from connector. (2) Attach multimeter positive lead (+) to resistor at circuit breaker side. (3) Attach multimeter negative lead (–) to resistor at light side. (a) If 1500 ohms resistance is measured, replace wire 10 (Para 8-48). (b) If 1500 ohms resistance is not measured, replace resistor (Para 8-9).



21. LOW BRAKE PRESSURE INDICATOR LIGHT DOES NOT OPERATE.

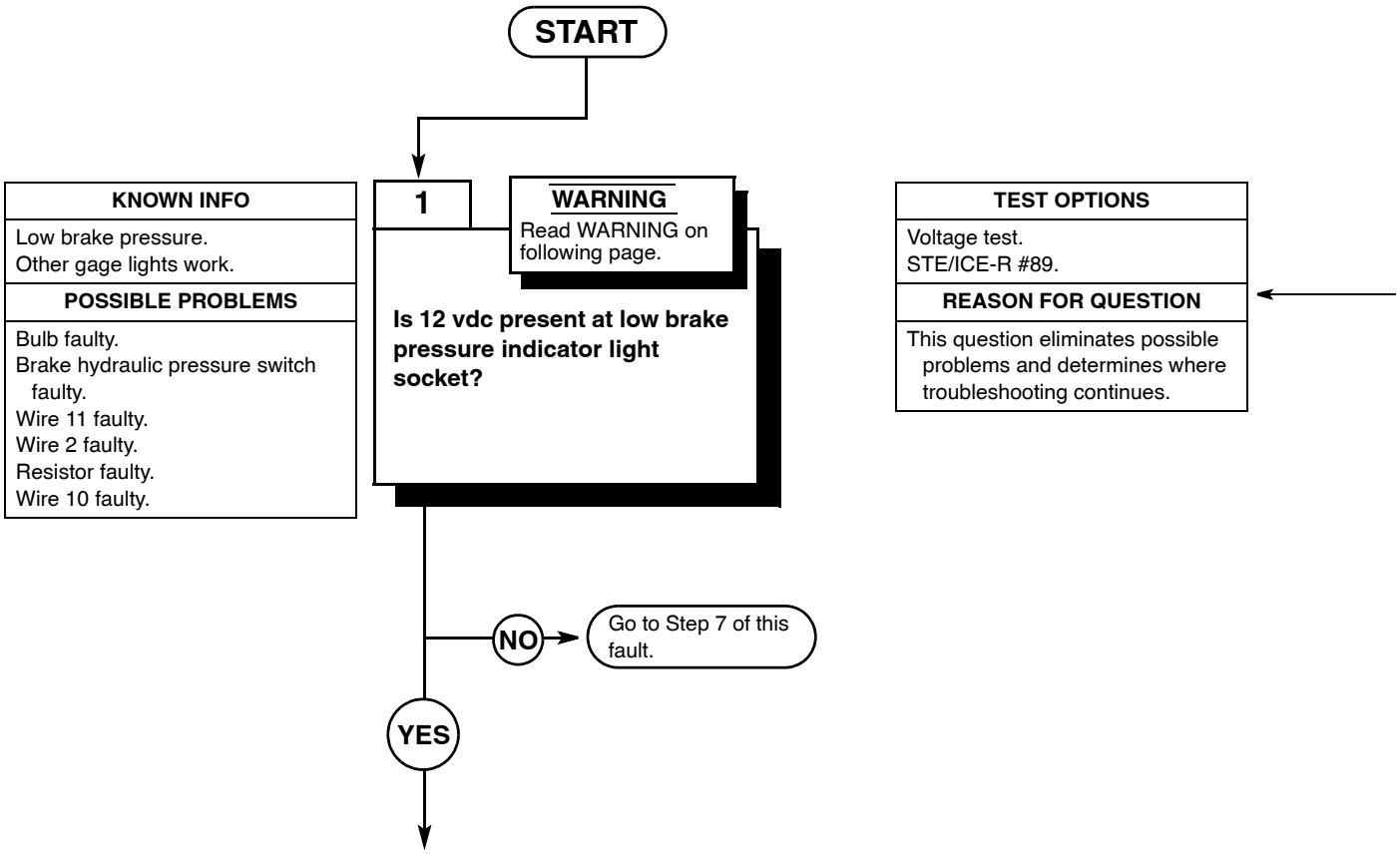
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

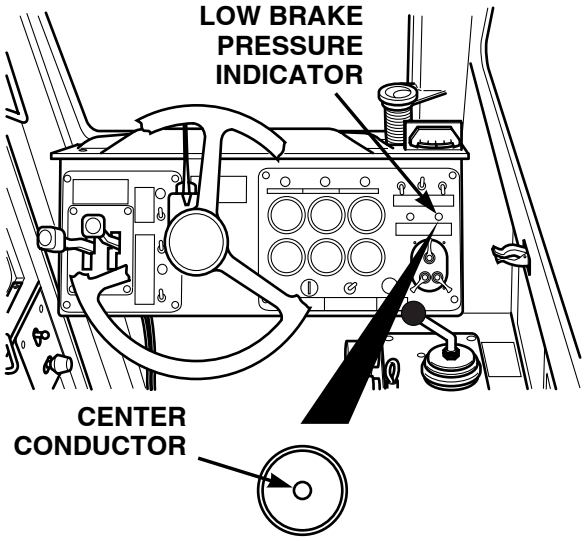
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove lens/bulb from low brake pressure indicator. (2) Set multimeter to volts dc. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect multimeter positive lead (+) to center conductor of low brake pressure indicator light socket. (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 12 vdc is present, go to Step 2 of this fault. (b) If 12 vdc is not present, go to Step 7 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10).



21. LOW BRAKE PRESSURE INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Low brake pressure. Other gage lights work.
POSSIBLE PROBLEMS
Bulb faulty. Brake hydraulic pressure switch faulty. Wire 11 faulty. Wire 2 faulty.

2

Is continuity present across low brake pressure indicator lens/bulb?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, replace bulb.

NO → Replace faulty bulb (Para 8-9).

YES

KNOWN INFO
Other gages work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Brake hydraulic pressure switch faulty. Wire 11 faulty. Wire 2 faulty.

3

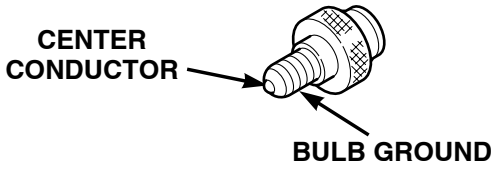
Is continuity present between low brake pressure indicator light socket outside conductor and known good ground?

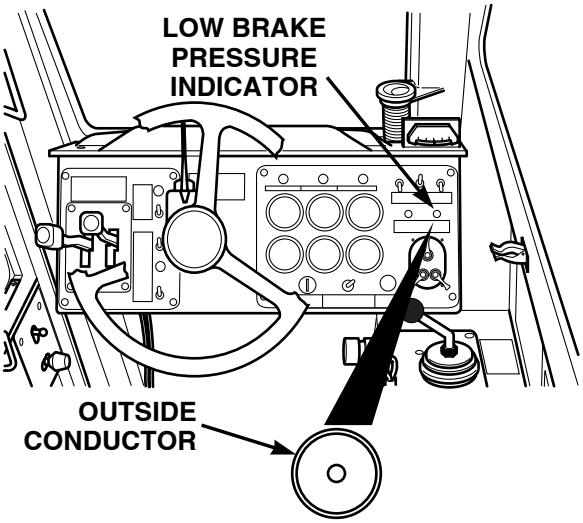
TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
This question determines where troubleshooting continues.

NO → Go to Step 4 of this fault.

YES → Go to Step 1 of this fault.

CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to center conductor of bulb. (3) Connect multimeter negative lead (–) to bulb ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, replace bulb (Para 8-9).





CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to outside conductor of low brake pressure indicator light socket. (3) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, replace lens/bulb (Para 8-9). (b) If continuity is not present, go to Step 4 of this fault.

21. LOW BRAKE PRESSURE INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Low brake pressure. Other gage lights work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Brake hydraulic pressure switch faulty. Wire 11 faulty. Wire 2 faulty.

4

Is brake hydraulic pressure switch OK (Para 8-17)?

TEST OPTIONS
Brake Hydraulic Pressure Switch Test (Para 8-17)
REASON FOR QUESTION
If continuity is not present, parking brake switch is faulty.

NO → Replace brake hydraulic pressure switch (Para 8-17).

YES

KNOWN INFO
Low brake pressure. Other gages work. 12 vdc present at socket. Bulb OK. Brake hydraulic pressure switch OK.
POSSIBLE PROBLEMS
Wire 11 faulty. Wire 2 faulty.

5

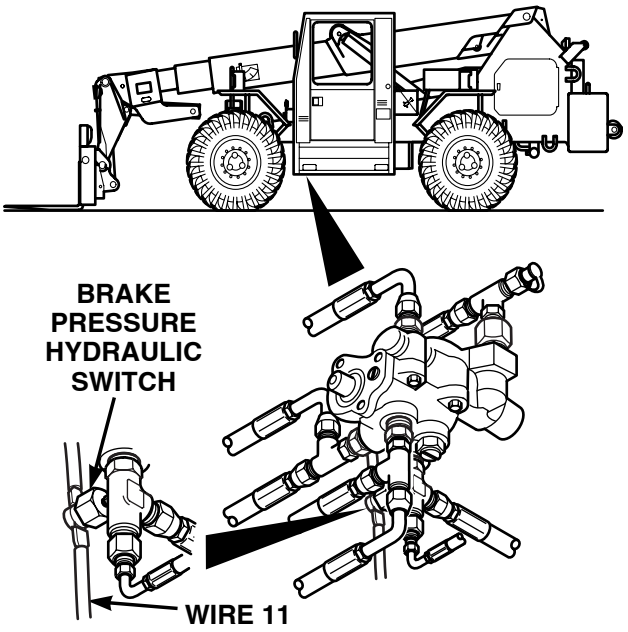
Is continuity present across wire 11?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present across wire, wire is faulty.

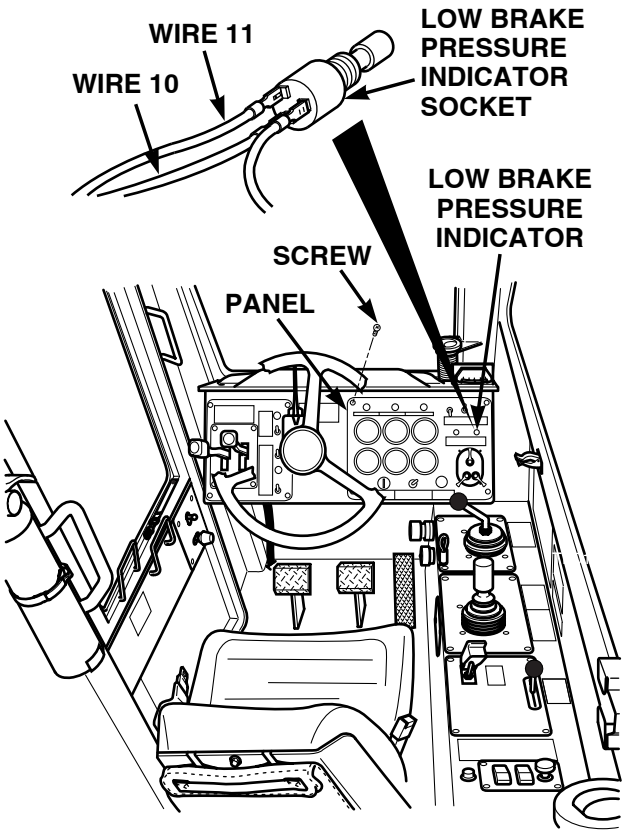
NO → Replace or repair wire 11 (Para 8-48).

YES

BRAKE HYDRAULIC PRESSURE SWITCH TEST
Refer to Paragraph 8-17.



CONTINUITY CHECK
(1) Connect multimeter positive lead (+) to wire 11 at brake hydraulic pressure switch. (2) Connect multimeter negative lead (–) to wire 11 at low brake pressure indicator light. (a) If continuity is not present, replace wire 11 (Para 8-48). (b) If continuity is present, go to Step 6 of this fault.



21. LOW BRAKE PRESSURE INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
Low brake pressure. Other gages work. 12 vdc present at socket. Bulb OK. Brake hydraulic pressure switch OK. Wire 11 OK.
POSSIBLE PROBLEMS
Wire 2 faulty.

6

Is continuity present between wire 2 at brake hydraulic pressure switch and known good ground?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire is faulty.

NO → Replace or repair wire 2 (Para 8-48).

YES → Repeat Step 3 through Step 6 of this fault.

KNOWN INFO
Low brake pressure. Other gages work. 12 vdc not measured at socket.
POSSIBLE PROBLEMS
Resistor faulty. Wire 10 faulty.

7

Are 1500 ohms present across resistor?

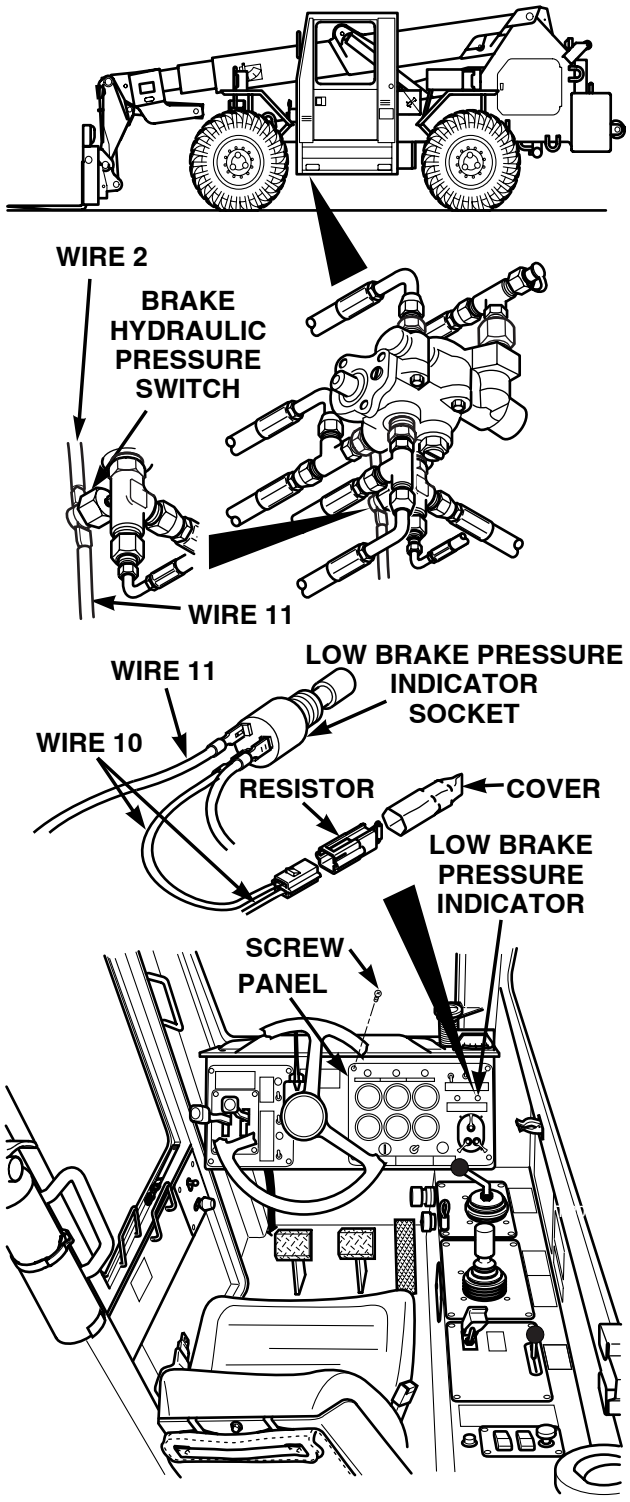
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If 1500 ohms are not measured, resistor is faulty.

NO → Replace resistor (Para 8-9).

YES → Repair or replace wire 10 (Para 8-9).

CONTINUITY CHECK
(1) Connect multimeter positive lead (+) to wire 2 at brake hydraulic pressure switch terminal. (2) Connect multimeter negative lead (–) to known good ground. (a) If continuity is not present, repair or replace wire 2 (Para 8-48). (b) If continuity is present, repeat Step 3 through Step 6 of this fault.

RESISTANCE TEST
(1) Remove cover and disconnect resistor from connector. (2) Attach multimeter positive lead (+) to resistor at circuit breaker side. (3) Attach multimeter negative lead (–) to resistor at light side. (a) If 1500 ohms resistance is measured, replace wire 10 (Para 8-48). (b) If 1500 ohms resistance is not measured, replace resistor (Para 8-9).



22. HIGH WATER TEMP INDICATOR LIGHT DOES NOT OPERATE.

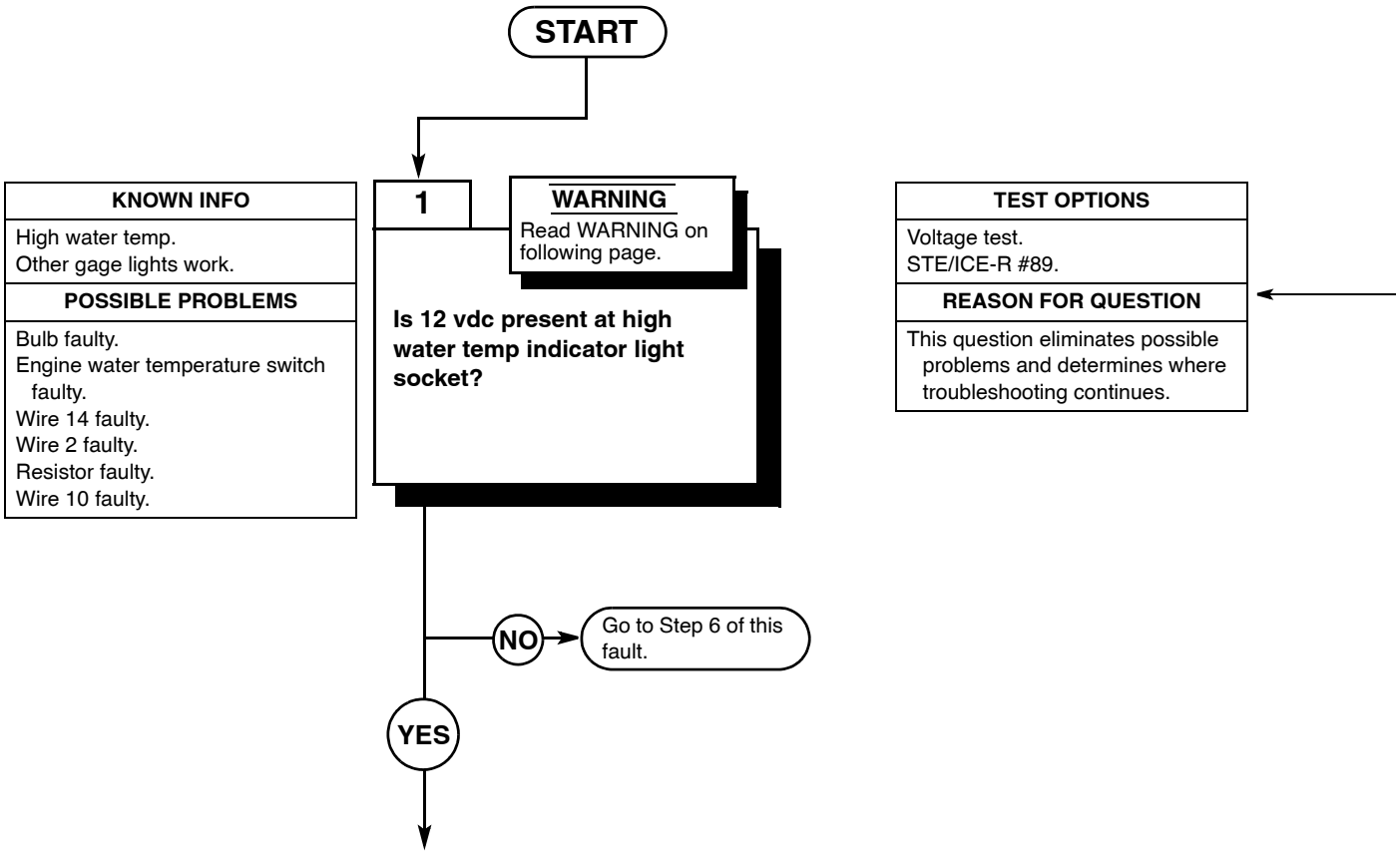
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

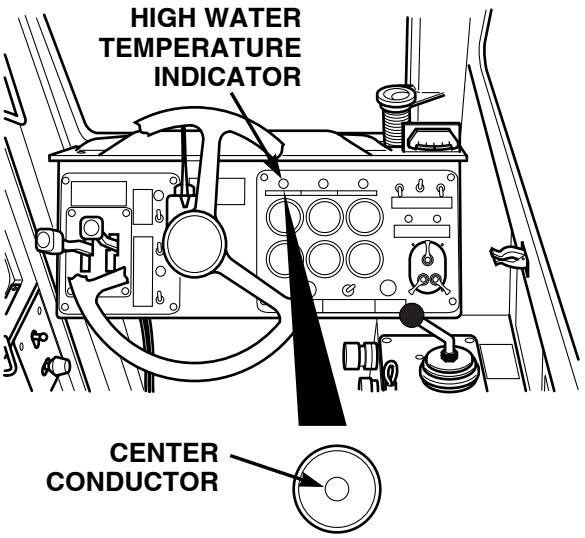
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove lens/bulb from high water temp indicator. (2) Set multimeter to volts dc. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect multimeter positive lead (+) to center conductor of high water temp indicator light socket. (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 12 vdc is present, go to Step 2 of this fault. (b) If 12 vdc is not present, go to Step 6 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10).



22. HIGH WATER TEMP INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
High water temp. Other gage lights work.
POSSIBLE PROBLEMS
Bulb faulty. Engine water temperature switch faulty. Wire 14 faulty. Wire 2 faulty.

2

Is continuity present across high water temp indicator lens/bulb?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, replace bulb.

NO → Replace faulty bulb (Para 8-9).

YES

KNOWN INFO
High water temp. Other gages work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Engine water temperature switch faulty. Wire 14 faulty. Wire 2 faulty.

3

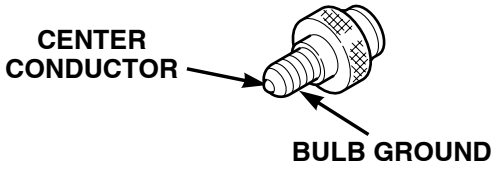
Is continuity present between high water temp indicator light socket outside conductor and known good ground while parking brake switch is on?

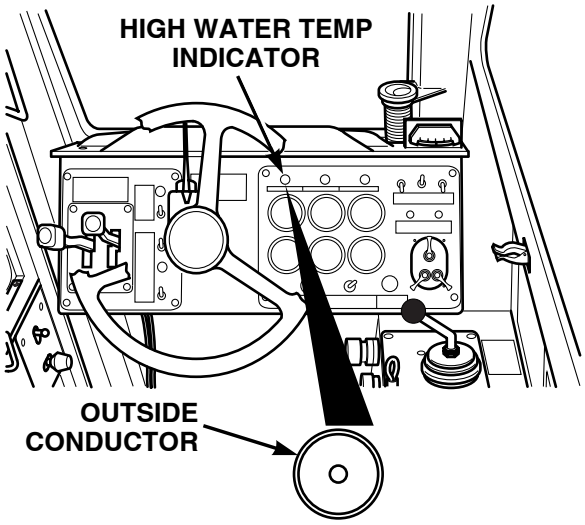
TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
This question determines where troubleshooting continues.

NO → Go to Step 4 of this fault.

YES → Go to Step 1 of this fault.

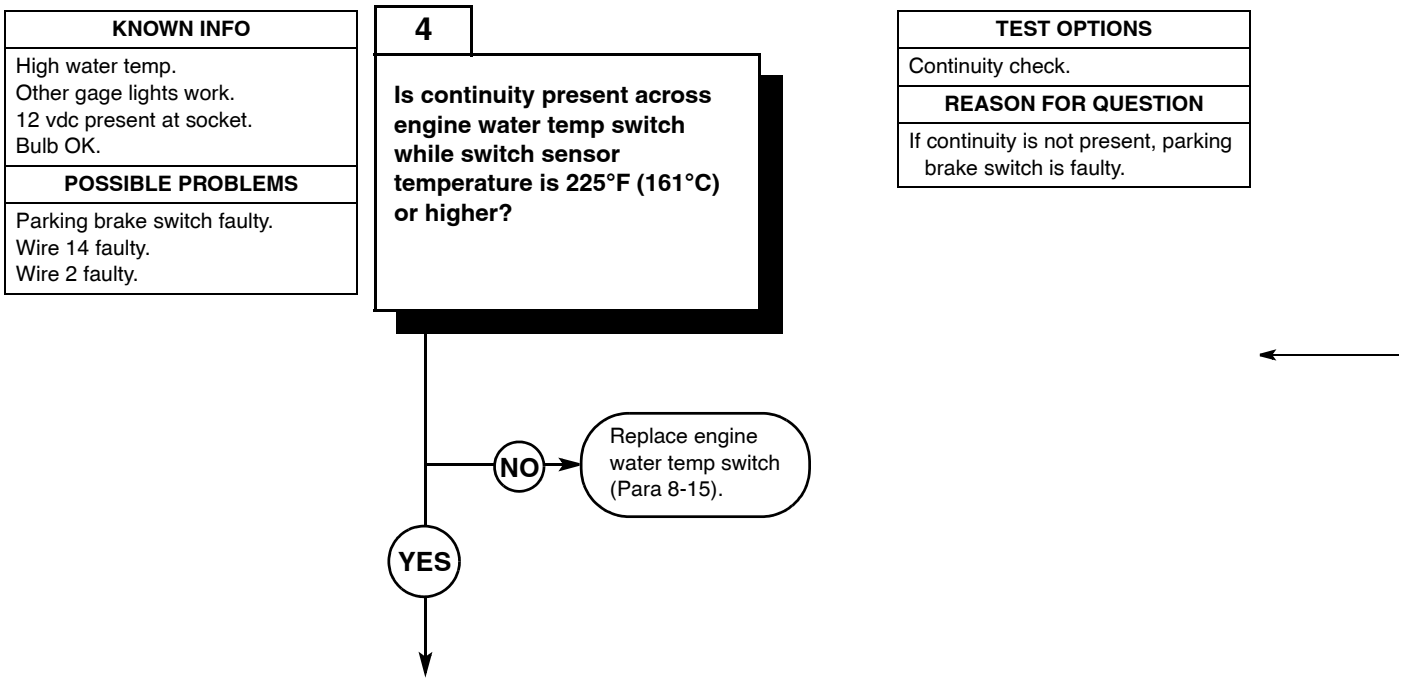
CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to center conductor of bulb. (3) Connect multimeter negative lead (–) to bulb ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, replace lens/bulb (Para 8-9).

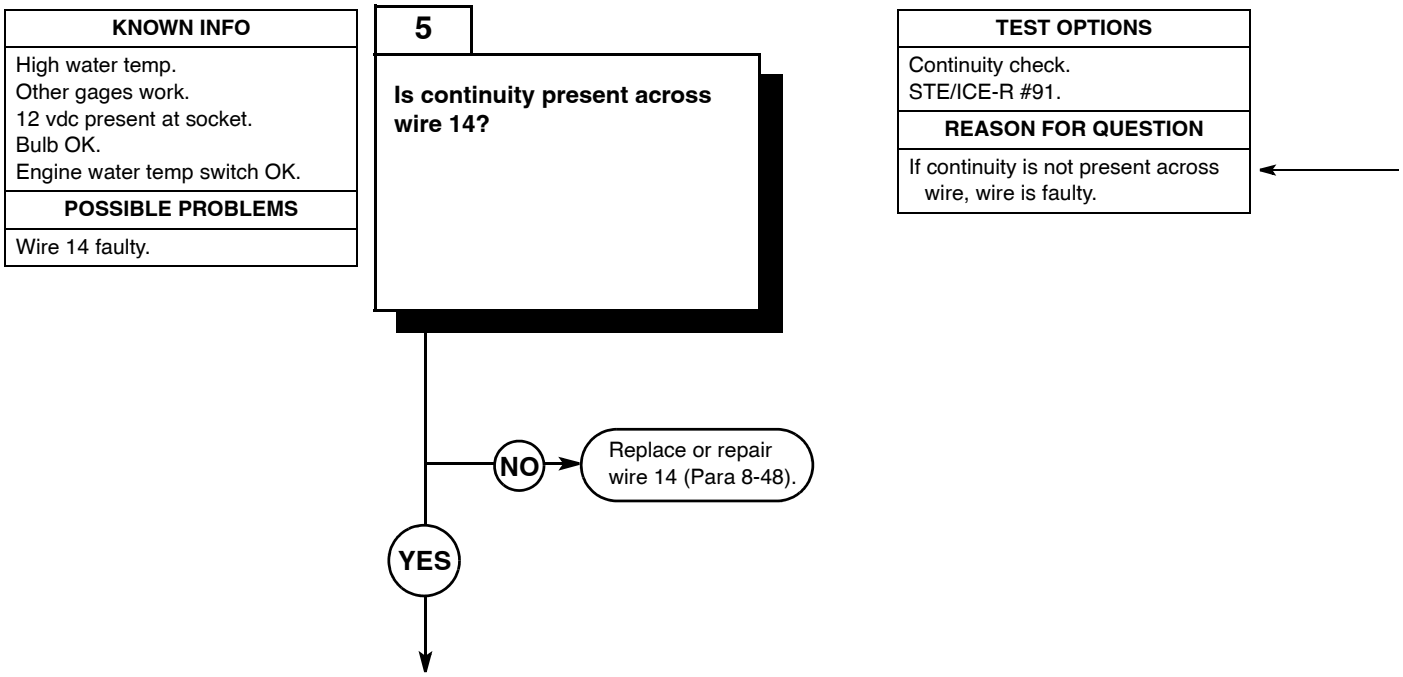




VOLTAGE TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to outside conductor of high water temp indicator. (3) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, replace lens/bulb (Para 8-9). (b) If continuity is not present, go to Step 4 of this fault.

22. HIGH WATER TEMP INDICATOR LIGHT DOES NOT OPERATE (CONT).





CONTINUITY CHECK

(1) Remove wire 14 and engine water temp switch from bushing.
(2) Hang engine water temp switch in pan of water. Position switch completely under water. Do not let switch make contact with pan.
(3) Place a thermometer in water.
(4) Put heat to pan of water and stir water for consistent temperature of minimum 225°F (161°C).

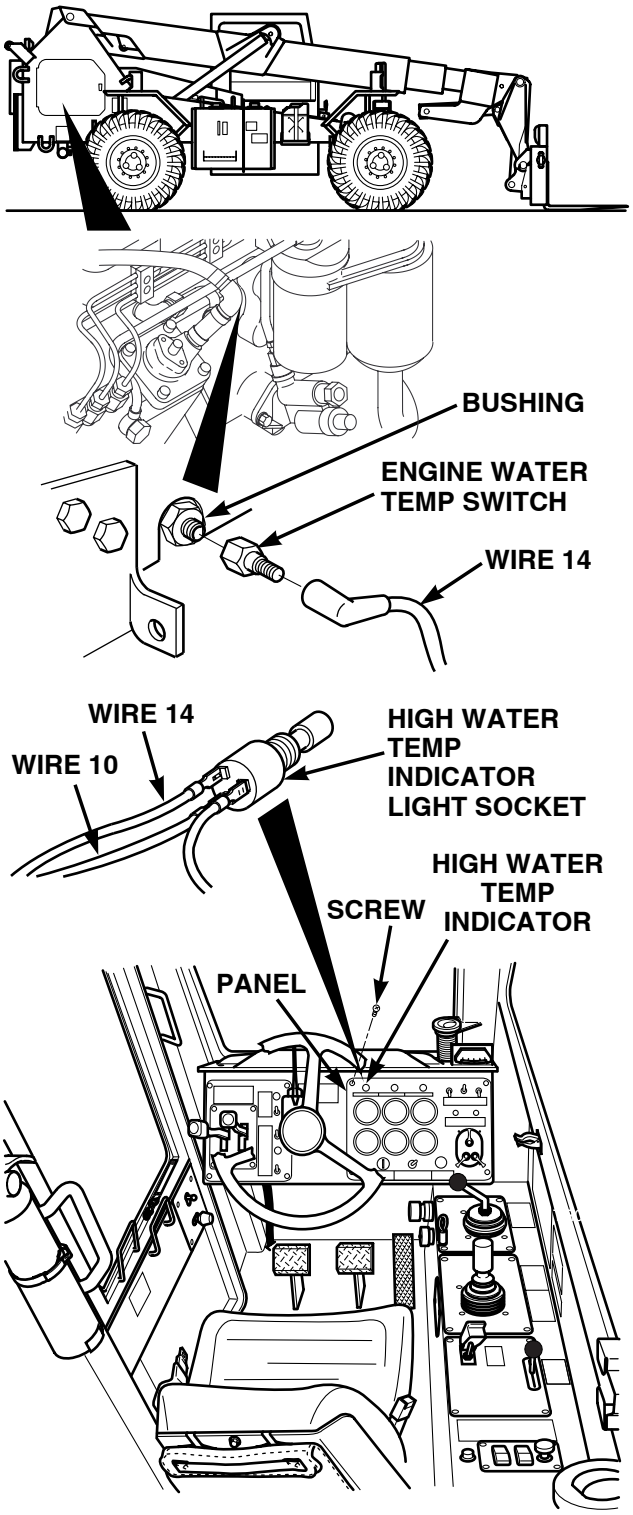
WARNING

Do not allow fingers or skin to contact hot water or hot parts. Serious burns to personnel could result.

(5) Set multimeter to ohms.
(6) Connect multimeter positive lead (+) to center conductor of engine water temp switch.
(7) Connect multimeter negative lead (–) to ground of engine water temp switch.
   (a) If continuity is not present, replace switch (Para 8-15).
   (b) If continuity is present, install switch (Para 8-15) and go to Step 5 of this fault.

CONTINUITY CHECK

(1) Remove four screws and panel.
(2) Connect multimeter positive lead (+) to wire 14 at high water temp indicator terminal.
(3) Using a known good jumper wire, connect multimeter negative lead (–) to wire 14 at engine water temp switch terminal.
   (a) If continuity is not present, replace wire 14 (Para 8-48).
   (b) If continuity is present, repeat Step 3 through Step 5 of this fault.



22. HIGH WATER TEMP INDICATOR LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO
High water temp. Other gages work. 12 vdc not measured at socket.
POSSIBLE PROBLEMS
Resistor faulty. Wire 10 faulty.

6

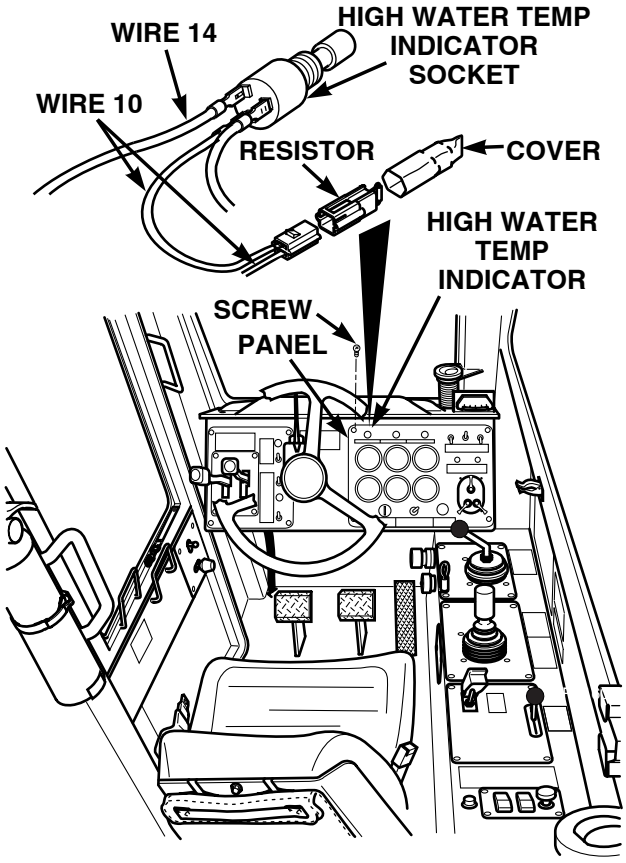
Are 1500 ohms present across resistor?

TEST OPTIONS
Continuity test. STE/ICE-R #89.
REASON FOR QUESTION
If 1500 ohms are not measured, resistor is faulty.

NO → Replace resistor (Para 8-9).

YES → Repair or replace wire 10 (Para 8-48).

RESISTANCE CHECK
(1) Remove cover and disconnect resistor from connector. (2) Attach multimeter positive lead (+) to resistor at circuit breaker side. (3) Attach multimeter negative lead (–) to resistor at light side. (a) If 1500 ohms resistance is measured, replace wire 10 (Para 8-48). (b) If 1500 ohms resistance is not measured, replace resistor (Para 8-9).



23. LOW OIL PRESSURE INDICATOR DOES NOT OPERATE.

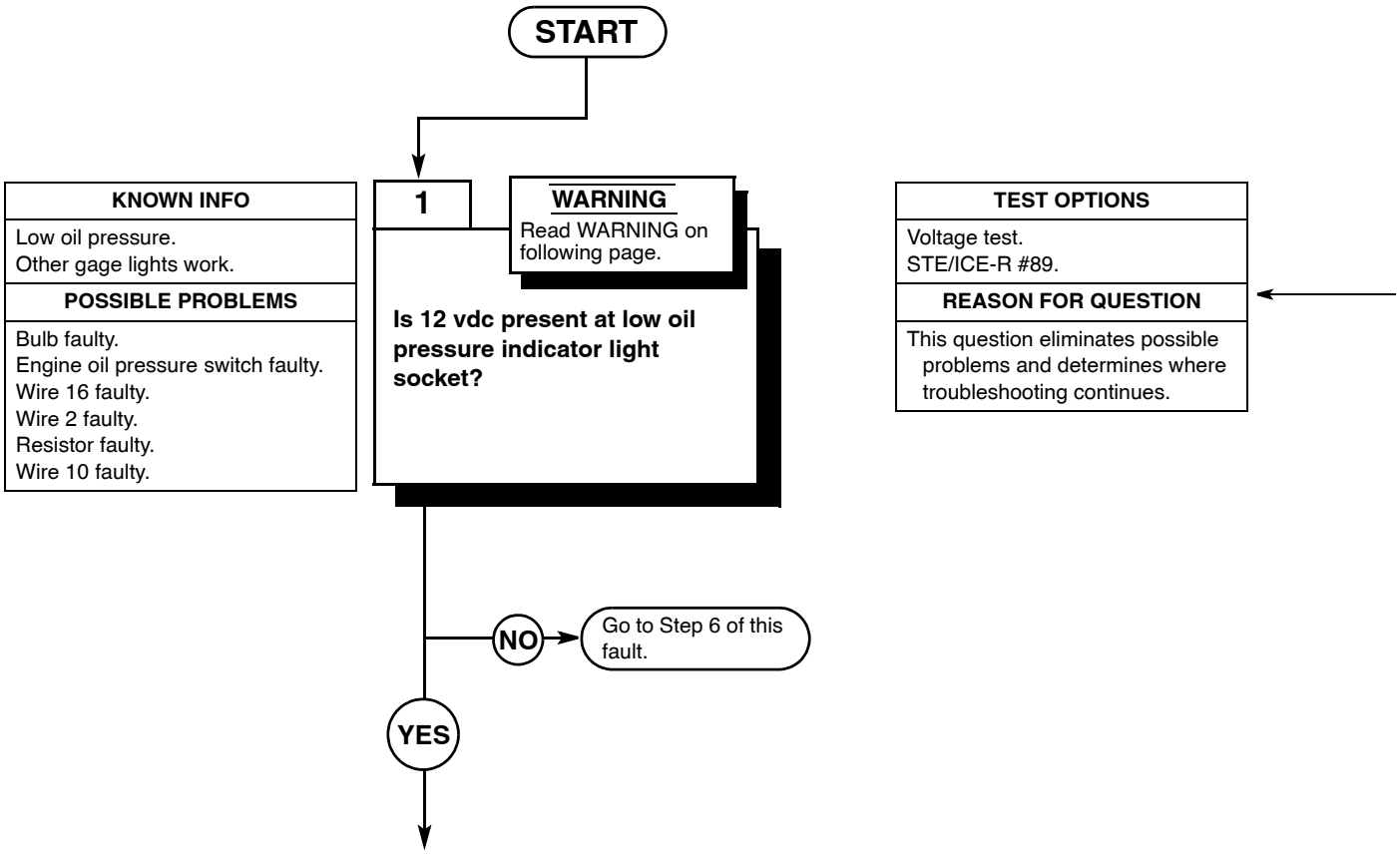
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

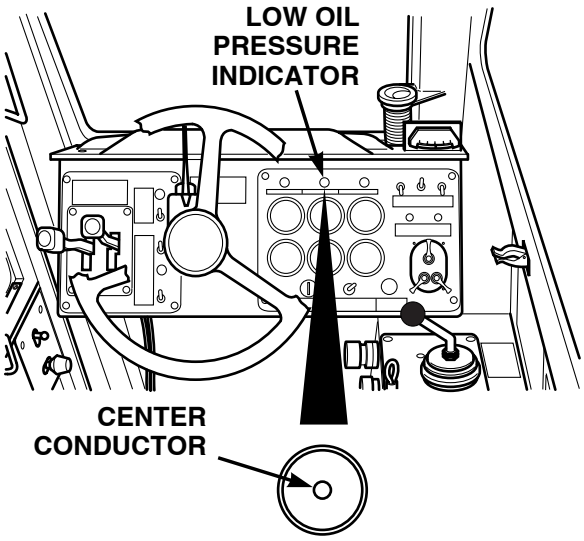
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove lens/bulb from low oil pressure indicator. (2) Set multimeter to volts dc. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect multimeter positive lead (+) to center conductor of low oil pressure indicator light socket. (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 12 vdc is present, go to Step 2 of this fault. (b) If 12 vdc is not present, go to Step 6 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10).



23. LOW OIL PRESSURE INDICATOR DOES NOT OPERATE (CONT).

KNOWN INFO
Low oil pressure. Other gage lights work.
POSSIBLE PROBLEMS
Bulb faulty. Engine oil pressure switch faulty. Wire 16 faulty. Wire 2 faulty.

2

Is continuity present across low oil pressure lens/bulb?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, replace bulb.

NO → Replace faulty bulb (Para 8-9).

YES

KNOWN INFO
Low oil pressure. Other gages work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Engine oil pressure switch faulty. Wire 16 faulty. Wire 2 faulty.

3

Is continuity present between low oil pressure indicator light socket outside conductor and known good ground?

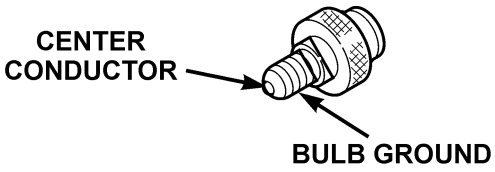
TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
This question determines where troubleshooting continues.

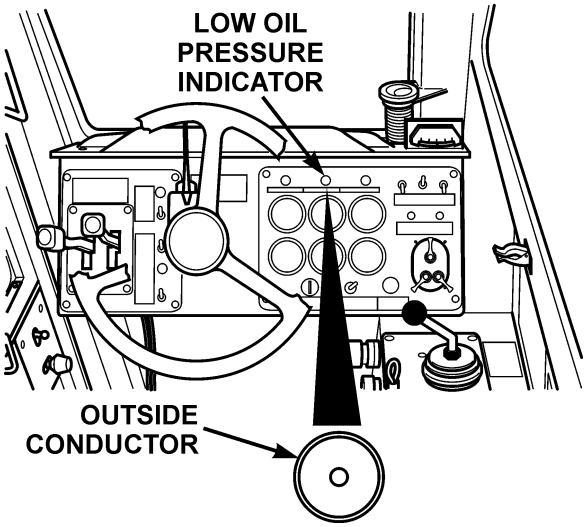
NO → Go to Step 4 of this fault.

YES

Go to Step 1 of this fault.

CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to center conductor of bulb. (3) Connect multimeter negative lead (–) to bulb ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, replace bulb (Para 8-9).





CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to outside conductor of low oil pressure indicator. (3) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, replace lens/bulb (Para 8-9). (b) If continuity is not present, go to Step 4 of this fault.

23. LOW OIL PRESSURE INDICATOR DOES NOT OPERATE (CONT).

KNOWN INFO
Low oil pressure. Other gage lights work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Parking brake switch faulty. Wire 16 faulty. Wire 2 faulty.

4

Is engine oil pressure switch OK (Para 8-14)?

TEST OPTIONS
Engine oil pressure switch test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, engine oil pressure switch is faulty.

NO → Replace engine oil pressure switch (Para 8-14).

YES

KNOWN INFO
Low oil pressure. Other gages work. 12 vdc present at socket. Bulb OK. Parking brake switch OK.
POSSIBLE PROBLEMS
Wire 16 faulty. Wire 2 faulty.

5

Is continuity present across wire 16?

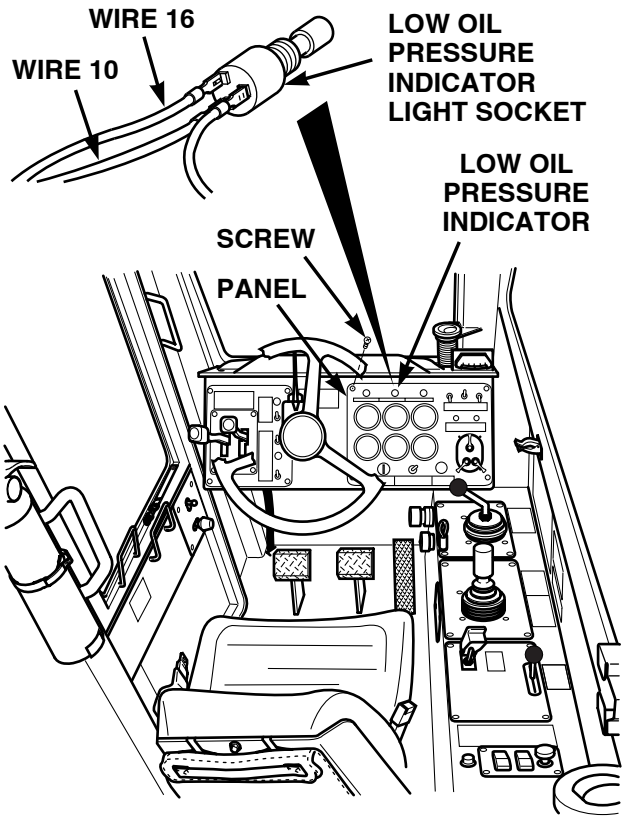
TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present across wire, wire is faulty.

NO → Replace or repair wire 16 (Para 8-48).

YES

ENGINE OIL PRESSURE SWITCH TEST
Refer to Paragraph 8-14.

CONTINUITY CHECK
(1) Remove four screws and panel. (2) Connect multimeter positive lead (+) to wire 16 at low oil pressure indicator terminal. (3) Connect multimeter negative lead (–) to wire 16 at engine oil pressure switch terminal with known good jumper wire. (a) If continuity is not present, replace wire 16 (Para 8-48). (b) If continuity is present, go to Step 6 of this fault.



23. LOW OIL PRESSURE INDICATOR DOES NOT OPERATE (CONT).

KNOWN INFO
Low oil pressure. Other gages work. 12 vdc not measured at socket.
POSSIBLE PROBLEMS
Resistor faulty. Wire 10 faulty.

6

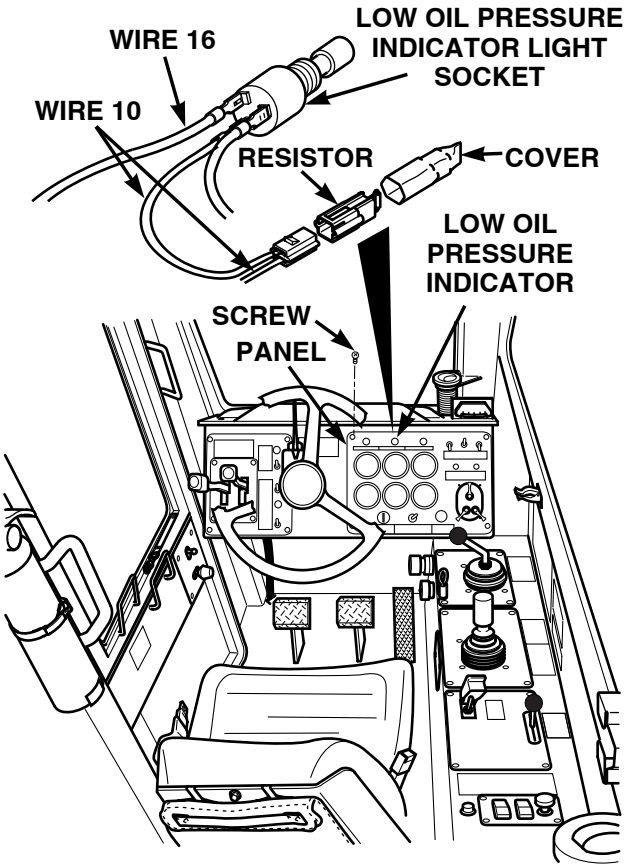
Are 1500 ohms present across resistor?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If 1500 ohms are not measured, resistor is faulty.

NO → Replace resistor (Para 8-9).

YES → Repair or replace wire 10 (Para 8-48).

RESISTANCE CHECK
(1) Attach multimeter positive lead (+) to resistor at circuit breaker side. (2) Attach multimeter negative lead (–) to resistor at light side. (a) If 1500 ohms resistance is measured, replace wire 10 (Para 8-48). (b) If 1500 ohms resistance is not measured, replace resistor (Para 8-9).



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24. HIGH TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE.

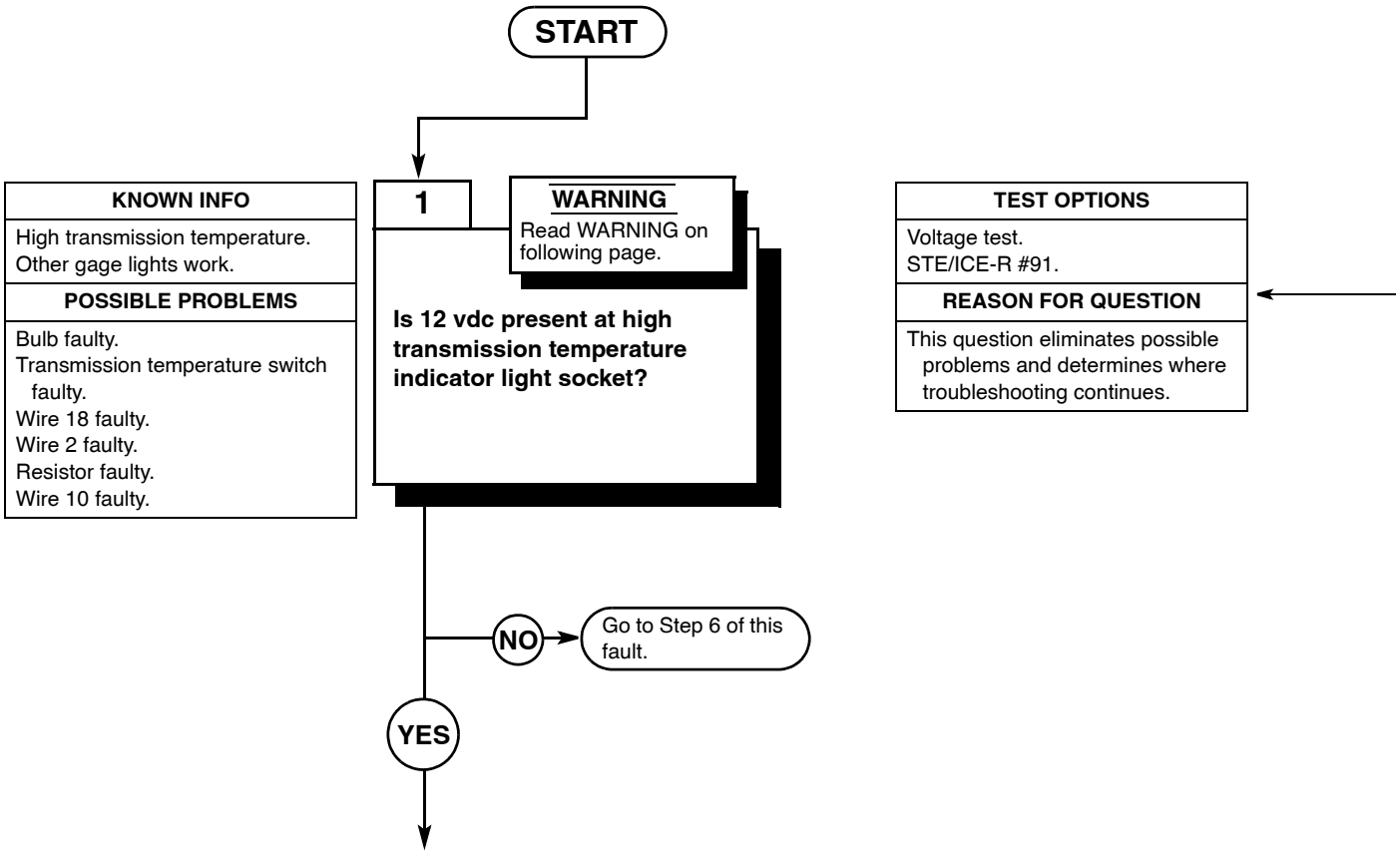
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

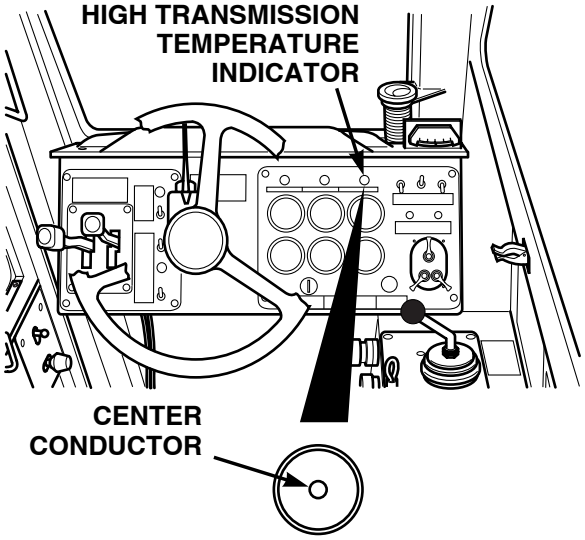
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove lens/bulb from high transmission temperature indicator. (2) Set multimeter to volts dc. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect multimeter positive lead (+) to center conductor of high transmission temperature indicator light socket. (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 12 vdc is present, go to Step 2 of this fault. (b) If 12 vdc is not present, go to Step 6 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10).



24. HIGH TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT).

KNOWN INFO
High transmission temperature. Other gage lights work.
POSSIBLE PROBLEMS
Bulb faulty. Transmission temperature switch faulty. Wire 18 faulty. Wire 2 faulty.

2

Is continuity present across high transmission temperature lens/bulb?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, replace bulb.

NO → Replace light bulb (Para 8-9).

YES

KNOWN INFO
High transmission temperature. Other gages work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Transmission temperature switch faulty. Wire 18 faulty. Wire 2 faulty.

3

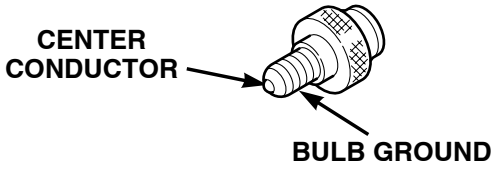
Is continuity present between high transmission temperature indicator light socket outside conductor and known good ground?

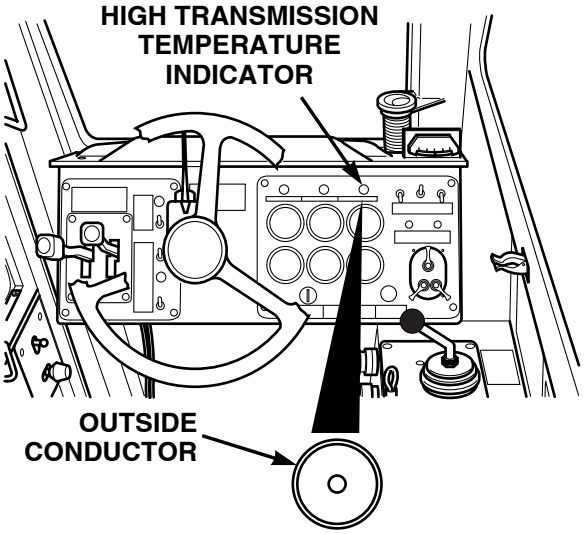
TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
This question determines where troubleshooting continues.

NO → Go to Step 4 of this fault.

YES → Go to Step 1 of this fault.

CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to center conductor of bulb. (3) Connect multimeter negative lead (–) to bulb ground. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, replace lens/bulb (Para 8-9).





CONTINUITY CHECK
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to outside conductor of high transmission temperature indicator. (3) Connect multimeter negative lead (–) to known good ground. (a) If continuity is present, replace lens/bulb (Para 8-9). (b) If continuity is not present, go to Step 4 of this fault.

24. HIGH TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT).

KNOWN INFO
High transmission temperature. Other gage lights work. 12 vdc present at socket. Bulb OK.
POSSIBLE PROBLEMS
Transmission temperature switch faulty. Wire 18 faulty. Wire 2 faulty.

4

Are 115 to 140 ohms measured across transmission temperature switch stabilized at 200°F (93.3°C) for 15 minutes?

TEST OPTIONS
Resistance check.
REASON FOR QUESTION
If correct resistance is not measured, transmission temperature switch is faulty.

NO → Replace transmission temperature switch (Para 8-16).

YES

KNOWN INFO
High transmission temperature. Other gages work. 12 vdc present at socket. Bulb OK. Transmission temperature switch OK.
POSSIBLE PROBLEMS
Wire 18 faulty. Wire 2 faulty.

5

Is continuity present across wire 18?

TEST OPTIONS
Continuity check. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present across wire, wire is faulty.

NO → Repair or replace wire 18 (Para 8-48).

YES

RESISTANCE CHECK

(1) Remove nut, lockwasher, washer, and wire 18 from transmission temperature switch.
(2) Remove transmission temperature switch from reducer.
(3) Hang transmission temperature switch in pan of water. Do not let switch make contact with pan.
(4) Place a thermometer in water.
(5) Put heat to pan of water and stir water for consistent temperature of 200°F (93.3°C). Allow water temperature to stabilize for 15 minutes.

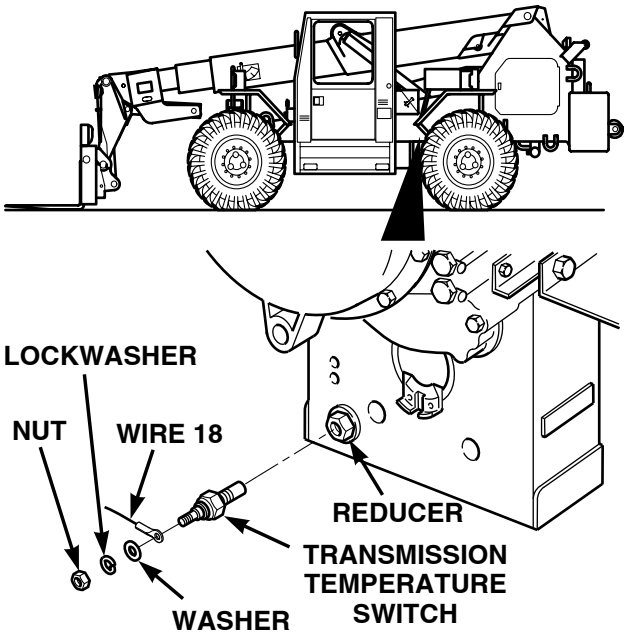
WARNING

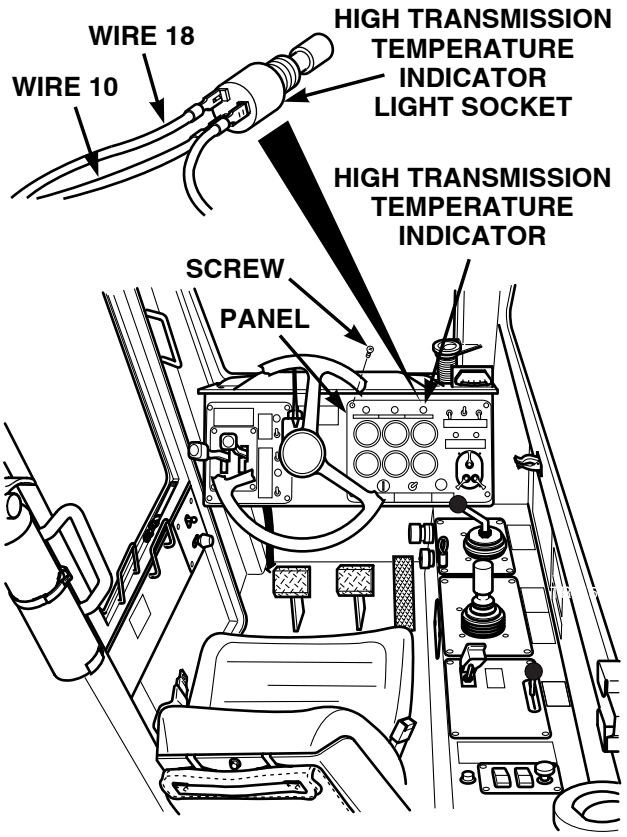
Do not allow fingers or skin to contact hot water or hot parts. Serious burns to personnel could result.

(6) Set multimeter to ohms.
(7) Connect multimeter positive lead (+) to stud of transmission temperature switch.
(8) Connect multimeter negative lead (–) to hex or large threads of transmission temperature switch.
  (a) If 115 to 140 ohms are not measured, replace transmission temperature switch (Para 8-16).
  (b) If 115 to 140 ohms are measured, install transmission temperature switch (Para 8-16) and go to Step 5 of this fault.

CONTINUITY CHECK

(1) Remove four screws and panel.
(2) Connect multimeter positive lead (+) to wire 18 at high transmission temperature indicator terminal.
(3) Using a known good jumper wire, connect multimeter negative lead (–) to wire 18 at transmission temperature switch terminal.
  (a) If continuity is not present, replace wire 18 (Para 8-48).
  (b) If continuity is present, go to Step 6 of this fault.





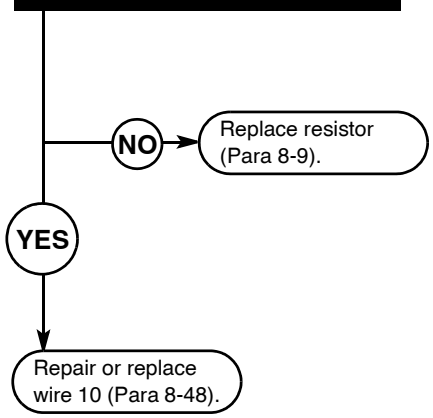
24. HIGH TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT).

KNOWN INFO
Parking brake OK. Other gages work. 12 vdc not measured at socket.
POSSIBLE PROBLEMS
Resistor faulty. Wire 10 faulty.

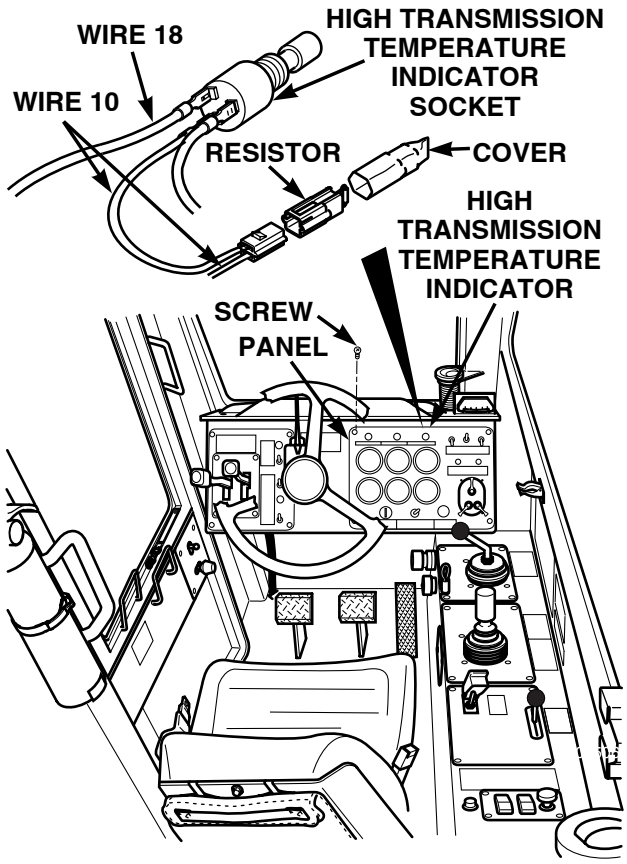
6

Are 1500 ohms present across resistor?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If 1500 ohms are not measured, resistor is faulty.



RESISTANCE TEST
(1) Remove cover and disconnect resistor from connector. (2) Attach multimeter positive lead (+) to resistor at circuit breaker side. (3) Attach multimeter negative lead (–) to resistor at light side. (a) If 1500 ohms resistance is measured, replace wire 10 (Para 8-48). (b) If 1500 ohms resistance is not measured, replace resistor (Para 8-9).



25. FRONT WINDSHIELD WIPERS DO NOT OPERATE.

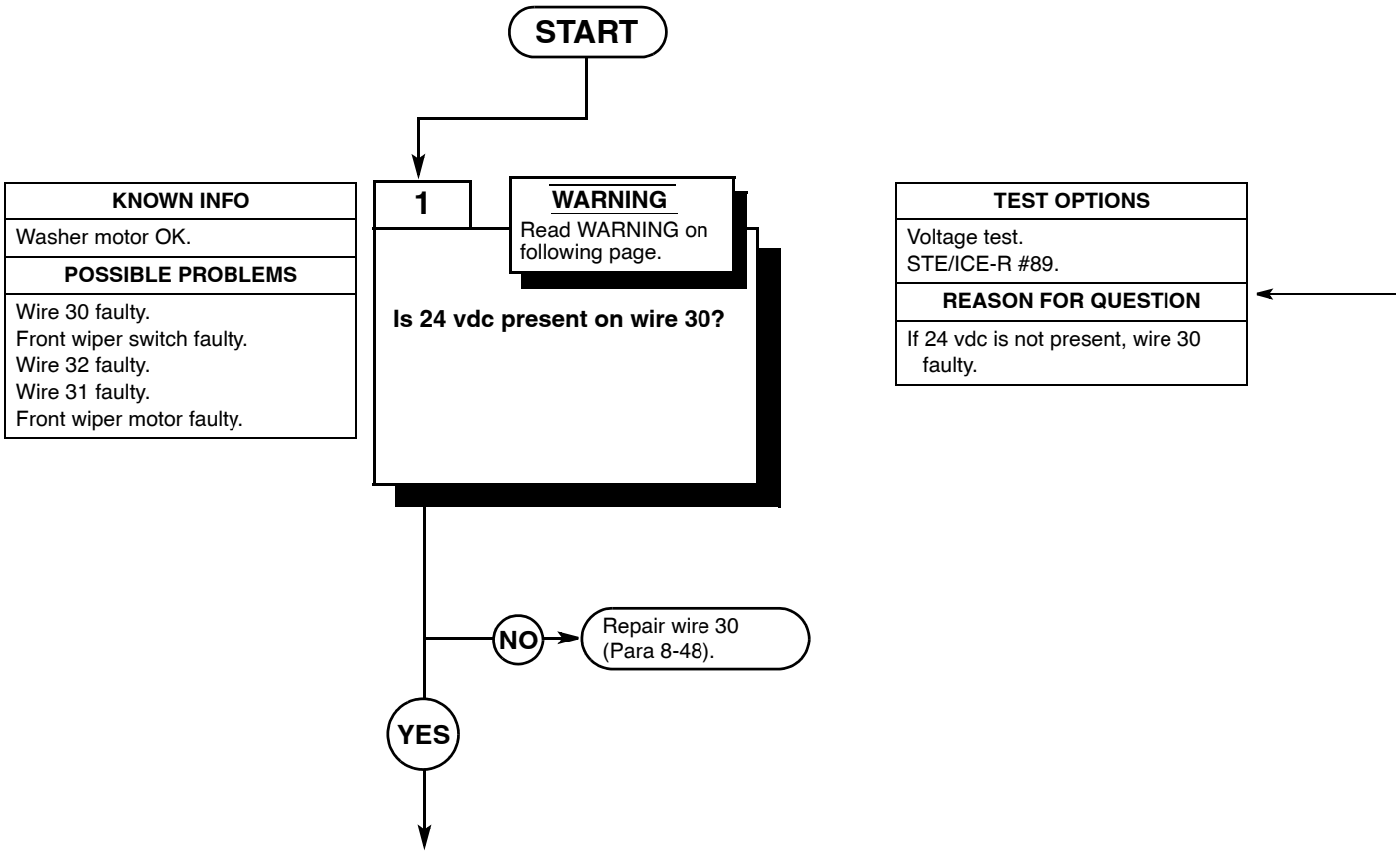
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

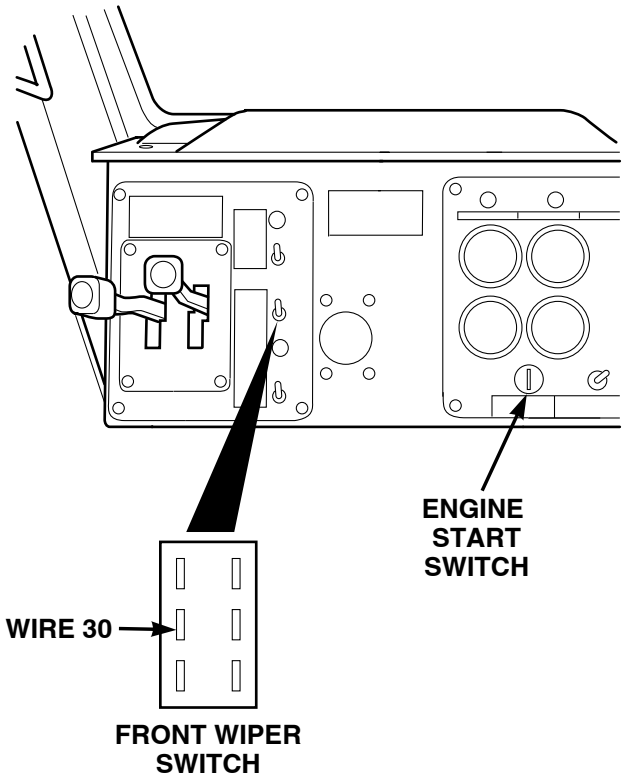
References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE CHECK
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable (Para 8-44). (3) Remove four screws from left-hand instrument panel. (4) Lift panel out to get to back of front wiper switch. (5) Set multimeter to volts dc. (6) Connect multimeter positive lead (+) to wire 30 where wire 30 connects to front wiper switch. (7) Connect multimeter negative lead (–) to known good ground. (8) Connect negative battery cable to negative side of battery (Para 8-44). (9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 2 of this fault. (b) If 24 vdc is not present, repair wire 30 (Para 8-48). (10) Turn engine start switch to OFF position (TM 10-3930-673-10). (11) Disconnect negative battery cable (Para 8-44).



25. FRONT WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor OK. Wire 30 OK.
POSSIBLE PROBLEMS
Front wiper switch faulty. Wire 32 faulty. Wire 31 faulty. Front wiper motor faulty.

2

Is 24 vdc present at front wiper switch where wire 31 connects (HIGH)?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, front wiper switch faulty.

NO → Replace front wiper switch (Para 8-7).

YES

KNOWN INFO
Washer motor OK. Wire 30 OK.
POSSIBLE PROBLEMS
Front wiper switch faulty. Wire 32 faulty. Wire 31 faulty. Front wiper motor faulty.

3

Is 24 vdc present at front wiper switch where wire 32 connects (LOW)?

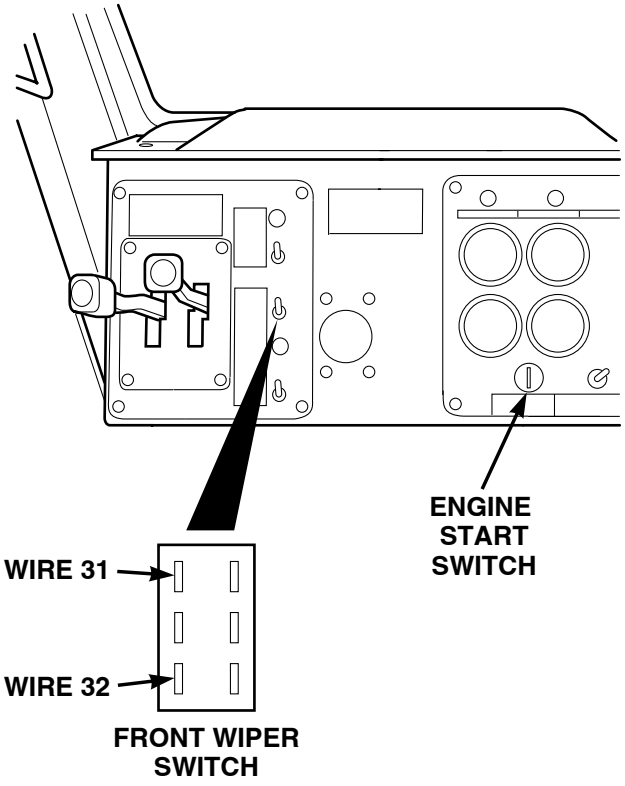
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, front wiper switch faulty.

NO → Replace front wiper switch (Para 8-7).

YES

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 31 where wire 31 connects to front wiper switch. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn front wiper switch to HI position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, replace front wiper switch (Para 8-7). (7) Turn front wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch OFF (TM 10-3930-673-10). (9) Disconnect negative battery cable (Para 8-44).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 32 where wire 32 connects to front wiper switch. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn front wiper switch to LO position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, replace front wiper switch (Para 8-7). (7) Turn front wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch OFF (TM 10-3930-673-10). (9) Disconnect negative battery cable (Para 8-44).



25. FRONT WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor OK. Wire 30 OK. Front wiper switch OK.
POSSIBLE PROBLEMS
Wire 32 faulty. Wire 31 faulty. Front wiper motor faulty.

4

Is 24 vdc present on wire 32 where wire 32 connects to front wiper motor?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 32 faulty.

NO → Repair wire 32 (Para 8-48).

YES

KNOWN INFO
Washer motor OK. Wire 30 OK. Front wiper switch OK. Wire 32 OK.
POSSIBLE PROBLEMS
Wire 31 faulty. Front wiper motor faulty.

5

Is 24 vdc present on wire 31 where wire 31 connects to front wiper motor?

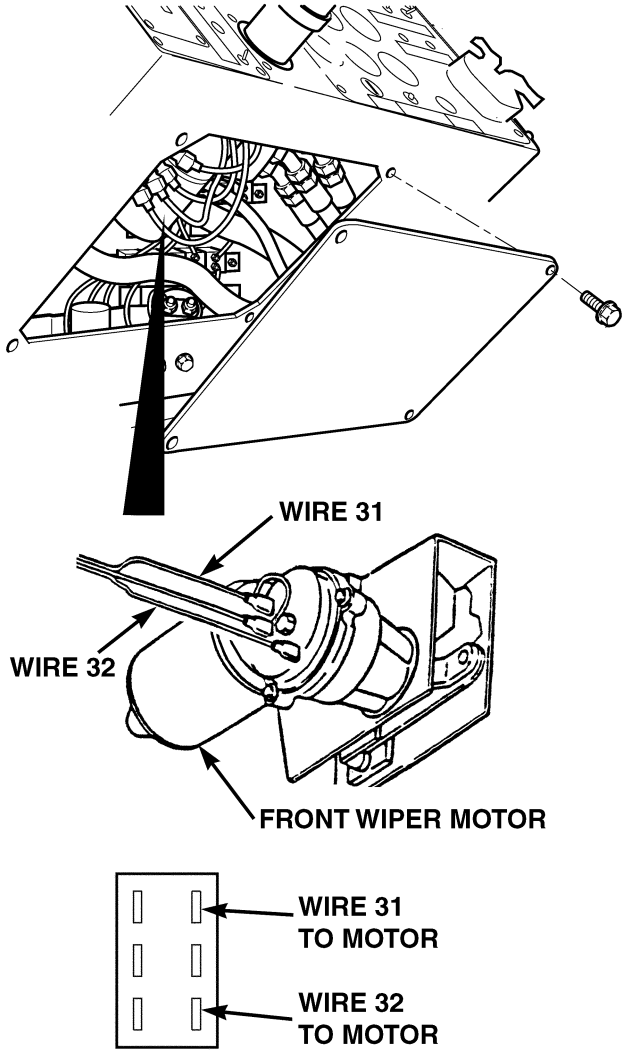
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 31 faulty.

NO → Repair wire 31 (Para 8-48).

YES → Replace front wiper motor (Para 17-2).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 32 where wire 32 connects to front wiper motor. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn front wiper switch to LO position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, repair wire 32 (Para 8-48). (7) Turn front wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch OFF (TM 10-3930-673-10). (9) Disconnect negative battery cable (Para 8-44).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 31 where wire 31 connects to front wiper motor. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn front wiper switch to HI position (TM 10-3930-673-10). (a) If 24 vdc is present, replace front wiper motor (Para 17-2). (b) If 24 vdc is not present, repair wire 31 (Para 8-48). (7) Turn front wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch OFF (TM 10-3930-673-10). (9) Install battery cover (Para 8-42). (10) Install four screws to secure left-hand instrument panel.



26. REAR WINDSHIELD WIPERS DO NOT OPERATE.

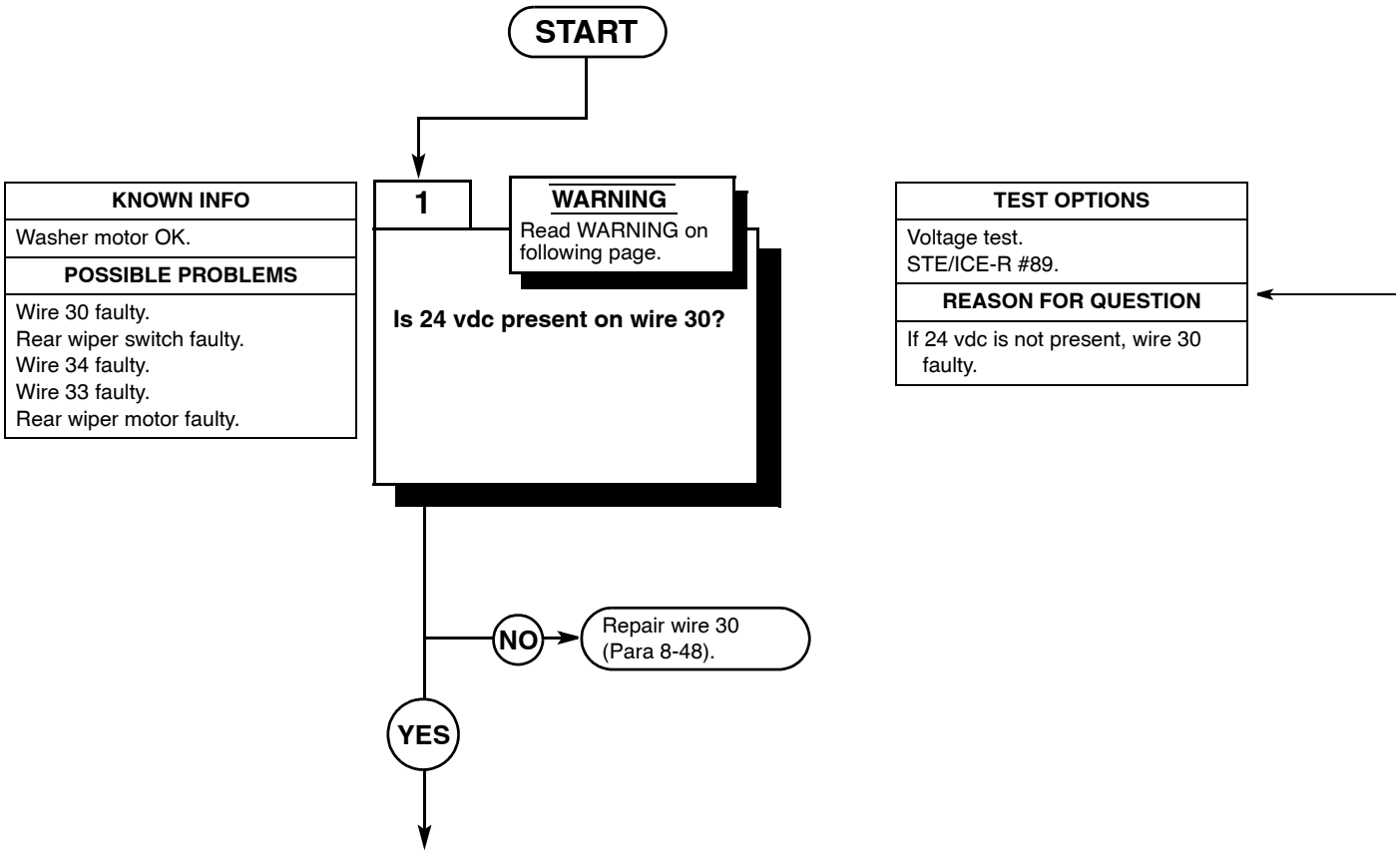
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

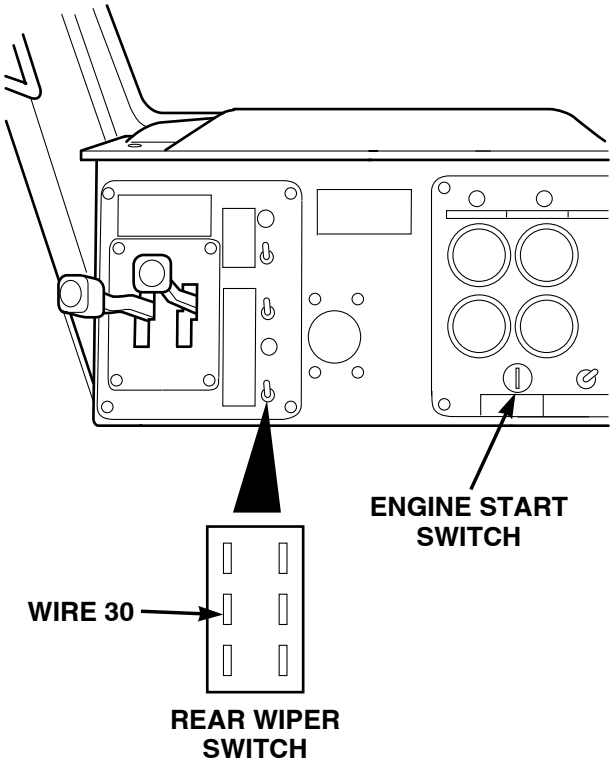


WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE CHECK

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable (Para 8-44).
(3) Remove four screws from left-hand instrument panel.
(4) Lift panel out to get to back of rear wiper switch.
(5) Set multimeter to volts dc.
(6) Connect multimeter positive lead (+) to wire 30 where wire 30 connects to rear wiper switch.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-44).
(9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 2 of this fault.
  (b) If 24 vdc is not present, repair wire 30 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable (Para 8-44).



26. REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor OK. Wire 30 OK.
POSSIBLE PROBLEMS
Rear wiper switch faulty. Wire 34 faulty. Wire 33 faulty. Rear wiper motor faulty.

2

Is 24 vdc present at rear wiper switch where wire 33 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, rear wiper switch faulty.

NO → Replace rear wiper switch (Para 8-7).

YES

KNOWN INFO
Washer motor OK. Wire 30 OK.
POSSIBLE PROBLEMS
Rear wiper switch faulty. Wire 34 faulty. Wire 33 faulty. Rear wiper motor faulty.

3

Is 24 vdc present at rear wiper switch where wire 34 connects?

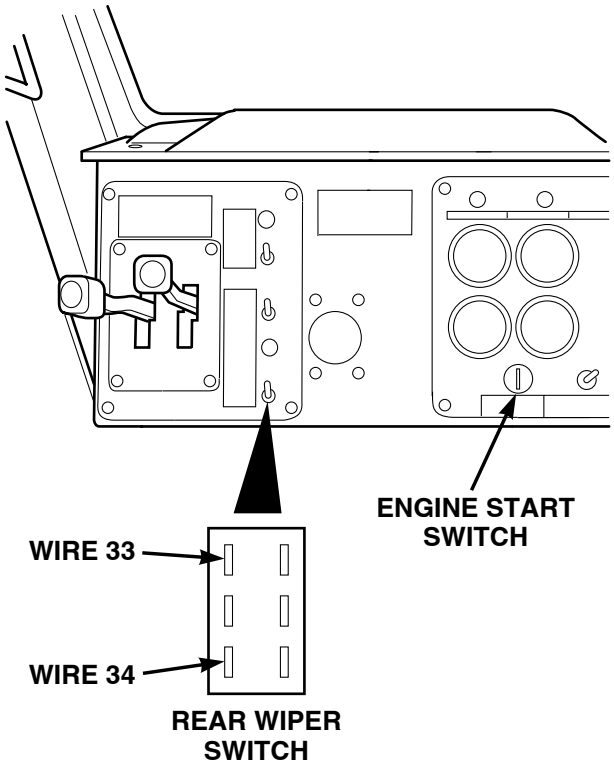
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, rear wiper switch faulty.

NO → Replace rear wiper switch (Para 8-7).

YES

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 33 where wire 33 connects to rear wiper switch. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn rear wiper switch to HI position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, replace rear wiper switch (Para 8-7). (7) Turn rear wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch OFF (TM 10-3930-673-10). (9) Disconnect negative battery cable (Para 8-44).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 34 where wire 34 connects to rear wiper switch. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn rear wiper switch to LO position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, replace rear wiper switch (Para 8-7). (7) Turn rear wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch OFF (TM 10-3930-673-10). (9) Disconnect negative battery cable (Para 8-44).



26. REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor OK. Wire 30. Rear wiper motor OK.
POSSIBLE PROBLEMS
Wire 34 faulty. Wire 33 faulty. Rear wiper motor faulty.

4

Is 24 vdc present at wire 34 where wire 34 connects to rear wiper motor?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 34 faulty.

NO → Repair wire 34 (Para 8-48).

YES

KNOWN INFO
Washer motor OK. Wire 30 OK. Rear wiper switch OK. Wire 34 OK.
POSSIBLE PROBLEMS
Wire 33 faulty. Rear wiper motor faulty.

5

If 24 vdc present at wire 33 where wire 33 connects to rear wiper motor?

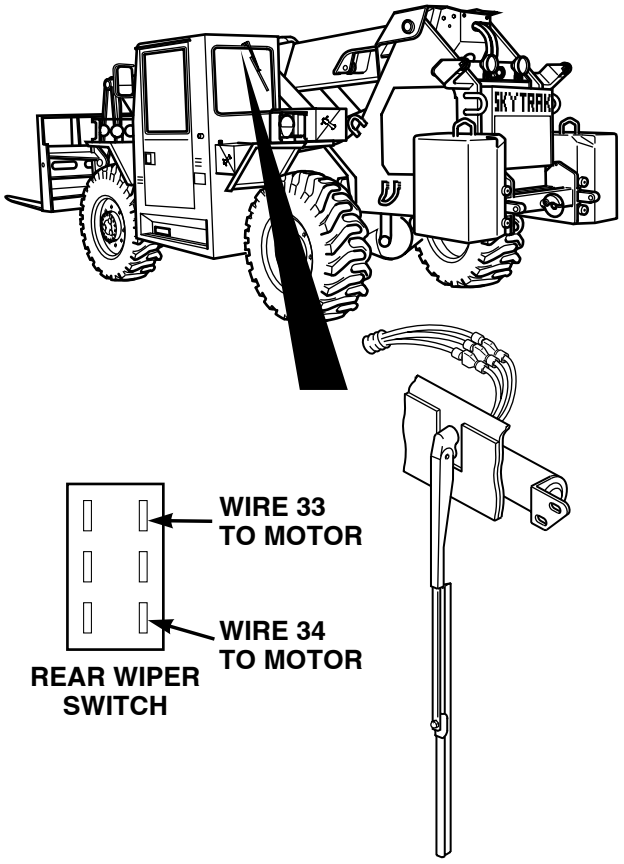
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 24 vdc is not present, wire 33 faulty.

NO → Repair wire 33 (Para 8-48).

YES → Replace rear wiper motor (Para 17-3).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Remove rear wiper motor from vehicle (Para 17-3). (3) Connect multimeter positive lead (+) to wire 34 where wire 34 connects to rear wiper motor. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn rear wiper switch to LO position (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, repair wire 34 (Para 8-48). (8) Turn rear wiper switch to OFF position (TM 10-3930-673-10). (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable (Para 8-44).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 33 where wire 33 connects to rear wiper motor. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn rear wiper switch to HI position (TM 10-3930-673-10). (a) If 24 vdc is present, replace rear wiper motor (Para 17-3). (b) If 24 vdc is not present, repair wire 33 (Para 8-48). (7) Turn rear wiper switch to OFF position (TM 10-3930-673-10). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Install rear wiper motor (Para 17-3). (10) Install battery cover (Para 8-42). (11) Install four screws to secure left-hand instrument panel.



27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE.

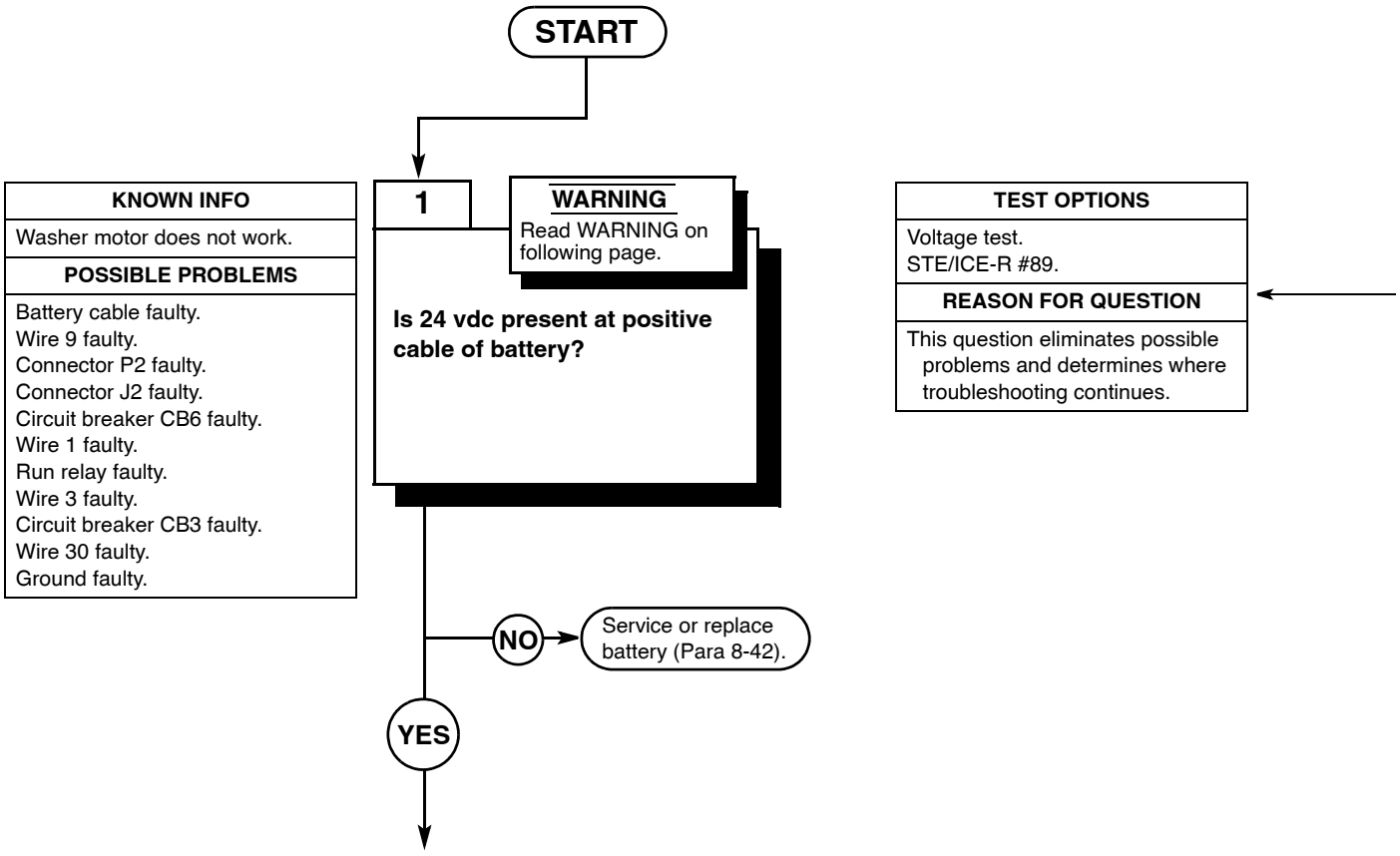
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

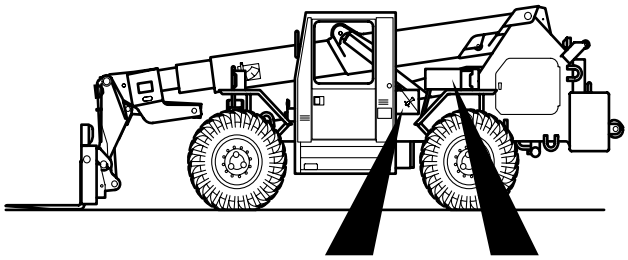
Personnel Required
Two

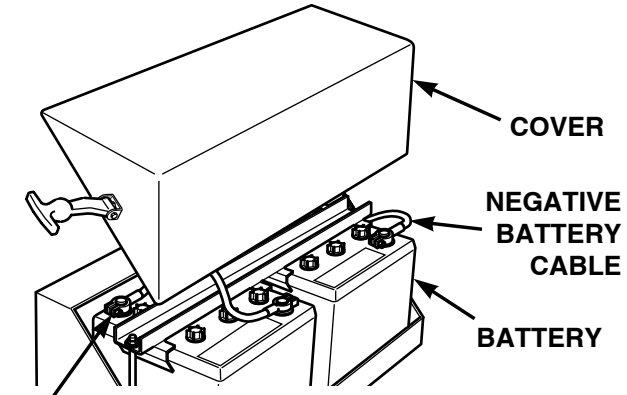
References
TM 10-3930-673-10
TM 9-4910-571-12&P

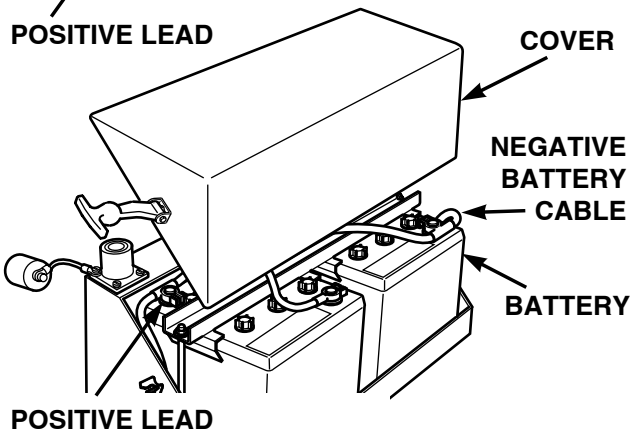


WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.







VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Set multimeter to volts dc. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect multimeter positive lead (+) to positive lead of battery. (a) If 24 vdc is present, go to Step 2 of this fault. (b) If 24 vdc is not present, service or replace battery (Para 8-42).

27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor does not work.
POSSIBLE PROBLEMS
Battery cable faulty. Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

2

Is 24 vdc present on positive battery cable where positive battery cable connects at starter motor solenoid?

NO → Repair battery cable (Para 8-42).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, battery cable faulty.

KNOWN INFO
Washer motor does not work. Battery cable OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

3

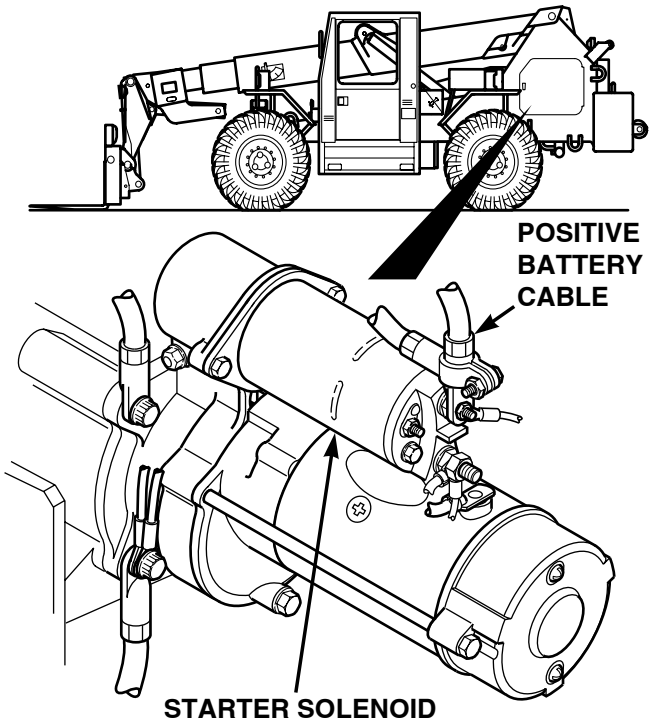
Is 24 vdc present on wire 9 where wire 9 connects to connector P2-1?

NO → Go to Step 12 of this fault.

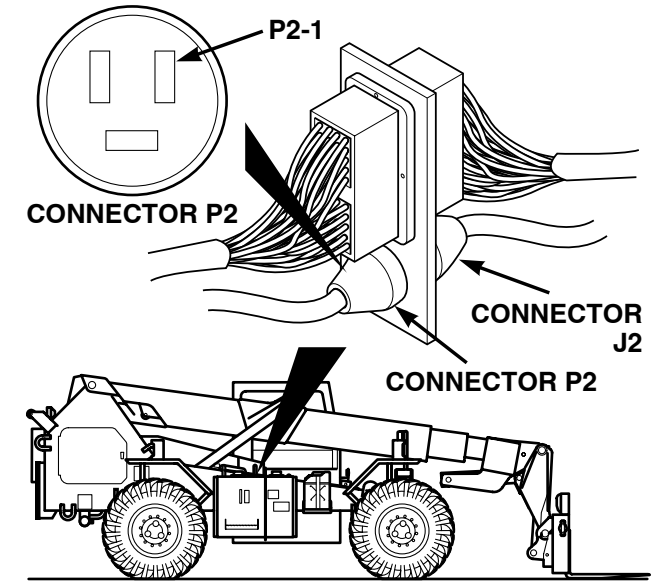
YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 or connector P2 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to starter motor solenoid where positive battery cable connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, repair battery cable (Para 8-42). (6) Disconnect negative battery cable from negative side of battery (Para 8-44).



VOLTAGE TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to connector P2-1. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, go to Step 12 of this fault. (6) Disconnect negative battery cable from negative side of battery (Para 8-44). (7) Connect connector J2 to connector P2.



27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor does not work. Battery cable OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

4

Is 24 vdc present on wire 9 where wire 9 connects to circuit breaker CB6?

NO → Go to Step 11 of this fault.

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 faulty.

KNOWN INFO
Washer motor does not work. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

5

Is 24 vdc present on wire 1 where wire 1 connects to circuit breaker CB6?

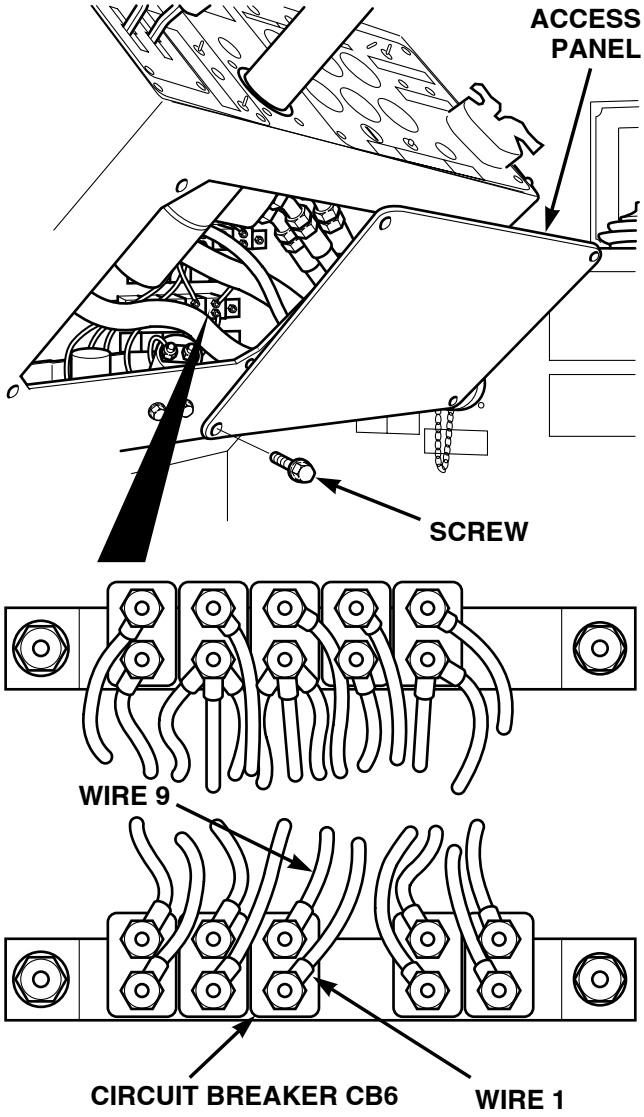
NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Remove four screws and access panel. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to circuit breaker CB6. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, go to Step 11 of this fault. (7) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 1 where wire 1 connects to circuit breaker CB6. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6. (5) Disconnect negative battery cable from negative side of battery (Para 8-44).



27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor does not work. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

6

Is 24 vdc present on wire 1 where wire 1 connects to relay K1?

NO → Repair wire 1 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 1 faulty.

KNOWN INFO
Washer motor does not work. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

7

Is 24 vdc present on wire 3 where wire 3 connects to relay K1?

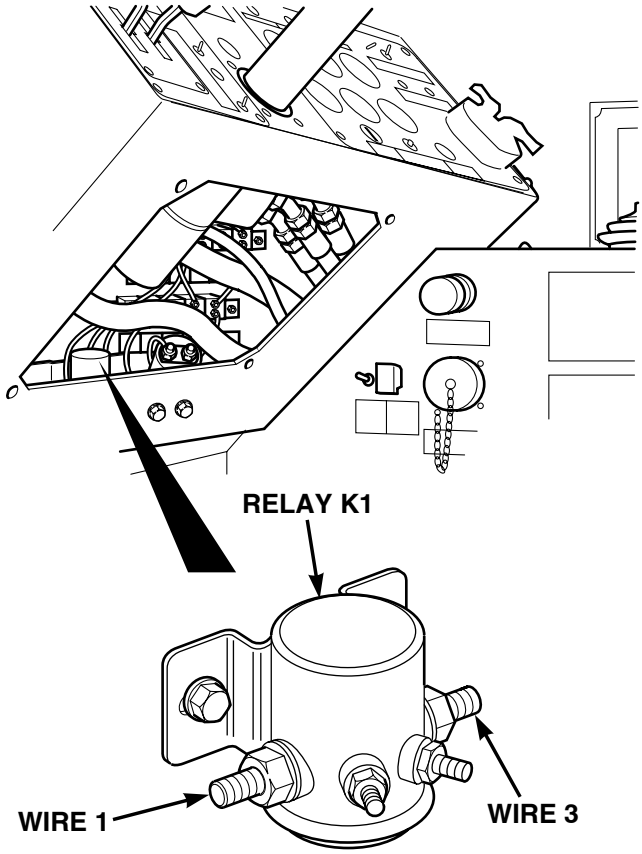
NO → Replace run relay (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, run relay faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to wire 1 where wire 1 connects to run relay. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-44). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 1. (6) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 3 where wire 3 connects to run relay. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 8 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor does not work. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

8

Is 24 vdc present on wire 3 where wire 3 connects to circuit breaker CB3?

NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 3 faulty.

KNOWN INFO
Washer motor does not work. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

9

Is 24 vdc present on wire 30 where wire 30 connects to circuit breaker CB3?

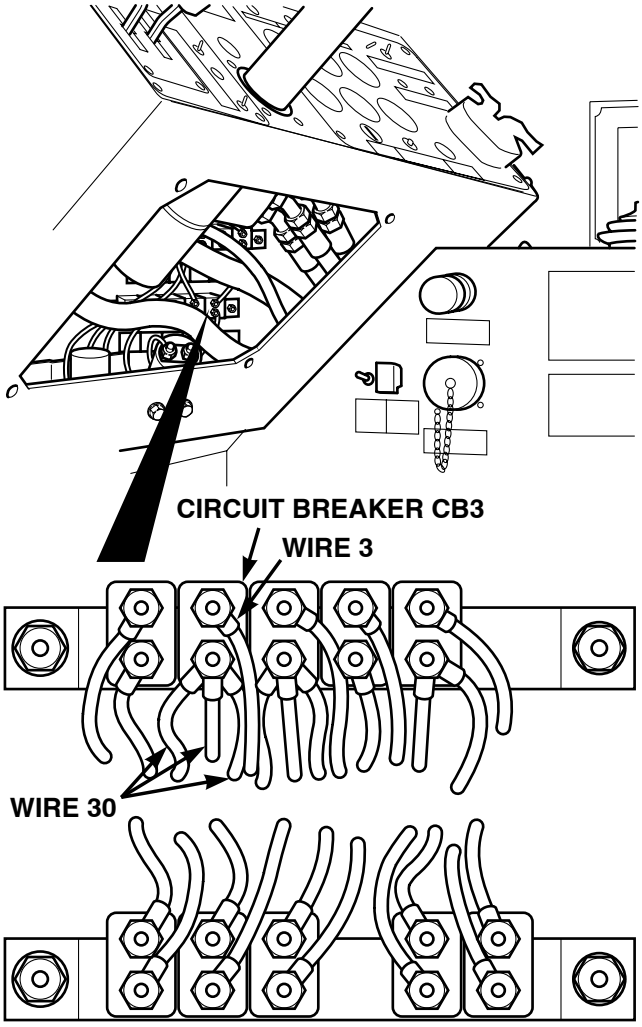
NO → Replace circuit breaker CB3 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB3 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to wire 3 where wire 3 connects to circuit breaker CB3. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable (1) to negative side of battery (Para 8-44). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 9 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-44).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 30 where wire 30 connects to circuit breaker CB3. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 10 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB3 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-44).



27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor does not work. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB3 OK.
POSSIBLE PROBLEMS
Wire 30 faulty. Ground faulty.

10

Is continuity present on wire 30 between where wire 30 connects to circuit breaker CB3 and washer switch?

NO → Repair wire 30 (Para 8-48).

YES → Repair ground (Para 8-48).

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If voltage is not present, wire 30 faulty.

KNOWN INFO
Washer motor does not work. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Battery cable faulty. Wire 1 faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

11

Is continuity present on wire 9 between wire 9 and connector J2-1?

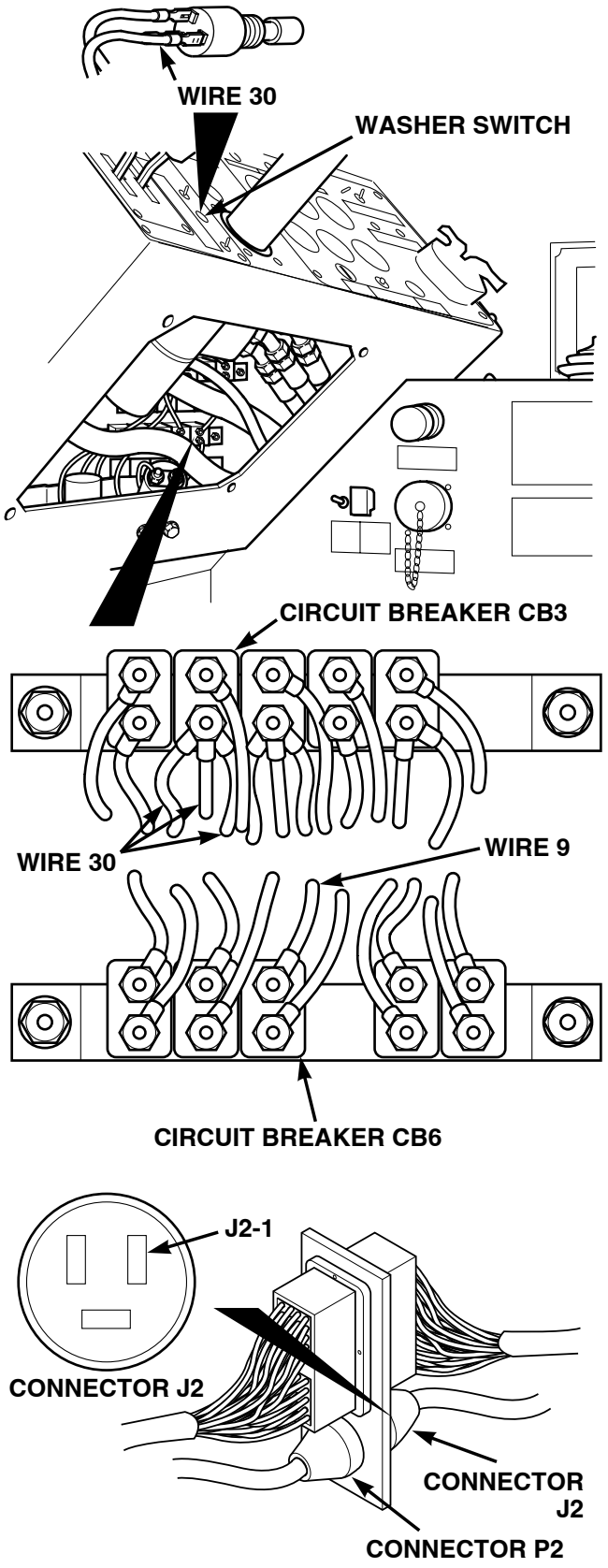
NO → Repair wire 9 or connector J2 (Para 8-48).

YES →

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, ground faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 30 where wire 30 connects to circuit breaker CB3. (4) Connect multimeter negative lead (–) to wire 30 where wire 30 connects to washer switch. (a) If continuity is present, repair ground wire. (b) If continuity is not present, repair wire 30. (5) Install access panel and four screws.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-44). (2) Disconnect connector J2 from connector P2. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to circuit breaker CB6. (5) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, go to Step 5 of this fault. (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48).



27. FRONT AND REAR WINDSHIELD WIPERS DO NOT OPERATE (CONT).

KNOWN INFO
Washer motor does not work. Wire 9 OK.
POSSIBLE PROBLEMS
Battery cable faulty. Wire 1 faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

12

Is continuity present on wire 9 between starter motor solenoid and connector P2-1?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 faulty.

NO → Repair wire 9 or connector P2 (Para 8-49).

YES → Go to Step 4 of this fault.

KNOWN INFO
Washer motor does not work.
POSSIBLE PROBLEMS
Battery cable faulty. Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Wire 3 faulty. Circuit breaker CB3 faulty. Wire 30 faulty. Ground faulty.

13

Is 24 voltage output 24 vdc on STE/ICE-R?

TEST OPTIONS
Voltage test. STE/ICE-R #82.
REASON FOR QUESTION
If voltage is not present, alternator faulty.

NO → Replace alternator (Para 8-2).

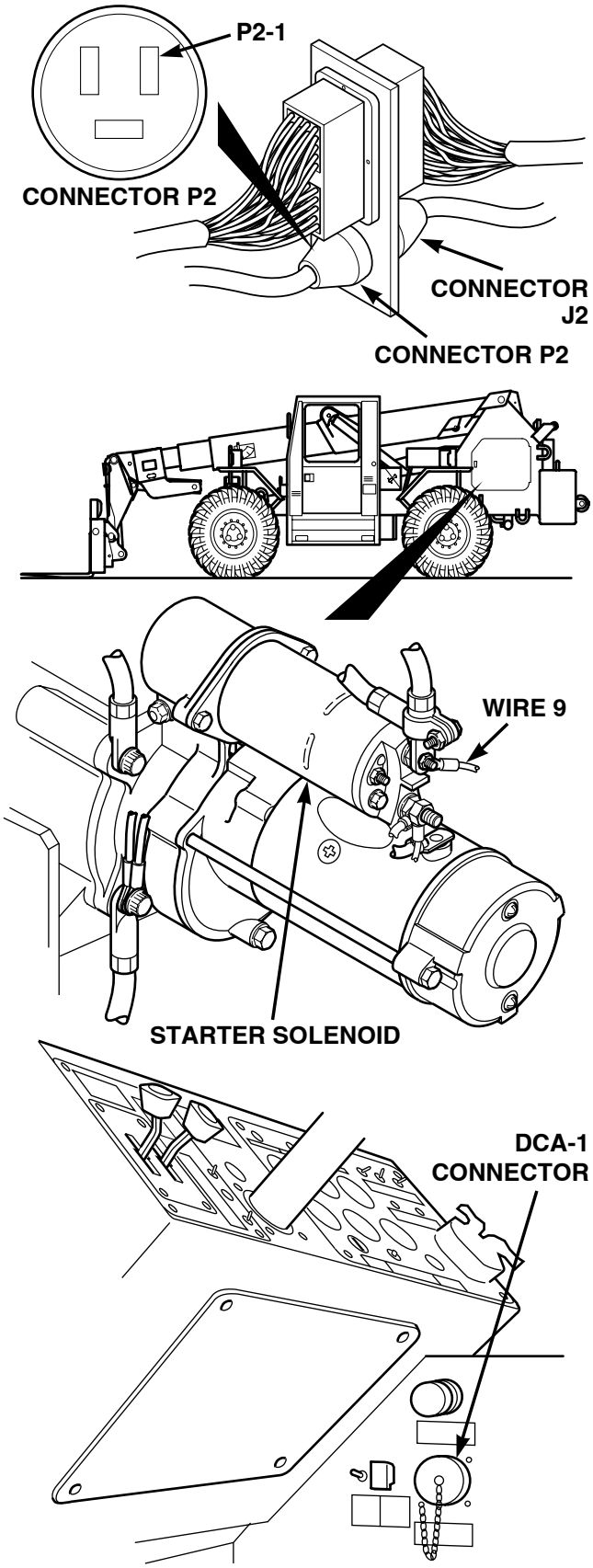
YES → Go to Step 4 of this fault.

CONTINUITY TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-44).
(2) Disconnect connector J2 from connector P2.
(3) Set multimeter to ohms.
(4) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to starter motor solenoid.
(5) Connect multimeter negative lead (–) to connector P2-1.
  (a) If continuity is present, go to Step 4 of this fault.
  (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).

VOLTAGE TEST

(1) Connect negative battery cable to negative side of battery.
(2) Remove dust cover from DCA-1 connector.
(3) Connect cable W1 to the Vehicle Test Meter (VTM) and DCA-1 connector.
(4) Power up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(5) Turn auxiliary fuel shut-off switch on.
(6) Start engine (TM 10-3930-763-10).
(7) Perform STE/ICE test #82.
(8) Press and release test button.
(9) Observe VTM display for test results.
  (a) If voltage is present at output of alternator, go to Step 4 of this fault.
  (b) If voltage is not present at output of alternator, replace alternator (Para 8-2).
(10) Shut off engine (TM 10-3930-673-10).
(11) Turn auxiliary fuel shut-off switch off.
(12) Power down STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(13) Disconnect DCA cable from DCA-1(2).
(14) Install battery cover (Para 8-42).



28. WINDSHIELD WASHER DOES NOT OPERATE.

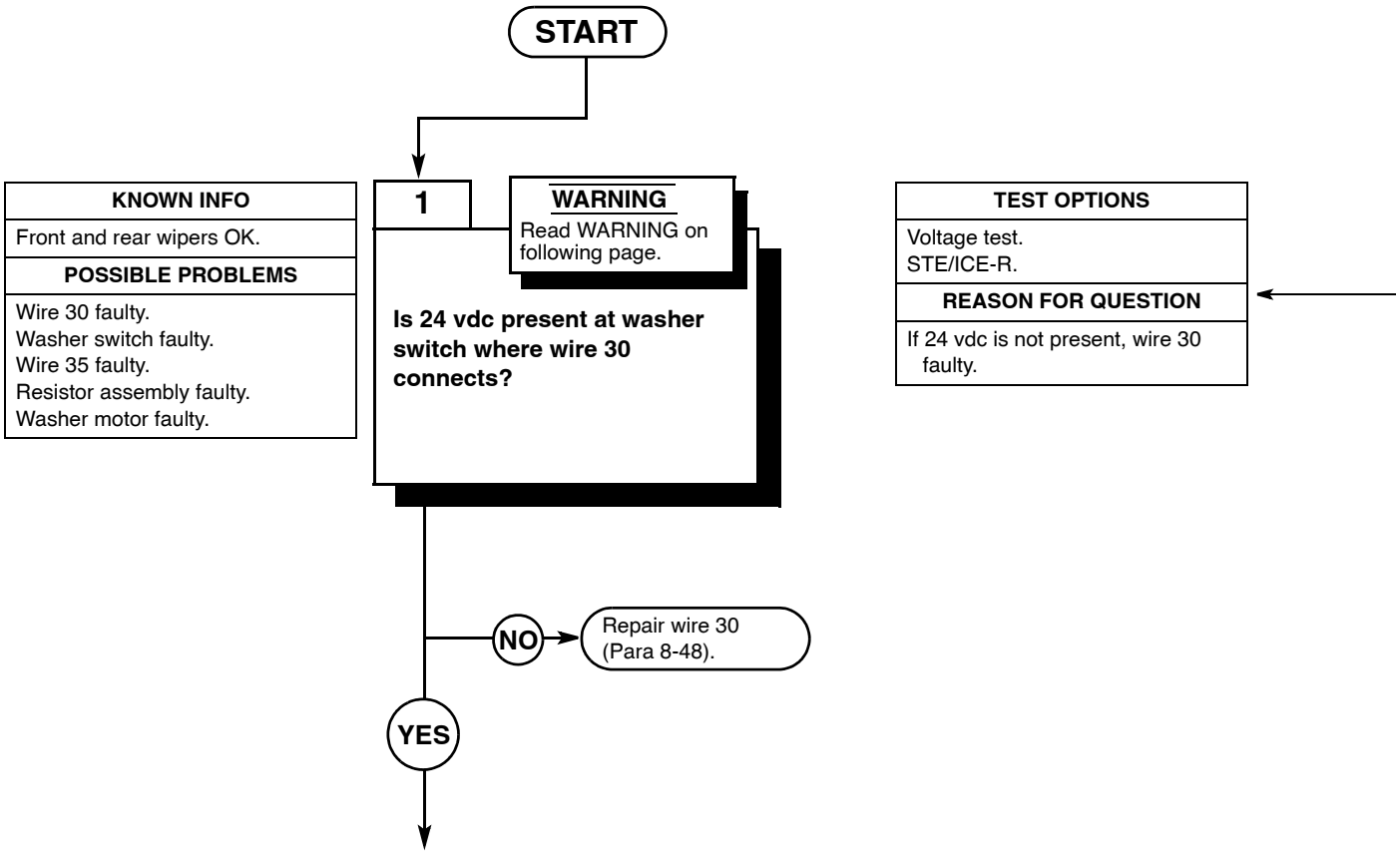
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

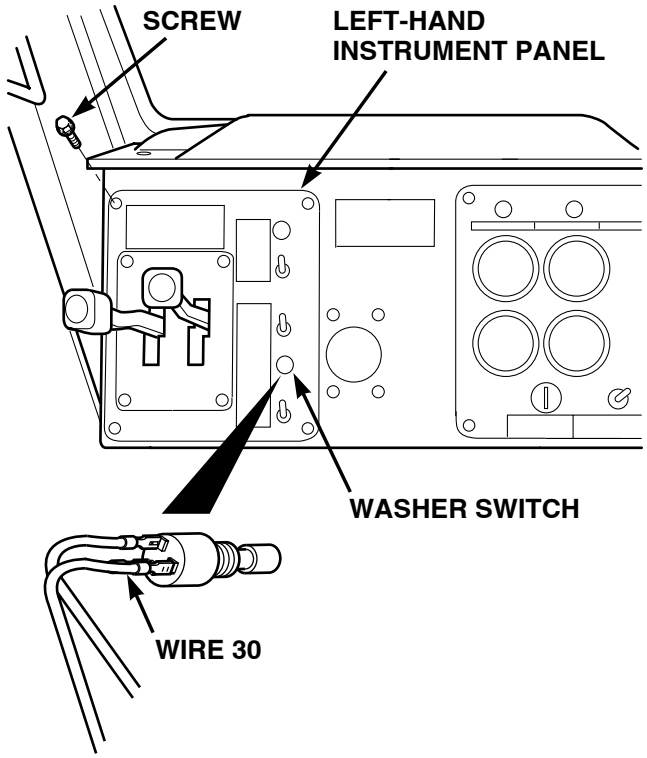


WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE CHECK

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable (Para 8-44).
(3) Remove four screws from left-hand instrument panel.
(4) Lift left-hand instrument panel out to get to washer switch.
(5) Set multimeter to volts dc.
(6) Connect multimeter positive lead (+) to wire 30 where wire 30 connects to washer switch.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-44).
(9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 2 of this fault.
  (b) If 24 vdc is not present, repair wire 30 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable (Para 8-44).



28. WINDSHIELD WASHER DOES NOT OPERATE (CONT).

KNOWN INFO
Washer motor OK. Wire 30 OK.
POSSIBLE PROBLEMS
Washer switch faulty. Wire 35 faulty. Resistor assembly faulty. Washer motor faulty.

2

Is 24 vdc present at washer switch where wire 35 connects?

TEST OPTIONS
Voltage test. STE/ICE-R.
REASON FOR QUESTION
If 24 vdc is not present, washer switch faulty.

NO → Replace washer switch (Para 8-7).

YES

KNOWN INFO
Washer motor OK. Wire 30 OK. Rear wiper switch OK.
POSSIBLE PROBLEMS
Wire 35 faulty. Resistor assembly faulty. Washer motor faulty.

3

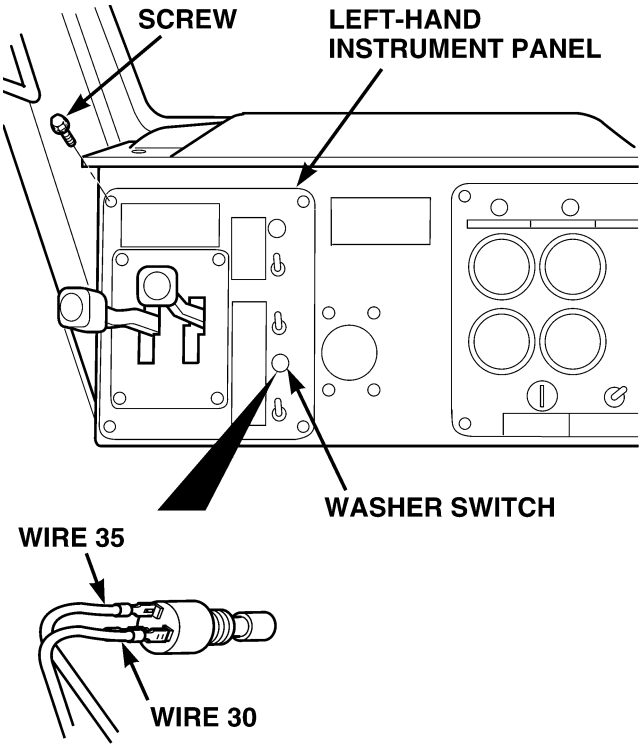
Is 24 vdc present at resistor assembly where wire 35 connects?

TEST OPTIONS
Voltage test. STE/ICE-R.
REASON FOR QUESTION
If 24 vdc is not present, wire 35 faulty.

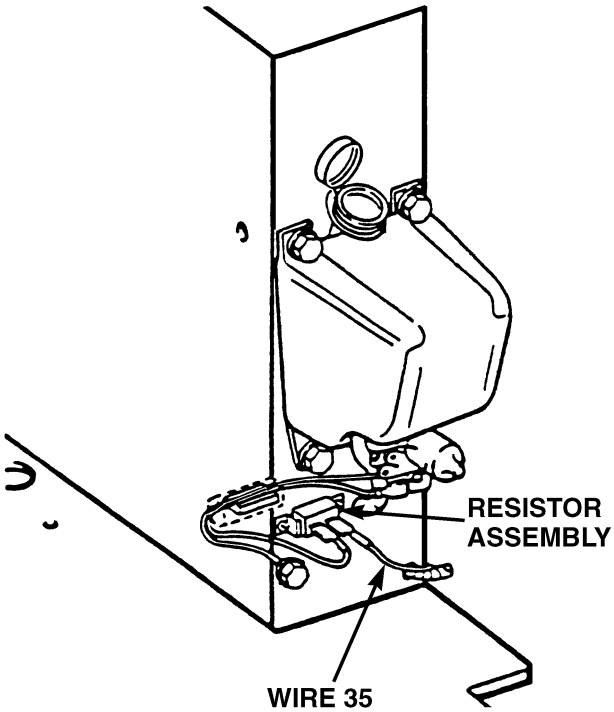
NO → Repair wire 35 (Para 8-48).

YES

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 35 where wire 35 connects to washer switch. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress washer switch (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, replace washer switch (Para 8-7). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable (Para 8-44).



VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 35 where wire 35 connects to resistor assembly. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress washer switch (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, repair wire 35. (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable (Para 8-44).



28. WINDSHIELD WASHER DOES NOT OPERATE (CONT).

KNOWN INFO
Washer motor OK. Wire 30 OK. Rear wiper switch OK.
POSSIBLE PROBLEMS
Wire 35 faulty. Washer motor faulty.

4

Is 24 vdc present at resistor assembly where wire 35 leads to washer motor?

TEST OPTIONS
Voltage test. STE/ICE-R.
REASON FOR QUESTION
If 24 vdc is not present, wire 35 faulty.

NO → Replace resistor assembly (Para 17-4).

YES

KNOWN INFO
Washer motor OK. Wire 30 OK. Rear wiper switch OK.
POSSIBLE PROBLEMS
Wire 35 faulty. Washer motor faulty.

5

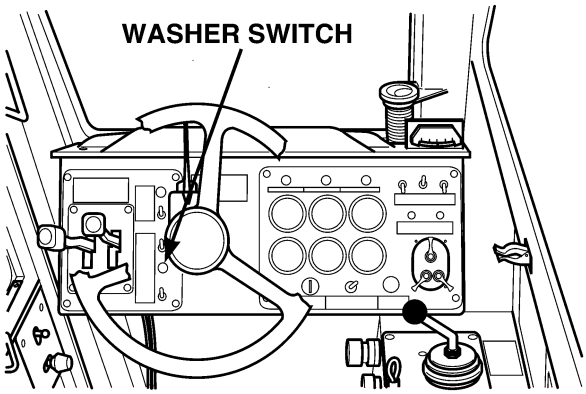
Is 24 vdc present on wire 35 where wire 35 connects to washer motor?

TEST OPTIONS
Voltage test. STE/ICE-R.
REASON FOR QUESTION
If 24 vdc is not present, wire 35 faulty.

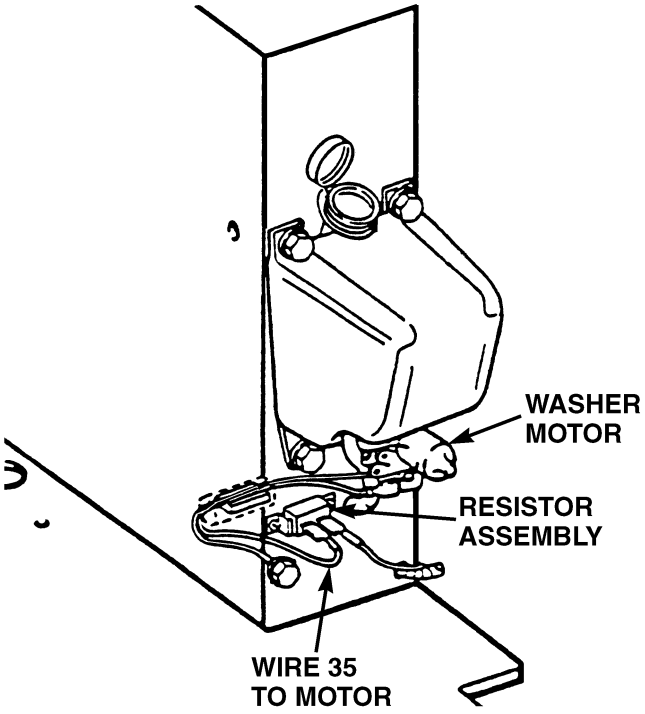
NO → Repair wire 35 (Para 8-48).

YES → Replace washer motor (Para 17-4).

VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 35 where wire 35 leaves resistor assembly. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress washer switch (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, replace resistor assembly (Para 17-4). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable (Para 8-44).



VOLTAGE CHECK
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 35 where wire 35 connects to motor. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-44). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Depress washer switch (TM 10-3930-673-10). (a) If 24 vdc is present, replace washer motor (Para 17-4). (b) If 24 vdc is not present, repair wire 35 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Install left-hand instrument panel and four screws. (9) Install battery cover (Para 8-42).



29. HEATER DOES NOT OPERATE.

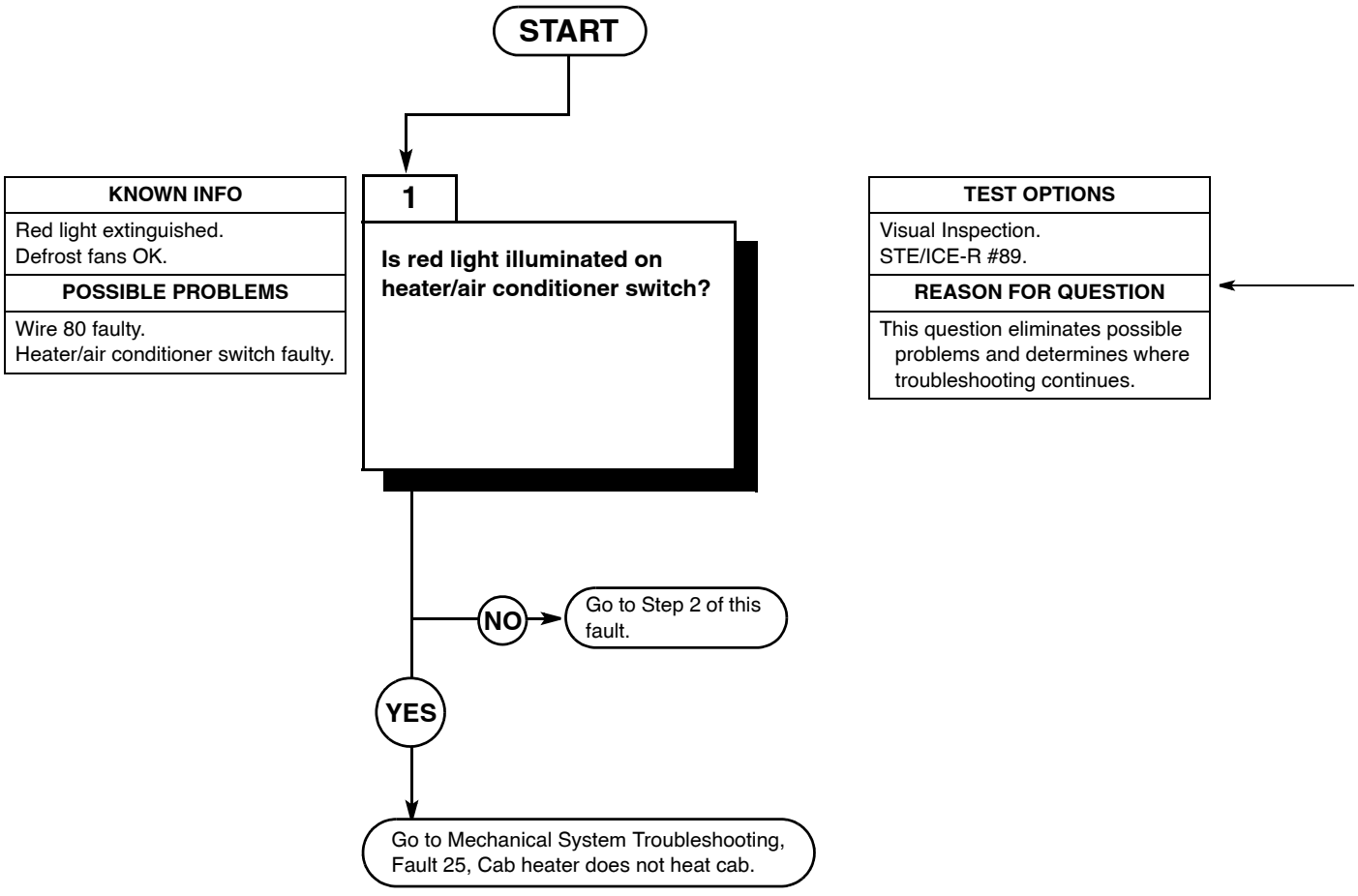
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

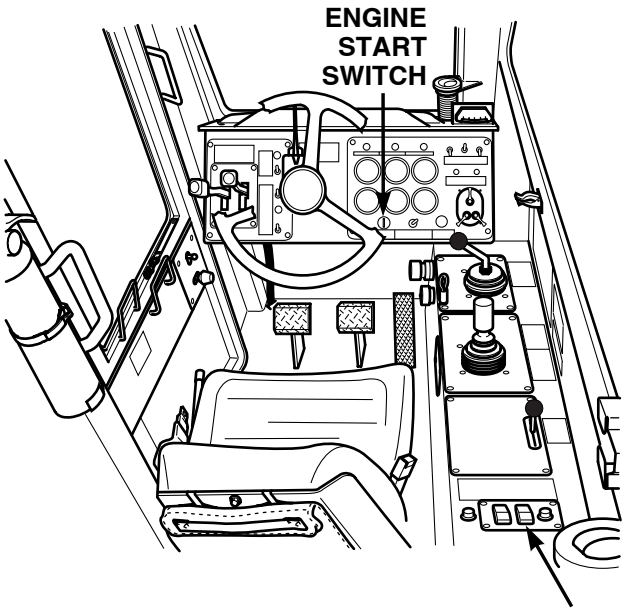
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (2) Turn heater/air conditioner switch to HEAT (TM 10-3930-673-10). (a) If light is illuminated, go to Mechanical System Troubleshooting Fault 25, Cab heater does not heat cab. (b) If light is not illuminated, go to Step 2 of this fault. (3) Turn heater/air conditioner switch OFF (TM 10-3930-673-10). (4) Turn engine start switch to OFF position (TM 10-3930-673-10).



29. HEATER DOES NOT OPERATE (CONT).

KNOWN INFO
Red light extinguished. Defrost fans OK.
POSSIBLE PROBLEMS
Wire 80 faulty. Heater/air conditioner switch faulty.

2

WARNING

Read WARNING on following page.

Is 24 vdc present at heater/air conditioner switch where wire 80 (red wire) connects pin 5?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 80 is faulty.

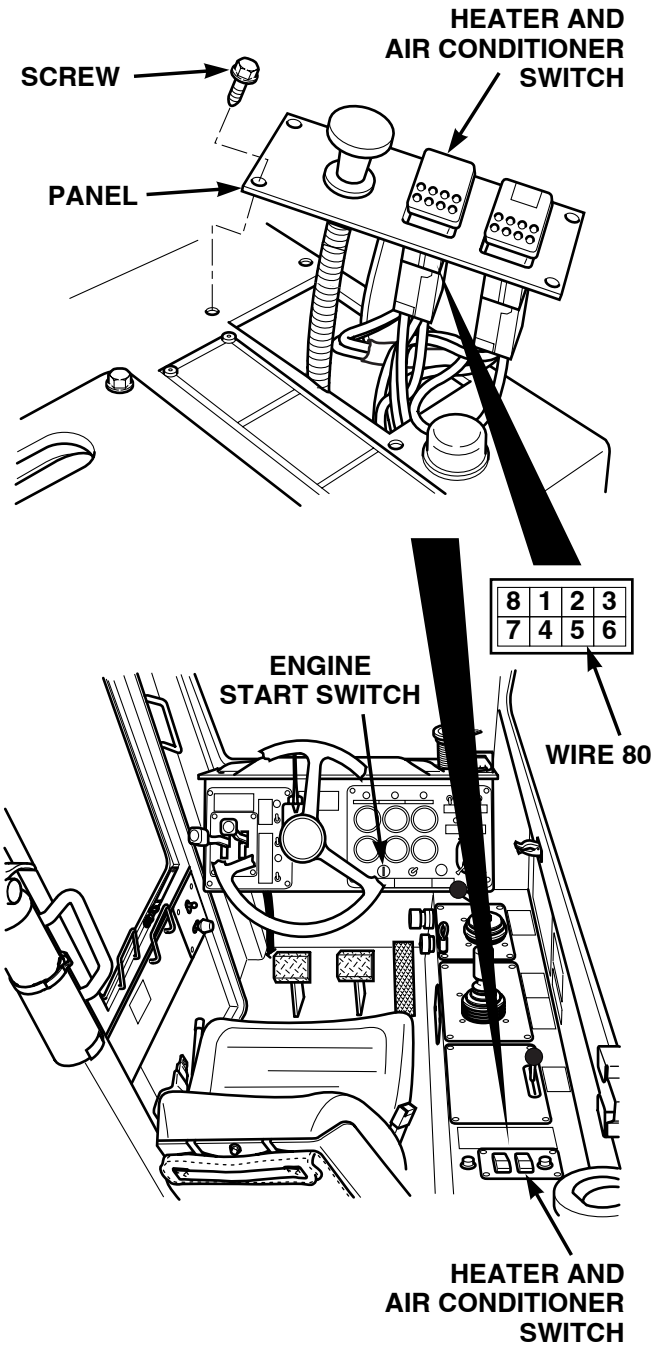
NO → Repair wire 80 (Para 8-48).

YES

WARNING

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock. Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Remove four screws from heater and air conditioner temperature control panel. (4) Set multimeter to volts dc. (5) Raise heater and air conditioner temperature control panel out to reach heater/air conditioner switch. (6) Connect multimeter positive lead (+) to heater/air conditioner switch where wire 80 (red wire) connects pin 5. (7) Connect multimeter negative lead (–) to known good ground. (8) Connect negative battery cable to negative side of battery (Para 8-42). (9) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, repair wire 80 (Para 8-48). (10) Turn engine start switch to OFF position (TM 10-3930-673-10). (11) Disconnect negative battery cable from negative side of battery (Para 8-42).



29. HEATER DOES NOT OPERATE (CONT).

KNOWN INFO
Red light extinguished. Defrost fans OK. Wire 80 OK.
POSSIBLE PROBLEMS
Heater/air conditioner switch faulty.

3

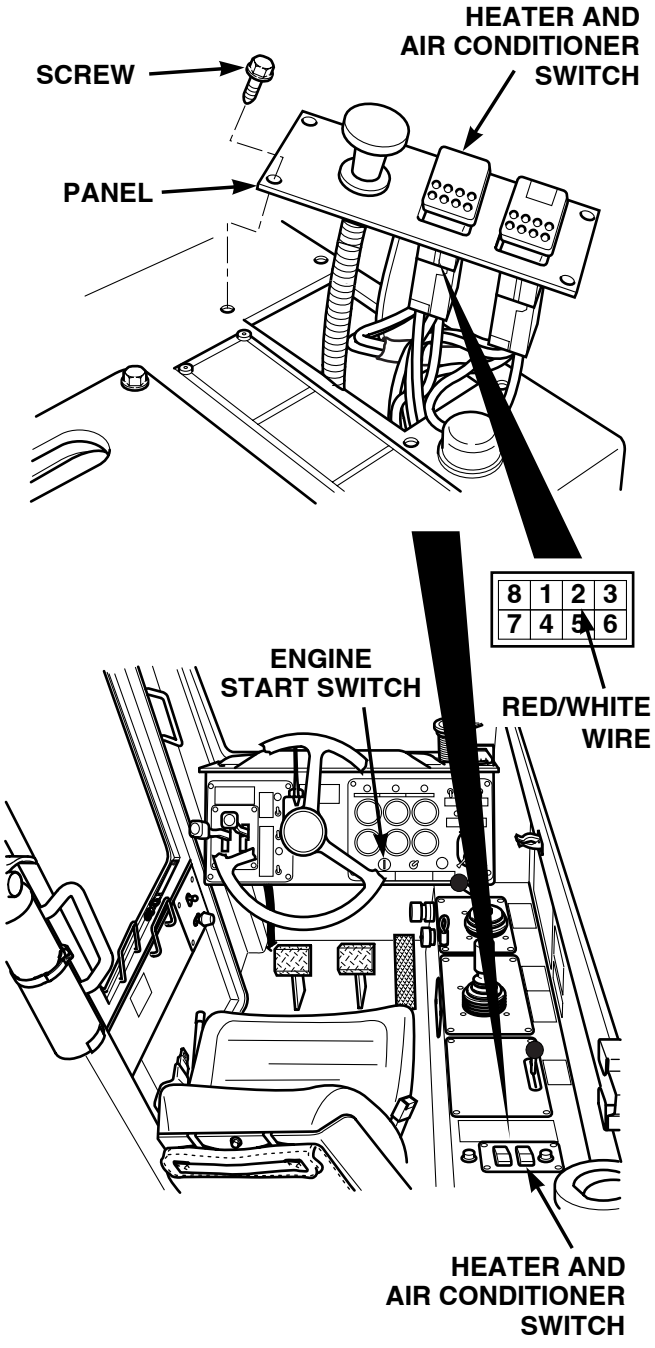
Is voltage present at heater/ air conditioner switch where red/white wire connects pin 2?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, heater/air conditioner switch is faulty.

NO → Replace heater/air conditioner switch (Para 8-7).

YES → Go to Mechanical System Troubleshooting, Fault 25, Cab heater does not heat cab.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to heater/air conditioner switch where red/white wire connects pin 2. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (5) Turn heater/air conditioner switch to HEATER (TM 10-3930-673-10) (a) If voltage is present, go to Mechanical System Troubleshooting, Fault 25, Cab heater does not heat cab. (b) If voltage is not present, replace heater/air conditioner switch (Para 8-7). (6) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (7) Turn engine start switch to OFF position (TM 10-3930-673-10).



30. AIR CONDITIONER DOES NOT OPERATE.

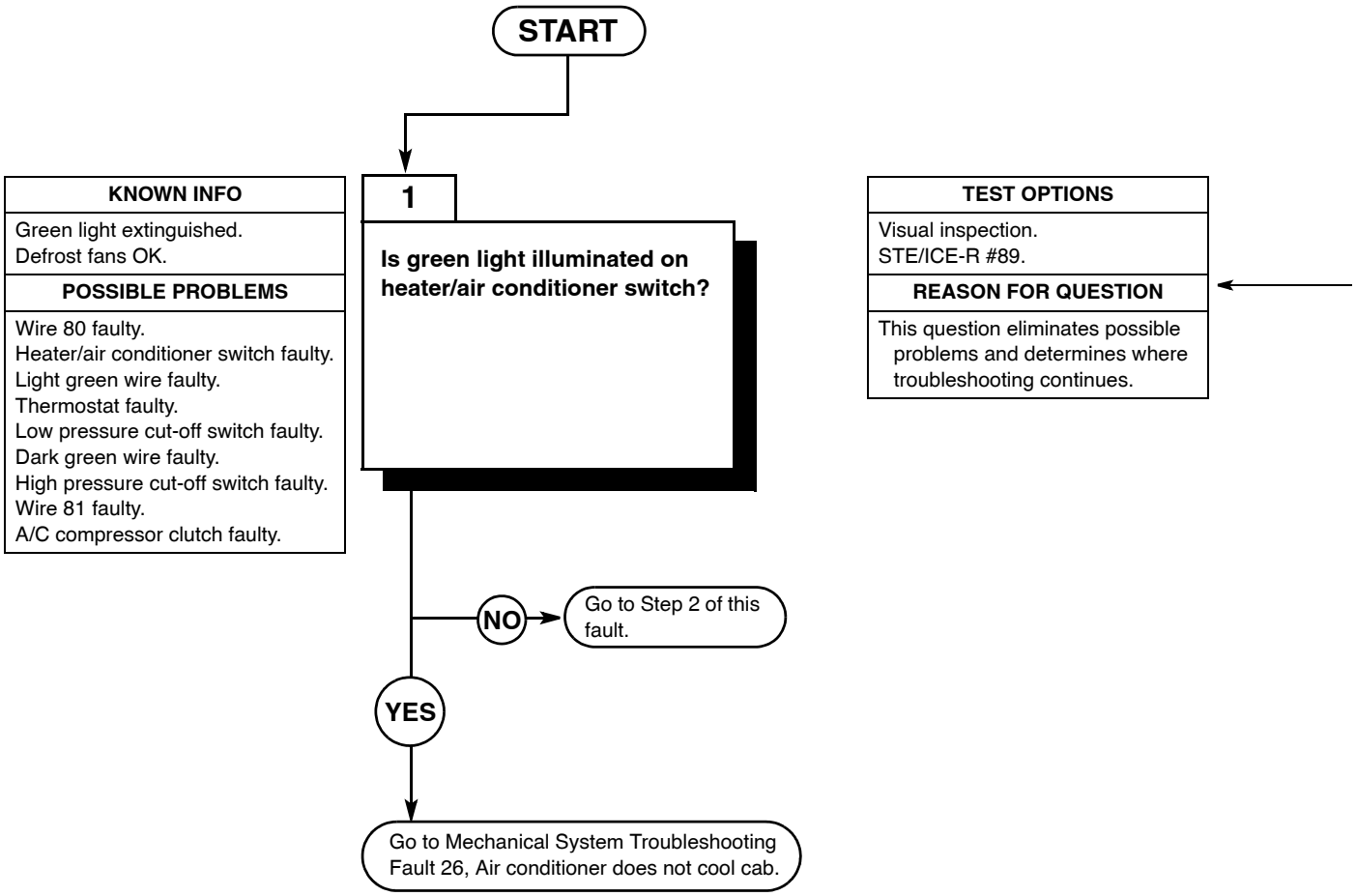
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

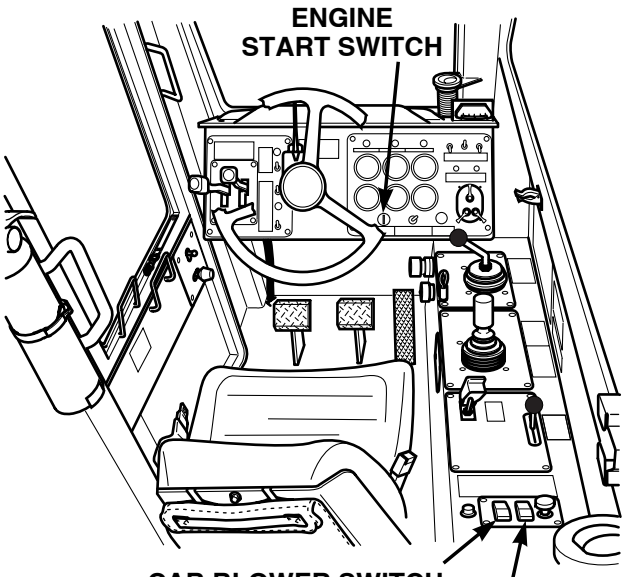
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (2) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10). (a) If light is illuminated, go to Mechanical System Troubleshooting, Fault 26, Air conditioner does not cool cab. (b) If light is not illuminated, go to Step 2 of this fault. (3) Turn heater/air conditioner switch OFF (TM 10-3930-673-10). (4) Turn engine start switch to OFF position (TM 10-3930-673-10).



30. AIR CONDITIONER DOES NOT OPERATE (CONT).

KNOWN INFO
Green light extinguished. Defrost fans OK.
POSSIBLE PROBLEMS
Wire 80 faulty. Heater/air conditioner switch faulty. Light green wire faulty. Thermostat faulty. Low pressure cut-off switch faulty. Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

2

WARNING

Read WARNING on following page.

Is 24 vdc present at heat/air conditioner switch where wire 80 (red wire) connects pin 5?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 80 is faulty.

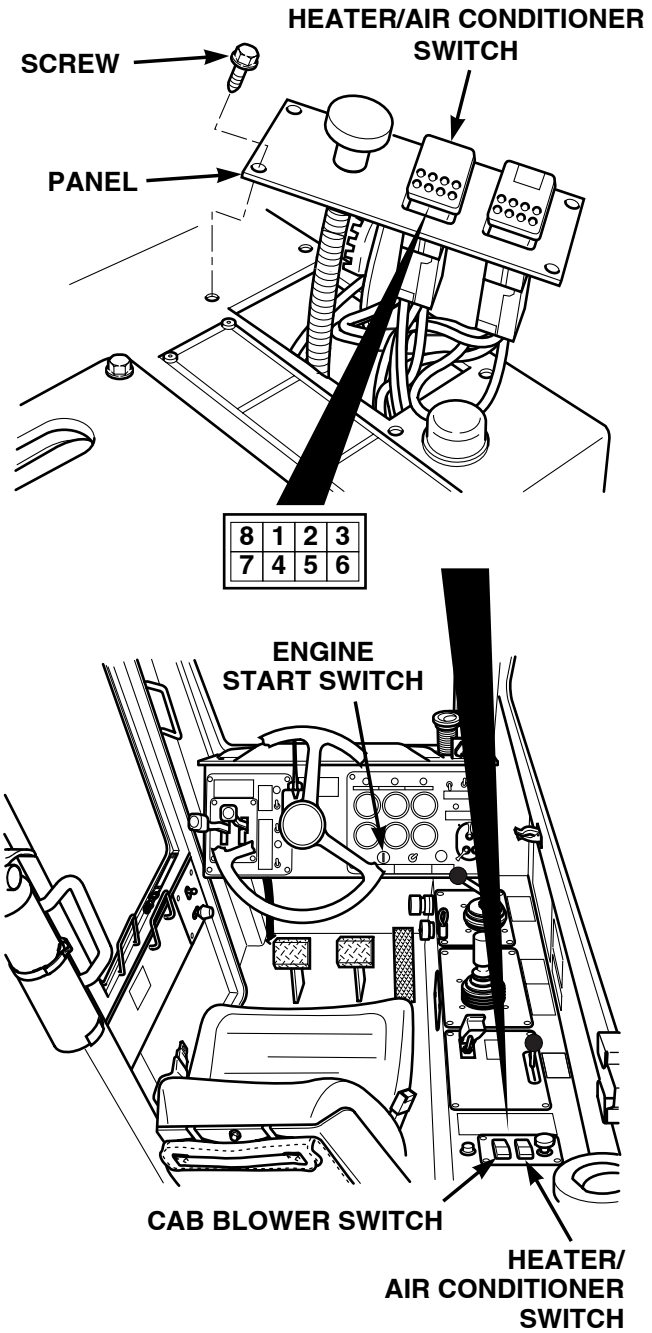
NO → Repair wire 80 (Para 8-48).

YES

WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Remove four screws from heater and air conditioner temperature control panel. (4) Set multimeter to volts dc. (5) Raise heater and air conditioner temperature control panel out to reach heater/air conditioner switch. (6) Connect multimeter positive lead (+) to heater/air conditioner switch where wire 80 (red wire) connects pin 5. (7) Connect multimeter negative lead (–) to known good ground. (8) Connect negative battery cable to negative side of battery (Para 8-42). (9) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, repair wire 80 (Para 8-48). (10) Turn engine start switch to OFF position (TM 10-3930-673-10). (11) Disconnect negative battery cable from negative side of battery (Para 8-42).



30. AIR CONDITIONER DOES NOT OPERATE (CONT).

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK.
POSSIBLE PROBLEMS
Heater/air conditioner switch faulty. Light green wire faulty. Thermostat faulty. Low pressure cut-off switch faulty. Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

3

Is 24 vdc present at heater/air conditioner switch where light green wire connects pin 1?

NO → Replace heater/air conditioner switch (Para 17-9).

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, heater/air conditioner switch is faulty.

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK.
POSSIBLE PROBLEMS
Light green wire faulty. Thermostat faulty. Low pressure cut-off switch faulty. Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

4

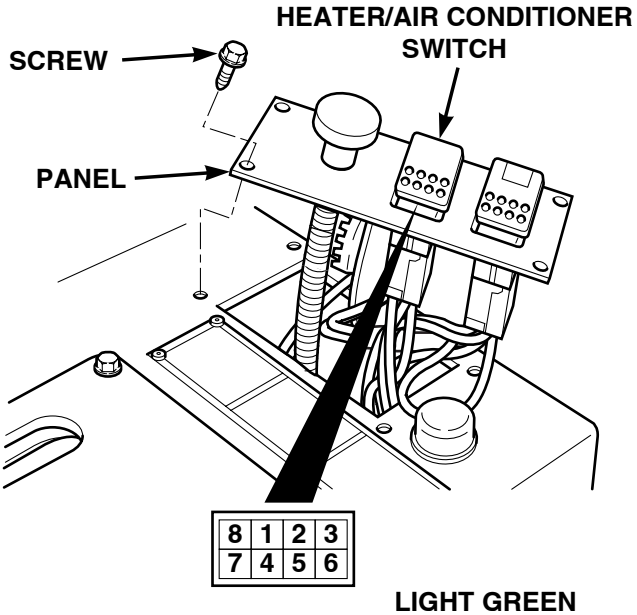
Is 24 vdc present at thermostat where light green wire connects?

NO → Repair light green wire (Para 8-48).

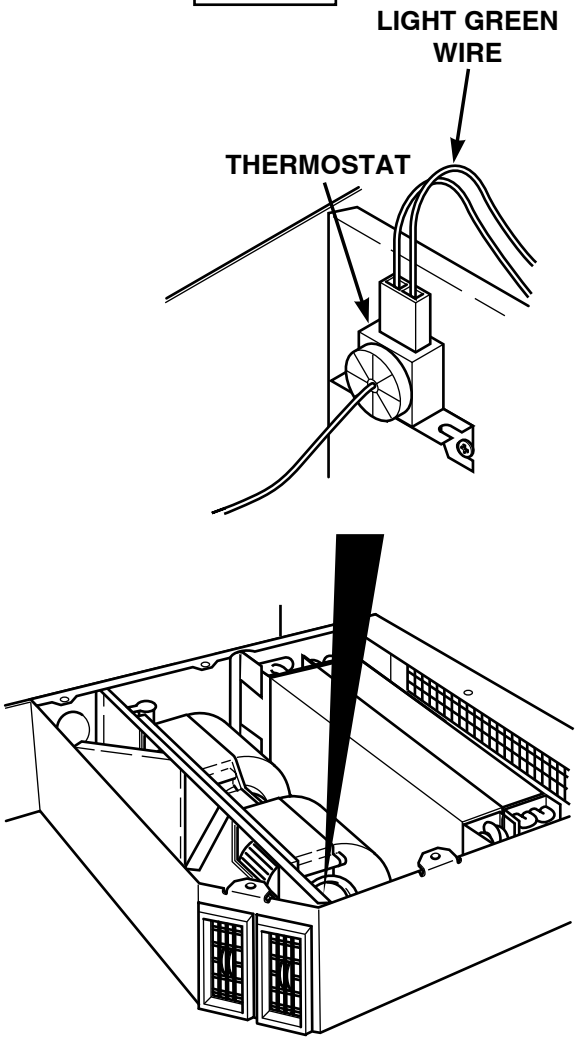
YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, light green wire is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to heater/air conditioner switch where light green wire connects pin 1. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negtive side of battery (Para 8-42). (5) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (6) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, replace heater/air conditioner switch (Para 17-9). (7) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Remove seat (Para 16-12). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to thermostat where light green wire connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (7) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, go to Step 5 of this fault. (b) If voltage is not present, repair light green wire (Para 8-48). (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42).



30. AIR CONDITIONER DOES NOT OPERATE (CONT).

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK. Light green wire OK.
POSSIBLE PROBLEMS
Thermostat faulty. Low pressure cut-off switch faulty. Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

5

Is voltage present at thermostat where wire 81 connects?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, thermostat is faulty.

NO → Replace thermostat (Para 17-12).

YES

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK. Light green wire OK. Thermostat OK.
POSSIBLE PROBLEMS
Low pressure cut-off switch faulty. Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

6

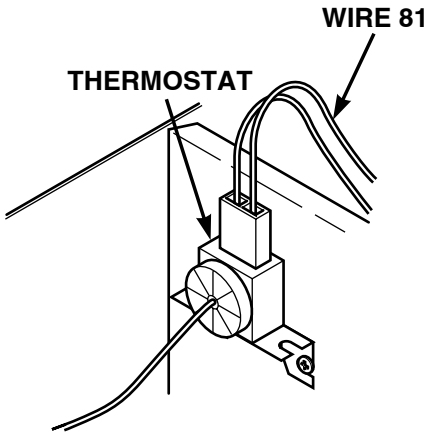
Is voltage present at low pressure cut-off switch where wire 81 connects?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 81 is faulty.

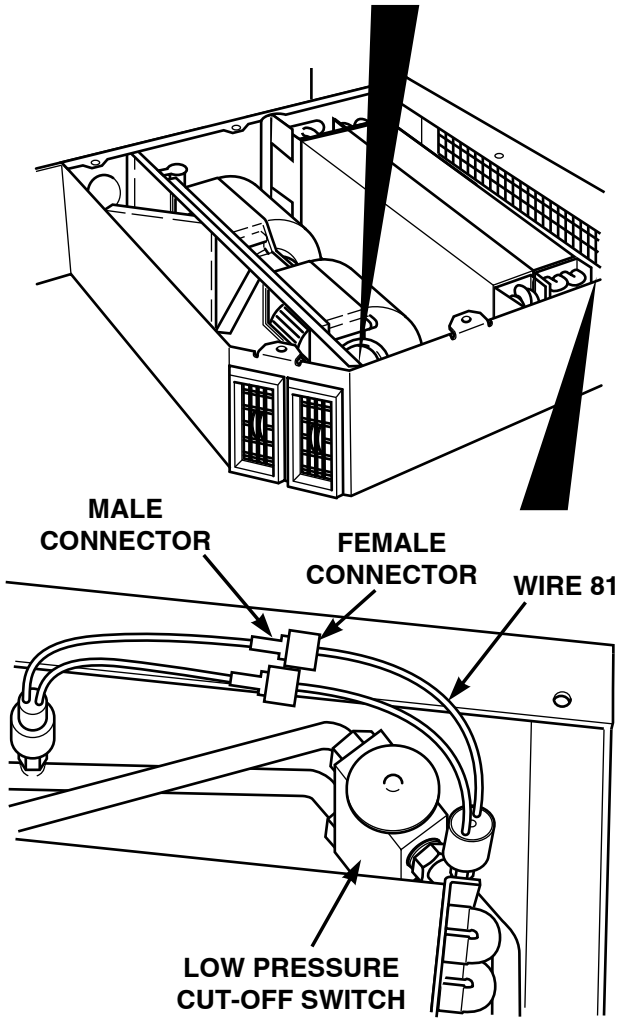
NO → Repair wire 81 (Para 8-48).

YES

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to thermostat where wire 81 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery to negative side of battery (Para 8-42). (5) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (6) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, go to Step 6 of this fault. (b) If voltage is not present, replace thermostat (Para 17-12). (7) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect male connector from female connector for wire 81. (3) Connect multimeter positive lead (+) to low pressure cut-off switch where wire 81 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (7) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, go to Step 7 of this fault. (b) If voltage is not present, repair wire 81 (Para 8-48). (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42). (11) Connect male connector to female connector for wire 81.



30. AIR CONDITIONER DOES NOT OPERATE (CONT).

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK. Light green wire OK. Thermostat OK. Wire 81 OK.
POSSIBLE PROBLEMS
Low pressure cut-off switch faulty. Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

7

Is voltage present at low pressure cut-off switch where dark green wire connects?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, low pressure cut-off switch is faulty.

NO → Notify Direct Support to replace low pressure cut-off switch.

YES

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK. Light green wire OK. Thermostat OK. Wire 81 OK. Low pressure cut-off switch OK
POSSIBLE PROBLEMS
Dark green wire faulty. High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

8

Is voltage present at high pressure cut-off switch where dark green wire connects?

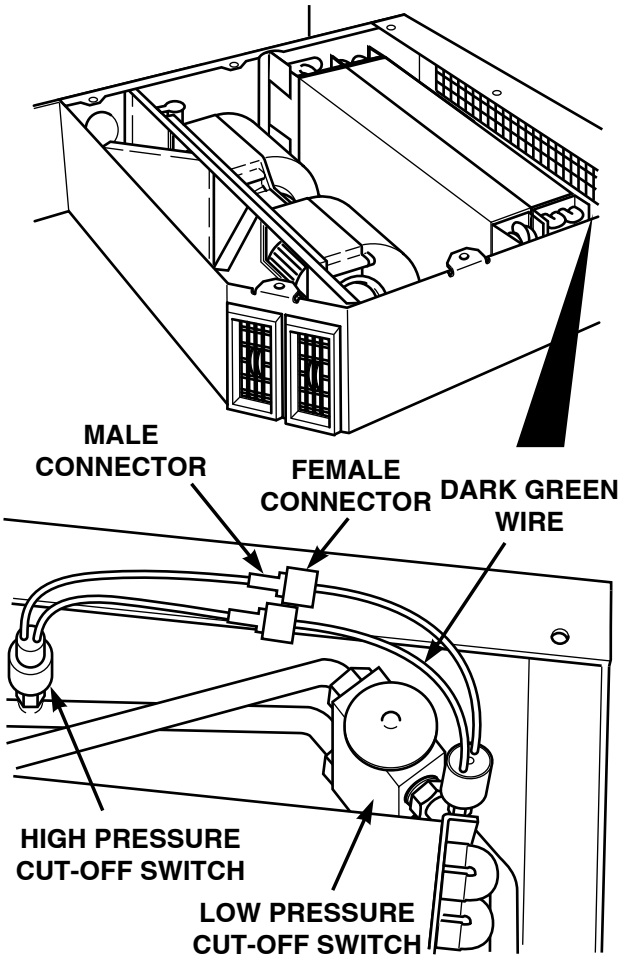
TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, dark green wire is faulty.

NO → Repair dark green wire (Para 8-48).

YES

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect male connector from female connector for dark green wire at low pressure auto-off switch. (3) Connect multimeter positive lead (+) to low pressure cut-off switch where dark green wire connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (7) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, go to Step 8 of this fault. (b) If voltage is not present, notify Direct Suport to replace low pressure cut-off switch. (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42). (11) Connect male connector to female connector.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect male connector from female connector. (3) Connect multimeter positive lead (+) to high pressure cut-off switch where dark green wire connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (7) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, go to Step 9 of this fault. (b) If voltage is not present, repair dark green wire (Para 8-48). (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42). (11) Connect male connector to female connector for dark green wire at high pressure cut-off switch.



30. AIR CONDITIONER DOES NOT OPERATE (CONT).

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK. Light green wire OK. Thermostat OK. Wire 81 OK. Low pressure cut-off switch OK Dark green wire OK.
POSSIBLE PROBLEMS
High pressure cut-off switch faulty. Wire 81 faulty. A/C compressor clutch faulty.

9

Is voltage present at high pressure cut-off switch where wire 81 connects?

NO → Notify Direct Support to replace high pressure cut-off switch.

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, high pressure cut-off switch is faulty.

KNOWN INFO
Green light extinguished. Defrost fans OK. Wire 80 OK. Heater/air conditioner switch OK. Light green wire OK. Thermostat OK. Wire 81 OK. Low pressure cut-off switch OK Dark green wire OK. High pressure cut-off switch OK.
POSSIBLE PROBLEMS
Wire 81 faulty. A/C compressor clutch faulty.

10

Is voltage present at A/C compressor clutch where wire 81 connects?

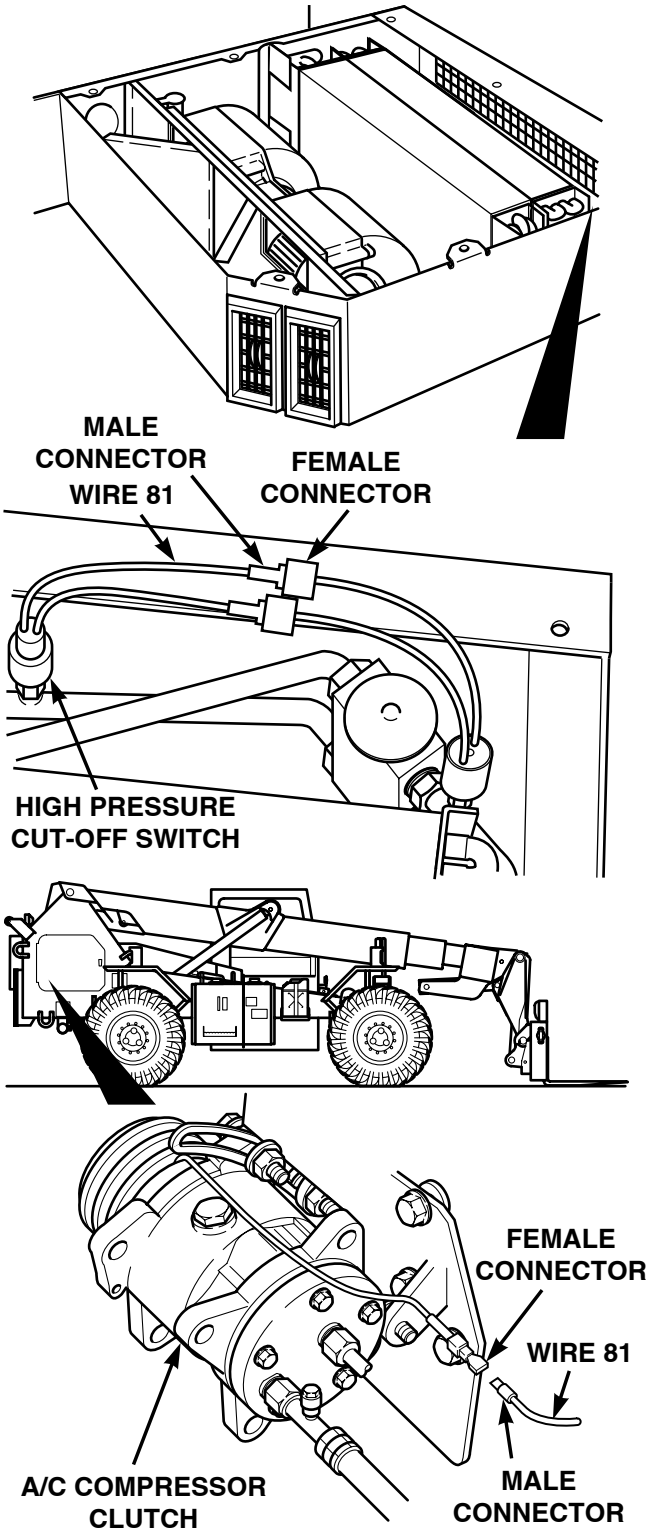
NO → Repair wire 81 (Para 8-48).

YES → Notify Direct Support to replace A/C compressor clutch.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 81 is faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect male connector from female connector for wire 81 at high pressure cut-off switch. (3) Connect multimeter positive lead (+) to high pressure cut-off switch where wire 81 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (7) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, go to Step 10 of this fault. (b) If voltage is not present, notify Direct Support to replace high pressure cut-off switch. (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Disconnect negative battery cable from negative side of battery (Para 8-42). (11) Connect male connector to female connector for wire 81 at high pressure cut-off switch.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Disconnect male connector from female connector for wire 81. (3) Connect multimeter positive lead (+) to A/C compressor clutch where wire 81 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to START position, START ENGINE (TM 10-3930-673-10). (7) Turn heater/air conditioner switch to A/C (TM 10-3930-673-10) (a) If voltage is present, notify Direct Support to replace A/C compressor clutch. (b) If voltage is not present, repair wire 81 (Para 8-48). (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (9) Turn engine start switch to OFF position (TM 10-3930-673-10). (10) Connect male connector to female connector for wire 81. (11) Install battery cover (Para 8-42).



31. CAB BLOWER DOES NOT OPERATE.

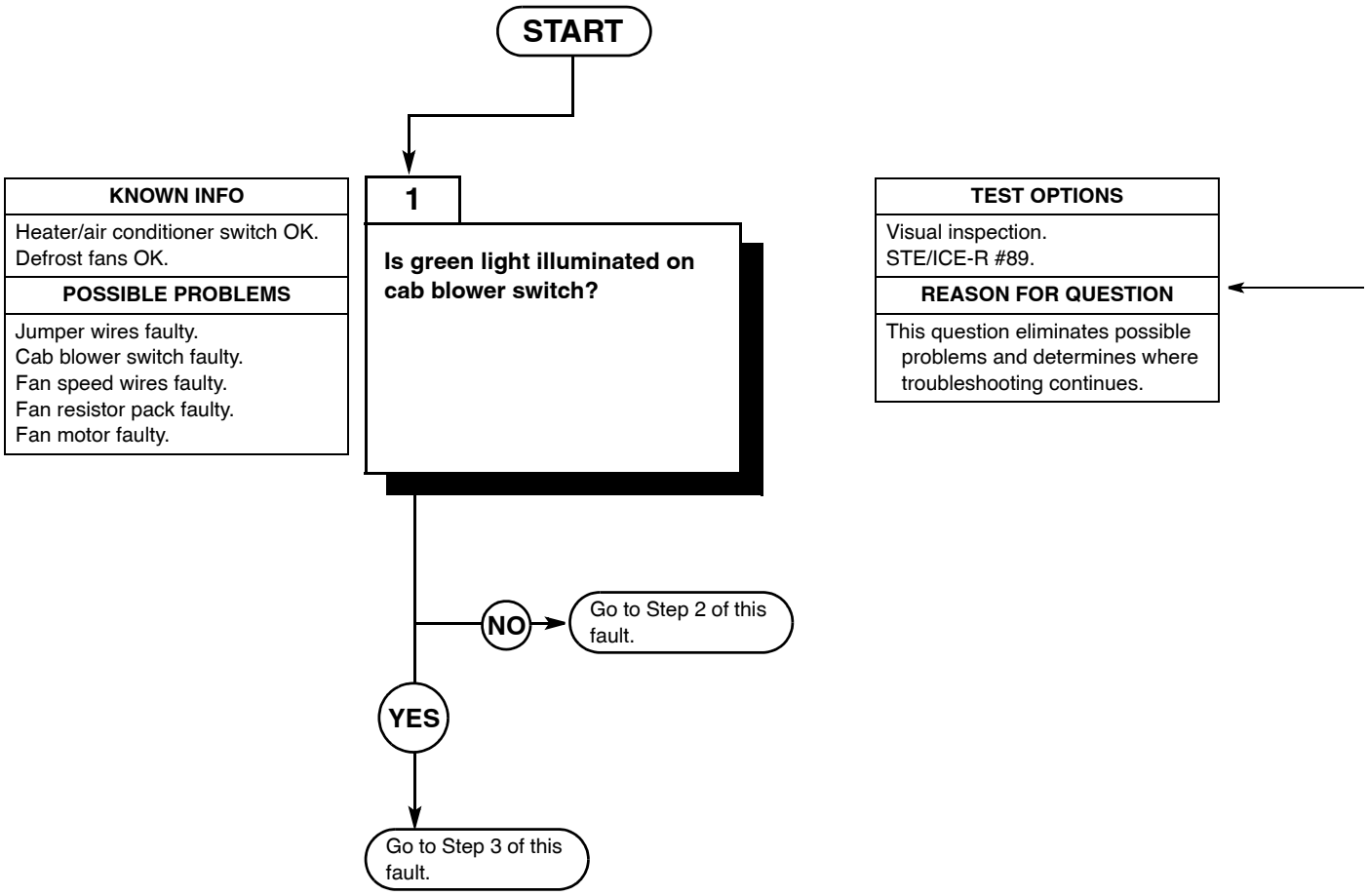
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

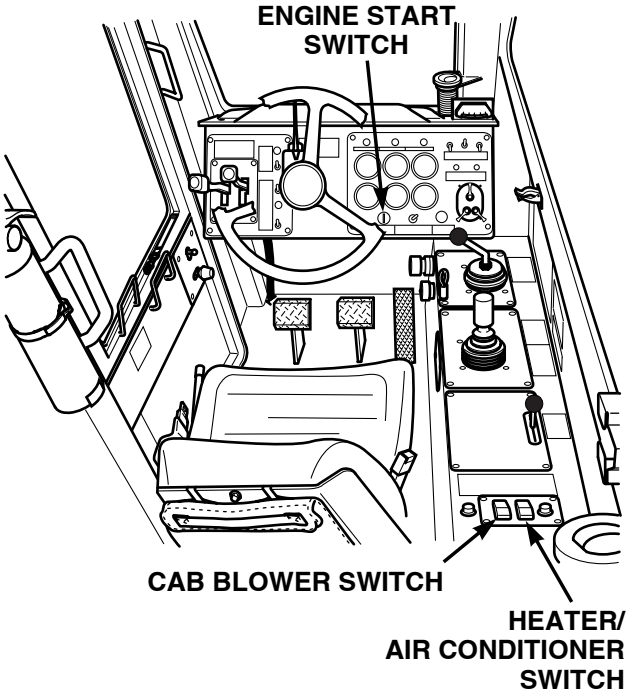
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (2) Turn heater/air conditioner switch to HEAT (TM 10-3930-673-10). (3) Cycle through all fan speeds, High, Medium, Low (TM 10-3930-673-10). (a) If light is illuminated, go to Step 3 of this fault. (b) If light is not illuminated, go to Step 2 of this fault. (4) Turn heater/air conditioner switch OFF (TM 10-3930-673-10). (5) Turn engine start switch to OFF position (TM 10-3930-673-10).



31. CAB BLOWER DOES NOT OPERATE (CONT).

KNOWN INFO
Heater/air conditioner switch OK. Defrost fans OK.
POSSIBLE PROBLEMS
Jumper wires faulty. Cab blower switch faulty. Fan speed wires faulty. Fan resistor pack faulty. Fan motor faulty.

2

WARNING

Read WARNING on following page.

Is voltage present at cab blower switch where jumper wire (pink wire) connects heater/air conditioner switch and cab blower switch?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, jumper wire is faulty.

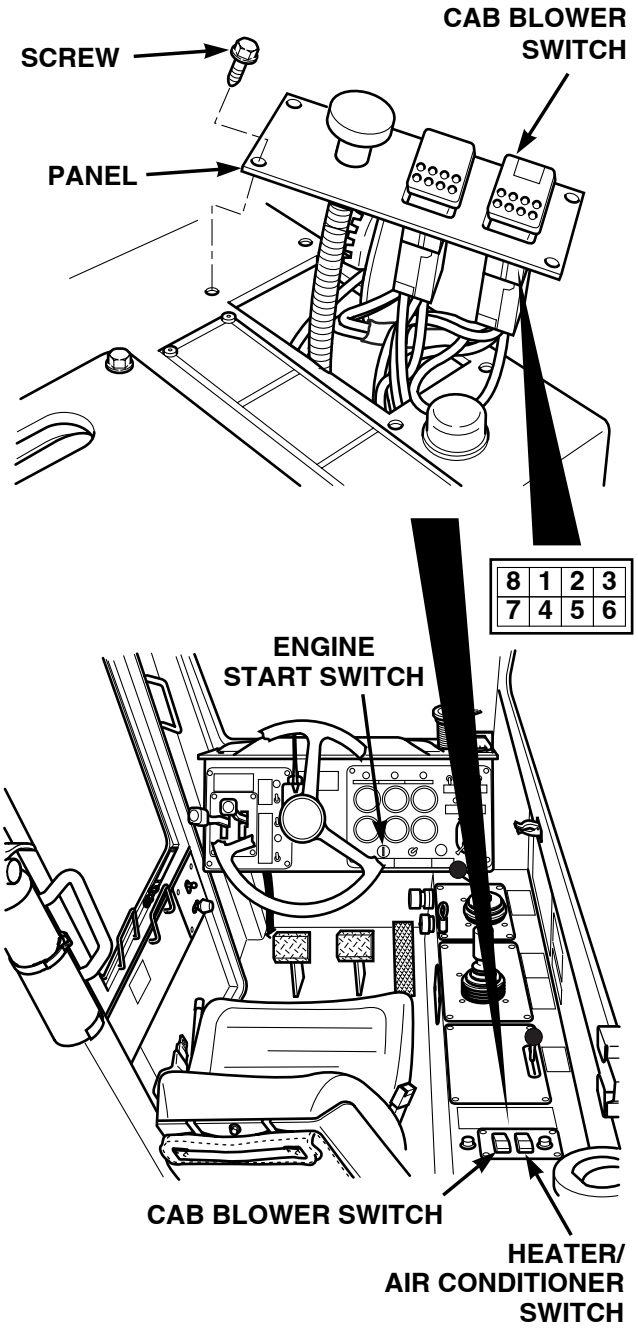
NO → Repair jumper wire (Para 8-48).

YES

WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Remove four screws from heater and air conditioner temperature control panel. (4) Raise heater and air conditioner temperature control panel out to reach heater/air conditioner switch. (5) Set multimeter to volts dc. (6) Connect multimeter positive lead (+) to cab blower switch where jumper wires connect pins 7, 8 and/or 5. (7) Connect multimeter negative lead (–) to known good ground. (8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (9) Turn heater/air conditioner switch to HEAT (TM 10-3930-673-10). (a) If voltage is present, go to Step 3 of this fault. (b) If voltage is not present, repair jumper wire (Para 8-48). (10) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (11) Turn engine start switch to OFF position (TM 10-3930-673-10).



31. CAB BLOWER DOES NOT OPERATE (CONT).

KNOWN INFO
Heater/air conditioner switch OK. Defrost fans OK. Jumper wires OK.
POSSIBLE PROBLEMS
Cab blower switch faulty. Fan speed wires faulty. Fan resistor pack faulty. Fan motor faulty.

3

Is voltage present at fan switch where high (orange wire), medium (light blue wire), and low (yellow wire) connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, fan switch is faulty.

NO → Replace fan switch (Para 17-9).

YES

KNOWN INFO
Heater/air conditioner switch OK. Defrost fans OK. Jumper wires OK. Cab blower switch OK.
POSSIBLE PROBLEMS
Fan speed wires faulty. Fan resistor pack faulty. Fan motor faulty.

4

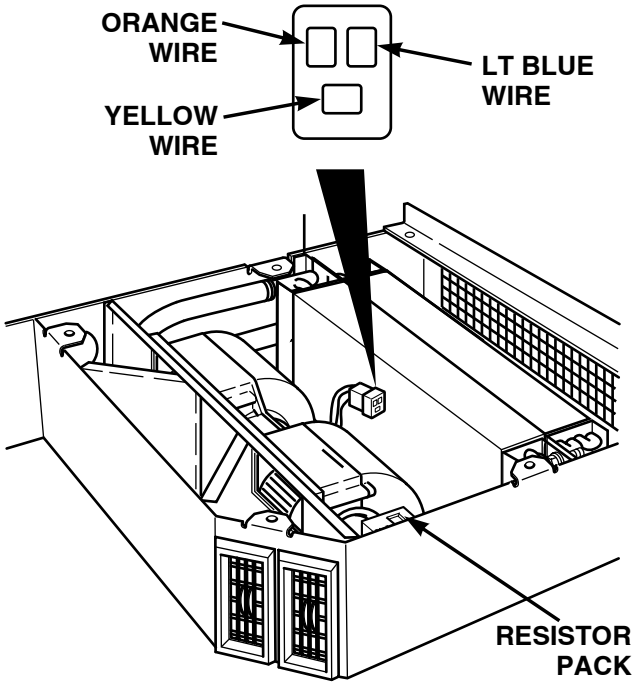
Is voltage present at fan resistor pack where high (orange wire), medium (light blue wire), and low (yellow wire) connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, fan speed wire is faulty.

NO → Repair faulty fan speed wire (Para 8-48).

YES

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to fan switch where high (orange wire), medium (light blue wire), low (yellow wire) connects pins 1, 3, or 6. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (5) Turn heater/air conditioner switch to Heat (TM 10-3930-673-10) (6) Cycle through all fan speeds, High, Medium, Low (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, replace fan switch (Para 17-9). (7) Turn heater/air conditioner switch OFF (TM 10-3930-673-10) (8) Turn engine start switch to OFF position (TM 10-3930-673-10).



VOLTAGE TEST
(1) Remove seat (Para 16-12). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to fan Resistor Pack connector J1 where high (orange wire), medium (light blue wire), low (yellow wire) connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Turn heater/air conditioner switch to Heat (TM 10-3930-673-10) (7) Cycle through all the fan speeds, High, Medium, Low (TM 10-3930-673-10). (a) If voltage is present, go to Step 5 of this fault. (b) If voltage is not present, repair faulty wire (Para 8-48). (8) Turn heater/air conditioner switch OFF (TM 10-3930-673-10). (9) Turn engine start switch to OFF position (TM 10-3930-673-10).

31. CAB BLOWER DOES NOT OPERATE (CONT).

KNOWN INFO
Heater/air conditioner switch OK. Defrost fans OK. Jumper wires OK. Cab blower switch OK. Fan speed wire OK.
POSSIBLE PROBLEMS
Fan resistor pack faulty. Fan motor faulty.

5

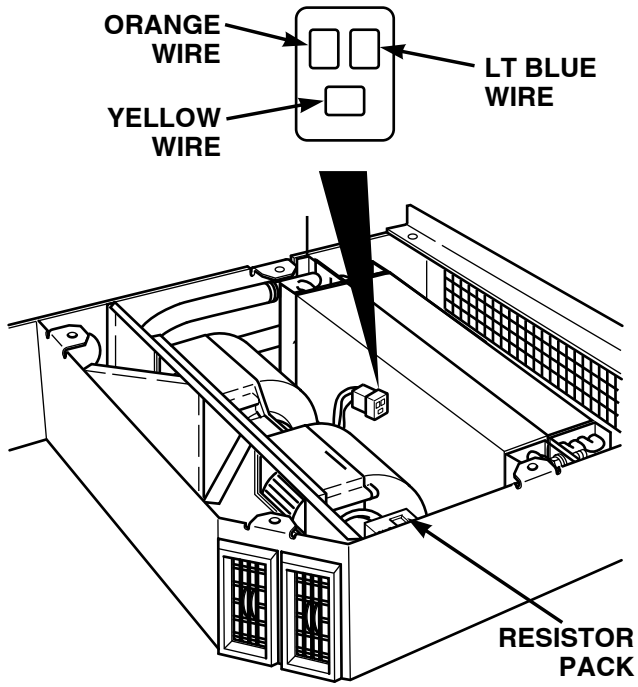
Is voltage present at fan resistor pack connector where orange wire connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, fan resistor pack is faulty.

NO → Notify Direct Support to replace fan resistor pack.

YES → Replace fan motor (Para 17-10).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to fan blower motor connector J1 where high (orange wire), medium (light blue wire), low (yellow wire) connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (5) Turn heater/air conditioner switch to Heat (TM 10-3930-673-10) (6) Cycle through all the fan speeds, High, Medium, Low (TM 10-3930-673-10). (a) If voltage is present, replace fan motor (Para 17-10). (b) If voltage is not present, notify Direct Support to replace fan resistor pack. (7) Turn heater/air conditioner switch OFF (TM 10-3930-673-10). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Install seat (Para 16-12).



32. FORK AUTO-LEVELER DOES NOT OPERATE.

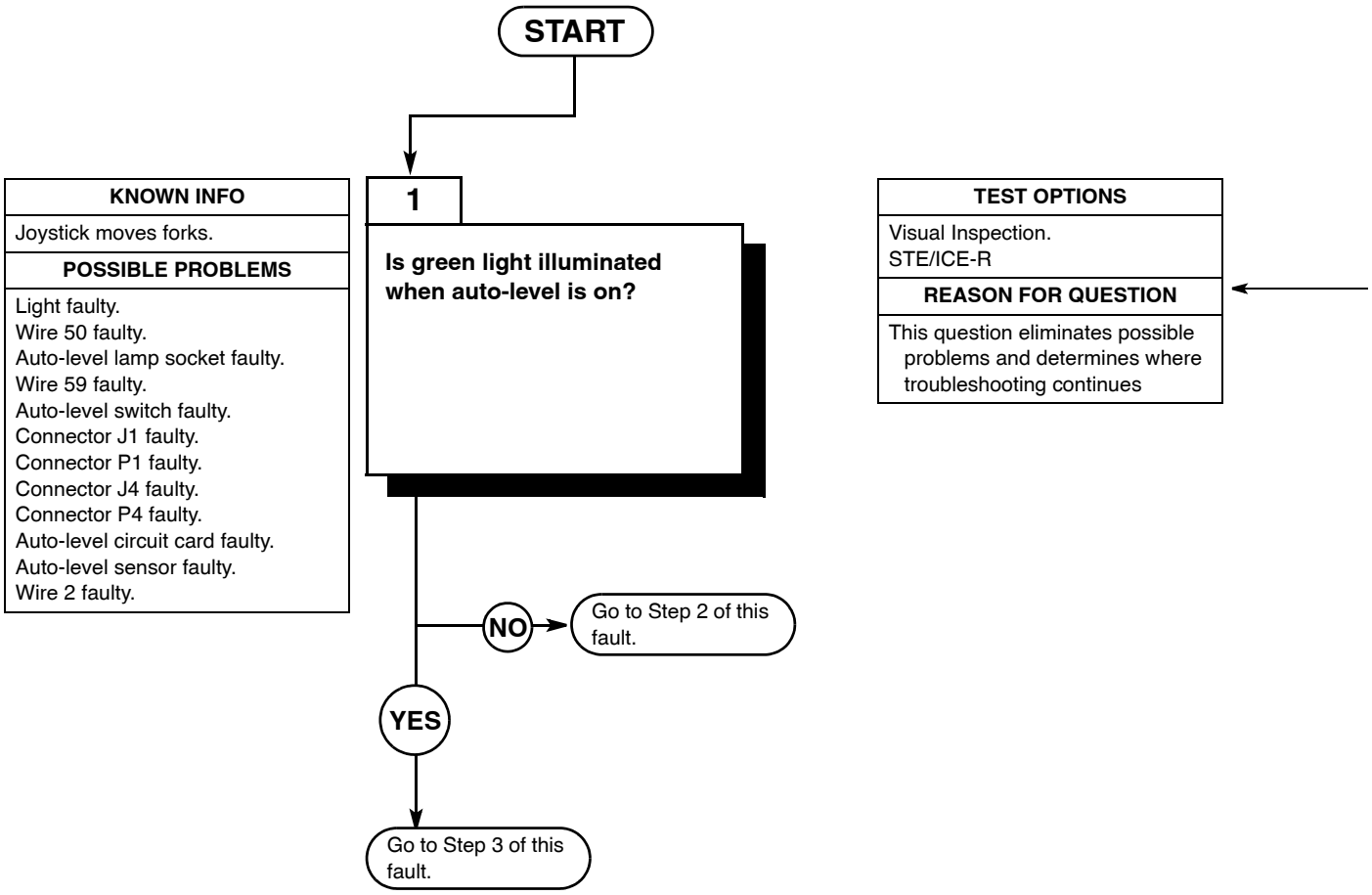
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

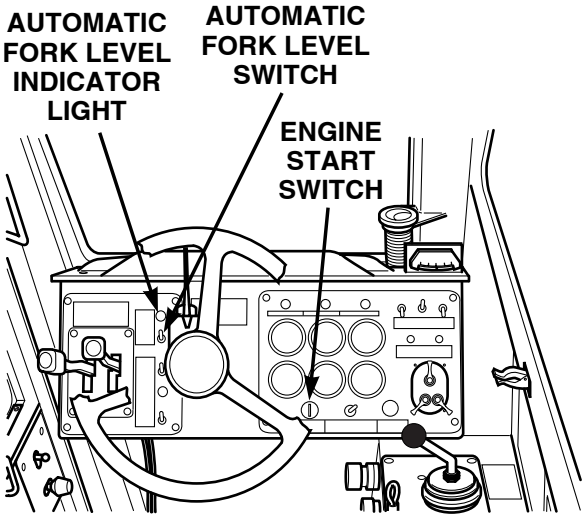
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (2) Turn auto-level switch to ON (TM 10-3930-673-10). (a) If green light is illuminated, go to Step 3 of this fault. (b) If green light is not illuminated, go to Step 2 of this fault. (3) Turn auto-level switch OFF (TM 10-3930-673-10). (4) Turn engine start switch to OFF position (TM 10-3930-673-10).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks.
POSSIBLE PROBLEMS
Light faulty. Wire 50 faulty. Auto-level light socket faulty. Wire 59 faulty. Auto-level switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

2

WARNING
Read WARNING on following page.

Is continuity present between indicator light center connector and ground?

NO → Replace light (Para 8-9).

YES

TEST OPTIONS
Continuity Test STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, light is faulty.

KNOWN INFO
Joystick moves forks. Light OK.
POSSIBLE PROBLEMS
Wire 50 faulty. Auto-level light socket faulty. Wire 59 faulty. Auto-level switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

3

Is voltage present on wire 50 where wire 50 connects to light socket?

NO → Repair wire 50 (Para 8-48).

YES

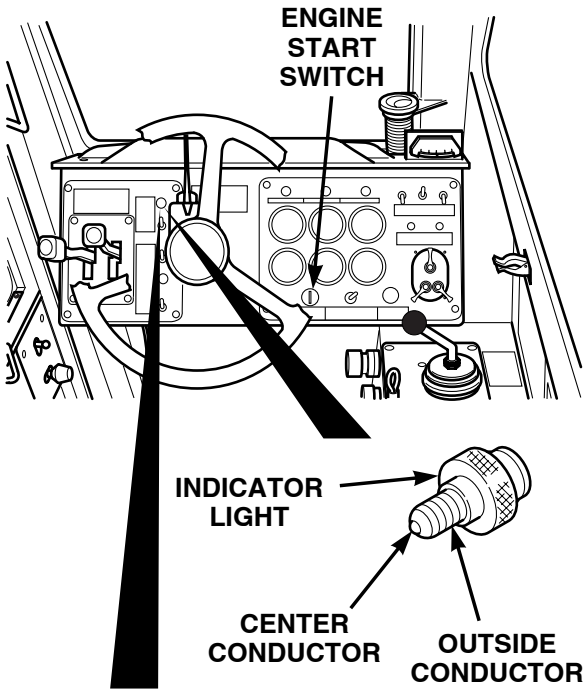
TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 50 is faulty.

WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

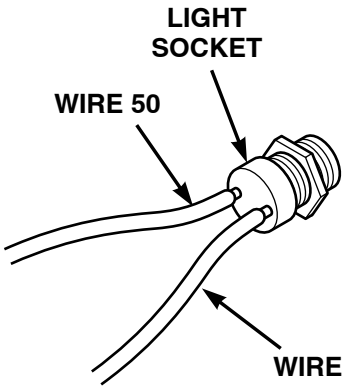
CONTINUITY TEST

(1) Remove indicator light from socket.
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to center conductor of indicator light.
(4) Connect multimeter negative lead (–) to outside conductor of indicator light.
  (a) If continuity is present, go to Step 3 of this fault.
  (b) If continuity is not present, replace lamp (Para 8-9).



VOLTAGE TEST

(1) Remove four screws from left-hand instrument panel.
(2) Raise panel out to reach auto-level light socket.
(3) Disconnect negative battery cable from negative side of battery (Para 8-42).
(4) Set multimeter to dc.
(5) Connect multimeter positive lead (+) to wire 50 where wire 50 connects to socket.
(6) Connect multimeter negative lead (–) to known good ground.
(7) Connect negative battery cable (1) to negative side of battery (2) (Para 8-42).
(8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(9) Turn auto-level switch to ON (TM 10-3930-673-10).
  (a) If voltage is present, go to Step 4 of this fault.
  (b) If voltage is not present, repair wire 50 (Para 8-48).
(10) Turn auto-level switch OFF (TM 10-3930-673-10).
(11) Turn engine start switch to OFF position (TM 10-3930-673-10).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK.
POSSIBLE PROBLEMS
Auto-level light socket faulty. Wire 59 faulty. Auto-level switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

4

Is voltage present on wire 59 where wire 59 connects to auto-level light socket?

NO → Replace auto-level light socket (Para 8-9).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, auto-level light socket is faulty.

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK.
POSSIBLE PROBLEMS
Wire 59 faulty. Auto-level switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

5

Is voltage present on wire 59 where wire 59 connects to auto-level switch?

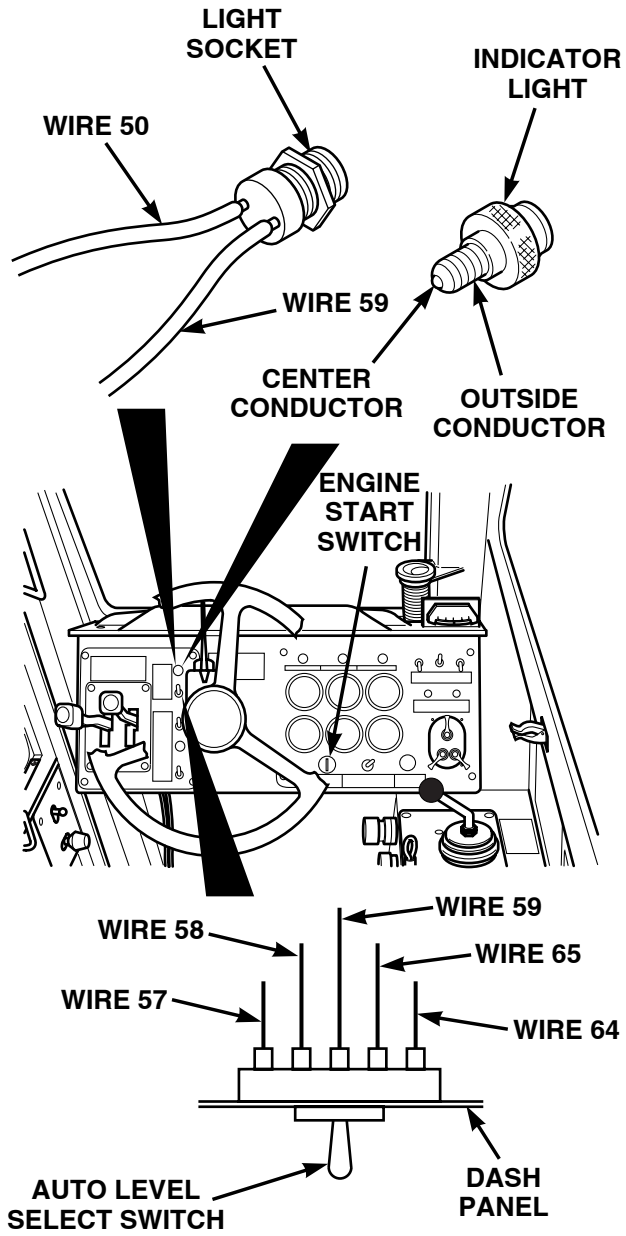
NO → Go to Step 11 of this fault.

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to dc. (3) Connect multimeter positive lead (+) to wire 59 where wire 59 connects to auto-level light socket. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn auto-level switch to ON (TM 10-3930-673-10). (a) If voltage is present, go to Step 5 of this fault. (b) If voltage is not present, replace auto-level light socket (Para 8-9). (8) Turn auto-level switch OFF (TM 10-3930-673-10). (9) Turn engine start switch to OFF position (TM 10-3930-673-10).

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to dc. (3) Connect multimeter positive lead (+) to wire 59 where wire 59 connects to auto-level switch. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn auto-level switch to ON (TM 10-3930-673-10). (a) If voltage is present, go to Step 6 of this fault. (b) If voltage is not present, go to Step 12 of this fault. (8) Turn auto-level switch OFF (TM 10-3930-673-10). (9) Turn engine start switch to OFF position (TM 10-3930-673-10).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK.
POSSIBLE PROBLEMS
Auto-level switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

6

Is voltage present on wire 57 and 58 where wire 57 and wire 58 connects to auto-level switch?

NO → Replace auto-level switch (Para 8-20).

YES

TEST OPTIONS
Voltage Test STE/ICE-R #89.
REASON FOR QUESTION
If voltage is present, auto-level switch is faulty.

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

7

Is red light illuminated on auto-level circuit card when engine start switch is ON?

NO → Go to Step 8 of this fault.

YES → Go to Step 10 of this fault.

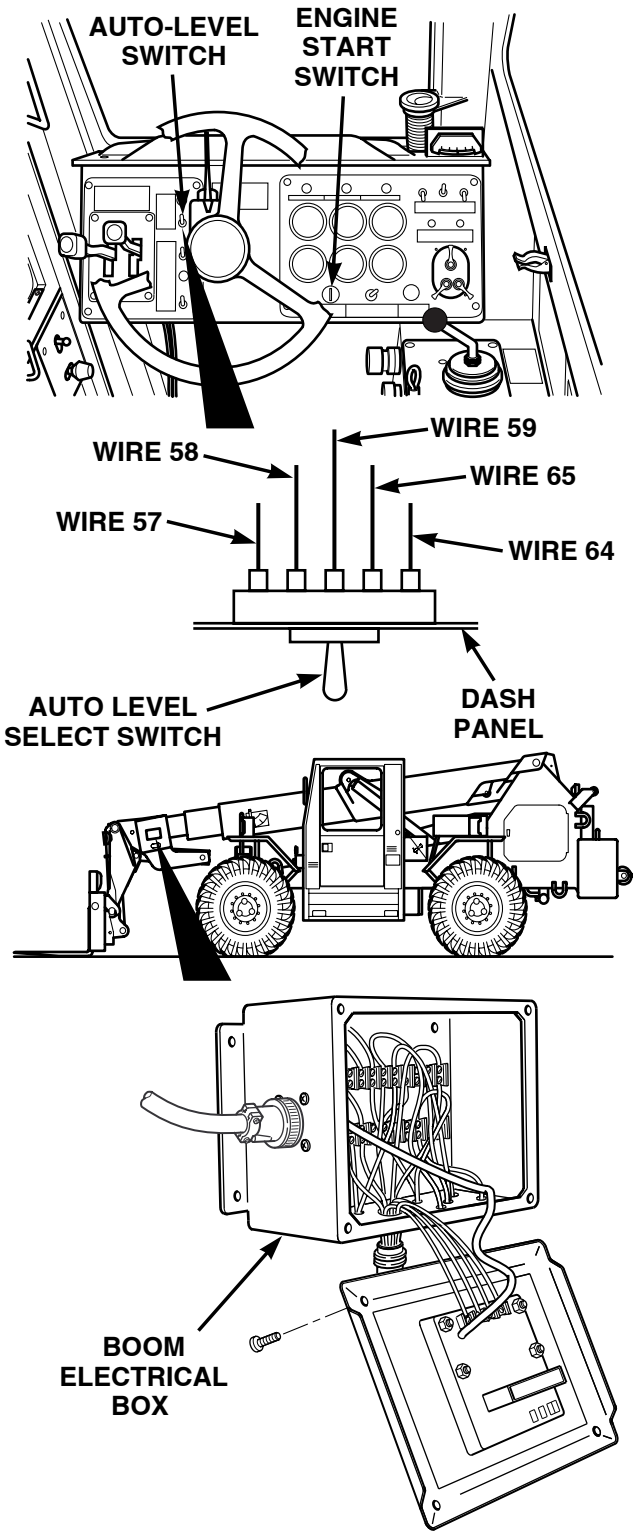
TEST OPTIONS
Visual Inspection STE/ICE-R.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to dc.
(3) Connect multimeter positive lead (+) to wire 57 and 58 where wire 57 and 58 connects to auto-level switch.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn auto-level switch to ON (TM 10-3930-673-10).
  (a) If voltage is present, go to Step 7 of this fault.
  (b) If voltage is not present, replace auto-level switch (Para 8-20).
(8) Turn auto-level switch OFF (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).
(10) Install four screws to secure left-hand instrument panel.

VISUAL INSPECTION

(1) Loosen four screws and lower cover from electrical junction box.
(2) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(3) Turn auto-level switch to ON (TM 10-3930-673-10).
  (a) If red light is illuminated, go to Step 10 of this fault.
  (b) If red light is not illuminated, go to Step 8 of this fault.
(4) Turn auto-level switch OFF (TM 10-3930-673-10).
(5) Turn engine start switch OFF (TM 10-3930-673-10).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

8

Is voltage present on wire 50 where wire 50 connects to auto-level circuit card?

NO → Go to Step 15 of this fault.

YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK.
POSSIBLE PROBLEMS
Auto-level circuit card faulty. Auto-level sensor faulty. Wire 2 faulty.

9

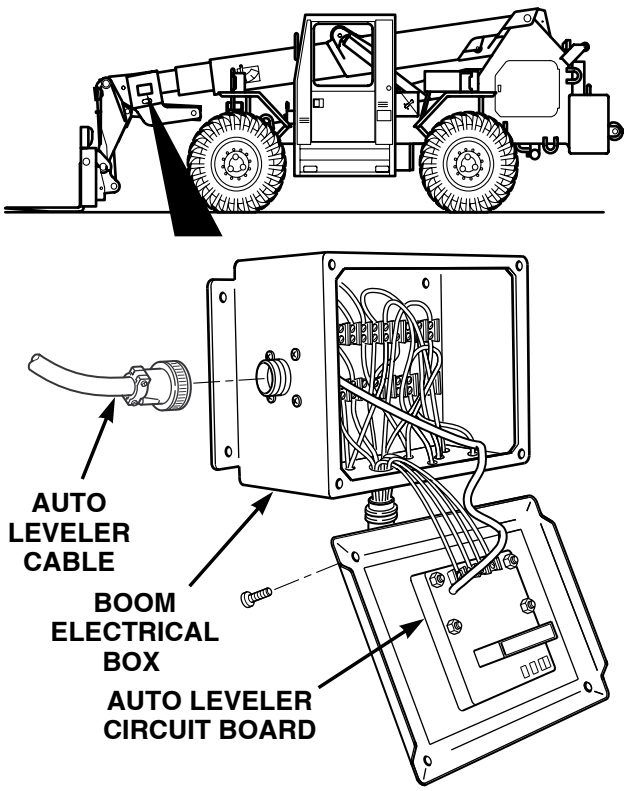
Is voltage present on wire 64 where wire 64 connects to auto-level circuit card?

NO → Replace auto-level circuit card (Para 8-19).

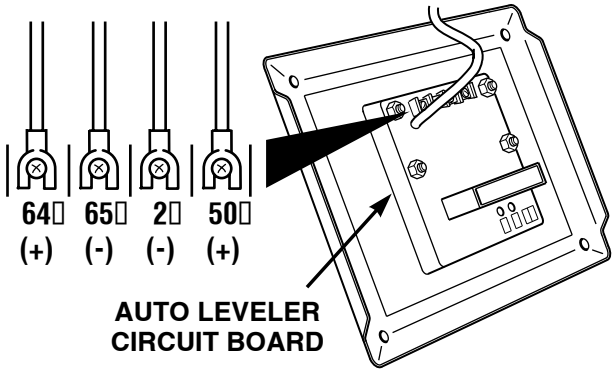
YES

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, auto-level circuit card faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to dc. (3) Connect multimeter positive lead (+) to wire 50 where wire 50 connects to auto-level circuit card. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn auto-level switch to ON (TM 10-3930-673-10). (a) If voltage is present, go to Step 9 of this fault. (b) If voltage is not present, go to Step 15 of this fault. (8) Turn auto-level switch OFF (TM 10-3930-673-10). (9) Turn engine start switch OFF (TM 10-3930-673-10).



VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to wire 64 where wire 64 connects to auto-level circuit card. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn auto-level switch to ON (TM 10-3930-673-10). (a) If voltage is present, go to Step 10 of this fault. (b) If voltage is not present, replace auto-level circuit card (Para 8-19). (8) Turn auto-level switch OFF (TM 10-3930-673-10). (9) Turn engine start switch OFF (TM 10-3930-673-10).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK. Auto-level circuit card OK.
POSSIBLE PROBLEMS
Auto-level sensor faulty. Wire 2 faulty.

10

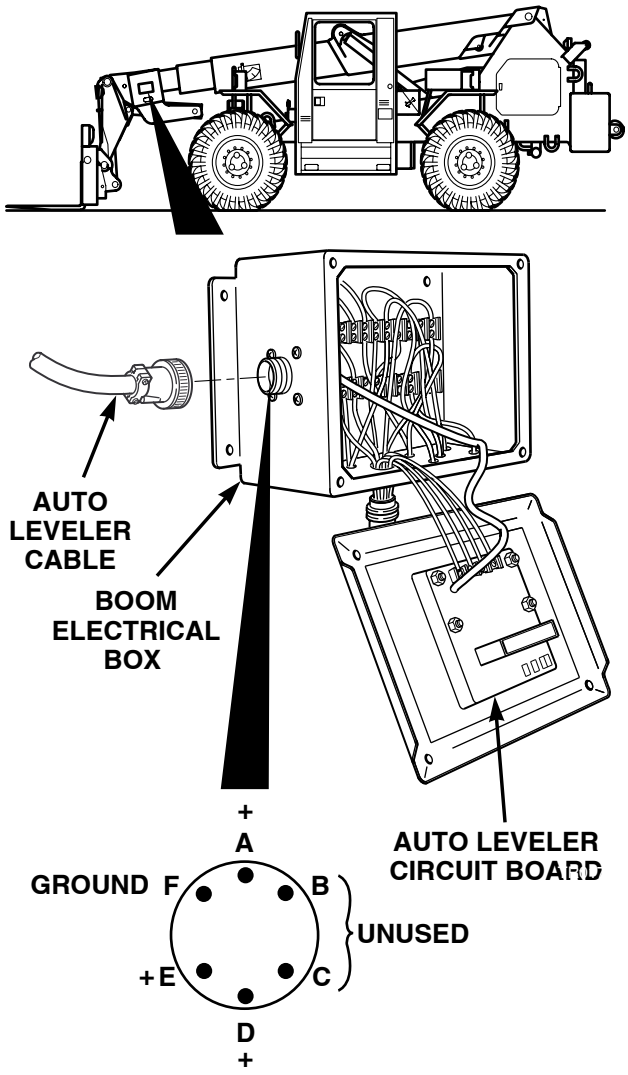
Is voltage present on auto-level sensor connector where connector connects to electrical junction box?

NO → Go to Step 11 of this fault.

YES → Replace auto-leveler sensor (Para 8-20).

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to dc. (3) Connect multimeter positive lead (+) to auto-level sensor connectors A, D, and E where connectors connect to electrical junction box. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Turn auto-level switch to ON (TM 10-3930-673-10). (a) If voltage is present, replace sensor (Para 8-20). (b) If voltage is not present, go to Step 11 of this faulty. (8) Turn auto-level switch OFF (TM 10-3930-673-10). (9) Turn engine start switch to OFF position (TM 10-3930-673-10).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK. Auto-level circuit card OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Wire 2 faulty.

11

Is voltage present at auto-level switch where wire 64 and 65 connect to auto-level switch?

NO → Go to Step 12 of this fault.

YES → Replace auto-level switch (Para 8-20).

TEST OPTIONS
Voltage Test STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Auto-level circuit card OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 2 faulty.

12

Is continuity present between wire 64 and 65 at auto-level switch and connector J1-36 and connector J1-35?

NO → Repair wire 64 or 65 or connector J1 (Para 8-48).

YES →

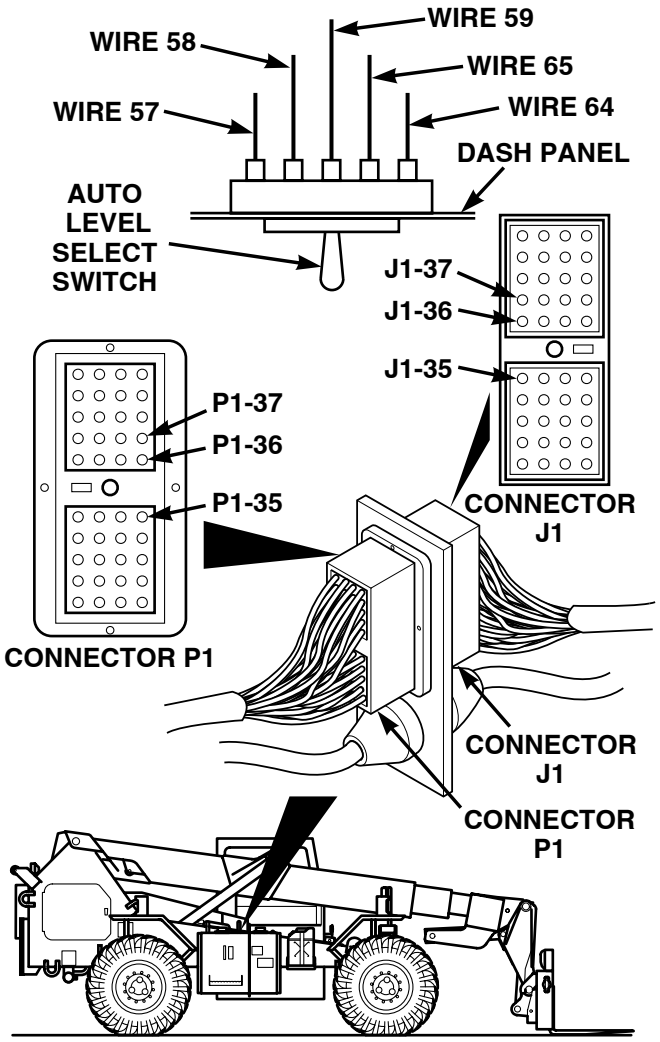
TEST OPTIONS
Continuity Test. STE/ICE-R #89.
REASON FOR QUESTION
If continuity is not present, connector P1, connector J4 and/or wire 64 or 65 are faulty.

VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to dc.
(3) Connect multimeter positive lead (+) to wire 64 and wire 65 where wire 64 and wire 65 connect to auto-level switch.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(7) Turn auto-level switch to ON (TM 10-3930-673-10).
    (a) If voltage is present, replace auto-level switch (Para 8-20).
    (b) If voltage is not present, go to Step 12 of this fault.
(8) Turn auto-level switch OFF (TM 10-3930-673-10).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).

CONTINUITY TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to ohms.
(3) Disconnect connector J1 from connector P1.
(4) Connect multimeter positive lead (+) to wire 64 and 65 where wire 64 and 65 connect to auto-level switch.
(5) Connect multimeter negative lead (–) to connector J1-35 or connector J1-36.
    (a) If continuity is present, go to Step 13 of this fault.
    (b) If continuity is not present, repair wire 64 or 65 and/or connector J1 (Para 8-48).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Auto-level circuit card OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 2 faulty.

13

Is continuity present between connector J4-R and J4-P and connector P1-36 and P1-35?

NO → Repair wire 64 or 65 and/or connectors P1, and J4 (Para 8-48).

YES

TEST OPTIONS
Continuity Test. STE/ICE-R #89.
REASON FOR QUESTION
If continuity is not present, connector P1, connector J4, and/or wire 64 and 65 are faulty.

KNOWN INFO
Joystick moves forks. Light OK. Wire 50 OK. Auto-level light socket OK. Wire 59 OK. Auto-level circuit card OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Auto-level switch faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 2 faulty.

14

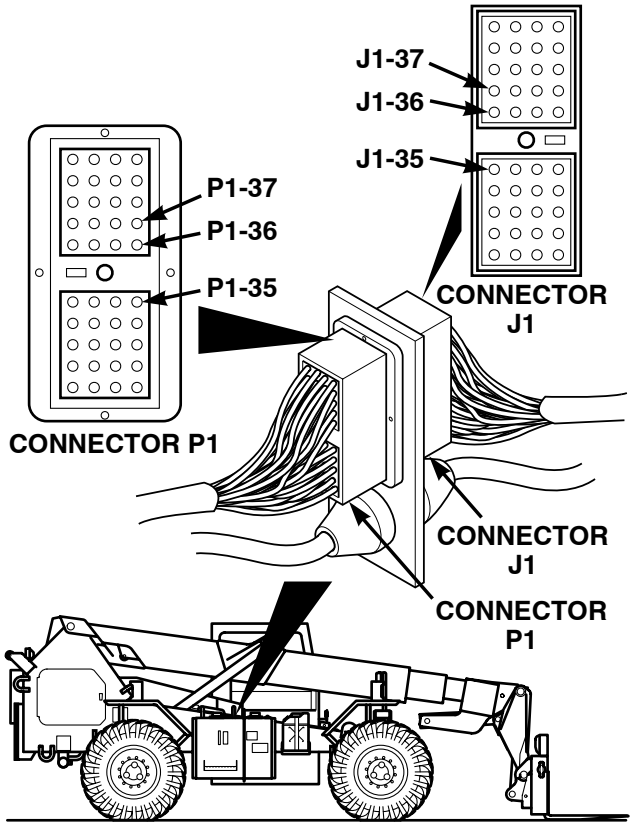
Is continuity present between wire 64 and 65 at electrical junction box and connector P4-R and P4-P?

NO → Repair wire 64, 65 and/or connector J1, J4 (Para 8-49), (Para 8-50).

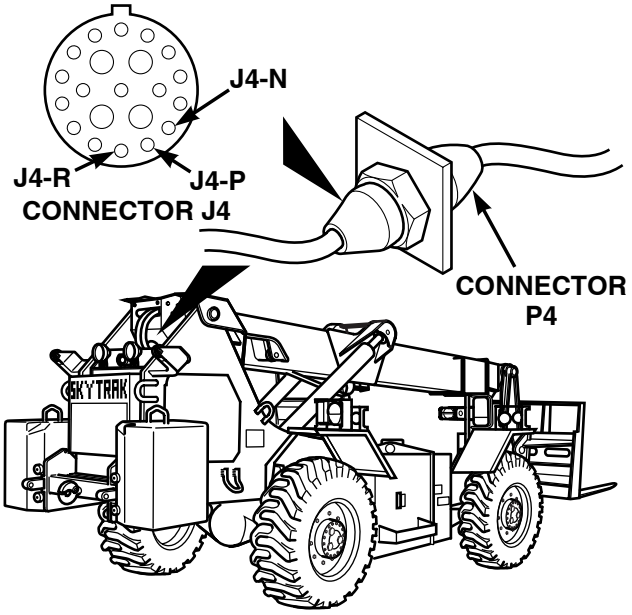
YES → Replace auto-level switch (Para 8-20).

TEST OPTIONS
Continuity Test. STE/ICE-R #89.
REASON FOR QUESTION
If continuity is not present, connector P1, connector J4 and/or wire 64, 65 are faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Disconnect connector J1 from connector P1. (4) Disconnect connector J4 from connector P4. (5) Connect multimeter positive lead (+) to connector J4-P and J4-R where wire 64 and 65 connect. (6) Connect multimeter negative lead (–) to connector P1-35 and P1-36. (a) If continuity is present, go to Step 14 of this fault. (b) If continuity is not present, repair wire 64 or 65 and/or connector P1, connector J4 (Para 8-49), (Para 8-50).



CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Disconnect connector J1 from connector P1. (4) Connect multimeter positive lead (+) to wire 64 and 65 where wire 64 and 65 connect to electrical junction box. (5) Connect multimeter negative lead (–) to connector P4-R and P4-P. (a) If continuity is present, replace auto-level switch (Para 8-20). (b) If continuity is not present, repair wire 64 or 65 and/or connector J1 (Para 8-49), (Para 8-50). (6) Connect connector J1 to connector P1. (7) Connect connector J4 to connector P4.



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Auto-level circuit card OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Wire 50 fautly. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 2 faulty.

15

Is continuity present between wire 50 at circuit breaker CB5 and connector J1-37?

NO → Repair wire 50 and/or connector J1 (Para 8-48).

YES

TEST OPTIONS
Continuity Test. STE/ICE-R #89.
REASON FOR QUESTION
If continuity is not present, connector J1 and/or wire 50 is faulty.

KNOWN INFO
Joystick moves forks. Light OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Auto-level circuit card OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Wire 50 faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 2 faulty.

16

Is continuity present on wire 50 between connector P1-37 and connector J4-N?

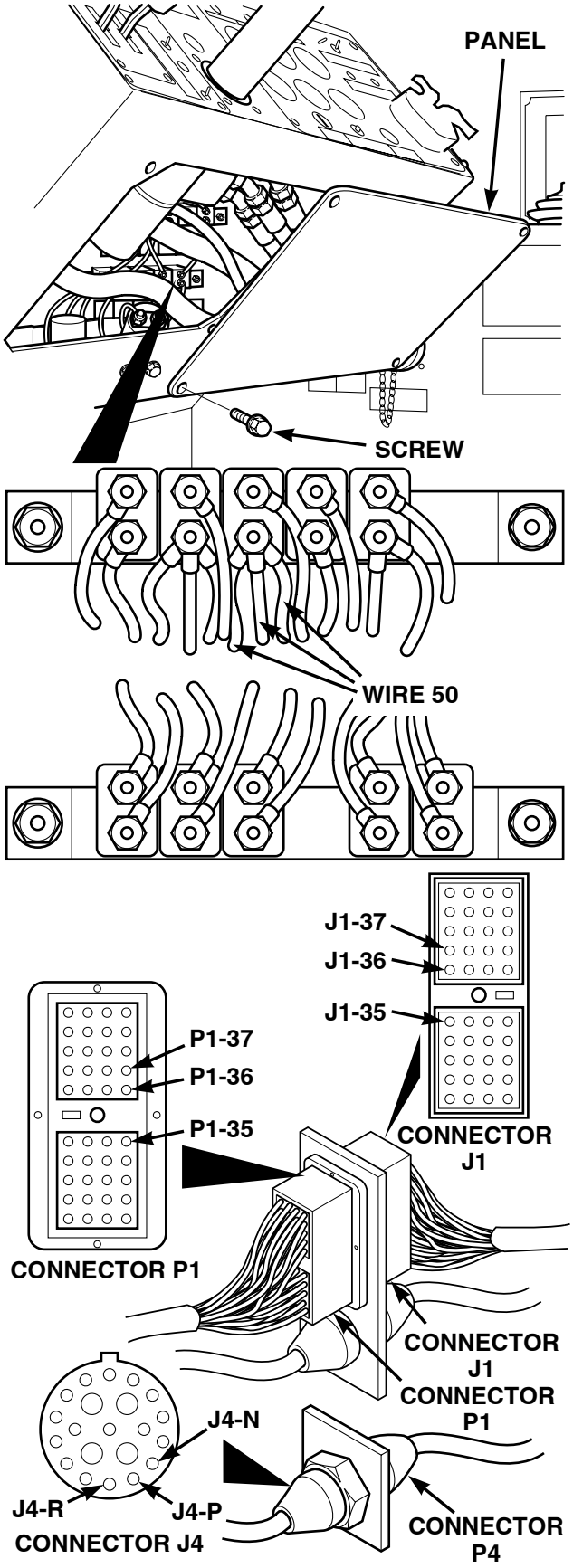
NO → Repair wire 50 and/or connectors P1, J4 (Para 8-49), (Para 8-50).

YES

TEST OPTIONS
Continuity Test. STE/ICE-R #89.
REASON FOR QUESTION
If continuity is not present, connector P1, connector J4 and/or wire 50 faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Disconnect connector J1 from connector P1. (4) Remove four screws from access panel. (5) Connect multimeter positive lead (+) to wire 50 where wire 50 connects to circuit breaker CB6. (6) Connect multimeter negative lead (–) to connector J1-37. (a) If continuity is present, go to Step 16 of this fault. (b) If continuity is not present, repair wire 50 and/or connector J1 (Para 8-48).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J4 from connector P4. (3) Connect multimeter positive lead (+) to connector P1-37 where wire 50 connects. (4) Connect multimeter negative lead (–) to connector J4-N. (a) If continuity is present, go to Step 17 of this fault. (b) If continuity is not present, repair wire 50 and/or connectors P1, J4 (Para 8-49), (Para 8-50).



32. FORK AUTO-LEVELER DOES NOT OPERATE (CONT).

KNOWN INFO
Joystick moves forks. Light OK. Auto-level light socket OK. Wire 59 OK. Auto-level switch OK. Auto-level sensor OK.
POSSIBLE PROBLEMS
Wire 50 faulty. Auto-level circuit card faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 2 faulty.

17

Is continuity present on wire 50 between connector P4-N and auto-level circuit card?

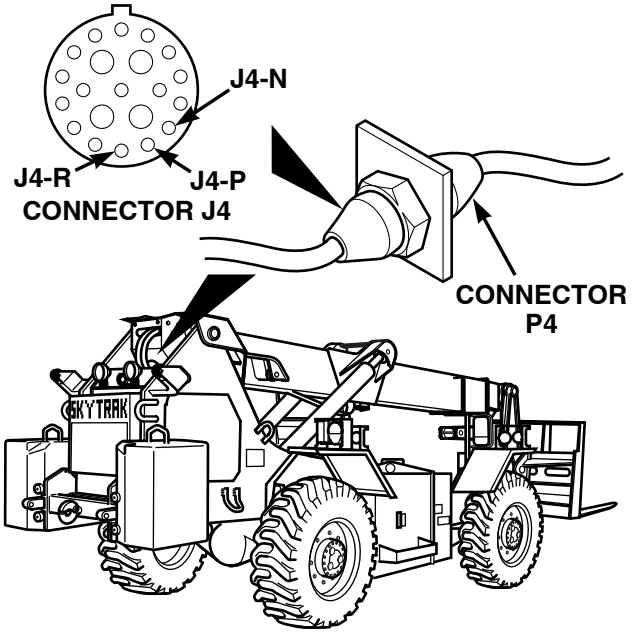
NO → Repair wire 50 and/or connector P4 (Para 8-50).

YES → Replace auto-level circuit card (Para 8-19).

TEST OPTIONS
Continuity Test STE/ICE-R #89.
REASON FOR QUESTION
If continuity is not present, connector P1, connector J4 and/or wire 50 faulty.

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect multimeter positive lead (+) to connector P4-N where wire 50 connects.
(3) Connect multimeter negative lead (–) to auto-level circuit card.
    (a) If continuity is present, replace auto-level circuit card (Para 8-19).
    (b) If continuity is not present, repair wire 50 and/or connector P4 (Para 8-50).
(4) Connect connector J4 to connector P4.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Install battery cover (Para 8-42).
(7) Install electrical junction box cover and tighten four screws.



33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE.

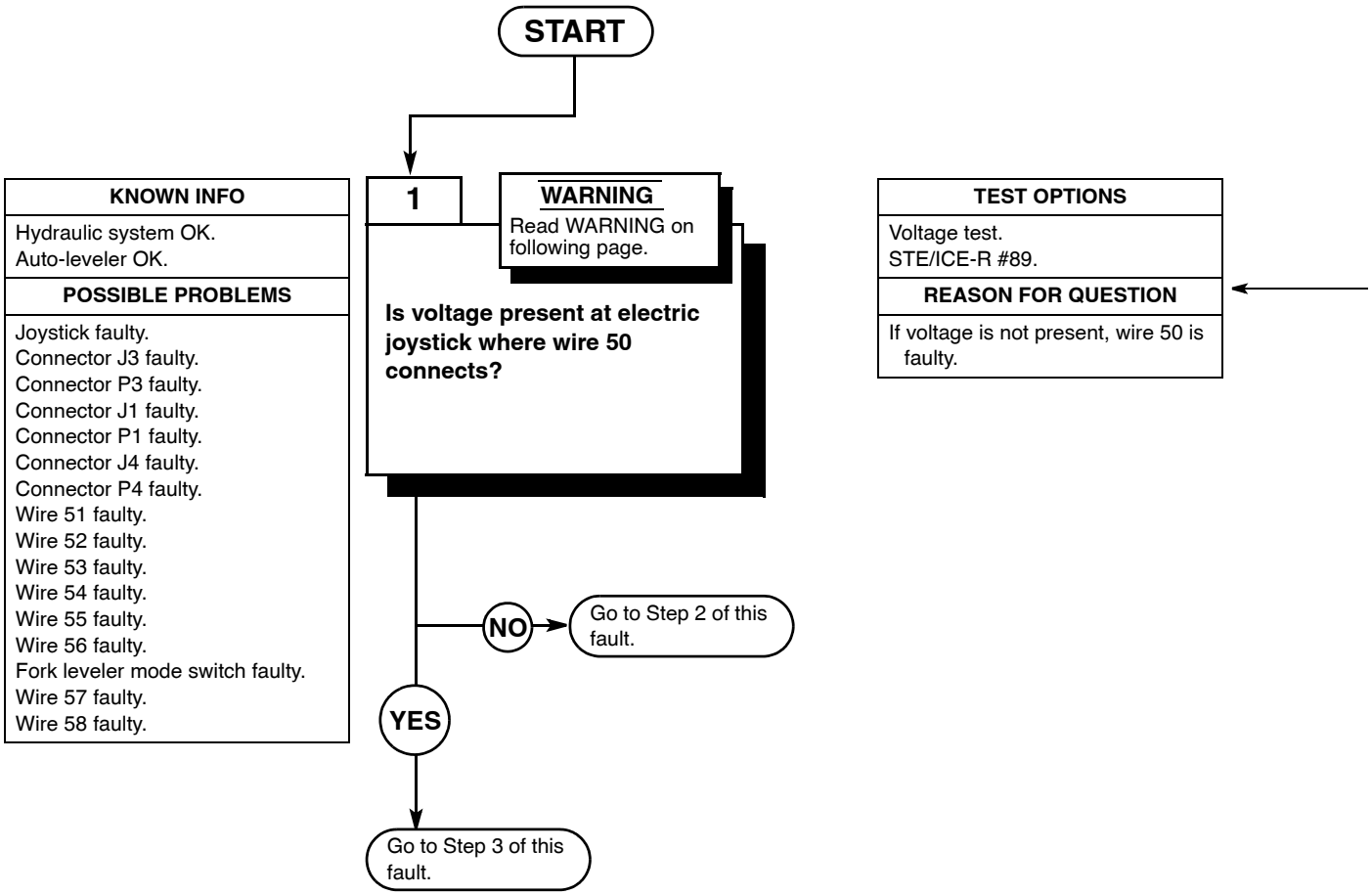
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

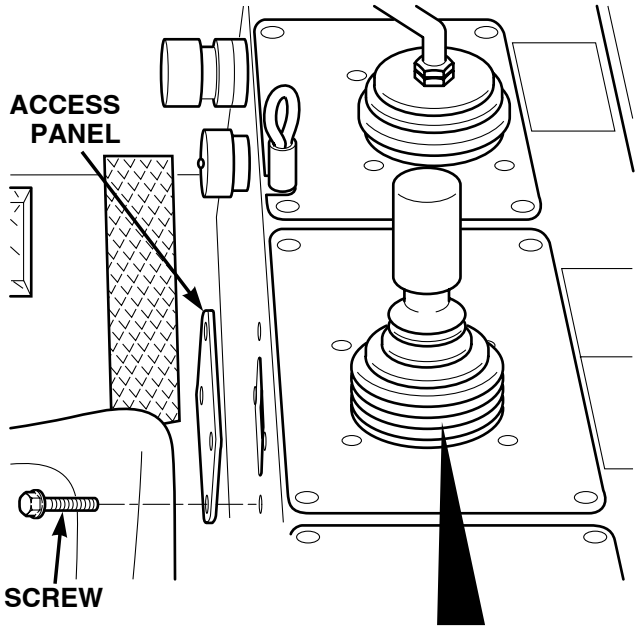
Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

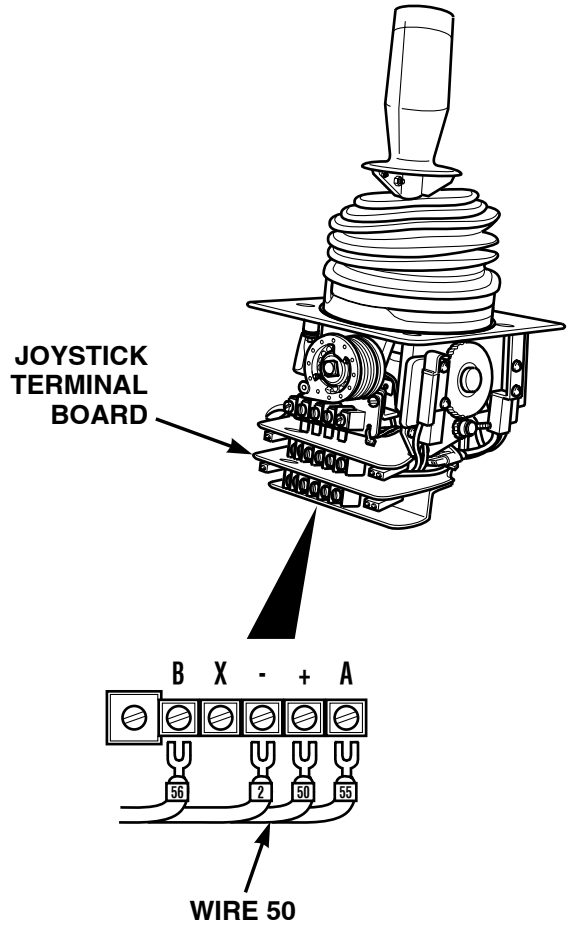


WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.



VOLTAGE TEST
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Remove four screws and access panel from side console. (4) Set multimeter to volts dc. (5) Connect multimeter positive lead (+) to electric joystick terminal boards 2 and 3 pin + where wire 50 connects (one at a time). (6) Connect multimeter negative lead (–) to known good ground. (7) Connect negative battery cable to negative side of battery (Para 8-42). (8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 3 of this fault. (b) If voltage is not present, go to Step 2 of this fault. (9) Turn engine start switch OFF (TM 10-3930-673-10).



33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK.
POSSIBLE PROBLEMS
Joystick faulty. Connector J3 faulty. Connector P3 faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 51 faulty. Wire 52 faulty. Wire 53 faulty. Wire 54 faulty. Wire 55 faulty. Wire 56 faulty. Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

2

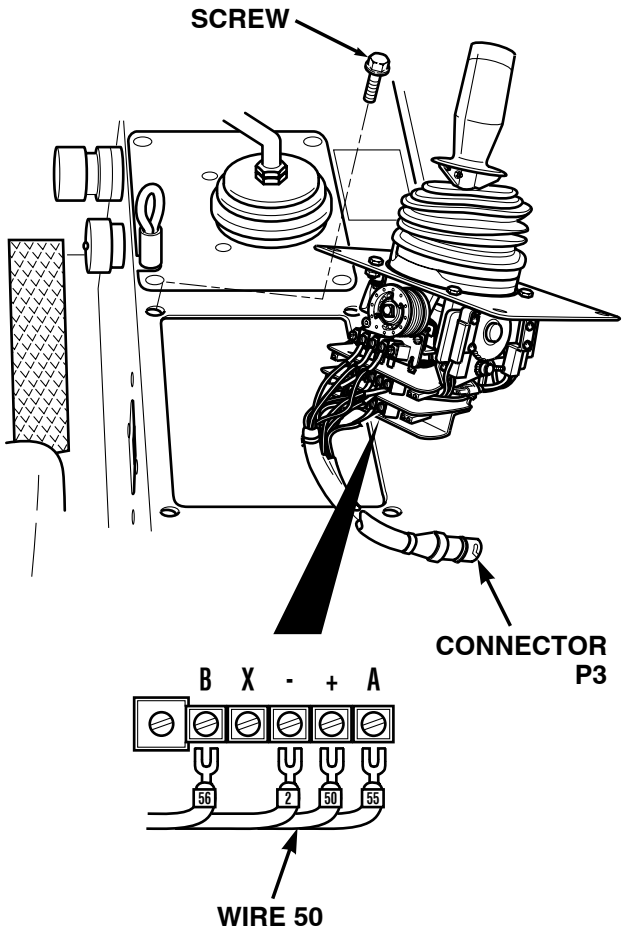
Is continuity present on wire 50 between connector P3-A and joystick terminal board pin +?

NO → Repair wire 50 and/or connector P3 (Para 8-48).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 50 or connector P3 is faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Remove four screws from joystick cover plate. (4) Lift cover plate and joystick out to reach both places where wire 50 connects at pin +. (5) Disconnect connector P3 from connector J3. Connect multimeter positive lead (+) to joystick terminal board where wire 50 connects (one at a time). (6) Connect multimeter negative lead (–) to connector P3-A. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, repair wire 50 and/or connector P3 (Para 8-48).



33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK.
POSSIBLE PROBLEMS
Joystick faulty. Connector J3 faulty. Connector P3 faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 51 faulty. Wire 52 faulty. Wire 53 faulty. Wire 54 faulty. Wire 55 faulty. Wire 56 faulty. Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

3

Is voltage present at specified pin in Table 2-5 for appropriate function?

NO → Go to Step 4 of this fault.

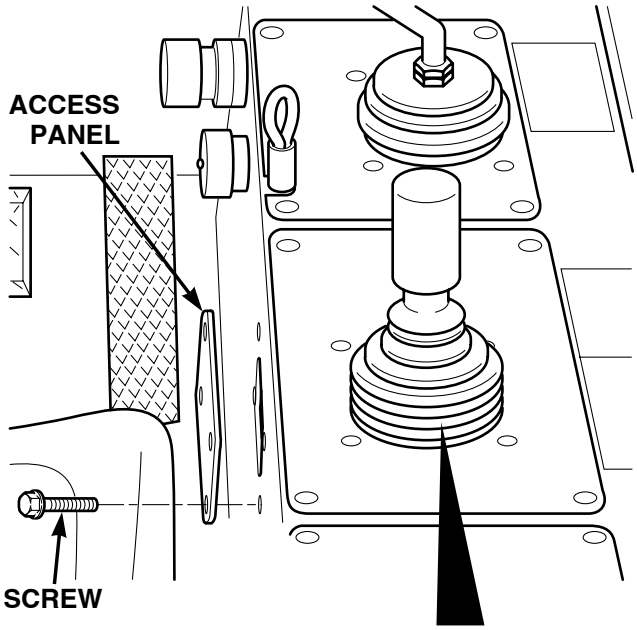
YES → Go to Step 5 of this fault.

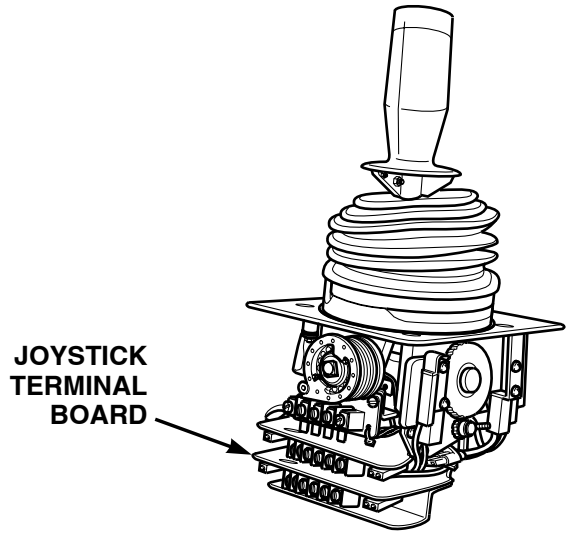
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

Table 2-5. Electric Joystick Connections

Joystick Connector	Wire	Main Connector		Boom Connector		Joystick Terminal Board and Pin	Function
Button Out							
P3-C	2	J2-2	P2-2			TB1-C, TB2-__, and TB-3__	Ground
P3-E	51	J1-27	P1-27	J4-K	P4-K	TB1-B	Fork Ground
P3-G	53	Fork Leveler Switch				TB2-A	Fork Tilt Up
P3-D	54	Fork Leveler Switch				TB2-B	Fork Tilt Down
P3-J	55	J1-31	P1-31	J4-X	P4-X	TB3-A	Attachment Raise
P3-F	56	J1-32	P1-32	J4-L	P4-L	TB3-B	Attachment Lower
	57	J1-33	P1-32	J4-M	P4-M		Fork Tilt Up
	58	J1-34	P1-34	J4-S	P4-S		Fork Tilt Down
Button In							
P3-C	2	J2-2	P2-2			TB1-C, TB2-__, and TB3-__	Ground
P3-H	52	J1-28	P1-28	J4-H	P4-H	TB2-A	Attachment Ground
P3-G	53	J1-29	P1-29	J4-J	P4-J	TB2-A	Left Fork In
P3-D	54	J1-30	P1-30	J4-A	P4-A	TB2-B	Left Fork Out
P3-J	55	J1-31	P1-31	J4-X	P4-X	TB3-A	Right Fork In
P3-F	56	J1-32	P1-32	J4-L	P4-L	TB3-B	Right Fork Out

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to joystick terminal board pin for appropriate function. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 5 of this fault. (b) If voltage is not present, go to Step 4 of this fault. (6) Turn engine start switch to OFF position (TM 10-3930-673-10).





33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK.
POSSIBLE PROBLEMS
Joystick faulty. Connector J3 faulty. Connector P3 faulty. Connector J1 faulty. Connector P1 faulty. Connector J4 faulty. Connector P4 faulty. Wire 51 faulty. Wire 52 faulty. Wire 53 faulty. Wire 54 faulty. Wire 55 faulty. Wire 56 faulty. Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

4

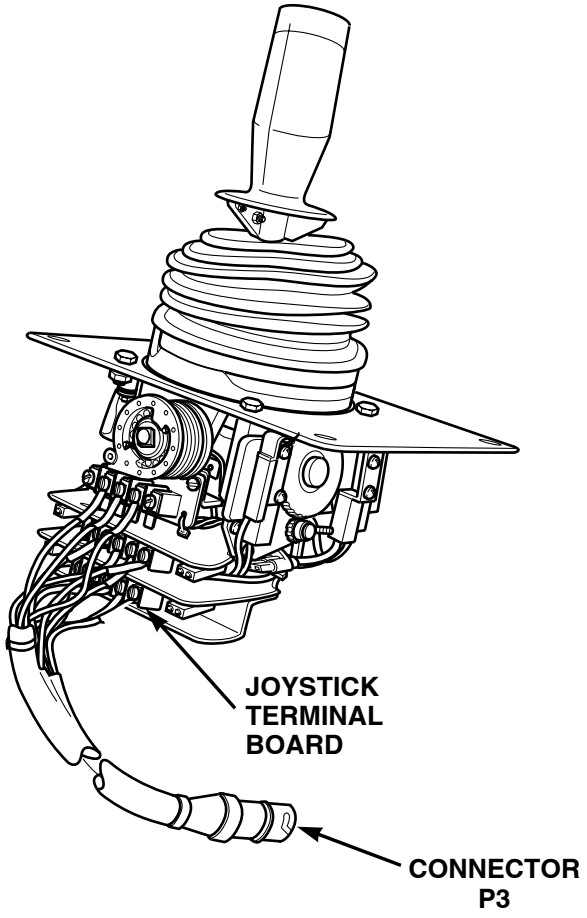
Is continuity present between specified pin in Table 2-5 and connector P3 for appropriate function?

NO → Repair wire and/or connector P3 (Para 8-48).

YES → Replace electric joystick (Para 8-18).

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire associated with appropriate function is faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Disconnect connector P3 from connector J3. (4) Connect multimeter positive lead (+) to joystick terminal board pin for appropriate function. (5) Connect multimeter negative lead (–) to connector pin for appropriate function. (a) If continuity is present, replace electric joystick (Para 8-18). (b) If continuity is not present, repair faulty wire and/or connector P3 (Para 8-48). (6) Disconnect negative battery cable from negative side of battery (Para 8-42). (7) Connect connector J3 to connector P3. (8) Install four screws to secure access panel to side console.



33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK. Joystick OK. Connector J3 OK. Connector P3 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Connector J4 faulty. Connector P4 faulty. Wire 51 faulty. Wire 52 faulty. Wire 53 faulty. Wire 54 faulty. Wire 55 faulty. Wire 56 faulty. Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

5

Is voltage present at numbered connector in electrical junction box for specified wire/function as listed in Table 2-6?

NO → Go to Step 6 of this fault.

YES → Go to Step 7 of this fault.

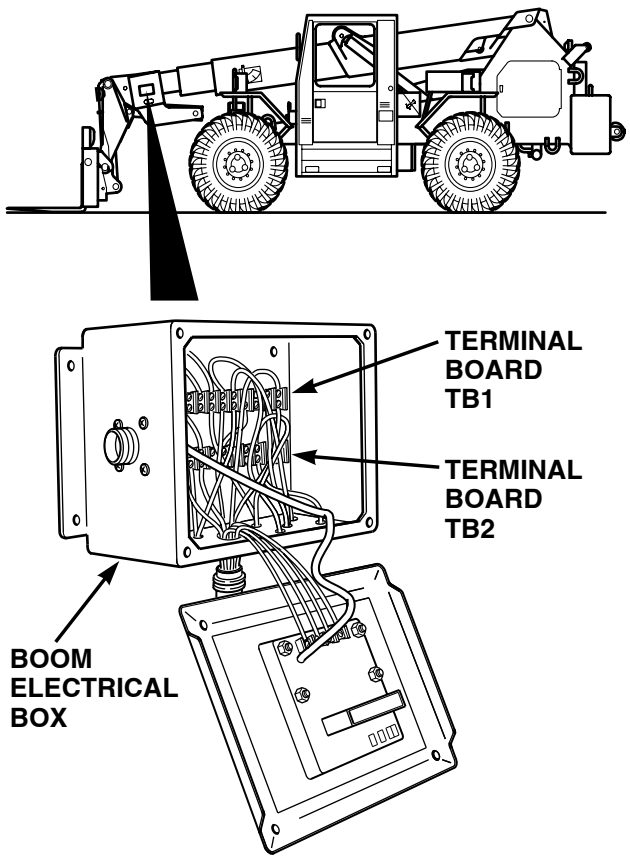
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

Table 2-6. Electrical Junction Box Connections

Wire	Electrical Junction Box Connector		Boom Connector		Main Connector		Function
	In	Out					
Button Out							
2	TB1-16	TB1-32					Ground
51	TB2-14	TB2-32, 31, 30, and 29	J4-K	P4-K	J1-27	P1-27	Attachment Ground
53	TB1-4	TB1-20	Fork Leveler Switch				Fork Tilt Up
54	TB1-5	TB1-21	Fork Leveler Switch				Fork Tilt Down
55	TB1-7	TB1-23	J4-X	P4-X	J1-31	P1-31	Attachment Raise
56	TB1-9	TB1-25	J4-L	P4-L	J1-32	P1-32	Attachment Lower
57	TB1-15	TB1-31	J4-M	P4-M	J1-33	P1-33	Fork Tilt Up
58	TB1-11	TB-127	J4-S	P4-S	J1-34	P1-34	Fork Tilt Down
Button In							
2	TB1-16	TB1-32					Ground
52	TB2-14	TB2-3, 17, 18, and 19	J4-H	P4-H	J1-28	P1-28	Attachment Ground
53	TB1-4	TB1-20	J4-J	P4-J	J1-29	P1-29	Left Fork In
54	TB1-5	TB1-21	J4-A	P4-A	J1-30	P1-30	Left Fork Out
55	TB1-7	TB1-23	J4-X	P4-X	J1-31	P1-31	Right Fork In
56	TB1-9	TB1-25	J4-L	P4-L	J1-32	P1-32	Right Fork Out

VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to electrical junction box terminal board pin for appropriate function.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If voltage is present, go to Step 7 of this fault.
    (b) If voltage is not present, go to Step 6 of this fault.
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK. Joystick OK. Connector J3 OK. Connector P3 OK. Connector J1 OK. Connector P1 OK.
POSSIBLE PROBLEMS
Connector J4 faulty. Connector P4 faulty. Wire 51 faulty. Wire 52 faulty. Wire 53 faulty. Wire 54 faulty. Wire 55 faulty. Wire 56 faulty. Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

6

Is continuity present between boom connector and electrical junction box terminal board connection as listed in Table 2-6 for appropriate wire/function?

NO → Repair wire and/or connector (Para 8-50).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, repair faulty wire and/or connector for appropriate function.

KNOWN INFO
Hydraulic system OK. Auto-leveler OK. Joystick OK. Connector J3 OK. Connector P3 OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK. Wire 51 OK. Wire 52 OK. Wire 53 OK. Wire 54 OK. Wire 55 OK. Wire 56 OK.
POSSIBLE PROBLEMS
Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

7

Is voltage present at fork leveler mode switch where wire 53 or 54 connects?

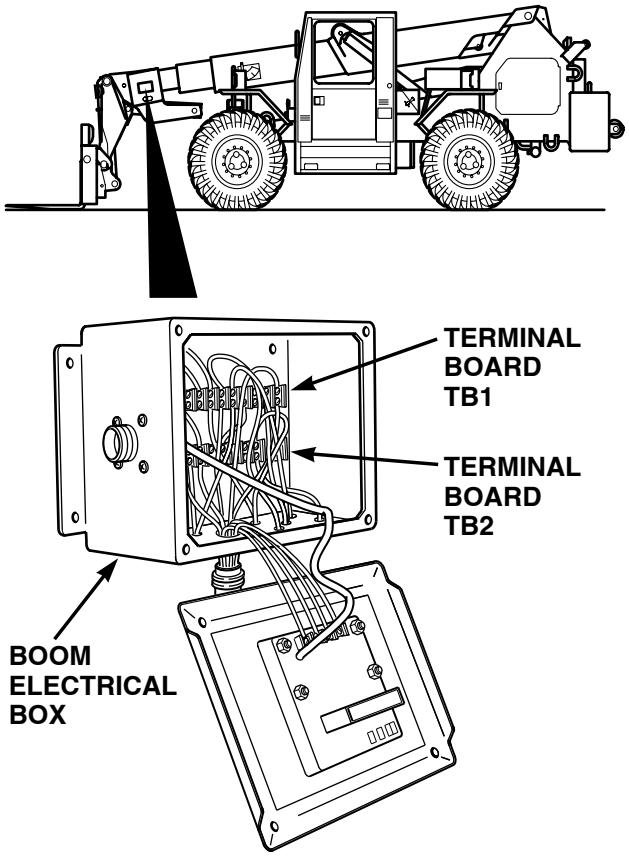
NO → Repair wire 53 or 54 (Para 8-50).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 53 or 54 is faulty.

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Disconnect connector P3 from connector J3.
(3) Connect multimeter positive lead (+) to electrical junction box terminal board pin for appropriate function.
(4) Connect multimeter negative lead (–) to boom connector pin for appropriate function.
  (a) If continuity is present, go to Step 7 of this fault.
  (b) If continuity is not present, repair faulty wire and/or connector (Para 8-50).
(5) Connect connector J3 to connector P3.



VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to electrical junction box TB1-4 or TB1-5 for appropriate function.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If voltage is present, go to Step 8 of this fault.
  (b) If voltage is not present, repair wire 53 or 54 (Para 8-50).
(6) Turn engine start switch to OFF position (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).

33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK. Joystick OK. Connector J3 OK. Connector P3 OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK. Wire 51 OK. Wire 52 OK. Wire 53 OK. Wire 54 OK. Wire 55 OK. Wire 56 OK.
POSSIBLE PROBLEMS
Fork leveler mode switch faulty. Wire 57 faulty. Wire 58 faulty.

8

Is voltage present at fork leveler mode switch where wire 57 and 58 connect?

NO → Replace fork mode leveler switch (Para 8-20).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, fork mode leveler switch is faulty.

KNOWN INFO
Hydraulic system OK. Auto-leveler OK. Joystick OK. Connector J3 OK. Connector P3 OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK. Wire 51 OK. Wire 52 OK. Wire 53 OK. Wire 54 OK. Wire 55 OK. Wire 56 OK. Fork leveler mode switch OK.
POSSIBLE PROBLEMS
Wire 57 faulty. Wire 58 faulty.

9

Is continuity present between main connector and fork leveler mode switch where wire 57 and 58 connect?

NO → Repair wire and/or connector (Para 8-48).

YES

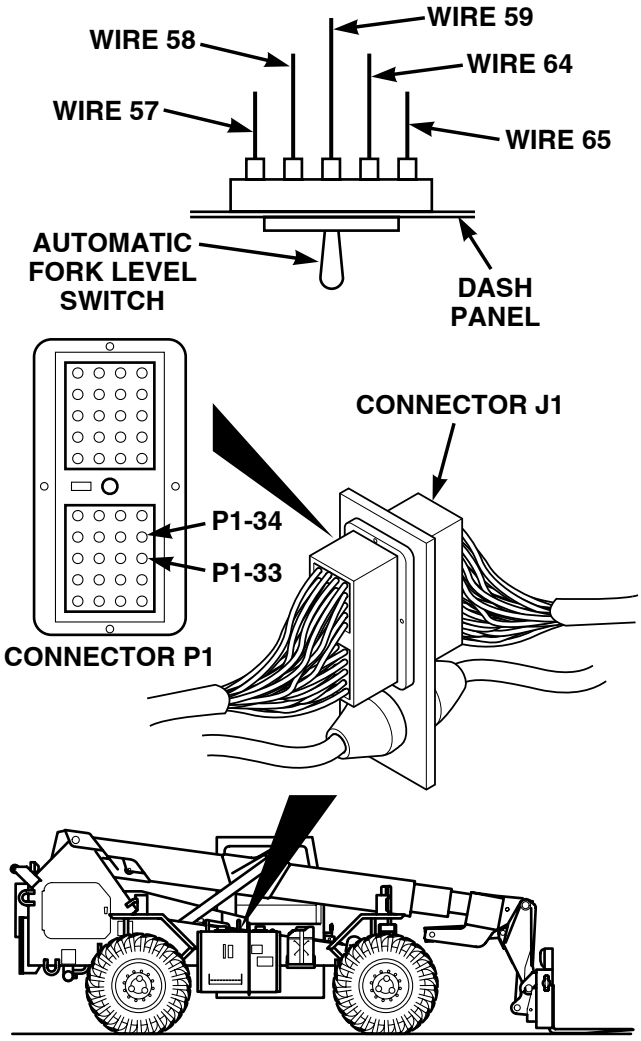
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire and/or connector are faulty.

VOLTAGE TEST

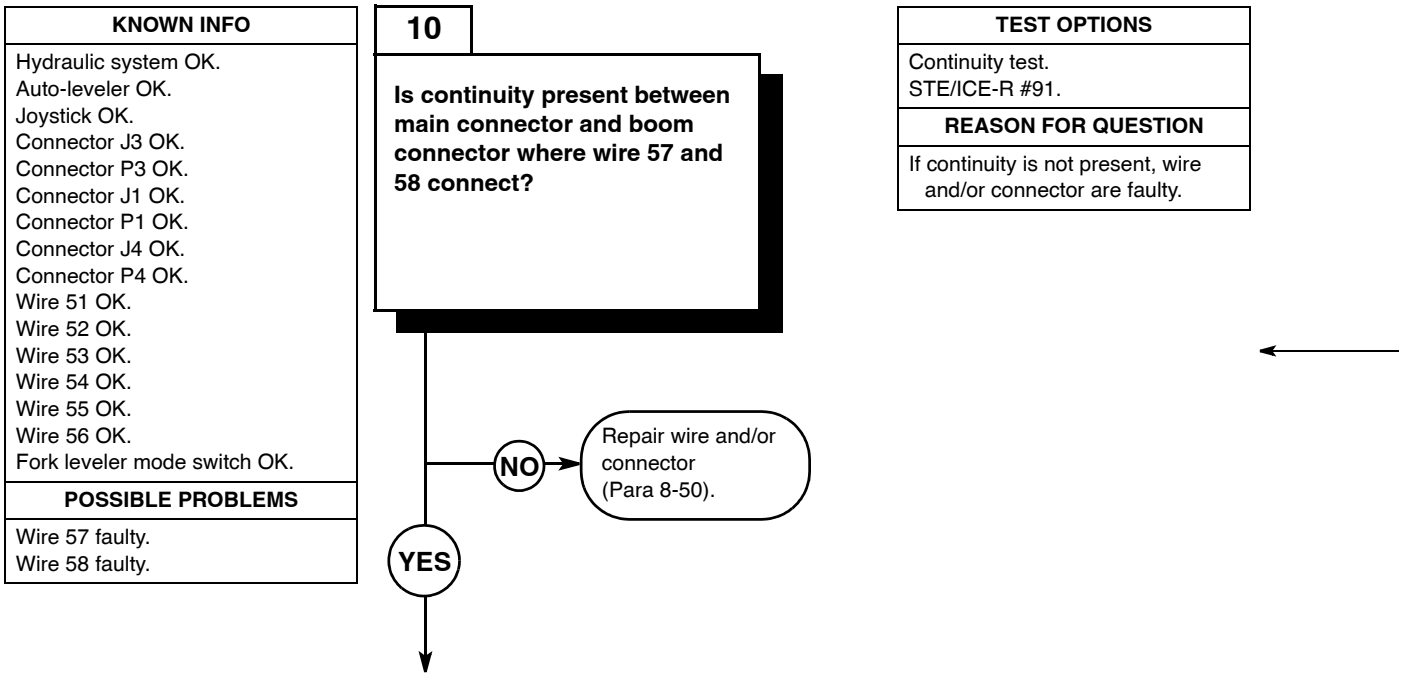
(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to fork leveler mode switch where wire 57 and 58 connect.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
(6) Turn fork leveler mode switch to MANUAL position (TM 10-3930-673-10).
    (a) If voltage is present, go to Step 9 of this fault.
    (b) If voltage is not present, replace fork leveler mode switch (Para 8-20).
(7) Turn engine start switch to OFF position (TM 10-3930-673-10).
(8) Disconnect negative battery cable from negative side of battery (Para 8-42).

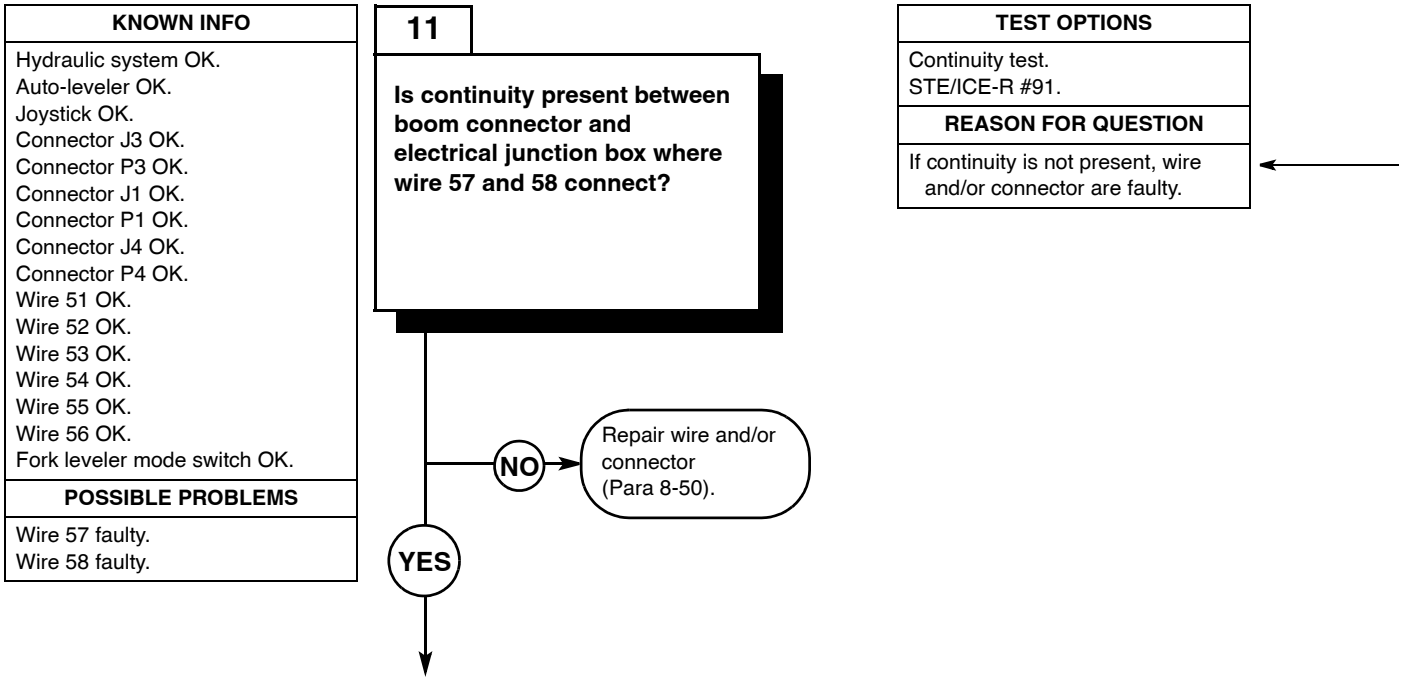
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Disconnect connector J1 from connector P1.
(3) Connect multimeter positive lead (+) to fork leveler mode switch where wire 57 and 58 connect.
(4) Connect multimeter negative lead (–) to main connector pin 33 and 34 for appropriate wire.
    (a) If continuity is present, go to Step 10 of this fault.
    (b) If continuity is not present, repair faulty wire and/or connector (Para 8-48).

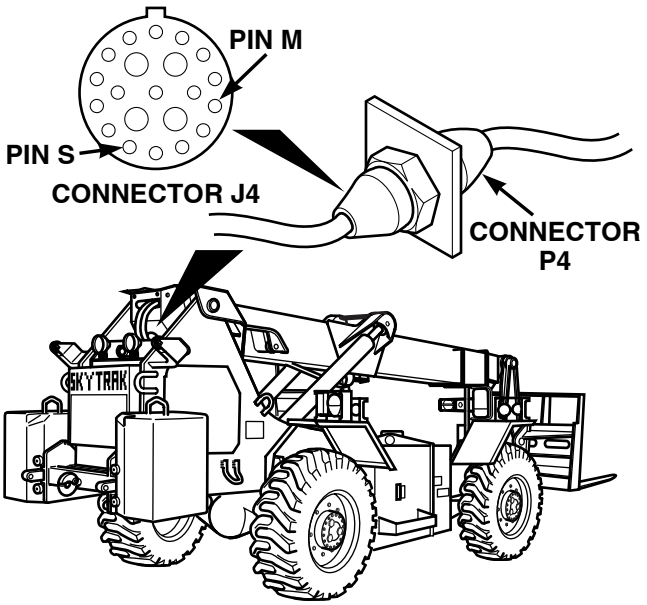


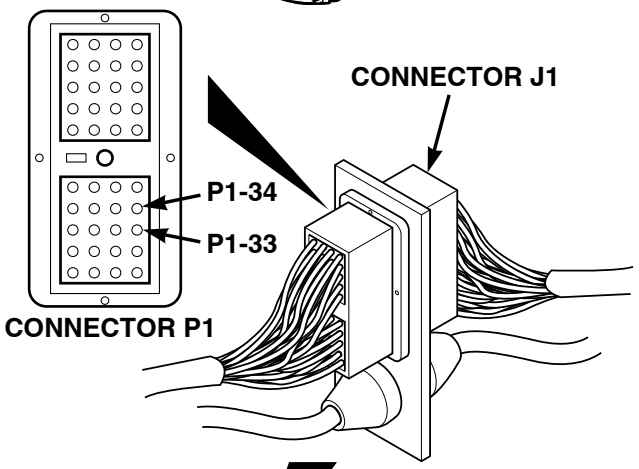
33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).



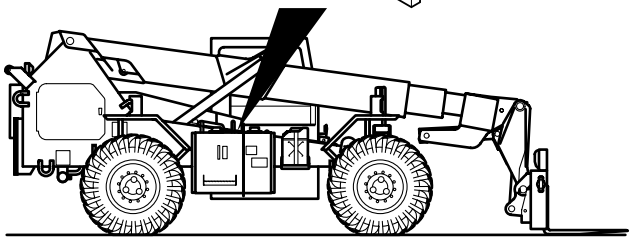


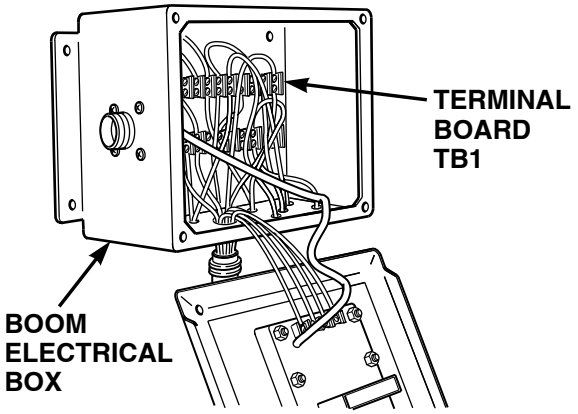
CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J4 from connector P4. (3) Connect multimeter positive lead (+) to boom connector pin M and S for appropriate wire. (4) Connect multimeter negative lead (–) to main connector pin 33 and 34 for appropriate wire. (a) If continuity is present, go to Step 11 of this fault. (b) If continuity is not present, repair faulty wire and/or connector (Para 8-50).





CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to boom connector pin M and S for appropriate wire. (3) Connect multimeter negative lead (–) to electrical junction box TB1-10 and TB1-11 for appropriate wire. (a) If continuity is present, go to Step 12 of this fault. (b) If continuity is not present, repair faulty wire and/or connector (Para 8-50). (4) Connect connector J1 to connector P1. (5) Connect connector J4 to connector P4.





33. ELECTRIC JOYSTICK CONTROL DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic system OK. Auto-leveler OK. Joystick OK. Connector J3 OK. Connector P3 OK. Connector J1 OK. Connector P1 OK. Connector J4 OK. Connector P4 OK. Wire 51 OK. Wire 52 OK. Wire 53 OK. Wire 54 OK. Wire 55 OK. Wire 56 OK. Fork leveler mode switch OK.
POSSIBLE PROBLEMS
Wire 57 faulty. Wire 58 faulty.

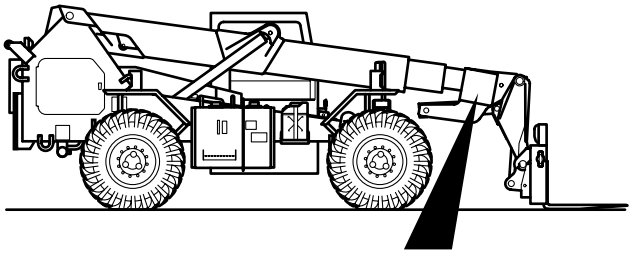
12

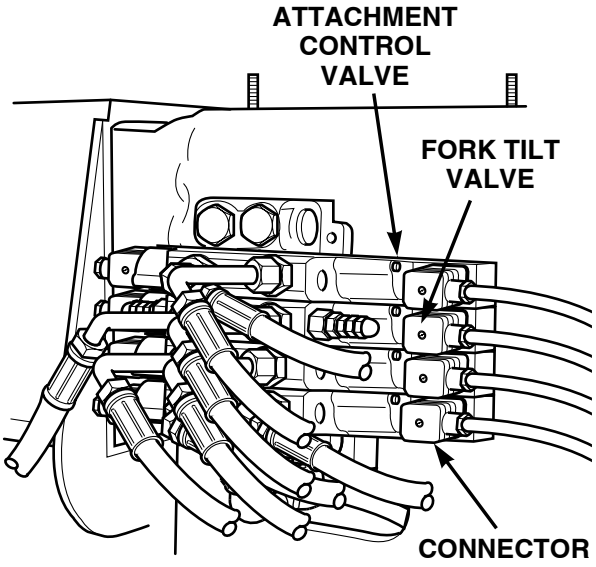
Is continuity present between fork tilt valve connector and electrical junction box where wire 57 and 58 connect?

NO → Repair wire and or connector (Para 8-50).

YES → Replace fork tilt valve (Para 18-14).

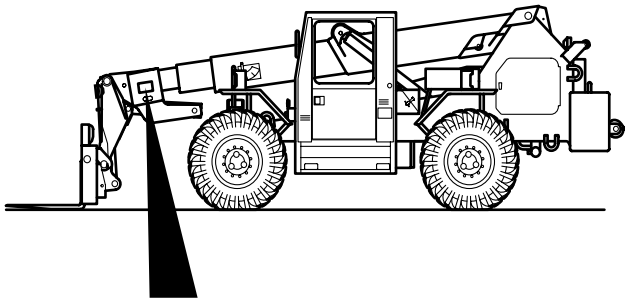
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire and/or connector are faulty.

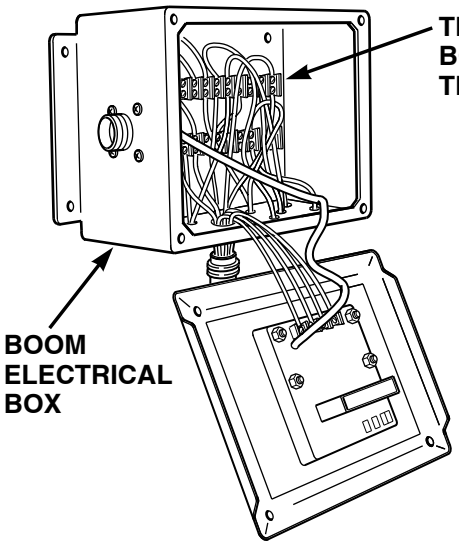




CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Disconnect appropriate connector for appropriate wire.
(3) Connect multimeter positive lead (+) to fork tilt valve for appropriate wire.
(4) Connect multimeter negative lead (–) to electrical junction box TB1-10 or TB1-11 for appropriate wire.
  (a) If continuity is present, replace fork tilt valve (Para 18-14).
  (b) If continuity is not present, repair faulty wire and/or connector (Para 8-50).
(5) Connect connector to appropriate fork tilt valve.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
(7) Install battery cover (Para 8-42).
(8) Install four screws to secure joystick to side console.





34. NONE OF THE GAGES OPERATE.

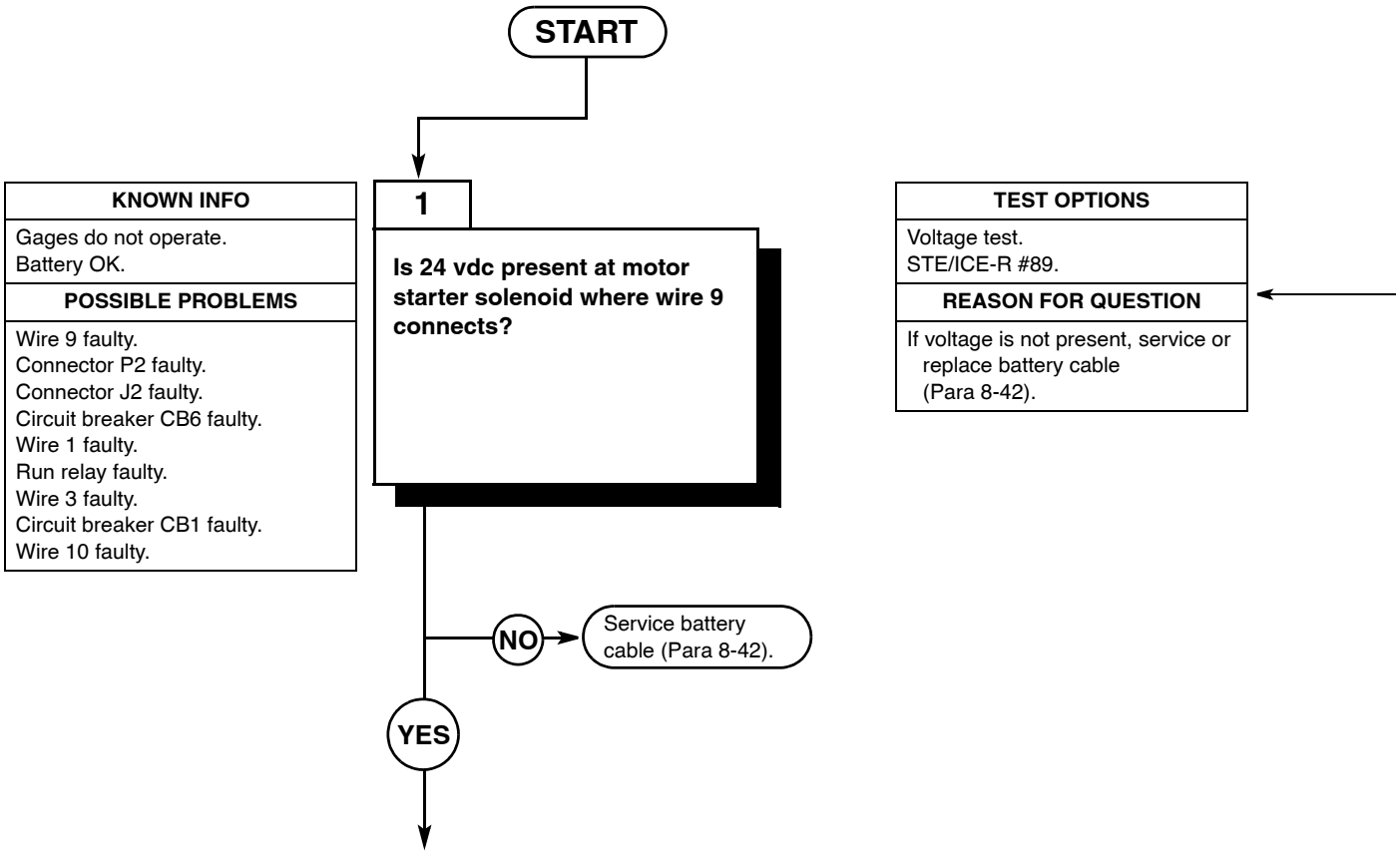
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

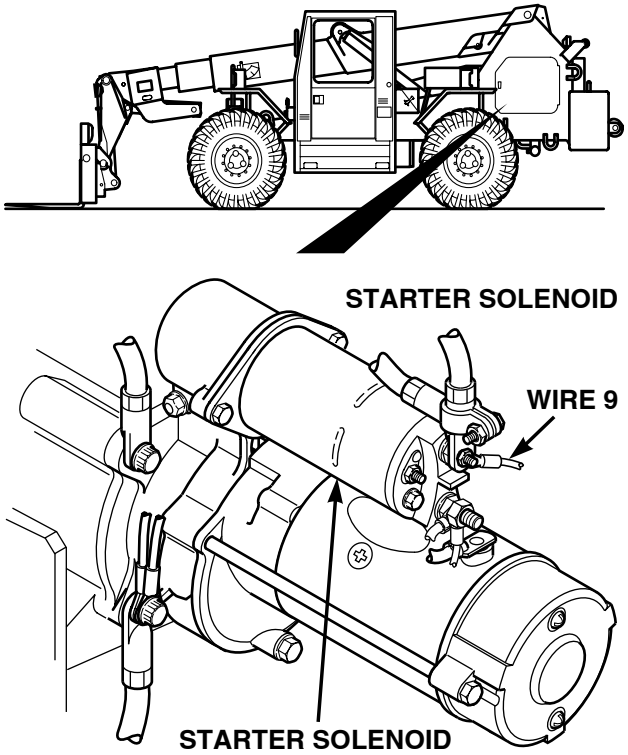
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Remove battery cover (Para 8-42). (2) Disconnect negative battery cable from negative side of battery (Para 8-42). (3) Set multimeter to volts dc. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect multimeter positive lead (+) to starter solenoid where wire 9 connects. (a) If 24 vdc is present, go to Step 2 of this fault. (b) If 24 vdc is not present, service battery cable (Para 8-42).



34. NONE OF THE GAGES OPERATE (CONT).

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present on wire 9 where wire 9 connects to circuit breaker CB6?

NO → Go to step 8 of this fault.

YES

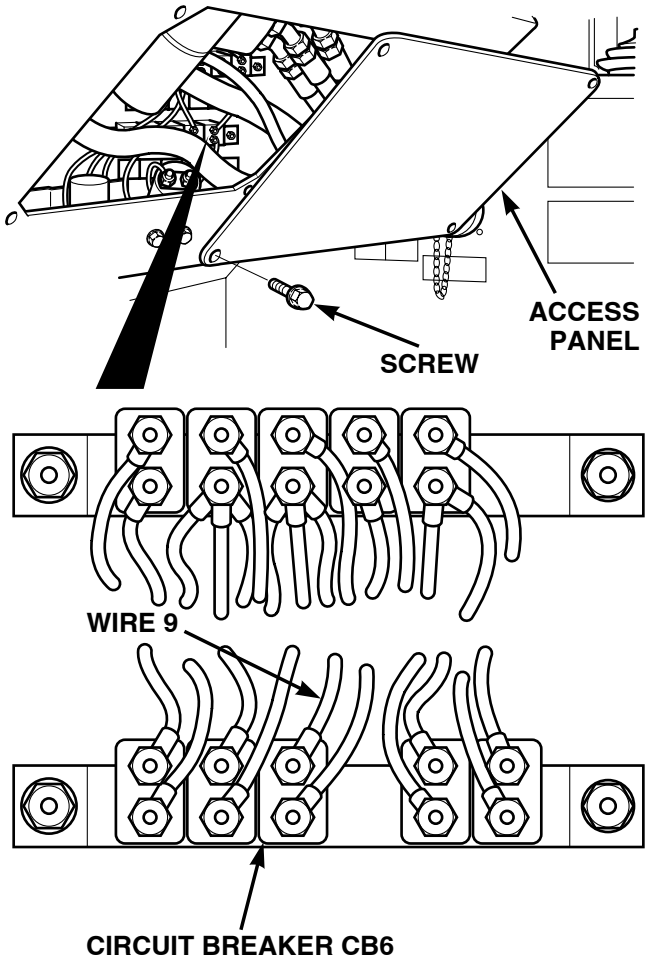
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 faulty.

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Remove four screws and access panel.
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to circuit breaker CB6.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If 24 vdc is present, go to Step 3 of this fault.
  (b) If 24 vdc is not present, go to Step 8 of this fault.
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



34. NONE OF THE GAGES OPERATE (CONT).

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty.

3

Is 24 vdc present on wire 1 where wire 1 connects to circuit breaker CB6?

NO → Replace circuit breaker CB6 (Para 8-11).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB6 faulty.

KNOWN INFO
Gages do not operate. Battery OK. Battery cabl e OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK.
POSSIBLE PROBLEMS
Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty. Fuel gage faulty. Wire 12 faulty. Connector J1 faulty. Connector P1 faulty. Fuel level transducer faulty.

4

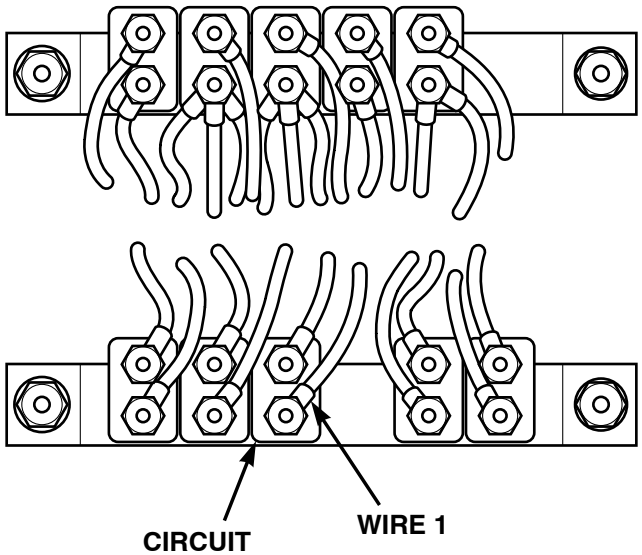
Is 24 vdc present on wire 1 where wire 1 connects to run relay?

NO → Repair wire 1 (Para 8-48).

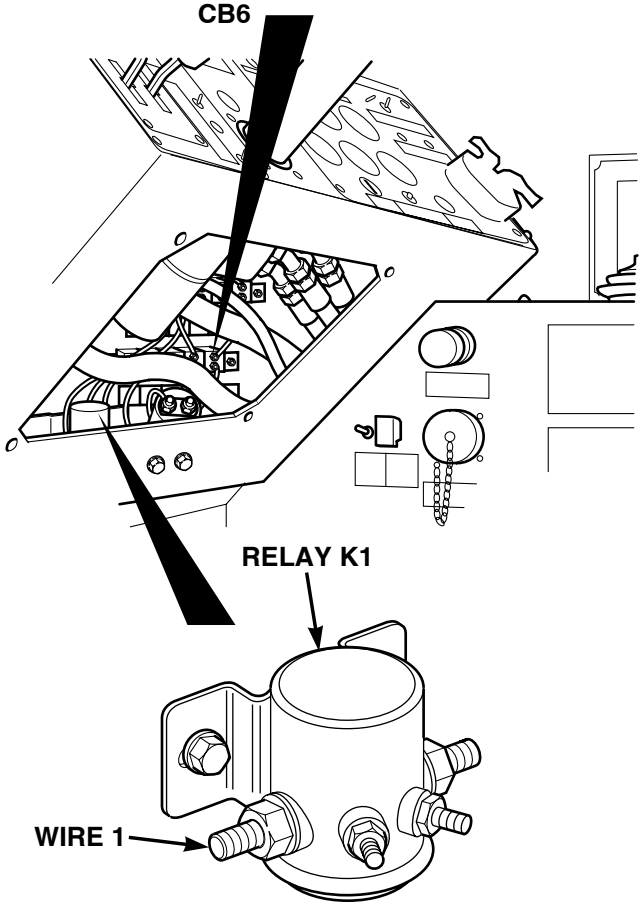
YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 1 faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to wire 1 where wire 1 connects to circuit breaker CB6. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB6 (Para 8-11). (6) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 1 where wire 1 connects to run relay. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, repair wire 1 (Para 8-48). (5) Disconnect negative battery cable from negative side of battery (Para 8-42).



34. NONE OF THE GAGES OPERATE (CONT).

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK.
POSSIBLE PROBLEMS
Run relay faulty. Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty. Fuel gage faulty. Wire 12 faulty. Connector J1 faulty. Connector P1 faulty. Fuel level transducer faulty.

5

Is 24 vdc present on wire 3 where wire 3 connects to run relay?

NO → Replace run relay (Para 8-23).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, run relay faulty.

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK.
POSSIBLE PROBLEMS
Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty.

6

Is 24 vdc present on wire 3 where wire 3 connects to circuit breaker CB1?

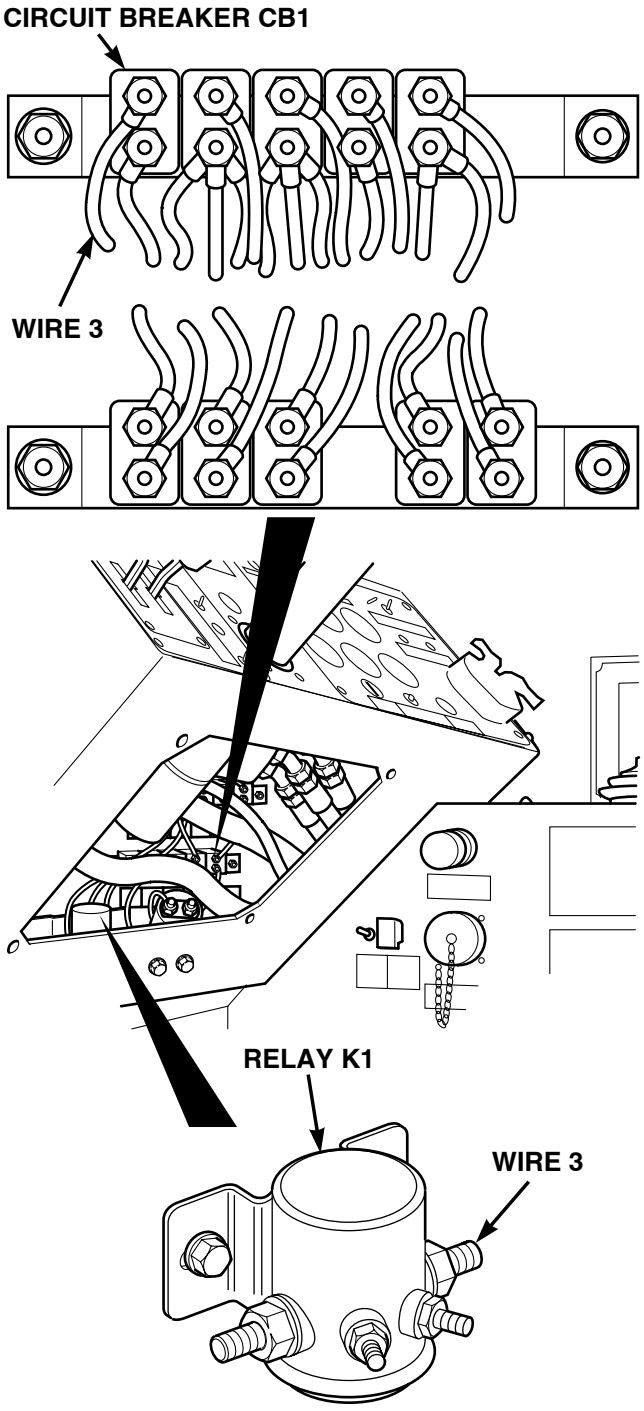
NO → Repair wire 3 (Para 8-48).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 3 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 3 where wire 3 connects to run relay. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, replace run relay (Para 8-23). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 3 where wire 3 connects to circuit breaker CB1. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 7 of this fault. (b) If 24 vdc is not present, repair wire 3 (Para 8-48). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



34. NONE OF THE GAGES OPERATE (CONT).

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB1 faulty. Wire 10 faulty.

7

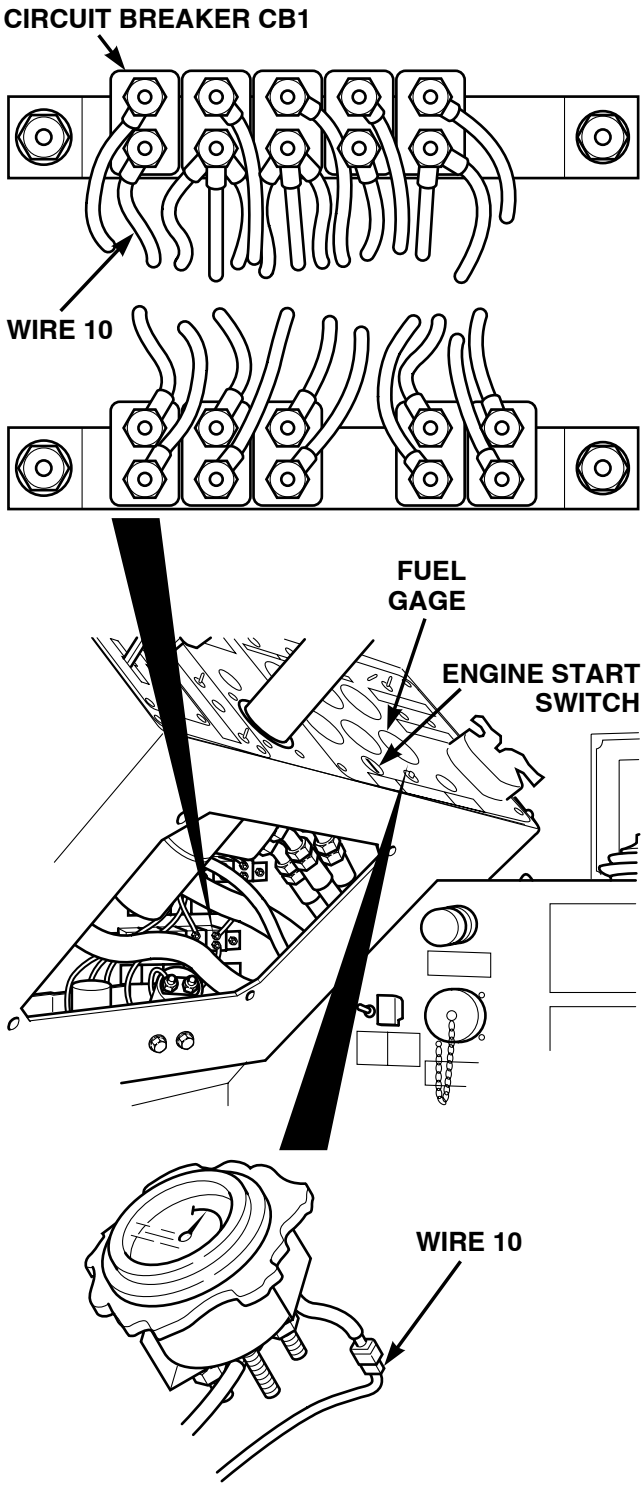
Is 24 vdc present on wire 10 where wire 10 connects to circuit breaker CB1?

NO → Replace circuit breaker CB1 (Para 8-11).

YES → Repair wire 10 (Para 8-48).

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB1 faulty.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to wire 10 where wire 10 connects to circuit breaker CB1. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, repair wire 10 (Para 8-48). (b) If 24 vdc is not present, replace circuit breaker CB1 (Para 8-11). (6) Turn engine start switch to OFF position, (TM 10-3930-673-10). (7) Install access panel and four screws. (8) Install battery cover (Para 8-42).



34. NONE OF THE GAGES OPERATE (CONT).

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Connector P2 faulty. Connector J2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty.

8

Is continuity present on wire 9 between wire 9 and connector J2-1?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector J2 faulty.

NO → Repair wire 9 or connector J2 (Para 8-48).

YES

KNOWN INFO
Gages do not operate. Battery OK. Battery cable OK. Wire 9 OK. Connector J2 OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Circuit breaker CB6 faulty. Wire 1 faulty. Run relay faulty. Wire 3 faulty. Circuit breaker CB1 faulty. Wire 10 faulty. Fuel gage faulty. Wire 12 faulty. Connector J1 faulty. Connector P1 faulty. Fuel level transducer faulty.

9

Is continuity present on wire 9 between starter motor solenoid and connector P2-1?

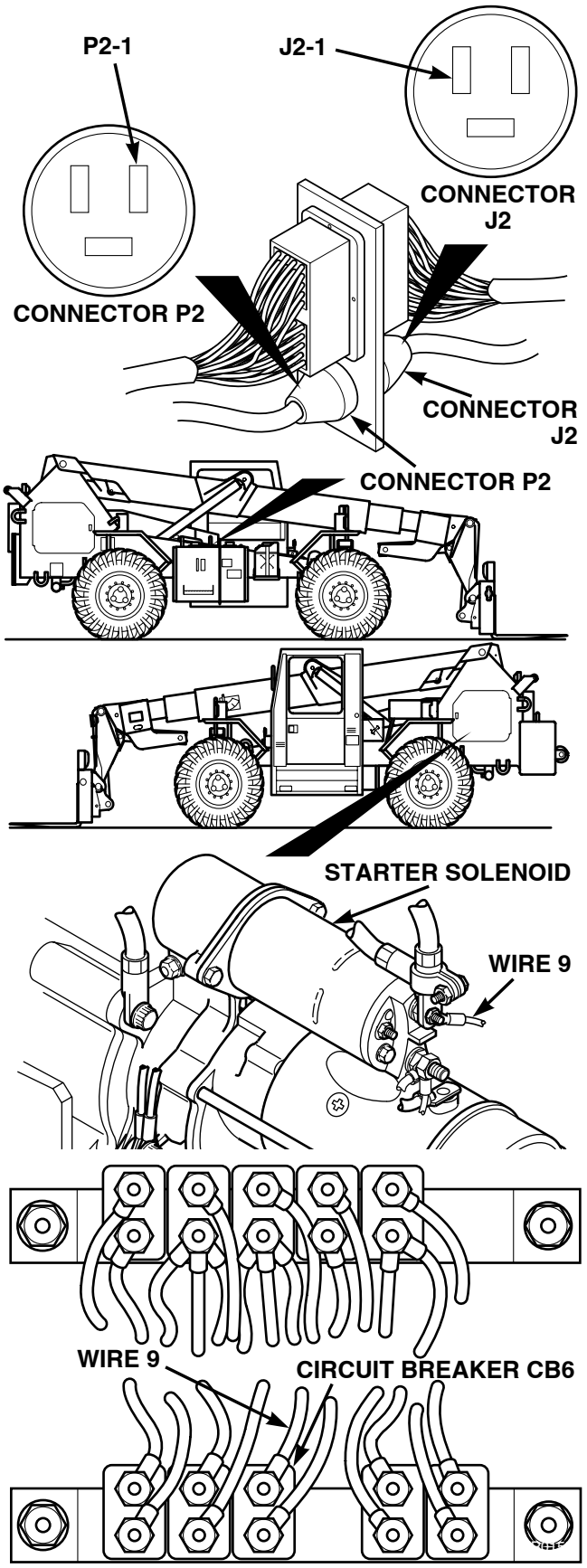
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 9 or connector P2 faulty.

NO → Repair wire 9 or connector P2 (Para 8-49).

YES → Go to Step 3 of this fault.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J2 from connector P2. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to circuit breaker CB6. (5) Connect multimeter negative lead (–) to connector J2-1. (a) If continuity is present, go to Step 9 of this fault. (b) If continuity is not present, repair wire 9 or connector J2 (Para 8-48).

CONTINUITY TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 9 where wire 9 connects to starter motor solenoid. (4) Connect multimeter negative lead (–) to connector P2-1. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, repair wire 9 or connector P2 (Para 8-49).



35. VOLTMETER DOES NOT OPERATE.

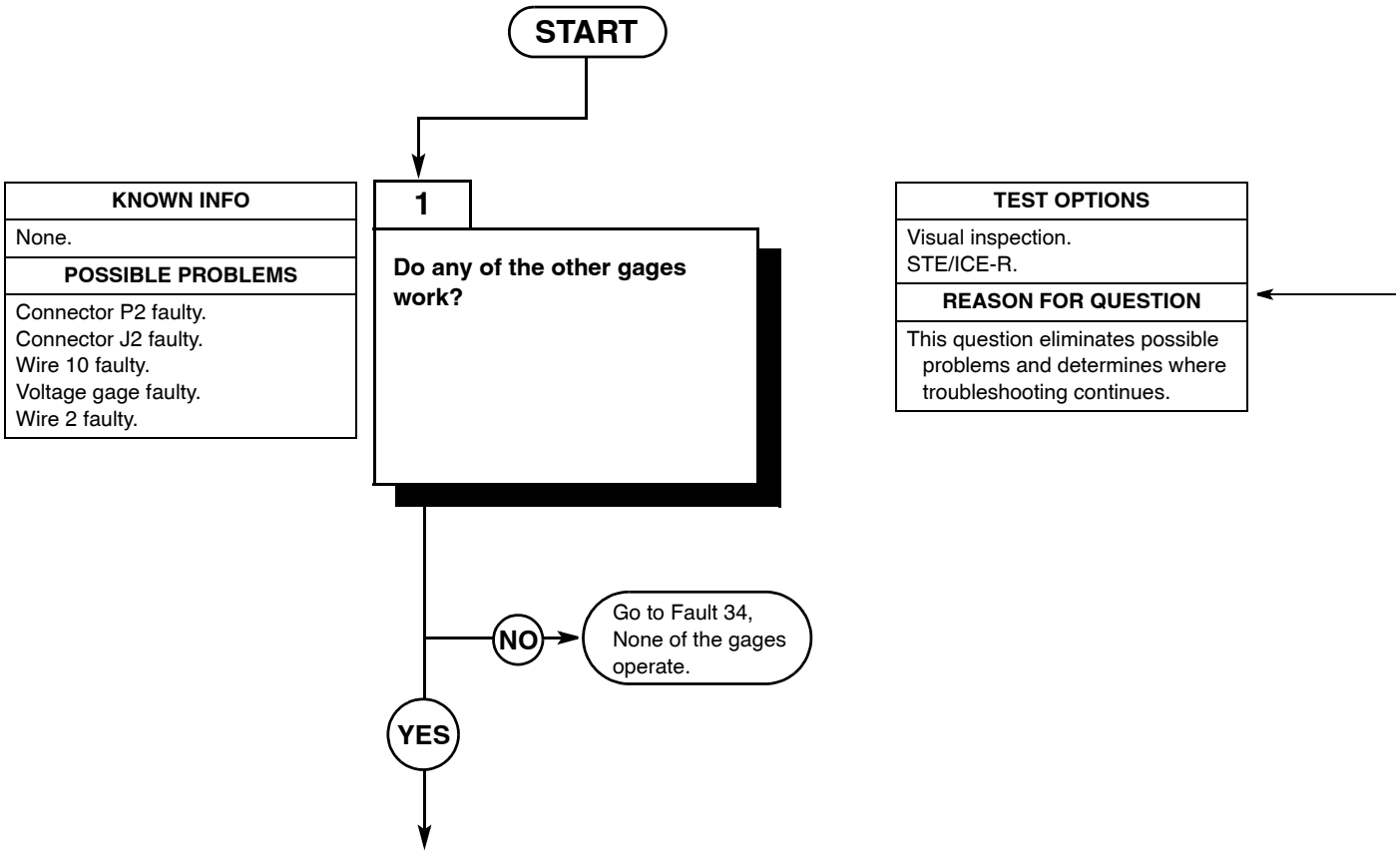
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

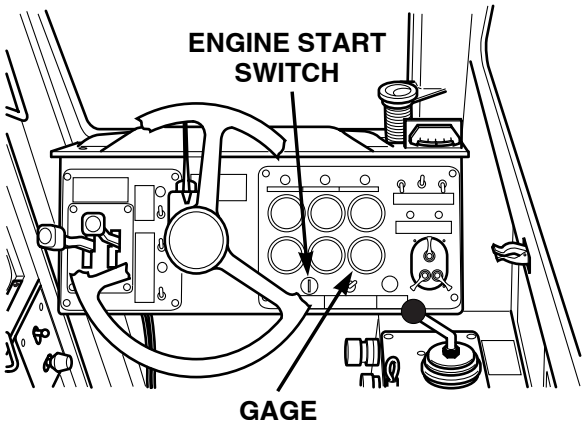
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

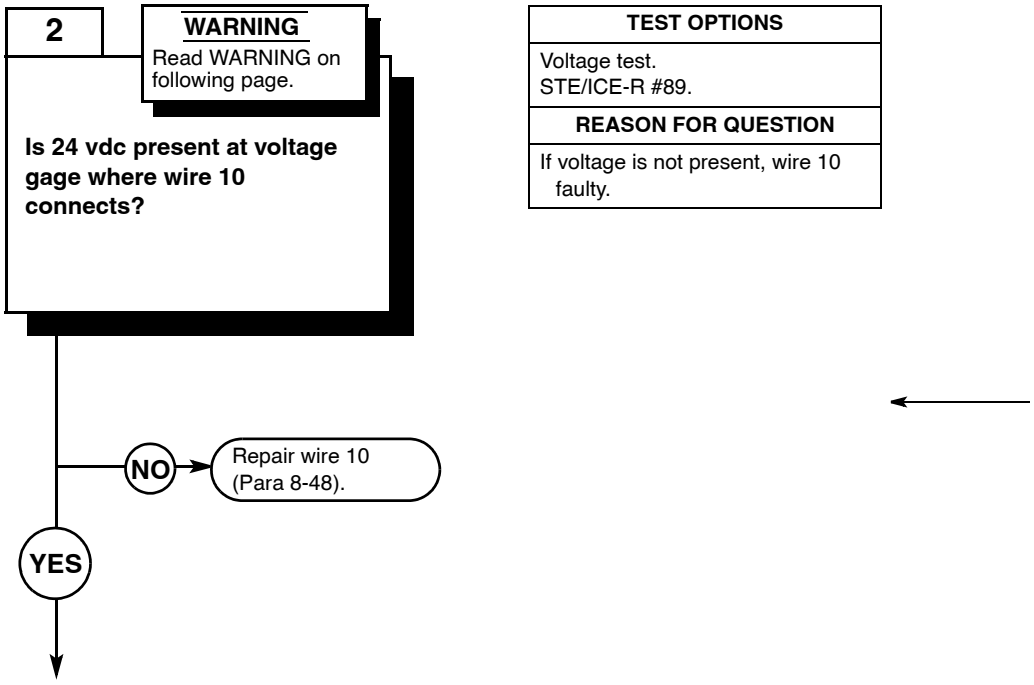


VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If the other gages are operating, go to Step 2 of this fault. (b) If all gages are not operating, go to Fault 34, None of the gages operate. (2) Turn engine start switch to OFF position (TM 10-3930-673-10).



35. VOLTMETER DOES NOT OPERATE (CONT).

KNOWN INFO
None.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 10 faulty. Voltage gage faulty. Wire 2 faulty.



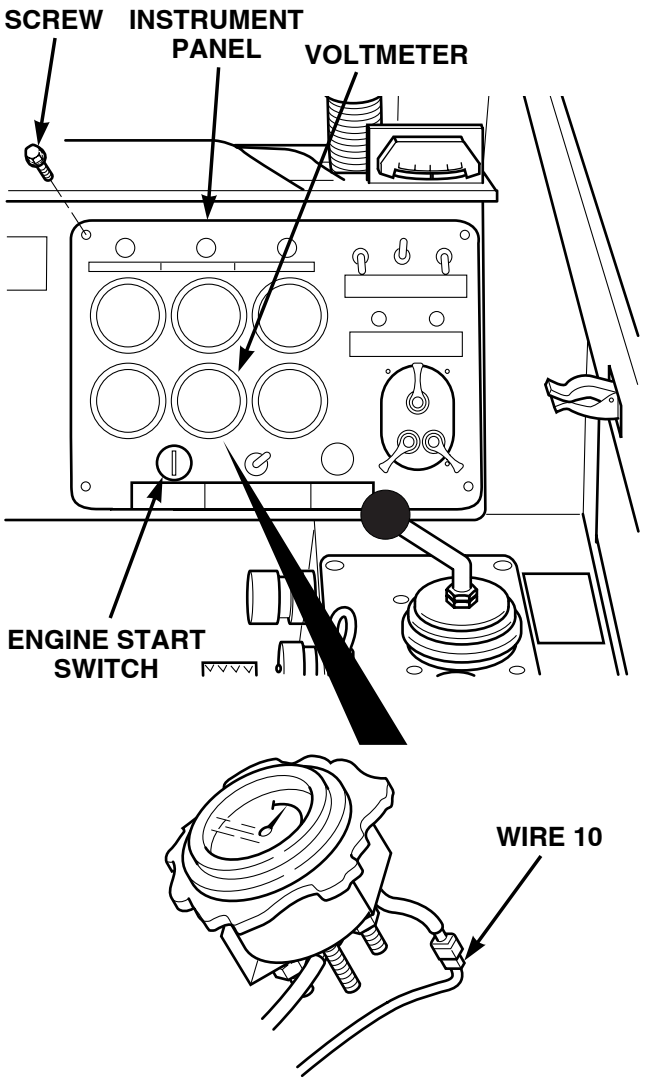
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 faulty.

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws from instrument panel.
(4) Set multimeter to volts dc.
(5) Lift right-hand instrument panel out to reach voltage gage.
(6) Connect multimeter positive lead (+) to voltage gage where wire 10 connects.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-42).
(9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 3 of this fault.
  (b) If 24 vdc is not present, repair wire 10 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).



35. VOLTMETER DOES NOT OPERATE (CONT).

KNOWN INFO
Wire 10 OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Voltage gage faulty. Wire 2 faulty.

3

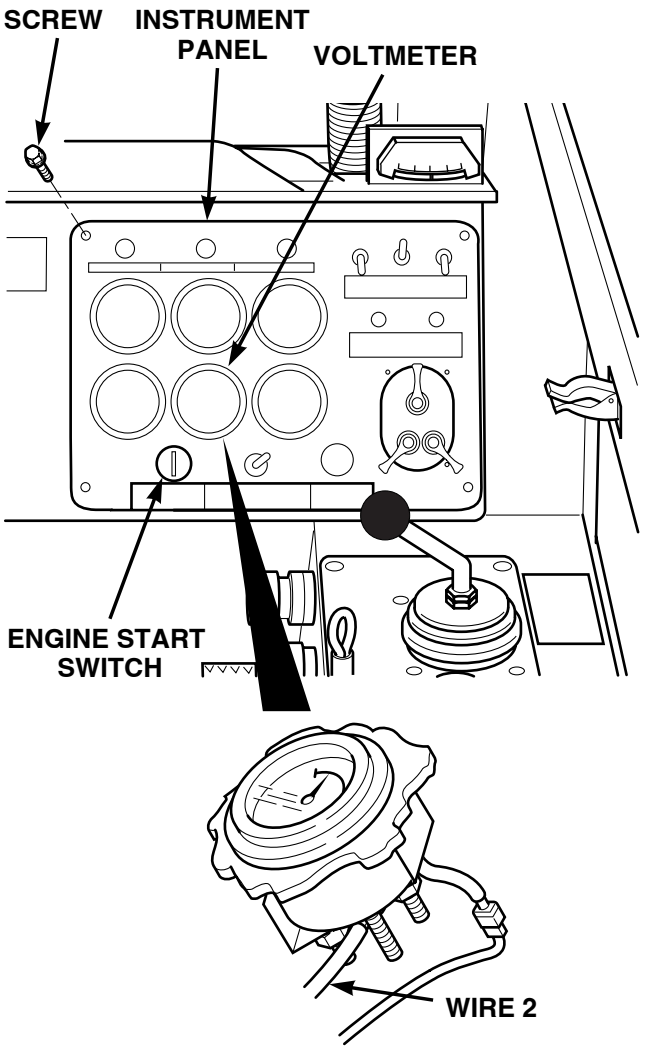
Is voltage present at voltage gage where wire 2 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, voltage gage faulty.

NO → Replace voltage gage (Para 8-6).

YES ↓

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to voltage gage where wire 2 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, replace voltage gage (Para 8-6). (5) Turn engine start switch OFF (TM 10-3930-673-10).



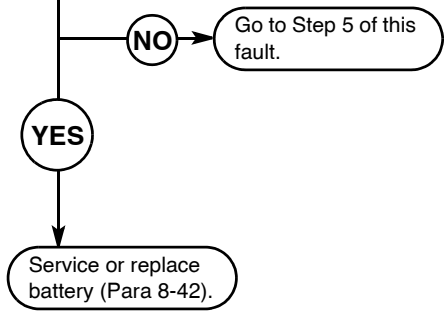
35. VOLTMETER DOES NOT OPERATE (CONT).

KNOWN INFO
Wire 10 OK. Voltage gage OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 2 faulty.

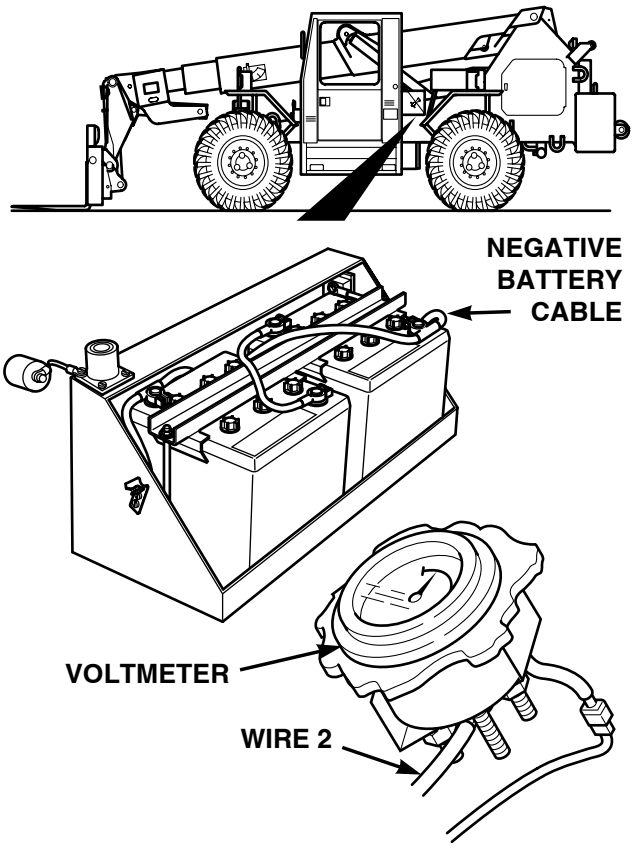
4

Is continuity present on wire 2 where wire 2 connects to voltage gage and negative battery cable?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.



CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 2 where wire 2 connects to voltage gage. (4) Connect multimeter negative lead (–) to negative battery cable. (a) If continuity is present, service or replace battery (Para 8-42). (b) If 24 vdc is not present, go to Step 5 of this fault.



35. VOLTMETER DOES NOT OPERATE (CONT).

KNOWN INFO
Wire 10 OK. Voltage gage OK.
POSSIBLE PROBLEMS
Wire 2 faulty. Connector J2 faulty. Connector P2 faulty.

5

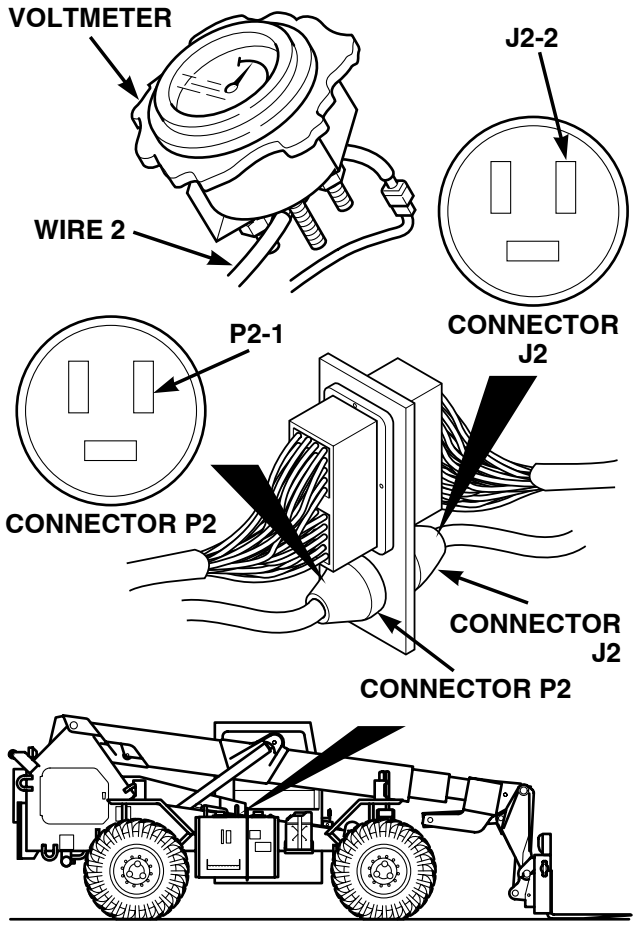
Is continuity present on wire 2 between voltage gage and connector J2-2?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 2 or connector J2 faulty.

NO → Repair wire 2 or connector J2 (Para 8-48).

YES → Go to Step 6 of this fault.

CONTINUITY TEST
(1) Disconnect connector J2 from connector P2. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 2 where wire 2 connects to voltage gage. (4) Connect multimeter negative lead (–) to connector J2-2. (a) If continuity is present, go to Step 6 of this fault. (b) If continuity is not present, repair wire 2 or connector J2 (Para 8-48). (5) Install instrument panel and four screws.



35. VOLTMETER DOES NOT OPERATE (CONT).

KNOWN INFO
Wire 10 OK. Voltage gage OK. Connector J2 OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Wire 2 faulty.

6

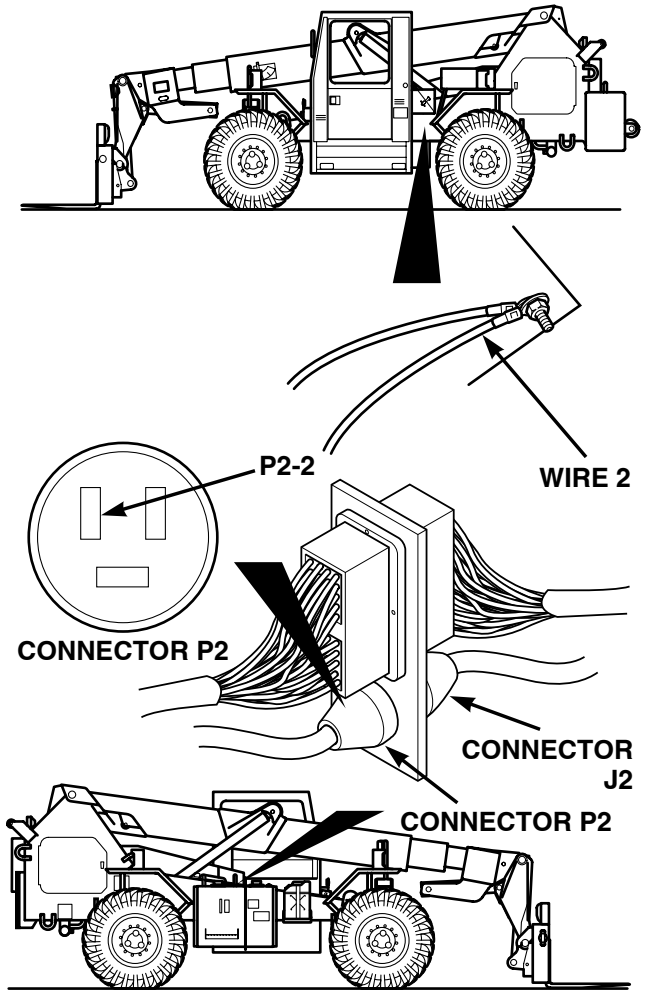
Is continuity present on wire 2 between negative battery cable and connector P2-2?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 2 or connector P2 faulty.

NO → Repair wire 2 or connector P2 (Para 8-49).

YES → Service or replace battery (Para 8-42).

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J2 from connector P2. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 2 where wire 2 connects to negative battery cable. (5) Connect multimeter negative lead (–) to connector P2-2. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair wire 2 or connector P2 (Para 8-49). (6) Connect connector J2 to connector P2. (7) Connect negative battery cable to negative side of battery (Para 8-42). (8) Install battery cover (Para 8-42).



36. ENGINE HOUR METER DOES NOT OPERATE.

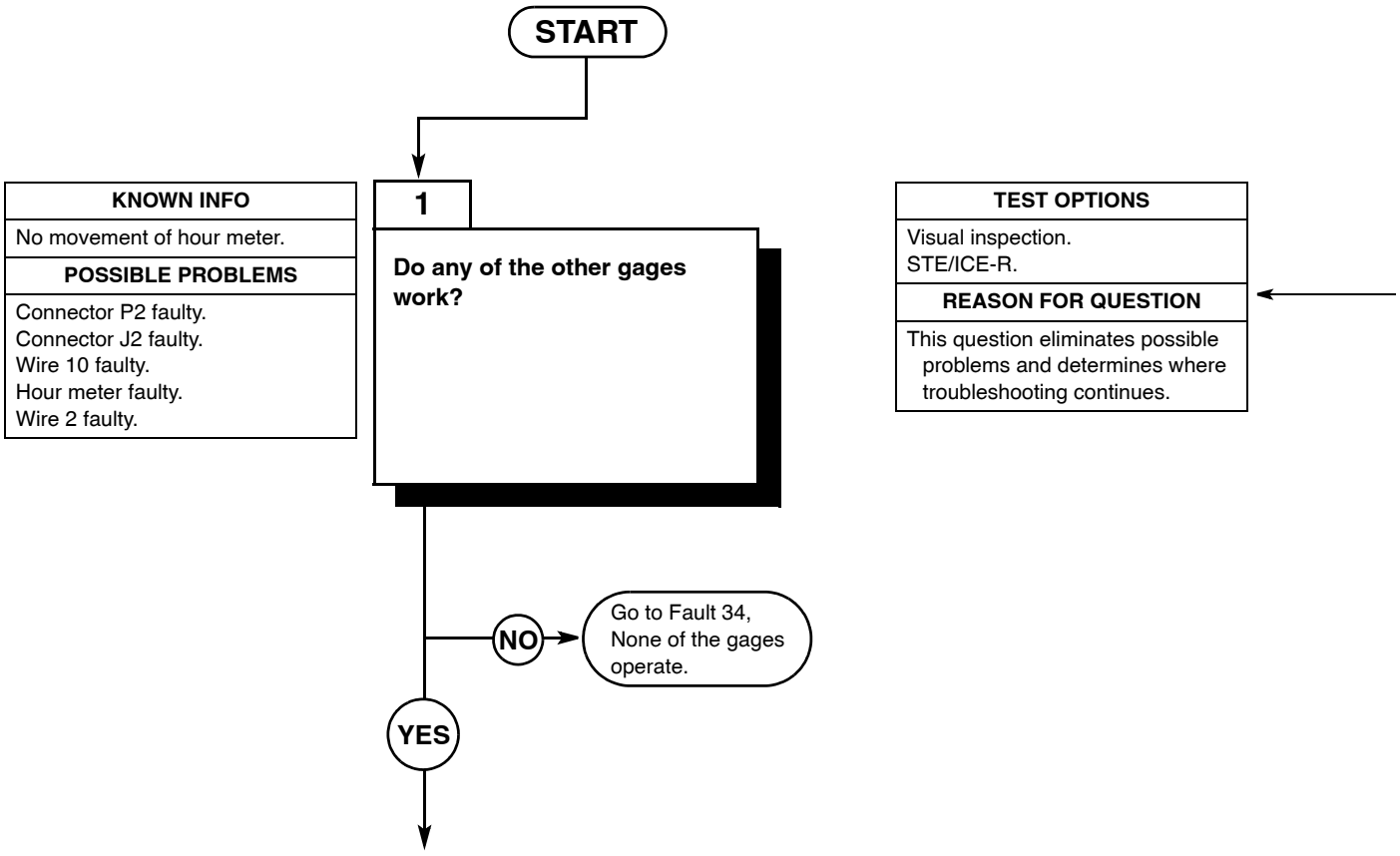
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

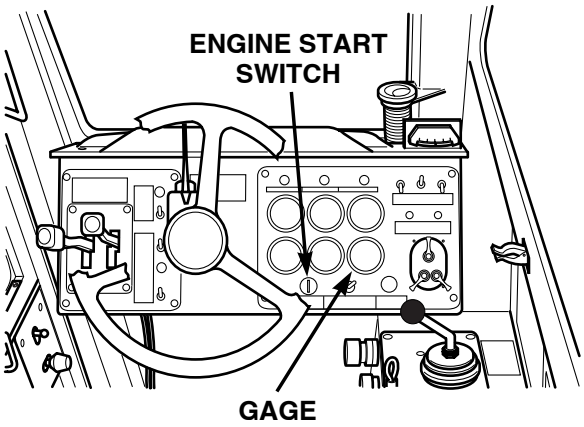
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If the other gages are operating, go to Step 2 of this fault. (b) If all gages are not operating, go to Fault 34, None of the gages operate. (2) Turn engine start switch to OFF position (TM 10-3930-673-10).



36. ENGINE HOUR METER DOES NOT OPERATE (CONT).

KNOWN INFO
No movement of hour meter.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 10 faulty. Hour meter faulty. Wire 2 faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at hour meter where wire 10 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 faulty.

NO → Repair wire 10 (Para 8-48).

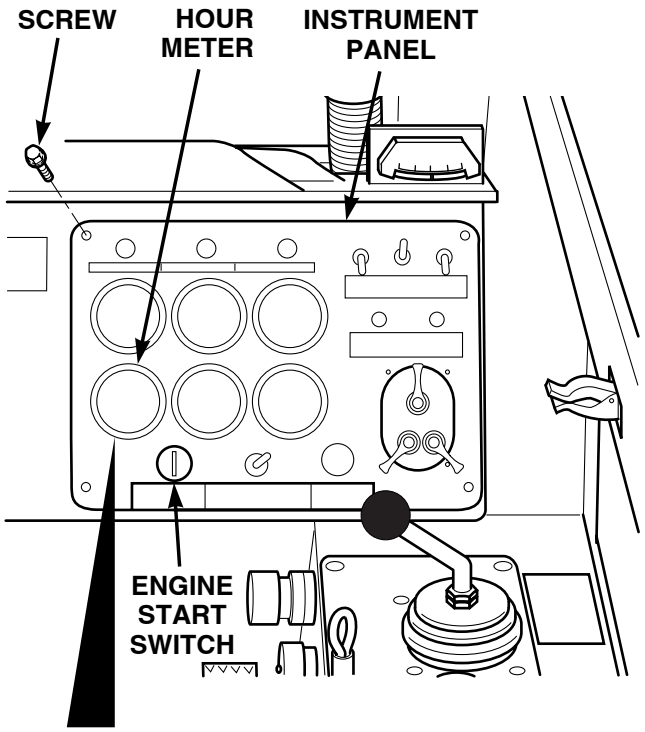
YES

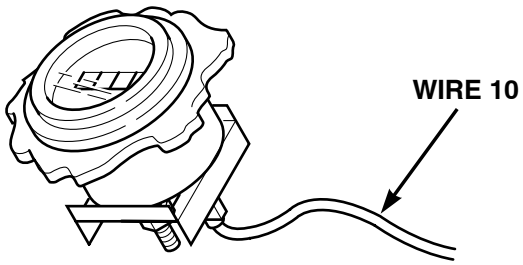
WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws from instrument panel.
(4) Set multimeter to volts dc.
(5) Left instrument panel out to reach hour meter.
(6) Connect multimeter positive lead (+) to hour meter where wire 10 connects.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-42).
(9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 3 of this fault.
    (b) If 24 vdc is not present, repair wire 10 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).





36. ENGINE HOUR METER DOES NOT OPERATE (CONT).

KNOWN INFO
No movement of hour meter. Wire 10 OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Hour meter faulty. Wire 2 faulty.

3

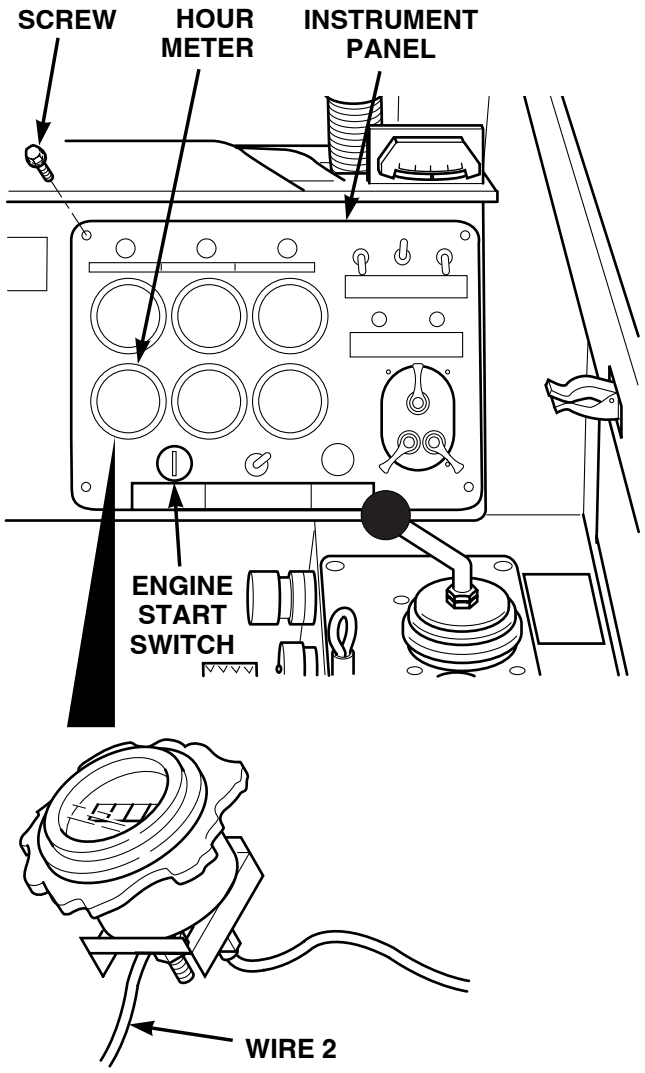
Is voltage present at hour meter where wire 2 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, hour meter faulty.

NO → Replace hour meter (Para 8-10).

YES

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to hour meter where wire 2 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, replace hour meter (Para 8-10). (6) Turn engine start switch OFF (TM 10-3930-673-10).



36. ENGINE HOUR METER DOES NOT OPERATE (CONT).

KNOWN INFO
No movement of hour meter. Wire 10 OK. Hour meter OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Connector J2 faulty. Wire 2 faulty.

4

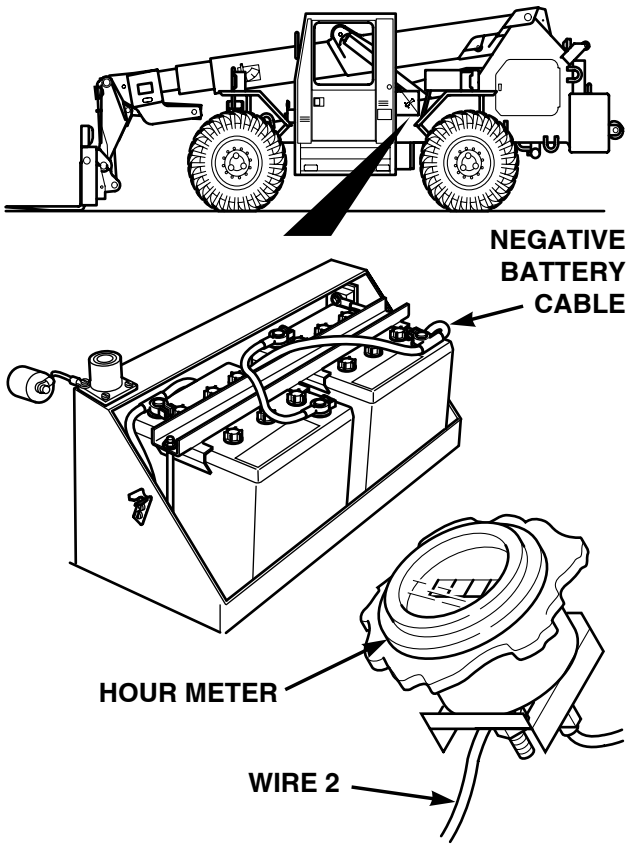
Is continuity present on wire 2 where wire 2 connects to hour meter and negative battery cable?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 5 of this fault.

YES → Service or replace battery (Para 8-42).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to wire 2 where wire 2 connects to hour meter. (3) Connect multimeter negative lead (–) to negative battery cable. (a) If continuity is present, service or replace battery (Para 8-42). (b) If 24 vdc is not present, go to Step 5 of this fault.



36. ENGINE HOUR METER DOES NOT OPERATE (CONT).

KNOWN INFO
No movement of hour meter. Wire 10 OK. Hour meter OK.
POSSIBLE PROBLEMS
Wire 2 faulty. Connector J2 faulty. Connector P2 faulty.

5

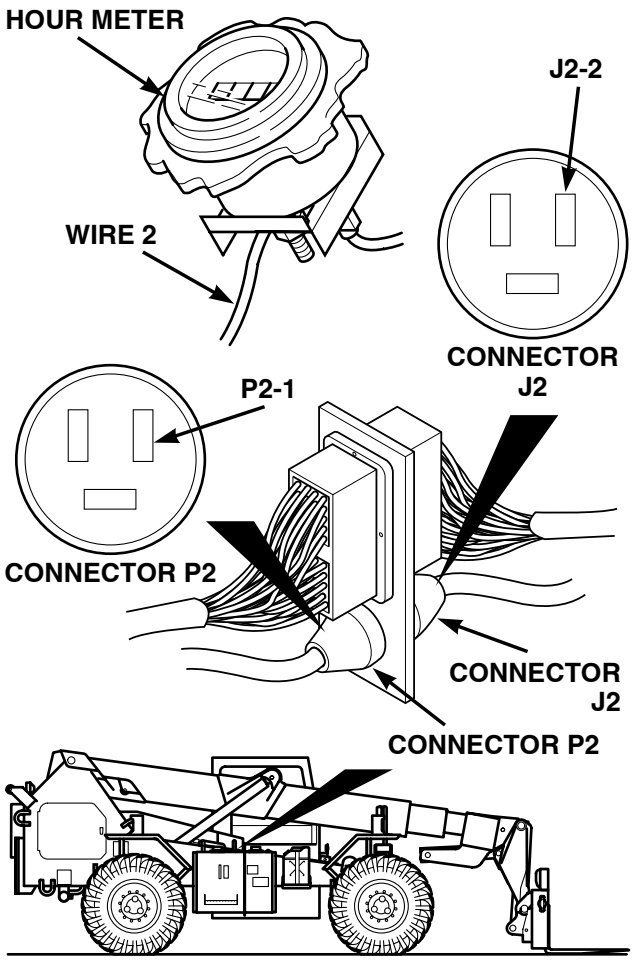
Is continuity present on wire 2 between hour meter and connector J2-2?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 2 or connector J2 faulty.

NO → Repair wire 2 or connector J2 (Para 8-48).

YES

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to wire 2 where wire 2 connects to hour meter. (3) Connect multimeter negative lead (–) to connector J2-2. (a) If continuity is present, go to Step 6 of this fault. (b) If continuity is not present, repair wire 2 or connector J2 (Para 8-48).



36. ENGINE HOUR METER DOES NOT OPERATE (CONT).

KNOWN INFO
No movement of hour meter. Wire 10 OK. Hour meter OK. Connector J2 OK.
POSSIBLE PROBLEMS
Connector P2 faulty. Wire 2 faulty.

6

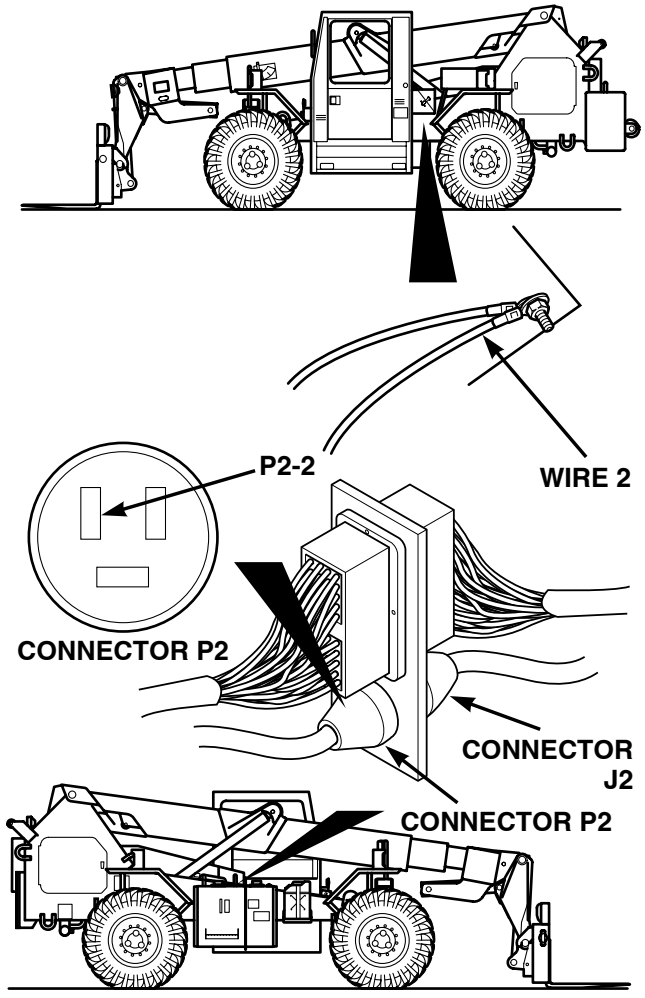
Is continuity present on wire 2 between negative battery cable and connector P2-2?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 2 or connector P2 faulty.

NO → Repair wire 2 or connector P2 (Para 8-49).

YES → Service or replace battery (Para 8-42).

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead (+) to wire 2 where wire 2 connects to negative battery cable. (3) Connect multimeter negative lead (–) to connector P2-2. (a) If continuity is present, service or replace battery (Para 8-42). (b) If continuity is not present, repair wire 2 or connector P2 (Para 8-49). (4) Connect connector J2 to connector P2. (5) Install instrument panel and four screws to secure instrument panel. (6) Install access panel and four screws to secure acces panel. (7) Connect negative battery cable to negative side of battery (Para 8-42). (8) Install battery cover (Para 8-42).



37. FUEL GAGE DOES NOT OPERATE.

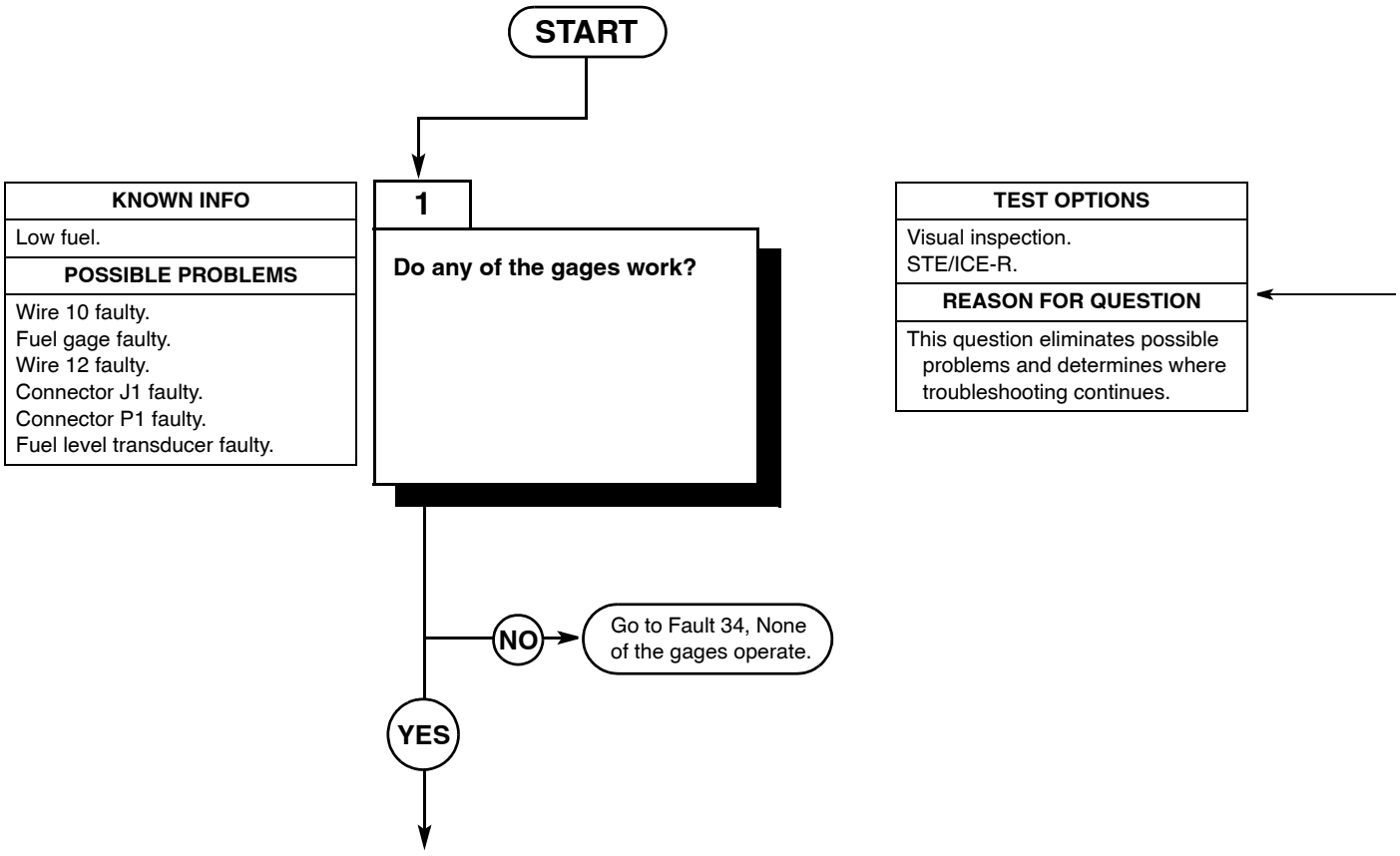
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

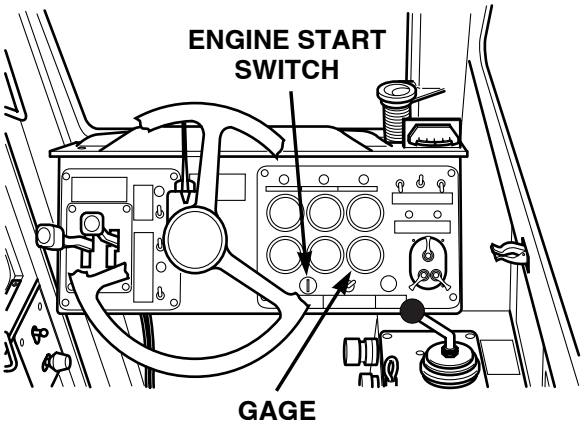
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

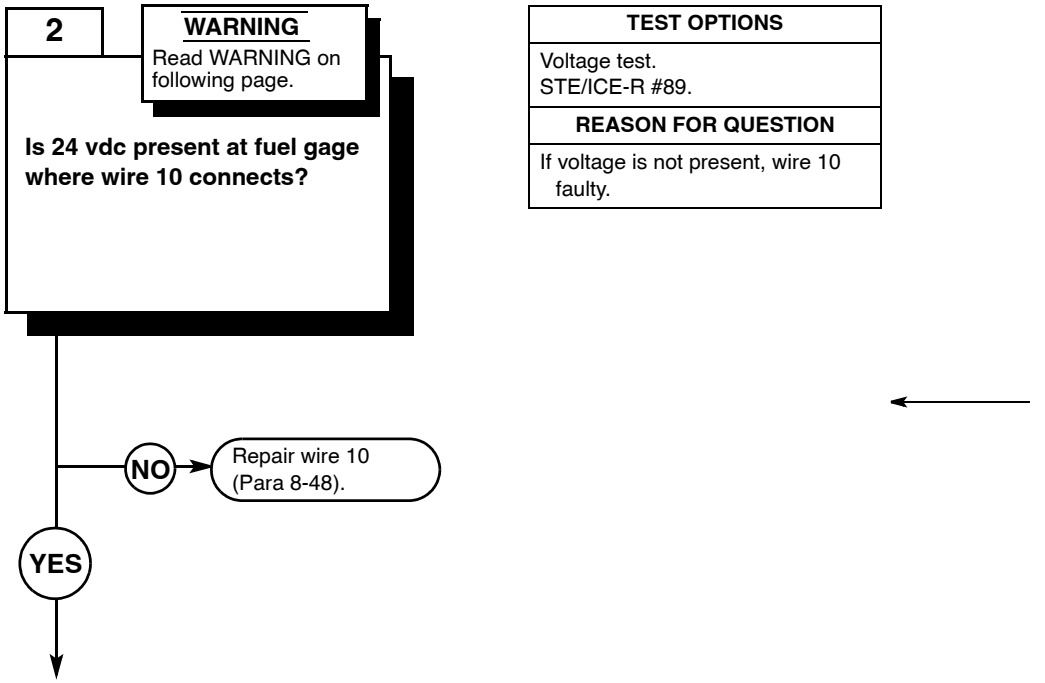


VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If the other gages are operating, go to Step 2 of this fault. (b) If all gages are not operating, go to Fault 34, None of the gages operate. (2) Turn engine start switch to OFF position (TM 10-3930-673-10).



37. FUEL GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
Low fuel.
POSSIBLE PROBLEMS
Wire 10 faulty. Fuel gage faulty. Wire 12 faulty. Connector J1 faulty. Connector P1 faulty. Fuel level transducer faulty.



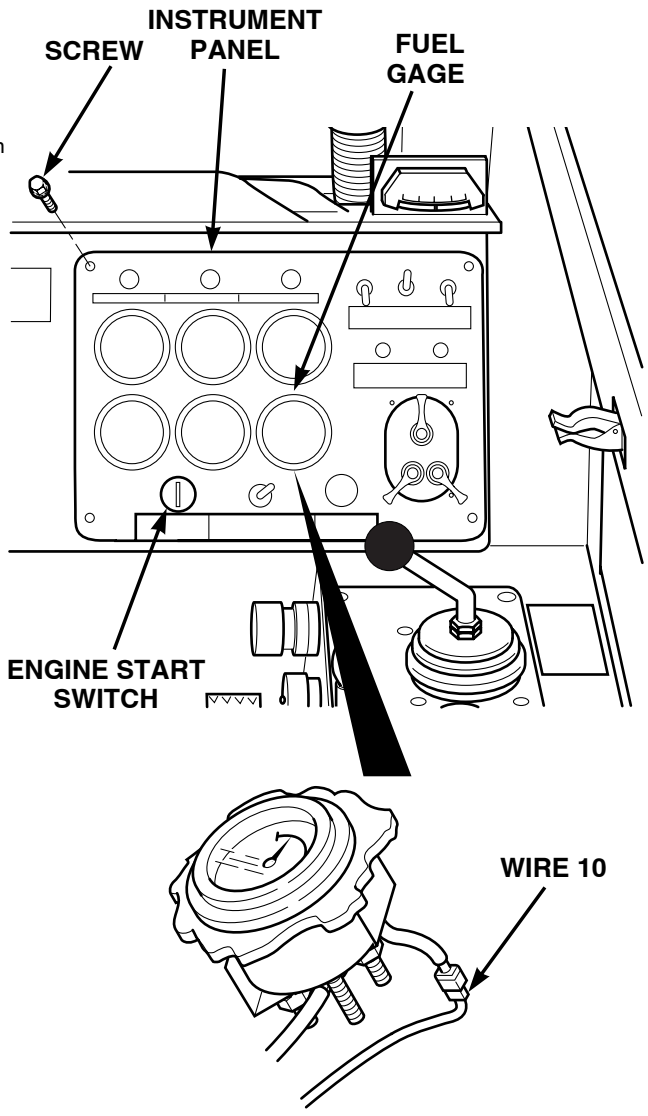
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 faulty.

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws from right-hand instrument panel.
(4) Set multimeter to volts dc.
(5) Lift right-hand instrument panel out to reach fuel gage.
(6) Connect multimeter positive lead (+) to fuel gage where wire 10 connects.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-42).
(9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 3 of this fault.
    (b) If 24 vdc is not present, repair wire 10 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).



37. FUEL GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
Low fuel. Wire 10 OK.
POSSIBLE PROBLEMS
Fuel gage faulty. Wire 12 faulty. Connector J1 faulty. Connector P1 faulty. Fuel level transducer faulty.

3

Is voltage present at fuel gage where wire 12 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, fuel gage faulty.

NO → Replace fuel gage (Para 8-6).

YES

KNOWN INFO
Low fuel. Wire 10 OK. Fuel gage OK.
POSSIBLE PROBLEMS
Wire 12 faulty. Connector J1 faulty. Connector P1 faulty. Fuel level transducer faulty.

4

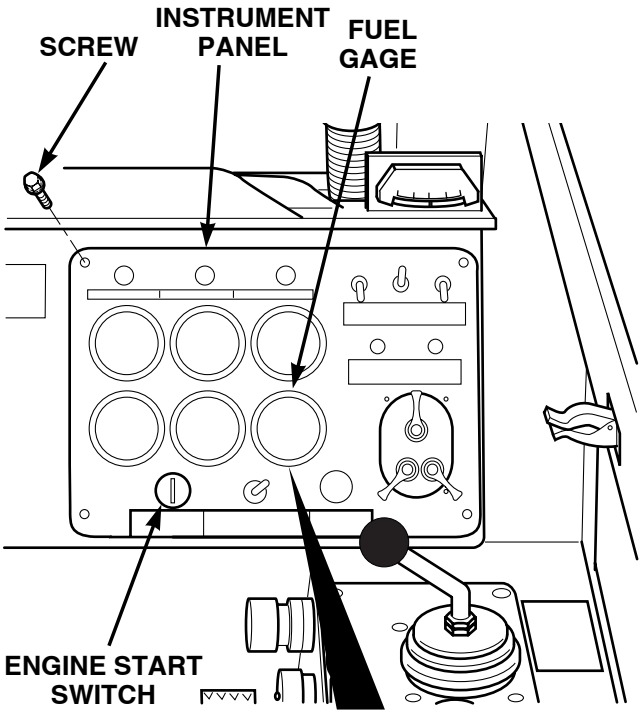
Is voltage present at fuel level transducer where wire 12 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

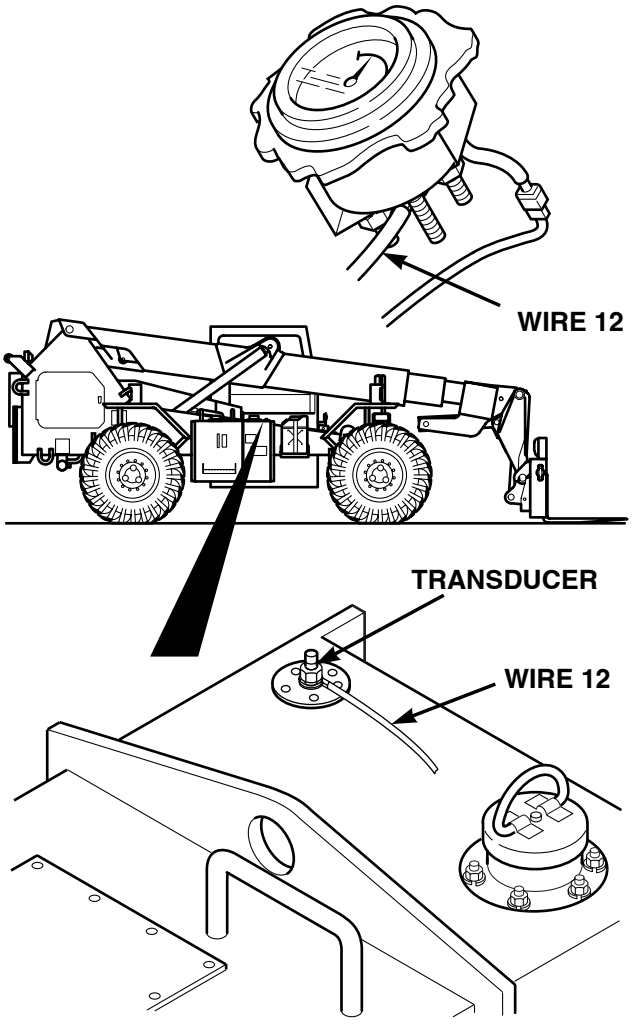
NO → Go to Step 5 of this fault.

YES → Repair fuel level transducer (Para 8-38).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to fuel gage where wire 12 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, replace fuel gage (Para 8-6). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Remove four screws and cap from fuel level transducer. (3) Connect multimeter positive lead (+) to fuel level transducer where wire 12 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, replace fuel level transducer (Para 8-38). (b) If voltage is not present, go to Step 5 of this fault. (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42). (9) Install cap and four screws for fuel level transducer.



37. FUEL GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
Low fuel. Wire 10 OK. Fuel gage OK.
POSSIBLE PROBLEMS
Wire 12 faulty. Connector J1 faulty. Connector P1 faulty.

5

Is continuity present on wire 12 between fuel gage and connector J1-16?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 12 or connector J1 faulty.

NO → Repair wire 12 or connector J1 (Para 8-48).

YES

KNOWN INFO
Low fuel. Fuel gage OK. Wire 10 OK. Connector J1 OK.
POSSIBLE PROBLEMS
Connector P1 faulty. Wire 12 faulty.

6

Is continuity present on wire 12 between fuel level transducer and connector P1-16?

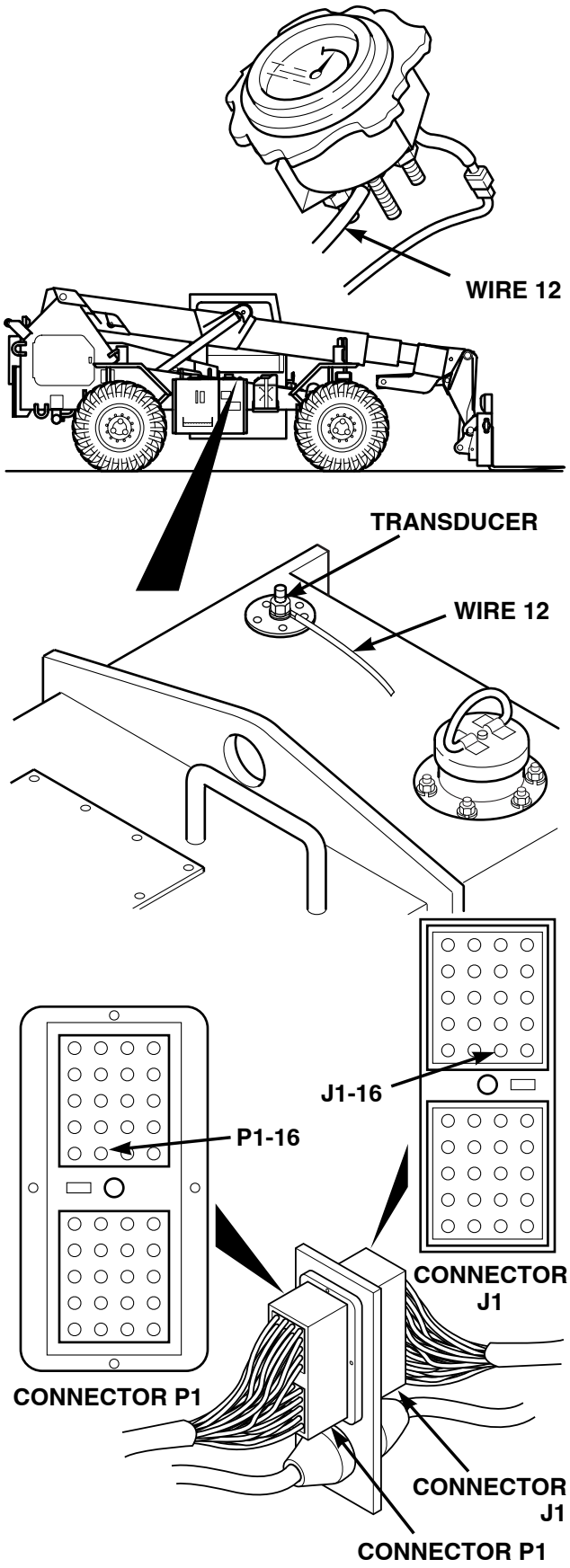
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 12 or connector P1 faulty.

NO → Repair wire 12 or connector P1 (Para 8-49).

YES → Replace fuel level transducer (Para 8-38).

CONTINUITY TEST
(1) Disconnect connector J1 from connector P1. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 12 where wire 12 connects to fuel gage. (4) Connect multimeter negative lead (–) to connector J1-16. (a) If continuity is present, go to Step 6 of this fault. (b) If continuity is not present, repair wire 12 or connector J1 (Para 8-48). (5) Connect connector J1 to connector P1.

CONTINUITY TEST
(1) Disconnect connector J1 from connector P1. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 12 where wire 12 connects to fuel level transducer. (4) Connect multimeter negative lead (–) to connector P1-16. (a) If continuity is present, replace fuel level transducer (Para 8-38). (b) If continuity is not present, repair wire 12 or connector P1 (Para 8-49). (5) Connect connector J1 to connector P1. (6) Install instrument panel and four screws. (7) Connect negative battery cable to negative side of battery (Para 8-42). (8) Install battery cover (Para 8-42).



38. TEMPERATURE GAGE DOES NOT OPERATE.

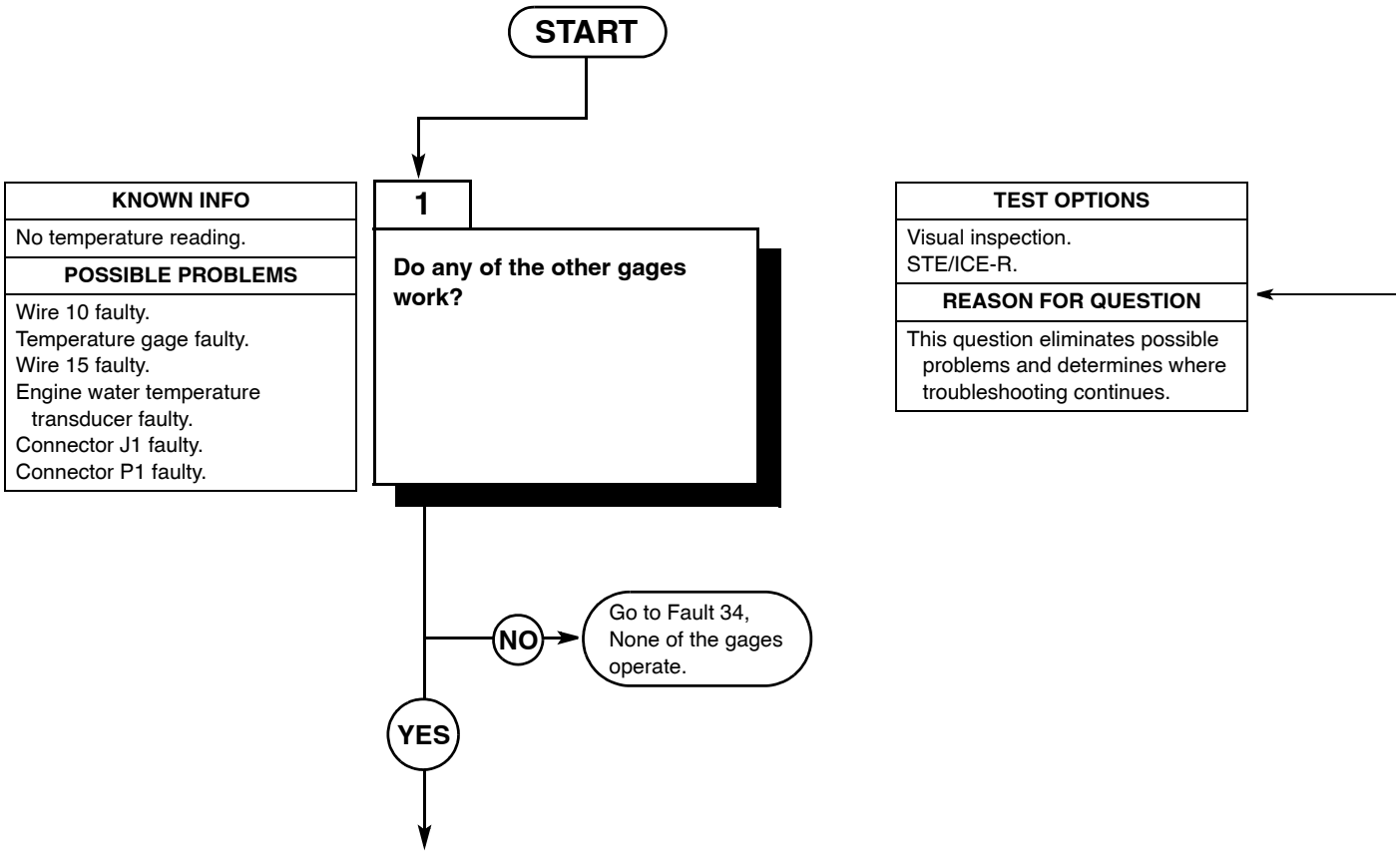
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

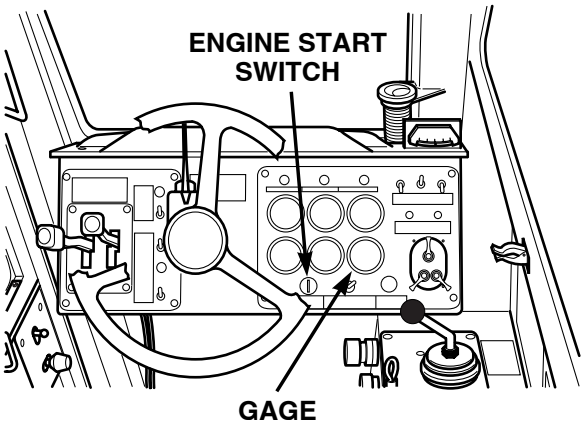
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If the other gages are operating, go to Step 2 of this fault. (b) If all gages are not operating , go to Fault 34, None of the gages operate. (2) Turn engine start switch to OFF position (TM 10-3930-673-10).



38. TEMPERATURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No temperature reading.
POSSIBLE PROBLEMS
Wire 10 faulty. Temperature gage faulty. Wire 15 faulty. Engine water temperature transducer faulty. Connector J1 faulty. Connector P1 faulty.

2

WARNING
Read WARNING on following page.

Is 24 vdc present at temperature gage where wire 10 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 faulty.

NO → Repair wire 10 (Para 8-48).

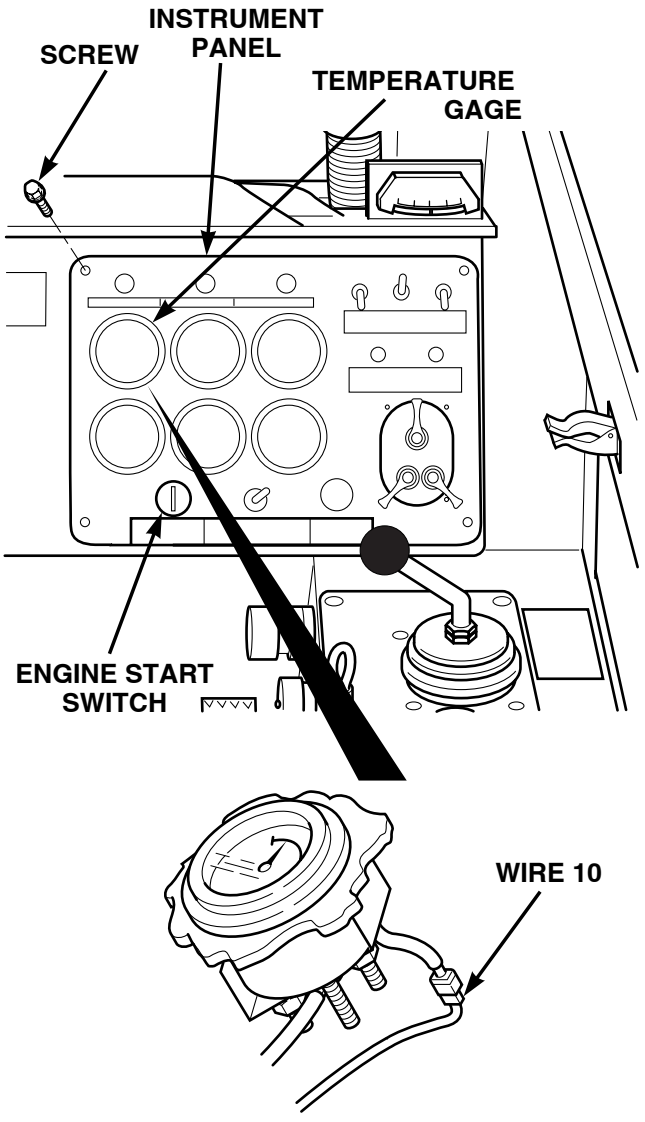
YES

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws from right-hand instrument panel.
(4) Set multimeter to volts dc.
(5) Lift right-hand instrument panel out to reach temperature gage.
(6) Connect multimeter positive lead (+) to temp gage where wire 10 connects.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-42).
(9) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
    (a) If 24 vdc is present, go to Step 3 of this fault.
    (b) If 24 vdc is not present, repair wire 10 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).



38. TEMPERATURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No temperature reading. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK.
POSSIBLE PROBLEMS
Temperature gage faulty. Wire 15 faulty. Engine water temperature transducer faulty. Connector J1 faulty. Connector P1 faulty.

3

Is voltage present at temperature gage where wire 15 connects?

NO → Replace temp gage (Para 8-6).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, temperature gage faulty.

KNOWN INFO
No temperature reading. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Temperature gage OK.
POSSIBLE PROBLEMS
Wire 15 faulty. Connector J1 faulty. Connector P1 faulty. Engine water temperature transducer faulty.

4

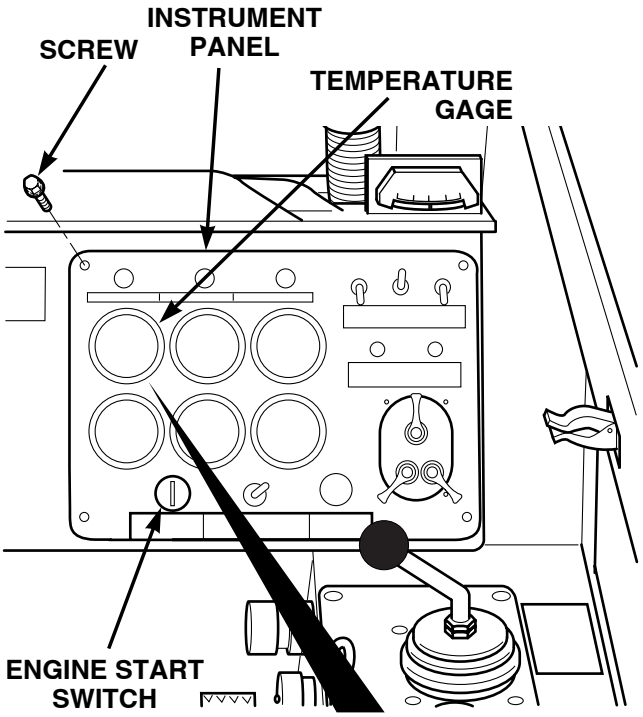
Is voltage present at engine water temperature transducer where wire 15 connects?

NO → Go to Step 5 of this fault.

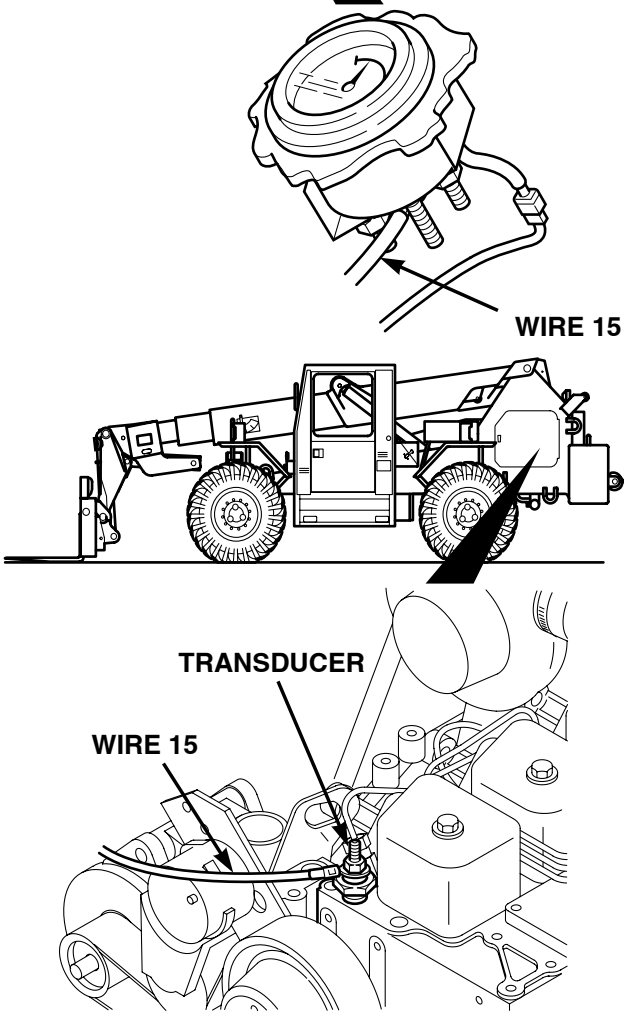
YES → Replace engine water temperature transducer (Para 8-36).

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to temp gage where wire 15 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, replace temp gage (Para 8-6). (5) Turn engine start switch OFF (TM 10-3930-673-10).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to engine water temperature transducer where wire 15 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, replace temp. transducer (Para 8-36). (b) If voltage is not present, go to Step 5 of this fault. (5) Turn engine start switch to OFF position (TM 10-3930-673-10).



38. TEMPERATURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No temperature reading. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Temperature gage OK.
POSSIBLE PROBLEMS
Wire 15 faulty. Connector J1 faulty. Connector P1 faulty.

5

Is continuity present on wire 15 between temp gage and connector J1-10?

NO → Repair wire 15 (Para 8-48) or connector J1 (Para 8-48).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 15 or connector J1 faulty.

KNOWN INFO
No temperature reading. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Connector J1 OK.
POSSIBLE PROBLEMS
Connector P1 faulty. Wire 15 faulty.

6

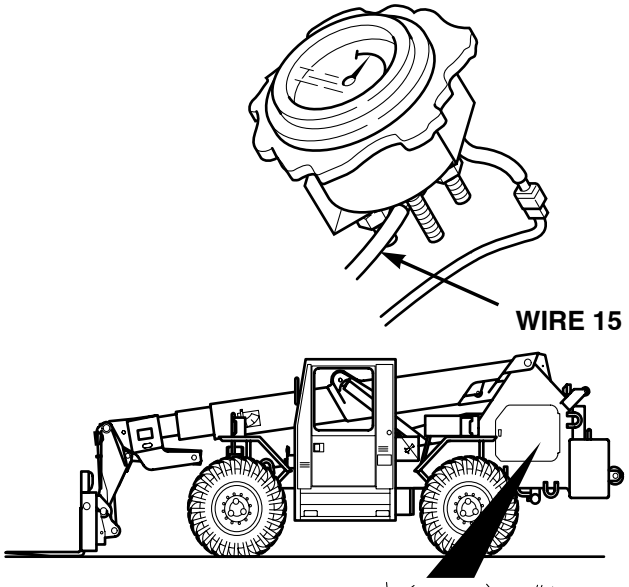
Is continuity present on wire 15 between water temp transducer and connector P1-10?

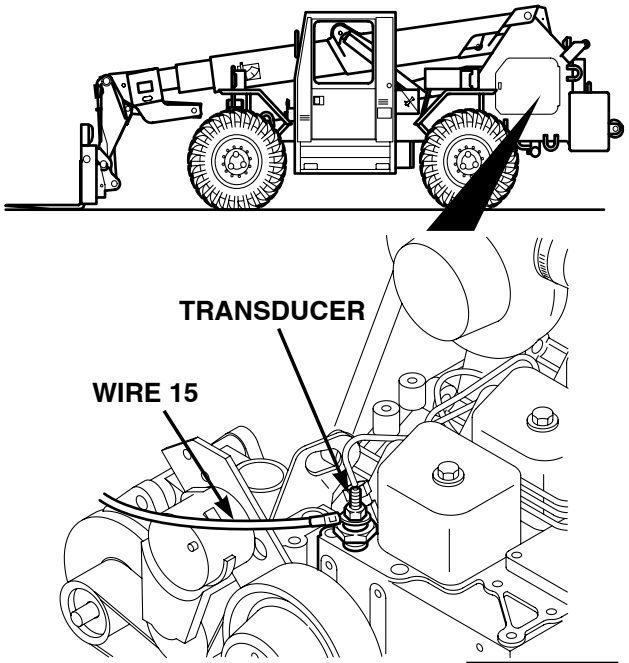
NO → Repair wire 15 (Para 8-49) or connector P1 (Para 8-49).

YES → Replace engine water temperature transducer (Para 8-36).

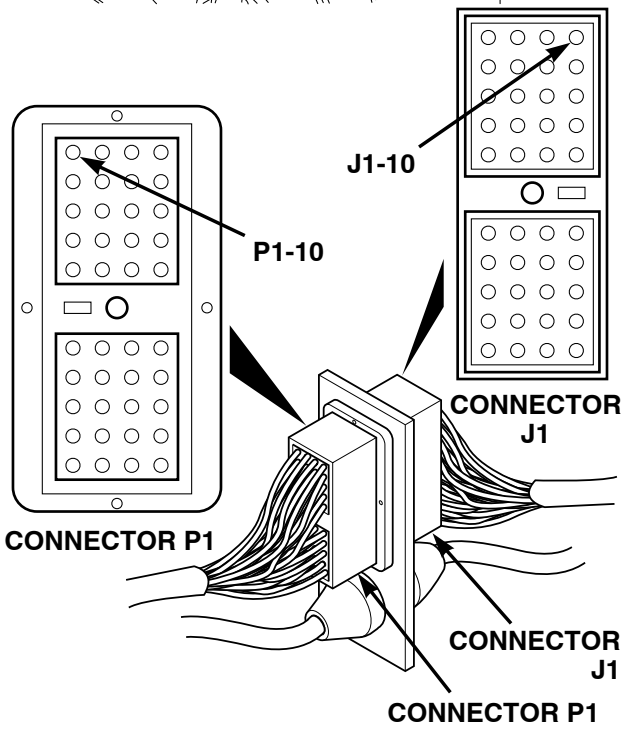
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 15 or connector P1 faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J1 from connector P1. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 15 where wire 15 connects to temp gage. (5) Connect multimeter negative lead (–) to connector J1-10. (a) If continuity is present, go to Step 6 of this fault. (b) If continuity is not present, repair wire 15 or connector J1 (Para 8-48). (6) Install instrument panel and four screws.





CONTINUITY TEST
(1) Disconnect connector J1 from connector P1. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 15 where wire 15 connects to engine water temperature transducer. (4) Connect multimeter negative lead (–) to connector P1-16). (a) If continuity is present, replace water temp. transducer (Para 8-36). (b) If continuity is not present, repair wire 15 or connector P1 (Para 8-49). (5) Connect negative battery cable to negative side of battery. (6) Install battery cover (Para 8-42).



39. OIL PRESSURE GAGE DOES NOT OPERATE.

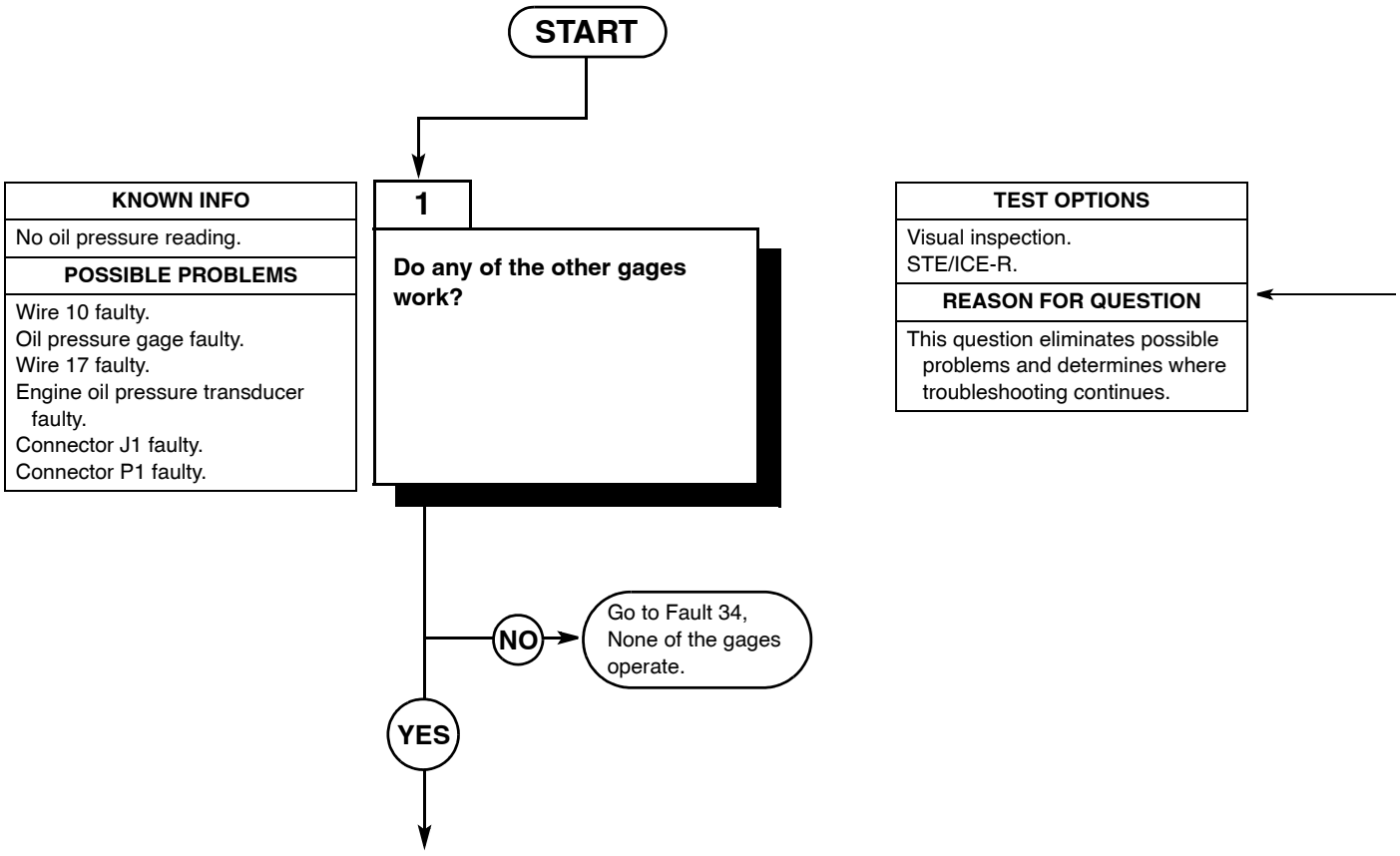
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

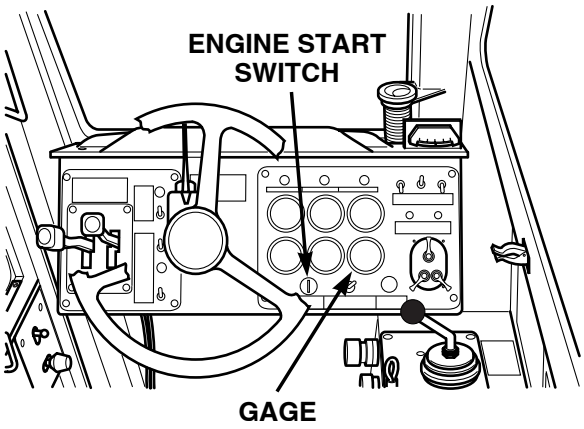
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If the other gages are operating, go to Step 2 of this fault. (b) If all gages are not operating, go to Fault 34, None of the gages operate. (2) Turn engine start switch to OFF position (TM 10-3930-673-10).



39. OIL PRESSURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No oil pressure reading.
POSSIBLE PROBLEMS
Wire 10 faulty. Oil pressure gage faulty. Wire 17 faulty. Engine oil pressure transducer faulty. Connector J1 faulty. Connector P1 faulty.

2

WARNING

Read WARNING on following page.

Is 24 vdc present at engine oil pressure gage where wire 10 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 faulty.

NO → Repair wire 10 (Para 8-48).

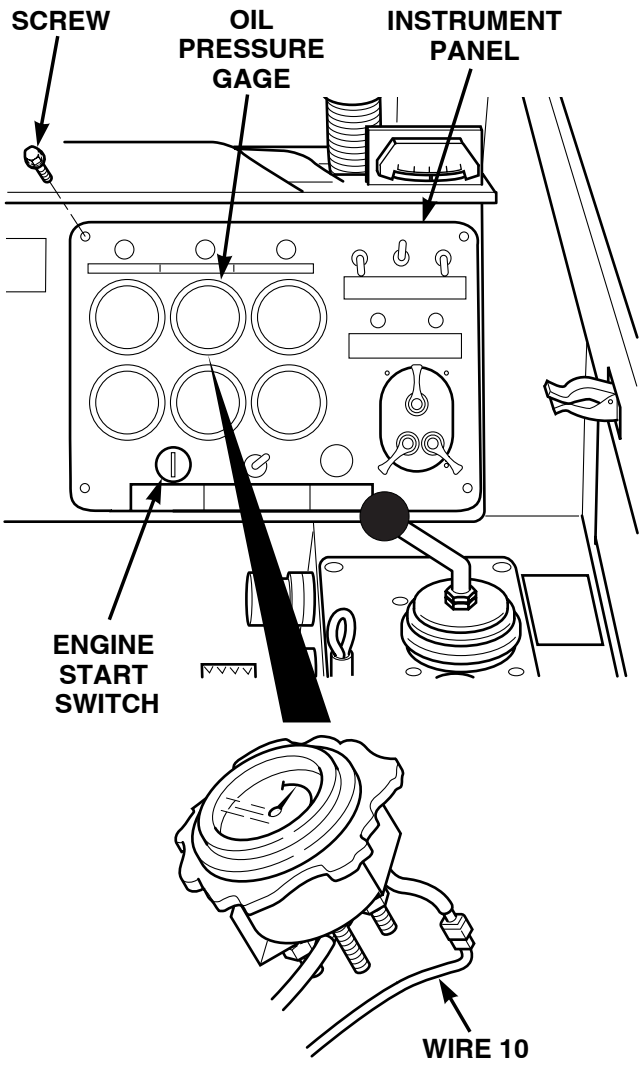
YES

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws from right-hand instrument panel.
(4) Set multimeter to volts dc.
(5) Lift right-hand instrument panel out to reach oil pressure gage.
(6) Connect multimeter positive lead (+) to oil pressure gage where wire 10 connects.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-42).
(9) Turn engine start switch to START position, (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 3 of this fault.
  (b) If 24 vdc is not present, repair wire 10 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-42).



39. OIL PRESSURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No oil pressure reading. Wire 10 OK.
POSSIBLE PROBLEMS
Oil pressure gage faulty. Wire 17 faulty. Engine oil pressure transducer faulty. Connector J1 faulty. Connector P1 faulty.

3

Is voltage present at oil pressure gage where wire 17 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, temperature gage faulty.

NO → Replace oil pressure gage (Para 8-6).

YES

KNOWN INFO
No oil pressure reading. Wire 10 OK. Oil pressure gage OK.
POSSIBLE PROBLEMS
Wire 17 faulty. Connector J1 faulty. Connector P1 faulty. Engine oil pressure transducer faulty.

4

Is voltage present at engine oil pressure transducer where wire 17 connects?

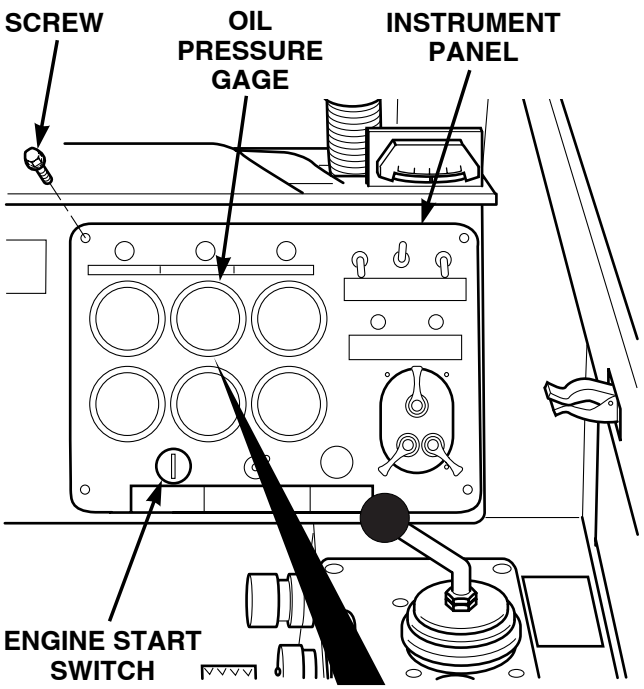
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 5 of this fault.

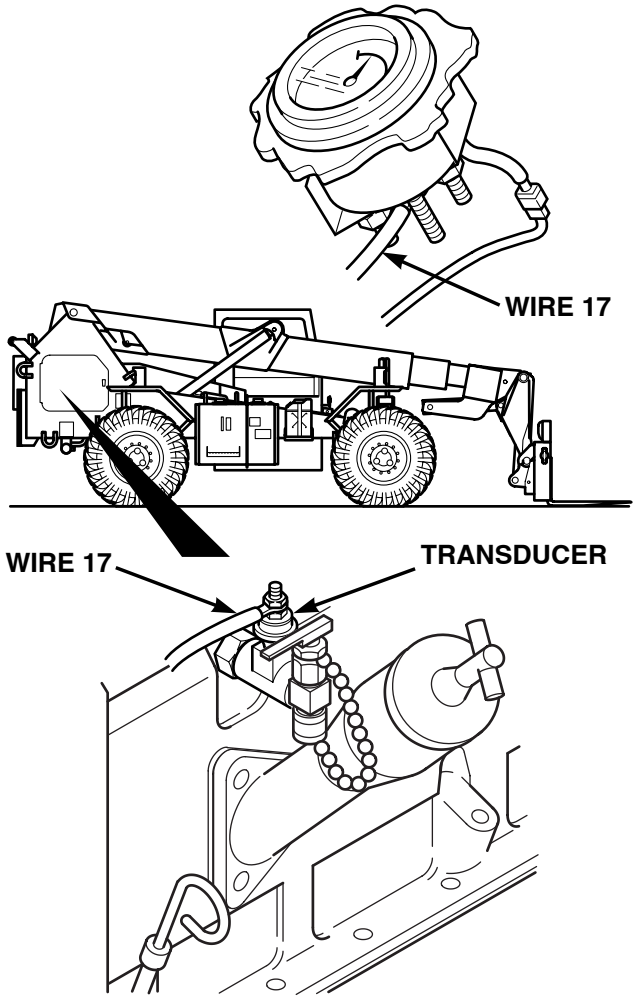
YES

Replace engine oil pressure transducer (Para 8-35).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to oil pressure gage where wire 17 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to START position, (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, replace oil pressure gage (Para 8-6). (5) Turn engine start switch to OFF position (TM 10-3930-673-10).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to engine oil pressure transducer where wire 17 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to START position, (TM 10-3930-673-10). (a) If voltage is present, replace oil pressure transducer (Para 8-35). (b) If voltage is not present, go to Step 5 of this fault. (5) Turn engine start switch to OFF position (TM 10-3930-673-10).



39. OIL PRESSURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No oil pressure reading. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Oil pressure gage OK.
POSSIBLE PROBLEMS
Wire 17 faulty. Connector J1 faulty. Connector P1 faulty.

5

Is continuity present on wire 17 between oil pressure gage and connector J1-12?

NO → Repair wire 17 or connector J1 (Para 8-48).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 17 or connector J1 faulty.

KNOWN INFO
No oil pressure reading. Wire 9 OK. Connector P2 OK. Connector J2 OK. Circuit breaker CB6 OK. Wire 1 OK. Run relay OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Connector J1 OK.
POSSIBLE PROBLEMS
Connector P1 faulty. Wire 17 faulty.

6

Is continuity present on wire 17 between engine oil pressure transducer and connector P1-12?

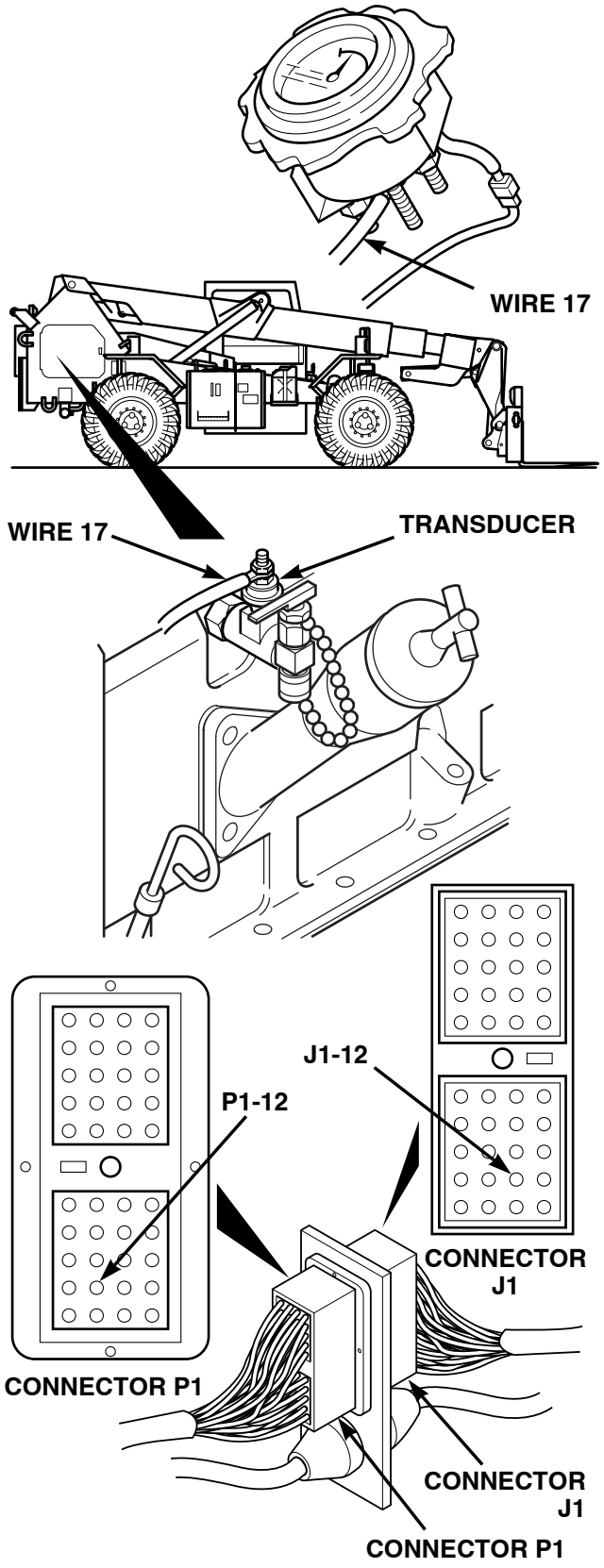
NO → Repair wire 17 or connector P1 (Para 8-49).

YES → Replace oil pressure transducer (Para 8-35).

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 17 or connector P1 faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J1 from connector P1. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 17 where wire 17 connects to oil pressure gage. (5) Connect multimeter negative lead (–) to connector J1-12. (a) If continuity is present, go to Step 6 of this fault. (b) If continuity is not present, repair wire 17 or connector J1 (Para 8-48). (6) Install instrument panel and four screws.

CONTINUITY TEST
(1) Disconnect connector J1 from connector P1. (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to wire 17 where wire 17 connects to engine oil pressure transducer. (4) Connect multimeter negative lead (–) to connector P1-12. (a) If continuity is present, replace oil pressure transducer (Para 8-35). (b) If continuity is not present, repair wire 17 or connector P1 (Para 8-49). (5) Connect negative battery cable to negative side of battery. (6) Install battery cover (Para 8-42).



40. TRANSMISSION FLUID TEMPERATURE GAGE DOES NOT OPERATE.

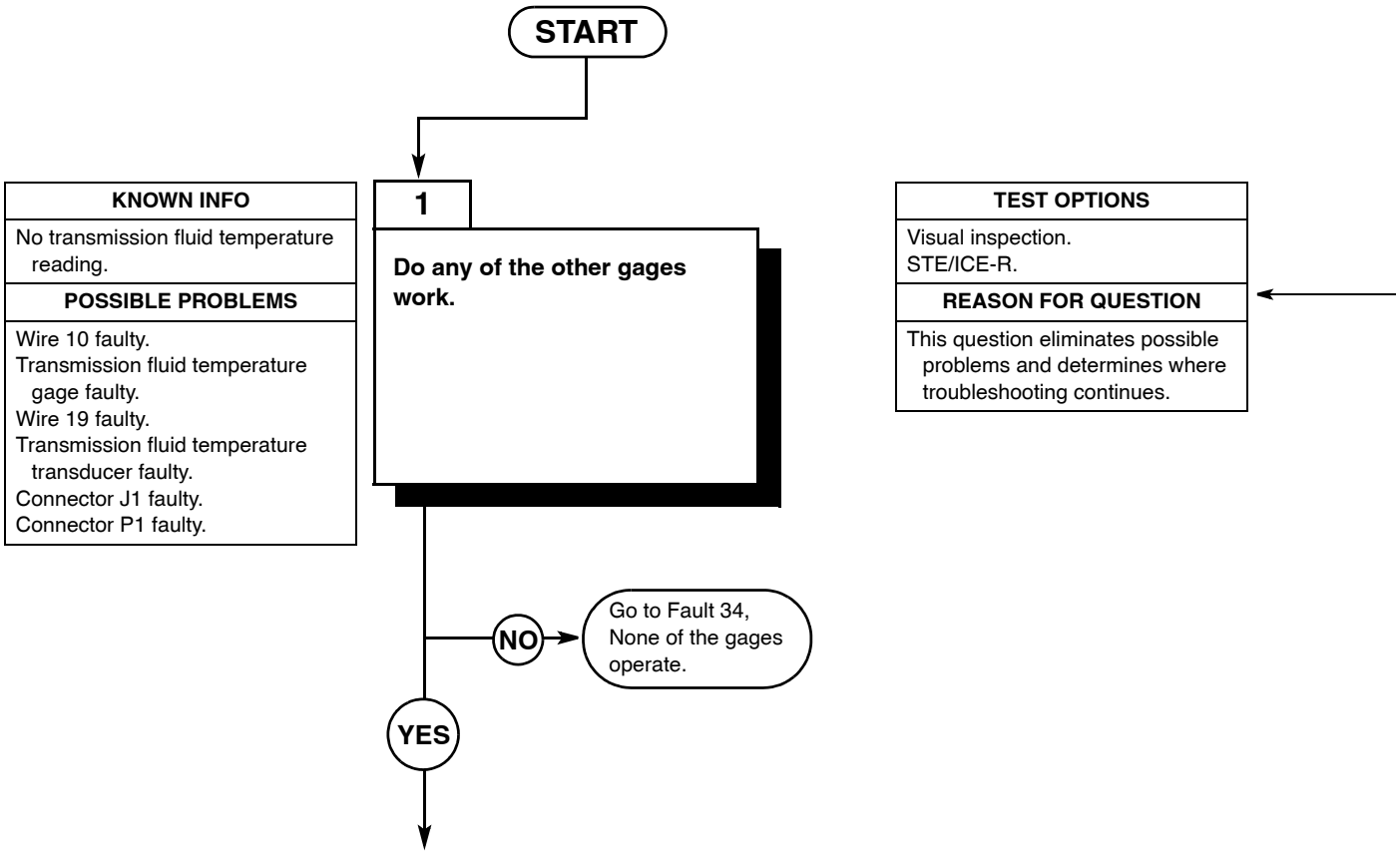
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

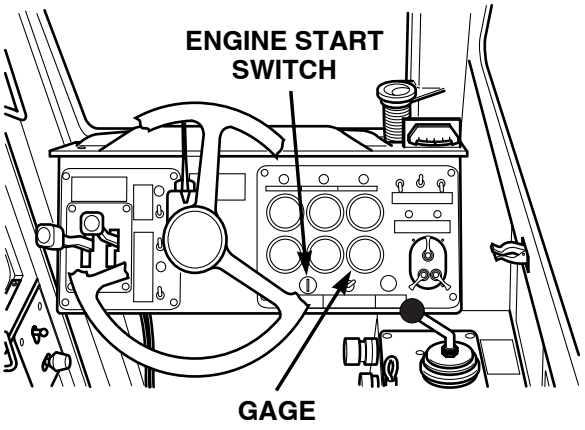
Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

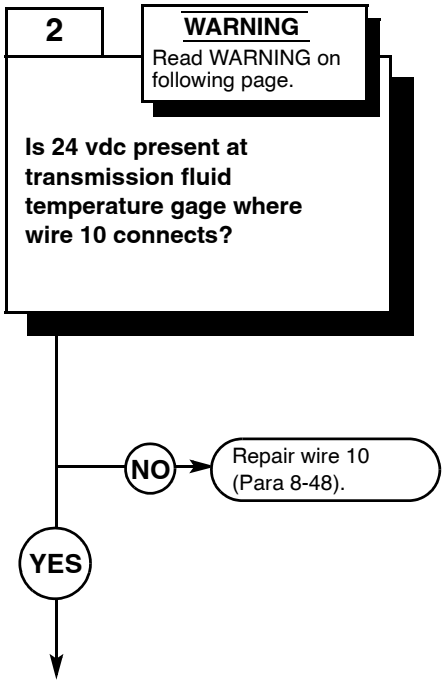


VISUAL INSPECTION
(1) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If the other gages are operating, go to Step 2 of this fault. (b) If all gages are not operating, go to Fault 34, None of the gages operate. (2) Turn engine start switch to OFF position (TM 10-3930-673-10).



40. TRANSMISSION FLUID TEMPERATURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No transmission fluid temperature reading.
POSSIBLE PROBLEMS
Wire 10 faulty. Transmission fluid temperature gage faulty. Wire 19 faulty. Transmission fluid temperature transducer faulty. Connector J1 faulty. Connector P1 faulty.

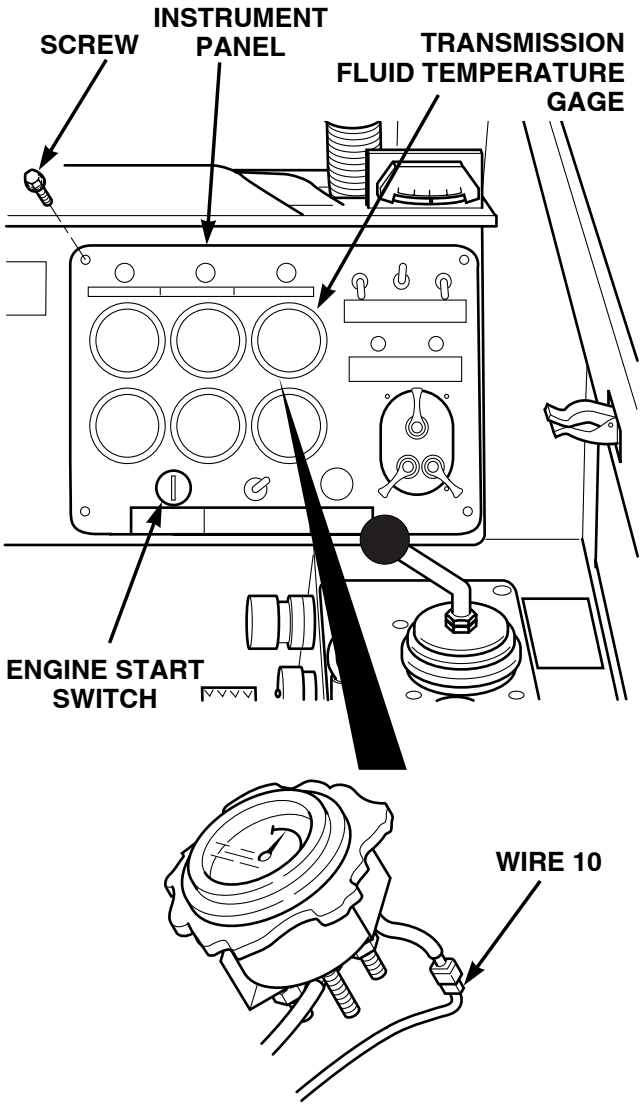


TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 faulty.

WARNING

- Remove rings bracelets watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST
(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws from right-hand instrument panel.
(4) Set multimeter to volts dc.
(5) Lift instrument panel out to reach transmission fluid temperature gage.
(6) Connect multimeter positive lead (+) to transmission fluid temperature gage where wire 10 connects.
(7) Connect multimeter negative lead (–) to known good ground.
(8) Connect negative battery cable to negative side of battery (Para 8-42).
(9) Turn engine start switch to START position, (TM 10-3930-673-10).
(a) If 24 vdc is present, go to Step 3 of this fault.
(b) If 24 vdc is not present, repair wire 10 (Para 8-48).
(10) Turn engine start switch to OFF position (TM 10-3930-673-10).
(11) Disconnect negative battery cable from negative side of battery (Para 8-44).



40. TRANSMISSION FLUID TEMPERATURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No transmission fluid temperature reading. Wire 10 OK.
POSSIBLE PROBLEMS
Transmission fluid temperature gage faulty. Wire 19 faulty. Transmission fluid temperature transducer faulty. Connector J1 faulty. Connector P1 faulty.

3

Is voltage present at transmission fluid temperature gage where wire 19 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, transmission fluid temperature gage faulty.

NO → Replace transmission fluid temperature gage (Para 8-6).

YES

KNOWN INFO
No transmission fluid temperature reading. Wire 10 OK. Transmission fluid temperature gage OK.
POSSIBLE PROBLEMS
Wire 19 faulty. Connector J1 faulty. Connector P1 faulty. Transmission fluid temperature transducer faulty.

4

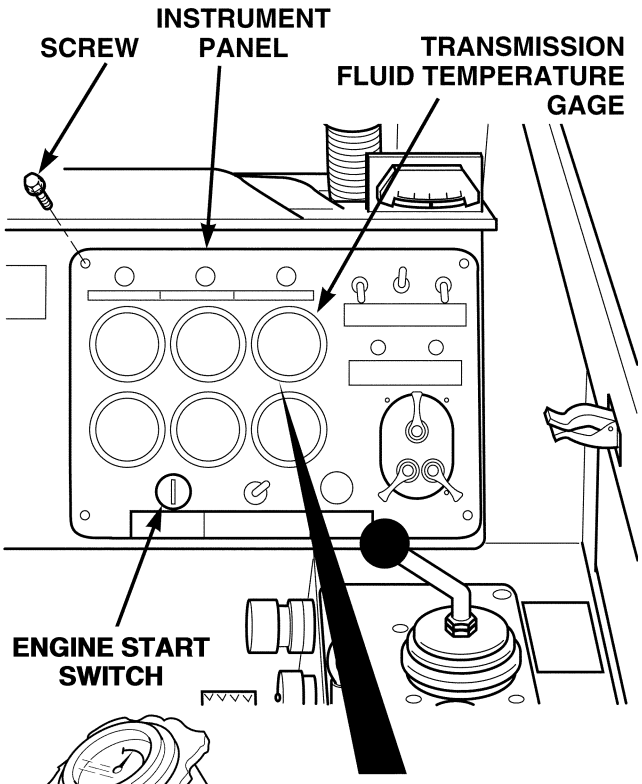
Is voltage present at transmission fluid temperature transducer where wire 19 connects?

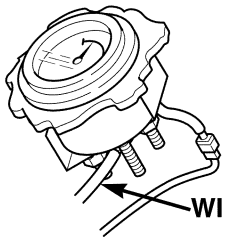
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to Step 5 of this fault.

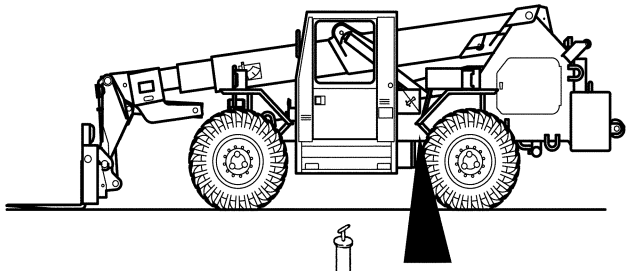
YES → Replace transmission fluid temperature transducer (Para 8-16).

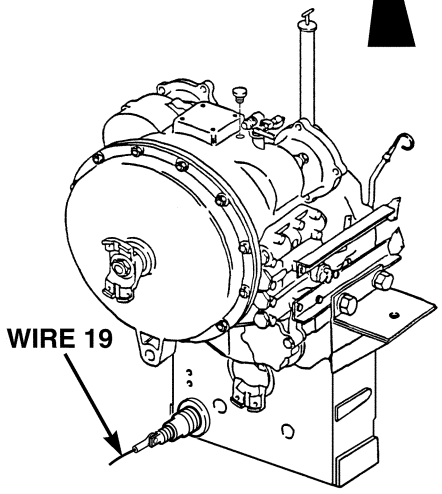
VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to transmission fluid temperature gage where wire 19 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to START position, (TM 10-3930-673-10). (a) If voltage is present, replace transmission fluid temperature gage (Para 8-6). (b) If voltage is not present, go to Step 5 of this fault. (5) Turn engine start switch to OFF position (TM 10-3930-673-10).





VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to trans fluid temp transducer where wire 19 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Turn engine start switch to START position, (TM 10-3930-673-10). (a) If voltage is present, replace transmission fluid temperature transducer (Para 8-16). (b) If voltage is not present, go to Step 5 of this fault. (5) Turn engine start switch to OFF position (TM 10-3930-673-10).





40. TRANSMISSION FLUID TEMPERATURE GAGE DOES NOT OPERATE (CONT).

KNOWN INFO
No transmission fluid temperature reading. Wire 10 OK. Transmission fluid temperature gage OK.
POSSIBLE PROBLEMS
Wire 19 faulty. Connector J1 faulty. Connector P1 faulty.

5

Is continuity present on wire 19 between transmission fluid temperature gage and connector J1-14?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 19 or connector J1 faulty.

NO → Repair wire 19 or connector J1 (Para 8-48).

YES

KNOWN INFO
No transmission fluid temperature reading. Wire 10 OK. Connector J1 OK.
POSSIBLE PROBLEMS
Connector P1 faulty. Wire 19 faulty.

6

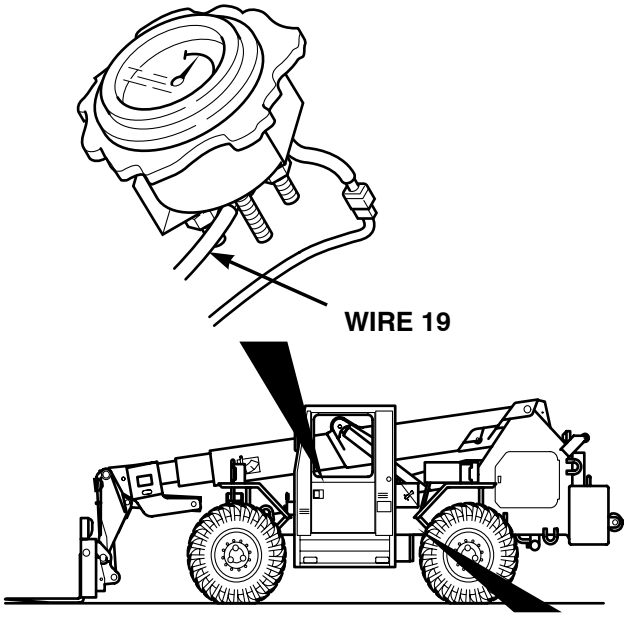
Is continuity present on wire 19 between transmission fluid temperature transducer and connector P1-14?

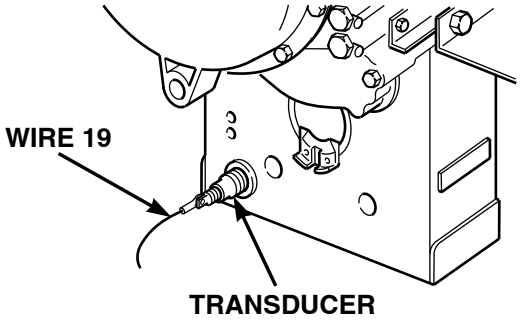
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 19 or connector P1 faulty.

NO → Repair wire 19 or connector P1 (Para 8-49).

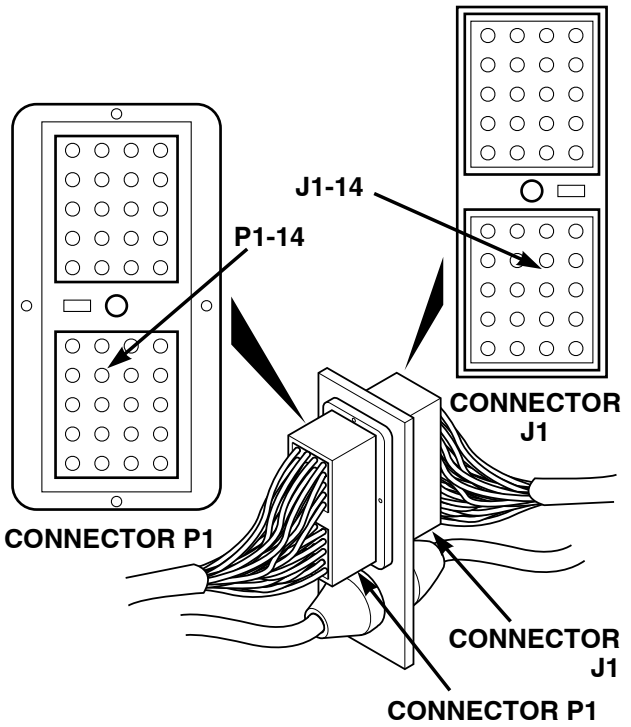
YES → Replace transmission fluid temperature transducer (Para 8-16).

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J1 from connector P1. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 19 where wire 19 connects to transmission fluid temperature gage. (5) Connect multimeter negative lead (–) to connector J1-14. (a) If continuity is present, go to Step 6 of this fault. (b) If continuity is not present, repair wire 19 (Para 8-48) or connector J1 (Para 8-48).





CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Disconnect connector J1 from connector P1. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to wire 19 where wire 19 connects to trans fluid temp transducer. (5) Connect multimeter negative lead (–) to connector P1-14. (a) If continuity is present, replace transmission fluid temperature transducer (Para 8-16). (b) If continuity is not present, repair wire 19 or connector P1 (Para 8-49). (6) Connect negative battery cable to negative side of battery. (7) Install battery cover (Para 8-42).



41. EMERGENCY STEERING PUMP DOES NOT OPERATE.

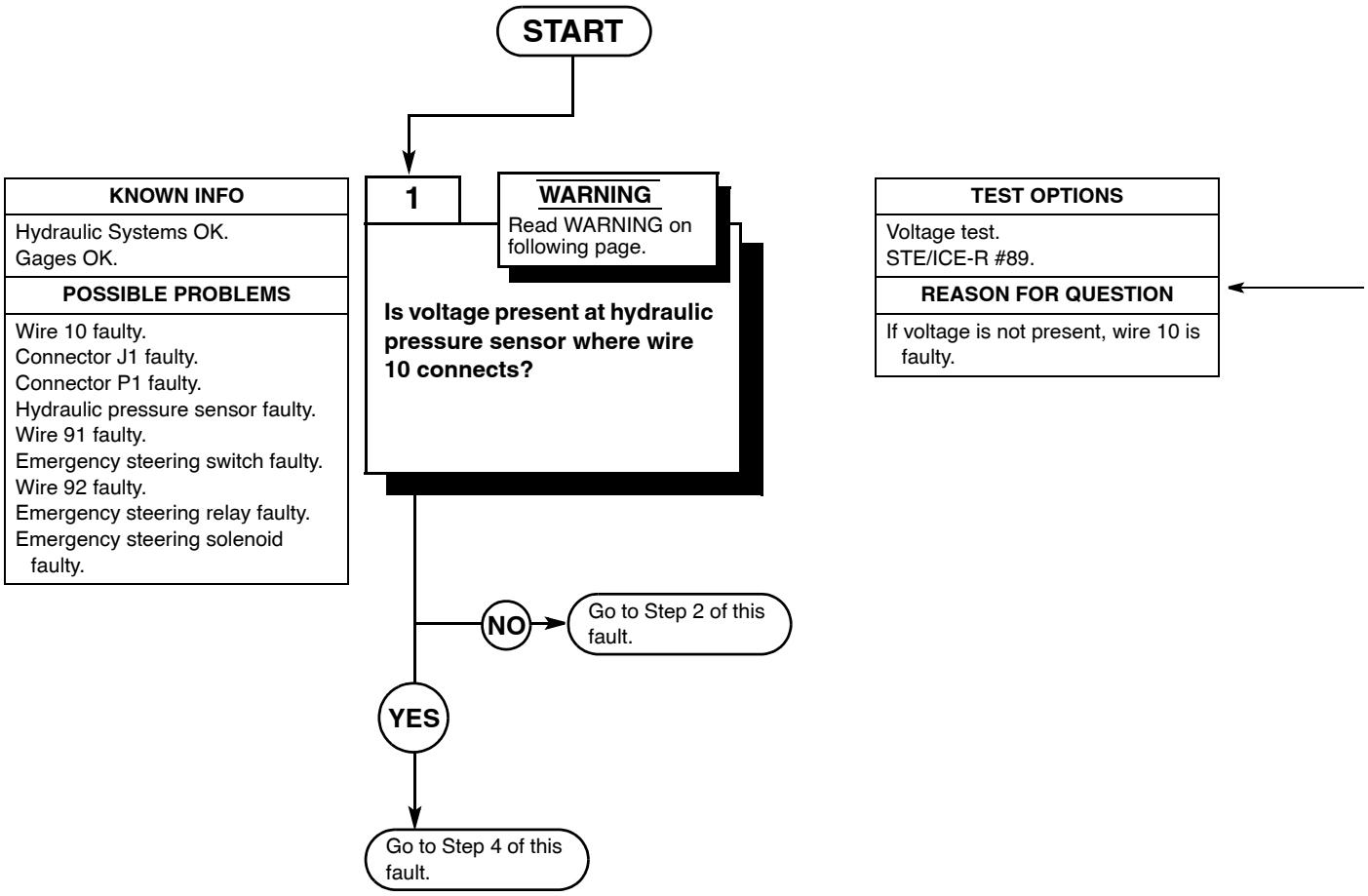
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

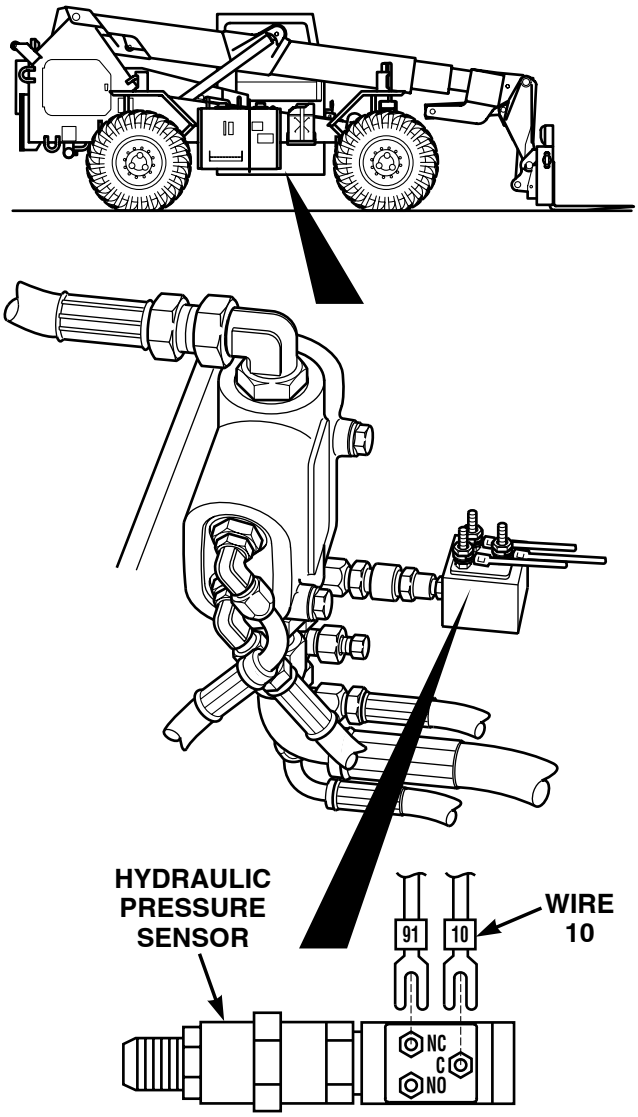


WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery.
(3) Set multimeter to volts dc.
(4) Connect multimeter positive lead (+) to hydraulic pressure sensor where wire 10 connects.
(5) Connect multimeter negative lead (–) to known good ground.
(6) Connect negative battery cable to negative side of battery (Para 8-42).
  (a) If voltage is present, go to Step 4 of this fault.
  (b) If voltage is not present, go to Step 2 of this fault.



41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Hydraulic pressure sensor faulty. Wire 91 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

2

Is continuity present on wire 10 between circuit breaker CB1 and connector J1-23?

NO → Repair wire 10 and/or connector J1 (Para 8-48).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, connector J1 or wire 10 is faulty.

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Hydraulic pressure sensor faulty. Wire 91 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

3

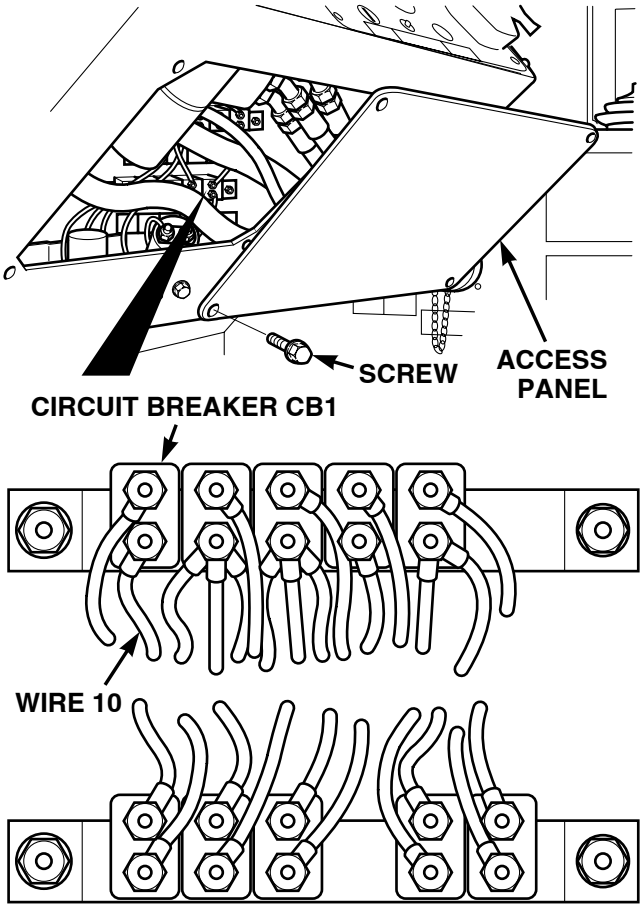
Is continuity present on wire 10 between hydraulic pressure sensor and connector P1-23?

NO → Repair wire 10 and/or connector P1 (Para 8-49).

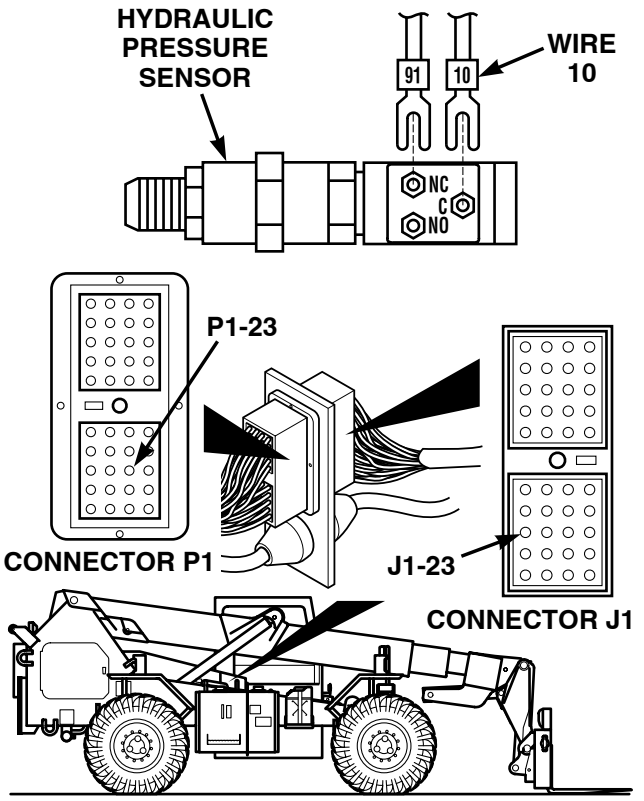
YES

TEST OPTIONS
Continuity test STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, connector P1 or wire 10 is faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Remove four screws and access panel. (3) Set multimeter to ohms. (4) Connect multimeter positive lead (+) to circuit breaker CB1 where wire 10 connects. (5) Connect multimeter negative lead (–) to connector J1-23. (a) If continuity is present, go to Step 3 of this fault. (b) If continuity is not present, repair wire 10 and/or connector J1 (Para 8-48). (6) Install access panel and four screws.



CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to hydraulic pressure sensor where wire 10 connects. (4) Connect multimeter negative lead (–) to connector P1-23. (a) If continuity is present, go to Step 4 of this fault. (b) If continuity is not present, repair wire 10 and/or connector P1 (Para 8-49).



41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Hydraulic pressure sensor faulty. Wire 91 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

4

Is voltage present at hydraulic pressure sensor where wire 91 connects?

NO → Repair hydraulic pressure sensor (Para 8-53).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, hydraulic pressure sensor is faulty.

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Hydraulic pressure sensor faulty. Wire 91 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

5

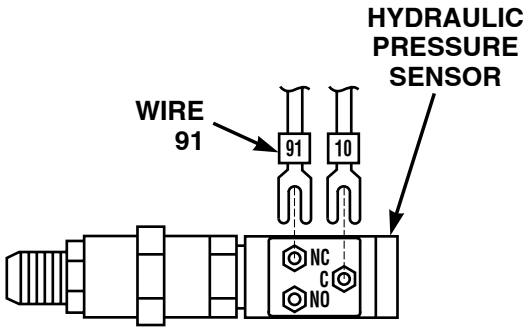
Is voltage present at emergency steering switch where wire 91 connects?

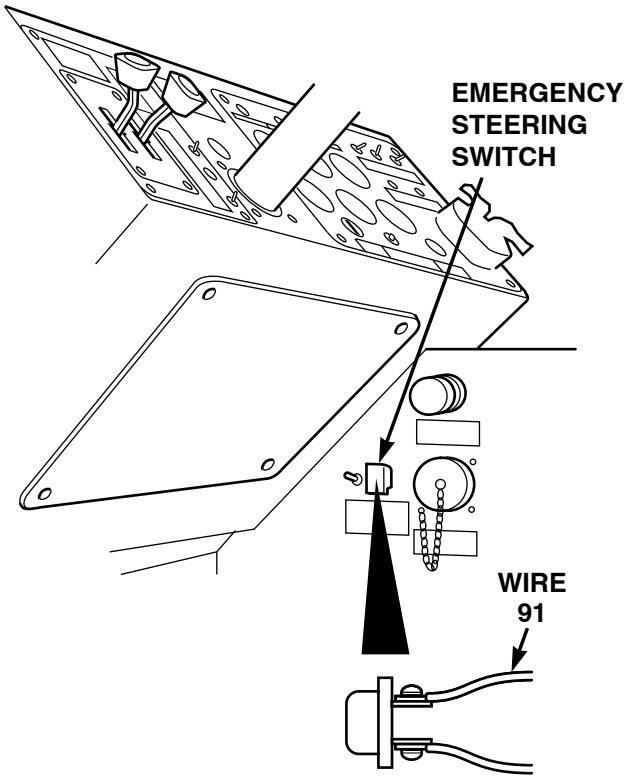
NO → Go to Step 6 of this fault.

YES → Go to Step 8 of this fault.

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 91 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to hydraulic pressure sensor where wire 91 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If voltage is present, go to Step 5 of this fault. (b) If voltage is not present, replace hydraulic pressure sensor (Para 8-53).





VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to emergency steering switch where wire 91 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (a) If voltage is present, go to Step 8 of this fault. (b) If voltage is not present, go to Step 6 of this fault. (6) Turn emergency steering switch OFF (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42).

41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Hydraulic pressure sensor faulty. Wire 91 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

6

Is continuity present on wire 91 between hydraulic pressure sensor and conector J1-22?

NO → Repair wire 91 and/or connector J1 (Para 8-48).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, connector J1 or wire 91 is faulty.

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Hydraulic pressure sensor faulty. Wire 91 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

7

Is continuity present on wire 91 between emergency steering switch and connector P1-22?

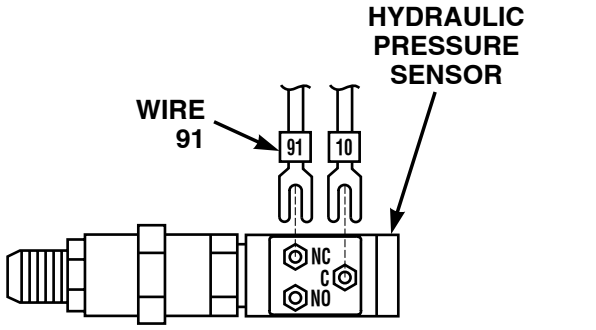
NO → Repair wire 91 and/or connector P1 (Para 8-49).

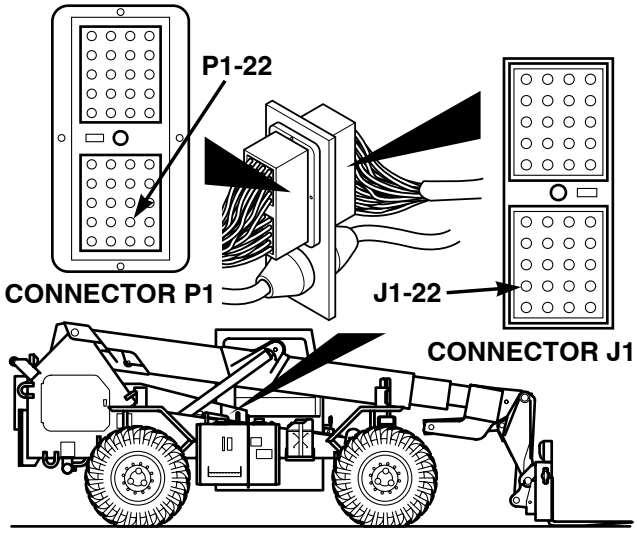
YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, connector P1 or wire 91 faulty.

CONTINUITY TEST

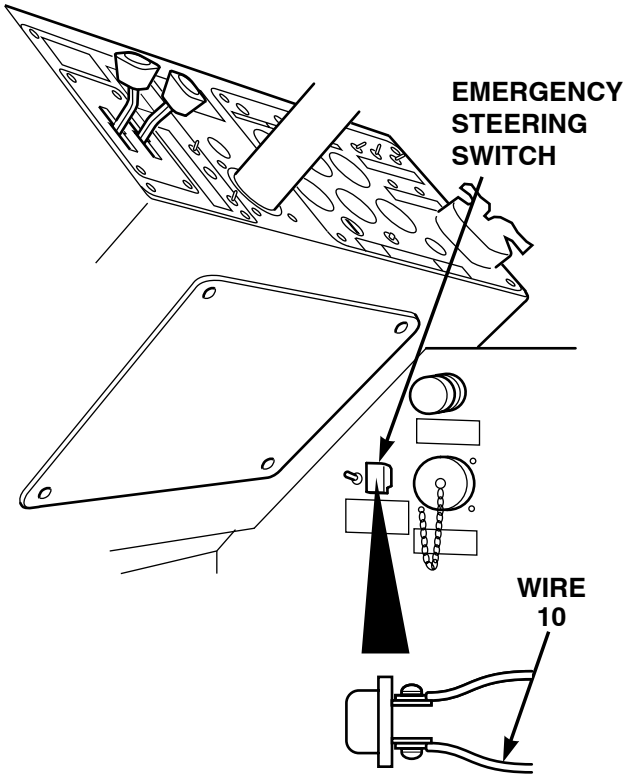
(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to hydraulic pressure sensor where wire 91 connects.
(4) Connect multimeter negative lead (–) to connector J1-22.
  (a) If continuity is present, go to Step 7 of this fault.
  (b) If continuity is not present, repair wire 91 and/or connector J1 (Para 8-48).





CONTINUITY TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to ohms.
(3) Connect multimeter positive lead (+) to emergency steering switch where wire 91 connects.
(4) Connect multimeter negative lead (–) to connector P1-22.
  (a) If continuity is present, go to Step 8 of this fault.
  (b) If continuity is not present, repair wire 91 and/or connector P1 (Para 8-49).



41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Emergency steering switch faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

8

Is voltage present at emergency steering switch where wire 92 connects with the emergency steering switch ON?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, emergency steering switch is faulty.

NO → Replace emergency steering switch (Para 8-7).

YES

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK. Emergency steering switch OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

9

Is voltage present at emergency steering solenoid where wire 92 connects with the emergency steering switch ON?

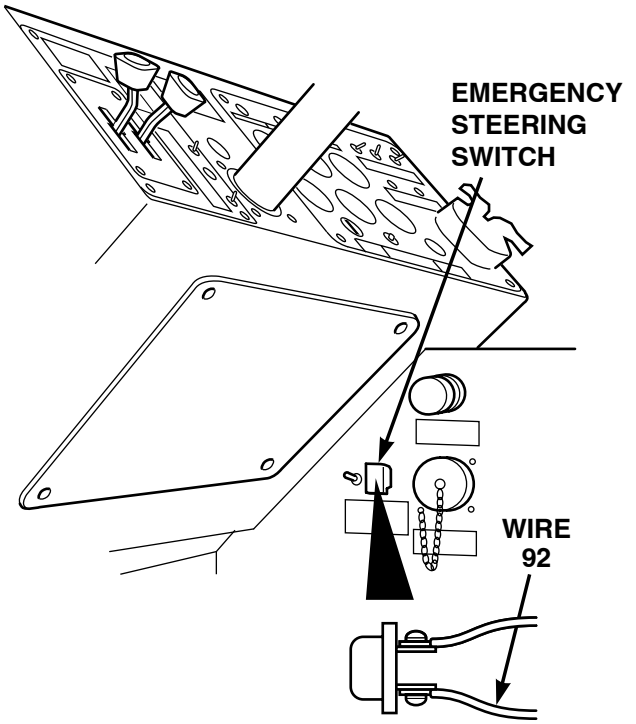
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 92 is faulty.

NO → Go to Step 10 of this fault.

YES → Go to Step 12 of this fault.

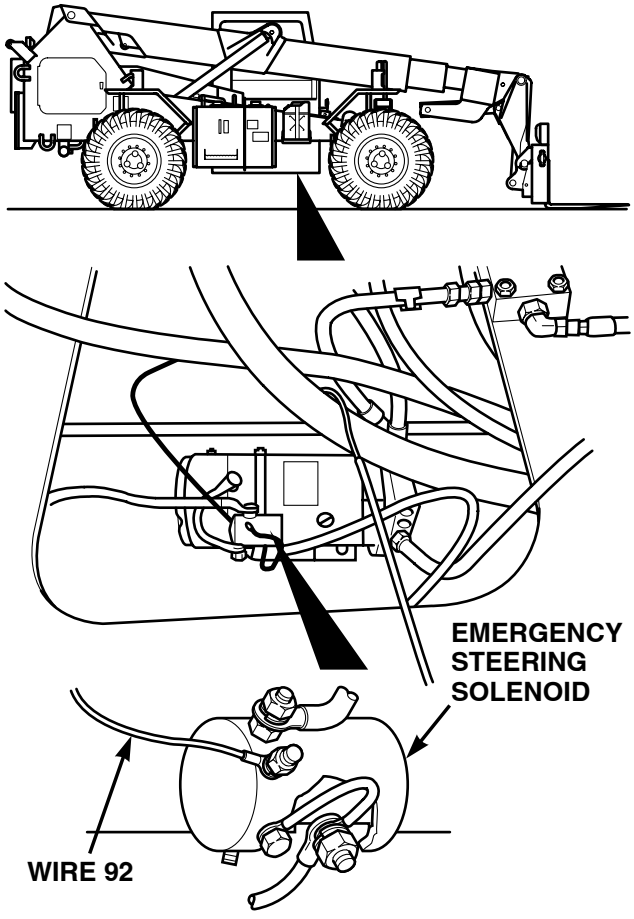
VOLTAGE TEST

(1) Disconnect negative battery cable from negative side of battery (Para 8-42).
(2) Set multimeter to volts dc.
(3) Connect multimeter positive lead (+) to emergency steering switch where wire 92 connects.
(4) Connect multimeter negative lead (–) to known good ground.
(5) Connect negative battery cable to negative side of battery (Para 8-42).
(6) Turn emergency steering switch ON (TM 10-3930-673-10).
  (a) If voltage is present, go to Step 9 of this fault.
  (b) If voltage is not present, replace emergency steering switch (Para 8-7).
(7) Turn emergency steering switch OFF (TM 10-3930-673-10).
(8) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST

(1) Set multimeter to volts dc.
(2) Connect multimeter positive lead (+) to emergency steering switch where wire 92 connects.
(3) Connect multimeter negative lead (–) to known good ground.
(4) Connect negative battery cable to negative side of battery (Para 8-42).
(5) Turn emergency steering switch ON (TM 10-3930-673-10).
  (a) If voltage is present, go to Step 12 of this fault.
  (b) If voltage is not present, go to Step 10 of this fault.
(6) Turn emergency steering switch OFF (TM 10-3930-673-10).
(7) Disconnect negative battery cable from negative side of battery (Para 8-42).



41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK. Emergency steering switch OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

10

Is continuity present on wire 92 between emergency steering switch and connector J1-21?

NO → Repair wire 92 and/or connector J1 (Para 8-48).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, connector J1 or wire 92 is faulty.

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK. Emergency steering switch OK.
POSSIBLE PROBLEMS
Connector J1 faulty. Connector P1 faulty. Wire 92 faulty. Emergency steering relay faulty. Emergency steering solenoid faulty.

11

Is continuity present on wire 92 between emergency steering solenoid and connector P1-21?

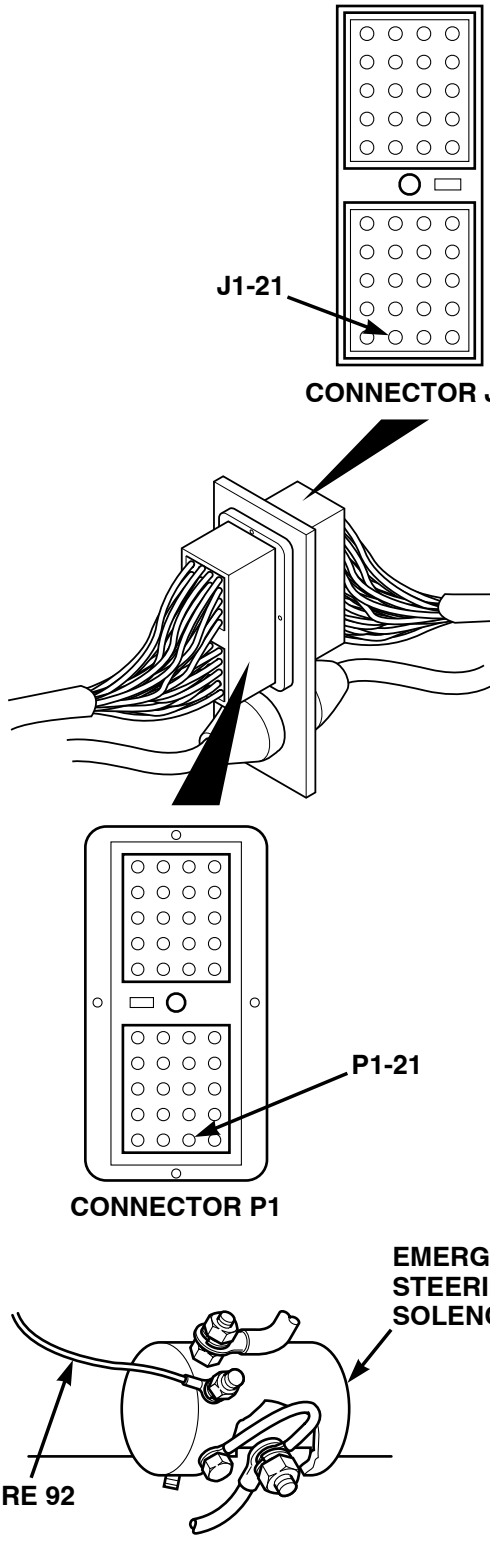
NO → Repair wire 92 and/or connector P1 (Para 8-49).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, connector P1 or wire 92 is faulty.

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to emergency steering switch where wire 92 connects. (4) Connect multimeter negative lead (–) to connector J1-21. (a) If continuity is present, go to Step 11 of this fault. (b) If continuity is not present, repair wire 92 and/or connector J1 (Para 8-48).

CONTINUITY TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to ohms. (3) Connect multimeter positive lead (+) to emergency steering solenoid where wire 92 connects. (4) Connect multimeter negative lead (–) to connector P1-22. (a) If continuity is present, go to Step 12 of this fault. (b) If continuity is not present, repair wire 92 and/or connector J1 (Para 8-49).



41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK. Emergency steering switch OK. Connector J1 OK. Connector P1 OK. Wire 92 OK. Emergency steering relay OK.
POSSIBLE PROBLEMS
Emergency steering solenoid faulty.

12

Is voltage present at emergency steering solenoid where ground wire connects?

NO → Replace emergency steering solenoid (Para 8-22).

YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, emergency steering solenoid is faulty.

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK. Emergency steering switch OK. Connector J1 OK. Connector P1 OK. Wire 92 OK. Emergency steering relay OK. Emergency steering solenoid OK.
POSSIBLE PROBLEMS
Wire 9 faulty. Emergency steering motor faulty.

13

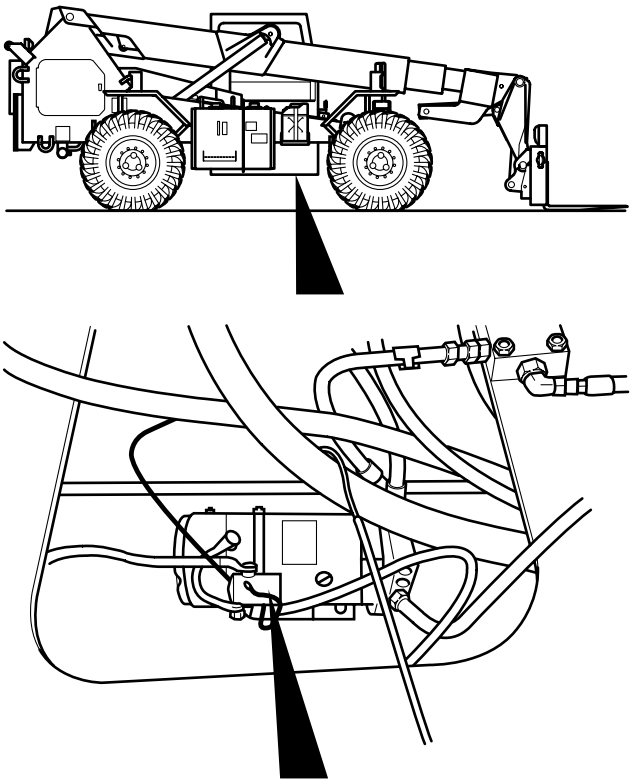
Is voltage present at emergency steering motor where wire 9 connects?

NO → Repair wire 9 (Para 8-49).

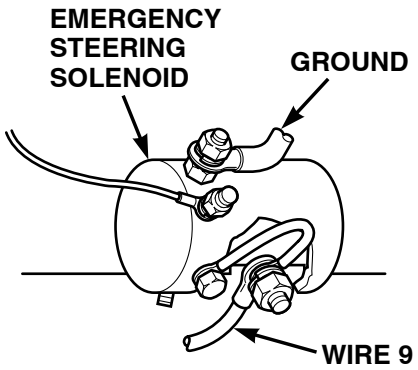
YES

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 9 is faulty.

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to emergency steering solenoid where ground wire connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn emergency steering switch ON (TM 10-3930-673-10). (a) If voltage is present, go to Step 13 of this fault. (b) If voltage is not present, replace emergency steering solenoid (Para 8-22). (7) Turn emergency steering switch OFF (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to emergency steering motor where wire 9 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn emergency steering switch ON (TM 10-3930-673-10). (a) If voltage is present, go to Step 14 of this fault. (b) If voltage is not present, repair wire 9 (Para 8-49). (7) Turn emergency steering switch OFF (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).



41. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic Systems OK. Gages OK. Wire 10 OK. Hydraulic pressure sensor OK. Wire 91 OK. Emergency steering switch OK. Connector J1 OK. Connector P1 OK. Wire 92 OK. Emergency steering relay OK. Emergency steering solenoid OK. Wire 9 OK.
POSSIBLE PROBLEMS
Emergency steering motor faulty.

14

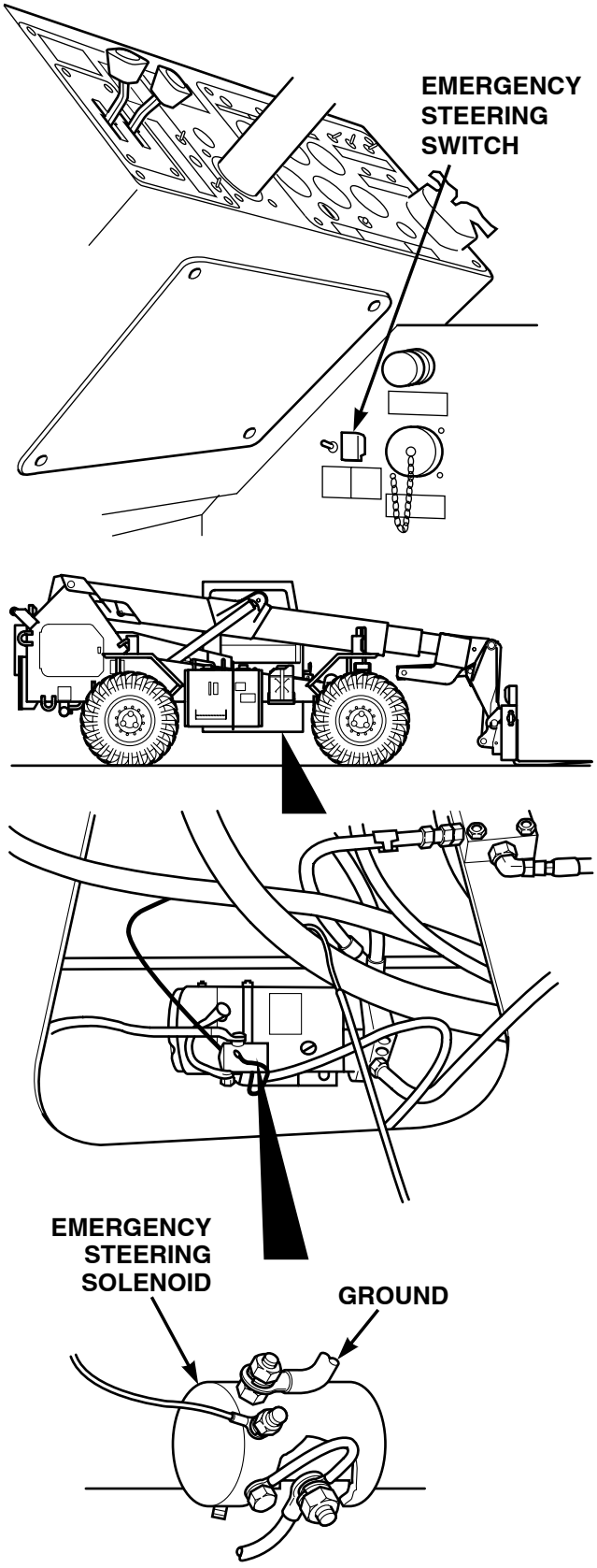
Is voltage present at emergency steering motor where ground wire connects with the emergency steering switch ON?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, emergency steering motor is faulty.

NO → Replace emergency steering motor (Para 8-22).

YES → Repair ground wire (Para 8-49).

VOLTAGE TEST
(1) Disconnect negative battery cable from negative side of battery (Para 8-42). (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to emergency steering motor where ground wire connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn emergency steering switch ON (TM 10-3930-673-10). (a) If voltage is present, repair ground wire (Para 8-49). (b) If voltage is not present, replace emergency steering motor (Para 8-22). (7) Turn emergency steering switch OFF (TM 10-3930-673-10). (8) Install battery cover (Para 8-42).



42. STEERING SELECT SWITCH DOES NOT OPERATE.

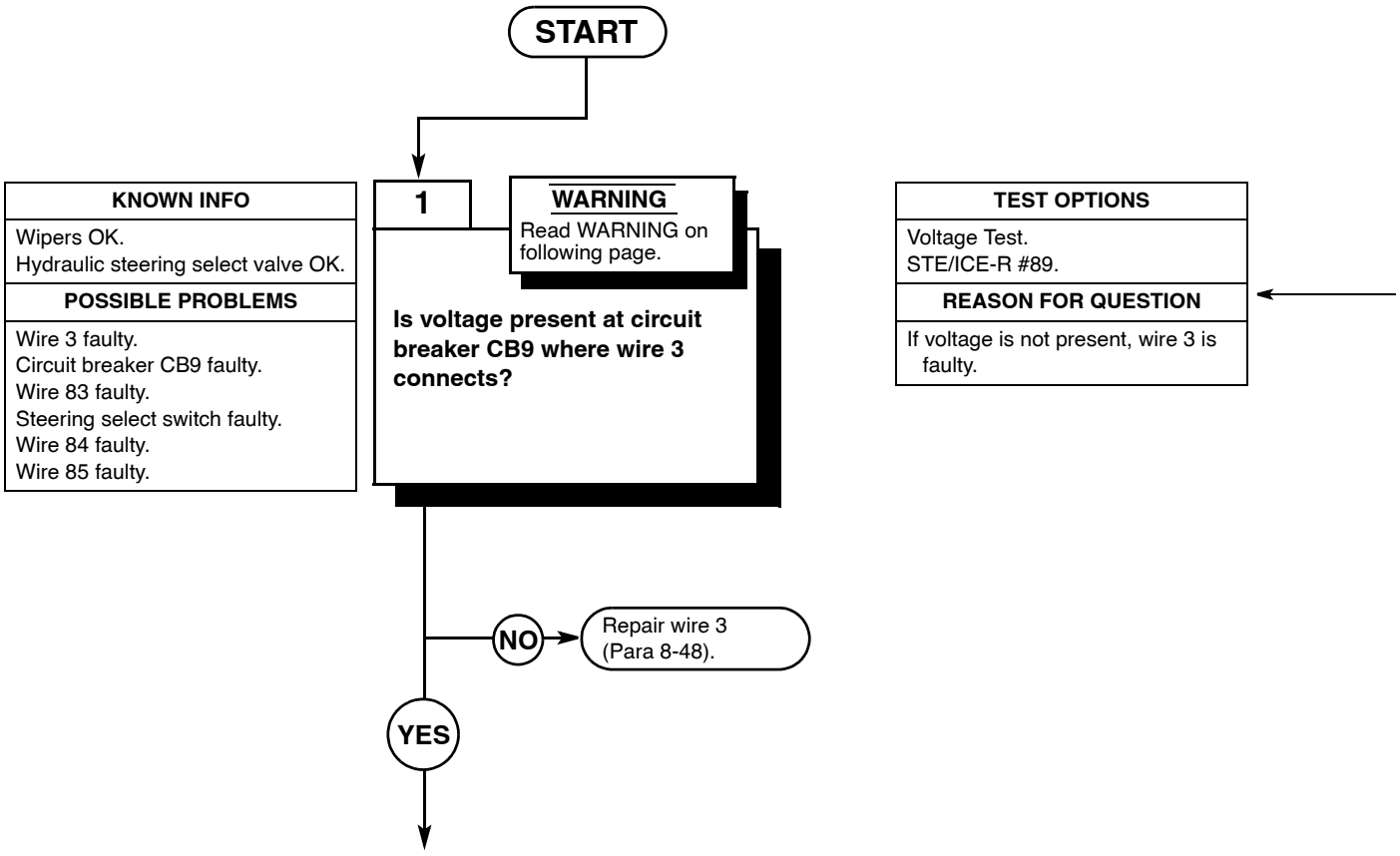
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

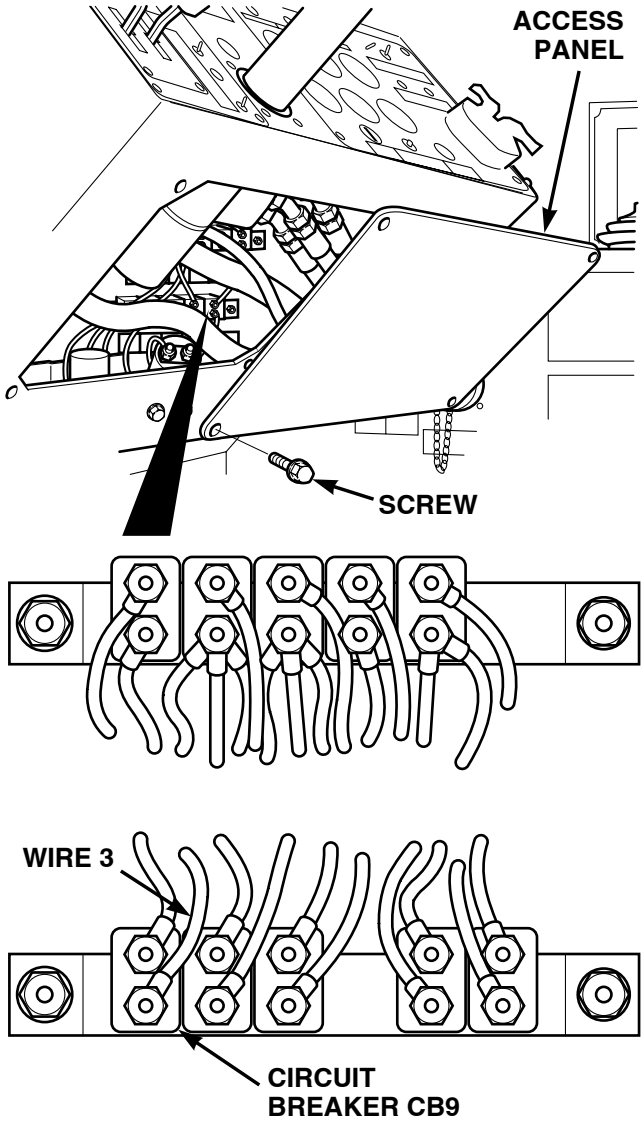


WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws and access panel.
(4) Set multimeter to volts dc.
(5) Connect multimeter positive lead (+) to circuit breaker CB9 where wire 3 connects.
(6) Connect multimeter negative lead (–) to known good ground.
(7) Connect negative battery cable to negative side of battery (Para 8-42).
(8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If voltage is present, go to Step 2 of this fault.
  (b) If voltage is not present, repair wire 3 (Para 8-48).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).



42. STEERING SELECT SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Wipers OK. Steering select valve OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB9 faulty. Wire 83 faulty. Steering select switch faulty. Wire 84 faulty. Wire 85 faulty.

2

Is voltage present at circuit breaker CB9 where wire 83 connects?

TEST OPTIONS
Voltage Test STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB9 is faulty.

NO → Replace circuit breaker CB9 (Para 8-11).

YES

KNOWN INFO
Wipers OK. Steering select valve OK. Wire 3 OK. Circuit breaker CB9 OK.
POSSIBLE PROBLEMS
Wire 83 faulty. Steering select switch faulty. Wire 84 faulty. Wire 85 faulty.

3

Is voltage present at steering select switch where wire 83 connects?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 83 is faulty.

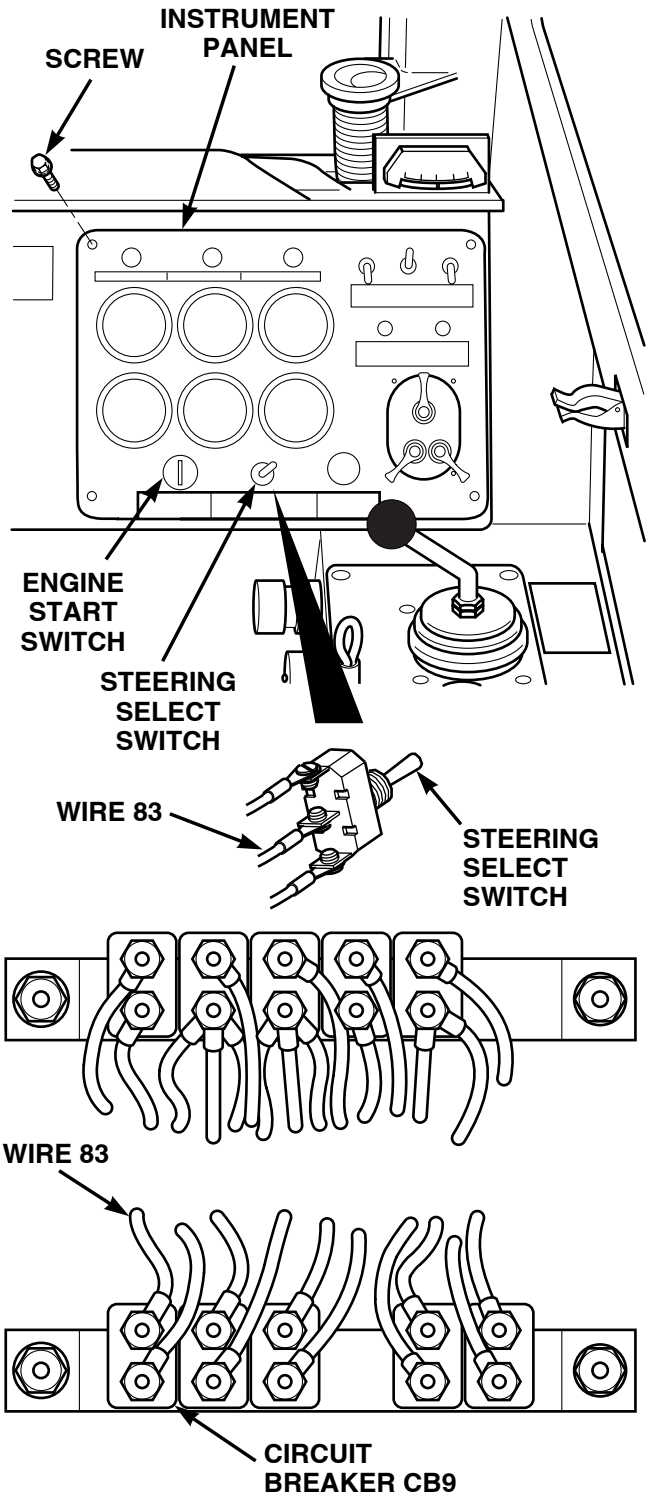
NO → Repair wire 83 (Para 8-48).

YES

Go to Step 4 (crab) or Step 5 (4 wheel) of this fault.

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to circuit breaker CB9 where wire 83 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 3 of this fault. (b) If voltage is not present, replace circuit breaker CB9 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42). (8) Install access panel and four screws.

VOLTAGE TEST
(1) Remove four screws from instrument panel. (2) Raise instrument panel out to reach steering select switch. (3) Set multimeter to volts dc. (4) Connect multimeter positive lead (+) to steering select switch where wire 83 connects. (5) Connect multimeter negative lead (–) to known good ground. (6) Connect negative battery cable to negative side of battery (Para 8-42). (7) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If voltage is present, go to Step 4 of this fault. (b) If voltage is not present, repair wire 83 (Para 8-48). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



42. STEERING SELECT SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Wipers OK. Steering select valve OK. Wire 3 OK. Circuit breaker CB9 OK. Wire 83 OK.
POSSIBLE PROBLEMS
Steering select switch faulty. Wire 84 faulty. Wire 85 faulty.

4

Is voltage present at steering select switch where wire 84 connects?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, steering select switch is faulty.

NO → Replace steering select switch (Para 8-7).

YES → Go to Step 6 of this fault.

KNOWN INFO
Wipers OK. Steering select valve OK. Wire 3 OK. Circuit breaker CB9 OK. Wire 83 OK.
POSSIBLE PROBLEMS
Steering select switch faulty. Wire 84 faulty. Wire 85 faulty.

5

Is voltage present at steering select switch where wire 85 connects?

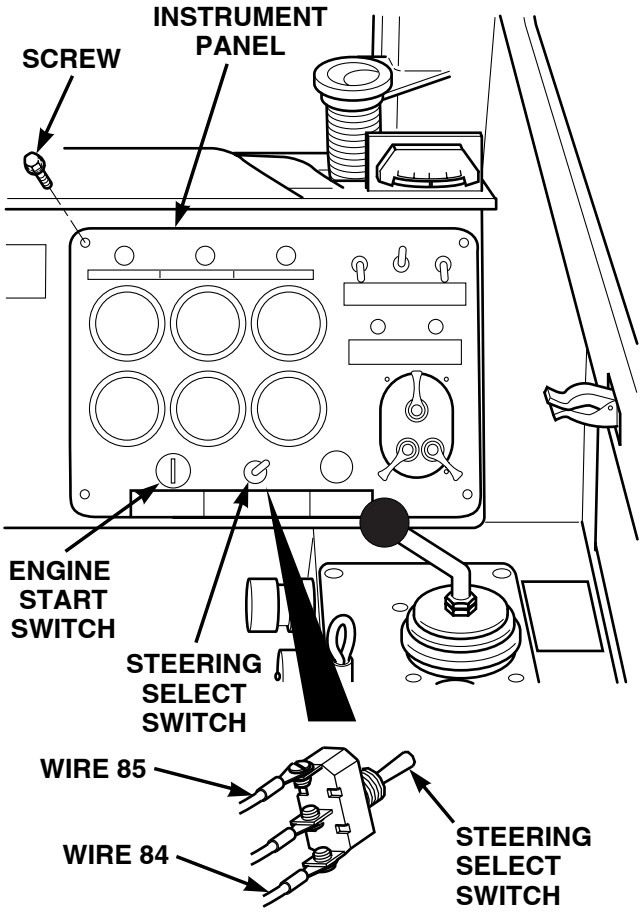
TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, steering select switch is faulty.

NO → Replace steering select switch (Para 8-7).

YES → Go to Step 7 of this fault.

VOLTAGE TEST
(1) Raise instrument panel out to reach steering select switch. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to steering select switch where wire 84 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Switch steering select switch to CRAB position (TM 10-3930-673-10). (a) If voltage present, go to Step 6 of this fault. (b) If voltage is not present, replace steering select switch (Para 8-7). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).

VOLTAGE TEST
(1) Raise instrument panel out to reach steering select switch. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead (+) to steering select switch where wire 85 connects. (4) Connect multimeter negative lead (–) to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (7) Switch steering select switch to 4 WHEEL position (TM 10-3930-673-10). (a) If voltage present, go to Step 7 of this fault. (b) If voltage is not present, replace steering select switch (Para 8-7). (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Install instrument panel and four screws.



42. STEERING SELECT SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Wipers OK. Steering select valve OK. Wire 3 OK. Circuit breaker CB9 OK. Wire 83 OK. Steering select switch OK. Wire 85 OK.
POSSIBLE PROBLEMS
Wire 84 faulty.

6

Is voltage present at steering select valve where wire 84 connects?

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 84 and/or connector is faulty.

NO → Repair wire 84 and/or connector (Para 8-48).

YES → Replace steering select valve (Para 14-10).

KNOWN INFO
Wipers OK. Steering select valve OK. Wire 3 OK. Circuit breaker CB9 OK. Wire 83 OK. Steering select switch OK. Wire 84 OK.
POSSIBLE PROBLEMS
Wire 85 faulty.

7

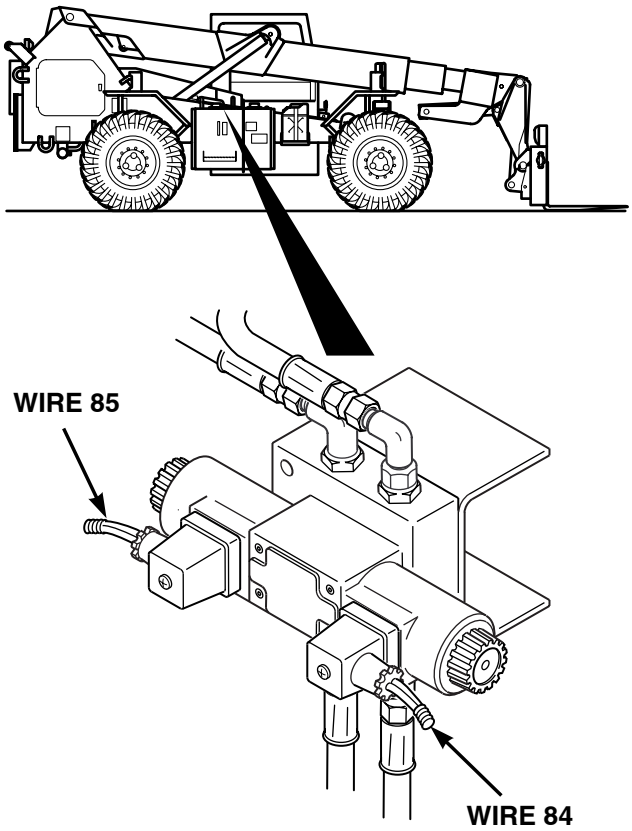
Is voltage present at steering select valve where wire 85 connects.

TEST OPTIONS
Voltage Test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 85 and/or connector is faulty.

NO → Repair wire 85 and/or connector (Para 8-48).

YES → Replace steering select valve (Para 14-10).

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to steering select valve where wire 84 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Switch steering select switch to CRAB position (TM 10-3930-673-10). (a) If voltage present, replace steering select valve (Para 14-10). (b) If voltage is not present, repair wire 84 and/or connector (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).



VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead (+) to steering select valve where wire 85 connects. (3) Connect multimeter negative lead (–) to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (6) Switch steering select switch to 4 WHEEL position (TM 10-3930-673-10). (a) If voltage present, replace steering select valve (Para 14-10). (b) If voltage is not present, repair wire 85 and/or connector (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Install battery cover (Para 8-42).

43. PARKING BRAKE SWITCH DOES NOT OPERATE.

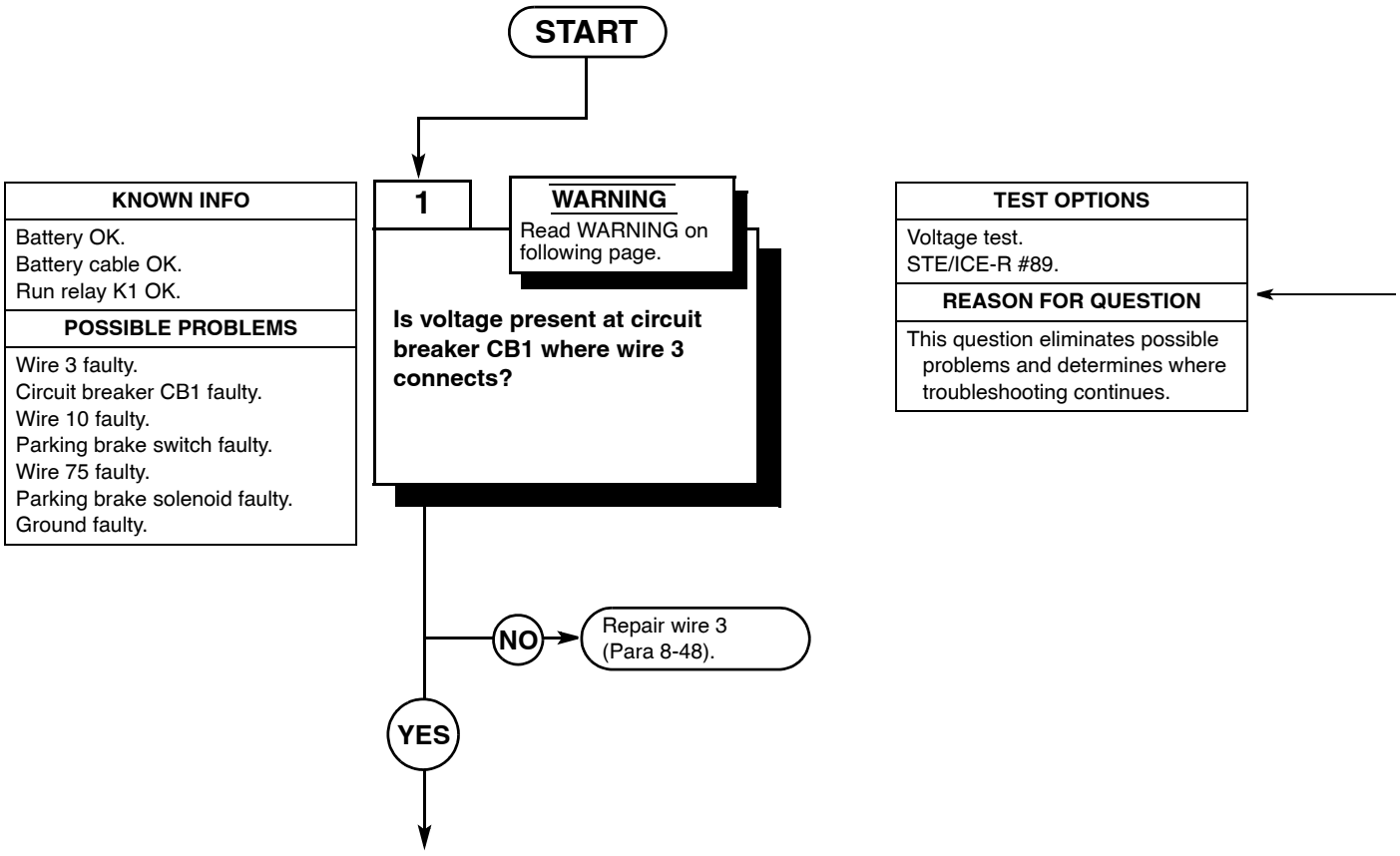
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Multimeter, Digital (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

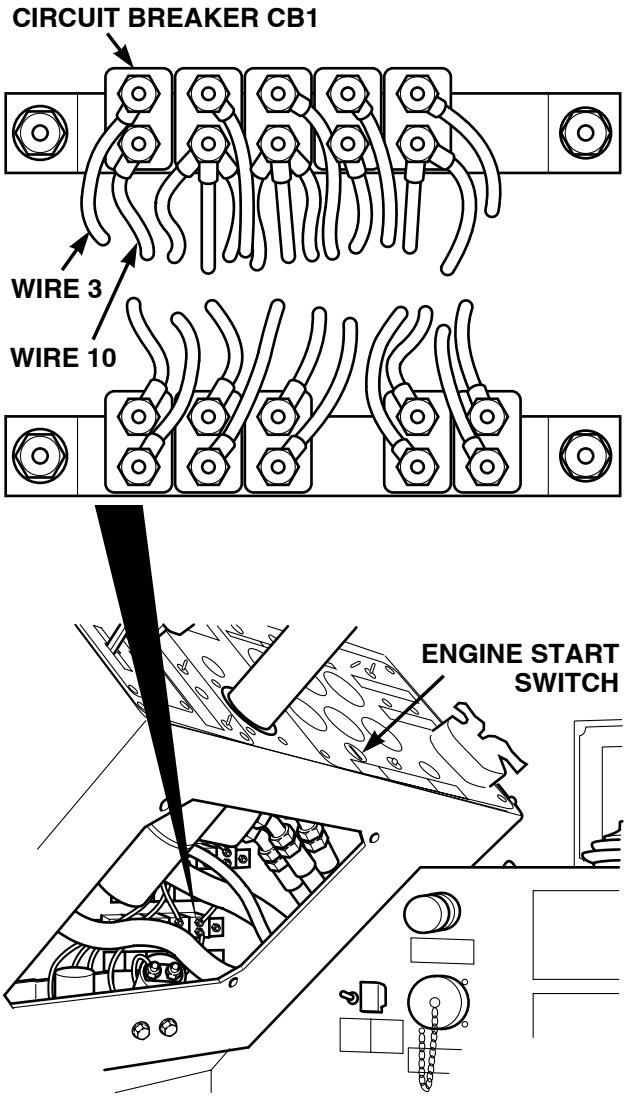
Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.



VOLTAGE TEST

(1) Remove battery cover (Para 8-42).
(2) Disconnect negative battery cable from negative side of battery (Para 8-42).
(3) Remove four screws and access panel.
(4) Set multimeter to volts dc.
(5) Connect multimeter positive lead to wire 3 where wire 3 connects to circuit breaker (CB1).
(6) Connect multimeter negative lead to known good ground.
(7) Connect negative battery cable to negative side of battery (Para 8-42).
(8) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10).
  (a) If 24 vdc is present, go to Step 2 of this fault.
  (b) If 24 vdc is not present, repair wire 3 (Para 8-48).
(9) Turn engine start switch to OFF position (TM 10-3930-673-10).
(10) Disconnect negative battery cable from negative side of battery (Para 8-42).

43. PARKING BRAKE SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Battery OK. Battery cable OK. Run relay K1 OK. Wire 3 OK.
POSSIBLE PROBLEMS
Circuit breaker CB1 faulty. Wire 10 faulty. Parking brake switch faulty. Wire 75 faulty. Parking brake solenoid faulty. Ground faulty.

2

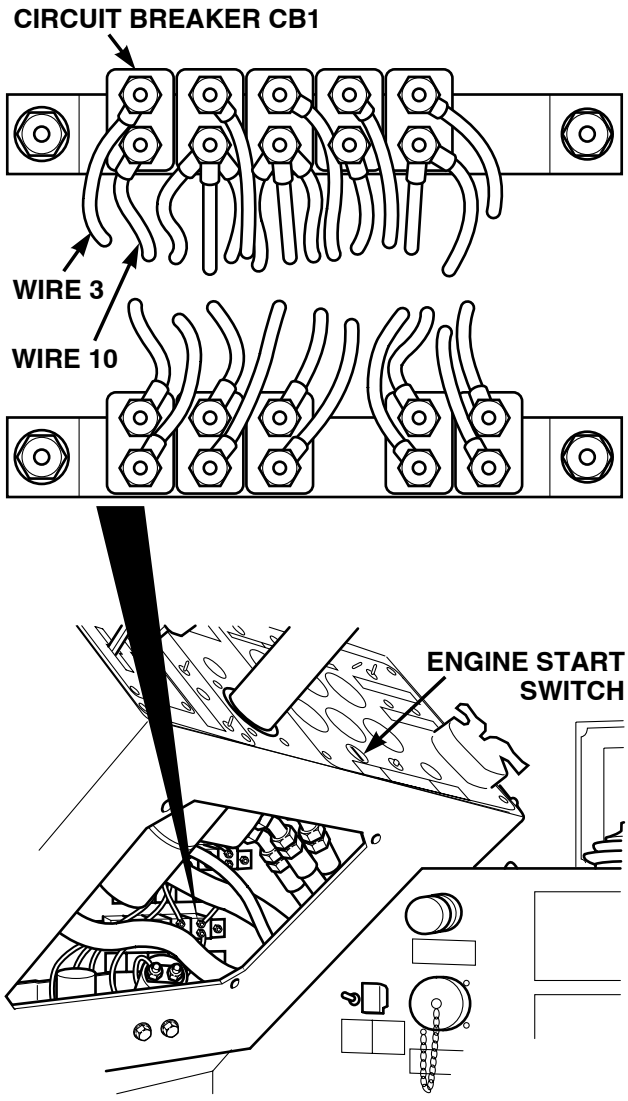
Is voltage present at circuit breaker CB1 where wire 10 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, circuit breaker CB1 is faulty.

NO → Replace circuit breaker CB1 (Para 8-11)

YES ↓

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead to wire 10 where wire 10 connects to circuit breaker CB1. (3) Connect multimeter negative lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 3 of this fault. (b) If 24 vdc is not present, replace circuit breaker CB1 (Para 8-11). (6) Turn engine start switch to OFF position (TM 10-3930-673-10). (7) Disconnect negative battery cable from negative side of battery (Para 8-42). (8) Install access panel and four screws.



43. PARKING BRAKE SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Battery OK. Battery cable OK. Run relay K1 OK. Wire 3 OK. Circuit breaker CB1 OK.
POSSIBLE PROBLEMS
Wire 10 faulty. Parking brake switch faulty. Wire 75 faulty. Parking brake solenoid faulty. Ground faulty.

3

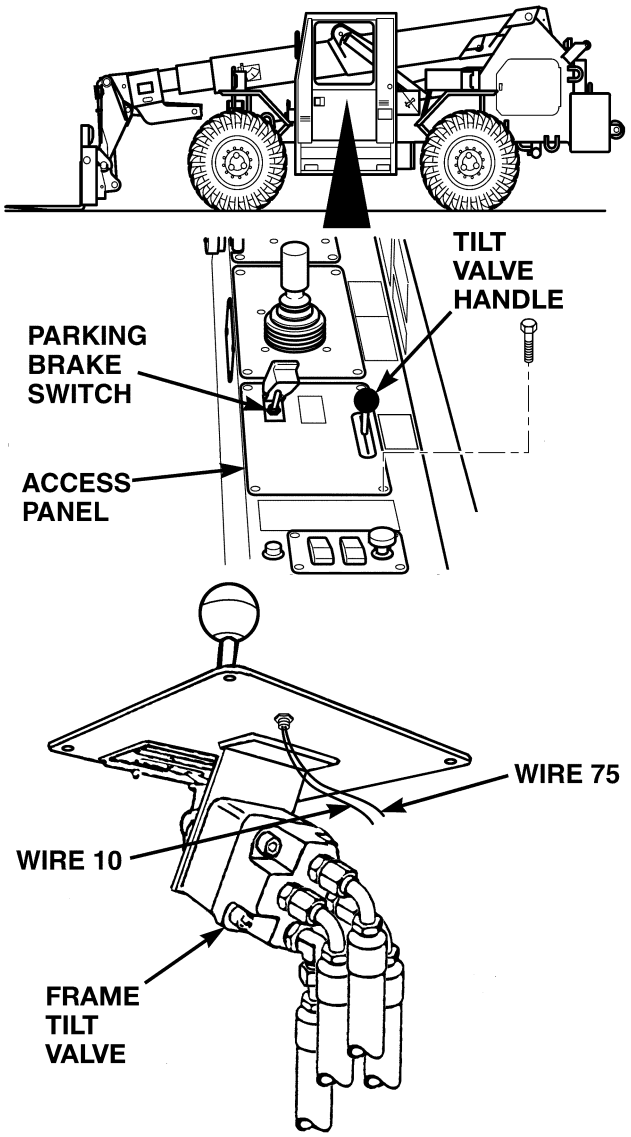
Is voltage present at parking brake switch where wire 10 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 10 is faulty.

NO → Repair wire 10 (Para 8-48).

YES

VOLTAGE TEST
(1) Remove screws and console access panel to access switch. (2) Set multimeter to volts dc. (3) Connect multimeter positive lead to wire 10 where wire 10 connects to parking brake switch. (4) Connect multimeter negative lead to known good ground. (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Turn engine start switch to ON position, BUT DO NOT START ENGINE, (TM 10-3930-673-10). (a) If 24 vdc is present, go to Step 4 of this fault. (b) If 24 vdc is not present, repair wire 10 (Para 8-48). (7) Turn engine start switch to OFF position (TM 10-3930-673-10). (8) Disconnect negative battery cable from negative side of battery (Para 8-42).



43. PARKING BRAKE SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Battery OK. Battery cable OK. Run relay K1 OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK.
POSSIBLE PROBLEMS
Parking brake switch faulty. Wire 75 faulty. Parking brake solenoid faulty. Ground faulty.

4

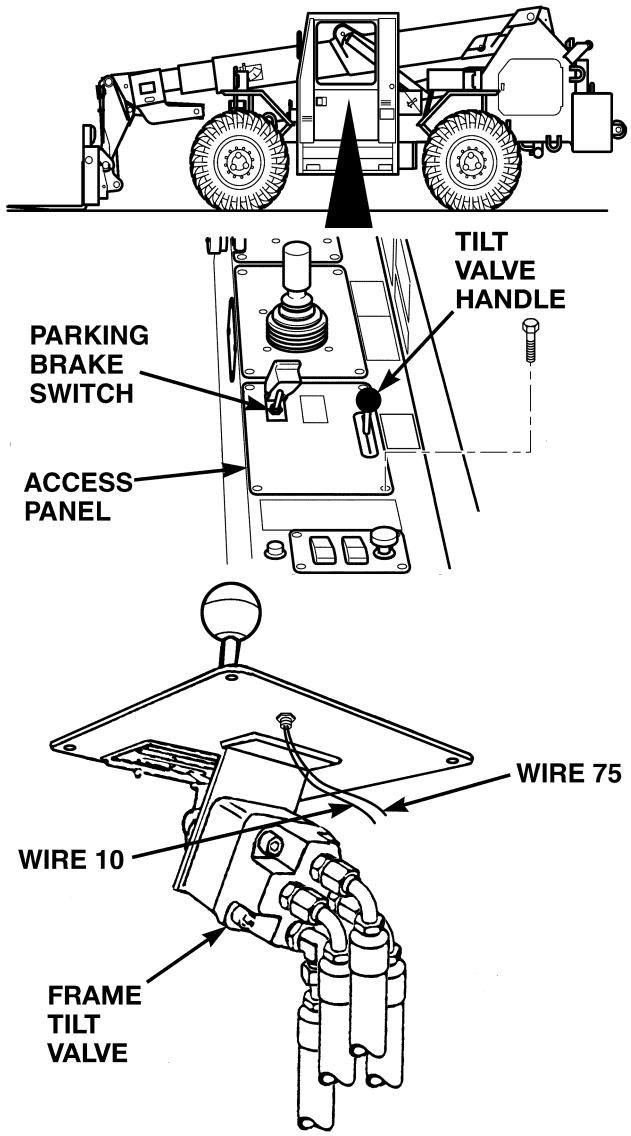
Is voltage present at parking brake switch where wire 75 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, parking brake switch is faulty.

NO → Replace parking brake switch (Para 8-7).

YES

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead to wire 75 where wire 75 connects to parking brake switch. (3) Connect multimeter negative lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE, (TM 10-3930-673-10). (6) Turn parking brake switch to ON position. (a) If 24 vdc is present, go to Step 5 of this fault. (b) If 24 vdc is not present, replace parking brake switch (Para 8-7). (7) Turn parking brake switch to OFF position. (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42). (10) Install console access panel and screws.



43. PARKING BRAKE SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Battery OK. Battery cable OK. Run relay K1 OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Parking brake switch OK.
POSSIBLE PROBLEMS
Wire 75 faulty. Parking brake solenoid faulty. Ground faulty.

5

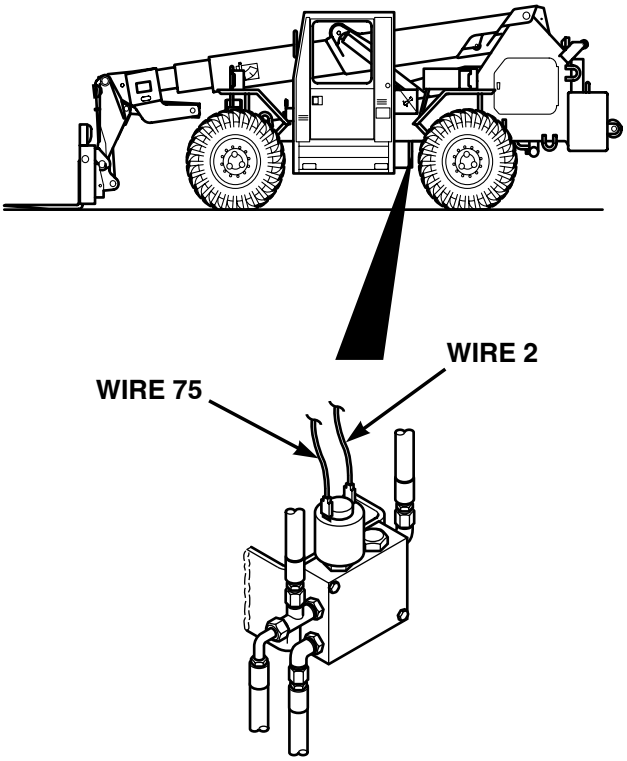
Is voltage present at parking brake solenoid where wire 75 connects?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If voltage is not present, wire 75 is faulty.

NO → Repair wire 75 (Para 8-48).

YES

VOLTAGE TEST
(1) Set multimeter to volts dc. (2) Connect multimeter positive lead to wire 75 where wire 75 connects to parking brake solenoid. (3) Connect multimeter negative lead to known good ground. (4) Connect negative battery cable to negative side of battery (Para 8-42). (5) Turn engine start switch to ON position, BUT DO NOT START ENGINE, (TM 10-3930-673-10). (6) Turn parking brake switch to ON position. (a) If 24 vdc is present, go to Step 6 of this fault. (b) If 24 vdc is not present, repair wire 75 (Para 8-48). (7) Turn parking brake switch to OFF position. (8) Turn engine start switch to OFF position (TM 10-3930-673-10). (9) Disconnect negative battery cable from negative side of battery (Para 8-42).



43. PARKING BRAKE SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Battery OK. Battery cable OK. Run relay K1 OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Parking brake switch OK. Wire 75 OK.
POSSIBLE PROBLEMS
Parking brake solenoid faulty. Ground faulty.

6

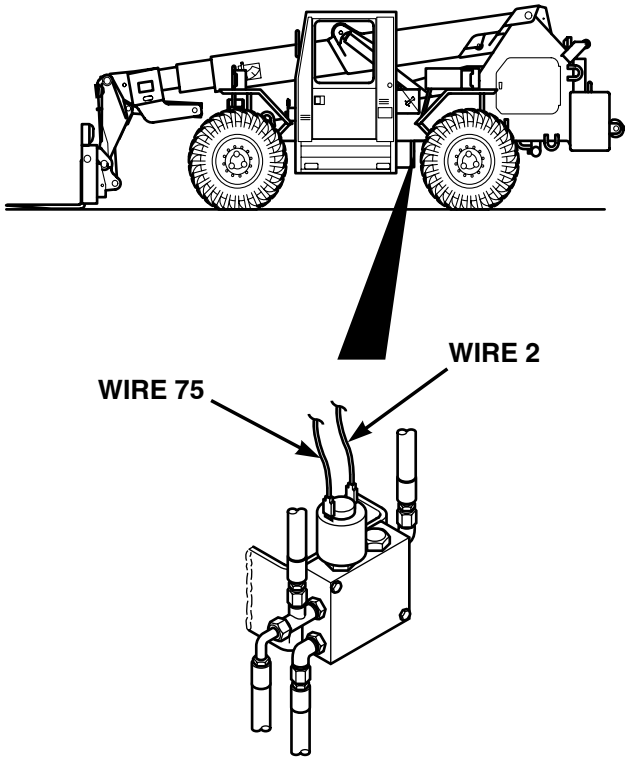
Is continuity present at parking brake solenoid between wire 75 and wire 2?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, parking brake solenoid is faulty.

NO → Replace parking brake solenoid/ valve (Para 12-4).

YES

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Connect multimeter positive lead to wire 75 where wire 75 connects to parking brake solenoid. (3) Connect multimeter negative lead to wire 2 where wire 2 connects to parking brake solenoid. (a) If continuity is present, go to Step 7 of this fault. (b) If continuity is not present, replace solenoid/valve (Para 12-4).



43. PARKING BRAKE SWITCH DOES NOT OPERATE (CONT).

KNOWN INFO
Battery OK. Battery cable OK. Run relay K1 OK. Wire 3 OK. Circuit breaker CB1 OK. Wire 10 OK. Parking brake switch OK. Wire 75 OK. Parking brake solenoid OK.
POSSIBLE PROBLEMS
Ground faulty.

7

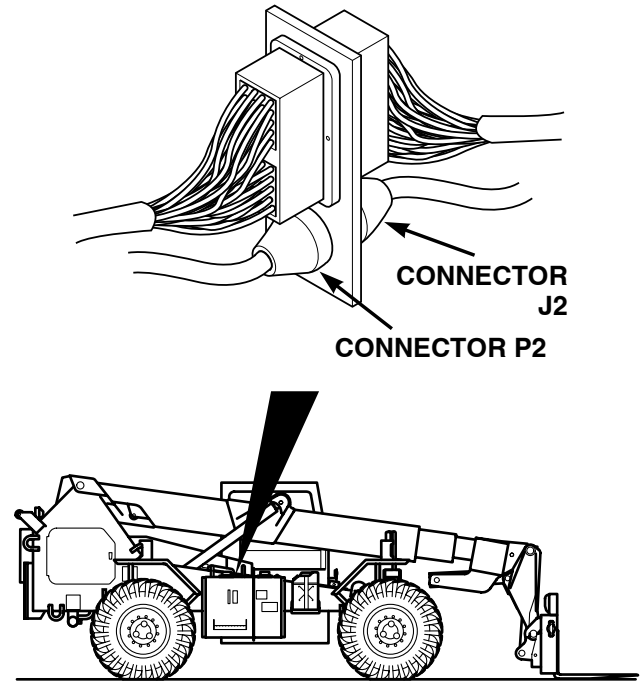
Is continuity present on wire 2 at connector J2-P2?

TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, ground is faulty.

NO → Replace wire 2 or connector J2-P2 (Para 8-48).

YES → Notify Direct Support about this fault.

CONTINUITY TEST
(1) Set multimeter to ohms. (2) Disconnect connector J2 from connector P2. (3) Connect multimeter positive lead to connector J2-2. (4) Connect multimeter negative lead to known good ground. (a) If continuity is present, notify Direct Support about this fault. (b) If continuity is not present, repair wire 2 or connector J2-P2 (Para 8-48). (5) Connect negative battery cable to negative side of battery (Para 8-42). (6) Install battery cover.



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2-16. MECHANICAL SYSTEM TROUBLESHOOTING

This paragraph covers mechanical system troubleshooting. The Mechanical System Fault Index, Table 2-7, lists faults for the mechanical system of the ATLAS. Refer to schematics found at the end of this volume when performing test and corrective actions.

Table 2-7. Mechanical System Fault Index

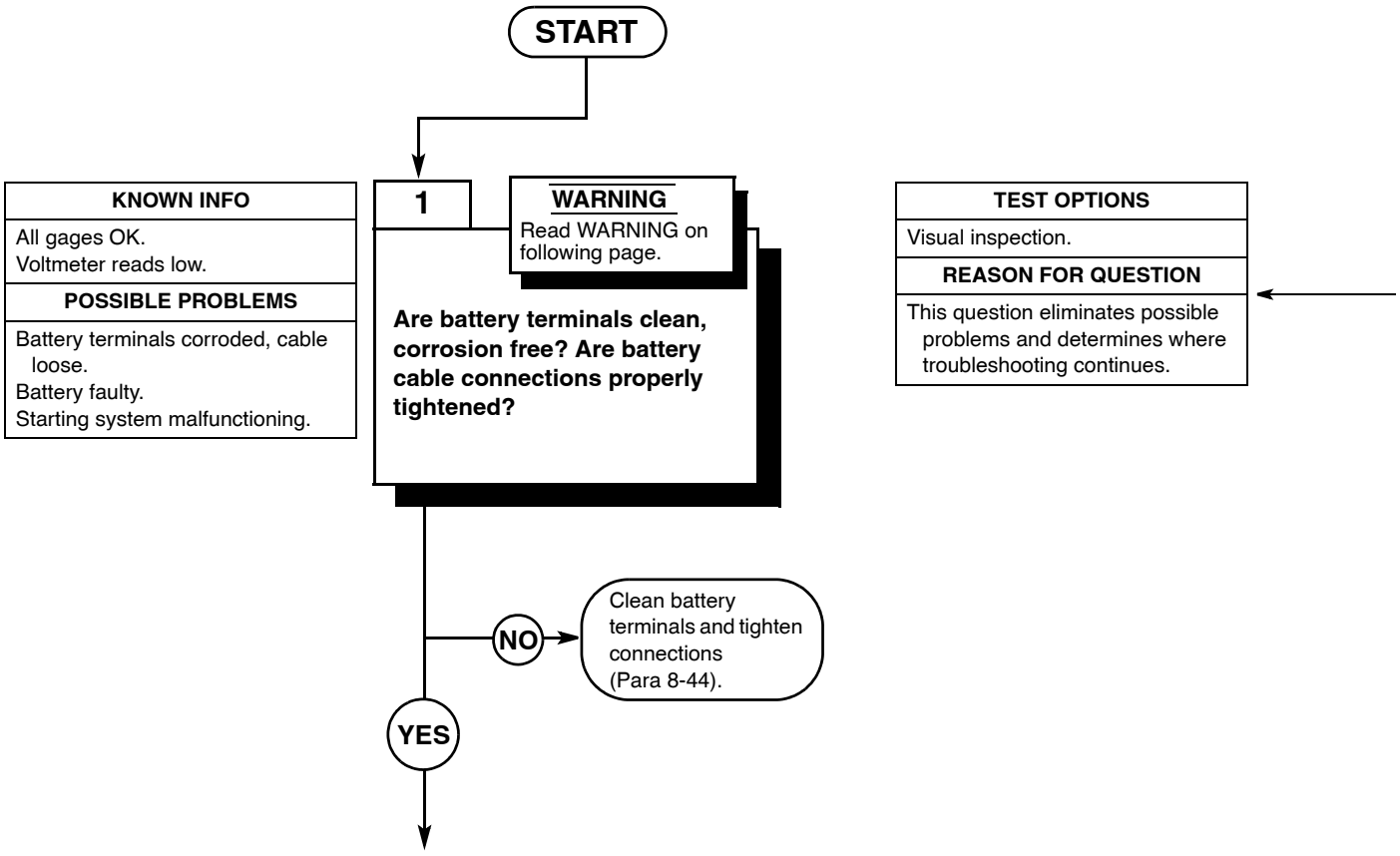
1. STARTER DOES NOT TURN ENGINE, TURNS ENGINE SLOWLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



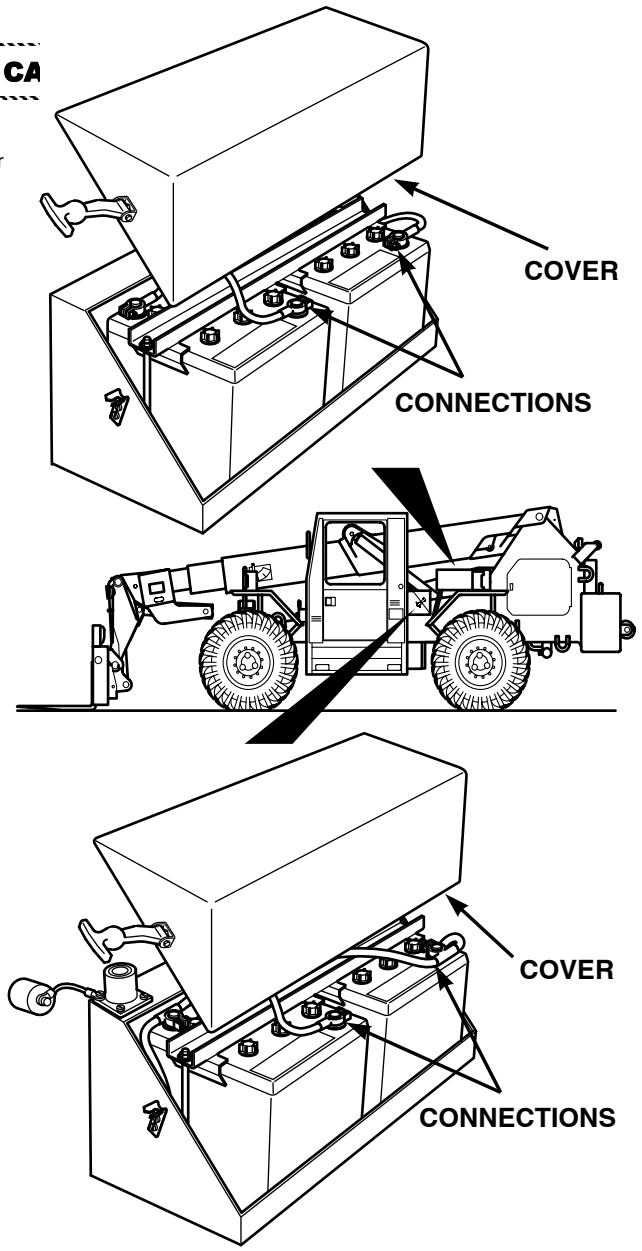
WARNING

- Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

CA

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

BATTERY TERMINALS AND CABLE CONNECTIONS VISUAL INSPECTION
Check battery terminals for corrosion, and check tightness of cable connections. (a) If battery terminals are clean, and cable connections properly tightened, go to Step 2 of this fault. (b) If terminals are corroded, clean terminals, If cable connections are loose, tighten connections. Restart vehicle.



1. STARTER DOES NOT TURN ENGINE, TURNS ENGINE SLOWLY (CONT).

KNOWN INFO
All gages OK. Voltmeter reads low. Battery terminals, cable connections OK.
POSSIBLE PROBLEMS
Battery faulty. Starting system malfunctioning.

2

WARNING
Read WARNING on following page.

Is battery voltage at 24 volts or higher?

TEST OPTIONS
STE/ICE test #67.
REASON FOR QUESTION
If battery voltage below required 24 volts, battery will not turn over engine.

NO → Service or replace battery as necessary (Para 8-42).

YES

KNOWN INFO
All gages OK. Voltmeter reads low. Battery terminals, cable connections OK. Battery OK.
POSSIBLE PROBLEMS
Starting system malfunctioning.

3

Does sequence of STE/ICE tests indicate proper starter system operation?

TEST OPTIONS
STE/ICE Tests #68, 69, 70, 71, 72.
REASON FOR QUESTION
If starting system malfunctioning, engine will not start.

NO → Replace faulty components as necessary (Para 8-42) and (Para 8-43).

YES

If fault not corrected, notify Direct Support.

WARNING

- Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.
- Battery acid is harmful to skin and eyes. Always wear eye protection when working with batteries.

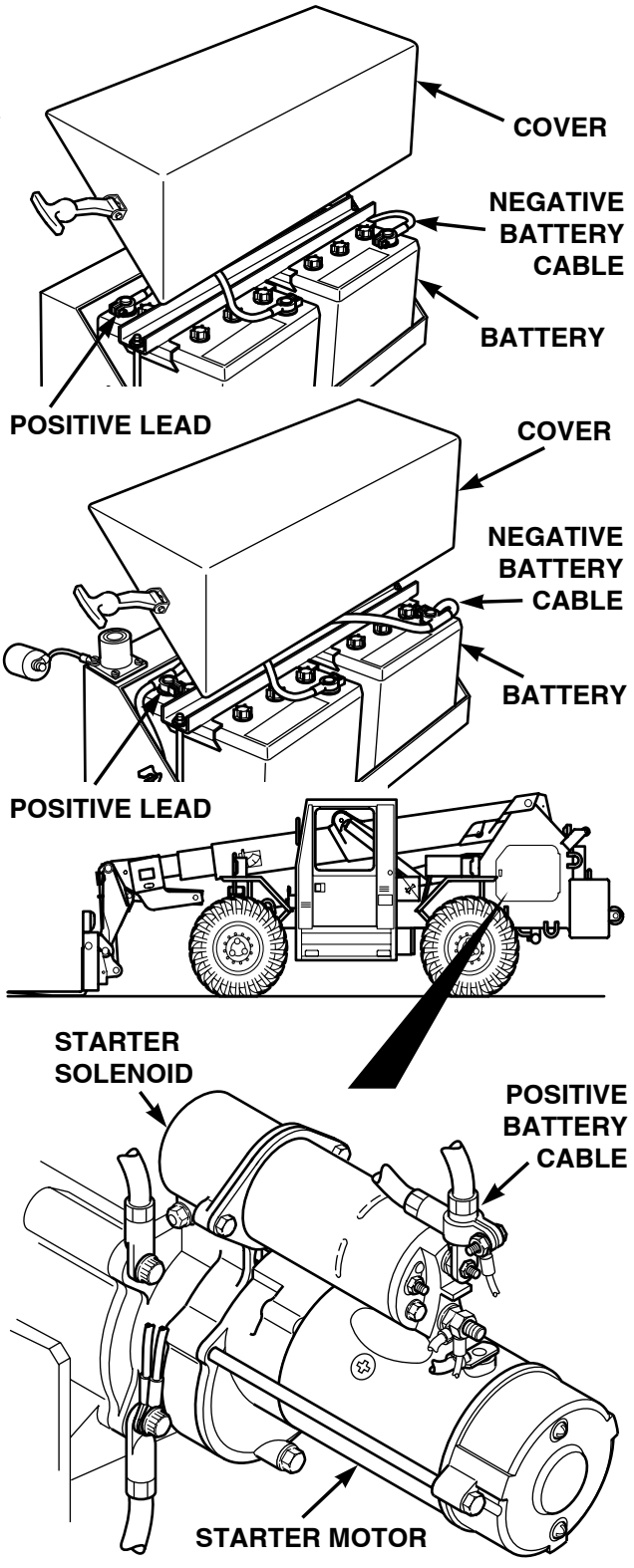
BATTERY VOLTAGE WITH STE/ICE

Use STE/ICE Test #67 to test voltage of battery. Or, connect multimeter to positive battery cable and known good ground to test voltage. Battery voltage should be 24 volts or higher.

(a) If voltage is 24 volts or higher, go to Step 3 of this fault.
(b) If voltage is below 24 volts, service or replace battery as necessary (Para 8-42). Restart vehicle.

STE/ICE TESTS ON STARTING SYSTEM

(1) Perform STE/ICE Test #68. Starter motor voltage should test between 18 and 27.5 volts. If voltage is not within range, replace positive cable (Para 8-42).
(2) Perform STE/ICE Test #69. Negative cable voltage drop should test between 0 and 3 volts. If voltage drop is greater, replace negative cable (Para 8-42).
(3) Perform STE/ICE Test #70. Solenoid voltage should test between 18 and 27.5 volts. If voltage is less, replace solenoid (Para 8-3).
(4) Perform STE/ICE Test #89. Solenoid voltage drop should test less than 0.3 volts. If voltage drop is greater, replace solenoid (Para 8-3).
(5) Perform STE/ICE Test #71. Starter current average should test between 0 and 250 amps. If current is greater, replace starter (Para 8-3).
(6) Perform STE/ICE Test #72. Starter current first peak should test between 300 and 1000 amps. If peak is not within range, service or replace battery (Para 8-42).



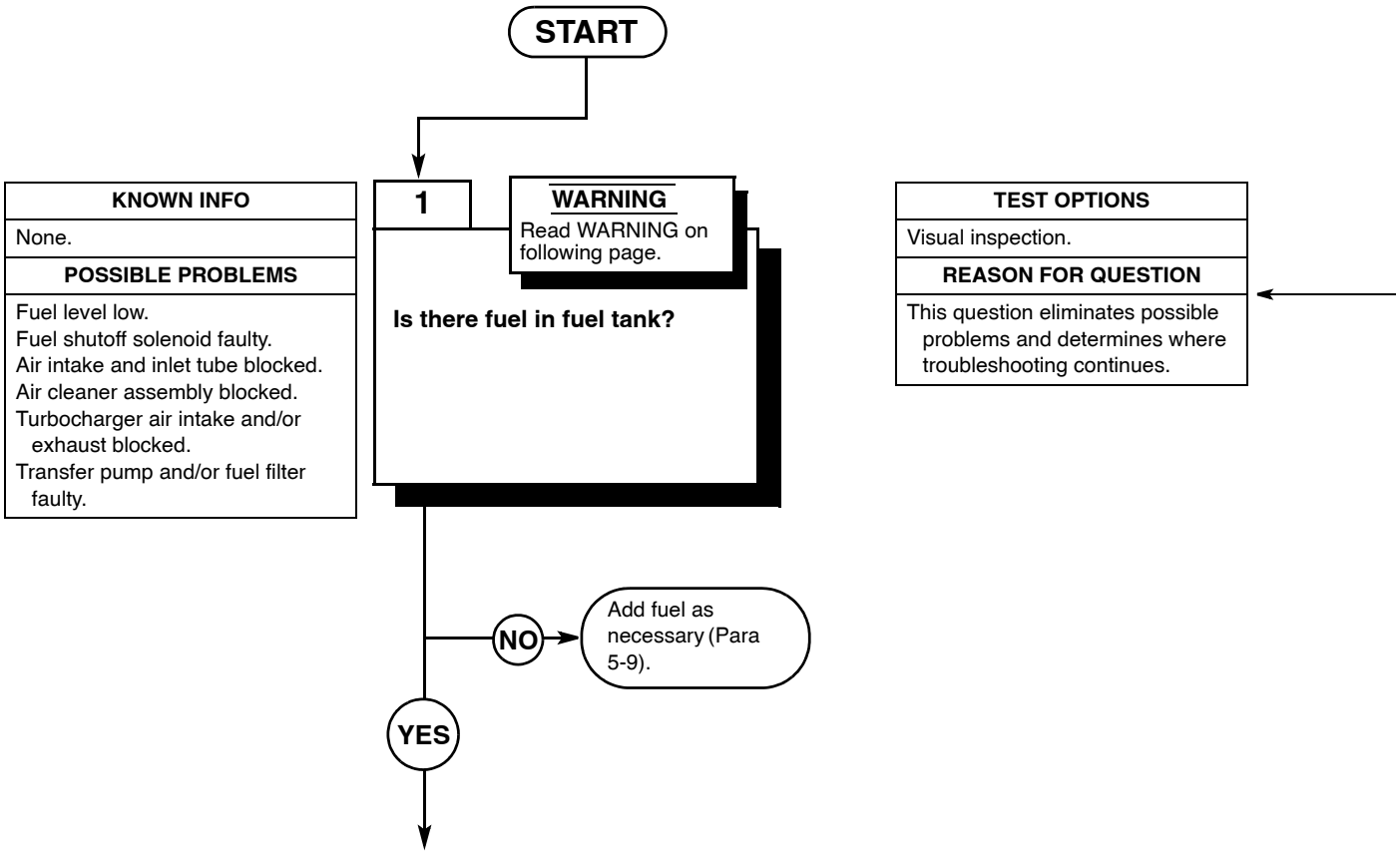
2. ENGINE CRANKS BUT DOES NOT START.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
Multimeter (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10
TM 9-4910-571-12&P



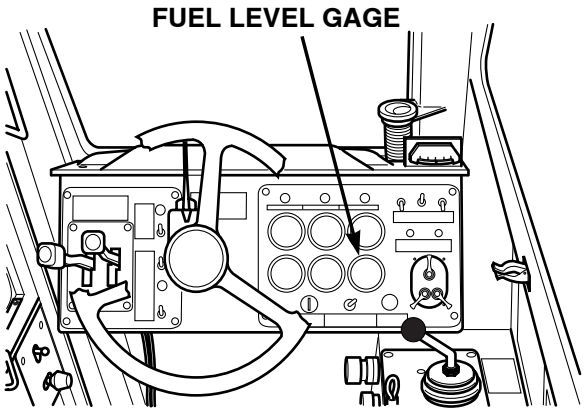
WARNING

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

ENGINE FUEL LEVEL VISUAL INSPECTION
(1) Check engine fuel level gage to determine if there is fuel in fuel tank. (2) Fuel level should be above gage E mark. (a) If fuel level is above the E mark, go to Step 2 of this fault. (b) If fuel level is near or at the E mark, add fuel as necessary (Para 5-9). Go to Step (3) below. (3) Start engine (TM 10-3930-673-10). If engine fails to start, go to Step 2 of this fault.



2. ENGINE CRANKS BUT DOES NOT START (CONT).

KNOWN INFO
Fuel level OK.
POSSIBLE PROBLEMS
Fuel shutoff solenoid faulty. Air intake and inlet tube blocked. Air cleaner assembly blocked. Turbocharger air intake and/or exhaust blocked. Transfer pump and/or fuel filter faulty.

2

Is resistance and current draw at fuel shutoff valve solenoid within acceptable limits?

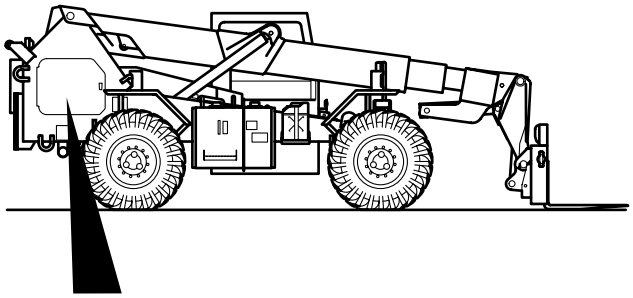
TEST OPTIONS
Resistance and draw test.
REASON FOR QUESTION
If resistance and current draw are low, fuel shutoff solenoid faulty.

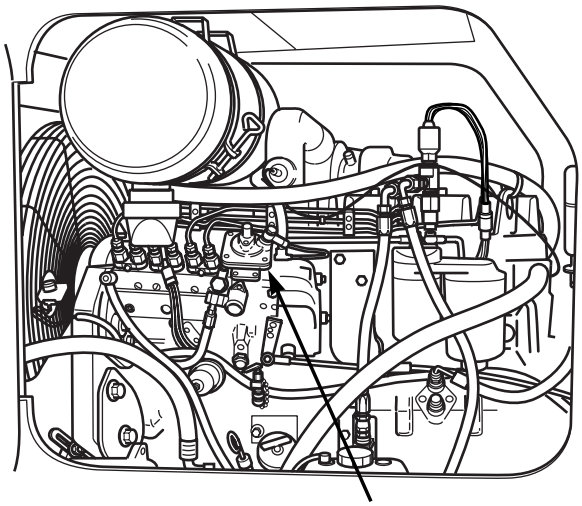
NO → Faulty solenoid, notify Direct Support.

YES

RESISTANCE AND CURRENT DRAW TESTS AT FUEL SHUTOFF VALVE SOLENOID

(1) Set multimeter to ohms to test resistance at fuel shutoff solenoid.
  (a) If resistance reads 29.5 ohms ±2.5, go to Step (2) below.
  (b) If resistance is not within acceptable limits, notify Direct Support.
(2) Set multimeter to amps to test current draw at fuel shutoff solenoid.
  (a) If current draw reads approximately 1 ampere, go to Step (3) below.
  (b) If reading is not correct, notify Direct Support.
(3) Start engine (TM 10-3930-673-10). If engine fails to start, go to Step 3 of this fault.





FUEL SHUTOFF SOLENOID

2. ENGINE CRANKS BUT DOES NOT START (CONT).

KNOWN INFO
Fuel level OK. Fuel shutoff solenoid OK.
POSSIBLE PROBLEMS
Air intake and inlet tube blocked. Air cleaner assembly blocked. Turbocharger air intake and/or exhaust blocked. Transfer pump and/or fuel filter faulty.

3

Are the air intake and inlet tube clear and clean?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air intake and inlet tube blocked, engine will not start.

NO → Clean air intake and inlet tube (Para 5-5).

YES

KNOWN INFO
Fuel level OK. Fuel shutoff solenoid OK. Air intake and inlet tube OK.
POSSIBLE PROBLEMS
Air cleaner assembly blocked. Turbocharger air intake and/or exhaust blocked. Transfer pump and/or fuel filter faulty.

4

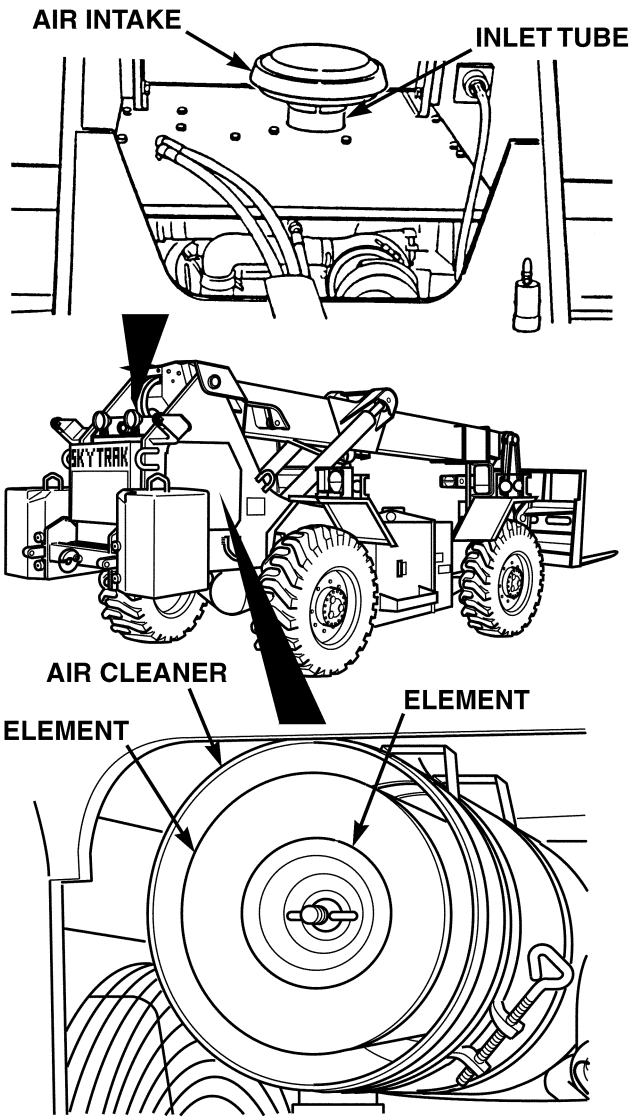
Is air cleaner clear and clean?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air cleaner is blocked, engine will not start.

NO → Clean and/or replace elements (Para 5-4).

YES

AIR INTAKE AND INLET TUBE VISUAL INSPECTION
(1) Visually inspect air intake and inlet tube for obstructions. (a) If air intake and inlet tube are clear and clean, go to Step 4 of this fault. (b) If air intake and tube are blocked, clean air intake and tube (Para 5-5). Go to Step (2) below. (2) Start engine (TM 10-3930-673-10). If engine fails to start, go to Step 4 of this fault.



AIR CLEANER ASSEMBLY VISUAL INSPECTION
(1) Remove air cleaner and elements (Para 5-4). (2) Visually inspect air cleaner elements for obstructions. (a) If elements are clear and clean, go to Step 5 of this fault. (b) If elements and assembly are dirty and/or blocked, clean and/or replace elements (Para 5-4). Go to Step (3) below. (3) Start engine (TM 10-3930-673-10). If engine fails to start, go to Step 5 of this fault.

2. ENGINE CRANKS BUT DOES NOT START (CONT).

KNOWN INFO
Fuel level OK. Fuel shutoff solenoid OK. Air intake and inlet tube OK. Air cleaner assembly OK.
POSSIBLE PROBLEMS
Turbocharger air intake and/or exhaust blocked. Transfer pump and/or fuel filter faulty.

5

Are turbocharger air intake lines and engine exhaust free from obstructions?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If turbocharger air intake lines and exhaust are blocked, engine will not run smoothly.

NO → Replace blocked intake lines (Para 5-7) and/or exhaust (Para 6-3).

YES

KNOWN INFO
Fuel level OK. Fuel shutoff solenoid OK. Air intake and inlet tube OK. Air cleaner assembly OK. Turbocharger air intake and/or exhaust OK.
POSSIBLE PROBLEMS
Transfer pump and/or fuel filter faulty.

6

Does fuel flow freely through transfer pump and fuel filter?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transfer pump and/or fuel filter faulty, fuel will not flow freely.

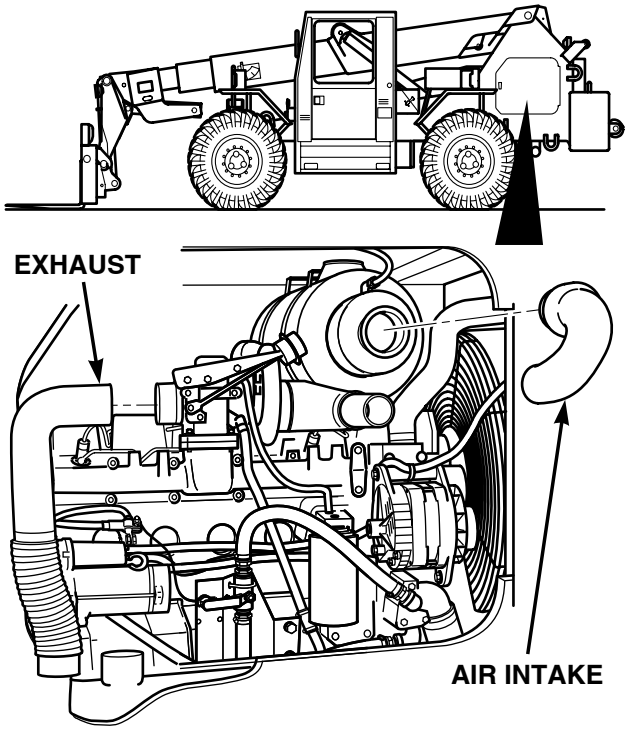
NO → Replace faulty transfer pump (Para 5-3) and/or filter elements (Para 5-15).

YES

If fault not corrected, notify Direct Support.

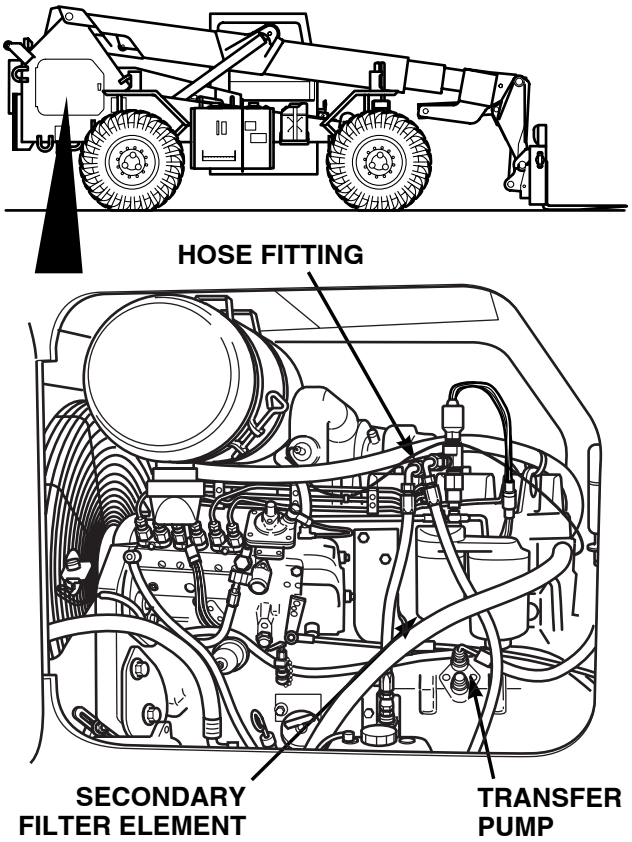
TURBOCHARGER AIR INTAKE LINES AND EXHAUST VISUAL INSPECTION

(1) Remove turbocharger air intake (Para 5-7) and exhaust (Para 6-3).
(2) Visually inspect intake and exhaust for obstructions.
  (a) If intake and exhaust are clear, go to Step 6 of this fault.
  (b) If intake and/or exhaust are blocked, replace intake (Para 5-7) and/or exhaust (Para 6-3). Go to Step (3) below.
(3) Start engine (TM 10-3930-673-10). If engine fails to start, go to Step 6 of this fault.



FUEL FLOW THROUGH FILTER VISUAL INSPECTION

(1) Loosen hose fitting at top of secondary filter element (Para 5-15).
(2) Crank engine for thirty seconds.
  (a) If fuel flows freely from fitting, transfer pump and fuel filter OK.
  (b) If fuel does not flow freely, replace transfer pump (Para 5-3) and/or filter elements (Para 5-15). Go to Step (3) below.
(3) Start engine (TM 10-3930-673-10). If engine fails to start, notify Direct Support.



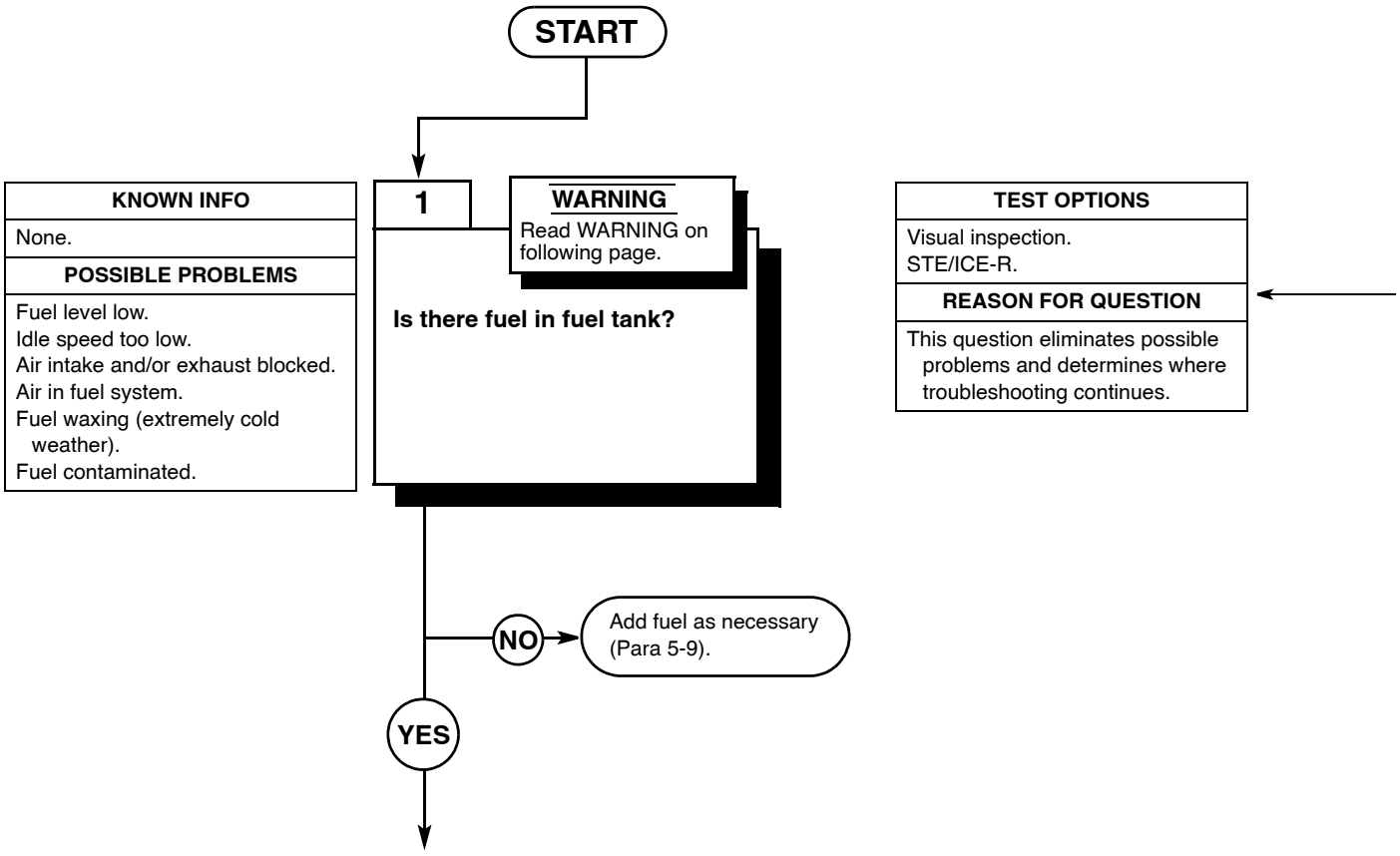
3. ENGINE STARTS BUT DOES NOT CONTINUE TO RUN.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

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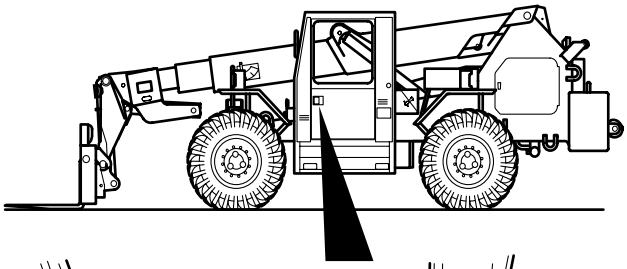
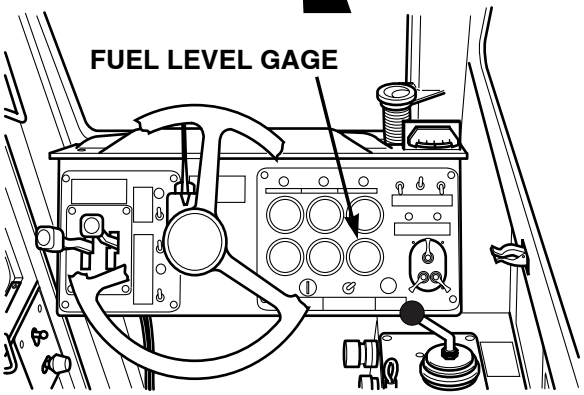
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

ENGINE FUEL LEVEL VISUAL INSPECTION
(1) Check engine fuel level gage to determine if there is fuel in fuel tank. (2) Fuel level should be above gage E mark. (a) If fuel level is above E mark, go to Step 2 of this fault. (b) If fuel level is near or at E mark, add fuel as necessary (Para 5-9).





3. ENGINE STARTS BUT DOES NOT CONTINUE TO RUN (CONT).

KNOWN INFO
Fuel level OK.
POSSIBLE PROBLEMS
Idle speed too low. Air intake and/or exhaust blocked. Air in fuel system. Fuel waxing (extremely cold weather). Fuel contaminated.

2

Is idle speed adjusted correctly for accessories and operating environment (normally: 850 to 950 RPM)?

TEST OPTIONS
STE/ICE-R.
REASON FOR QUESTION
If idle speed is too low, engine will not continue to run.

NO → Adjust idle speed as necessary (Para 5-20).

YES

KNOWN INFO
Fuel level OK. Idle speed OK.
POSSIBLE PROBLEMS
Air intake and/or exhaust blocked. Air in fuel system. Fuel waxing (extremely cold weather). Fuel contaminated.

3

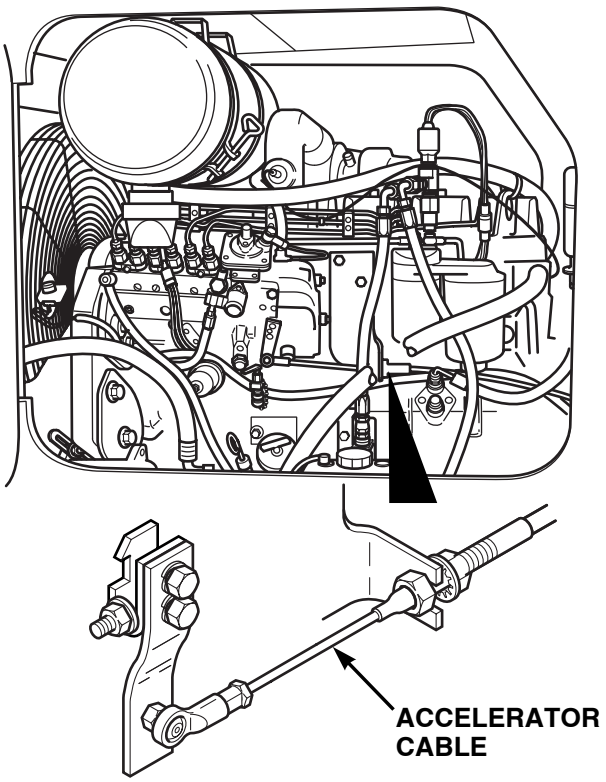
Are air intake and/or exhaust free from obstructions and/or restrictions?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air intake and/or exhaust blocked, engine will not continue to run.

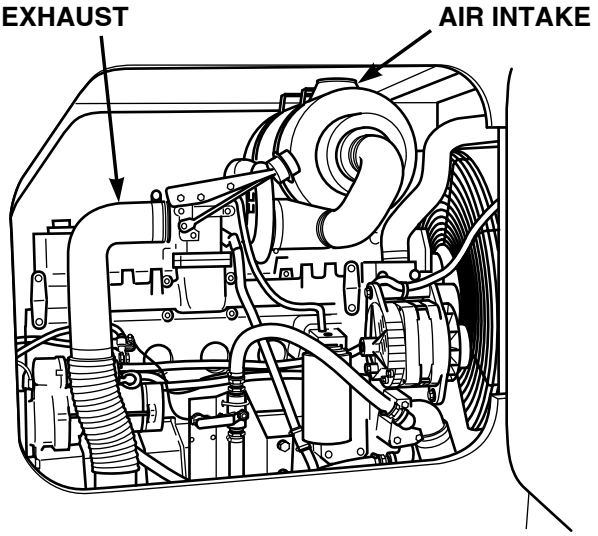
NO → Clean air intake and/or exhaust as necessary (Para 5-5, Para 5-4, and Para 6-3).

YES

IDLE SPEED STE/ICE-R RPM CHECK
Use STE/ICE to check engine RPM at idle (Para 5-20). (a) If idle RPM within 850 to 950 range, go to Step 3 of this fault. (b) If idle RPM is not within specified range, adjust idle speed by adjusting accelerator cable as necessary (Para 5-20).



AIR INTAKE AND EXHAUST VISUAL INSPECTION
Visually inspect air intake and exhaust for obstructions and/or restrictions. (a) If air intake and exhaust are clean, go to Step 4 of this fault. (b) If air intake and exhaust are blocked, shut down engine (TM 10-3930-673-10) and clean intake cap and exhaust pipe (Para 5-5, Para 5-4, and Para 6-3).



3. ENGINE STARTS BUT DOES NOT CONTINUE TO RUN (CONT).

KNOWN INFO
Fuel level OK. Idle speed OK. Air intake and exhaust OK.
POSSIBLE PROBLEMS
Air in fuel system. Fuel waxing (extremely cold weather). Fuel contaminated.

4

Is fuel system free from air in fuel lines?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air is in fuel system, engine will not run smoothly.

NO → Check fuel flow and bleed system as necessary (Para 5-11).

YES

KNOWN INFO
Fuel level OK. Idle speed OK. Air intake and exhaust OK. Fuel system OK.
POSSIBLE PROBLEMS
Fuel waxing (extremely cold weather). Fuel contaminated.

5

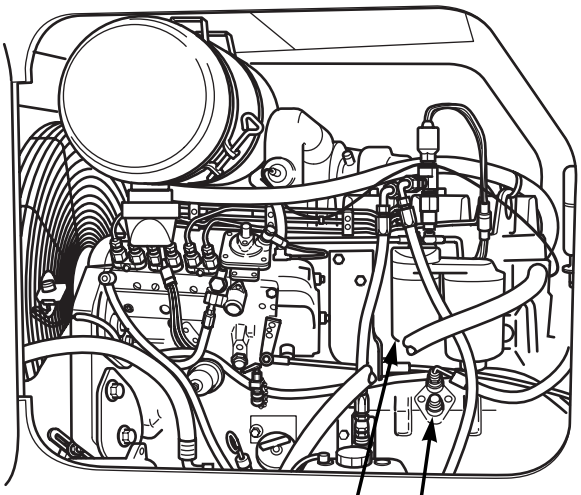
Is fuel climatized for operating environment?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fuel waxing occurs, engine will not continue to run.

NO → Inspect filter, clean system, replace fuel with climatized fuel (Para 5-15).

YES

FUEL FLOW THROUGH FILTER VISUAL INSPECTION
Check flow of fuel through fuel filter (Para 5-11). (a) If fuel flows freely without air, go to Step 5 of this fault. (b) If air in fuel lines, check for air leaks, shut down engine (TM 10-3930-673-10), and bleed system (Para 5-11).



FILTER AND FUEL VISUAL INSPECTION
Check fuel consistency in fuel filter (Para 5-15). (a) If fuel is thin and flows freely, go to Step 6 of this fault. (b) If fuel is thick and jelling, shut down engine (TM 10-3930-673-10), clean fuel system (Para 5-15) and replace fuel with climatized fuel (Para 5-9).

3. ENGINE STARTS BUT DOES NOT CONTINUE TO RUN (CONT).

KNOWN INFO
Fuel level OK. Idle speed OK. Air intake and exhaust OK. Fuel system OK. Fuel consistency OK.
POSSIBLE PROBLEMS
Fuel contaminated.

6

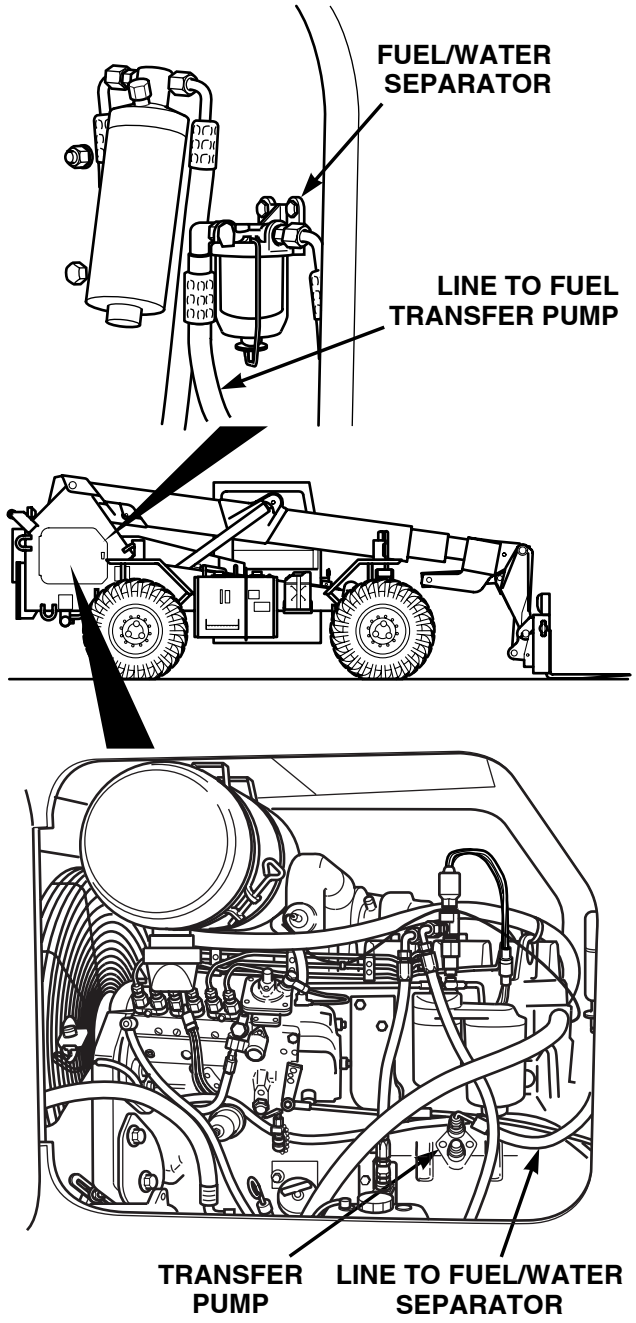
Is fuel clean and free from contaminants?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fuel contaminated, engine will jerk and/or stall.

NO → Drain and flush fuel tank, and replace fuel (Para 5-9).

YES → Refer to the Electrical Troubleshooting Section to solve possible electrical problems.

CONTAMINATED FUEL VISUAL INSPECTION
(1) Check for contaminated fuel by operating engine with known clean fuel from temporary supply tank. (a) Disconnect fuel line at fuel/water separator, where line leads to fuel transfer pump. (b) Place disconnected end of fuel line in temp tank of known clean fuel. (c) Start engine and run it for approximately 5 minutes to determine if engine performance improves with known clean fuel. (2) If fuel in fuel tank proves clean, refer to the Electrical Troubleshooting Section to continue. (3) If fuel in fuel tank is contaminated, shut down engine (TM 10-3930-673-10), drain and flush tank, and replace fuel with clean fuel (Para 5-9).



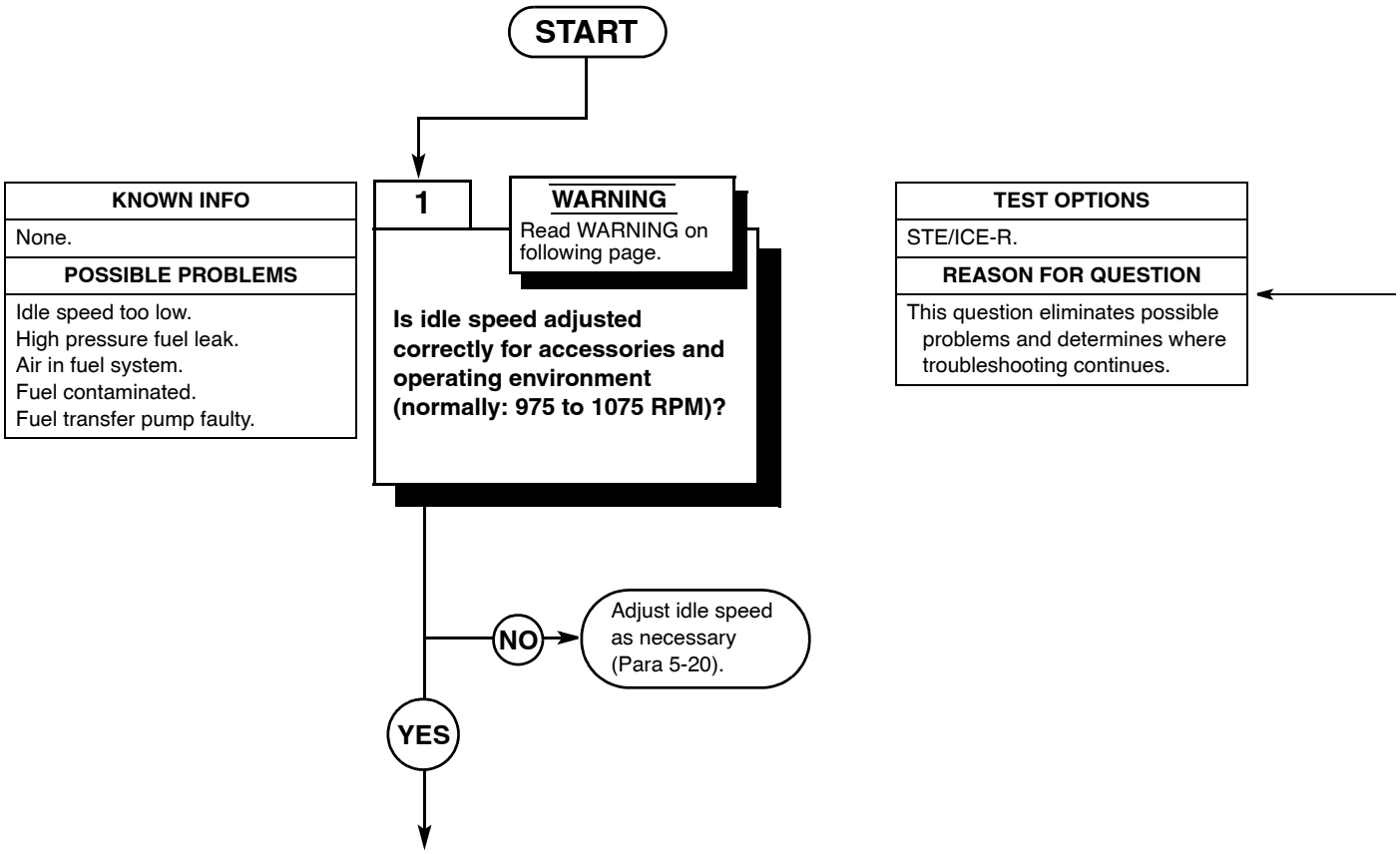
4. ENGINE STARTS BUT IDLES ROUGHLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10
TM 9-4910-571-12&P



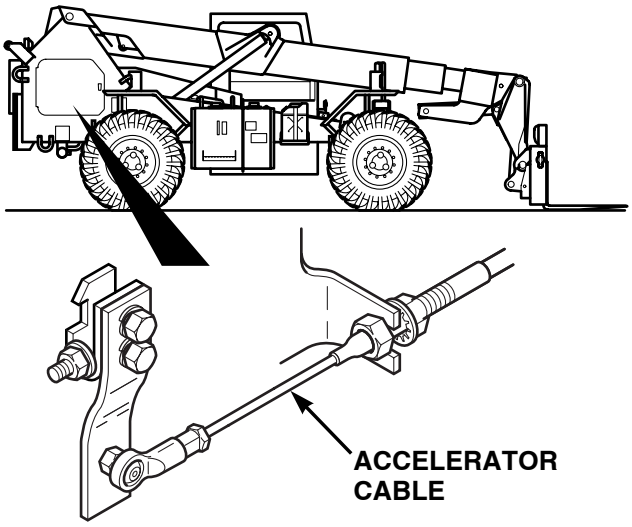
WARNING

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

IDLE SPEED STE/ICE-R RPM CHECK
Use STE/ICE to check engine RPM at idle (Para 5-20). (a) If idle RPM is within 975 to 1075 range, go to Step 2 of this fault. (b) If idle RPM is not within specified range, adjust idle speed by adjusting accelerator cable as necessary (Para 5-20).



4. ENGINE STARTS BUT IDLES ROUGHLY (CONT).

KNOWN INFO
Idle speed OK.
POSSIBLE PROBLEMS
High pressure fuel leak. Air in fuel system. Fuel contaminated. Fuel transfer pump faulty.

2

Are high pressure fuel lines, fittings, sealing washers, and/or valve seals free from leaks?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If high pressure fuel leaks, engine will not run smoothly.

NO → Replace lines, fittings, sealing washers, and/or valve seals as necessary (Para 5-11).

YES

KNOWN INFO
Idle speed OK. High pressure fuel lines OK.
POSSIBLE PROBLEMS
Air in fuel system. Fuel contaminated. Fuel transfer pump faulty.

3

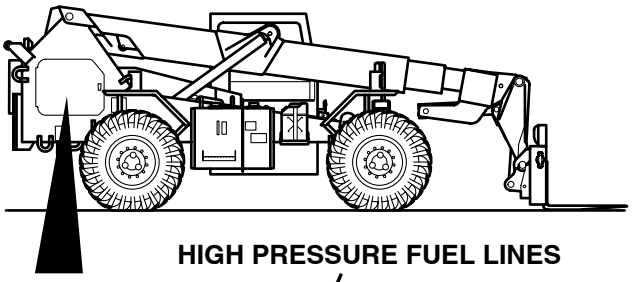
Is fuel system free from air in fuel lines?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air is in fuel system, engine will jerk and/or stall.

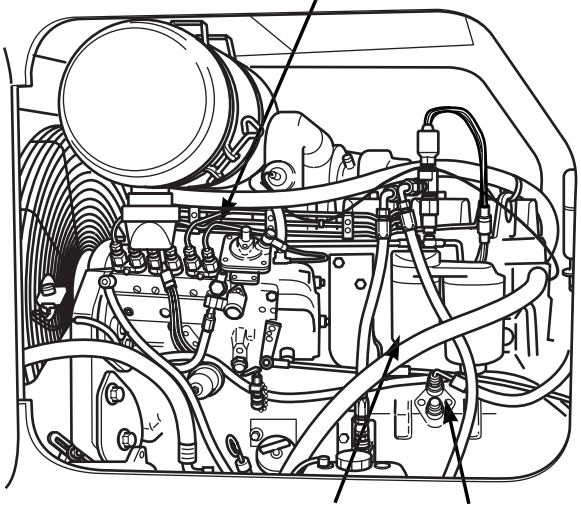
NO → Check fuel flow and bleed system as necessary (Para 5-11).

YES

HIGH PRESSURE FUEL LINES VISUAL INSPECTION
Visually inspect high pressure fuel lines and fittings for signs of leaks. (a) If lines, fittings, and/or seals free from leaks, go to Step 3 of this fault. (b) If lines, fittings, and/or seals show signs of leaks, shut down engine (TM 10-3930-673-10) and replace components as necessary (Para 5-11).



HIGH PRESSURE FUEL LINES



FUEL FILTER

TRANSFER PUMP

FUEL FLOW THROUGH FILTER VISUAL INSPECTION
Check flow of fuel through fuel filter (Para 5-11). (a) If fuel flows freely without air, go to Step 4 of this fault. (b) If air in fuel lines, check for air leaks, shut down engine (TM 10-3930-673-10) and bleed system (Para 5-11).

4. ENGINE STARTS BUT IDLES ROUGHLY (CONT).

KNOWN INFO
Idle speed OK. High pressure fuel lines OK. Fuel system OK.
POSSIBLE PROBLEMS
Fuel contaminated. Fuel transfer pump faulty.

4

Is fuel clean and free from contaminants?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fuel contaminated, engine will not run smoothly.

NO → Drain and flush fuel tank, and replace fuel (Para 5-9).

YES

KNOWN INFO
Idle speed OK. High pressure fuel lines OK. Fuel system OK. Fuel OK.
POSSIBLE PROBLEMS
Transfer pump and/or fuel filter faulty.

5

Does fuel flow freely through the transfer pump and fuel filter?

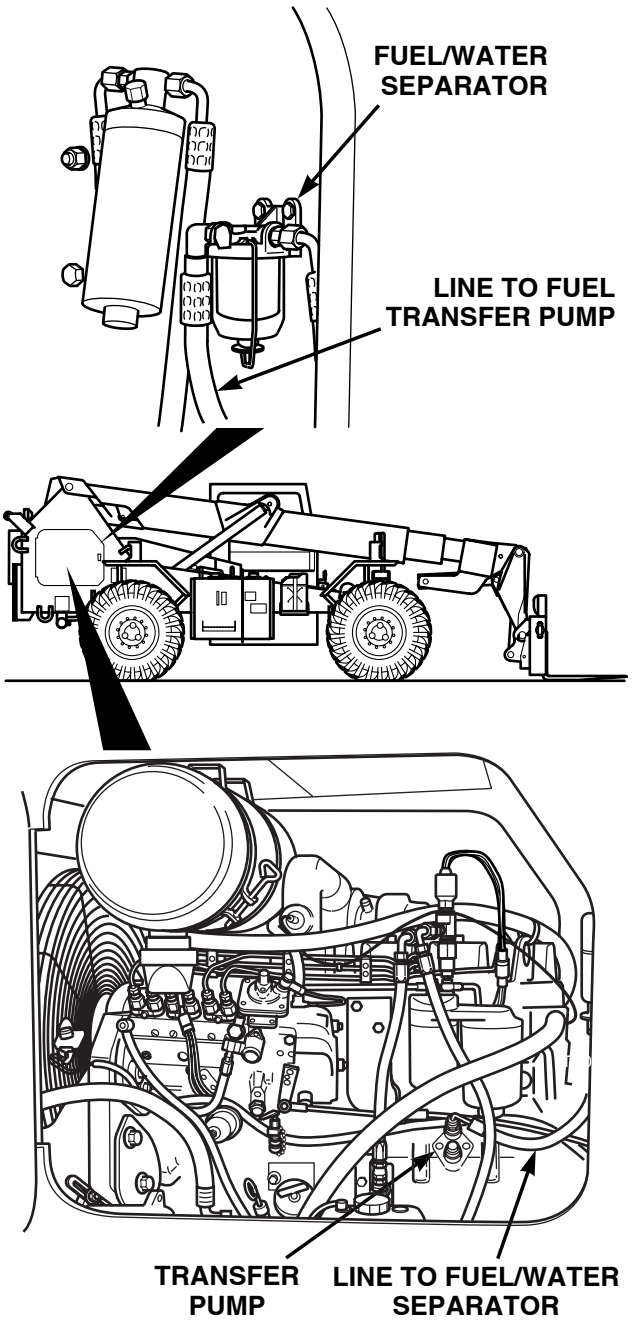
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transfer pump and/or fuel filter faulty, engine will not run smoothly.

NO → Replace faulty transfer pump (Para 5-3) and/or filter elements (Para 5-15).

YES → Refer to the Electrical Troubleshooting Section to solve possible electrical problems.

CONTAMINATED FUEL VISUAL INSPECTION
(1) Check for contaminated fuel by operating engine with known clean fuel from temporary supply tank. (a) Disconnect fuel line at fuel/water separator, where line leads to fuel transfer pump. (b) Place disconnected end of fuel line in temp tank of known clean fuel. (c) Start engine and run it for approximately 5 minutes to determine if engine performance improves with known clean fuel. (2) If fuel in fuel tank proves clean, go to Step 5 of this fault. (3) If fuel in fuel tank is contaminated, shut down engine (TM 10-3930-673-10), drain and flush tank, and replace fuel with clean fuel (Para 5-9).

FUEL FLOW THROUGH FILTER VISUAL INSPECTION
(1) Loosen hose fitting at top of secondary filter element (Para 5-15). (2) Crank engine for thirty seconds. (a) If fuel flows freely from fitting, transfer pump and fuel filter OK. (b) If fuel does not flow freely, replace transfer pump (Para 5-3) and/or filter elements (Para 5-15).



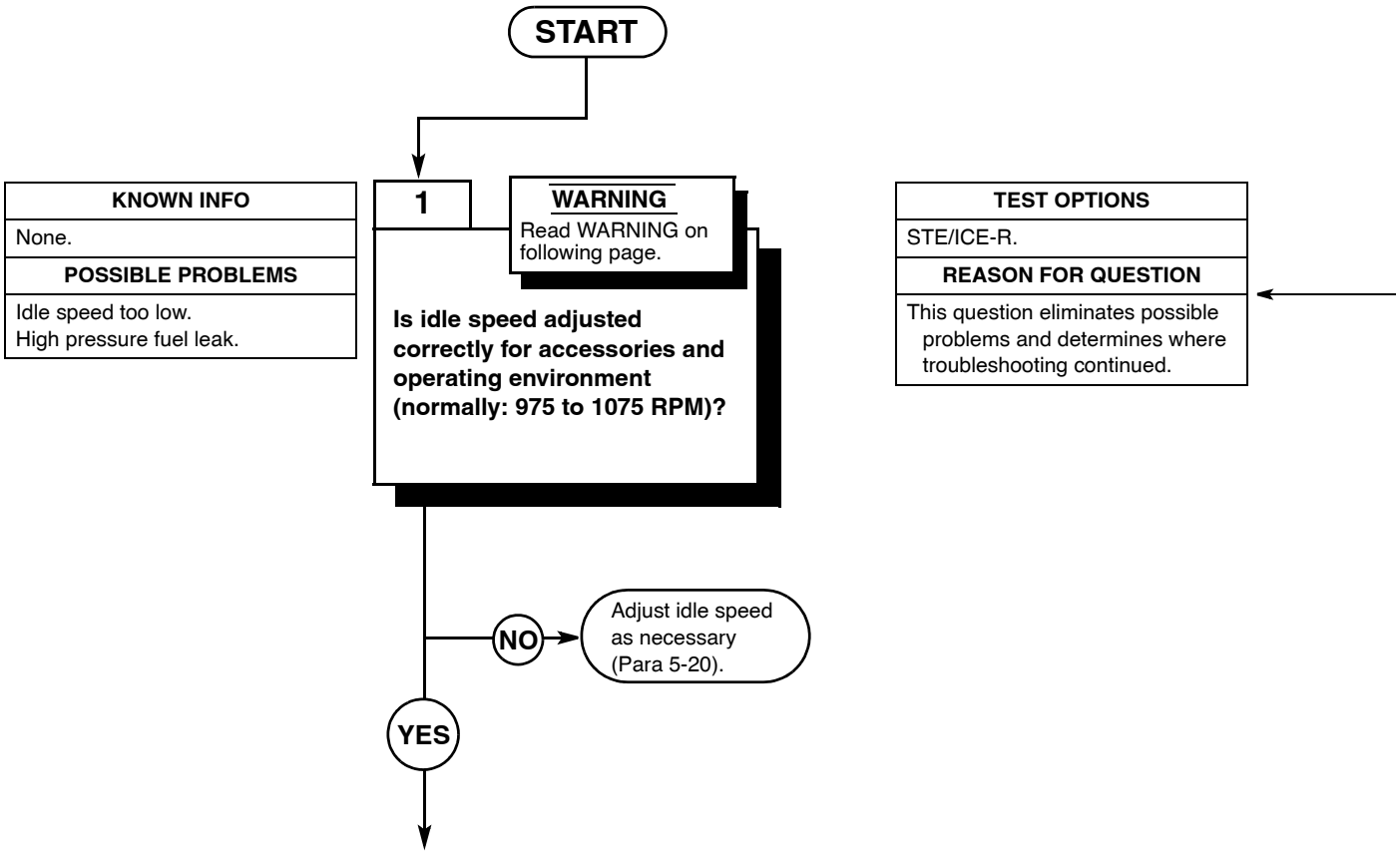
5. ENGINE SURGES, CHANGES SPEED.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10
TM 9-4910-571-12&P



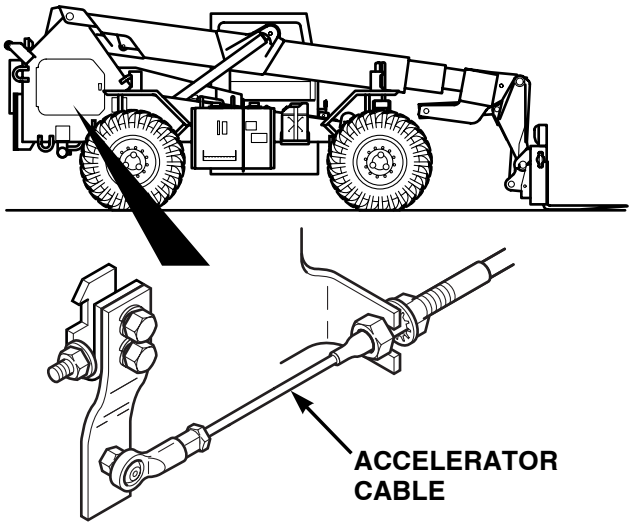
WARNING

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

IDLE SPEED STE/ICE-R RPM CHECK
Use STE/ICE to check engine RPM at idle (Para 5-20). (a) If idle RPM within 975 to 1075 range, go to Step 2 of this fault. (b) If idle RPM is not within specified range, adjust idle speed by adjusting accelerator cable as necessary (Para 5-20).



5. ENGINE SURGES, CHANGES SPEED (CONT).

KNOWN INFO
Idle speed OK.
POSSIBLE PROBLEMS
High pressure fuel leak.

2

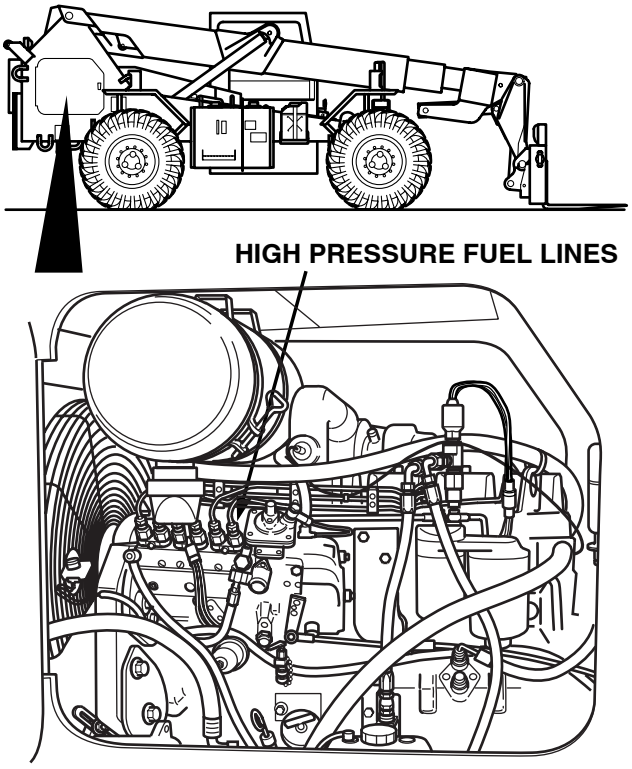
Are high pressure fuel lines, fittings, sealing washers, and/or valve seals free from leaks?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If high pressure fuel leaks, engine will jerk and/or stall.

NO → Replace lines, fittings, sealing washers, and/or valve seals as necessary (Para 5-11).

YES → Notify Direct Support about this fault.

HIGH PRESSURE FUEL LINES VISUAL INSPECTION
Visually inspect high pressure fuel lines and fittings for signs of leaks. (a) If lines, fittings, and/or seals free from leaks, notify Direct Support about this fault. (b) If lines, fittings, and/or seals show signs of leaks, shut down engine (TM 10-3930-673-10) and replace components as necessary (Para 5-11).



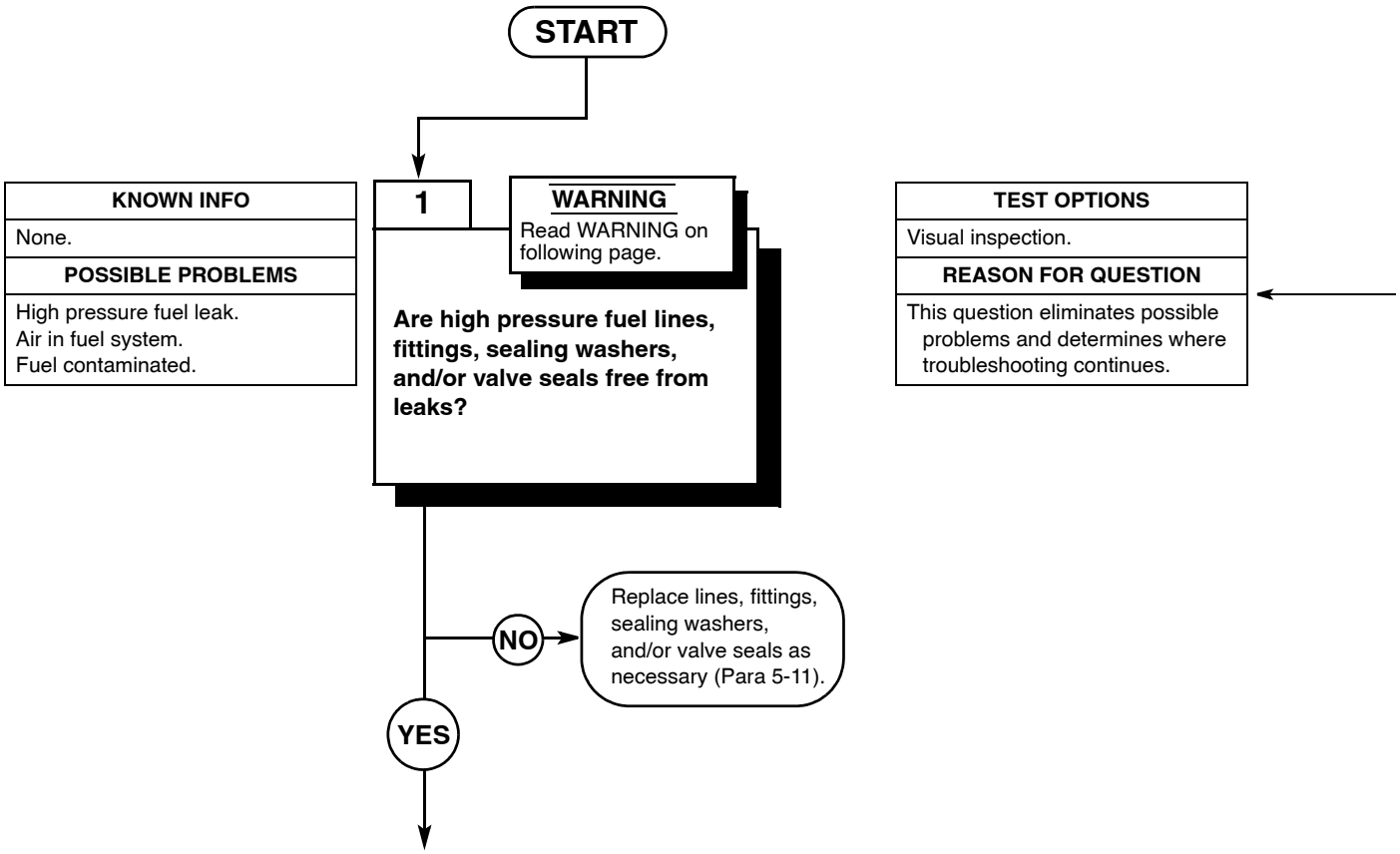
6. ENGINE RUNS ROUGHLY, MISFIRES.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



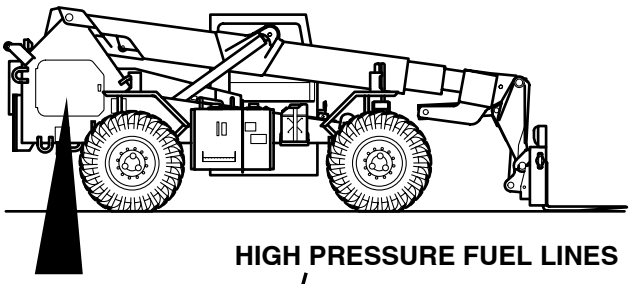
WARNING

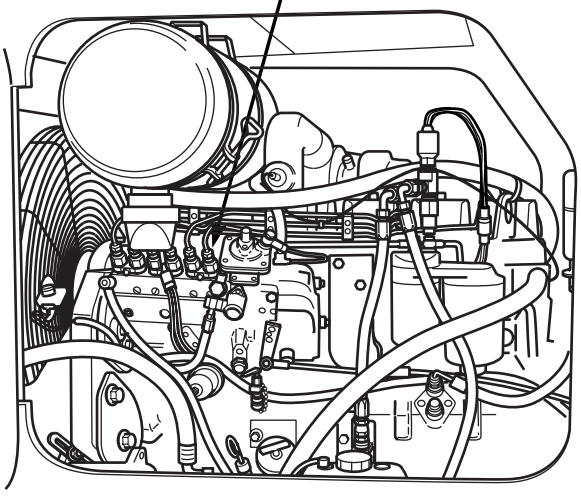
- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

HIGH PRESSURE FUEL LINES VISUAL INSPECTION
Visually inspect high pressure fuel lines and fittings for signs of leaks. (a) If lines, fittings, and/or seals free from leaks, go to Step 2 of this fault. (b) If lines, fittings, and/or seals show signs of leaks, shut down engine (TM 10-3930-673-10) and replace components as necessary (Para 5-11).





6. ENGINE RUNS ROUGHLY, MISFIRES (CONT).

KNOWN INFO
High pressure fuel lines OK.
POSSIBLE PROBLEMS
Air in fuel system. Fuel contaminated.

2

Is fuel system free from air in fuel lines?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air is in fuel system, engine will not run smoothly.

NO → Check fuel flow and bleed system as necessary (Para 5-11).

YES

KNOWN INFO
High pressure fuel lines OK. Fuel system OK.
POSSIBLE PROBLEMS
Fuel contaminated.

3

Is fuel clean and free from contaminants?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fuel contaminated, engine will jerk and/or stall.

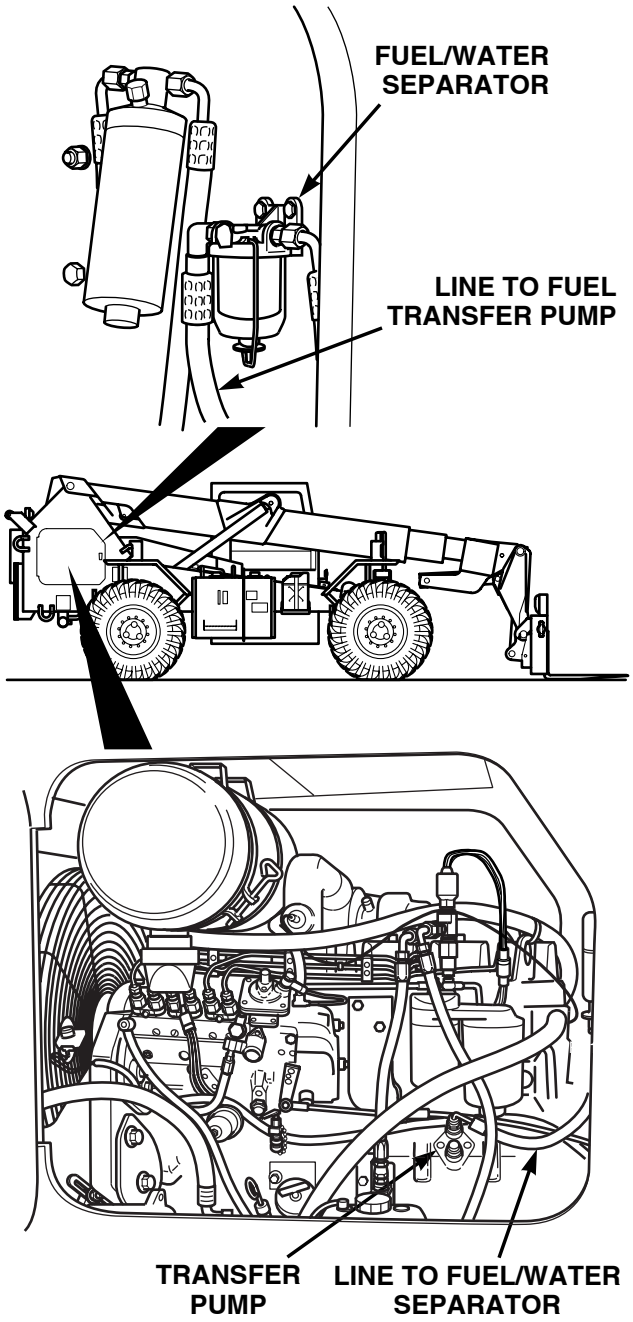
NO → Drain and flush fuel tank and replace fuel (Para 5-9).

YES

Refer to the Electrical Troubleshooting Section to solve possible electrical problems.

FUEL FLOW THROUGH FILTER VISUAL INSPECTION
Check flow of fuel through fuel filter (Para 5-11). (a) If fuel flows freely without air, go to Step 3 of this fault. (b) If air in fuel lines, check for air leaks, shut down engine (TM 10-3930-673-10) and bleed system (Para 5-11).

CONTAMINATED FUEL VISUAL INSPECTION
(1) Check for contaminated fuel by operating engine with known clean fuel from temporary supply tank. (a) Disconnect fuel line at fuel/water separator, where line leads to fuel transfer pump. (b) Place disconnected end of fuel line in temp tank of known clean fuel. (c) Start engine and run it for approximately 5 minutes to determine if engine performance improves with known clean fuel. (2) If fuel in fuel tank proves clean, use as is. (3) If fuel in fuel tank is contaminated, shut down engine (TM 10-3930-673-10), drain and flush tank, and replace fuel with clean fuel (Para 5-9).



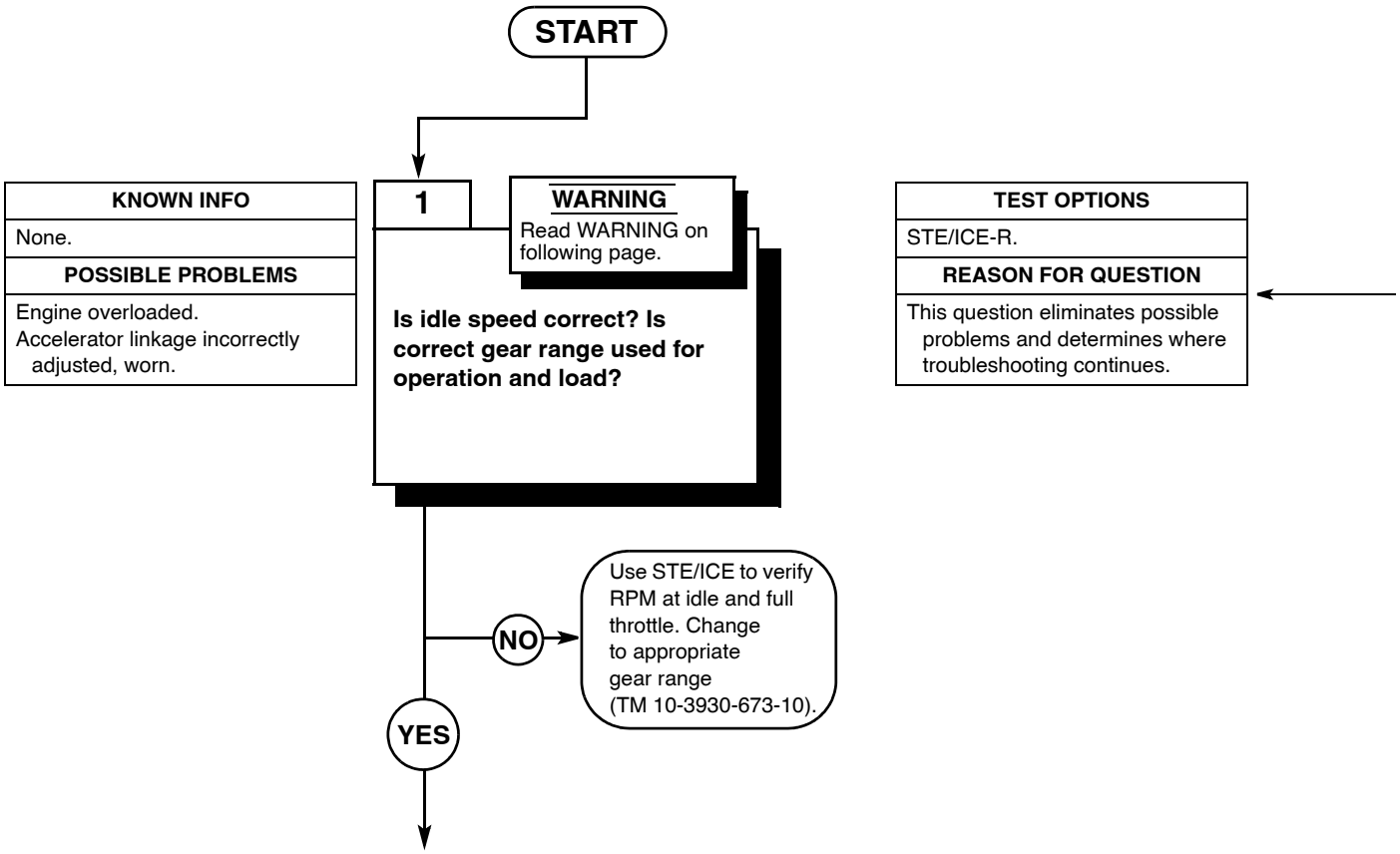
7. ENGINE RPM DOES NOT REACH RATED SPEED.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10
TM 9-4910-571-12&P



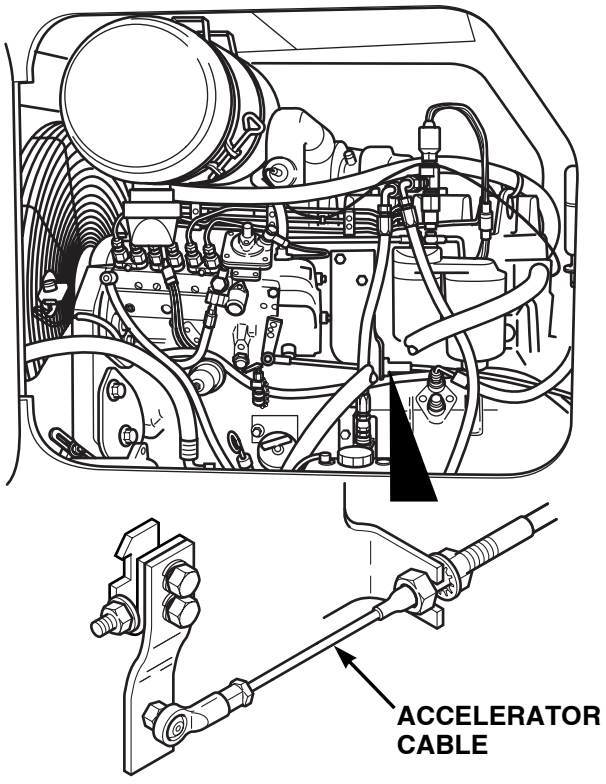
WARNING

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

IDLE AND GEAR RANGE STE/ICE-R RPM CHECK
Use STE/ICE test to verify RPM within 975 to 1075 at idle and 2650 to 2750 at full throttle. Check that gear range is correct for operation and load. (a) If RPM is within specified range and gear range is correct, go to Step 2 of this fault. (b) If RPM is not within specified range and/or gear range is incorrect, adjust as necessary (Para 5-20).



7. ENGINE RPM DOES NOT REACH RATED SPEED (CONT).

KNOWN INFO
Idle and gear range OK.
POSSIBLE PROBLEMS
Accelerator linkage incorrectly adjusted, worn.

2

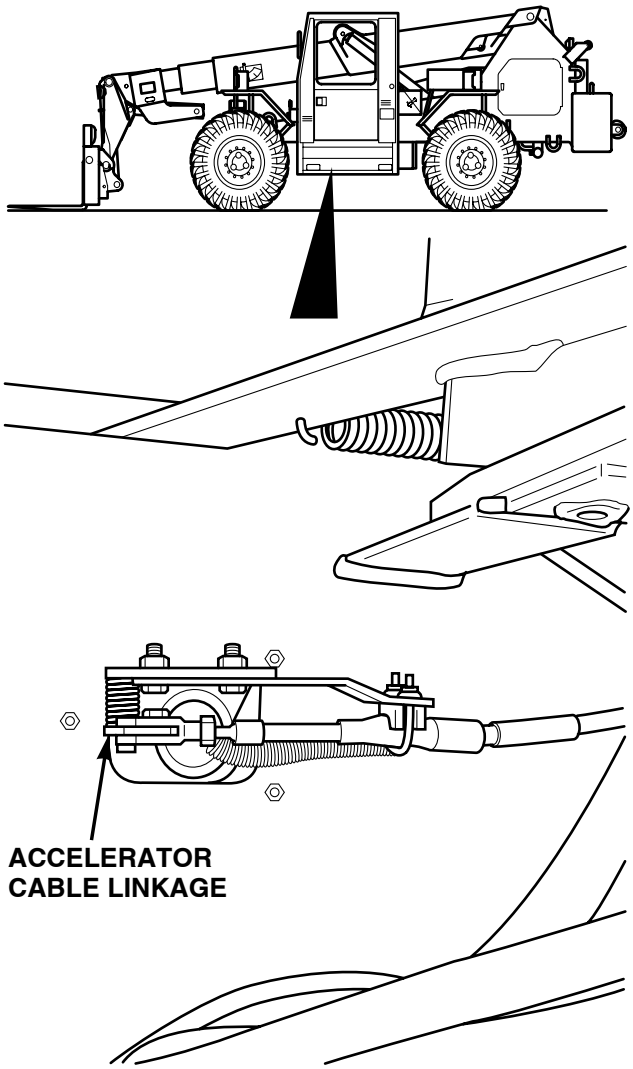
Is accelerator linkage adjusted correctly and free from signs of wear?

TEST OPTIONS
Visual inspection. STE/ICE (10).
REASON FOR QUESTION
If accelerator linkage incorrectly adjusted or worn, engine will not reach rated speed.

NO → Adjust or replace accelerator cable linkage as necessary (Para 5-20).

YES → Notify Direct Support of this fault.

ACCELERATOR CABLE LINKAGE VISUAL INSPECTION
Shut down engine and check accelerator cable linkage for adjustment and signs of wear (Para 5-20). (a) If linkage is adjusted correctly and is free from signs of wear, notify Direct Support. (b) If linkage is not adjusted correctly or worn, adjust or replace linkage as necessary (Para 5-20).



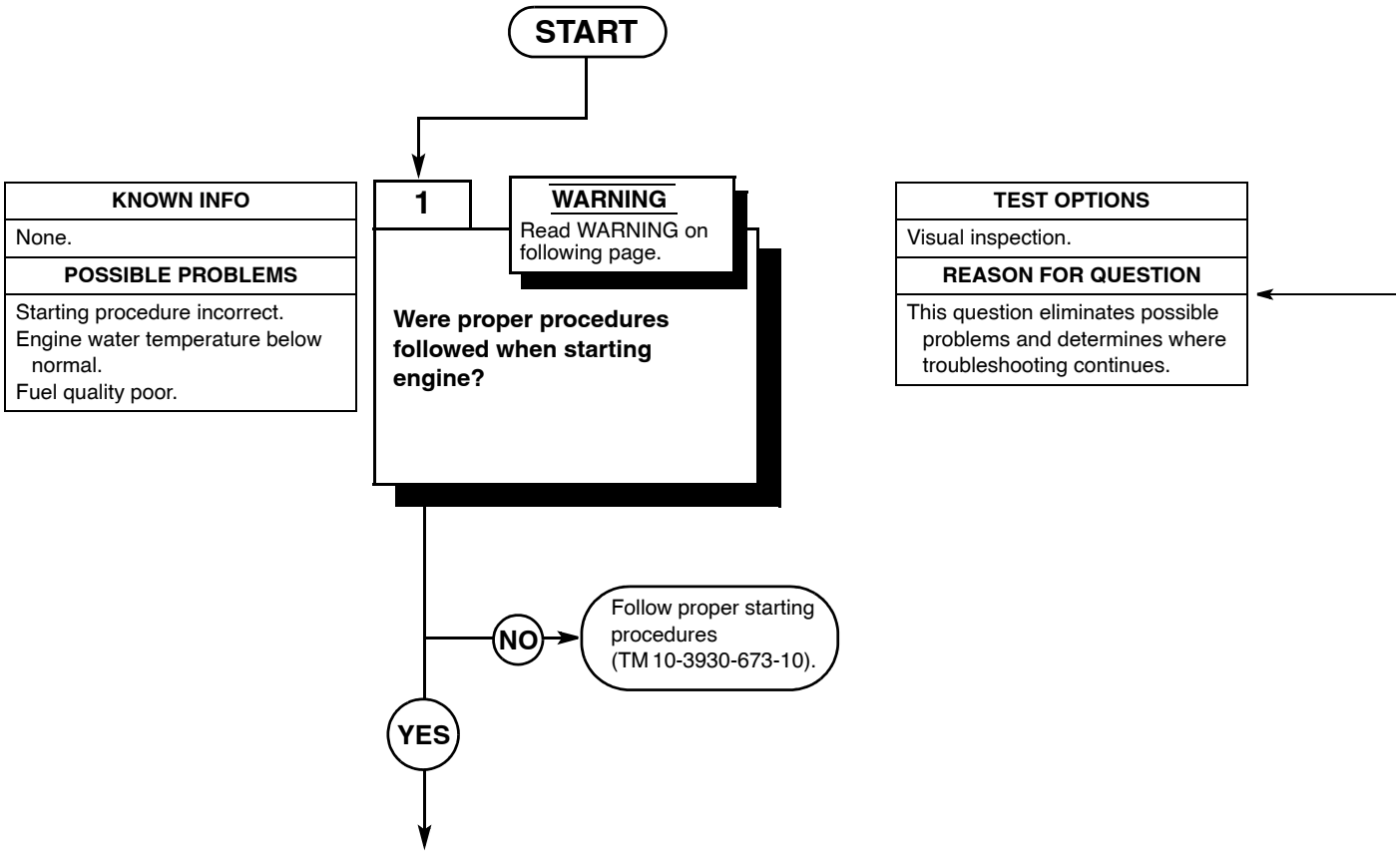
8. ENGINE PRODUCES EXCESSIVE WHITE EXHAUST SMOKE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM 9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

STARTING PROCEDURES VISUAL INSPECTION
Review proper procedures for starting engine. (a) If proper starting procedures were followed, go to Step 2 of this fault. (b) If proper procedures were not followed, follow proper procedures to restart engine (TM 10-3930-673-10).

8. ENGINE PRODUCES EXCESSIVE WHITE EXHAUST SMOKE (CONT).

KNOWN INFO
Starting procedure OK.
POSSIBLE PROBLEMS
Engine water temperature below normal. Fuel quality poor.

2

Is indicated engine water temperature within normal 180 to 210 degrees F operating range?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If engine water temperature is below normal, engine produces excessive white exhaust smoke.

NO → Refer to Fault 12, Engine water temperature below normal to correct this fault.

YES

KNOWN INFO
Starting procedures OK. Engine water temperature OK.
POSSIBLE PROBLEMS
Fuel quality poor.

3

Is fuel in fuel tank known to be of good quality?

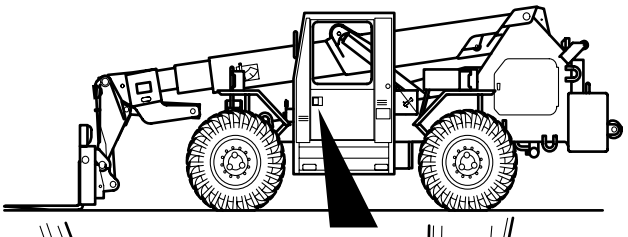
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fuel quality is poor, engine produces excessive white exhaust smoke.

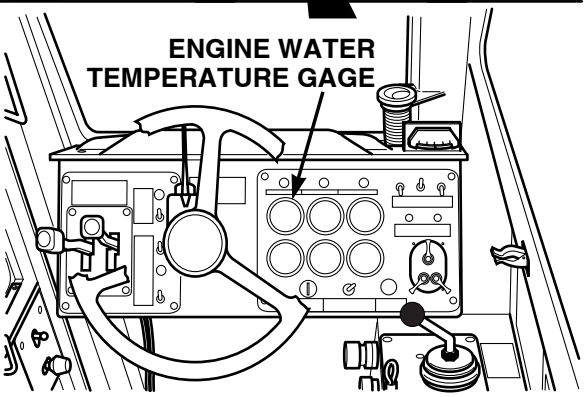
NO → Check quality of current fuel by operating engine from a temporary tank of known fuel quality.

YES → Notify Direct Support about this fault.

ENGINE WATER TEMPERATURE VISUAL INSPECTION

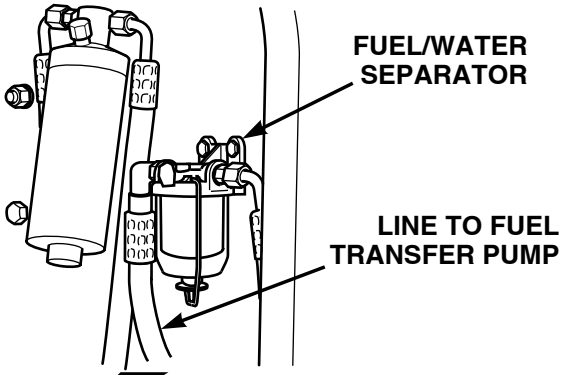
(1) Check indicated engine water temperature to determine if it is within normal 180 to 210 degrees F operating range.
   (a) If engine water temperature is within normal operating range, go to Step 3 of this fault.
   (b) If engine water temperature is not within normal operating range, refer to the Engine Water Temperature Below Normal Troubleshooting Section to correct this fault.
(2) Start and run engine (TM 10-3930-673-10). If engine water temperature within normal range, go to Step 3 of this fault.

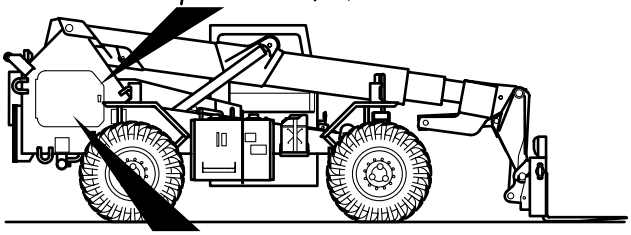


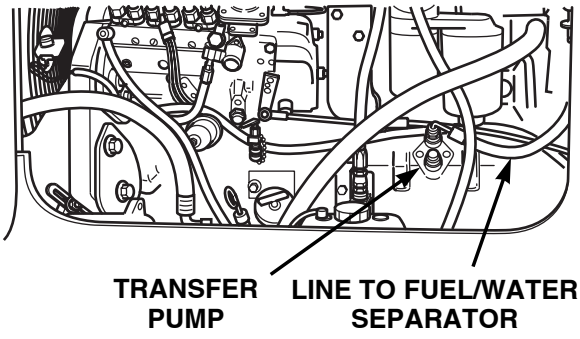


CURRENT FUEL QUALITY VISUAL INSPECTION

(1) Check quality of fuel in fuel tank by operating engine from a temporary tank of known fuel quality.
   (a) Disconnect fuel line at fuel/water separator, where line leads to fuel transfer pump.
   (b) Place disconnected end of fuel line in temp tank of known clean fuel.
   (c) Start engine and run it for approximately 5 minutes to determine if engine performance improves with known clean fuel.
(2) If fuel is of good quality, notify Direct Support about this fault.
(3) If fuel is of questionable quality, drain fuel tank and replace fuel (Para 5-9). Go to Step (4) below.
(4) Start and run engine. If engine exhaust smoke normal, fault is corrected. If not, notify Direct Support about this fault.







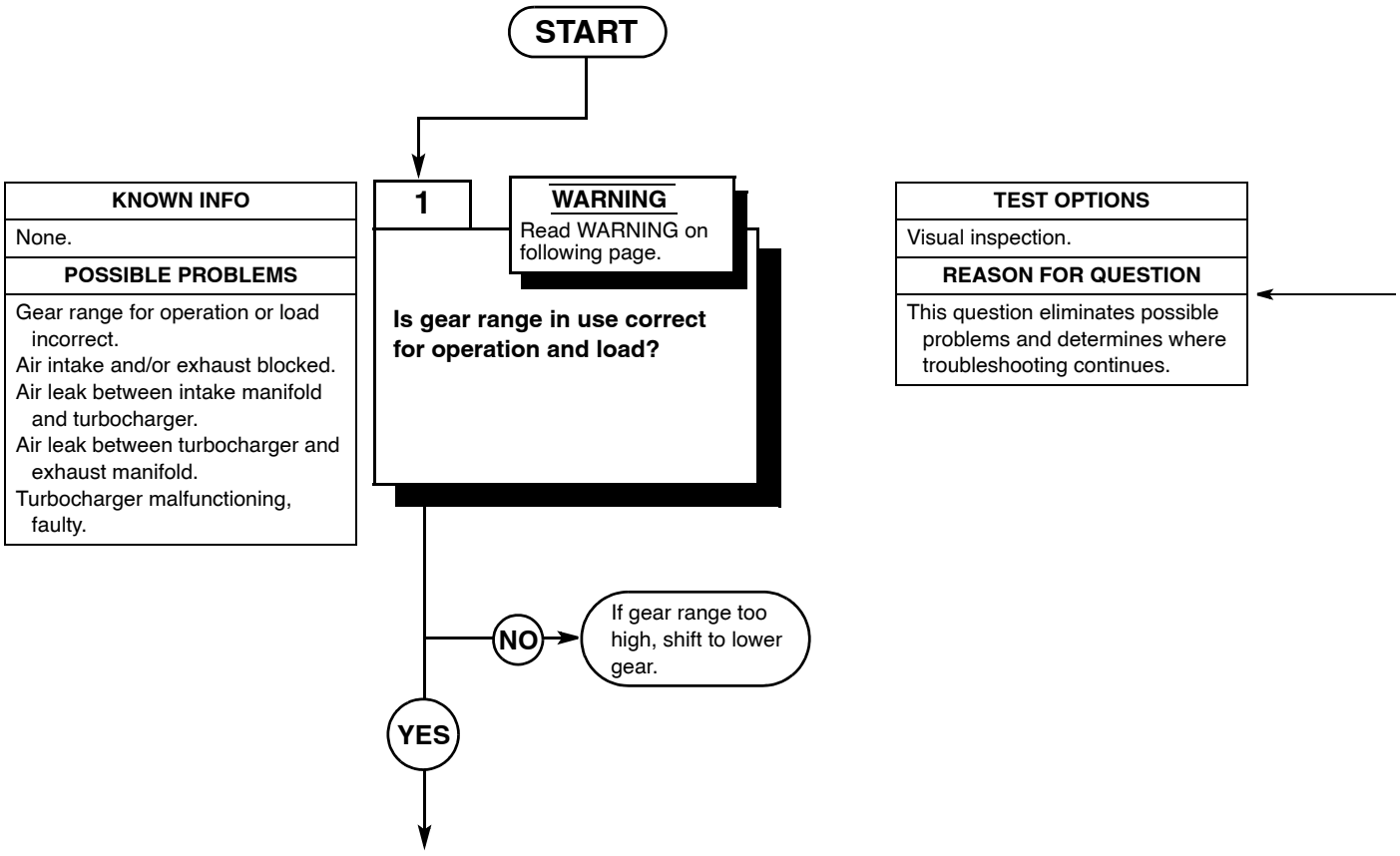
9. ENGINE PRODUCES EXCESSIVE BLACK EXHAUST SMOKE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



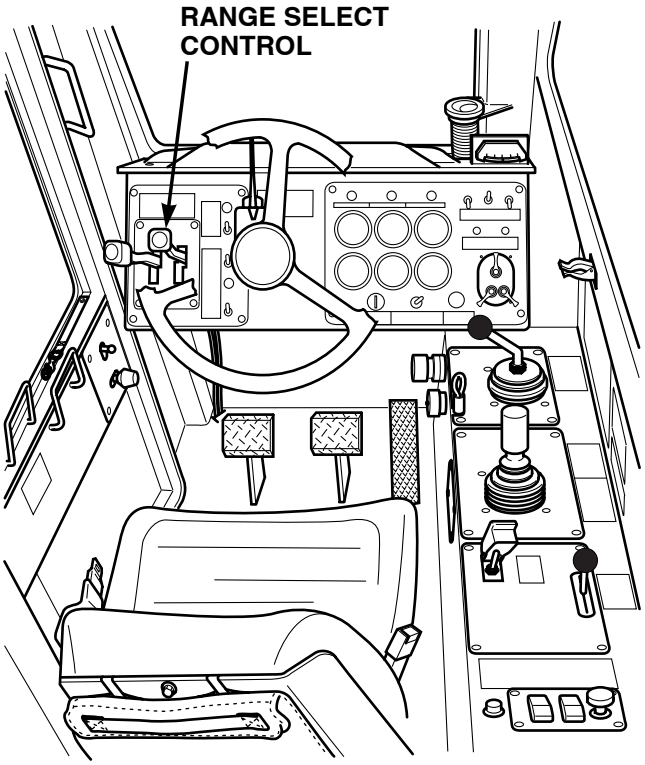
WARNING

- Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

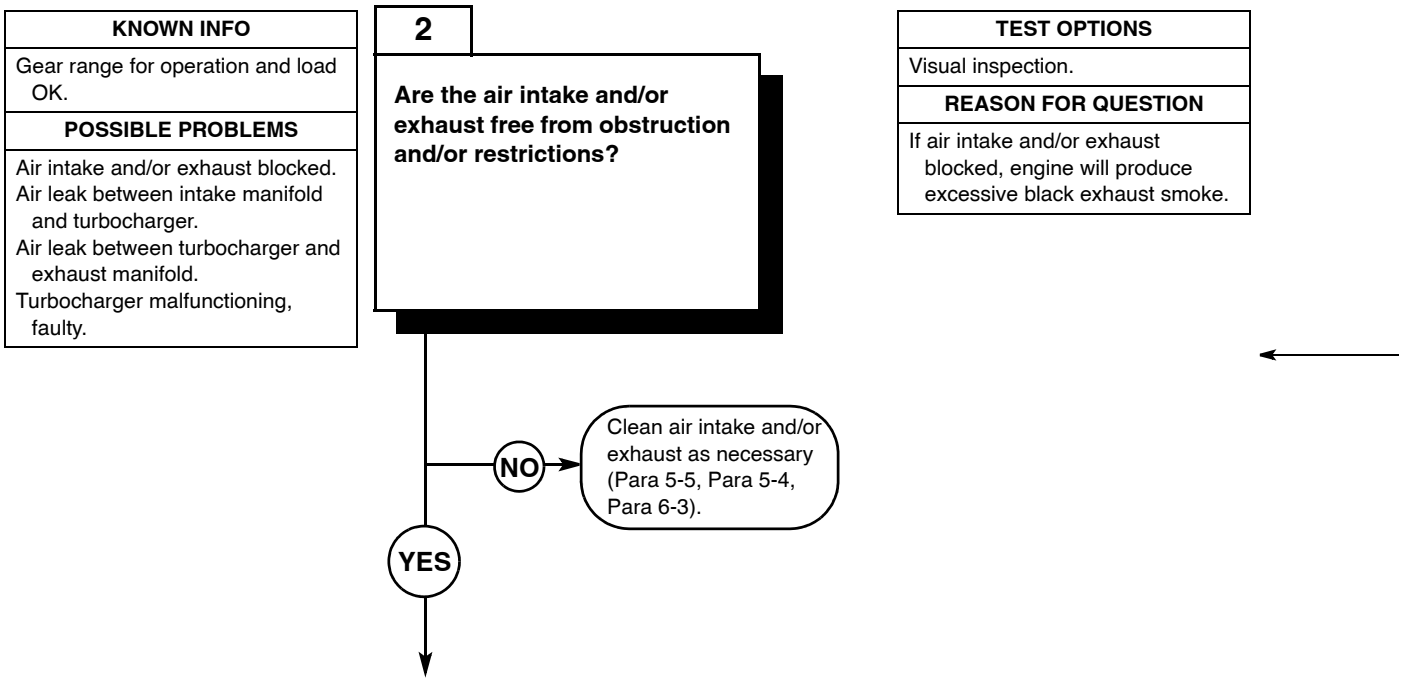
CAUTION

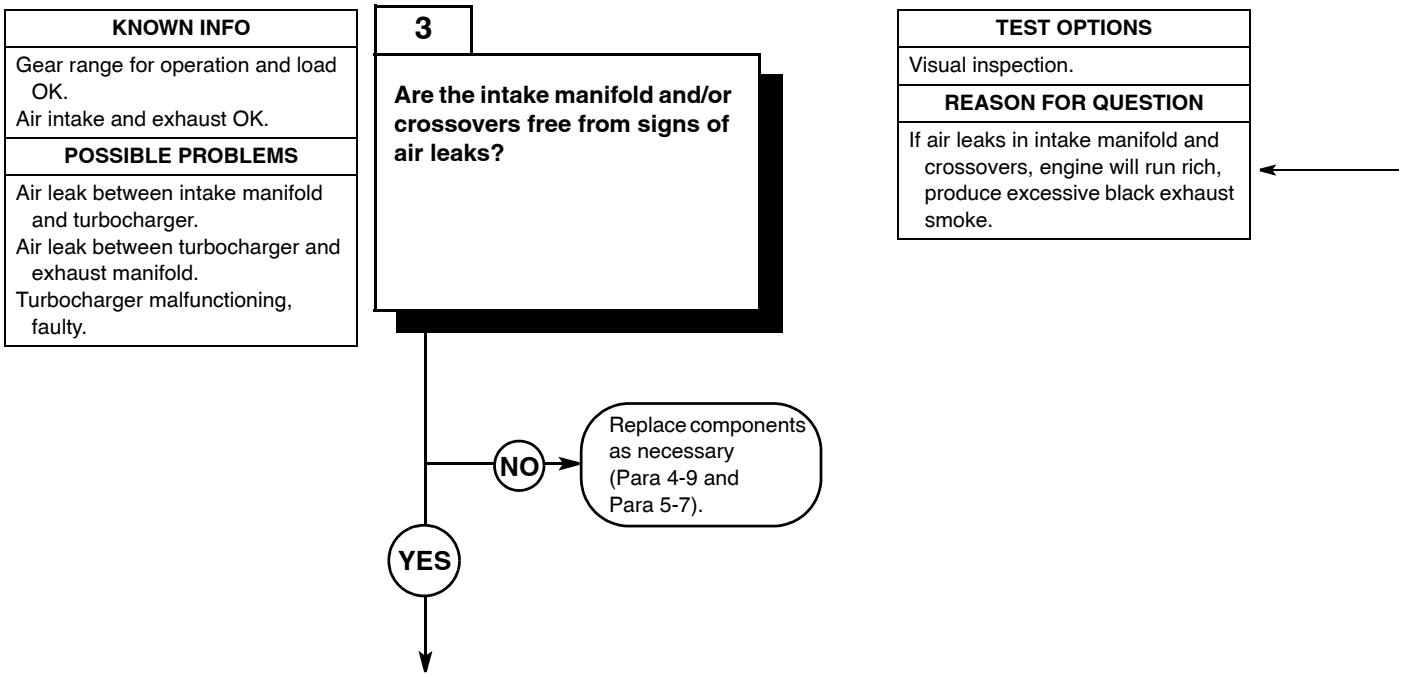
Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

GEAR RANGE OPERATION AND LOAD VISUAL INSPECTION
Check that gear range in use is correct for operation and load (TM 10-3930-673-10). (a) If gear range is correct, go to Step 2 of this fault. (b) If gear range is too high, shift to lower gear (TM 10-3930-673-10).

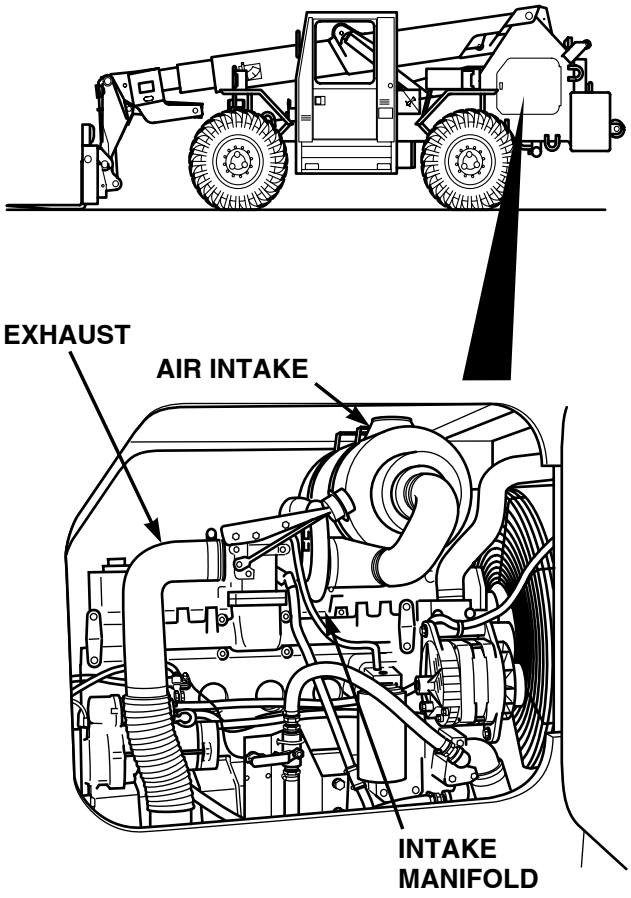


9. ENGINE PRODUCES EXCESSIVE BLACK EXHAUST SMOKE (CONT).



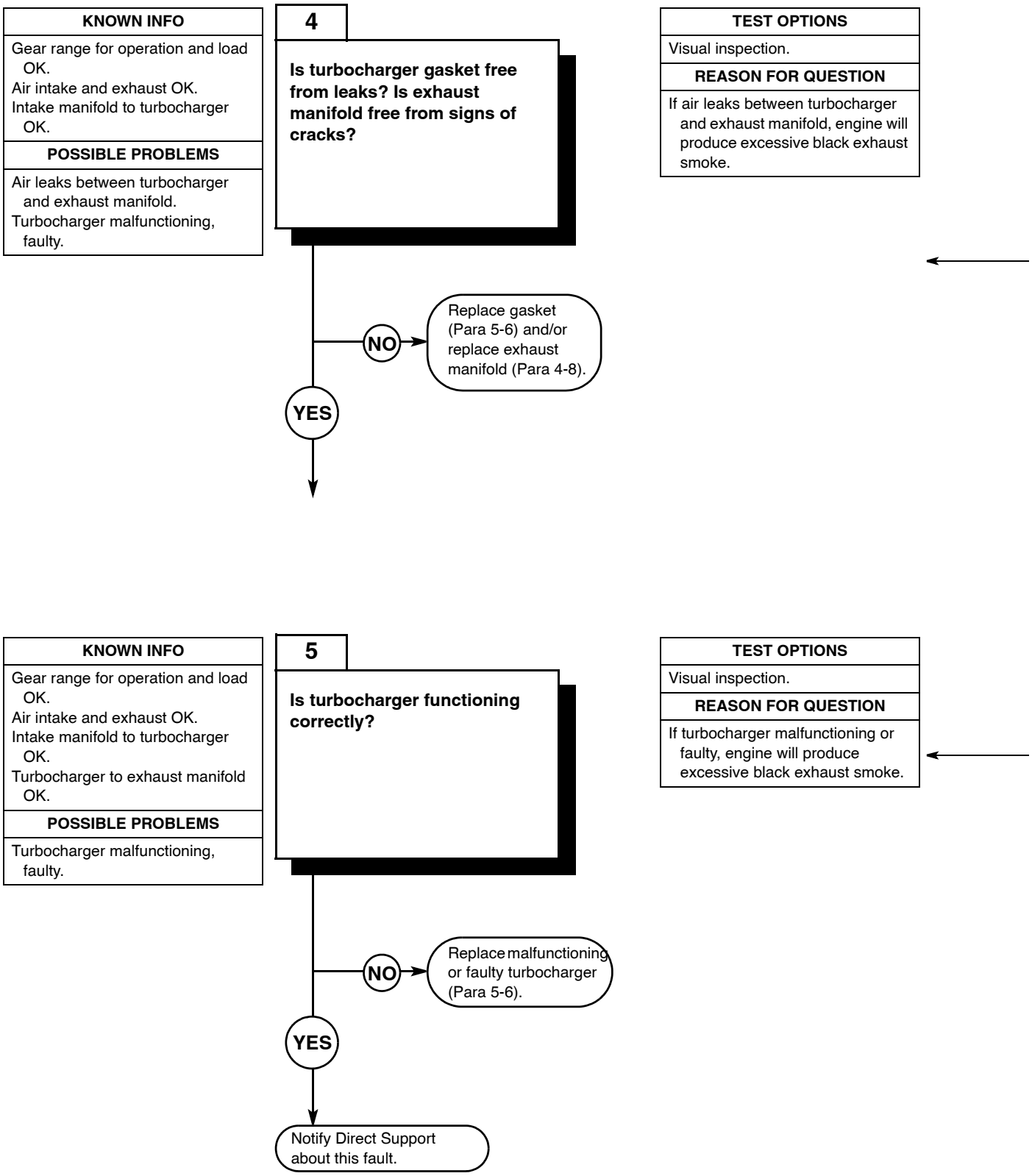


AIR INTAKE AND EXHAUST VISUAL INSPECTION
Visually inspect air intake and exhaust for obstructions and/or restrictions. (a) If air intake and exhaust are clean, go to Step 3 of this fault. (b) If air intake and exhaust are blocked, clean intake cap and exhaust pipe (Para 5-5, Para 5-4, Para 6-3).



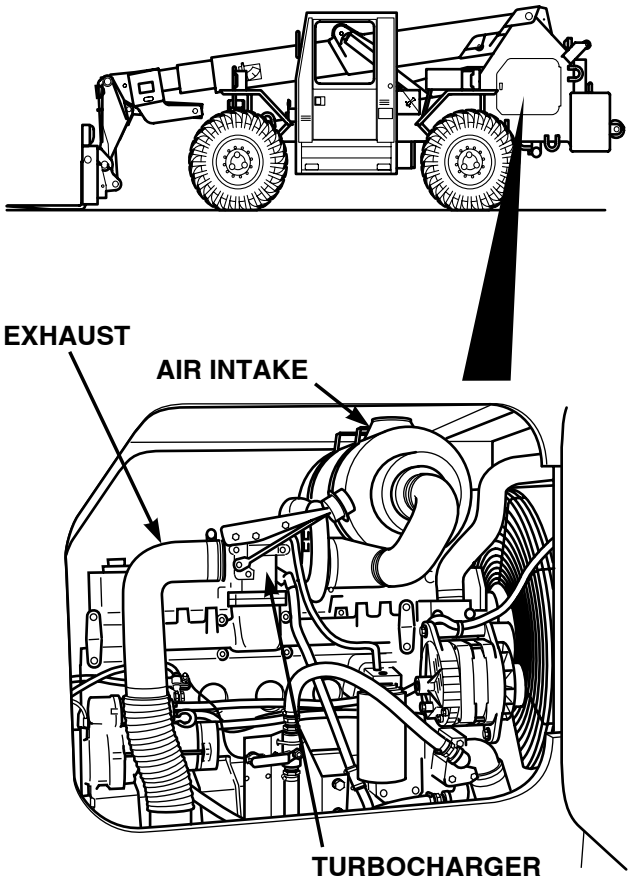
MANIFOLD AND CROSSOVERS VISUAL INSPECTION
Visually inspect manifold and crossover hoses for obstructions and/or restrictions. (a) If manifold and crossover hoses are clean, go to Step 4 of this fault. (b) If manifold and crossover hoses are blocked, clean manifold and hoses (Para 4-9 and Para 5-7).

9. ENGINE PRODUCES EXCESSIVE BLACK EXHAUST SMOKE (CONT).



TURBOCHARGER AND EXHAUST MANIFOLD VISUAL INSPECTION
Visually inspect turbocharger (gasket) and exhaust manifold for signs of cracks and air leaks. (a) If there are no signs of cracks and air leaks, go to Step 5 of this fault. (b) If there are signs of cracks and/or air leaks, replace turbocharger gasket (Para 5-6), and/or exhaust manifold (Para 4-8) as necessary.

TURBOCHARGER VISUAL INSPECTION
Check turbocharger intake, air and oil lines for debris. Check wastegate (Para 5-6). (a) If turbocharger is functioning correctly, notify Direct Support about this fault. (b) If turbocharger shows signs of debris, malfunctioning assemblies, replace turbocharger (Para 5-6).



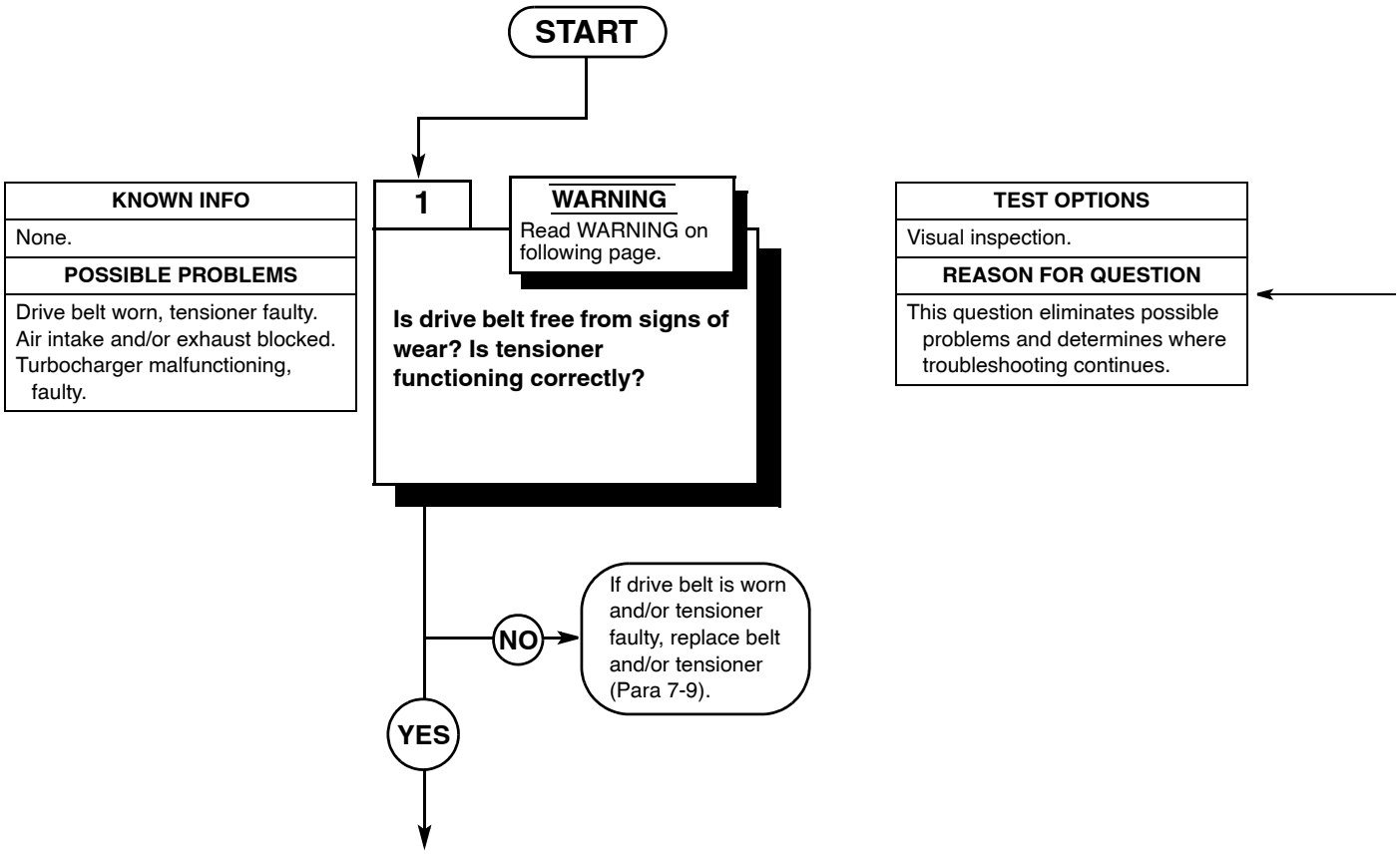
10. ENGINE PRODUCES EXCESSIVE NOISE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

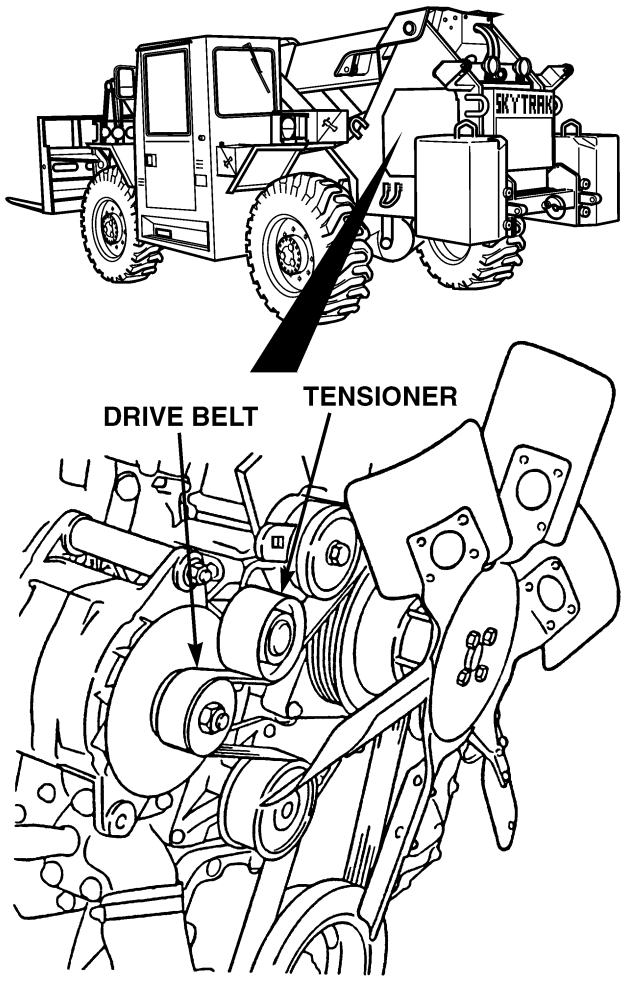


WARNING

- Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

DRIVE BELT AND TENSIONER VISUAL INSPECTION
Visually inspect drive belt for wear. Check operation of tensioner. Drive belt deflection should be no greater than 1/2 in. (a) If belt is not worn and tensioner is functioning correctly, go to Step 2 of this fault. (b) If belt is worn and/or tensioner is not deflecting belt correctly, replace belt and/or tensioner (Para 7-9).



10. ENGINE PRODUCES EXCESSIVE NOISE (CONT).

KNOWN INFO
Drive belt and tensioner OK.
POSSIBLE PROBLEMS
Air intake and/or exhaust blocked. Turbocharger malfunctioning, faulty.

2

Are the air intake and/or exhaust free from obstructions and/or restrictions?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air intake and/or exhaust blocked, engine will produce excessive noise.

NO → Clean air intake and/or exhaust as necessary (Para 5-5, Para 5-4, Para 6-3).

YES

KNOWN INFO
Drive belt and tensioner OK. Air intake and exhaust OK.
POSSIBLE PROBLEMS
Turbocharger malfunctioning, faulty.

3

Is turbocharger functioning correctly?

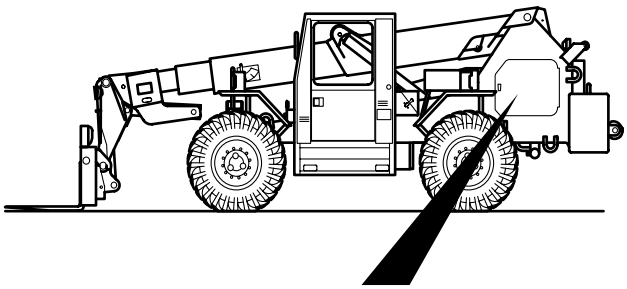
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If turbocharger malfunctioning or faulty, turbocharger will produce additional noise.

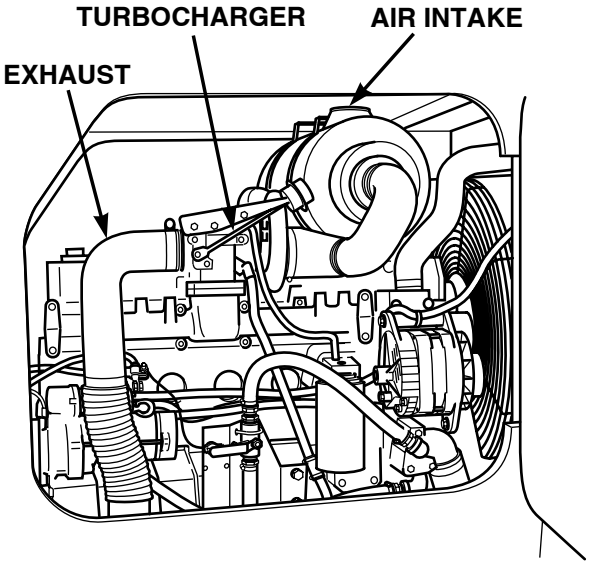
NO → Replace malfunctioning or faulty turbocharger (Para 5-6).

YES

Notify Direct Support of this fault.

AIR INTAKE AND EXHAUST VISUAL INSPECTION
Visually inspect air intake and exhaust for obstructions and/or restrictions. (a) If air intake and exhaust are clean, go to Step 3 of this fault. (b) If air intake and exhaust are blocked, shut down engine and clean intake cap and exhaust pipe (Para 5-5, Para 5-4, Para 6-3).





TURBOCHARGER VISUAL INSPECTION
Check turbocharger intake, air and oil lines for obstructions. Check wastegate (Para 5-6). (a) If turbocharger is functioning correctly, notify Direct Support about this fault. (b) If turbocharger shows signs of obstructions, faulty assemblies, shut down engine (TM 10-3930-673-10) and replace turbocharger (Para 5-6).

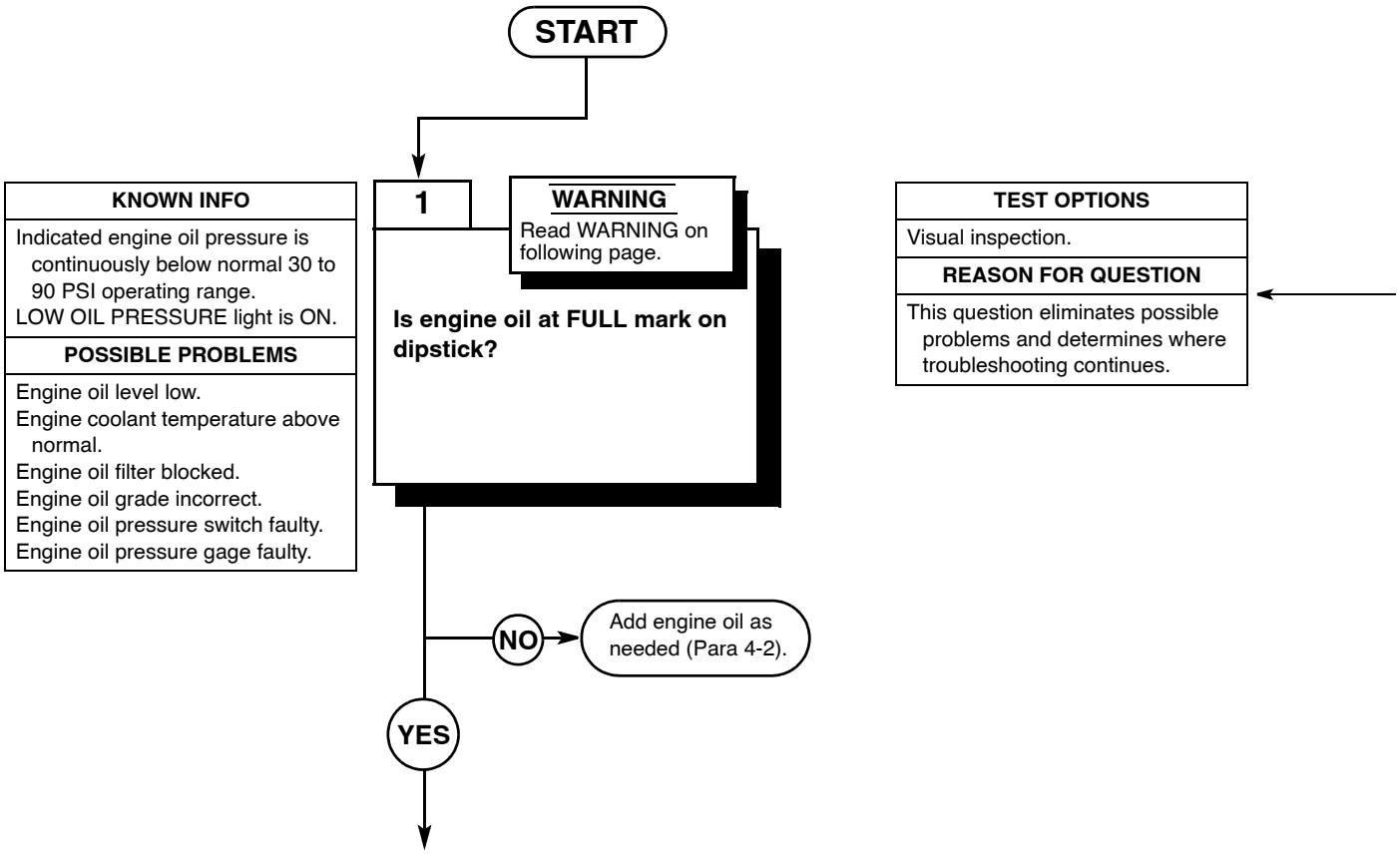
11. ENGINE OIL PRESSURE BELOW NORMAL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

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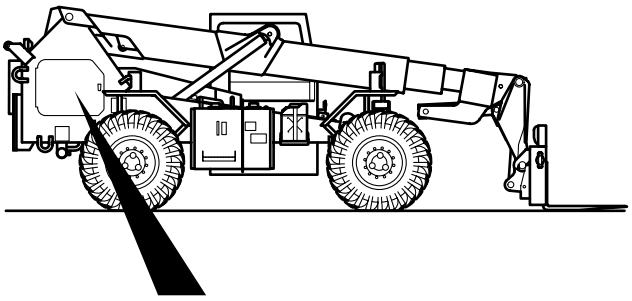
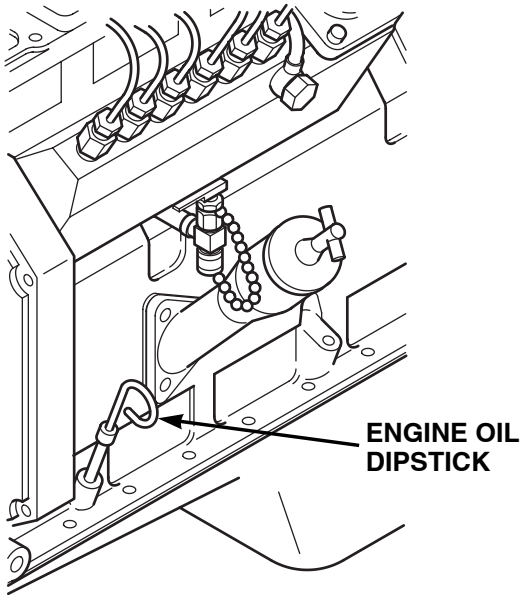
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

ENGINE OIL LEVEL VISUAL INSPECTION
(1) Check engine oil level by means of dipstick to determine if engine oil is at proper level (Para 4-2). (2) Engine oil should be near or at FULL mark on dipstick. (a) If engine oil is near or at FULL mark, go to Step 2 of this fault. (b) If engine oil is not at FULL mark, add engine oil as needed (Para 4-2).





11. ENGINE OIL PRESSURE BELOW NORMAL (CONT).

KNOWN INFO
Indicated engine oil pressure is below normal 30 to 90 PSI operating range. LOW OIL PRESSURE light is ON. Engine oil level OK.
POSSIBLE PROBLEMS
Engine coolant temperature is above normal. Engine filter blocked. Engine oil grade incorrect. Oil pressure switch faulty. Oil pressure gage faulty.

2

Is engine coolant temperature within normal 180 to 210 degrees F operating range?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If engine coolant temperature is above normal, see Fault 13, Engine water temperature above normal Troubleshooting Section.

NO → See Fault 13, Engine water temperature above normal Troubleshooting Section.

YES

KNOWN INFO
Indicated engine oil pressure is below normal 30 to 90 PSI operating range. LOW OIL PRESSURE light is ON. Engine oil level OK. Engine coolant temperature OK.
POSSIBLE PROBLEMS
Engine filter blocked. Engine oil grade incorrect. Oil pressure switch faulty. Oil pressure gage faulty.

3

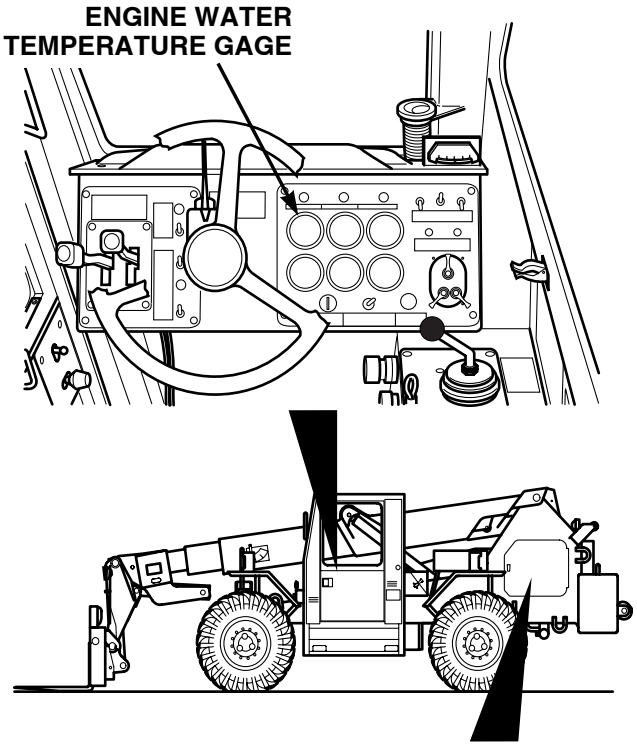
Does engine oil flow freely through engine oil filter?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If engine oil filter is dirty or blocked, engine oil pressure will be low.

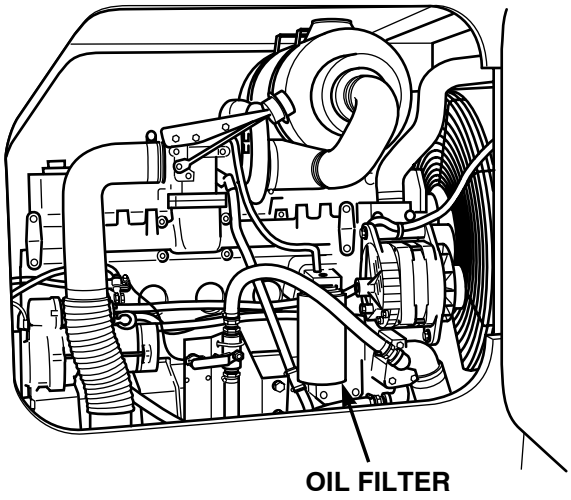
NO → Replace engine oil filter (Para 4-2).

YES

ENGINE COOLANT TEMPERATURE VISUAL INSPECTION
Check engine coolant temperature gage to determine if coolant temperature is within normal operating range. (a) If temperature is within normal operating range (180 to 210 degrees F), go to Step 3 of this fault. (b) If temperature is above normal operating range, go to Fault 13, Engine water temperature above normal Troubleshooting Section.



ENGINE OIL FILTER VISUAL INSPECTION
Check last date of oil filter replacement. Visually inspect oil filter for damage. (a) If recent replacement and no damage, go to Step 4 of this fault. (b) If dirty, blocked, or damaged, shut down engine (TM 10-3930-673-10) and replace engine oil filter (Para 4-2).



11. ENGINE OIL PRESSURE BELOW NORMAL (CONT).

KNOWN INFO
Indicated engine oil pressure is below normal 30 to 90 PSI operating range. LOW OIL PRESSURE light is ON. Engine oil level OK. Engine coolant temperature OK. Engine oil filter OK.
POSSIBLE PROBLEMS
Engine oil grade incorrect. Oil pressure switch faulty. Oil pressure gage faulty.

4

Is engine oil of correct grade for working environment (normally: OE/HDO-15/40)?

NO → Replace engine oil with oil of correct grade (Para 4-2).

YES

TEST OPTIONS
Sample, analysis.
REASON FOR QUESTION
If engine oil grade is incorrect, engine oil pressure will be low.

KNOWN INFO
Indicated engine oil pressure is below normal 30 to 90 PSI operating range. LOW OIL PRESSURE light is ON. Engine oil OK. Engine coolant temperature OK. Engine oil filter OK. Engine oil grade OK.
POSSIBLE PROBLEMS
Oil pressure switch faulty. Oil pressure gage faulty.

5

Is engine oil pressure within range of 30 to 90 PSI (at normal engine coolant temperature of 140 to 210 degrees F)?

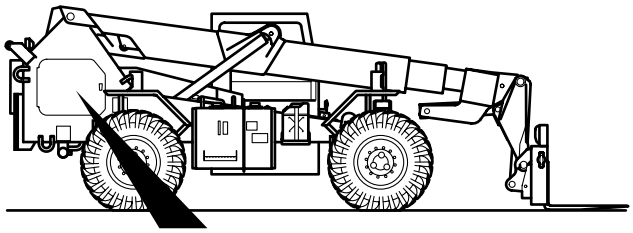
NO → Notify Direct Support about this fault.

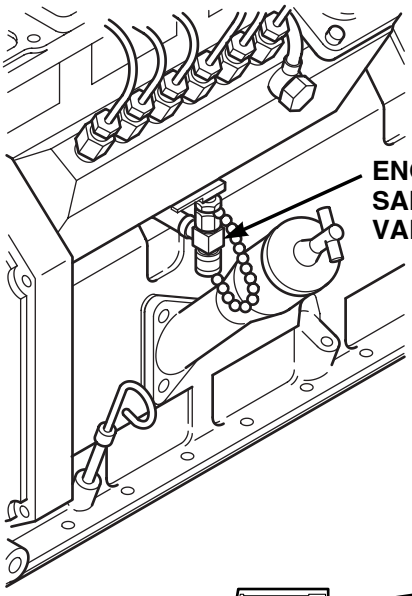
YES → Refer to Electrical System Troubleshooting Fault 39, Oil pressure gage does not operate.

TEST OPTIONS
STE/ICE Test #50.
REASON FOR QUESTION
If engine oil pressure sensor/gage faulty, engine oil pressure will be low.

ENGINE OIL GRADE SAMPLE AND ANALYSIS

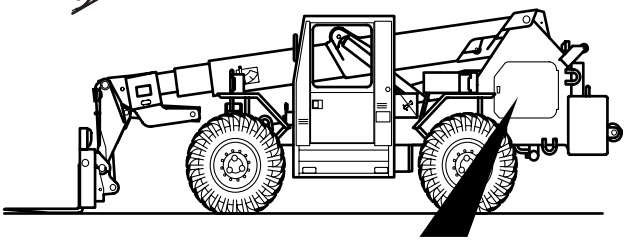
(1) Take engine oil sample from engine oil sampling valve.
(2) Have engine oil sample analyzed.
  (a) If engine oil sample is of correct grade, go to Step 5 of this fault.
  (b) If engine oil sample is of incorrect grade, replace the current oil with oil of correct grade (Para 4-2).

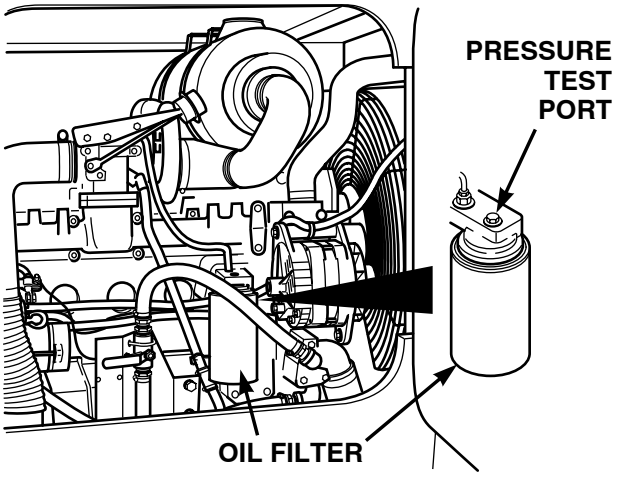




PRESSURE AND ENGINE OIL PRESSURE SWITCH STE/ICE TEST

(1) Remove plug from oil filter base and install STE/ICE pressure transducer.
(2) Perform STE/ICE Test #50 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If engine oil pressure is within 30 to 90 PSI, refer to Electrical System Troubleshooting Fault 39, Oil pressure gage does not operate.
  (b) If engine oil pressure is not within 30 to 90 PSI, shut down engine (TM 10-3930-673-10). Notify Direct Support about this fault.





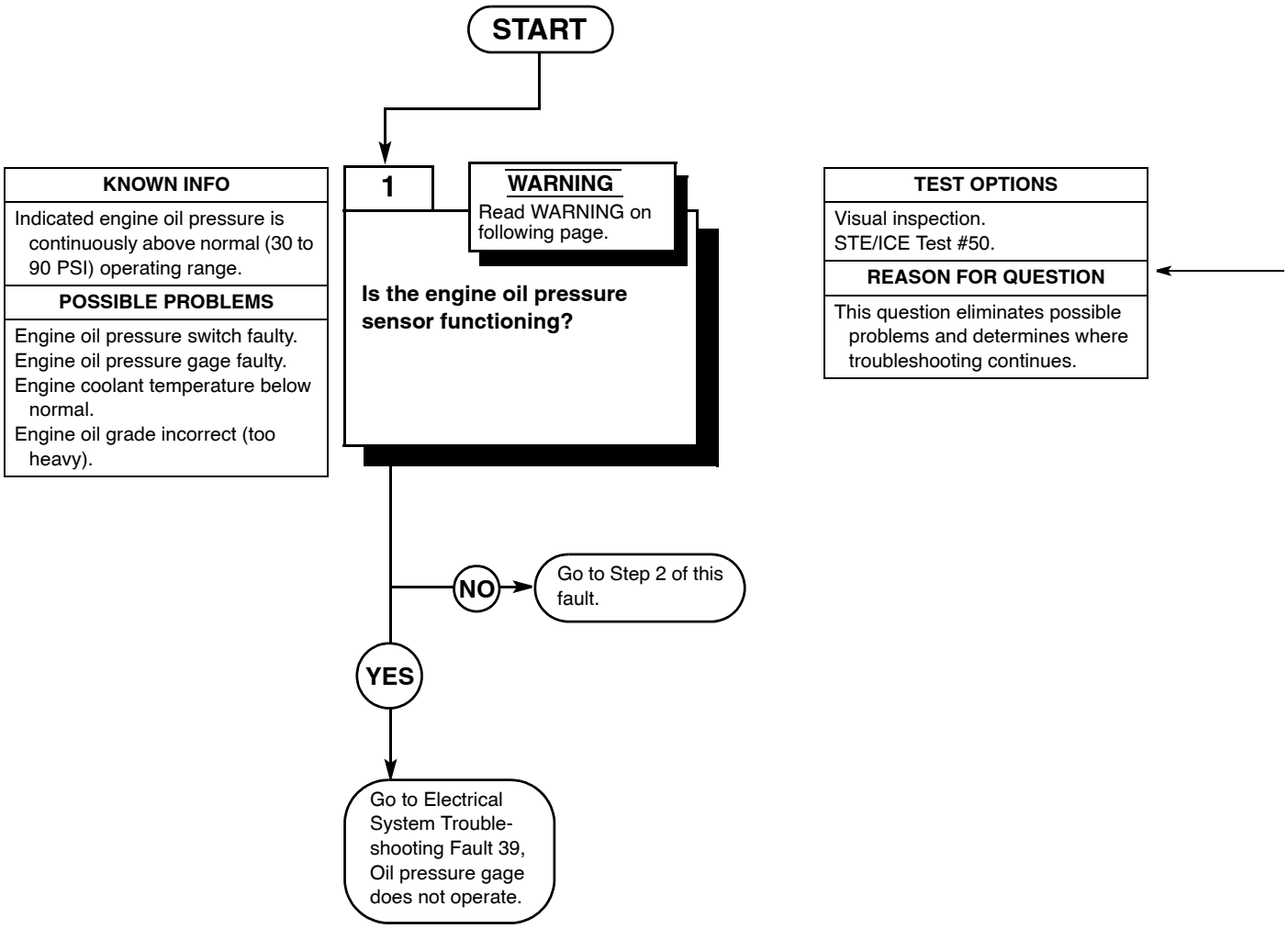
12. ENGINE OIL PRESSURE ABOVE NORMAL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

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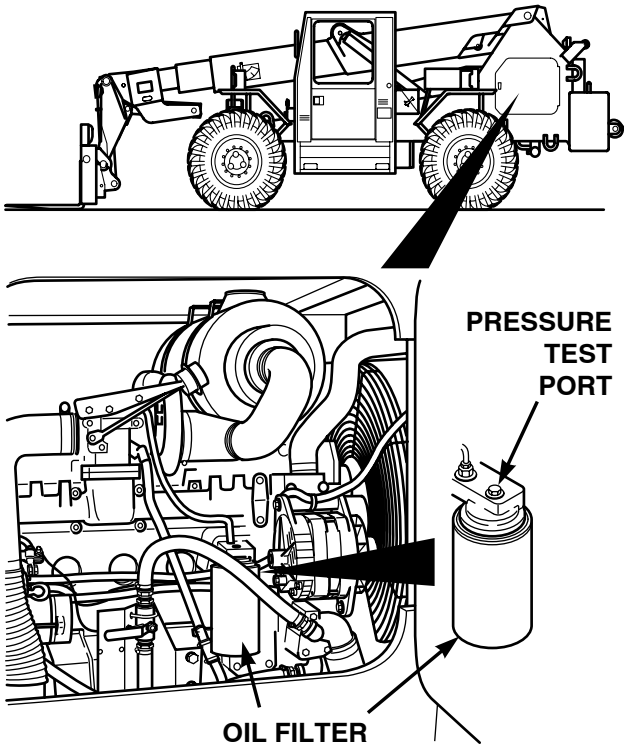
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

PRESSURE AND ENGINE OIL PRESSURE SWITCH VISUAL INSPECTION AND STE/ICE TEST
(1) Remove plug from oil filter base and install STE/ICE pressure transducer. (2) Perform STE/ICE Test #50 (TM 9-4910-571-12&P). (3) Read output pressure on test device. (a) If engine oil pressure is within 30 to 90 PSI, go to Electrical System Troubleshooting Fault 39, Oil pressure gage does not operate. (b) If engine oil pressure is not within 30 to 90 PSI, shut down engine (TM 10-3930-673-10). Go to Step 2 of this fault.



12. ENGINE OIL PRESSURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated engine oil pressure is continuously above normal 30 to 90 PSI operating range. Engine oil pressure switch OK. Engine oil pressure gage OK.
POSSIBLE PROBLEMS
Engine coolant temperature below normal. Engine oil grade incorrect (too heavy).

2

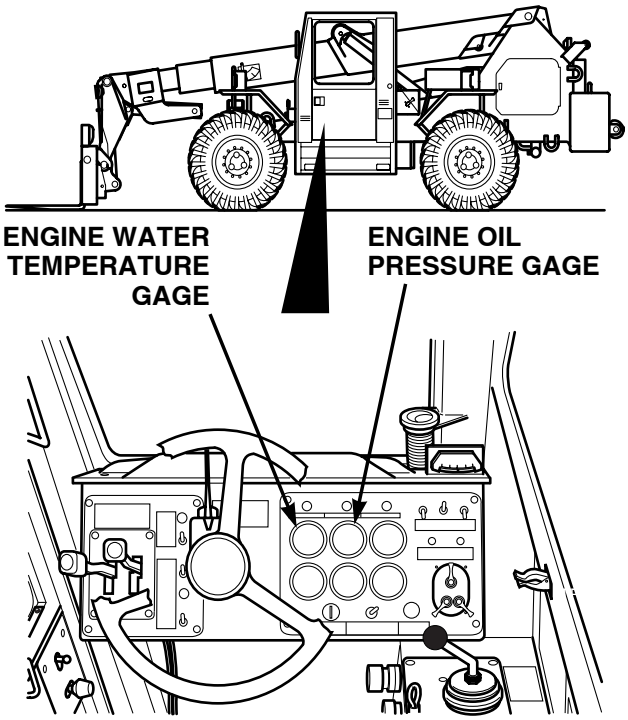
Is engine coolant temperature within normal (180 to 210 degrees F) operating range?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If coolant temperature is below normal, engine oil pressure will read above normal.

NO → See Fault 12, Engine water temperature below normal Troubleshooting Section.

YES

ENGINE COOLANT TEMPERATURE VISUAL INSPECTION
Check engine coolant temperature gage to determine if coolant temperature is within normal operating range. (a) If temperature is within normal operating range (180 - 210 degrees F), go to Step 3 of this fault. (b) If temperature is below normal operating range, go to Fault 12, Engine water temperature below normal Troubleshooting Section.



12. ENGINE OIL PRESSURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated engine oil pressure is continuously above normal 30 to 90 PSI operating range. Engine oil pressure switch OK. Engine oil pressure gage OK. Engine coolant temperature OK.
POSSIBLE PROBLEMS
Engine oil grade incorrect.

3

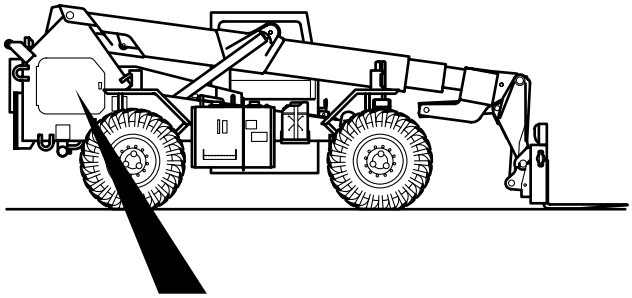
Is engine oil of correct grade for working environment (normally: OE/HDO-15/40)?

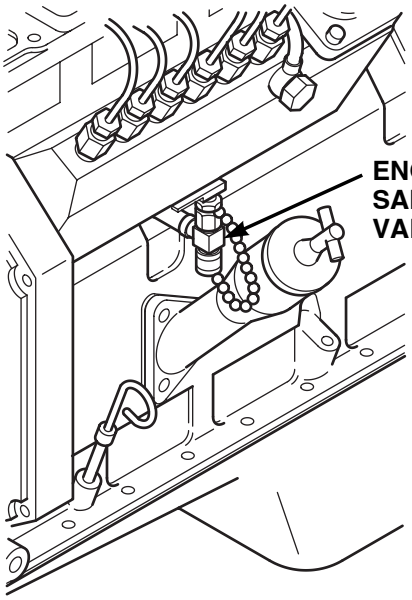
TEST OPTIONS
Oil sample, analysis.
REASON FOR QUESTION
If engine oil grade is incorrect, oil pressure will read above normal.

NO → Replace engine oil with oil of correct weight (Para 4-2).

YES → Notify Direct Support of this fault.

ENGINE OIL GRADE SAMPLE AND ANALYSIS
(1) Take engine oil sample from engine oil sampling valve (TM 10-3930-673-10). (2) Have engine oil sample analyzed. (a) If engine oil sample is of correct grade, notify Direct Support about this fault. (b) If engine oil sample is of incorrect grade, shut down engine (TM 10-3930-673-10) and replace the current oil with oil of correct grade (Para 4-2).





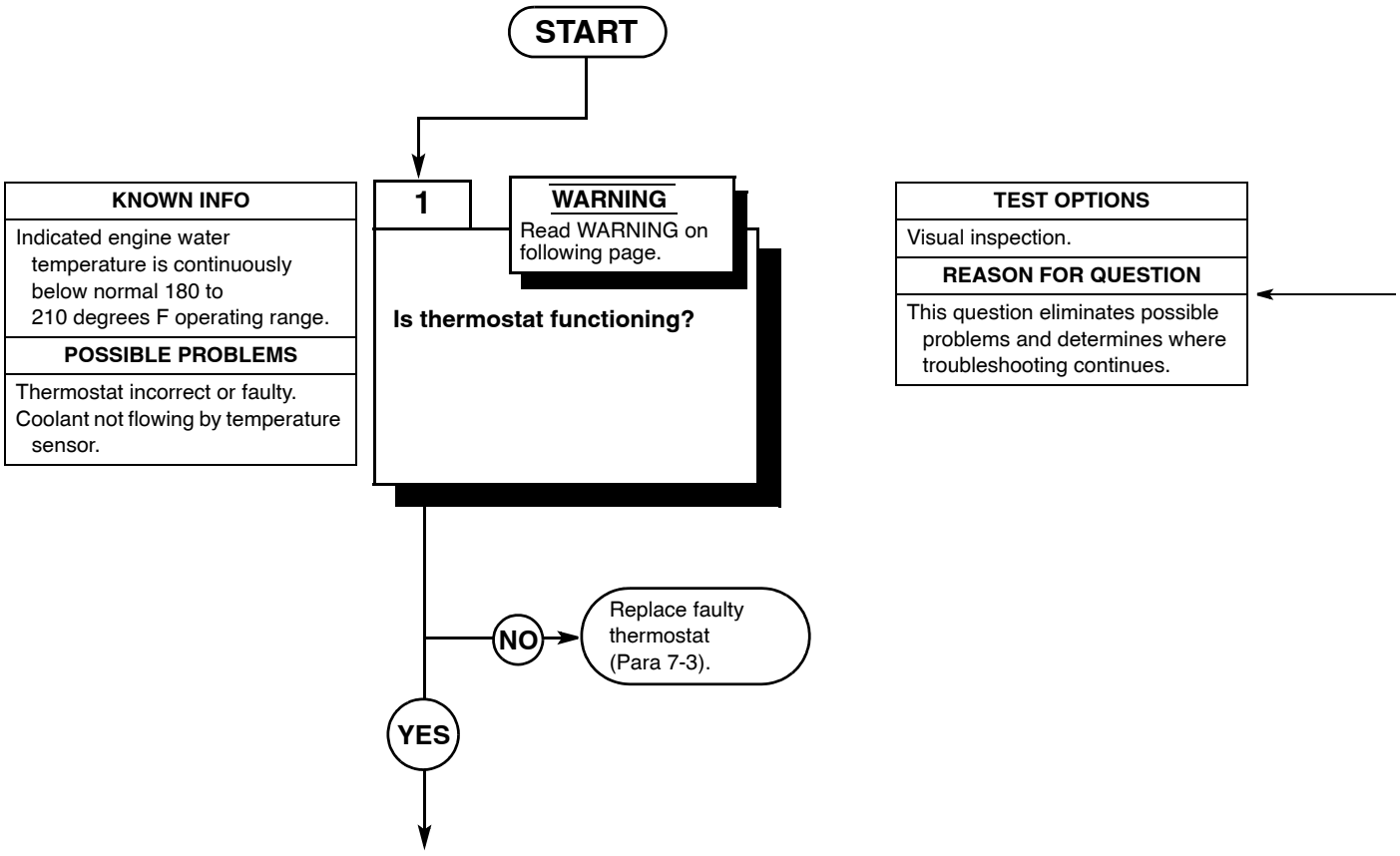
13. ENGINE WATER TEMPERATURE BELOW NORMAL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

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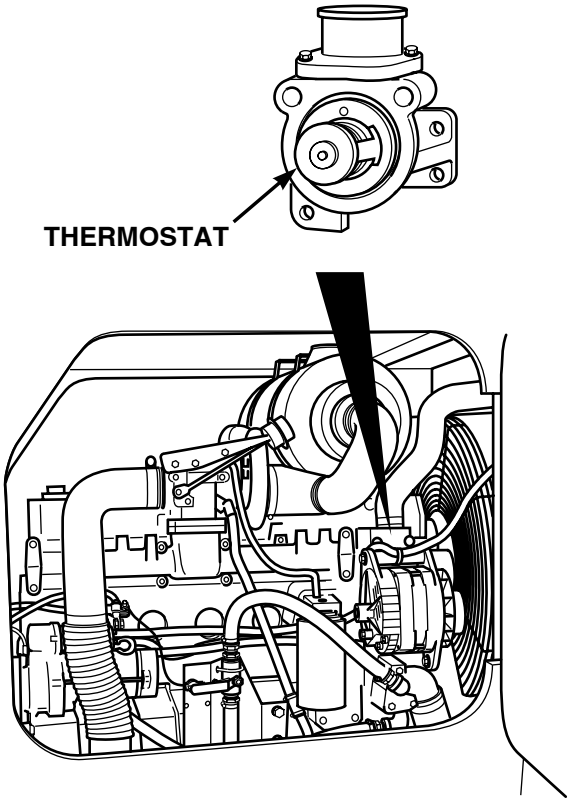
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

THERMOSTAT VISUAL INSPECTION
(1) Shut down engine and let it cool to ambient temperature. (2) Relieve pressure on cooling system. (3) Remove thermostat. Inspect and test thermostat to determine if it is functioning (Para 7-3). (a) If thermostat is functioning, reinstall thermostat and go to Step 2 of this fault. (b) If thermostat is faulty, replace thermostat (Para 7-3).



13. ENGINE WATER TEMPERATURE BELOW NORMAL (CONT).

KNOWN INFO
Indicated engine water temperature is continuously below normal 180 to 210 degrees F operating range. Thermostat OK. Engine water temperature switch OK. Engine water temperature gage OK.
POSSIBLE PROBLEMS
Coolant not flowing by temperature sensor.

2

Is engine coolant flowing by temperature sensor?

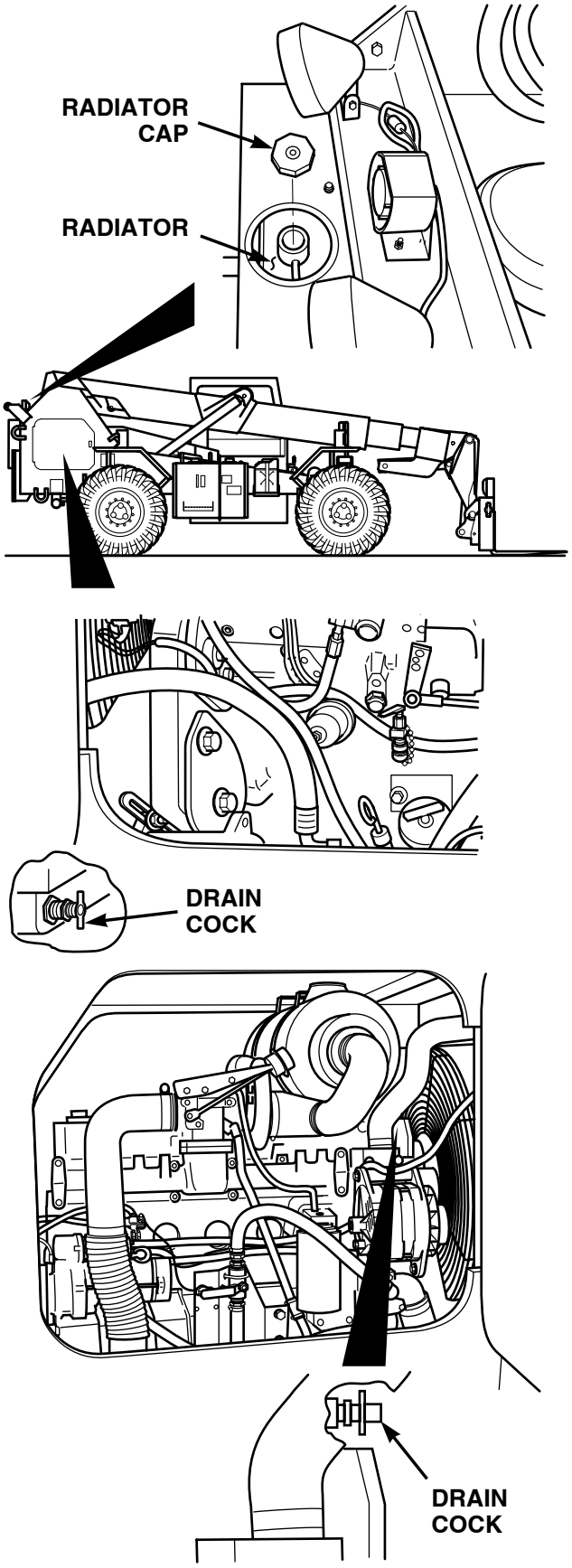
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If coolant is not flowing by sensor, water temperature will read below normal.

NO → Flush and refill coolant system (Para 7-2).

YES → Go to Electrical System Troubleshooting Fault 38, Temperature gage does not operate.

COOLANT
VISUAL INSPECTION

(1) Remove radiator cap.
(2) Run engine for approximately 10 minutes.
(3) Visually check that coolant is flowing freely.
  (a) If coolant is flowing freely, go to Electrical System Troubleshooting Fault 38, Temperature gage does not operate.
  (b) If coolant is not flowing freely, shut down engine (TM 10-3930-673-10) and flush and refill coolant system (Para 7-2).



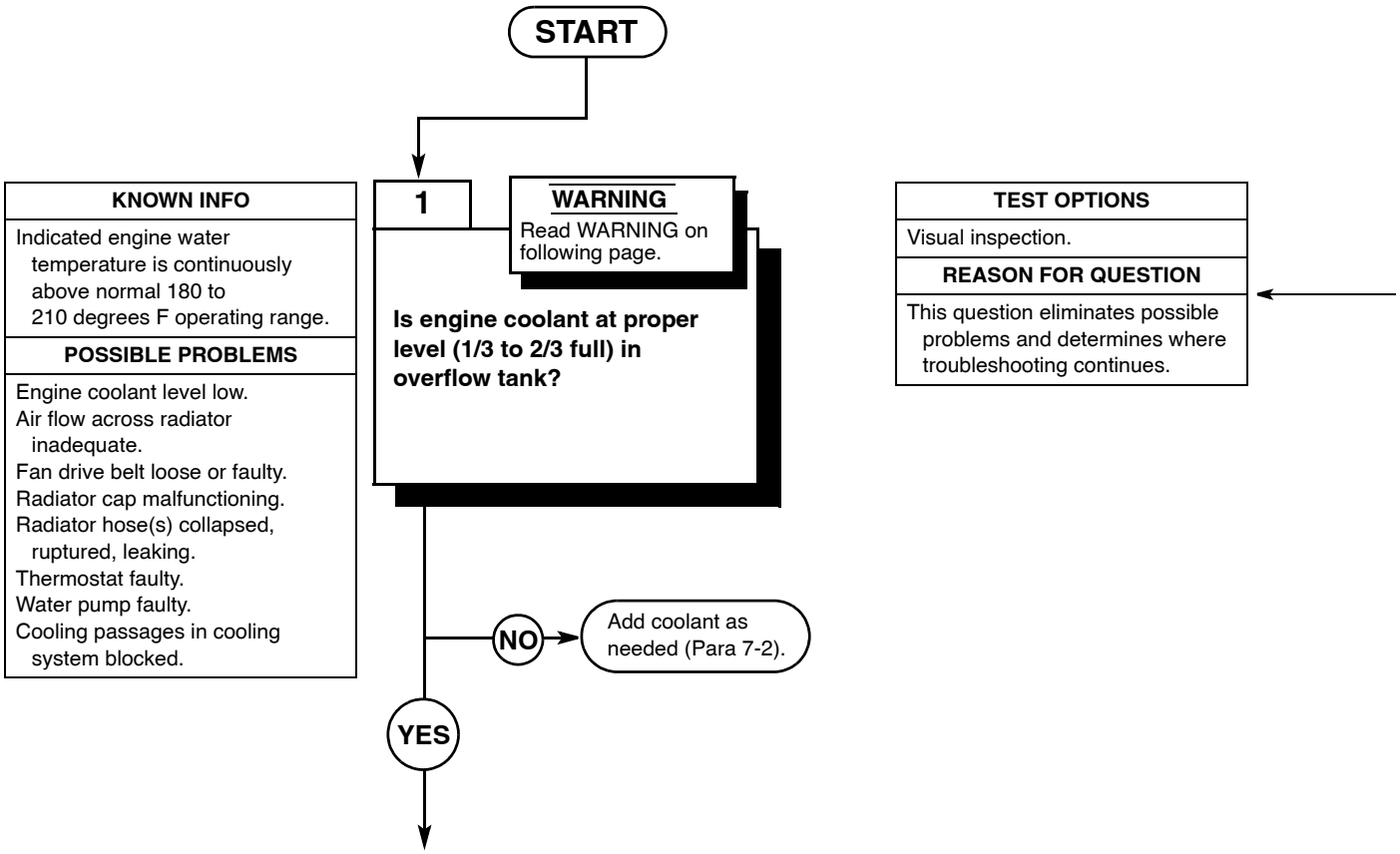
14. ENGINE WATER TEMPERATURE ABOVE NORMAL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



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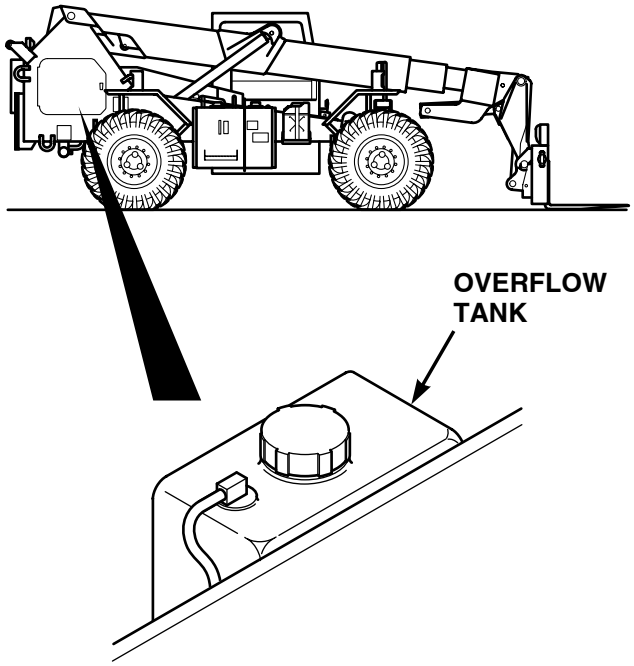
- Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.
- Cooling system is pressurized. Remove radiator cap slowly and only when engine is cool or painful burns could result.
- The engine and radiator can be extremely hot. Contacting exposed skin to these areas could result in severe burns.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

ENGINE COOLANT VISUAL INSPECTION
Visually check engine coolant level in overflow tank. Tank should be 1/3 to 2/3 full (Para 7-2). (a) If tank is 1/3 to 2/3 full, go to Step 2 of this fault. (b) If tank is not filled to proper level, add coolant as needed (Para 7-2).



14. ENGINE WATER TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK.
POSSIBLE PROBLEMS
Air flow across radiator inadequate. Fan drive belt loose or faulty. Radiator cap malfunctioning. Radiator hose(s) collapsed, ruptured, leaking. Thermostat faulty. Water pump faulty. Cooling passages in cooling system blocked.

2

Is air flow across radiator free from obstructions/ restrictions?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air flow restricted, engine will overheat.

NO → Remove obstructions/ restrictions.

YES

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK. Air flow across radiator adequate.
POSSIBLE PROBLEMS
Fan drive belt loose or faulty. Radiator cap malfunctioning. Radiator hose(s) collapsed, ruptured, leaking. Thermostat faulty. Water pump faulty. Cooling passages in cooling system blocked.

3

Is fan drive belt tightened properly and free from signs of wear?

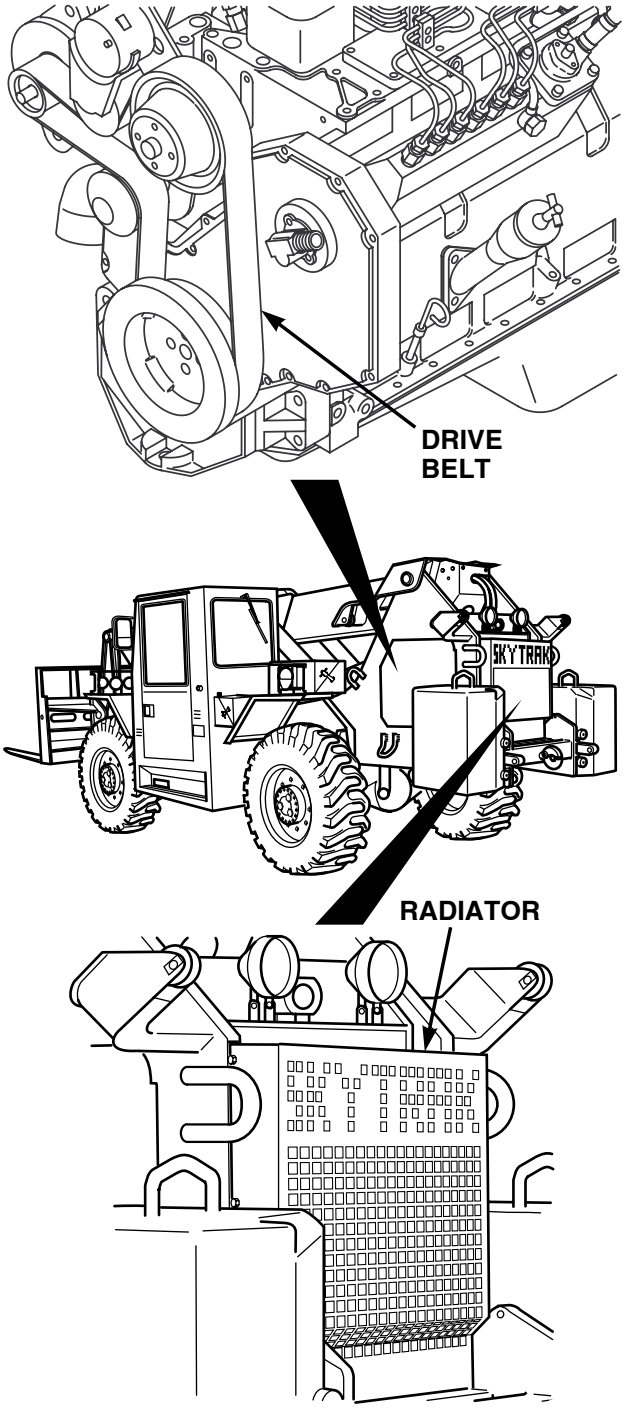
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fan drive belt is loose or faulty, engine will run hot.

NO → Tighten loose belt or replace worn belt (Para 7-9).

YES

RADIATOR FINS AND FAN VISUAL INSPECTION
Visually inspect radiator fins and fan for obstructions and/or restrictions that might restrict air flow. (a) If there are no obstructions and/or restrictions, go to Step 3 of this fault. (b) If there are obstructions and/or restrictions, shut down engine (TM 10-3930-673-10) and remove obstructions and/or restrictions.

FAN DRIVE BELT VISUAL INSPECTION
Visually inspect fan drive belt for tension and wear (cracks, frays, worn areas). (a) If belt is properly adjusted and not severely worn, go to Step 4 of this fault. (b) If belt is loose, shut down engine (TM 10-3930-673-10) and tighten belt. If belt is severely worn, replace belt (Para 7-9).



14. ENGINE WATER TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK. Air flow across radiator adequate. Fan drive belt OK.
POSSIBLE PROBLEMS
Radiator cap malfunctioning. Radiator hose(s) collapsed, ruptured, leaking. Thermostat faulty. Water pump faulty. Cooling passages in cooling system blocked.

4

Is radiator cap (normally: 15 PSI) functioning properly?

NO → Test, clean and/or replace radiator cap (Para 7-2).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If radiator cap is malfunctioning, engine will run hot.

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK. Air flow across radiator adequate. Fan drive belt OK. Radiator cap OK.
POSSIBLE PROBLEMS
Radiator hose(s) collapsed, ruptured, leaking. Thermostat faulty. Water pump faulty. Cooling passages in cooling system blocked.

5

Are upper and lower radiator hoses free from collapsed sections, ruptures, and/or leaks?

NO → Replace faulty radiator hose(s) (Para 7-4).

YES

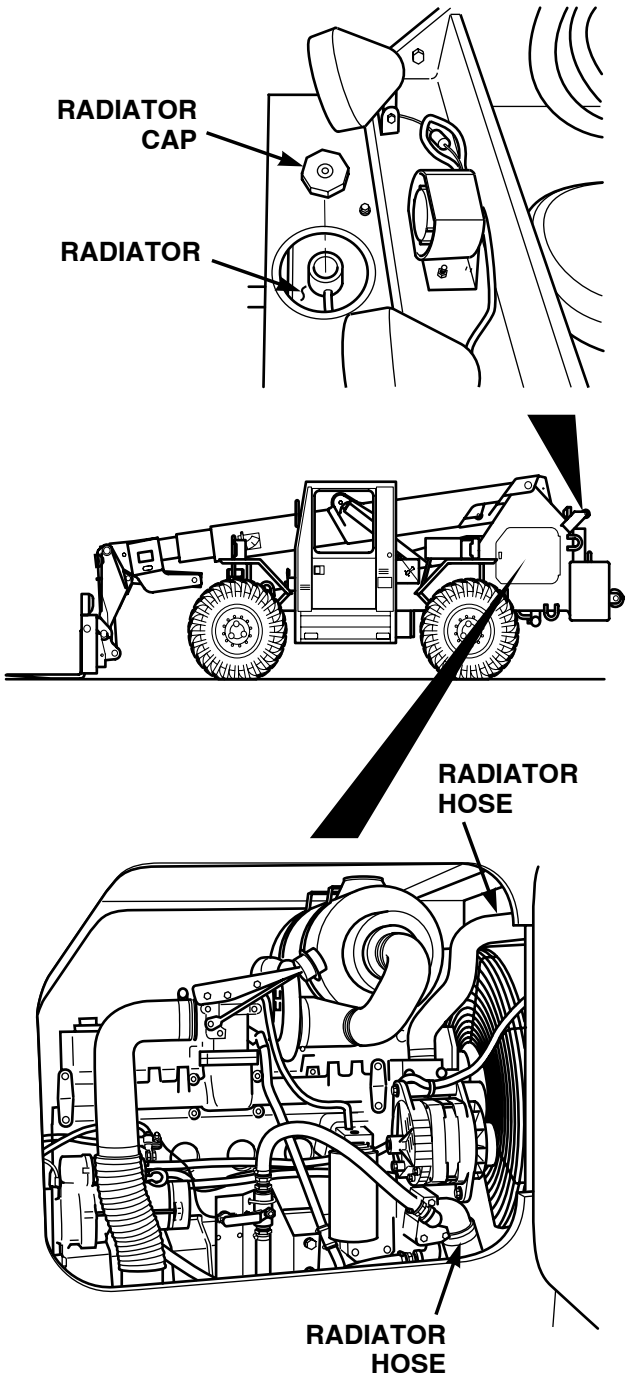
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If radiator hose(s) collapsed, ruptured, leaking, engine will overheat.

RADIATOR CAP VISUAL INSPECTION

Use a known functioning radiator cap on the radiator.

(a) If engine water temperature continues above normal operating temperature, clean and reinstall original cap. Go to Step 5 of this fault.

(b) If engine water temperature returns to normal temperature range, original cap faulty. Replace original cap (Para 7-2).



RADIATOR HOSES VISUAL INSPECTION

Visually inspect upper and lower radiator hoses for soft or collapsed sections, cracks or ruptures, and leaks.

(a) If radiator hoses are free from soft or collapsed sections, cracks or ruptures, and leaks, go to Step 6 of this fault.

(b) If hoses have soft sections, cracks or ruptures, and/or leaks, shut down engine (TM 10-3930-673-10) and replace the hoses (Para 7-4).

14. ENGINE WATER TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK. Air flow across radiator adequate. Fan drive belt OK. Radiator cap OK. Radiator hose(s) OK.
POSSIBLE PROBLEMS
Thermostat faulty. Water pump faulty. Cooling passages in cooling system blocked.

6

Is thermostat functioning?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If thermostat faulty, engine will overheat.

NO → Replace faulty thermostat (Para 7-3).

YES

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK. Air flow across radiator adequate. Fan drive belt OK. Radiator cap OK. Radiator hose(s) OK. Thermostat OK.
POSSIBLE PROBLEMS
Water pump faulty. Cooling passages in cooling system blocked.

7

Is water pump functioning properly?

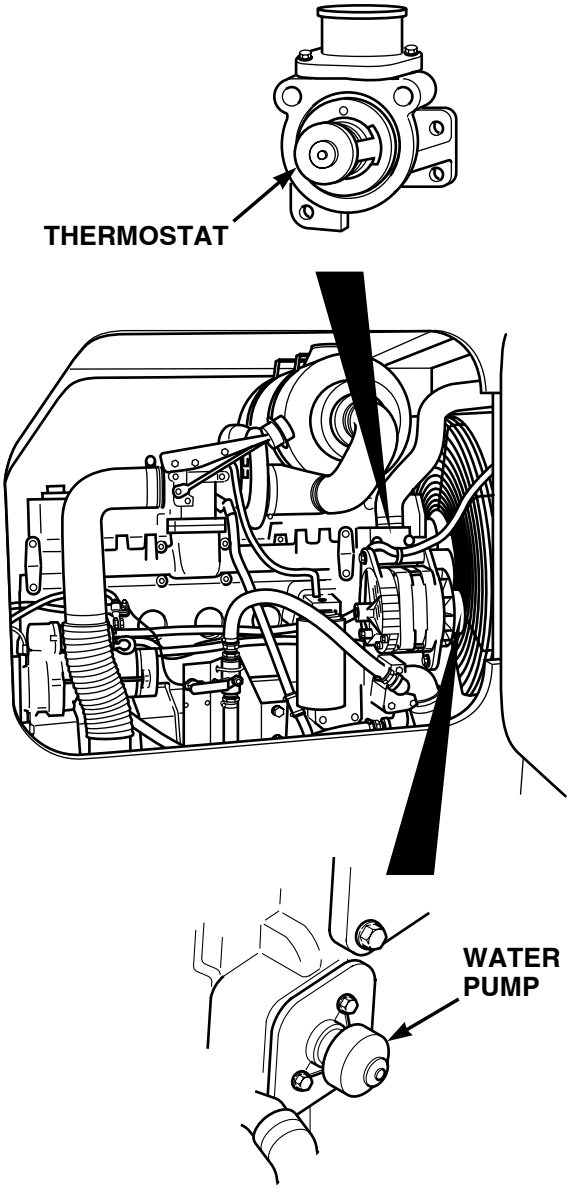
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If water pump faulty, engine will run hot.

NO → Replace worn and/or faulty pump (Para 7-5).

YES

THERMOSTAT VISUAL INSPECTION
(1) Shut down engine (TM 10-3930-673-10) and let it cool to ambient temperature. (2) Relieve pressure on cooling system. (3) Remove, inspect, and test thermostat to determine if it is functioning (Para 7-3). (a) If thermostat is functioning, reinstall thermostat and go to Step 7 of this fault. (b) If thermostat is faulty, replace thermostat (Para 7-3).

WATER PUMP VISUAL INSPECTION
Listen for rattles and/or squeals from water pump. Visually inspect water pump for leaks. (a) If pump is free from unusual noise and leaks, go to Step 8 of this fault. (b) If pump makes unusual noise and/or leaks, pump worn and/or faulty. Shut down engine (TM 10-3930-673-10) and replace pump (Para 7-5).



14. ENGINE WATER TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated engine water temperature is continuously above normal 180 to 210 degrees F operating range. Engine coolant level OK. Air flow across radiator adequate. Fan drive belt OK. Radiator cap OK. Radiator hose(s) OK. Thermostat OK. Water pump OK.
POSSIBLE PROBLEMS
Cooling passages in cooling system blocked.

8

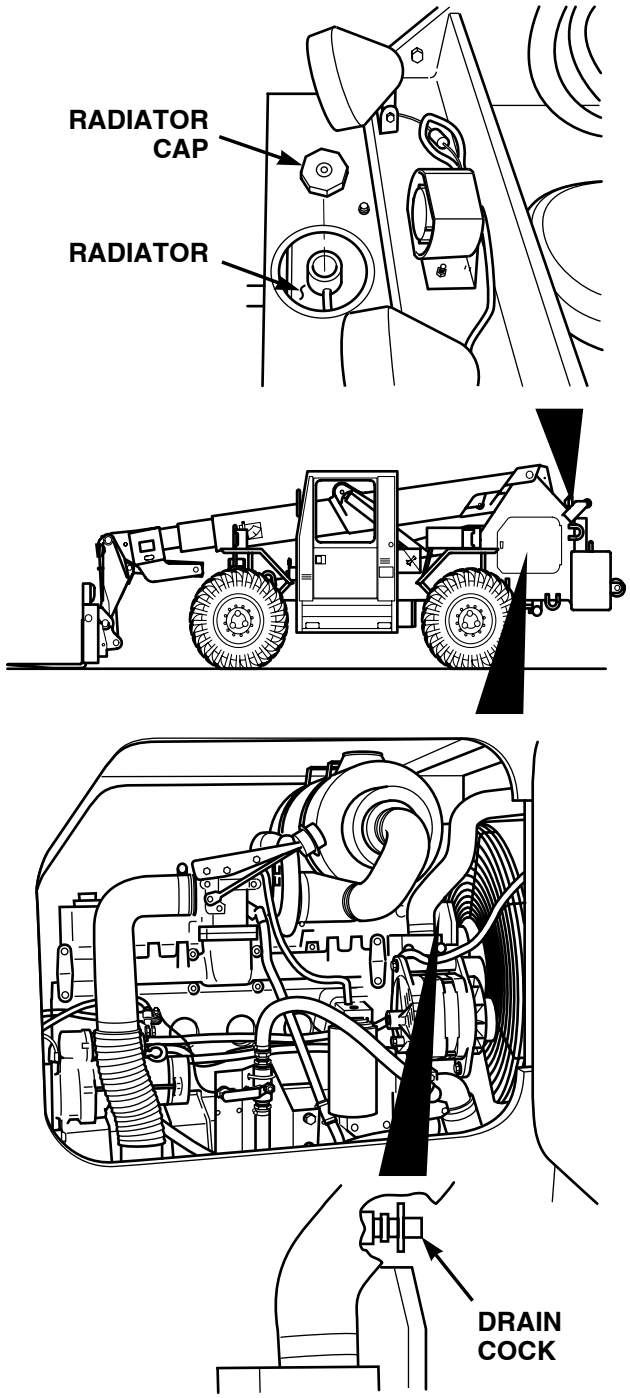
Does coolant flow freely through the cooling passages of the system?

NO → Flush and refill coolant system (Para 7-2).

YES → Notify Direct Support about this fault.

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If cooling passages blocked, engine will overheat.

COOLANT FLOW IN SYSTEM VISUAL INSPECTION
(1) Remove radiator cap. (2) Run engine to operating temperature. (3) Visually check coolant flow through radiator. (a) If coolant flows freely through radiator, but water temperature remains above normal, notify Direct Support about this fault. (b) If coolant does not flow freely, shut down engine (TM 10-3930-673-10) and flush and refill coolant system (Para 7-2).



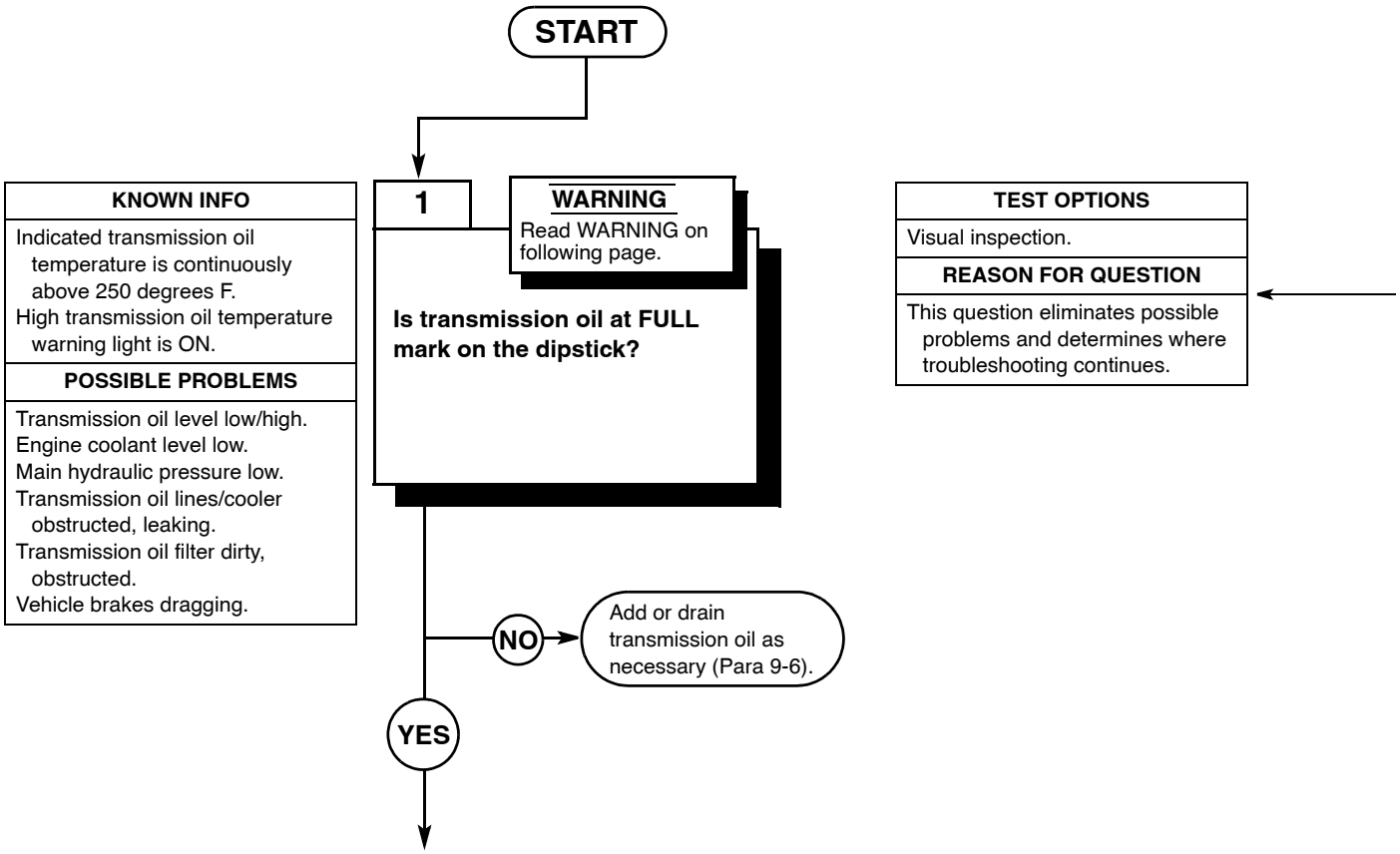
15. TRANSMISSION OIL TEMPERATURE ABOVE NORMAL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



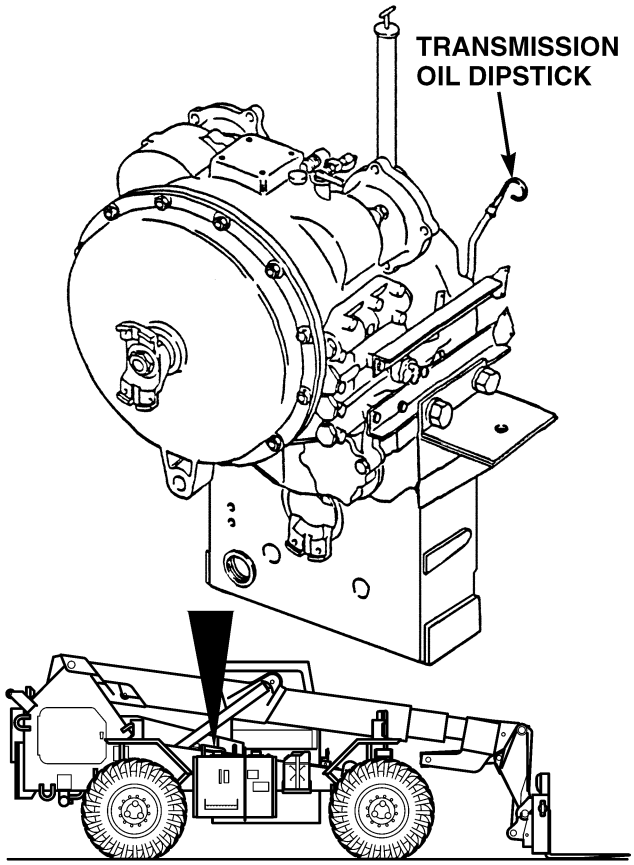
WARNING

- Drycleaning solvent P-D-680 (Type II) is a flammable solvent that is potentially dangerous to personnel. Keep away from heat, sparks, or open flame. Flash point of solvent is 138 degrees F (59 degrees C). Use only in a well-ventilated area. Inhaling vapors over a period of time can cause headache and drowsiness. Use gloves to prevent irritation or inflammation of the skin. Solvent absorbed through the skin can result in internal disorders. If contact occurs, wash the affected area with water for 15 minutes. For eyes, flush with water and then seek immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

TRANSMISSION OIL VISUAL INSPECTION
Check transmission oil level with dipstick. Transmission oil should be at or near FULL mark. (a) If transmission oil at FULL mark, go to Step 2 of this fault. (b) If transmission oil is at or near ADD mark, add transmission oil as necessary (Para 9-6). (c) If transmission oil is above FULL mark, drain transmission oil to proper level (Para 9-6).



15. TRANSMISSION OIL TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated transmission oil temperature is continuously above 250 degrees F. High transmission oil temperature warning light is ON. Transmission oil level OK.
POSSIBLE PROBLEMS
Engine coolant level low. Main hydraulic pressure low. Transmission oil lines/cooler obstructed, leaking. Transmission oil filter dirty, obstructed. Vehicle brakes dragging.

2

Is engine coolant at proper level (1/3 to 2/3 full) in overflow tank?

NO → Add coolant as needed (Para 7-2).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If engine coolant level low, engine will run hot.

KNOWN INFO
Indicated transmission oil temperature is continuously above 250 degrees F. High transmission oil temperature warning light is ON. Transmission oil level OK. Engine coolant level OK.
POSSIBLE PROBLEMS
Main hydraulic pressure low. Transmission oil lines/cooler obstructed, leaking. Transmission oil filter dirty, obstructed. Vehicle brakes dragging.

3

Do hydraulic functions (boom cylinder and attachment cylinders, for example) operate smoothly, without hesitation?

NO → Possible low hydraulic pressure. Refer to the Hydraulic Troubleshooting Section to correct fault.

YES

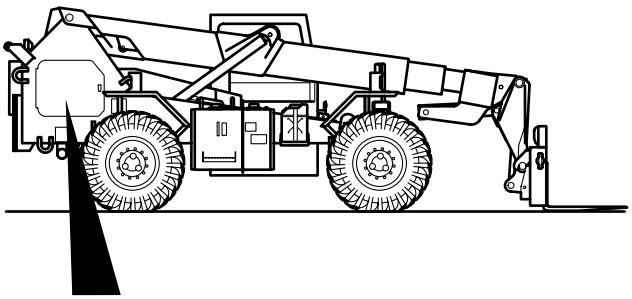
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hydraulic functions operate slowly and/or jerk, hydraulic pressure is low.

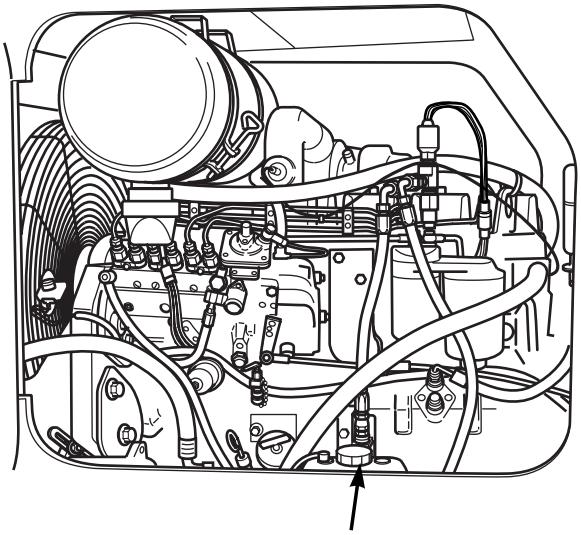
ENGINE COOLANT VISUAL INSPECTION

Visually check engine coolant level in overflow tank. Tank should be 1/3 to 2/3 full (Para 7-2).

(a) If tank is 1/3 to 2/3 full, go to Step 3 of this fault.

(b) If tank is not filled to proper level, add coolant as needed (Para 7-2).





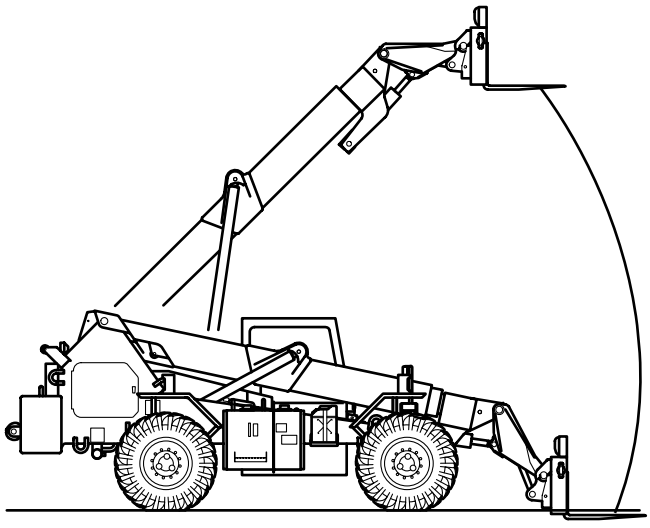
OVERFLOW TANK

HYDRAULIC PRESSURE VISUAL INSPECTION

Operate hydraulic functions (boom cylinder, attachment cylinders, for example) to check hydraulic pressure.

(a) If functions operate smoothly, without hesitation, go to Step 4 of this fault.

(b) If functions are sluggish, hesitate, or jerk, hydraulic pressure may be low. Refer to the Hydraulic Troubleshooting Section to correct fault.



15. TRANSMISSION OIL TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated transmission oil temperature is continuously above 250 degrees F. High transmission oil temperature warning light is ON. Transmission oil level OK. Engine coolant level OK. Main hydraulic pressure OK.
POSSIBLE PROBLEMS
Transmission oil lines/cooler obstructed, leaking. Transmission oil filter dirty, obstructed. Vehicle brakes dragging.

4

Are transmission oil lines and cooler free from signs of leaks or obstructions?

NO → Replace transmission oil lines as necessary (Para 7-2 and Para 9-7).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transmission oil lines and/or cooler obstructed or leaking, transmission will run hot.

KNOWN INFO
Indicated transmission oil temperature is continuously above 250 degrees F. High transmission oil temperature warning light is ON. Transmission oil level OK. Engine coolant level OK. Main hydraulic pressure OK. Transmission oil lines, cooler OK.
POSSIBLE PROBLEMS
Transmission oil filter dirty, obstructed. Vehicle brakes dragging.

5

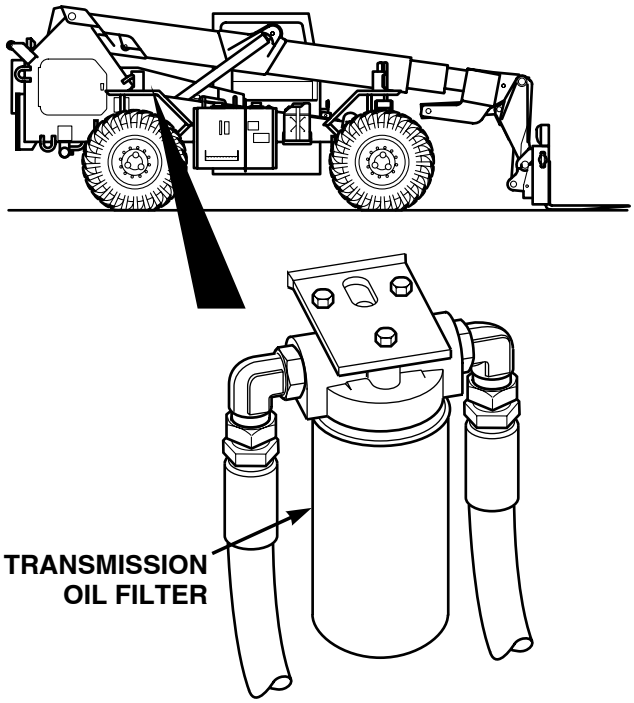
Is transmission oil filter clean and free from obstructions?

NO → Replace transmission oil filter (Para 9-8).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transmission oil filter is dirty or obstructed, transmission oil will overheat.

TRANSMISSION OIL LINES AND COOLER VISUAL INSPECTION
Visually inspect transmission oil lines and cooler for signs of damage and leaks or obstructions. (a) If lines and cooler are tight, clean, and undamaged, go to Step 5 of this fault. (b) If lines and/or cooler show signs of damage and/or leaks, replace components as necessary (Para 9-7).



TRANSMISSION OIL FILTER VISUAL INSPECTION
Check transmission oil filter for dirt, damage, and/or obstructions. (a) If oil flows freely through filter, go to Step 6 of this fault. (b) If oil does not flow freely through filter (filter obstructed and/or damaged), replace transmission oil filter (Para 9-8).

15. TRANSMISSION OIL TEMPERATURE ABOVE NORMAL (CONT).

KNOWN INFO
Indicated transmission oil temperature is continuously above 250 degrees F. High transmission oil temperature warning light is ON. Transmission oil level OK. Engine coolant level OK. Main hydraulic pressure OK. Transmission oil lines, cooler OK. Transmission oil filter OK.
POSSIBLE PROBLEMS
Vehicle brakes dragging.

6

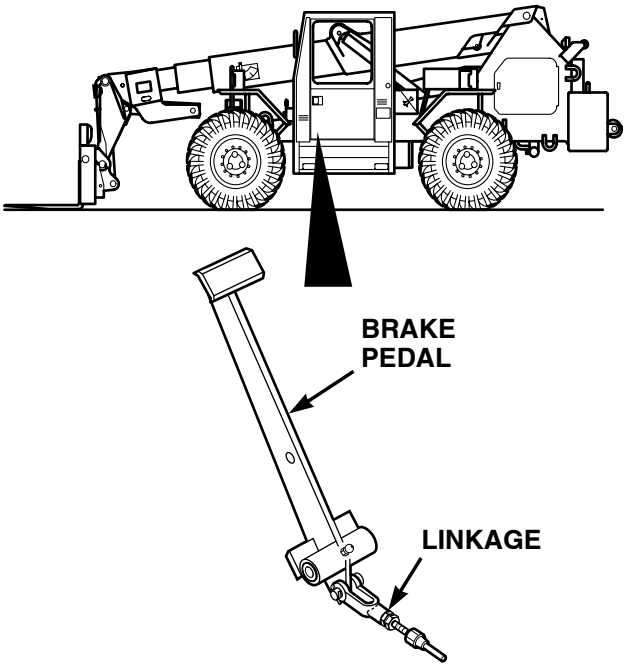
Are vehicle brakes functioning correctly?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If vehicle brakes dragging, refer to the Brakes Troubleshooting Sections to correct this fault.

NO → Refer to the Service and Parking Brakes Troubleshooting Sections to correct this fault.

YES → Replace transmission oil filter. If fault not corrected, notify Direct Support about this fault.

VEHICLE BRAKES VISUAL INSPECTION
Check that vehicle brake pedal returns to full up position, and that park brake linkage is adjusted correctly. (a) If vehicle brakes are functioning correctly, replace transmission oil filter. If fault not corrected, notify Direct Support. (b) If vehicle brakes are not functioning correctly, refer to the Service and Parking Brakes Troubleshooting Sections to correct this fault.



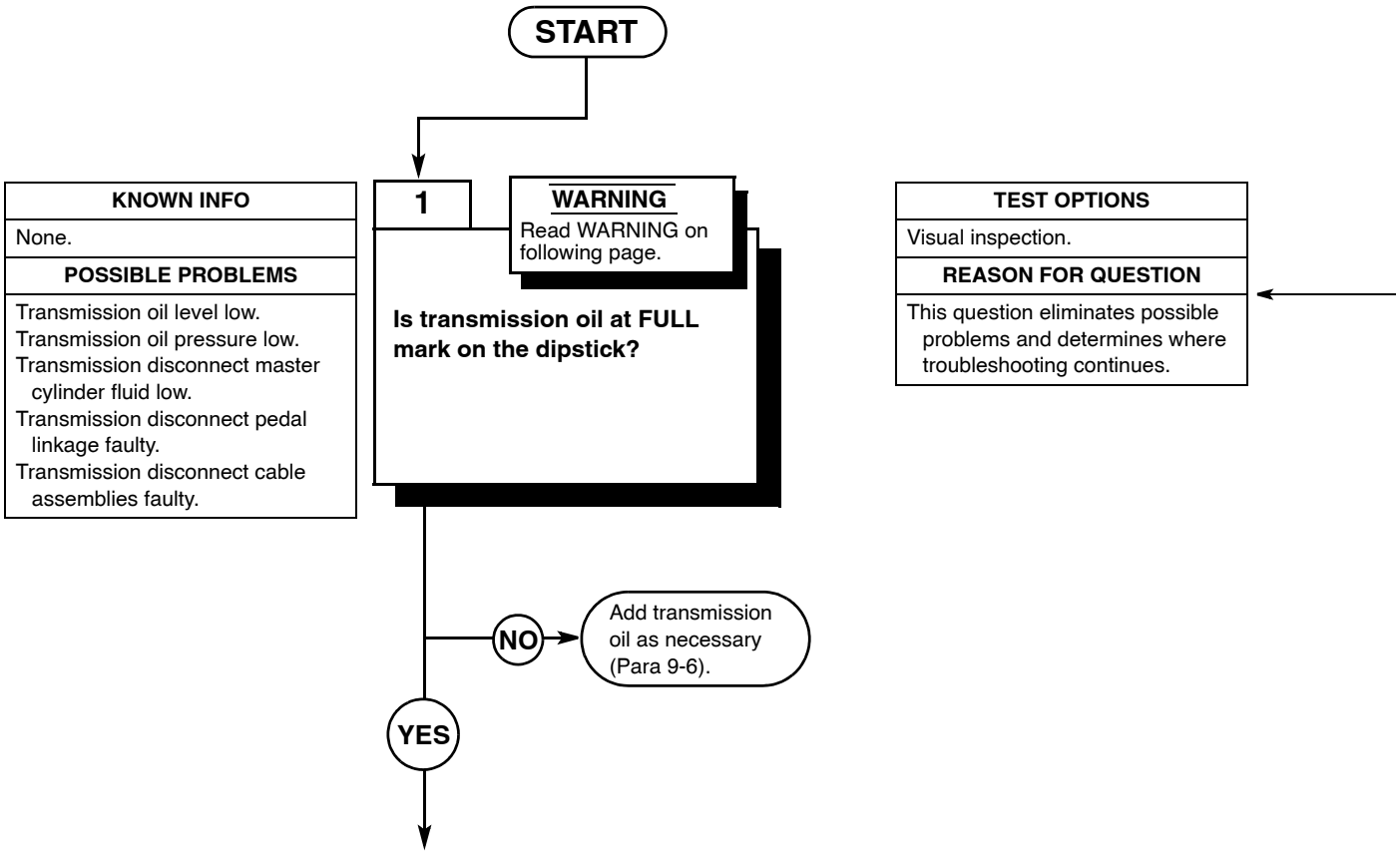
16. TRANSMISSION DISCONNECT SLOW OR MALFUNCTIONING.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10
TM 9-4910-571-12&P



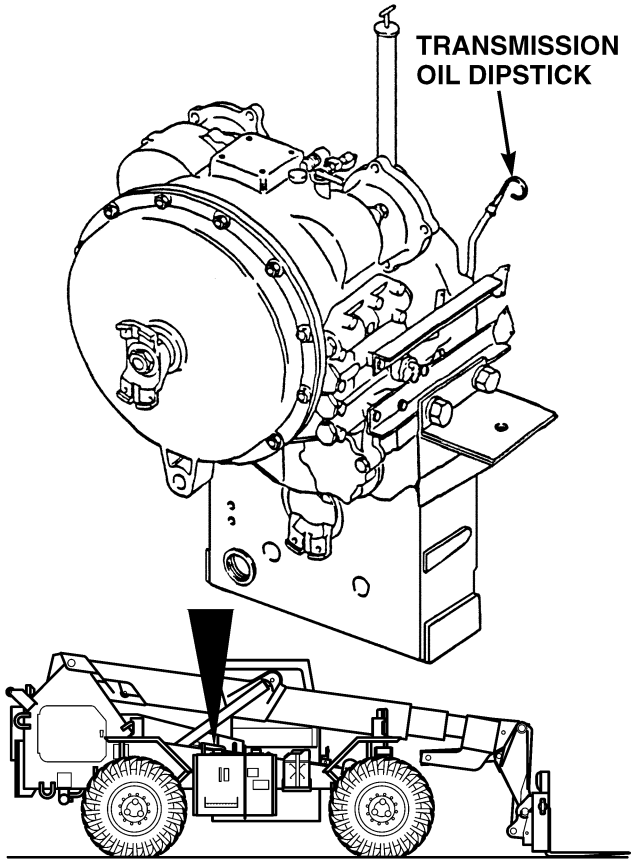
WARNING

- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

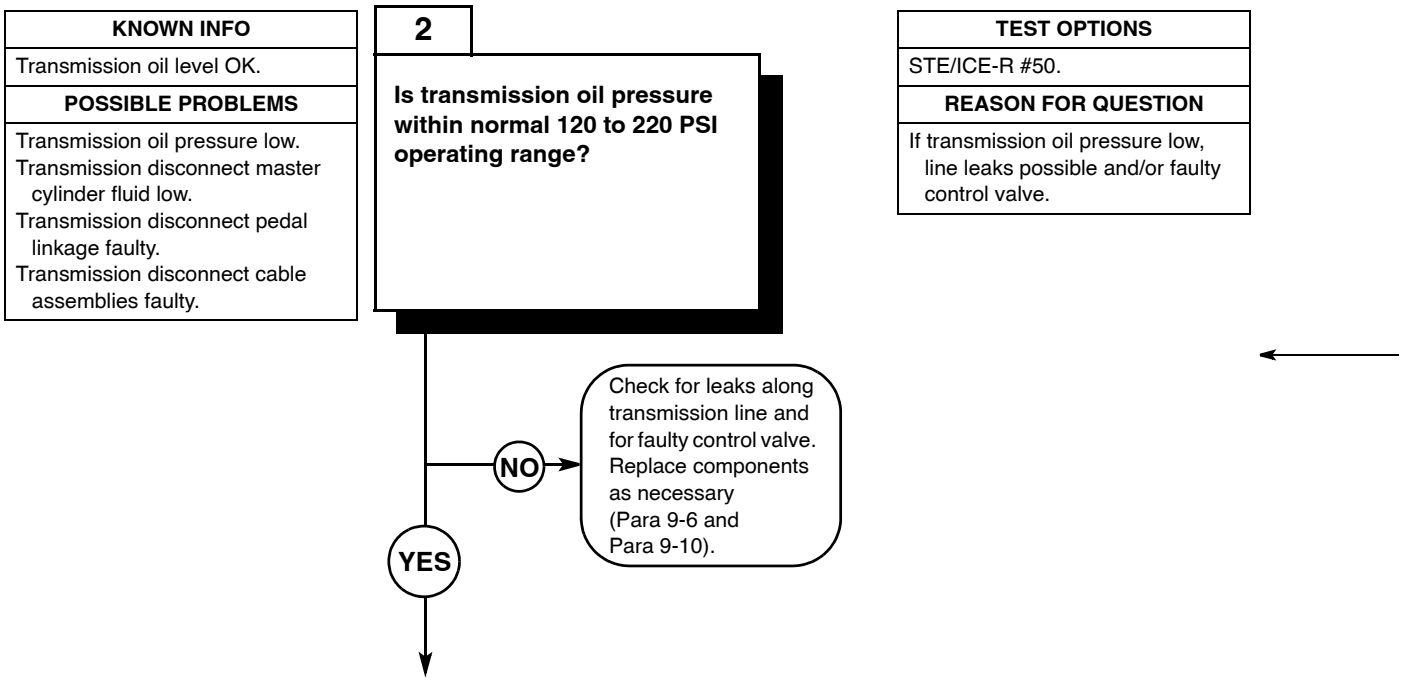
CAUTION

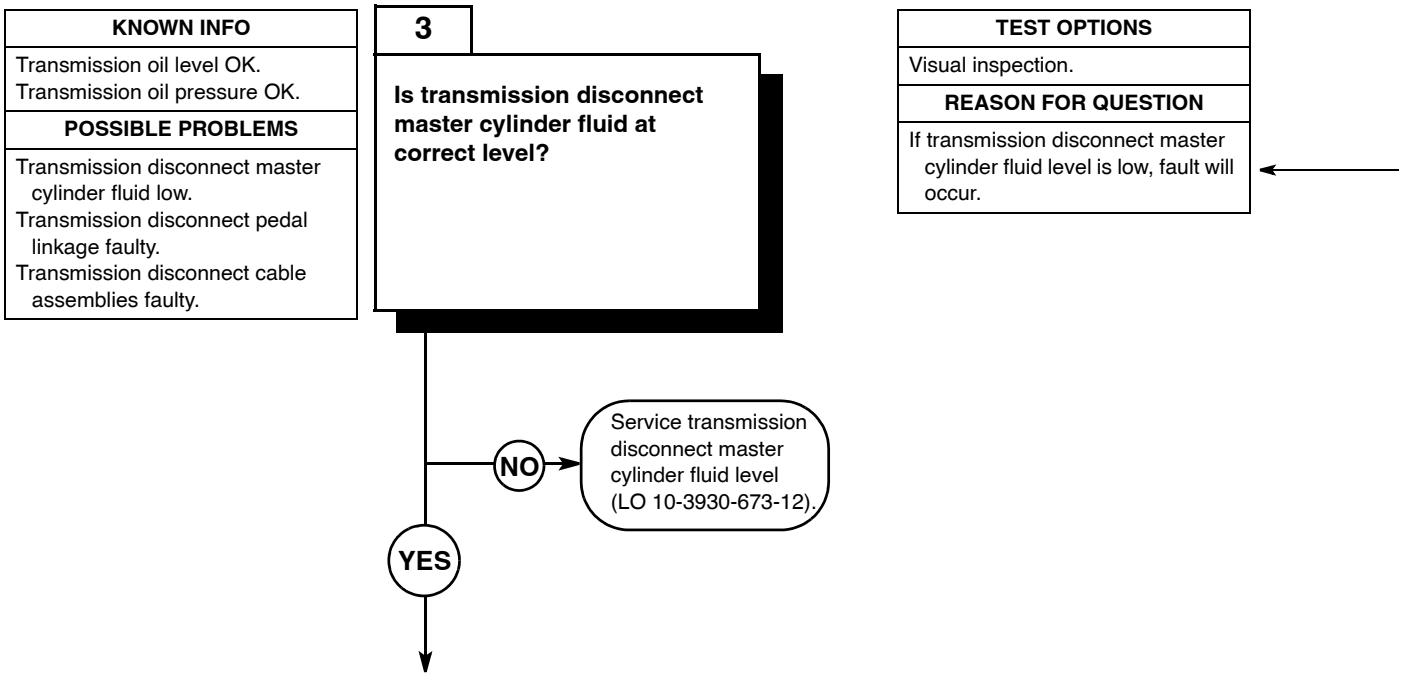
Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

TRANSMISSION OIL VISUAL INSPECTION
Check transmission oil level with dipstick. Transmission oil should be at or near FULL mark. (a) If transmission oil at FULL mark, go to Step 2 of this fault. (b) If transmission oil is at or near ADD mark, add transmission oil as necessary (Para 9-6).

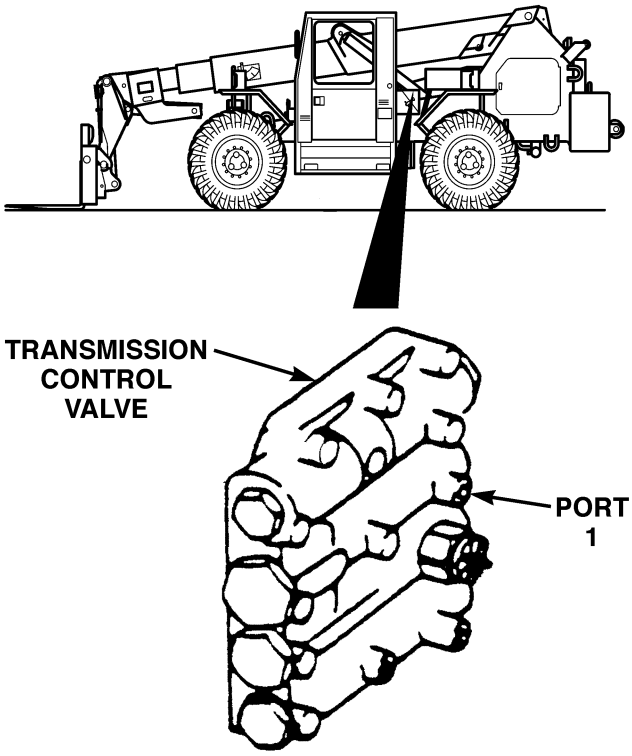


16. TRANSMISSION DISCONNECT SLOW OR MALFUNCTIONING (CONT).

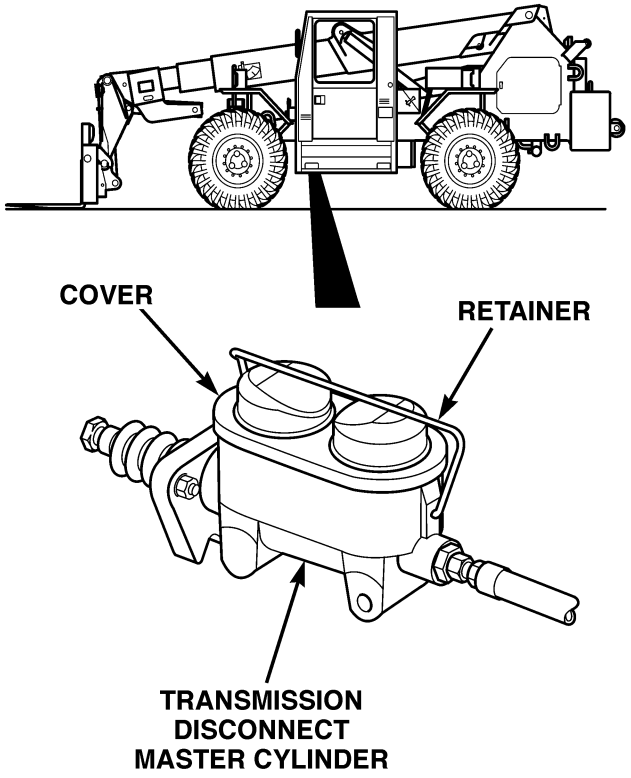




TRANSMISSION OIL PRESSURE STE/ICE PRESSURE TEST
(1) Install STE/ICE test device on port number 1 of transmission control valve. (2) Perform STE/ICE Test #50 (TM 9-4910-571-12&P). (3) Read output pressure on test device. (a) If pressure is within 120 to 220 PSI at 2000 RPM, go to Step 3 of this fault. (b) If pressure is below specified range, check for leaks along transmission lines, or for faulty control valve. Shut down engine (TM 10-3930-673-10) and replace components as necessary (Para 9-6 and Para 9-10).



TRANSMISSION DISCONNECT MASTER CYLINDER VISUAL INSPECTION
Loosen retainer and remove cover from transmission disconnect master cylinder. (a) If fluid level is below 1/4 in. (6.35 mm) of top, service transmission disconnect master cylinder fluid level (LO 10-3930-673-12). (b) If fluid level is within 1/4 in. (6.35 mm) of top, install cover with retainer. Go to Step 4 of this fault.



16. TRANSMISSION DISCONNECT SLOW OR MALFUNCTIONING (CONT).

KNOWN INFO
Transmission oil level OK. Transmission oil pressure OK. Transmission disconnect master cylinder fluid level OK.
POSSIBLE PROBLEMS
Transmission disconnect pedal linkage faulty. Transmission disconnect cable assemblies faulty.

4

Is transmission disconnect pedal linkage adjusted correctly and free from signs of wear?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transmission disconnect pedal linkage worn or faulty, transission disconnect will malfunction.

NO → Replace worn or faulty transmission disconnect pedal linkage as necessary (Para 9-4).

YES

KNOWN INFO
Transmission oil level OK. Transmission oil pressure OK. Transmission disconnect master cylinder fluid level OK. Transmission disconnect pedal linkage OK.
POSSIBLE PROBLEMS
Transmission disconnect cable assemblies faulty.

5

Are transmission disconnect cable and connections free from signs of wear and/or damage?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transmission disconnect cable and connections worn or damaged, transmission disconnect will malfunction.

NO → Replace worn or damaged cable and connections (Para 9-3).

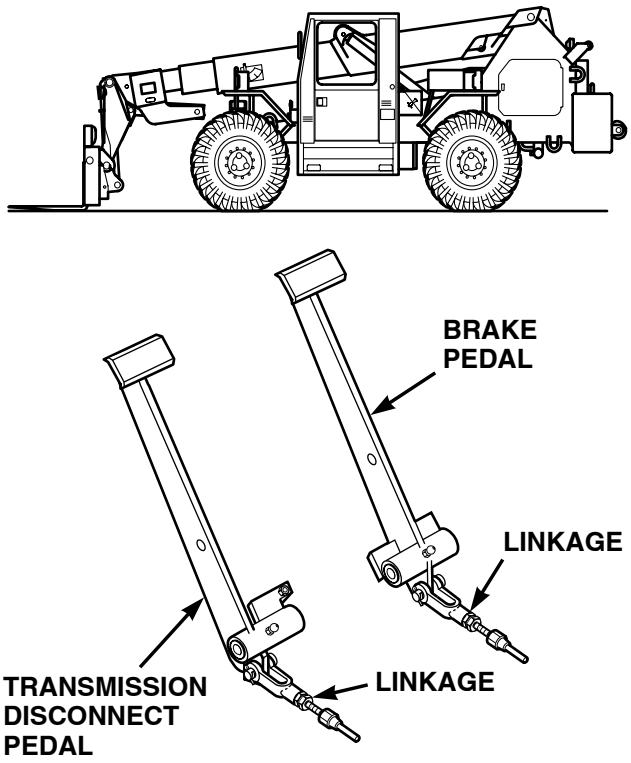
YES → Notify Direct Support about this fault.

TRANSMISSION DISCONNECT PEDAL LINKAGE VISUAL INSPECTION

Visually inspect transmission disconnect pedal linkage for incorrect adjustment and/or signs of wear.

(a) If linkage is correctly adjusted and free from signs of wear, go to Step 5 of this fault.

(b) If linkage is incorrectly adjusted, readjust linkage (Para 9-4). If linkage shows signs of wear, replace worn components (Para 9-4).

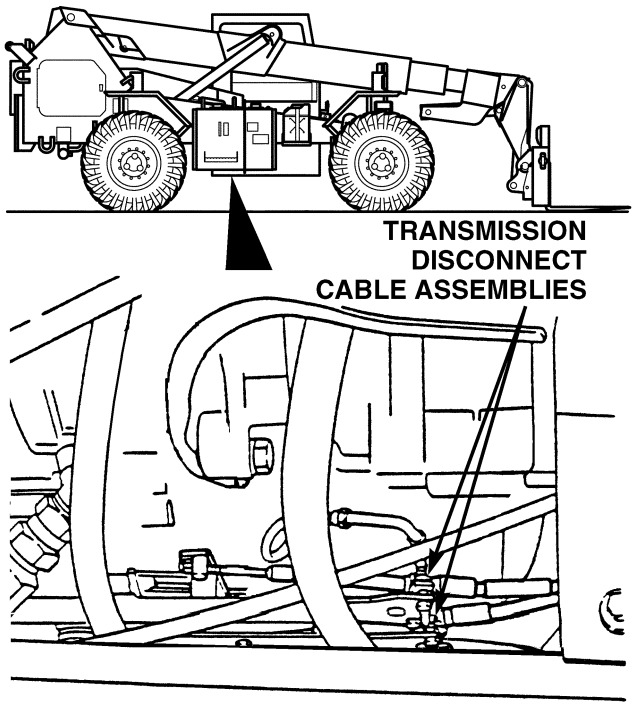


TRANSMISSION DISCONNECT CABLE AND CONNECTIONS VISUAL INSPECTION

Visually inspect transmission disconnect cable and connections for wear and/or damage.

(a) If cable and/or connections show no signs of wear or damage, notify Direct Support about this fault.

(b) If cable and/or connections show signs of wear and/or damage, replace worn or damaged cable and/or connections (Para 9-3).



17. STEERING PULLS TO RIGHT OR LEFT.

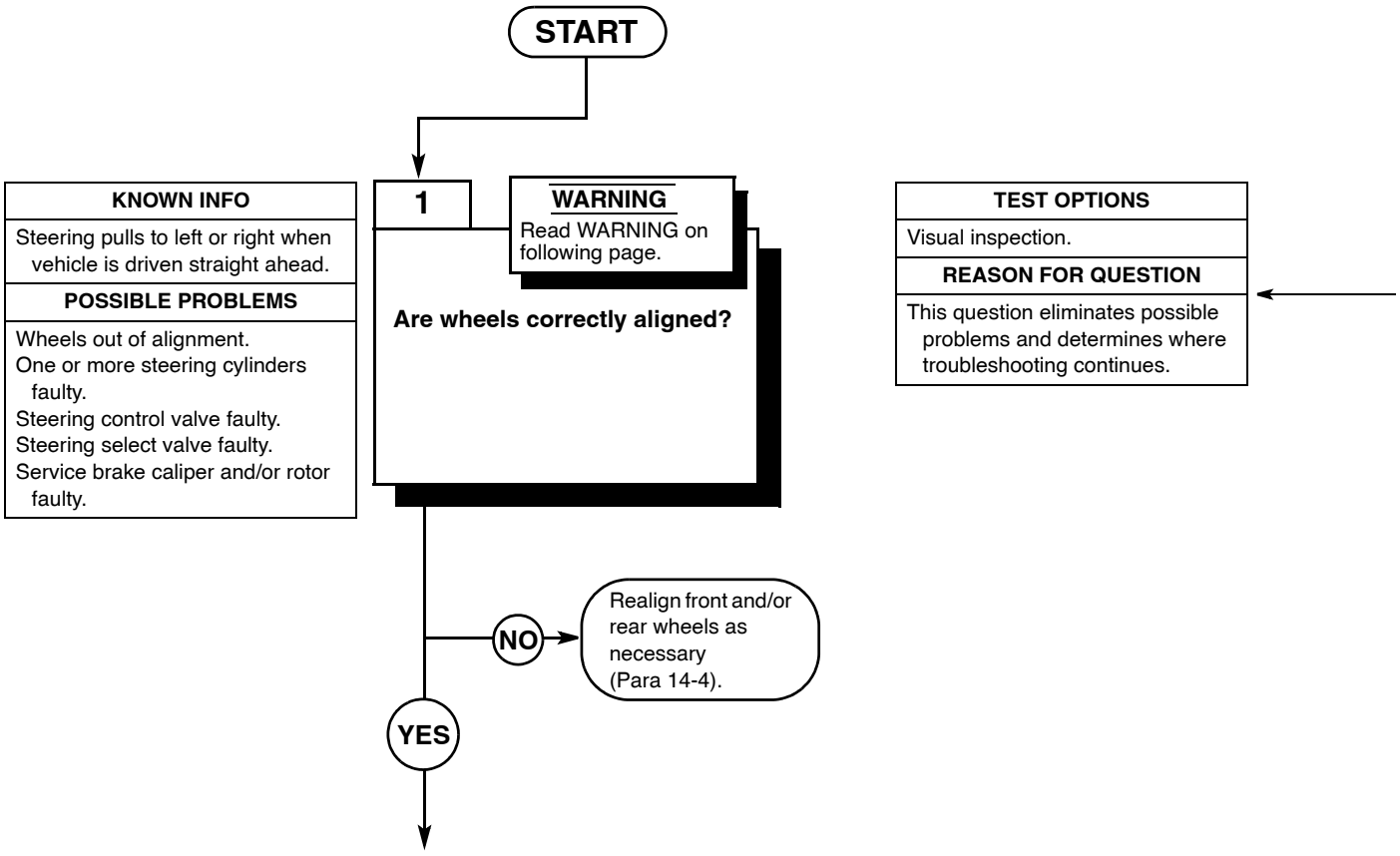
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
Multimeter, Digital (Item 9, Appendix F)
Pressure Gage, 0 to 5000 PSI (Item 6, Appendix F)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



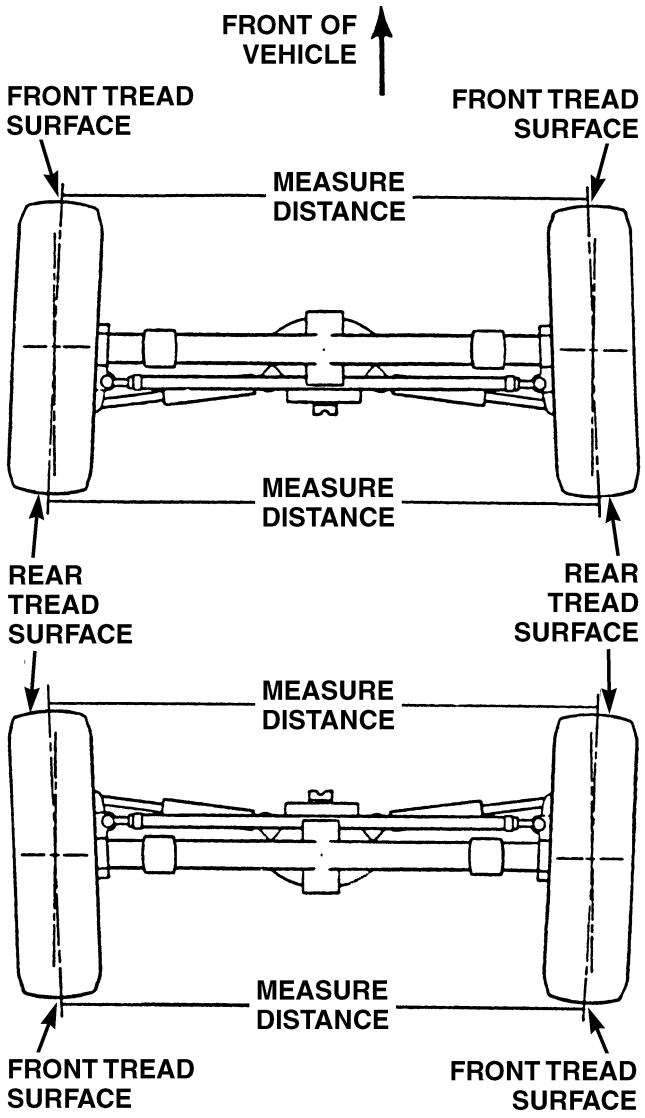
WARNING

- Hydraulic oil in the system can be under pressure over 3000 psi with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in the hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on the ground, move control levers through all operating positions several times to relieve levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

- Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines.
- Contamination of the hydraulic system could result in premature failure.

FRONT AND/OR REAR WHEEL ALIGNMENT VISUAL INSPECTION
Measure distances between front tread surfaces of front and/or rear wheels, and distances between rear tread surfaces of wheels to determine if front and/or rear wheels are correctly aligned (Para 14-4). (a) If distances between the front tread surfaces and rear tread surfaces of wheels are within 1/8 in., go to Step 2 of this fault. (b) If distances between the front tread surfaces and rear tread surfaces of wheels are greater than 1/8 in., adjust tie rods to realign wheels (Para 14-4).



17. STEERING PULLS TO RIGHT OR LEFT (CONT).

KNOWN INFO
Steering pulls to left or right when vehicle is driven straight ahead. Wheel alignment OK.
POSSIBLE PROBLEMS
One or more steering cylinders faulty. Steering control valve faulty. Steering select valve faulty. Service brake caliper and/or rotor faulty.

2

Are hydraulic steering cylinders free from signs of damage and/or leaks?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If one or more steering cylinders faulty, steering will pull to right or left.

NO → Replace damaged or leaking hydraulic steering cylinders (Para 14-7).

YES

KNOWN INFO
Steering pulls to left or right when vehicle is driven straight ahead. Wheel alignment OK. Hydraulic steering cylinders OK.
POSSIBLE PROBLEMS
Steering control valve faulty. Steering select valve faulty. Service brake caliper and/or rotor faulty.

3

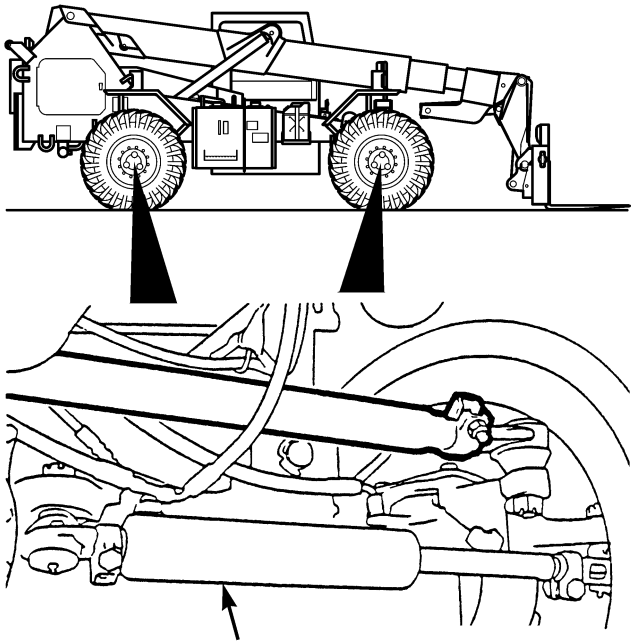
Is hydraulic oil pressure at steering control valve at 2500 PSI?

TEST OPTIONS
Visual inspection. Pressure test.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2500 PSI, priority valve is faulty.

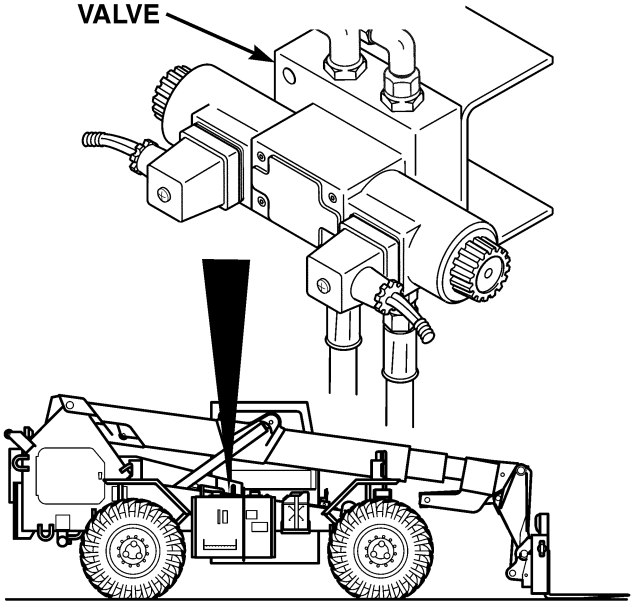
NO → Replace faulty steering control valve (Para 14-9).

YES

HYDRAULIC STEERING CYLINDERS VISUAL INSPECTION
Visually inspect hydraulic steering cylinders for signs of damage and/or leaks. (a) If there are no signs of damage or leaks, go to Step 3 of this fault. (b) If there are signs of damage and/or leaks replace cylinders as necessary (Para 14-7).



STEERING CONTROL VALVE VISUAL INSPECTION AND HYDRAULIC PRESSURE TEST
(1) Use a test tee and a 0 to 5000 PSI pressure gage to test hydraulic pressure at the steering control valve output line. (2) Read output pressure on test device. (a) If the hydraulic oil pressure is at 2500 PSI, go to Step 4 of this fault. (b) If the hydraulic oil pressure is not at 2500 PSI, remove and replace the priority valve (Para 14-9).



17. STEERING PULLS TO RIGHT OR LEFT (CONT).

KNOWN INFO
Steering pulls to left or right when vehicle is driven straight ahead. Wheel alignment OK. Hydraulic steering cylinders OK. Steering control valve OK.
POSSIBLE PROBLEMS
Steering select valve faulty. Service brake caliper and/or rotor faulty.

4

Is continuity indicated at solenoids on the steering select valve?

TEST OPTIONS
Visual inspection. Continuity test.
REASON FOR QUESTION
If continuity is not indicated at solenoids, faulty steering select valve.

NO → Replace faulty steering select valve (Para 14-10).

YES

KNOWN INFO
Steering pulls to left or right when vehicle is driven straight ahead. Wheel alignment OK. Hydraulic steering cylinders OK. Steering control valve OK. Steering select valve OK.
POSSIBLE PROBLEMS
Service brake caliper and/or rotor faulty.

5

Are vehicle brakes functioning correctly (not binding or dragging)?

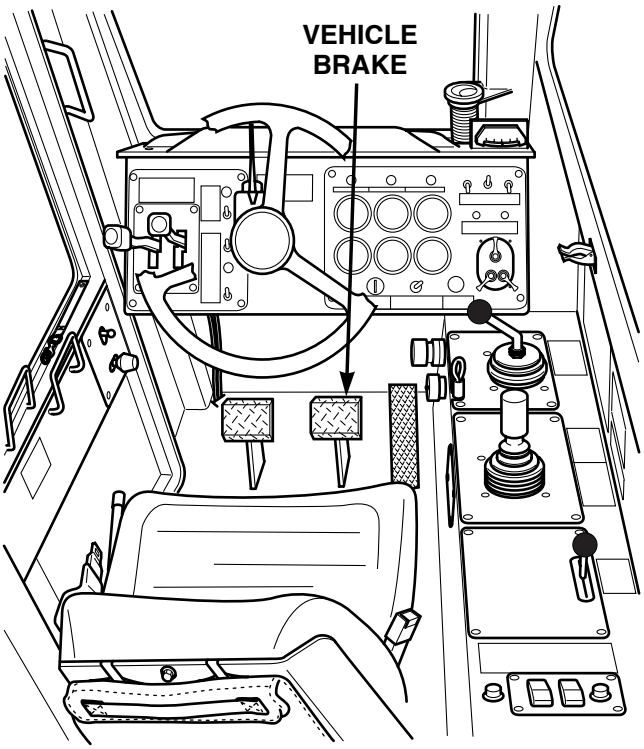
TEST OPTIONS
Visual inspections.
REASON FOR QUESTION
If brake calipers or rotors binding or faulty, notify Direct Support to replace calipers.

NO → Notify Direct Support to replace calipers.

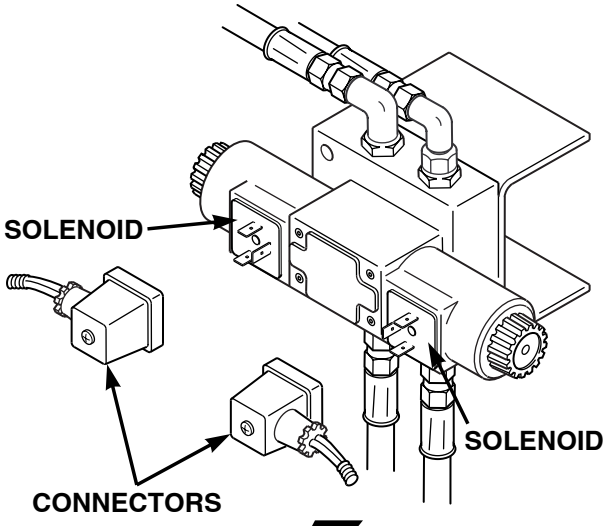
YES

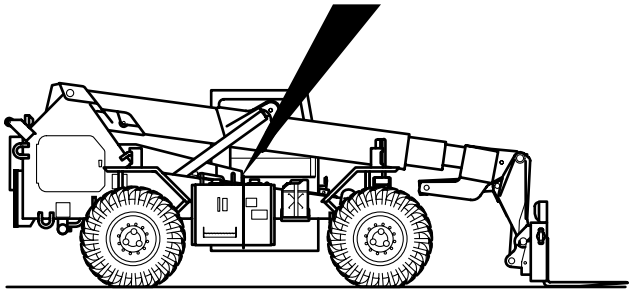
Notify Direct Support about this fault.

SOLENOIDS AT STEERING SELECT VALVE CONTINUITY TEST
(1) Set multimeter to ohms. (2) Perform a continuity test on solenoids at the steering select valve. (3) Read output of multimeter. (a) If multimeter indicates continuity, go to Step 5 of this fault. (b) If continuity is not indicated, replace steering select valve (Para 14-10).



BRAKES VISUAL INSPECTION
Operate brakes to test brake calipers, rotors for binding and/or dragging. (a) If brakes functioning correctly, notify Direct Support about this fault. (b) If one or more service brakes binding, dragging, notify Direct Support to replace calipers and/or rotors.





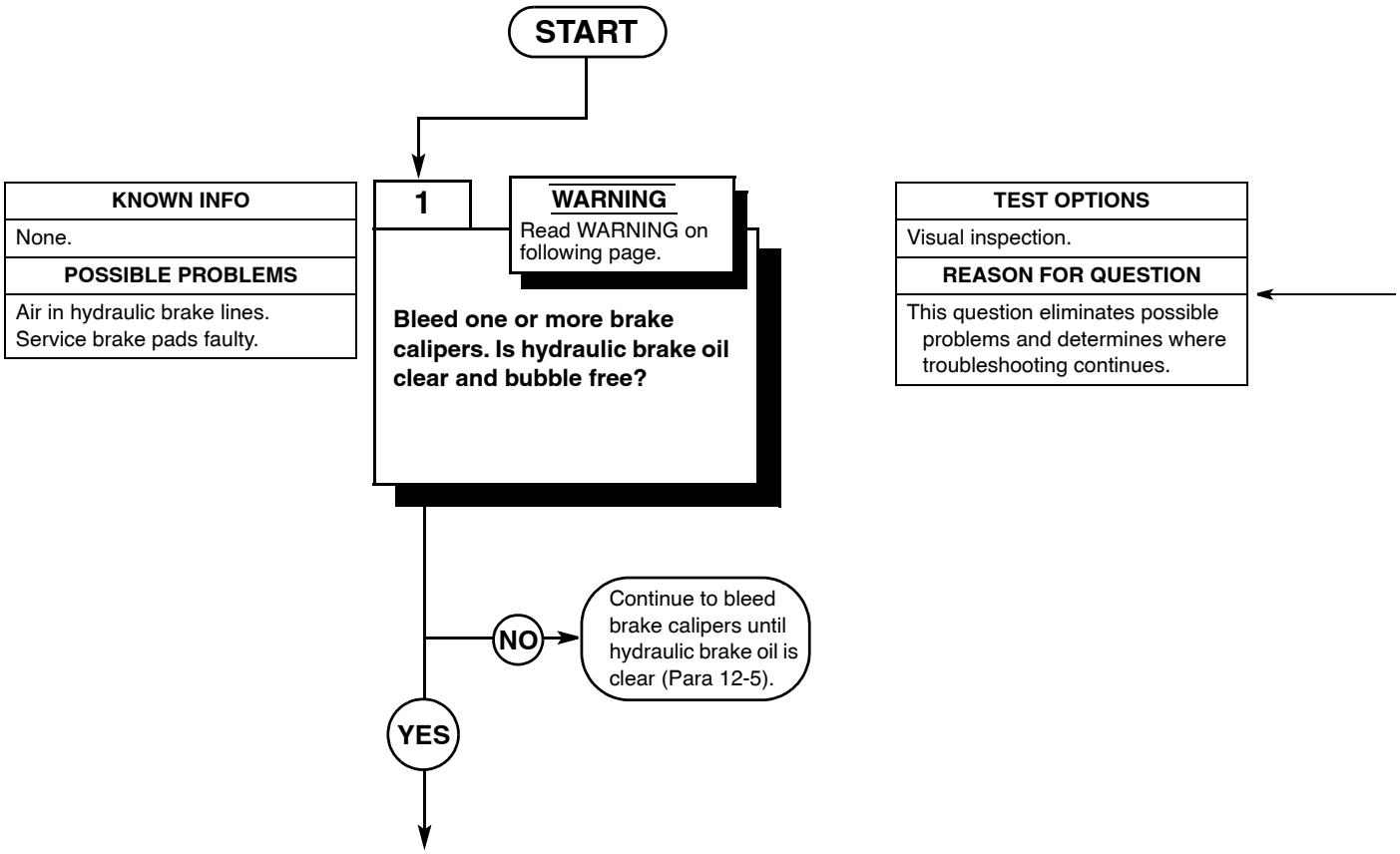
18. SERVICE BRAKES CHATTER, ARE NOISY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



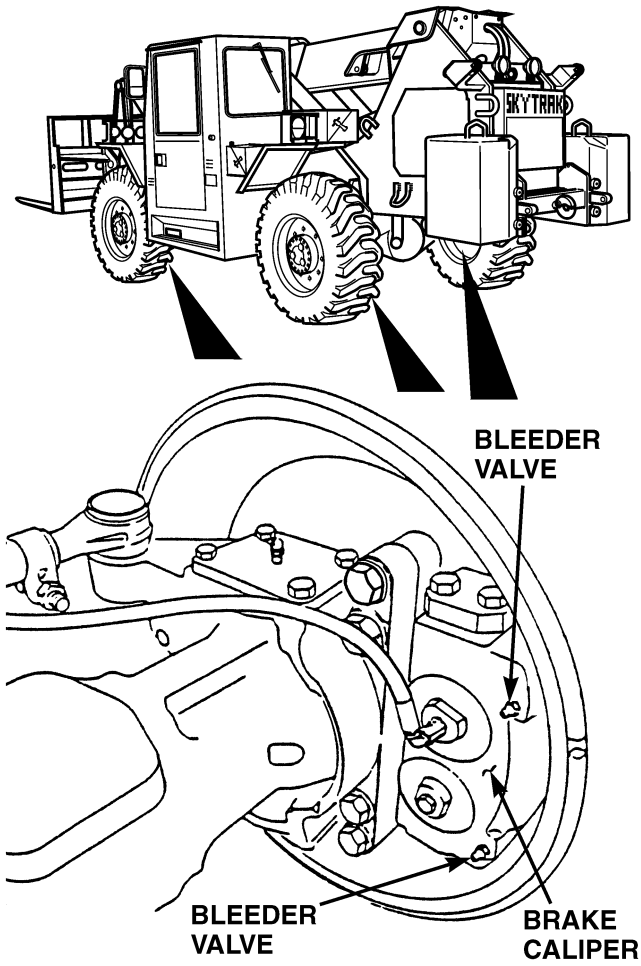
WARNING

- Be sure wheels are chocked before removing parking brake assembly.
- Springs are under tension. Always wear protective glasses when working on springs under tension. Use care when removing springs from brake pads. Failure to follow these precautions could result in personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

- Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines.
- Contamination of the hydraulic system could result in premature failure.
- Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

BRAKE CALIPERS VISUAL INSPECTION
(1) Bleed one or more brake calipers to determine if there is air in brake lines (Para 12-5). (a) If hydraulic brake oil is clear and bubble free, go to Step 2 of this fault. (b) If hydraulic brake oil is cloudy or contains bubbles, continue to bleed lines until air is removed from lines (Para 12-5). Go to Step (2) below. (2) Test service brakes. If fault is not corrected, go to Step 2 of this fault.



18. SERVICE BRAKES CHATTER, ARE NOISY (CONT).

KNOWN INFO
Brake lines free of air.
POSSIBLE PROBLEMS
Service brake pads faulty.

2

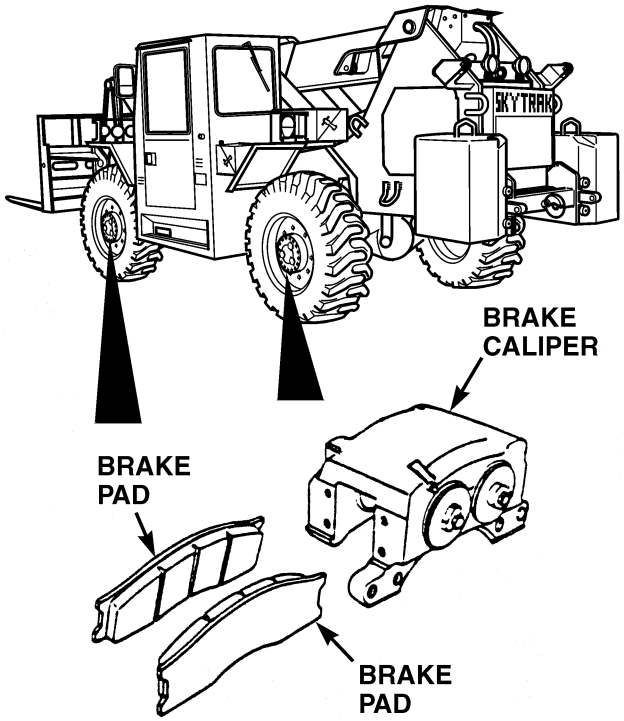
Are service brake pads free from signs of excessive wear?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If service brake pads worn, service brakes will chatter.

NO → Replace service brake pads as necessary (Para 0-1).

YES → Notify Direct Support of this fault.

BRAKE PADS VISUAL INSPECTION
(1) Visually inspect service brake pads for uneven and/or excessive wear. (a) If brake pads appear OK, notify Direct Support of this fault. (b) If brake pads show uneven and/or excessive wear, replace pads as necessary (Para 0-1). Go to Step (2) below. (2) Test service brakes. If fault is not corrected, notify Direct Support of this fault.



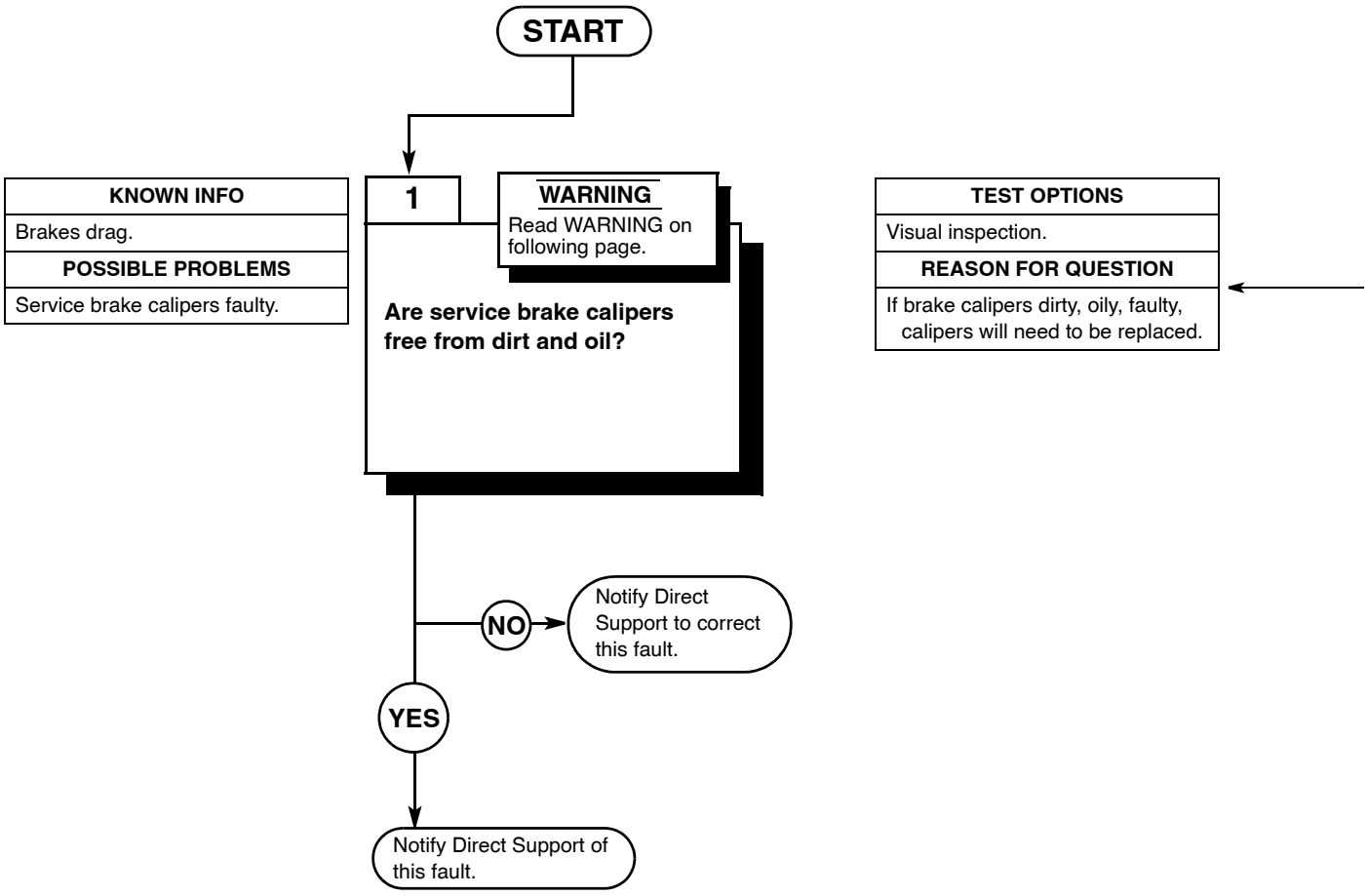
19. BRAKES DRAG.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



WARNING

- Be sure wheels are chocked before removing parking brake assembly.
- Springs are under tension. Always wear protective glasses when working on springs under tension. Use care when removing springs from brake pads. Failure to follow these precautions could result in personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

- Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines.
- Contamination of the hydraulic system could result in premature failure.
- Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

BRAKE CALIPERS VISUAL INSPECTION
Inspect service brake calipers for dirt and oil. (a) If brake calipers are clean, notify Direct Support of this fault. (b) If brake calipers are dirty and show signs of oil, notify Direct Support to replace calipers.

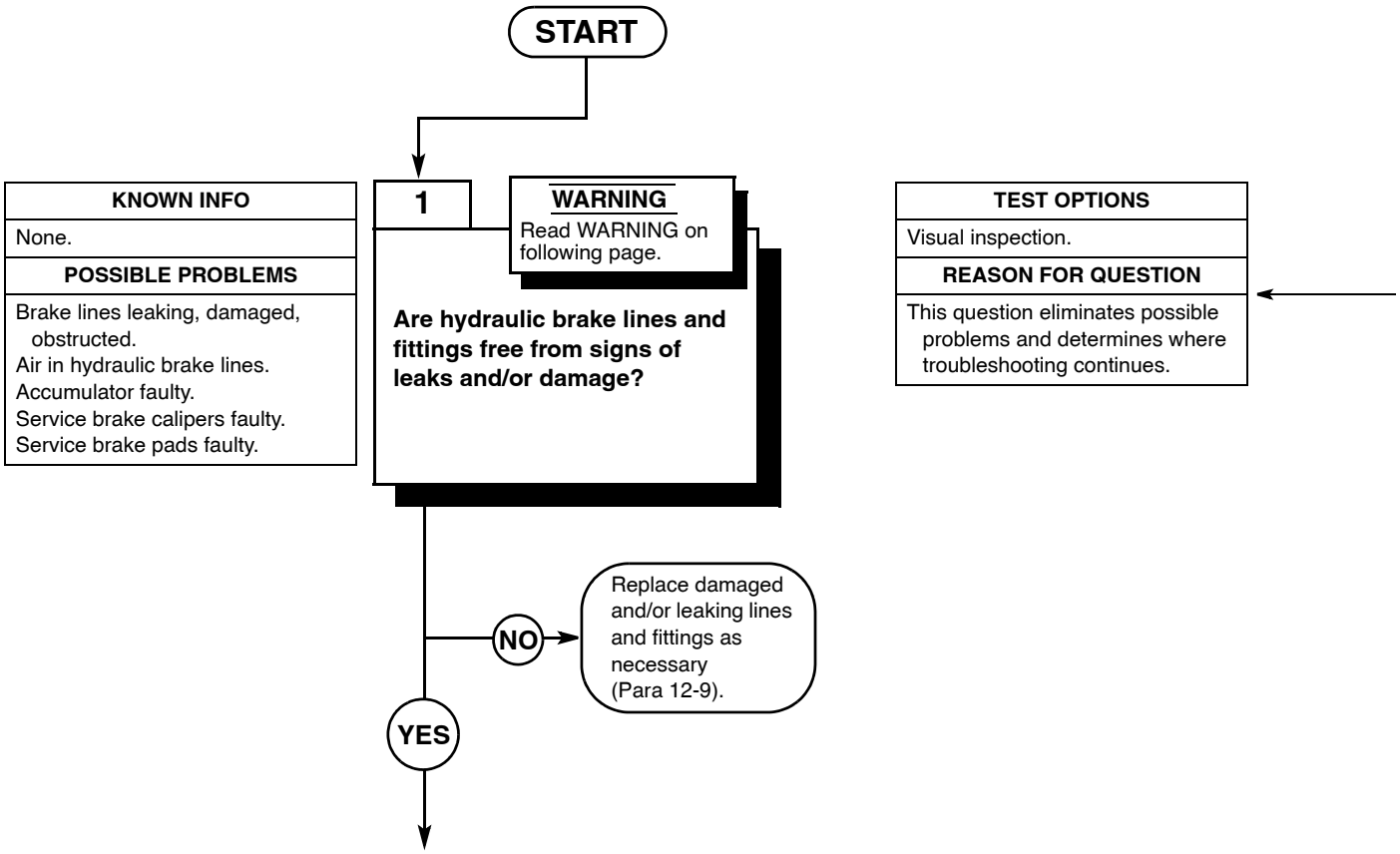
20. SERVICE BRAKES DO NOT STOP VEHICLE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



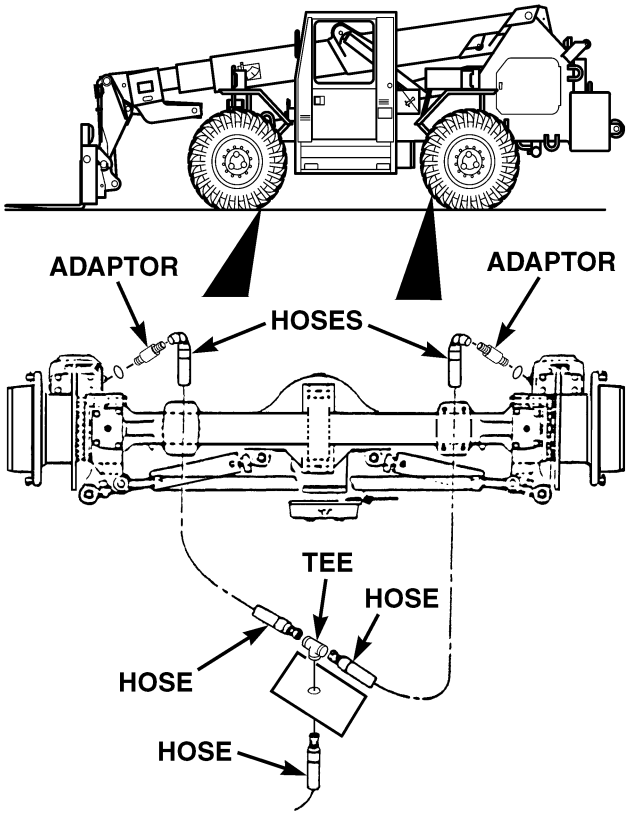
WARNING

- Be sure wheels are chocked before removing parking brake assembly.
- Springs are under tension. Always wear protective glasses when working on springs under tension. Use care when removing springs from brake pads. Failure to follow these precautions could result in personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

- Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines.
- Contamination of the hydraulic system could result in premature failure.
- Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

BRAKE LINES AND FITTINGS VISUAL INSPECTION
Visually inspect hydraulic brake lines and fittings for breaks and leaks. (a) If lines and fittings are free from signs of damage and/or leaks, go to Step 2 of this fault. (b) If lines and fittings show signs of damage and/or leaks, replace lines and fittings as necessary (Para 12-9).



20. SERVICE BRAKES DO NOT STOP VEHICLE (CONT).

KNOWN INFO
Brake lines and fittings OK.
POSSIBLE PROBLEMS
Air in hydraulic brake lines. Accumulator faulty. Service brake calipers faulty. Service brake pads faulty.

2

Bleed one or more brake calipers. Is hydraulic brake oil clear and bubble free?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air is in hydraulic brake lines, lines will need to be bled.

NO → Continue to bleed brake calipers until hydraulic brake oil is clear (Para 12-5).

YES

KNOWN INFO
Brake lines and fittings OK. Brake lines free of air.
POSSIBLE PROBLEMS
Accumulator faulty. Service brake calipers faulty. Service brake pads faulty.

3

Does accumulator charge correctly? Is nitrogen precharge at specified 900 PSI?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If accumulator fails to charge, nitrogen precharge is low, accumulator is faulty.

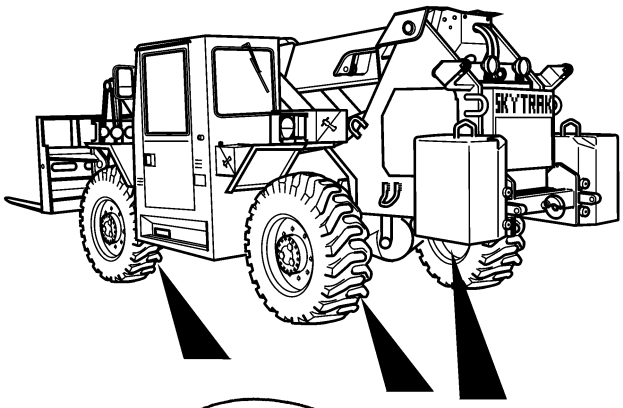
NO → Recharge and/or replace brake accumulator (Para 12-8).

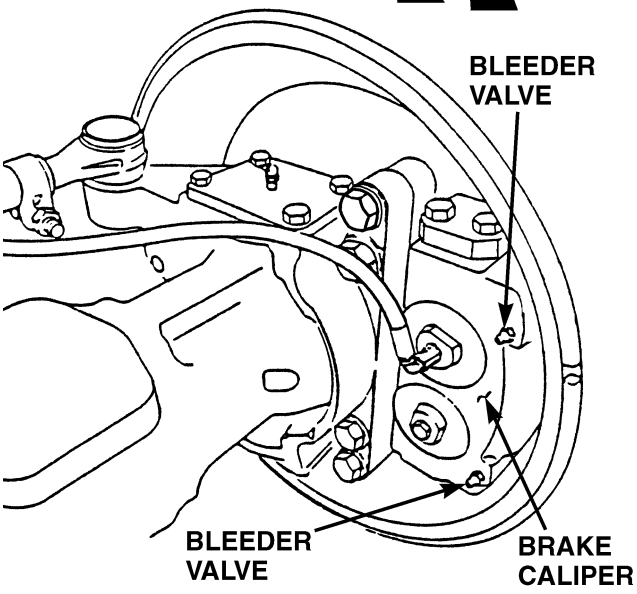
YES

BRAKE CALIPERS
VISUAL INSPECTION

Bleed one or more brake calipers to determine if there is air in the brake lines (Para 12-5).

(a) If hydraulic brake oil is clear and bubble free, go to Step 3 of this fault.
(b) If hydraulic brake oil is cloudy or contains bubbles, continue to bleed lines until air is removed from lines (Para 12-5).

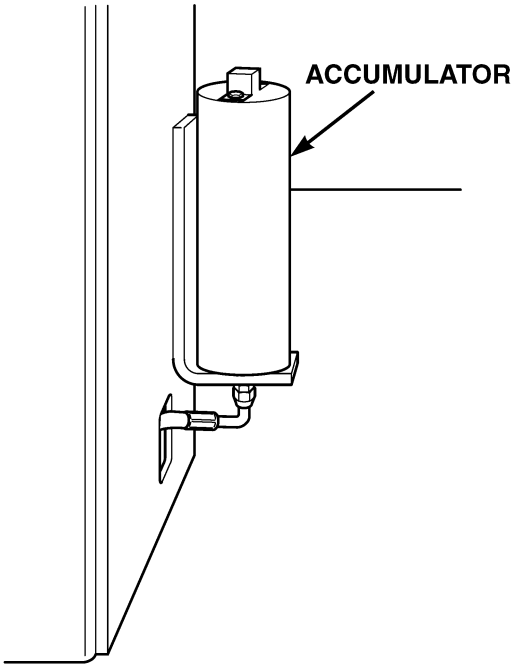




ACCUMULATOR
VISUAL INSPECTION AND
PRECHARGE PRESSURE TEST

Visually inspect brake accumulator for signs of damage. Remove accumulator and test precharge pressure (Para 12-8).

(a) If accumulator shows no signs of damage, and precharge is at specified pressure, go to Step 4 of this fault.
(b) If accumulator is damaged, replace accumulator (Para 12-8).
(c) If precharge is not at 900 PSI, add nitrogen charge (Para 12-8).



20. SERVICE BRAKES DO NOT STOP VEHICLE (CONT).

KNOWN INFO
Brake lines and fittings OK. Brake lines free of air. Brake accumulator OK.
POSSIBLE PROBLEMS
Service brake calipers faulty. Service brake pads faulty.

4

Are service brake calipers free from dirt and oil?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If service brake calipers dirty or show signs of oil, service bakes will not stop vehicle.

NO → Notify Direct Support to correct this fault.

YES

KNOWN INFO
Brake lines and fittings OK. Brake lines free of air. Brake accumulator OK. Service brake calipers OK.
POSSIBLE PROBLEMS
Service brake pads faulty.

5

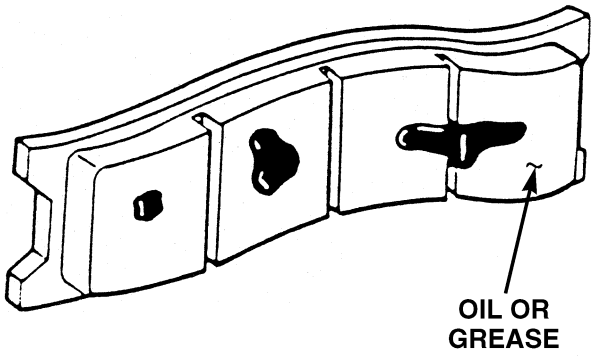
Are service brake pads free from signs of excessive wear?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If service brake pads worn, pads are faulty.

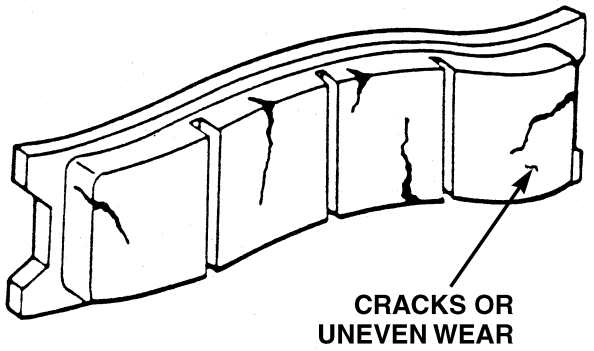
NO → Replace service brake pads as necessary (Para 0-1).

YES → Notify Direct Support about this fault.

BRAKE CALIPERS VISUAL INSPECTION
Inspect service brake calipers for dirt and oil. (a) If brake calipers are clean, go to Step 5 of this fault. (b) If brake calipers are dirty and show signs of oil, notify Direct Support to replace calipers.



BRAKE PADS VISUAL INSPECTION
Visually inspect service brake pads for uneven and/or excessive wear. (a) If brake pads appear OK, notify Direct Support about this fault. (b) If brake pads show uneven and/or excessive wear, replace pads as necessary (Para 0-1).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE.

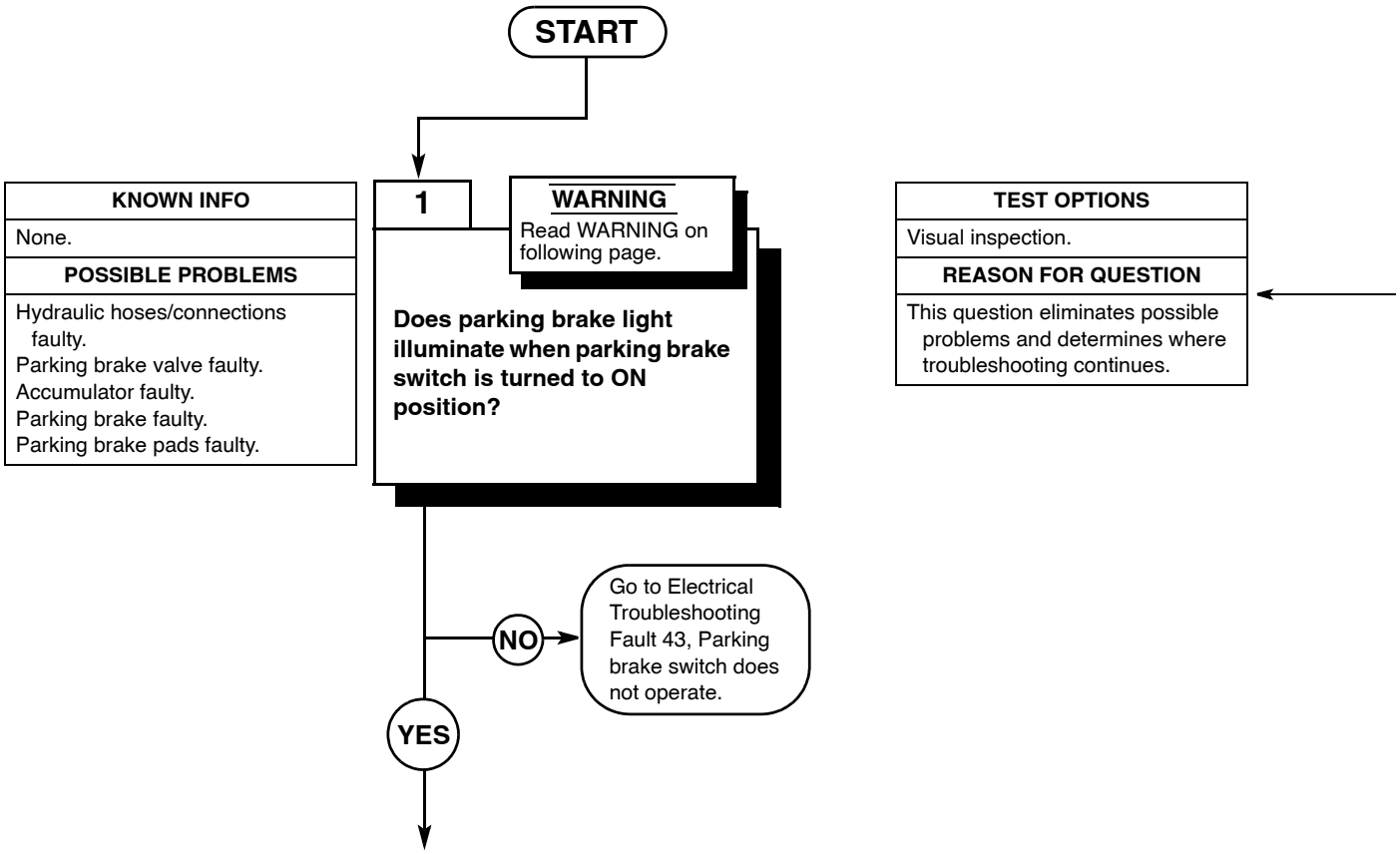
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10



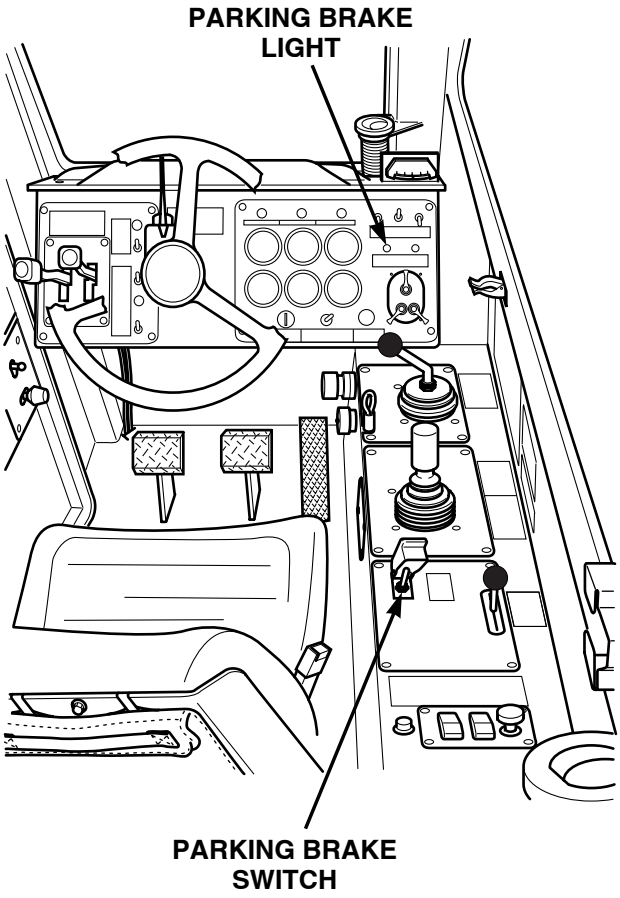
WARNING

- Be sure wheels are chocked before removing parking brake.
- Springs are under tension. Always wear protective glasses when working on springs under tension. Use care when removing springs from brake pads. Failure to follow these precautions could result in personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

- Wipe the area clean around hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines.
- Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

VISUAL INSPECTION
(1) Turn engine start switch to ON position (TM 10-3930-673-10). (2) Turn parking brake switch to ON position. (3) Check to determine if parking brake light illuminates. (a) If light illuminates, go to Step 2 of this fault. (b) If light does not illuminate, go to Electrical Troubleshooting Fault 43, Parking brake switch does not operate. (4) Turn parking brake switch to OFF position. (5) Turn engine start switch to OFF position (TM 10-3930-673-10).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE (CONT).

KNOWN INFO
Parking brake switch OK.
POSSIBLE PROBLEMS
Hydraulic hoses/connections faulty. Parking brake valve faulty. Accumulator faulty. Parking brake faulty. Parking brake pads faulty.

2

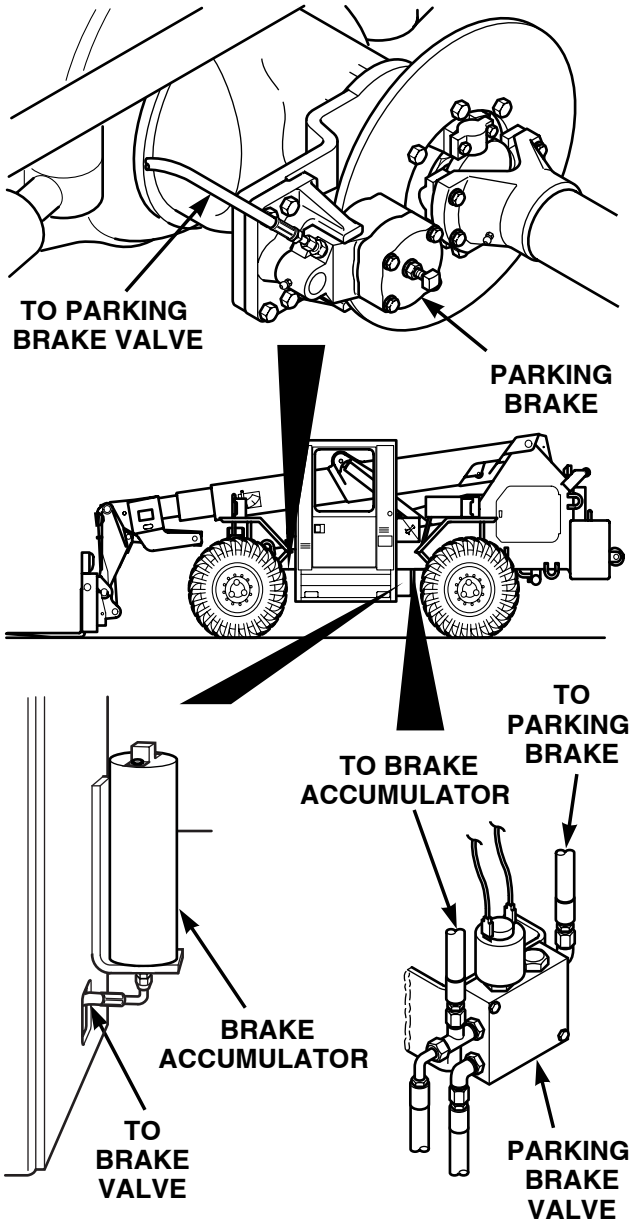
Are hydraulic hoses and connections between the parking brake valve, brake accumulator, and parking brake free from signs of leaks and damage?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hoses and connections are faulty or loose, parking brake will not engage/disengage.

NO → Replace hoses and tighten connections as necessary (Para 12-2 and Para 12-9).

YES

VISUAL INSPECTION
Visually inspect the hoses and connections from and to the parking brake valve, brake accumulator, and parking brake. (a) If hoses and connections are free from signs of leaks and damage, go to Step 3 of this fault. (b) If hoses and connections show signs of leaks and damage, replace hoses and tighten connections as necessary (Para 12-2 and Para 12-9).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE (CONT).

KNOWN INFO
Parking brake switch OK. Hoses and connections OK.
POSSIBLE PROBLEMS
Parking brake valve faulty. Accumulator faulty. Parking brake faulty. Parking brake pads faulty.

3

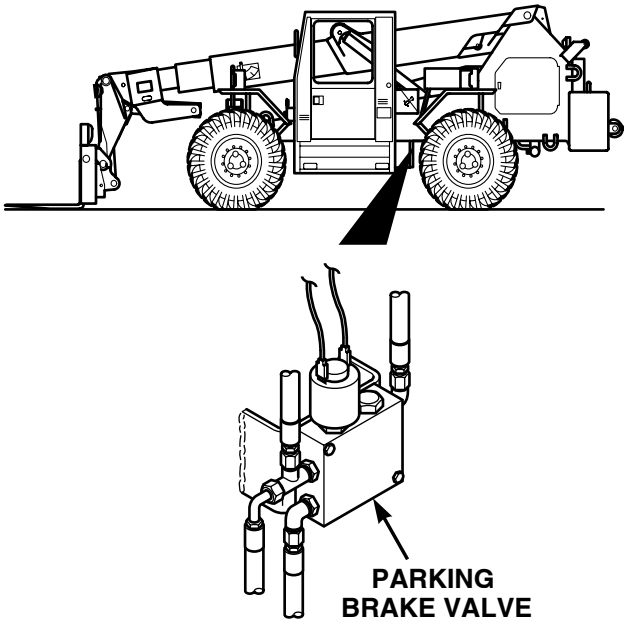
Is parking brake valve free from signs of leaks and damage?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If parking brake valve is damaged or leaks, brake will not engage/ disengage.

NO → Replace parking brake valve (Para 12-4).

YES

VISUAL INSPECTION
Visually inspect the parking brake valve for leaks and damage. (a) If valve is free from signs of leaks and damage, go to Step 4 of this fault. (b) If valve shows signs of leaks and damage, replace parking brake valve (Para 12-4).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE (CONT).

KNOWN INFO
Parking brake switch OK. Hoses and connections OK. Parking brake valve OK.
POSSIBLE PROBLEMS
Accumulator faulty. Parking brake faulty. Parking brake pads faulty.

4

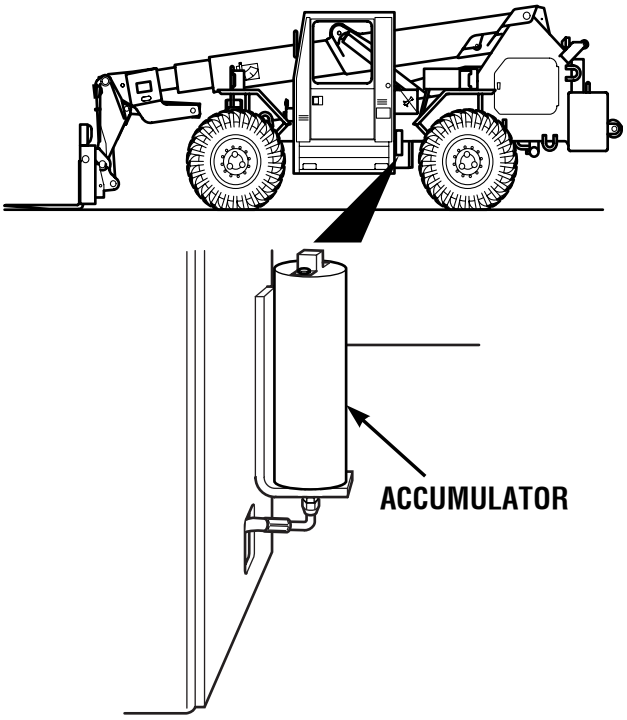
Is the brake accumulator charging pressure properly adjusted?

NO → Adjust charging pressure as necessary (Para 12-8).

YES

TEST OPTIONS
Pressure test.
REASON FOR QUESTION
If accumulator charging pressure is not within specified psi, parking brake will not engage/disengage.

PRESSURE TEST
Perform a pressure test at the brake accumulator (Para 12-8). (a) If charging pressure is adjusted to 2250 (±25) psi, go to Step 5 of this fault. (b) If charging pressure is not adjusted to 2250 (±25) psi, adjust charging pressure as necessary (Para 12-8).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE (CONT).

KNOWN INFO
Parking brake switch OK. Hoses and connections OK. Parking brake valve OK. Accumulator OK.
POSSIBLE PROBLEMS
Parking brake faulty. Parking brake pads faulty.

5

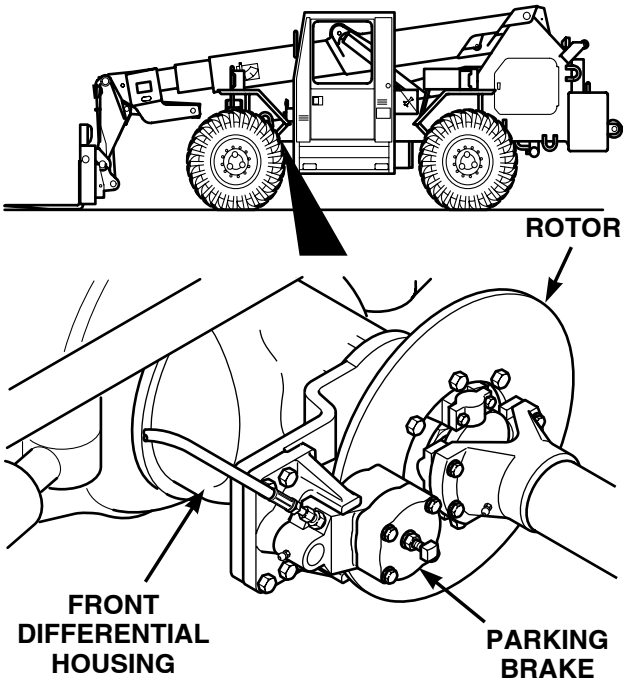
Is parking brake free from signs of leaks and damage?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If parking brake is damaged or leaks, brake will not engage/ disengage.

NO → Replace parking brake assembly (Para 12-2).

YES →

VISUAL INSPECTION
Visually inspect parking brake for leaks and damage. (a) If parking brake is free from signs of leaks and damage, go to Step 6 of this fault. (b) If brake shows signs of leaks and damage, replace parking brake assembly (Para 12-2).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE (CONT).

KNOWN INFO
Parking brake switch OK. Hoses and connections OK. Parking brake valve OK. Accumulator OK. Parking brake OK.
POSSIBLE PROBLEMS
Parking brake adjustment faulty. Parking brake pads faulty.

6

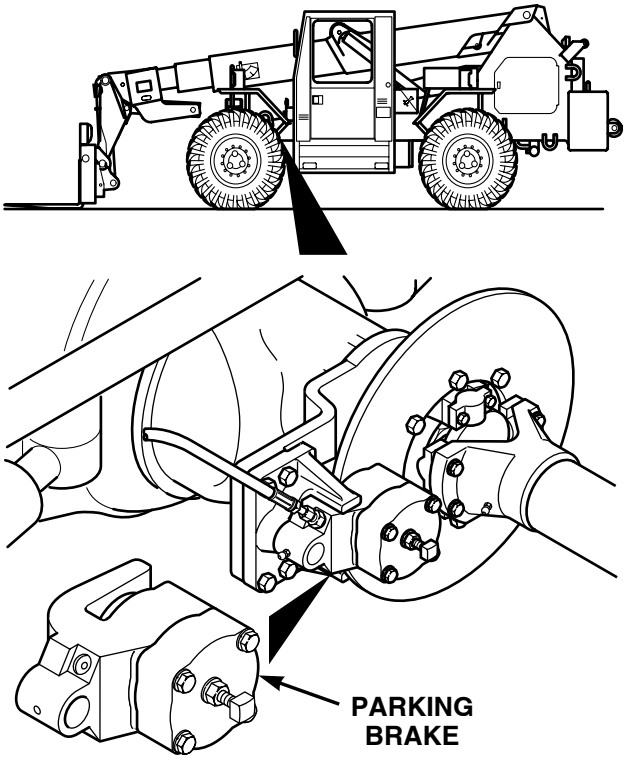
Is parking brake properly adjusted?

TEST OPTIONS
Brake adjustment check.
REASON FOR QUESTION
If parking brake is not properly adjusted, brake will not engage/ disengage.

NO → Adjust parking brake as necessary (Para 12-2).

YES

BRAKE ADJUSTMENT CHECK
(1) Remove parking brake assembly from vehicle (Para 12-2). (2) Check brake for proper adjustment. (a) If brake is properly adjusted, go to Step 7 of this fault. (b) If brake is not properly adjusted, adjust the parking brake as necessary (Para 12-2).



21. PARKING BRAKE DOES NOT ENGAGE/DISENGAGE (CONT).

KNOWN INFO
Parking brake switch OK. Hoses and connections OK. Parking brake valve OK. Accumulator OK. Parking brake OK. Brake adjustment OK.
POSSIBLE PROBLEMS
Parking brake pads faulty.

7

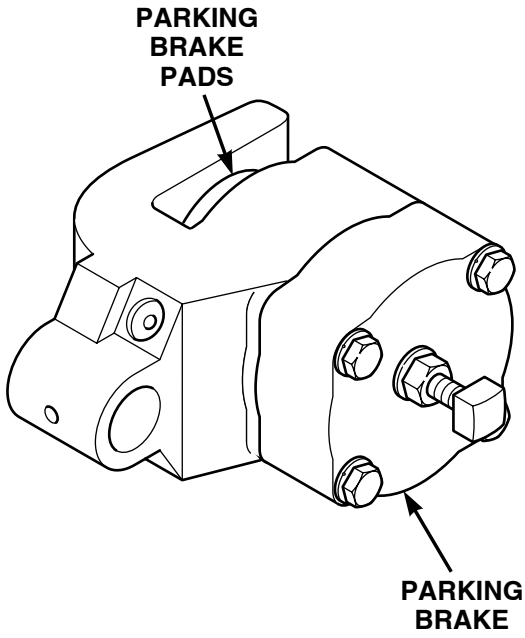
Are parking brake pads free from signs of wear and damage?

TEST OPTIONS
Brake pads check.
REASON FOR QUESTION
If parking brake pads worn or faulty, brake will not engage/ disengage.

NO → Notify Direct Support to replace parking brake pads.

YES → Notify Direct Support about this fault.

BRAKE PADS CHECK
(1) With brake removed from vehicle, check parking brake pads (Para 12-2). (a) If brake pads are OK, notify Direct Support about this fault. (b) If brake pads show signs of wear or are faulty, notify Direct Support to replace brake pads. (2) Install parking brake assembly on vehicle (Para 12-2).



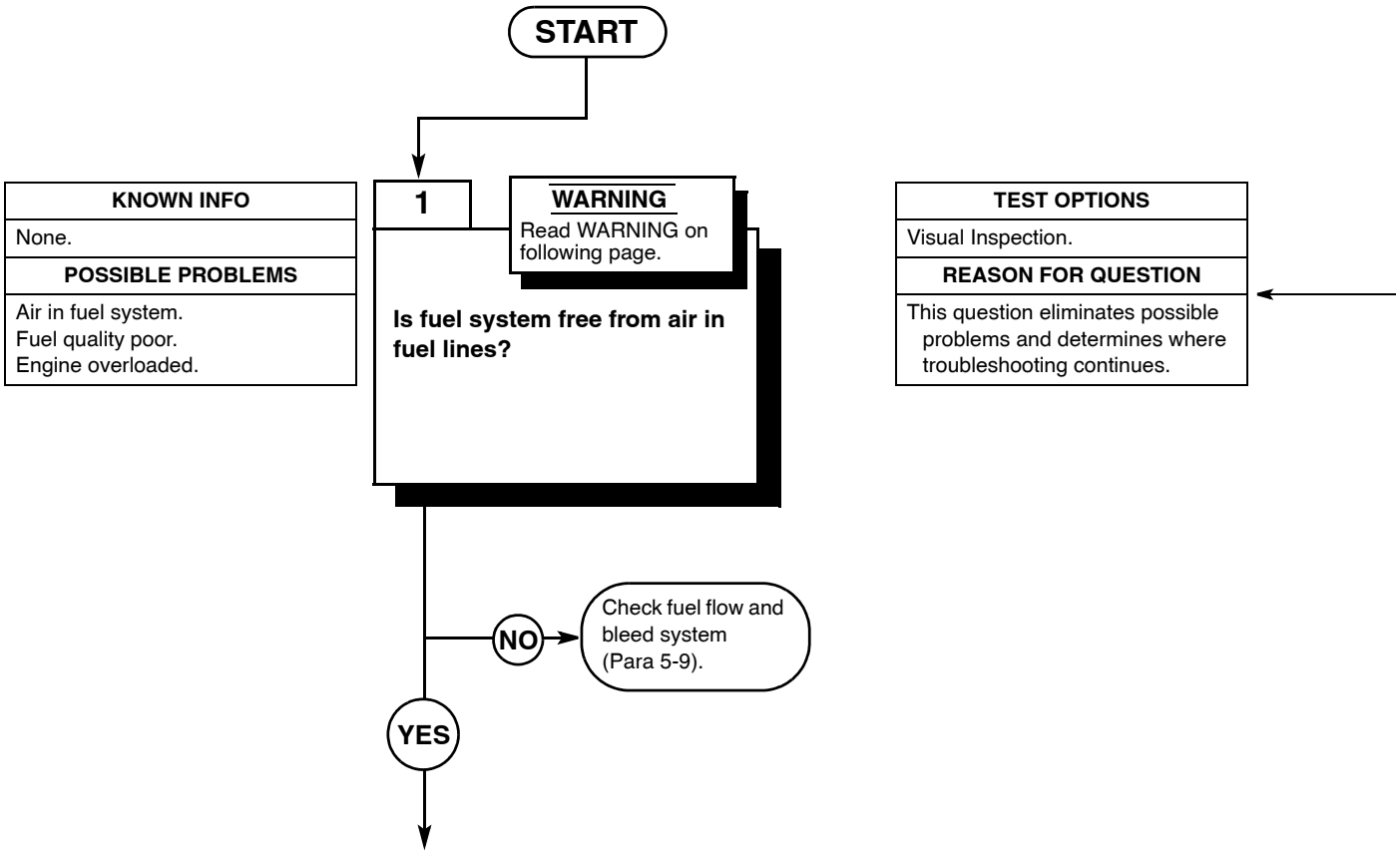
22. COMPRESSION KNOCKS.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



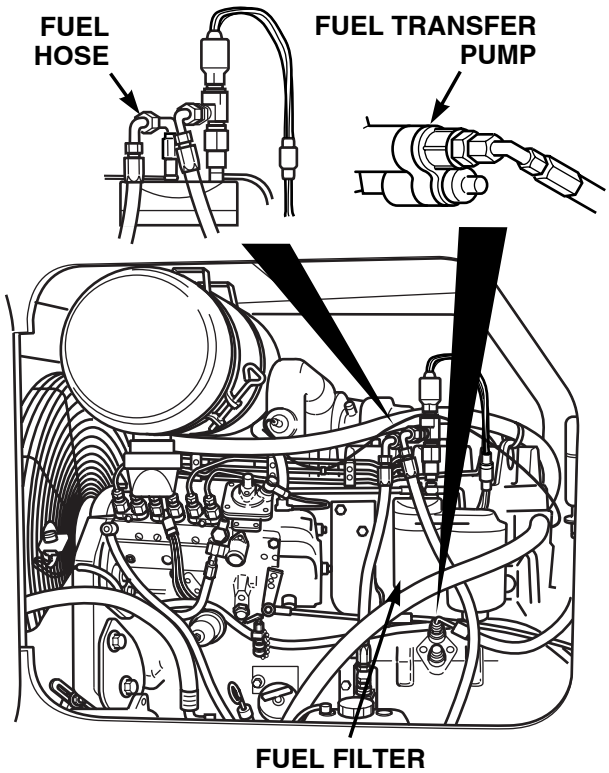
WARNING

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Pressure test procedure results in fuel under high pressure. Be sure that pressure test device is connected properly and use safety shield during test. Failure to do so may result in injury to personnel.
- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100°F (38°C), type II is 138°F (50°C), and type III is 200°F (93.3°C). Failure to do so may result in injury or death to personnel. If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM 9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

FUEL FLOW VISUAL INSPECTION
Check flow of fuel through fuel filter (Para 5-9). (a) If fuel flows freely without air bubbles, go to Step 2 of this fault. (b) If air is in fuel lines, check for air leaks then bleed system (Para 5-9).



22. COMPRESSION KNOCKS (CONT).

KNOWN INFO
Fuel system fuel OK.
POSSIBLE PROBLEMS
Fuel quality poor. Engine overloaded.

2

Is fuel in fuel tank known to be of good quality?

TEST OPTIONS
Visual Inspection.
REASON FOR QUESTION
If fuel quality is poor, engine will produce audible compression knocks.

NO → Drain and flush fuel tank and replace fuel (Para 5-9).

YES

KNOWN INFO
Fuel system fuel OK. Fuel quality OK.
POSSIBLE PROBLEMS
Engine overloaded.

3

Is payload within specified load range? Is gear range in use correct for operation and load?

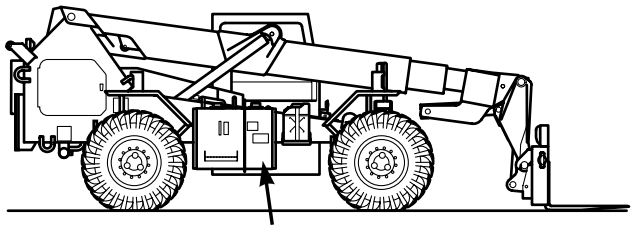
TEST OPTIONS
Visual Inspection.
REASON FOR QUESTION
If machine is overloaded, or gear range incorrect, engine will produce audible compression knocks.

NO → If overloaded, reduce load. If gear range too high, shift to lower gear.

YES → Notify Direct Support about this fault.

FUEL QUALITY
VISUAL INSPECTION

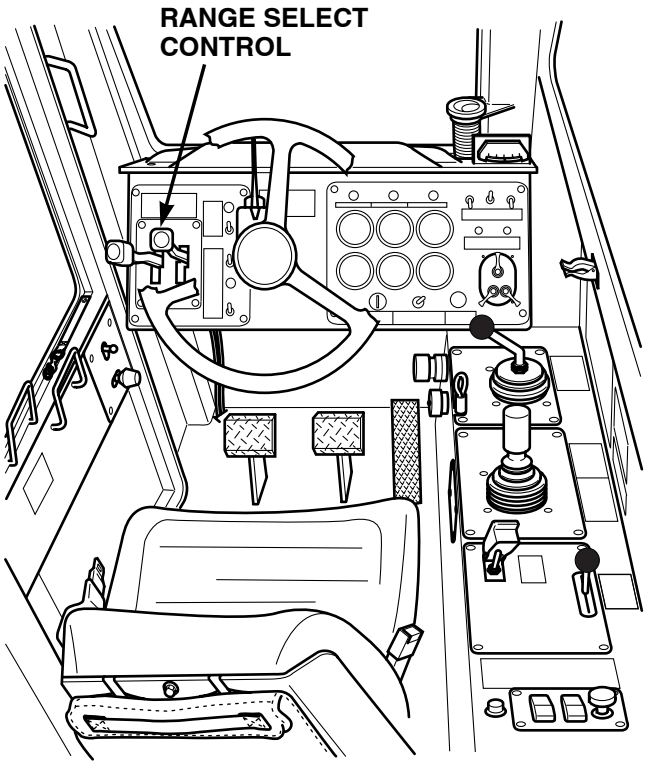
(1) Check quality of fuel in fuel tank by operating engine from a temporary tank of known fuel quality.
   (a) Disconnect fuel line at fuel/water separator, where line leads to fuel transfer pump.
   (b) Place disconnected end of fuel line in temp tank of known clean fuel.
   (c) Start engine and run it for approximately 5 minutes to determine if engine performance improves with known clean fuel.
(2) If fuel is of good quality, go to Step 3 of this fault.
(3) If fuel is of questionable quality, drain fuel tank and replace fuel (Para 5-9).



FUEL TANK

LOAD AND GEAR RANGE
VISUAL INSPECTION

Check that payload is within specified load range for machine. Check that gear range in use is correct for operation and load (TM 10-3930-673-10).
   (a) If load is within specified range and gear range is correct, notify Direct Support about this fault.
   (b) If load is above specified range, reduce load. If gear range too high, shift to lower gear (TM 10-3930-673-10).



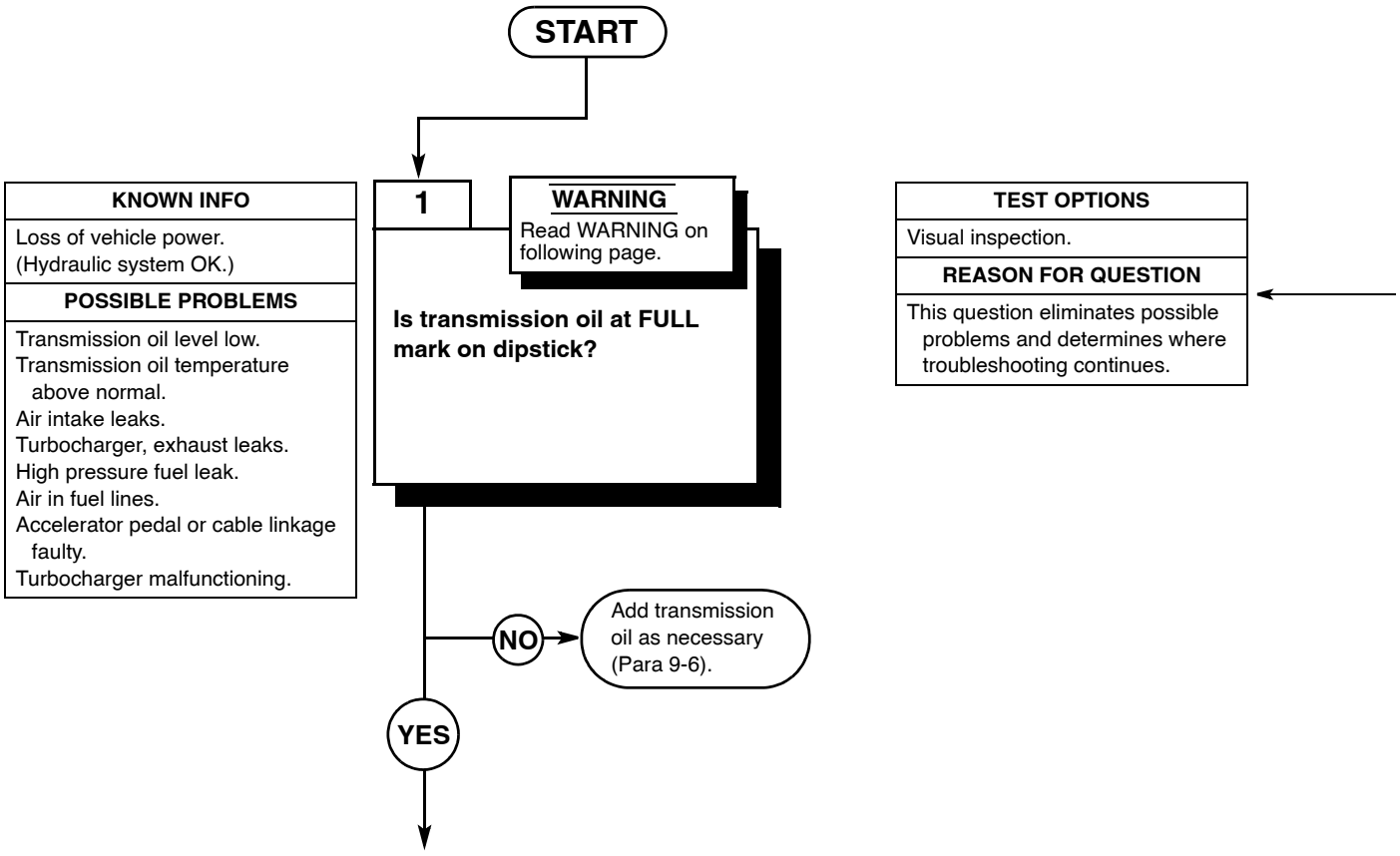
23. LOSS OF POWER.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



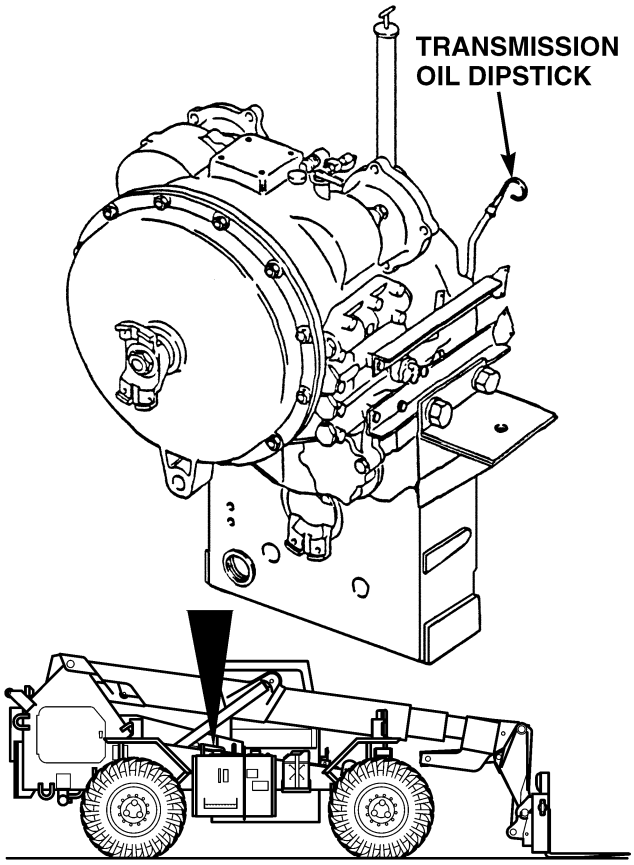
WARNING

- Do not smoke or allow open flame or sparks in the vicinity while working on any part of the fuel system. Diesel fuel is highly flammable and can cause injury or death if accidentally ignited.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

TRANSMISSION OIL VISUAL INSPECTION
Check transmission oil level with dipstick. Transmission oil should be at or near FULL mark. (a) If transmission oil is at FULL mark, go to Step 2 of this fault. (b) If transmission oil is at or near ADD mark, add transmission oil as necessary (Para 9-6).



23. LOSS OF POWER (CONT).

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK.
POSSIBLE PROBLEMS
Transmission oil temperature above normal. Air intake leaks. Turbocharger, exhaust leaks. High pressure fuel leak. Air in fuel lines. Accelerator pedal or cable linkage faulty. Turbocharger malfunctioning.

2

Is indicated transmission oil temperature within normal (180 to 210 degrees F) operating range?

NO → Refer to Fault 15, Transmission oil temperature above normal Troubleshooting Section to correct fault.

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If transmission oil temperature at or above 250 degrees F, refer to Fault 15, Transmission oil temperature above normal on Page 2-692 to correct fault.

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK. Transmission oil temperature OK.
POSSIBLE PROBLEMS
Air intake leaks. Turbocharger, exhaust leaks. High pressure fuel leak. Air in fuel lines. Accelerator pedal or cable linkage faulty. Turbocharger malfunctioning.

3

Are the intake manifold and/or crossovers free from signs of air leaks?

NO → Replace components as necessary (Para 4-9 and Para 5-7).

YES

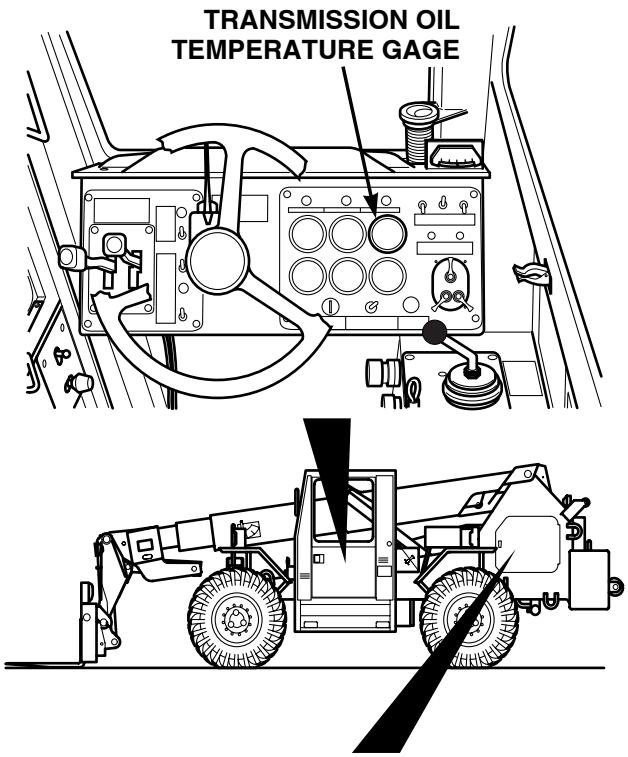
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air intake and crossovers to turbocharger leaking, engine will lose power.

TRANSMISSION OIL TEMPERATURE VISUAL INSPECTION

Check transmission oil temperature gage to determine oil temperature.

(a) If transmission oil temperature is within normal 180 to 210 degrees F operating range, go to Step 3 of this fault.

(b) If indicated temperature is at or near 250 degrees F, refer to Fault 15, Transmission oil temperature above normal to correct fault.

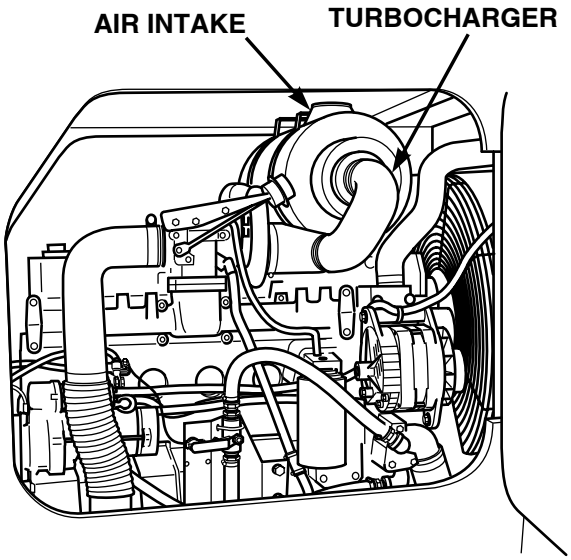


INTAKE MANIFOLD AND CROSSOVERS AIR LEAK VISUAL INSPECTION

Visually inspect air intake and air crossovers to turbocharger for air leaks.

(a) If there are no signs of air leaks, go to Step 4 of this fault.

(b) If there are signs of air leaks, replace components as necessary (Para 4-9 and Para 5-7).



23. LOSS OF POWER (CONT).

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK. Transmission oil temperature OK. Air intake manifold OK.
POSSIBLE PROBLEMS
Turbocharger, exhaust leaks. High pressure fuel leak. Air in fuel lines. Accelerator pedal or cable linkage faulty. Turbocharger malfunctioning.

4

Is turbocharger gasket free from leaks? Is exhaust manifold free from signs of cracks?

NO → Replace gasket (Para 5-6) and/or replace exhaust manifold (Para 4-8).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air leaks in turbocharger gasket and/or exhaust manifold, engine will lose power.

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK. Transmission oil temperature OK. Air intake manifold OK. Turbocharger, exhaust manifold OK.
POSSIBLE PROBLEMS
High pressure fuel leak. Air in fuel lines. Accelerator pedal or cable linkage faulty. Turbocharger malfunctioning.

5

Are high pressure fuel lines, fittings, sealing washers, and/or valve seals free from leaks?

NO → Replace lines, fittings, sealing washers, and/or valve seals as necessary (Para 5-11).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If leak in high pressure fuel lines and/or fittings, lines, engine will lose power.

TURBOCHARGER AND EXHAUST MANIFOLD AIR LEAK VISUAL INSPECTION

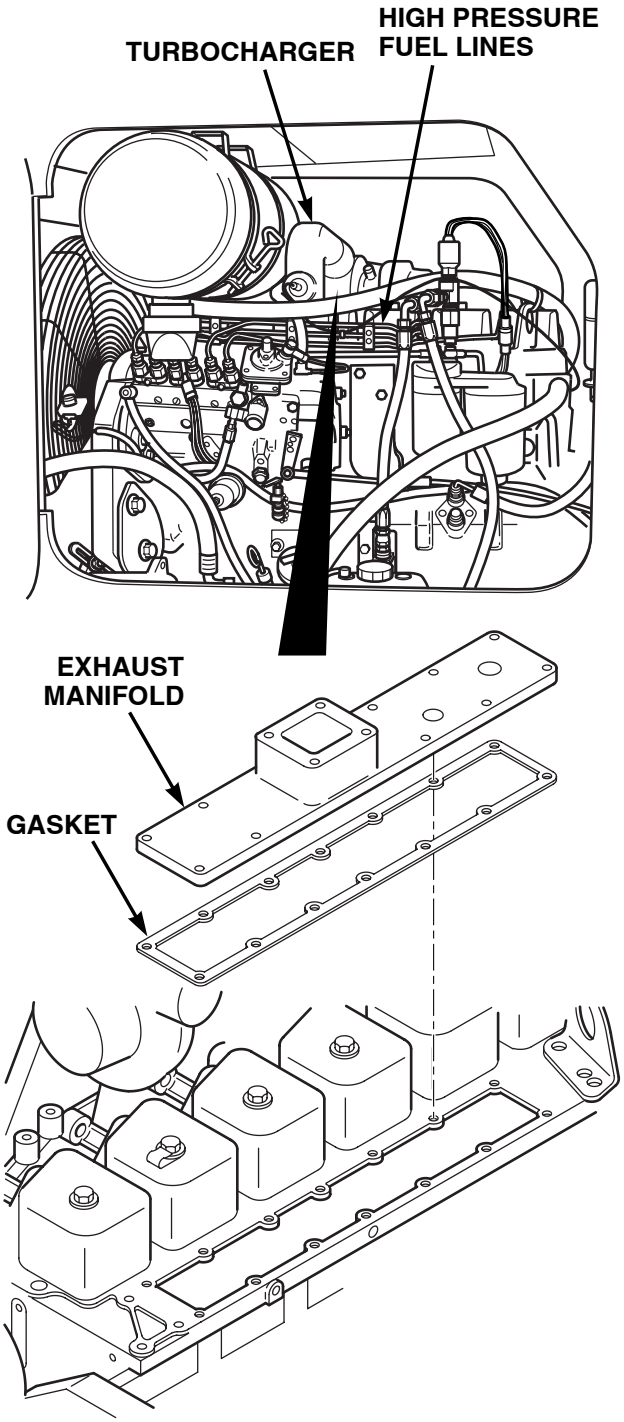
Visually inspect turbocharger gasket and exhaust manifold for signs of cracks and air leaks.

(a) If there are no signs of cracks and air leaks, go to Step 5 of this fault.
(b) If there are signs of cracks and/or air leaks, replace turbocharger gasket (Para 5-6), and/or exhaust manifold (Para 4-8) as necessary.

HIGH PRESSURE FUEL LINES VISUAL INSPECTION

Visually inspect high pressure fuel lines and fittings for signs of leaks.

(a) If lines, fittings, and/or seals free from signs of leaks, go to Step 6 of this fault.
(b) If lines, fittings, and/or seals show signs of leaks, replace components as necessary (Para 5-11).



23. LOSS OF POWER (CONT).

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK. Transmission oil temperature OK. Air intake manifold OK. Turbocharger, exhaust manifold OK. High pressure fuel lines OK.
POSSIBLE PROBLEMS
Air in fuel lines. Accelerator pedal or cable linkage faulty. Turbocharger malfunctioning.

6

Is fuel system free from air in fuel lines?

NO → Check fuel flow and bleed system as necessary (Para 5-11).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air in fuel lines, engine will not run smoothly.

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK. Transmission oil temperature OK. Air intake manifold OK. Turbocharger, exhaust manifold OK. High pressure fuel lines OK. Fuel lines OK.
POSSIBLE PROBLEMS
Accelerator pedal or cable linkage faulty. Turbocharger malfunctioning.

7

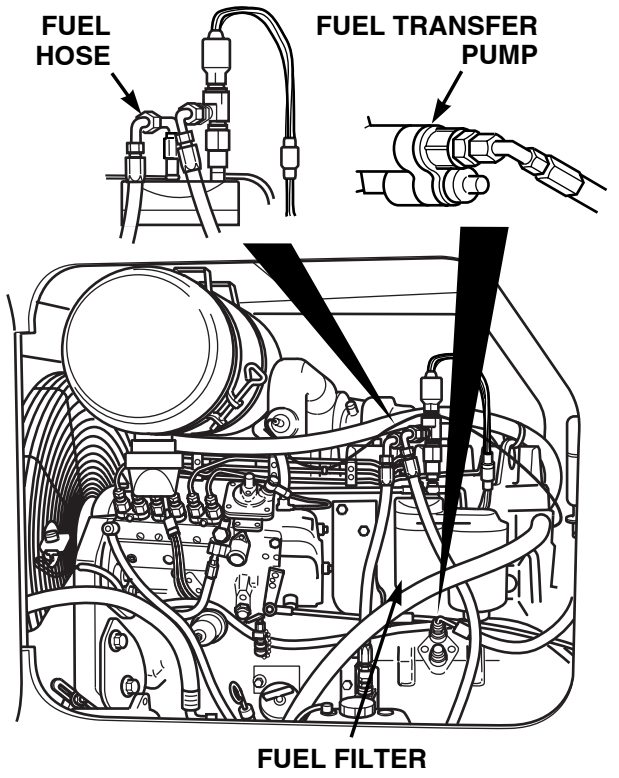
Are accelerator pedal and linkage adjusted correctly and free from signs of wear?

NO → Adjust or replace accelerator cable linkage as necessary (Para 5-20 and Para 5-21).

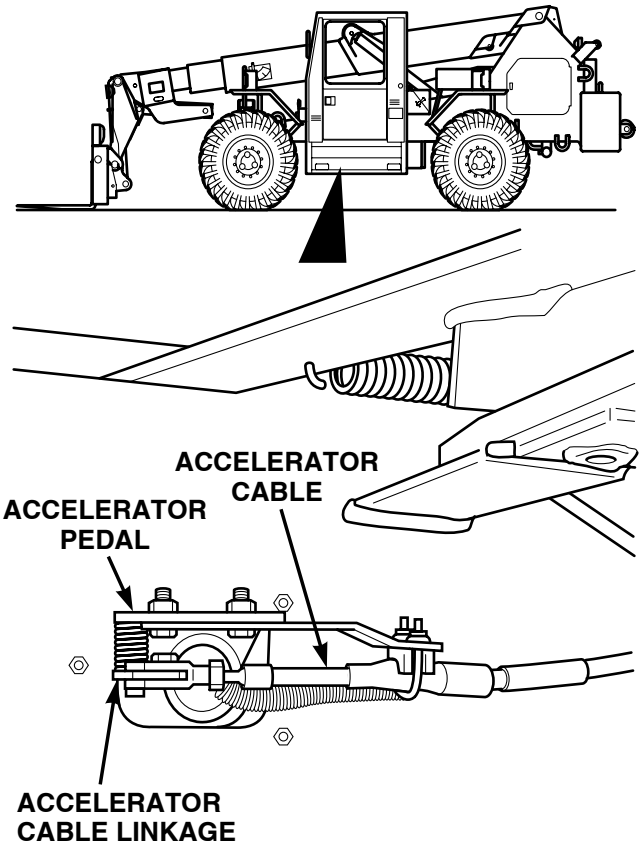
YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If accelerator pedal and/or linkage incorrectly adjusted or worn, engine will not run smoothly.

FUEL FLOW THROUGH FILTER VISUAL INSPECTION
Check flow of fuel through fuel filter (Para 5-11). (a) If fuel flows freely without air, go to Step 7 of this fault. (b) If air in fuel lines, check for air leaks, then bleed system (Para 5-11).



ACCELERATOR PEDAL AND/OR LINKAGE VISUAL INSPECTION
Check accelerator pedal and cable linkage for adjustment and signs of wear (Para 5-20 and Para 5-21). (a) If pedal and linkage are adjusted correctly and are free from signs of wear, go to Step 8 of this fault. (b) If pedal and linkage are not adjusted correctly or are worn, adjust or replace pedal and/or linkage as necessary (Para 5-20 and Para 5-21).



23. LOSS OF POWER (CONT).

KNOWN INFO
Loss of vehicle power. (Hydraulic system OK.) Transmission oil level OK. Transmission oil temperature OK. Air intake manifold OK. Turbocharger, exhaust manifold OK. High pressure fuel lines OK. Accelerator pedal or cable linkage OK.
POSSIBLE PROBLEMS
Turbocharger malfunctioning.

8

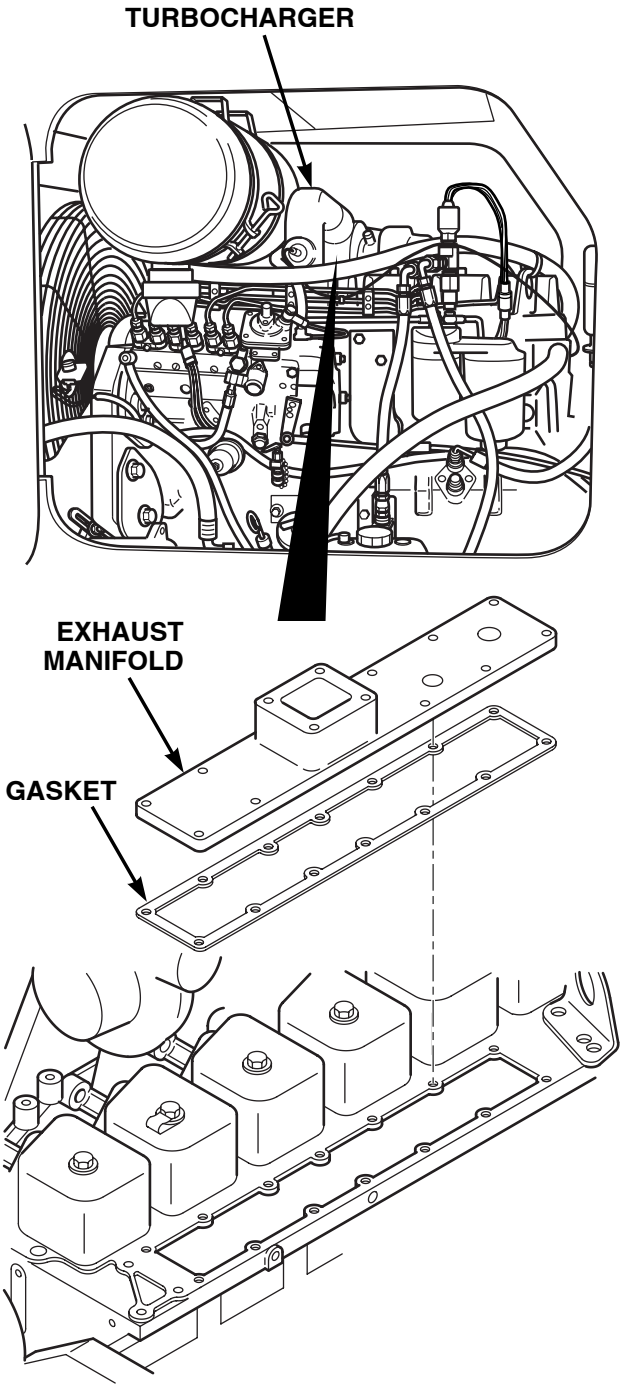
Is turbocharger functioning correctly?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If turbocharger malfunctioning or faulty, engine will lose power.

NO → Replace malfunctioning or faulty turbocharger (Para 5-6).

YES → Notify Direct Support of this fault.

TURBOCHARGER VISUAL INSPECTION
Check turbocharger intake, air and oil lines for debris. Check wastegate. Check exhaust manifold for cracks(Para 5-6). (a) If turbocharger is functioning correctly, notify Direct Support about this fault. (b) If turbocharger shows signs of debris, malfunctioning assemblies, or cracks, replace turbocharger (Para 5-6).



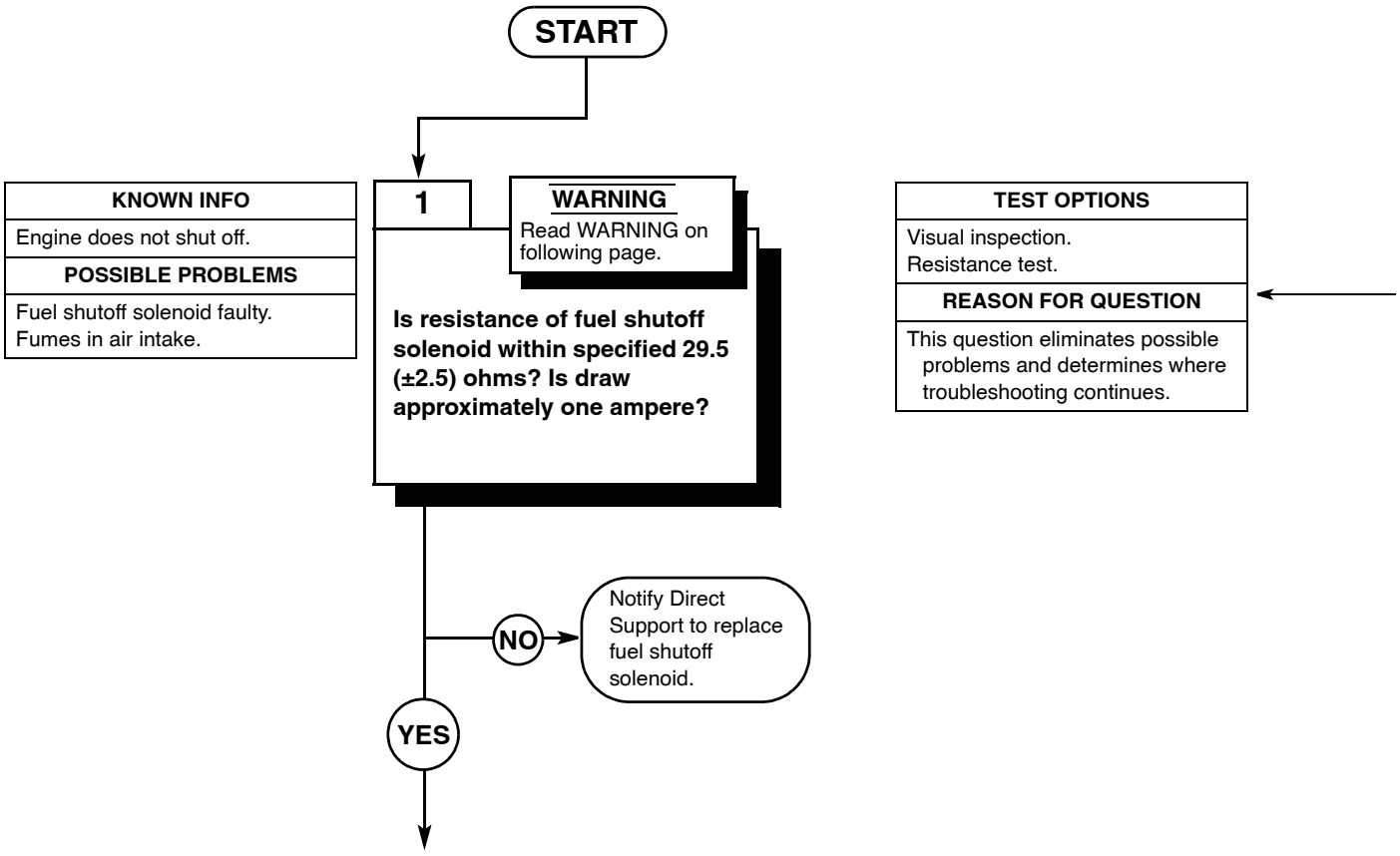
24. ENGINE DOES NOT SHUT OFF.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
Multimeter (Item 9, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

References
TM 10-3930-673-10



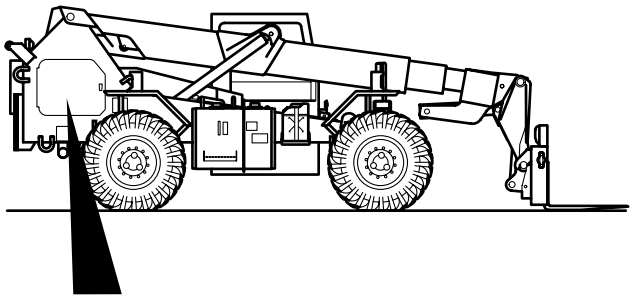
WARNING

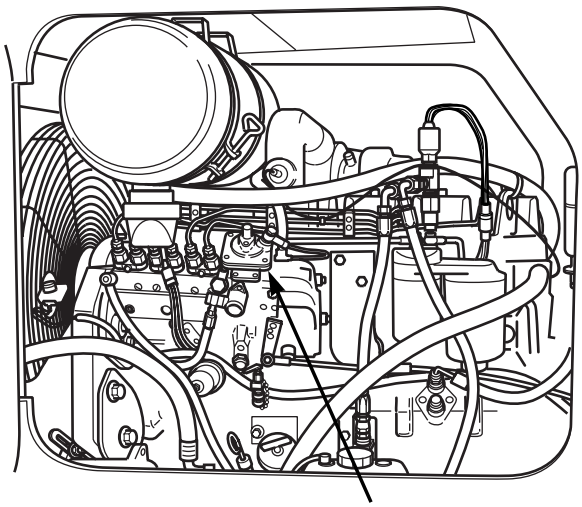
- Do not smoke or allow open flame or sparks in the vicinity while working on any part of the fuel system. Diesel fuel is highly flammable and can cause injury or death if accidentally ignited.
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment. Refer to TM9-247 for correct information.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

RESISTANCE TEST AND DRAW OF SOLENOID
Set multimeter to ohms to test resistance of fuel shutoff solenoid. Set multimeter to amps to test draw of solenoid (Para 5-2). (a) If resistance and draw are within specified ohms and amperes, go to Step 2 of this fault. (b) If resistance and/or draw are not within specified ohms and amperes, notify Direct Support to replace solenoid.





FUEL SHUTOFF SOLENOID

24. ENGINE DOES NOT SHUT OFF (CONT).

KNOWN INFO
Engine does not shut off. Fuel shutoff solenoid OK.
POSSIBLE PROBLEMS
Fumes in air intake.

2

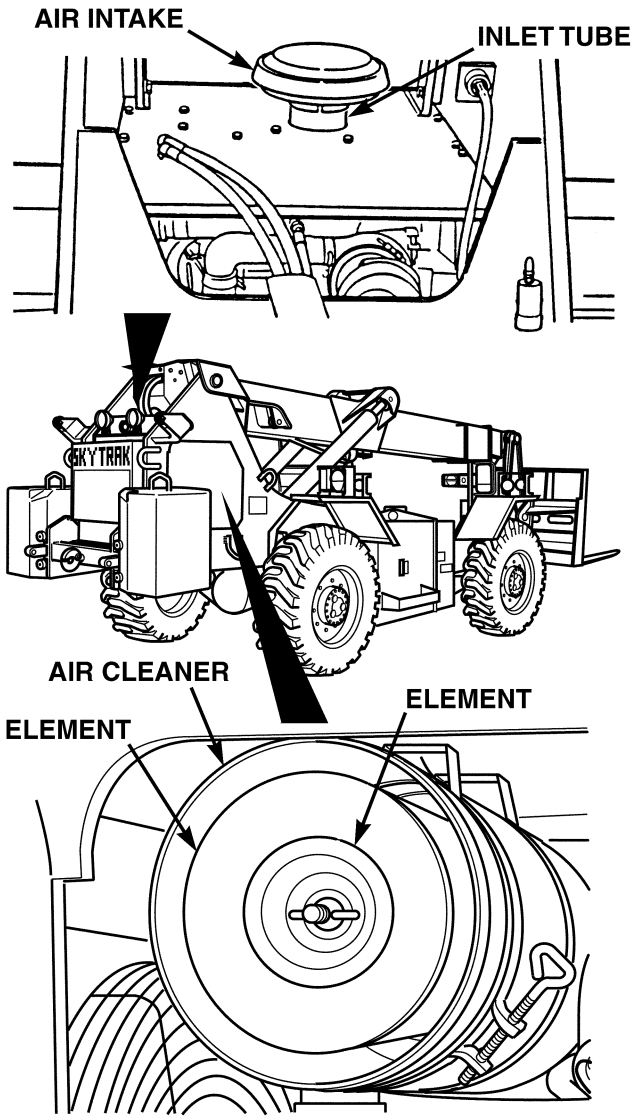
Are air intake assemblies free of fumes which cause continued dieseling?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If fumes in air intake assemblies, assemblies will need to be cleared.

NO → Check air intake assemblies to determine source of fumes. Replace faulty assemblies as necessary.

YES → Notify Direct Support about this fault.

AIR INTAKE ASSEMBLIES VISUAL INSPECTION
(1) Check air intake assemblies to determine source of fumes which cause continued dieseling. (a) If air intake assemblies are clear and functioning correctly, notify Direct Support of this fault. (b) If source of fumes is determined, replace air intake assemblies as necessary. (2) Start engine, then shut off engine. If engine shuts off, fault corrected. If not, notify Direct Support of this fault.



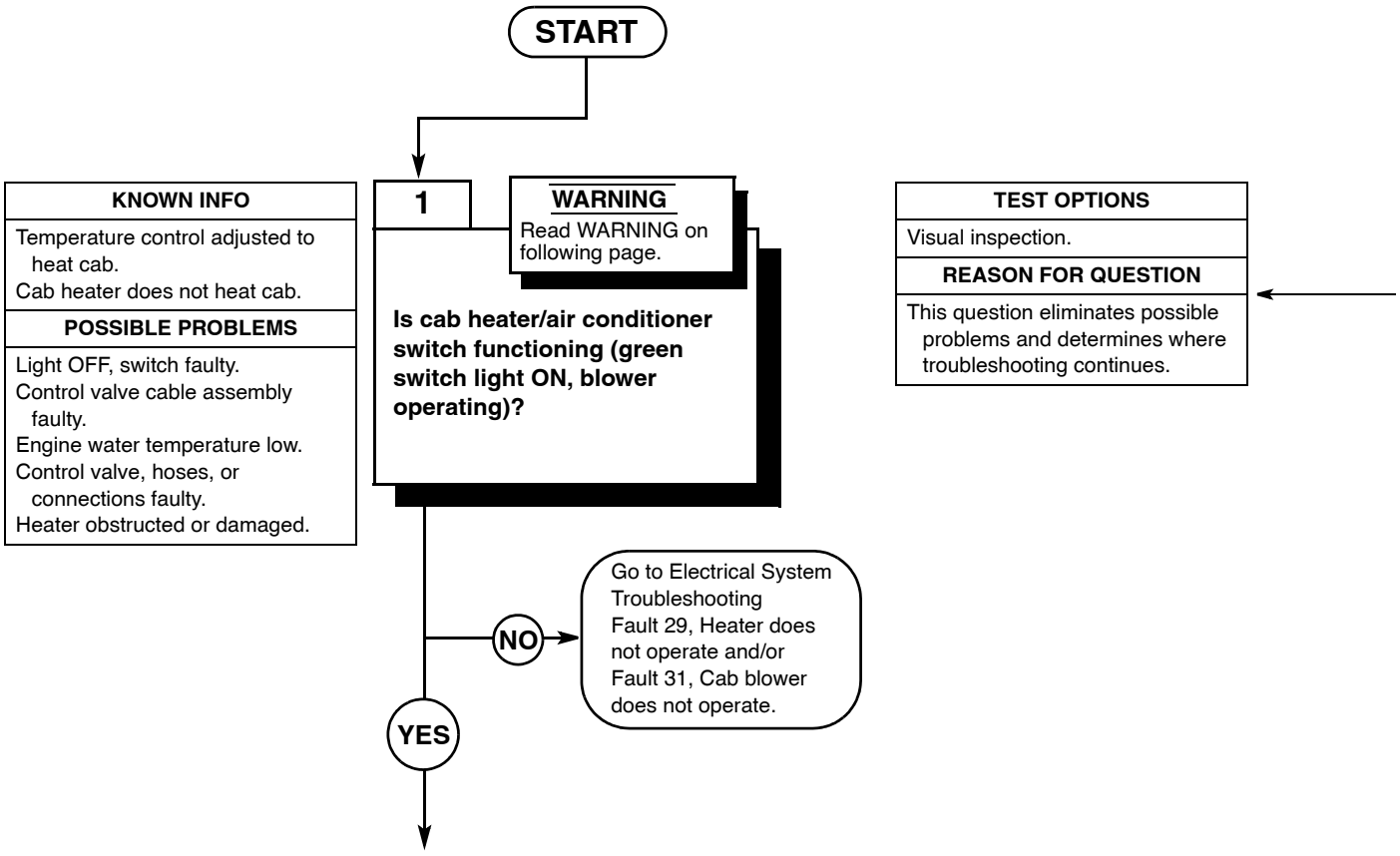
25. CAB HEATER DOES NOT HEAT CAB.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



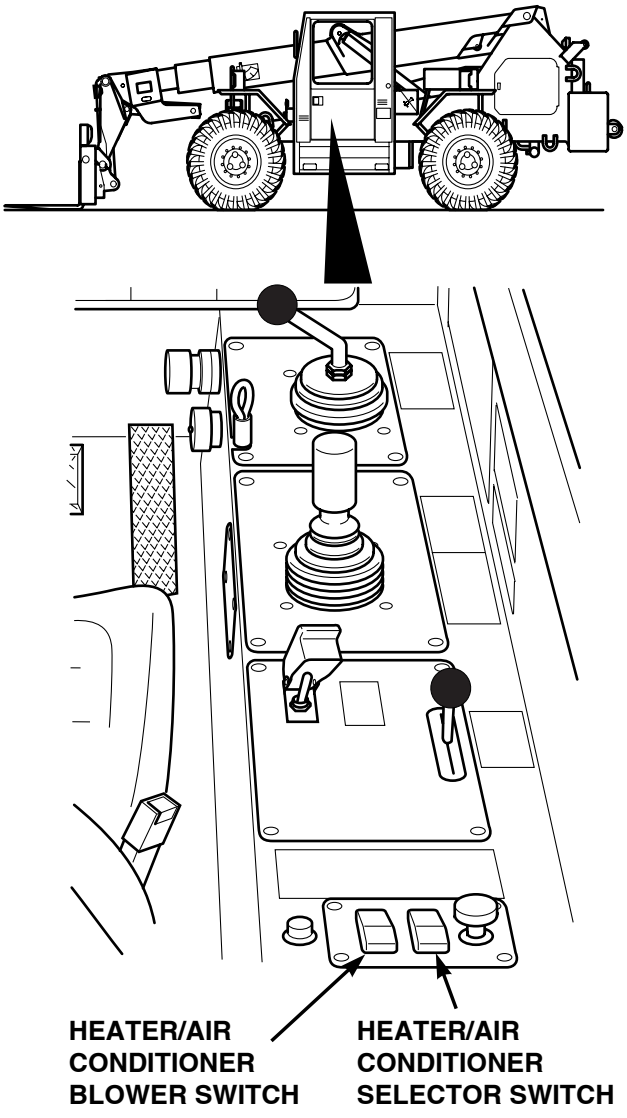
WARNING

Always wear eye and hand protection when working on an air conditioning system or compressor. Liquid refrigerant can cause frostbite and/or blindness.

CAUTION

Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

HEATER/AIR CONDITIONER SWITCH VISUAL INSPECTION
Press cab heater/air conditioner switch to ON position. (a) If green switch light is ON and blower functions, go to Step 2 of this fault. (b) If green switch light is not ON and blower does not function, go to Electrical System Trouble-shooting Fault 29, Heater does not operate and/or Fault 31, Cab blower does not operate.



25. CAB HEATER DOES NOT HEAT CAB (CONT).

KNOWN INFO
Temperature control adjusted to heat cab. Cab heater does not heat cab. Light ON, switch OK.
POSSIBLE PROBLEMS
Control valve cable assembly faulty. Engine water temperature low. Control valve, hoses, or connections faulty. Heater obstructed or damaged.

2

Is heater control valve cable assembly correctly connected to control valve and functioning?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If control valve cable assembly faulty, valve will not operate properly.

NO → Replace faulty control valve cable assembly.

YES

KNOWN INFO
Temperature control adjusted to heat cab. Cab heater does not heat cab. Light ON, switch OK. Control valve cable assembly OK.
POSSIBLE PROBLEMS
Engine water temperature low. Control valve, hoses, or connections faulty. Heater obstructed or damaged.

3

Is engine water temperature within the normal (180 to 210 degrees F) operating range?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If engine water temperature low, refer to Fault 12, Engine water temperature below normal on Page 2-678.

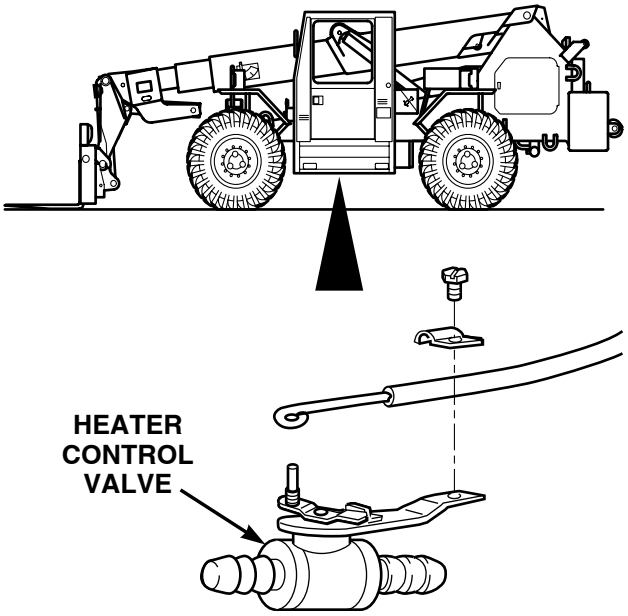
NO → Refer to Fault 12, Engine water temperature below normal on Page 2-678 to correct fault.

YES

CONTROL VALVE CABLE ASSEMBLY AND CONNECTION TO CONTROL VALVE VISUAL INSPECTION

Inspect heater control valve cable assembly and its connection to heater control valve (Para 17-8).

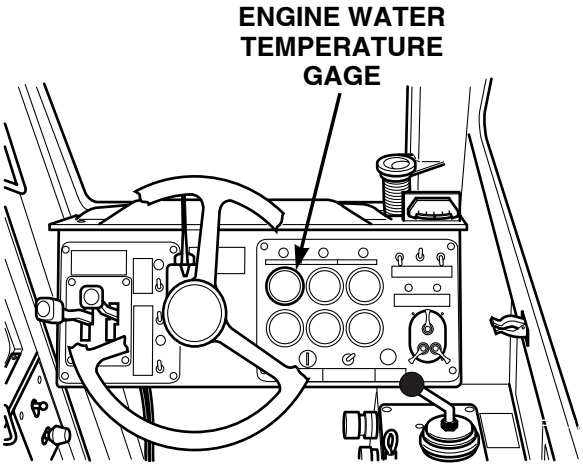
(a) If control valve cable assembly is correctly connected to control valve and functioning, go to Step 3 of this fault.
(b) If cable assembly is disconnected from control valve, connect assembly to valve (Para 17-8).
(c) If cable assembly is damaged, replace assembly (Para 17-8).



ENGINE WATER TEMPERATURE VISUAL INSPECTION

Check engine water temperature gage to determine if water temperature is within the normal (180 to 210 degrees F) operating range.

(a) If engine water temperature is within normal operating range, go to Step 4 of this fault.
(b) If engine water temperature below normal, refer to Fault 12, Engine water temperature below normal on Page 2-678 to correct fault.



25. CAB HEATER DOES NOT HEAT CAB (CONT).

KNOWN INFO
Temperature control adjusted to heat cab. Cab heater does not heat cab. Light ON, switch OK. Control valve cable assembly OK. Engine water temperature OK.
POSSIBLE PROBLEMS
Control valve, hoses, or connections faulty. Heater obstructed or damaged.

4

Are the control valve, heater hoses, and connections free from signs of damage and/or leaks?

NO → Check valve, hoses, and connections for damage and leaks. Replace as necessary (Para 17-8).

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
Damaged or leaking valve, hoses, or connections will affect heater operation.

KNOWN INFO
Temperature control adjusted to heat cab. Cab heater does not heat cab. Light ON, switch OK. Control valve cable assembly OK. Engine water temperature OK. Control valve, hoses, connections OK.
POSSIBLE PROBLEMS
Heater obstructed or damaged.

5

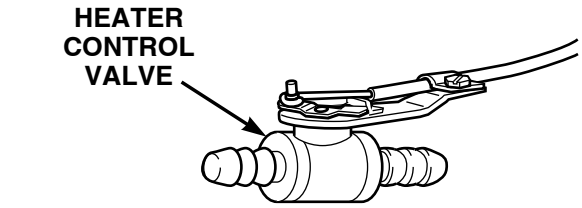
Are heater fins free to radiate heat? Is heater free from signs of damage?

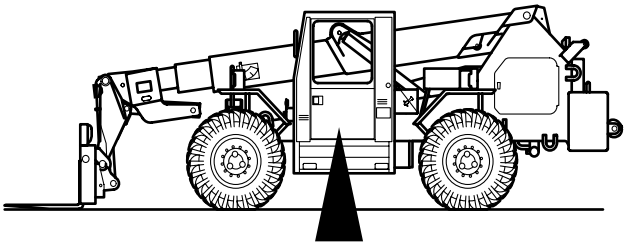
NO → Clean dirt and debris from heater fins, or replace damaged heater.

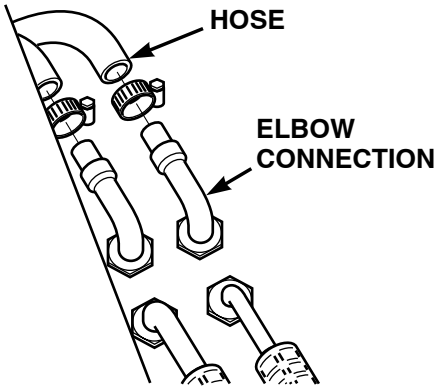
YES → Notify Direct Support about this fault.

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If heater obstructed or damaged, heater will not operate properly.

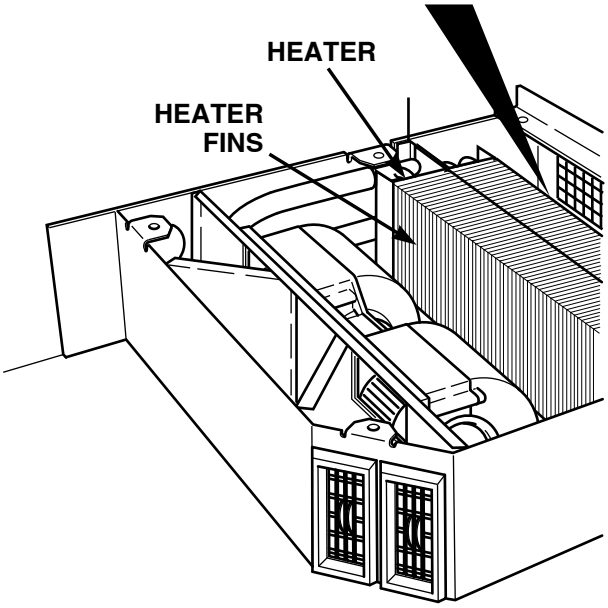
VALVE, HOSES, CONNECTIONS VISUAL INSPECTION
Visually inspect heater control valve, heater hoses, and connections for damage and leaks. (a) If valve, hoses, and connections are clean, tight, and free from damage and leaks, go to Step 5 of this fault. (b) If valve, hoses, and/or connections show signs of damage or leaks, replace as necessary (Para 17-7).







HEATER VISUAL INSPECTION
Visually inspect heater fins for dirt and debris or signs of damage. (a) If heater fins are free to radiate heat and heater is free from signs of damage, notify Direct Support about this fault. (b) If heater fins are blocked by dirt and debris, clean heater fins. (c) If heater shows signs of damage, repair or replace heater (Para 17-7).



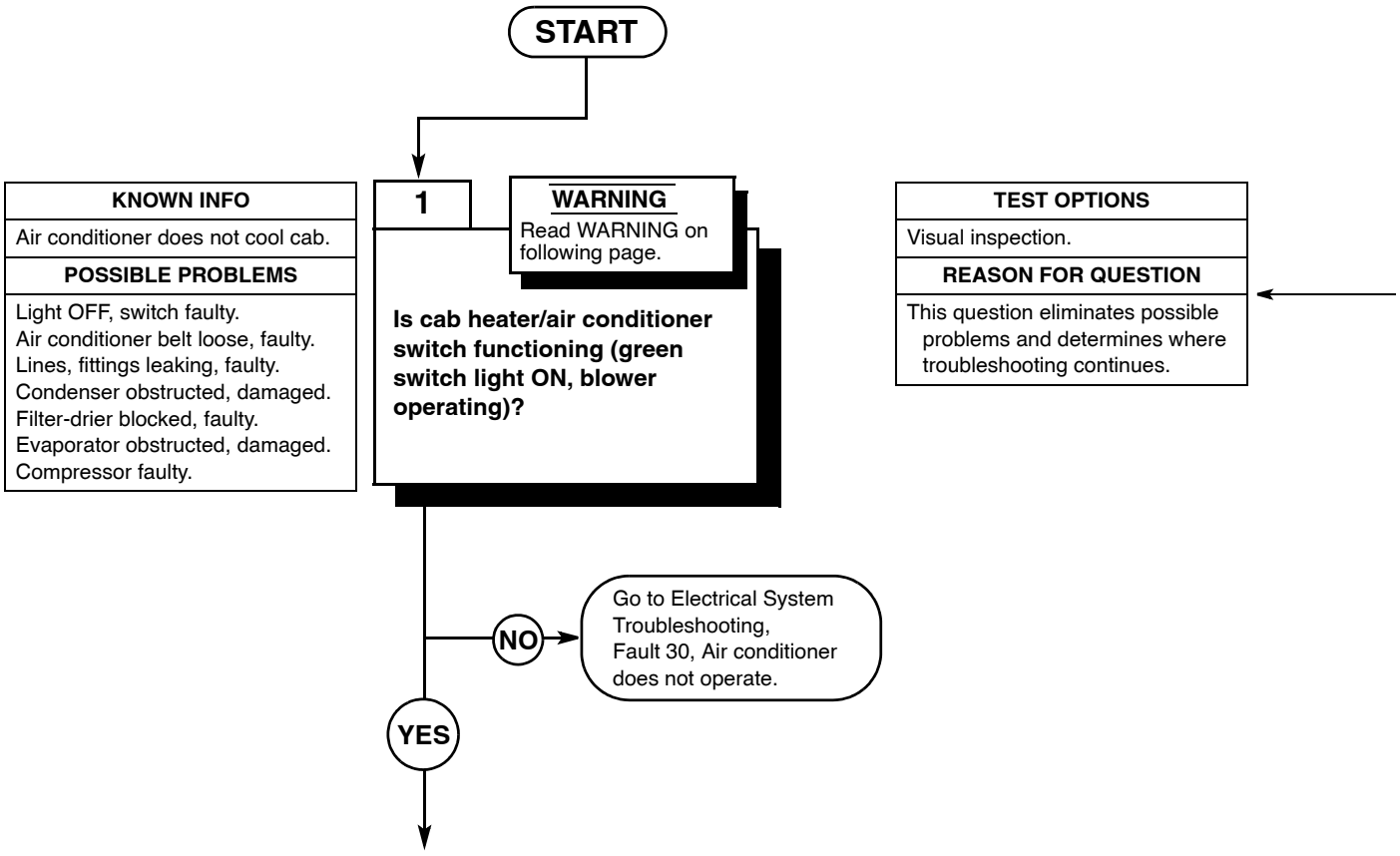
26. AIR CONDITIONER DOES NOT COOL CAB.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
Refrigerant Leak Detector (Item 13, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



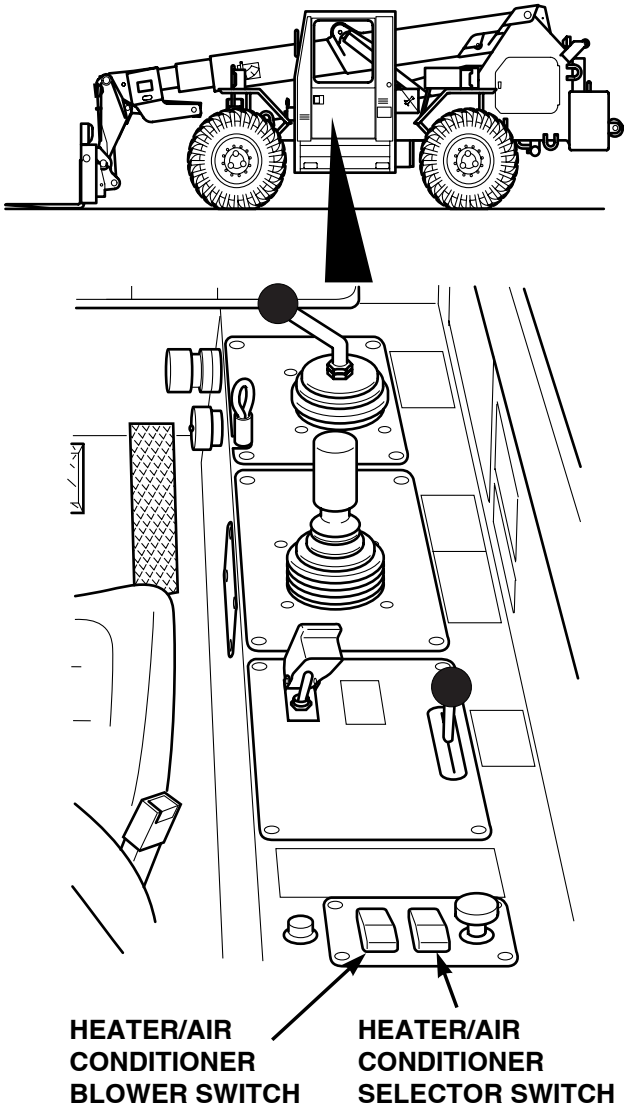
WARNING

Always wear eye and hand protection when working on an air conditioning system or compressor. Liquid refrigerant can cause frostbite and/or blindness.

CAUTION

- Before disconnecting lines, make sure refrigerant has been removed from air conditioning system by recovering it with appropriate recovery equipment. Do not mix refrigerant in same recovery equipment.
- When working on compressors, always relieve internal pressure first. Internal compressor pressure can be relieved by removing oil plug, or by removing shipping caps/pads from ports.
- Keep refrigerants and oils away from open flames. Refrigerants can produce poisonous gases in open flames. Work in well-ventilated area.
- Do not introduce compressed air into an air conditioning system due to danger of contamination.
- Washing oil seals, electrical cables and flexible hoses with dry cleaning solvents or mineral spirits will cause serious damage or destroy materials.

HEATER/AIR CONDITIONER SWITCH VISUAL INSPECTION
Press cab heater/air conditioner switch to ON position. (a) If green switch light is ON and blower functions, go to Step 2 of this fault. (b) If green switch light is not ON and blower does not function, go to Electrical System Trouble-shooting Fault 30, Air conditioner does not operate.



26. AIR CONDITIONER DOES NOT COOL CAB (CONT).

KNOWN INFO
Air conditioner does not cool cab. Light ON, switch OK.
POSSIBLE PROBLEMS
Air conditioner belt loose, faulty. Lines, fittings leaking, faulty. Condenser obstructed, damaged. Filter-drier blocked, faulty. Evaporator obstructed, damaged. Compressor faulty.

2

Is air conditioner belt adjusted properly and free from signs of wear?

NO → Adjust tension or replace belt.

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If air conditioner belt loose or faulty, air conditioner will not operate properly.

KNOWN INFO
Air conditioner does not cool cab. Light ON, switch OK. Air conditioner belt OK.
POSSIBLE PROBLEMS
Lines, fittings leaking, faulty. Condenser obstructed, damaged. Filter-drier blocked, faulty. Evaporator obstructed, damaged. Compressor faulty.

3

Are air conditioning lines and/or fittings clean, tight, and free from leaks?

NO → Check lines and fittings for leaks, and replace lines and fittings as necessary.

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If lines and/or fittings are leaking, air conditioner will not operate properly.

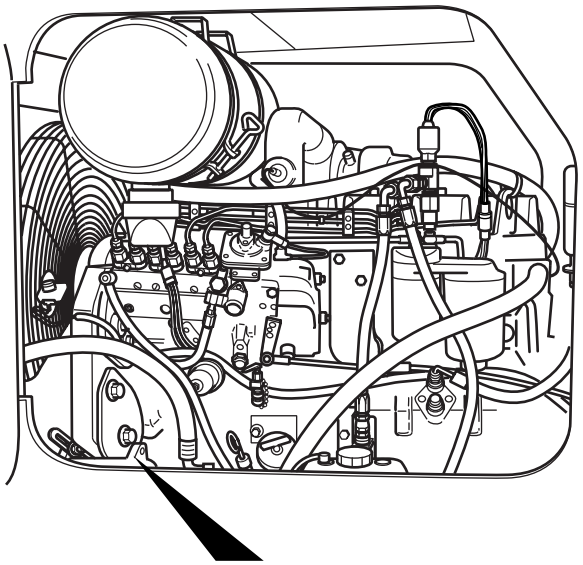
AIR CONDITIONER BELT VISUAL INSPECTION

Inspect air conditioner belt for proper tension and/or signs of wear.

(a) If tension correct and belt free from signs of wear, go to Step 3 of this fault.

(b) If tension is incorrect, tighten or loosen the belt as necessary (Para 7-8).

(c) If belt shows signs of wear (cracks, deteriorated sections), replace belt (Para 7-8).

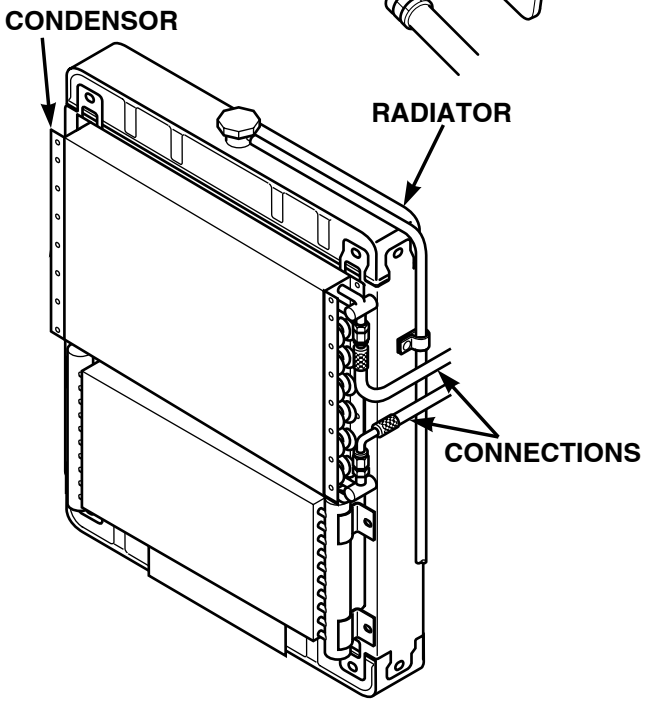


LINES AND FITTINGS VISUAL INSPECTION

Use a leak detector (which is sensitive to refrigerant in use) to check air conditioning lines and fittings for leaks.

(a) If lines and fittings are clean, tight, and free from leaks, go to Step 4 of this fault.

(b) If leaks are detected, evacuate system, replace faulty lines and/or fittings, and recharge system.



26. AIR CONDITIONER DOES NOT COOL CAB (CONT).

KNOWN INFO
Air conditioner does not cool cab. Light ON, switch OK. Air conditioner belt OK. Lines and fittings OK.
POSSIBLE PROBLEMS
Condenser obstructed, damaged. Filter-drier blocked, faulty. Evaporator obstructed, damaged. Compressor faulty.

4

Are condenser fins free to radiate captured heat? Is condenser free from signs of damage?

NO → Clean dirt and debris from condenser fins, or replace damaged condenser.

YES

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If condenser is obstructed or damaged, condenser will not function.

KNOWN INFO
Air conditioner does not cool cab. Light ON, switch OK. Air conditioner belt OK. Lines and fittings OK. Condenser OK. Filter-drier OK.
POSSIBLE PROBLEMS
Evaporator obstructed, damaged. Compressor faulty.

5

Is there an adequate flow of air across evaporator fins? Is evaporator free from signs of damage?

NO → Clean evaporator fins or replace damaged evaporator.

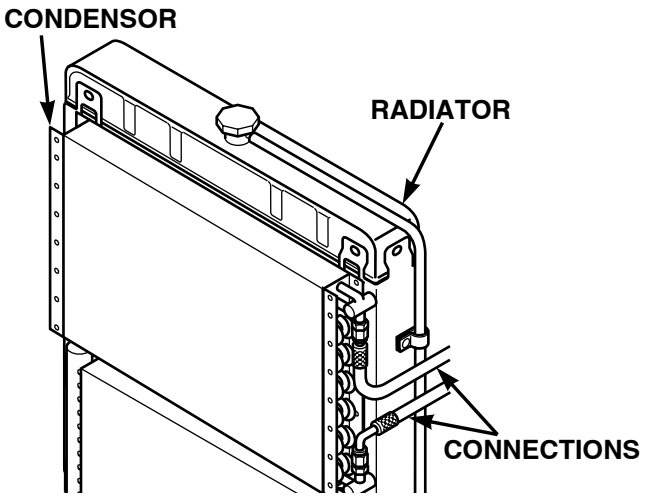
YES

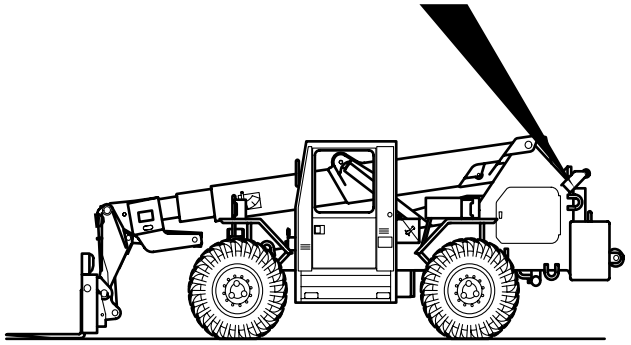
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If evaporator in cab is obstructed or damaged, evaporator will not function properly.

CONDENSER VISUAL INSPECTION

Visually inspect condenser fins for dirt and debris or signs of damage.

(a) If condenser fins are free to radiate heat and condenser is free from signs of damage, go to Step 5 of this fault.
(b) If condenser fins are blocked by dirt and debris, clean condenser with water or air (under pressure).
(c) If condenser shows signs of damage, notify Direct Support Maintenance.

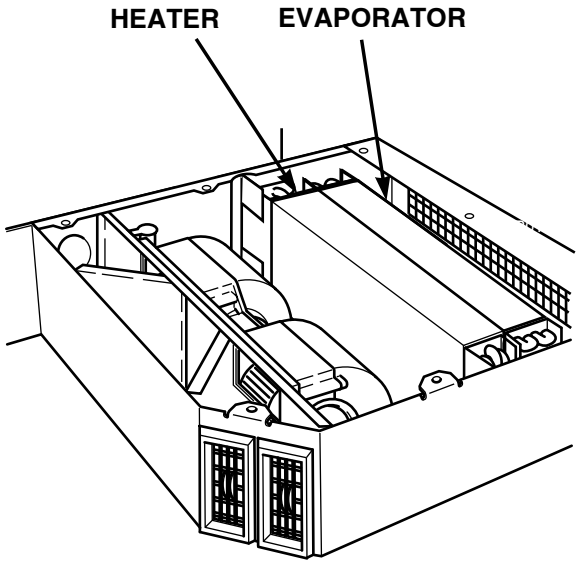




EVAPORATOR VISUAL INSPECTION

Visually inspect evaporator fins for dirt and debris, and for signs of damage.

(a) If evaporator fins are clean and free from damage, go to Step 6 of this fault.
(b) If evaporator fins obstructed with dirt and debris, clean fins.
(c) If evaporator shows signs of damage, repair or replace evaporator.



26. AIR CONDITIONER DOES NOT COOL CAB (CONT).

KNOWN INFO
Air conditioner does not cool cab. Light ON, switch OK. Air conditioner belt OK. Lines and fittings OK. Condenser OK. Filter-drier OK. Evaporator OK.
POSSIBLE PROBLEMS
Compressor faulty.

6

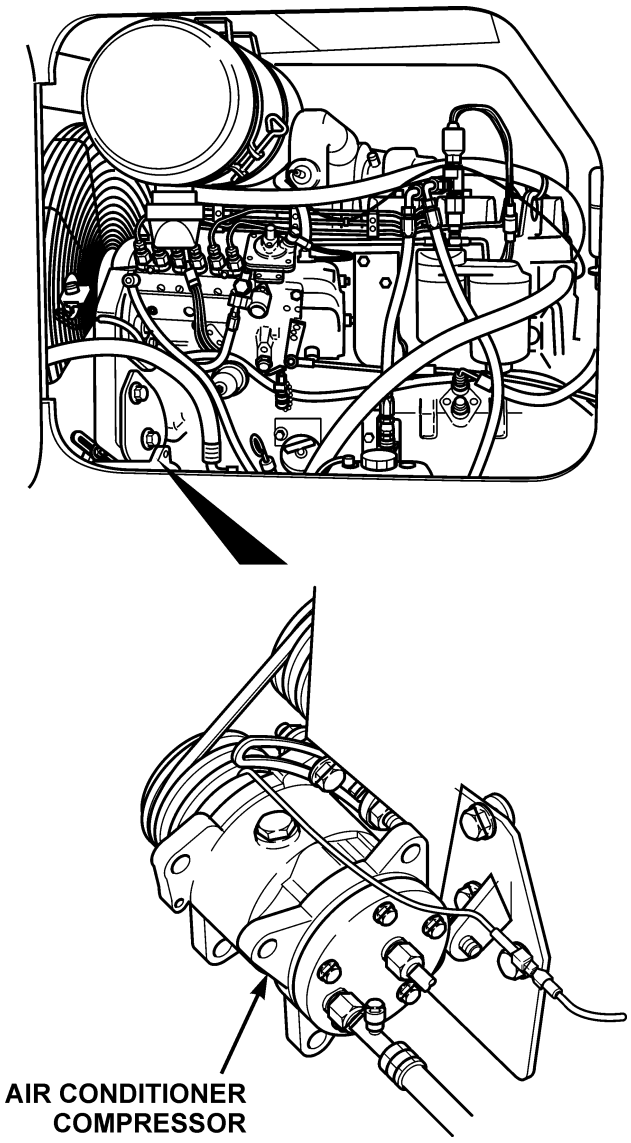
Does compressor run smoothly without unusual noise? Is compressor free from signs of leaks?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If compressor is leaking or faulty, compressor will not function properly.

NO → Notify DIrect Support to repair or replace faulty compressor.

YES → Notify Direct Support of this fault.

COMPRESSOR VISUAL INSPECTION
Check compressor (clutch, shaft, and mounting components, for example) for unusual noise. Leak check compressor. (a) If compressor runs smoothly and is free from signs of leaks, notify Direct Support about this fault. (b) If compressor runs with unusual noise and/or shows signs of leaks, notify Direct Support to repair faulty components or replace compressor.



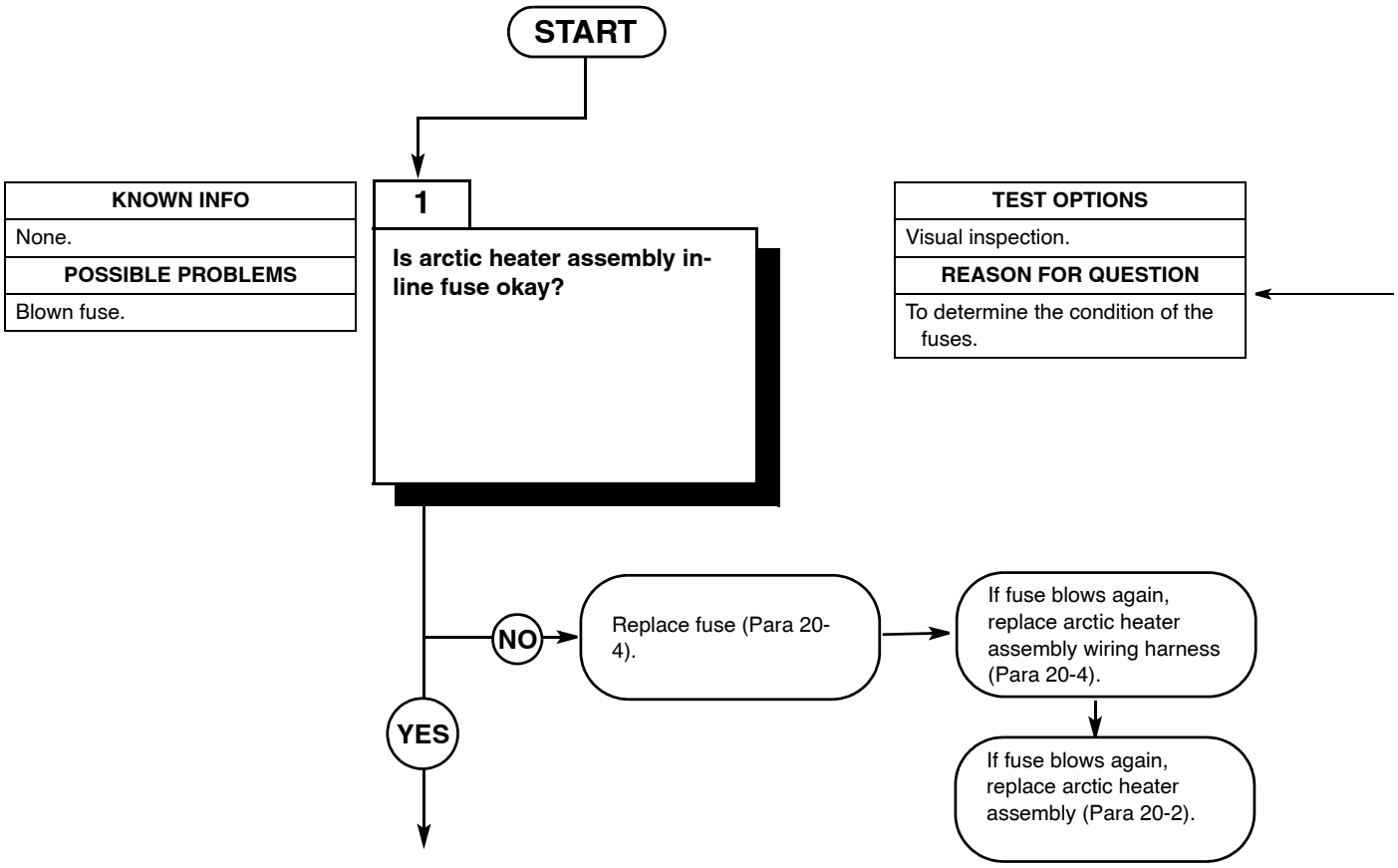
27. ARCTIC HEATER DOES NOT OPERATE CORRECTLY

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)
Refrigerant Leak Detector (Item 13, Appendix F)

References
TM 10-3930-673-10
TM 9-4910-571-12&P

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)



KNOWN INFO
Fuse is OK.
POSSIBLE PROBLEMS
Lines restricted, leaking, or damaged.

2

Are coolant lines to arctic heater assembly restricted, leaking, or damaged?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If cooling system does not operate correctly, the arctic heater will not operate.

YES → Repair or replace coolant lines to heater assembly.

NO

KNOWN INFO
Coolant lines are OK.
POSSIBLE PROBLEMS
Fuel line damaged, restricted, or leaking.

3

Is fuel line to arctic heater assembly restricted, leaking, or damaged?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If the fuel line is damaged the heater will not operate.

YES → Replace fuel line to heater assembly.

NO

27. ARCTIC HEATER DOES NOT OPERATE CORRECTLY (CONT).

KNOWN INFO
Fuel line is OK.
POSSIBLE PROBLEMS
Debris blocking the intake.

4

Is intake port on bottom of arctic heater assembly blocked or damaged?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If the intake is blocked, the heater will not operate.

YES → If debris is blocking the intake port, clear it away. → If intake port appears to be damaged, replace arctic heater assembly (Para 20-2).

NO

KNOWN INFO
Intake is OK.
POSSIBLE PROBLEMS
Exhaust is plugged.

5

Is exhaust port and tube on bottom of arctic heater assembly blocked or damaged?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If exhaust is plugged the heater will not operate correctly.

YES → If debris is blocking the exhaust tube or port clear it away. → If exhaust tube appears to be damaged, replace exhaust tube (Para 20-2). → If exhaust port appears to be damaged, replace heater assembly (Para 20-2).

NO

KNOWN INFO
Exhaust is OK.
POSSIBLE PROBLEMS
Heater wiring harness is damaged.

6

Is there power to heater assembly?

(1) Place battery disconnect switch in OFF position.
(2) Disconnect cannon plug to arctic heater assembly.
(3) Place battery disconnect switch in ON position.
(4) Using multimeter, measure voltage between cannon plug pin H harness side (red wire) and ground.

Is there battery voltage present?

TEST OPTIONS
Multimeter.
REASON FOR QUESTION
If the harness is damaged the heater will not operate.

NO → Replace arctic heater assembly wiring harness (Para 20-4).

YES

KNOWN INFO
Heater is getting power.
POSSIBLE PROBLEMS
Open ground.

7

Is the arctic heater assembly ground wire okay?

Using a multimeter, measure resistance between cannon plug pin 1 harness side (brown wire) and ground.

Is there battery voltage present?

TEST OPTIONS
Multimeter.
REASON FOR QUESTION
If the ground is open the heater will not operate.

NO → Replace arctic heater assembly wiring harness (Para 20-4).

YES

27. ARCTIC HEATER DOES NOT OPERATE CORRECTLY (CONT).

KNOWN INFO
Ground is OK.
POSSIBLE PROBLEMS
Damaged heater harness.

8

Is there power to the fuel pump?

(1) Place battery disconnect switch in OFF position.
(2) Connect the cannon plug to arctic heater assembly.
(3) Disconnect 2-pin connector from arctic heater fuel pump.
(4) Place battery disconnect switch in ON position.
(5) Using multimeter, measure voltage between 2-pin connector pin 1 harness side (Green wire) and ground.

Is there battery voltage present?

YES → STEP 10

NO ↓

TEST OPTIONS
Multimeter.
REASON FOR QUESTION
If the harness is damaged, the heater will not operate.

KNOWN INFO
No power to fuel pump.
POSSIBLE PROBLEMS
Damaged harness or heater assembly.

9

Is there continuity in Green wire to fuel pump?

(1) Place battery disconnect switch in OFF position.
(2) Disconnect cannon plug from arctic heater assembly.
(3) Using multimeter, measure resistance between 2-pin connector pin 1 harness side (green wire) and cannon plug pin a harness side (green wire).

Is there continuity present?

NO → Replace arctic heater assembly wiring harness (Para 20-4).

YES ↓

Replace arctic heater assembly (Para 20-2).

TEST OPTIONS
Multimeter.
REASON FOR QUESTION
If the harness is damaged, the heater will not operate.

KNOWN INFO
Fuel pump gets power.
POSSIBLE PROBLEMS
Damaged heater harness.

10

Is the fuel pump ground wire okay?

Using multimeter, measure resistance between 2-pin connector pin 2 harness side (brown wire) and ground.

Is there continuity present?

TEST OPTIONS
Multimeter.
REASON FOR QUESTION
If the harness is damaged, the heater will not operate.

NO → Replace arctic heater assembly wiring harness (Para 20-4).

YES → Replace arctic heater fuel pump (Para 20-3).

2-17. HYDRAULIC SYSTEM TROUBLESHOOTING

This paragraph covers hydraulic system troubleshooting. The Hydraulic System Fault Index, Table 2-8, lists faults for the hydraulic system of the ATLAS. Refer to schematics found at the end of this volume when performing test and corrective actions.

Table 2-8. Hydraulic System Fault Index

1. LEFT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE.

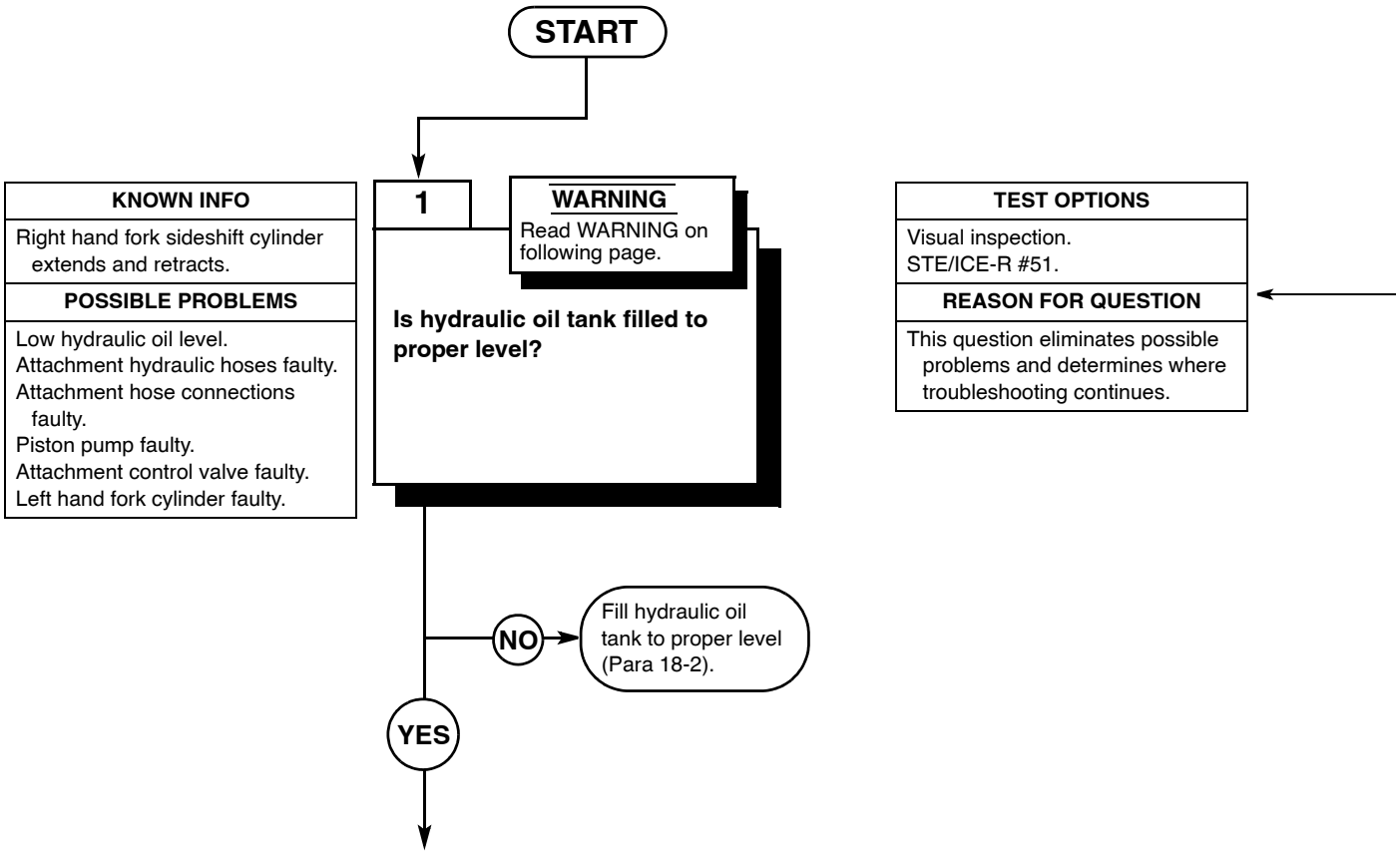
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Gage 0-5000 psi

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



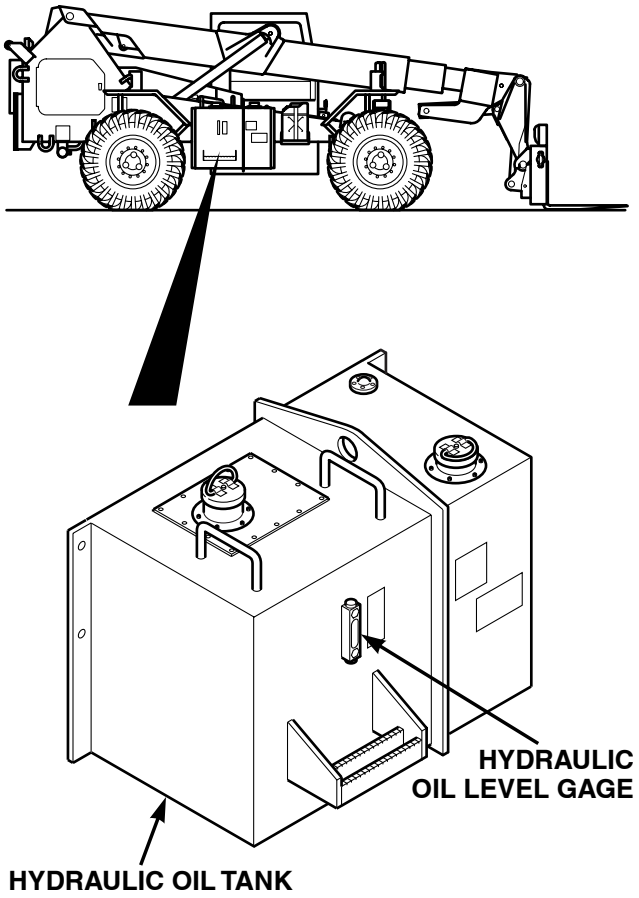
WARNING

- Hydraulic oil in system can be under pressures over 3000 psi With engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Fill tank to FULL mark with hydraulic oil, (TM 10-3930-673-20). Go to Step 2 of this fault.



1. LEFT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Right hand fork cylinder extends and retracts. Hydraulic oil OK.
POSSIBLE PROBLEMS
Attachment hydraulic hoses faulty. Attachment hose connections faulty. Piston pump faulty. Attachment control valve faulty. Left hand fork cylinder faulty.

2

Are hydraulic hoses leading to left hand fork sideshift cylinder free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hoses are cracked, kinked, or pinched, fork cylinder will not operate.

NO → Replace faulty hoses (Para 18-25).

YES

KNOWN INFO
Right hand fork cylinder extends and retracts. Hydraulic oil OK. Hydraulic hoses OK.
POSSIBLE PROBLEMS
Attachment hose connections faulty. Piston pump faulty. Attachment control valve faulty. Left hand fork cylinder faulty.

3

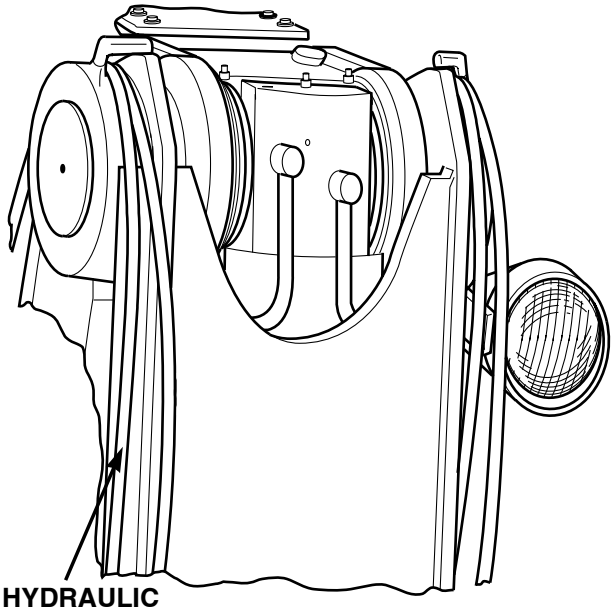
Are hydraulic hose connections leading to left hand fork sideshift cylinder tight and free of leaks?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hydraulic hose connections are leaking, fork cylinder will not operate.

NO → Replace faulty fittings (Para 18-25).

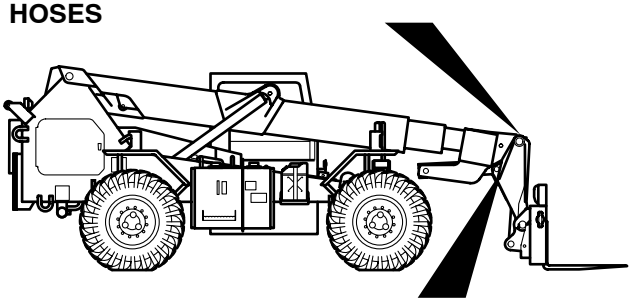
YES

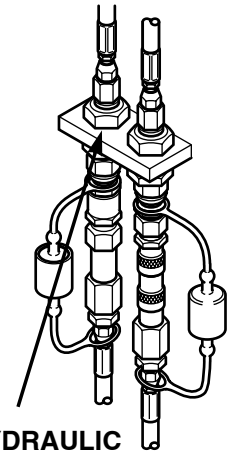
HYDRAULIC HOSES VISUAL INSPECTION
Visually inspect hydraulic hoses leading to left-hand fork sideshift cylinder for cracks, kinks, or pinches. (a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault. (b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-25).



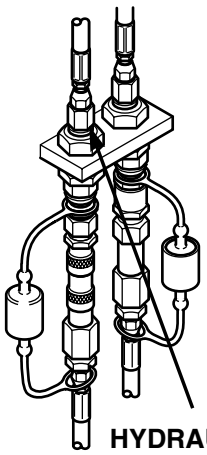
HYDRAULIC HOSES

HYDRAULIC HOSE CONNECTION VISUAL INSPECTION
Visually inspect hydraulic hose connections leading to left hand fork sideshift cylinder for leaks. (a) If there are no leaks at hydraulic hose connections, go to Step 4. (b) If there are leaks at one or more of connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 18-25).





HYDRAULIC FITTINGS



HYDRAULIC CONNECTIONS

1. LEFT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Right hand fork cylinder extends and retracts. Hydraulic oil OK. Hydraulic hoses OK. Hose connections OK.
POSSIBLE PROBLEMS
Piston pump faulty. Attachment control valve faulty. Left hand fork cylinder faulty.

4

Is hydraulic oil pressure at piston pump 160 psi (1103.2 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not 160 psi, piston pump faulty.

NO → Test/replace faulty piston pump (Para 18-4).

YES

KNOWN INFO
Right hand fork cylinder extends and retracts. Hydraulic oil OK. Hydraulic hoses OK. Hose connections OK. Piston pump OK.
POSSIBLE PROBLEMS
Attachment control valve faulty. Left hand fork cylinder faulty.

5

Is hydraulic oil pressure at attachment control valve between 160 psi (minimum stand-by pressure) and 3625 psi (maximum operating pressure) (1103.2 and 24994.4 kPa)?

TEST OPTIONS
Pressure Test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not between 160 and 3625 psi, attachment control valve faulty.

NO → Replace faulty attachment control valve (Para 18-6).

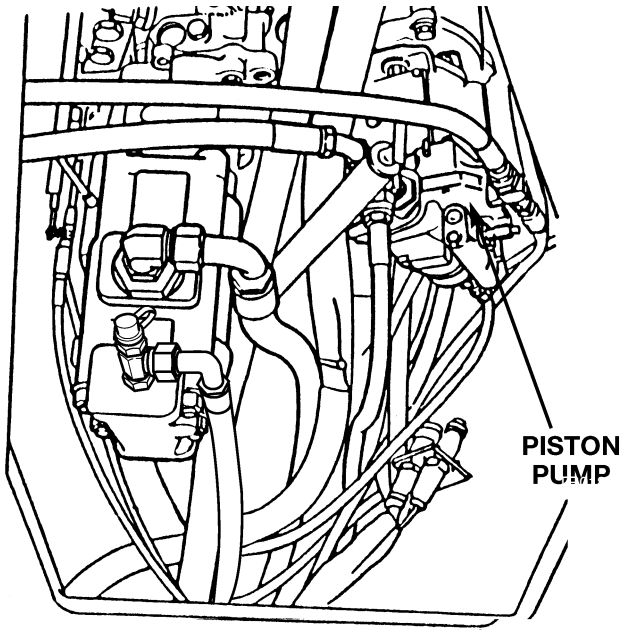
YES

NOTE

Hydraulic oil pressure should be checked only while engine is idling with no controls operated. If a function is operated, the pressure will rise up to 3625 psi.

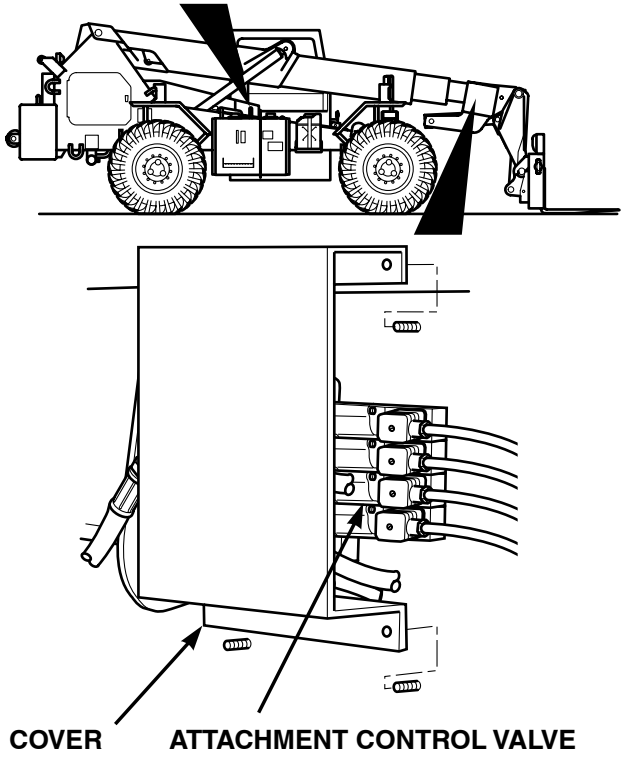
PISTON PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on piston pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is 160 psi (1103.2 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not 160 psi (1103.2 kPa), shut down engine (TM 10-3930-673-10) and test and replace piston pump (Para 18-4).



ATTACHMENT CONTROL VALVE PRESSURE TEST

(1) Remove cover from diagnostic coupler on attachment control valve.
(2) Perform STE/ICE Test #51 (see TM 9-4910-571-12&P)
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is between 160 and 3625 psi (1003.2 and 24994.4 kPa), go to Step 6 of this fault.
  (b) If hydraulic oil pressure is not between 160 and 3625 psi (1003.2 and 24994.4 kPa), shut down engine (TM 10-3930-673-10) and replace attachment control valve (Para 18-6).



1. LEFT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Right hand fork cylinder extends and retracts. Hydraulic oil OK. Hydraulic hoses OK. Hose connections OK. Piston pump OK. Attachment control valve OK.
POSSIBLE PROBLEMS
Left hand fork cylinder faulty.

6

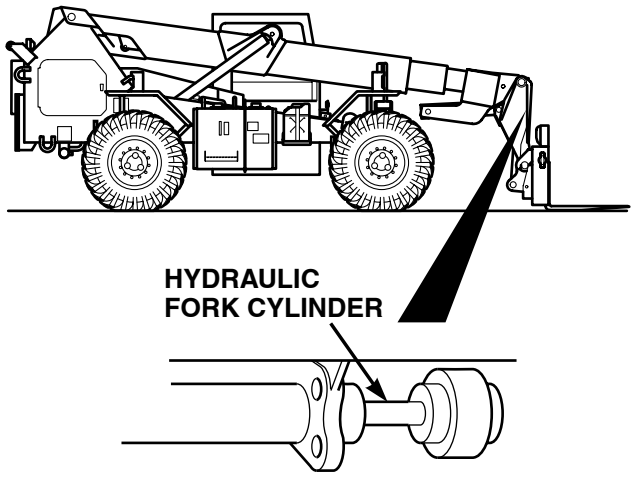
Is left hand fork cylinder or its housing free from signs of damage?

TEST OPTIONS
Visual Inspection. STE/ICE-R #51.
REASON FOR QUESTION
If left hand fork cylinder or housing is damaged, fork cylinder will not operate.

NO → Replace damaged cylinder and housing (Para 18-28).

YES → Go to Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate.

LEFT HAND FORK CYLINDER VISUAL INSPECTION
Visually inspect left hand fork sideshift cylinder and its housing for signs of damage. (a) If left hand fork cylinder and/or its housing are not damaged, see Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate. (b) If left hand fork cylinder and/or its housing are damaged, shut down engine (TM 10-3930-673-10) and replace cylinder and its housing (Para 18-28).



2. RIGHT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE.

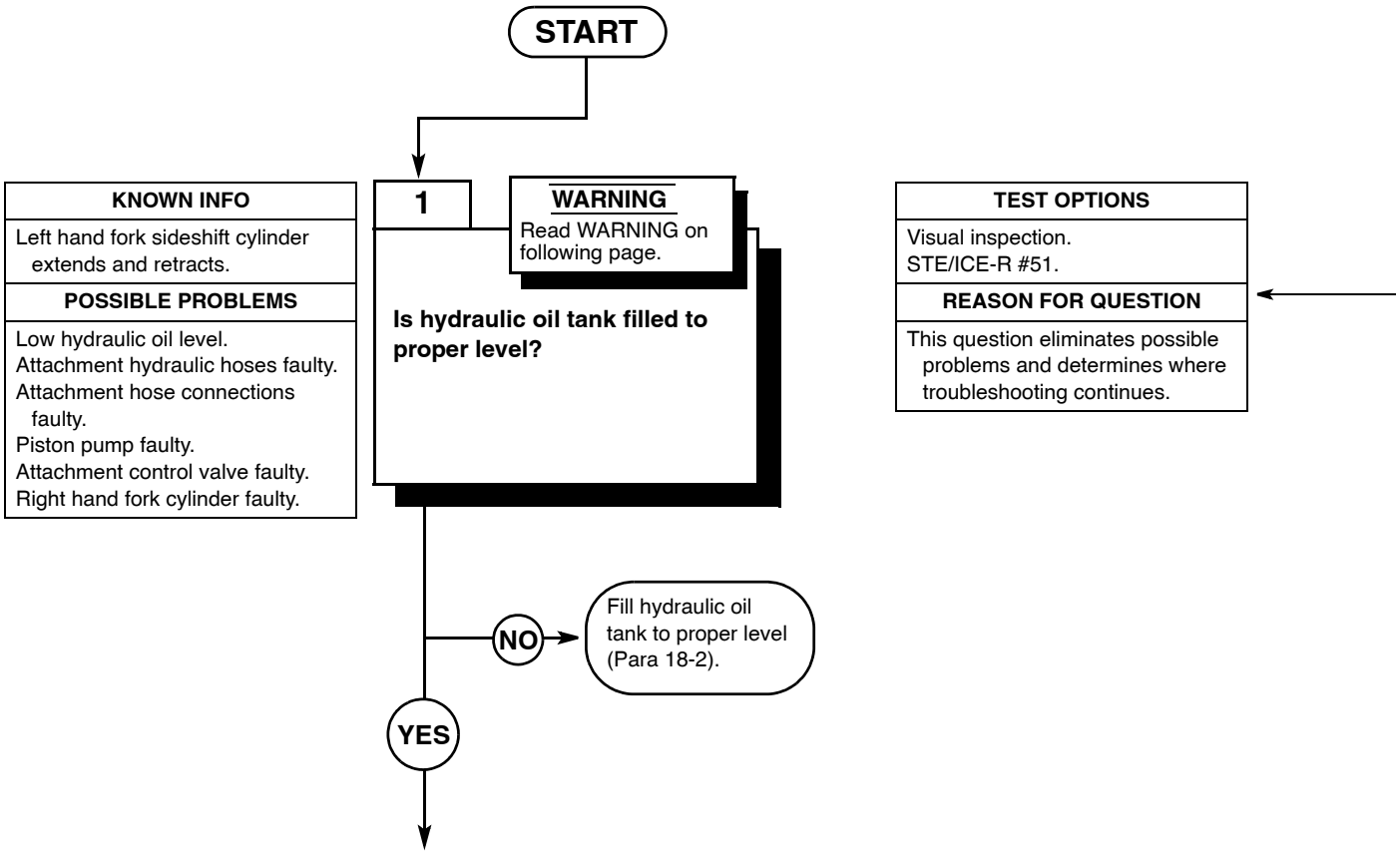
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

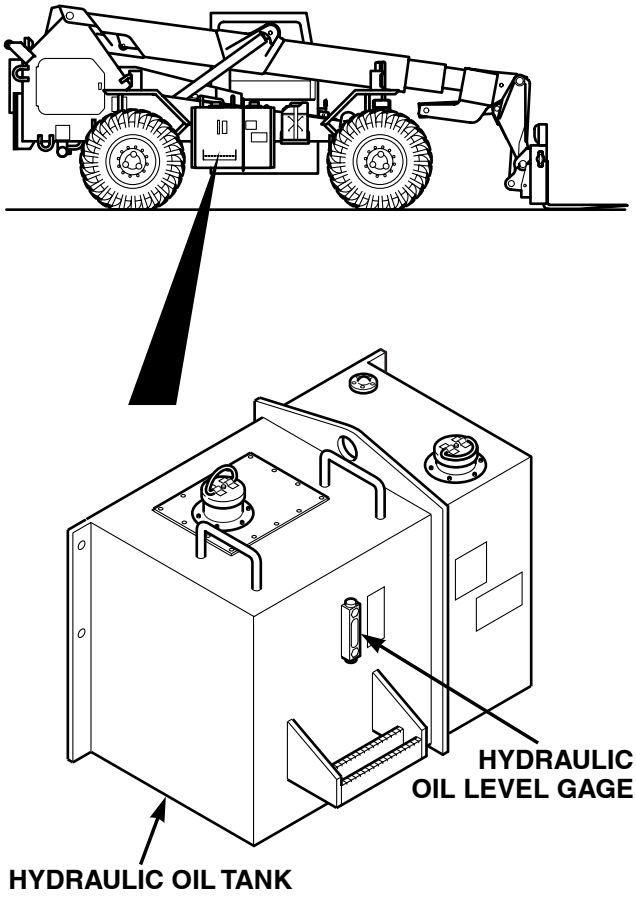
- Hydraulic oil in system can be under pressures over 3000 psi With engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

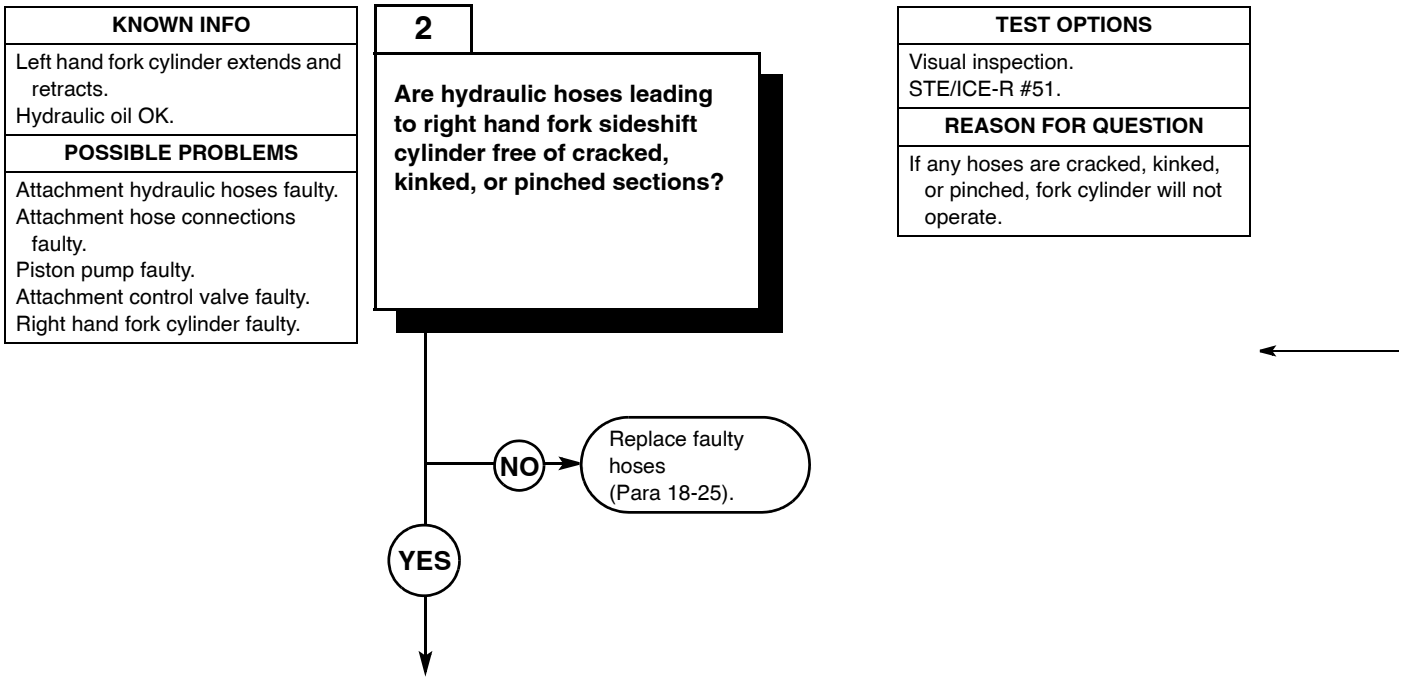
CAUTION

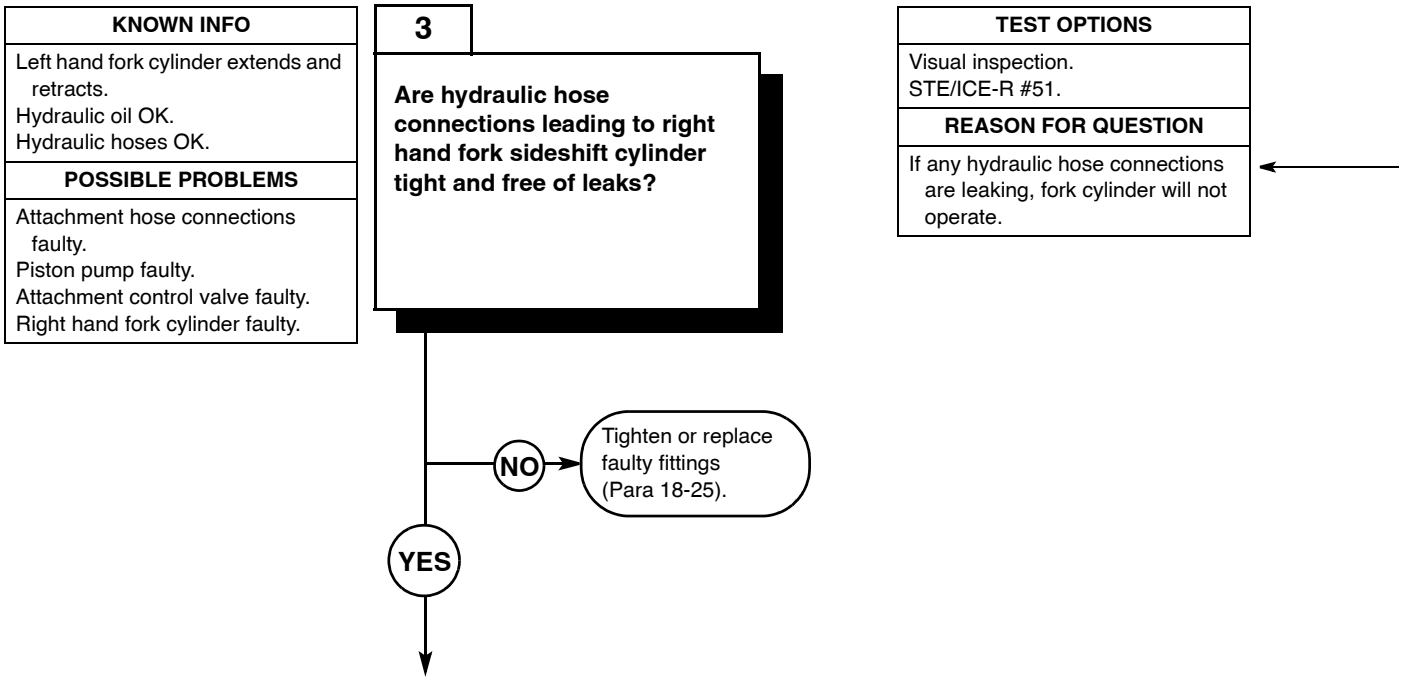
Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gauge to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil, (TM 10-3930-673-20). Go to Step 2 of this fault.

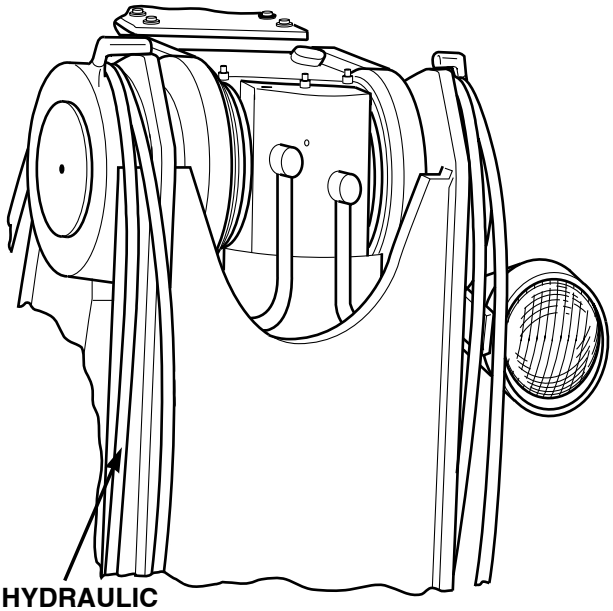


2. RIGHT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE (CONT).



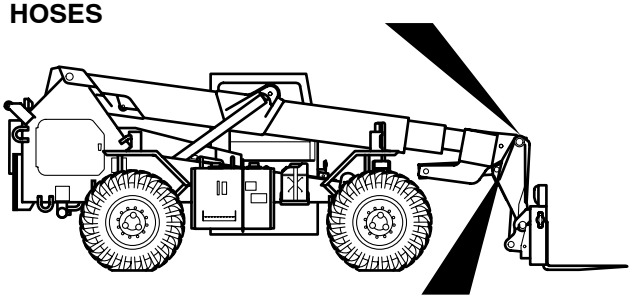


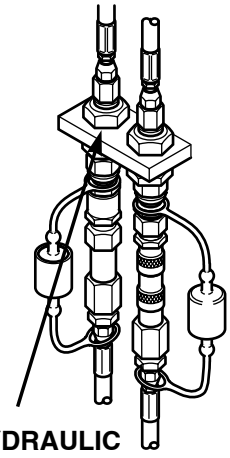
HYDRAULIC HOSES VISUAL INSPECTION
Visually inspect hydraulic hoses leading to right hand fork sideshift cylinder for cracks, kinks, or pinches. (a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault. (b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-25).



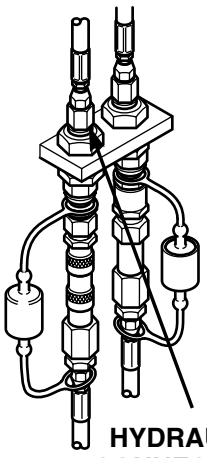
HYDRAULIC HOSES

HYDRAULIC HOSE CONNECTIONS VISUAL INSPECTION
Visually inspect hydraulic hose connections leading to right hand fork sideshift cylinder for leaks. (a) If there are no leaks at hydraulic hose connections, go to Step 4 of this fault. (b) If there are leaks at one or more of connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 18-25).





HYDRAULIC FITTINGS



HYDRAULIC CONNECTIONS

2. RIGHT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Left hand fork cylinder extends and retracts. Hydraulic oil OK. Hydraulic hoses OK. Hose connections OK.
POSSIBLE PROBLEMS
Piston pump faulty. Attachment control valve faulty. Right hand fork cylinder faulty.

4

Is hydraulic oil pressure at piston pump 160 psi (1103.2 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not 160 psi, piston pump is faulty.

NO → Test/replace faulty piston pump (Para 18-4).

YES

KNOWN INFO
Left hand fork cylinder extends and retracts. Hydraulic oil OK. Hydraulic hoses OK. Hose connections OK. Piston pump OK.
POSSIBLE PROBLEMS
Attachment control valve faulty. Right hand fork cylinder faulty.

5

Is hydraulic oil pressure at attachment control valve between 160 psi (minimum stand-by pressure) and 3625 psi (maximum operating pressure) (1103.2 and 24994.4 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not between 160 and 3625 psi, attachment control valve is faulty.

NO → Replace faulty attachment control valve (Para 18-6).

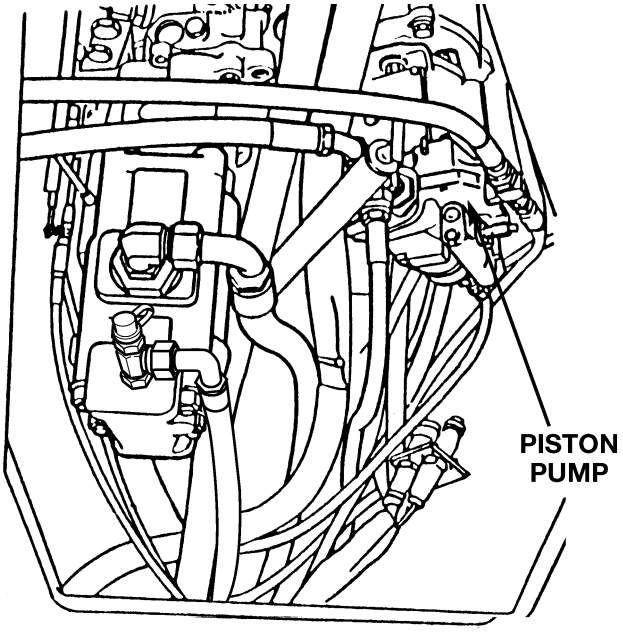
YES

NOTE

Hydraulic oil pressure should be checked only while engine is idling with no controls operated. If a function is operated, the pressure will rise up to 3625 psi.

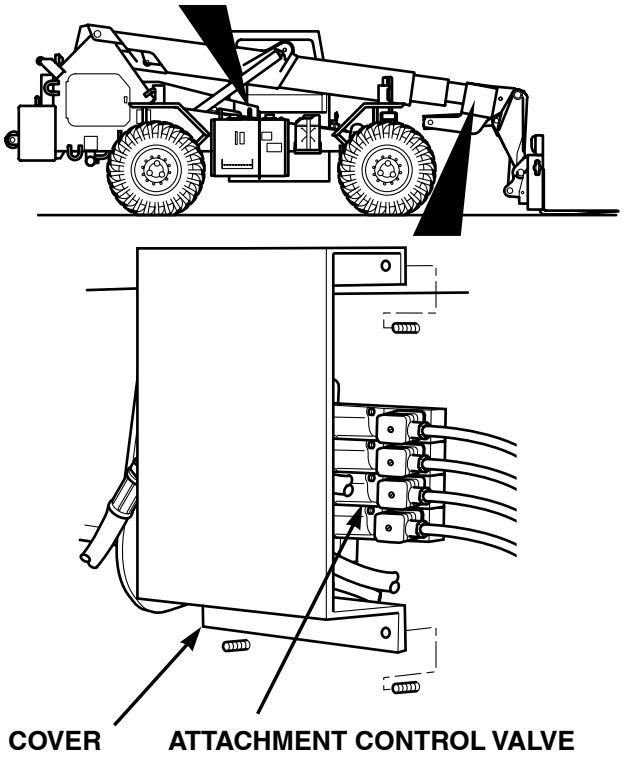
PISTON PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on piston pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is 160 psi (1103.2 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not 160 psi (1103.2 kPa), shut down engine (TM 10-3930-673-10) and test and replace piston pump (Para 18-4).

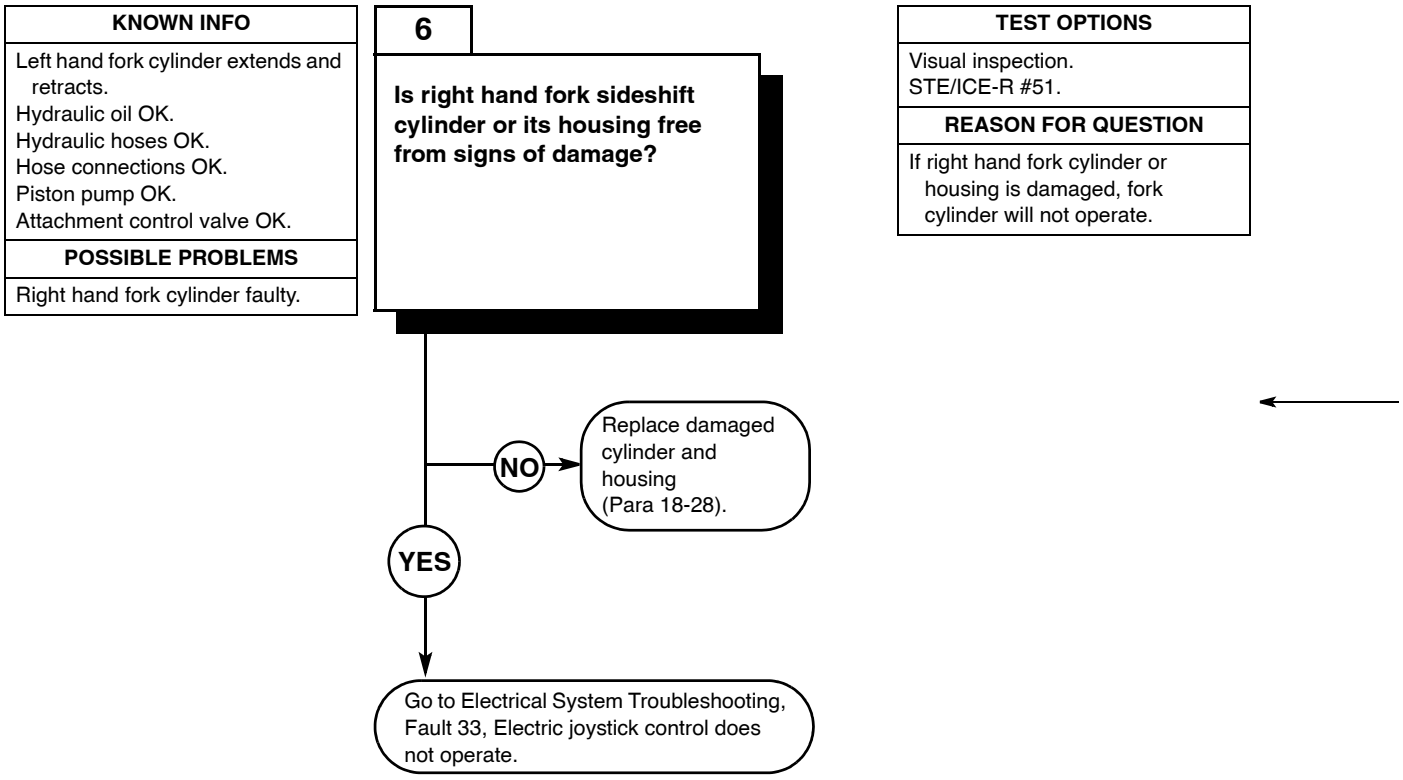


ATTACHMENT CONTROL VALVE PRESSURE TEST

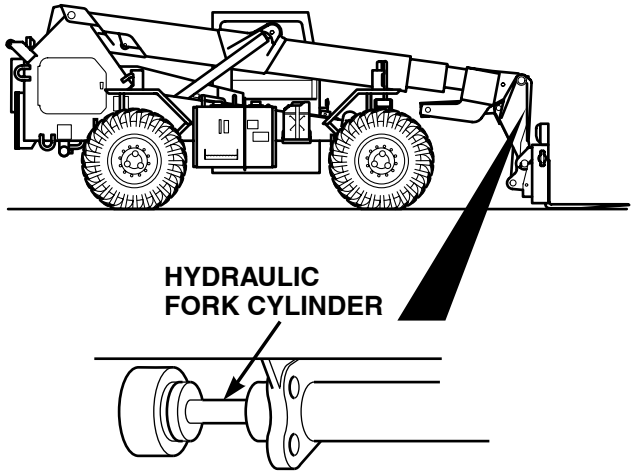
(1) Remove cover from diagnostic coupler on attachment control valve.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P)
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is between 160 and 3625 psi (1103.2 and 24994.4 kPa), go to Step 6 of this fault.
  (b) If hydraulic oil pressure is not between 160 and 3625 psi (1103.2 and 24994.4 kPa), shut down engine (TM 10-3930-673-10) and replace attachment control valve (Para 18-6).



2. RIGHT HAND FORK SIDESHIFT CYLINDER DOES NOT OPERATE (CONT).



HAND FORK CYLINDER VISUAL INSPECTION
Visually inspect right hand fork sideshift cylinder and its housing for signs of damage. (a) If right hand fork cylinder and/or its housing are not damaged, see Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate. (b) If right hand fork cylinder and/or its housing are damaged, shut down engine (TM 10-3930-673-10) and replace cylinder and its housing (Para 18-28).



3. FORK TILT CYLINDER DOES NOT OPERATE.

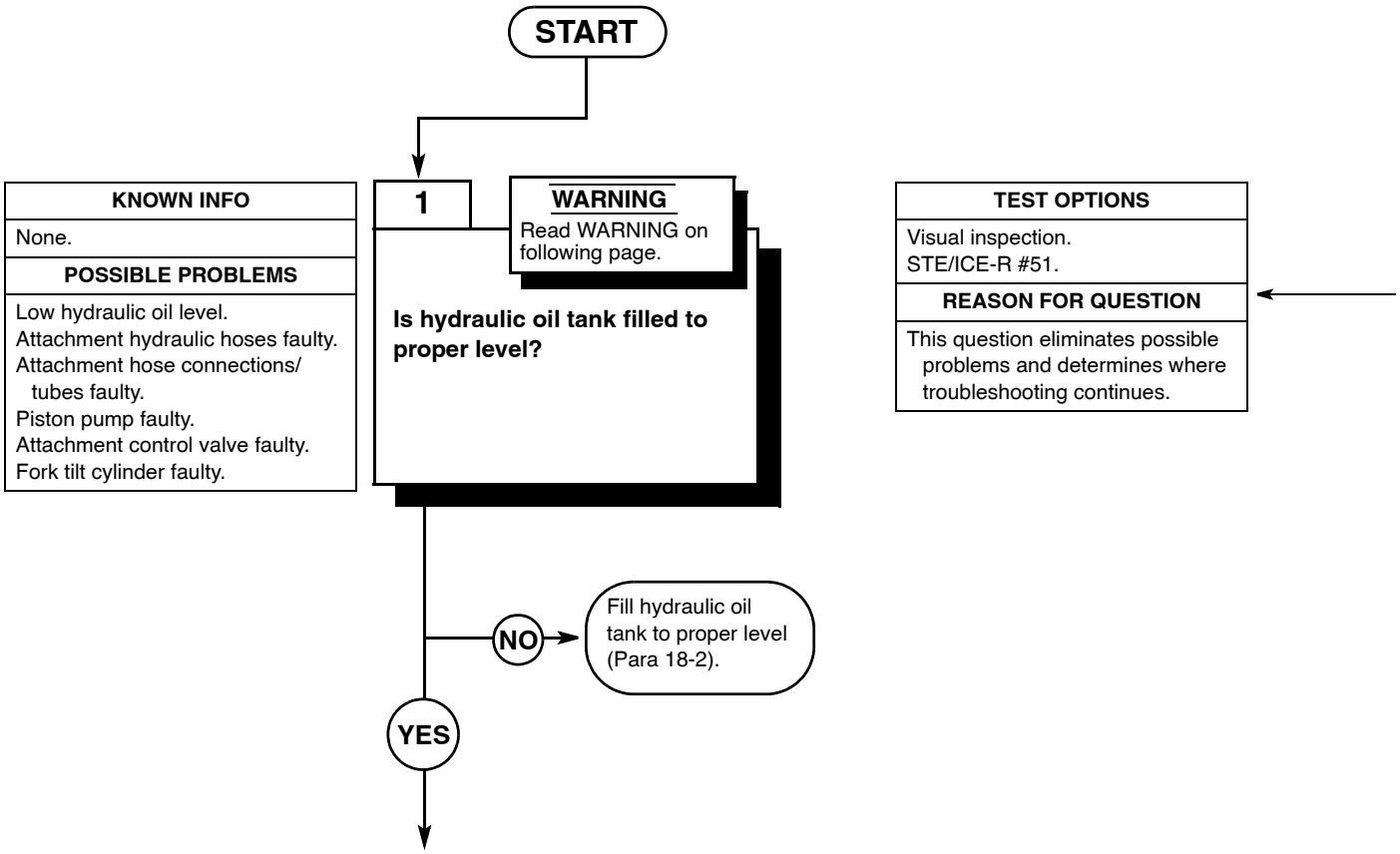
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)
Gage, 0-5000 psi

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

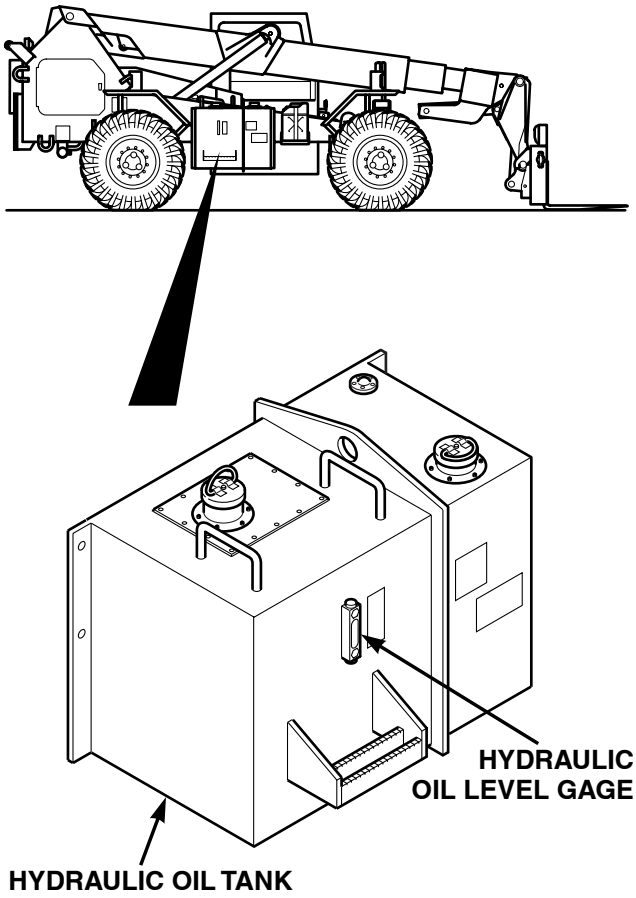
- Hydraulic oil in system can be under pressures over 3000 psi With engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gauge to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (TM 10-3930-673-20) and go to Step 2 of this fault.



3. FORK TILT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil OK.
POSSIBLE PROBLEMS
Attachment hydraulic hoses faulty. Attachment hose connections/ tubes faulty. Piston pump faulty. Attachment control valve faulty. Fork tilt cylinder faulty.

2

Are hydraulic hoses leading to fork tilt cylinder free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hoses are cracked, kinked, or pinched, tilt cylinder will not operate.

NO → Replace faulty hoses (Para 18-25).

YES

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK.
POSSIBLE PROBLEMS
Attachment hose connections/ tubes faulty. Piston pump faulty. Attachment control valve faulty. Fork tilt cylinder faulty.

3

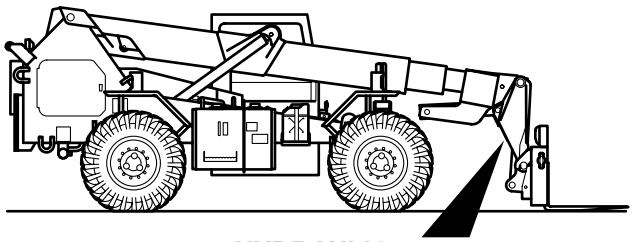
Are hydraulic hose connections leading to fork tilt cylinder tight and free of leaks? Are hydraulic tubes undamaged and intact?

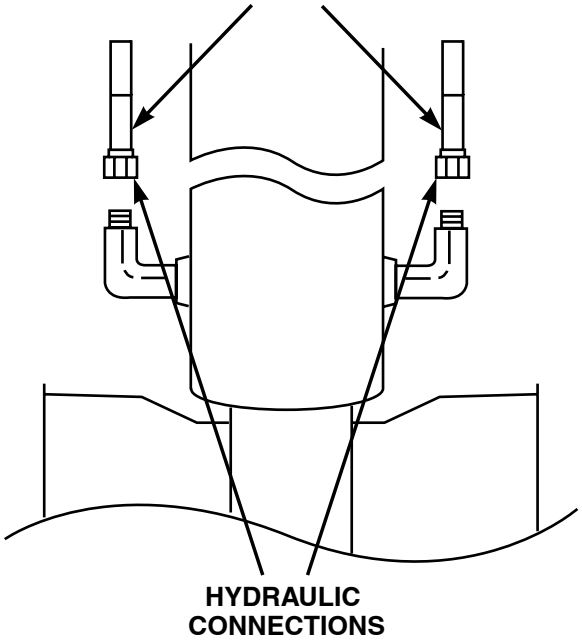
TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hydraulic hose connections are leaking, tilt cylinder will not operate.

NO → Tighten or replace faulty fittings (Para 18-25). Replace damaged tube (Para 18-26).

YES

HYDRAULIC HOSES VISUAL INSPECTION
Visually inspect hydraulic hoses leading to fork tilt cylinder for cracks, kinks, or pinches. (a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault. (b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-25).





HYDRAULIC HOSE CONNECTIONS VISUAL INSPECTION
Visually inspect hydraulic hose connections leading to fork tilt cylinder for leaks. Visually inspect hydraulic tubes on cylinder housing. (a) If there are no leaks at hydraulic hose connections and tubes are not damaged, go to Step 4 of this fault. (b) If there are leaks at one or more of connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 18-25). If tube(s) are damaged, replace tube(s) (Para 18-26).

3. FORK TILT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK. hose/tube connections OK.
POSSIBLE PROBLEMS
Piston pump faulty. Attachment control valve faulty. Fork tilt cylinder faulty.

4

Is hydraulic oil pressure at piston pump 160 psi (1103.2 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not 160 psi, piston pump is faulty.

NO → Test/replace faulty piston pump (Para 18-4).

YES

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK. Hose/tube connections OK. Piston pump OK.
POSSIBLE PROBLEMS
Attachment control valve faulty. Fork tilt cylinder faulty.

5

Is hydraulic oil pressure at attachment control valve between 160 psi (minimum stand-by pressure) and 3625 psi (maximum operating pressure) (1103.2 and 24994.4 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not between 160 and 3625 psi, attachment control valve is faulty.

NO → Replace faulty attachment control valve (Para 18-6).

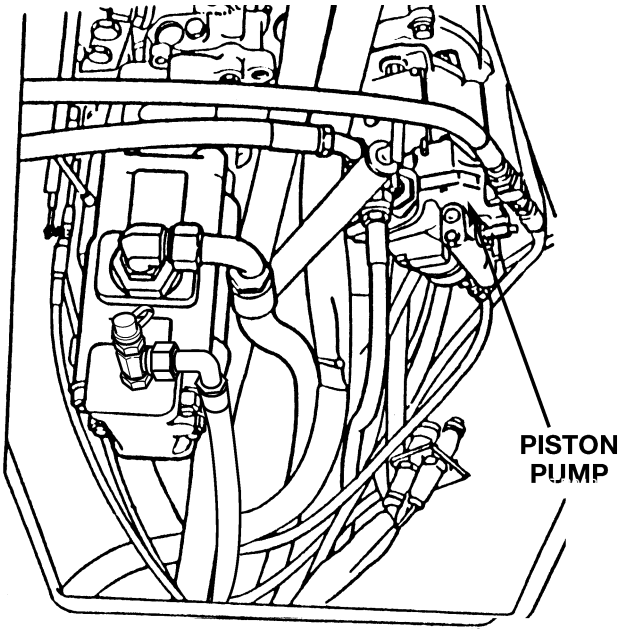
YES

NOTE

Hydraulic oil pressure should be checked only while engine is idling with no controls operated. If a function is operated, the pressure will rise up to 3625 psi.

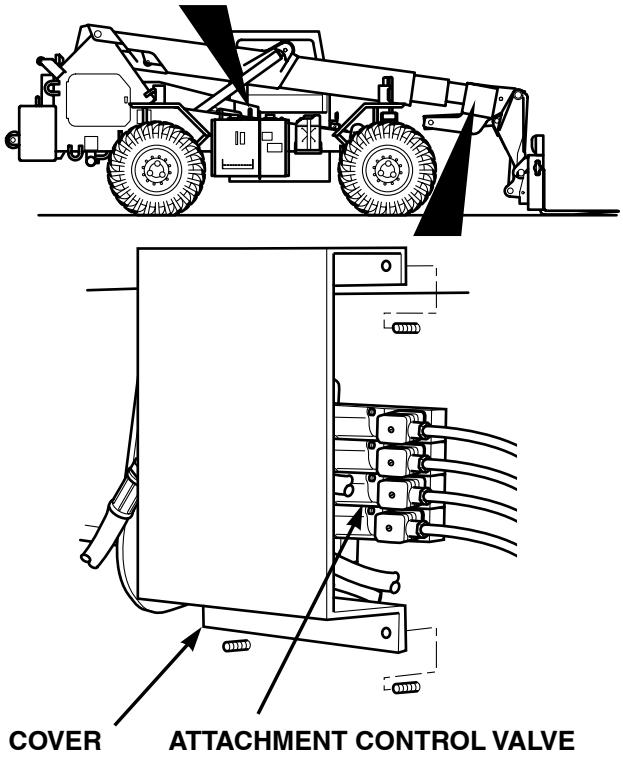
PISTON PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on piston pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is 160 psi (1103.2 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not 160 psi (1103.2 kPa), shut down engine (TM 10-3930-673-10) and test and replace piston pump (Para 18-4).



ATTACHMENT CONTROL VALVE PRESSURE TEST

(1) Remove cover from diagnostic coupler on attachment control valve.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P)
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is between 160 and 3625 psi (1103.2 and 24994.4 kPa), go to Step 6 of this fault.
  (b) If hydraulic oil pressure is not between 160 and 3625 psi (1103.2 and 24994.4 kPa), shut down engine (TM 10-3930-673-10) and replace attachment control valve (Para 18-6).



3. FORK TILT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK. Hose/tube connections OK. Piston pump OK. Attachment control valve OK.
POSSIBLE PROBLEMS
Fork tilt cylinder faulty.

6

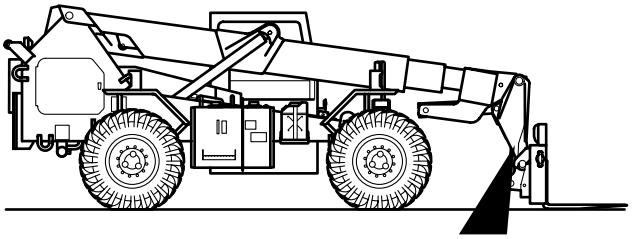
Is fork tilt cylinder or its housing free from signs of damage?

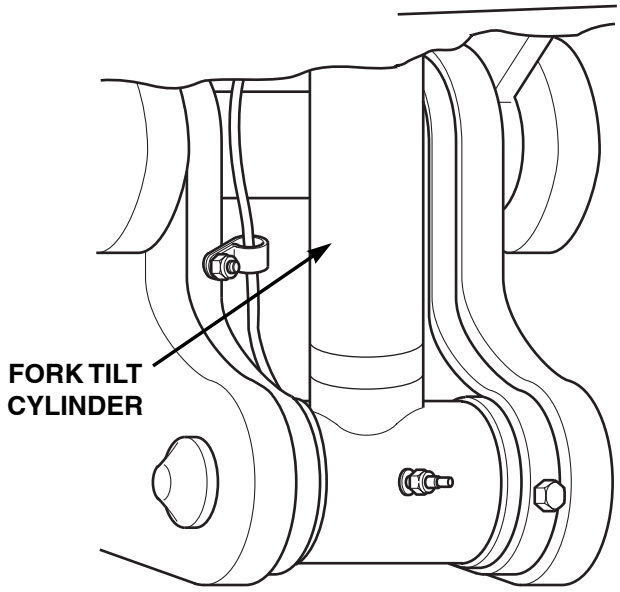
TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If fork tilt cylinder or housing is damaged, tilt cylinder will not operate.

NO → Replace damaged cylinder and housing (Para 18-28).

YES → Go to Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate.

TILT CYLINDER VISUAL INSPECTION
Visually inspect fork tilt cylinder and its housing for signs of damage. (a) If fork tilt cylinder and/or its housing are not damaged, see Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate. (b) If fork tilt cylinder and/or its housing are damaged, shut down engine (TM 10-3930-673-10) and replace cylinder and its housing (Para 18-28).





4. ATTACHMENT CYLINDER DOES NOT OPERATE.

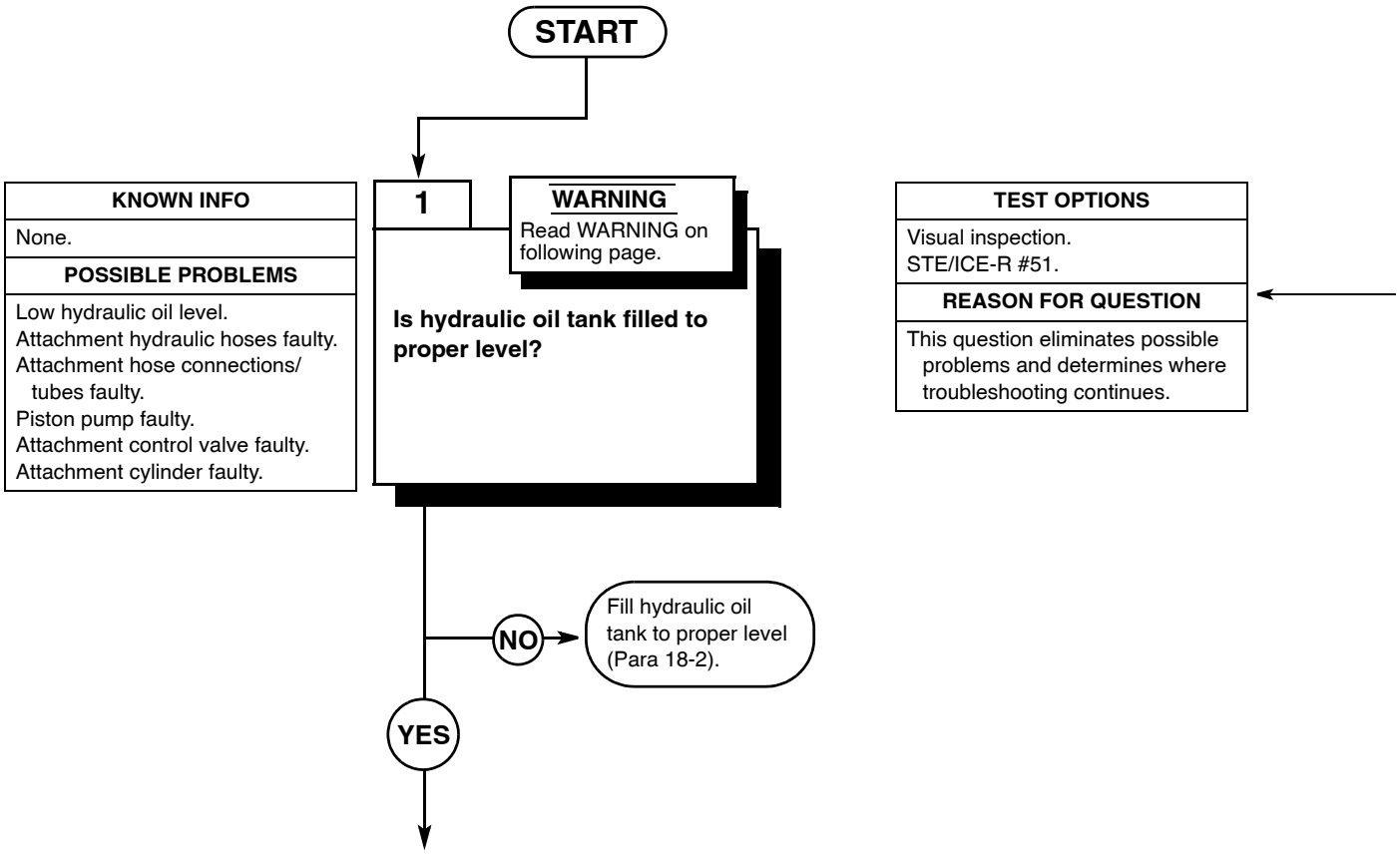
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

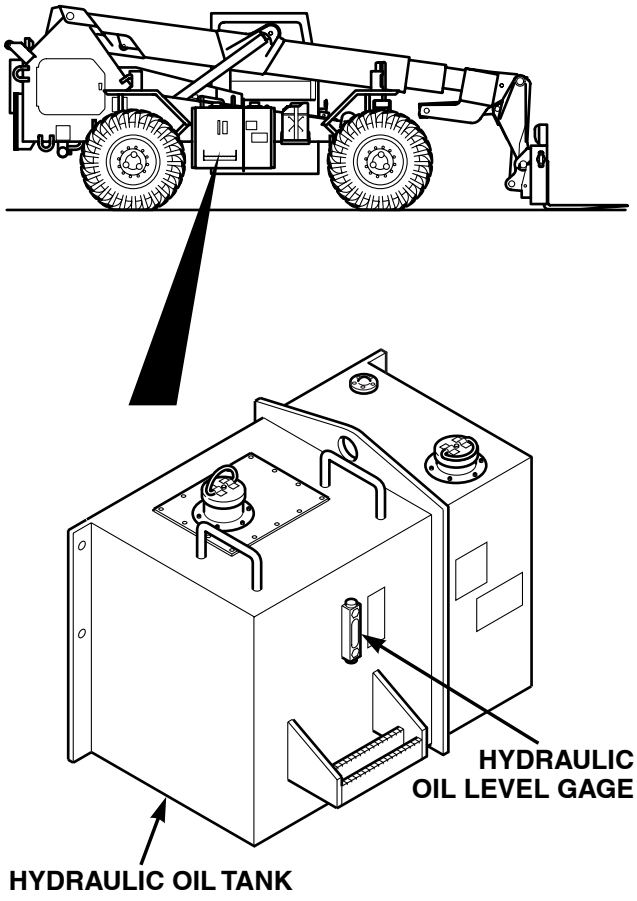
- Hydraulic oil in system can be under pressures over 3000 psi With engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gauge to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (TM 10-3930-673-20) and go to Step 2 of this fault.



4. ATTACHMENT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil OK.
POSSIBLE PROBLEMS
Attachment hydraulic hoses faulty. Attachment hose connections/ tubes faulty. Piston pump faulty. Attachment control valve faulty. Attachment cylinder faulty.

2

Are hydraulic hoses leading to attachment cylinder free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hoses are cracked, kinked, or pinched, attachment cylinder will not operate.

NO → Replace faulty hoses (Para 18-25).

YES

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK.
POSSIBLE PROBLEMS
Attachment hose connections/ tubes faulty. Piston pump faulty. Attachment control valve faulty. Attachment cylinder faulty.

3

Are hydraulic hose connections leading to attachment cylinder tight and free of leaks? Is hydraulic tube undamaged and intact?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hydraulic hose connections and tubes are leaking, attachment cylinder will not operate.

NO → Tighten or replace faulty fittings (Para 18-25). Replace damaged tube (Para 18-26).

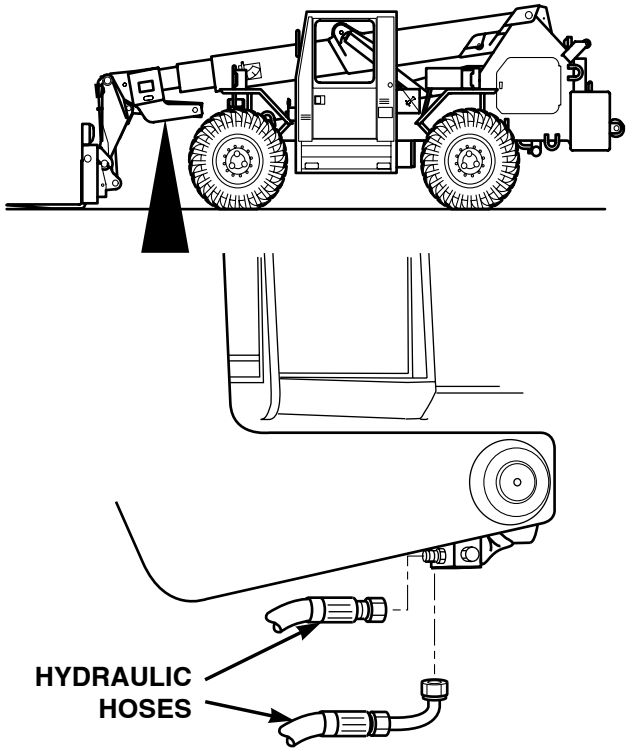
YES

HYDRAULIC HOSES VISUAL INSPECTION

Visually inspect hydraulic hoses leading to attachment cylinder for cracks, kinks, or pinches.

(a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault.

(b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-24).

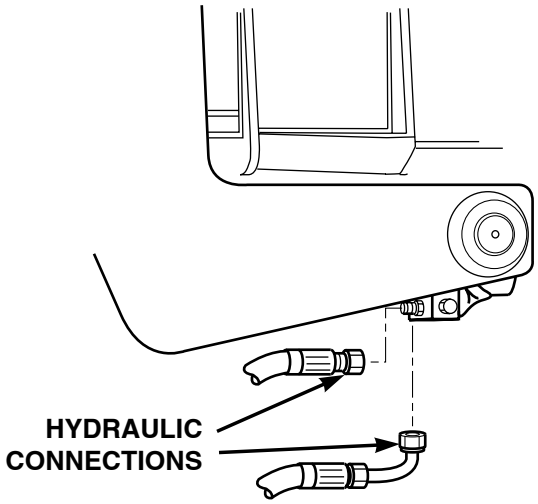


HYDRAULIC HOSE CONNECTIONS VISUAL INSPECTION

Visually inspect hydraulic hose connections leading to attachment cylinder for leaks. Visaully inspect hydraulic tube on cylinder housing.

(a) If there are no leaks at hydraulic hose connections and tube is not damaged, go to Step 4 of this fault.

(b) If there are leaks at one or more of connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 18-25). If tube is damaged, replace tube (Para 18-26).



4. ATTACHMENT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK. Hose/tube connections OK.
POSSIBLE PROBLEMS
Piston pump faulty. Attachment control valve faulty. Attachment cylinder faulty.

4

Is hydraulic oil pressure at piston pump 160 psi (1103.2 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not 160 psi, piston pump is faulty.

NO → Test/replace faulty piston pump (Para 18-4).

YES

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK. Hose/tube connections OK. Piston pump OK.
POSSIBLE PROBLEMS
Attachment control valve faulty. Attachment cylinder faulty.

5

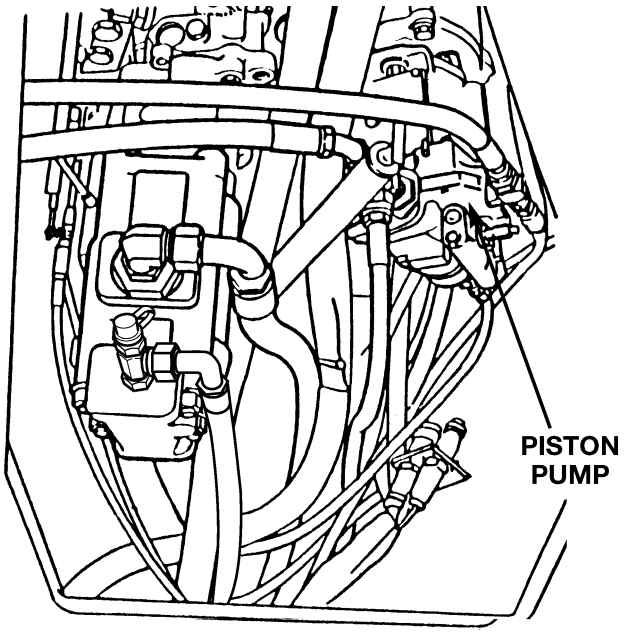
Is hydraulic oil pressure at attachment control valve between 160 psi (minimum stand-by pressure) and 3625 psi (maximum operating pressure) (1103.2 and 24994.4 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not between 160 and 3625 psi, attachment control valve is faulty.

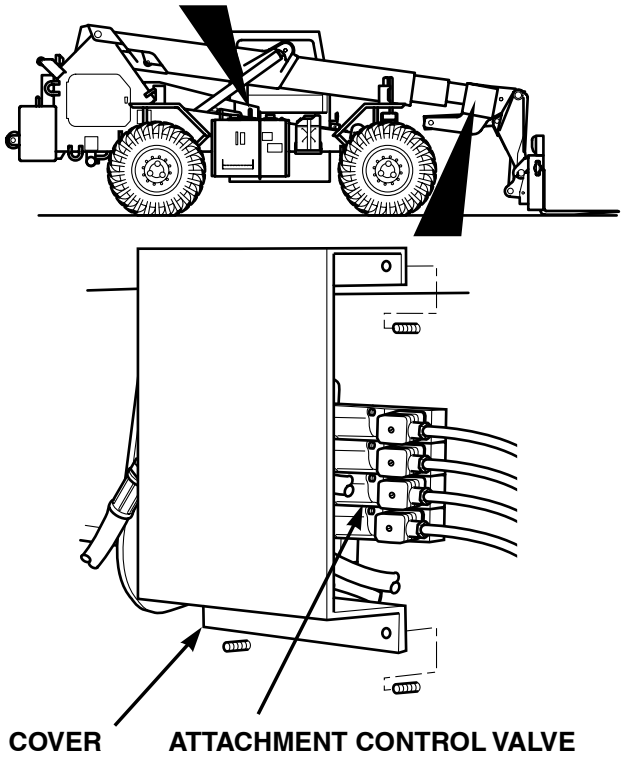
NO → Replace faulty attachment control valve (Para 18-6).

YES

PISTON PUMP PRESSURE TEST
(1) Remove cover from diagnostic coupler on piston pump. (2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P). (3) Read output pressure on test device. (a) If hydraulic oil pressure is 160 psi (1103.2 kPa), go to Step 5 of this fault. (b) If hydraulic oil pressure is not 160 psi (1103.2 kPa), shut down engine (TM 10-3930-673-10) and test and replace piston pump (Para 18-4).



ATTACHMENT CONTROL VALVE PRESSURE TEST
(1) Remove cover from diagnostic coupler on attachment control valve. (2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P) (3) Read output pressure on test device. (a) If hydraulic oil pressure is between 160 and 3625 psi (1103.2 and 24994.4 kPa), go to Step 6 of this fault. (b) If hydraulic oil pressure is not between 160 and 3625 psi (1103.2 and 24994.4 kPa), shut down engine (TM 10-3930-673-10) and replace attachment control valve (Para 18-6).



4. ATTACHMENT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil OK. Hydraulic hoses OK. Hose/tube connections OK. Piston pump OK. Attachment control valve OK.
POSSIBLE PROBLEMS
Attachment cylinder faulty.

6

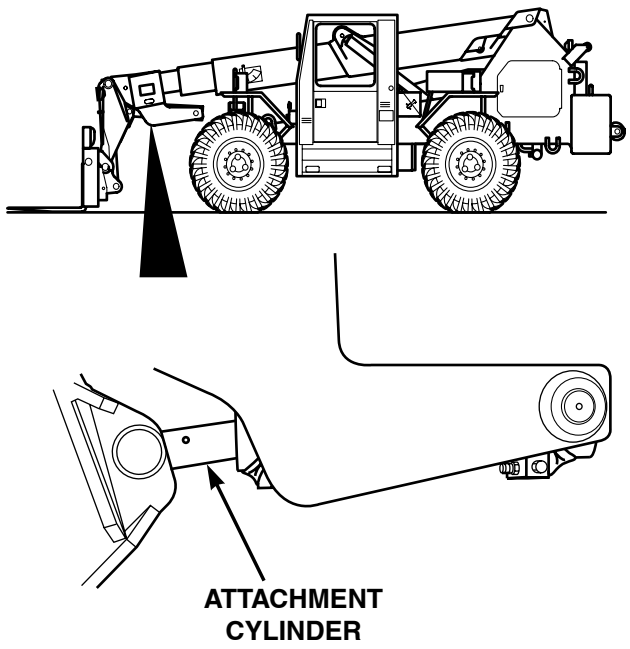
Is attachment cylinder or its housing free from signs of damage?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If attachment cylinder or housing is damaged, attachment cylinder will not operate.

NO → Replace damaged cylinder and housing (Para 18-15).

YES → Go to Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate.

ATTACHMENT CYLINDER VISUAL INSPECTION
Visually inspect attachment cylinder and its housing for signs of damage. (a) If attachment cylinder and/or its housing are not damaged, see Electrical System Troubleshooting, Fault 33, Electric joystick control does not operate. (b) If attachment cylinder and/or its housing are damaged, shut down engine (TM 10-3930-673-10) and replace cylinder and its housing (Para 18-15).



5. LEFT AND/OR RIGHT HOIST CYLINDERS DO NOT EXTEND OR RETRACT.

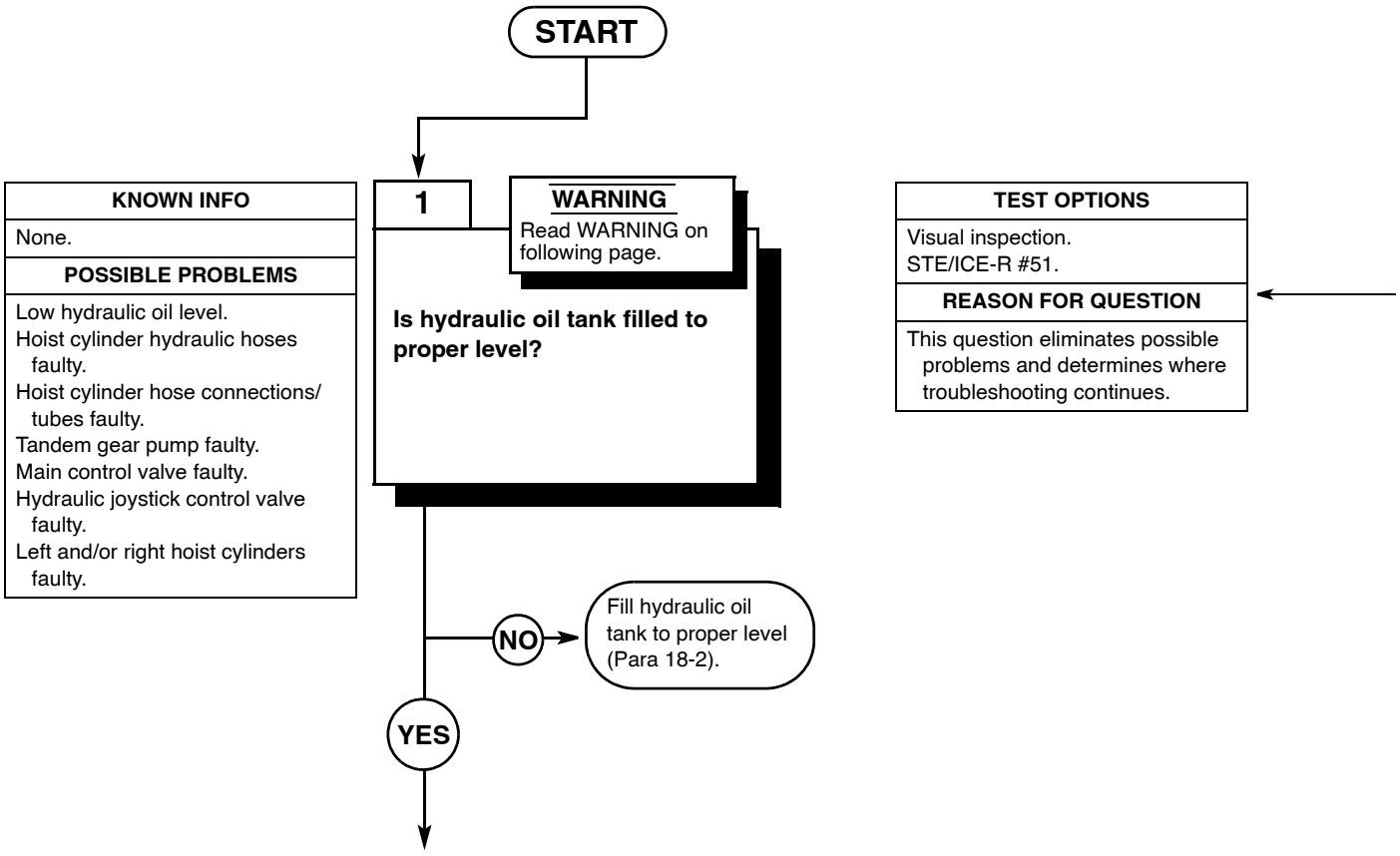
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

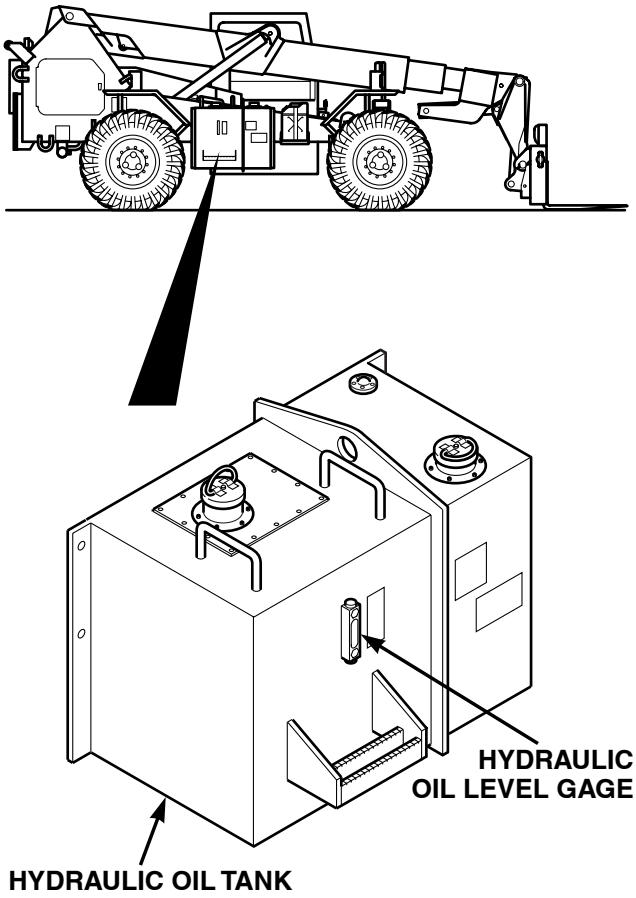
- Hydraulic oil in the system can be under pressures over 3000 psi With engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in the hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on the ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gauge to determine if tank is filled to proper level (Para 18-2). (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2). Go to Step 2 of this fault.



5. LEFT AND/OR RIGHT HOIST CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil OK.
POSSIBLE PROBLEMS
Hoist cylinder hydraulic hoses faulty. Hoist cylinder hose connections/ tubes faulty. Tandem gear pump faulty. Main control valve faulty. Hydraulic joystick control valve faulty. Left and/or right hoist cylinders faulty.

2

Are hydraulic hoses leading to hoist cylinders free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hoses are cracked, kinked, or pinched, hoist cylinders will not operate.

NO → Replace faulty hoses (Para 18-25).

YES

KNOWN INFO
Hydraulic oil OK. Hoist cylinder hydraulic hoses OK.
POSSIBLE PROBLEMS
Hoist cylinder hose connections/ tubes faulty. Tandem gear pump faulty. Main control valve faulty. Hydraulic joystick control valve faulty. Left and/or right hoist cylinders faulty.

3

Are hydraulic hose connections leading to hoist cylinders tight and free of leaks? Are hydraulic tubes undamaged and intact?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If any hydraulic hose connections/ tubes are leaking, hoist cylinders will not operate.

NO → Tighten or replace faulty fittings (Para 18-25). Replace damaged tube (Para 18-26).

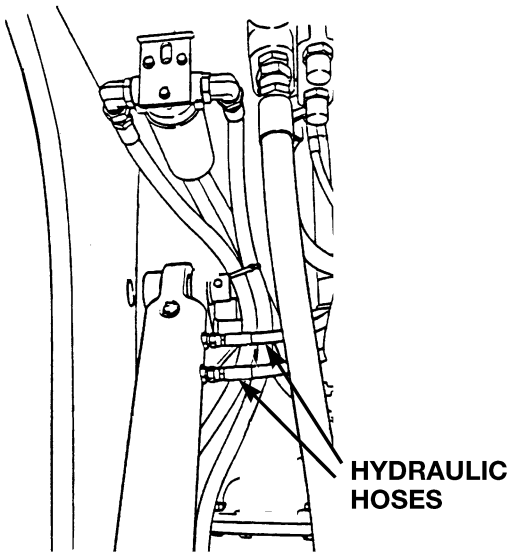
YES

HYDRAULIC HOSES VISUAL INSPECTION

Visually inspect hydraulic hoses leading to left and/or right hoist cylinders for cracks, kinks, or pinches.

(a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault.

(b) If there are cracks, kinks, or pinches in one or more hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-25).

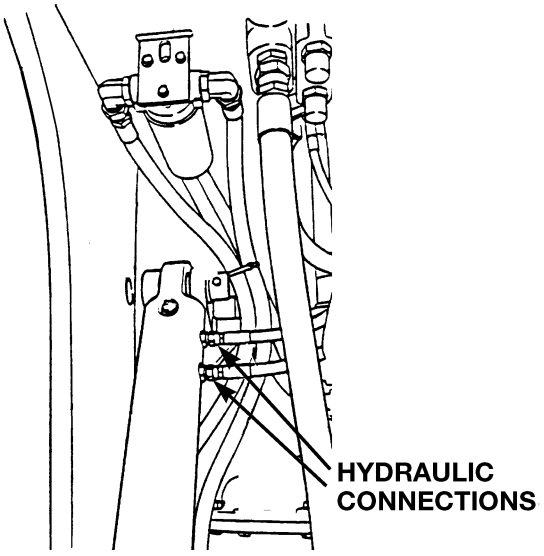


HYDRAULIC HOSE CONNECTIONS/ TUBES VISUAL INSPECTION

Visually inspect hydraulic hose connections leading to hoist cylinders for leaks. Visually inspect hydraulic tubes on cylinder housings.

(a) If there are no leaks at hydraulic hose connections and tubes are not damaged, go to Step 4 of this fault.

(b) If there are leaks at one or more connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 18-25). If tubes are damaged, replace tubes (Para 18-26).



5. LEFT AND/OR RIGHT HOIST CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil OK. Hoist cylinder hydraulic hoses OK. Hoist cylinder hose connections/ tubes OK.
POSSIBLE PROBLEMS
Tandem gear pump faulty. Main control valve faulty. Hydraulic joystick control valve faulty. Left and/or right hoist cylinders faulty.

4

Is hydraulic oil flow rate at tandem gear pump at 42.3 to 55.2 gpm (160 to 209 Lpm)?

NO → Test/replace faulty tandem gear pump (Para 18-3).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil flow rate is not at 42.3 to 55.2 gpm (160 to 209 Lpm), tandem gear pump faulty.

KNOWN INFO
Hydraulic oil OK. Hoist cylinder hydraulic hoses OK. Hoist cylinder hose connections/ tubes OK. Tandem gear pump OK.
POSSIBLE PROBLEMS
Main control valve faulty. Hydraulic joystick control valve faulty. Left and/or right hoist cylinders faulty.

5

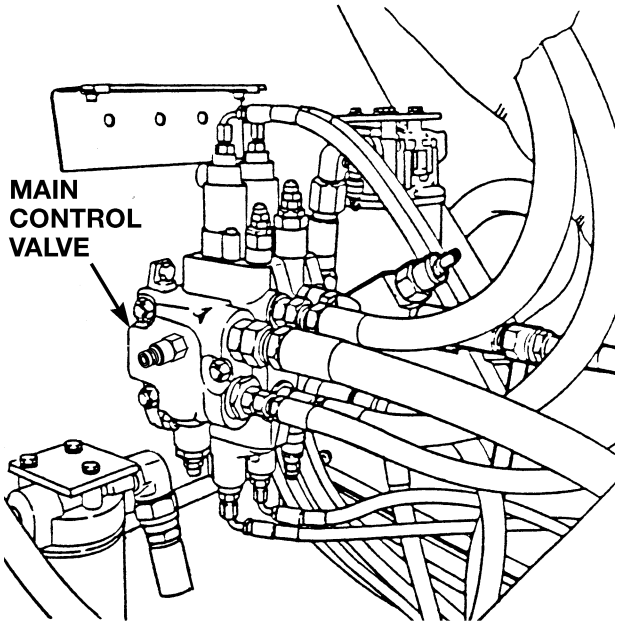
Is hydraulic oil pressure at main control valve between 3050 +/- 50 psi (21029.75 +/- 345 kPa)?

NO → Replace faulty main control valve (Para 18-5).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 3050 +/- 50 psi (21029.75 +/- 345 kPa), main control valve faulty.

MAIN CONTROL VALVE PRESSURE TEST
(1) Remove cover from diagnostic coupler on main control valve. (2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P). (3) Read output pressure on test device. (a) If hydraulic oil pressure is at 3050 +/- 50 psi (21029.75 +/- 345 kPa), go to Step 6 of this fault. (b) If hydraulic oil pressure is not at 3050 +/- 50 psi (21029.75 +/- 345 kPa), shut down engine (TM 10-3930-673-10) and replace main control valve (Para 18-5).



5. LEFT AND/OR RIGHT HOIST CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil OK. Hoist cylinder hydraulic hoses OK. Hoist cylinder hose connections/ tubes OK. Main control valve OK.
POSSIBLE PROBLEMS
Hydraulic joystick control valve faulty. Left and/or right hoist cylinders faulty.

6

Does hydraulic joystick control valve operate properly?

NO → Replace faulty hydraulic control valve (Para 18-11).

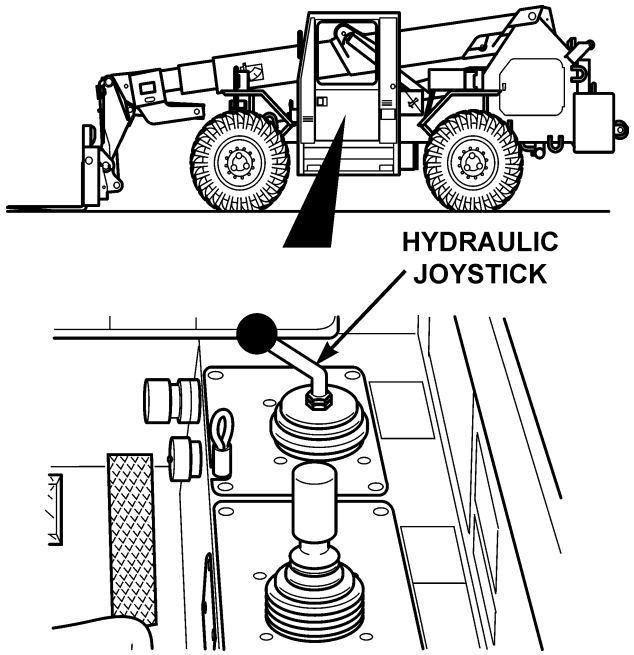
YES

TEST OPTIONS
Pressure Test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic joystick control valve does not operate properly, control valve is faulty.

NOTE

Relieve accumulator pressure before removing pressure hose on hydraulic joystick.

HYDRAULIC JOYSTICK CONTROL VALVE PRESSURE TEST
(1) Place hydraulic joystick in neutral position. Attach 3-way gage and check pressure at “P” port on joystick. (a) If hydraulic oil pressure is null go to Step (2) of this fault. (b) If not, replace joystick control valve (Para 18-11). (2) Place hydraulic joystick in raise position and then in lower position. Check pressure at input lines to main control valve. (a) If hydraulic oil pressure is at 1700 to 1800 psi (11721 to 12411 kPa), go to Step 7 of this fault. (b) If hydraulic oil pressure is not at 1700 to 1800 psi (11721 to 12411 kPa), shut down engine (TM 10-3930-673-10) and replace the joystick control valve.



5. LEFT AND/OR RIGHT HOIST CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil OK. Hoist cylinder hydraulic hoses OK. Hoist cylinder hose connections/ tubes OK. Main control valve OK. Hydraulic joystick control valve OK.
POSSIBLE PROBLEMS
Left and/or right hoist cylinders faulty.

7

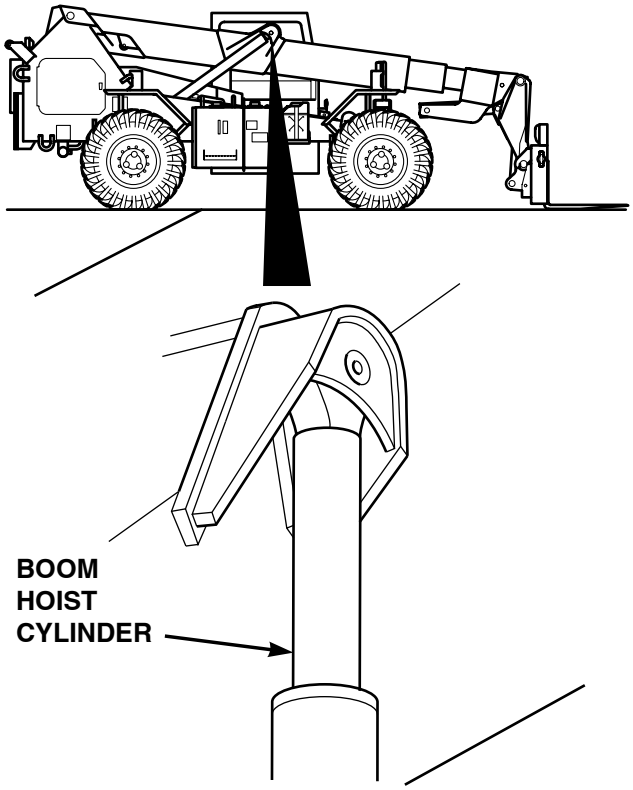
Are hoist cylinders and their housings free from signs of damage?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hoist cylinders or housings are damaged, hoist cylinders will not operate.

NO → Replace damaged cylinder and housing (Para 18-29).

YES → Go to Electrical Troubleshooting Section to continue.

VISUAL INSPECTION
Visually inspect hoist cylinders and their housings for signs of damage. (a) If hoist cylinders and/or their housings are not damaged, go to Electrical Troubleshooting Section to continue. (b) If hoist cylinders and/or their housings are damaged, shut down engine (TM 10-3930-673-10) and replace cylinders and their housings (Para 18-29).



6. BOOM EXTEND CYLINDER SLOW OR DOES NOT EXTEND OR RETRACT.

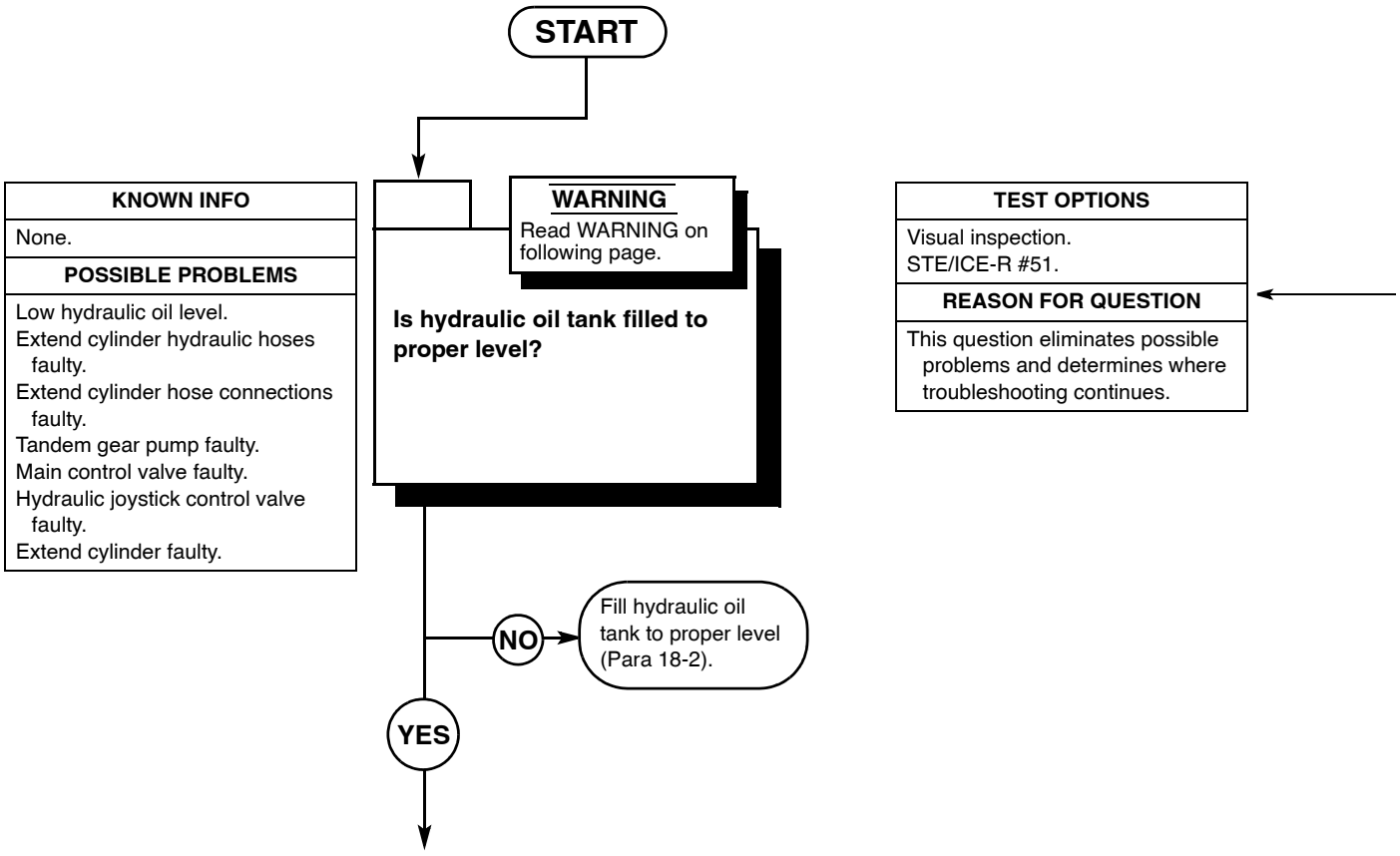
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

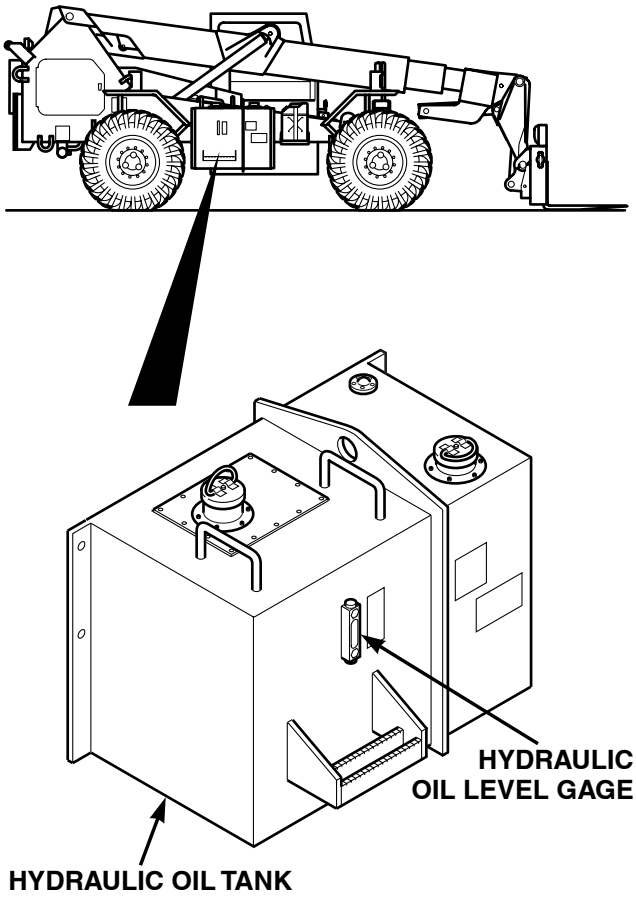
- Hydraulic oil in the system can be under pressures over 3000 psi With engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in the hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on the ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

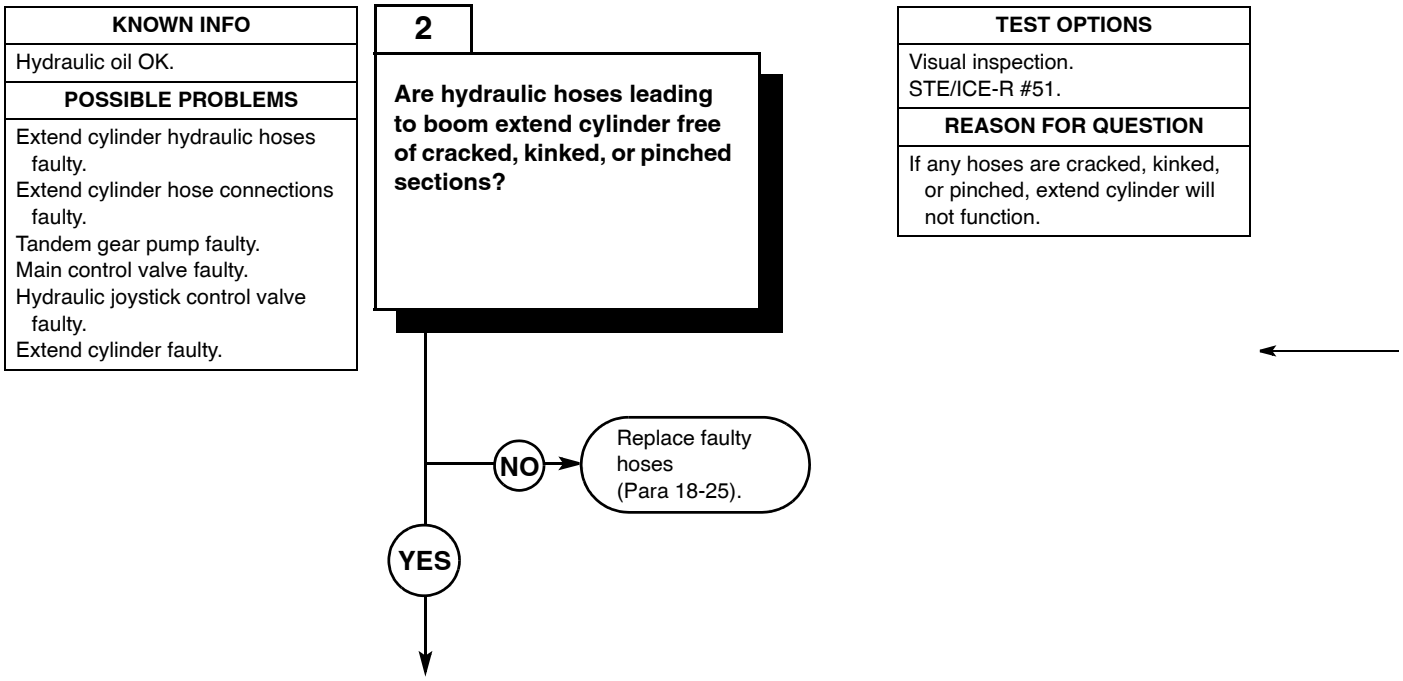
CAUTION

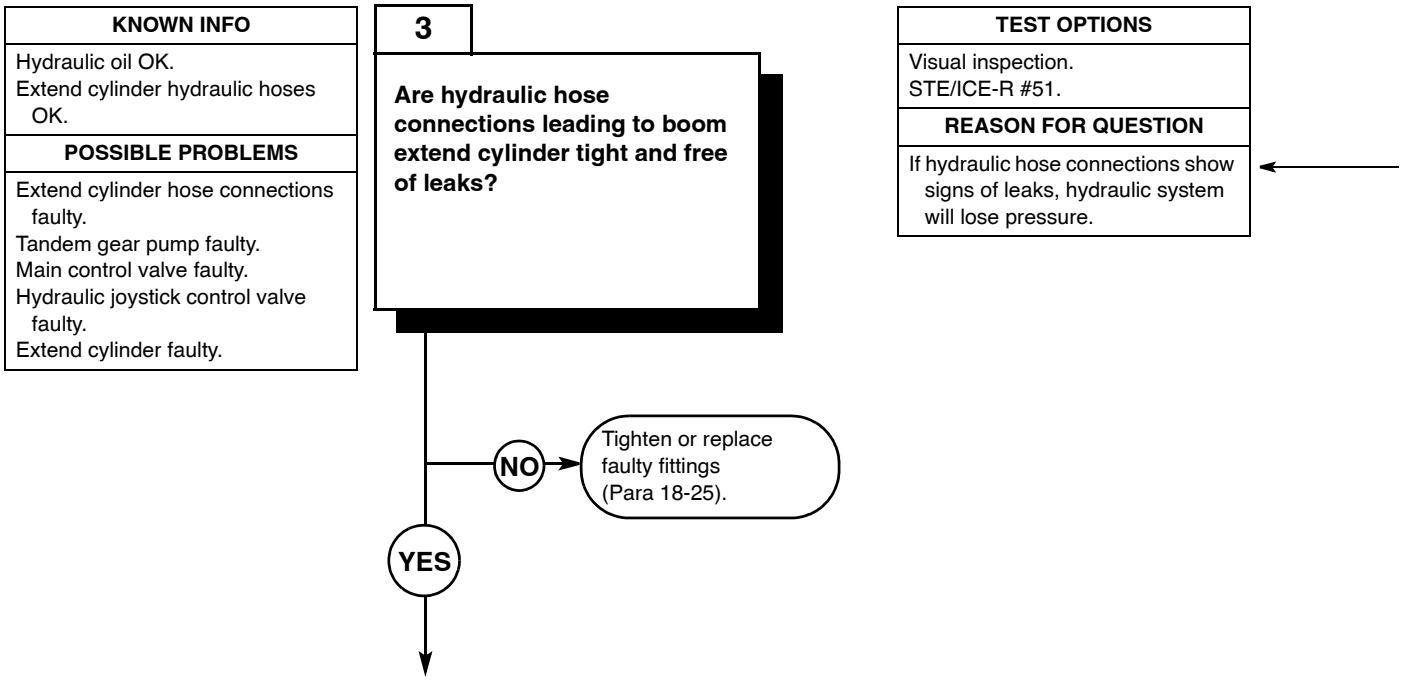
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level (Para 18-2). (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2).



6. BOOM EXTEND CYLINDER SLOW OR DOES NOT EXTEND OR RETRACT (CONT).



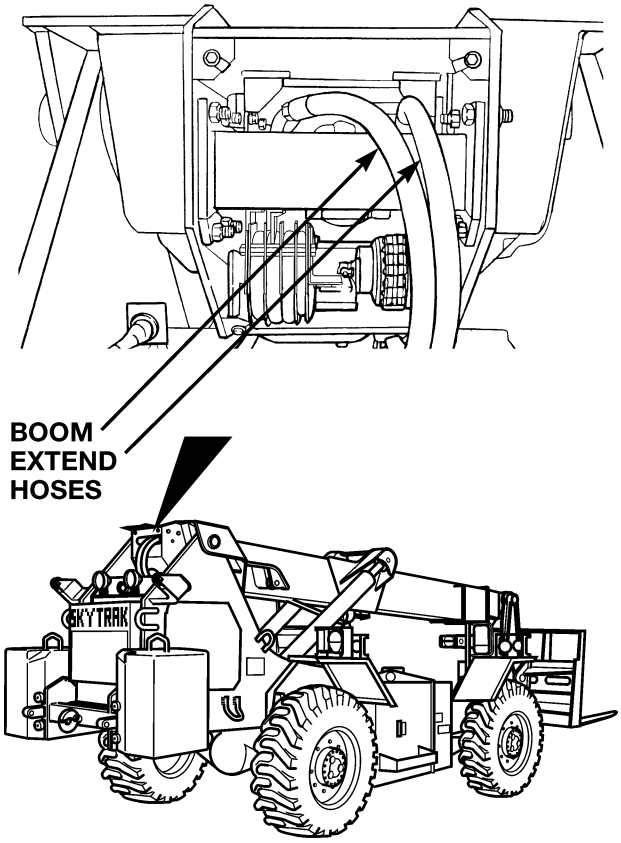


HYDRAULIC HOSES VISUAL INSPECTION

Visually inspect hydraulic hoses leading to extend cylinder for cracks, kinks, or pinches. Note especially points of possible wear: at boom hoist pulley, for example, and at tensioner.

(a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault.

(b) If there are cracks, kinks, or pinches in one or more hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-25).



HYDRAULIC HOSE CONNECTIONS VISUAL INSPECTION

Visually inspect hydraulic hose connections leading to extend cylinder for leaks.

(a) If there are no leaks at hydraulic hose connections, go to Step 4 of this fault.

(b) If there are leaks at one or more connections, shut down engine (TM 10-3930-673-10) and tighten or replace the connection(s) (Para 18-25).

6. BOOM EXTEND CYLINDER SLOW OR DOES NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil OK. Extend cylinder hydraulic hoses OK. Extend cylinder hose connections OK.
POSSIBLE PROBLEMS
Tandem gear pump faulty. Main control valve faulty. Hydraulic joystick control valve faulty. Extend cylinder faulty.

4

Is hydraulic oil flow rate at large section of tandem gear pump at 41.3 to 55.2 gpm (156 to 209 Lpm)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil flow rate is not at 41.3 to 55.2 gpm (156 to 209 Lpm), tandem gear pump faulty.

NO → Test/replace faulty tandem gear pump (Para 18-3).

YES

KNOWN INFO
Hydraulic oil OK. Extend cylinder hydraulic hoses OK. Extend cylinder hose connections OK. Tandem gear pump OK.
POSSIBLE PROBLEMS
Main control valve faulty. Hydraulic joystick control valve faulty. Extend cylinder faulty.

5

Is hydraulic oil pressure at main control valve at 3050 +/- 50 psi (21029.75 +/- 345 kPa)?

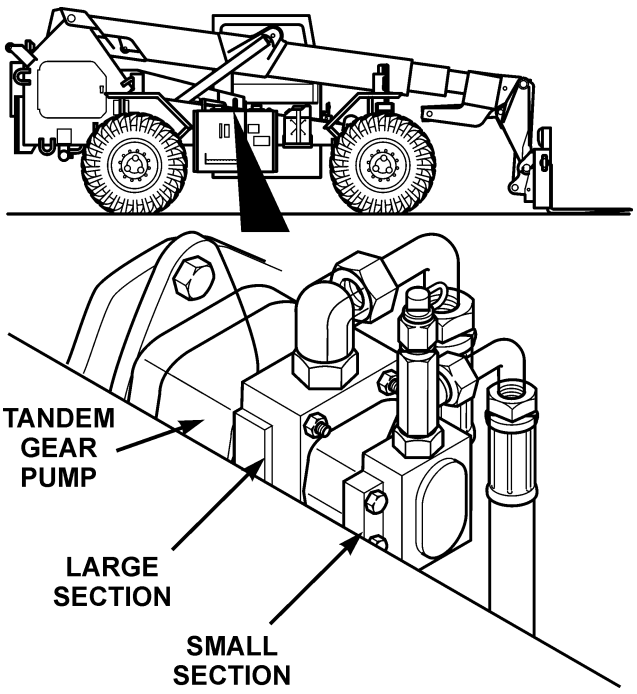
TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 3050 +/- 50 psi (21029.75 +/- 345 kPa), main control valve faulty.

NO → Replace faulty main control valve (Para 18-5).

YES

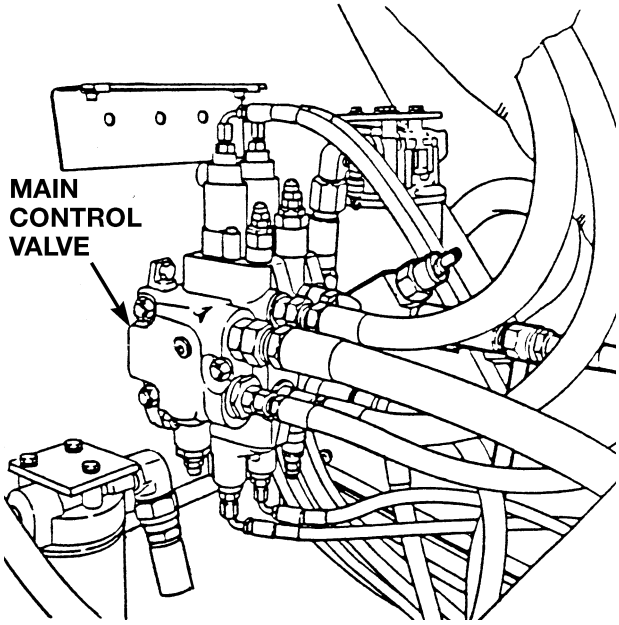
TANDEM GEAR PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on large section tandem gear pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 3050+/- 50 psi (21029.75 +/- 345 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not at 3050+/- 50 psi (21029.75 +/- 345 kPa), shut down engine (TM 10-3930-673-10) and test and replace tandem gear pump (Para 18-3).

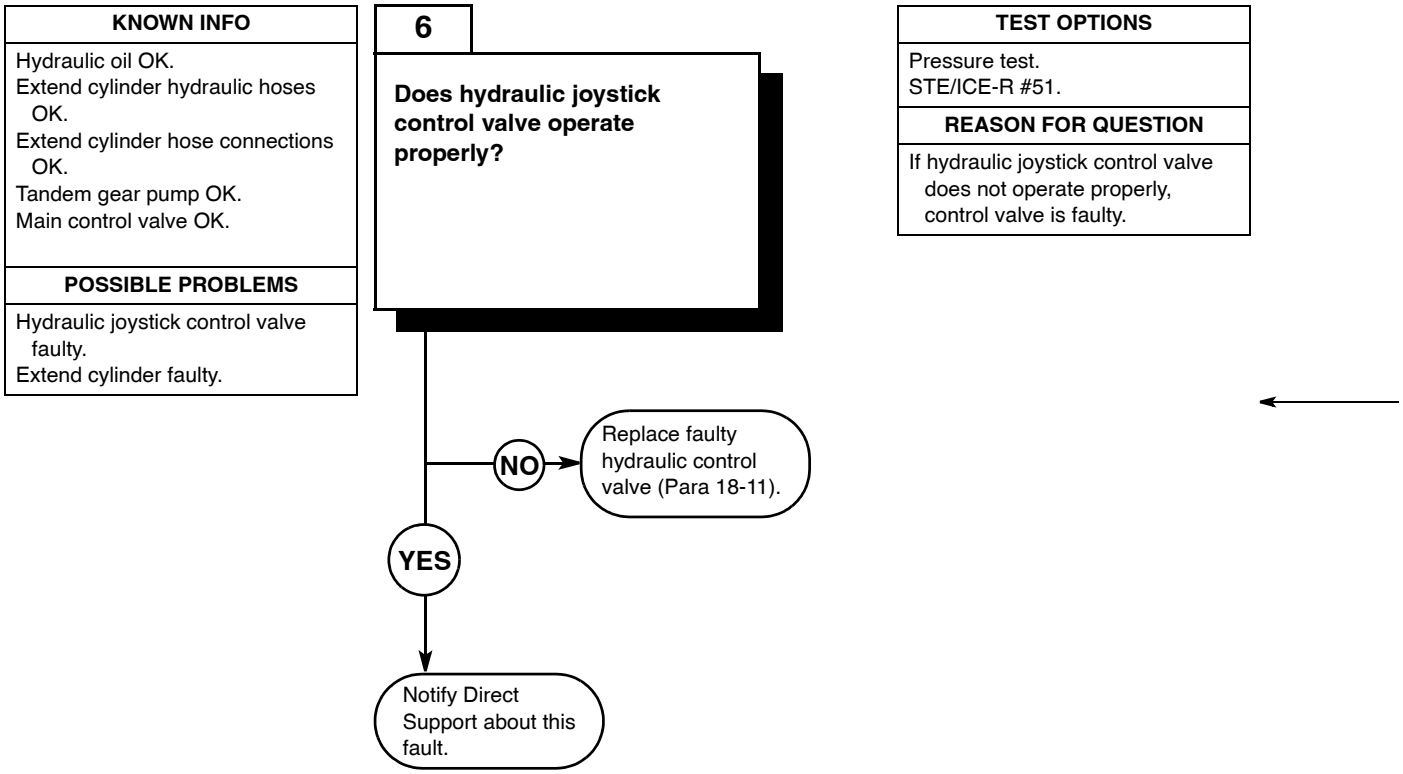


MAIN CONTROL VALVE PRESSURE TEST

(1) Remove cover from diagnostic coupler on main control valve.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read the output pressure on test device.
  (a) If hydraulic oil pressure is at 3050 +/- 50 psi (21029.75 +/- 345 kPa), go to Step 6 of this fault.
  (b) If the hydraulic oil pressure is not at 3050 +/- 50 psi (21029.75 +/- 345 kPa), shut down engine (TM 10-3930-673-10) and replace main control valve (Para 18-5).



6. BOOM EXTEND CYLINDER SLOW OR DOES NOT EXTEND OR RETRACT (CONT).



WARNING

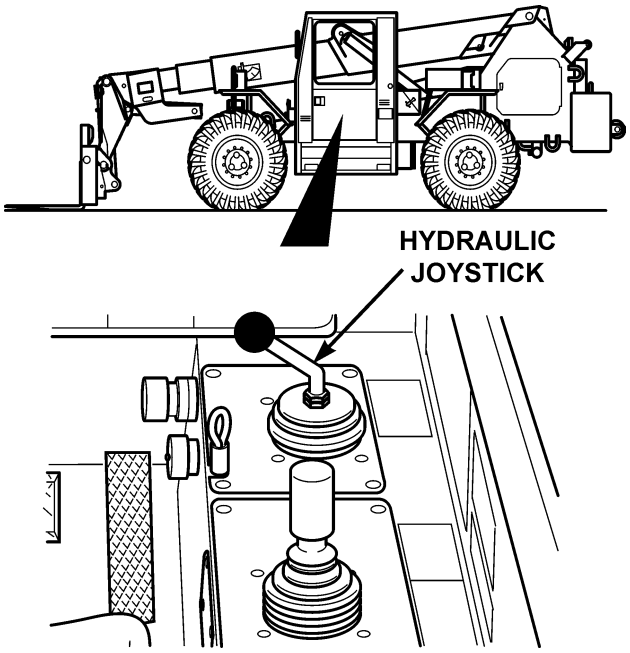
- Hydraulic oil in the system can be under pressures over 3000 psi with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in the hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on the ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

HYDRAULIC JOYSTICK CONTROL VALVE PRESSURE TEST

(1) Place hydraulic joystick in neutral position and check the pressure at the hydraulic joystick control valve “p” port.
  (a) If hydraulic oil pressure is null go to Step (2) below.
  (b) If not, replace joystick control valve (Para 18-11).

(2) Place hydraulic joystick in raise position and then in lower position. Check pressure at input lines to hydraulic joystick control valve.
  (a) If hydraulic oil pressure is at 1700 to 1800 psi (11721 to 12411 kPa), notify Direct Support of faulty extend cylinder.
  (b) If hydraulic oil pressure is not at 1700 to 1800 psi (11721 to 12411 kPa), shut down engine (TM 10-3930-673-10) and replace hydraulic joystick control valve.



7. LEFT AND RIGHT REAR STEERING CYLINDERS DO NOT EXTEND OR RETRACT.

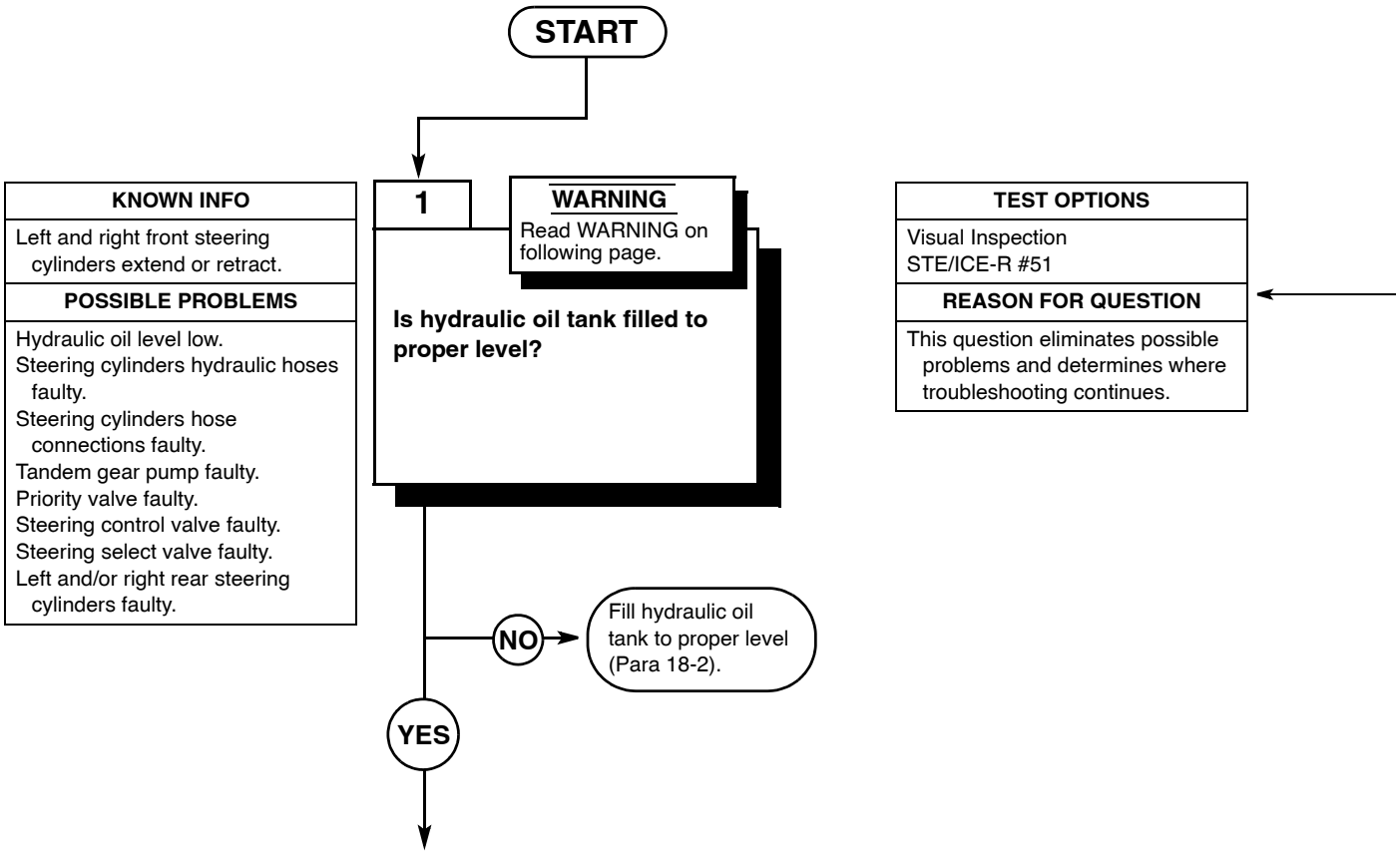
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



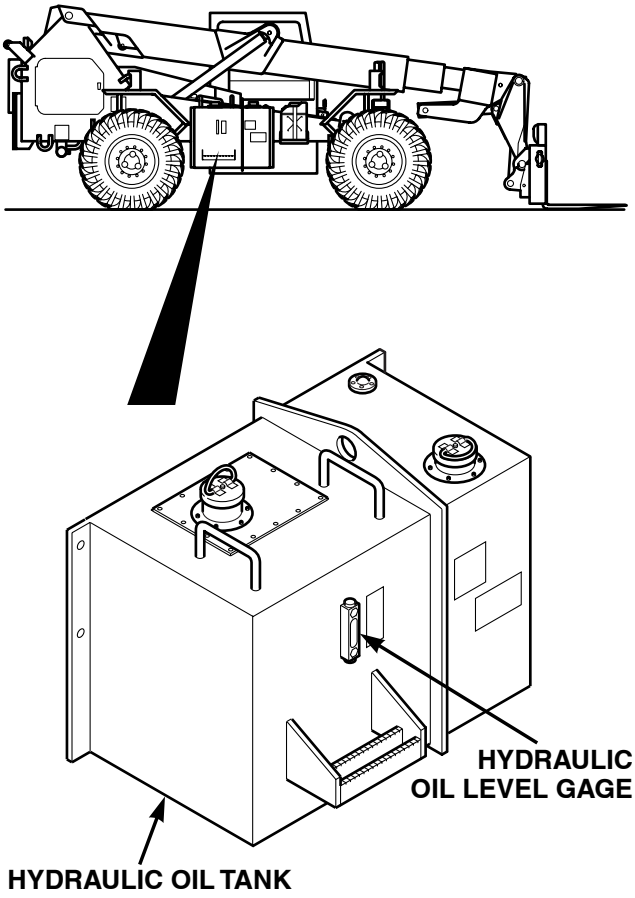
WARNING

- Hydraulic oil in the system can be under pressures over 3000 psi with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in the hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on the ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2).



7. LEFT AND RIGHT REAR STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right front steering cylinders extend or retract. Hydraulic oil level OK.
POSSIBLE PROBLEMS
Steering cylinders hydraulic hoses faulty. Steering cylinders hose connections faulty. Tandem gear pump faulty. Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right rear steering cylinders faulty.

2

Are hydraulic hoses leading to left and right rear steering cylinders free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual Inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hoses are cracked, kinked, or pinched, hoses are faulty and will need replaced.

NO → Replace faulty hoses (Para 14-6).

YES

KNOWN INFO
Left and right frontsteering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK.
POSSIBLE PROBLEMS
Steering cylinders hose connections faulty. Tandem gear pump faulty. Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right rear steering cylinders faulty.

3

Are hydraulic hose connections leading to left and right rear steering cylinders tight and free of leaks?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hose connections are loose or show signs of leaks, hose connections will need to be tightened or replaced.

NO → TIghten or replace faulty fittings (Para 14-6).

YES

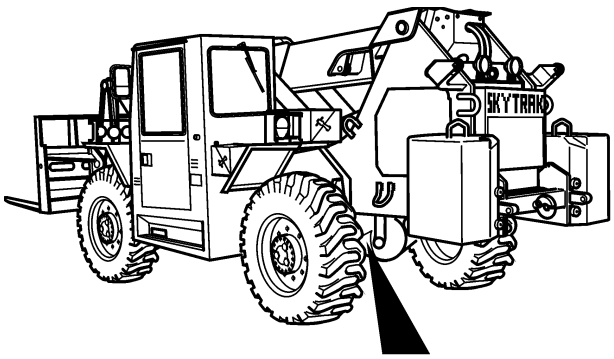
HYDRAULIC HOSES
VISUAL INSPECTION

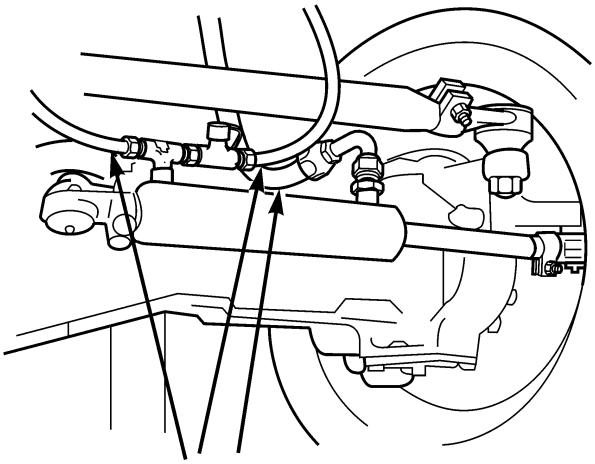
Visually inspect hydraulic hoses leading to rear steering cylinders for cracks, kinks, or pinches.

(a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault.
(b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 14-6).

NOTE

Hydraulic hoses must be mounted (indexed) in such a way to allow movement of hoses during steering without rubbing, crimping, or exceeding minimum bend radius.



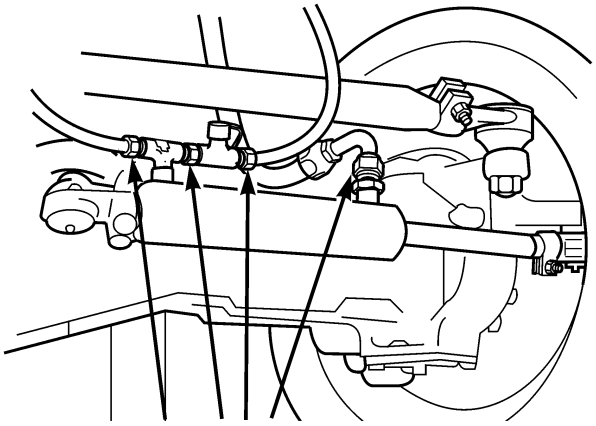


HYDRAULIC HOSES

HYDRAULIC HOSE CONNECTIONS
VISUAL INSPECTION

Visually inspect hydraulic hose connections leading to left and right rear steering cylinders for leaks.

(a) If there are no leaks at hydraulic hose connections, go to Step 4 of this fault.
(b) If there are leaks at one or more of connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 14-6).



HYDRAULIC CONNECTONS

7. LEFT AND RIGHT REAR STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right front steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK.
POSSIBLE PROBLEMS
Tandem gear pump faulty. Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right rear steering cylinders faulty.

4

Is hydraulic oil flow rate at large section of tandem gear pump at 41.3 to 55.2 gpm (156 to 209 Lpm)?

NO → Test/replace faulty tandem gear pump (Para 18-3).

YES

TEST OPTIONS
Pressure Test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil flow rate is not at 41.3 to 55.2 gpm (156 to 55.2 Lpm), tandem gear pump is faulty.

KNOWN INFO
Left and right front steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK.
POSSIBLE PROBLEMS
Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right rear steering cylinders faulty.

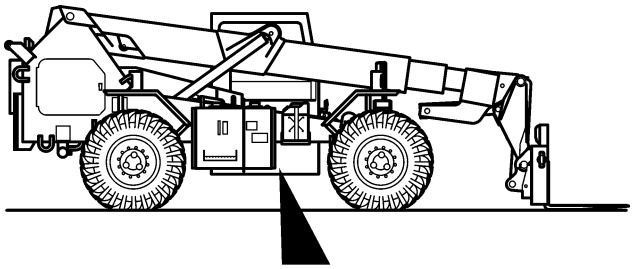
5

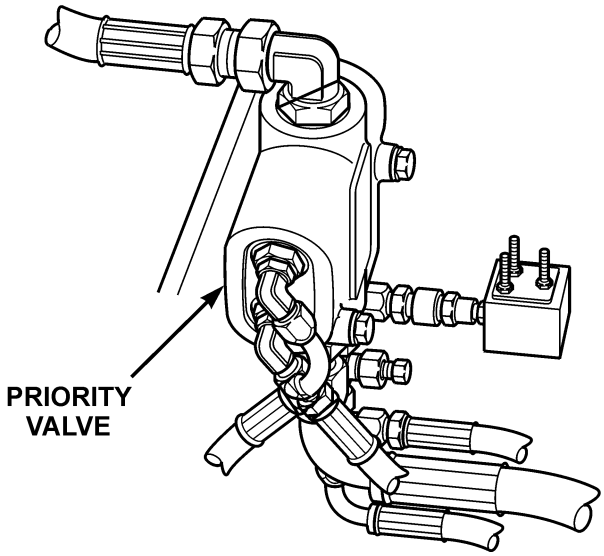
Is hydraulic oil pressure at priority valve at 2500 +/- 50 psi (17237.5 +/- 345 kPa)?

NO → Test/replace faulty priority valve (Para 18-7).

YES

TEST OPTIONS
Pressure Test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2500 +/- 50 psi (17237.5 +/- 345 kPa), priority valve is faulty.





PRIORITY VALVE PRESSURE TEST
(1) Remove cover from diagnostic coupler at priority valve. (2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P). (3) Read output pressure on test device. (a) If hydraulic oil pressure is at 2500 +/- 50 psi (17237.5 +/- 345 kPa), go to Step 6 of this fault. (b) If hydraulic oil pressure is not at 2500 +/- 50 psi (17237.5 +/- 345 kPa), shut down engine (TM 10-3930-673-10) and replace priority valve (Para 18-7).

7. LEFT AND RIGHT REAR STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right front steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK. Priority valve OK.
POSSIBLE PROBLEMS
Steering control valve faulty. Steering select valve faulty. Left and/or right rear steering cylinders faulty.

6

Is hydraulic oil pressure at steering control valve at 2500 +/- 50 psi (17237.5 +/- 345 kPa)?

NO → Replace faulty steering control valve (Para 14-9).

YES

TEST OPTIONS
Pressure Test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2500 +/- 50 psi (17237.5 +/- 345 kPa), steering control valve is faulty.

KNOWN INFO
Left and right front steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK. Priority valve OK. Steering control valve OK.
POSSIBLE PROBLEMS
Steering select valve faulty. Left and/or right rear steering cylinders faulty.

7

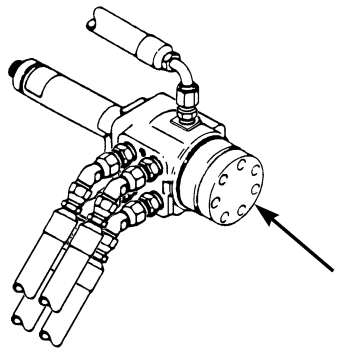
Is continuity indicated at solenoids on steering select valve?

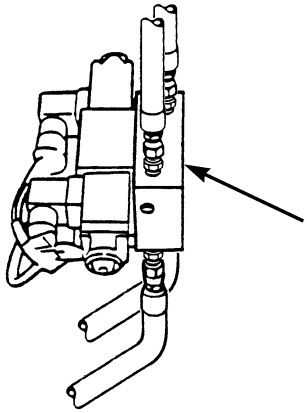
NO → Replace faulty steering select valve (Para 14-10).

YES

TEST OPTIONS
Continuity Test. STE/ICE-R #51.
REASON FOR QUESTION
If continuity is not indicated at solenoids, steering select valve is faulty.

STEERING CONTROL VALVE PRESSURE TEST
(1) Use test tee and 0 to 5000 psi (0 to 34475 kPa) pressure gage to test hydraulic pressure at steering control valve output line. (2) Read output pressure on test device. (a) If hydraulic oil pressure is at 2500 +/- 50 psi (17237.5 +/- 345 kPa), go to Step 7 of this fault. (b) If hydraulic oil pressure is not at 2500 +/- 50 psi (17237.5 +/- 345 kPa), shut down engine (TM 10-3930-673-10) and replace steering control valve (Para 14-9).





STEERING SELECT VALVE SOLENOID CONTINUITY TEST
(1) Perform continuity test on solenoids at steering select valve. (2) Read output of ohmmeter. (a) If ohmmeter indicates continuity, go to Step 8 of this fault. (b) If continuity is not indicated, shut down engine (TM 10-3930-673-10) and replace steering select valve (Para 14-10).

7. LEFT AND RIGHT REAR STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right front steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK. Priority valve OK. Steering control valve OK. Steering select valve OK.
POSSIBLE PROBLEMS
Left and/or right rear steering cylinders faulty.

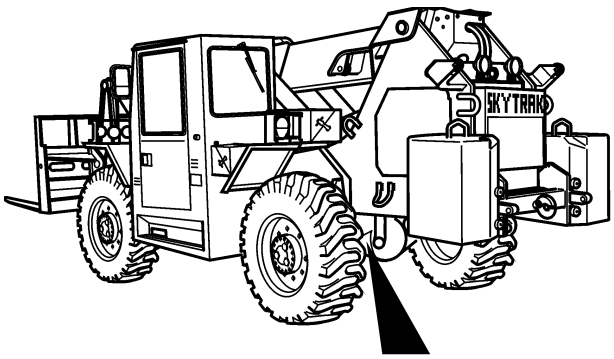
8

Are rear steering cylinders and their housings free from signs of damage?

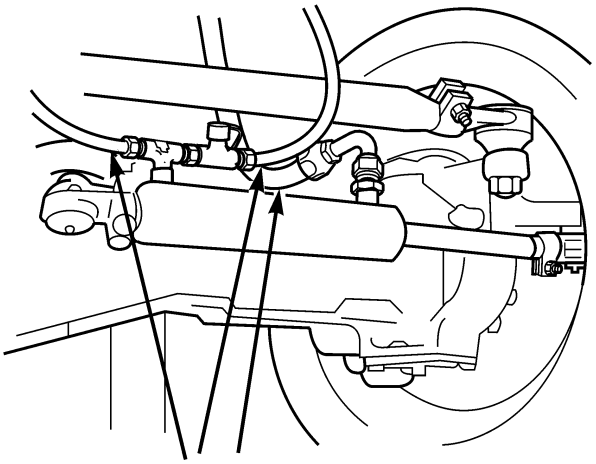
TEST OPTIONS
Visual Inspection. STE/ICE-R #51.
REASON FOR QUESTION
If steering cylinders and their housings show signs of damage, cylinders and/or their housings will not function.

NO → Replace damaged cylinder and housing (Para 14-7).

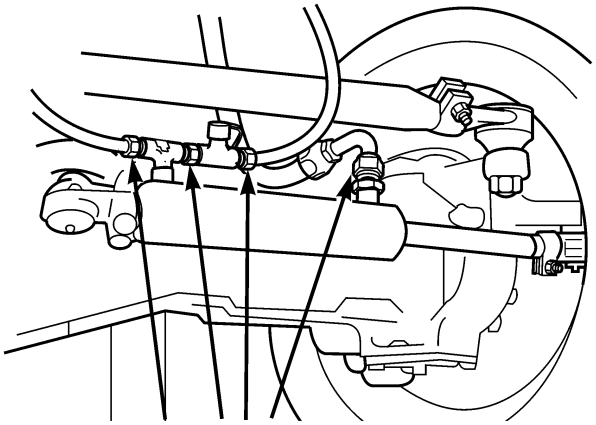
YES → Notify Direct Support about this fault.



REAR STEERING CYLINDER VISUAL INSPECTION
Visually inspect rear steering cylinders and their housings for signs of damage. (a) If steering cylinders and/or their housings are not damaged, notify Direct Support about this fault. (b) If rear steering cylinders and/or their housings are damaged, shut down engine (TM 10-3930-6573-10) and replace cylinders and their housings (Para 14-7).



HYDRAULIC HOSES



HYDRAULIC CONNECTONS

8. LEFT AND RIGHT FRONT STEERING CYLINDERS DO NOT EXTEND OR RETRACT.

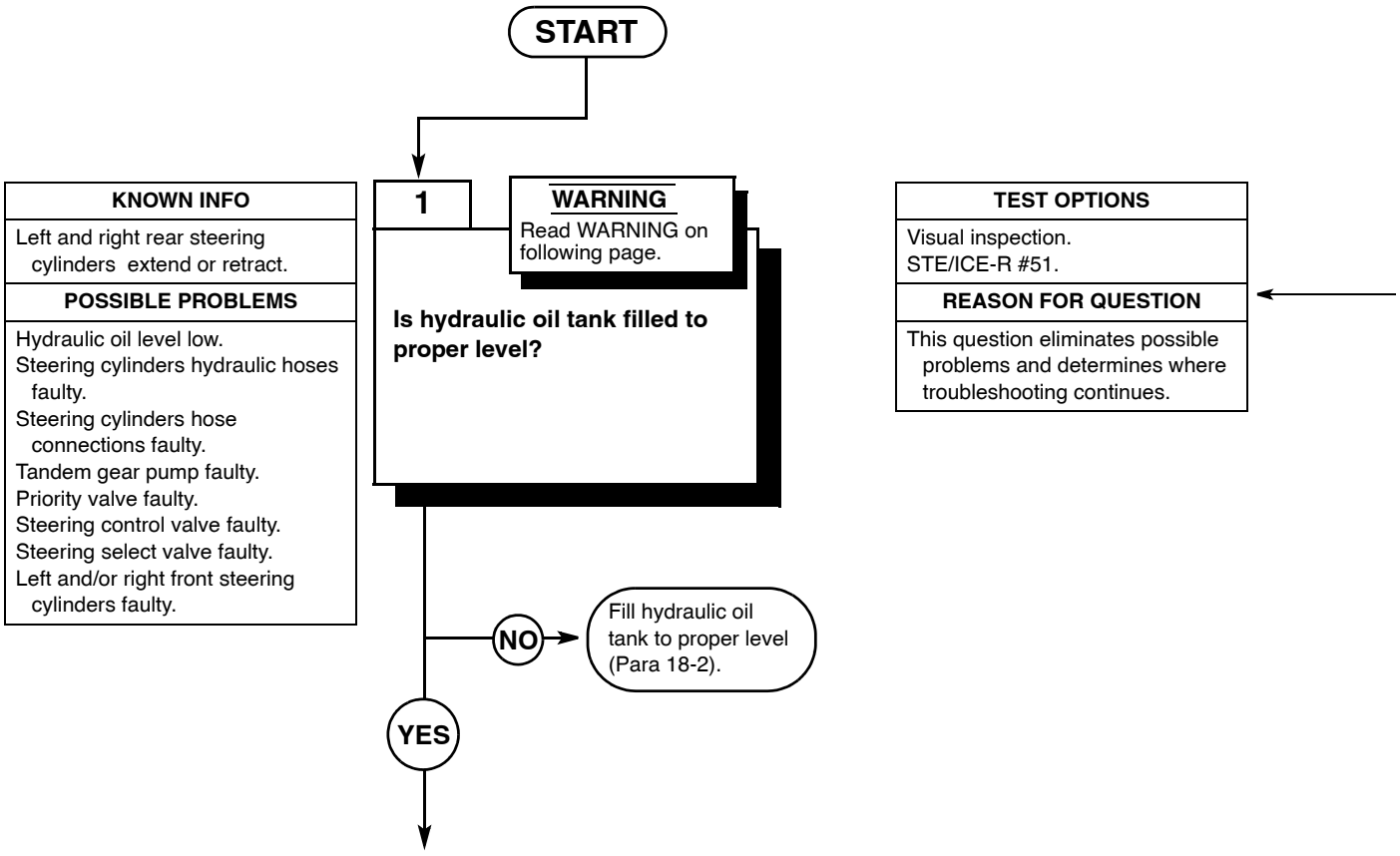
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



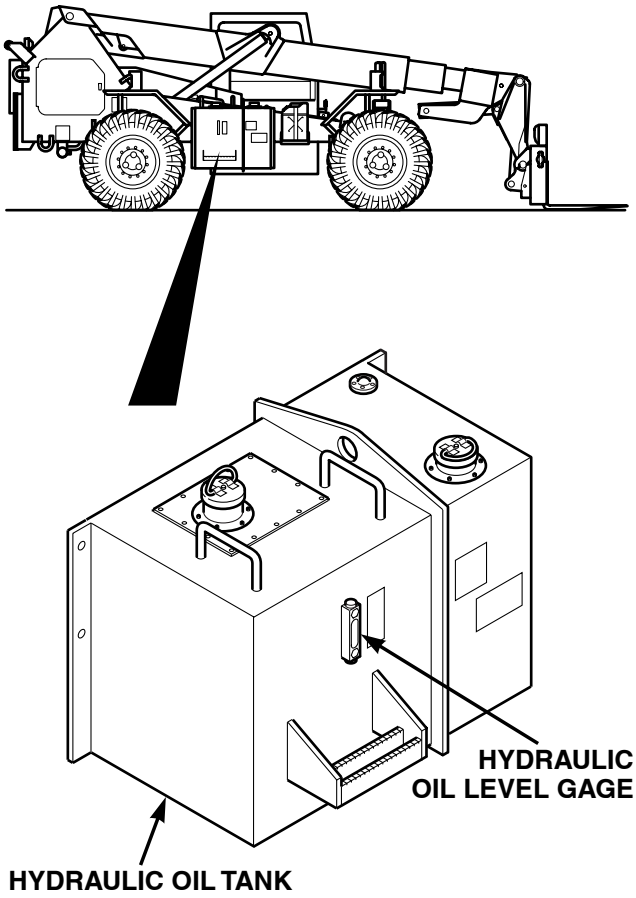
WARNING

- Hydraulic oil in the system can be under pressures over 3000 psi with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in the hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on the ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2).



8. LEFT AND RIGHT FRONT STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right rear steering cylinders extend or retract. Hydraulic oil level OK.
POSSIBLE PROBLEMS
Steering cylinders hydraulic hoses faulty. Steering cylinders hose connections faulty. Tandem gear pump faulty. Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right front steering cylinders faulty.

2

Are hydraulic hoses leading to left and right front steering cylinders free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hoses are cracked, kinked, or pinched, cylinders will not function.

NO → Replace faulty hoses (Para 14-6).

YES

KNOWN INFO
Left and right rear steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK.
POSSIBLE PROBLEMS
Steering cylinders hose connections faulty. Tandem gear pump faulty. Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right front steering cylinders faulty.

3

Are hydraulic hose connections leading to left and right front steering cylinders tight and free of leaks?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hose connections are loose or show signs of leaks, cylinders will not function.

NO → Tighten or replace faulty fittings (Para 14-6).

YES

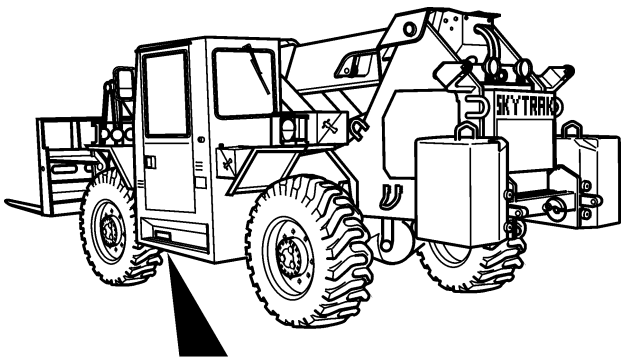
HYDRAULIC HOSES
VISUAL INSPECTION

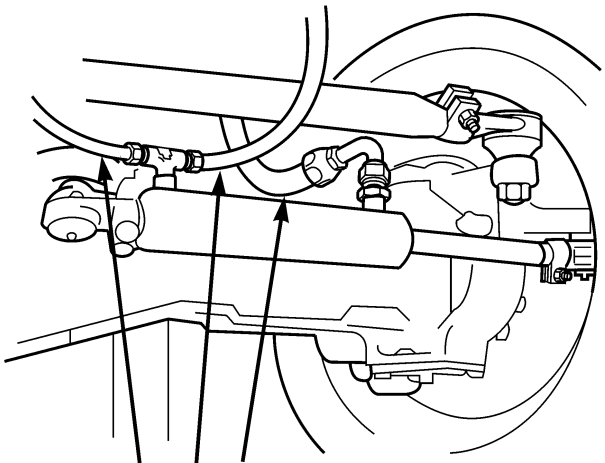
Visually inspect hydraulic hoses leading to front steering cylinders for cracks, kinks, or pinches.

(a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault.
(b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 14-6).

NOTE

Hydraulic hoses must be mounted (indexed) in such a way to allow movement of hoses during steering without rubbing, crimping, or exceeding minimum bend radius.



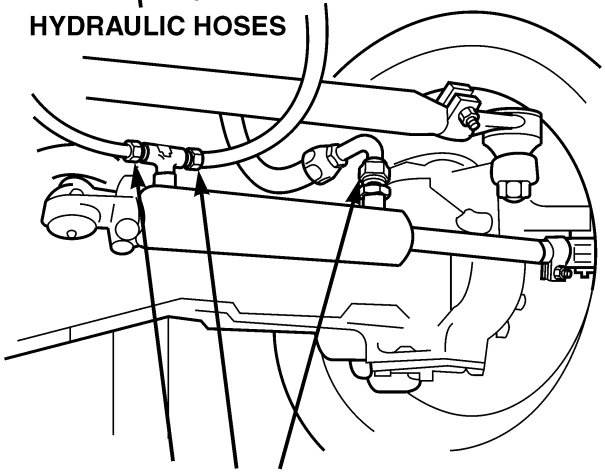


HYDRAULIC HOSES

HYDRAULIC HOSE CONNECTIONS
VISUAL INSPECTION

Visually inspect hydraulic hose connections leading to left and right front steering cylinders for leaks.

(a) If there are no leaks at hydraulic hose connections, go to Step 4 of this fault.
(b) If there are leaks at one or more of connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 14-6).



HYDRAULIC CONNECTONS

8. LEFT AND RIGHT FRONT STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right rear steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK.
POSSIBLE PROBLEMS
Tandem gear pump faulty. Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right front steering cylinders faulty.

4

Is hydraulic oil pressure at large section of tandem gear pump at 2600 to 2700 psi (17940 to 18630 kPa)?

NO → Test/replace faulty tandem gear pump (Para 18-3).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), tandem gear pump is faulty.

KNOWN INFO
Left and right rear steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK.
POSSIBLE PROBLEMS
Priority valve faulty. Steering control valve faulty. Steering select valve faulty. Left and/or right front steering cylinders faulty.

5

Is hydraulic oil pressure at priority valve at 2600 to 2700 psi (17940 to 18630 kPa)?

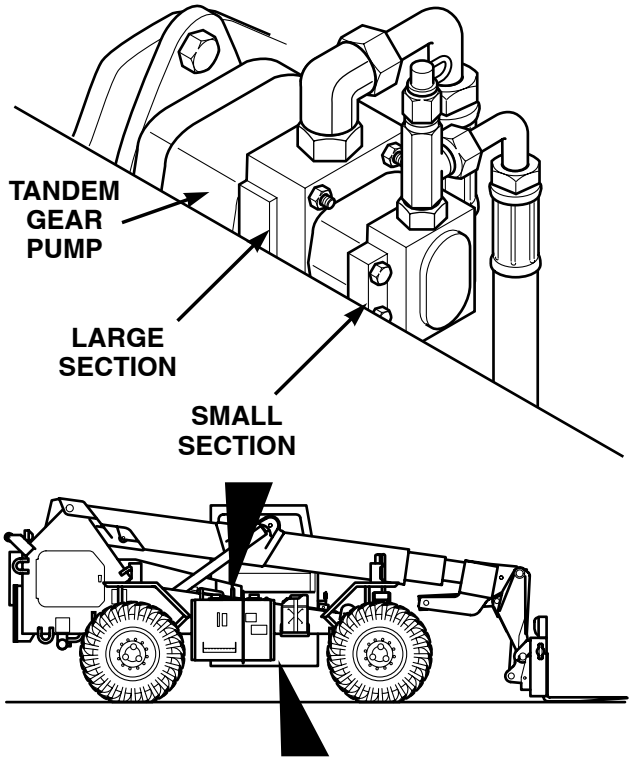
NO → Test/replace faulty priority valve (Para 18-7).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), priority valve is faulty.

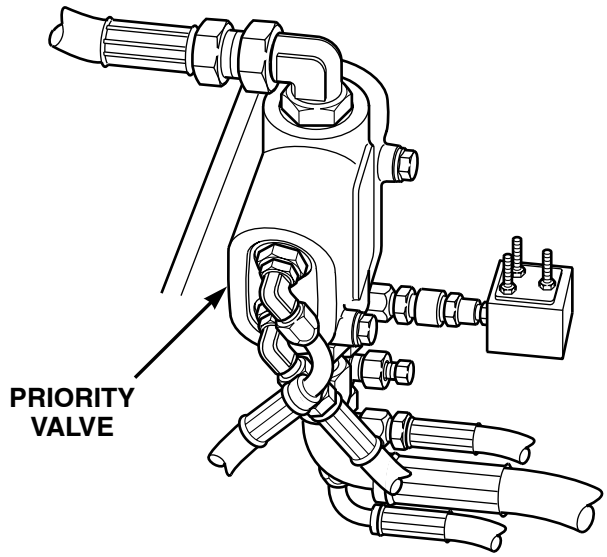
TANDEM GEAR PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on large section of tandem gear pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 2600 to 2700 psi (17940 to 18630 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), shut down engine (TM 10-3930-673-10) and test and replace tandem gear pump (Para 18-3).



PRIORITY VALVE PRESSURE TEST

(1) Remove cover from diagnostic coupler at priority valve.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 2600 to 2700 psi (17940 to 18630 kPa), go to Step 6 of this fault.
  (b) If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), shut down engine (TM 10-3930-673-10) and replace priority valve (Para 18-7).



8. LEFT AND RIGHT FRONT STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Left and right rear steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK. Priority valve OK.
POSSIBLE PROBLEMS
Steering control valve faulty. Steering select valve faulty. Left and/or right front steering cylinders faulty.

6

Is hydraulic oil pressure at steering control valve at 2600 to 2700 psi (17940 to 18630 kPa)?

NO → Replace faulty steering control valve (Para 14-9).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), steering control valve is faulty.

KNOWN INFO
Left and right rear steering cylinders extend or retract. Hydraulic oil level OK. Steering cylinders hydraulic hoses OK. Steering cylinders hose connections OK. Tandem gear pump OK. Priority valve OK. Steering control valve OK.
POSSIBLE PROBLEMS
Steering select valve faulty. Left and/or right front steering cylinders faulty.

7

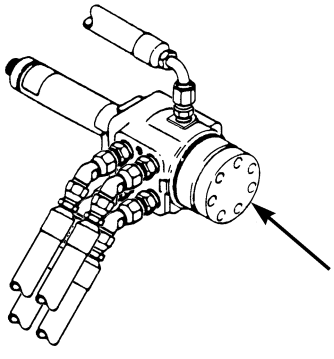
Is continuity indicated at solenoids on steering select valve?

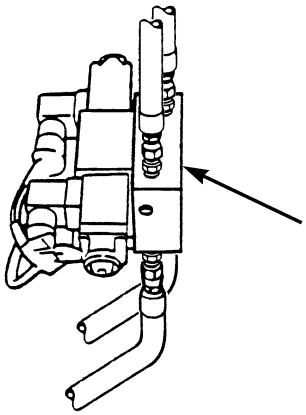
NO → Replace faulty steering select valve (Para 14-10).

YES

TEST OPTIONS
Continuity test. STE/ICE-R #51.
REASON FOR QUESTION
If continuity is not indicated at solenoids, steering select valve is faulty.

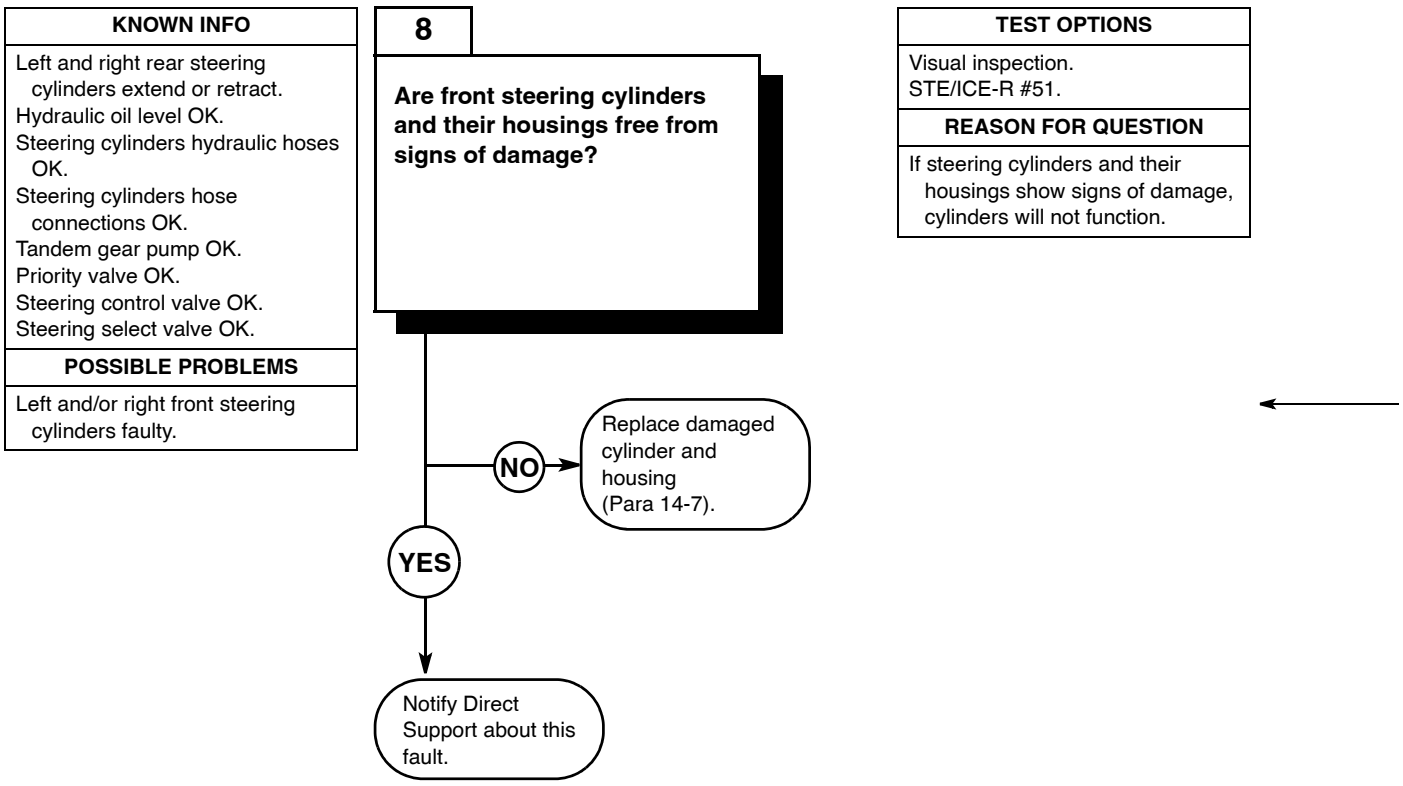
STEERING CONTROL VALVE PRESSURE TEST
(1) Use test tee and 0 to 5000 psi (0 to 34475 kPa) pressure gage to test hydraulic pressure at steering control valve output line. (2) Read output pressure on test device. (a) If hydraulic oil pressure is at 2600 to 2700 psi (17940 to 18630 kPa), go to Step 7 of this fault. (b) If hydraulic oil pressure is not at 2500 psi (17237.5 kPa), shut down engine (TM 10-3930-673-10) and replace steering control valve (Para 14-9).



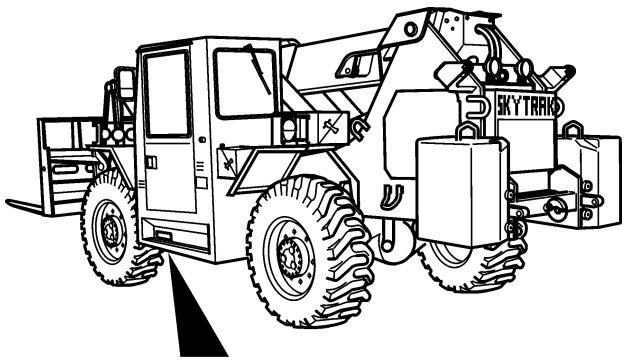


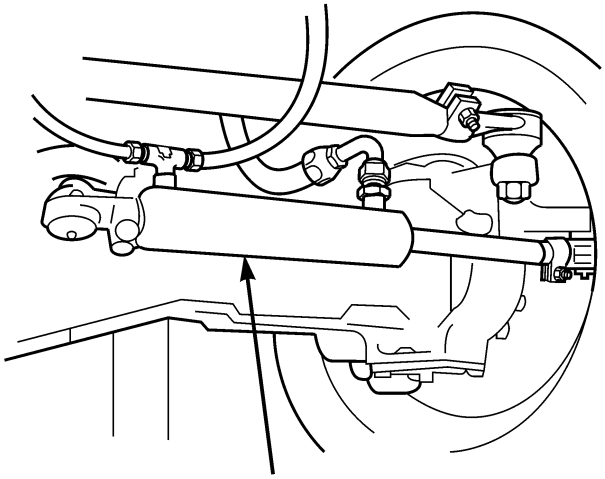
STEERING SELECT VALVE SOLENOID CONTINUITY TEST
(1) Perform continuity test on solenoids at steering select valve. (2) Read output of ohmmeter. (a) If ohmmeter indicates continuity, go to Step 8 of this fault. (b) If continuity is not indicated, shut down engine (TM 10-3930-673-10) and replace steering select valve (Para 14-10).

8. LEFT AND RIGHT FRONT STEERING CYLINDERS DO NOT EXTEND OR RETRACT (CONT).



FRONT STEERING CYLINDER VISUAL INSPECTION
Visually inspect front steering cylinders and their housings for signs of damage. (a) If steering cylinders and/or their housings are not damaged, notify Direct Support about this fault. (b) If steering cylinders and/or their housings are damaged, shut down engine (TM 10-3930-673-10) and replace cylinders and their housings (Para 14-7).





HYDRAULIC STEERING CYLINDER

9. FRAME TILT CYLINDER DOES NOT EXTEND OR RETRACT.

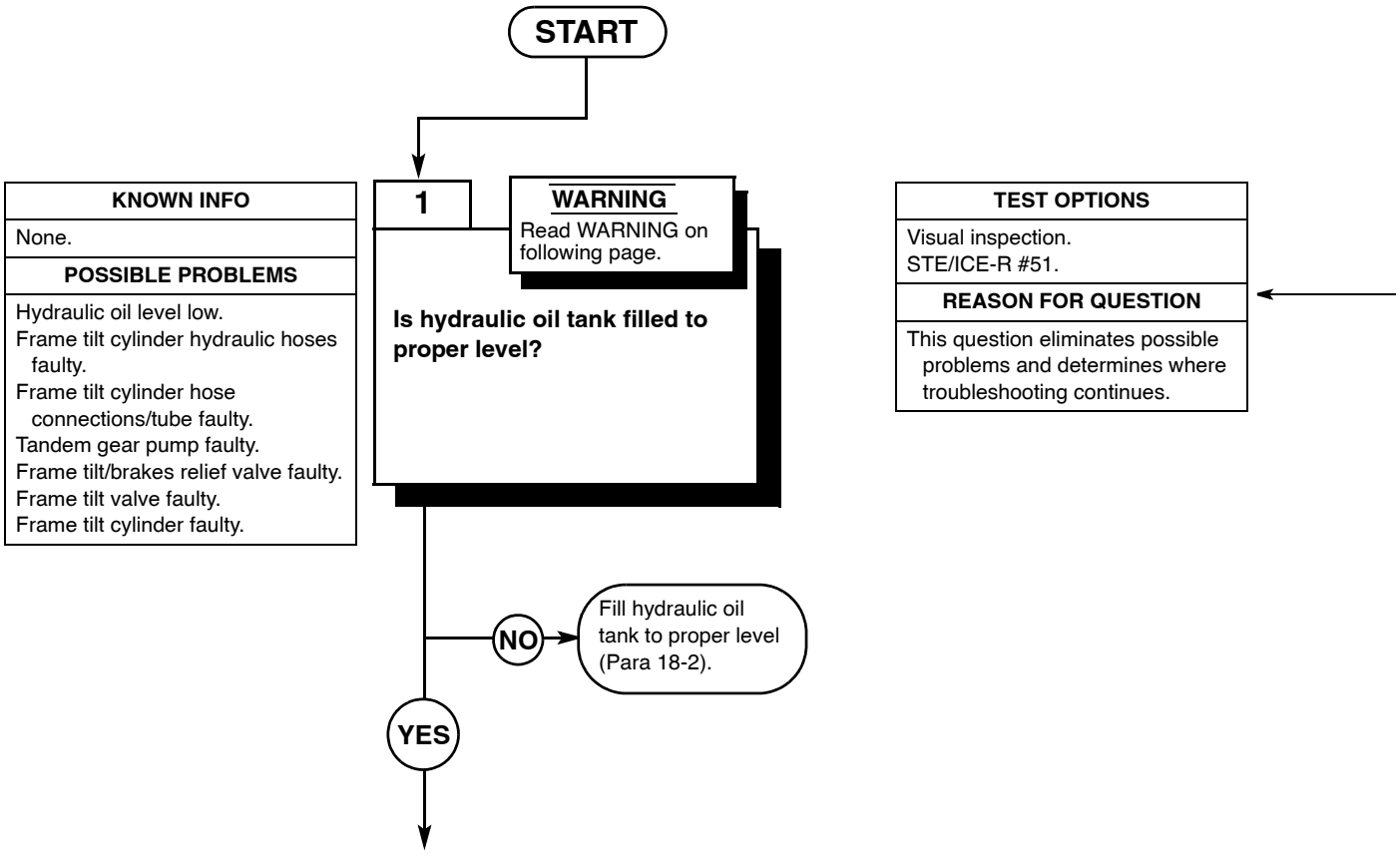
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

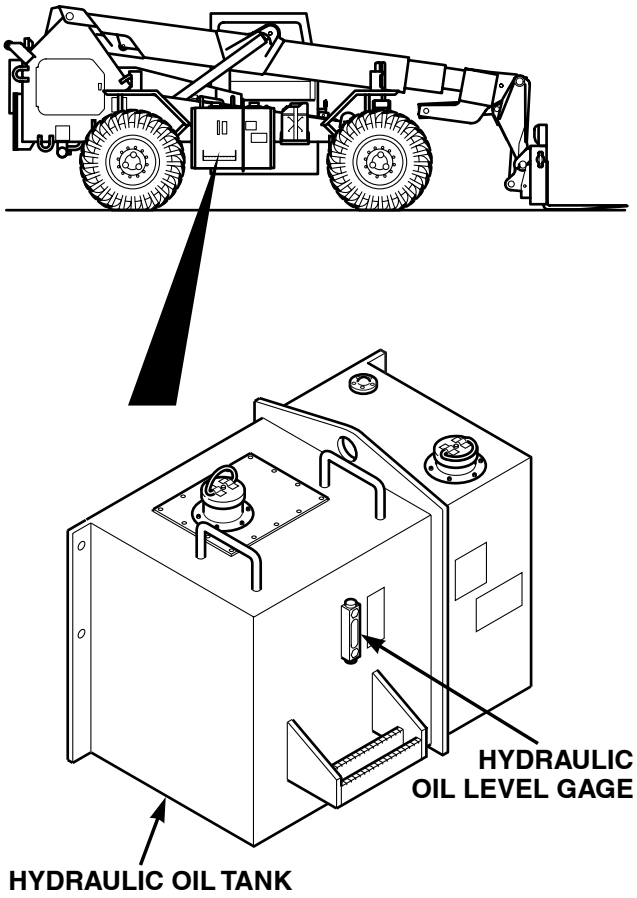
- Hydraulic oil in system can be under pressures over 3000 psi with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of this fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2).



9. FRAME TILT CYLINDER DOES NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil level OK.
POSSIBLE PROBLEMS
Frame tilt cylinder hydraulic hoses faulty. Frame tilt cylinder hose connections/tube faulty. Tandem gear pump faulty. Frame tilt/brakes relief valve faulty. Frame tilt valve faulty. Frame tilt cylinder faulty.

2

Are hydraulic hoses leading to the frame tilt cylinder free of cracked, kinked, or pinched sections?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic hoses are cracked, kinked, or pinched, hydraulic system will lose pressure.

NO → Replace faulty hoses (Para 18-25).

YES

KNOWN INFO
Hydraulic oil level OK. Frame tilt cylinder hydraulic hoses OK.
POSSIBLE PROBLEMS
Frame tilt cylinder hose connections/tube faulty. Tandem gear pump faulty. Frame tilt/brakes relief valve faulty. Frame tilt valve faulty. Frame tilt cylinder faulty.

3

Are hydraulic hose connections leading to frame tilt cylinder tight and free of leaks? Is hydraulic tube undamaged and intact?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic hose connections and tube are damaged or leaking, hydraulic system will lose pressure.

NO → Tighten or replace faulty fittings (Para 18-25). Replace damaged tube (Para 18-26).

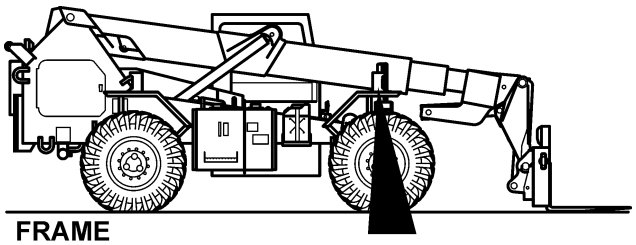
YES

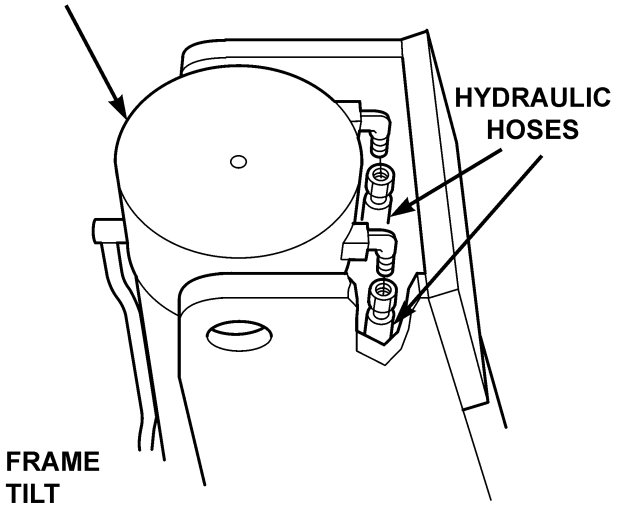
HYDRAULIC HOSES VISUAL INSPECTION

Visually inspect hydraulic hoses leading to frame tilt cylinder for cracks, kinks, or pinches.

(a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault.

(b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 18-25).



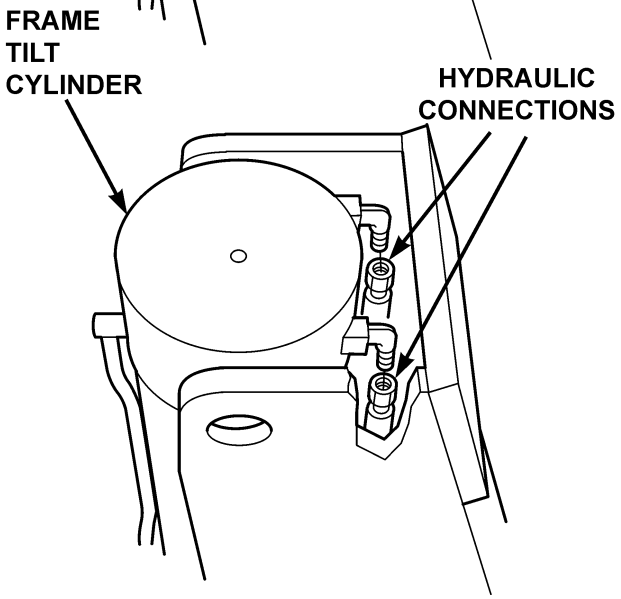


HYDRAULIC HOSE CONNECTIONS/TUBE VISUAL INSPECTION

Visually inspect hydraulic hose connections leading to frame tilt cylinder for leaks.
Visually inspect hydraulic tube on cylinder housing.

(a) If there are no leaks at hydraulic hose connections, and tube is not damaged, go to Step 4 of this fault.

(b) If there are leaks at one or more connections, shut down engine (TM 10-3930-673-10) and tighten or replace connection(s) (Para 18-25). If tube is damaged, replace tube (Para 18-26).



9. FRAME TILT CYLINDER DOES NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil level OK. Frame tilt cylinder hydraulic hoses OK. Frame tilt cylinder hose connections/tube OK.
POSSIBLE PROBLEMS
Tandem gear pump faulty. Frame tilt/brakes relief valve faulty. Frame tilt valve faulty. Frame tilt cylinder faulty.

4

Is hydraulic oil pressure at small section of tandem gear pump at 2600 to 2700 psi (17940 to 18630 kPa)?

NO → Test/replace faulty tandem gear pump (Para 18-3).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), tandem gear pump is faulty.

KNOWN INFO
Hydraulic oil level OK. Frame tilt cylinder hydraulic hoses OK. Frame tilt cylinder hose connections/tube OK. Tandem gear pump OK.
POSSIBLE PROBLEMS
Frame tilt/brakes relief valve faulty. Frame tilt valve faulty. Frame tilt cylinder faulty.

5

Is hydraulic oil pressure at the frame tilt/brakes relief valve at 2600 to 2700 psi (17940 to 18630 kPa)?

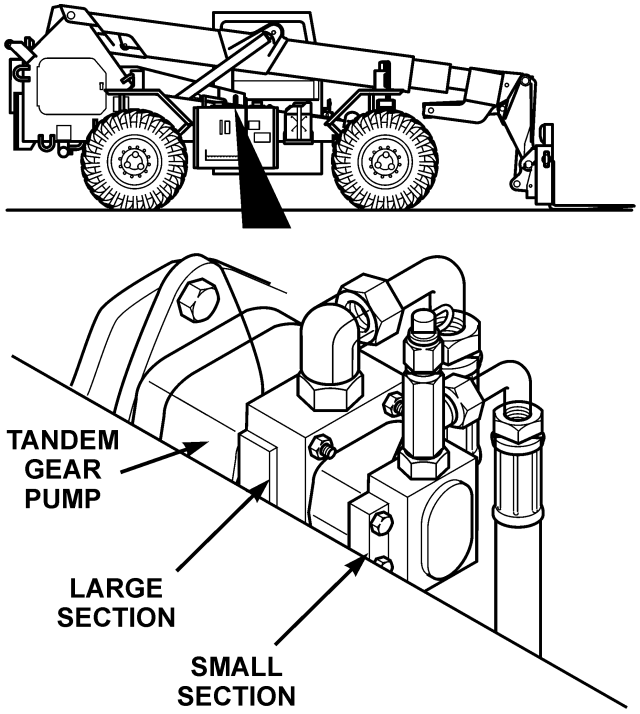
NO → Adjust pressure or replace faulty relief valve (Para 18-8).

YES

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), relief valve is faulty.

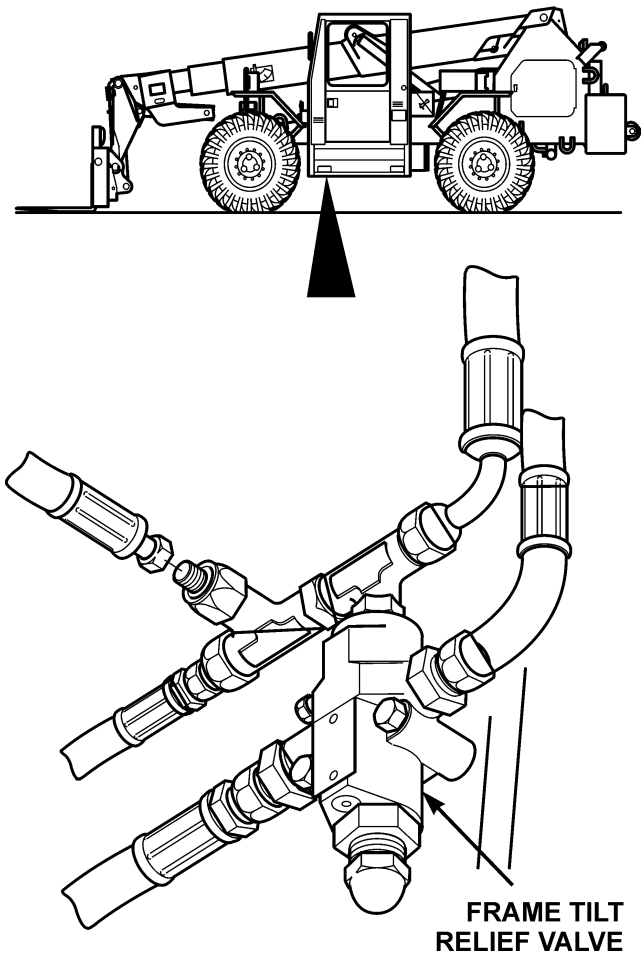
TANDEM GEAR PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on small section of tandem gear pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 2600 to 2700 psi (17927 to 18616 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), shut down engine (TM 10-3930-673-10) and test and replace tandem gear pump (Para 18-3).



FRAME TILT/BRAKES RELIEF VALVE PRESSURE TEST

(1) Install test tee on inlet line to frame tilt/brakes relief valve.
(2) Connect 0 to 5000 psi (0 to 34475 kPa) pressure gage to test tee.
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 2600 to 2700 psi (17940 to 18630 kPa), go to Step 6 of this fault.
  (b) If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), go to Step (4) below.
(4) If valve is not damaged, adjust relief pressure to specified psi and remove pressure gage and test tee.
  (a) If hydraulic oil pressure is adjusted to specified psi, go to Step 6 of this fault.
  (b) If hydraulic oil pressure cannot be adjusted, replace relief valve (Para 18-8).



9. FRAME TILT CYLINDER DOES NOT EXTEND OR RETRACT (CONT).

KNOWN INFO
Hydraulic oil level OK. Frame tilt cylinder hydraulic hoses OK. Frame tilt cylinder hose connections/tube OK. Tandem gear pump OK. Frame tilt/brakes relief valve OK.
POSSIBLE PROBLEMS
Frame tilt valve faulty. Frame tilt cylinder faulty.

6

Is hydraulic oil at 2600 to 2700 psi (17940 to 18630 kPa)?

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), frame tilt valve is faulty.

NO → Replace faulty frame tilt valve (Para 18-10).

YES

KNOWN INFO
Hydraulic oil level OK. Frame tilt cylinder hydraulic hoses OK. Frame tilt cylinder hose connections/tube OK. Tandem gear pump OK. Frame tilt/brakes relief valve OK. Frame tilt valve OK.
POSSIBLE PROBLEMS
Frame tilt cylinder faulty.

7

Is frame tilt cylinder and its housing free from signs of damage?

TEST OPTIONS
Visual inspection. STE/ICE-R #51.
REASON FOR QUESTION
If frame tilt cylinder and its housing is damaged, cylinder will not function.

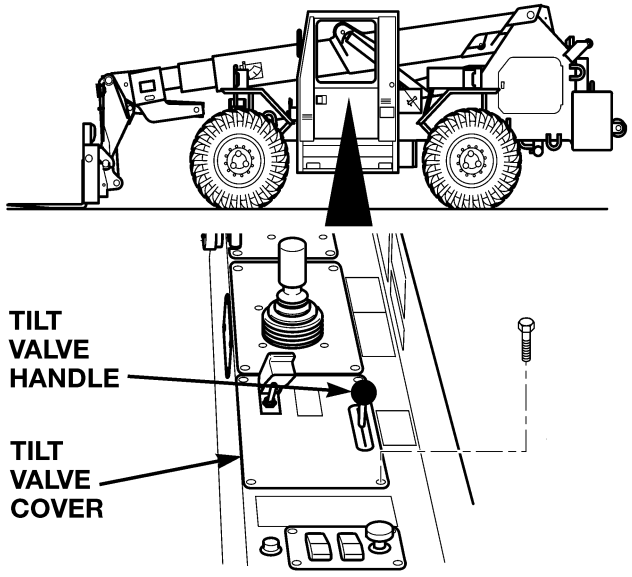
NO → Replace damaged cylinder and housing (Para 18-13).

YES

Notify Direct Support about this fault.

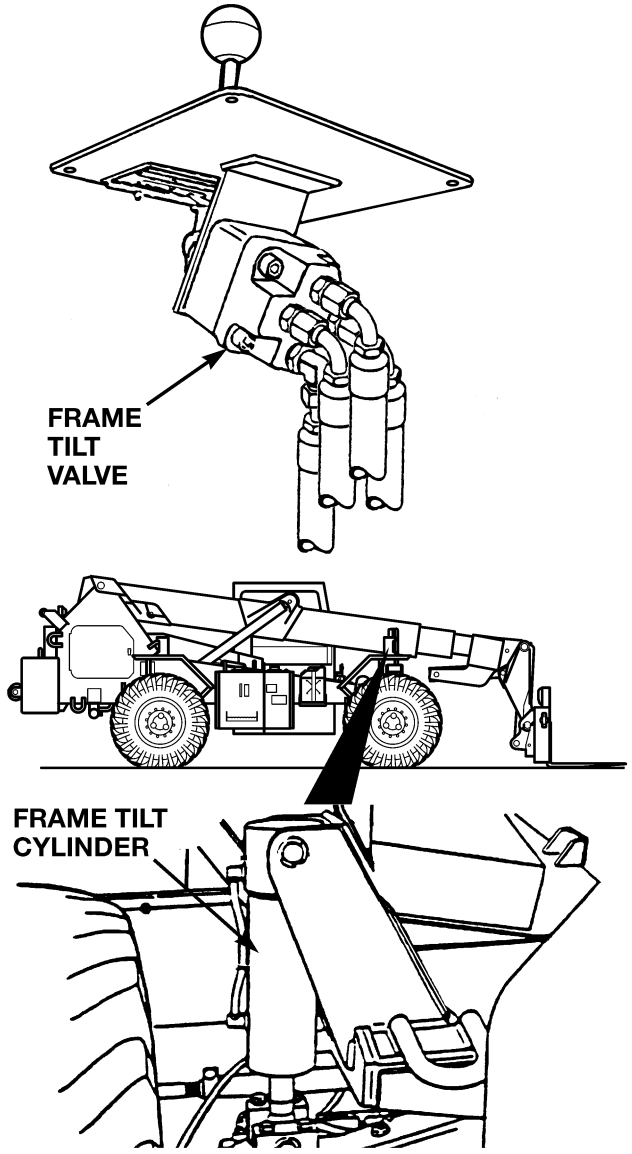
FRAME TILT VALVE PRESSURE TEST

(1) Remove cover from diagnostic coupler.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 2600 to 2700 psi (17940 to 18630 kPa), go to Step 7 of this fault.
  (b) If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), shut down engine (TM 10-3930-673-10) and replace frame tilt valve.



FRAME TILT CYLINDER VISUAL INSPECTION

Visually inspect frame tilt cylinder and its housing for signs of damage.
  (a) If frame tilt cylinder and/or its housing are not damaged, notify Direct Support about this fault.
  (b) If frame tilt cylinder and/or its housing are damaged, shut down engine (TM 10-3930-673-10) and replace cylinder and/or its housing (Para 18-13).



10. BRAKE ACTUATORS (LEFT AND/OR RIGHT REAR AND LEFT AND/OR RIGHT FRONT) DO NOT OPERATE CORRECTLY.

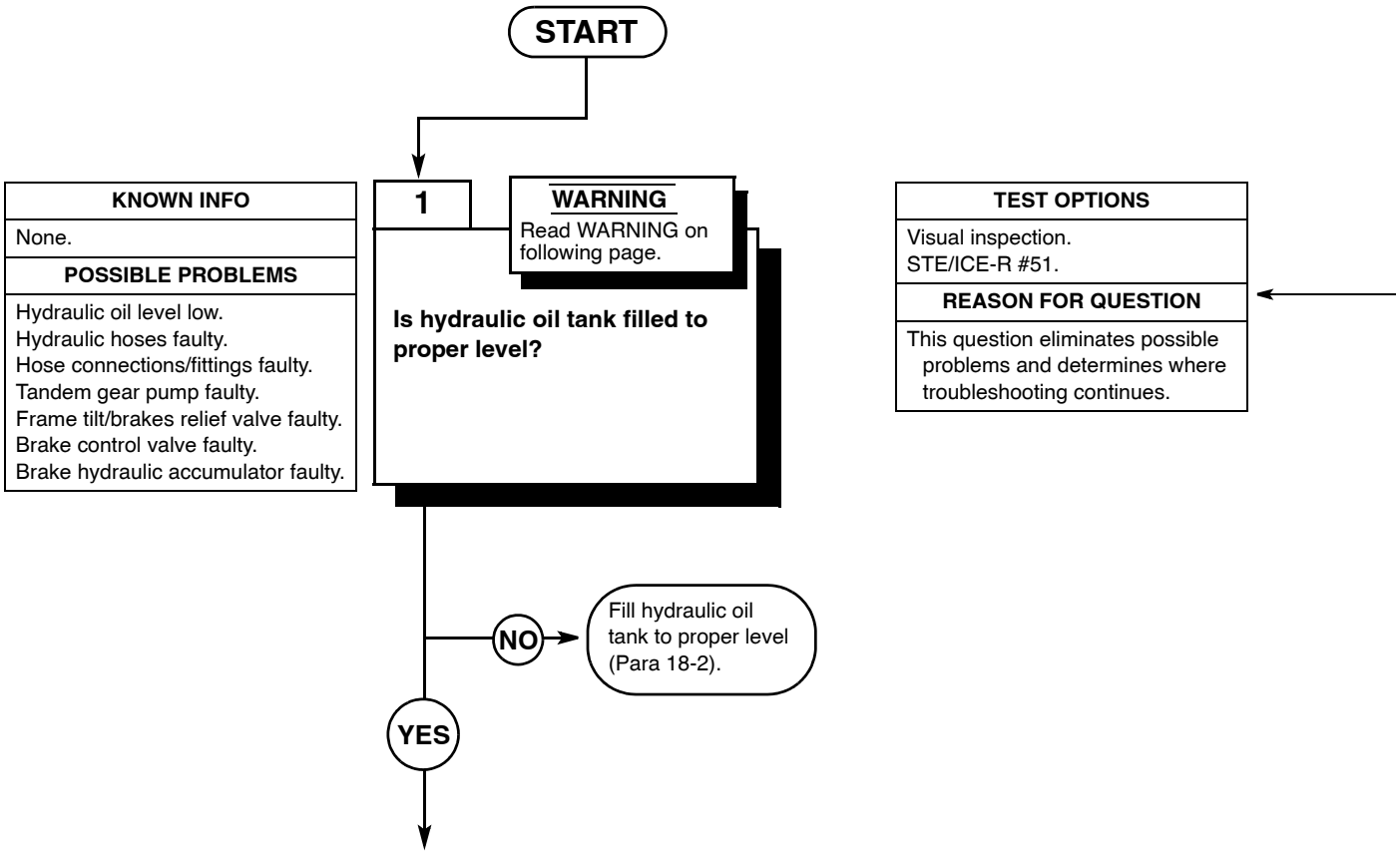
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)
STE/ICE-R (Item 17, Appendix F)

Equipment Condition
Engine running (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



WARNING

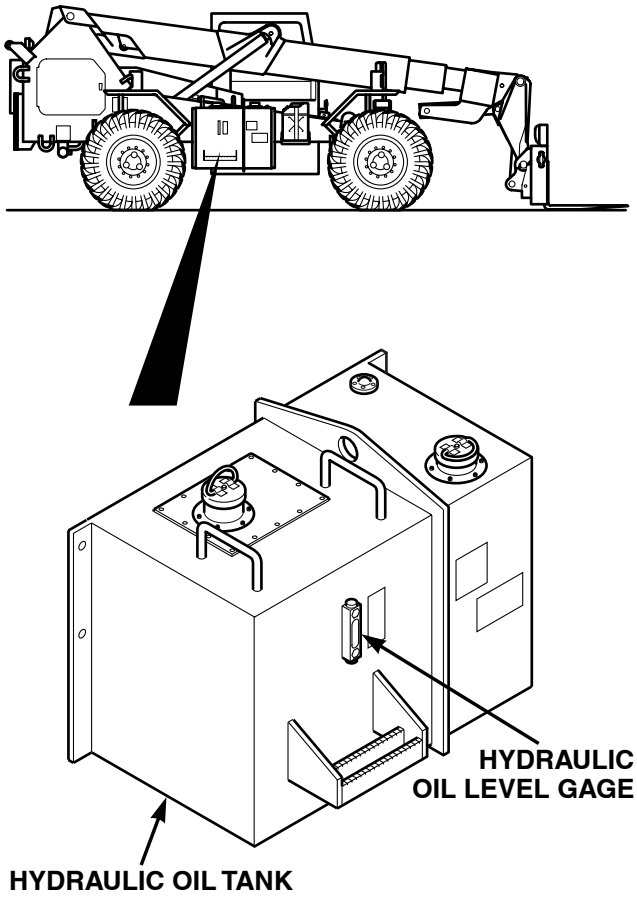
- Hydraulic oil in system can be under pressures over 3000 psi with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.

- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

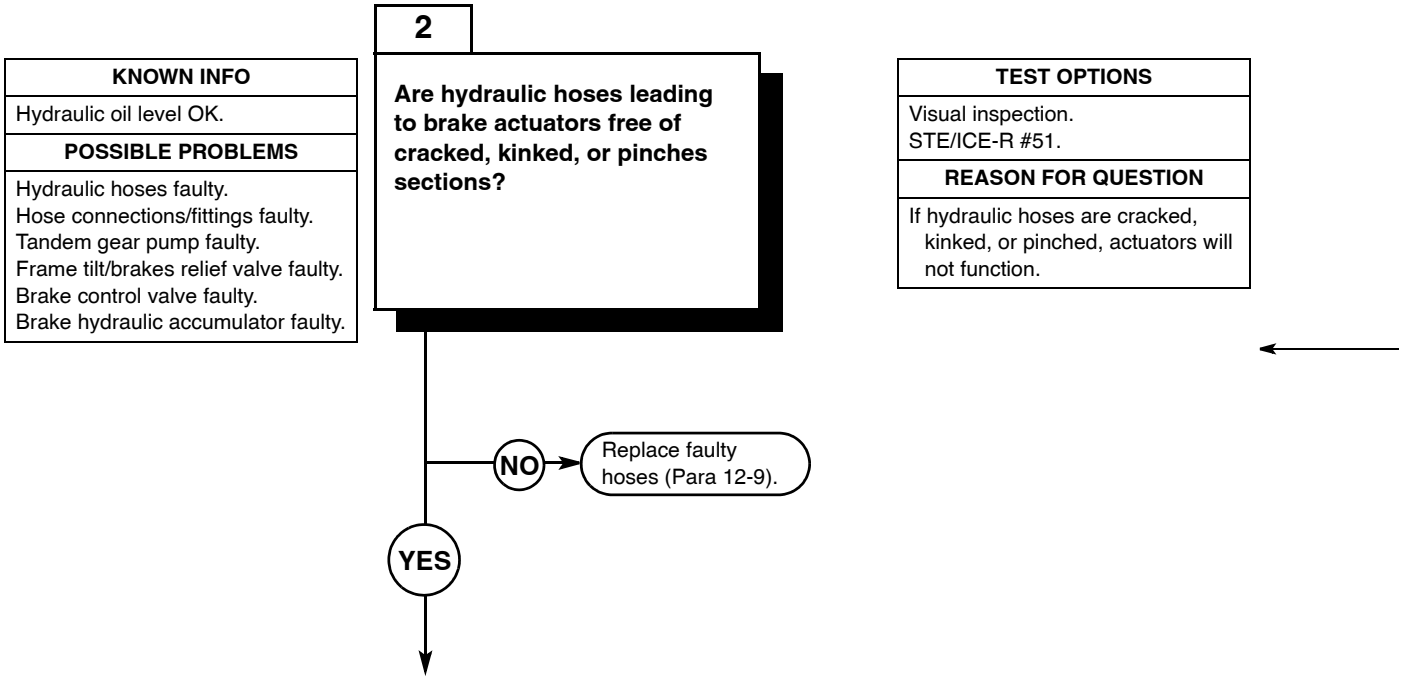
CAUTION

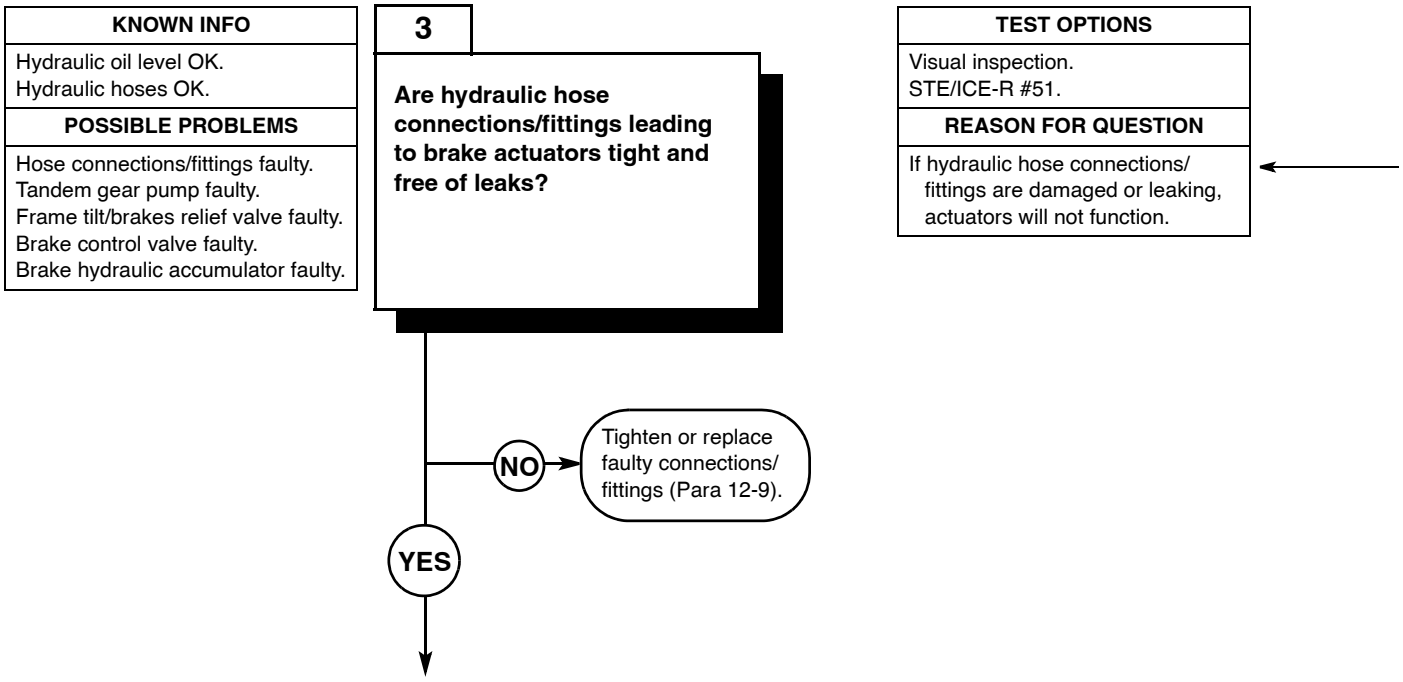
Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2).



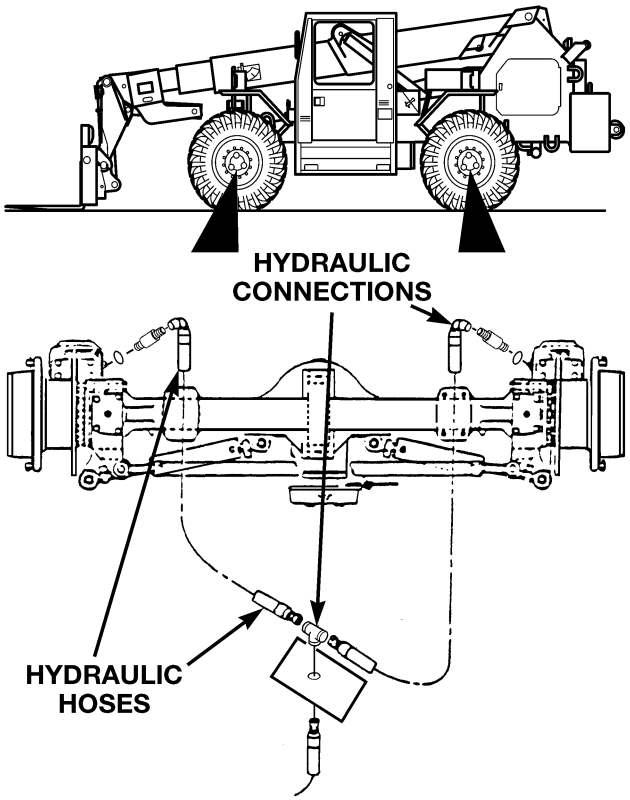
10. BRAKE ACTUATORS (LEFT AND/OR RIGHT REAR AND LEFT AND/OR RIGHT FRONT) DO NOT OPERATE CORRECTLY (CONT).



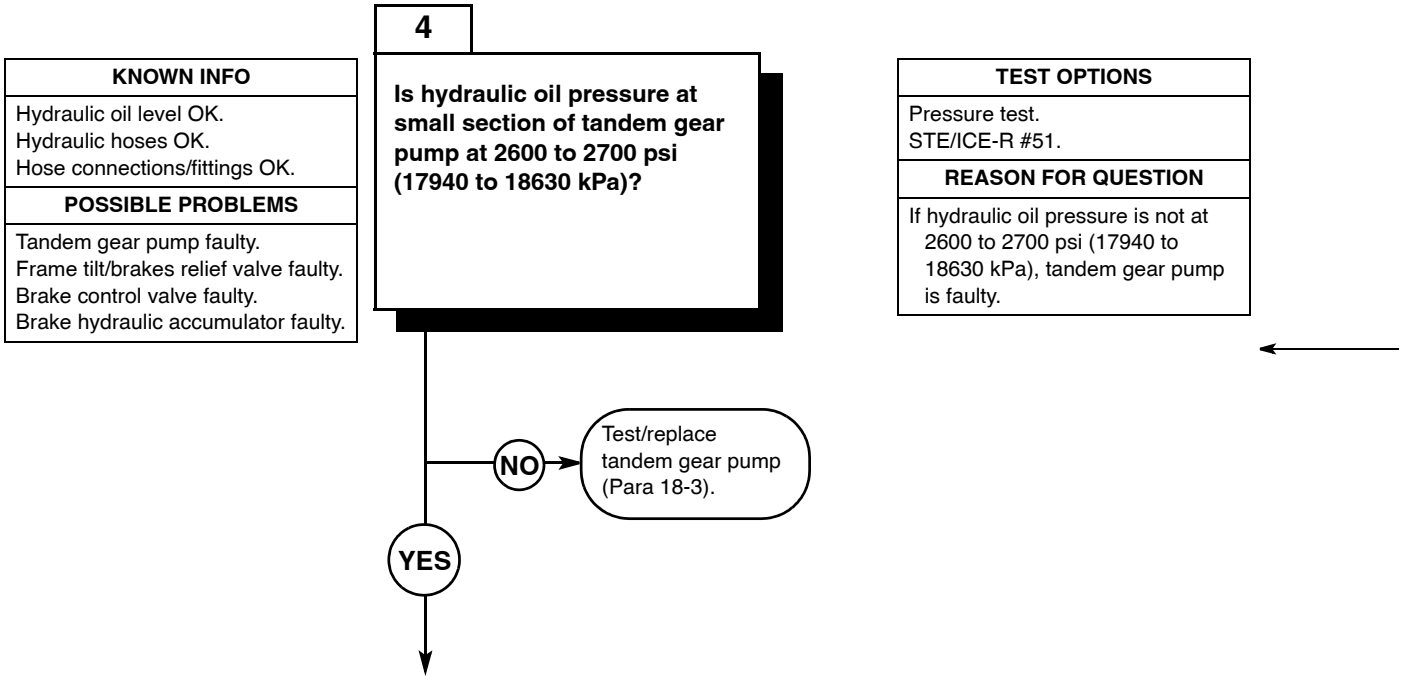


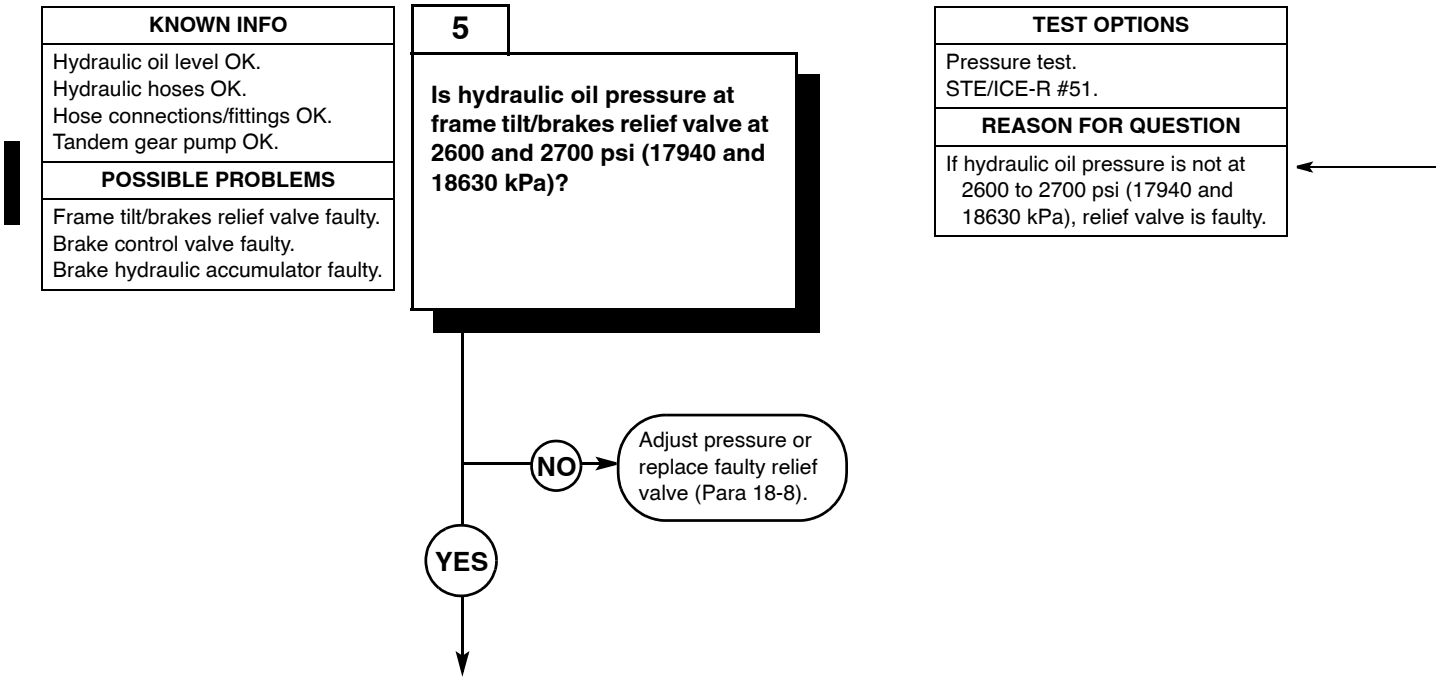
HYDRAULIC HOSES VISUAL INSPECTION
Visually inspect hydraulic hoses leading to brake actuators for cracks, kinks, or pinches. (a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault. (b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, shut down engine (TM 10-3930-673-10) and replace hose(s) (Para 12-9).

HYDRAULIC HOSE CONNECTIONS VISUAL INSPECTION
Visually inspect hydraulic hose connections/ fittings leading to brake actuators for leaks. (a) If there are no leaks at hydraulic hose connections/fittings, go to Step 4 of this fault. (b) If there are leaks at one or more of connections/fittings, shut down engine (TM 10-3930-673-10) and tighten or replace connections/ fittings (Para 12-9).



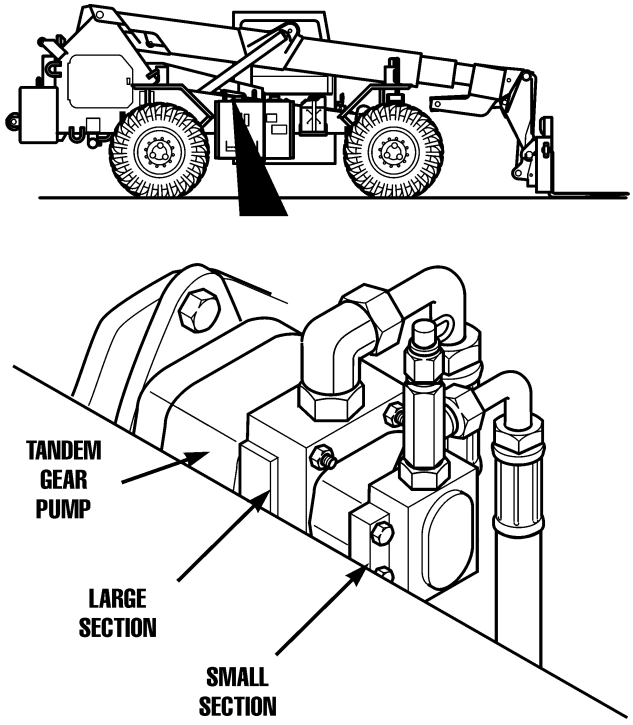
10. BRAKE ACTUATORS (LEFT AND/OR RIGHT REAR AND LEFT AND/OR RIGHT FRONT) DO NOT OPERATE CORRECTLY (CONT).





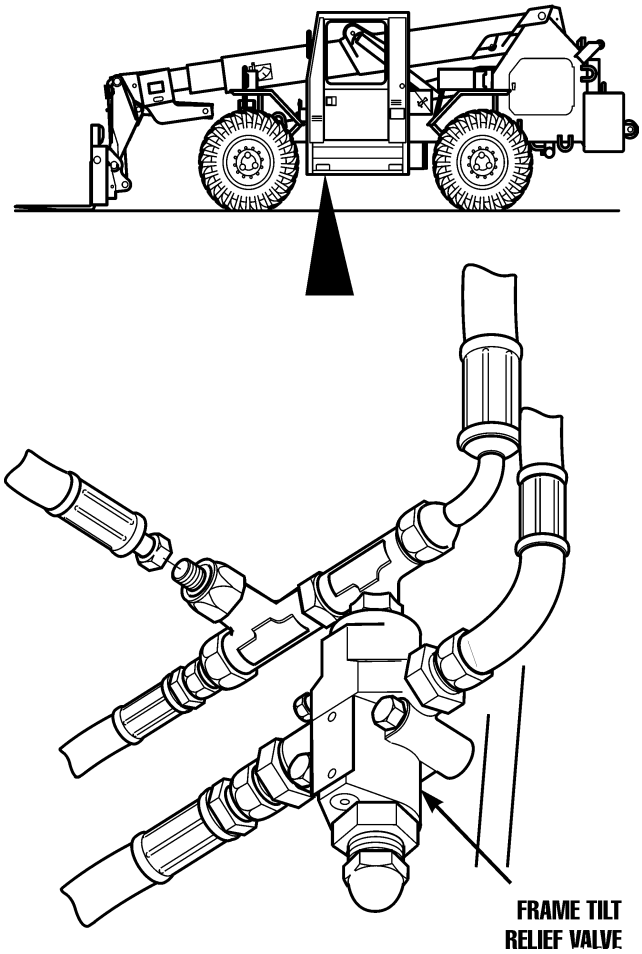
TANDEM GEAR PUMP PRESSURE TEST

(1) Remove cover from diagnostic coupler on small section of tandem gear pump.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 2600 to 2700 psi (17940 to 18630 kPa), go to Step 5 of this fault.
  (b) If hydraulic oil pressure is not at 2600 to 2700 psi (17940 to 18630 kPa), shut down engine (TM 10-3930-673-10) and test (small section) and replace tandem gear pump (Para 18-3).



FRAME TILT/BRAKES RELIEF VALVE PRESSURE TEST

(1) Install a test tee on inlet line to frame tilt/brakes relief valve.
(2) Connect a 0 to 5000 psi (0 to 34475 kPa) pressure gage to test tee.
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is between 2350 to 2450 psi (16215 to 16905 kPa), go to Step 6 of this fault.
  (b) If hydraulic oil pressure is not between 2350 to 2450 psi (16215 to 16905 kPa), go to Step (4) below.
(4) If valve is not damaged, adjust relief pressure to specified psi and remove pressure gage and test tee.
  (a) If hydraulic oil pressure is adjusted to specified psi, go to Step 6 of this fault.
  (b) If hydraulic oil pressure cannot be adjusted, replace relief valve (Para 18-8).



10. BRAKE ACTUATORS (LEFT AND/OR RIGHT REAR AND LEFT AND/OR RIGHT FRONT) DO NOT OPERATE CORRECTLY (CONT).

6

Is hydraulic oil pressure at brake control valve between 1600 and 1700 psi (11040 and 11730 kPa) (2350 to 2450 psi [16203 to 16892 kPa] fully charged)?

KNOWN INFO
Hydraulic oil level OK. Hydraulic hoses OK. Hose connections/fittings OK. Tandem gear pump OK. Frame tilt/brakes relief valve OK.
POSSIBLE PROBLEMS
Brake control valve faulty. Brake hydraulic accumulator faulty.

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic oil pressure is not 1700 to 1800 psi (11721 to 12411 kPa) (2350 to 2450 psi [16203 to 16892 kPa] fully charged), brake control valve is faulty.

NO → Replace faulty brake control valve (Para 0-1).

YES

7

Is brake hydraulic accumulator free from signs of damage? Is precharge pressure in brake hydraulic accumulator set at 900 psi (6210 kPa)?

KNOWN INFO
Hydraulic oil level OK. Hydraulic hoses OK. Hose connections/fittings OK. Tandem gear pump OK. Frame tilt/brakes relief valve OK. Brake control valve OK.
POSSIBLE PROBLEMS
Brake hydraulic accumulator faulty.

TEST OPTIONS
Visual inspection. Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If brake accumulator is damaged, accumulator will not function. If pressure is not at precharged limit, actuators will not function.

NO → Replace damaged accumulator (Para 12-8) or adjust pressure to 900 psi.

YES

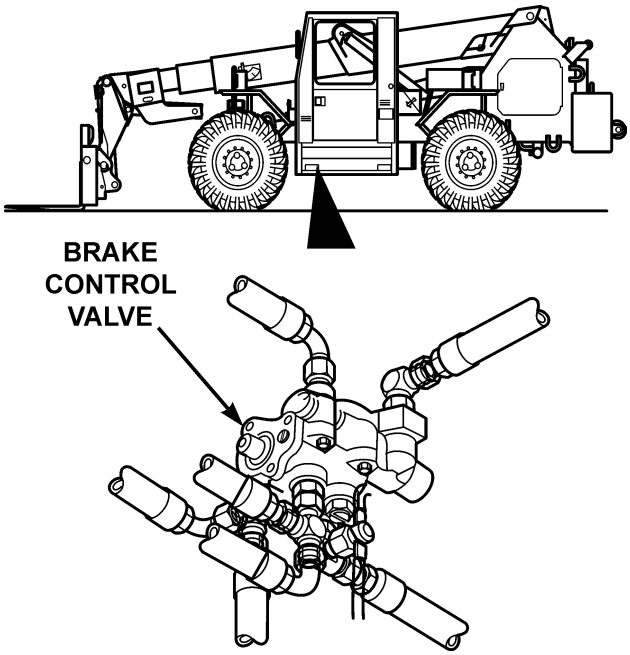
Notify Direct Support about this fault.

FRAME TILT VALVE PRESSURE TEST

(1) Remove cover from diagnostic coupler on brake control valve.
(2) Perform STE/ICE Test #51 (TM 9-4910-571-12&P).
(3) Read output pressure on test device.
  (a) If hydraulic oil pressure is at 1600 and 1700 psi (11040 and 11730 kPa) (2350 to 2450 psi [16203 to 16892 kPa] fully charged), go to Step 7 of this fault.
  (b) If hydraulic oil pressure is not at 1600 and 1700 psi (11040 and 11730 kPa) (2350 to 2450 psi [16203 to 16892 kPa] fully charged), shut down engine (TM 10-3930-673-10) and replace brake control valve (Para 0-1).

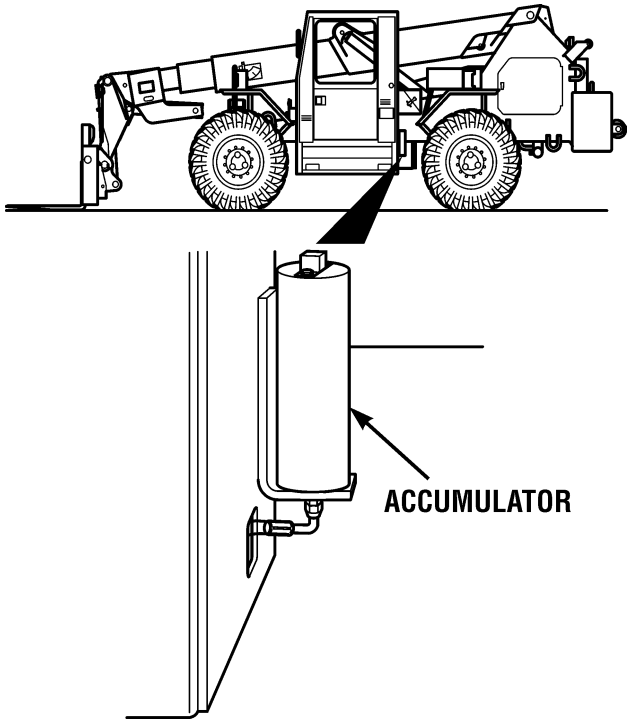
NOTE

Adjust accumulator charging pressure at brake control valve to 1650 ±25 psi.



HYDRAULIC ACCUMULATOR VISUAL INSPECTION/PRESSURE TEST

(1) Visually inspect brake hydraulic accumulator for signs of damage.
  (a) If brake hydraulic accumulator is not damaged, go to Step (2) below.
  (b) If brake hydraulic accumulator is damaged, replace accumulator (Para 12-8).
(2) Shut down engine (TM 10-3930-673-10) and remove brake hydraulic accumulator (Para 12-8) and test precharge pressure in accumulator.
  (a) If precharge pressure in accumulator is at 900 psi (6210 kPa), reinstall accumulator (Para 12-8).
  (b) If precharge pressure in accumulator is less than 900 psi (6210 kPa), add nitrogen; if pressure is greater than 900 psi (6210 kPa), bleed nitrogen from accumulator. Reinstall accumulator (Para 12-8).



11. EMERGENCY STEERING PUMP DOES NOT OPERATE.

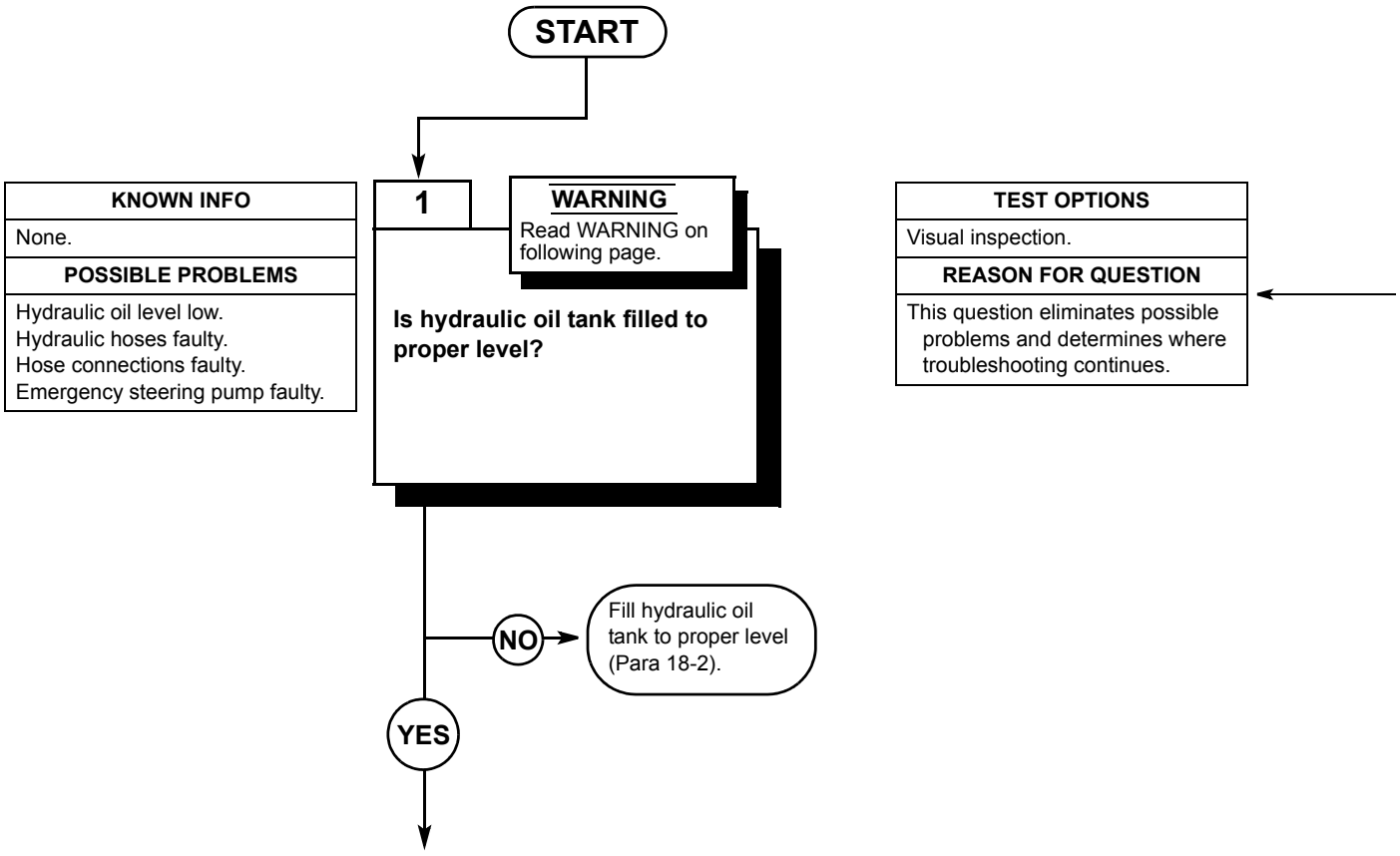
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanics: Automotive (Item 18, Appendix F)

Equipment Condition
Engine shut down (TM 10-3930-673-10)
Parking brake on (TM 10-3930-673-10)
Wheels chocked (TM 10-3930-673-10)

Personnel Required
Two

References
TM 10-3930-673-10
TM 9-4910-571-12&P



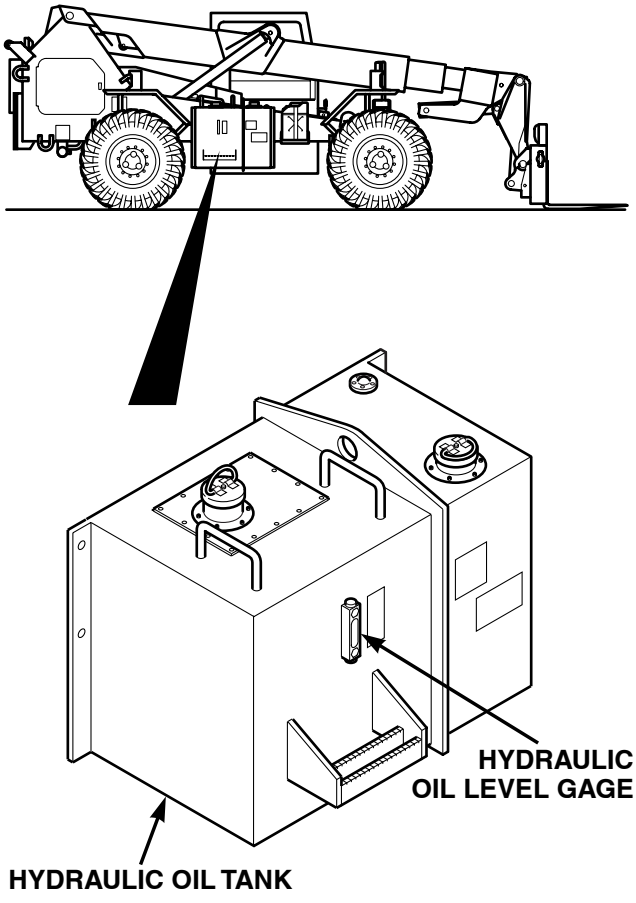
WARNING

- Hydraulic oil in system can be under pressures over 3000 psi (20685 kPa) with engine OFF. Always relieve pressure in hydraulic lines before attempting to remove any component in hydraulic system. With engine OFF, starter switch in RUN position, and MLRS attachment on ground, move control levers through all operating positions several times to relieve live pressure. Relieve pressure in hydraulic oil tank by loosening filler cap very slowly. Failure to follow these precautions could result in serious personal injury.
- At operating temperatures, hydraulic oil is hot and under pressure. Hot oil is hot and under pressure. Hot oil can cause injuries. Allow hydraulic oil to cool before disconnecting any hydraulic lines.

CAUTION

Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of hydraulic system could result in premature failure.

HYDRAULIC OIL LEVEL VISUAL INSPECTION
(1) Visually inspect hydraulic oil level gage to determine if tank is filled to proper level. (2) Hydraulic oil should be visible between ADD and FULL marks. (a) If hydraulic oil is visible between ADD and FULL marks, go to Step 2 of the fault. (b) If hydraulic oil is not visible, inspect tank for leaks. Then fill tank to FULL mark with hydraulic oil (Para 18-2).



11. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil level OK.
POSSIBLE PROBLEMS
Hydraulic hoses faulty. Hose connections faulty. Emergency steering pump faulty.

2

Are hydraulic hoses leading to emergency steering pump free of cracked, kinked, or pinches sections?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hydraulic hoses are cracked, kinked, or pinched, emergency steering pump will not function.

NO → Replace faulty hoses (Para 14-6)..

YES

KNOWN INFO
Hydraulic oil level OK. Hydraulic hoses OK.
POSSIBLE PROBLEMS
Hose connections faulty. Emergency steering pump faulty.

3

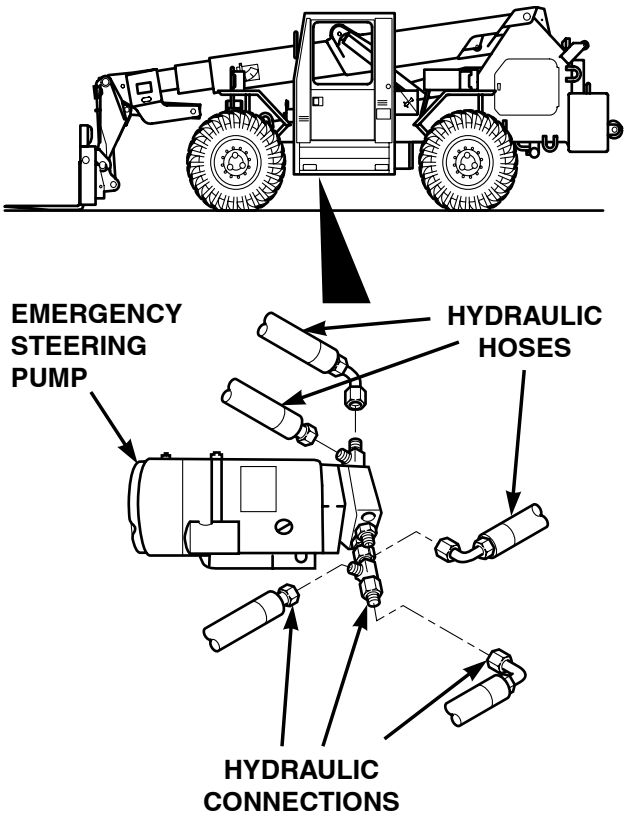
Are hydraulic hose connections leading to emergency steering pump tight and free of leaks?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hydraulic hose connections are damaged or leaking, hydraulic system will lose pressure.

NO → Tighten or replace faulty connections/ fittings (Para 14-6).

YES

HYDRAULIC HOSES VISUAL INSPECTION
Visually inspect hydraulic hoses leading to emergency steering pump for cracks, kinks, or pinches. (a) If there are no cracks, kinks, or pinches in hydraulic hoses, go to Step 3 of this fault. (b) If there are cracks, kinks, or pinches in one or more of hydraulic hoses, replace hose(s) (Para 14-6).



HYDRAULIC HOSE CONNECTIONS VISUAL INSPECTION
Visually inspect hydraulic hose connections leading to emergency steering pump for leaks. (a) If there are no leaks at hydraulic hose connections, go to Step 4 of this fault. (b) If there are leaks at one or more of connections/fittings, tighten or replace connections/fittings (Para 14-6).

11. EMERGENCY STEERING PUMP DOES NOT OPERATE (CONT).

KNOWN INFO
Hydraulic oil level OK. Hydraulic hoses OK. Hose connections OK.
POSSIBLE PROBLEMS
Emergency steering pump faulty.

4

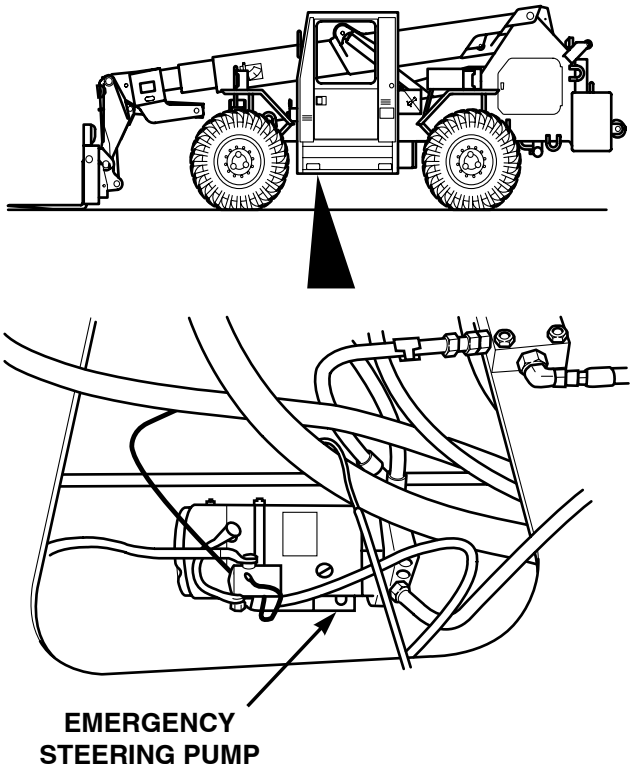
Is emergency steering pump free from signs of damage?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If emergency steering pump is damaged, pump will not function.

NO → Replace damaged emergency steering pump (Para 14-5).

YES → Go to Electrical System Troubleshooting, Fault 41, Emergency steering pump does not operate.

EMERGENCY STEERING PUMP VISUAL INSPECTION
Visually inspect emergency steering pump for signs of damage. (a) If emergency steering pump is not damaged, go to Fault 41, Emergency steering pump does not operate. (b) If emergency steering pump is damaged, replace pump (Para 14-5).



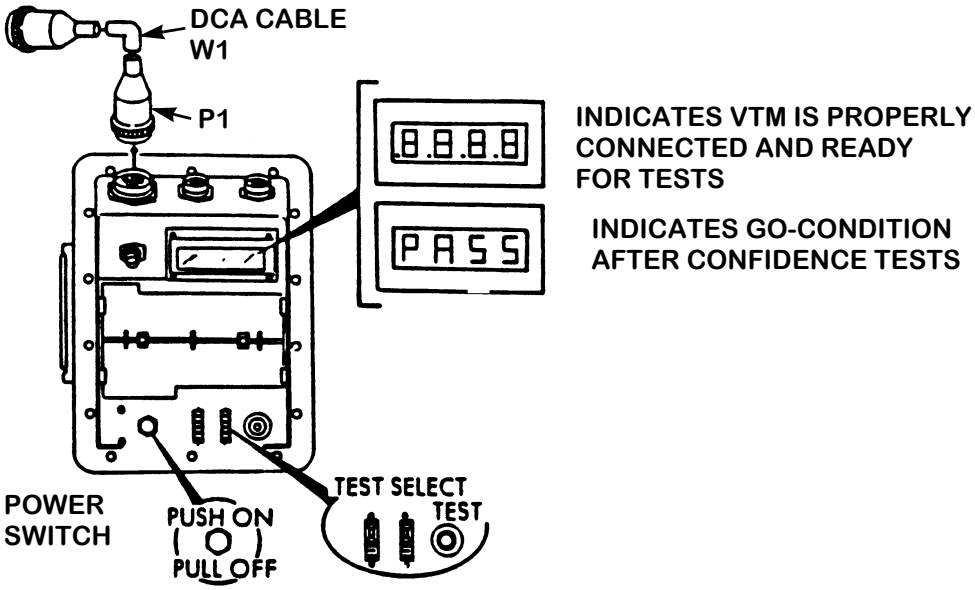
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK

STE-ICE-R GO-Chain Testing Sequence

The following GO-Chain tests are made using vehicle DCA connector. All tests must be performed sequentially. The following is a summary of each test.

For normal readings, see vehicle test card, page 2-912.

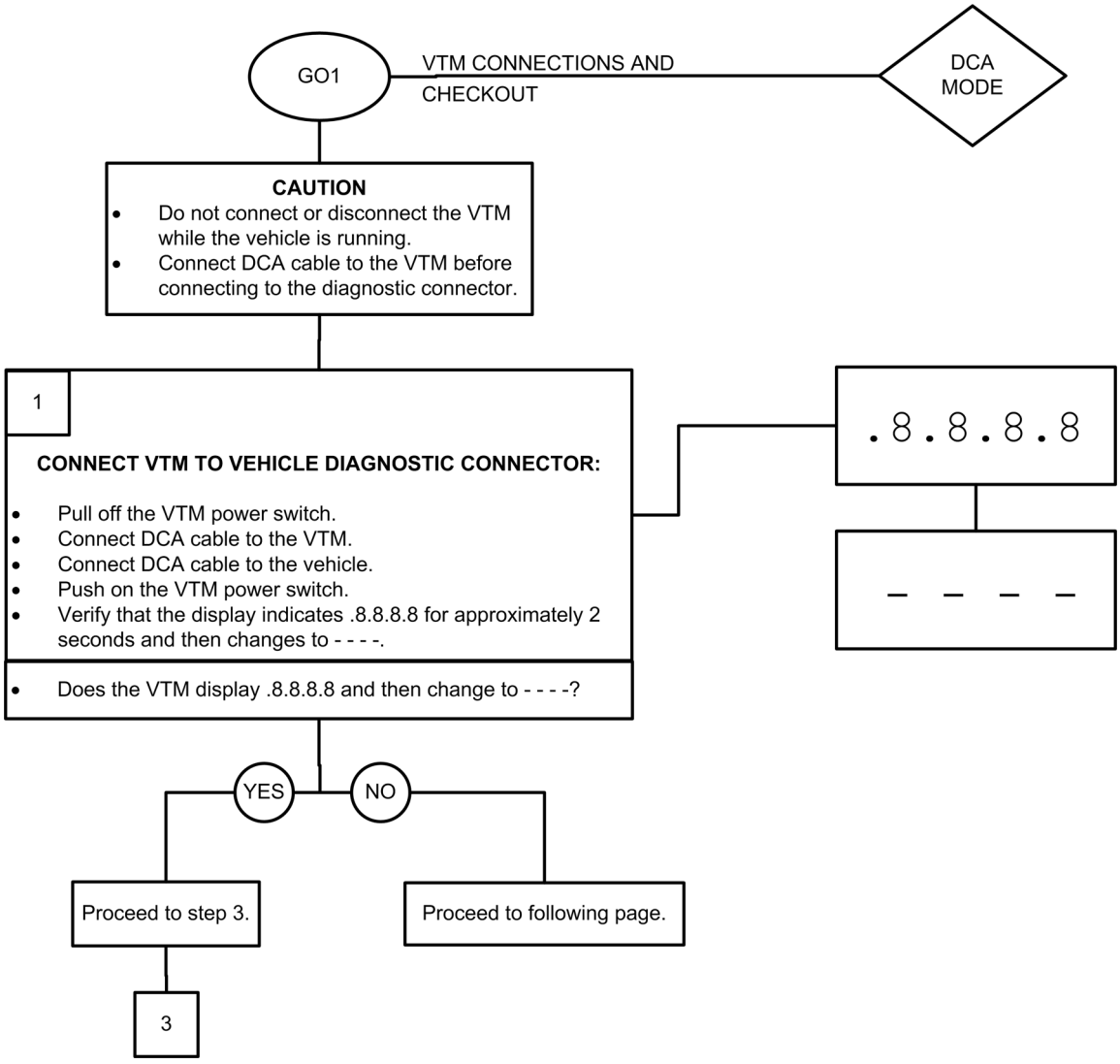
GO TEST NUMBER	MODE	TEST TITLE	PAGE NUMBER
GO1	DCA	VTM Connection and Checkout	2-866
GO2	DCA	First Peak Test-Starter Current	2-870
GO3	DCA	Vehicle Gauges Check	2-872
GO4	DCA	Vehicle Voltmeter	2-875
GO5	DCA	Engine Temperature and Pressure Checks	2-876
GO6	DCA	Engine Idle Speed Check	2-878
GO7	DCA	Battery Voltage Check	2-879
GO8	DCA-TK	Engine Oil Pressure Test	2-880
GO9	DCA	Engine Power Test	2-882
G10	DCA-TK	Transmission Oil Pressure Test	2-883
G11	DCA-TK	Transmission Clutch Pressure Test	2-885
G12	DCA-TK	Transmission Converter Charge Pressure Test	2-887
G13	DCA-TK	Transmission Brake Cutoff Valve Pressure Test	2-889
G14	CDA-TK	Fuel Return Line Pressure Test	2-891

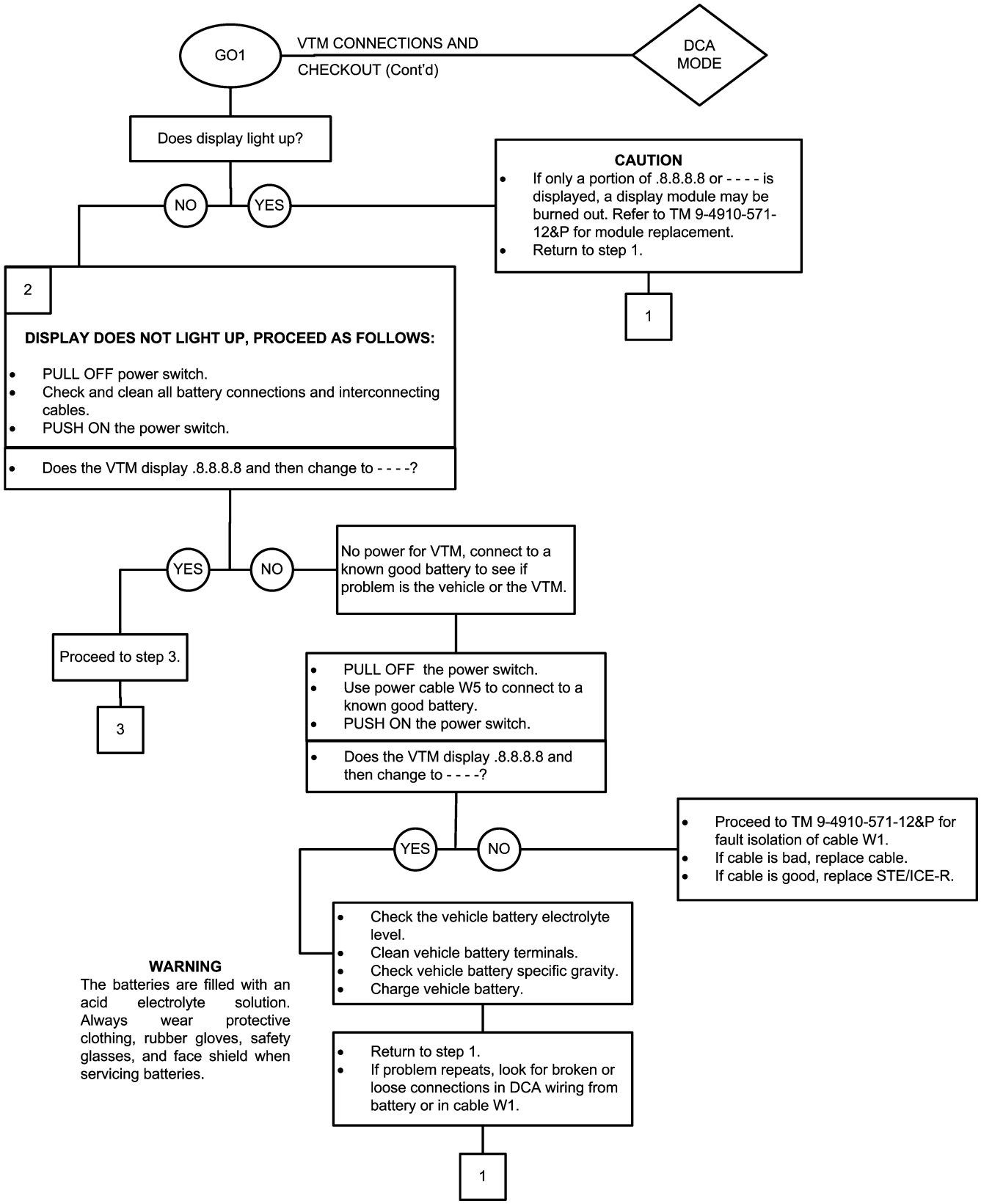


2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)

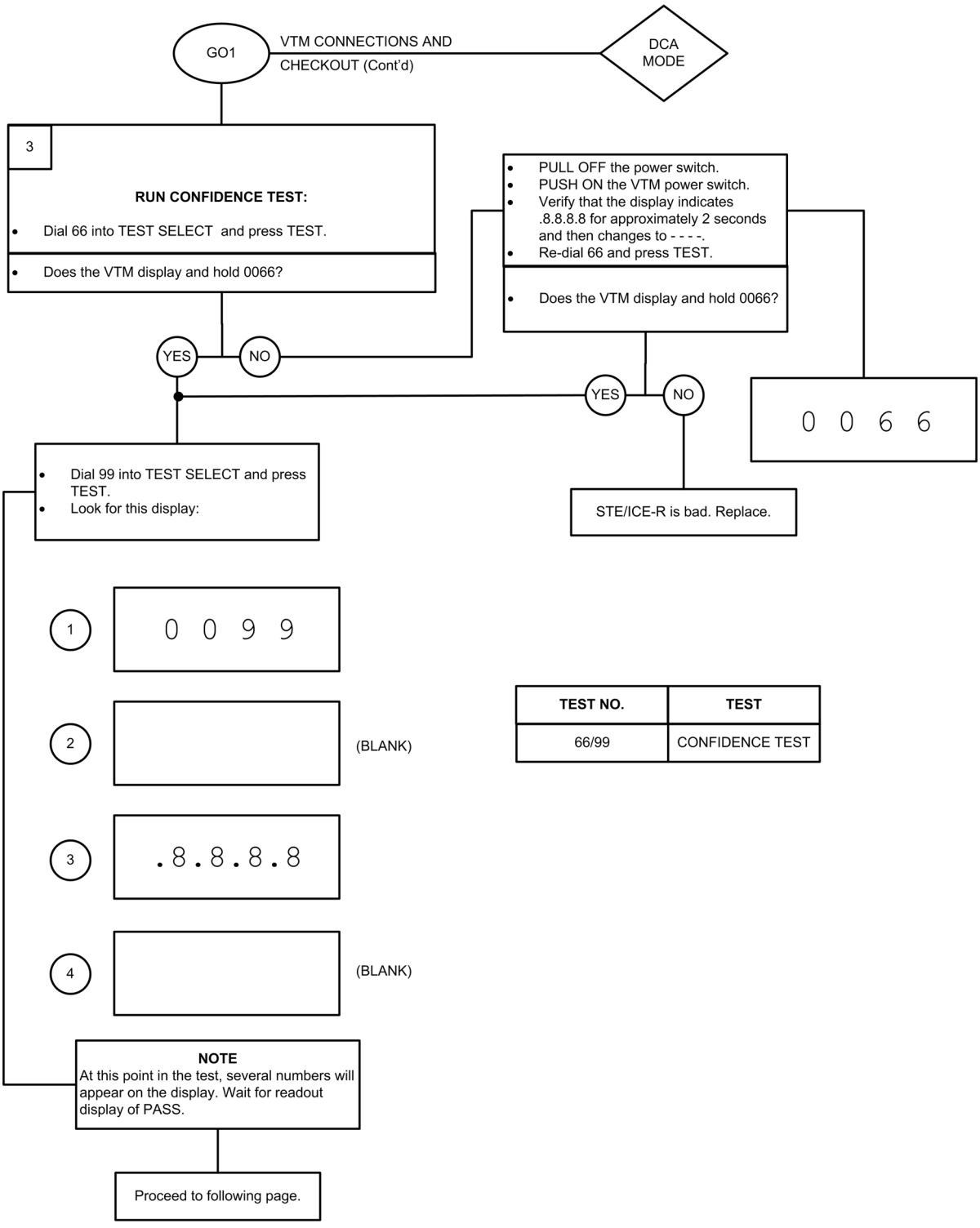
NOTE

Perform all GO steps until a NO-GO condition exists, then perform the NO-GO step indicated.

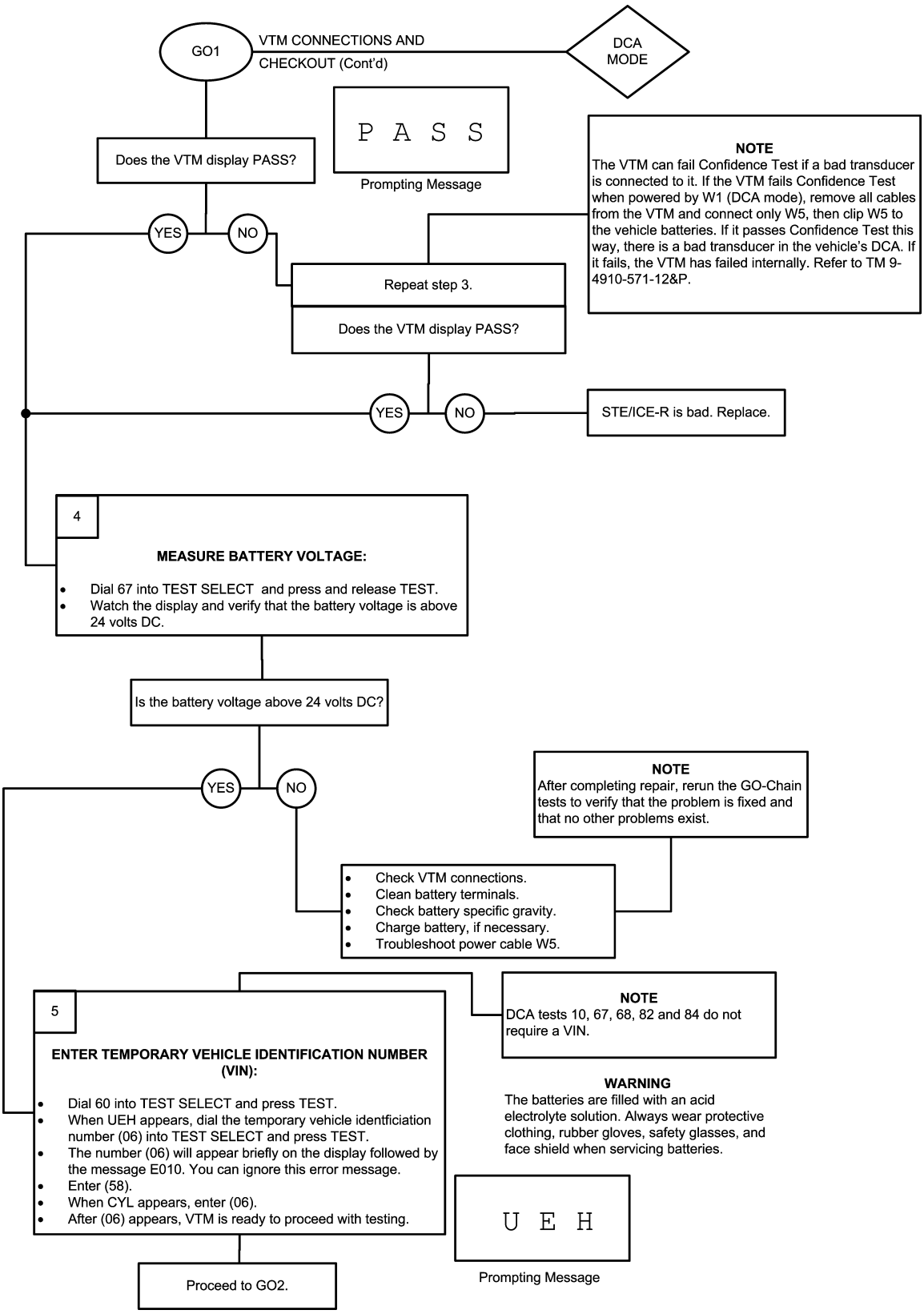



GO1
VTM CONNECTIONS AND CHECKOUT (Cont'd)
DCA MODE
Does display light up?
NO
YES
CAUTION
• If only a portion of .8.8.8.8 or - - - - is displayed, a display module may be burned out. Refer to TM 9-4910-571-12&P for module replacement.
• Return to step 1.
1
2
DISPLAY DOES NOT LIGHT UP, PROCEED AS FOLLOWS:
• PULL OFF power switch.
• Check and clean all battery connections and interconnecting cables.
• PUSH ON the power switch.
• Does the VTM display .8.8.8.8 and then change to - - - -?
YES
NO
No power for VTM, connect to a known good battery to see if problem is the vehicle or the VTM.
Proceed to step 3.
3
• PULL OFF the power switch.
• Use power cable W5 to connect to a known good battery.
• PUSH ON the power switch.
• Does the VTM display .8.8.8.8 and then change to - - - -?
YES
NO
• Proceed to TM 9-4910-571-12&P for fault isolation of cable W1.
• If cable is bad, replace cable.
• If cable is good, replace STE/ICE-R.
• Check the vehicle battery electrolyte level.
• Clean vehicle battery terminals.
• Check vehicle battery specific gravity.
• Charge vehicle battery.
• Return to step 1.
• If problem repeats, look for broken or loose connections in DCA wiring from battery or in cable W1.
1
WARNING
The batteries are filled with an acid electrolyte solution. Always wear protective clothing, rubber gloves, safety glasses, and face shield when servicing batteries.

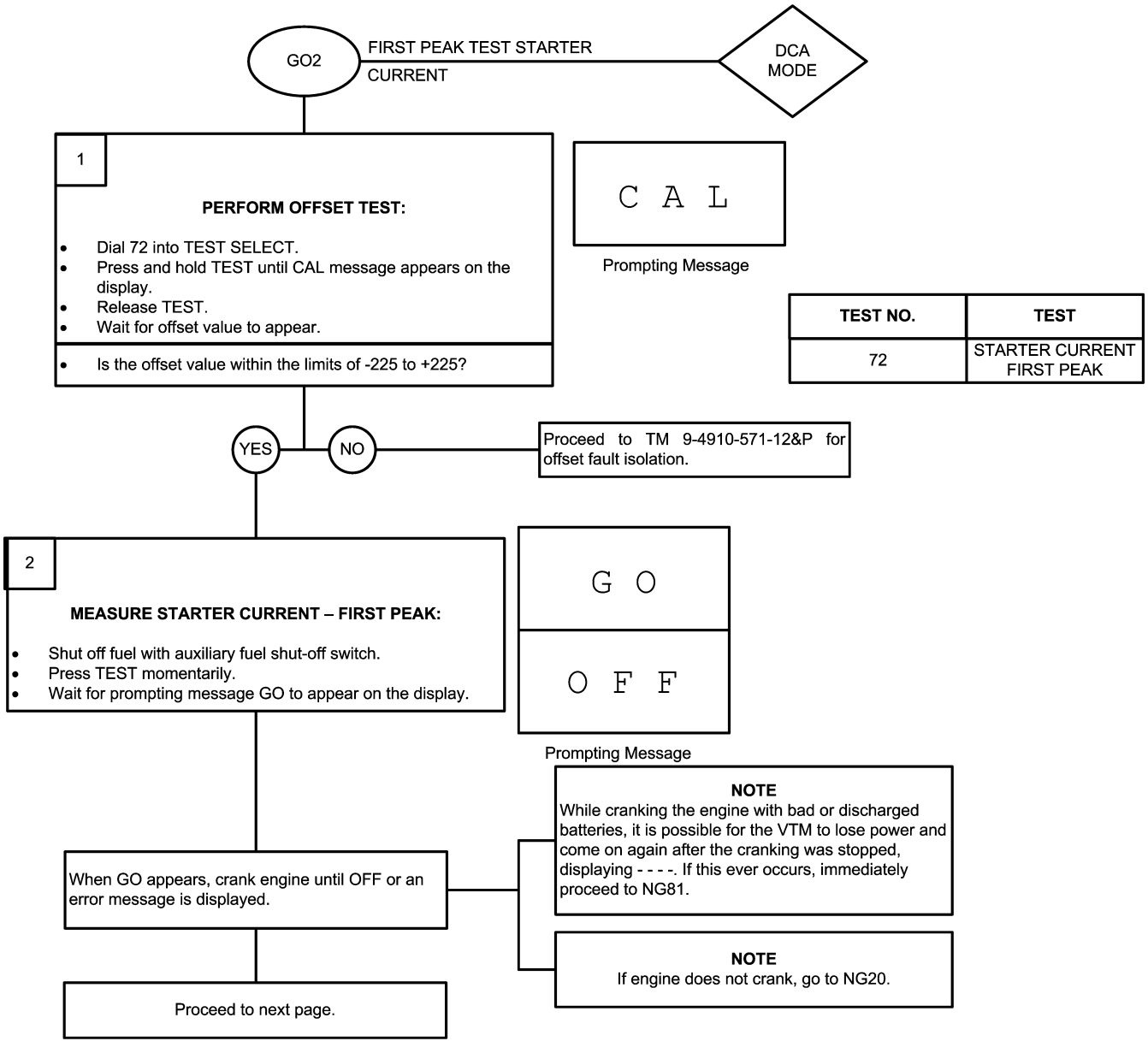
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)

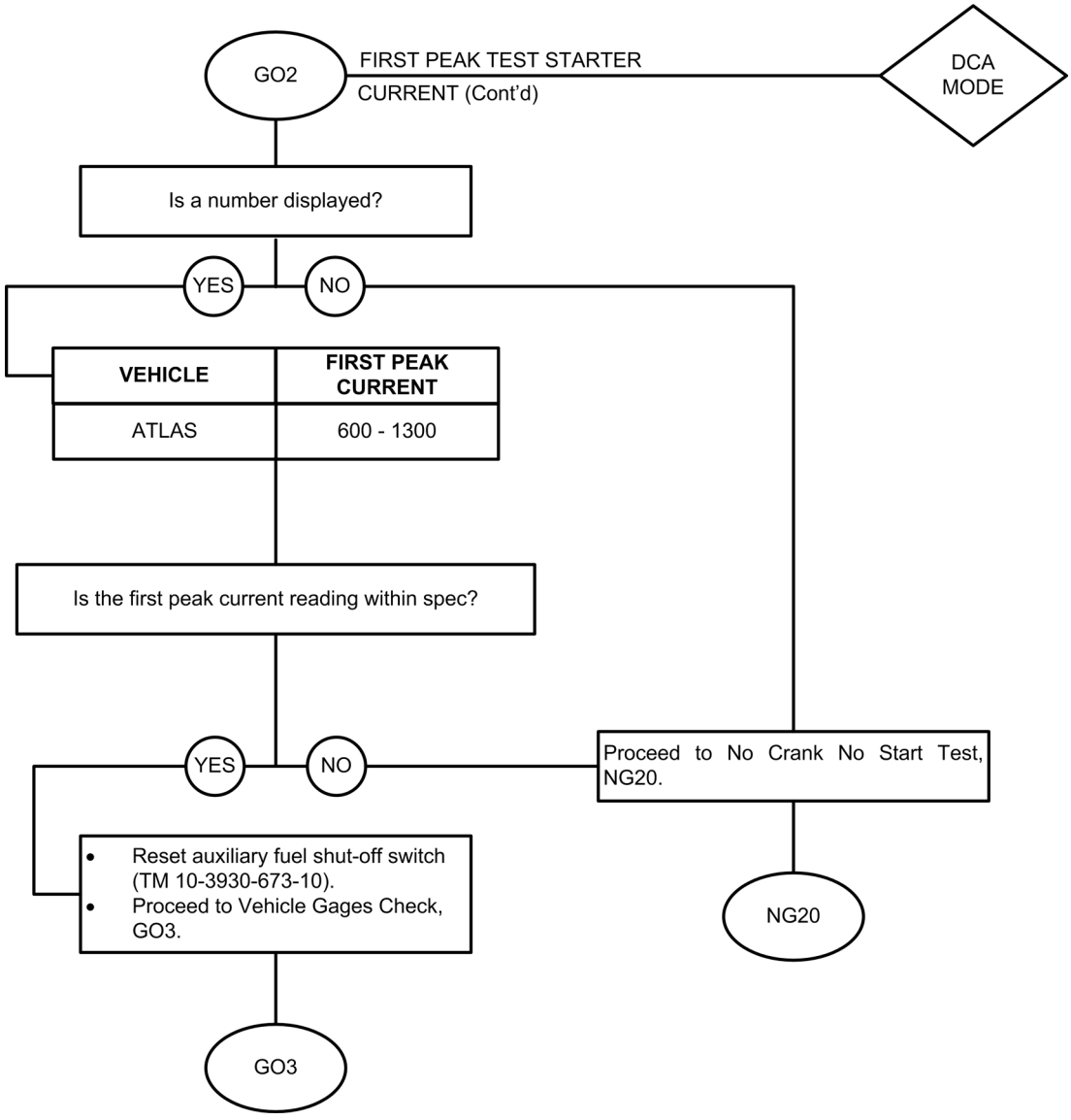


TEST NO.	TEST
66/99	CONFIDENCE TEST

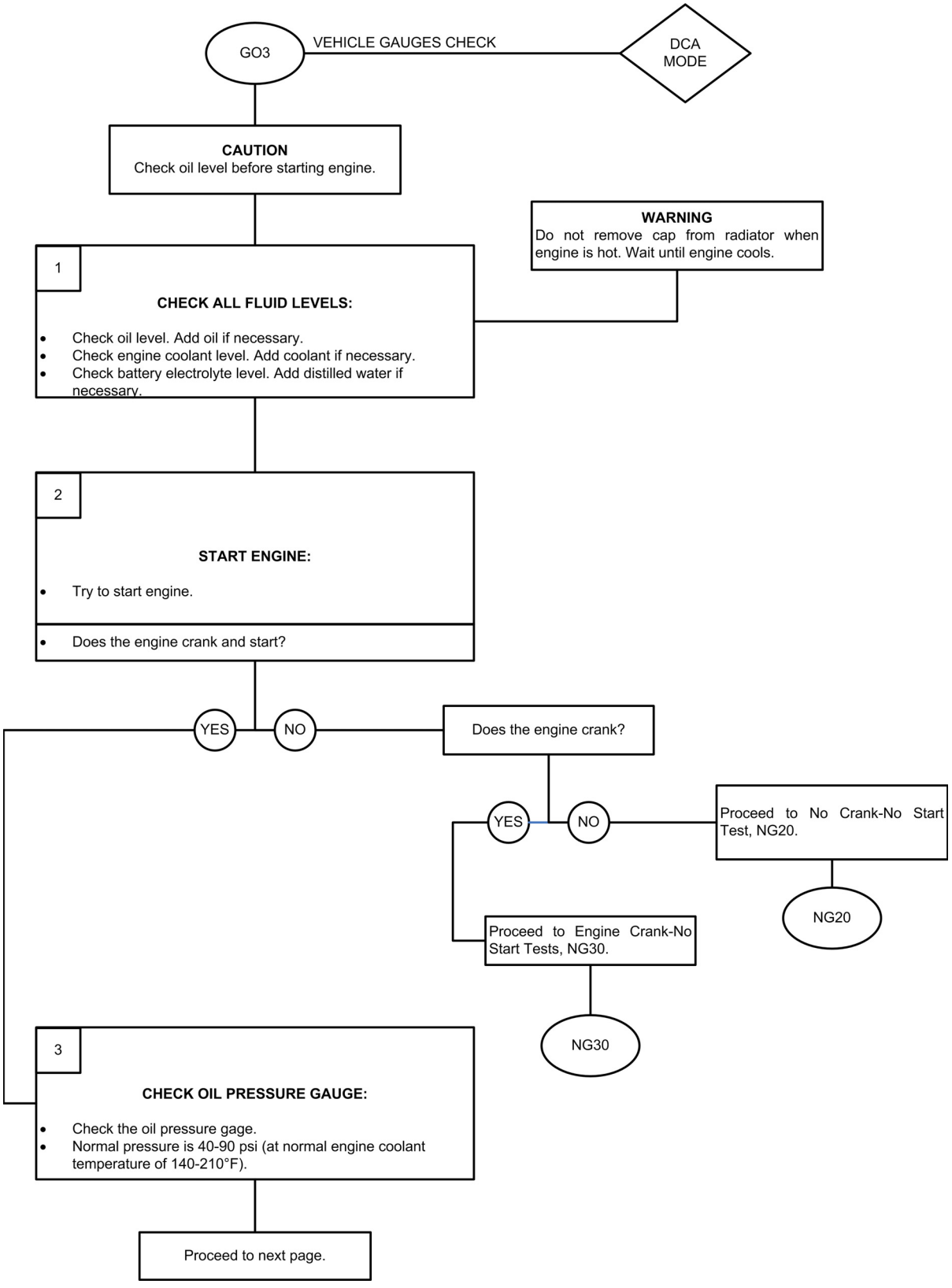

GO1
VTM CONNECTIONS AND CHECKOUT (Cont'd)
DCA MODE
Does the VTM display PASS?
P A S S
Prompting Message
NOTE
The VTM can fail Confidence Test if a bad transducer is connected to it. If the VTM fails Confidence Test when powered by W1 (DCA mode), remove all cables from the VTM and connect only W5, then clip W5 to the vehicle batteries. If it passes Confidence Test this way, there is a bad transducer in the vehicle's DCA. If it fails, the VTM has failed internally. Refer to TM 9-4910-571-12&P.
YES
NO
Repeat step 3.
Does the VTM display PASS?
YES
NO
STE/ICE-R is bad. Replace.
4
MEASURE BATTERY VOLTAGE:
Dial 67 into TEST SELECT and press and release TEST.
Watch the display and verify that the battery voltage is above 24 volts DC.
Is the battery voltage above 24 volts DC?
YES
NO
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.
Check VTM connections.
Clean battery terminals.
Check battery specific gravity.
Charge battery, if necessary.
Troubleshoot power cable W5.
5
ENTER TEMPORARY VEHICLE IDENTIFICATION NUMBER (VIN):
Dial 60 into TEST SELECT and press TEST.
When UEH appears, dial the temporary vehicle identficiation number (06) into TEST SELECT and press TEST.
The number (06) will appear briefly on the display followed by the message E010. You can ignore this error message.
Enter (58).
When CYL appears, enter (06).
After (06) appears, VTM is ready to proceed with testing.
NOTE
DCA tests 10, 67, 68, 82 and 84 do not require a VIN.
WARNING
The batteries are filled with an acid electrolyte solution. Always wear protective clothing, rubber gloves, safety glasses, and face shield when servicing batteries.
U E H
Prompting Message
Proceed to GO2.

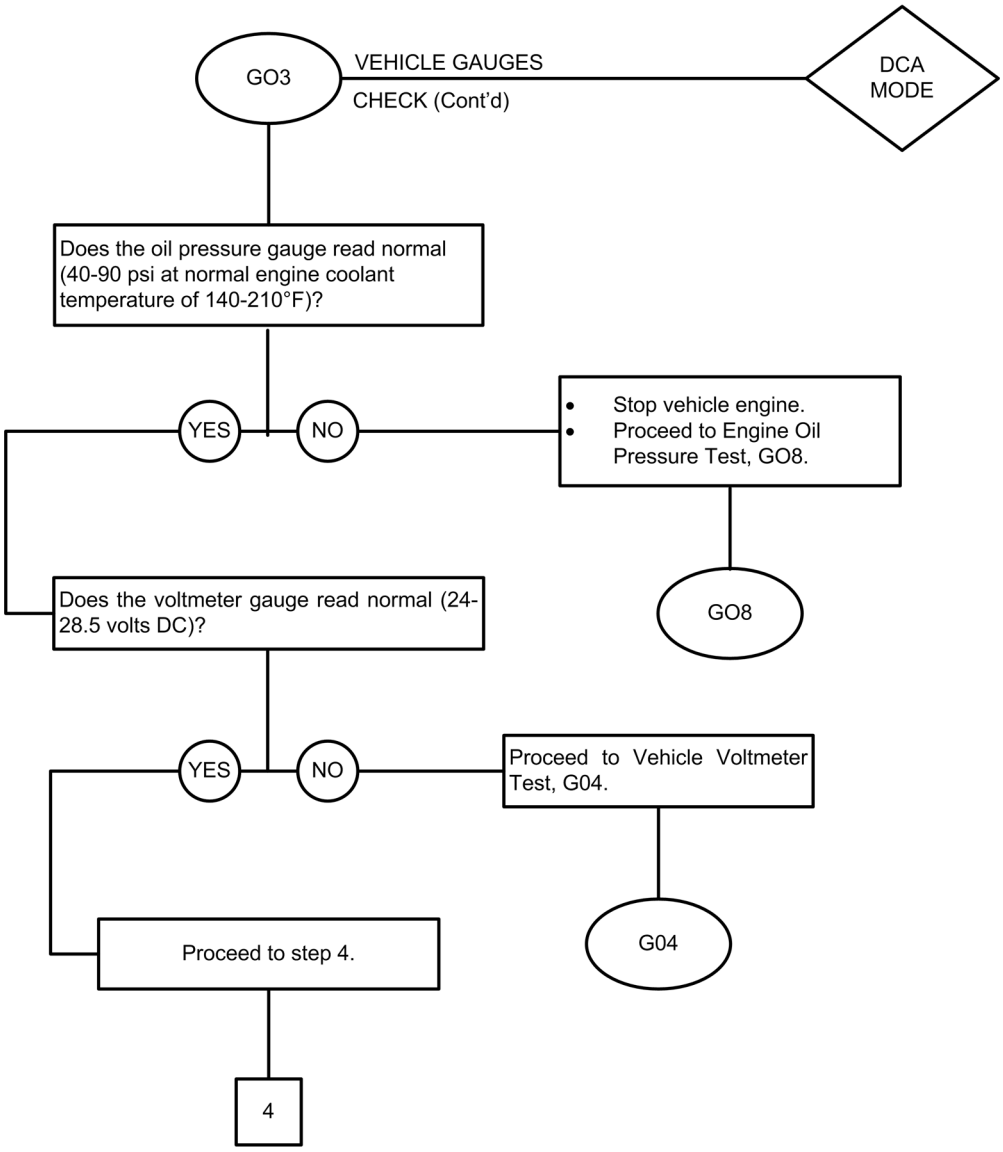
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



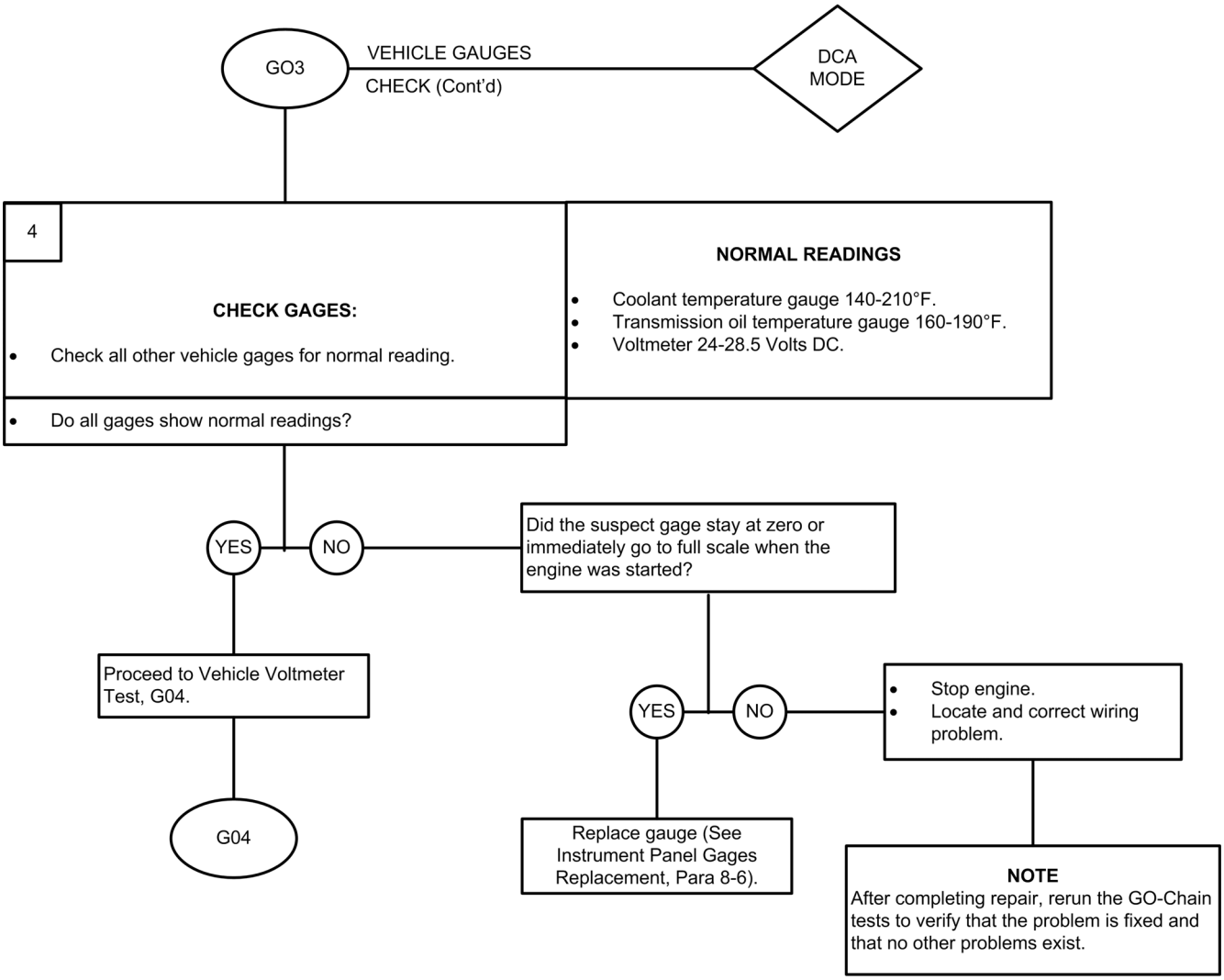

GO2
FIRST PEAK TEST STARTER CURRENT (Cont'd)
DCA MODE
Is a number displayed?
YES
NO
VEHICLE
FIRST PEAK CURRENT
ATLAS
600 - 1300
Is the first peak current reading within spec?
YES
NO
Proceed to No Crank No Start Test, NG20.
Reset auxiliary fuel shut-off switch (TM 10-3930-673-10).
Proceed to Vehicle Gages Check, GO3.
NG20
GO3

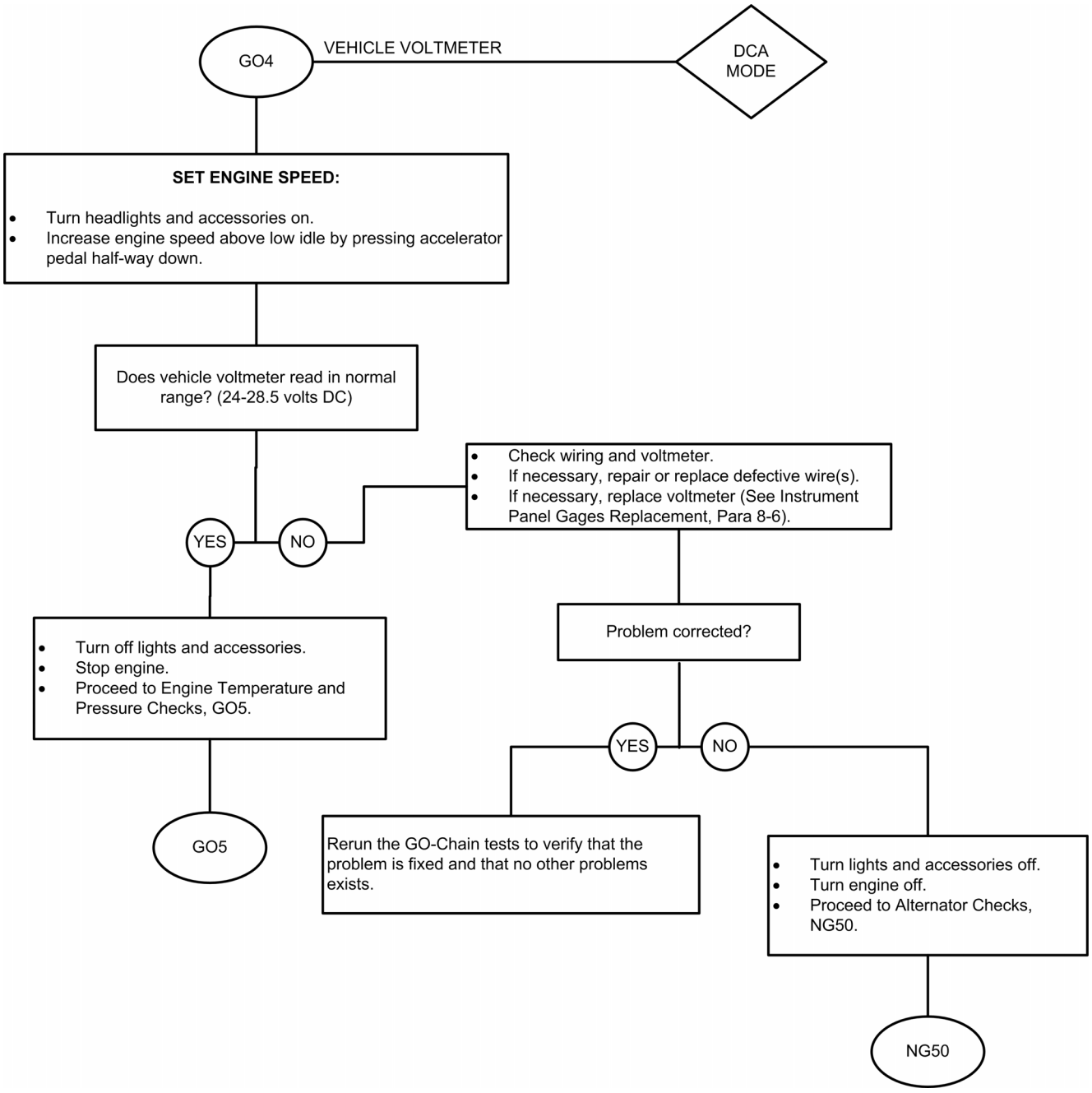
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



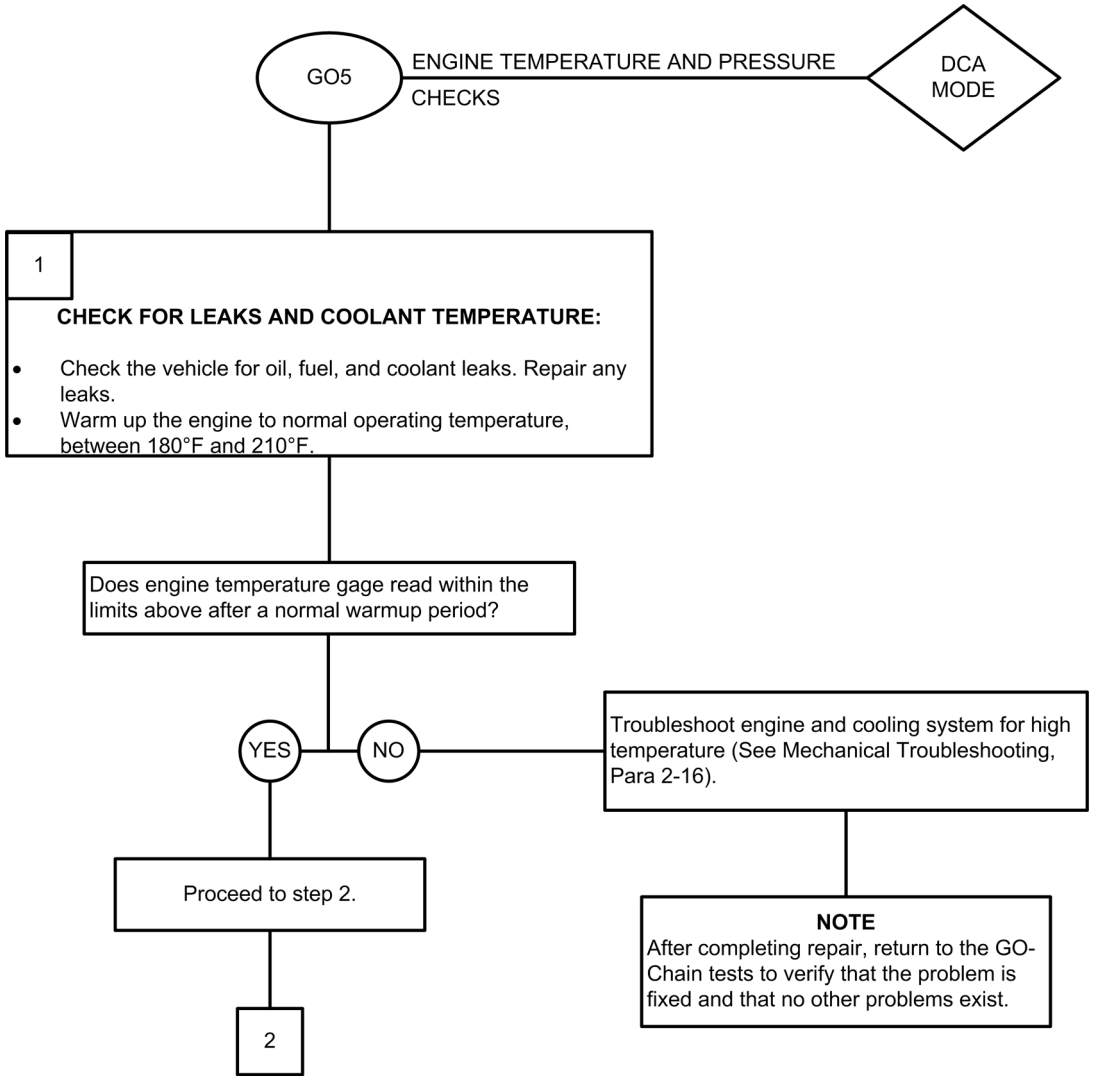

GO3
VEHICLE GAUGES
CHECK (Cont'd)
DCA
MODE
Does the oil pressure gauge read normal (40-90 psi at normal engine coolant temperature of 140-210°F)?
YES
NO
Stop vehicle engine.
Proceed to Engine Oil Pressure Test, GO8.
GO8
Does the voltmeter gauge read normal (24-28.5 volts DC)?
YES
NO
Proceed to Vehicle Voltmeter Test, G04.
G04
Proceed to step 4.
4

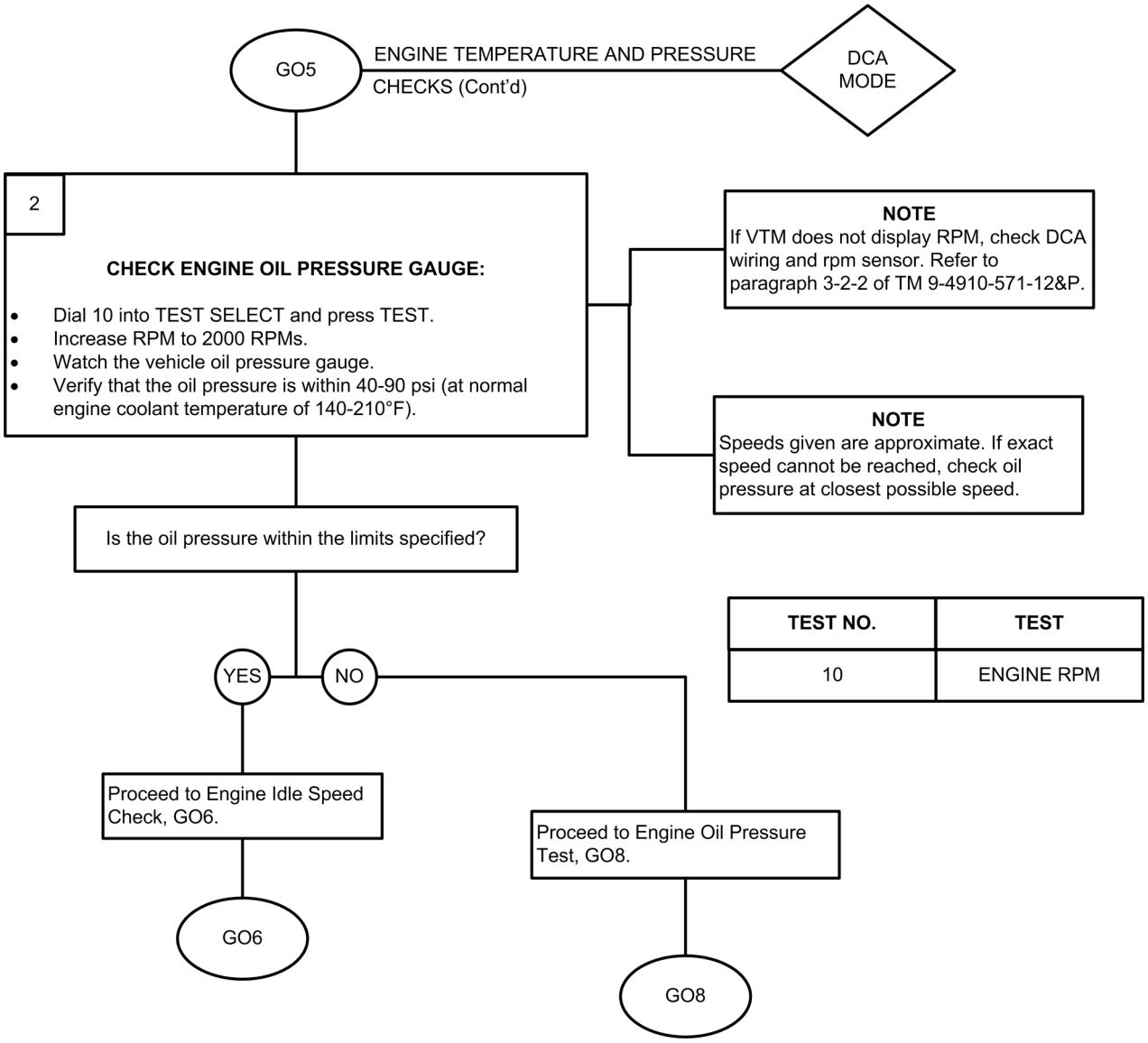
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



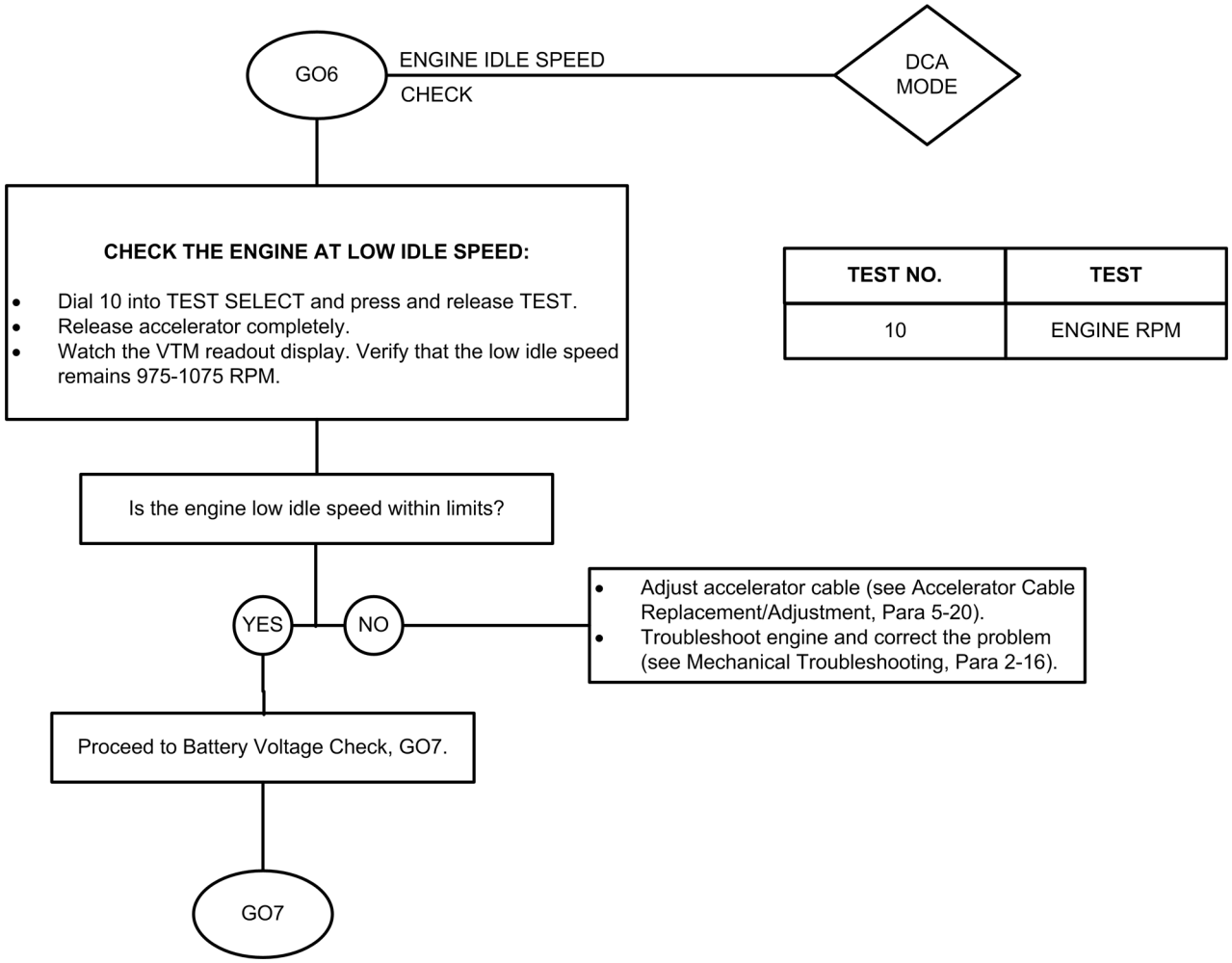

GO4
VEHICLE VOLTMETER
DCA MODE
SET ENGINE SPEED:
• Turn headlights and accessories on.
• Increase engine speed above low idle by pressing accelerator pedal half-way down.
Does vehicle voltmeter read in normal range? (24-28.5 volts DC)
YES
NO
• Check wiring and voltmeter.
• If necessary, repair or replace defective wire(s).
• If necessary, replace voltmeter (See Instrument Panel Gages Replacement, Para 8-6).
• Turn off lights and accessories.
• Stop engine.
• Proceed to Engine Temperature and Pressure Checks, GO5.
Problem corrected?
YES
NO
GO5
Rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exists.
• Turn lights and accessories off.
• Turn engine off.
• Proceed to Alternator Checks, NG50.
NG50

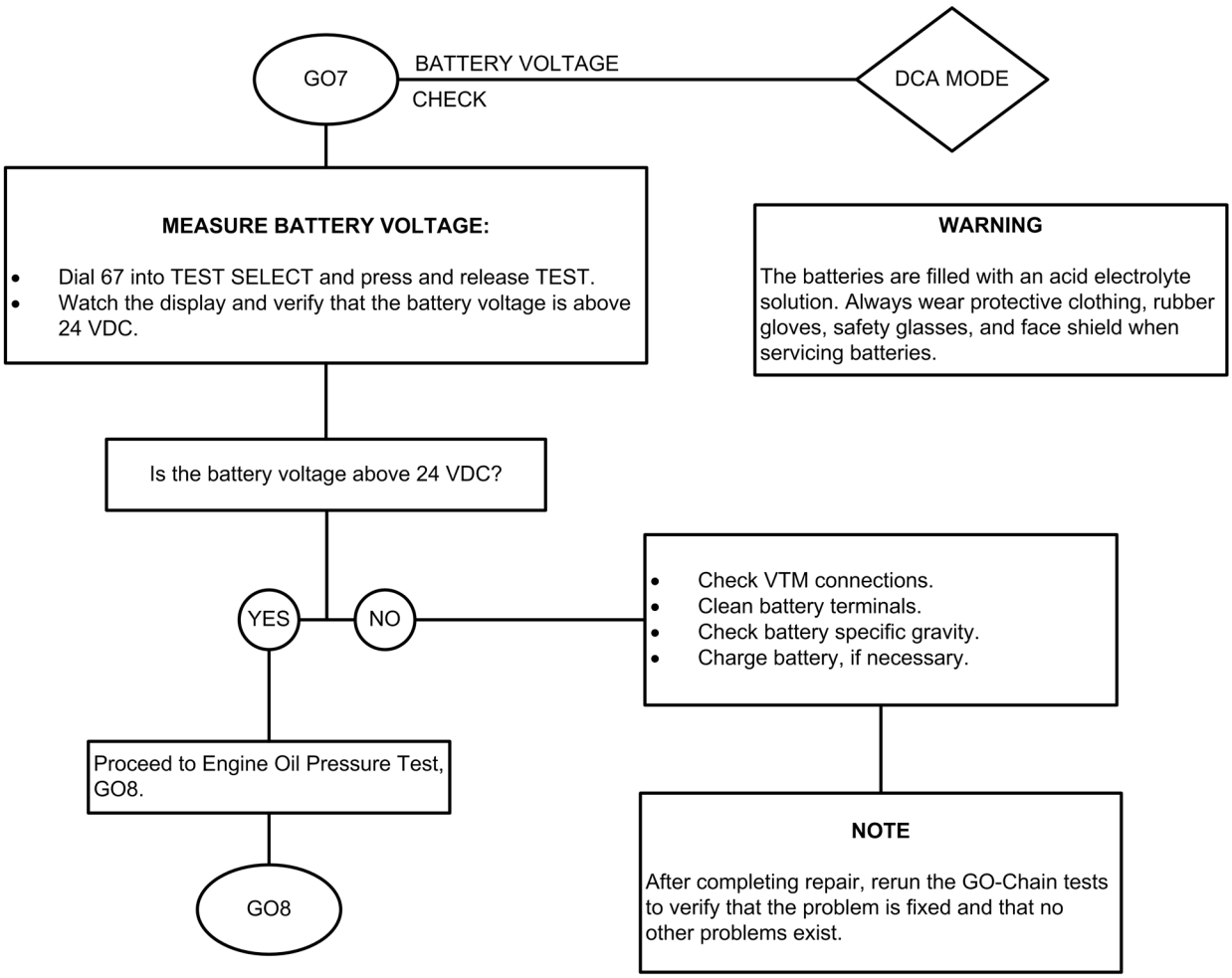
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



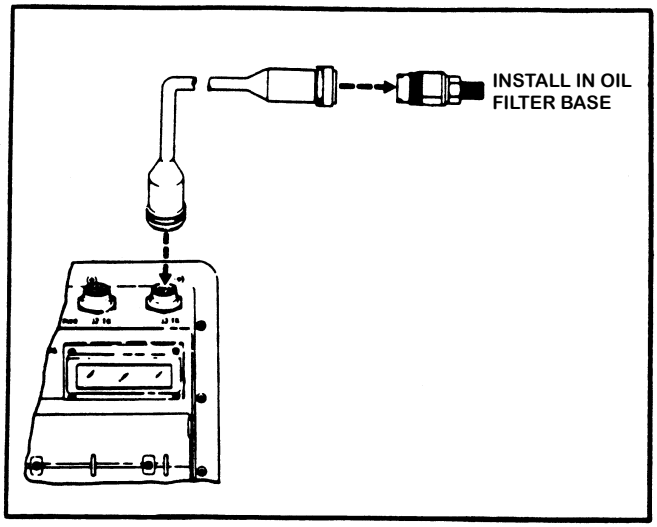

GO5
ENGINE TEMPERATURE AND PRESSURE
CHECKS (Cont'd)
DCA
MODE
2
CHECK ENGINE OIL PRESSURE GAUGE:
• Dial 10 into TEST SELECT and press TEST.
• Increase RPM to 2000 RPMs.
• Watch the vehicle oil pressure gauge.
• Verify that the oil pressure is within 40-90 psi (at normal engine coolant temperature of 140-210°F).
NOTE
If VTM does not display RPM, check DCA wiring and rpm sensor. Refer to paragraph 3-2-2 of TM 9-4910-571-12&P.
NOTE
Speeds given are approximate. If exact speed cannot be reached, check oil pressure at closest possible speed.
Is the oil pressure within the limits specified?
TEST NO.
TEST
10
ENGINE RPM
YES
NO
Proceed to Engine Idle Speed Check, GO6.
Proceed to Engine Oil Pressure Test, GO8.
GO6
GO8

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)




GO7
BATTERY VOLTAGE CHECK
DCA MODE
MEASURE BATTERY VOLTAGE:
• Dial 67 into TEST SELECT and press and release TEST.
• Watch the display and verify that the battery voltage is above 24 VDC.
WARNING
The batteries are filled with an acid electrolyte solution. Always wear protective clothing, rubber gloves, safety glasses, and face shield when servicing batteries.
Is the battery voltage above 24 VDC?
YES
NO
• Check VTM connections.
• Clean battery terminals.
• Check battery specific gravity.
• Charge battery, if necessary.
Proceed to Engine Oil Pressure Test, GO8.
GO8
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



GO8 — ENGINE OIL PRESSURE TEST — DCA-TK MODE

1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug in oil filter head.
- Install pressure transducer TK item 17 (blue strip).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

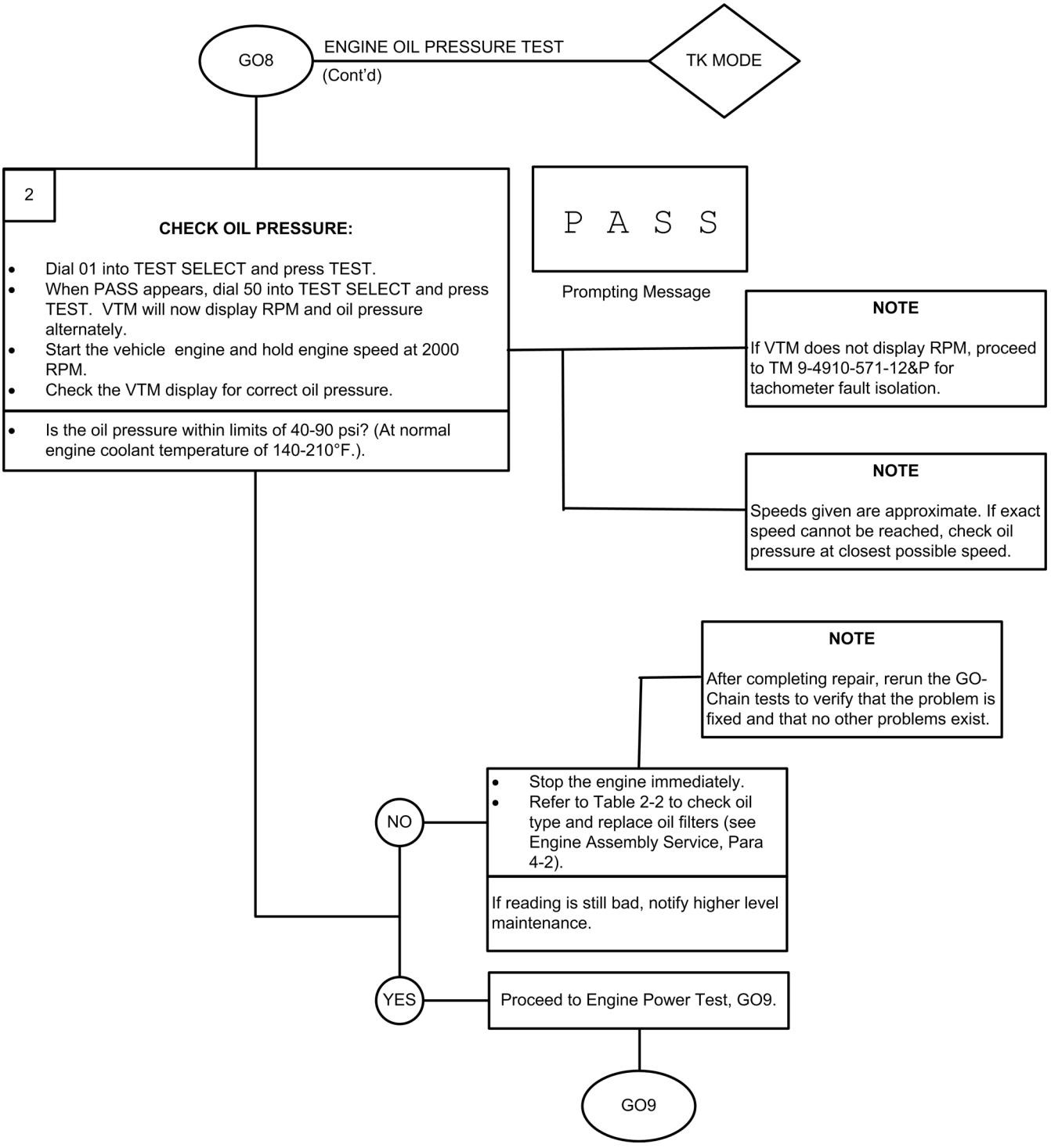
C A L

Prompting Message

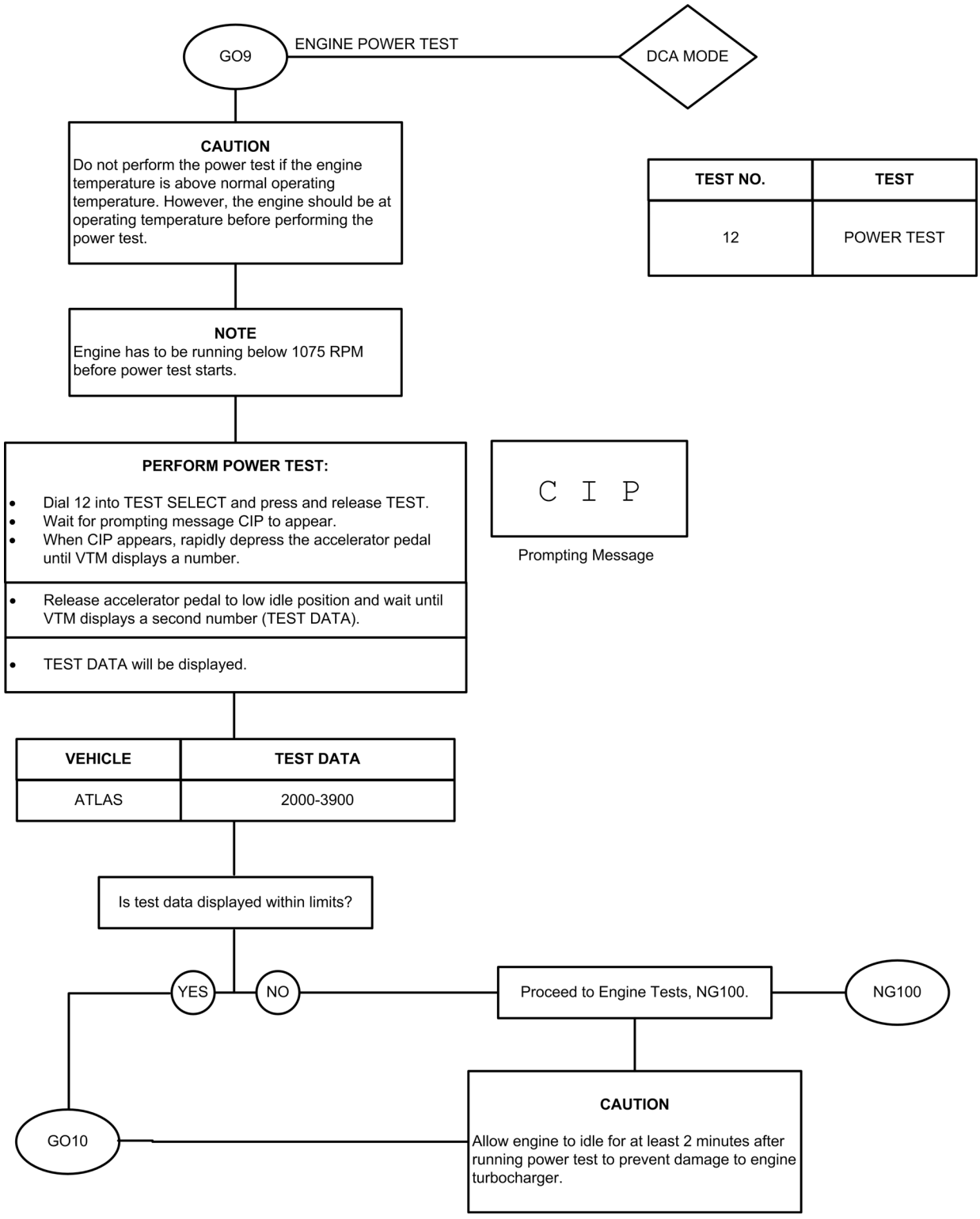
- Is the offset value within the limits -150 to +150?

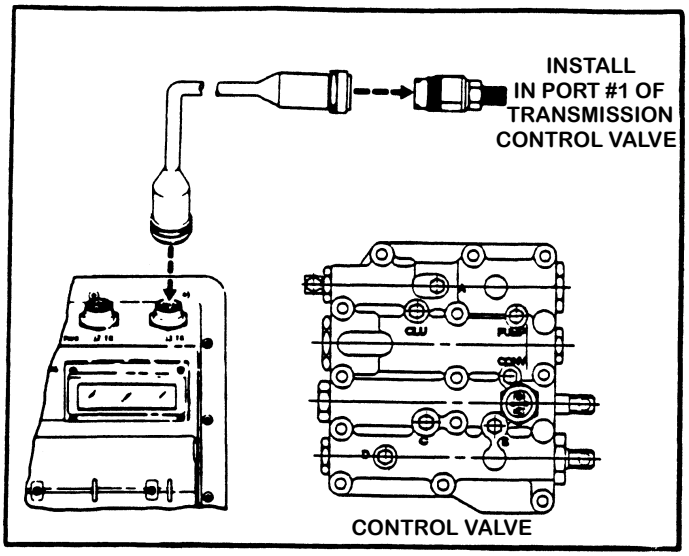
YES — NO — Proceed to TM 9-4910-571-12&P for offset fault isolation.

2


GO8
ENGINE OIL PRESSURE TEST
(Cont'd)
TK MODE
2
CHECK OIL PRESSURE:
• Dial 01 into TEST SELECT and press TEST.
• When PASS appears, dial 50 into TEST SELECT and press TEST. VTM will now display RPM and oil pressure alternately.
• Start the vehicle engine and hold engine speed at 2000 RPM.
• Check the VTM display for correct oil pressure.
• Is the oil pressure within limits of 40-90 psi? (At normal engine coolant temperature of 140-210°F.).
P A S S
Prompting Message
NOTE
If VTM does not display RPM, proceed to TM 9-4910-571-12&P for tachometer fault isolation.
NOTE
Speeds given are approximate. If exact speed cannot be reached, check oil pressure at closest possible speed.
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.
NO
• Stop the engine immediately.
• Refer to Table 2-2 to check oil type and replace oil filters (see Engine Assembly Service, Para 4-2).
If reading is still bad, notify higher level maintenance.
YES
Proceed to Engine Power Test, GO9.
GO9

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)





GO10 — TRANSMISSION OIL PRESSURE TEST — DCA-TK MODE

1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #1 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

C A L

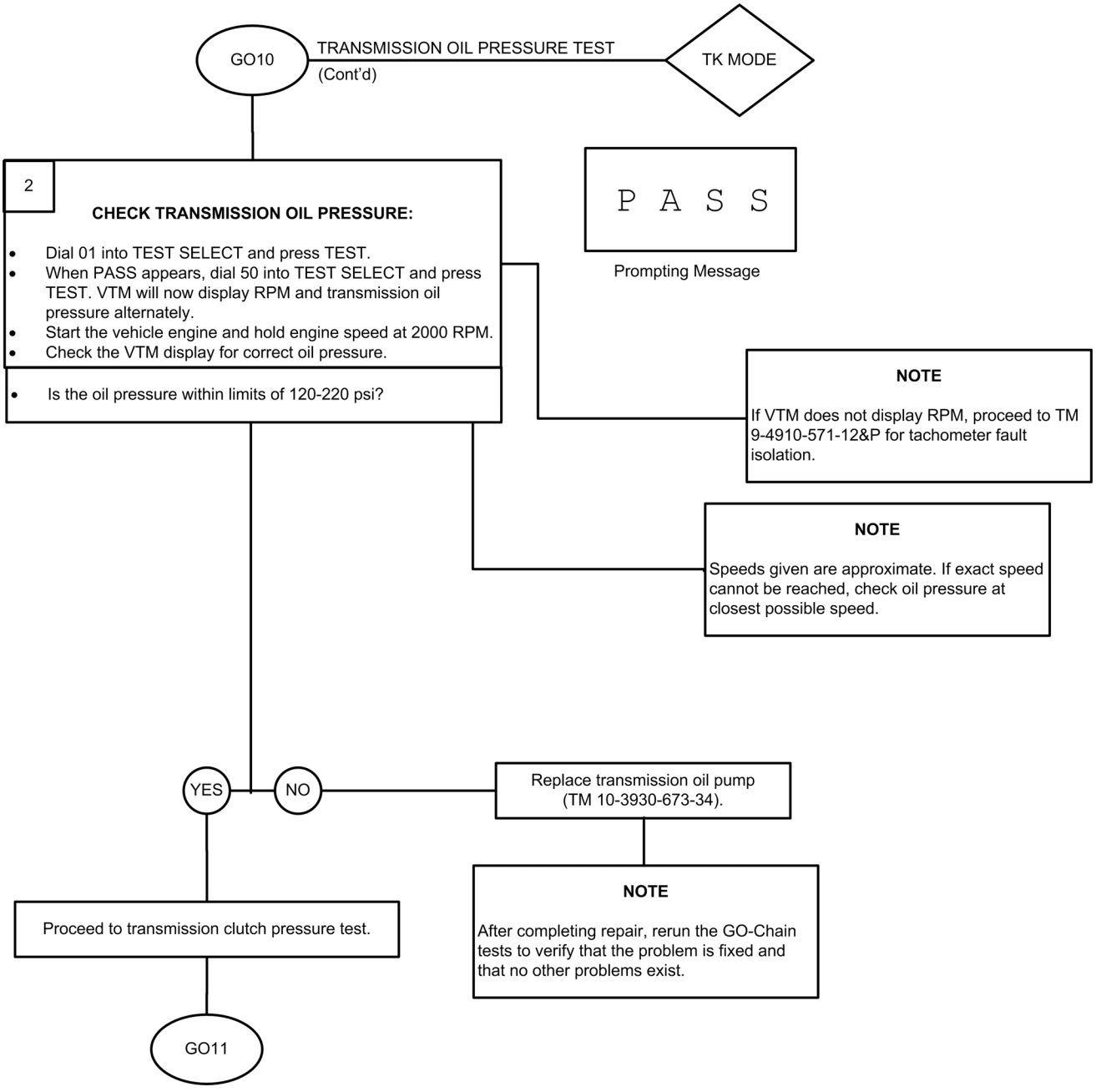
Prompting Message

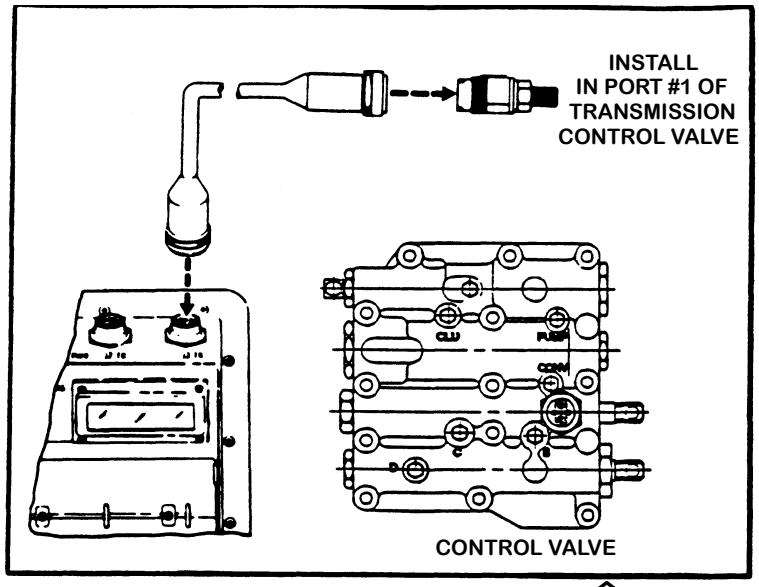
- Is the offset value within the limits -150 to +150?

YES — NO — Proceed to TM 9-4910-571-12&P for offset fault isolation.

2

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)





GO11 — TRANSMISSION CLUTCH PRESSURE TEST — DCA-TK MODE

1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #2 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

C A L

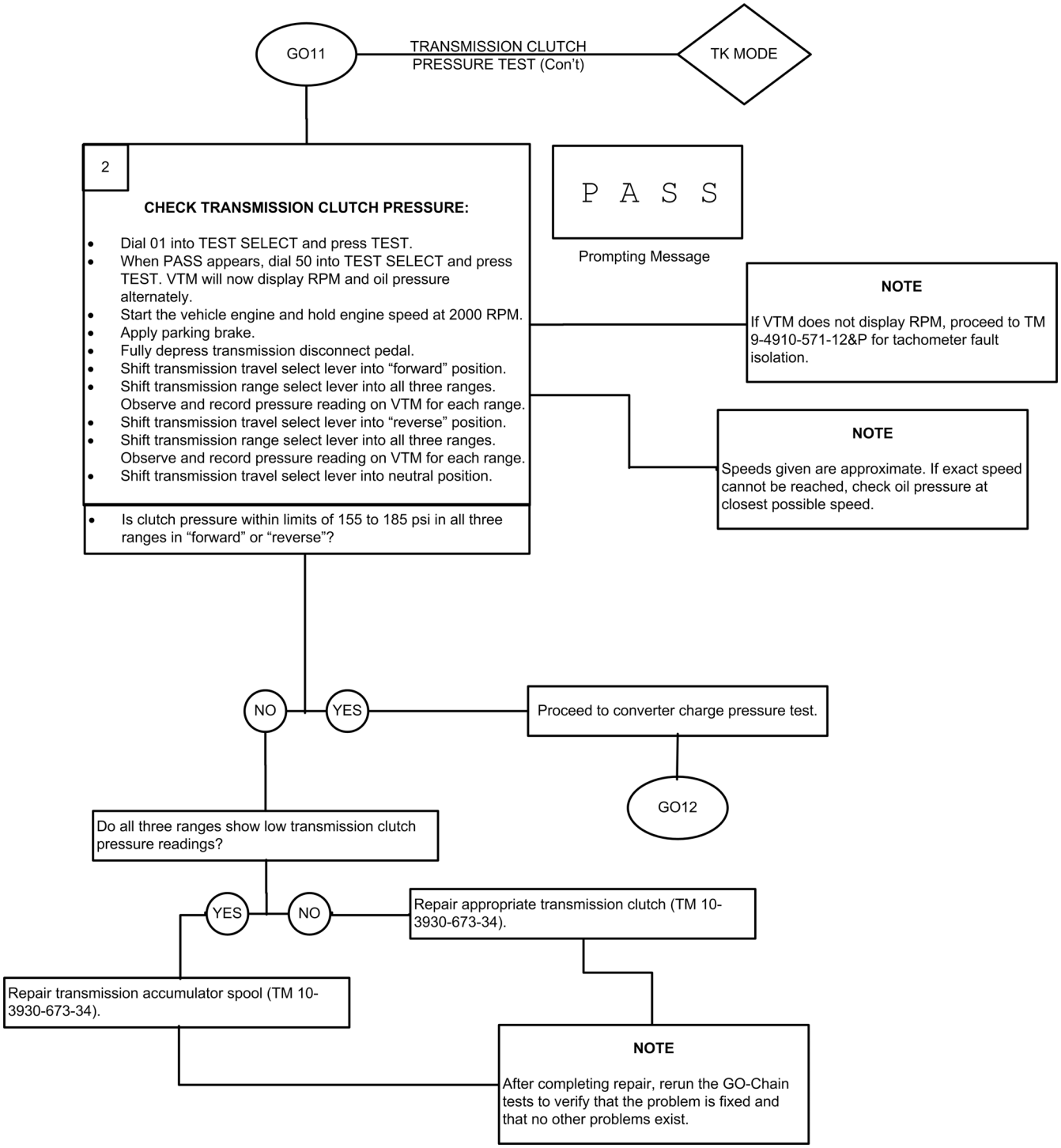
Prompting Message

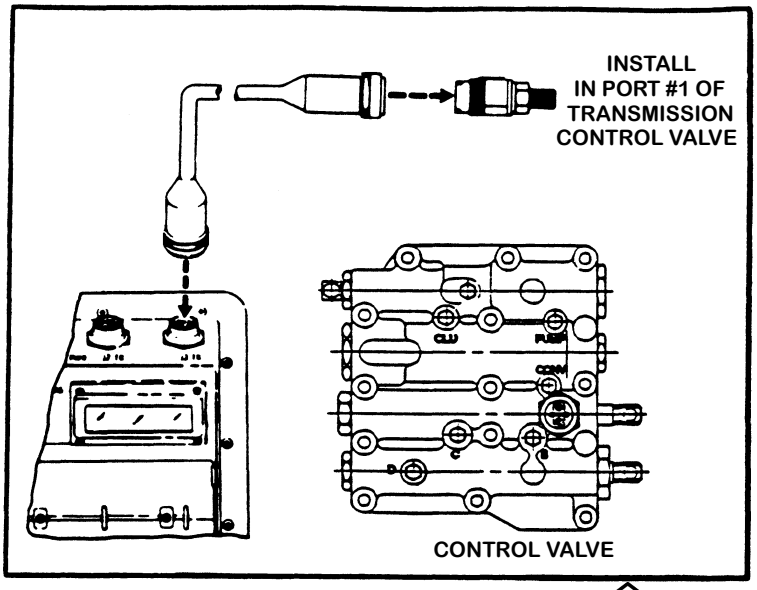
- Is the offset value within the limits -150 to +150?

YES — NO — Proceed to TM 9-4910-571-12&P for offset fault isolation.

2

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)





GO12

TRANSMISSION CONVERTER CHARGE PRESSURE TEST

DCA-TK MODE

1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #3 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

C A L

Prompting Message

- Is the offset value within the limits -150 to +150?

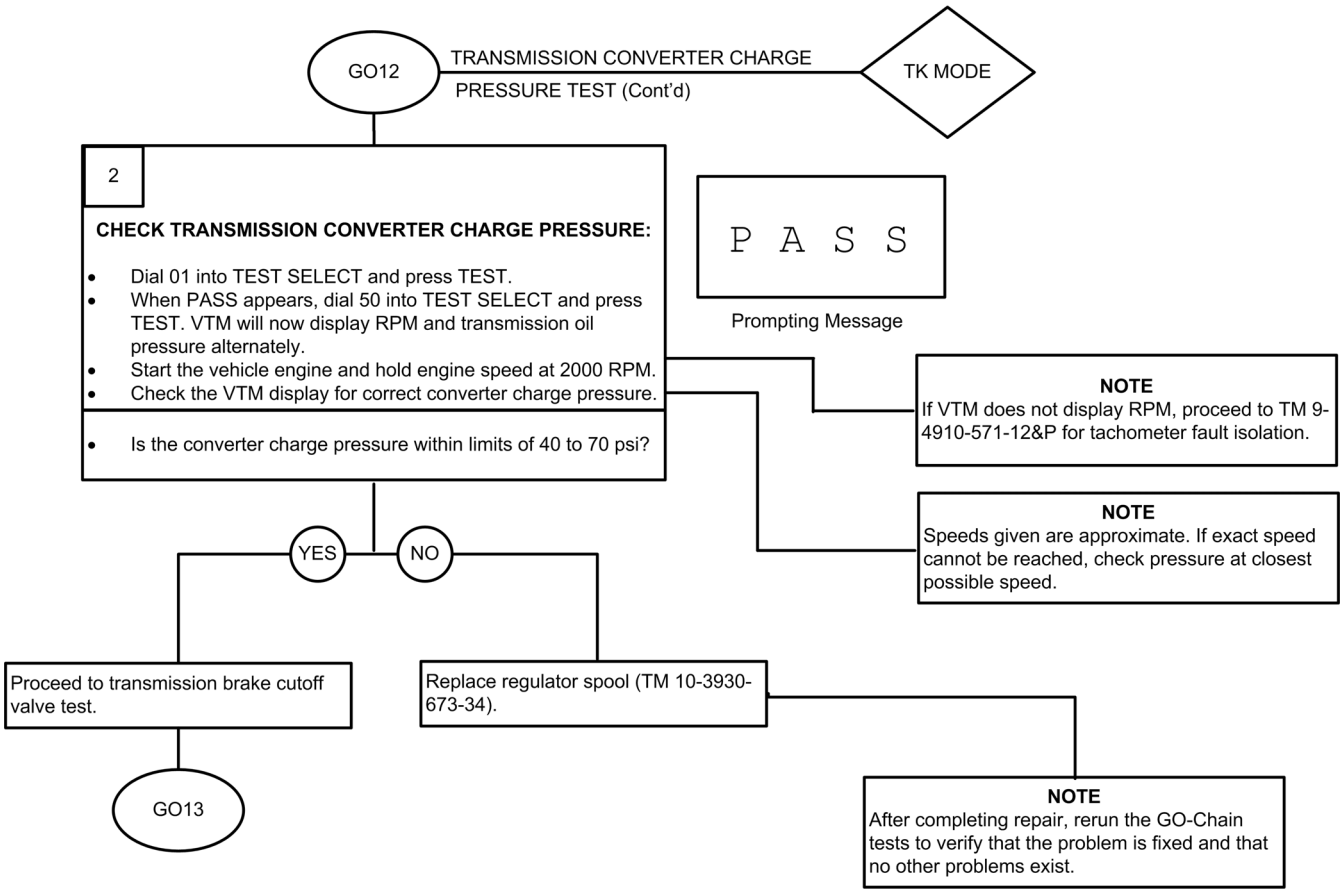
YES

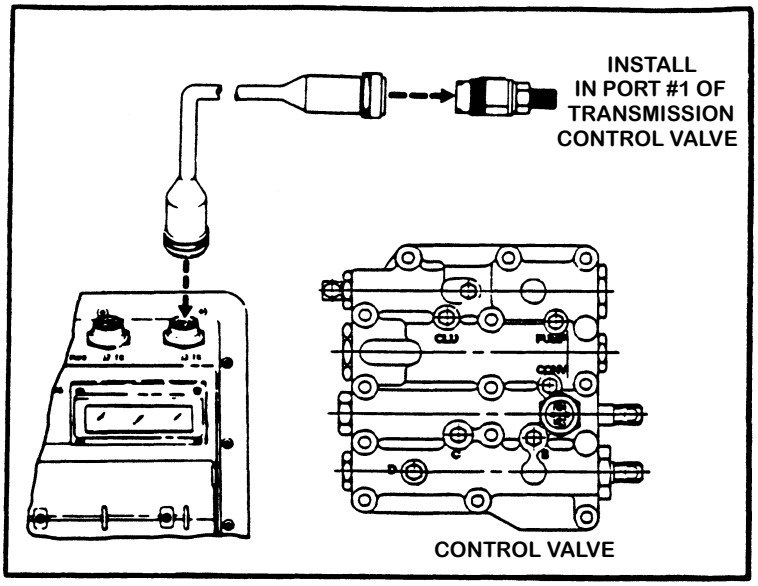
NO

Proceed to TM 9-4910-571-12&P for offset fault isolation.

2

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)





GO13

TRANSMISSION BRAKE CUTOFF VALVE PRESSURE TEST

DCA-TK MODE

1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #2 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

C A L

Prompting Message

- Is the offset value within the limits -150 to +150?

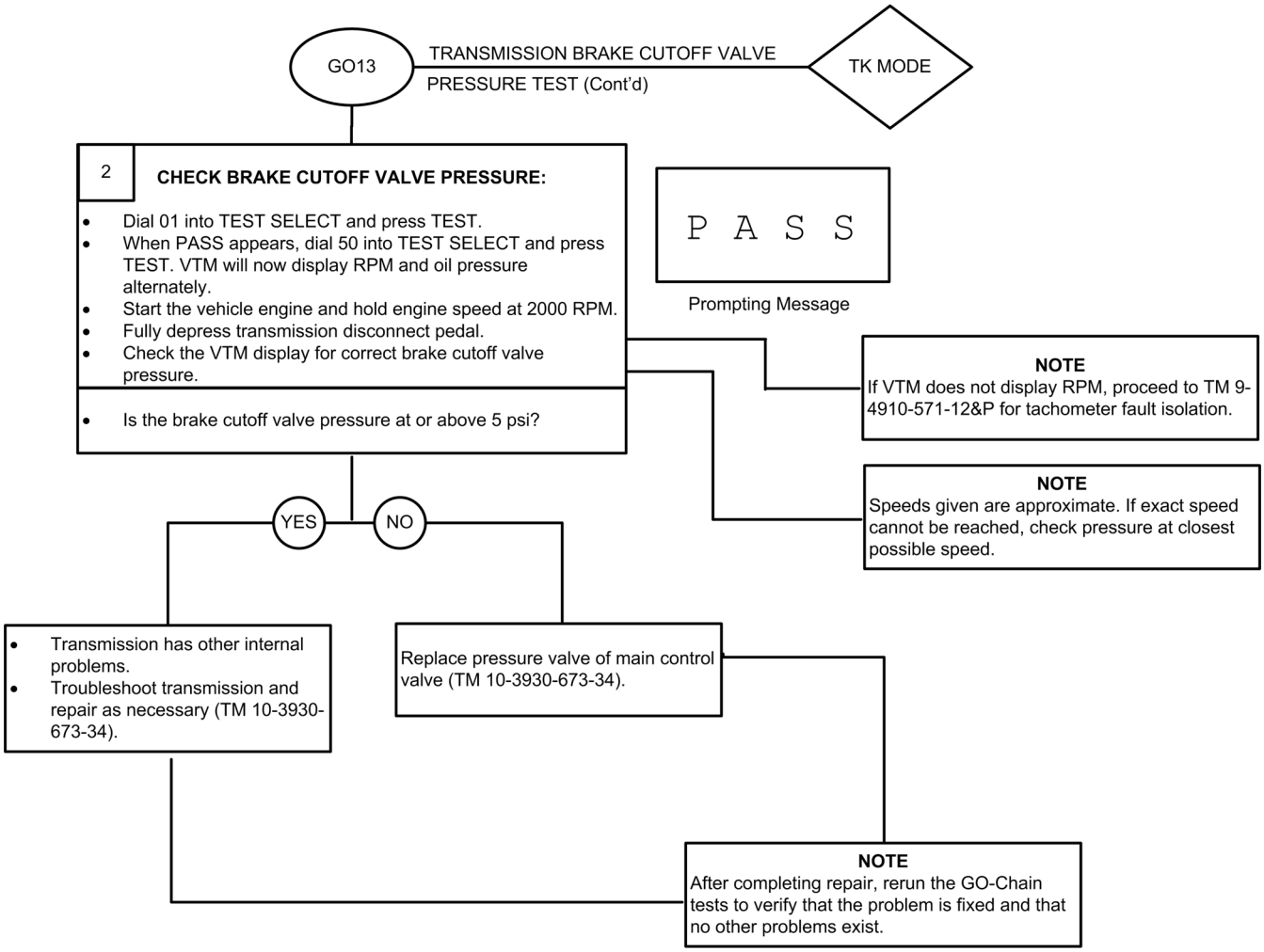
YES

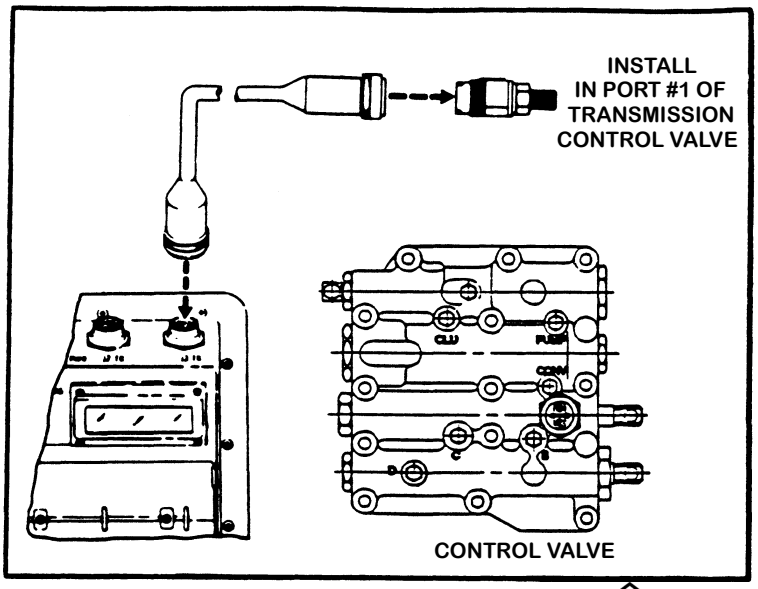
NO

Proceed to TM 9-4910-571-12&P for offset fault isolation.

2

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)





GO14

FUEL RETURN LINE
PRESSURE TEST

DCA-TK
MODE

1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug in elbow at fuel return port on fuel tank.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

TEST NO.	TEST
01	INTERLEAVE
50	0-20 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

C A L

Prompting Message

- Is the offset value within the limits -150 to +150?

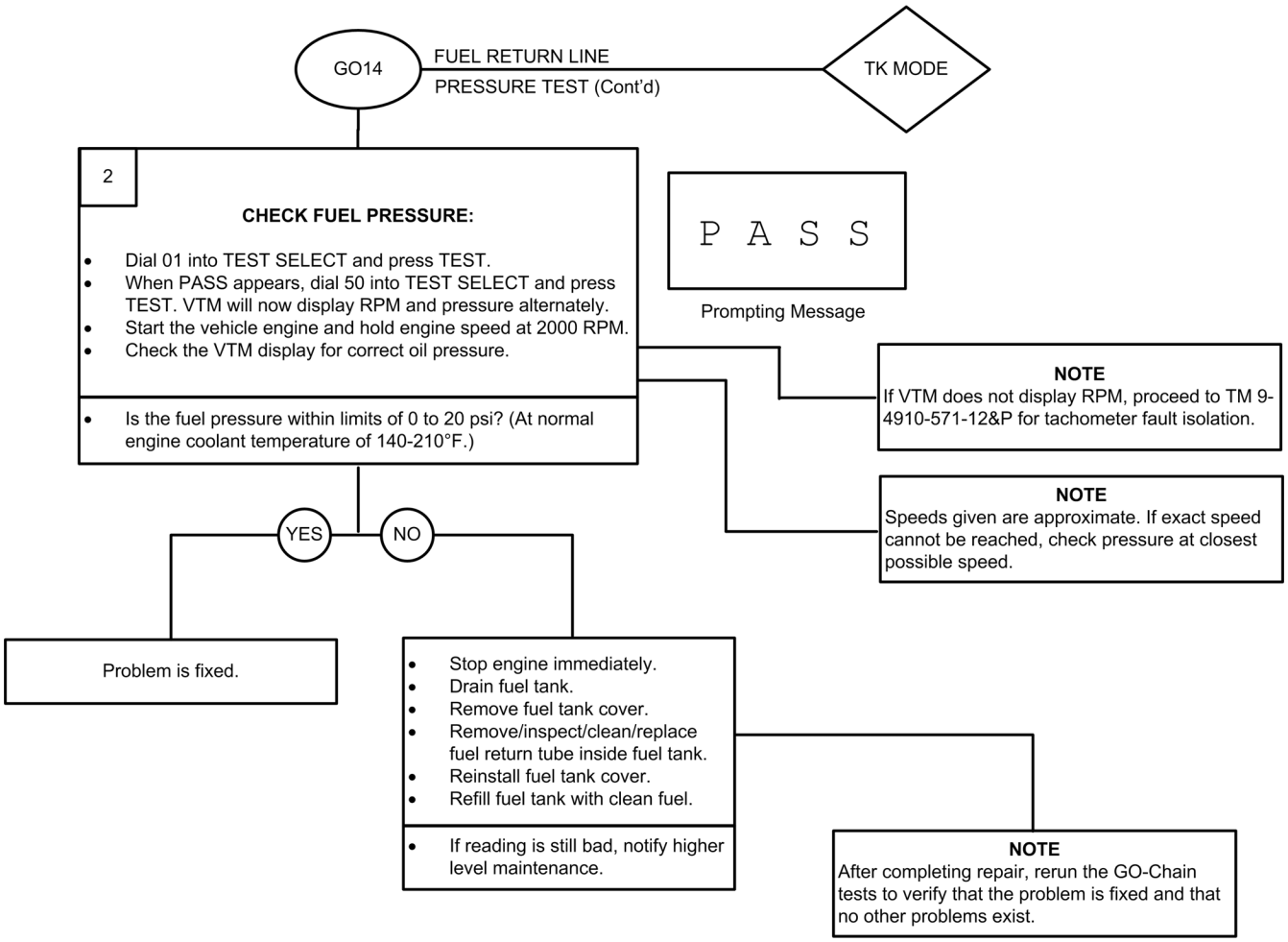
YES

NO

Proceed to TM 9-4910-571-12&P for offset fault isolation.

2

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)

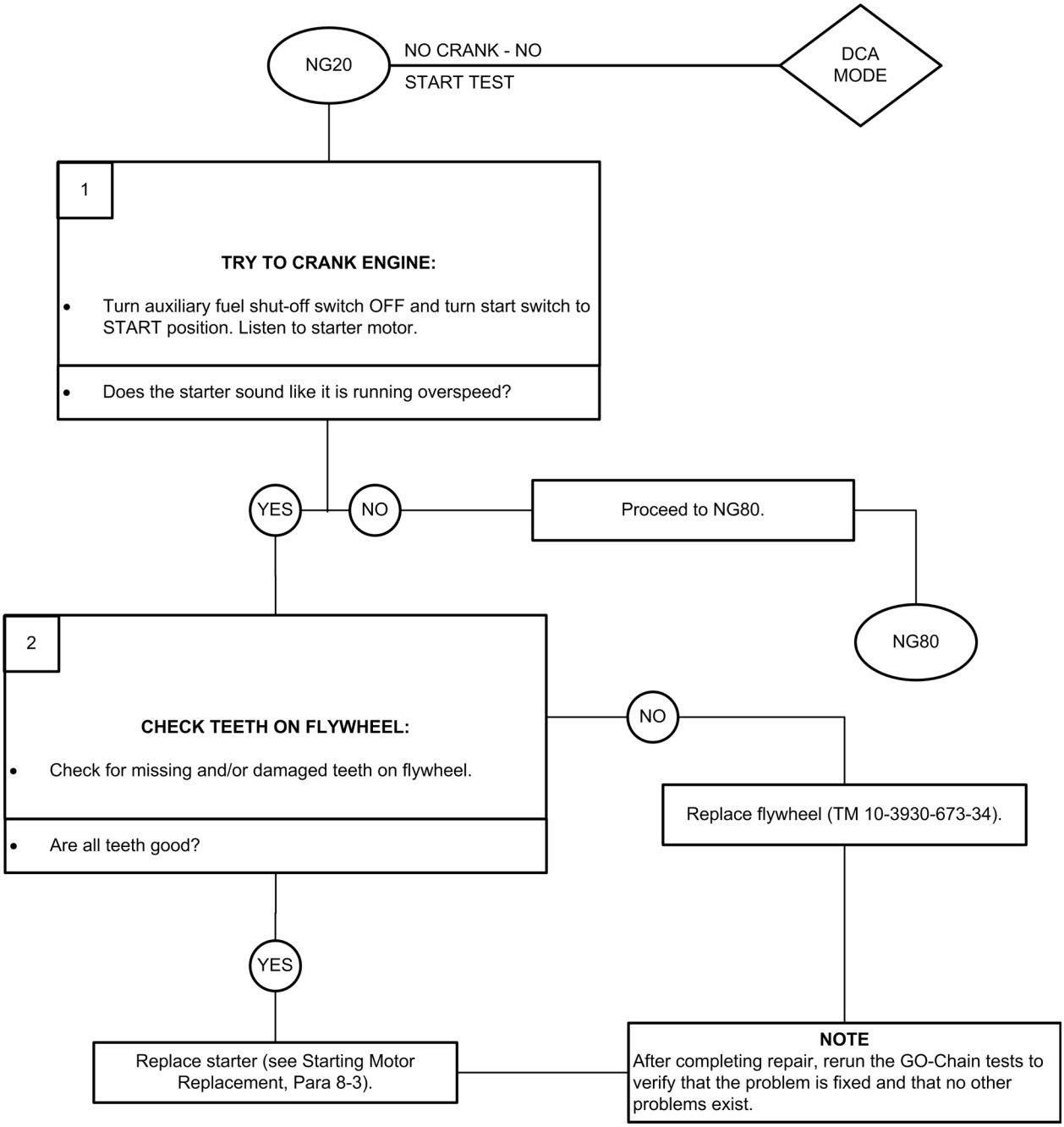


STE/ICE-R NO-GO-Chain Testing Sequence

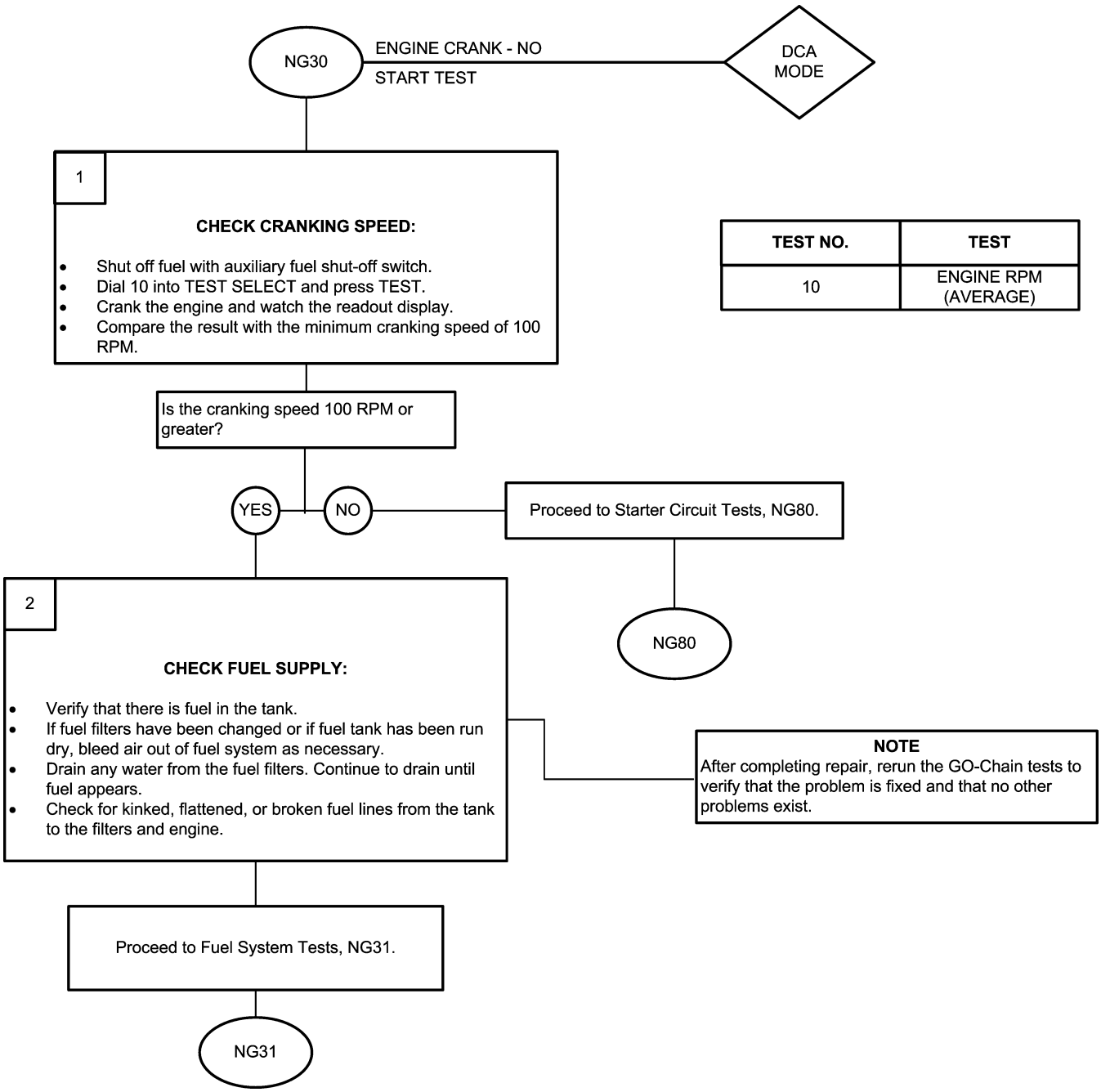
The following NO-GO-Chain tests are made using the vehicle DCA connector. Each test is referenced from the GO-Chain testing sequence. Do not perform any of these test unless you are instructed to by the GO-Chain testing. All testing is referenced by the NG (NO-GO) number. Refer to the following table for the NO-GO test index.

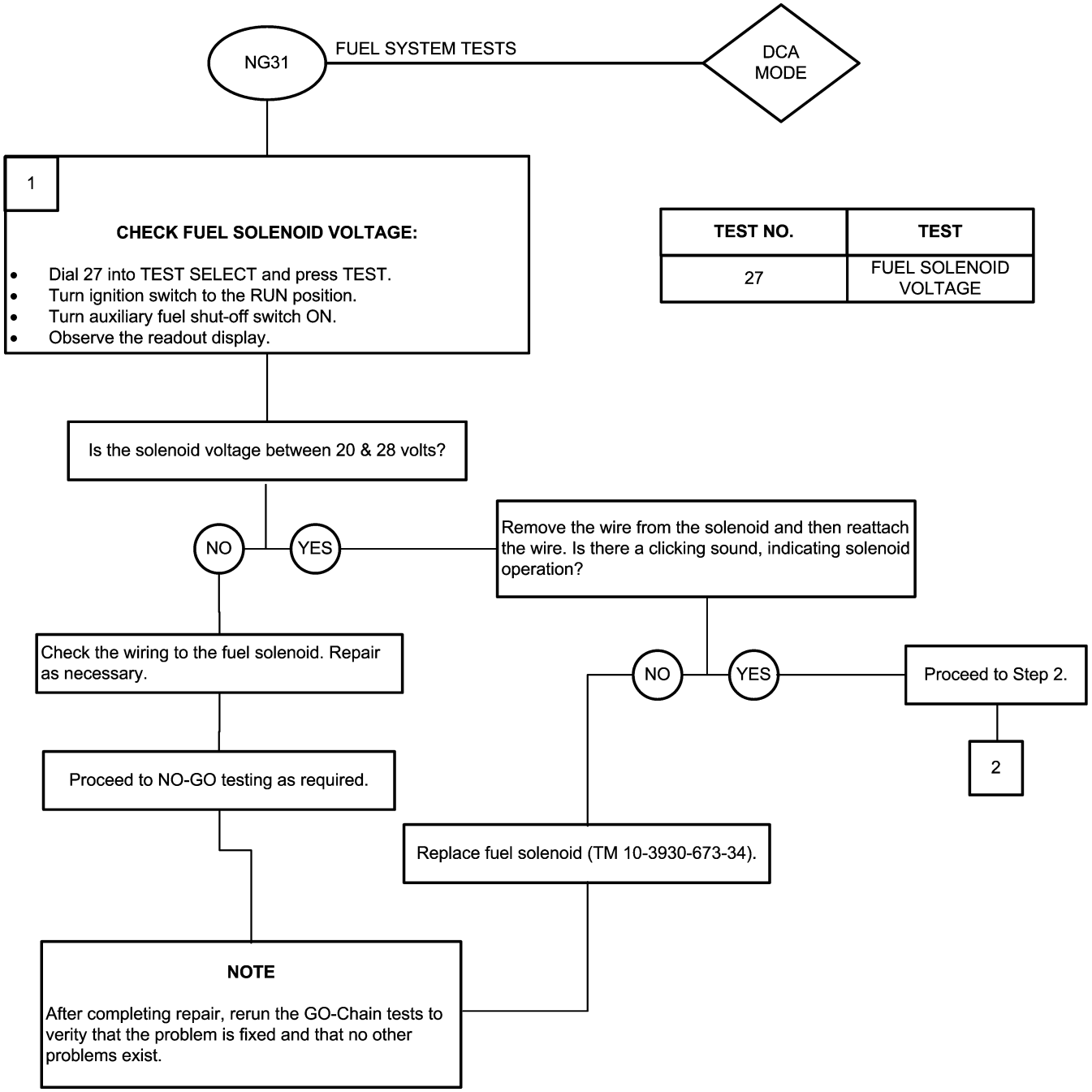
For normal readings, see vehicle test card, page 2-912.

GO TEST NUMBER	MODE	TEST TITLE	PAGE NUMBER
NG20	DCA	No Crank-No Start Test	2-893
NG30	DCA	Engine Crank-No Start Test	2-894
NG31	DCA	Fuel System Tests	2-895
NG50	DCA	Alternator Tests	2-898
NG80	DCA	Starter Circuit Tests	2-900
NG81	DCA	Battery Tests	2-904
NG90	DCA	Starter Tests	2-907
NG100	DCA	Engine Tests	2-909
NG110	DCA	Starter Current Test	2-911

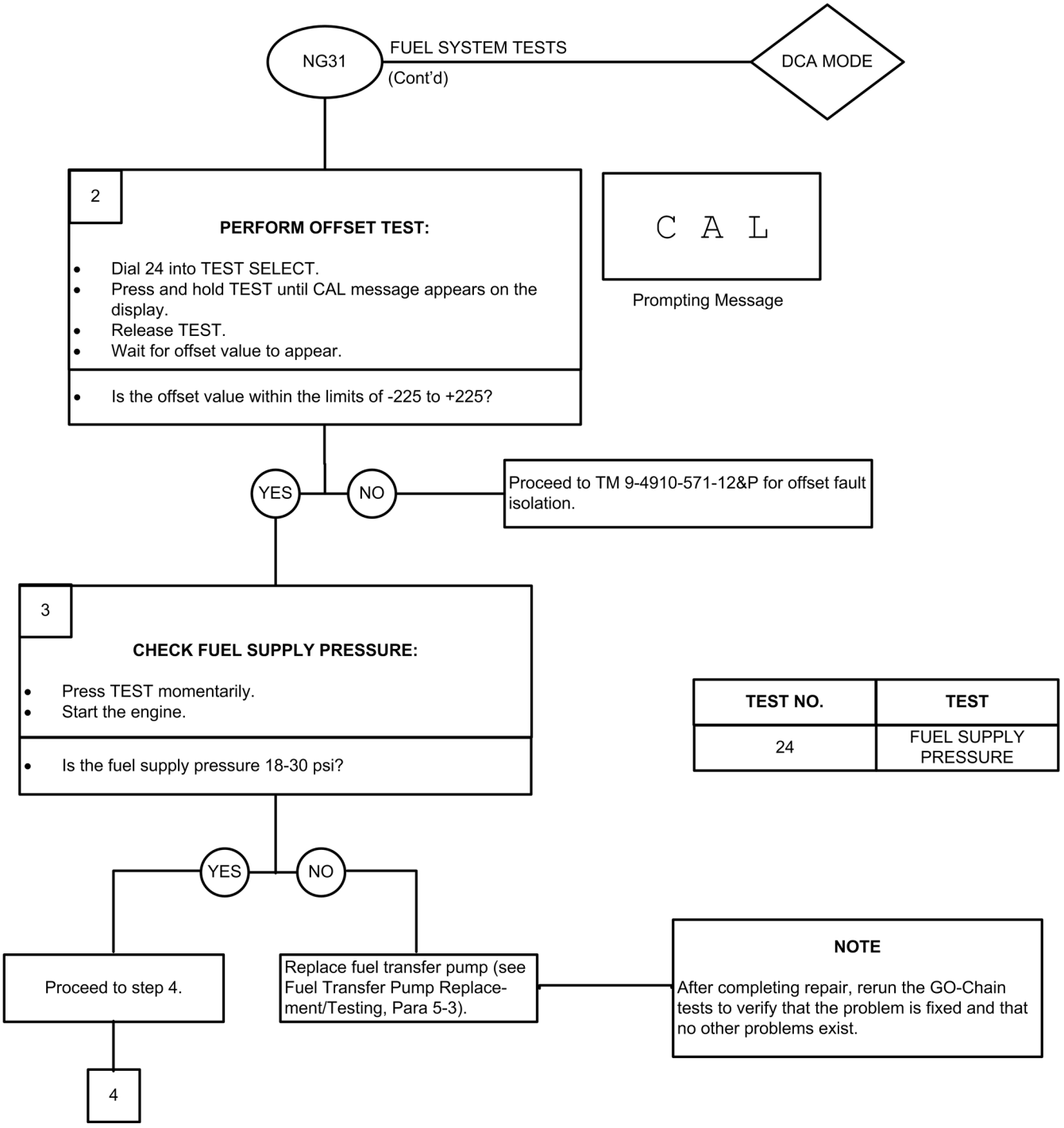

NG20
NO CRANK - NO START TEST
DCA MODE
1
TRY TO CRANK ENGINE:
• Turn auxiliary fuel shut-off switch OFF and turn start switch to START position. Listen to starter motor.
• Does the starter sound like it is running overspeed?
YES
NO
Proceed to NG80.
NG80
2
CHECK TEETH ON FLYWHEEL:
• Check for missing and/or damaged teeth on flywheel.
• Are all teeth good?
NO
Replace flywheel (TM 10-3930-673-34).
YES
Replace starter (see Starting Motor Replacement, Para 8-3).
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.

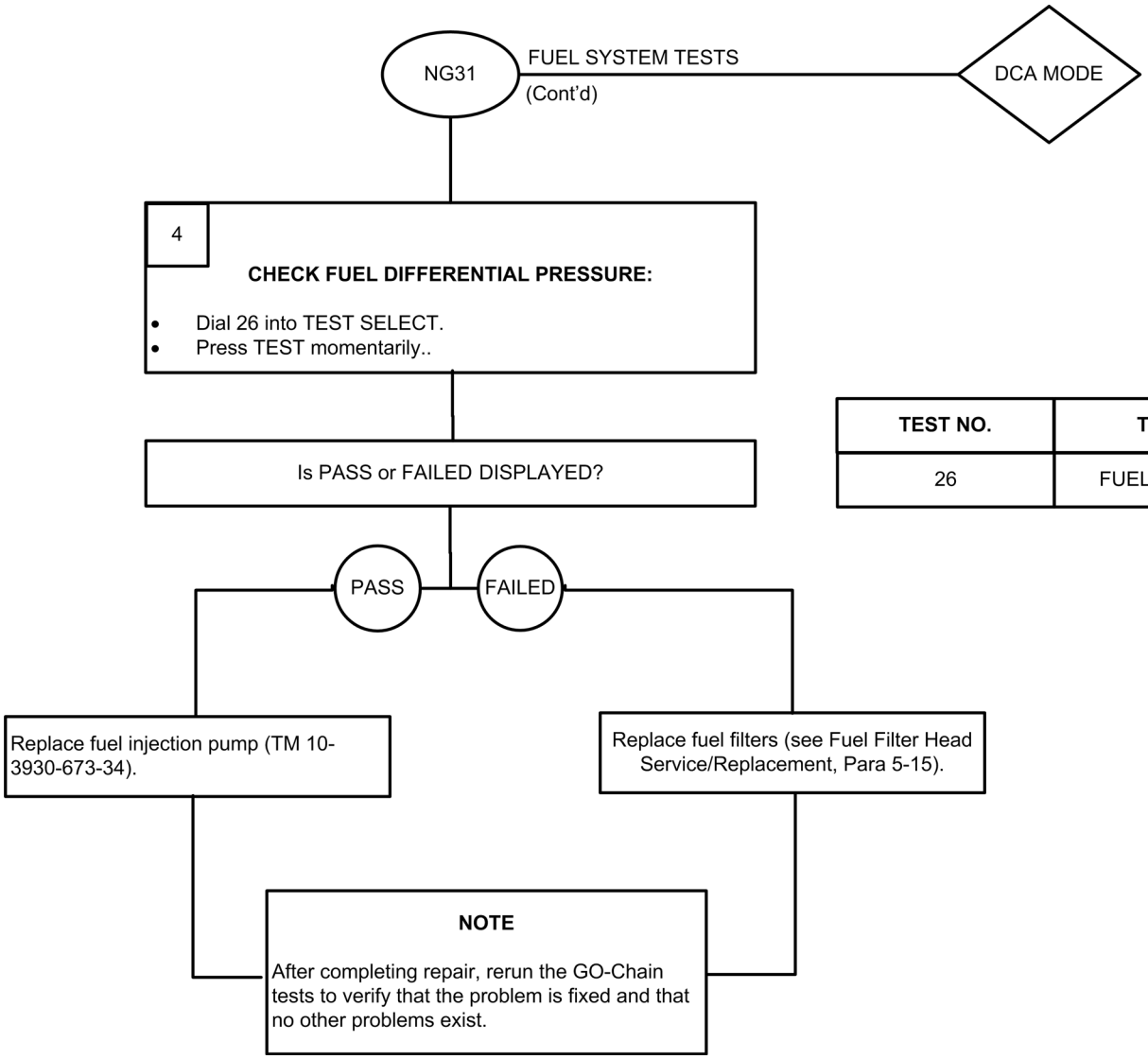
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)




NG31
FUEL SYSTEM TESTS
DCA MODE
1
CHECK FUEL SOLENOID VOLTAGE:
• Dial 27 into TEST SELECT and press TEST.
• Turn ignition switch to the RUN position.
• Turn auxiliary fuel shut-off switch ON.
• Observe the readout display.
TEST NO.
TEST
27
FUEL SOLENOID VOLTAGE
Is the solenoid voltage between 20 & 28 volts?
NO
YES
Remove the wire from the solenoid and then reattach the wire. Is there a clicking sound, indicating solenoid operation?
Check the wiring to the fuel solenoid. Repair as necessary.
NO
YES
Proceed to Step 2.
2
Proceed to NO-GO testing as required.
Replace fuel solenoid (TM 10-3930-673-34).
NOTE
After completing repair, rerun the GO-Chain tests to verity that the problem is fixed and that no other problems exist.

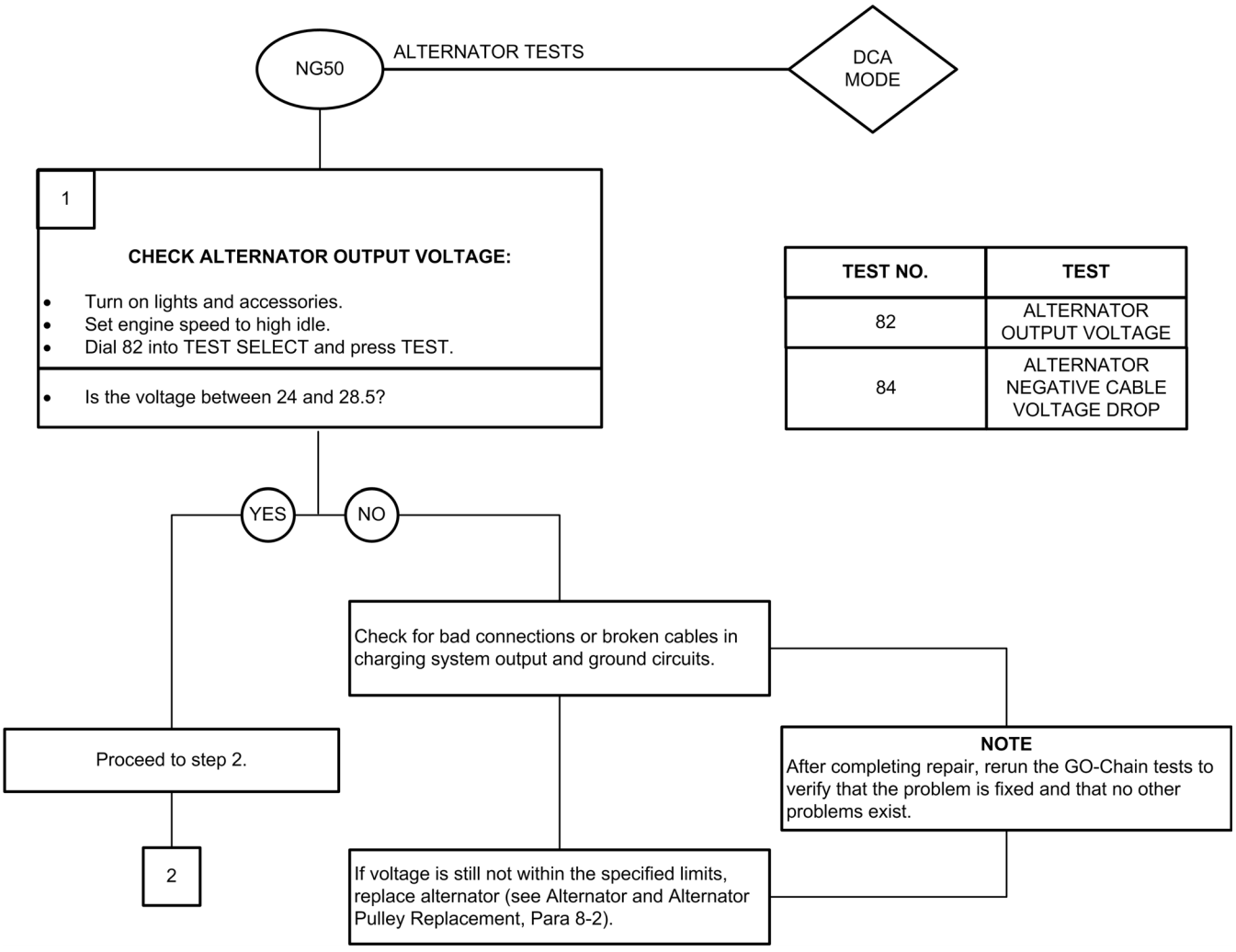
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)

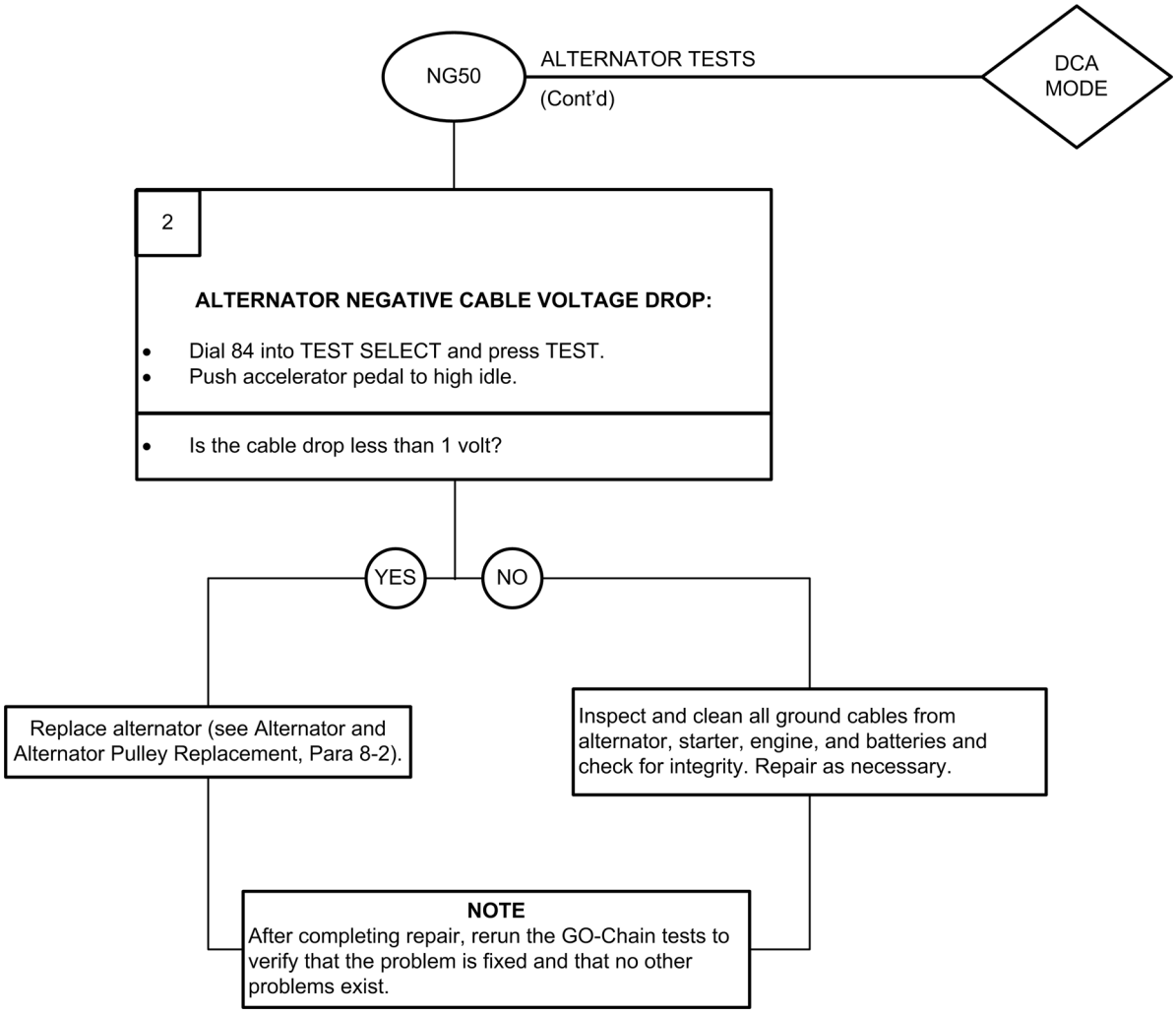




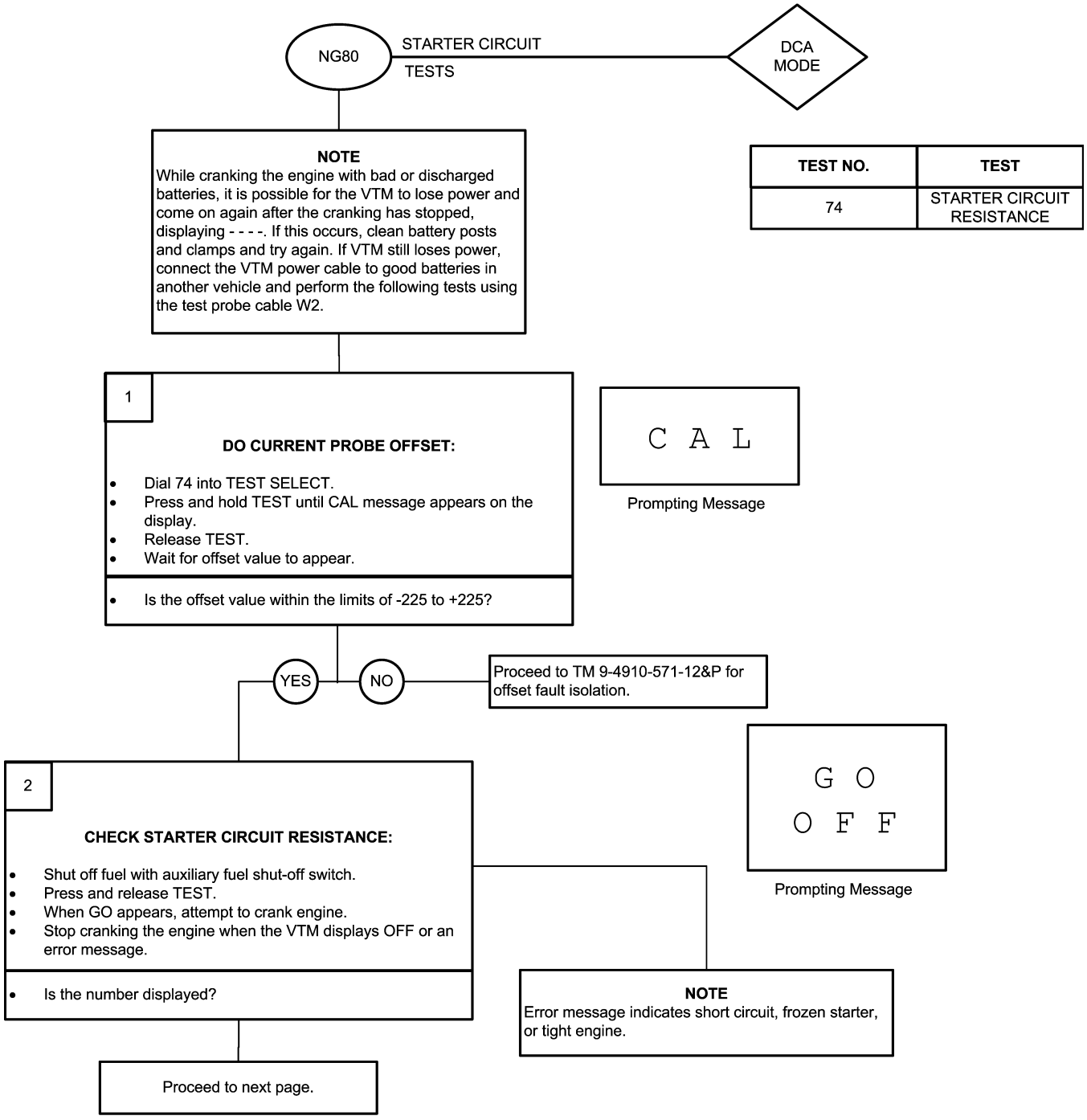
TEST NO.	TEST
26	FUEL FILTER

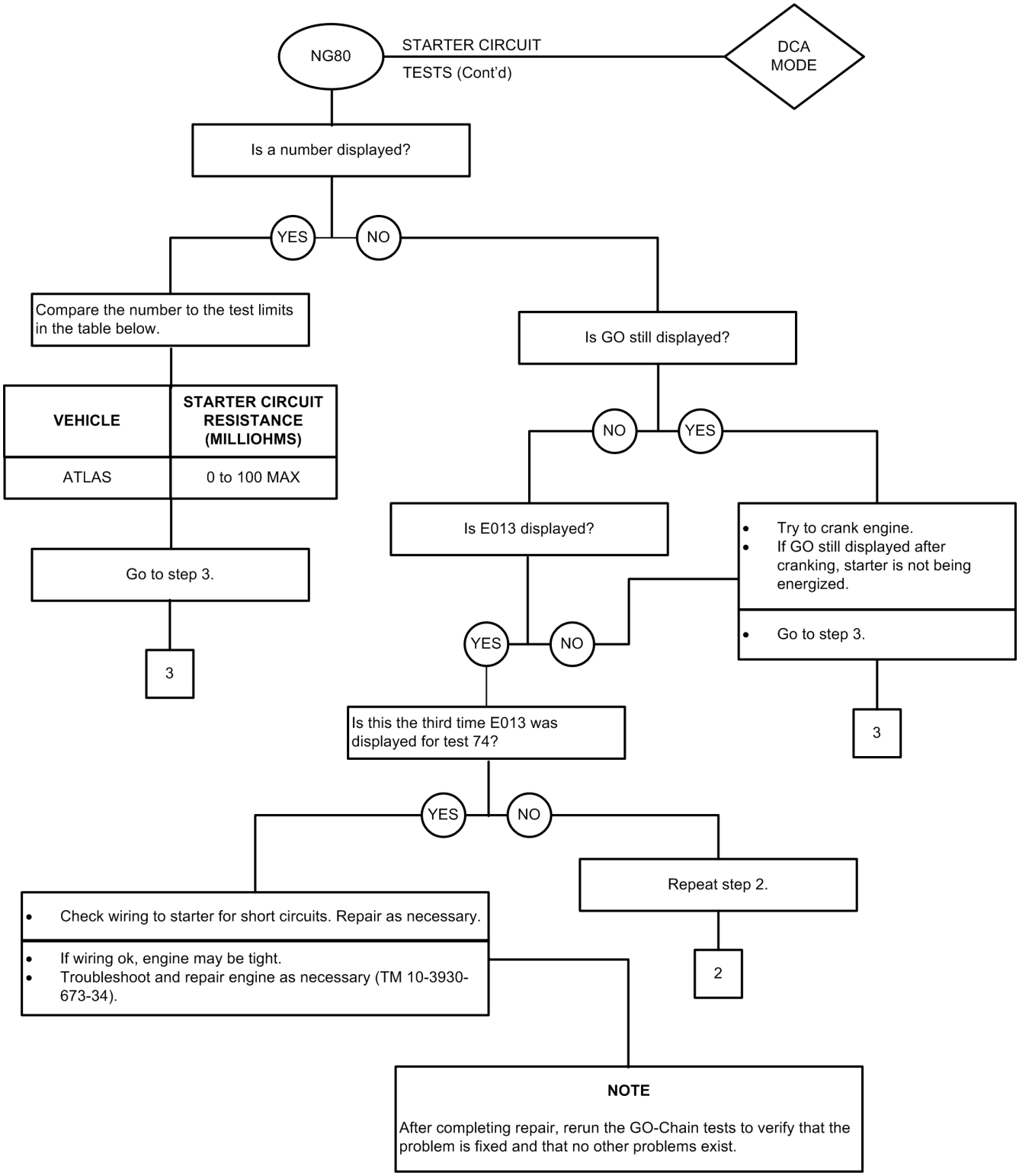
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



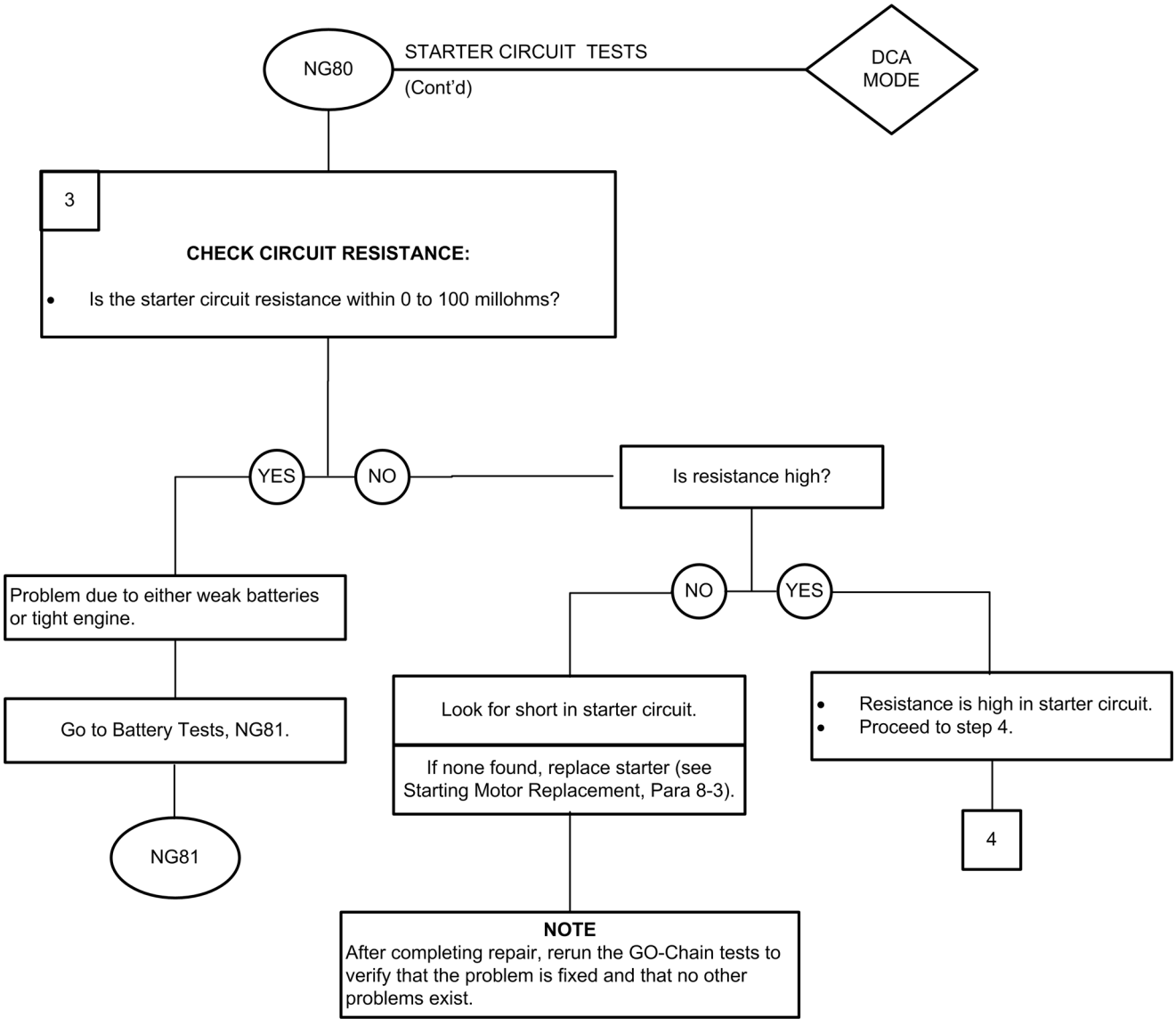

NG50
ALTERNATOR TESTS
(Cont'd)
DCA MODE
2
ALTERNATOR NEGATIVE CABLE VOLTAGE DROP:
• Dial 84 into TEST SELECT and press TEST.
• Push accelerator pedal to high idle.
• Is the cable drop less than 1 volt?
YES
NO
Replace alternator (see Alternator and Alternator Pulley Replacement, Para 8-2).
Inspect and clean all ground cables from alternator, starter, engine, and batteries and check for integrity. Repair as necessary.
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.

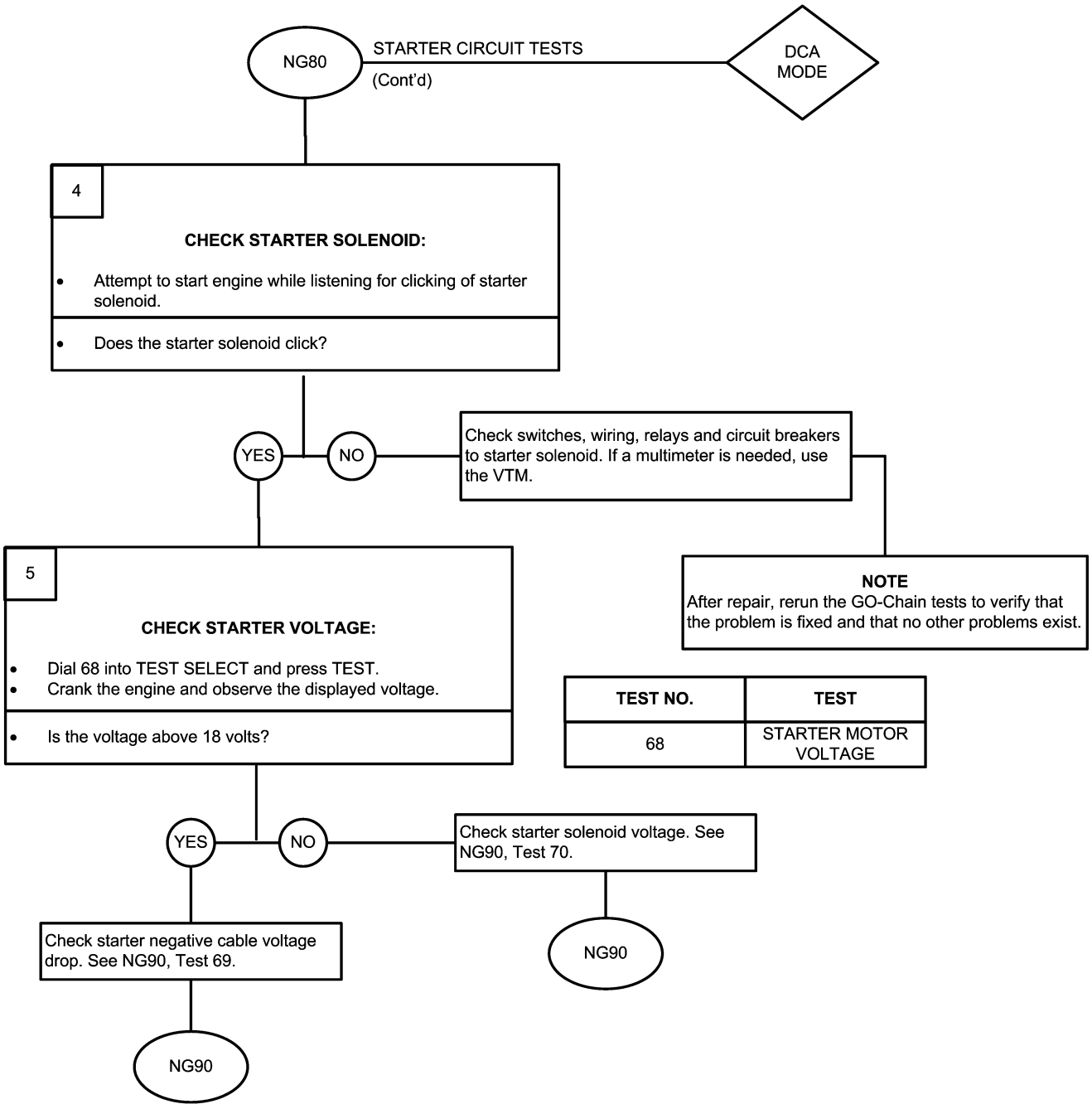
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



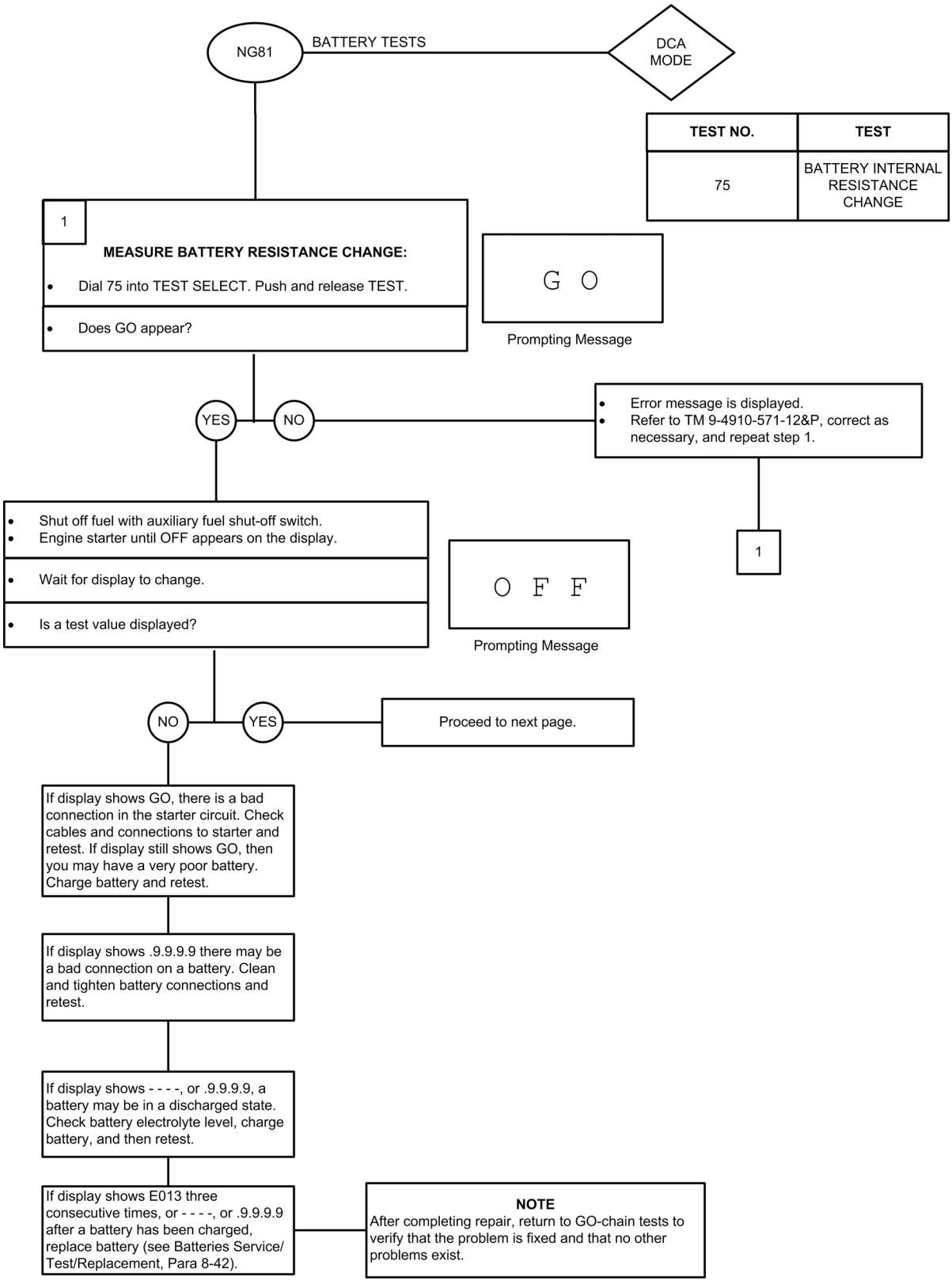

NG80
STARTER CIRCUIT TESTS (Cont'd)
DCA MODE
Is a number displayed?
YES
NO
Compare the number to the test limits in the table below.
VEHICLE
STARTER CIRCUIT RESISTANCE (MILLIOHMS)
ATLAS
0 to 100 MAX
Go to step 3.
3
Is GO still displayed?
NO
YES
Is E013 displayed?
YES
NO
Is this the third time E013 was displayed for test 74?
YES
NO
Repeat step 2.
2
Check wiring to starter for short circuits. Repair as necessary.
If wiring ok, engine may be tight.
Troubleshoot and repair engine as necessary (TM 10-3930-673-34).
Try to crank engine.
If GO still displayed after cranking, starter is not being energized.
Go to step 3.
3
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.

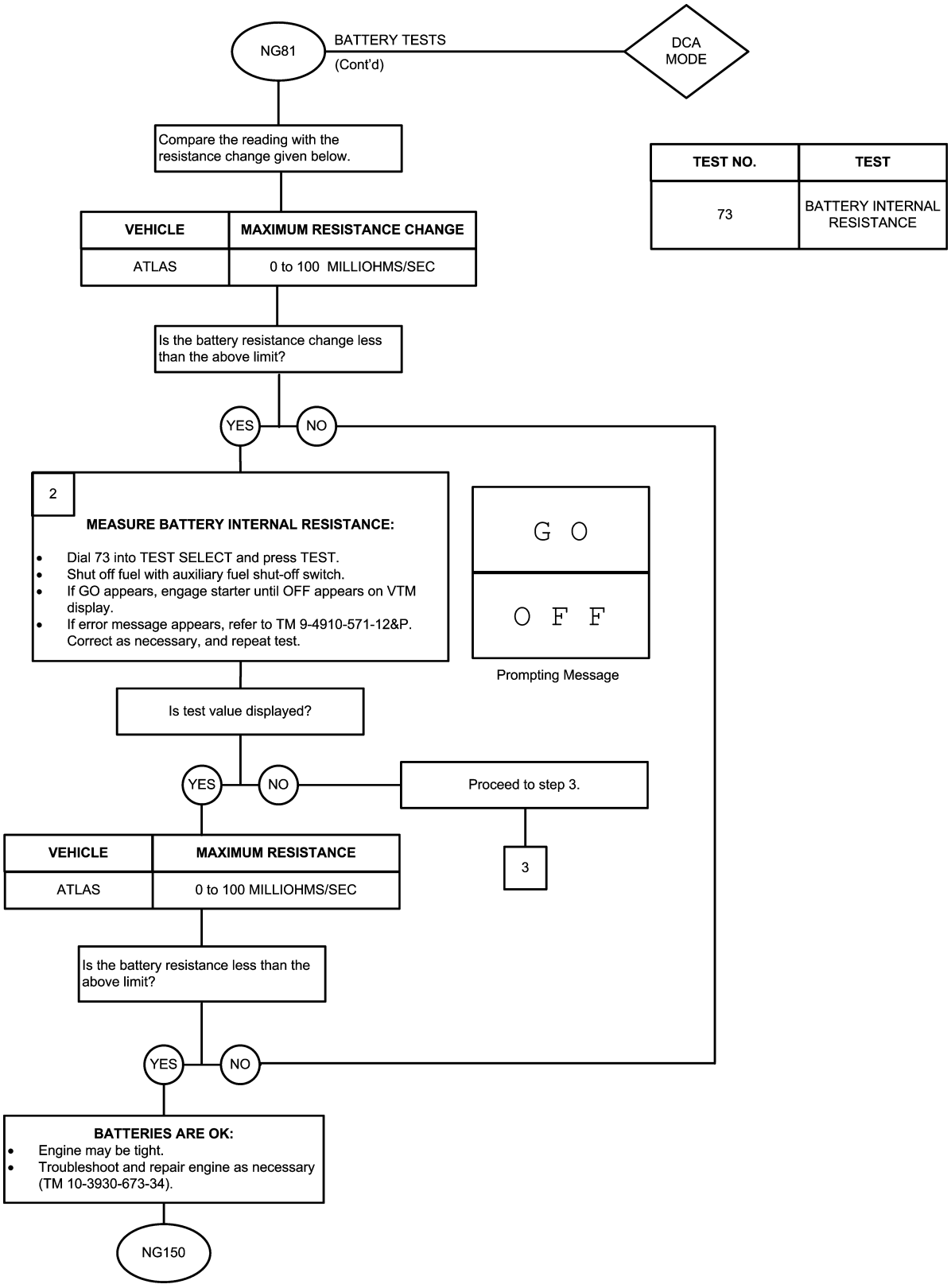
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



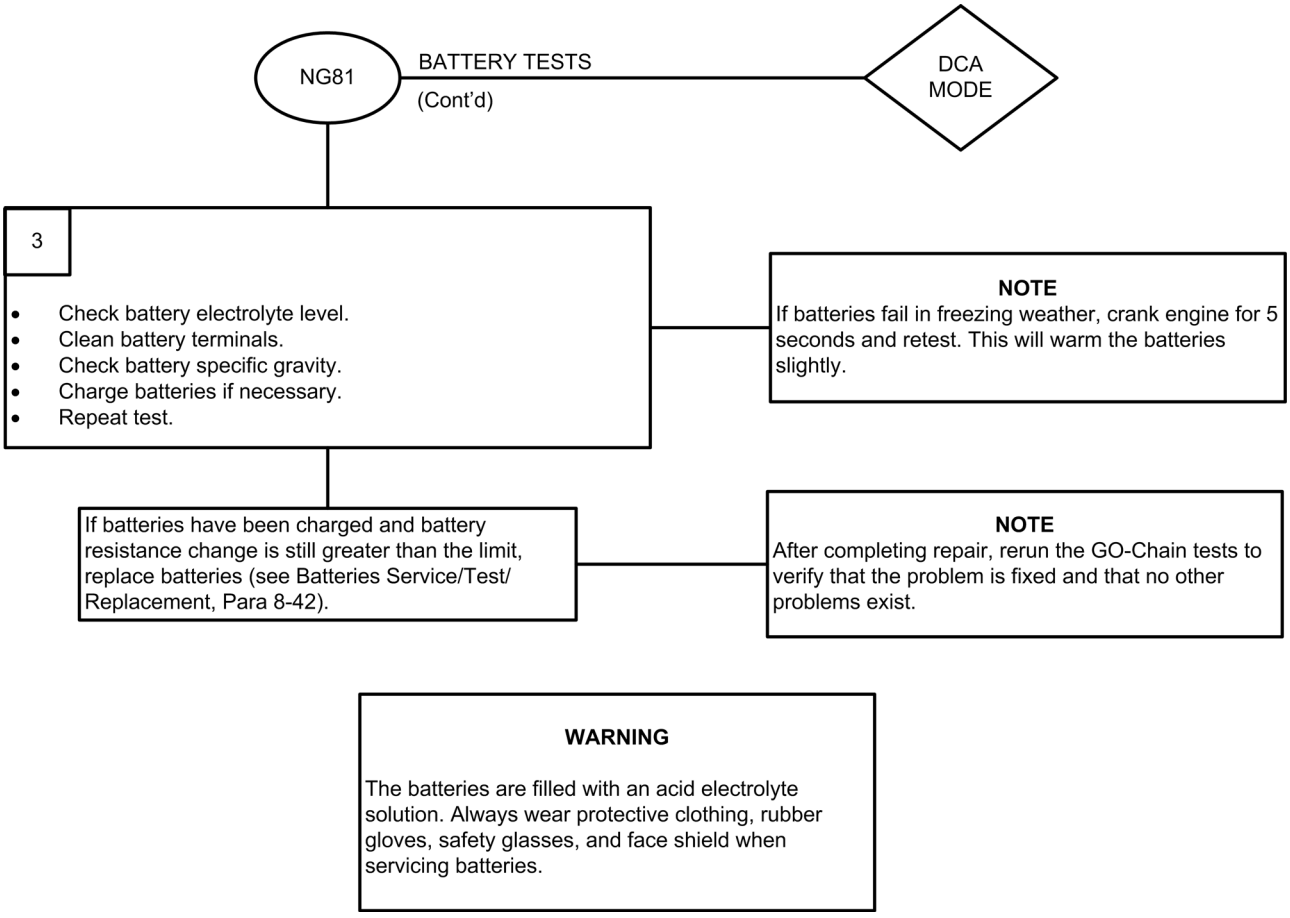

NG80
STARTER CIRCUIT TESTS
(Cont'd)
DCA MODE
4
CHECK STARTER SOLENOID:
• Attempt to start engine while listening for clicking of starter solenoid.
• Does the starter solenoid click?
YES
NO
Check switches, wiring, relays and circuit breakers to starter solenoid. If a multimeter is needed, use the VTM.
NOTE
After repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.
5
CHECK STARTER VOLTAGE:
• Dial 68 into TEST SELECT and press TEST.
• Crank the engine and observe the displayed voltage.
• Is the voltage above 18 volts?
TEST NO. | TEST
68 | STARTER MOTOR VOLTAGE
YES
NO
Check starter solenoid voltage. See NG90, Test 70.
NG90
Check starter negative cable voltage drop. See NG90, Test 69.
NG90

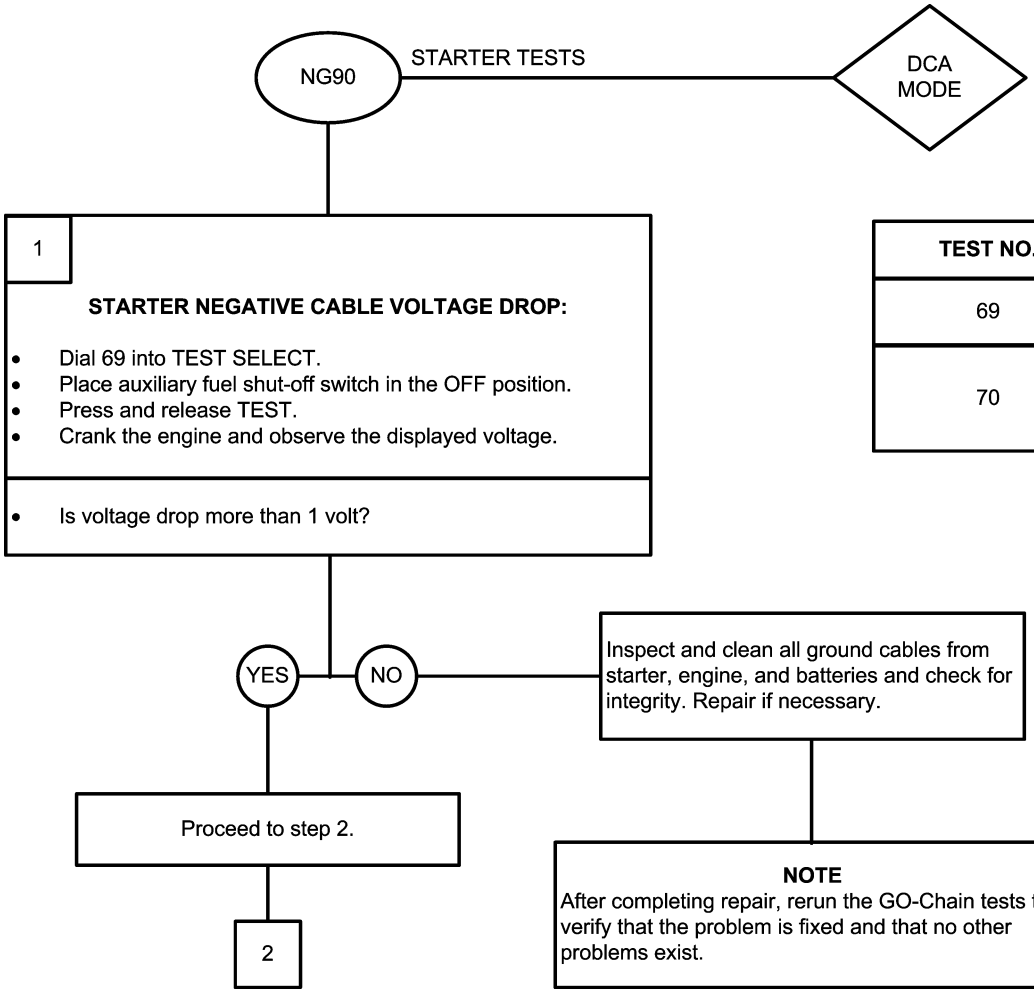
2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)




NG81
BATTERY TESTS
(Cont'd)
DCA MODE
Compare the reading with the resistance change given below.
VEHICLE
MAXIMUM RESISTANCE CHANGE
ATLAS
0 to 100 MILLIOHMS/SEC
TEST NO.
TEST
73
BATTERY INTERNAL RESISTANCE
Is the battery resistance change less than the above limit?
YES
NO
2
MEASURE BATTERY INTERNAL RESISTANCE:
Dial 73 into TEST SELECT and press TEST.
Shut off fuel with auxiliary fuel shut-off switch.
If GO appears, engage starter until OFF appears on VTM display.
If error message appears, refer to TM 9-4910-571-12&P. Correct as necessary, and repeat test.
G O
O F F
Prompting Message
Is test value displayed?
YES
NO
Proceed to step 3.
3
VEHICLE
MAXIMUM RESISTANCE
ATLAS
0 to 100 MILLIOHMS/SEC
Is the battery resistance less than the above limit?
YES
NO
BATTERIES ARE OK:
Engine may be tight.
Troubleshoot and repair engine as necessary (TM 10-3930-673-34).
NG150

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)





TEST NO.	TEST
69	STARTER NEGATIVE CABLE DROP
70	STARTER SOLENOID VOLTAGE

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)

NG90 STARTER TESTS (Cont'd) → DCA MODE

2

CHECK STARTER SOLENOID VOLTAGE:

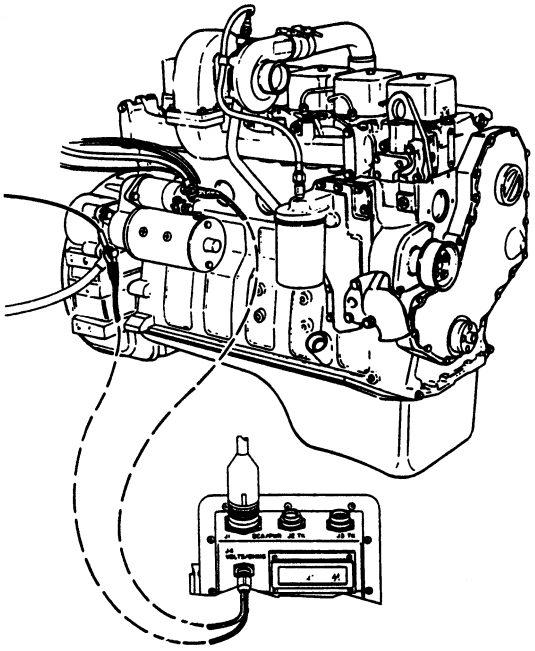
- Dial 70 into TEST SELECT.
- Place auxiliary fuel shut-off switch in the OFF position.
- Crank the engine and observe the displayed voltage.

- Is the starter solenoid voltage above 18 volts?

YES / NO → Proceed to Starter Current Test, NG110. → NG110

NOTE

As a guide, the voltage drop across a connection should not exceed 0.1 volt and the drop across a cable should not exceed 0.3 volts. Check the voltage drop across the solenoid, and all cables/ connections in the positive side of the starter circuit. Use the procedure outlined below for each voltage drop check.



2

MEASURE VOLTAGE DROP:

- Connect connector P1 of cable W2 to J4 on the VTM.
- Dial 89 into TEST SELECT.
- Attach red clip (E1) of cable W2 to the solenoid positive (+) terminal and the black clip (E2) to the starter motor ground cable.
- Press and release TEST.
- Engage the starter.

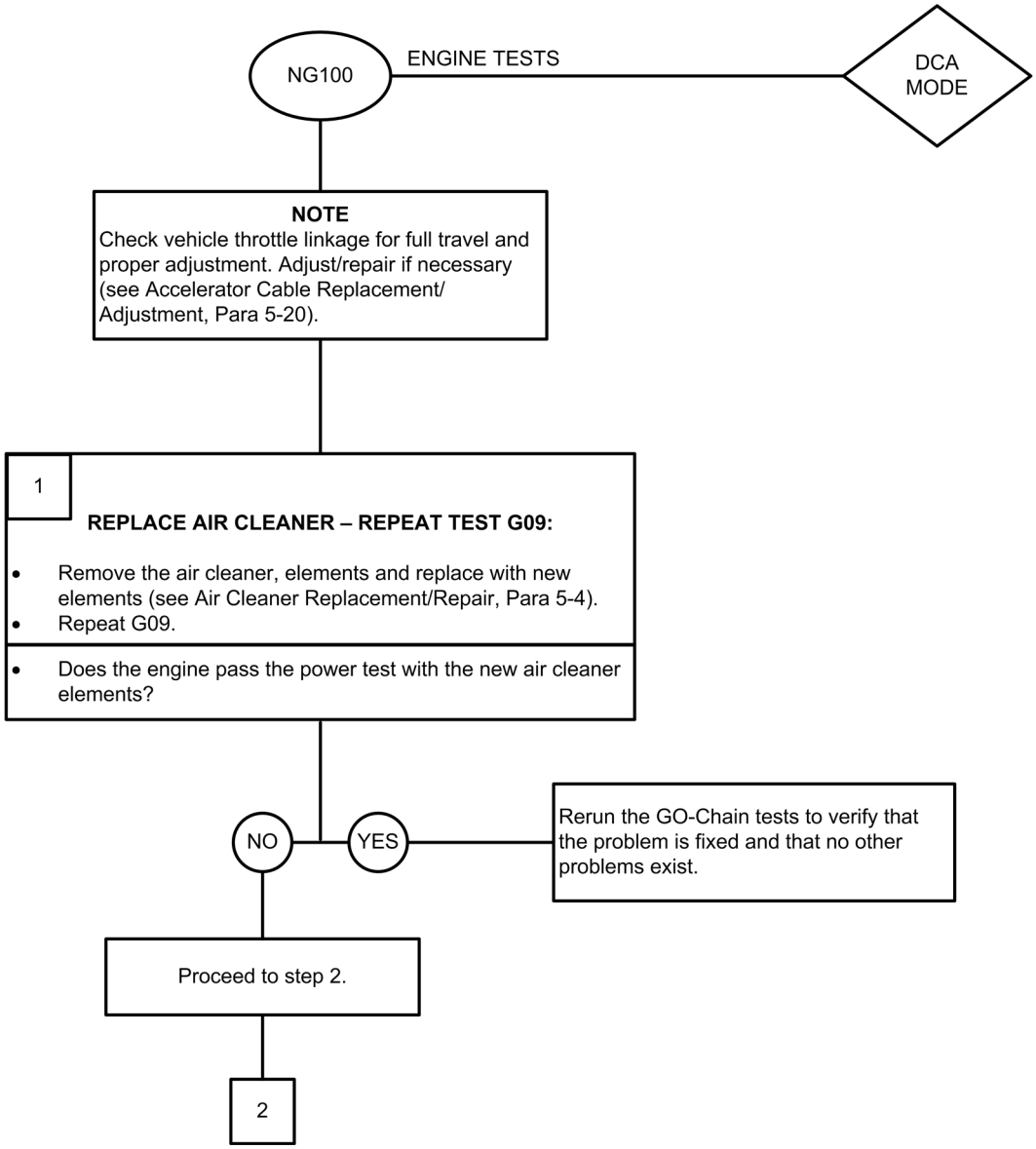
- Is voltage drop less than 0.3 volts?

YES / NO → Proceed to Starter Current Test, NG110. → NG110

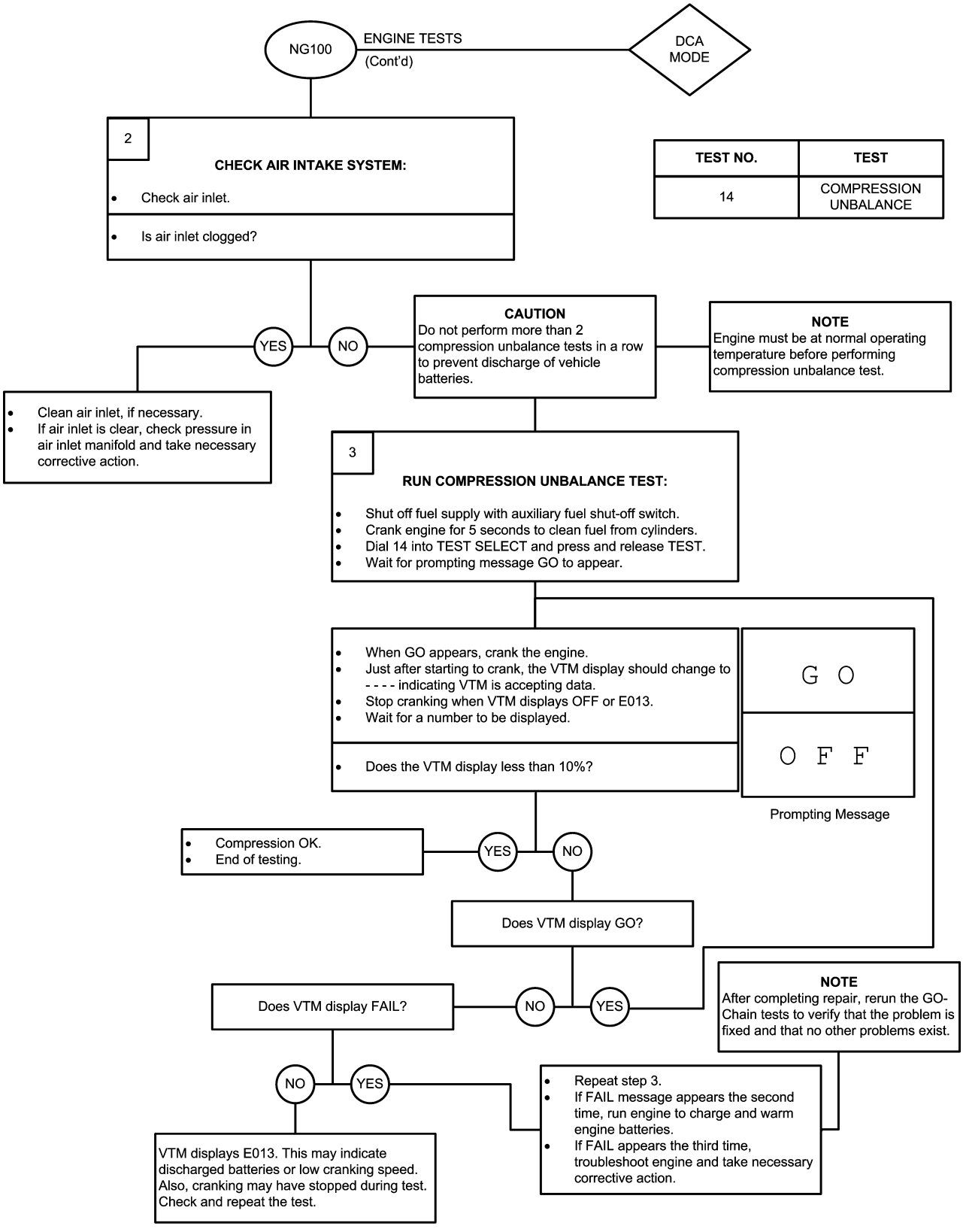
Repair or replace defective solenoid (TM 10-3930-673-34).

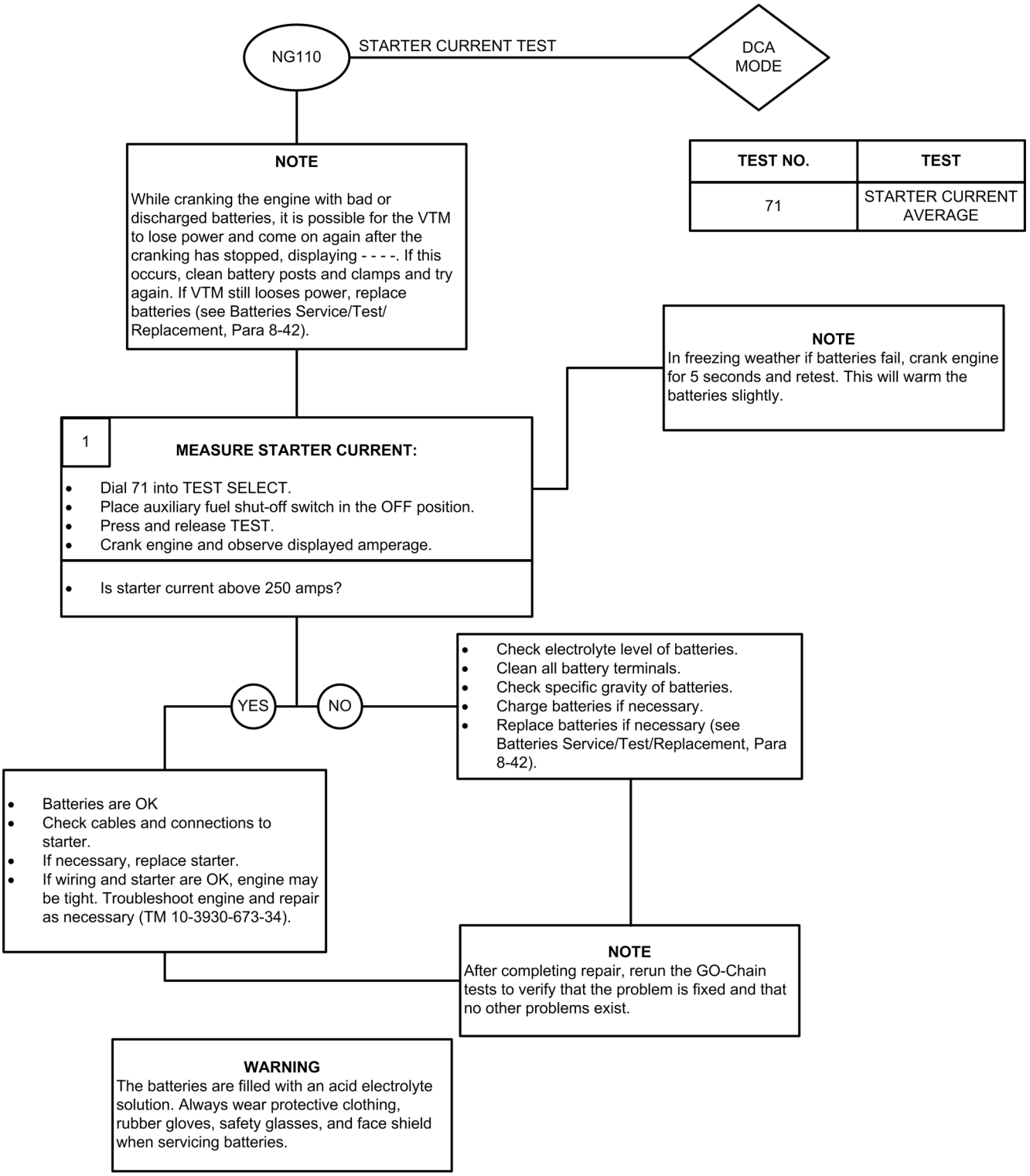
NOTE

After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.


NG100
ENGINE TESTS
DCA MODE
NOTE
Check vehicle throttle linkage for full travel and proper adjustment. Adjust/repair if necessary (see Accelerator Cable Replacement/ Adjustment, Para 5-20).
1
REPLACE AIR CLEANER – REPEAT TEST G09:
• Remove the air cleaner, elements and replace with new elements (see Air Cleaner Replacement/Repair, Para 5-4).
• Repeat G09.
• Does the engine pass the power test with the new air cleaner elements?
NO
YES
Rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.
Proceed to step 2.
2

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)




NG110
STARTER CURRENT TEST
DCA MODE
NOTE
While cranking the engine with bad or discharged batteries, it is possible for the VTM to lose power and come on again after the cranking has stopped, displaying - - - -. If this occurs, clean battery posts and clamps and try again. If VTM still looses power, replace batteries (see Batteries Service/Test/ Replacement, Para 8-42).
TEST NO.
TEST
71
STARTER CURRENT AVERAGE
NOTE
In freezing weather if batteries fail, crank engine for 5 seconds and retest. This will warm the batteries slightly.
1
MEASURE STARTER CURRENT:
Dial 71 into TEST SELECT.
Place auxiliary fuel shut-off switch in the OFF position.
Press and release TEST.
Crank engine and observe displayed amperage.
Is starter current above 250 amps?
YES
NO
Check electrolyte level of batteries.
Clean all battery terminals.
Check specific gravity of batteries.
Charge batteries if necessary.
Replace batteries if necessary (see Batteries Service/Test/Replacement, Para 8-42).
Batteries are OK
Check cables and connections to starter.
If necessary, replace starter.
If wiring and starter are OK, engine may be tight. Troubleshoot engine and repair as necessary (TM 10-3930-673-34).
NOTE
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.
WARNING
The batteries are filled with an acid electrolyte solution. Always wear protective clothing, rubber gloves, safety glasses, and face shield when servicing batteries.

ATLAS VEHICLE TEST CARD

PRE-TEST INSPECTION

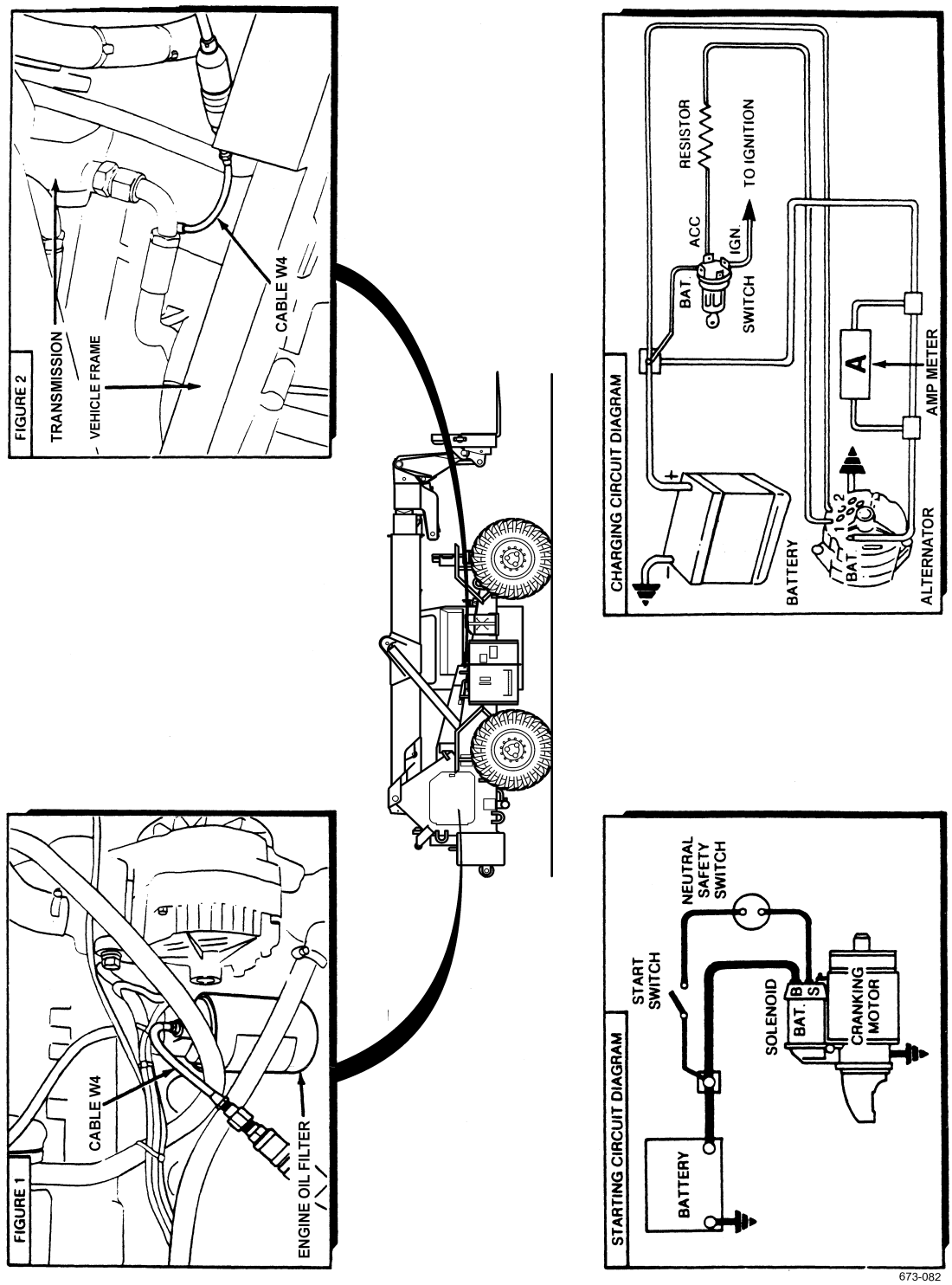
1. Fan Belts	4. Fuel Level
2. Oil Level	5. Batteries
3. Coolant Level	

POWERING UP VTM

1.Connect VTM to W1 cable. W1 cable attaches to batteries.
2. Enter VID into VTM using test 60.
3. Perform confidence test, test 66. (second entry 99)

MEASUREMENT NAME	VTM TEST NO.	VTM OFFSET LIMITS	OPERATING CONDITION	SPECIAL CONNECTIONS REQUIRED	MIN	LIMITS NORM	MAX	UNITS
Engine RPM (Average)	10	—	Idle	DCA-CABLE W1	975	±50	1075	RPM Average
Power Test	12	—	Engine Warm	DCA-CABLE W1	2000	2000-3900	3900	— — —
Compression Unbalance	14	—	Warm Engine, Crank on GO	DCA-CABLE W1	0	0-10	10	%
Fuel Supply Pressure	24	—	Idle	DCA-CABLE W1	20	18-30	50	PSI
Fuel Filter Pressure Drop (PASS/FAIL)	26	—	Idle	DCA-CABLE W1				PASS/FAIL
Fuel Solenoid Voltage	27	—	Idle	DCA-CABLE W1	20	20-28	28	VOLTS DC
Engine Oil Pressure	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	40	40-90	90	PSI
Transmission Oil Pressure	50	±150	Engine Warm, Neutral	CABLES W1, W4 (FIG 2)	120	120-220	220	PSI
Transmission Clutch Pressure	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	155	155-185	185	PSI
Transmission Converter Charge	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	40	40-70	70	PSI
Transmission Brake Cutoff Valve	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	5	—	—	PSI
Battery Voltage	67	—	Engine Off	DCA-CABLE W1	24	24-27	27	VOLTS DC
Starter Motor Voltage	68	—	Cranking	DCA-CABLE W1	18	18-27.5	27.5	VOLTS DC
Starter Negative Cable Voltage Drop	69	—	Cranking	DCA-CABLE W1	0	0-3	1	VOLTS DC
Starter Solenoid Volts	70	—	Cranking	DCA-CABLE W1	18	18-27.5	27.5	VOLTS DC
Starter Current Average	71	—	Crank on the GO	DCA-CABLE W1	0	0-250	250	AMPS
Starter Current First Peak	72	±225	Crank on the GO	DCA-CABLE W1	600	600-1300	1300	AMPS (PEAK)
Battery Internal Resistance	73	±225	Crank on the GO	DCA-CABLE W1	0	0-100	100	MILLIOHMS
Starter Circuit Resistance	74	±225	Crank on the GO	DCA-CABLE W1	0	0-100	100	MILLIOHMS
Battery Resistance Change	75	±225	Crank on the GO	DCA-CABLE W1	0	0-100	100	MILLIOHMS/ SECOND
Alternator Output Voltage	82	—	2,000 RPM	DCA-CABLE W1	24	24-28.5	28.5	VOLTS DC
Alternator Negative Cable Voltage Drop	84	—	Idle	DCA-CABLE W1	0	0-1	1	VOLTS DC
Fuel Return Pressure	50	±150	2,000 RPM	DCA-CABLE W1, W4	0	0-20	20	PSI

2-18. STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK (CONT)



APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists forms, field manuals, technical manuals, and other publications referenced in this manual and which apply to unit maintenance of the ATLAS Clean Burn Diesel, Model Skytrak 10000M.

A-2. DEPARTMENT OF THE ARMY PAMPHLETS

Consolidated Index of Army Publications and Blank Forms . . . . . DA Pam 25-30

The Army Maintenance Management System (TAMMS). . . . . DA Pam 738-750

A-3. FORMS

Recommended Changes to Equipment Technical Publications. . . . . DA Form 2028-2

Organizational Control Record for Equipment . . . . . DA Form 2401

Equipment Inspection and Maintenance Worksheet (Electronic) . . . . . DA Form 5988-E

Maintenance Request . . . . . DA Form 2407

Processing and Deprocessing Record for Shipment, Storage, and
Issue of Vehicles and Spare Engines. . . . . DD Form 1397

Product Quality Deficiency Report (NSN 7540-00-105-0078) . . . . . .SF 368

A-4. FIELD MANUALS

Camouflage, Concealment, and Decoys . . . . . FM 20-3

First Aid . . . . . .FM 4-25.11

Basic Cold Weather Manual. . . . . FM 31-70

Northern Operations. . . . . FM 31-71

Mountain Operations (How To Fight) . . . . . .FM 3-97.6

Desert Operations. . . . . FM 90-3

A-5. TECHNICAL BULLETINS

Hearing Conservation Program . . . . . DA Pam 40-501

Equipment Improvement Report and Maintenance Digest
(US Army Tank-Automotive Command) Tank-Automotive Equipment . . . . . TB 430001-39 series

Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling System . . . . . .TB 750-651

A-6. TECHNICAL MANUALS

Operator's Manual for All Terrain Lifter Army System (ATLAS) Clean Burn Diesel, 10,000 lb Capacity, Model Skytrak 10000M. TMl0-3930-673-l0

Unit Maintenance, Intermediate Direct Support, and Intermediate General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools List) for All TerrainLifter Army System (ATLAS) Clean Burn Diesel, 10,000 lb Capacity, Model Skytrak 10000M. TMl0-3930-673-24P

Operator and Organizational Maintenance Manual Including Repair Parts and Special Tools List Simplified Test Equipment for Internal Combustion Engines (STE-ICE) (4910-00-124-2554) . . . . . TM9-49l0-57l-12&P

Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries; 4HN, 24V, (NSN 6140-00-069- 3528) MS75047-1; 2HN, 12V (6140-00-057-2553) MS 35000-1; 6TN, 12V (6140-00-057-2554) Ms35000-3 . . . . . TM9-6140-200-14

Organizational, Direct Support, and General Support Care, Maintenance and Repair: Pneumatic Tires and Inner Tubes . . . . . .TM 9-2610-200-24

Inspection, Care, and Maintenance of Antifriction Bearings. . . . . TM 9-214

Painting Instructions for Field Use. TM43-0l39

Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command) . . . . . TM 750-244-3

Tool Outfit, Hydraulic Systems Test and Repair (HSTRU) (4940-01-036-5784). TM9-4940-468-13

Transportability Guidance for Application of Blocking, Bracing and Tiedown Materiels for Rail Transport . . . . . .TM 55-2200-001-12

A-7. SPECIFICATIONS AND STANDARDS

Drycleaning Solvent. . . . . Fed Spec P-D-680

Methyl Ethyl Ketone, Technica1 . . . . . .TT-M-261

A-8. OTHER PUBLICATIONS

Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items) CTA-50-970

Army Medical Department Expendable/Durable Items. . . . . CTA 8-100

APPENDIX B
MAINTENANCE ALLOCATION CHART (MAC)

Section I. INTRODUCTION

B-1. THE ARMY MAINTENANCE SYSTEM MAC

a. This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

b. The MAC immediately following this introduction designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown in the MAC in column (4) as:

Field - includes subcolumns:
- C - Operator/Crew
- O - Unit
- D - Direct Support

Sustainment - includes subcolumns:
- H - General Support
- D - Depot

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

B-2. MAINTENANCE FUNCTIONS (CONT)

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and the assigned maintenance level is shown as the third position code of the SMR code.

i. Repair. The application of maintenance services[1] including fault location/troubleshooting[2], removal/installation and disassembly/assembly[3] procedures, and maintenance actions[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/ operational condition as required by maintenance standards in appropriate technical publications (i.e. DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g. hours/miles) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column (1), Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column (2), Component/Assembly. Column 2 contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column (3), Maintenance Function. Column 3 lists functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. **Column (4) - Maintenance Level.** Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average

1. Services - Inspect, test, service, adjust, align, calibrate, and/or replace.
2. Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).
3. Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e. identified as maintenance significant).
4. Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

Field:

C - Operator/Crew Maintenance
O - Unit Maintenance
D - Direct Support Maintenance

Sustainment:

H - General Support Maintenance
D - Depot Maintenance

*Asterisk indicates level of maintenance authorized to complete this function. No time is established.

e. Column (5), Tools and Equipment Ref Code. Column 5 specifies, by code, those common tool sets (not individual tools), common TMDE, and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to tools and test equipment in Section III.

f. Column (6), Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column (1), Tool or Test Equipment Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, column 5.

b. Column (2), Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column (3), Nomenclature. Name or identification of the tool or test equipment.

d. Column (4), National Stock Number. The National Stock Number of the tool or test equipment.

e. Column (5), Tool Number. The manufacturer's part number, model number, or type number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column (1), Remarks Code. The code recorded in column 6, Section II.

b. Column (2), Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART FOR ALL TERRAIN LIFTER, ARMY SYSTEM (ATLAS)

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
Group Number	Component/Assembly	Maintenance Function	Unit C	Unit O	DS F	GS H	Depot D	Tools and Equipment	Remarks
01	ENGINE								A
0100	Engine Assembly:	Inspect	0.1						
		Service	0.1	1.5				2,3	C,I
		Test		1.0				4,11	B
		Replace			7.0			5	
		Repair			10.0			5,6	
		Rebuild				40.0		5,6	
	Engine Mounts	Inspect		0.1					
		Replace			2.0			2,5	
	Lifting Bracket	Replace			1.0			2,5	
0101	Crankcase, Cylinder Block, Cylinder Head:								
	Cylinder Block	Replace				30.0		5	
		Repair				8.0		5,6	
	Cylinder Head	Adjust			2.0			5	D
	Assembly with Valves	Replace			2.0			5	
		Repair				8.0		5,6	
0102	Crankshaft:								
	Crankshaft	Replace				8.0		5	
		Repair				8.0		5,6	
	Crankshaft Main Bearings	Replace				6.0		5	E
	Oil Seals	Replace				4.0		5	
	Vibration Damper	Replace				4.0		5	
0103	Flywheel Assembly:								
	Flywheel	Replace			4.0			5,15	
	Flywheel Housing and Cover	Replace			4.0			5	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0104	Pistons, Connecting Rods:								
	Pistons, Piston Pins, and Rings	Replace				10.0		6	
	Connecting Rods and Bearings	Replace				10.0		6	
0105	Valves, Camshaft and Timing System:								
	Rocker Lever Covers	Replace		1.0				2	
	Rocker Lever Assembly	Replace			4.0			2	
		Repair			2.0			2	
	Tappet, Valve	Replace				4.0		5	
	Camshaft and Timing Gears	Replace				24.0		5	
	Front Housing	Replace				3.0		2,5	
	Front Cover	Replace			3.0			2	
	Push Rod Cover	Replace		1.0				2	
0106	Engine Lubrication System:								
	Oil Pan	Inspect	0.1						F
		Replace			4.0			5	
	Oil Pump Inlet Tube	Replace			1.0			2	
	Engine Oil Pump	Replace			1.0			2	
	Oil Filter	Replace		0.2				14	
	Oil Filter Base	Replace		0.5				2	
	Oil Dipstick and Dipstick Tube	Replace		0.1				2	
	Oil Filler Neck	Replace		0.1				2	
	Oil Hoses, Tubes, and Fittings	Inspect	0.1						F
		Replace		0.5				2	
	Oil Sampling Valve	Service	0.1					4	
		Replace		0.1				2	
	Oil Cooler	Replace			1.0			2	
0108	Manifolds:								
	Exhaust Manifold	Replace		1.0				2	
	Intake Manifold Cover	Replace		1.0				2	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
03	FUEL SYSTEM								
0301	Fuel Injector:								
	Injector	Test			0.5			6,18	
		Replace			1.0			5	
0302	Fuel Pumps:								
	Fuel Injection Pump	Test		0.5				2	
		Adjust			2.0			2	G
		Replace			4.0			4,5,6	
	Fuel Shutoff Valve	Test		0.1				3	
	Fuel Shutoff Solenoid	Replace			0.5			2	
	Fuel Transfer Pump	Test		0.5				3	
		Replace		1.0				2	
0304	Air Cleaner:								
	Air Cleaner Assembly	Replace		0.7				2	
		Repair		1.0				2	
	Air Cleaner Elements	Service	0.2	0.2					H
		Replace		0.2				2	
	Air Inlet Cap	Replace		0.2				2	
	Air Inlet Hoses and Tubing	Replace		0.5				2	
0305	Turbocharger:								
	Turbocharger Assembly	Replace		2.0				2	
		Repair				4.0		3	
	Turbocharger Air Hoses	Replace		1.0				2	
	Turbocharger Oil Hoses and Tubes	Replace		0.2				2	
0306	Tanks, Hoses, Tubes, and Fittings								
	Fuel/Hydraulic Tank	Inspect	0.1						I
		Service	0.2	1.5					J
		Replace			2.0			2	
		Repair			2.0			7,8	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
	Fuel Filter	Inspect	0.1						
		Service		0.5				2	
		Replace		0.5				2	
	Fuel Hoses, Tubes, and Fittings	Inspect	0.1						F
		Replace		1.0				2	
	Water Separator Assembly	Service	0.1						
		Replace		0.5				2	
0309	Fuel Filter Assemblies	Replace		0.5				14	
0311	Engine Starting Aids:								
	Ether Start Kit	Replace		0.7				2	
		Repair		1.0				2	
	Ether Start Cartridge	Replace		0.2					
	Thermostat, Ether Start	Test		1.0				3	
		Replace		1.0				2	
	Bracket, Mounting	Replace		0.3				2	
0312	Accelerator Controls:								
	Accelerator Cable	Adjust		0.5				2	K
		Replace		2.0				2	
	Accelerator Pedal and Linkage	Inspect	0.1						
		Replace		2.0				2	
		Repair		1.0				2	
04	EXHAUST SYSTEM								
	Muffler	Replace		0.7				2	
	Tail Pipe	Replace		0.5				2	
	Exhaust Pipe	Replace		0.3				2	
05	COOLING SYSTEM								
0501	Radiator:								
	Radiator	Inspect	0.1						F
		Test		0.5				1	
		Service		0.5				3	
		Replace		2.0				2	
		Repair				2.0		2,5	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
	Radiator Overflow Tank	Replace		0.5					
0502	Cover	Replace		2.0				2	
0503	Water Manifold, Headers, Thermostats, Housing Gasket:								
	Thermostat	Test		1.0				3	
		Replace		0.5				2	
	Housing	Replace		1.0				2	
	Radiator Hoses	Inspect	0.1						
		Replace		0.5				2	
0504	Water Pump	Replace		2.0				2	
0505	Fan Assembly:								
	Fan Blade and Spacer	Inspect	0.1						
		Replace		1.5				2	
	Fan Guard	Inspect	0.1						
		Replace		1.0				2	
	Drive Belt and Tensioner	Inspect	0.1					2	
		Replace		1.5				2	
06	ELECTRICAL SYSTEM								
0601	Alternator:								
	Alternator and Alternator Connections	Replace		0.4				2	
		Repair				4.0		5	
	Pulley	Replace		1.0				2	
0603	Starter:								
	Starting Motor	Replace		0.4				2	
		Repair				4.0		5	
	Neutral Safety Switch	Inspect		0.2					
		Replace		0.5				2	
0607	Instrument Panel:								
	Instrument Panel	Replace		4.0				2,3	
	Gages, Switches, Lights	Inspect	0.1						
		Replace		0.5				3	
	Circuit Breakers	Replace		0.2				3	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
Group Number	Component/Assembly	Maintenance Function	Unit C	Unit O	DS F	GS H	Depot D	Tools and Equipment	Remarks
0608	Miscellaneous Electrical Components:								
	Blackout/Service Light Switch	Inspect	0.1						
		Replace		0.5				2	
	Temperature and Pressure Switches	Test		0.5				3	
		Replace		0.2				3	
	Electric Joystick Assembly	Inspect	0.1						
		Replace		1.0				3	
	Fork Autoleveler Switch	Inspect	0.1						
		Adjust		1.0				2,11	
		Test		1.0				3	
		Replace		1.0				3	
	Relays	Test		0.5				3	
		Replace		0.2				3	
	Boom Electrical Junction Box Assembly	Inspect	0.1						
		Replace		2.0				3	
		Repair		2.0				3	
	STE/ICE-R Electrical Components	Test		0.5				3,10	B
		Replace		0.2				3	
0609	Lights:								
	Headlights/Floodlights	Inspect	0.1						
		Replace		0.5				2	
		Repair		1.0				2	
	Blackout Headlights	Inspect	0.1						
		Replace		0.5				2	
		Repair		1.0				2	
	Stop and Blackout Taillights	Inspect	0.1						
		Replace		0.5				2	
		Repair		0.5				2	
	Blackout Marker Lights	Inspect	0.1						
		Replace		0.5				2	
		Repair		0.5				2	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
	Turn Signal Lights	Inspect	0.1						
		Replace		0.5				2	
		Repair		0.5				2	
	Turn Signal Switch	Replace		0.5					
	Turn Signal Flasher	Replace		0.5					
0610	Sending Units and Warning Switches:								
	Oil Pressure Sender	Test		0.5				3	
		Replace		0.1				3	
	Water Temperature Sender	Test		0.5				3	
		Replace		0.1				3	
	Transmission Temperature Sender	Test		0.5				3	
		Replace		0.1				3	
	Fuel Level Sender	Test		0.5				3	
		Replace		0.7				3	
0611	Horn, Siren:								
	Back-up Alarm	Inspect	0.1						
		Replace		0.1				3	
	Back-up Switch	Test	0.1						
		Adjust		0.5					
		Replace		1.0				3	
	Horn	Inspect	0.1						
		Replace		0.1				3	
0612	Batteries:								
	Batteries	Inspect	0.1						
		Test		0.5				3	
		Service		0.5				3	
		Replace		0.5				2	
	Battery Cables	Service		0.1				3	
		Inspect	0.1						
		Replace		0.2				2	
	Battery Boxes	Replace		0.5				2	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
Group Number	Component/Assembly	Maintenance Function	Unit C	Unit O	DS F	GS H	Depot D	Tools and Equipment	Remarks
0613	Wiring Harnesses:								
	Cab Wiring Harness	Test		0.5				3	
		Replace			8.0			2	
		Repair			2.5			5	
	Main Wiring Harness	Inspect	0.1						
		Test		0.5				3	
		Replace			8.0			2	
		Repair			2.0			5	
	Boom Electrical Cable	Test		0.5				3	
		Replace		4.0				2	
		Repair		0.5				3	
	STE/ICE-R Harness	Test		0.5				3	
		Replace		4.0				2	
		Repair		0.5				3	
	Electric Joystick Harness	Test		0.5				3	
		Replace		1.0				2	
		Repair		0.5				3	
	Slave Receptacle	Replace		0.3				2	
07	TRANSMISSION								
0705	Transmission Shifting Components:								
	Transmission Shifter	Adjust		1.0				1	
		Replace		2.5				2	
	Transmission Cables	Replace		2.0				2	
	Transmission Disconnect Pedal	Adjust		1.0				2	
		Replace		2.0				2	
	Transmission Disconnect Master Cylinder	Replace		2.0				2	
		Repair		0.3					P
0708	Torque Converter	Test			0.2			5	
		Replace			8.0			2,5	
		Repair				14.0		2,5	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0710	Transmission:								
	Transmission Assembly	Inspect	0.1						F
		Service	0.1	0.5				2,3	C,J
		Test		0.5				17	
		Replace			8.0			5	
		Repair			8.0			5	
		Rebuild				40.0		5,6,12	
	Mounting Brackets	Replace			2.0			5	
	Front Cover Assembly	Replace			2.0			5	
		Repair				1.0		5	
	Clutch Packs	Replace				4.0		5,12	
		Repair				3.0		5,6	
	Output Shaft	Replace				4.0		5	
		Repair				3.0		5,6	
	Front Housing	Replace				2.0		5	
		Repair				2.0		5	
	Input Shaft	Replace				4.0		5	
		Repair				1.0		5,6	
	Case and Covers	Replace				8.0		5	
		Repair				4.0		5	
0714	Servo Unit:								
	Control Valve	Replace			2.0			2	
		Repair				4.0		5,6	
0721	Coolers, Pumps, Motors:								
	Transmission Oil Pump	Replace			4.0			2	
		Repair				1.5		5	
	Breather	Replace		0.5				2	
	Oil Filter	Replace		0.2				14	
	Valve, Oil Sampling	Service	0.1					4	
		Replace		0.1				2	
	Transmission Cooler	Inspect	0.1						
		Replace		2.0					

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
Group Number	Component/Assembly	Maintenance Function	Unit C	Unit O	DS F	GS H	Depot D	Tools and Equipment	Remarks
09	PROPELLER AND PROPELLER SHAFTS								
0900	Front and Rear Propeller Shafts	Service		0.1				3	
		Replace		0.3				3	
		Repair		0.3				3	
	Transmission Propeller Shaft	Service		0.1				3	
		Replace		1.0				3	
		Repair		1.0				3	
10	FRONT AXLE								
1000	Front Axle Assembly	Inspect		0.1					
		Service		0.1				3	
		Replace			2.0			5	
		Repair				22.0		5	
	Pin, Axle Carrier	Service		0.1				3	
		Replace			0.7			5	
1002	Front Differential Carrier Assembly	Service		0.3				3	
		Replace				4.0		5	M
		Repair				2.0		5	
1003	Front Planetary Wheel Ends	Service		0.3				3	
		Replace			1.0			5	M
		Repair				4.0		5	
11	REAR AXLE								
1100	Rear Axle Assembly	Inspect	0.1						
		Service		0.1				3	
		Replace			2.0			5	
		Repair				22.0		5	
	Pin, Axle Carrier	Service		0.1				3	
		Replace			0.7			5	
1102	Rear Differential Carrier Assembly	Service		0.3				3	
		Replace				4.0		5	M
		Repair				2.0		5	
1103	Rear Planetary Wheel Ends	Service		0.3				3	
		Replace			1.0			5	M

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
		Inspect				1.0			
		Repair				4.0		5,6	
12	BRAKES								
1201	Parking Brake:								
	Parking Brake Assembly	Inspect	0.1						
		Adjust		1.0				2	
		Replace		1.0				3	
		Repair				2.0		5	
	Brake Pads	Inspect		0.5					
		Replace		1.0				2	
	Brake Valve	Inspect		0.2					
		Replace		1.0				2	
1202	Service Brakes:								
	Disc Brake Assembly	Replace		1.0				3	
		Repair			1.5			5	
	Brake Pads	Inspect		0.5					
		Replace		1.0				3	
1204	Hydraulic Brake System:								
	Brake Control Valve	Replace		1.0				2	
	Accumulator	Test		0.2					
		Replace		0.5				2	
	Hoses, Tubes, and Fittings	Inspect	0.1						
		Replace		1.0				2	
13	WHEELS AND TRACKS								
1311	Wheel Assembly	Inspect	0.1						
		Replace		1.0				3	
		Repair		1.0				3	
1313	Tire	Inspect	0.1						
		Service	0.1					3	
		Replace		1.0				3	
		Repair				1.0		5	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
14	STEERING								
1401	Steering Gear Assembly:								
	Steering Wheel	Replace		0.5				3	
	Steering Column	Replace		1.0				3	
	Drive Wheel Spindle	Service		0.2				3	
		Adjust			1.0			2	Q
		Replace			2.0			5	
	Tie Rod	Service		0.2				3	
		Adjust		0.5				1	
		Replace		1.5				3	
	Universal (Cardan) Steering Joints	Replace		1.5				3	
1410	Hydraulic Pump:								
	Emergency Steering Pump	Test	0.1	0.2				17	
		Replace		1.0				2	
		Repair			2.0			5	
1411	Hoses, Tubes, Fittings	Inspect	0.1						
		Replace		0.5				2	
		Repair		0.5				3,9	
1412	Hydraulic Cylinders:								
	Steering Cylinders	Inspect	0.2						
		Service		0.1				3	
		Replace		1.0				3	
1414	Steering System Valves:								
	Steering Valve, Control	Replace		1.0				3	
		Repair				1.5		5	
	Valve, Steering Select, Solenoid	Test		0.5				16	
		Replace		1.0				2	
15	FRAME, TOWING ATTACHMENTS, AND DRAWBARS								
1501	Frame Assembly	Repair				2.0		7,8	
1502	Counterweight	Replace		0.3				3	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
1503	Pintle Hook	Inspect	0.1						
		Service		0.1				3	
		Replace		0.3				2	
		Repair		0.5				2	
18	BODY, CAB, HOOD AND HULL								
1801	Body, Cab, Hood and Hull Assemblies:								
	Engine Covers	Replace		0.3				2	
	Radiator Cover	Replace		0.5				2	
	Engine Door Panel	Replace		0.1				2	
	Transmission Cover	Replace		0.1				2	
	Cab Assembly with ROPS/ FOPS	Inspect	0.2						
		Replace			8.0			5	N
		Repair			1.5			5,7,8	L
	Sound Suppression Panels	Replace			1.0			2	
	Doors	Service		0.1				3	
		Replace		0.2				2	
		Repair			1.0			5,7,8	L
1802	Fenders, Running Boards, Windshield Glass:								
	Fenders	Replace		0.2				2	
	Fender Braces	Replace		0.6				2	
	Cab Windows	Replace		2.0				3	
1806	Seat:								
	Seat Assembly	Inspect	0.1						
		Replace		1.0				2	
		Repair		1.0				3	
	Seat Suspension Assembly	Replace			1.0			2,5	
	Seat Belts	Inspect	0.1						
		Replace		0.2				2	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
Group		Maintenance	Unit		DS	GS	Depot	Tools and	
Number	Component/Assembly	Function	C	O	F	H	D	Equipment	Remarks
22	BODY, CHASSIS AND HULL ACCESSORY ITEMS								
2202	Accessory Items:								
	Front and Rear Wiper Assemblies	Inspect	0.1						
		Replace		1.0				2	
		Repair		0.5				2	
	Front and Rear Windshield Washer Assembly	Inspect	0.1						
		Service		0.3					
		Replace		0.6				2	
		Repair		0.6				2	
	Left and Right Hand Mirrors	Inspect	0.1						
		Replace		0.5				2	
	Fans, Ventilation	Inspect	0.1						
		Replace		0.5				2	
2207	Winterization Equipment:								
	24V Heater/Air Conditioner Assembly	Inspect	0.1						
		Replace		3.0				2	
		Repair			2.0			2	
	Compressor Belt	Replace		0.5				2	
	Compressor, Air Conditioner	Remove		1.0				19,20	
		Repair		4.0				2,5	
	Temperature Control Valve	Inspect	0.1						
		Replace		1.0				2	
	AC Thermostat	Replace		0.5				2	
	Heater/AC Fan Switches	Replace		1.0					
	Heater Hose, Lines and Fittings	Inspect	0.1						
		Replace		1.0				2	
	Cab Blower	Replace		1.0					
	Heater Plenum and Hoses	Replace		1.0					
2210	Data Plates	Replace		0.2				3	
24	HYDRAULIC AND FLUID SYSTEMS								
2401	Drive Pump Assemblies:								

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
	Tandem Gear Pump	Test		0.5				16	
		Replace		1.5				2	
		Repair				2.0		5,16	
	Piston Pump	Test		0.5				17	
		Replace		1.0				2	
2402	Control Valves								
	Main Control Valve Assembly	Adjust		0.5				2	
		Replace		2.0				2	
		Repair				2.0		5	
	Attachment Control Valve Assembly	Replace		1.0				2	
		Repair				2.0		5	
	Priority Valve	Replace		0.5				2	
	Relief Valve, Frame Tilt/ Brakes	Test		0.5				16	
		Replace		0.5				2	
	Shuttle Valve	Replace		0.5				2	
	Frame Tilt Valve	Replace		0.5				2	
	Boom Cylinder Flow Control Valve	Replace		0.4				2	
2404	Tilt Cylinder:								
	Frame Tilt Cylinder	Service		0.3				3	
		Replace		0.7				2	
		Repair			1.0	1.0		5,13	
	Carriage Tilt Cylinder	Service		0.3				3	
		Replace		2.0				2	
		Repair			1.0	1.0		5,13	
2405	Attachment:								
	Carriage Assembly	Inspect	0.1						
		Service		0.3				3	
		Replace		0.1				2	
		Repair			2.0			5	
	Forks	Inspect	0.1						
		Replace		1.0				2	
		Repair		1.0					
	Fork Bushings	Inspect	0.1						
		Replace		0.5				3	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
	Attachment	Inspect	0.1						
		Service		0.3				3	
		Replace		4.0				2	
		Repair			2.0			7,8	
	Boom Assembly	Inspect		0.5					
		Service		0.2				3	
		Replace			5.0			3	
		Repair			8.0			3	
	Boom Pivot Pins	Inspect	0.1						
		Service		0.1				3	
		Replace			1.0			5	
	Wear Pads, Boom	Inspect		0.5					
		Replace			8.0			5,8	O
	Pulley	Replace		1.0				3	
	Sheave	Replace		1.0				3	
	Extend and Retract Chains	Inspect		0.1					
		Adjust		0.5				2	
		Replace			4.0			2	
2406	Strainers, Filters, Hoses, Tubes and Fittings:								
	Hoses, Lines and Fittings	Inspect	0.1						F
		Replace		1.0				2	
		Repair		0.5				6,9	
	Tubing	Inspect	0.1						
		Replace		0.5				3	
	Oil Sampling Valve	Service	0.1					4	
		Replace		0.1				2	
	Strainer	Service		0.2				2	
		Replace		0.5				2	
	Oil Filter	Replace		0.2				14	
2407	Hydraulic Cylinders:								
	Boom Extend Cylinder	Inspect	0.2						
		Replace			3.0			5	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
		Repair			1.5			5,13	
	Fork Sideshift Cylinders	Inspect	0.2						
		Replace		1.0				3	
		Repair			1.0			13,14	
	Boom Hoist Cylinders	Inspect	0.2						
		Service		0.1				4	
		Replace		2.0				3	
		Repair			1.5			5,13	
	Attachment Cylinder	Inspect	0.2						
		Service		0.1				4	
		Replace		1.5				3	
		Repair			1.5			5,13	
2408	Tanks and Reservoirs:								
	Hydraulic Oil Cooler	Inspect	0.1						
		Replace		1.0					
31	BASIC ISSUE ITEMS, MANUFACTURER INSTALLED								
3100	Basic Issue Items:								
	Emergency Boom Lift Kit	Replace		0.2				2	
33	SPECIAL PURPOSE KITS								
3303	Engine Arctic Kit	Inspect	0.1						
		Install			4.0			2,5	
		Repair		1.5					
47	GAGES (NON-ELECTRICAL)								
4702	Gages, Mountings, Lines and Fittings:								
	Sight Gages	Inspect	0.1						
		Replace		0.5				2	
	Air Cleaner Restriction Indicator	Inspect	0.1						
		Replace		0.5				2	

Maintenance Allocation Chart for All Terrain Lifter, Army System (ATLAS) (Continued)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			FIELD			SUSTAINMENT			
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
91	CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT								
9131	Decontamination Kit	Inspect	0.2					2,3	
		Replace		0.5					

Section III. TOOLS AND TEST EQUIPMENT FOR ALL TERRAIN LIFTER, ARMY SYSTEM (ATLAS)

Tools and Test Equipment for All Terrain Lifter, Army System (ATLAS)

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
1	O	Tool Kit, Auto Mechanics SC5180-90-N26	5180-00-177-7033	W33004
2	O,F	Tool Kit, General Mechanics SC5180-90-CL-N05	5180-00-699-5273	W45060
3	O	Shop Equipment, Automotive Maintenance and Repair, Common #1 Less Power SC4910-95-CL-A74	4910-00-754-0654	W32593
4	O	Shop Equipment, Automotive Maintenance, Common #2 Less Power SC4910-95-CL-A72	4910-00-754-0650	W32730
5	F	Shop Equipment, Automotive Maintenance and Repair; Field Maintenance, Basic, Less Power SC4910-95-CL-A31	4910-00-754-0705	T24660
6	F	Tool Kit, Machinists: Post, Camp and Station SC5280-95-CL-A02	5280-00-511-1950	W44512
7	F	Shop Equipment, Machine Shop: Field Maintenance Basic, Less Power SC3470-95-CL-A02	3470-00-754-0708	T15644
8	F	Tool Kit, Body and Fender Repair SC5180-90-CL-N34	5180-00-754-0643	W33689
9	F	Tool Outfit, Hydraulic System Test and Repair (HSTRU) SC4940-95-CL-B07	4940-01-036-5784	13221E6850
10	O	Simplified Test Equip. for Internal Combustion Engines (STE-ICE-R) TM9-4910-571-34&P	4910-01-222-6589	2389409
11	O	Level, Pocket	5210-00-223-9604	GGG-L-211
12	H	Tool Kit, Transmission Consisting of the following:	5180-01-307-9395	8801801
		Clutch Pack, Lift	5120-01-311-9161	DR04-708-1
		Bearing Driver	5120-01-311-7242	DR04-708-2

Tools and Test Equipment for All Terrain Lifter, Army System (ATLAS) (Continued)

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
		Bearing Driver	5120-01-311-7243	DR04-708-3
		Spring Compressor Tool	5120-01-311-7244	DR04-708-5
13	F	Wrench Set, Spanner, Consisting of the following:	5120-01-454-1235	6621222
		Spanner Wrench, Boom Lift Cylinder and Boom Extend Cylinder	5120-01-510-2556	8801816
		Spanner Wrench, Adjustable	5120-01-510-2561	6623737
14	O	Wrench, Strap, 1-6″ Capacity		W18-36
15	F	Tool, Engine Barring	5120-01-285-5193	3377371
16	O,F	Gage, Hydraulic Pressure	4940-01-086-8756	13221E6828
17	O,F	Kit, Accumulator Charging	4930-01-046-7109	1225217
18	F	Test Set, Diesel Injector	4910-00-317-8265	5910359
19	F	Kit, Compressor Tool		J-529642-B
20	F	Gauge Set, Manifold	4130-01-032-2912	

Section IV. REMARKS FOR ALL TERRAIN LIFTER, ARMY SYSTEM (ATLAS)

(1) Remarks Code	(2) Remarks
A	Engine assembly is manufactured to metric measure.
B	STE/ICE tests.
C	Service by changing oil and filter.
D	Consists of valve clearance adjustment.
E	Oversize/undersize replacement bearings are available.
F	Inspect for leakage.
G	Includes timing the injection pump using a timing pin method.
H	Consists of cleaning element with compressed air, if appropriate. Crew can remove and clean inner element.
I	Fuel and hydraulic tanks are incorporated in one assembly.
J	Crew adds oil or fuel; Unit Maintenance drains, cleans and refills the tank/reservoir.
K	Fuel control lever travel adjustment.
L	No repair on ROPS or FOPS.
M	Front and rear differential carriers and planetaries are identical, except No-Spin differential is used on front axle.
N	Includes replacement of instrument panels, seat, etc.
O	Only inspect wear pads that are visible at boom ends.
P	Repair by replacing boot and adapter.
Q	End play adjustment.
R	Crew can remove and install only.

APPENDIX C
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section IV. INTRODUCTION

C-1. SCOPE

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the ATLAS. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

C-2. EXPLANATION OF COLUMNS

a. Column (1) -- Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, Appendix C").

b. Column (2) -- Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

c. Column (3) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the part number followed by Commercial And Government Entity (CAGE) Code in parentheses.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by two-character alphabetical abbreviations (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section V. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	O	8040-01-202-1138	Adhesive, P12 (08125)	oz
2	O	6810-00-527-2476	Ammonia	qt
3	O	6850-01-441-3248	Antifreeze, Permanent, Type: Arctic Grade (58536) A-A-52624 55 Gallon Drum	gal
4	O	6850-00-464-9137 6850-01-464-9152	Antifreeze, Permanent, Ethylene Glycol, Inhibited MIL-A-46153 (81349) 5 Gallon Can 55 Gallon Drum	gal gal
5	O	5120-00-926-5175	Brush, Wire	ea
6	O	8040-00-938-1535	Caulk, Silicone, Clear	tu
7	O	8030-00-087-8630	Compound, Anti-seize, MIL-T-83483 (81349) 1 Can	lb
8	O	8030-01-054-0740	Compound, Sealing: Pipe Thread (61603), Type A	ea
9	O	6810-00-543-7415	Denatured Alcohol	qt
10	O	6850-00-926-2276	Fluid, Windshield Washer	qt
10.1	O	9130-01-031-5816	Fuel, Turbine, Aviation (81349) MILT83133 GR JP8	gal
11	O	9320-01-237-1157	Gloves, Rubber	pr
12	O	9150-01-197-7688 9150-01-197-7693 9150-01-197-7690 9150-01-197-7692	Grease, Automotive and Artillery, GAA, MIL-G-10924 (81349) 2-1/4 oz Tube 14 oz Cartridge 1-3/4 Pound Can 35 Pound Can	oz oz lb lb
13	O	9150-00-735-1800	Grease, Graphite	tu
14	O	9150-00-250-0933	Jelly, Petroleum	lb
15	O	2640-00-256-5526	Lubricant, Ru-Glide Rubber	lb
15.1	O	3930-01-512-2281	Lubricant, Teflon Dry, 8526415 (1YHH8) 1 Spray Can	oz

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
17	O		Oil, Fuel, Diesel, DF-2 Regular VVF800 (81349)	
		9140-00-286-5295	5 Gallon Can	gal
		9140-00-286-5296	55 Gallon Drum	gal
		9140-00-286-5294	Bulk	gal
18	O		Oil, Fuel, Diesel, DF-1 Winter VVF800 (81349)	
		9140-00-286-5287	5 Gallon Can	gal
		9140-00-286-5288	55 Gallon Drum	gal
		9140-00-286-5286	Bulk	gal
19	O		Oil, Fuel, Diesel, DF-A Arctic WF800 (81349)	
		9140-00-286-5282	5 Gallon Can	gal
		9140-00-286-5284	55 Gallon Drum	gal
		9140-00-286-5283	Bulk	gal
20	O		Oil, Lubricating, Engine OE/HDO-15/40, MIL-L-2104 (81349)	
		9150-01-152-4117	1 Quart Can	qt
		9150-01-152-4118	5 Gallon Can	gal
		9150-01-152-4119	55 Gallon Drum	gal
21	O		Oil, Lubricating, Engine Arctic OEA, MIL-L-46167 (81349)	
		9150-00-402-2372	1 Quart Can	qt
22	O		Oil, Lubricating, Gear Multipurpose GO 80/90 MIL-L-2105 (81349)	
		9150-01-035-5392	1 Quart Can	qt
		9150-01-035-5393	5 Gallon Can	gal
		9150-01-035-5394	55 Gallon Drum	gal
23	O		Oil, Lubricating, Transmission/Hydraulic OE/HDO-10 MIL-L-2104 (81349)	
		9150-00-189-6727	1 Quart Can	qt
		9150-00-191-2772	55 Gallon Drum	gal
24	O	5350-00-619-9167	Paper, Emery, Grit #80	pcs
25	O	8010-00-159-4518	Primer, Metal (83421)	qt
26	O	7920-00-205-1711	Rags, Wiping (64067)	lb
27	O		Rubber, Window Locking (P/N 8582421-1080)	ea
28	O	8030-01-014-5869	Sealant, Loctite 242 MIL-S-46163 Type II Grade N (80244)	oz
29	O	8030-01-158-6070	Sealant, Loctite 271 MIL-S-46163 Type I Grade L (80244)	oz
30	O	8030-01-063-7510	Sealant, Loctite 277 MIL-S-46163 Type I Grade L (80244)	oz
31	O		Sealant, Loctite 545	oz
32	O	8030-00-204-9149	Sealant, Loctite 59241	oz

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
33	O	8030-00-180-6150	Sealant, Loctite 609 MIL-R-46082BB Type I (05962)	oz
33.1	O	3930-01-504-6944	Sealant, Urethane (1YHH8) 8035523	 oz
34	O	5680-01-067-9998	Sealer, Ribbon, Black Tape	ft
35	O	6810-00-252-1345	Soap, Liquid	bt
36	O	6810-00-264-6618	Soda, Baking	oz
37	O		Solvent, Chlorinated	qt
38	O	 6850-01-337-1808 6850-01-337-3349 6850-01-331-3350	Solvent, Dry Cleaning P-D-680 Type III (81348) 1 Quart Container 1 Gallon Container 1 Drum	 qt gal dr
39	O	8135-00-178-9200	Tags 1 Carton	ctn
40	O	5970-00-547-0966	Tape, Electrical 1 Dispenser	ea
41	O	5975-00-984-6582	Tie Wraps 1 Carton	hd
42	O	8010-00-180-6343	Varnish, Anti-fungus	qt
43	O	6810-00-356-4936	Water, Distilled	gal

APPENDIX D
ILLUSTRATED LIST OF MANUFACTURED ITEMS

None

APPENDIX E
TORQUE LIMITS

E-1. SCOPE

This appendix provides general torque limits for the different fasteners used on the ATLAS. Special torque limits are listed in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal bracket then tighten it one more turn.

E-2. TORQUE LIMITS

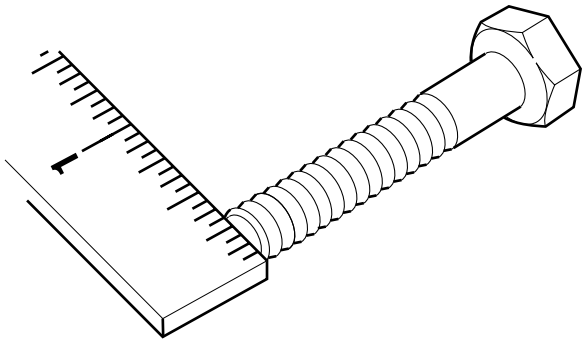
Refer to the following tables for specific torque limits:

* Wet torque limits are used on screws that have high pressure lubricants applied to the threads.
** Dry torque limits are used on screws that do not have high pressure lubricants applied to the threads.

E-3. HOW TO USE THE TORQUE TABLE

a. Measure the diameter of the screw you are installing with a ruler.

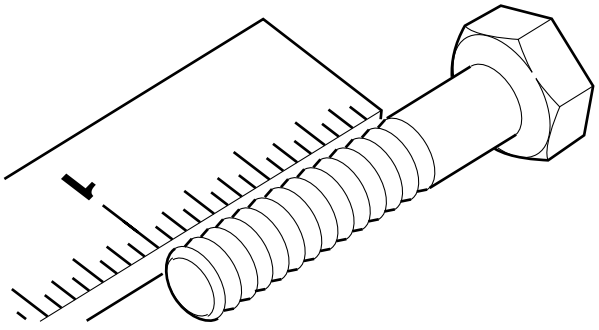
b. Measure out one inch with a ruler and count the number of threads per inch.



c. Under the heading SIZE, look down the left-hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).

d. In the second column under SIZE, find the number of threads per inch that matches the number of threads per inch you counted in Step b. (Not required for metric screws.)

e. To find the grade screw you are installing, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the torque table.



f. Look down the column under the picture you found in Step e. until you find the torque limit (lb-ft or N•m) for the diameter and threads per inch of the screw you are installing.

g. Use wet torque values.

Capscrew Head Markings	
Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).	Metric screws are of three grades: 8.8, 10.9, and 12.9. Grades and manufacturer's marks appear on the screw head.
	
Standard	**Metric**

Table E-1. Torque Limits for Wet Flange Nuts

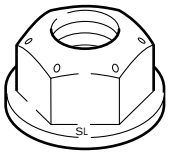
Spiralock Flange Nut Markings Grade 8	Diameter		Threads per inch	Torque	
	In.	mm		lb-ft	N•m
	1/4	6.35	20	15	20
	5/16	7.94	18	25	34
	3/8	9.65	16	45	61
	1/2	12.70	13	110	149
	5/8	15.87	11	210	285
	3/4	19.05	10	375	508

Table E-2. Torque Limits for Wet Socket Head Capscrews

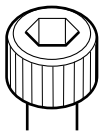
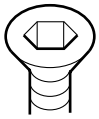
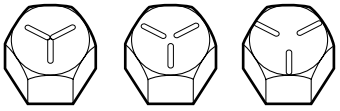
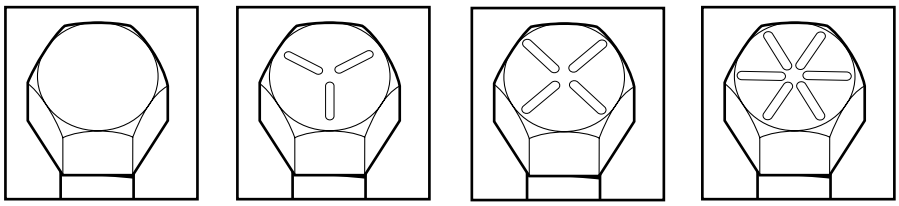
	Torque in Ft Lbs (Capscrews) Lubed		
Socket Head/12 Pt. 	Size	Socket Head or 12 Pt	Socket Flat Head
	0.10-24	5	2.5
	0.25-20	12	6
	0.31-18	25	12
	0.38-16	44	22
Socket Flat Head 	0.50-13	70	36
	0.56-12	106	53
	0.62-11	212	106
	0.75-10	375	187
	1.00-8	781	

Table E-3. Torque Limits for Dry Fasteners

CAPSCREW HEAD MARKINGS



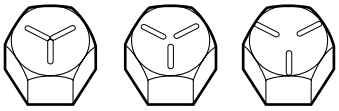
Manufacturer's marks may vary.
These are all SAE Grade 5 (3-line).



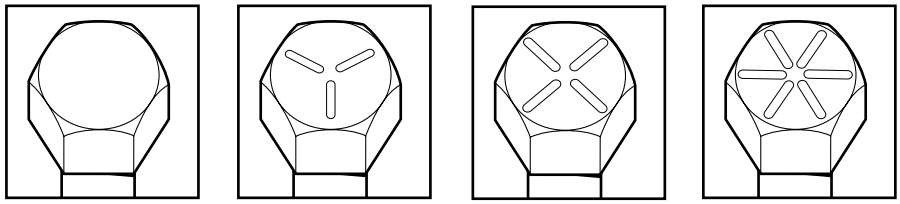
Size			Torque							
			SAE Grade No. 2		SAE Grade No. 5		SAE Grade No. 6 or 7		SAE Grade No. 8	
Dia. Inches	Threads per Inch	mm	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m
1/4	20	6.35	5	7	8	11	10	14	12	16
	28	6.35	6	9	10	14	12	16	14	19
5/16	18	7.94	11	15	17	23	21	28	25	34
	24	7.94	12	16	19	26	24	33	25	34
3/8	16	9.53	20	27	30	41	40	54	45	61
	24	9.53	23	31	35	47	45	61	50	68
7/16	14	11.11	30	41	50	68	60	81	70	95
	20		35	47	55	75	70	95	80	108
1/2	13	12.70	50	68	75	102	95	129	110	149
	20		55	75	90	122	100	136	120	163
9/16	12	14.29	65	88	110	149	135	183	150	203
	18		75	102	120	163	150	203	170	231
5/8	11	15.88	90	122	150	203	190	258	220	298
	18		100	136	180	244	210	285	240	325
3/4	10	19.05	160	217	260	353	320	434	380	515
	16		180	244	300	407	360	488	420	570
7/8	9	22.23	140	190	400	542	520	705	600	814
	14		155	210	440	597	580	786	660	895
1	8	25.40	220	298	580	786	800	1085	900	1220
	12		240	325	640	868	860	1166	1000	1356
1-1/8	7	25.58	300	407	800	1085	1120	1519	1280	1736
	12		340	461	880	1193	1260	1709	1440	1953
1-1/4	7	31.75	420	570	1120	1519	1580	2142	1820	2468
	12		460	624	1240	1681	1760	2387	2000	2712
1-3/8	6	34.93	560	759	1460	1980	2080	2820	2380	3227
	12		640	868	1680	2278	2380	3227	2720	3688
1-1/2	6	38.10	740	1003	1940	2631	2780	3770	3160	4285
	12		840	1139	2200	2983	3100	4204	3560	4827

Table E-4. Torque Limits for Wet Fasteners

CAPSCREW HEAD MARKINGS



Manufacturer's marks may vary.
These are all SAE Grade 5 (3-line).



Size			Torque							
			SAE Grade No. 2		SAE Grade No. 5		SAE Grade No. 6 or 7		SAE Grade No. 8	
Dia. Inches	Threads per Inch	mm	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m
1/4	20	6.35	4	6	6	8	8	11	9	12
	28	6.35	5	7	7	9	9	12	10	14
5/16	18	7.94	8	11	13	18	16	22	18	24
	24	7.94	9	12	14	19	18	24	20	27
3/8	16	9.53	15	20	23	31	30	41	35	47
	24	9.53	17	23	25	34	30	41	35	47
7/16	14	11.11	24	33	35	47	45	61	55	75
	20		25	34	40	54	50	68	60	81
1/2	13	12.70	35	47	55	75	70	95	80	108
	20		40	54	65	88	80	108	90	122
9/16	12	14.29	50	68	80	108	100	136	110	149
	18		55	75	90	122	110	149	130	176
5/8	11	15.88	70	95	110	149	140	190	170	231
	18		80	108	130	176	160	217	180	244
3/4	10	19.05	120	163	200	271	240	325	280	380
	16		140	190	220	298	280	380	320	434
7/8	9	22.23	110	149	300	407	400	542	460	624
	14		120	163	320	434	440	597	500	678
1	8	25.40	160	217	440	597	600	814	680	922
	12		170	231	480	651	660	895	740	1003
1-1/8	7	25.58	220	298	600	814	840	1139	960	1320
	12		260	353	660	895	940	1275	1080	1464
1-1/4	7	31.75	320	434	840	1139	1100	1492	1360	1844
	12		360	488	920	1248	1320	1790	1500	2034
1-3/8	6	34.93	420	570	1100	1492	1560	2115	1780	2414
	12		460	624	1260	1709	1780	2414	2040	2776
1-1/2	6	38.10	560	760	1460	1980	2080	2820	2360	3200
	12		620	841	1640	2224	2320	3146	2660	3607

APPENDIX F
TOOL IDENTIFICATION LIST

Section I. INTRODUCTION

F-1. SCOPE

This appendix lists the tools you will need to operate and maintain the ATLAS.

F-2. EXPLANATION OF COLUMNS

a. Column (1) -- Item Number. This number is assigned to the entry in the listing and is referenced in the narrative task box to identify the tool (e.g., "Tool Kit, General Mechanic's: Automotive (Item 18, Appendix F)").

b. Column (2) -- Item Name. This column identifies the tool.

c. Column (3) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column (4) - Part Number. This is the manufacturer's part number assigned to the item.

e. Column (5) - Reference. This column references the Supply Catalog Number and tools which are part of/ components of shop set authorized to section/teams; tools authorized by RPSTL and CTA 50-970; special and fabricated tools; and items of TMDE.

Section II. TOOL IDENTIFICATION LIST

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
1	Bits, Torx Head Set	5120-01-170-4454	38699-1	SC 4910-95-CL-A72
2	Cable/Chain Hoist, 6000 lb capacity	3950-00-965-0097		
3	Cap and Plug Set	5340-00-450-5718	10935405	
4	Floor Jack, 10-ton capacity	4910-00-289-7233		SC 4910-95-A31
5	Flowmeter, Hydraulic	4940-01-079-5263	13221E6829	
6	Gage, Hydraulic Pressure	4940-01-086-8756	13221E6828	
7	Jackstand, 10-ton capacity	4910-01-265-0401	93525	SC 4910-95-A31
8	Level, Template	4910-01-075-0020	3375855	
9	Multimeter, Digital	6625-01-139-2512	T00377	SC 4910-95-A72
10	Press, Arbor, 10-ton	3444-00-163-4338		
11	Protractor, Circular	5210-00-273-3422	GGG-P-676	
12	Puller, Steering Wheel	5120-00-620-0020		
13	Refrigerant Leak Detector	4330-01-411-6560		
14	Shop Equipment, Automotive Maintenance and Repair, Common No. 1 Less Power	4910-00-754-0654	W32593	SC 4910-95-CL-A74
15	Shop Equipment, Automotive Maintenance, Common No. 2 Less Power	4910-00-754-0650	W32730	SC 4910-95-CL-A72
16	Soldering Kit	3439-00-460-7198		
17	STE/ICE-R (Include transducer from AAL)	4910-00-124-2554 (6685-01-193-1733)	12258760 (1225B956)	TM 9-4910-571-12&P
18	Tool Kit, General Mechanic's: Automotive	5180-00-177-7033	W33004	SC 5180-90-N26
19	Tool Kit, Machinists: Post, Camp and Station	5280-00-511-1950	W44512	SC 5280-95-CL-A02
20	Tool Outfit, Hydraulic System Test and Repair (HSTRU)	4940-01-036-5784	13221E6850	SC 4940-95-CL-B07
21	Wrench, Adjustable	5120-00-264-3793		

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
22	Wrench, Strap, 1 - 6 in. Capacity	5120-00-776-1840	W18-36	
23	Wrench, Torque, 3/8 inch drive, 0-200 lb-in (0-1700 N•m)	5120-00-853-4538	F200-1	SC 4910-95-A72
24	Wrench, Torque, 1/2 inch drive, 0-175 lb-ft (0-237 N•m)	5100-00-640-6364	A-A-2411	SC 4910-95-A72
25	Wrench, Torque, 0-600 lb-ft (0-814 N•m)	5120-00-221-7983	SW130-301	SC 4910-95-A74

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W

By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
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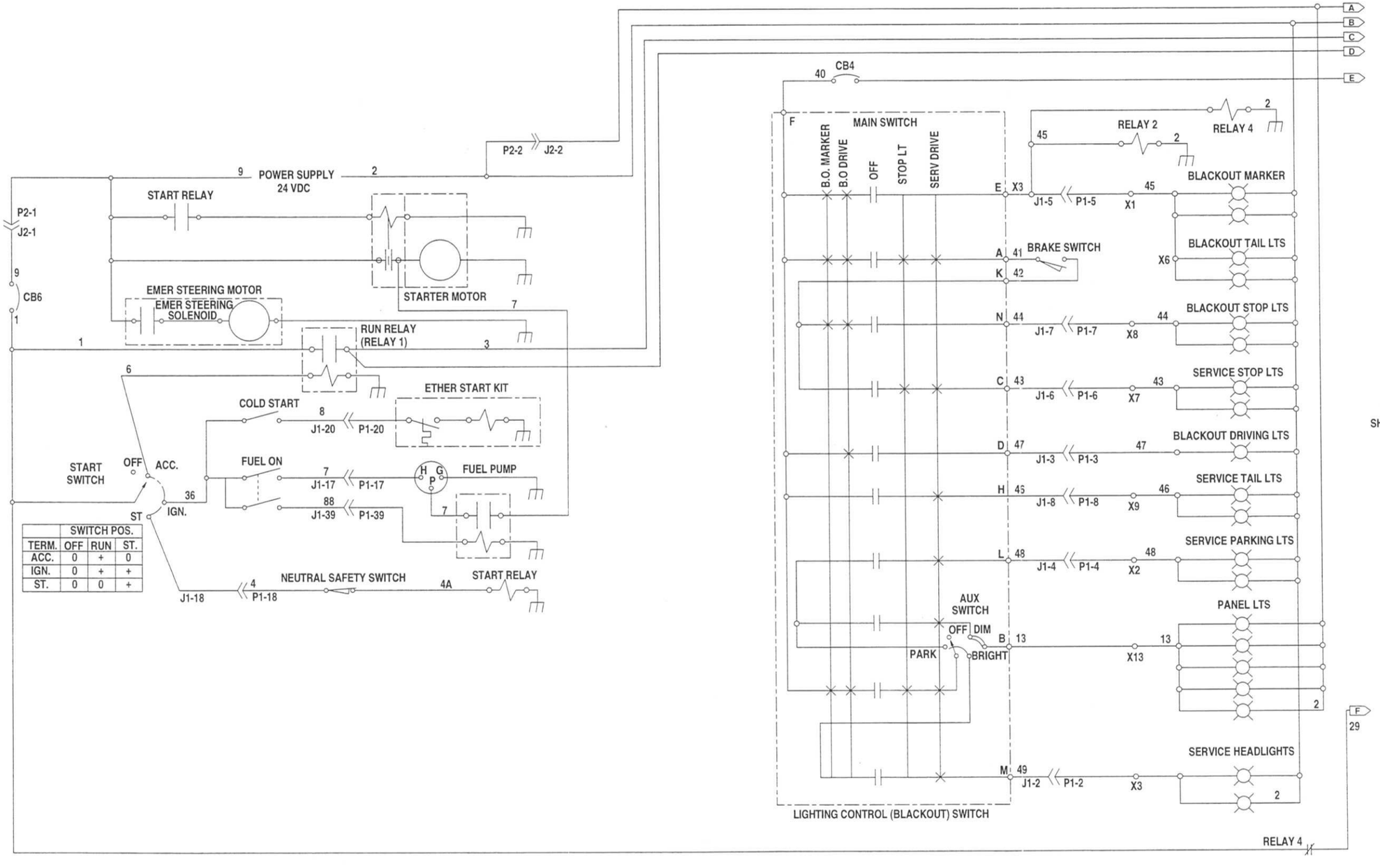

Figure FO-1. Electrical System (Sheet 1 of 3)

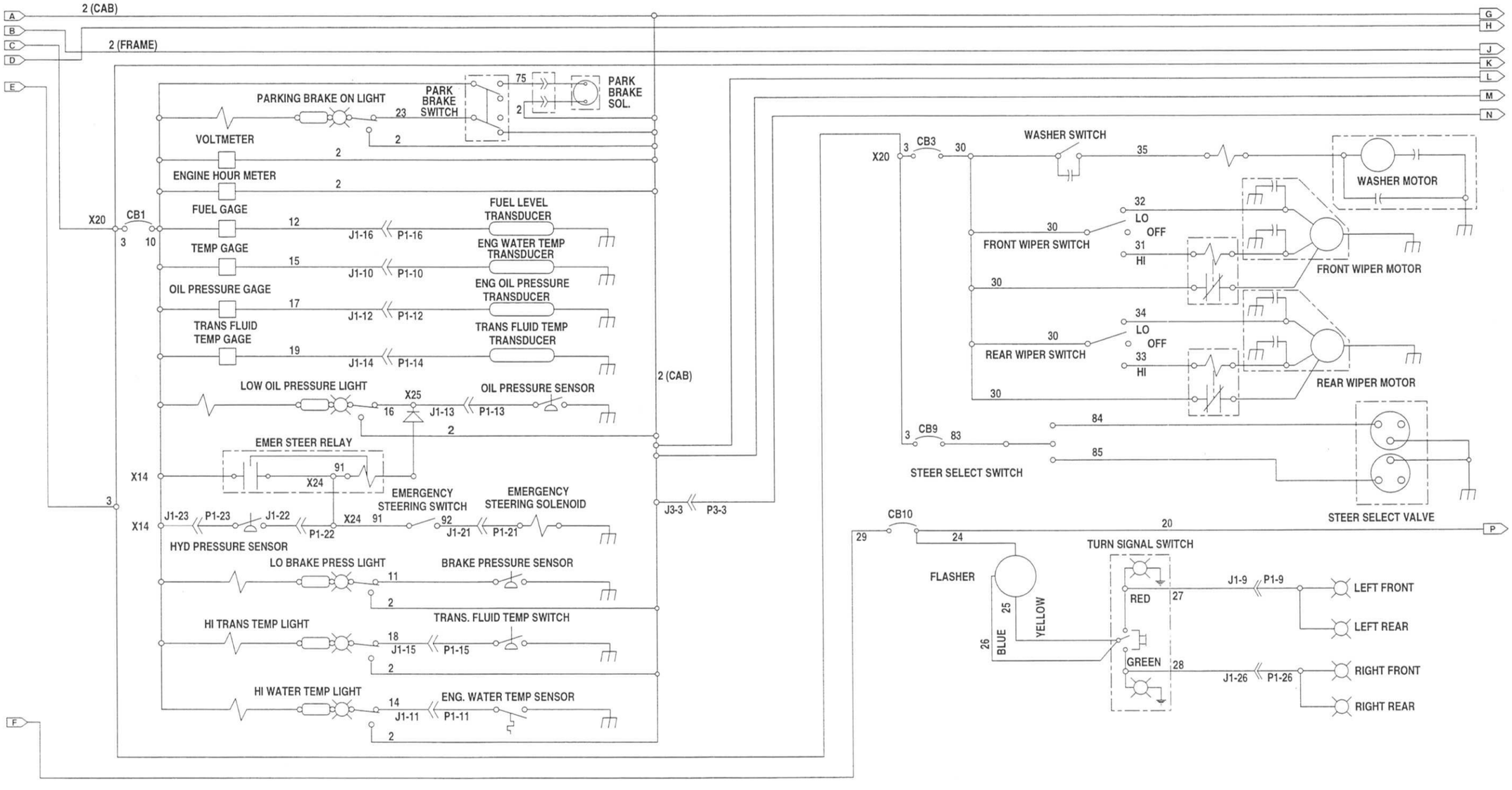

Figure FO-1. Electrical System (Sheet 2 of 3)

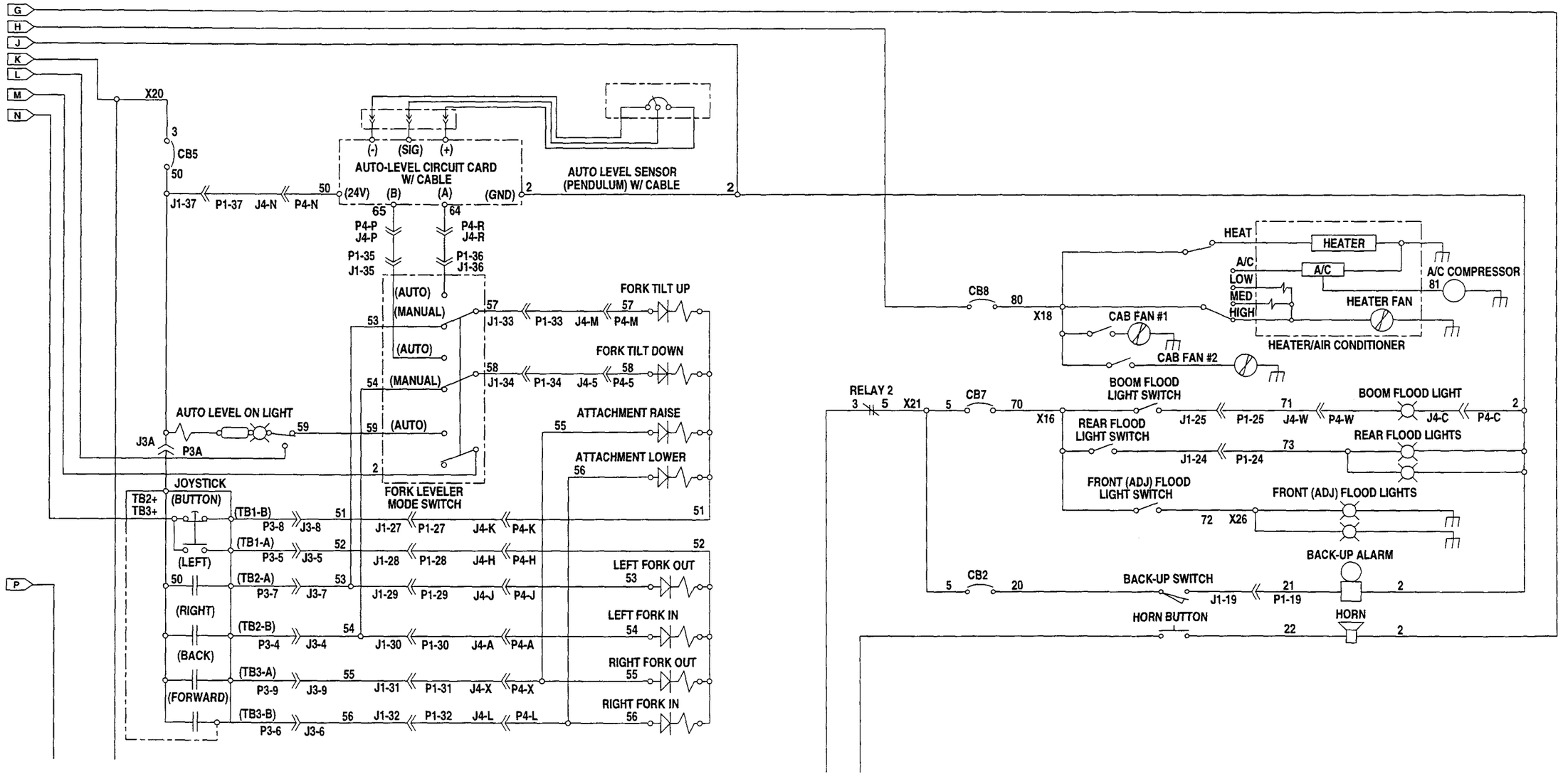

Figure FO-1. Electrical System (Sheet 3 of 3)

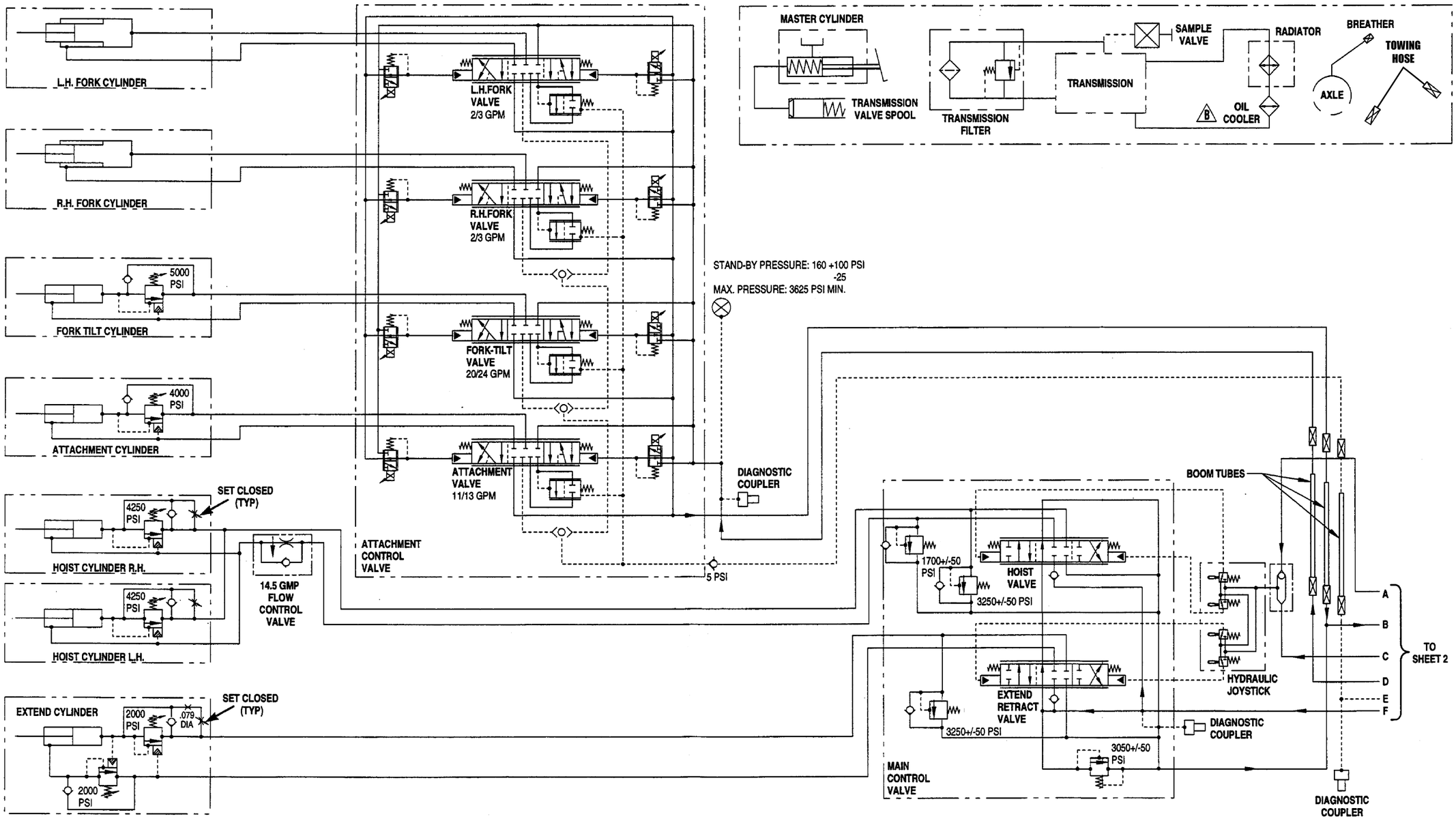

Figure FO-2. Hydraulic System (Sheet 1 of 2)

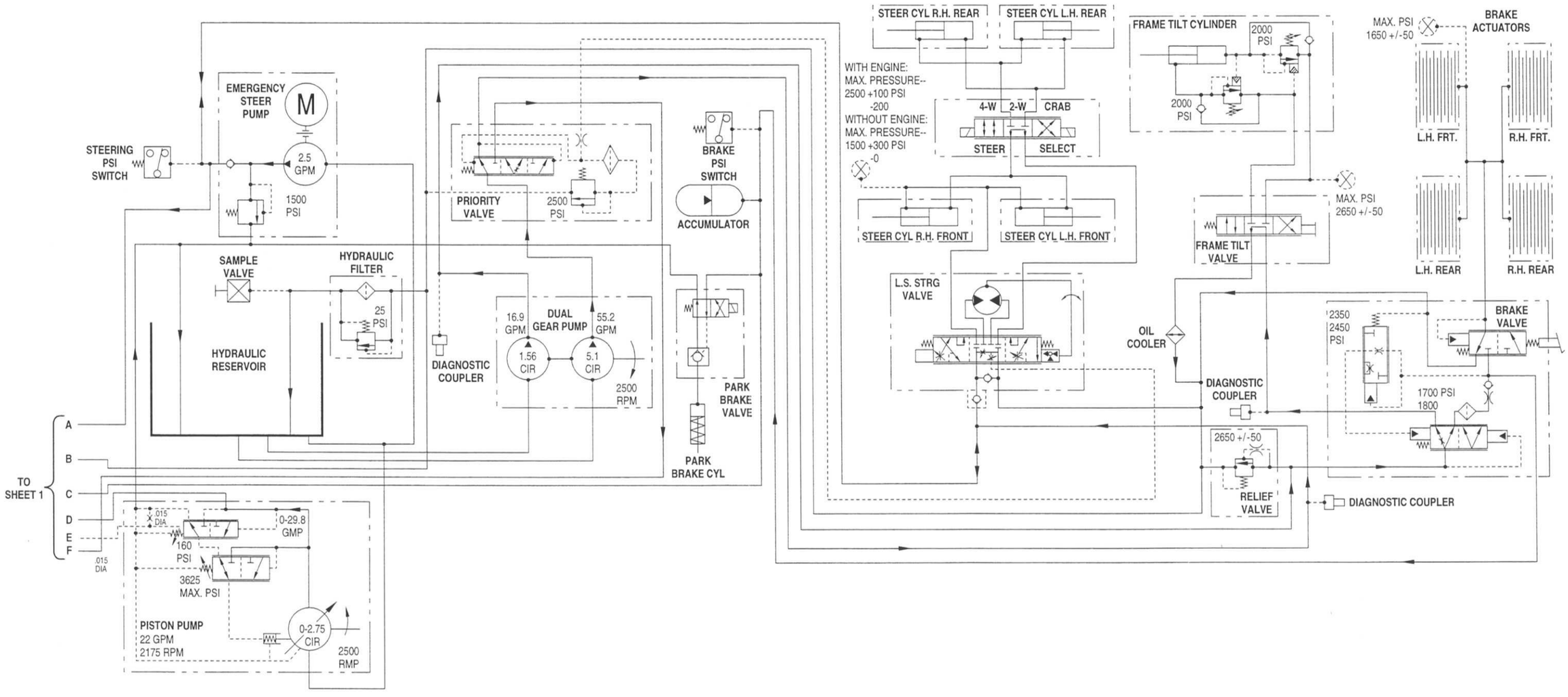

Figure FO-2. Hydraulic System (Sheet 2 of 2)

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter=10 Millimeters=0.01 Meters=0.3937 Inches
1 Meter=100 Centimeters=1000 Millimeters=39.37 Inches
1 Kilometer=1000 Meters=0.621 Miles

WEIGHTS

1 Gram=0.001 Kilograms=1000 Milligrams=0.035 Ounces
1 Kilogram=1000 Grams=2.2 Lb
1 Metric Ton=1000 Kilograms=1 Megagram=1.1 Short Tons

LIQUID MEASURE

1 Milliliter=0.001 Liters=0.0338 Fluid Ounces
1 Liter=1000 Milliliters=33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter=100 Sq Millimeters=0.155 Sq Inches
1 Sq Meter=10,000 Sq Centimeters=10.76 Sq Feet
1 Sq Kilometer=1,000,000 Sq Meters=0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches
1 Cu Meter=1,000,000 Cu Centimeters=35.31 Cu Feet

TEMPERATURE

5/9 (°F – 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 (C° + 32) = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Squares 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/Sq 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
Sq Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Sq 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 Sq Inch	0.145
Km per Liter	Miles per Gallon	2.354
Km per Hour	Miles per Hour	0.621