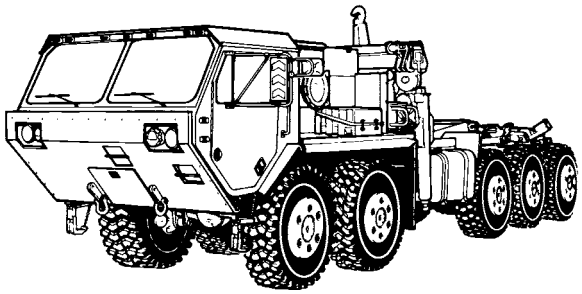
TM 9-2320-364-20-2

THIS MANUAL SUPERSEDES TM 9-2320-364-20-2 DATED 01 AUG 1999, INCLUDING ALL CHANGES.

TECHNICAL MANUAL

UNIT MAINTENANCE VOLUME II

PALLETIZED LOAD SYSTEM



MODEL M1074/M1075

NSN 2320-01-304-2277
NSN 2320-01-304-2278

ATEC TROUBLESHOOTING	2-811
ENGINE TROUBLESHOOTING	2-935
FUEL SYSTEM TROUBLESHOOTING	2-1012
COOLING SYSTEM TROUBLESHOOTING	2-1071
EXHAUST SYSTEM TROUBLESHOOTING	2-1097
ELECTRICAL SYSTEM TROUBLESHOOTING	2-1105
TRANSMISSION TROUBLESHOOTING	2-1675
TRANSFER CASE TROUBLESHOOTING	2-1700
DRIVESHAFT TROUBLESHOOTING	2-1727
BRAKE SYSTEMS TROUBLESHOOTING	2-1737
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DISTRIBUTION RESTRICTION
Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY
30 NOVEMBER 2005

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

WARNING

Radiator, radiator cap, coolant, and hoses are very hot and pressurized during truck operation. Let radiator cool before checking hoses. Failure to do so may result in serious burns to personnel.

WARNING

Use extreme care when removing the radiator pressure cap. Sudden release of pressure can cause a steam flash which could seriously injure personnel. Slowly loosen cap to the first stop to relieve pressure before removing cap completely. After opening, securely tighten cap.

WARNING

Use a clean, thick waste cloth or like material to remove radiator pressure cap. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.

WARNING

Apply truck brakes and chock wheels before any maintenance tasks are performed. Otherwise serious injury to personnel could result.

WARNING

Never use fuel to clean parts. Fuel is highly flammable. Serious personal injury could result if fuel ignites during cleaning.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.

WARNING

Steam cleaning creates hazardous noise levels and severe burn potential. Eye, skin, and ear protection is required. Failure to comply may result in injury to personnel.

WARNING

Solvents used with a spray gun must be used in a spray booth with filter. Face shield must be used by personnel operating spray gun. Failure to comply may result in injury to personnel.

WARNING

On direct contact, uncured silicone sealant irritates eyes. In case of contact, flush eyes with water and seek medical attention. In case of skin contact, wipe off and flush with water.

WARNING

Do not drain engine oil while engine is hot. Severe injury to personnel may result.

WARNING

Ensure engine is cool before performing this task or injury to personnel may result.

WARNING

Use care when removing springs. Springs are under tension and can act as projectiles when released and could cause injury to personnel.

WARNING

Use care when installing springs. Springs are under tension and can act as projectiles when released and could cause injury to personnel.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

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.

WARNING

Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.

WARNING

After Nuclear, Biological, or Chemical (NBC) exposure of truck, all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive material are present. If truck is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with FM 3-4. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation area away from the worksite. The same procedure applies for radioactive dust contamination. The Company NBC team should measure radiation prior to filter removal to determine extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with FM 3-5 and local SOP.

WARNING

Brake drum can get very hot during vehicle operation. Place hand near drum to check for excessive heat, but do not touch. Failure to comply may result in injury to personnel.

WARNING

Use extreme care when removing coolant system pressure tester. Sudden release of pressure can cause injury to personnel.

WARNING

Fuel is slippery and can cause falls. To avoid injury, wipe up spilled fuel with rags.

WARNING

Starting fluid is toxic and highly flammable. Container is pressurized. NEVER heat container and NEVER discharge starting fluid in confined areas or near open flame. Severe injury to personnel may result.

WARNING

Allow engine to cool before performing maintenance on the muffler, exhaust pipe, exhaust manifold or turbocharger. If necessary, use insulated pads and gloves.

WARNING

Muffler weighs 152 lbs (69 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Ensure this task is done only when muffler is cool. Performing this task on a warm or hot muffler may result in severe burning to personnel.

WARNING

Use extreme care when removing coolant system pressure tester. Sudden release of pressure can cause injury to personnel.

WARNING

Excess coolant may splash out upon removal of tube from hump hose. Ensure proper eye protection is worn to prevent possible injury to personnel.

WARNING

Cooling assembly weighs 925 lbs (420 kg). Attach suitable lifting device for removal and properly support cooling assembly to prevent possible injury to personnel.

WARNING

Ensure all personnel stay clear of radiator while engine is running. Air in radiator will be released which may cause hot coolant to spray out and cause injury or death to personnel.

WARNING

Engine cover assembly weighs 55 lbs (25 kg). Use an assistant to help remove engine cover assembly or injury to personnel may result.

WARNING

Radiator assembly weighs 575 lbs (261 kg). Do not stand directly under radiator assembly or injury to personnel may result.

WARNING

Ensure grille assembly is fully supported by lifting device prior to removal of screws. Failure to comply may result in severe injury to personnel.

WARNING

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

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

WARNING

Starter weighs 73 lbs. (33 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Starter weighs 73 lbs. (33 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

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.

WARNING

Use care when installing 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.

WARNING

Diesel fuel is flammable. Do not perform this procedure near fire, flame, or sparks. Injury or death to personnel could result.

WARNING

Do not remove screws securing fan brace. Removing screws will cause fan brace to drop and may result in severe injury or death to personnel.

WARNING

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

WARNING

Upon removal of all wires and cables, ensure no contact is made with battery terminals or other wires and cables. Strap wires and cables away from battery terminals and other wires and cables as required to prevent damage to parts, personal injury, or death.

WARNING

Ensure that exhaust pipe and turbo charger pipe connections are free from soot or debris. Failure to comply may result in exhaust leak and injury or death to personnel.

WARNING

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

WARNING

Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

WARNING

Wear safety goggles and acid-proof gloves when battery cover must be removed or when adding electrolyte.

WARNING

Avoid electrolyte contact with skin, eyes, or clothing. If battery electrolyte spills, take immediate action to stop burning effects:

- External: Immediately flush with cold running water to remove all acid.
- Eyes: Flush with cold water for at least 15 minutes. Seek immediate medical attention.
- Internal: Drink large amounts of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Seek immediate medical attention.
- Clothing or Vehicle: Wash at once with cold water. Neutralize with baking soda or household ammonia solution.

WARNING

Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.

WARNING

Corrosion inhibitor contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention.

WARNING

Do not allow personnel to perform maintenance directly under boom or mast. Failure to follow proper procedures could cause serious injury or death.

WARNING

22 to 28 vdc are always present on wire 1431 at the ENGINE switch. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

WARNING

22 to 28 vdc are always present on wire 1281 and DUVAC connectors. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

WARNING

22 to 28 vdc are always present on wire 1139 at starter solenoid. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

WARNING

Transmission oil will be extremely hot when drained. Do not come in contact with hot oil to avoid severe burns. If burned with hot oil, seek medical attention immediately.

WARNING

Ensure there are no personnel in front of truck when placing it into drive. Failure to do so may result in injury or death to personnel.

WARNING

Ensure transmission oil and filter are cool prior to removal. Failure to comply may result in injury to personnel.

WARNING

Wear safety goggles when performing tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

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.

WARNING

Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.

WARNING

Driveshafts can weigh up to 100 lbs (45 kg), obtain aid from an assistant to prevent possible injury to personnel.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death keep flame away from fuel and keep fire extinguisher within easy reach.

WARNING

Use jackstands to support axle weight. Failure to comply may result in injury to personnel.

WARNING

Brake shoes may be covered with dust. Breathing this dust may be harmful to your health. Do not use compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury or death to personnel.

WARNING

Use care when removing brake spring. Spring is under tension and can act as a projectile when released and could cause injury to personnel.

WARNING

Use care when installing brake spring. Spring is under tension and can act as a projectile when released and could cause injury to personnel.

WARNING

22 to 28 vdc are always present at DUVAC connectors. Care must be exercised when removing the DUVAC cover. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuitc, a direct short may result. Damage to equipment, injury or death to personnel may occur.

WARNING

Spring in air chamber is very powerful and is under tension. Failure to cage air chamber before removal will release tension of spring abruptly and could result in injury or death to personnel.

WARNING

Air reservoir will fall when screws are removed. Support air reservoir prior to removing screws to prevent injury to personnel.

WARNING

Do not touch hot exhaust system with bare hands; injury to personnel will result.

WARNING

Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

WARNING

Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure bracket does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

WARNING

Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure DUVAC cover or bracket does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

WARNING

Inner wheel weighs 105 lbs (48 kg). Attach suitable lifting device prior to moving rim to prevent possible injury to personnel.

WARNING

Ensure all personnel keep hands and fingers out from between tire and bead lock. Failure to comply may result in injury to personnel.

WARNING

Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.

WARNING

High pressure hydraulics [oil under 3,700 psi (25,512 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fittings without first dropping pressure to zero. High pressure oil stream can pierce body and cause severe injury to personnel.

WARNING

Ensure all personnel wear proper eye protection. Do not stand directly in front of valve stem when draining air from tire. Tire is under extreme air pressure. Failure to comply may result in injury to personnel.

WARNING

Prolonged contact with lubricating oil (MIL-L-2104) may cause a skin rash. Skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be well-ventilated to keep fumes to a minimum.

WARNING

Tie-rod end may unexpectedly pop-up when pressure is applied with hydraulic jack. Keep hands and face clear of tie-rod end. Failure to comply may result in severe injury to personnel.

WARNING

Skid plate weighs 130 lbs (59 kg). Attach suitable lifting device prior to removal to prevent injury to personnel.

WARNING

Skid plate structure weighs 95 lbs (43 kg). Attach suitable lifting device prior to removal to prevent injury to personnel.

WARNING

Skid plate crossmember weighs 55 lbs (25 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Right hand and left hand extension assemblies weigh 110 lb (50 kg) each. Use the aid of an assistant when lifting to prevent injury to personnel.

WARNING

Crossover tube weighs 100 lbs (45 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Each hard lift bracket weighs 67 lbs (30 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Self-guided coupler weighs 100 lbs (45 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands, or allow body to come in contact with pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

WARNING

Support hoist extension before removing retaining pin or injury to personnel may occur.

WARNING

Tire carrier weighs 145 lbs (66 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Wire rope can become frayed or contain broken wires. Wear heavy leather-palmed work gloves when handling wire rope. Frayed or broken wires can cause injury to personnel.

WARNING

Never let moving wire rope slide through hands, even when wearing gloves. A broken wire could cut through glove and can cause injury to personnel.

WARNING

Cab door weighs 100 lbs (45 kg). Support with suitable lifting device to avoid injury to personnel.

WARNING

Do not let window fall. Broken glass may cause serious injury to personnel.

WARNING

Platform assembly weighs 62 lbs (28 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Always wear proper eye protection and protective clothing when handling glass. Failure to comply may result in injury to personnel.

WARNING

Seat assembly weighs 55 lbs (25 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Box assembly weighs 92 lbs (42 kg). Ensure box assembly is properly supported to prevent possible injury to personnel.

WARNING

Wear heavy gloves when handling crane cable. Never let cable run through hands; frayed cables can cut.

WARNING

The crane hydraulic system operates at oil pressures up to 3,100 psi (21,375 kPa). Never disconnect any hydraulic line or fitting without first dropping the pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Self-recovery winch weighs 645 lbs (292 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Front tension guide weighs 60 lbs (27 kg). Use an assistant to prevent possible injury to personnel.

WARNING

Leave top front screw installed in frame to prevent spacer from falling. Failure to comply may result in injury to personnel.

WARNING

Front guide assembly weighs 75 lbs (34 kg). Use an assistant to prevent injury to personnel.

WARNING

Position top front screw in frame to hold spacer in place. Failure to comply may result in injury to personnel.

WARNING

Rear tension guide weighs 50 lbs (23 kg). Use an assistant to prevent injury to personnel.

WARNING

Rear guide assembly weighs 65 lbs (29 kg). Use an assistant to prevent possible injury to personnel.

WARNING

Rear roller assembly weighs 375 lbs (170 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Do not remove heater hoses when engine is hot; steam and hot coolant can escape and burn personnel.

WARNING

Use clean wiping rags or like material to remove heater hoses. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.

WARNING

Coolant is slippery and can cause falls and injury. Clean up spilled coolant immediately.

WARNING

Allow engine to cool prior to removal of heater core to prevent burns and injury to personnel.

WARNING

Use caution when removing hoses to prevent getting antifreeze in eyes or mouth, if antifreeze does get in eyes or mouth, seek medical attention immediately.

WARNING

Extreme care should be taken when removing heater hoses if water temperature gage reads above 180 degrees F (82 degrees C). Contact by steam or hot coolant may result in injury or death to personnel.

WARNING

Allow engine to cool prior to removal of valve to prevent burns and possible injury to personnel.

WARNING

Ensure engine is cool before performing this task or severe burns from hot hydraulic fluid may result.

WARNING

The main hydraulic system operates at oil pressures up to 3,675 psi (25,339 kPa). Never disconnect any hydraulic line, fitting or component without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Use extreme care when loosening filler cap. Sudden release of pressure could seriously injure personnel. Slowly loosen cap to relieve pressure and ensure proper eye protection is worn.

WARNING

Hydraulic reservoir weighs 120 lbs (54 kg). The aid of an assistant is required to prevent possible injury to personnel.

WARNING

Battery weighs 75 lbs (34 kg). Remove battery only with the aid of an assistant to prevent possible injury to personnel.

WARNING

Battery weighs 75 lbs (34 kg). Install battery only with the aid of an assistant to prevent possible injury to personnel.

WARNING

Battery box weighs 75 lbs (34 kg). Use the aid of an assistant to prevent possible injury to personnel.

WARNING

Sharp edges of exhaust pipe could cause injury to personnel.

WARNING

Coolant may run out of water jacket when turned. Wear eye protection or injury to personnel may result.

WARNING

High pressure hydraulics [oil under 3,100 psi (21,374 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fittings without first dropping pressure to zero. A high pressure oil stream can pierce body and cause severe injury to personnel.

WARNING

Machine gun ring weighs 295 lbs (134 kg). Attach suitable lifting device to prevent injury to personnel.

WARNING

Machine gun ring front support weighs 55 lbs (25 kg). Attach suitable lifting device to prevent injury to personnel.

WARNING

Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

WARNING

Ensure equipment will not move while repairing or inspecting it. For trailers, “red tag” the hitch, and block or chock wheels or tracks. For powered equipment, block or chock wheels or tracks, and “red tag” the starter. Prevent a “quick fix” from becoming a quick injury.

WARNING

When adjustment or service requires a running engine, two personnel will be used; one at controls and one at service point. This helps prevent accidental movement of controls.

WARNING

Wires 1866 and 1867 have 12 vdc at all times direct from batteries. Care must be exercised when working with these wires to avoid injury to personnel.

WARNING

Ensure all personnel are clear of rear of truck before shifting into R (reverse). Failure to do so might result in injury or death to personnel.

WARNING

Circuit breakers and relays are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

WARNING

Ether is toxic and highly flammable. Container is pressurized. Never heat container and never discharge ether into confined areas or near open flame. Severe injury to personnel may result.

WARNING

Do not place any part of body in area of fan operation. Failure to do so will result in injury or death to personnel.

WARNING

10 to 14 vdc are always present at terminals E and F of connector MC7.

WARNING

Before inflating or deflating, stand out of the trajectory area or personal injury or death may result.

WARNING

Hot transmission oil can cause severe burns and injury to personnel. Transmission should be allowed to cool before oil is drained.

WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

WARNING

If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

WARNING

Exercise extreme caution when working around wheels or under truck while engine is operating. Movement of truck may cause injury or death to personnel.

WARNING

Keep clear of equipment when equipment is being raised or lowered. Equipment may fall and cause serious injury or death to personnel.

WARNING

Never crawl under equipment when performing maintenance unless equipment is securely blocked. Equipment may fall and cause serious injury or death to personnel.

WARNING

Do not work on any item supported only by lift jacks or hoist. Always use blocks or proper stands to support the item prior to any work. Equipment may fall and cause injury or death to personnel.

WARNING

Ensure transmission is cool before proceeding. Failure to comply may result in injury to personnel.

WARNING

Keep hands and arms away from fan blade and drive while engine is running, or serious injury to personnel will result.

WARNING

Maintain adequate distance from moving steering parts or serious injury to personnel may result.

WARNING

Do not stand between wheels when engine is operating. Movement of vehicle can cause injury or death to personnel.

WARNING

Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

WARNING

Do not use retread tires on vehicles equipped with a Central Tire Inflation System (CTIS). Use only the tires that are specified in the Repair Parts and Special Tools List (RPSTL). Failure to comply may result in tire failure and loss of vehicle control.

WARNING

Ensure transfer case is cool before proceeding. Failure to comply may result in injury to personnel.

WARNING

Failure to place wheel/tire assembly in safety cage prior to initial inflation could result in serious injury or death to personnel.

WARNING

When a wheel/tire is in a restraining device, do not lean any part of body or equipment on or against the restraining device, or injury or death could result.

WARNING

Stand clear of trajectory area during deflation or personal injury or death may result.

WARNING

Always completely deflate tire by removing valve core from valve stem before attempting demounting operation. After air has finished exhausting from valve stem, carefully run a piece of wire through valve stem to ensure it is not plugged and tire is completely deflated. Failure to comply may result in injury to personnel.

WARNING

Wheel/tire assembly must be deflated in a safety cage or personal injury or death may result.

WARNING

Keep hands clear of studs and outer face of wheel to prevent injury to personnel.

WARNING

Wheel/tire assembly weighs 523 lbs (237 kg). Attach suitable lifting device prior to moving to prevent possible injury to personnel.

WARNING

Stay out of the trajectory as indicated by the area shown. Under some circumstances, the trajectory may deviate from its expected path. Injury or death to personnel may result.

WARNING

Container lock could drop suddenly if not supported. Failure to comply may result in injury to personnel.

WARNING

Slider weighs 142 lbs (64 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Right front support bracket weighs 98 lbs (44 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Left front support bracket weighs 98 lbs (44 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Front support assembly weighs 660 lbs (299 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Front crossmember assembly weighs approximately 500 lbs (227 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Stow cone weldment weighs approximately 225 lbs (102 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Rear guide assembly weighs 70 lbs (32 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Slide arm weighs 65 lbs (29 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Lifting frame weighs 1600 lbs (726 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Stow weldment weighs 410 lbs (186 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Rear roller bracket weighs 150 lbs (68 kg). When removing one rear roller bracket, ensure remaining rear roller bracket is supported. Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Arm assembly weighs 240 lbs (109 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Right strut bracket assembly weighs 80 lbs (36 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Alternator weighs 75 lbs (34 kg). Use the aid of an assistant to prevent possible injury to personnel.

WARNING

Starter weighs 73 lbs (33 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

WARNING

Ensure brake drum is not pulled back more than approximately two inches (5 cm). Failure to comply may result in injury or death to personnel.

WARNING

Most circuit breakers are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the ECB cover.

WARNING

Tip of removal tool is very sharp. Use caution when using tool. Failure to comply may result in injury to personnel.

WARNING

Stand clear of tires while turning them. Failure to do so may result in injury or death to personnel

WARNING

Never inflate the wheel/tire assembly unless all ten outer wheel nuts have been properly torqued or personal injury could result.

WARNING

Brake drum weighs 132 lbs (60 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Axle's No. 1 and No. 2 brake drums may swing out during removal. Use the aid of an assistant to support lifting device. Failure to comply may result in injury to personnel.

WARNING

Keep hands clear of studs and outer face of axles to prevent injury to personnel.

WARNING

Stand clear of tires while turning. Failure to do so may result in injury or death to personnel.

WARNING

Sharp edges of exhaust pipe could cause injury to personnel.

WARNING

Do not remove hoses when cooling system is hot; steam and hot coolant can escape and burn personnel.

WARNING

The hydraulic system operates at high pressures. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

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

- ALWAYS use air line respirators when using CARC paint unless air sampling shows exposure to be below standards. Use chemical cartridge respirator if air sampling is below standards.
- DO NOT let skin or eyes come in contact with CARC paint. Always wear protective equipment (gloves, ventilation mask, safety goggles, etc.).
- DO NOT use CARC paint without adequate ventilation.
- NEVER weld or cut CARC-coated materials.
- DO NOT grind or sand painted equipment without high-efficiency air purifying respirators in use.
- BE AWARE of CARC paint exposure symptoms; symptoms can occur a few days after initial exposure. Seek medical help immediately if symptoms are detected.

WARNING

Horizontal roller weighs 75 lbs (34 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Do not put fingers in between boom sections when removing wear pads. Use a screwdriver or similar tool to remove wear pads. Failure to comply may result in injury to personnel.

WARNING

Do not put fingers in between boom sections when installing wear pads. Use a screwdriver or similar tool. Failure to comply may result in injury to personnel.

WARNING

Do not inhale fumes; could cause severe injury or death.

WARNING

Do not over-tighten clamp during installation. Accumulator is filled with compressed gas, and a change in pressure could cause crane to malfunction. Failure to complay may result in injury or death to personnel.

WARNING

Wire cable assembly can become frayed or contain broken wires. Wear heavy leather-palmed work gloves when handling wire cable assembly. Frayed or broken wires can cause injury to personnel.

WARNING

Never let moving wire cable assembly slide through hands, even when wearing gloves. A broken wire could cut through glove and cause injury to personnel.

WARNING

Air cleaner assembly can weigh up to 100 lbs (45 kg). Ensure air cleaner assembly is properly supported during removal. Failure to comply may result in injury to personnel.

WARNING

Ensure air cleaner assembly is properly supported. Failure to comply may result in injury to personnel.

WARNING

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

WARNING

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

WARNING

Pull out ride control valve knob to release pressure in air-ride system. Failure to comply may result in injury to personnel.

LIST OF EFFECTIVE PAGES

Dates of issue for original and changed pages are:

Original..... 01 August 1999
Revision 0001..... 30 November 2005

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 1420 CONSISTING OF THE FOLLOWING:

Page No.	* Change No.
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Blank	0
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iv Blank	0
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2-934 Blank	0
2-935 thru 2-1069	0
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2-1071 thru 2-1095	0
2-1096 Blank	0
2-1097 thru 2-1103	0
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2-1105 thru 2-1673	0
2-1674 Blank	0
2-1675 thru 2-1725	0
2-1726 Blank	0
2-1727 thru 2-1735	0
2-1736 Blank	0
2-1737 thru 2-1911	0
2-1912 Blank	0
A-1 and A-2	0
B-1 thru B-42	0
C-1 thru C-10	0
D-1 thru D-16	0
E-1 thru E-7	0
E-8 Blank	0
F-1 thru F-13	0
F-14 Blank	0
G-1 thru G-4	0
INDEX-1 thru INDEX-15	0
INDEX-16 Blank	0
SCHMTC-1	0
SCHMTC-2 Blank	0
SCHMTC-3	0
SCHMTC-4 Blank	0
FP-1 thru FP-69	0
FP-70 Blank	0
SCHMTC-5	0
SCHMTC-6 Blank	0
FP-1 thru FP-51	0
FP-52 Blank	0

* Zero In This Column Indicates An Original Page.

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY

No. 9-2320-364-20

Washington D.C.,30 November 2005

Unit Maintenance Manual

PALLETIZED LOAD SYSTEM

MODEL M1074/M1075
NSN 2320-01-304-2277
NSN 2320-01-304-2278

Current as of 31 October 2005

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM." The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or email your letter, DA Form 2028, or DA Form 2028-2 direct to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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C EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST C-1

D ILLUSTRATED LIST OF MANUFACTURED ITEMS D-1

E TORQUE LIMITS E-1

This manual supersedes TM 9-2320-364-20-2, dated 01 August 1999.

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HOW TO USE THIS MANUAL

This manual is designed to help maintain the Model M1074/M1075 Palletized Load System (PLS) truck. Listed below are some special features included in this manual to help locate and use the needed information:

- A front cover table of contents is provided for quick reference to chapters and sections that will be used often.
- WARNING, CAUTION, and NOTE headings, subject headings, and other essential information are printed in bold type making them easier to see.
- The maintenance tasks describe what must be done to the truck before starting the task (Equipment Condition), and what must be done to return the vehicle to operating condition after the task is finished (Follow-On Maintenance).
- The Appendixes are located at the end of the manual. They contain a reference guide to other manuals, the Maintenance Allocation Chart (MAC), a list of expendable supplies and materials, and other material for maintaining the PLS truck.
- In addition to text, there are exploded-view illustrations showing how to take a component off and put it back on. Cleaning and inspection procedures are also included as required.
- Chapter 2 of this manual covers Unit level Preventive Maintenance Checks and Services (PMCS) and basic troubleshooting, as well as general maintenance.

Follow these guidelines when using this manual:

- Read all WARNINGS and CAUTIONS before performing any procedure.
- The equipment conditions found in the maintenance procedures are of a general nature and the mechanic may be able to perform only certain steps within a procedure to accomplish the equipment condition.

2-15. ATEC TROUBLESHOOTING.

NOTE

Ensure that wire connections 208/209 on battery A2 ground terminal, and wire connections 1866 on battery A2 positive terminal are tight and free of corrosion before starting to troubleshoot ATEC system. Refer to Paras 7-90 and 7-91 and tighten/clean any loose or corroded wire connections.

This paragraph covers ATEC System Troubleshooting. The ATEC System Fault Index, Table 2-26, lists faults for the ATEC system of the PLS truck. Refer to schematics Figure 2-18 through 2-22 when performing tests and corrective actions.

Table 2-26. ATEC System Fault Index

Fault No.	Description	Page
1.	CODE 12: Low Oil Level	2-818
2.	CODE 13: Low Battery Voltage	2-828
3.	CODE 14: Forward Pressure Switch Inoperative	2-834
4.	CODE 15: Reverse Pressure Switch Inoperative	2-842
5.	CODE 21: Throttle Sensor Inoperative	2-850
6.	CODE 22: Speed Sensor Inoperative	2-862
7.	CODE 23: Shift Selector	2-870
8.	CODE 24: Oil Temperature (High Limit Exceeded)	2-884
9.	CODE 32: Transmission Direction Signal	2-886
10.	CODE 33: Oil Temperature Sensor Inoperative	2-896
11.	CODE 34: Prom Check	2-904
12.	CODES 41 Through 45 And 51 Through 53: Solenoids J, F, D, C, B, A, G, E Or H Inoperative	2-908
13.	CODE 46: Solenoid A Inoperative	2-914
14.	CODE 54: A, B, C, D, F And J Solenoid Off Test	2-920
15.	CODE 69: Electronic Control Unit (ECU) Failure	2-930

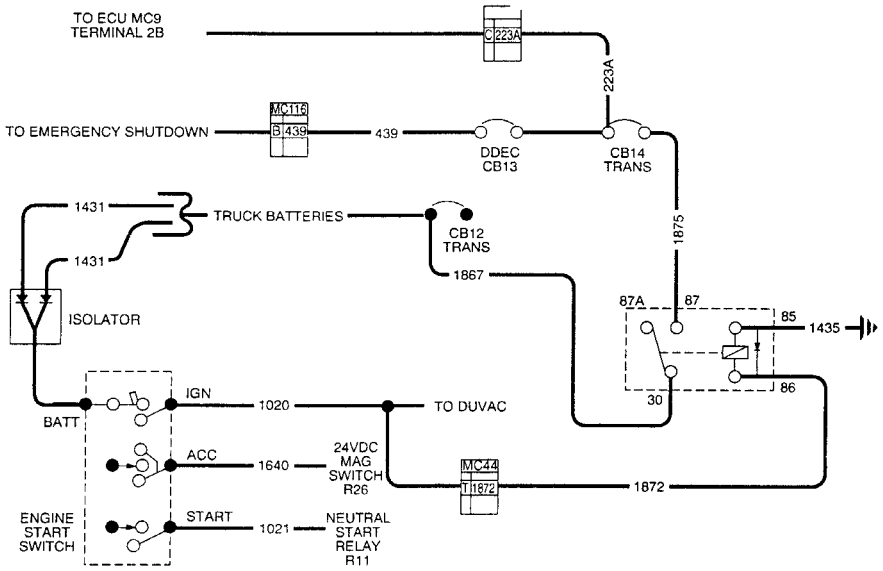


Figure 2-18. TRANS/DDEC Relay R19 Schematic

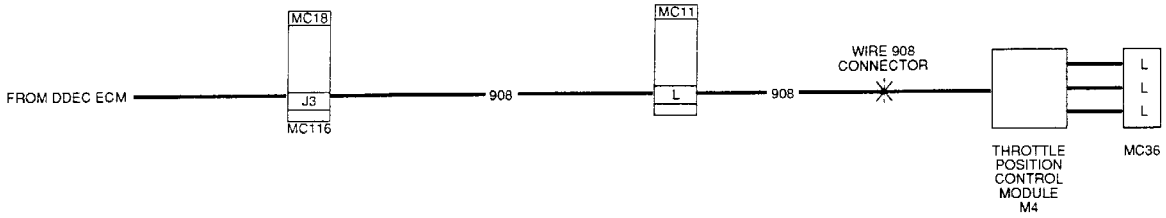


Figure 2-19. Wire 908 Continuity Test Schematic

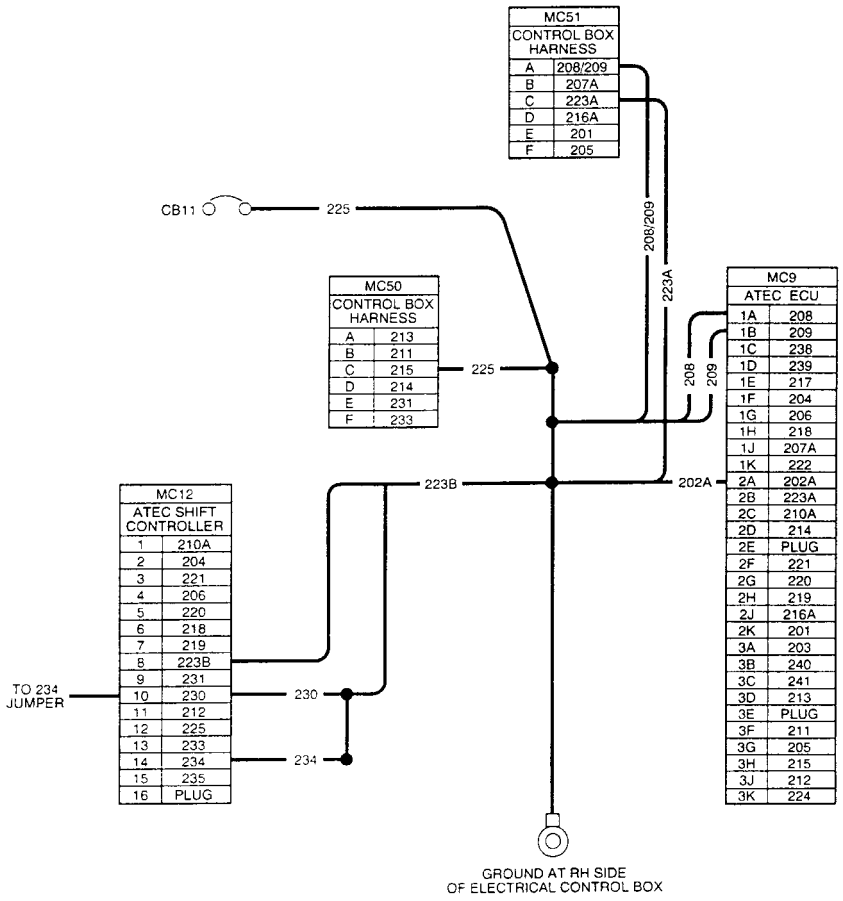


Figure 2-20. ECB/ATEC Wire Harness Schematic

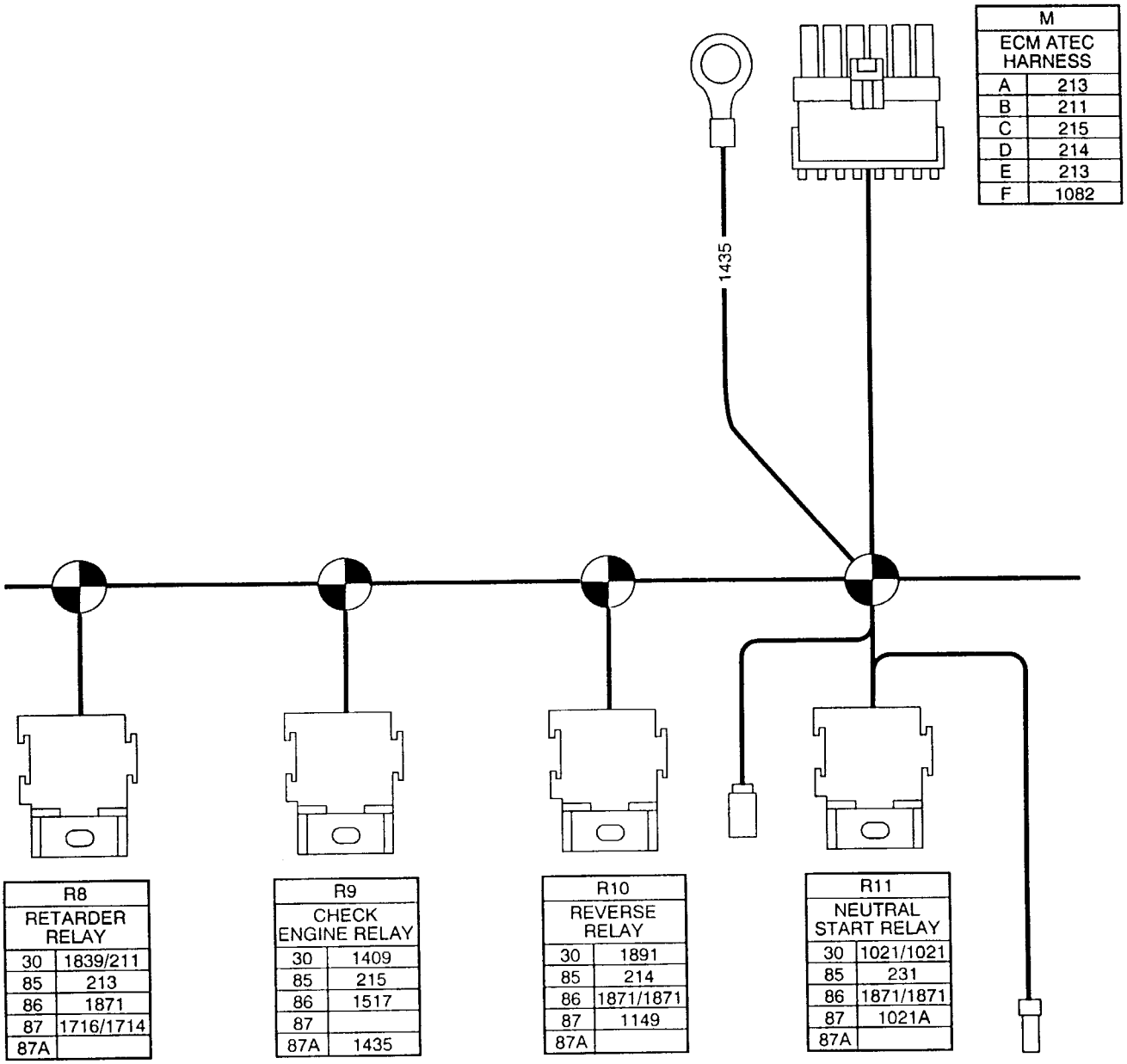


Figure 2-21. Electrical Control Box Wire Harness To ATEC Schematic

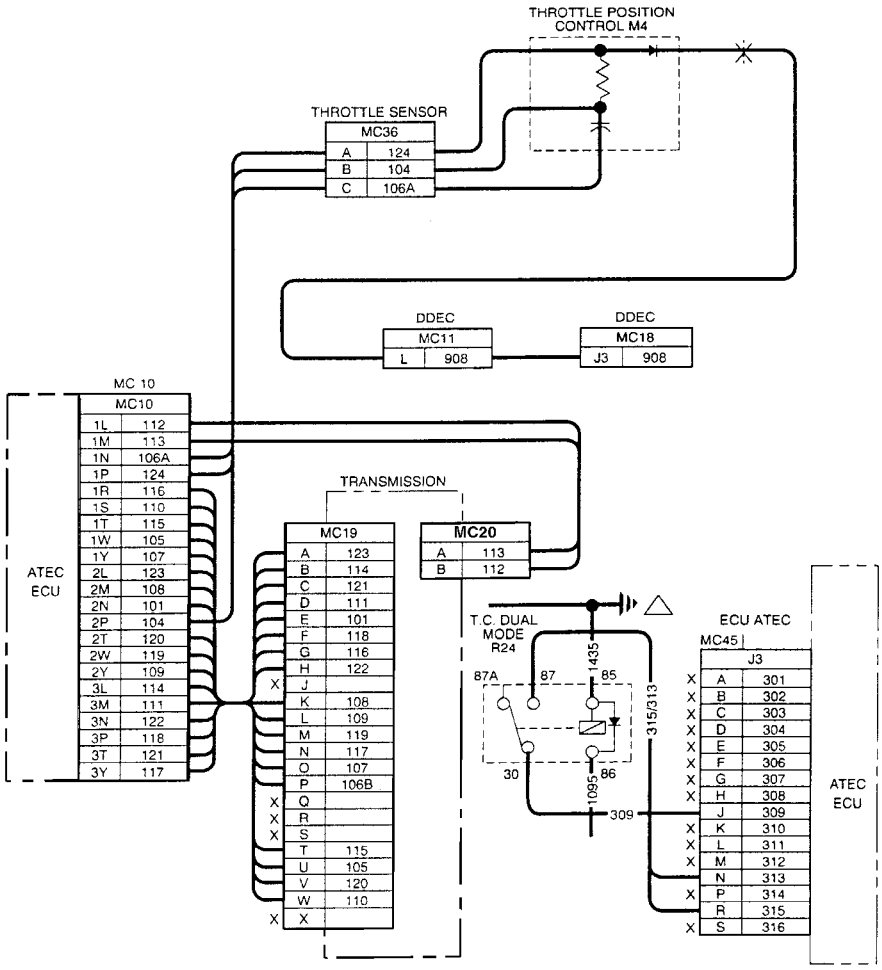


Figure 2-22. ATEC Input/Output Schematic (Sheet 1 of 2)

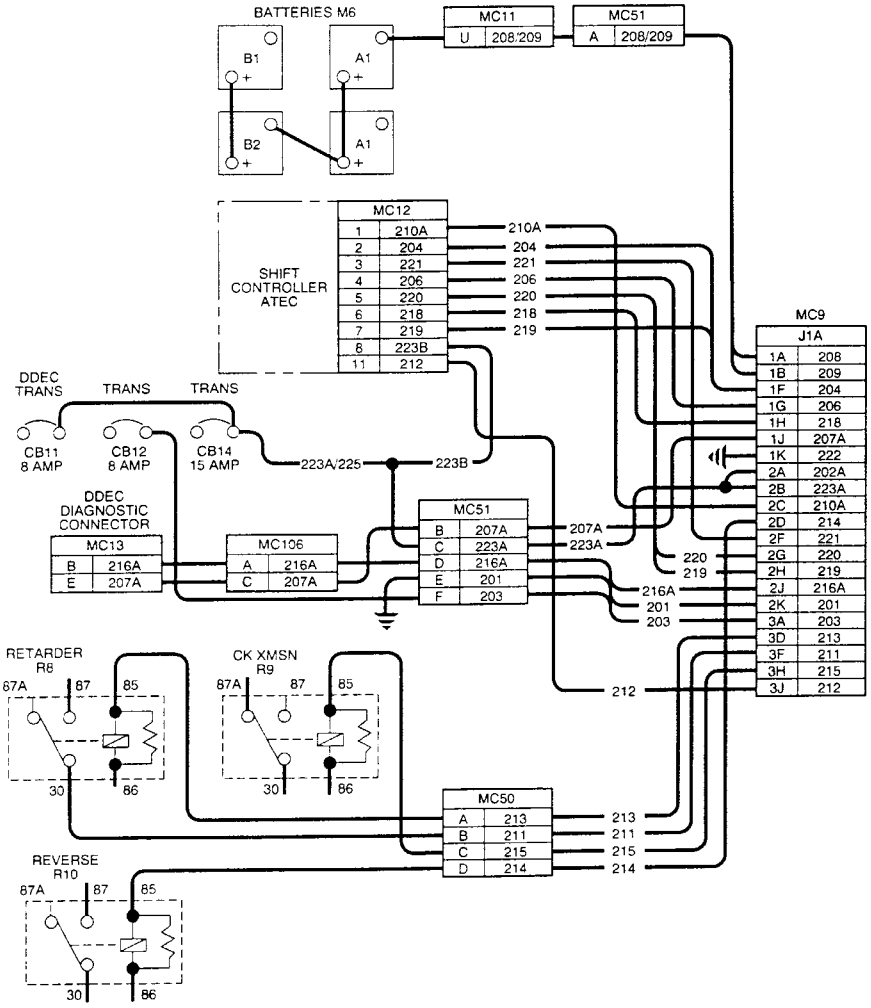


Figure 2-22. ATEC Input/Output Schematic (Sheet 2 of 2)

2-15. ATEC TROUBLESHOOTING (CONT).

1. CODE 12: LOW OIL LEVEL.

INITIAL SETUP

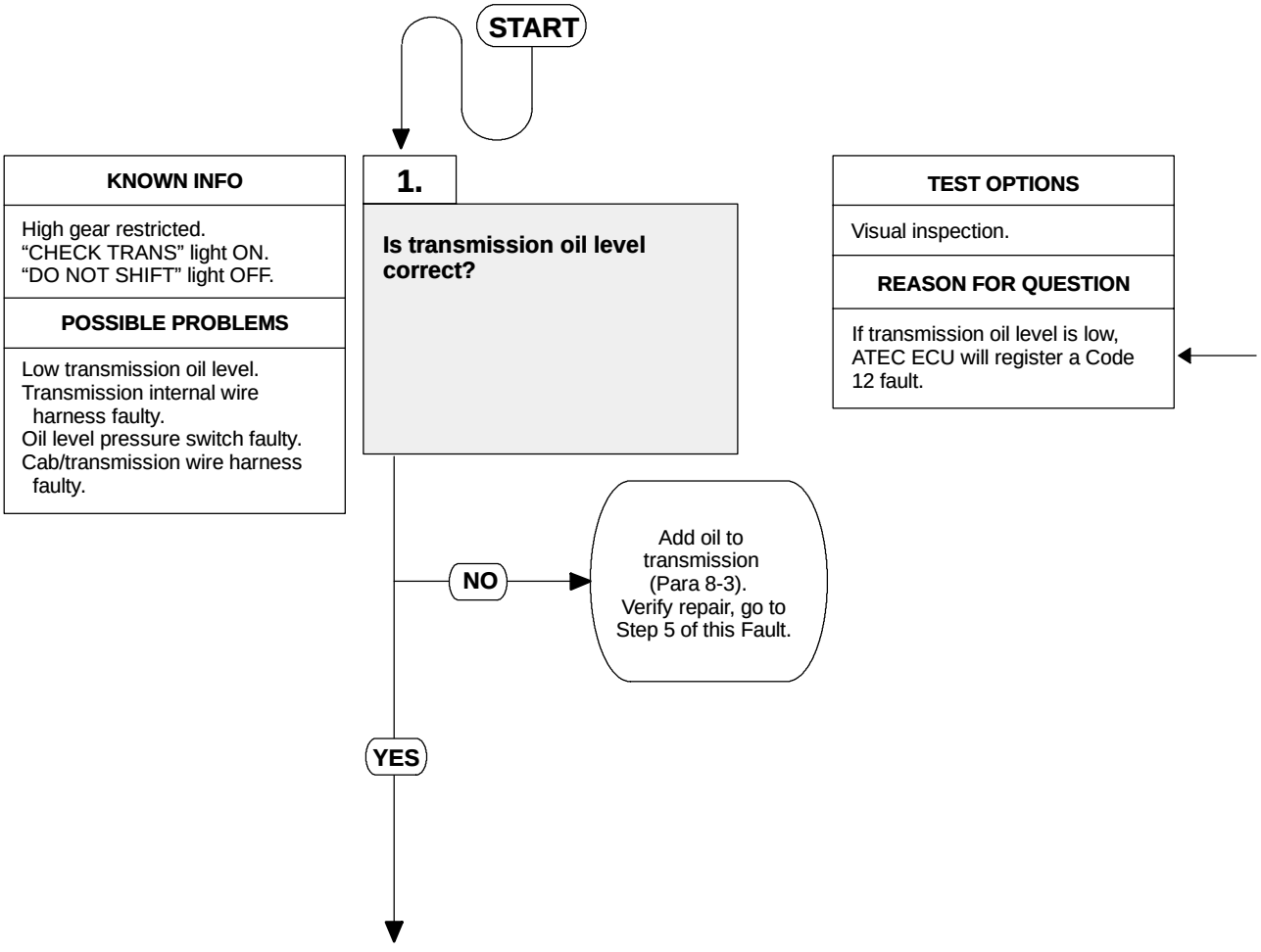
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Breakout Harness (Item 36, Appendix G)
Multimeter (Item 44, Appendix G)
Pressure Test Kit (Item 50, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

Materials/Parts
Sealant, Teflon Pipe (Item 71, Appendix C)

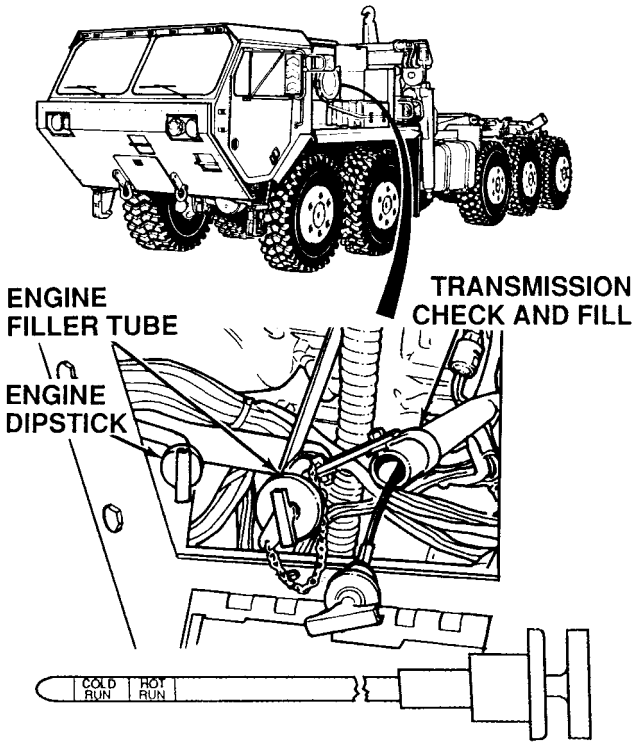
Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

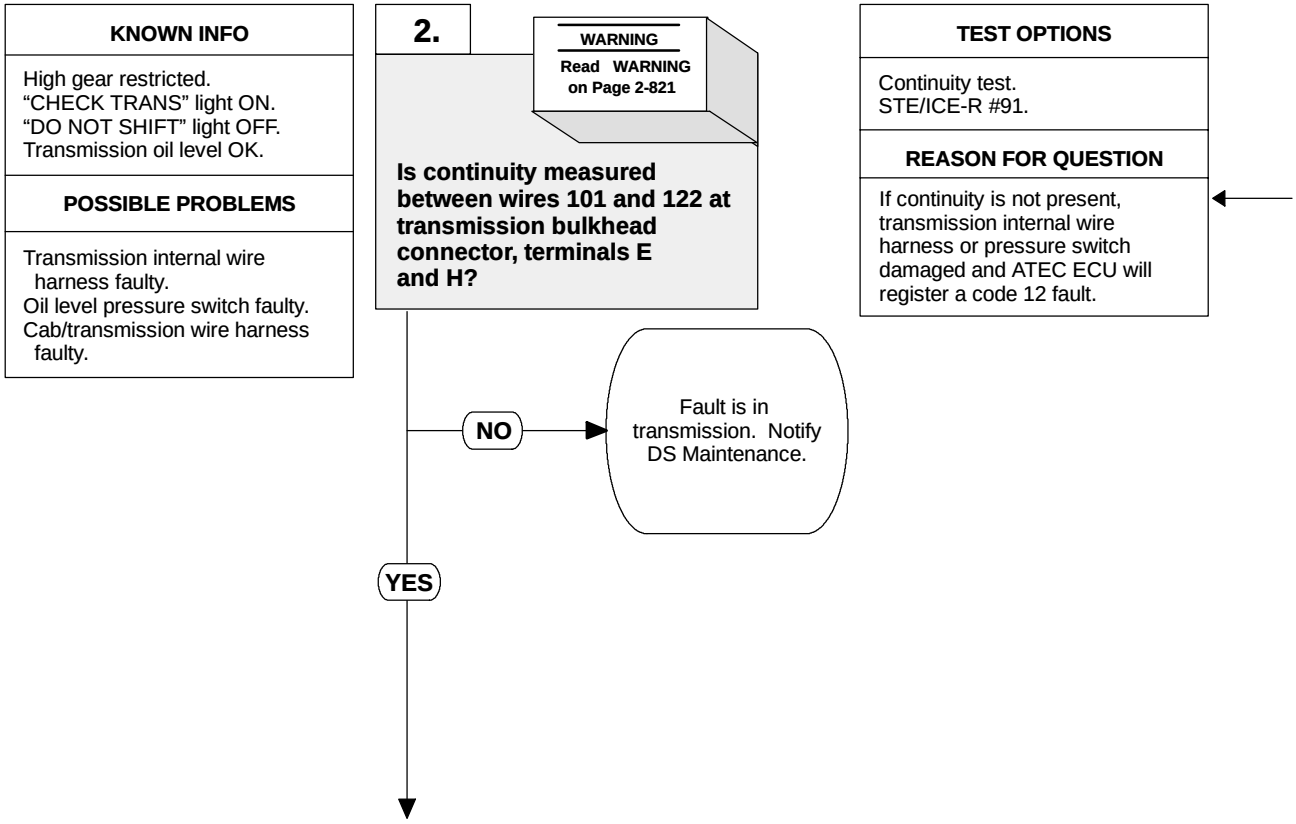
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)



VISUAL INSPECTION
Check transmission oil level (TM 9-2320-364-10). (1) If transmission oil level is too low, add oil to correct level (Para 8-3). (2) If transmission oil level is OK, go to Step 2 of this Fault.



1. CODE 12: LOW OIL LEVEL (CONT).

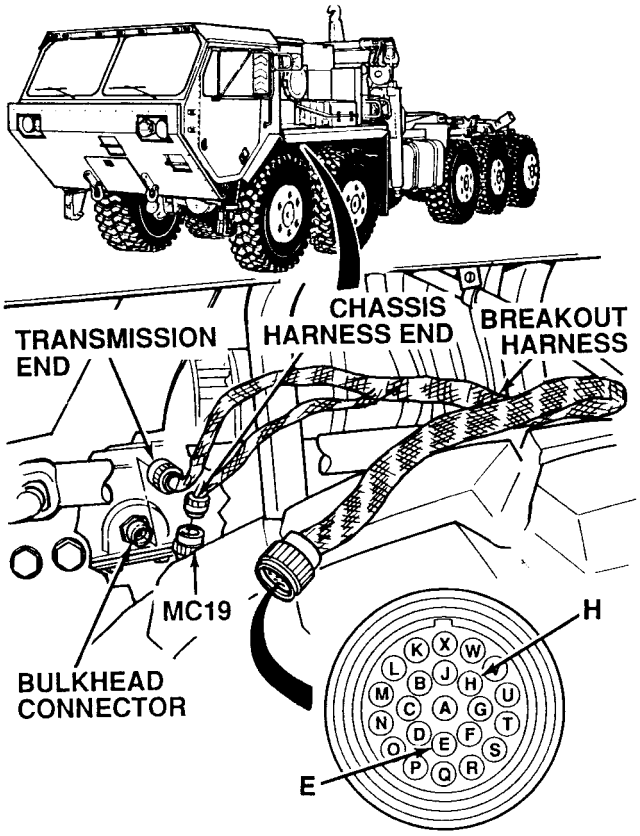


WARNING

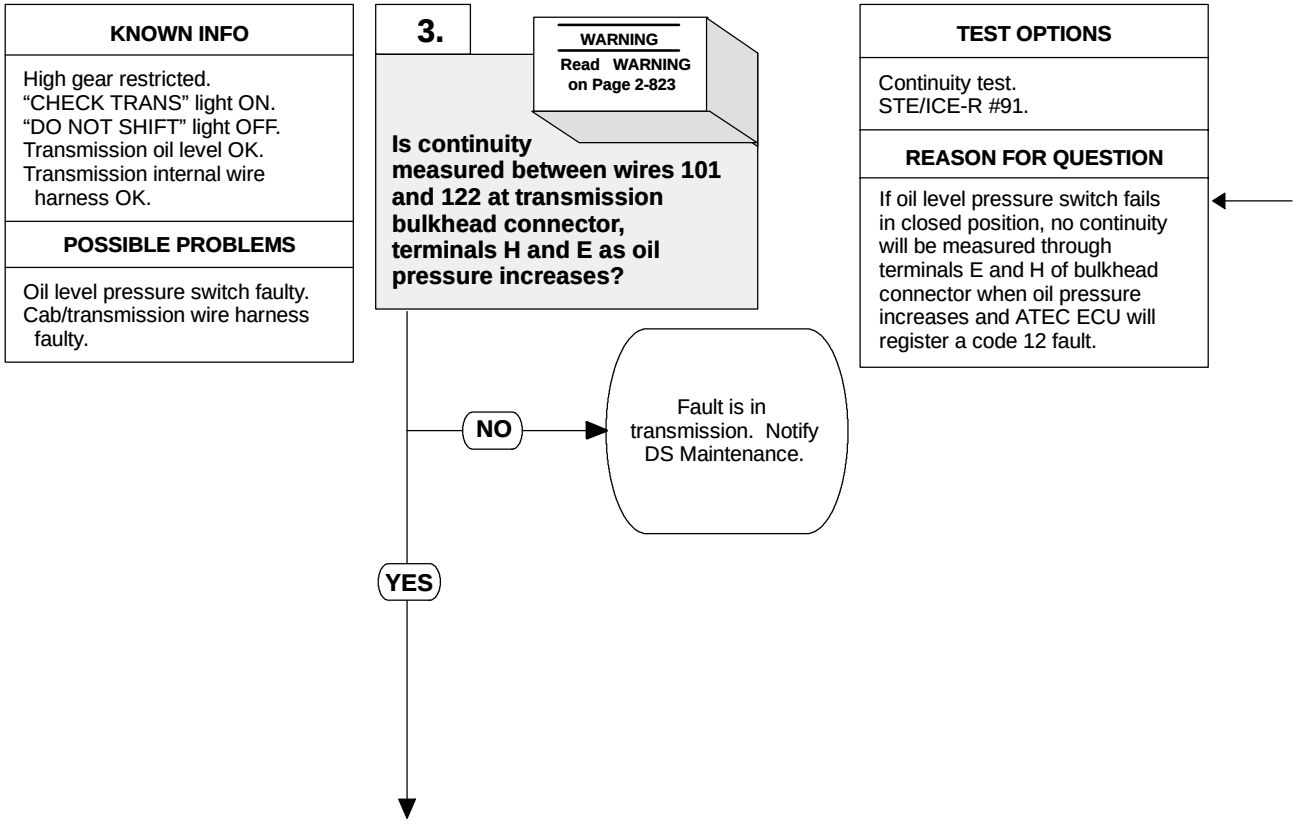
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect transmission connector MC19 from transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between wires 101 and 122 at transmission breakout harness connector, terminals E and H?
   (a) If there is no continuity, fault is in transmission. Notify DS Maintenance.
   (b) If there is continuity, oil level sensor switch is OK.



1. CODE 12: LOW OIL LEVEL (CONT).



WARNING

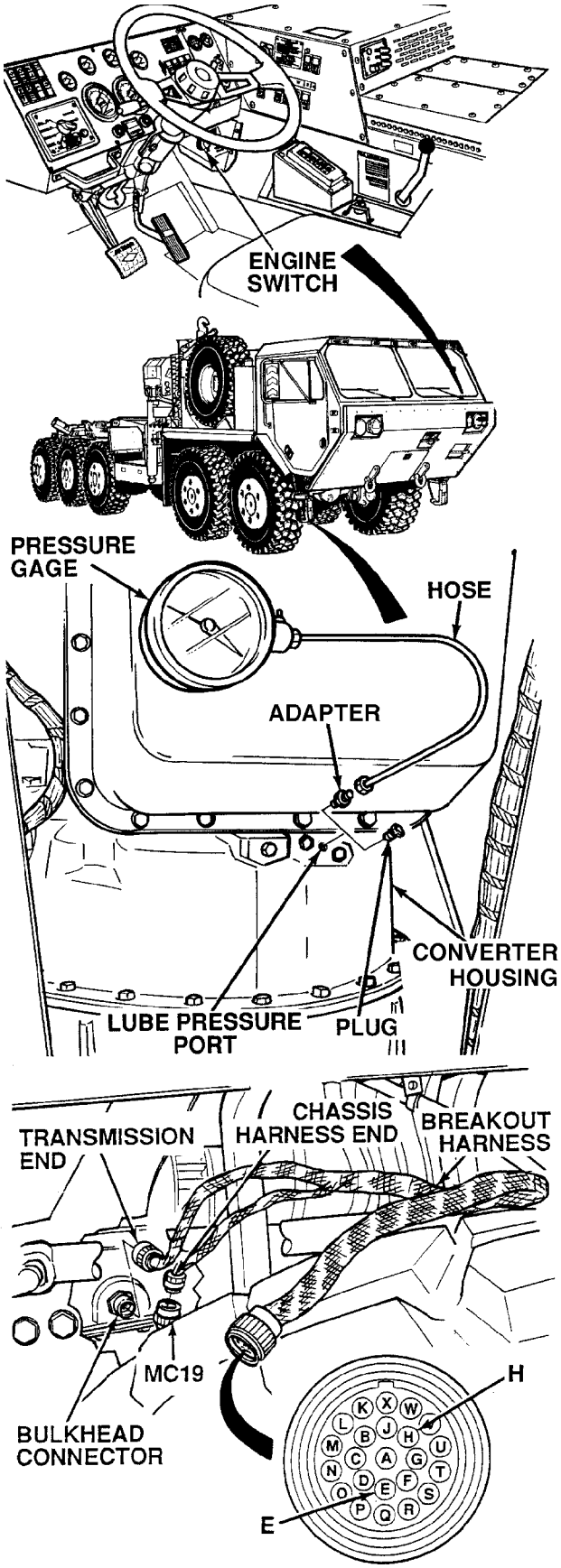
- Ensure equipment will not move while repairing or inspecting it. For trailers, “red tag” the hitch, and block or chock wheels or tracks. For powered equipment, block or chock wheels or tracks, and “red tag” the starter. Prevent a “quick fix” from becoming a quick injury.
- When adjustment or service requires a running engine, two personnel will be used; one at controls and one at service point. This helps prevent accidental movement of controls.

NOTE

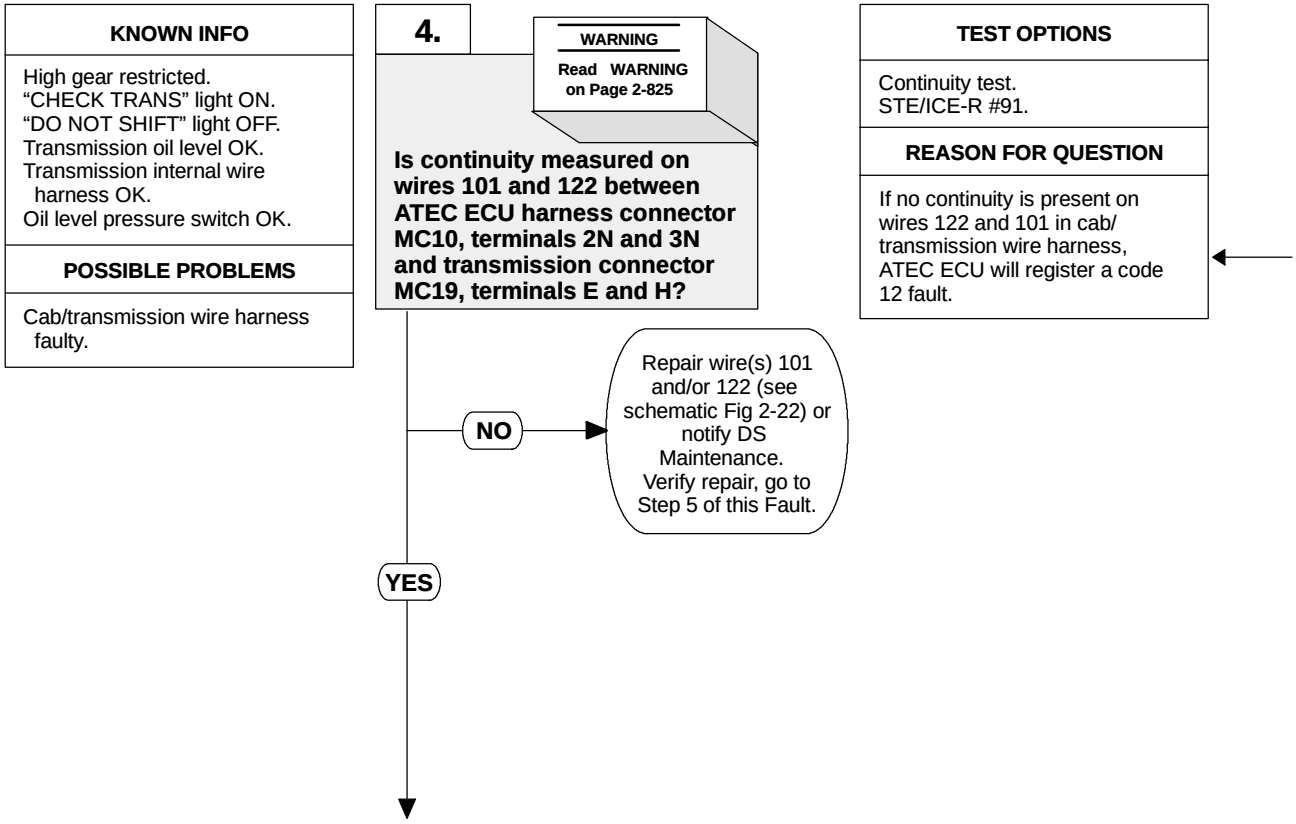
Approximately one quart of oil will flow from oil level port when plug is removed. Due to limited work area, be prepared with suitable container to catch oil.

CONTINUITY TEST

(1) Position suitable container to catch oil.
(2) Remove lube port plug from bottom of torque converter housing.
(3) Install Test Kit-hose adapter and direct reading oil pressure 0 to 160 psi (0 to 1103 kPa) gage in transmission torque converter housing lube oil pressure port.
(4) Set multimeter select switch to ohms.
(5) Start engine (TM 9-2320-364-10).
(6) No continuity will be measured between breakout harness, terminals E and H at oil level pressure switch as pressure increases.
  (a) If pressure is not correct or pressure switch is not functioning correctly, fault is in transmission. Perform Step (7) below and notify DS Maintenance.
  (b) If pressure is correct and pressure switch functions corrrectly, oil level pressure switch is OK.
(7) Turn OFF ENGINE switch.
(8) Remove oil pressure gage and Test Kit hose adapter from lube oil port of transmission torque converter housing.
(9) Apply pipe sealant to lube port plug and install in lube oil port.
(10) Tighten plug to 4 to 5 lb-ft (5 to 7 N·m).

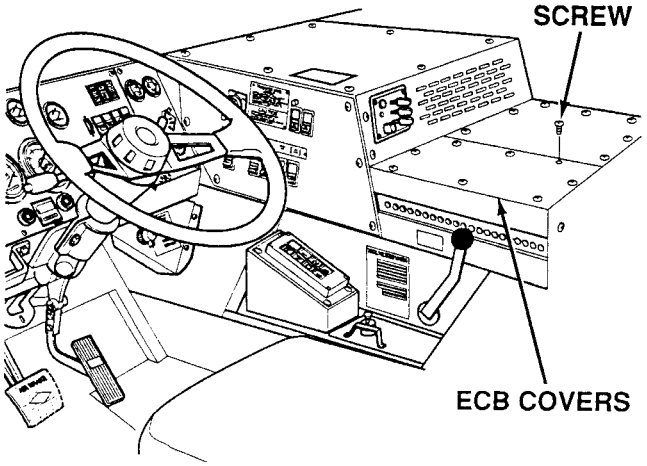


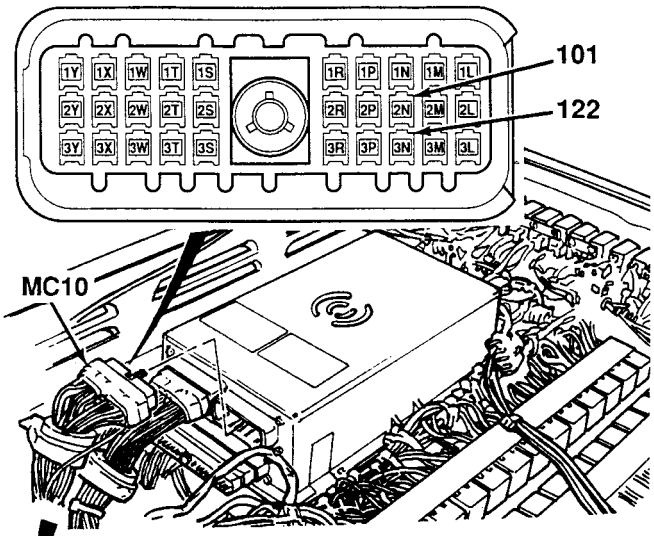
1. CODE 12: LOW OIL LEVEL (CONT).



WARNING

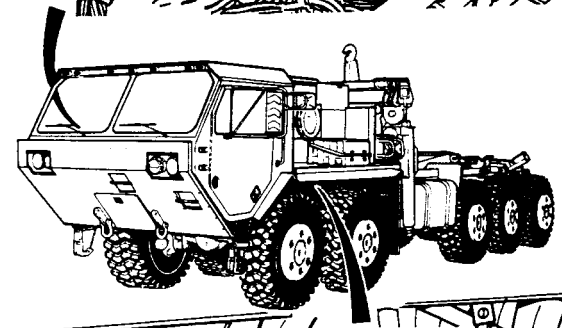
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Voltage is always present at circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 and can cause severe injury to personnel. Non-metallic tools shall be used when removing relays.

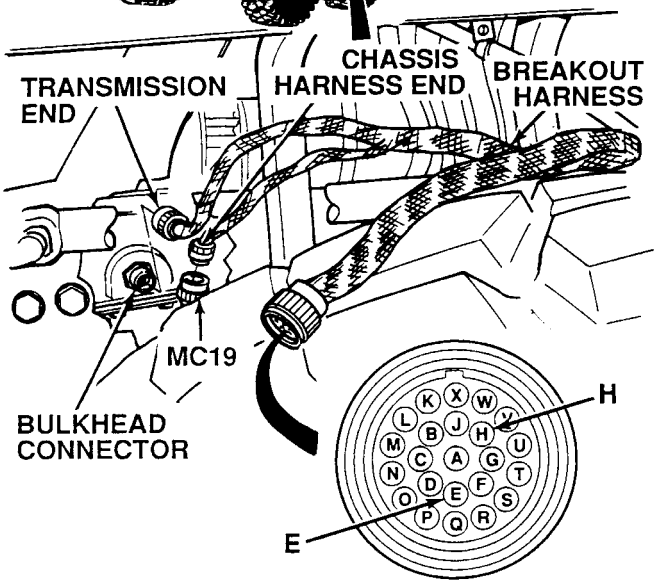




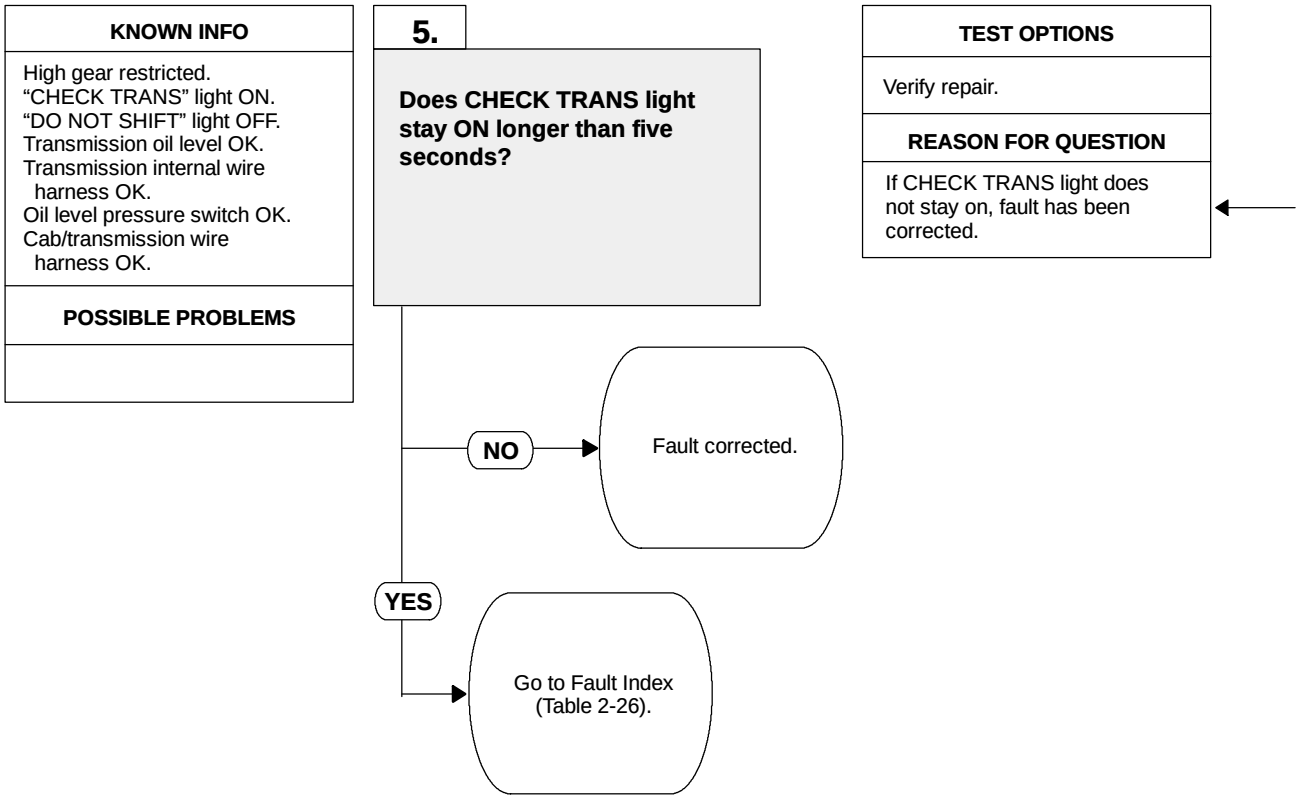
CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness, chassis harness end connector.
(4) Is there continuity on wire 122 between breakout harness, terminal H and harness connector MC10, terminal 3N?
  (a) If there is no continuity, repair wire 122 (see schematic Fig 2-22) or notify DS Maintenance and perform Steps (6) through (10) below.
  (b) If there is continuity, wire 122 is OK.
(5) Is there continuity on wire 101 between breakout harness, terminal E and harness connector MC10, terminal 2N?
  (a) If there is no continuity, repair wire 101 (see schematic Fig 2-22) or notify DS Maintenance and perform Steps (6) through (10) below.
  (b) If there is continuity, wire 101 is OK.
(6) Connect connector MC10 and tighten screw.
(7) Install two ECB covers and 15 screws.
(8) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(9) Connect connector MC19 to transmission bulkhead connector.
(10) Install left rear skirt on underside of fender (Para 17-34).



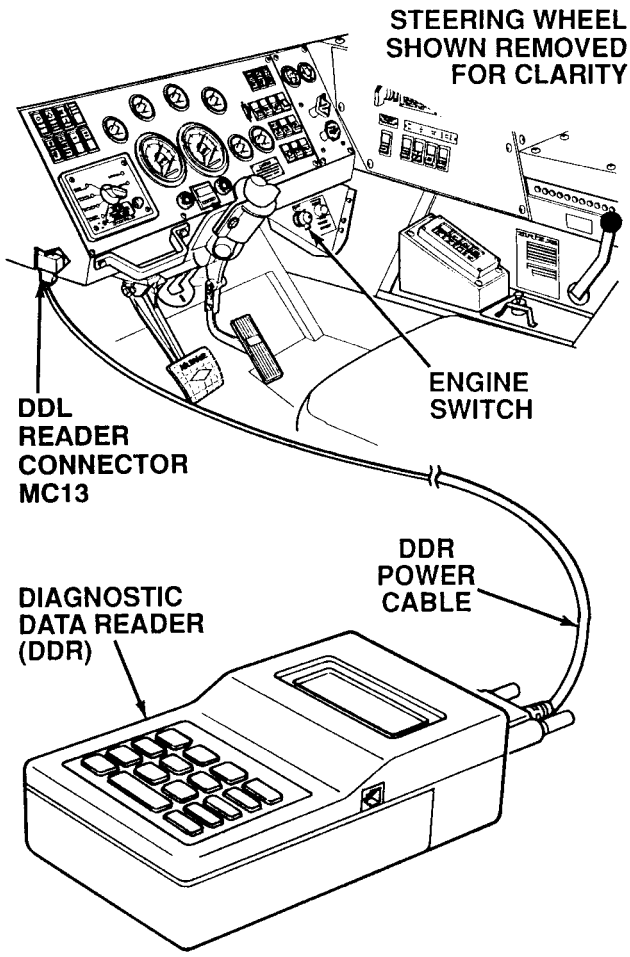


1. CODE 12: LOW OIL LEVEL (CONT).



VERIFY REPAIR

(1) Connect DDR to DDL connector MC13.
(2) Clear ATEC codes (Para 2-11).
(3) Start engine (TM 9-2320-364-10) and observe CTL.
  (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Steps (4) and (5) below.
  (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Steps (4) and (5) below and go to Fault Index (Table 2-26).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

2. CODE 13: LOW BATTERY VOLTAGE.

INITIAL SETUP

Tools and Special Tools

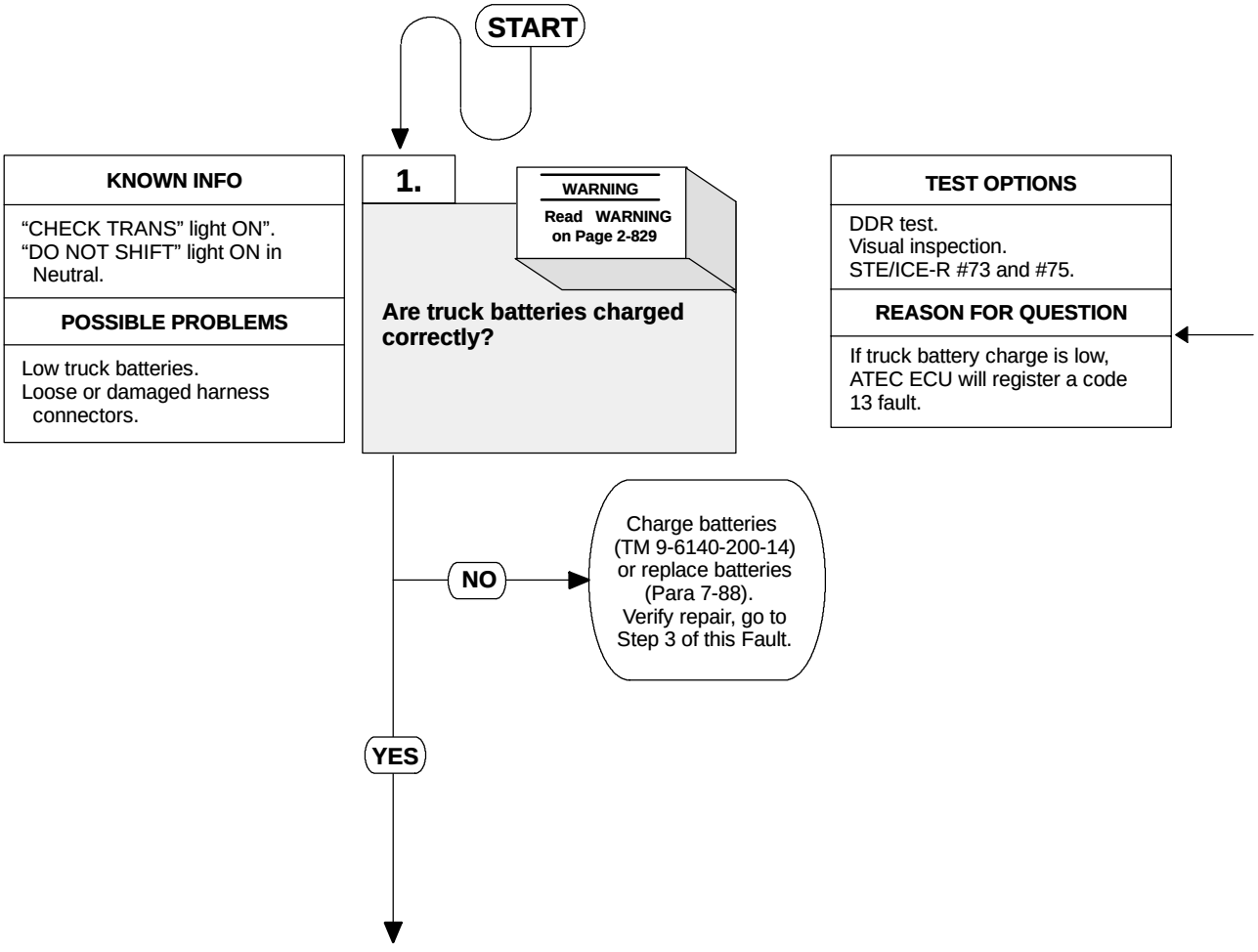
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

References

TM 9-2320-364-10
TM 9-4910-571-12&P
TM 9-6140-200-14

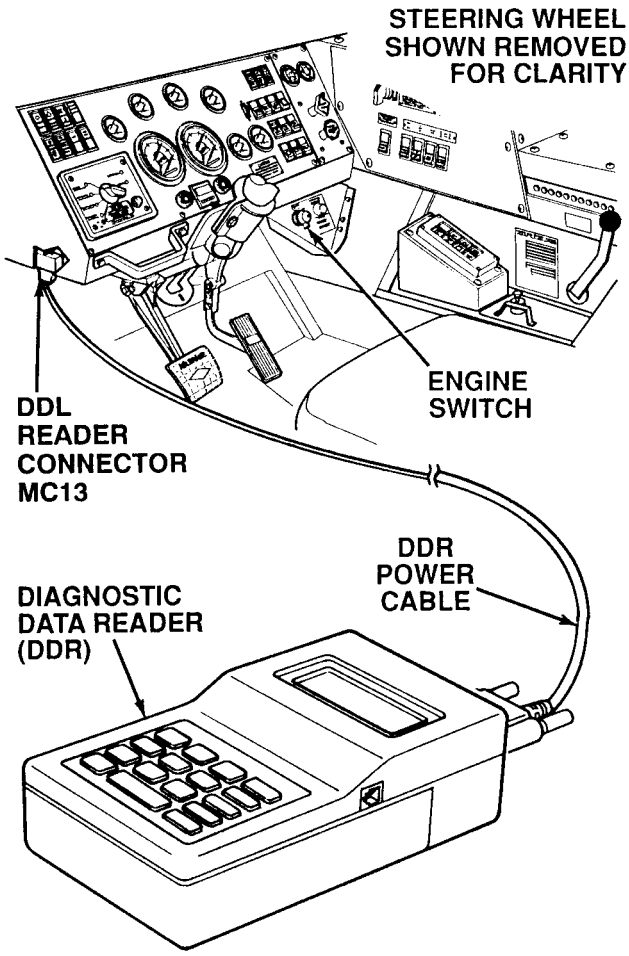
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

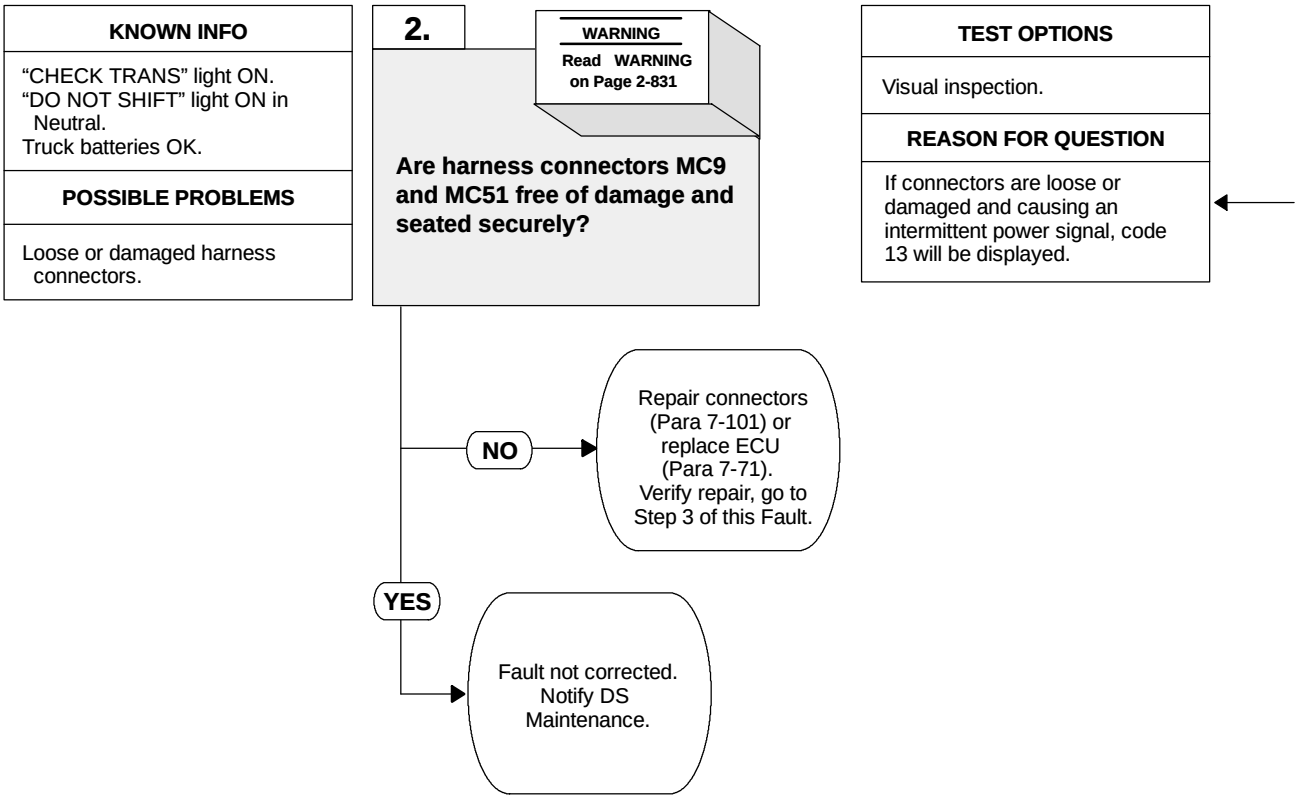
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



VISUAL INSPECTION AND DDR TEST

(1) Connect DDR cable to DDL connector MC13.
(2) Turn ON ENGINE switch (TM 9-2320-364-10).
(3) Select data list display and scroll down to INPUT VOLTAGE.
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and charge or replace batteries (TM 9-6140-200-14 or (Para 7-88).
  (b) If 10 to 14 vdc are present, go to Step (4) below.
(4) Turn OFF ENGINE switch.

2. CODE 13: LOW BATTERY VOLTAGE (CONT).

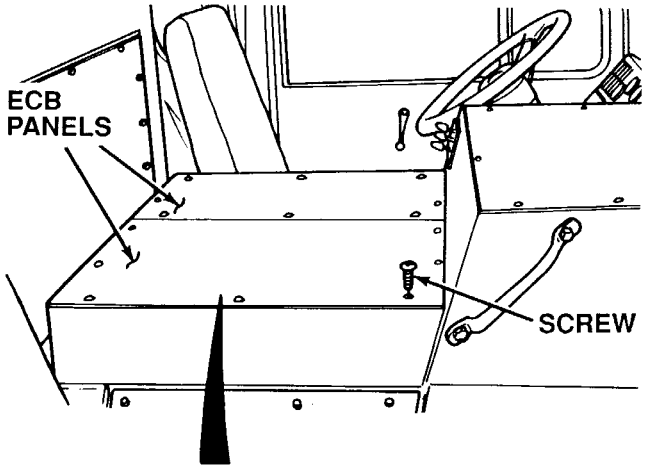


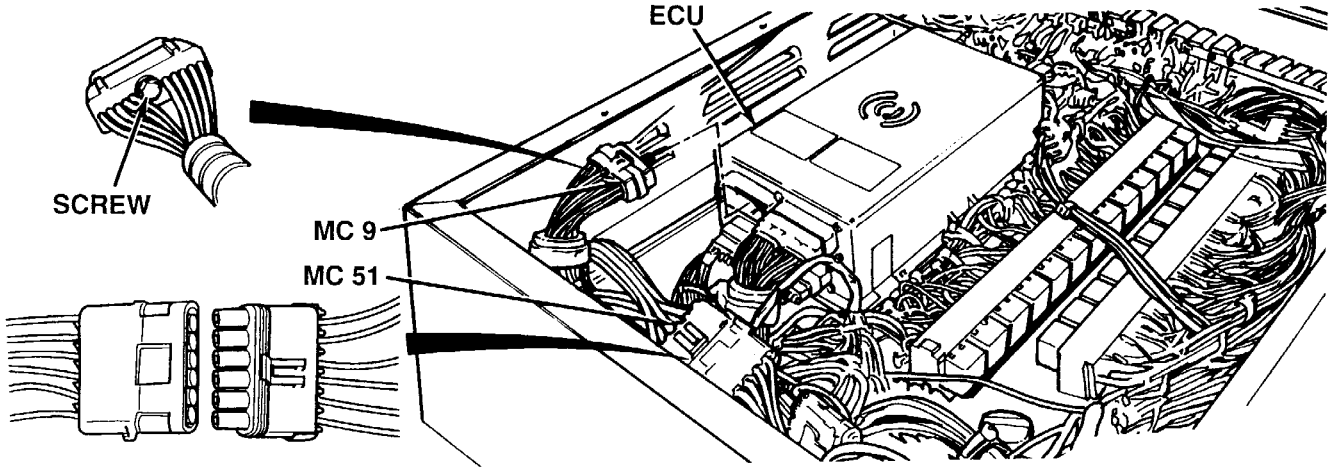
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.
- Wires 1866 and 1867 have 12 vdc at all times direct from batteries. Care must be exercised when working with these wires to avoid injury to personnel.

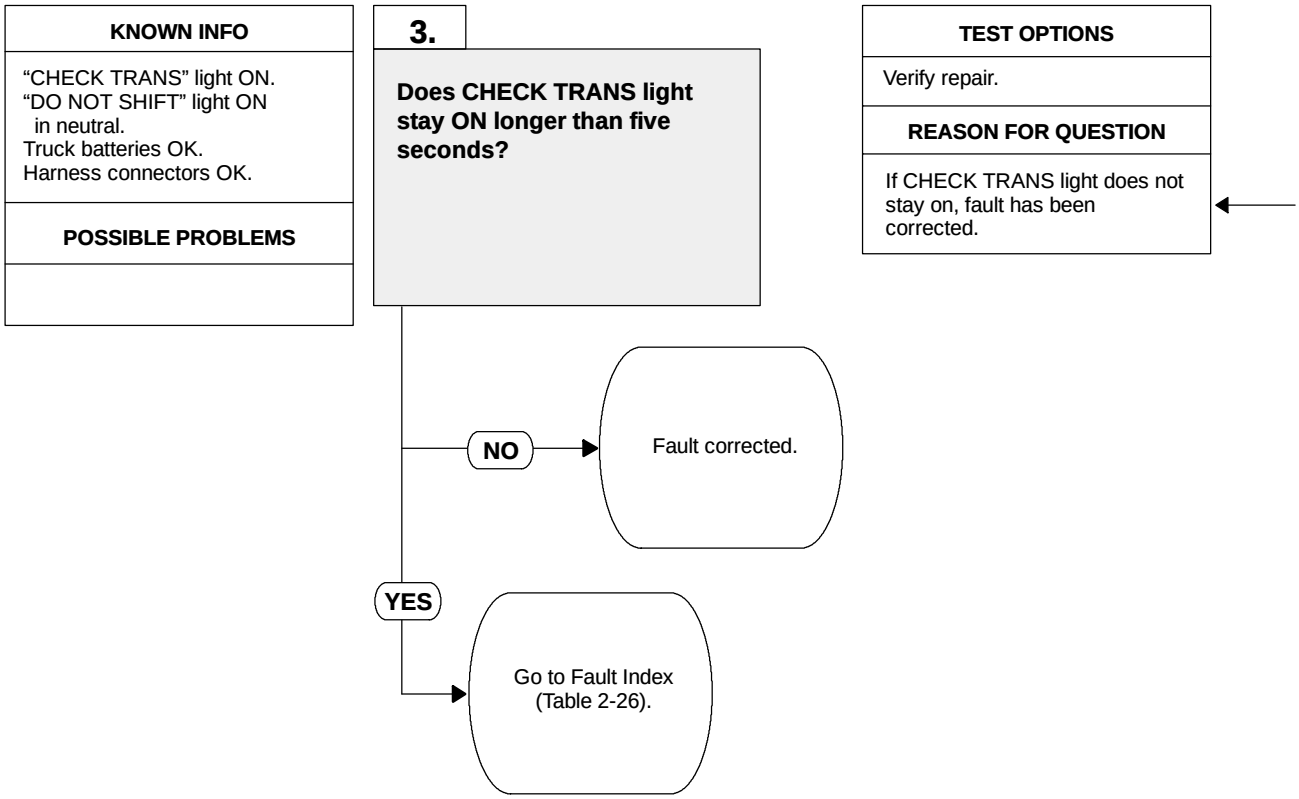
VISUAL INSPECTION

(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC9 from ATEC ECU.
(3) Disconnect connector MC51.
(4) Check connectors for bent, corroded, or unseated terminals.
  (a) If harness connector MC9 and/or MC51 are damaged, repair connectors (7-101).
  (b) If ECU connector MC9 is damaged, replace ECU (Para 7-71).
(5) Connect connector MC51.
(6) Connect connector MC9 to ATEC ECU and tighten screw.
(7) Install two ECB panels and 15 screws.



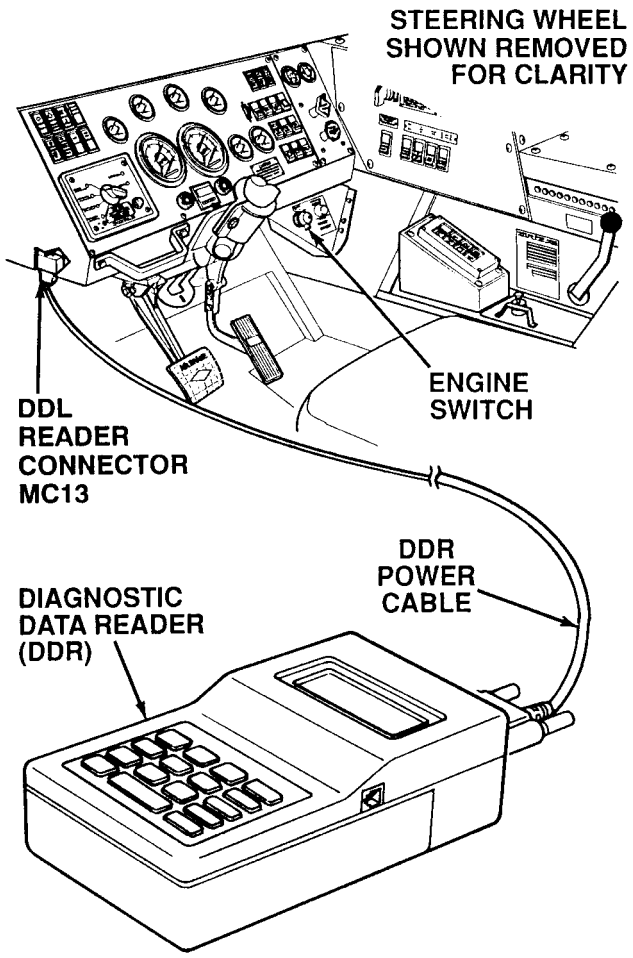


2. CODE 13: LOW BATTERY VOLTAGE (CONT).



VERIFY REPAIR

(1) Connect DDR cable to DDL connector MC13.
(2) Start engine (TM 9-2320-364-10).
(3) Clear ATEC codes (Para 2-11) and observe CTL.
  (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Steps (4) and (5) below.
  (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Steps (4) and (5) below and go to Fault Index (Table 2-26).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

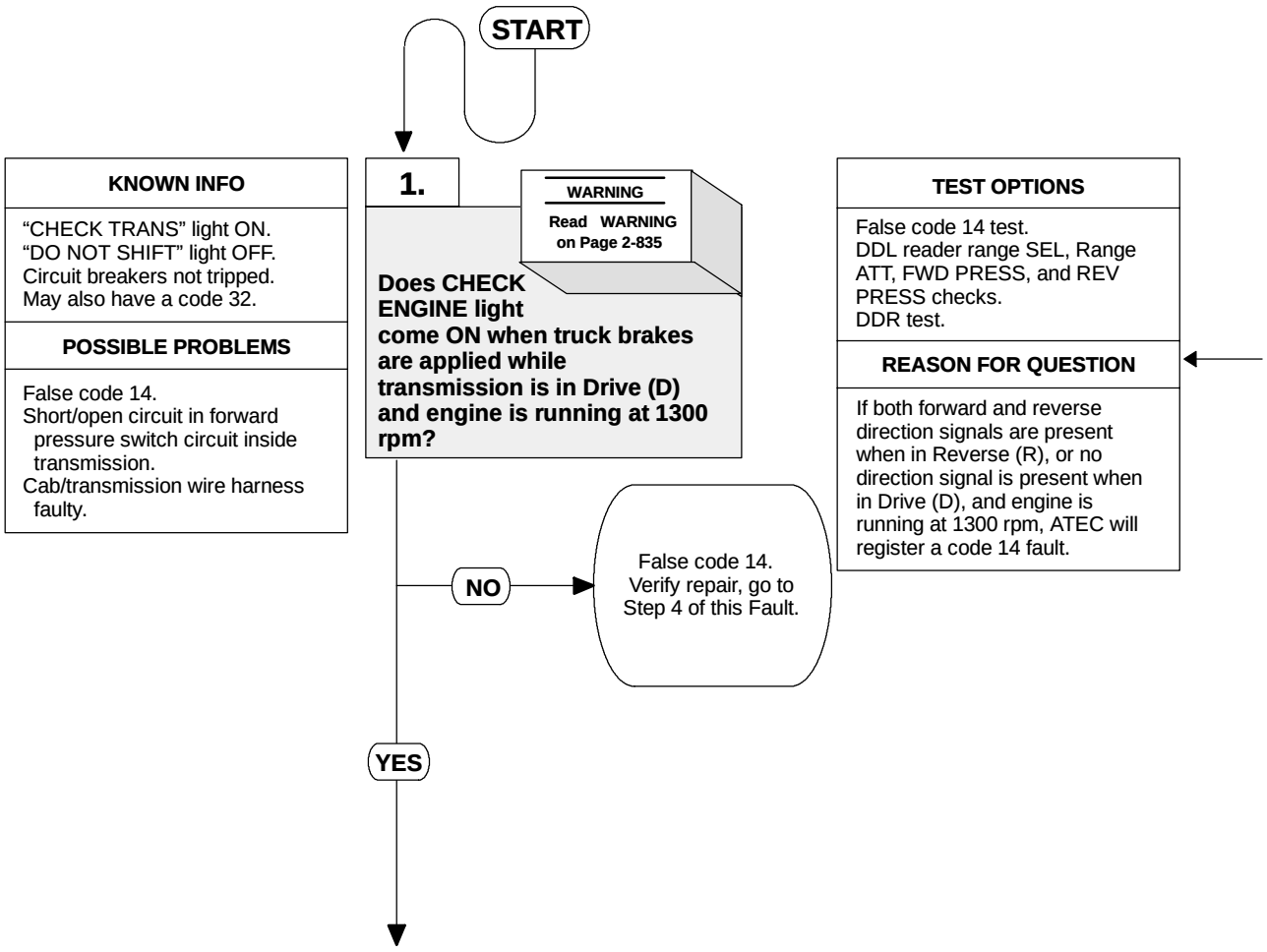
3. CODE 14: FORWARD PRESSURE SWITCH INOPERATIVE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Breakout Harness (Item 36, Appendix G)
Multimeter (Item 44, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)



WARNING

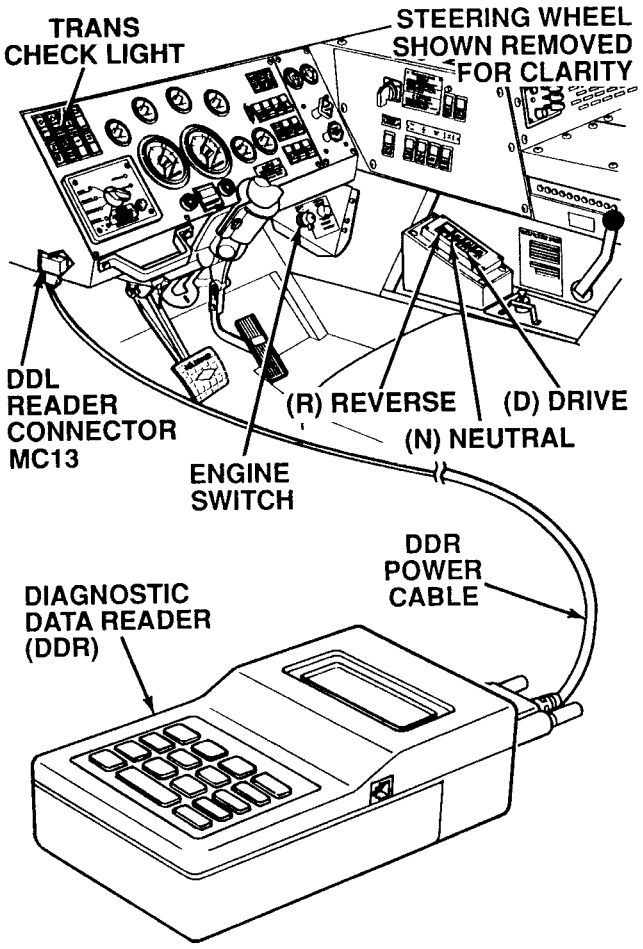
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CAUTION

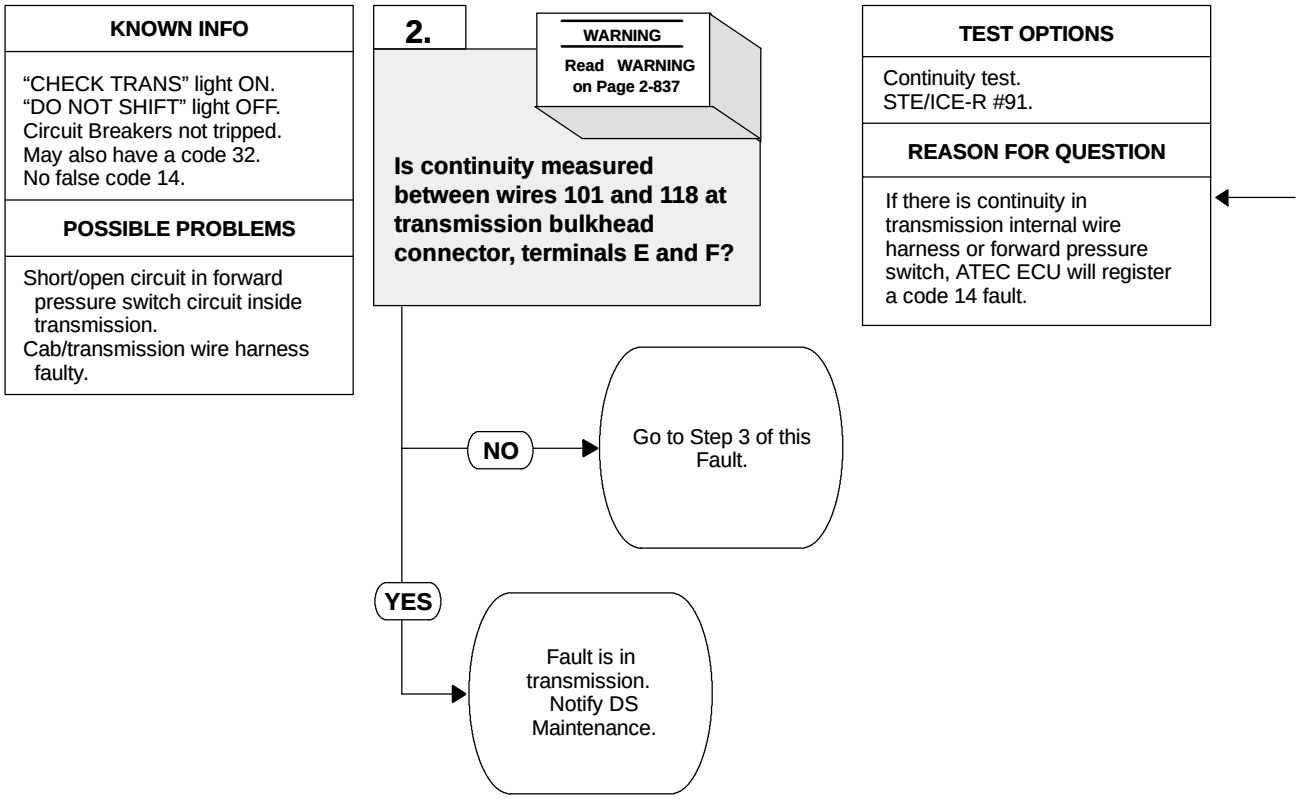
Do not exceed 2000 engine rpm. Damage to transmission could occur.

DDR TEST

(1) Connect DDR cable to DDL connector MC13.
(2) START engine (TM 9-2320-364-10).
(3) Fully apply brake pedal.
(4) Select D (Drive) on shift selector.
(5) Increase engine speed to 1300 rpm.
(6) Observe TRANS CHECK light.
    (a) If TRANS CHECK light comes ON, perform Steps (9) and (10) below and go to Step 2 of this Fault.
    (b) If TRANS CHECK light is not ON, code 14 is false. Go to Step (7) below.
(7) Clear ATEC codes (Para 2-11).
(8) Test drive in drive (D) at 1300 rpm or greater to see if code reappears.
    (a) If code is not displayed, code 14 was false. Perform Steps (9) and (10) below and go to Step 4 of this Fault.
    (b) If code appears, perform Steps (9) and (10) below and go to Step 2 of this Fault.
(9) Turn OFF ENGINE switch.
(10) Disconnect DDR cable from DDL connector MC13.



3. CODE 14: FORWARD PRESSURE SWITCH INOPERATIVE (CONT).

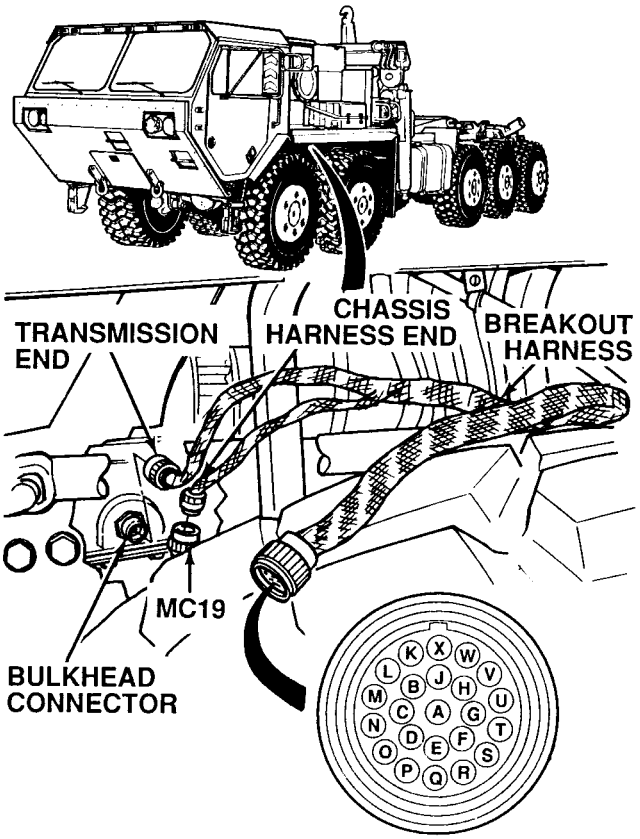


WARNING

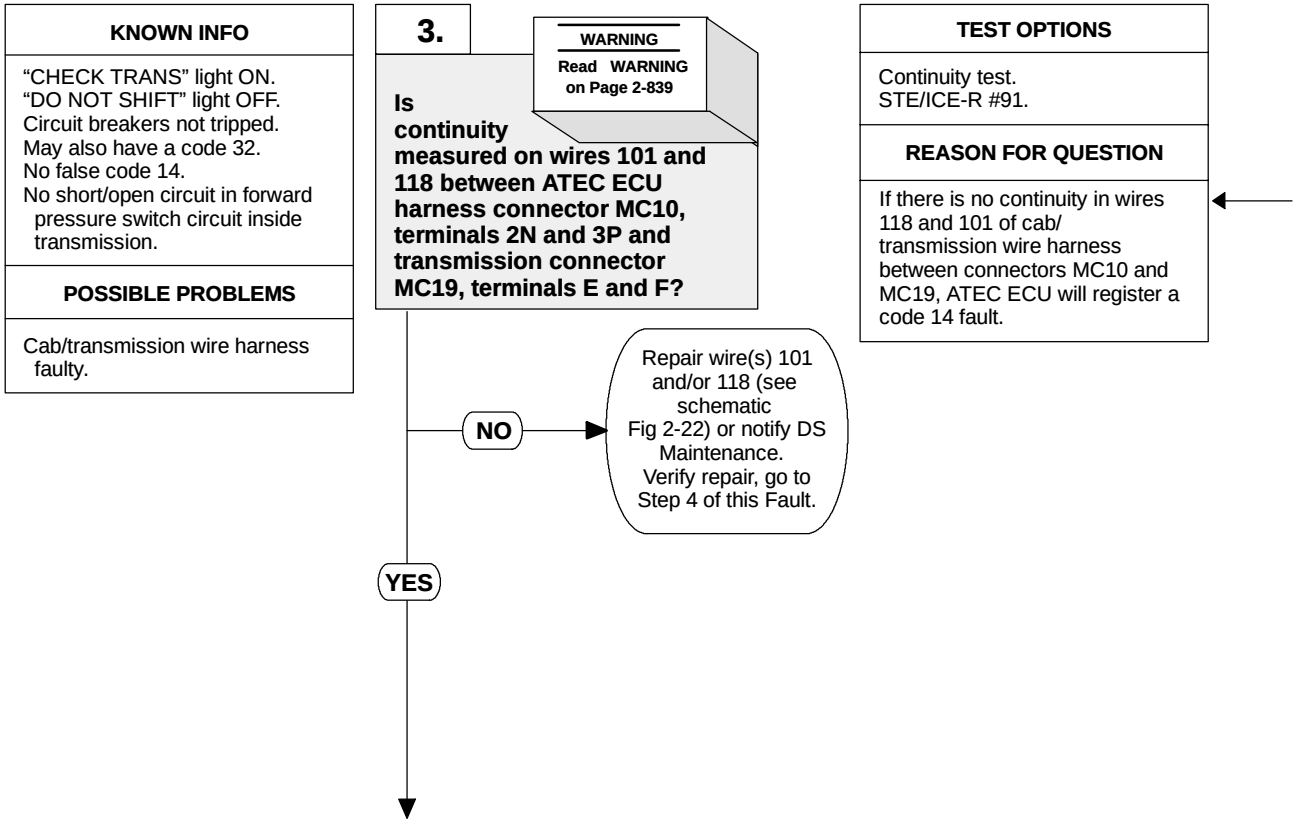
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect transmission connector MC19 from transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between wires 101 and 118 at breakout harness, terminals E and F?
   (a) If there is no continuity, forward pressure switch and wiring inside transmission is OK.
   (b) If there is continuity, fault is in transmission. Notify DS Maintenance.

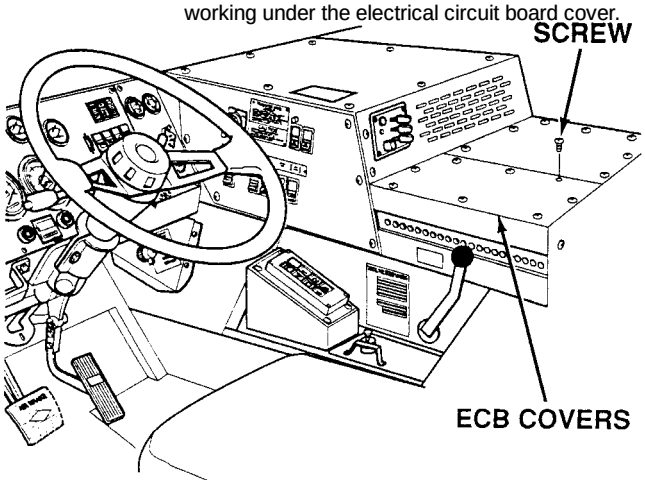


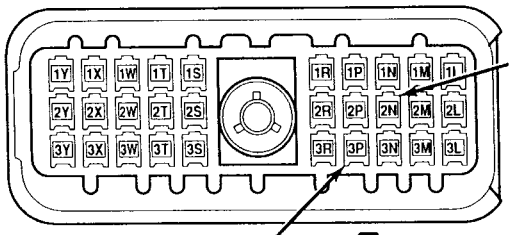
3. CODE 14: FORWARD PRESSURE SWITCH INOPERATIVE (CONT).

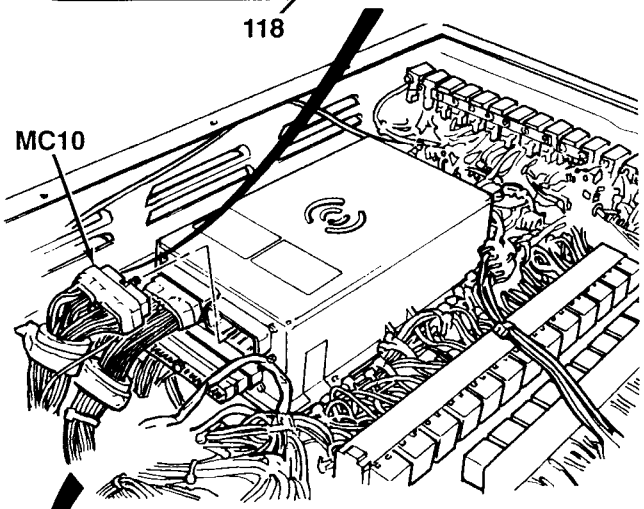


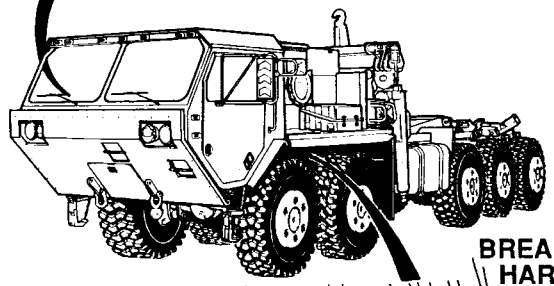
WARNING

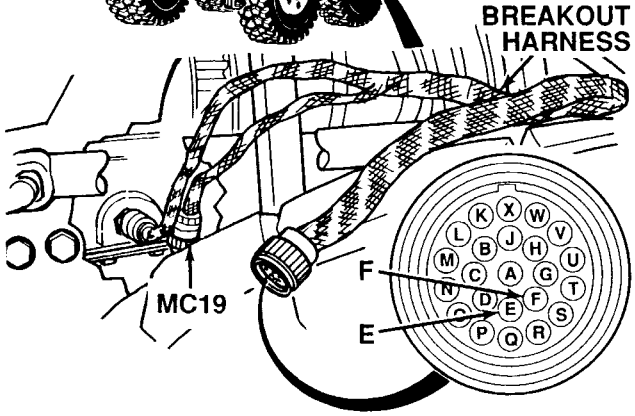
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.







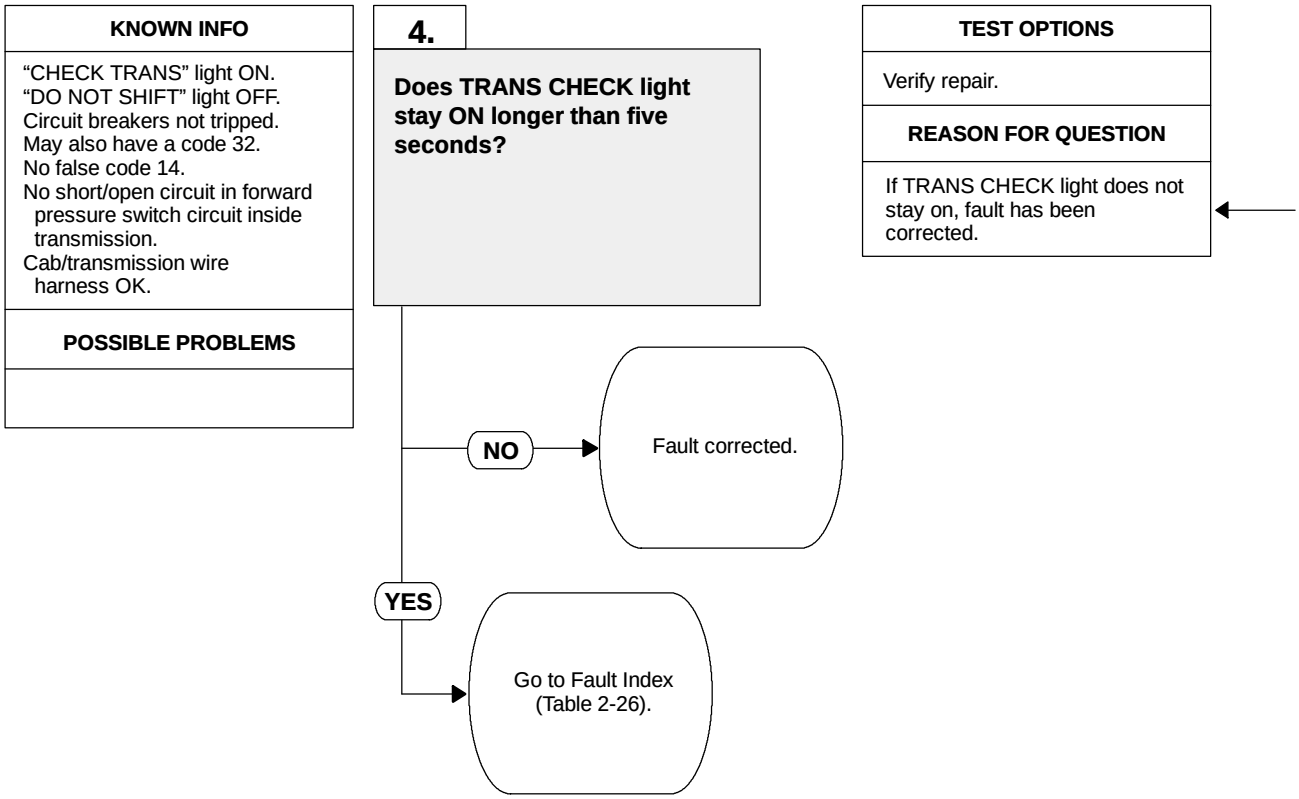




CONTINUITY TEST

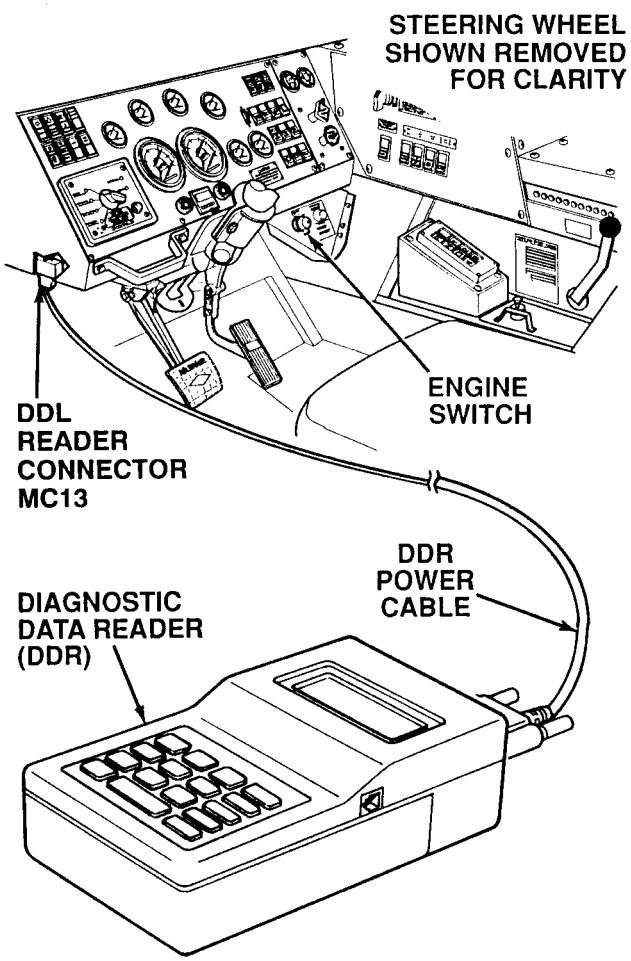
(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 at ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity on wire 101 between breakout harness, terminal E and harness connector MC10, terminal 2N?
  (a) If there is no continuity, repair wire 101 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 101 is OK.
(5) Is there continuity on wire 118 between breakout harness, terminal F and harness connector MC10, terminal 3P?
  (a) If there is no continuity, repair wire 118 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 118 is OK.
(6) Connect connector MC10 to ATEC ECU and tighten screw.
(7) Install two ECB covers and 15 screws.
(8) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(9) Connect transmission connector MC19 to transmission bulkhead connector.
(10) Install left rear skirt on underside of fender (Para 17-34).

3. CODE 14: FORWARD PRESSURE SWITCH INOPERATIVE (CONT).



VERIFY REPAIR

(1) Connect DDR cable to DDL connector MC13.
(2) Clear ATEC codes (Para 2-11).
(3) Start engine (TM 9-2320-364-10) and observe CTL.
  (a) If TRANS CHECK light comes on for about five seconds then goes off, fault has been corrected. Perform Steps (4) and (5) below.
  (b) If TRANS CHECK light comes on and stays on after engine warms up, perform Steps (4) and (5) below and go to Fault Index (Table 2-26).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR cable from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

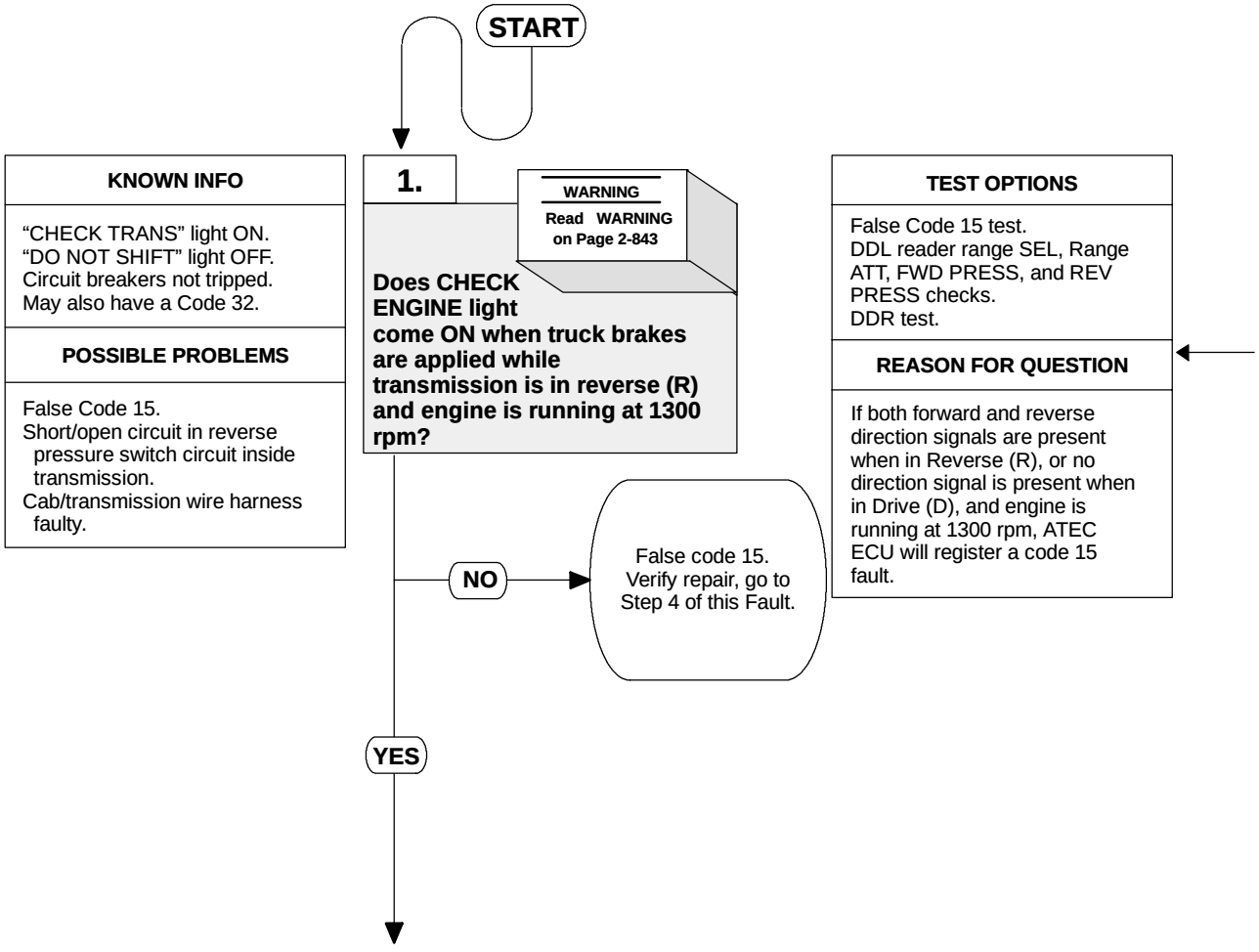
4. CODE 15: REVERSE PRESSURE SWITCH INOPERATIVE.

INITIAL SETUP

Tools and Special Tools
- Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
- STE/ICE-R (optional) (Item 3, Appendix G)
- Breakout Harness (Item 36, Appendix G)
- Multimeter (Item 44, Appendix G)
- Reader, Diagnostic (Item 53, Appendix G)

References
- TM 9-2320-364-10
- TM 9-4910-571-12&P

Equipment Condition
- Engine OFF, (TM 9-2320-364-10)
- Parking brake applied, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Left rear skirt removed, (Para 17-34)



WARNING

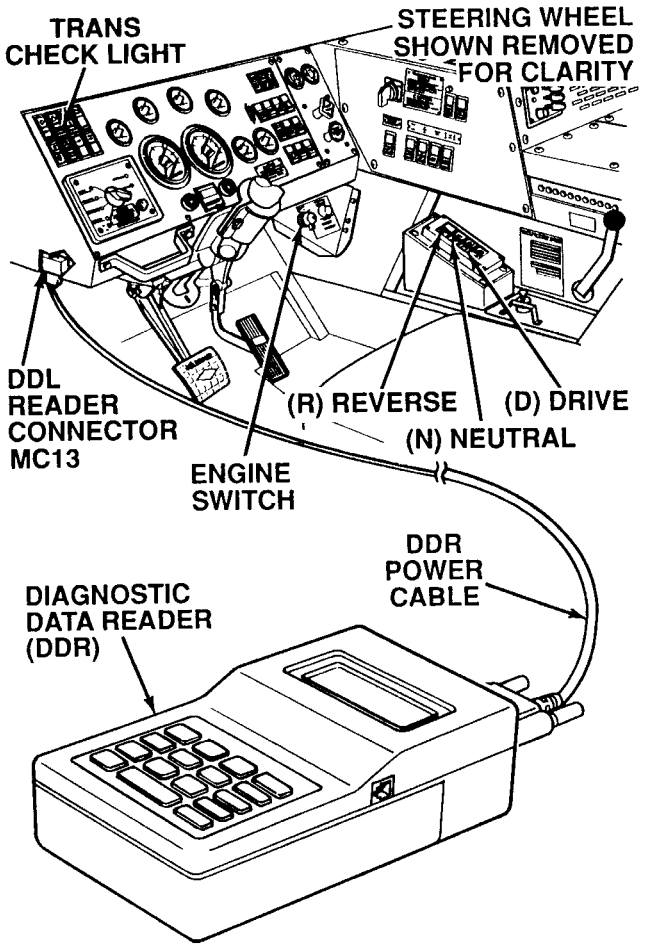
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.
- Ensure all personnel are clear of rear of truck before shifting into R (reverse). Failure to do so might result in injury or death to personnel.

CAUTION

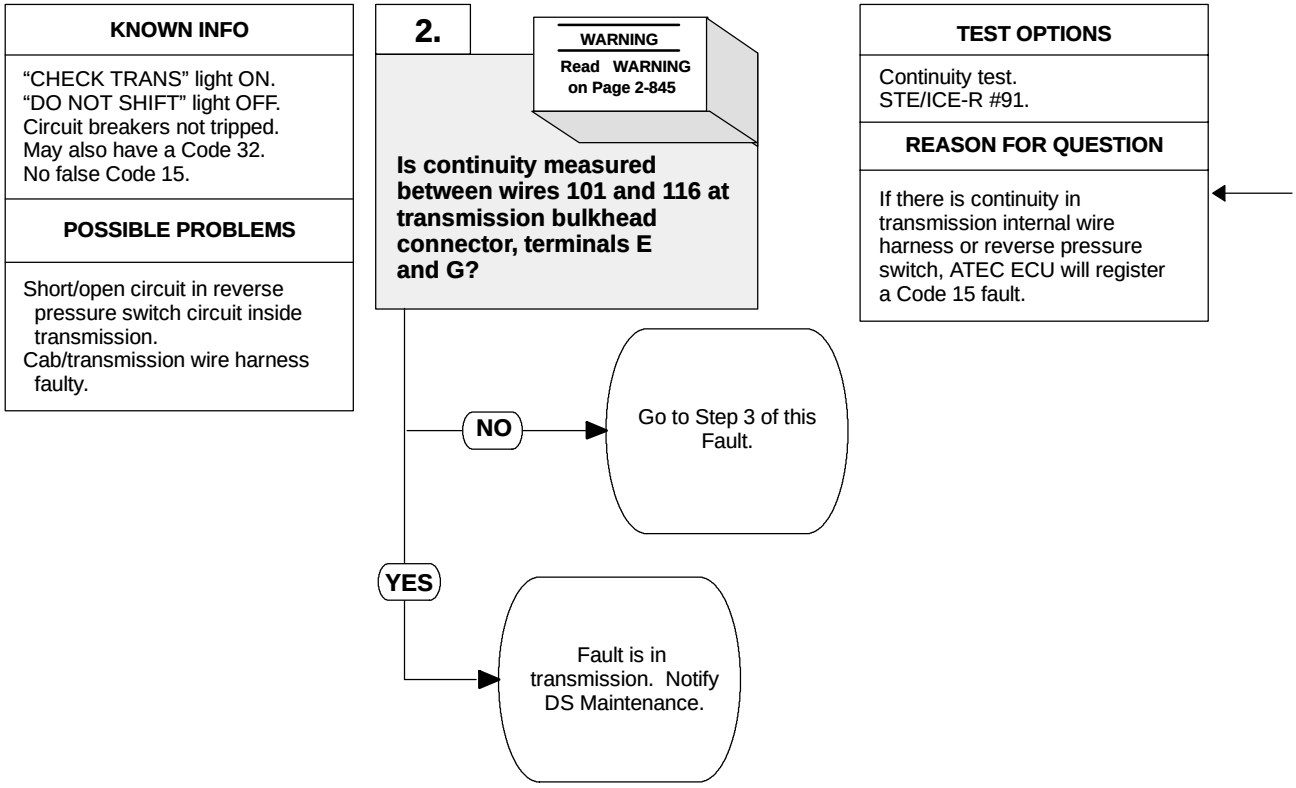
Do not exceed 2000 engine rpm. Damage to transmission could occur.

DDR TEST

(1) Connect DDR cable to DDL connector MC13.
(2) START engine (TM 9-2320-364-10).
(3) Fully apply brake pedal.
(4) Select R (Reverse) on shift selector.
(5) Increase engine speed to 1300 rpm.
(6) Observe TRANS CHECK light.
  (a) If TRANS CHECK light comes ON, perform Steps (9) and (10) below and go to Step 2 of this Fault.
  (b) If TRANS CHECK light is not ON, Code 15 is false. Go to Step (7) below.
(7) Clear ATEC codes (Para 2-11).
(8) Test drive in R (Reverse) at 1300 rpm or greater to see if code reappears.
  (a) If code did not reappear, Code 15 was false. Perform Steps (9) and (10) below and go to Step 4 of this Fault.
  (b) If code appears, perform Steps (9) and (10) below and go to Step 2 of this Fault.
(9) Turn OFF ENGINE switch.
(10) Disconnect DDR cable from DDL connector MC13.



4. CODE 15: REVERSE PRESSURE SWITCH INOPERATIVE (CONT).

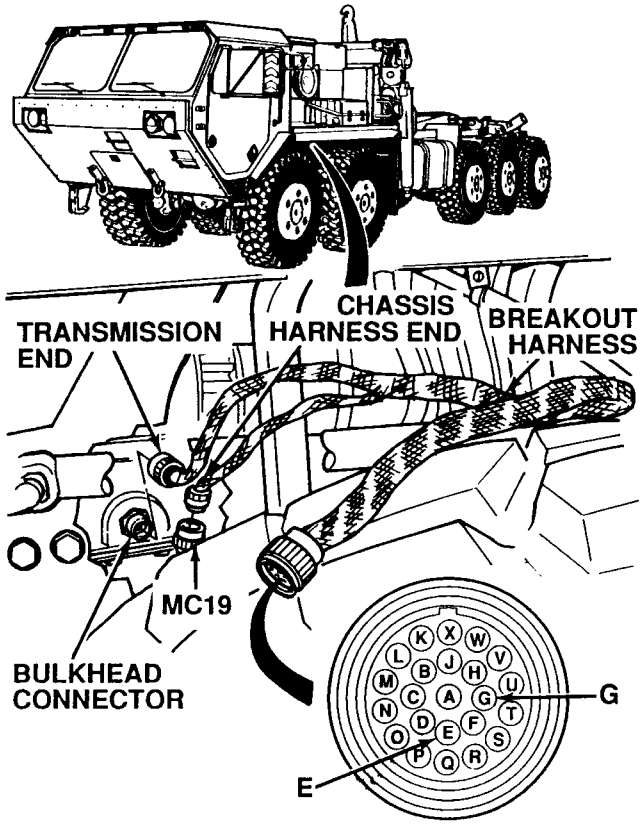


WARNING

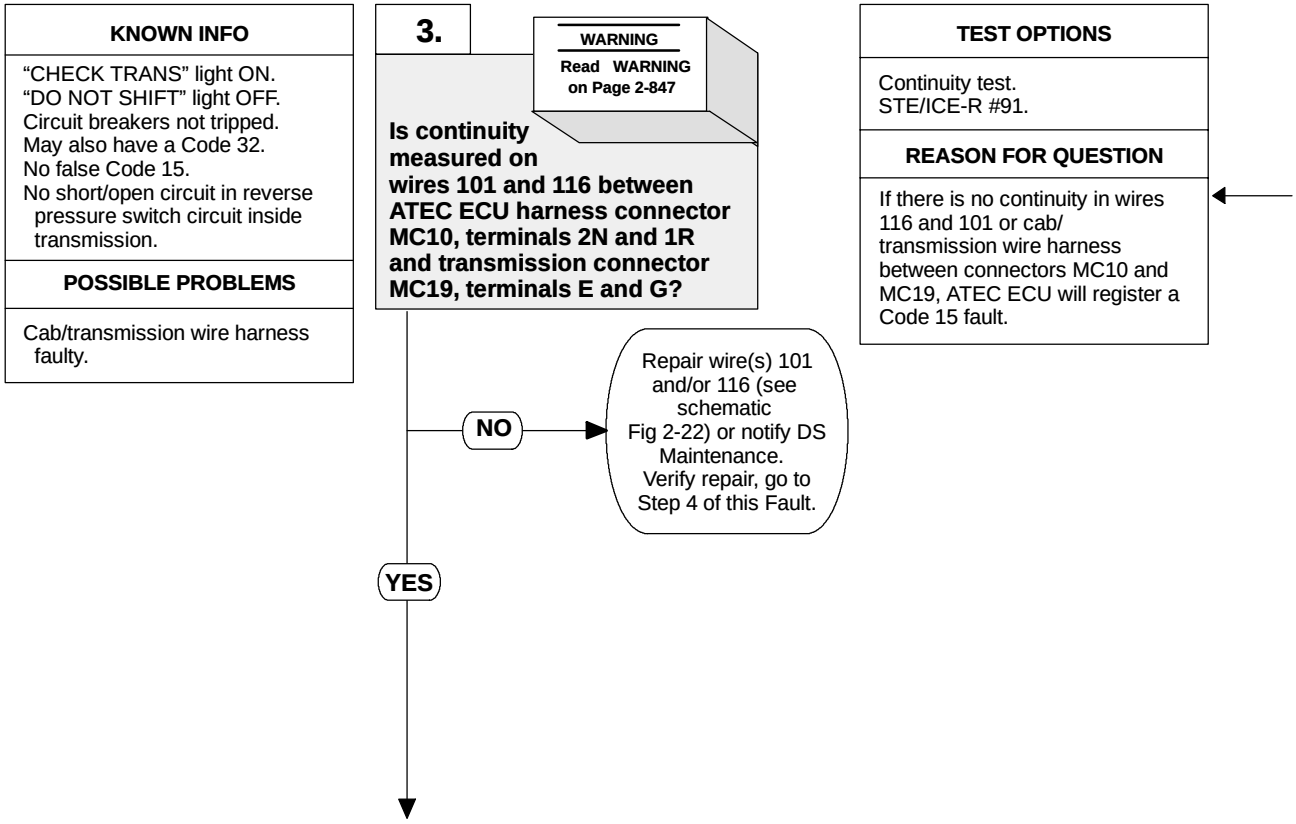
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect transmission connector MC19 at transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between wires 101 and 116 at breakout harness, terminals E and G?
   (a) If there is no continuity, reverse pressure switch and wires inside transmission are OK.
   (b) If there is continuity, notify DS Maintenance.

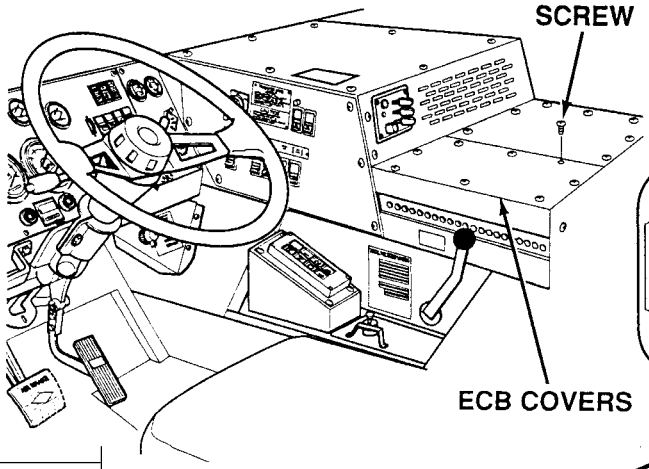


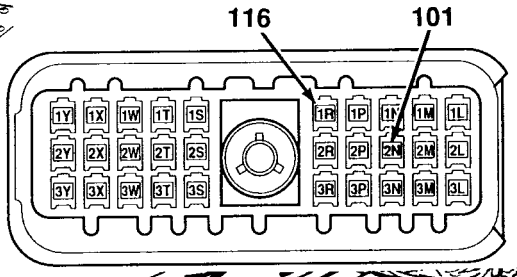
4. CODE 15: REVERSE PRESSURE SWITCH INOPERATIVE (CONT).

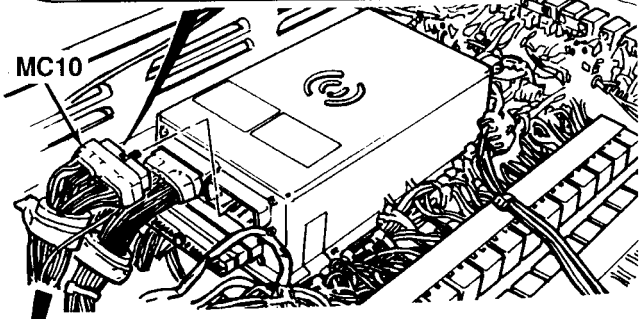


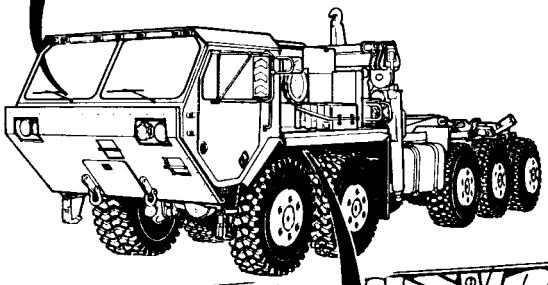
WARNING

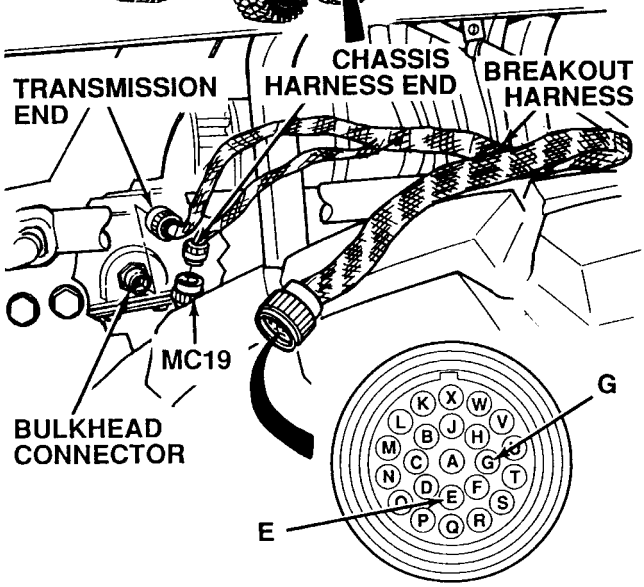
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.







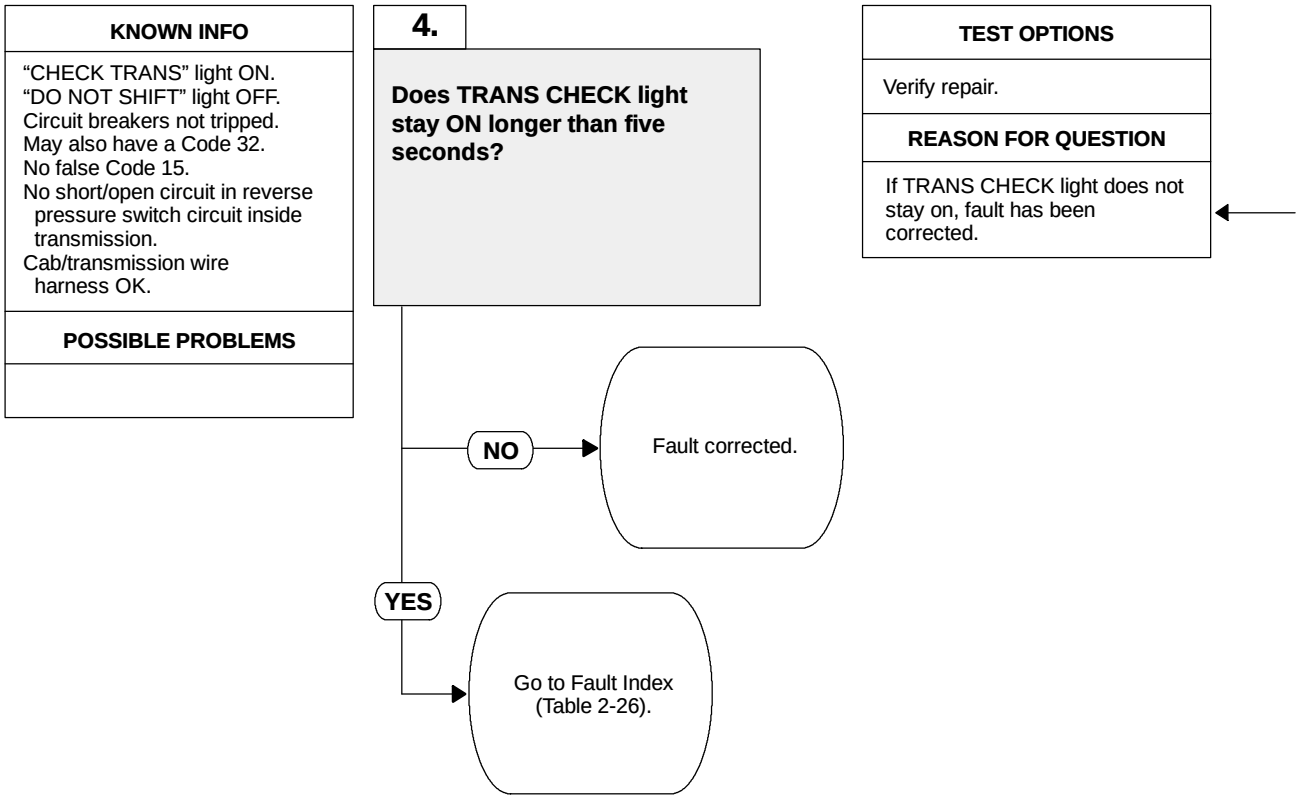




CONTINUITY TEST

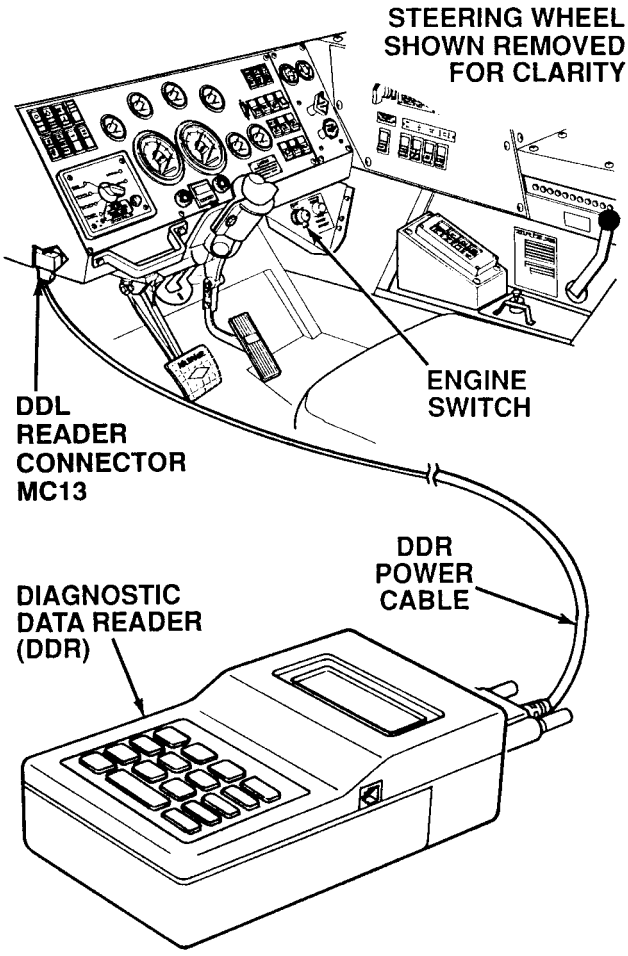
(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity on wire 101 between breakout harness, terminal E and harness connector MC10, terminal 2N?
  (a) If there is no continuity, repair wire 101 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 101 is OK.
(5) Is there continuity on wire 116 between breakout harness, terminal G and harness connector MC10, terminal 1R?
  (a) If there is no continuity, repair wire 116 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 116 is OK.
(6) Connect connector MC10 to ATEC ECU and tighten screw.
(7) Install two ECB covers and 15 screws.
(8) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(9) Connect transmission connector MC19 to transmission bulkhead connector.
(10) Install left rear skirt on underside of fender (Para 17-34).

4. CODE 15: REVERSE PRESSURE SWITCH INOPERATIVE (CONT).



VERIFY REPAIR

(1) Connect DDR cable to DDL connector MC13.
(2) Clear ATEC codes (Para 2-11).
(3) Start engine (TM 9-2320-364-10) and observe CTL.
  (a) If TRANS CHECK light comes on for about five seconds then goes off, fault has been corrected. Perform Steps (4) and (5) below.
  (b) If TRANS CHECK light comes on and stays on after engine warms up, perform Steps (4) and (5) below and go to Fault Index (Table 2-26).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR cable from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

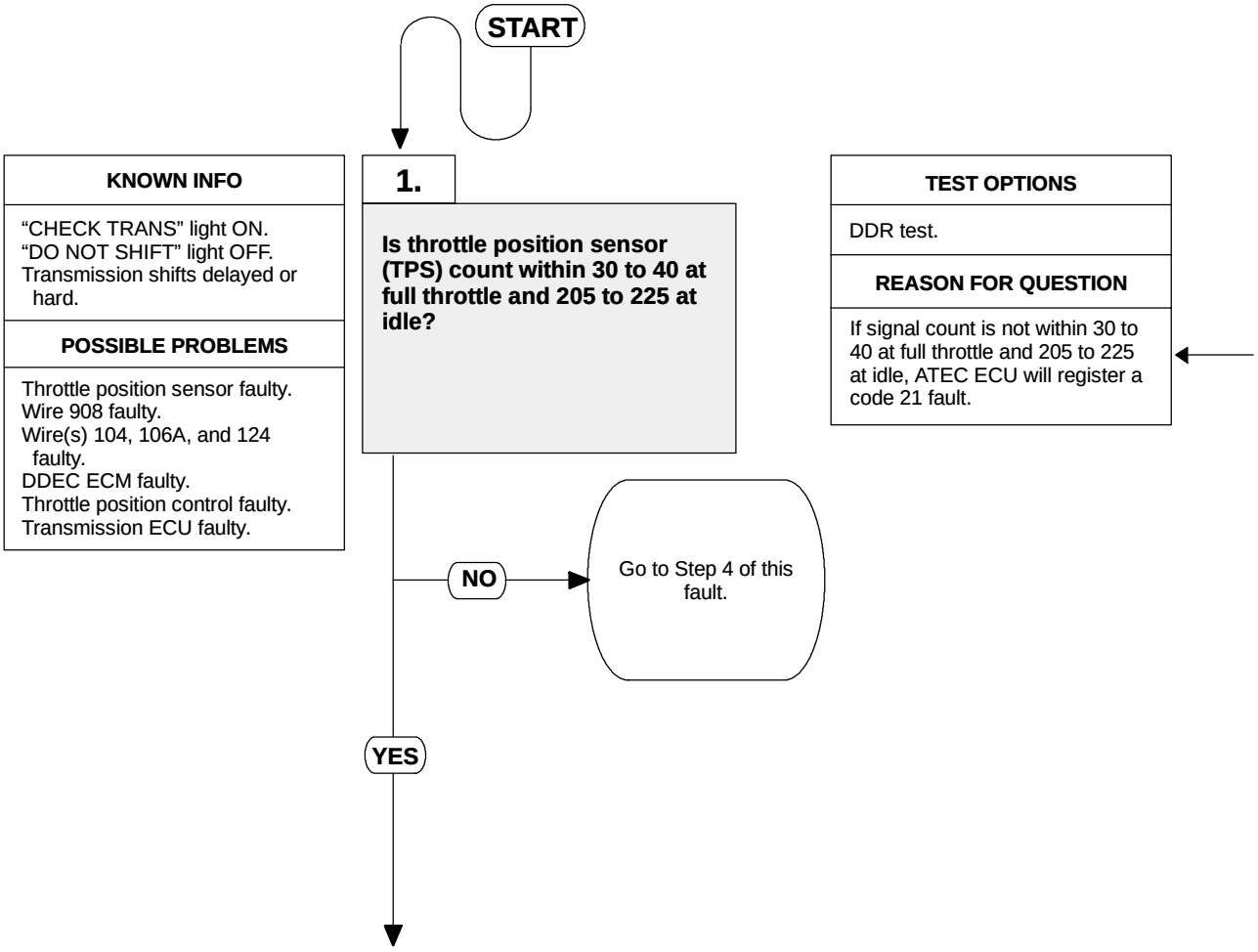
5. CODE 21: THROTTLE SENSOR INOPERATIVE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
DDEC Repair Kit (Item 15, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

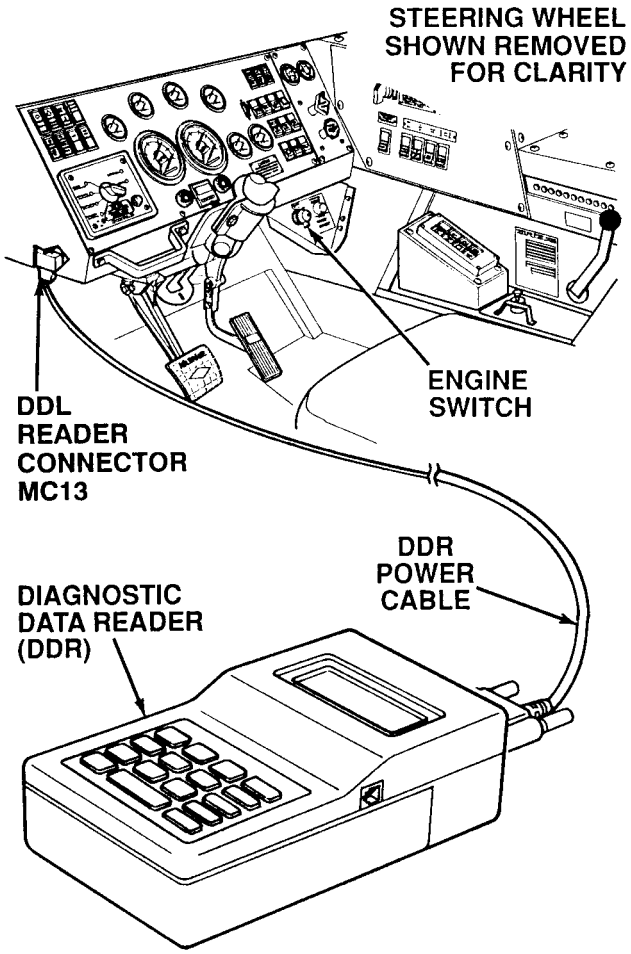
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover opened, (TM 9-2320-364-10)



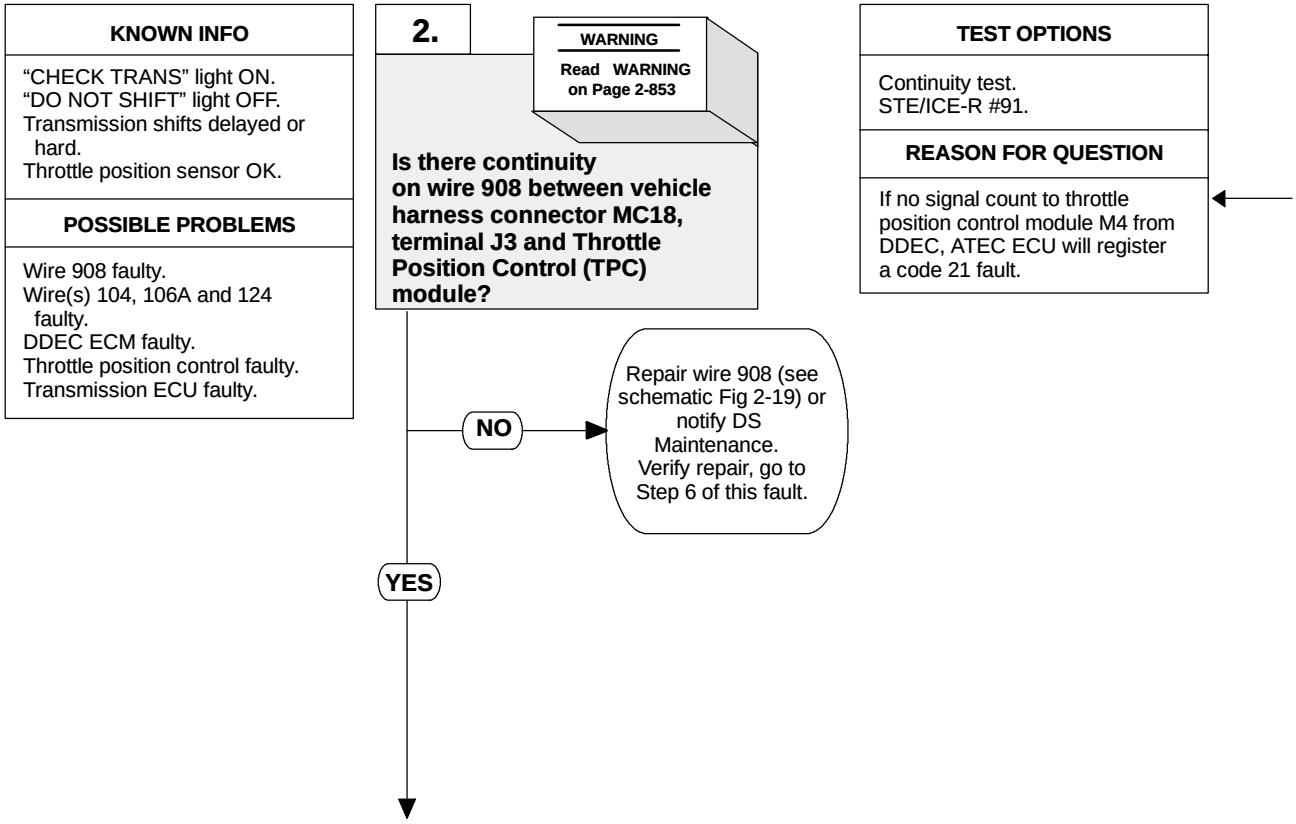
NOTE

TPS counts and percentage are found on the DDR ATEC DIAG CODE display.

DDR TEST
(1) Connect DDR cable to DDL connector MC13. (2) Turn ON ENGINE switch (TM 9-2320-364-10). (3) Select DIAG CODE display and scroll to TPS. (4) Slowly apply and release throttle and read throttle position sensor (TPS) count on reader (Para 2-11). (5) Record count of idle and full throttle. (a) If count is not at 30 to 40 full throttle or 205 to 225 at idle, perform Step (6) below and go to Step 4 of this Fault. (b) If count is at 30 to 40 full throttle or 205 to 225 at idle, perform Step (6) below and go to Step 2 of this Fault. (6) Turn OFF ENGINE switch.

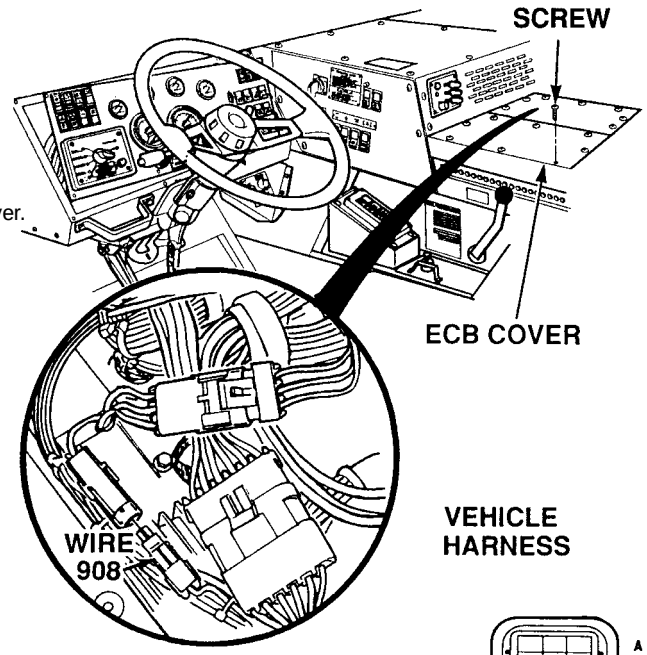


5. CODE 21: THROTTLE SENSOR INOPERATIVE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

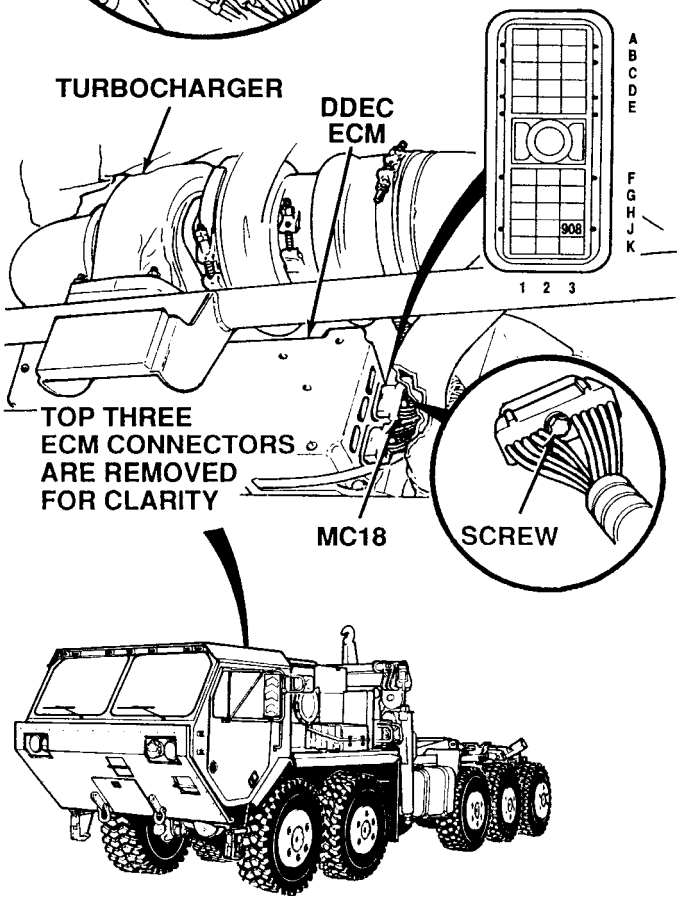


CAUTION

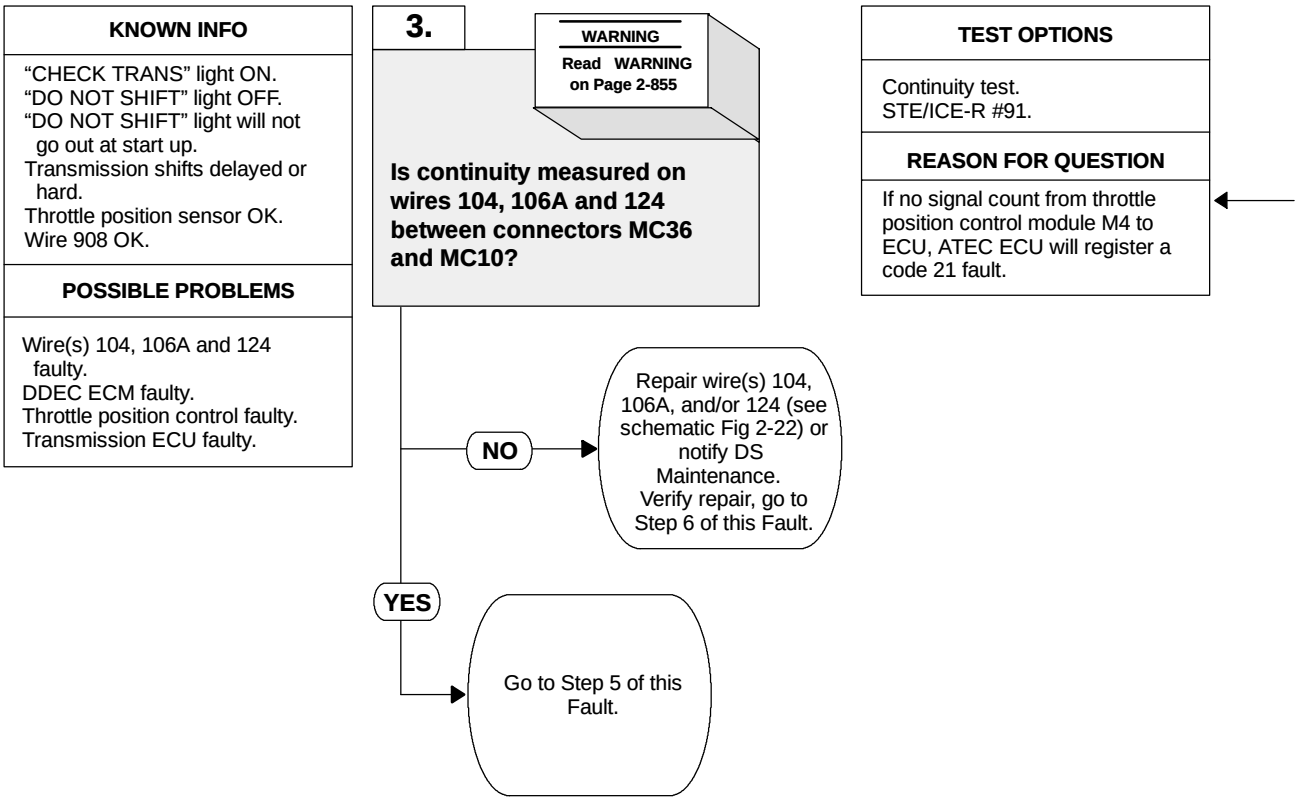
ECM connector terminals are easily damaged. Use care when connecting and disconnecting connectors.

CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Disconnect TPC module connector.
(3) Loosen screw and disconnect vehicle harness connector MC18 from DDEC ECM.
(4) Set multimeter select switch to ohms.
(5) Is there continuity on wire 908 between vehicle harness connector MC18, terminal J3 and wire 908 connector?
  (a) If there is no continuity, repair wire 908 (see schematic Fig 2-19) or notify DS Maintenance.
  (b) If there is continuity, wire 908 is OK.
(6) Connect connector MC18 to DDEC ECM and tighten screw.
(7) Close top engine access cover (TM 9-2320-364-10).



5. CODE 21: THROTTLE SENSOR INOPERATIVE (CONT).

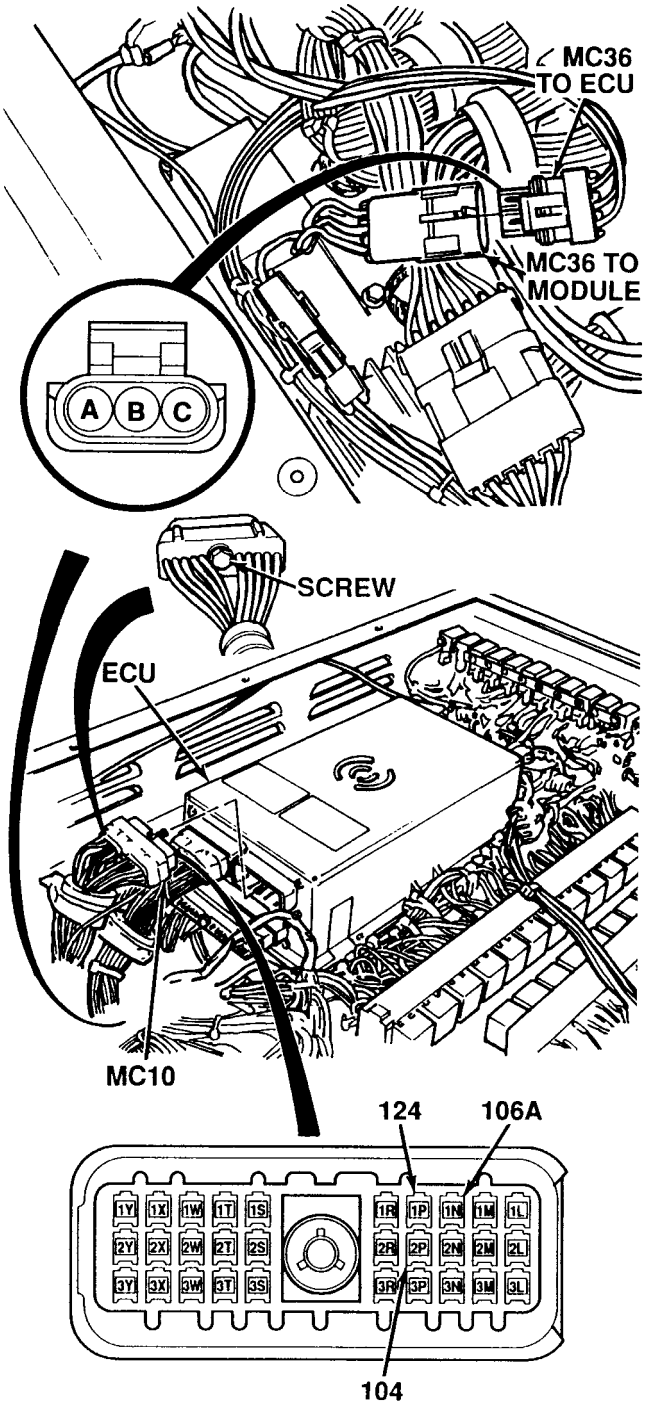


WARNING

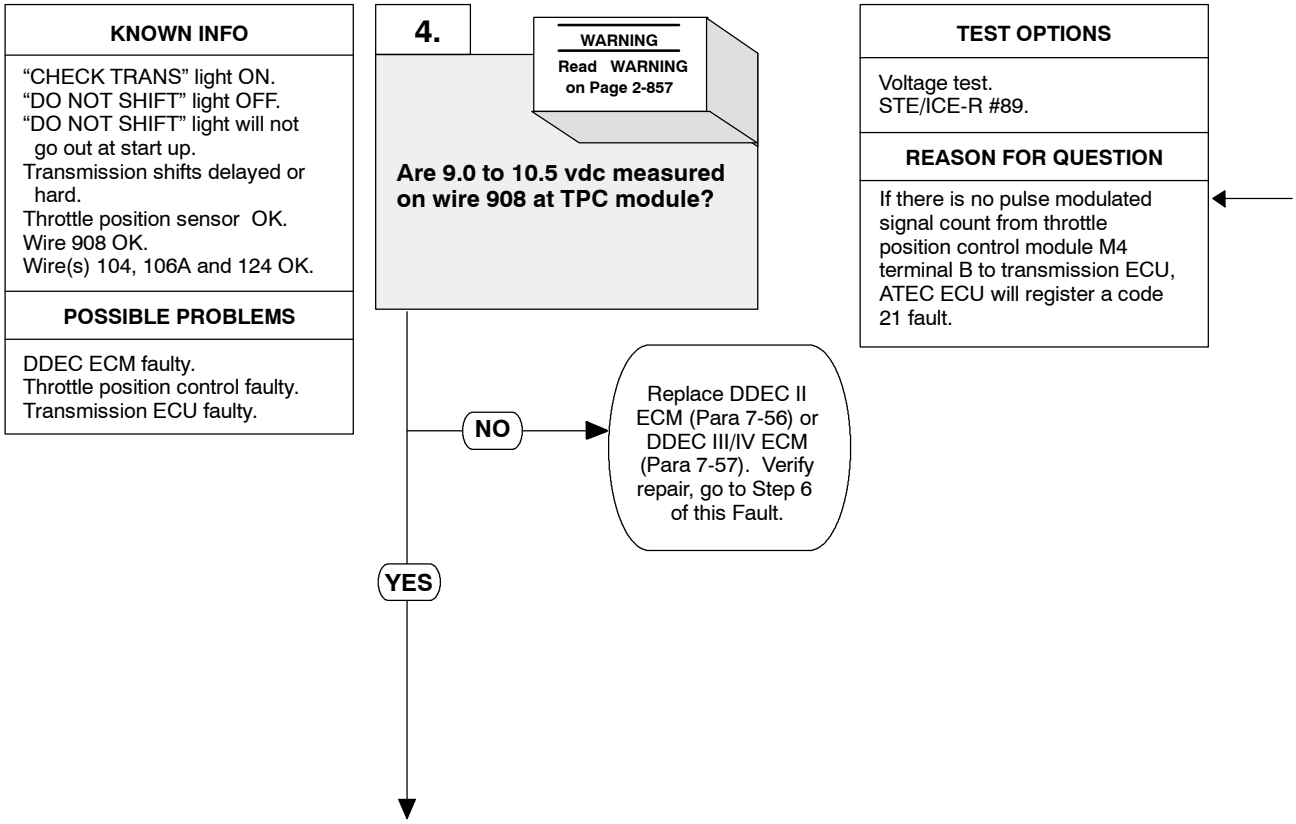
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Voltage is always present at circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 and can cause severe injury to personnel. Non-metallic tools shall be used when removing relays.

CONTINUITY TEST

(1) Disconnect connector MC36.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Set multimeter select switch to ohms.
(4) Is there continuity on wire 104 between connector MC36, terminal B and connector MC10, terminal 2P?
  (a) If there is no continuity, repair wire (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 104 is OK.
(5) Repeat Step (4) above for wire 124 at connector MC36, terminal A and connector MC10, terminal 1P. Go to Step (6) below.
(6) Repeat Step (4) above for wire 106A at connector MC36, terminal C and connector MC10, terminal 1N.
(7) Connect connector MC10 to ATEC ECU and tighten screw.
(8) Connect connector MC36.



5. CODE 21: THROTTLE SENSOR INOPERATIVE (CONT).

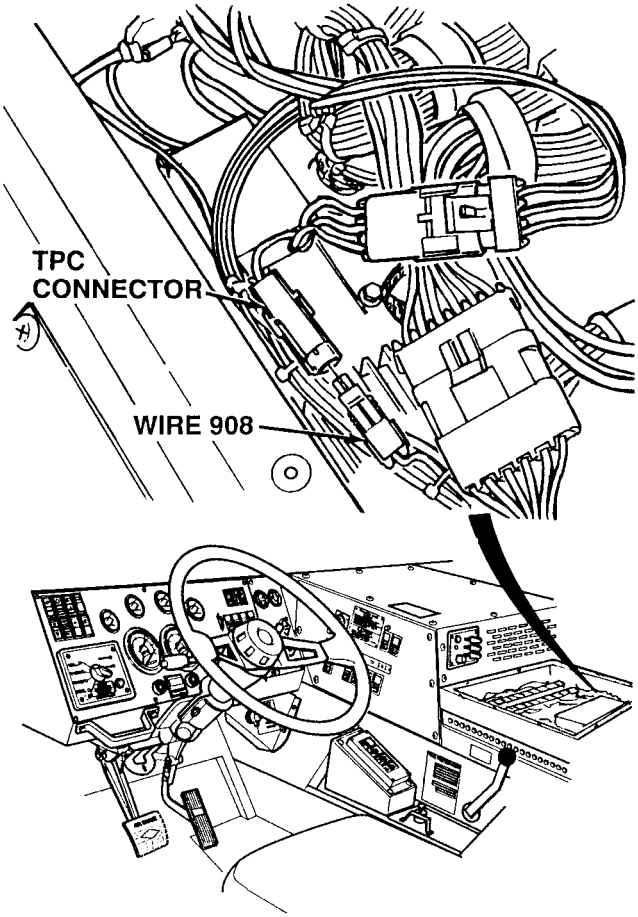


WARNING

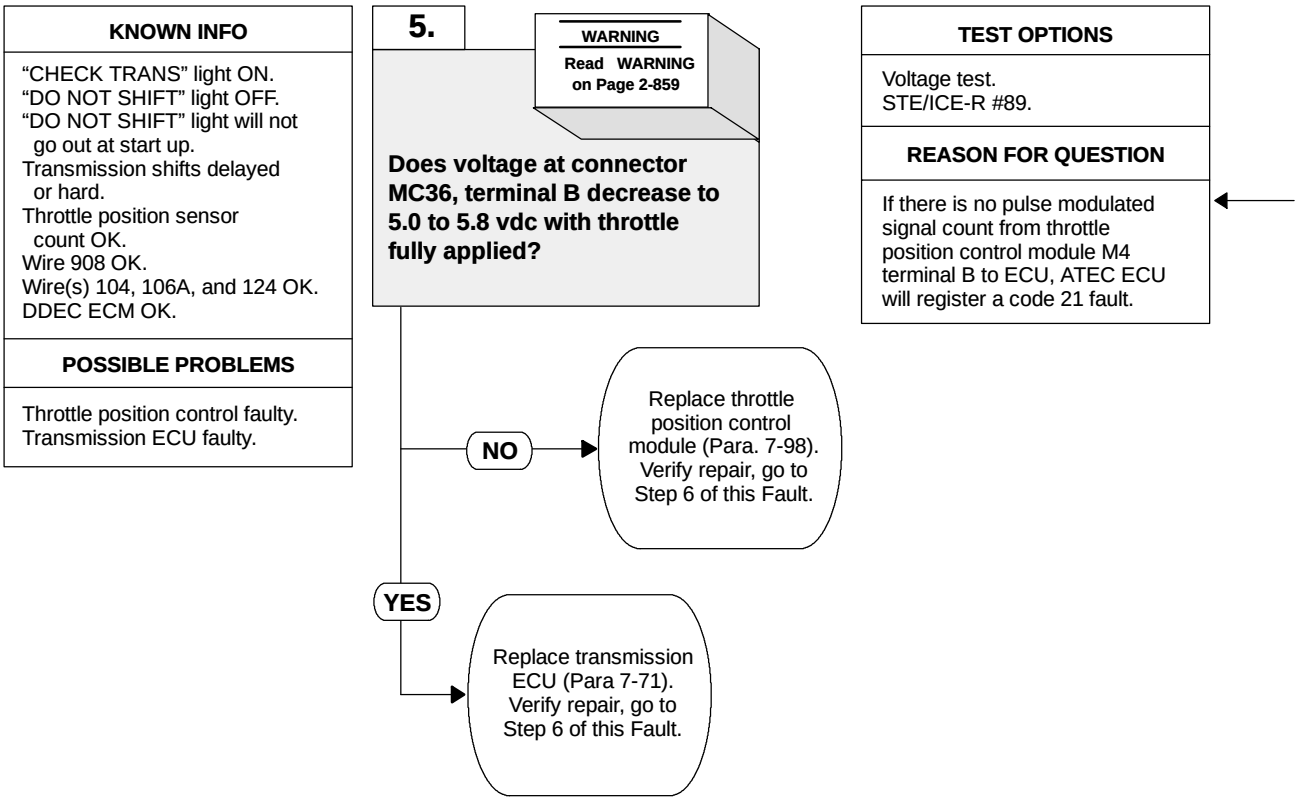
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Voltage is always present at circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 and can cause severe injury to personnel. Non-metallic tools shall be used when removing relays.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Disconnect TPC module connector.
(3) Connect positive (+) multimeter lead to TPC module connector wire 908.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 9.0 to 10.5 vdc are not present, perform Steps (6) and (7) below and replace DDEC II ECM (Para 7-56) or DDEC III/IV ECM (Para 7-57).
  (b) If 9.0 to 10.5 vdc are present, DDEC ECM is OK.
(6) Turn OFF ENGINE switch.
(7) Connect TPC connector.



5. CODE 21: THROTTLE SENSOR INOPERATIVE (CONT).

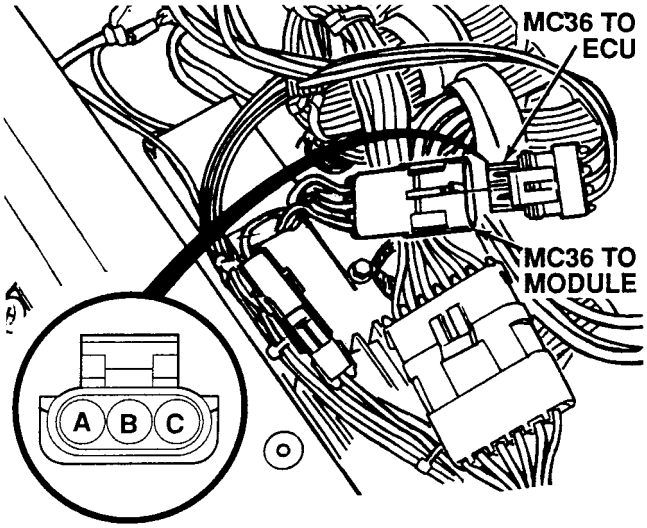


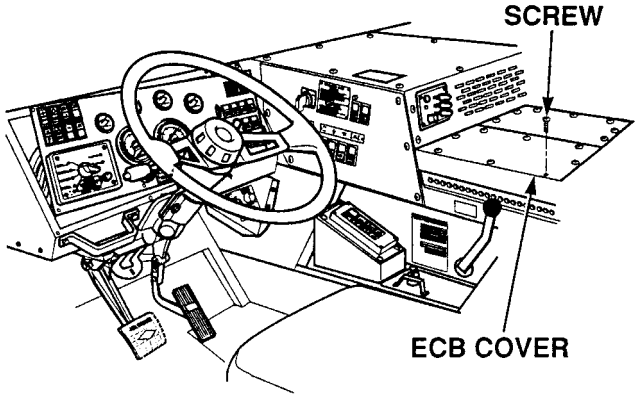
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Voltage is always present at circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 and can cause severe injury to personnel. Non-metallic tools shall be used when removing relays.

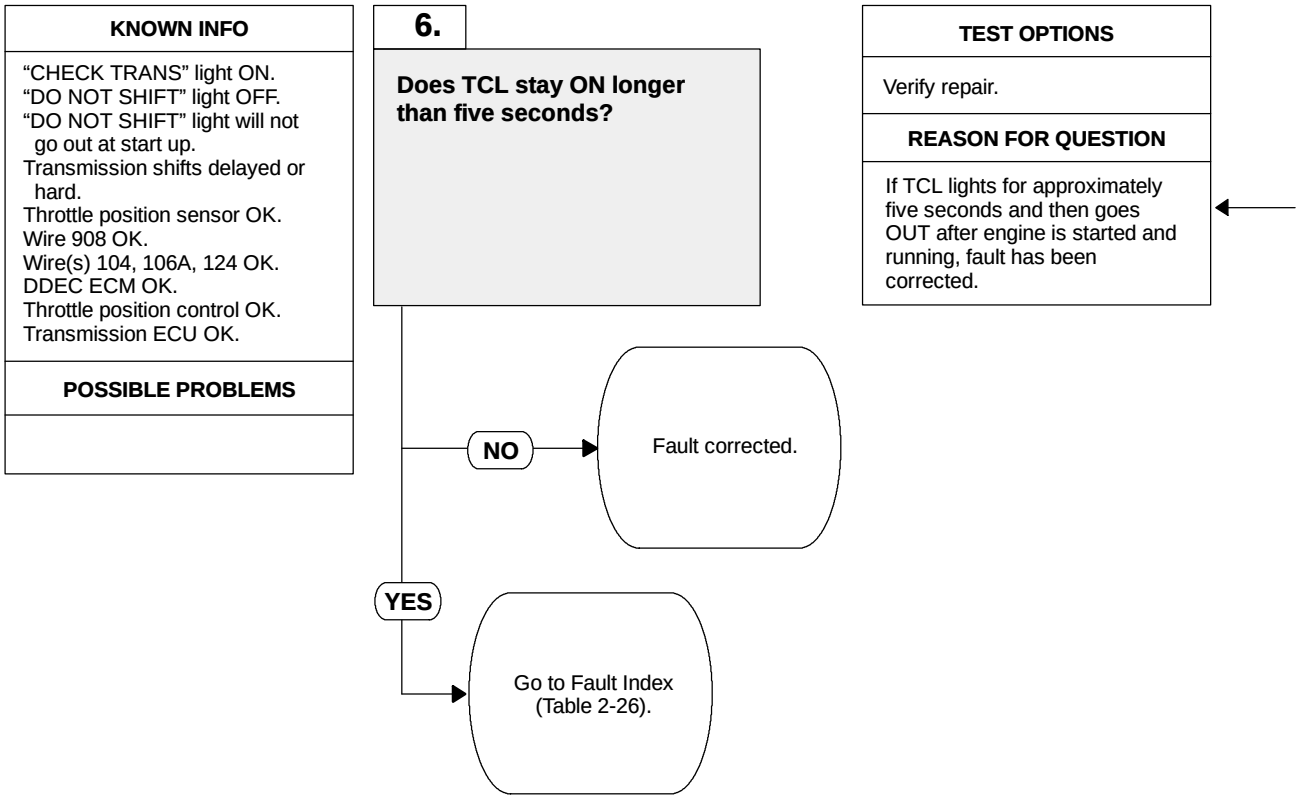
VOLTAGE TEST

(1) Remove terminal B and wire 104 from module side of connector MC36.
(2) Connect positive (+) multimeter lead to connector MC36, terminal B.
(3) Connect negative (–) multimeter lead to known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Fully apply throttle and observe multimeter.
  (a) If 5.0 to 5.8 vdc are not present, perform Steps (6) through (9) below and .replace throttle position control module (Para 7-98).
  (b) If 5.0 to 5.8 vdc are present, perform Steps (6) through (8) below and replace ATEC ECU (Para 7-71).
(6) Release throttle.
(7) Turn OFF ENGINE switch.
(8) Install wire 104 in terminal B of module connector MC36.
(9) Install two ECB covers and 15 screws.



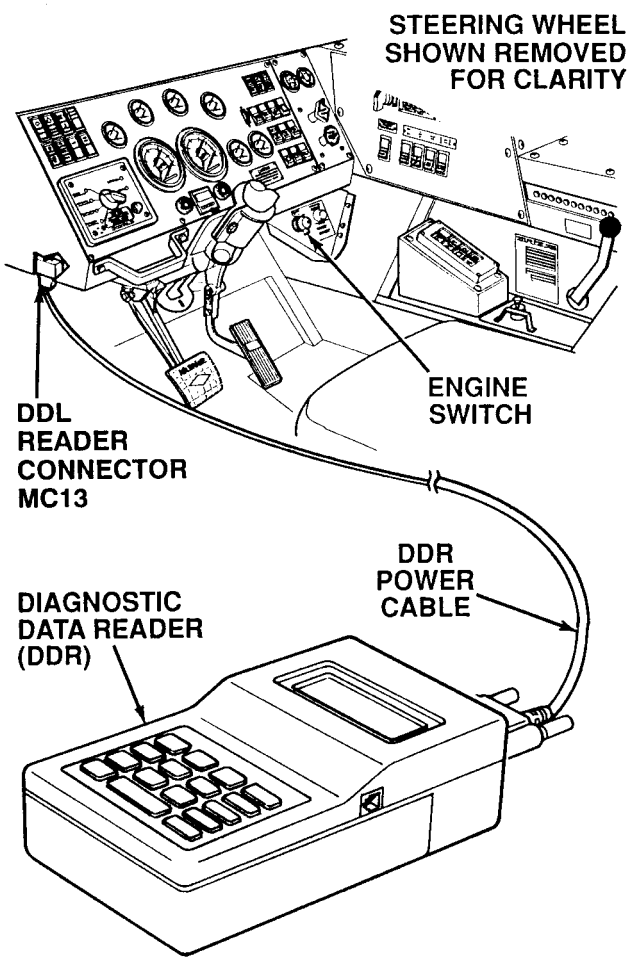


5. CODE 21: THROTTLE SENSOR INOPERATIVE (CONT).



VERIFY REPAIR

(1) Connect DDR cable to DDL connector MC13.
(2) Clear ATEC codes (Para 2-11).
(3) Start engine (TM 9-2320-364-10) and observe CTL.
  (a) If TRANS CHECK light comes on for about five seconds then goes off, fault has been corrected. Perform Steps (4) and (5) below.
  (b) If TRANS CHECK light comes on and stays on after engine warms up, perform Steps (4) and (5) below and go to Fault Index (Table 2-26).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR cable from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

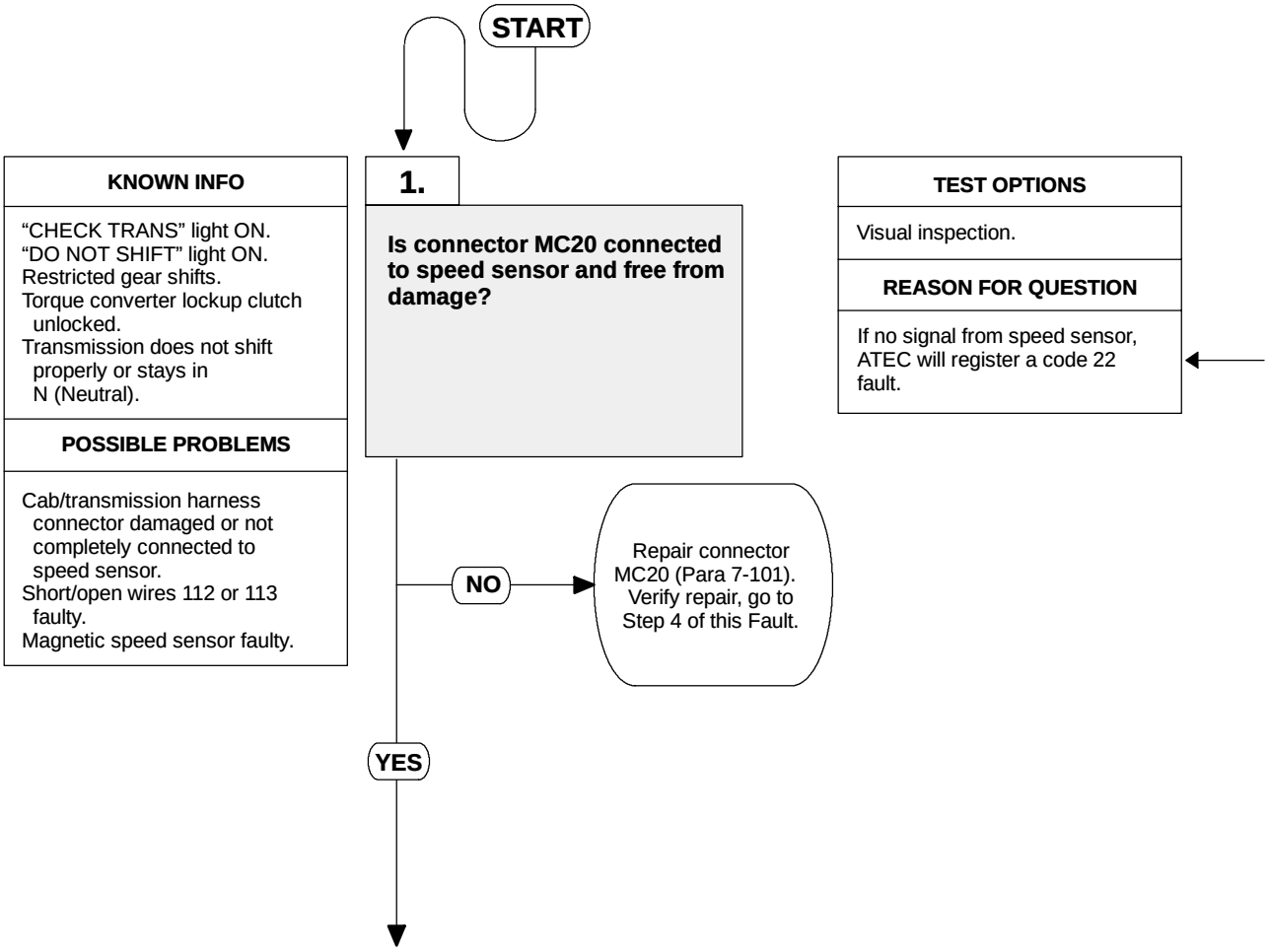
6. CODE 22: SPEED SENSOR INOPERATIVE.

INITIAL SETUP

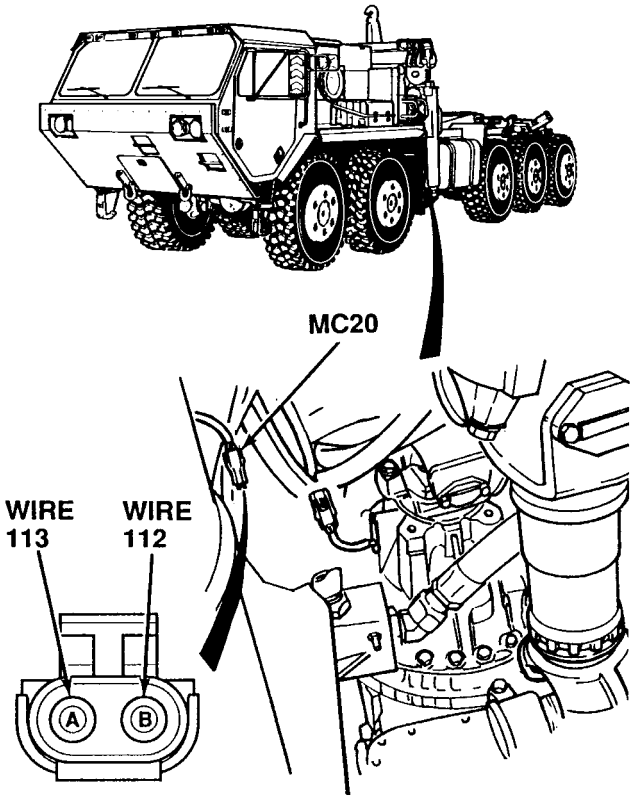
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

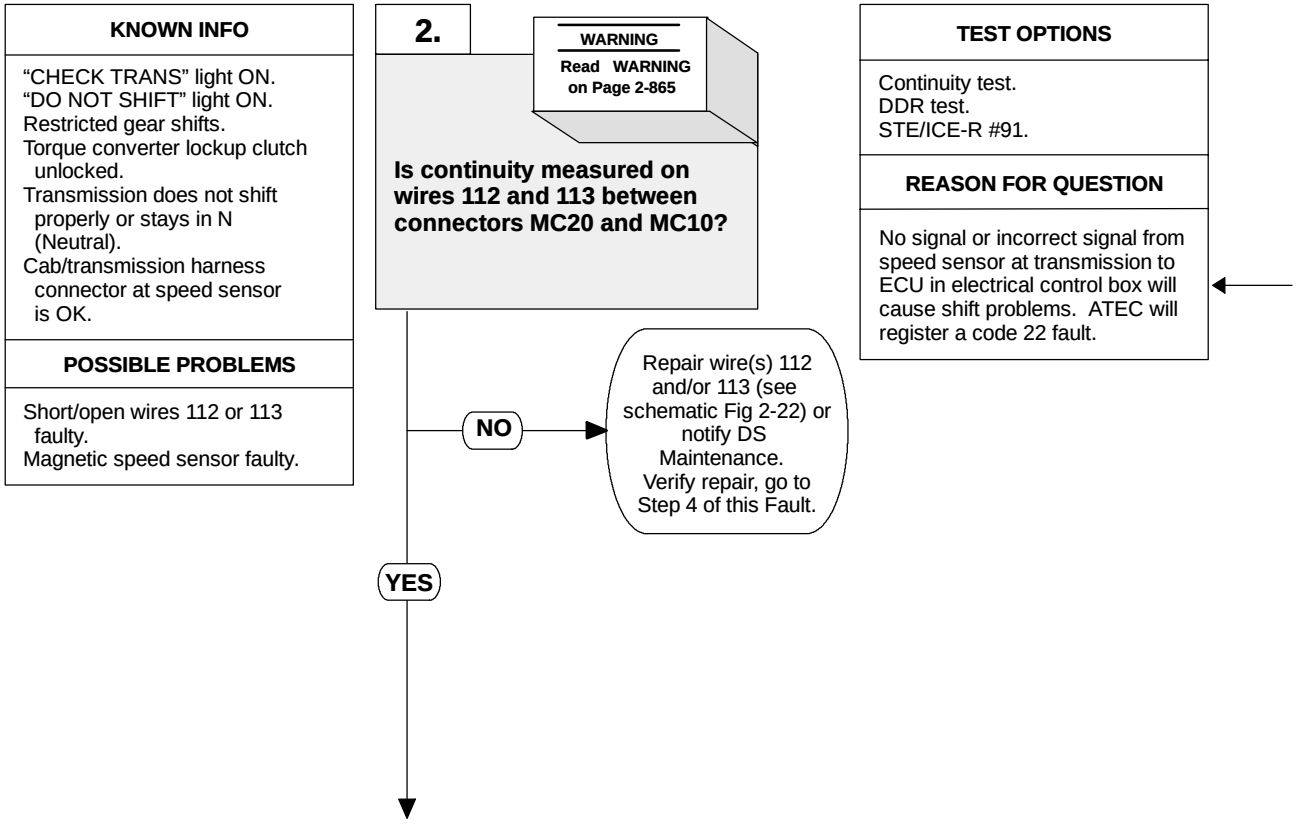
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)
Wheels turned fully to the right, (TM 9-2320-364-10)



VISUAL INSPECTION
Inspect connector MC20. (1) If connector MC20 is damaged, repair connector (Para 7-101). (2) If connector MC20 is loose or disconnected, connect connector MC20.

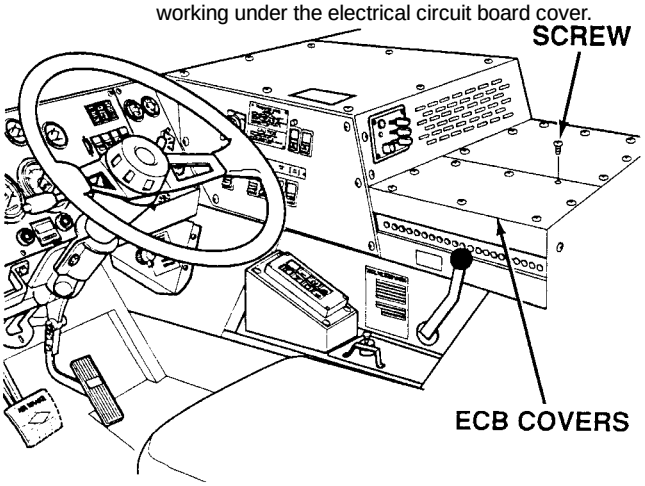


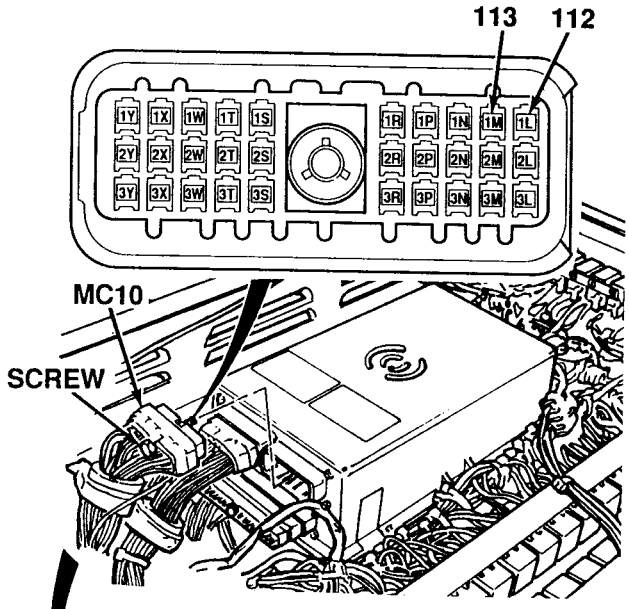
6. CODE 22: SPEED SENSOR INOPERATIVE (CONT).



WARNING

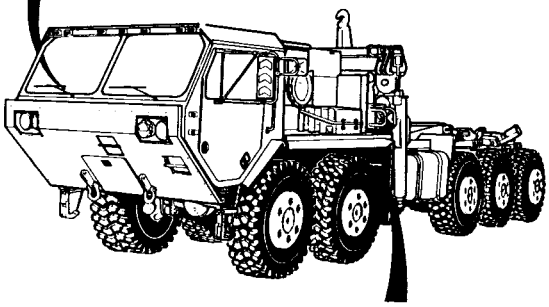
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

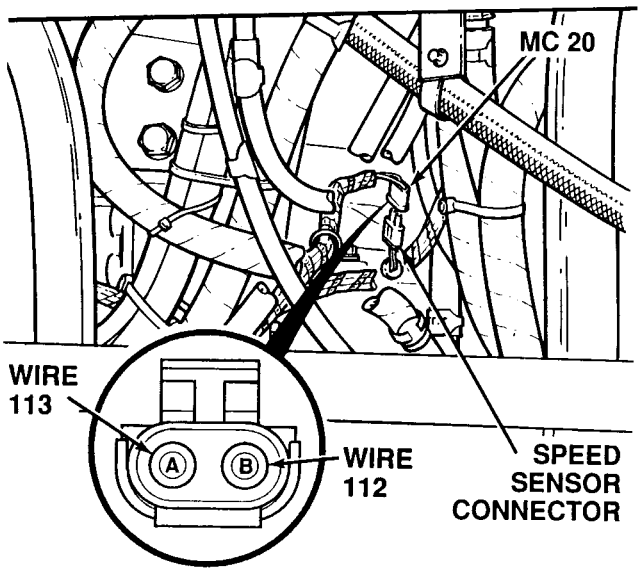




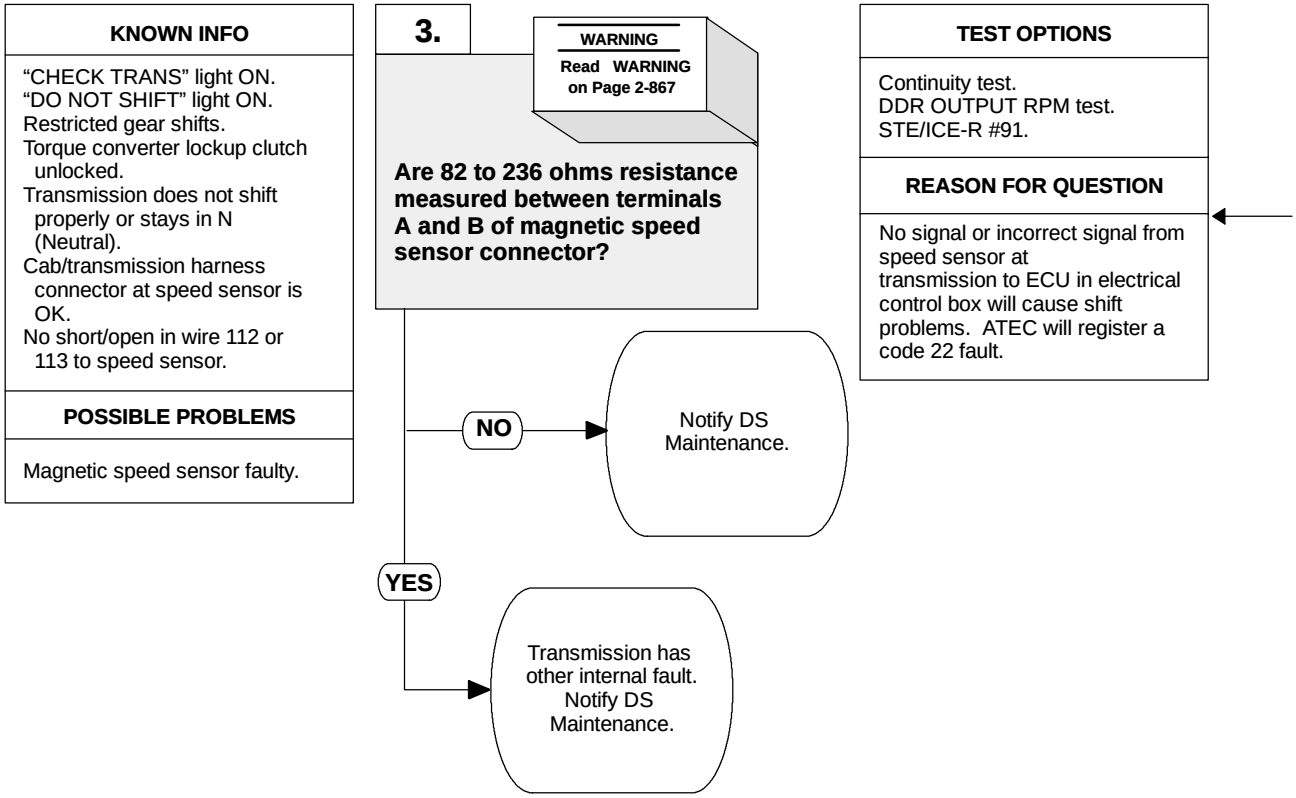
CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 at ATEC ECU.
(3) Disconnect connector MC20 at transmission speed sensor.
(4) Set multimeter select switch to ohms.
(5) Is there continuity on wire 112 between connector MC20, terminal B and harness connector MC10, terminal 1L?
  (a) If there is no continuity, repair wire 112 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 112 is OK.
(6) Is there continuity on wire 113 between connector MC20, terminal A and harness connector MC10, terminal 1M?
  (a) If there is no continuity, repair wire 113 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 113 is OK.
(7) Connect connector MC10 to ATEC ECU and tighten screw.
(8) Install two ECB covers and 15 screws.





6. CODE 22: SPEED SENSOR INOPERATIVE (CONT).



WARNING

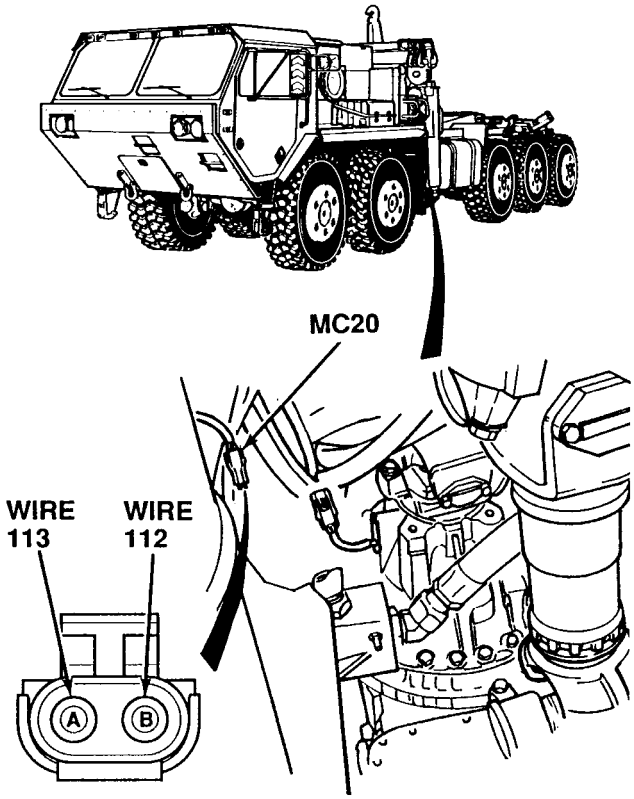
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

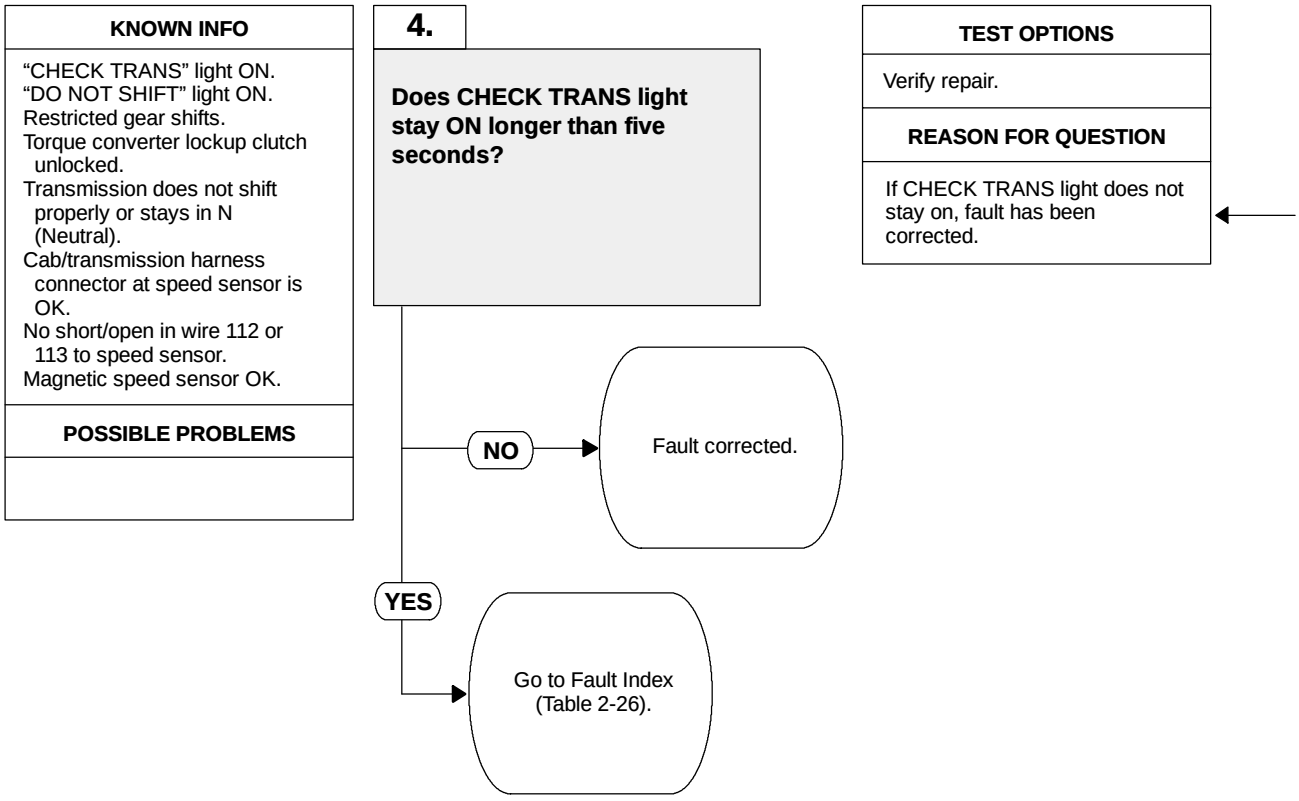
Speed sensor resistance will change with temperature of sensor. Resistance values in ohms, range from 82 to 236.

CONTINUITY TEST

(1) Measure resistance between terminals A and B of magnetic speed sensor connector MC20.
   (a) If resistance is not between 82 to 236 ohms, speed sensor is faulty. Notify DS Maintenance.
   (b) If resistance is in range, go to Step (2) below.
(2) Is there continuity between magnetic speed sensor connector MC20, terminal A and a known good ground?
   (a) If there is continuity, notify DS Maintenance.
   (b) If there is no continuity, go to Step (3) below.
(3) Is there continuity between magnetic speed sensor connector MC20, terminal B and a known good ground?
   (a) If there is continuity, notify DS Maintenance.
   (b) If there is no continuity, magnetic speed sensor is OK.
(4) Connect wire harness connector MC20.
(5) Install left rear skirt on underside of fender (Para 17-34).

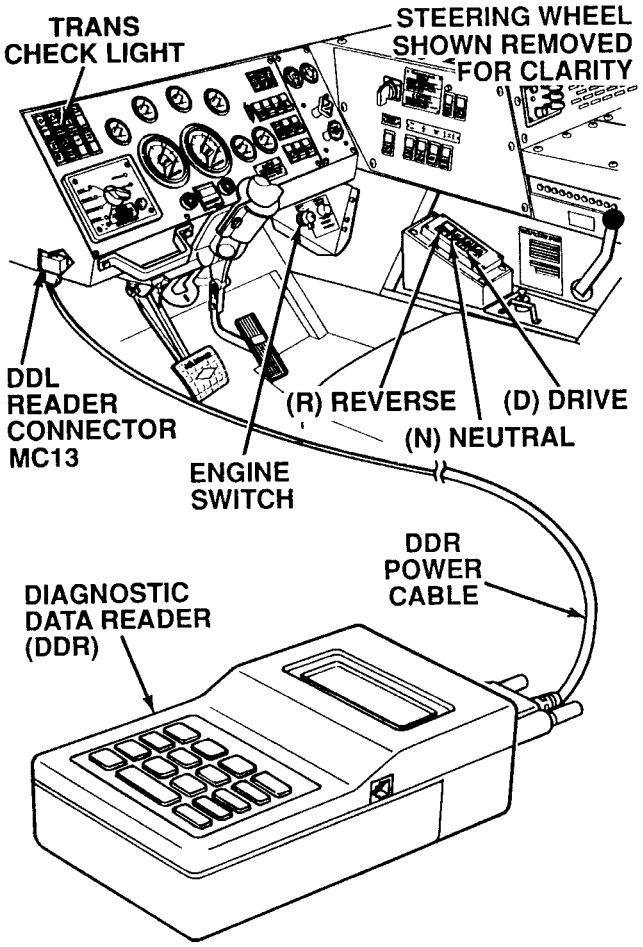


6. CODE 22: SPEED SENSOR INOPERATIVE (CONT).



VERIFY REPAIR

(1) Connect DDR cable to DDL connector MC13.
(2) Start engine (TM 9-2320-364-10).
(3) Select D (Drive), drive truck and then select N (Neutral) on shift selector and observe DDR.
  (a) If codes do not appear, fault has been corrected. Perform Steps (4) through (6) below.
  (b) If code(s) appear, perform Steps (4) through (6) below and go to Fault Index (Table 2-26).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR cable from DDL connector MC13.
(6) Install left rear skirt on underside of fender (Para 17-34).



2-15. ATEC TROUBLESHOOTING (CONT).

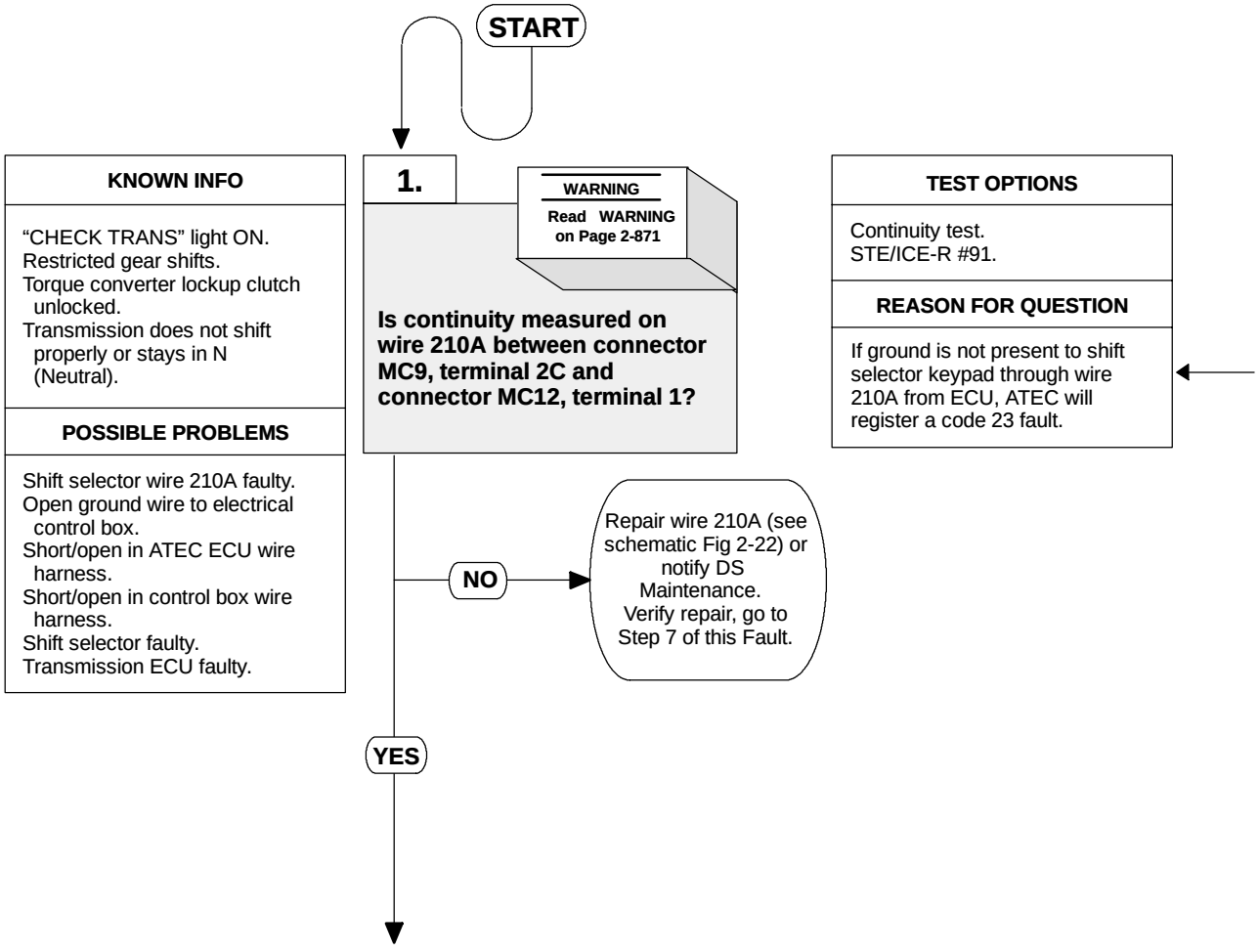
7. CODE 23: SHIFT SELECTOR.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

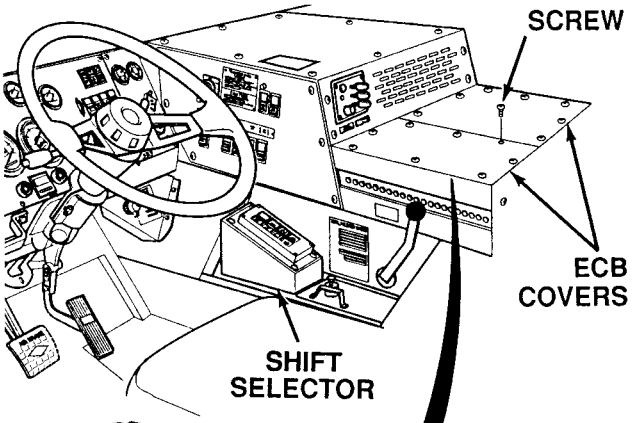
References
TM 9-2320-364-10
TM 9-4910-571-12&P

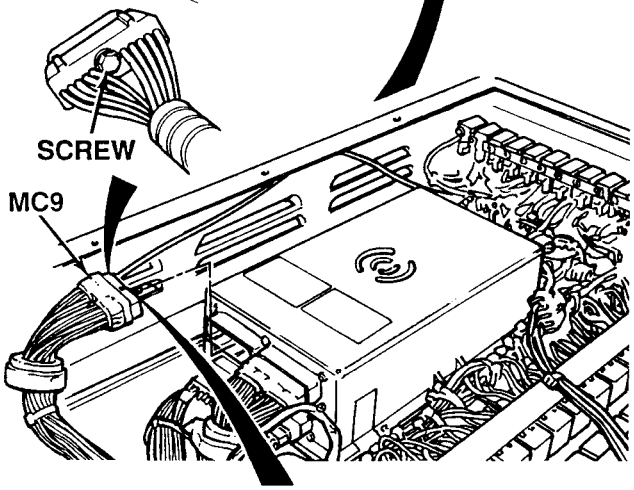
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Deleted
Deleted
Deleted



WARNING

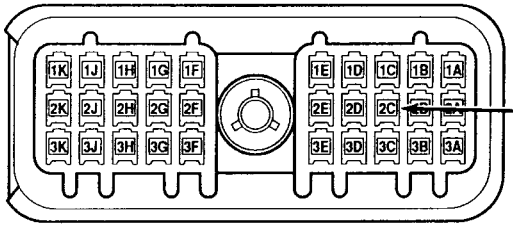
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

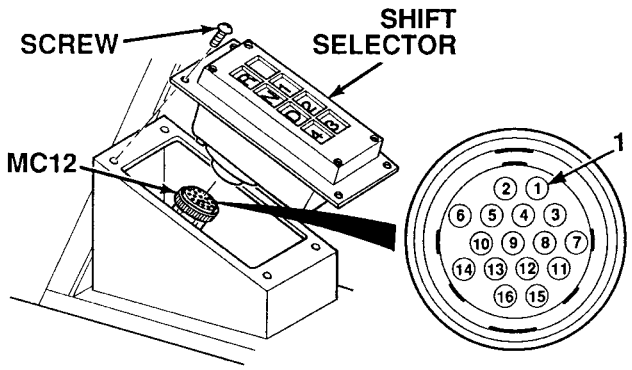




CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC9 from ATEC ECU.
(3) Remove four screws and shift selector.
(4) Disconnect connector MC12.
(5) Set multimeter select switch to ohms.
(6) Is there continuity on wire 210A between connector MC9, terminal 2C and connector MC12, terminal 1?
  (a) If there is no continuity, repair wire 210A (see schematic Fig 2-20) or notify DS Maintenance.
  (b) If there is continuity, wire 210A is OK.





7. CODE 23: SHIFT SELECTOR (CONT).

KNOWN INFO

"CHECK TRANS" light ON.
Restricted gear shifts.
Torque converter lockup clutch unlocked.
Transmission does not shift properly or stays in N (Neutral).
Wire 210A is OK.

POSSIBLE PROBLEMS

Ground wire 230/234 to electrical control box faulty.
Short/open in ATEC ECU wire harness.
Short/open in control box wire harness.
Shift selector faulty.
Transmission ECu faulty.

2.

WARNING
Read WARNING on Page 2-873

Is continuity measured on wires 230 and 234 between connector MC12, terminals 10 and 14 and a known good ground?

NO → Repair wire(s) 230 and/or 234 (see schematic Fig 2-20) or notify DS Maintenance. Verify repair, go to Step 7 of this Fault.

YES

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If ground is faulty, shift selector keypad will not operate correctly. ATEC will register a code 23 fault.

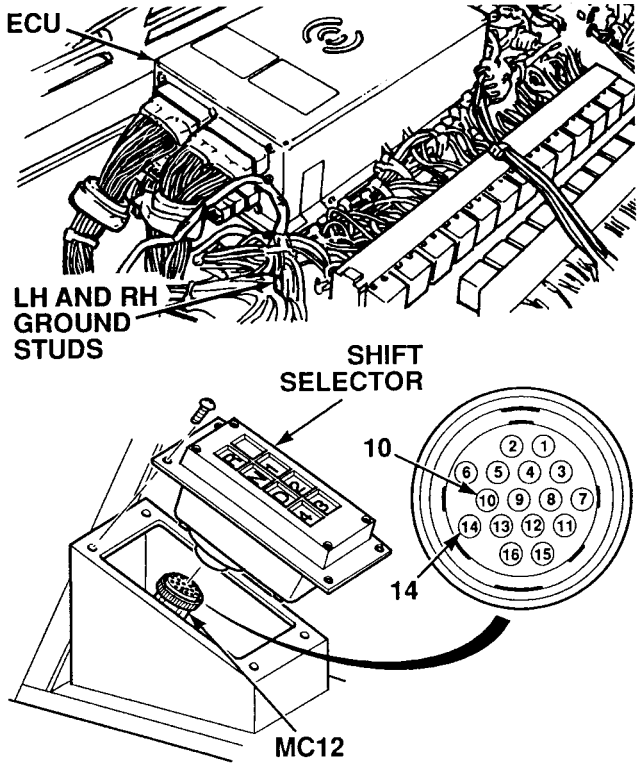
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

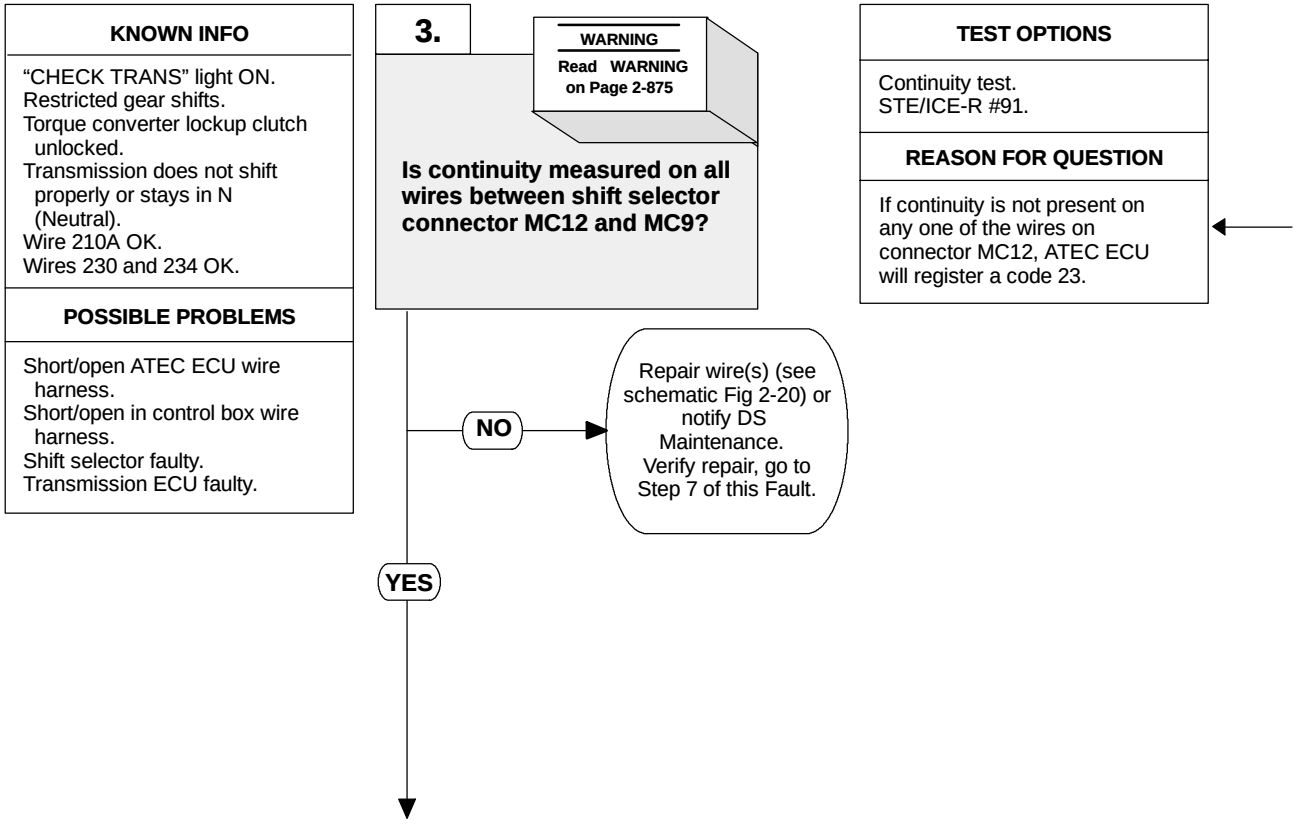
CONTINUITY TEST

(1) Is there continuity on wire 230 between connector MC12, terminal 10 and a known good ground?
   (a) If there is no continuity, repair wire 230 (see schematic Fig 2-20) or notify DS Maintenance.
   (b) If there is continuity, wire 230 is OK.

(2) Is there continuity on wire 234 between connector MC12, terminal 14 and a known good ground?
   (a) If there is no continuity, repair wire 234 (see schematic Fig 2-20) or notify DS Maintenance.
   (b) If there is continuity, wire 234 is OK.



7. CODE 23: SHIFT SELECTOR (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

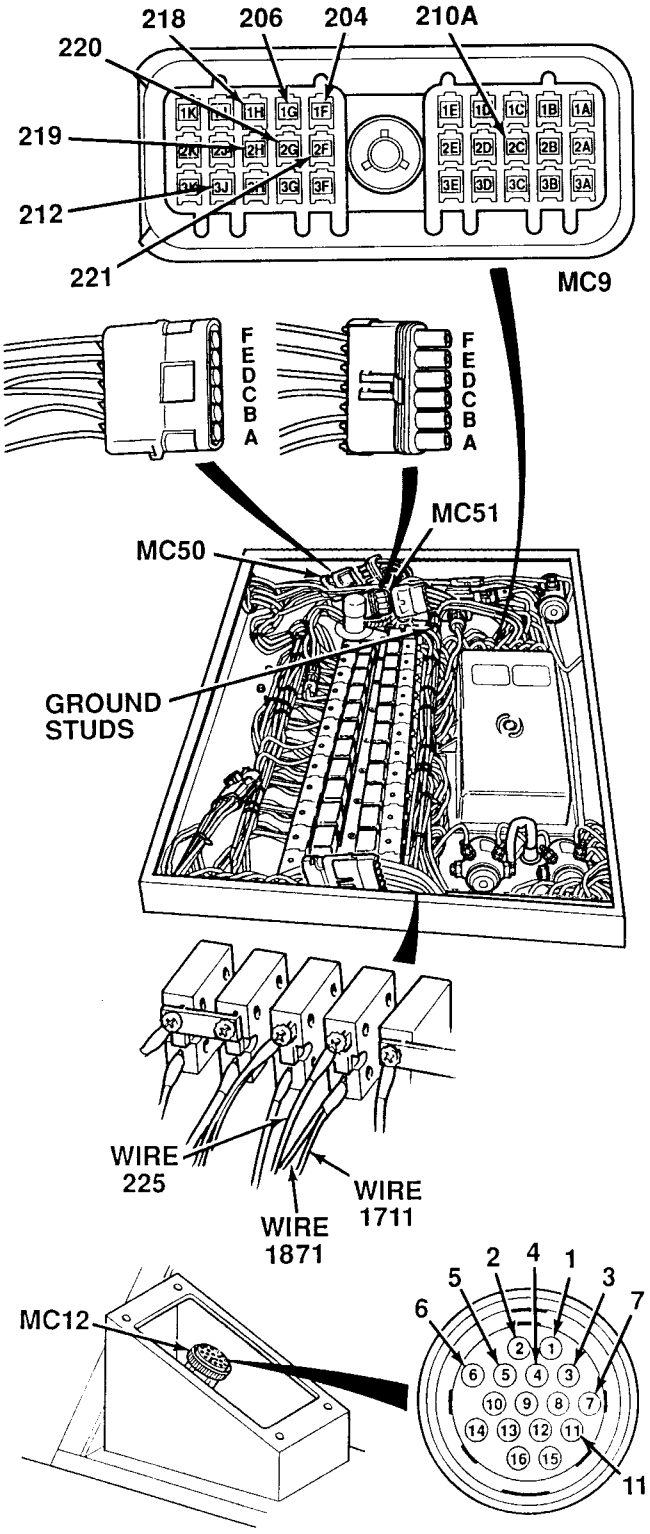
The following test checks continuity between the terminals on connectors MC12 and the other terminals on the ECB/ATEC wire harness. Table 2-27 lists the terminal numbers on connector MC12, the wire connected to them and terminal at the other end of the harness. Terminals on connector MC9 match those on connector MC12.

Table 2-27. ECB/ATEC Wire Harness Connector MC12 and MC9.

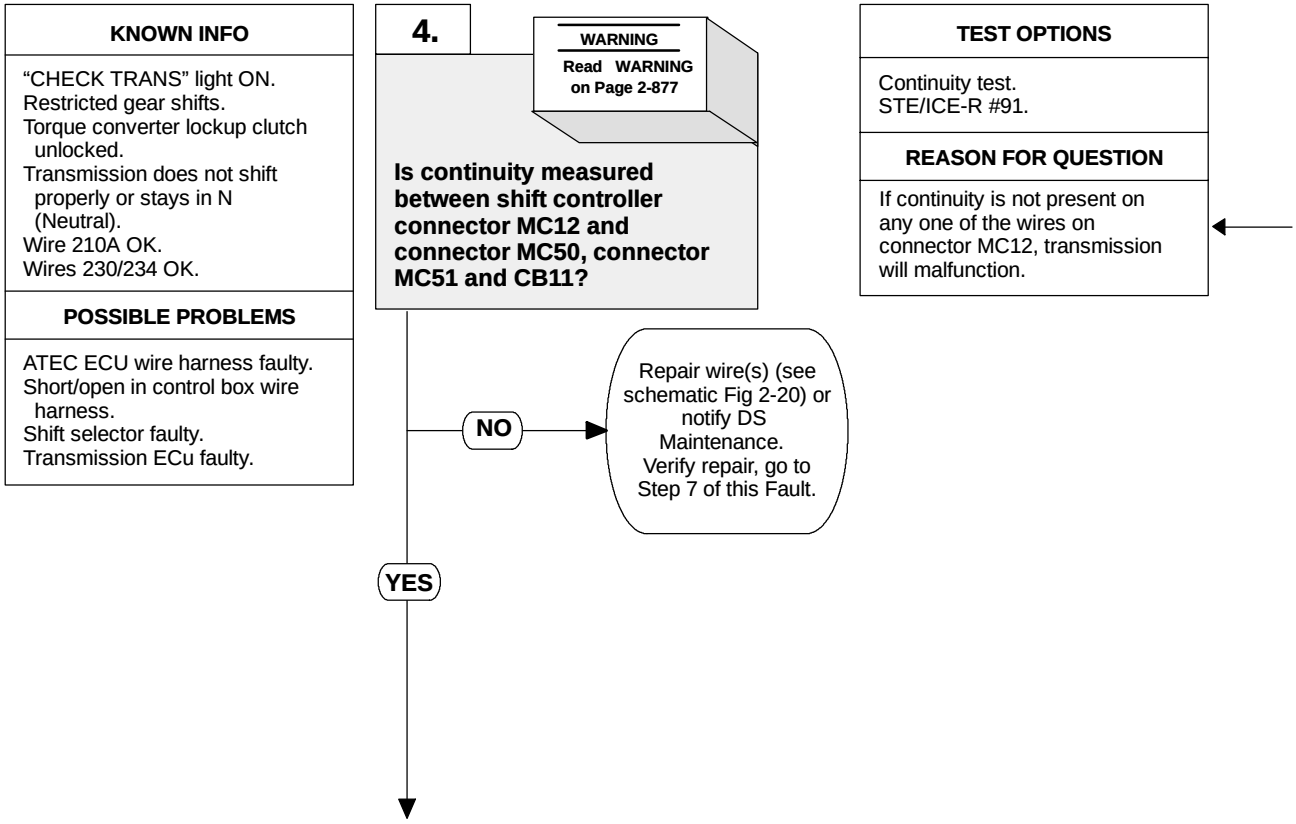
MC12/MC9 Terminal	Wire	MC12/MC9 Terminal	Wire
1	210A	5	220
2	204	6	218
3	221	7	219
4	206	11	212

CONTINUITY TEST

(1) Disconnect connectors MC50 and MC51.
(2) Loosen screw and disconnect connector MC9 from ATEC ECU.
(3) Is there continuity on wire 210A between connectors MC12, terminal 1 and MC9, terminal 2C?
  (a) If there is no continuity, repair wire (see schematic Fig 2-20) or notify DS Maintenance.
  (b) If there is continuity, wire 210A is OK.
(4) Repeat Step (3) for terminals and connectors listed in Table 2-27.
(5) Connect connector MC9 to ATEC ECU and tighten screw.



7. CODE 23: SHIFT SELECTOR (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

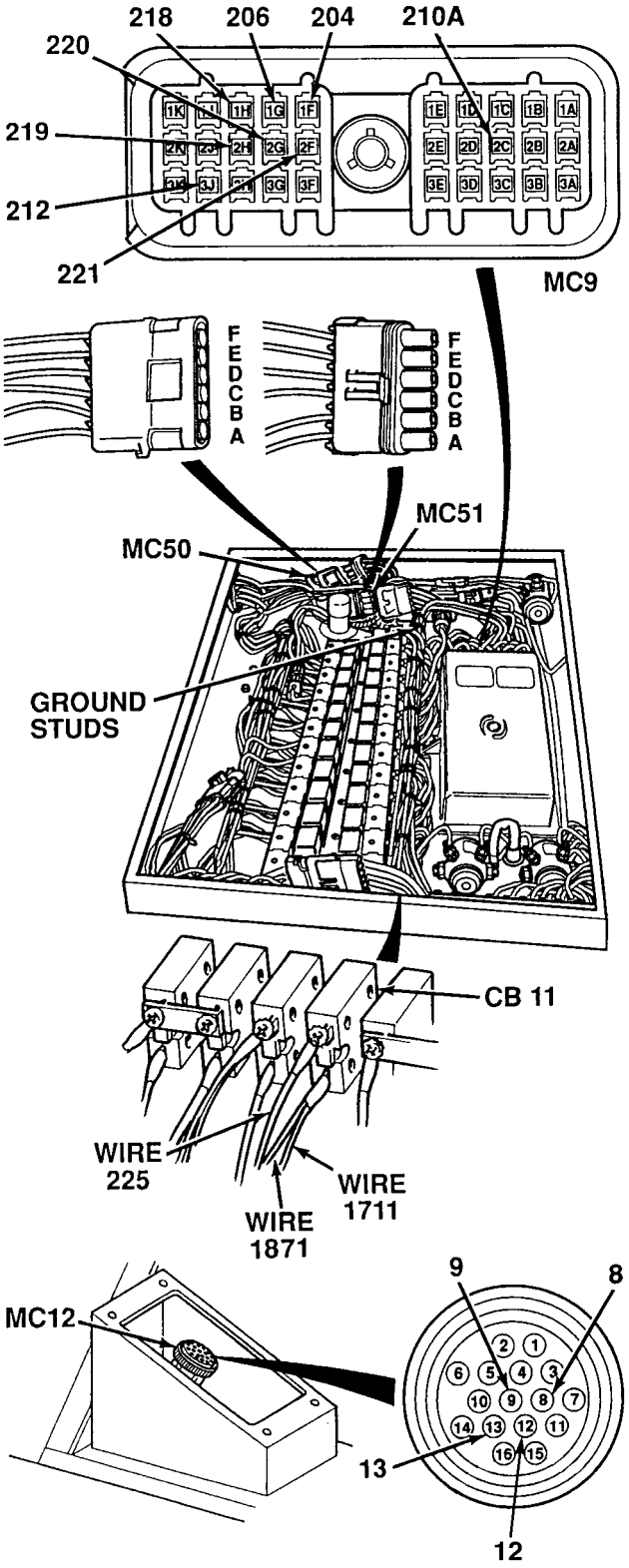
The following test checks continuity between the terminals on connectors MC12 and the other terminals on the ECB/ATEC wire harness. Table 2-28 lists the terminal numbers on connector MC12, the wire connected to them and terminal at the other end of the harness. Terminals on connector MC9 match those on connector MC12.

Table 2-28. ECB/ATEC Wire Harness Connectors MC12, MC50 and MC51.

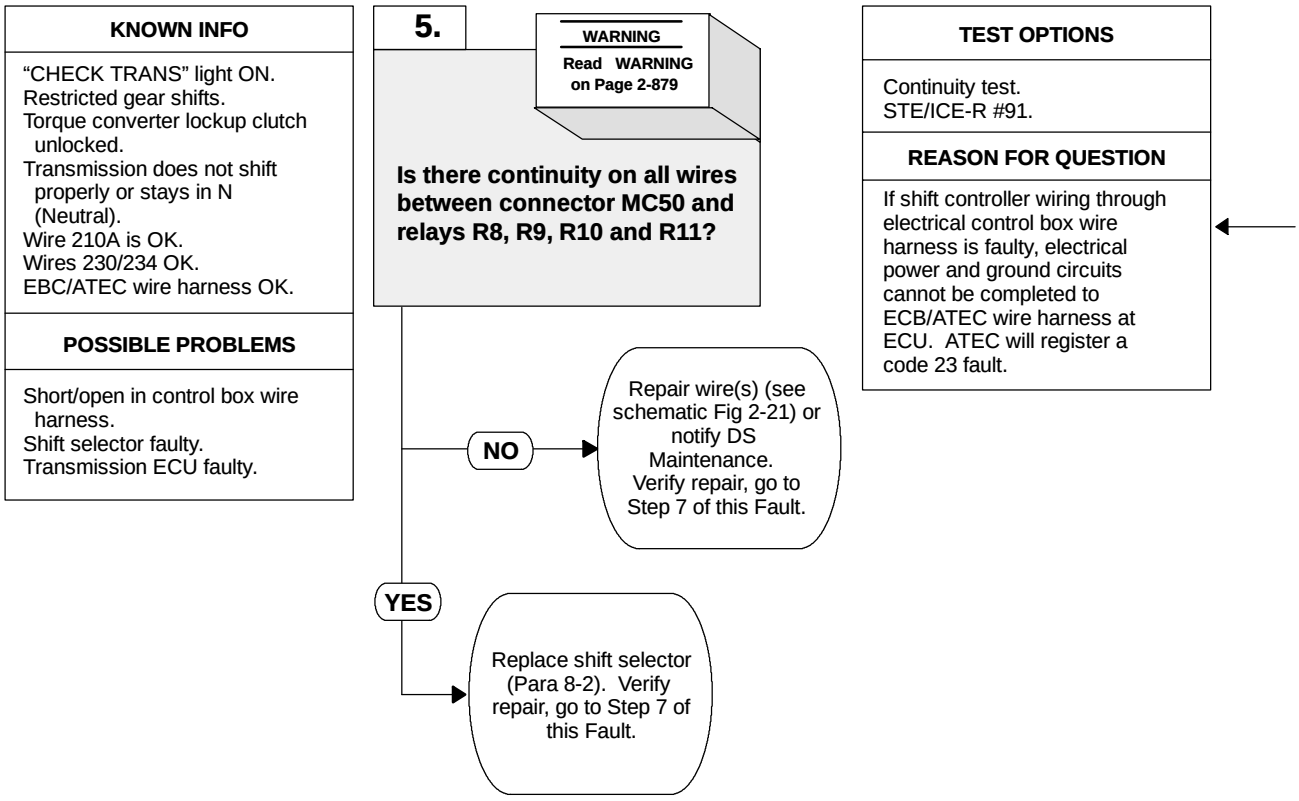
MC12/MC51 Terminal	Wire	MC12/CB11 Terminal	Wire	MC12/MC50 Terminal	Wire
8	223B	12	225	9	231
				13	233

CONTINUITY TEST

(1) Is there continuity on wire 223A/B between connector MC12, terminal 8 and connector MC51, terminal C?
  (a) If there is no continuity, repair wire 223A/B (see schematic Fig 2-20) or notify DS Maintenance.
  (b) If there is continuity, wire 223A/B is OK.
(2) Repeat Step (1) for terminals and connectors listed in Table 2-28.
(3) Connect connector MC12.
(4) Connect connector MC51.



7. CODE 23: SHIFT SELECTOR (CONT).



WARNING

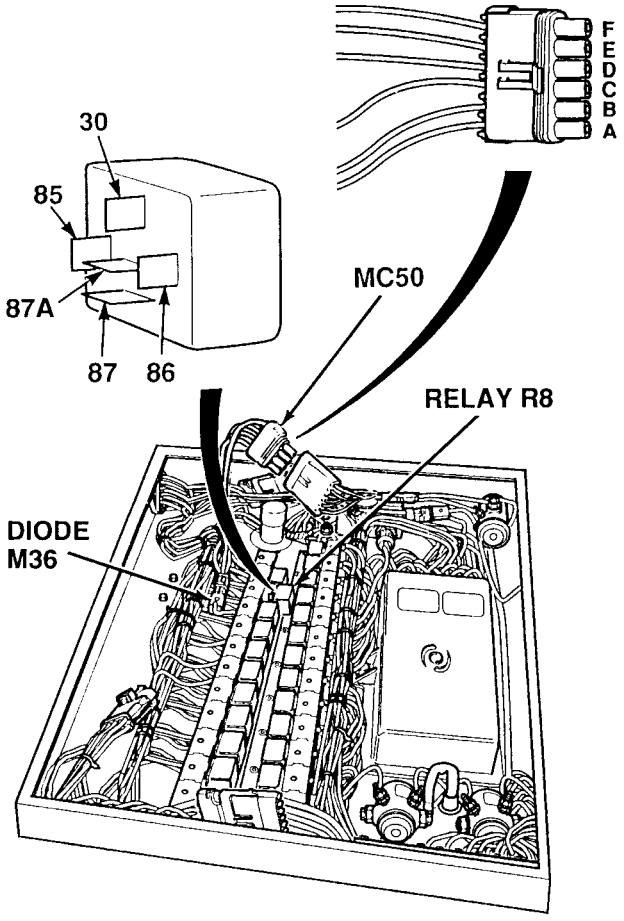
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Electrical control box connector MC50, terminal F interfaces with dash lighting circuits in cab through wire 1052. Go to "Electrical Troubleshooting" (Para 2-20) if problem with lighting controls or illumination at shift selector.

Table 2-29. ECB/ATEC Wire Harness Connector MC50.

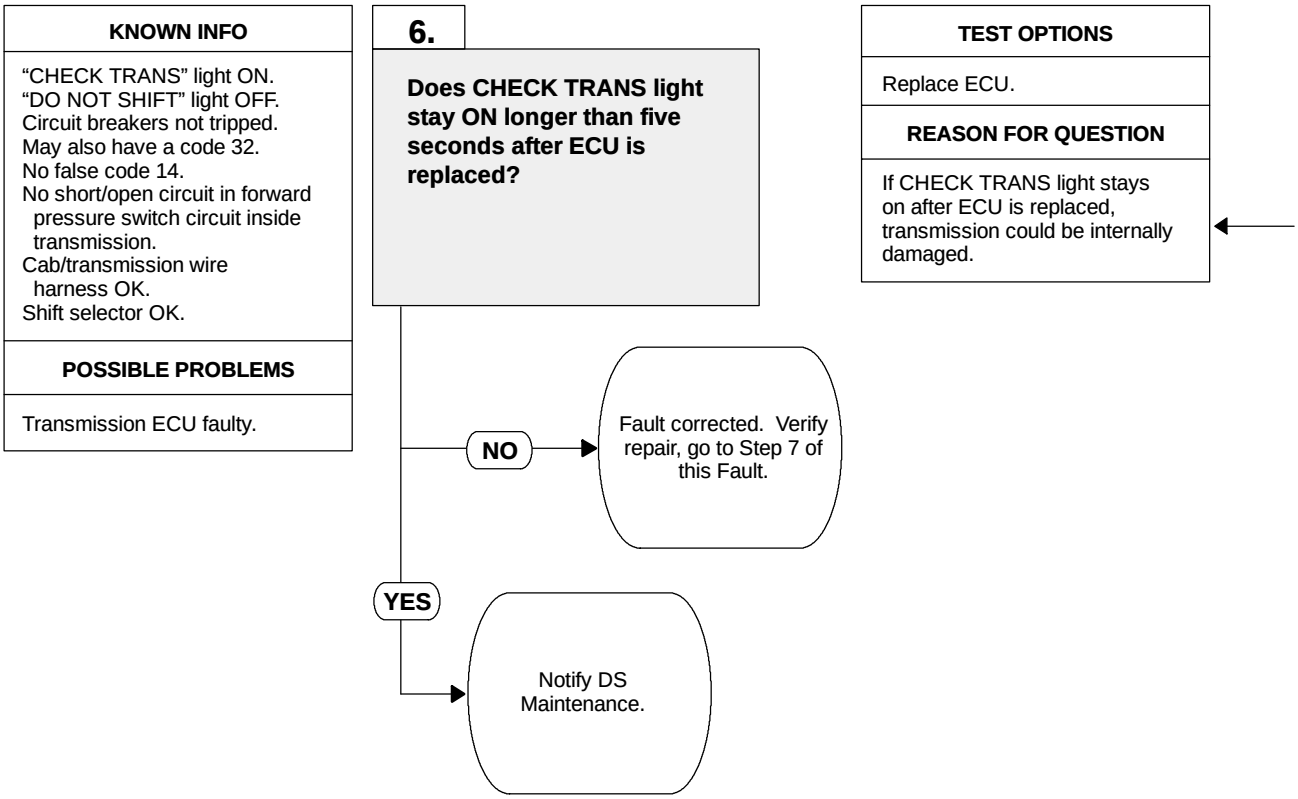
Relay	Relay terminal	MC50 terminal	Wire
R8	30	B	211
R9	85	C	215
R10	85	D	214
R11	85	Diode M36	231



CONTINUITY TEST

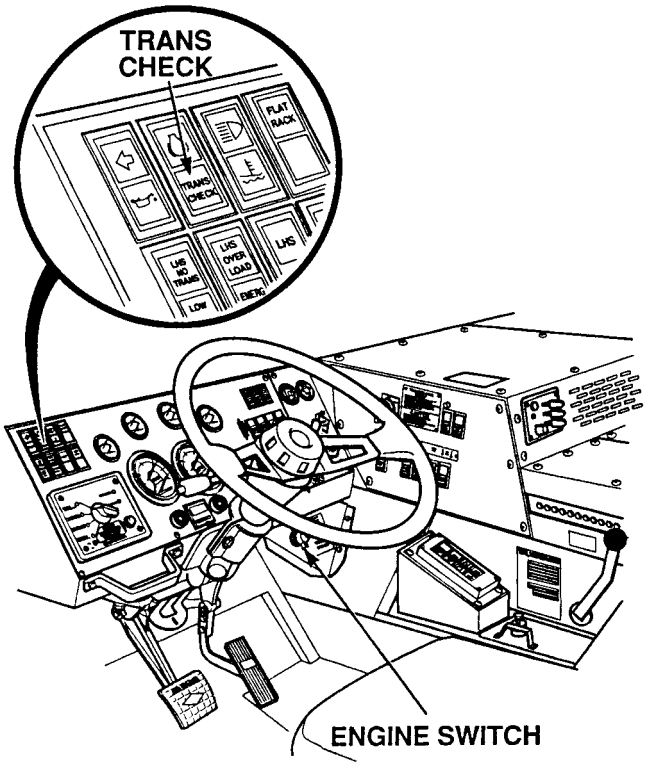
(1) Suspect wire(s) in electrical control box wire harness could be faulty from connector MC50 to terminal 85 of the following relay(s): RETARDER relay R8, C.K. TRANS relay R9, REVERSE relay R10, NEUTRAL START relay R11.
(2) Is there continuity on wire 211 between connector MC50, terminal B and relay R8, terminal 30?
  (a) If there is no continuity, repair wire (see schematic Fig 2-21) or notify DS Maintenance.
  (b) If there is continuity, wire is OK.
  (c) If all wires are OK, perform Steps (4) and (5) below and replace shift selector (Para 8-2). Go to Step 6 of this Fault.
(3) Repeat Step (2) for relays and terminals listed in Table 2-29.
(4) Connect connector MC50.
(5) Install two ECB covers and 15 screws.

7. CODE 23: SHIFT SELECTOR (CONT).

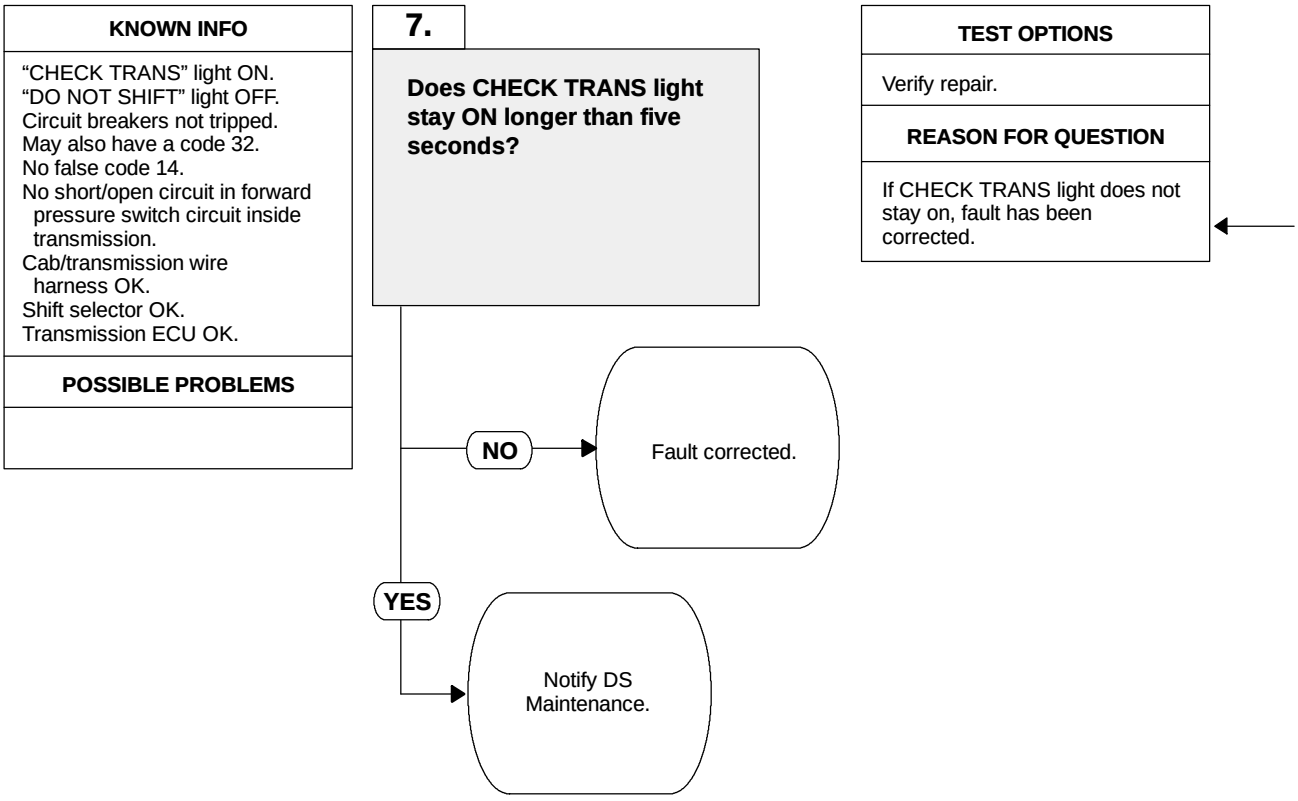


REPLACE ECU

(1) Replace ECU (Para 7-71).
(2) Start engine (TM 9-2320-364-10) observe CTL.
    (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (3) below.
    (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Step (3) below and notify DS Maintenance.
(3) Turn OFF ENGINE switch.

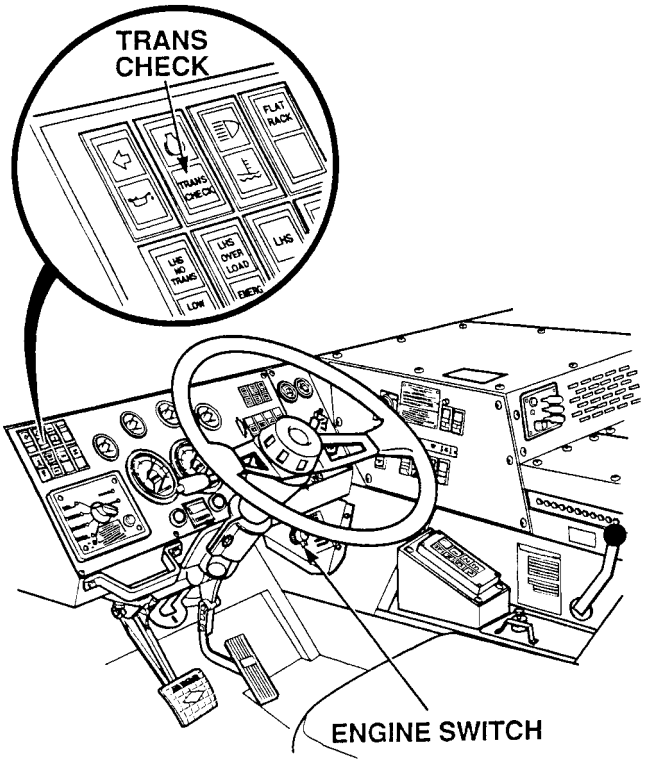


7. CODE 23: SHIFT SELECTOR (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) observe CTL.
   (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below.
   (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Step (2) below and notify DS Maintenance.
(2) Turn OFF ENGINE switch.



2-15. ATEC TROUBLESHOOTING (CONT).

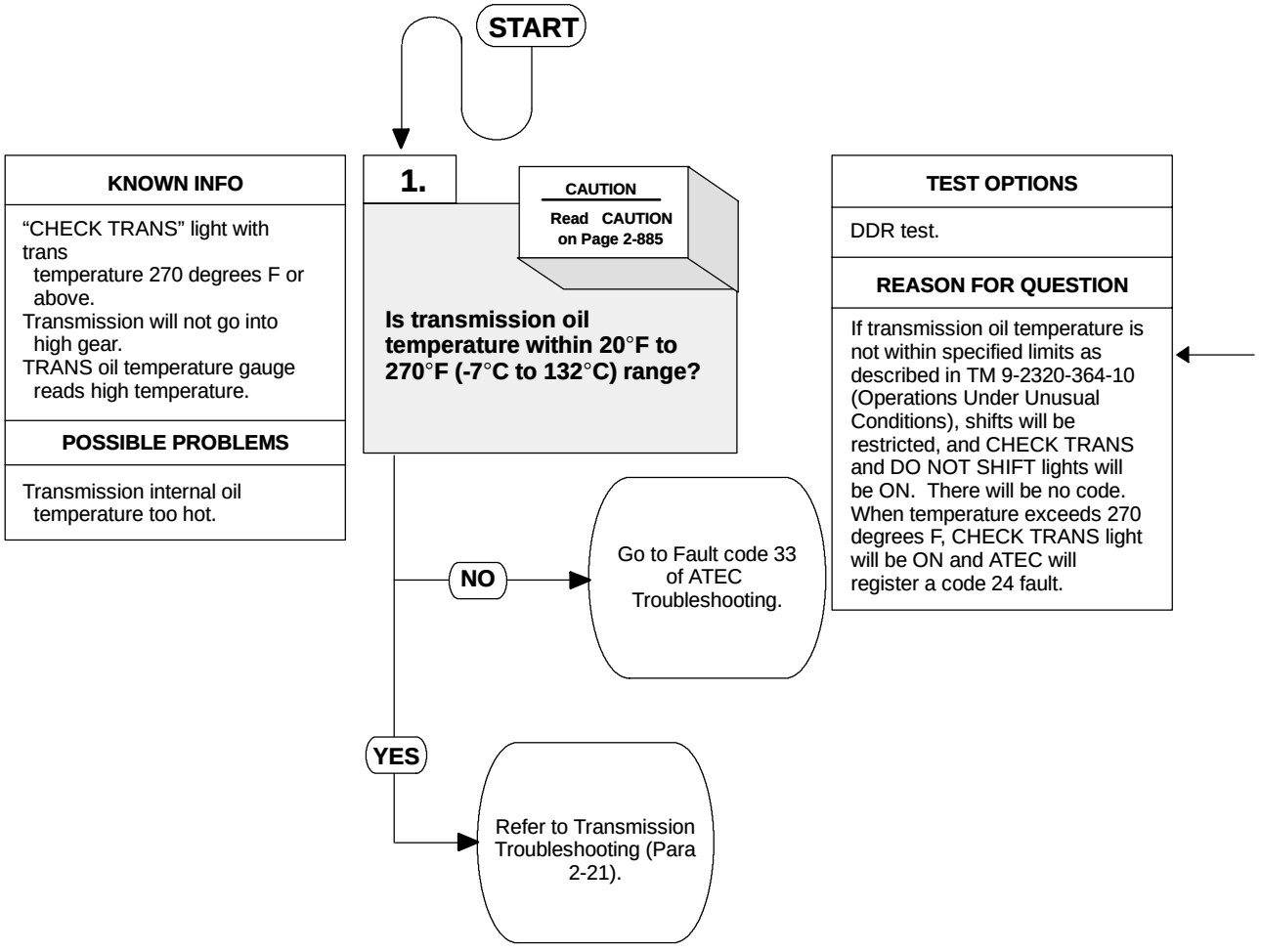
8. CODE 24: OIL TEMPERATURE (HIGH LIMIT EXCEEDED).

INITIAL SETUP

Tools and Special Tools
Reader, Diagnostic (Item 53, Appendix G)

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

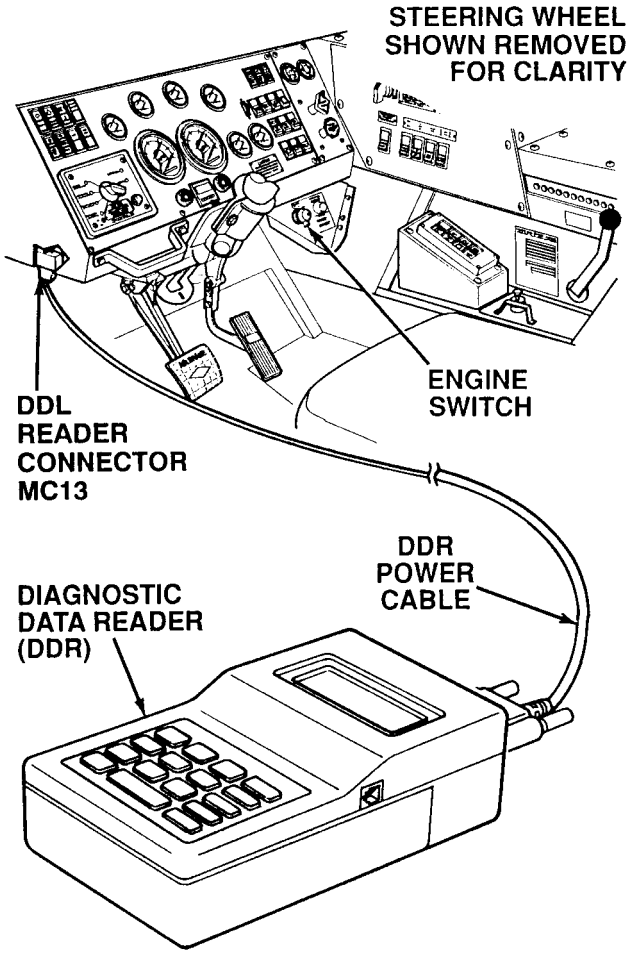


CAUTION

Do not exceed 2000 engine rpm. Damage to transmission might occur.

DDR TEST

(1) Connect DDR cable to DDL connector MC13.
(2) Start engine and allow engine to warm up (TM 9-2320-364-10).
(3) Select DIAG CODE display and scroll to TRANS OIL TEMP.
  (a) If DDR displays more than 270°F (132°C), perform Steps (4) and (5) below and go to Fault code 33 of ATEC Troubleshooting.
  (b) If DDR displays 270°F (132°C) or less, perform Steps (4) and (5) below and go to Transmission Troubleshooting (Para 2-21).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR cable from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

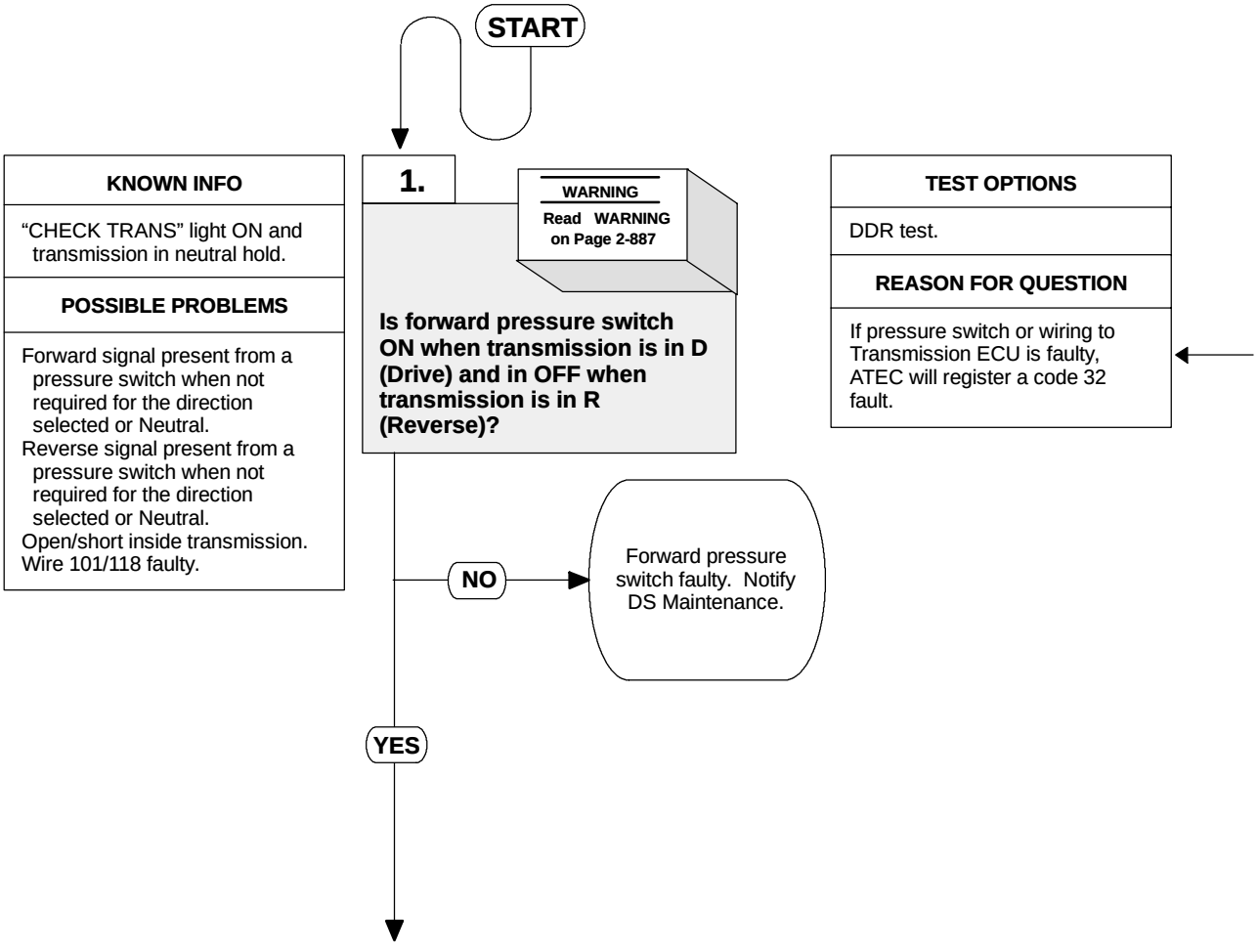
9. CODE 32: TRANSMISSION DIRECTION SIGNAL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Breakout Harness (Item 36, Appendix G)
Multimeter (Item 44, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)

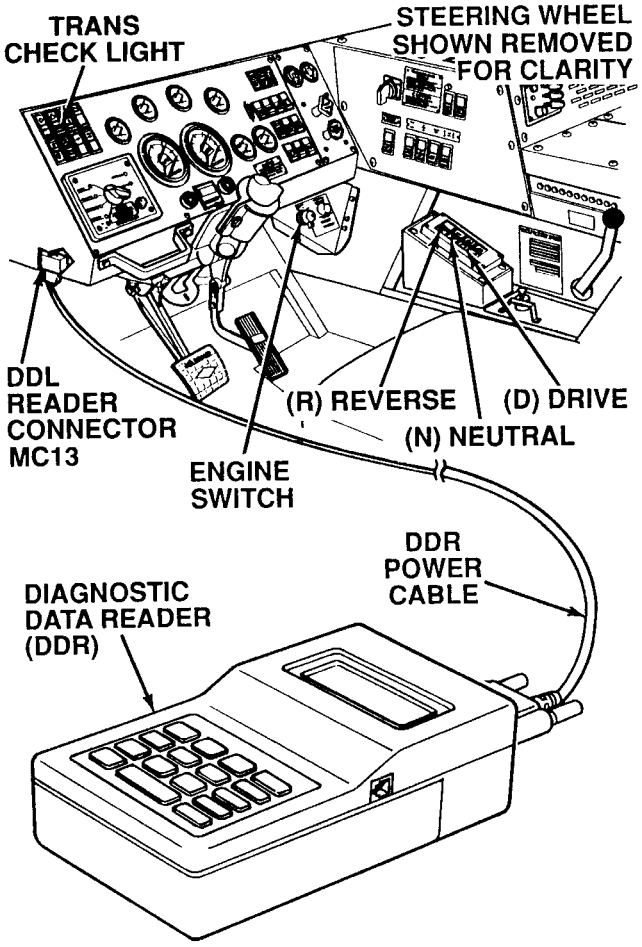


WARNING

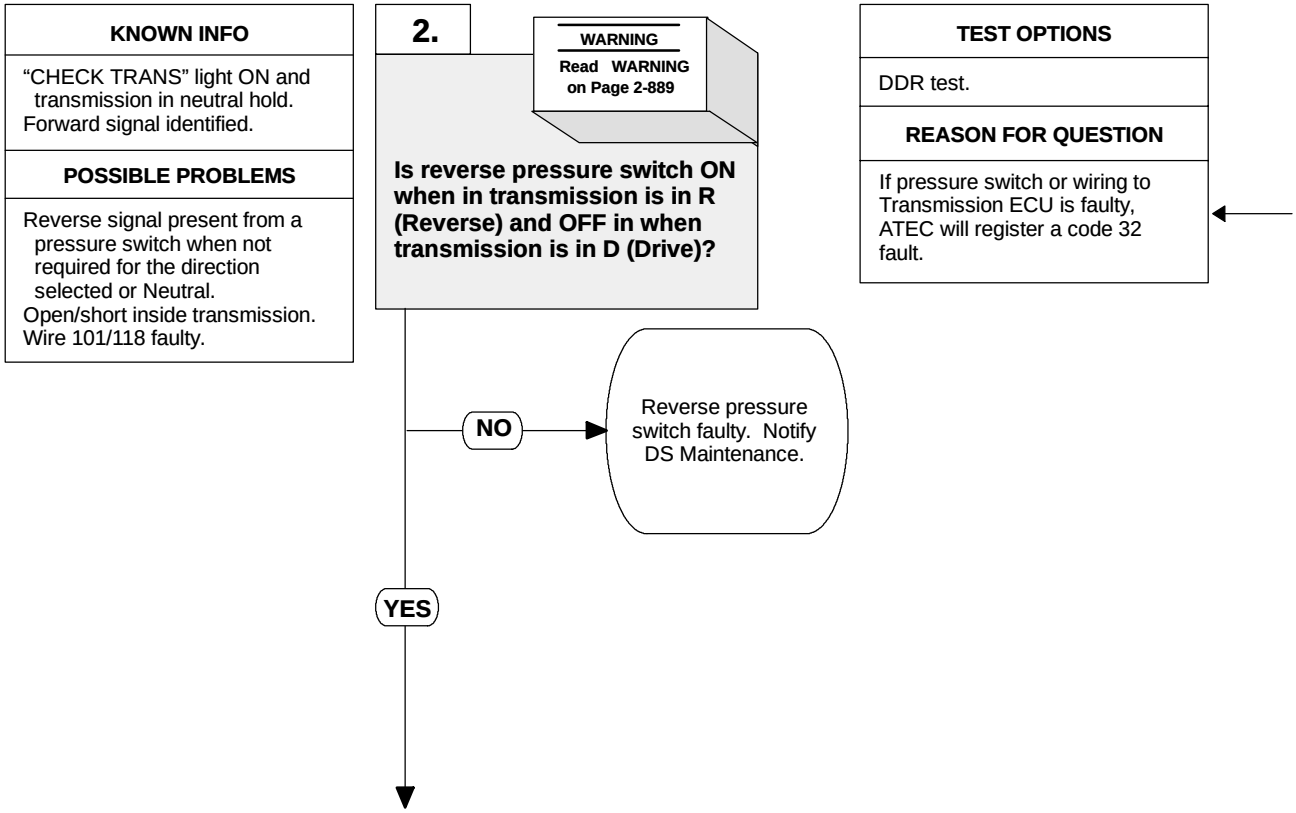
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

DDR TEST

(1) Connect DDR to DDL cable connector MC13.
(2) Turn ON ENGINE switch (TM 9-2320-364-10).
(3) Select DIAG CODE display and scroll to FWD PRESS SW.
  (a) If DDR displays ON, there is forward pressure when R (Reverse) is selected. Pressure switch is faulty.
  (b) If DDR displays OFF, there is no forward pressure when R (Reverse) or N (Neutral) is selected. Pressure switch is OK.
(4) START engine.
(5) Repeat Step (3) above.
(6) Select (R) Reverse and (D) Drive while observing DDR.
(7) If directional signal from forward pressure switch is reading incorrectly, wiring or internal transmission components are suspect. Perform Step (8) below and notify DS Maintenance.
(8) Turn OFF ENGINE switch.



9. CODE 32: TRANSMISSION DIRECTION SIGNAL (CONT).

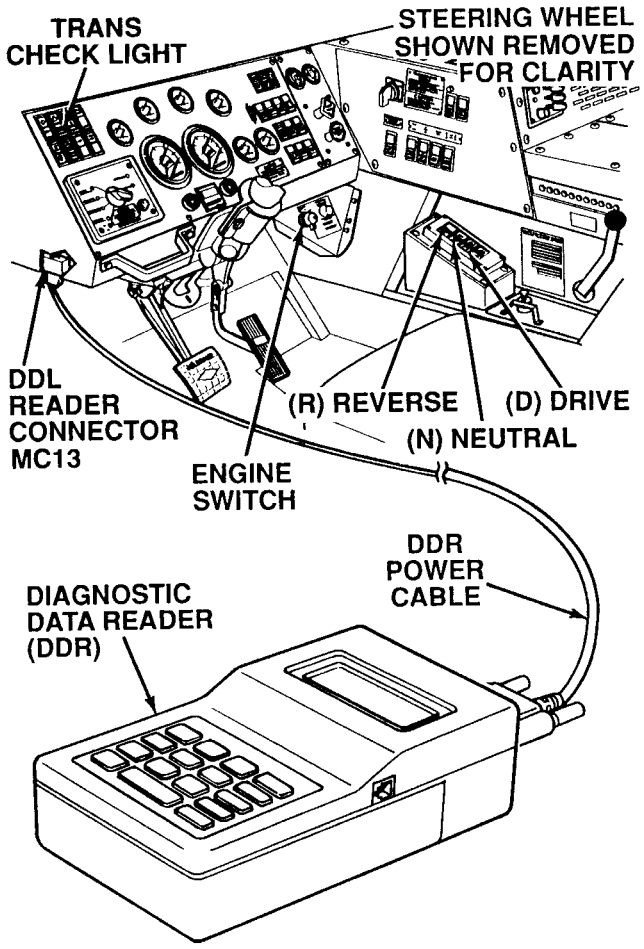


WARNING

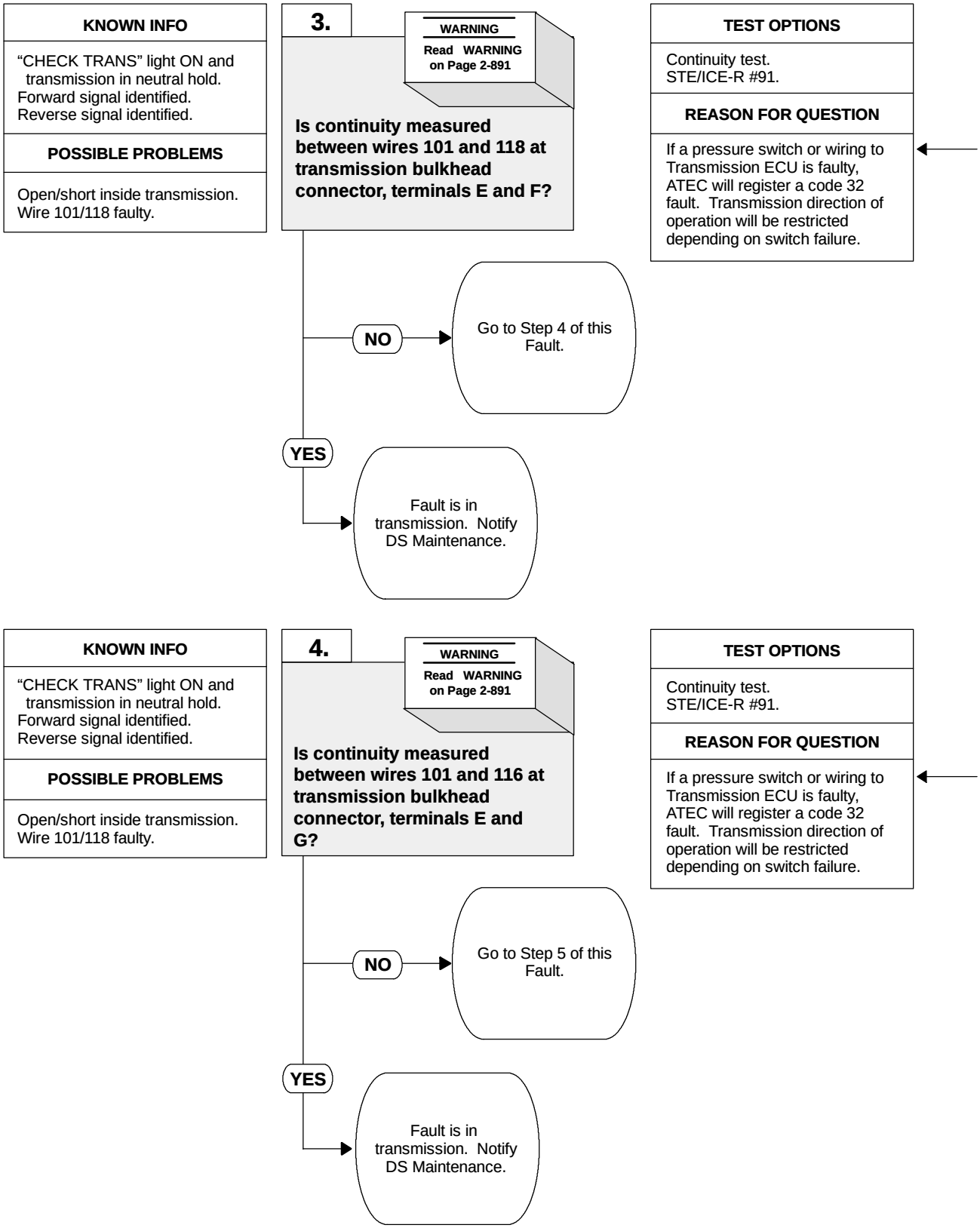
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

DDR TEST

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Select DIAG CODE display and scroll to REV PRESS SW.
  (a) If DDR displays ON, there is reverse pressure when D (Drive) is selected. Pressure switch is faulty. Notify DS Maintenance.
  (b) If DDR displays OFF, there is no reverse pressure when D (Drive) or N (Neutral) is selected. Pressure switch is OK.
(3) START engine.
(4) Repeat Step (2) above.
(5) Select (R) Reverse and (D) Drive while observing DDR.
(6) If directional signal from either pressure switch is reading incorrectly, wiring or internal transmission components are suspect. Perform Steps (7) and (8) below and notify DS Maintenance.
(7) Turn OFF ENGINE switch.
(8) Disconnect DDR cable from DDL connector MC13.



9. CODE 32: TRANSMISSION DIRECTION SIGNAL (CONT).

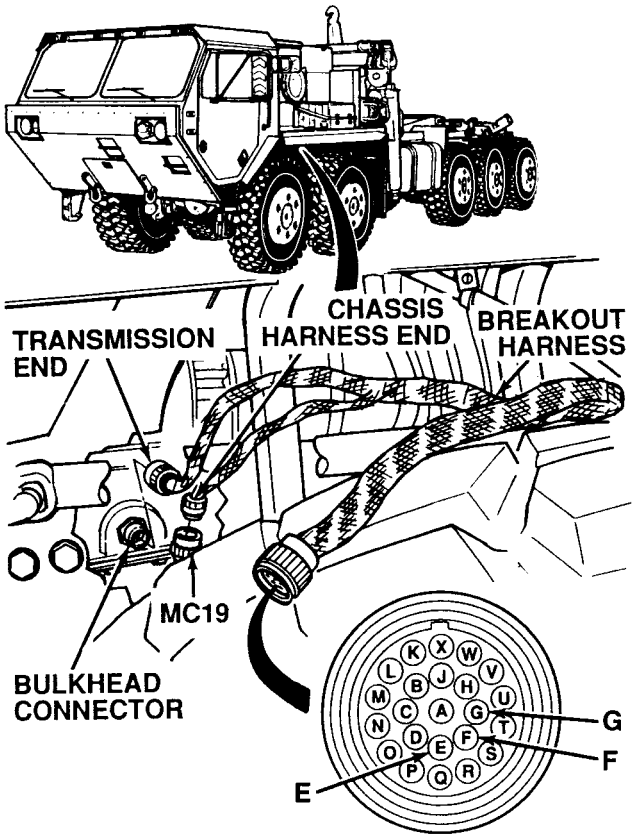


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

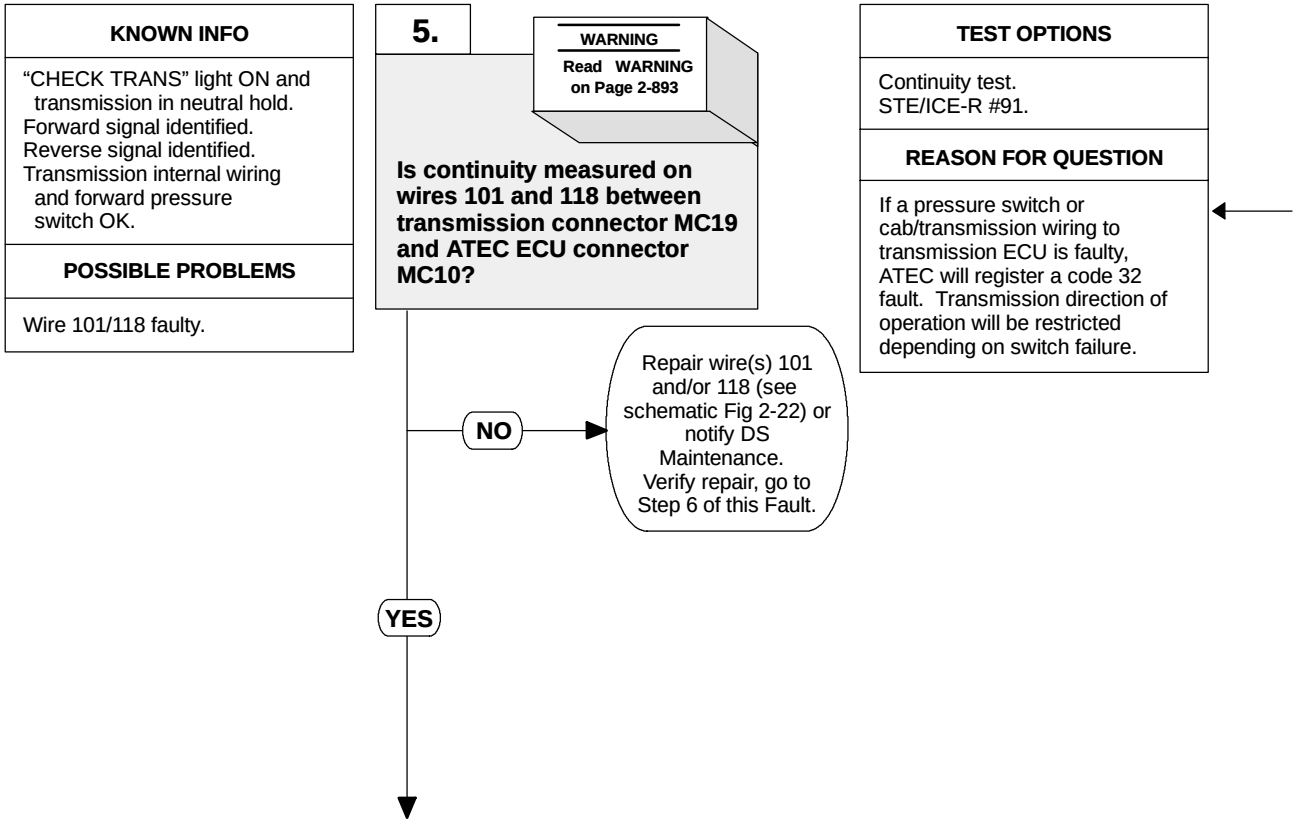
(1) Disconnect transmission connector MC19 from transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between wires 101 and 118 at breakout harness, terminals E and F?
    (a) If there is continuity, notify DS Maintenance.
    (b) If there is no continuity, forward pressure switch and wiring inside transmission are OK. Go to Step 4 of this Fault.



CONTINUITY TEST

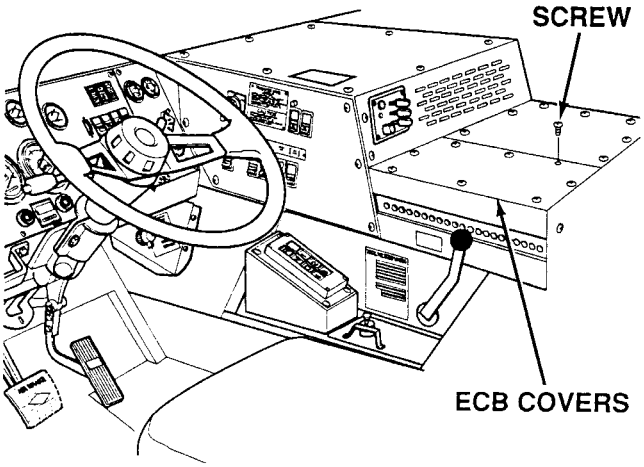
Is there continuity between wires 101 and 116 at breakout harness, terminals E and G?
(1) If there is continuity, notify DS Maintenance.
(2) If there is no continuity, wiring inside transmission is OK.

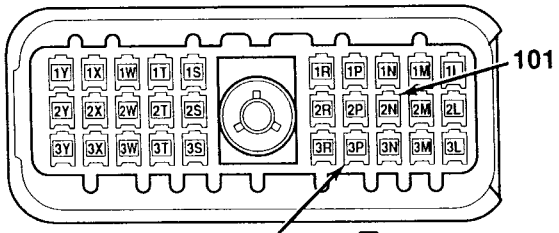
9. CODE 32: TRANSMISSION DIRECTION SIGNAL (CONT).

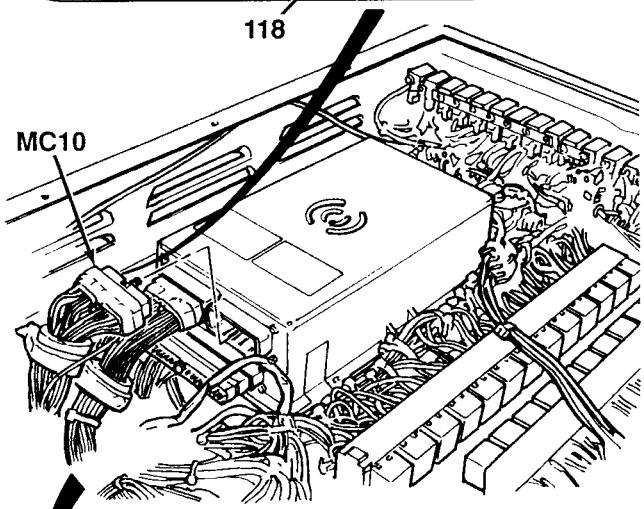


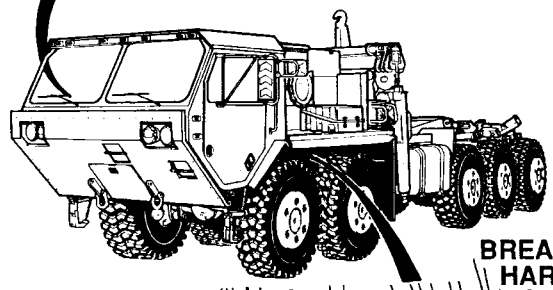
WARNING

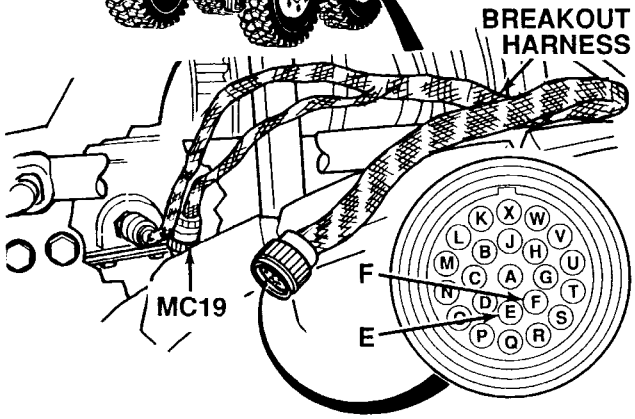
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.







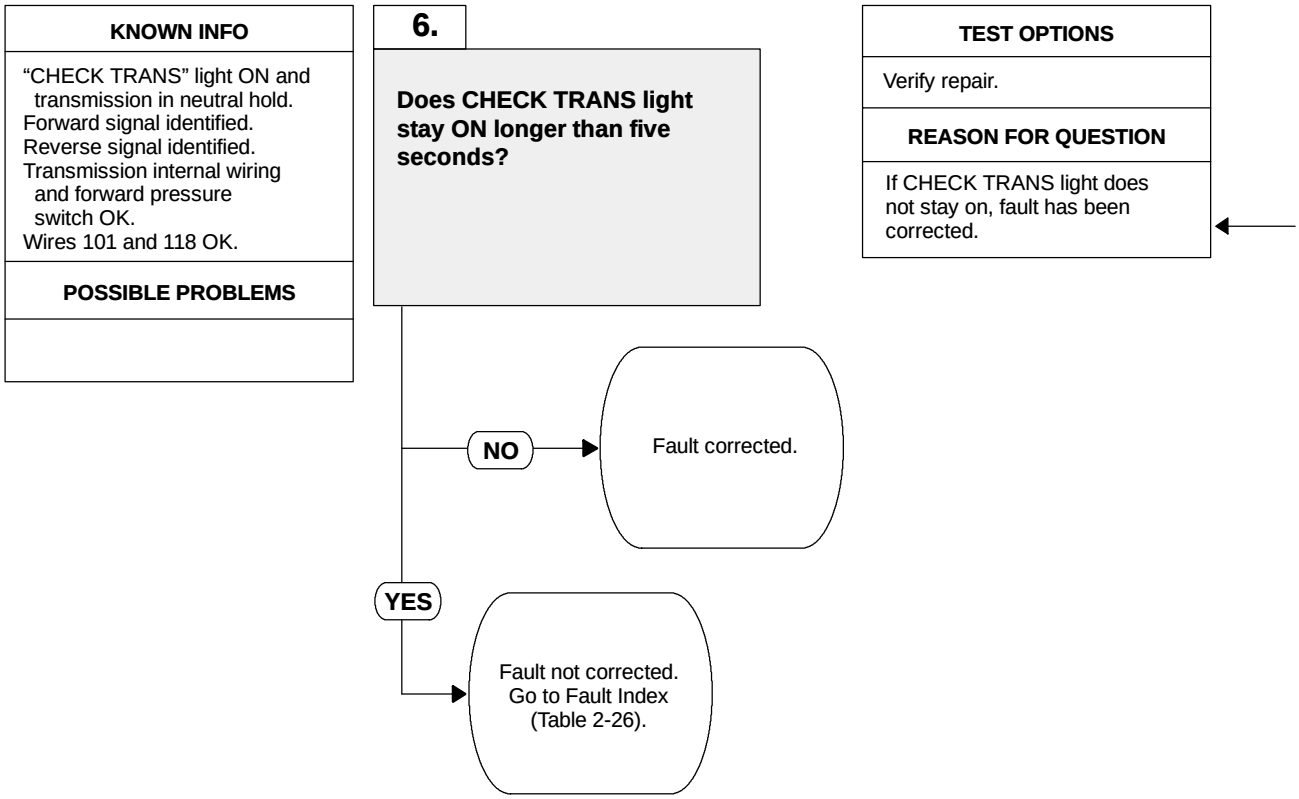




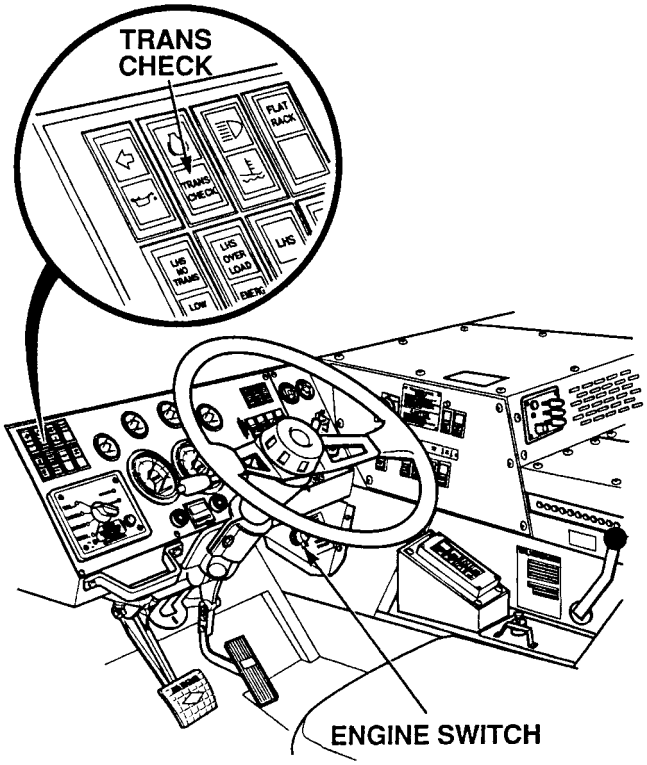
CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity on wire 101 between breakout harness, terminal E and ECU ATEC harness connector MC10, terminal 2N?
  (a) If there is no continuity, repair wire 101 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 101 is OK.
(5) Is there continuity on wire 118 between breakout harness, terminal F and ECU ATEC harness connector MC10, terminal 3P?
  (a) If there is no continuity, repair wire 118 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 118 is OK.
(6) Connect connector MC10 to ATEC ECU and tighten screw.
(7) Install two ECB covers and 15 screws.
(8) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(9) Connect transmission connector MC19 to transmission bulkhead connector.
(10) Install left rear skirt on underside of fender (Para 17-34).

9. CODE 32: TRANSMISSION DIRECTION SIGNAL (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10) and observe CTL. (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below. (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Step (2) below and go to Fault Index (Table 2-26). (2) Turn OFF ENGINE switch.



2-15. ATEC TROUBLESHOOTING (CONT).

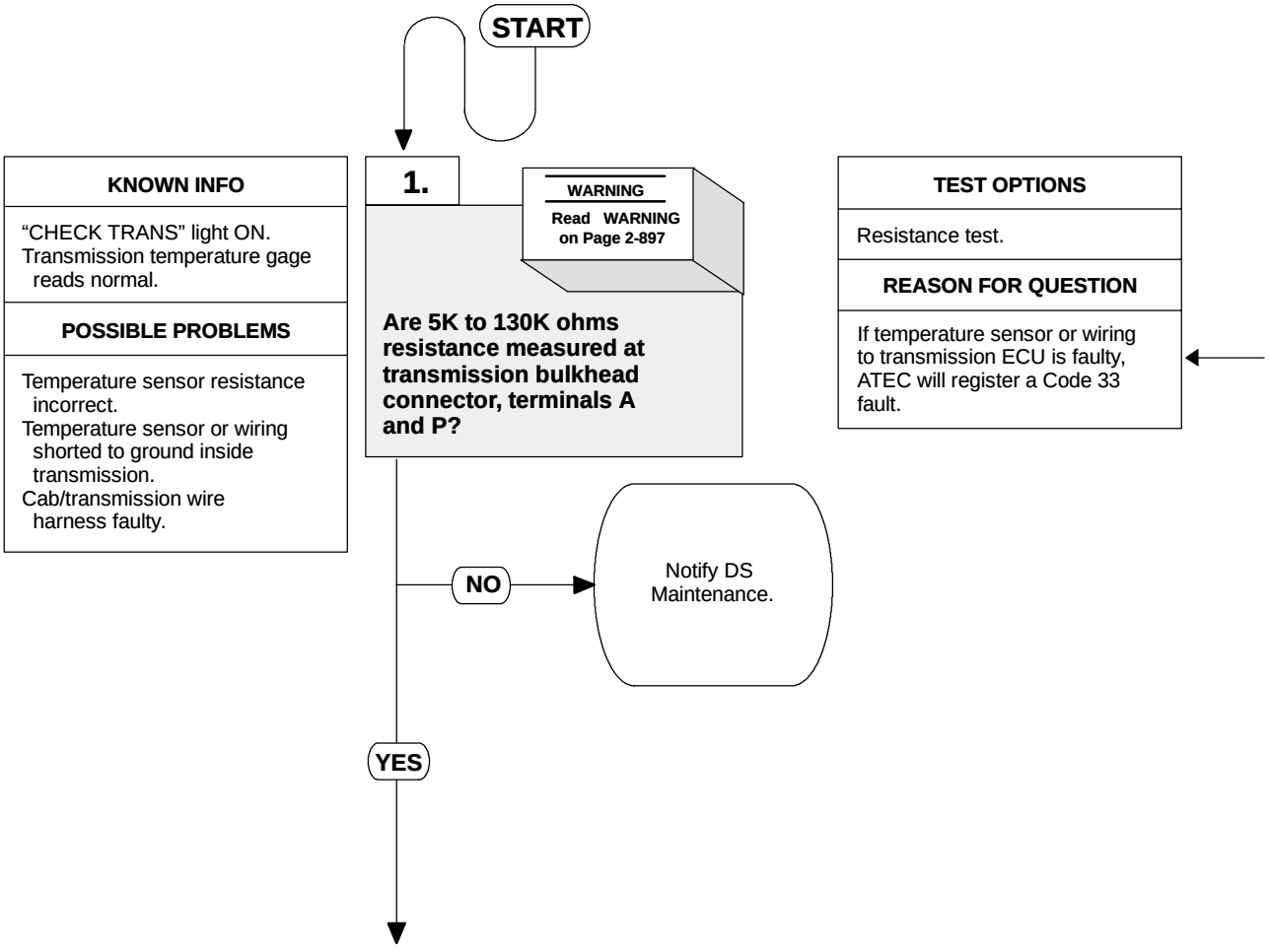
10. CODE 33: OIL TEMPERATURE SENSOR INOPERATIVE.

INITIAL SETUP

Tools and Special Tools
- Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
- STE/ICE-R (optional) (Item 3, Appendix G)
- Breakout Harness (Item 36, Appendix G)
- Multimeter (Item 44, Appendix G)
- Reader, Diagnostic (Item 53, Appendix G)

References
- TM 9-2320-364-10
- TM 9-4910-571-12&P

Equipment Condition
- Engine OFF, (TM 9-2320-364-10)
- Parking brake applied, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Left rear skirt removed, (Para 17-34)

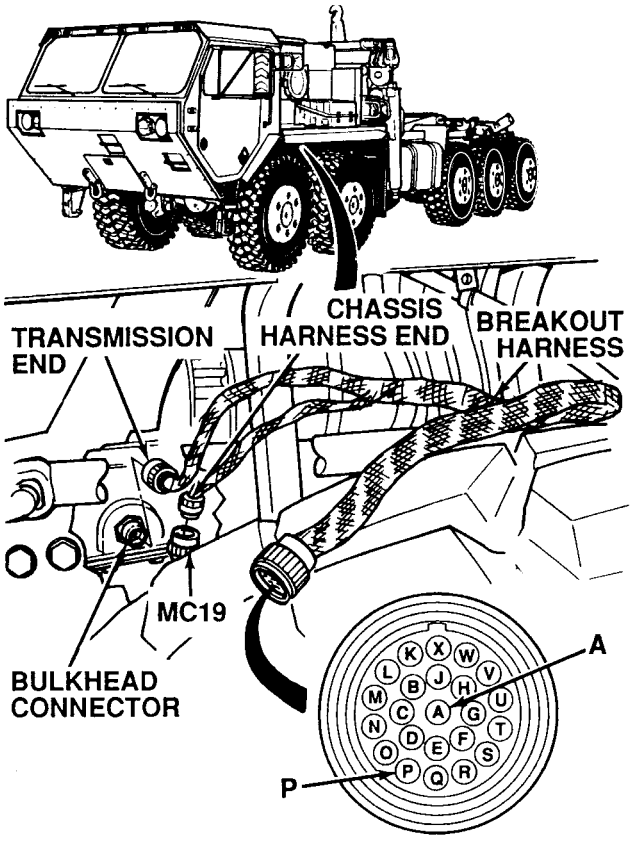


WARNING

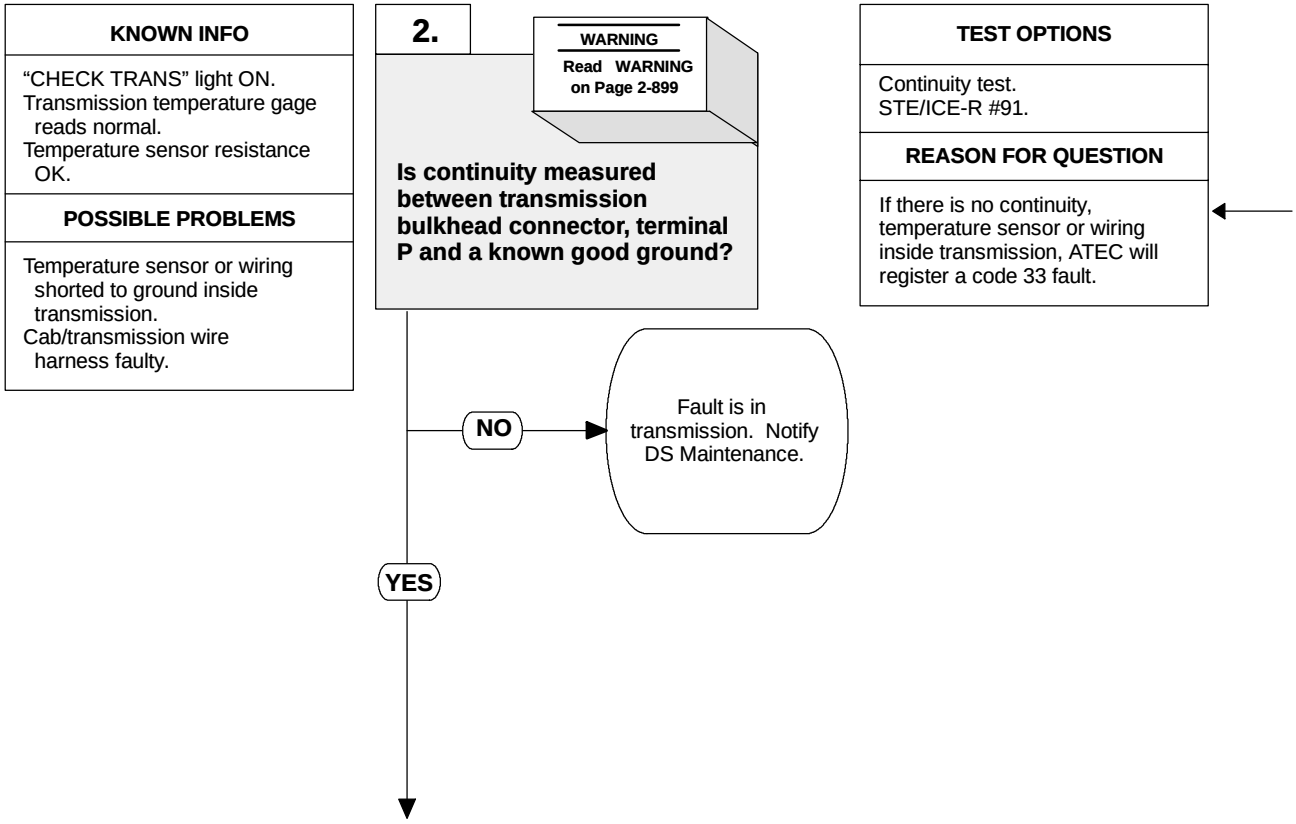
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

RESISTANCE TEST

(1) Disconnect transmission connector MC19 at transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Read resistance between terminals A and P of breakout harness.
   (a) If 5K to 130K ohms resistance are not present, wiring inside transmission or temperature sensor is faulty. Notify DS Maintenance.
   (b) If 5K to 130K ohms resistance are present, wiring inside transmission and temperature sensor is OK.



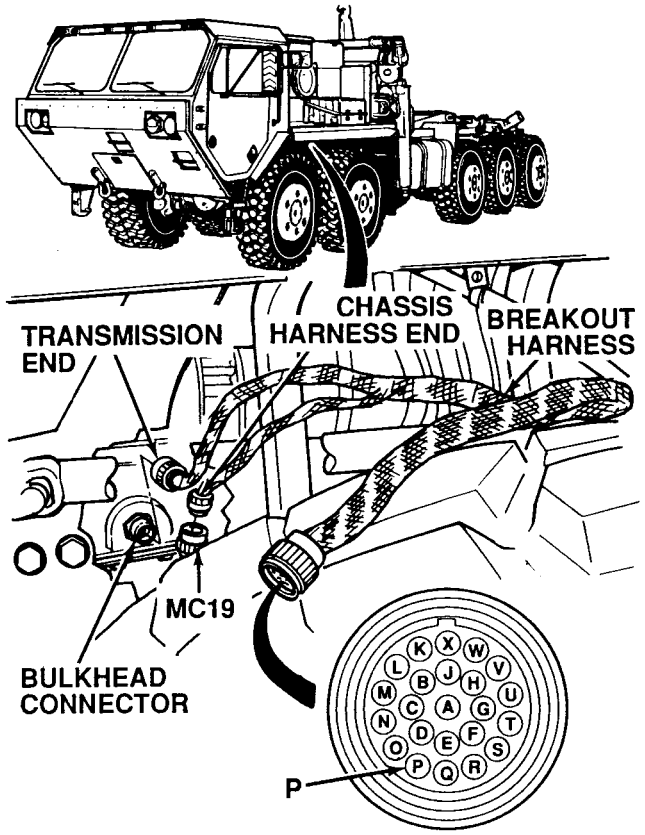
10. CODE 33: OIL TEMPERATURE SENSOR INOPERATIVE (CONT).



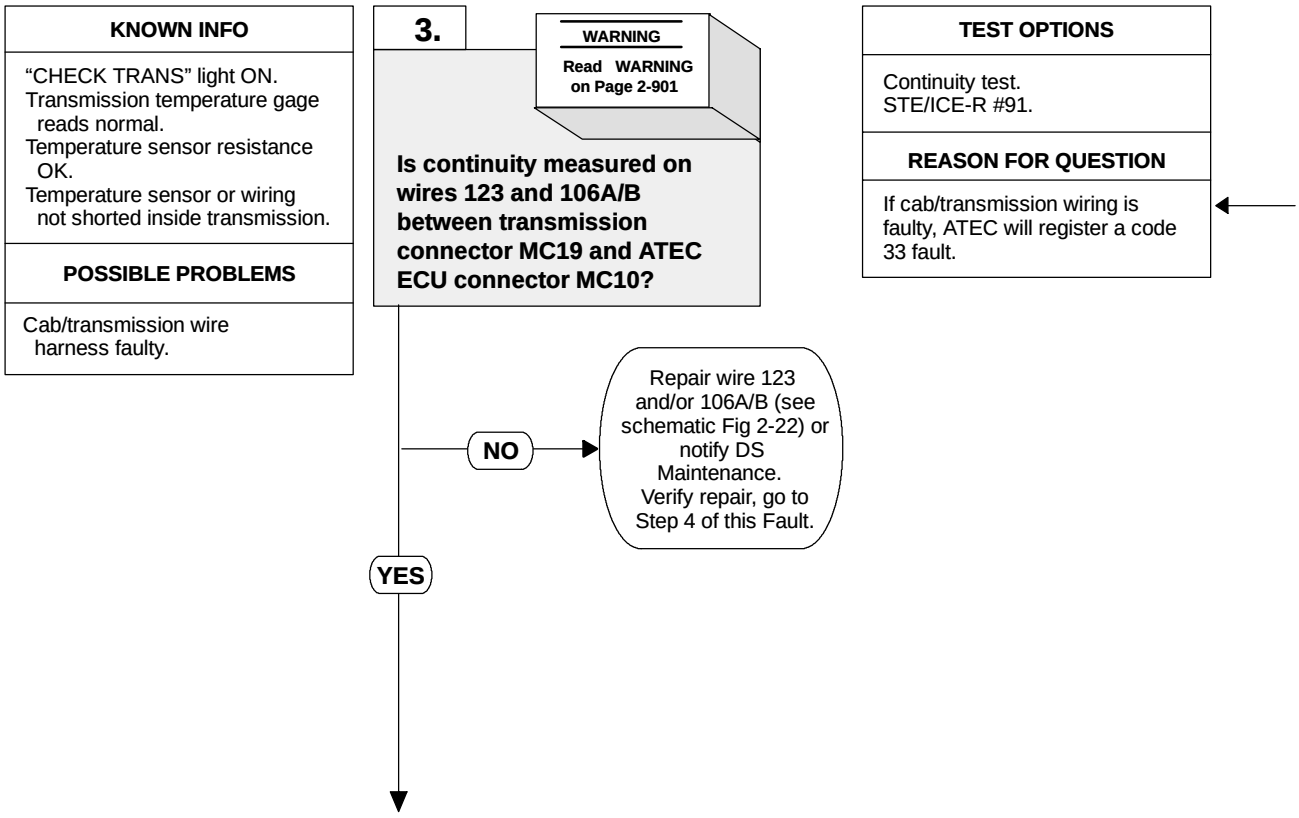
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST
Is there continuity between breakout harness, terminal P and a known good ground? (1) If there is no continuity, notify DS Maintenance. (2) If there is continuity, wiring inside transmission and temperature sensor is OK.

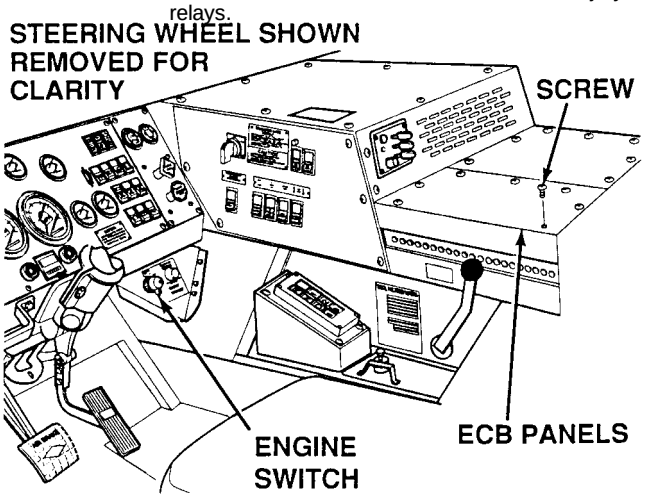


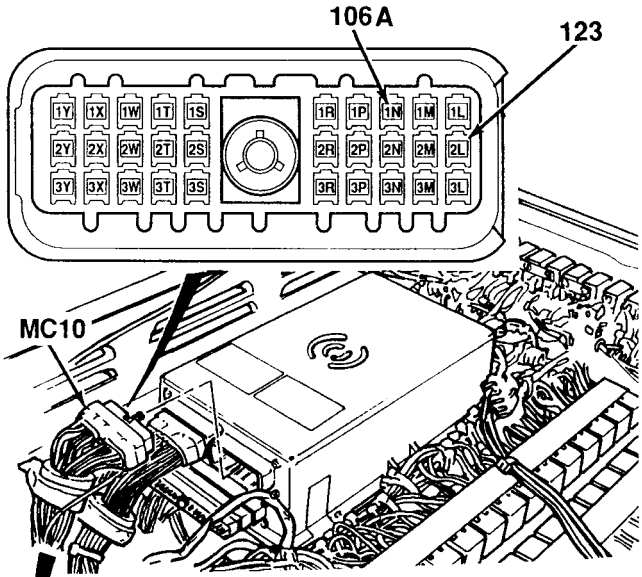
10. CODE 33: OIL TEMPERATURE SENSOR INOPERATIVE (CONT).

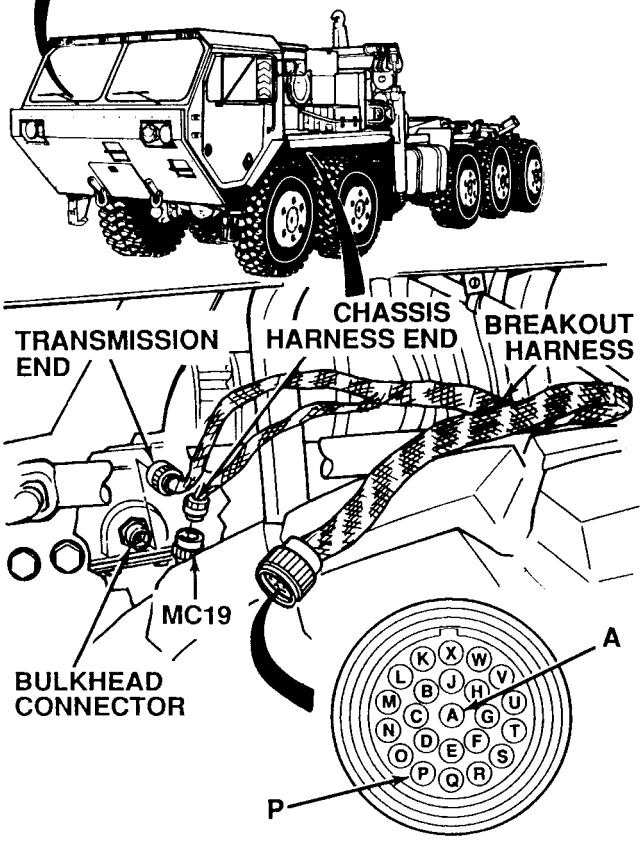


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Voltage is always present at circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 and can cause severe injury to personnel. Non-metallic tools shall be used when removing relays.



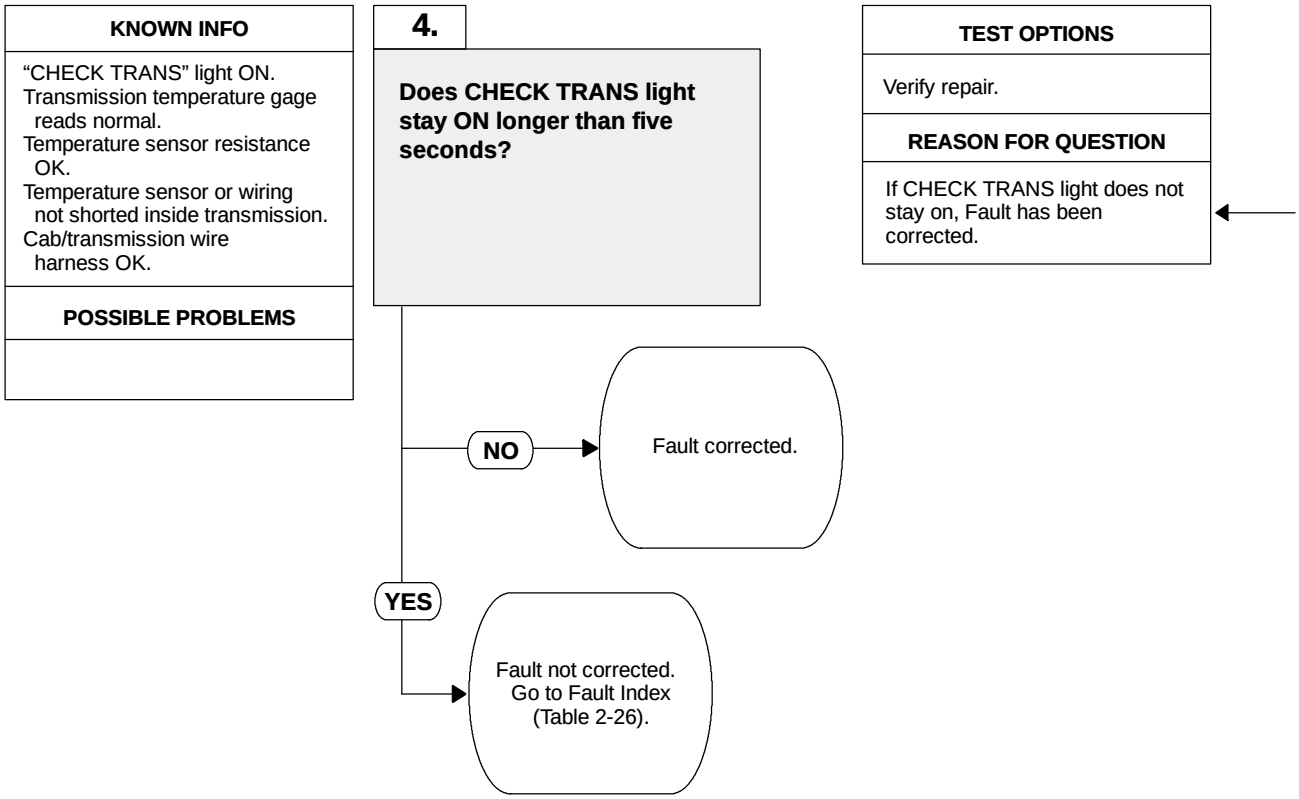




CONTINUITY TEST

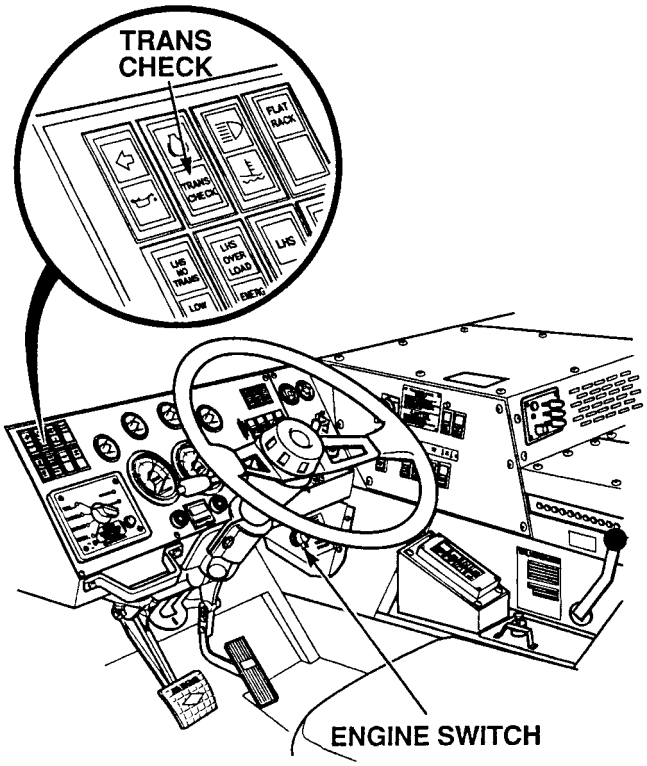
(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity on wire 123 between breakout harness, terminal A and harness connector MC10, terminal 2L?
  (a) If there is no continuity, repair wire 123 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 123 is OK.
(5) Is there continuity on wire 106A/B between breakout harness, terminal P and harness connector MC10, terminal 1N?
  (a) If there is no continuity, repair wire 106A/B (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 106A/B is OK.
(6) Connect connector MC10 to ATEC ECU and tighten screw.
(7) Install two ECB covers and 15 screws.
(8) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(9) Connect transmission connector MC19 to transmission bulkhead connector.
(10) Install left rear skirt on underside of fender (Para 17-34).

10. CODE 33: OIL TEMPERATURE SENSOR INOPERATIVE (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) and observe CTL.
   (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below.
   (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Step (2) below and go to Fault Index (Table 2-26).
(2) Turn OFF ENGINE switch.



2-15. ATEC TROUBLESHOOTING (CONT).

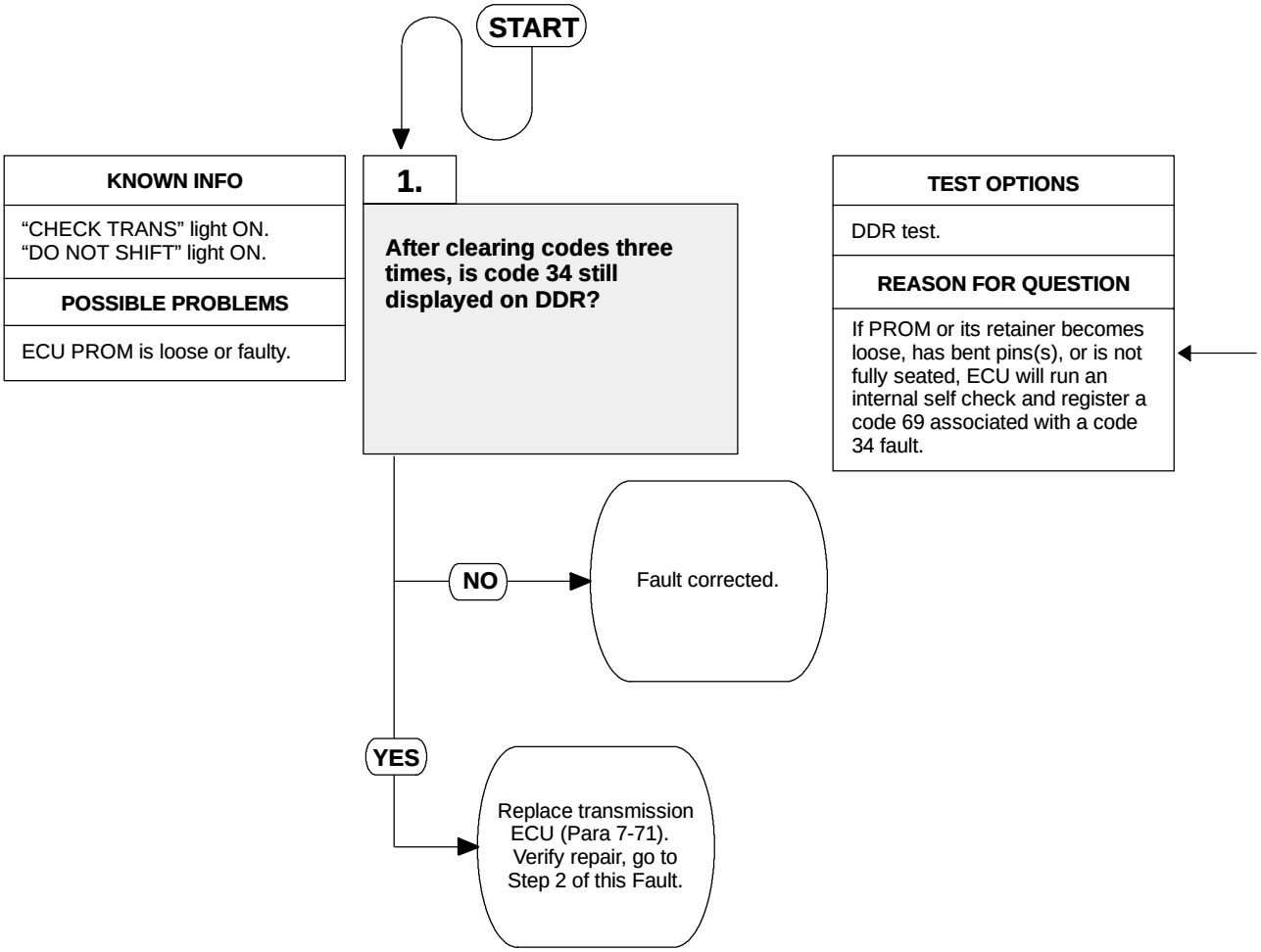
11. CODE 34: PROM CHECK.

INITIAL SETUP

Tools and Special Tools
Reader, Diagnostic (Item 53, Appendix G)

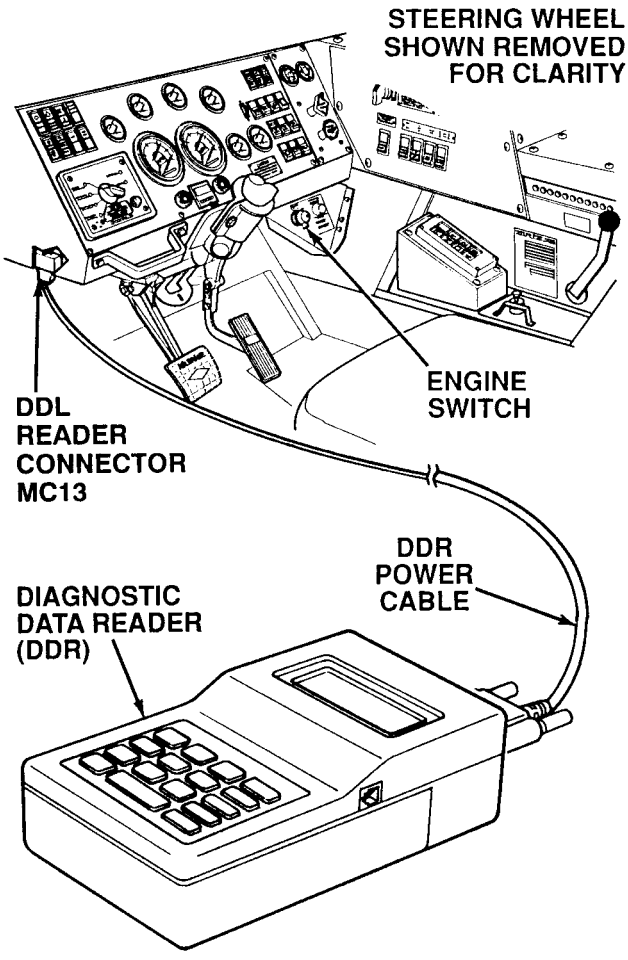
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

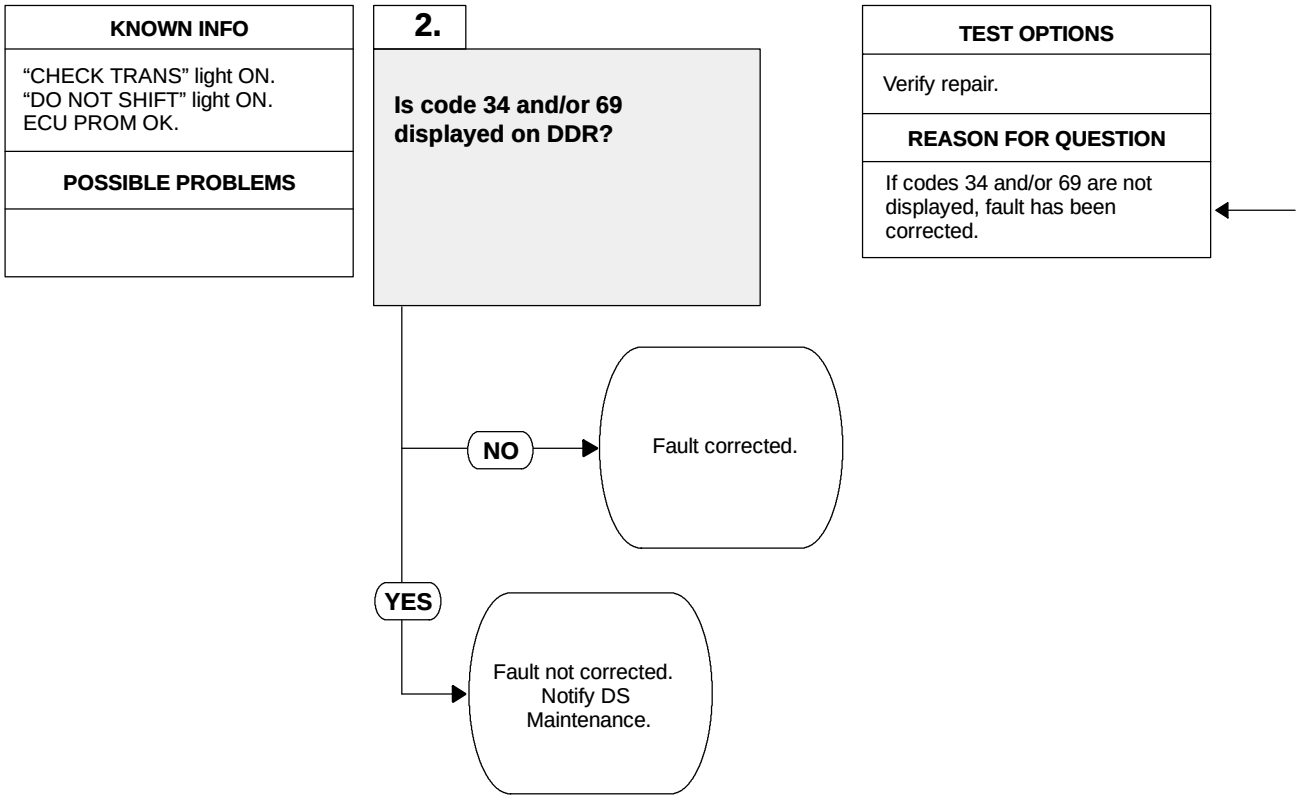


DDR TEST

(1) Connect DDR cable to DDL connector MC13.
(2) Turn ON ENGINE switch (TM 9-2320-364-10).
(3) Clear DDR codes three times (Para 2-11).
(4) Observe DDR screen.
    (a) If codes 34 and 69 are displayed on DDR, turn OFF ENGINE switch and replace ATEC ECU (Para 7-71).
    (b) If codes 34 and 69 are not displayed, fault corrected.
(5) Turn OFF ENGINE switch.

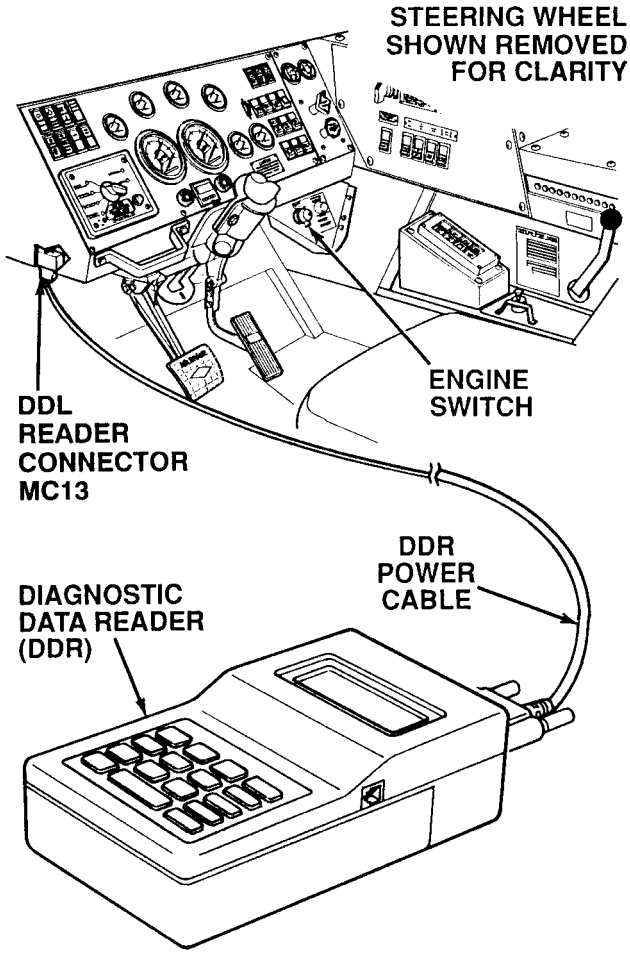


11. CODE 34: PROM CHECK (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Clear ATEC codes (Para 2-11).
(3) Observe DDR screen.
    (a) If codes 34 and/or 69 are not displayed, fault has been corrected. Perform Steps (4) and (5) below.
    (b) If codes 34 and/or 69 are displayed, fault not corrected. Perform Steps (4) and (5) below and notify DS Maintenance.
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR cable from DDL connector MC13.



2-15. ATEC TROUBLESHOOTING (CONT).

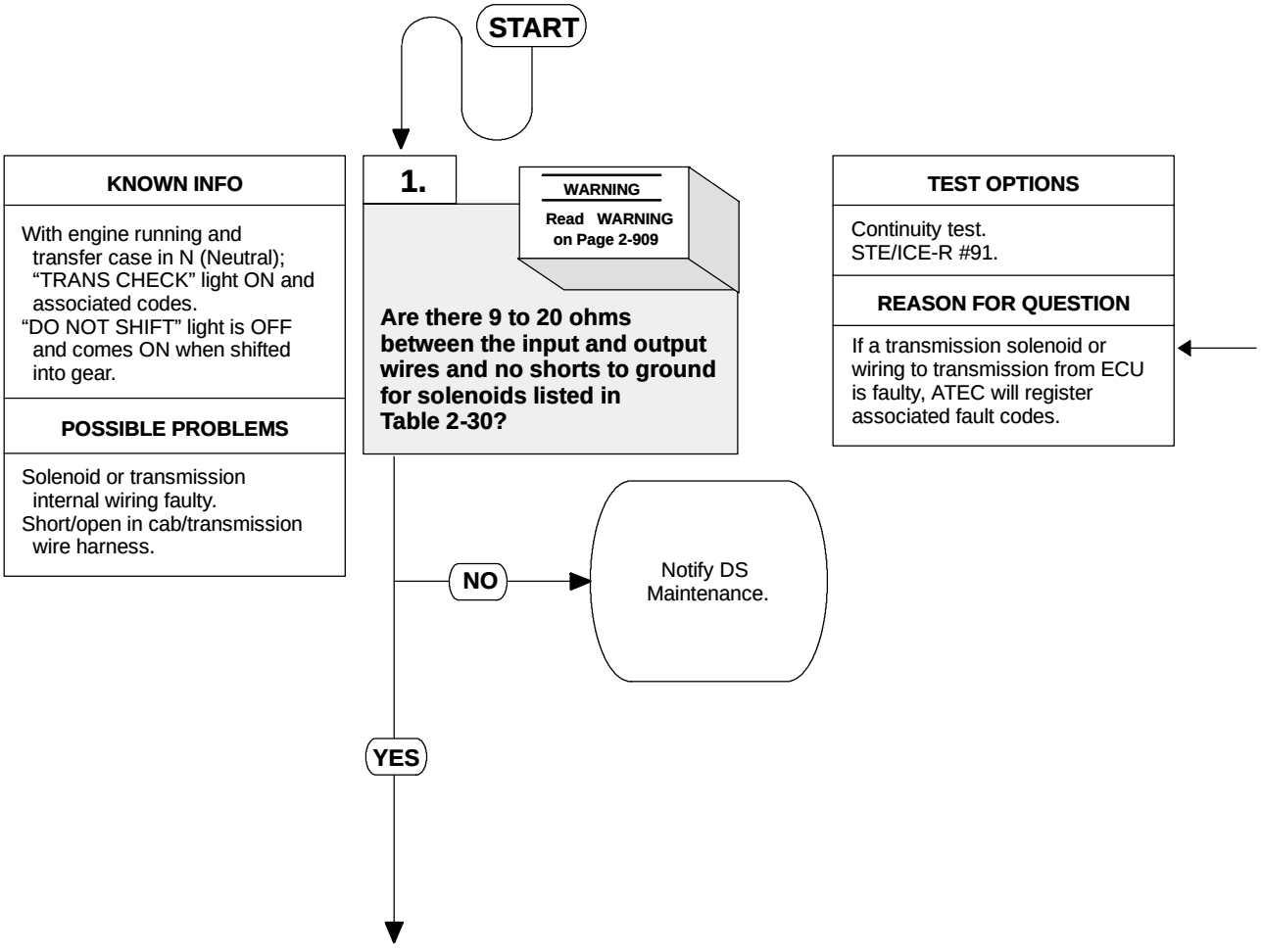
12. CODES 41 THROUGH 45 AND 51 THROUGH 53: SOLENOIDS J, F, D, C, B, A, G, E OR H INOPERATIVE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Breakout Harness (Item 36, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)



WARNING

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

NOTE

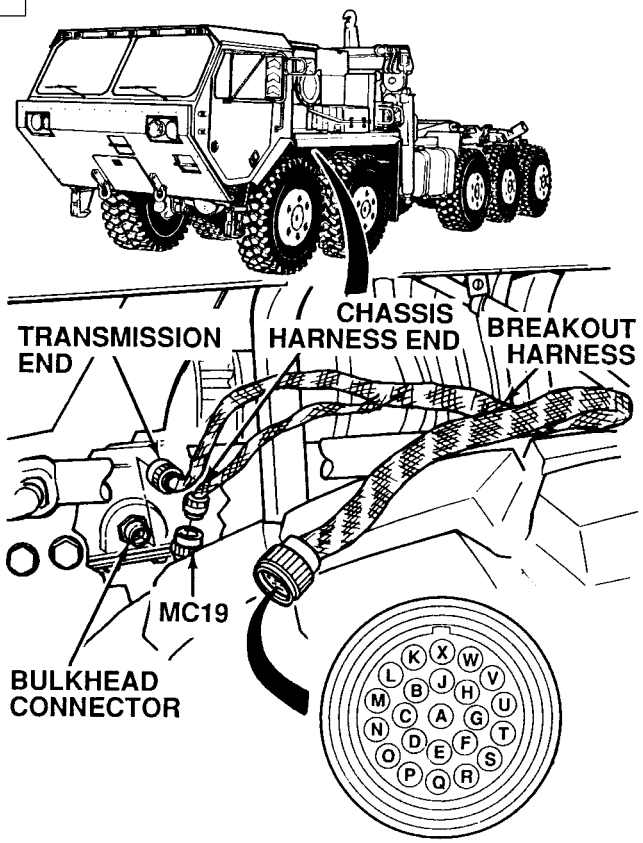
Table 2-30 lists each solenoid tested by the following procedures and the bulkhead terminals and wires used as test points for each solenoid.

Table 2-30. Transmission Solenoid Test Points.

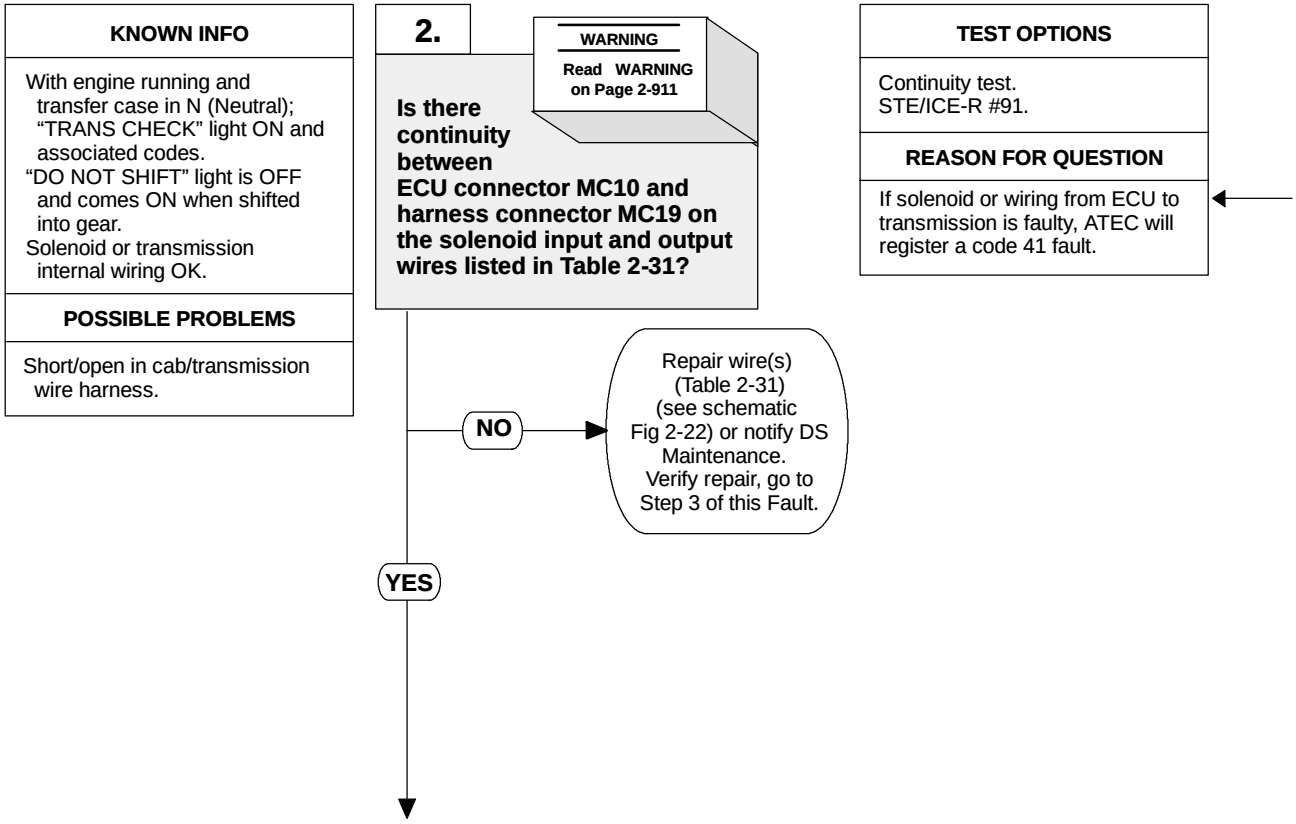
Solenoid (Code No.)	TRANSMISSION CONNECTOR MC19 TEST POINTS	
	Output Wires Term. (Wire No.)	Input Wires Term. (Wire No.)
J(41)	B(114)	D(111)
F(42)	V(120)	U(105)
D(43)	V(120)	W(110)
C(44)	W(110)	B(114)
B(45)	U(105)	T(115)
A(46)	T(115)	C(121)
G(51)	O(107)	L(109)
E(52)	M(119)	N(117)
H(53)	K(108)	N(117)

CONTINUITY TEST

(1) Disconnect transmission connector MC19 at transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Are 9 to 20 ohms measured between solenoid input and output terminals on the transmission bulkhead connector through breakout harness (Table 2-30)?
  (a) If 9 to 20 ohms are not measured, notify DS maintenance.
  (b) If 9 to 20 ohms are measured, solenoid wiring is OK.
(4) Is continuity measured between solenoid output terminal on bulkhead connector and a known good ground (Table 2-30)?
  (a) If there is continuity, notify DS Maintenance.
  (b) If there is no continuity, solenoid wiring is OK. Go to Step 2 of this Fault.



12. CODES 41 THROUGH 45 AND 51 THROUGH 53: SOLENOIDS J, F, D, C, B, A, G, E OR H INOPERATIVE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts positive electrical circuits, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Non-metallic tools shall be used when removing relays.

NOTE

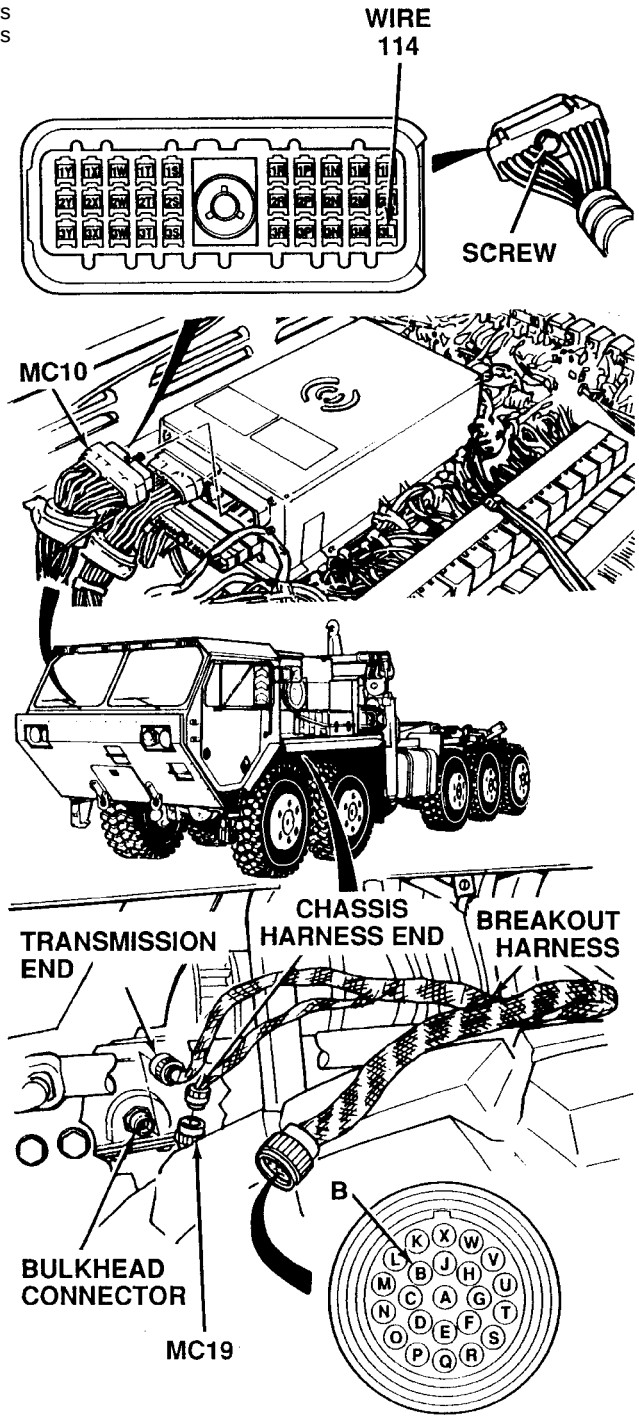
Table 2-31 lists ECU and transmission bulkhead connectors MC10 and MC19 and the solenoid wires and connector terminals used as test points for the following procedures.

Table 2-31. ECU and Transmission Bulkhead Connectors.

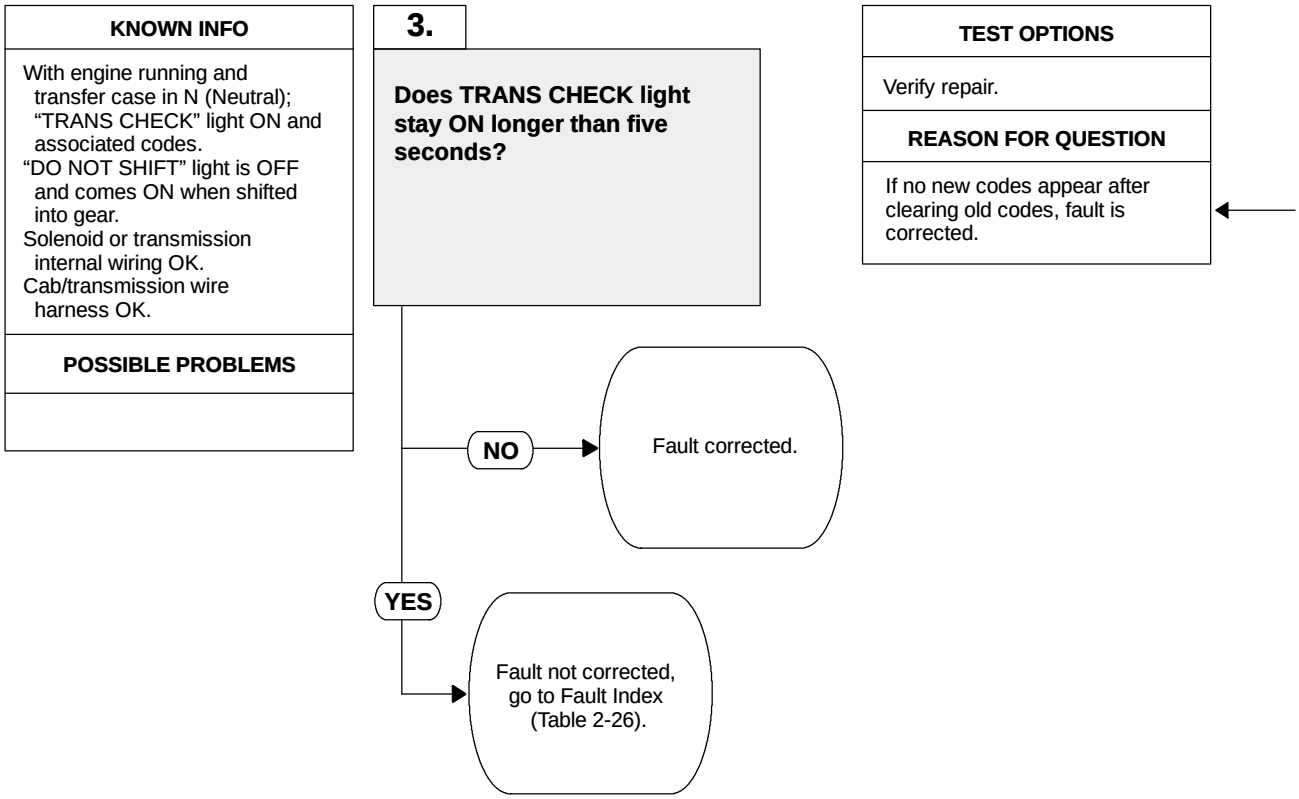
	ATEC WIRE HARNESS SOLENOID WIRES TEST POINTS	
Solenoid Conn. (Code No.)	**ECU Conn. MC10 Term. (Wire No.)**	**Bulkhead Term. (Wire No.)**
J(41)	3L(114)	B(114)
	3M(111)	D(111)
F(42)	2T(120)	V(120)
	1W(105)	U(105)
D(43)	2T(120)	V(120)
	1S(110)	W(110)
C(44)	3L(114)	B(114)
	1S(110)	W(110)
B(45)	1T(115)	T(115)
	1W(105)	U(105)
A(46)	1T(115)	T(115)
	3T(121)	C(121)
G(51)	1Y(107)	O(107)
	2Y(109)	L(109)
E(52)	2W(119)	M(119)
	3Y(117)	N(117)
H(53)	2M(108)	K(108)

CONTINUITY TEST

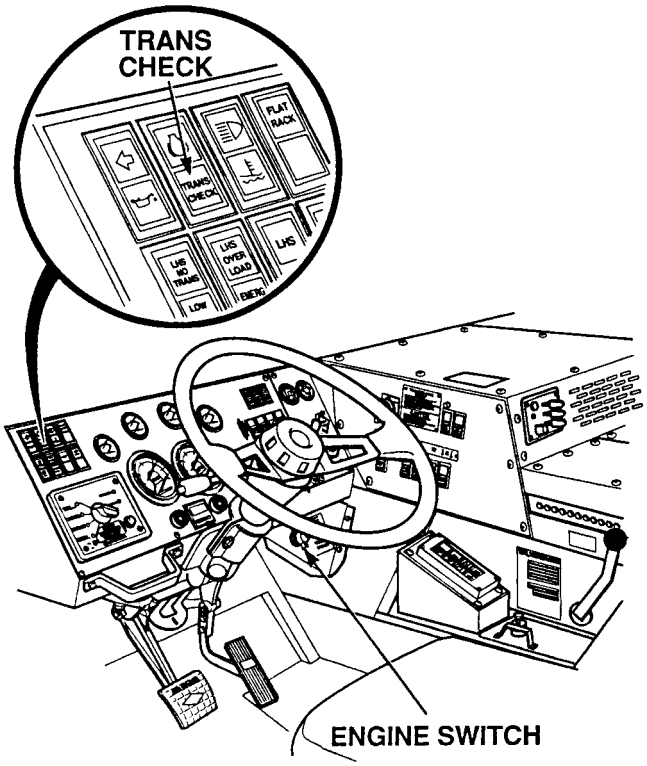
(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity between connector MC10 and breakout harness connector on the solenoid harness input and output wires listed in (Table 2-31)?
  (a) If there is no continuity, repair wire(s) (Table 2-31) (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, cab/transmission harness wires are OK.
(5) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(6) Connect transmission connector MC19 to transmission bulkhead connector.
(7) Install connector MC10 to ATEC ECU and tighten screw.
(8) Install two ECB covers and 15 screws.
(9) Install left rear skirt on underside of fender (Para 17-34).



12. CODES 41 THROUGH 45 AND 51 THROUGH 53: SOLENOIDS J, F, D, C, B, A, G, E OR H INOPERATIVE (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10) and observe CTL. (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below. (b) If TRANS CHECK light comes on and stays on after engine warms up, perform Step (2) below and go to Fault Index (Table 2-26). (2) Turn OFF ENGINE switch.



2-15. ATEC TROUBLESHOOTING (CONT).

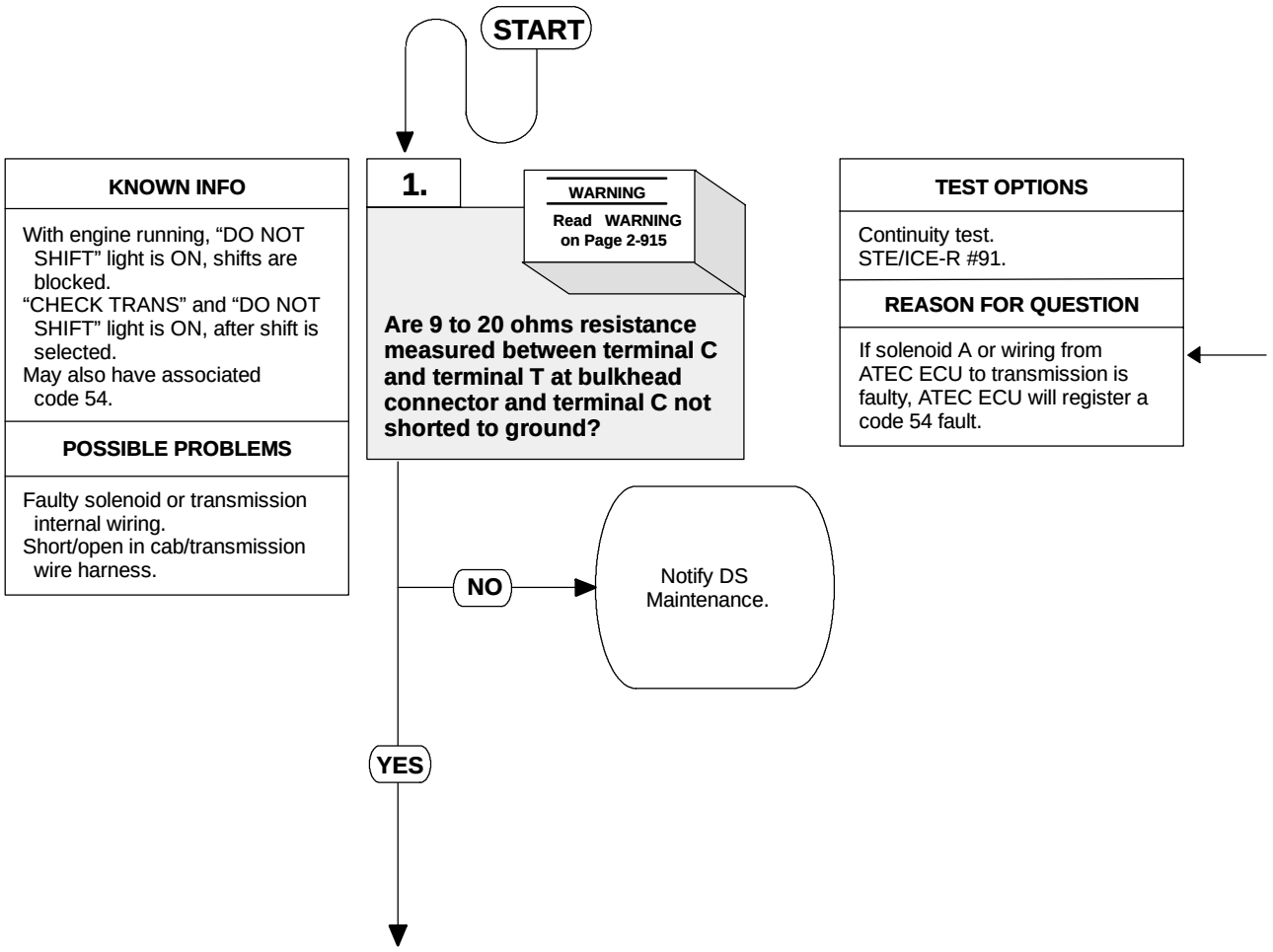
13. CODE 46: SOLENOID A INOPERATIVE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Breakout Harness (Item 36, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)

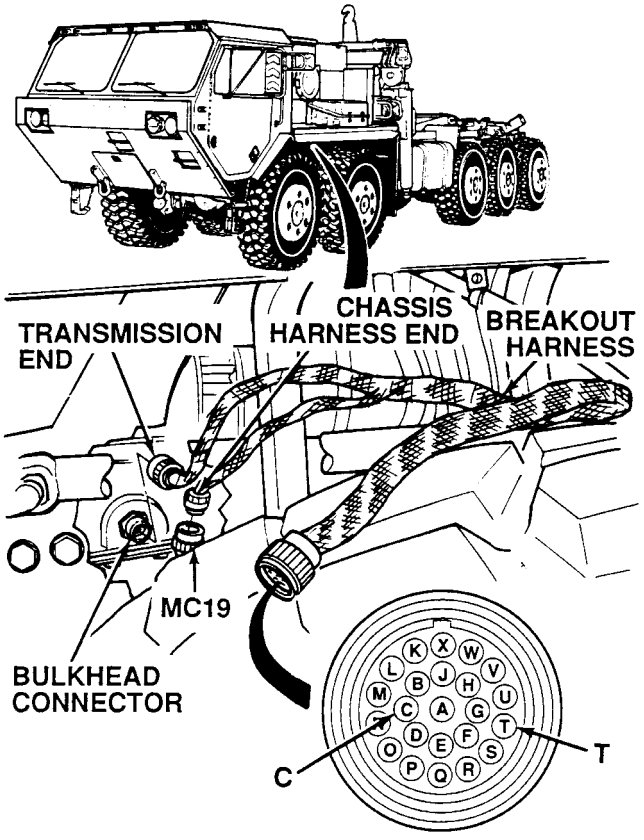


WARNING

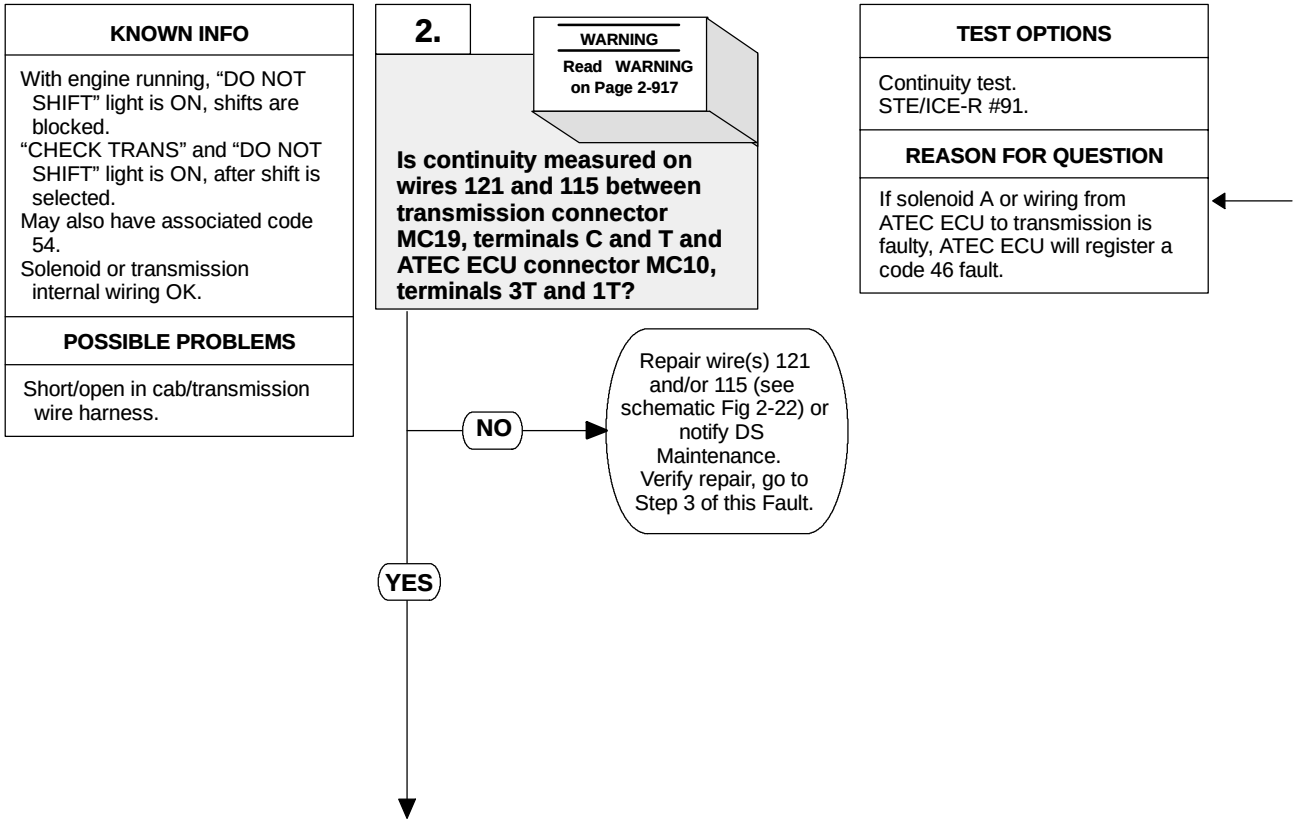
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect transmission connector MC19 at transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Read resistance between terminal C and terminal T of breakout harness connector.
  (a) If 9 to 20 ohms resistance are not measured, wiring inside transmission and solenoid A is faulty. Notify DS Maintenance.
  (b) If 9 to 20 ohms resistance are measured, go to Step (5) below.
(5) Is there continuity between breakout harness connector, terminal C and a known good ground?
  (a) If there is no continuity, wiring inside transmission and solenoid A is OK. Go to Step 2 of this Fault.
  (b) If there is continuity, wiring inside transmission and/or Solenoid A is faulty. Notify DS Maintenance.

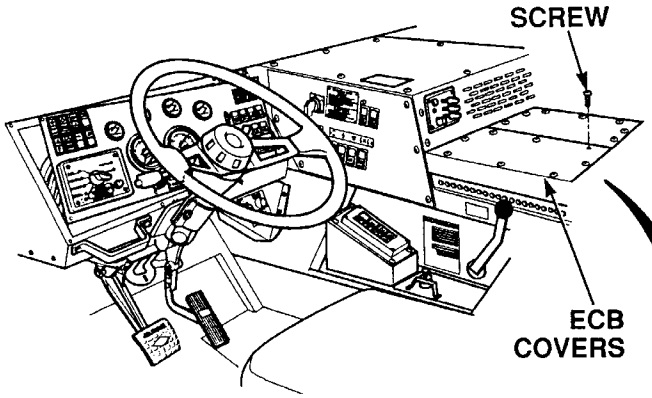


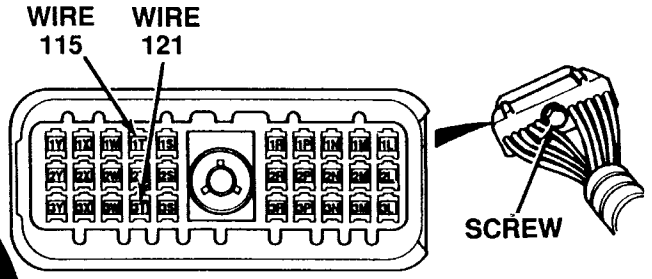
13. CODE 46: SOLENOID A INOPERATIVE (CONT).

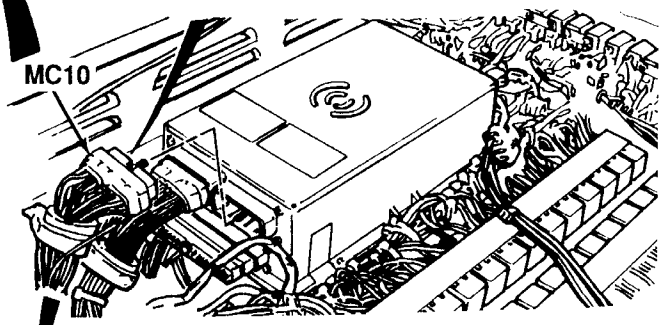


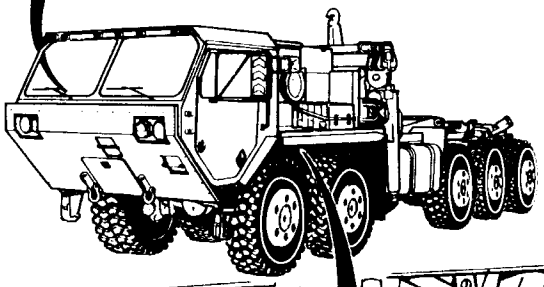
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.



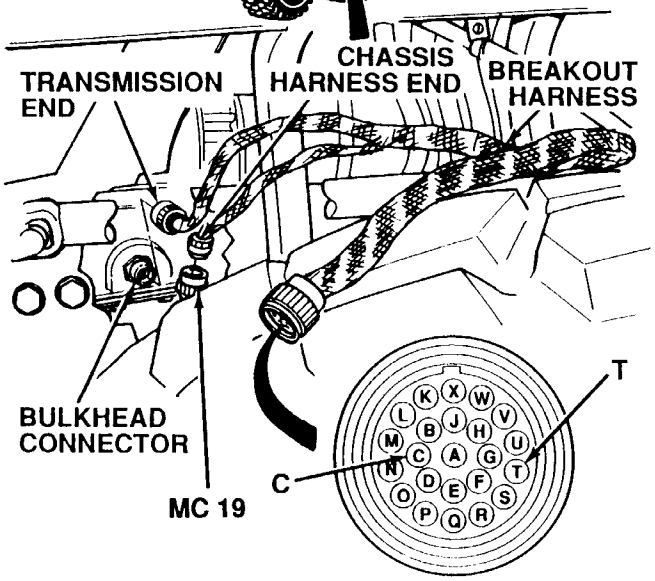




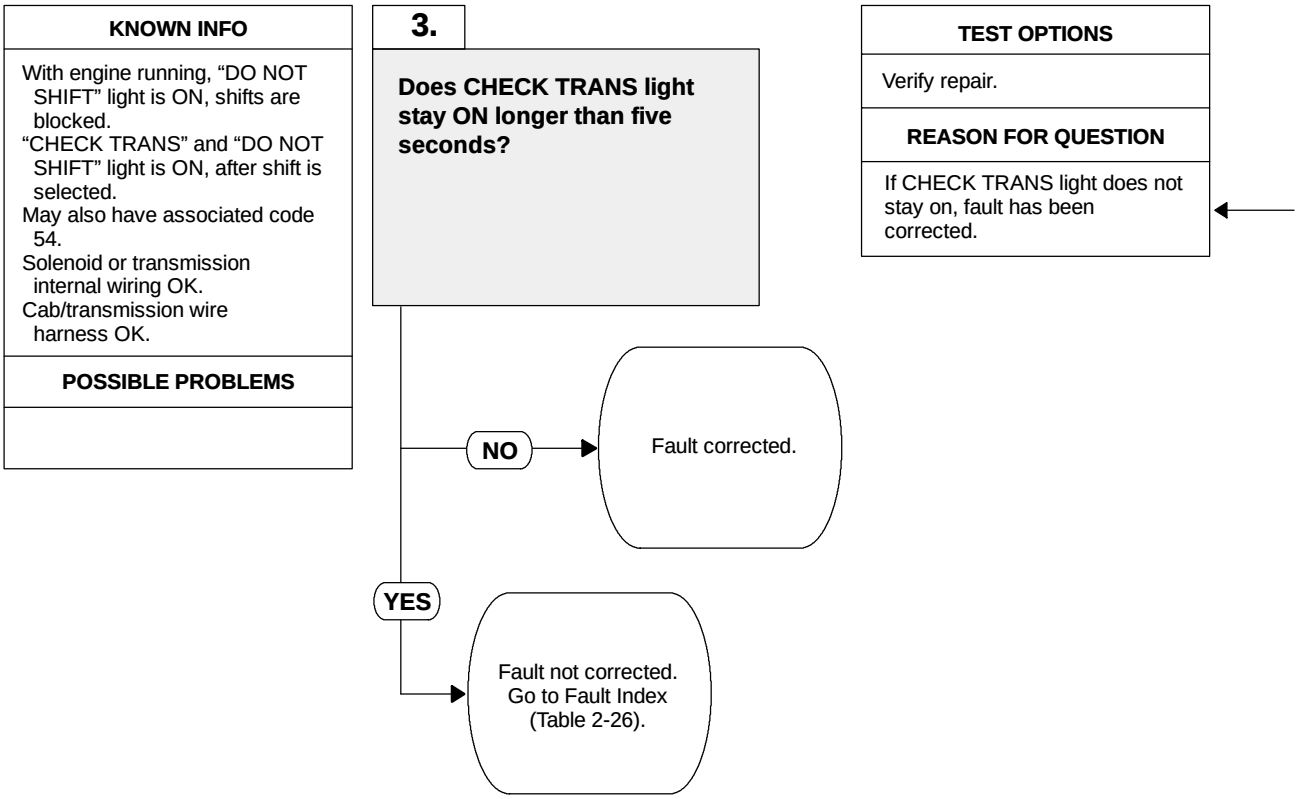


CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity between breakout harness, terminal C and connector MC10, terminal 3T?
  (a) If there is no continuity, repair wire 121 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 121 is OK. Go to Step (5) below.
(5) Is there continuity between breakout harness, terminal T and connector MC10, terminal 1T?
  (a) If there is no continuity, repair wire 115 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 115 is OK.
(6) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(7) Connect transmission connector MC19 at transmission bulkhead connector.
(8) Connect connector MC10 to ATEC ECU and tighten screw.
(9) Install two ECB covers and 15 screws.
(10) Install left rear skirt on underside of fender (Para 17-34).

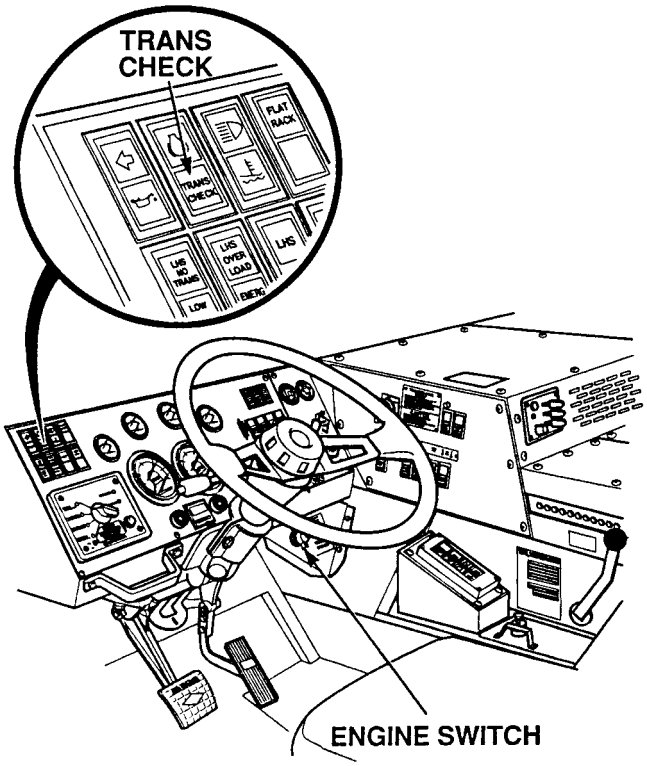


13. CODE 46: SOLENOID A INOPERATIVE (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) and observe CTL.
   (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below.
   (b) If CHECK TRANS light comes on and stays on after engine warms up, perform Step (2) below and go to Fault Index (Table 2-26).
(2) Turn OFF ENGINE switch.



2-15. ATEC TROUBLESHOOTING (CONT).

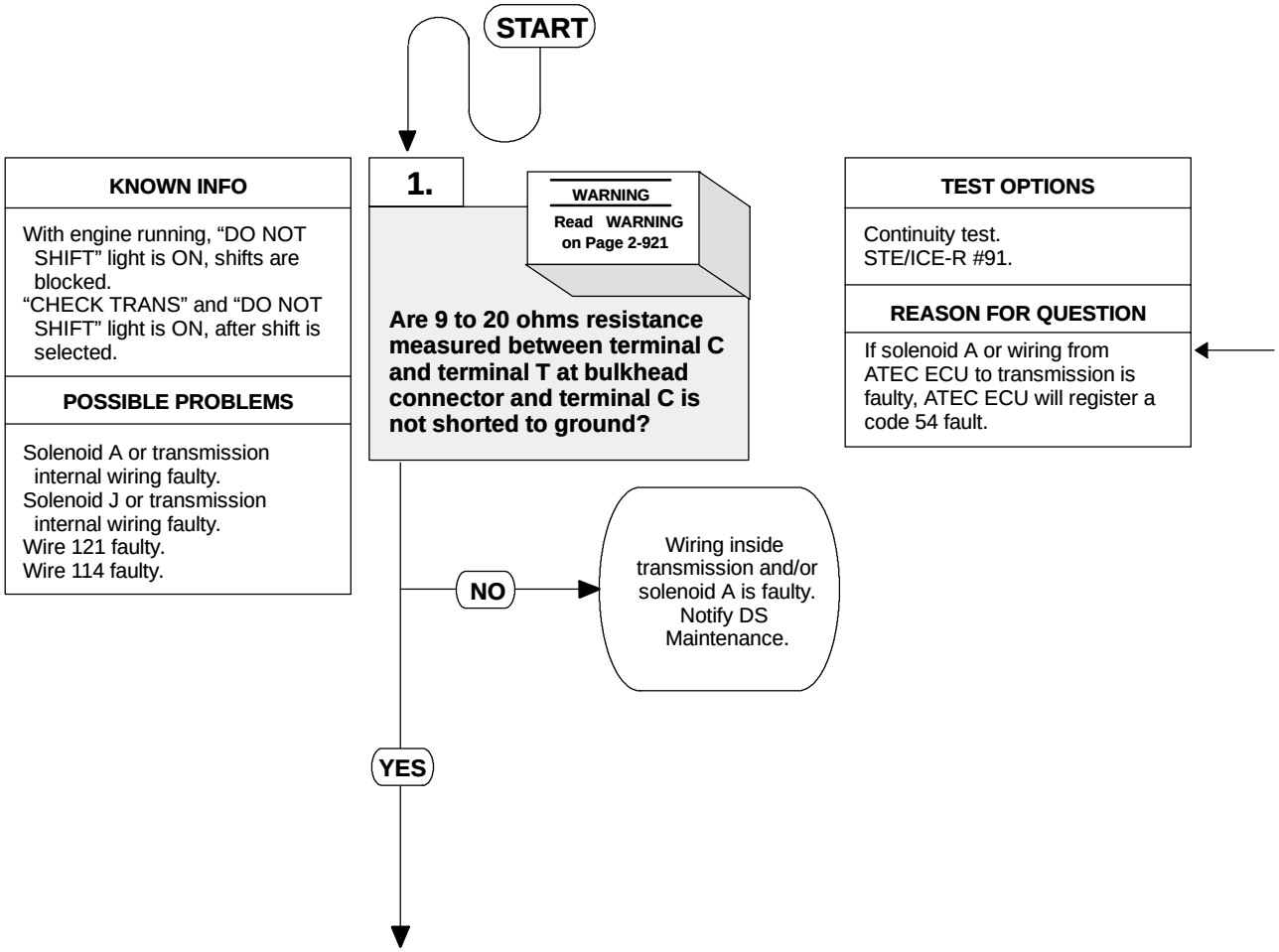
14. CODE 54: A, B, C, D, F, AND J SOLENOID OFF TEST.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Breakout Harness (Item 36, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)

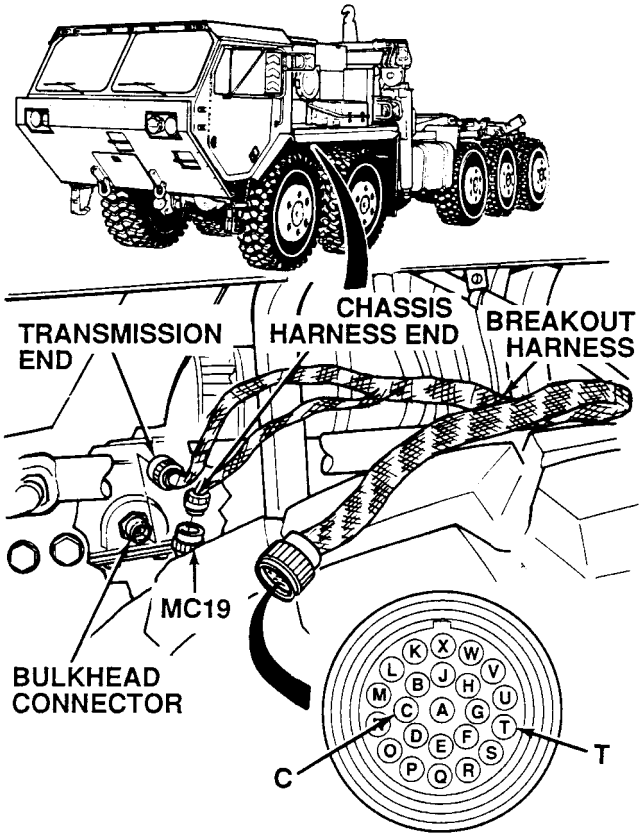


WARNING

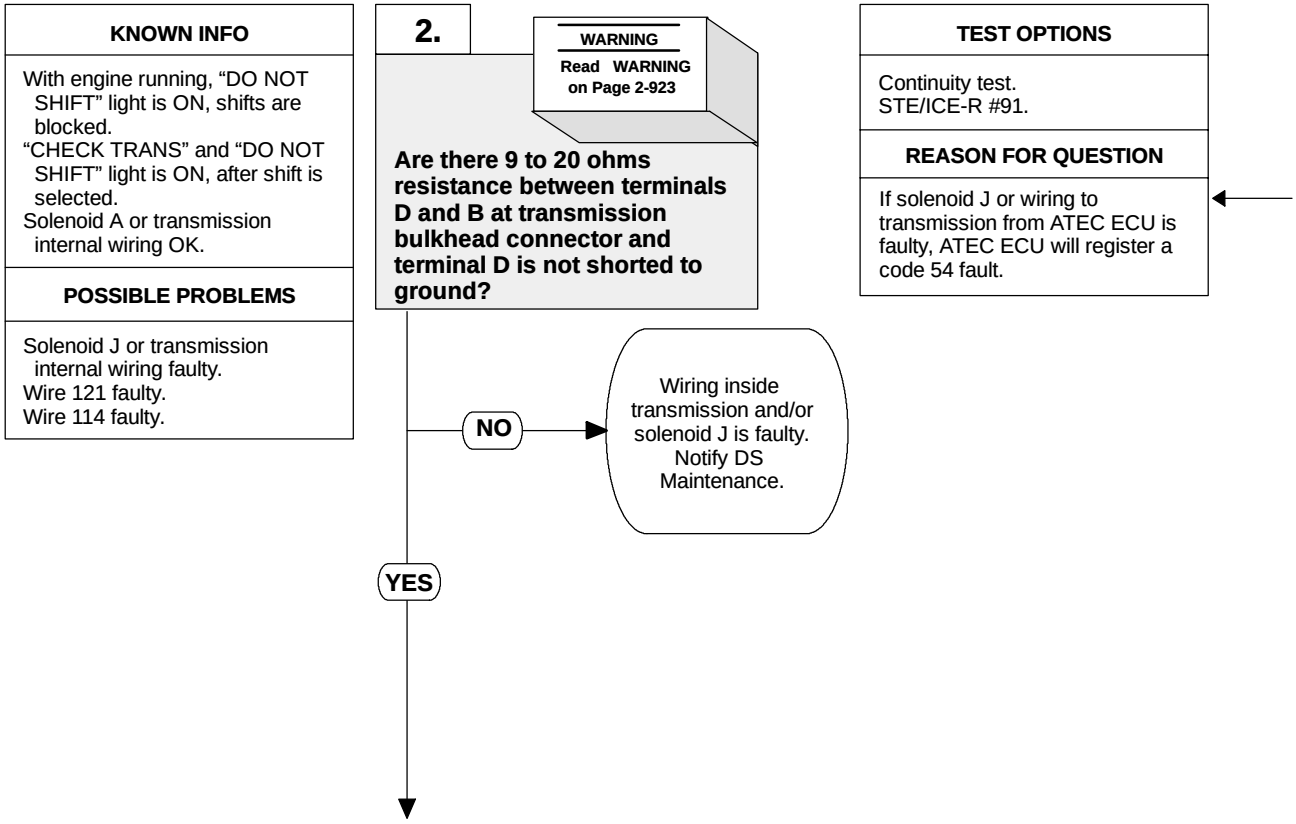
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect transmission connector MC19 from transmission bulkhead connector.
(2) Connect breakout harness transmission end connector to transmission bulkhead connector.
(3) Set multimeter select switch to ohms.
(4) Read resistance between terminal C and T of breakout harness.
  (a) If 9 to 20 ohms resistance are not present, wiring inside transmission and/or solenoid A is faulty. Notify DS Maintenance.
  (b) If 9 to 20 ohms are present, go to Step (5) below.
(5) Is there continuity between terminal C and a known good ground?
  (a) If there is no continuity, wiring inside transmission and solenoid A is OK.
  (b) If there is continuity, wiring inside transmission and/or solenoid A is faulty. Notify DS Maintenance.



14. CODE 54: A, B, C, D, F, AND J SOLENOID OFF TEST (CONT).

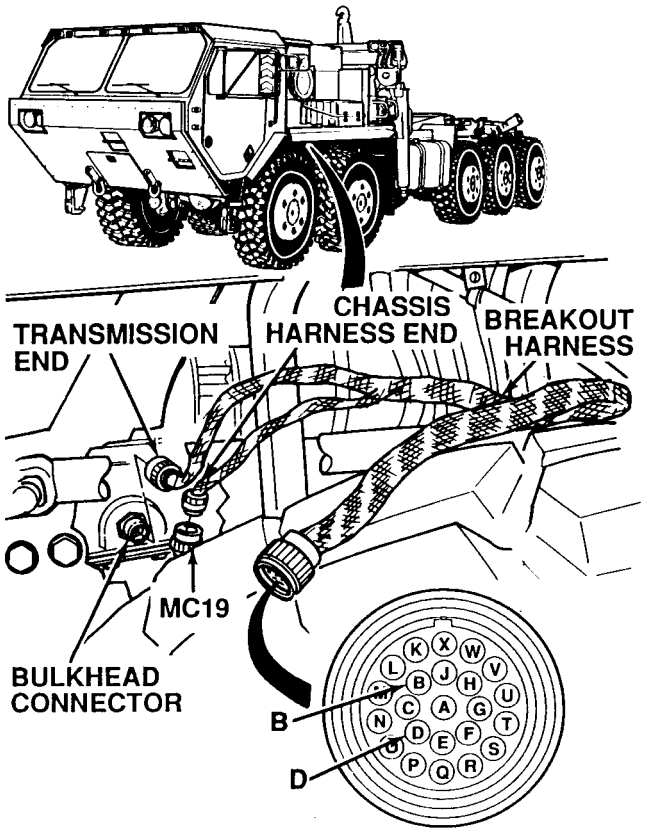


WARNING

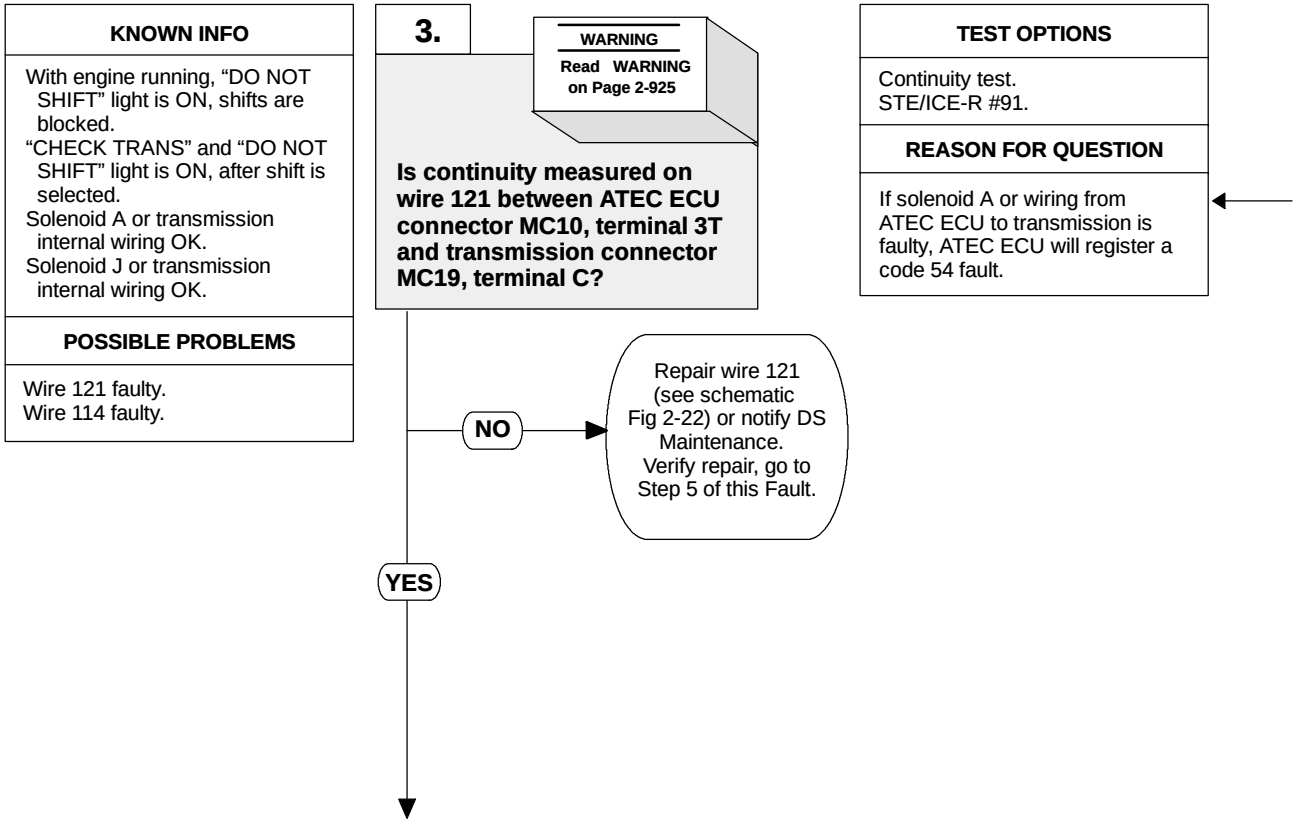
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Read resistance between terminals D and B at breakout harness.
   (a) If 9 to 20 ohms are not present, wiring inside transmission and/or solenoid J is faulty. Notify DS Maintenance.
   (b) If 9 to 20 ohms are present, go to Step (2) below.
(2) Is there continuity between breakout harness, terminal D and a known good ground?
   (a) If there is no continuity, wiring inside transmission or solenoid J is OK. Go to Step 3 of this Fault.
   (b) If there is continuity, wiring inside transmission and/or solenoid J is faulty. Notify DS Maintenance.

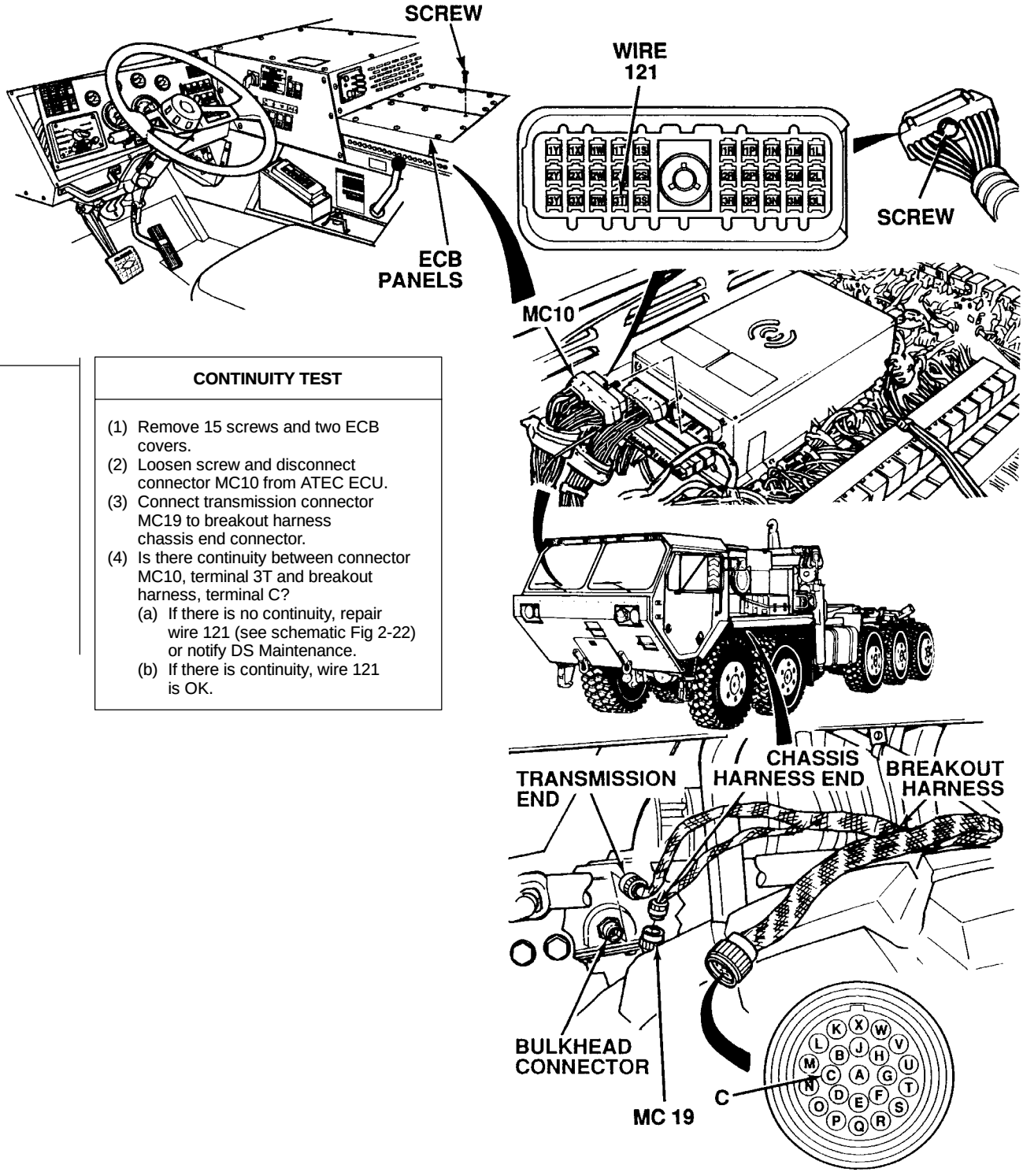


14. CODE 54: A, B, C, D, F, AND J SOLENOID OFF TEST (CONT).



WARNING

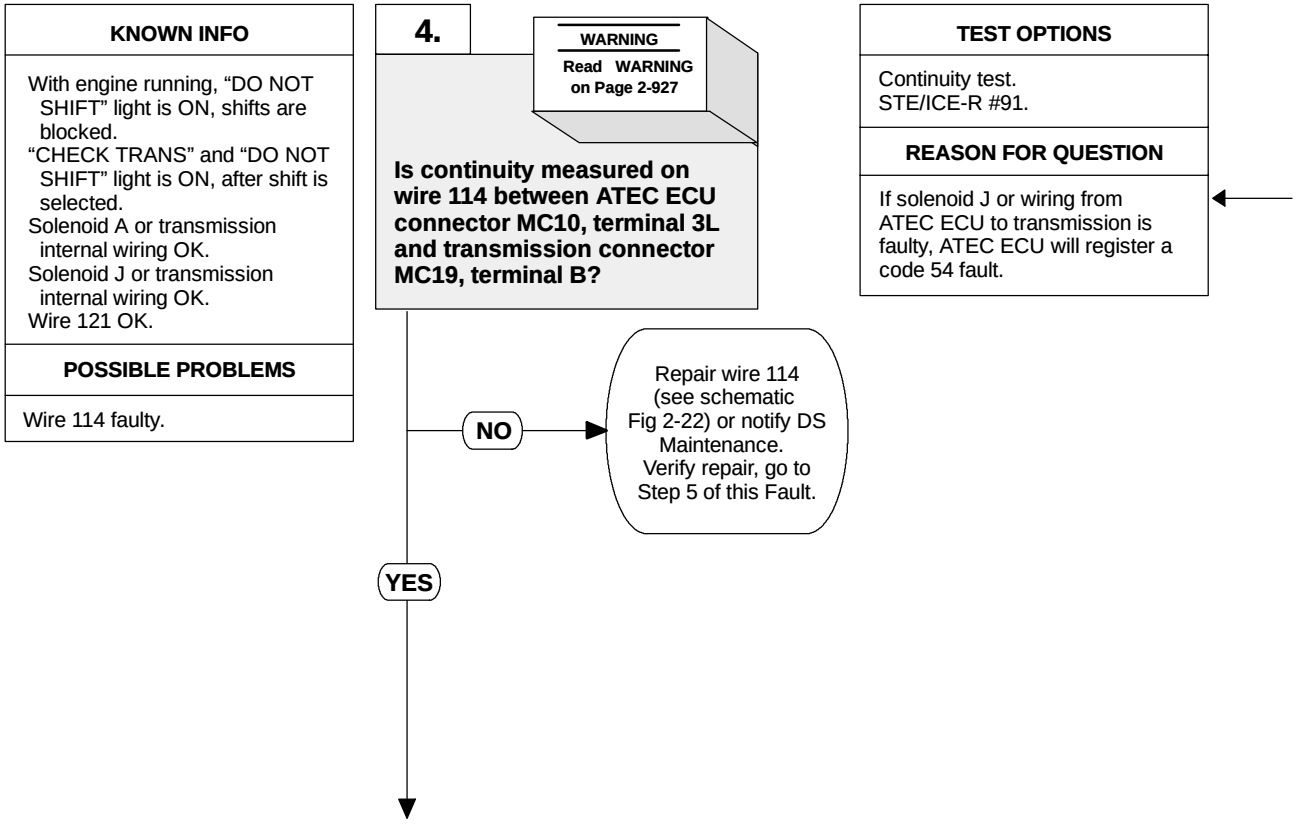
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.



CONTINUITY TEST

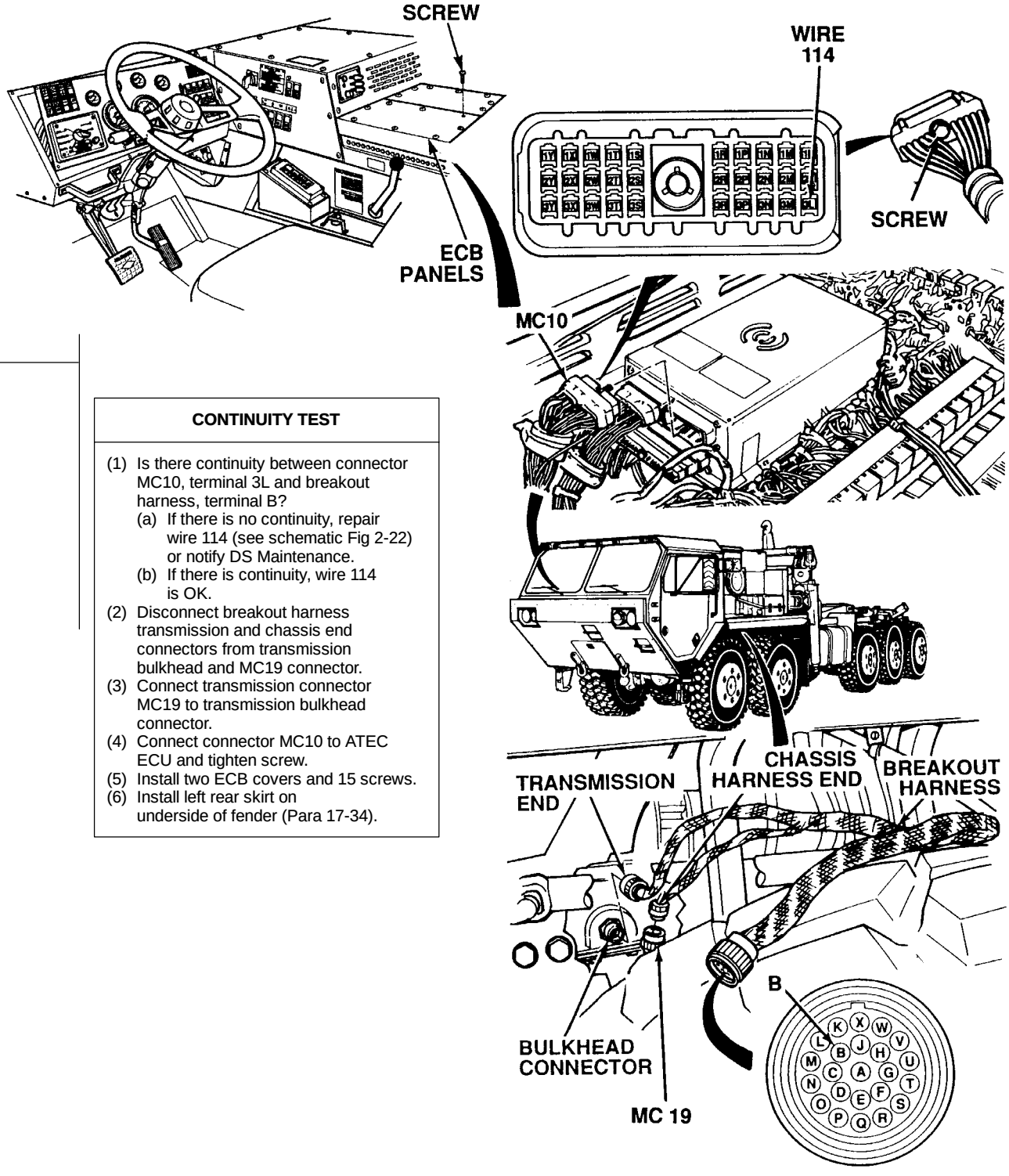
(1) Remove 15 screws and two ECB covers.
(2) Loosen screw and disconnect connector MC10 from ATEC ECU.
(3) Connect transmission connector MC19 to breakout harness chassis end connector.
(4) Is there continuity between connector MC10, terminal 3T and breakout harness, terminal C?
  (a) If there is no continuity, repair wire 121 (see schematic Fig 2-22) or notify DS Maintenance.
  (b) If there is continuity, wire 121 is OK.

14. CODE 54: A, B, C, D, F, AND J SOLENOID OFF TEST (CONT).



WARNING

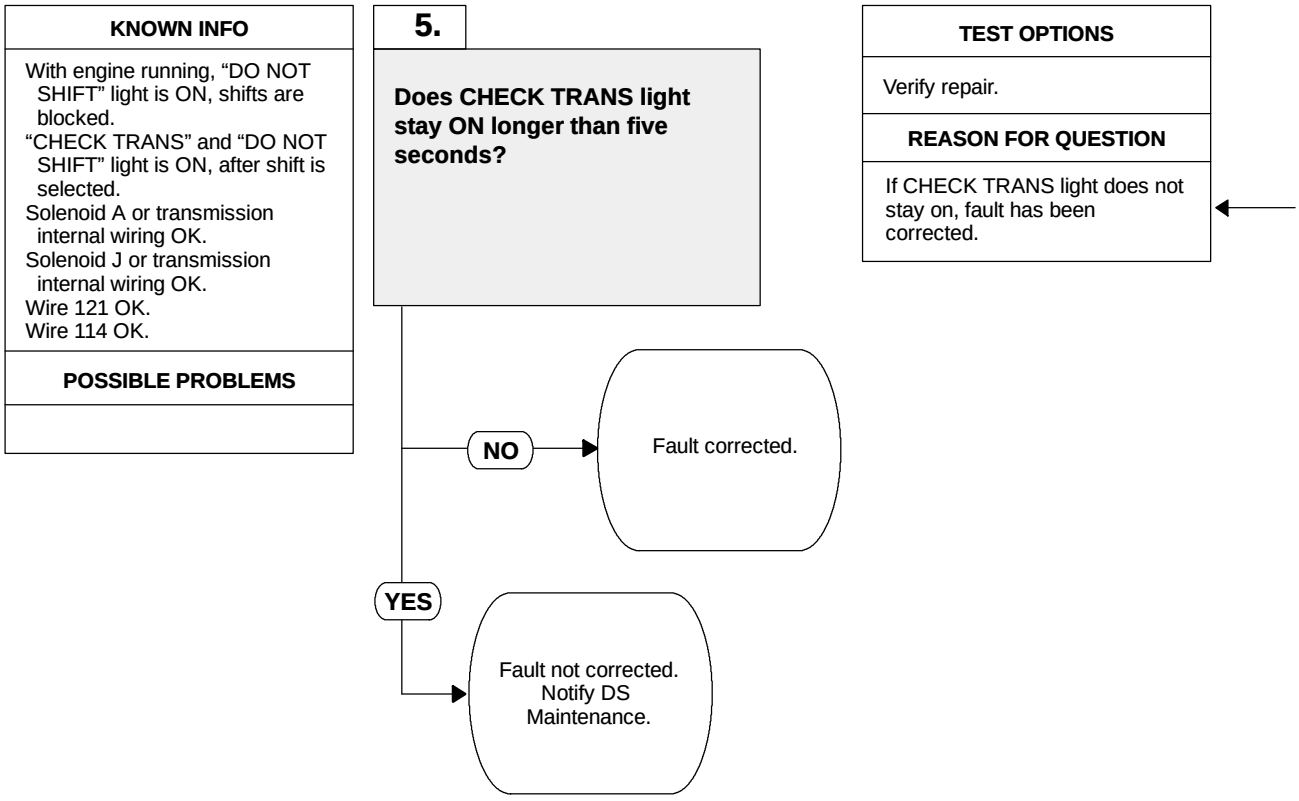
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.



CONTINUITY TEST

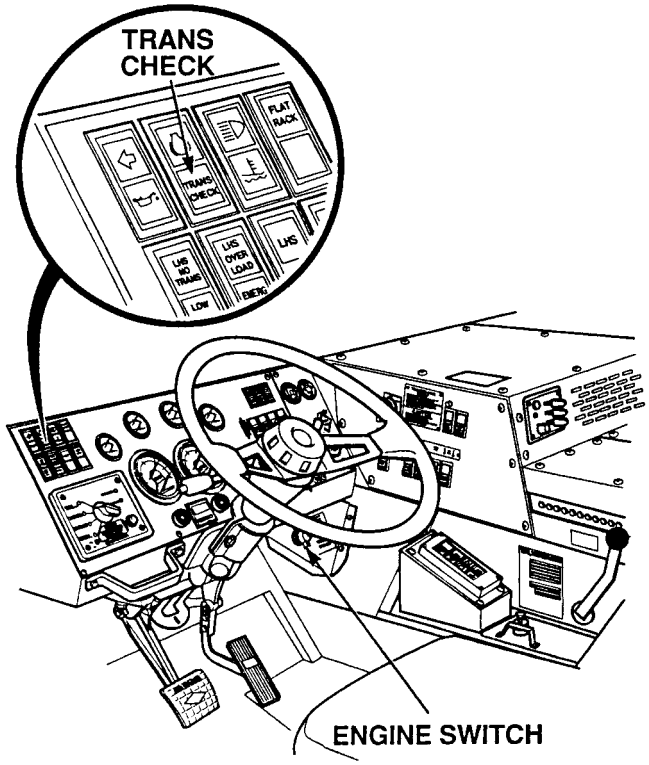
(1) Is there continuity between connector MC10, terminal 3L and breakout harness, terminal B?
   (a) If there is no continuity, repair wire 114 (see schematic Fig 2-22) or notify DS Maintenance.
   (b) If there is continuity, wire 114 is OK.
(2) Disconnect breakout harness transmission and chassis end connectors from transmission bulkhead and MC19 connector.
(3) Connect transmission connector MC19 to transmission bulkhead connector.
(4) Connect connector MC10 to ATEC ECU and tighten screw.
(5) Install two ECB covers and 15 screws.
(6) Install left rear skirt on underside of fender (Para 17-34).

14. CODE 54: A, B, C, D, F, AND J SOLENOID OFF TEST (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) and observe CTL.
   (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below.
   (b) If CHECK TRANS light comes on and stays on after engine warms up, fault not corrected. Perform Steps (2) below and notify DS Maintenance.
(2) Turn OFF ENGINE switch.



2-15. ATEC TROUBLESHOOTING (CONT).

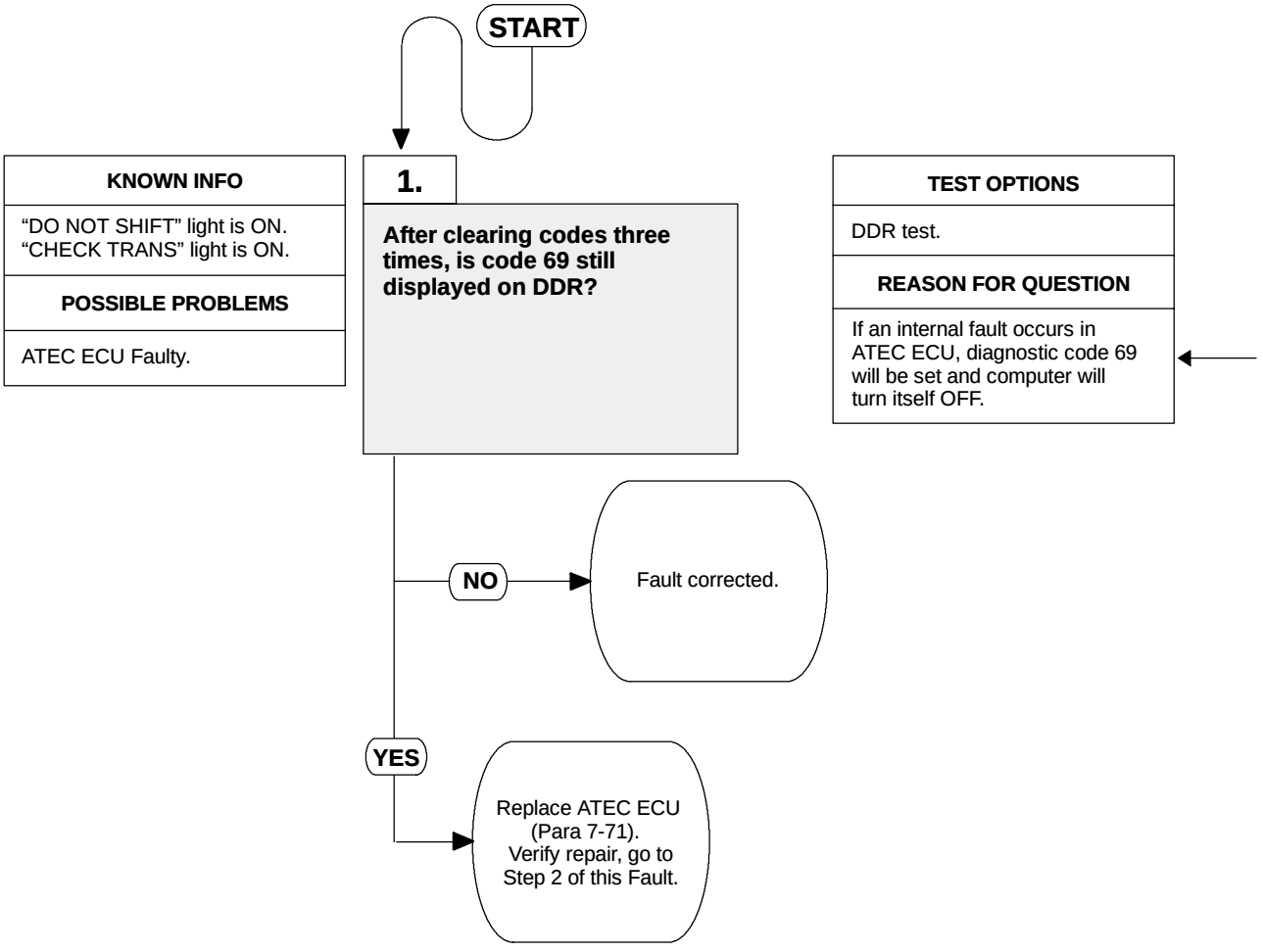
15. CODE 69: ELECTRONIC CONTROL UNIT (ECU) FAILURE.

INITIAL SETUP

Tools and Special Tools
Reader, Diagnostic (Item 53, Appendix G)

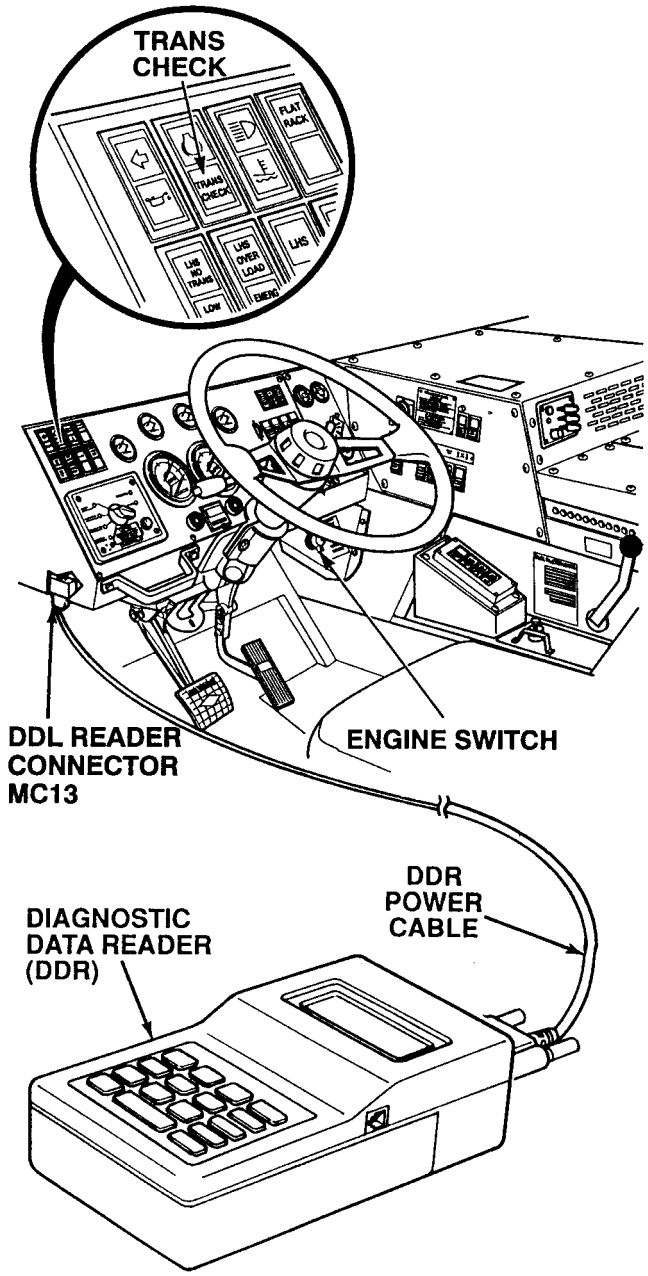
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

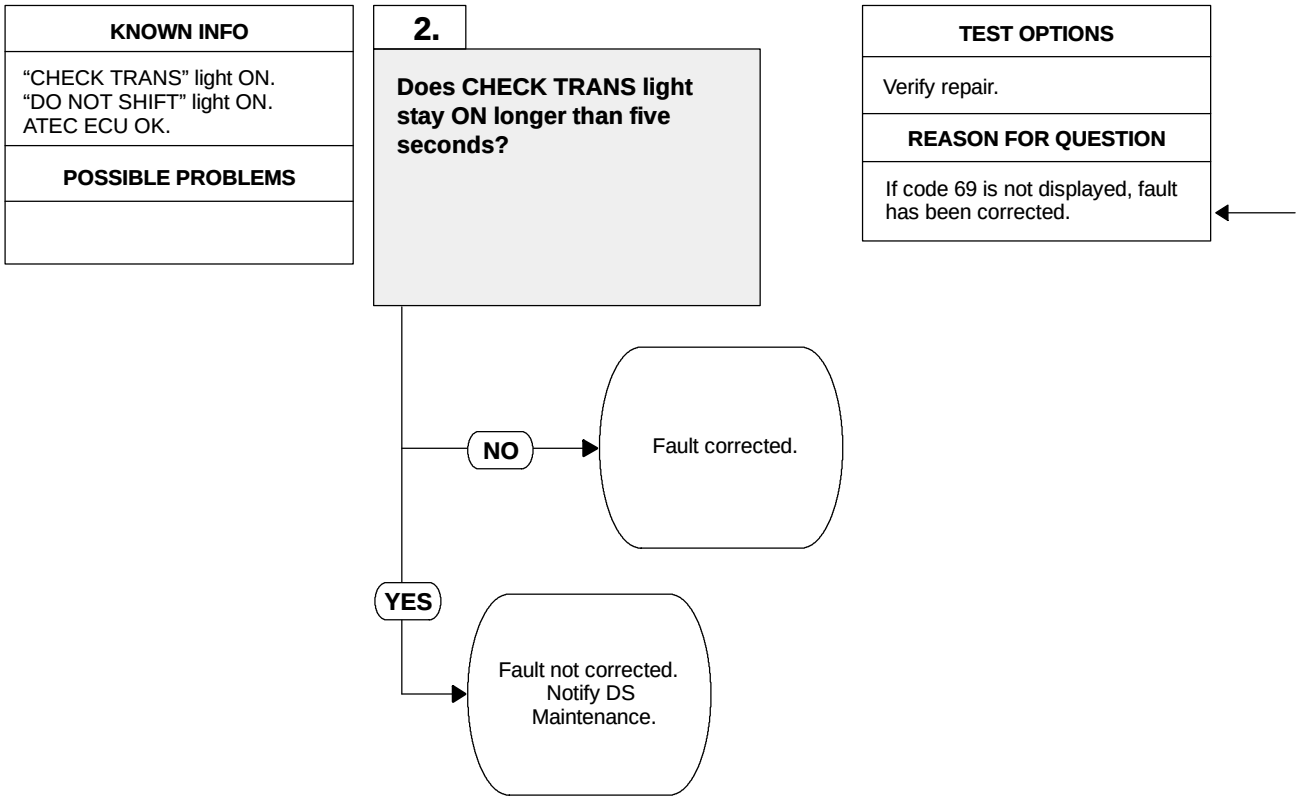


DDR TEST

(1) Connect DDR connector to DDL connector MC13.
(2) Turn ON ENGINE switch (TM 9-2320364-10).
(3) Clear ATEC codes and observe CTL (Para 2-11).
  (a) If code 69 is not displayed, fault corrected.
  (b) If code 69 is displayed, perform Steps (4) and (5) below and replace transmission ECU (Para 7-71).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR connector from DDL connector MC13.

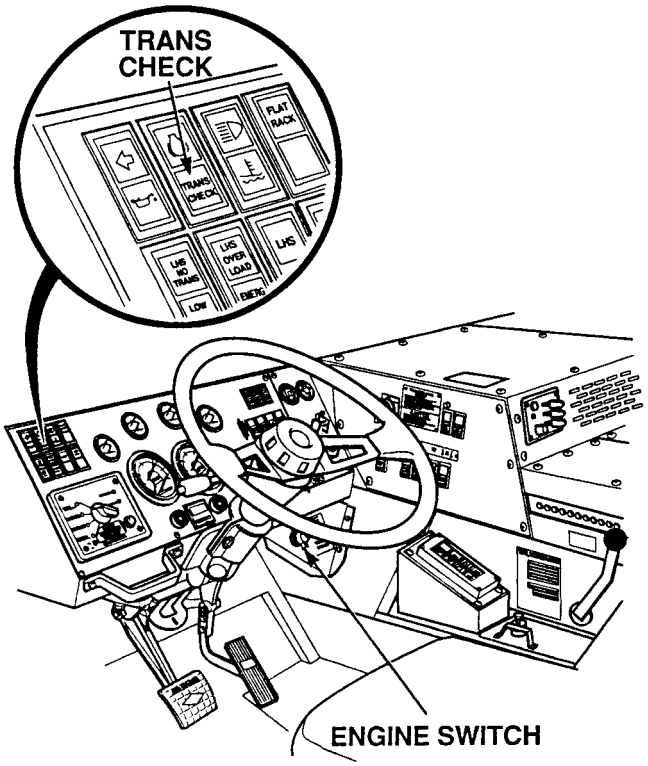


15. CODE 69: ELECTRONIC CONTROL UNIT (ECU) FAILURE (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) and observe CTL.
   (a) If CHECK TRANS light comes on for about five seconds then goes off, fault has been corrected. Perform Step (2) below.
   (b) If CHECK TRANS light comes on and stays on after engine warms up, turn OFF ENGINE switch and notify DS Maintenance.
(2) Turn OFF ENGINE switch.



2-16. ENGINE TROUBLESHOOTING.

This paragraph covers Engine System Troubleshooting. The Engine System Fault Index, Table 2-32, lists faults for the engine system of the PLS truck.

Table 2-32. Engine System Fault Index

Fault No.	Description	Page
1.	Engine Fails To Crank	2-936
2.	Low Engine Oil Pressure (Oil Press Gage Continuously Reads Less Than 35 To 40 psi [241 To 276 kPa] At 1800 To 2100 rpm)	2-968
3.	Excessive Engine Oil Consumption	2-974
4.	Excessive Black Or Gray Exhaust Smoke (Water Temp Gage Reads Over 180°F [82°C])	2-986
5.	Blue Exhaust Smoke (Water Temp Gage Reads Over 180°F [82°C])	2-990
6.	White Exhaust Smoke (Water Temp Gage Reads Over 180°F [82°C])	2-994
7.	Engine Does Not Develop Full Power	2-998
8.	Engine Has No Throttle Response With No Codes Or Code 22	2-1000

2-16. ENGINE TROUBLESHOOTING (CONT).

1. ENGINE FAILS TO CRANK.

INITIAL SETUP

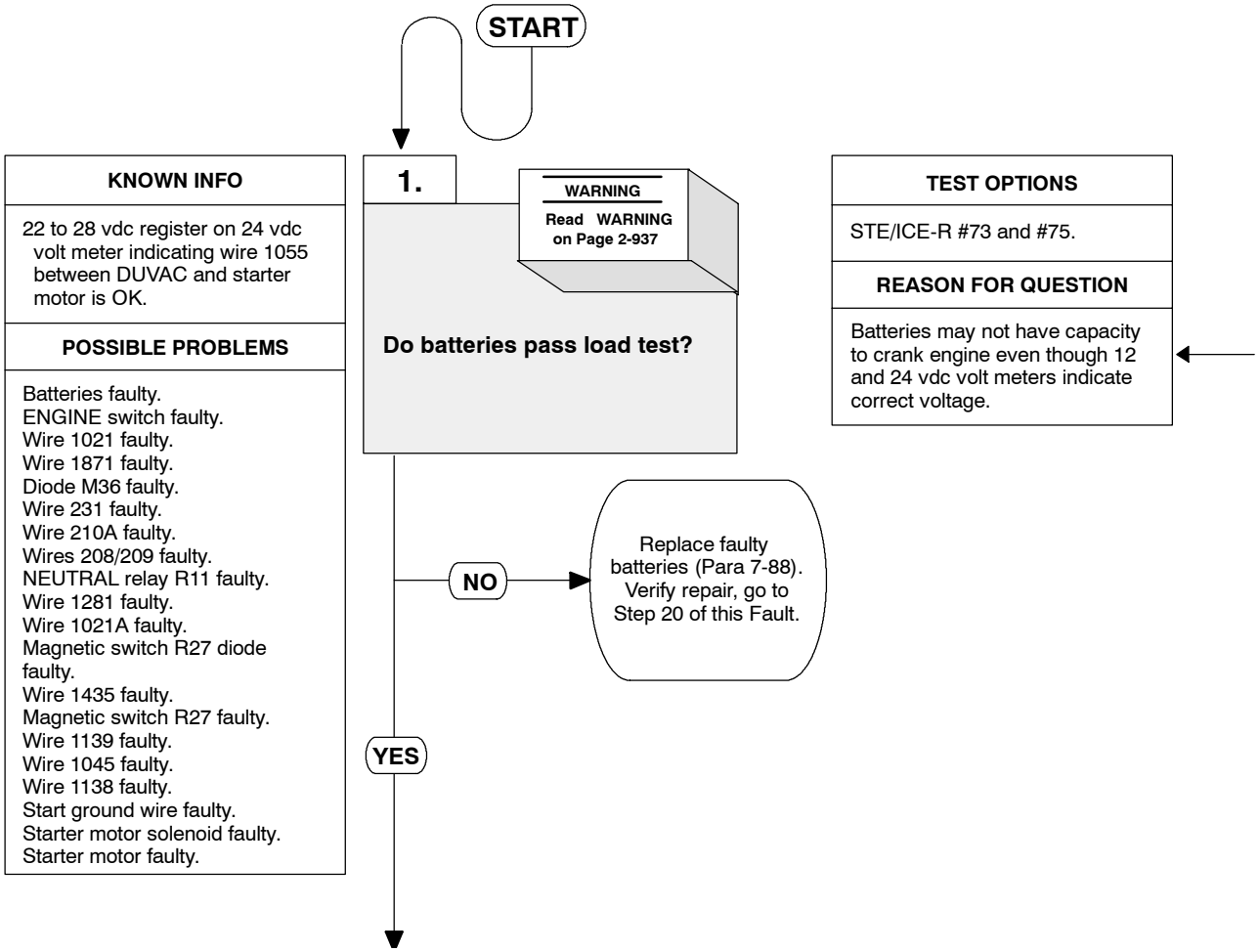
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Remover, Connector (Item 55, Appendix G)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 95, Appendix G)

Materials/Parts
Compound, Corrosion Preventive (Item 34, Appendix C)
Lockwasher (19) (Item 195, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Personnel Required
Two

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

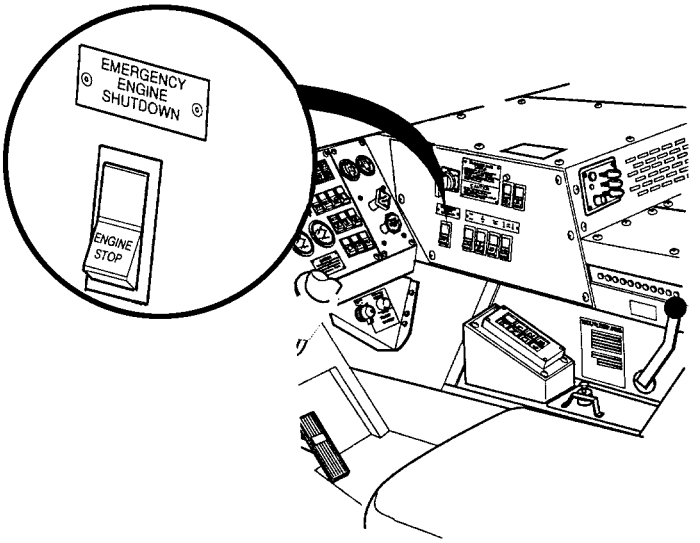


WARNING

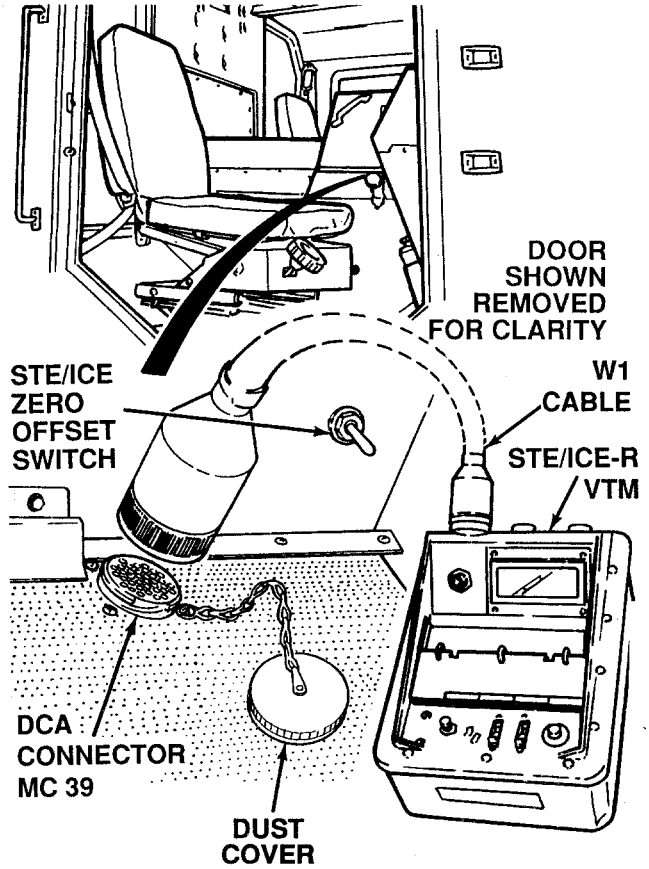
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

STE/ICE-R #73 AND #75

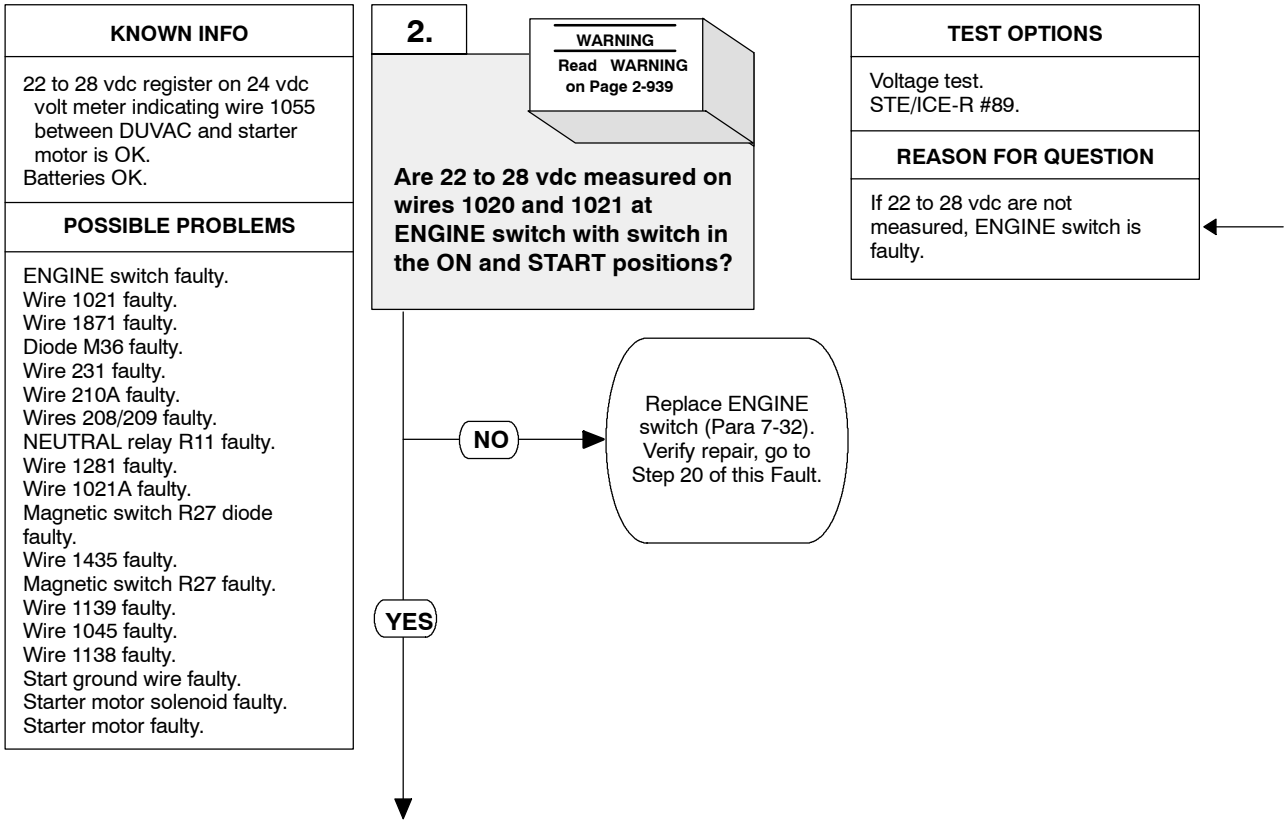
(1) Remove dust cover from DCA connector MC39.
(2) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector MC39.
(3) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(4) Enter the vehicle identification (VID) number (38).
(5) Perform confidence test.
(6) Set STE/ICE-R TEST SELECT switches to #73.
(7) Perform offset test.
(8) Press and release TEST button.
(9) When GO is displayed on the VTM, push down and hold engine stop switch and turn ENGINE switch to START until OFF is displayed on the VTM (TM 9-2320-364-10).
(10) Turn OFF ENGINE switch, release engine stop switch and wait about five seconds.
  (a) If more than 13 miliohms are displayed, perform STE/ICE-R test 73 on each truck battery.
  (b) If 13 miliohms or less are displayed, go to Step (11).
(11) Set STE/ICE-R TEST SELECT switches to 75.
(12) Perform offset test
(13) Press and release TEST button.
(14) When GO is displayed on the VTM, push down and hold engine stop switch and turn ENGINE switch to START until OFF is displayed on the VTM (TM 9-2320-364-10).
(15) Turn OFF ENGINE switch, release engine stop switch and wait about five seconds.
  (a) If more than 25 miliohms/sec are not displayed, perform STE/ICE-R test 75 on each truck battery.
  (b) If 25 miliohms or less/sec. are displayed, batteries are OK.
(16) Disconnect DCA connector.
(17) Install dust cover on STE/ICE-R connector MC39.



STEERING WHEEL SHOWN REMOVED FOR CLARITY



1. ENGINE FAILS TO CRANK (CONT).

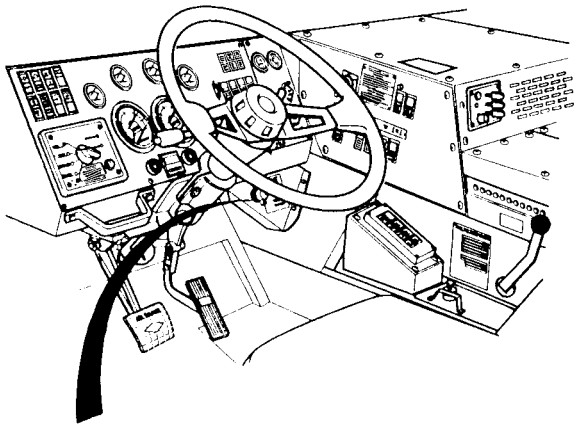


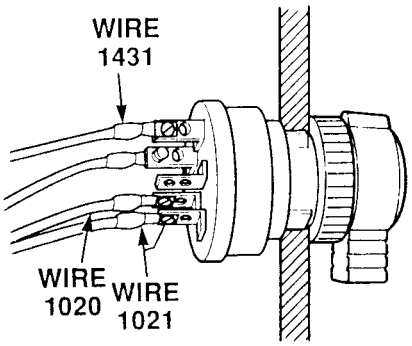
WARNING

22 to 28 vdc are always present on wire 1431 at the ENGINE switch. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

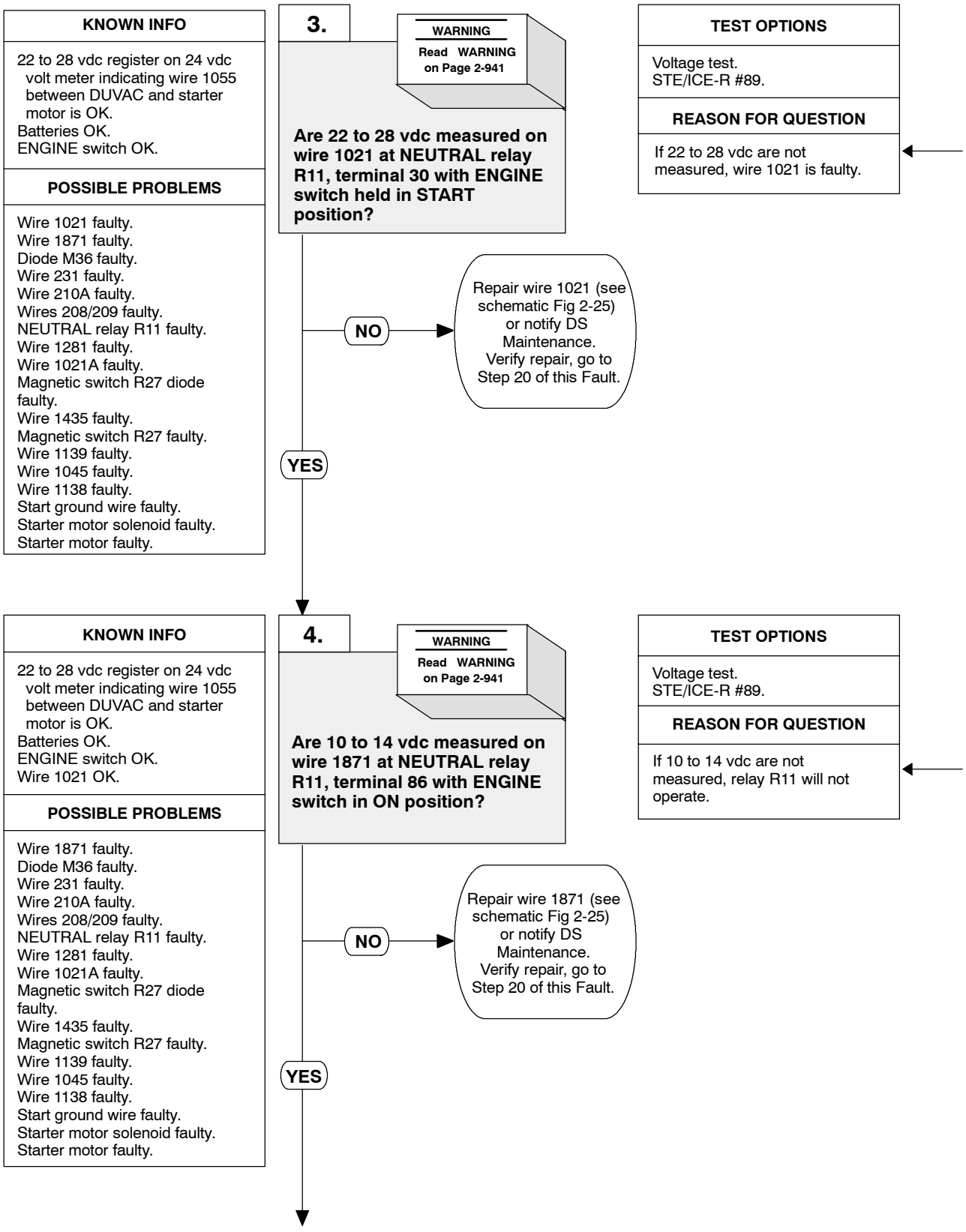
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1020 at ENGINE switch.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace switch (Para 7-32).
    (b) If 22 to 28 vdc are present, go to Step (7) below.
(5) Turn OFF ENGINE switch.
(6) Connect positive (+) multimeter lead to wire 1021 at ENGINE switch.
(7) Turn and hold ENGINE switch to START.
    (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace ENGINE switch (Para 7-32).
    (b) If 22 to 28 vdc are present, ENGINE switch is OK.
(8) Turn OFF ENGINE switch.





1. ENGINE FAILS TO CRANK (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

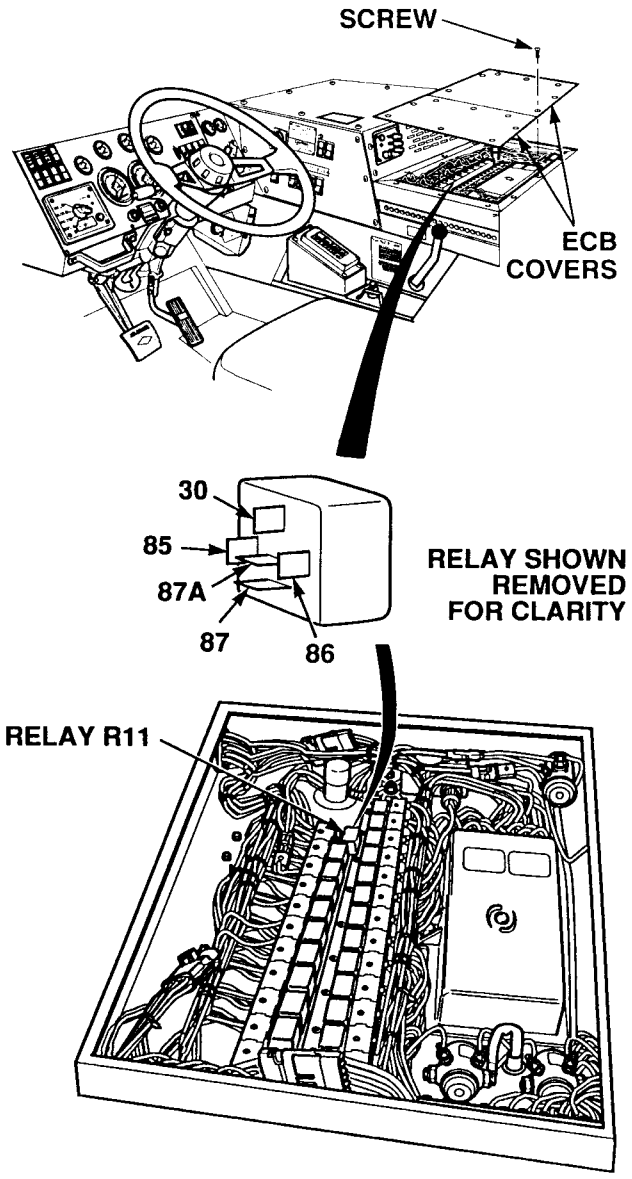
Relay test must be performed with relay partially removed

VOLTAGE TEST

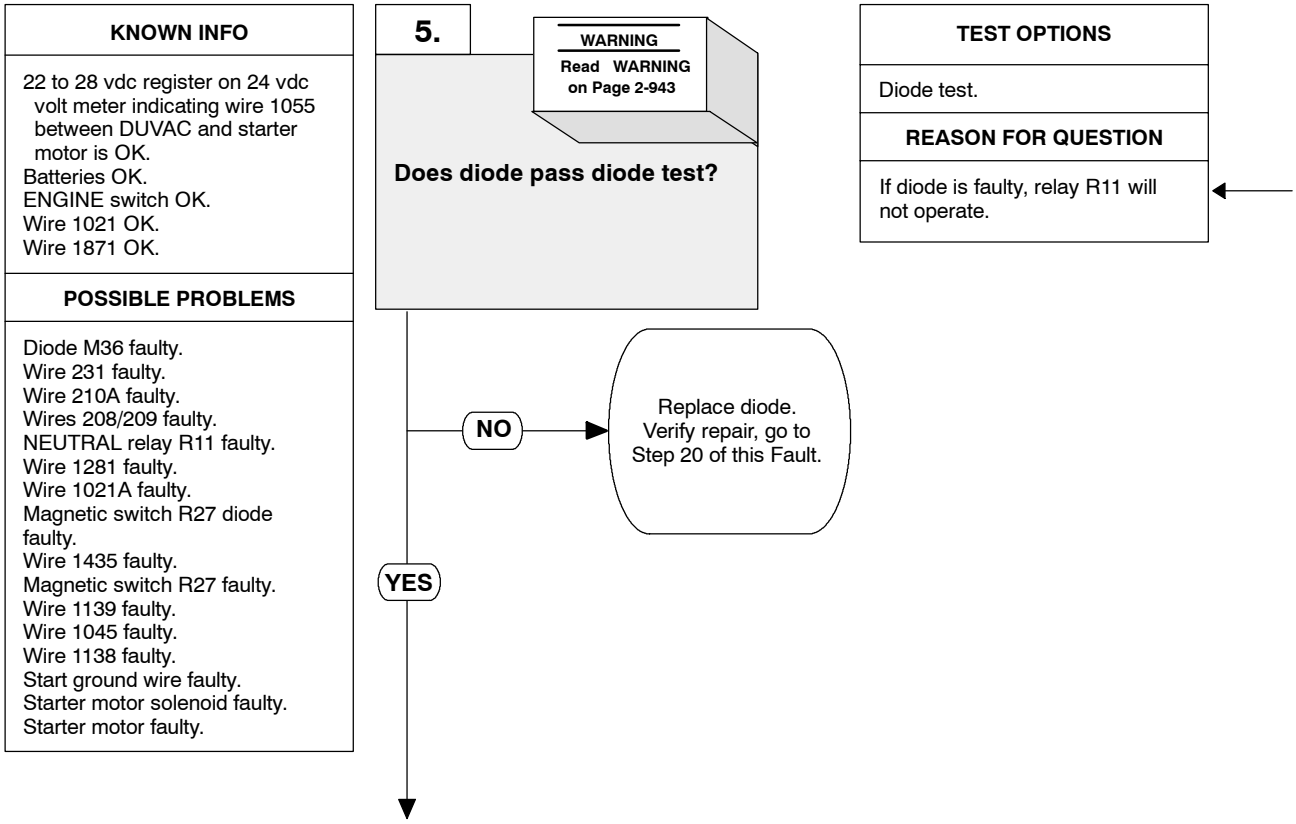
(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1021 at NEUTRAL relay R11, terminal 30.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn and hold ENGINE switch to START position (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1021 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 22 to 24 vdc are present, wire 1021 is OK.
(5) Turn OFF ENGINE switch.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1871 at neutral start relay R11, terminal 86.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1871 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1871 is OK.
(4) Turn OFF ENGINE switch.



1. ENGINE FAILS TO CRANK (CONT).

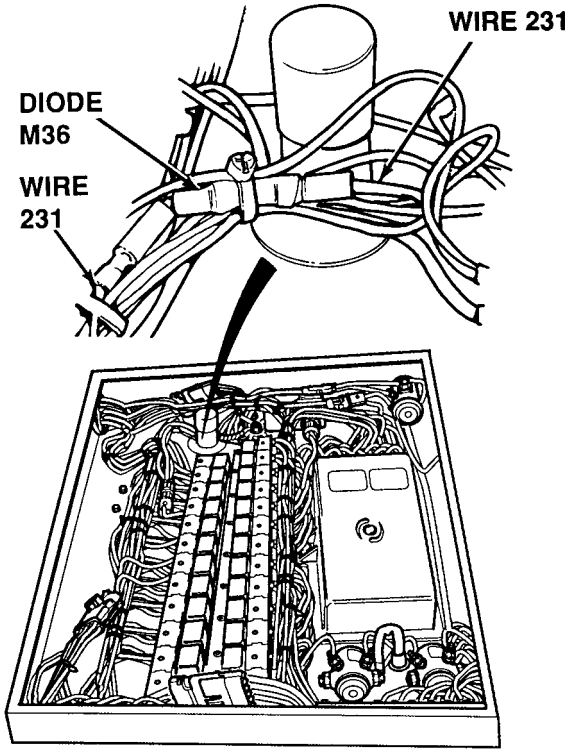


WARNING

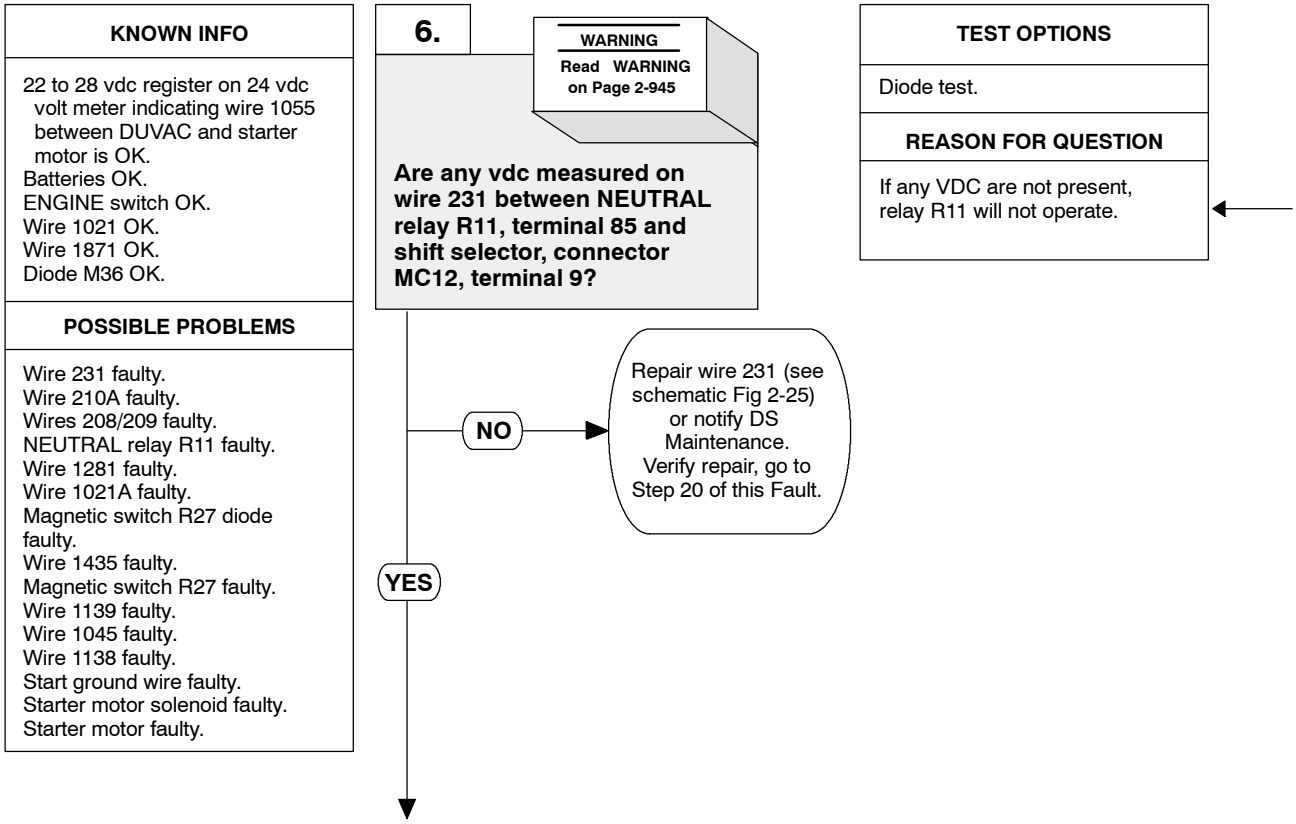
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

DIODE TEST

(1) Tag, mark and disconnect wires 231 from both sides of diode M36.
(2) Set multimeter select switch to diode check position.
(3) Connect positive (+) lead to female end of diode.
(4) Connect negative (–) lead to male end of diode.
  (a) If a vdc is not present, diode is faulty, replace diode.
  (b) If a vdc value is present, go to Step (5).
(5) Connect positive (+) lead to male end of diode.
(6) Connect negative (–) lead to female end of diode.
  (a) If a vdc value is not present, diode is OK.
  (b) If a vdc value is present, diode is faulty, replace diode.



1. ENGINE FAILS TO CRANK (CONT).



WARNING

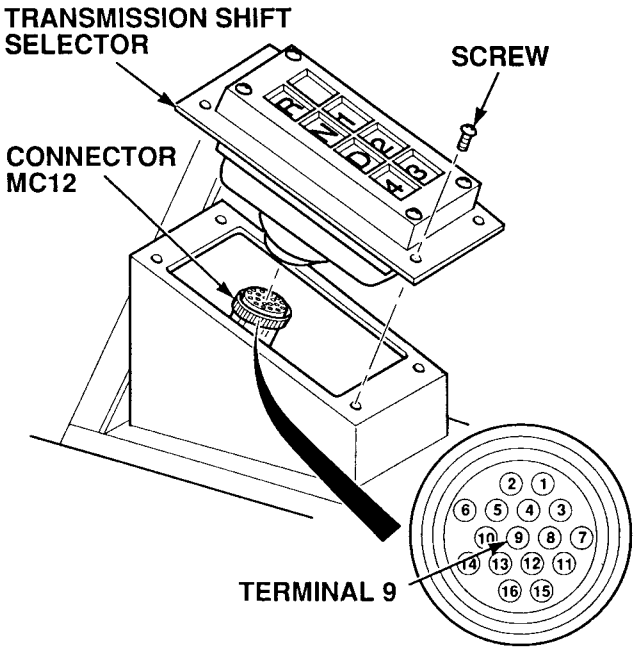
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

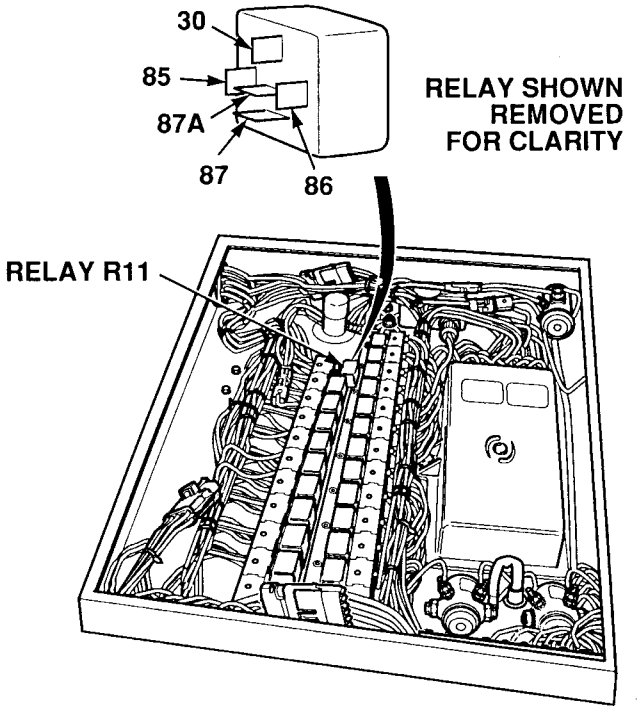
NOTE

Relay test must be performed with relay partially removed.

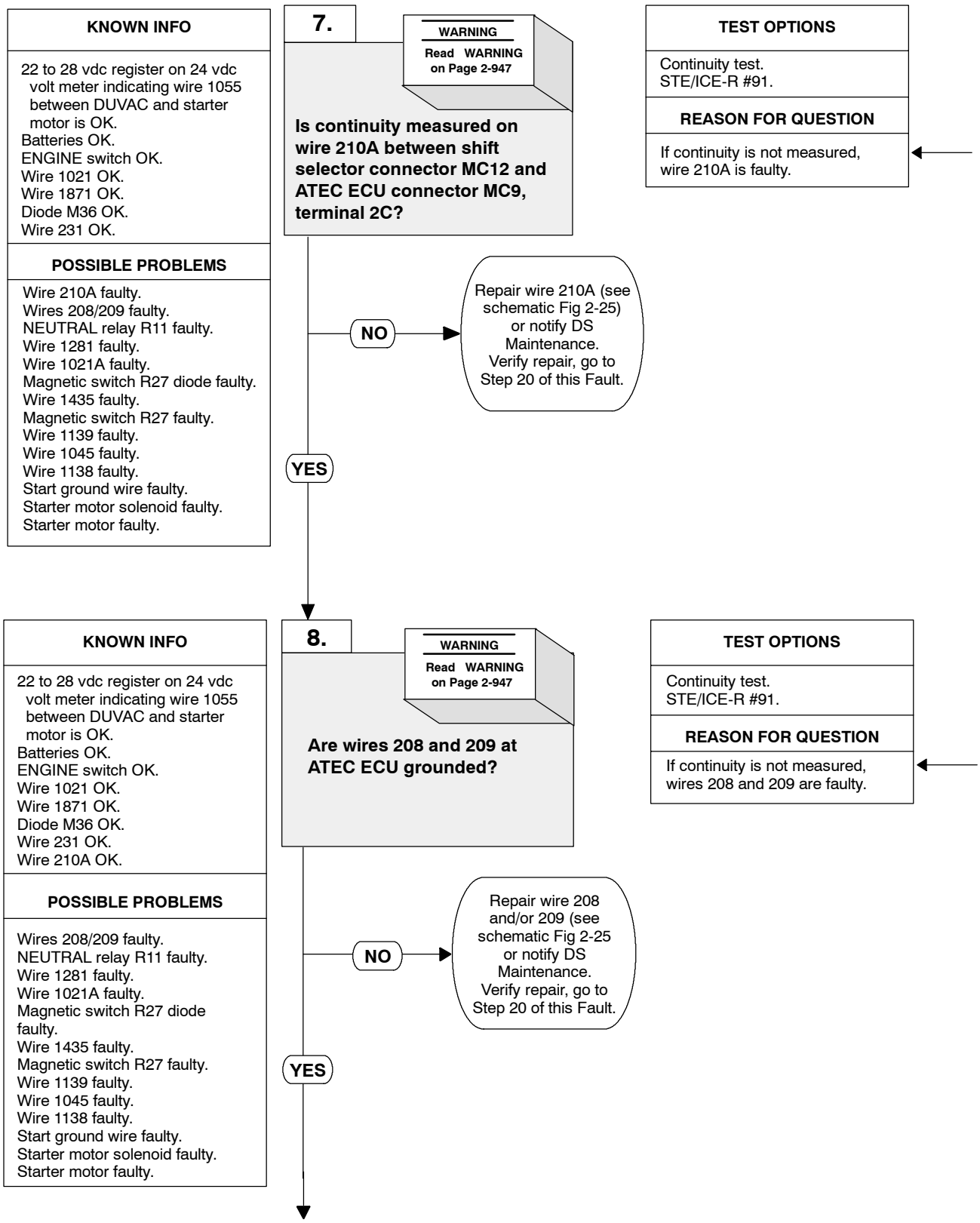
DIODE TEST

(1) Remove four screws and lift transmission shift selector from mounting bracket.
(2) Disconnect shift selector connector MC12 from shift selector.
(3) Set multimeter select switch to diode check.
(4) Connect a jumperwire between shift controller MC12, terminal 9 and a known good ground.
(5) Connect positive (+) multimeter lead to wire 231 at NEUTRAL relay R11, terminal 85.
(6) Connect negative (–) multimeter lead to a known good ground.
  (a) If any vdc are not present, remove jumper and repair wire 231 (see schematic Fig 2-25) or notify DS Maintenance and remove jumper from connector MC12.
  (b) If any vdc are present, wire 231 is OK.
(7) Remove jumper from connector MC12.





1. ENGINE FAILS TO CRANK (CONT).



WARNING

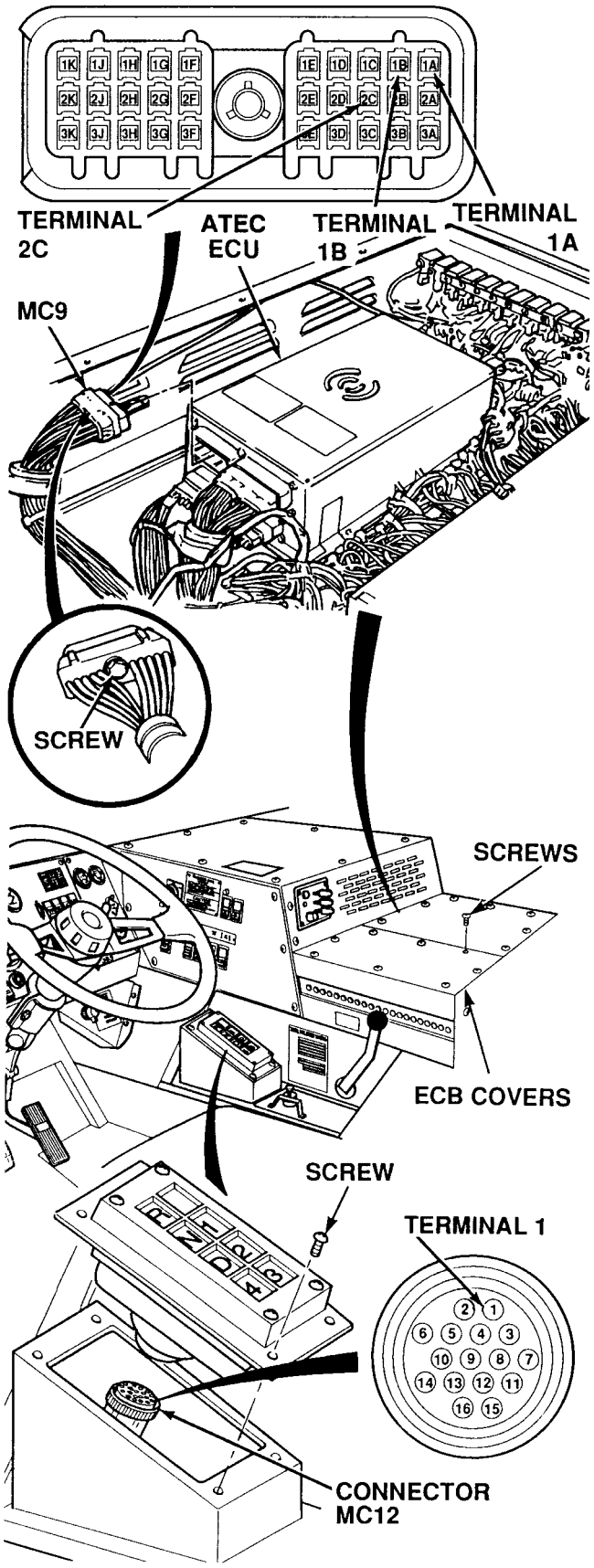
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

CONTINUITY TEST

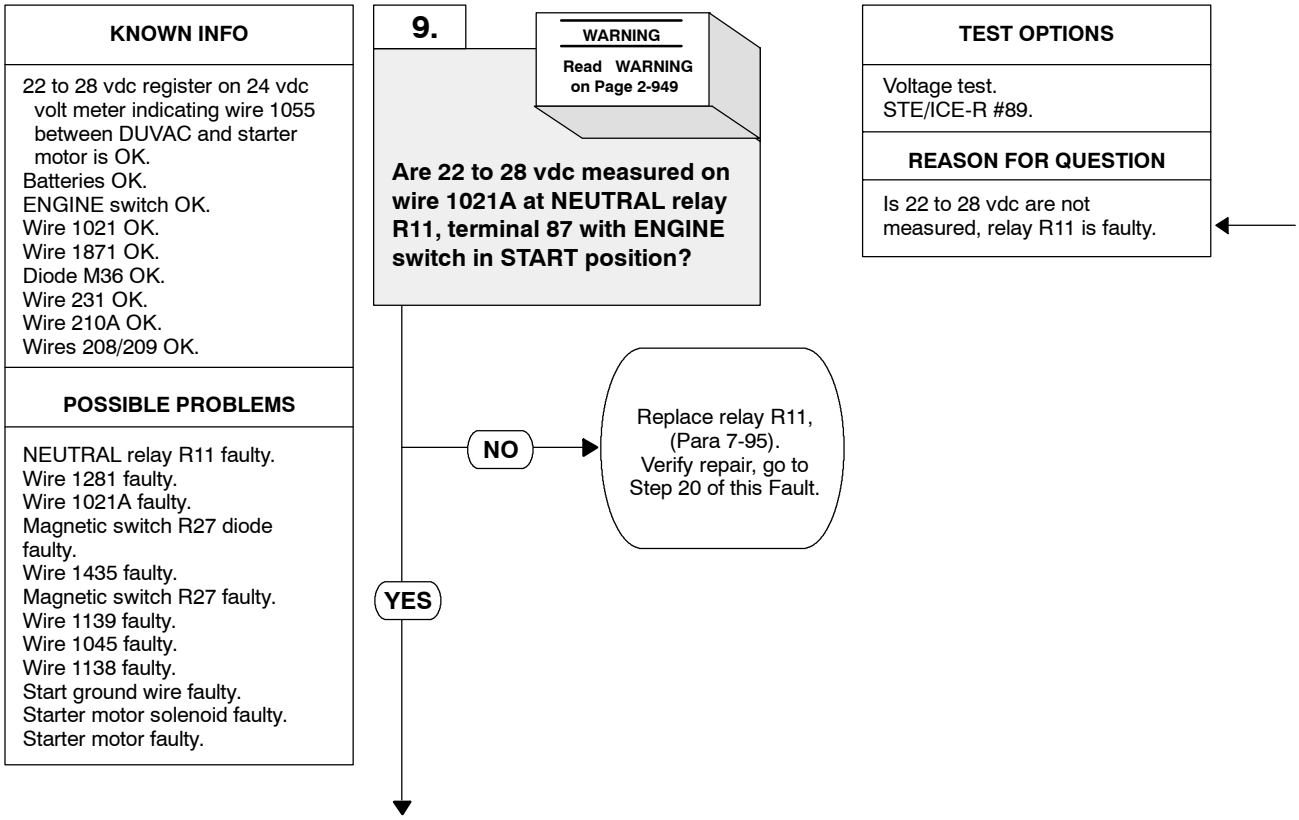
(1) Loosen screw and disconnect connector MC9 from ATEC ECU.
(2) Is there continuity on wire 210A between shift selector connector MC12, terminal 1 and ATEC ECU connector MC9, terminal 2C?
  (a) If there is no continuity, perform Steps (3) and (4) below and repair wire 210A (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If there is continuity, wire 210A is OK.
(3) Connect shift selector connector MC12 to shift selector.
(4) Install shift selector and four screws.

CONTINUITY TEST

(1) Is there continuity on wire 208 between ATEC ECU connector MC9, terminal 1A and a known good ground?
  (a) If there is no continuity, perform Steps (3) and (4) below, and repair wire 208 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If there is continuity, wire 208 is OK.
(2) Is there continuity on wire 209 between ATEC ECU connector MC9, terminal 1B and a known good ground?
  (a) If there is no continuity, perform Steps (3) and (4) below, and repair wire 208 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If there is continuity, wire 209 is OK.
(3) Connect connector MC9 to ATEC ECU and tighten screw.
(4) Install two ECB covers and 15 screws.



1. ENGINE FAILS TO CRANK (CONT).



WARNING

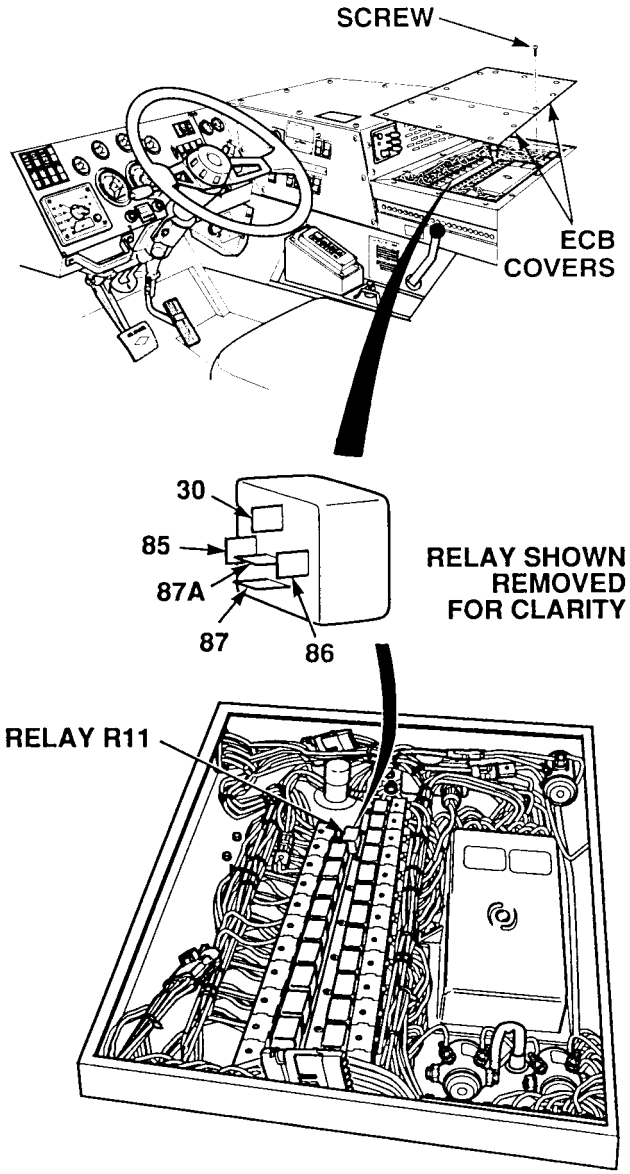
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

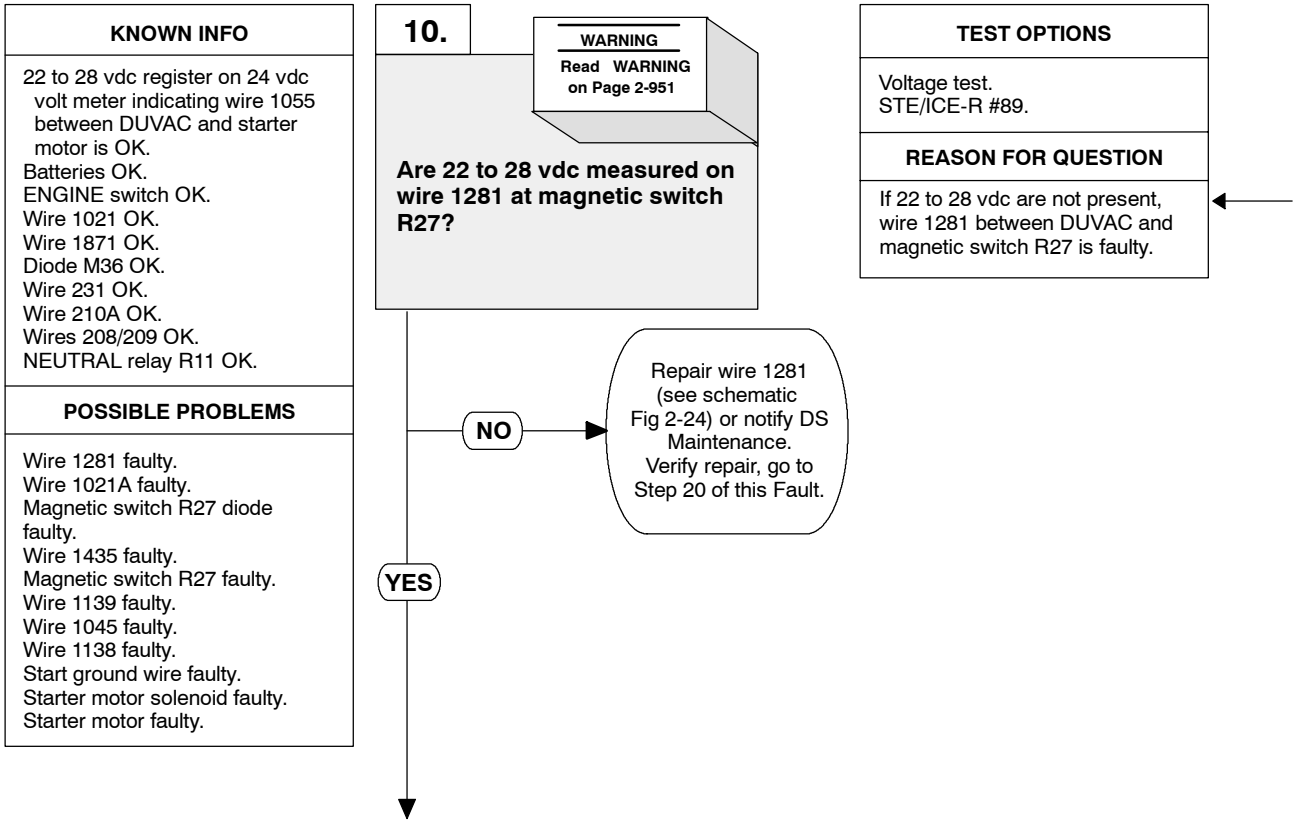
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1021A on NEUTRAL relay R11, terminal 87.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ENGINE switch to START and observe multimeter.
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace NEUTRAL relay R11 (Para 7-95).
  (b) If 22 to 28 vdc are present, NEUTRAL relay R11 is OK.
(5) Turn OFF ENGINE switch.



1. ENGINE FAILS TO CRANK (CONT).

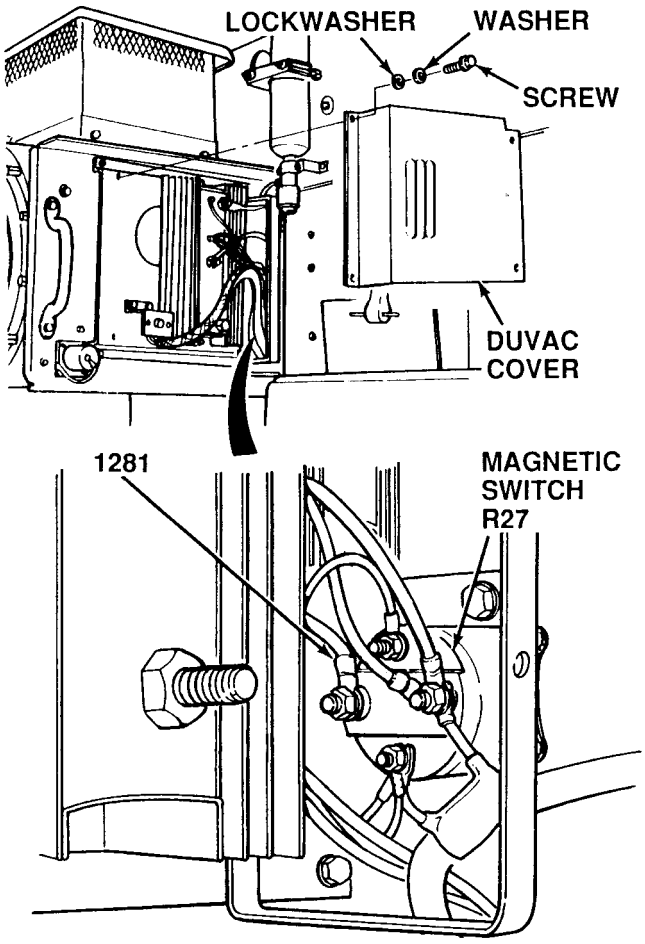


WARNING

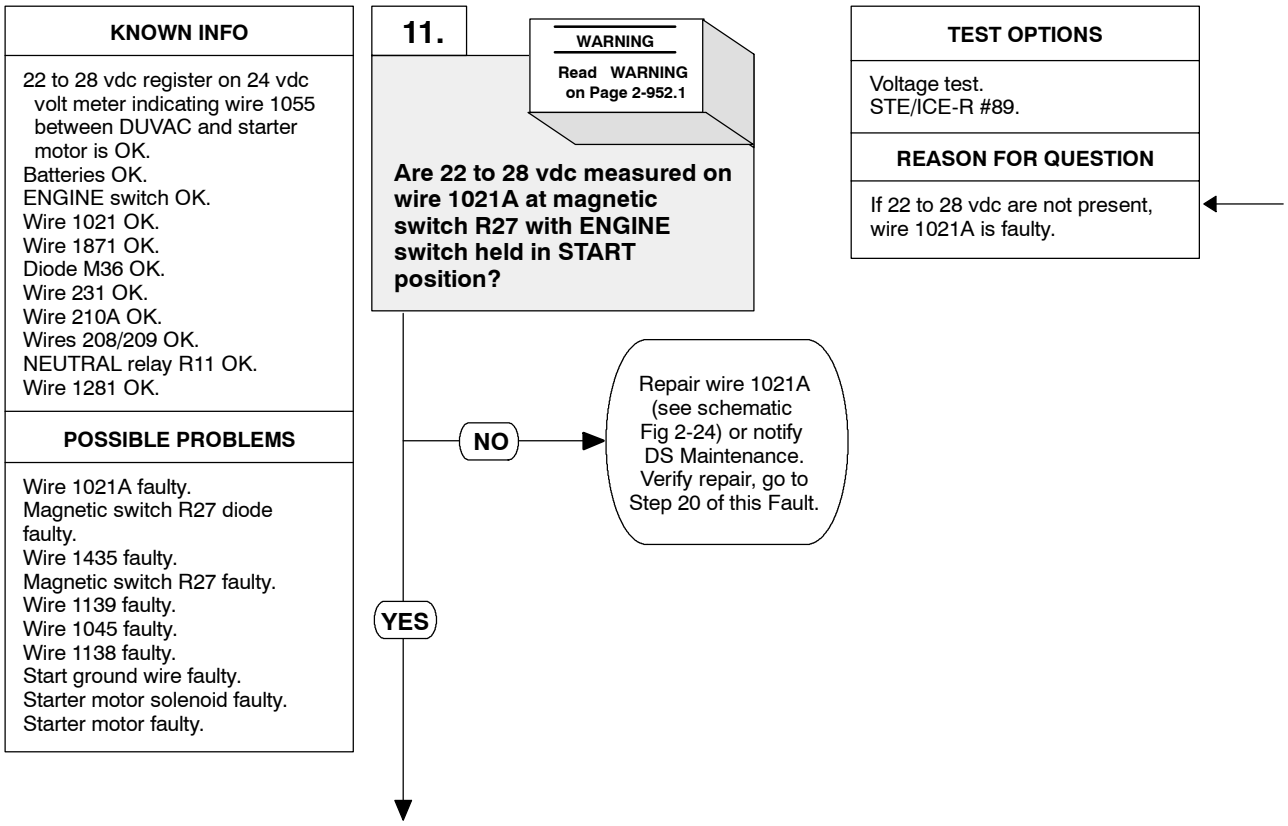
22 to 28 vdc are always present on wire 1281 and DUVAC connectors. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove four screws, washers, lockwashers and DUVAC cover. Discard lockwashers.
(2) Connect positive (+) multimeter lead to wire 1281 magnetic switch R27.
(3) Connect negative (-) multimeter lead to a known good ground.
   (a) If 22 to 28 vdc are not present, repair wire 1281 (see schematic Fig 2-24) or notify DS Maintenance.
   (b) If 22 to 28 vdc are present, wire 1281 is OK.



1. ENGINE FAILS TO CRANK (CONT).

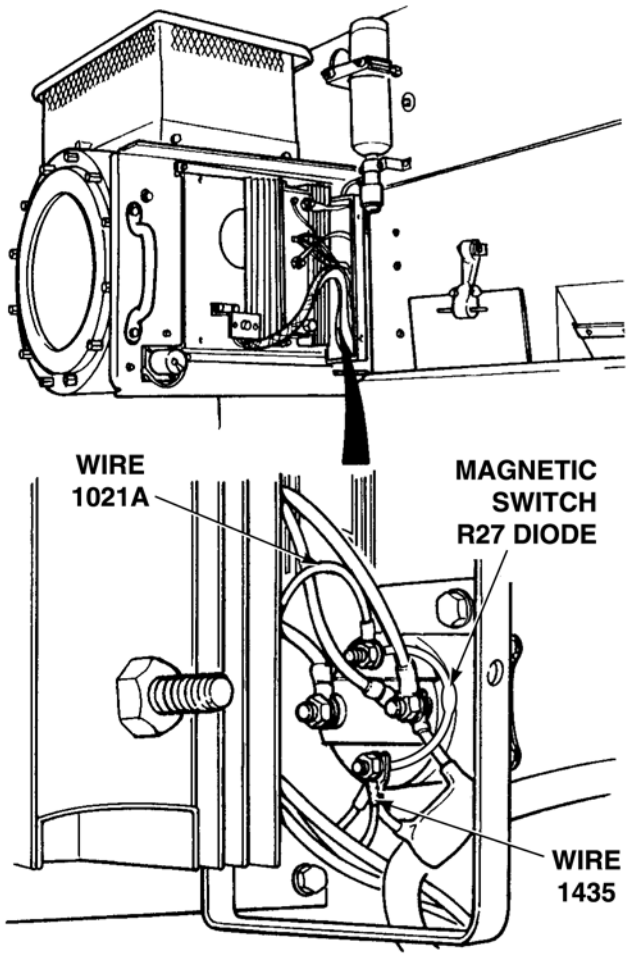


WARNING

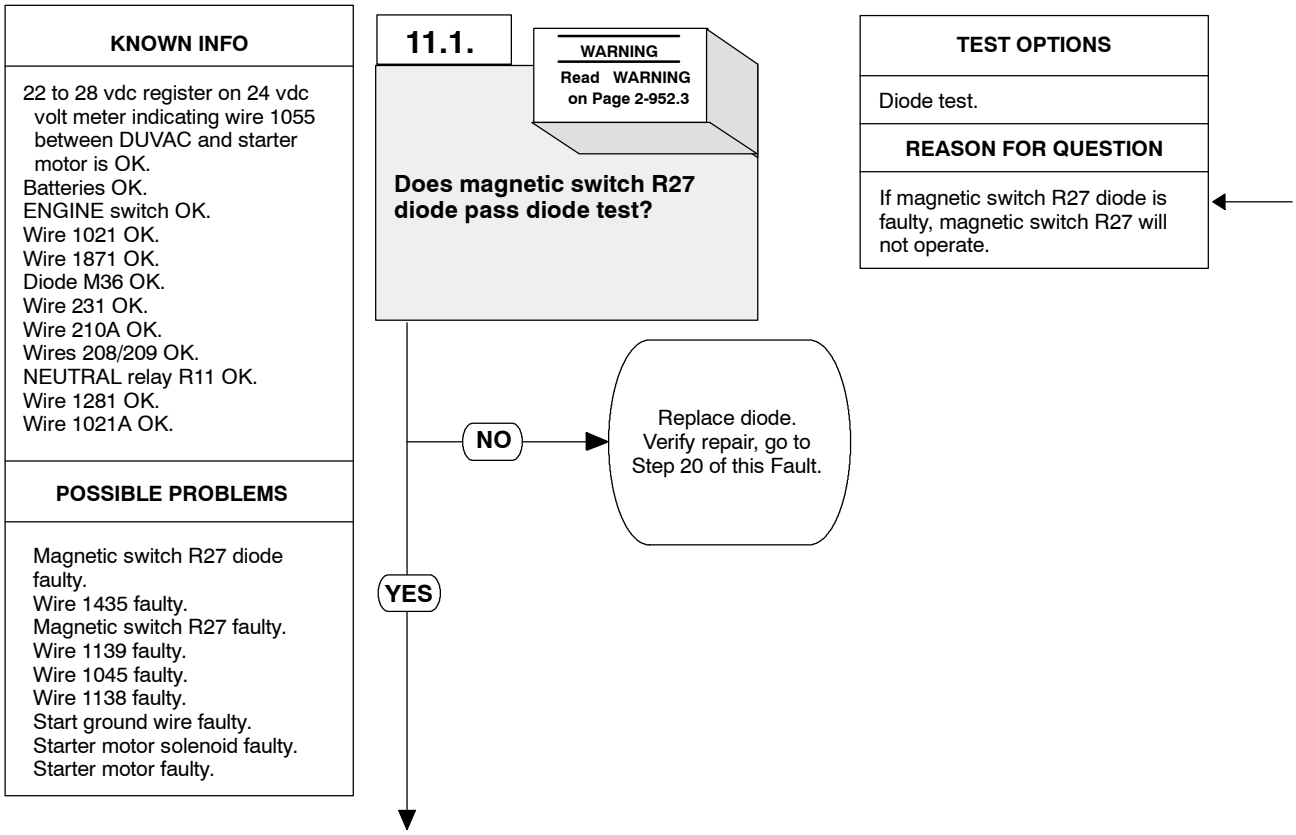
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1021A at magnetic switch R27.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) While assistant holds ENGINE switch in START position, observe multimeter (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1021A (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1021A is OK.
(4) Turn OFF ENGINE switch.



1. ENGINE FAILS TO CRANK (CONT).

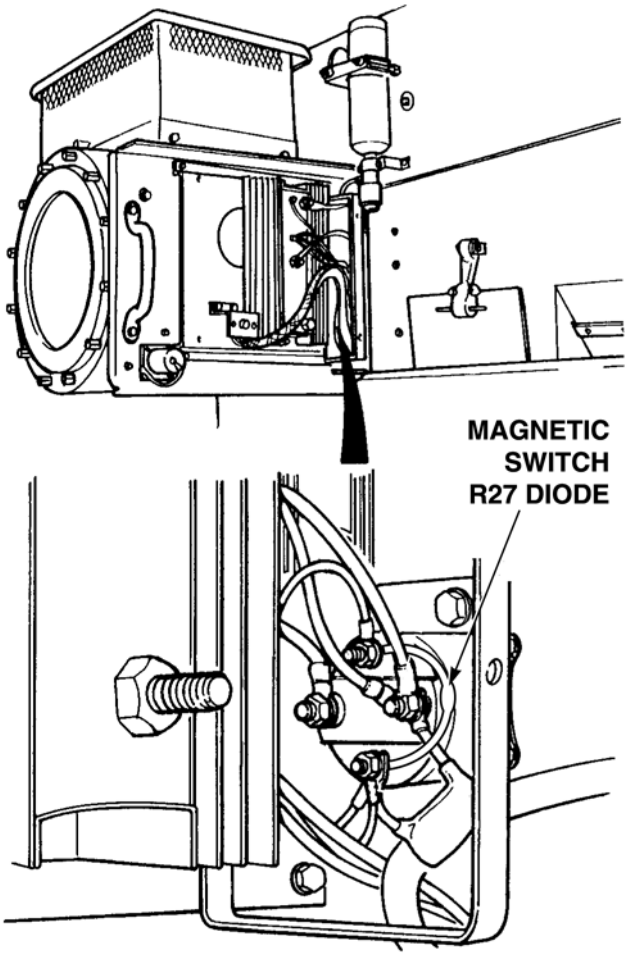


WARNING

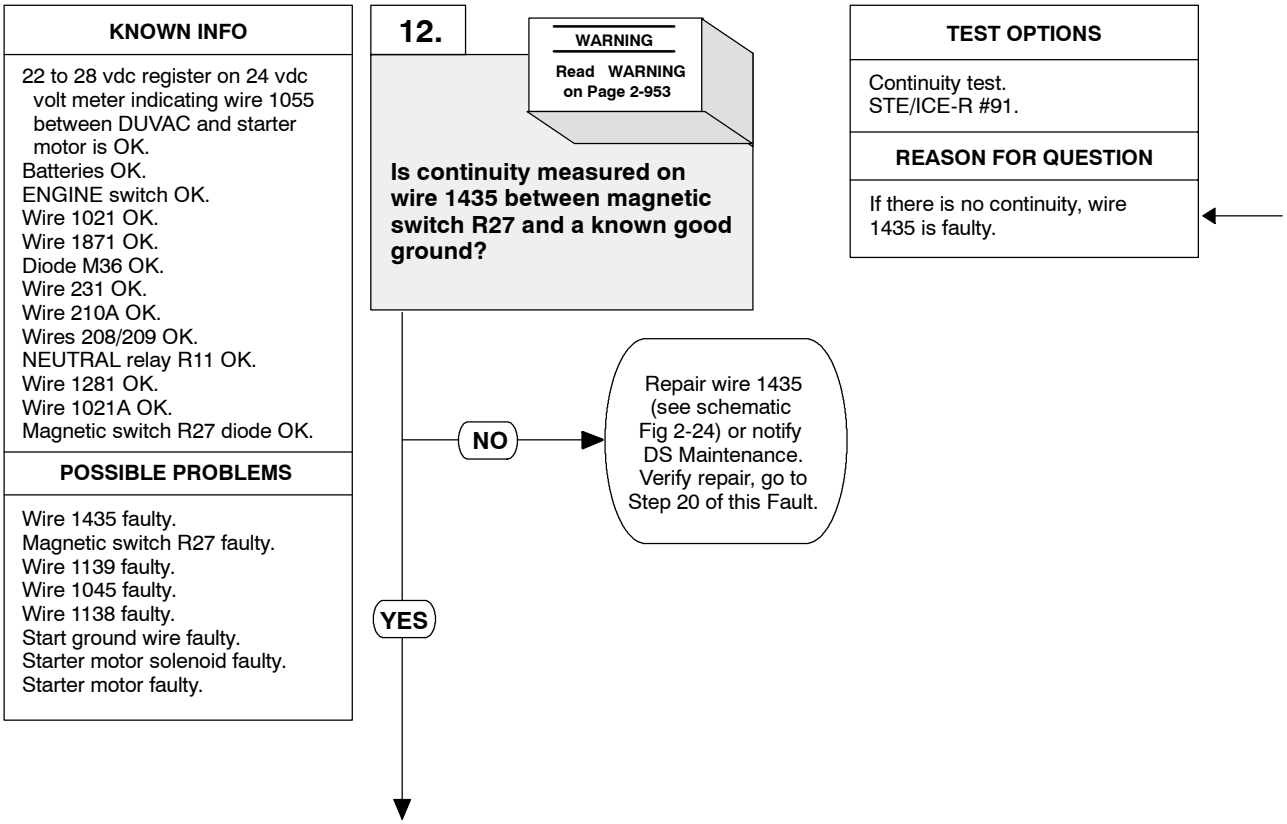
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

DIODE TEST

(1) Remove magnetic switch R27 diode (Para 7-9).
(2) Set multimeter select switch to diode check position.
(3) Connect positive (+) lead to female end of diode.
(4) Connect negative (-) lead to male end of diode.
  (a) If a vdc is not present, diode is faulty, replace diode.
  (b) If a vdc value is present, go to Step (5).
(5) Connect positive (+) lead to male end of diode.
(6) Connect negative (-) lead to female end of diode.
  (a) If a vdc value is not present, diode is OK.
  (b) If a vdc value is present, diode is faulty, replace diode.
(7) Install magnetic switch R27 diode (Para 7-9).

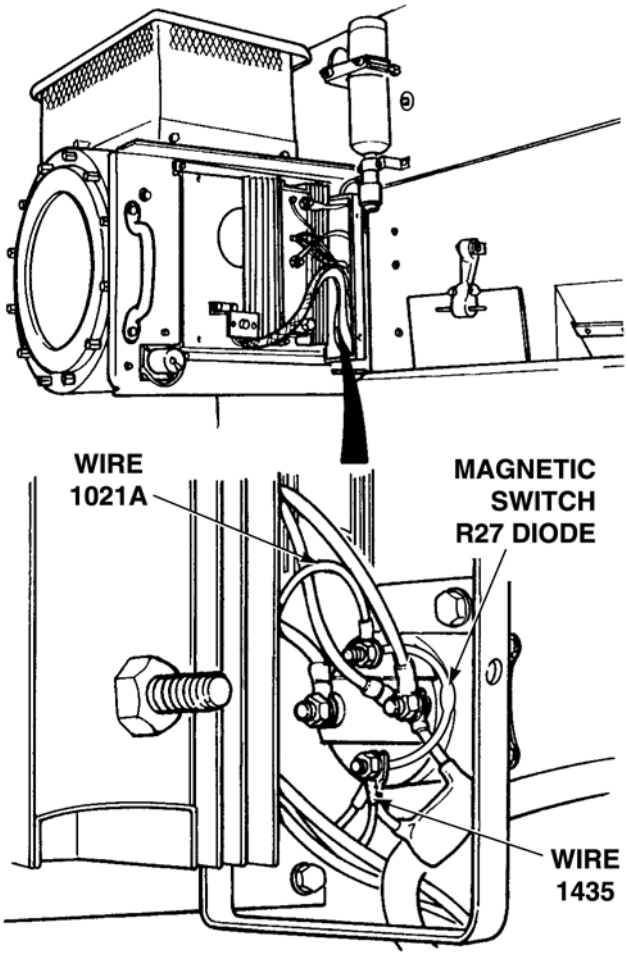


1. ENGINE FAILS TO CRANK (CONT).



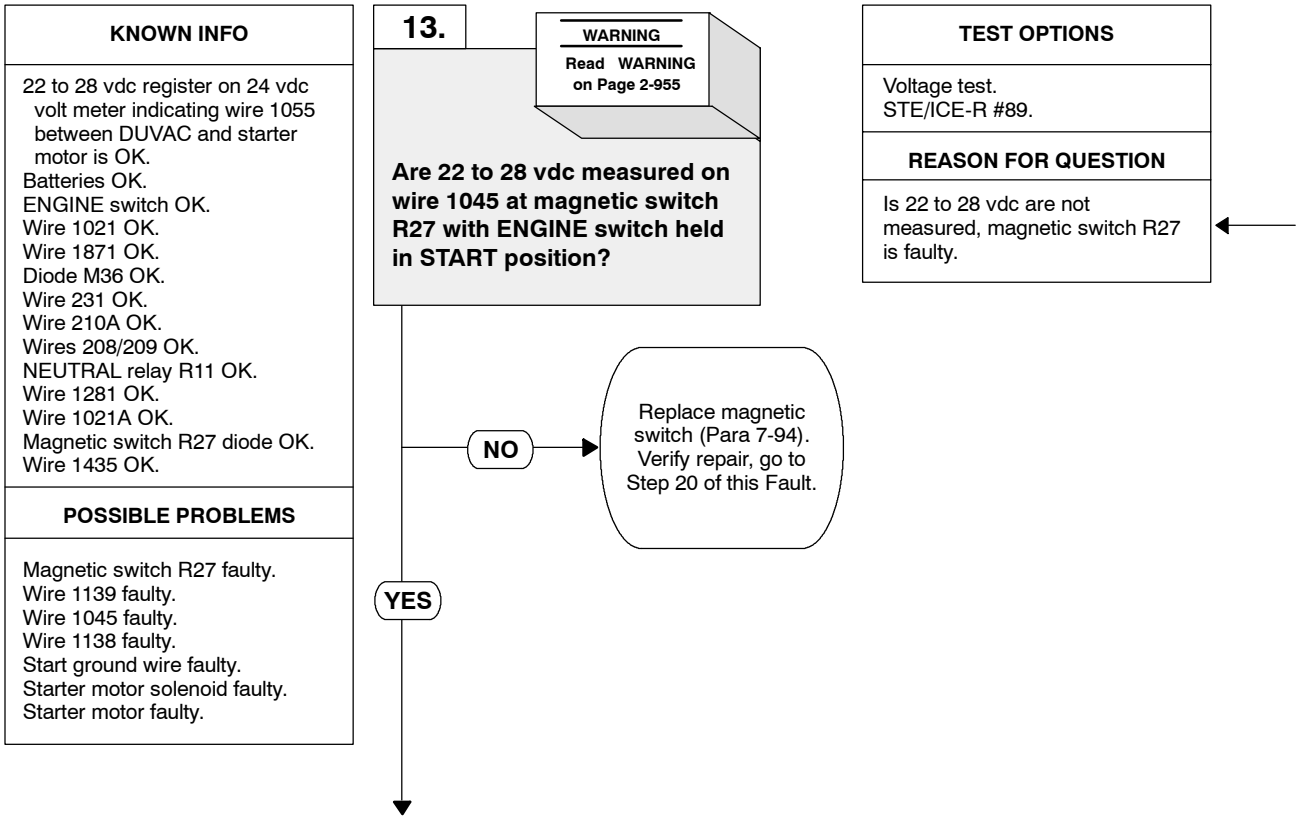
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



CONTINUITY TEST
(1) Set multimeter select switch to ohms. (2) Is there continuity between wire 1435 at magnetic switch R27 and a known good ground? (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-24) or notify DS Maintenance. (b) If there is continuity, wire 1435 is OK.

1. ENGINE FAILS TO CRANK (CONT).

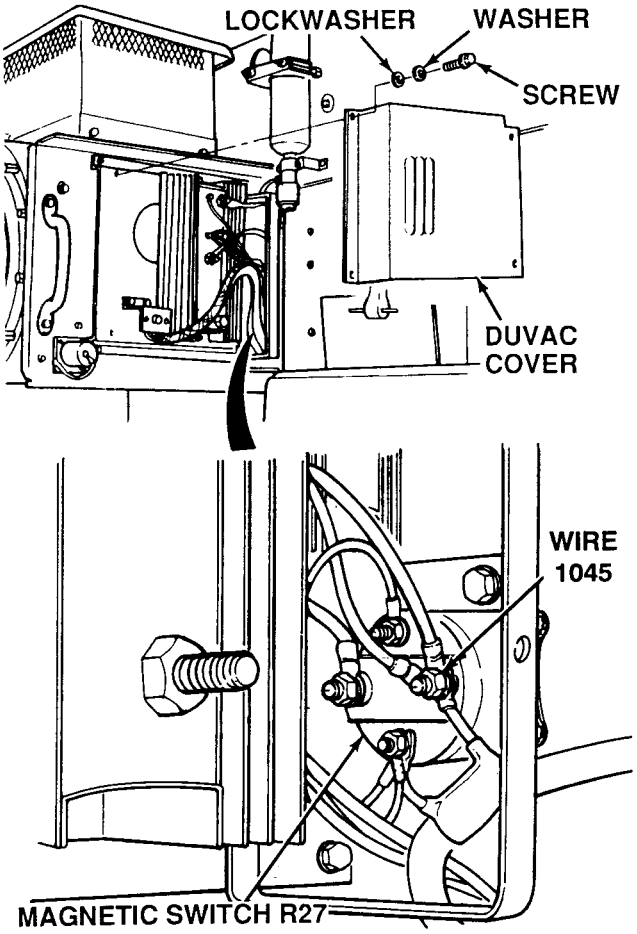


WARNING

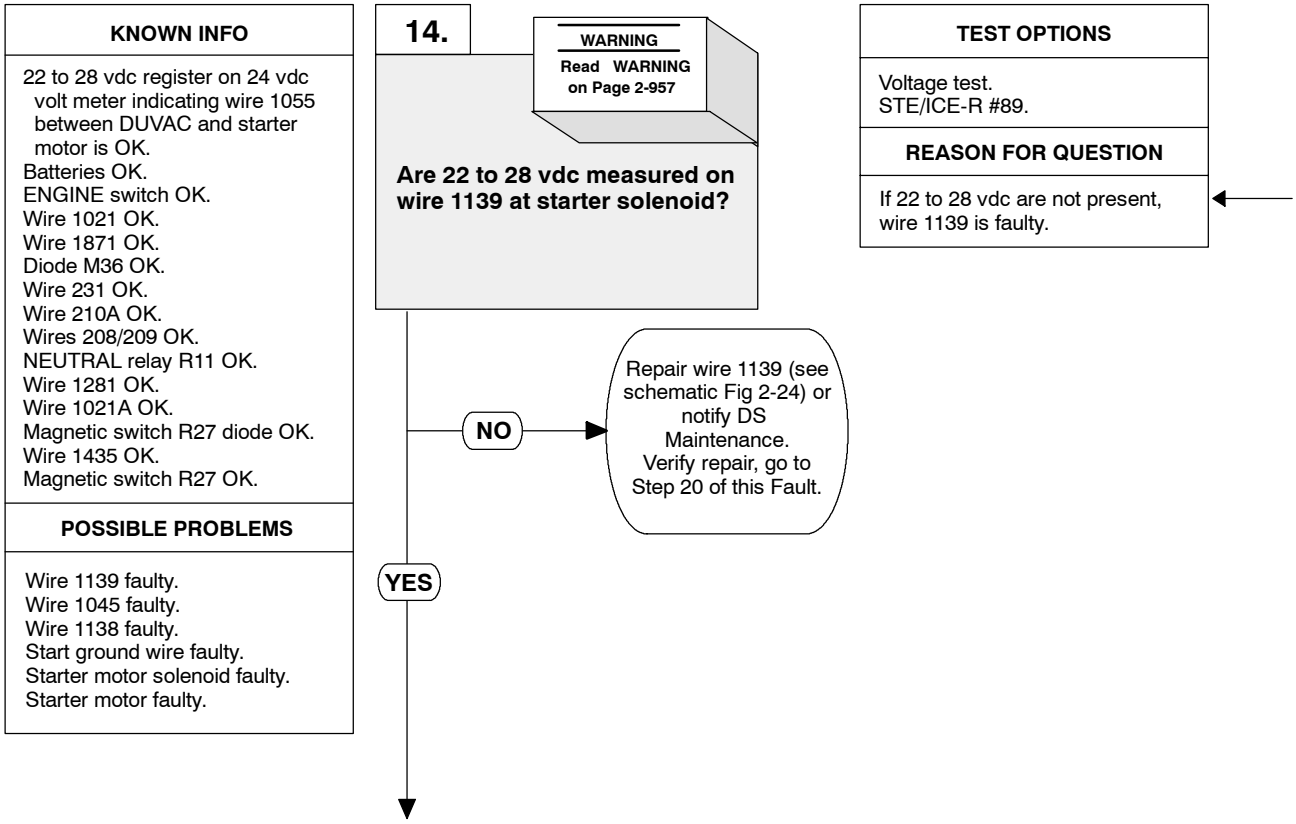
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1045 at magnetic switch R27.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) While assistant holds ENGINE switch in START position (TM 9-2320-364-10), observe multimeter.
    (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace magnetic switch (Para 7-94).
    (b) If 22 to 28 vdc are present, magnetic switch R27 is OK.
(5) Turn OFF ENGINE switch.
(6) Install four screws, washers, lockwashers and DUVAC cover.



1. ENGINE FAILS TO CRANK (CONT).

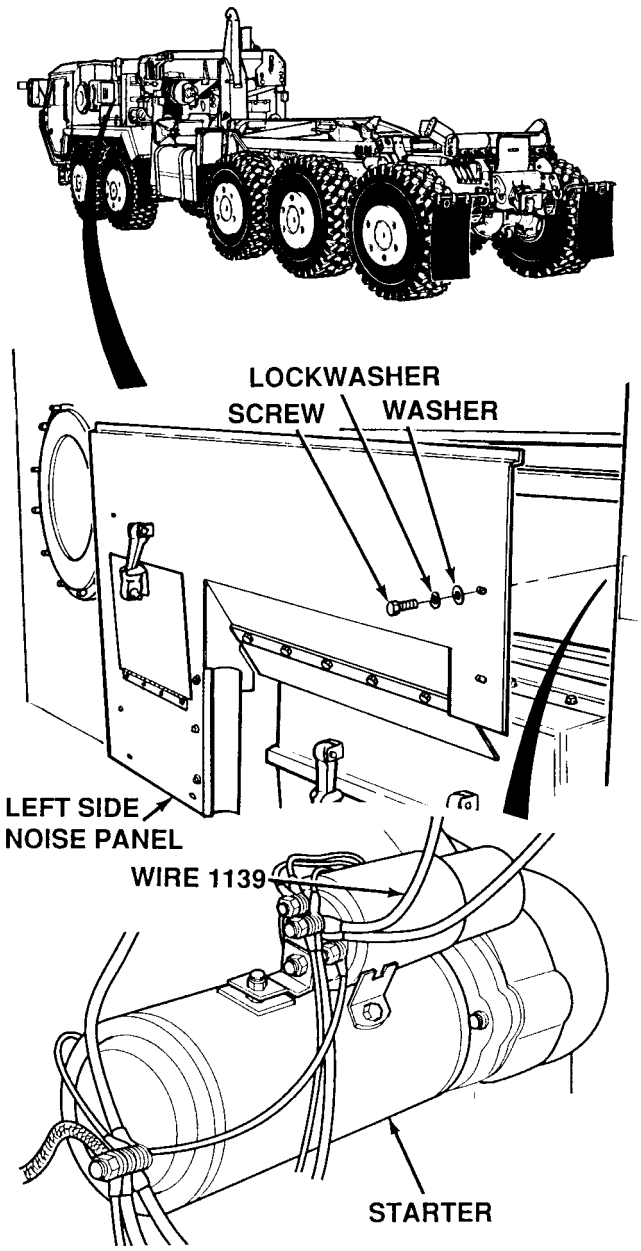


WARNING

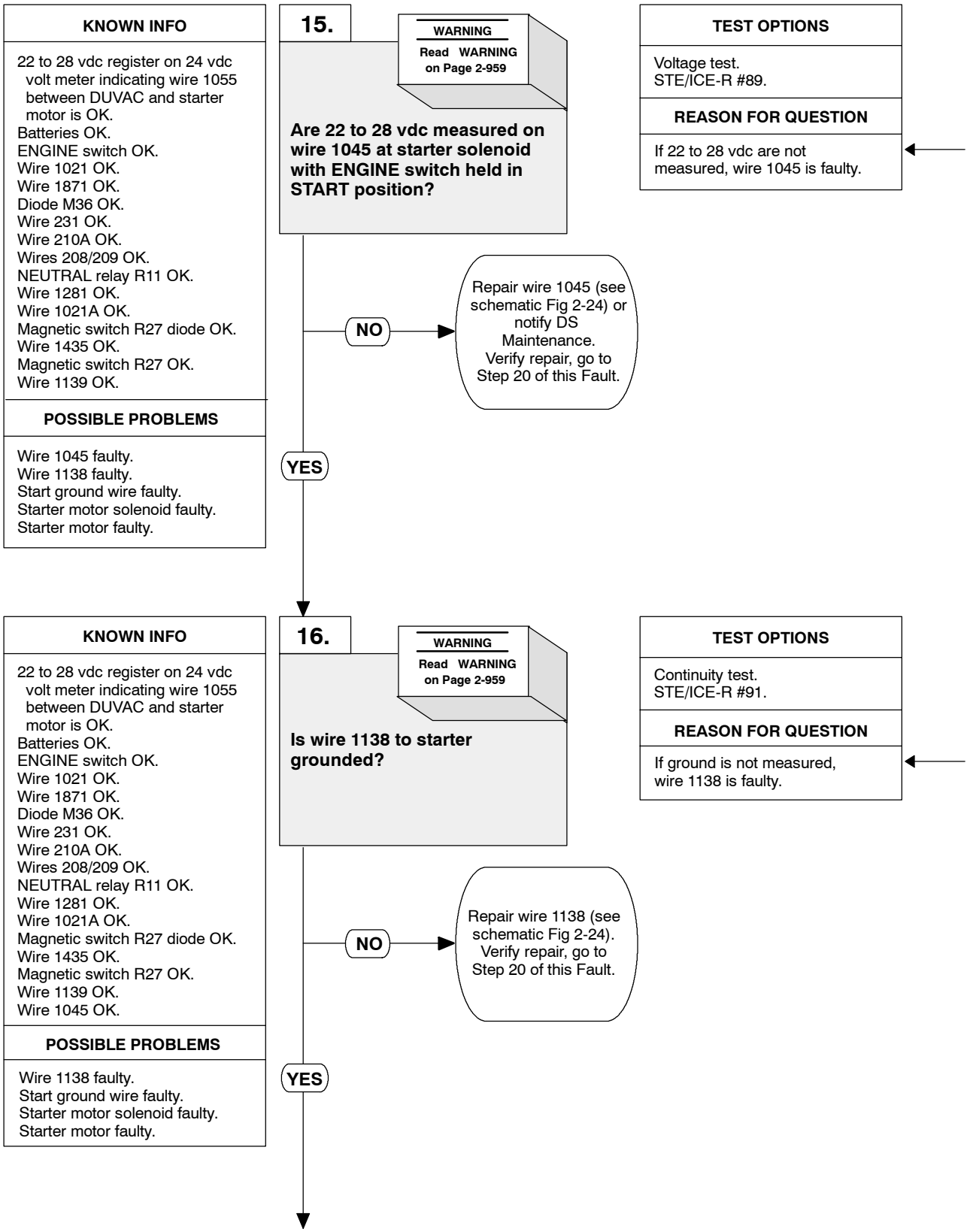
22 to 28 vdc are always present on wire 1139 at starter solenoid. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove 15 screws, washers, lockwashers and left side noise panel. Discard lockwashers.
(2) Connect positive (+) multimeter lead to wire 1139 at starter solenoid.
(3) Connect negative (–) multimeter lead to a known good ground.
  (a) If 22 to 28 vdc are not present, repair wire 1139 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1139 is OK.



1. ENGINE FAILS TO CRANK (CONT).

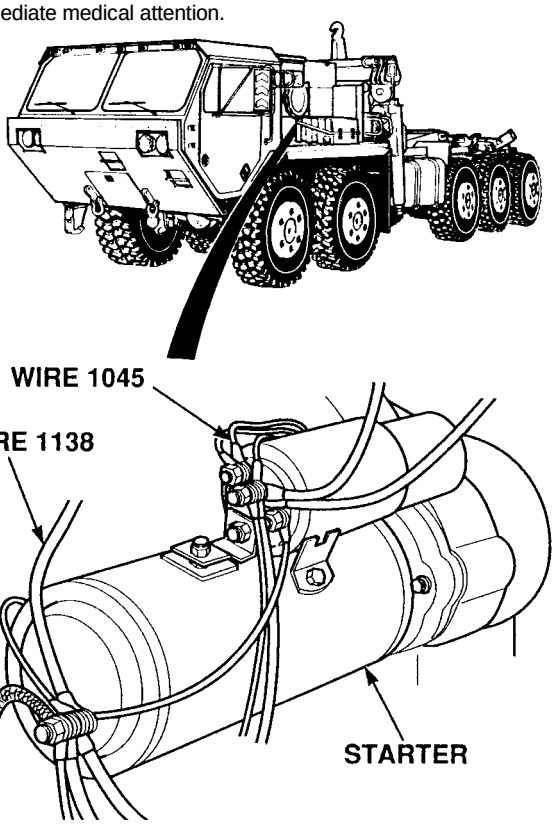


WARNING

- 22 to 28 vdc are always present on wire 1139 at starter solenoid. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Corrosion inhibitor contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1045 at starter solenoid.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) While assistant holds ENGINE switch in START position (TM 9-2320-364-10), observe multimeter.
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1045 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1045 is OK.
(4) Turn OFF ENGINE switch.

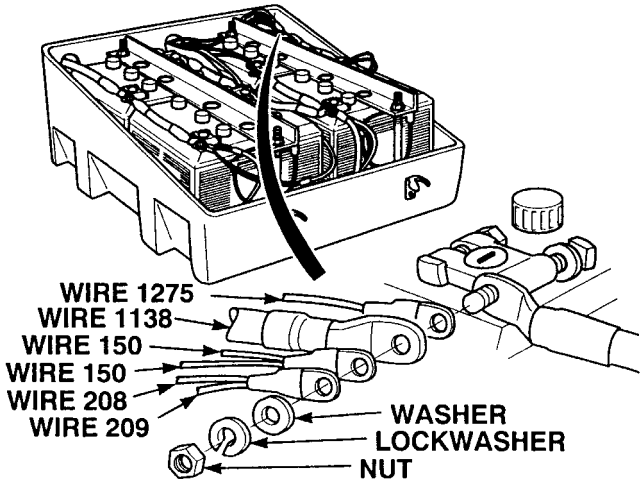


CAUTION

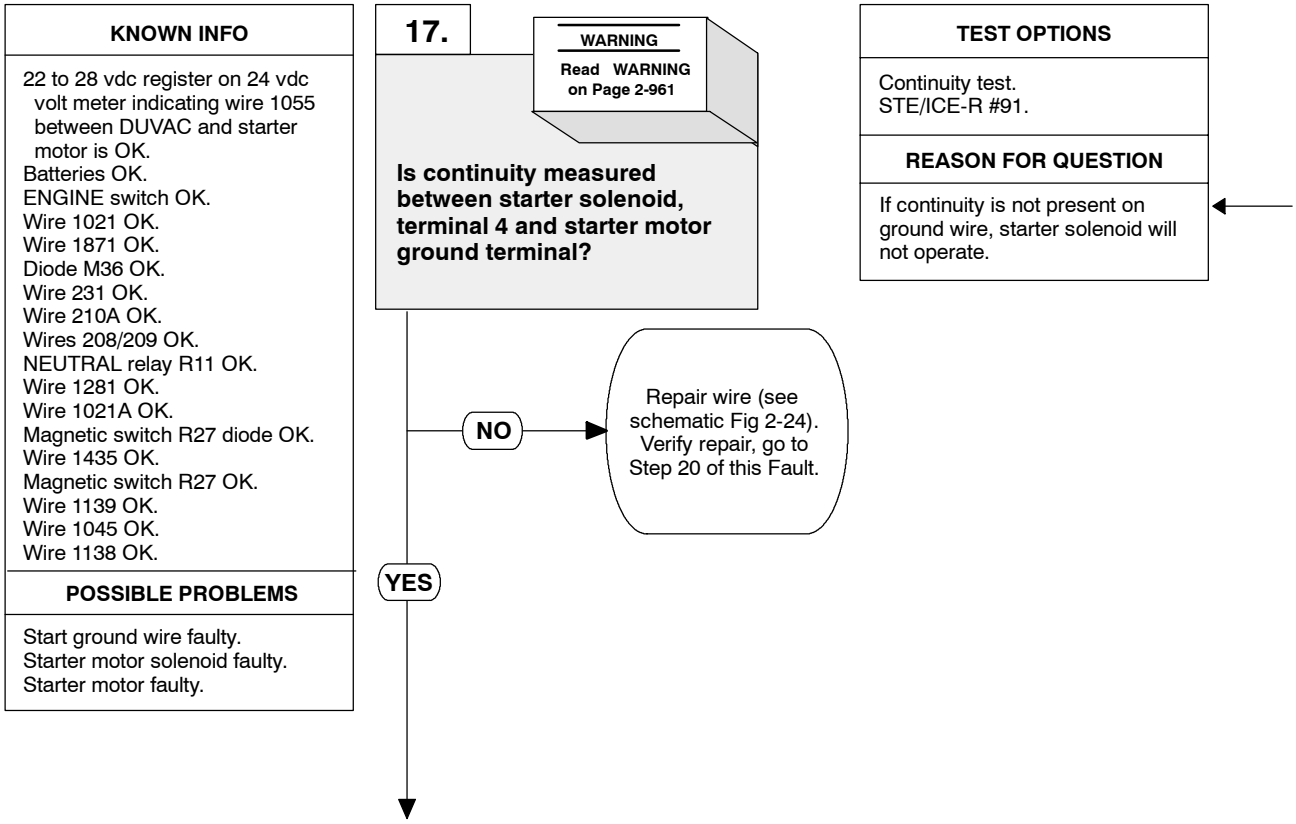
While applying torque to nut, hold screw with wrench or damage to battery may occur.

CONTINUITY TEST

(1) Disconnect wire 1138 from battery 4 (Para 7-90 or 7-91).
(2) Set multimeter selector switch to ohms.
(3) Is there continuity on wire 1138 between starter motor and end of wire?
  (a) If there is no continuity, repair wire 1138 (see schematic Fig 2-24) and perform Step (4) below.
  (b) If there is continuity, wire 1138 is OK.
(4) Connect wire 1138 on battery 4.
(5) Tighten nut to 23 lb-ft (31 N·m).
(6) Apply corrosion preventive compound on nut.



1. ENGINE FAILS TO CRANK (CONT).



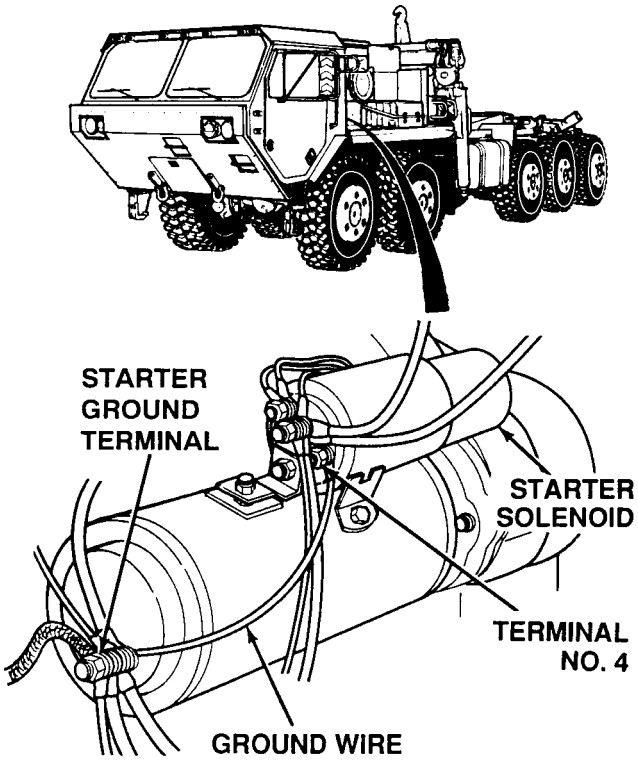
WARNING

22 to 28 vdc are always present on wire 1139 at starter solenoid. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

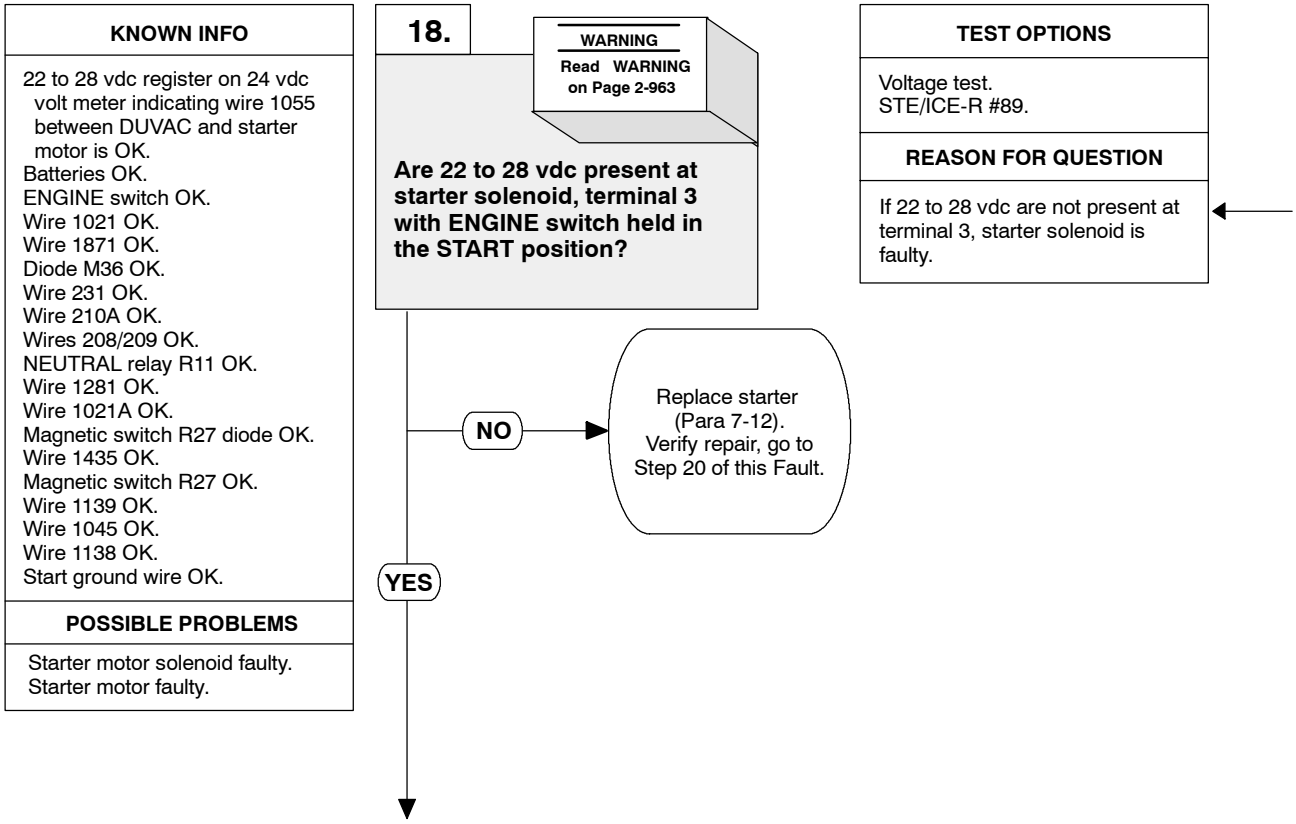
CONTINUITY TEST

Is there continuity on ground wire between starter solenoid, terminal 4 and starter motor ground terminal?

(1) If there is no continuity, replace ground wire.
(2) If there is continuity, ground wire is OK.



1. ENGINE FAILS TO CRANK (CONT).

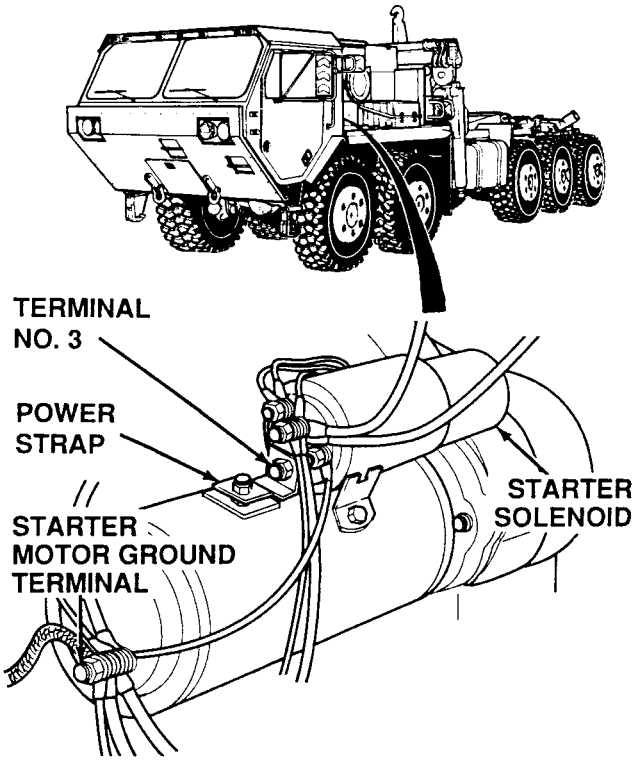


WARNING

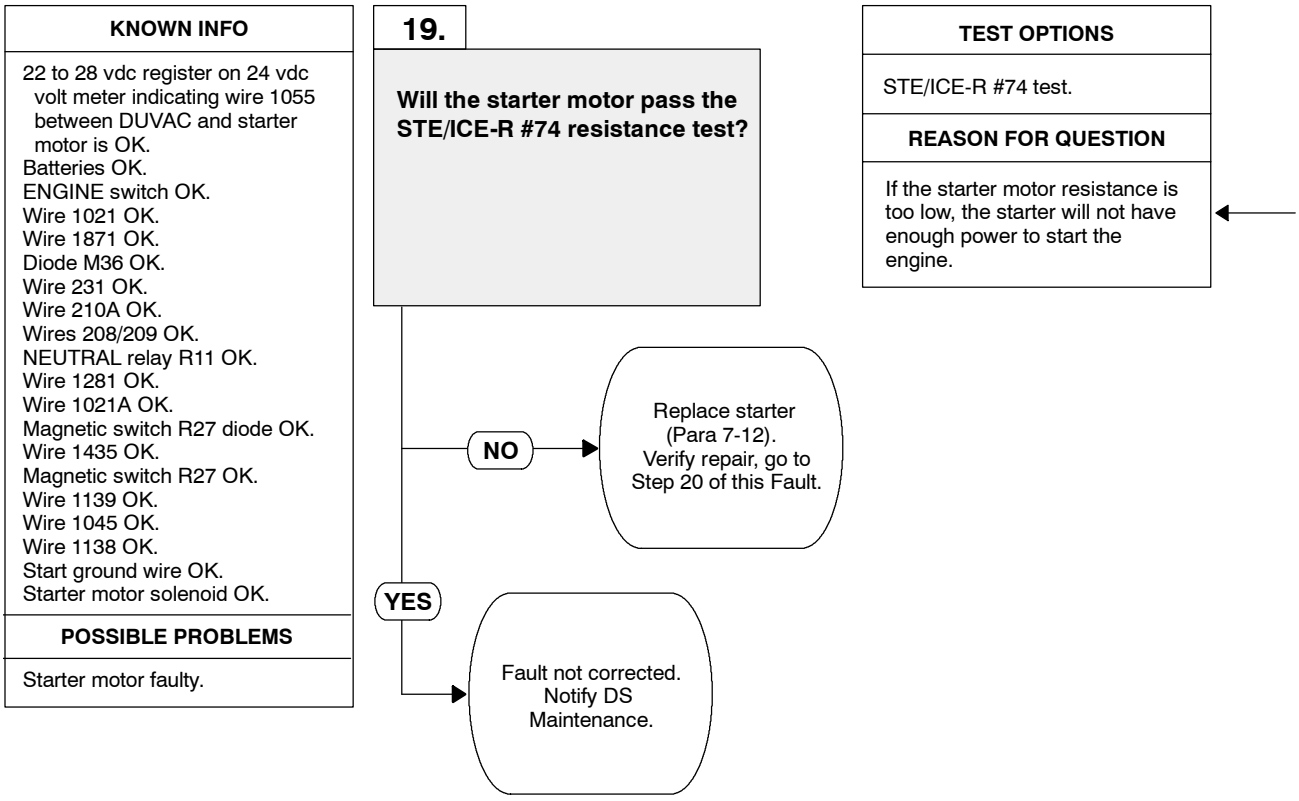
22 to 28 vdc are always present on wire 1139 at starter solenoid. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to starter solenoid, terminal 3.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Visually check power strap between terminal 3 and starter field coil post for breaks, corrosion, looseness, or damage.
(5) While assistant holds ENGINE switch in START position, observe multimeter (TM 9-2320-364-10).
    (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch, and replace starter (Para 7-12).
    (b) If 22 to 28 vdc are present, turn OFF ENGINE switch and go to Step 20 of this fault.

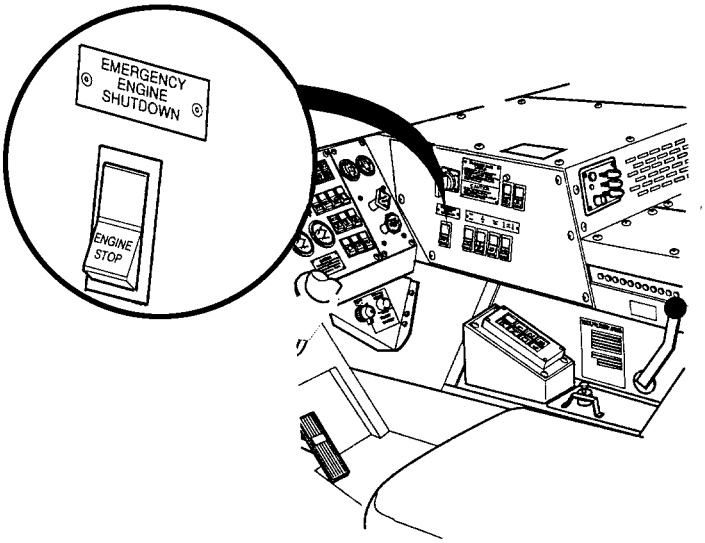


1. ENGINE FAILS TO CRANK (CONT).

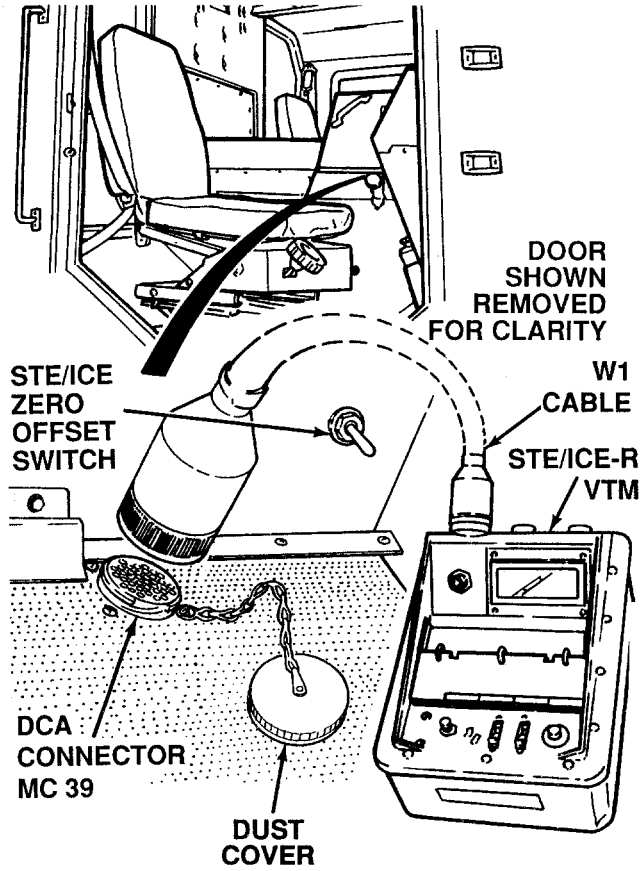


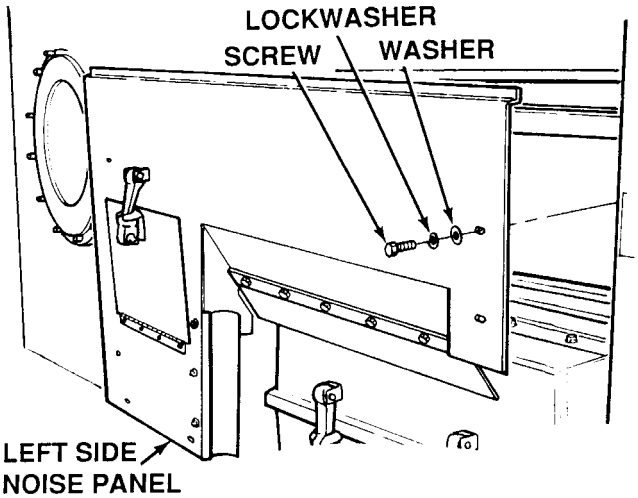
STE/ICE-R #74

(1) Remove dust cover from DCA connector MC-39.
(2) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector.
(3) Power-up the STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(4) Enter vehicle identification (VID) number (38).
(5) Perform a confidence test.
(6) Set TEST test select switch to 74.
(7) Perform offset test.
(8) Press and release TEST button.
(9) When GO is displayed on the VTM, push down and hold engine stop switch and turn ENGINE switch to START until OFF is displayed on VTM (TM 9-2320-364-10).
(10) Turn OFF ENGINE switch, release engine stop switch and wait about five seconds.
  (a) If more than 25 miliohms are displayed, replace starter (Para 7-12) and perform Steps (11) through (13) below.
  (b) If 25 miliohms or less are displayed, notify DS Maintenance.
(11) Disconnect DCA cable W1.
(12) Install dust cover on DCA connector MC39.
(13) Install left front noise panel and left side noise panel, 15 screws, washers, and lockwashers.

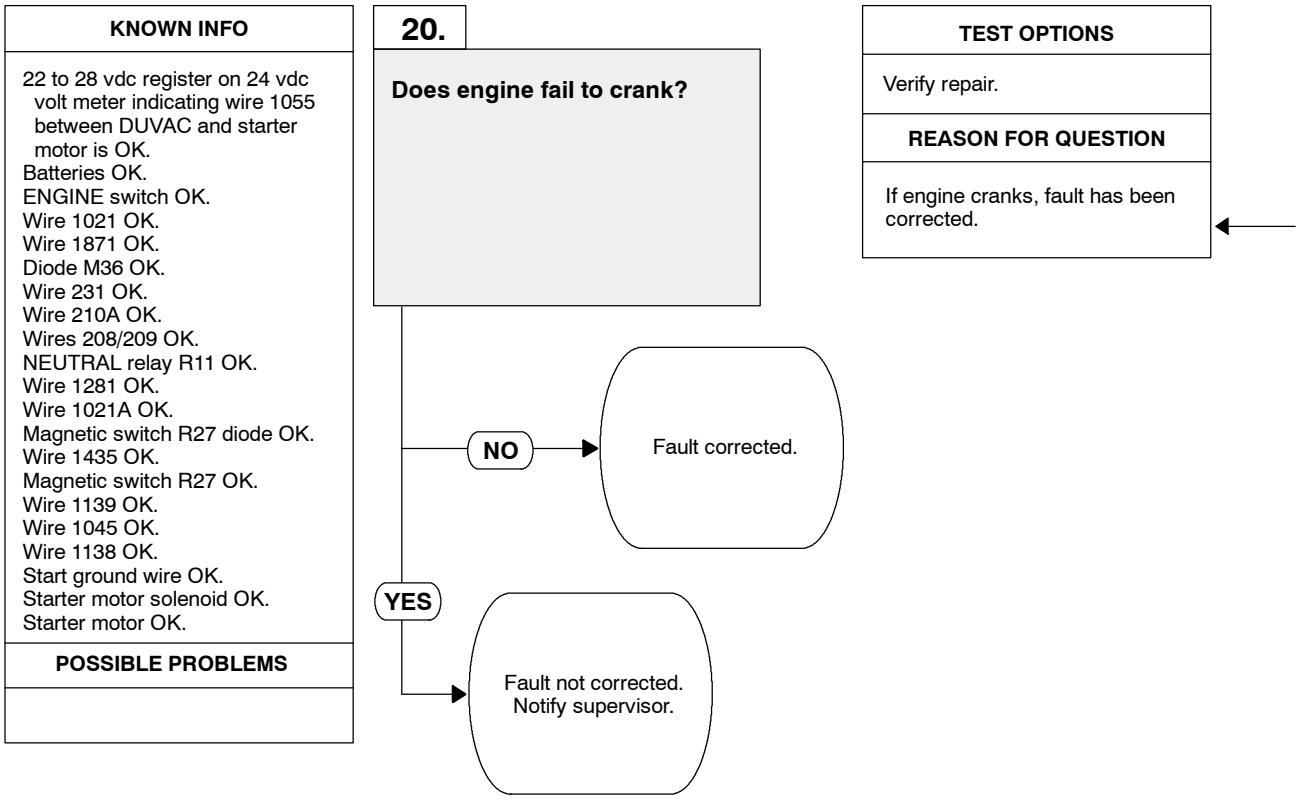


STEERING WHEEL SHOWN REMOVED FOR CLARITY



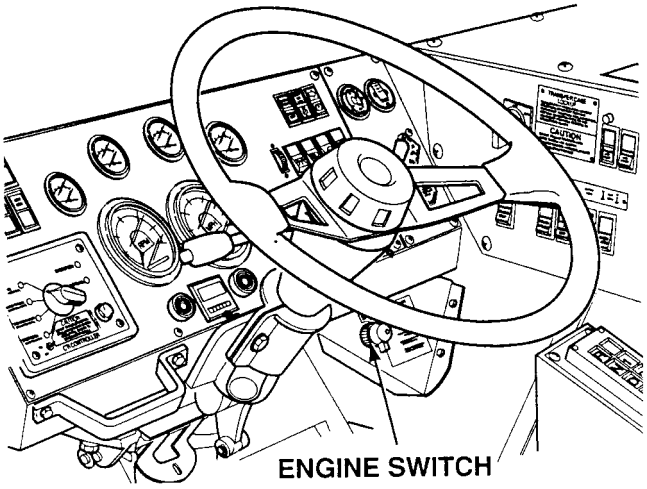


1. ENGINE FAILS TO CRANK (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
   (a) If engine fails to crank, fault not corrected. Turn OFF ENGINE switch and notify supervisor.
   (b) If engine cranks, fault has been corrected.
(2) Turn OFF ENGINE switch.



2-16. ENGINE TROUBLESHOOTING (CONT).

2. LOW ENGINE OIL PRESSURE (OIL PRESS GAGE CONTINUOUSLY READS LESS THAN 35 TO 40 PSI [241 TO 276 kPa] AT 1800 TO 2100 RPM).

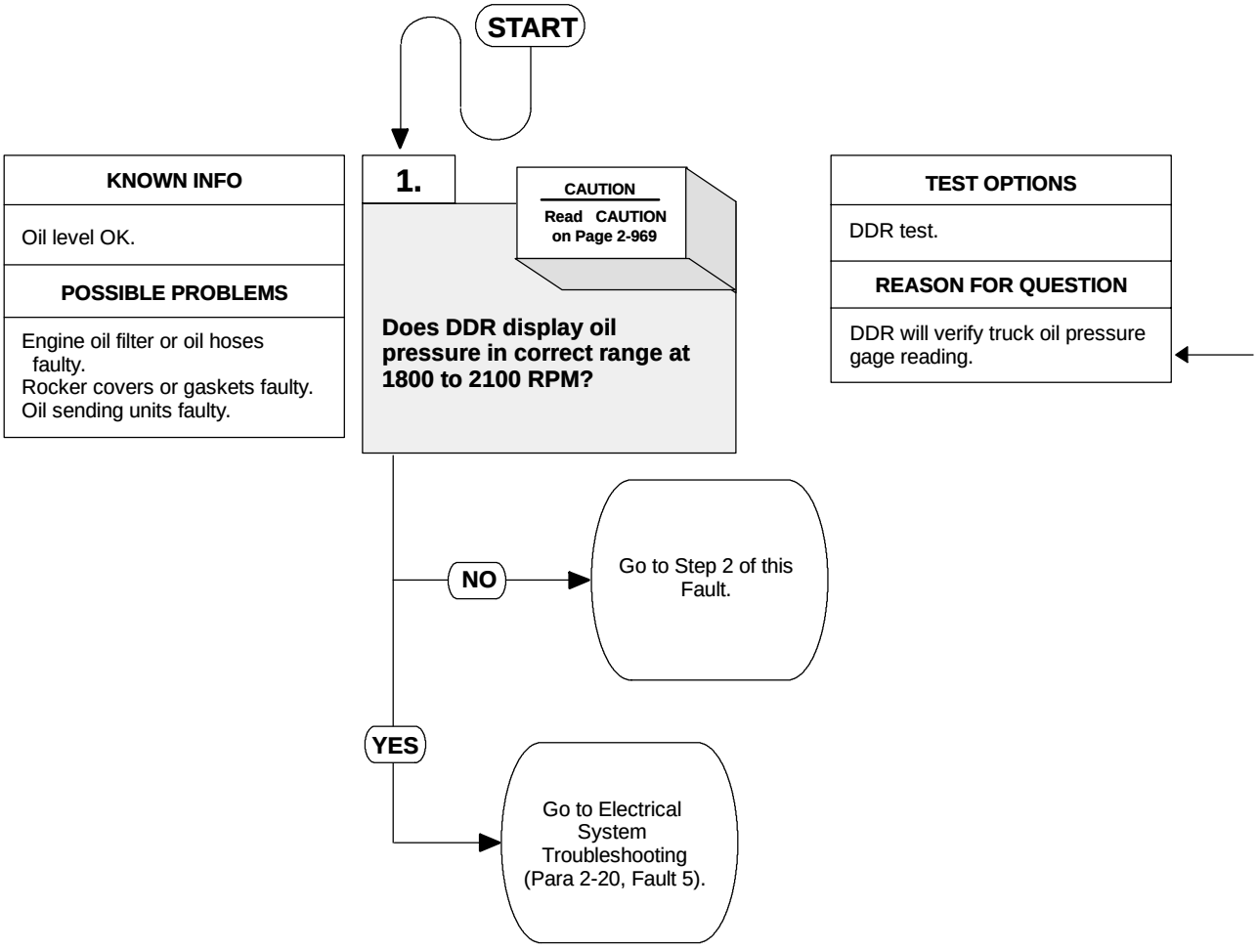
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)

Materials/Parts
Lockwasher (8) (Item 195, Appendix F)

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)



CAUTION

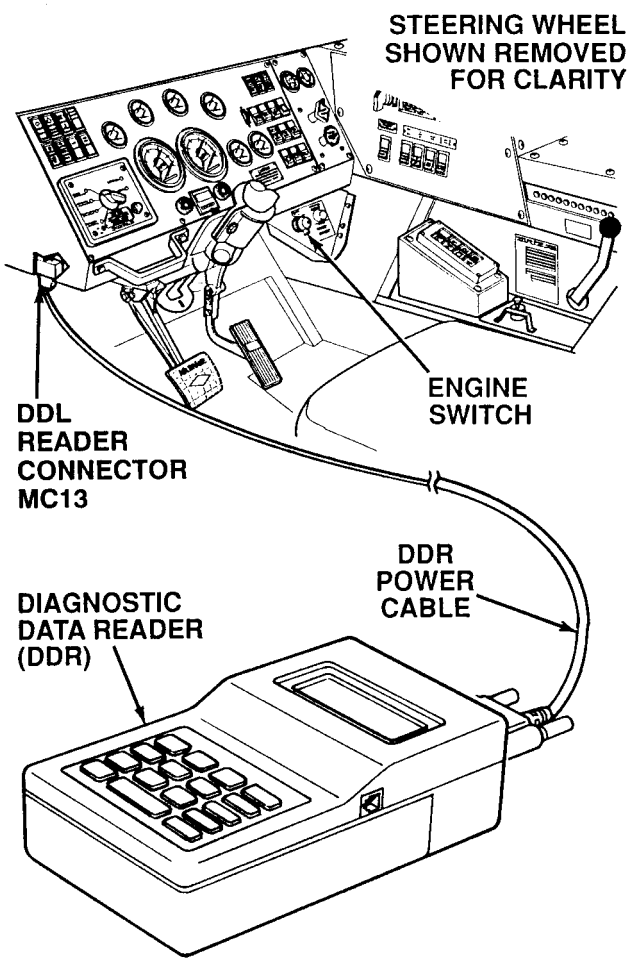
Operating engine for prolonged time with low oil pressure will result in internal damage to engine.

NOTE

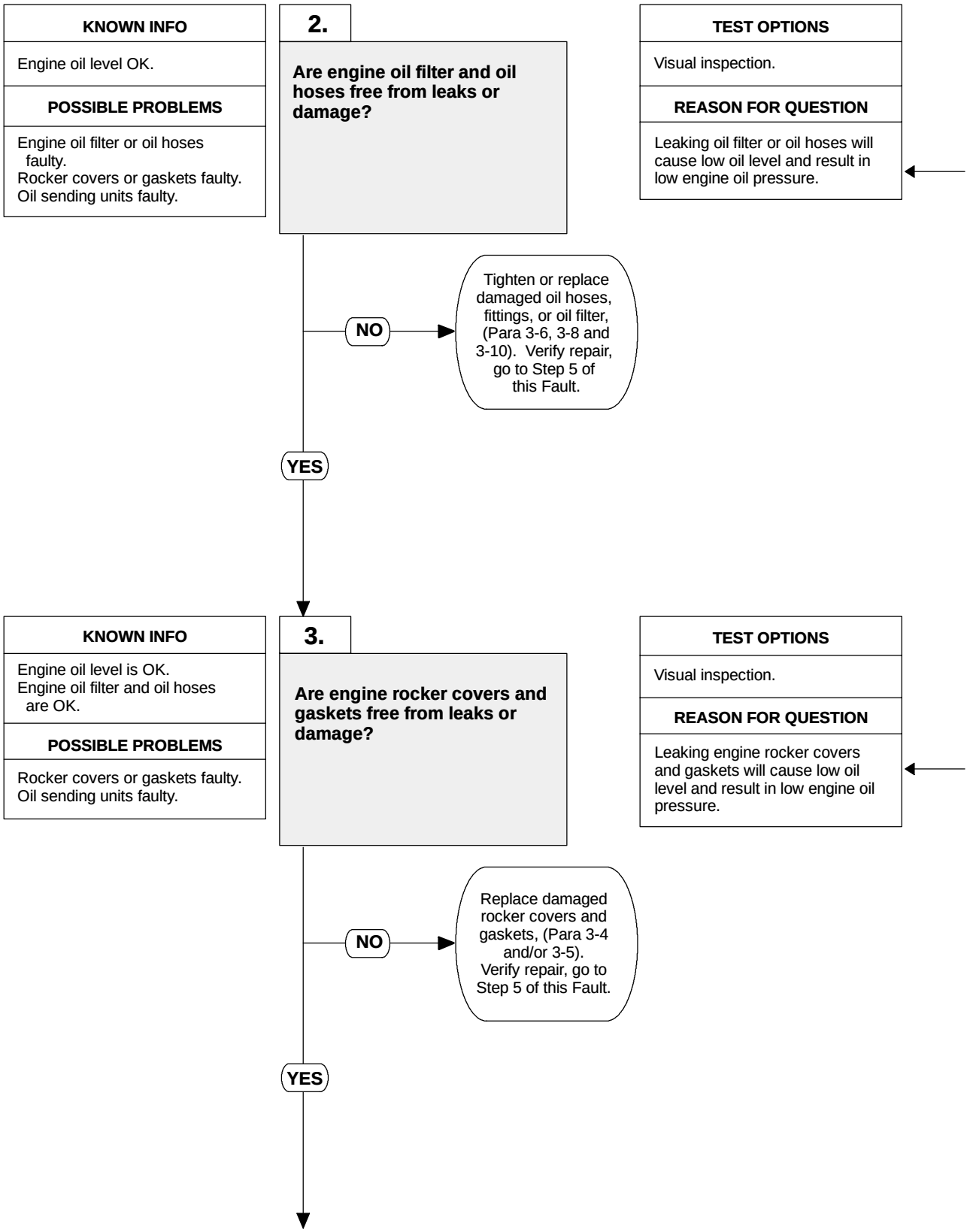
Oil pressure can go as low as 5 psi (34 kPa) at engine idle.

DDR TEST

(1) Connect DDR to DDL connector MC13.
(2) Start engine (TM 9-2320-364-10).
(3) Scroll down to mode 17 OIL PRS PSI.
(4) Increase engine speed to 1800 to 2100 RPM.
    (a) If engine oil pressure is less than 35 psi (241 kPa), turn OFF ENGINE switch, and go to Step 2 of this Fault.
    (b) If engine oil pressure is more than 40 psi (276 kPa), turn OFF ENGINE switch, and go to Electrical System Troubleshooting (Para 2-20, Fault 5).

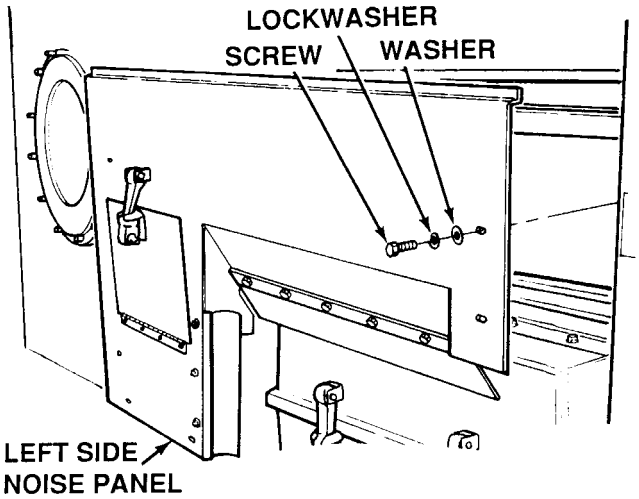


2. LOW ENGINE OIL PRESSURE (OIL PRESS GAGE CONTINUOUSLY READS LESS THAN 35 TO 40 PSI [241-276 kPa] AT 1800 TO 2100 RPM) (CONT).



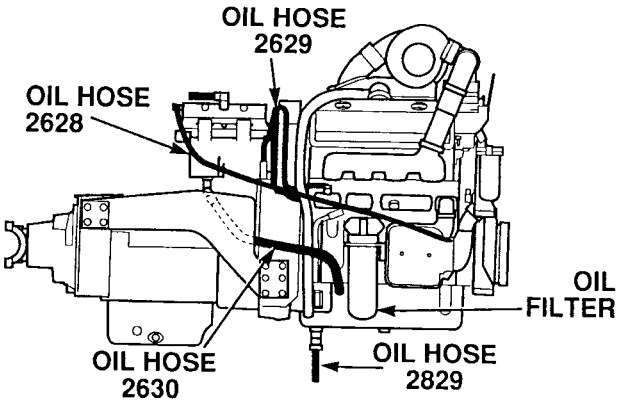
VISUAL INSPECTION

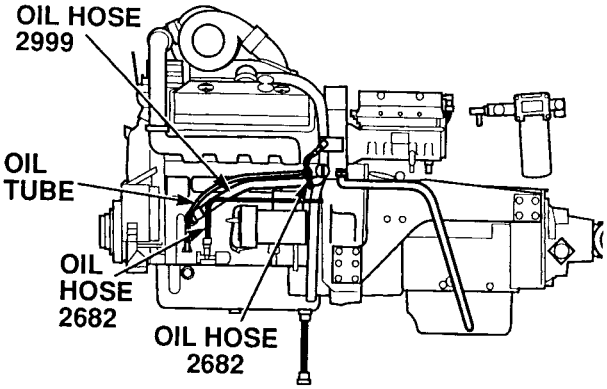
(1) Remove eight screws, lockwashers, washers and left side noise panel. Discard lockwashers.
(2) Check engine oil filter and oil hoses for leaks or damage.
  (a) If hoses, fittings, or filter are loose, leaking, or damaged, tighten fittings or replace filter and/or hoses (Para 3-6, 3-8 and/or 3-10).
  (b) If hoses, fittings, and filter are not loose, leaking or damaged, go to Step 3 of this Fault.

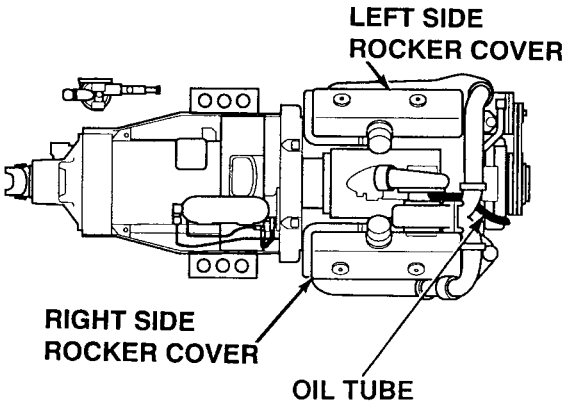


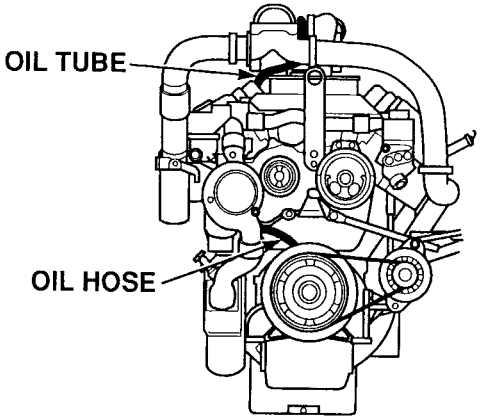
VISUAL COVER INSPECTION

Check engine rocker covers and gaskets for leaks or damage.
(1) Secure loose rocker covers or replace gaskets (Para 3-4 and/or 3-5).
(2) If rocker covers are not loose, go to Step 4 of this Fault.

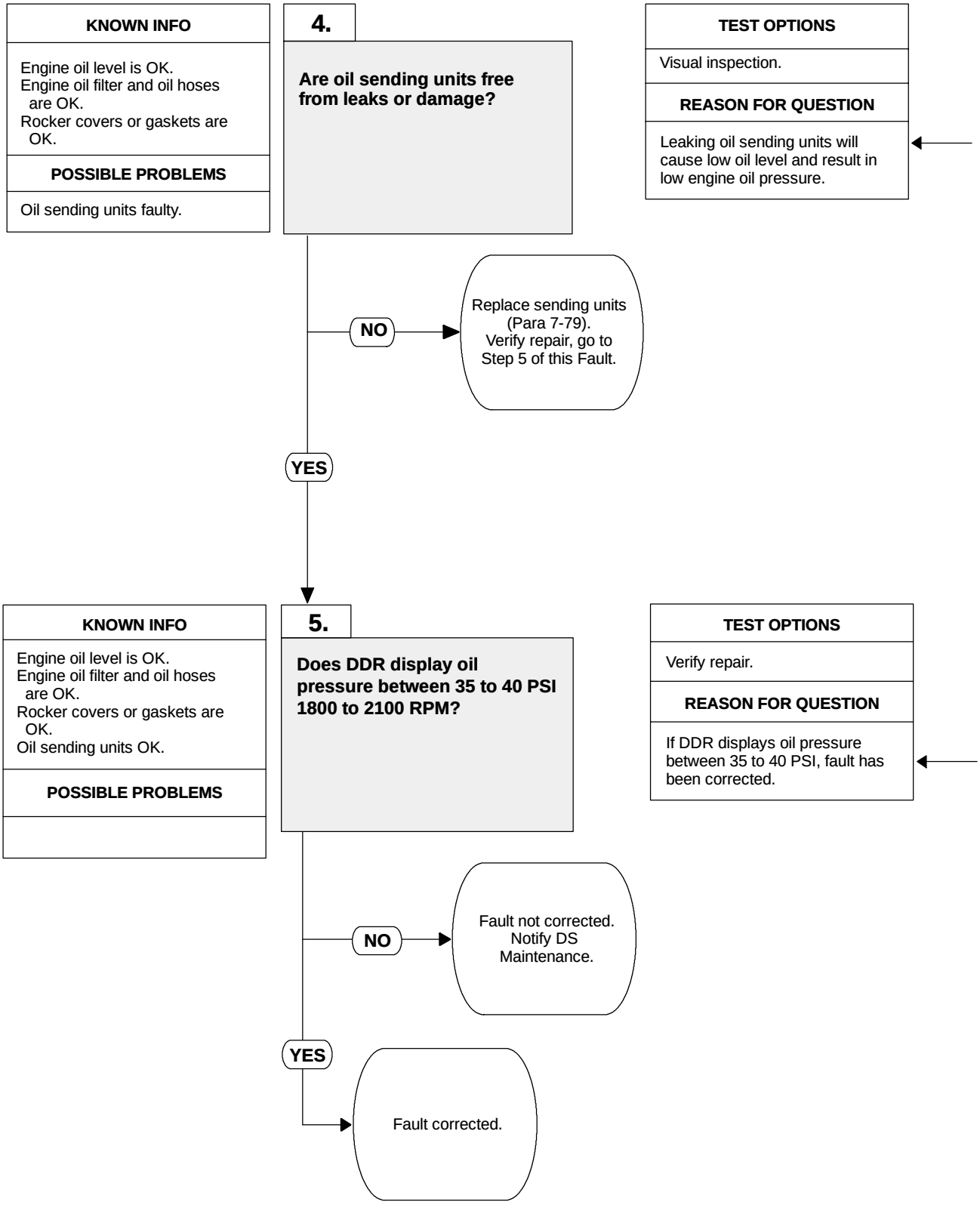






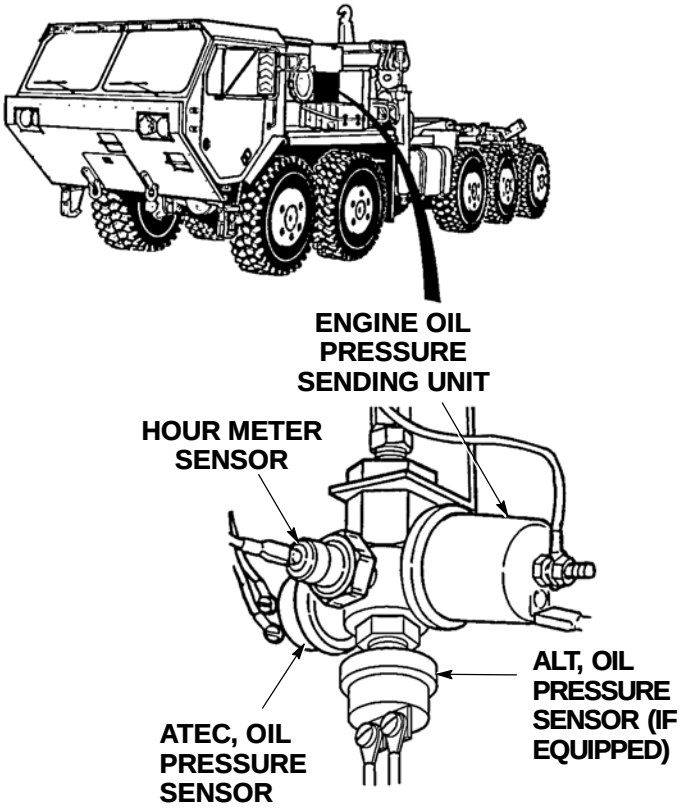


2. LOW ENGINE OIL PRESSURE (OIL PRESS GAGE CONTINUOUSLY READS LESS THAN 35 TO 40 PSI [241-276 kPa] AT 1800 TO 2100 RPM) (CONT).



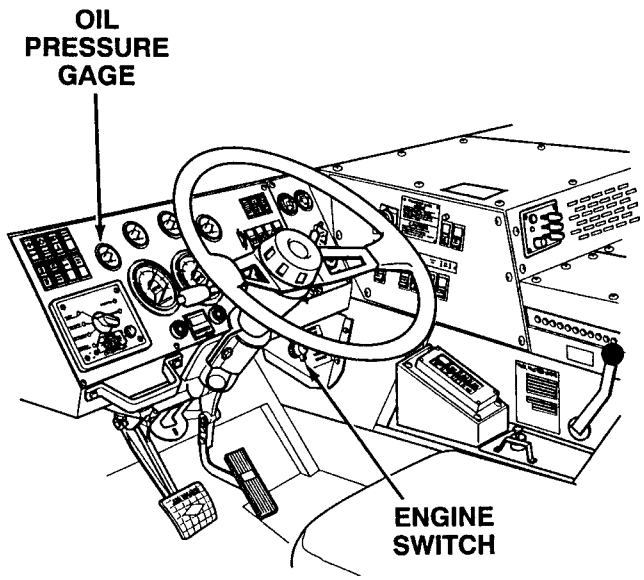
VISUAL INSPECTION

(1) Check oil sending units for leakage or damage.
   (a) If oil sending units are loose, leaking, or damaged, tighten or replace damaged units (Para 7-79).
   (b) If oil sending units are not leaking, oil sending units are OK.
(2) Install left side noise panel, eight screws, washers, and lockwashers.
(3) Install right side noise panel (Para 17-26).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Scroll down to mode 17 OIL PRESSURE PSI.
(3) Increase engine speed to 1800 to 2100 RPM.
   (a) If engine oil pressure is less than 35 psi (241 kPa), perform Steps (3) through (5) below and notify DS Maintenance.
   (b) If engine oil pressure is between 35 and 40 psi (241 and 276 kPa), fault has been corrected.
(3) Clear codes (Para 2-11).
(4) Turn OFF ENGINE switch.
(5) Disconnect DDR from DDL connector MC13.



2-16. ENGINE TROUBLESHOOTING (CONT).

3. EXCESSIVE ENGINE OIL CONSUMPTION.

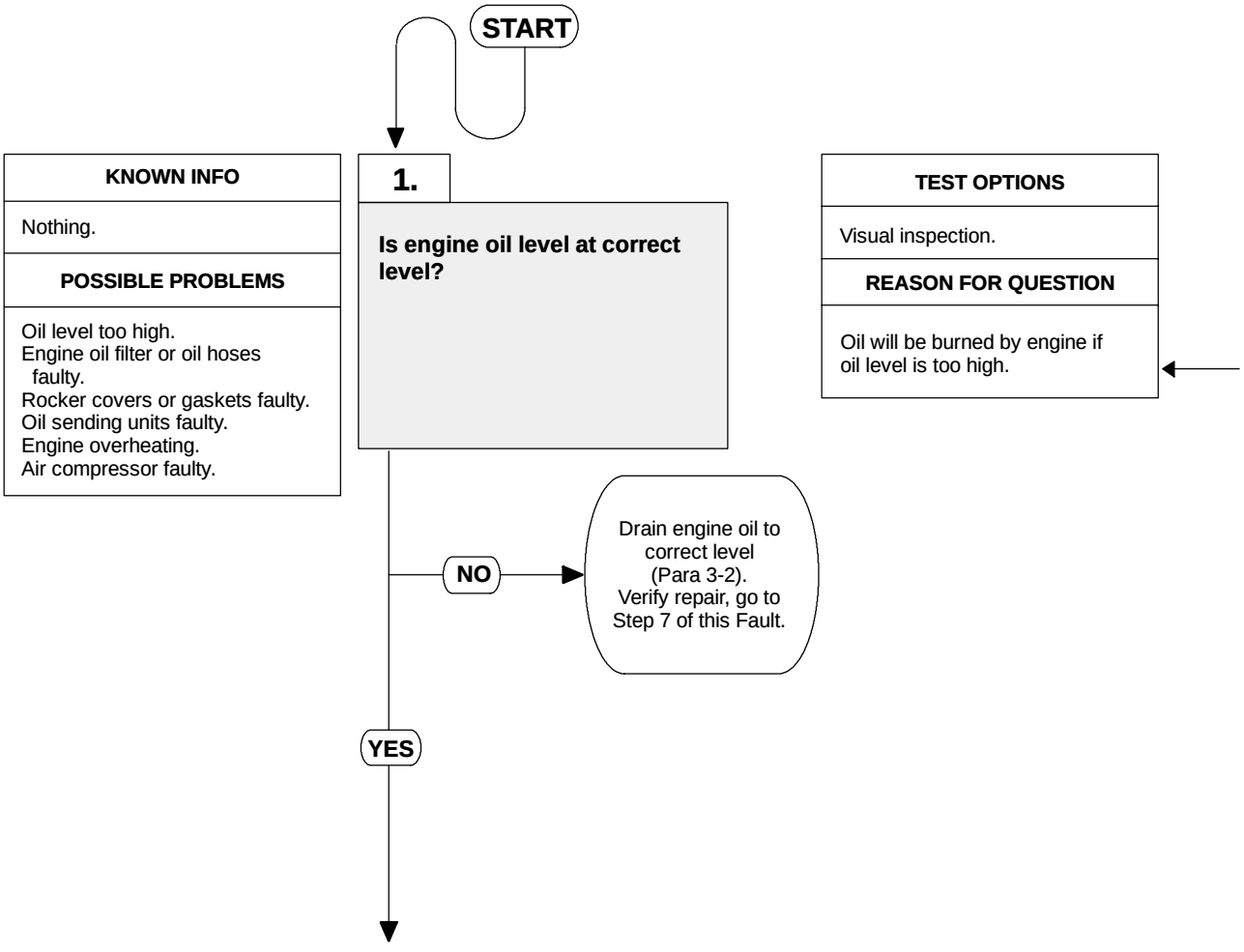
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Measure, Liquid (Item 43, Appendix G)

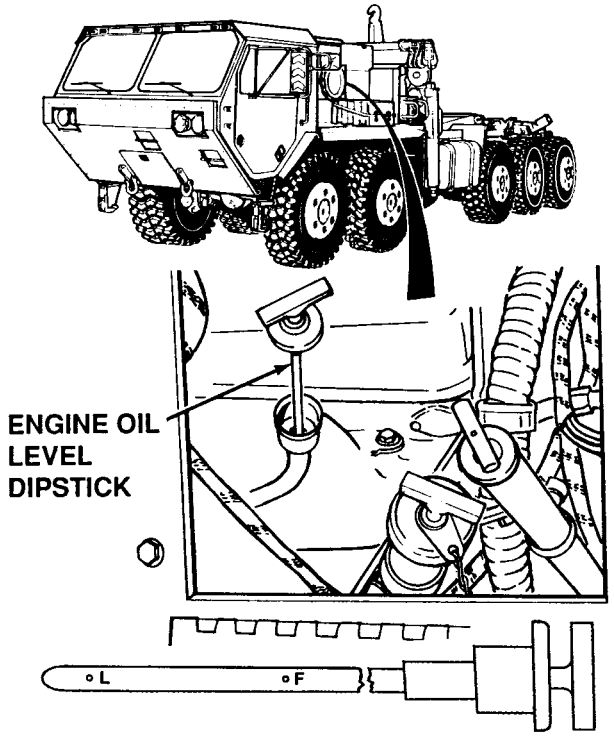
Materials/Parts
Lockwasher (8) (Item 195, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

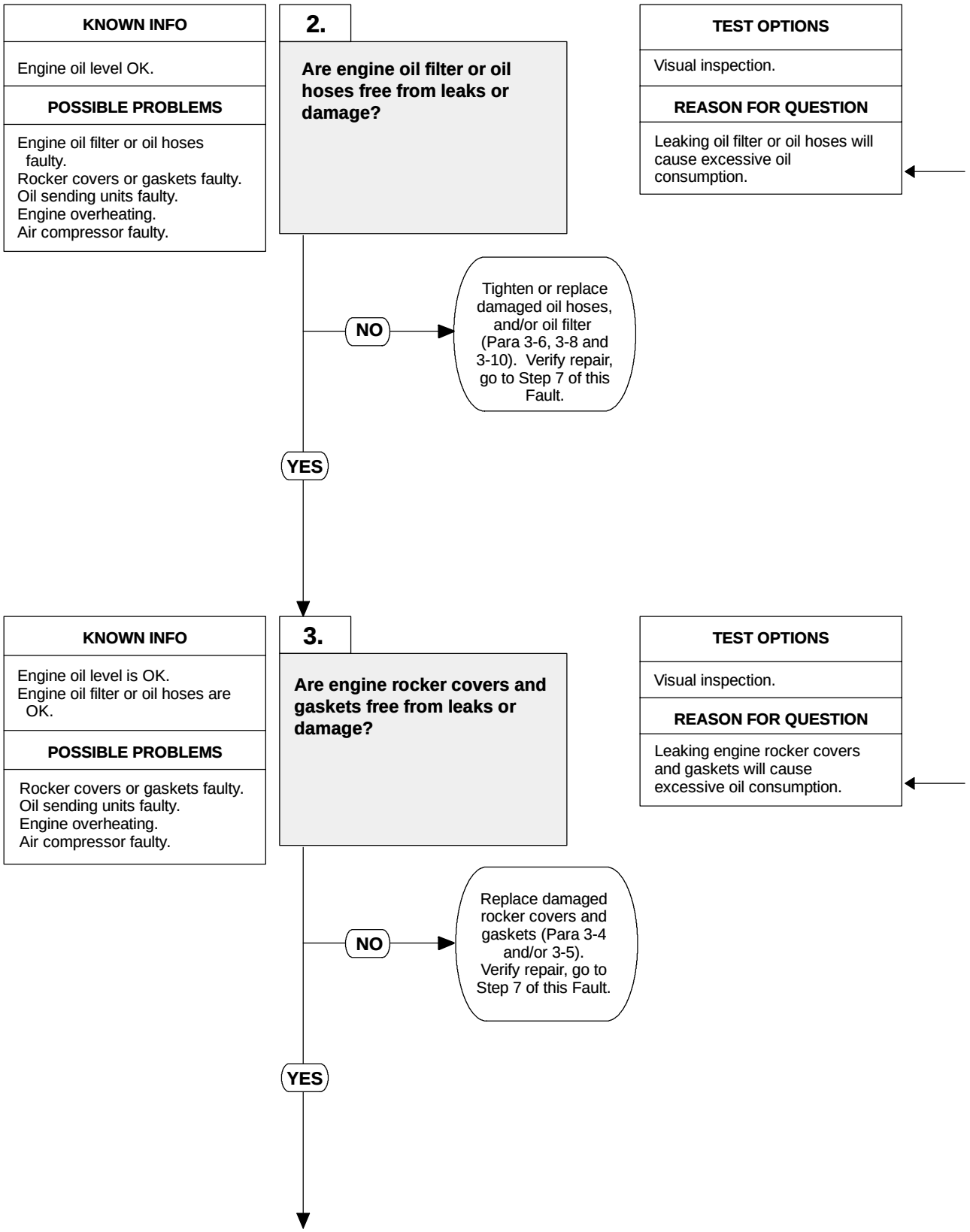
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



VISUAL INSPECTION
Check engine oil level at dipstick. Proper level should be between LOW and FULL mark. (1) If level is above FULL mark, drain oil to correct level (Para 3-2). (2) If oil level is OK, go to Step 2 of this Fault.

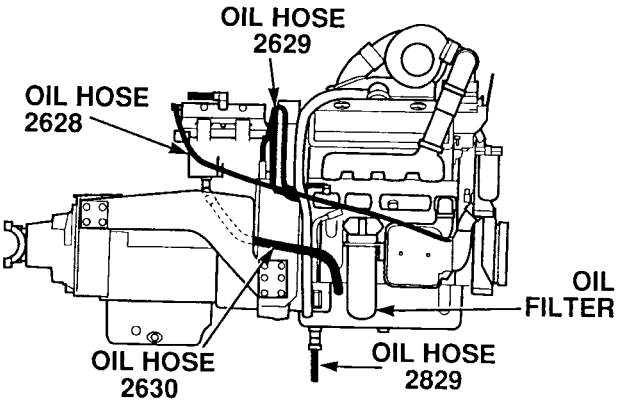


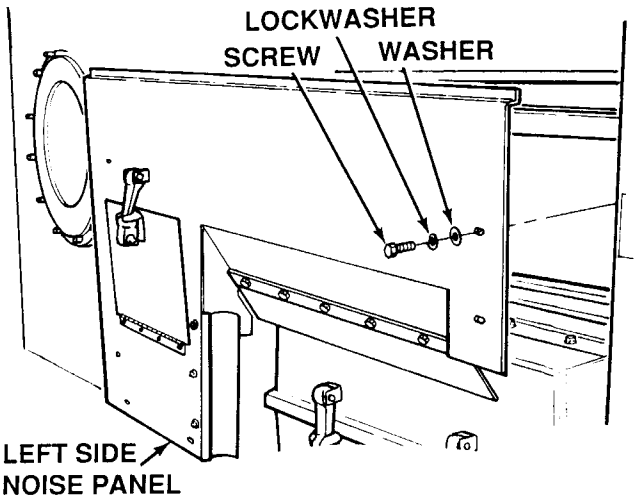
3. EXCESSIVE ENGINE OIL CONSUMPTION (CONT).

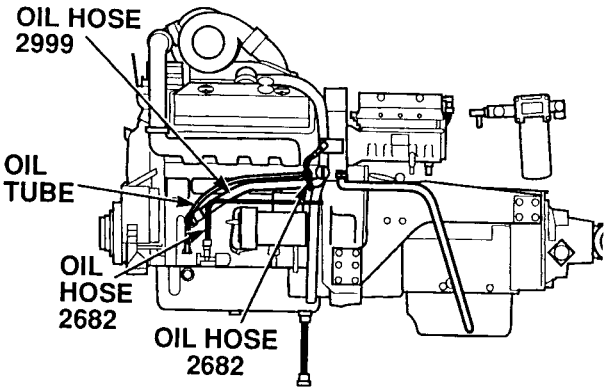


VISUAL INSPECTION

(1) Remove 8 screws, washers, lockwashers, and left side noise panel. Discard lockwashers.
(2) Check engine oil filter and oil hoses for leaks or damage.
   (a) If hoses, fittings, or filter are loose, leaking or damaged, tighten fittings or replace filter and/or hoses (Para 3-6, 3-8 and 3-10).
   (b) If hoses, fittings, and filter are not loose, leaking or damaged, go to Step 3 of this Fault.

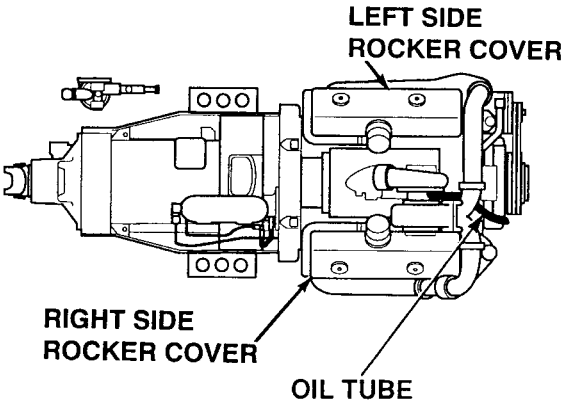


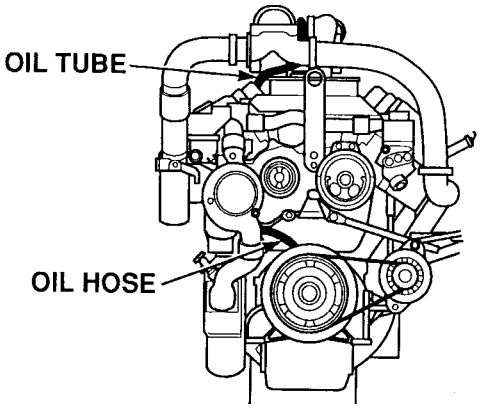




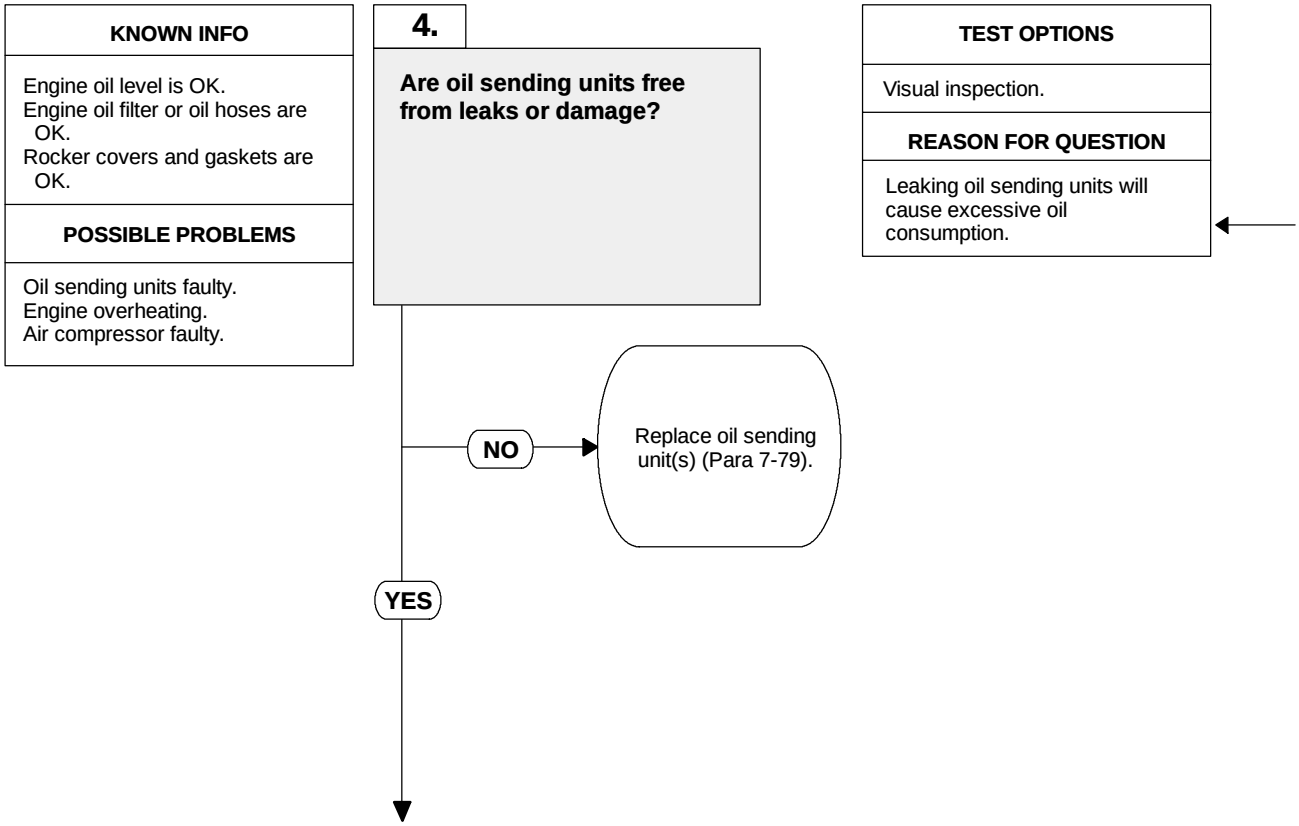
VISUAL INSPECTION

Check engine rocker covers and gaskets for leaks or damage.
(1) Secure loose rocker cover or replace gaskets (Para 3-4 and/or 3-5).
(2) If rocker covers are not loose or leaking, covers are OK.



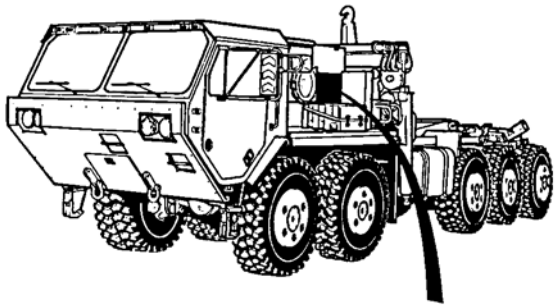


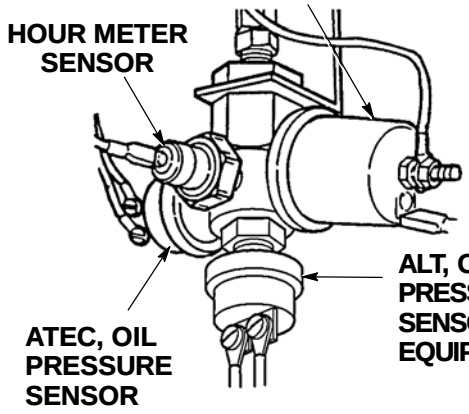
3. EXCESSIVE ENGINE OIL CONSUMPTION (CONT).



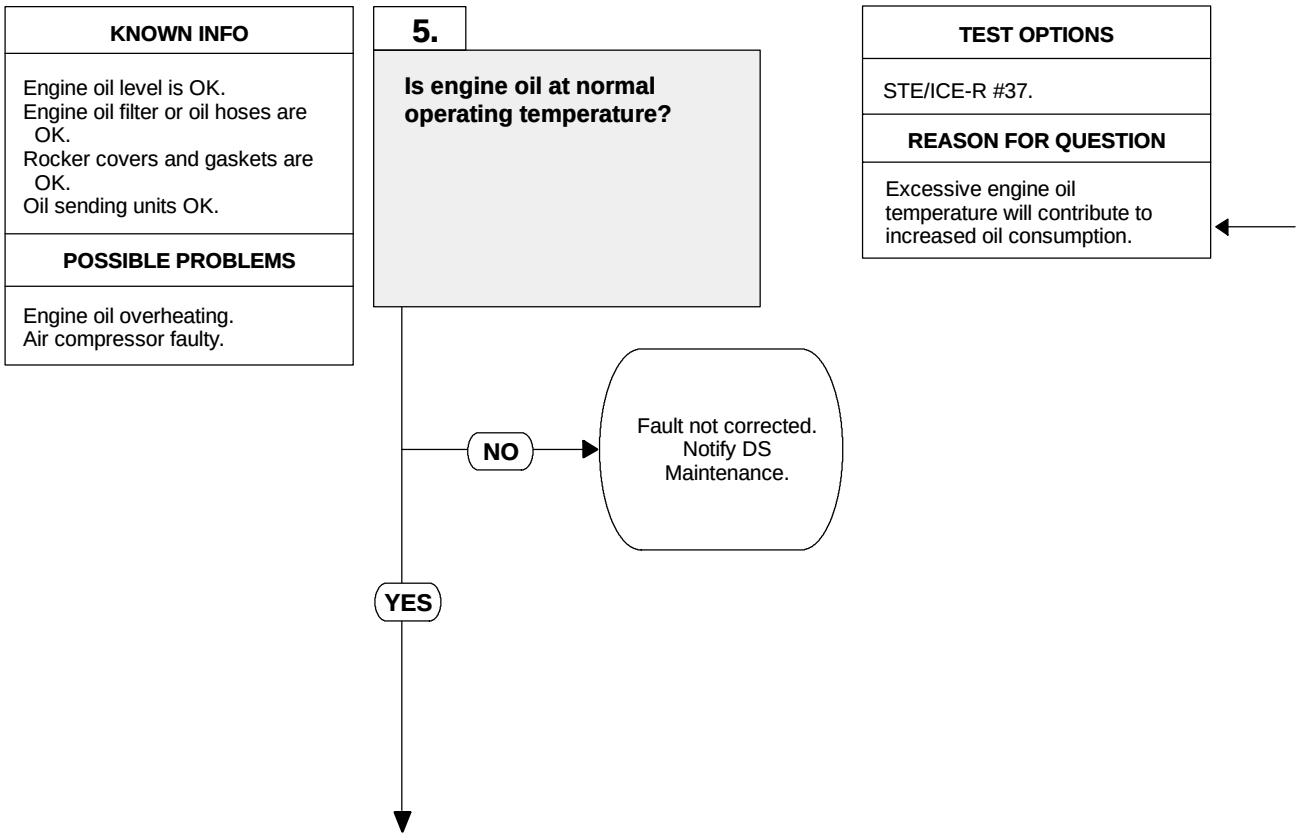
VISUAL INSPECTION

(1) Check oil sending units for leaks or damage.
(2) Install left side noise panel, eight screws, washers and lockwashers.
(3) Install right side noise panel (Para 17-26).
    (a) If oil sending units are loose, leaking, or damaged, tighten or replace damaged units (Para 7-79).
    (b) If oil sending units are not leaking, go to Step 5 of this Fault.



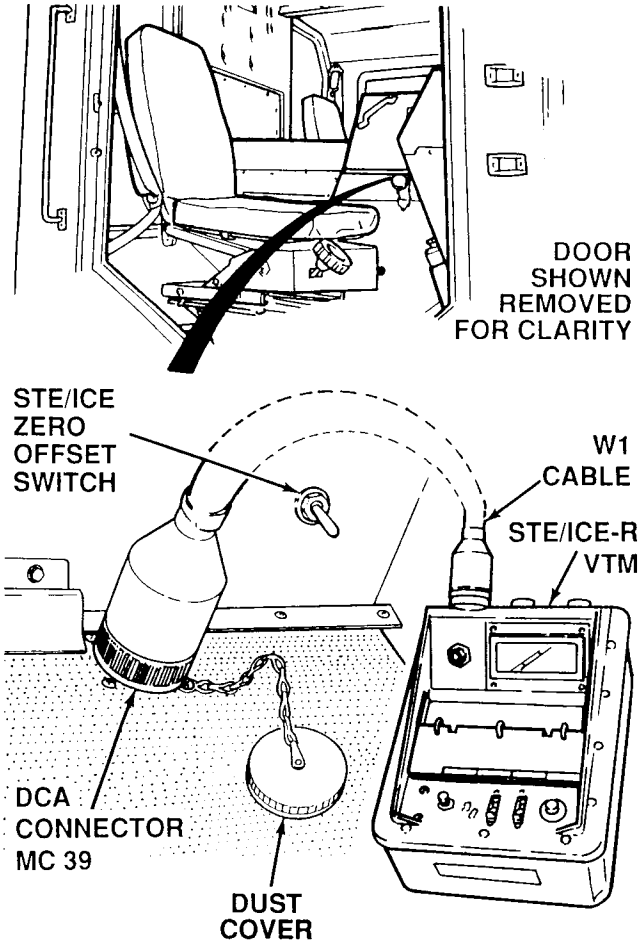


3. EXCESSIVE ENGINE OIL CONSUMPTION (CONT).

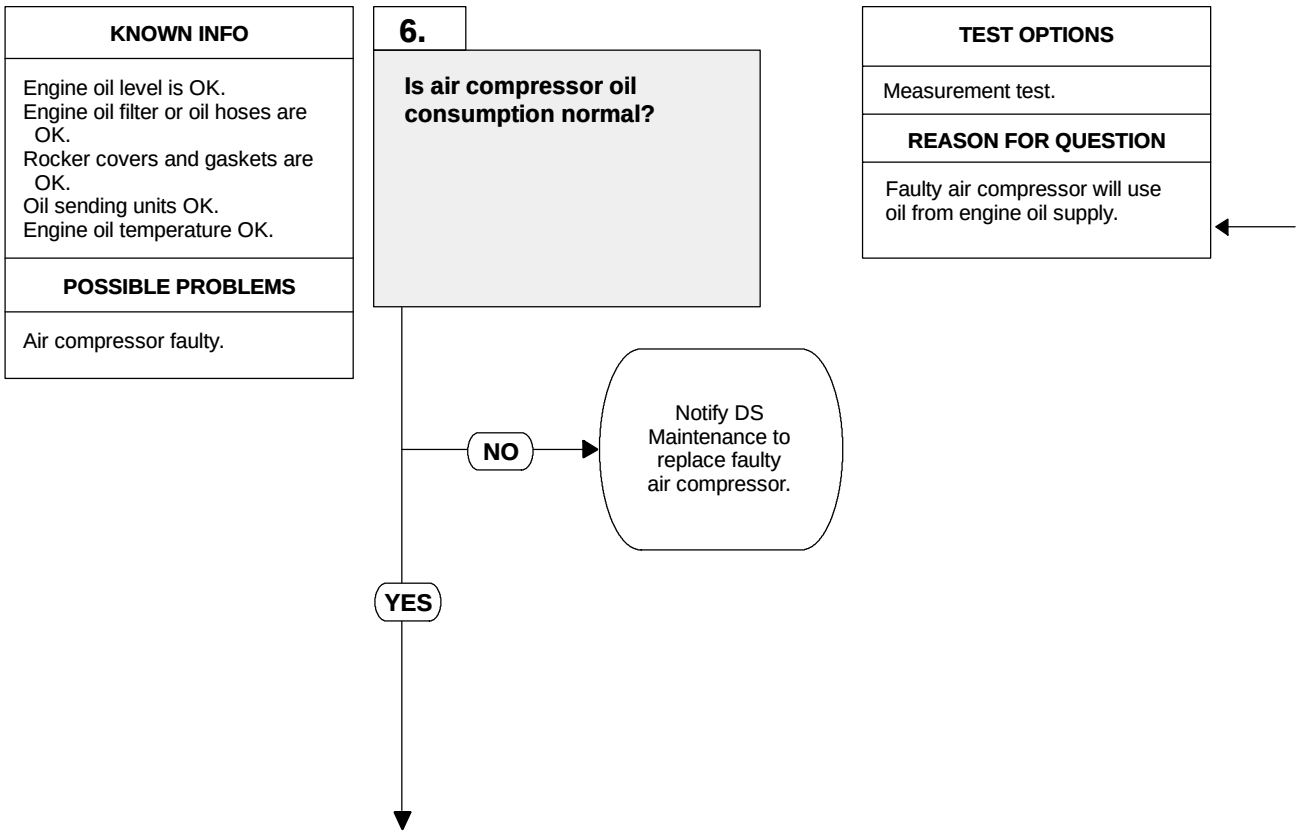


STE/ICE-R #37 ENGINE OIL TEMPERATURE TEST

(1) Remove dust cover from DCA connector MC39.
(2) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector.
(3) Power up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(4) Perform a confidence test.
(5) Set TEST SELECT switches to 37.
(6) Start engine (TM 9-2320-364-10).
(7) Set STE/ICE ZERO OFFSET switch to ON.
(8) Perform offset test.
(9) Press and release TEST button.
    (a) If engine oil temperature is greater than 250°F (121°C), perform Steps (10) through (13) below and notify DS Maintenance.
    (b) If engine oil temperature is between 200°F and 250°F (93°C and 121°C), engine oil temperature is OK.
(10) Turn OFF ENGINE switch.
(11) Set STE/ICE ZERO OFFSET switch to OFF.
(12) Disconnect DCA cable W1.
(13) Install dust cover on DCA connector MC39.

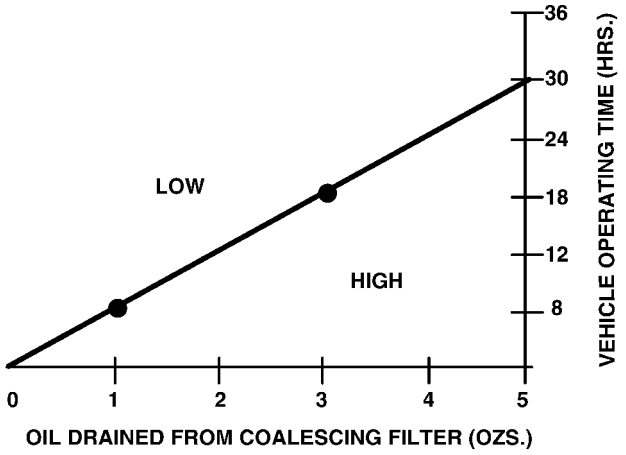


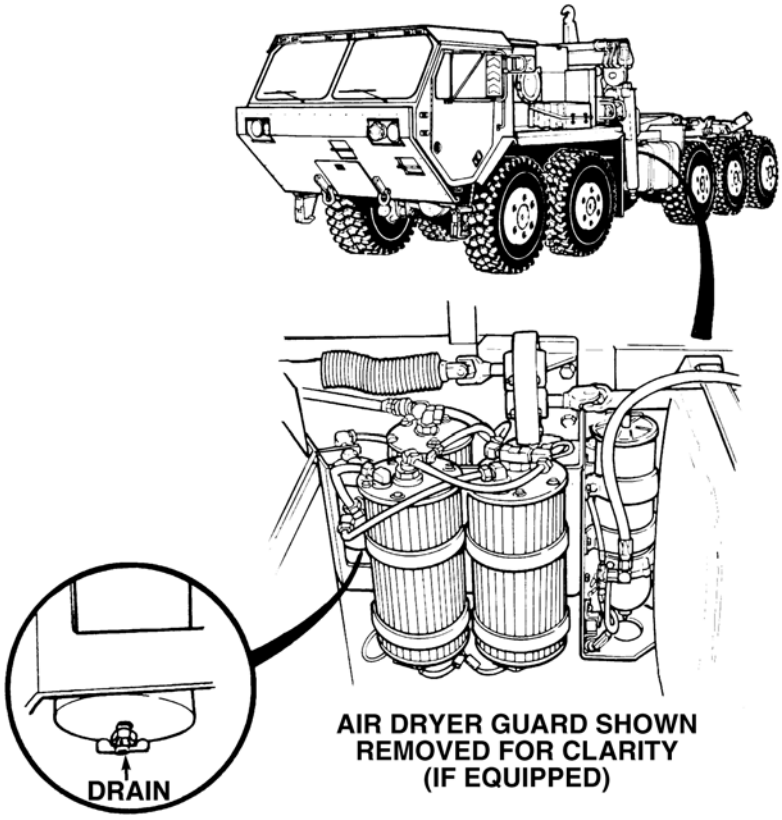
3. EXCESSIVE ENGINE OIL CONSUMPTION (CONT).



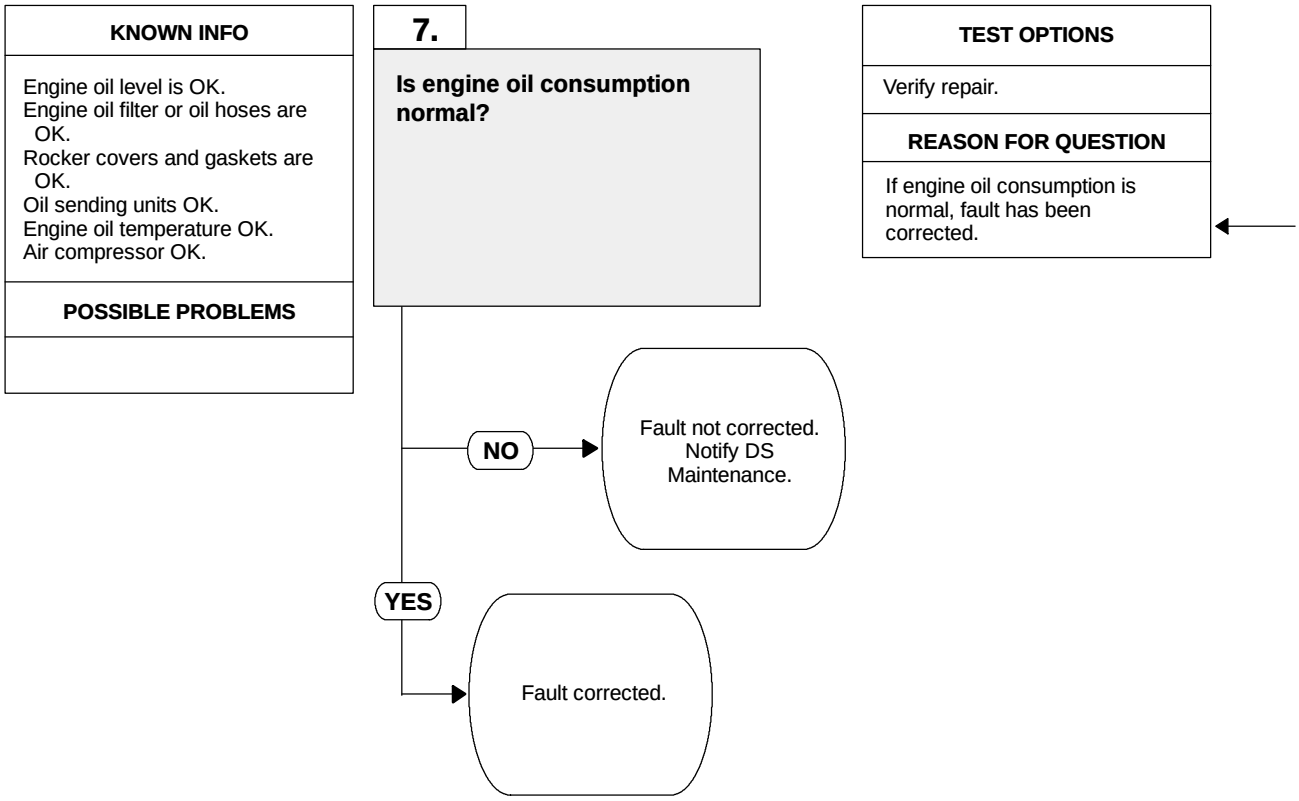
MEASUREMENT TEST
(1) Drain air system pressure to zero (TM 9-2320-364-10). (2) Place measuring cup under coalescing filter drain. (3) Open drain and allow oil and other contaminants to drain. (4) Close drain. (5) Allow oil and contaminants to settle for at least 24 hours. (6) Determine the amount of oil in ounces (ml) that has settled on top of container. (7) Compare oil amount with engine operating hours since last coalescing filter draining to Table 2-33. (a) If oil amount is in the HIGH area, notify DS Maintenance to replace air compressor. (b) If oil amount is in the LOW area, air compressor is OK.

Table 2-33.

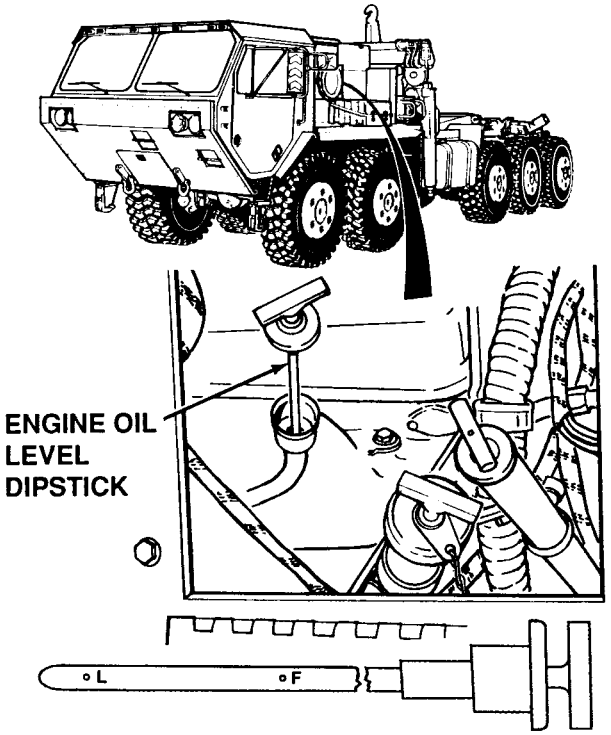




3. EXCESSIVE ENGINE OIL CONSUMPTION (CONT).



VERIFY REPAIR
Operate over the period of time specified in unit PMCS lubrication chart (Para 2-9). (1) If engine oil consumption exceeds 10 quarts per 1,000 miles, oil consumption is excessive, fault not corrected. (2) If engine oil consumption does not exceed 10 quarts per 1,000 miles, oil consumption is normal, fault has been corrected.



2-16. ENGINE TROUBLESHOOTING (CONT).

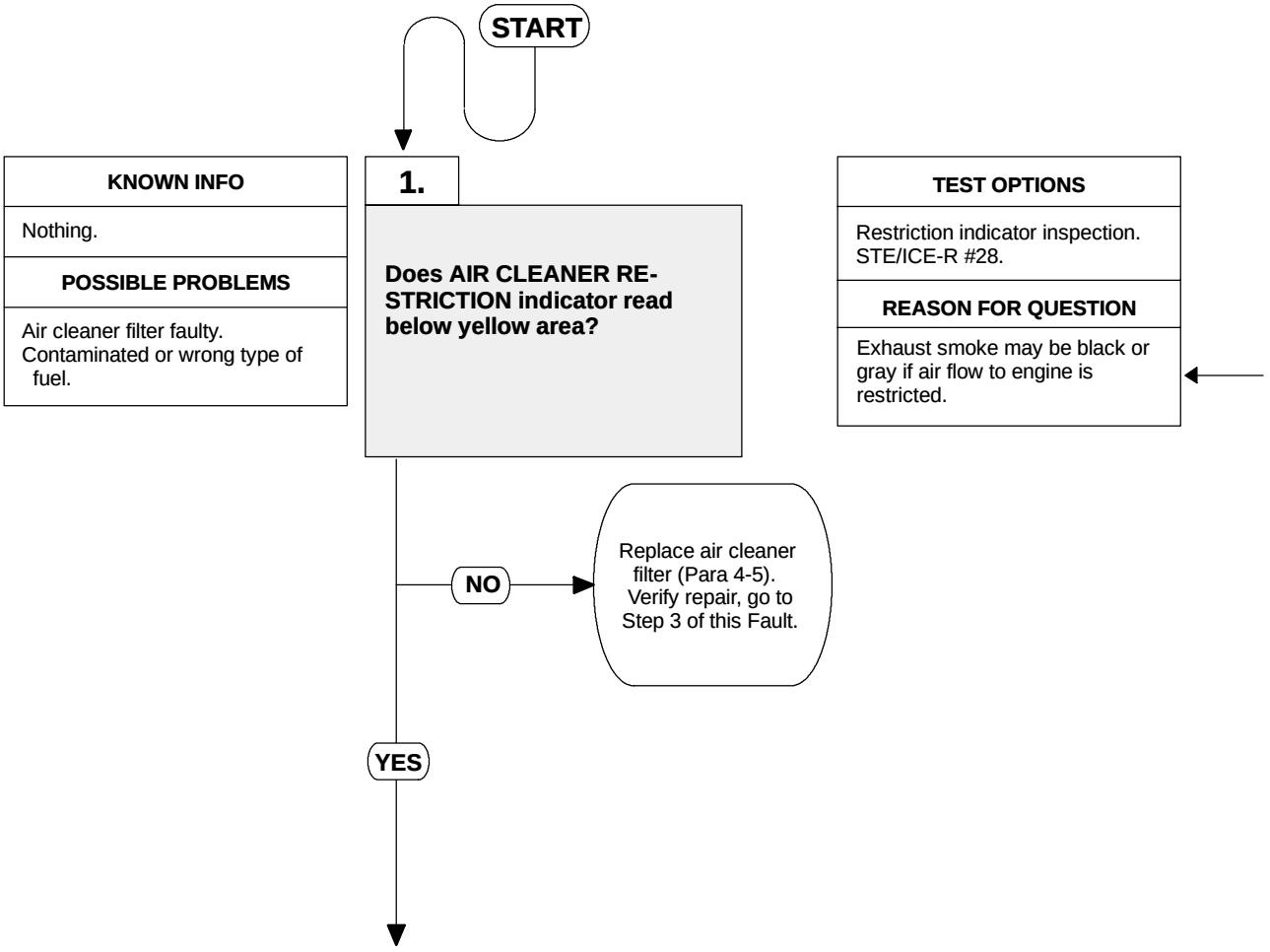
4. EXCESSIVE BLACK OR GRAY EXHAUST SMOKE (WATER TEMP GAGE READS OVER 180°F [82°C]).

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)

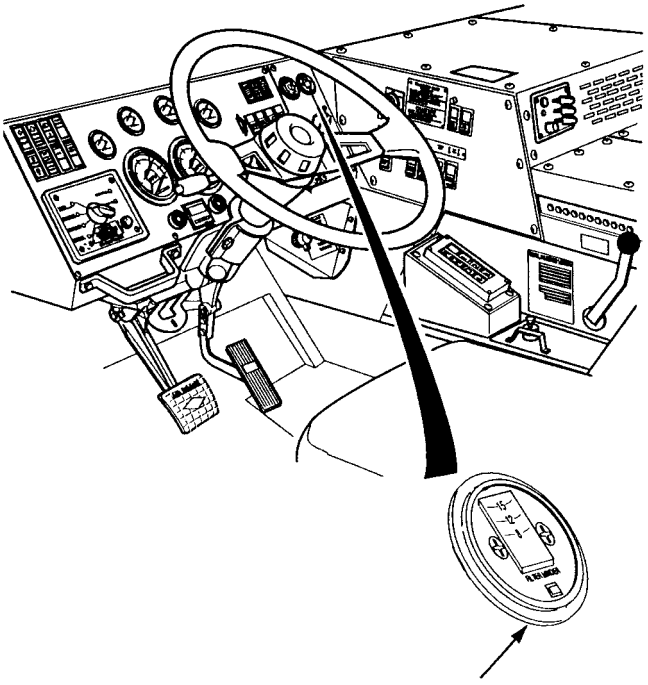
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

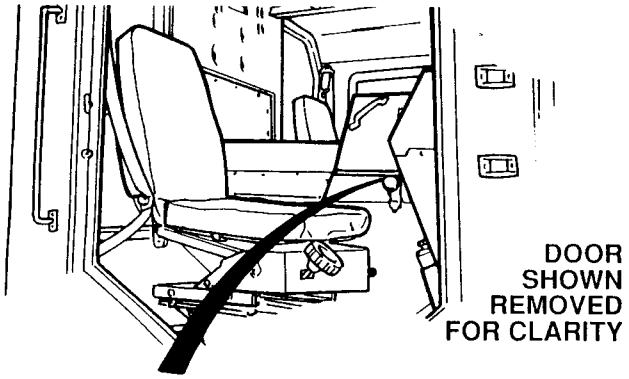
References
TM 9-2320-364-10

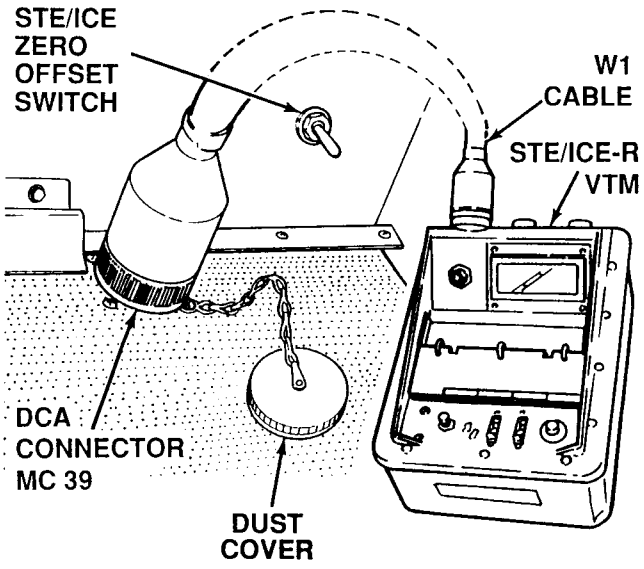


RESTRICTION INDICATOR AND STE/ICE-R #28 TEST

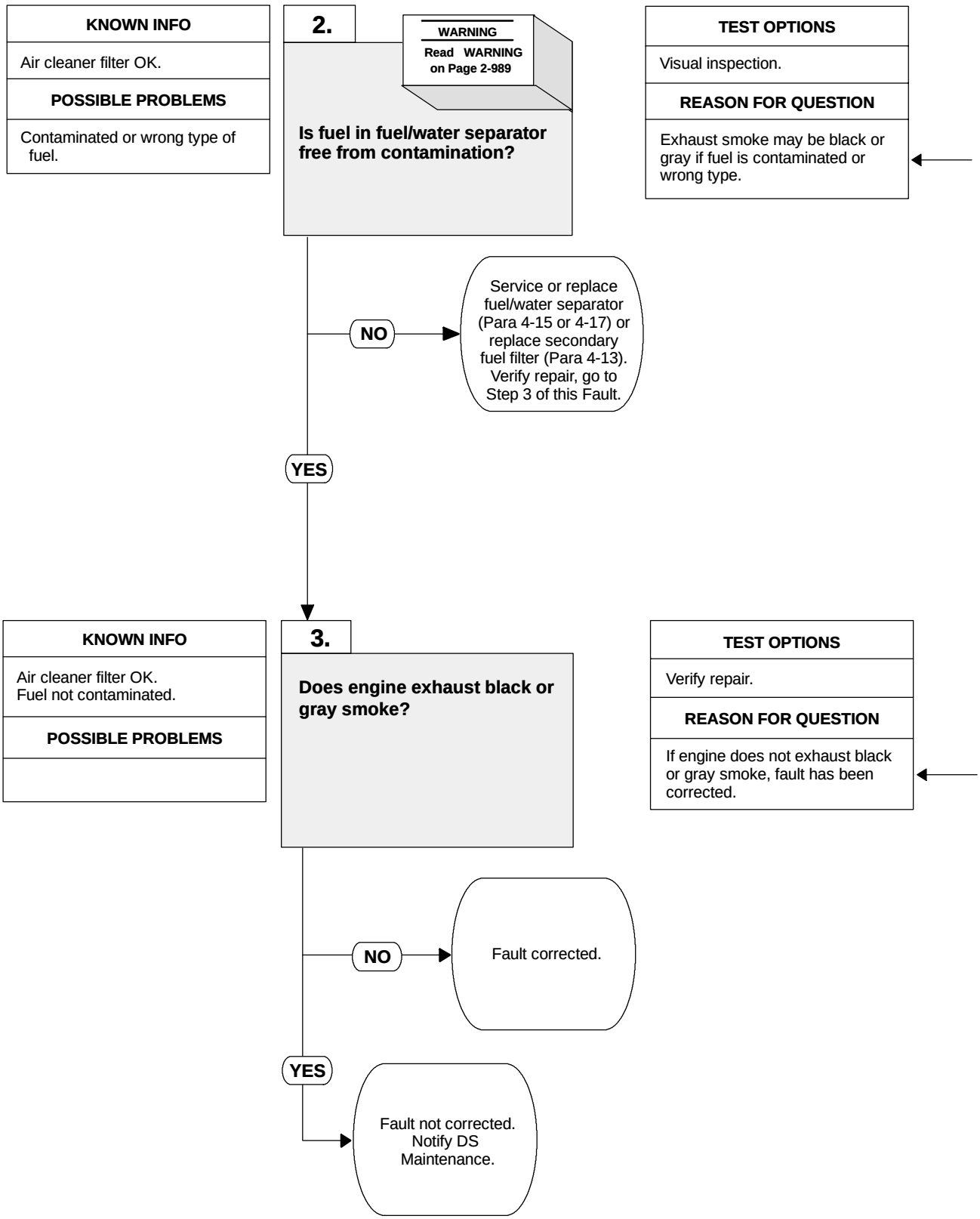
(1) Check air restriction indicator.
(2) If restriction indicator reads between 15 and 20 (in yellow area) or above 20 (in red area), press reset button.
(3) Start engine (TM 9-2320-364-10).
  (a) If restriction indicator remains between 15 and 20 or above 20 in the yellow or red areas, turn OFF ENGINE switch and replace air cleaner filter (Para 4-5).
  (b) If restriction indicator is not in the yellow area (less than 15), go to Step (4) below.
(4) Turn OFF ENGINE switch.
(5) Remove dust cover from DCA connector MC-39.
(6) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector.
(7) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(8) Perform a confidence test.
(9) Start engine.
(10) Set VTM TEST SELECT switches to 28.
(11) Perform offset test.
(12) Release TEST button.
  (a) If –9 to +9 offset is not displayed, refer to TM 9-4910-571-12&P.
  (b) If –9 to +9 offset is displayed, go to Step (13) below.
(13) Increase engine speed to approximately 2100 rpm.
(14) Press and release TEST button.
  (a) If air cleaner pressure drop is between 15 to 20 in H20, or greater than 20 in H20, turn OFF ENGINE switch, and replace air cleaner filter (Para 4-5).
  (b) If air cleaner pressure drop is less than 15 in H20, the air cleaner filter is OK.
(15) Release throttle and allow engine rpm to return to idle speed.
(16) Turn OFF ENGINE switch.
(17) Disconnect DCA cable W1.
(18) Install dust cover on DCA connector MC39.







4. EXCESSIVE BLACK OR GRAY EXHAUST SMOKE (WATER TEMP GAGE READS OVER 180°F [82°C]) (CONT).



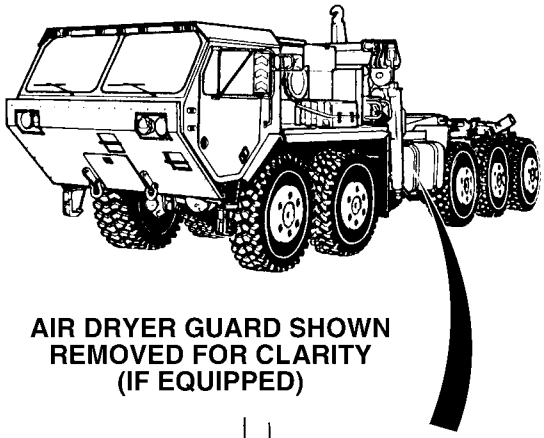
WARNING

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.

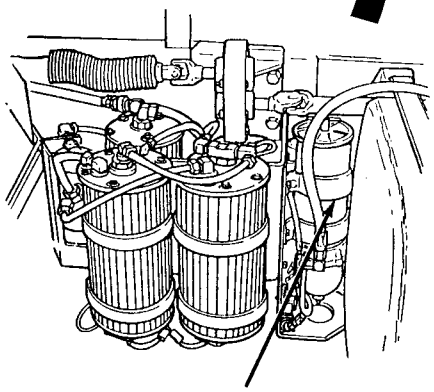
VISUAL INSPECTION

Check fuel/water separator fuel bowl for contamination.

(1) If contaminated, drain contaminated fuel from tank, replace secondary fuel filter (Para 4-13) and service or replace fuel/water separator filters (Para 4-15 or 4-17) and fill fuel tank with clean fuel.
(2) If fuel is not contaminated, go to Step 3 of this Fault.



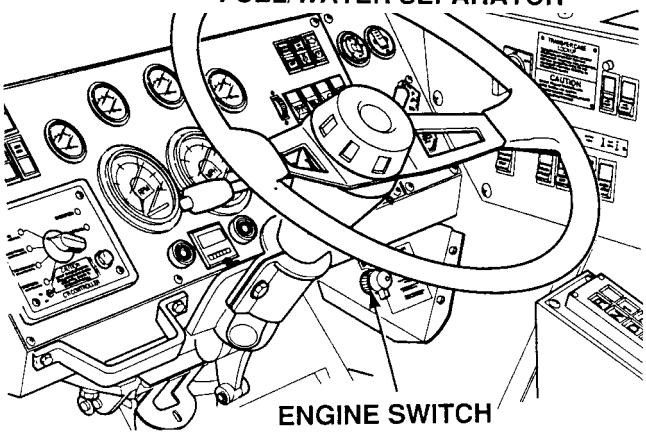
AIR DRYER GUARD SHOWN REMOVED FOR CLARITY (IF EQUIPPED)



FUEL/WATER SEPARATOR

VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
  (a) If engine does not exhaust black or gray smoke, fault has been corrected. Perform Step (2) below.
  (b) If engine exhausts black or gray smoke, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
(2) Turn OFF ENGINE switch.



ENGINE SWITCH

2-16. ENGINE TROUBLESHOOTING (CONT).

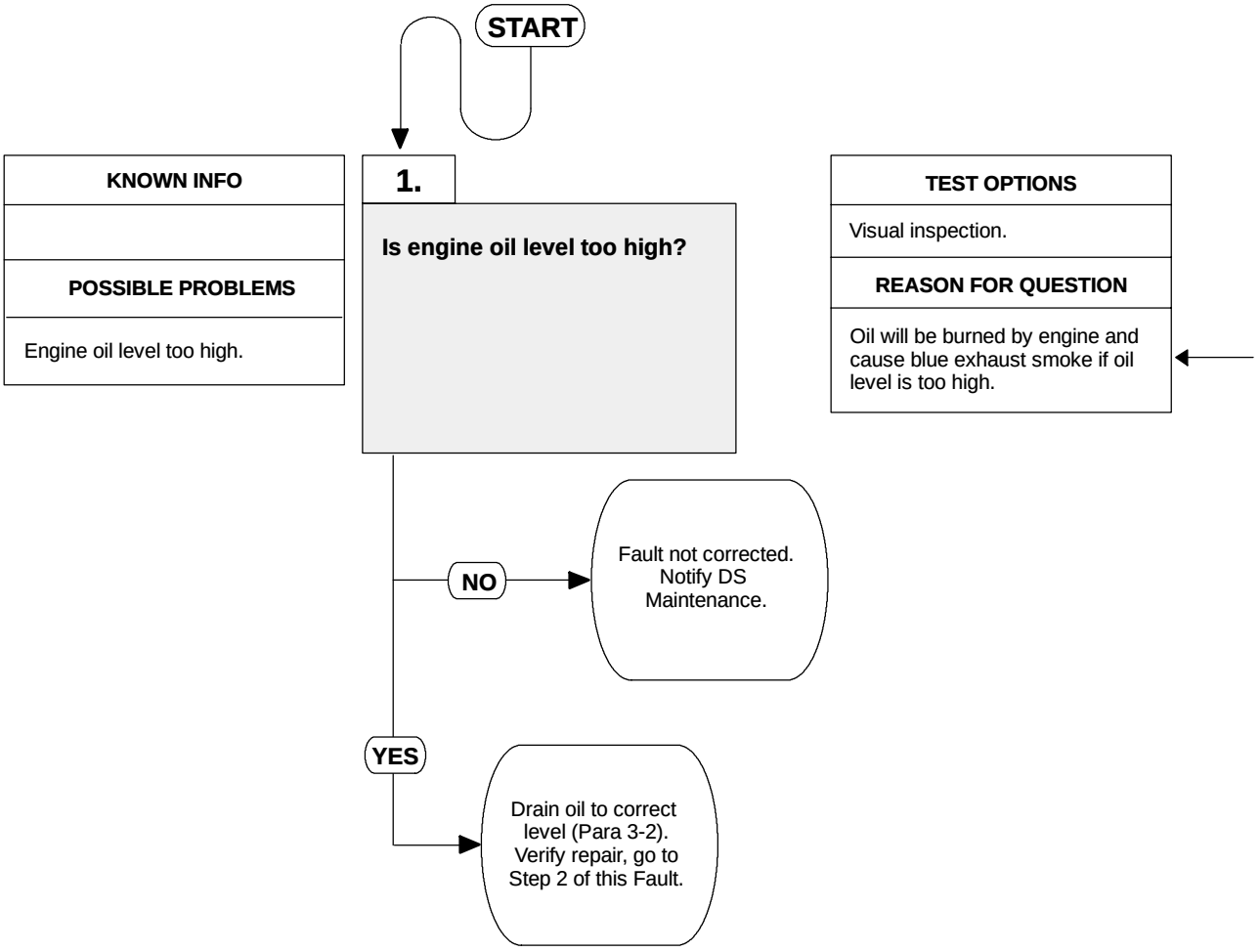
5. BLUE EXHAUST SMOKE (WATER TEMP GAGE READS OVER 180°F [82°C]).

INITIAL SETUP

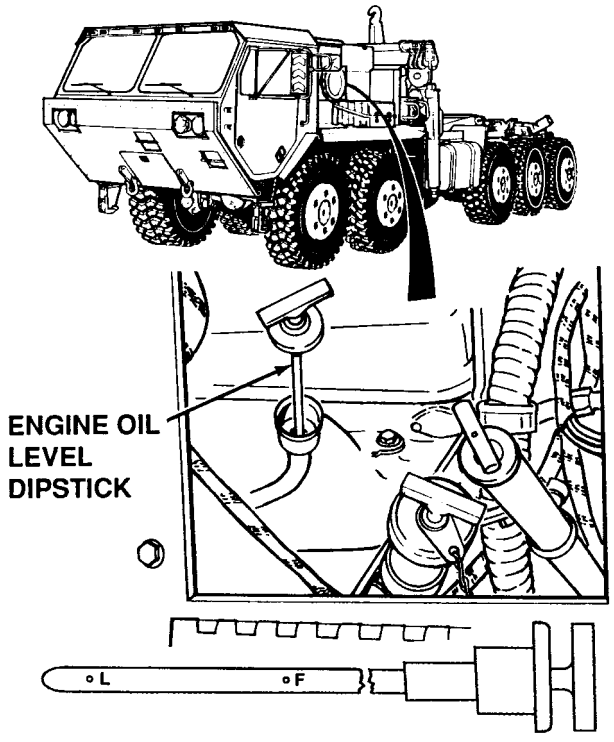
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

References
TM 9-2320-364-10

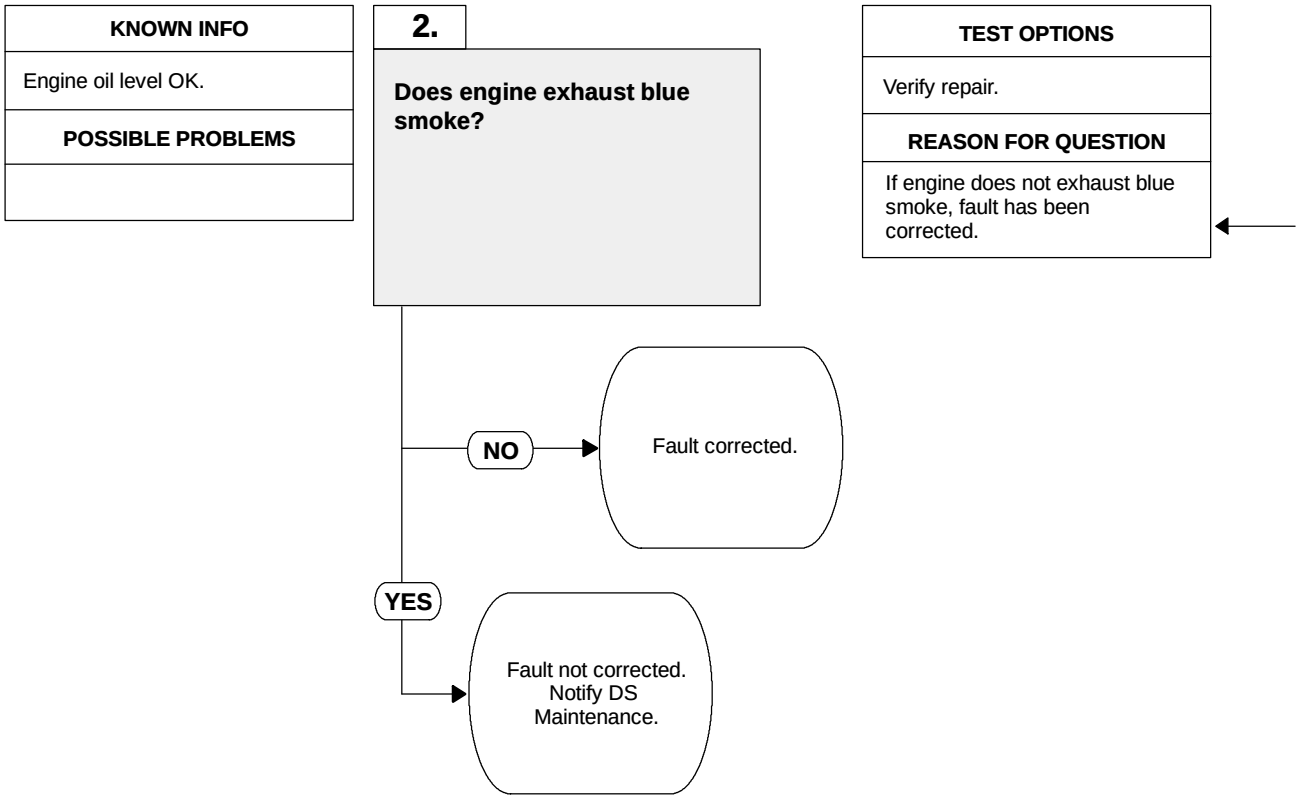
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



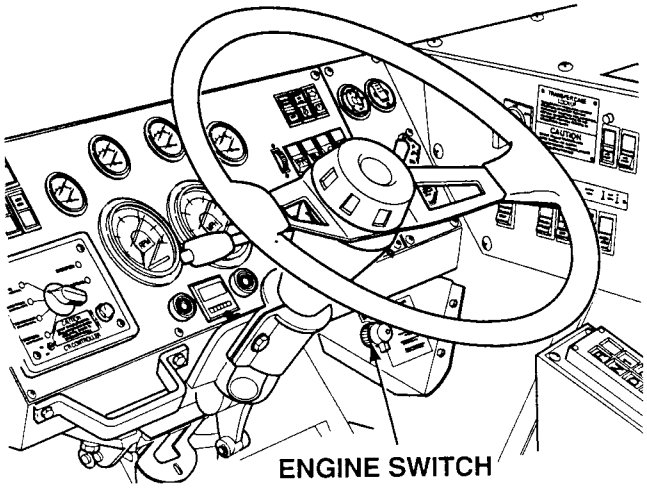
VISUAL INSPECTION
Check engine oil level on dipstick. Proper oil level is between LOW mark and FULL mark. (1) If level is above FULL mark, drain oil to correct level. (2) If oil level is OK, notify DS Maintenance.



5. BLUE EXHAUST SMOKE (WATER TEMP GAGE READS OVER 180°F [82°C]) (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10). (a) If engine exhausts blue smoke, fault has not been corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If engine does not exhaust blue smoke, fault has been corrected. (2) Turn OFF ENGINE switch.



2-16. ENGINE TROUBLESHOOTING (CONT).

6. WHITE EXHAUST SMOKE (WATER TEMP GAGE READS OVER 180°F [82°C]).

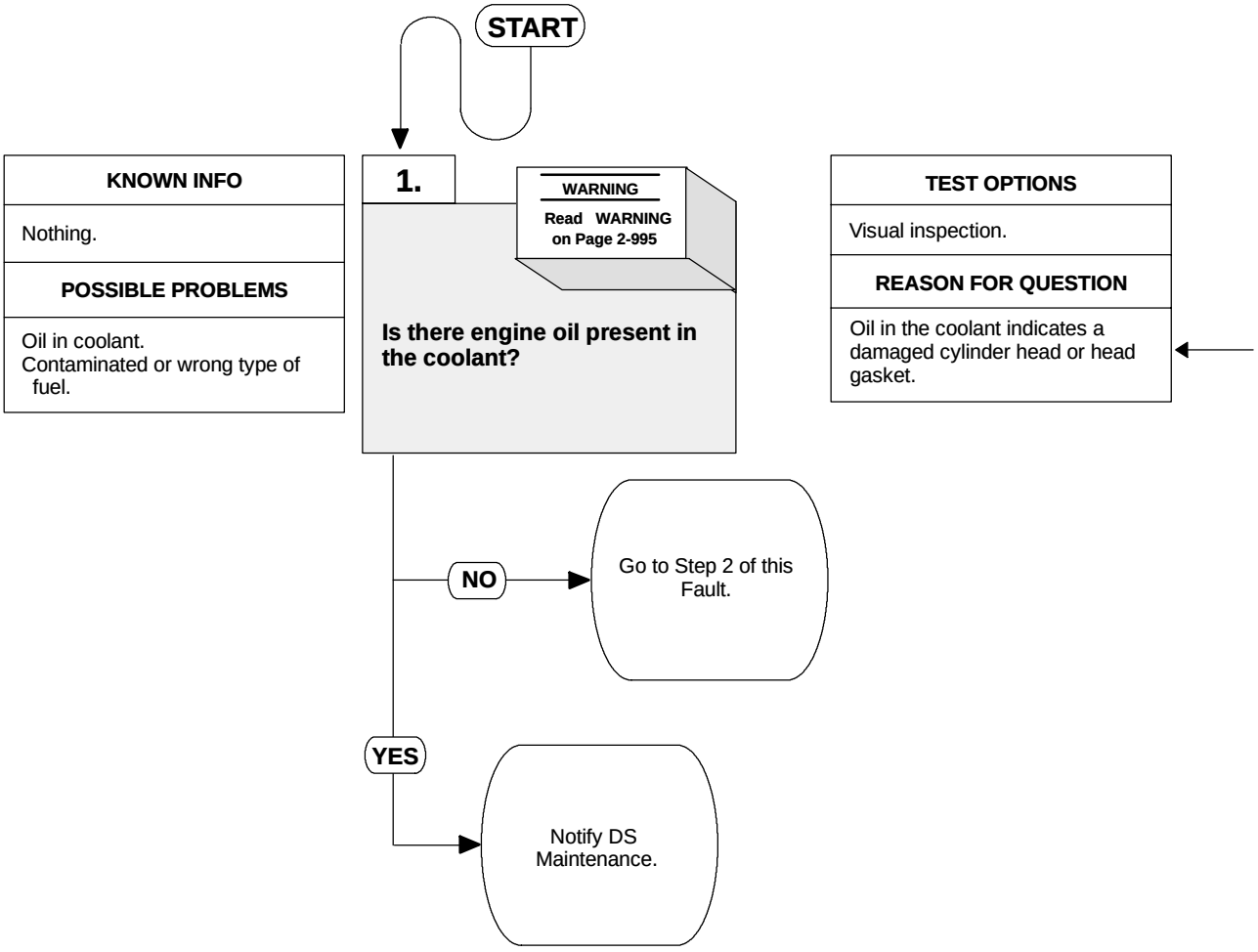
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

Materials/Parts
Rags, Wiping (Item 67, Appendix C)

References
TM 9-2320-364-10

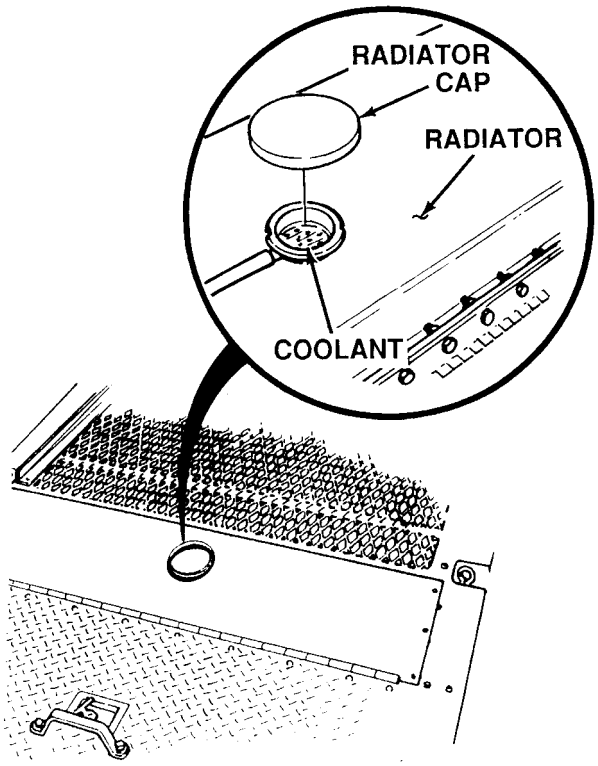
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.
- Use a clean, thick waste cloth or like material to remove the pressure cap. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.

VISUAL INSPECTION
Remove radiator cap and check for oil in the coolant. (1) If there is oil in the coolant, install radiator cap and notify DS Maintenance. (b) If there is no oil in the coolant, install radiator cap and go to Step 2 of this Fault.



6. WHITE EXHAUST SMOKE (WATER TEMP GAGE READS OVER 180°F [82°C]) (CONT).

KNOWN INFO
Coolant OK.
POSSIBLE PROBLEMS
Contaminated or wrong type of fuel.

2.

WARNING
Read WARNING on Page 2-997

Is fuel in fuel tank the proper type, and is it free from contamination?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
Exhaust smoke may be white if fuel is contaminated or the wrong type.

NO → Service or replace fuel/water separator (Para 4-15 or 4-17), replace secondary fuel filter (Para 4-13) and drain tank. Verify repair, go to Step 3 of this Fault.

YES → Fault not corrected. Notify DS Maintenance.

KNOWN INFO
Coolant OK. Fuel not contaminated.
POSSIBLE PROBLEMS

3.

Does engine exhaust white smoke at normal operating temperature 180°F to 230°F (82°C to 110°C)?

TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If engine does not exhaust white smoke, fault has been corrected.

NO → Fault corrected.

YES → Fault not corrected. Notify DS Maintenance.

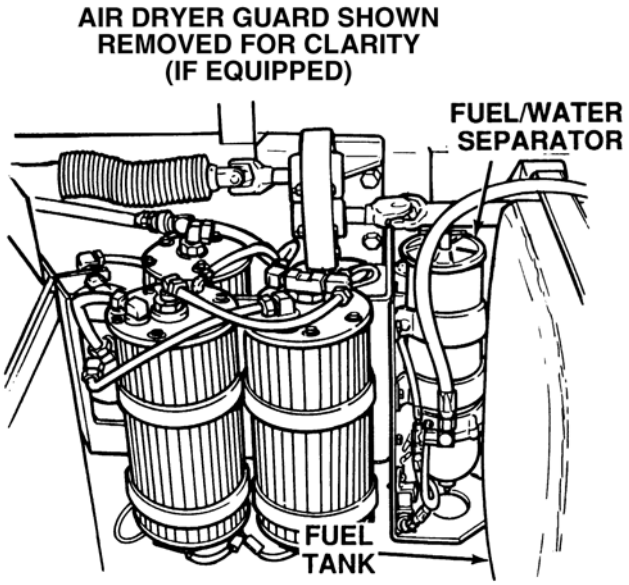
WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death keep flame away from fuel and keep fire extinguisher within easy reach.

VISUAL INSPECTION

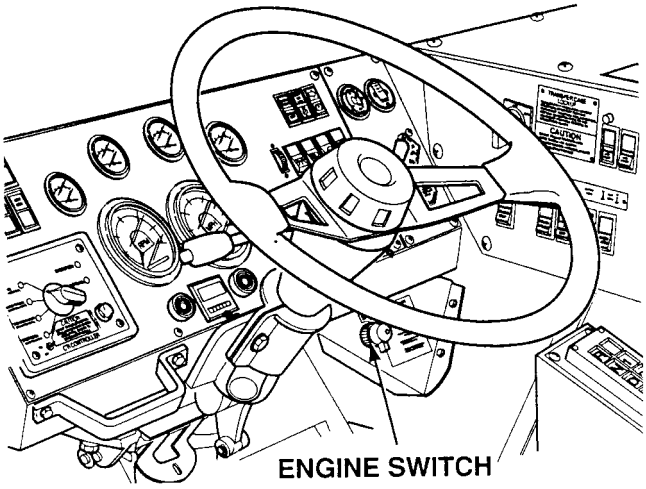
Check fuel/water separator fuel bowl for contamination.

(1) If contaminated, drain contaminated fuel from tank, replace secondary fuel filter (Para 4-13) and service or replace fuel/water separator filters (Para 4-15 or 4-17) and fill fuel tank with clean fuel.
(2) If fuel is not contaminated, fault is not corrected. Notify DS Maintenance.



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) and allow to warm to normal operating temperature 180°F to 230°F (82°C to 110°C).
   (a) If engine does not exhaust white smoke, fault has been corrected. Perform Step (2) below.
   (b) If engine exhausts white smoke, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
(2) Turn OFF ENGINE switch.



2-16. ENGINE TROUBLESHOOTING (CONT).

7. ENGINE DOES NOT DEVELOP FULL POWER.

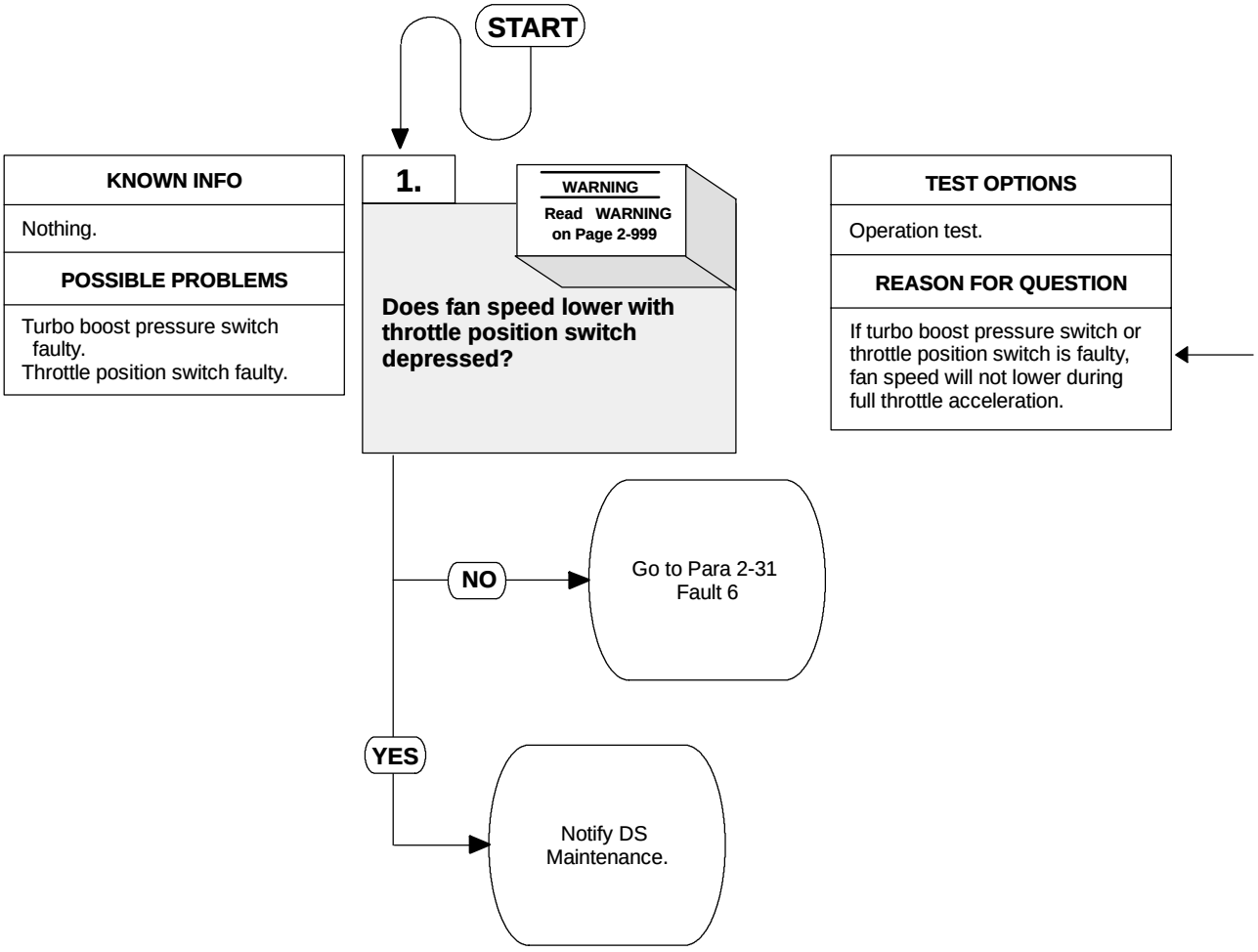
INITIAL SETUP

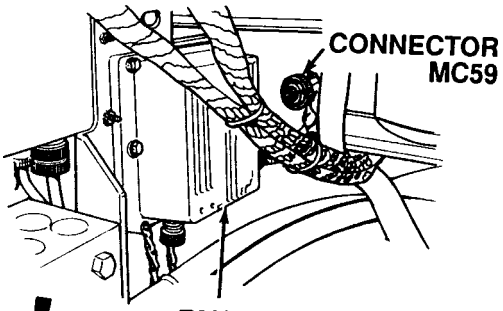
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

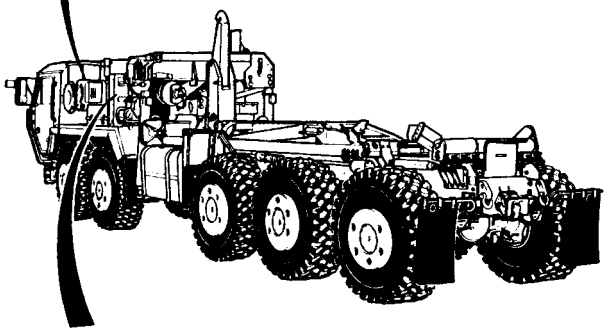
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

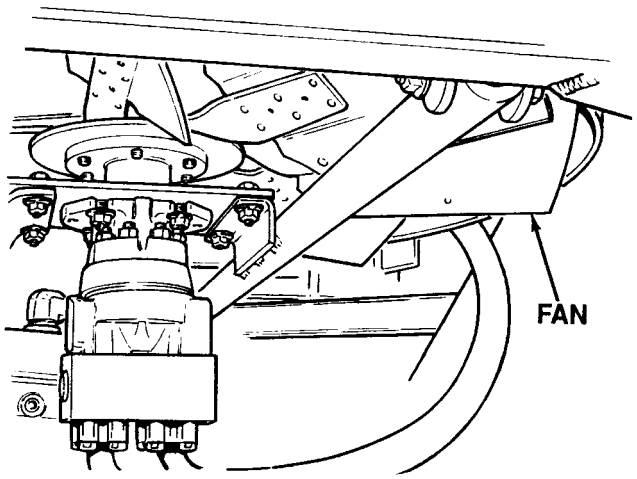






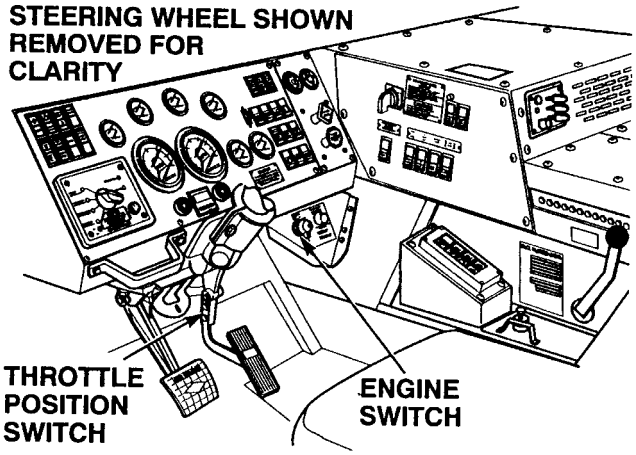
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits a direct short may result. Damage to equipment, injury or death to personnel may occur.



OPERATION TEST

(1) Disconnect connector MC59 from fan controller.
(2) Start engine (TM 9-2320-364-10).
(3) Observe fan, it should be operating at high speed.
(4) Push in on throttle position switch.
  (a) If fan speed does not slow, perform Steps (5) and (6) below and go to Para 2-31, Fault 6
  (b) If fan speed does slow, perform Steps (5) and (6) below and notify DS Maintenance.
(5) Turn OFF ENGINE switch.
(6) Connect connector MC59 to fan controller.



2-16. ENGINE TROUBLESHOOTING (CONT).

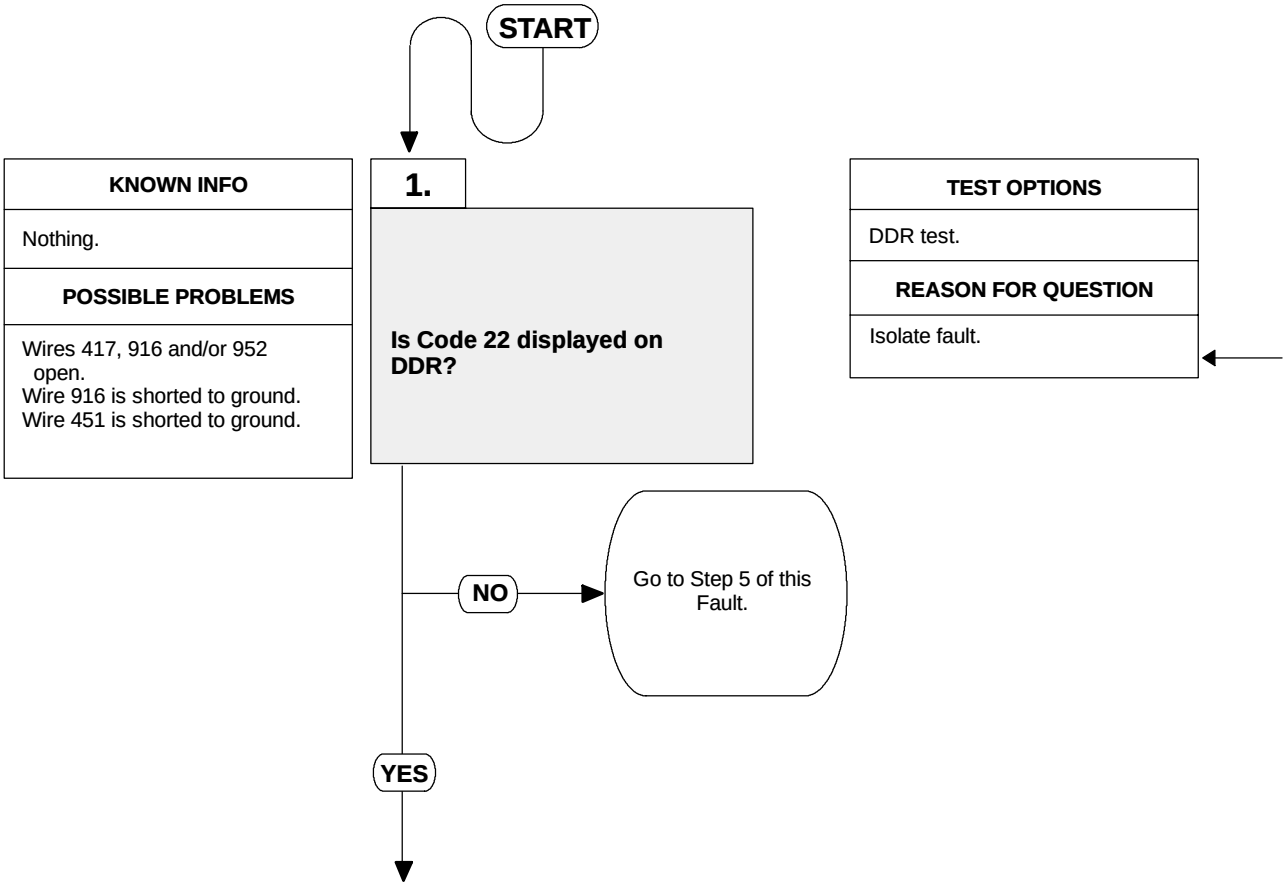
8. ENGINE HAS NO THROTTLE RESPONSE WITH NO CODES OR CODE 22.

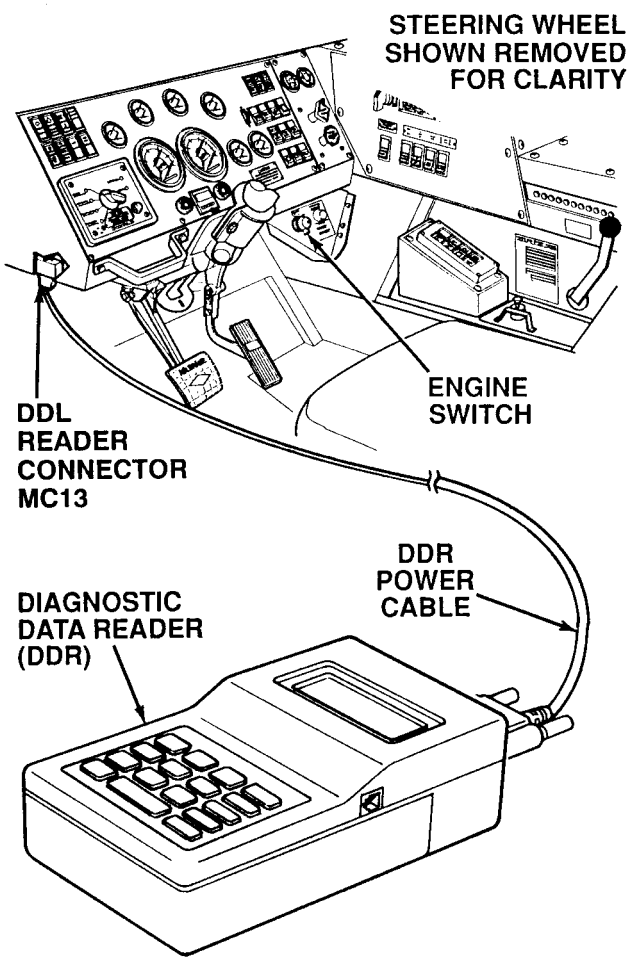
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
DDEC Repair Kit (Item 15, Appendix G)
Multimeter, (Item 44, Appendix G)
Reader, Diagnostic (Item 53, Appendix G)
Jumperwire

References
TM 9-2320-364-10
TM 9-4910-571-12&P

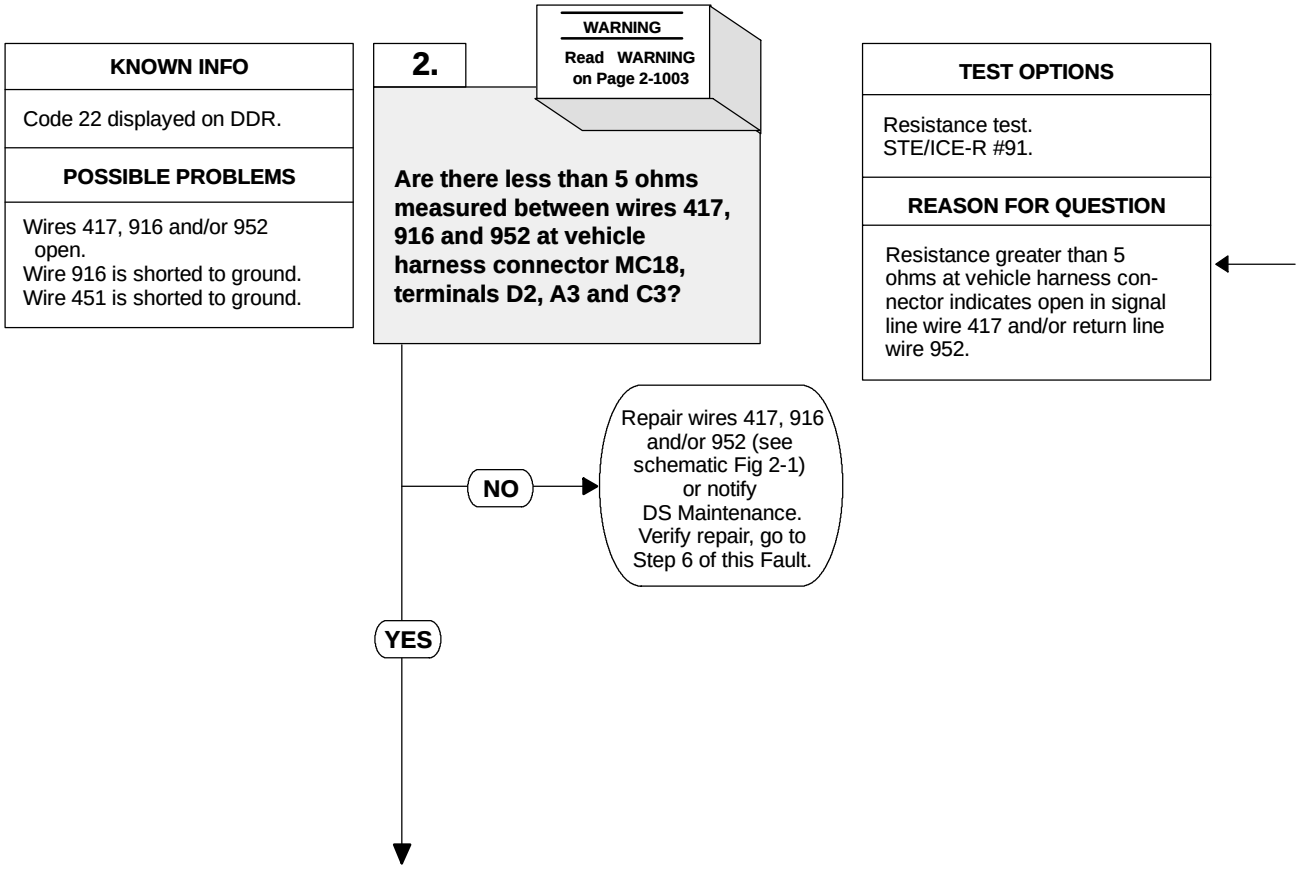
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover opened, (TM 9-2320-364-10)





DDR TEST
(1) Connect DDR to DDL connector MC13. (2) Turn ON ENGINE switch (TM 9-2320-364-10). (3) Select MODE 01 (ACTIVE CODES) on DDR. (a) If no codes are displayed go to Step 5 of this Fault. (b) If only code 22 is displayed, turn OFF ENGINE switch and go to Step 2 of this Fault.

8. ENGINE HAS NO THROTTLE RESPONSE WITH NO CODES OR CODE 22 (CONT).



WARNING

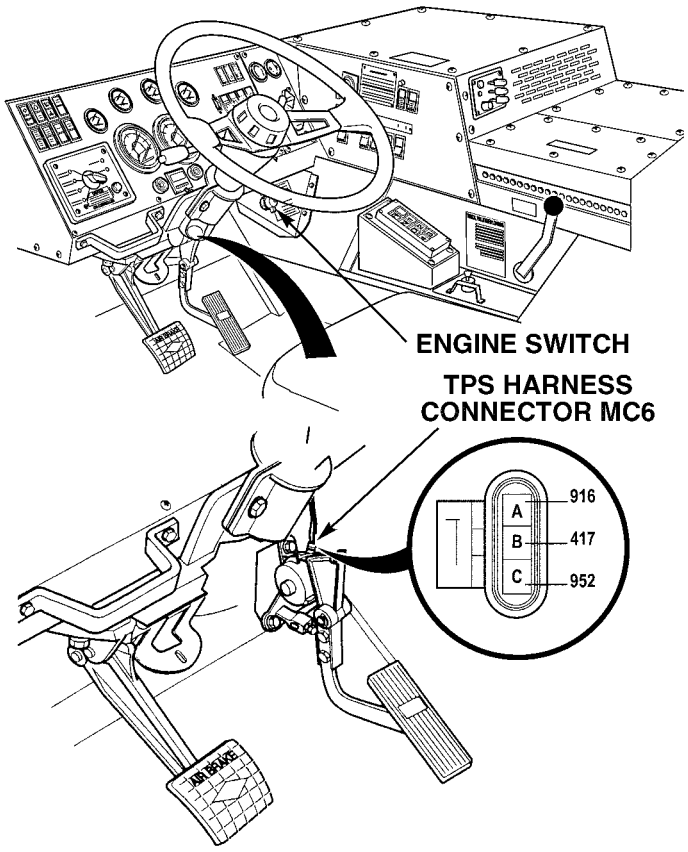
- Allow engine to cool before performing trouble-shooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

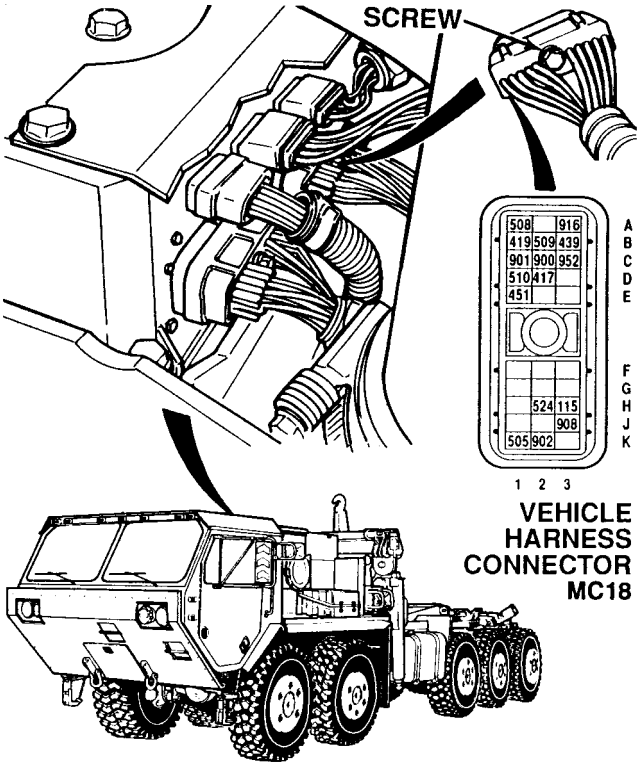
CAUTION

- Use jumperwire only between terminals indicated. Failure to comply may result in damage to DDEC components or wiring.
- DDEC ECM connector terminals are easily damaged. Use care when connecting and disconnecting connectors.

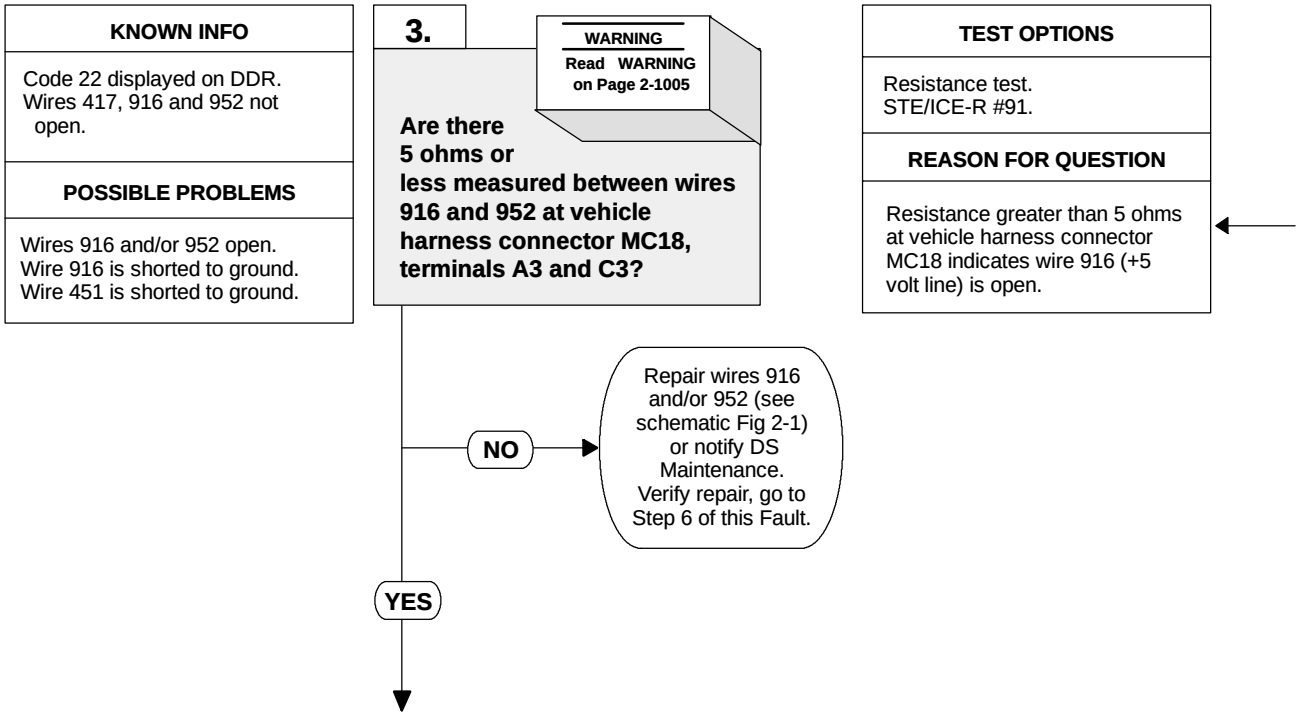
RESISTANCE TEST

(1) Place jumperwire between TPS harness connector MC6, terminals A and B.
(2) Loosen screw and disconnect vehicle harness connector MC18.
(3) Set multimeter select switch to ohms.
(4) Read resistance between wires 417 and 952 at vehicle harness connector MC18, terminals C3 and D2.
  (a) If there are more than 5 ohms present, remove jumperwire and repair wires 417 and/or 952 (See schematic Fig 2-1) or notify DS Maintenance.
  (b) If there are 5 ohms or less, go to Step (5) below.
(5) Read resistance between wires 417, 916 and 952 at vehicle harness connector MC18, terminals D2, A3 and C3.
  (a) If there are more than 5 ohms present, remove jumperwire and repair wires 417, 916 and/or 952 (See schematic Fig 2-1) or notify DS Maintenance.
  (b) If there are 5 ohms or less, wires 417, 916 and 952 are OK.
(6) Remove jumperwire.





8. ENGINE HAS NO THROTTLE RESPONSE WITH NO CODES OR CODE 22 (CONT).



WARNING

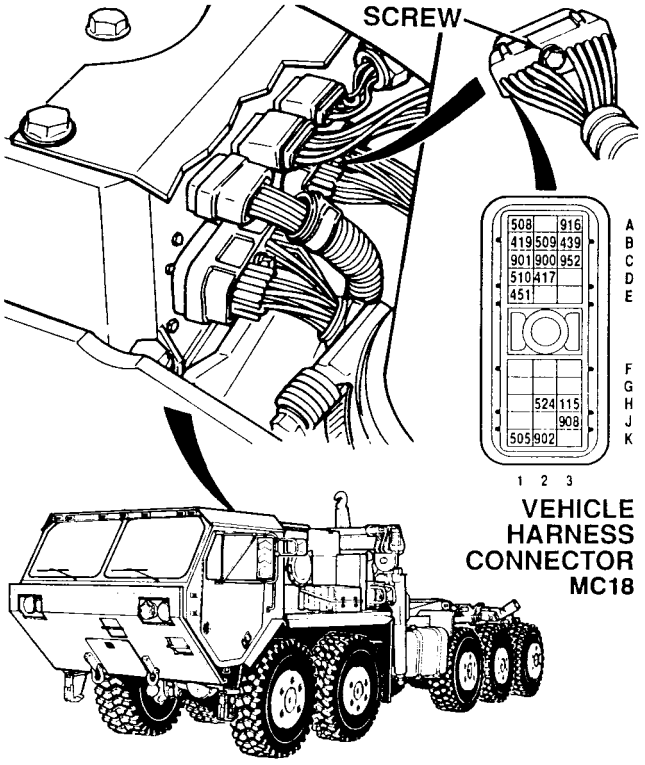
- Allow engine to cool before performing trouble-shooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

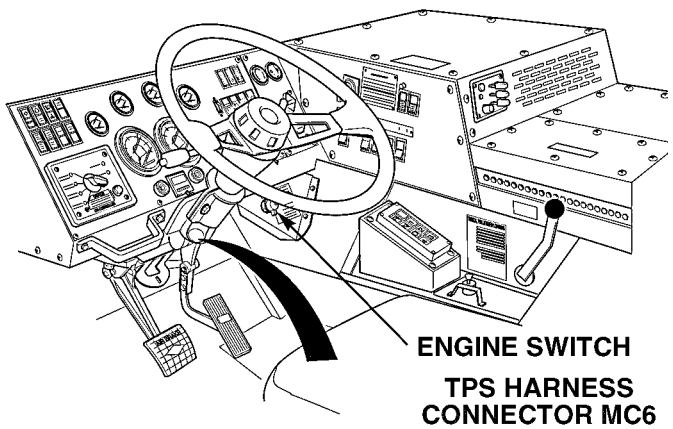
CAUTION

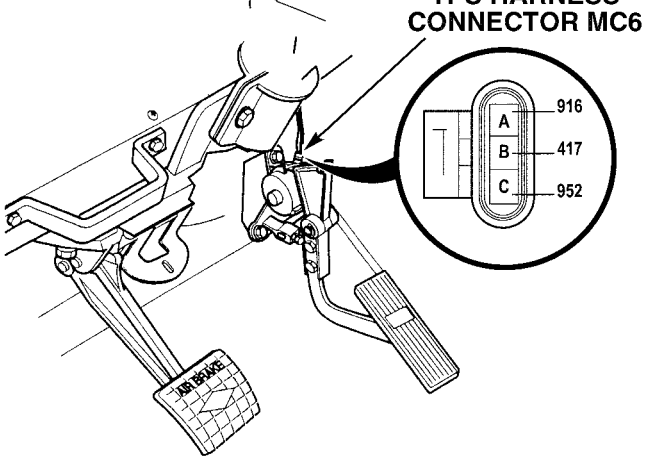
Use jumperwire only between terminals indicated. Failure to comply may result in damage to DDEC components or wiring.

RESISTANCE TEST

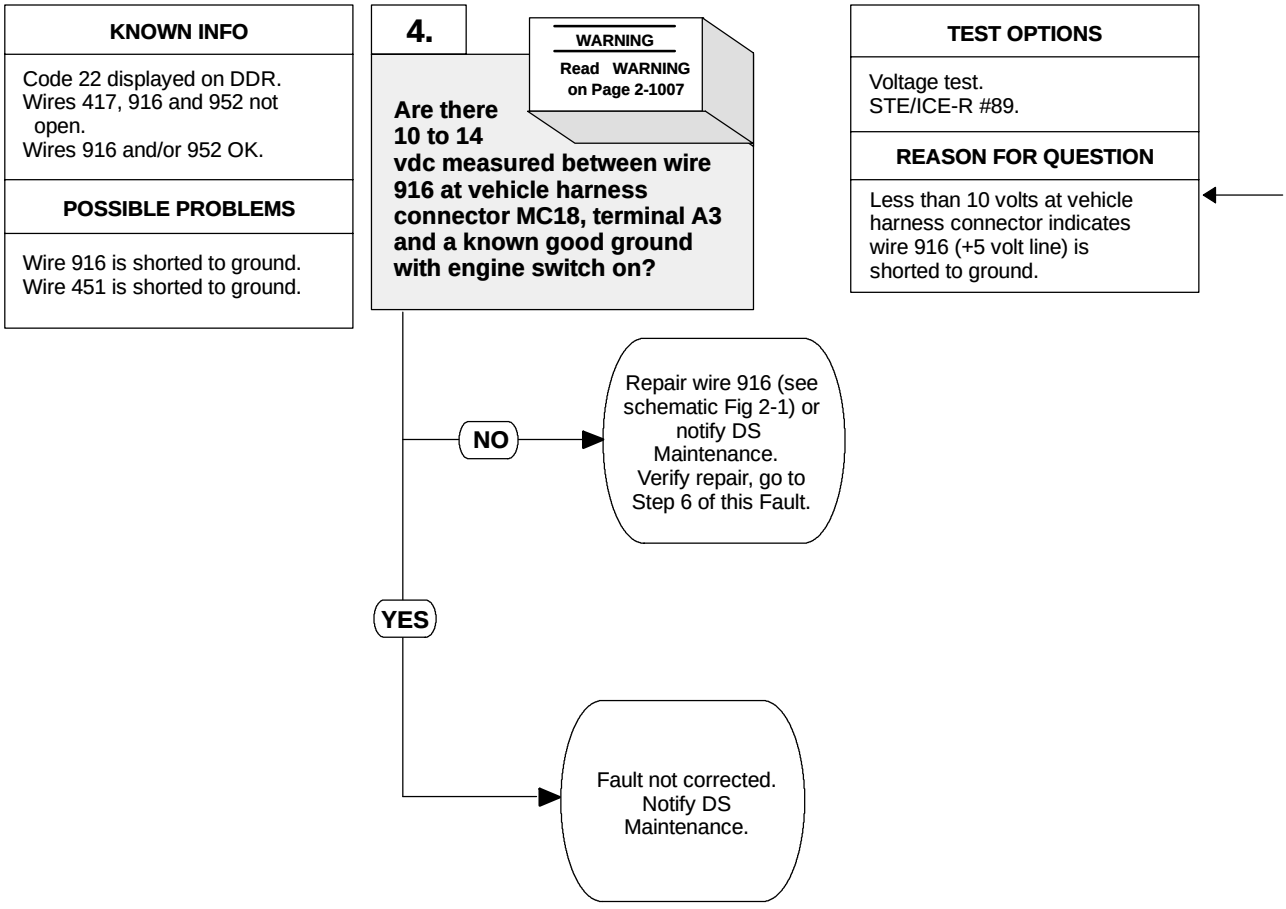
(1) Loosen screw and disconnect vehicle harness connector MC18.
(2) Place a jumperwire between terminals A and C on TPS harness connector.
(3) Read resistance between wires 916 and 952 at vehicle harness connector MC18, terminals A3 and C3.
  (a) If there are more than 5 ohms present, repair wires 916 and/or 952 (see schematic Fig 2-1) or notify DS Maintenance and perform Steps (4) through (7).
  (b) If there are 5 ohms or less present, wires 916 and 952 are OK.
(4) Remove jumperwire.
(5) Connect TPS connector.
(6) Connect vehicle harness connector MC18 to DDEC ECM and tighten screw.
(7) Close top engine access cover.







8. ENGINE HAS NO THROTTLE RESPONSE WITH NO CODES OR CODE 22 (CONT).

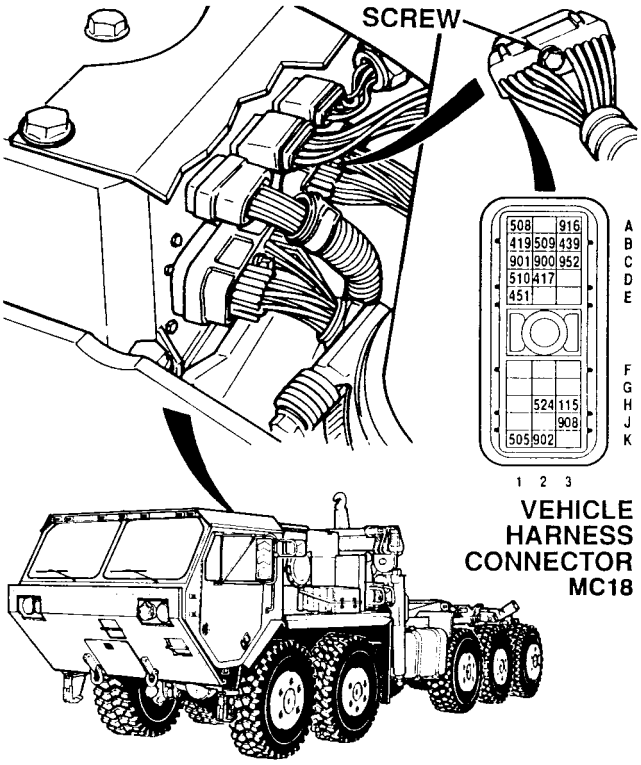


WARNING

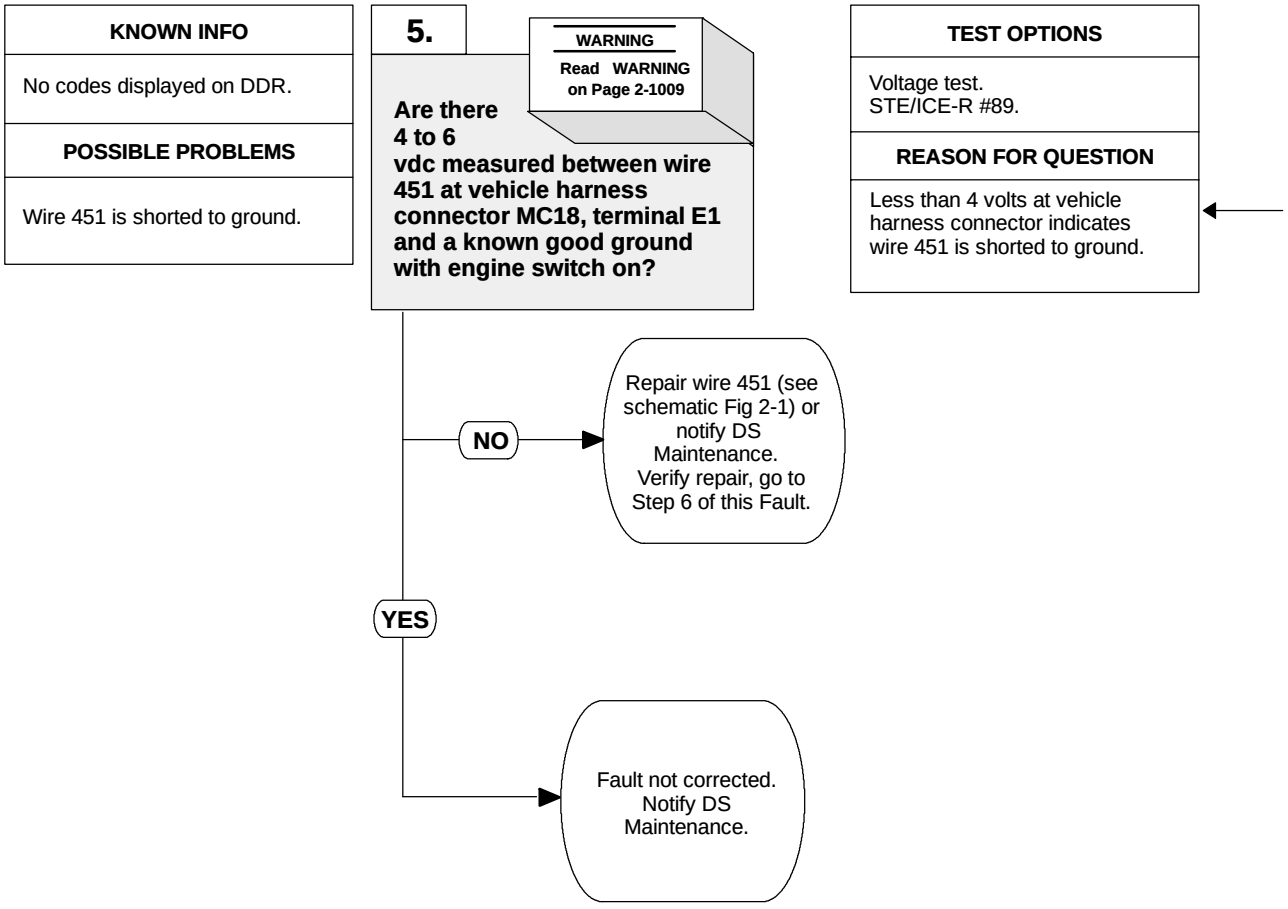
- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to vehicle harness connector MC18, terminal A3.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Are there 4 to 6 vdc present between wire 916 at vehicle harness connector MC18, terminal A3 and a known good ground?
   (a) If less than 4 vdc are present, turn OFF ENGINE switch and repair wire 916 (see schematic Fig 2-1) or notify DS Maintenance.
   (b) If 4 to 6 vdc are present, turn OFF ENGINE switch and go to Step 5 of this Fault.



8. ENGINE HAS NO THROTTLE RESPONSE WITH NO CODES OR CODE 22 (CONT).

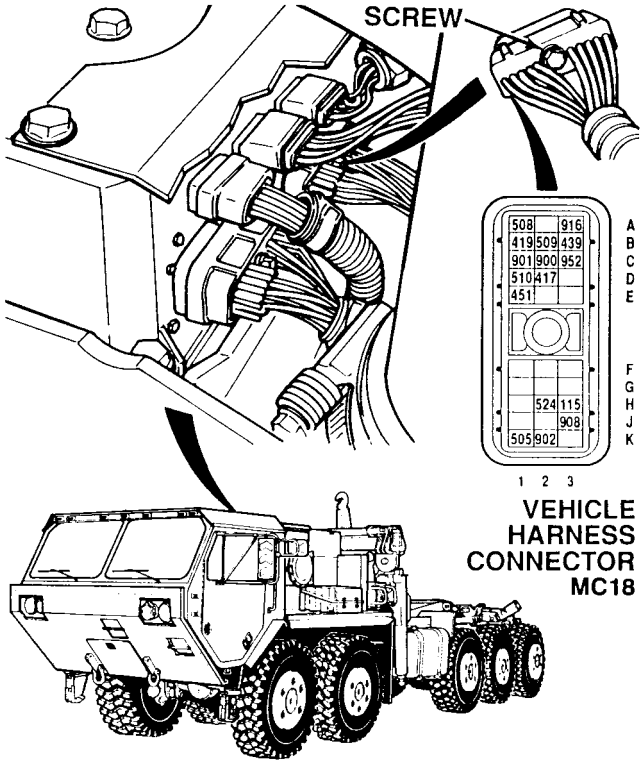


WARNING

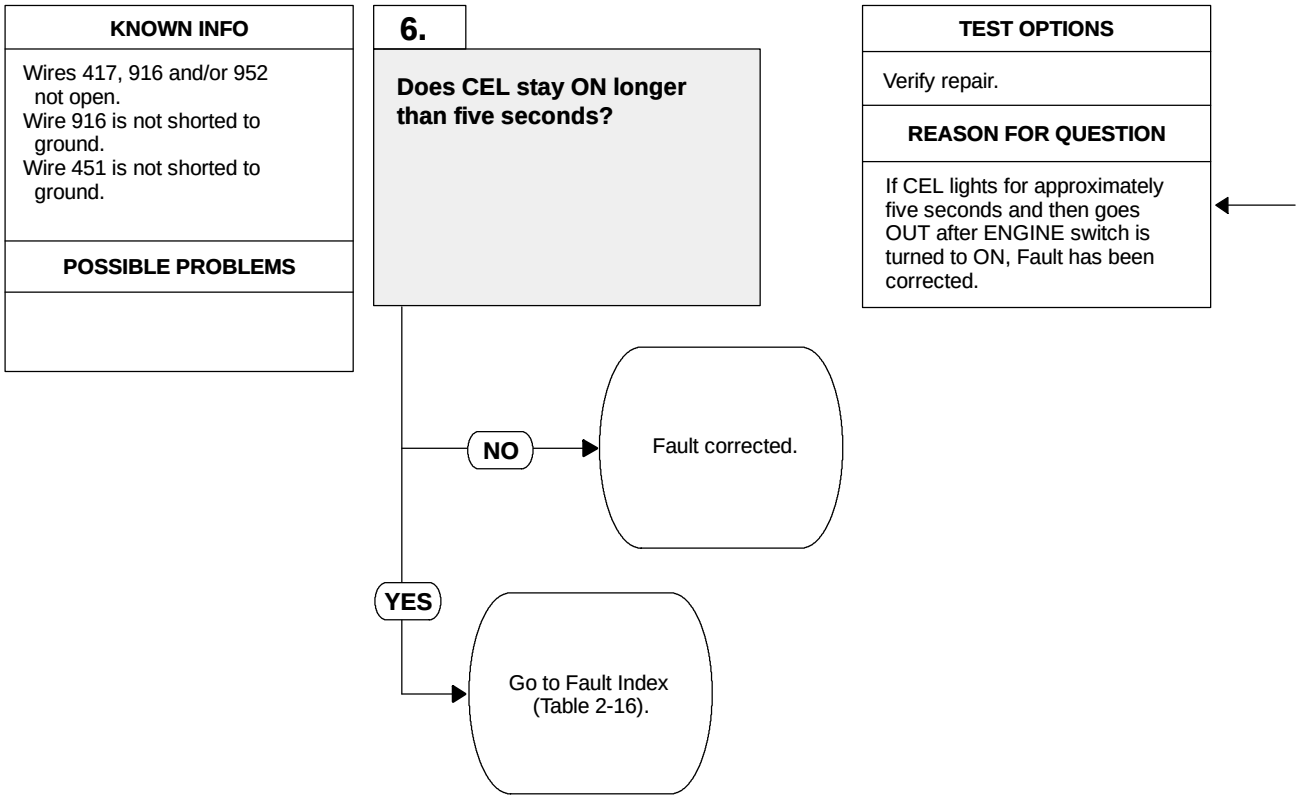
- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to vehicle harness connector MC18, terminal E1.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Are there 4 to 6 vdc present between wire 451 at vehicle harness connector MC18, terminal E1 and a known good ground?
   (a) If less than 4 vdc are present, turn OFF ENGINE switch and repair wire 451 (see schematic Fig 2-1) or notify DS Maintenance.
   (b) If 4 to 6 vdc are present, turn OFF ENGINE switch and go to Step 6 of this Fault.

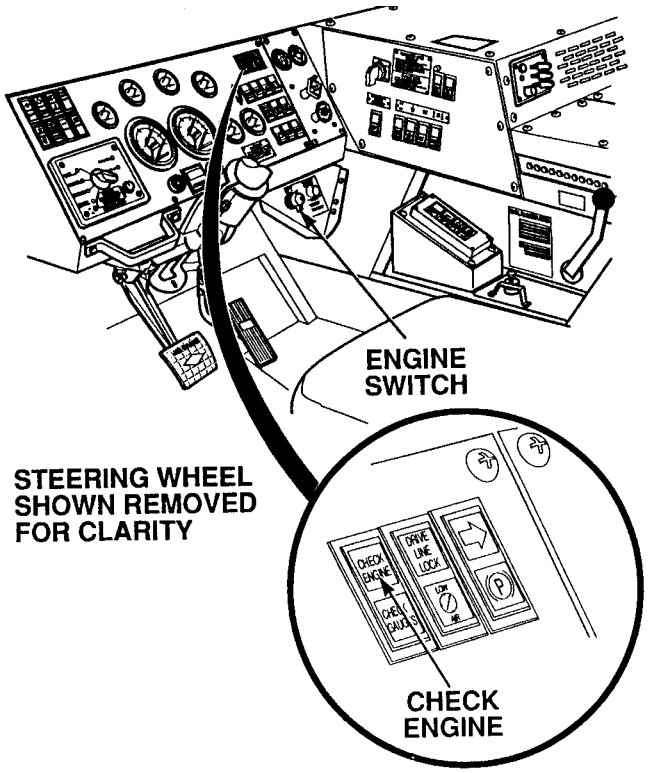


8. ENGINE HAS NO THROTTLE RESPONSE WITH NO CODES OR CODE 22 (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Clear codes on DDR (Para 2-11).
(3) Select MODE 01 (ACTIVE CODES) on DDR.
(4) If CEL does not stay ON, start engine and run for 8 minutes or until CEL comes ON.
    (a) If CHECK ENGINE light comes on for about five seconds and then goes off, fault has been corrected. Perform Steps (5) and (6) below.
    (b) If CHECK ENGINE light comes on and stays on, perform Steps (5) and (6) below and go to Fault Index (Table 2-16).
(5) Turn OFF ENGINE switch.
(6) Disconnect DDR from DDL connector MC13.



2-17. FUEL SYSTEM TROUBLESHOOTING.

This paragraph covers Fuel System Troubleshooting. The Fuel System Fault Index, Table 2-34, lists faults for the Fuel System of the PLS truck. Refer to electrical schematic Figure 2-23 when performing tests and corrective actions.

Table 2-34. Fuel System Fault Index

Fault No.	Description	Page
1.	Engine Cranks But Fails To Start Or Stalls After Starting	2-1014
2.	Engine Starts But Misfires, Runs Rough, Or Lacks Power	2-1044
3.	Engine Does Not Start When Ether Starting Aid Is Used In Cold Weather	2-1058

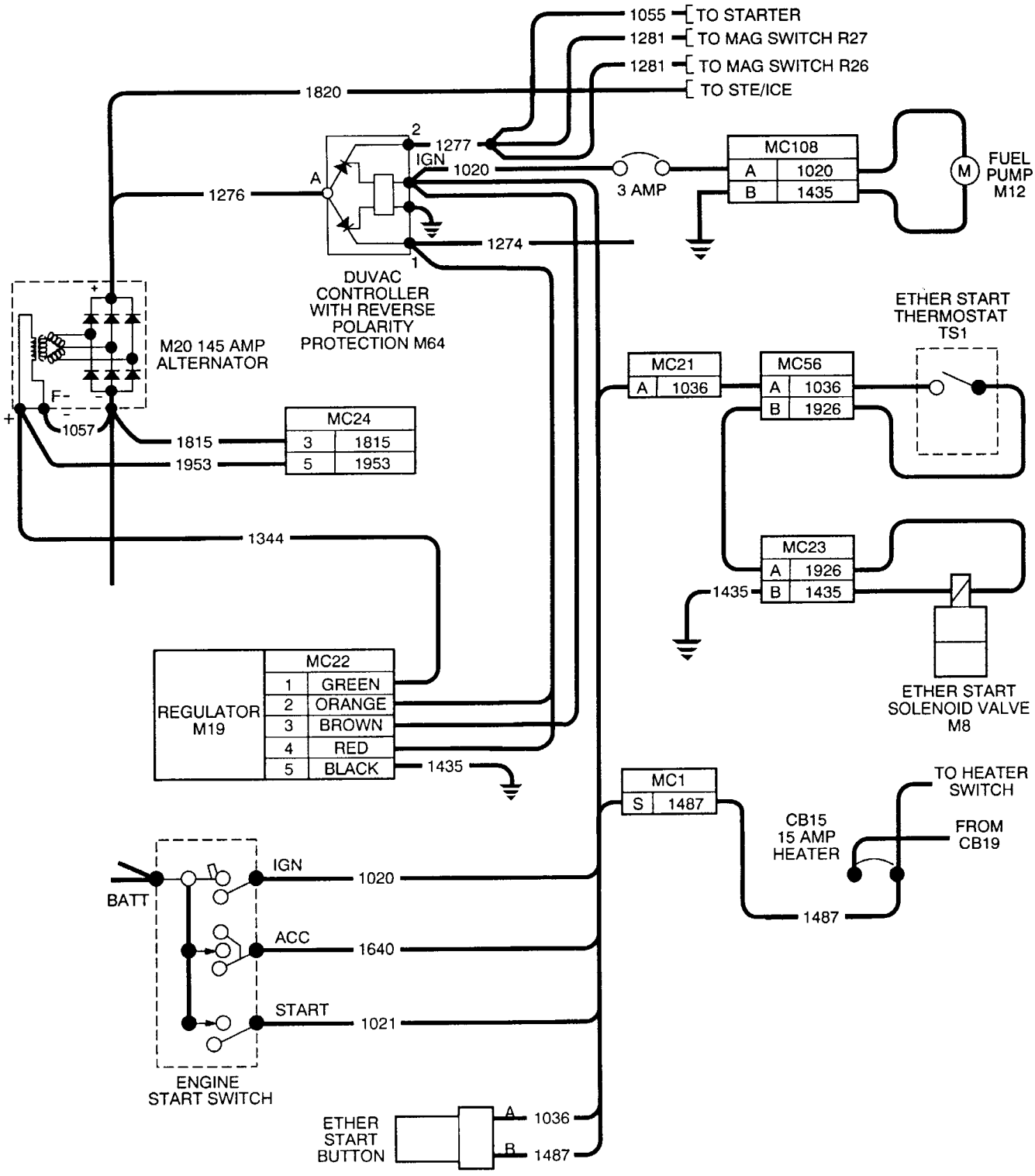


Figure 2-23. Fuel System Electrical Schematic

2-17. FUEL SYSTEM TROUBLESHOOTING (CONT).

1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING.

INITIAL SETUP

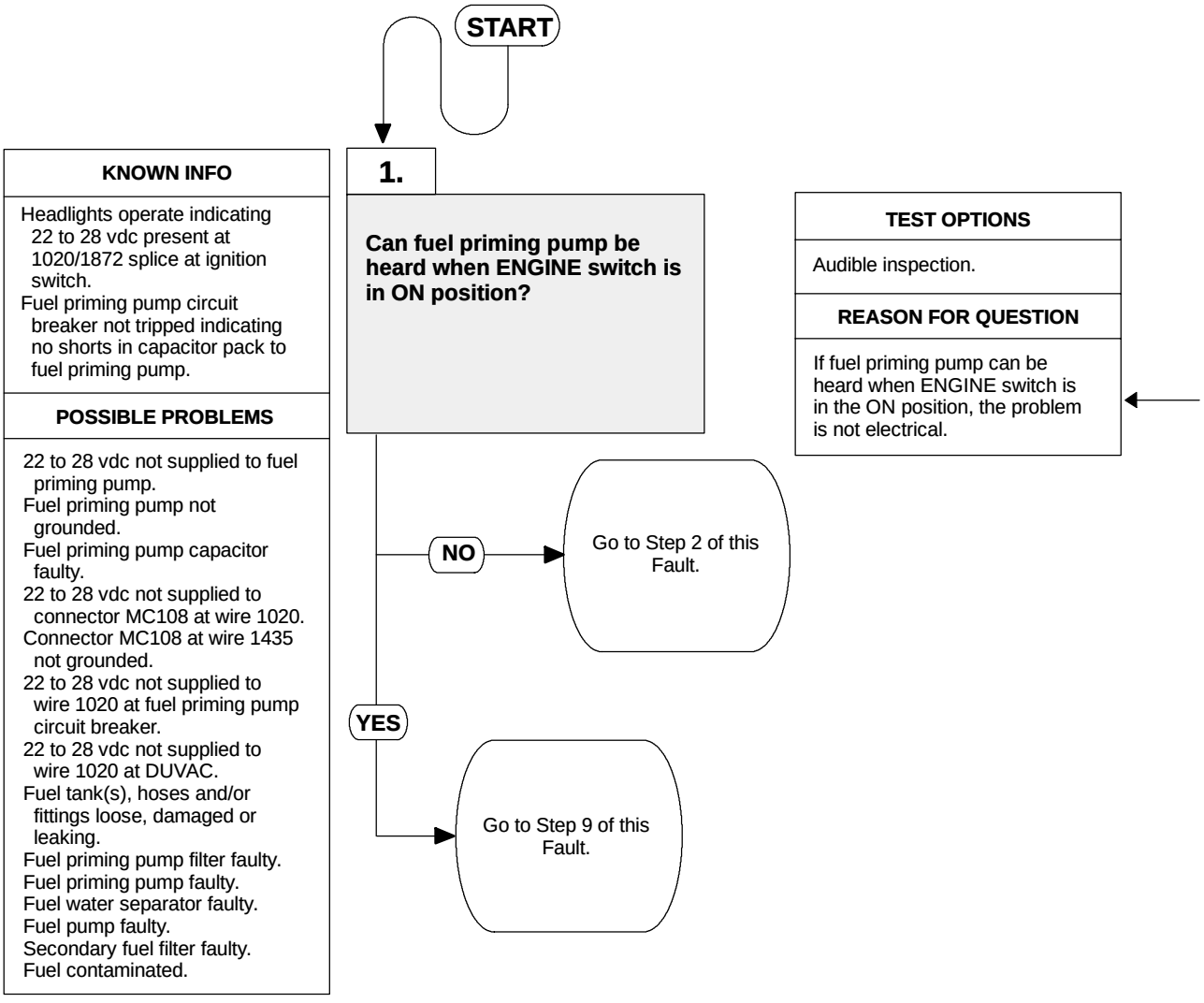
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Pan, Drain (Item 46, Appendix G)

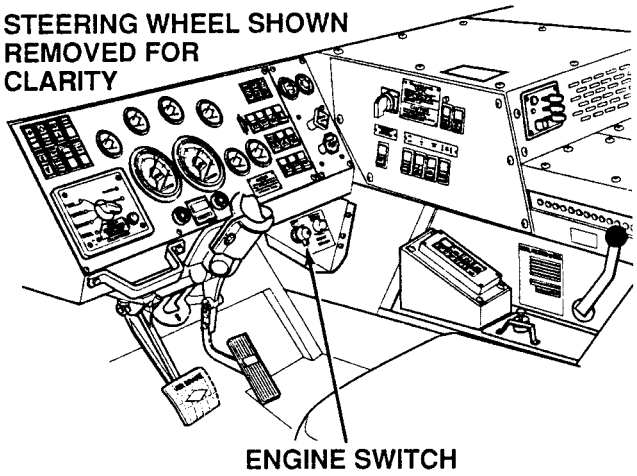
Materials/Parts
Lockwashers (26) (Item 195, Appendix F)
Gasket (Item 63, Appendix F)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

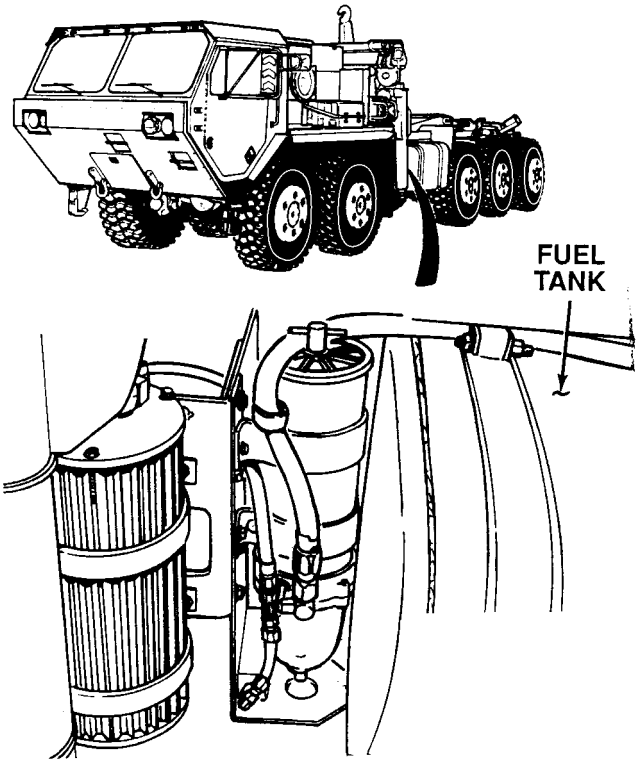
Equipment Condition
Engine off, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



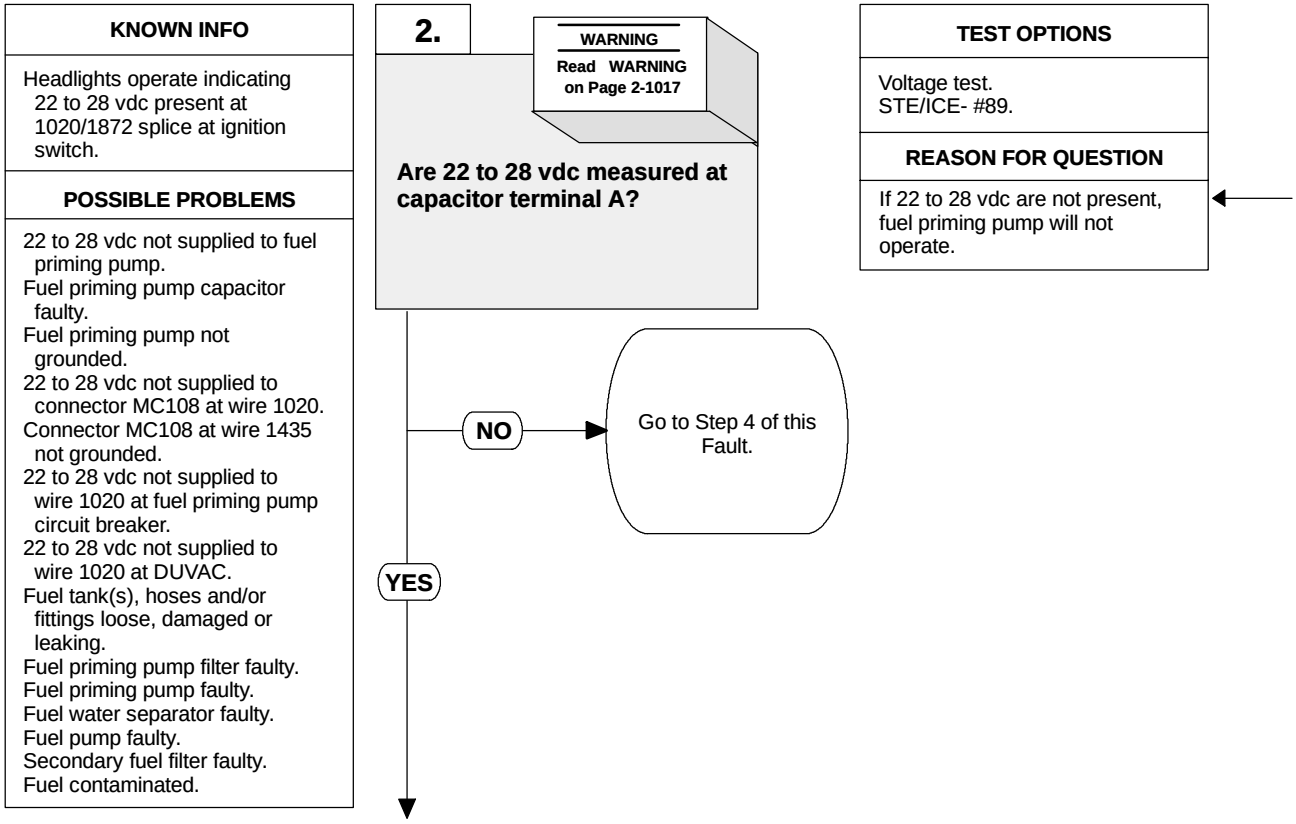


AUDIBLE INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Stand next to fuel tank.
  (a) If fuel priming pump clicking sound can be heard, turn OFF ENGINE switch, and go to Step 9 of this Fault.
  (b) If fuel priming pump clicking sound cannot be heard, turn OFF ENGINE switch, and go to Step 2 of this Fault.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

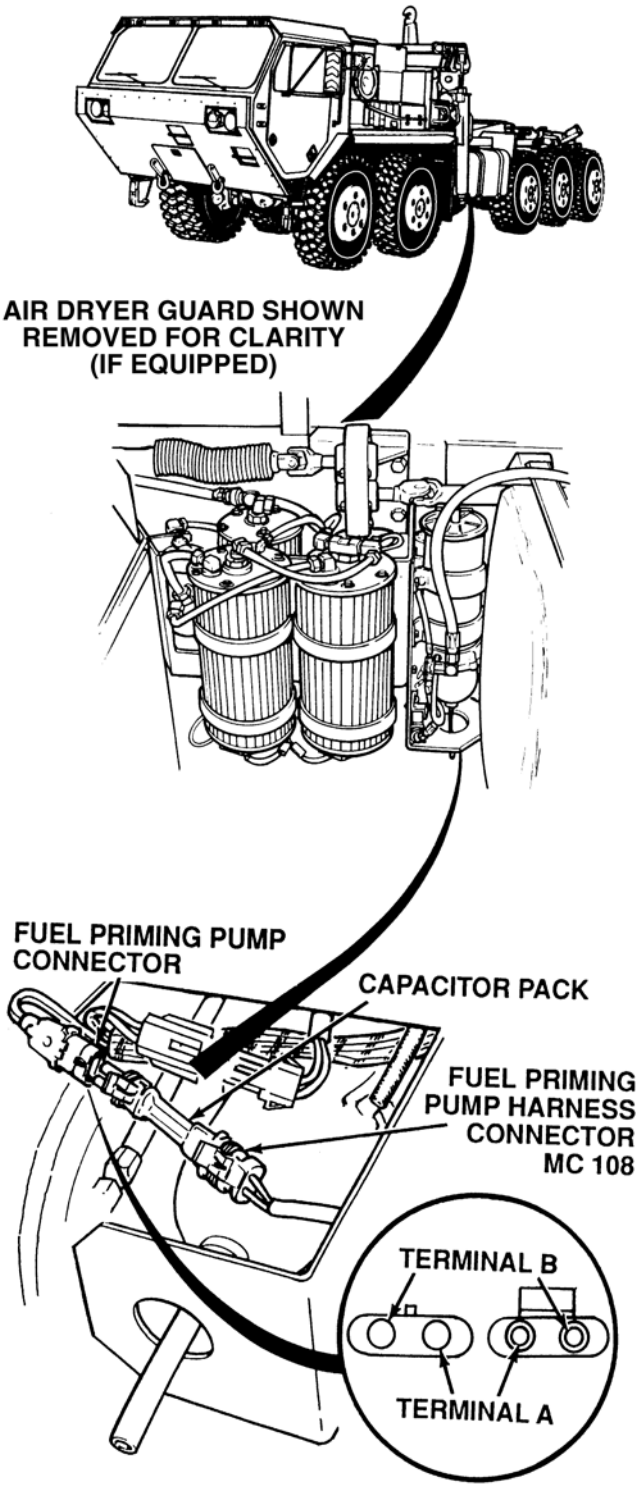


WARNING

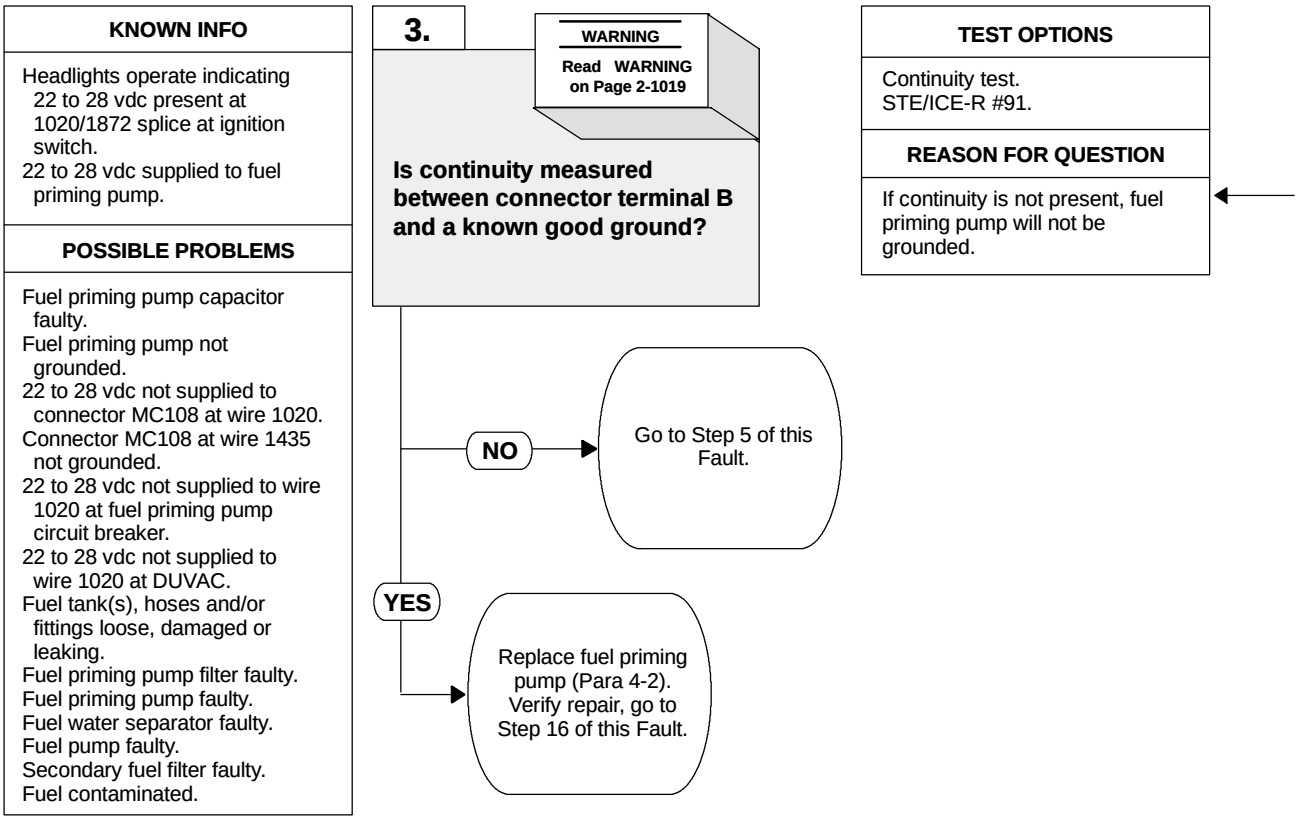
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Disconnect fuel priming pump connector from capacitor.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to the capacitor, terminal A.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 22 to 28 vdc volts are not present, turn OFF ENGINE switch, and go to Step 4 of this Fault.
    (b) If 22 to 28 vdc are present, wire to 1020 is OK.
(6) Turn OFF ENGINE switch.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

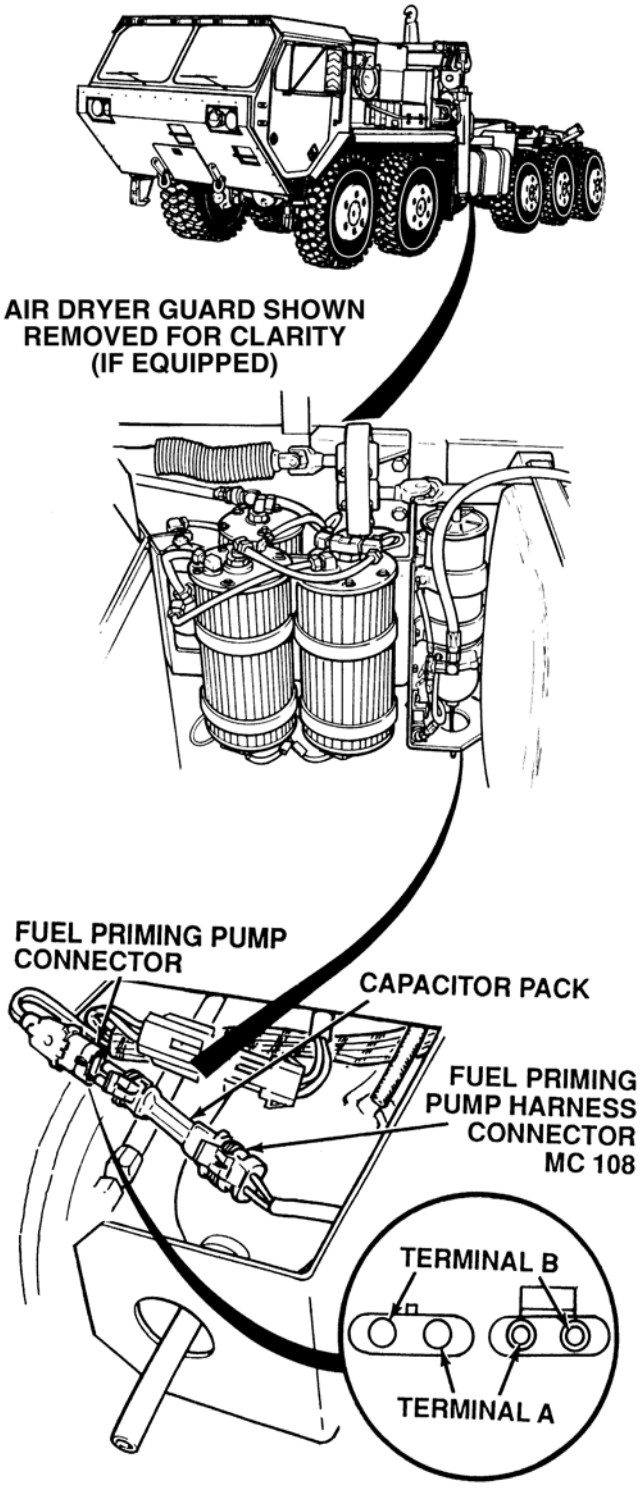


WARNING

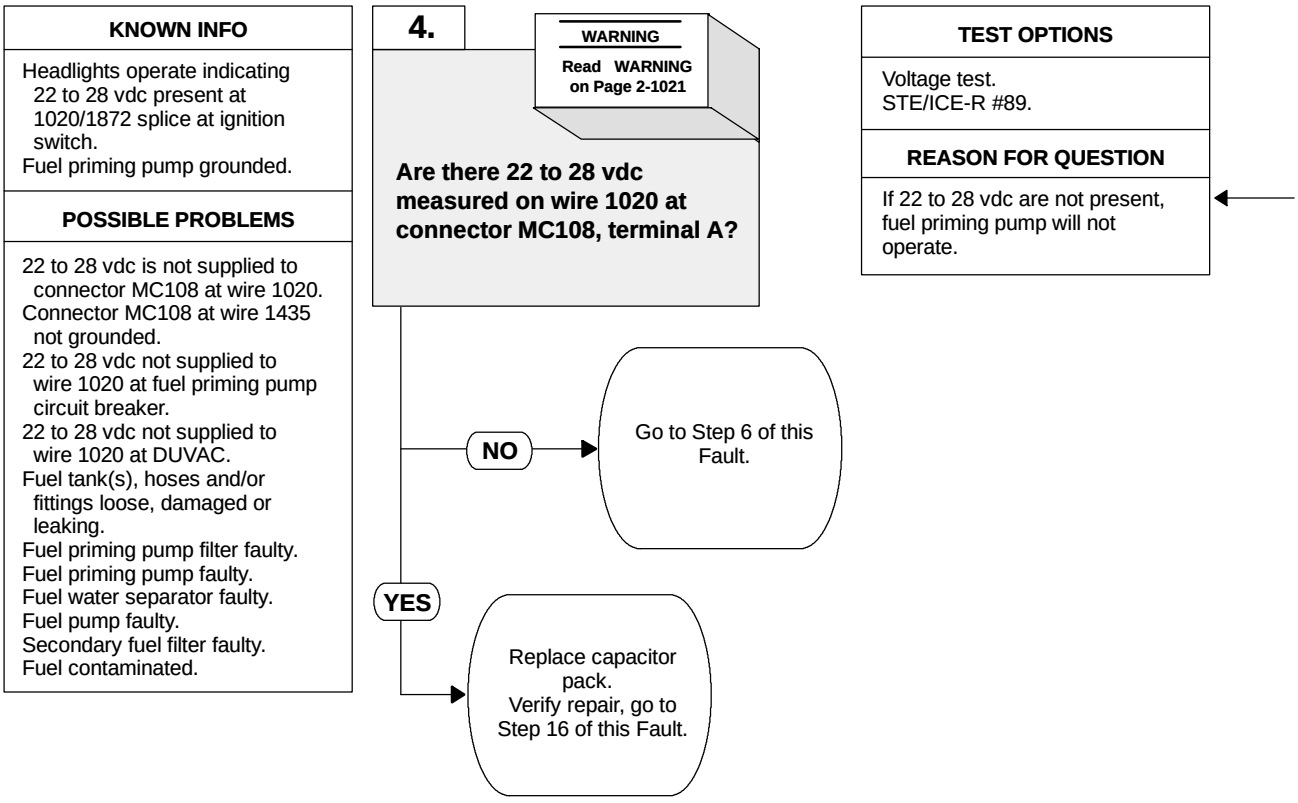
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between connector terminal B and a known good ground?
   (a) If there is no continuity, go to Step 5 of this Fault.
   (b) If there is continuity, replace fuel priming pump (Para 4-2).



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).



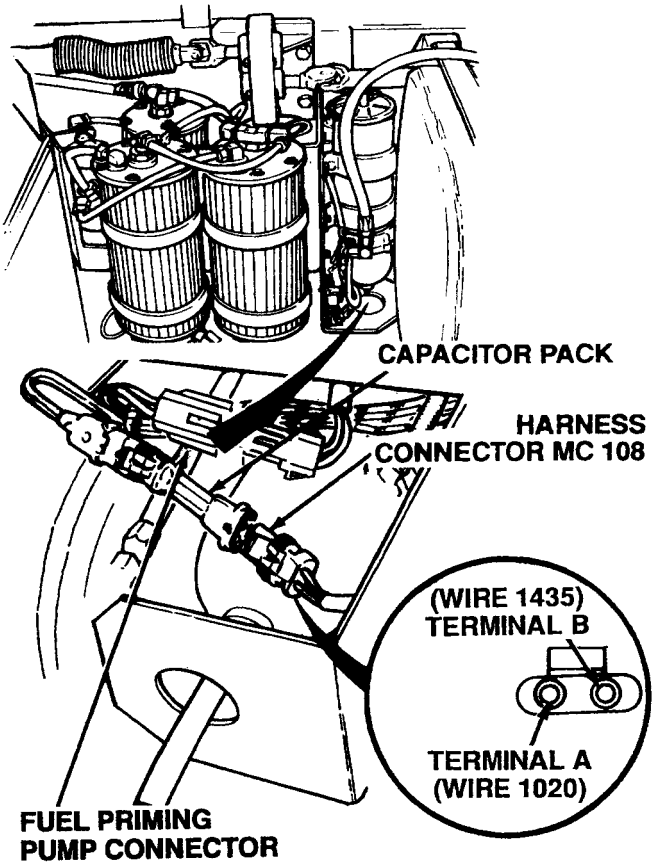
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

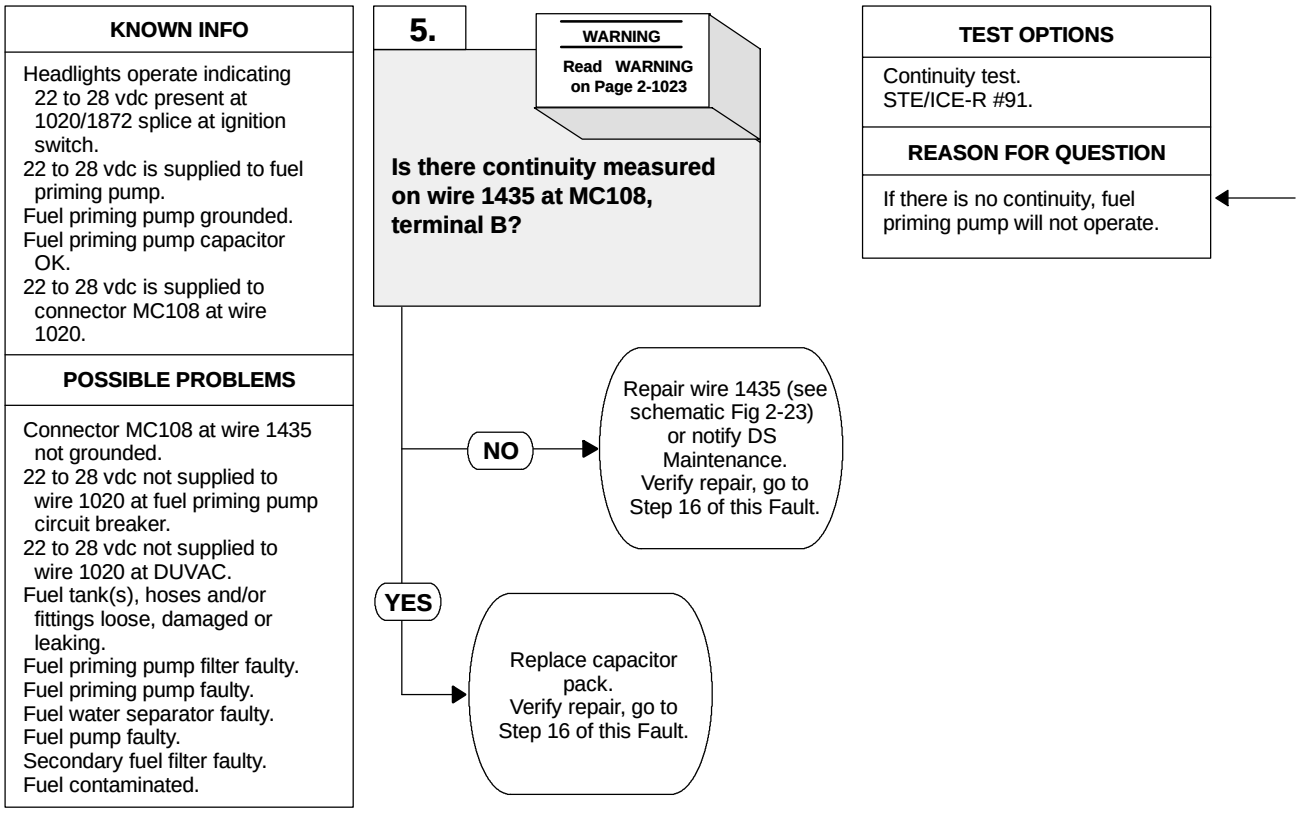
VOLTAGE TEST

(1) Disconnect harness connector MC108 from capacitor pack.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1020 at connector MC108 terminal A.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, perform Steps (6) and (7) below, and go to Step 6 of this Fault.
  (b) If 22 to 28 vdc are present, replace capacitor pack.
(6) Turn OFF ENGINE switch.
(7) Connect connector MC108 to capacitor pack.

AIR DRYER GUARD SHOWN REMOVED FOR CLARITY (IF EQUIPPED)



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).



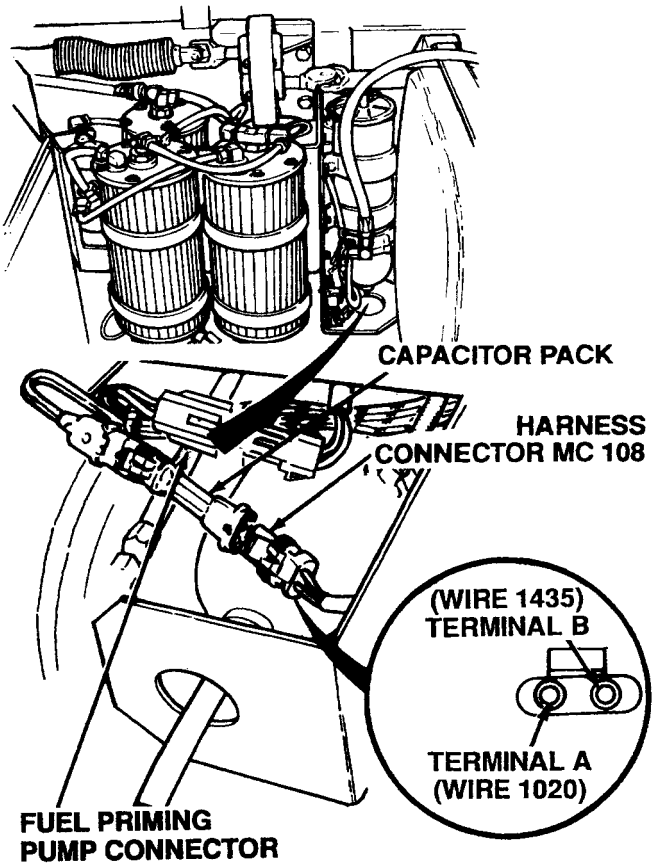
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

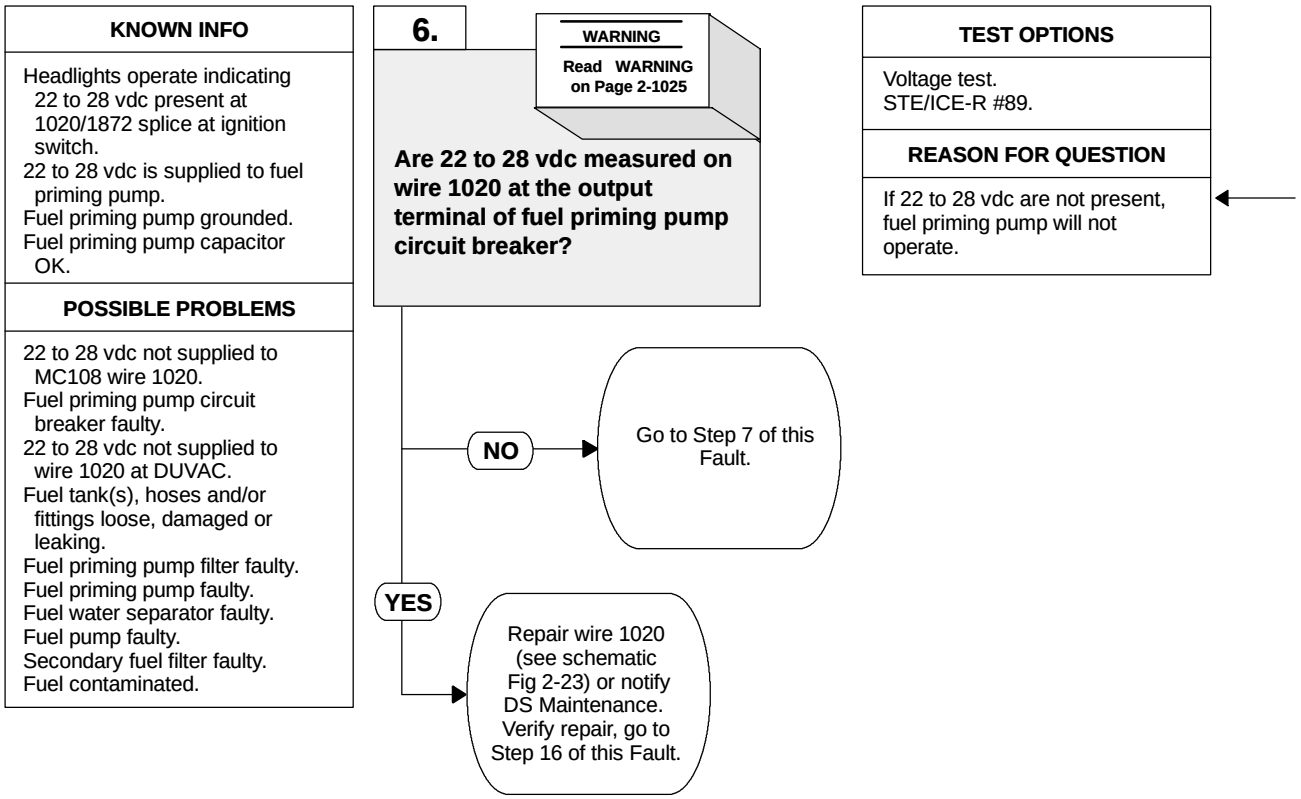
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Disconnect capacitor pack from harness connector, MC108.
(3) Is there continuity between wire 1435 terminal B at connector MC108 and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-23) and perform Steps (4) through (6) below or notify DS Maintenance.
   (b) If there is continuity, replace capacitor pack and perform Steps (5) and (6) below.
(4) Replace capacitor pack.
(5) Connect capacitor pack to fuel priming pump connector.
(6) Connect capacitor pack to harness connector, MC108.

AIR DRYER GUARD SHOWN REMOVED FOR CLARITY (IF EQUIPPED)

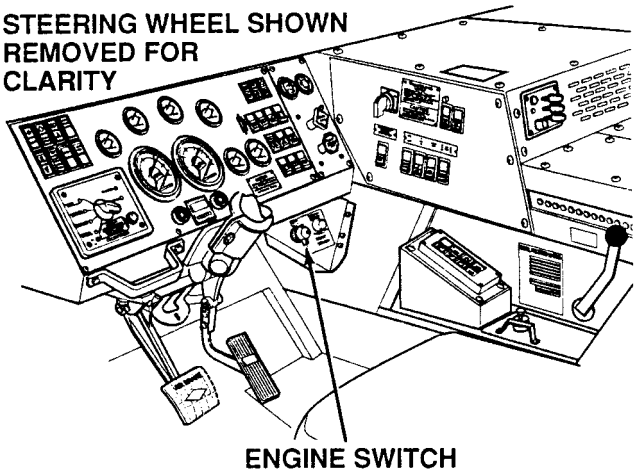


1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).



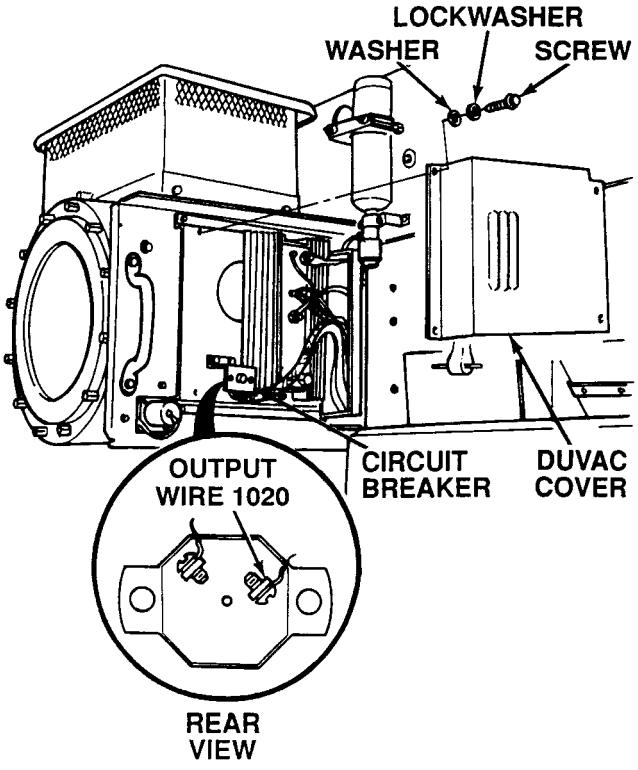
WARNING

22 to 28 vdc are always present at the DUVAC connectors. Care must be exercised when removing the DUVAC cover. Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Remove four screws, lockwashers, washers and DUVAC cover. Discard lockwashers.
(3) Connect positive (+) multimeter lead to output wire 1020 at fuel priming pump circuit breaker.
(4) Connect negative (-) multimeter lead to known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If there are not 22 to 28 vdc present, turn OFF ENGINE switch, and go to Step 7 of this Fault.
    (b) If there are 22 to 28 vdc present, turn OFF ENGINE switch, and repair wire 1020 (see schematic Fig 2-23) or notify DS Maintenance.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

KNOWN INFO

Headlights operate indicating 22 to 28 vdc present at 1020/1872 splice at ignition switch.
22 to 28 vdc is supplied to fuel priming pump.
Fuel priming pump grounded.
Fuel priming pump capacitor OK.

POSSIBLE PROBLEMS

Circuit breaker faulty.
22 to 28 vdc not supplied to wire 1020 at DUVAC.
Fuel tank(s), hoses and/or fittings loose, damaged or leaking.
Fuel priming pump filter faulty.
Fuel priming pump faulty.
Fuel water separator faulty.
Fuel pump faulty.
Secondary fuel filter faulty.
Fuel contaminated.

7.

WARNING
Read WARNING on Page 2-1027

Are 22 to 28 vdc measured on wire 1020 at the input terminal of fuel priming pump circuit breaker?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not measured, fuel priming pump will not operate.

NO → Go to Step 8 of this Fault.

YES → Replace circuit breaker (Para 7-16). Verify repair, go to Step 16 of this Fault.

KNOWN INFO

Headlights operate indicating 22 to 28 vdc present at 1020/1872 splice at ignition switch.
22 to 28 vdc is supplied to fuel priming pump.
Fuel priming pump grounded.
Fuel priming pump capacitor OK.
22 to 28 vdc is supplied to connector MC108 at wire 1020.
Connector MC108 at wire 1435 is grounded.
22 to 28 vdc are supplied to wire 1020 at fuel priming pump circuit breaker.

POSSIBLE PROBLEMS

22 to 28 vdc not supplied to wire 1020 at DUVAC.
Fuel tank(s), hoses and/or fittings loose, damaged or leaking.
Fuel priming pump filter faulty.
Fuel priming pump faulty.
Fuel water separator faulty.
Fuel pump faulty.
Secondary fuel filter faulty.
Fuel contaminated.

8.

WARNING
Read WARNING on Page 2-1027

Are 22 to 28 vdc measured on wire 1020 at DUVAC?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 - 24 vdc are not measured, fuel priming pump will not operate.

NO → Repair wire 1020 from ENGINE switch to DUVAC (see schematic Fig 2-23) or notify DS Maintenance. Verify repair, go to Step 16 of this Fault.

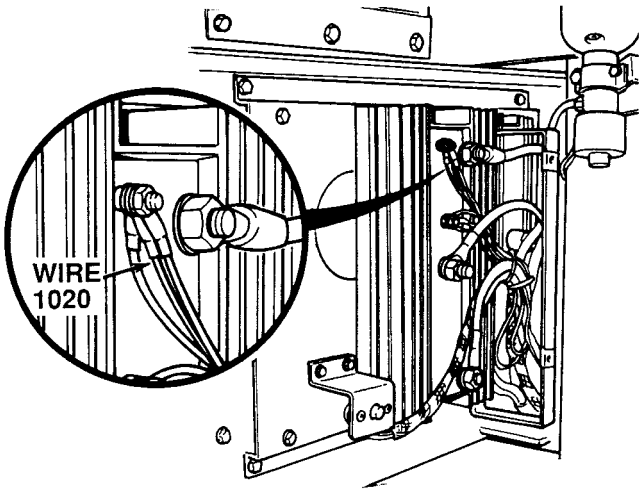
YES → Repair wire 1020 from DUVAC to circuit breaker (see schematic Fig 2-23) or notify DS Maintenance. Verify repair, go to Step 16 of this Fault.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

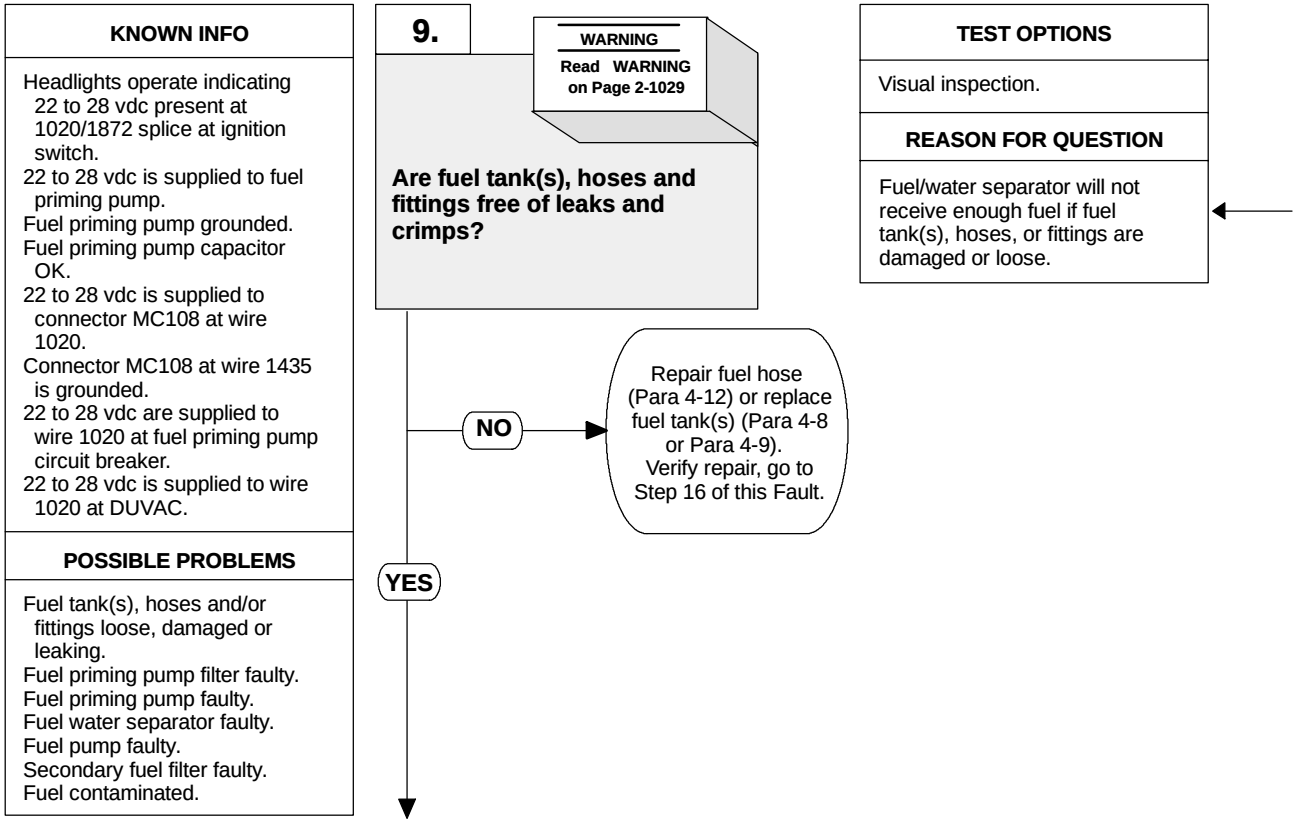
(1) Connect positive (+) multimeter lead to wire 1020 at circuit breaker terminal.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
   (a) If there are not 22 to 28 vdc present, turn OFF ENGINE switch, and go to Step 8 of this Fault.
   (b) If there are 22 to 28 vdc present turn OFF ENGINE switch, and replace circuit breaker (Para 7-16).



VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1020 at DUVAC.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
   (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch, and repair wire 1020 between DUVAC and ENGINE switch (see schematic Fig 2-23) or notify DS Maintenance.
   (b) If 22 to 28 vdc are present, wire 1020 is OK.
(4) Turn OFF ENGINE switch.

1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

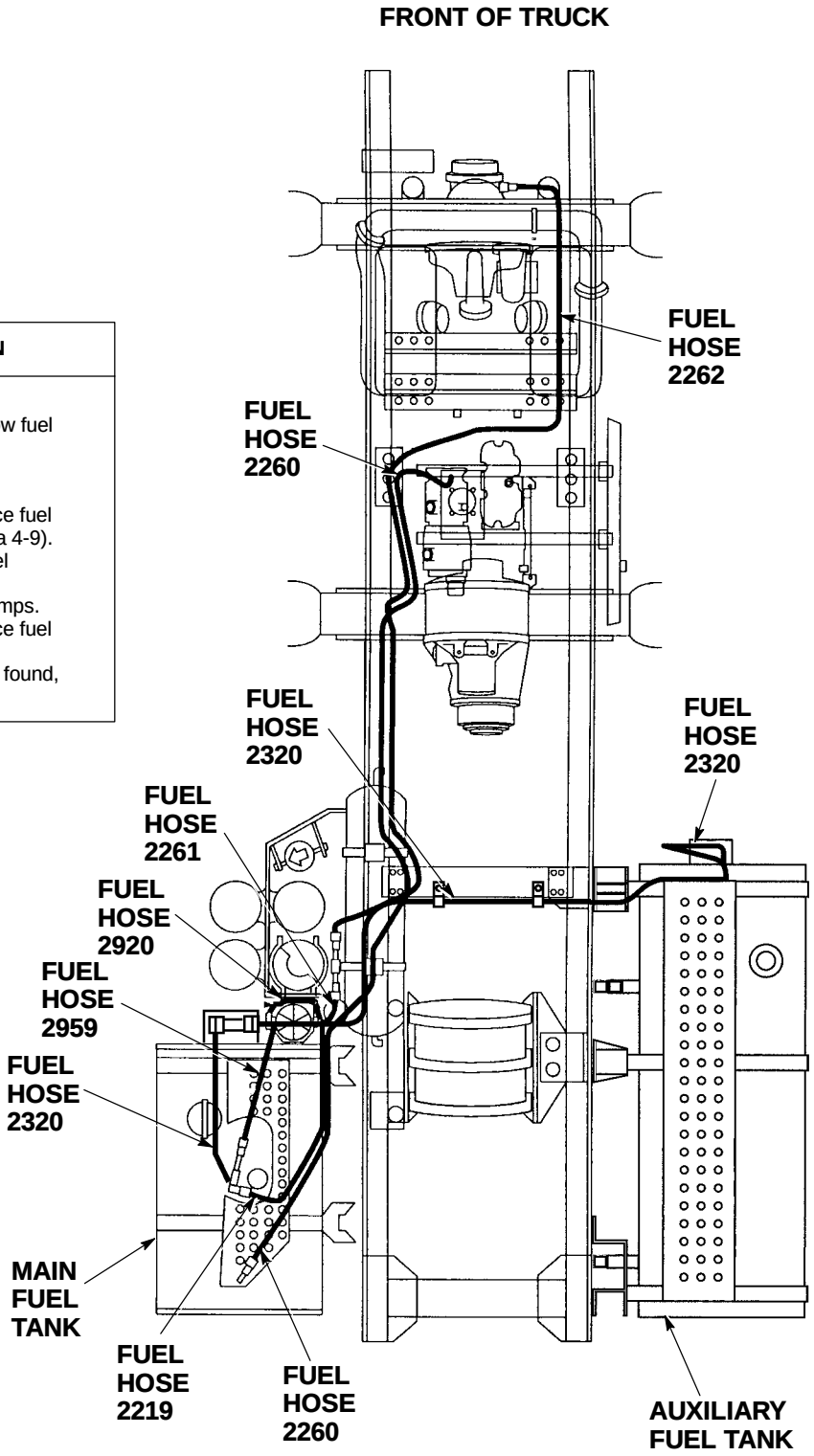


WARNING

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.

VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10) and allow fuel pressure to build up.
(2) Turn OFF ENGINE switch.
(3) Check fuel tank(s) for leaks.
  (a) If leaks are found, replace fuel tank(s) (Para 4-8 or Para 4-9).
  (b) If no leaks are found, fuel tank(s) are OK.
(4) Check hoses for leaks or crimps.
  (a) If leaks are found, replace fuel lines (Para 4-12).
  (b) If no leaks or crimps are found, hoses are OK.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

KNOWN INFO

Headlights operate indicating 22 to 28 vdc present at 1020/1872 splice at ignition switch.
22 to 28 vdc is supplied to fuel priming pump.
Fuel priming pump grounded.
Fuel priming pump capacitor OK.
22 to 28 vdc is supplied to connector MC108 at wire 1020.
Connector MC108 at wire 1435 is grounded.
22 to 28 vdc are supplied to wire 1020 at fuel priming pump circuit breaker.
22 to 28 vdc are supplied to wire 1020 at DUVAC.
Fuel/priming pump clicks, indicating power and ground OK.
Fuel tank(s), hoses and/or fittings OK.

POSSIBLE PROBLEMS

Fuel priming pump filter faulty.
Fuel priming pump faulty.
Fuel water separator faulty.
Fuel pump faulty.
Secondary fuel filter faulty.
Fuel contaminated.

10.

WARNING
Read WARNING on Page 2-1031

Does fuel priming pump deliver fuel to fuel/water separator?

NO → Go to Step 11 of this Fault.

YES → Go to Step 12 of this Fault.

TEST OPTIONS

Visual inspection.

REASON FOR QUESTION

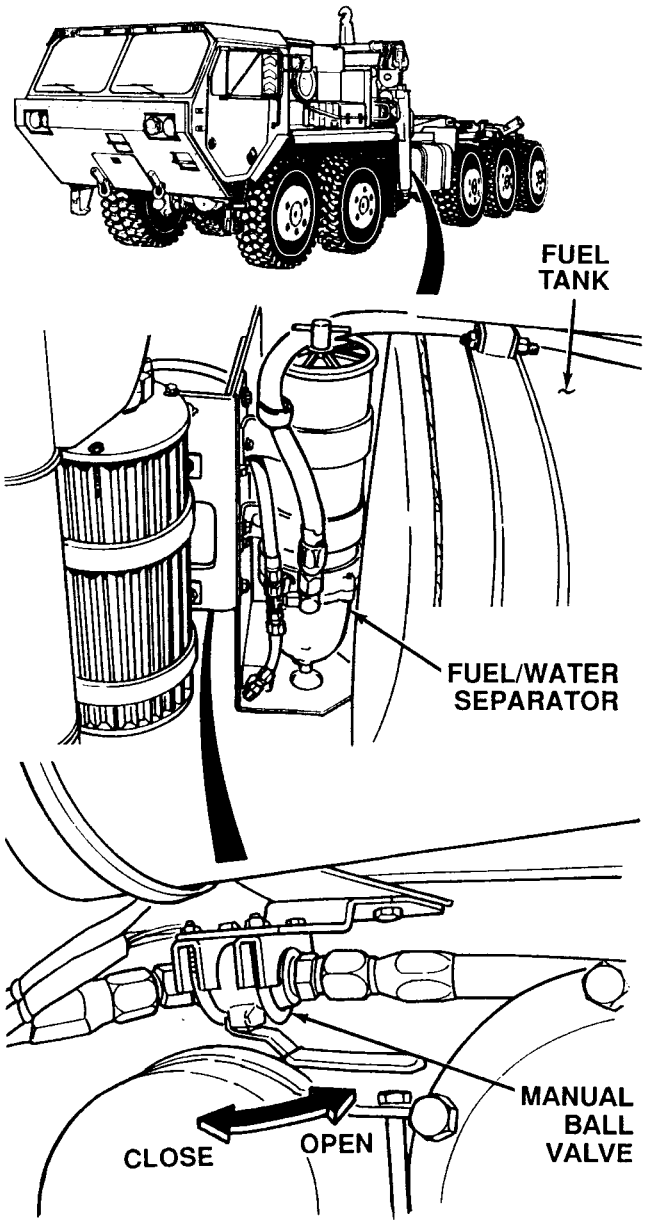
Fuel/water separator will not receive fuel if fuel priming pump is defective or if priming pump filter is clogged.

WARNING

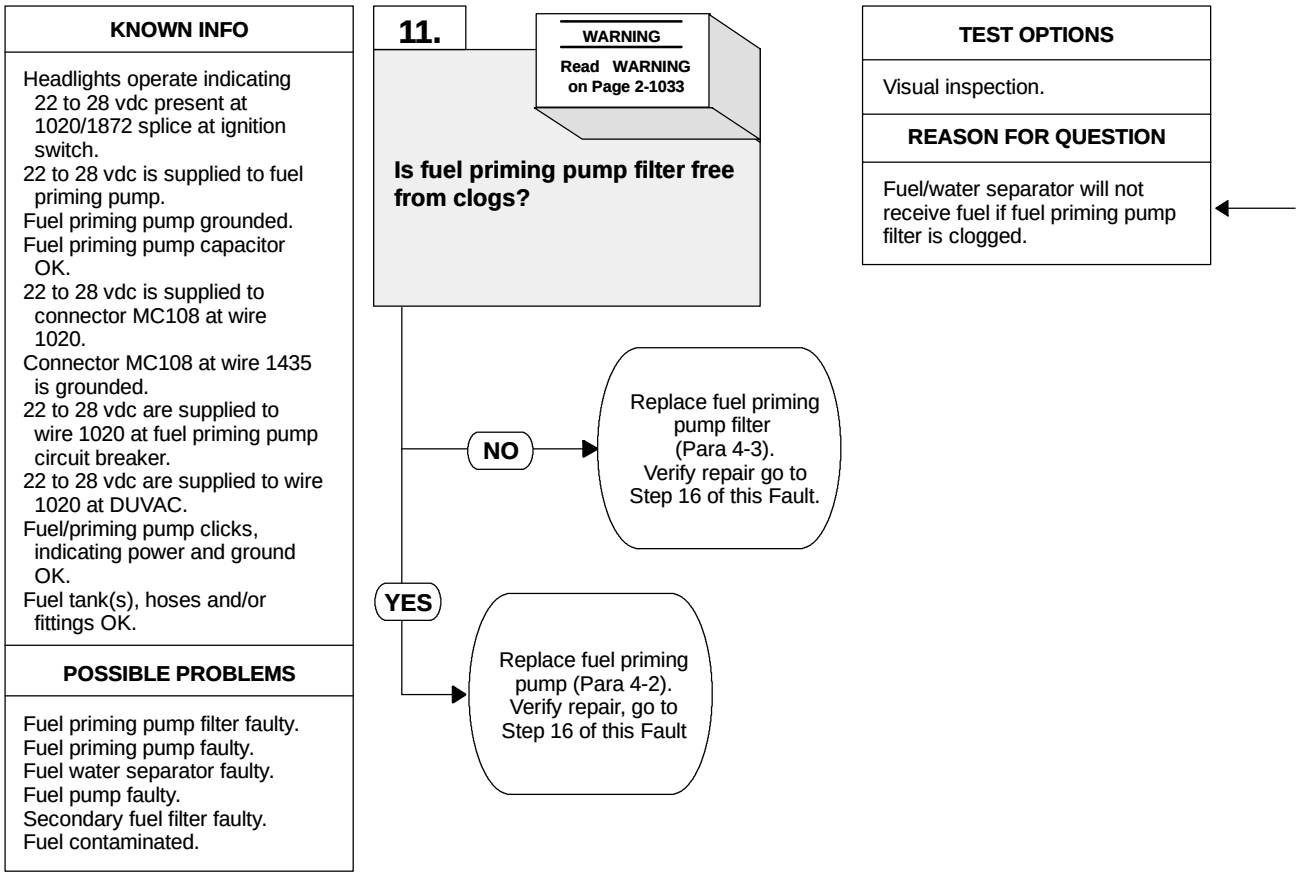
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION

(1) Place drain pan under fuel water separator.
(2) Ensure manual ball valve in fuel supply line is closed.
(3) Open fuel/water separator drain valve.
(4) Loosen fuel/water separator T-handle.
(5) Drain fuel/water separator into drain pan until fuel/water separator is empty.
(6) Tighten fuel/water separator T-handle and close fuel/water separator drain valve.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If fuel/water separator bowl does not fill, perform Step (8) below, and go to Step 11 of this Fault.
    (b) If fuel/water separator bowl fills, fuel priming pump is OK.
(8) Turn OFF ENGINE switch.
(9) Open manual ball valve.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

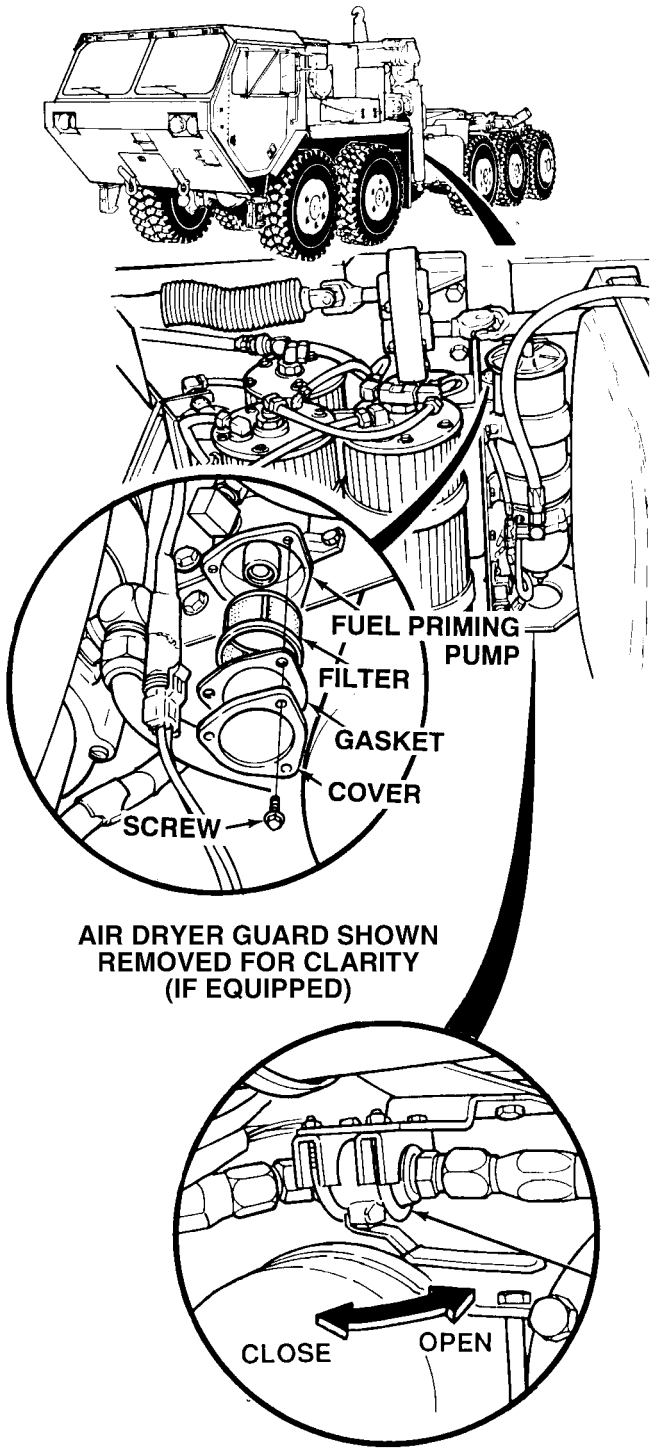


WARNING

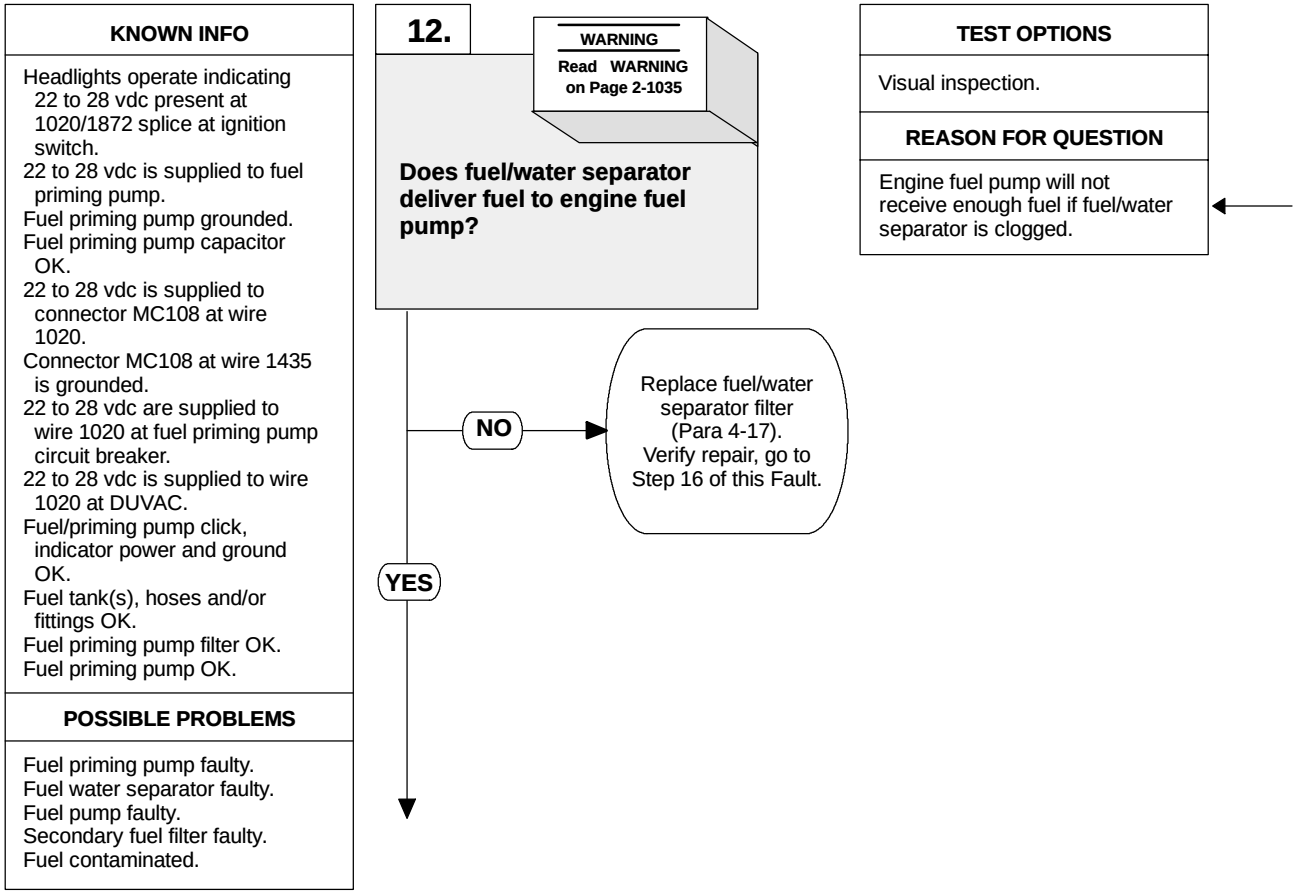
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION

(1) Place drain pan under fuel priming pump.
(2) Ensure manual ball valve in fuel supply line is closed.
(3) Remove three screws, cover, gasket and filter from fuel priming pump. Discard gasket.
(4) Inspect filter for foreign matter that would clog filter or restrict flow.
  (a) If filter is plugged or restricted, replace filter (Para 4-3) and perform Steps (5) and (6) below.
  (b) If filter is clean and free of obstructions, replace fuel priming pump (Para 4-2).
(5) Install filter, gasket and cover on fuel priming pump with three screws.
(6) Open manual ball valve.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

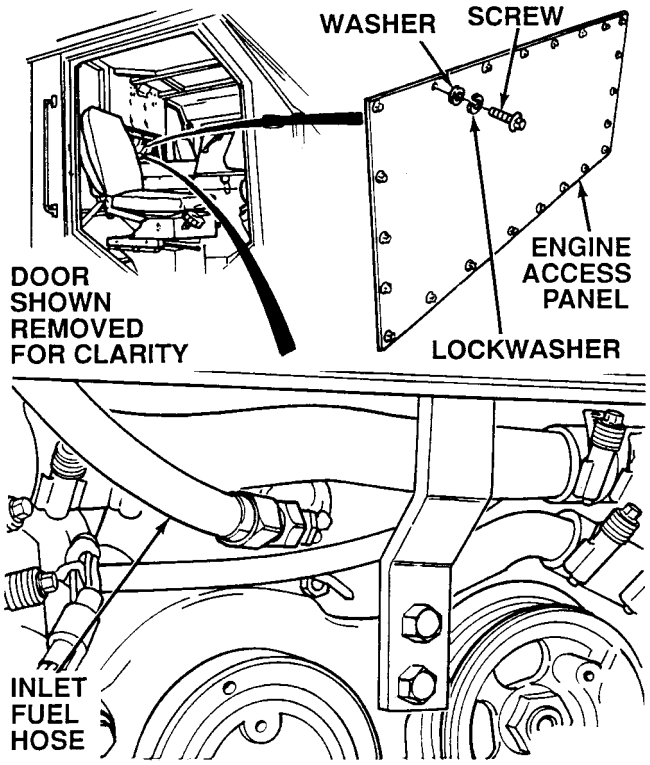


WARNING

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.

VISUAL INSPECTION

(1) Remove 22 screws, lockwashers, washers and engine access panel. Discard lockwashers.
(2) Loosen inlet fuel hose at fuel pump.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If fuel does not flow from fitting, turn OFF ENGINE switch, and replace fuel/water separator filter (Para 4-17).
  (b) If fuel flows from fitting, fuel/water separator filter is OK.
(4) Turn OFF ENGINE switch.
(5) Tighten inlet fuel fitting.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

KNOWN INFO

Headlights operate indicating 22 to 28 vdc present at 1020/1872 splice at ignition switch.
22 to 28 vdc is supplied to fuel priming pump.
Fuel priming pump grounded.
Fuel priming pump capacitor OK.
22 to 28 vdc is supplied to connector MC108 at wire 1020.
Connector MC108 at wire 1435 is grounded.
22 to 28 vdc are supplied to wire 1020 at fuel priming pump circuit breaker.
22 to 28 vdc is supplied to wire 1020 at DUVAC.
Fuel/priming pump click, indicator power and ground OK.
Fuel tank(s), hoses and/or fittings OK.
Fuel priming pump filter OK.
Fuel priming pump OK.
Fuel water separator OK.

POSSIBLE PROBLEMS

Fuel pump faulty.
Secondary fuel filter faulty.
Fuel contaminated.

13.

WARNING
Read WARNING on Page 2-1037

Does engine fuel pump deliver fuel to secondary fuel filter?

NO → Notify DS Maintenance.

YES

TEST OPTIONS

Visual inspection.
STE/ICE-R #24.

REASON FOR QUESTION

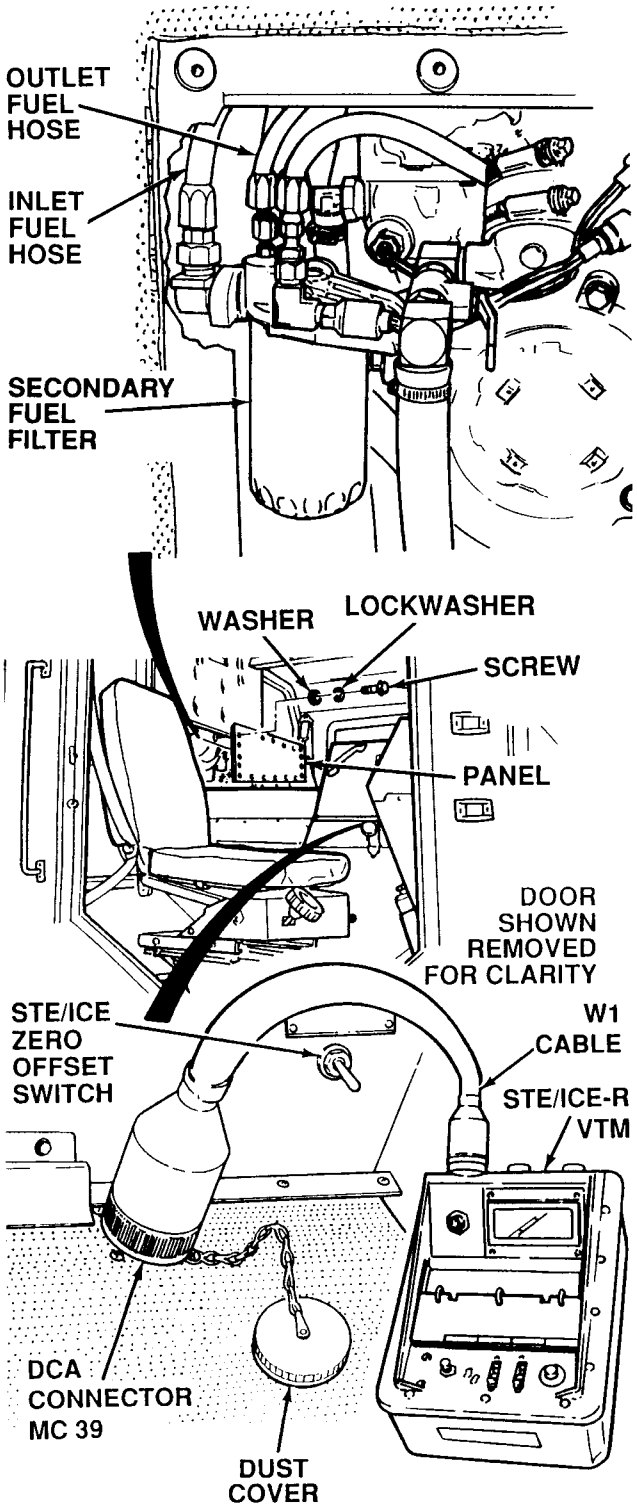
Secondary fuel filter will not receive enough fuel if engine fuel pump is defective.

WARNING

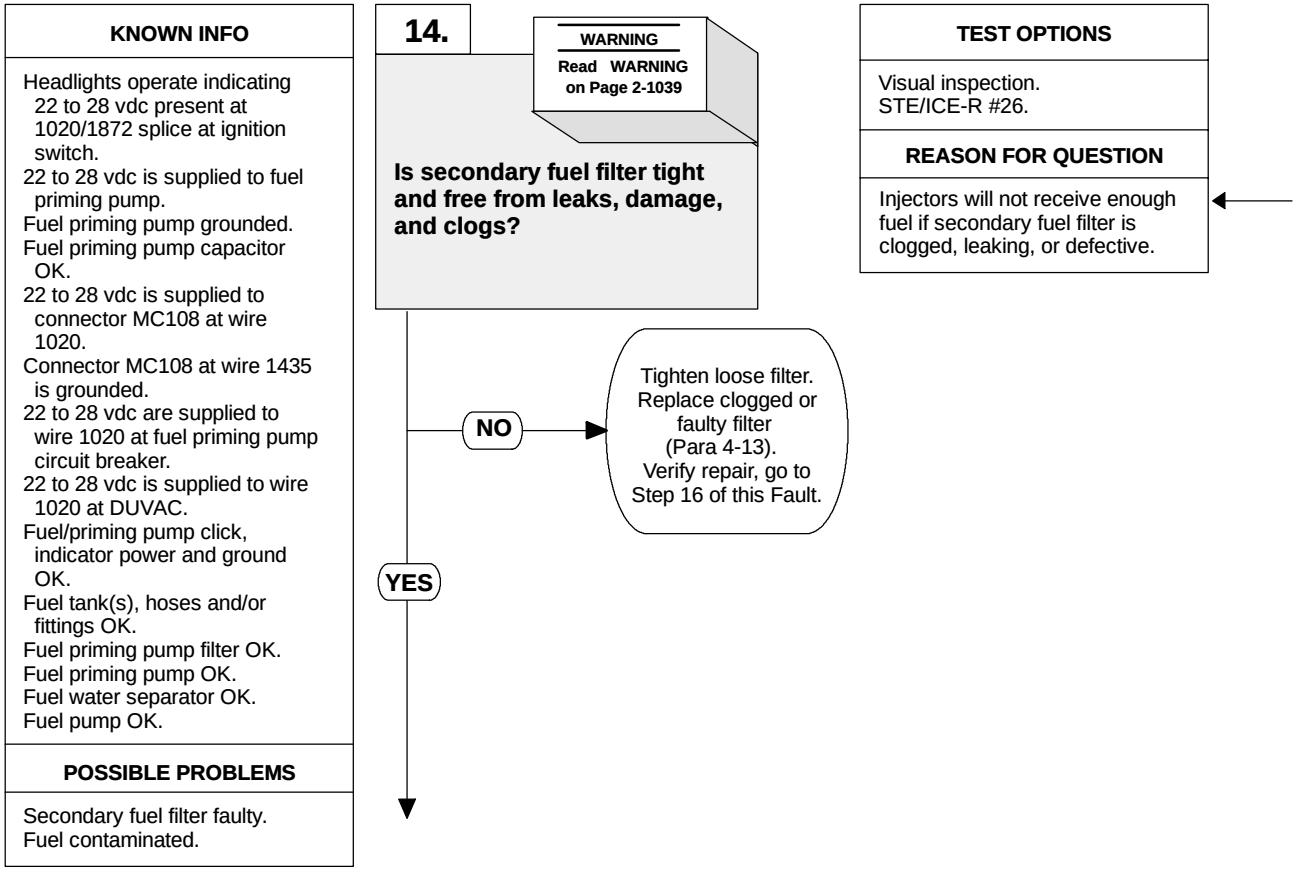
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION

(1) Loosen fuel inlet hose at secondary fuel filter.
(2) Attempt to start engine (TM 9-2320-364-10).
  (a) If fuel does not flow from hose fitting, turn OFF ENGINE switch, perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If fuel flows from hose fitting, go to Step (3) below.
(3) Turn OFF ENGINE switch.
(4) Tighten inlet fuel fitting.
(5) Remove dust cover from DCA connector MC39.
(6) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector MC39.
(7) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(8) Perform confidence Test.
(9) Set STE/ICE-R test select switch to 24.
(10) Perform offset test.
(11) Release TEST button.
  (a) If –15 to +15 offset is not displayed, refer to TM 9-4910-571-12&P.
  (b) If –15 to +15 is displayed, go to Step (12) below.
(12) Press and release TEST button.
(13) Start engine (TM 9-2320-364-10).
  (a) If fuel supply pressure is less than 31 psi (214 kPa), perform Steps (14) through (16), and notify DS Maintenance.
  (b) If fuel supply pressure is between 31 psi (214 kPa) and 50 psi (345 kPa), the engine fuel pump is OK.
(14) Turn OFF ENGINE switch.
(15) Disconnect DCA cable W1.
(16) Install dust cover on DCA connector MC39.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

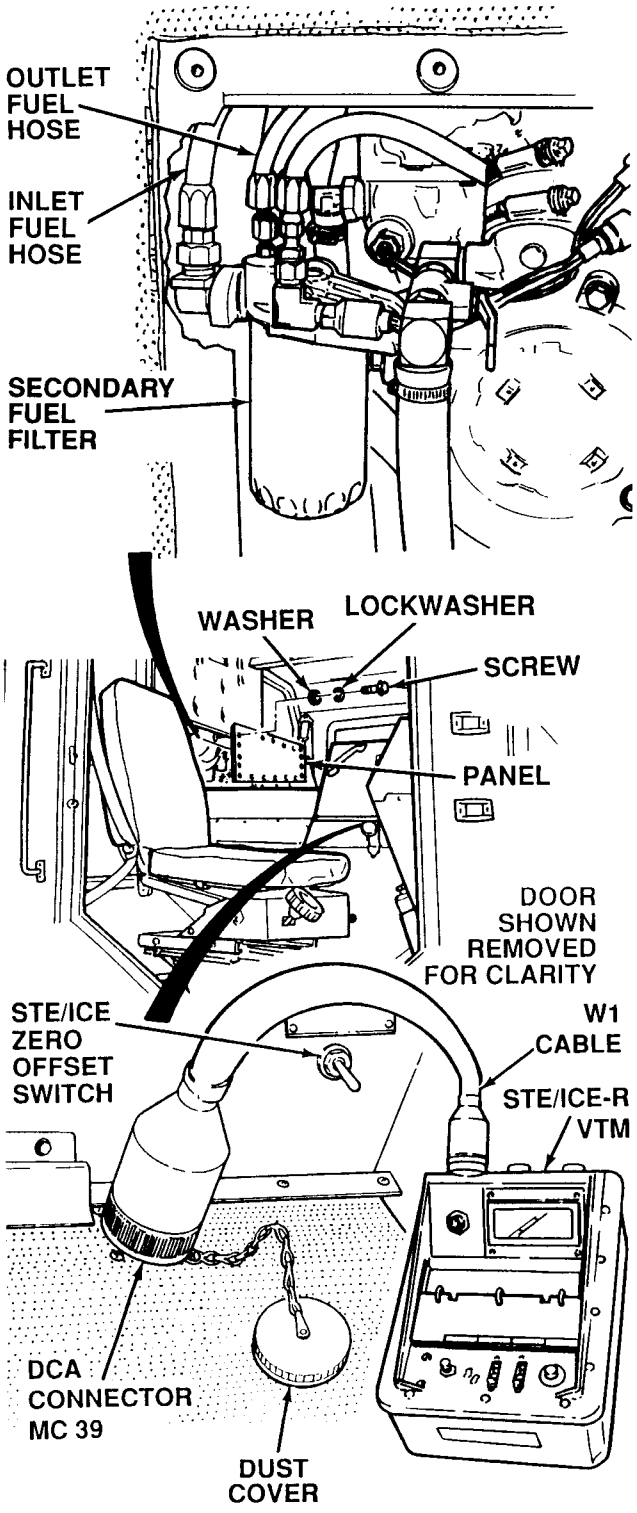


WARNING

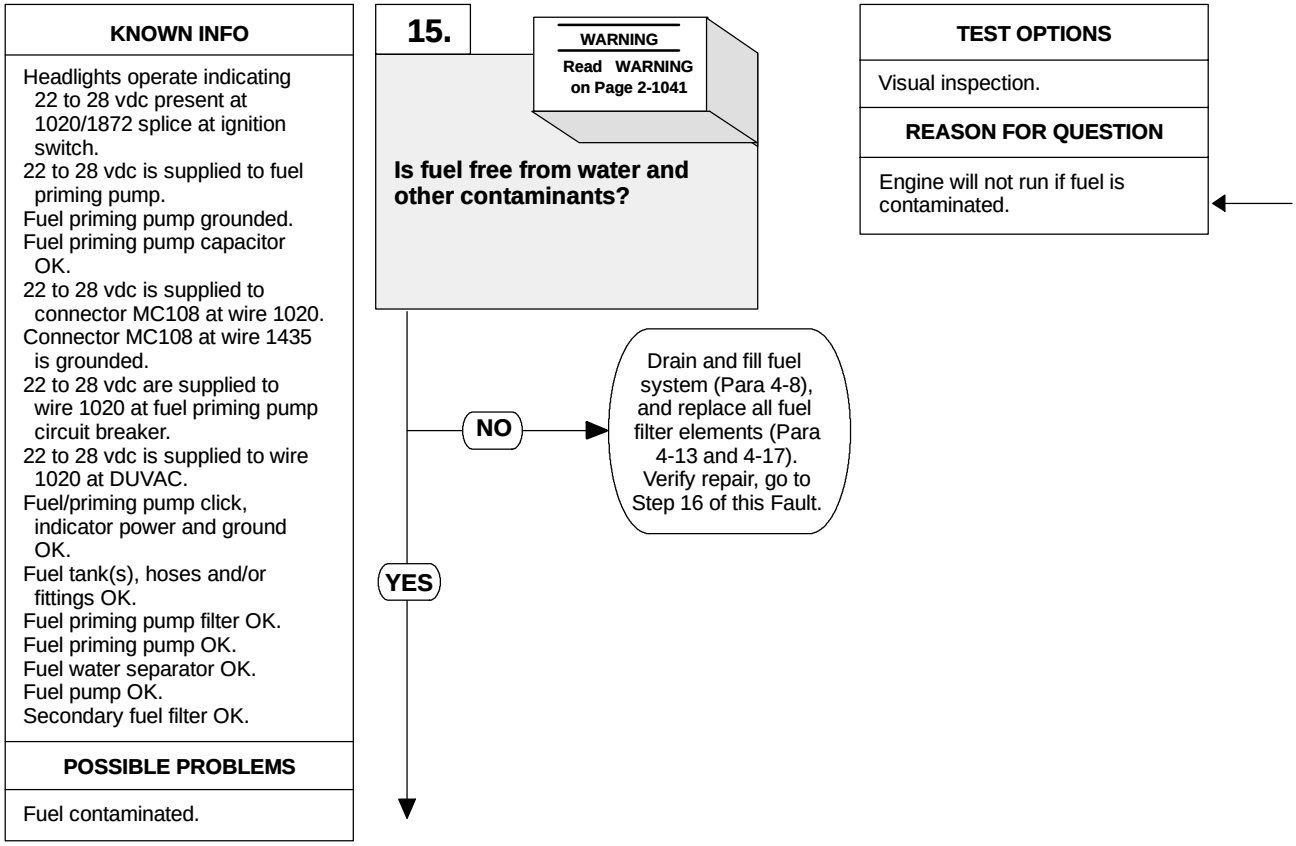
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION/STE/ICE-R #26 TEST

(1) Disconnect fuel outlet hose from secondary fuel filter.
(2) Attempt to start engine (TM 9-2320-364-10).
  (a) If fuel does not flow from secondary fuel filter, turn OFF ENGINE switch, and replace secondary fuel filter (Para 4-13).
  (b) If fuel flows from secondary fuel filter, go to Step (3) below.
(3) Turn OFF ENGINE switch.
(4) Connect fuel outlet hose to secondary filter.
(5) Remove dust cover from DCA connector MC39.
(6) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector MC39.
(7) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(8) Perform a confidence test.
(9) Set test select switch to 26.
(10) Attempt to start engine (TM 9-2320-364-10).
(11) Press and release TEST button.
  (a) If FAIL is displayed, perform Steps (12) through (14) below, and replace secondary fuel filter (Para 4-13).
  (b) If PASS is displayed secondary fuel filter is OK.
(12) Turn OFF ENGINE switch.
(13) Disconnect DCA cable W1.
(14) Install dust cap on DCA connector MC39.
(15) Install engine access panel 22 washers, lockwashers and screws.



1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).

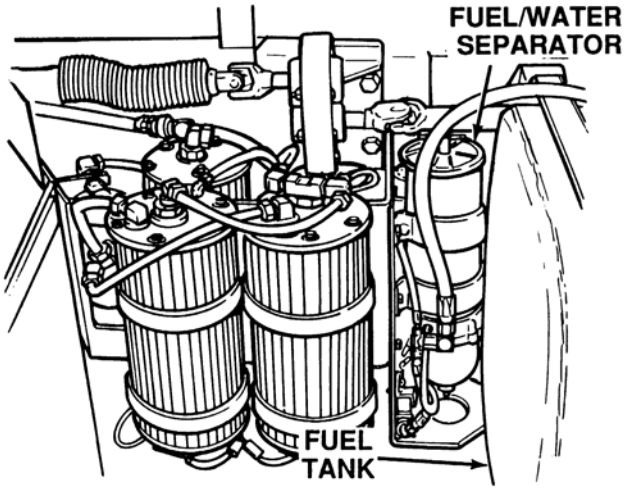


WARNING

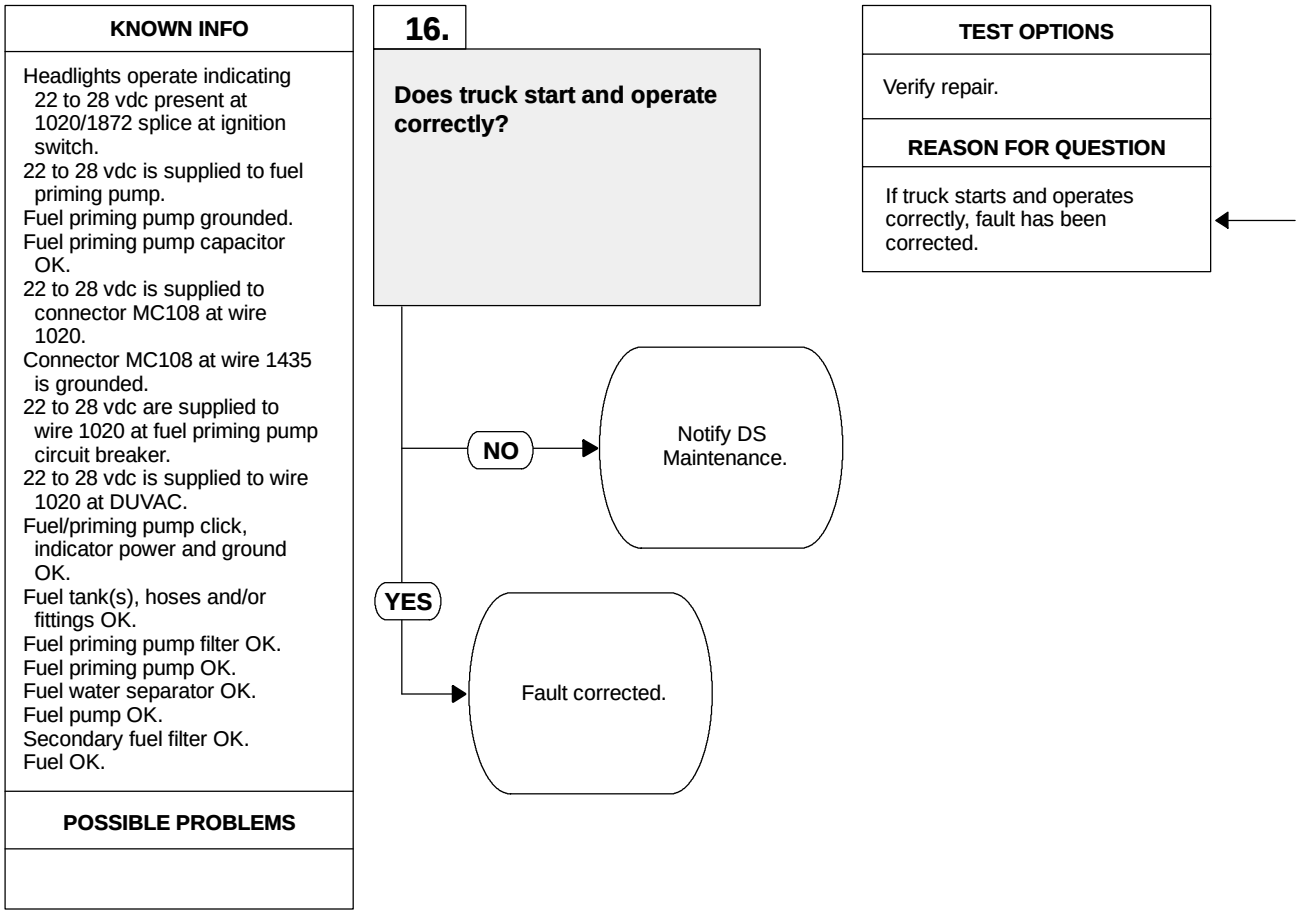
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION
Check fuel/water separator fuel bowl for contamination. (1) If contaminated, drain contaminated fuel from tank (Para 4-8), replace secondary fuel filter and fuel/water separator filters (Para 4-13 and 4-17), and fill fuel tank with clean fuel. (2) If fuel is not contaminated, fault is not corrected, notify DS Maintenance.

AIR DRYER GUARD SHOWN REMOVED FOR CLARITY (IF EQUIPPED)

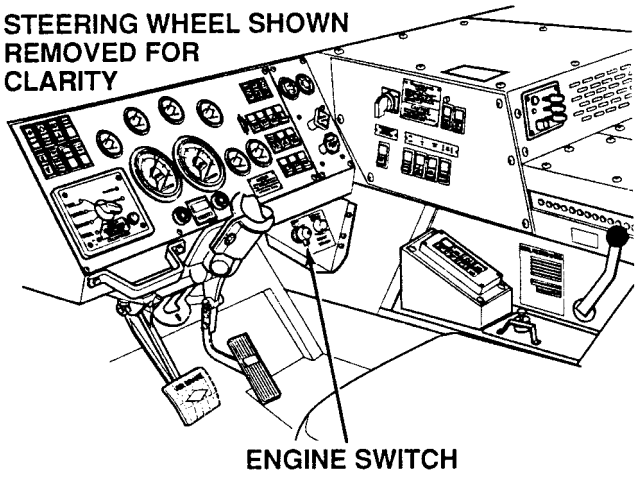


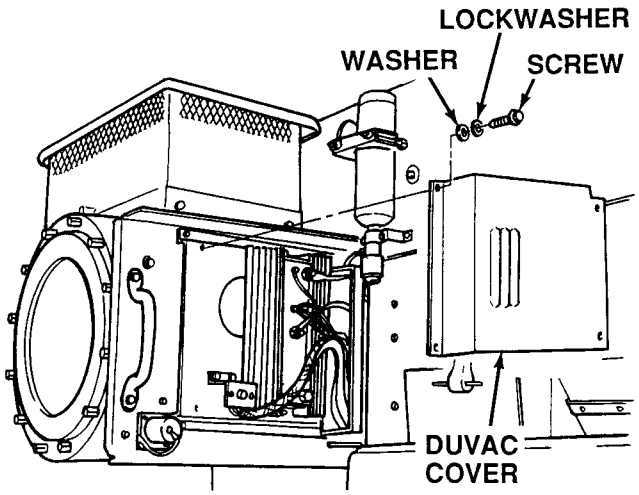
1. ENGINE CRANKS BUT FAILS TO START OR STALLS AFTER STARTING (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
  (a) If truck does not start or does not operate correctly, turn OFF ENGINE switch, and notify DS Maintenance.
  (b) If truck starts and operates properly, fault has been corrected.
(2) Turn OFF ENGINE switch.
(3) Install DUVAC cover, four washers, lockwashers and screws.





2-17. FUEL SYSTEM TROUBLESHOOTING (CONT).

2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER.

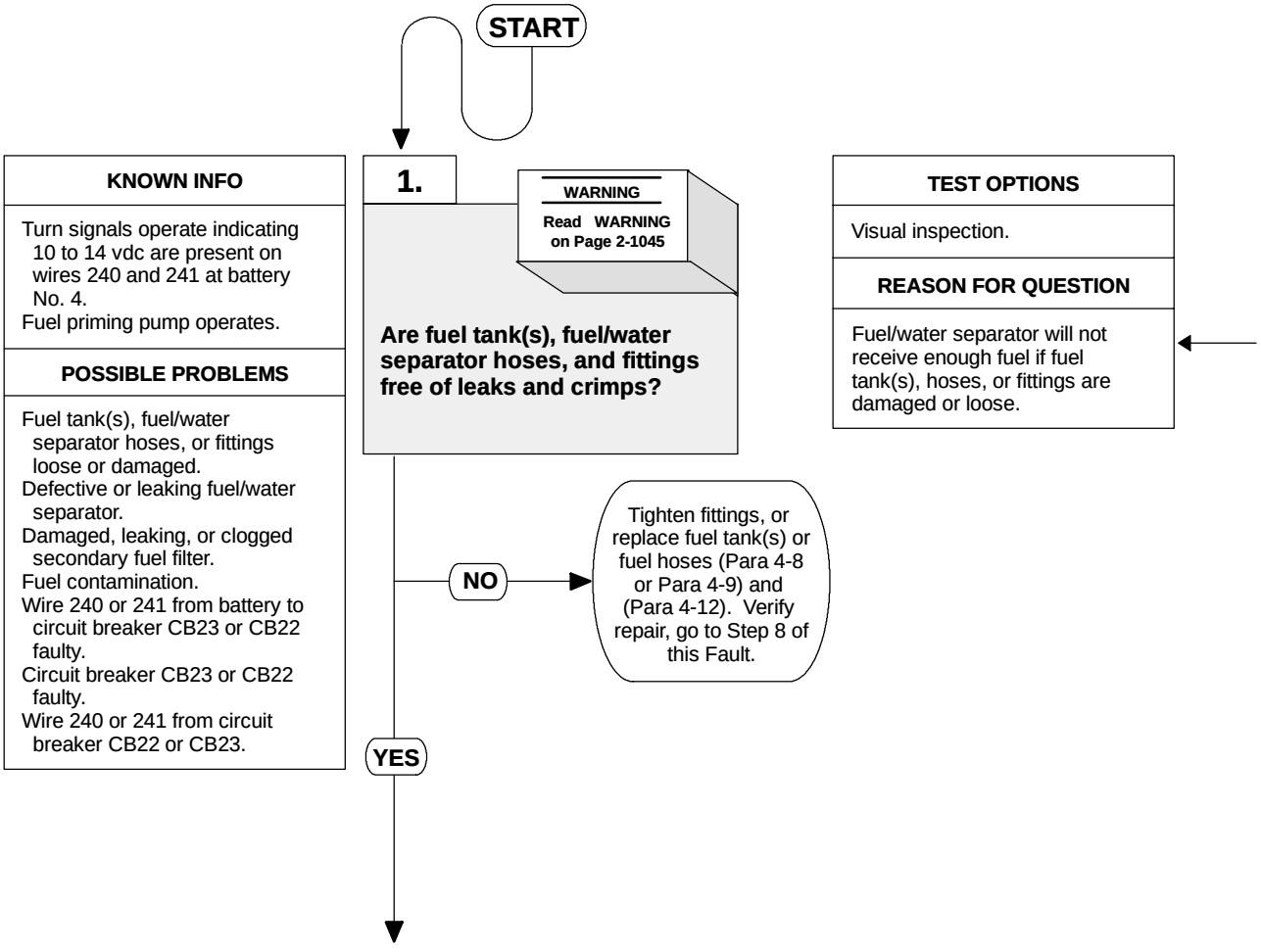
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Remover, Connector (Item 55, Appendix G)

Materials/Parts
Lockwasher (22) (Item 195, Appendix F)

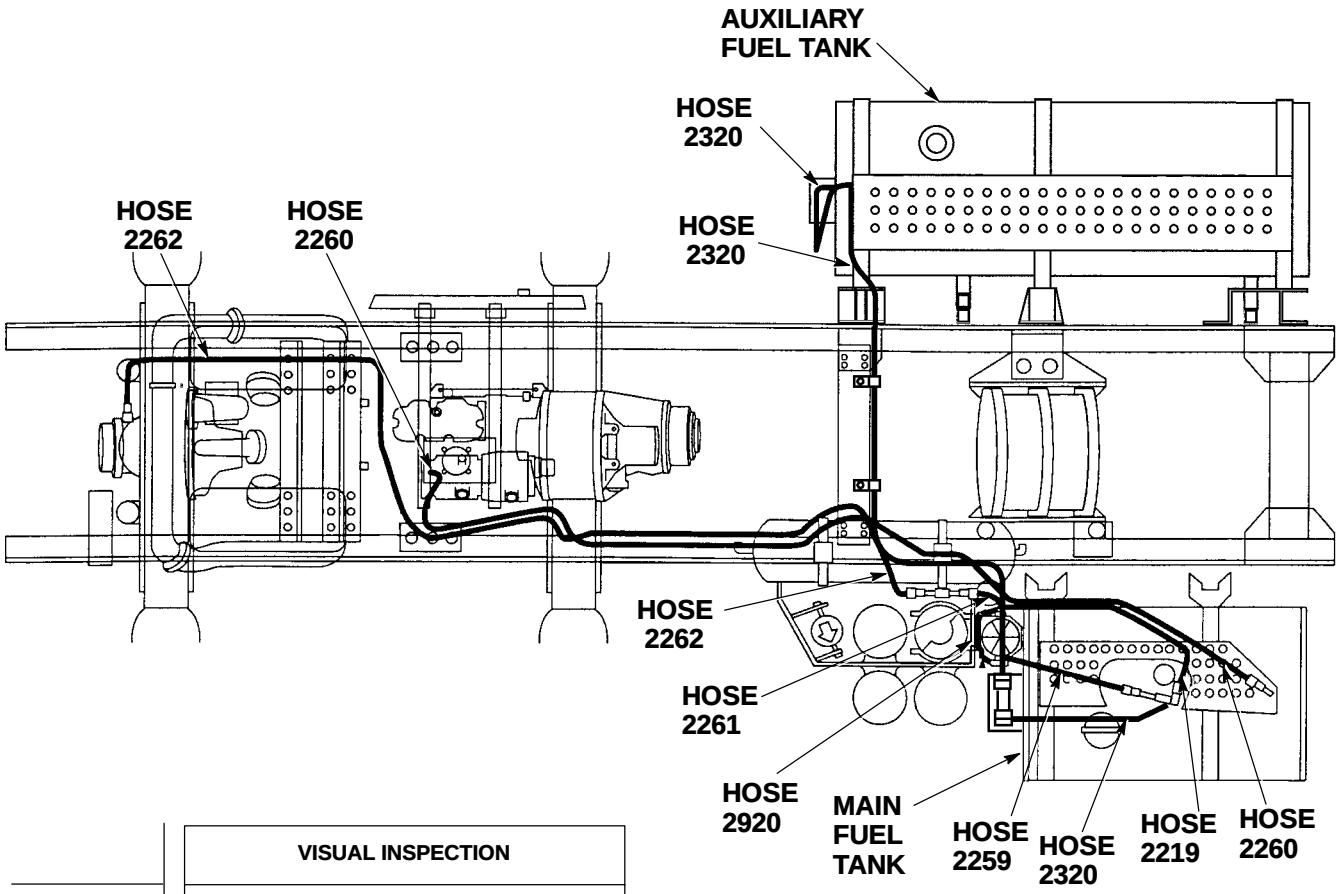
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover opened, (TM 9-2320-364-10)



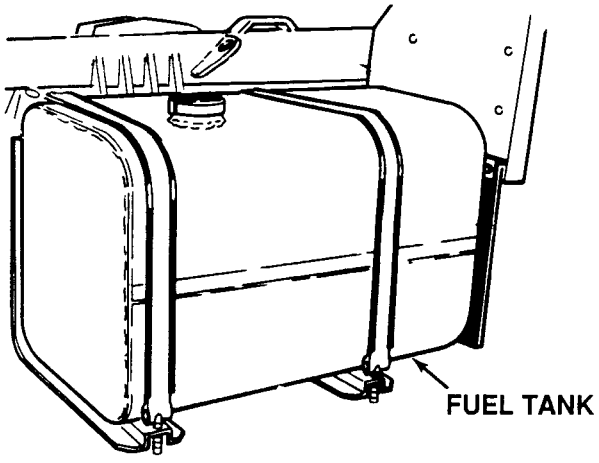
WARNING

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.

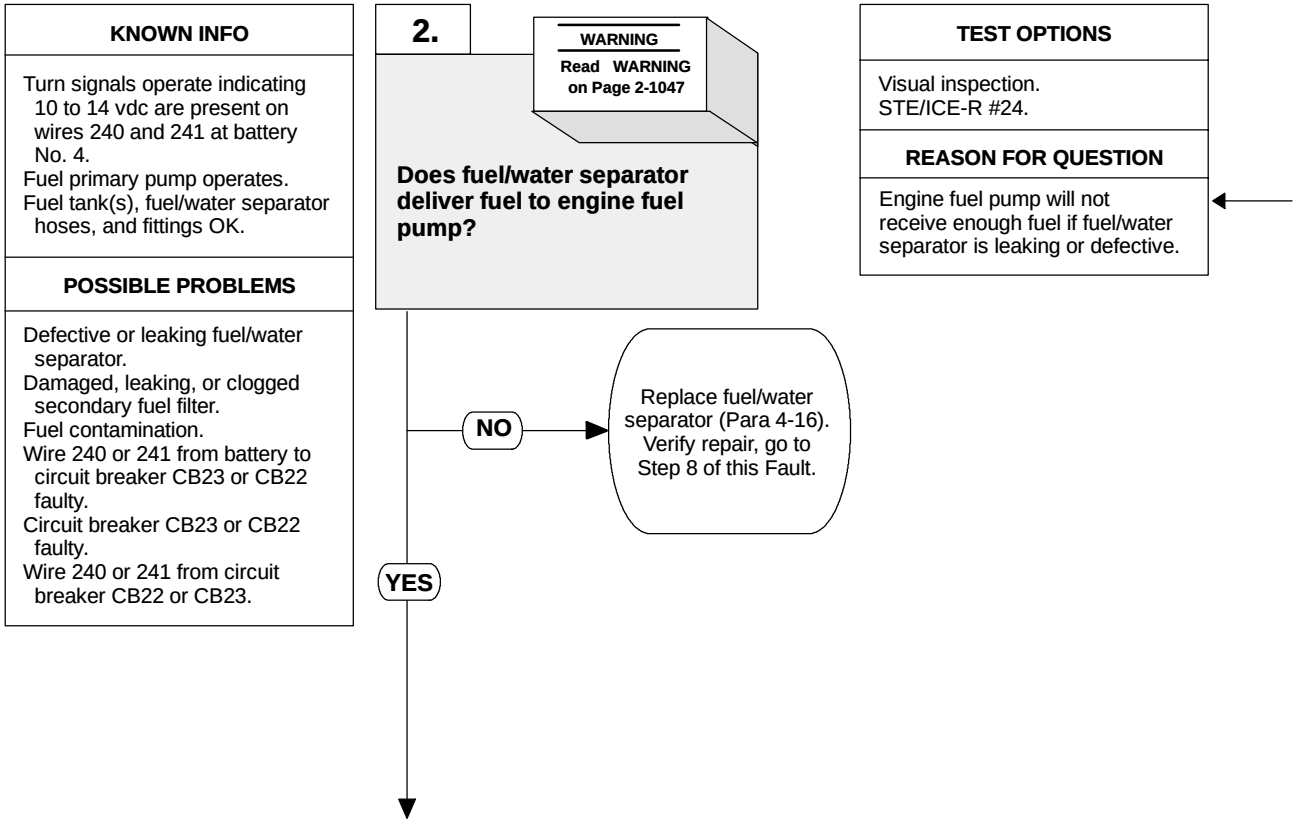


VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Check hoses for leaks or crimps.
  (a) If leak or crimp is found, turn OFF ENGINE switch, and tighten fittings or replace hose (Para 4-12).
  (b) If no leak or crimp is found, hoses are OK.
(3) Check fuel tank(s) for leaks.
  (a) If leaks are found, turn OFF ENGINE switch and replace fuel tank(s) (Para 4-8 or Para 4-9).
  (b) If no leaks or cracks are found, Fuel tanks are OK.
(4) Turn OFF ENGINE switch.



2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).

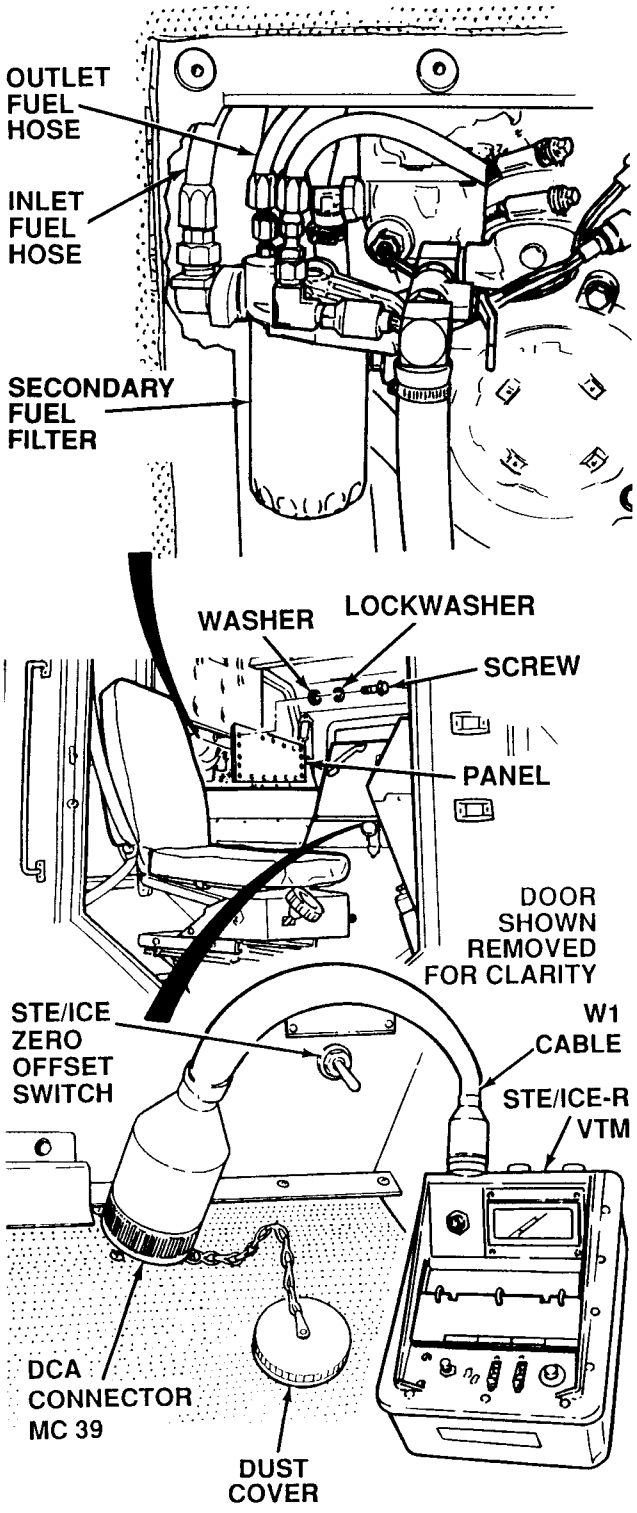


WARNING

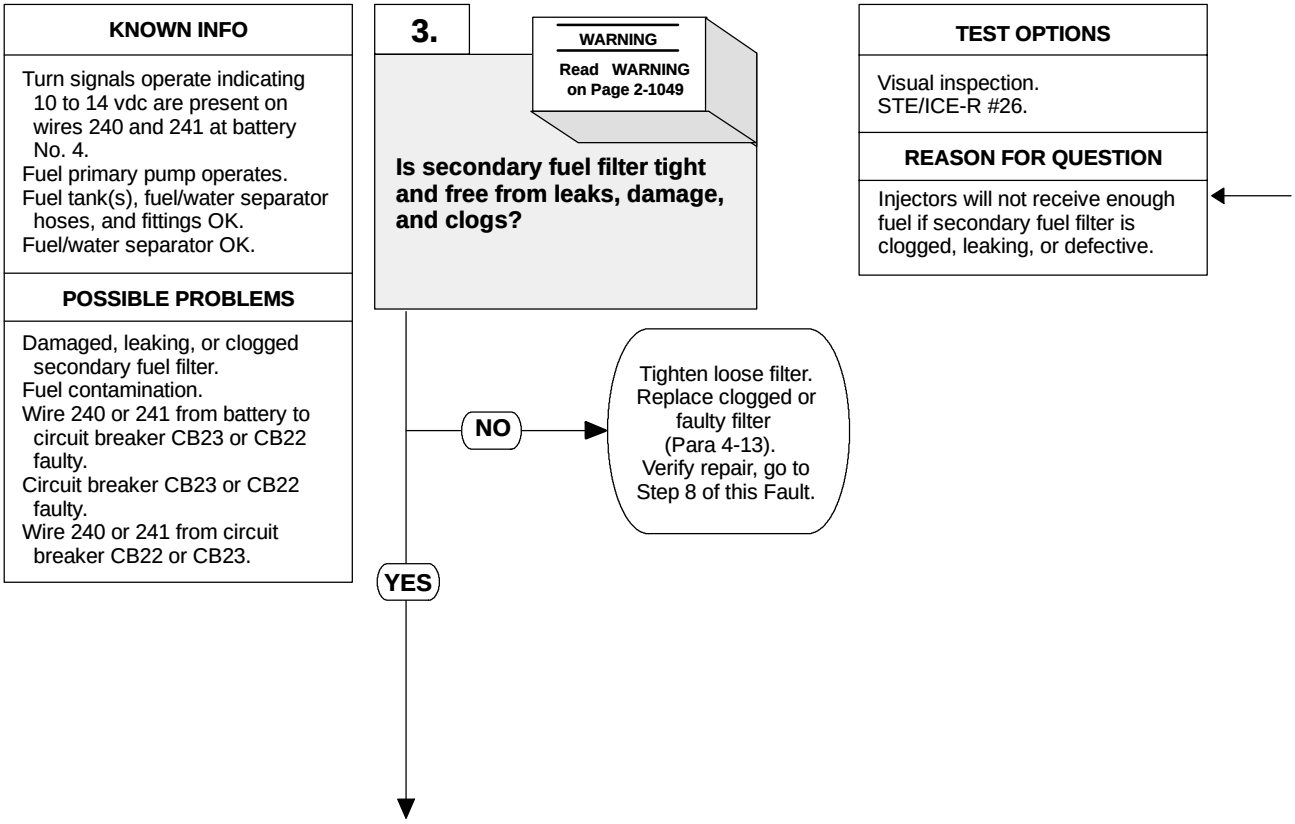
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION/STE/ICE-R #24 TEST

(1) Remove 22 screws, lockwashers, washers, and engine access panel. Discard lockwashers.
(2) Loosen fuel inlet hose at secondary fuel filter.
(3) Attempt to start engine (TM 9-2320-364-10).
  (a) If fuel does not flow from hose fitting, turn OFF ENGINE switch, perform Steps (4) and (5) below and notify DS Maintenance.
  (b) If fuel flows from hose fitting, go to Step (4) below.
(4) Turn OFF ENGINE switch.
(5) Tighten inlet fuel fitting.
(6) Remove dust cover from DCA connector MC39.
(7) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector MC39.
(8) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(9) Perform confidence Test.
(10) Set STE/ICE-R test select switch to 24.
(11) Perform offset test.
(12) Release TEST button.
  (a) If –15 to +15 offset is not displayed, refer to TM 9-4910-571-12&P.
  (b) If –15 to +15 is displayed, go to Step (13) below.
(13) Press and release TEST button.
(14) Start engine (TM 9-2320-364-10).
  (a) If fuel supply pressure is less than 31 psi (214 kPa), perform Steps (15) through (17) and notify DS Maintenance.
  (b) If fuel supply pressure is between 31 psi (214 kPa) and 50 psi (345 kPa), the engine fuel pump is OK.
(15) Turn OFF ENGINE switch.
(16) Disconnect DCA cable W1.
(17) Install dust cover on DCA connector MC39.



2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).

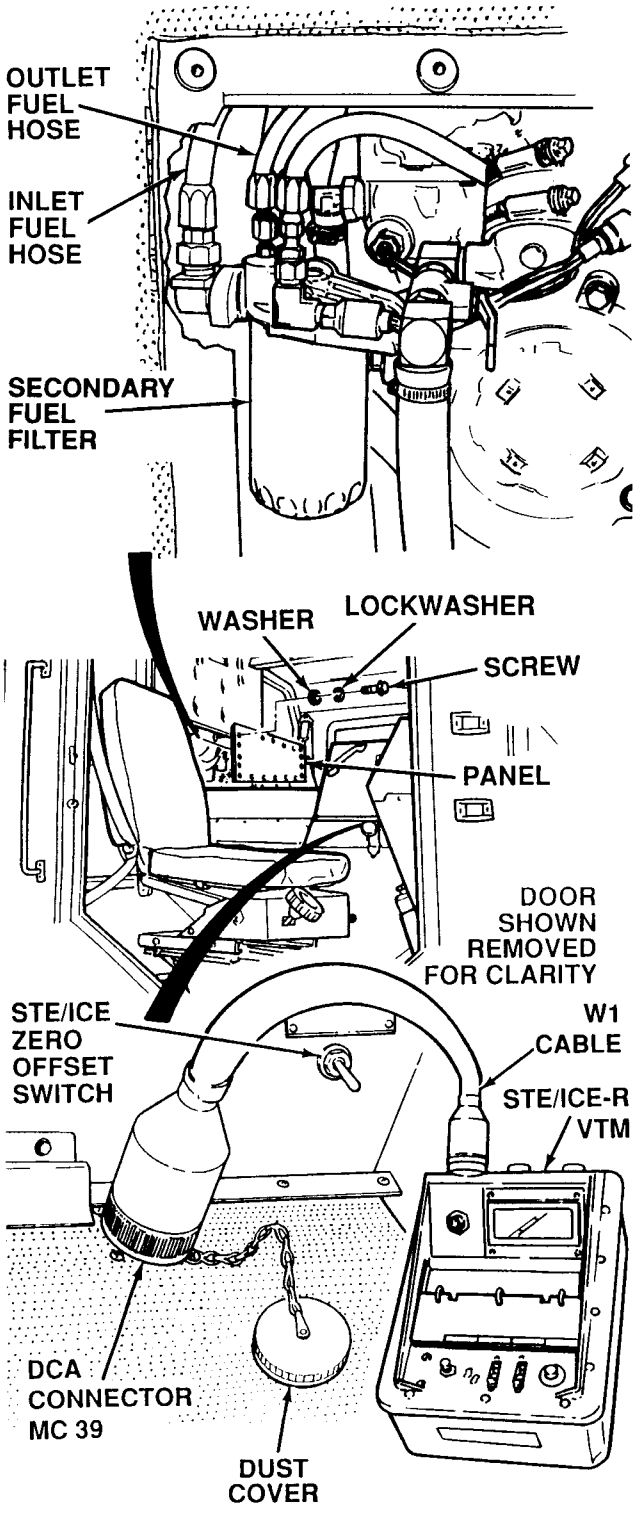


WARNING

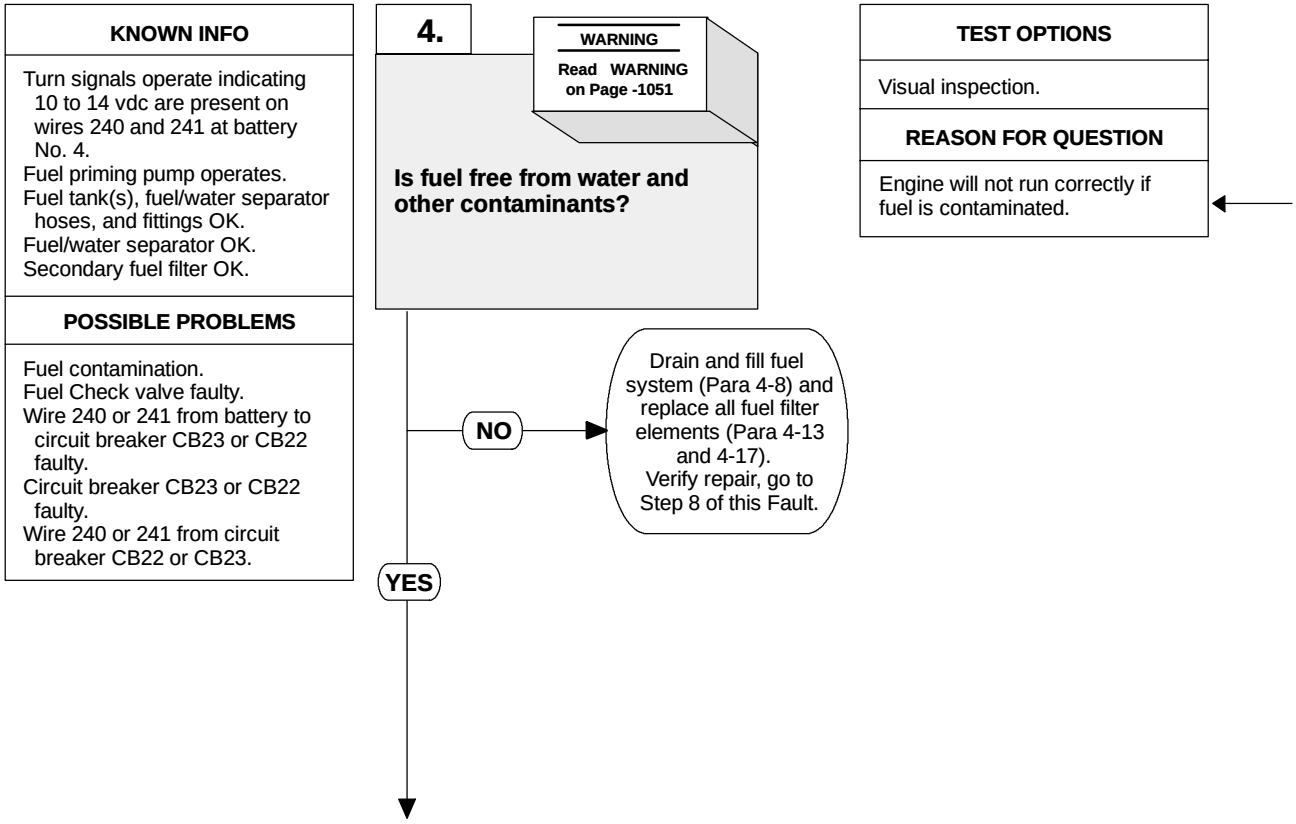
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

VISUAL INSPECTION/STE/ICE-R #26 TEST

(1) Disconnect fuel outlet hose from secondary fuel filter.
(2) Start engine (TM 9-2320-364-10).
  (a) If fuel does not flow from secondary fuel filter, turn OFF ENGINE switch, and replace secondary fuel filter (Para 4-13).
  (b) If fuel flows from secondary fuel filter, go to Step (3) below.
(3) Turn OFF ENGINE switch.
(4) Connect fuel outlet hose to secondary filter.
(5) Remove dust cover from DCA connector MC39.
(6) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector MC39.
(7) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(8) Perform a confidence test.
(9) Set test select switch to 26.
(10) Start engine (TM 9-2320-364-10).
(11) Press and release TEST button.
  (a) If FAIL is displayed, perform Steps (12) through (15) below and replace secondary fuel filter (Para 4-13).
  (b) If PASS is displayed secondary fuel filter is OK.
(12) Turn OFF ENGINE switch.
(13) Disconnect DCA cable W1.
(14) Install dust cap on DCA connector MC39.
(15) Install engine access panel, 22 washers, lockwashers and screws.



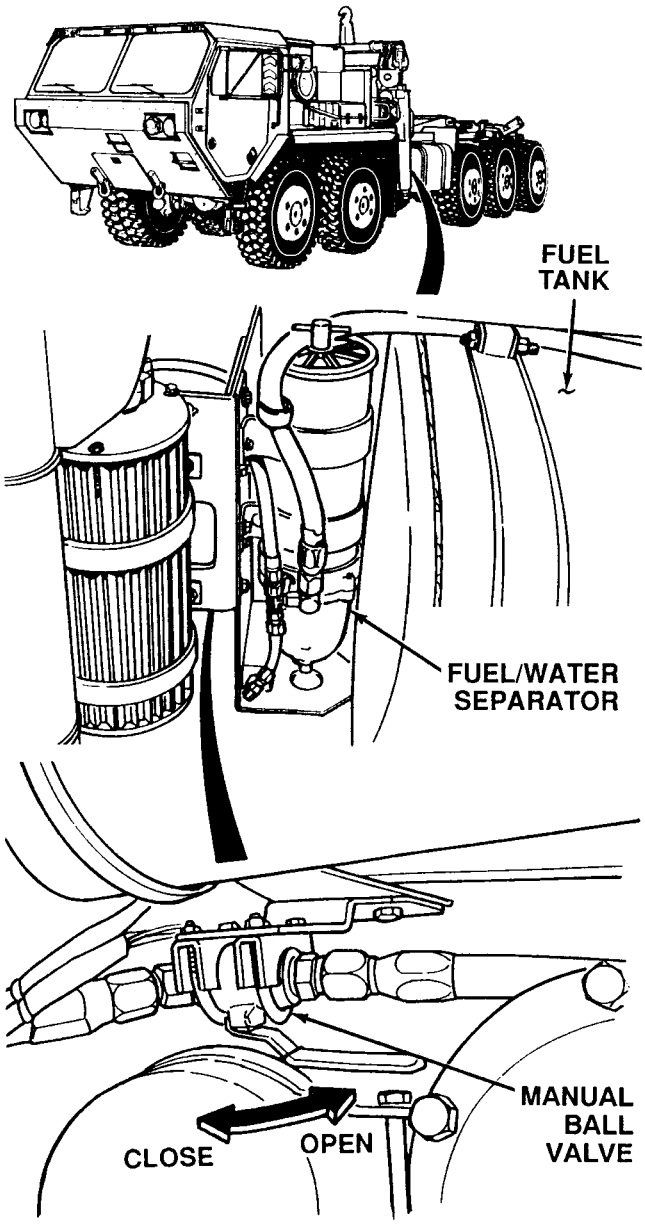
2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).



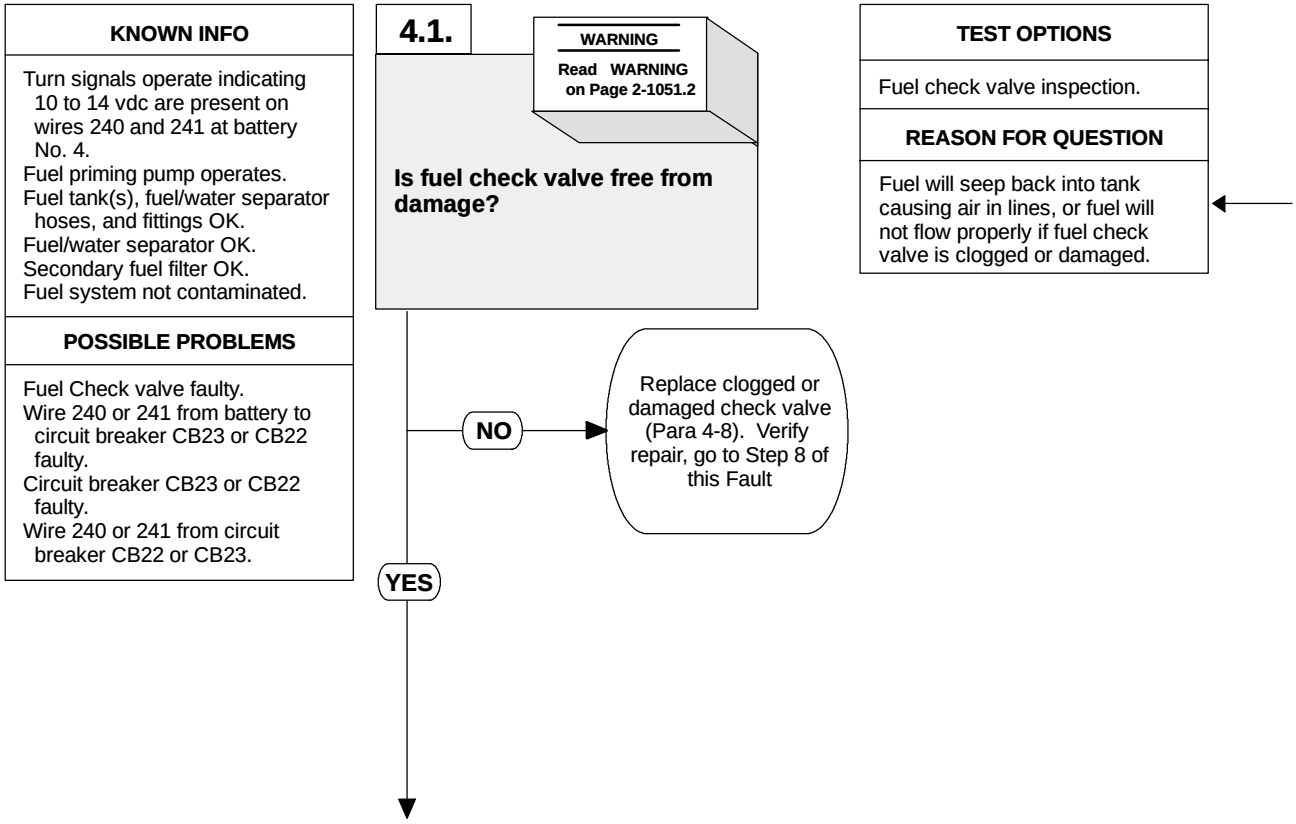
WARNING

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.

VISUAL INSPECTION
Check fuel/water separator fuel bowl for contamination. (1) If contaminated, drain contaminated fuel from tank (Para 4-8), replace secondary fuel filter and fuel/water separator filters (Paras 4-13 and 4-17), and fill fuel tank with clean fuel. (2) If fuel is not contaminated, fault is not corrected, notify DS Maintenance.

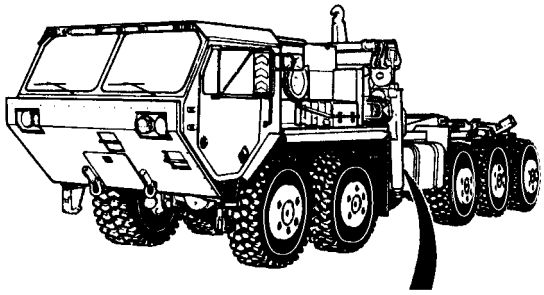


2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).



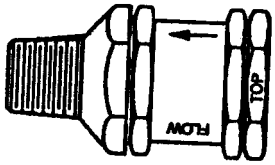
WARNING

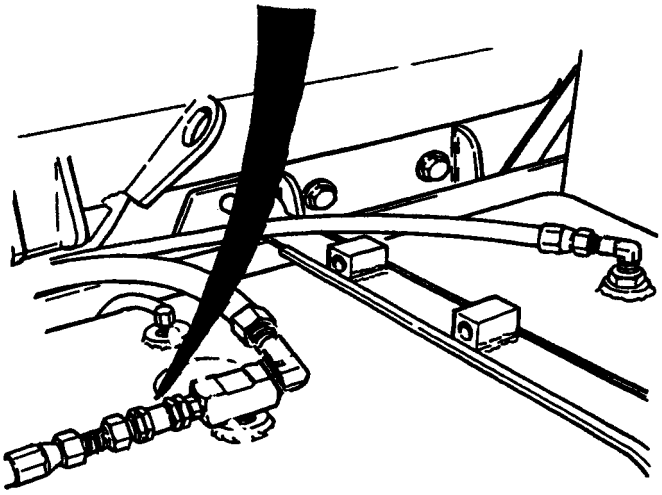
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.



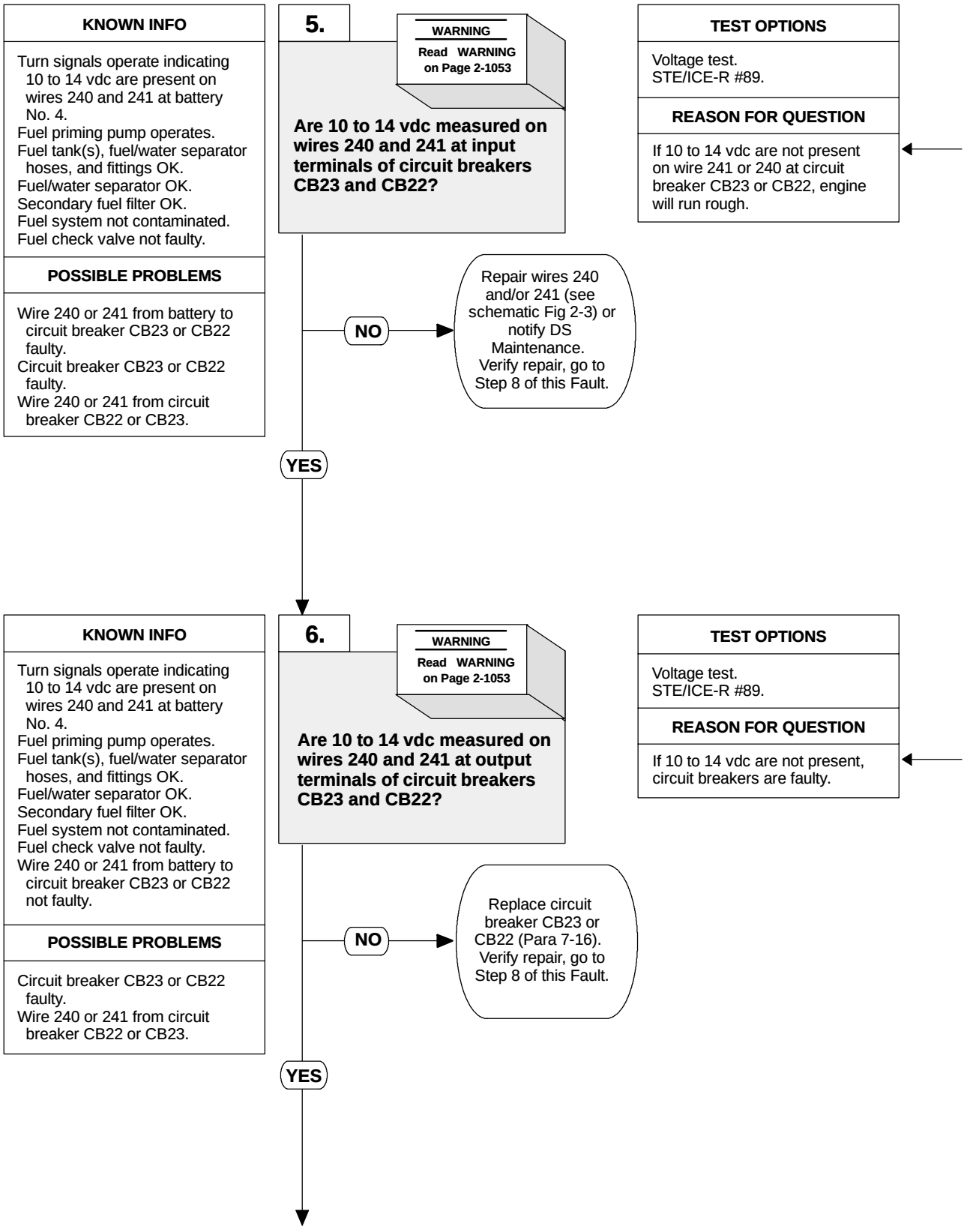
FUEL CHECK VALVE INSPECTION

(1) Inspect fuel check valve for installation with arrow in direction of fuel flow and the word “TOP” on top.
   (a) If check valve is oriented incorrectly, reorient check valve and verify repair/
   (b) If check valve is oriented correctly, remove check valve and inspect for leaks or damage (Para 4-8).
   (c) If check valves are not leaking, plugged, or damaged, valves are OK, reinstall valves (Para 4-8).





2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).



WARNING

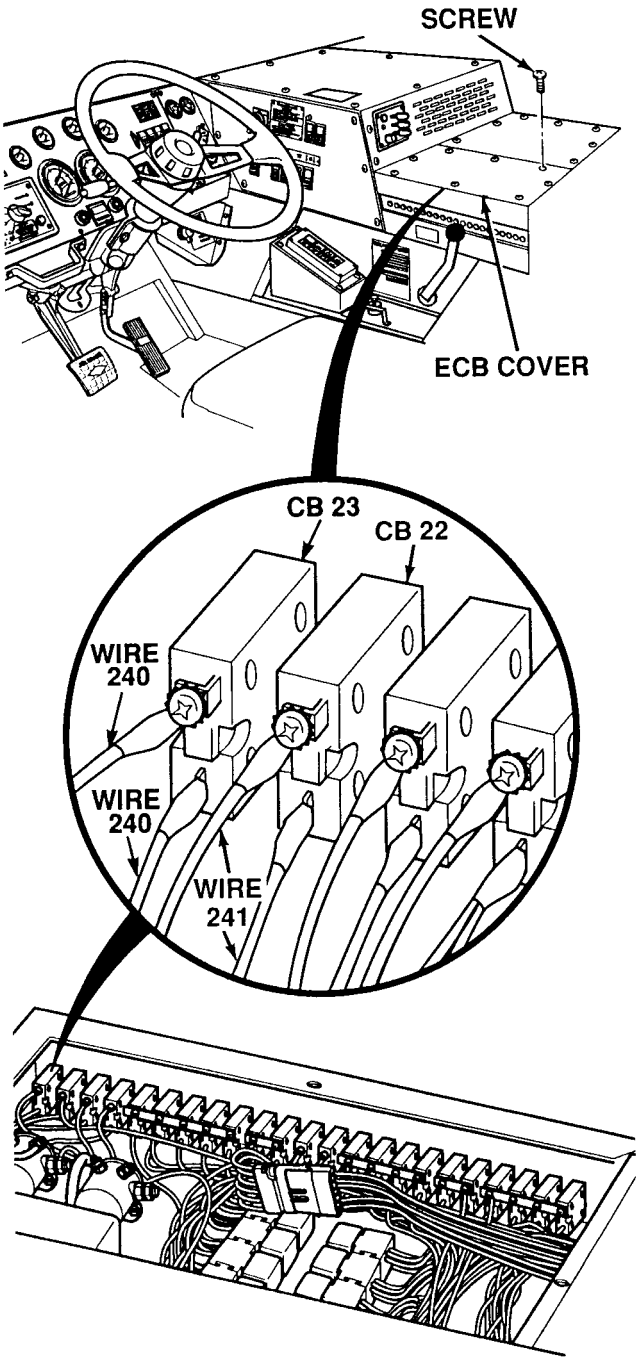
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

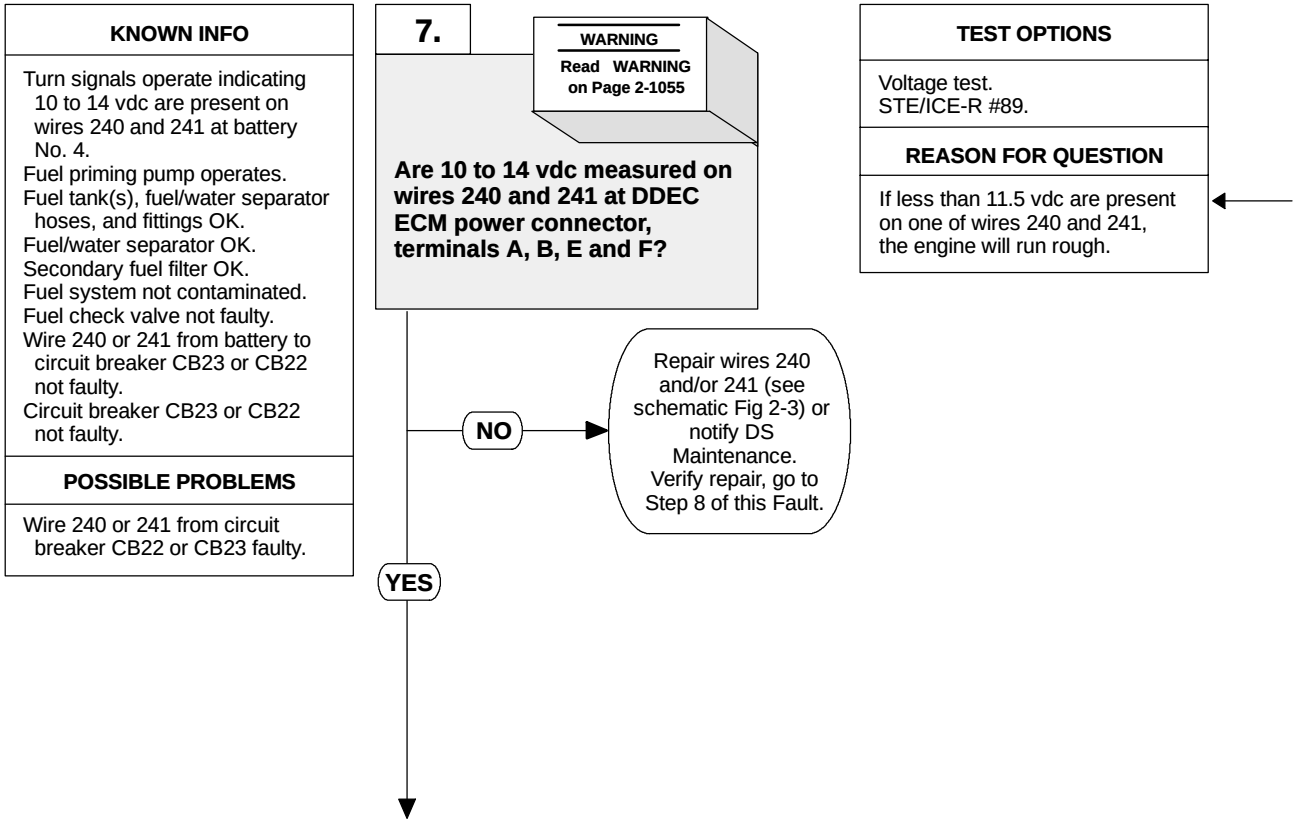
(1) Remove 15 screws, and two ECB covers.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to circuit breaker CB22 input terminal.
(4) Connect negative (–) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, repair wire 241 (see schematic Fig 2-3) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, go to Step (5) below.
(5) Connect positive (+) multimeter lead to circuit breaker CB23 input terminal.
  (a) If 10 to 14 vdc are not present, repair wire 240 (see schematic Fig 2-3) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wires 240 and 241 are OK.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to circuit breaker CB22 output terminal.
(2) Connect negative (–) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, replace circuit breaker CB22 (Para 7-16).
  (b) If 10 to 14 vdc are present, go to Step (3) below.
(3) Connect positive (+) multimeter lead to circuit breaker CB23 output terminal.
  (a) If 10 to 14 vdc are not present, replace circuit breaker CB23 (Para 7-16).
  (b) If 10 to 14 vdc are present, circuit breakers CB22 and CB23 are OK.
(4) Install two ECB covers and 15 screws.



2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).

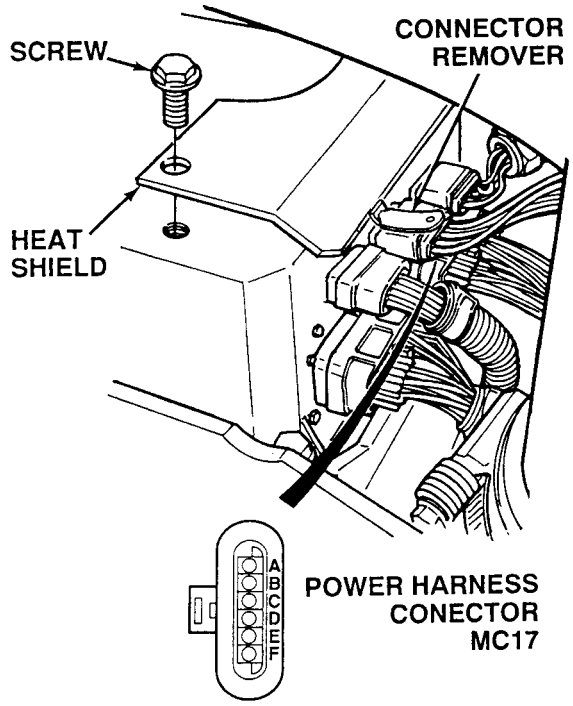


WARNING

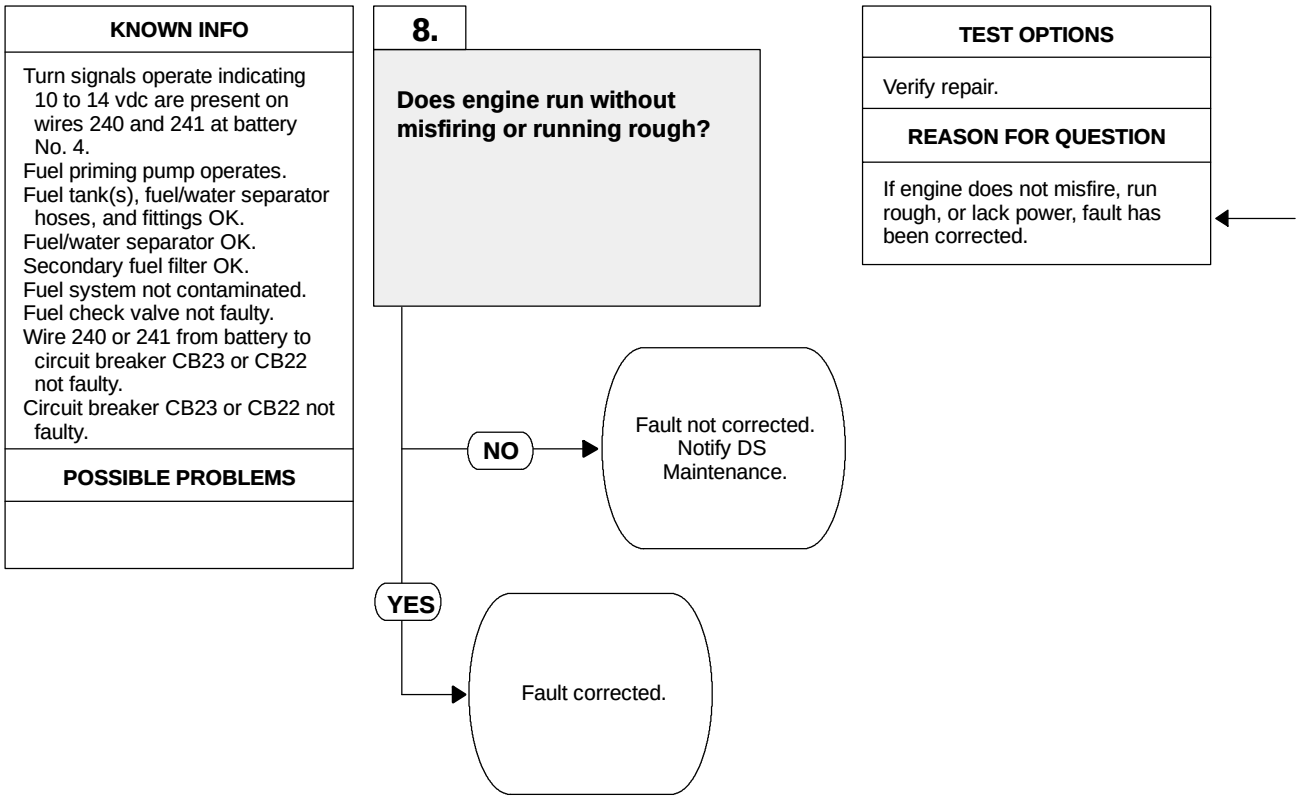
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Remove two screws and heat shield from DDEC ECM.
(2) Disconnect power harness connector MC17 from DDEC ECM with connector remover.
(3) Connect positive (+) multimeter lead to wires 241 at DDEC ECM power connector, terminals A and B one at a time.
(4) Connect negative (-) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, repair wires 241 (see schematic Fig 2-3) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, go to Step (5) below.
(5) Connect positive (+) multimeter lead to wires 240, terminals E and F one at a time.
  (a) If 10 to 14 vdc are not present, repair wires 240 (see schematic Fig 2-3) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wires 240 are OK. Go to Step (6) below.
(6) Connect power harness connector MC17 to DDEC ECM.
(7) Install heat shield and two mounting screws.

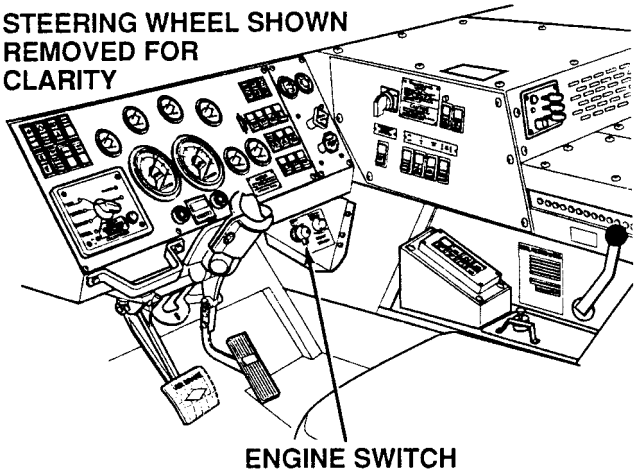


2. ENGINE STARTS BUT MISFIRES, RUNS ROUGH, OR LACKS POWER (CONT).



VERIFY REPAIR

(1) Start engine and operate truck (TM 9-2320-364-10).
(2) Listen to engine operation.
  (a) If engine misfires, runs rough, or lacks power, Fault not corrected. Notify DS Maintenance.
  (b) If engine does not misfire, run rough, or lack power, Fault corrected.
(3) Turn OFF ENGINE switch.
(4) Close top engine access cover.



2-17. FUEL SYSTEM TROUBLESHOOTING (CONT).

3. ENGINE DOES NOT START WHEN ETHER STARTING AID IS USED IN COLD WEATHER.

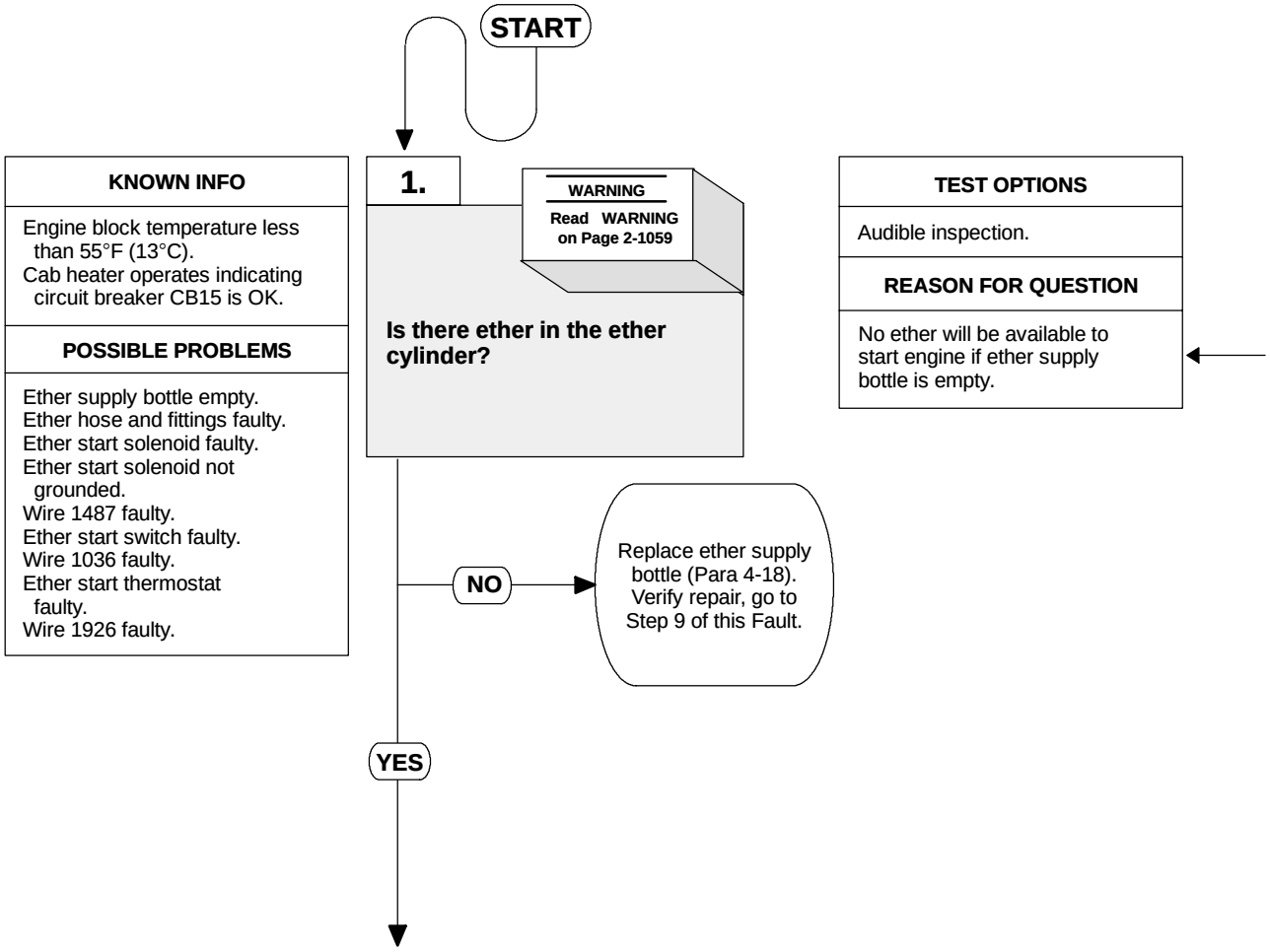
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R, (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Corrosion Preventive Compound (Item 34, Appendix C)
Lockwasher (Item 168, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left front skirt removed, (Para 17-34)



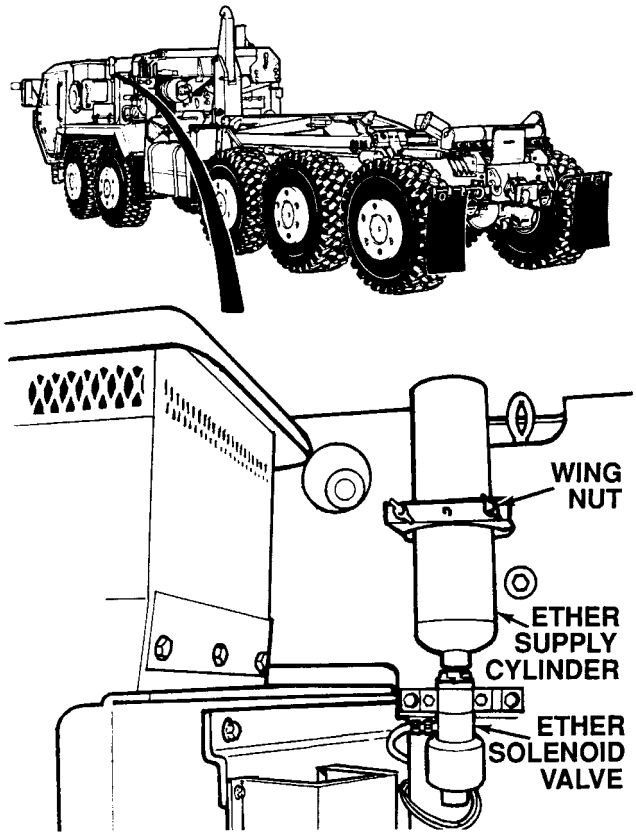
WARNING

Ether is toxic and highly flammable. Container is pressurized. Never heat container and never discharge ether into confined areas or near open flame. Severe injury to personnel may result.

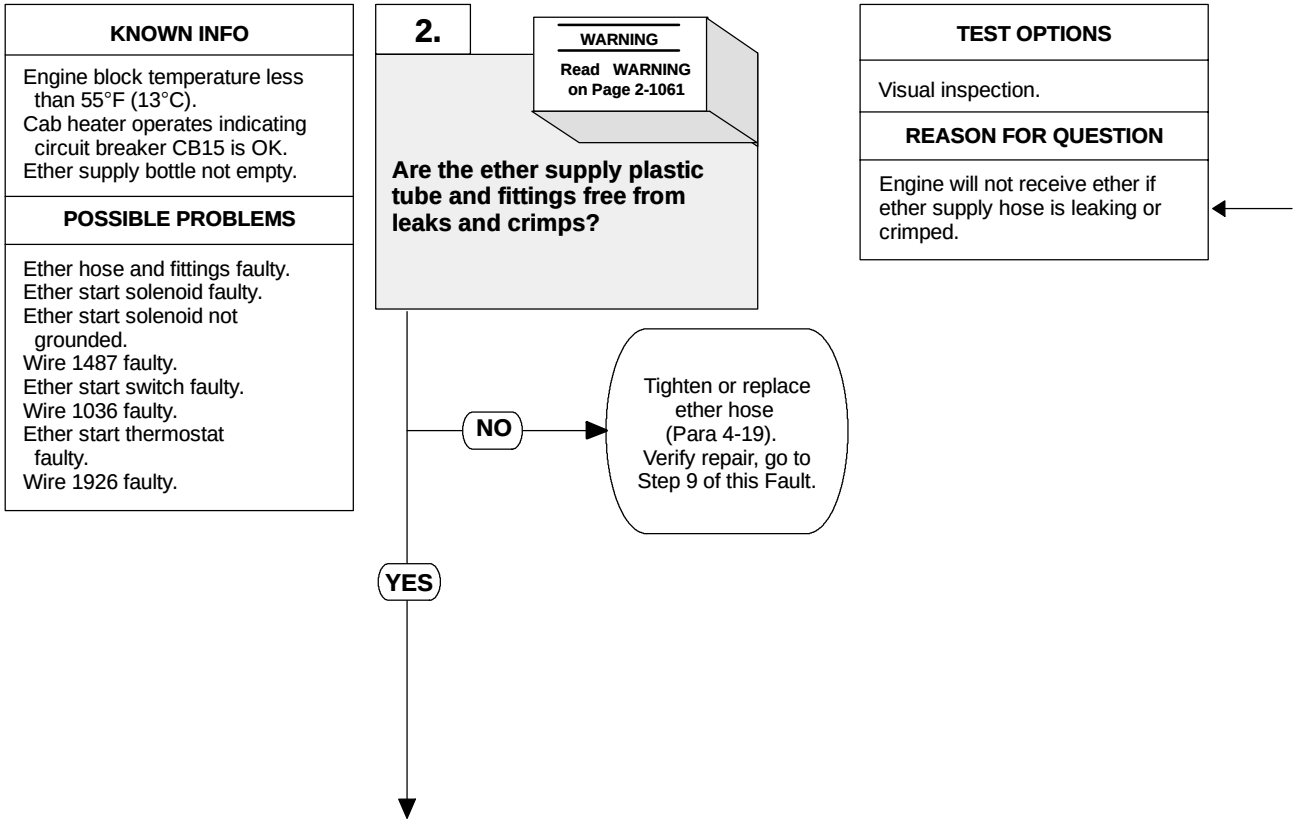
NOTE

Temperature at engine block must be below 55°F (13°C) before ether starting aid will work.

AUDIBLE INSPECTION
(1) Loosen two wing nuts and unscrew ether supply cylinder. (2) Shake cylinder. (a) If there is no ether in cylinder, replace cylinder (Para 4-18). (b) If there is ether in cylinder, go to Step 3 below. (3) Screw ether supply cylinder into solenoid valve and tighten two wing nuts. (4) Ensure cylinder is installed correctly.



3. ENGINE DOES NOT START WHEN ETHER STARTING AID IS USED IN COLD WEATHER (CONT).



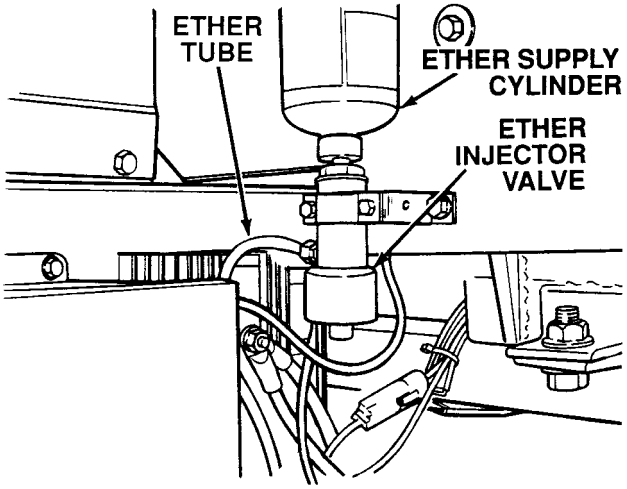
WARNING

Ether is toxic and highly flammable. Container is pressurized. Never heat container and never discharge ether into confined areas or near open flame. Severe injury to personnel may result.

VISUAL INSPECTION

Check ether supply tube and fittings along entire length, for looseness, leaks and crimps.

(1) If ether supply hose is loose, leaking or crimped, tighten or replace hose as necessary (Para 4-19).
(2) If ether supply hose and fittings are OK, go to Step 3 of this Fault.



3. ENGINE DOES NOT START WHEN ETHER STARTING AID IS USED IN COLD WEATHER (CONT).

KNOWN INFO

Engine block temperature less than 55°F (13°C).
Cab heater operates indicating circuit breaker CB15 is OK.
Ether supply bottle not empty.
Ether hose and fittings OK.

POSSIBLE PROBLEMS

Ether start solenoid faulty.
Ether start solenoid not grounded.
Wire 1487 faulty.
Ether start switch faulty.
Wire 1036 faulty.
Ether start thermostat faulty.
Wire 1926 faulty.

3.

WARNING
Read WARNING on Page 2-1063

Are 22 to 28 vdc measured on wire 1926 on ether start solenoid harness connector MC23, terminal A?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not present at connector MC23, terminal A, the ether start solenoid valve will not operate.

NO → Go to Step 5 of this Fault.

YES

KNOWN INFO

Engine block temperature less than 55°F (13°C).
Cab heater operates indicating circuit breaker CB15 is OK.
Ether supply bottle not empty.
Ether hose and fittings OK.

POSSIBLE PROBLEMS

Ether start solenoid faulty.
Ether start solenoid not grounded.
Wire 1487 faulty.
Ether start switch faulty.
Wire 1036 faulty.
Ether start thermostat faulty.
Wire 1926 faulty.

4.

Is continuity measured between wire 1435 at ether start solenoid harness connector MC23, terminal B and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If continuity is not measured at connector MC23 terminal B, the ether start solenoid will not operate.

NO → Repair wire 1435 (see schematic Fig 2-23) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

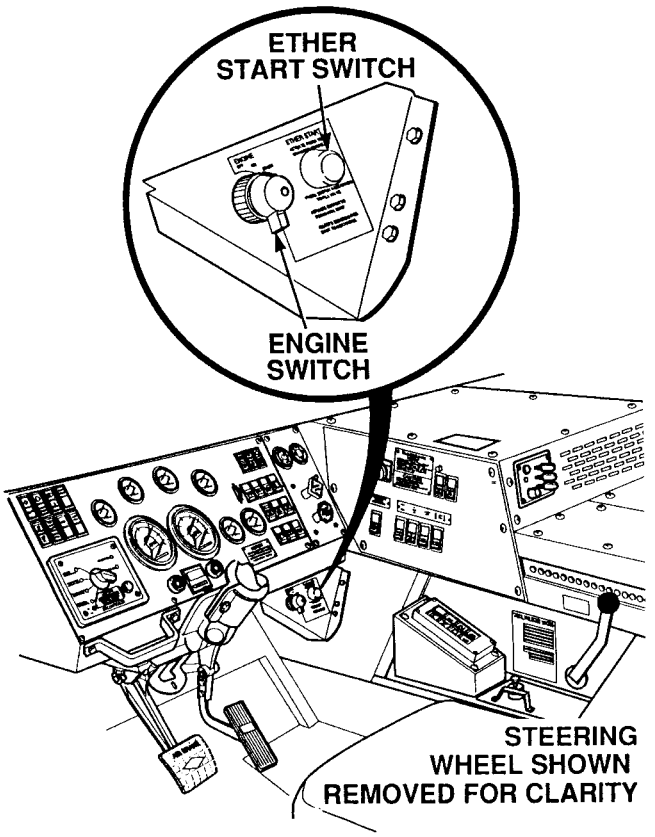
YES → Replace ether start solenoid (Para 4-18). Verify repair, go to Step 9 of this Fault.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

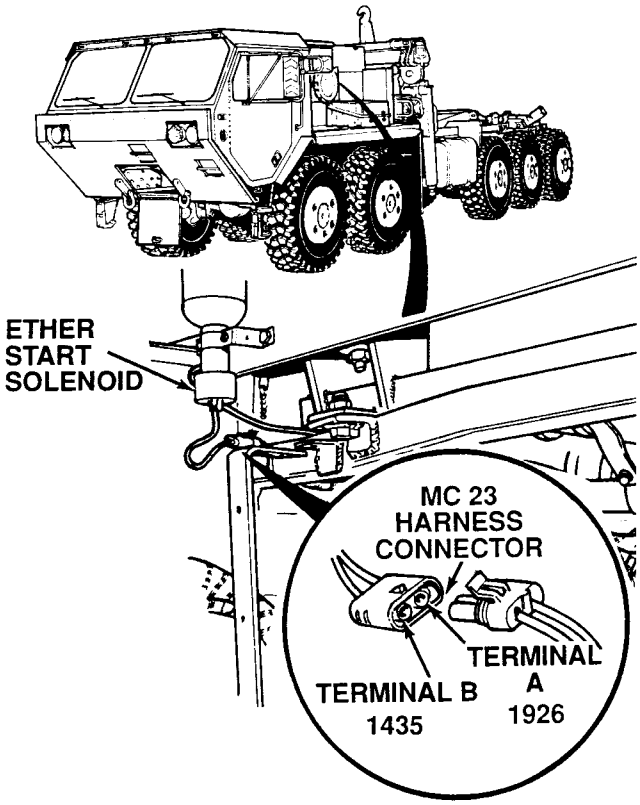
VOLTAGE TEST

(1) Disconnect connector MC23.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to ether start solenoid harness connector MC23, terminal A.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) Press and hold the ether start switch while checking for voltage.
  (a) If there are not 22 to 28 vdc present, turn OFF ENGINE switch, and go to Step 5 of this Fault.
  (b) If there are 22 to 28 vdc present, wire 1926 is OK.
(7) Turn OFF ENGINE switch.



CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between solenoid connector MC23, terminal B and a known good ground?
  (a) If there is no continuity present, repair wire 1435 (see schematic Fig 2-23) or notify DS Maintenance.
  (b) If there is continuity present, replace ether start solenoid (Para 4-18).
(3) Connect connector MC23 to ether start solenoid connector.



3. ENGINE DOES NOT START WHEN ETHER STARTING AID IS USED IN COLD WEATHER (CONT).

KNOWN INFO

Engine block temperature less than 55°F (13°C).
Cab heater operates indicating circuit breaker CB15 is OK.
Ether supply bottle not empty.
Ether hose and fittings OK.
Ether start solenoid OK.
Ether start solenoid is grounded.

POSSIBLE PROBLEMS

Wire 1487 faulty.
Ether start switch faulty.
Wire 1036 faulty.
Ether start thermostat faulty.
Wire 1926 faulty.

5.

WARNING
Read WARNING on Page 2-1065

Are 22 to 28 vdc measured at wire 1487 on ether start switch, terminal A?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not present at ether start switch, ether start solenoid will not operate.

NO → Repair wire 1487 (see schematic Fig 2-23) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

YES

KNOWN INFO

Engine block temperature less than 55°F (13°C).
Cab heater operates indicating circuit breaker CB15 is OK.
Ether supply bottle not empty.
Ether hose and fittings OK.
Ether start solenoid OK.
Ether start solenoid is grounded.
Wire 1487 OK.

POSSIBLE PROBLEMS

Ether start switch faulty.
Wire 1036 faulty.
Ether start thermostat faulty.
Wire 1926 faulty.

6.

WARNING
Read WARNING on Page 2-1065

Are 22 to 28 vdc measured at wire 1036 on ether start switch, terminal B, when switch is pressed?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

Ether start solenoid will not operate if ether start switch is faulty.

NO → Replace ether start switch (Para 7-33). Verify repair, go to Step 9 of this Fault.

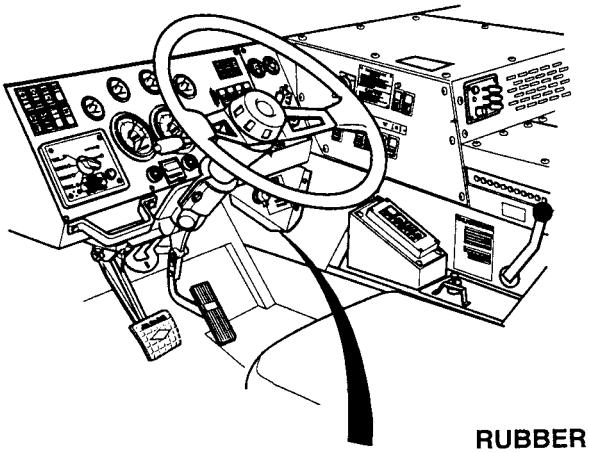
YES

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

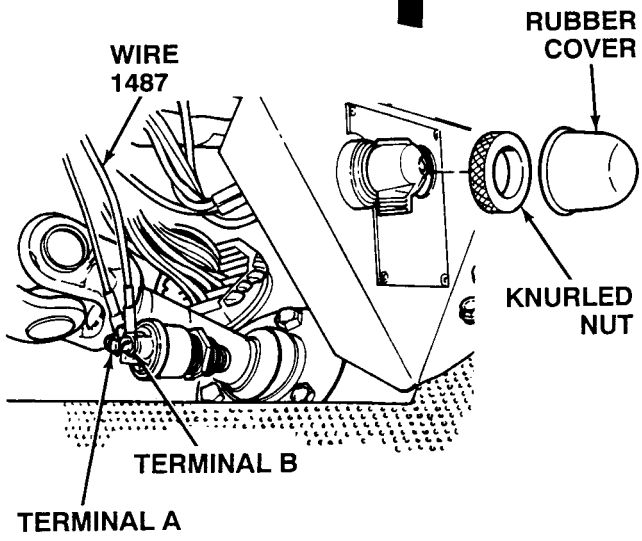
VOLTAGE TEST

(1) Remove rubber cover, knurled nut and ether start switch from panel.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1487 on ether start switch.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch.
  (a) If there are not 22 to 28 vdc present, turn OFF ENGINE switch, and repair wire 1487 (see schematic Fig 2-23) or notify DS Maintenance.
  (b) If there are 22 to 28 vdc present, wire 1487 is OK.
(6) Turn OFF ENGINE switch.



VOLTAGE TEST

(1) Connect positive (+) multimeter lead to ether start switch, terminal B.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch.
(4) Press ether start switch.
  (a) If there are not 22 to 28 vdc present, turn OFF ENGINE switch and replace ether start switch (Para 7-33).
  (b) If there are 22 to 28 vdc present, ether start switch is OK.
(5) Turn OFF ENGINE switch.
(6) Install ether start switch, nut and rubber cover.



3. ENGINE DOES NOT START WHEN ETHER STARTING AID IS USED IN COLD WEATHER (CONT).

KNOWN INFO

Engine block temperature less than 55°F (13°C).
Cab heater operates indicating circuit breaker CB15 is OK.
Ether supply bottle not empty.
Ether hose and fittings OK.
Ether start solenoid OK.
Ether start solenoid is grounded.
Wire 1487 OK.
Ether start switch OK.

POSSIBLE PROBLEMS

Wire 1036 faulty.
Ether start thermostat faulty.
Wire 1926 faulty.

7.

WARNING

Read WARNING on Page 2-1067

Are 22 to 28 vdc measured at wire 1036 in harness connector MC56?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not measured, wire 1036 is faulty and ether start solenoid will not operate.

NO → Replace wire 1036 (see schematic Fig 2-23) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

YES

KNOWN INFO

Engine block temperature less than 55°F (13°C).
Cab heater operates indicating circuit breaker CB15 is OK.
Ether supply bottle not empty.
Ether hose and fittings OK.
Ether start solenoid OK.
Ether start solenoid is grounded.
Wire 1487 OK.
Ether start switch OK.
Wire 1036 OK.

POSSIBLE PROBLEMS

Ether start thermostat faulty.
Wire 1926 faulty.

8.

Is continuity measured across ether start thermostat TS1 when switch is cooled to less than 55°F (13°C)?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

Ether start solenoid will not open if thermostat is faulty.

NO → Replace thermostat (Para 4-20). Verify repair, go to Step 9, of this Fault.

YES → Repair wire 1926 (see schematic Fig 2-23) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

WARNING

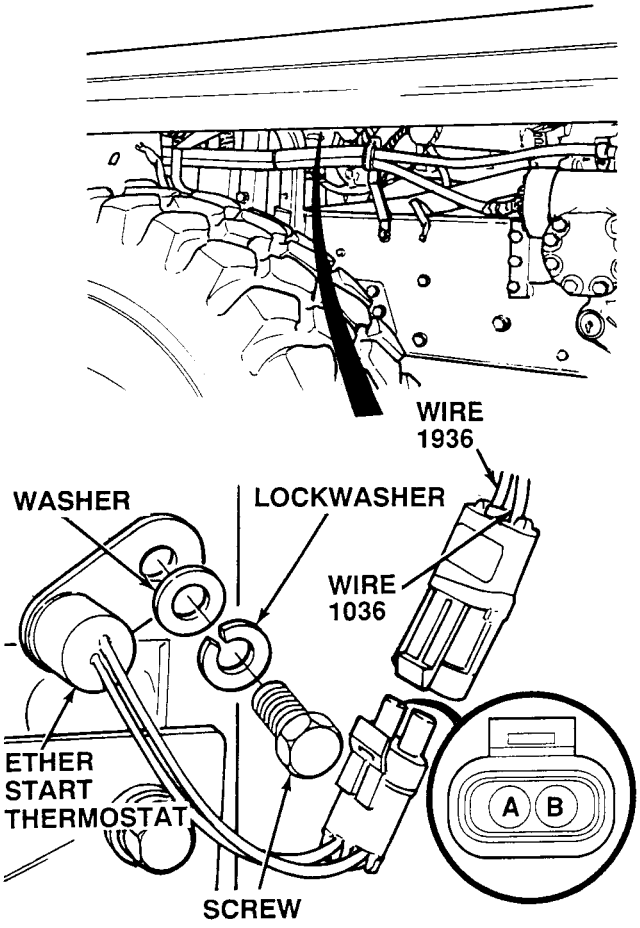
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

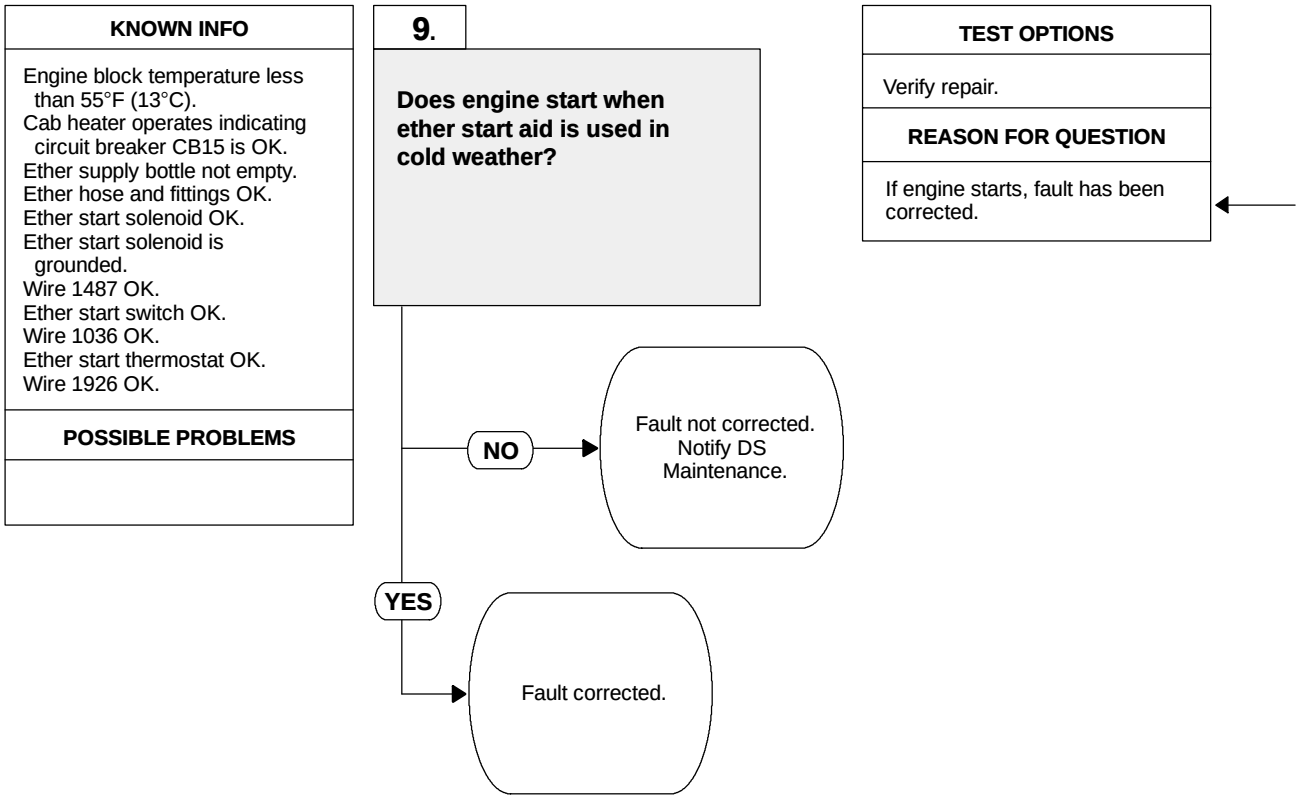
(1) Disconnect connector MC56.
(2) Connect positive (+) multimeter lead to wire 1036 on harness connector MC56, terminal A.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch.
(5) Press ether start switch.
    (a) If there are not 22 to 28 vdc present, turn OFF ENGINE switch, and repair wire 1036 (see schematic Fig 2-23) or notify DS Maintenance.
    (b) If there are 22 to 28 vdc present, wire 1036 is OK.
(6) Turn OFF ENGINE switch.

CONTINUITY TEST

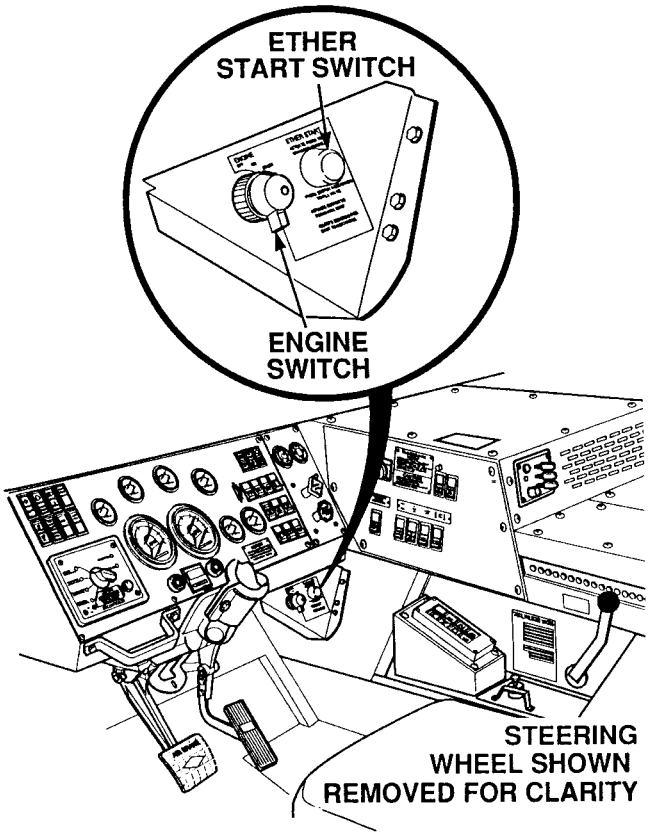
(1) Remove screw, lockwasher, washer, and thermostat from engine. Discard lockwasher.
(2) Cool thermostat to less than 55°F (13°C).
(3) Set multimeter select switch to ohms.
(4) Is there continuity between wires 1036 at terminals A and B of thermostat connector?
    (a) If there is no continuity present, replace thermostat (Para 4-20).
    (b) If there is continuity present, repair wire 1926 (see schematic Fig 2-23) or notify DS Maintenance, and perform Steps (5) through (7) below.
(5) Install thermostat, washer, lockwasher and screw.
(6) Apply corrosion preventative compound on screw.
(7) Install left front skirt (Para 17-34).



3. ENGINE DOES NOT START WHEN ETHER STARTING AID IS USED IN COLD WEATHER (CONT).



VERIFY REPAIR
(1) Start engine using ether starting aid (TM 9-2320-364-10). (a) If engine does not start, Fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If engine starts, Fault has been corrected. (2) Turn OFF engine switch.



2-18. COOLING SYSTEM TROUBLESHOOTING.

This paragraph covers Cooling System Troubleshooting. The Cooling System Fault Index, Table 2-35, lists faults for the cooling system of the PLS truck.

Table 2-35. Cooling System Fault Index.

Fault No.	Description	Page
1.	Engine Overheats (Water Temp Gage Continuously Reads Over 230°F [110°C])	2-1072
2.	Engine Runs Too Cool	2-1090

2-17. COOLING SYSTEM TROUBLESHOOTING (CONT).

1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C)).

INITIAL SETUP

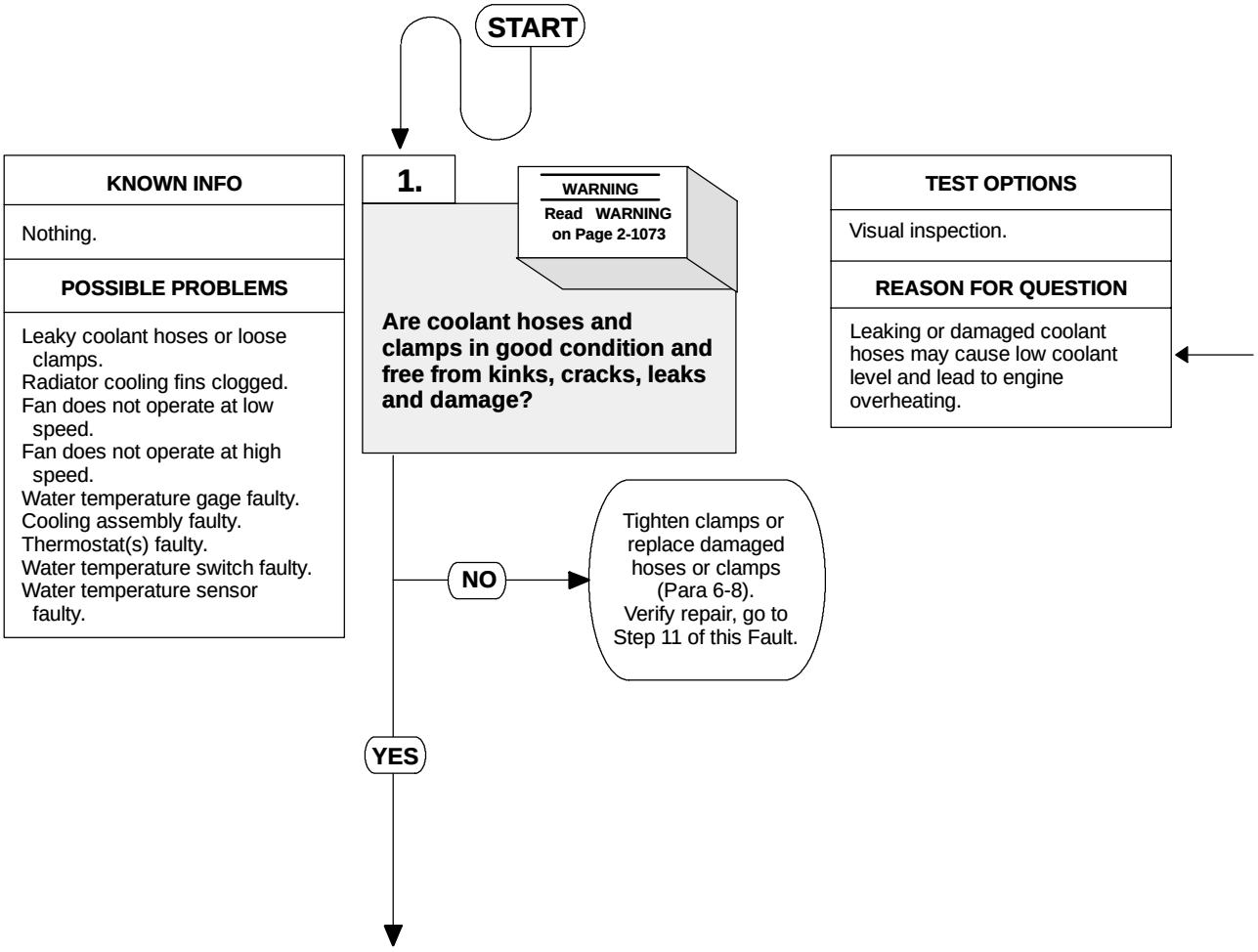
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Adapter, Radiator (Item 2, Appendix G)
STE/ICE-R (Item 3, Appendix G)
Multimeter, (Item 44, Appendix G)
Tester, Pressure, Radiator (Item 71, Appendix G)

Materials/Parts
Lockwasher (22) (Item 195, Appendix F)
Lockwasher (8) (Item 171, Appendix F)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P
TM 750-254

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)



WARNING

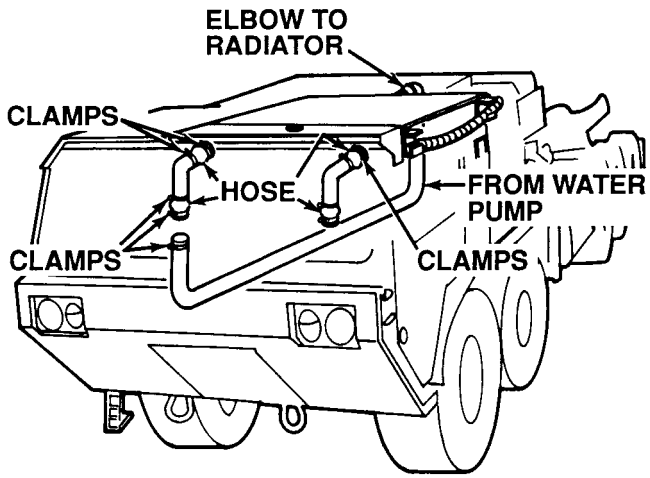
Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

NOTE

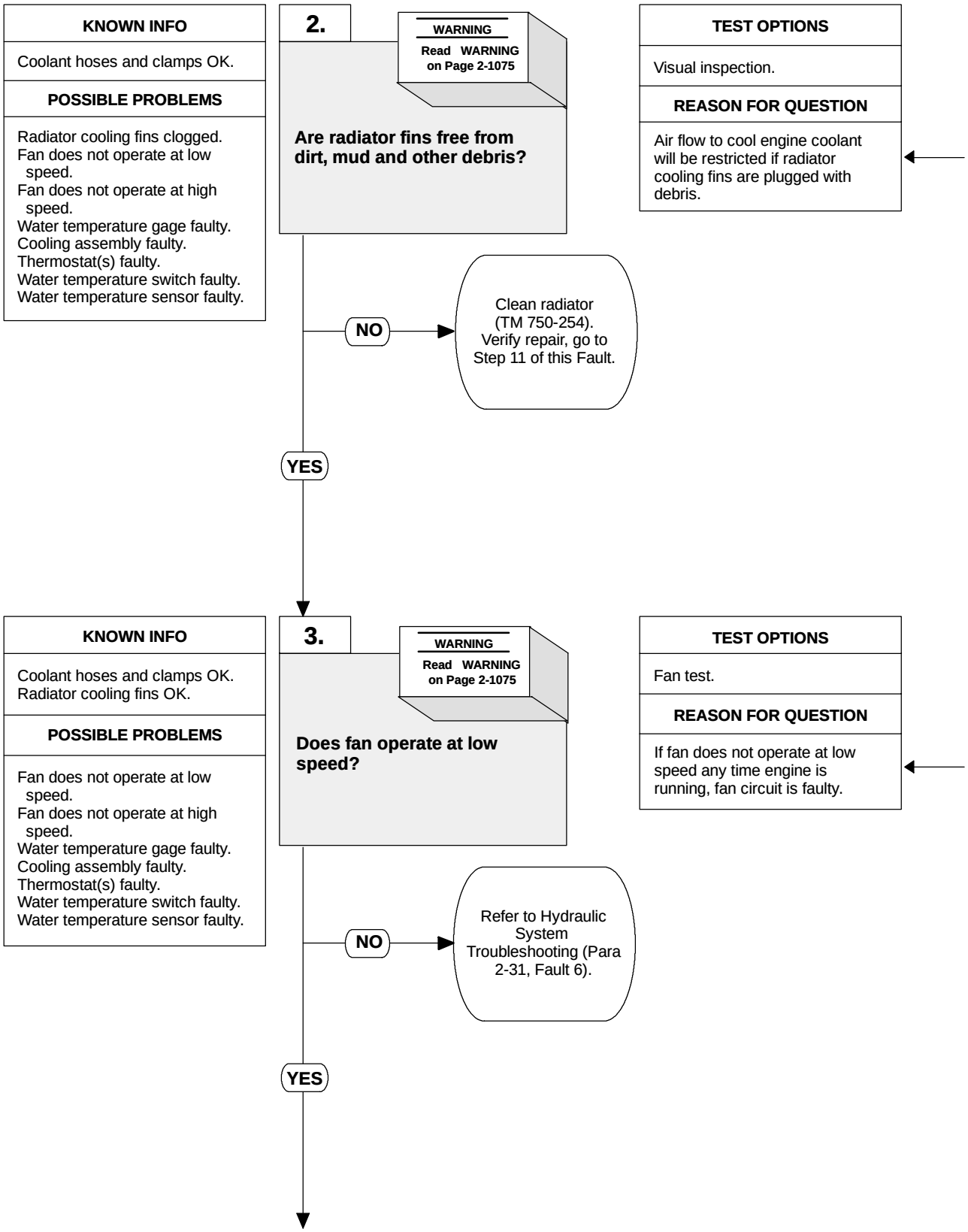
Pressure loss without external leaks indicates internal coolant leaks.

HOSE INSPECTION

(1) Using hose diagram (Para 6-8), check coolant hoses for leaks, cracks, and bulging.
(2) Check for loose or damaged clamps.
(3) Look for wet spots, drips, and stains that indicate where coolant is leaking.
   (a) If you see cracked hoses or loose, damaged clamps, tighten or replace clamps or replace hoses (Para 6-8).
   (b) If no leaks or damage is observed, hoses and clamps are OK.



1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).

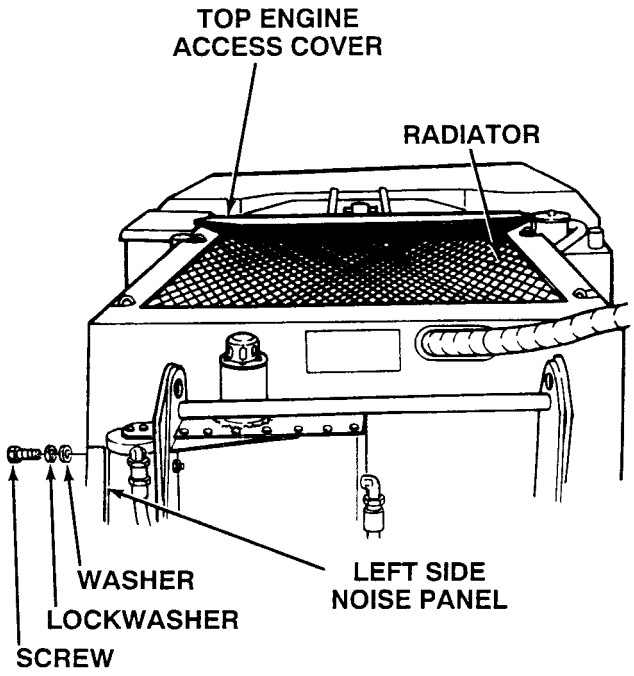


WARNING

- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Do not place any part of body in area of fan operation. Failure to do so will result in injury or death to personnel.

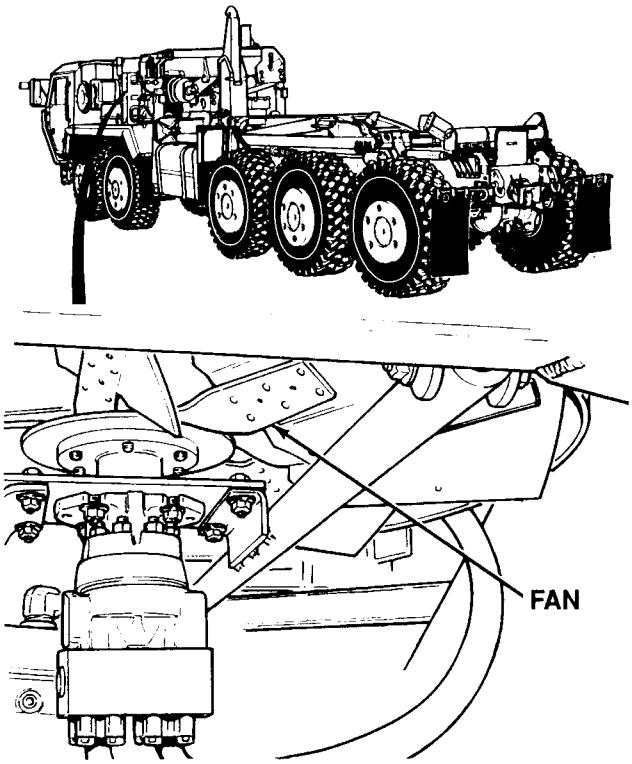
VISUAL INSPECTION

(1) Open top engine access cover.
(2) Check if radiator is covered with dirt, mud or other debris.
(3) Remove 8 screws, lockwashers, washers and left side noise panel. Discard lockwashers.
(4) While assistant moves light under radiator, check radiator fins for plugging.
  (a) If dirt or debris is present, clean radiator and perform Step (5) below.
  (b) If dirt or debris is not present, go to Step (5) below.
(5) Close top engine access cover.

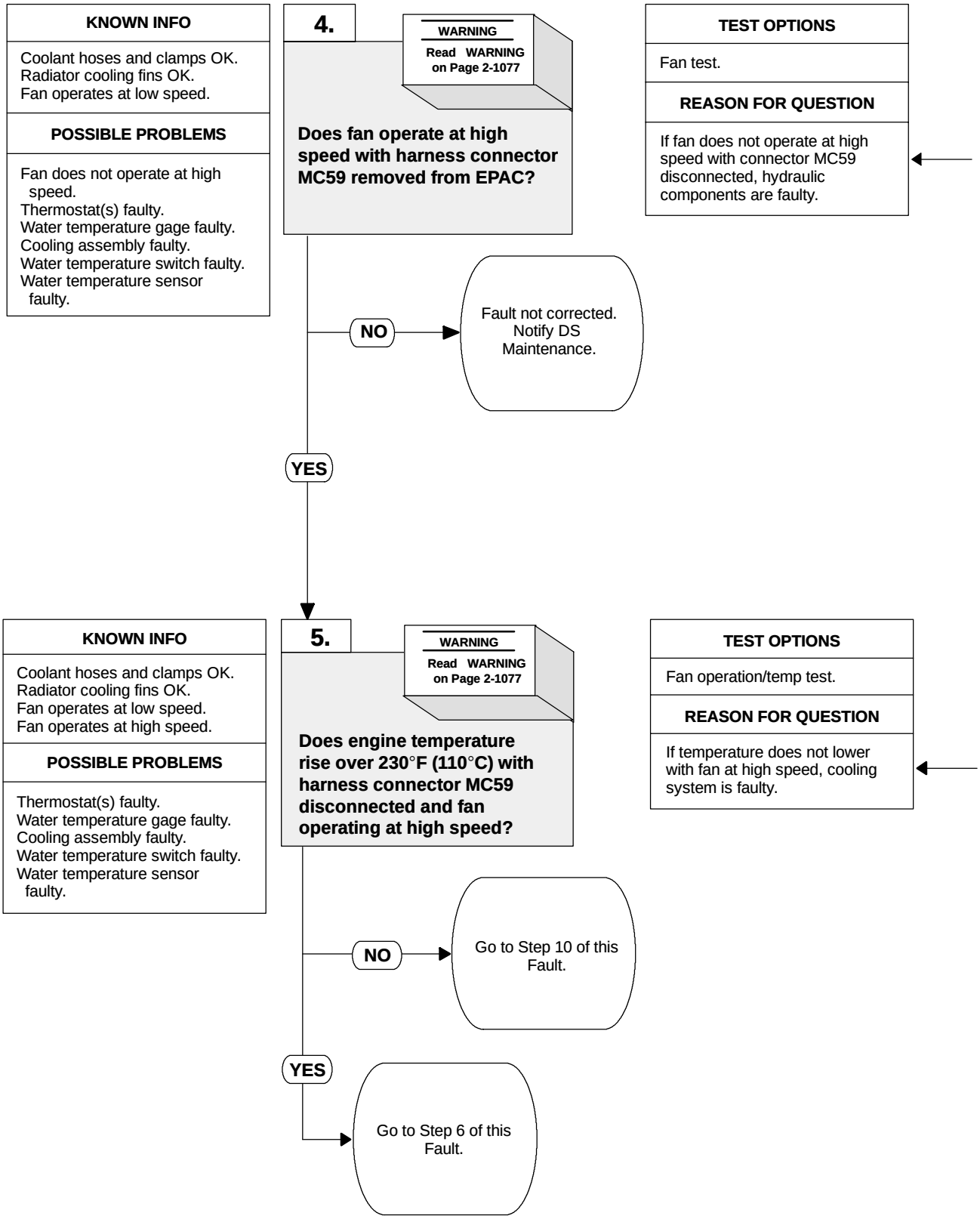


FAN TEST

(1) Start engine (TM 9-2320-364-10).
(2) Observe cooling fan operation.
  (a) If fan is not operating, fan circuit is faulty. Turn OFF ENGINE switch and refer to Hydraulic Troubleshooting (Para 2-31, Fault 5).
  (b) If fan is operating, turn OFF ENGINE switch and go to Step 4 of this Fault.



1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).

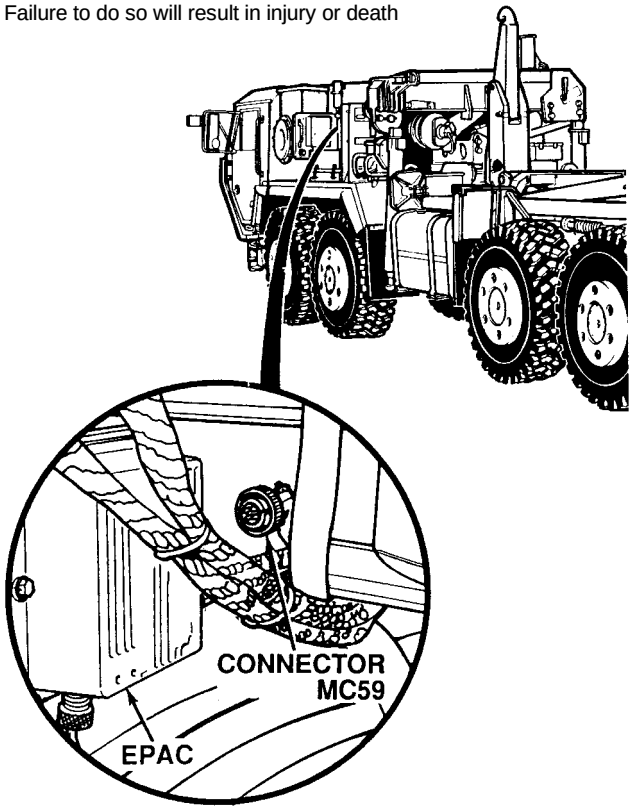


WARNING

- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.
- Do not place any part of body in area of fan operation. Failure to do so will result in injury or death to personnel.

FAN TEST

(1) Disconnect harness connector MC59 from EPAC.
(2) Start engine (TM 9-2320-364-10).
  (a) If fan speed does not increase, perform Steps (3) through (6) below and notify DS Maintenance.
  (b) If fan speed does increase, perform Steps (3) through (5) below and go to Step 5 of this Fault.
(3) Turn OFF ENGINE switch.
(4) Install left side noise panel, eight washers, lockwashers and screws.
(5) Install right side noise panel (Para 17-26).
(6) Connect harness connector MC59 to EPAC.

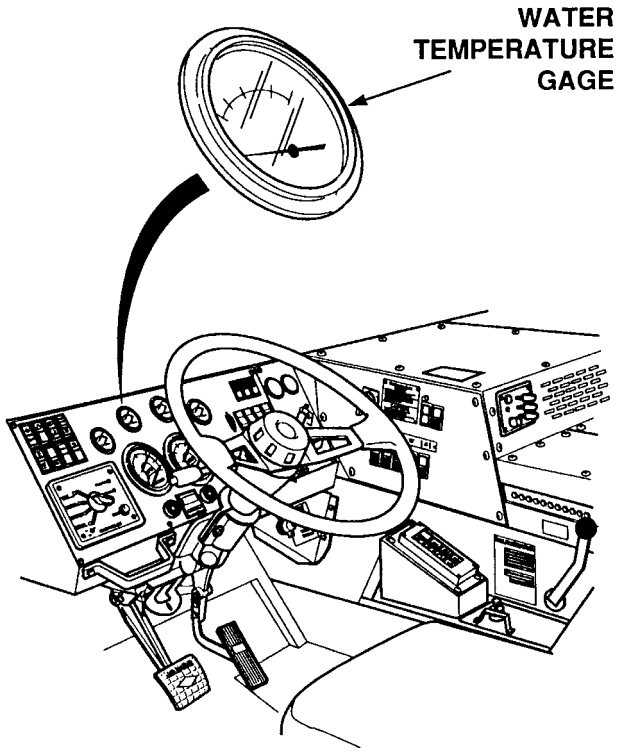


NOTE

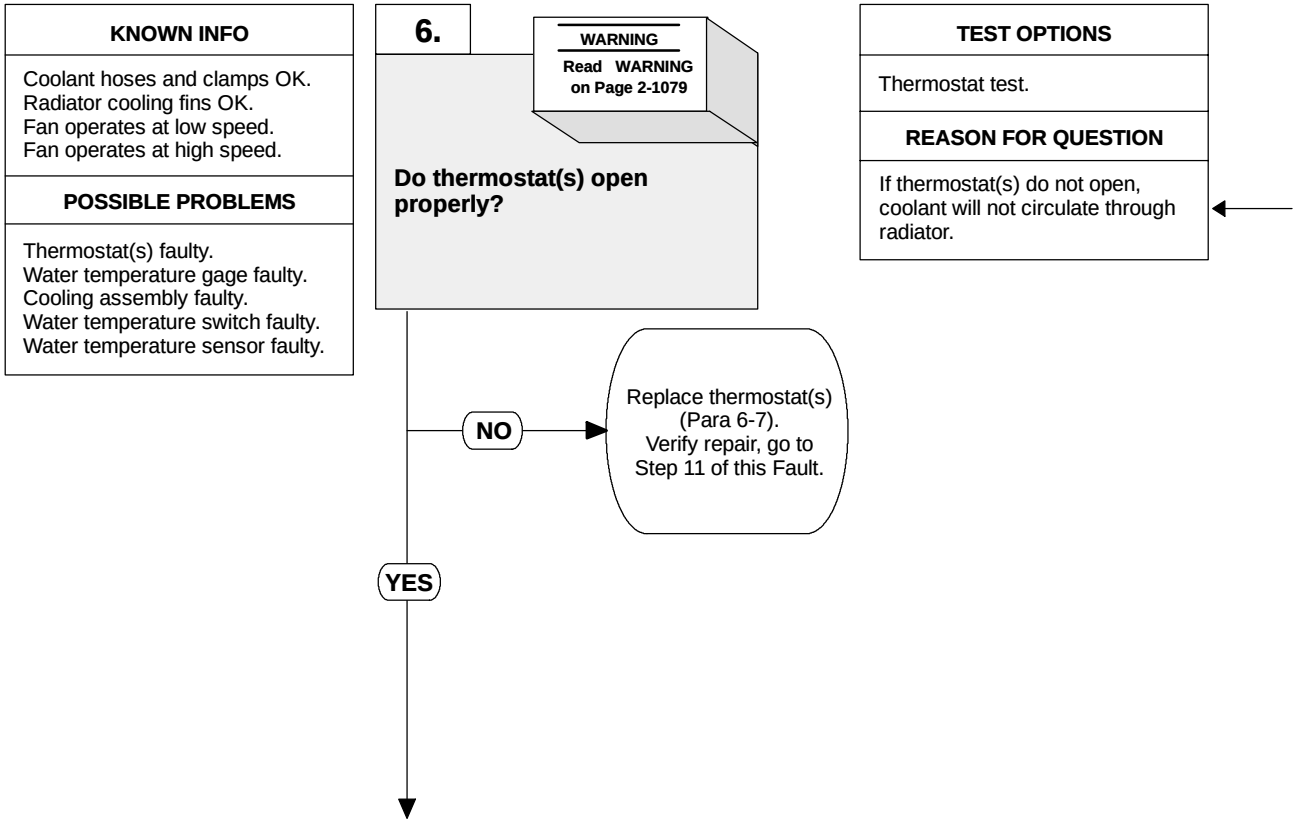
Engine temperature must be below 192°F (88°C) before performing test.

FAN OPERATION/TEMP TEST

(1) Start engine (TM 9-2320-364-10).
(2) Observe WATER TEMP gage for reading above 230°F (110°C) with engine running and fan at high speed.
  (a) If WATER TEMP gage indicates engine temperature above 230°F (110°C), cooling assembly is faulty. Perform Steps (3) and (4) below and go to Step 6 of this Fault.
  (b) If WATER TEMP gage indicates engine temperature under 230°F (110°C), temperature sensing circuit is faulty. Perform Steps (3) and (4) below and go to Step 10 of this Fault.
(3) Turn OFF ENGINE switch.
(4) Connect harness connector MC59 to EPAC.



1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).

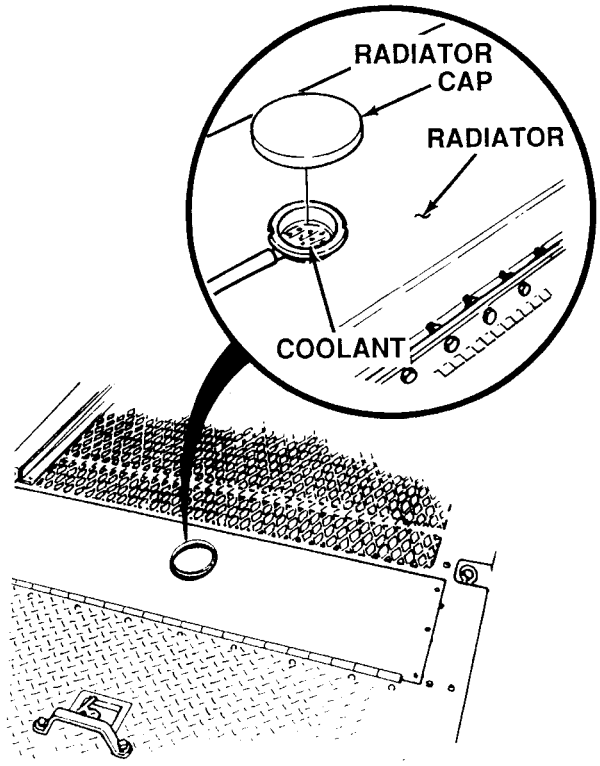


WARNING

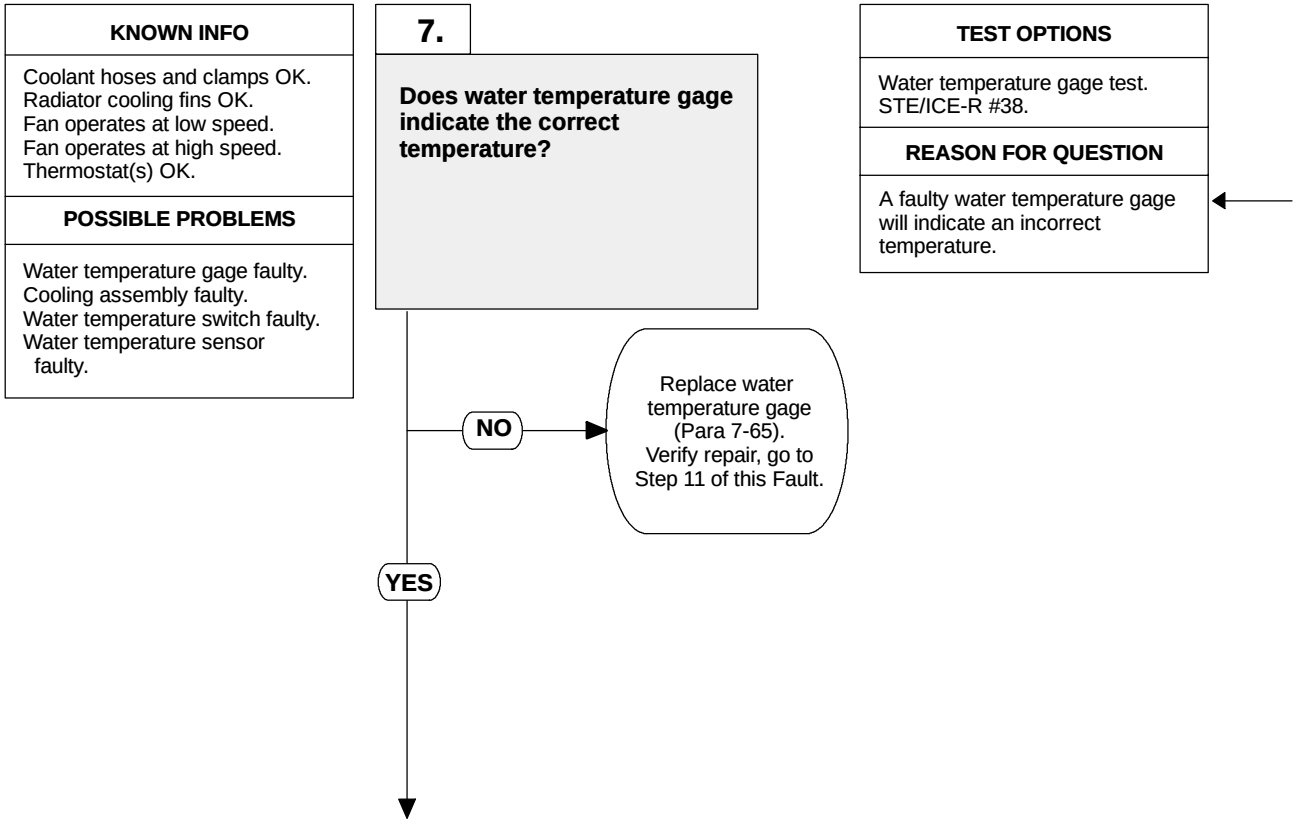
- Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.
- Use a clean, thick waste cloth or like material to remove the cap. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.

THERMOSTAT TEST

(1) Push down on radiator cap and slowly turn to left to relieve pressure from radiator.
(2) Start engine (TM 9-2320-364-10). Allow engine to warm to operating temperature of 190°F (88°C).
(3) Inspect coolant flow in radiator.
  (a) If coolant does not flow, perform Steps (4) and (5) below and replace thermostat(s) (Para 6-7).
  (b) If coolant does flow, thermostat(s) is OK.
(4) Turn OFF ENGINE switch.
(5) Install radiator cap on radiator.

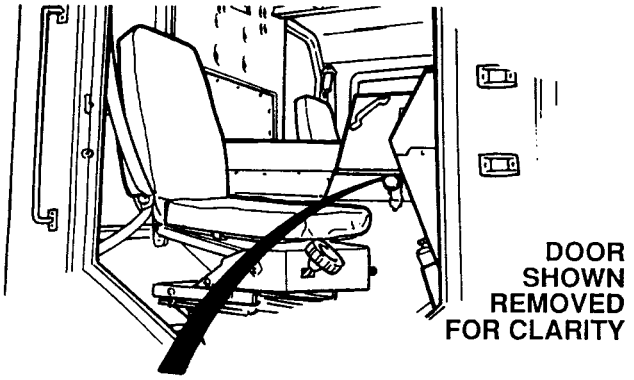


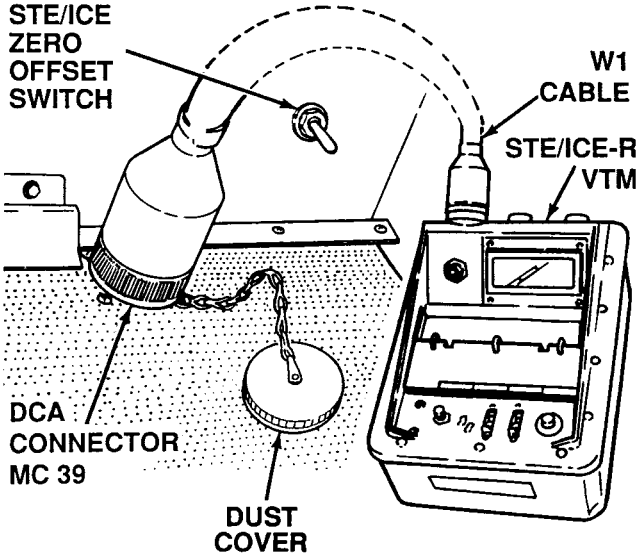
1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).

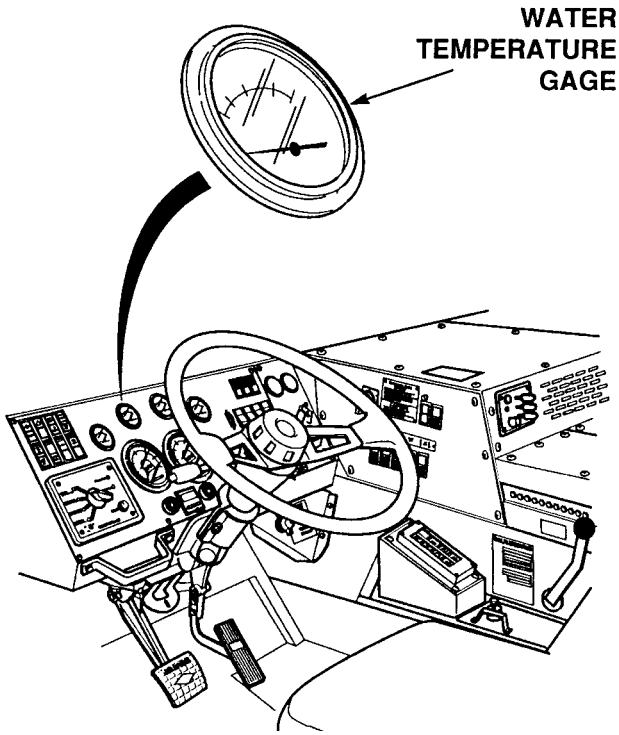


WATER TEMPERATURE GAGE TEST

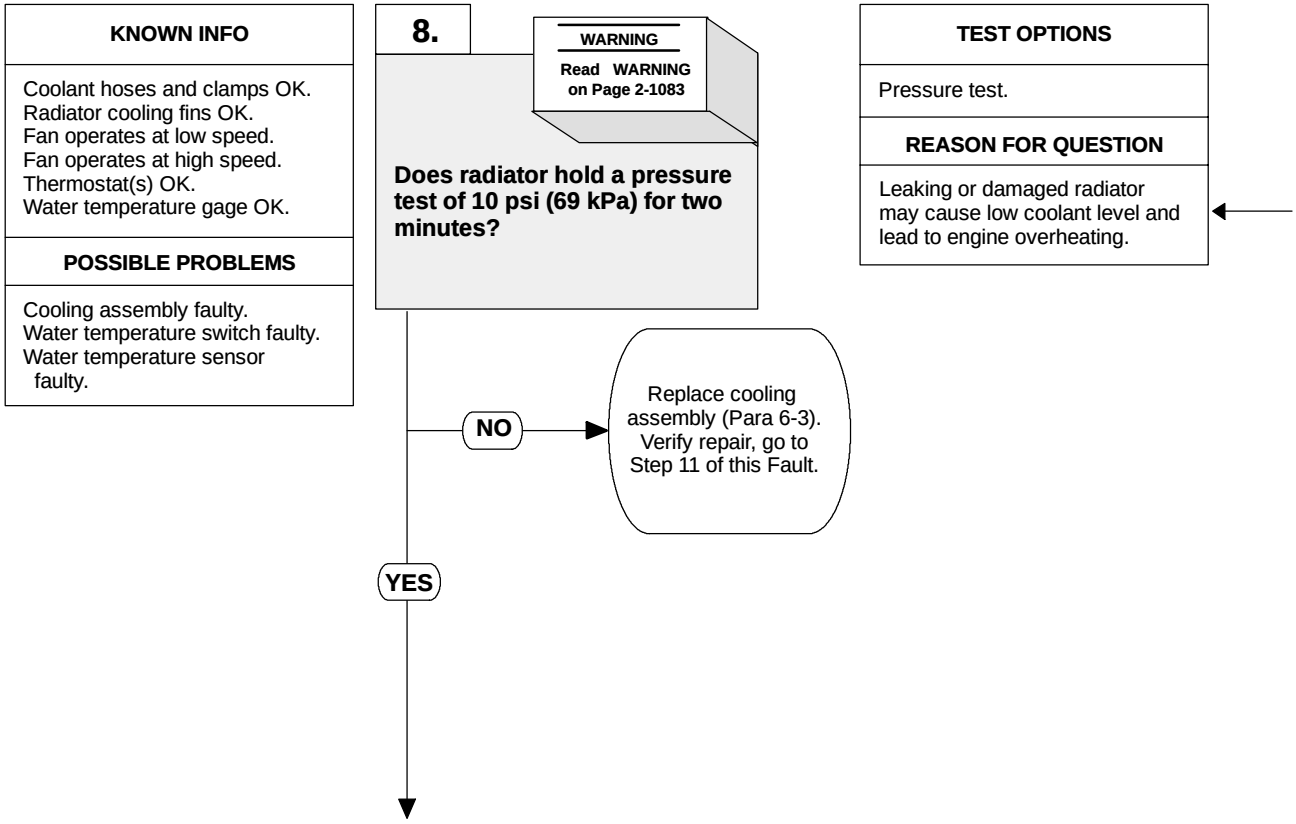
(1) Remove dust cover from DCA connector MC39.
(2) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector.
(3) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(4) Perform a confidence test.
(5) Set TEST SELECT switches to 38.
(6) Start engine (TM 9-2320-364-10).
(7) Set STE/ICE zero offset switch to ON.
(8) Perform offset test (TM 9-4910-571-12&P).
(9) Allow engine to run until operating temperature equalizes.
(10) Press and release TEST button.
  (a) If engine coolant temperature is not between 180°F and 230°F (82°C and 100°C), go to Step (10) below.
  (b) If engine coolant temperature is between 180°F and 230°F (82°C and 110°C), perform Steps (12) through (15) below and go to Step 8 of this Fault.
(11) Compare the STE/ICE-R test #38 results to the water temperature gage in the truck cab.
  (a) If water temperature gage reading is different from the STE/ICE-R test #38 temperature reading, go to Electrical System Troubleshooting (Para 2-20, Fault 5).
  (b) If water temperature gage reading is equal to the STE/ICE-R test #38 temperature reading, fault not corrected. Perform Steps (12) through (15) below and go to Step 8 of this Fault.
(12) Turn OFF ENGINE switch.
(13) Set STE/ICE zero offset switch to OFF.
(14) Disconnect DCA cable W1.
(15) Install dust cover on DCA connector MC39.







1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).

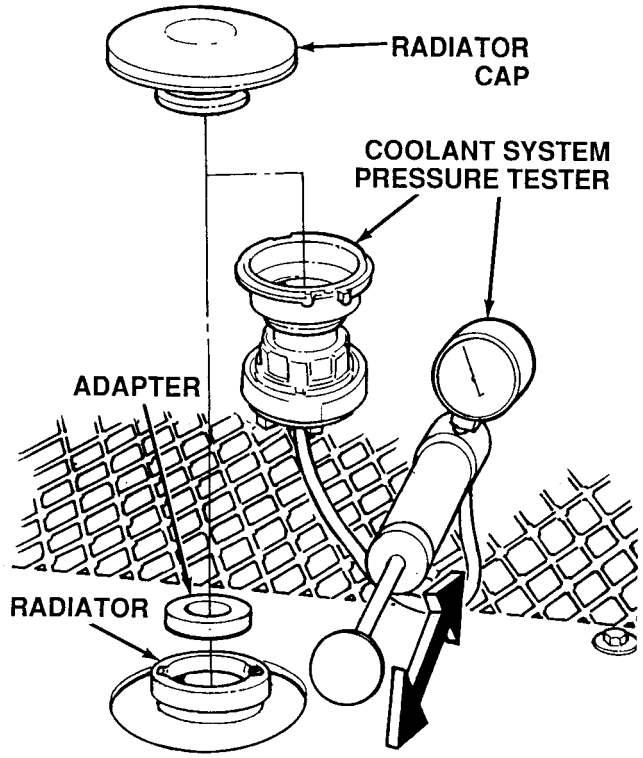


WARNING

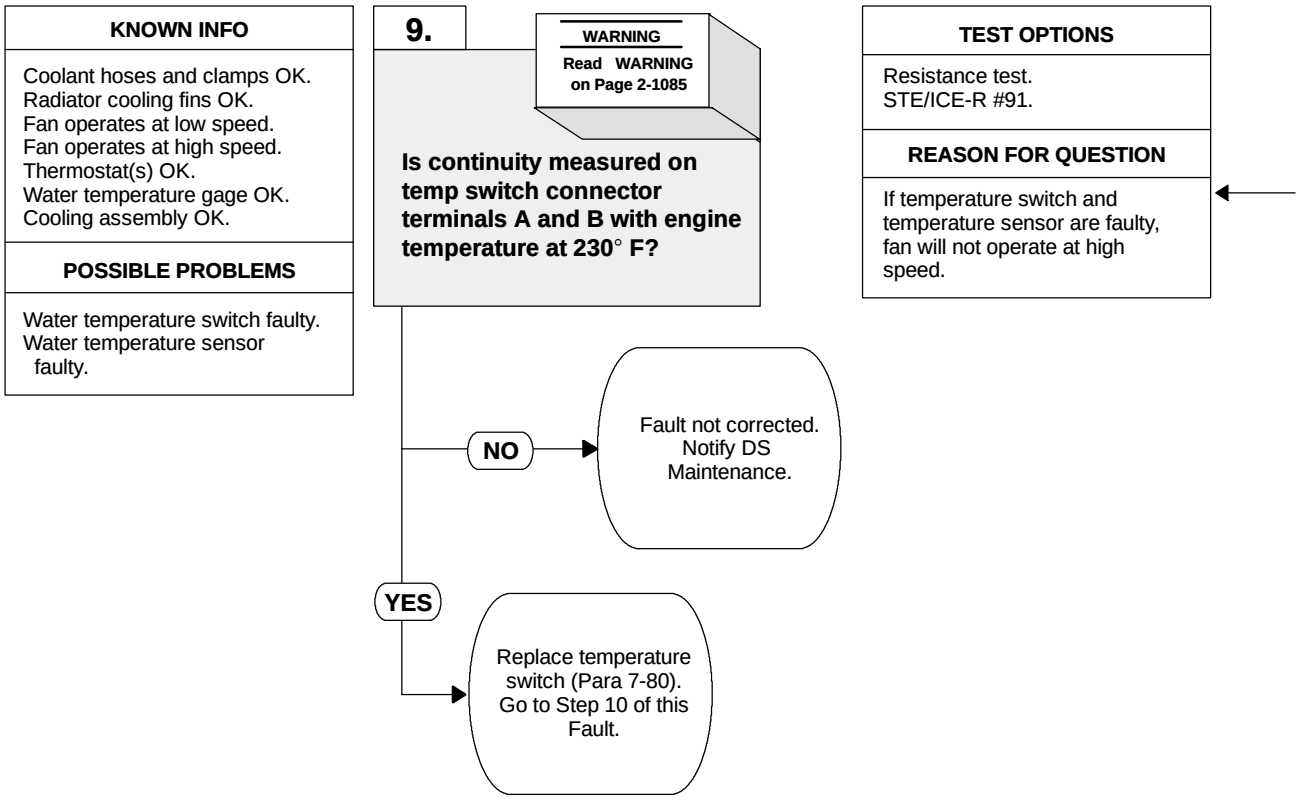
- Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.
- Use extreme care when removing coolant system pressure tester. Sudden release of pressure can cause injury to personnel.

PRESSURE TEST

(1) Push down on radiator cap and slowly turn to left to relieve pressure from radiator.
(2) Turn radiator cap additional 1/2 turn left and remove cap from radiator.
(3) Install radiator cap in radiator pressure tester.
(4) Pressurize radiator cap.
  (a) If pressure valve on radiator cap does not hold for more than 30 seconds or begins to open below 6.5 psi (45 kPa), replace radiator cap.
  (b) If pressure valve on radiator cap holds for more than 30 seconds and begins to open at 6.5 to 8 psi (45-55 kPa), the radiator cap is OK.
(5) Remove radiator cap from radiator pressure tester.
(6) Install adapter and radiator pressure tester in radiator.
(7) Pressurize coolant system to 10 to 15 psi (69-103 kPa).
  (a) If pressure does not hold for two minutes, perform Steps (8) and (9) below and notify DS Maintenance.
  (b) If pressure holds for two minutes, radiator is OK.
(8) Slowly remove radiator pressure tester from radiator.
(9) Install radiator cap on radiator.



1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F [110°C]) (CONT).

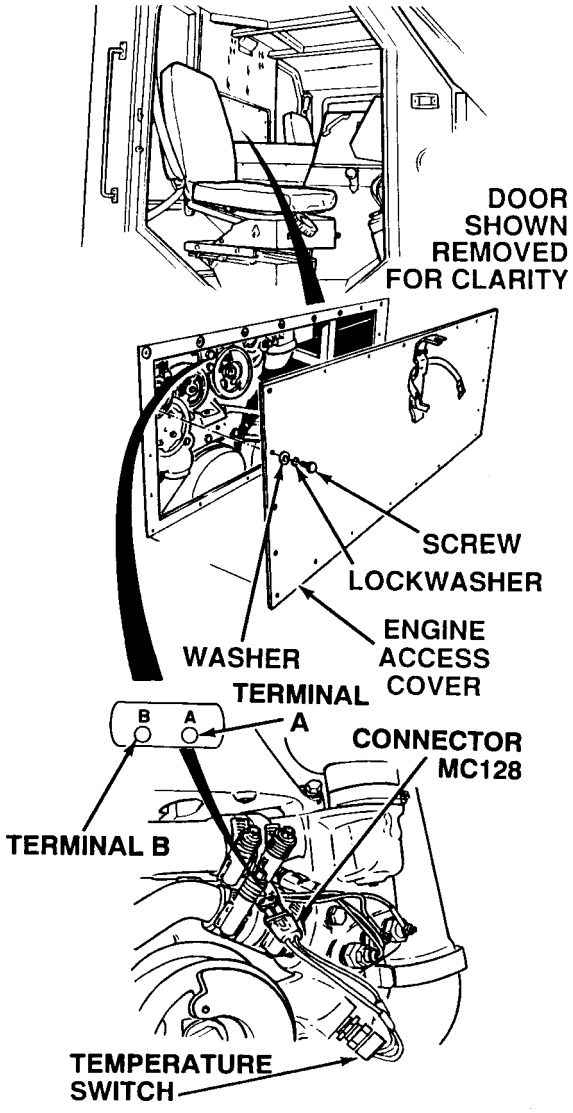


WARNING

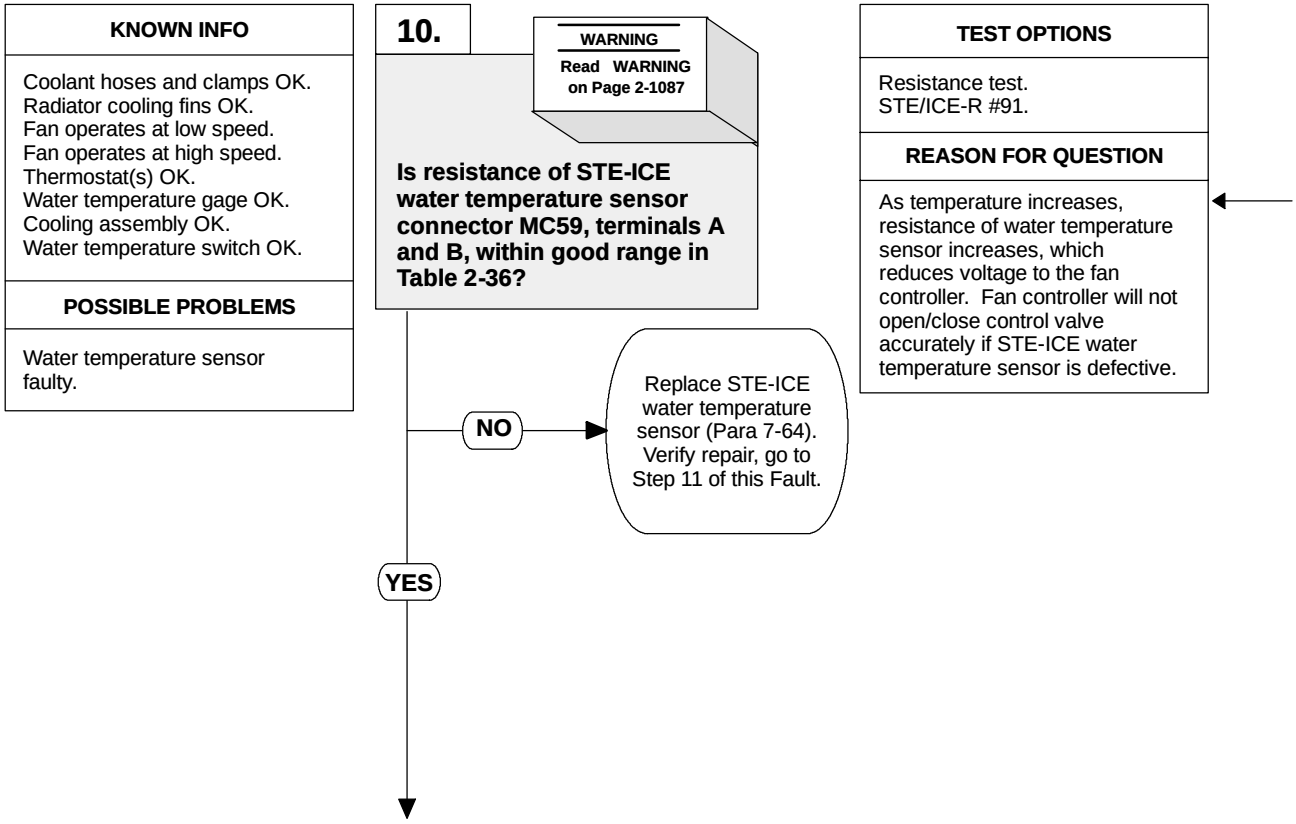
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove 22 screws, lockwashers, washers and engine access panel. Discard lockwashers.
(2) Disconnect connector MC128 from temperature switch.
(3) Start engine (TM 9-2320-364-10).
(4) Shut off engine when temperature gage reads 230°F.
(5) Check continuity at temperature switch connector between terminals A and B.
  (a) If there is no continuity, fault not corrected. Perform Steps (6) and (7) below and notify DS Maintenance.
  (b) If there is continuity, replace temperature switch (Para 7-80). Perform Steps (6) and (7) below and go to Step 10 of this Fault.
(6) Connect connector MC128 to temperature switch connector.
(7) Install engine access panel with 22 screws, lockwashers and washers.



1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Use STE/ICE-R #91 to monitor coolant temperature.

RESISTANCE TEST

(1) Disconnect connector MC59 from EPAC.
(2) Set multimeter select switch to ohms.
(3) Start engine and run at idle speed (TM 9-2320-364-10). It is normal for fan to operate at high speed with connector MC59 disconnected.
(4) Measure resistance at connector MC59 between terminals A and B.
  (a) If resistance is not within range at specified temperature shown in Table 2-36, turn OFF ENGINE switch and replace STE-ICE water temperature sensor (Para 7-64).
  (b) If resistance is within range at specified temperature shown in Table 2-36, temperature sensor is OK.
(5) Turn OFF ENGINE switch.
(6) Connect connector MC59 to EPAC.

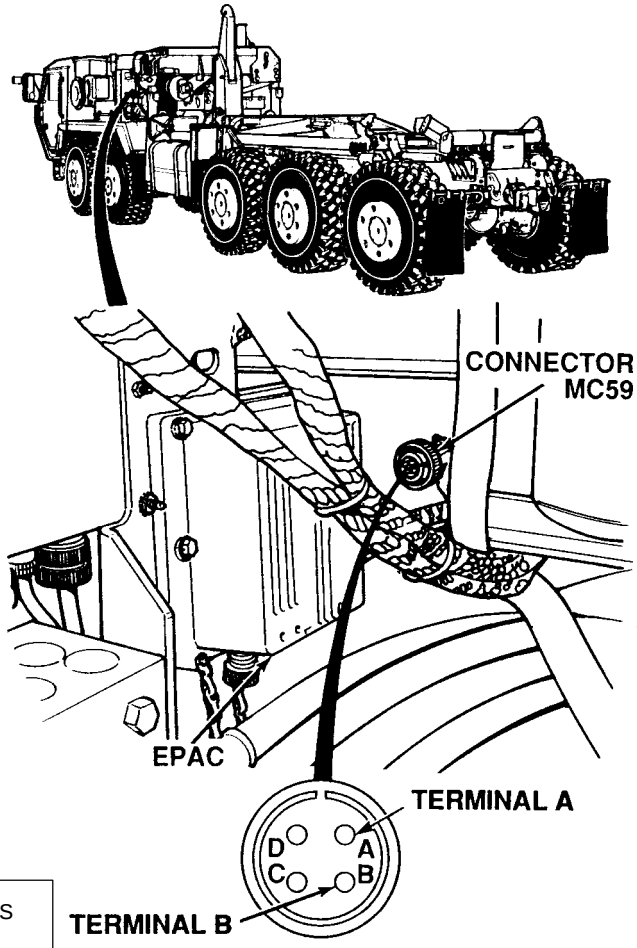
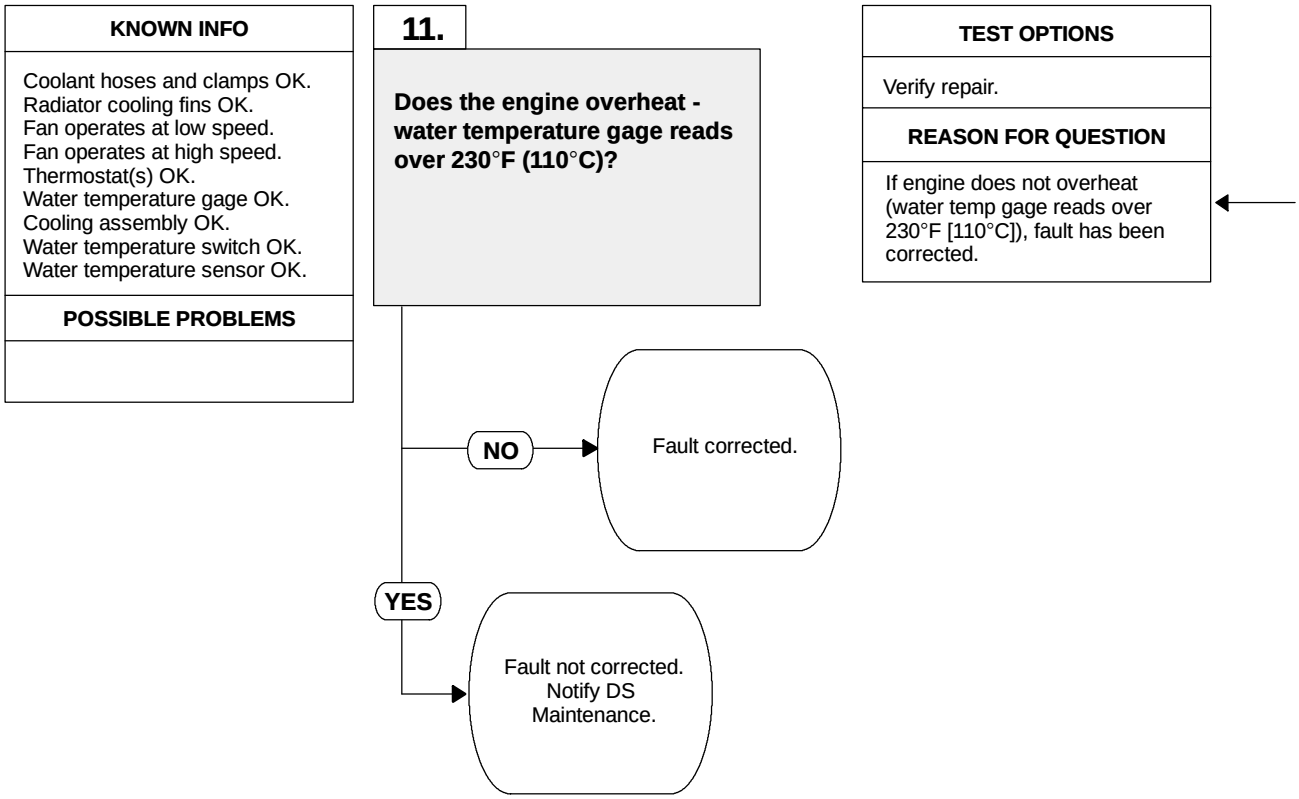


Table 2-36. Water Temperature Sensor Resistance

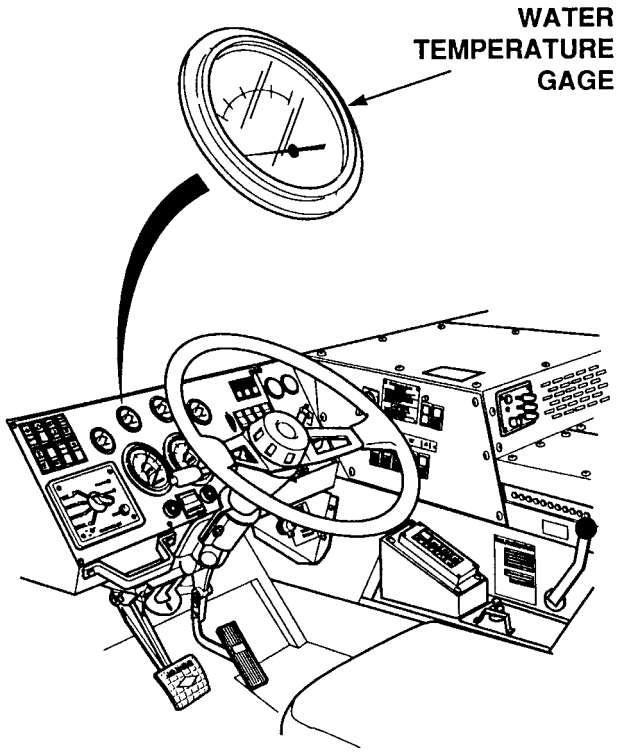
TEMPERATURE vs RESISTANCE CALIBRATION POINTS			
Temperature	Resistance (ohms)	Temperature	Resistance (ohms)
-40°C (-40°F)	684 ± 30	60°C (140°F)	1199 ± 30
-30°C (-22°F)	728 ± 30	70°C (158°F)	1259 ± 10
-20°C (-4°F)	774 ± 30	80°C (176°F)	1322 ± 5
-10°C (14°F)	821 ± 30	90°C (194°F)	1385 ± 5
0°C (32°F)	870 ± 30	100°C (212°F)	1451 ± 5
10°C (50°F)	921 ± 30	110°C (230°F)	1518 ± 10
20°C (68°F)	973 ± 30	120°C (248°F)	1587 ± 30
30°C (86°F)	1027 ± 30	130°C (266°F)	1657 ± 30
40°C (104°F)	1083 ± 30	140°C (284°F)	1729 ± 30
50°C (122°F)	1140 ± 30	150°C (302°F)	1803 ± 30

1. ENGINE OVERHEATS (WATER TEMP GAGE CONTINUOUSLY READS OVER 230°F (110°C) (CONT)).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10) and allow to warm up.
(2) Observe water temperature gage reading.
  (a) If water temperature is below 230°F (110°C), fault has been corrected. Perform Steps (3) and (4) below.
  (b) If water temperature is over 230°F (110°C), fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
(3) Turn OFF ENGINE switch.
(4) Install right side noise panel (Para 17-26).



2-18. COOLING SYSTEM TROUBLESHOOTING (CONT).

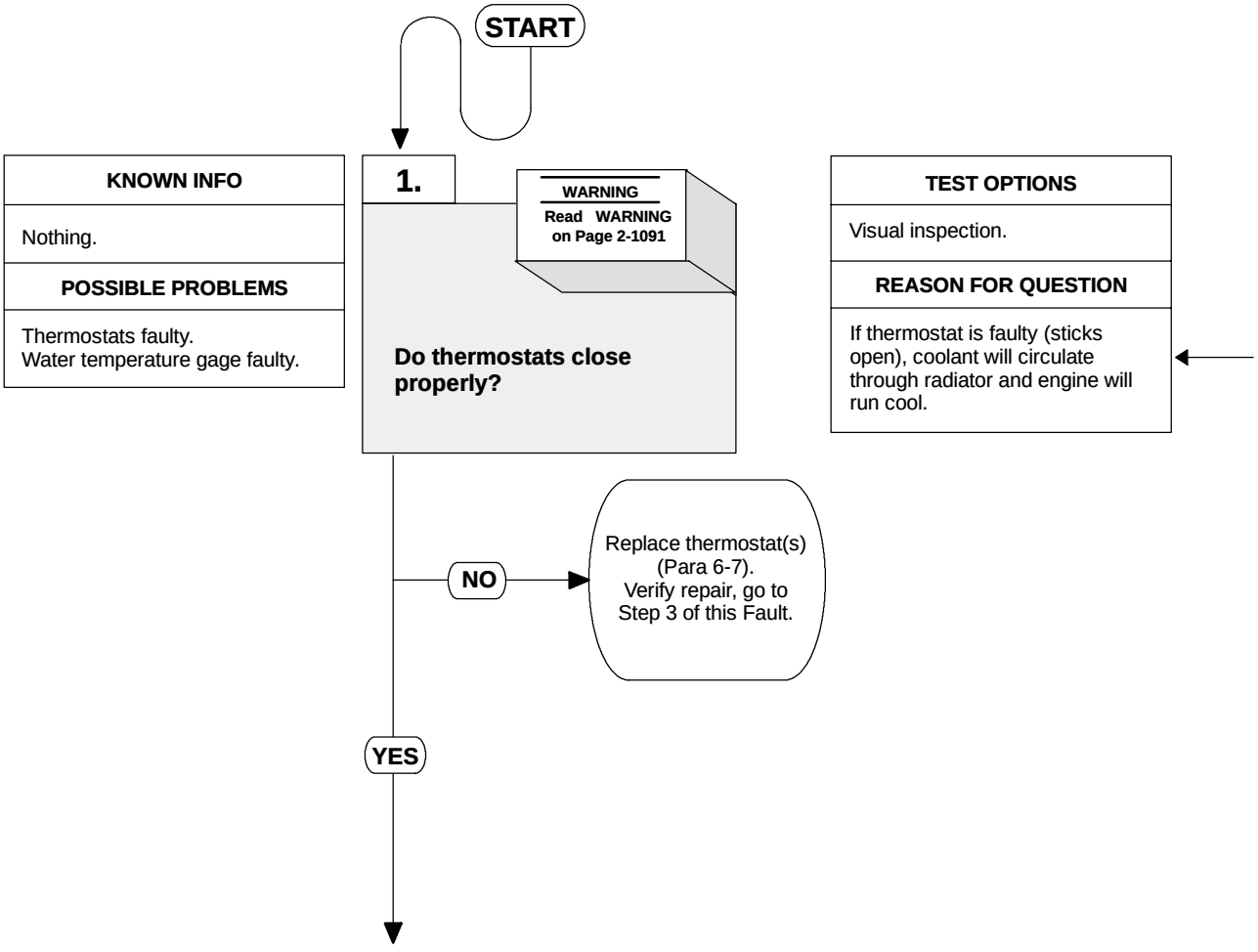
2. ENGINE RUNS TOO COOL.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)

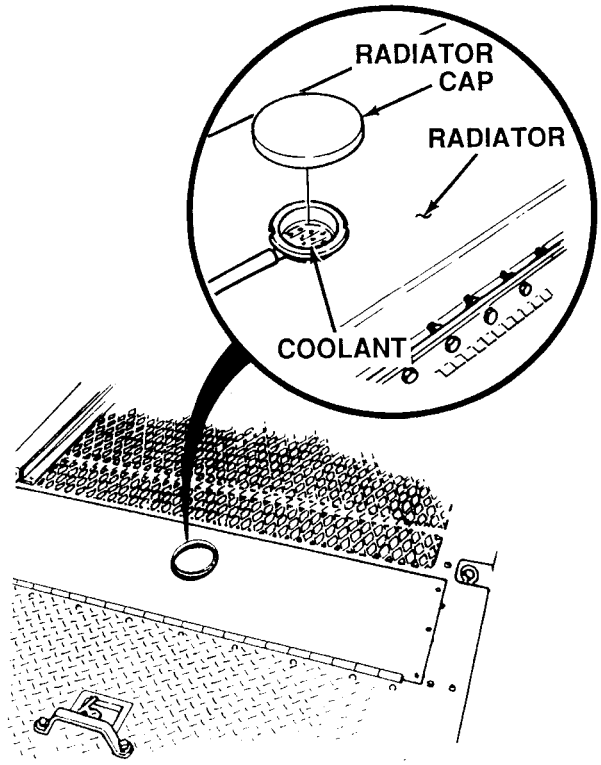


WARNING

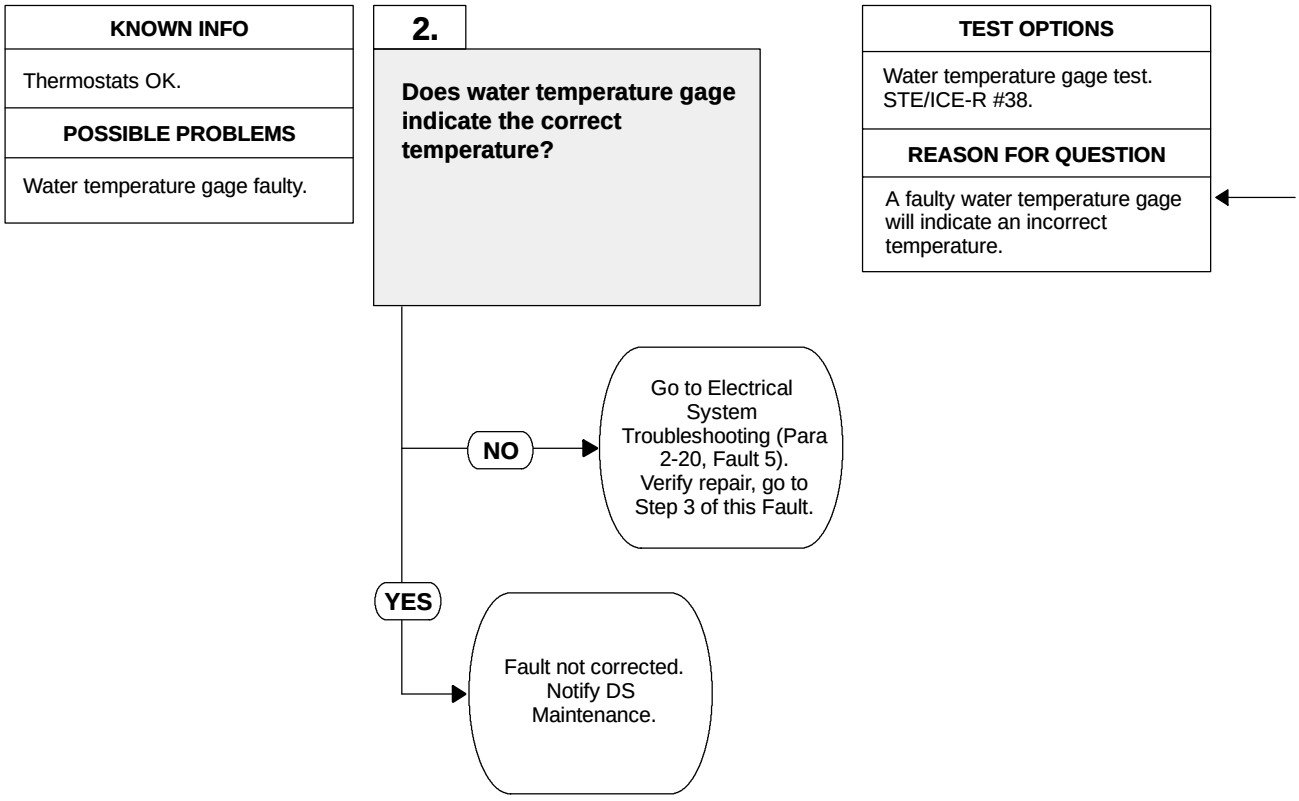
- Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.
- Use a clean, thick waste cloth or like material to remove the cap. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.

VISUAL INSPECTION

(1) Push down on radiator cap and slowly turn to left to relieve pressure from radiator.
(2) Start engine (TM 9-2320-364-10).
(3) Inspect flow of coolant in radiator.
  (a) If coolant does flow through radiator, turn OFF ENGINE switch and replace thermostat(s) (Para 6-7) and perform Steps (5) and (6) below.
  (b) If coolant does not flow through radiator, thermostat(s) is OK.
(4) Turn OFF ENGINE switch.
(5) Install radiator cap.
(6) Install right side noise panel (Para 17-26).

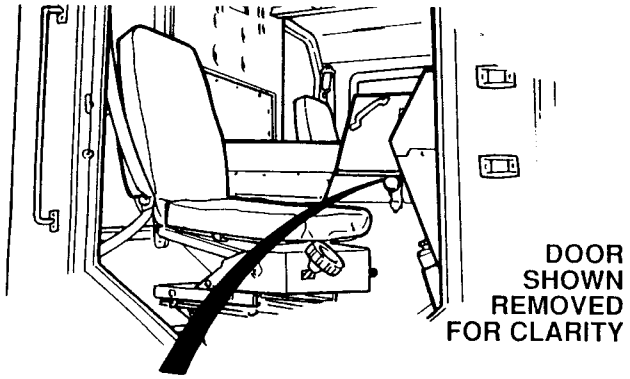


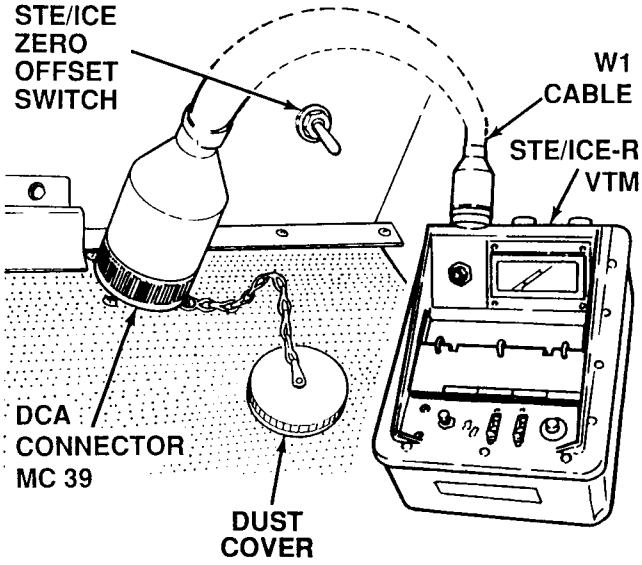
2. ENGINE RUNS TOO COOL (CONT).

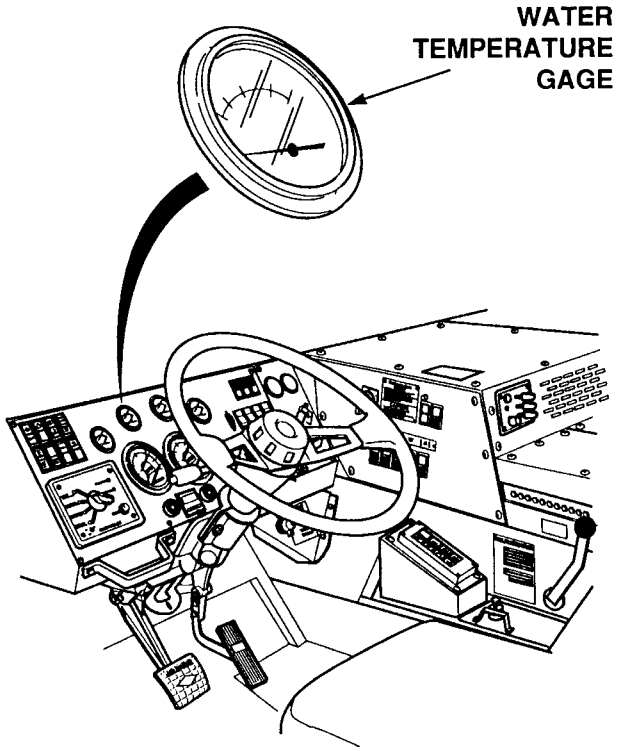


WATER TEMPERATURE GAGE TEST

(1) Remove dust cover from DCA connector MC39.
(2) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector.
(3) Power-up STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(4) Perform a confidence test.
(5) Set TEST SELECT switches to 38.
(6) Start engine (TM 9-2320-364-10).
(7) Perform offset test (TM 9-4910-571-12&P).
(8) Allow engine to run until gage starts to indicate an increase in temperature.
(9) Press and release TEST button.
    (a) If engine coolant temperature is not between 180°F and 230°F (82°C and 110°C), go to Step (10) below.
    (b) If engine coolant temperature is between 180°F and 230°F (82°C and 110°C), perform Steps (11) through (13) below and notify DS Maintenance.
(10) Compare the STE/ICE-R test #38 results to the water temperature gage in the truck cab.
    (a) If water temperature gage reading is different from the STE/ICE-R test #38 temperature reading, go to Electrical System Troubleshooting (Para 2-20, Fault 5).
    (b) If water temperature gage reading is equal to the STE/ICE-R test #38 temperature reading, fault not corrected. Perform Steps (11) through (13) and notify DS Maintenance.
(11) Turn OFF ENGINE switch.
(12) Disconnect DCA cable W1.
(13) Install dust cover on DCA connector MC39.







2. ENGINE RUNS TOO COOL (CONT).

KNOWN INFO
Thermostats OK. Water temperature gage OK.
POSSIBLE PROBLEMS

3.

Does engine temperature reach 180°F to 190°F (82°C-88°C)?

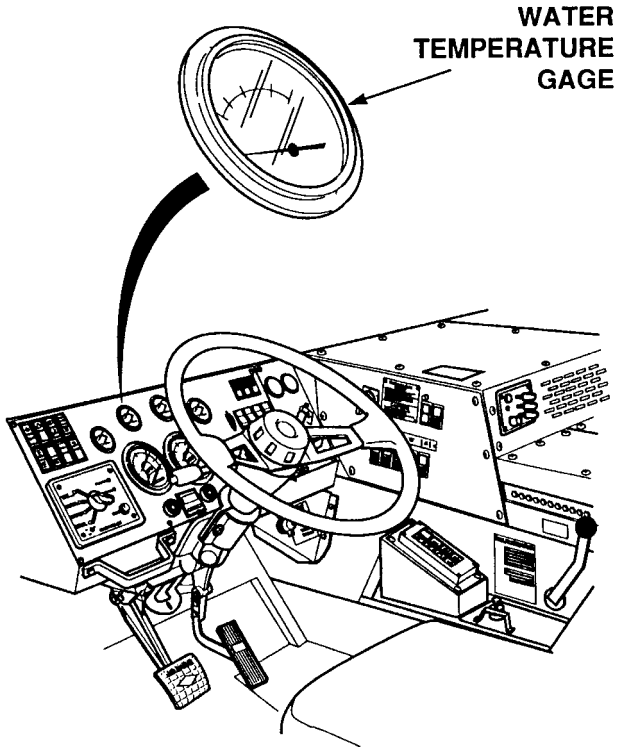
TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If engine temperature reaches 180°F to 190°F (82°C-88°C), fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10), and run until reaching normal operating temperature, 180°F to 230°F (82°C-110°C).
   (a) If engine does not operate at normal temperature, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
   (b) If engine operates at normal temperature, fault has been corrected.
(2) Turn OFF ENGINE switch.



2-19. EXHAUST SYSTEM TROUBLESHOOTING.

This paragraph covers Exhaust System Troubleshooting. The Exhaust System Fault Index, Table 2-37, lists faults for the exhaust system of the PLS truck.

Table 2-37. Exhaust System Fault Index

Fault No.	Description	Page
1.	Exhaust System Unusually Noisy Or Vibrates Excessively During Engine Operation	2-1098

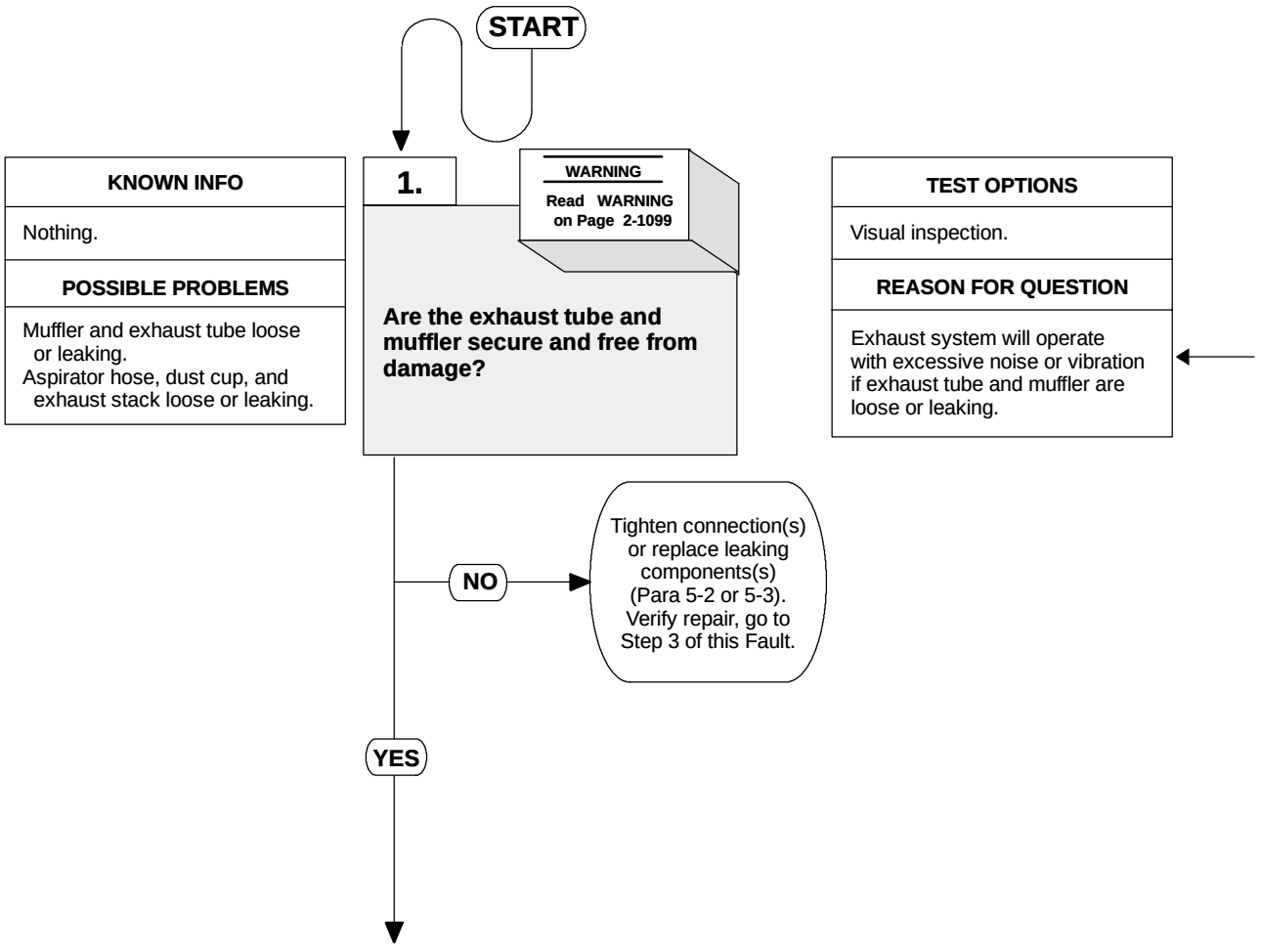
2-19. EXHAUST SYSTEM TROUBLESHOOTING (CONT).

1. EXHAUST SYSTEM UNUSUALLY NOISY OR VIBRATES EXCESSIVELY DURING ENGINE OPERATION.

INITIAL SETUP

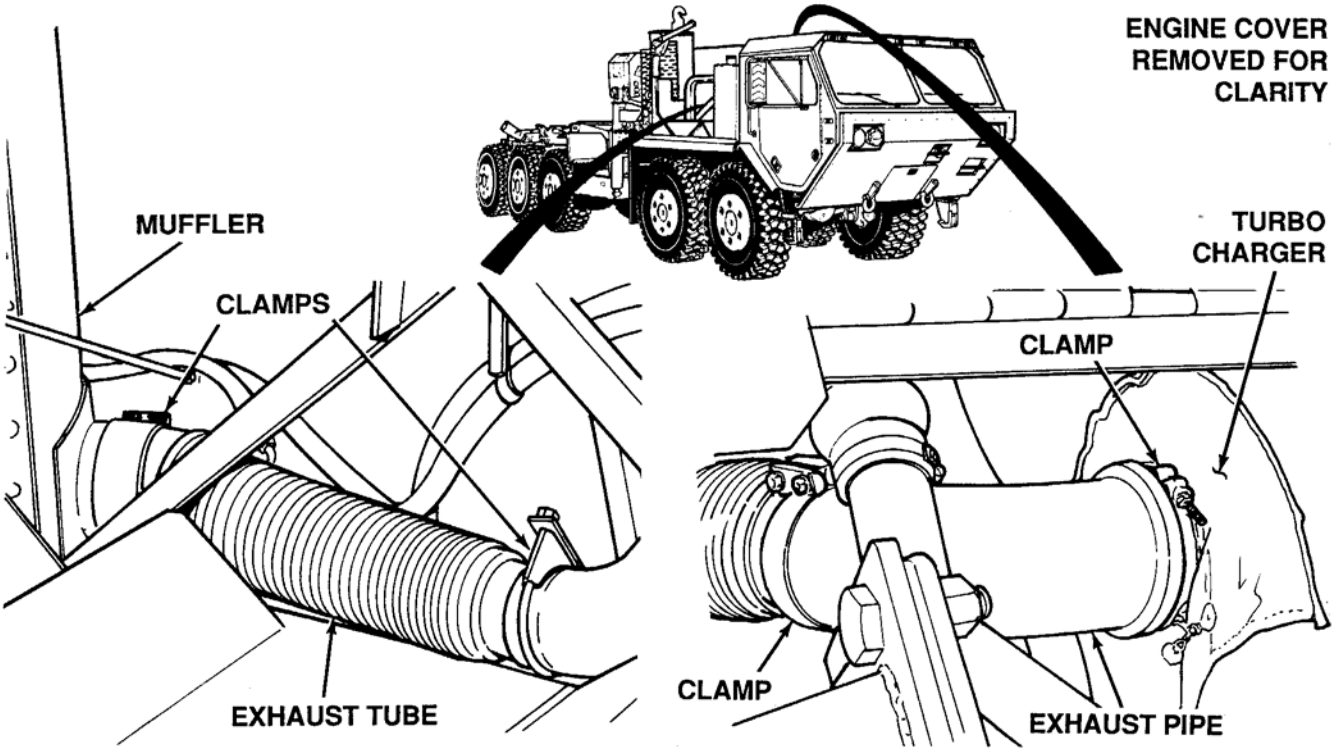
Tools and Special Tools
Tool Kit, General Mechanic: Automotive
(Item 74, Appendix G)

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover opened,
(TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)



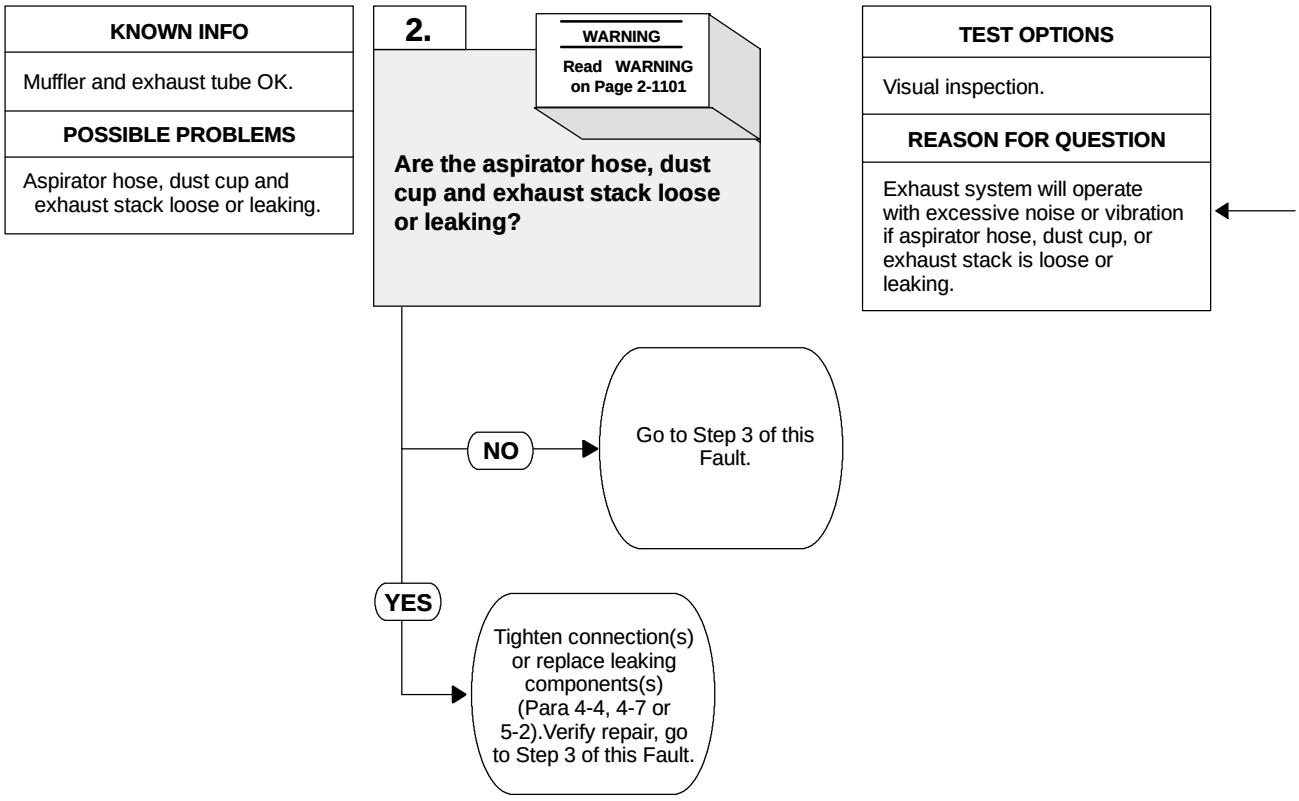
WARNING

- Allow engine to cool before performing maintenance on the muffler, exhaust pipe, exhaust manifold, or turbocharger. If necessary, use insulated pads and gloves to avoid injury to personnel.
- Do not touch hot exhaust system with bare hands; injury to personnel will result.



VISUAL INSPECTION
Inspect exhaust tube, muffler and clamps for looseness and exhaust leaks. (1) If components listed above are loose or leaking, repair exhaust system (Para 5-2 or 5-3). (2) If components listed above have no loose connections or leaks, components are OK.

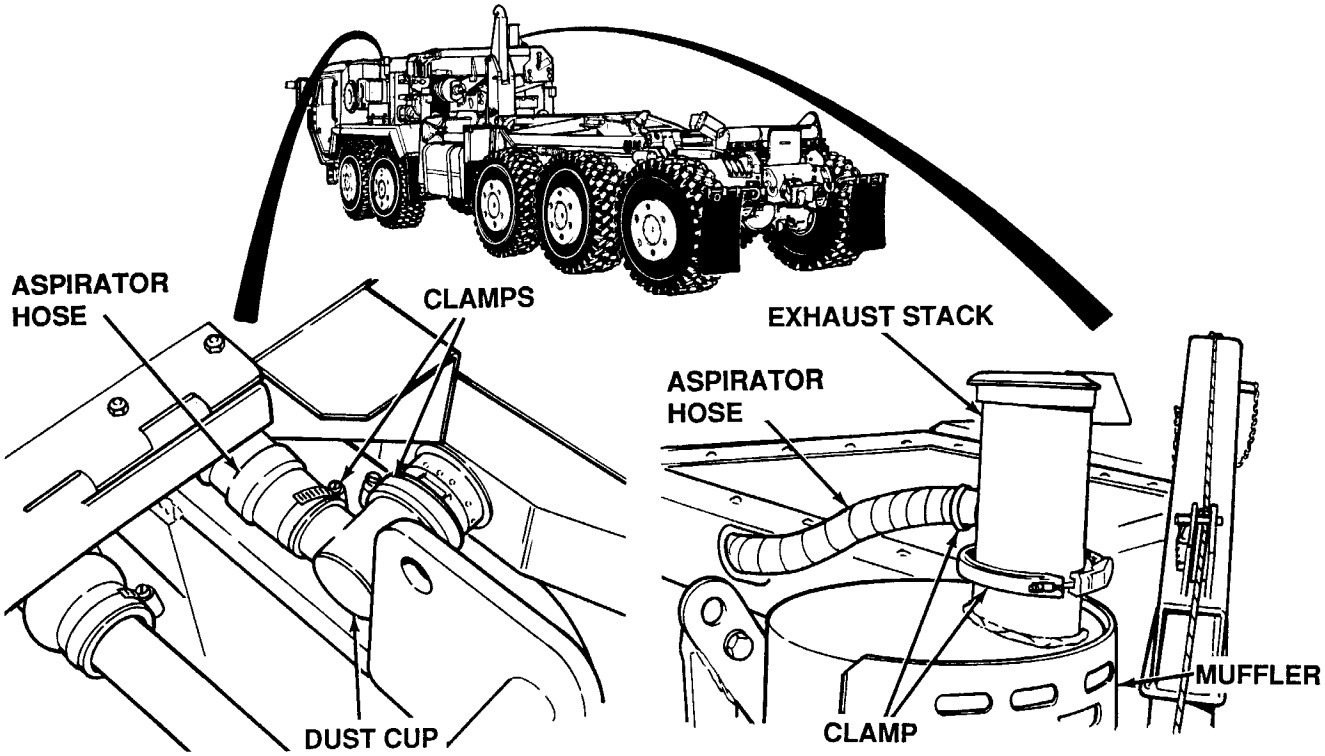
1. EXHAUST SYSTEM UNUSUALLY NOISY OR VIBRATES EXCESSIVELY DURING ENGINE OPERATION (CONT).



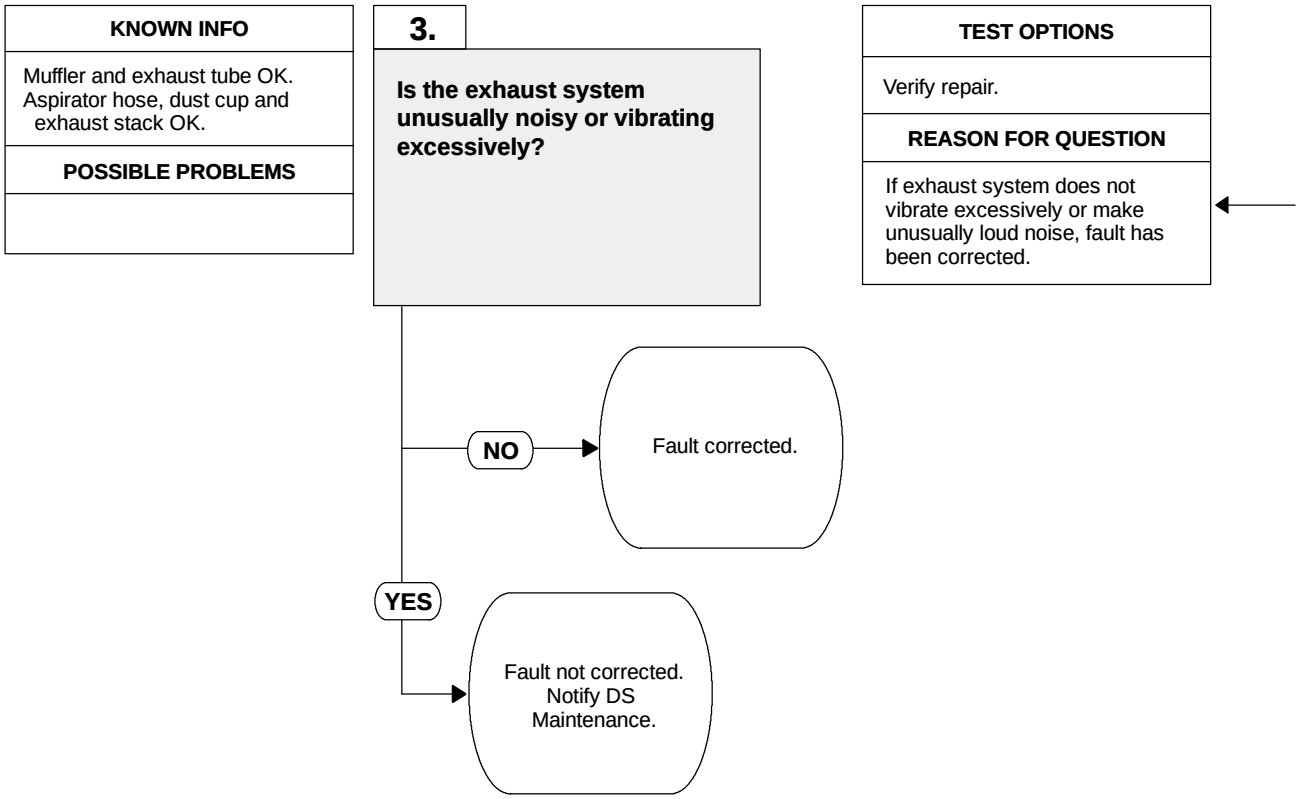
WARNING

- Allow engine to cool before performing maintenance on the muffler, exhaust pipe, exhaust manifold, or turbocharger. If necessary, use insulated pads and gloves, to avoid injury to personnel.
- Do not touch hot exhaust system with bare hands; injury to personnel will result.

VISUAL INSPECTION
Inspect aspirator hose, dust cup, and exhaust stack for looseness and exhaust leaks. (1) If components listed above are loose or leaking, repair exhaust system (Para 4-4, 4-7 or 5-2). (2) If components listed above have no loose connections or leaks, components are OK.

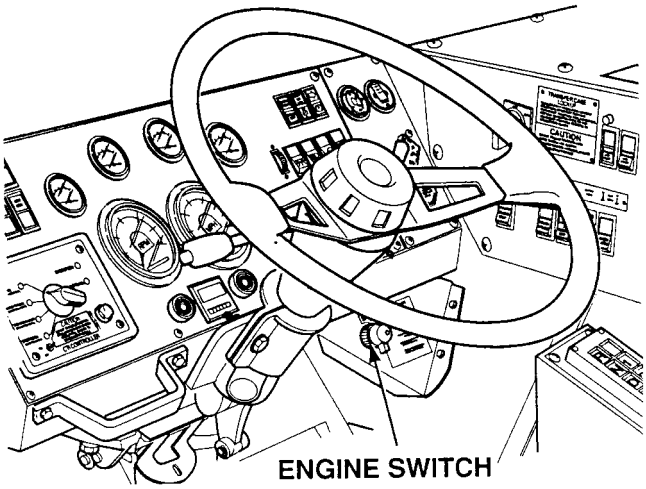


1. EXHAUST SYSTEM UNUSUALLY NOISY OR VIBRATES EXCESSIVELY DURING ENGINE OPERATION (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Visually inspect exhaust system and listen for leaks or unusual noises.
    (a) If exhaust system does not vibrate excessively or make unusually loud noise, fault has been corrected. Perform Steps (3) through (5) below.
    (b) If exhaust system does vibrate excessively or make unusually loud noise, fault not corrected. Perform Steps (3) through (5) below and notify supervisor.
(3) Turn OFF ENGINE switch.
(4) Close top engine access cover.
(5) Install right side noise panel (Para 17-26).



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING.

This paragraph covers Electrical System Troubleshooting. The Electrical System Fault Index, Table 2-38, lists faults for the electrical system of the PLS truck. Refer to schematics, Figures 2-24 through 2-41 when performing tests and corrective actions.

NOTE

Ensure battery disconnect switch is engaged (pushed in), if equipped, before starting troubleshooting for the electrical system.

Table 2-38. Electrical System Fault Index

Fault No.	Description	Page
1.	All 12 And 24 VDC Circuits Do Not Operate	2-1132
2.	Headlights, Clearance Lights, Horn, Work Lights, Dimmer Or Beacon Light Do Not Operate	2-1140
3.	CTIS, LHS, Crane And Heater Do Not Operate	2-1168
4.	Windshield Wipers, Engine Brakes And Gages Do Not Operate	2-1172
5.	Gage(s) Giving No Or Incorrect Readings	2-1178
6.	Work Light(s) Will Not Operate	2-1188
7.	Instrument Lights Do Not Operate	2-1204
8.	Dome Light Does Not Operate	2-1208
9.	Beacon Light Does Not Operate	2-1216
10.	Headlight(s) Do Not Operate (Low Beam)	2-1228
11.	Headlight(s) Do Not Operate (High Beam)	2-1246
12.	Taillight(s) Do Not Operate	2-1256
13.	All Turn Signals Do Not Operate	2-1266
14.	Right Rear Turn Signal Does Not Operate	2-1272
15.	Left Rear Turn Signal Does Not Operate	2-1282
16.	Left Front Turn Signal Does Not Operate	2-1292
17.	Right Front Turn Signal Does Not Operate	2-1300
18.	Parking Light(s) Do Not Operate	2-1310
19.	Stoplight Does Not Operate	2-1316

Table 2-38. Electrical System Fault Index (CONT).

Fault No.	Description	Page
20.	Reverse Light Does Not Operate	2-1326
21.	Reverse Alarm Does Not Operate	2-1338
22.	Clearance, Side Marker, And ID Light(s) Do Not Operate	2-1342
23.	All Blackout Lights Do Not Operate	2-1358
24.	Blackout Drive Light Does Not Operate	2-1362
25.	Blackout Stoplights Do Not Operate	2-1370
26.	Rear Blackout Clearance Or Taillights(s) Does Not Operate	2-1380
27.	Front Blackout Clearance Or Marker Light Does Not Operate	2-1390
28.	Blackout Tail, Marker And Clearance Lights Do Not Operate	2-1400
29.	Horn Does Not Operate	2-1404
30.	Windshield Washers Do Not Operate	2-1420
31.	Windshield Wipers Do Not Operate At High Or Low Speed	2-1432
32.	Windshield Wipers Do Not Operate (Low Speed)	2-1442
33.	Windshield Wipers Do Not Operate (High Speed)	2-1448
34.	Engine Brake Does Not Operate In Low	2-1452
35.	Engine Brake Does Not Operate In High	2-1482
36.	Shift Selector Panel Lamps Do Not Operate	2-1490
37.	Shift Selector Range LED(s) Do Not Operate	2-1500
38.	Trans Check Light Will Not Operate	2-1504
39.	Trans Check Light Will Not Go Out	2-1512
40.	Emerg Steer Light Will Not Go Out	2-1522
41.	Trailer Marker Lights Do Not Operate	2-1528
42.	Trailer R.H. Turn Signal/Stoplight Does Not Operate	2-1536
43.	Trailer L.H. Turn Signal/Stoplight Does Not Operate	2-1544
44.	Trailer Blackout Taillights Do Not Operate	2-1552
45.	Trailer Blackout Stoplights Do Not Operate	2-1560

Table 2-38. Electrical System Fault Index (CONT).

Fault No.	Description	Page
46.	Low Air/Hydraulic Oil Alarm Does Not Operate	2-1568
47.	Low Air Warning Light Does Not Operate	2-1576
48.	Low Air Light And Low Air/Hydraulic Oil Alarm Do Not Operate	2-1582
49.	Heater Does Not Operate Or Will Not Change Speeds	2-1586
50.	12 And 24 Volt Systems Not Charging Or Under Charging (145 AMP)	2-1600
51.	12 Volt System Over Or Under Charging (145 AMP)	2-1628
52.	24 Volt System Not Charging Or Under Charging (145 AMP)	2-1632
53.	24 Volt System Over Charging (145 AMP)	2-1642
54.	12 And 24 Volt Systems Not Charging Or Under Charging (200 AMP)	2-1648
55.	12 Volt System Over Or Under Charging (200 AMP)	2-1666
56.	24 Volt System Over Or Under Charging (200 AMP)	2-1670

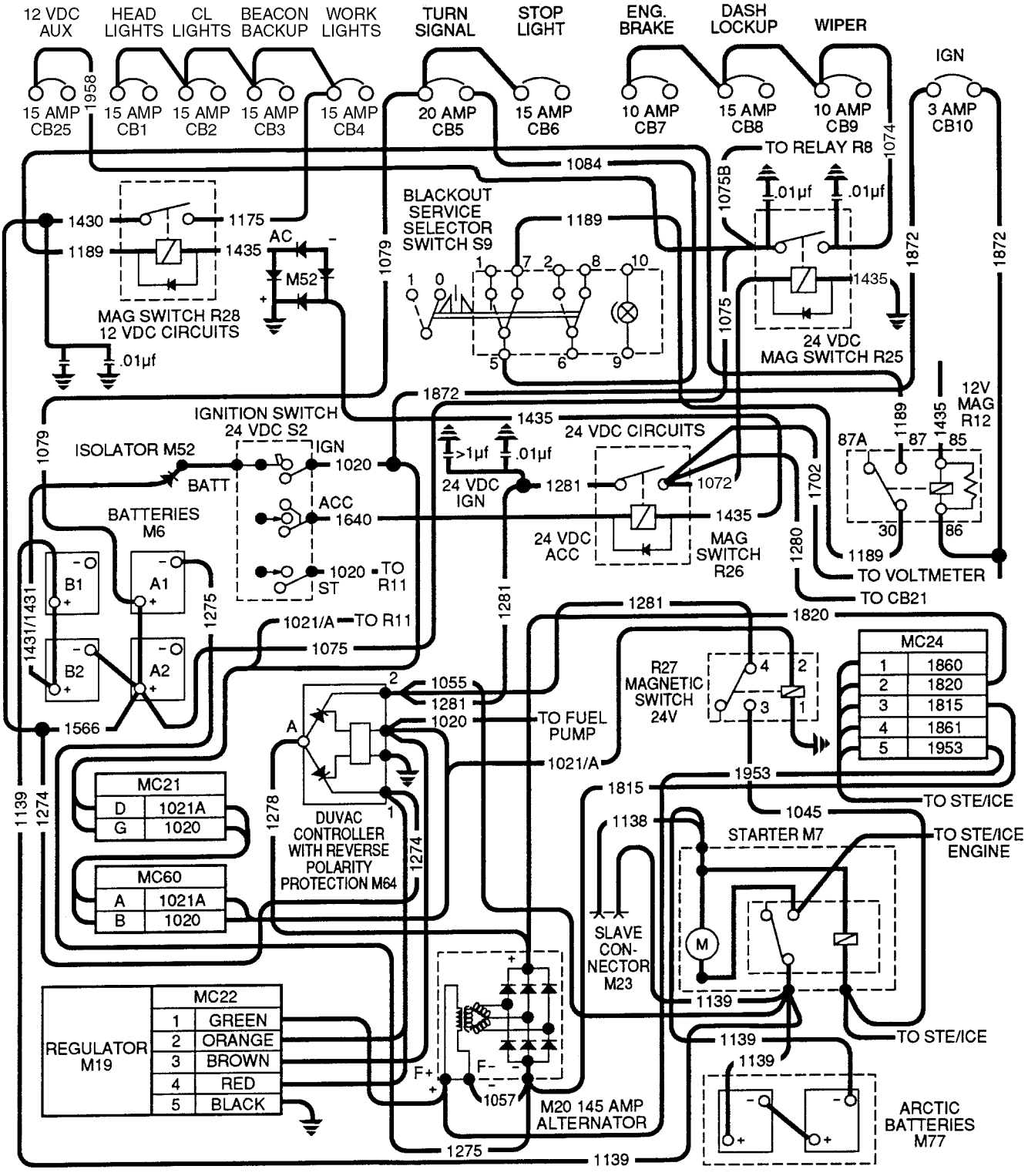


Figure 2-24. 12 vdc Circuit Wiring Schematic (145 AMP) (Sheet 1 of 3)

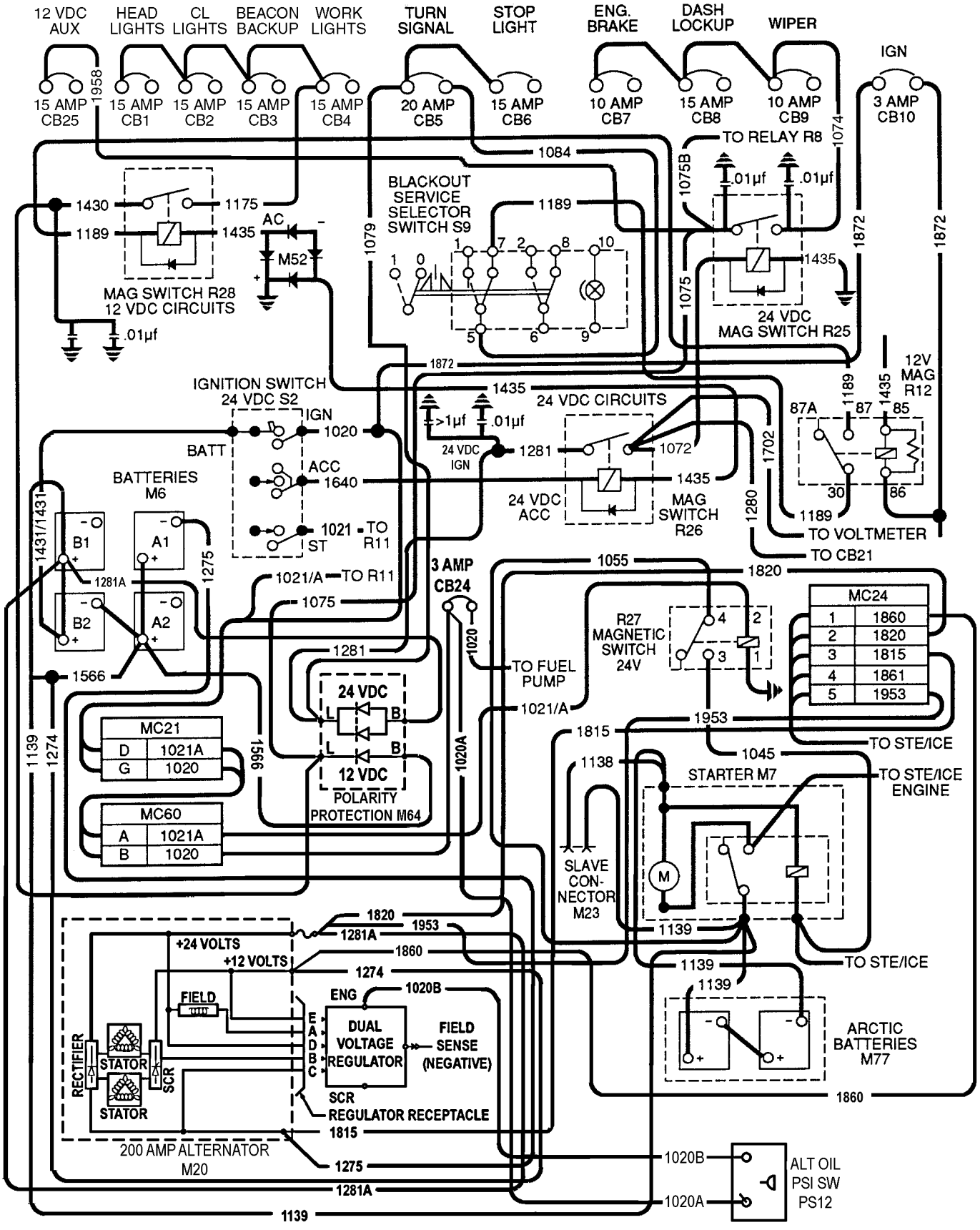


Figure 2-24. 12 vdc Circuit Wiring Schematic (200 AMP) (Sheet 2 of 3)

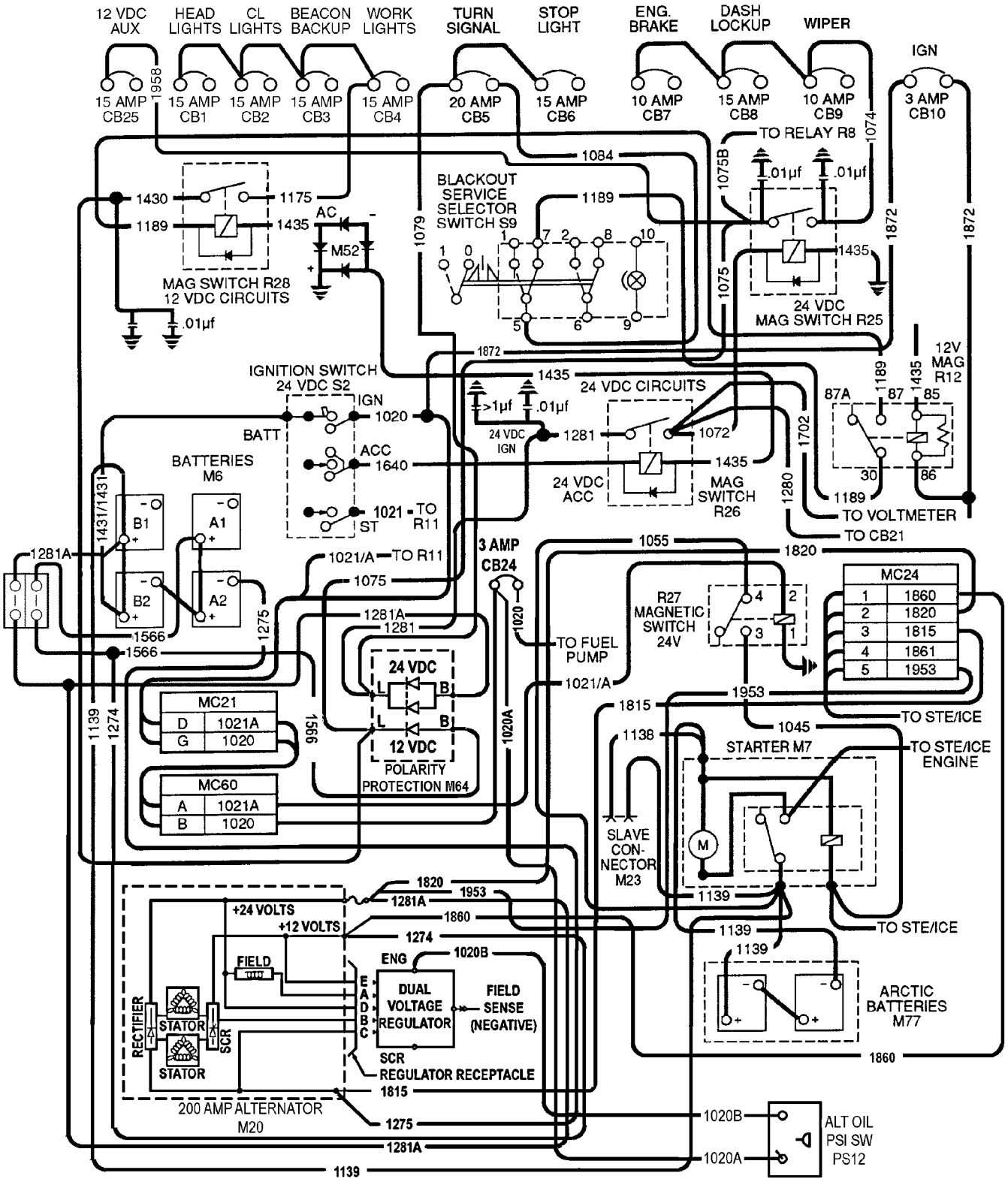


Figure 2-24. 12 vdc Circuit Wiring Schematic (200 AMP With Battery Disconnect Switch) (Sheet 3 of 3)

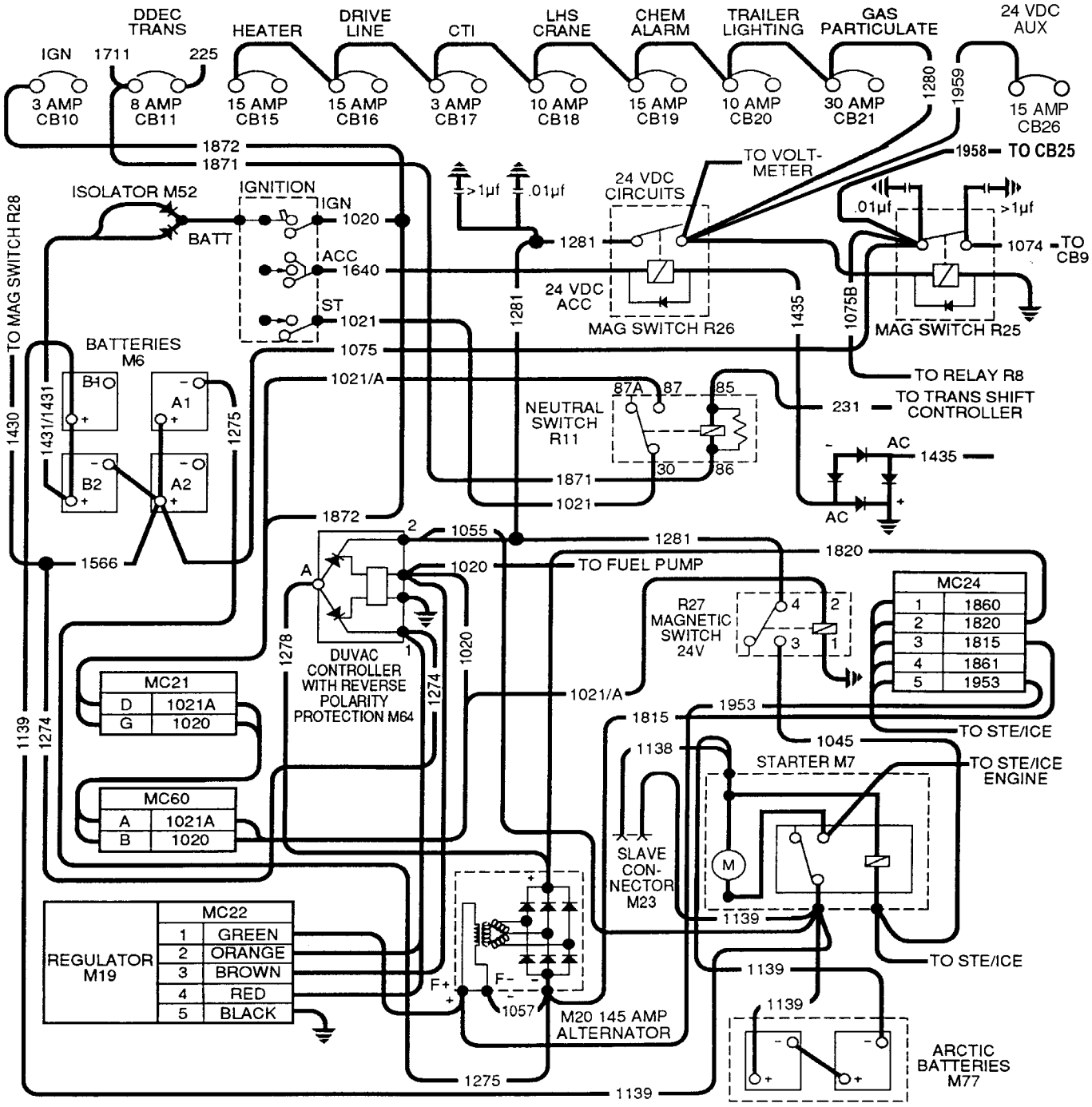


Figure 2-25. 24 vdc Circuit Wiring Schematic (145 AMP) (Sheet 1 of 3)

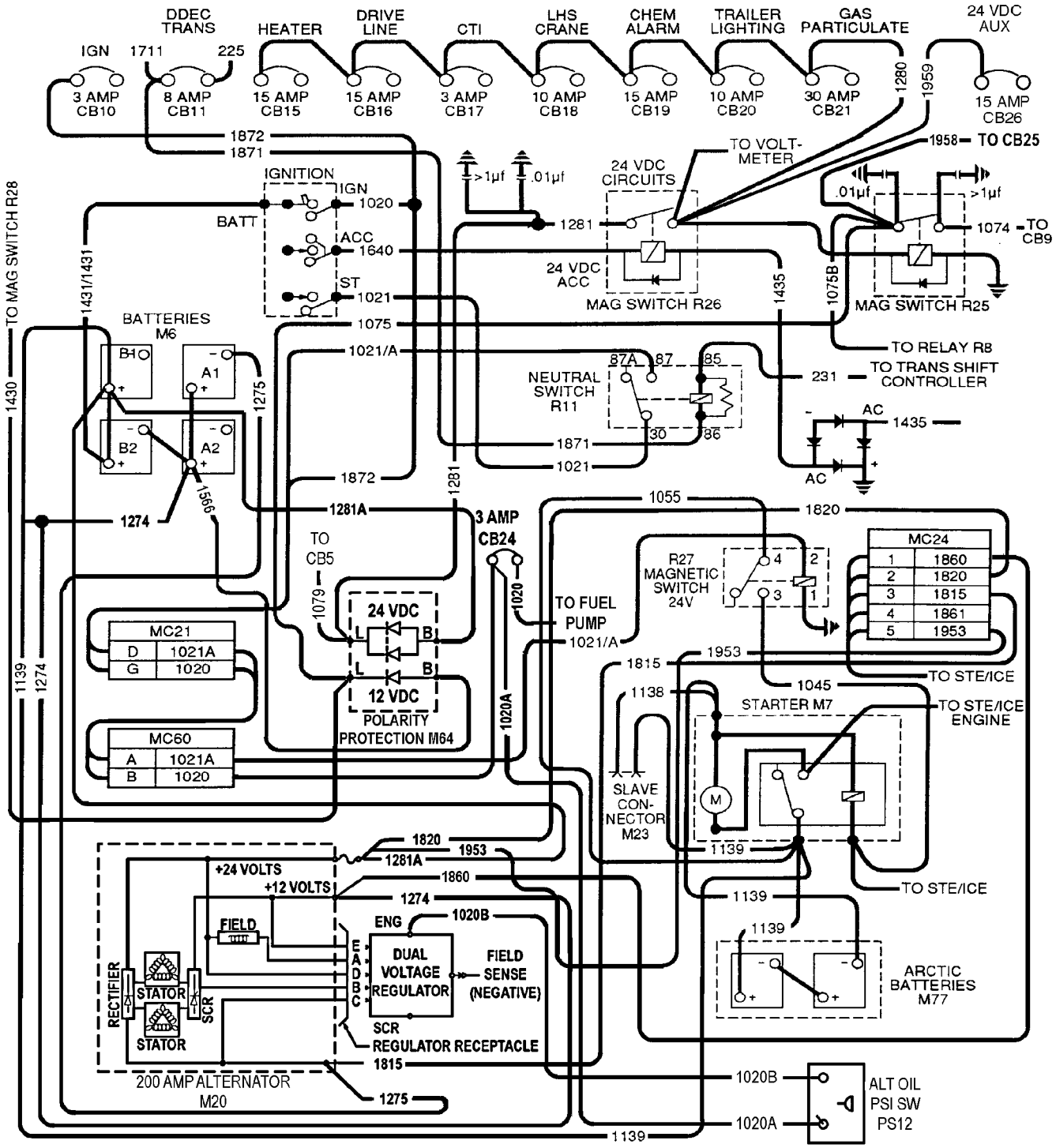


Figure 2-25. 24 vdc Circuit Wiring Schematic (200 AMP) (Sheet 2 of 3)

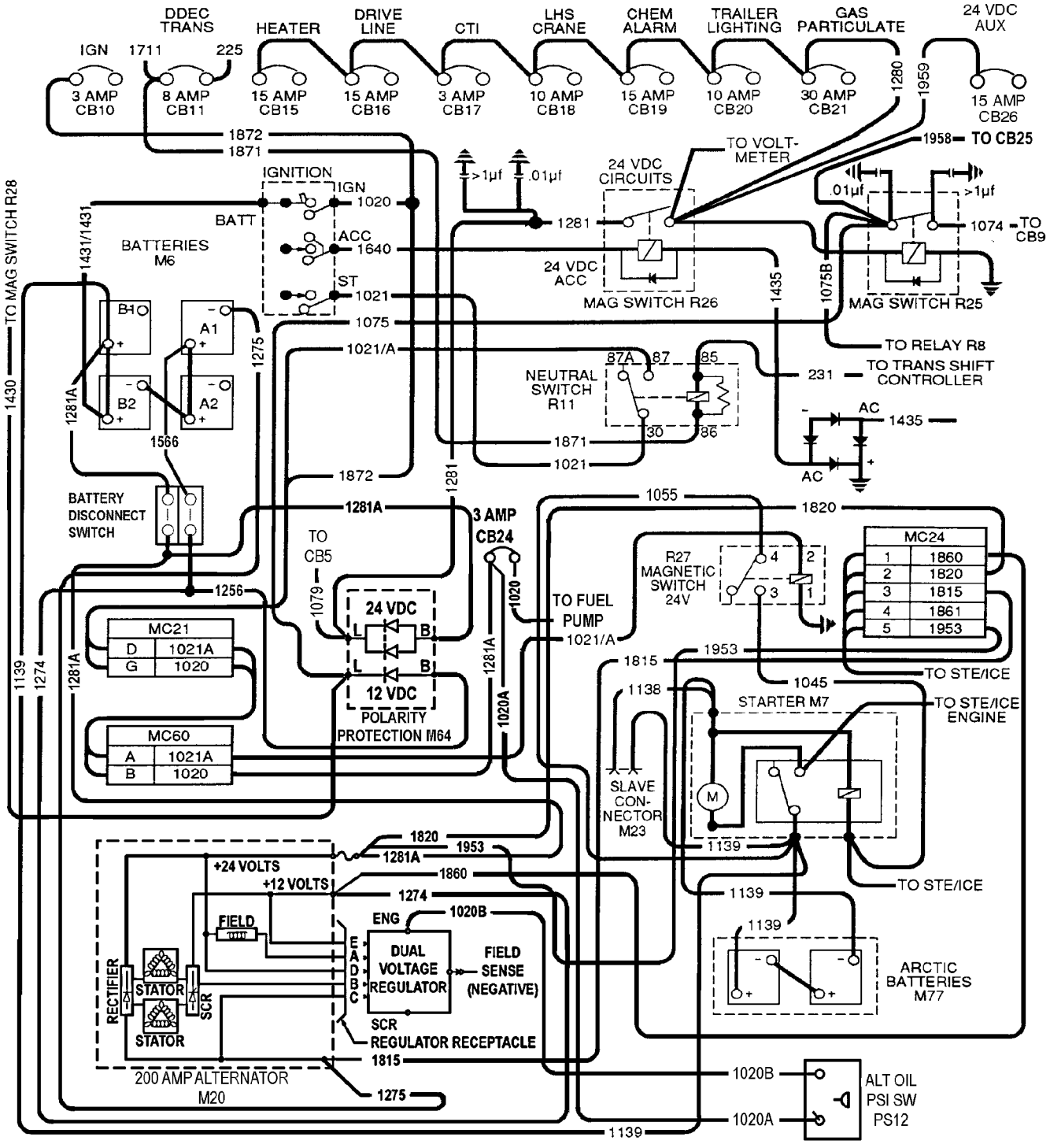


Figure 2-25. 24 vdc Circuit Wiring Schematic (200 AMP With Battery Disconnect Switch) (Sheet 3 of 3)

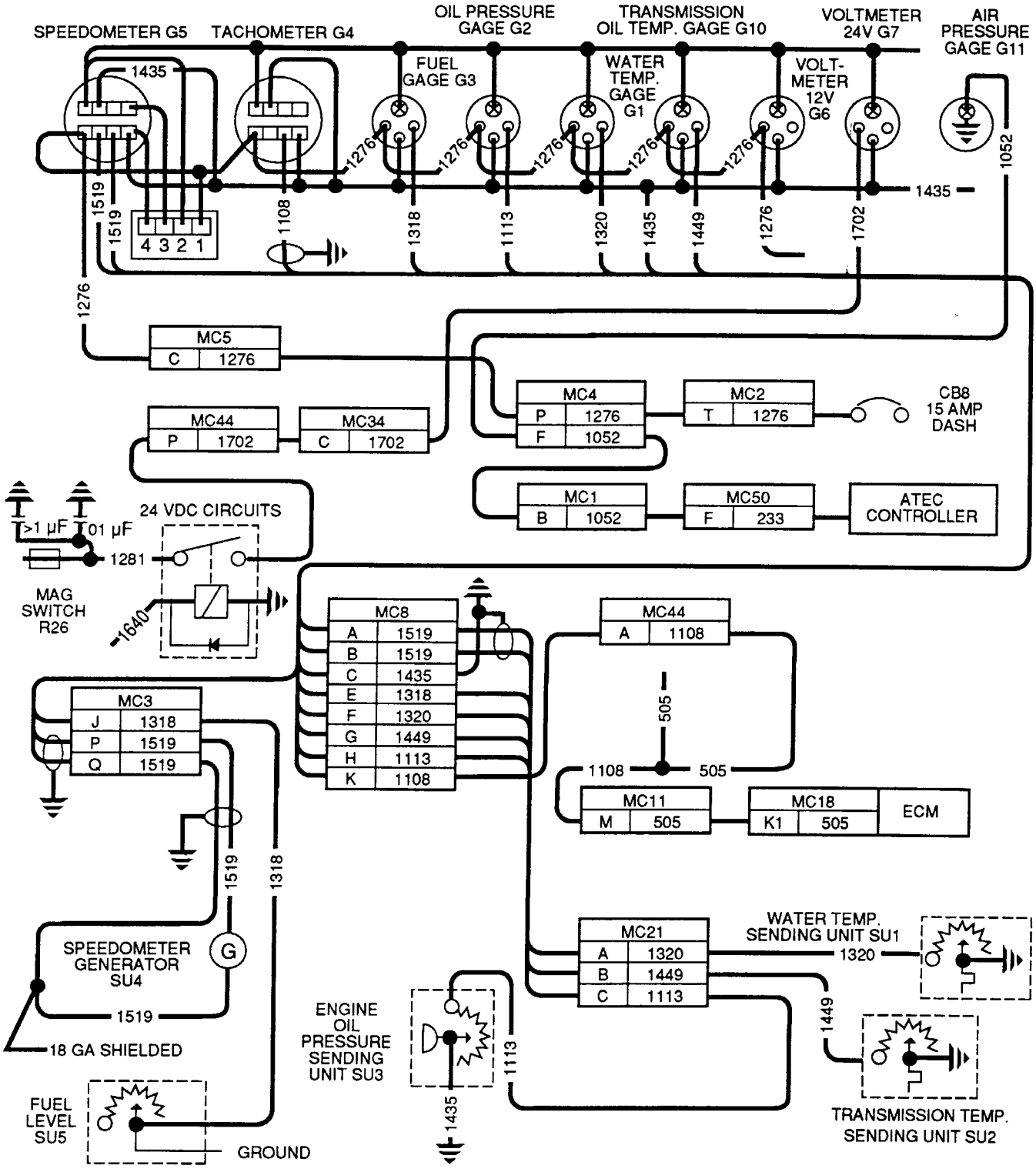


Figure 2-26. Gages Wiring Schematic

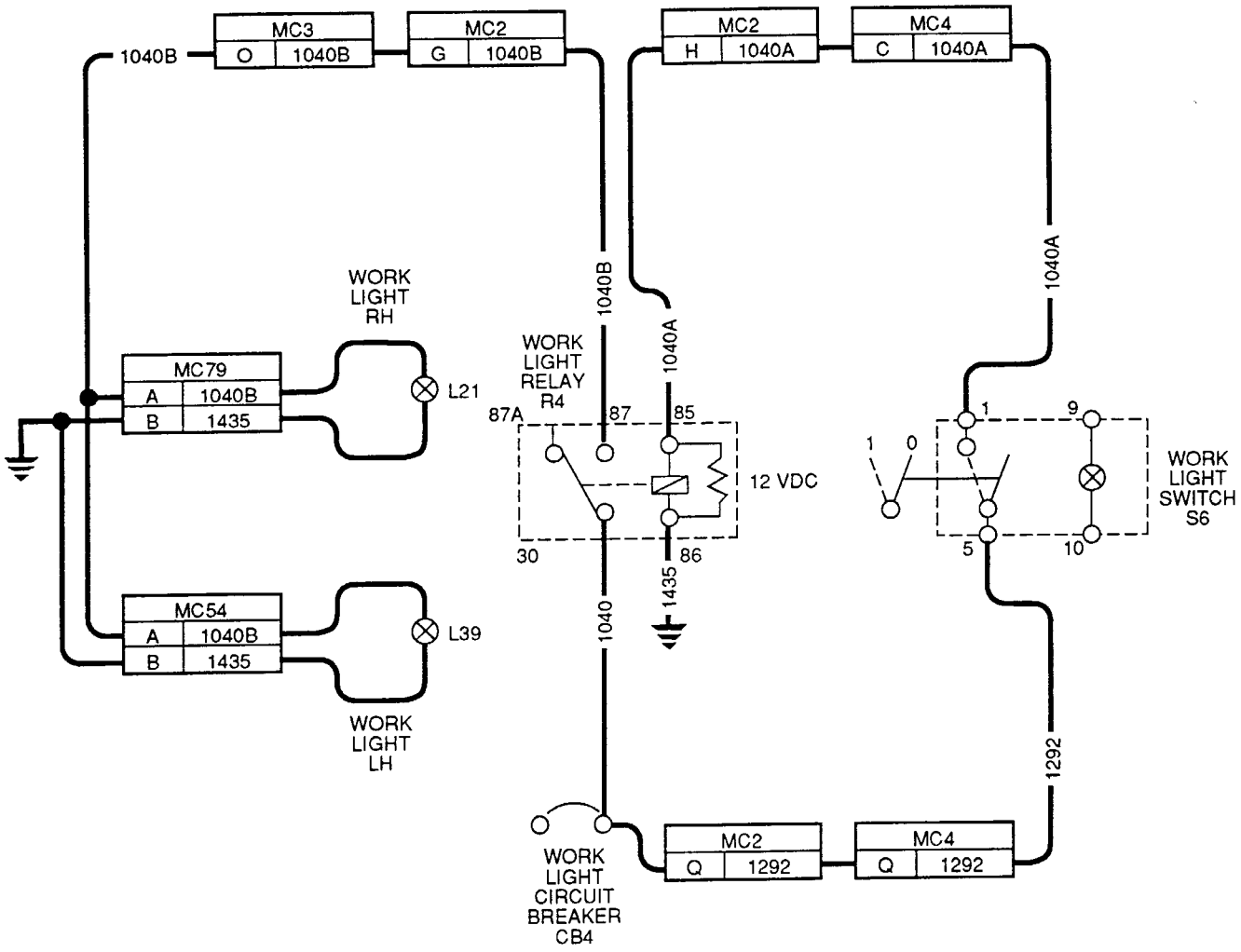


Figure 2-27. Work Lights Wiring Schematic

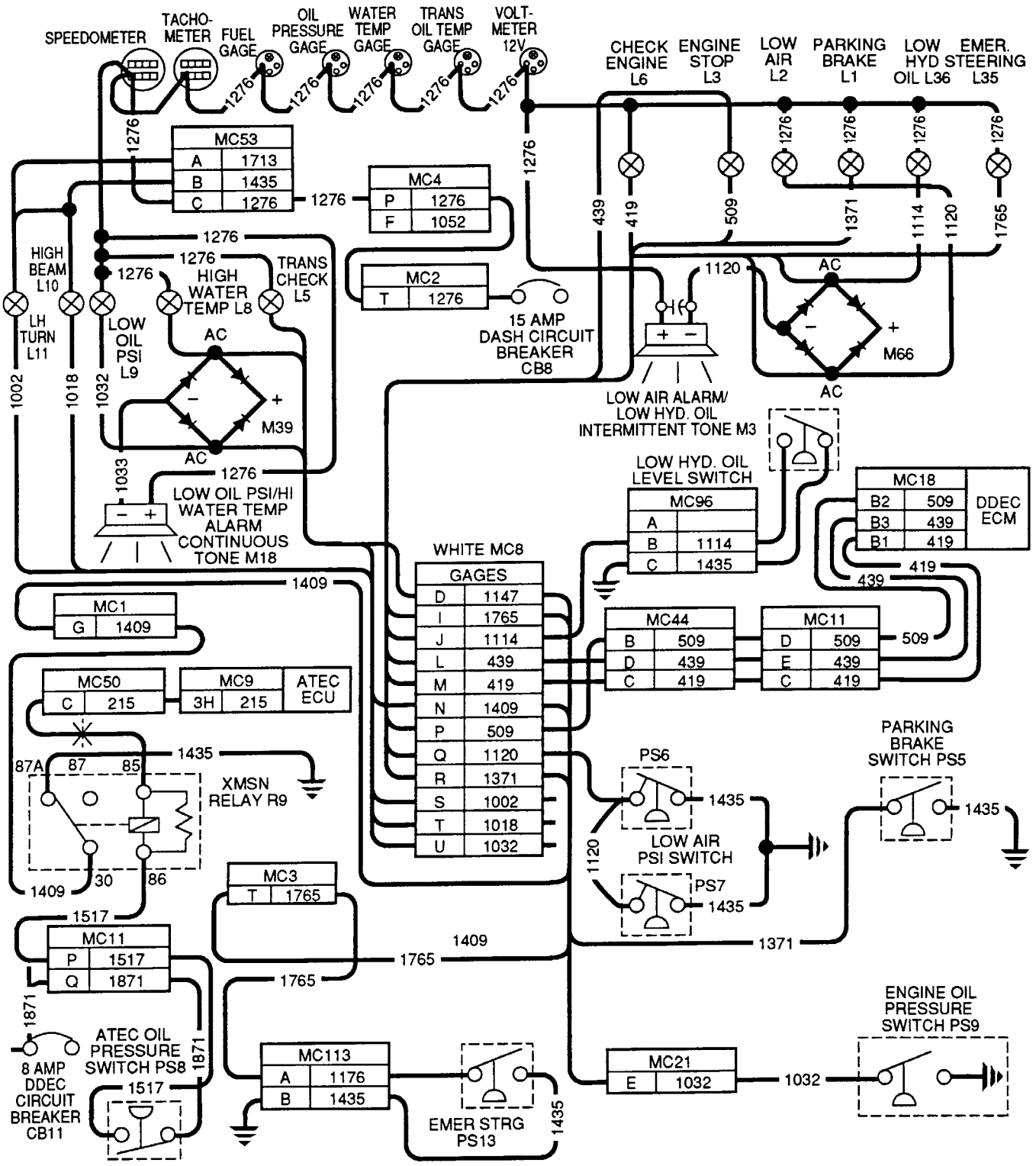


Figure 2-28. Instrument Panel Lights Wiring Schematic (Sheet 1 of 2)

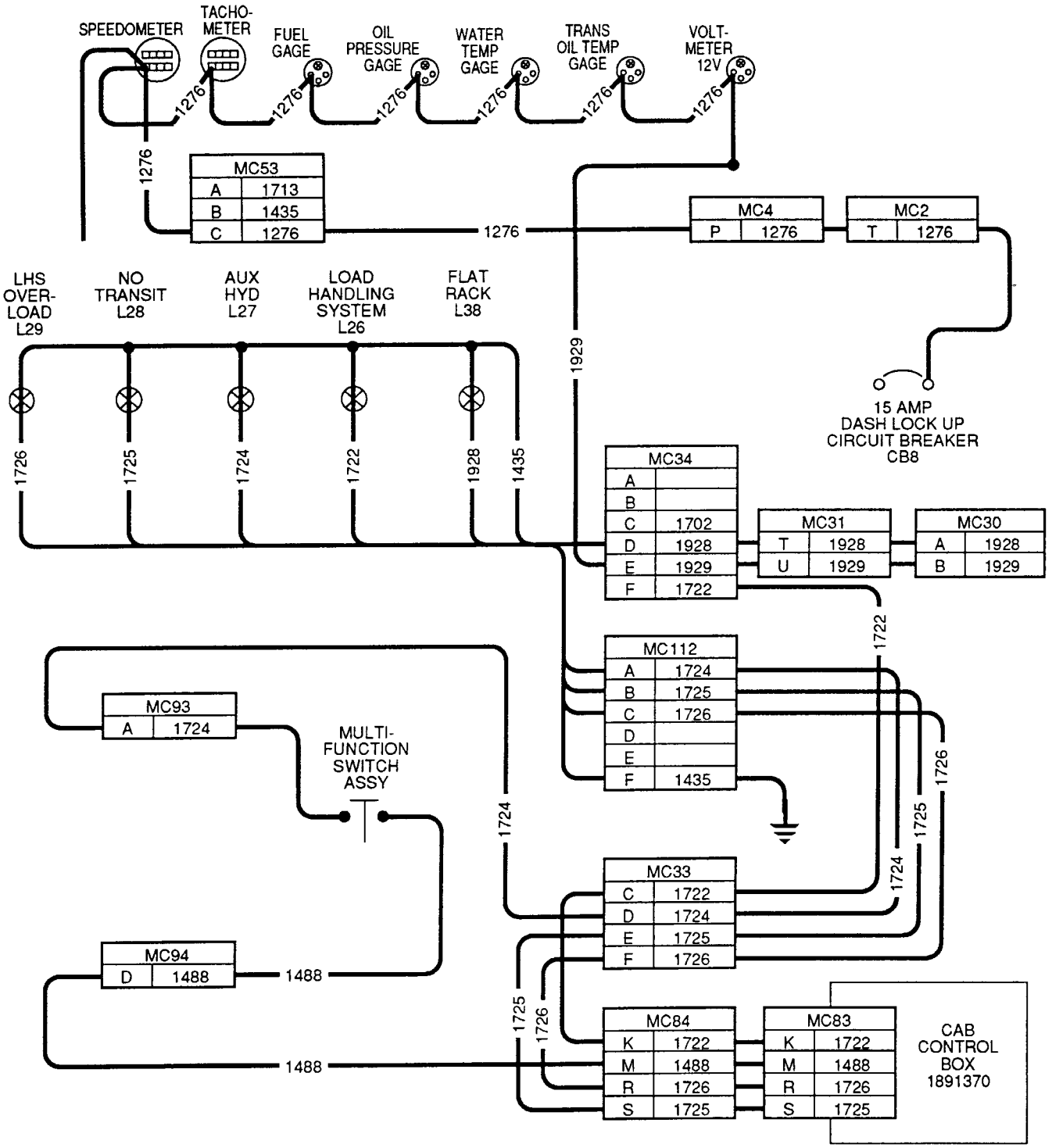


Figure 2-28. Instrument Panel Lights Wiring Schematic (Sheet 2 of 2)

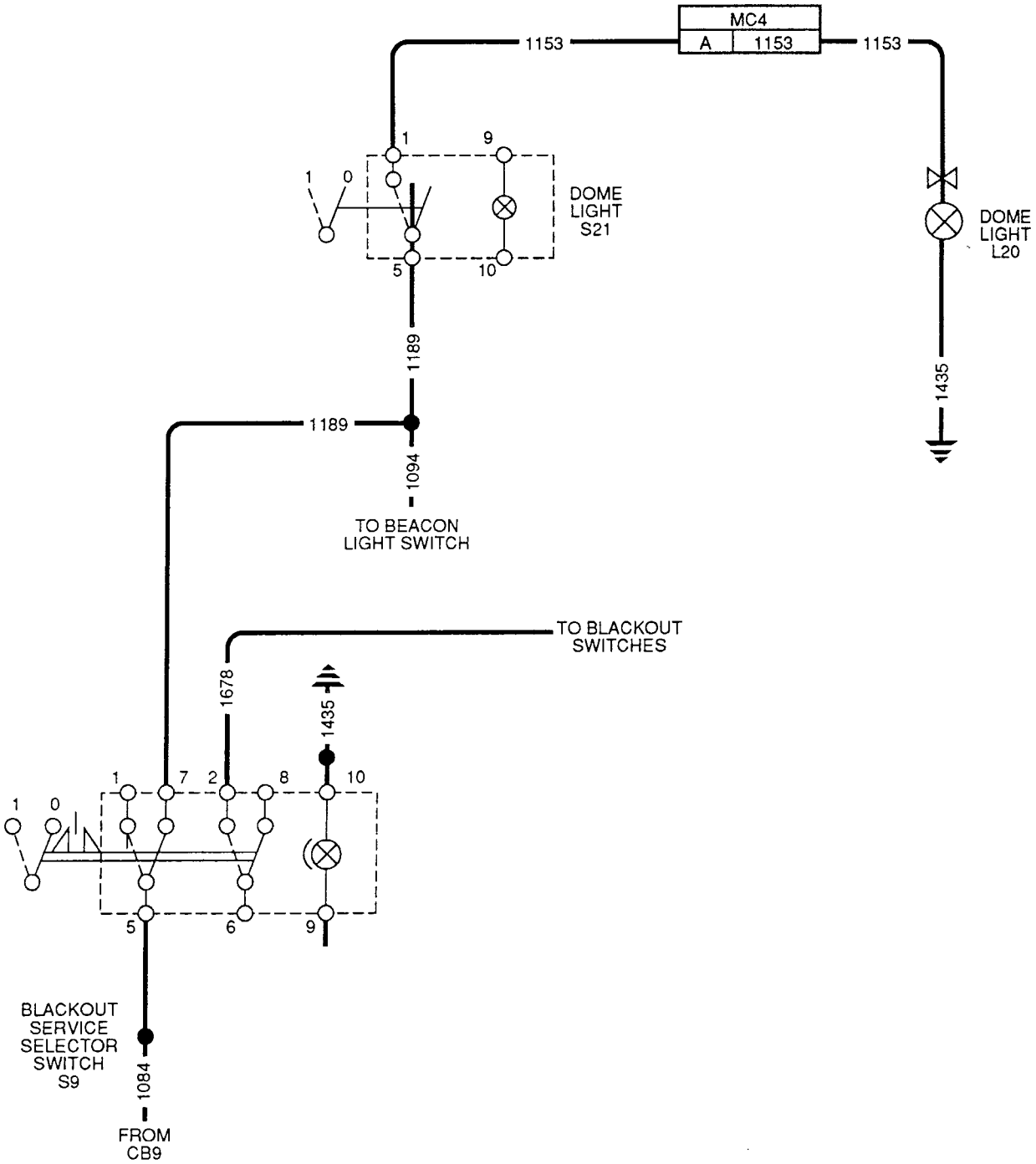


Figure 2-29. Dome Light Wiring Schematic

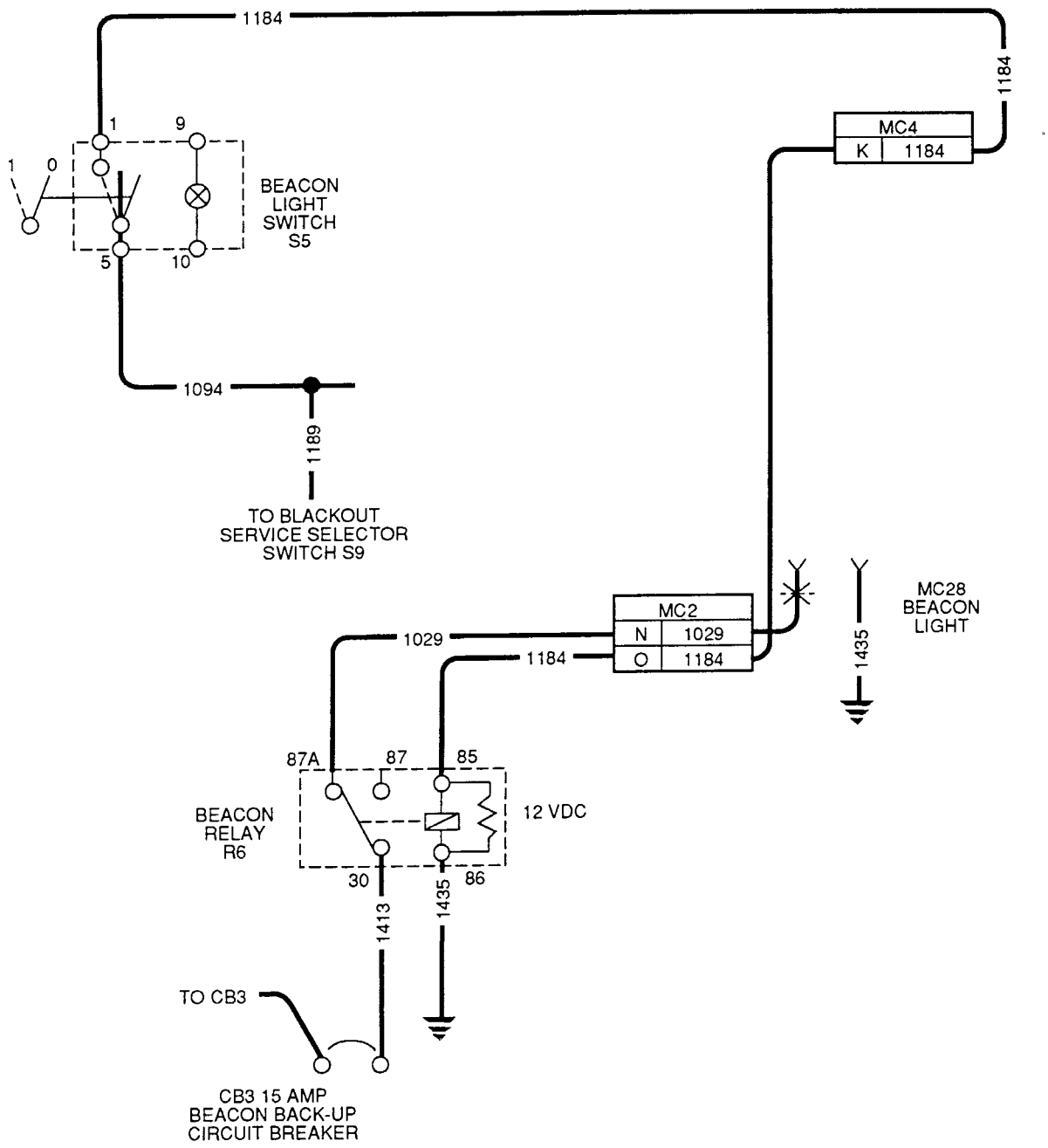


Figure 2-30. Beacon Light Wiring Schematic

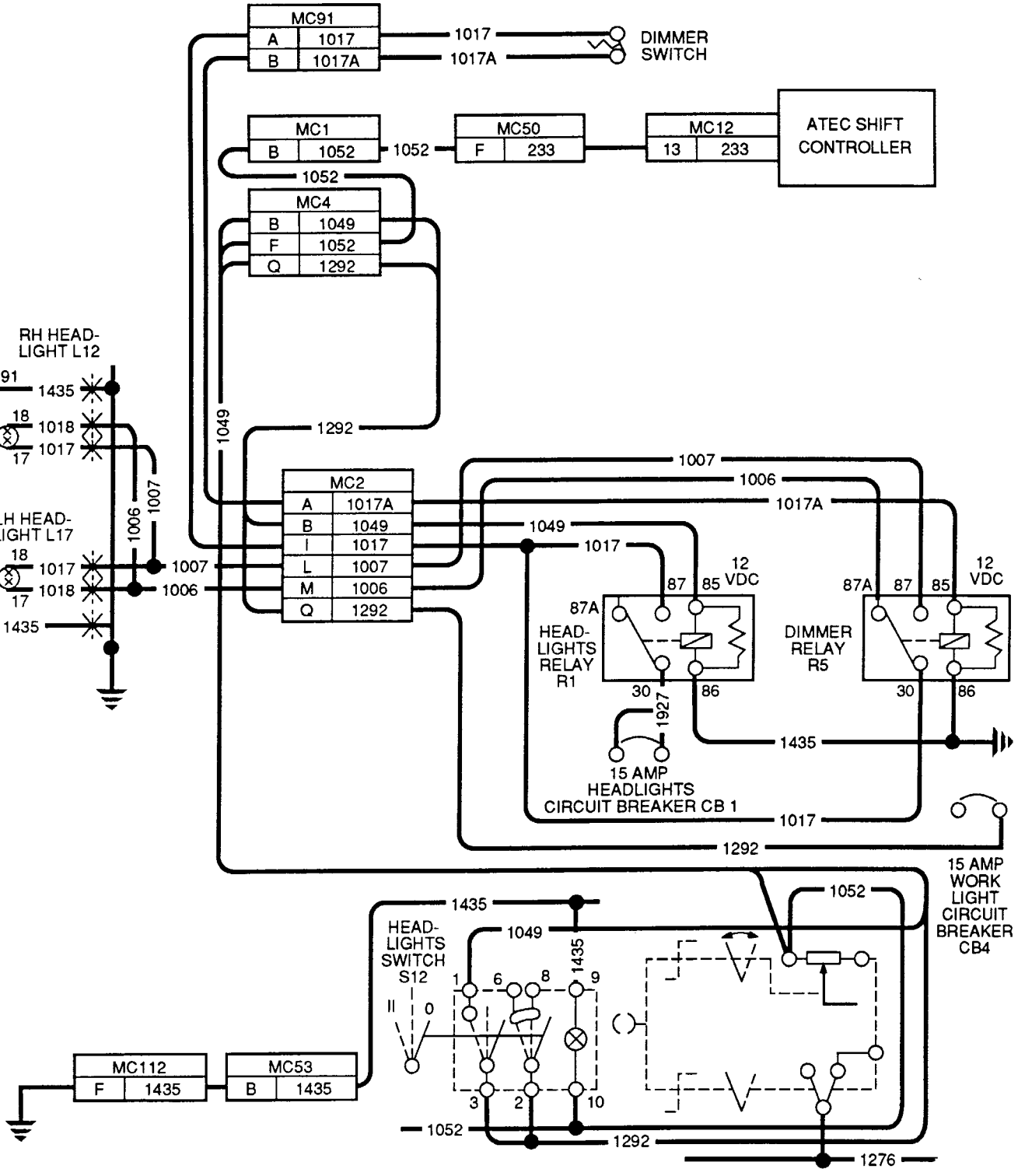


Figure 2-31. Headlights Wiring Schematic

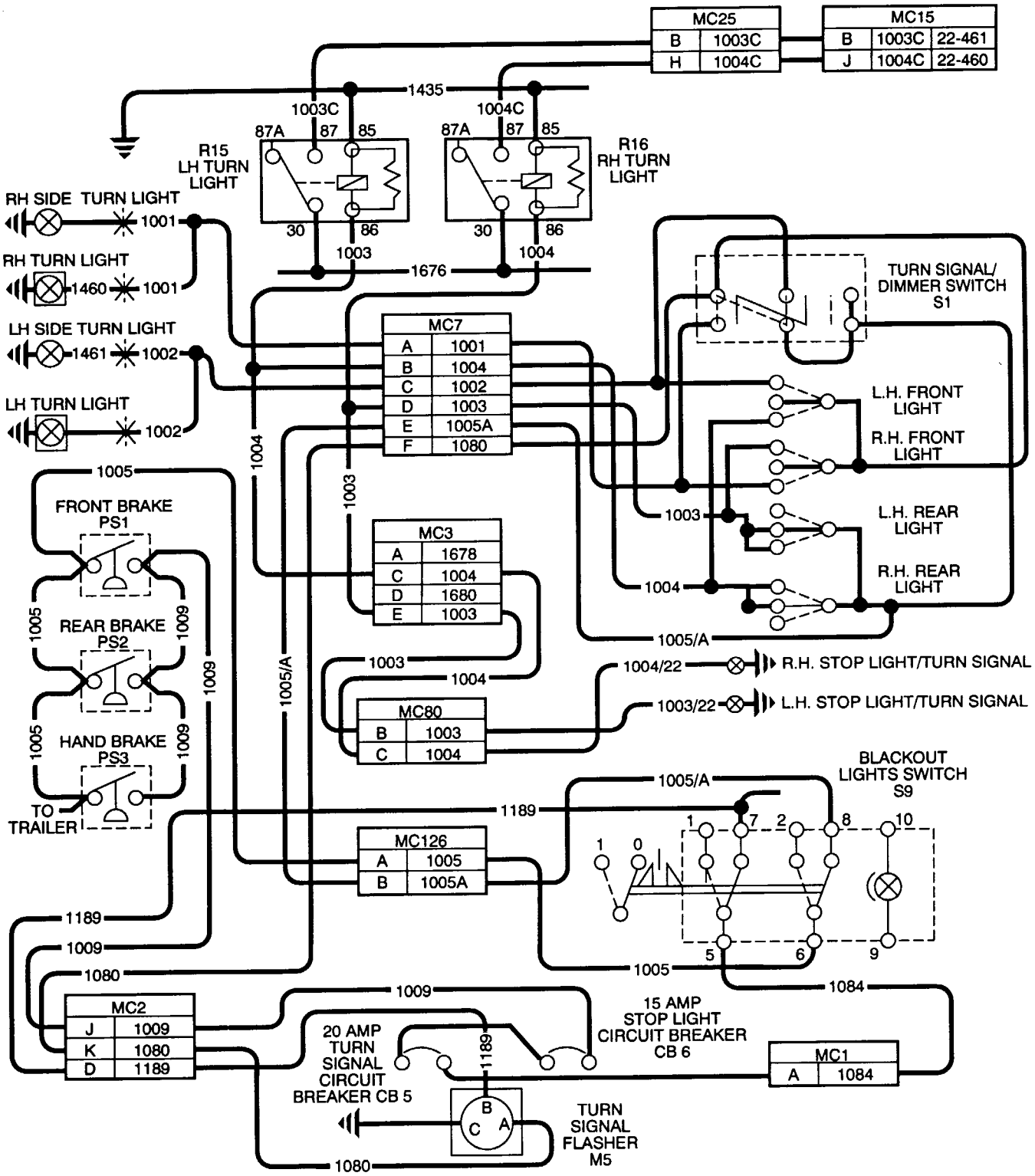


Figure 2-32. Turn Signals, Brake Lights Wiring Schematic

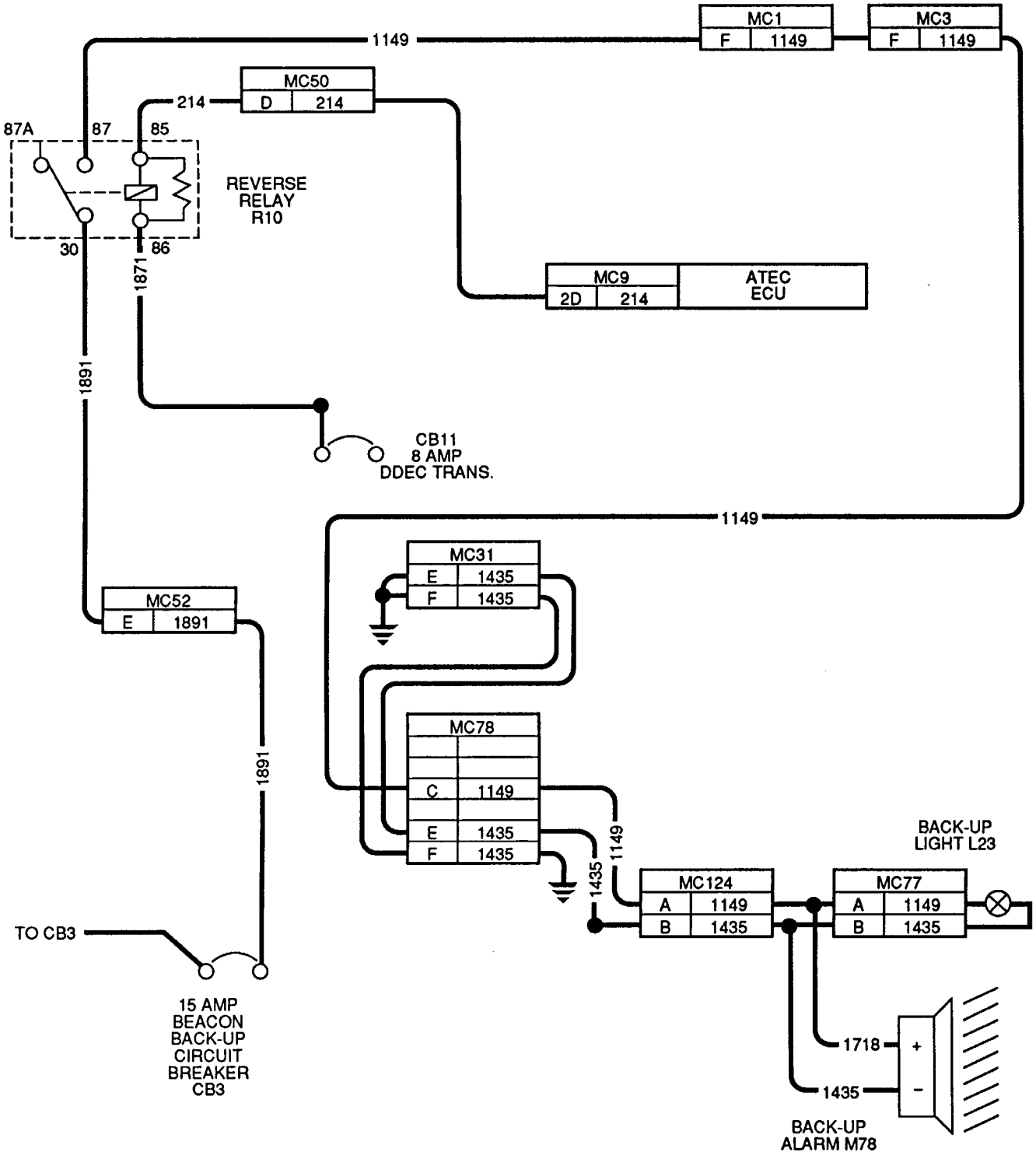


Figure 2-33. Reverse Light Wiring Schematic

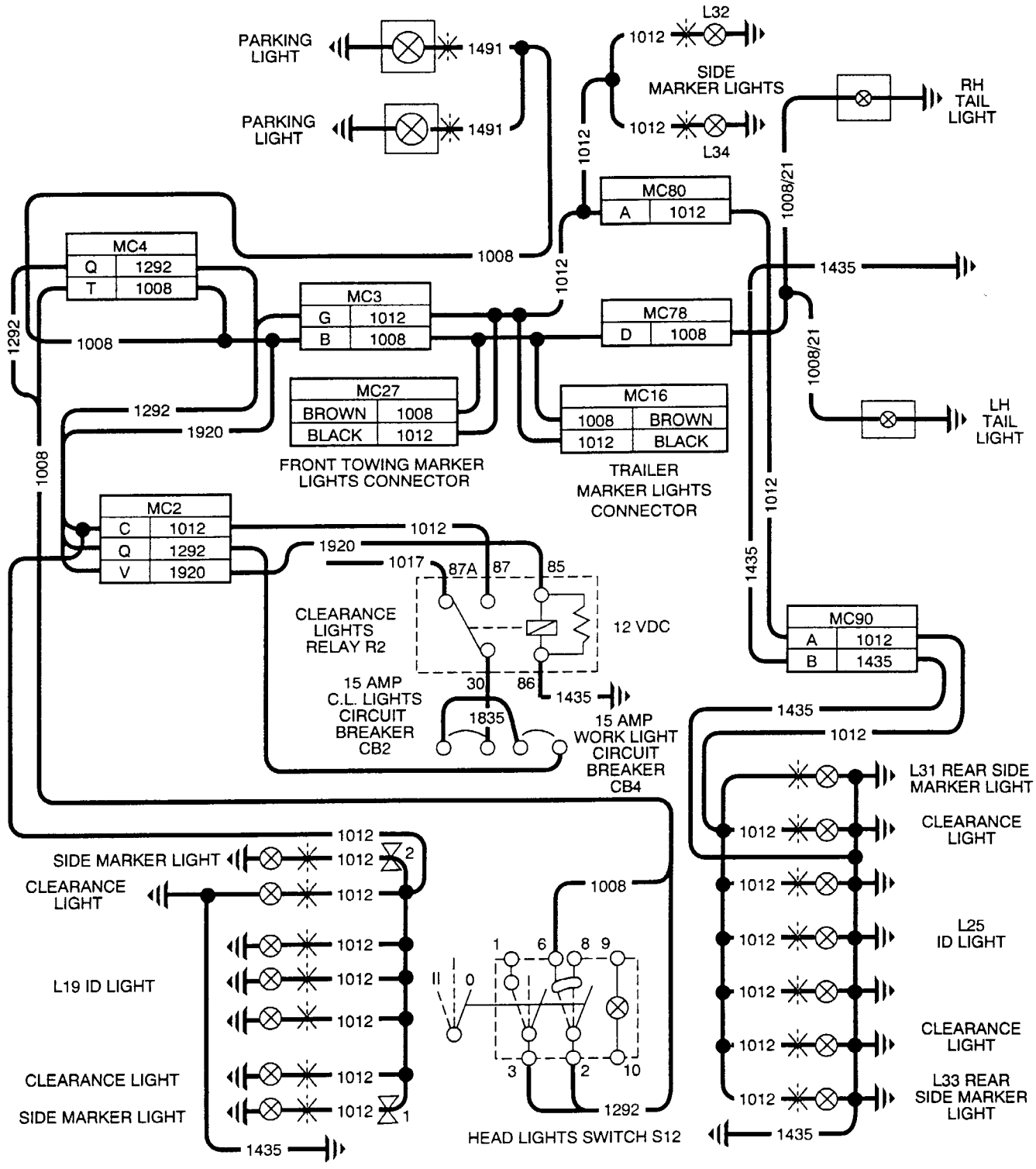


Figure 2-34. Marker Lights Wiring Schematic

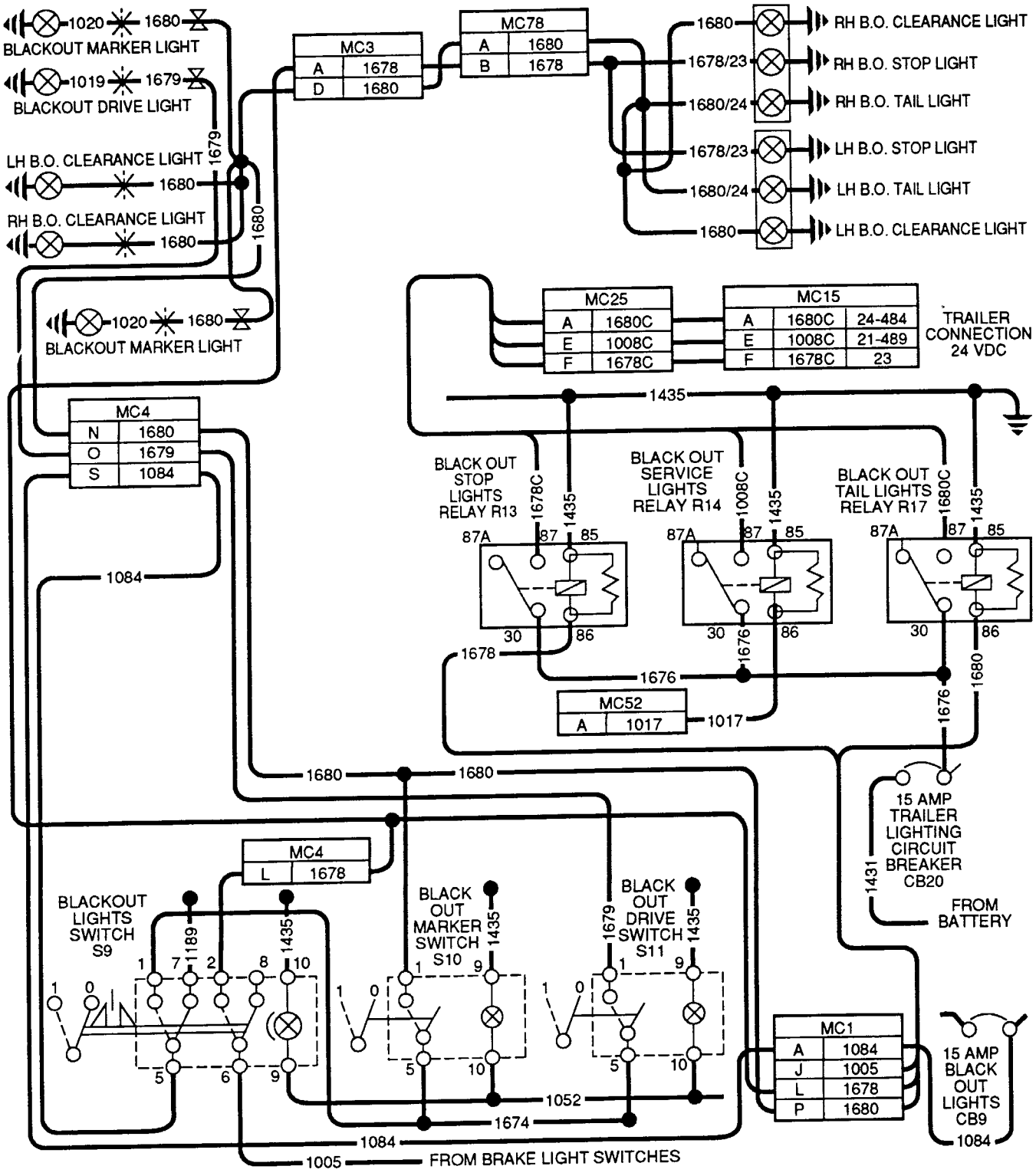


Figure 2-35. Blackout Lights Wiring Schematic

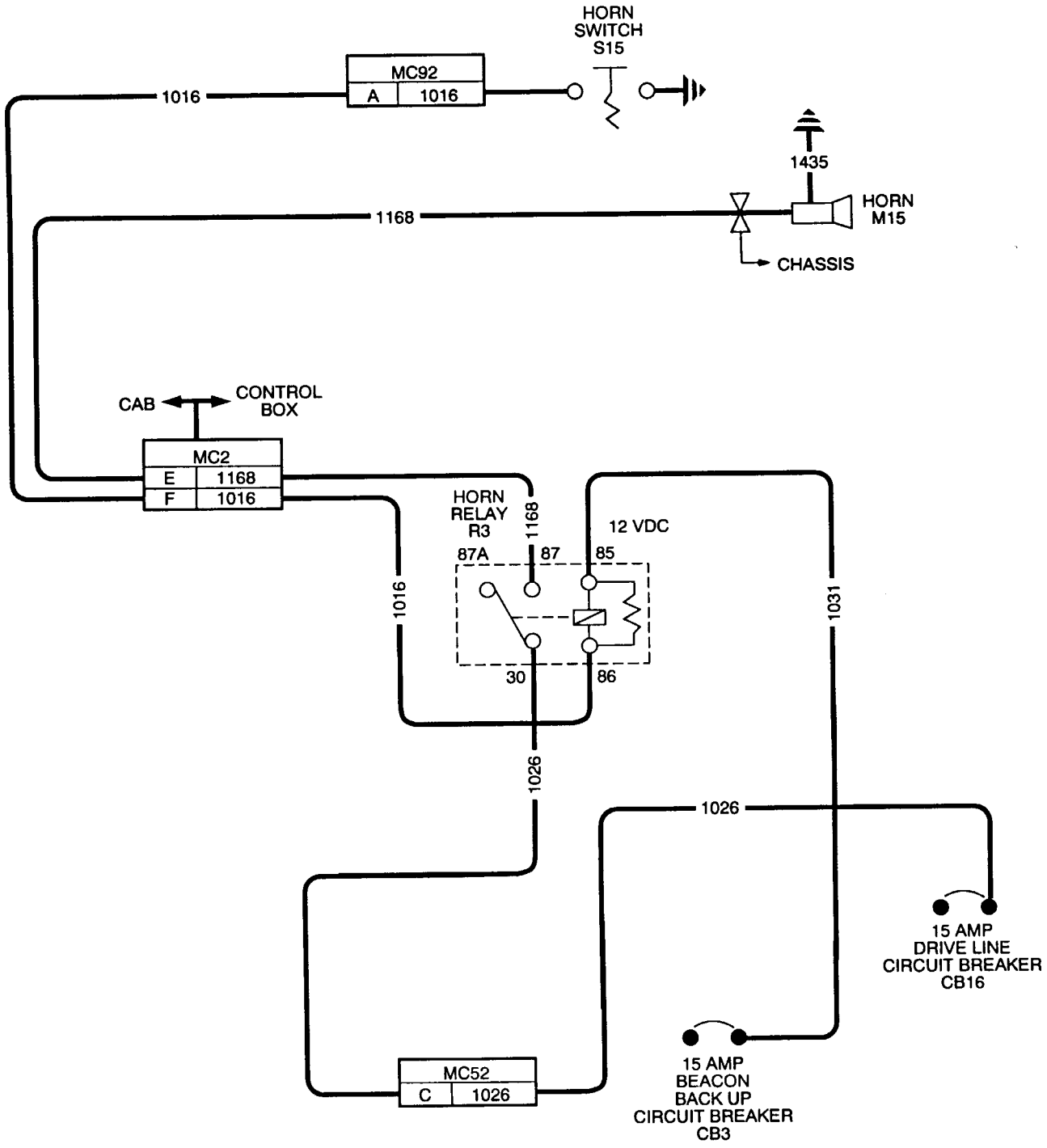


Figure 2-36. Horn Wiring Schematic

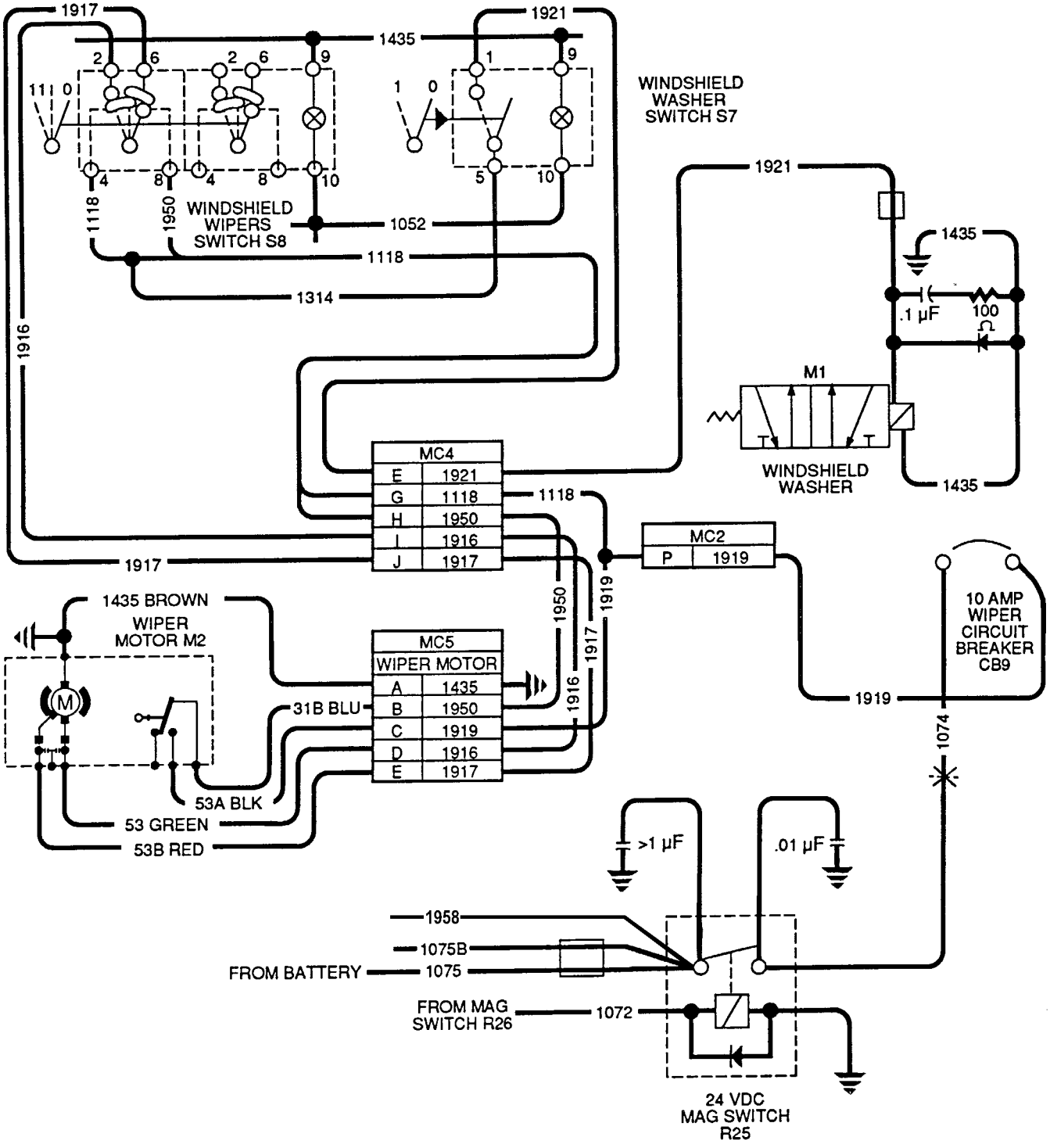
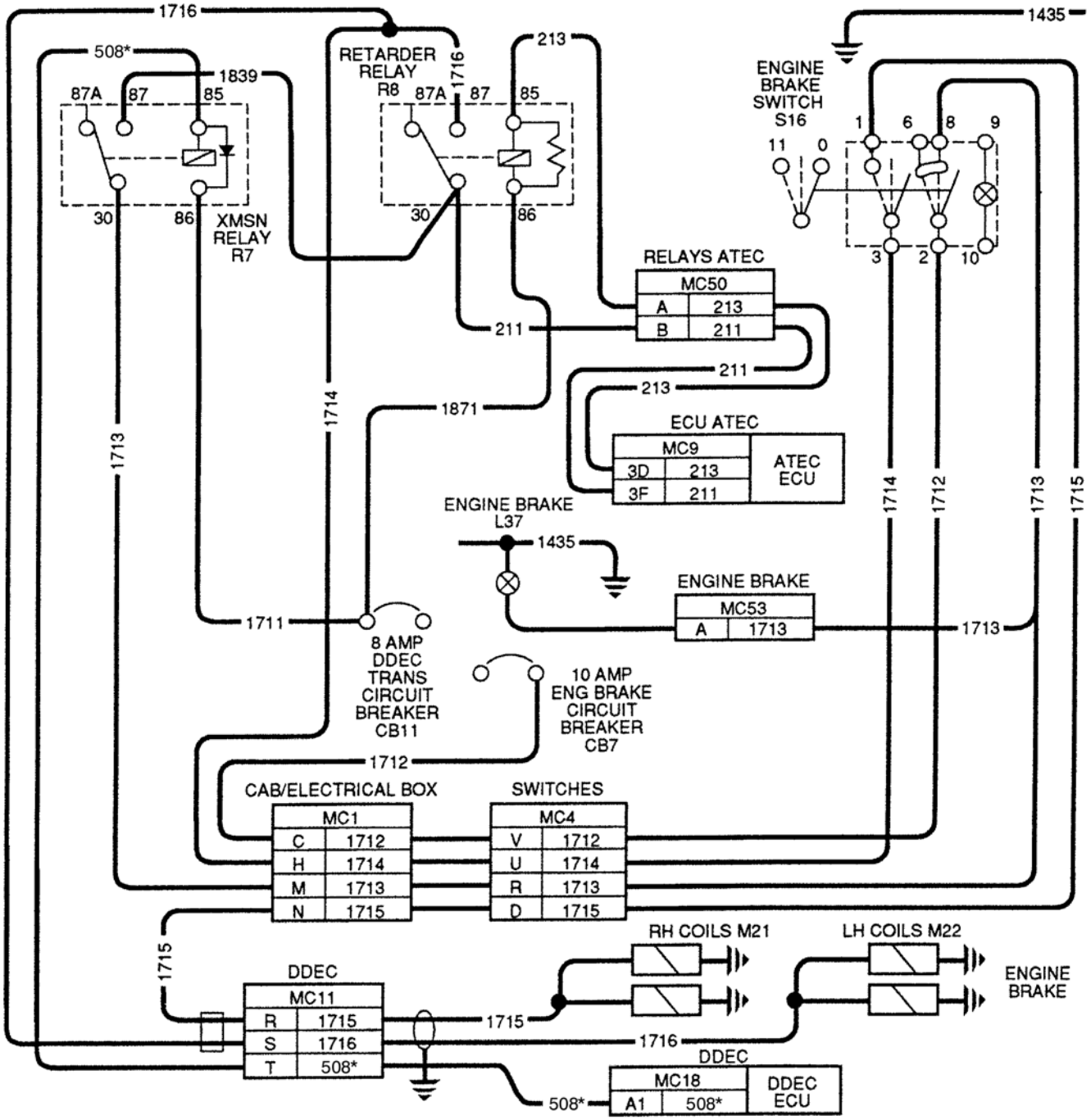


Figure 2-37. Windshield Washer And Wiper Wiring Schematic



*NOTE - On DDEC III/IV trucks, wire 988 replaces wire 508.

Figure 2-38. Engine Brake Wiring Schematic

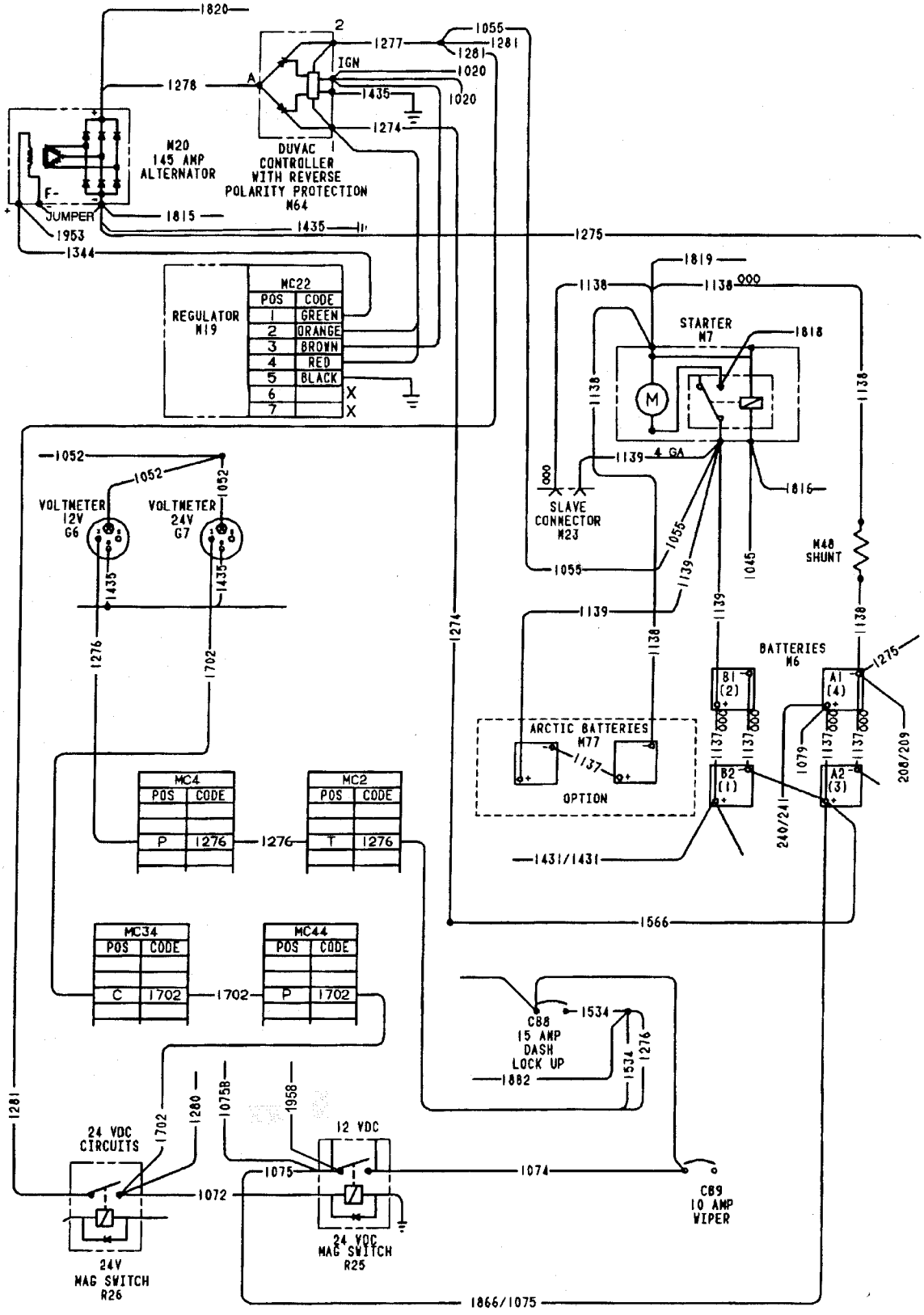


Figure 2-39. Charging System Wiring Schematic (145 AMP)

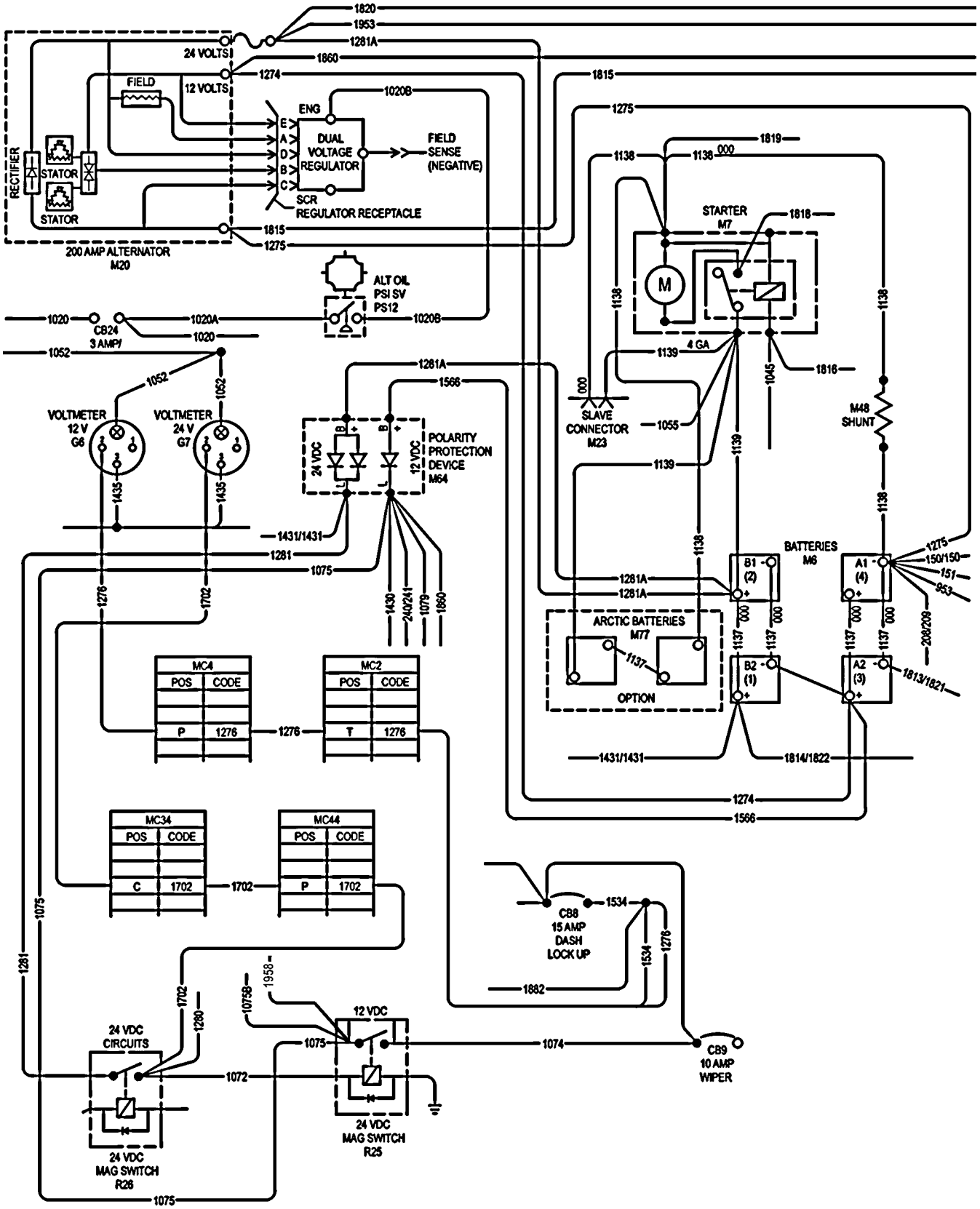


Figure 2-40. Charging System Wiring Schematic (200 AMP) (Sheet 1 of 2)

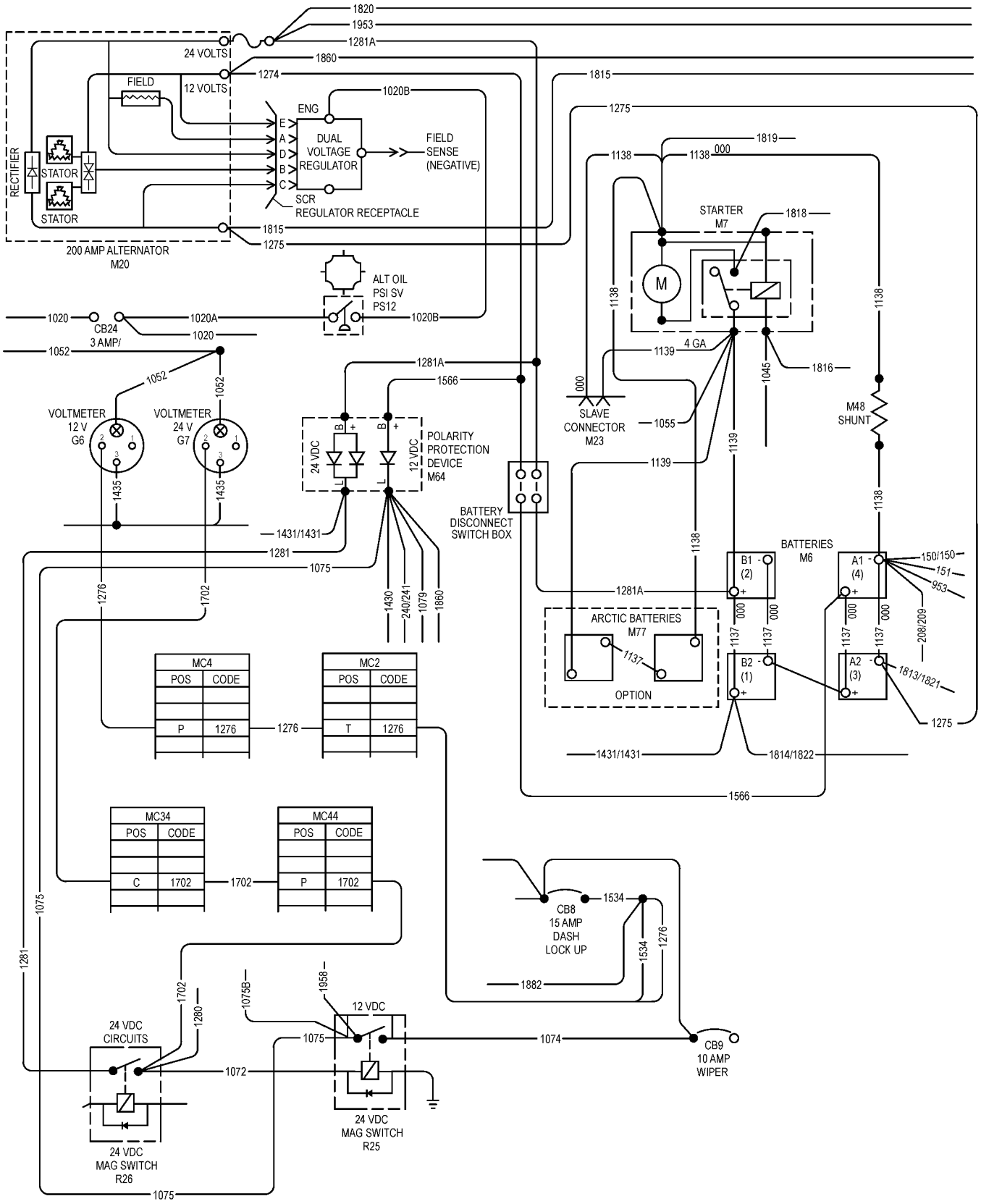


Figure 2-40. Charging System Wiring Schematic (200 AMP With Battery Disconnect Switch) (Sheet 2 of 2)

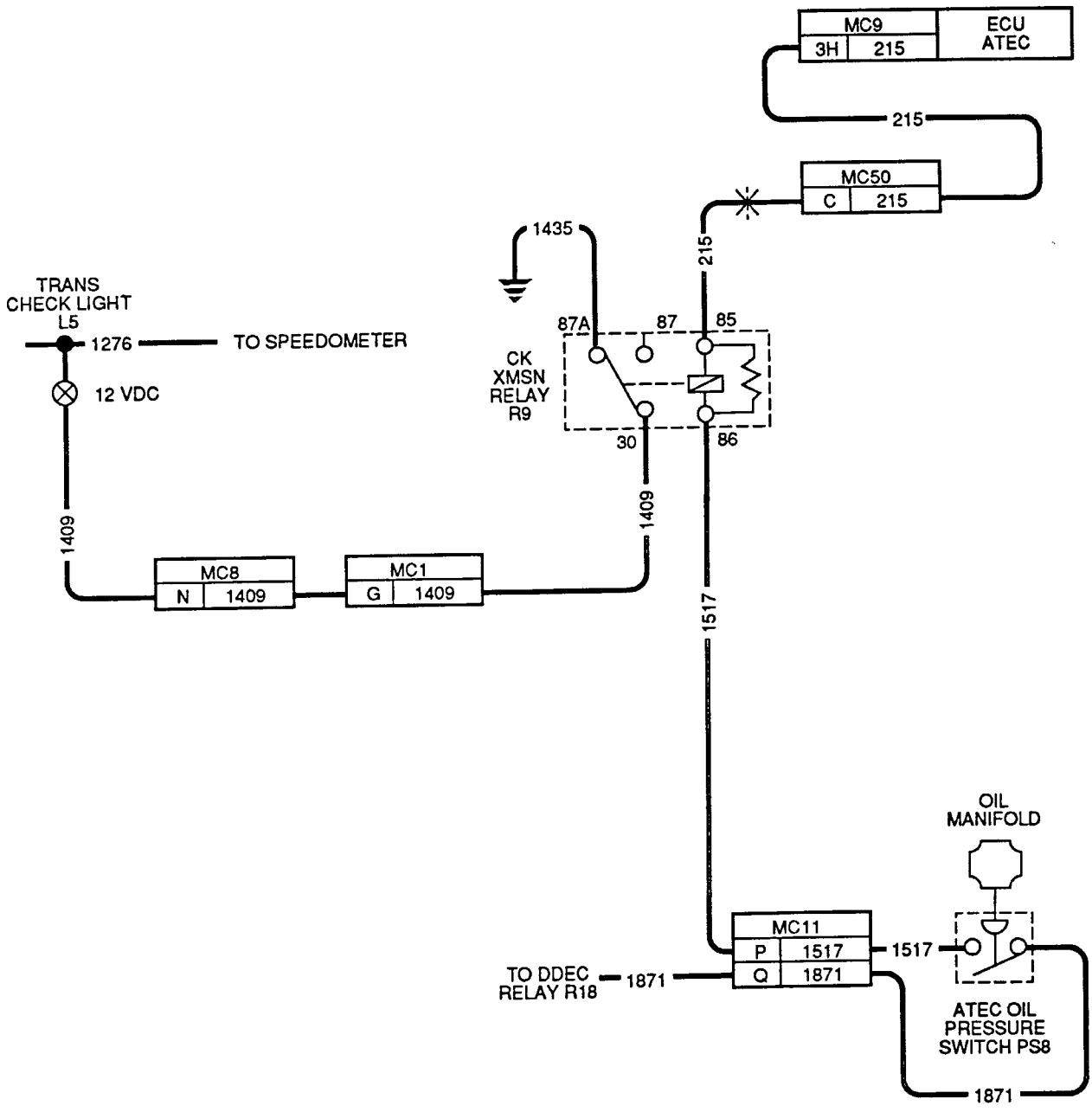


Figure 2-41. Check Transmission Light Wiring Schematic

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

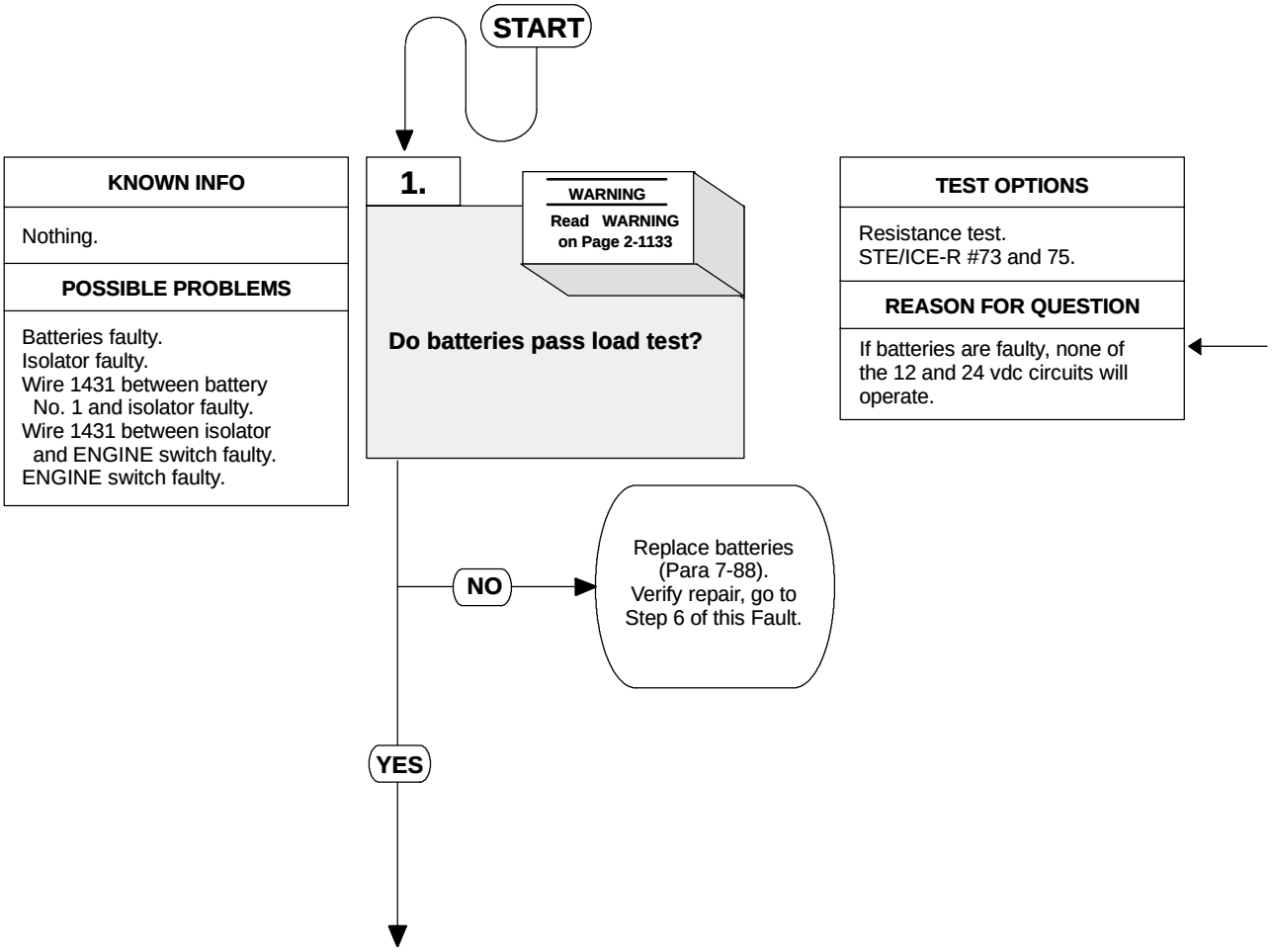
1. ALL 12 AND 24 VDC CIRCUITS DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Remover, connector (Item 55, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover open, (TM 9-2320-364-10)

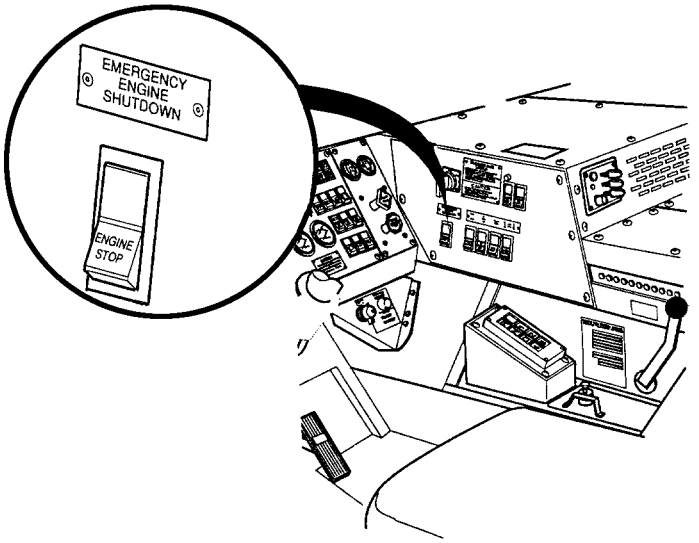


WARNING

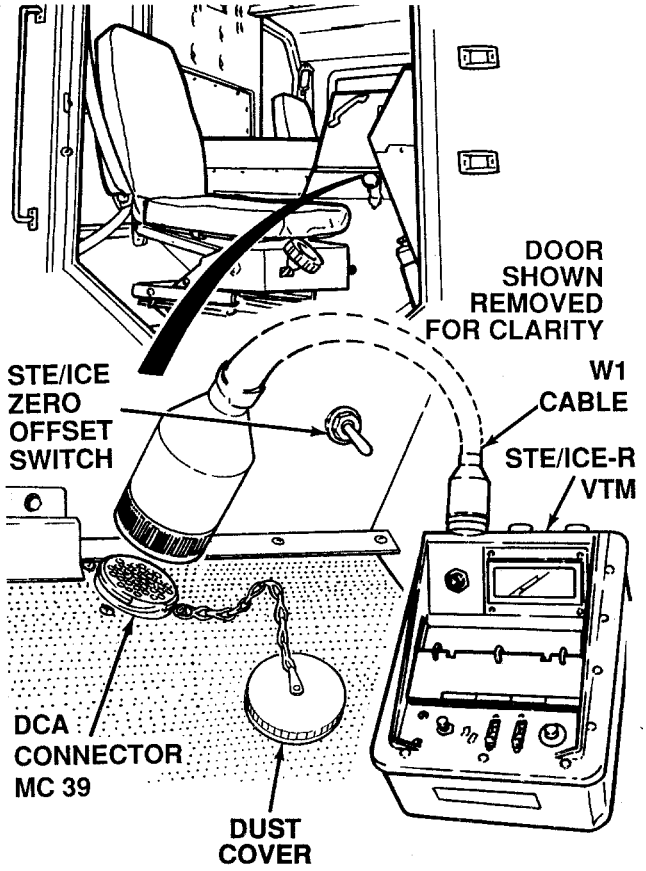
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

RESISTANCE TEST
STE/ICE-R # 73 AND 75 TEST

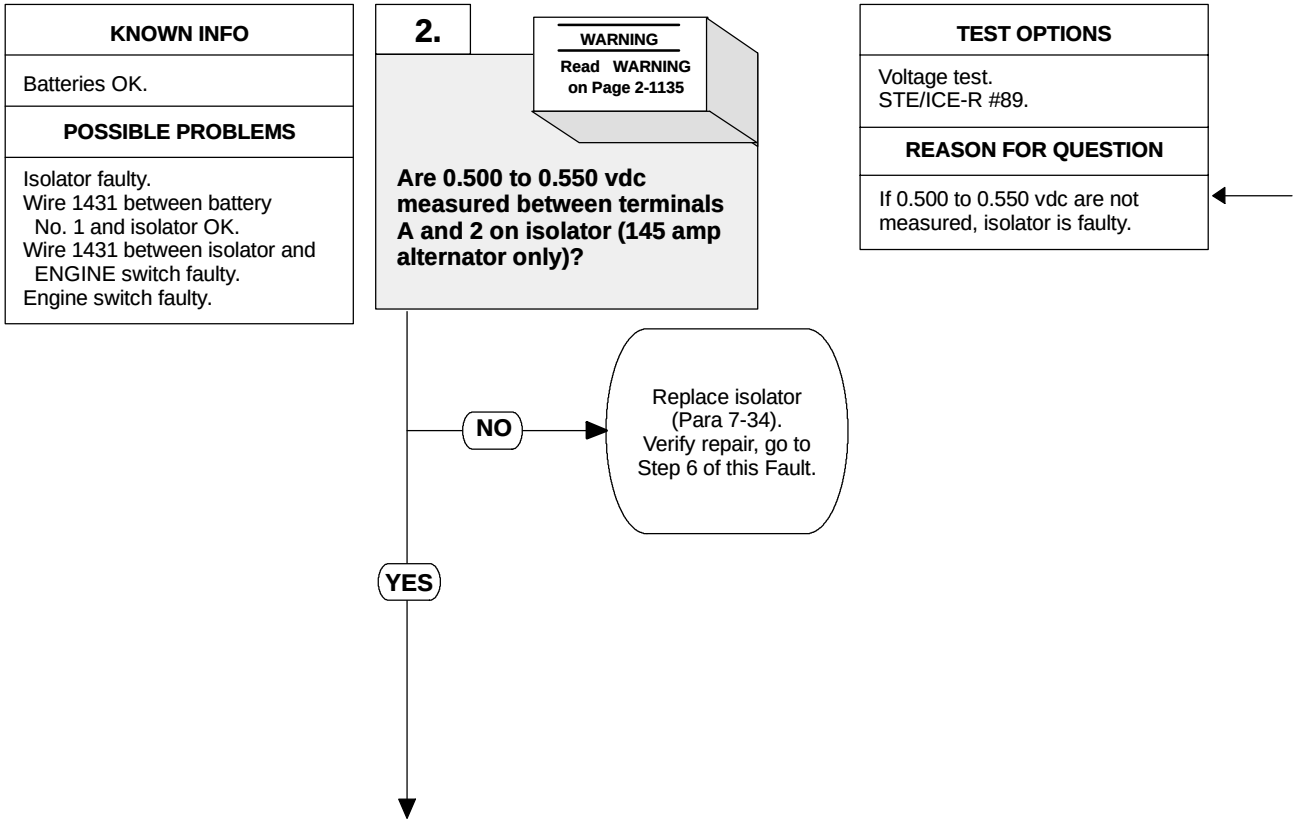
(1) Remove dust cover from DCA connector MC39.
(2) Connect DCA cable W1 to the vehicle test meter (VTM) and DCA connector MC39.
(3) Turn ON STE/ICE-R VTM in the DCA mode (TM 9-4910-571-12&P).
(4) Enter the vehicle identification (VID) number (38).
(5) Perform confidence test.
(6) Set STE/ICE-R TEST SELECT switches to #73.
(7) Perform offset test.
(8) Press and release TEST button.
(9) When GO is displayed on the VTM, push down and hold engine stop switch, and turn ENGINE switch to START until OFF is displayed on the VTM (TM 9-2320-364-10).
(10) Turn OFF ENGINE switch, release engine stop switch and wait about five seconds.
  (a) If more than 13 miliohms are displayed, perform STE/ICE-R test 73 on each truck battery.
  (b) If 13 miliohms or less are displayed, batteries are OK. Go to Step (11).
(11) Set STE/ICE-R TEST SELECT SWITCHES to 75.
(12) Perform offset test.
(13) Press and release TEST button.
(14) When GO is displayed on the VTM, push down and hold engine stop switch and turn ENGINE switch to START until OFF is displayed on the VTM.
(15) Turn OFF ENGINE switch, release engine stop switch and wait about five seconds.
  (a) If more than 25 miliohms/sec are displayed, perform STE/ICE-R test 75 on each truck battery.
  (b) If 25 miliohms or less are displayed, batteries are OK.
(16) Disconnect DCA connector.
(17) Install dust cover on STE/ICE-R connector MC39.



STEERING WHEEL SHOWN REMOVED FOR CLARITY



1. ALL 12 AND 24 VDC CIRCUITS DO NOT OPERATE (CONT).

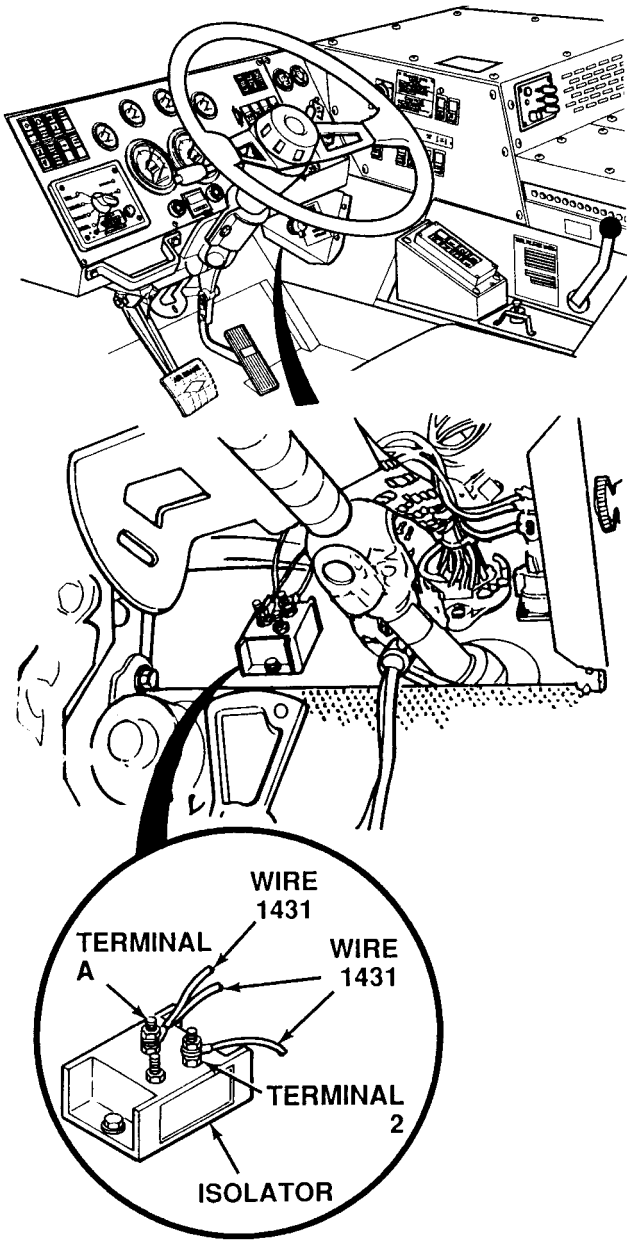


WARNING

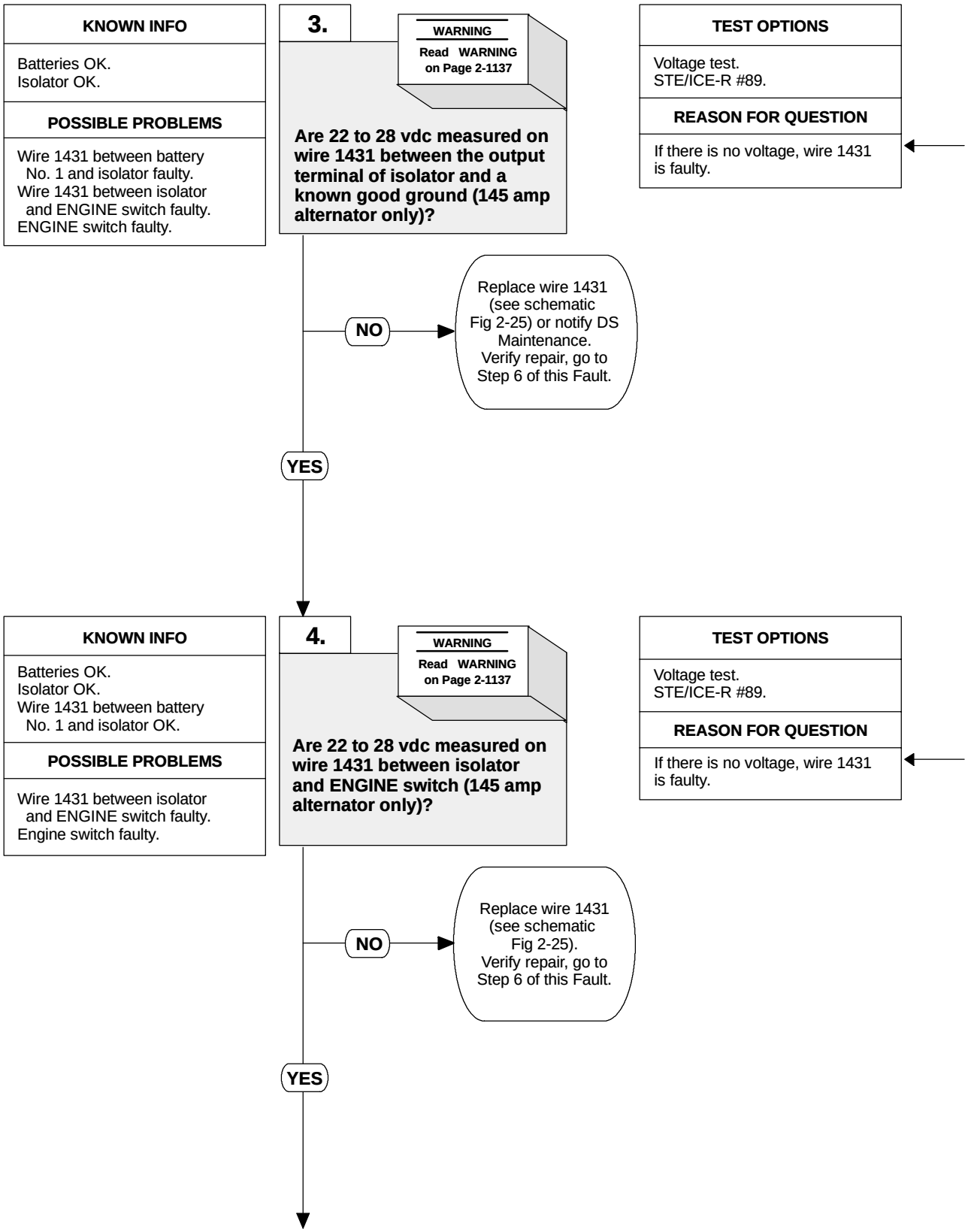
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

DIODE TEST

(1) Disconnect wire 1431 from battery (Para 7-90).
(2) Set multimeter select switch to diode check position.
(3) Connect positive (+) multimeter lead to terminal A on isolator.
(4) Connect negative (–) multimeter lead to terminal 2 on isolator.
  (a) If 0.500 to 0.550 vdc are not present, replace isolator (Para 7-34).
  (b) If 0.500 to 0.550 vdc are present, go to Step (5) below.
(5) Connect wire 1431 to battery box (Para 7-90).



1. ALL 12 AND 24 VDC CIRCUITS DO NOT OPERATE (CONT).



WARNING

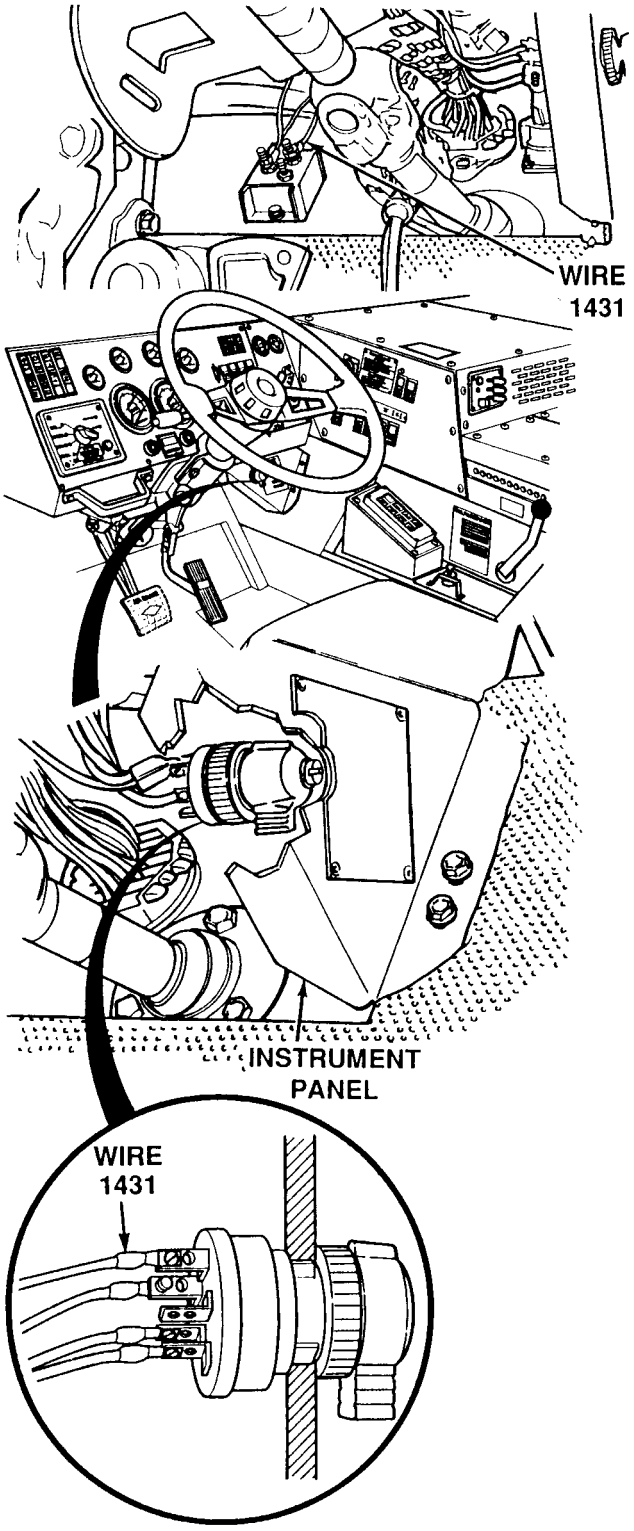
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Disconnect wire 1431 from the output side of isolator.
(3) Connect positive (+) multimeter lead to isolator output terminal.
(4) Connect negative (–) multimeter lead to a known good ground.
  (a) If 22 to 28 vdc are not present, repair wire 1431 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1431 is OK.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1431 at ENGINE switch.
(2) Connect negative (-) multimeter lead to a known good ground.
  (a) If 22 to 28 vdc are not present, replace wire 1431.
  (b) If 22 to 28 vdc are present, wire 1431 is OK.



1. ALL 12 AND 24 VDC CIRCUITS DO NOT OPERATE (CONT).

KNOWN INFO
Batteries OK. Isolator OK. Wires 1431 between battery No. 1 and isolator OK. Wire 1431 between isolator and ENGINE switch OK.
POSSIBLE PROBLEMS
Engine switch faulty.

5.

WARNING

Read WARNING on Page 2-1139

Are 22 to 28 vdc measured on wires 1020 and 1640 at ENGINE switch?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 22 to 28 vdc are not measured from ENGINE switch, 24 vdc circuits will not operate when ENGINE switch is turned to ON.

NO → Replace ENGINE switch (Para 7-32). Verify repair, go to Step 6 of this Fault.

YES → Fault not corrected. Notify DS Maintenance.

KNOWN INFO
Batteries OK. Isolator OK. Wires 1431 between battery No. 1 and isolator OK. Wire between isolator and ENGINE switch OK. ENGINE switch OK.
POSSIBLE PROBLEMS

6.

Do 12 and 24 vdc circuits operate?

TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If 12 and 24 vdc circuits operate, fault corrected.

NO → Fault not corrected. Notify DS Maintenance.

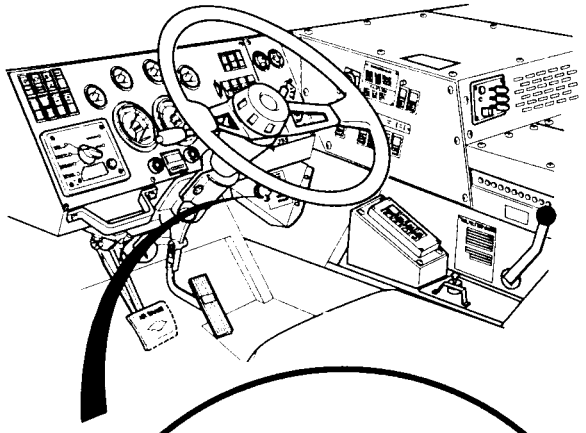
YES → Fault corrected.

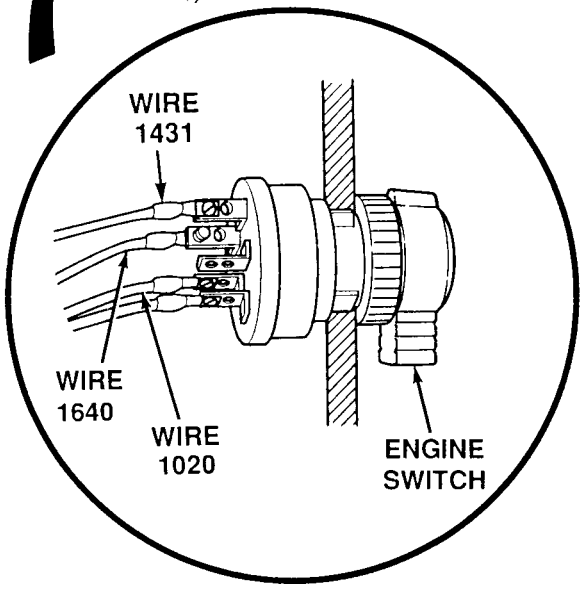
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1020 on ENGINE switch at ignition terminal.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace switch (Para 7-32).
  (b) If 22 to 28 vdc are present, go to Step (4) below.
(4) Turn OFF ENGINE switch.
(5) Connect positive (+) multimeter lead to wire 1640 on ENGINE switch at accessory terminal.
(6) Turn ON ENGINE switch.
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace switch (Para 7-32).
  (b) If 22 to 28 vdc are present, accessory circuit of ENGINE switch is OK.
(7) Turn OFF ENGINE switch.





VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 12 and 24 vdc circuits do not operate, fault not corrected. Perform Steps (2) and (3) below and notify DS Maintenance.
  (b) If 12 and 24 vdc circuits operate, fault has been corrected.
(2) Turn OFF ENGINE switch.
(3) Close top engine access cover.

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

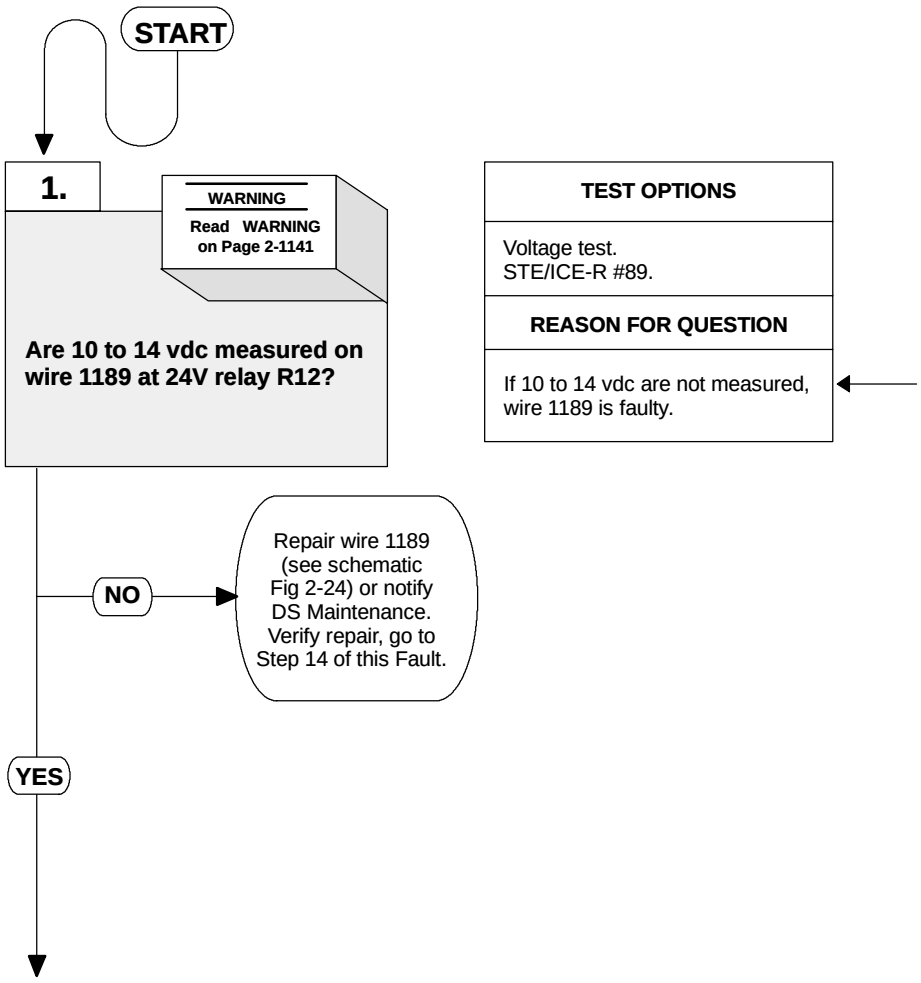
References
TM 9-2320-364-10
TM 9-4910-571-12&P

KNOWN INFO

22 to 28 vdc register on 24 vdc voltmeter indicating ENGINE switch is OK.
10 to 14 vdc register on 12 vdc voltmeter indicating batteries are OK.
Domelight operates indicating 10 to 14 vdc present on wire 1084 at BLACKOUT LIGHTS switch.

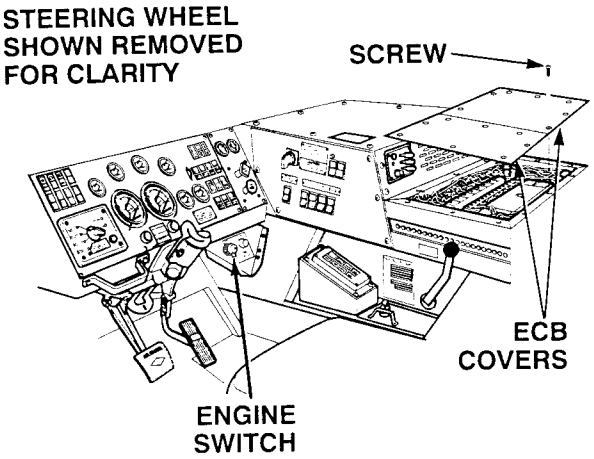
POSSIBLE PROBLEMS

Wire 1189 between splice at BLACKOUT LIGHTS switch and 24V relay R12 faulty.
Wire 1872 between ENGINE switch and IGNITION circuit breaker CB10 faulty.
IGNITION circuit breaker CB10 faulty.
Wire 1872 between IGNITION circuit breaker CB10 and 24V relay R12 faulty.
Wire 1435 between 24V relay R12 and known good ground faulty.
24V relay R12 faulty.
Wire 1430 faulty.
Wire 1189 between 24V relay R12 and magnetic switch R28 faulty.
Wire 1435 between magnetic switch R28 and known good ground faulty.
Wire 1435 between magnetic switch R28 and rectifier M52 faulty.
Rectifier M52 faulty.
Magnetic switch R28 faulty.
Wire 1175 faulty.



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

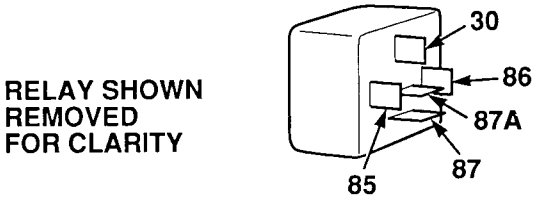


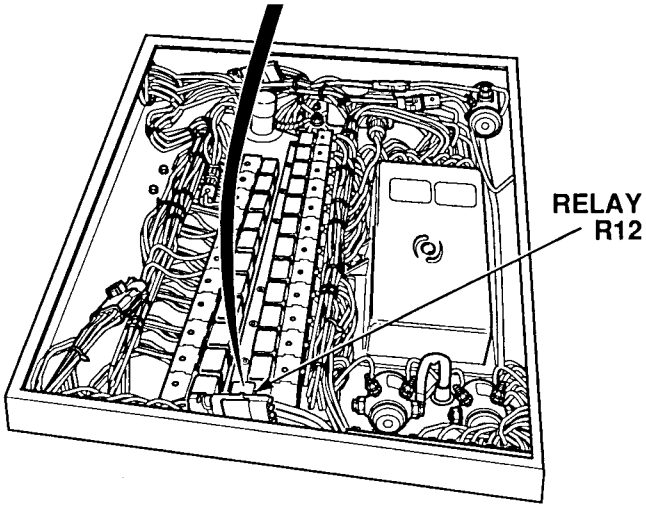
NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Remove 15 screws and two ECB covers.
(3) Connect positive (+) multimeter lead to wire 1189 at 24V relay R12, terminal 30.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1189 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1189 is OK.
(6) Turn OFF ENGINE switch.





2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

KNOWN INFO

22 to 28 vdc register on 24 vdc voltmeter indicating ENGINE switch is OK.
10 to 14 vdc register on 12 vdc voltmeter indicating batteries are OK.
Domelight operates indicating 10 to 14 vdc present on wire 1084 at BLACKOUT LIGHTS switch.
Wire 1189 between splice at BLACKOUT LIGHTS switch and 24V relay R12 OK.

POSSIBLE PROBLEMS

Wire 1872 between ENGINE switch and IGNITION circuit breaker CB10 faulty.
IGNITION circuit breaker CB10 faulty.
Wire 1872 between IGNITION circuit breaker CB10 and 24V relay R12 faulty.
Wire 1435 between 24V relay R12 and known good ground faulty.
24V relay R12 faulty.
Wires 1430 faulty.
Wire 1189 between 24V relay R12 and magnetic switch R28 faulty.
Wire 1435 between magnetic switch R28 and known good ground faulty.
Wire 1435 between magnetic switch R28 and rectifier M52 faulty.
Rectifier M52 faulty.
Magnetic switch R28 faulty.
Wire 1175 faulty.

2.

WARNING
Read WARNING on Page 2-1143

Are 22 to 28 vdc measured on wire 1872 at 24V relay R12, terminal 86 with ENGINE switch turned ON?

NO → Go to Step 3 of this Fault.

YES → Go to Step 5 of this Fault.

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not present, wire 1872 between IGNITION circuit breaker CB10 and 24V relay R12 is faulty.

WARNING

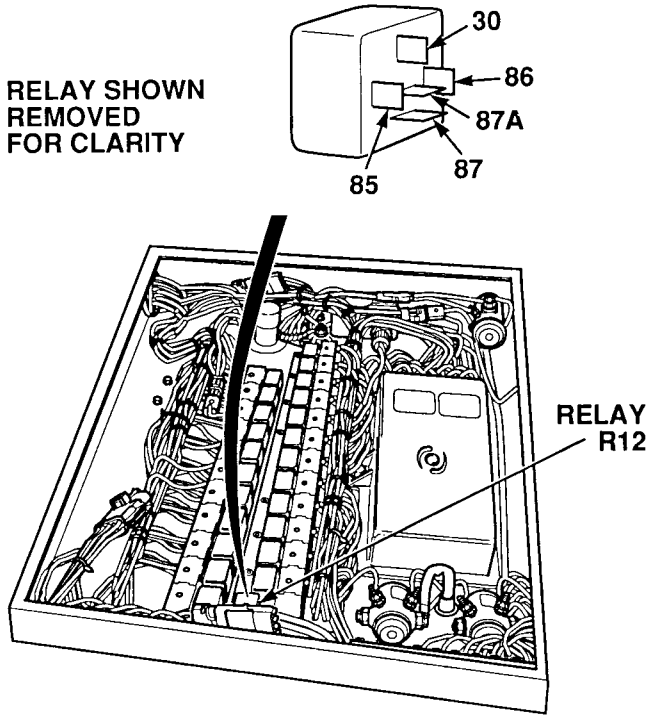
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

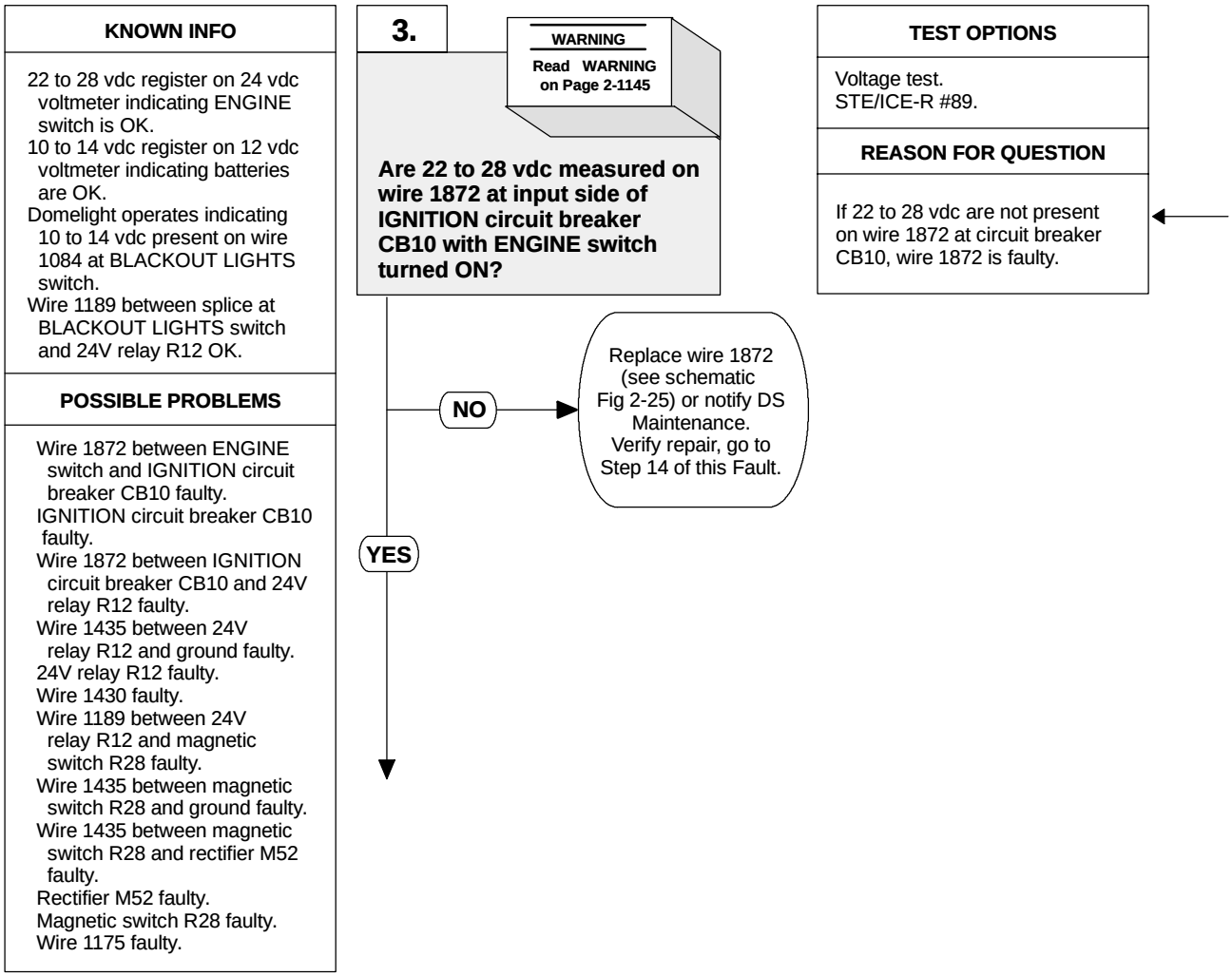
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1872 at 24V relay R12, terminal 86.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and go to Step 3 of this Fault.
  (b) If 22 to 28 vdc are present, wire 1872 is OK. Turn OFF ENGINE switch and go to Step 5 of this Fault.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

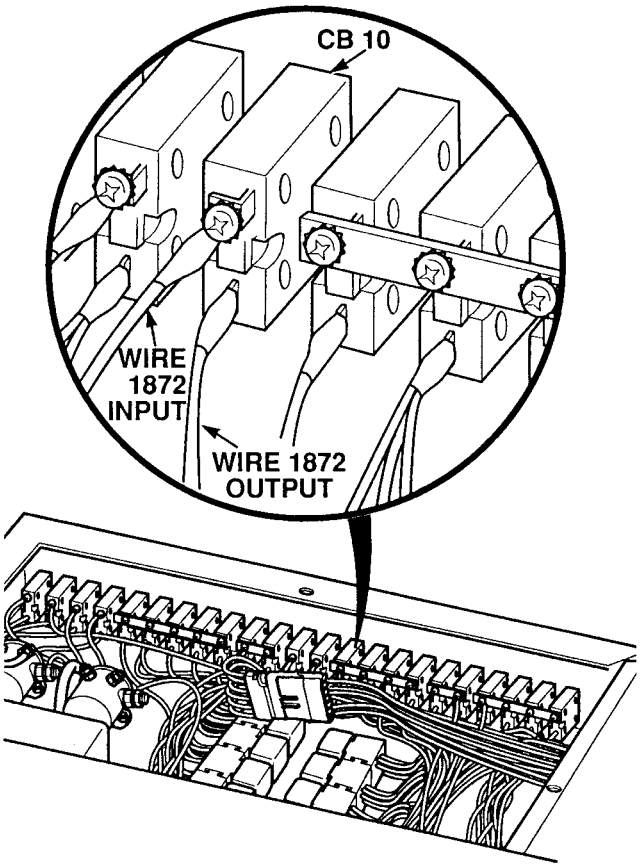


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1872 at input side of IGNITION circuit breaker CB10.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1872 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1872 is OK.
(4) Turn OFF ENGINE switch.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

KNOWN INFO

22 to 28 vdc register on 24 vdc voltmeter indicating ENGINE switch is OK.
10 to 14 vdc register on 12 vdc voltmeter indicating batteries are OK.
Domelight operates indicating 10 to 14 vdc present on wire 1084 at BLACKOUT LIGHTS switch.
Wire 1189 between splice at BLACKOUT LIGHTS switch and 24V relay R12 OK.
Wire 1872 between ENGINE switch and IGNITION circuit breaker CB10 OK.

POSSIBLE PROBLEMS

IGNITION circuit breaker CB10 faulty.
Wire 1872 between IGNITION circuit breaker CB10 and 24V relay R12 faulty.
Wire 1435 between 24V relay R12 and ground faulty.
24V relay R12 faulty.
Wires 1430 faulty.
Wire 1189 between 24V relay R12 and magnetic switch R28 faulty.
Wire 1435 between magnetic switch R28 and ground faulty.
Wire 1435 between magnetic switch R28 and rectifier M52 faulty.
Rectifier M52 faulty.
Magnetic switch R28 faulty.
Wire 1175 faulty.

4.

WARNING
Read WARNING on Page 2-1147

Are 22 to 28 vdc measured on wire 1872 at output side of IGNITION circuit breaker CB10 with ENGINE switch turned ON?

NO → Replace IGNITION circuit breaker CB10 (Para 7-16). Verify repair, go to Step 14 of this Fault.

YES → Repair wire 1872 between IGNITION circuit breaker CB10 and 24V relay R12 (see schematic Fig 2-24) or notify DS Maintenance. Verify repair, go to Step 14 of this Fault.

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

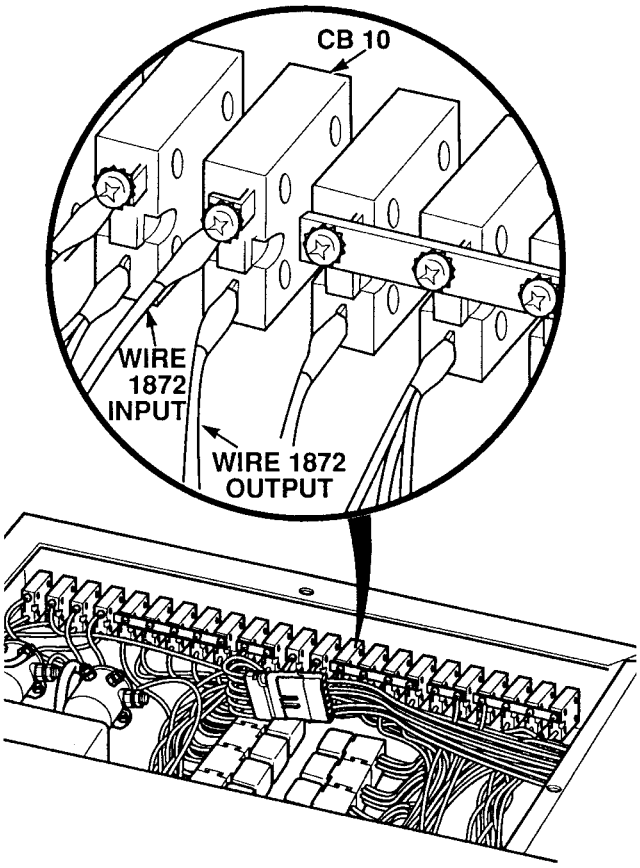
If 22 to 28 vdc are not present, circuit breaker CB10 is faulty.

WARNING

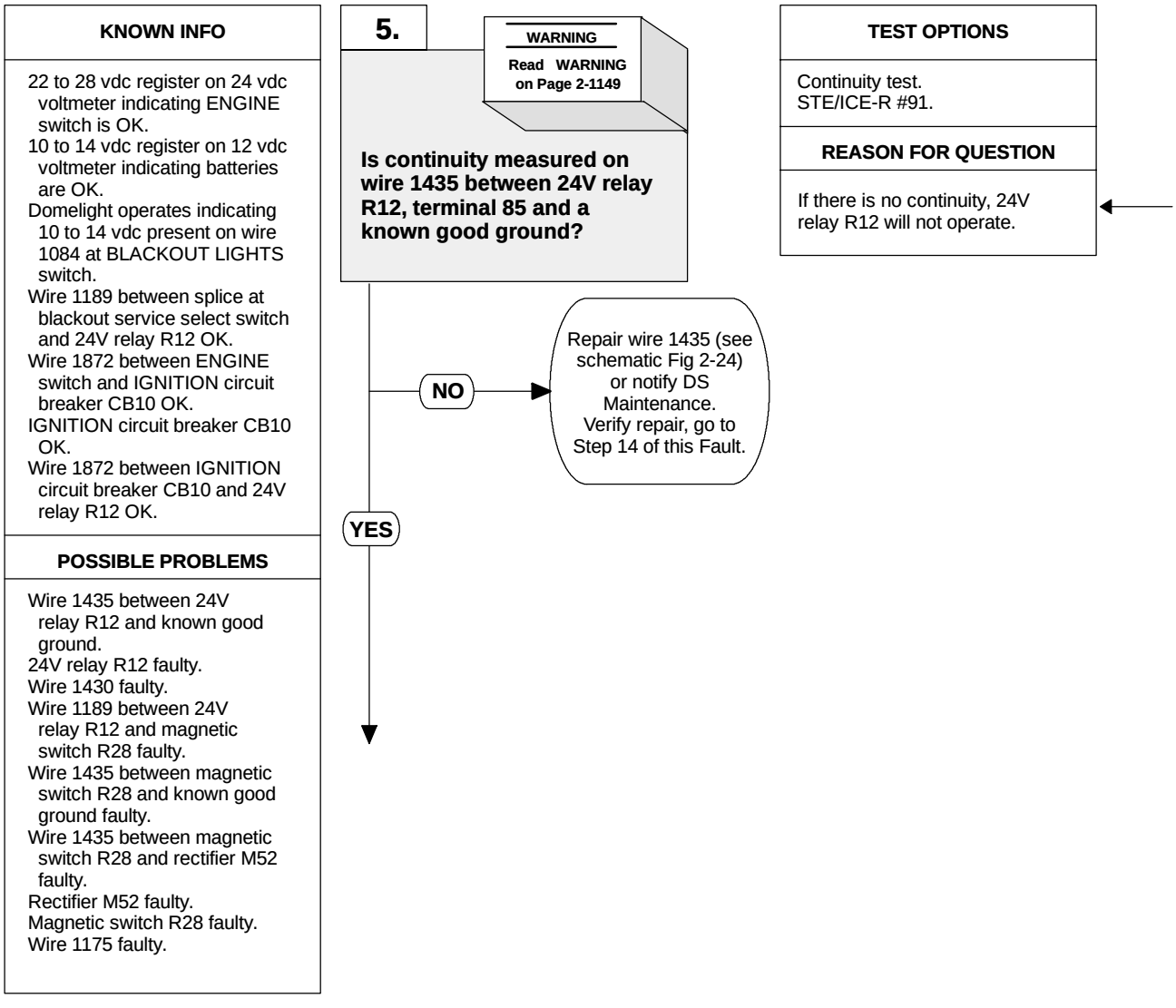
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1872 at output side of IGNITION circuit breaker CB10.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace IGNITION circuit breaker CB10 (Para 7-16).
  (b) If 22 to 28 vdc are present, repair wire 1872, or notify DS Maintenance.
(4) Turn OFF ENGINE switch.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

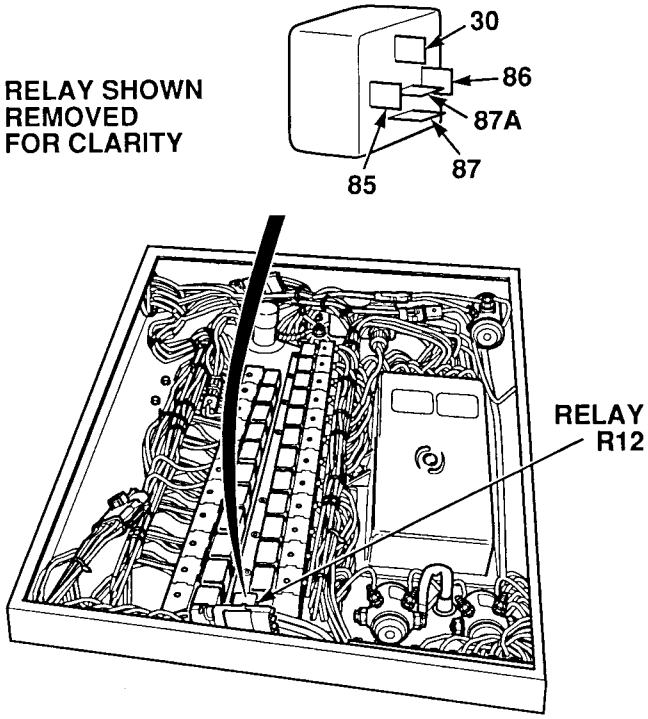


WARNING

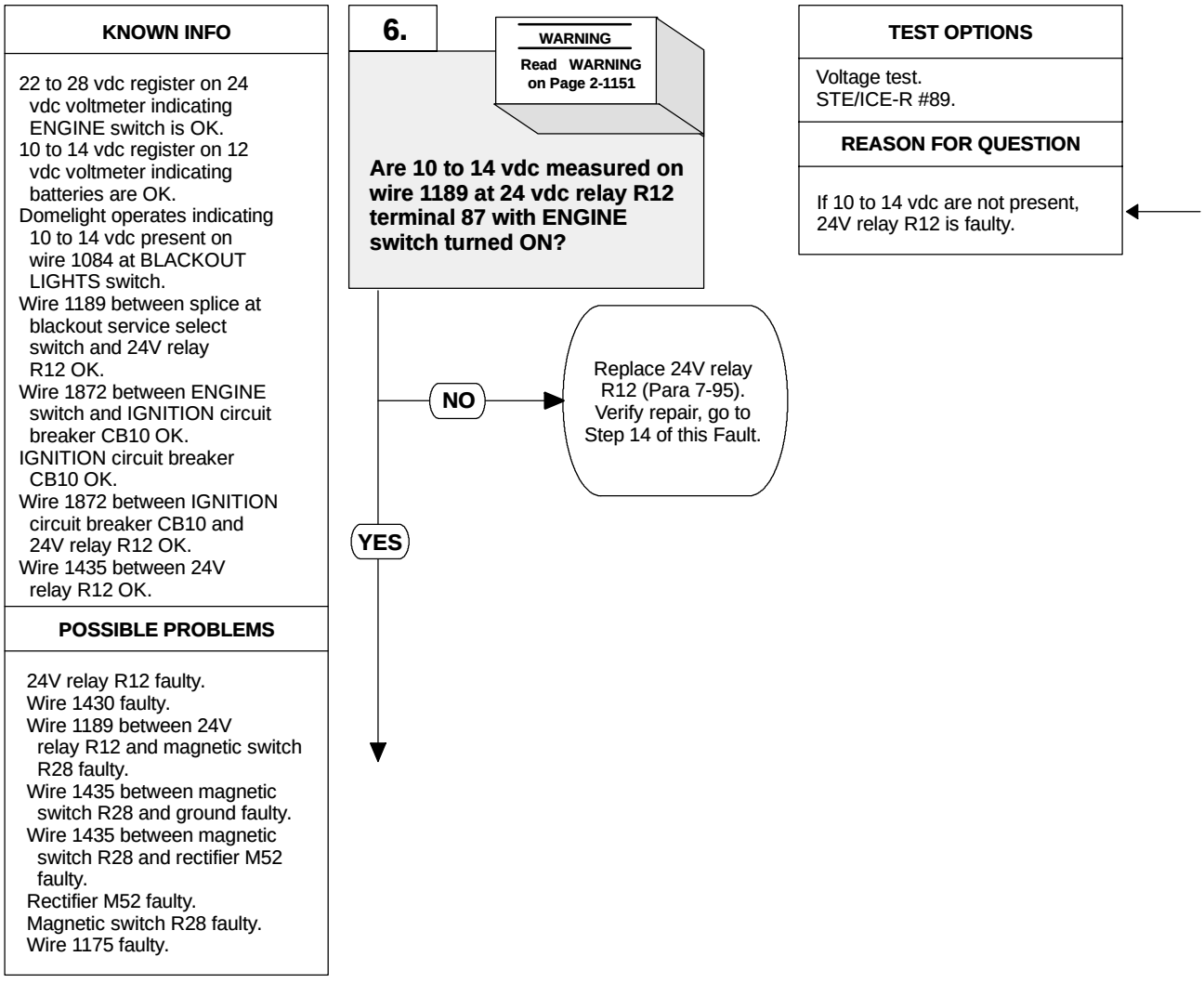
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity measured on wire 1435 between 24V relay R12, terminal 85 and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-24) or notify DS Maintenance.
   (b) If there is continuity, wire 1435 is OK.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).



WARNING

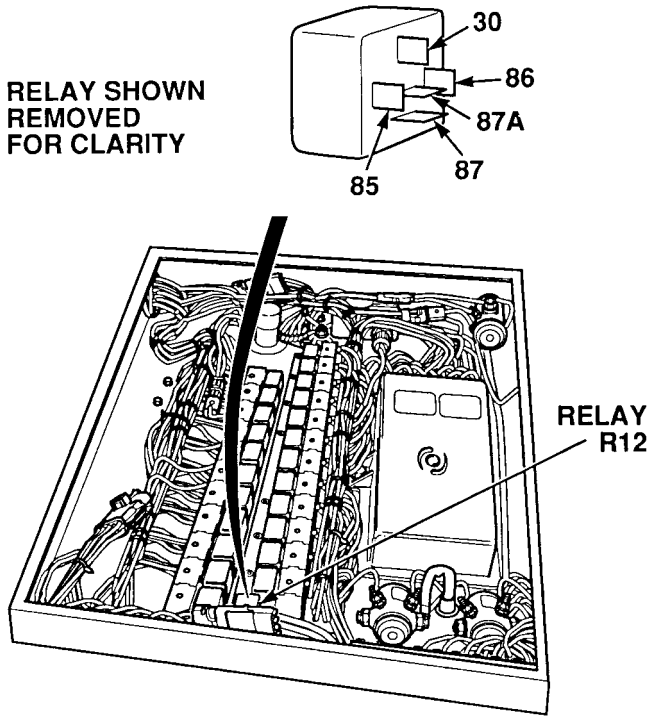
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

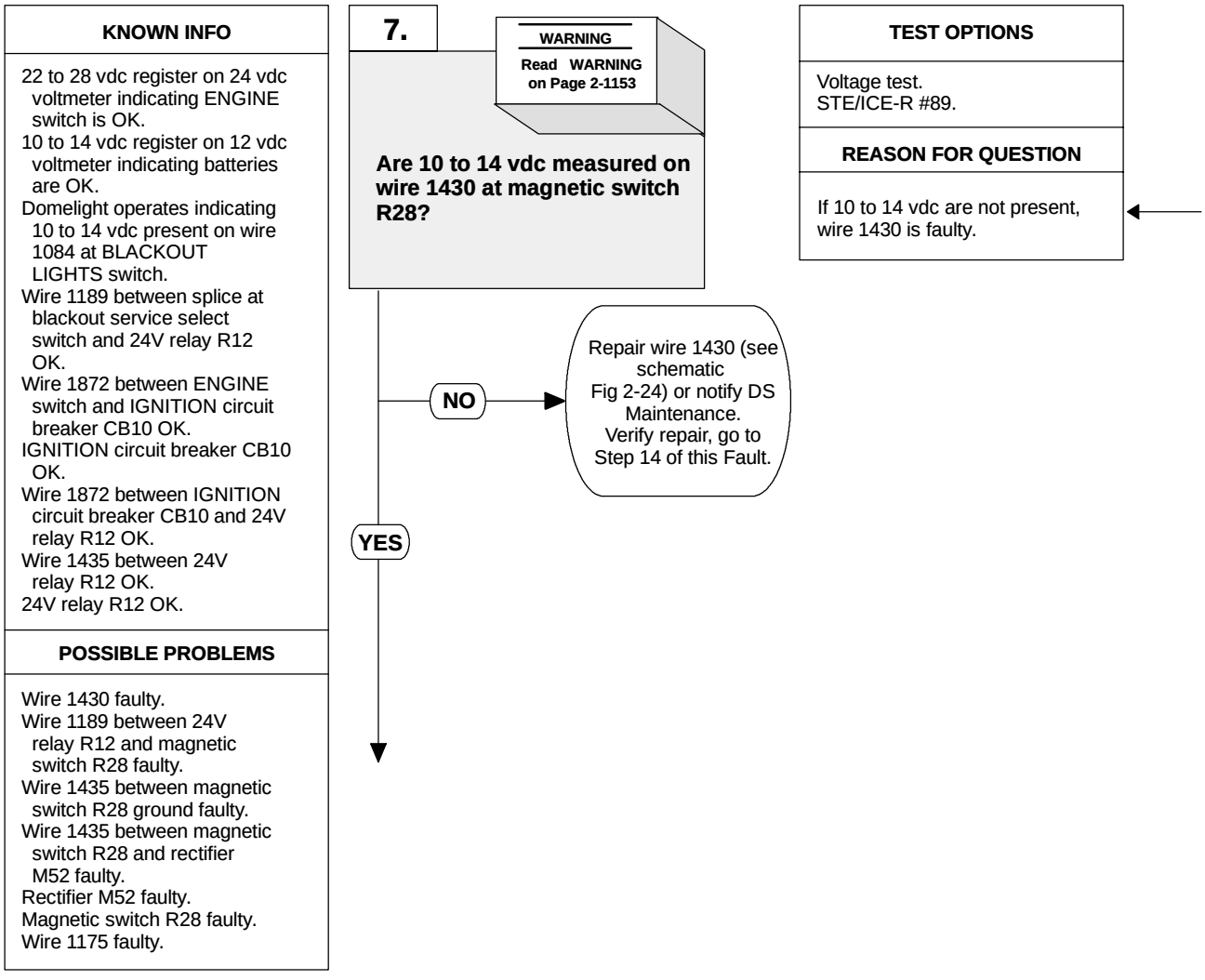
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1189 at 24V relay R12 terminal 87.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace 24V relay R12 (Para 7-95).
  (b) If 10 to 14 vdc are present, 24V relay R12 is OK.
(5) Turn OFF ENGINE switch.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

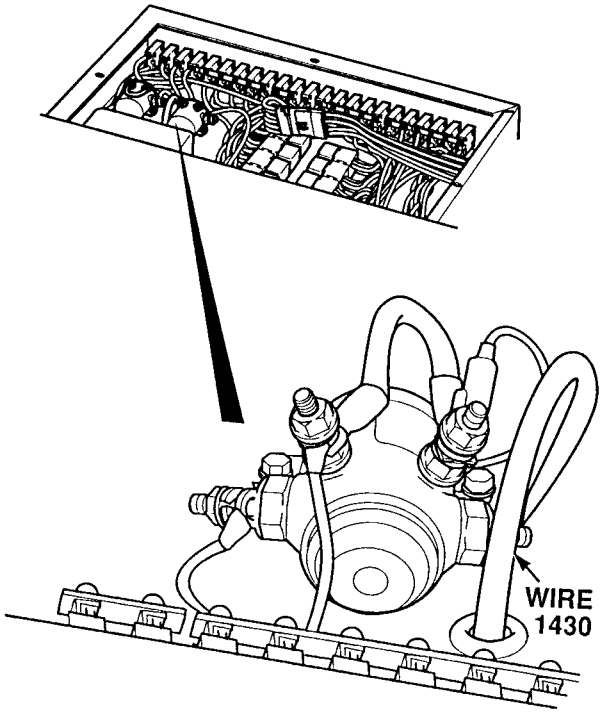


WARNING

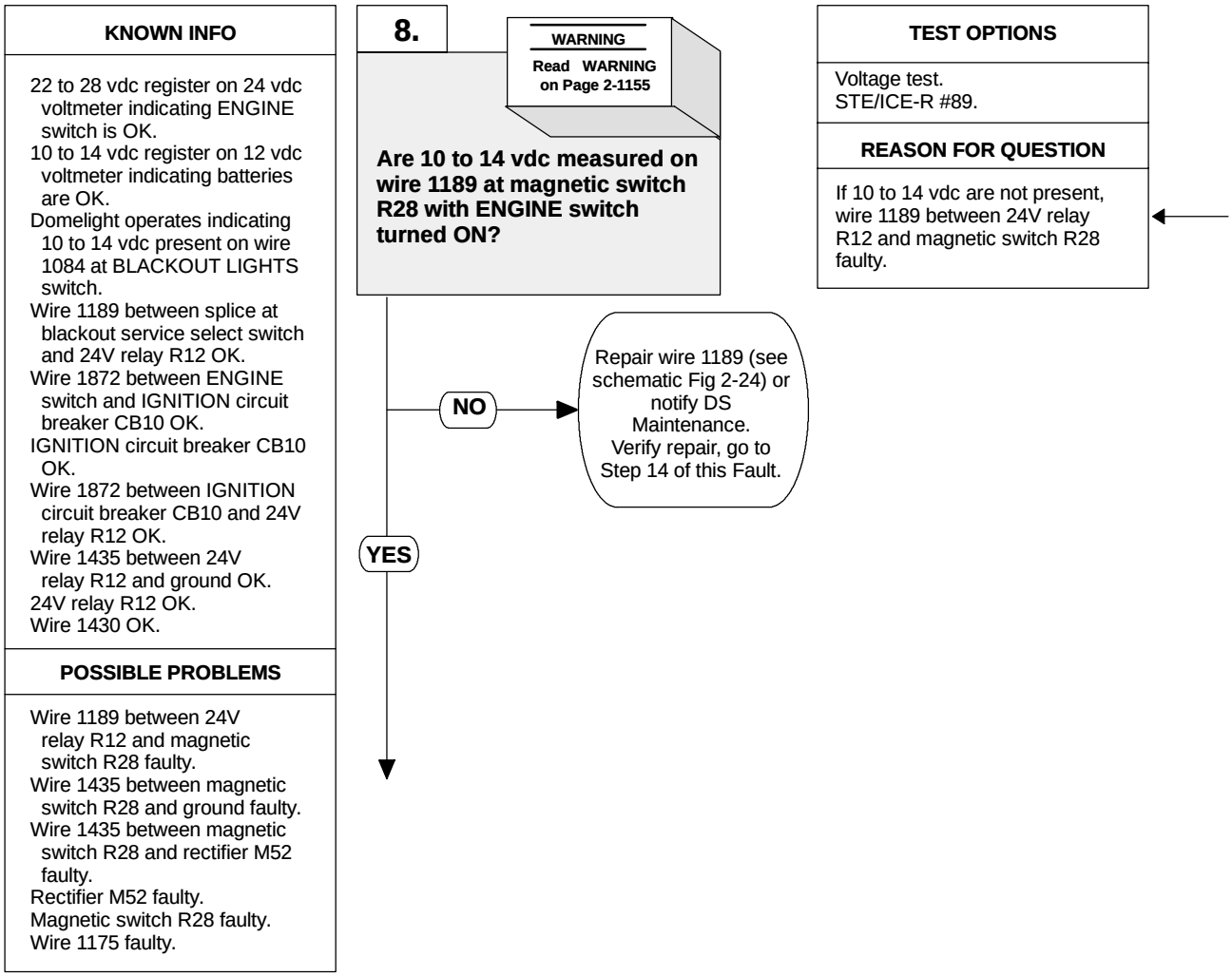
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1430 at magnetic switch R28.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1430 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1430 is OK.
(4) Turn OFF ENGINE switch.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

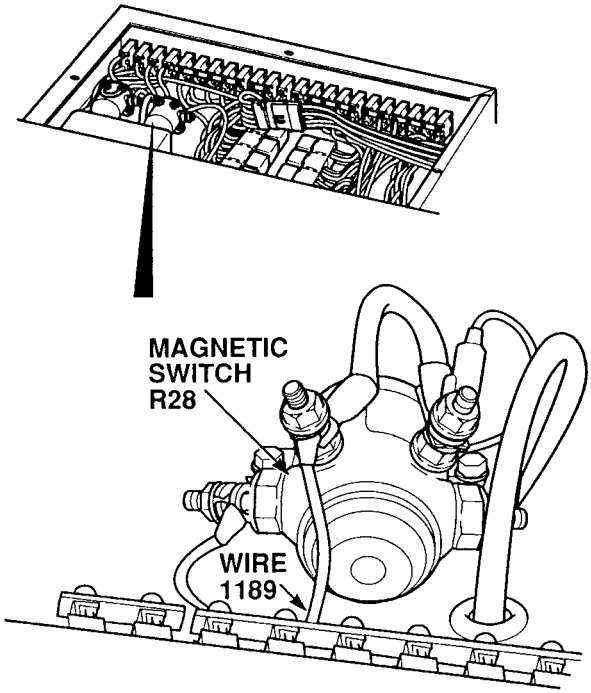


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1189 at magnetic switch R28.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1189 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1189 is OK.
(4) Turn OFF ENGINE switch.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

KNOWN INFO

22 to 28 vdc register on 24 vdc voltmeter indicating ENGINE switch is OK.
10 to 14 vdc register on 12 vdc voltmeter indicating batteries are OK.
Domelight operates indicating 10 to 14 vdc present on wire 1084 at BLACKOUT LIGHTS switch.
Wire 1189 between splice at blackout service select switch and 24V relay R12 OK.
Wire 1872 between ENGINE switch and IGNITION circuit breaker CB10 OK.
IGNITION circuit breaker CB10 OK.
Wire 1872 between IGNITION circuit breaker CB10 and 24V relay R12 OK.
Wire 1435 between 24V relay R12 and ground OK.
24V relay R12 OK.
Wire 1430 OK.
Wire 1189 between 24V relay R12 and magnetic switch R28 OK.

POSSIBLE PROBLEMS

Wire 1435 between magnetic switch R28 and ground faulty.
Wire 1435 between magnetic switch R28 and rectifier M52 faulty.
Rectifier M52 faulty.
Magnetic switch R28 faulty.
Wire 1175 faulty.

9.

WARNING

Read WARNING on Page 2-1157

Are any vdc measured on wire 1435 between magnetic switch R28 and a known good ground?

NO → Go to Step 10 of this Fault.

YES → Go to Step 11 of this Fault.

TEST OPTIONS

Voltage test.

REASON FOR QUESTION

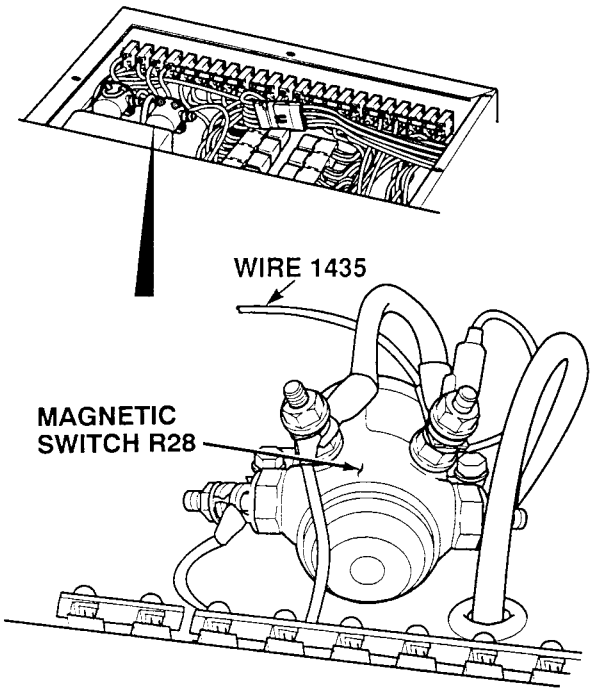
If any vdc are not present, magnetic switch R28 will not operate.

WARNING

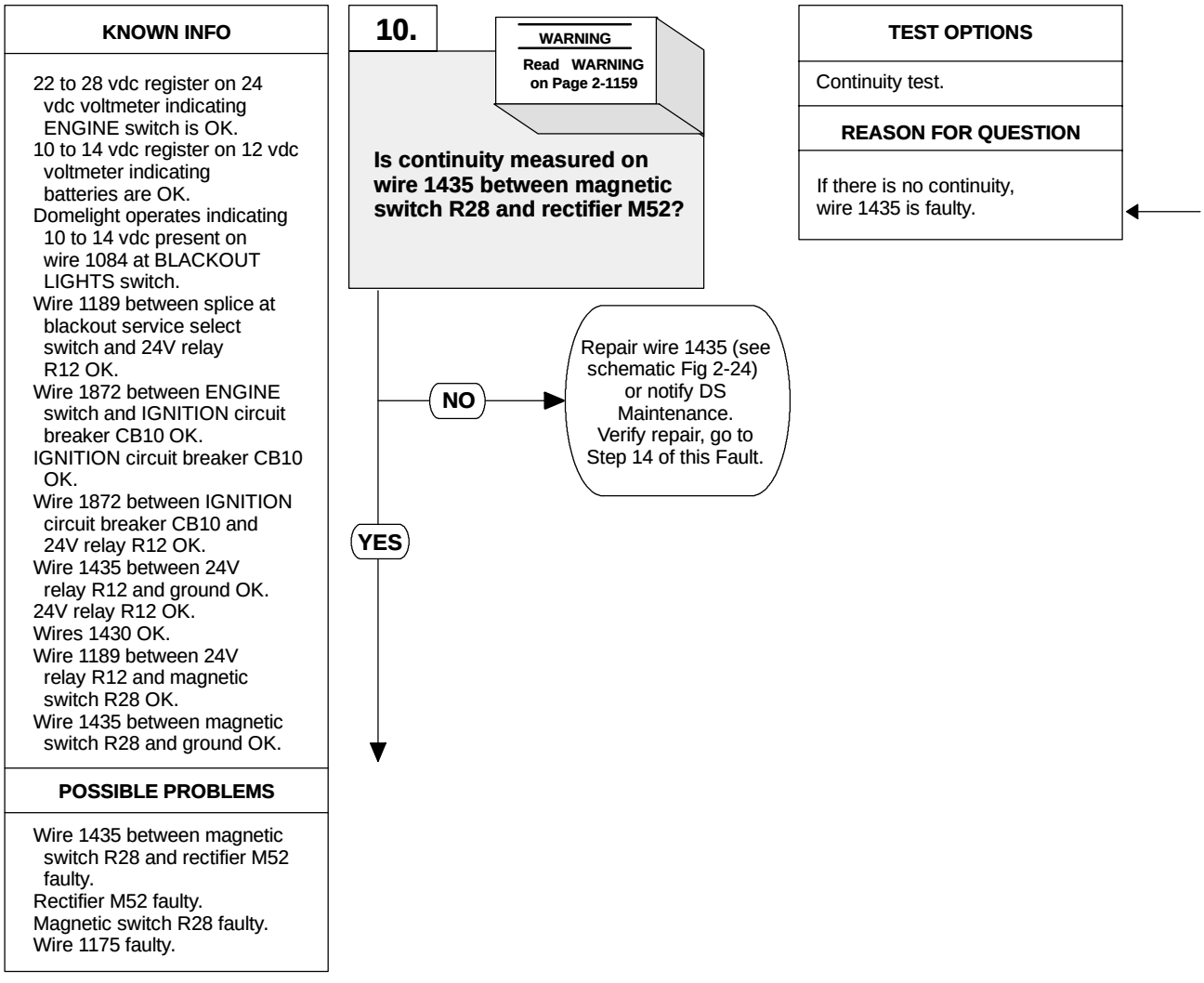
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12 CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Set multimeter select switch to diode check.
(2) Connect positive (+) multimeter lead to wire 1435 on magnetic switch R28.
(3) Connect negative (-) multimeter lead to a known good ground.
  (a) If any vdc are not present, go to Step 10 of this Fault.
  (b) If any vdc are present, go to Step 11 of this Fault.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

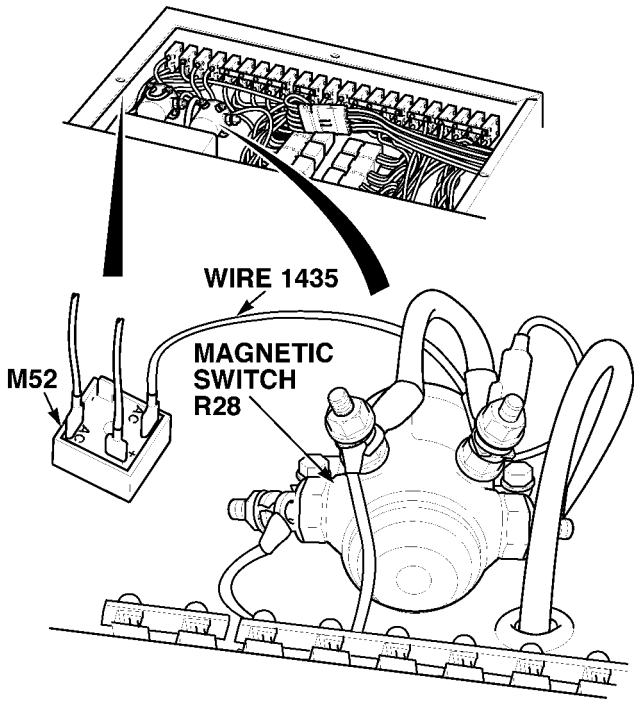


WARNING

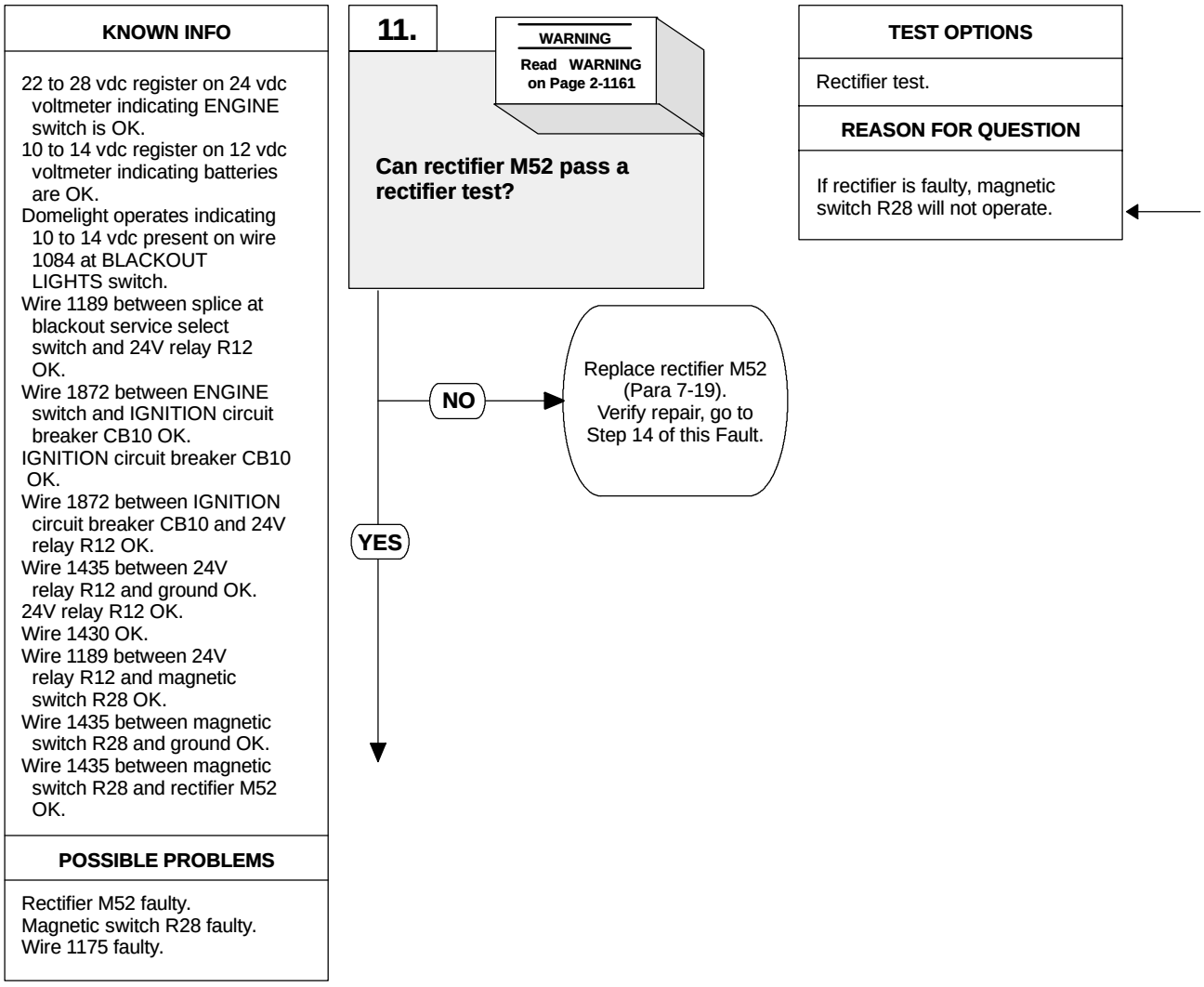
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between magnetic switch R28 and rectifier M52?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-24) or notify DS Maintenance.
   (b) If there is continuity, wire 1435 is OK.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

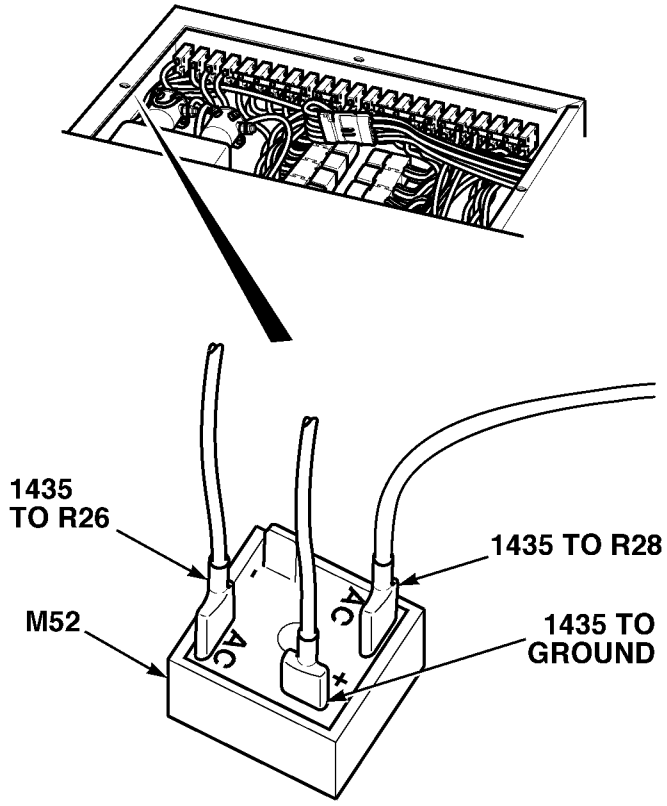


WARNING

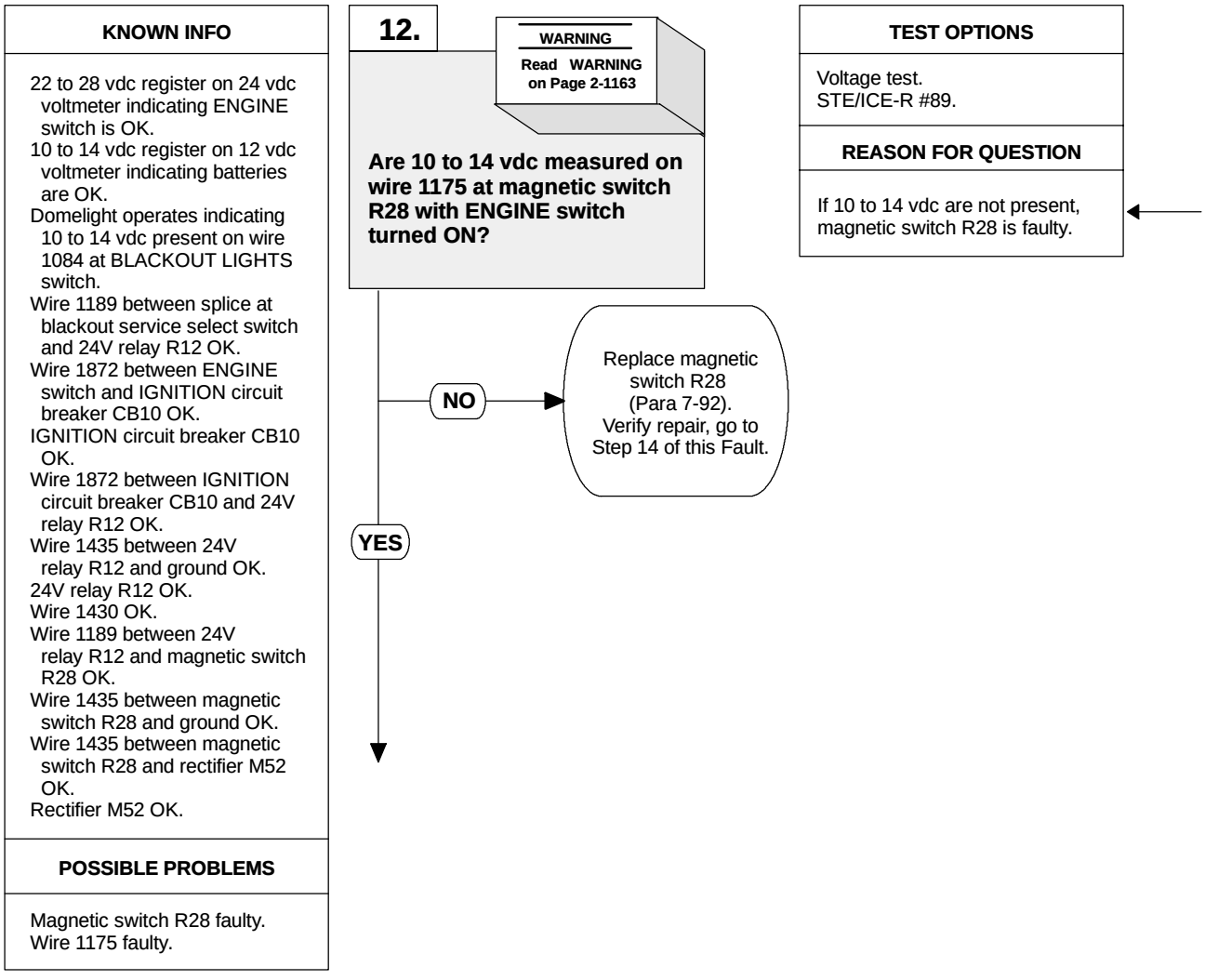
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

RECTIFIER TEST

(1) Identify, tag and disconnect wires from rectifier M52.
(2) Set multimeter select switch to DIODE CHECK.
(3) Connect positive (+) multimeter lead to negative rectifier terminal.
(4) Connect negative (-) multimeter lead to each rectifier AC terminal one at a time.
  (a) If vdc are not present, at either AC terminal, replace rectifier (Para 7-19).
  (b) If vdc are present at both AC terminals, go to Step (5) below.
(5) Connect negative (-) multimeter lead to positive (+) rectifier terminal.
(6) Connect positive (+) multimeter lead, to each rectifier AC terminal one at a time.
  (a) If vdc are not present at either AC terminal, replace rectifier.
  (b) If vdc are present at both AC terminals, rectifier is OK.
(7) Connect wires to rectifier.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

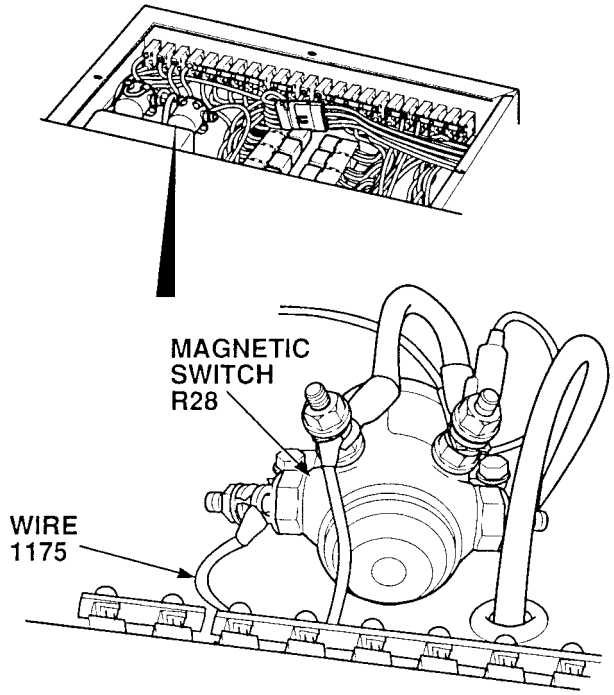


WARNING

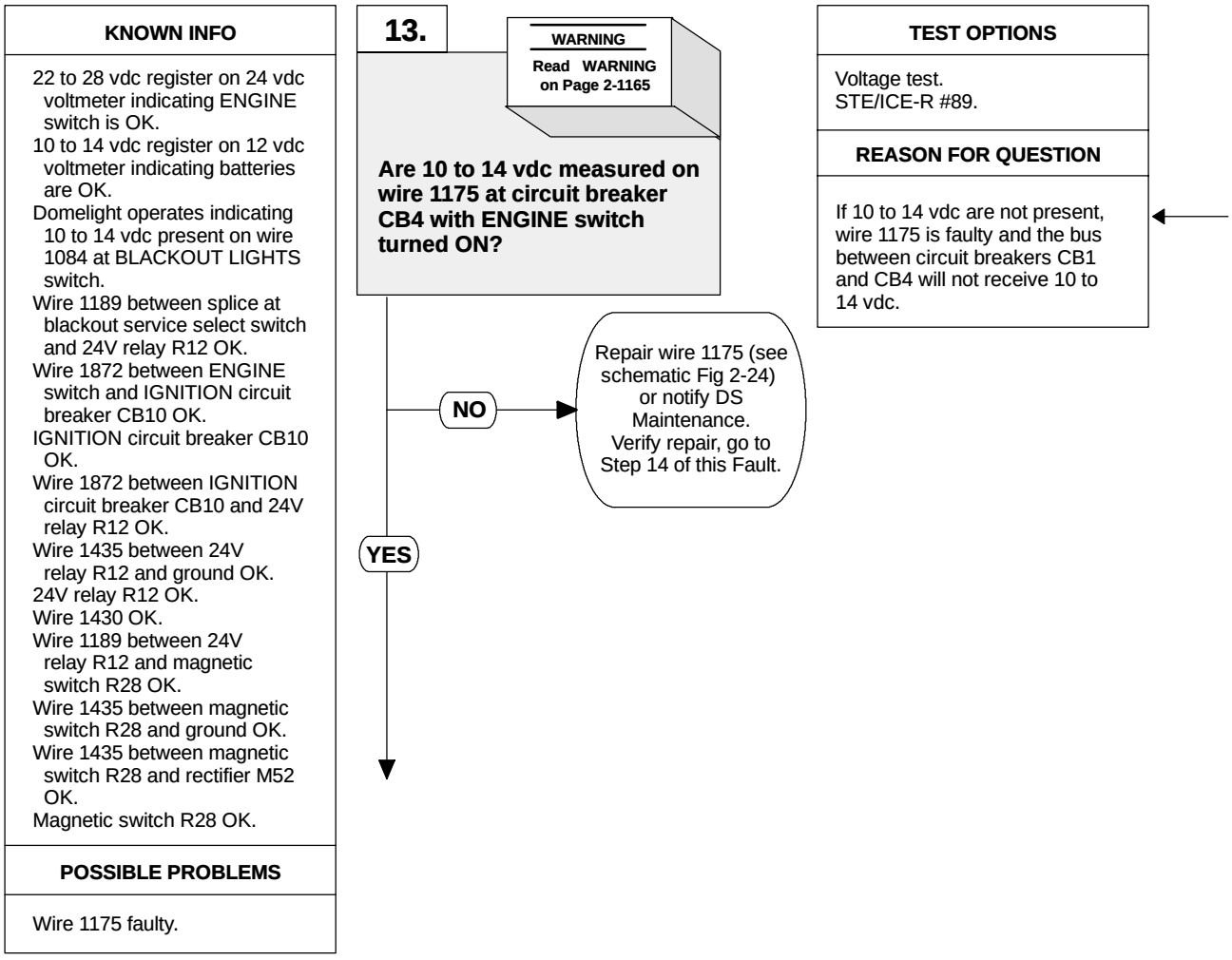
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1175 at magnetic switch R28.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace magnetic switch R28 (Para 7-92).
  (b) If 10 to 14 vdc are present, magnetic switch R28 is OK.
(5) Turn OFF ENGINE switch.



2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).

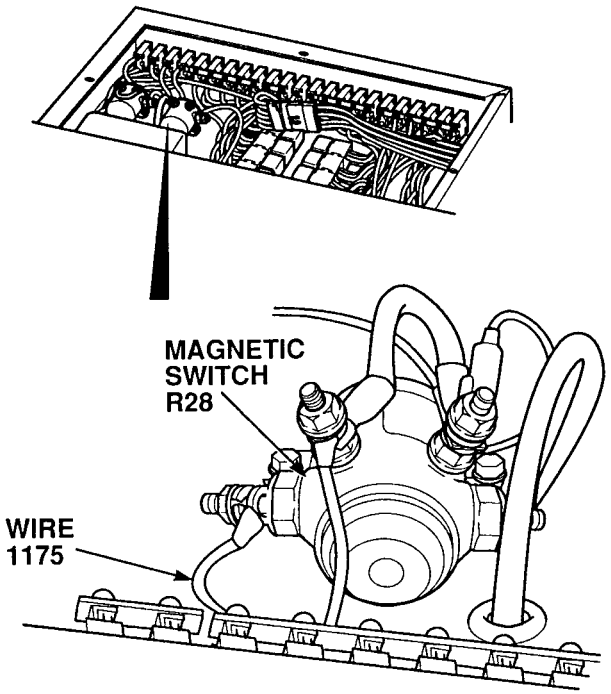


WARNING

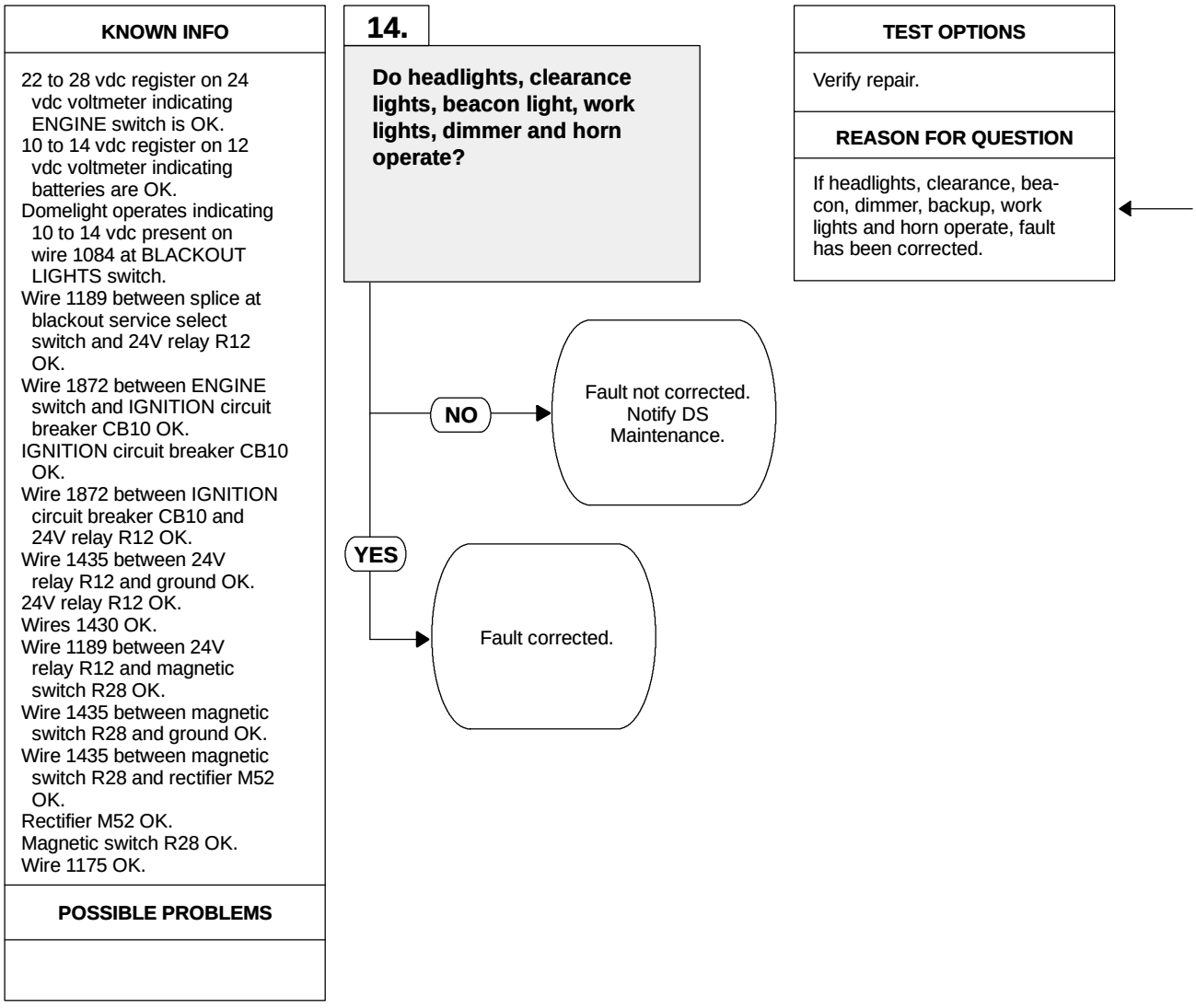
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1175 at circuit breaker CB4.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not measured, turn OFF ENGINE switch and repair wire 1175 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 10 to 14 vdc are measured, wire 1175 is OK.
(4) Turn OFF ENGINE switch.

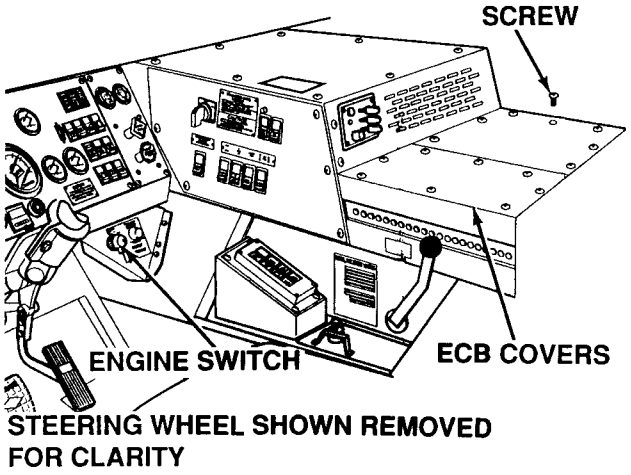


2. HEADLIGHTS, CLEARANCE LIGHTS, HORN, WORK LIGHTS, DIMMER, OR BEACON LIGHT DO NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on headlight switch.
    (a) If headlights, clearance, beacon, dimmer, work lights and horn do not operate, fault not corrected. Perform Steps (3) through (5) below and notify DS Maintenance.
    (b) If headlights, clearance, beacon, dimmer, work lights and horn operate, fault has been corrected.
(3) Turn off headlights switch.
(4) Turn OFF ENGINE switch.
(5) Install two ECB covers and 15 screws.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

3. CTIS, LHS, CRANE AND HEATER DO NOT OPERATE.

INITIAL SETUP

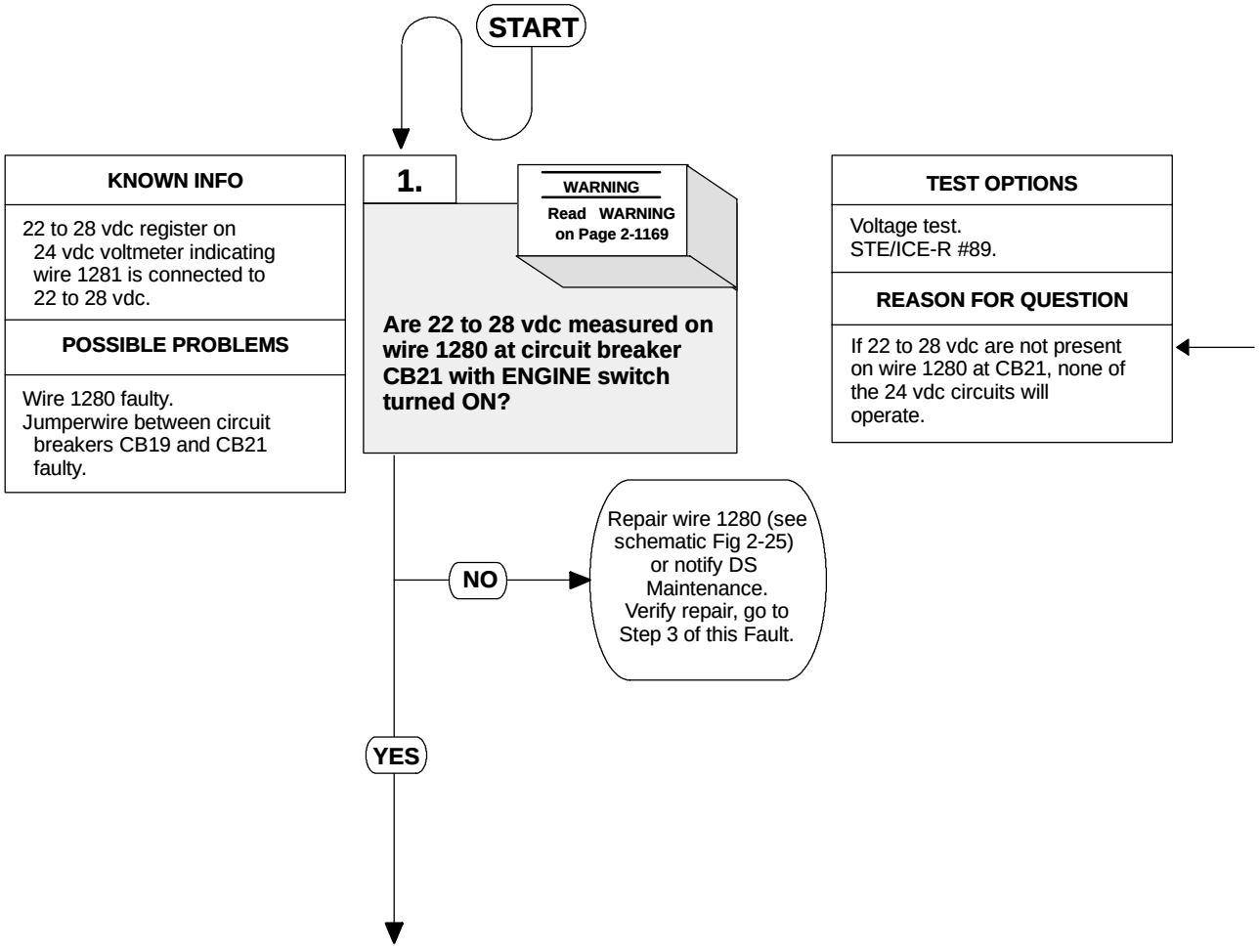
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

All of the following systems are controlled by the 24 vdc bus: heater, differential lockup, axle lockup, CTIS, LHS crane, chemical alarm, radio and gas particulate filter.

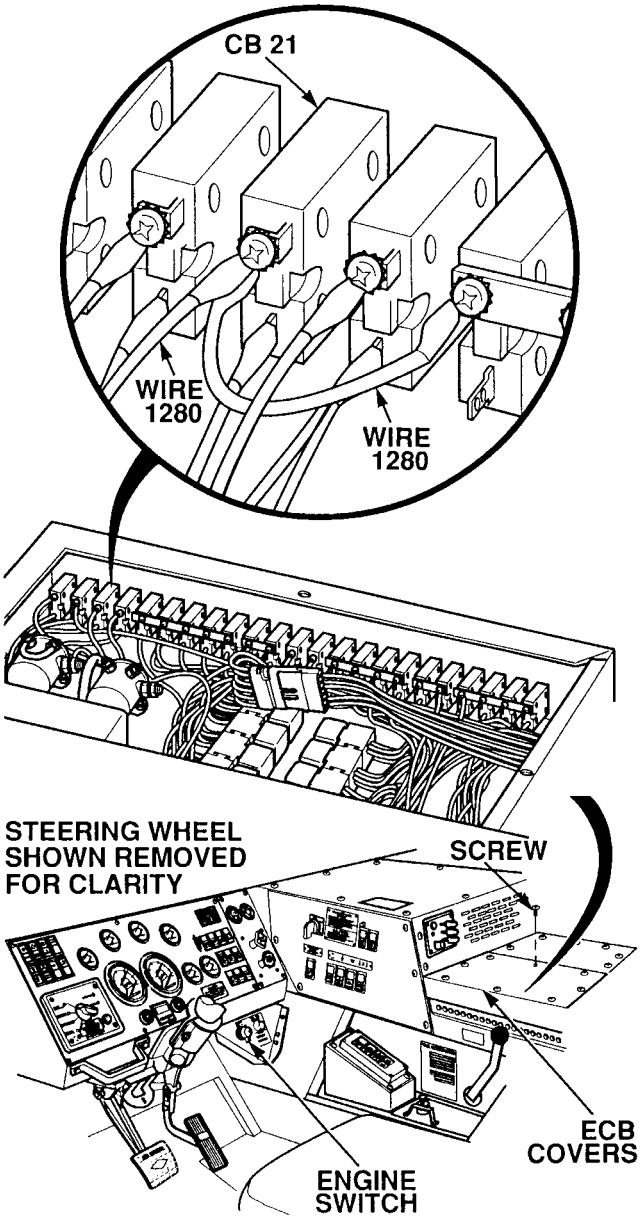


WARNING

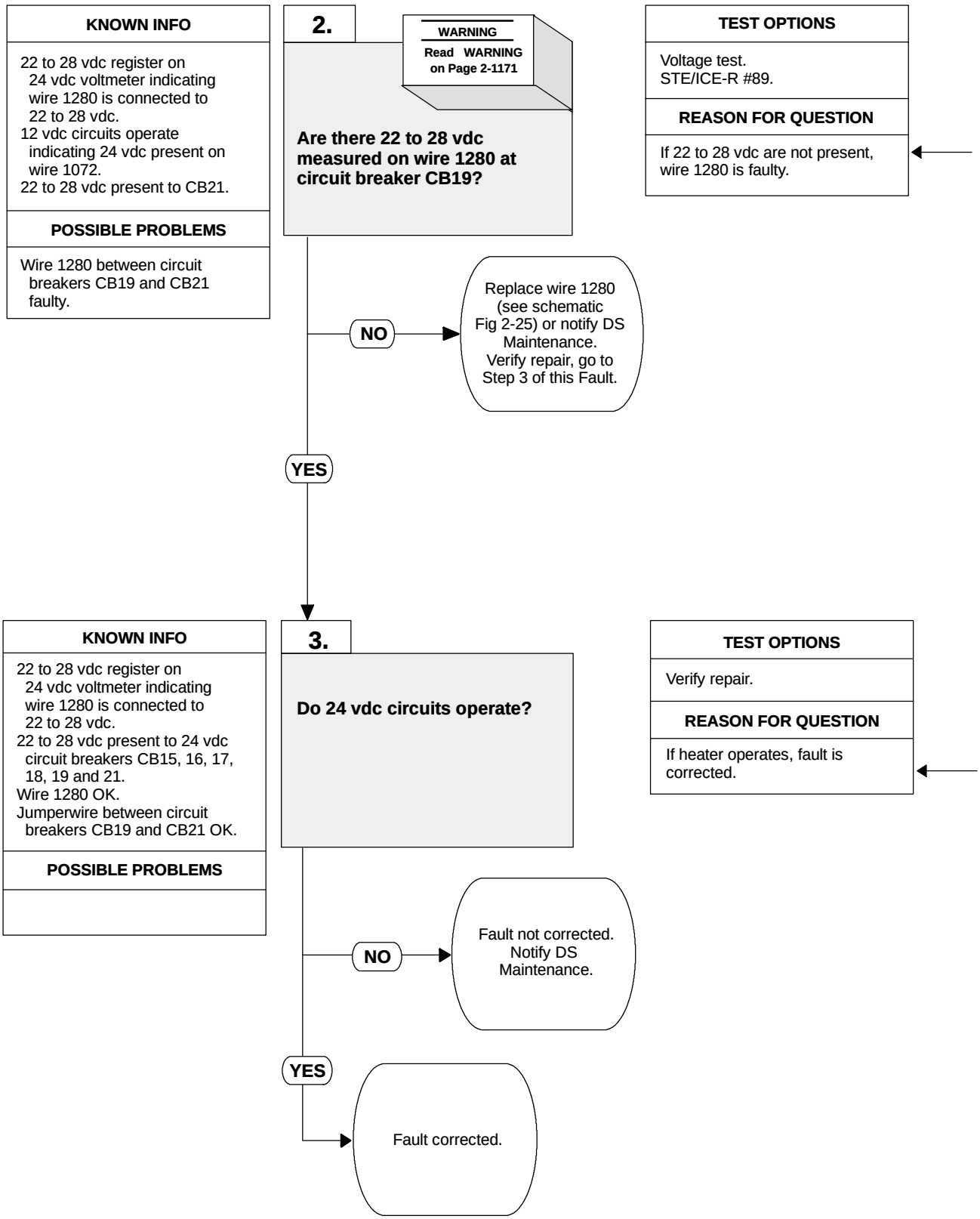
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1280 at circuit breaker CB21.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1280 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1280 is OK.
(6) Turn OFF ENGINE switch.



3. CTIS, LHS, CRANE AND HEATER DO NOT OPERATE (CONT).



WARNING

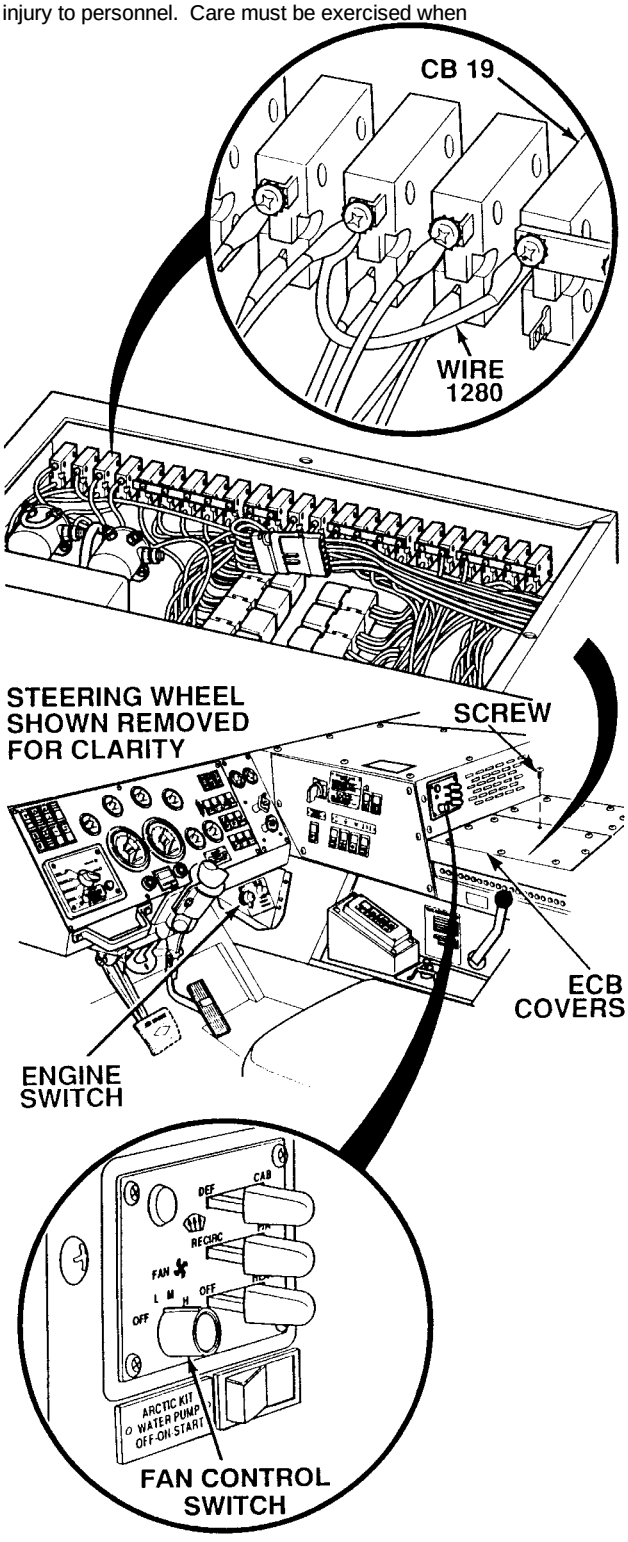
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1280 at circuit breaker CB19.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1280 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1280 is OK.
(4) Turn OFF ENGINE switch.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn FAN control to L.
  (a) If heater does not operate, Fault has not been corrected. Perform Steps (3) through (5) below and notify DS Maintenance.
  (b) If heater operates, Fault has been corrected.
(3) Turn FAN control to OFF.
(4) Turn OFF ENGINE switch.
(5) Install two ECB covers and 15 screws.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

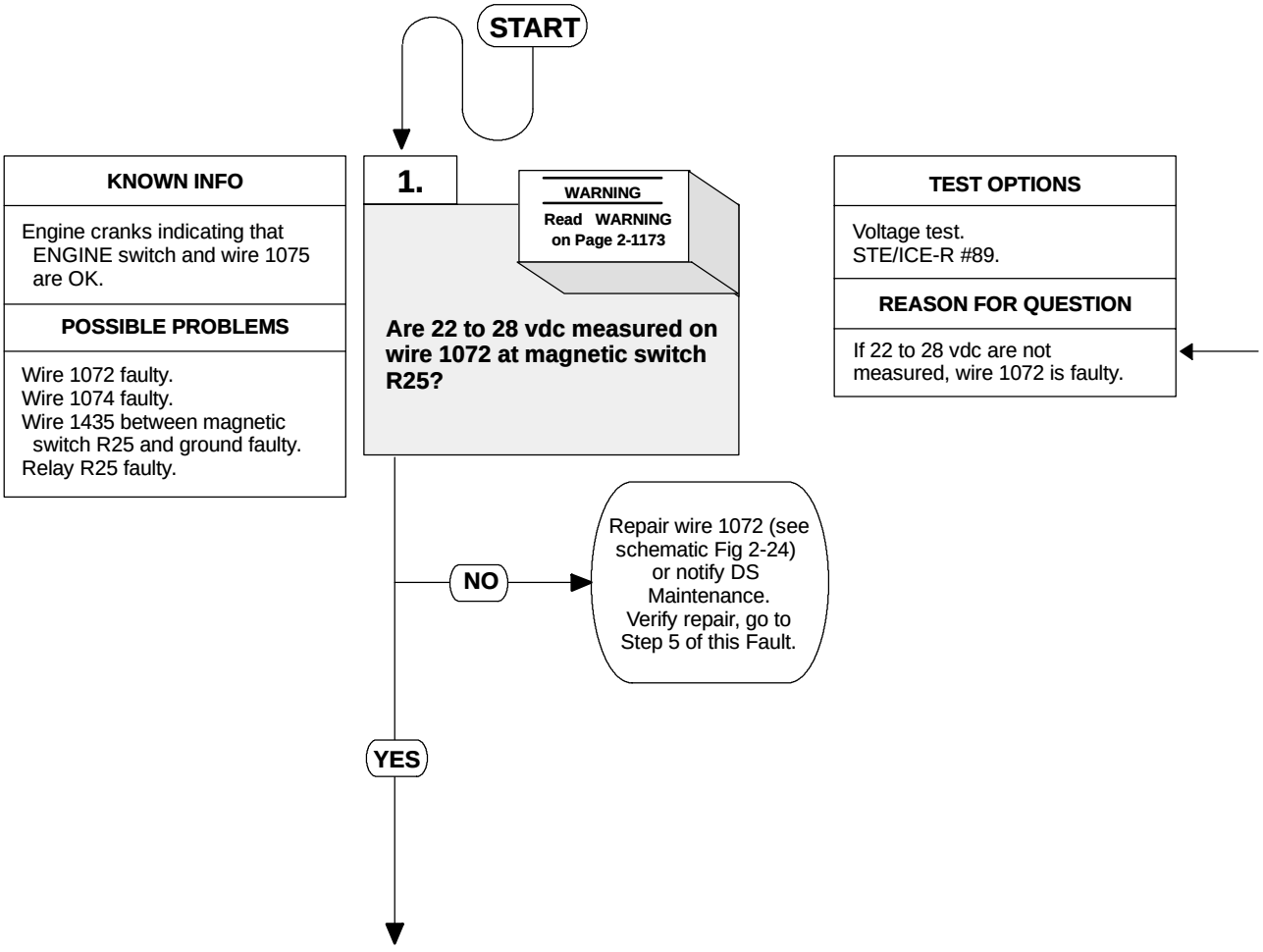
4. WINDSHIELD WIPERS, ENGINE BRAKE AND GAGES DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

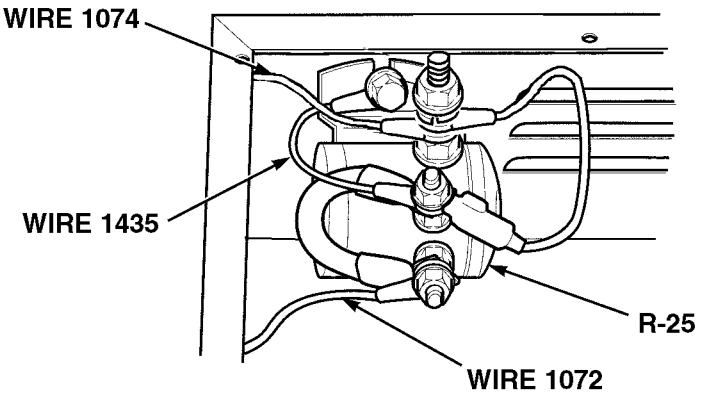
References
TM 9-2320-364-10
TM 9-4910-571-12&P

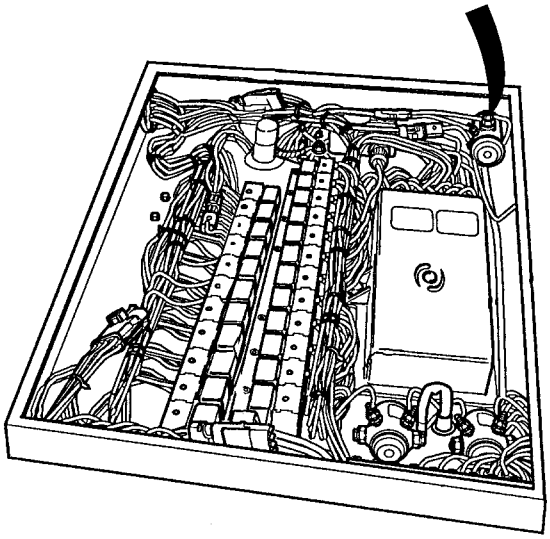
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

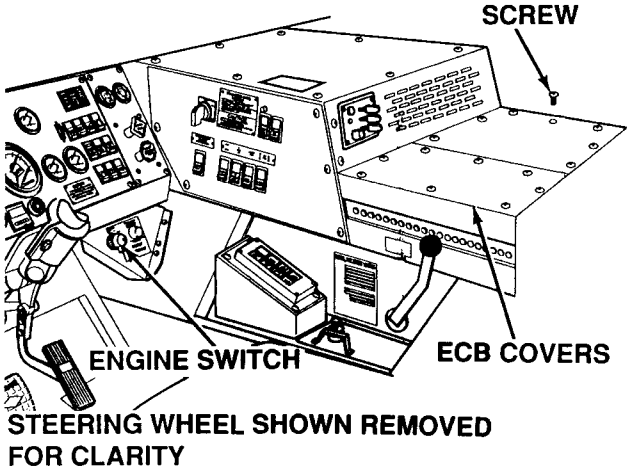
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.



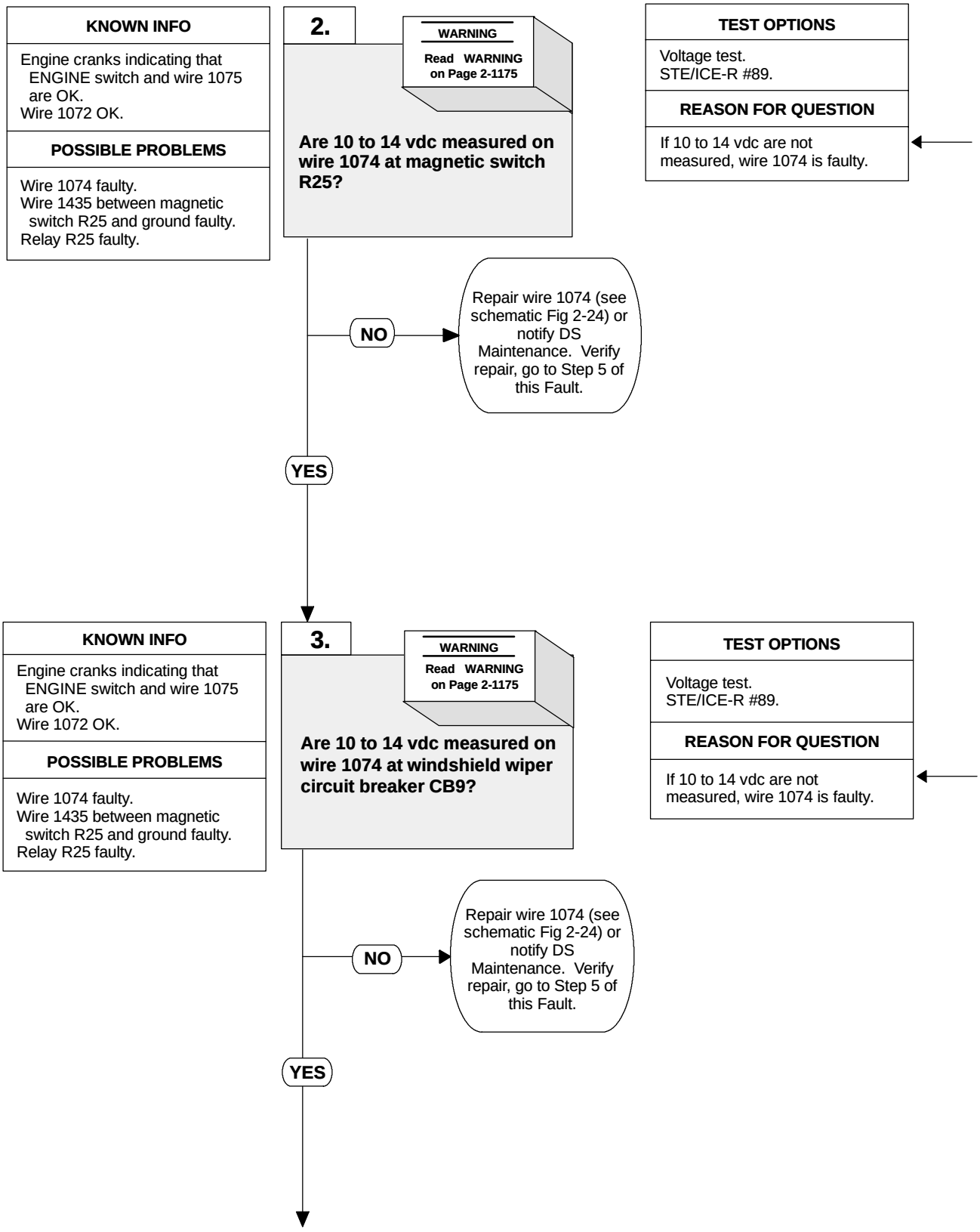


VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to input wire 1072 at magnetic switch R25.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, repair wire 1072 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1072 is OK.
(5) Turn OFF ENGINE switch.



4. WINDSHIELD WIPERS, ENGINE BRAKES AND ALL GAGES DO NOT OPERATE (CONT).

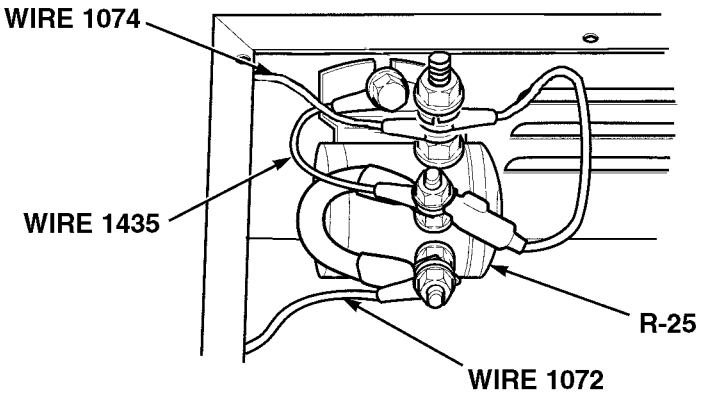


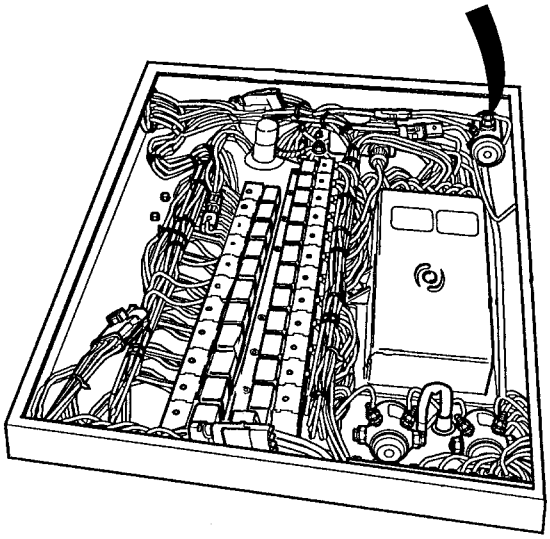
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1074 at magnetic switch R25.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1074 (see schematic Fig 2-25) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1074 is OK.
(4) Turn OFF ENGINE switch.

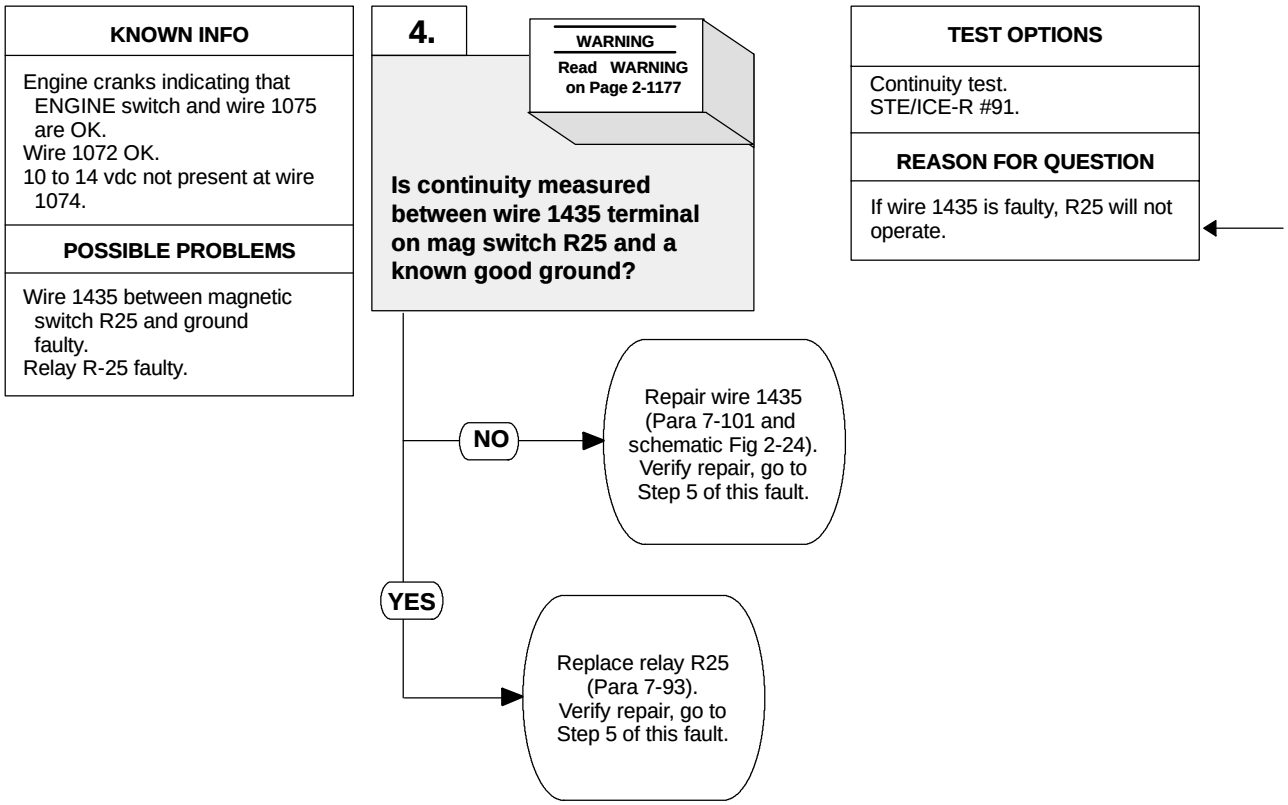


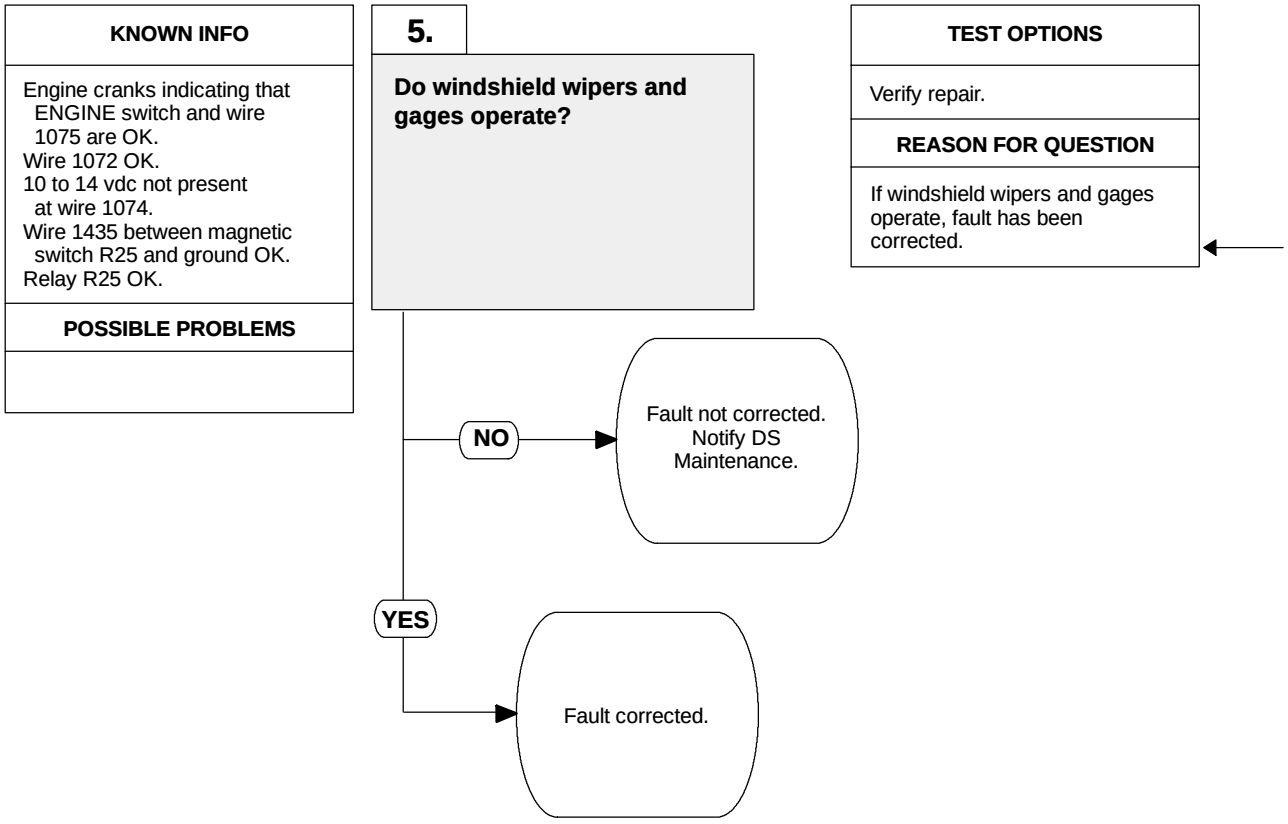


VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1074 at windshield wiper circiut breaker CB9.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1074 (see schematic Fig 2-24) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1074 is OK.
(4) Turn OFF ENGINE switch.

4. WINDSHIELD WIPERS, ENGINE BRAKES AND ALL GAGES DO NOT OPERATE (CONT).



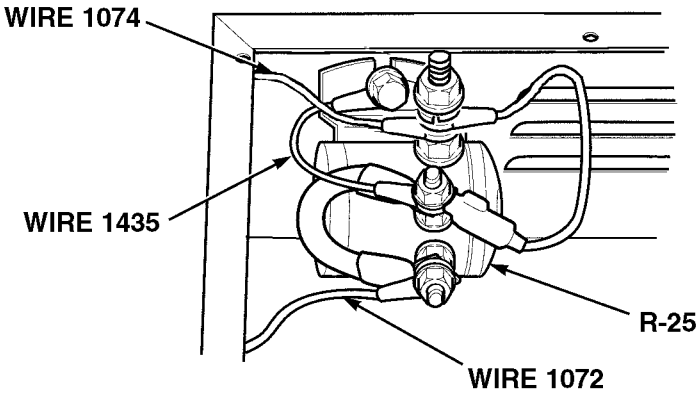


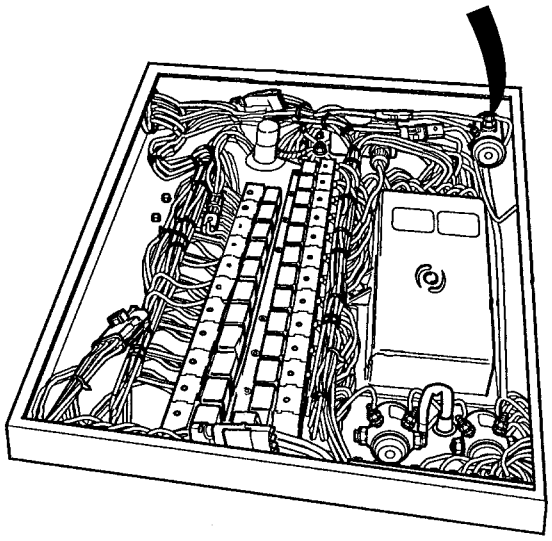
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

CONTINUITY TEST

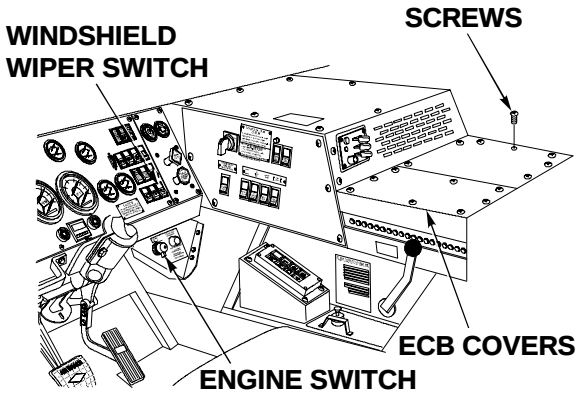
(1) Set multimeter select switch to OHMS.
(2) Is there continuity on wire 1435 between magnetic switch R-25 and a known good ground?
   (a) If there is no continuity, repair wire 1435 (Para 7-101 and schematic Fig 2-24).
   (b) If there is continuity, wire 1435 is OK, replace relay R25 (Para 7-93).
(3) Install two ECB covers and 15 screws.





VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Turn on windshield wipers and observe gages.
   (a) If windshield wipers or gages do not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
   (b) If windshield wipers and gages operate, fault has been corrected.
(3) Turn OFF ENGINE switch.



STEERING WHEEL REMOVED FOR CLARITY

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

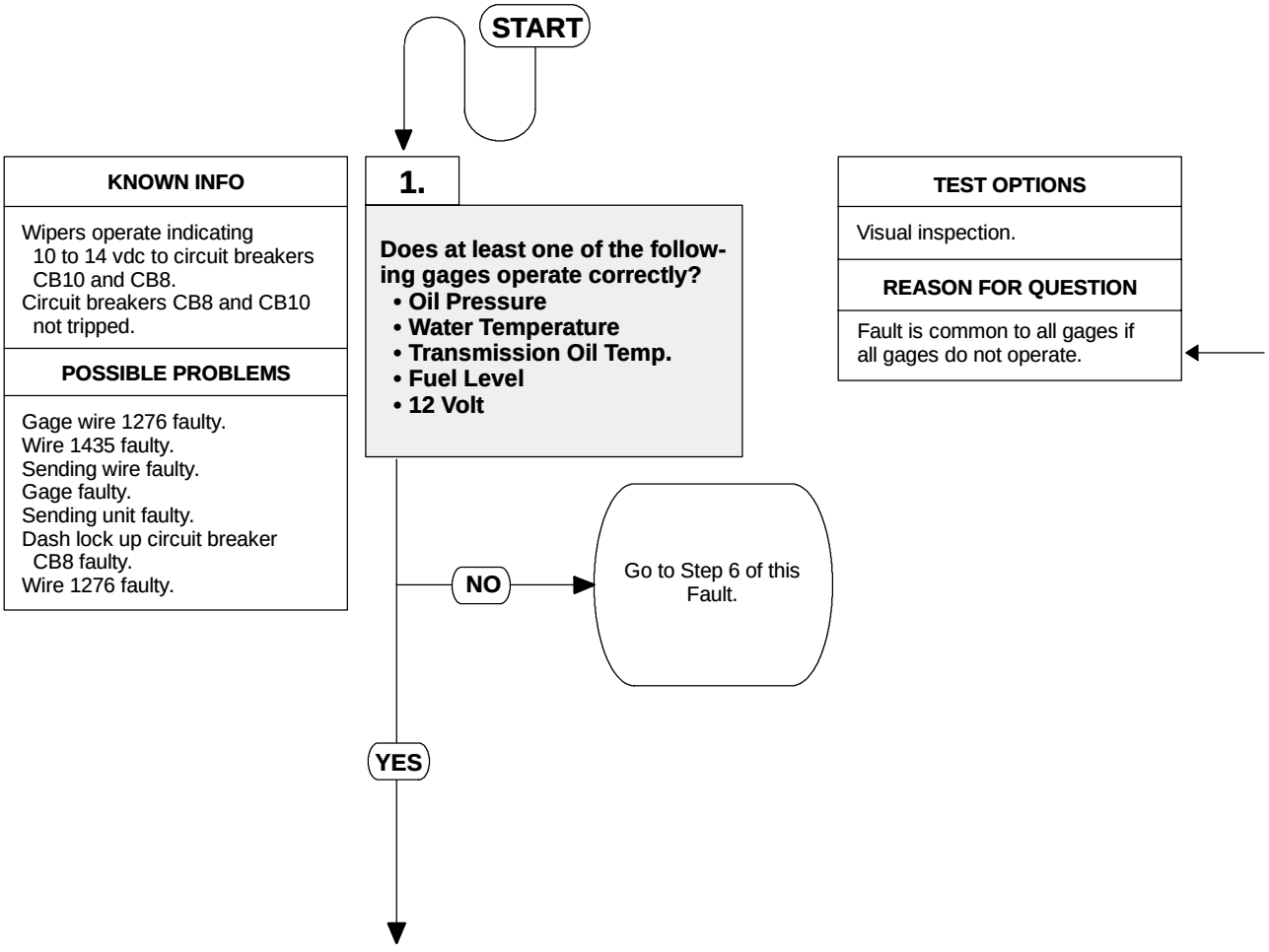
5. GAGE(S) GIVING NO OR INCORRECT READINGS.

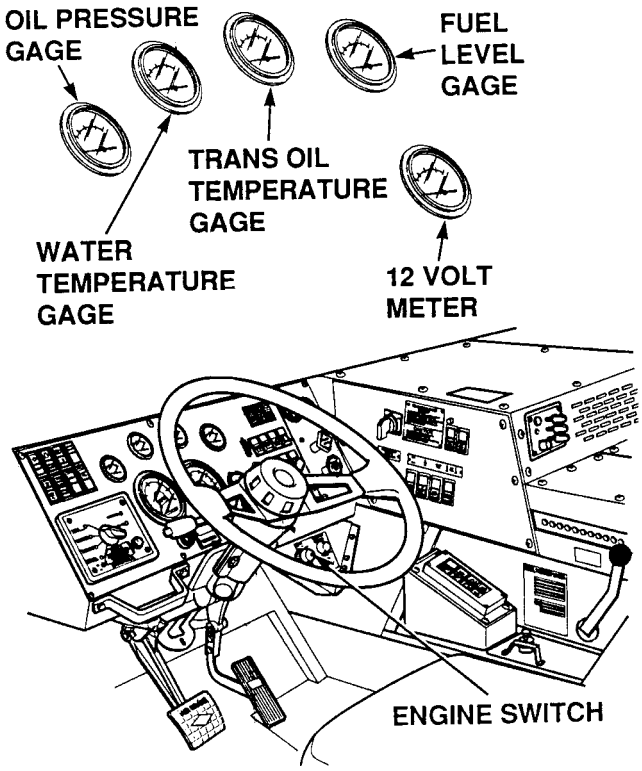
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Cab engine access panel removed for accessing water temperature sensor only, (Para 17-24)





VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Inspect gages for operation.
  (a) If all gages do not operate, turn OFF ENGINE switch and go to Step 6 of this Fault.
  (b) If one gage operates, turn OFF ENGINE switch and go to Step 2 of this Fault.

5. GAGE(S) GIVING NO OR INCORRECT READINGS (CONT).

KNOWN INFO

Wipers operate indicating 10 to 14 vdc to circuit breakers CB10 and CB8.
Circuit breakers CB8 and CB10 not tripped.

POSSIBLE PROBLEMS

Gage wire 1276 faulty.
Wire 1435 faulty.
Sending wire faulty.
Gage faulty.
Sending unit faulty.
Dash lock up circuit breaker CB8 faulty.
Wire 1276 faulty.

2.

WARNING
Read WARNING on Page 2-1181

Are 10 to 14 vdc measured on wire 1276 of suspect gage, terminal I?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If wire 1276 is loose, faulty, or shorted to ground, gage will not operate.

NO → Repair wire 1276 (see schematic Fig 2-26) or notify DS Maintenance. Verify repair, go to Step 7 of this Fault.

YES

KNOWN INFO

Wipers operate indicating 10 to 14 vdc to circuit breakers CB10 and CB8.
Circuit breakers CB8 and CB10 not tripped.
Gage wire 1276 OK.

POSSIBLE PROBLEMS

Wire 1435 faulty.
Sending wire faulty.
Gage faulty.
Sending unit faulty.
Dash lock up circuit breaker CB8 faulty.
Wire 1276 faulty.

3.

Is wire 1435 at suspect gage, terminal G grounded?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If gage is not grounded through wire 1435, gage will not operate.

NO → Repair wire 1435 (see schematic Fig 2-26) or notify DS Maintenance. Verify repair, go to Step 7 of this Fault.

YES

WARNING

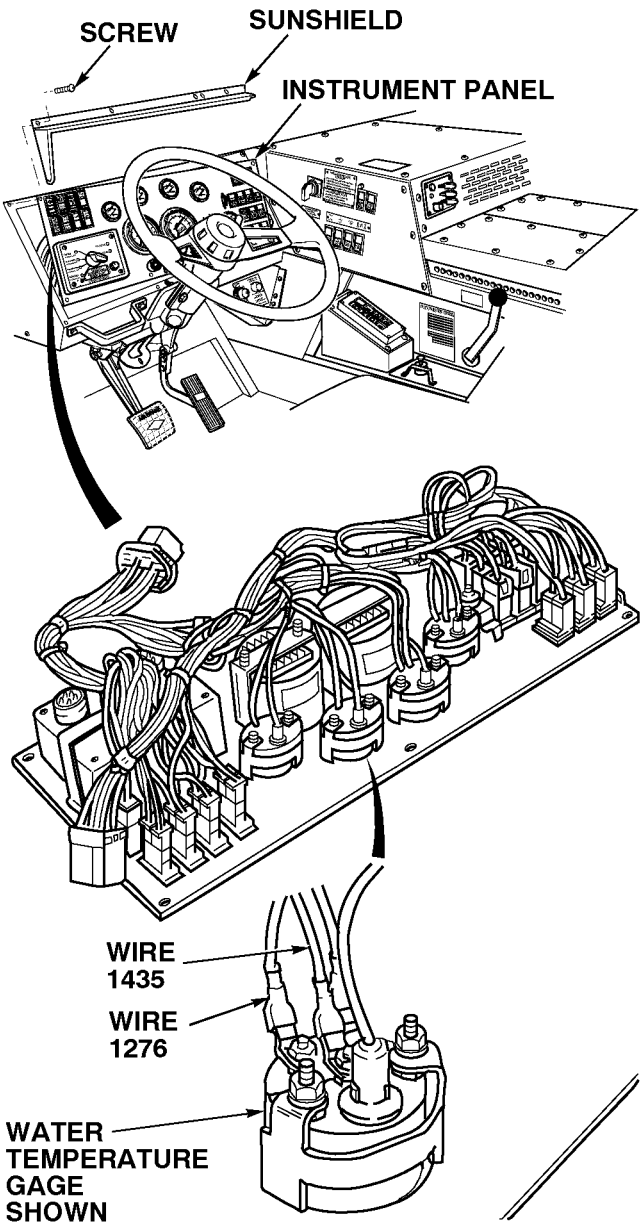
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

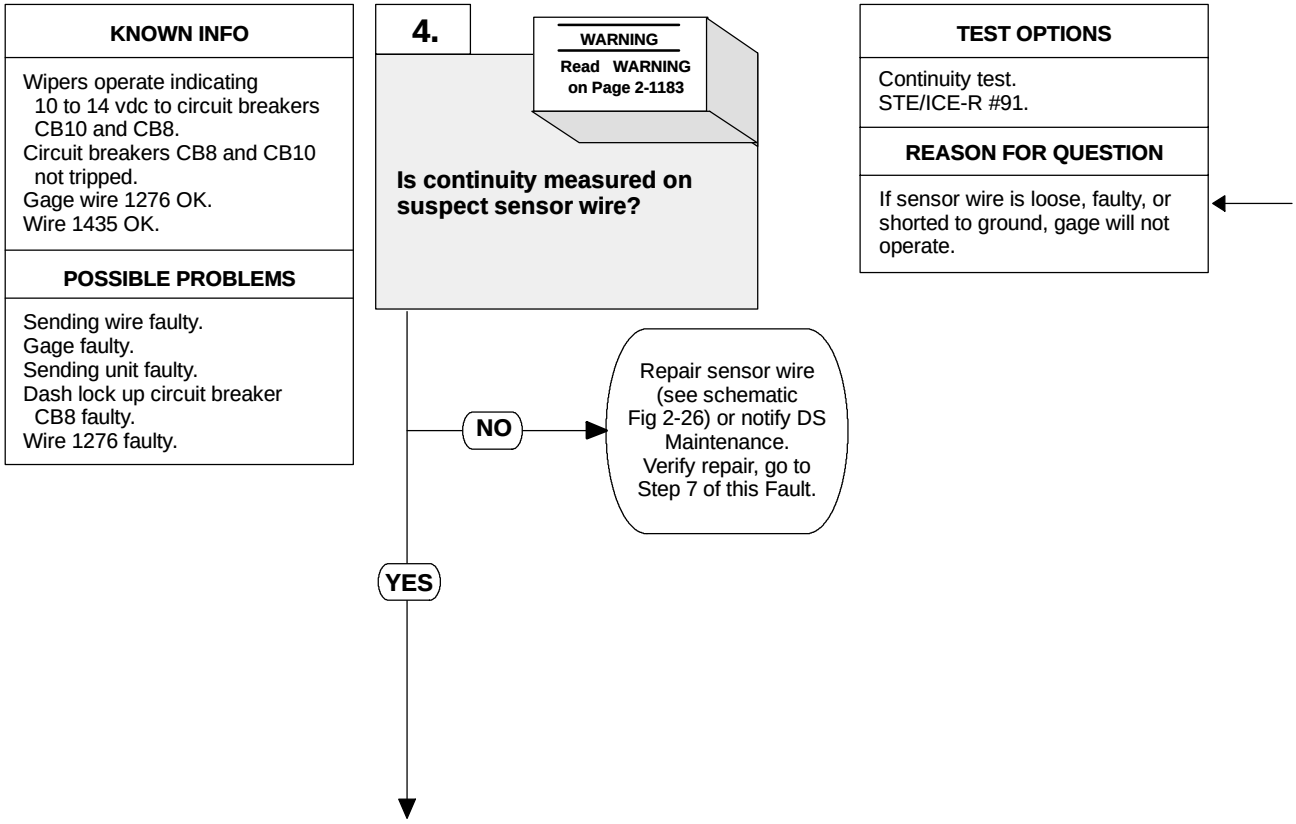
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to wire 1276 at faulty gage.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1276 (see schematic Fig 2-26) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1276 is OK.
(7) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between wire 1435 at terminal G of gage and a known good ground?
    (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-26) or notify DS Maintenance.
    (b) If there is continuity, wire 1435 is OK.



5. GAGE(S) GIVING NO OR INCORRECT READINGS (CONT).



WARNING

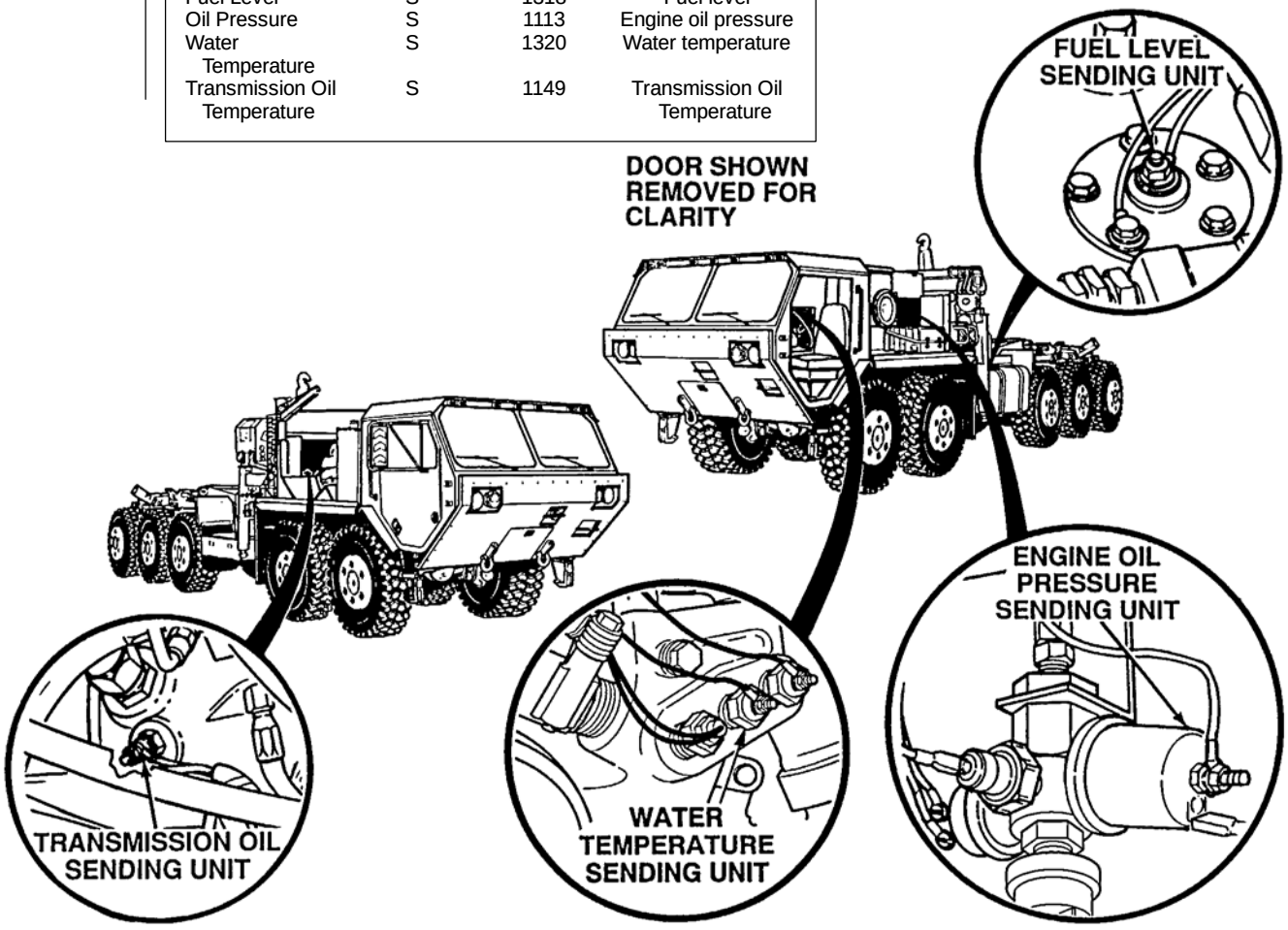
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

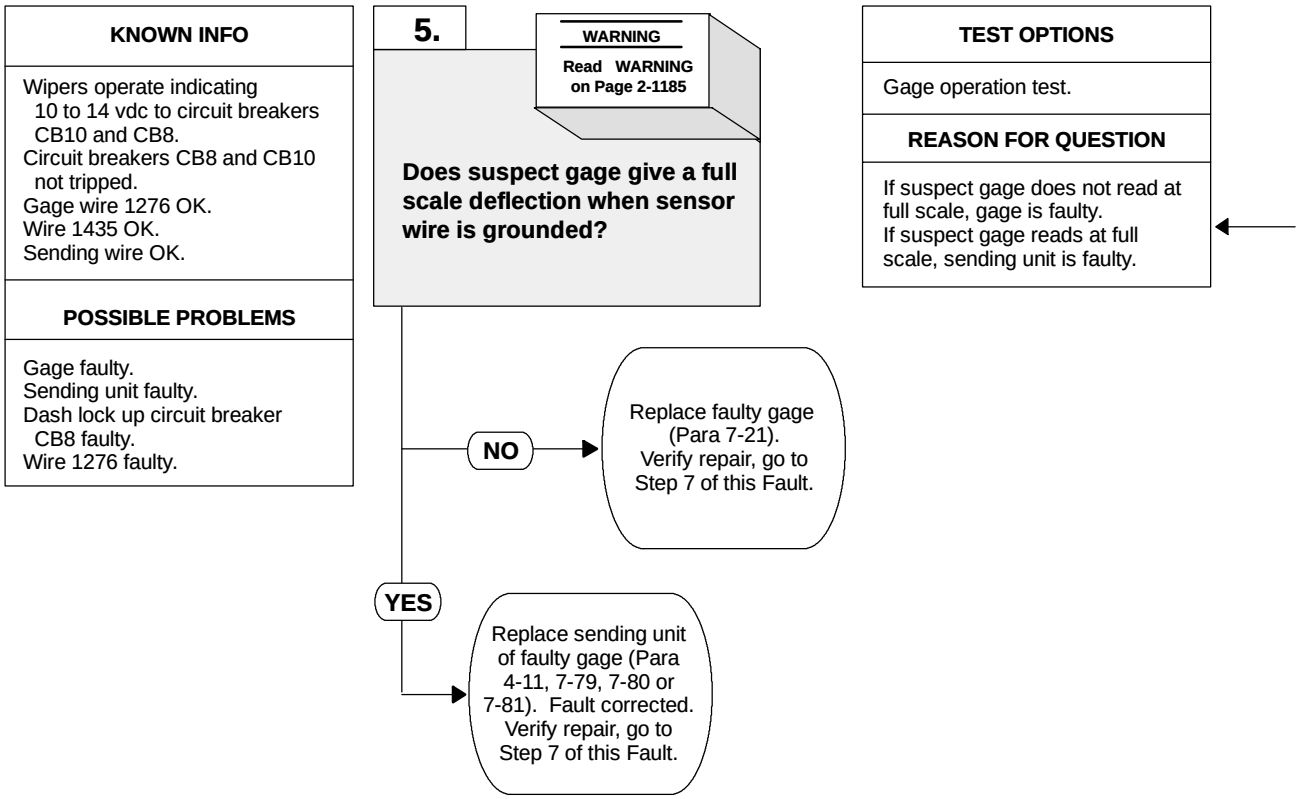
(1) Disconnect sensor wire from suspect sending unit (Table 2-39).
(2) Ground sending wire to a known good ground.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between terminal S of faulty gage and a known good ground?
   (a) If there is no continuity, repair sensor wire (see schematic Fig 2-26).
   (b) If there is continuity, sensor wire is OK.

Table 2-39. Gage/Sending Units Test Points

Gage Nomenclature	Sensor Terminal	Sensor Wire	Sending Unit Nomenclature
12vdc meter	S	1276	None
Fuel Level	S	1318	Fuel level
Oil Pressure	S	1113	Engine oil pressure
Water Temperature	S	1320	Water temperature
Transmission Oil Temperature	S	1149	Transmission Oil Temperature

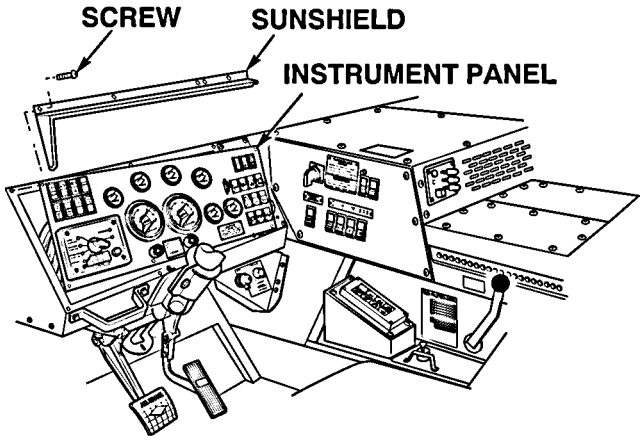


5. GAGE(S) GIVING NO OR INCORRECT READINGS (CONT).



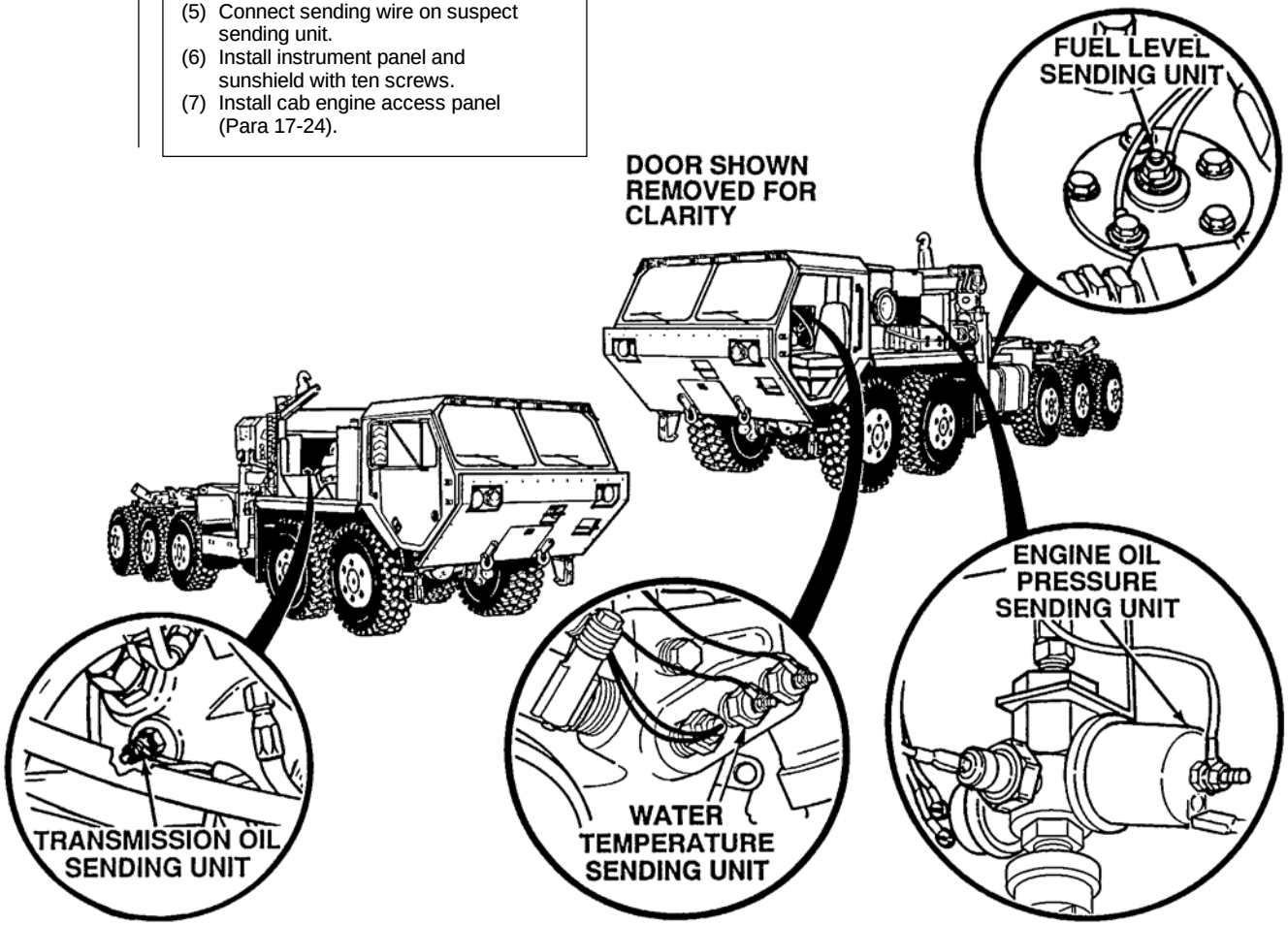
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



GAGE OPERATION TEST

(1) Connect sensor wire to ground using jumperwire.
(2) Turn ON ENGINE switch (TM 9-2320-364-10).
(3) Observe gage needle for reading.
  (a) If gage does not have a full scale deflection, replace gage (Para 7-21).
  (b) If gage has a full scale deflection, replace sending unit (Para 4-11, 7-79, 7-80 or 7-81).
(4) Turn OFF ENGINE switch.
(5) Connect sending wire on suspect sending unit.
(6) Install instrument panel and sunshield with ten screws.
(7) Install cab engine access panel (Para 17-24).



5. GAGE(S) GIVING NO OR INCORRECT READINGS (CONT).

KNOWN INFO

Wipers operate indicating 10 to 14 vdc to circuit breakers CB10 and CB8.
Circuit breakers CB8 and CB10 not tripped.
Gage wire 1276 OK.
Wire 1435 OK.
Sending wire OK.
Gage OK.
Sending unit OK.

POSSIBLE PROBLEMS

Dash lock up circuit breaker CB8 faulty.
Wire 1276 faulty.

6.

WARNING

Read WARNING on Page 2-1187

Are 10 to 14 vdc measured on wire 1276 at dash lock up circuit breaker CB8?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not measured, dash lock up circuit breaker is faulty.
If 10 to 14 vdc are measured, wire 1276 is faulty.

NO → Replace dash lock up circuit breaker CB8 (Para 7-16). Verify repair, go to Step 7 of this Fault.

YES → Repair wire 1276 (see schematic Fig 2-28) or notify DS Maintenance. Verify repair, go to Step 7 of this Fault.

KNOWN INFO

Wipers operate indicating 10 to 14 vdc to circuit breakers CB10 and CB8.
Circuit breakers CB8 and CB10 not tripped.
Gage wire 1276 OK.
Wire 1435 OK.
Sending wire OK.
Gage OK.
Sending unit OK.
Dash lock up circuit breaker CB8 OK.
Wire 1276 OK.

POSSIBLE PROBLEMS

7.

Does gage(s) give correct reading(s)?

TEST OPTIONS

Visual inspection.

REASON FOR QUESTION

If gage(s) give correct reading(s) after engine is started, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

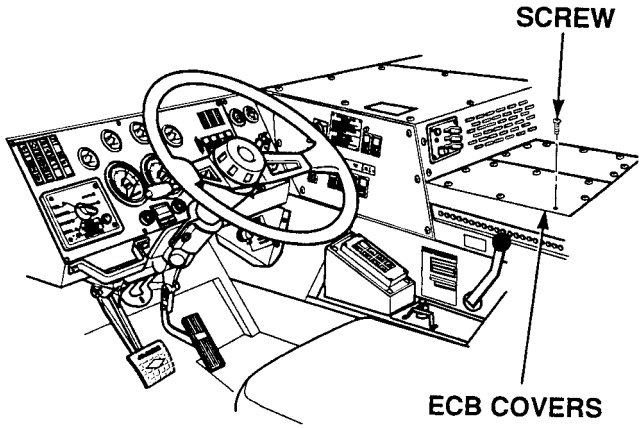
YES → Fault corrected.

WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

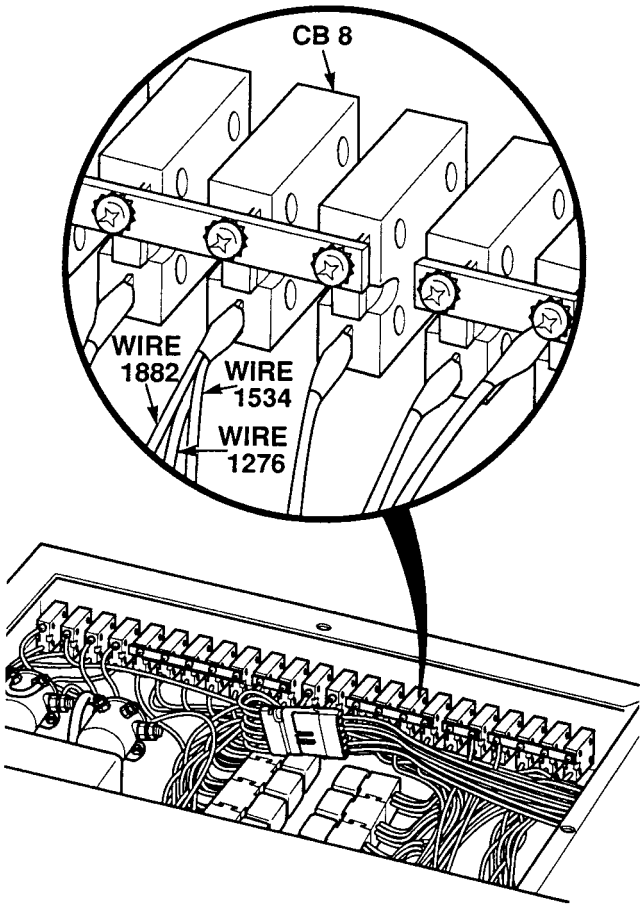
VISUAL INSPECTION

(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1276 at dash lock up circuit breaker CB8.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace dash lock up circuit breaker (Para 7-16).
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and repair wire 1276 (see schematic Fig 2-28) or notify DS Maintenance.
(5) Install two ECB covers and 15 screws.



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Inspect gage reading.
  (a) If gage gives incorrect reading, fault not corrected. Turn OFF ENGINE switch and Notify DS Maintenance.
  (b) If gage gives correct reading, fault has been corrected.
(3) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

6. WORK LIGHT(S) WILL NOT OPERATE.

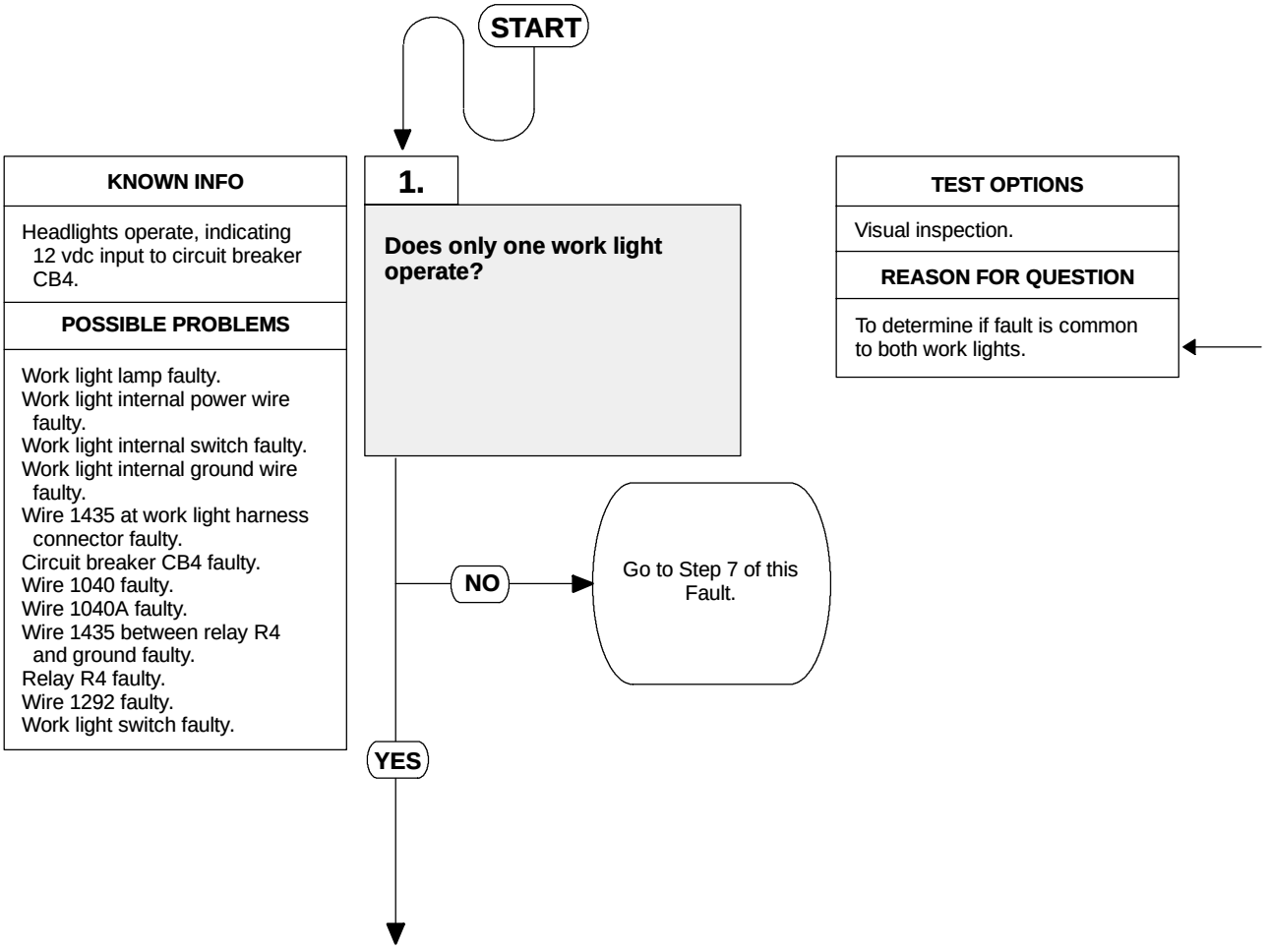
INITIAL SETUP

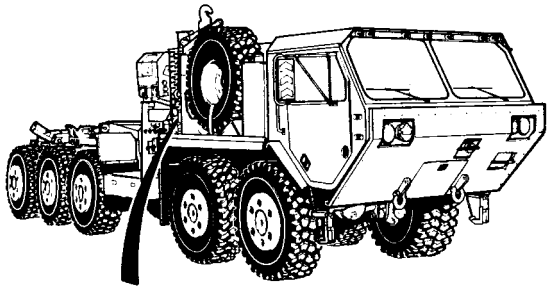
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

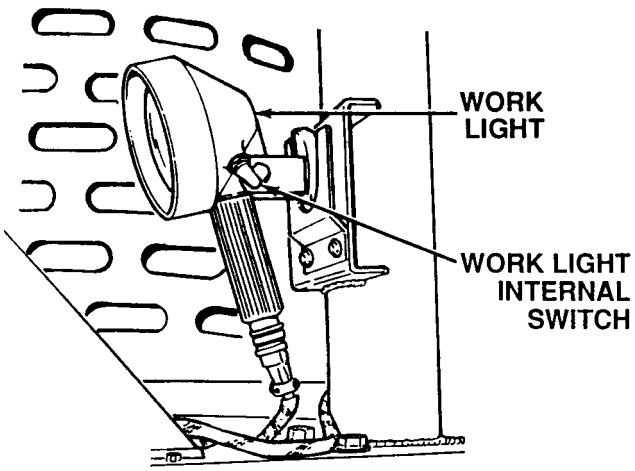
Materials/Parts
Primer (Item 65, Appendix C)
Sealing Compound (Item 77, Appendix C)

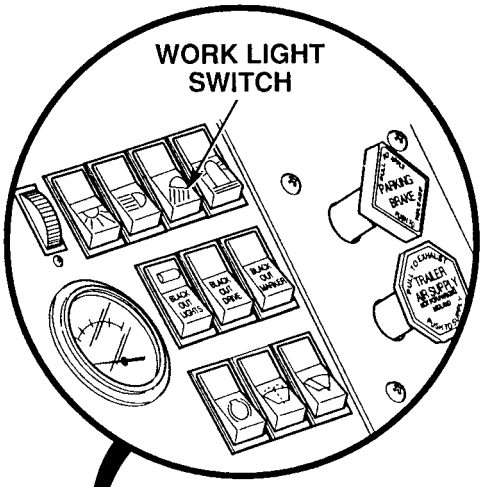
References
TM 9-2320-364-10
TM 9-4910-571-12&P

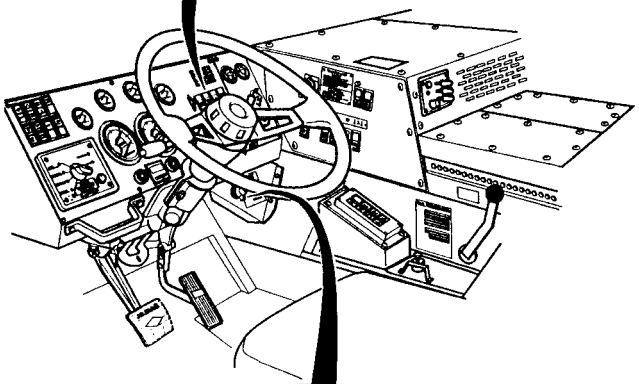
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

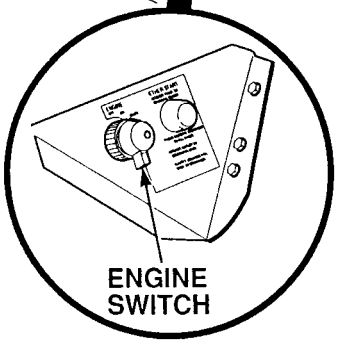








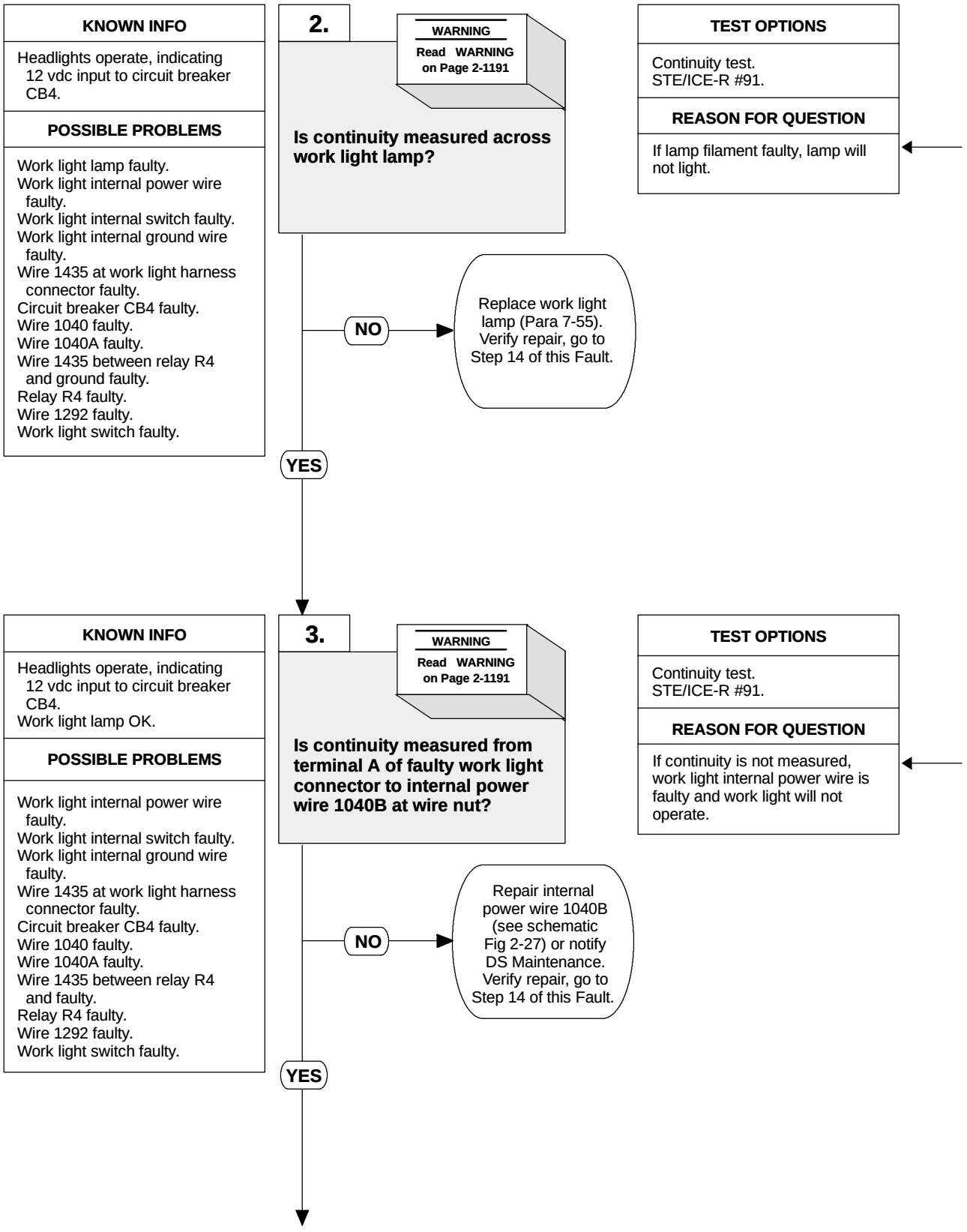




VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on work light switch.
(3) Turn on work light internal switch.
(4) Observe both work lights.
  (a) If both work lights fail to operate, perform Steps (5) through (7) below and go to Step 7 of this Fault.
  (b) If one work light operates, fault is between faulty work light and wire 1040B first splice. Perform Steps (5) through (7) below and go to Step 2 of this Fault.
(5) Turn off work light internal switch.
(6) Turn off work light switch.
(7) Turn OFF ENGINE switch.

6. WORK LIGHT(S) WILL NOT OPERATE (CONT).

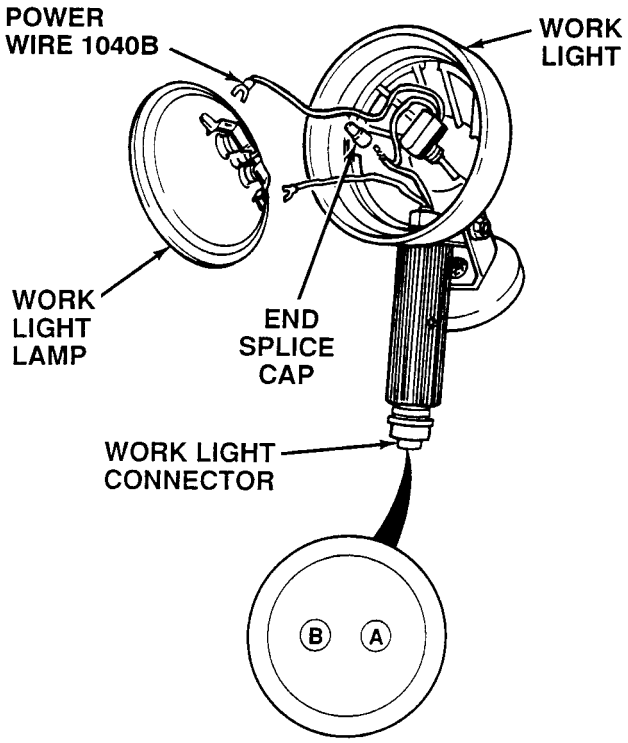


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

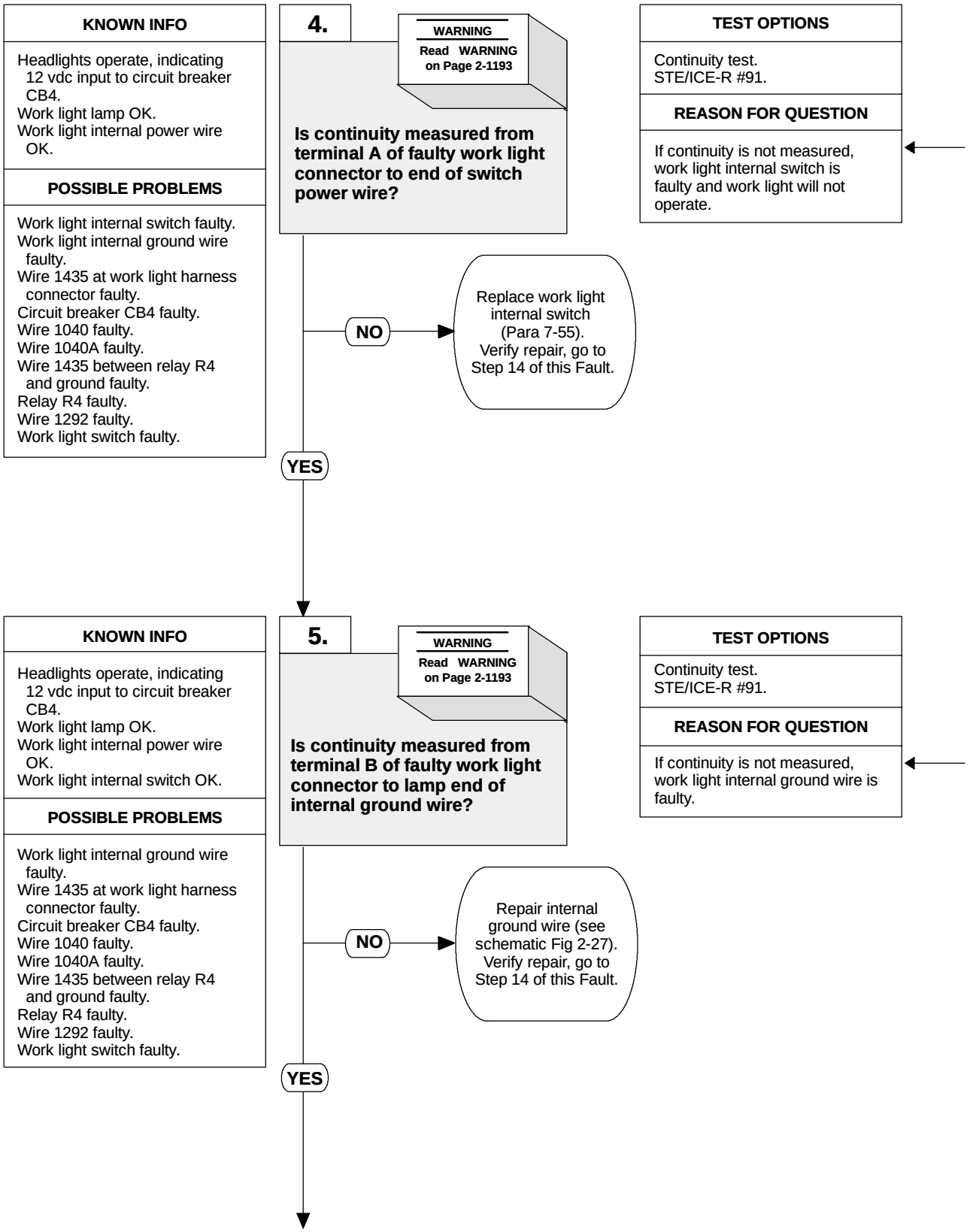
(1) Remove work light from bracket.
(2) Disconnect connector MC79 (RH) or MC54 (LH) from work light.
(3) Carefully pry lamp from work light.
(4) Disconnect wires from lamp.
(5) Set multimeter select switch to ohms.
(6) Is continuity measured across work light lamp?
    (a) If there is no continuity, replace lamp (Para 7-55).
    (b) If there is continuity, lamp is OK.



CONTINUITY TEST

(1) Remove splice cap from switch wire and internal power wire.
(2) Is there continuity measured between work light terminal A and internal power wire at wire nut?
    (a) If there is no continuity, repair internal power wire 1040B (see schematic Fig 2-27) or notify DS Maintenance.
    (b) If there is continuity, internal power wire 1040B is OK.
(3) Install splice on internal power wire.

6. WORK LIGHT(S) WILL NOT OPERATE (CONT).



WARNING

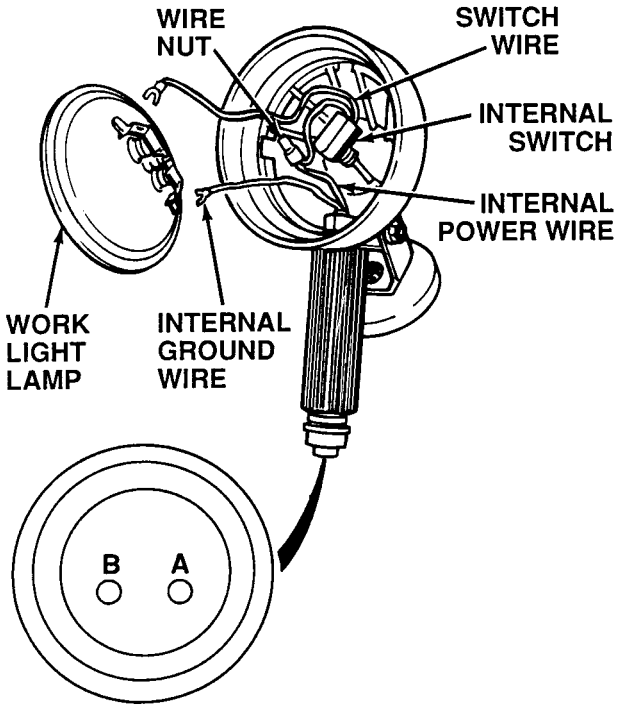
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Work light connector left hand side MC54 and right hand side MC79.

CONTINUITY TEST

(1) Set work light internal switch to on position.
(2) Is continuity measured between work light connector terminal A and end of switch power wire?
  (a) If there is no continuity, replace work light internal switch (Para 7-55).
  (b) If there is continuity, work light internal switch is OK.
(3) Set work light internal switch to off position.



CONTINUITY TEST

(1) Is continuity measured between work light connector terminal B and lamp end of internal ground wire?
  (a) If there is no continuity, repair work light internal ground wire (see schematic Fig 2-27).
  (b) If there is continuity, work light internal ground wire is OK.
(2) Connect lamp wires.
(3) Install lamp in light.
(4) Install work light on bracket.

6. WORK LIGHT(S) WILL NOT OPERATE (CONT).

KNOWN INFO

Headlights operate, indicating 12 vdc input to circuit breaker CB4.
Work light lamp OK.
Work light internal power wire OK.
Work light internal switch OK.
Work light internal ground wire OK.

POSSIBLE PROBLEMS

Wire 1435 at work light harness connector faulty.
Circuit breaker CB4 faulty.
Wire 1040 faulty.
Wire 1040A faulty.
Wire 1435 between relay R4 and ground faulty.
Relay R4 faulty.
Wire 1292 faulty.
Work light switch faulty.

6.

WARNING
Read WARNING on Page 2-1195

Is continuity measured on wire 1435 between work light harness connector terminal B and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If work light ground wire 1435 is faulty, lamp will not operate.

NO → Repair wire 1435 (see schematic Fig 2-27) or notify DS Maintenance. Verify repair, go to Step 14 of this Fault.

YES

KNOWN INFO

Wire 1435 at work light harness connector faulty.
Circuit breaker CB4 faulty.
Wire 1040 faulty.
Wire 1040A faulty.
Wire 1435 between relay R4 and ground faulty.
Relay R4 faulty.
Wire 1292 faulty.
Work light switch faulty.
Wire 1435 at work light harness connector faulty.

POSSIBLE PROBLEMS

Circuit breaker CB4 faulty.
Wire 1040 faulty.
Wire 1040A faulty.
Wire 1435 between relay R4 and known good ground faulty.
Relay R4 faulty.
Wire 1292 faulty.
Work light switch faulty.

7.

WARNING
Read WARNING on Page 2-1195

Are 10 to 14 vdc measured on wire 1292 at circuit breaker CB4 with ENGINE switch ON?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not present, circuit breaker CB4 is faulty.

NO → Replace circuit breaker CB4 (Para 7-16). Verify repair, go to Step 14 of this Fault.

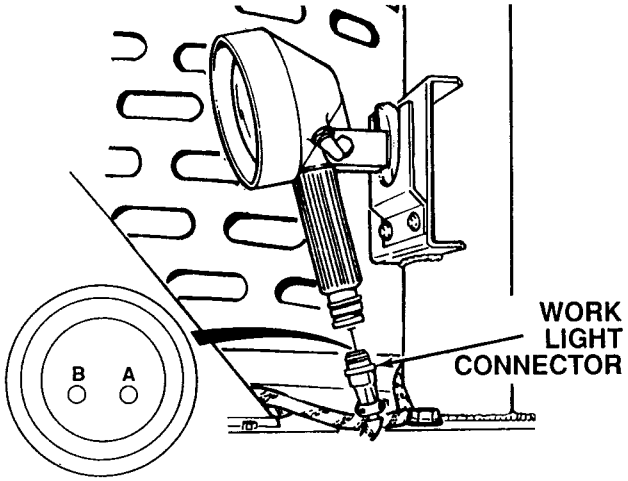
YES

WARNING

- Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13-R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

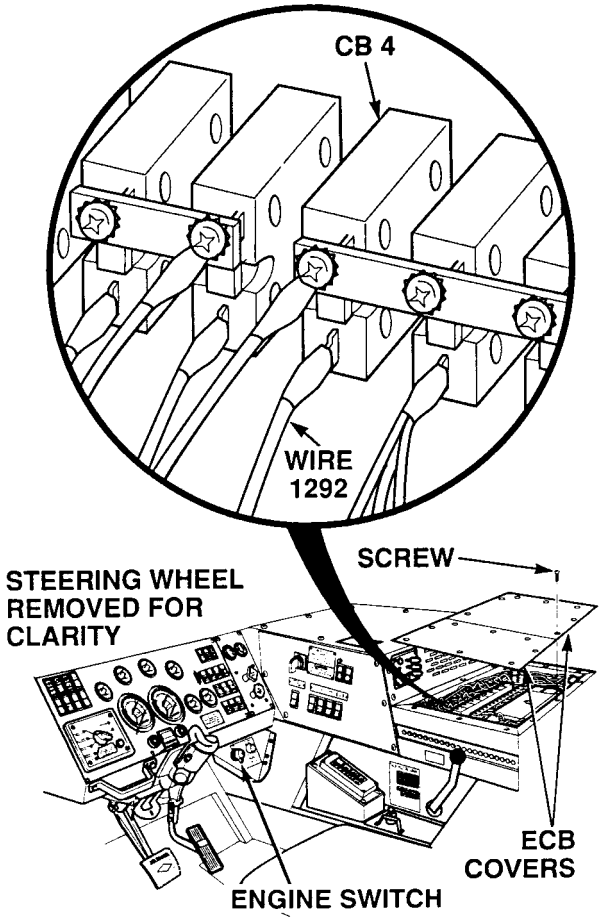
CONTINUITY TEST

(1) Is continuity measured on wire 1435 between work light harness connector terminal B and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-27) or notify DS Maintenance.
   (b) If there is continuity, wire 1435 is OK.
(2) Apply primer and sealing compound to three threads of work light connector.
(3) Connect work light connector to work light.

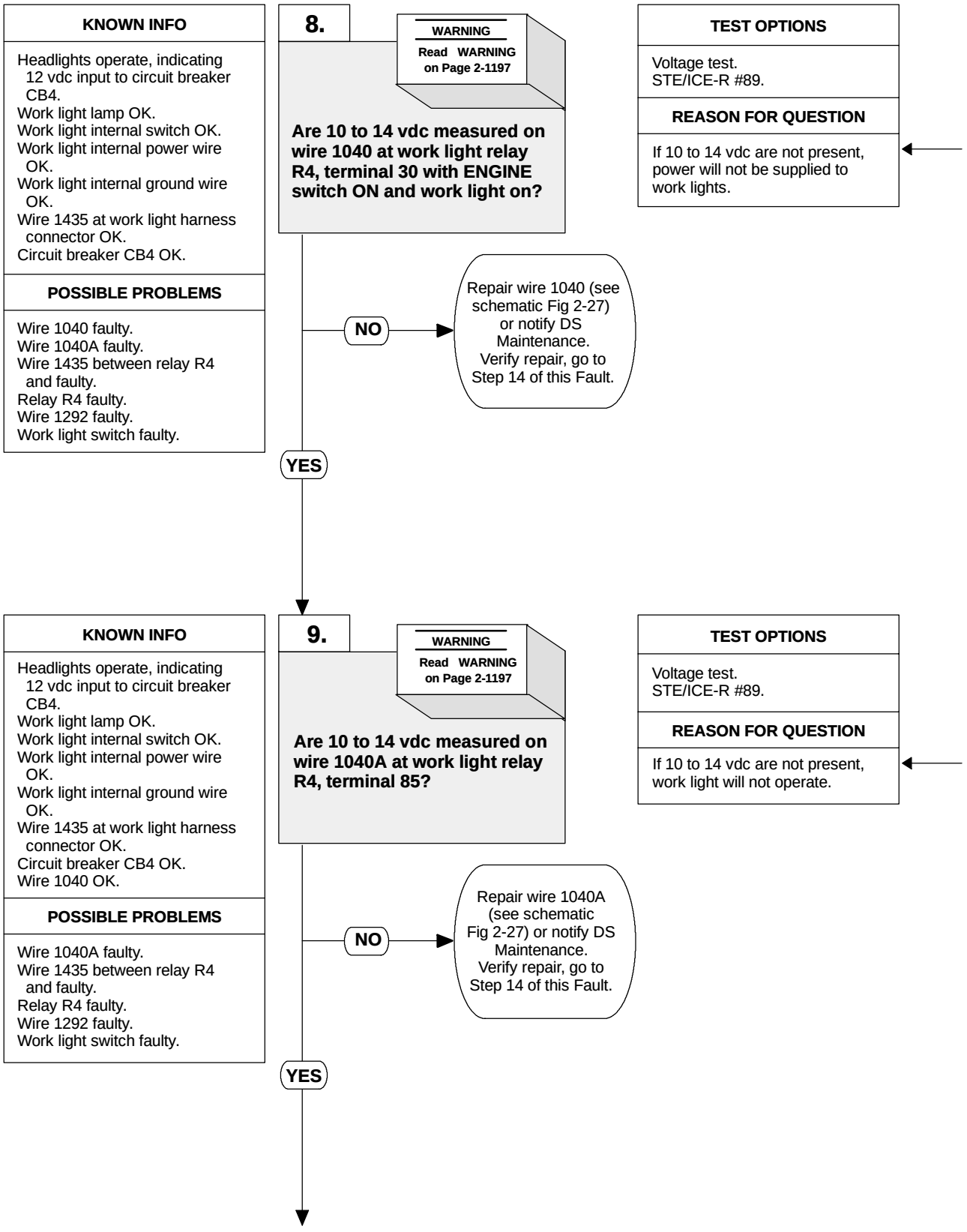


VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Set multimeter select switch to volts, dc.
(3) Connect positive (+) multimeter lead to wire 1292 at circuit breaker CB4.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
   (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace circuit breaker (Para 7-16).
   (b) If 10 to 14 vdc are present, circuit breaker CB4 is OK.
(6) Turn OFF ENGINE switch.



6. WORK LIGHT(S) WILL NOT OPERATE (CONT).



WARNING

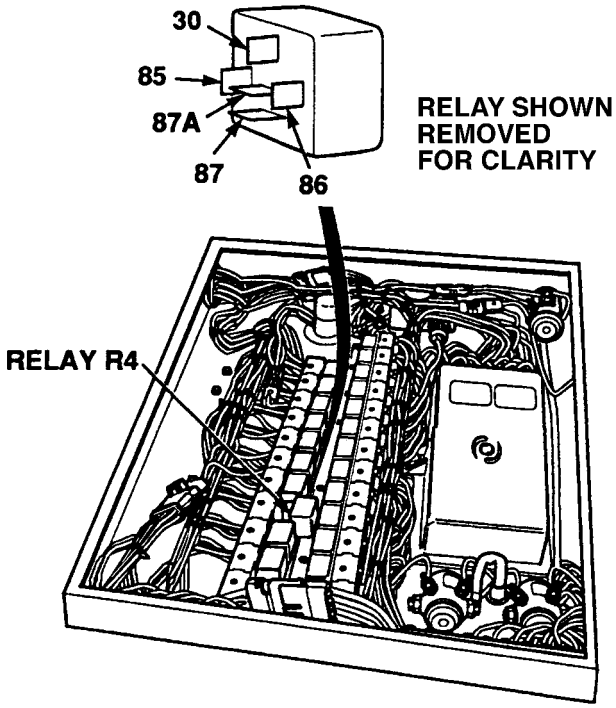
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13, R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical cirsuit board cover.

NOTE

Relay tests must be performed with relay partially removed.

VOLTAGE TEST

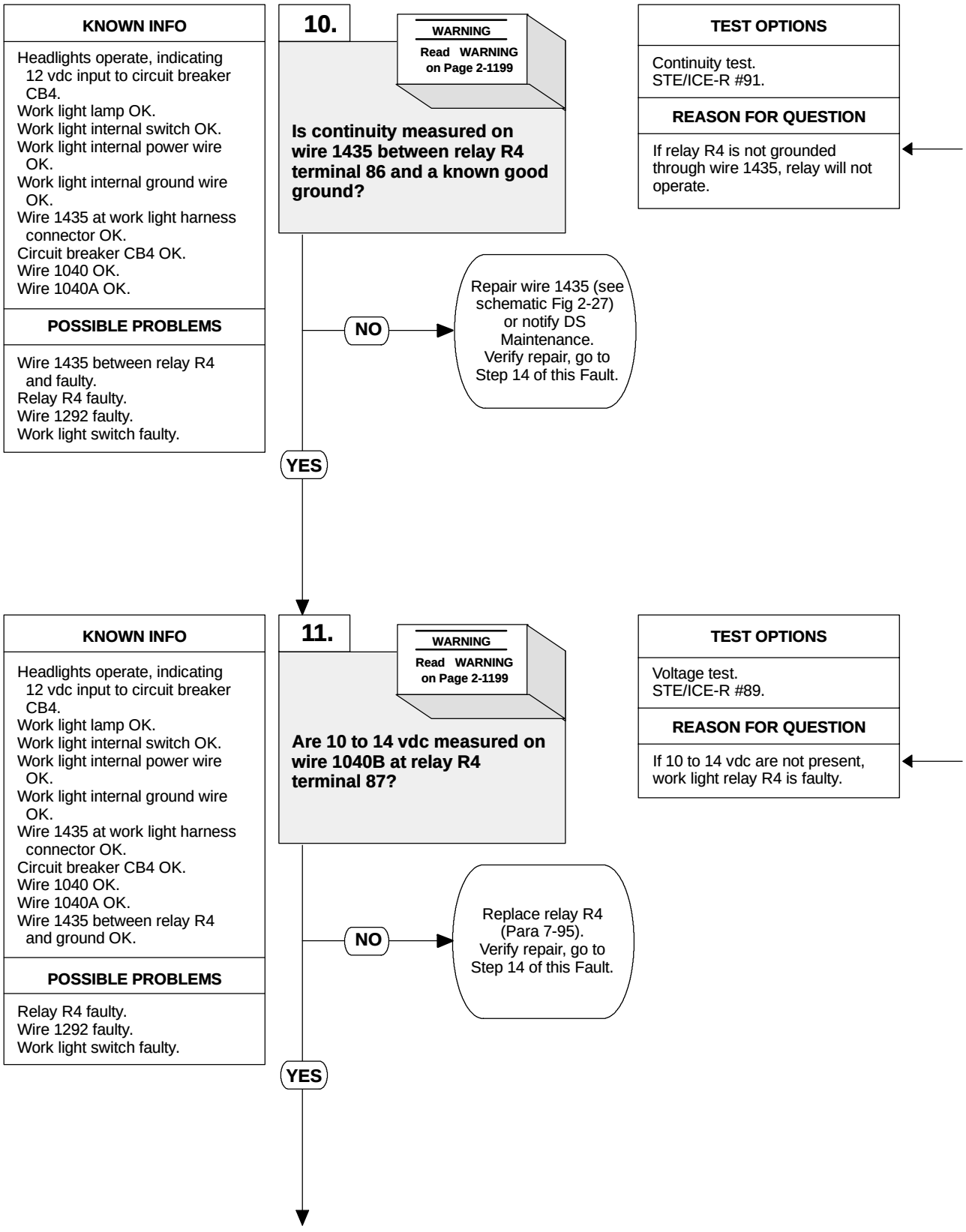
(1) Connect positive (+) multimeter lead to terminal 30 of relay R4.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn on worklight switch (TM 9-2320-364-10).
(4) Turn ON ENGINE switch.
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and worklight switch and repair wire 1040 (see schematic Fig 2-27) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1040 is OK.
(5) Turn OFF ENGINE switch.



VOLTAGE TEST

(1) Connect positive (+) multimeter lead to relay R4, terminal 85.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1040A (see schematic Fig 2-27) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1040A is OK.
(4) Turn OFF ENGINE switch.
(5) Turn off worklight switch.

6. WORK LIGHT(S) WILL NOT OPERATE (CONT).



WARNING

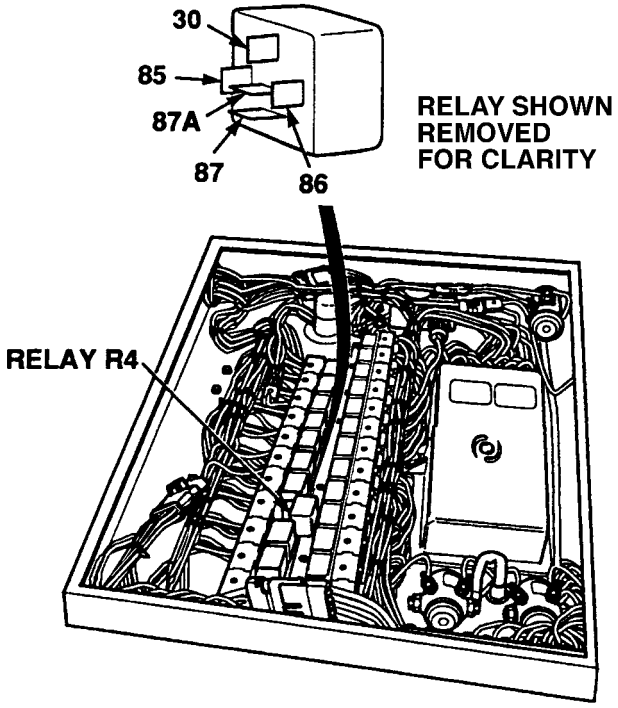
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13, R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the elctrical circuit board cover.

NOTE

Relay tests must be performed with relay partially removed.

CONTINUITY TEST

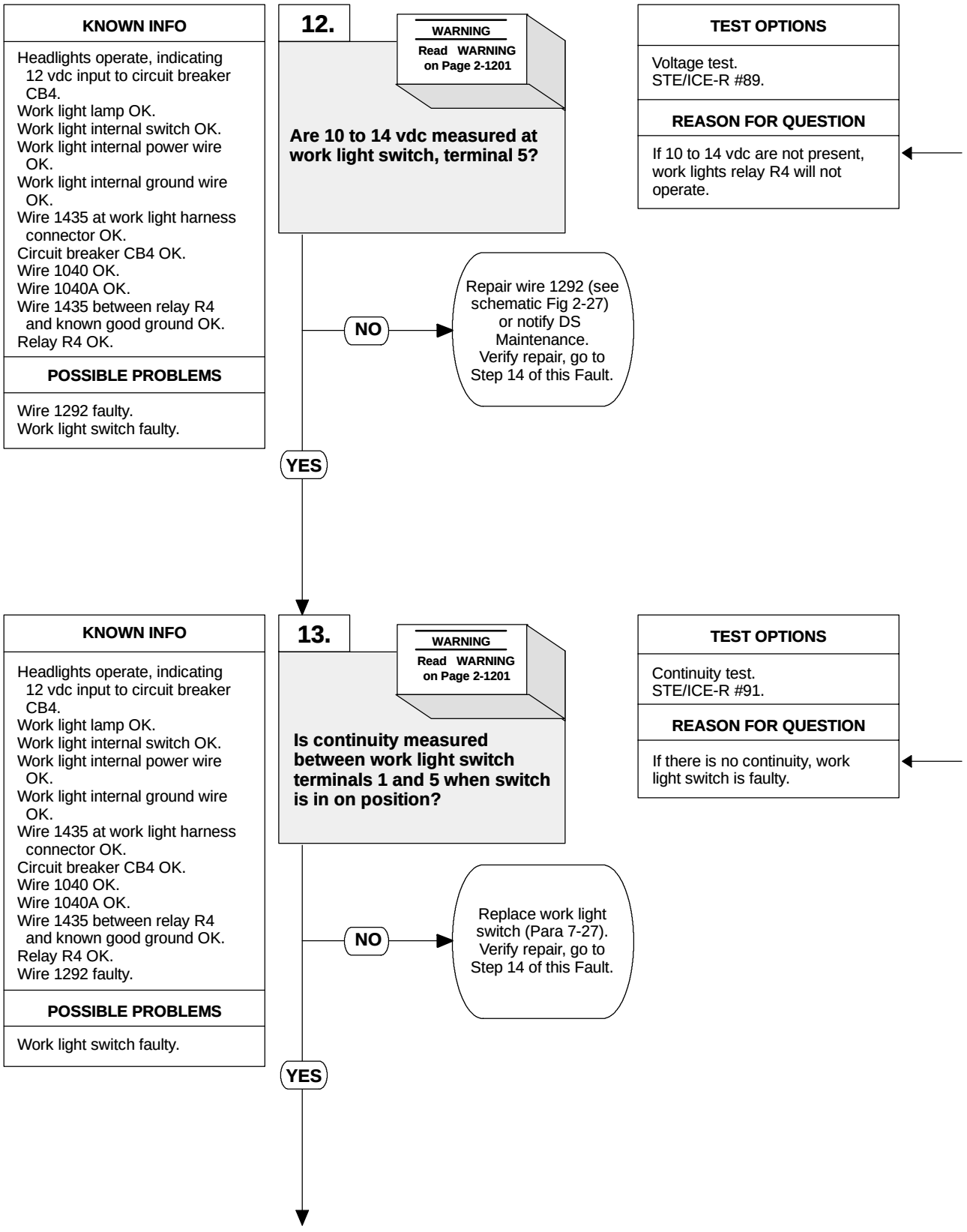
(1) Set multimeter select switch to ohms.
(2) Is continuity measured on wire 1435 between relay R4 terminal 86 and ground?
  (a) If there is no continuity, repair wire 1435 between relay R4, terminal 86 and a known good ground (see schematic Fig 2-27) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.



VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1040B at relay R4, terminal 87.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on worklight switch.
  (a) If 10 to 14 vdc are not present, replace relay R4 (Para 7-95).
  (b) If 10 to 14 vdc are present, relay R4 is OK.
(6) Turn OFF ENGINE switch.
(7) Turn off worklight switch.
(8) Push relay R4 completely into socket.
(9) Install two ECB covers and 15 screws.

6. WORK LIGHT(S) WILL NOT OPERATE (CONT).



WARNING

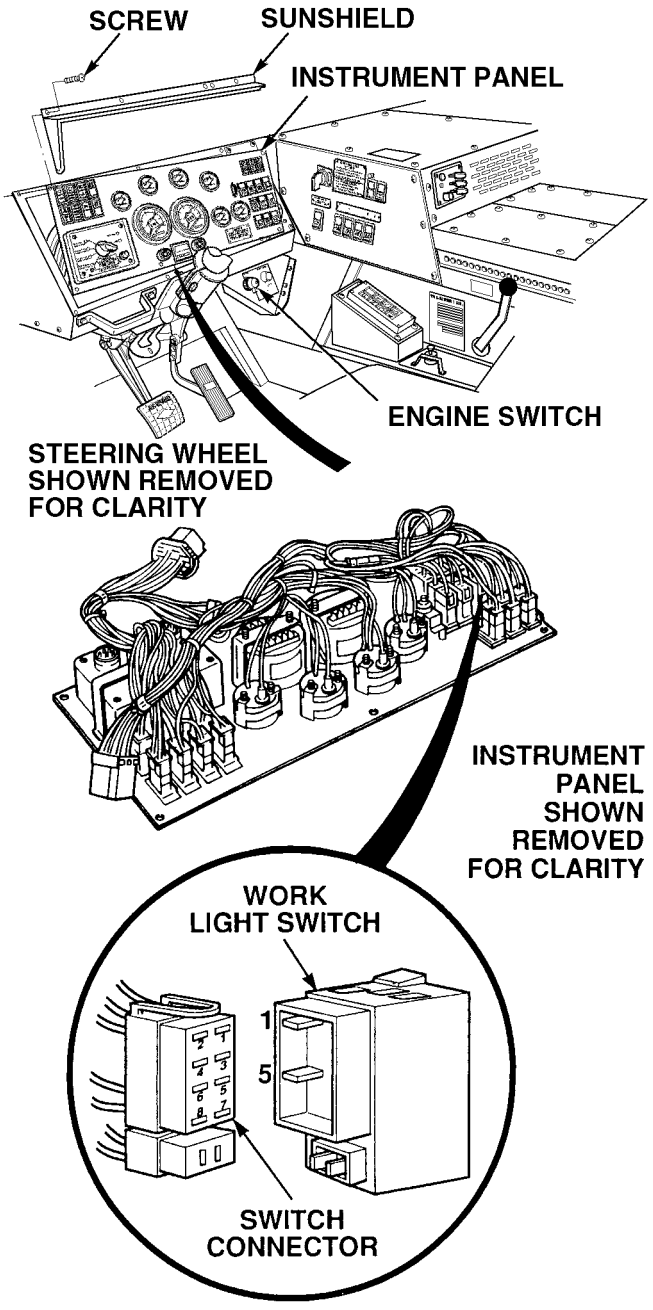
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

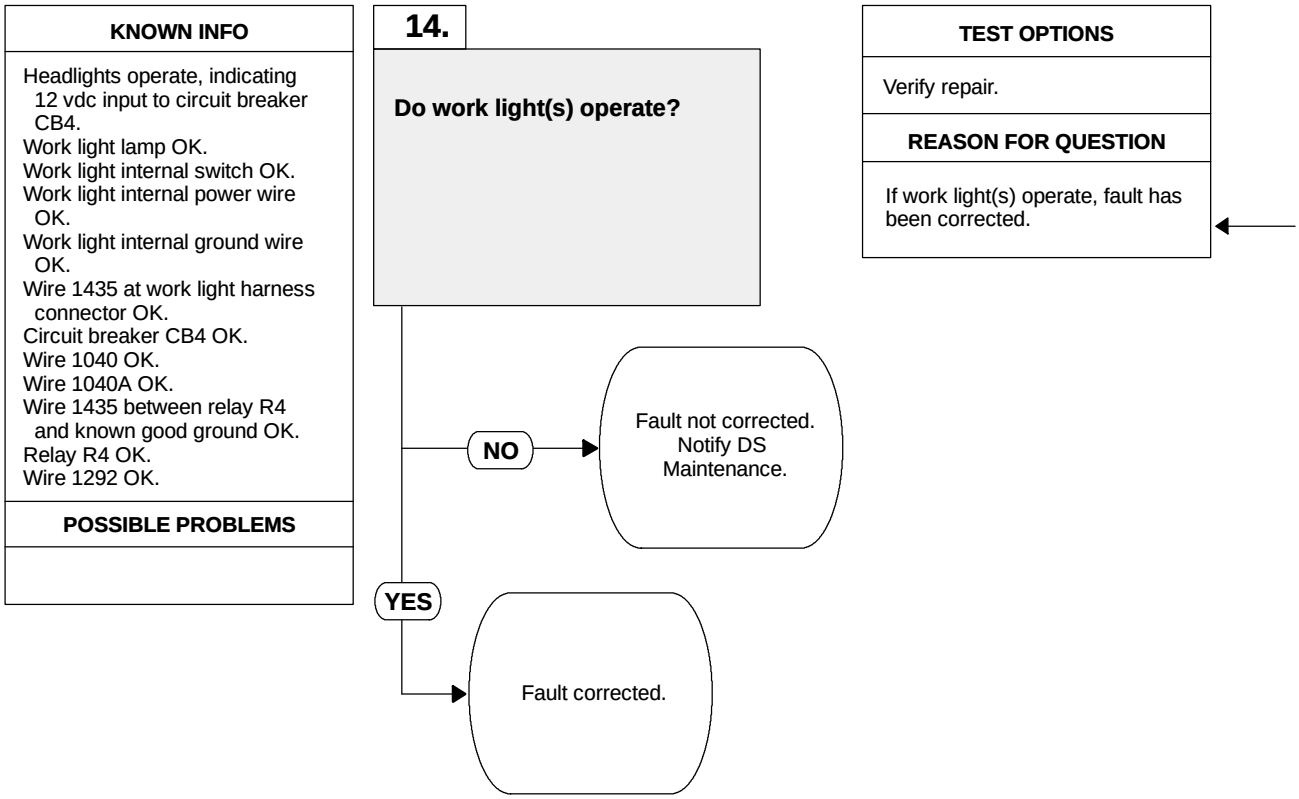
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect work light switch connector.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to work light switch, terminal 5.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1292 (see schematic Fig 2-27) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1292 is OK.
(8) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is continuity measured between work light switch terminals 1 and 5?
  (a) If there is no continuity, replace switch (Para 7-27).
  (b) If there is continuity, work light switch is OK.
(3) Connect work light switch connector.
(4) Install instrument panel and sunshield with ten screws.

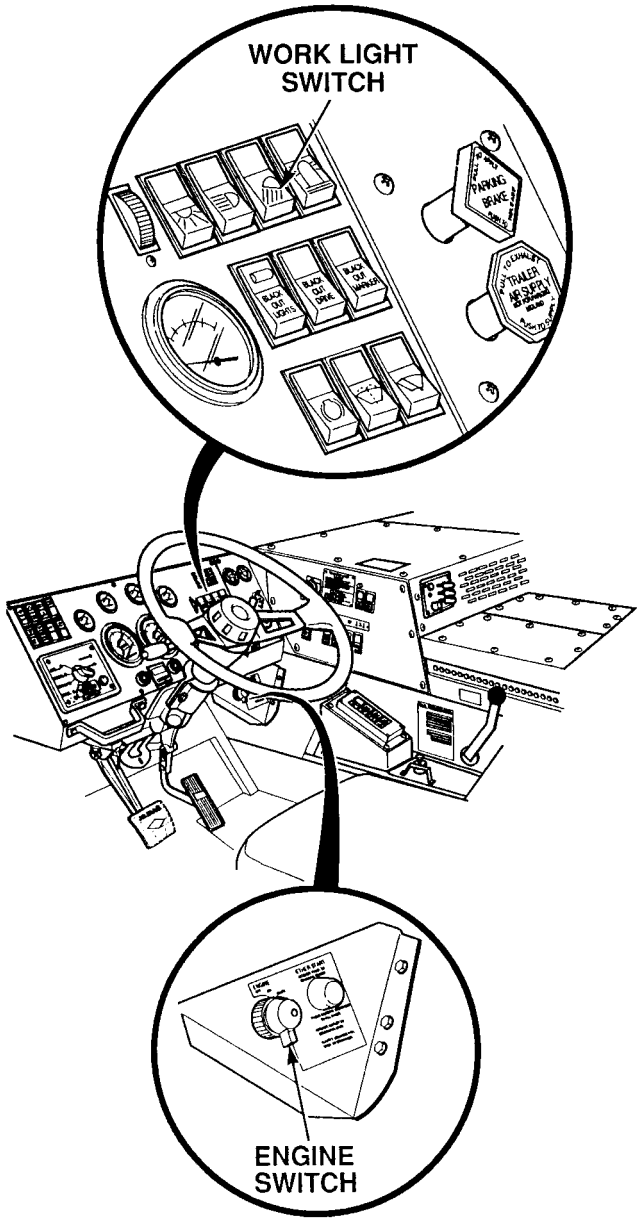


6. WORK LIGHT(S) WILL NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on work light switch.
(3) Turn on work light internal switch.
  (a) If work light(s) do not operate, fault not corrected. Perform Steps (4) through (6) below and notify DS Maintenance.
  (b) If work light(s) operate, fault has been corrected.
(4) Turn off work light internal switch.
(5) Turn off work light switch.
(6) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

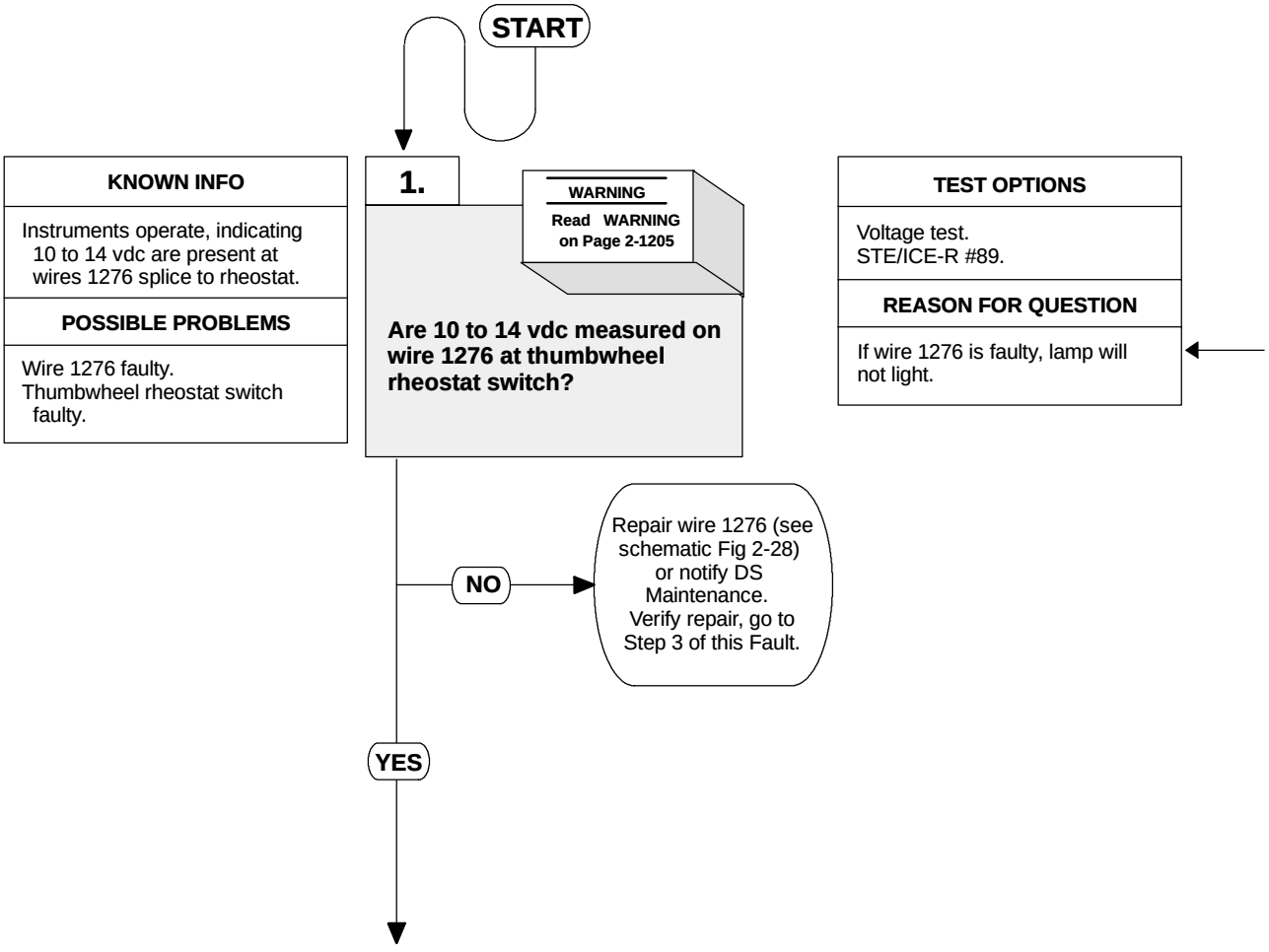
7. INSTRUMENT LIGHTS DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

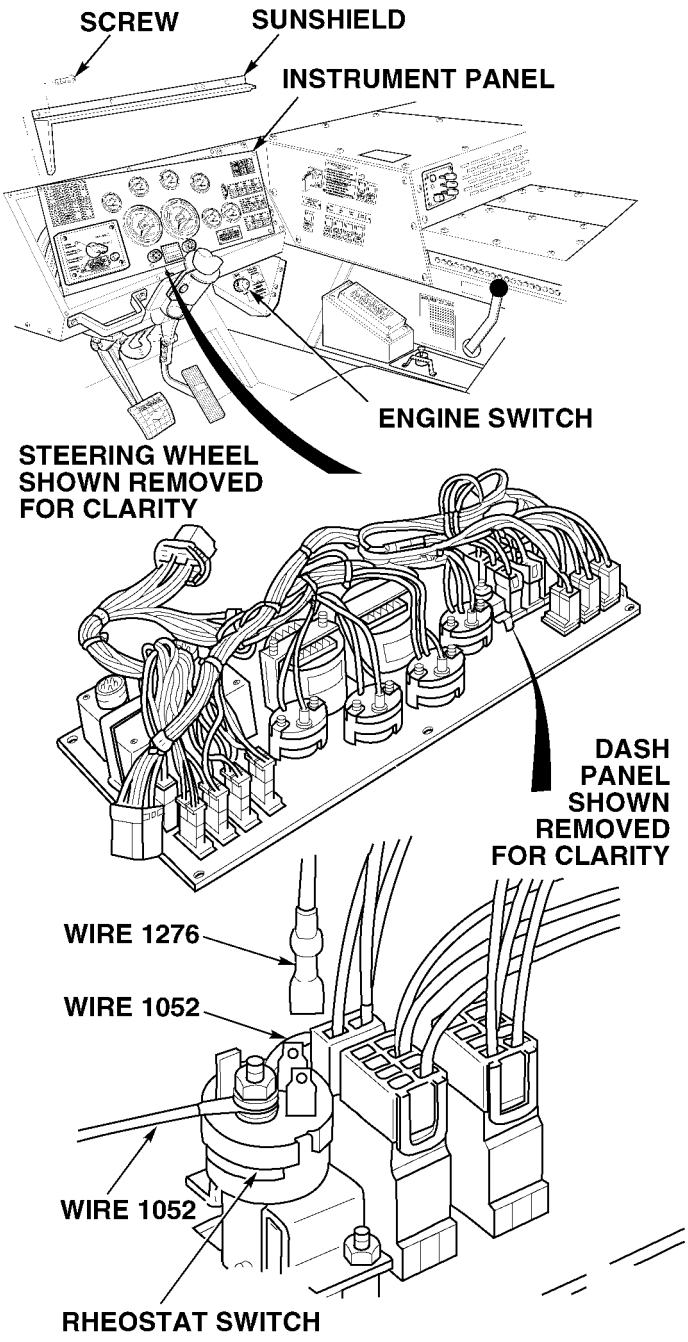


WARNING

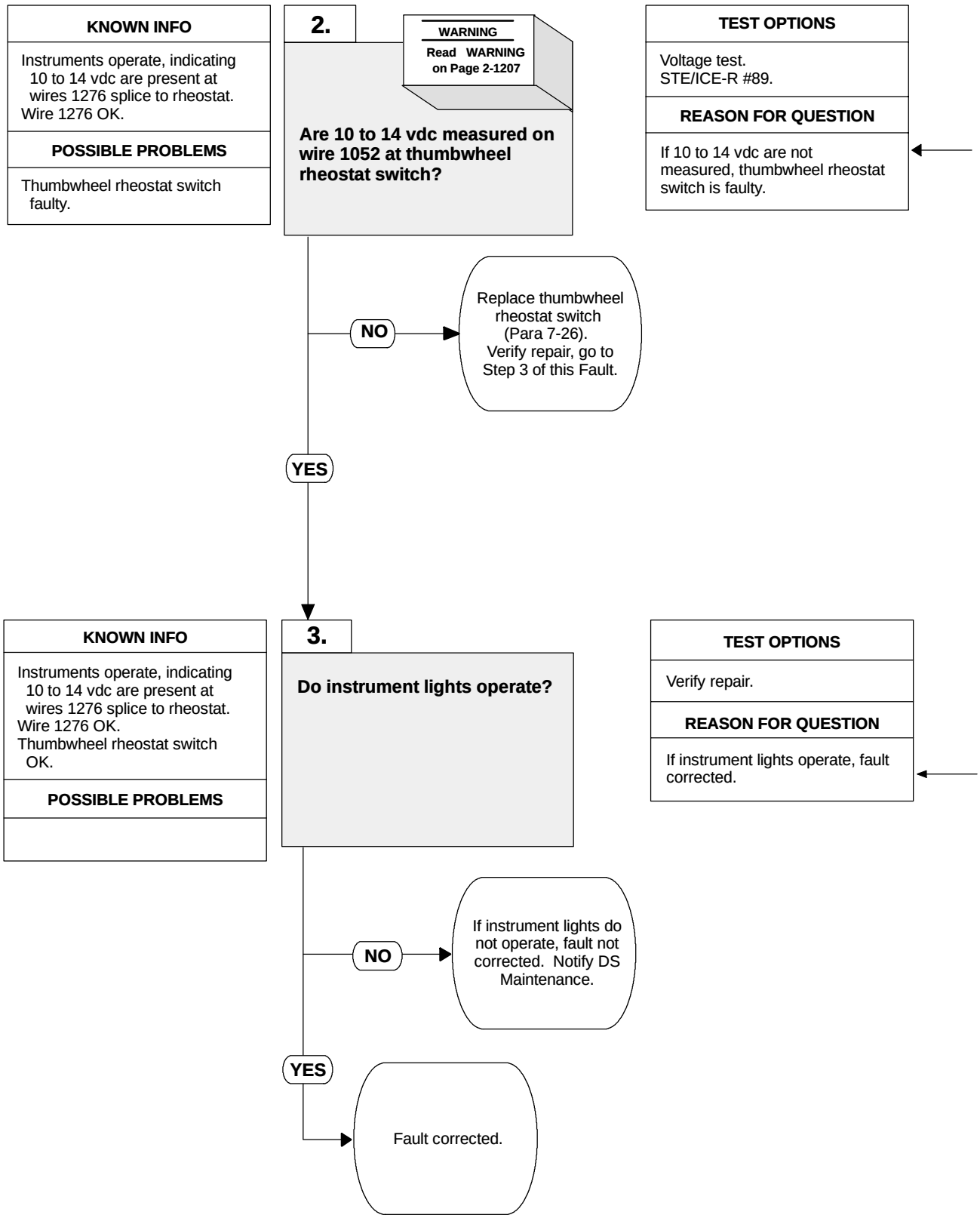
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to wire 1276 at rheostat switch.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1276 between rheostat and first splice in wire to connector MC4, terminal P (see schematic Fig 2-28 and FO 1) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1276 is OK.
(7) Turn OFF ENGINE switch.



7. INSTRUMENT LIGHTS DO NOT OPERATE (CONT).



WARNING

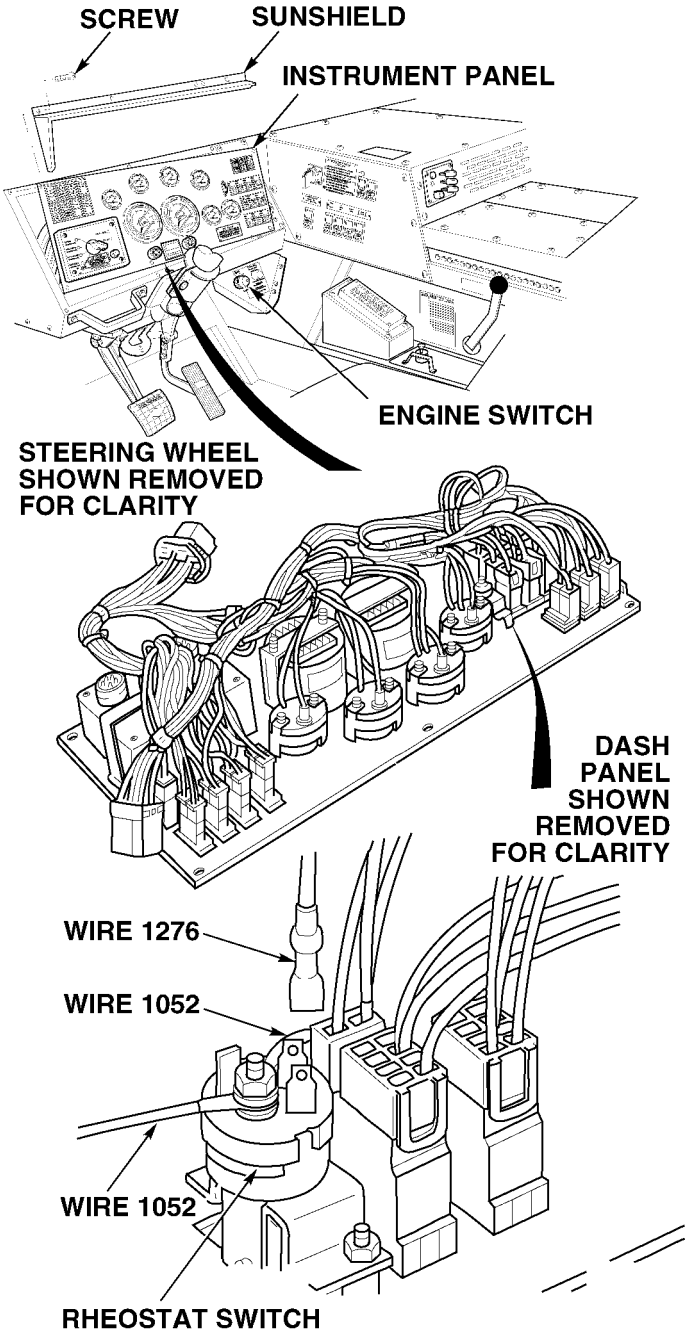
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1052 at thumbwheel rheostat switch.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
(4) Turn thumbwheel rheostat switch to full brightness.
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE and replace thumbwheel rheostat switch (Para 7-26).
  (b) If 10 to 14 vdc are present, thumbwheel rheostat switch is OK.
(5) Turn OFF ENGINE switch.
(6) Install instrument panel and sunshield with ten screws.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Adjust rheostat to full bright.
(3) Observe instrument lights.
  (a) If instrument lights do not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
  (b) If instrument lights operate, fault has been corrected.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

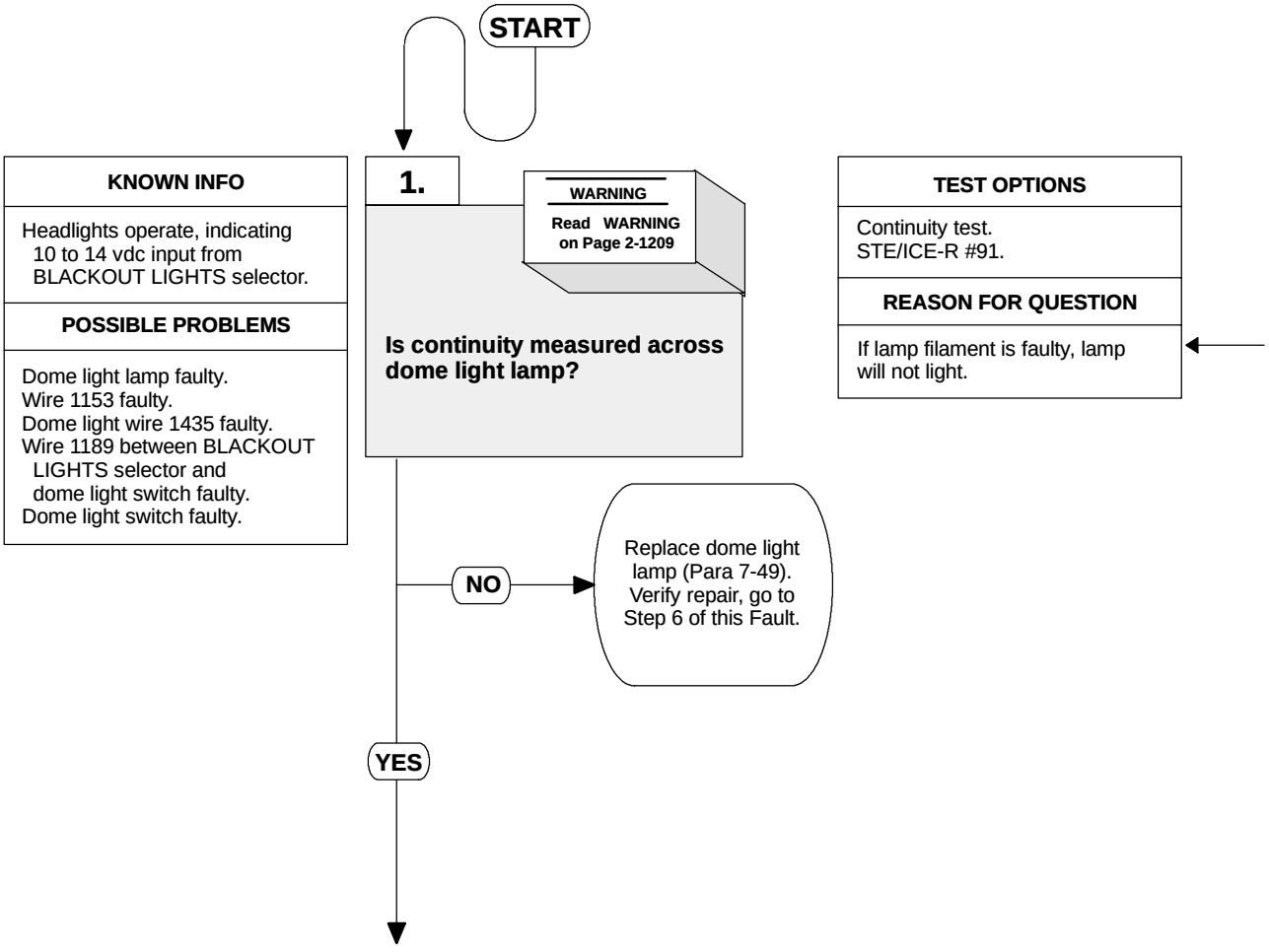
8. DOME LIGHT DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

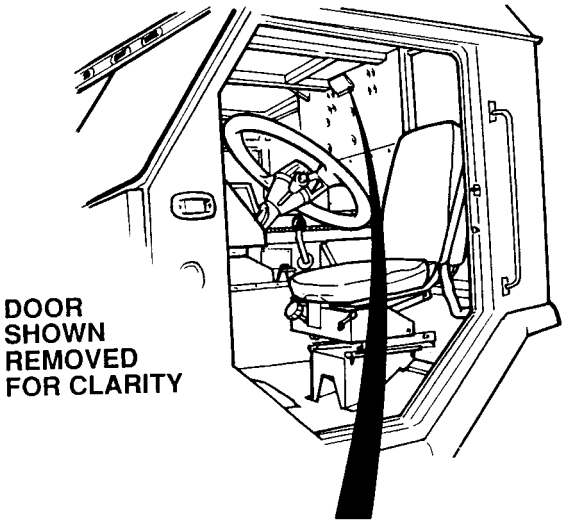
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



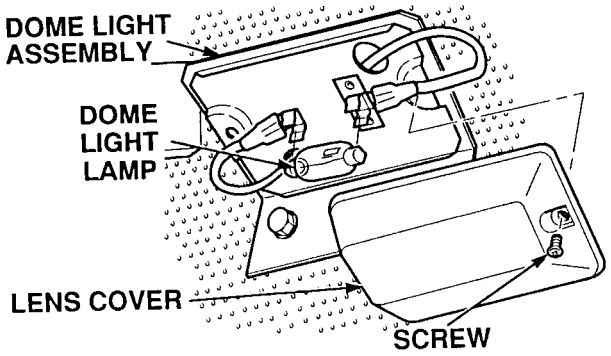
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

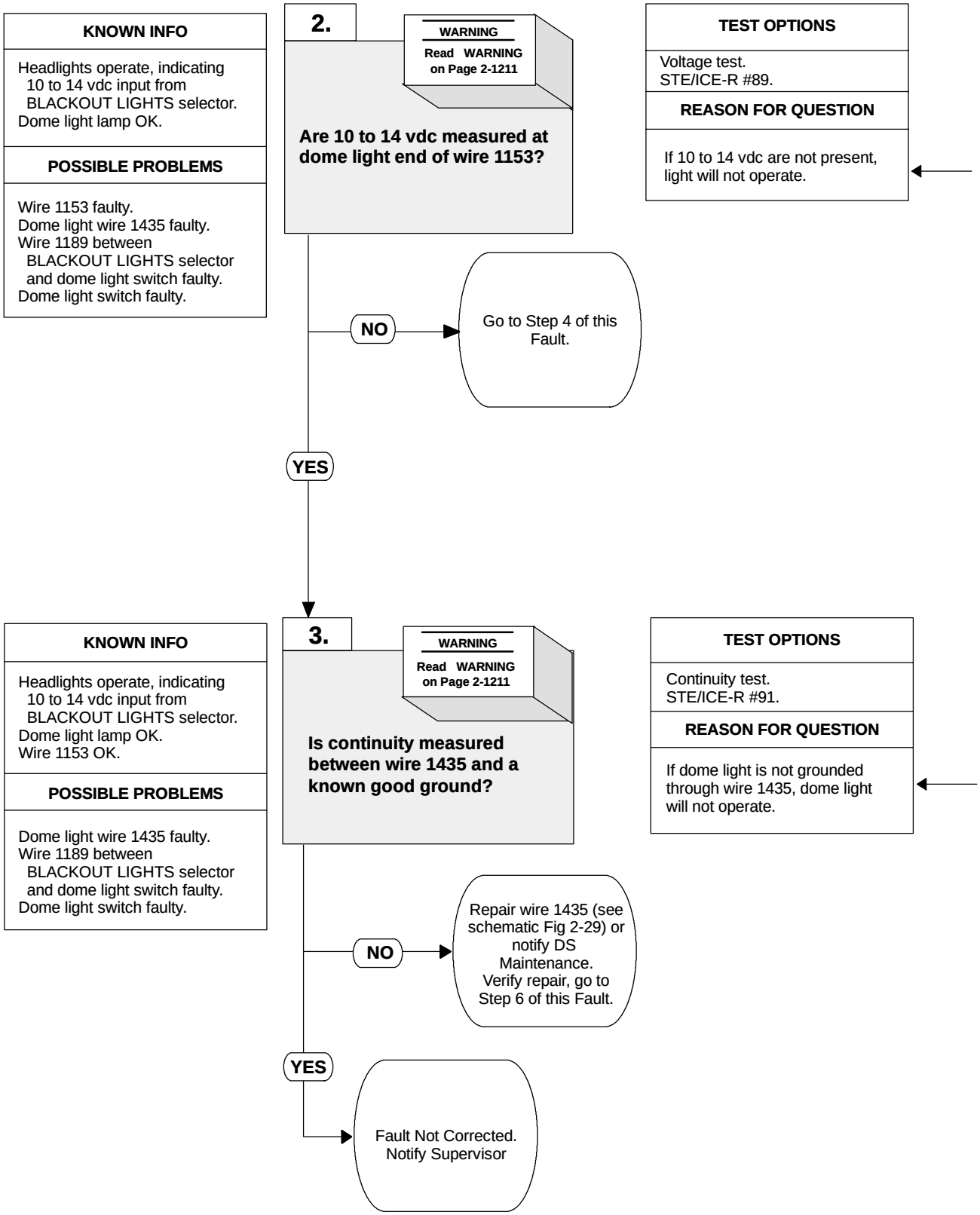


CONTINUITY TEST

(1) Remove two screws and dome light lens.
(2) Remove dome light lamp.
(3) Set multimeter select switch to ohms.
(4) Is there continuity across dome light lamp?
   (a) If there is no continuity, replace dome light lamp (Para 7-49).
   (b) If there is continuity, dome light lamp is OK.



8. DOME LIGHT DOES NOT OPERATE (CONT).

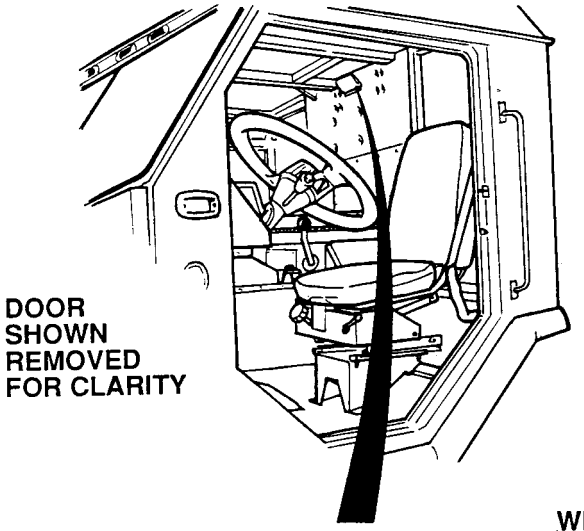


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

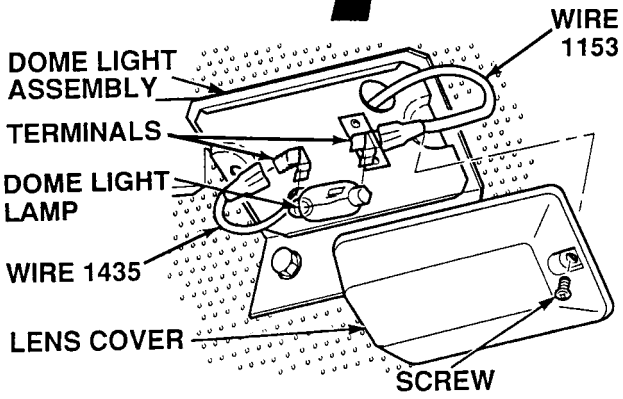
VOLTAGE TEST

(1) Disconnect wire 1153 from dome light.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1153 at dome light.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn on dome light switch (TM 9-2320-364-10).
(6) Turn ON ENGINE switch.
  (a) If 10 to 14 vdc are not present, perform Steps (7) through (9) below and go to Step 4 of this Fault.
  (b) If 10 to 14 vdc are present, perform Steps (7) through (9) and go to Step 3 of this Fault.
(7) Turn off dome light switch.
(8) Turn OFF ENGINE switch.
(9) Connect wire 1153 to dome light.

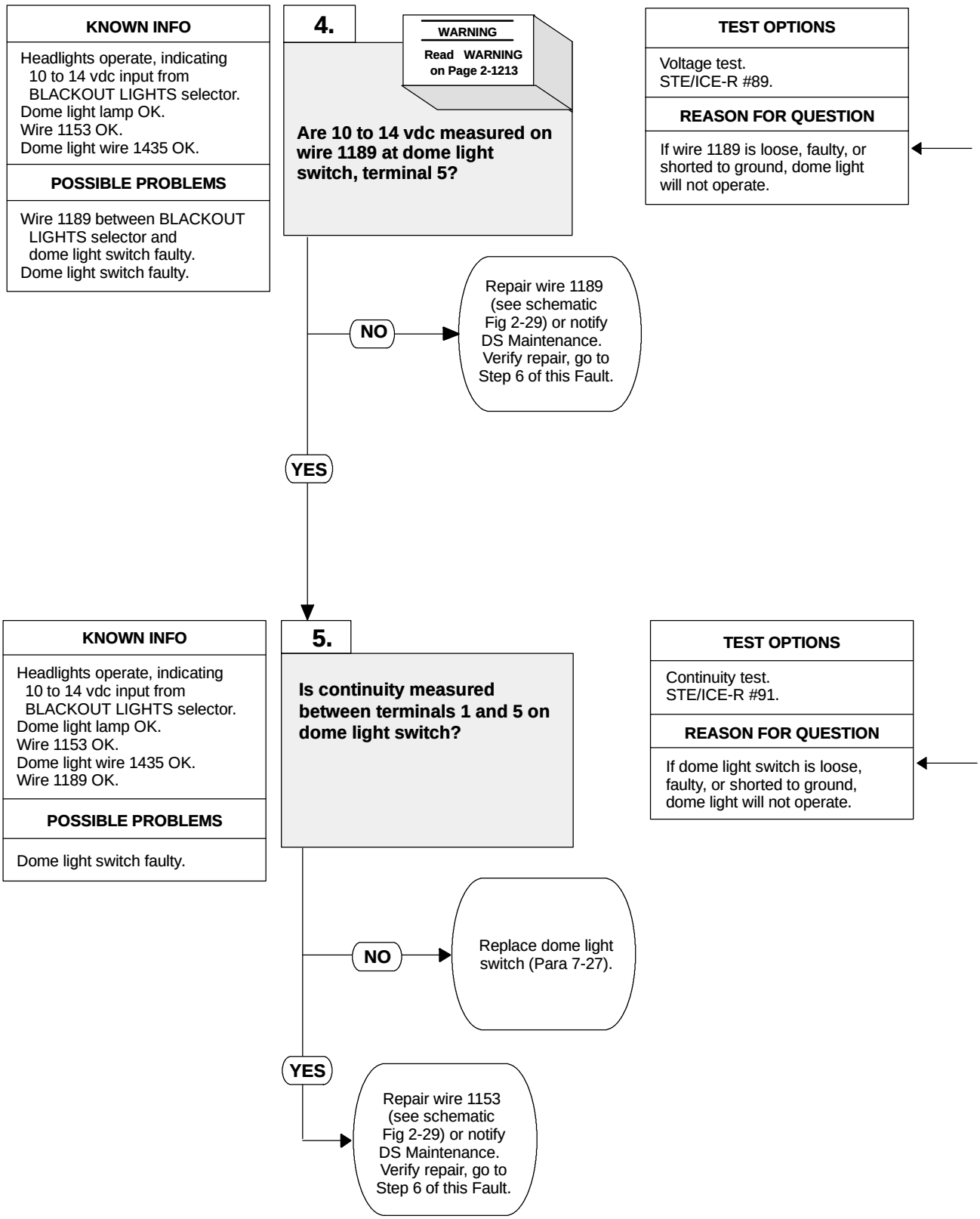


CONTINUITY TEST

(1) Disconnect wire 1435 from dome light.
(2) Set multimeter select switch to ohms.
(3) Is there continuity measured between wire 1435 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-29) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.
(4) Connect wire 1435 to domelight.
(5) Install dome light lamp.
(6) Install two screws and dome light lens (Para 7-49).



8. DOME LIGHT DOES NOT OPERATE (CONT).



WARNING

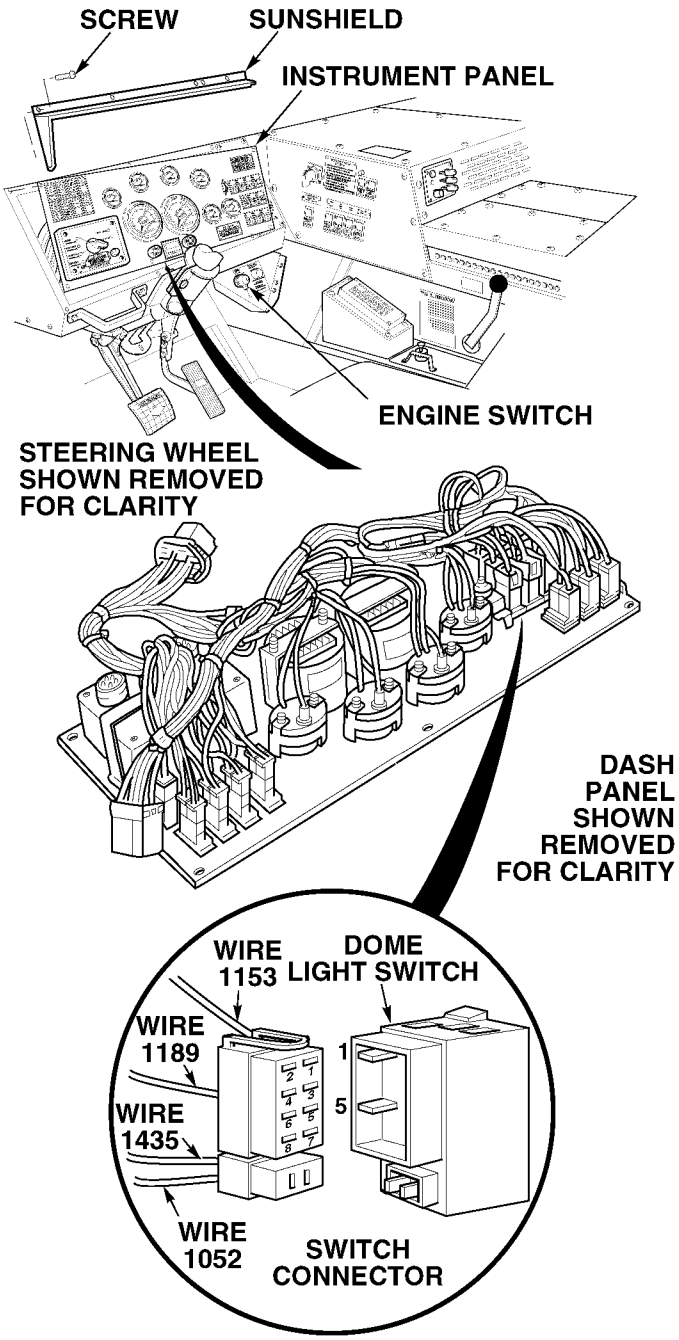
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

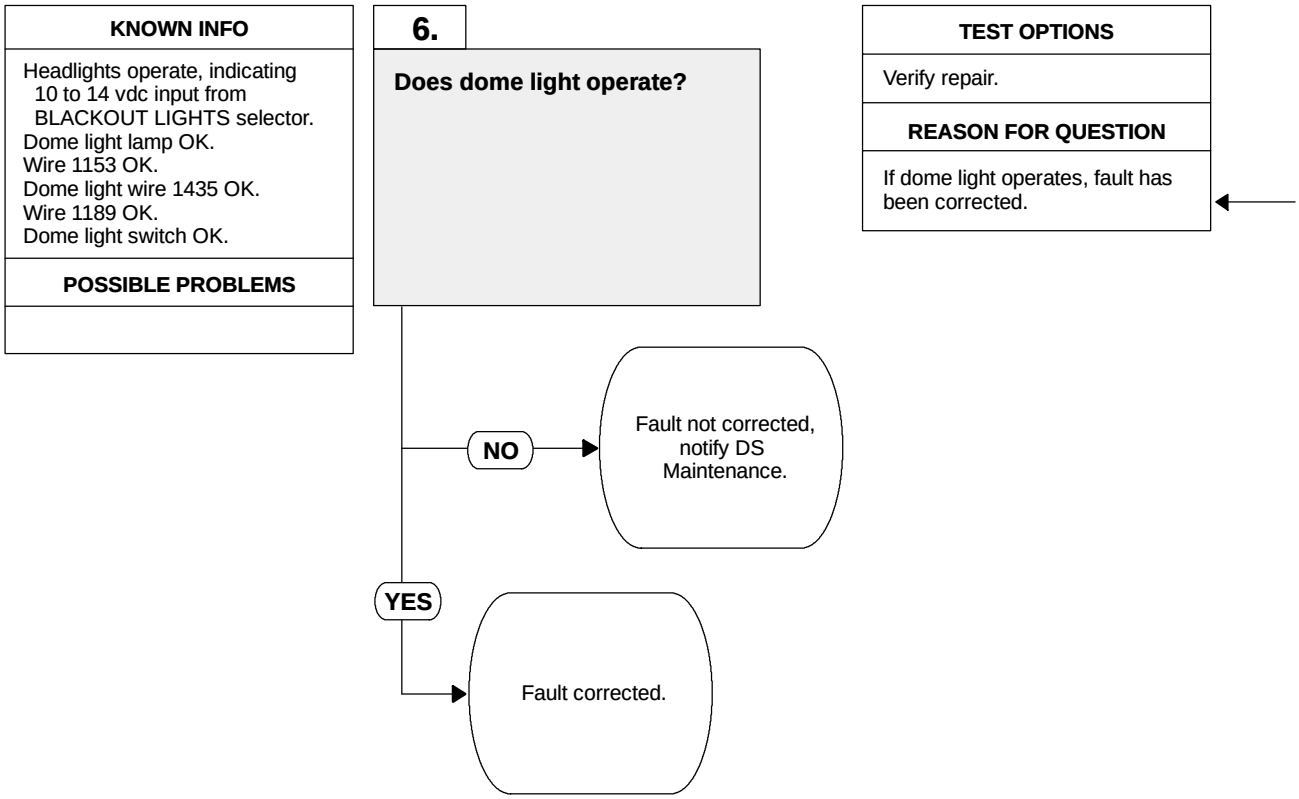
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect dome light switch connector.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to wire 1189 at dome light switch connector, terminal 5.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, perform Steps (8) and (9) below and repair wire 1189 (see schematic Fig 2-29) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1189 is OK.
(8) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Turn on dome light switch.
(3) Is continuity measured on dome light switch between terminal 5 and terminal 1?
  (a) If there is no continuity, replace dome light switch (Para 7-27).
  (b) If there is continuity, repair wire 1153 (see schematic Fig 2-29) or notify DS Maintenance.
(4) Connect dome light switch connector.
(5) Install instrument panel and sunshield with ten screws.

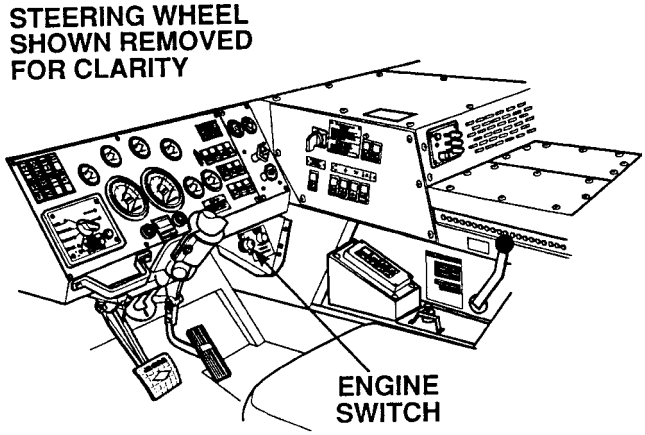


8. DOME LIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on dome light.
  (a) If dome light does not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If dome light operates, fault has been corrected.
(3) Turn off dome light.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

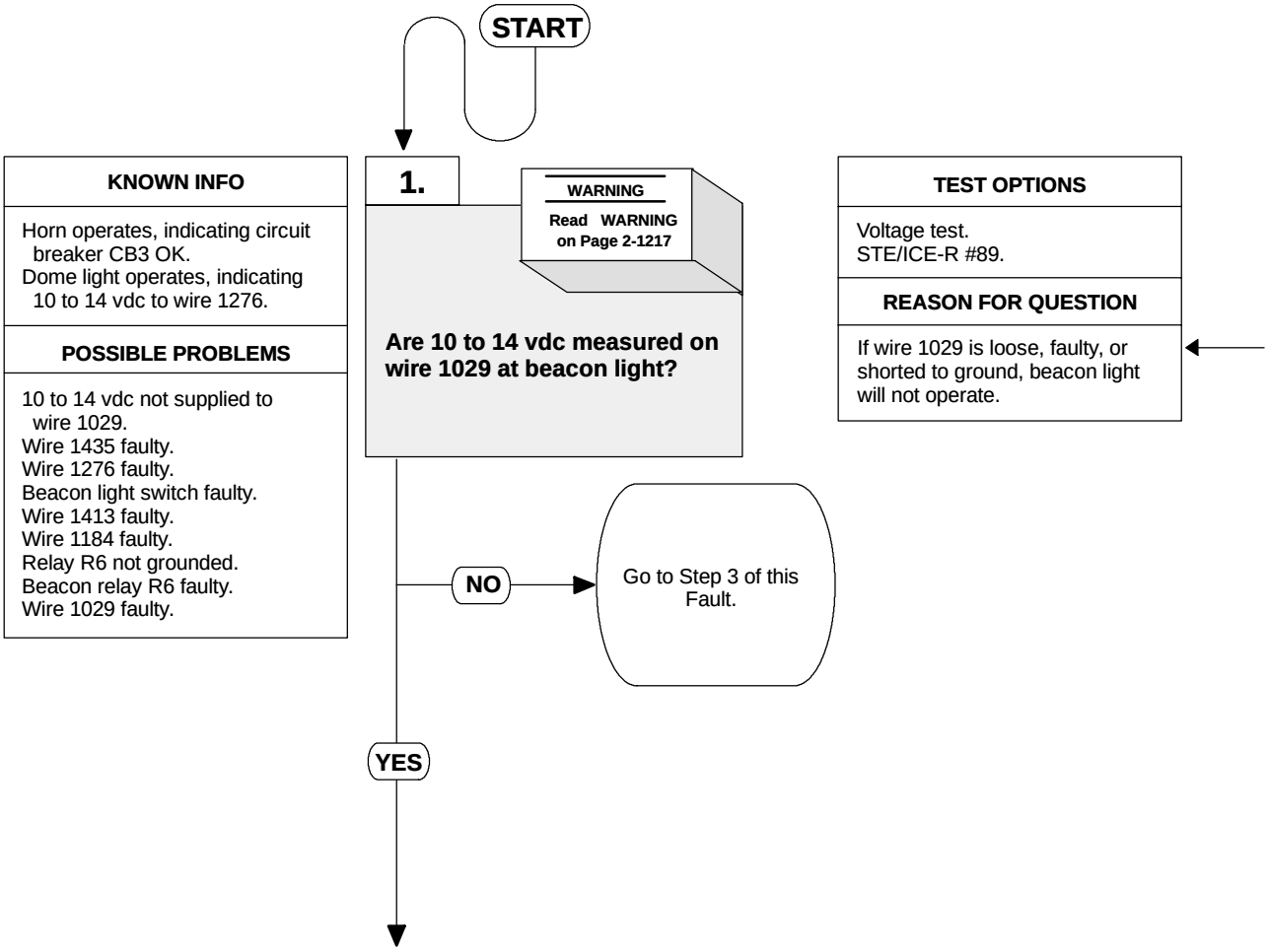
9. BEACON LIGHT DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

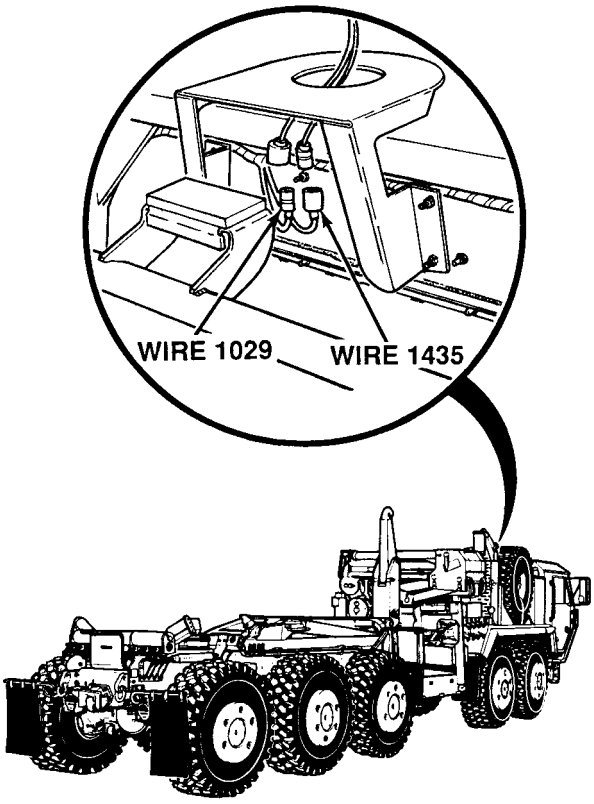
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

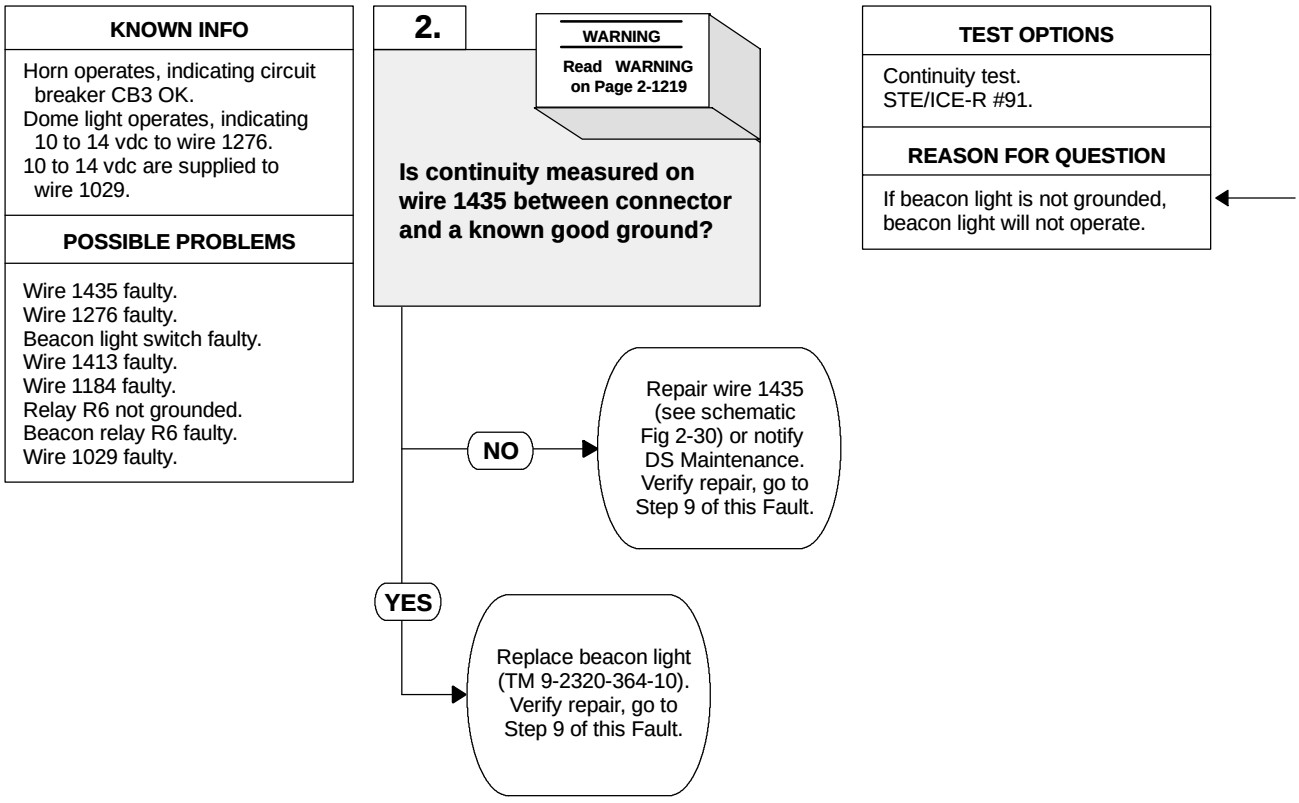
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



VOLTAGE TEST

(1) Open top engine cover (TM 9-2320-364-10).
(2) Disconnect wire 1029 from beacon light.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to wire 1029.
(5) Connect negative (-) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch.
(7) Turn on beacon light switch.
  (a) If 10 to 14 vdc are not present, perform Steps (8) through (10) below and go to Step 3 of this Fault.
  (b) If 10 to 14 vdc are present, perform Steps (8) through (10) below and go to Step 2 of this Fault.
(8) Turn off beacon light switch.
(9) Turn OFF ENGINE switch.
(10) Connect wire 1029 to beacon light.

9. BEACON LIGHT DOES NOT OPERATE (CONT).

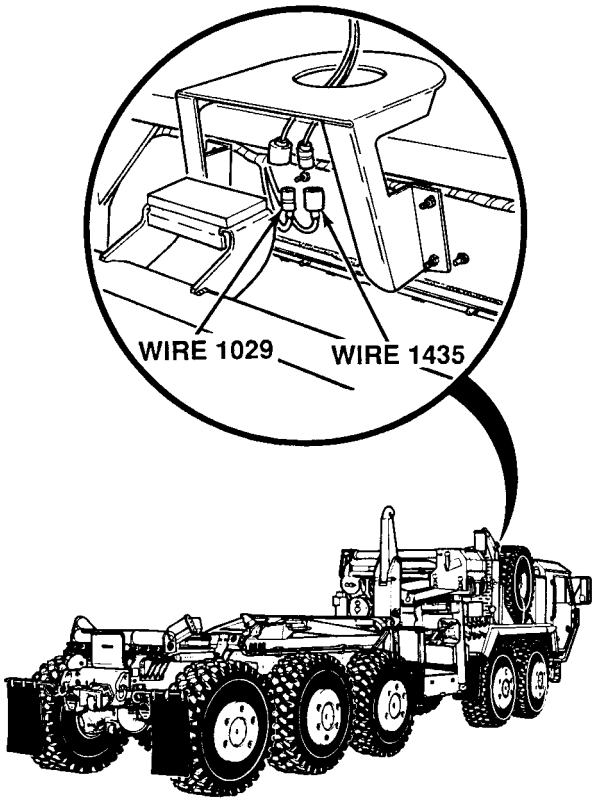


WARNING

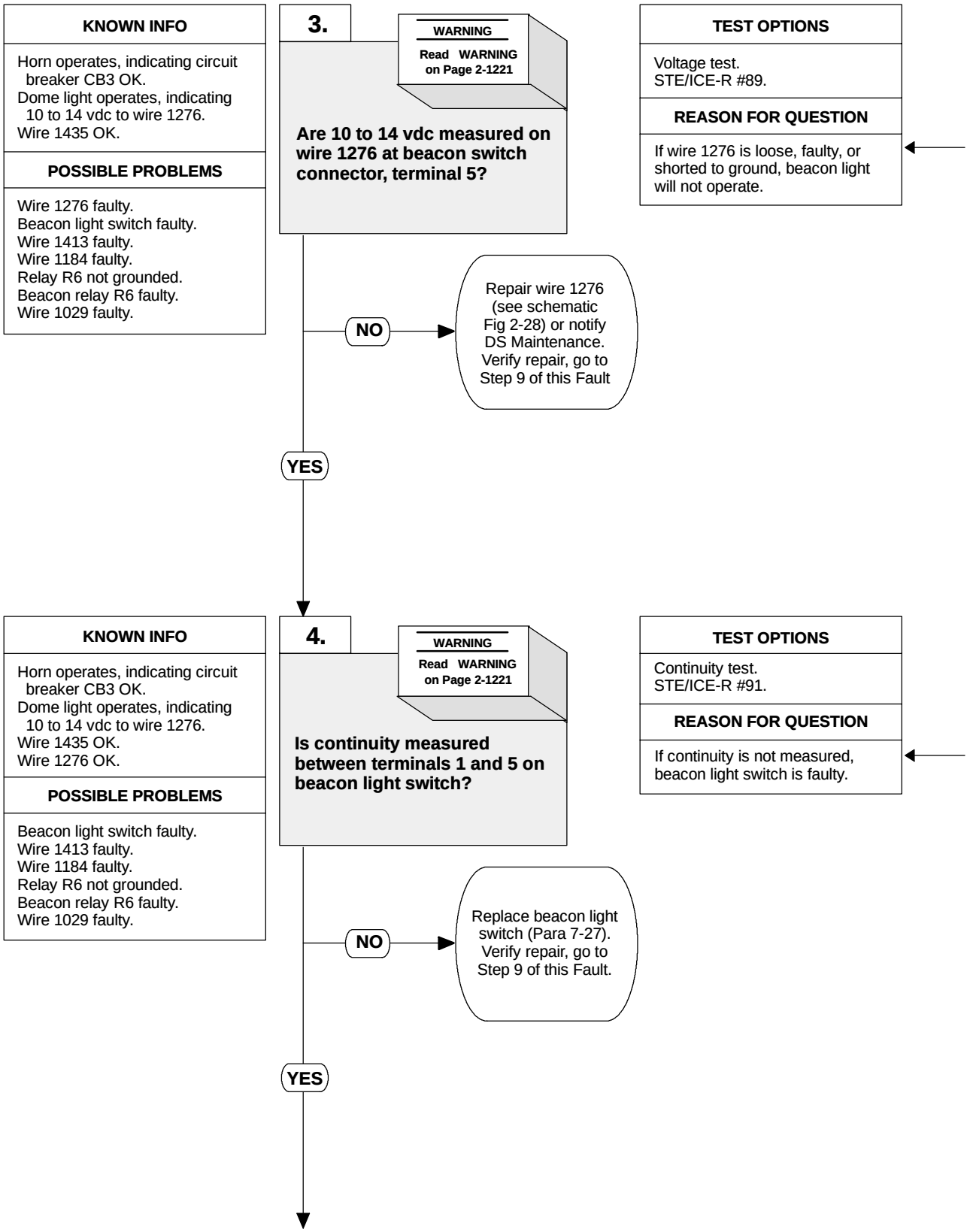
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect wire 1435 from beacon light.
(2) Set multimeter select switch to ohms.
(3) Is there continuity between beacon light connector wire 1435 and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-30) or notify DS Maintenance.
   (b) If there is continuity, replace beacon light (TM 9-2320-364-10).



9. BEACON LIGHT DOES NOT OPERATE (CONT).



WARNING

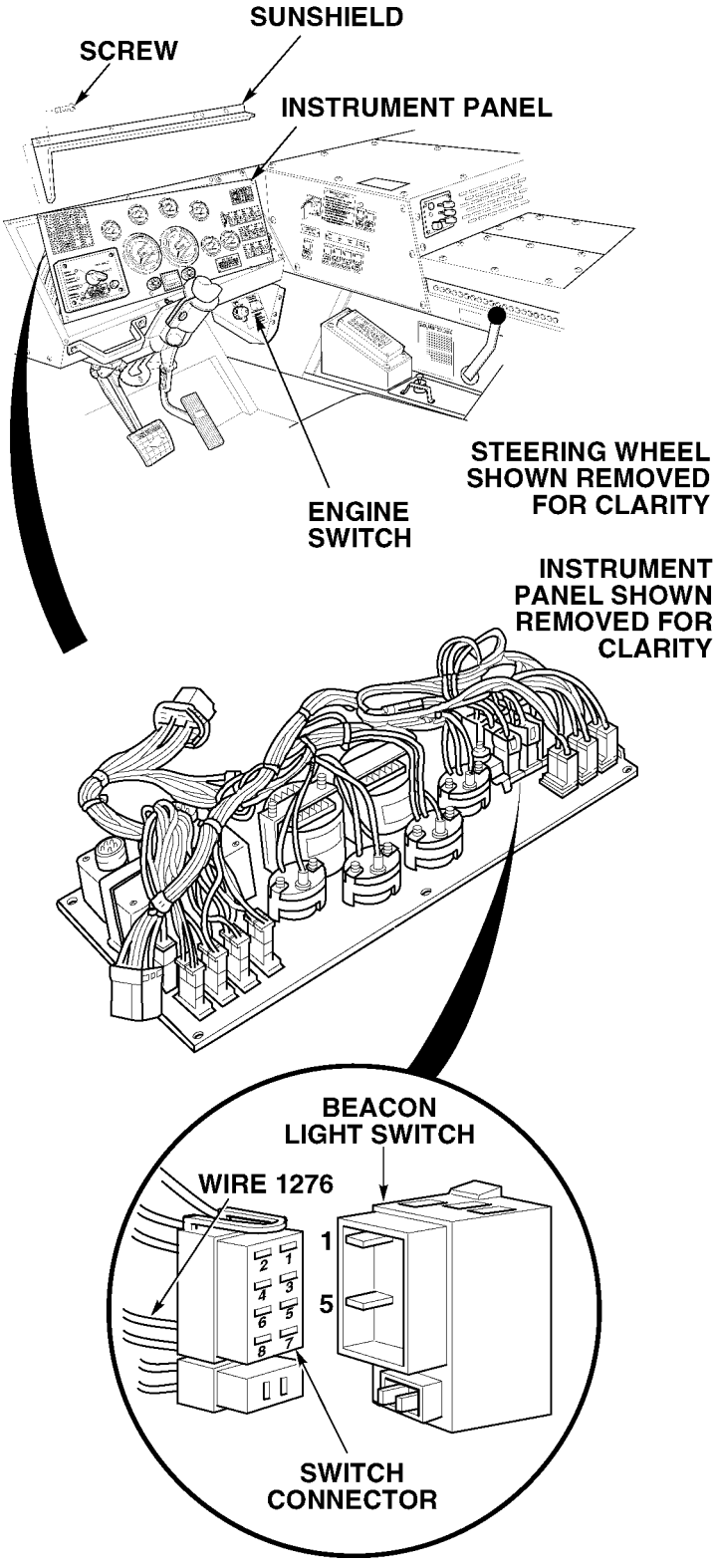
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

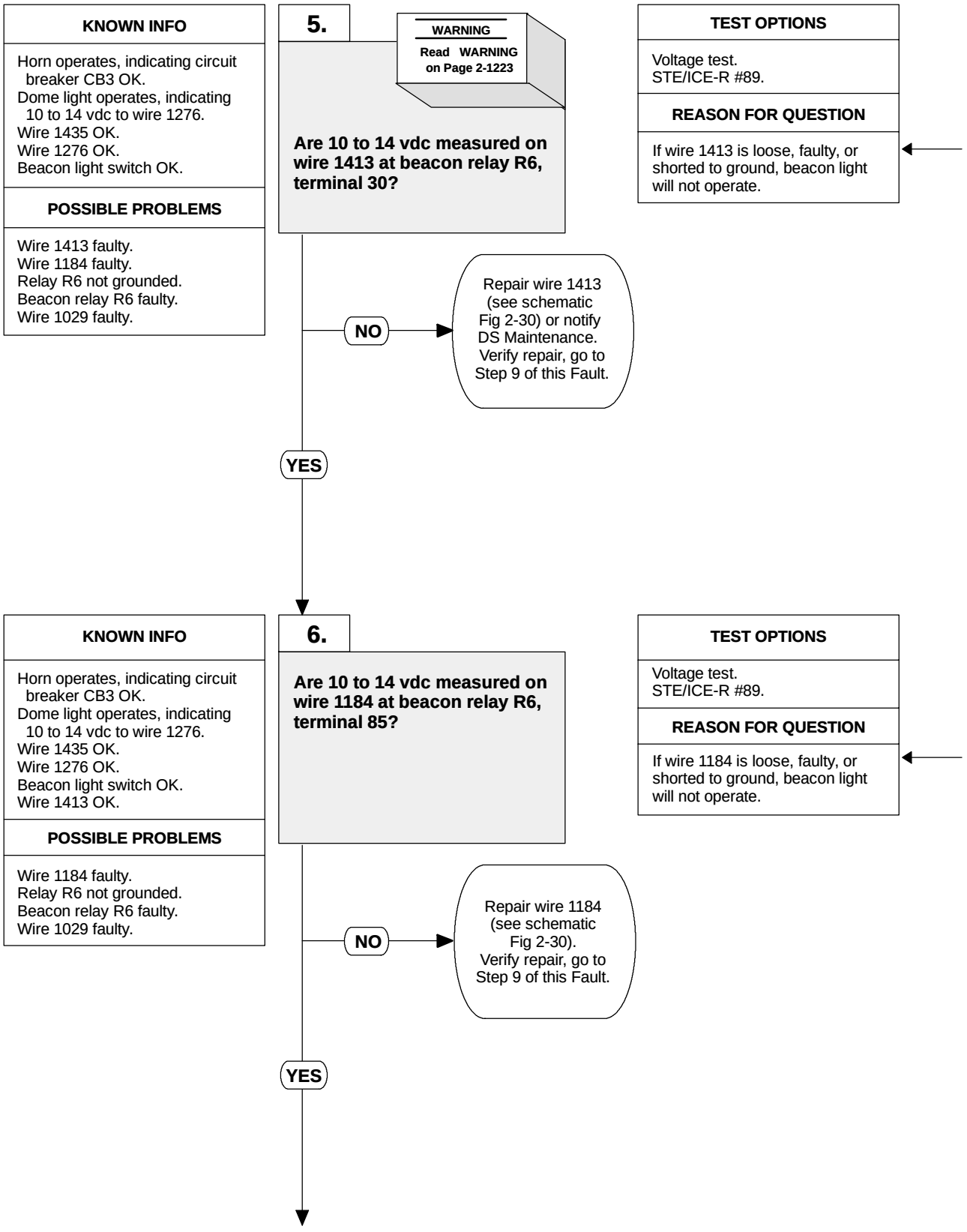
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove beacon light switch.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to wire 1276 at beacon light switch connector, terminal 5.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1276 (see schematic Fig 2-28).
  (b) If 10 to 14 vdc are present, wire 1276 is OK.
(8) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Turn on beacon light switch (TM 9-2320-364-10).
(2) Set multimeter select switch to ohms.
(3) Is there continuity between terminals 1 and 5 on beacon light switch?
  (a) If there is no continuity, replace beacon light switch (Para 7-27).
  (b) If there is continuity, beacon light switch is OK.
(3.1) Turn off beacon light switch.
(4) Install beacon light switch.
(5) Install instrument panel and sunshield with ten screws.



9. BEACON LIGHT DOES NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

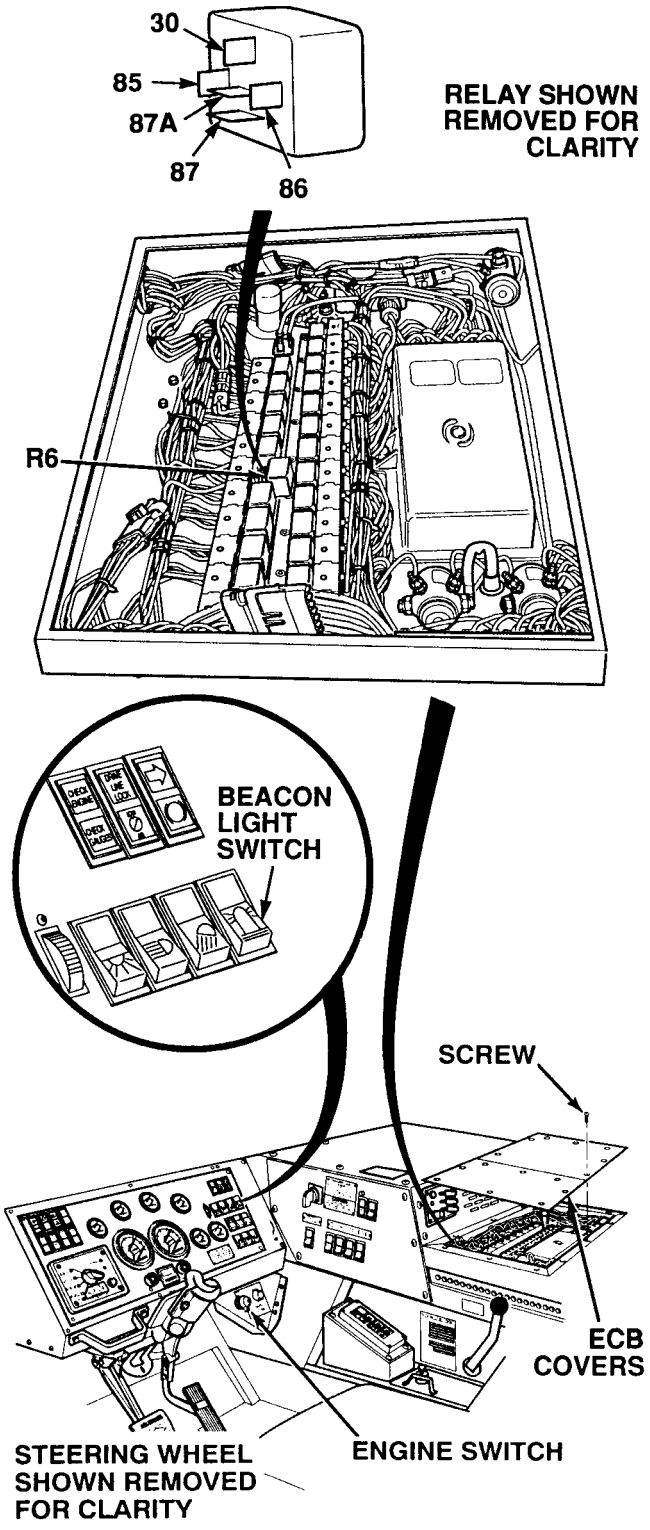
Relay tests must be performed with relay partially removed.

VOLTAGE TEST

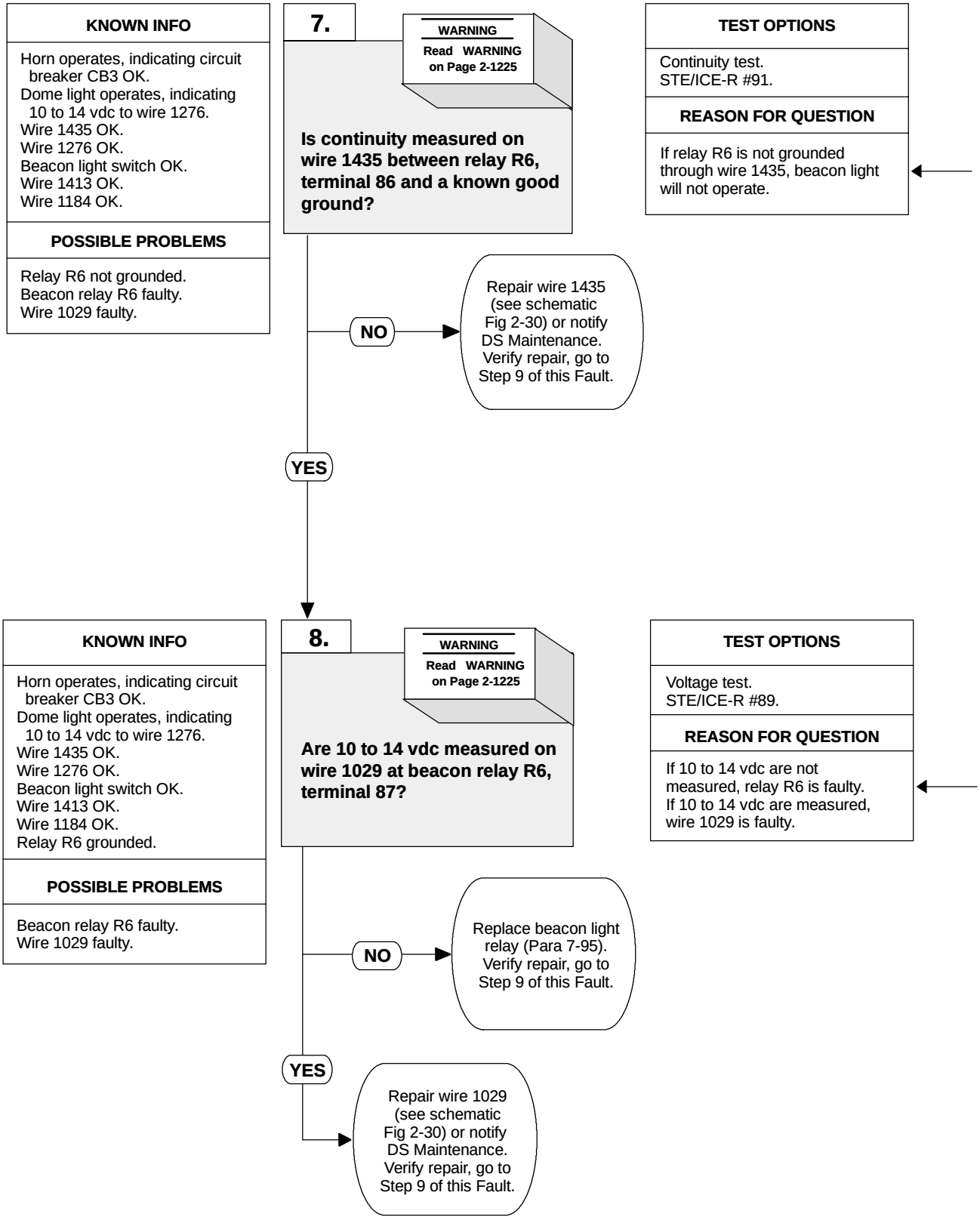
(1) Remove 15 screws and two ECB covers.
(2) Pull beacon relay R6 out of socket enough to access terminals with a test probe.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to wire 1413 at beacon relay R6, terminal 30.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
(7) Turn on beacon light switch.
  (a) If 10 to 14 vdc are not present, repair wire 1413 (see schematic Fig 2-30).
  (b) If 10 to 14 vdc are present, wire 1413 is OK.
(7.1) Turn off beacon light switch.
(8) Turn OFF ENGINE switch.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1184 at beacon relay R6, terminal 85.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, repair wire 1184 (see schematic Fig 2-30) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1184 is OK.
(4) Turn OFF ENGINE switch.



9. BEACON LIGHT DOES NOT OPERATE (CONT).



WARNING

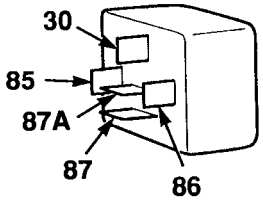
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

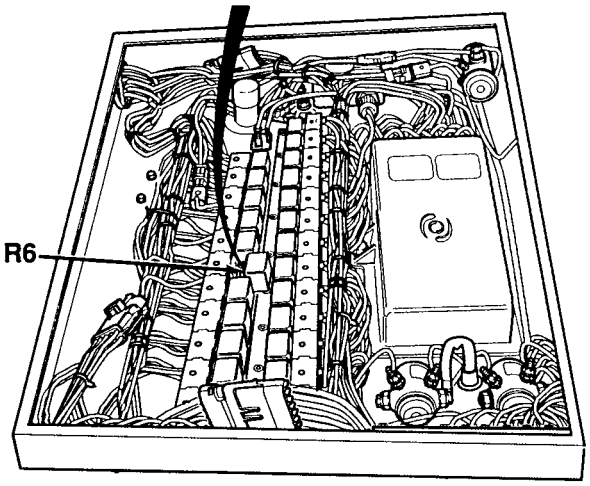
Relay tests must be performed with relay partially removed.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between relay R6, terminal 86 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (schematic Fig 2-30).
  (b) If there is continuity, wire 1435 is OK.



RELAY SHOWN REMOVED FOR CLARITY

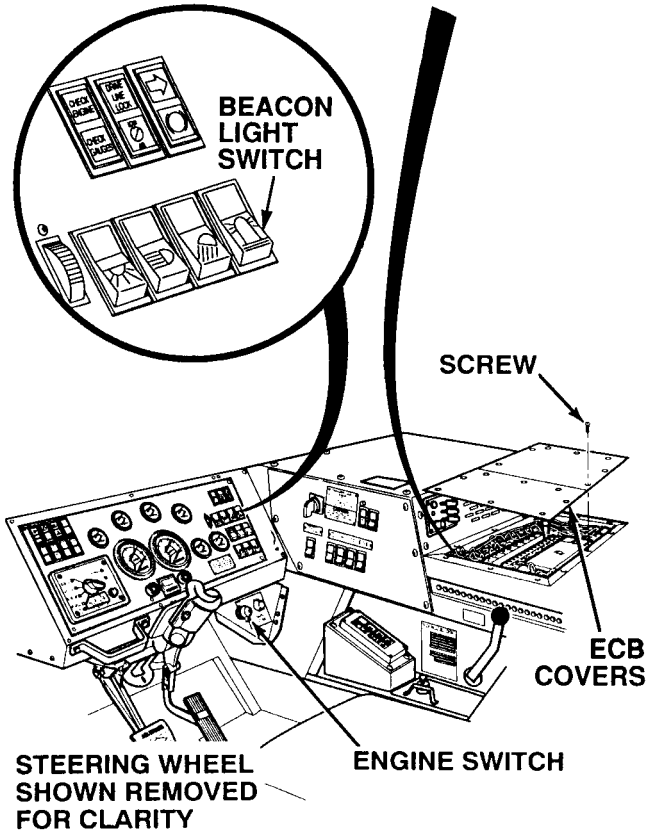


NOTE

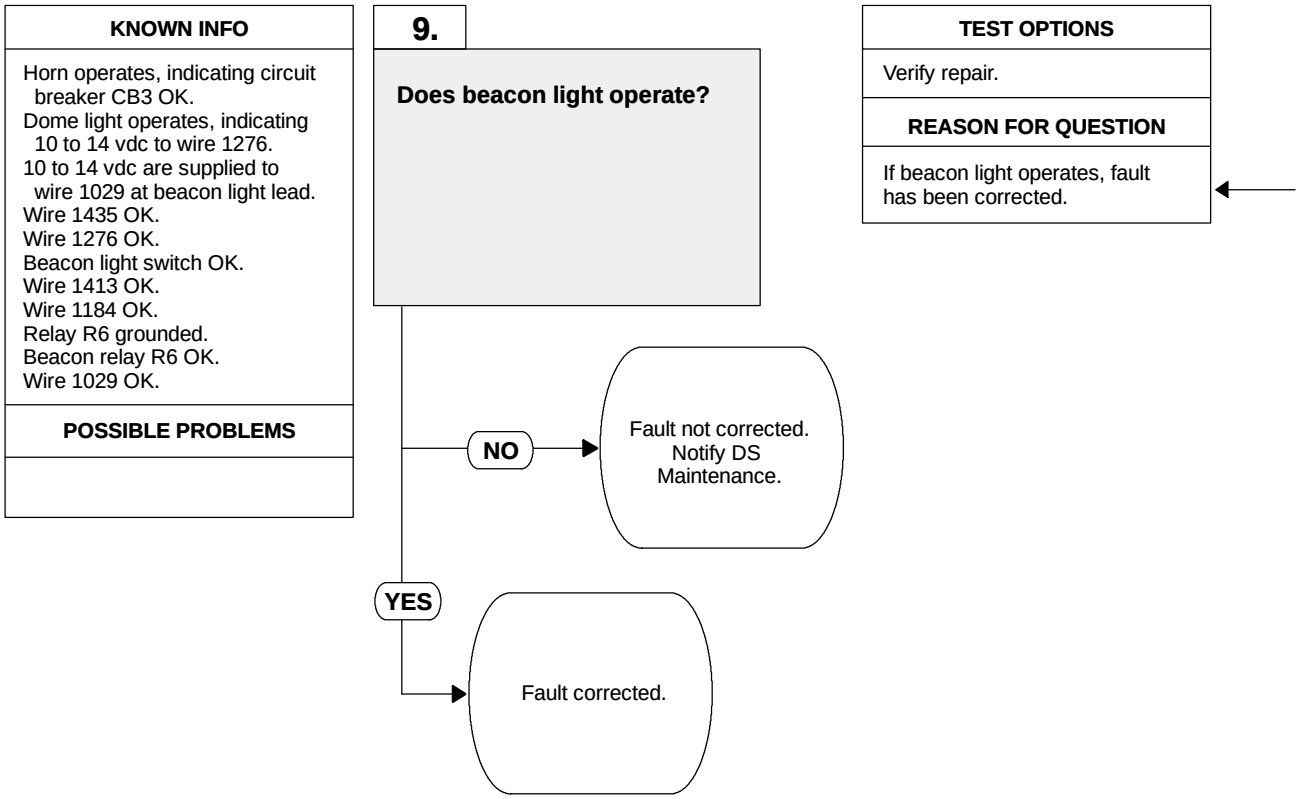
The use of an insulated jumperwire may be required to perform voltage test.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1029 at beacon relay R6, terminal 87.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on beacon light switch.
  (a) If 10 to 14 vdc are not present, perform Steps (6) through (8) below and replace relay R6 (Para 7-95).
  (b) If 10 to 14 vdc are present, perform Steps (6) and (7) below and repair wire 1029 (see schematic Fig 2-30) or notify DS Maintenance.
(6) Turn off beacon light switch.
(7) Turn OFF ENGINE switch.
(8) Push relay R6 completely in to socket.
(9) Install two ECB panels and 15 screws.

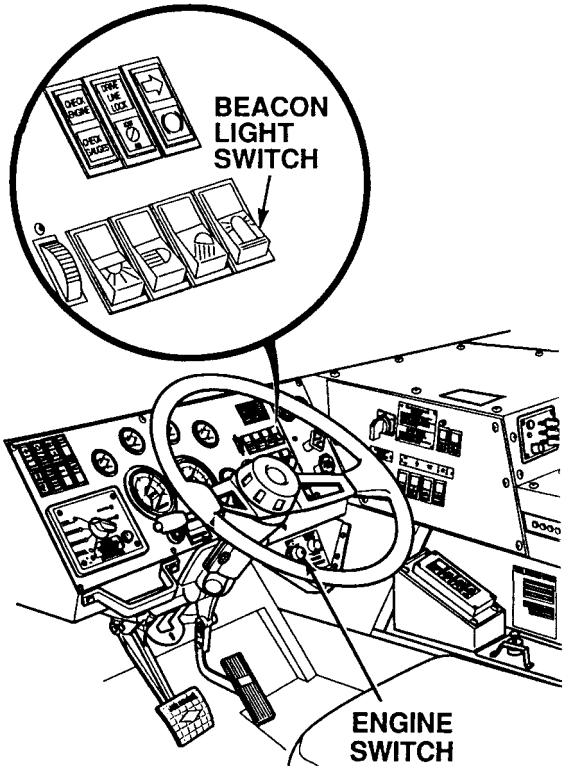


9. BEACON LIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on beacon light switch.
(3) Inspect beacon light operation.
    (a) If beacon light does not operate, fault not corrected. Perform Steps (4) through (6) below and notify DS Maintenance.
    (b) If beacon light does operate, fault has been corrected.
(4) Turn off beacon light switch.
(5) Turn OFF ENGINE switch.
(6) Close engine cover.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

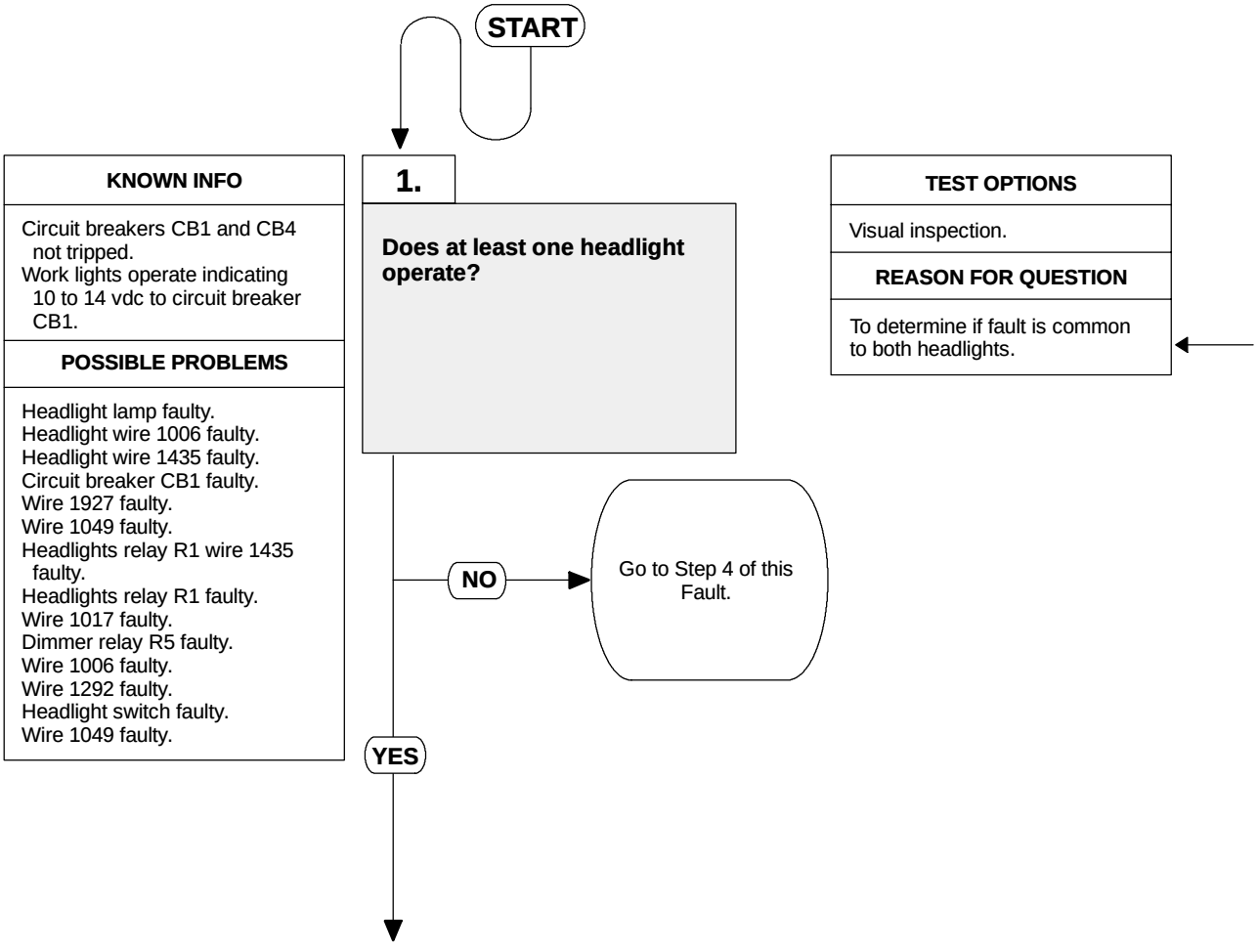
10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM).

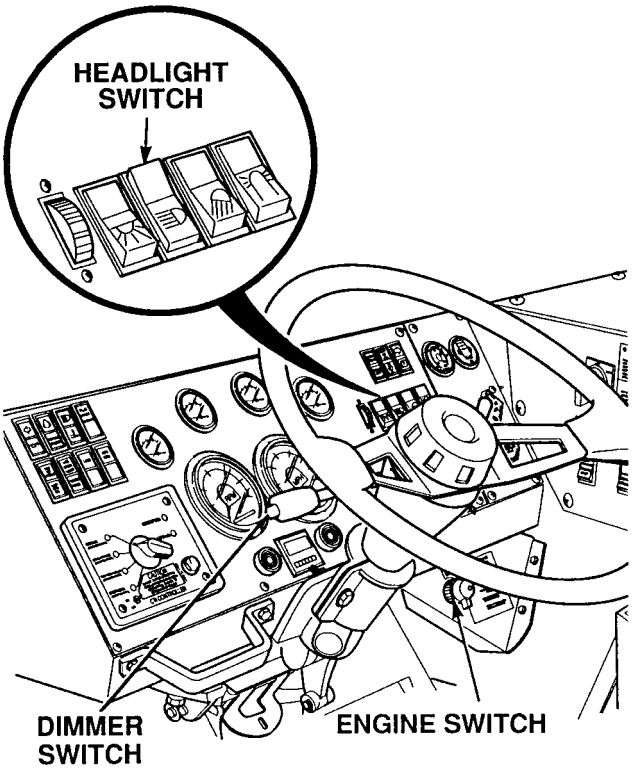
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

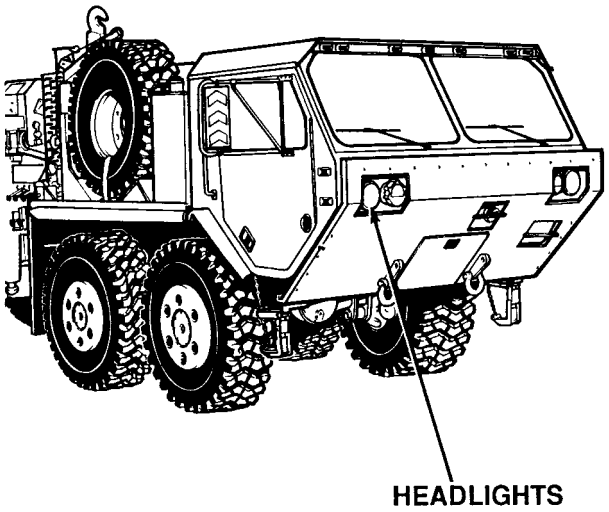
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



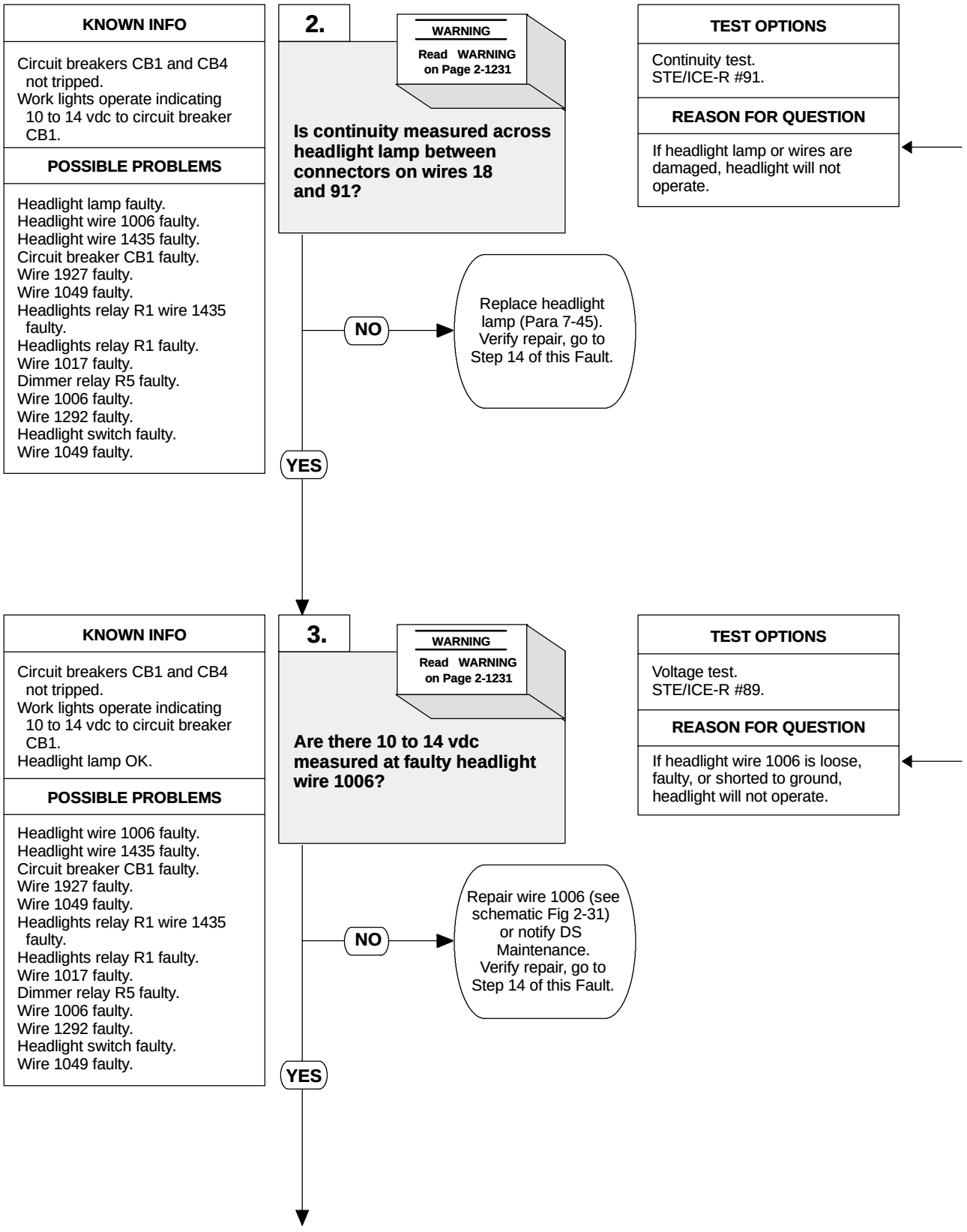


VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on headlight switch.
(3) Set dimmer switch on low beam.
(4) Inspect both headlights for operation.
    (a) If both headlights fail to operate, fault is between circuit breaker CB1 and headlights. Turn OFF ENGINE switch and go to Step 4 of this Fault.
    (b) If one headlight operates, fault is between faulty headlight lamp and wire 1006 first splice. Turn OFF ENGINE switch and go to Step 2 of this Fault.



10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).

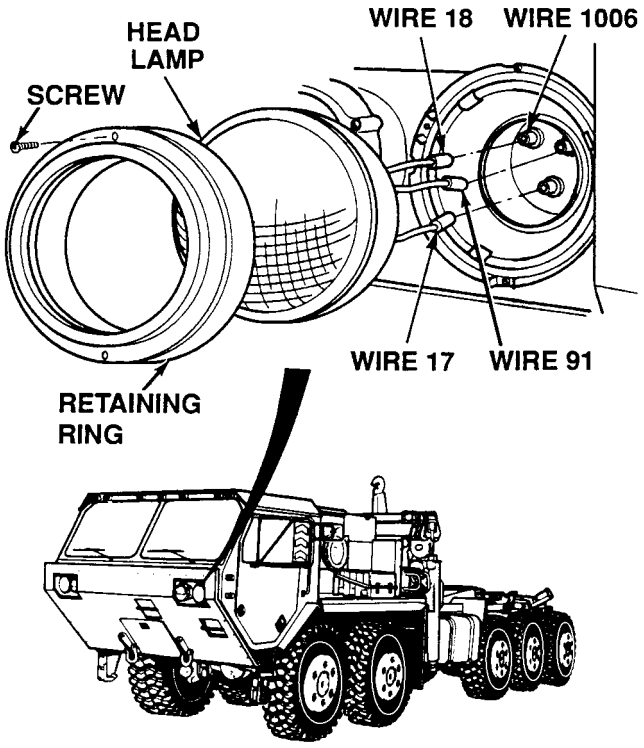


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

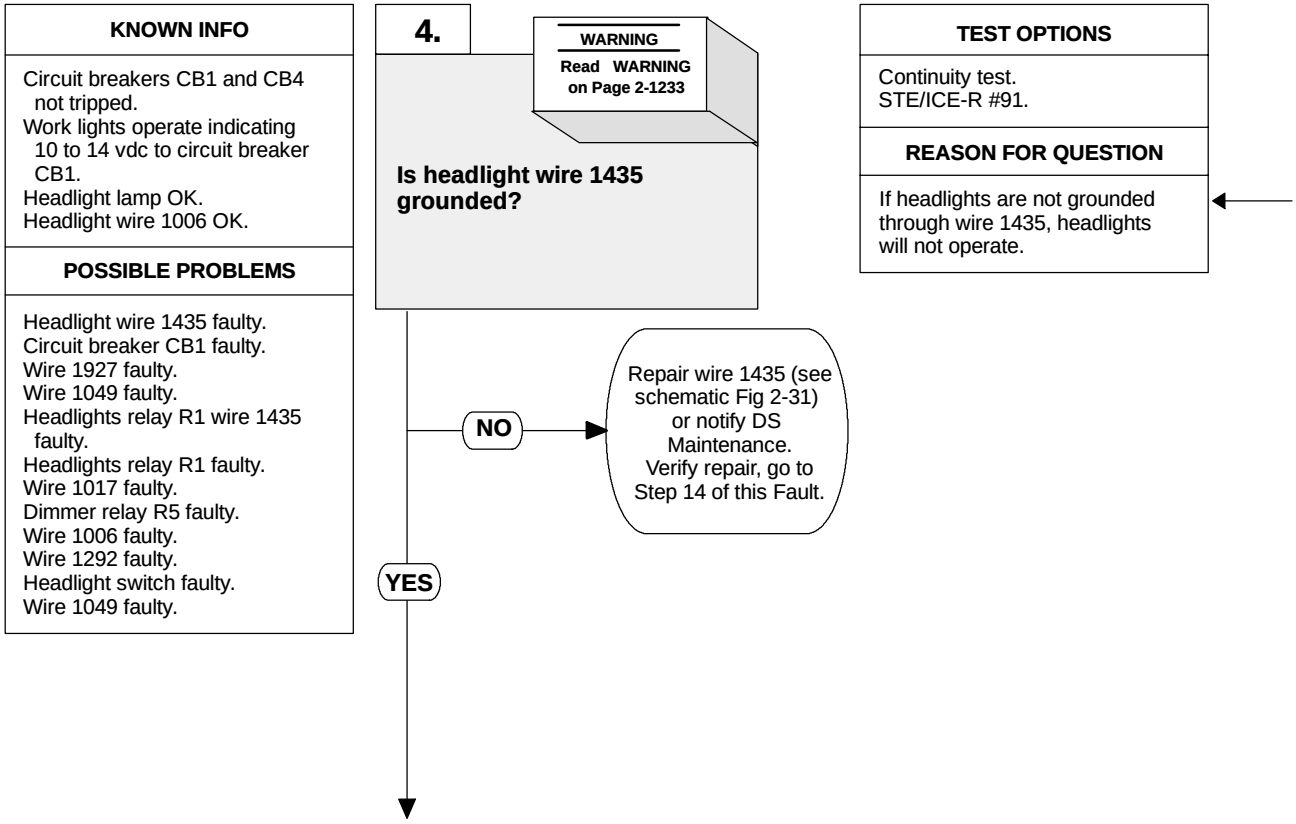
(1) Remove three screws and headlight retaining ring.
(2) Remove headlight lamp.
(3) Disconnect wires 17, 18 and 91 at electrical connectors.
(4) Set multimeter select switch to ohms.
(5) Is there continuity across headlight lamp measured between connectors on wires 18 and 91?
    (a) If there is no continuity, replace headlight lamp (Para 7-45).
    (b) If there is continuity, headlight lamp is OK.



VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1006.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on headlight switch.
    (a) If 10 to 14 vdc are not present, perform Steps (6) and (7) below and repair wire 1006 (see schematic Fig 2-31) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1006 is OK.
(6) Turn off headlight switch.
(7) Turn OFF ENGINE switch.

10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).

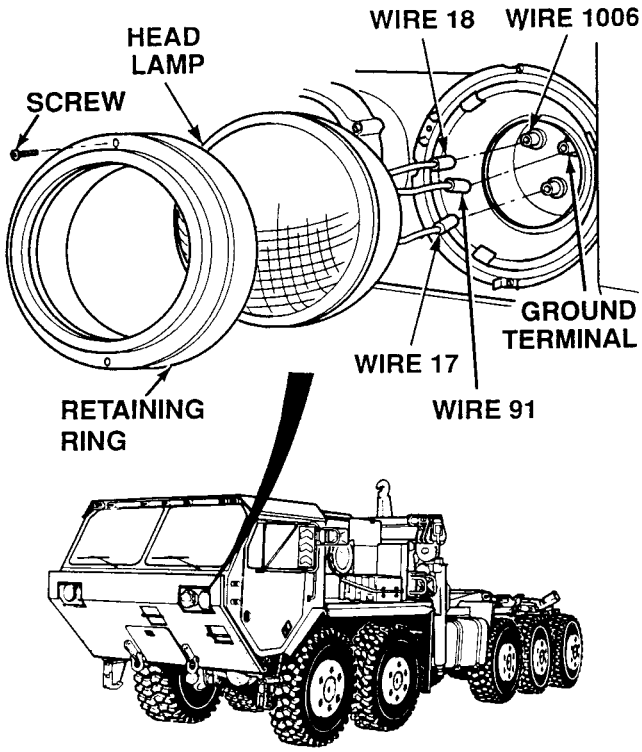


WARNING

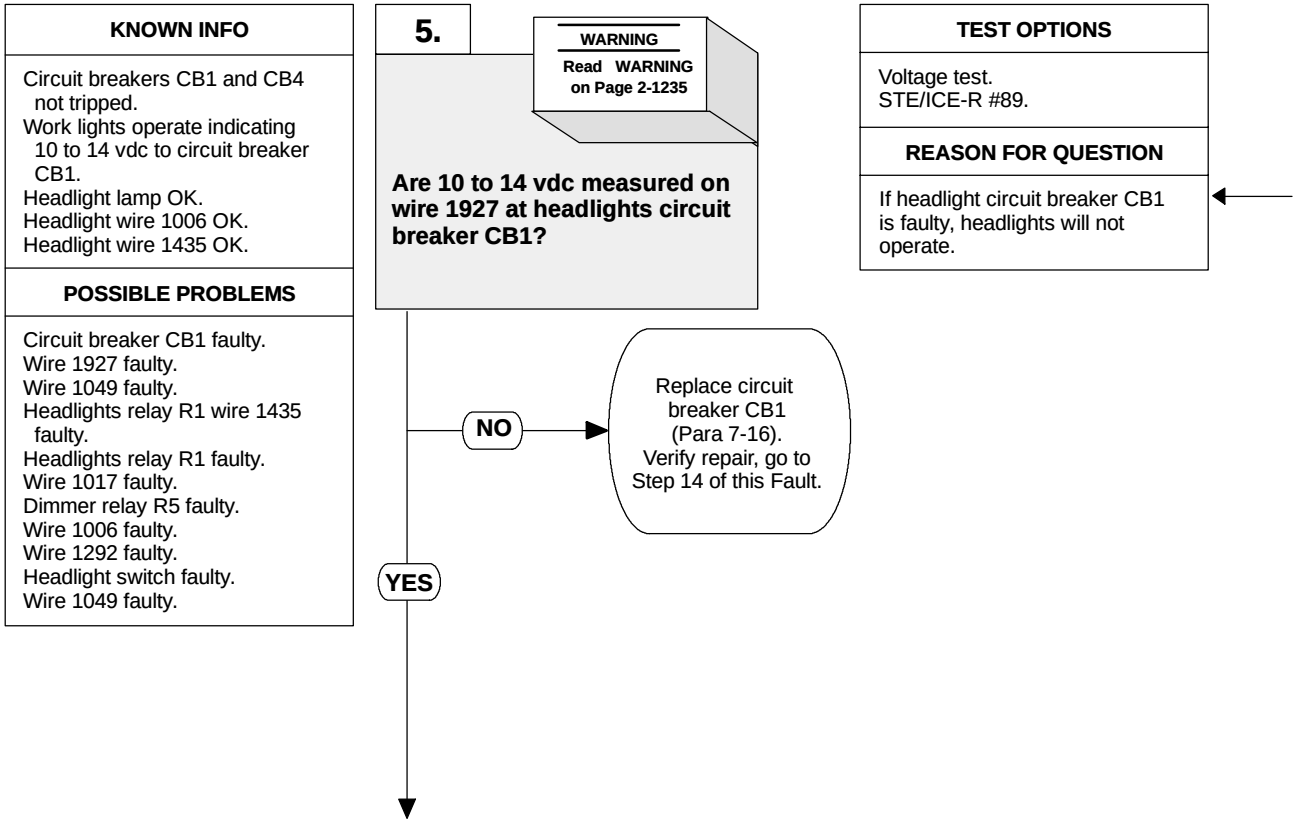
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove three screws and headlight retaining ring.
(2) Remove headlight lamp.
(3) Disconnect wires 17, 18 and 91 at electrical connectors.
(4) Set multimeter select switch to ohms.
(5) Is continuity measured between wire 1435, ground terminal and a known good ground?
    (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-31) or notify DS Maintenance.
    (b) If there is continuity, wire 1435 is OK.
(6) Connect headlight wires 17, 18 and 91.
(7) Install headlight lamp.
(8) Install headlight retaining ring and three screws.



10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).

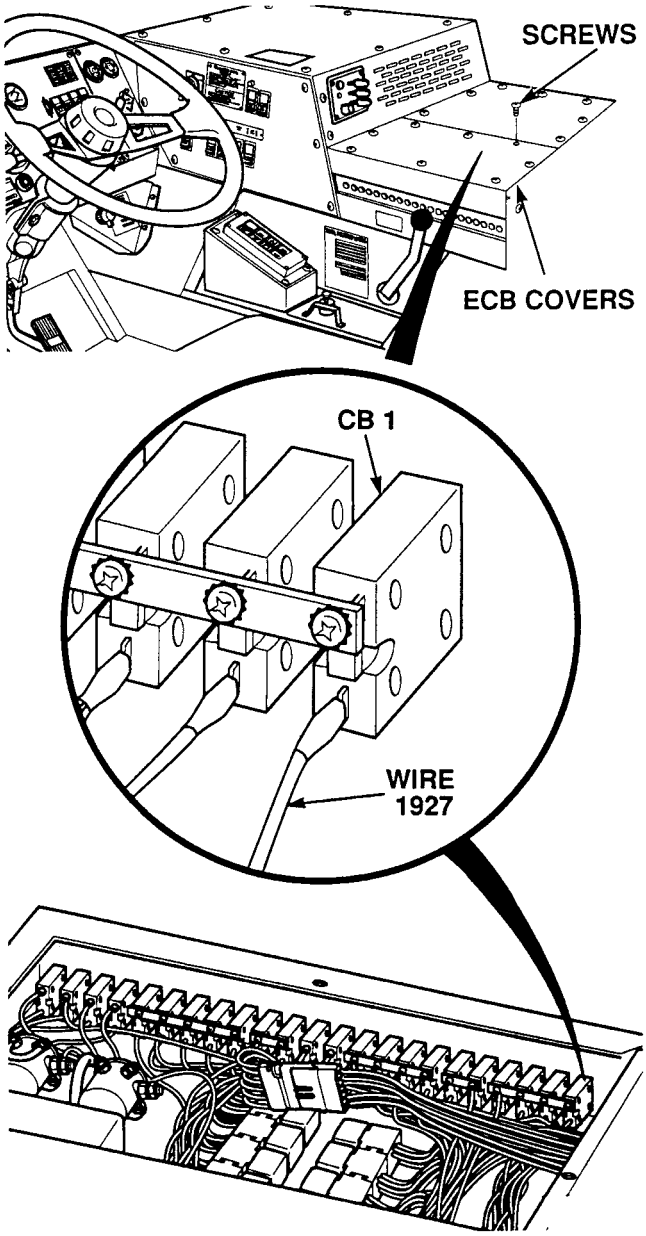


WARNING

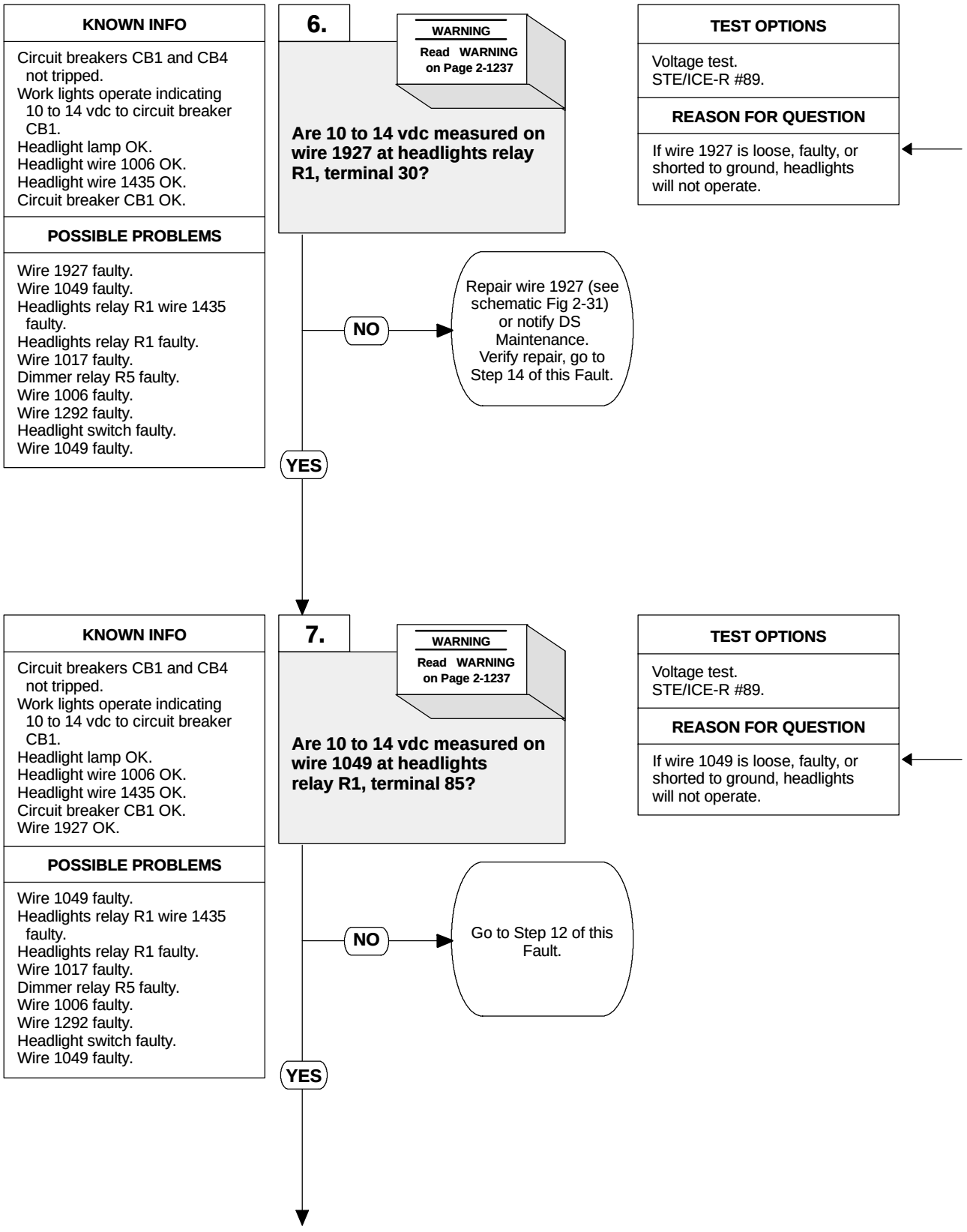
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Remove 15 screws and remove two ECB covers.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1927 at headlight circuit breaker CB1.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, replace circuit breaker CB1 (Para 7-16).
  (b) If 10 to 14 vdc are present, headlights circuit breaker CB1 is OK.
(6) Turn OFF ENGINE switch.



10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).



WARNING

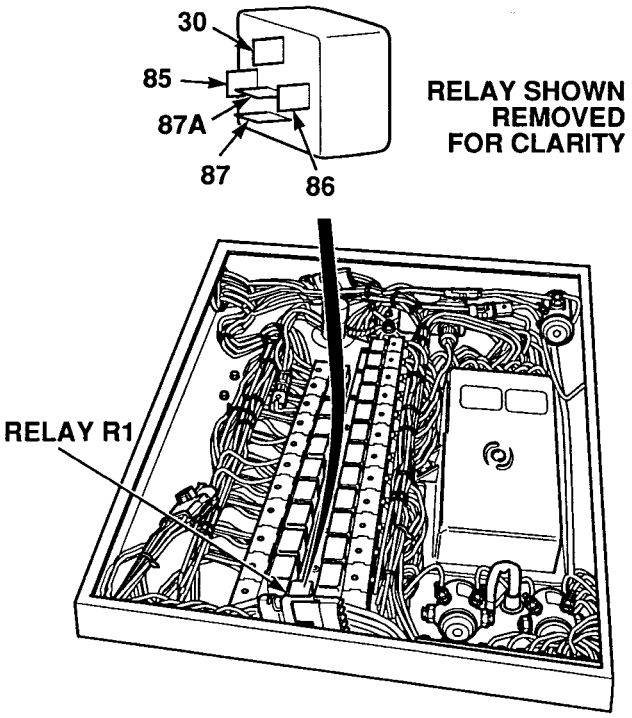
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay tests must be performed with relay partially removed.

VOLTAGE TEST

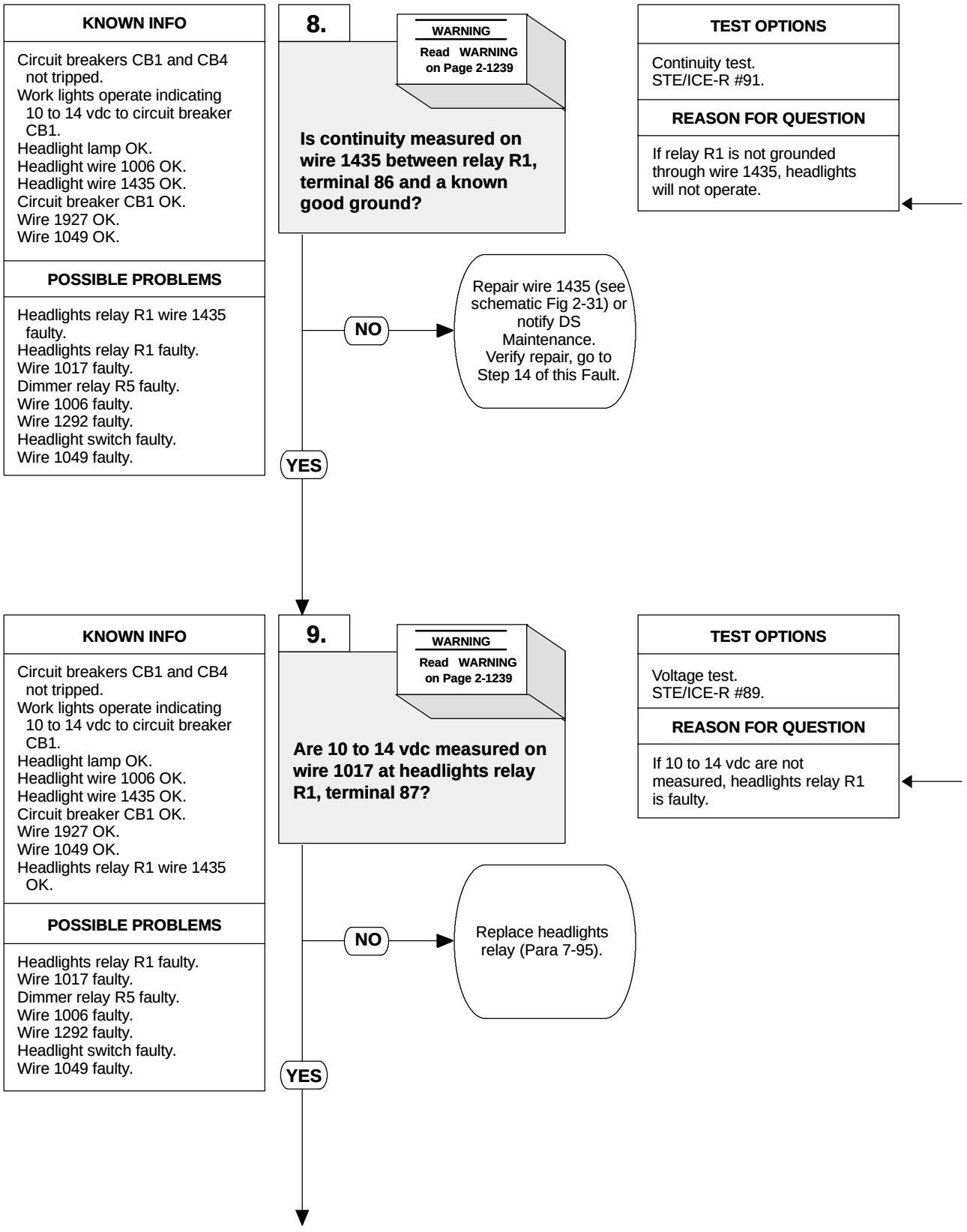
(1) Connect positive (+) multimeter lead to wire 1927 at headlights relay R1, terminal 30.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1927 between headlights relay R1 and headlights circuit breaker CB1 (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1927 is OK.
(4) Turn OFF ENGINE switch.



VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1049 at headlight relay R1, terminal 85.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
(4) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, go to Step 12 of this Fault.
  (b) If 10 to 14 vdc are present, wire 1949 is OK.
(5) Turn off headlight switch.
(6) Turn OFF ENGINE switch.

10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).



WARNING

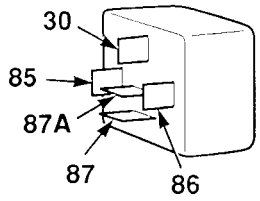
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

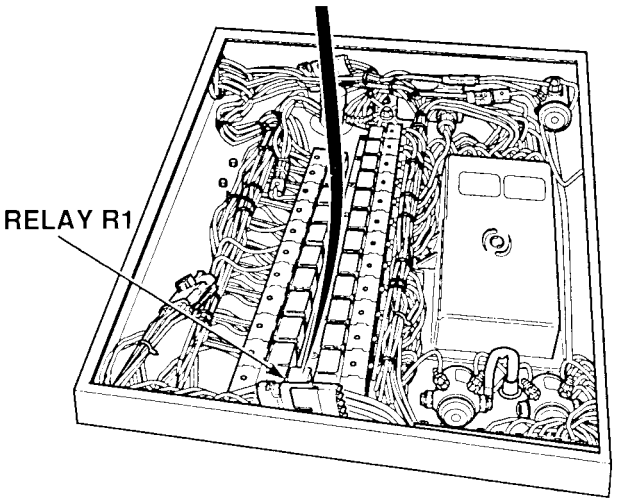
Relay tests must be performed with relay partially removed.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between relay R1, terminal 86 and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-31) or notify DS Maintenance.
   (b) If there is continuity, wire 1435 is OK.



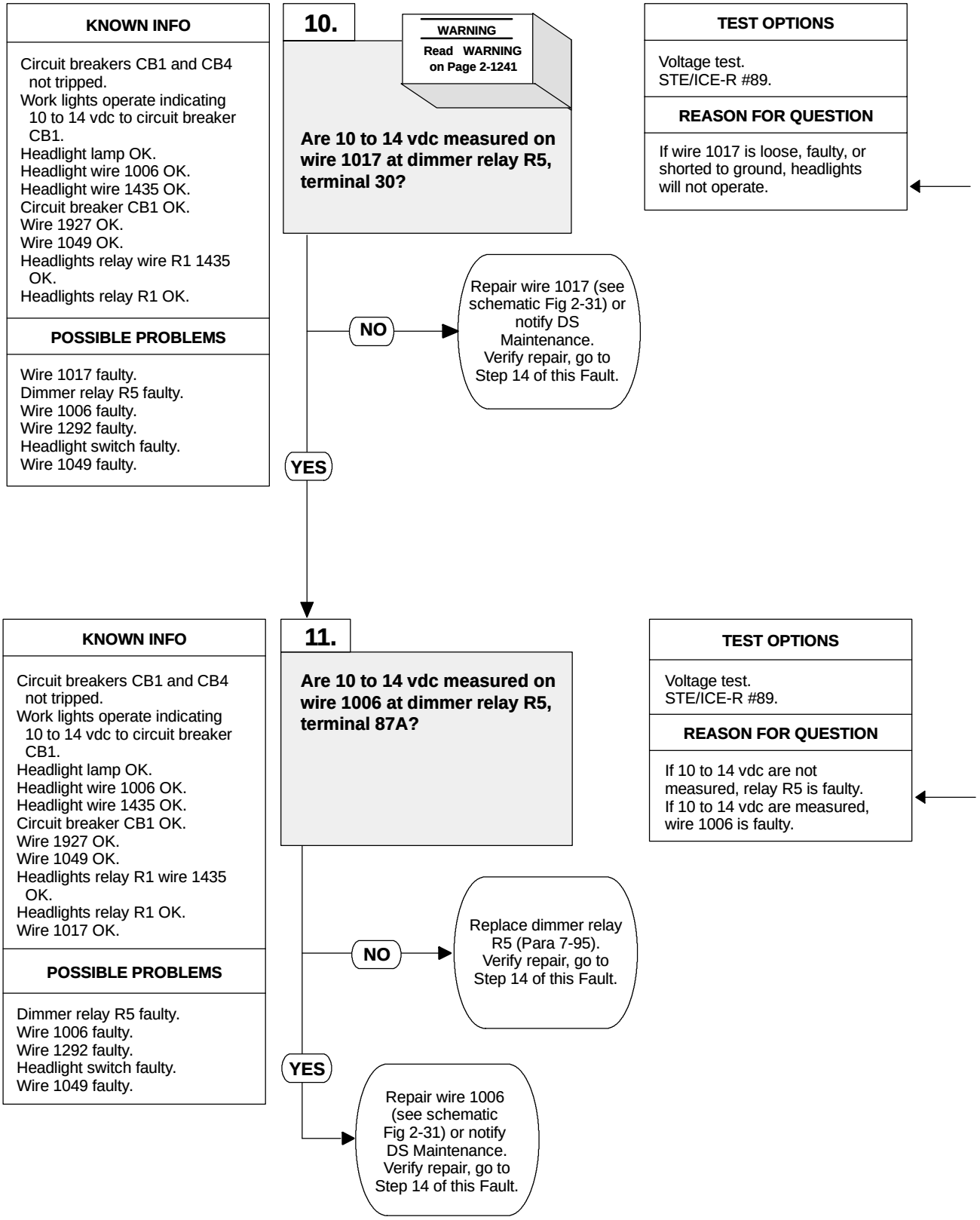
RELAY SHOWN REMOVED FOR CLARITY



VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1017 at headlight relay R1, terminal 87.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
   (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace headlights relay R1 (Para 7-95).
   (b) If 10 to 14 vdc are present, headlights relay R1 is OK.
(5) Turn OFF ENGINE switch.

10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

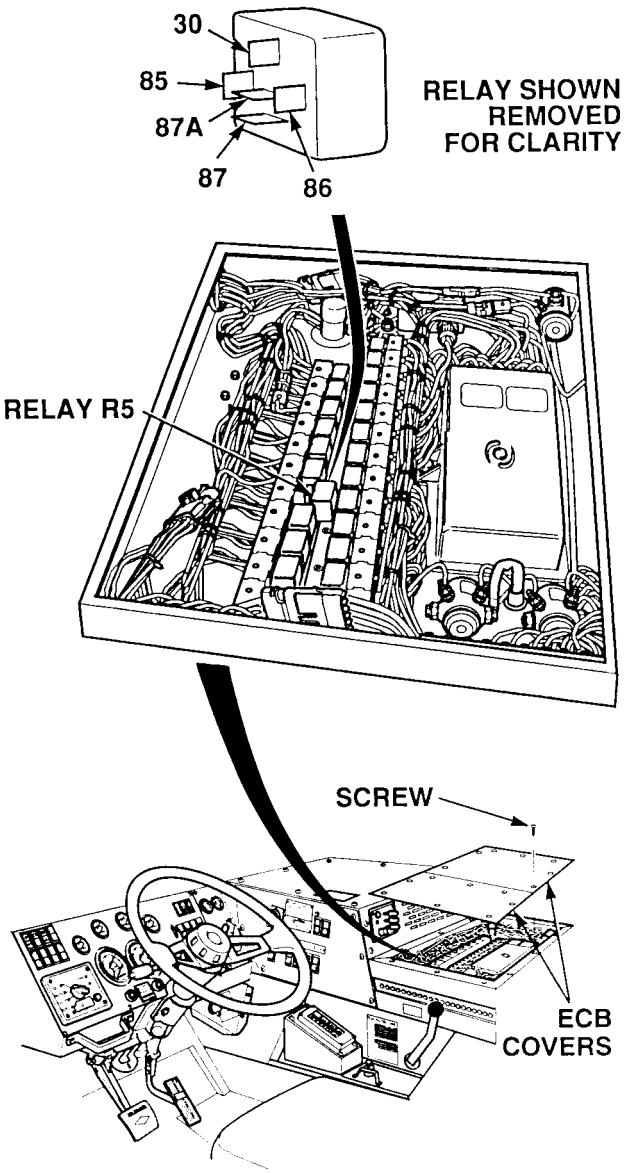
Relay tests must be performed with relay partially removed.

VOLTAGE TEST

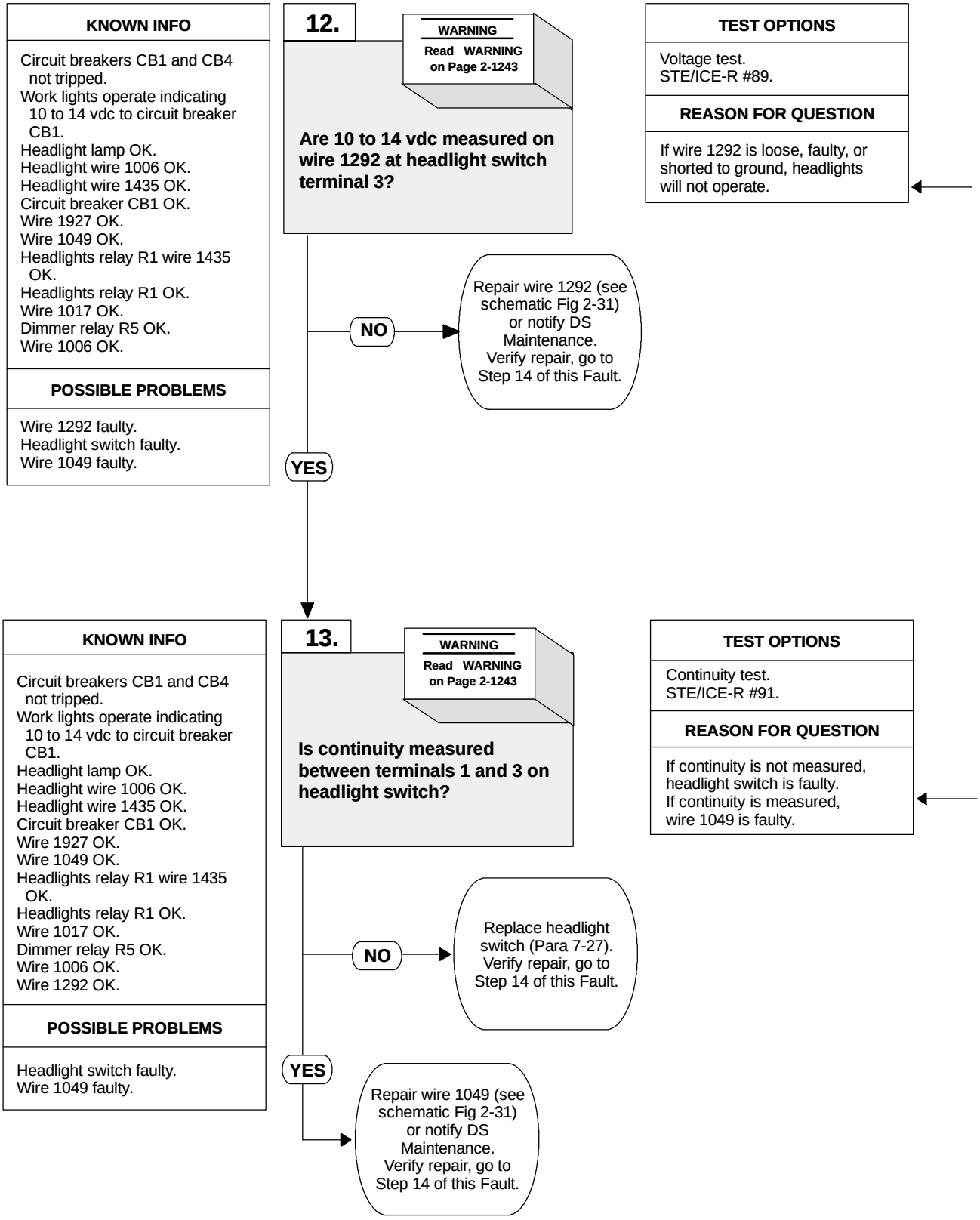
(1) Connect positive (+) multimeter lead to wire 1017 at dimmer relay R5, terminal 30.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1017 between dimmer relay R5 and first splice from relay R5 (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1017 is OK.
(4) Turn OFF ENGINE switch.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1006 at headlight dimmer relay R5, terminal 87A.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
(4) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, perform Steps (5) through (7) below and replace dimmer relay R5 (Para 7-95).
  (b) If 10 to 14 vdc are present, perform Steps (5) through (7) below and repair wire 1006 (see schematic Fig 2-31) or notify DS Maintenance.
(5) Turn OFF ENGINE switch.
(6) Turn off headlight switch.
(7) Install 15 screws and two ECB covers.



10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).

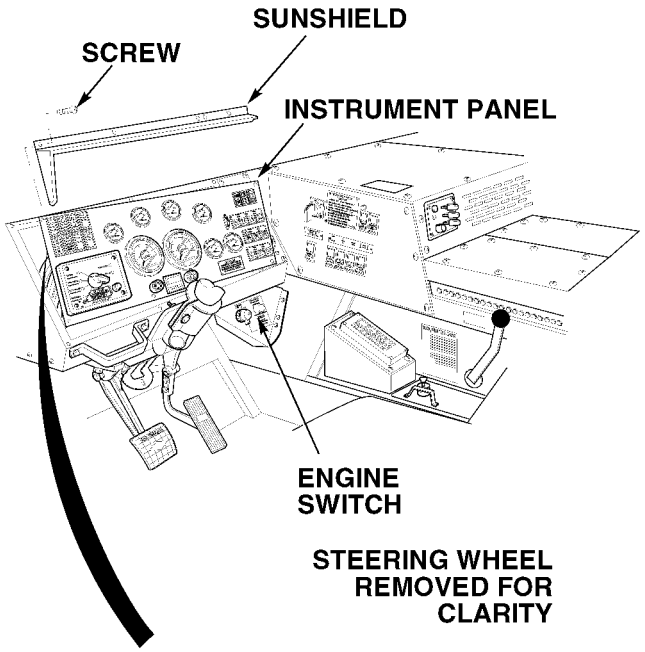


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

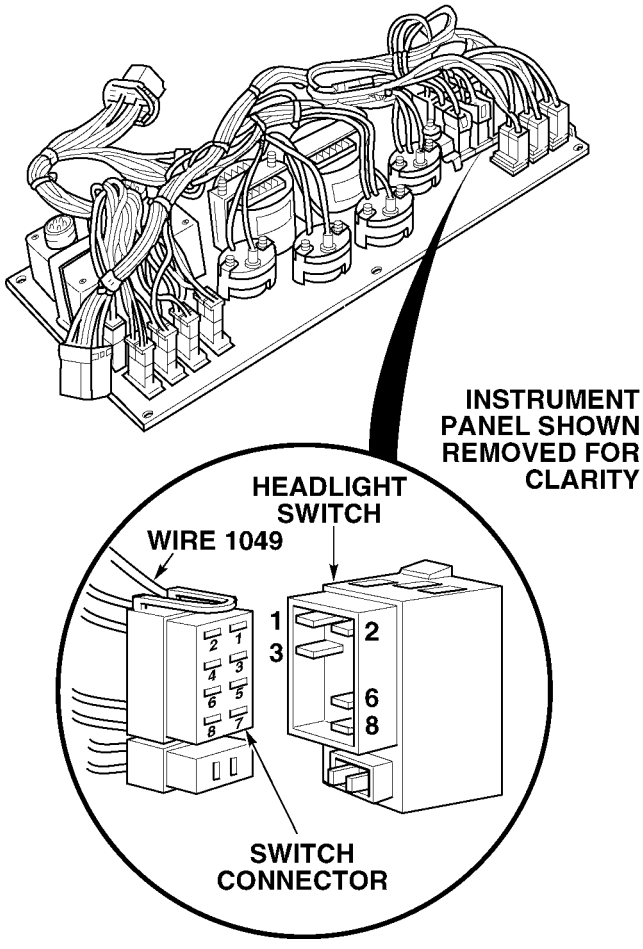
VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect headlight switch connector.
(4) Connect positive (+) multimeter lead to wire 1292 at headlight switch, terminal 3.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1292 between headlight switch and first splice to connector MC2, terminal Q (see schematic Fig 2-31 and FO 1) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1292 is OK.
(7) Turn OFF ENGINE switch.

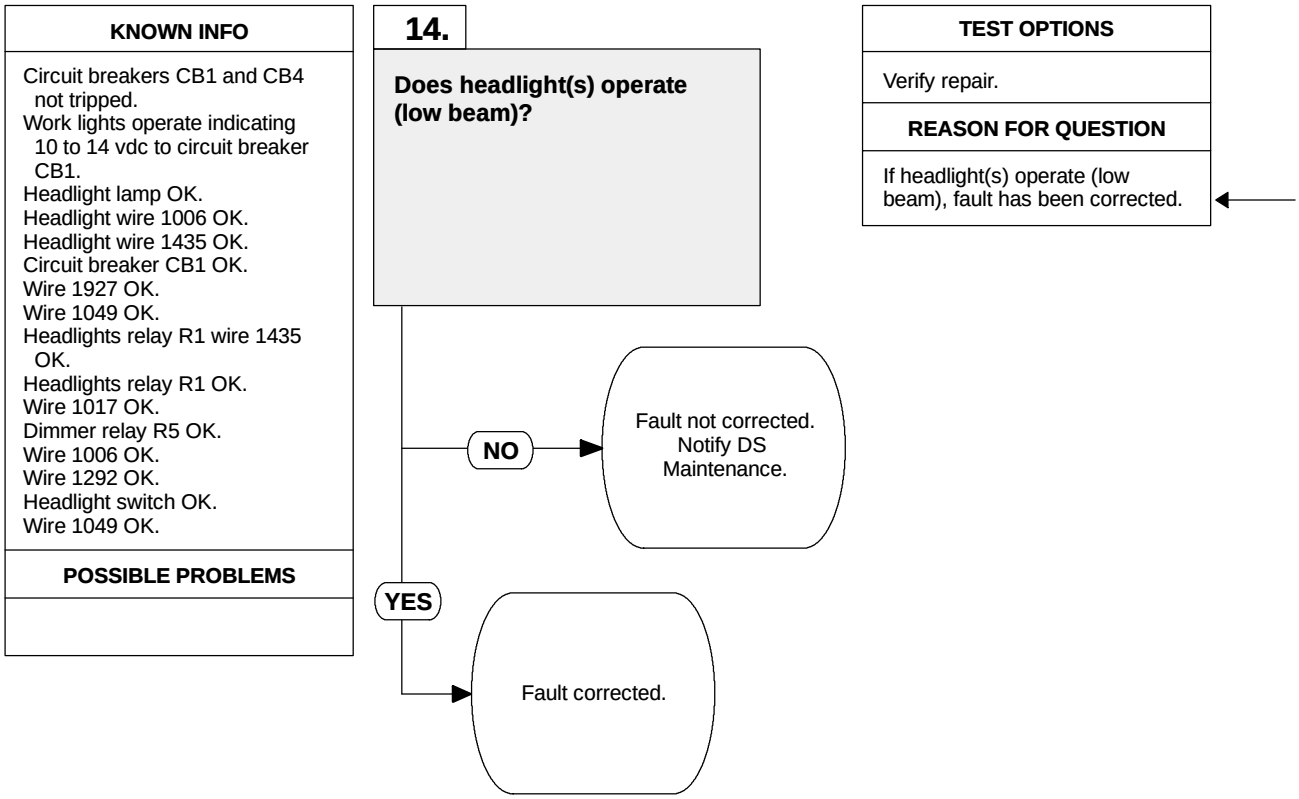


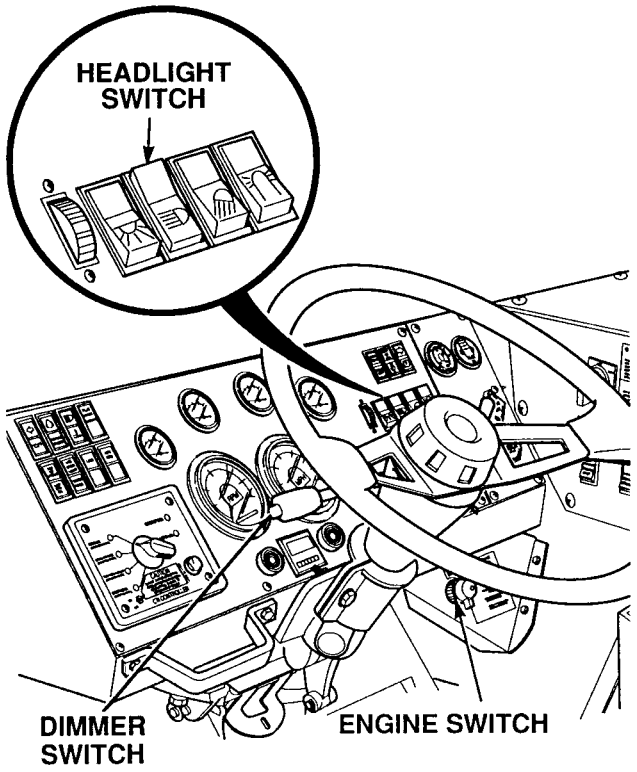
CONTINUITY TEST

(1) Turn on headlight switch (TM 9-2320-364-10).
(2) Set multimeter select switch to ohms.
(3) Is continuity measured between headlight switch, terminal 1 and terminal 3.
  (a) If there is no continuity, replace headlight switch (Para 7-27).
  (b) If there is continuity, turn off headlight switch and repair wire 1049 between headlight switch and headlights relay R1 (see schematic Fig 2-31) or notify DS Maintenance.
(4) Turn off headlight switch.
(5) Connect headlight switch connector.
(6) Install instrument panel and sunshield with ten screws.
(7) Install 15 screws and two ECB covers.



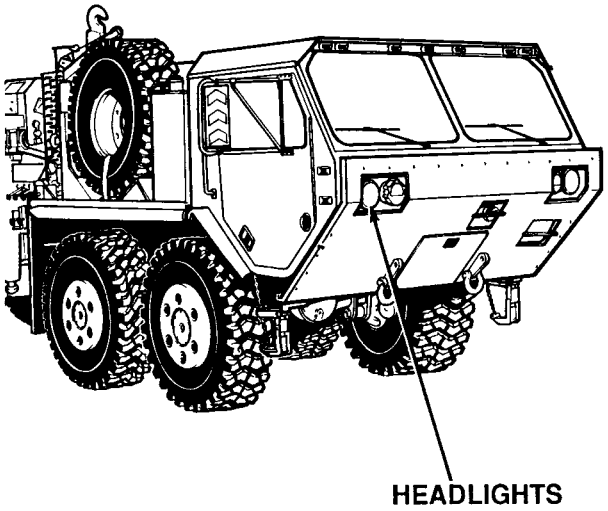
10. HEADLIGHT(S) DO NOT OPERATE (LOW BEAM) (CONT).





VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on headlight switch.
(3) Observe headlights.
  (a) If headlight(s) do not operate, fault not corrected. Perform Steps (4) and (5) below and notify DS Maintenance.
  (b) If headlight(s) operate, fault has been corrected.
(4) Turn off headlight switch.
(5) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

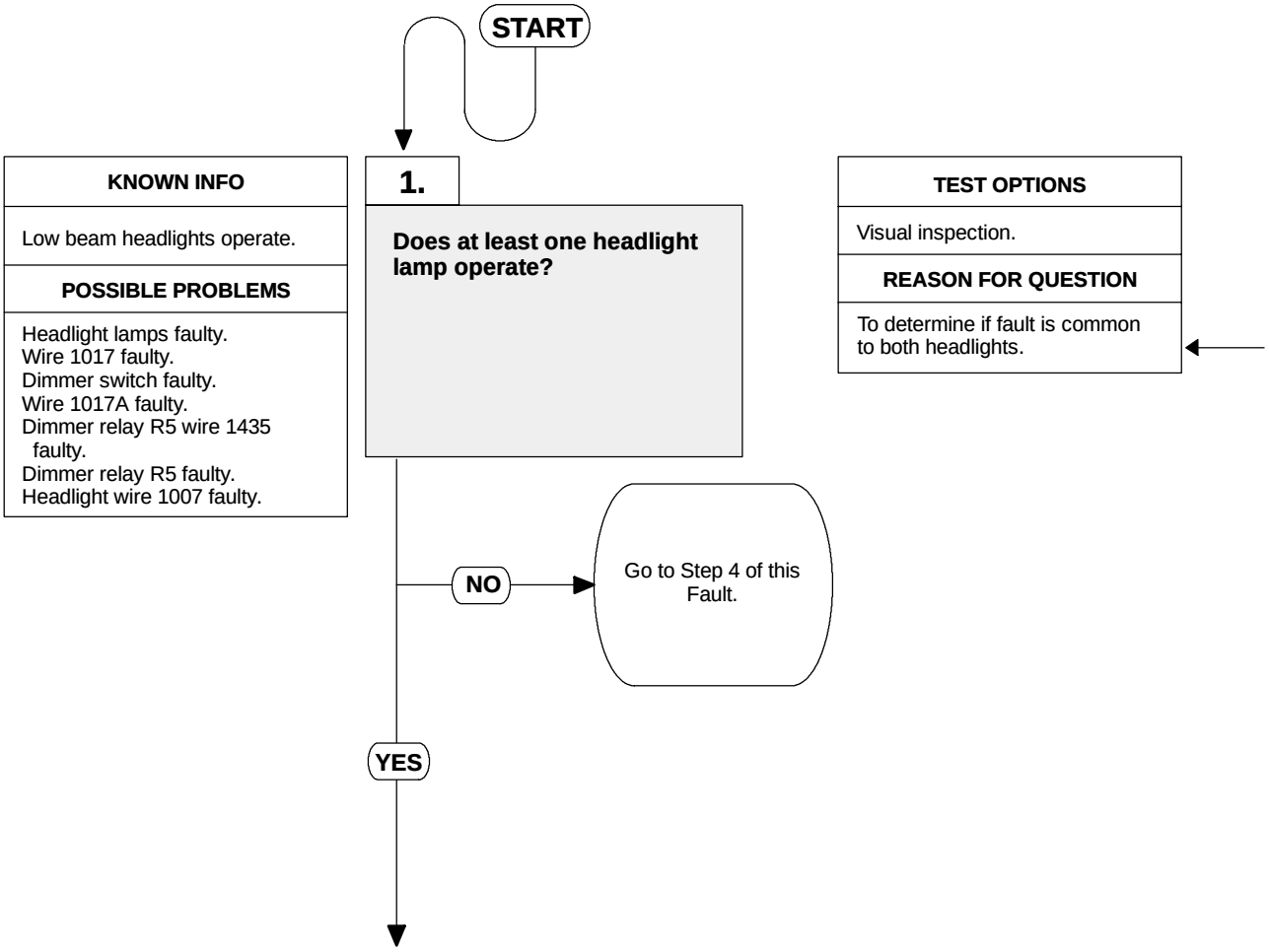
11. HEADLIGHT(S) DO NOT OPERATE (HIGH BEAM).

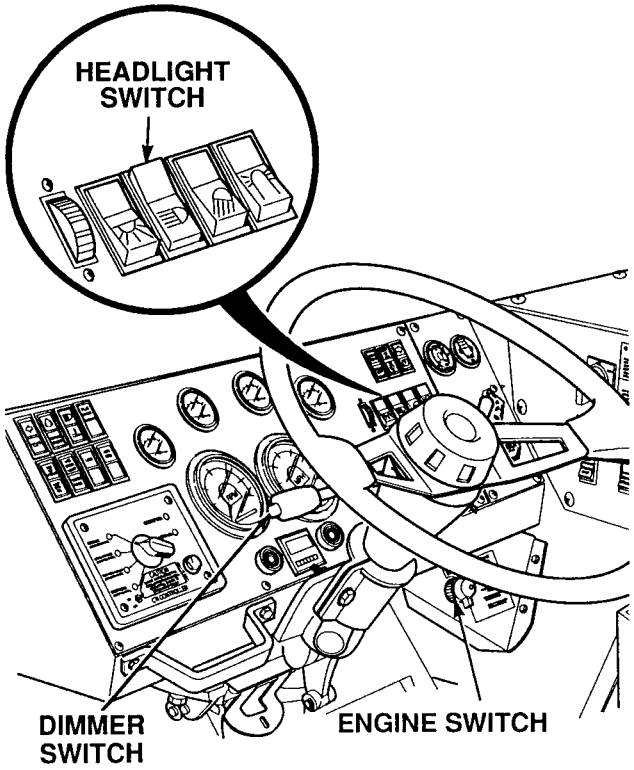
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

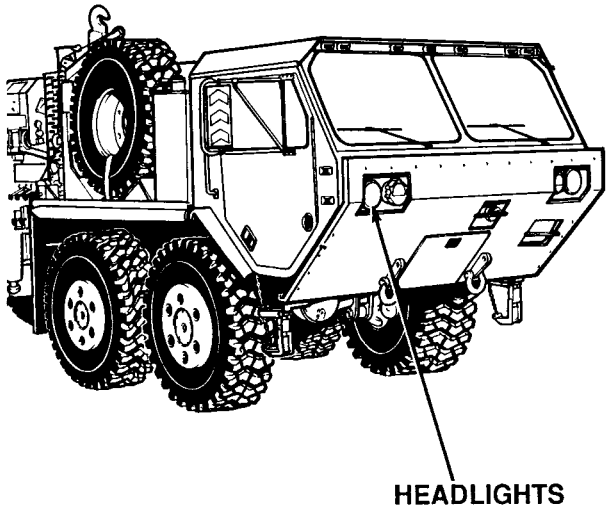




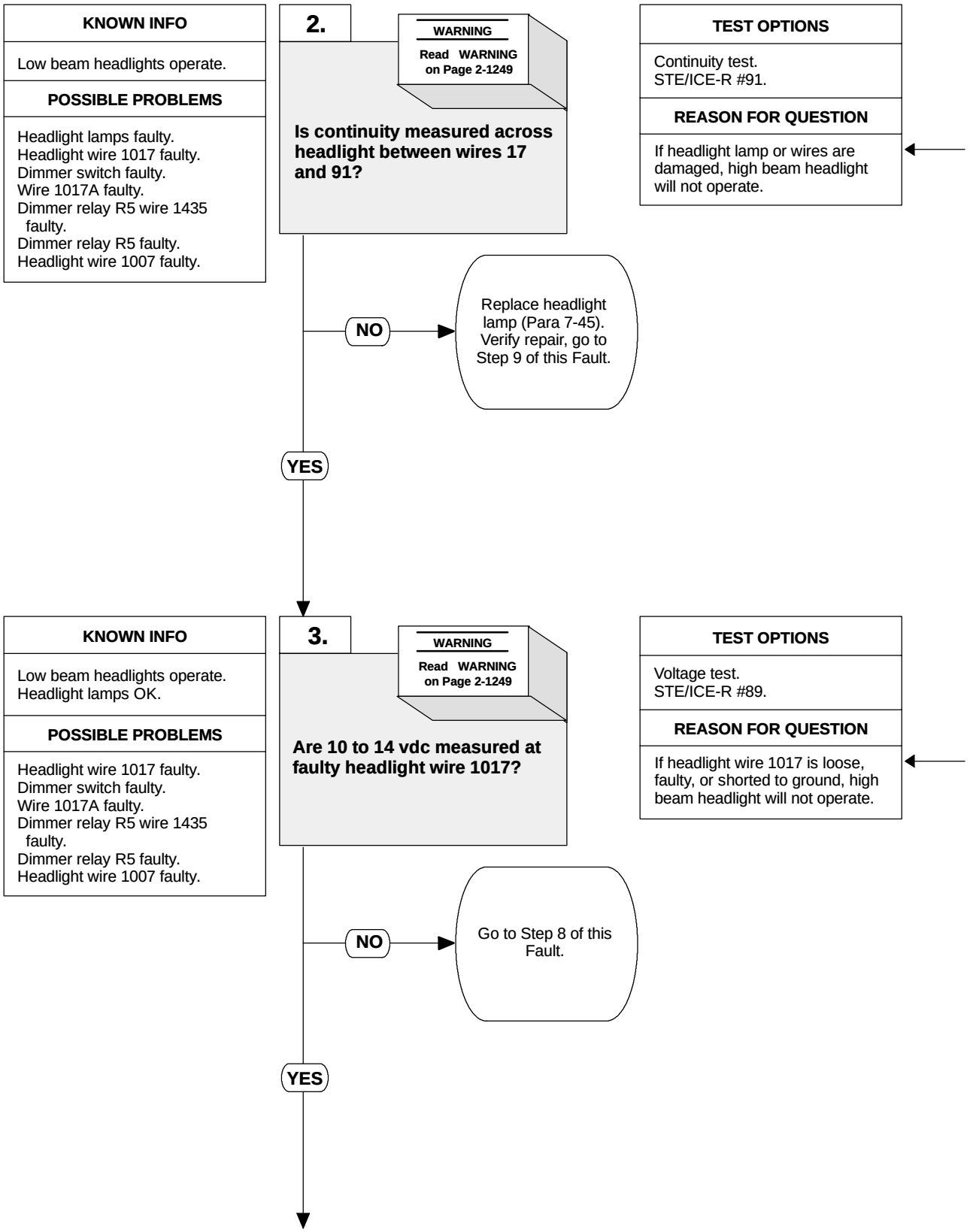
NOTE

The blue high beam light in the instrument panel indicates high beam lights are turned on.

VISUAL INSPECTION
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Turn on headlight switch. (3) Set dimmer switch to high beam. (4) Inspect both headlights for operation. (a) If both headlights fail to operate, fault is between dimmer switch and headlights. Perform Steps (5) and (6) below and go to Step 4 of this Fault. (b) If one headlight operates, fault is between faulty headlight lamp and wire 1007 first splice. Perform Steps (5) and (6) below and go to Step 2 of this Fault. (5) Turn off headlight switch. (6) Turn OFF ENGINE switch.



11. HEADLIGHT(S) DO NOT OPERATE (HIGH BEAM) (CONT).

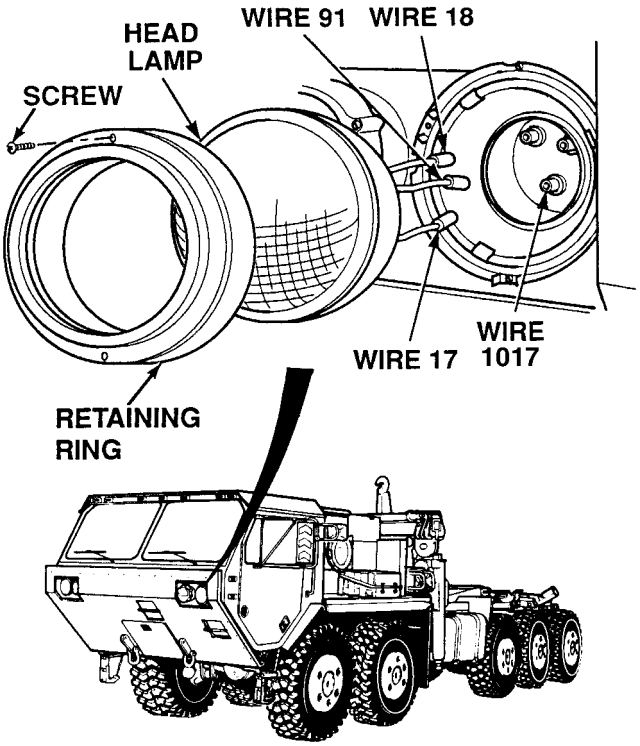


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

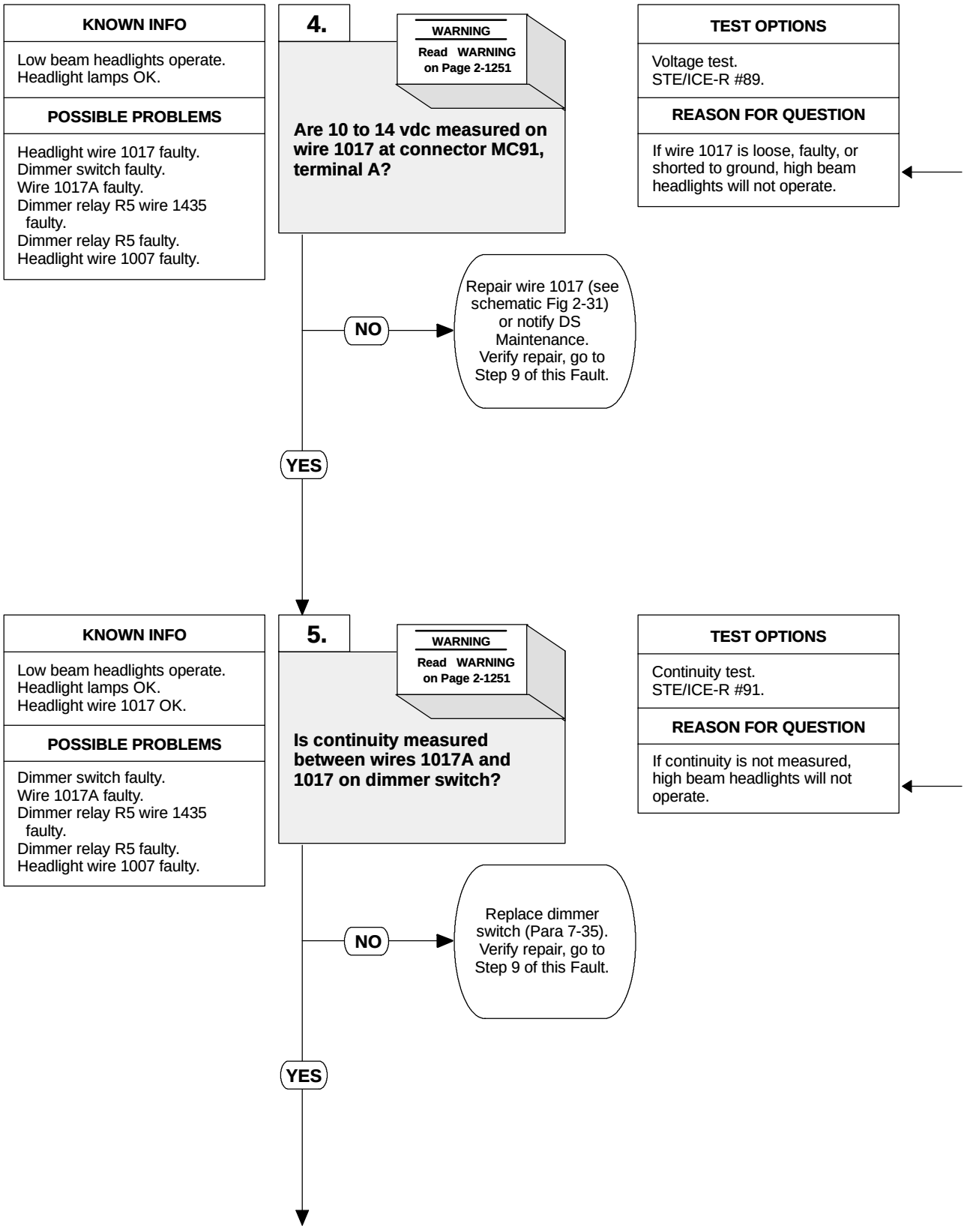
(1) Remove three screws and headlight retaining ring.
(2) Remove headlight lamp.
(3) Disconnect wires 17, 18 and 91 at electrical connectors.
(4) Set multimeter select switch to ohms.
(5) Is there continuity across headlight lamp measured between connectors on wires 17 and 91?
  (a) If there is no continuity, replace headlight lamp (Para 7-45).
  (b) If there is continuity, headlight lamp is OK.



VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1017.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, perform Steps (6) through (10) below and go to Step 8 of this Fault.
  (b) If 10 to 14 vdc are present, perform Steps (6) through (10) below and go to Step 4 of this Fault.
(6) Turn off headlight switch.
(7) Turn OFF ENGINE switch.
(8) Connect headlight wires 17, 18 and 91.
(9) Install headlight lamp.
(10) Install headlight retaining ring and three screws.

11. HEADLIGHT(S) DO NOT OPERATE (HIGH BEAM) (CONT).



WARNING

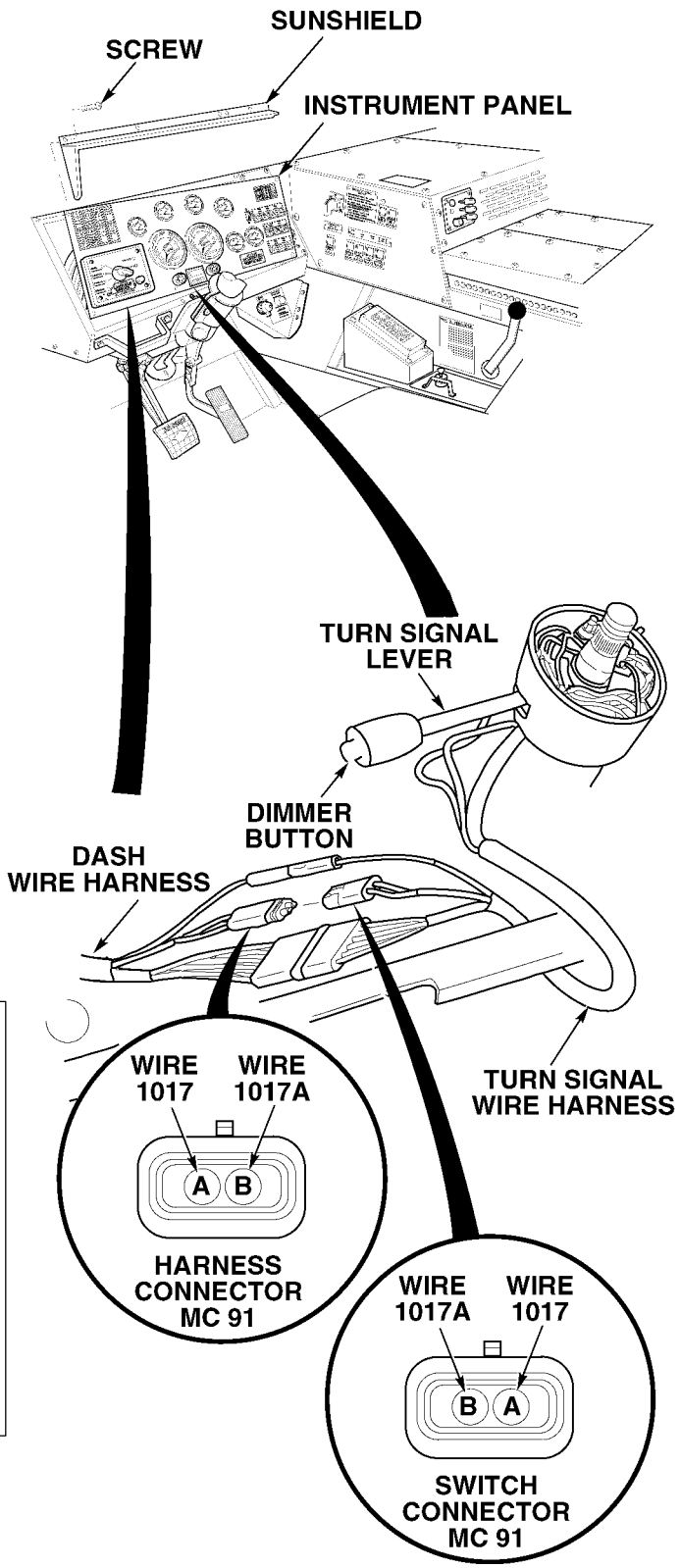
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

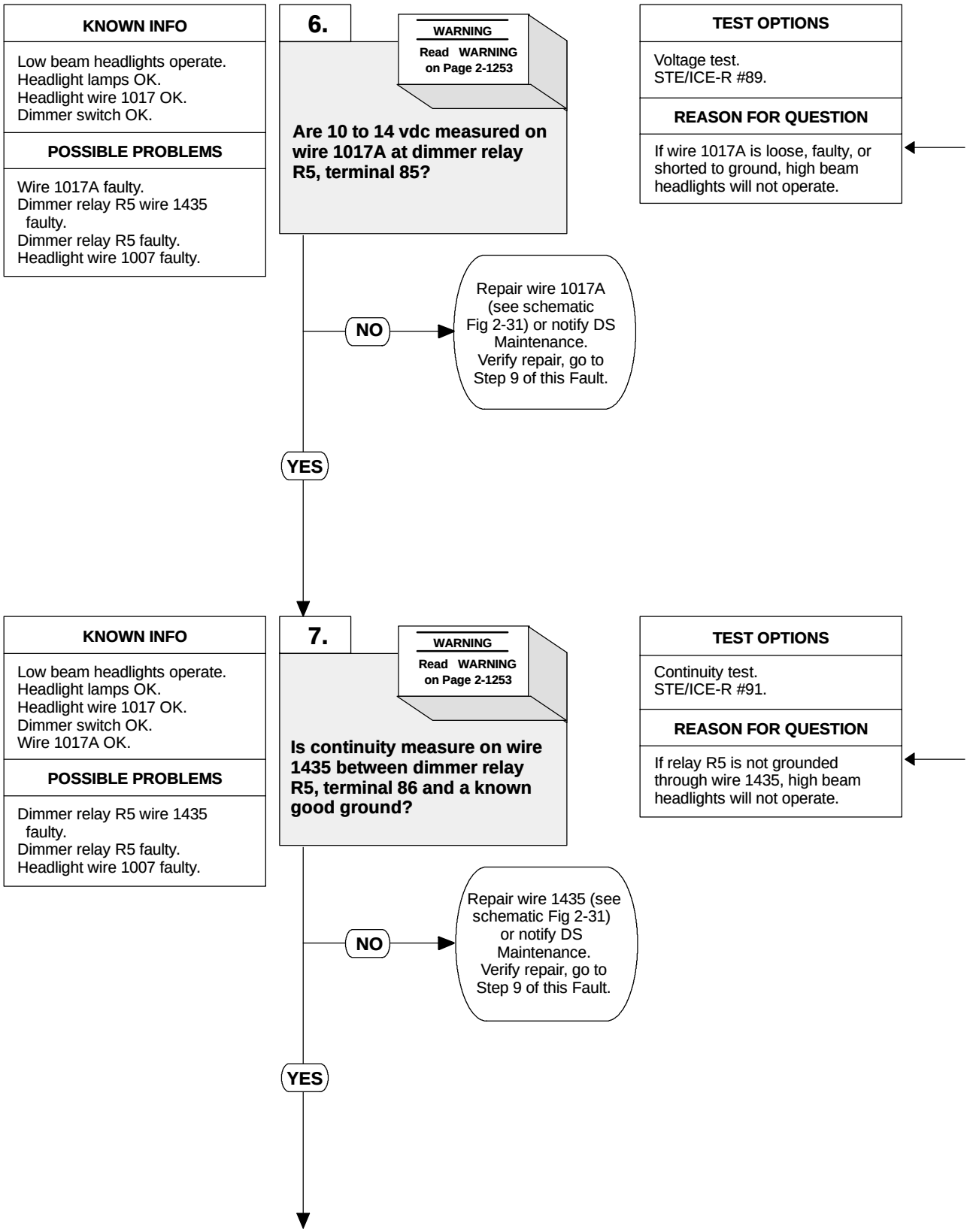
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect connector MC91.
(4) Connect positive (+) multimeter lead to wire 1017 at harness connector MC91, terminal A.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
(7) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, perform Steps (8) and (9) below and repair wire 1017 (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1017 is OK.
(8) Turn off headlight switch.
(9) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set dimmer switch to high beam.
(1.1) Set multimeter select switch to ohms.
(2) Connect positive (+) multimeter lead to wire 1017A at dimmer switch connector MC91, terminal B.
(3) Connect negative (–) multimeter lead to wire 1017 at dimmer switch connector MC91, terminal A.
  (a) If there is no continuity, replace dimmer switch (Para 7-35).
  (b) If there is continuity, dimmer switch is OK.
(4) Connect connector MC91.
(5) Install instrument panel and sunshield with ten screws.



11. HEADLIGHT(S) DO NOT OPERATE (HIGH BEAM) (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

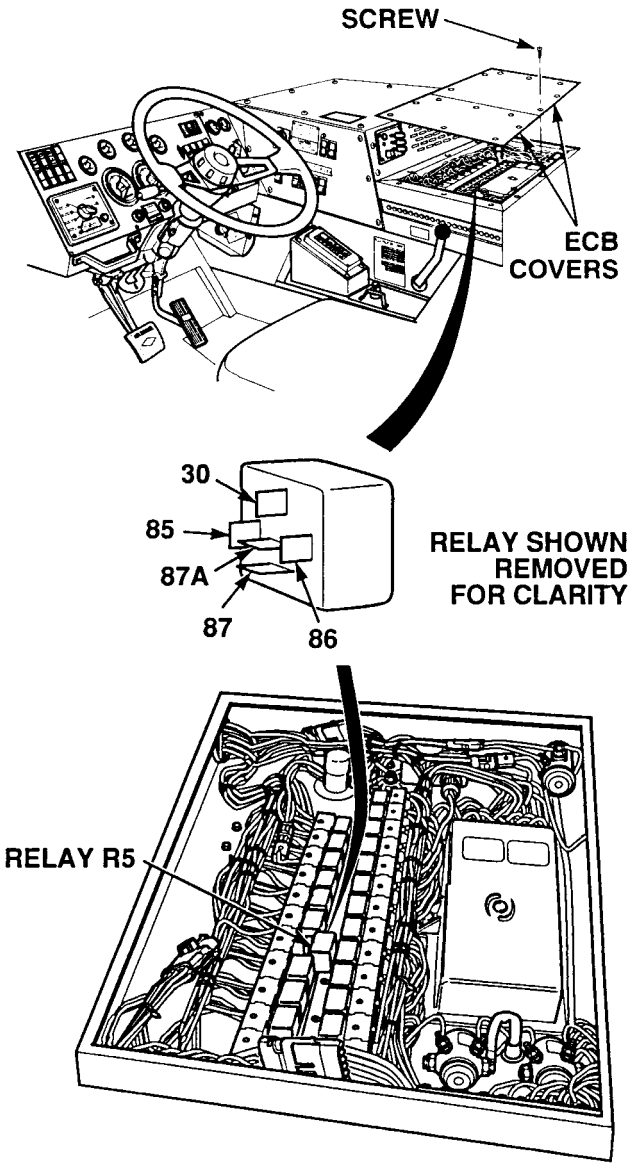
Relay tests must be performed with relay partially removed.

VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1017A at dimmer relay R5, terminal 85.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, perform Steps (6) and (7) below and repair wire 1017A (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1017A is OK.
(6) Turn off headlight switch.
(7) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is continuity measured on wire 1435 between dimmer relay R5, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.



11. HEADLIGHT(S) DO NOT OPERATE (HIGH BEAM) (CONT).

KNOWN INFO

Low beam headlights operate.
Headlight lamps OK.
Headlight wire 1017 OK.
Dimmer switch OK.
Wire 1017A OK.
Dimmer relay R5 wire 1435 OK.

POSSIBLE PROBLEMS

Dimmer relay R5 faulty.
Headlight wire 1007 faulty.

8.

WARNING
Read WARNING on Page 2-1255

Are 10 to 14 vdc measured on wire 1007 at dimmer relay R5, terminal 87?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not measured, relay R5 is faulty.
If 10 to 14 vdc are measured, wire 1007 is faulty.

NO → Replace dimmer relay R5 (Para 7-95). Verify repair, go to Step 9 of this Fault.

YES → Repair wire 1007 (see schematic Fig 2-31) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

KNOWN INFO

Low beam headlights operate.
Headlight lamps OK.
Headlight wire 1017 OK.
Dimmer switch OK.
Wire 1017A OK.
Dimmer relay R5 wire 1435 OK.
Dimmer relay R5 OK.
Headlight wire 1007 OK.

POSSIBLE PROBLEMS

9.

Do headlight(s) operate (high beam)?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If headlight(s) operate (high beam), fault corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

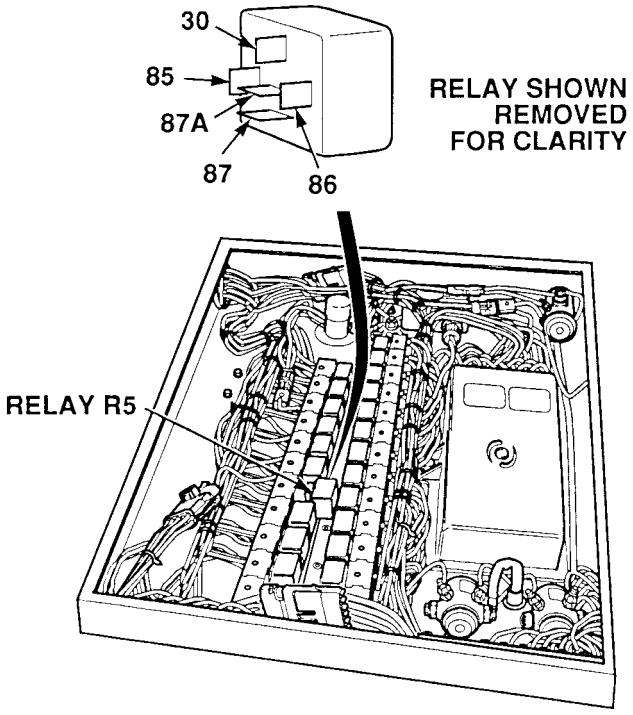
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay tests must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1007 at headlight dimmer relay R5, terminal 87.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, perform Steps (6) and (7) below and replace dimmer relay R5 (Para 7-95).
  (b) If 10 to 14 vdc are present, perform Steps (6) and (7) below and repair wire 1007 (see schematic Fig 2-31) or notify DS Maintenance.
(6) Turn OFF ENGINE switch.
(7) Turn off headlight switch.



NOTE

The blue high beam light in the instrument panel indicates high beam lights are on.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on headlight switch.
(3) Press dimmer switch.
(4) Observe headlights.
  (a) If headlights do not operate on high beam, fault not corrected. Perform Steps (5) through (7) below and notify DS Maintenance.
  (b) If headlights operate on high beam, fault has been corrected.
(5) Turn off headlight switch.
(6) Turn OFF ENGINE switch.
(7) Install 15 screws and two ECB covers.

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

12. TAILLIGHT(S) DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

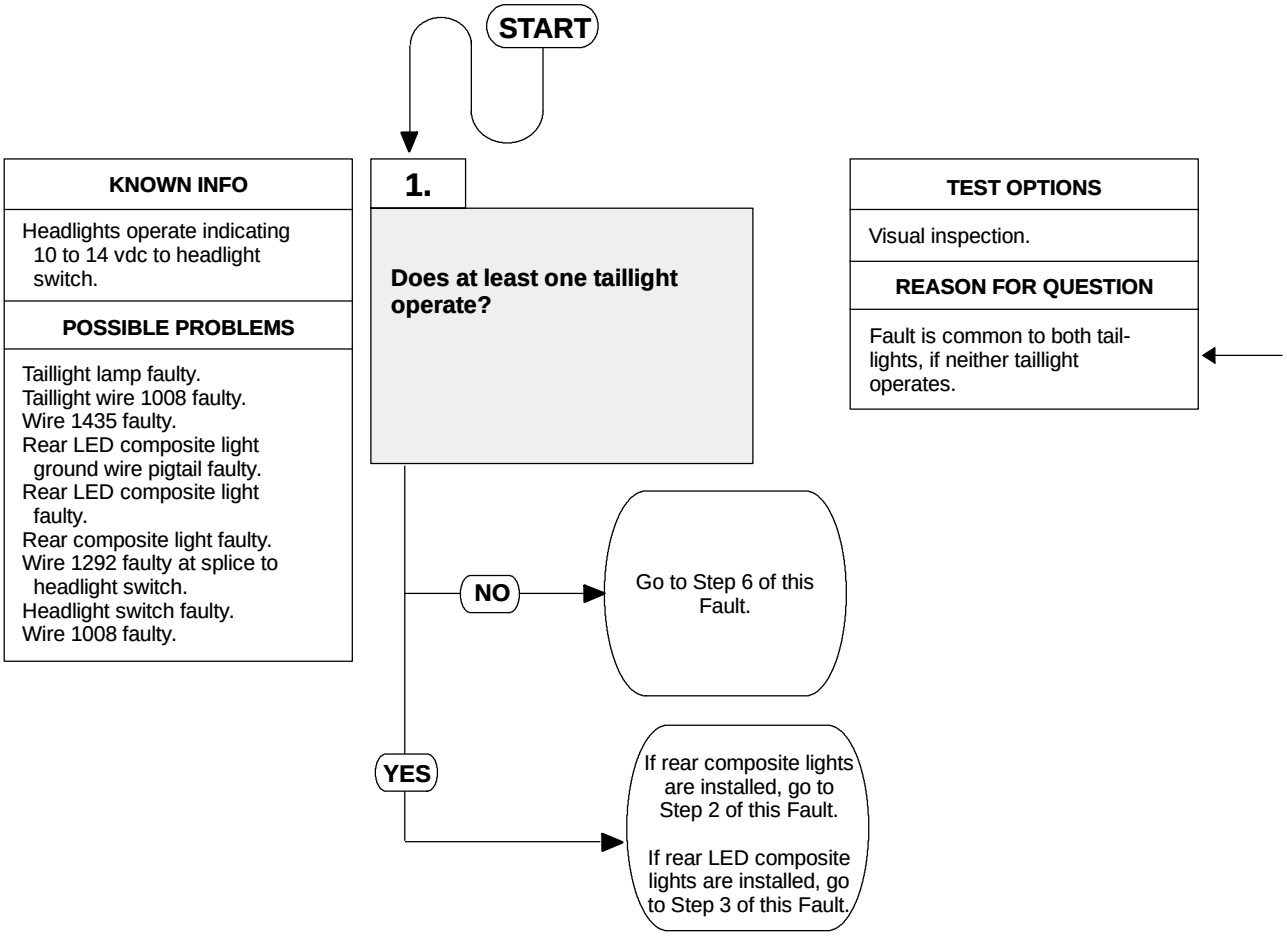
Materials/Parts
Preformed Packing (Item 224, Appendix F)
Lockwasher (Item 168, Appendix F)

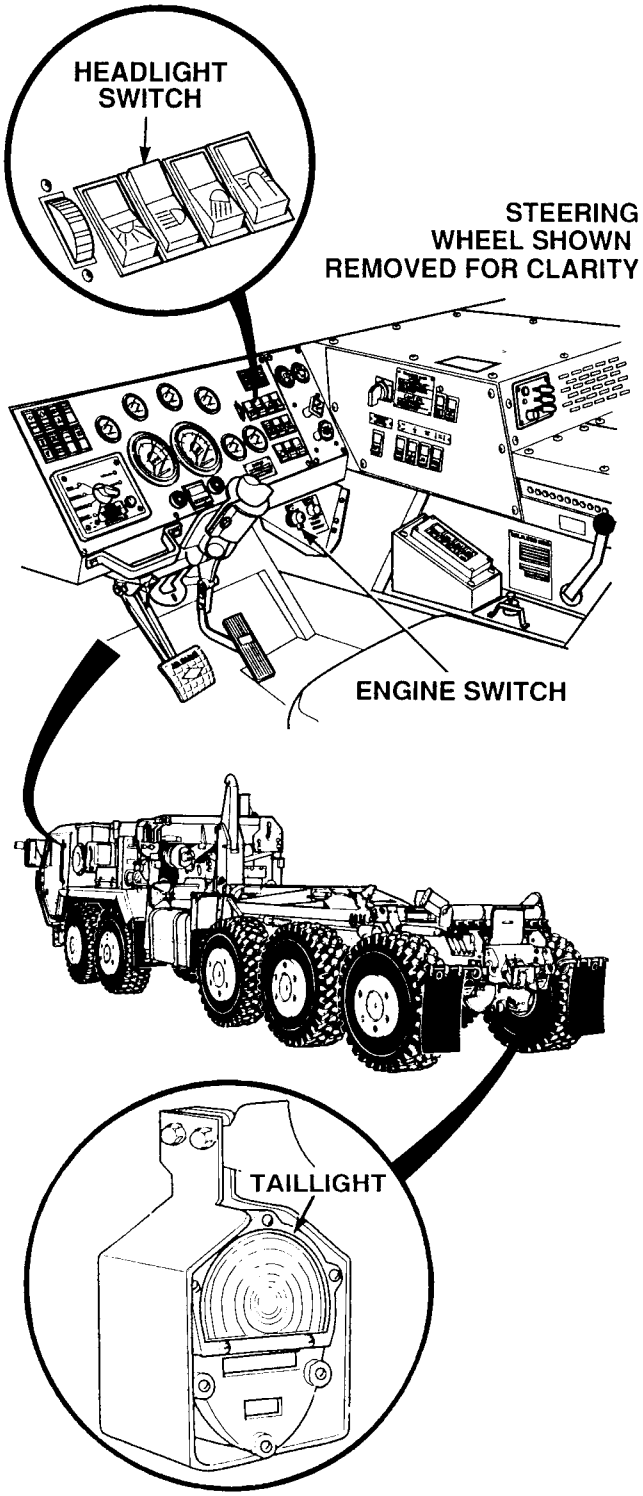
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

- The following troubleshooting procedures cover the left taillight, but they apply to both taillights.
- Truck may be equipped with rear composite lights or rear LED composite lights.

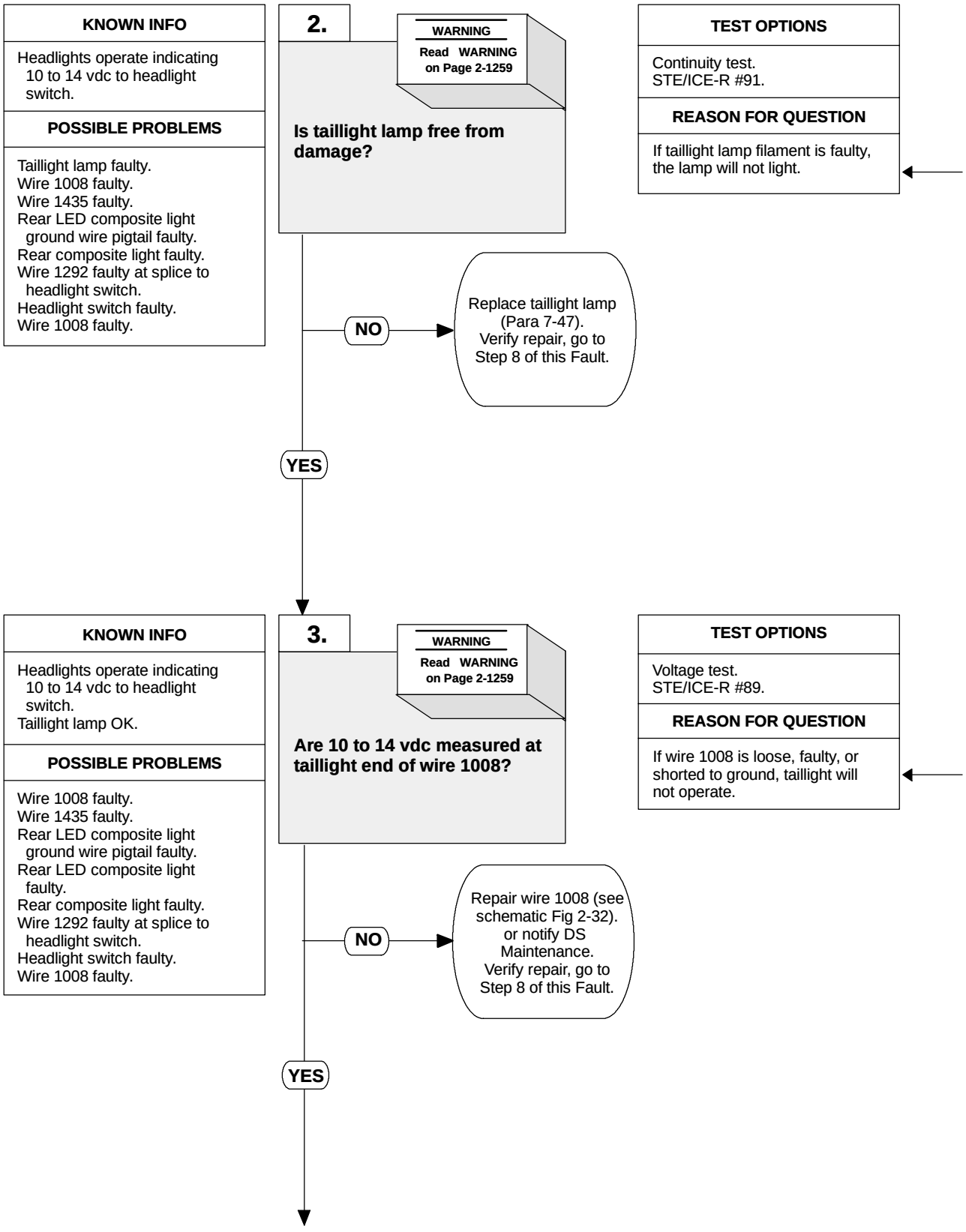




VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on headlight switch.
(3) Inspect both taillights for operation.
  (a) If both taillights fail to operate, fault is between headlight switch and connector MC3, terminal B. Go to Step 6 of this Fault.
  (b) If rear composite lights are installed and one taillight operates, fault is between faulty taillight lamp and wire 1008 first splice. Go to Step 2 of this Fault.
  (c) If rear LED composite lights are installed and one taillight operates, go to Step 3 of this Fault.
(4) Turn off headlight switch.
(5) Turn OFF ENGINE switch.

12. TAILLIGHT(S) DO NOT OPERATE (CONT).

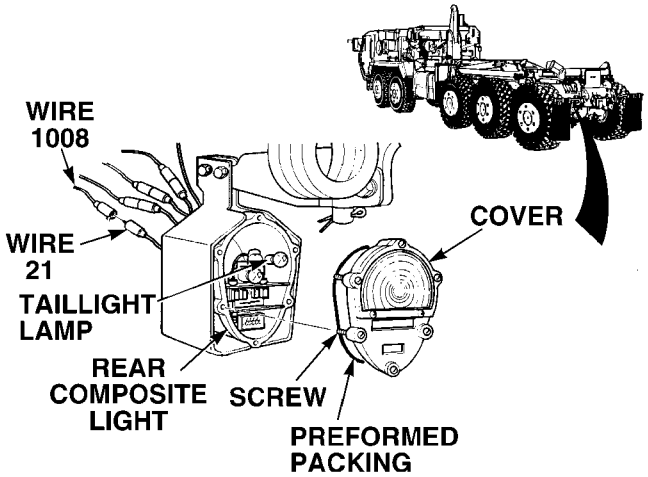


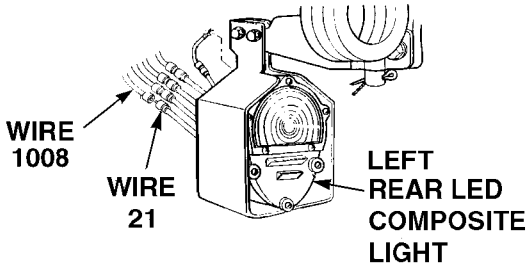
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

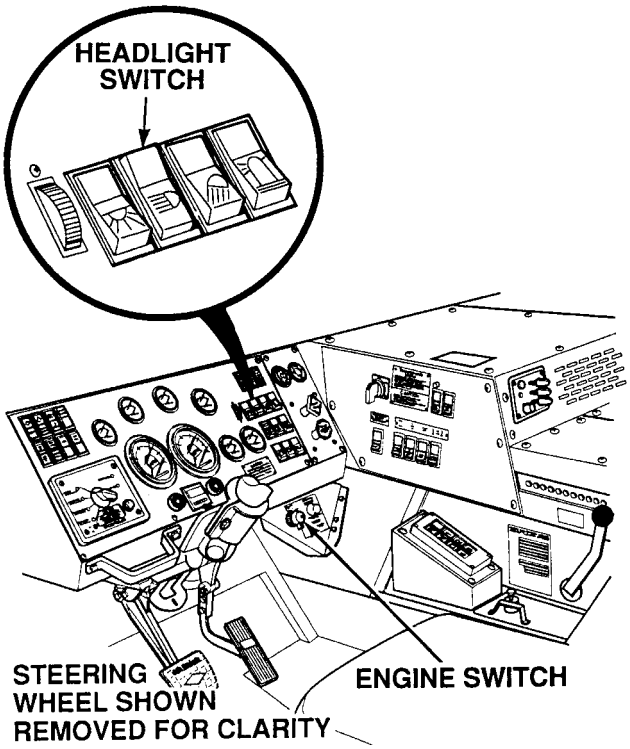
(1) Loosen six screws and remove composite light cover, preformed packing and taillight lamp. Discard preformed packing.
(2) Remove taillight lamp (Para 7-47).
(3) Set multimeter select switch to ohms.
(4) Is there continuity across taillight lamp?
  (a) If there is no continuity, replace lamp.
  (b) If there is continuity lamp is OK, go to Step 3 of this Fault.



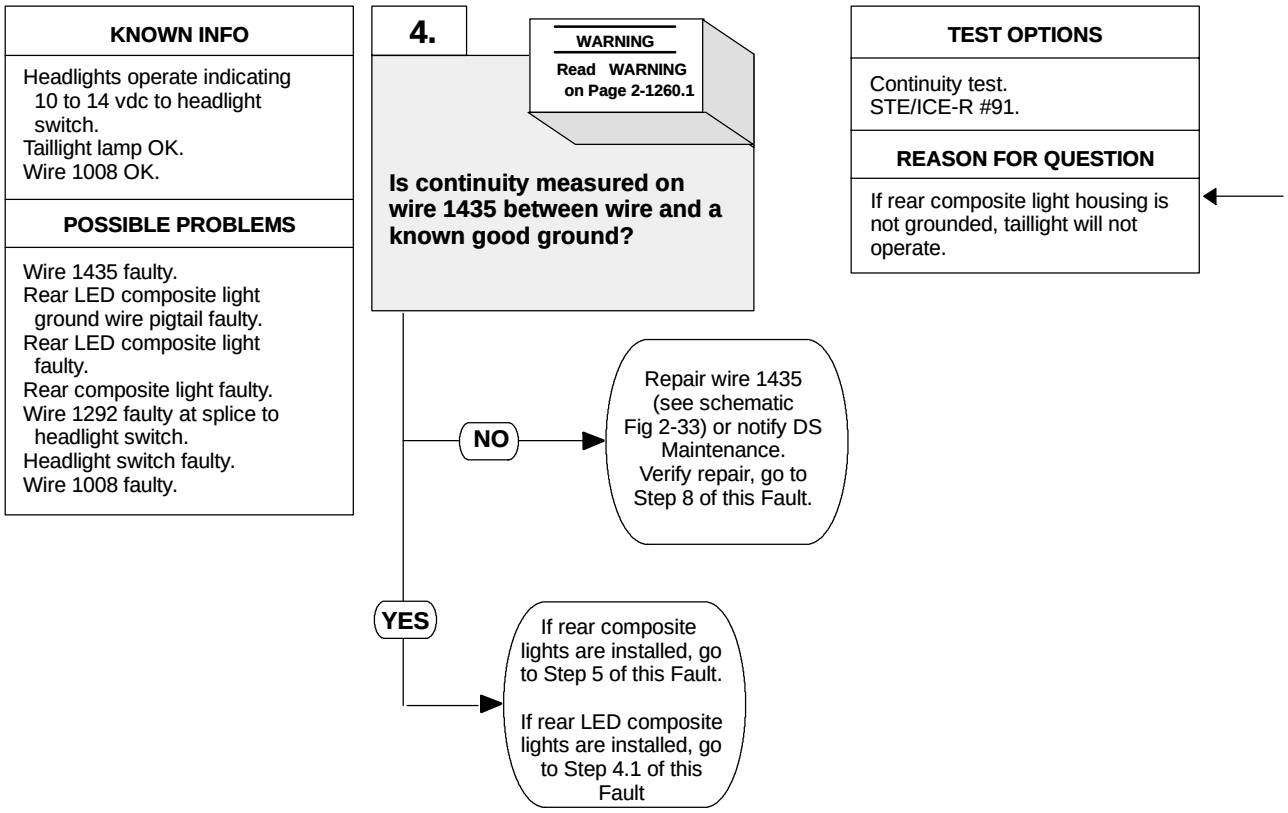


VOLTAGE TEST

(1) Disconnect wire 1008 from taillight wire 21.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1008.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) Turn on headlight switch.
  (a) If there are not 10 to 14 vdc present, perform Steps (7) and (8) below and repair wire 1008 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If there are 10 to 14 vdc present, wire 1008 to first splice is OK.
(7) Turn off headlight switch.
(8) Turn OFF ENGINE switch.



12. TAILLIGHT(S) DO NOT OPERATE (CONT).

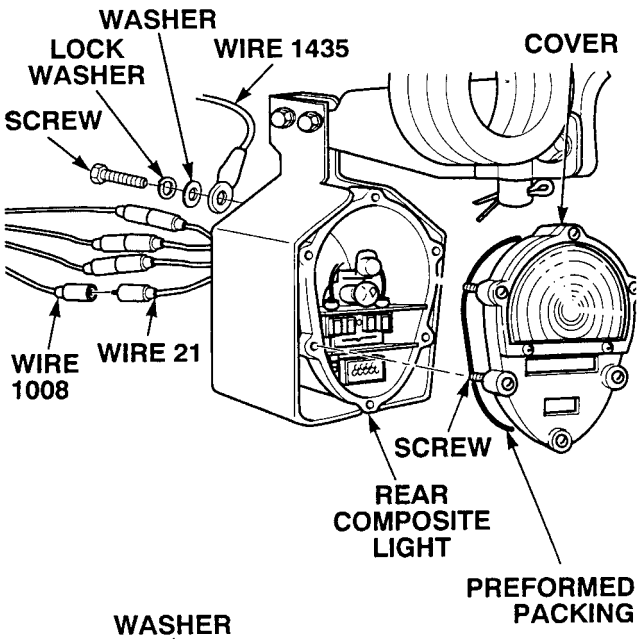


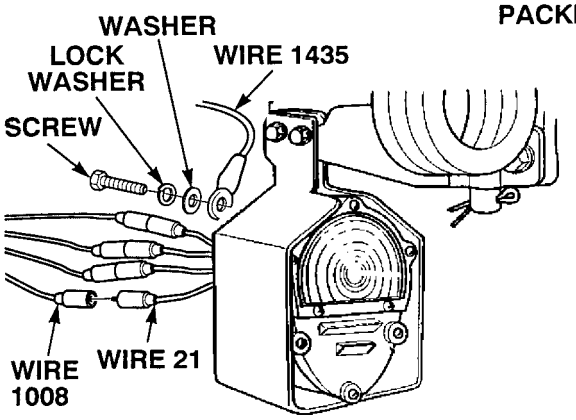
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

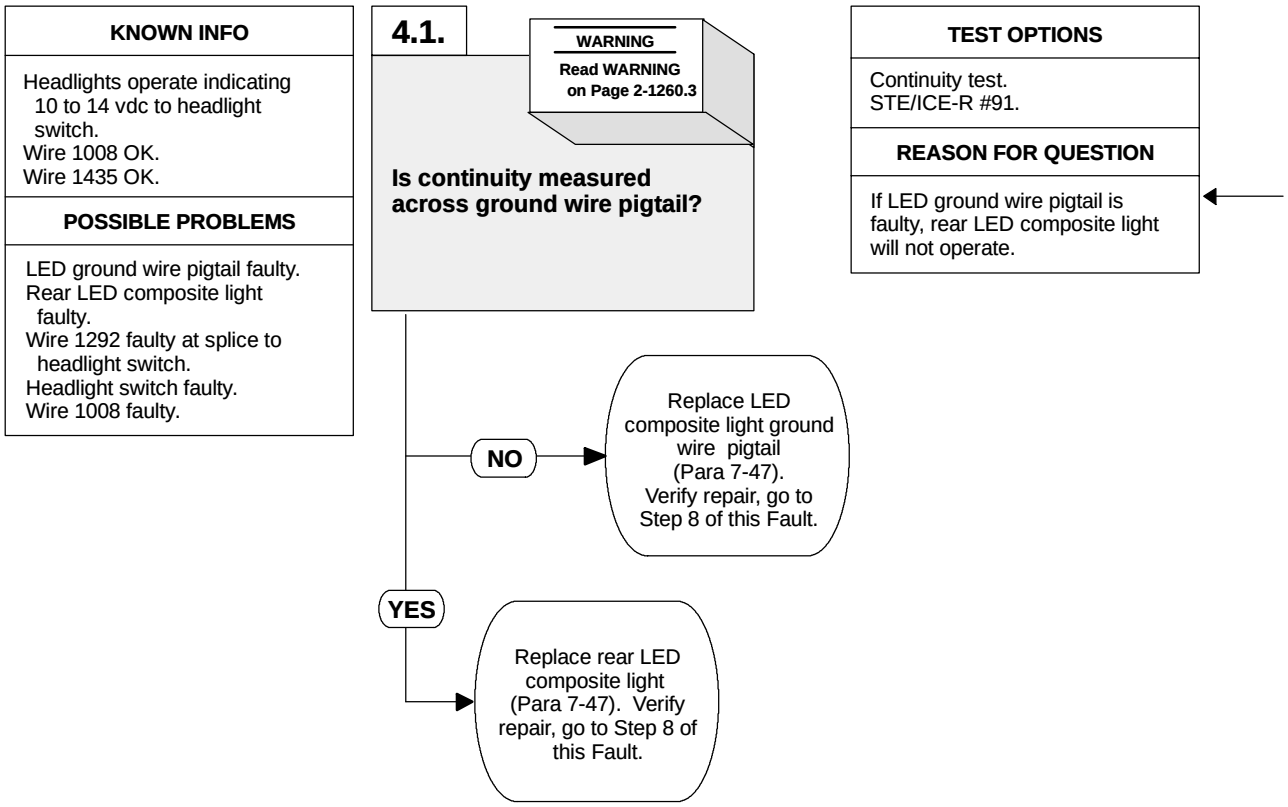
(1) Set multimeter select switch to ohms.
(2) Remove screw, lockwasher, washer and wire 1435. Discard lockwasher.
(3) Is there continuity between wire 1435 and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-33).
   (b) If there is continuity, and rear LED composite lights are installed, go to Step 4.1 of this Fault.
   (c) If there is continuity and rear composite lights are installed, go to Step 5 of this Fault.





LED COMPOSITE LIGHT

12. TAILLIGHT(S) DO NOT OPERATE (CONT).

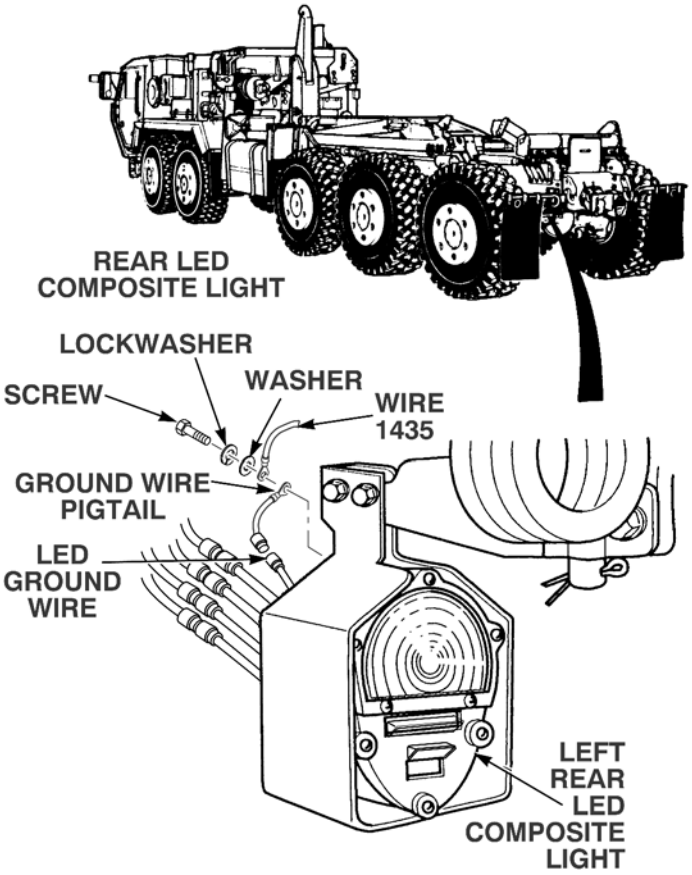


WARNING

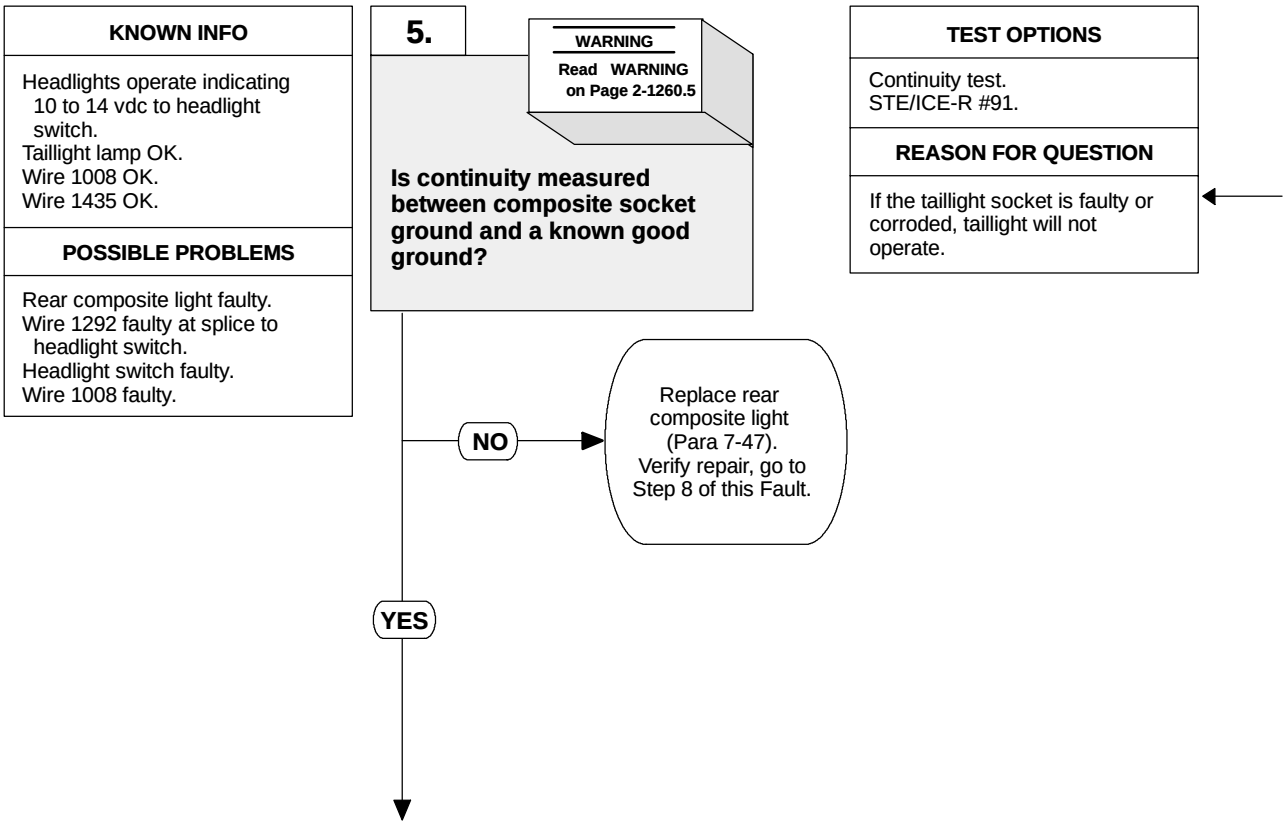
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Remove LED composite light ground wire pigtail from LED ground wire.
(3) Is there continuity across ground wire pigtail?
   (a) If there is no continuity, replace ground wire pigtail (Para 7-47).
   (b) If there is continuity, ground wire pigtail is OK. Replace LED composite light (Para 7-47).



12. TAILLIGHT(S) DO NOT OPERATE (CONT).

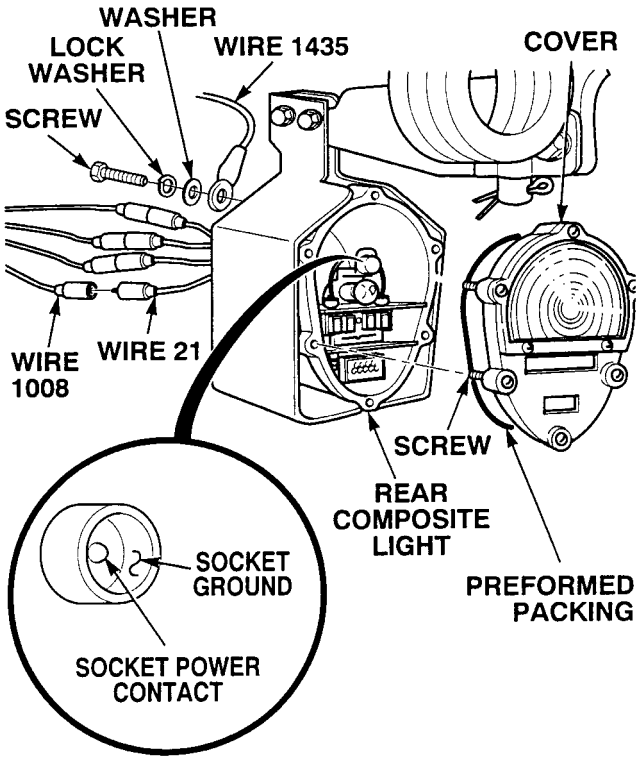


WARNING

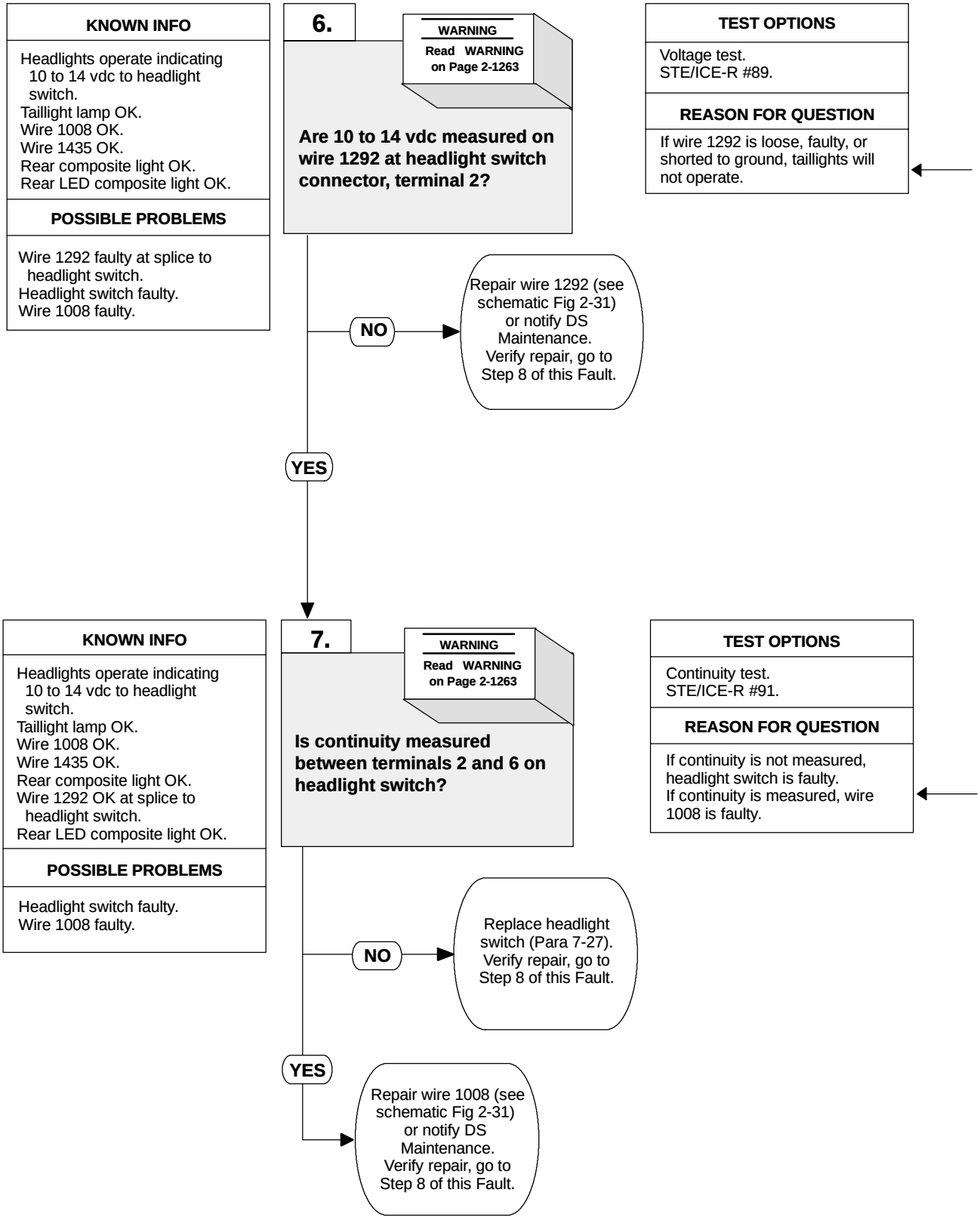
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Is there continuity between socket ground and a known good ground?
  (a) If there is no continuity, replace composite light (Para 7-47).
  (b) If there is continuity, taillight ground is OK.
(2) Is there continuity between socket power contact and wire 21?
  (a) If there is no continuity, replace composite light (Para 7-47).
  (b) If there is continuity, taillight is OK.
(3) Connect taillight lead 21 to wire 1008.
(4) Install taillight lamp.
(5) Install preformed packing, composite light cover and tighten six screws.



12. TAILLIGHT(S) DO NOT OPERATE (CONT).

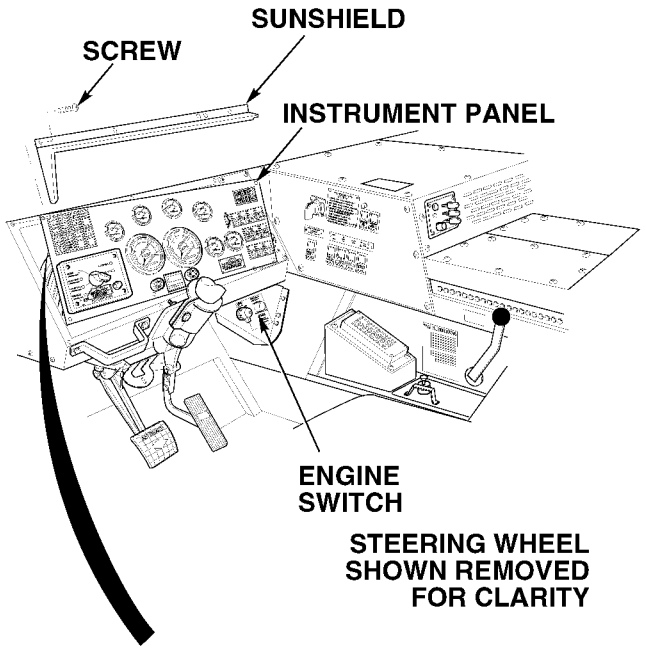


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

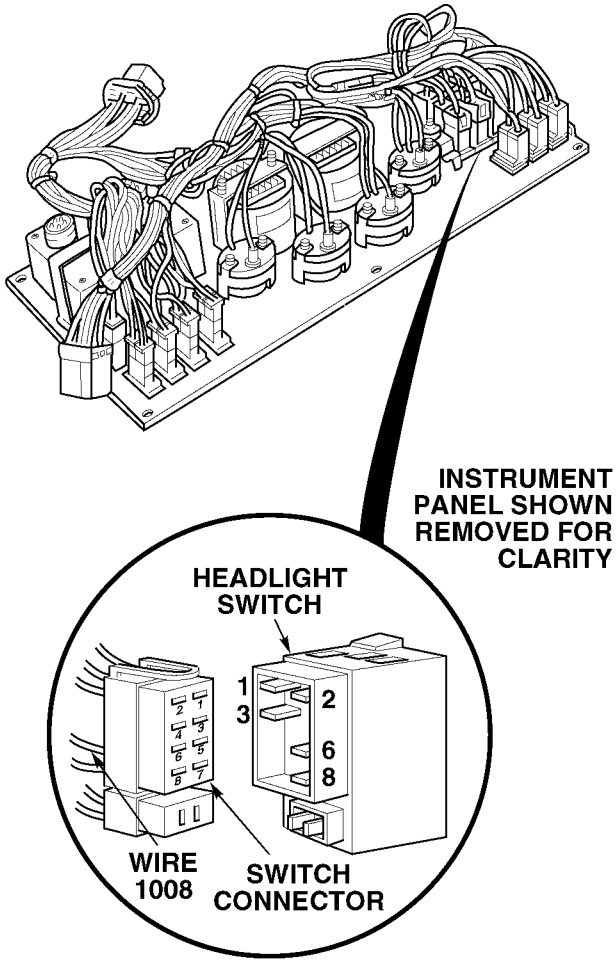
VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect headlight switch connector.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to wire 1292 at headlight switch connector, terminal 2.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
(8) Turn on headlight switch.
  (a) If 10 to 14 vdc are not present, perform Steps (9) and (10) below and repair wire 1292 (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If there are 10 to 14 vdc present, wire 1292 is OK.
(9) Turn off headlight switch.
(10) Turn OFF ENGINE switch.

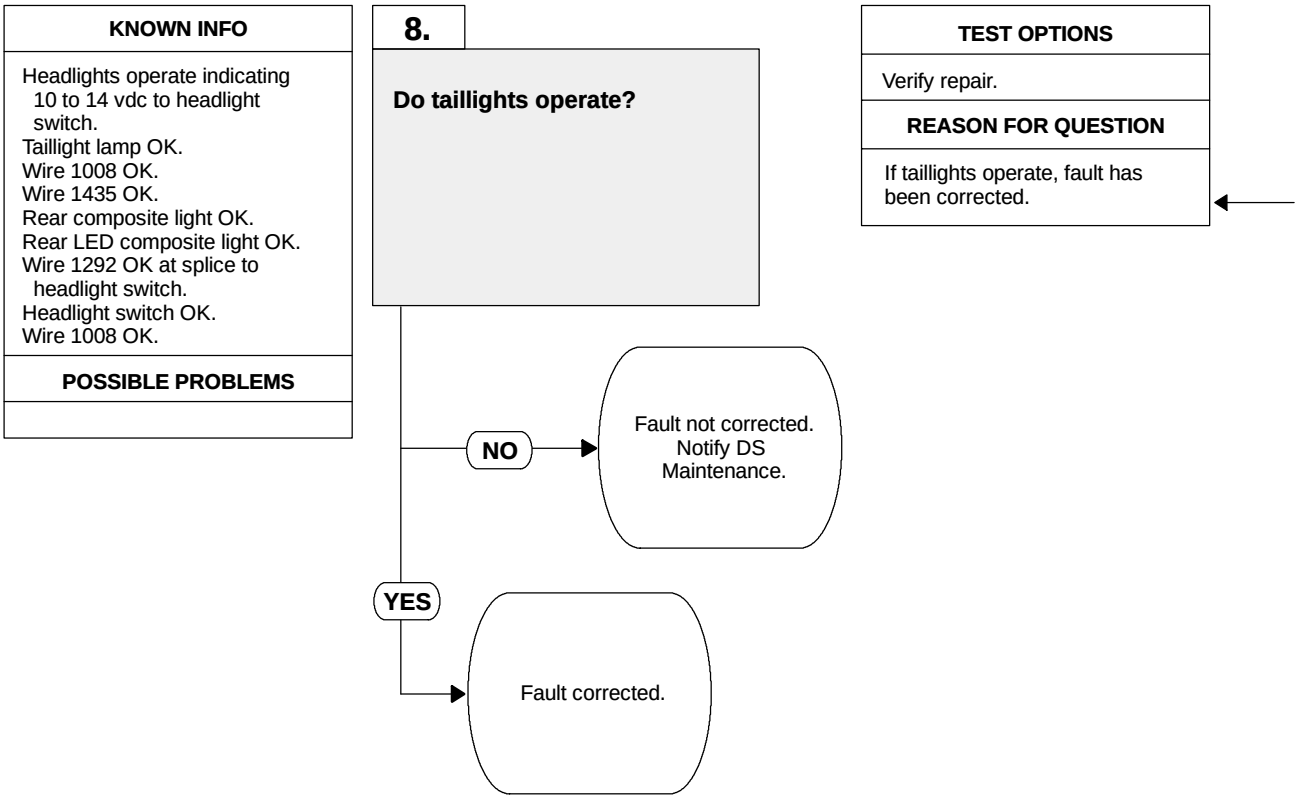


CONTINUITY TEST

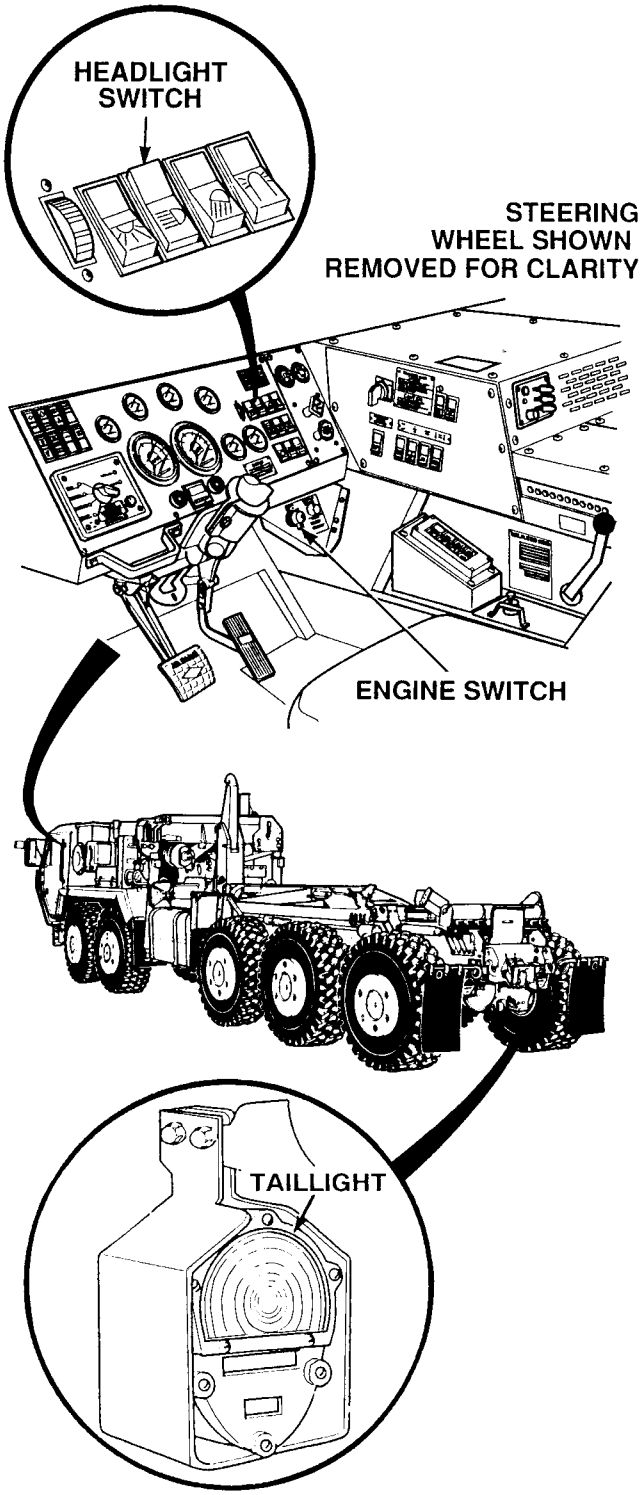
(1) Set multimeter select switch to ohms.
(2) Set headlight switch in the center position.
(3) Is there continuity between terminals 2 and 6 on headlight switch?
  (a) If there is no continuity, replace headlight switch (Para 7-27).
  (b) If there is continuity, repair wire 1008 (see schematic Fig 2-31) or notify DS Maintenance.
(4) Connect headlight switch connector.
(5) Install instrument panel and sunshield with ten screws.



12. TAILLIGHT(S) DO NOT OPERATE (CONT).



VERIFY REPAIR
(1) Turn ON ENGINE switch. (2) Turn on headlight light switch. (3) Inspect both taillights for operation. (a) If taillights do not operate, fault not corrected. Perform Steps (4) and (5) below and notify DS Maintenance. (b) If taillights do operate, fault has been corrected. (4) Turn off headlight light switch. (5) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

13. ALL TURN SIGNALS DO NOT OPERATE.

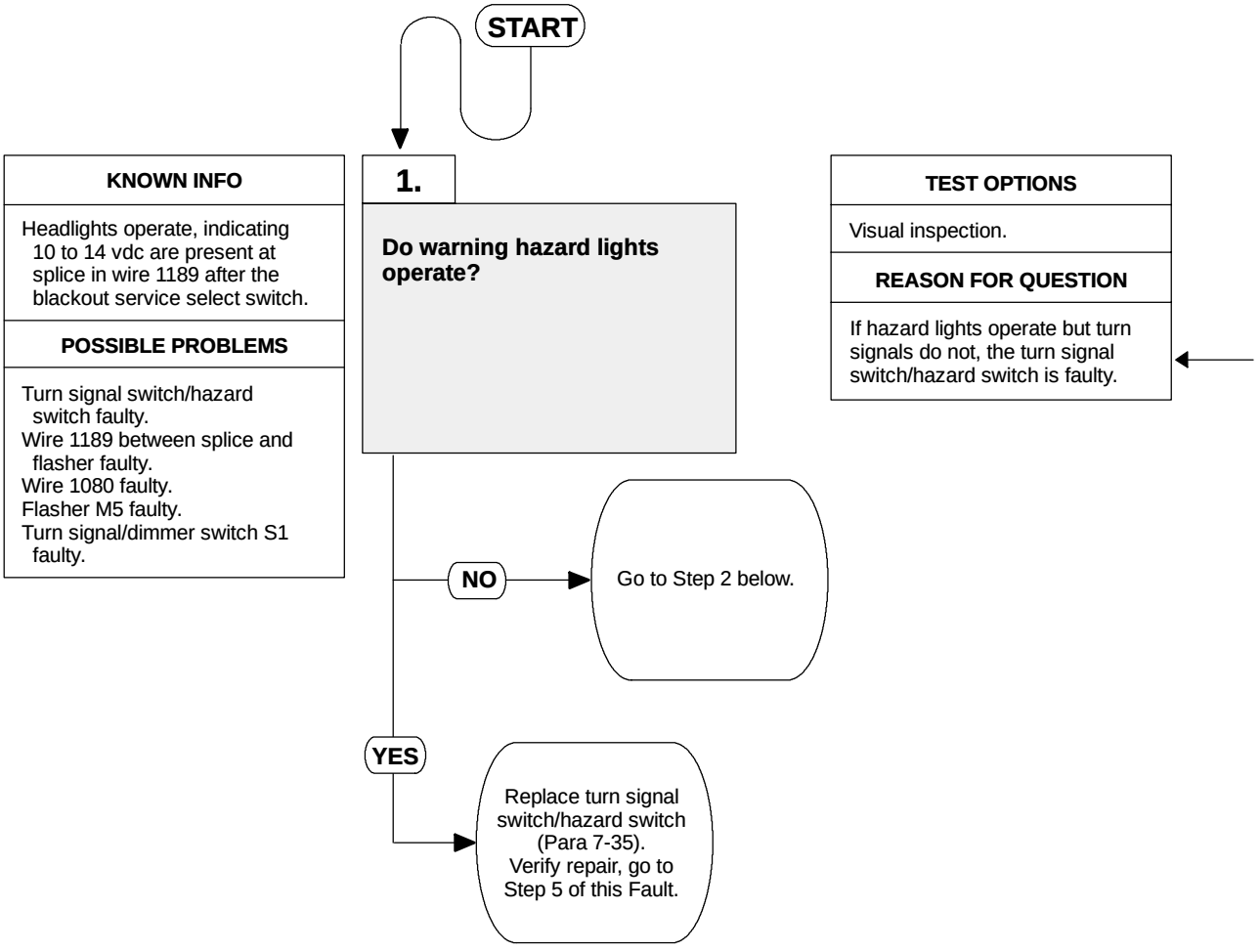
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

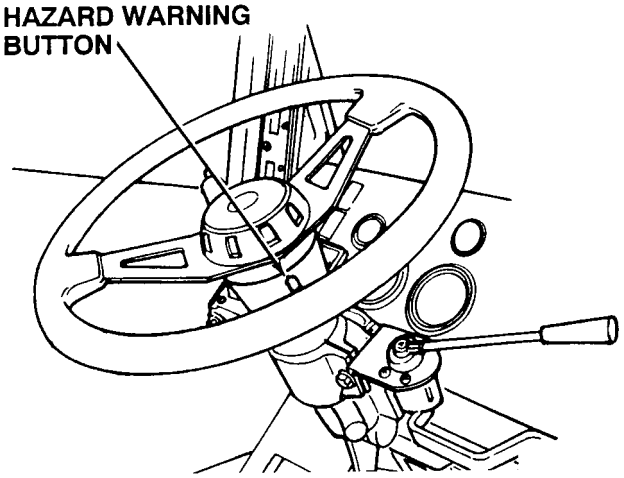
Materials/Parts
Cable Tie (Item 26, Appendix C)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

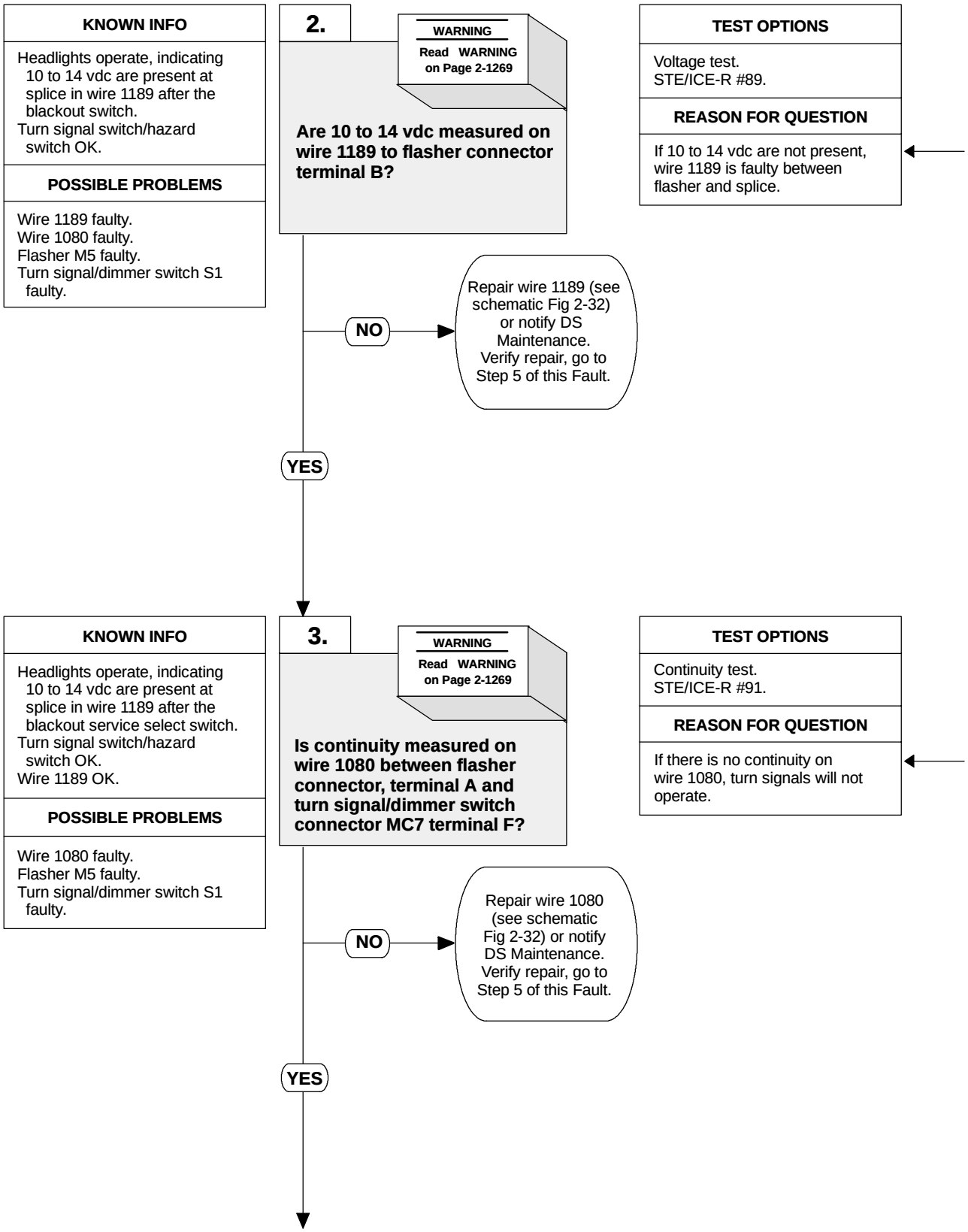
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



VISUAL INSPECTION
(1) Push in emergency flasher control button (TM 9-2320-364-10). (a) If warning hazard lights do not operate, perform Step (2) below and go to Step 2 of this Fault. (b) If warning hazard lights operate, perform Step (2) below and replace turn signal switch/hazard switch (Para 7-35). (2) Pull out emergency flasher control button.



13. ALL TURN SIGNALS DO NOT OPERATE (CONT).



WARNING

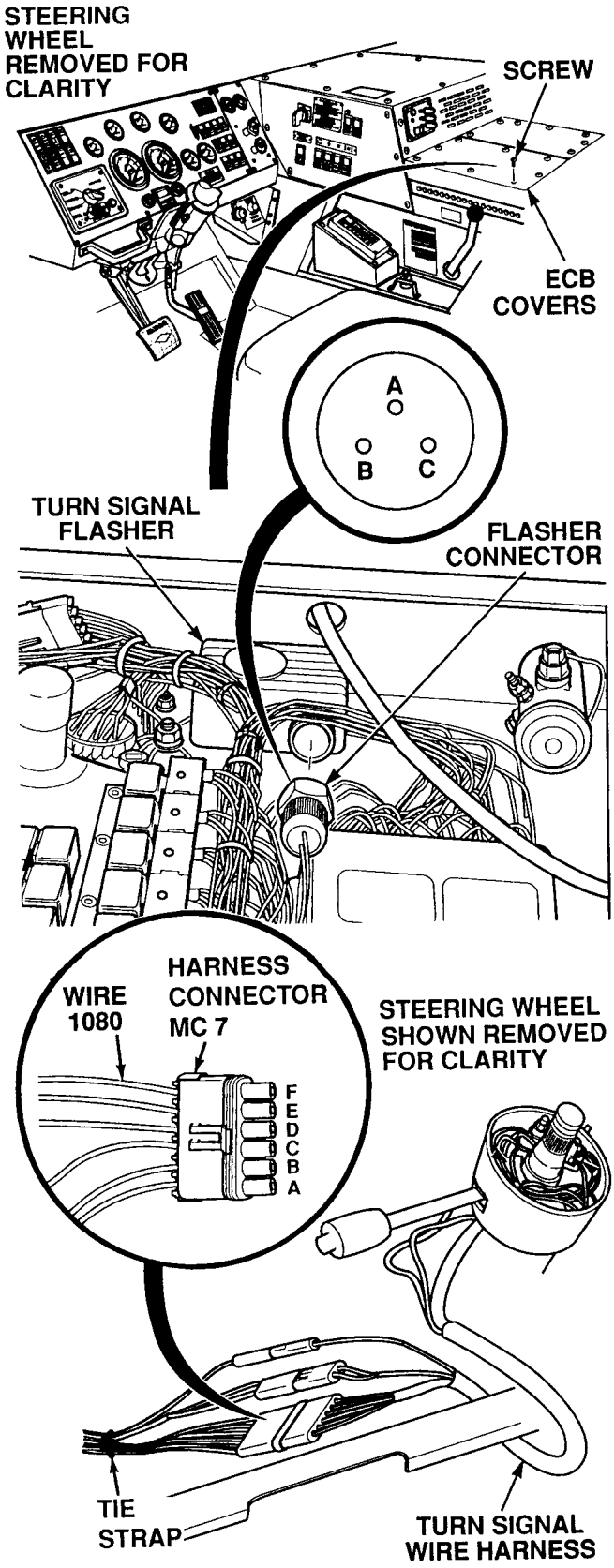
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

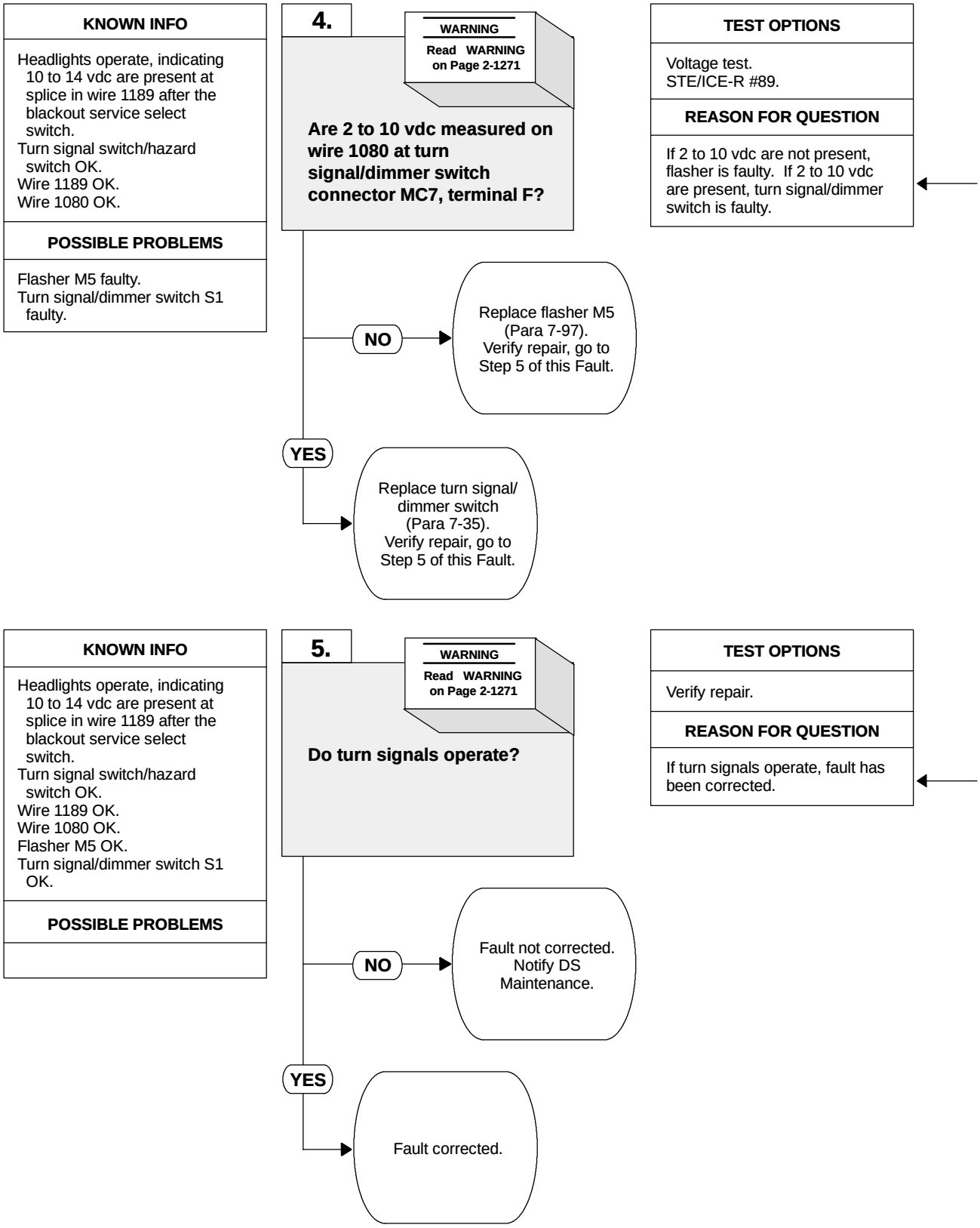
(1) Remove fifteen screws and two ECB covers.
(2) Disconnect flasher connector from flasher.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to flasher connector terminal B.
(5) Connect negative (-) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, repair wire 1189 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1189 is OK.

CONTINUITY TEST

(1) Remove cable ties as necessary.
(2) Disconnect turn signal dimmer switch connector MC7.
(3) Set multimeter select switch to ohms.
(4) Is there continuity on wire 1080 between flasher connector, terminal A and connector MC7, terminal F?
  (a) If there is no continuity, repair wire 1080 (see schematic Fig 2-32) or notify DS Maintenance and perform Step (5) below.
  (b) If there is continuity, wire 1080 is OK.
(5) Connect flasher connector to flasher.



13. ALL TURN SIGNALS DO NOT OPERATE (CONT).



WARNING

- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

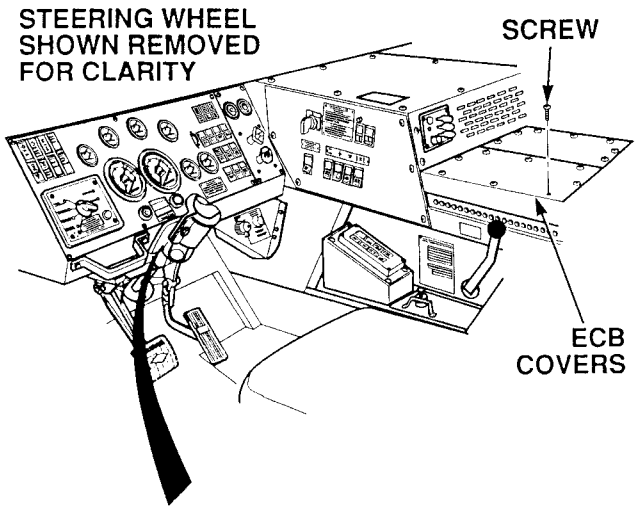
Voltage measured in Step (3) below will pulsate 2 to 10 vdc.

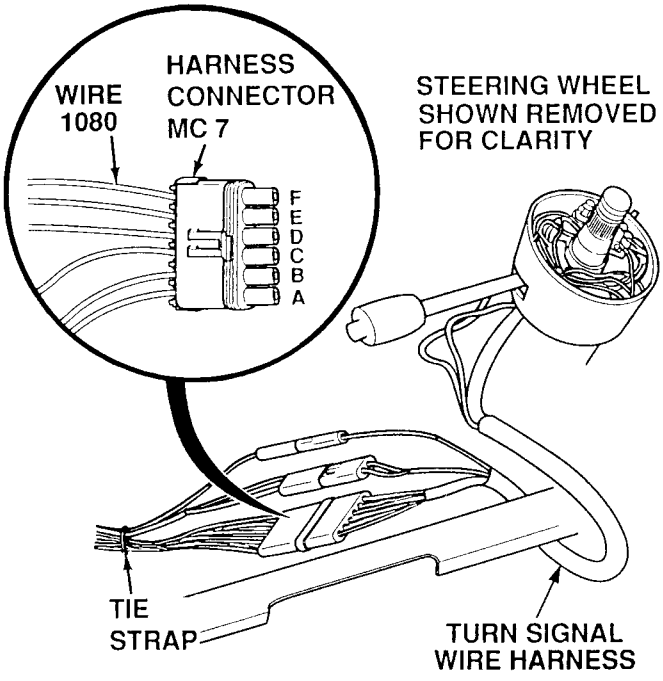
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to connector MC7, terminal F.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Push in hazard warning button (TM 9-2320-364-10).
  (a) If 2 to 10 vdc are not present, perform Steps (5) through (7) below and replace flasher M5 (Para 7-97).
  (b) If 2 to 10 vdc are present, replace turn signal switch/dimmer switch (Para 7-35) and perform Steps (5) through (8) below.
(5) Pull out hazard warning button.
(6) Connect connector MC7 to turn signal switch/dimmer switch connector.
(7) Install cable ties as necessary.
(8) Install two ECB covers and 15 screws.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on turn signals.
(3) Observe turn signals.
  (a) If turn signals do not operate, fault not corrected. Perform Steps (4) and (5) below and notify DS Maintenance.
  (b) If turn signals operate, fault has been corrected.
(4) Turn off turn signals.
(5) Turn OFF ENGINE switch.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

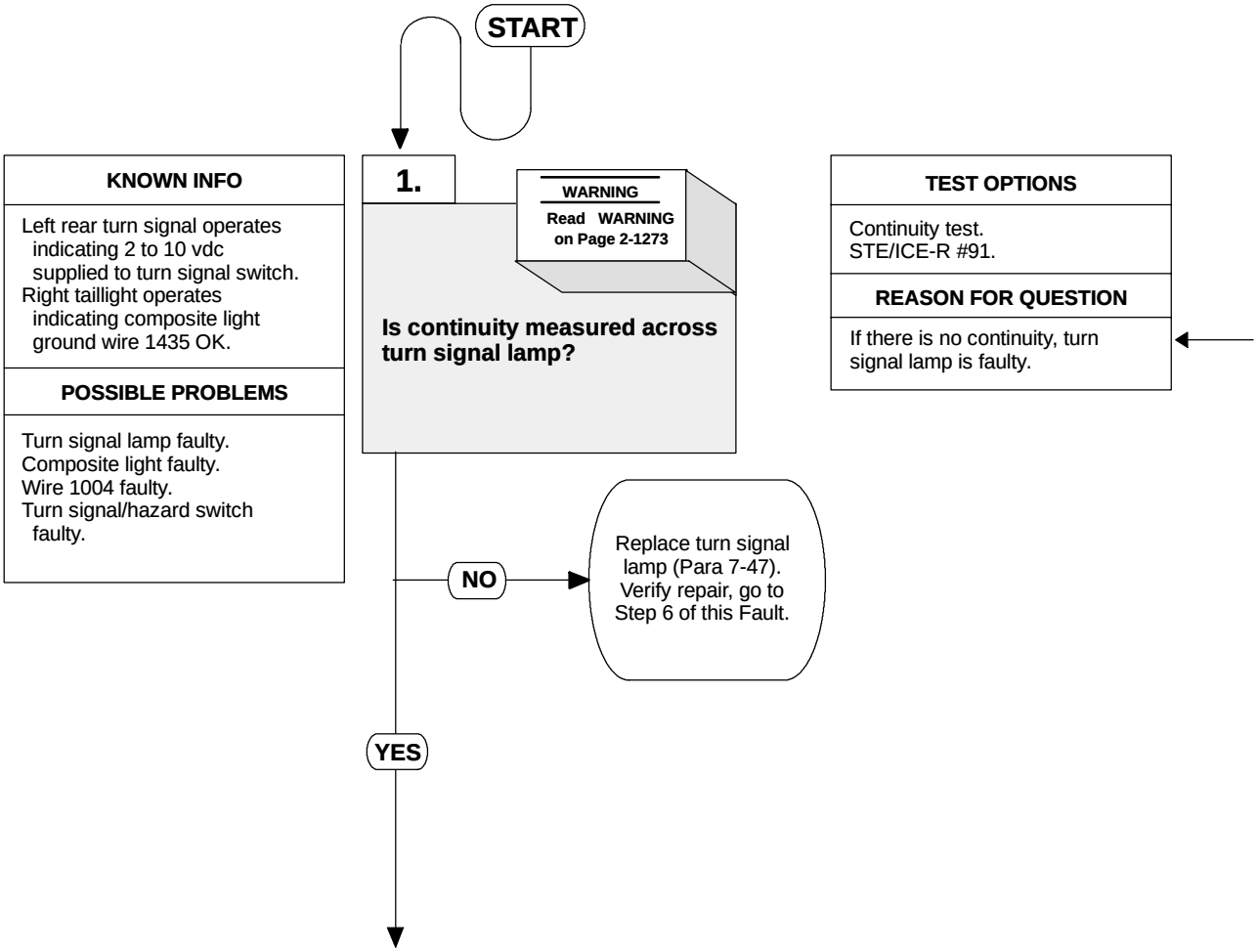
Materials/Parts
Cable Tie (Item 26, Appendix C)
Packing, Preformed (Item 224, Appendix F)
Lockwasher (Item 168, Appendix F)
(Rear LED composite light only)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

- Truck may be equipped with rear composite lights or rear LED composite lights.
- If rear LED composite light is installed, go to Step 2.1 of this Fault.

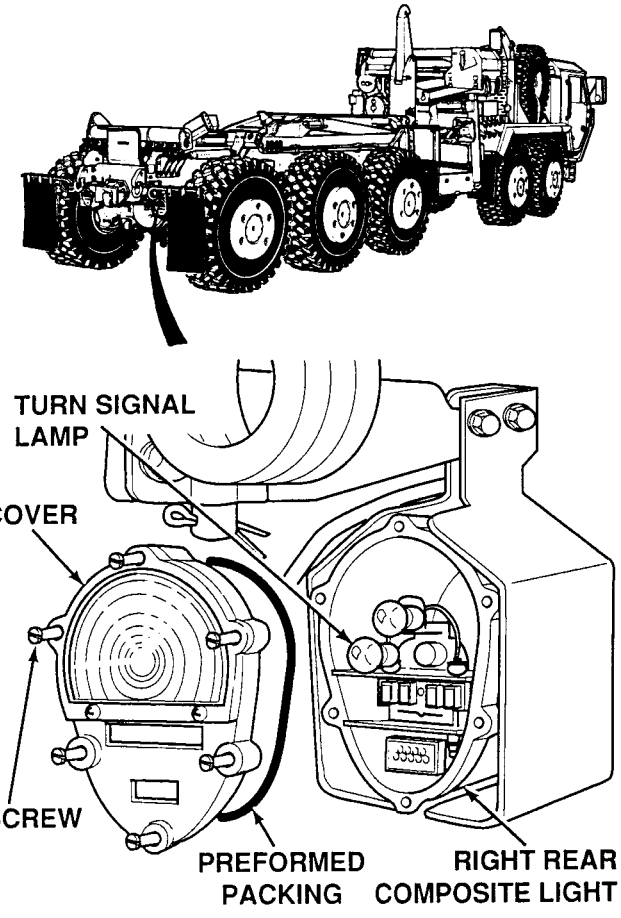


WARNING

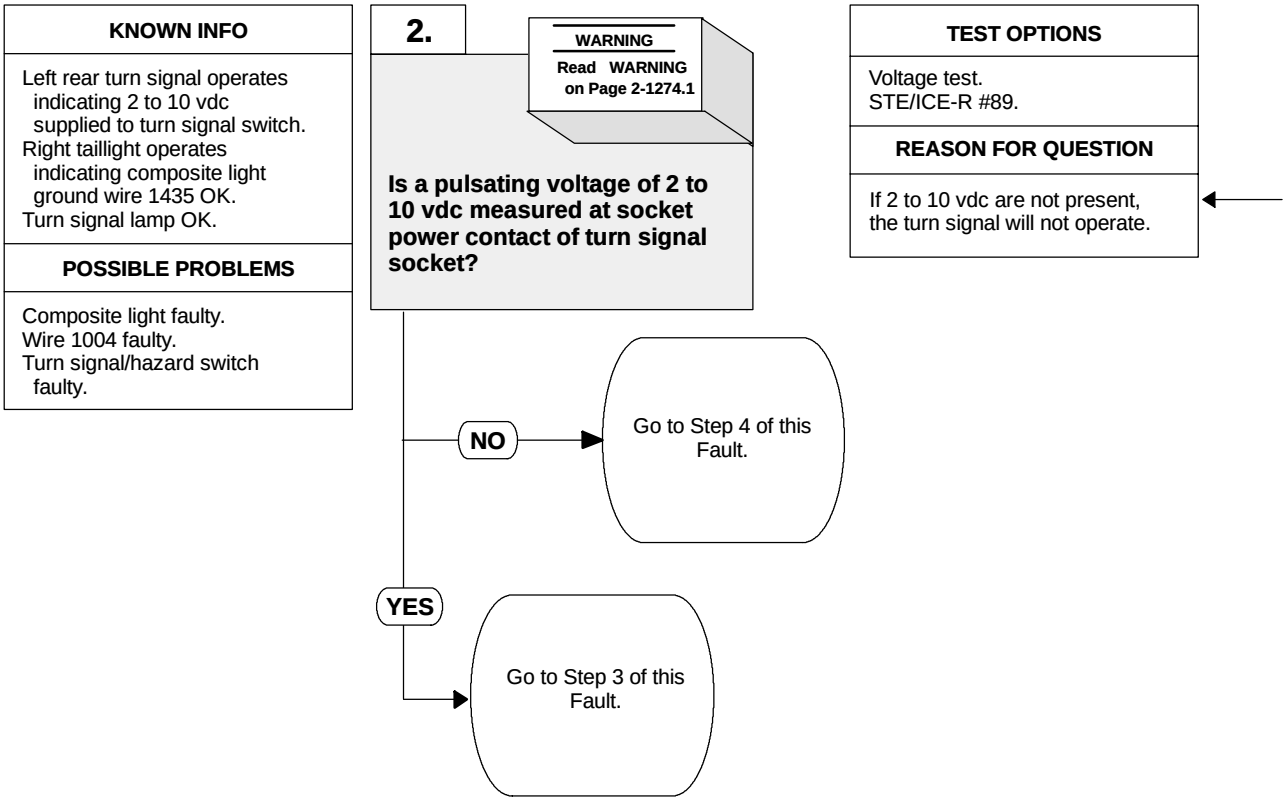
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Loosen six screws and remove right composite light cover and preformed packing. Discard preformed packing.
(2) Remove turn signal lamp.
(3) Set multimeter select switch to ohms.
(4) Is continuity measured across turn signal lamp?
    (a) If there is no continuity, replace lamp (Para 7-47).
    (b) If there is continuity, turn signal lamp is OK.



14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



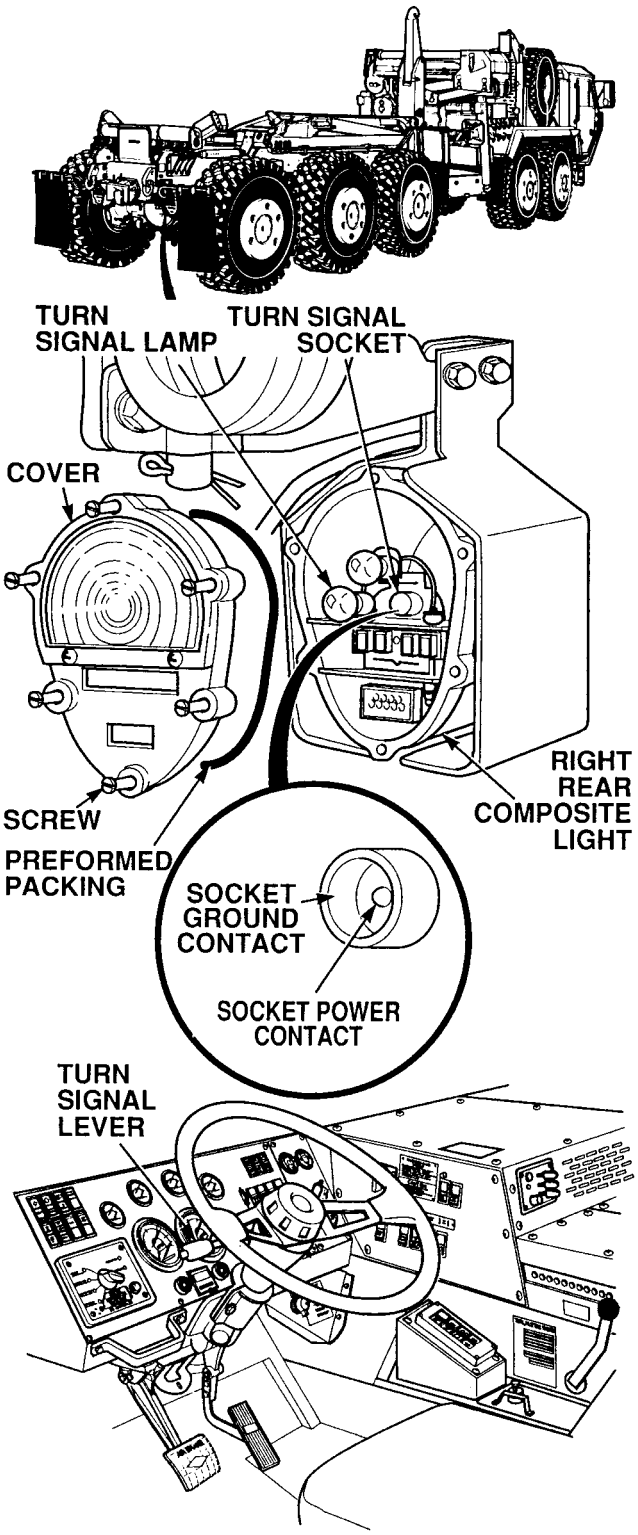
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

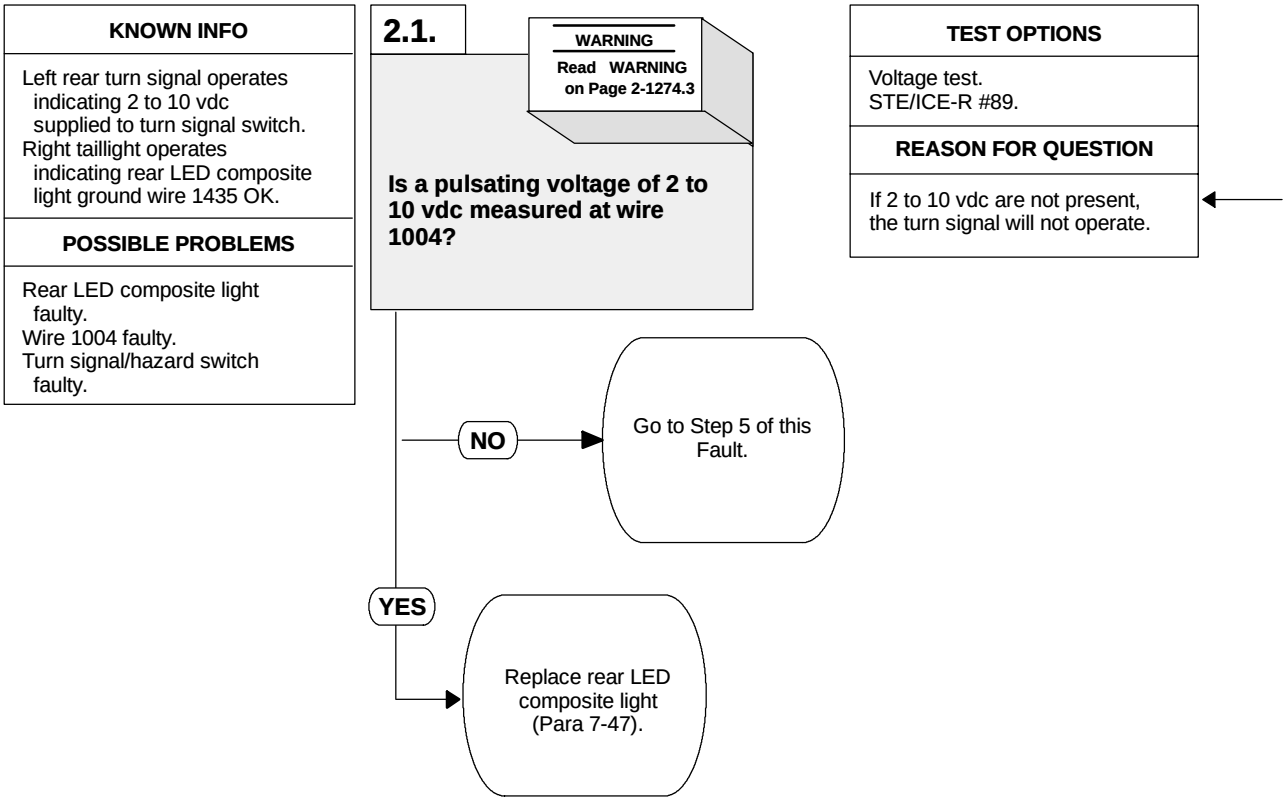
NOTE

Voltage will pulsate between 2 and 10 vdc during turn signal voltage tests.

VOLTAGE TEST
(1) Set multimeter select switch to volts dc. (2) Connect positive (+) multimeter lead to socket power contact of turn signal socket. (3) Connect negative (–) multimeter lead to a known good ground. (4) Turn on right turn signal. (a) If 2 to 10 vdc are not present, turn off right turn signal and go to Step 4 of this Fault. (b) If 2 to 10 vdc are present, turn off right turn signal and go to Step 3 of this Fault.



14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

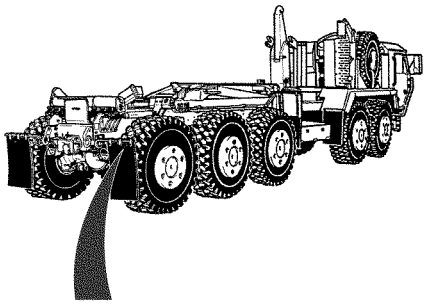
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

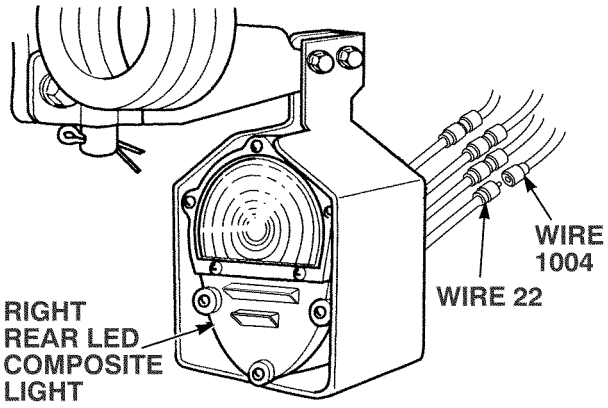
NOTE

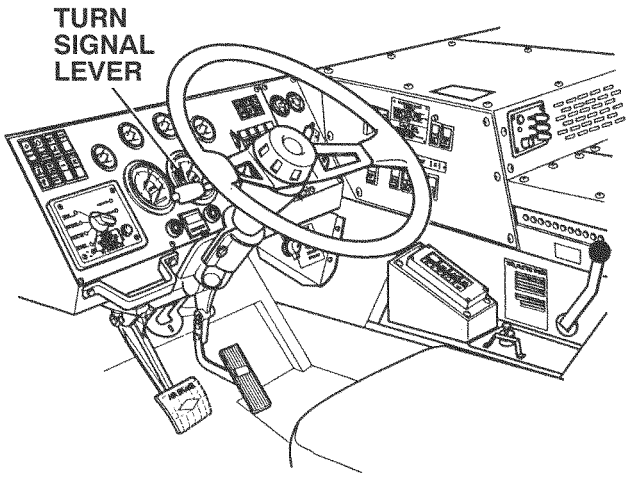
Voltage will pulsate between 2 and 10 vdc during turn signal voltage tests.

VOLTAGE TEST

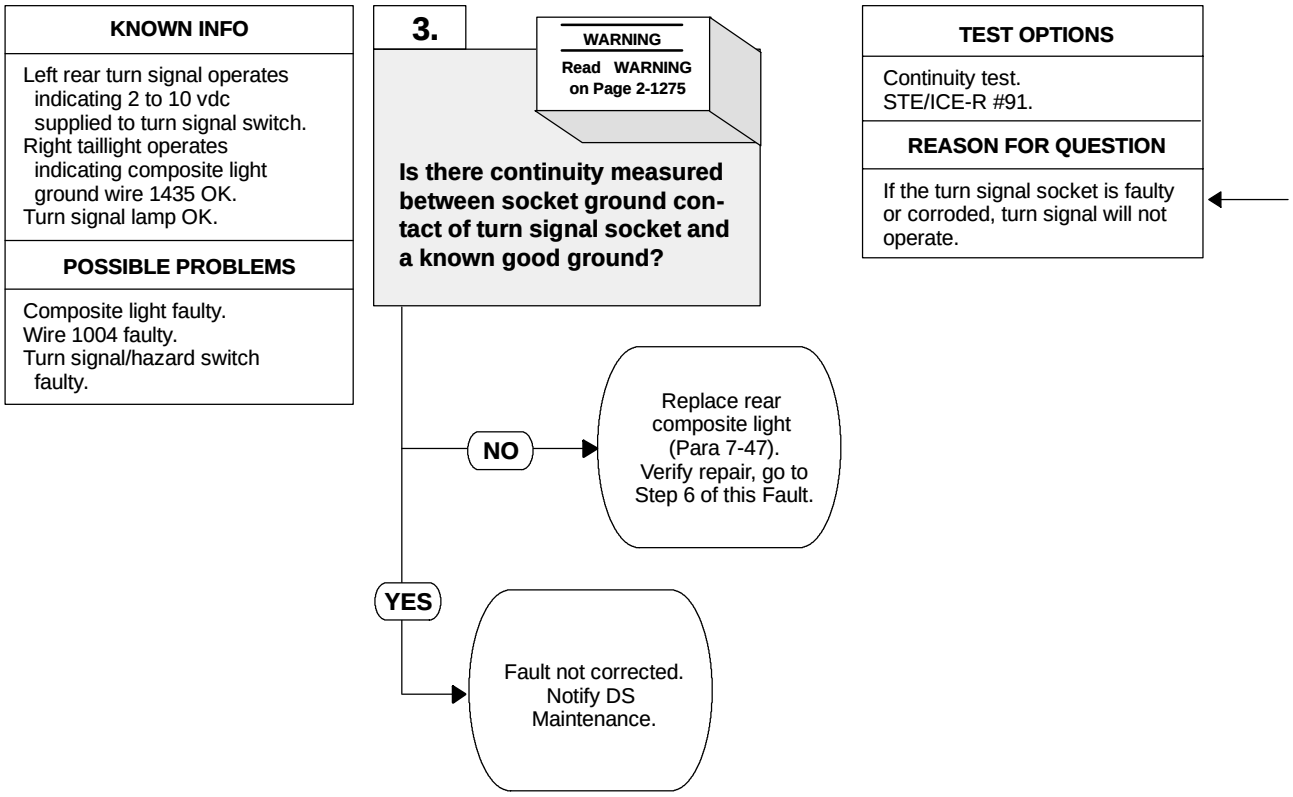
(1) Set multimeter select switch to volts dc.
(2) Disconnect wire 1004 from wire 22.
(3) Connect positive (+) multimeter lead to wire 1004.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn on right turn signal.
  (a) If 2 to 10 vdc are not present, turn off right turn signal, perform Step (6) below and go to Step 5 of this Fault.
  (b) If 2 to 10 vdc are present, turn OFF right turn signal. Replace rear LED composite light (Para 7-47).
(6) Connect wire 1004 to wire 22.







14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE (CONT).

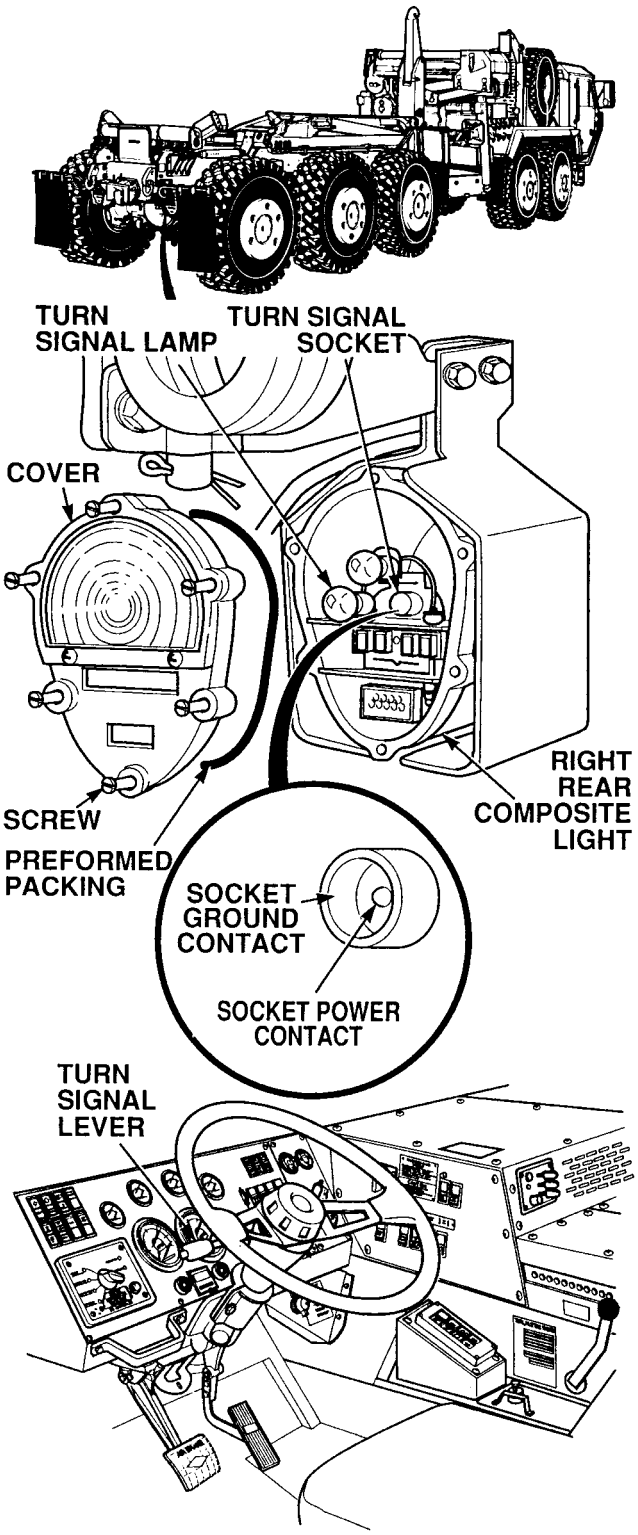


WARNING

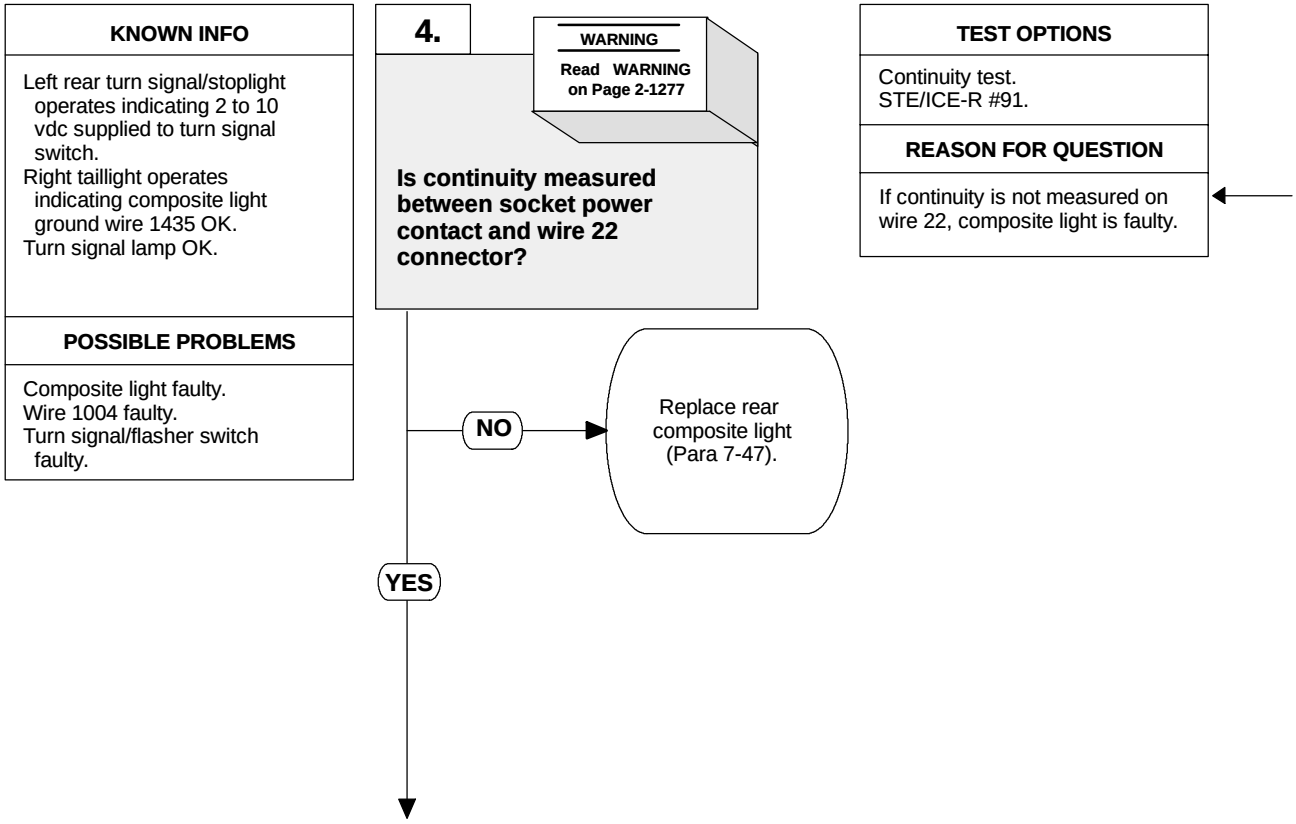
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between socket ground contact and a known good ground?
   (a) If there is no continuity, replace composite light.
   (b) If there is continuity and fault not corrected, perform Steps (3) and (4) below and notify DS Maintenance.
(3) Install turn signal lamp.
(4) Install preformed packing and composite light cover and tighten six screws.



14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE (CONT).

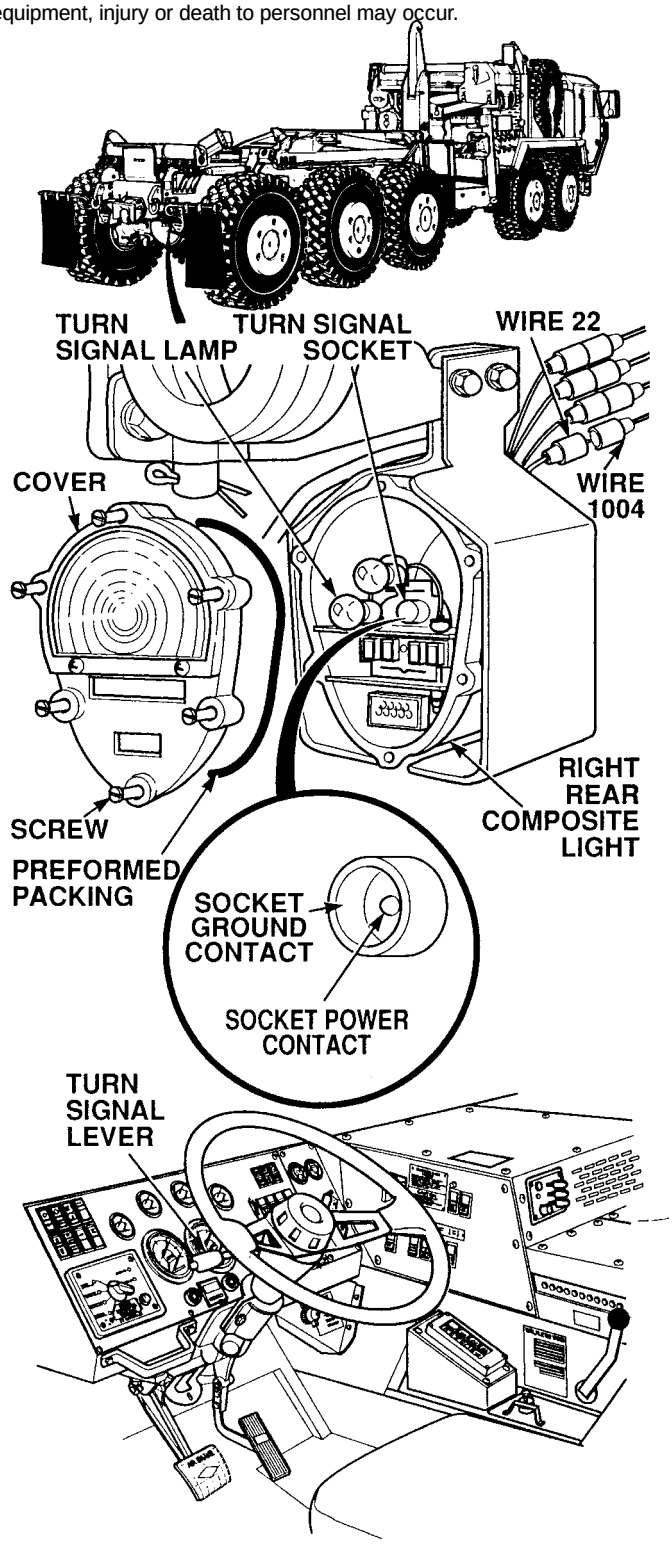


WARNING

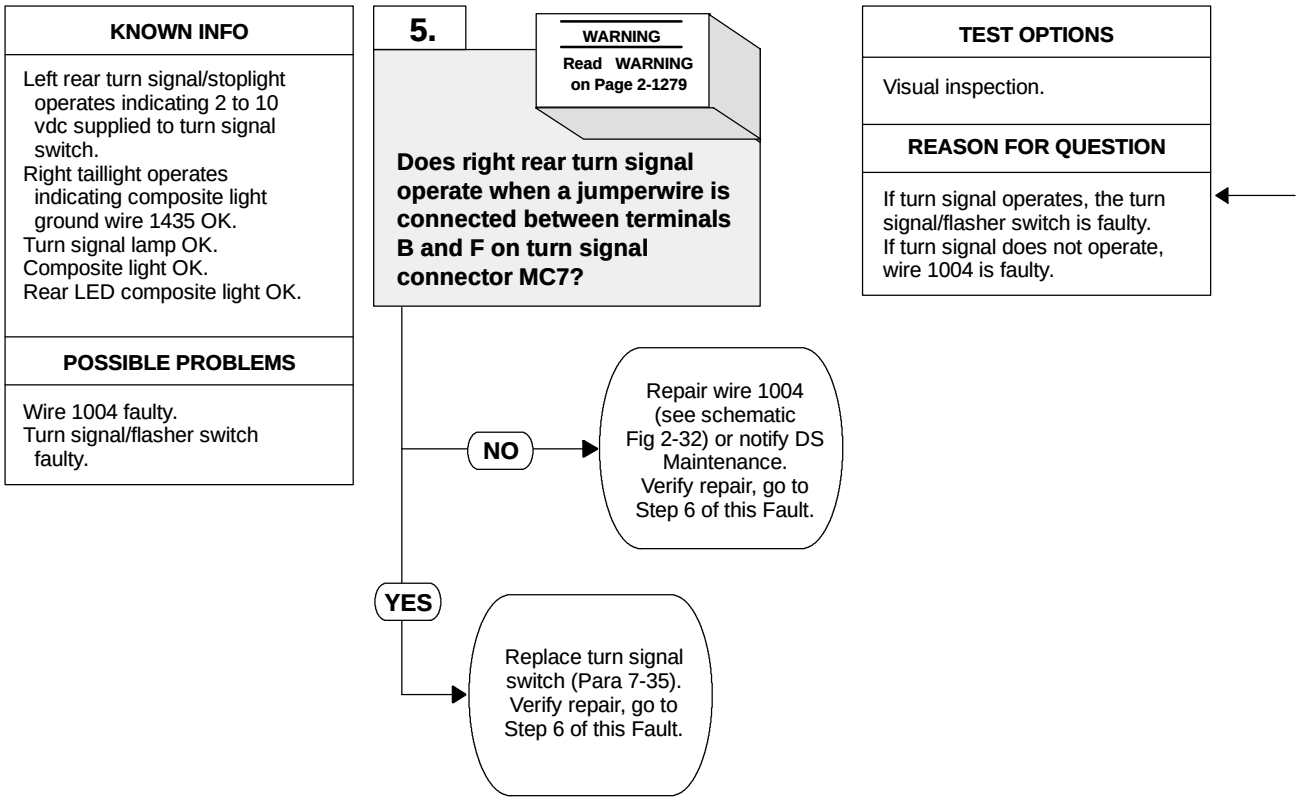
- 10 to 14 vdc are always present at terminals E and F of connector MC7.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect wire 1004 from right turn signal lead wire 22.
(2) Set multimeter select switch to ohms.
(3) Is there continuity between socket power contact and wire 22?
  (a) If there is no continuity, replace composite light (Para 7-47).
  (b) If there is continuity and fault not corrected, perform Steps (4) through (6) below and go to Step 5 of this Fault.
(4) Install lamp.
(5) Install preformed packing and composite light cover and tighten six screws.
(6) Connect wire 1004 to lead wire 22.



14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE (CONT).

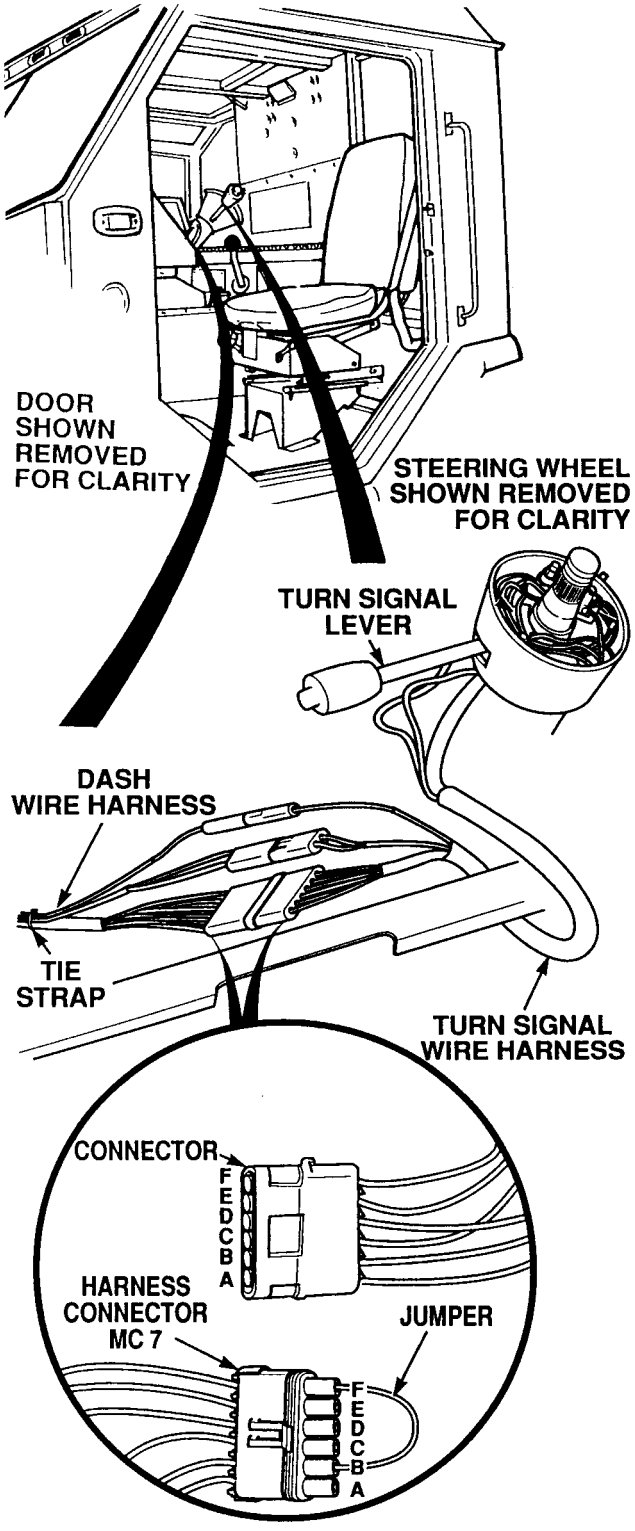


WARNING

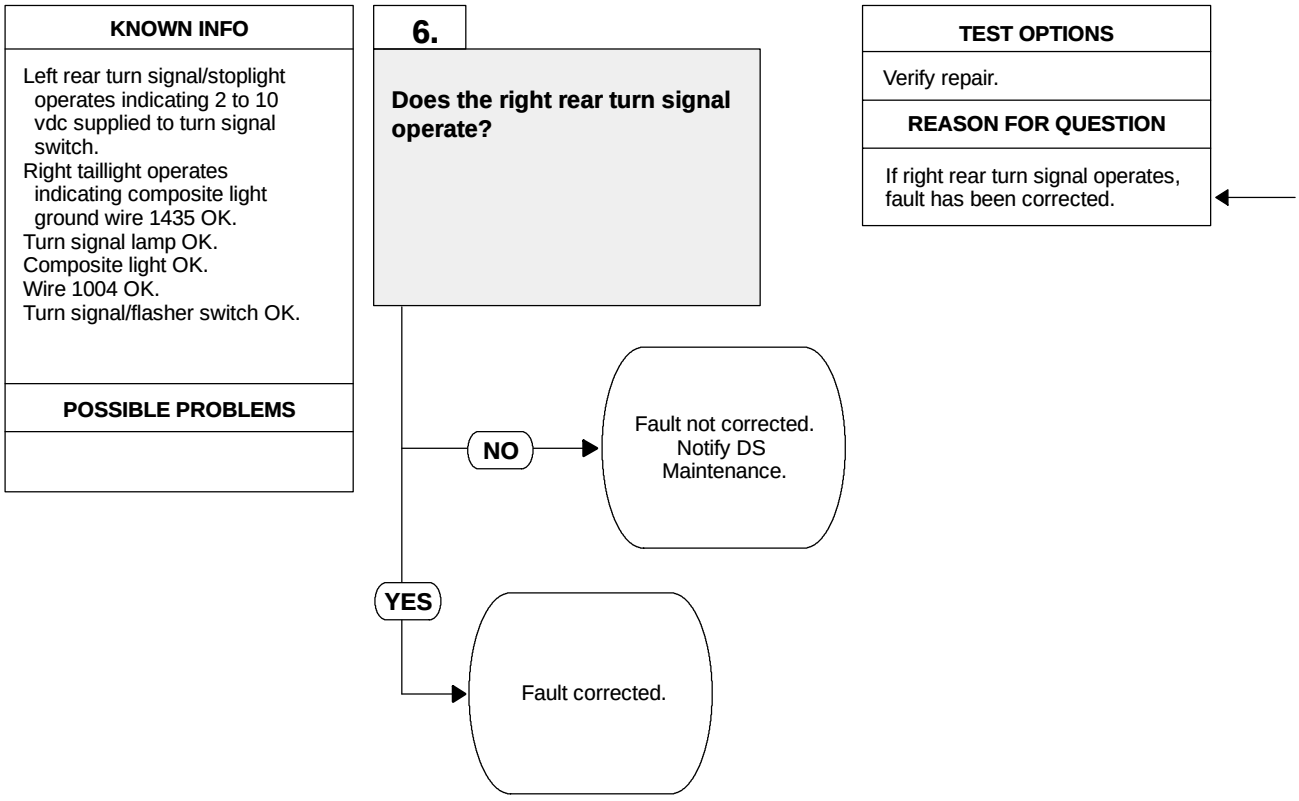
- 10 to 14 vdc are always present at terminals E and F of connector MC7.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VISUAL INSPECTION

(1) Disconnect turn signal/flasher connector MC7.
(2) Connect jumperwire between terminals B and F of connector MC7.
  (a) If right rear turn signal does not operate, repair wire 1004 (see schematic Fig 2-32) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.
  (b) If right turn signal operates, replace turn signal/flasher switch (Para 7-35).
(3) Remove jumperwire.
(4) Connect turn signal/flasher connector to harness connector MC7.

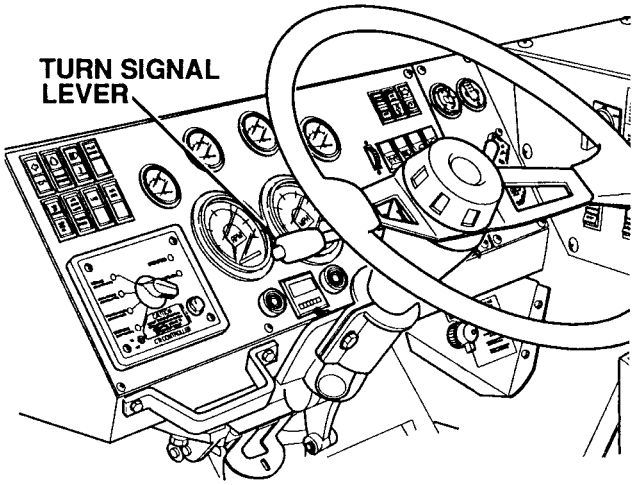


14. RIGHT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn on right turn signal (TM 9-2320-364-10).
   (a) If right rear turn signal does not operate, fault not corrected. Turn off right turn signal and notify DS Maintenance.
   (b) If right rear turn signal operates, fault has been corrected.
(2) Turn off right turn signal.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

15. LEFT REAR TURN SIGNAL DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

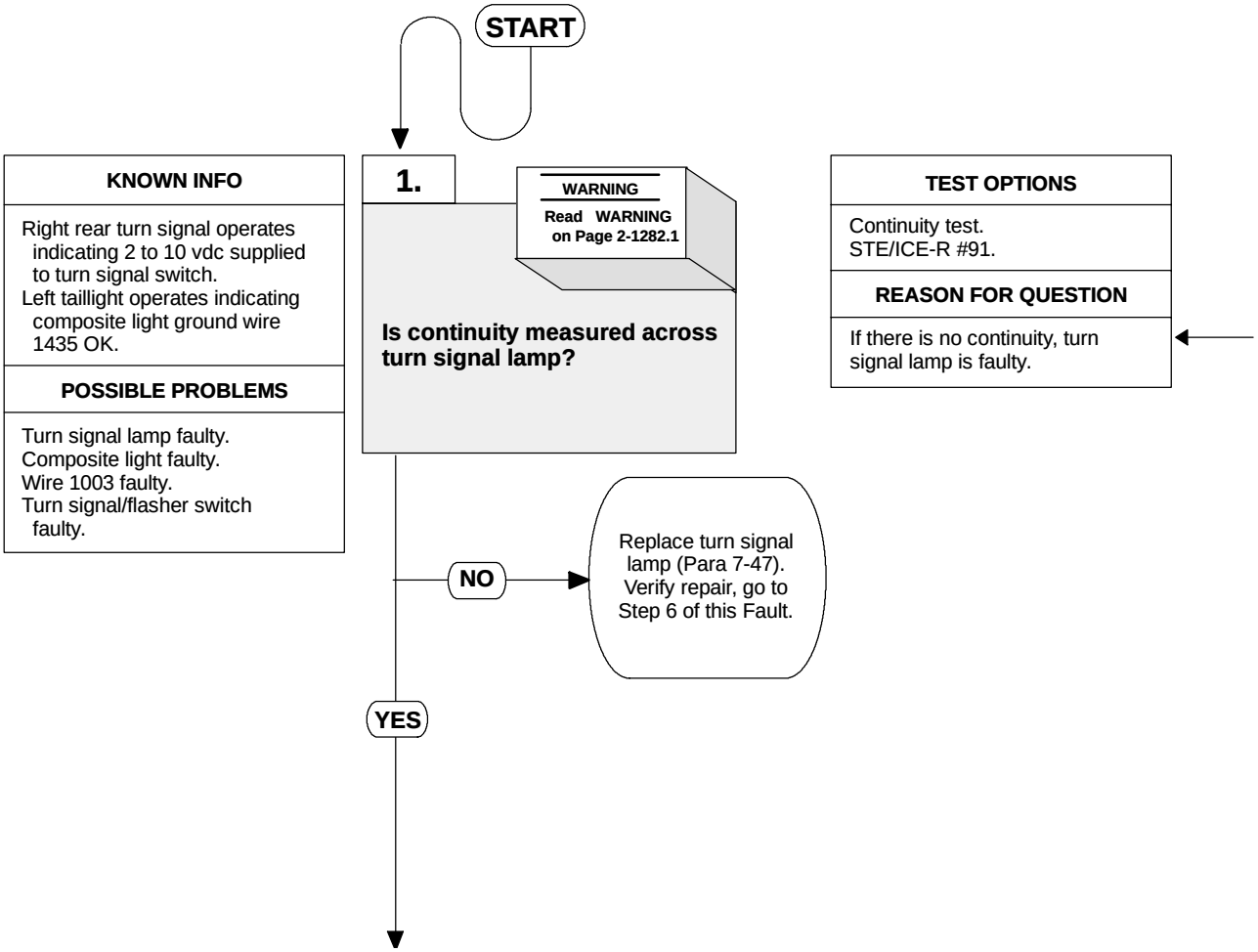
Materials/Parts
Cable Tie (Item 26, Appendix C)
Lockwasher (Item 168, Appendix F) (Rear LED composite light only)
Packing, Preformed (Item 224, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

- Truck may be equipped with rear composite lights or rear LED composite lights.
- If rear LED composite light is installed, go to Step 2.1 of this Fault.

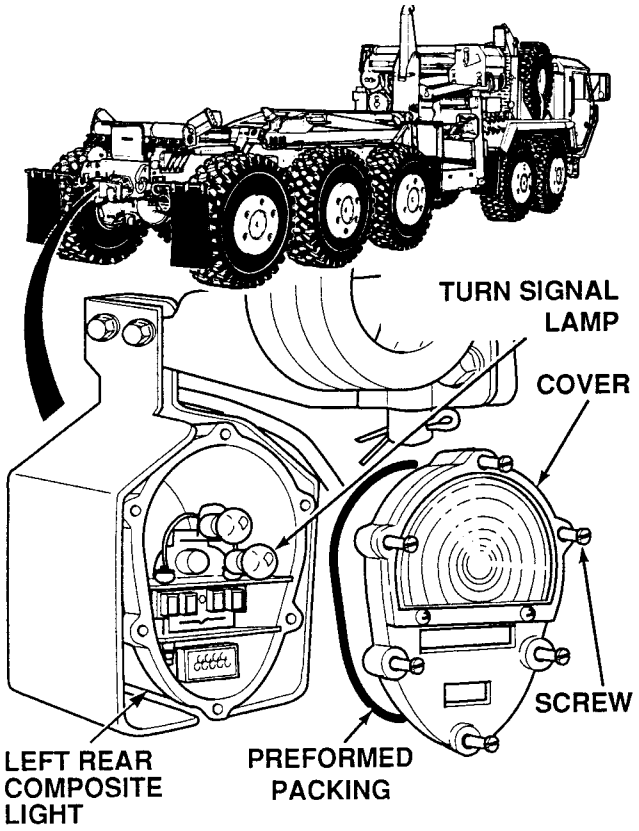


WARNING

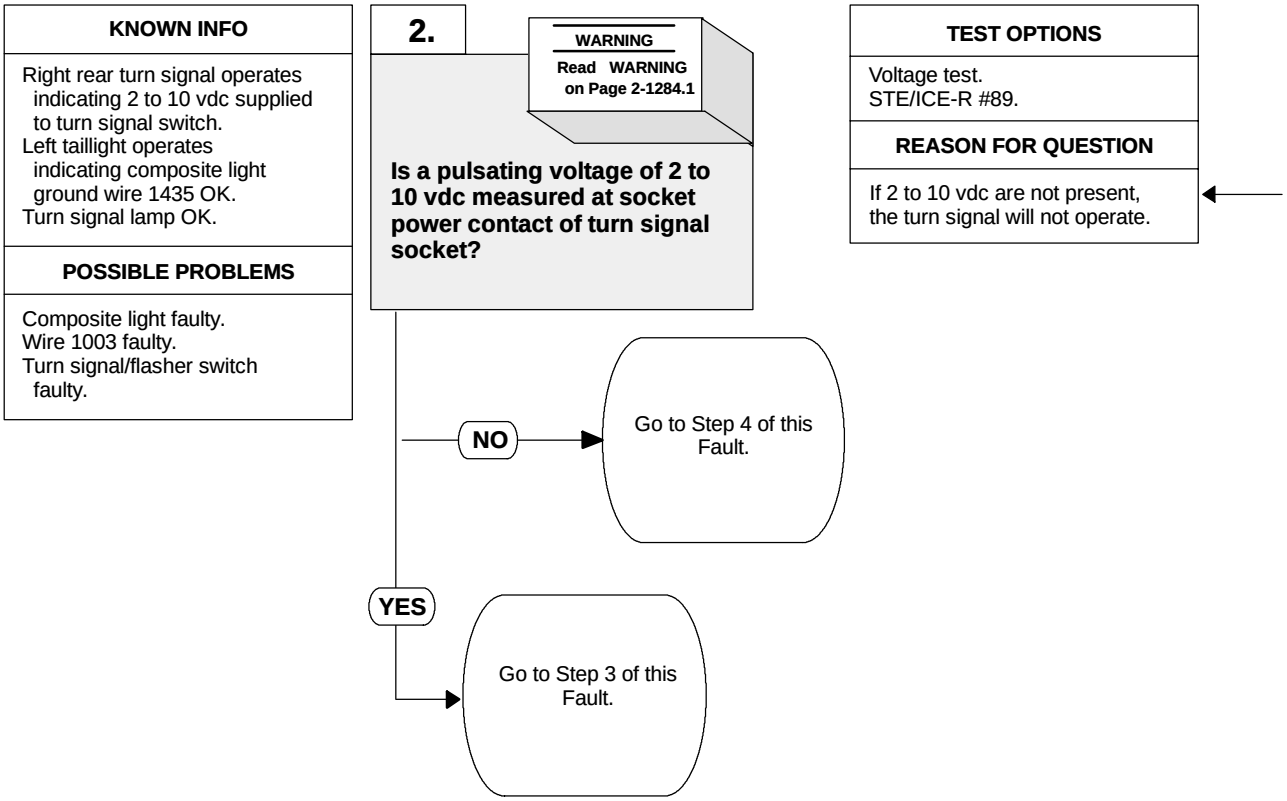
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Loosen six screws and remove left composite light cover and preformed packing. Discard preformed packing.
(2) Remove turn signal lamp.
(3) Set multimeter select switch to ohms.
(4) Is continuity measured across turn signal lamp?
    (a) If there is no continuity, replace lamp (Para 7-47).
    (b) If there is continuity, turn signal lamp is OK.



15. LEFT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



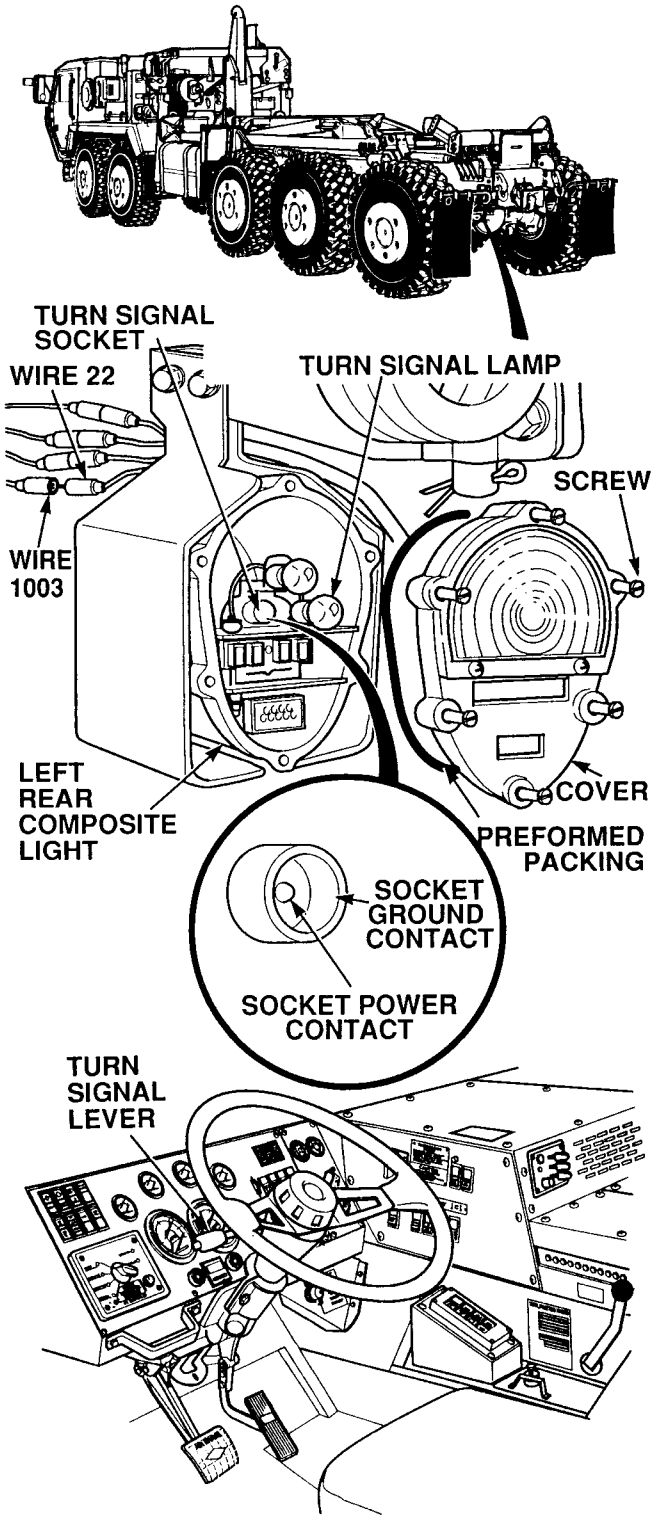
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

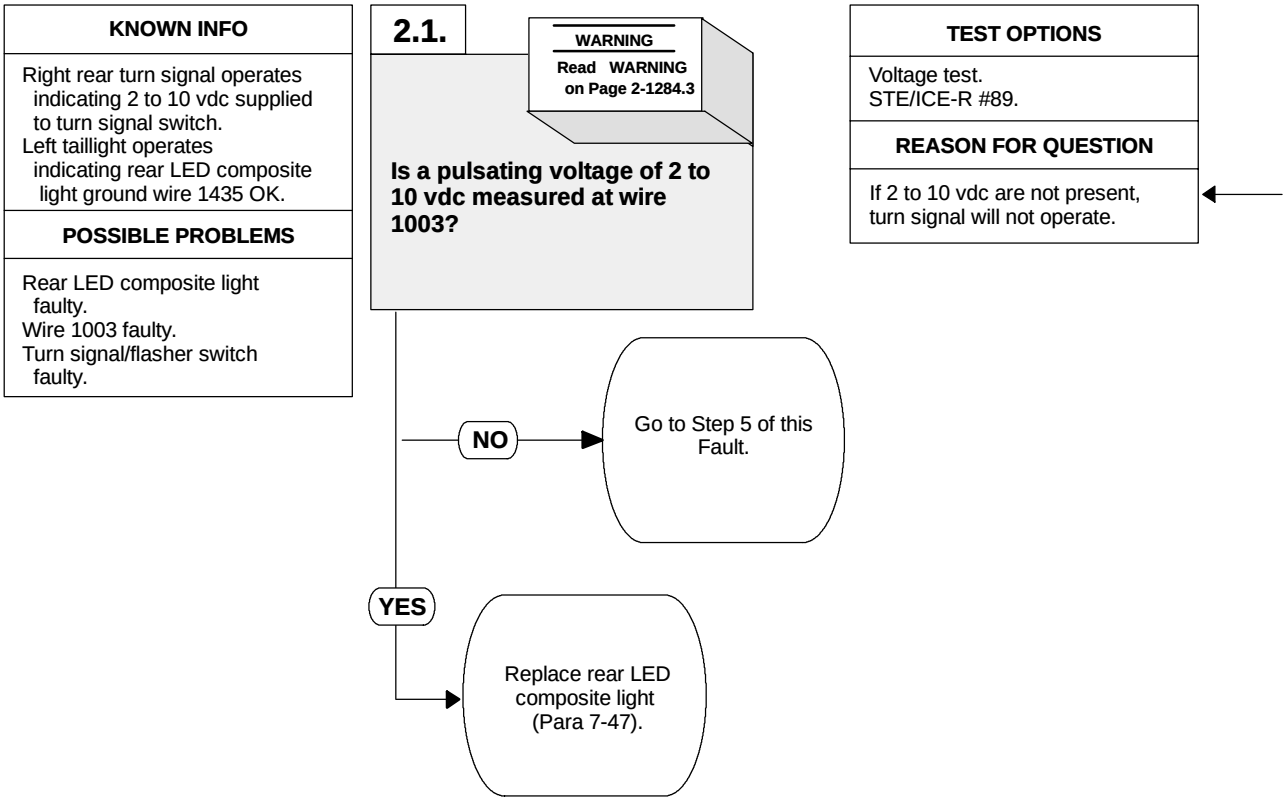
NOTE

Voltage will pulsate between 2 and 10 vdc during turn signal voltage tests.

VOLTAGE TEST
(1) Set multimeter select switch to volts dc. (2) Connect positive (+) multimeter lead to socket power contact of turn signal socket. (3) Connect negative (–) multimeter lead to a known good ground. (4) Turn on left turn signal. (a) If 2 to 10 vdc are not present, go to Step 4 of this Fault. (b) If 2 to 10 vdc are present, go to Step 3 of this Fault.



15. LEFT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

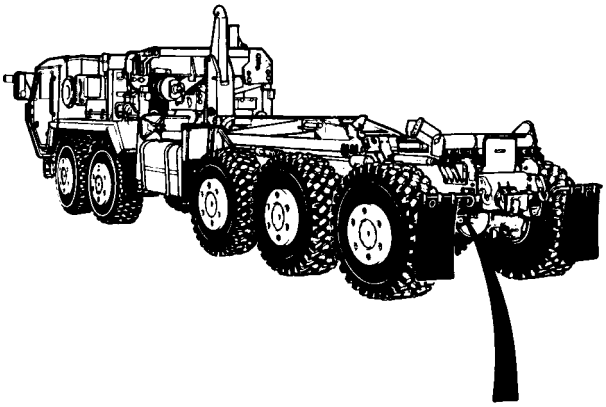
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

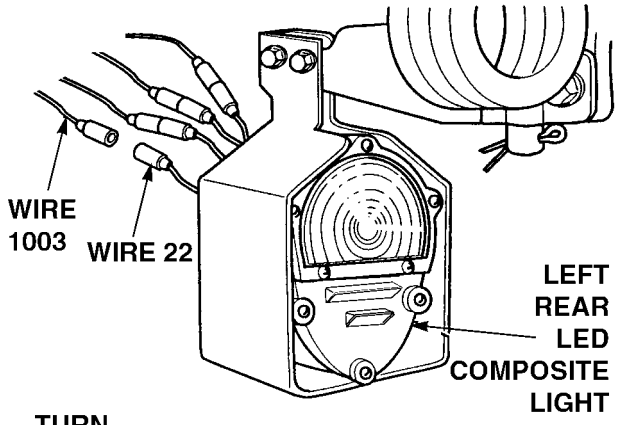
NOTE

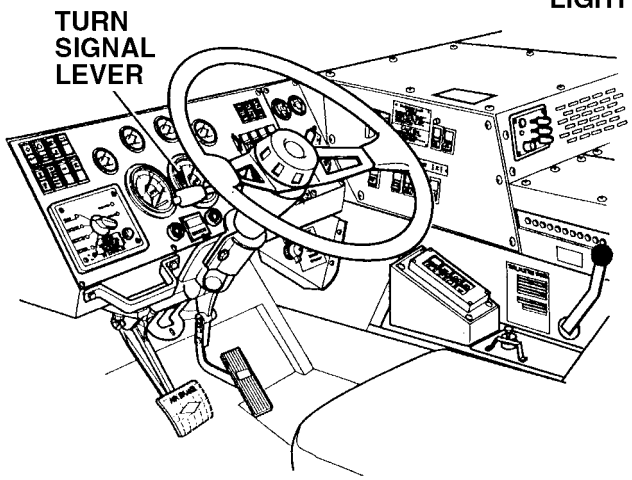
Voltage will pulsate between 2 and 10 vdc during turn signal voltage tests.

VOLTAGE TEST

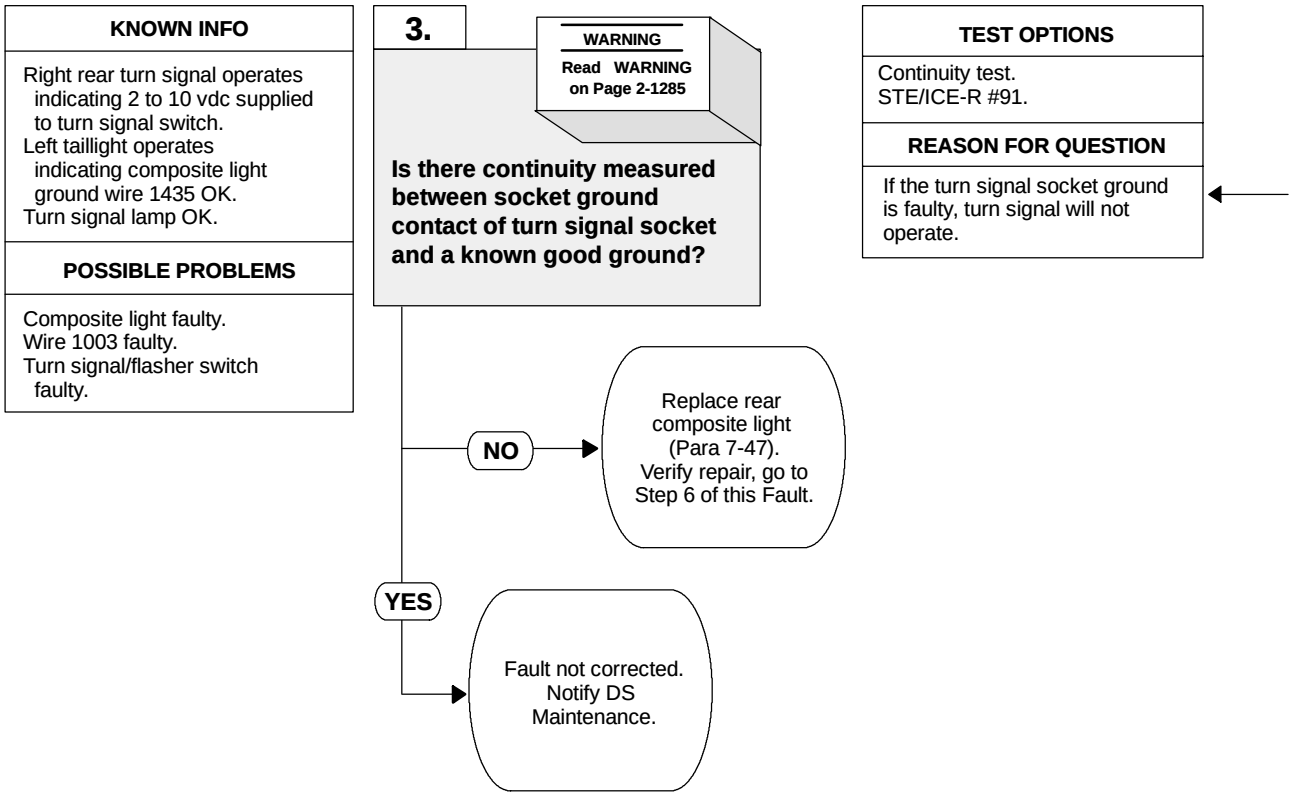
(1) Set multimeter select switch to volts dc.
(2) Disconnect wire 1003 from wire 22.
(3) Connect positive (+) multimeter lead to wire 1003.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn on left turn signal.
  (a) If 2 to 10 vdc are not present, perform Step (6) below and go to Step 5 of this Fault.
  (b) If 2 to 10 vdc are present, turn OFF turn signal. Replace LED composite light (Para 7-48).
(6) Connect wire 1003 to wire 22.







15. LEFT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

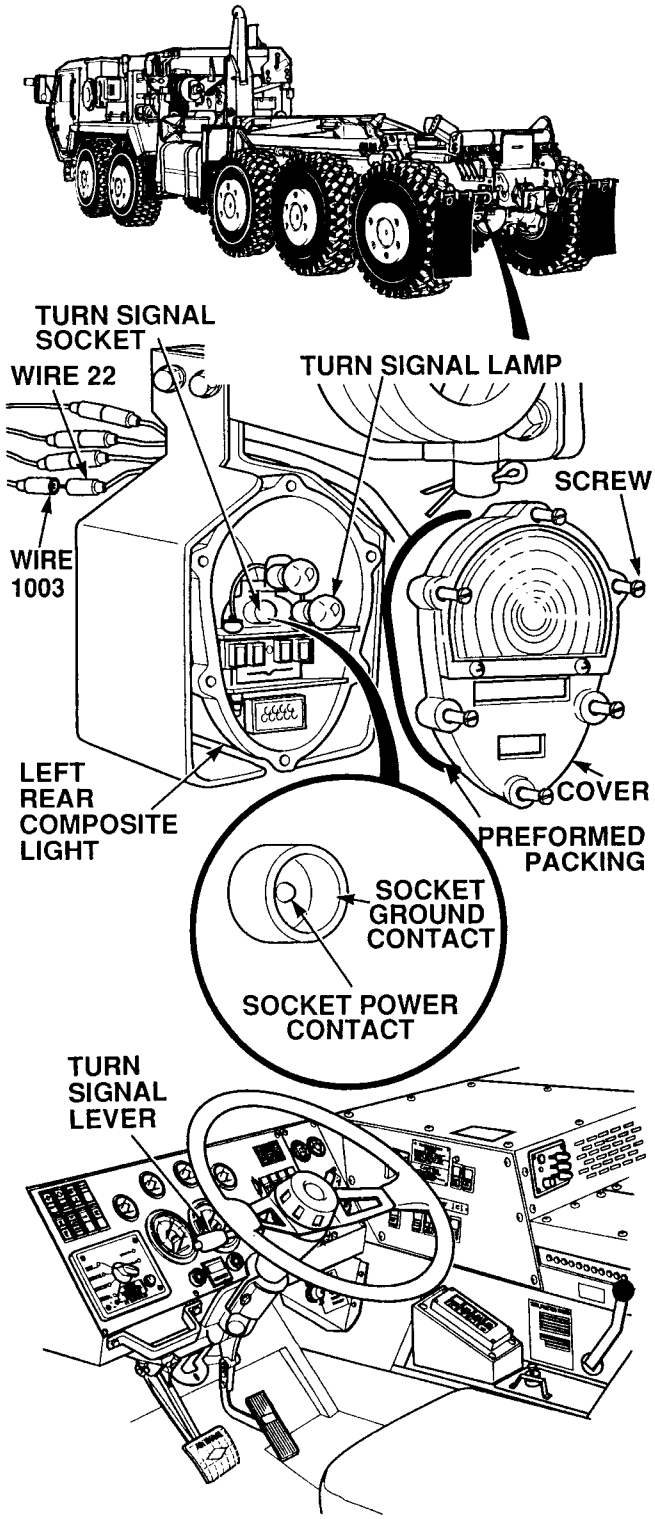
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

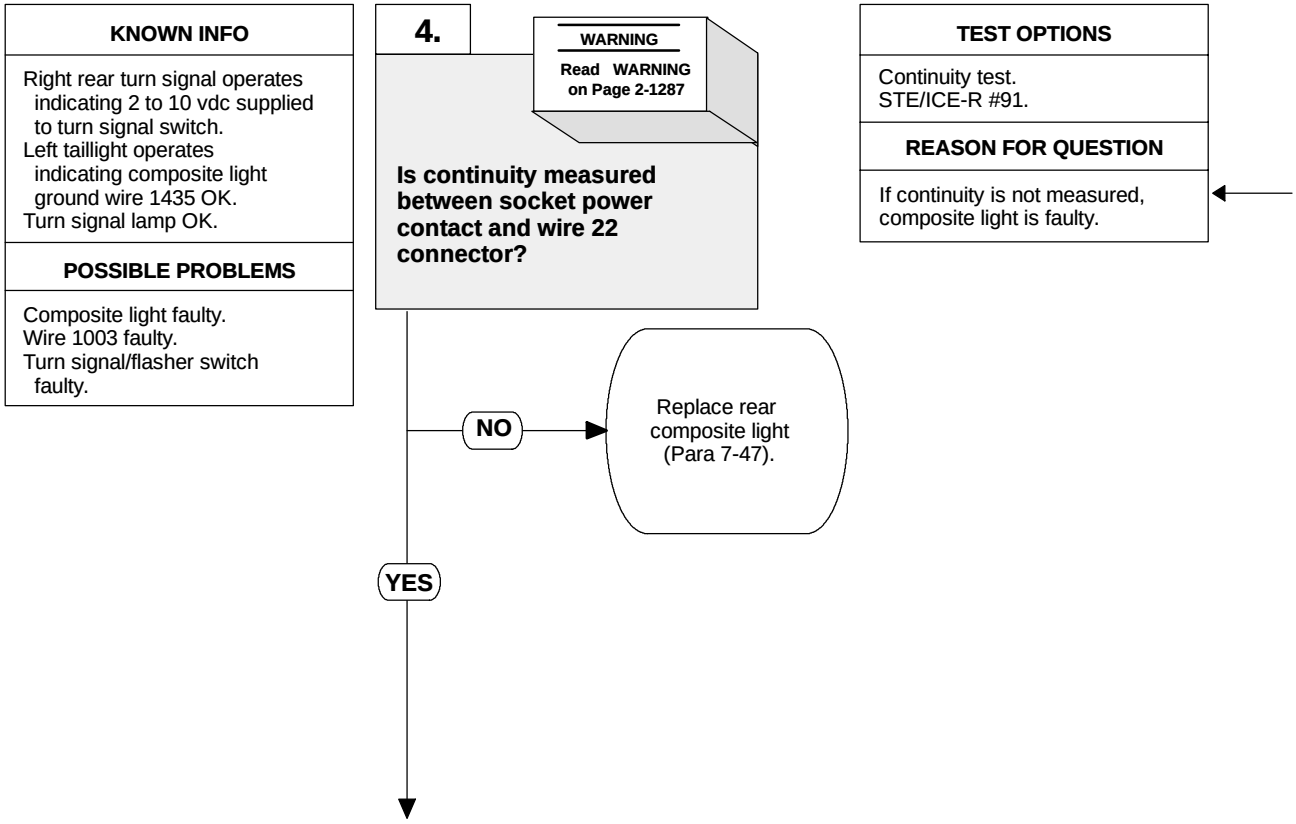
Voltage will pulsate between 2 and 10 vdc during turn signal voltage tests.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between turn signal socket ground contact and a known good ground?
   (a) If there is no continuity, replace composite light (Para 7-47).
   (b) If there is continuity, fault not corrected. Notify DS Maintenance.
(3) Install turn signal lamp.
(4) Install preformed packing and composite light cover and tighten six screws.



15. LEFT REAR TURN SIGNAL DOES NOT OPERATE (CONT).

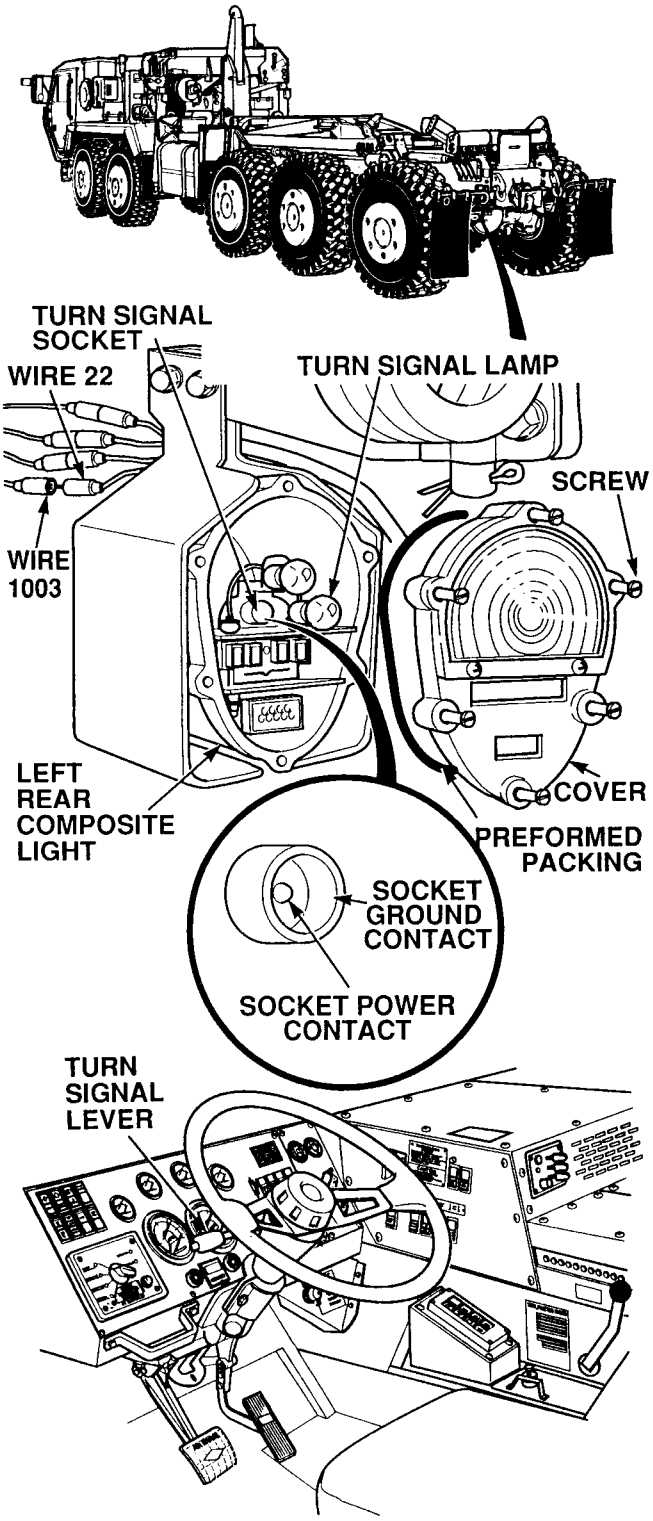


WARNING

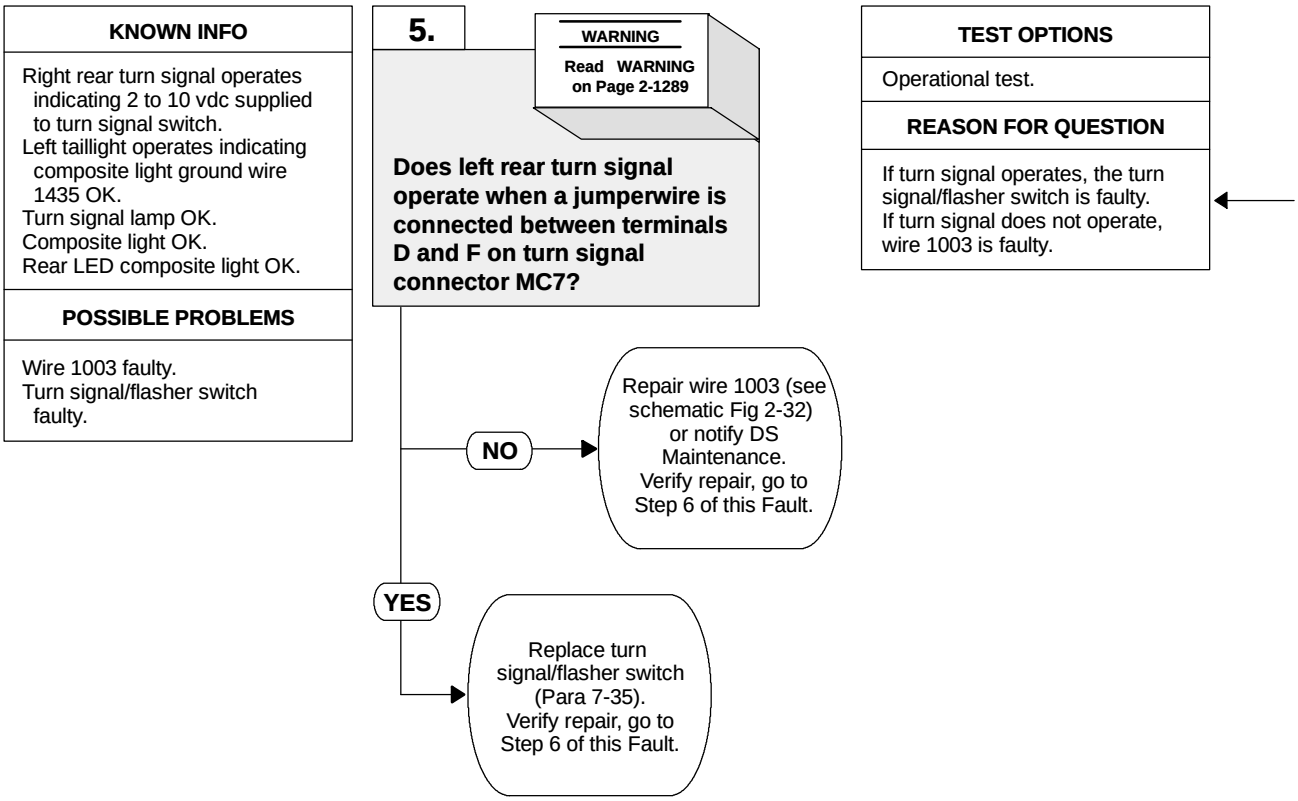
- 10 to 14 vdc are always present at terminals E and F of connector MC7.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Disconnect wire 1003 connector from left turn signal lead wire 22 connector.
(2) Set multimeter select switch to ohms.
(3) Is continuity measured between turn signal socket power contact and wire 22 connector?
  (a) If there is no continuity, replace rear composite light (Para 7-47).
  (b) If there is continuity and fault not corrected, perform Steps (4) through (6) below and go to Step 5 of this Fault.
(4) Install lamp.
(5) Install preformed packing and composite light cover and tighten six screws.
(6) Connect wire 1003 to lead wire 22.



15. LEFT REAR TURN SIGNAL DOES NOT OPERATE (CONT).

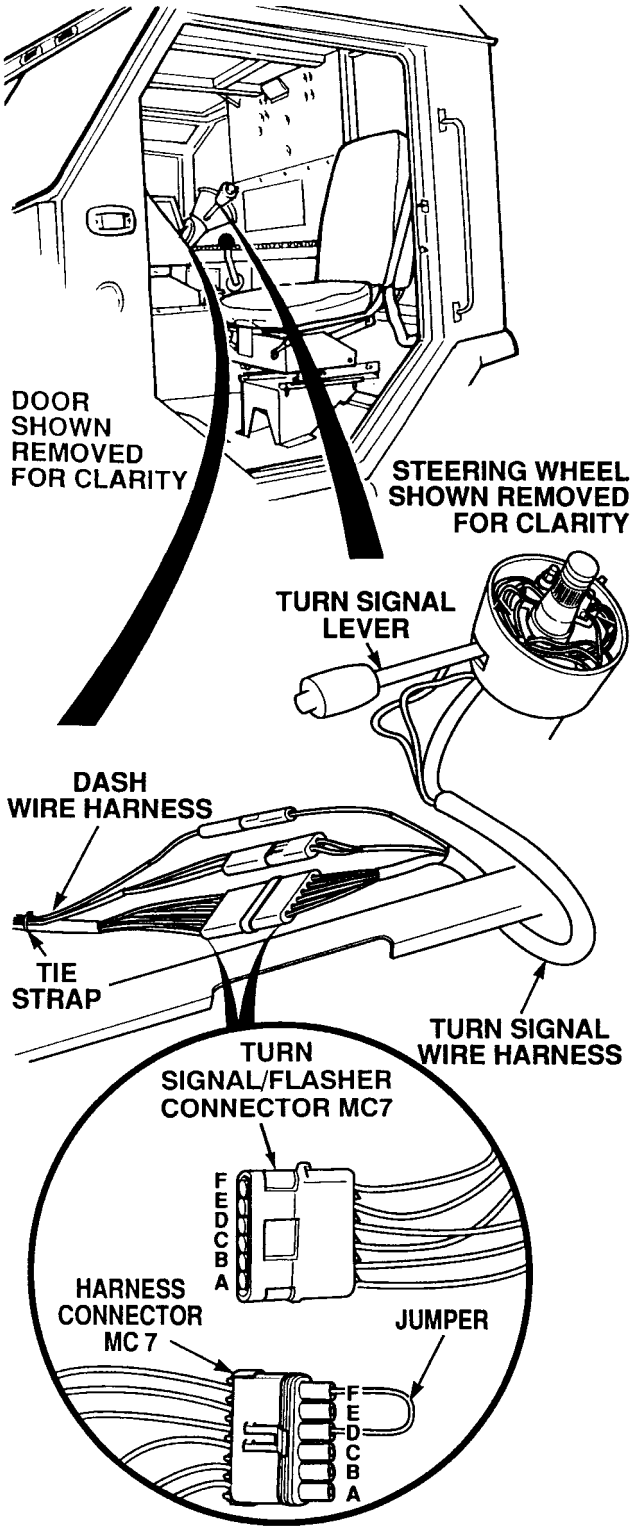


WARNING

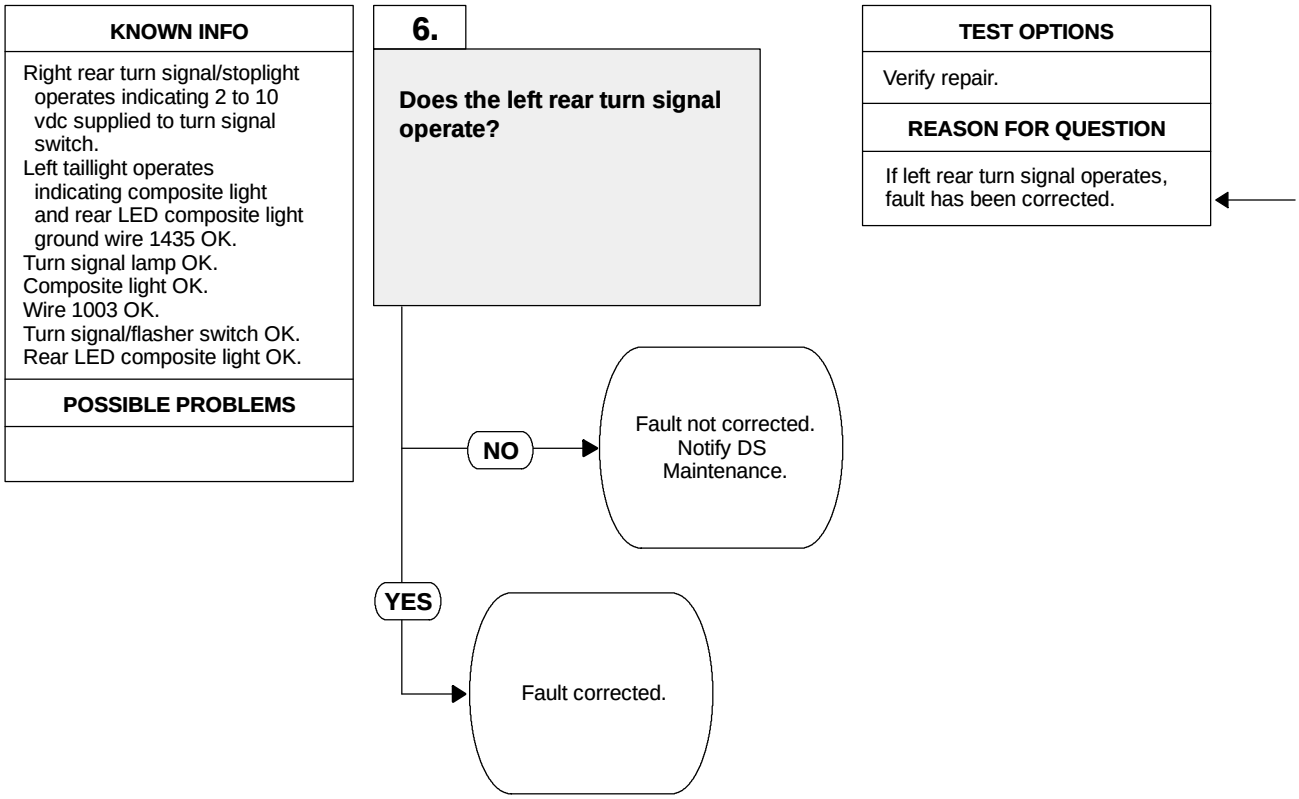
- 10 to 14 vdc are always present at terminals E and F of connector MC7.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

OPERATIONAL TEST

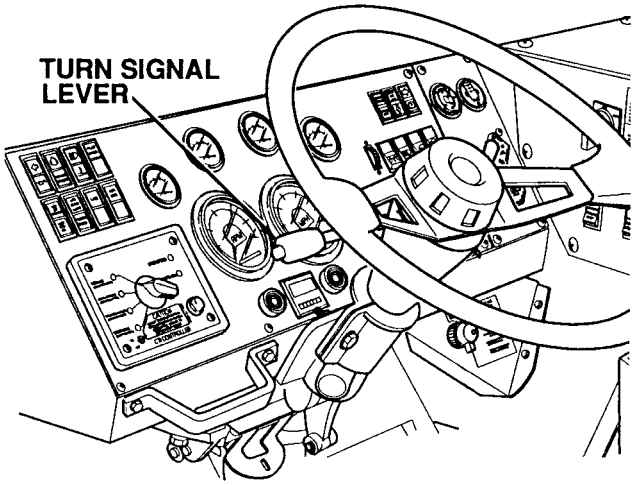
(1) Remove cable tie.
(2) Disconnect turn signal/flasher connector MC7.
(3) Connect jumperwire between terminals D and F of connector MC7.
  (a) If left rear turn signal does not operate, repair wire 1003 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If left turn signal operates, replace turn signal/flasher switch (Para 7-35).
(4) Remove jumperwire.
(5) Connect turn signal/flasher connector to harness connector MC7.
(6) Install cable tie.



15. LEFT REAR TURN SIGNAL DOES NOT OPERATE (CONT).



VERIFY REPAIR
(1) Turn on left turn signal (TM 9-2320-364-10). (a) If left rear turn signal does not operate, fault not corrected. Turn off left turn signal and notify DS Maintenance. (b) If left rear turn signal operates, fault has been corrected. (2) Turn off left turn signal.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

16. LEFT FRONT TURN SIGNAL DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

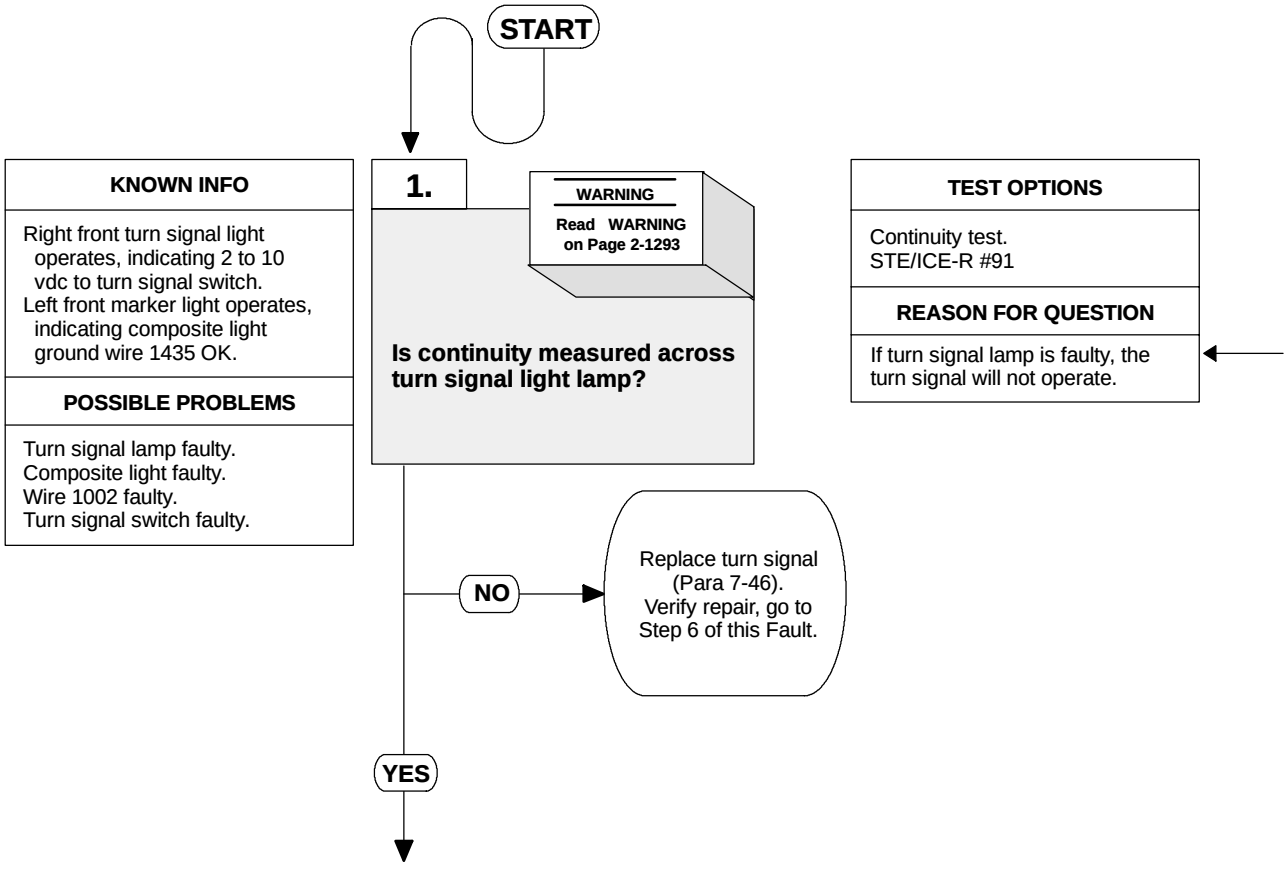
Materials/Parts
Cable Tie (Item 26, Appendix C)
Lockwasher (Item 168, Appendix F) (Front LED composite light only)
Preformed Packing (Item 223, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

- Truck may be equipped with front composite light or front LED composite light.
- If front LED composite light is installed, go to Step 2.1 of this Fault.

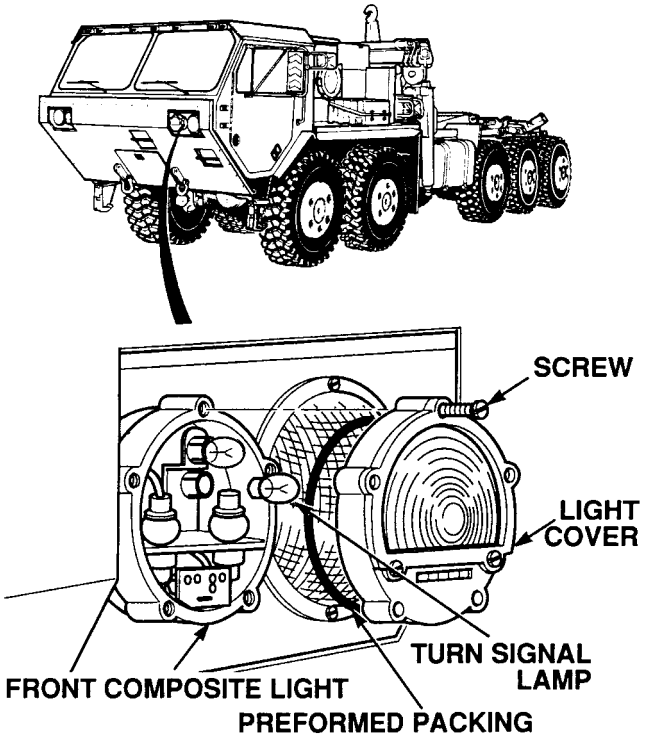


WARNING

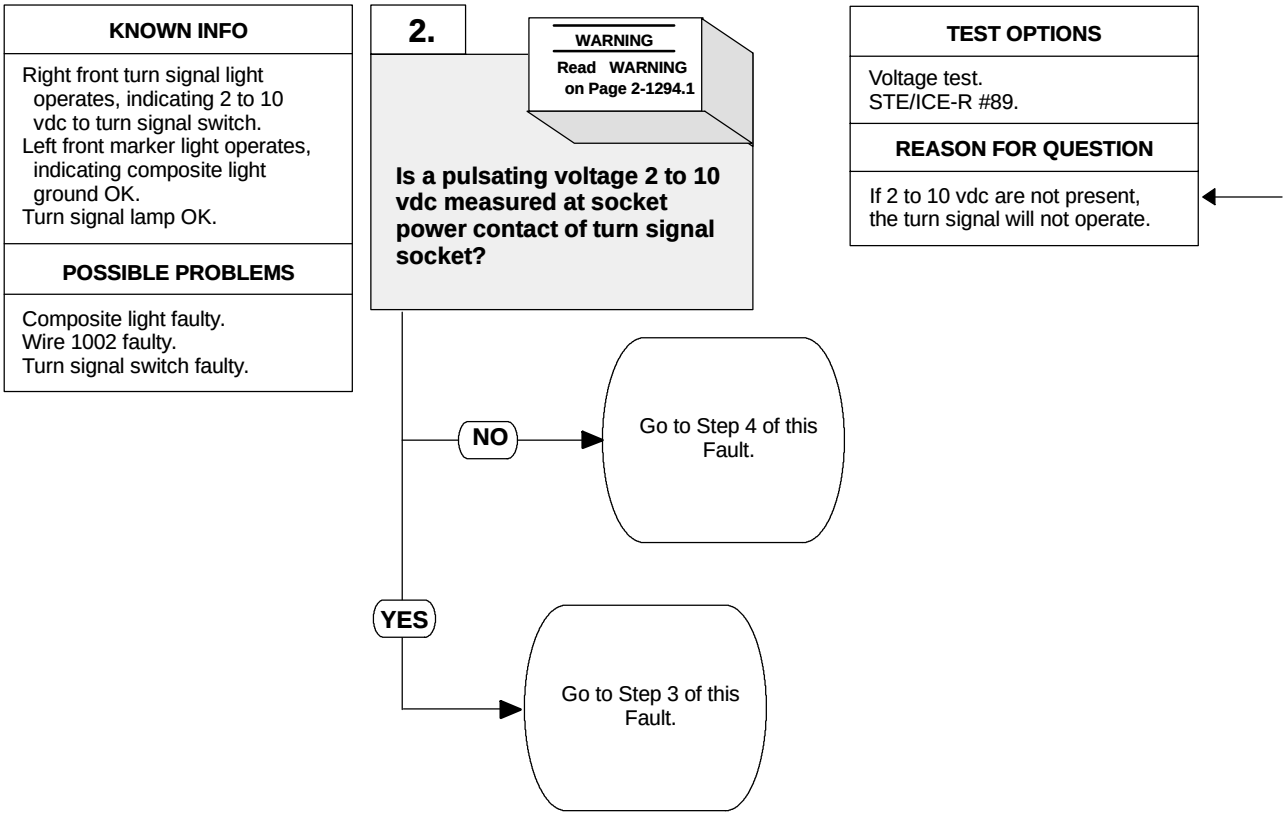
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Loosen five screws and remove preformed packing and left front composite light cover. Discard preformed packing.
(2) Remove turn signal lamp.
(3) Is there continuity across turn signal lamp?
   (a) If there is no continuity, replace lamp (Para 7-46).
   (b) If there is continuity, lamp is OK.



16. LEFT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

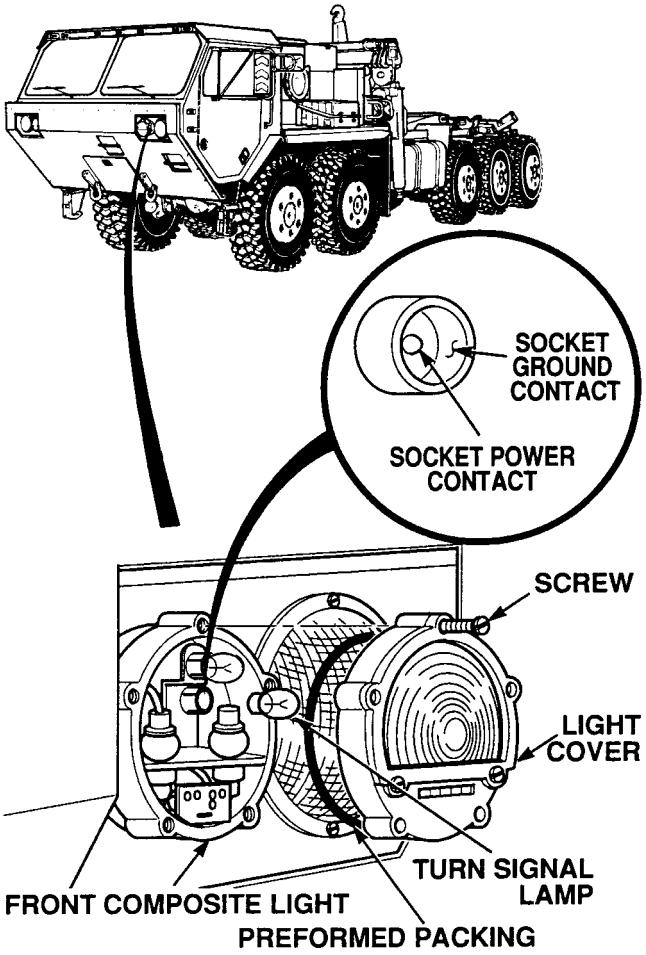
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

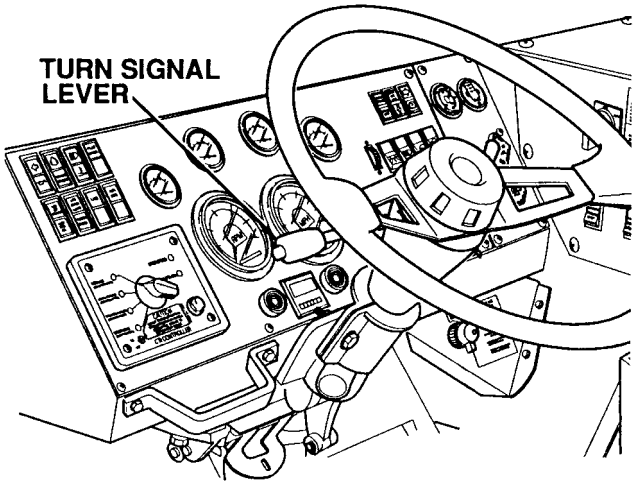
NOTE

Voltage will pulsate between 2 to 10 vdc during turn signal voltage test.

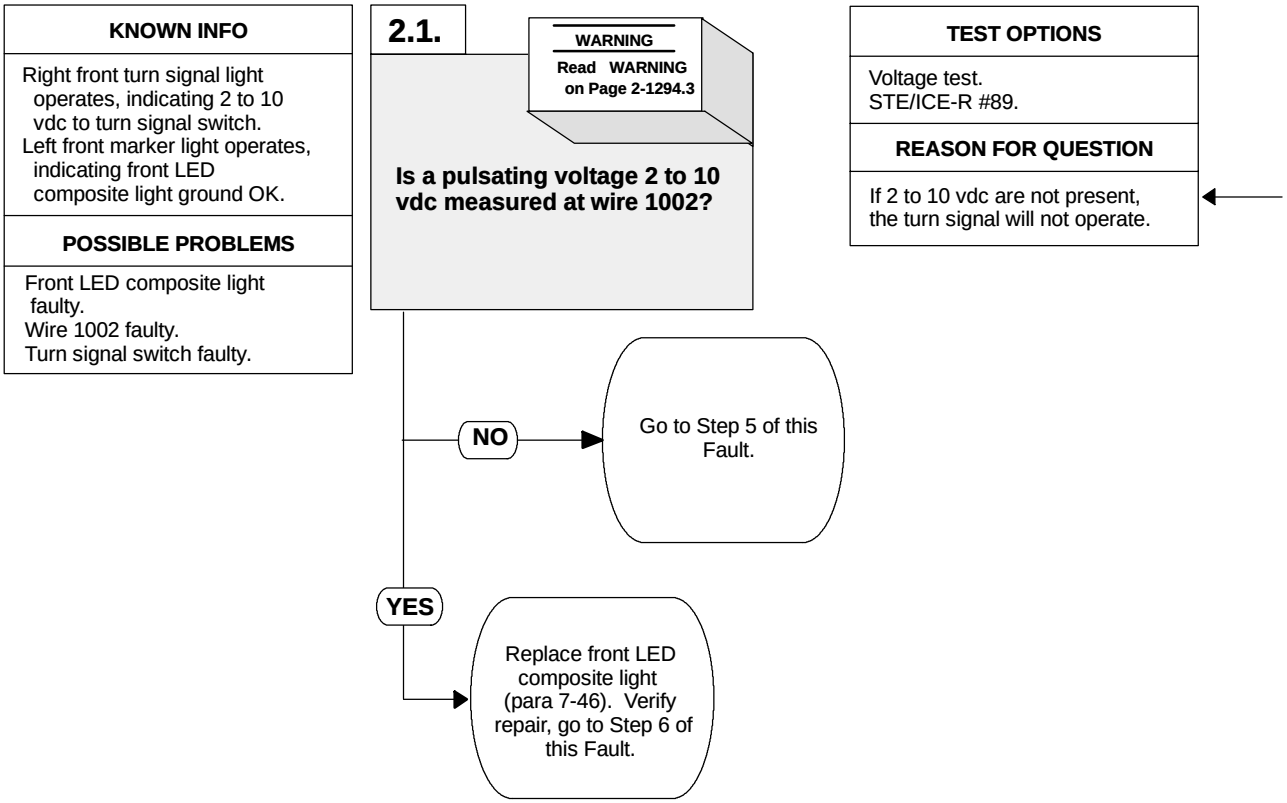
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to socket power contact of turn signal light socket.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn on left turn signal (TM 9-2320-364-10).
   (a) If 2 to 10 vdc are not present, turn off left turn signal and go to Step (4) of this Fault.
   (b) If 2 to 10 vdc are present, turn off left turn signal and go to Step (3) of this Fault.





16. LEFT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

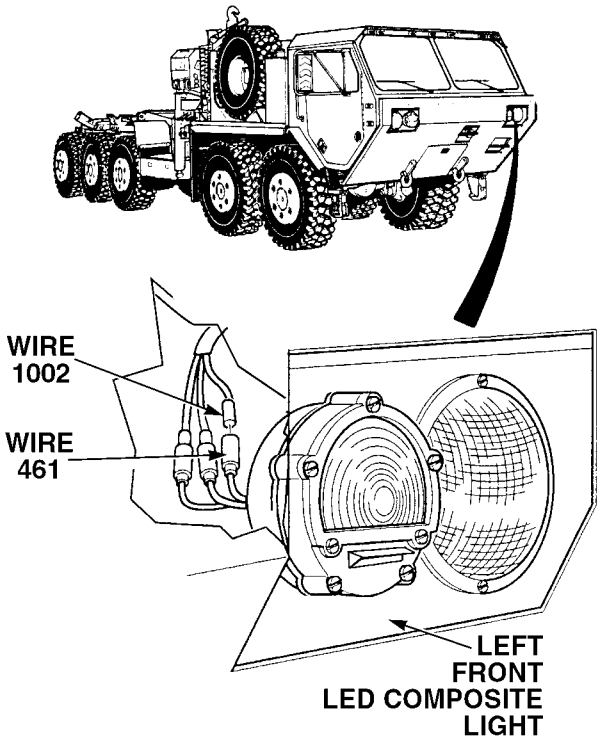
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

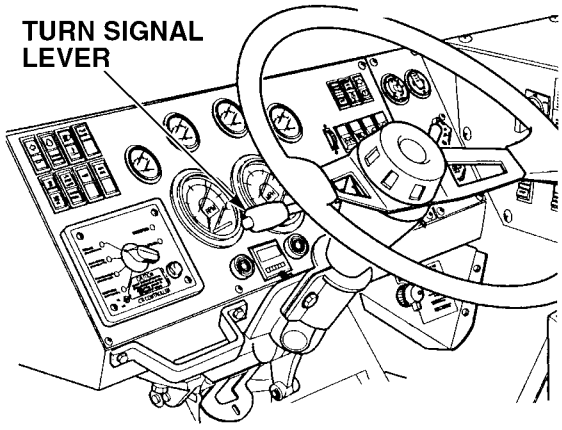
NOTE

Voltage will pulsate between 2 to 10 vdc during voltage test.

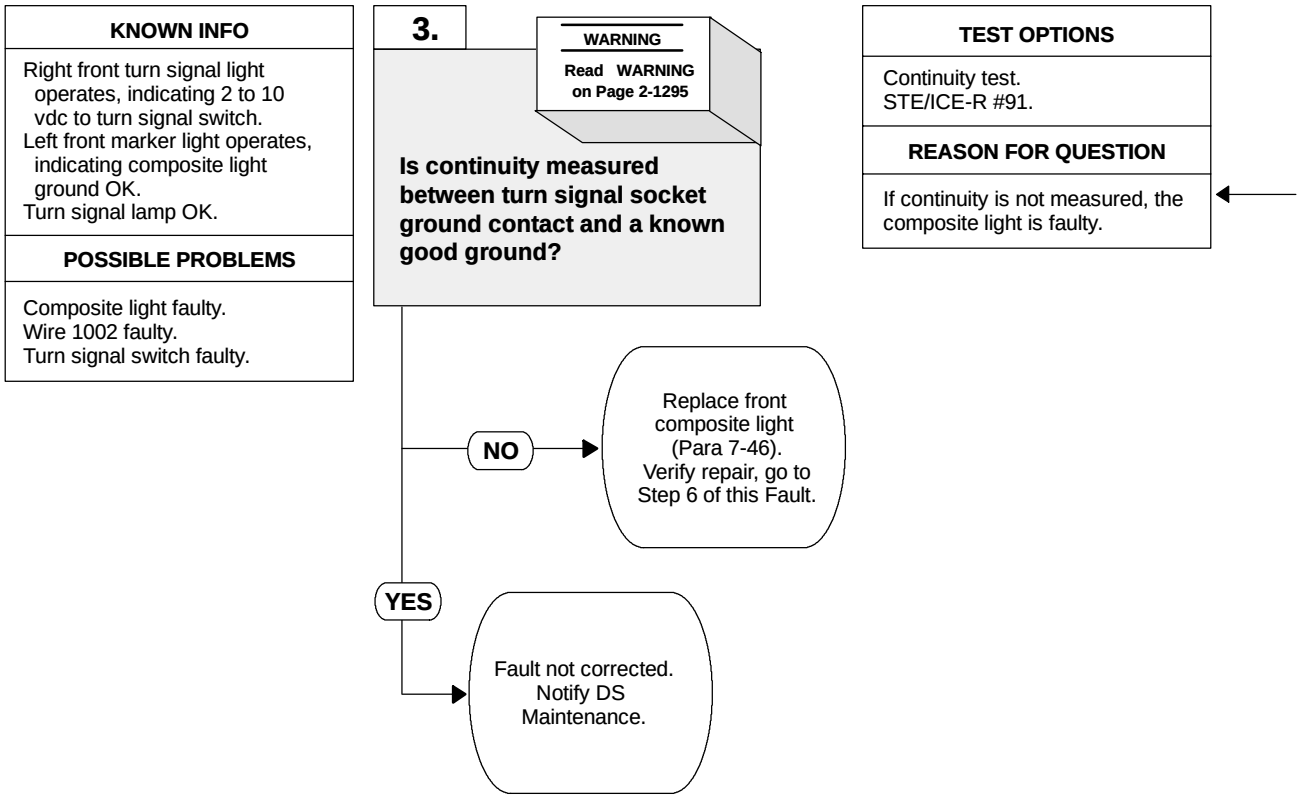
VOLTAGE TEST

(1) Disconnect wire 1002 from wire 461.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1002.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn on left turn signal (TM 9-2320-364-10).
  (a) If 2 to 10 vdc are not present, turn off left turn signal, perform Step (6) below and go to Step 5 of this Fault.
  (b) If 2 to 10 vdc are present, turn OFF left turn signal and replace front LED composite light (Para 7-46).
(6) Connect wire 1002 to wire 461.





16. LEFT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

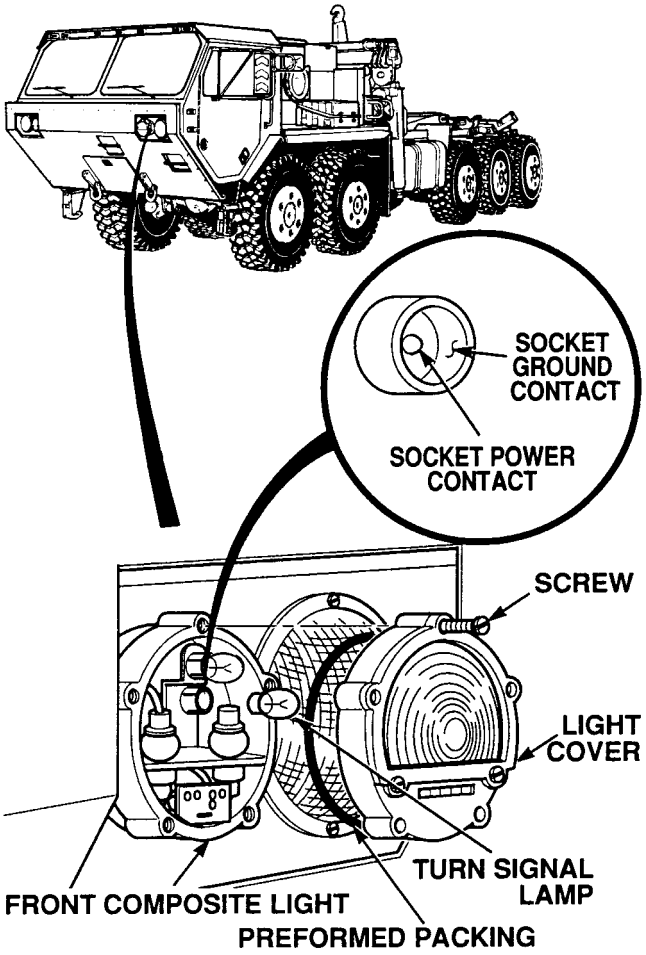
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

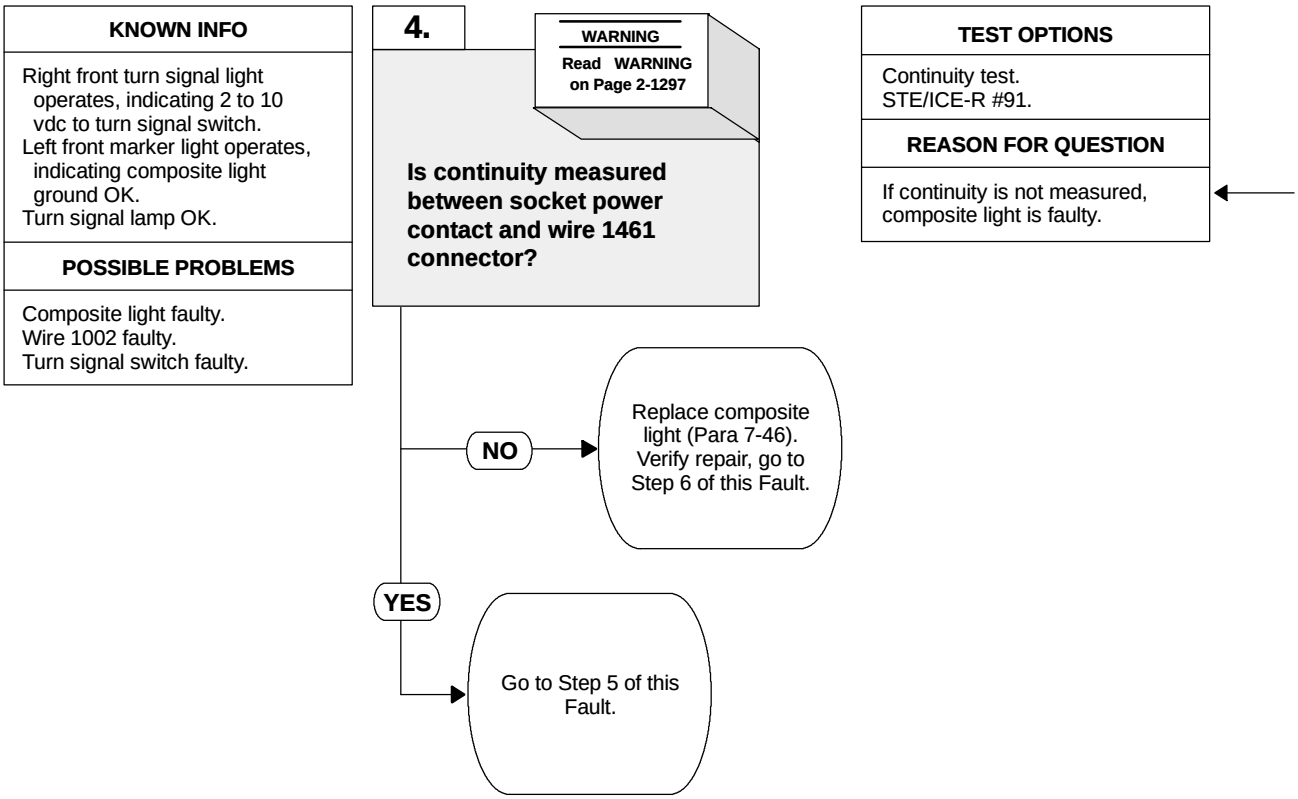
Voltage will pulsate between 2 to 10 vdc during turn signal voltage test.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between turn signal socket ground contact and a known good ground?
   (a) If there is no continuity, replace left front composite light (Para 7-46).
   (b) If there is continuity, perform Steps (3) and (4) below and notify DS Maintenance.
(3) Install turn signal lamp.
(4) Install preformed packing, composite light cover and tighten five screws.



16. LEFT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).

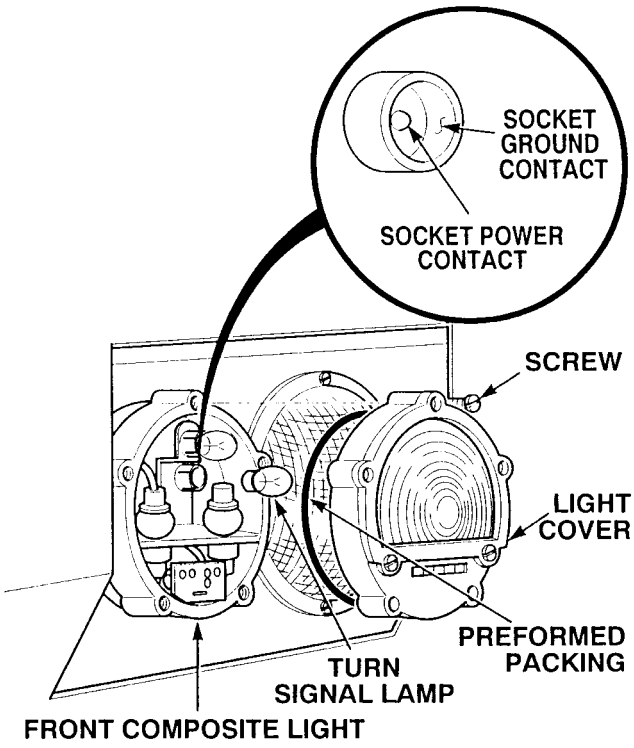


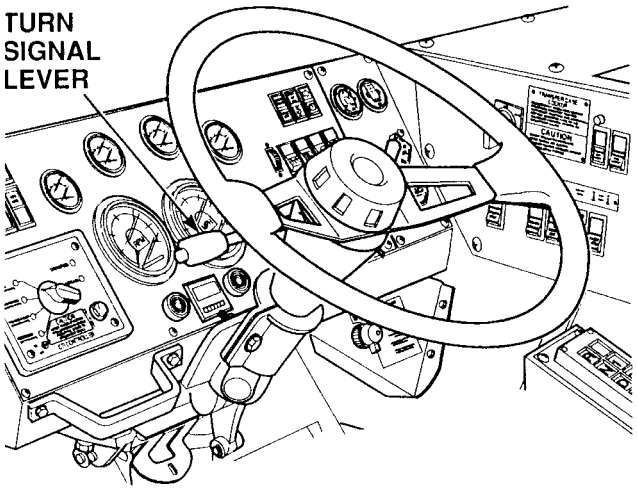
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between left front turn signal socket ground contact and a known good ground?
   (a) If there is no continuity, replace composite light (Para 7-46).
   (b) If there is continuity, composite light is OK.
(3) Install turn signal lamp.
(4) Install preformed packing, composite light cover and tighten five screws.





16. LEFT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO

Right front turn signal light operates, indicating 2 to 10 vdc to turn signal switch.
Left front marker light operates, indicating composite light ground OK.
Turn signal lamp OK.
Composite light OK.
Front LED composite light OK.

POSSIBLE PROBLEMS

Turn signal switch faulty.
Wire 1002 faulty.

5.

WARNING
Read WARNING on Page 2-1299

Does left front turn signal operate when a jumperwire is connected between terminals C and F of turn signal connector MC7?

TEST OPTIONS

Visual inspection.

REASON FOR QUESTION

If left front turn signal operates, turn signal switch is faulty and wire 1002 is OK.

NO → Repair wire 1002 (see schematic Fig 2-32) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

YES → Replace turn signal switch (Para 7-35). Verify repair, go to Step 6 of this Fault.

KNOWN INFO

Right front turn signal light operates, indicating 2 to 10 vdc to turn signal switch.
Left front marker light operates, indicating composite light and front LED composite light ground OK.
Turn signal lamp OK.
Composite light OK.
Wire 1002 OK.
Turn signal switch OK.
Front LED composite light OK.

POSSIBLE PROBLEMS

6.

Does left front turn signal operate?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If left front turn signal operates, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

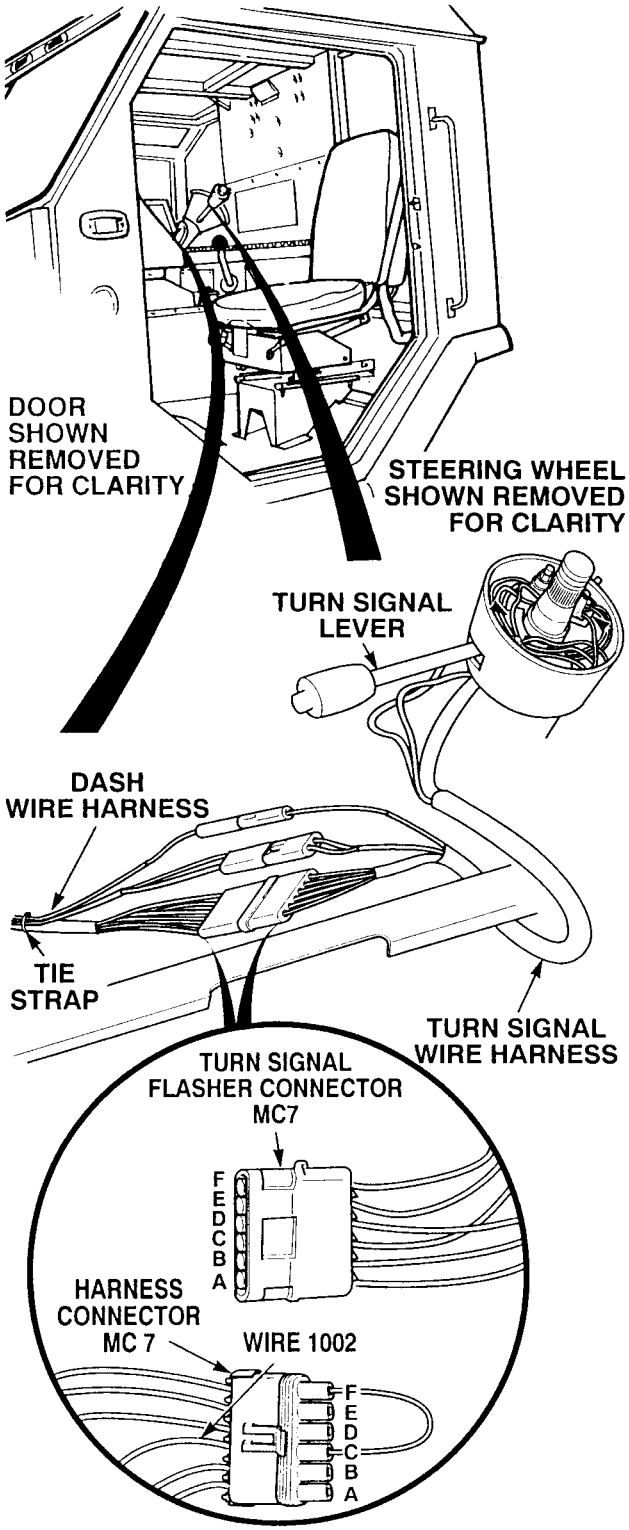
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VISUAL INSPECTION

(1) Remove cable tie.
(2) Disconnect turn signal/flasher connector MC7.
(3) Connect a jumperwire between terminals C and F of connector MC7.
  (a) If left turn signal does not operate, repair wire 1002 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If left turn signal operates, replace turn signal/flasher switch (Para 7-35).
(4) Remove jumperwire.
(5) Connect turn signal/flasher connector to harness connector MC7.
(6) Install cable tie.

VERIFY REPAIR

(1) Turn on left turn signal (TM 9-2320-364-10).
  (a) If left front turn signal light does not operate, fault not corrected. Turn off left turn signal and notify DS Maintenance.
  (b) If left front turn signal operates, fault has been corrected.
(2) Turn off left turn signal.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

17. RIGHT FRONT TURN SIGNAL DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

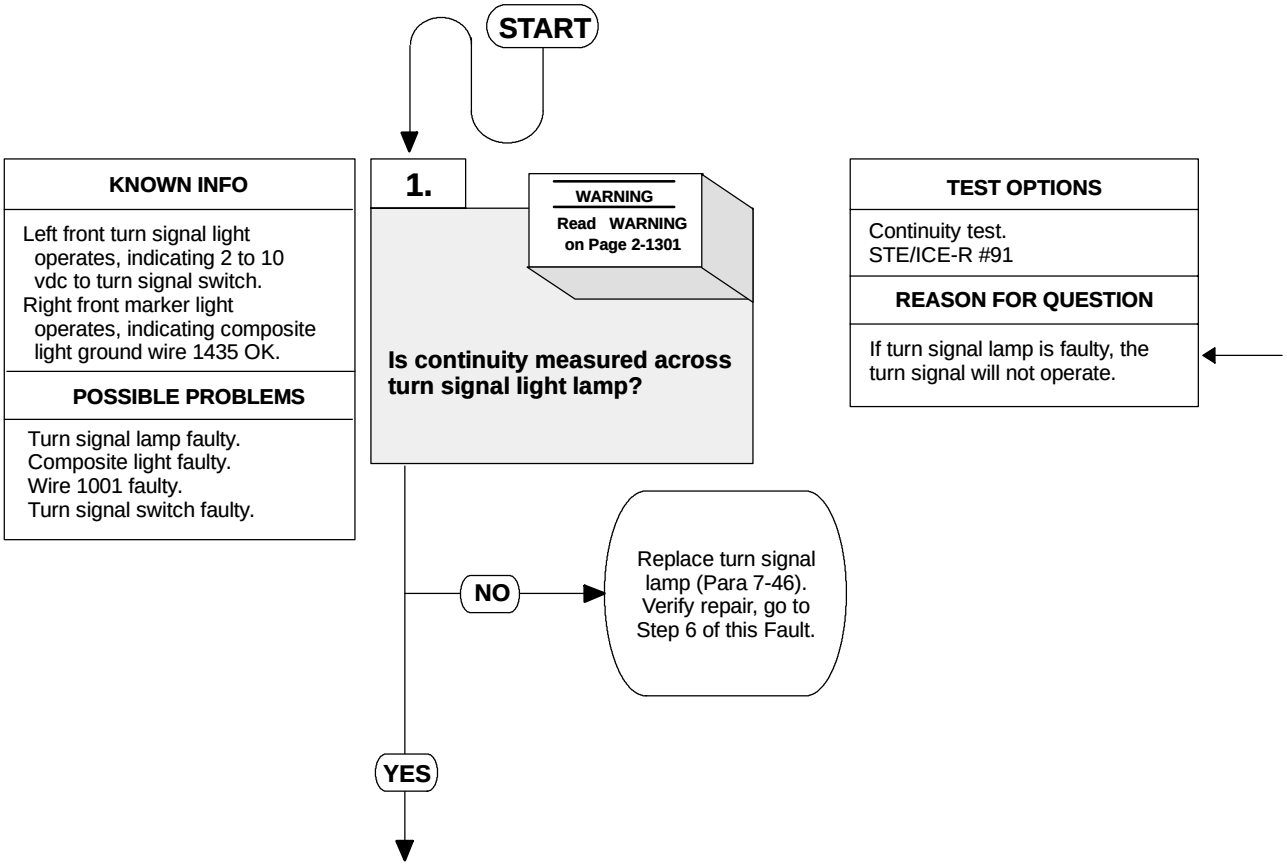
Materials/Parts
Cable Tie (Item 26, Appendix C)
Preformed Packing (Item 223, Appendix F)
Locknut (6) (Item 110, Appendix F)
Lockwasher (Item 168, Appendix F) (Front LED composite light only)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

- Truck may be equipped with front composite light or front LED composite light.
- If front LED composite light is installed, go to Step 2.1 of this Fault.

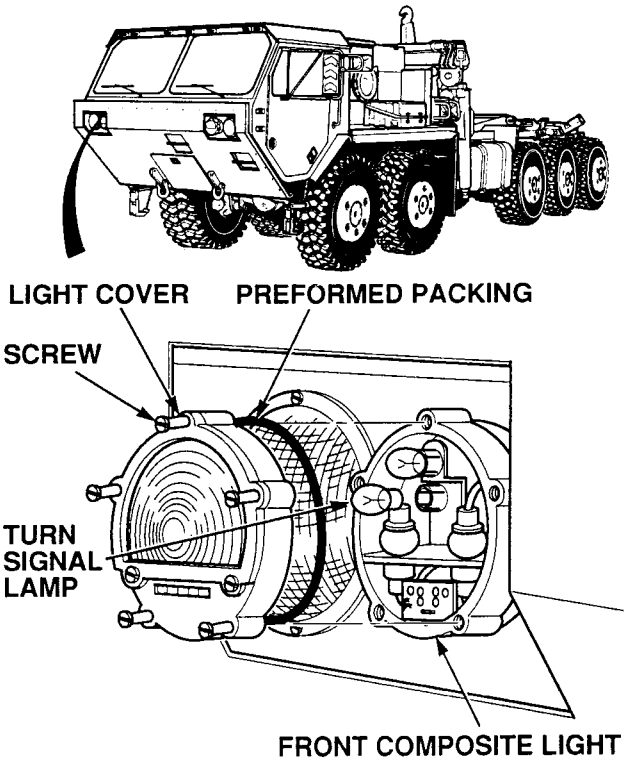


WARNING

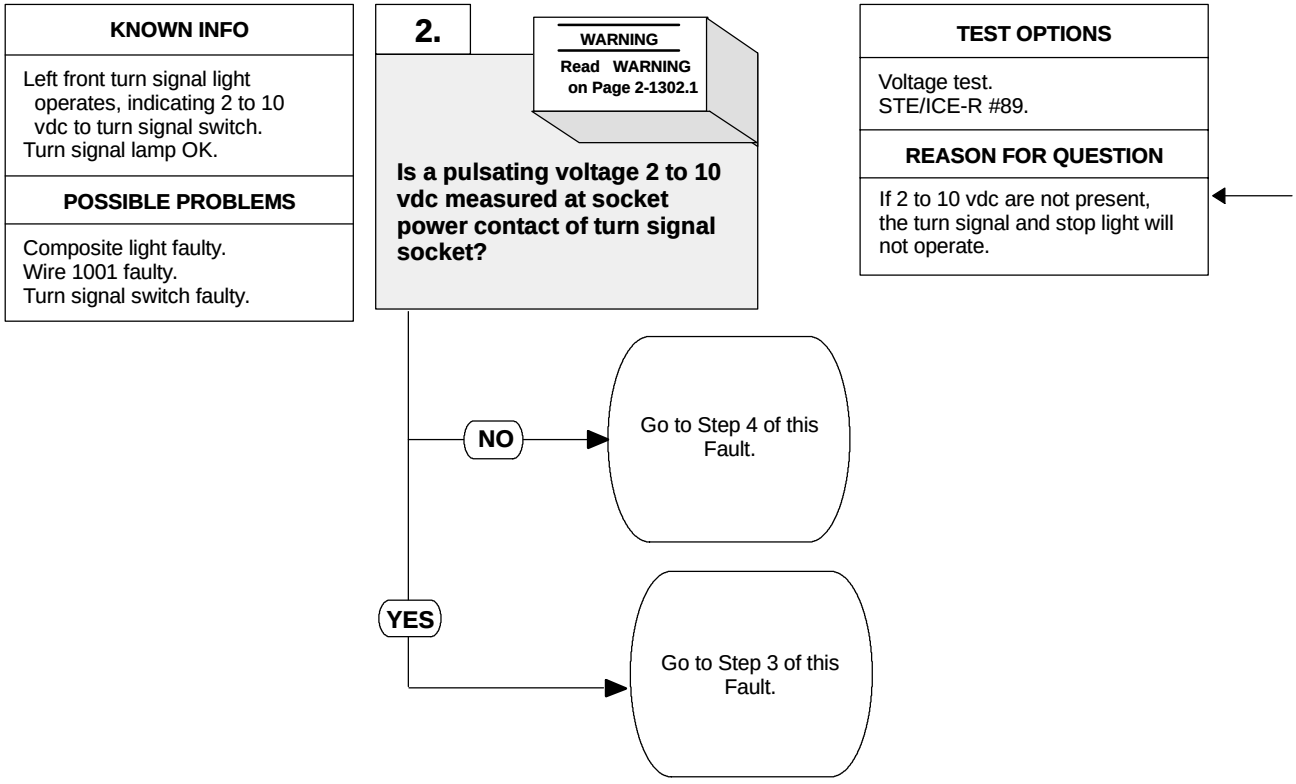
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Loosen five screws, right front composite light cover and preformed packing. Discard preformed packing.
(2) Remove turn signal lamp.
(3) Set multimeter select switch to ohms.
(4) Is there continuity across turn signal lamp?
    (a) If there is no continuity, replace lamp (Para 7-46).
    (b) If there is continuity, lamp is OK.



17. RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).



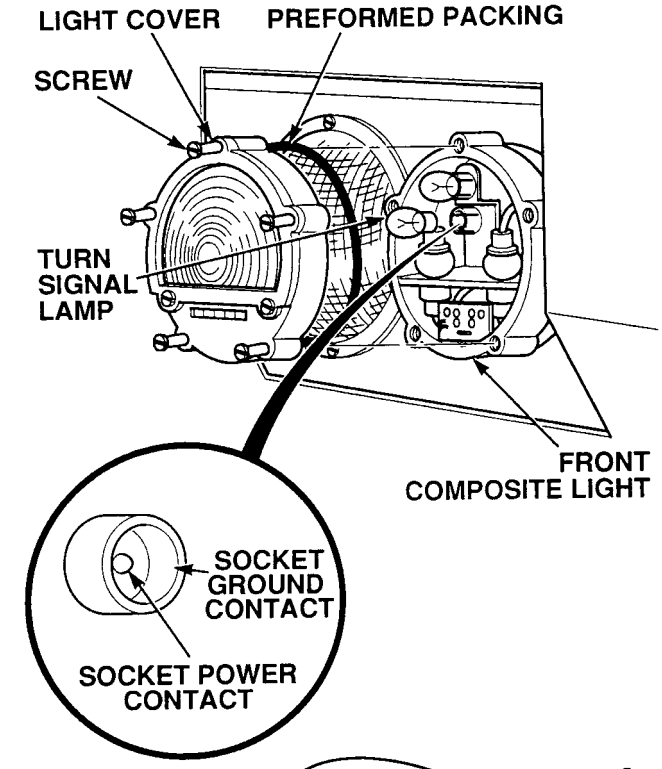
WARNING

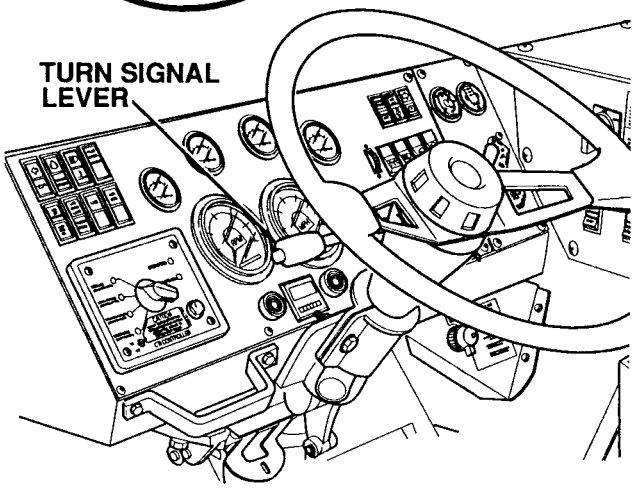
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

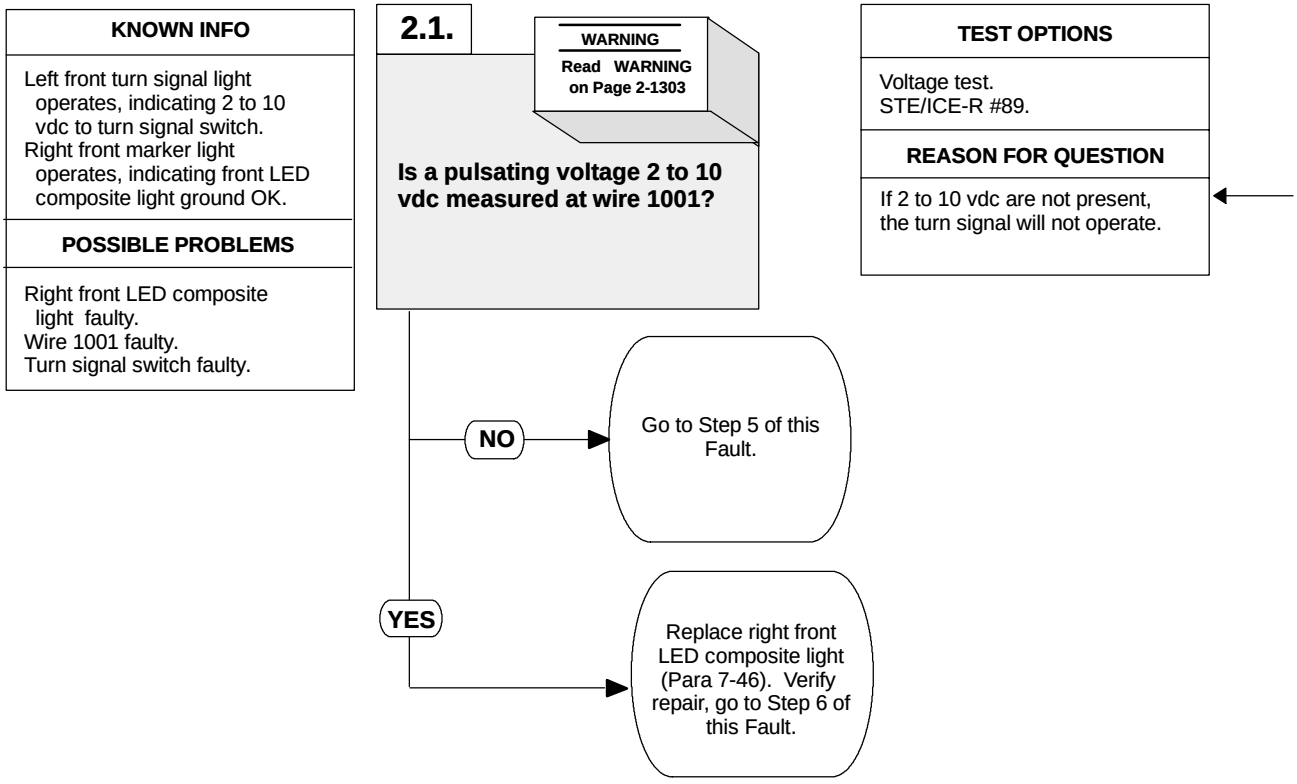
Voltage will pulsate between 2 to 10 vdc during turn signal voltage test.

VOLTAGE TEST
(1) Set multimeter select switch to volts dc. (2) Connect positive (+) multimeter lead to socket power contact of turn signal light socket. (3) Connect negative (-) multimeter lead to a known good ground. (4) Turn on right turn signal (TM 9-2320-364-10). (a) If 2 to 10 vdc are not present, turn off right turn signal and go to Step 4 of this Fault. (b) If 2 to 10 vdc are present, turn off right turn signal and go to Step 3 of this Fault.





17. RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).



WARNING

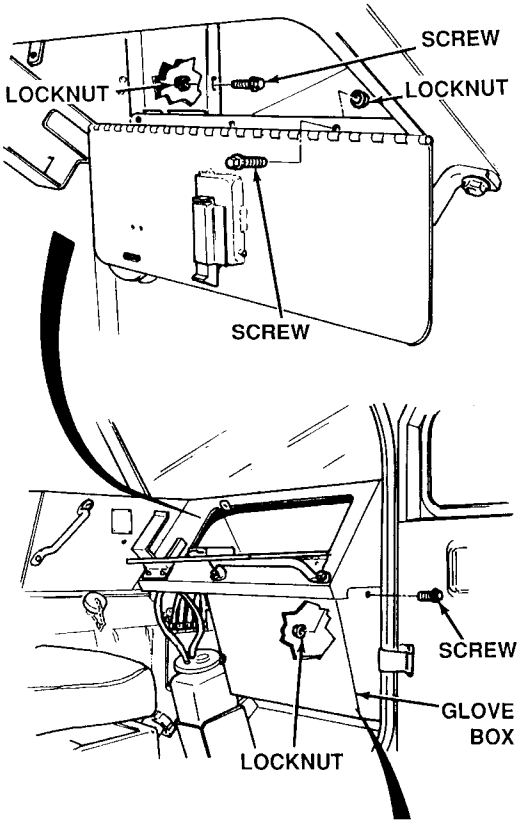
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

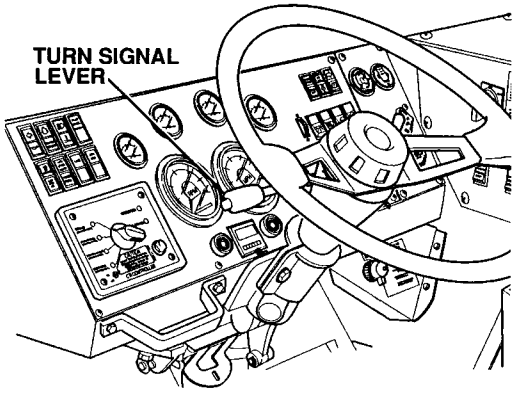
NOTE

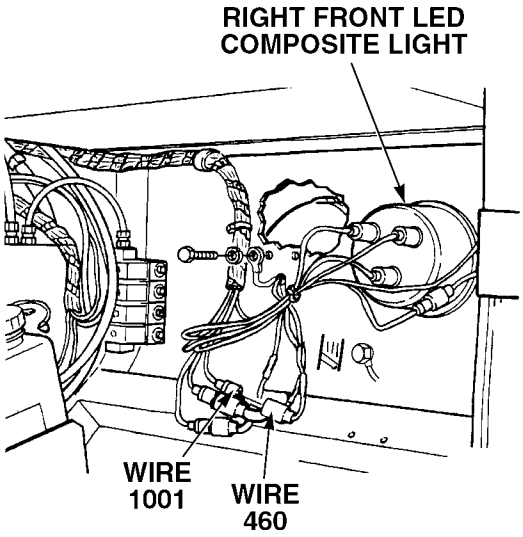
Voltage will pulsate between 2 to 10 vdc during turn signal voltage test.

VOLTAGE TEST

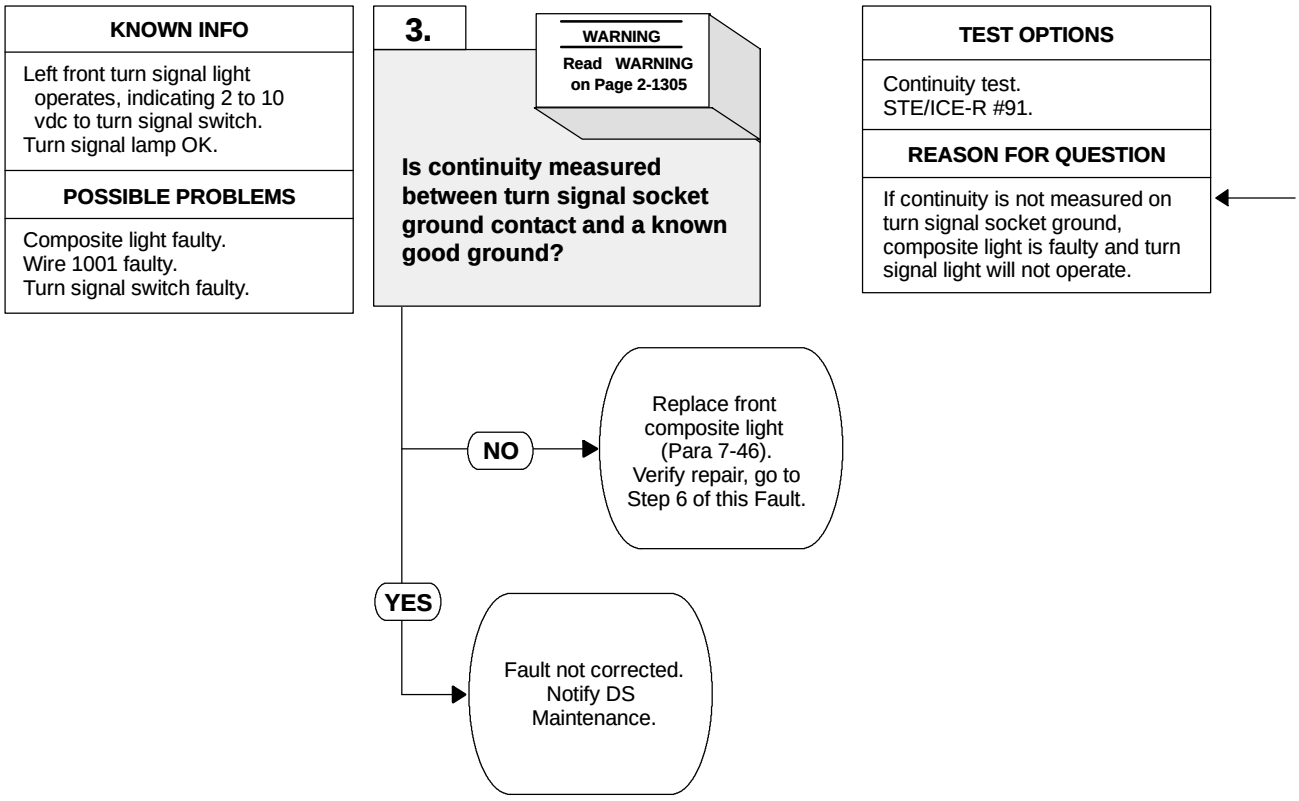
(1) Open glove box door.
(2) Remove six screws, locknuts and glove box. Discard locknuts.
(3) Disconnect wire 1001 from wire 460.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to wire 1001.
(6) Connect negative (-) multimeter lead to a known good ground.
(7) Turn on right turn signal (TM 9-2320-364-10).
    (a) If 2 to 10 vdc are not present, turn off right turn signal, perform Steps (8) through (10) below and go to Step 5 of this Fault.
    (b) If 2 to 10 vdc are present, turn off right turn signal and replace right front LED composite right light (Para 7-46).
(8) Connect wire 1001 to wire 460.
(9) Install glove box and six screws and locknuts.
(10) Close glove box door.







17. RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).

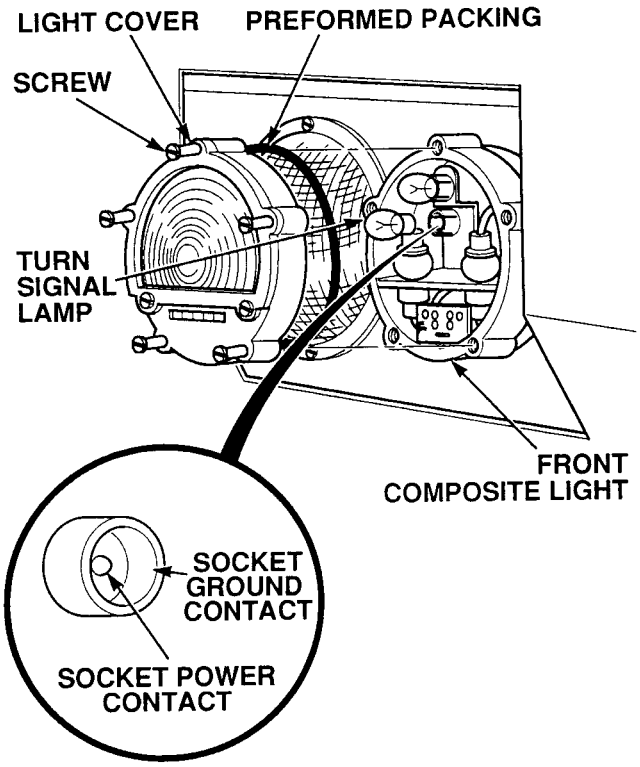


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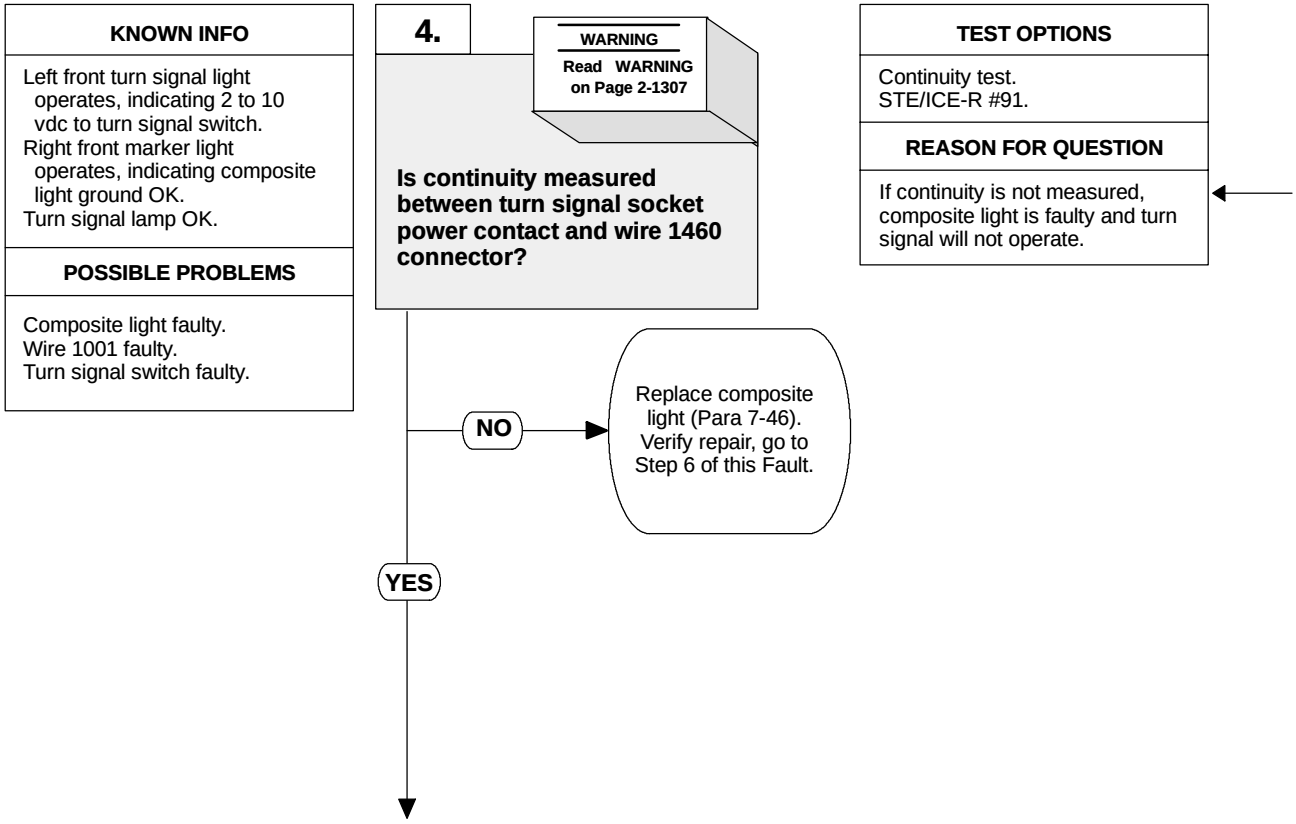
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between turn signal socket ground contact and a known good ground?
   (a) If there is no continuity, replace right front composite light (Para 7-46).
   (b) If there is continuity, fault not corrected. Notify DS Maintenance.
(3) Install turn light lamp.
(4) Install preformed packing, composite light cover and tighten five screws.



17. RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).

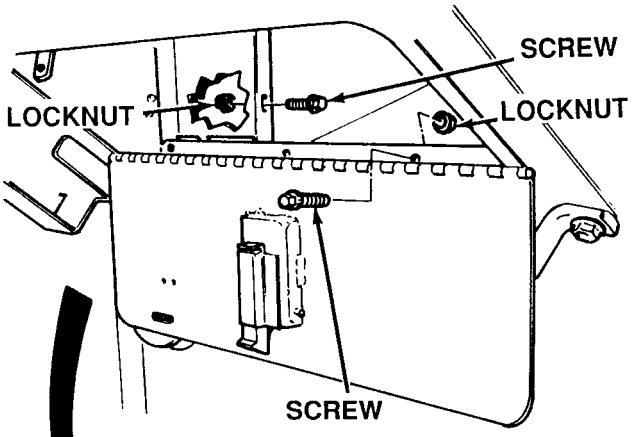


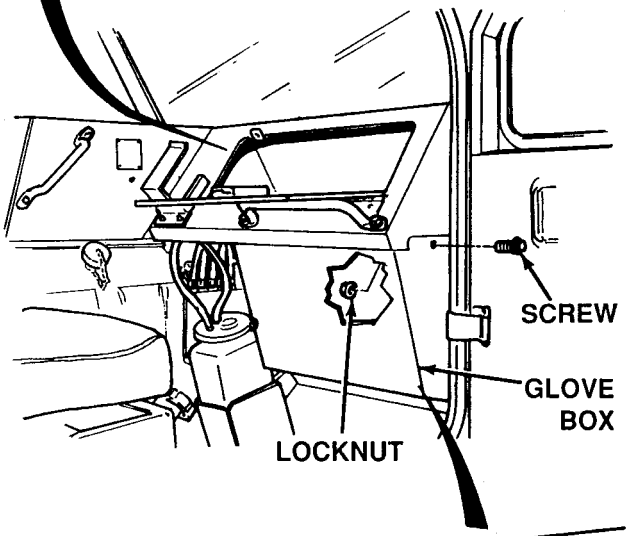
WARNING

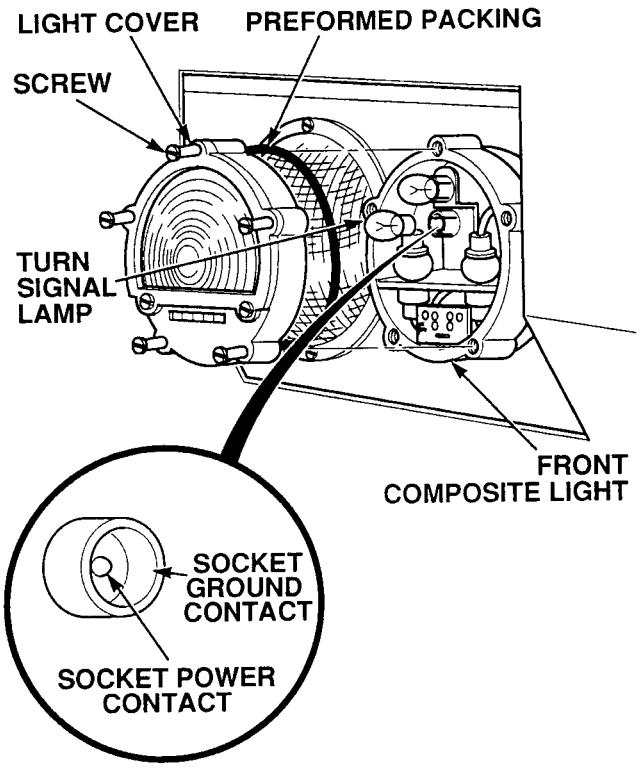
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

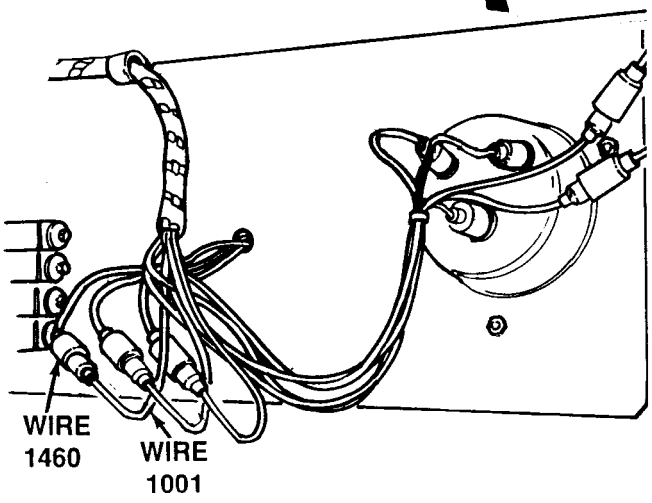
CONTINUITY TEST

(1) Open glove box door.
(2) Remove six screws, locknuts and glove box. Discard locknuts.
(3) Disconnect wire 1001 connector from wire 1460 connector.
(4) Set multimeter select switch to ohms.
(5) Is there continuity between turn signal socket power contact and wire 1460 connector?
    (a) If there is no continuity, replace composite light (Para 7-46).
    (b) If there is continuity, composite light is OK.
(6) Connect wire 1001 to wire 1460.
(7) Install glove box and six screws and locknuts.
(8) Close glove box door.
(9) Install turn signal light lamp.
(10) Install preformed packing, composite light cover and tighten five screws.









17. RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT).

KNOWN INFO

Left front turn signal light operates, indicating 2 to 10 vdc to turn signal switch.
Right front marker light operates, indicating composite light ground OK.
Turn signal lamp OK.
Composite light OK.
Front LED composite light OK.

POSSIBLE PROBLEMS

Wire 1001 faulty.
Turn signal switch faulty.

5.

WARNING
Read WARNING on Page 2-1309

Does right front turn signal operate when a jumperwire is connected between terminals A and F of turn signal connector MC7?

TEST OPTIONS

Visual inspection.

REASON FOR QUESTION

If right front turn signal operates, turn signal switch is faulty or wire 1001 is faulty.

NO → Repair wire 1001 (see schematic Fig 2-32) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

YES → Replace turn signal switch (Para 7-35). Verify repair, go to Step 6 of this Fault.

KNOWN INFO

Left front turn signal light operates, indicating 2 to 10 vdc to turn signal switch.
Composite lamp OK.
Turn signal light OK.
Wire 1001 OK.
Turn signal switch OK.
Front LED composite light OK.

POSSIBLE PROBLEMS

6.

Does right front turn signal operate?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If right front turn signal operates, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

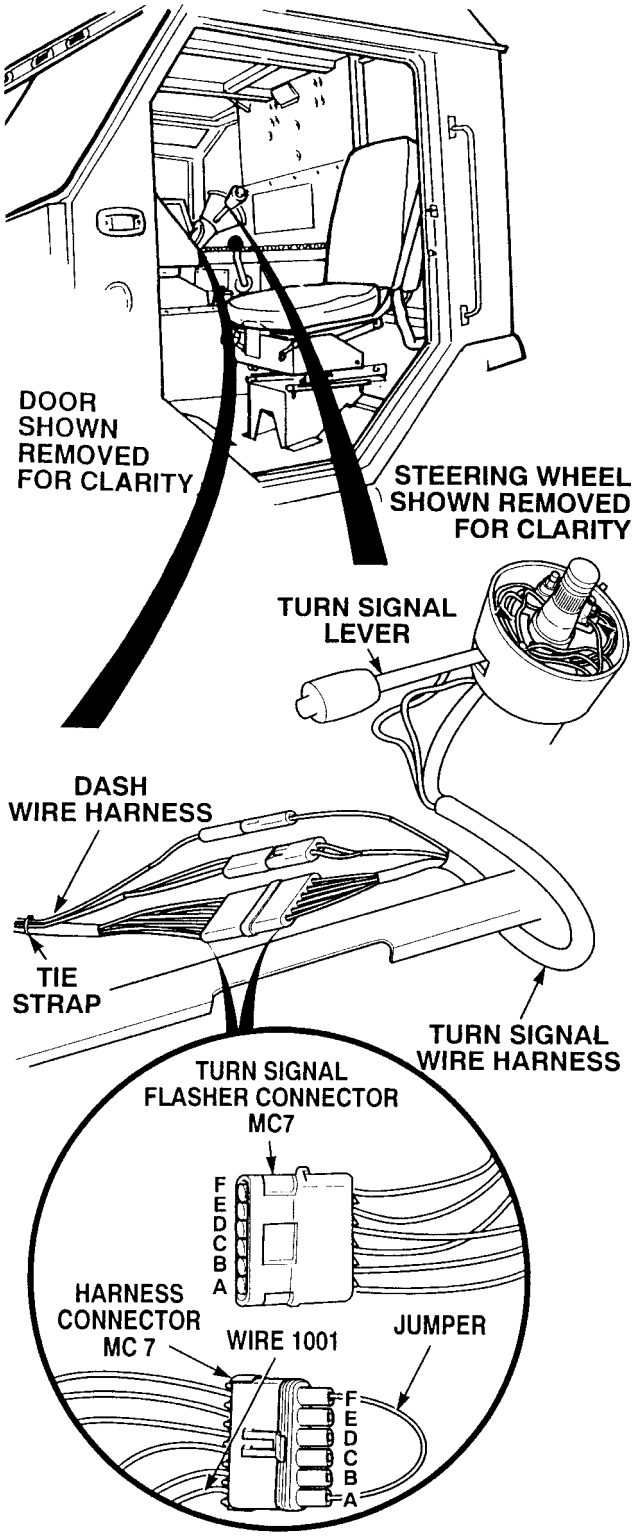
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VISUAL INSPECTION

(1) Remove cable tie.
(2) Disconnect turn signal/flasher connector MC7.
(3) Connect a jumperwire between terminals A and F of connector MC7.
  (a) If right turn signal does not operate, repair wire 1001 (see schematic Fig 2-31) or notify DS Maintenance.
  (b) If right turn signal operates, replace turn signal/flasher switch (Para 7-35).
(4) Remove jumperwire.
(5) Connect turn signal/flasher connector to harness connector MC7.
(6) Install cable tie.

VERIFY REPAIR

(1) Turn on right turn signal (TM 9-2320-364-10).
  (a) If right front turn signal does not operate, fault not corrected. Turn off right turn signal and notify DS Maintenance.
  (b) If right front turn signal operates, fault has been corrected.
(2) Turn off right turn signal.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

18. PARKING LIGHT(S) DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

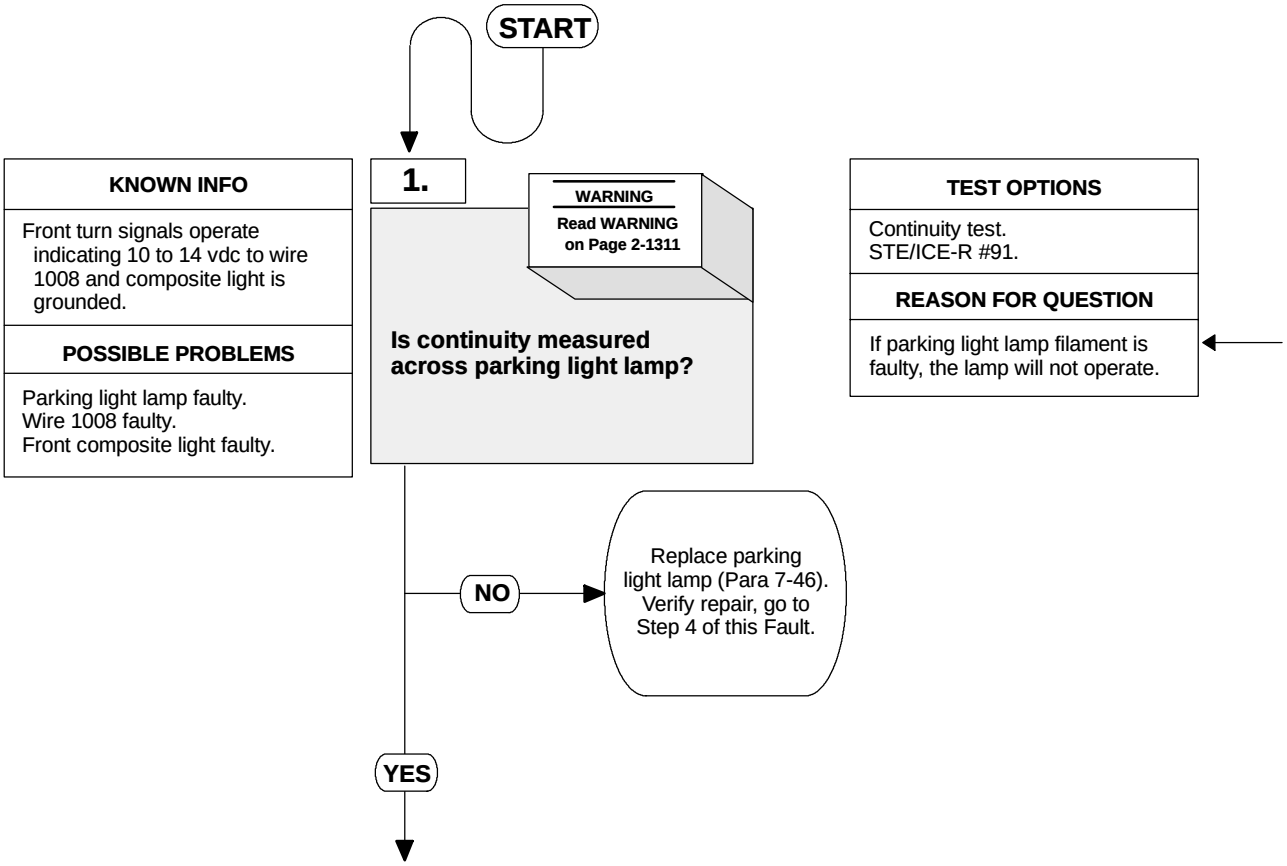
Materials/Parts
Cable Tie (Item 26, Appendix C)
Preformed Packing (Item 223, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Glove box removed, (right side parking lamp only) (Para 17-53)

NOTE

- The following troubleshooting procedures cover the left parking light but apply to both parking lights.
- Truck may be equipped with front composite lights or front LED composite light.
- If LED composite light is installed, go to Step 2 of this Fault.

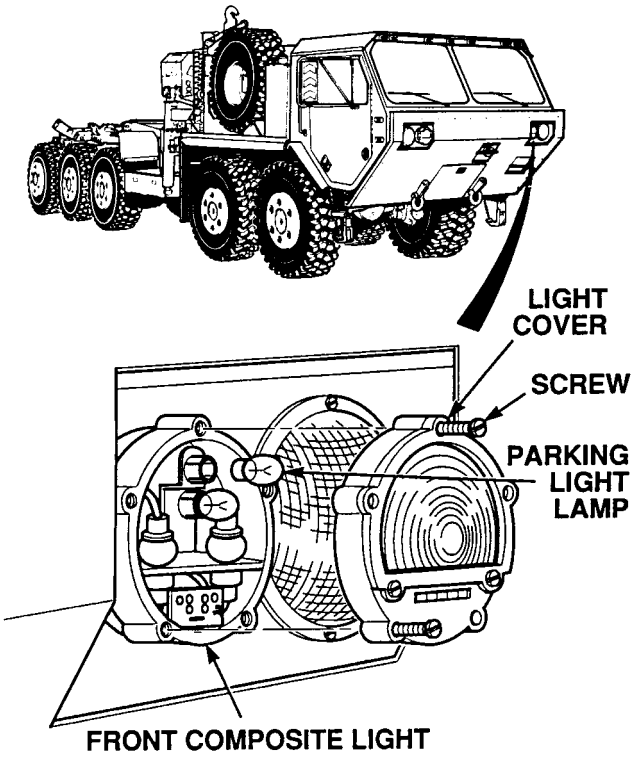


WARNING

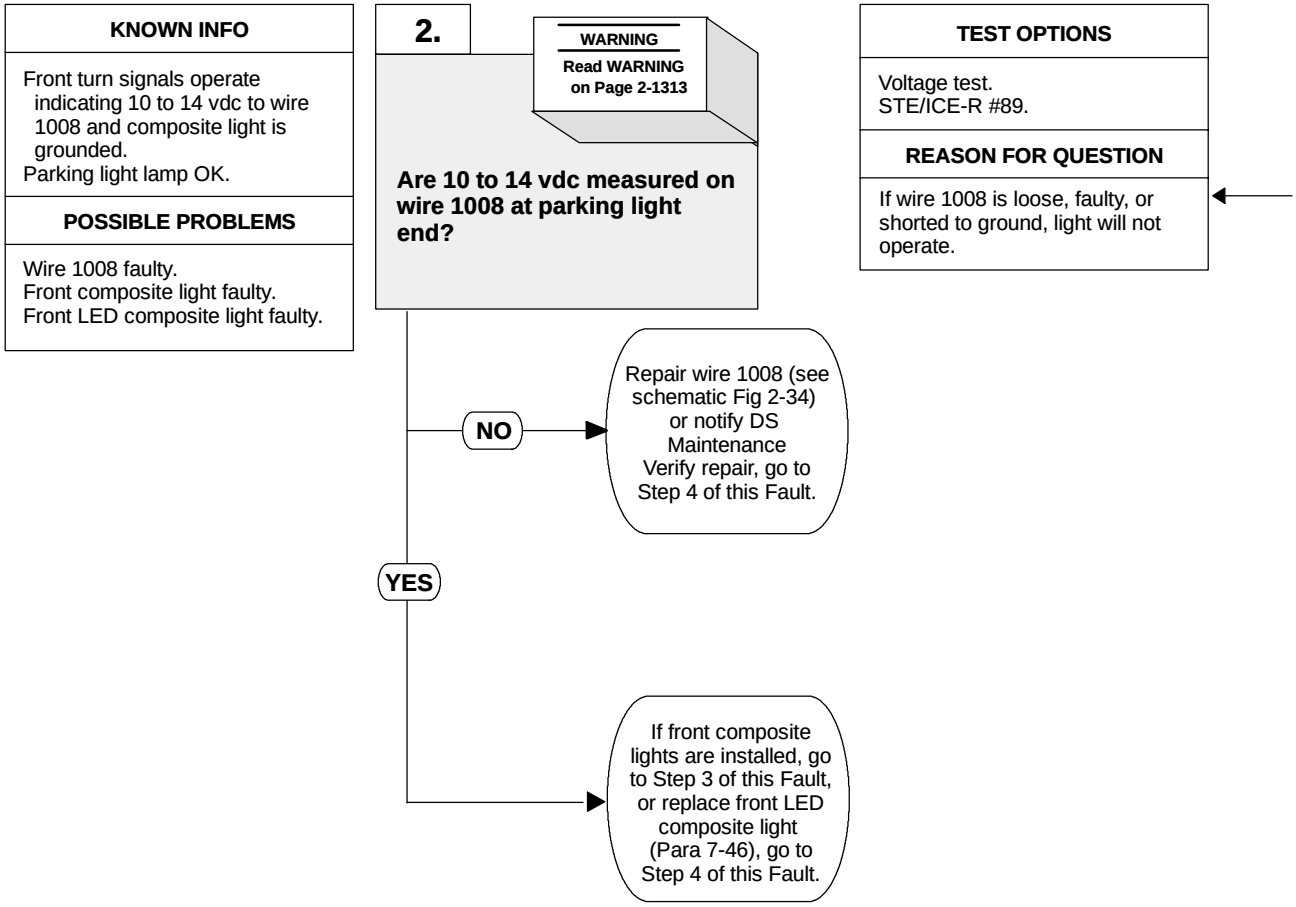
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Loosen five screws and remove left front composite light cover, lamp and performed packing. Discard performed packing.
(2) Set multimeter select switch to ohms.
(3) Is continuity measured across lamp?
  (a) If there is no continuity, replace lamp.
  (b) If there is continuity, lamp is OK.



18. PARKING LIGHT(S) DO NOT OPERATE (CONT).

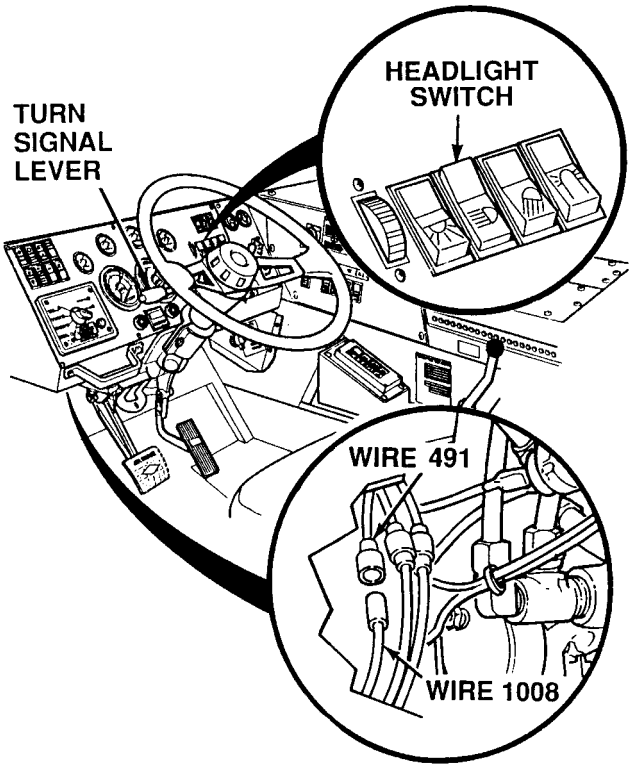


WARNING

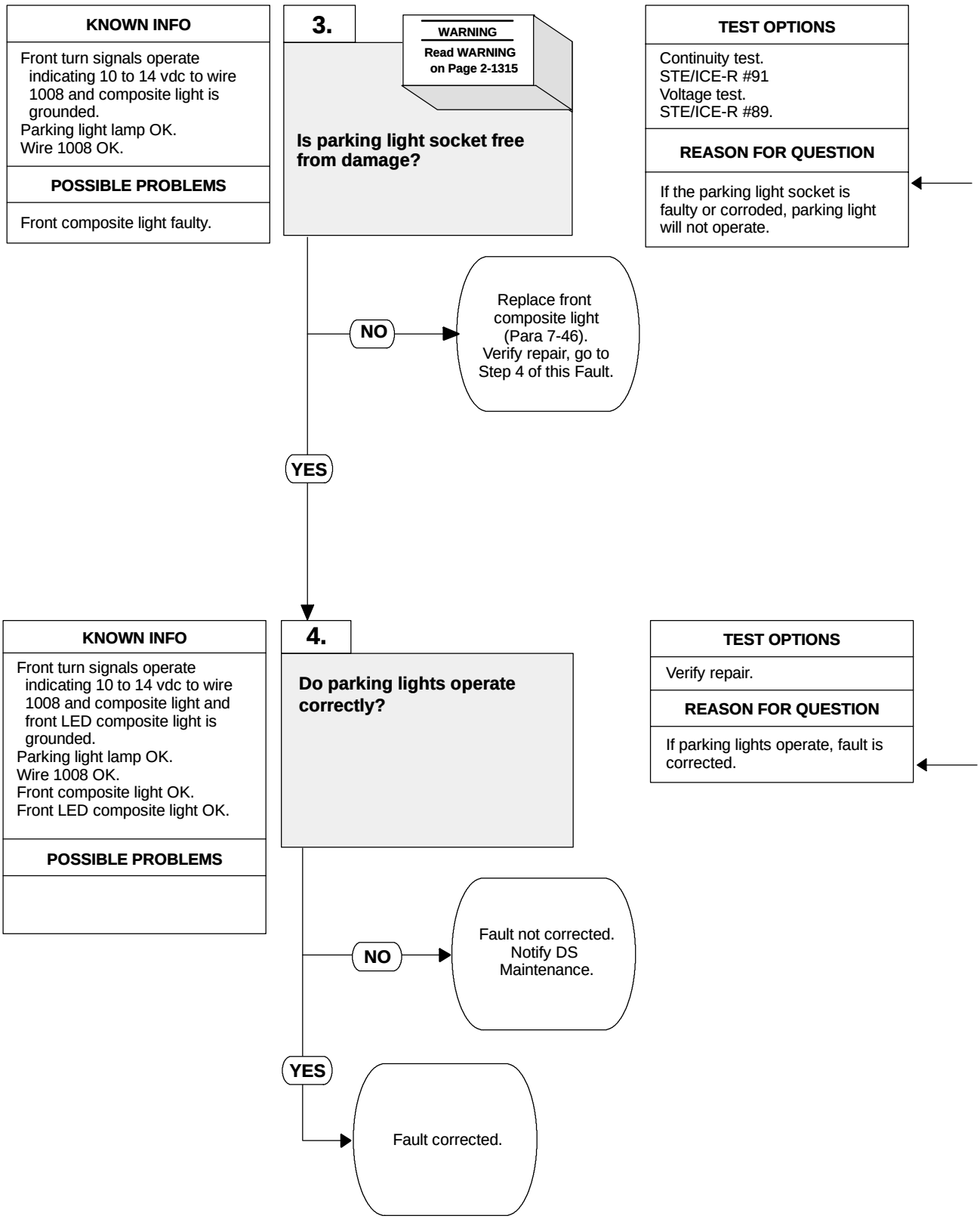
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Disconnect wire 1008 from wire 1491.
(2) Connect positive (+) multimeter lead to wire 1008.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Set multimeter select switch to volts dc.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) Set headlight switch to marker position.
    (a) If there are not 10 to 14 vdc present, perform Steps (7) and (8) below and repair wire 1008 (see schematic Fig 2-34) or notify DS Maintenance.
    (b) If there are 10 to 14 vdc present, and front composite lights are installed, perform Steps (7) through (8) below and go to Step 3 of this Fault.
    (c) If there are 10 to 14 vdc present, and front LED composite lights are installed, perform Steps (7) through (8) below and replace front LED composite light (Para 7-46).
(7) Turn off headlight switch.
(8) Turn OFF ENGINE switch.
(9) Connect wire 1008 to wire 1491.



18. PARKING LIGHT(S) DO NOT OPERATE (CONT).

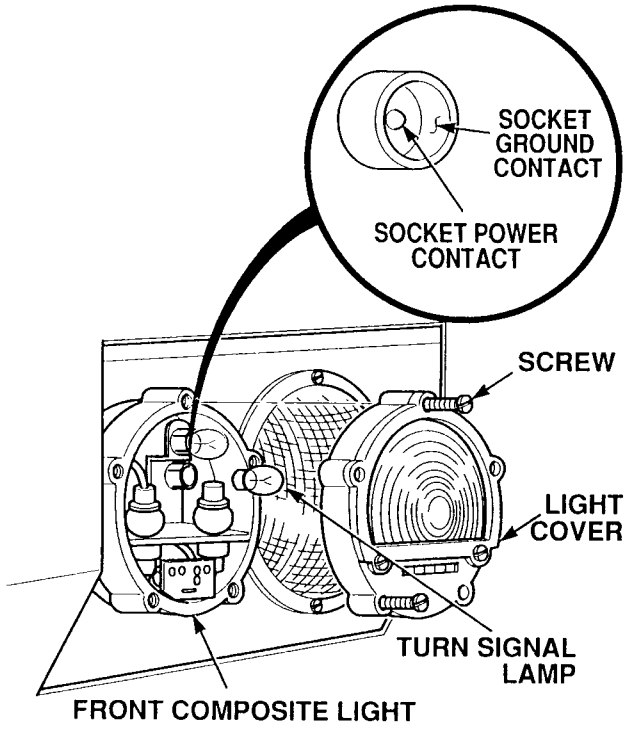


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

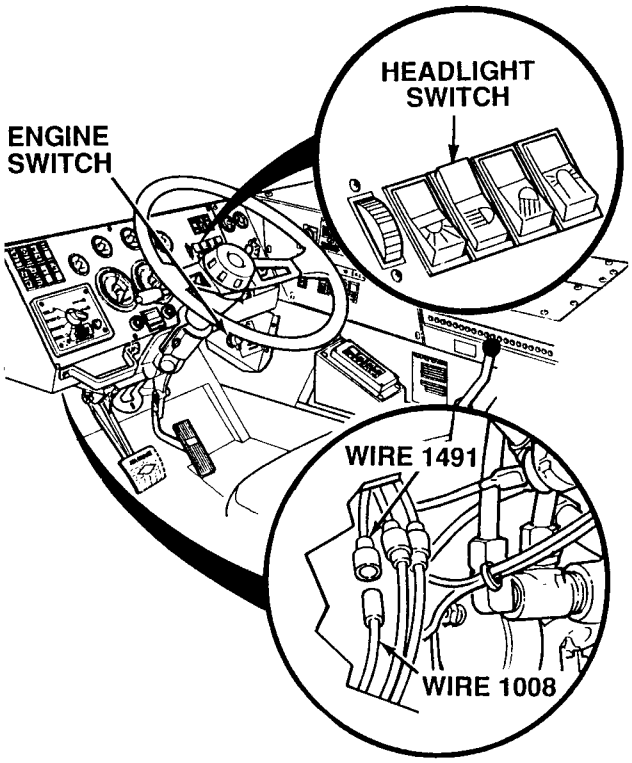
CONTINUITY TEST
VOLTAGE TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between socket ground contact and a known good ground?
  (a) If there is no continuity, replace composite light (Para 7-46).
  (b) If there is continuity, socket ground is OK.
(3) Connect wire 1008 to 1491.
(4) Set multimeter selector switch to volts dc.
(5) Connect positive (+) multimeter lead to socket power contact.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
(8) Set headlight switch to marker position.
  (a) If there are not 10 to 14 vdc, replace front composite light (Para 7-46).
  (b) If there are 10 to 14 vdc, parking light is OK.
(9) Turn off headlight switch.
(10) Turn OFF ENGINE switch.
(11) Install performed packing, lamp and composite light cover and tighten five screws.



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Set headlight switch to marker position.
  (a) If parking lights do not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If parking lights operate, fault has been corrected.
(3) Turn OFF headlight switch.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

19. STOPLIGHT DOES NOT OPERATE.

INITIAL SETUP

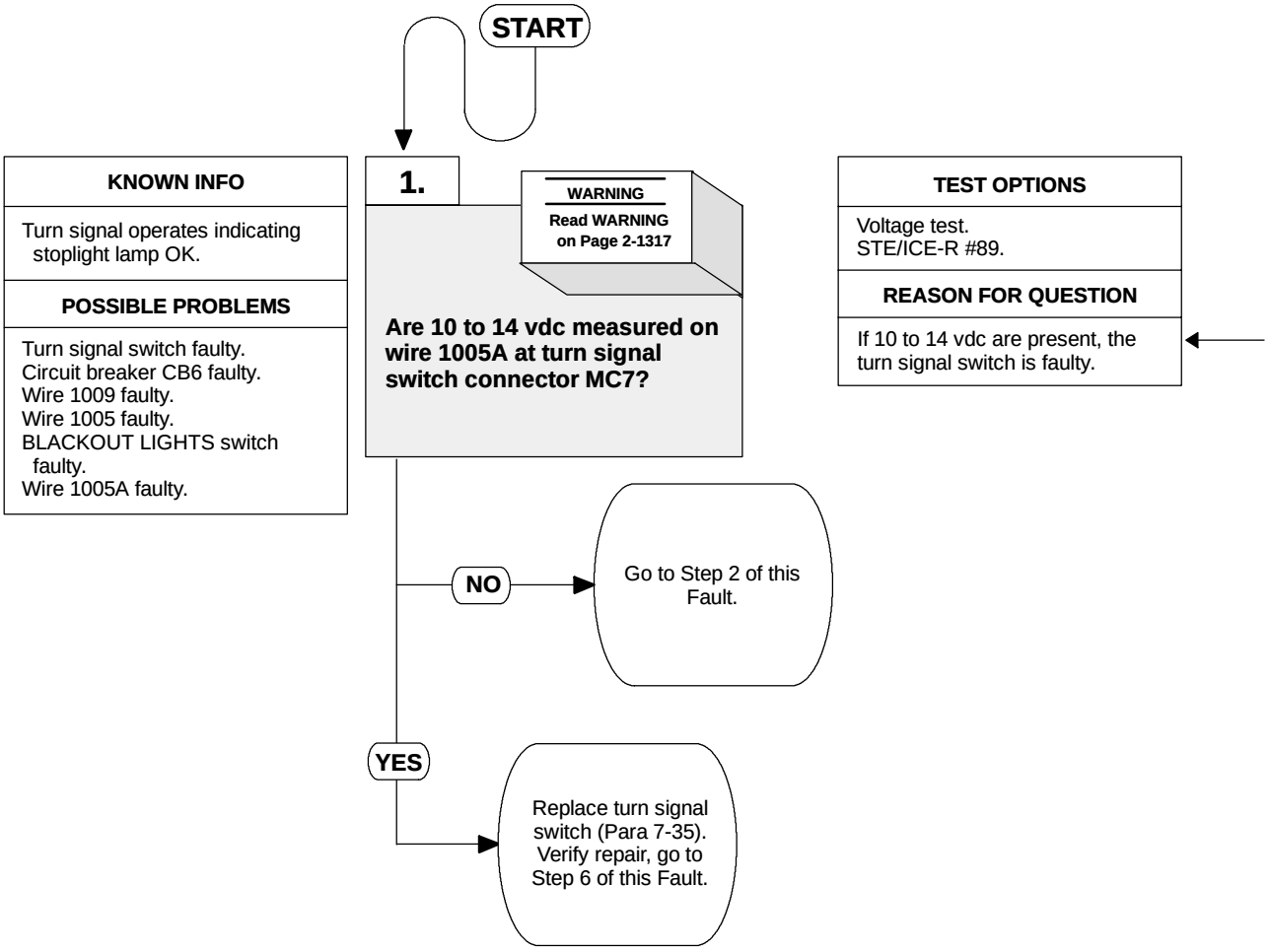
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Cable Tie (Item 26, Appendix C)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Air system charged, (TM 9-2320-364-10)

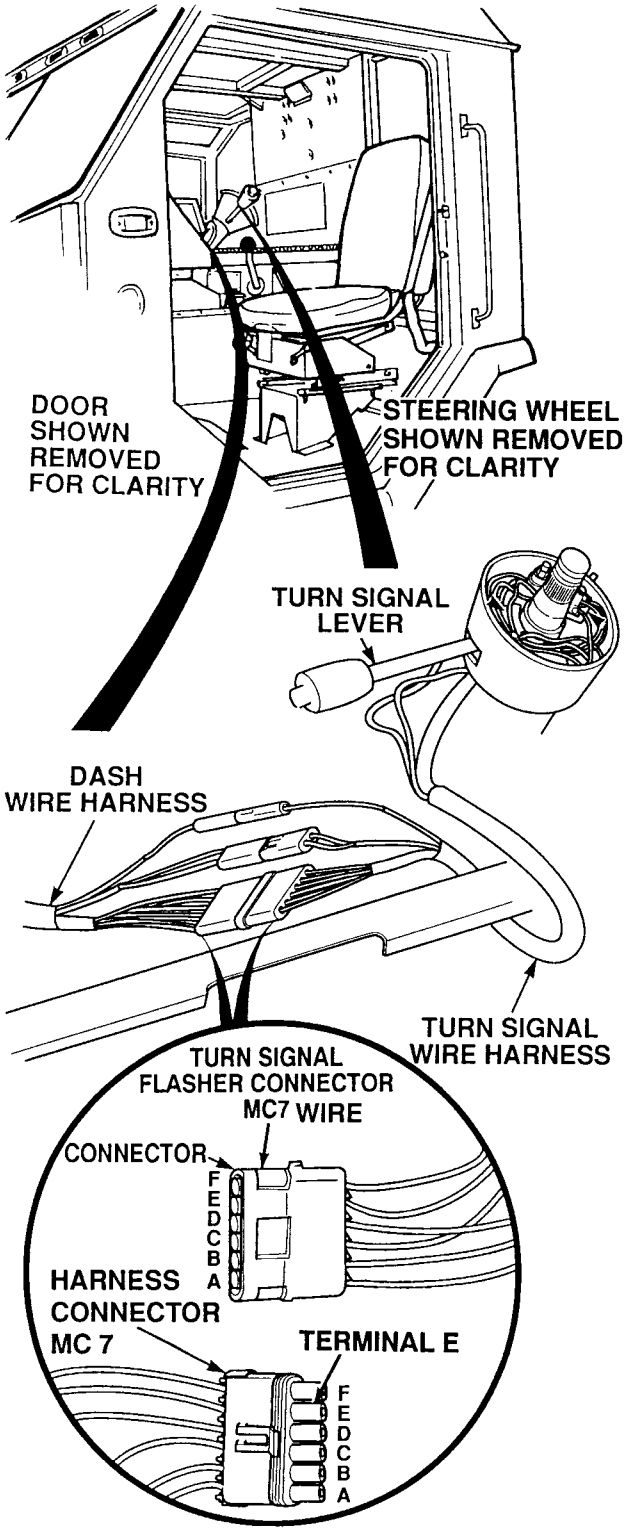


WARNING

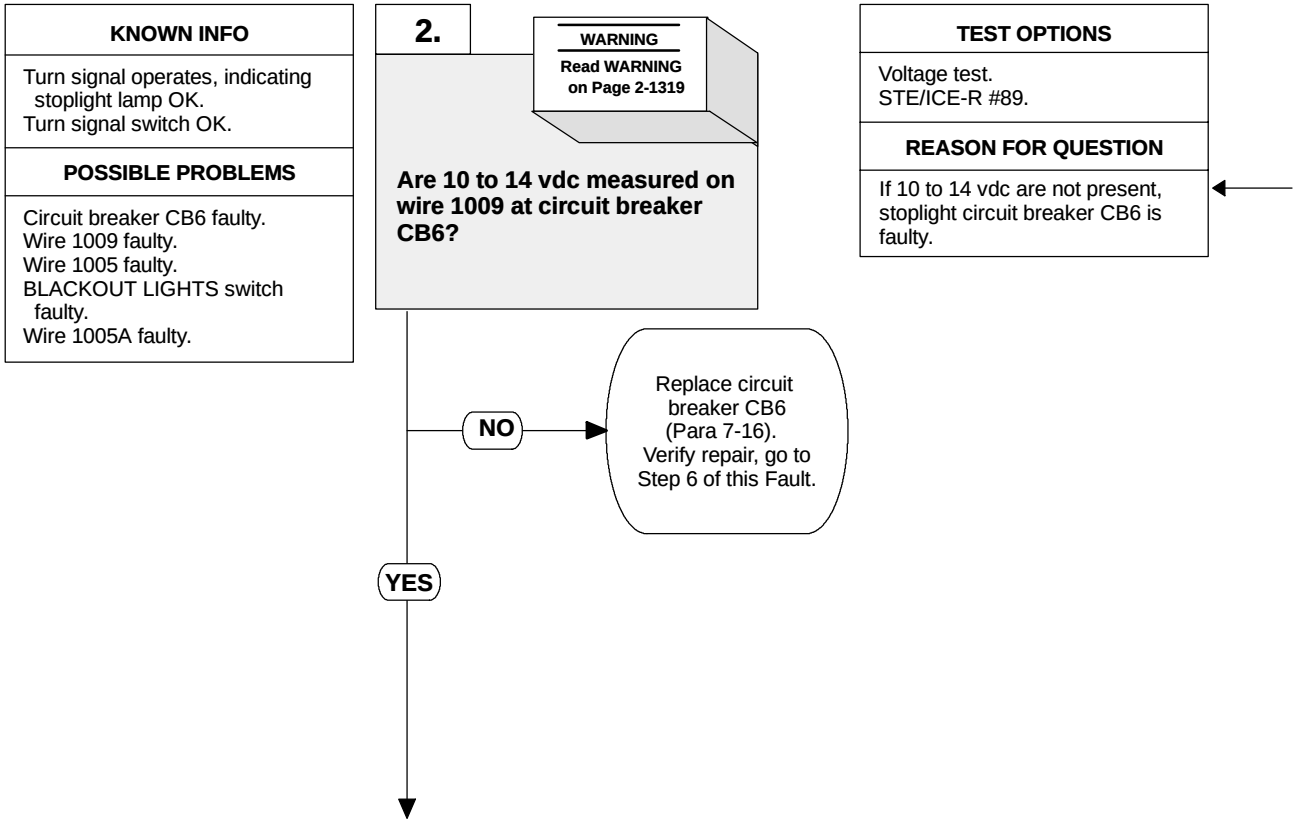
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove cable tie.
(2) Disconnect turn signal flasher connector MC7.
(3) Connect positive (+) multimeter lead to wire 1005A at harness connector MC7, terminal E.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Set multimeter select switch to volts dc.
(6) While assistant applies brake pedal (TM 9-2320-364-10), observe multimeter.
    (a) If 10 to 14 vdc are not present, perform Steps (7) through (9) below and go to Step 2 of this Fault.
    (b) If 10 to 14 vdc are present, perform Steps (7) through (9) below and replace turn signal switch (Para 7-35).
(7) Release brake pedal.
(8) Connect connector MC7.
(9) Install cable tie.

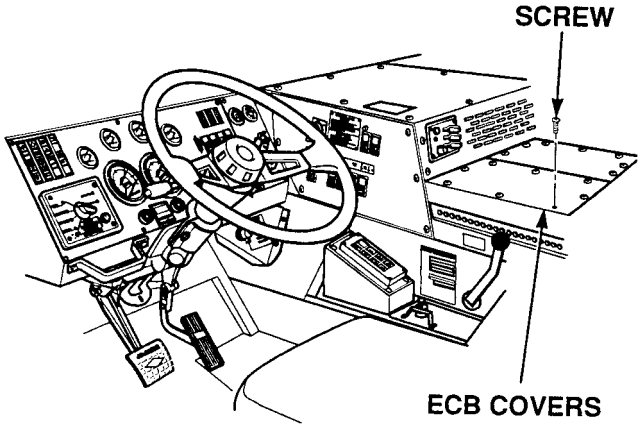


19. STOPLIGHT DOES NOT OPERATE (CONT).



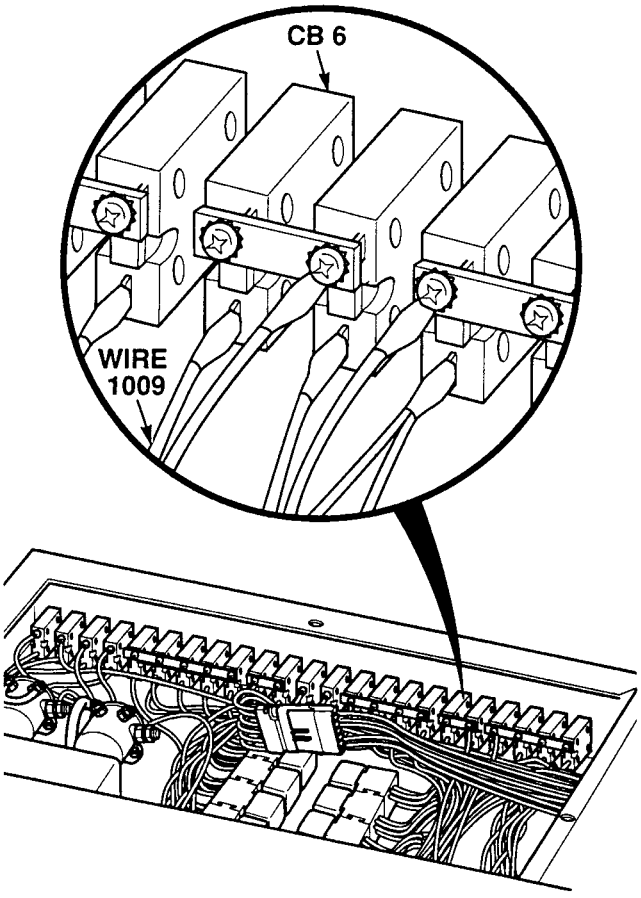
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

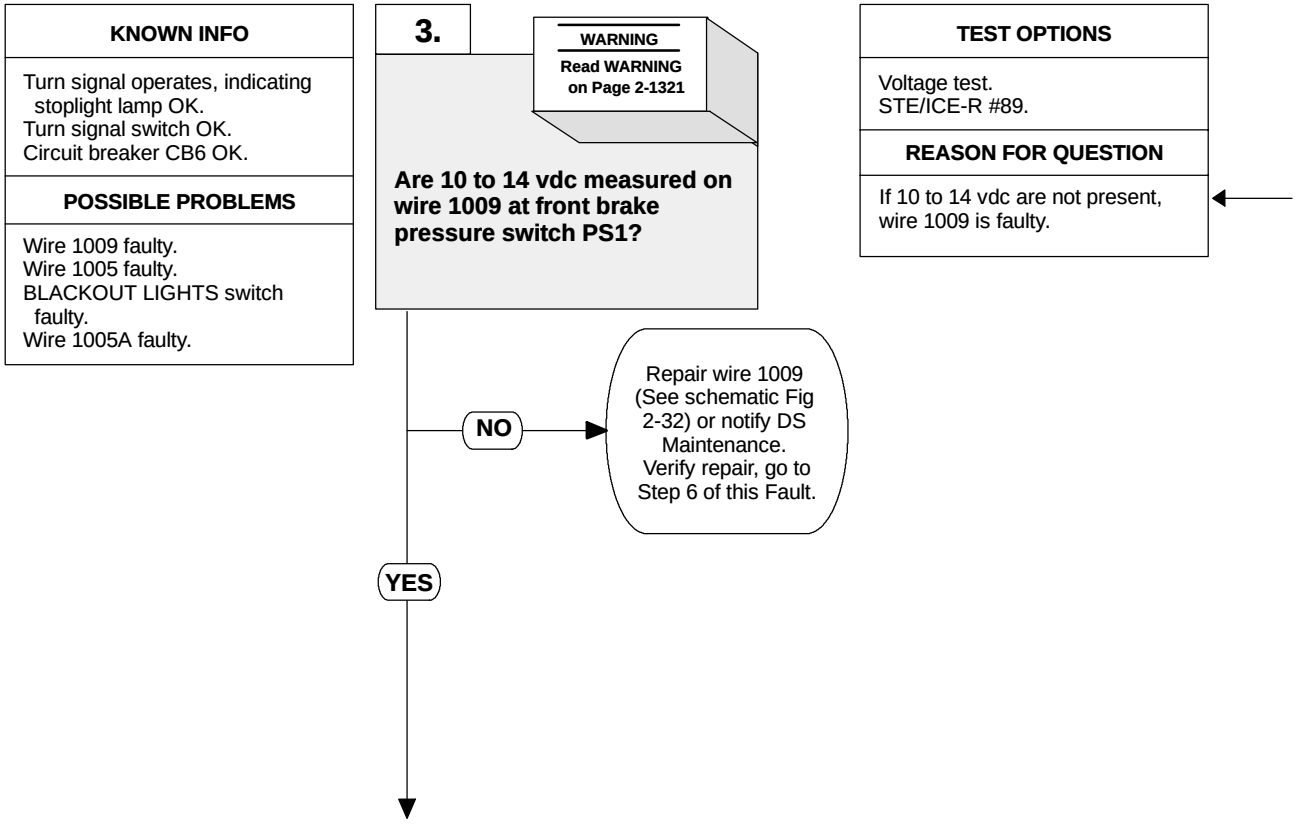


VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1009 at stoplight circuit breaker CB6.
(3) Connect negative (-) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, replace stoplight circuit breaker (Para 7-16).
  (b) If 10 to 14 vdc are present, stoplight circuit breaker CB6 is OK.
(4) Install two ECB covers and 15 screws.



19. STOPLIGHT DOES NOT OPERATE (CONT).

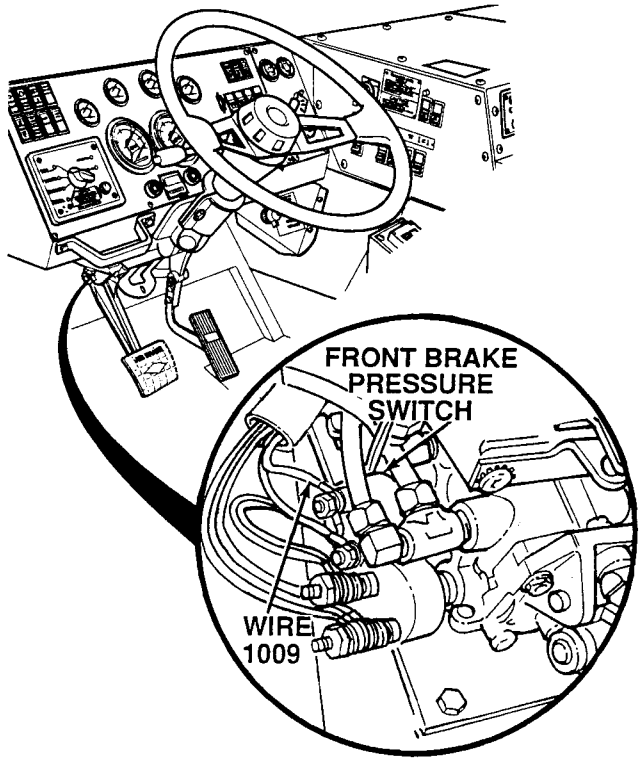


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1009 at front brake pressure switch.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) While assistant applies brake pedal (TM 9-2320-364-10), observe multimeter.
  (a) If 10 to 14 vdc are not present, release brake pedal and repair wire 1009 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1009 is OK.
(4) Release brake pedal.



19. STOPLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO

Turn signal operates indicating stoplight lamp OK.
Turn signal switch OK.
Circuit breaker CB6 OK.
Wire 1009 OK.

POSSIBLE PROBLEMS

Wire 1005 faulty.
BLACKOUT LIGHTS switch faulty.
Wire 1005A faulty.

4.

WARNING
Read WARNING on Page 2-1323

Are 10 to 14 vdc measured on wire 1005 at BLACKOUT LIGHTS switch, terminal 6?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not present, wire 1005 is faulty.

NO → Repair wire 1005 (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

YES

KNOWN INFO

Turn signal operates indicating stoplight lamp OK.
Turn signal switch OK.
Circuit breaker CB6 OK.
Wire 1009 OK.
Wire 1005 OK.

POSSIBLE PROBLEMS

BLACKOUT LIGHTS switch faulty.
Wire 1005A faulty.

5.

Is continuity measured between terminals 6 and 8 on BLACKOUT LIGHTS switch?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If there is no continuity measured, BLACKOUT LIGHTS switch is faulty. If continuity is measured, wire 1005A is faulty.

NO → Replace BLACKOUT LIGHTS switch (Para 7-27). Verify repair, go to Step 6 of this Fault.

YES → Repair wire 1005A (see schematic Fig 2-32) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

WARNING

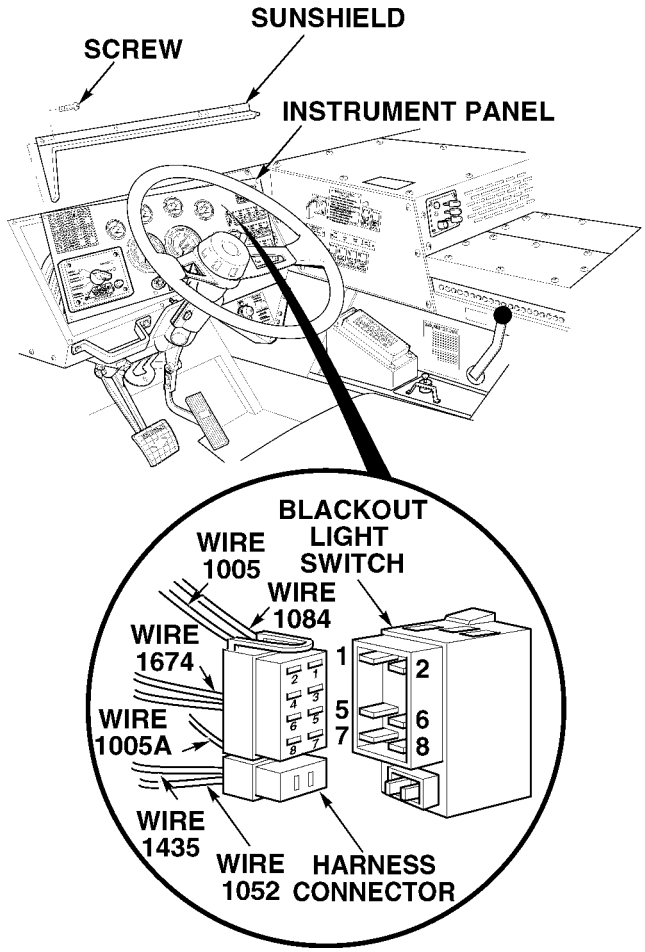
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

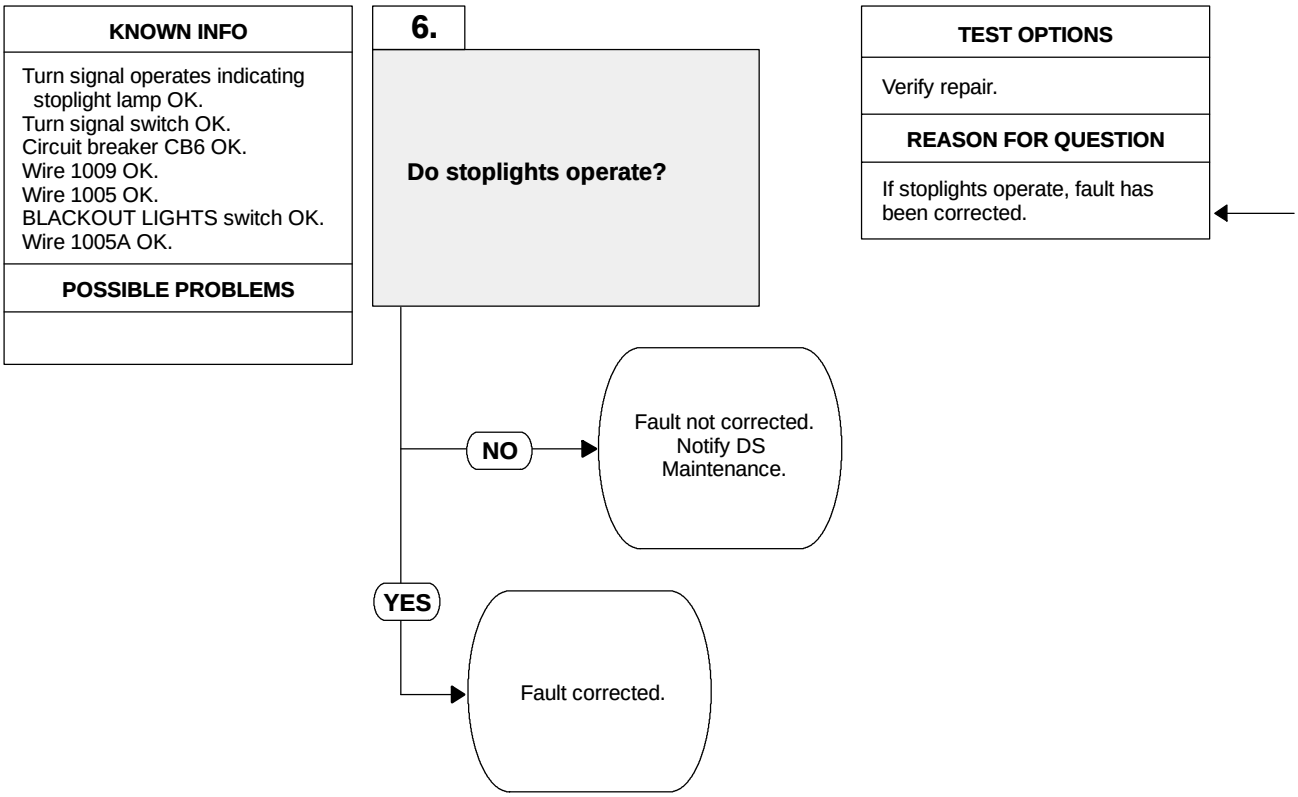
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect harness connector from BLACKOUT LIGHTS switch.
(4) Connect positive (+) multimeter lead to harness connector, terminal 6.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) While assistant applies brake pedal (TM 9-2320-364-10), observe multimeter.
    (a) If 10 to 14 vdc are not present, release brake pedal and repair wire 1005 (see schematic Fig 2-32) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1005 is OK.
(7) Release brake pedal.

CONTINUITY TEST

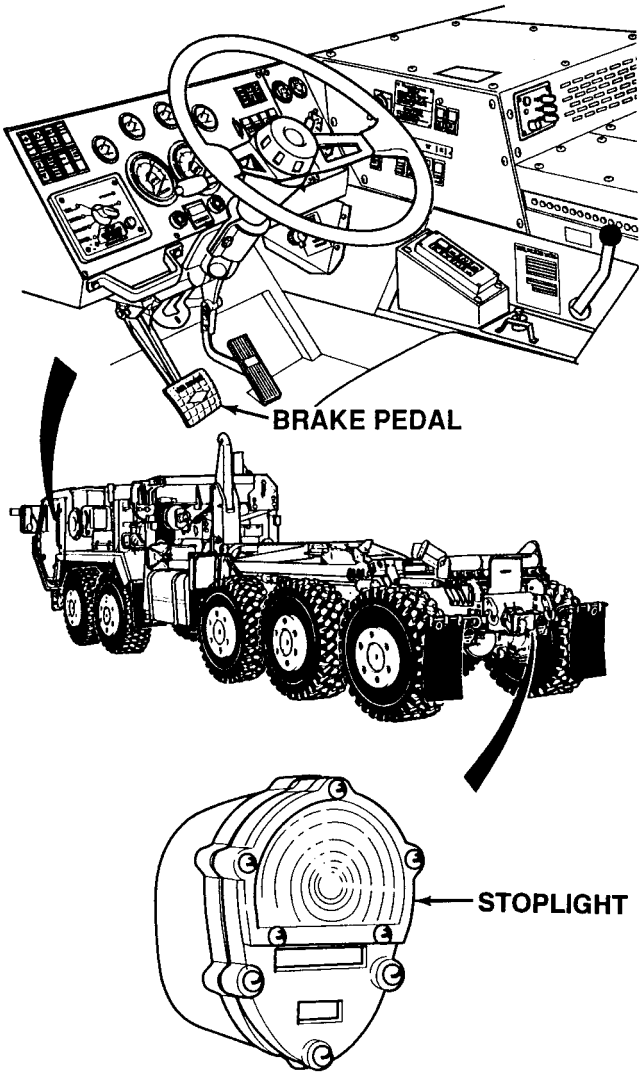
(1) Set multimeter select switch to ohms.
(2) Is their continuity between terminals 6 and 8 of BLACKOUT LIGHTS switch?
    (a) If there is no continuity, replace BLACKOUT LIGHTS switch (Para 7-27).
    (b) If there is continuity, repair wire 1005A (see schematic Fig 2-32) or notify DS Maintenance.
(3) Connect harness connector to BLACKOUT LIGHTS switch.
(4) Install instrument panel and sunshield with ten screws.



19. STOPLIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR
(1) While assistant applies brake pedal, observe stoplights. (a) If stoplights do not operate, fault not corrected. Release brake pedal and notify DS Maintenance. (b) If stoplights operate, fault has been corrected. (2) Release brake pedal.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

20. REVERSE LIGHT DOES NOT OPERATE.

INITIAL SETUP

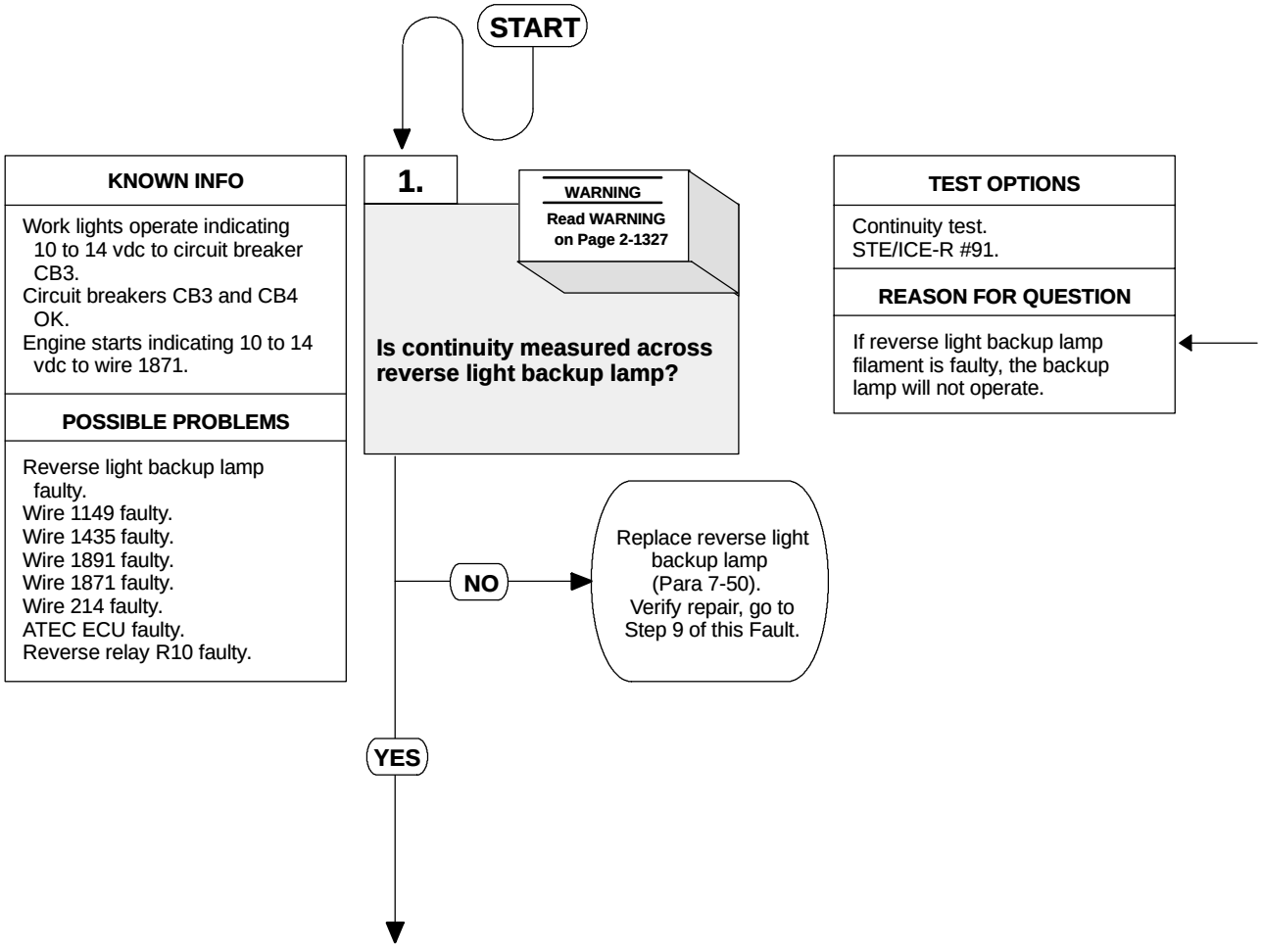
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

Materials/Parts
Solution, Soap (Item 86, Appendix C)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

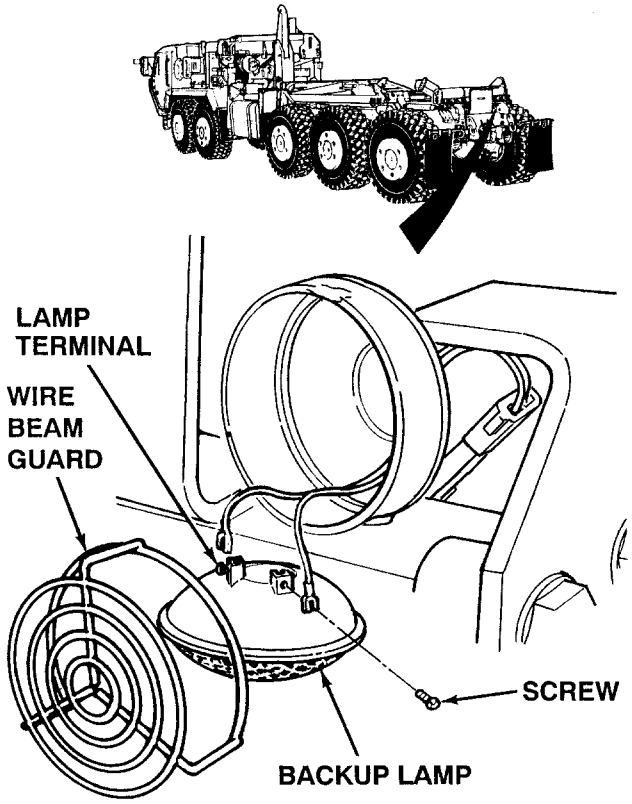


WARNING

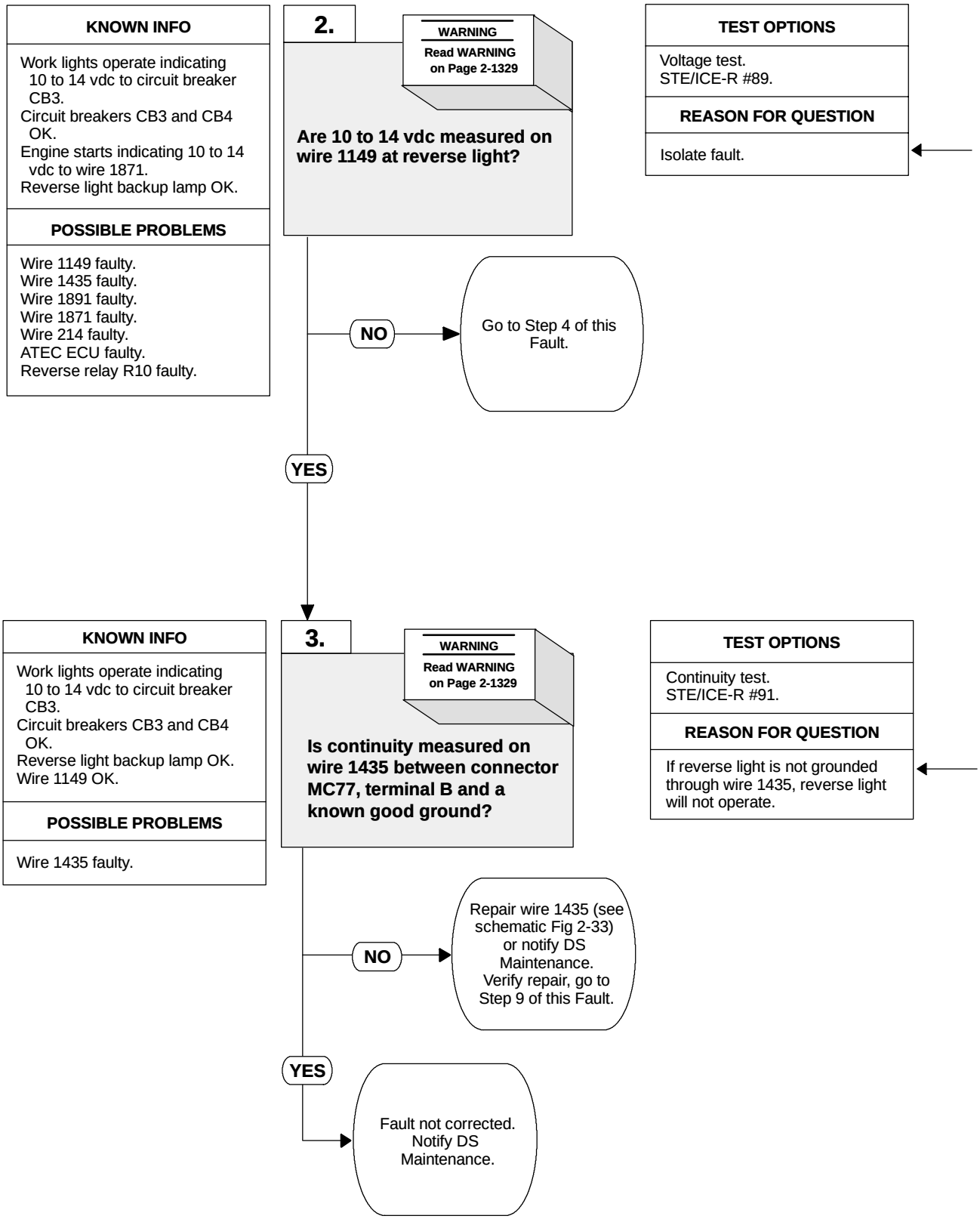
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove wire beam guard from reverse light.
(2) Lubricate edge of light with soap solution and remove lamp from reverse light.
(3) Loosen two screws and remove electrical connectors from lamp.
(4) Set multimeter select switch to ohms.
(5) Is there continuity across reverse backup light lamp?
    (a) If there is no continuity, replace reverse light backup lamp (Para 7-50).
    (b) If there is continuity, reverse light backup lamp is OK.
(6) Attach electrical connectors to lamp and tighten two screws.
(7) Install lamp into reverse backup light.
(8) Install wire beam guard.



20. REVERSE LIGHT DOES NOT OPERATE (CONT).

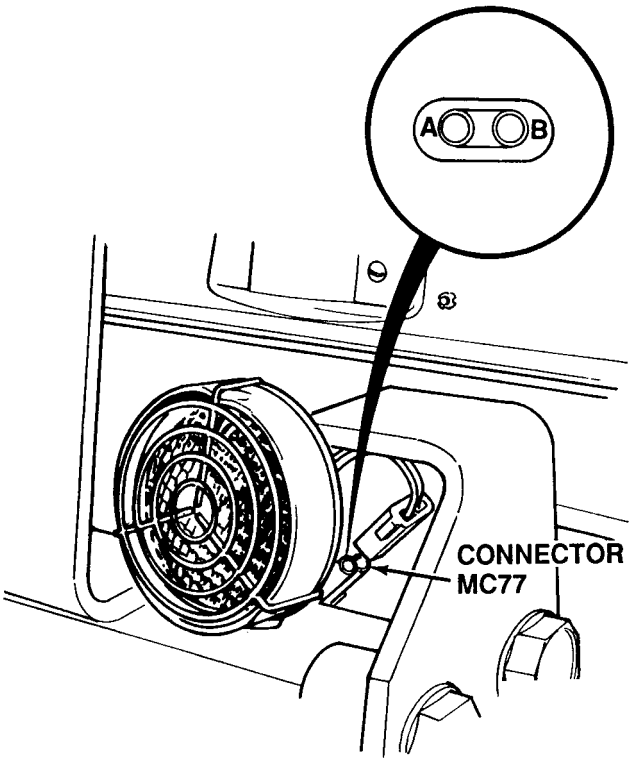


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

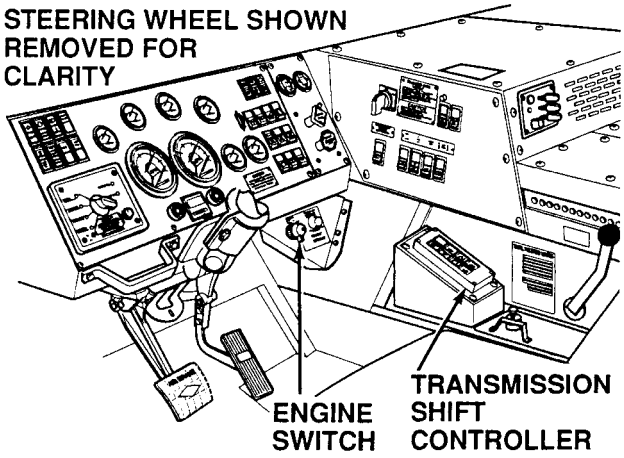
VOLTAGE TEST

(1) Disconnect connector MC77 from backup light.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1149 at harness connector MC77, terminal A.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) Shift transmission to R (Reverse).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 4 of this Fault.
    (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and go to Step 3 of this Fault.

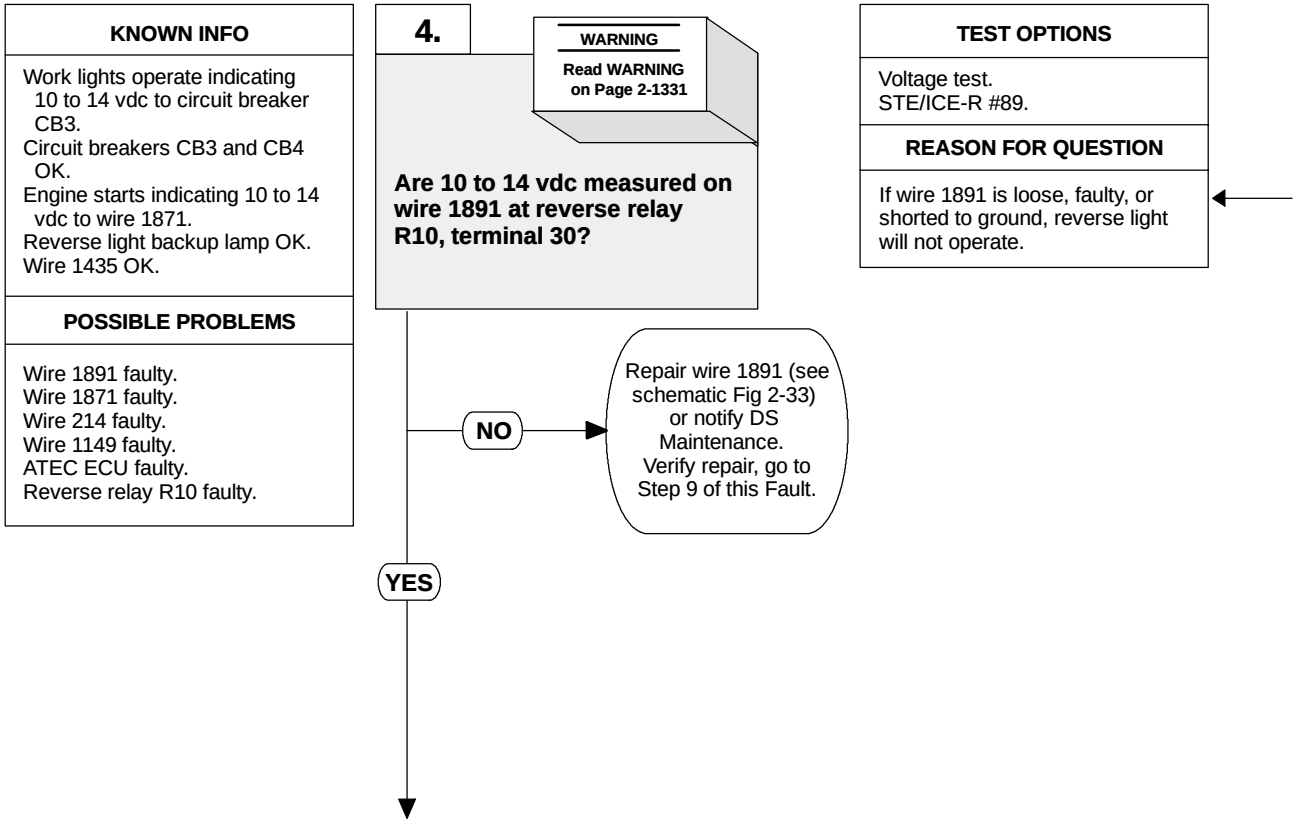


CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is continuity measured on wire 1435 between harness connector MC77, terminal B and a known good ground?
    (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-33) or notify DS Maintenance.
    (b) If there is continuity, wire 1435 is OK.
(3) Connect connector MC77 to backup light.



20. REVERSE LIGHT DOES NOT OPERATE (CONT).

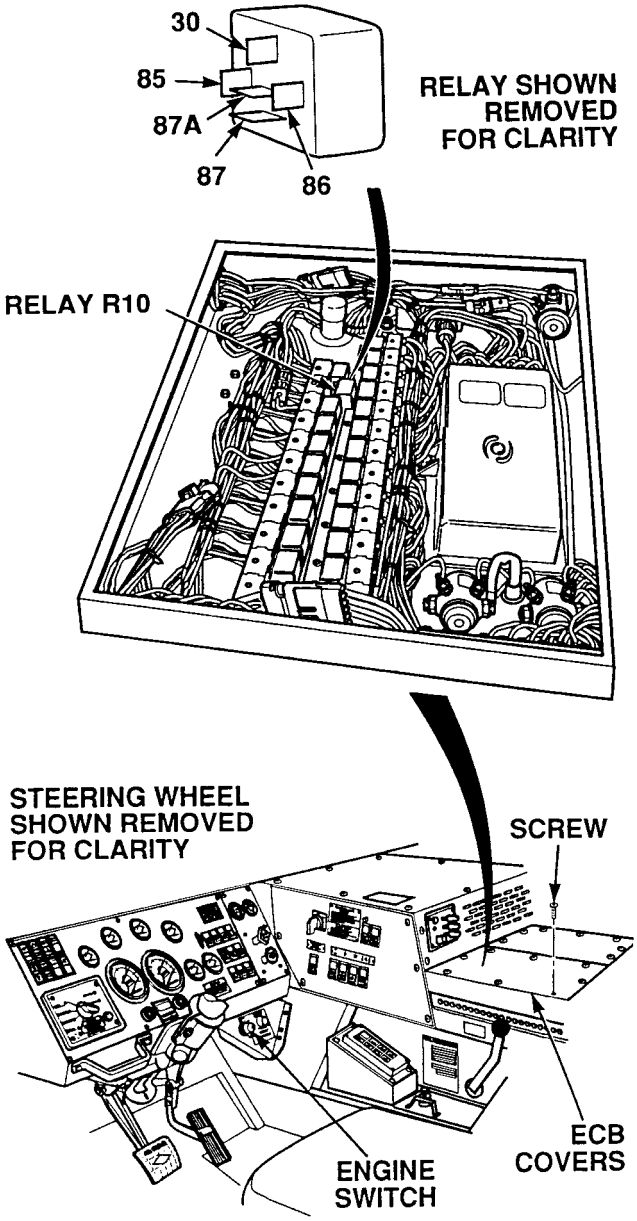


WARNING

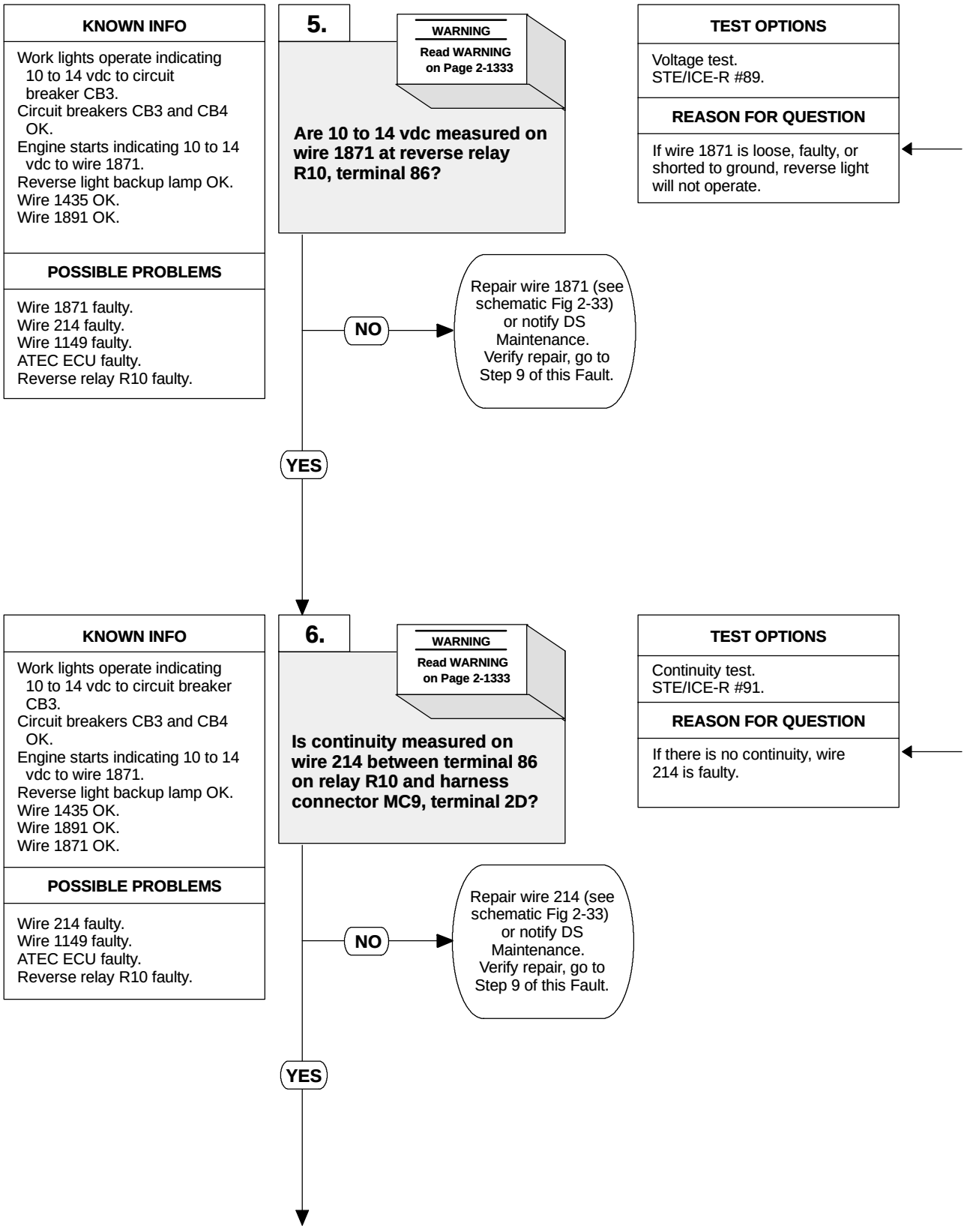
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1891 at reverse relay R10, terminal 30.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1891 (see schematic Fig 2-33) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1891 is OK.
(4) Turn OFF ENGINE switch.



20. REVERSE LIGHT DOES NOT OPERATE (CONT).



WARNING

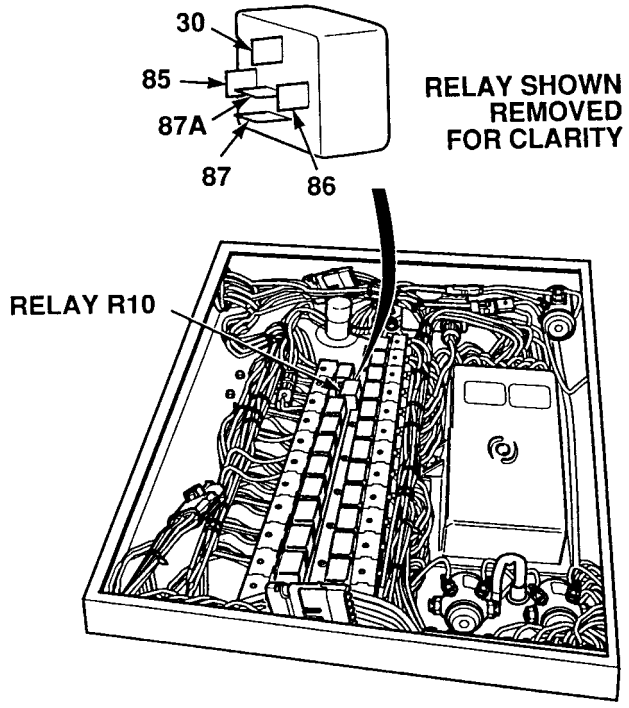
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay tests must be performed with relay partially removed.

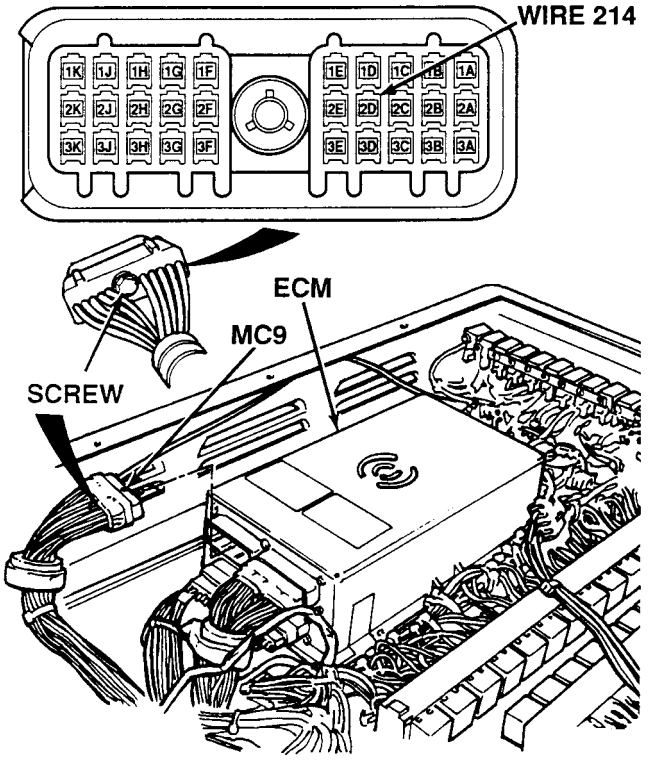
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to reverse relay R10, terminal 86.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1871 (see schematic Fig 2-33) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1871 is OK.
(4) Turn OFF ENGINE switch.



CONTINUITY TEST

(1) Loosen screw and disconnect connector MC9.
(2) Set multimeter select switch to ohms.
(3) Is there continuity between reverse relay R10, terminal 86 and harness connector MC9, terminal 2D?
  (a) If there is no continuity, repair wire 214 (see schematic Fig 2-33) or notify DS Maintenance.
  (b) If there is continuity, wire 214 is OK.
(4) Connect connector MC9 and tighten screw.



20. REVERSE LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO

Work lights operate indicating 10 to 14 vdc to circuit breaker CB3.
Circuit breakers CB3 and CB4 OK.
Engine starts indicating 10 to 14 vdc to wire 1871.
Reverse light backup lamp OK.
Wire 1435 OK.
Wire 1891 OK.
Wire 1871 OK.
Wire 214 OK.

POSSIBLE PROBLEMS

Wire 1149 faulty.
Reverse relay R10 faulty.
ATEC ECU faulty.

7.

WARNING
Read WARNING on Page 2-1335

Are 10 to 14 vdc measured on wire 1149 at reverse relay R10, terminal 87?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc is measured, wire 1149 is faulty.

NO → Go to Step 8 of this Fault.

YES → Repair wire 1149 (see schematic Fig 2-33) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

KNOWN INFO

Work lights operate indicating 10 to 14 vdc to circuit breaker CB3.
Circuit breakers CB3 and CB4 OK.
Engine starts indicating 10 to 14 vdc to wire 1871.
Reverse light backup lamp OK.
Wire 1149 OK.
Wire 1435 OK.
Wire 1891 OK.
Wire 1871 OK.
Wire 214 OK.
Wire 1149 OK.

POSSIBLE PROBLEMS

Reverse relay R10 faulty.
ATEC ECU faulty.

8.

WARNING
Read WARNING on Page 2-1335

Are 10 to 14 vdc measured on wire 1149 at reverse relay R10, terminal 87, when wire 214 at harness connector MC50, terminal D is jumpered to ground?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc is measured, ATEC ECU is faulty.
If 10 to 14 vdc are not measured, relay R10 is faulty.

NO → Replace reverse relay R10 (Para 7-95). Verify repair, go to Step 9 of this Fault.

YES → Replace ATEC ECU (Para 7-71). Verify repair, go to Step 9 of this Fault.

WARNING

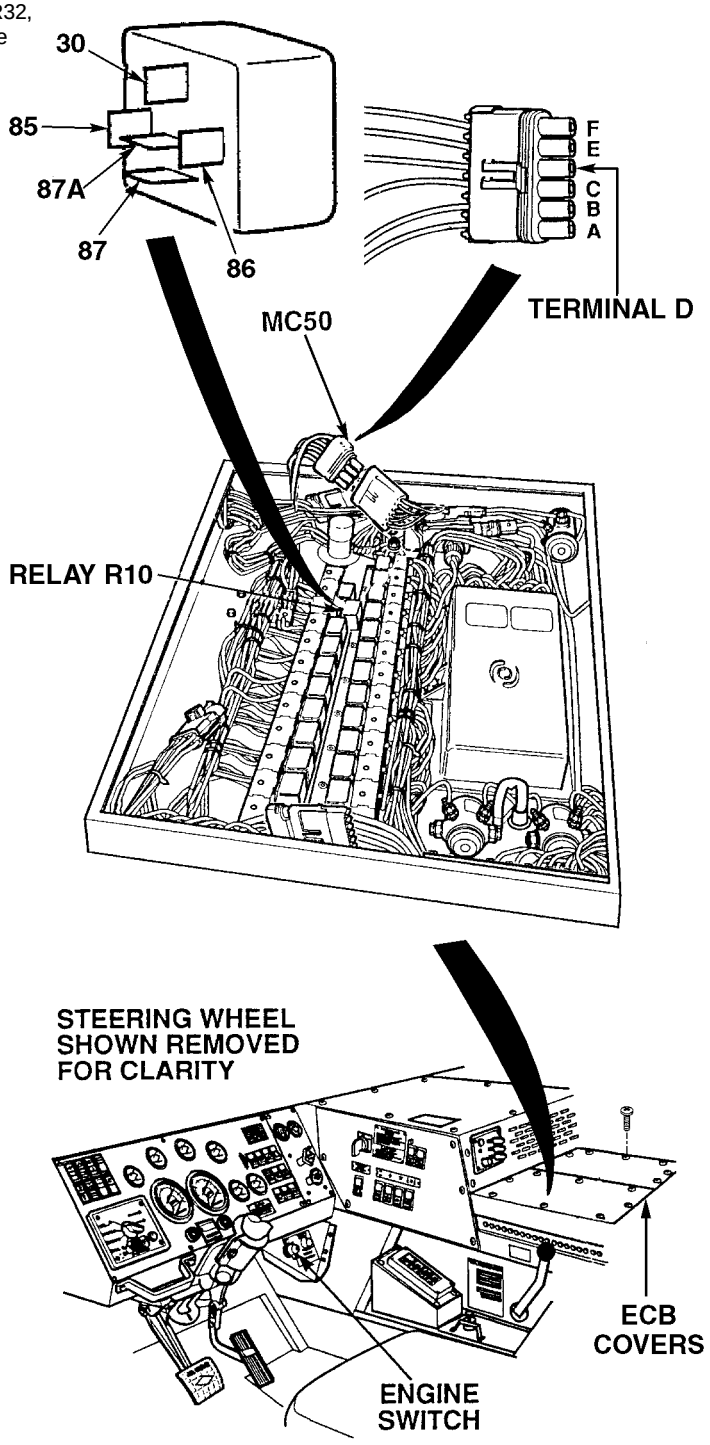
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

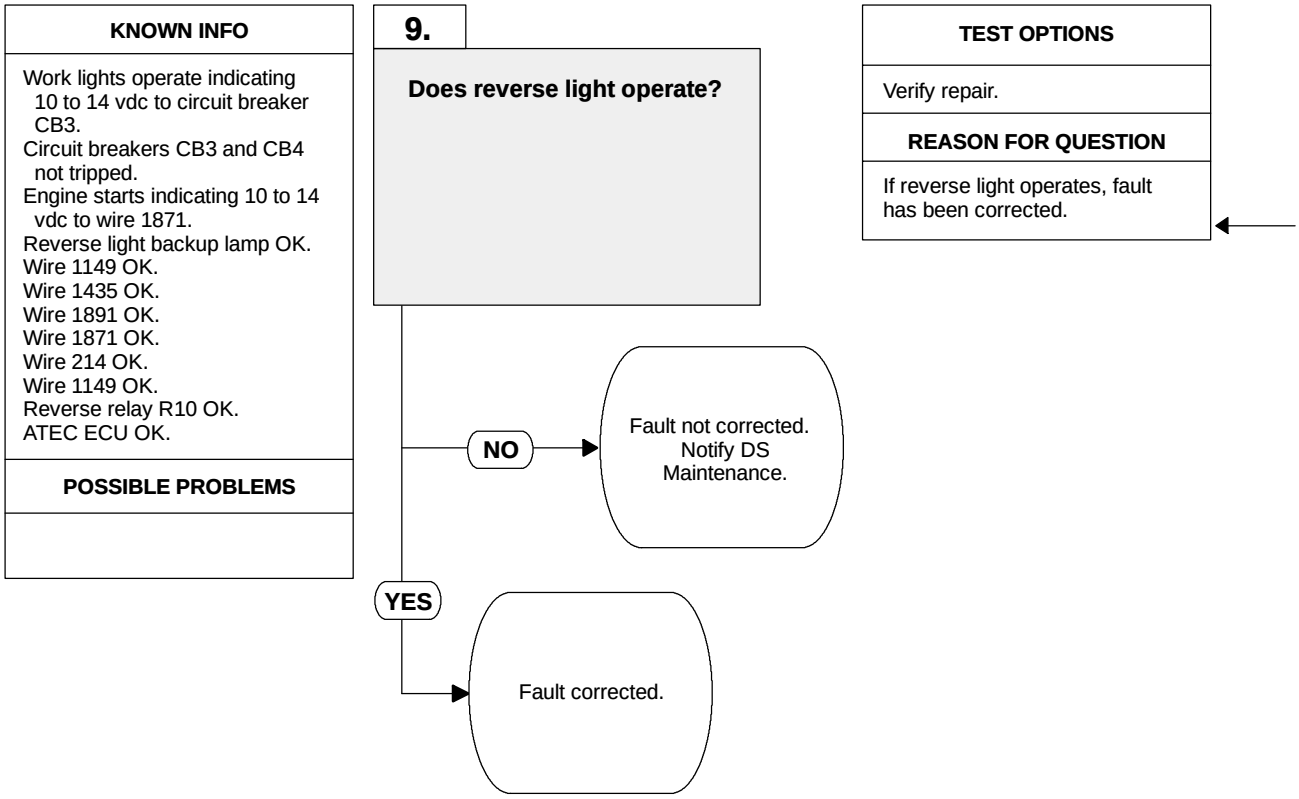
(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1149 at reverse relay R10, terminal 87 (Para 2-24).
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Shift transmission to R (reverse).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 8 of this fault.
  (b) If 10 to 14 vdc are present, repair wire 1149 (see schematic Fig 2-33) or notify DS Maintenance.
(6) Install two ECB covers and 15 screws.

VOLTAGE TEST

(1) Disconnect harness connector MC50.
(2) Attach a jumperwire to terminal D and a known good ground.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to wire 1149 at reverse relay R10, terminal 87 (Para 2-24).
(5) Connect negative (-) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace relay R10 (Para 7-95).
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch, connect MC50, and replace ATEC ECU (Para 7-71).
(7) Install two ECB covers and 15 screws.

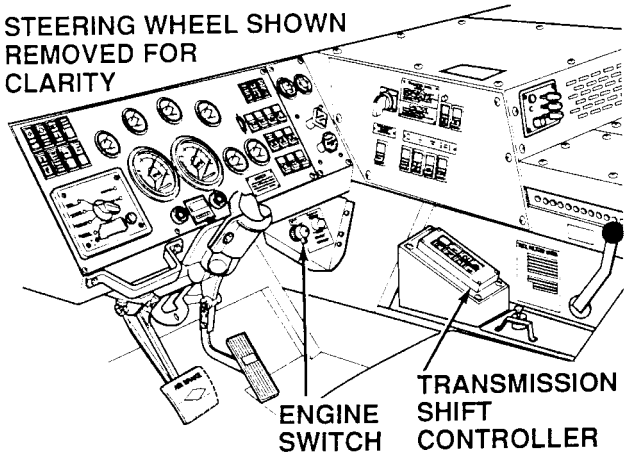


20. REVERSE LIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Shift transmission to R (Reverse).
  (a) If reverse light does not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
  (b) If reverse light operates, fault has been corrected.
(3) Turn OFF ENGINE switch.



2-20. ELECTRICAL TROUBLESHOOTING (CONT).

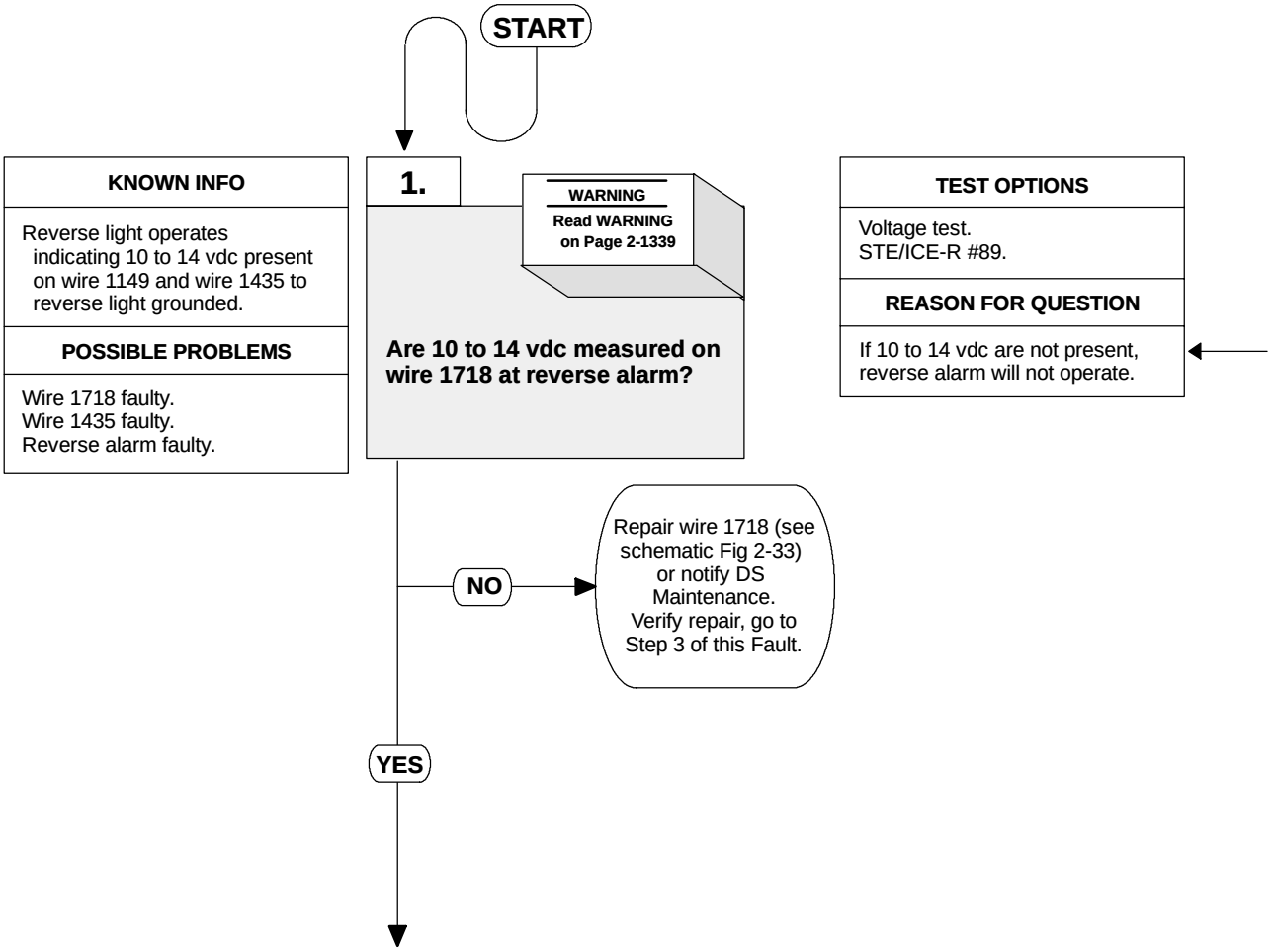
21. REVERSE ALARM DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

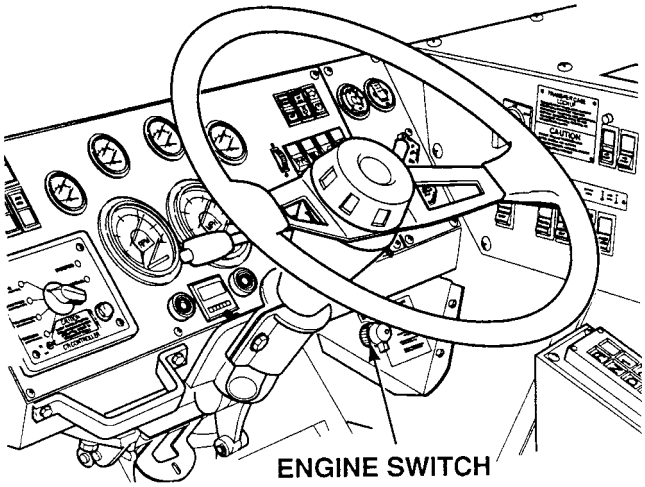
References
TM 9-2320-364-10
TM 9-4910-571-12&P

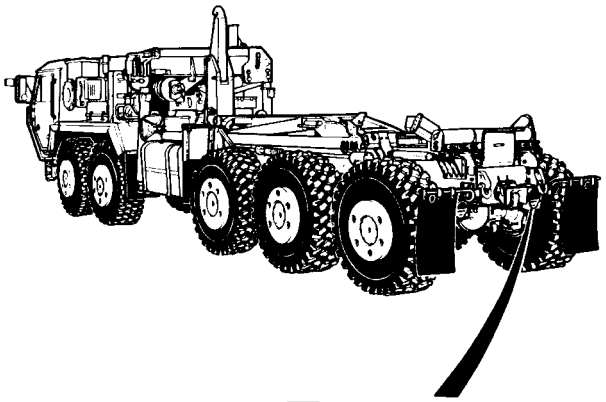
Equipment Condition
ENGINE OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2820-364-10)



WARNING

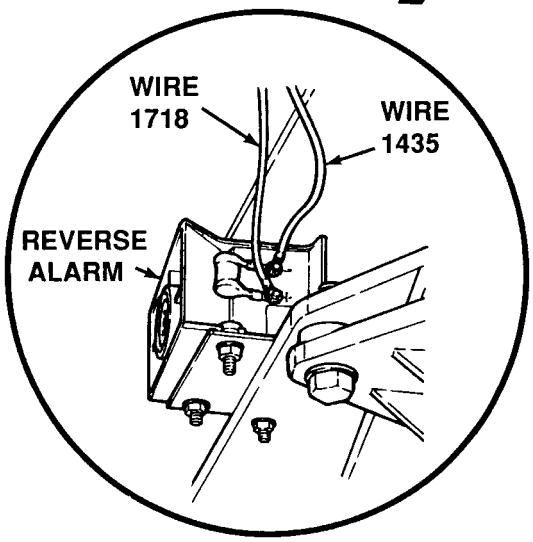
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.





VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1718 at reverse alarm.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
(4) Place shift selector in R (Reverse).
  (a) If 10 to 14 vdc are not measured, turn OFF ENGINE switch and repair wire 1718 (see schematic Fig 2-33) or notify DS Maintenance.
  (b) If 10 to 14 vdc are measured, wire 1718 OK.
(5) Turn OFF ENGINE switch.



21. REVERSE ALARM DOES NOT OPERATE (CONT).

KNOWN INFO

Reverse light operates indicating 10 to 14 vdc present on wire 1149 and wire 1435 to reverse light grounded.
Wire 1718 OK.

POSSIBLE PROBLEMS

Wire 1435 faulty.
Reverse alarm faulty.

2.

WARNING
Read WARNING on Page 2-1341

Is continuity measured on wire 1435 between reverse alarm and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If continuity is not present, reverse alarm will not operate.

NO → Repair wire 1435 (see schematic Fig 2-33) or notify DS Maintenance. Verify repair, go to Step 3 of this Fault.

YES → Replace alarm (Para 7-86). Verify repair, go to Step 3 of this Fault.

KNOWN INFO

Reverse light operates indicating 10 to 14 vdc present on wire 1149 and wire 1435 to reverse light grounded.
Wire 1718 OK.
Wire 1435 OK.
Reverse alarm OK.

POSSIBLE PROBLEMS

3.

Does reverse alarm operate?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If reverse alarm operates, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

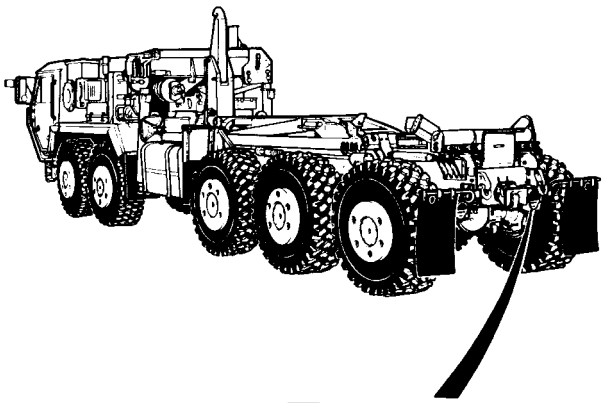
YES → Fault corrected.

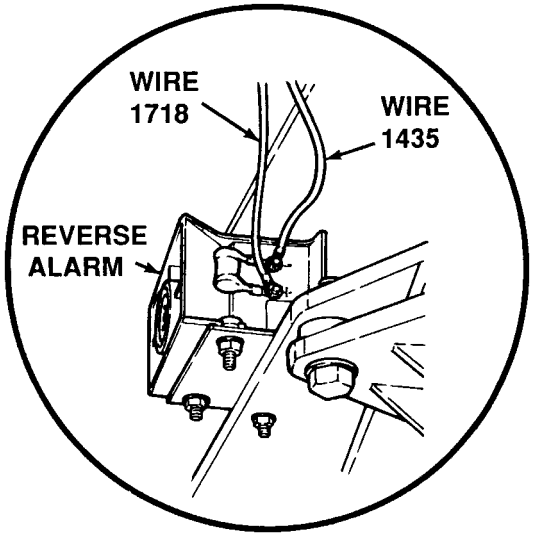
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between reverse alarm and a known good ground?
   (a) If there is no continuity measured, repair wire 1435 (see schematic Fig 2-33) or notify DS Maintenance.
   (b) If there is continuity measured, replace reverse alarm (Para 7-86).





VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Place shift selector in R (Reverse).
   (a) If reverse alarm does not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
   (b) If reverse alarm operates, fault has been corrected.
(3) Turn OFF ENGINE switch.

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

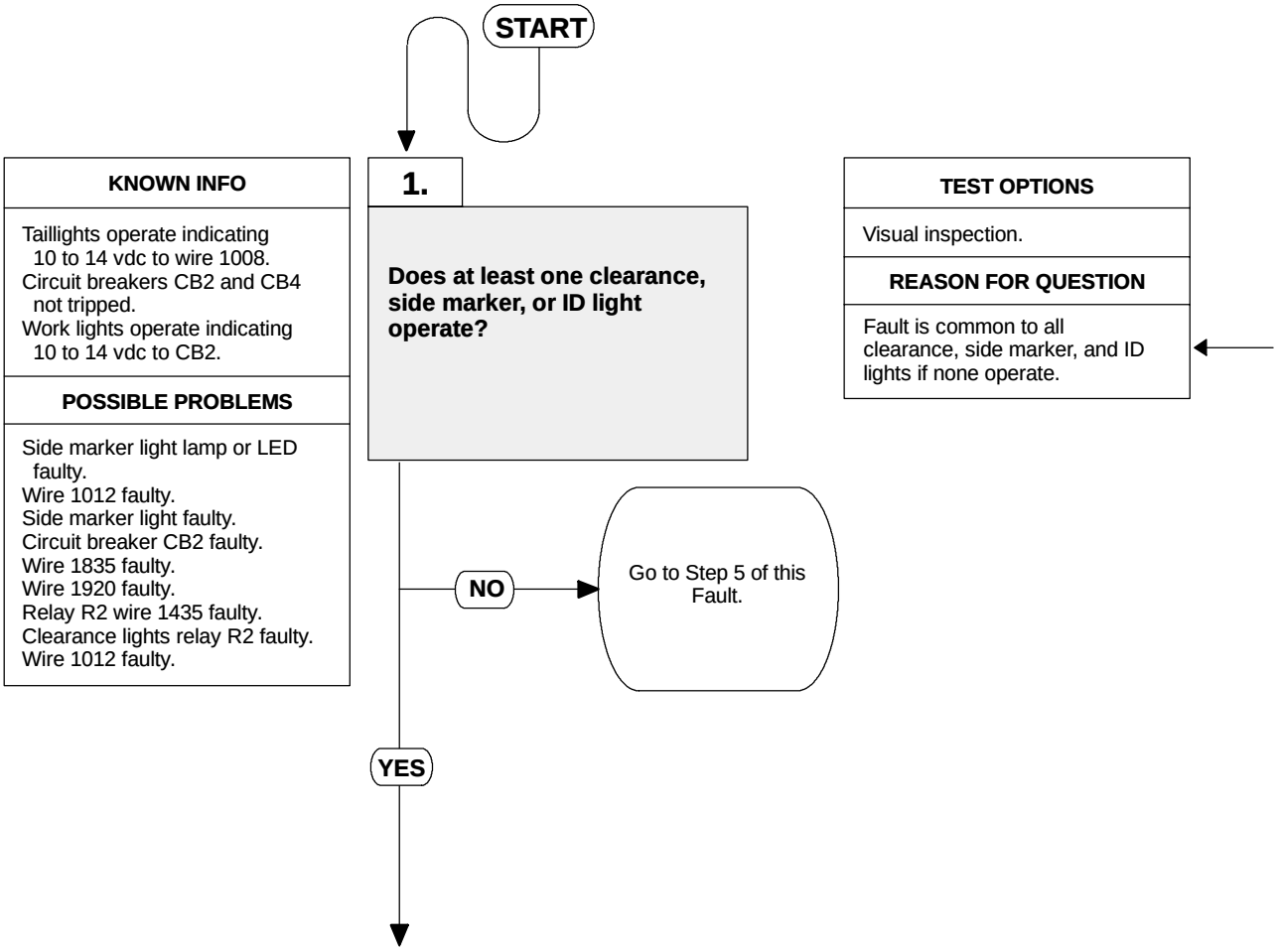
22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE.

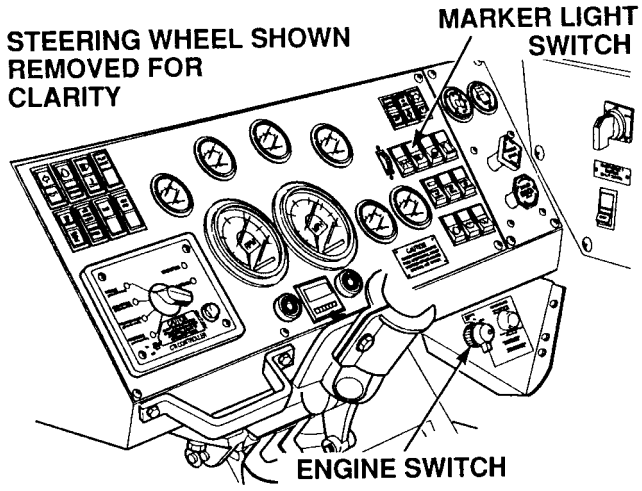
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

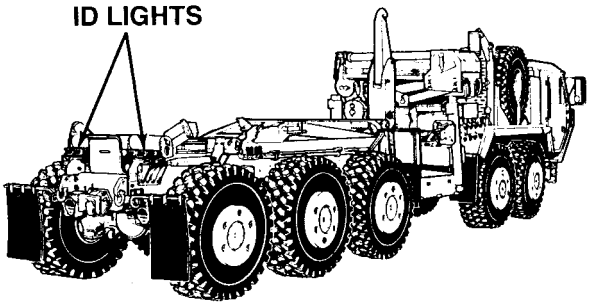
References
TM 9-2320-364-10
TM 9-4910-571-12&P

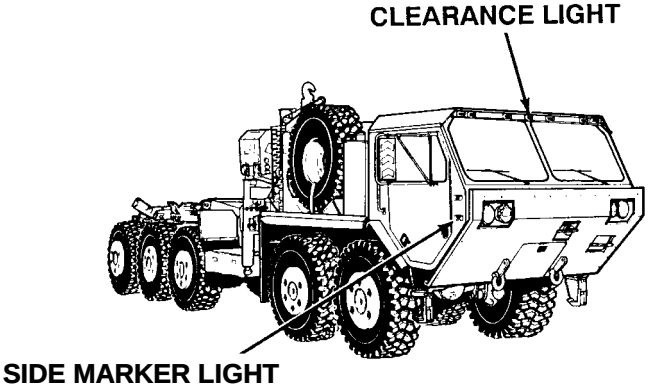
Equipment Condition
ENGINE OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2820-364-10)



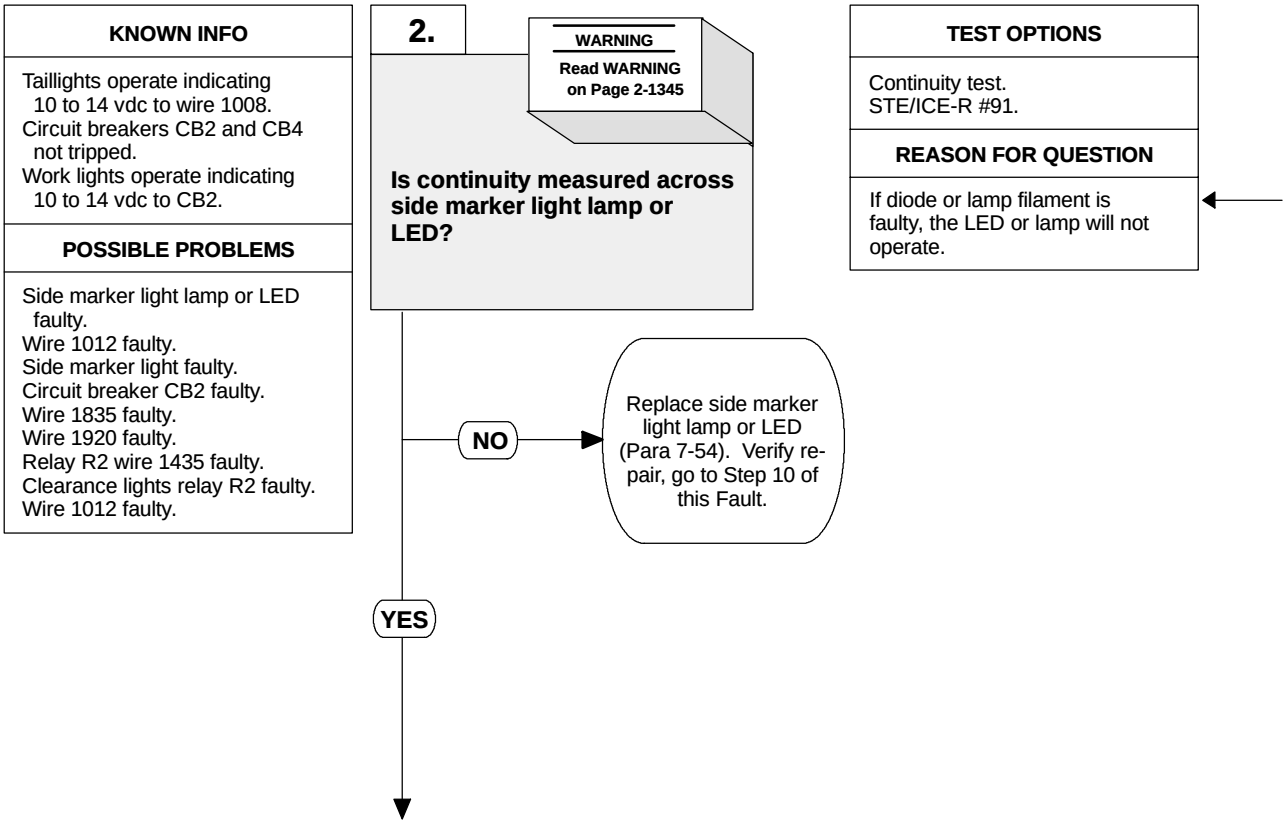


VISUAL INSPECTION
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Turn marker light switch to center position. (3) Inspect clearance, side marker, and ID lights for operation. (a) If all listed lights fail to operate, fault is between clearance lights, circuit breaker CB2 and wire 1920 and 1008 splice. Turn OFF ENGINE switch and go to Step 5 of this Fault. (b) If one of the listed lights operates, fault is between faulty light lamp or LED and wire 1012 first splice. Turn OFF ENGINE switch and go to Step 2 of this Fault.



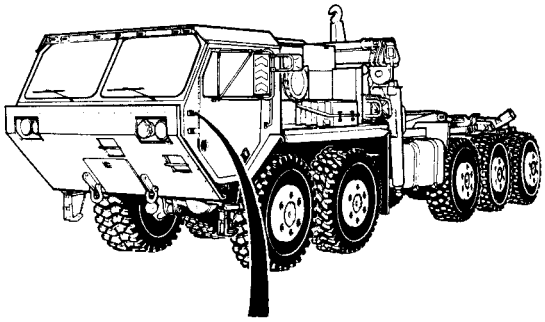


22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

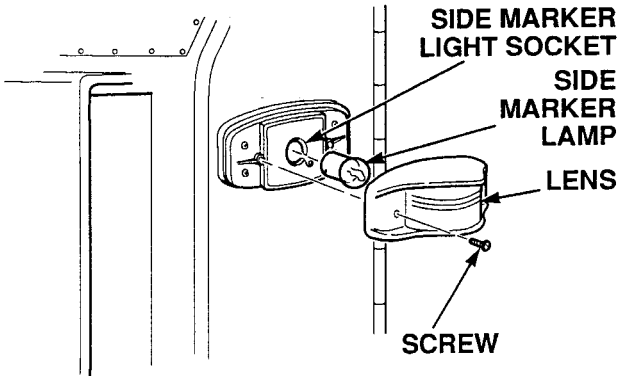


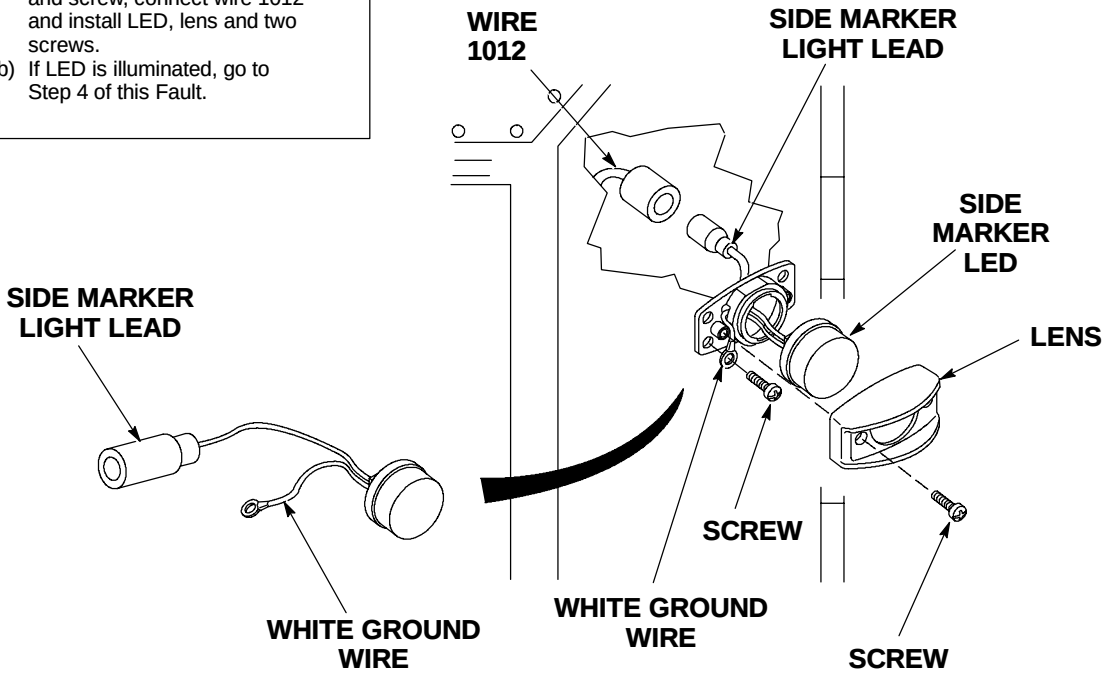
NOTE

- Lower lamp is side marker light, upper lamp is turn signal.
- Perform steps (1) through (3) for side marker lamp or steps (4) through (8) for side marker LED.

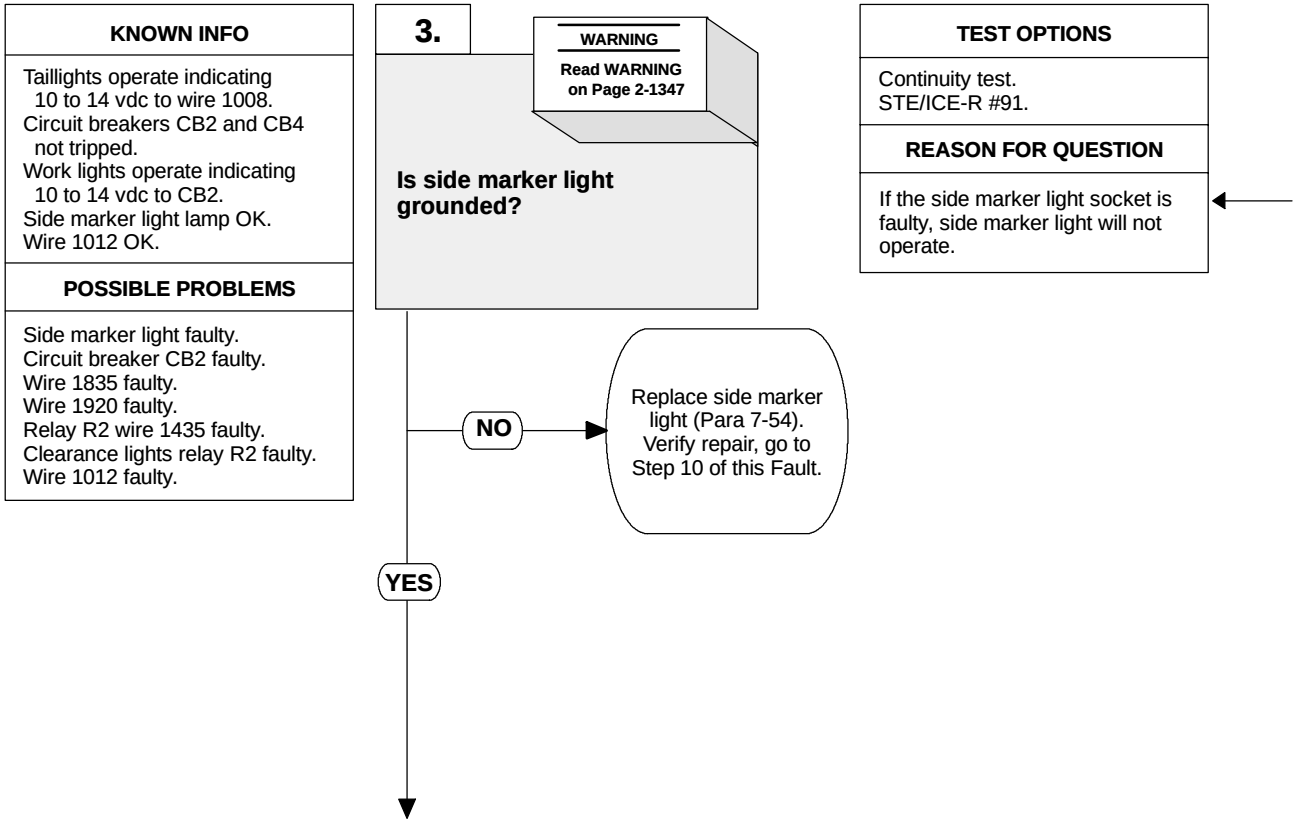
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Remove two screws, lens and lamp.
(3) Is there continuity across side marker light lamp?
  (a) If there is no continuity, replace lamp and install lens and two screws.
  (b) If there is continuity, go to Step 3 of this Fault.
(4) Remove two screws and lens.
(5) Remove screw and white ground wire.
(6) Remove LED and disconnect wire 1012.
(7) Connect side marker light lead to a known good 12 vdc source and white ground wire to a known good ground source.
(8) Check LED for illumination.
  (a) If LED is not illuminated, replace LED, connect white ground wire and screw, connect wire 1012 and install LED, lens and two screws.
  (b) If LED is illuminated, go to Step 4 of this Fault.





22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).

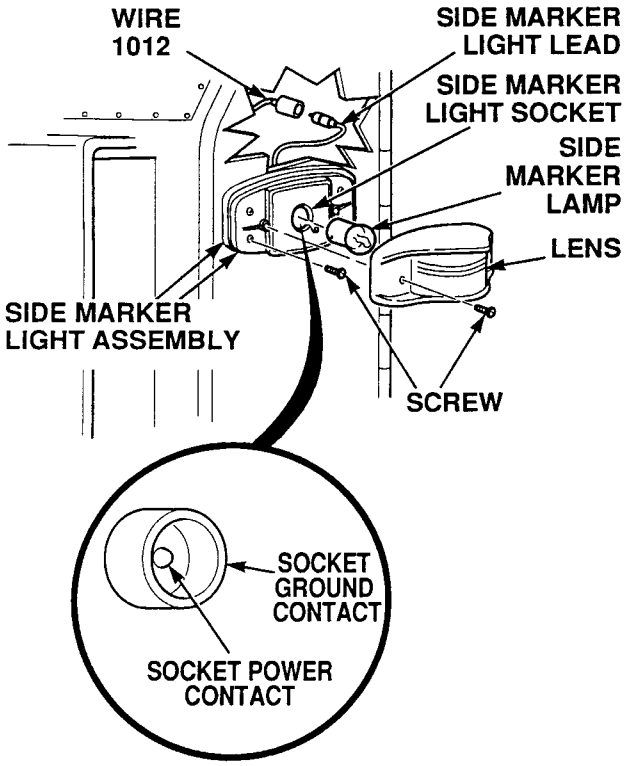


WARNING

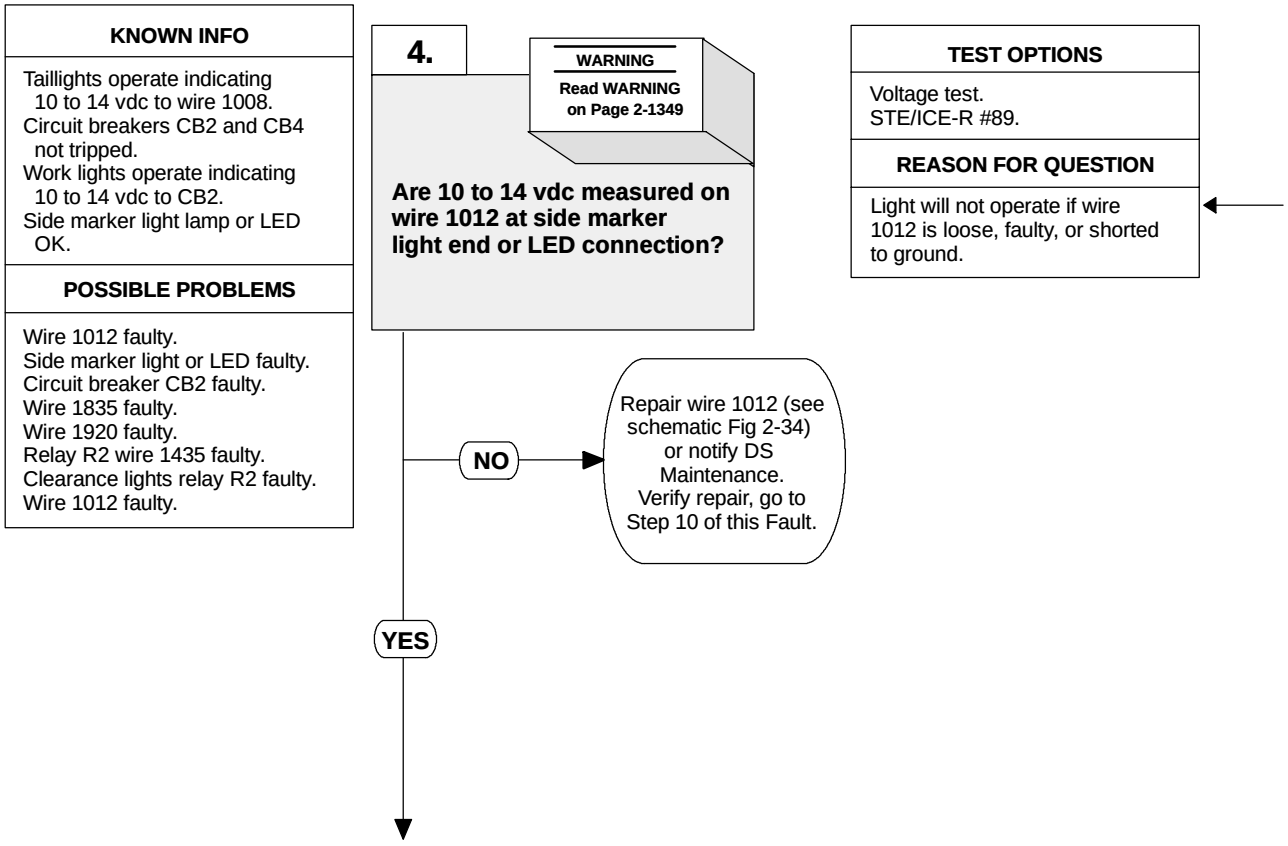
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove four screws and side marker light.
(2) Disconnect wire 1012 from side marker light.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between light socket ground contact and a known good ground?
  (a) If there is no continuity, clean and reground side marker light.
  (b) If there is continuity, side marker light ground is OK.
(5) Is there continuity between socket power contact of light socket and marker light lead?
  (a) If there is no continuity, replace side marker light (Para 7-54).
  (b) If there is continuity, side marker light is OK.
(6) Connect wire 1012 to side marker light.
(7) Install four screws and side marker light.
(8) Install lamp, lens and two screws.

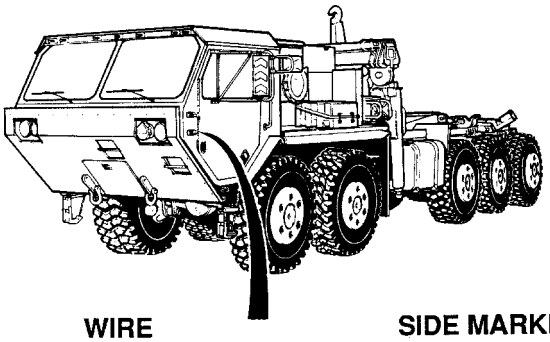


22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

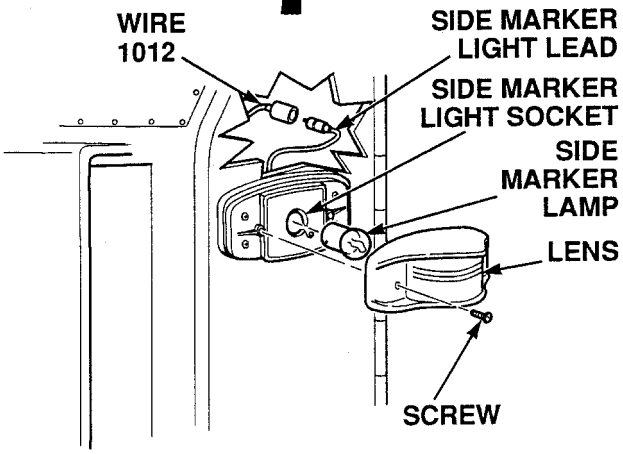


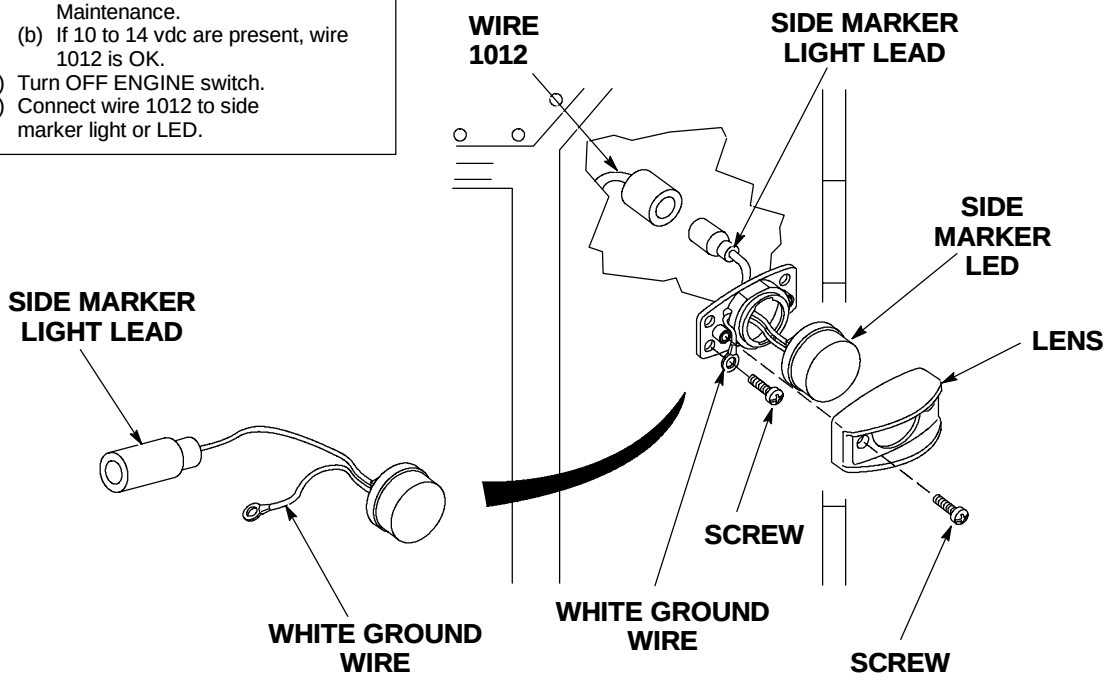
NOTE

If working on side marker LED, go to Step (2).

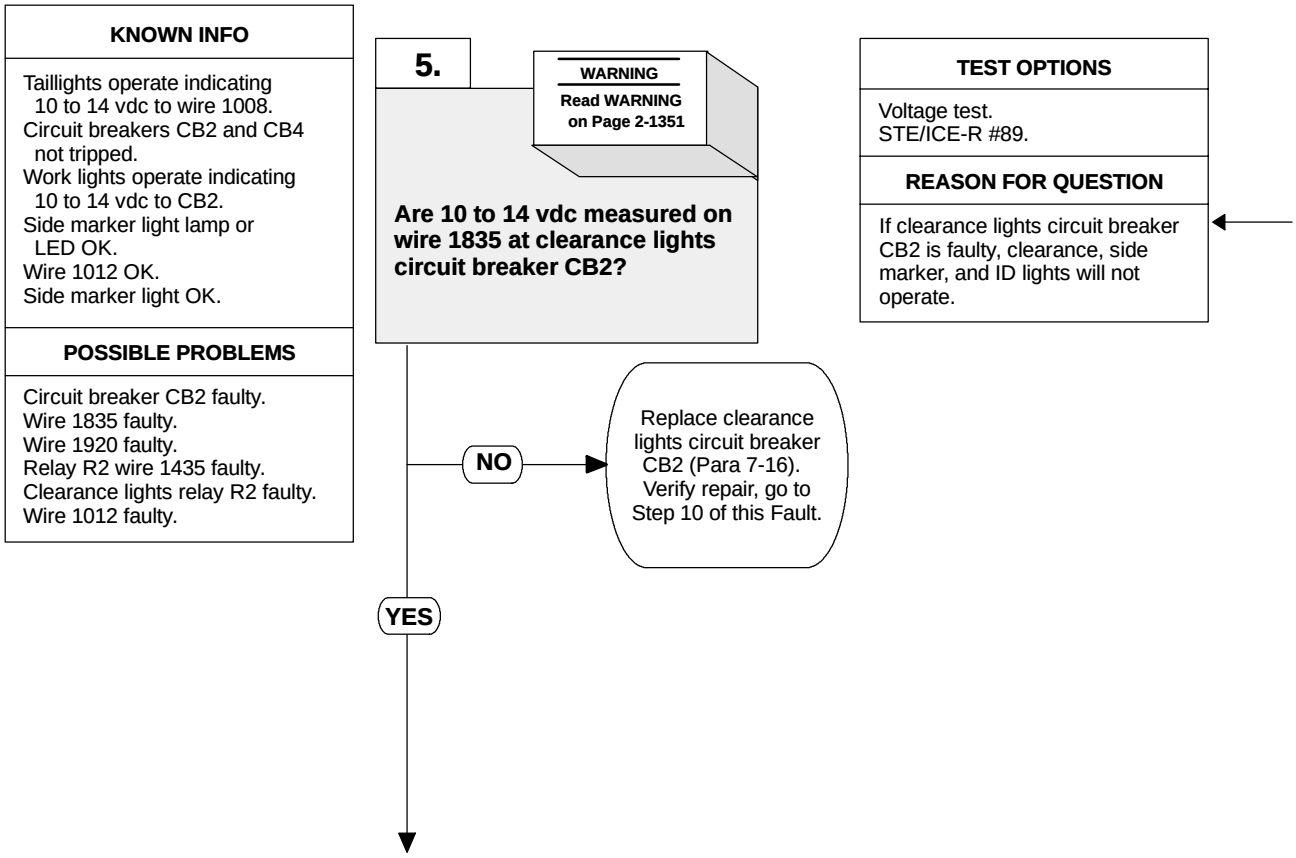
VOLTAGE TEST

(1) Disconnect wire 1012 from side marker light.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1012.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1012 (see schematic Fig 2-34) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1012 is OK.
(6) Turn OFF ENGINE switch.
(7) Connect wire 1012 to side marker light or LED.



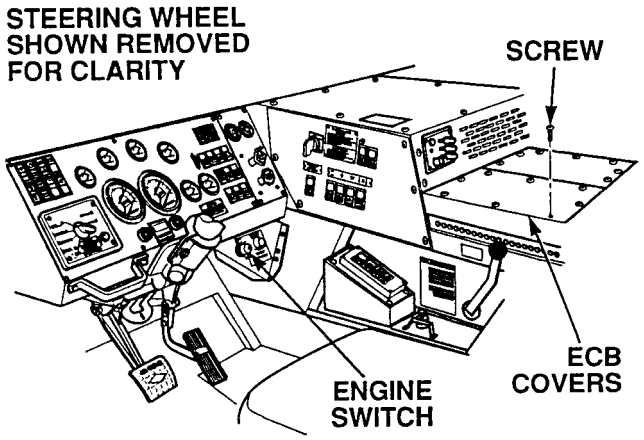


22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).



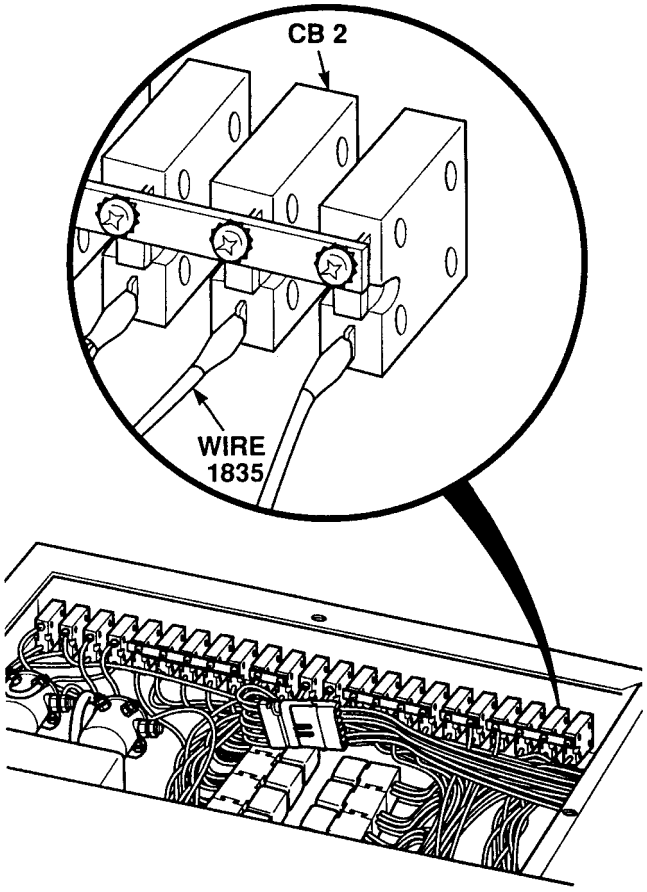
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

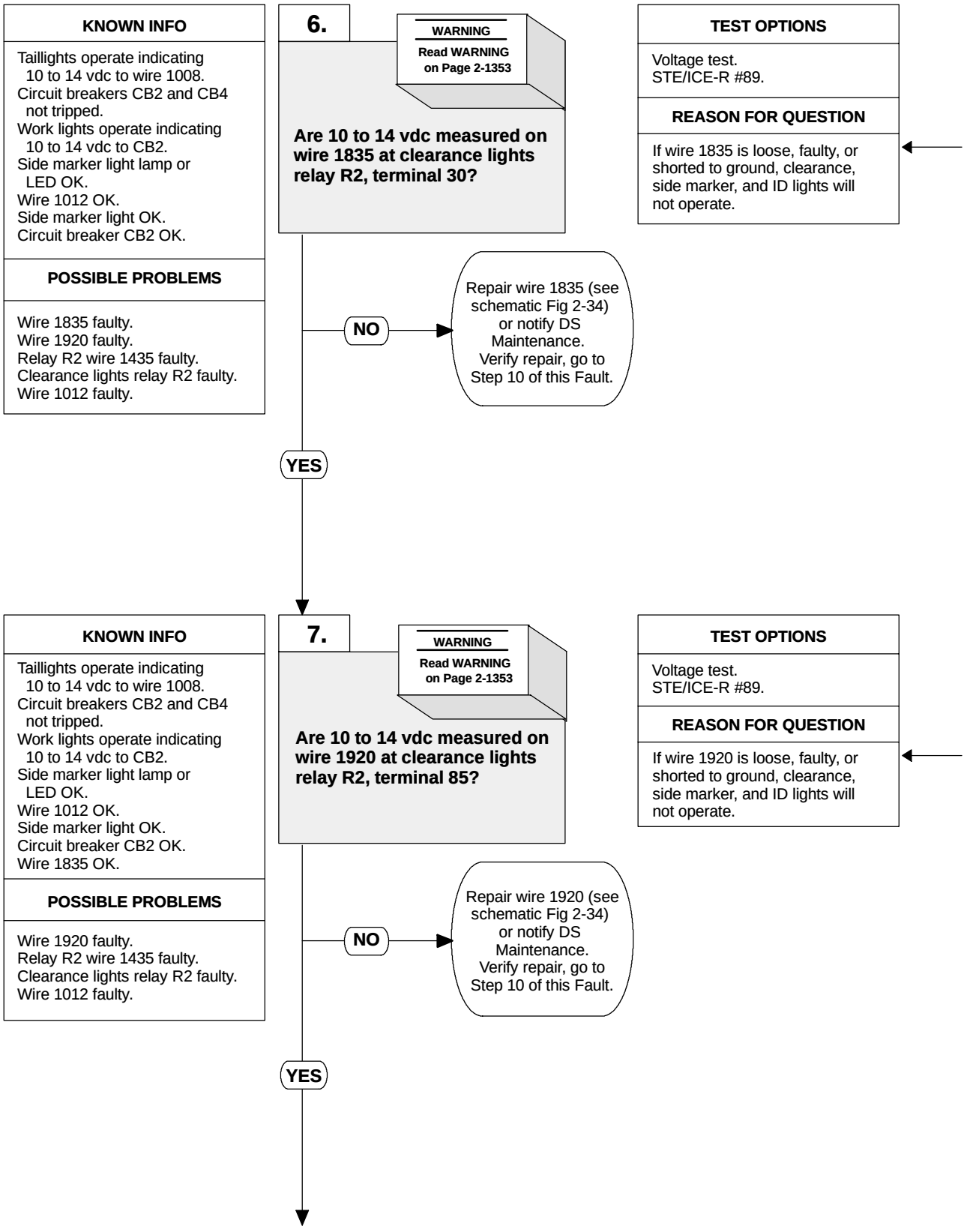


VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1835 at clearance lights circuit breaker CB2.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace clearance light circuit breaker CB2 (Para 7-16).
  (b) If 10 to 14 vdc are present, clearance lights circuit breaker CB2 is OK.
(6) Turn OFF ENGINE switch.



22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).

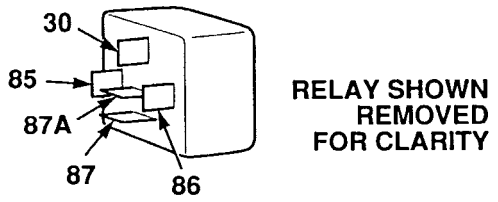


WARNING

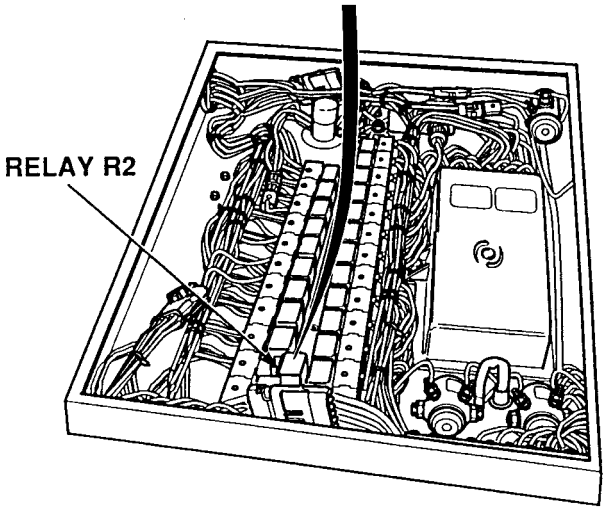
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1835 at clearance light relay R2, terminal 30.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1835 (see schematic Fig 2-34) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1835 is OK.
(5) Turn OFF ENGINE switch.



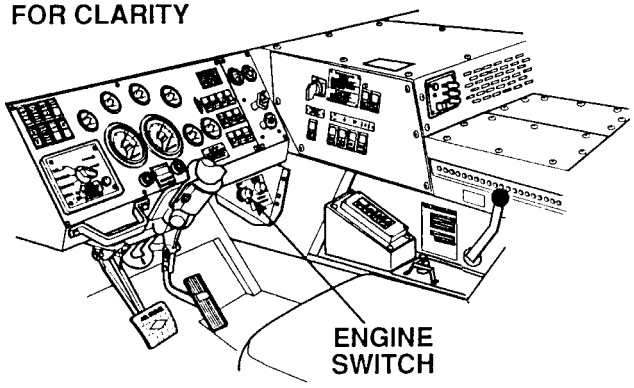
RELAY SHOWN REMOVED FOR CLARITY



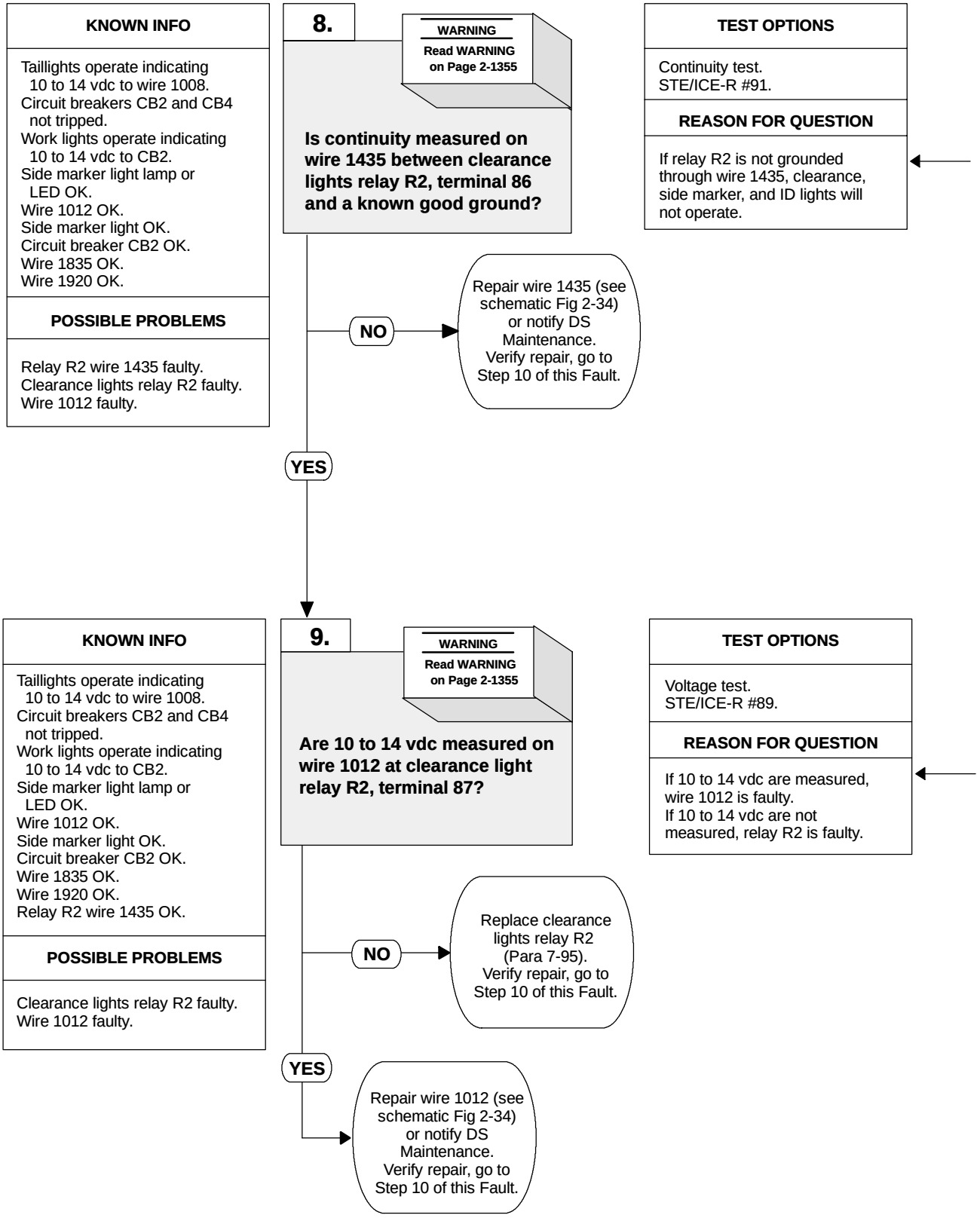
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1920 at clearance lights relay R2, terminal 85.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1920 (see schematic Fig 2-34) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1920 is OK.
(4) Turn OFF ENGINE switch.

STEERING WHEEL SHOWN REMOVED FOR CLARITY



22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).

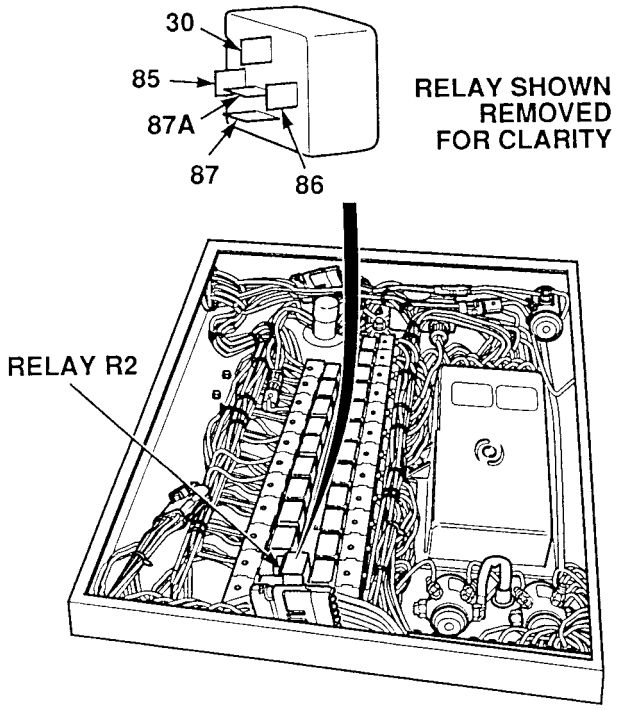


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

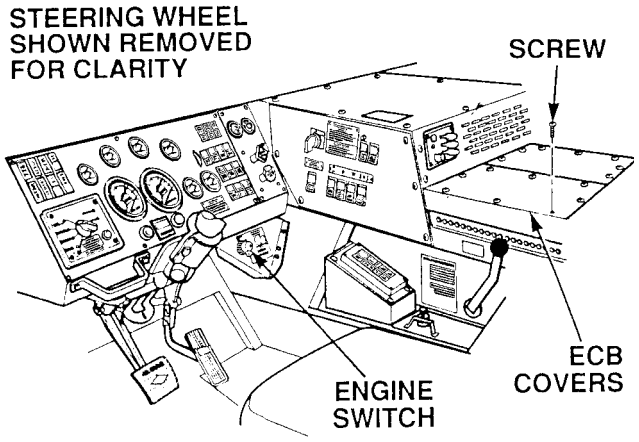
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between clearance lights relay R2, terminal 86 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-34) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.

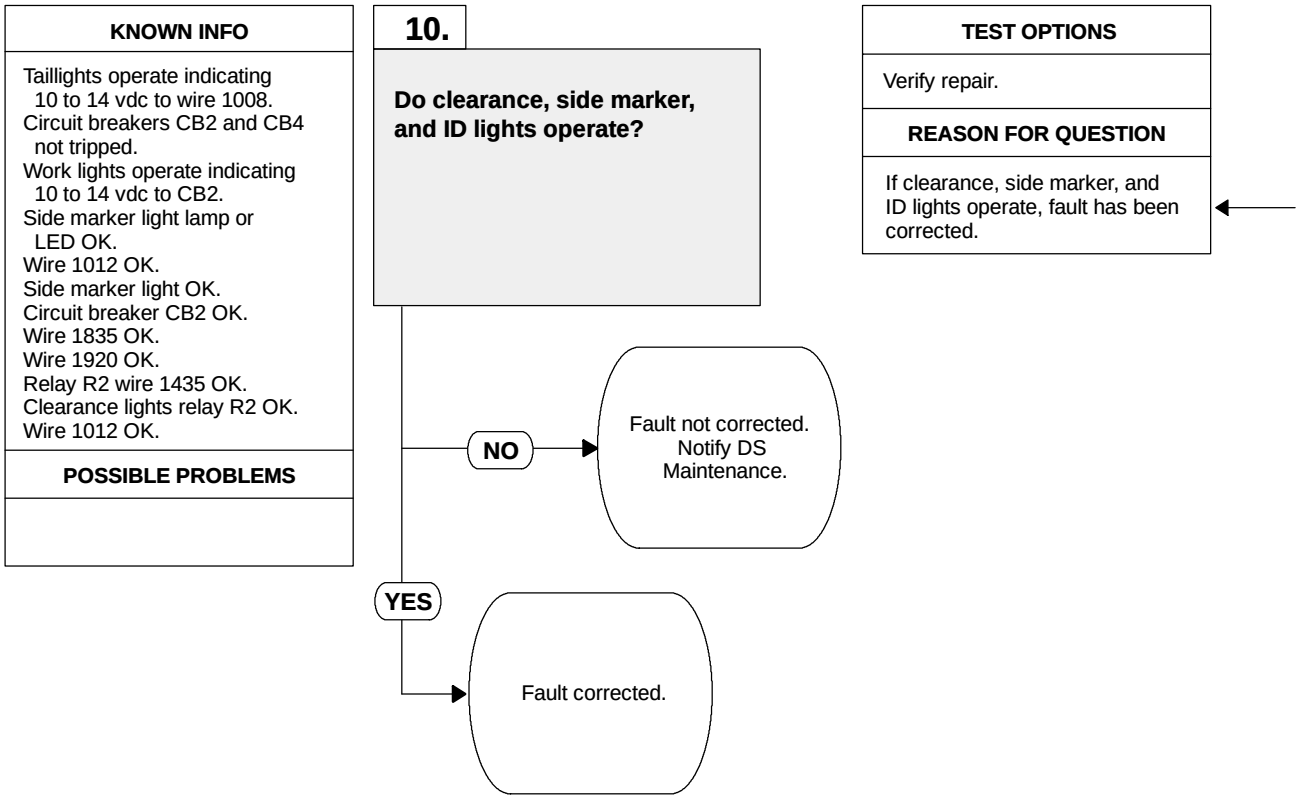


VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1012 at clearance lights relay R2, terminal 87.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, perform Steps (5) through (7) below and replace relay R2 (Para 7-95).
  (b) If 10 to 14 vdc are present, perform Steps (5) through (7) below and repair wire 1012 (see schematic Fig 2-34) or notify DS Maintenance.
(5) Turn off marker light switch.
(6) Turn OFF ENGINE switch.
(7) Install two ECB covers and 15 screws.

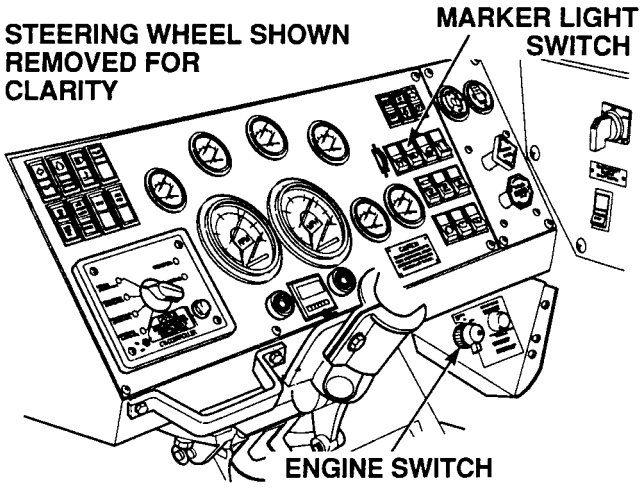


22. CLEARANCE, SIDE MARKER, AND ID LIGHT(S) DO NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on marker lights switch.
  (a) If clearance, side marker, and ID lights do not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If clearance, side marker, and ID lights operate, fault has been corrected.
(3) Turn off marker light switch.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

23. ALL BLACKOUT LIGHTS DO NOT OPERATE.

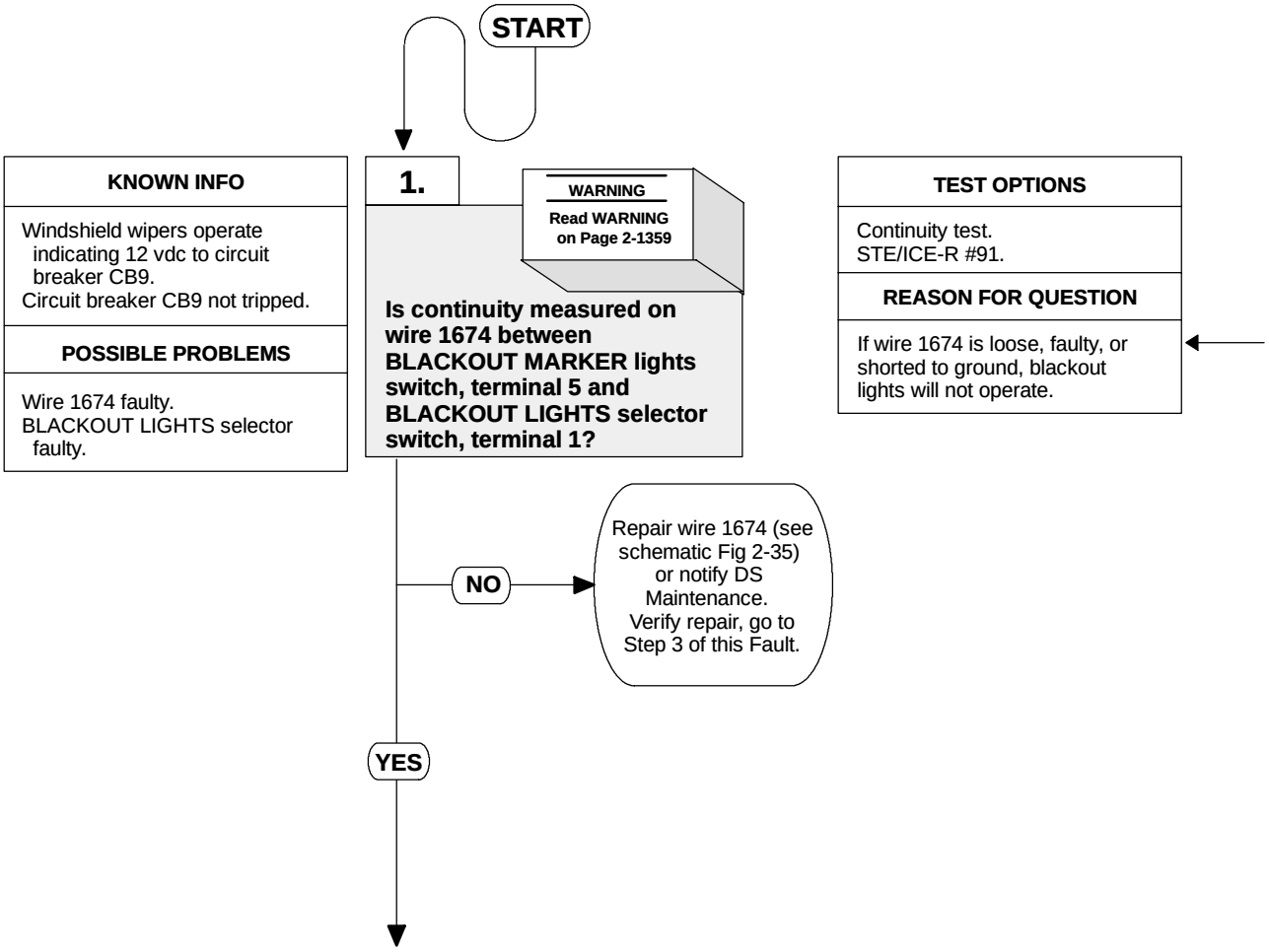
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Preformed Packing (Item 223, Appendix F)

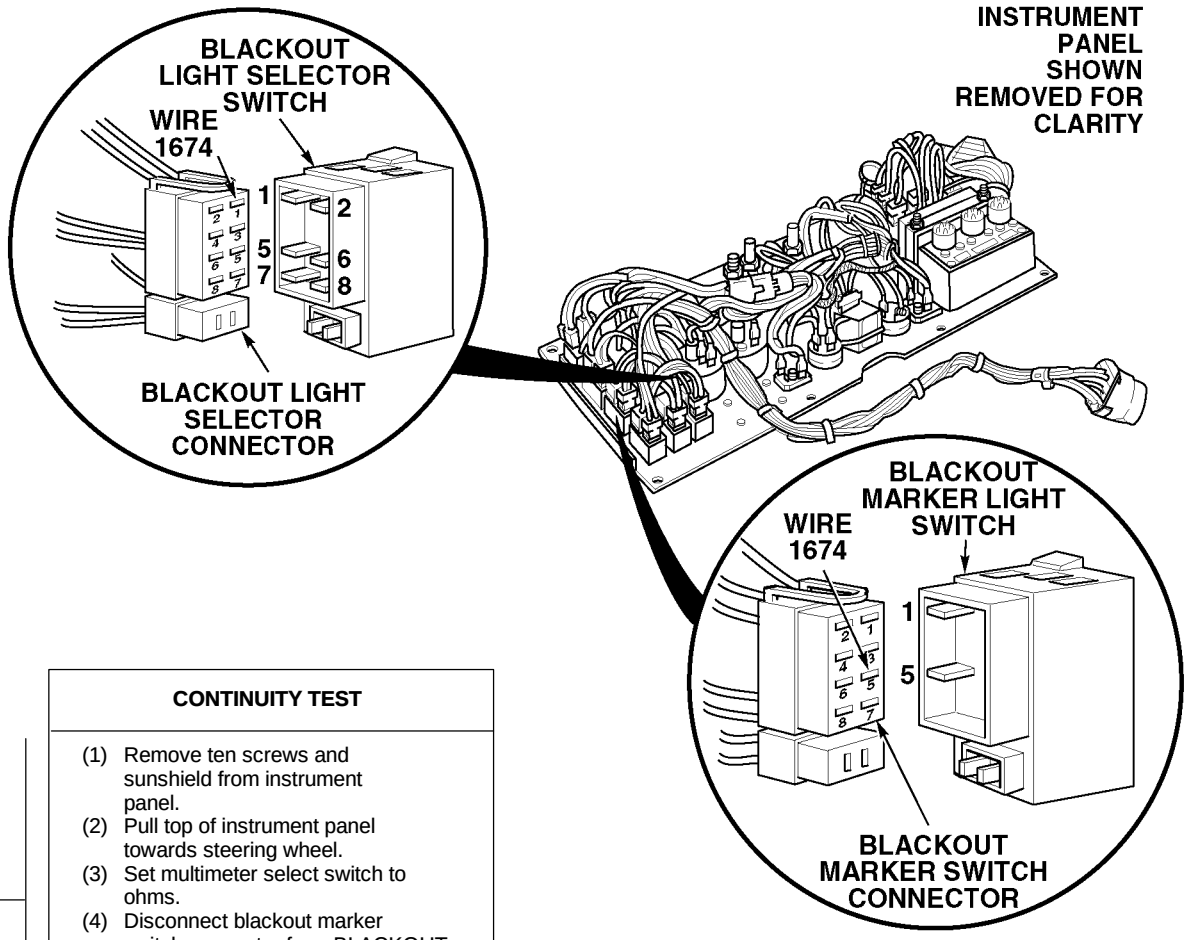
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



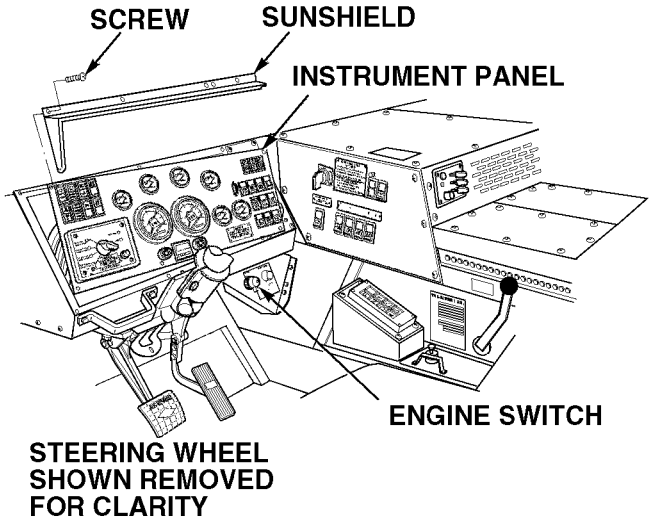
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

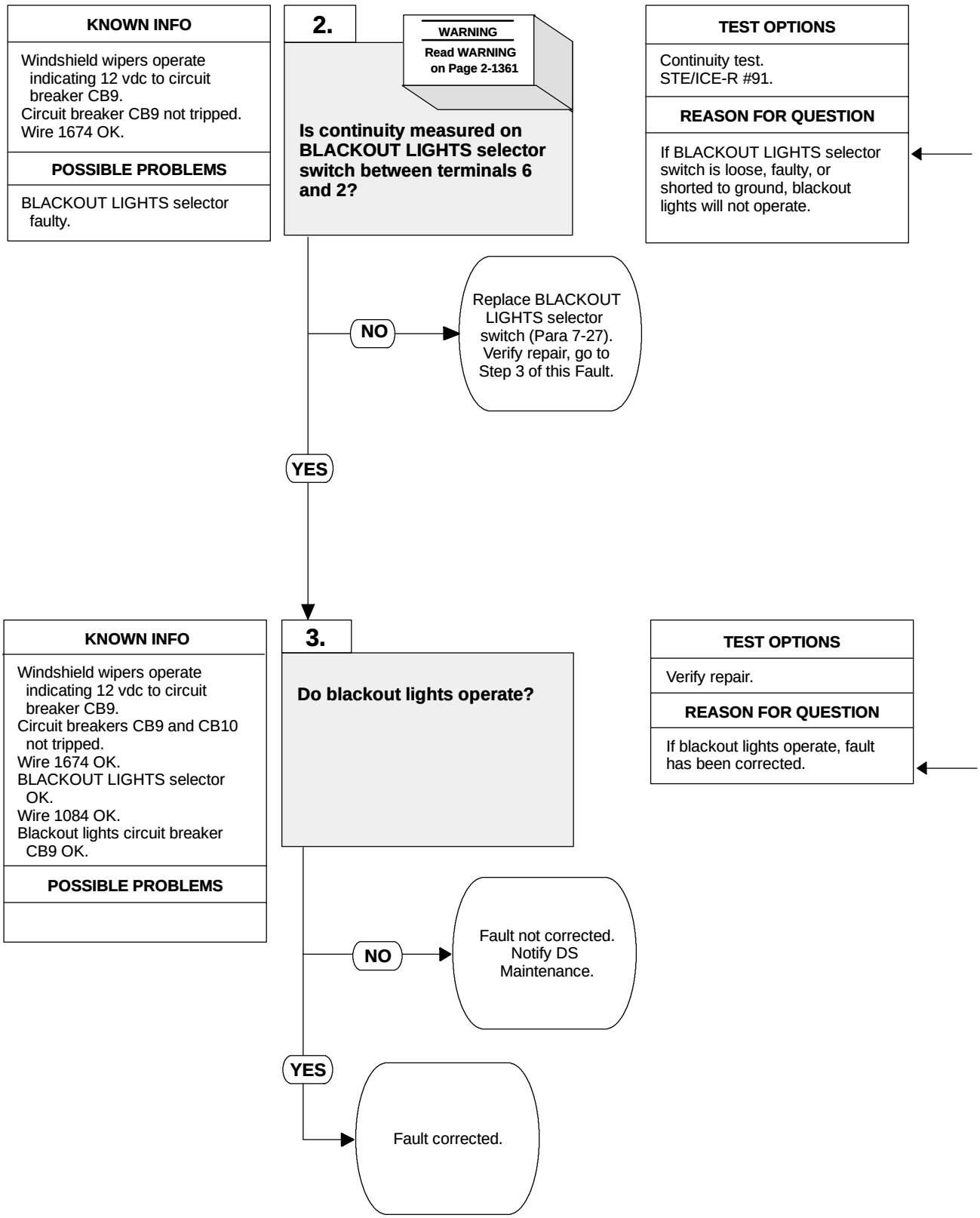


CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Set multimeter select switch to ohms.
(4) Disconnect blackout marker switch connector from BLACKOUT MARKER light switch.
(5) Disconnect BLACKOUT LIGHT selector connector from BLACKOUT LIGHT selector switch.
(6) Is there continuity between BLACKOUT LIGHT selector switch connector, terminal 1 and BLACKOUT MARKER light switch connector, terminal 5?
  (a) If there is no continuity, repair wire 1674 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If there is continuity, wire 1674 is OK.
(7) Connect blackout marker switch connector to BLACKOUT MARKER light switch.



23. ALL BLACKOUT LIGHTS DO NOT OPERATE (CONT).



WARNING

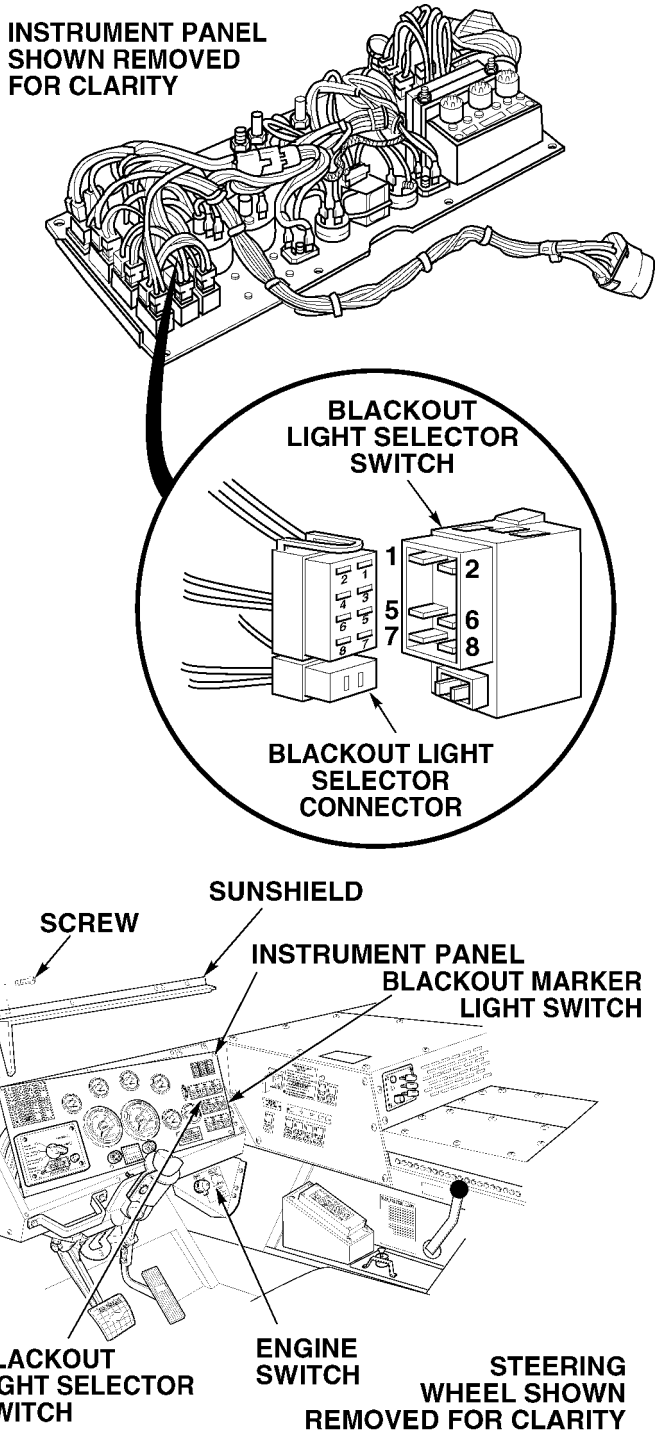
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

CONTINUITY TEST

(1) Turn on blackout light selector switch (TM 9-2320-364-10).
(2) Is there continuity measured between blackout light selector switch, terminals 2 and 6?
  (a) If there is no continuity, replace BLACKOUT LIGHT selector switch (Para 7-27).
  (b) If there is continuity, BLACKOUT LIGHT selector switch is OK.
(3) Connect blackout light selector switch and connector.
(4) Install instrument panel and sunshield with ten screws.

VERIFY REPAIR

(1) Turn on BLACKOUT MARKER light switch (TM 9-2320-364-10).
(2) Turn ON ENGINE switch.
(3) Observe all blackout lights.
  (a) If all blackout lights do not operate, fault not corrected. Perform Steps (4) through (6) below and notify DS Maintenance.
  (b) If all blackout lights operate, fault has been corrected.
(4) Turn off BLACKOUT LIGHT selector switch.
(5) Turn off BLACKOUT MARKER light switch.
(6) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

24. BLACKOUT DRIVE LIGHT DOES NOT OPERATE.

INITIAL SETUP

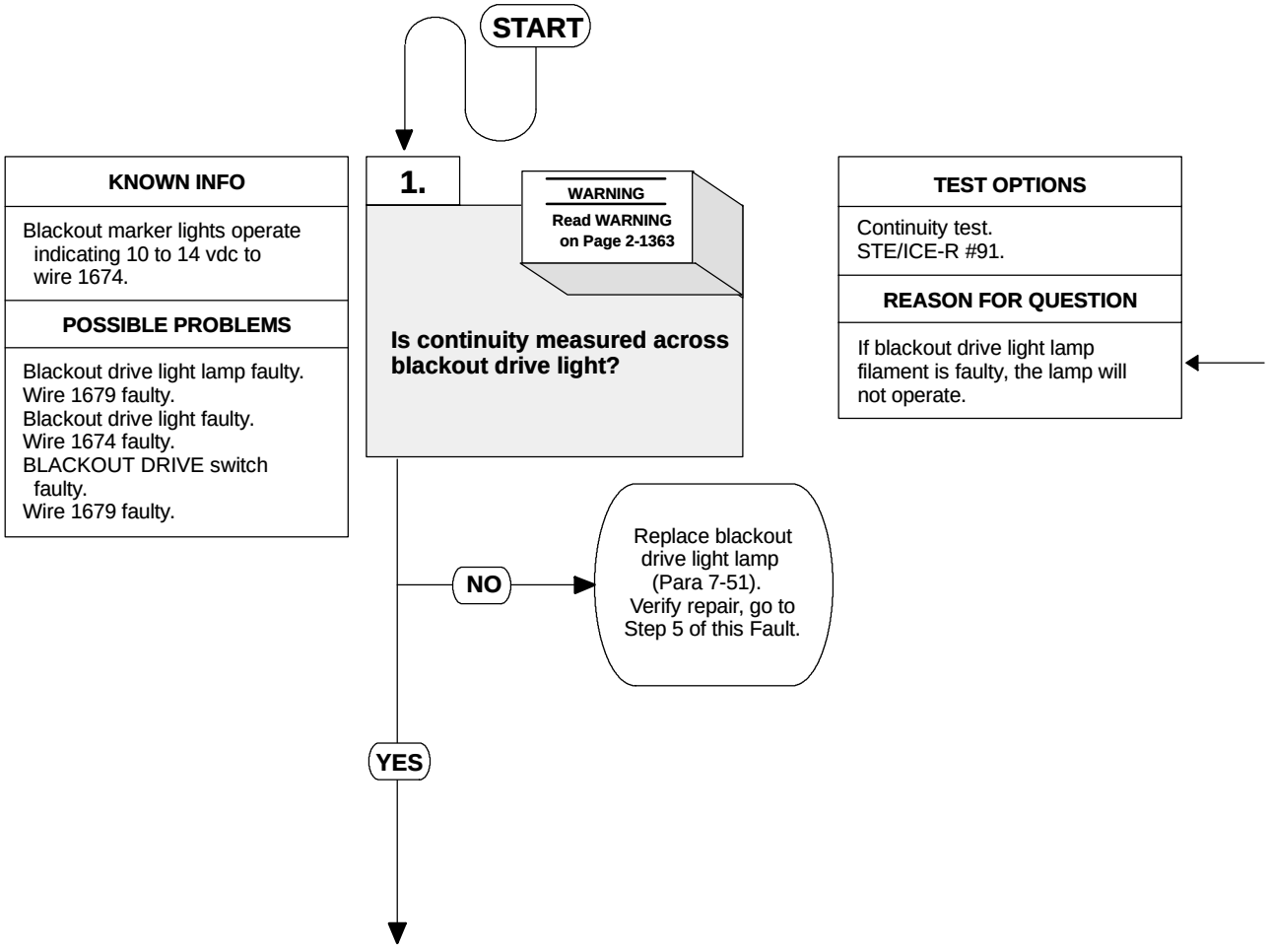
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

Model A, bulb type, or Model B, LED type, blackout drive light may be installed on vehicle.
If Model B, LED type is installed, go to Step 2 of this Fault.
Model B is not repairable.

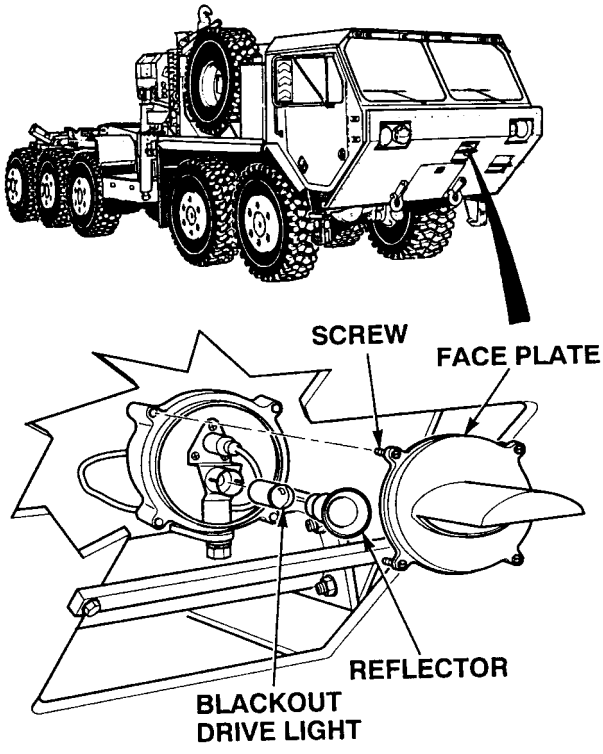


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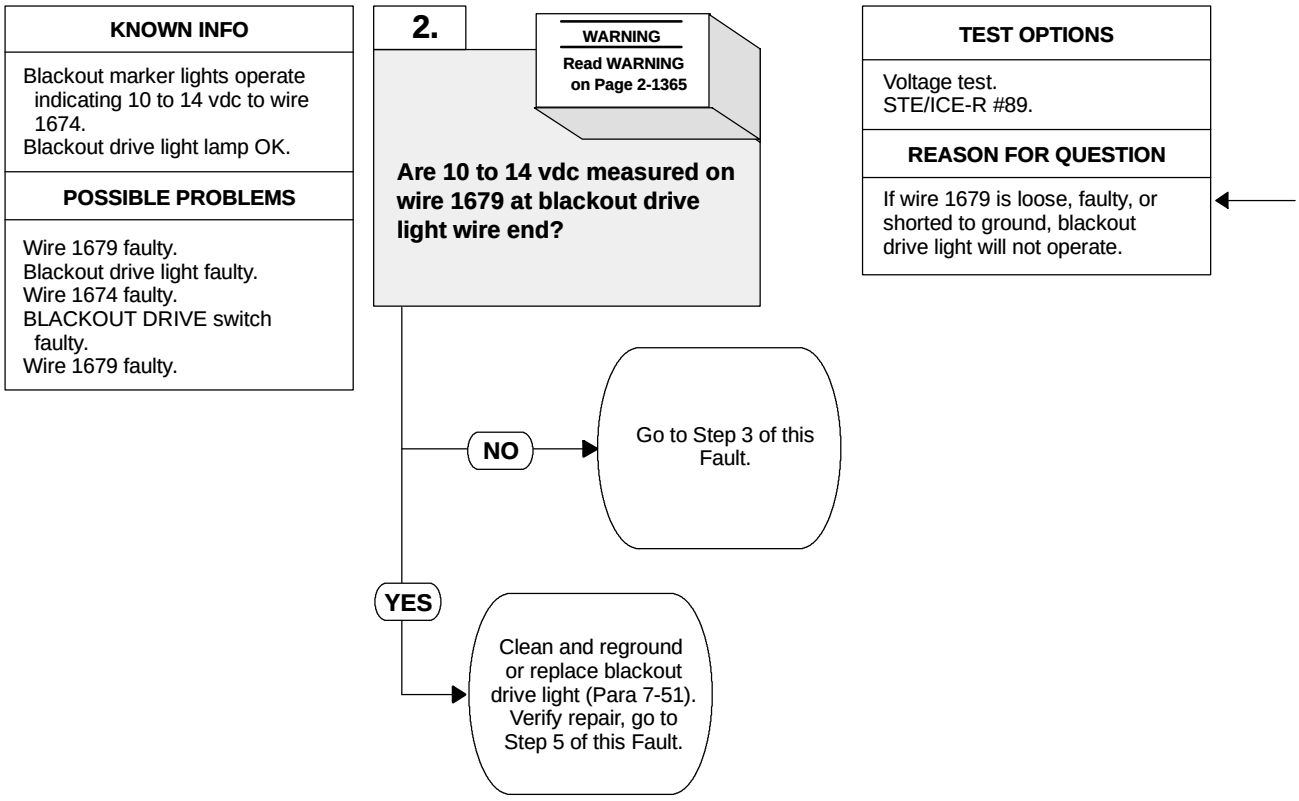
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Loosen four screws and remove blackout drive light face plate.
(2) Remove reflector and lamp.
(3) Set multimeter select switch to ohms.
(4) Is continuity measured across drive light lamp?
    (a) If continuity is not measured across lamp, replace lamp and install face plate (Para 7-51).
    (b) If continuity is measured, lamp is OK, perform Step (5) below and go to Step 2 of this Fault.
(5) Install lamp, reflector, face plate and tighten four screws.



24. BLACKOUT DRIVE LIGHT DOES NOT OPERATE (CONT).

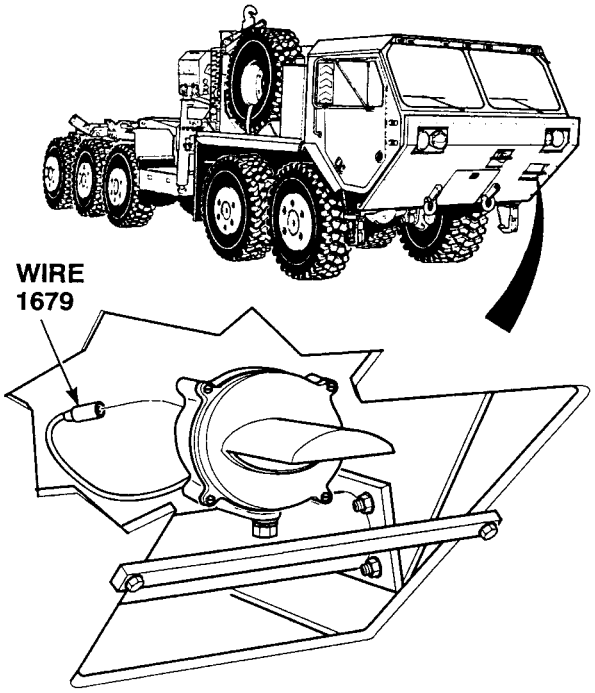


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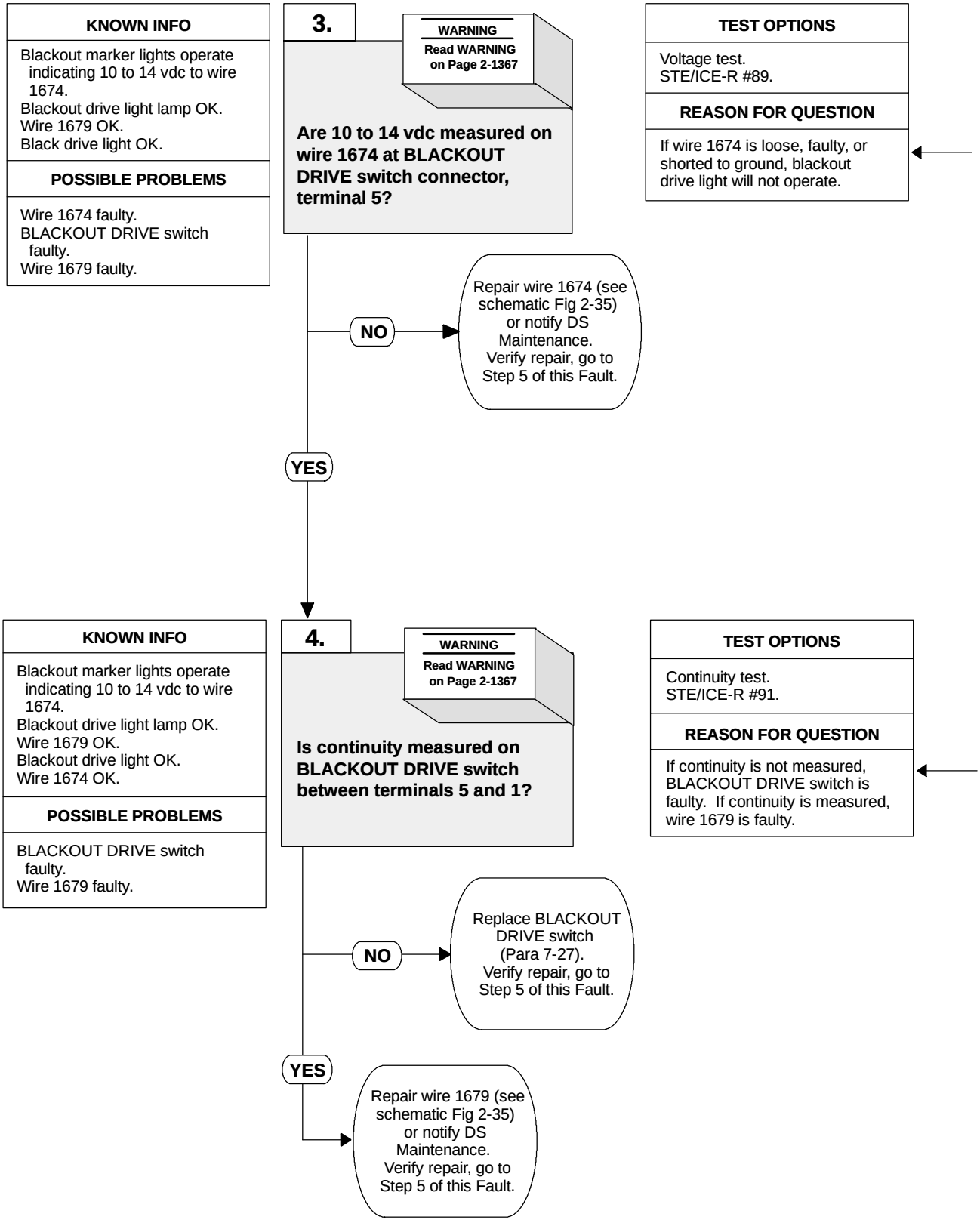
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Disconnect wire 1679 from blackout drive light.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to harness connector wire 1679 blackout drive light end.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON BLACKOUT LIGHTS selector switch (TM 9-2320-364-10).
(6) Turn ON BLACKOUT DRIVE switch.
(7) Turn ON ENGINE switch.
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 4 of this Fault.
    (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and replace blackout drive light (Para 7-51).



24. BLACKOUT DRIVE LIGHT DOES NOT OPERATE (CONT).

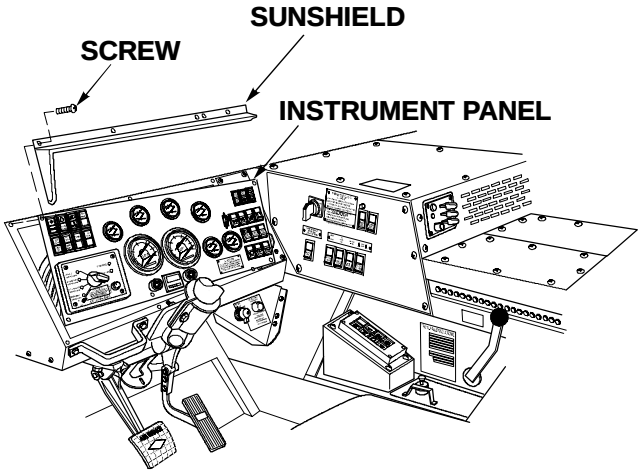


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

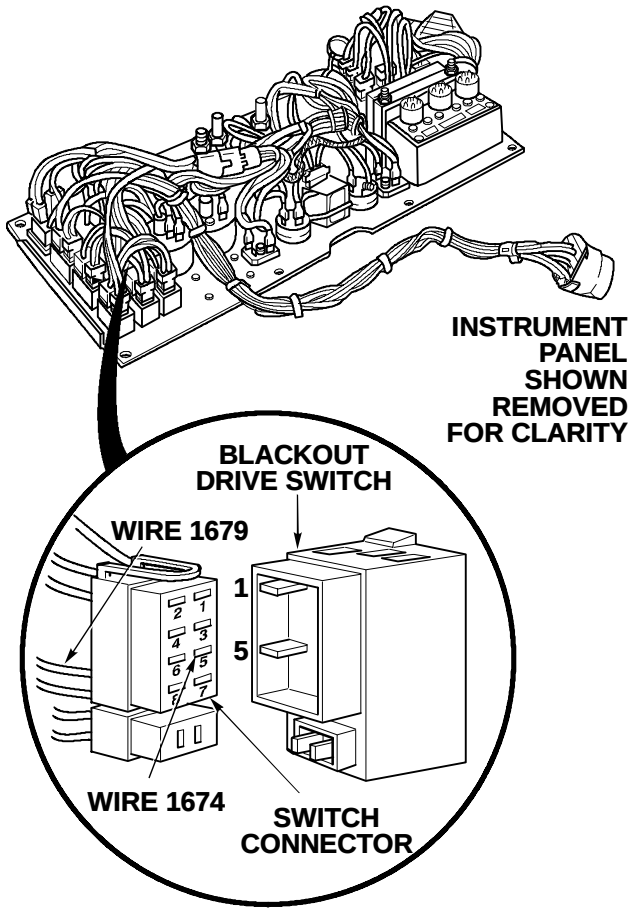
VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect BLACKOUT DRIVE switch connector from BLACKOUT DRIVE switch.
(4) Connect positive (+) multimeter lead to wire 1674 at BLACKOUT DRIVE switch, terminal 5.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1674 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1674 is OK.
(7) Turn OFF ENGINE switch.

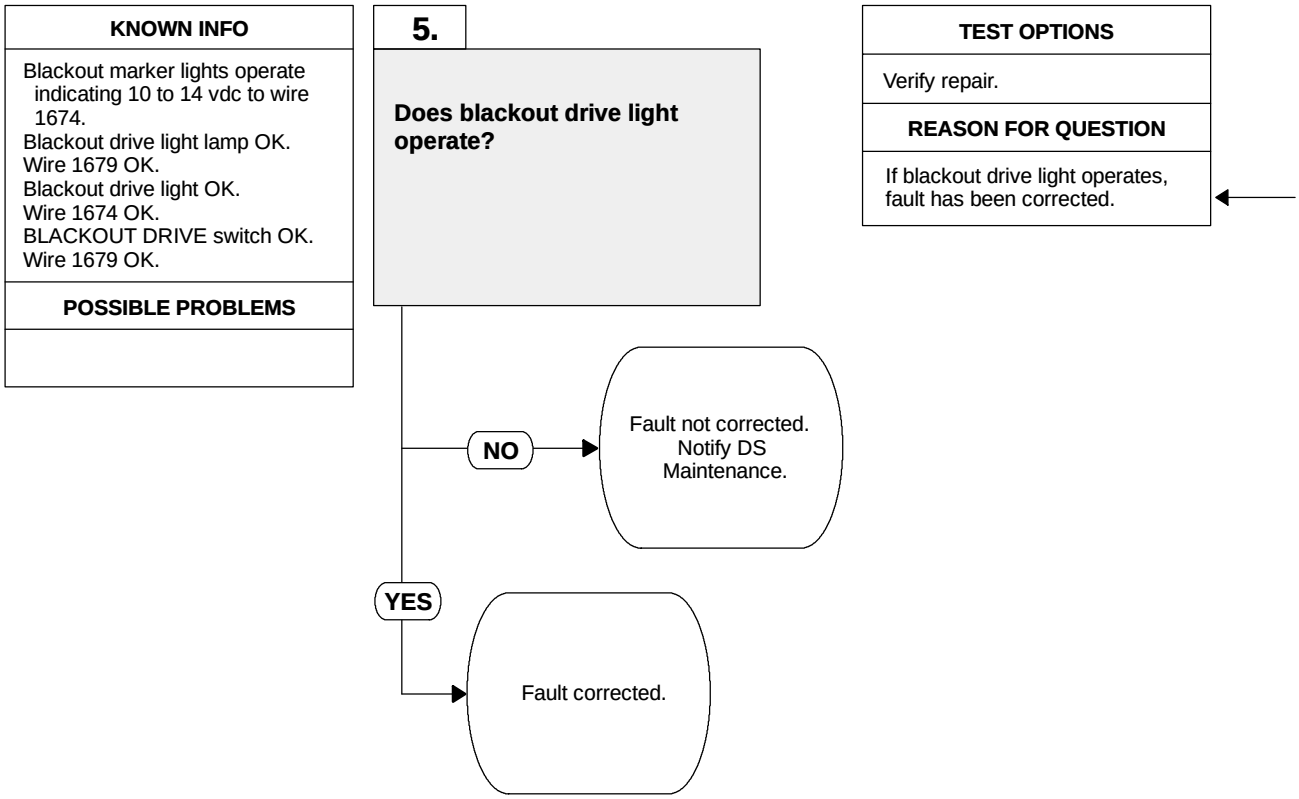


CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is continuity measured between BLACKOUT DRIVE switch, terminals 5 and 1?
  (a) If there is no continuity, replace BLACKOUT DRIVE switch (Para 7-27).
  (b) If there is continuity, repair wire 1679 (see schematic Fig 2-35) or notify DS Maintenance.
(3) Connect BLACKOUT DRIVE switch connector to BLACKOUT DRIVE switch.
(4) Install instrument panel and sunshield with ten screws.
(5) Install lamp and reflector.
(6) Install face plate and tighten four screws.
(7) Connect wire 1679 to blackout drive light lead wire 19.

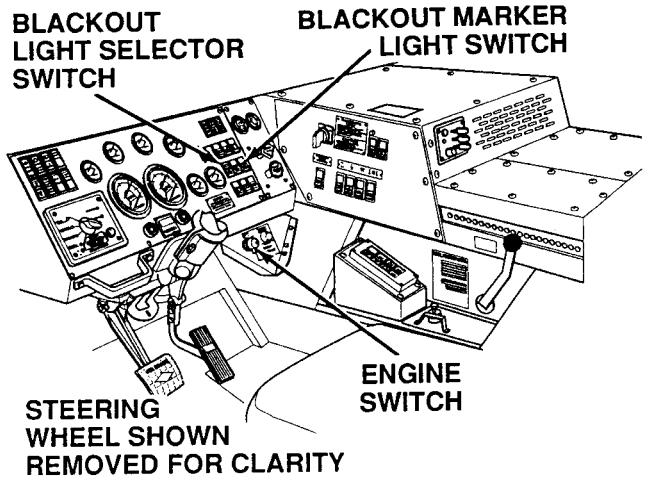


24. BLACKOUT DRIVE LIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Observe blackout drive light.
  (a) If blackout drive light does not operate, fault not corrected. Perform Steps (3) through (5) below and notify DS Maintenance.
  (b) If blackout drive light operates, fault has been corrected.
(3) Turn OFF ENGINE switch.
(4) Turn off BLACKOUT DRIVE switch.
(5) Turn off BLACKOUT LIGHTS selector switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

25. BLACKOUT STOPLIGHTS DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Preformed Packing (Item 223, Appendix F)

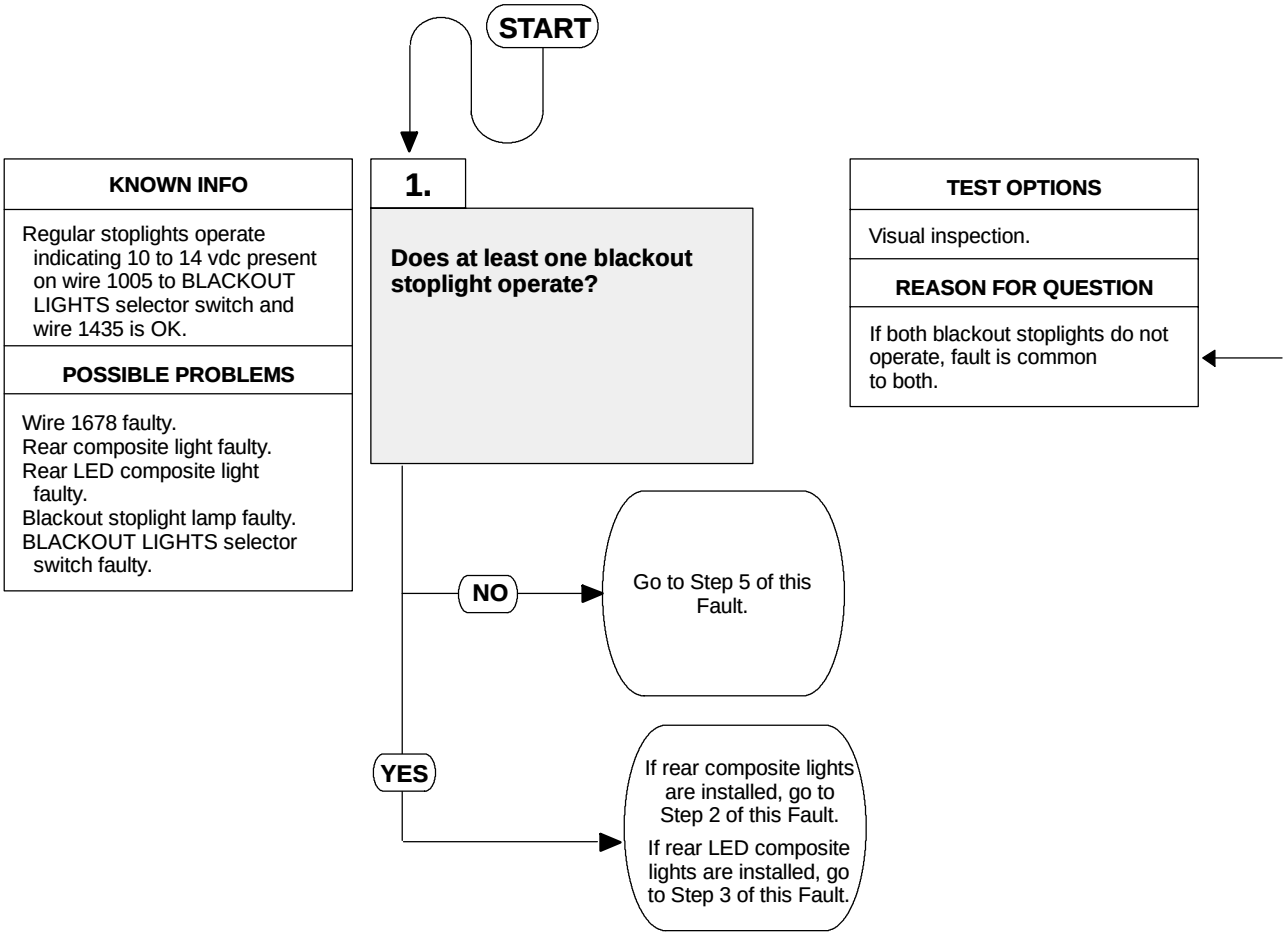
Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

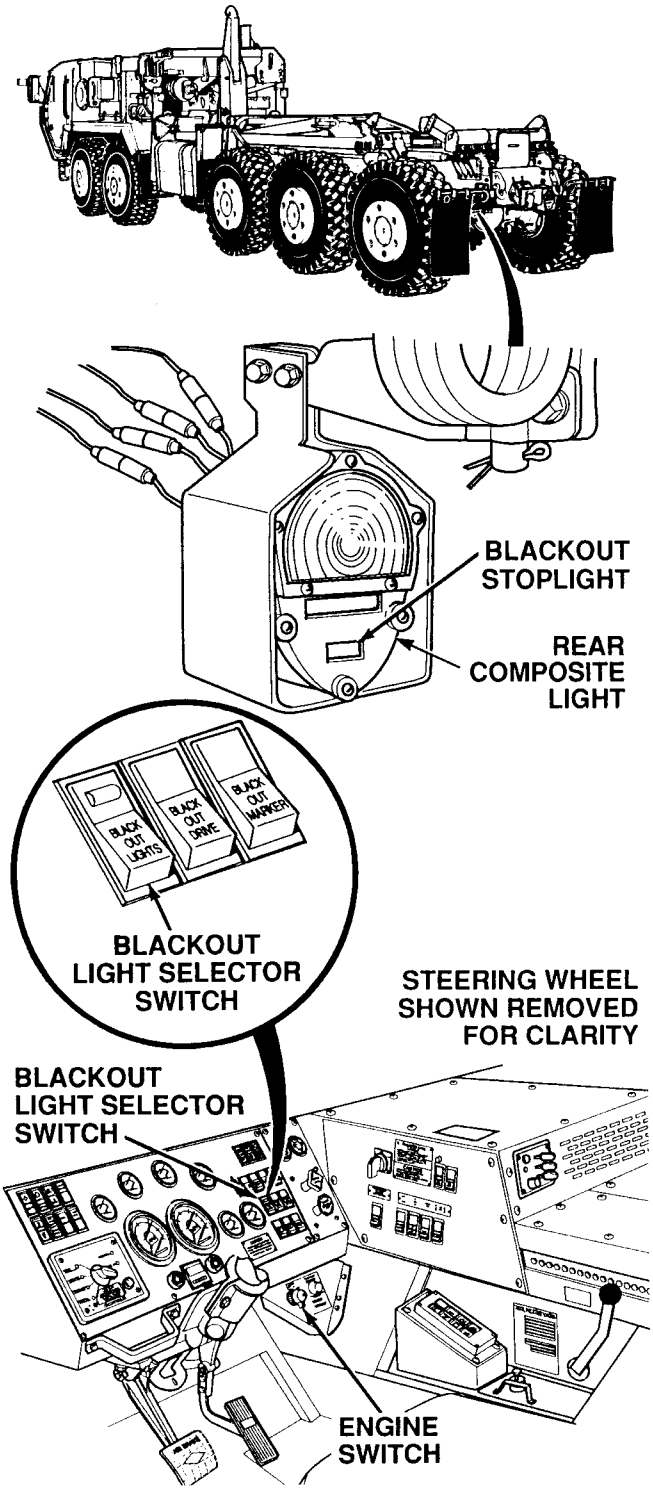
NOTE

Truck may be equipped with rear composite lights or rear LED composite lights.

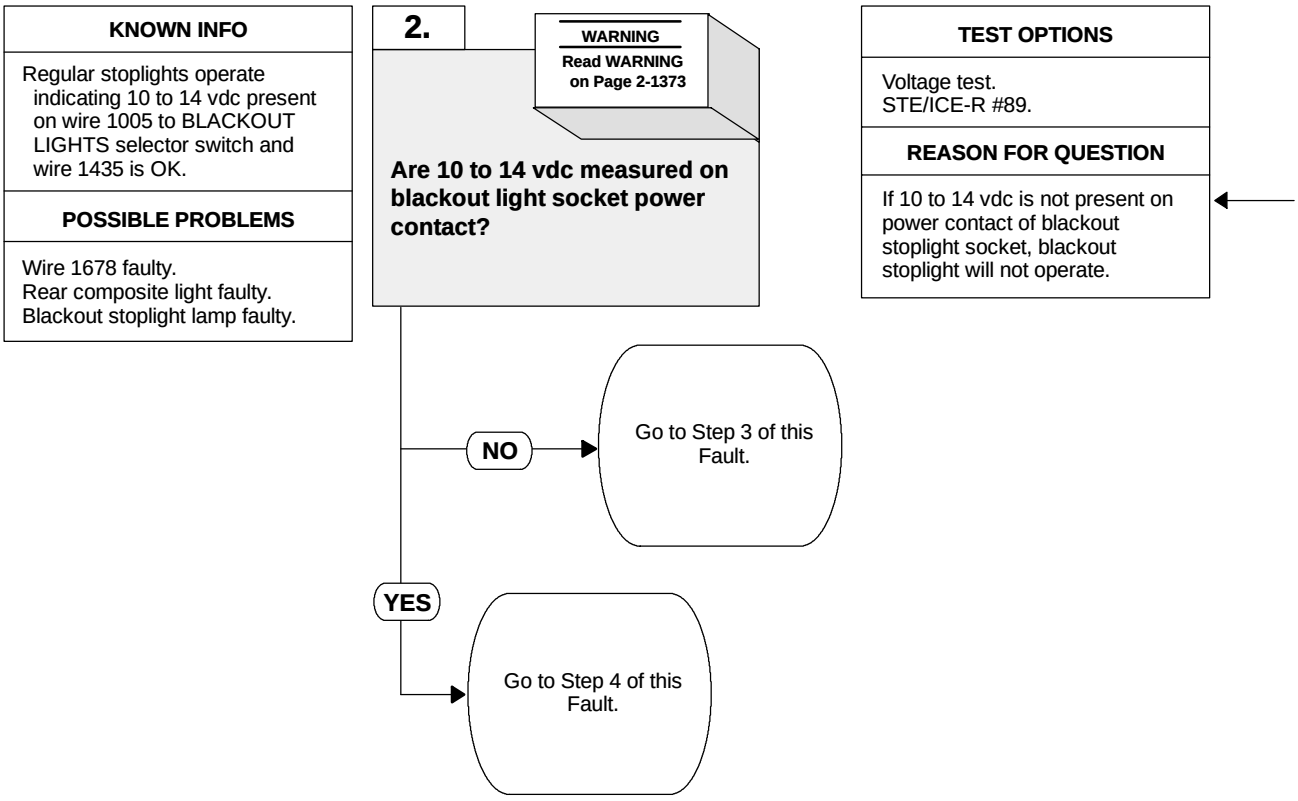


VISUAL INSPECTION

(1) Start engine and build air pressure to 125 psi (861 kPa) (TM 9-2320-364-10).
(2) Turn on BLACKOUT LIGHTS selector switch.
(3) While assistant applies brake pedal, observe blackout stoplights operation.
  (a) If both blackout stoplights fail to operate, fault is between blackout service select switch and connector MC78, terminal B. Perform Steps (4) and (5) below and go to Step 5 of this Fault.
  (b) If rear composite lights are installed and one of the blackout stoplights operates, perform Steps (4) and (5) below and go to Step 2 of this Fault.
  (c) If rear LED composite lights are installed and one of the blackout stoplights operates, perform Steps (4) and (5) below and go to Step 3 of this Fault.
(4) Release brake pedal.
(5) Turn OFF ENGINE switch.



25. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

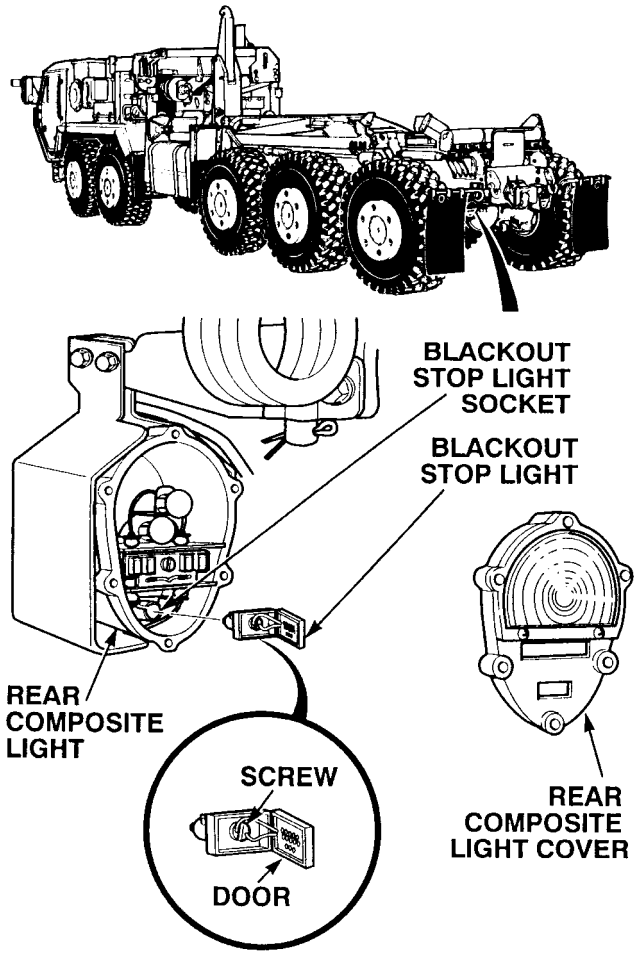


WARNING

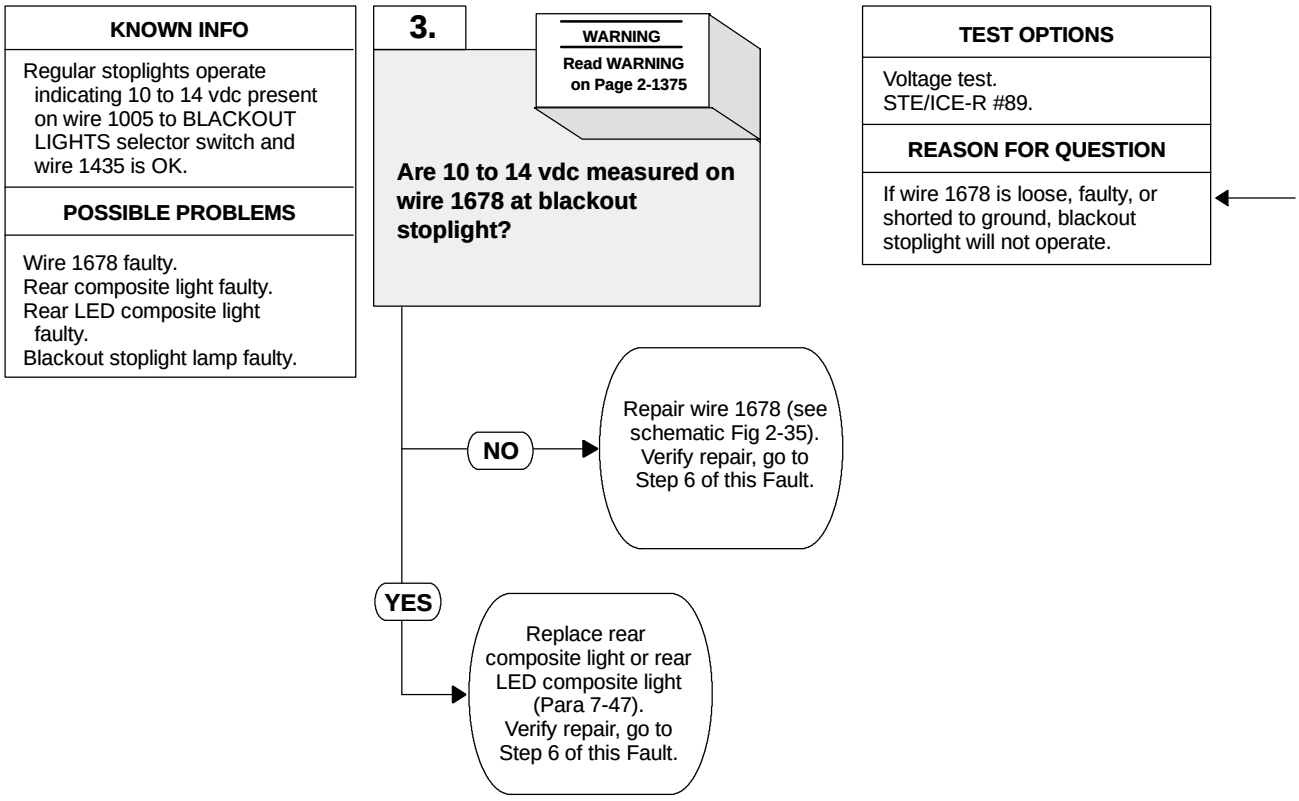
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Loosen six screws and remove rear composite light cover and preformed packing. Discard preformed packing.
(2) Open blackout lamp door on blackout brake lamp.
(3) Push in blackout brake lamp base screw and rotate counterclockwise. Remove blackout brake lamp from composite light housing.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to socket power contact of blackout stoplight lamp socket.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
(8) While assistant applies brake pedal, observe multimeter.
    (a) If 10 to 14 vdc are not present, perform Steps (9) through (13) below and go to Step 3 of this Fault.
    (b) If 10 to 14 vdc are present, perform Steps (9) and (10) below and go to Step 4 of this Fault.
(9) Release brake pedal.
(10) Turn OFF ENGINE switch.
(11) Install blackout brake lamp in composite light housing. Push in blackout brake lamp base screw and rotate clockwise.
(12) Close cover on blackout brake lamp.
(13) Install rear composite light cover, preformed packing and six screws.

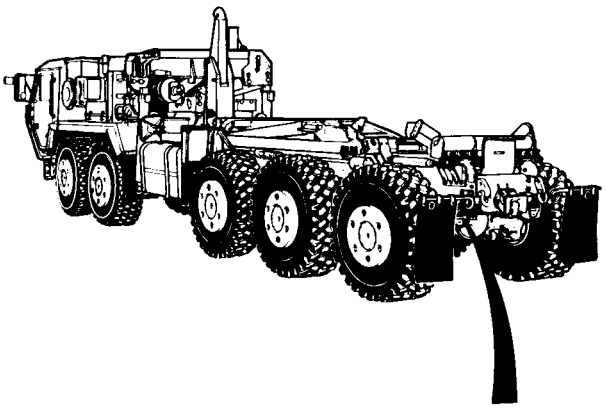


25. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).



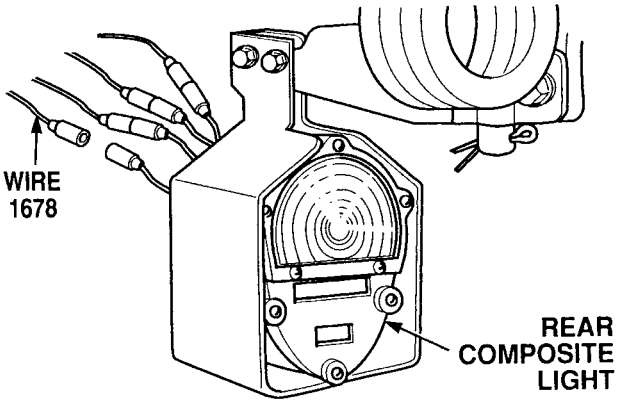
WARNING

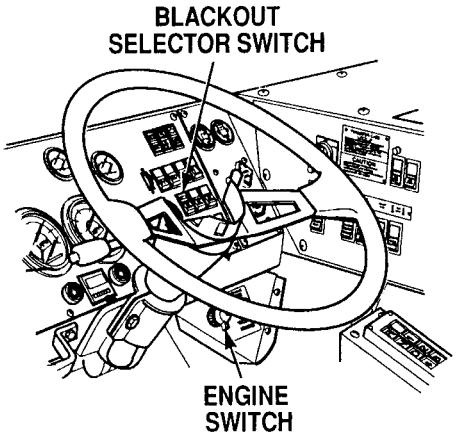
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



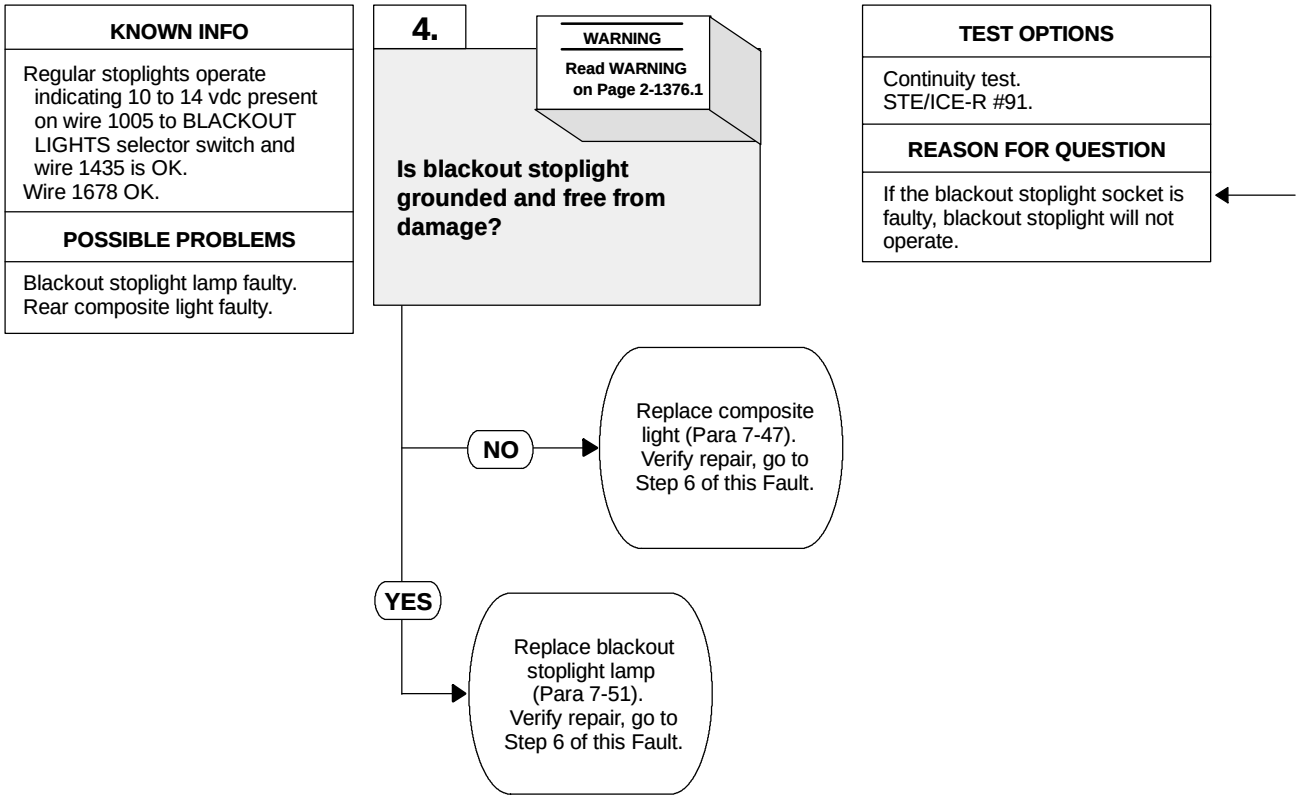
VOLTAGE TEST

(1) Pull wire out back of bracket area to expose four connectors.
(2) Disconnect wire 1678.
(3) Connect positive (+) multimeter lead to wire 1678.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) While assistant fully applies brake pedal, observe multimeter.
    (a) If 10 to 14 vdc are not present, perform Steps (7) through (9) below and repair wire 1678 (see schematic Fig 2-35).
    (b) If 10 to 14 vdc are present, perform Steps (7) through (9) below and replace rear composite light or rear LED composite light (Para 7-47).
(7) Release brake pedal.
(8) Turn off BLACKOUT LIGHTS selector switch.
(9) Turn OFF ENGINE switch.





25. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

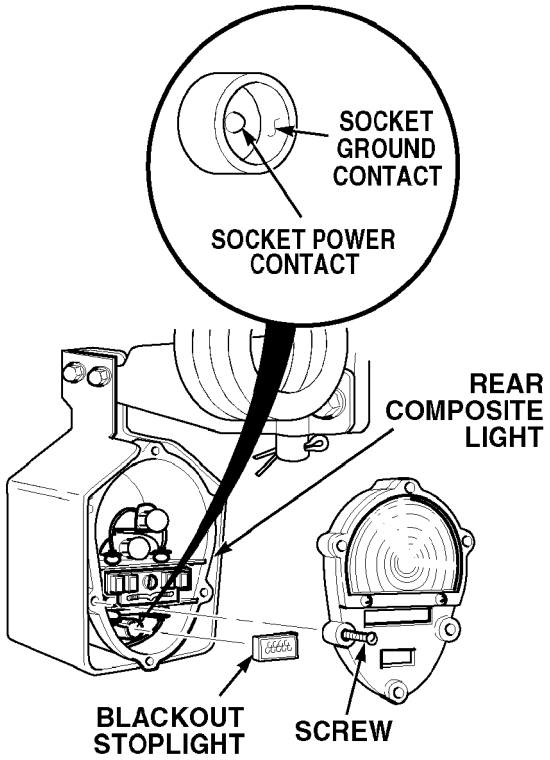


WARNING

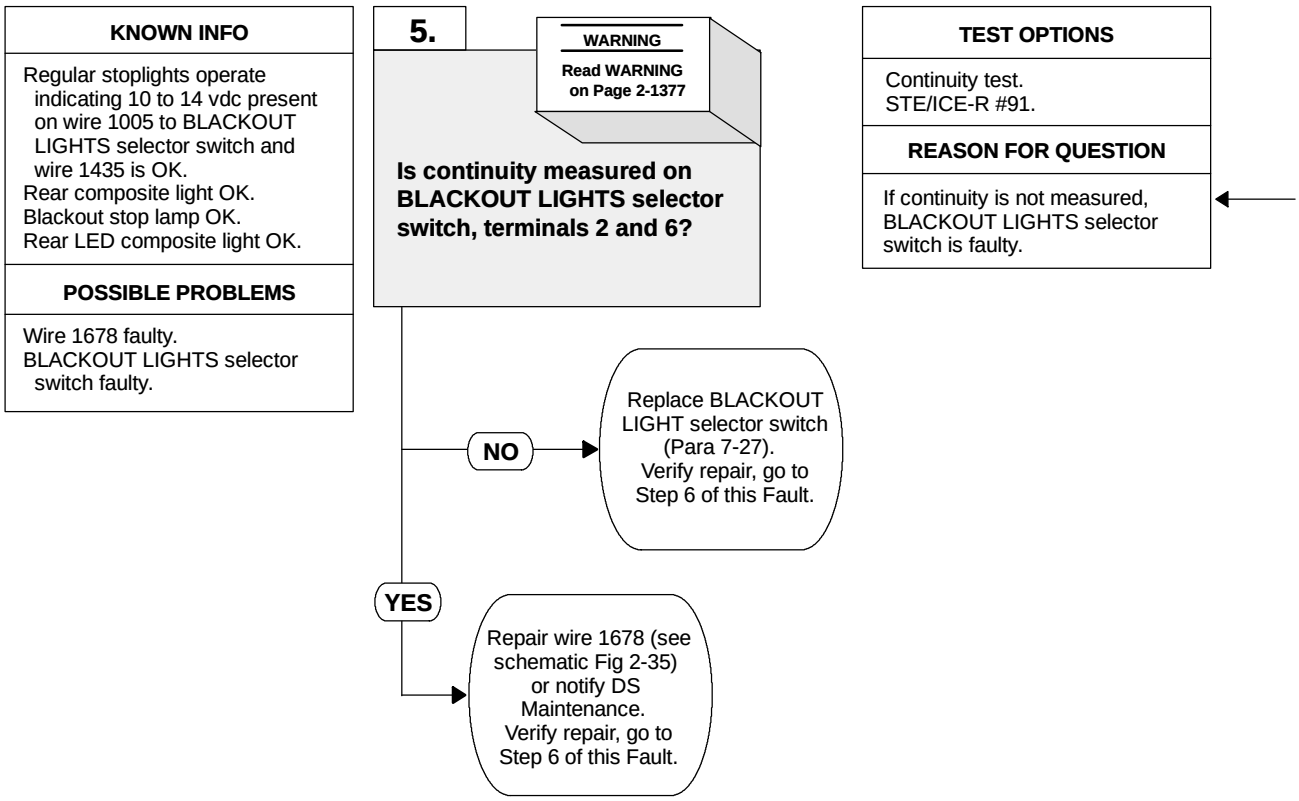
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between blackout stoplight socket ground contact and a known good ground?
  (a) If there is no continuity, replace rear composite light (Para 7-47).
  (b) If there is continuity, replace blackout stoplight lamp (Para 7-51).
(3) Install blackout brake lamp into housing.
(4) Push in and rotate brake lamp screw clockwise to secure lamp in composite light housing.
(5) Close cover on blackout brake lamp.
(6) Install composite light cover, preformed packing and six screws.
(7) Position four connectors and wire into back of bracket area.



25. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).

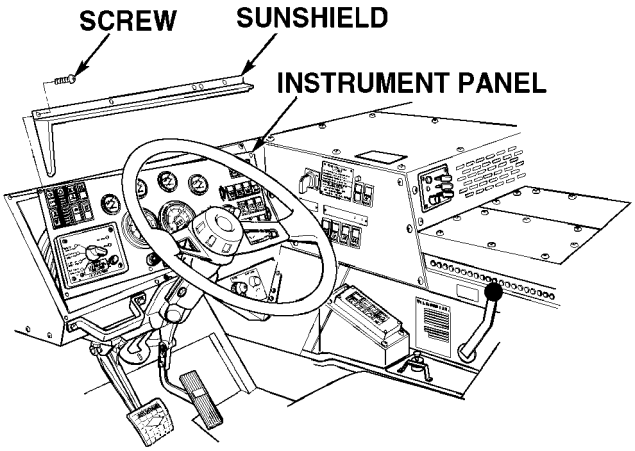


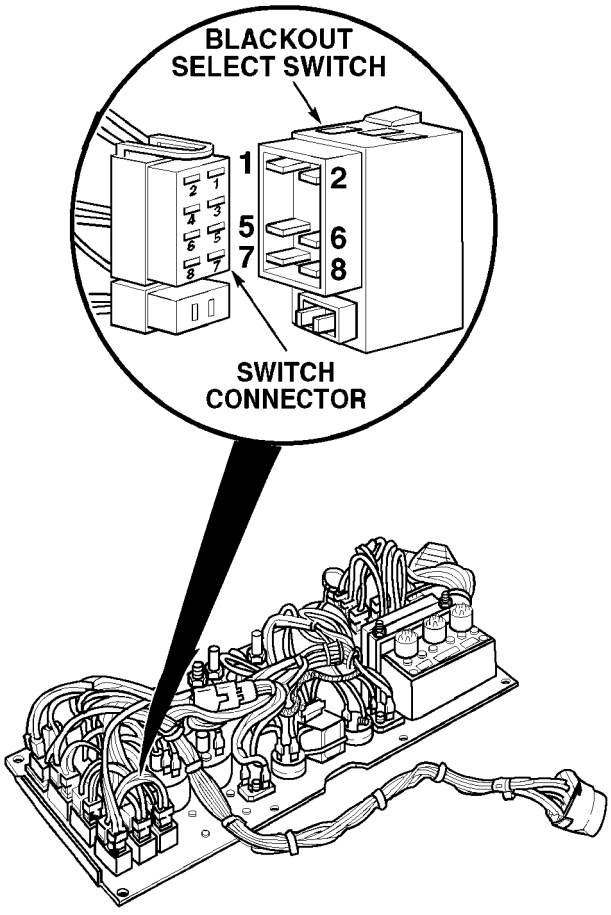
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

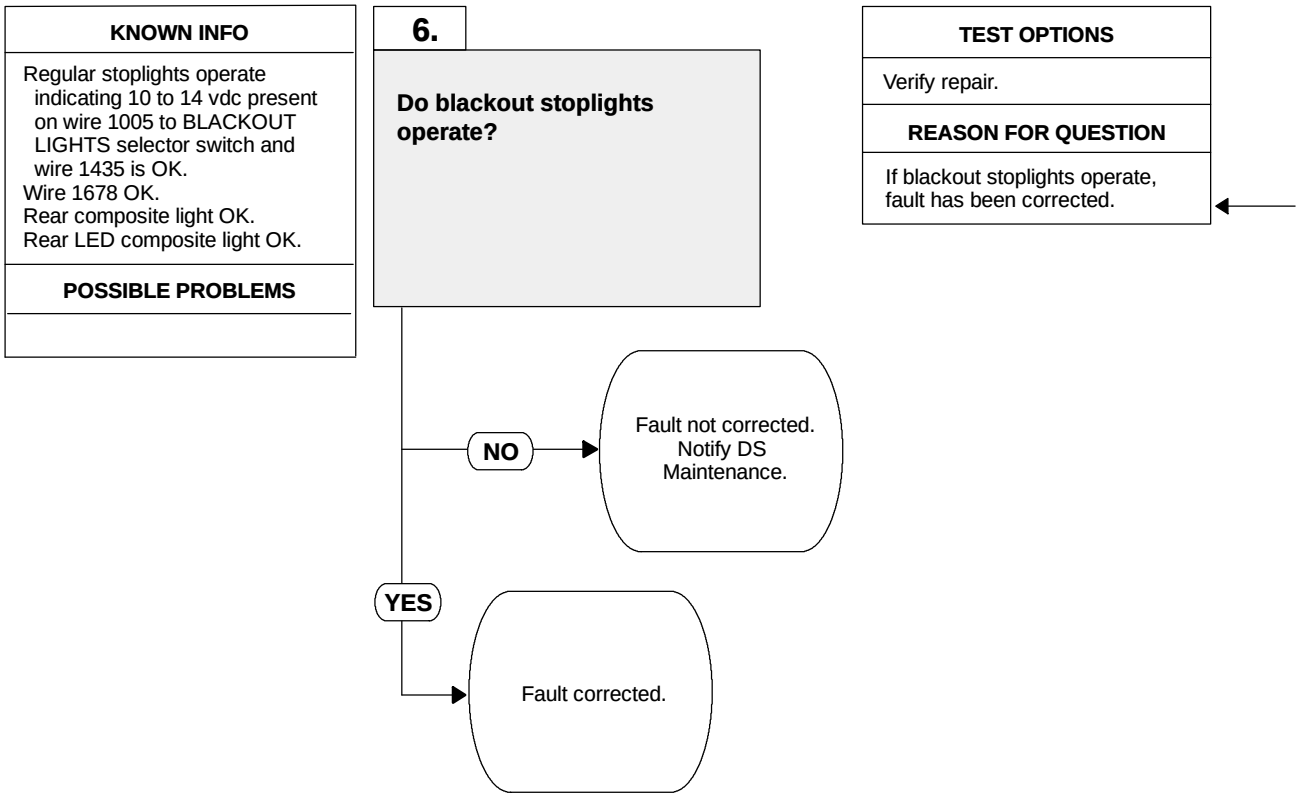
CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect BLACKOUT LIGHT selector connector from BLACKOUT LIGHT selector switch.
(4) Turn on BLACKOUT LIGHT selector switch.
(5) Is there continuity between BLACKOUT LIGHT selector switch, terminals 2 and 6?
    (a) If there is no continuity, replace BLACKOUT LIGHT selector switch (Para 7-27).
    (b) If there is continuity, repair wire 1678 (see schematic Fig 2-35).
(6) Connect blackout marker switch connector to BLACKOUT MARKER light switch.
(7) Install instrument panel and sunshield with ten screws.



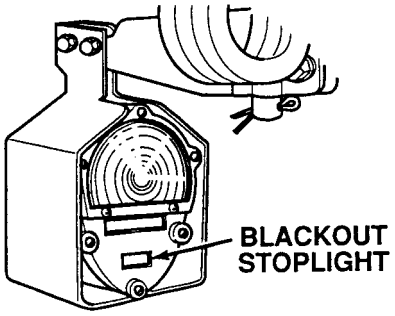


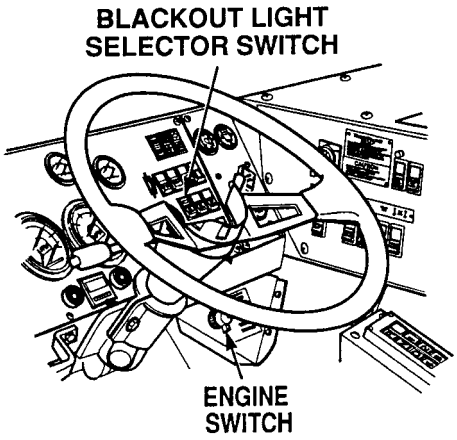
25. BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Turn on BLACKOUT LIGHTS selector switch.
(3) While assistant steps on brakes, observe blackout stoplights.
    (a) If blackout stoplights do not operate, fault not corrected. Perform Steps (4) and (5) below and notify DS Maintenance.
    (b) If blackout stoplights operate, fault has been corrected.
(4) Turn off BLACKOUT LIGHTS selector switch.
(5) Turn OFF ENGINE switch.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

26. REAR BLACKOUT CLEARANCE OR TAILLIGHT(S) DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

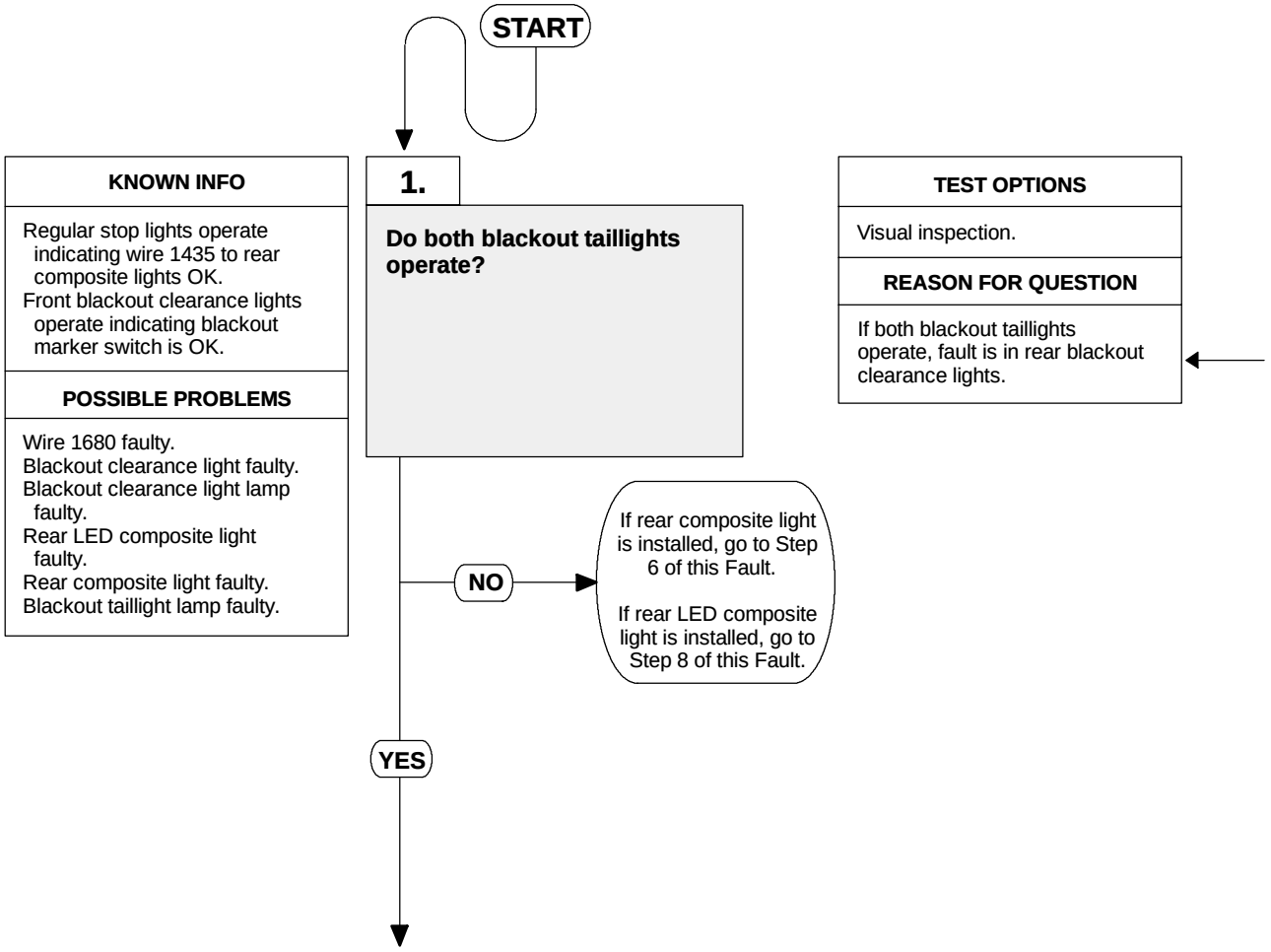
Materials/Parts
Preformed Packing (Item 223, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

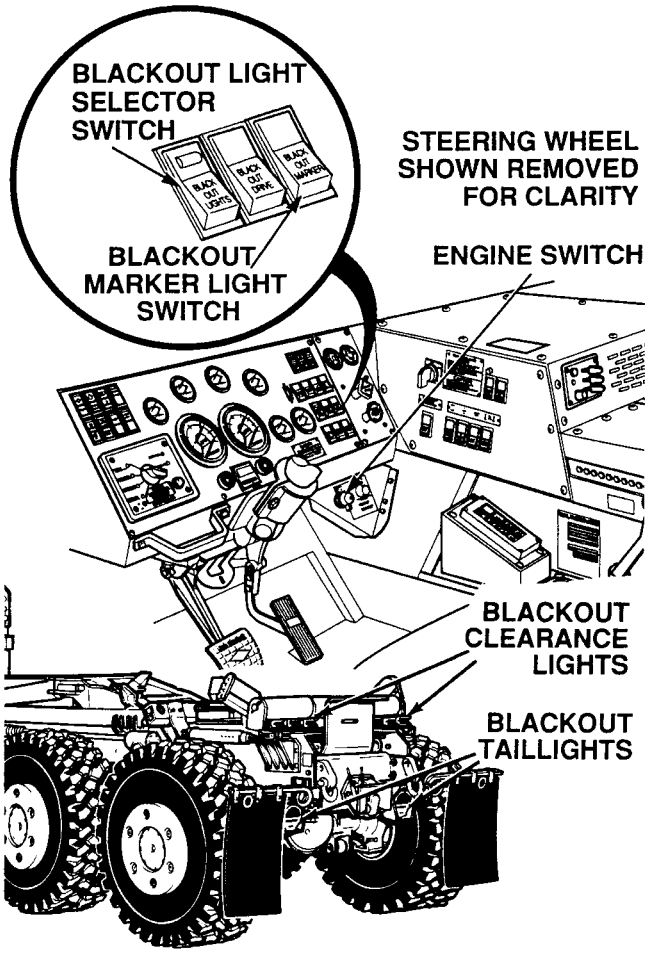
- Truck may or may not be equipped with blackout clearance lights.
- Truck may be equipped with rear composite lights or rear LED composite lights.



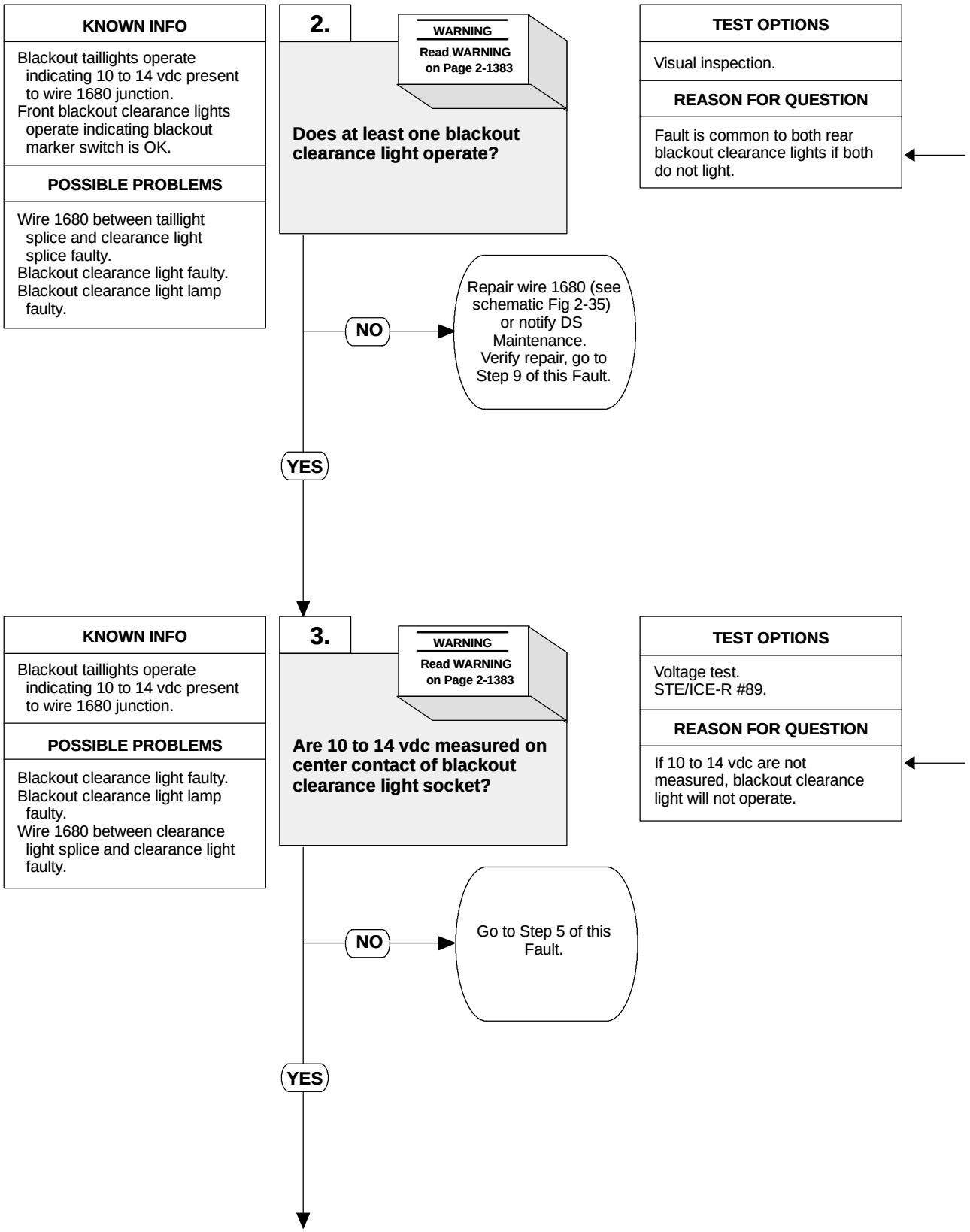
NOTE

Truck may or may not be equipped with blackout clearance lights.

VISUAL INSPECTION
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Turn on BLACKOUT LIGHTS selector switch. (3) Turn on BLACKOUT MARKER lights switch. (4) Observe rear blackout clearance and taillights. (a) If both blackout taillights do not operate, turn OFF ENGINE switch and go to Step 6 of this Fault. (b) If rear LED composite lights are installed and both blackout taillights do not operate, turn off ENGINE switch and go to Step 8 of this Fault. (c) If rear composite lights are installed and both blackout taillights operate, turn OFF ENGINE switch and go to Step 2 of this Fault.



26. REAR BLACKOUT CLEARANCE OR TAILLIGHT DOES NOT OPERATE (CONT).



WARNING

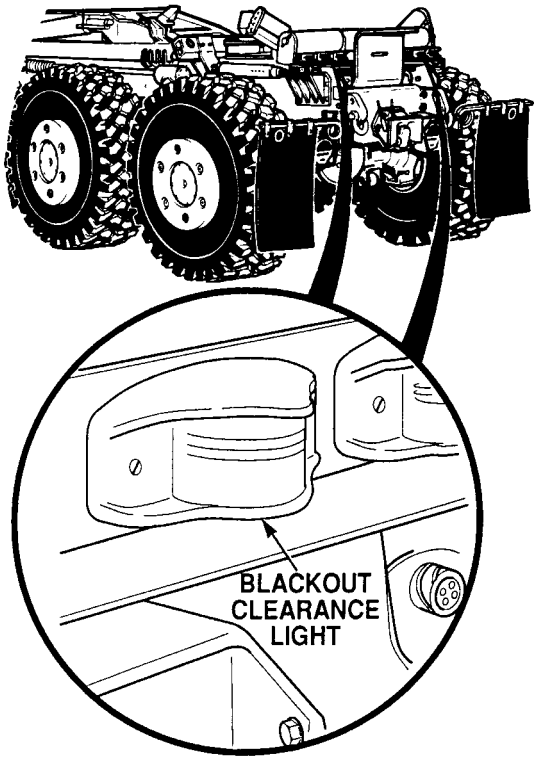
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Truck may or may not be equipped with blackout clearance lights.

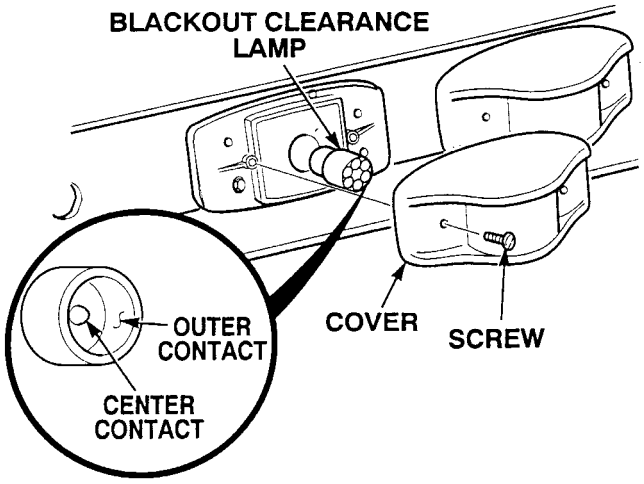
VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Observe blackout clearance lights.
  (a) If both clearance lights do not operate, turn OFF ENGINE switch and repair wire 1680 between taillight splice and clearance light splice (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If one clearance light does not operate, turn OFF ENGINE switch and go to Step 3 of this Fault.



VOLTAGE TEST

(1) Remove two screws, blackout clearance light cover and blackout clearance light lamp from blackout clearance light.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to center contact of clearance light lamp socket.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 5 of this fault.
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and go to Step 4 of this Fault.



26. REAR BLACKOUT CLEARANCE OR TAILLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO

10 to 14 vdc present to blackout clearance light lamp socket.

POSSIBLE PROBLEMS

Blackout clearance light faulty.
Blackout clearance light lamp faulty.

4.

WARNING
Read WARNING on Page 2-1385

Is continuity measured between outer contact of faulty blackout clearance light socket and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

Blackout clearance light will not operate if outer contact of socket is not grounded.

NO → Replace blackout clearance light (Para 7-53). Verify repair, go to Step 9 of this Fault.

YES → Replace blackout clearance light lamp (Para 7-53). Verify repair, go to Step 9 of this Fault.

KNOWN INFO

Blackout taillights operate indicating 10 to 14 vdc are present to wire 1680.
Blackout clearance light lamp grounded.

POSSIBLE PROBLEMS

Wire 1680 between clearance light splice and clearance light faulty.
Blackout clearance light faulty.

5.

WARNING
Read WARNING on Page 2-1385

Are 10 to 14 vdc measured on wire 1680 at blackout clearance light?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not measured, blackout clearance light will not operate.

NO → Repair wire 1680 (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

YES → Replace blackout clearance light (Para 7-51). Verify repair, go to Step 9 of this Fault.

WARNING

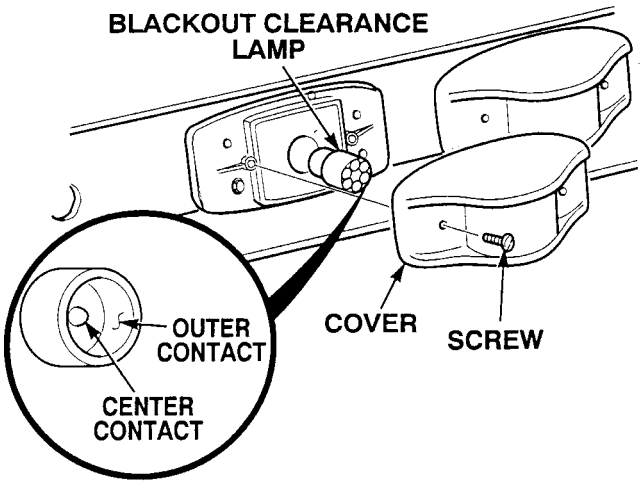
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Truck may or may not be equipped with blackout clearance lights.

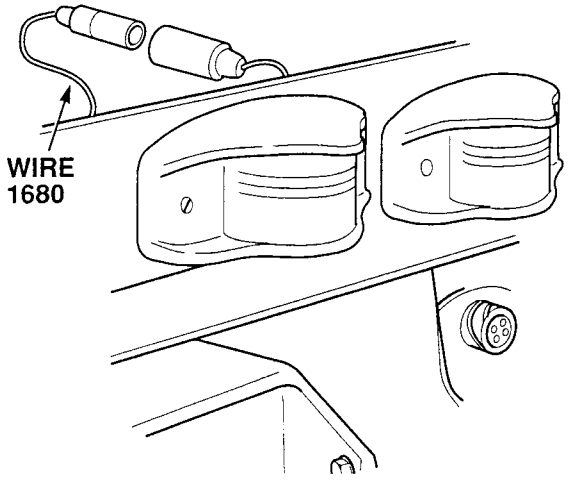
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between outer contact of blackout clearance light socket and a known good ground?
  (a) If there is no continuity, replace blackout clearance light (Para 7-53).
  (b) If there is continuity, replace blackout clearance light lamp (Para 7-53).

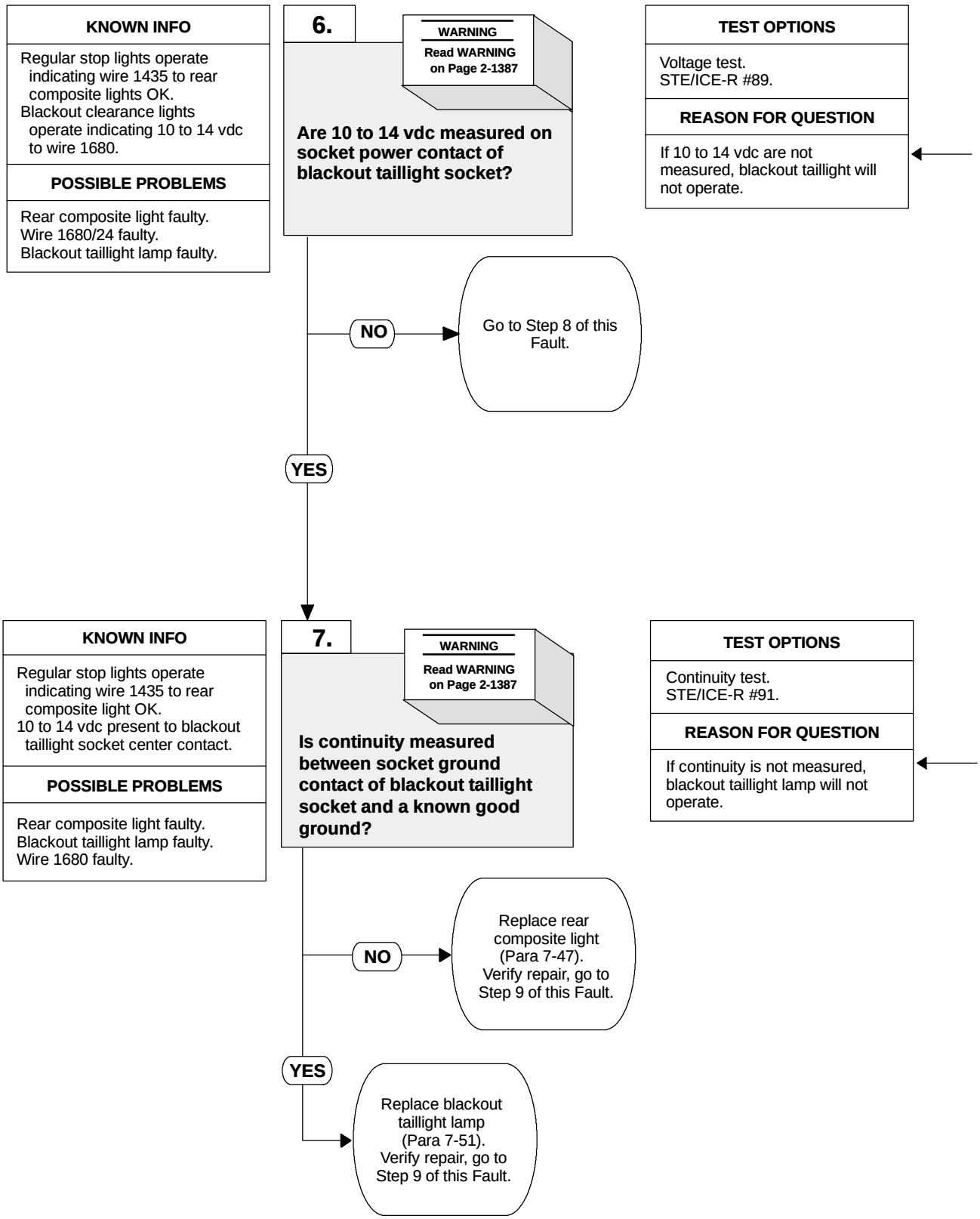


VOLTAGE TEST

(1) Disconnect wire 1680 at chassis harness connector.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire at chassis harness connector.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1680 between clearance light splice and clearance lights (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and replace blackout clearance light (Para 7-51).



26. REAR BLACKOUT CLEARANCE OR TAILLIGHT DOES NOT OPERATE (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

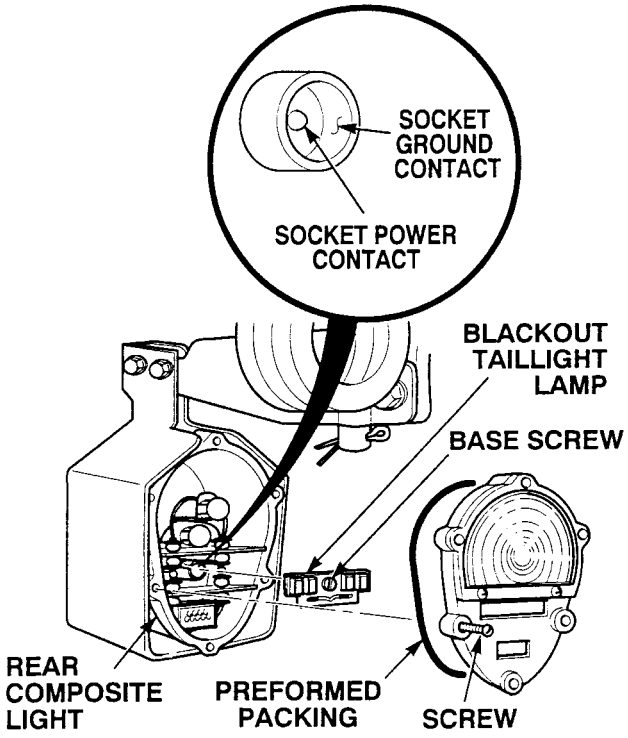
Truck may or may not be equipped with blackout clearance lights.

VOLTAGE TEST

(1) Loosen six screws and remove composite light cover and preformed packing. Discard preformed packing.
(2) Push in and rotate blackout taillight base screw counter-clockwise and remove taillight lamp.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to socket power contact of blackout taillight socket.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 8 of this Fault.
    (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and go to Step 7 of this Fault.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between blackout taillight socket ground contact and a known good ground?
    (a) If there is no continuity, replace rear composite light (Para 7-47).
    (b) If there is continuity, replace blackout taillight lamp (Para 7-51).



26. REAR BLACKOUT CLEARANCE OR TAILLIGHT DOES NOT OPERATE (CONT).

KNOWN INFO

Regular stoplights operate indicating wire 1435 to rear composite light OK.
Blackout clearance lights operate indicating 10 to 14 vdc to wire 1680.

POSSIBLE PROBLEMS

Wire 1680/24 faulty.
Rear LED composite light faulty.
~~Rear composite light faulty.~~

8.

WARNING
Read WARNING on Page 2-1389

Are 10 to 14 vdc measured on wire 1680/24 to faulty black-out taillight rear composite light?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not measured, blackout taillight lamp will not operate.

NO → Repair wire 1680/24 (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

YES → Replace rear composite light or rear LED composite Light (Para 7-47). Verify repair, go to Step 9 of this Fault.

KNOWN INFO

10 to 14 vdc present to blackout clearance and taillight socket center contact.
Ground present on blackout clearance and taillight socket outer contact.
Blackout clearance and taillight lamp OK.
Rear clearance light and composite light OK.

POSSIBLE PROBLEMS

9.

Do all rear blackout clearance and taillights operate?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If blackout clearance and taillights operates, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

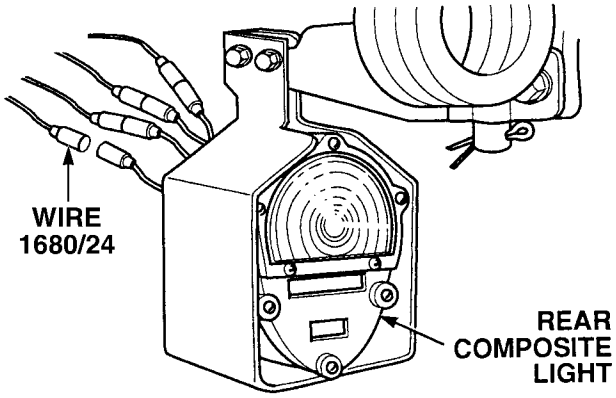
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Truck may or may not be equipped with blackout clearance lights.

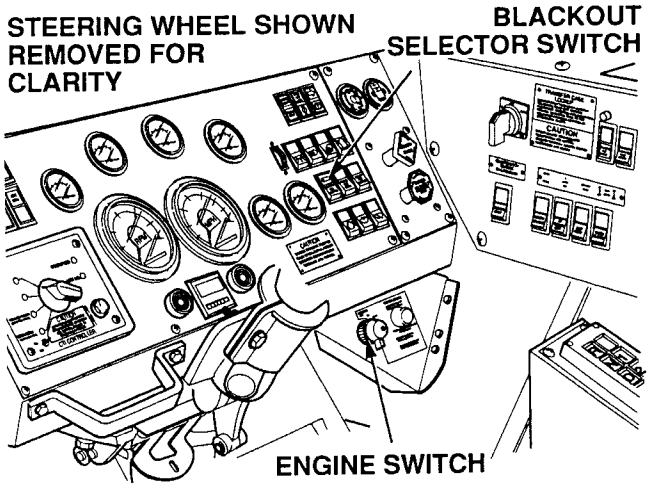
VOLTAGE TEST

(1) Disconnect wire 1680 from faulty rear composite light.
(2) Connect positive (+) multimeter lead to wire 1680 from chassis.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1680/24 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and replace rear composite light or rear LED composite light. (Para 7-47).
(5) Reconnect wire 1680 to rear composite light.
(6) Install preformed packing and composite light cover and tighten 6 screws.



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Inspect blackout clearance and tail light operation.
  (a) If blackout clearance and tail lights do not operate, fault not corrected. Perform Steps (3) through (5) below and notify DS Maintenance.
  (b) If blackout clearance and tail lights operate, fault has been corrected.
(3) Turn off BLACKOUT MARKER lights switch.
(4) Turn off BLACKOUT LIGHTS selector switch.
(5) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

27. FRONT BLACKOUT CLEARANCE OR MARKER LIGHT DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

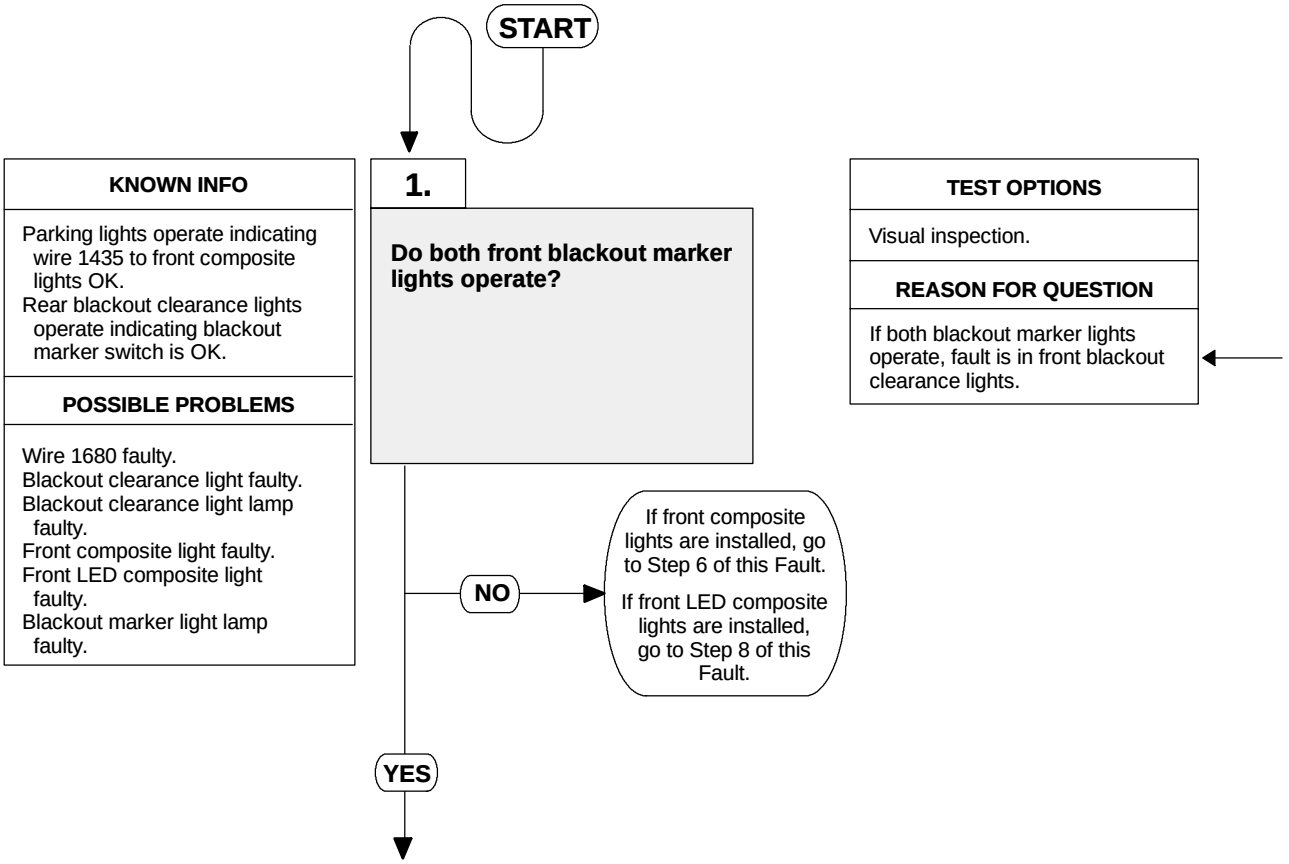
Materials/Parts
Preformed Packing (Item 223, Appendix F)
Lockwasher (Item 168 Appendix F)

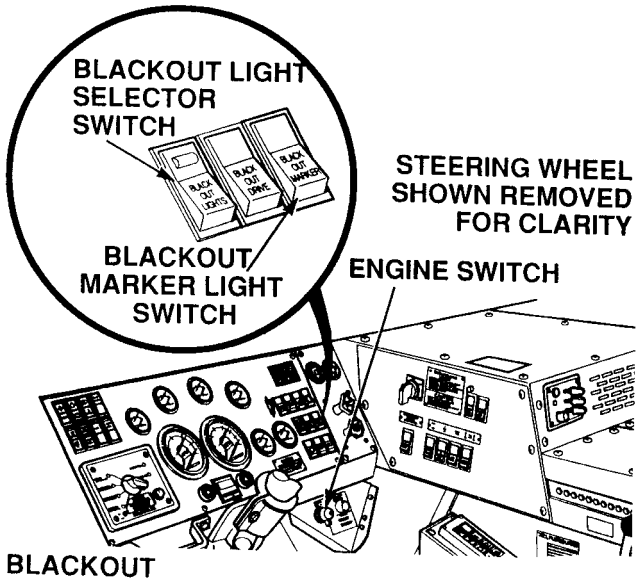
References
TM 9-2320-364-10
TM 9-4910-571-12&P

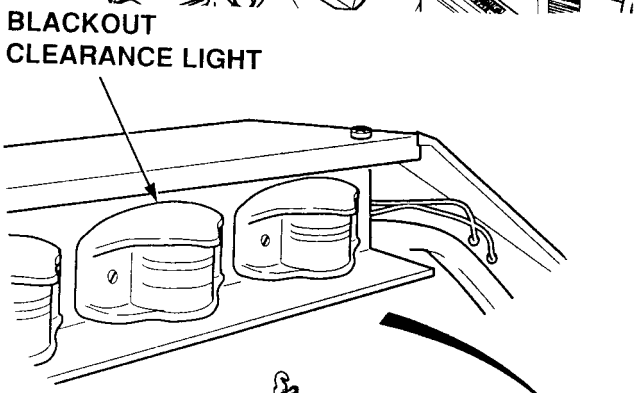
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

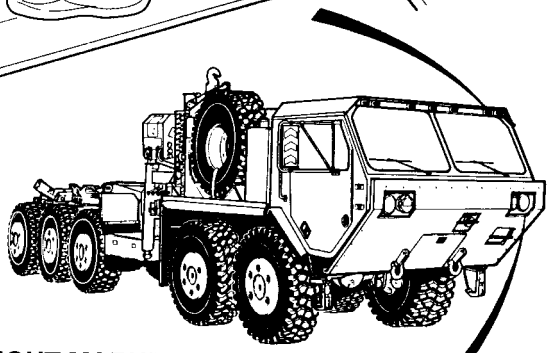
NOTE

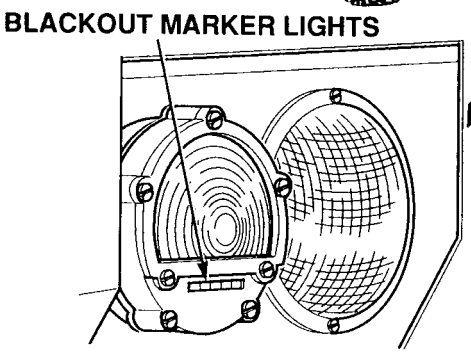
Truck may be equipped with front composite lights or front LED composite lights.









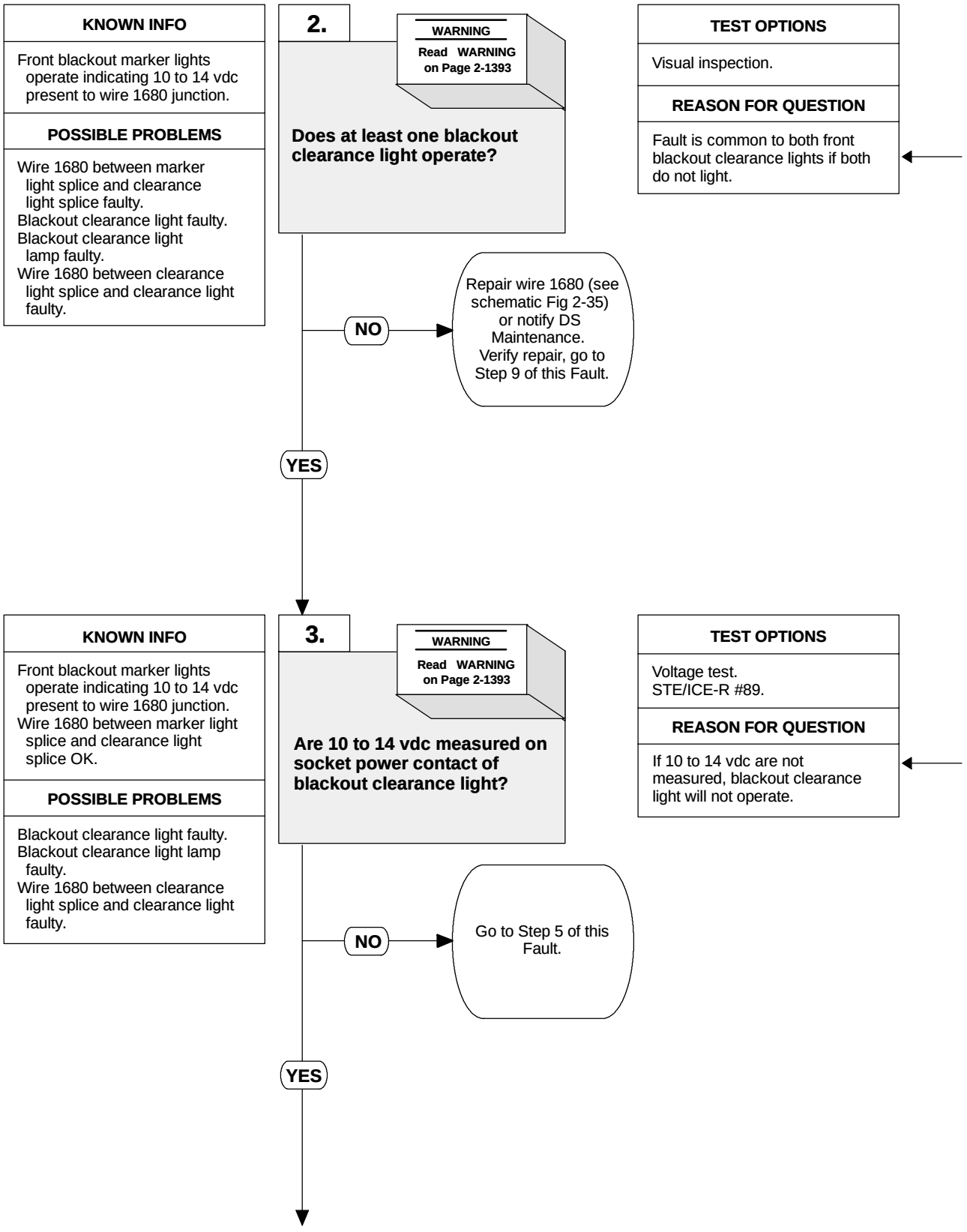


NOTE

Truck may or may not be equipped with blackout clearance lights.

VISUAL INSPECTION
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Turn on BLACKOUT LIGHTS selector switch. (3) Turn on BLACKOUT MARKER lights switch. (4) Observe front blackout clearance and marker lights. (a) If both front blackout marker lights do not operate, turn OFF ENGINE switch and go to Step 6 of this Fault. (b) If one or both front blackout marker lights operate, turn OFF ENGINE switch and go to Step 2 of this Fault.

27. FRONT BLACKOUT CLEARANCE OR MARKER LIGHT DOES NOT OPERATE (CONT).



WARNING

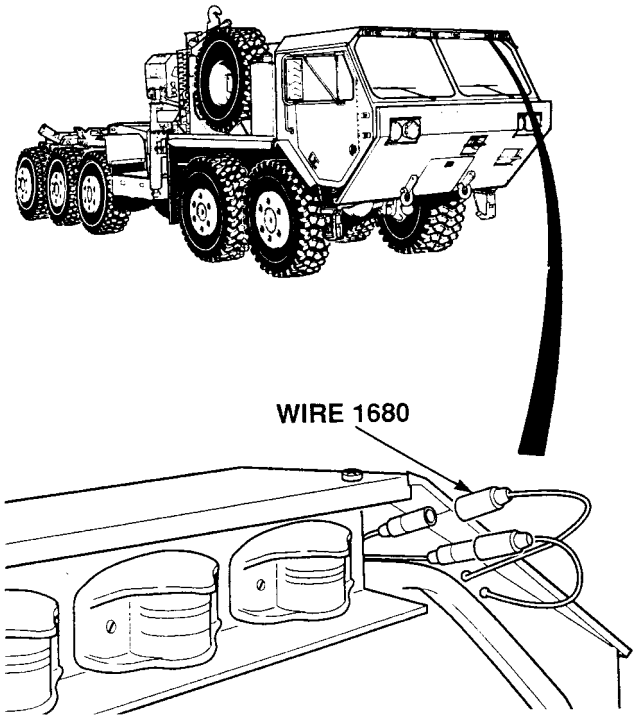
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Truck may or may not be equipped with blackout clearance lights.

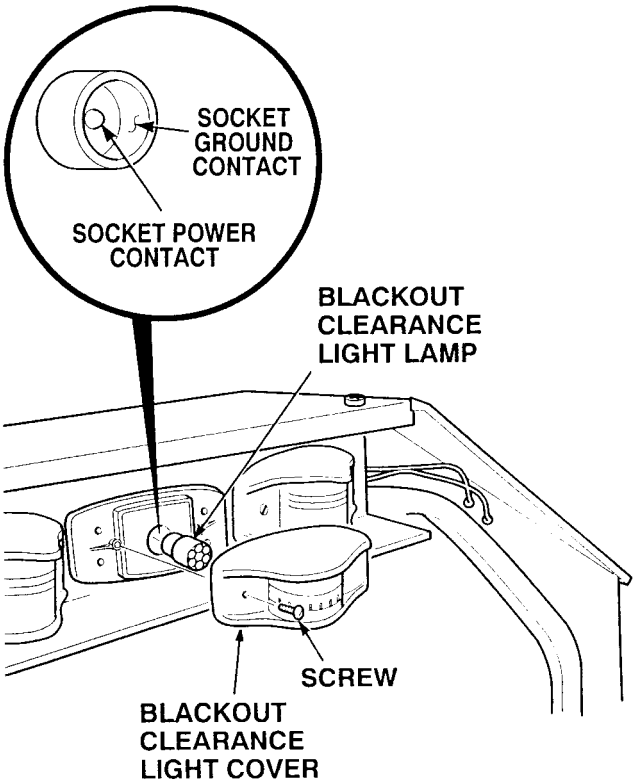
VISUAL INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Observe blackout clearance lights.
  (a) If both clearance lights do not operate, turn OFF ENGINE switch and repair wire 1680 between marker light splice and clearance light splice (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If one clearance light does operate, turn OFF ENGINE switch and go to Step 3 of this Fault.



VOLTAGE TEST

(1) Remove two screws, blackout clearance light cover and blackout clearance light lamp from blackout clearance light.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to socket power contact of clearance light lamp socket.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 5 of this Fault.
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and go to Step 4 of this Fault.



27. FRONT BLACKOUT CLEARANCE OR MARKER LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO

Front blackout marker lights operate indicating 10 to 14 VDC present to wire 1680 junction.
Wire 1680 between marker light splice and clearance light splice OK.
Wire 1680 between clearance light splice and clearance light OK.

POSSIBLE PROBLEMS

Blackout clearance light faulty.
Blackout clearance light lamp faulty.

4.

WARNING
Read WARNING on Page 2-1395

Is continuity measured between socket ground contact of faulty blackout clearance light socket and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If socket ground contact is not grounded, blackout clearance light will not operate.

NO → Replace blackout clearance light (Para 7-52). Verify repair, go to Step 9 of this Fault.

YES → Replace blackout clearance light lamp (Para 7-52). Verify repair, go to Step 9 of this Fault.

KNOWN INFO

Front blackout marker lights operate indicating 10 to 14 VDC present to wire 1680 junction.
Wire 1680 between marker light splice and clearance light splice OK.

POSSIBLE PROBLEMS

Blackout clearance light faulty.
Wire 1680 between clearance light splice and clearance light faulty.

5.

WARNING
Read WARNING on Page 2-1395

Are 10 to 14 vdc measured on wire 1680 to faulty blackout clearance light?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not measured, blackout clearance light will not operate.

NO → Repair wire 1680 (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

YES → Replace blackout clearance light (Para 7-51). Verify repair, go to Step 9 of this Fault.

WARNING

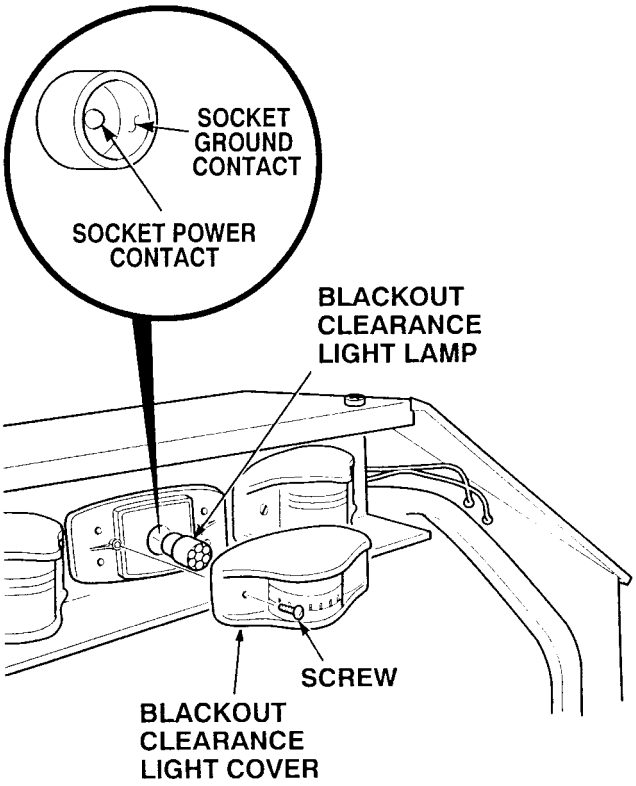
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Truck may or may not be equipped with blackout clearance lights.

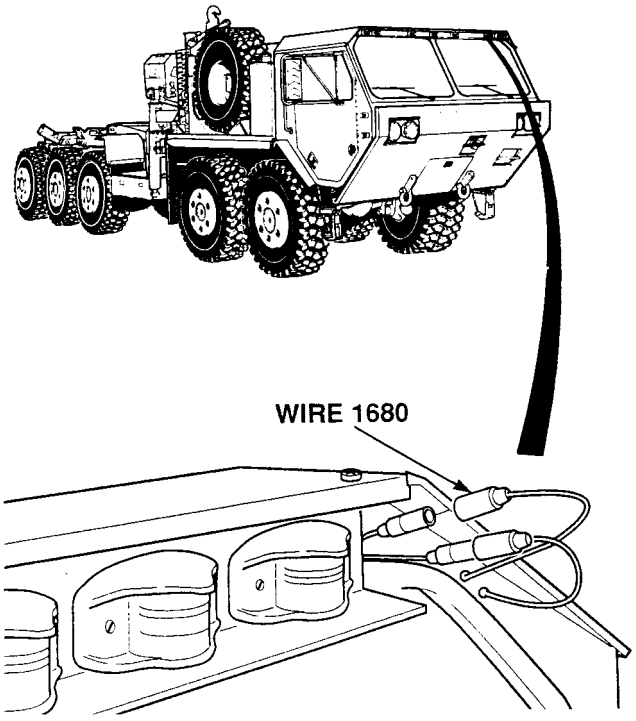
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between socket ground contact of blackout clearance light socket and a known good ground?
  (a) If there is no continuity, replace blackout clearance light (Para 7-52).
  (b) If there is continuity, replace blackout clearance light lamp (Para 7-52).
(3) Install blackout clearance light cover and two screws.

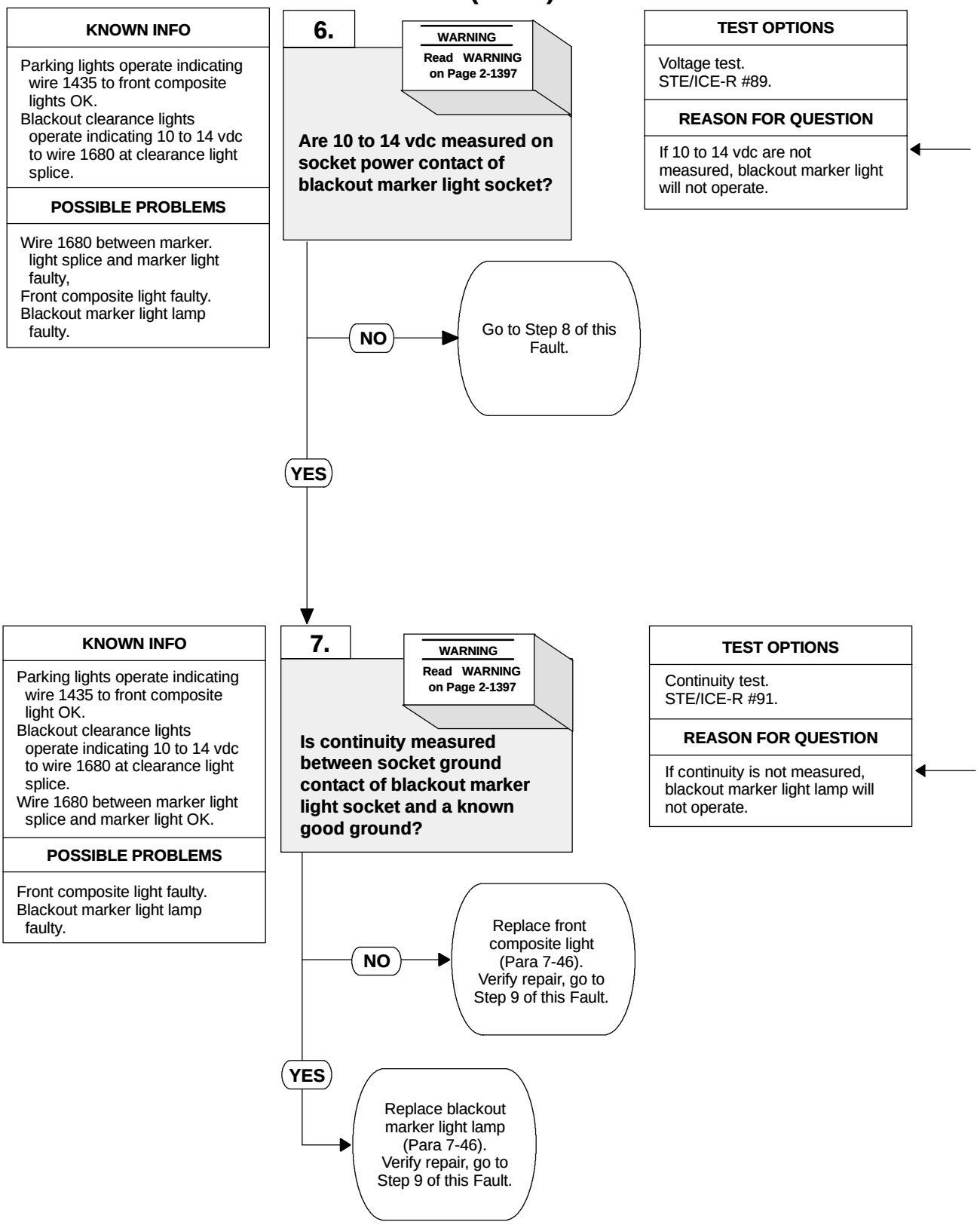


VOLTAGE TEST

(1) Disconnect wire 1680 at chassis harness connector.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire at chassis harness connector.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1680 between clearance light splice and clearance lights (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and replace blackout clearance light (Para 7-51).



27. FRONT BLACKOUT CLEARANCE OR MARKER LIGHT DOES NOT OPERATE (CONT).



WARNING

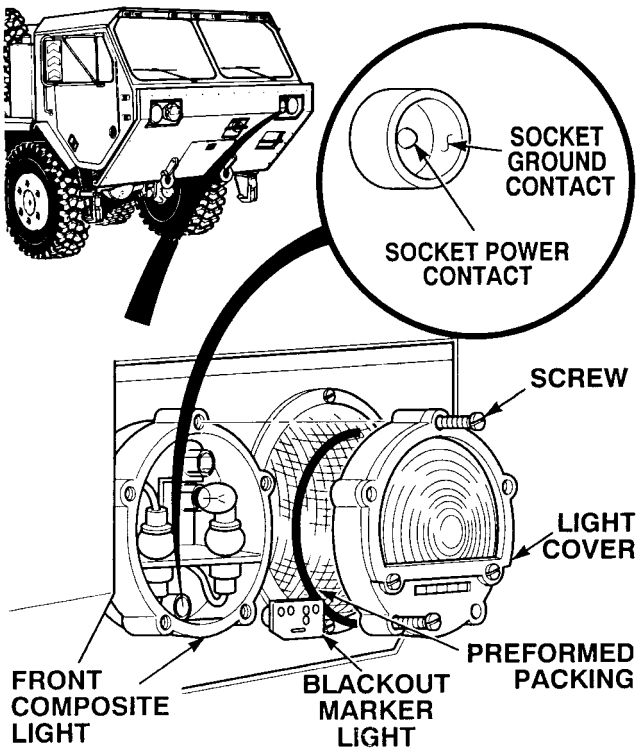
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Loosen five screws and remove composite light lens and preformed packing.
(2) Remove blackout marker light lamp.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to socket power contact of blackout marker light socket.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 8 of this Fault.
    (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and go to Step 7 of this Fault.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between blackout marker light socket ground contact and a known good ground?
    (a) If there is no continuity, replace front composite light (Para 7-46).
    (b) If there is continuity, replace blackout marker light lamp (Para 7-46).
(3) Install blackout marker light lamp.
(4) Install preformed packing and composite light lens and tighten six screws.



27. FRONT BLACKOUT CLEARANCE OR MARKER LIGHT DOES NOT OPERATE (CONT).

KNOWN INFO

Parking lights operate indicating wire 1435 to front composite light OK.
Blackout clearance lights operate indicating 10 to 14 vdc to wire 1680 at clearance light splice.

POSSIBLE PROBLEMS

Wire 1680 between marker light splice and marker light faulty.
Front composite light faulty.
Front LED composite light faulty.

8.

WARNING
Read WARNING on Page 2-1399

Are 10 to 14 vdc measured on wire 1680 to faulty blackout marker light front composite light?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 10 to 14 vdc are not measured, blackout marker light lamp will not operate.

NO → Repair wire 1680 (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 9 of this Fault.

YES → Replace front composite light or front LED composite light (Para 7-46). Verify repair, go to Step 9 of this Fault.

KNOWN INFO

Rear black clearance lights operate indicating blackout marker switch is OK.
Parking lights operate indicating wire 1435 to front composite light OK.
Blackout clearance and marker light lamp OK.
Front clearance light and composite light OK.
Wire 1680 OK.
Front LED composite light OK.

POSSIBLE PROBLEMS

9.

Do all front blackout clearance and marker lights operate?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If blackout clearance and marker lights operate, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

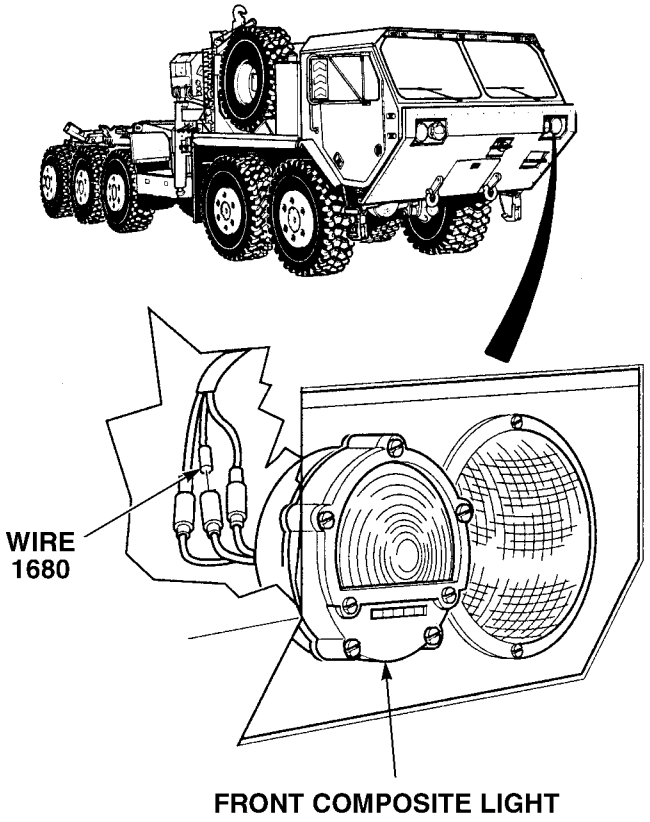
Truck may or may not be equipped with blackout clearance lights.

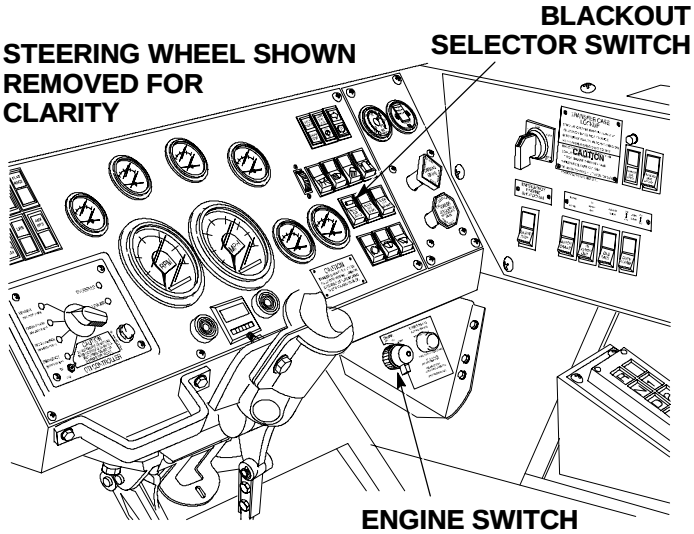
VOLTAGE TEST

(1) Disconnect wire 1680 from faulty front composite light.
(2) Connect positive (+) multimeter lead to wire 1680 from chassis.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1680 between marker light splice and marker light (see schematic Fig 2-35) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and replace front composite light or front LED composite light. (Para 7-46).
(5) Reconnect wire 1680 to front composite light.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Inspect blackout clearance and marker light operation.
    (a) If blackout clearance and marker lights do not operate, fault not corrected. Perform Steps (3) through (5) below and notify DS Maintenance.
    (b) If blackout clearance and marker lights operate, fault has been corrected.
(3) Turn off BLACKOUT MARKER light switch.
(4) Turn off BLACKOUT LIGHT selector switch.
(5) Turn OFF ENGINE switch.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

28. BLACKOUT TAIL, MARKER AND CLEARANCE LIGHTS DO NOT OPERATE.

INITIAL SETUP

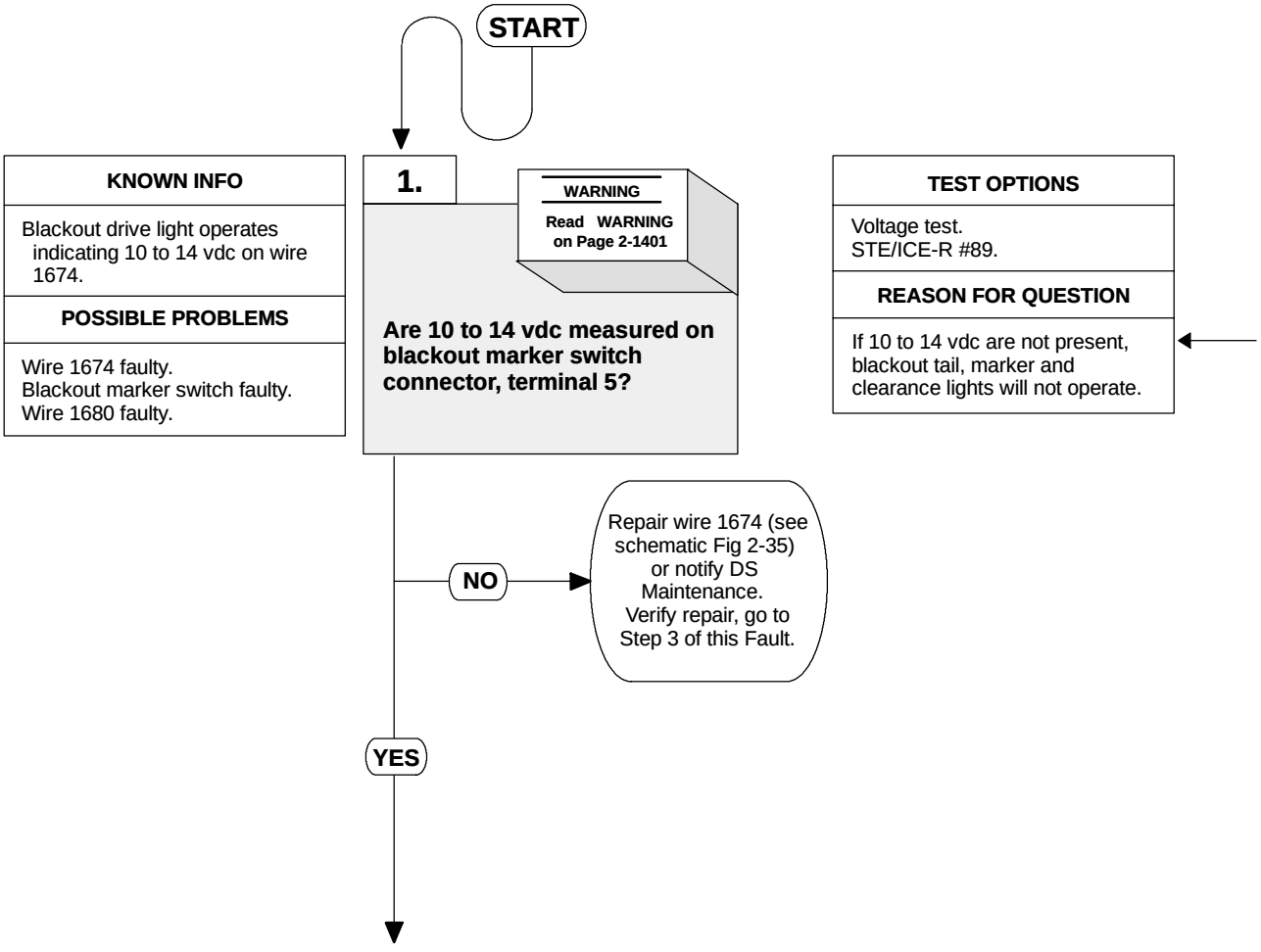
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

NOTE

Truck may or may not be equipped with blackout clearance lights.

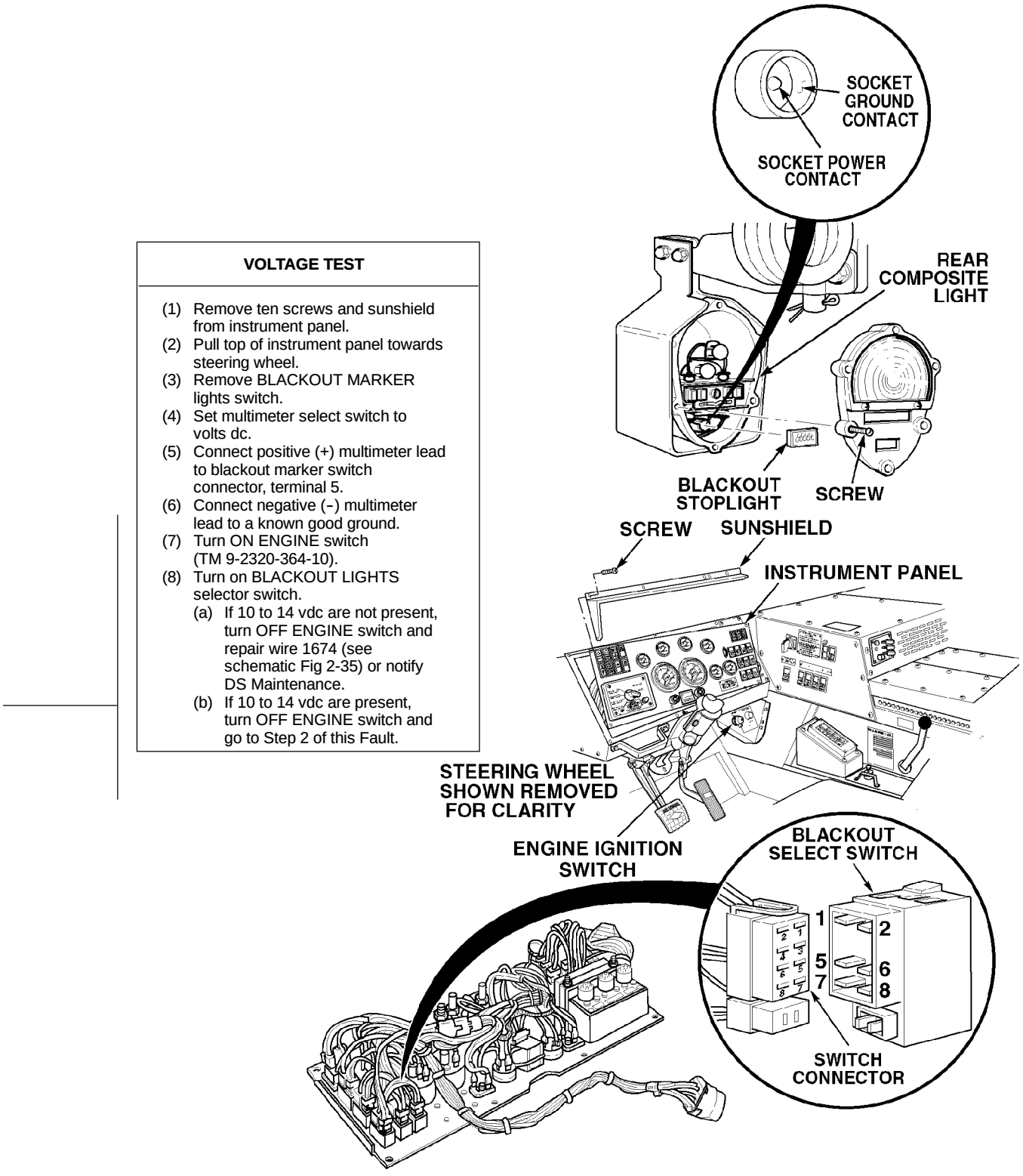


WARNING

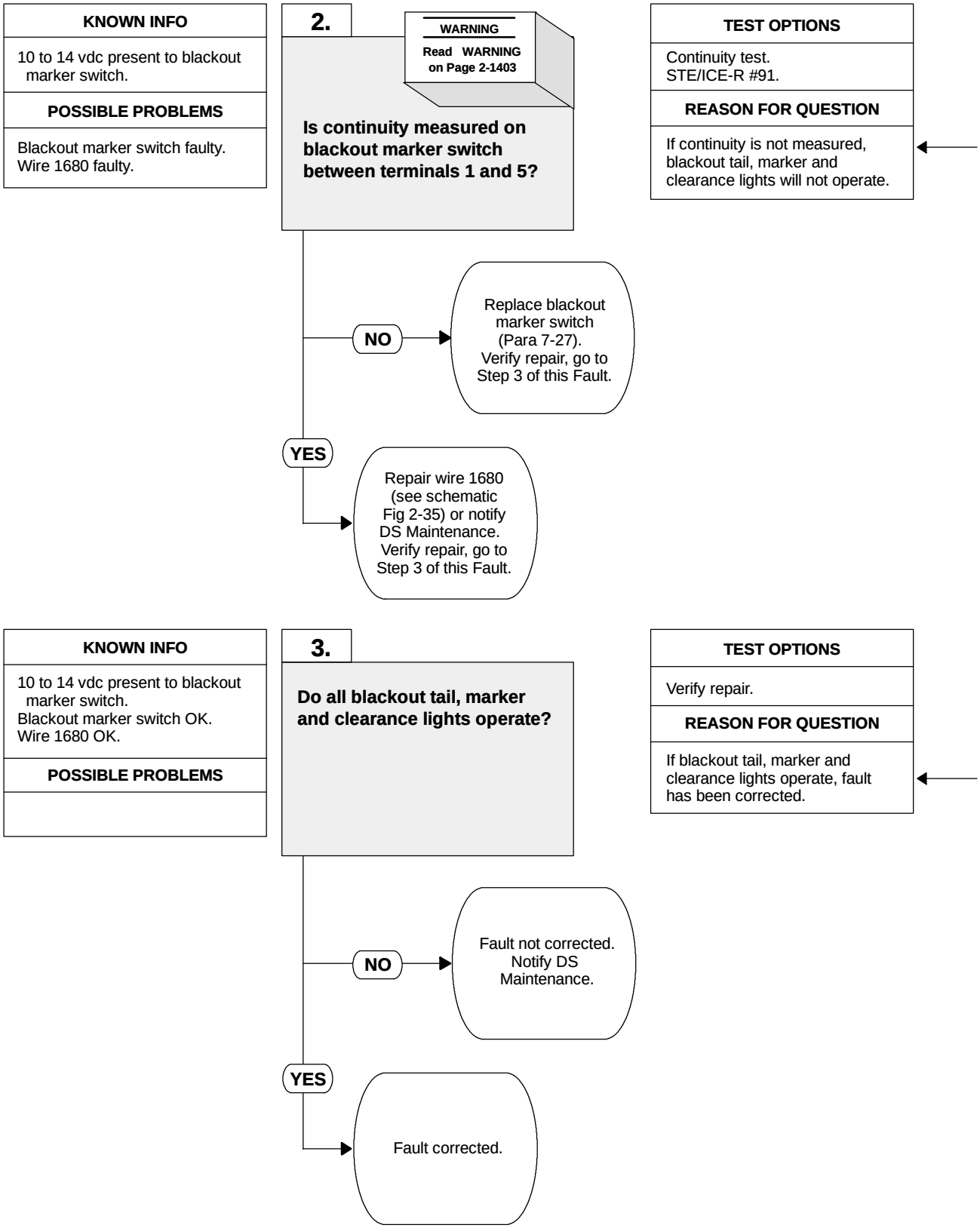
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove BLACKOUT MARKER lights switch.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to blackout marker switch connector, terminal 5.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
(8) Turn on BLACKOUT LIGHTS selector switch.
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1674 (see schematic Fig 2-35) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and go to Step 2 of this Fault.



28. BLACKOUT TAIL, MARKER AND CLEARANCE LIGHTS DO NOT OPERATE (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

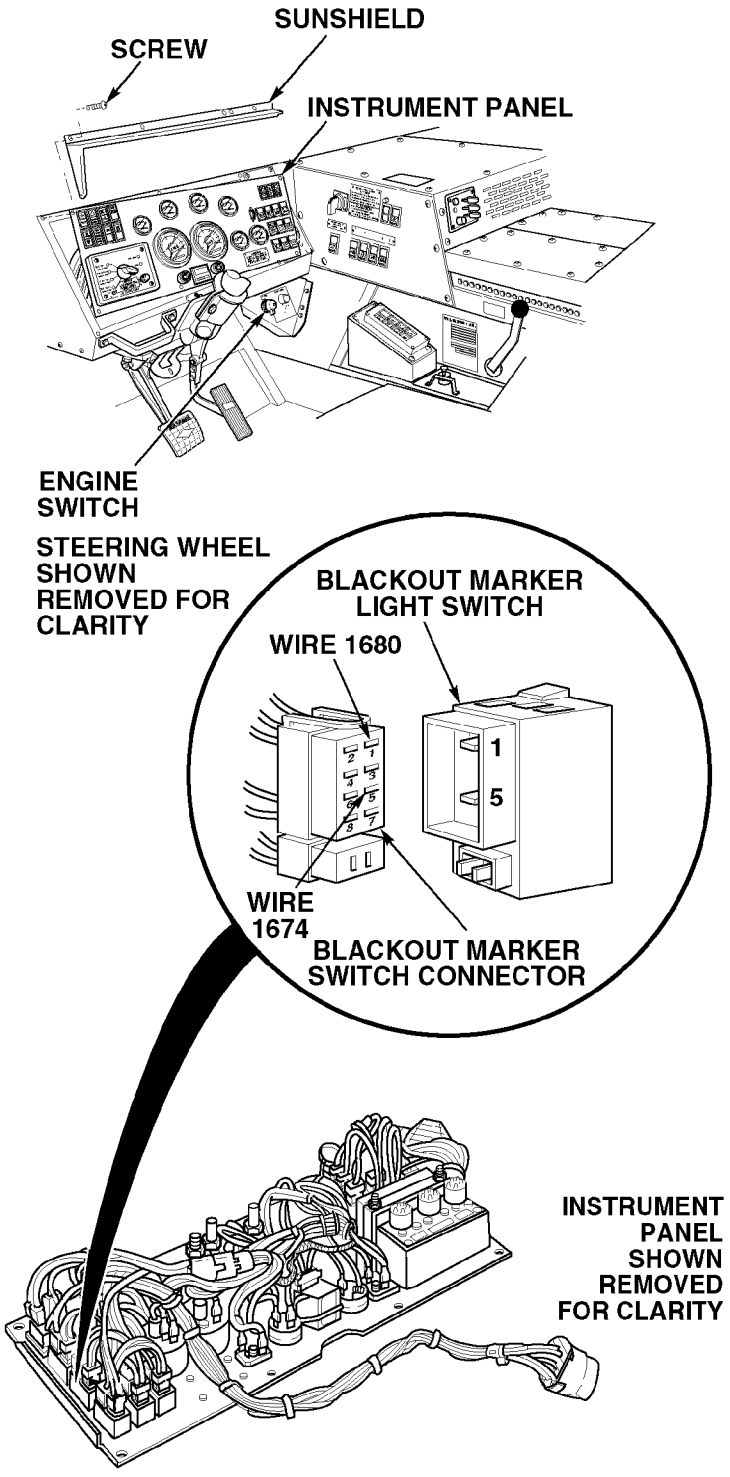
Truck may or may not be equipped with blackout clearance lights.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity measured between blackout marker switch, terminals 1 and 5?
   (a) If continuity is not measured, replace blackout marker light switch (Para 7-27).
   (b) If continuity is measured, repair wire 1680 (see schematic Fig 2-35) or notify DS Maintenance.
(3) Install BLACKOUT MARKER light switch.
(4) Install instrument panel and sunshield with ten screws.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
   (a) If blackout tail, marker and clearance lights operate, fault has been corrected. Perform Steps (2) through (4) below.
   (b) If blackout tail, marker and clearance lights do not operate, fault not corrected. Perform Steps (2) through (4) below and notify DS Maintenance.
(2) Turn off BLACKOUT MARKER lights switch.
(3) Turn off BLACKOUT LIGHTS selector switch.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

29. HORN DOES NOT OPERATE.

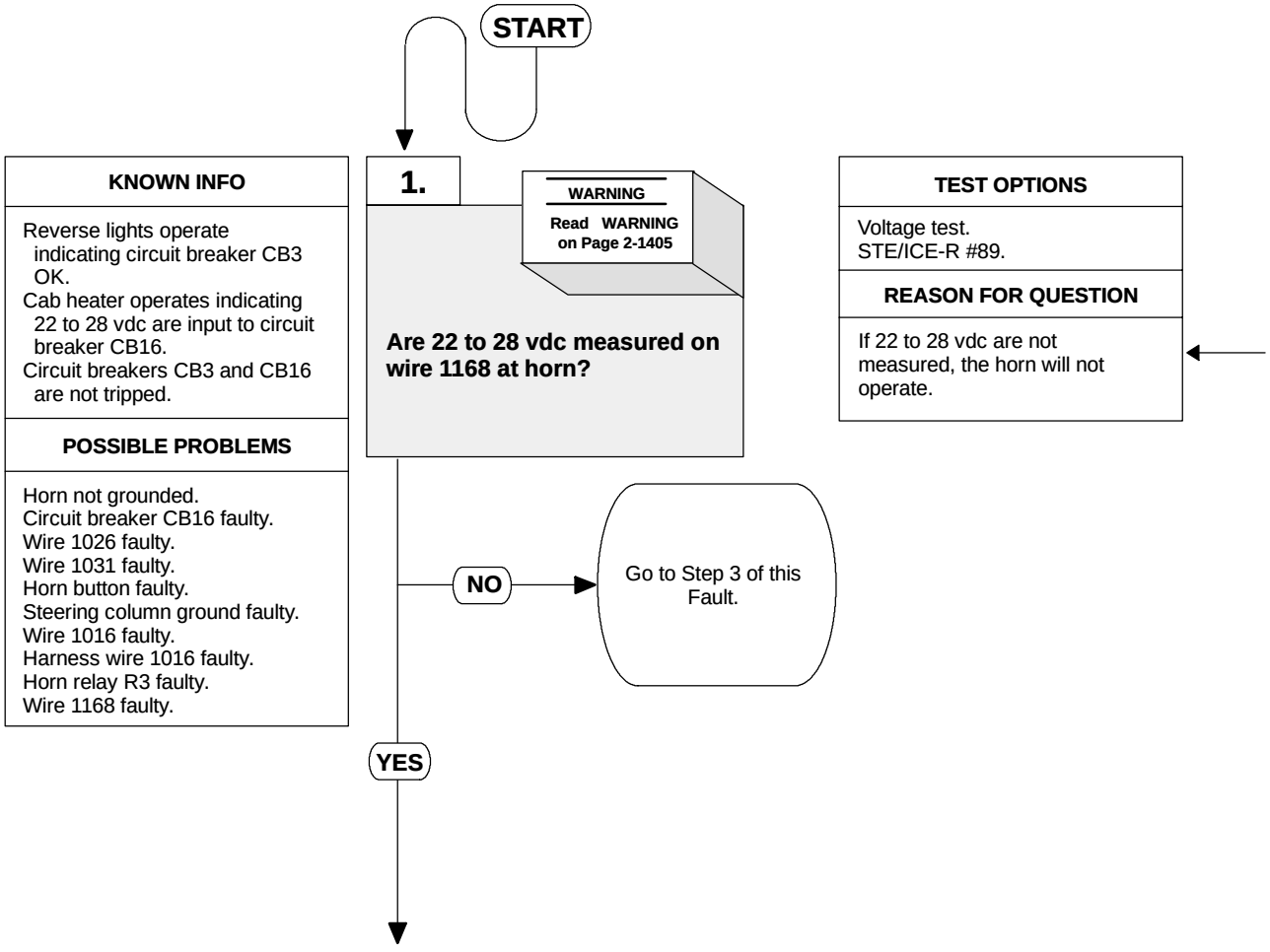
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

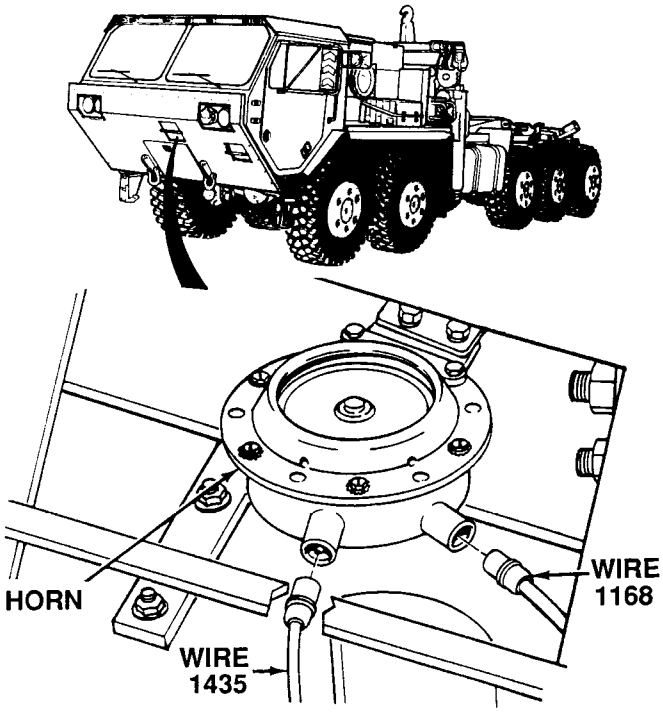


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Disconnect wire 1168 from horn.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1168 at horn.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) While assistant presses horn button, observe multimeter.
    (a) If 22 to 28 vdc are not present, perform Steps (7) and (8) below and go to Step 3 of this Fault.
    (b) If 22 to 28 vdc are present, perform Steps (7) and (8) below and go to Step 2 of this Fault.
(7) Turn OFF ENGINE switch.
(8) Reconnect wire 1168 to horn.



29. HORN DOES NOT OPERATE (CONT).

KNOWN INFO

Reverse lights operate indicating circuit breaker CB3 OK.
Cab heater operates indicating 22 to 28 vdc are input to circuit breaker CB16.
Circuit breakers CB3 and CB16 are not tripped.

POSSIBLE PROBLEMS

Horn not grounded.
Circuit breaker CB16 faulty.
Wire 1026 faulty.
Wire 1031 faulty.
Horn button faulty.
Steering column ground faulty.
Wire 1016 faulty.
Harness wire 1016 faulty.
Horn relay R3 faulty.
Wire 1168 faulty.

2.

WARNING

Read WARNING on Page 2-1407

Is continuity measured on wire 1435 between horn connector and a known good ground?

NO → Repair wire 1435 (see schematic Fig 2-36) or notify DS Maintenance. Verify repair, go to Step 11 of this Fault.

YES → Replace horn (Para 7-85). Verify repair, go to Step 11 of this Fault.

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

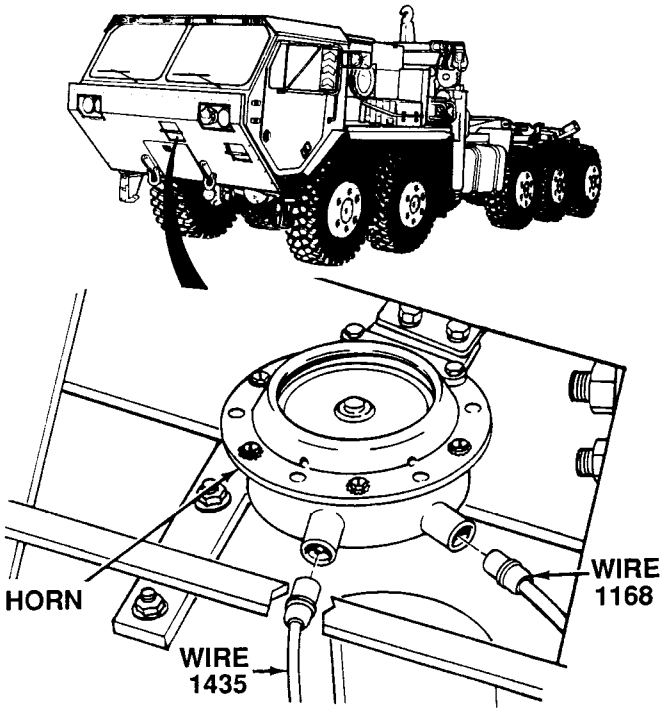
Horn will not operate if it is not grounded.

WARNING

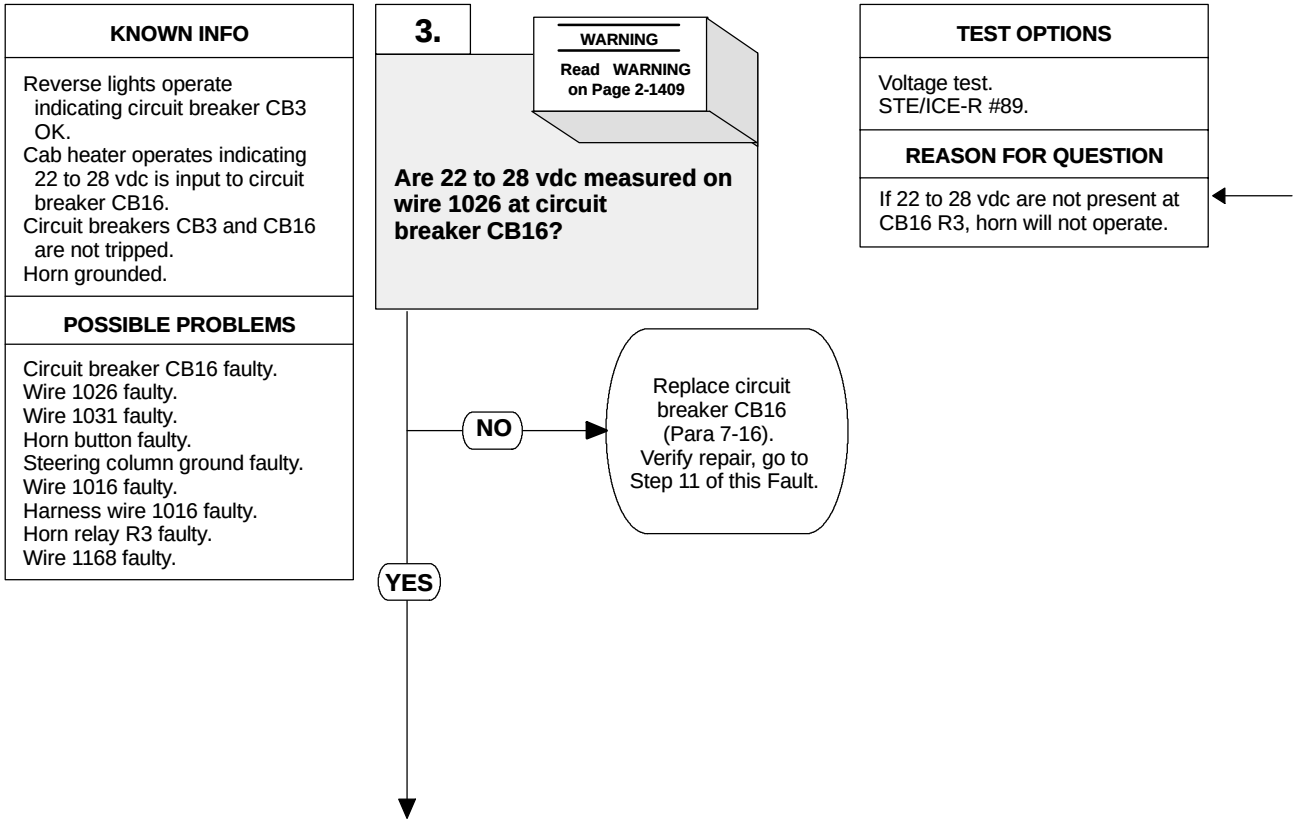
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between wire 1435 horn connector and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-36) or notify DS Maintenance.
   (b) If there is continuity, replace horn (Para 7-85).



29. HORN DOES NOT OPERATE (CONT).

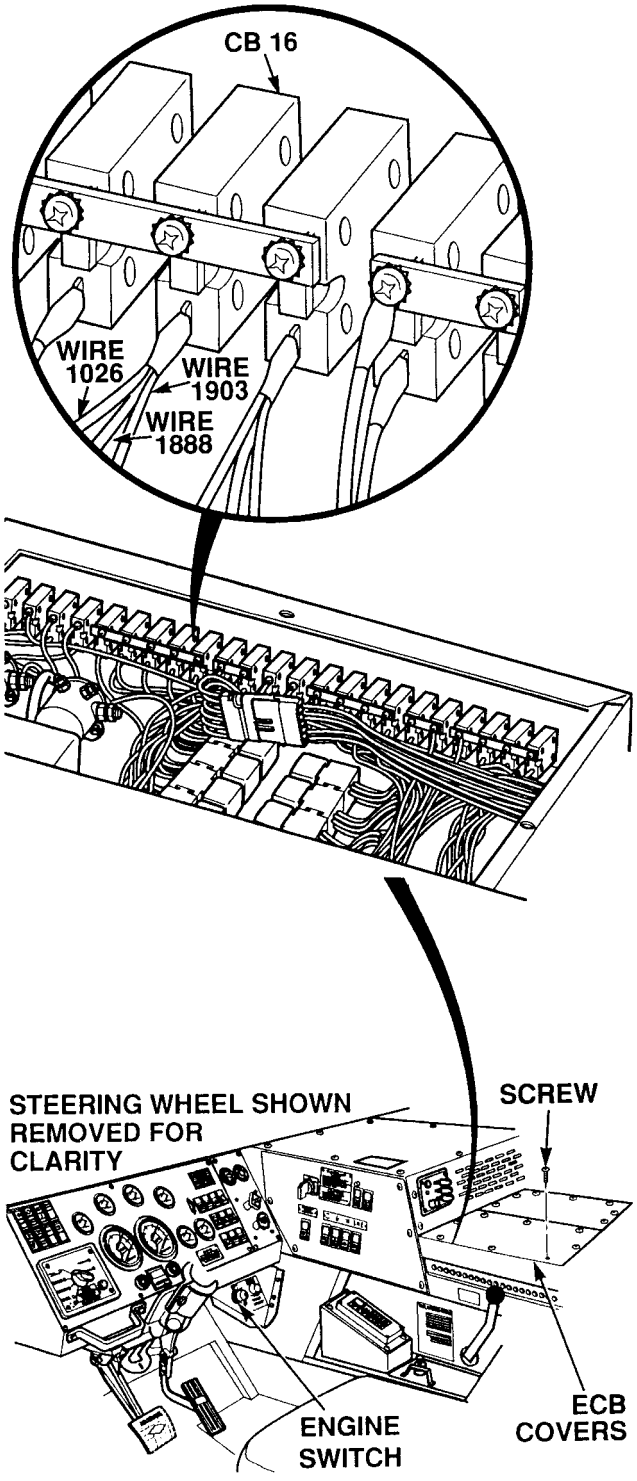


WARNING

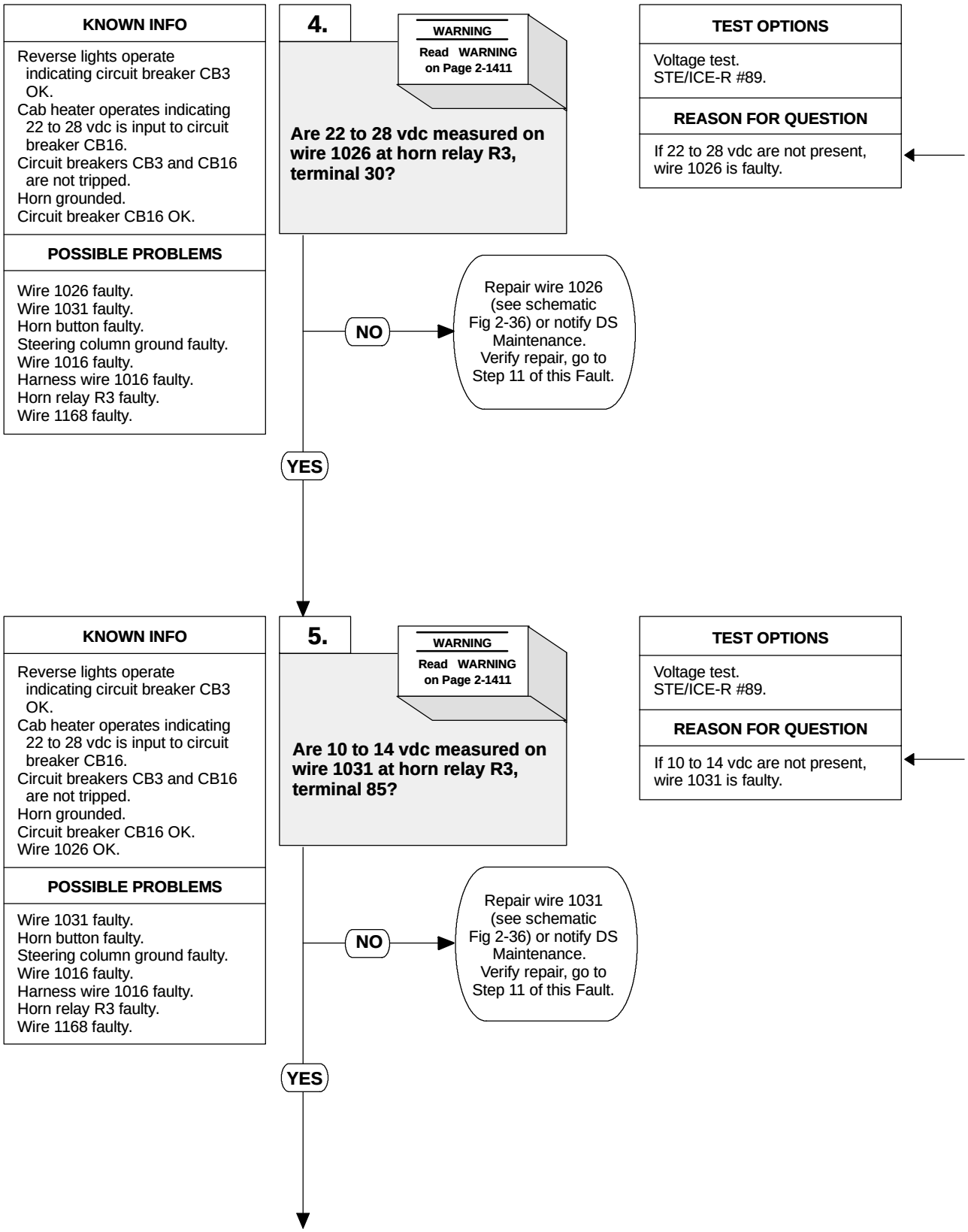
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1026 on circuit breaker CB16.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace circuit breaker CB16 (Para 7-16).
  (b) If 22 to 28 vdc are present, circuit breaker CB16 is OK.
(5) Turn OFF ENGINE switch.



29. HORN DOES NOT OPERATE (CONT).

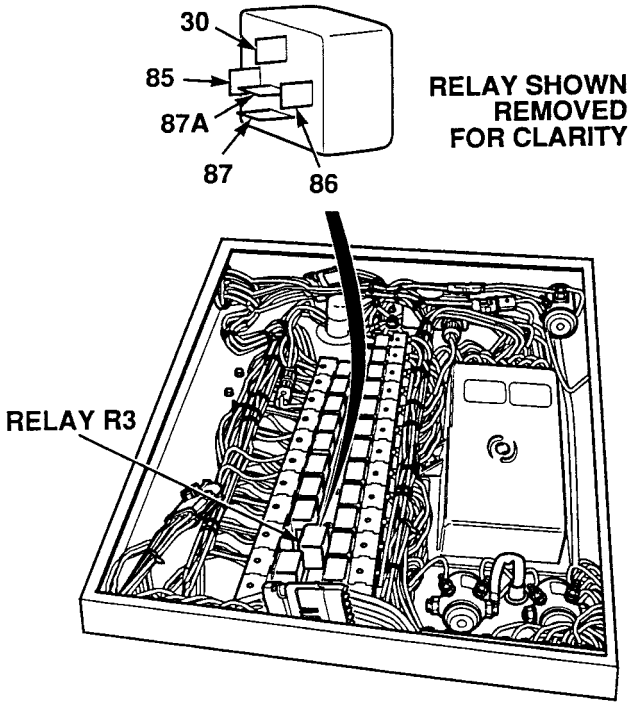


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

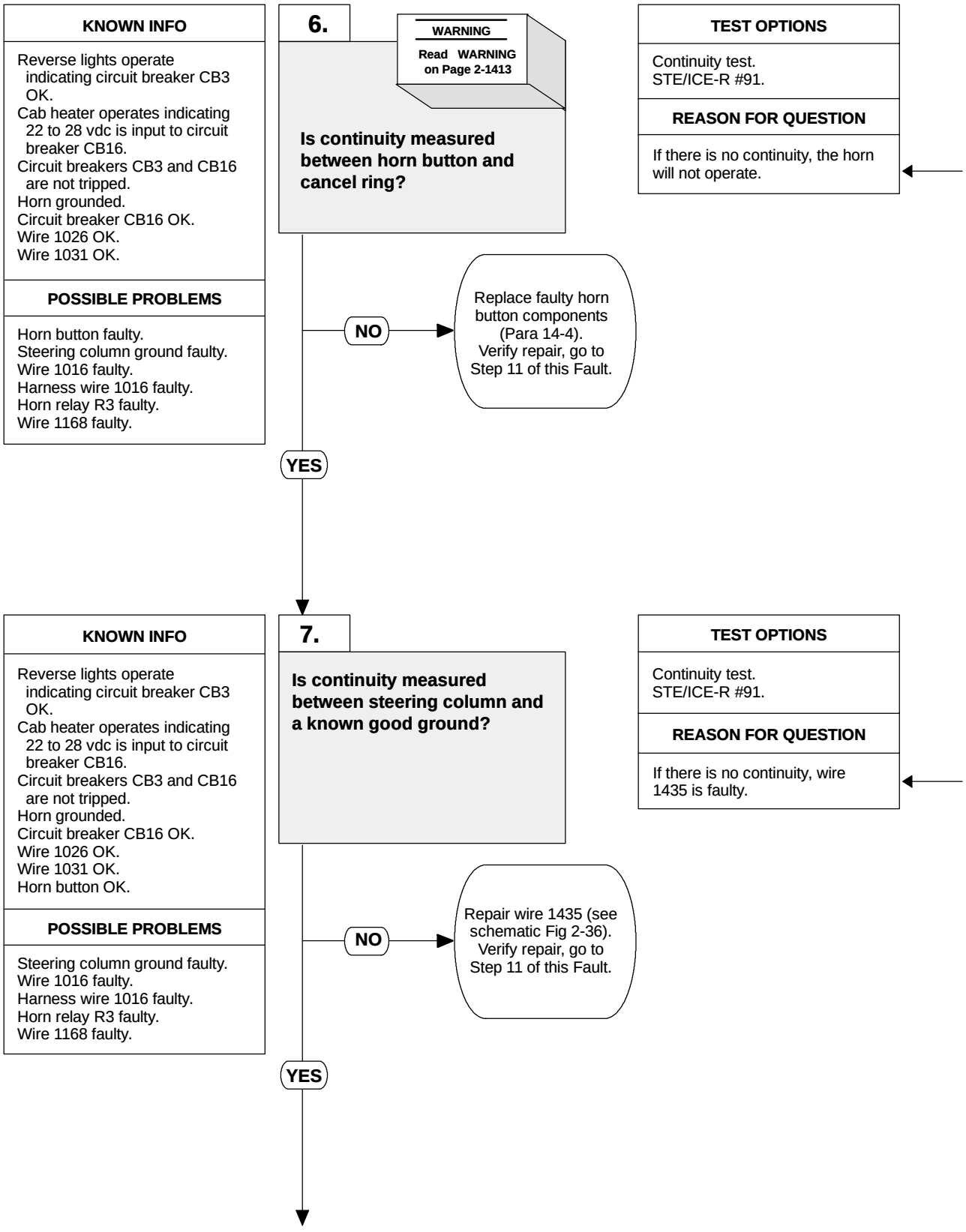
(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1026 at horn relay R3, terminal 30.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1026 (see schematic Fig 2-36) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1026 is OK.
(5) Turn OFF ENGINE switch.



VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1031 at horn relay R3, terminal 85.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1031 (see schematic Fig 2-36) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1031 is OK.
(4) Turn OFF ENGINE switch.

29. HORN DOES NOT OPERATE (CONT).

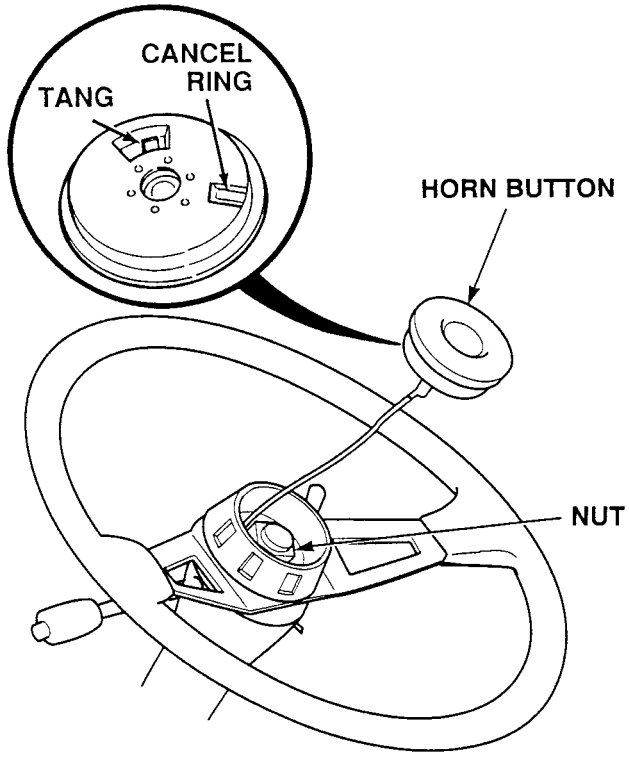


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

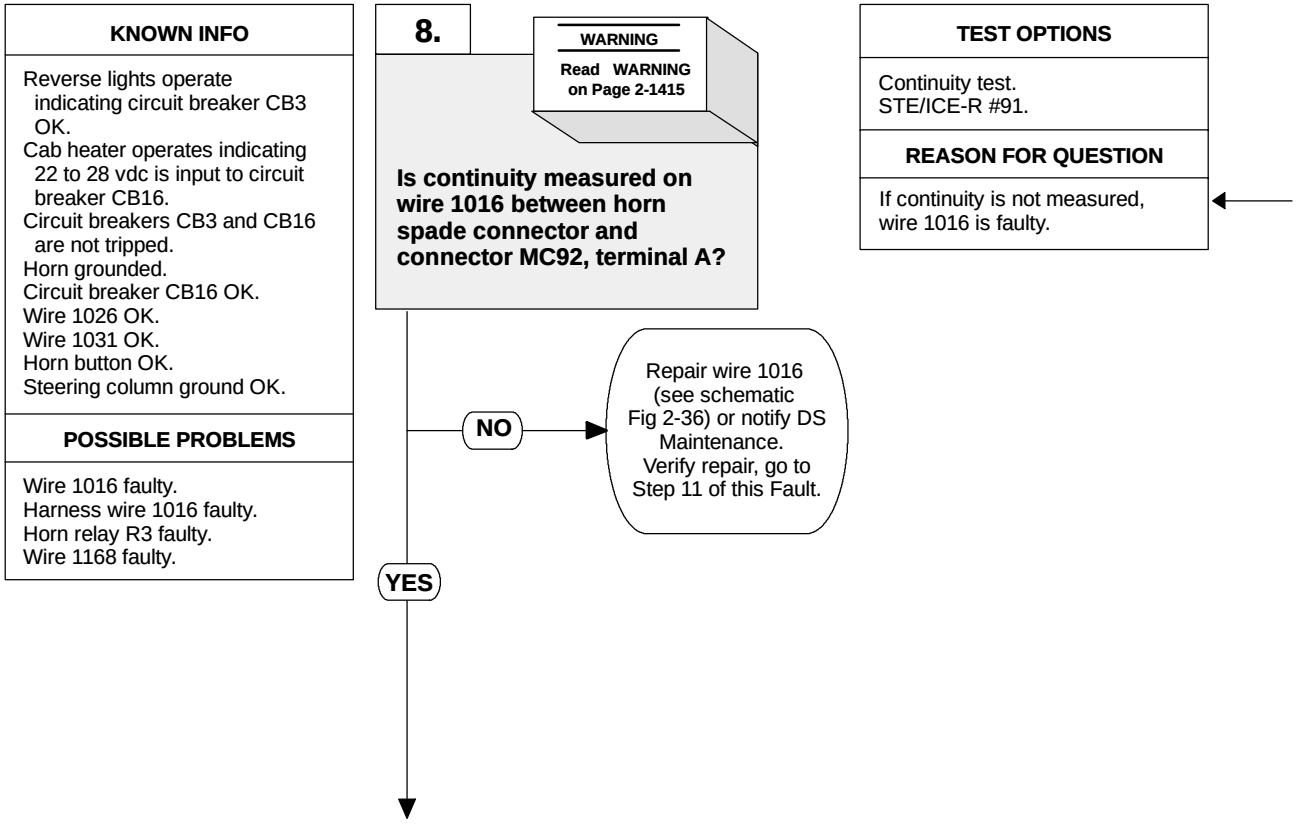
(1) Remove horn button.
(2) Set multimeter select switch to ohms.
(3) Is continuity measured between tang and cancel ring?
(4) Squeeze horn button.
    (a) If there is no continuity, replace horn button (Para 14-4).
    (b) If there is continuity, horn button is OK.



CONTINUITY TEST

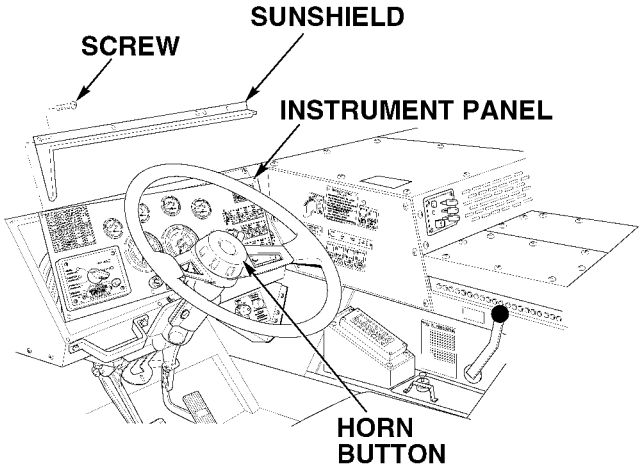
Is continuity measured between nut and a known good ground?
    (1) If there is no continuity, repair wire 1435 (see schematic Fig 2-36) or notify DS Maintenance.
    (2) If there is continuity, wire 1435 is OK.

29. HORN DOES NOT OPERATE (CONT).



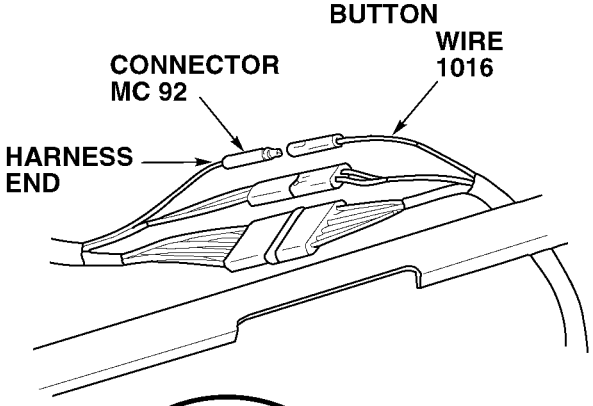
WARNING

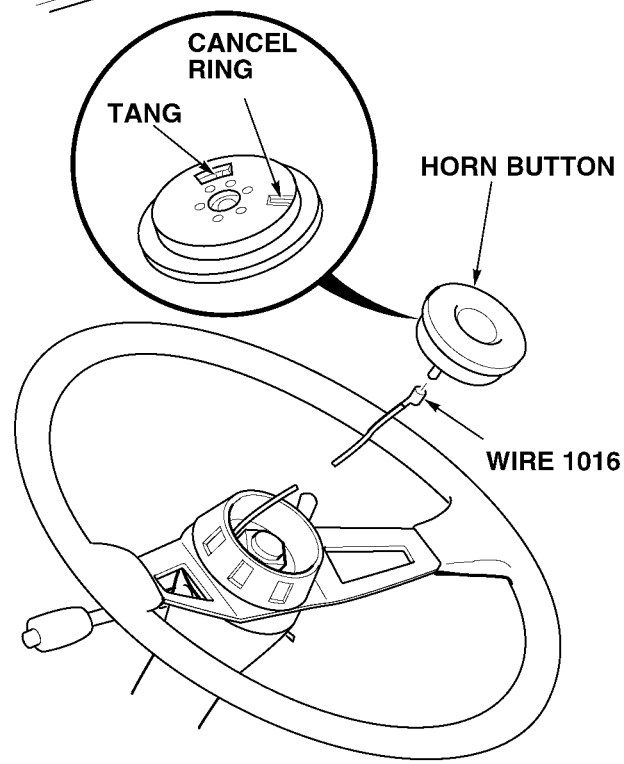
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive elecrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



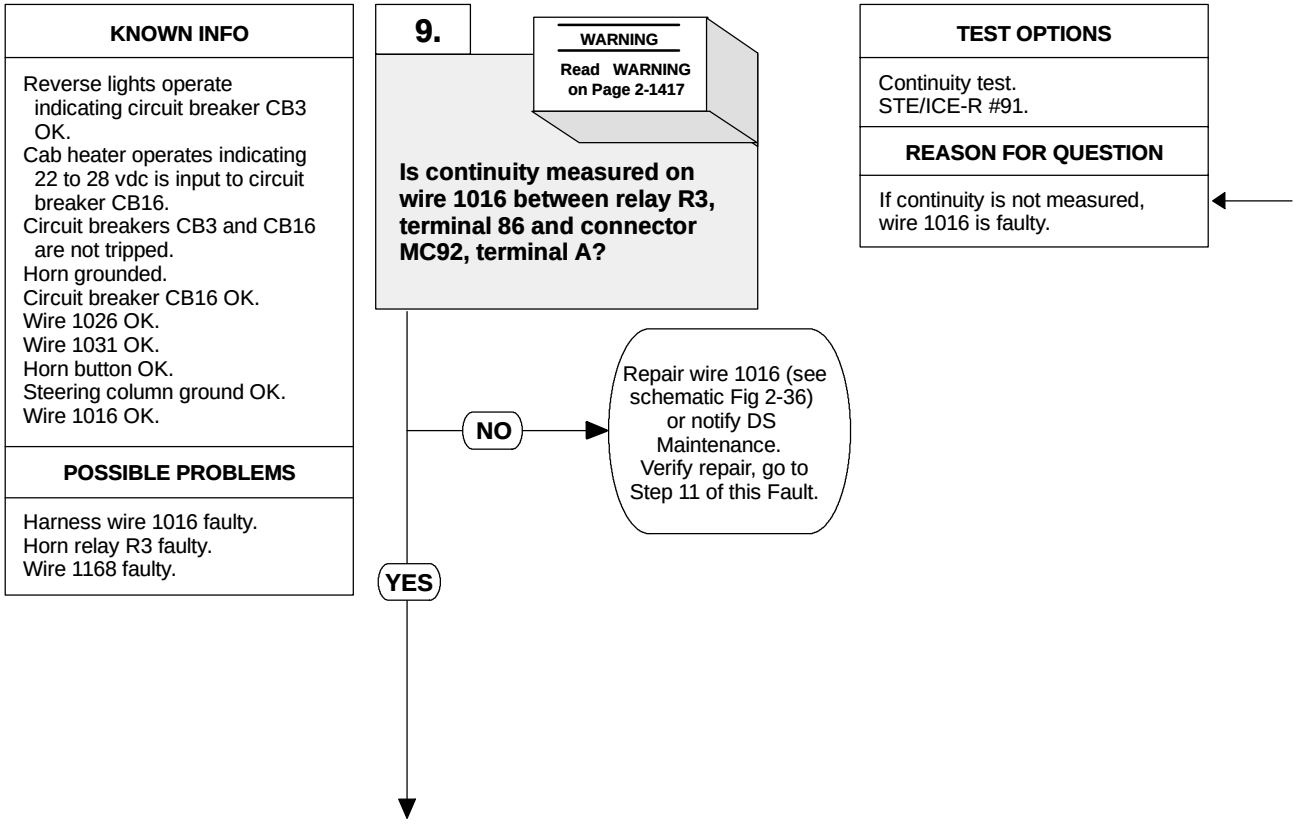
CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect wire 1016 from horn button.
(4) Disconnect connector MC92.
(5) Set multimeter select switch to ohms.
(6) Is continuity measured on wire 1016 between horn connector MC92, terminal A and horn button?
  (a) If there is no continuity, repair wire 1016 (see schematic Fig 2-36) or notify DS Maintenance.
  (b) If continuity is measured, wire 1016 is OK.
(7) Connect wire 1016 to horn button.
(8) Install horn button.



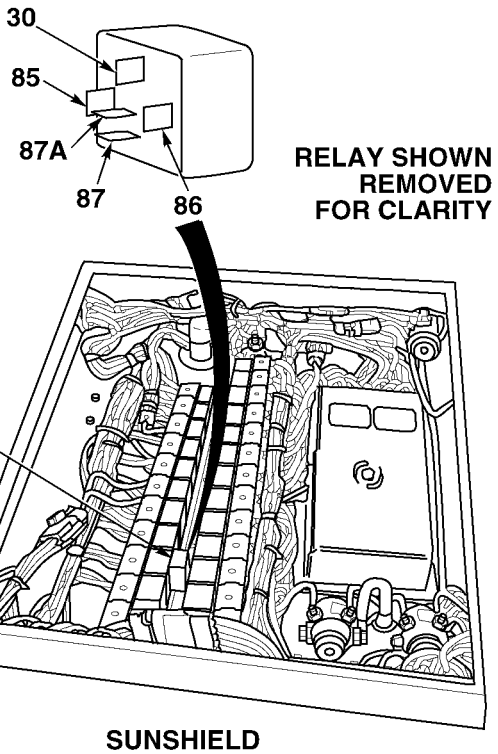


29. HORN DOES NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

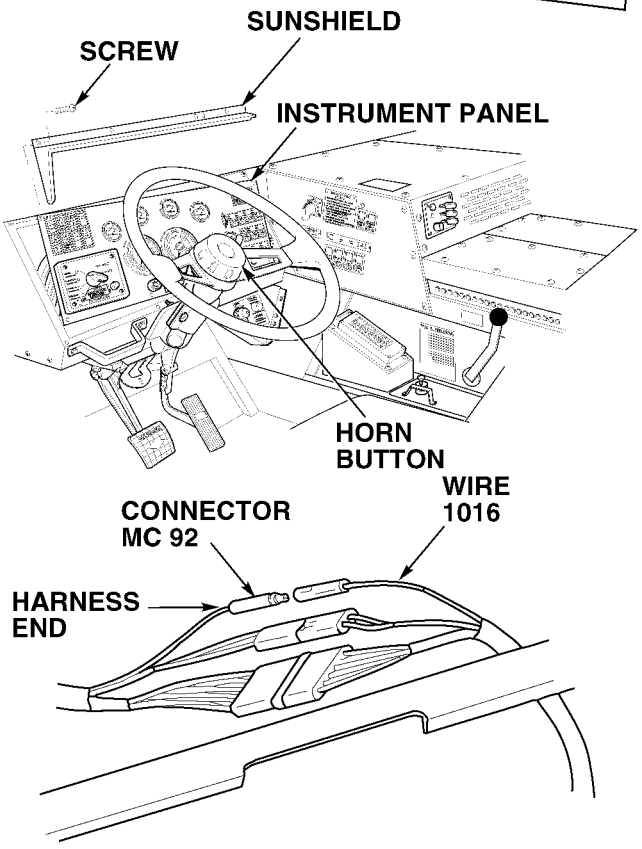


NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Ground wire 1016 at connector MC92, terminal A harness end.
(2) Is there continuity between horn relay R3, terminal 86 and a known good ground (Para 2-11)?
  (a) If continuity is not measured, repair wire 1016 (see schematic Fig 2-36) or notify DS Maintenance.
  (b) If continuity is measured, wire 1016 is OK.
(3) Connect connector MC92.
(4) Install instrument panel and sunshield with ten screws.



29. HORN DOES NOT OPERATE (CONT).

KNOWN INFO

Reverse lights operate indicating circuit breaker CB3 OK.
Cab heater operates indicating 22 to 28 vdc is input to circuit breaker CB16.
Circuit breakers CB3 and CB16 are not tripped.
Horn grounded.
Circuit breaker CB16 OK.
Wire 1026 OK.
Wire 1031 OK.
Horn button OK.
Steering column ground OK.
Wire 1016 OK.
Harness wire 1016 OK.

POSSIBLE PROBLEMS

Horn relay R3 faulty.
Wire 1168 faulty.

10.

WARNING
Read WARNING on Page 2-1419

Are 22 to 28 vdc measured at horn relay R3, terminal 87 when horn button is pressed?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not measured, horn relay R3 is faulty.
If 22 to 28 vdc are measured, wire 1168 is faulty.

NO → Replace relay R3 (Para 7-95). Verify repair, go to Step 11 of this Fault.

YES → Repair wire 1168 (see schematic Fig 2-36) or notify DS Maintenance. Verify repair, go to Step 11 of this Fault.

KNOWN INFO

Reverse lights operate indicating circuit breaker CB3 OK.
Cab heater operates indicating 22 to 28 vdc is input to circuit breaker CB16.
Circuit breakers CB3 and CB16 are not tripped.
Horn grounded.
Circuit breaker CB16 OK.
Wire 1026 OK.
Wire 1031 OK.
Horn button OK.
Steering column ground OK.
Wire 1016 OK.
Harness wire 1016 OK.
Horn relay R3 OK.
Wire 1168 OK.

POSSIBLE PROBLEMS

11.

Does horn operate?

TEST OPTIONS

Verify repair.

REASON FOR QUESTION

If horn operates, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

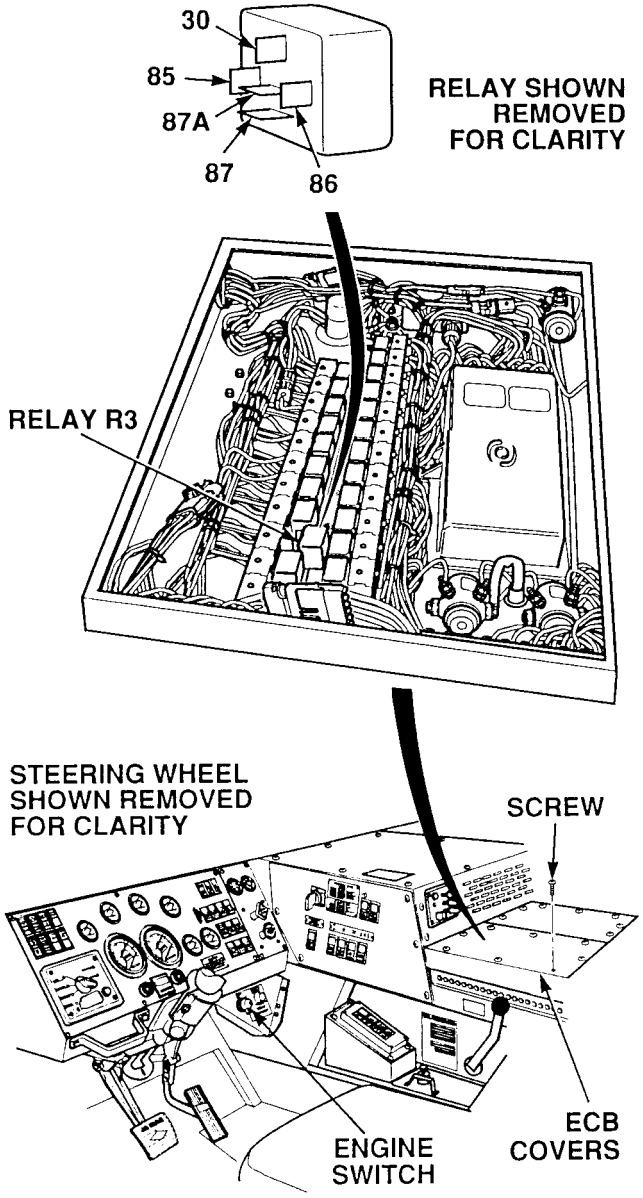
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to horn relay R3, terminal 87.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Press and hold horn button.
  (a) If 22 to 28 vdc are not present, replace horn relay R3 (Para 7-95).
  (b) If 22 to 28 vdc are present, repair wire 1168 (see schematic Fig 2-36) or notify DS Maintenance.
(6) Release horn button.
(7) Turn OFF ENGINE switch.
(8) Press relay R3 completely into relay socket.
(9) Install two ECB covers and 15 screws.

VERIFY REPAIR

(1) Press horn button and listen for horn.
  (a) If horn does not operate, fault not corrected. Release horn button and notify DS Maintenance.
  (b) If horn operates, fault has been corrected.
(2) Release horn button.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

30. WINDSHIELD WASHERS DO NOT OPERATE.

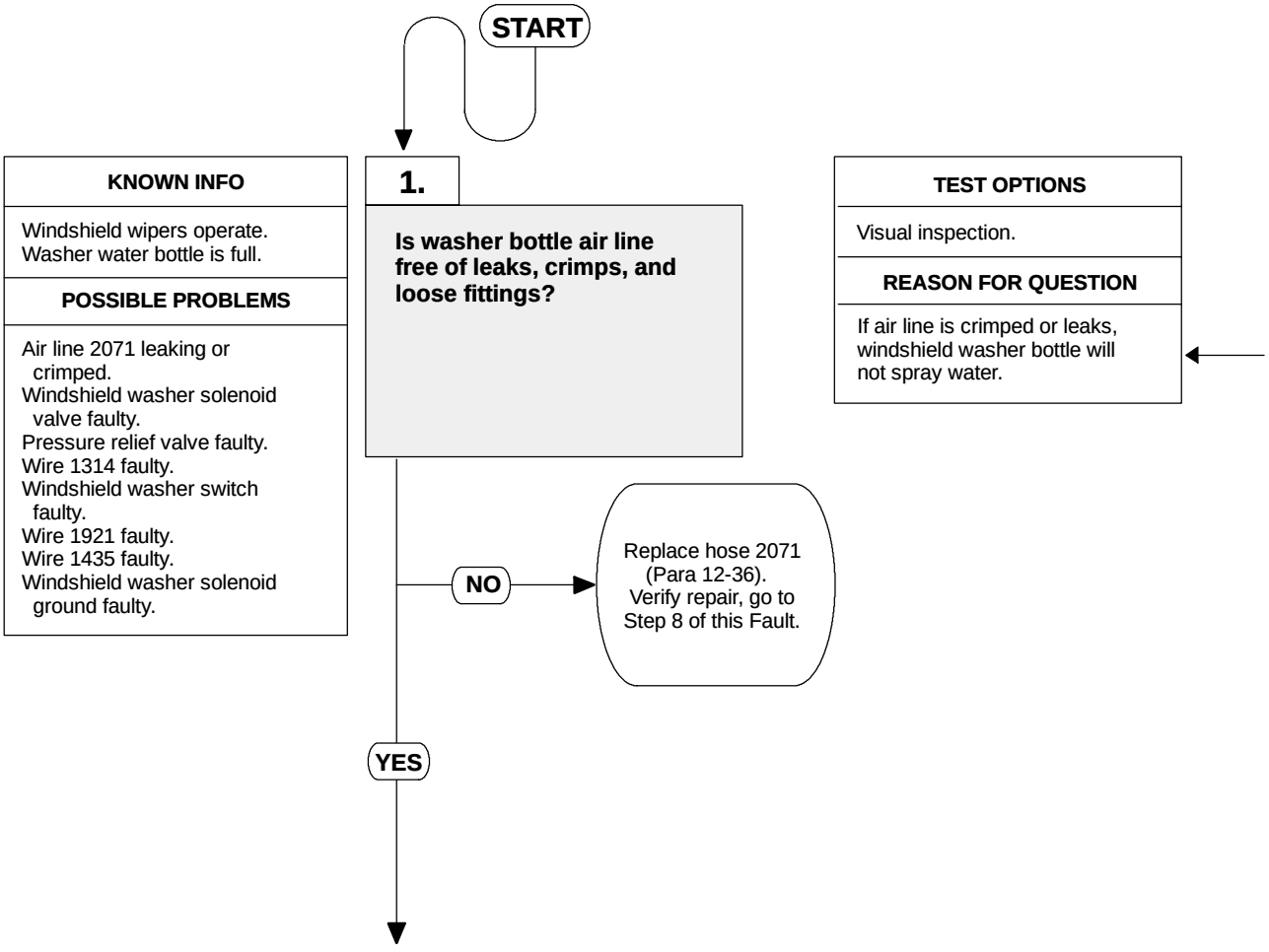
INITIAL SETUP

Tools and Special Tools
- Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
- STE/ICE-R (optional) (Item 3, Appendix G)
- Multimeter (Item 34, Appendix G)
- Goggles, Industrial (Item 30, Appendix G)
- Test Kit, Pressure (Item 50, Appendix G)

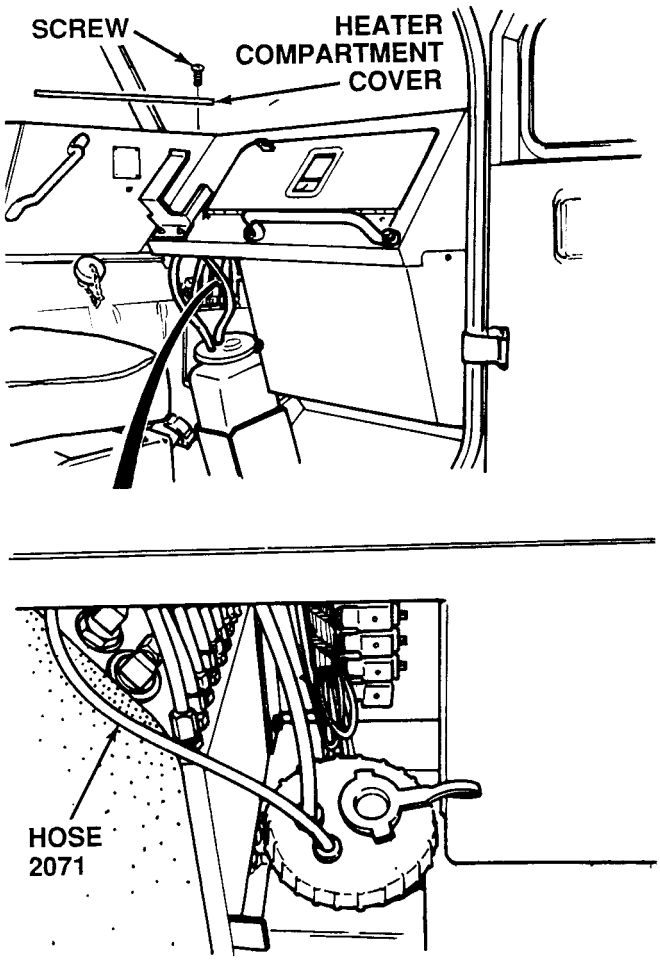
Materials/Parts
- Adhesive (Item 3, Appendix C)
- Solution, Soap (Item 86, Appendix C)

References
- TM 9-2320-364-10
- TM 9-4910-571-12&P

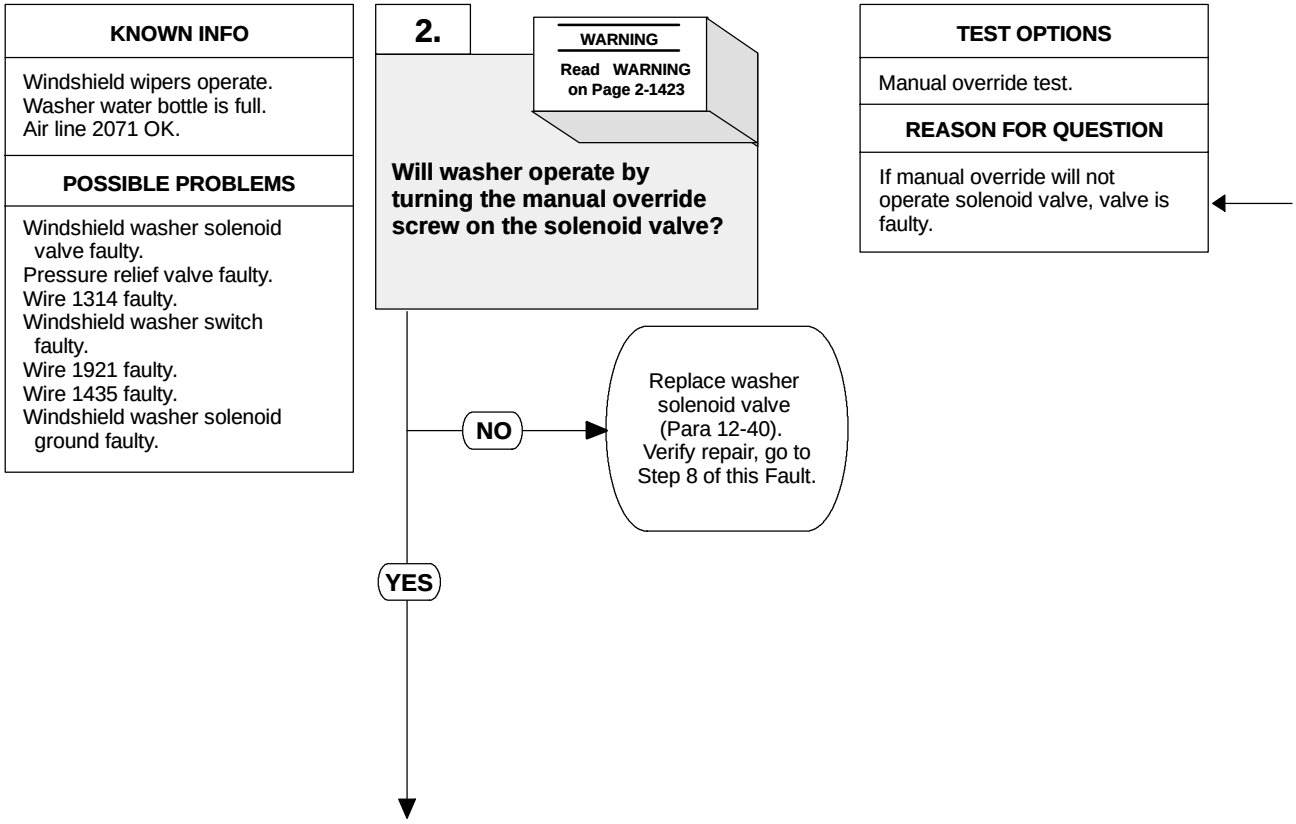
Equipment Condition
- Engine OFF, (TM 9-2320-364-10)
- Parking brake applied, (TM 9-2320-364-10)



VISUAL INSPECTION
(1) Remove eight screws and heater compartment cover. (2) Inspect air line 2071 for crimps, breaks, and loose fittings. (3) Perform leak check of air line 2071 with soap/water solution. (a) If air line 2071 is damaged or leaks, replace air line 2071 (Para 12-36). (b) If air line is OK, go to Step 2 of this Fault.



30. WINDSHIELD WASHERS DO NOT OPERATE (CONT).

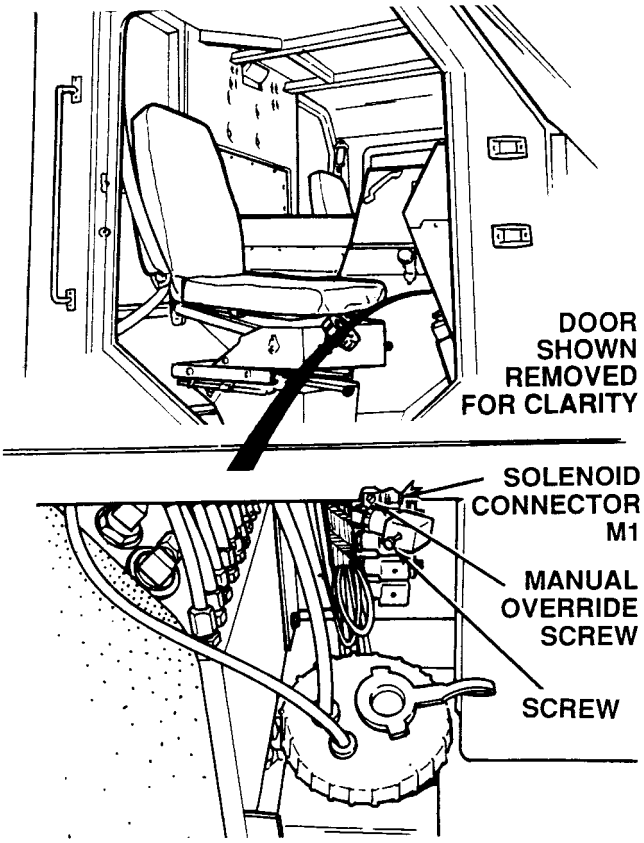


WARNING

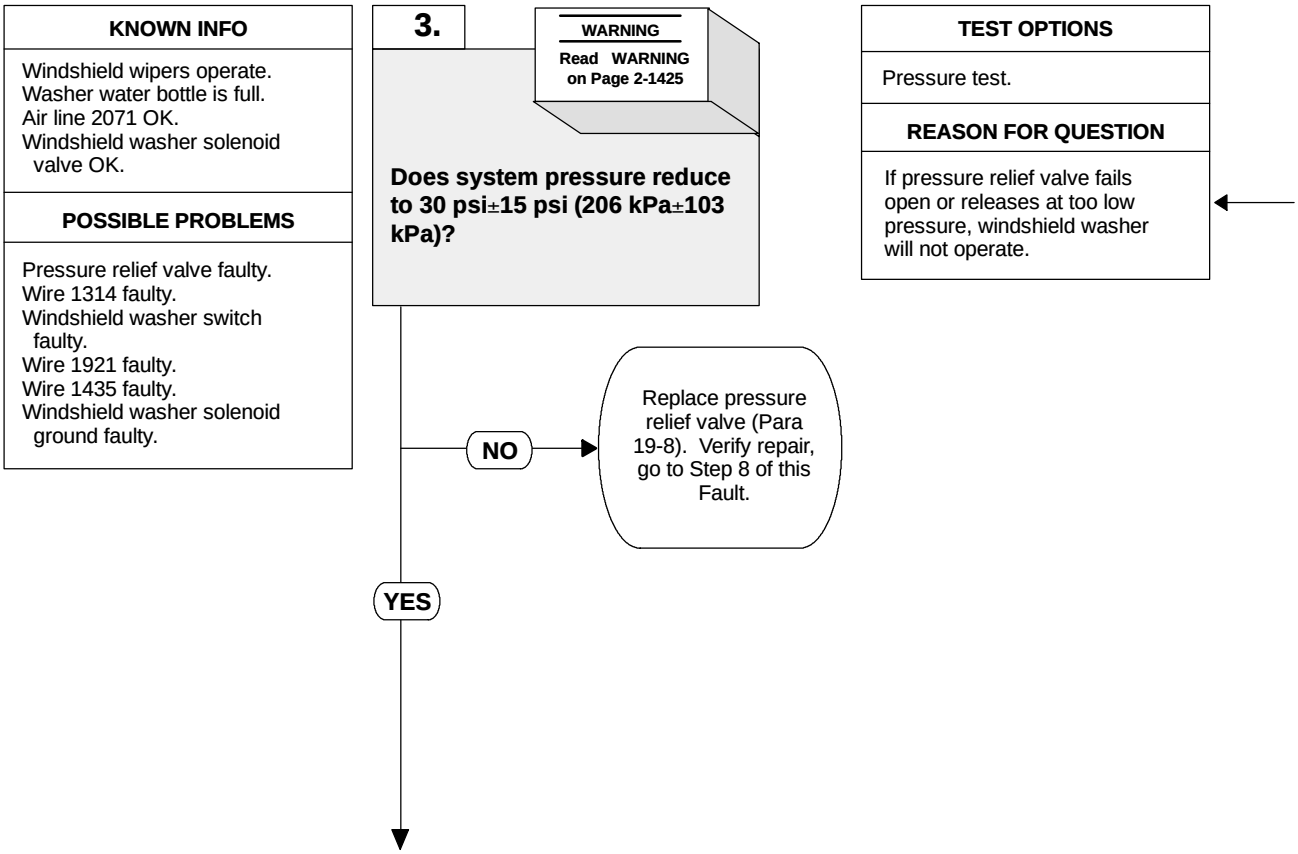
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

MANUAL OVERRIDE TEST

(1) Loosen screw and disconnect solenoid connector M1.
(2) Turn solenoid valve manual override screw all the way to the left and observe windshield.
   (a) If windshield washers do not operate, replace solenoid valve (Para 12-40).
   (b) If windshield washers operate, valve is OK.
(3) Turn solenoid valve manual override screw all the way to the right.



30. WINDSHIELD WASHERS DO NOT OPERATE (CONT).

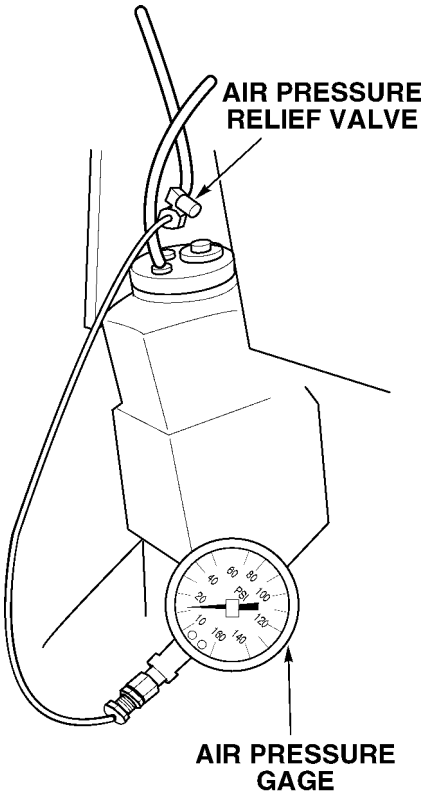


WARNING

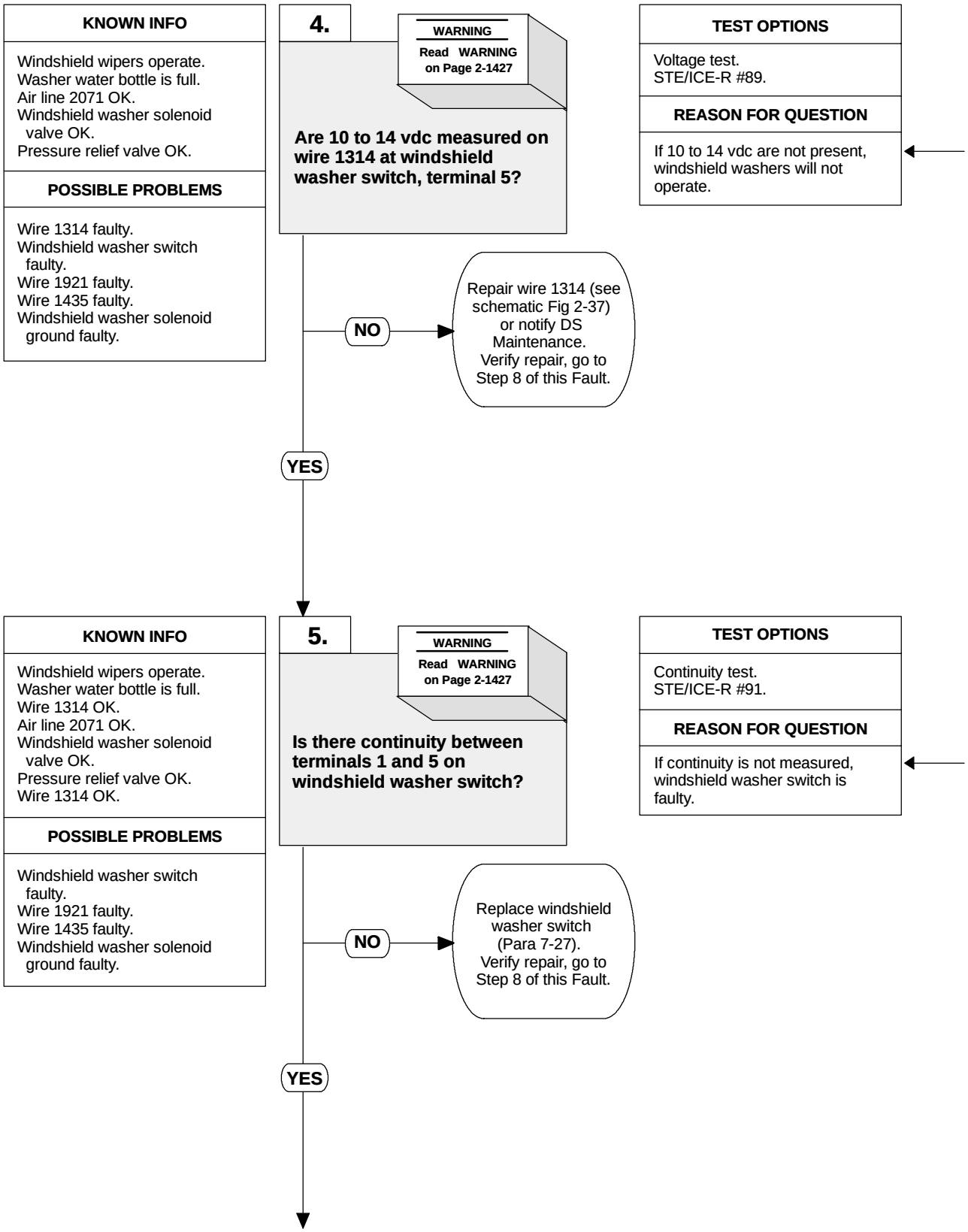
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

PRESSURE TEST

(1) Drain air pressure, (TM 9-2320-364-10).
(2) Disconnect windshield washer bottle air line from pressure relief valve.
(3) Connect 0 to 160 psi (0 to 1103 kPa) pressure gage to pressure relief valve.
(4) Start engine and build up air pressure.
(5) Depress windshield washer switch.
  (a) If air pressure is not 15 psi to 45 psi (103 kPa to 309 kPa), perform Steps (6) and (7) below and replace pressure relief valve (Para 19-8).
  (b) If air pressure is 15 psi to 45 psi (103 kPa to 309 kPa), pressure relief valve is OK.
(6) Release windshield washer switch.
(7) Turn OFF ENGINE switch.



30. WINDSHIELD WASHERS DO NOT OPERATE (CONT).

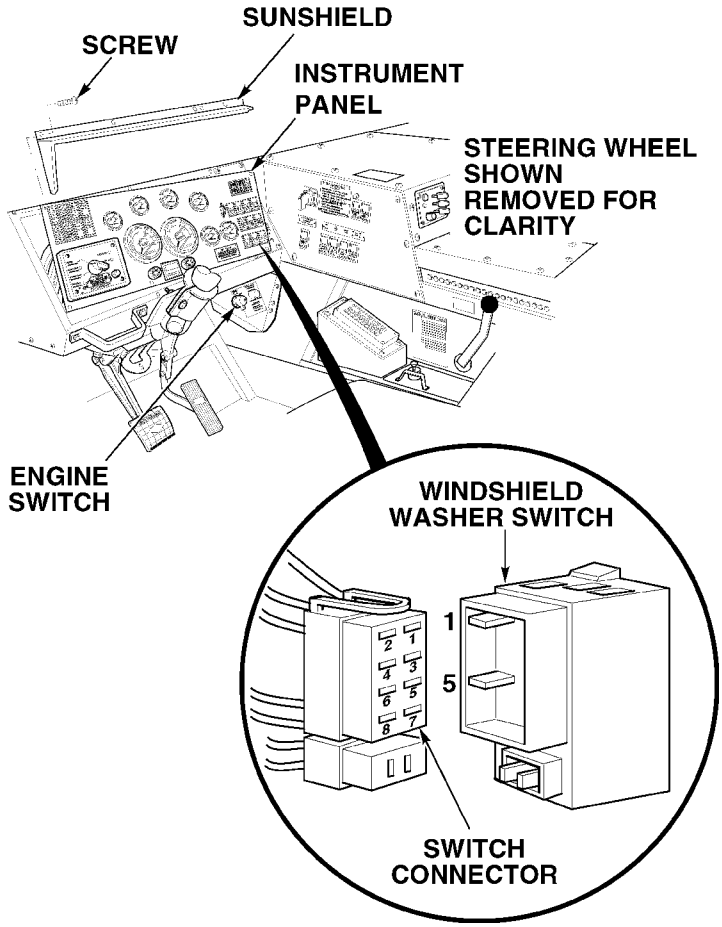


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

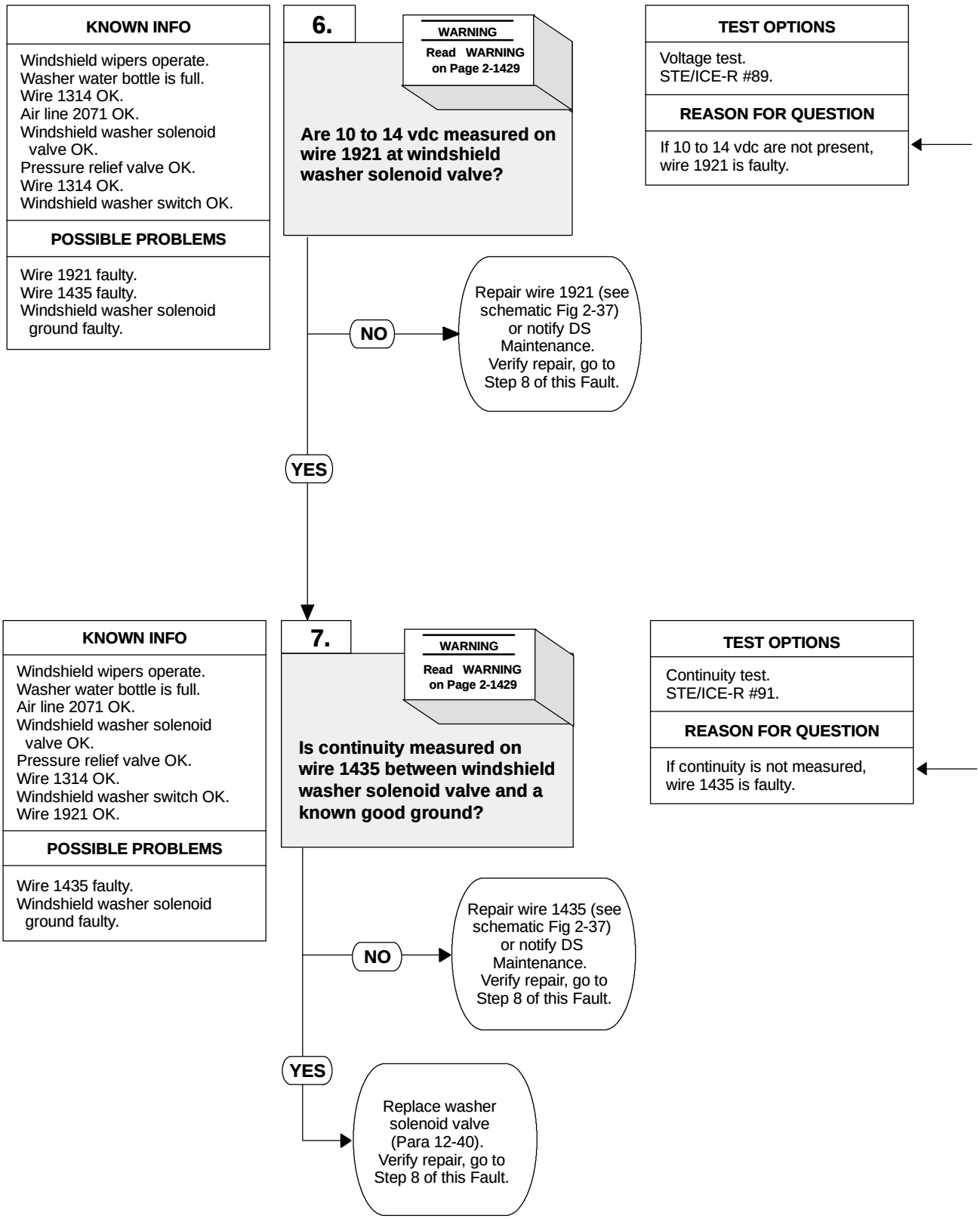
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove windshield washer switch from connector.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to wire 1314 at windshield washer switch, terminal 5.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
(8) Turn on windshield washer switch.
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1314 (see schematic Fig 2-37) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1314 is OK.
(9) Turn OFF ENGINE switch.



CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Press and hold windshield washer switch on.
(3) Is there continuity between windshield washer switch, terminals 1 and 5?
  (a) If there is no continuity, replace windshield washer switch (Para 7-27).
  (b) If there is continuity, windshield washer switch is OK.
(4) Install windshield washer switch.
(5) Install instrument panel and sunshield with ten screws.

30. WINDSHIELD WASHERS DO NOT OPERATE (CONT).



WARNING

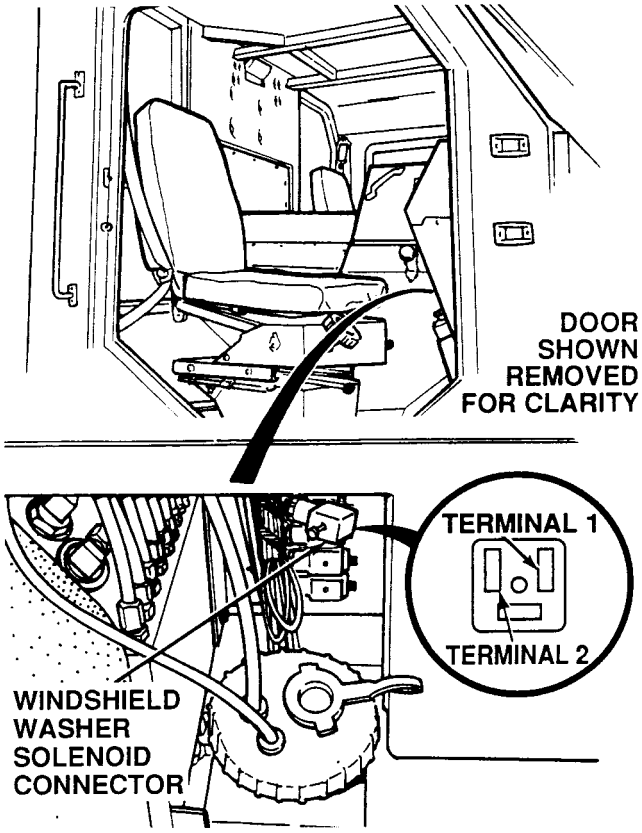
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

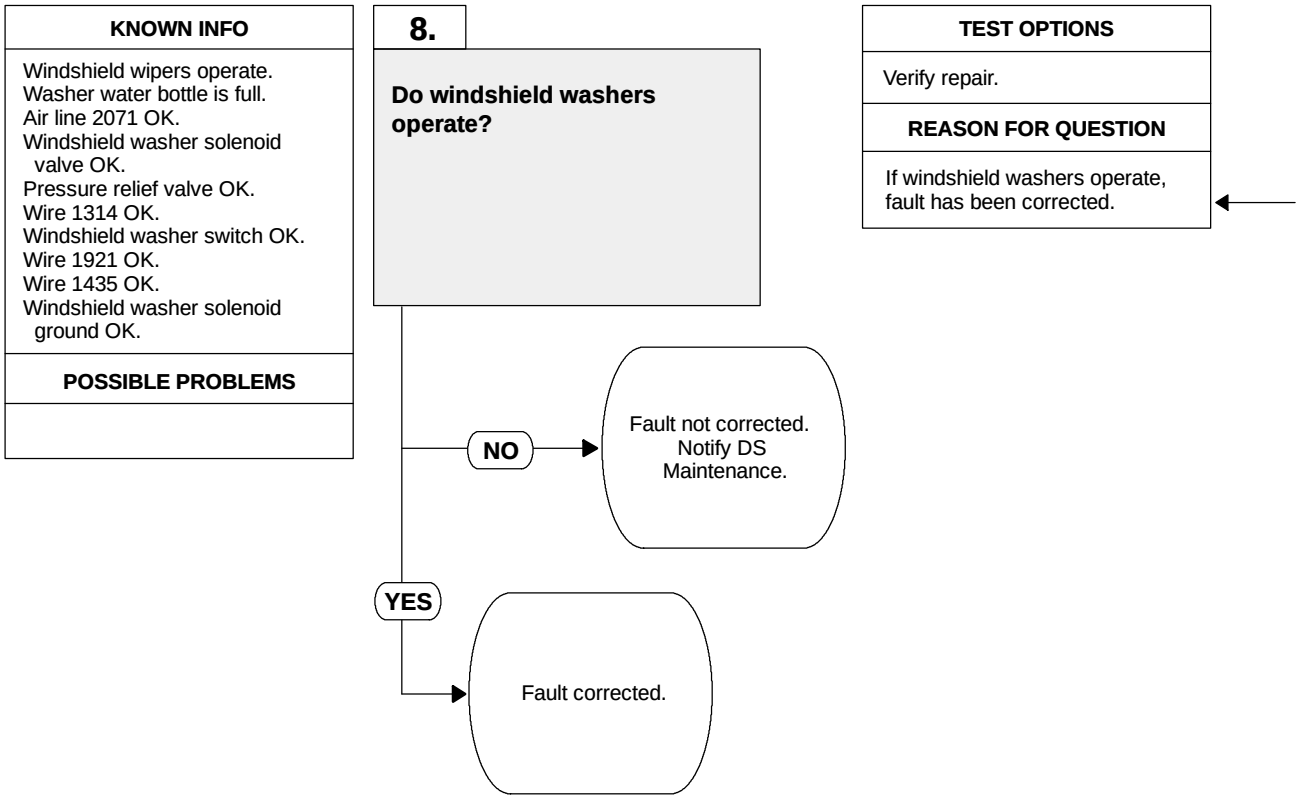
(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1921 at windshield washer solenoid, terminal 1.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on windshield washer switch.
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1921 (see schematic Fig 2-37) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1921 is OK.
(6) Turn OFF ENGINE switch.
(7) Install heater compartment cover and eight screws.

CONTINUITY TEST

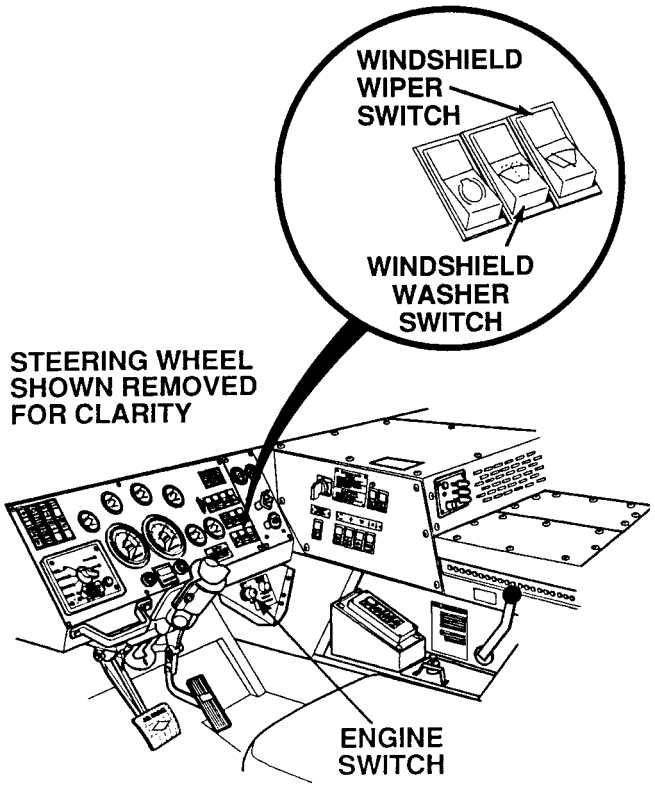
(1) Set multimeter select switch to ohms.
(2) Is there continuity between windshield washer solenoid valve, terminal 2 and a known good ground?
    (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-37) or notify DS Maintenance.
    (b) If there is continuity, replace washer solenoid valve (Para 12-40).
(3) Connect solenoid connector.
(4) Coat head of connector screw with adhesive and tighten screw.



30. WINDSHIELD WASHERS DO NOT OPERATE (CONT).



VERIFY REPAIR
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Press and hold windshield washer switch on. (a) If windshield washers do not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If windshield washers operate, fault has been corrected. (3) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

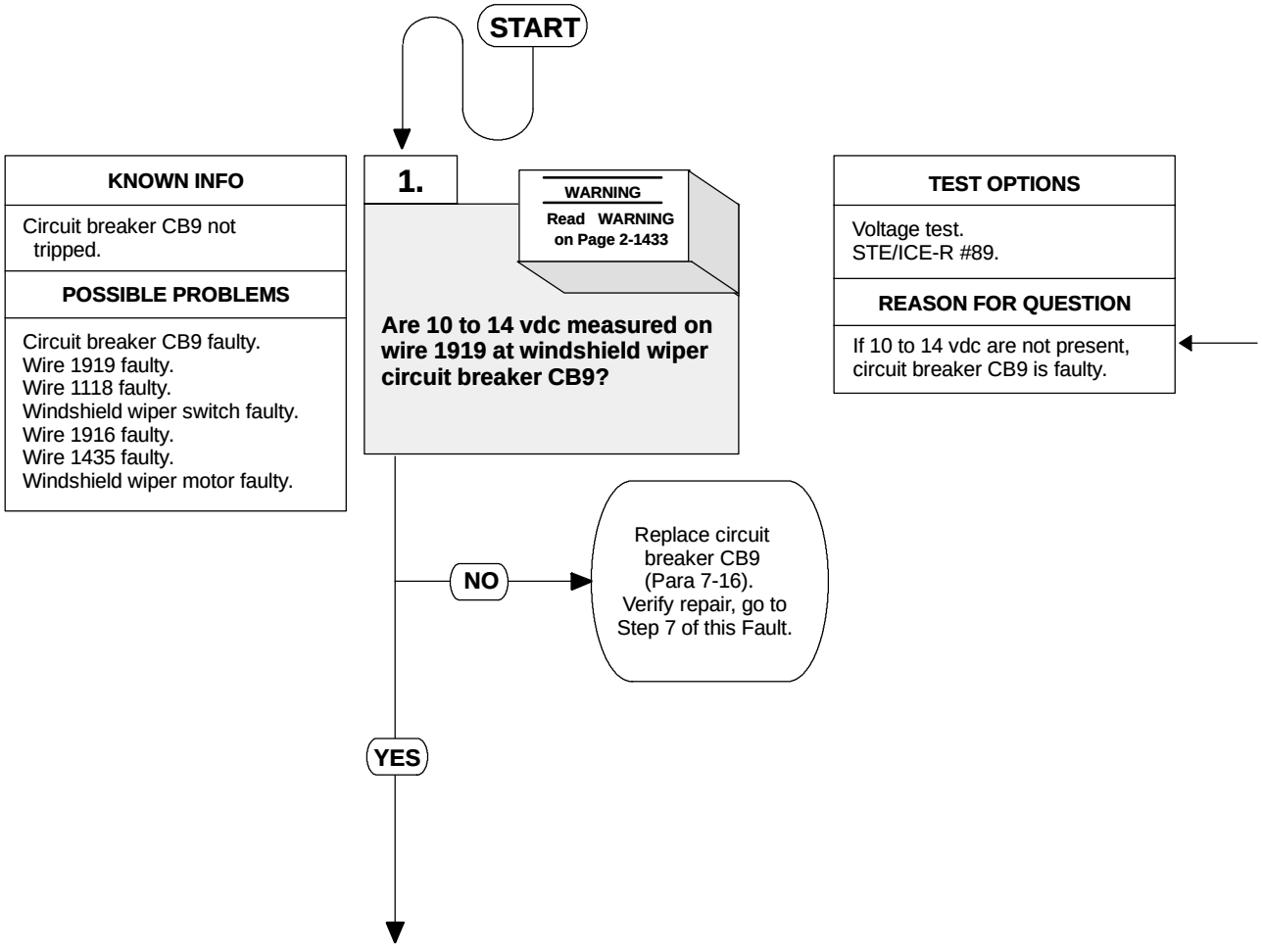
31. WINDSHIELD WIPERS DO NOT OPERATE AT HIGH OR LOW SPEED.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

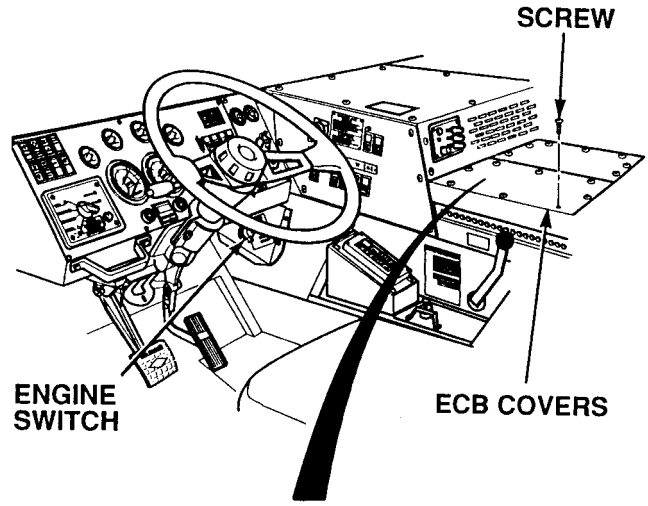
References
TM 9-2320-364-10
TM 9-4910-571-12&P

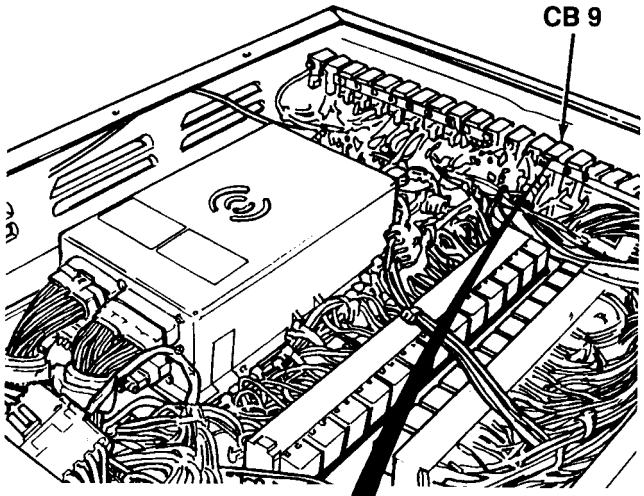
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

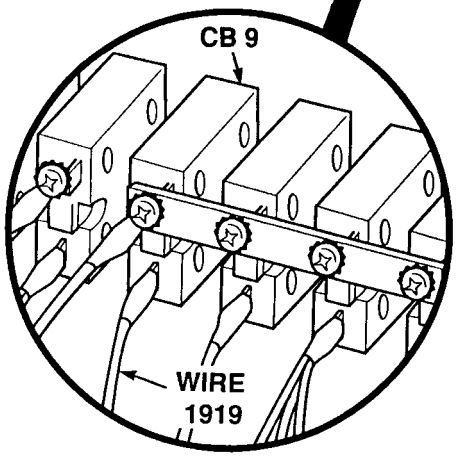


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.



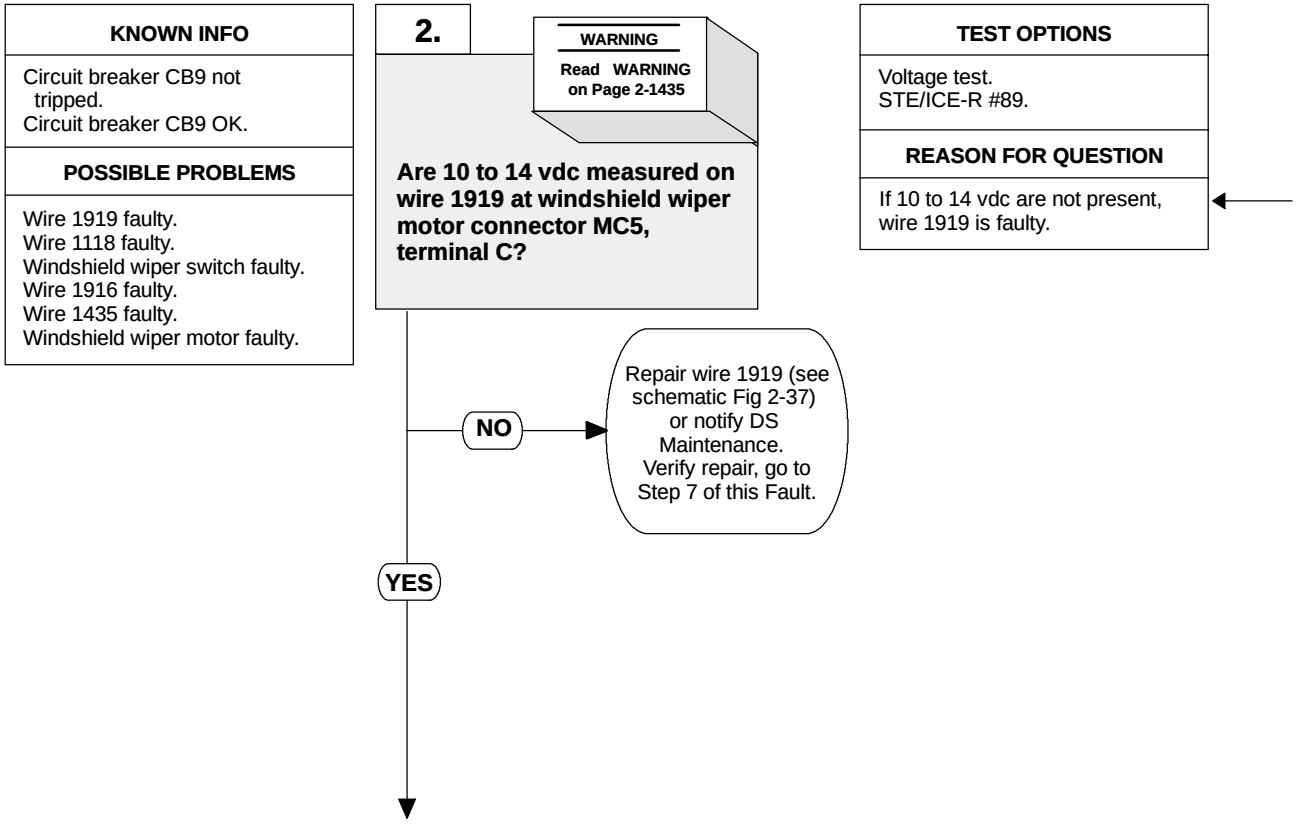




VOLTAGE TEST

(1) Remove 15 screws and ECB panels.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1919 at windshield wiper circuit breaker CB9.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace circuit breaker CB9 (Para 7-16).
  (b) If there are 10 to 14 vdc present, circuit breaker CB9 is OK.
(6) Turn OFF ENGINE switch.
(7) Install two ECB covers and 15 screws.

31. WINDSHIELD WIPERS DO NOT OPERATE AT HIGH OR LOW SPEED (CONT).

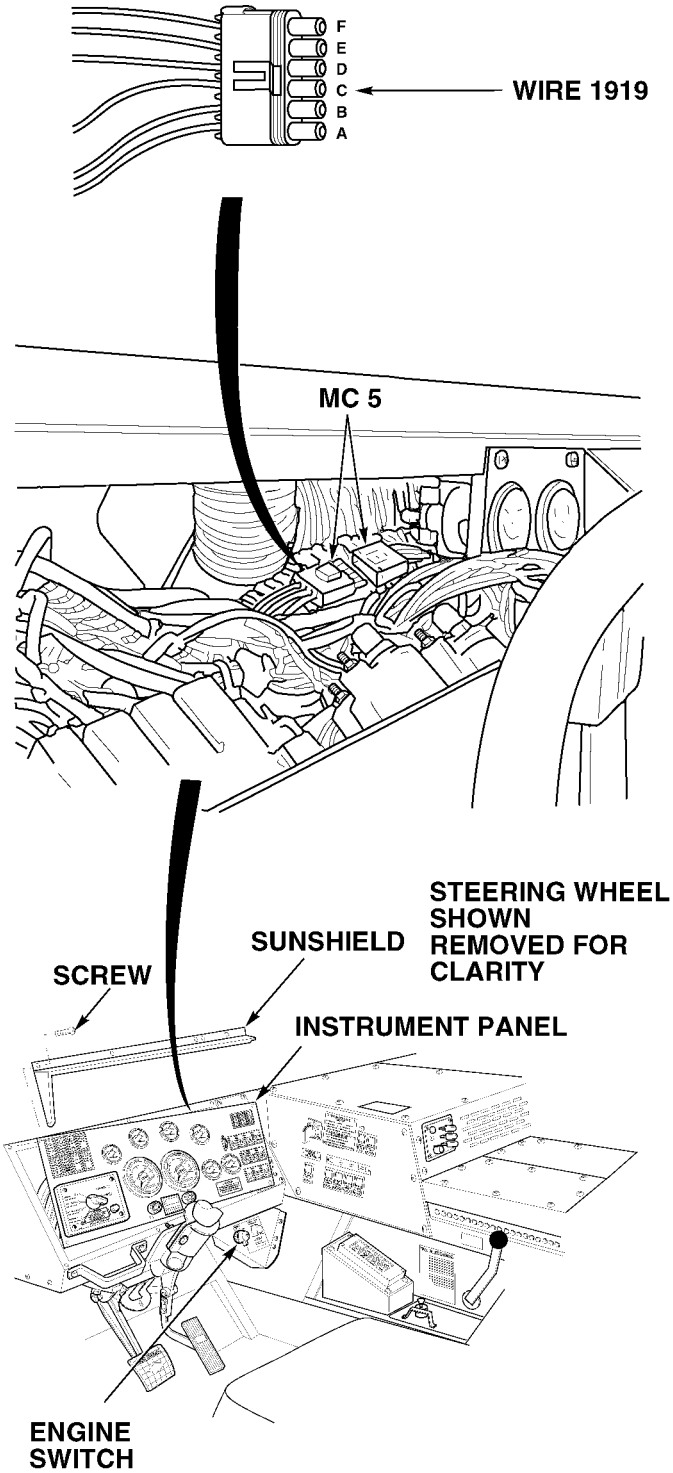


WARNING

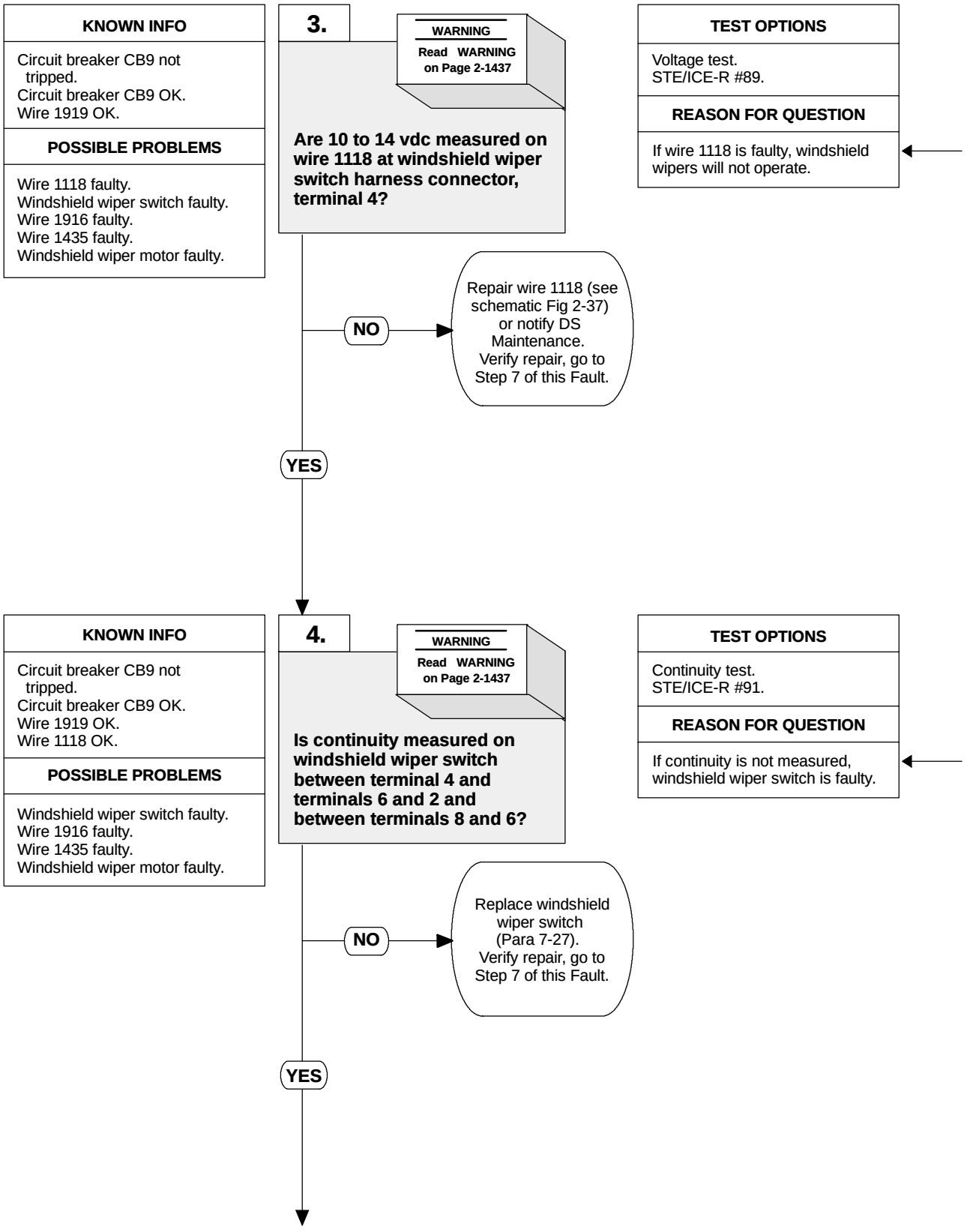
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect windshield wiper motor connector MC5.
(4) Connect positive (+) multimeter lead to wire 1919 at connector MC5, terminal C.
(5) Connect negative (-) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1919 (see schematic Fig 2-37) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1919 is OK.
(7) Turn OFF ENGINE switch.



31. WINDSHIELD WIPERS DO NOT OPERATE AT HIGH OR LOW SPEED (CONT).



WARNING

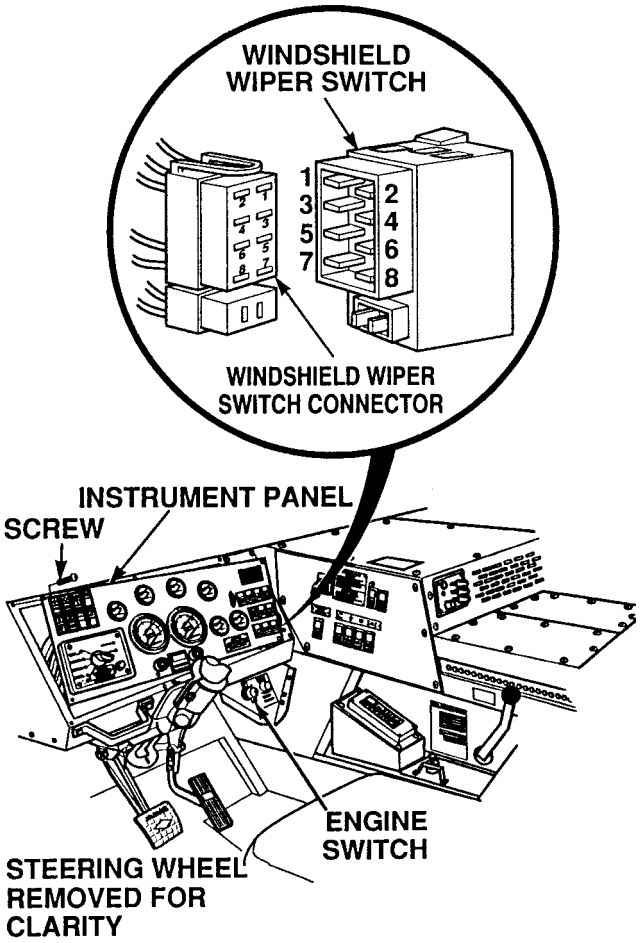
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

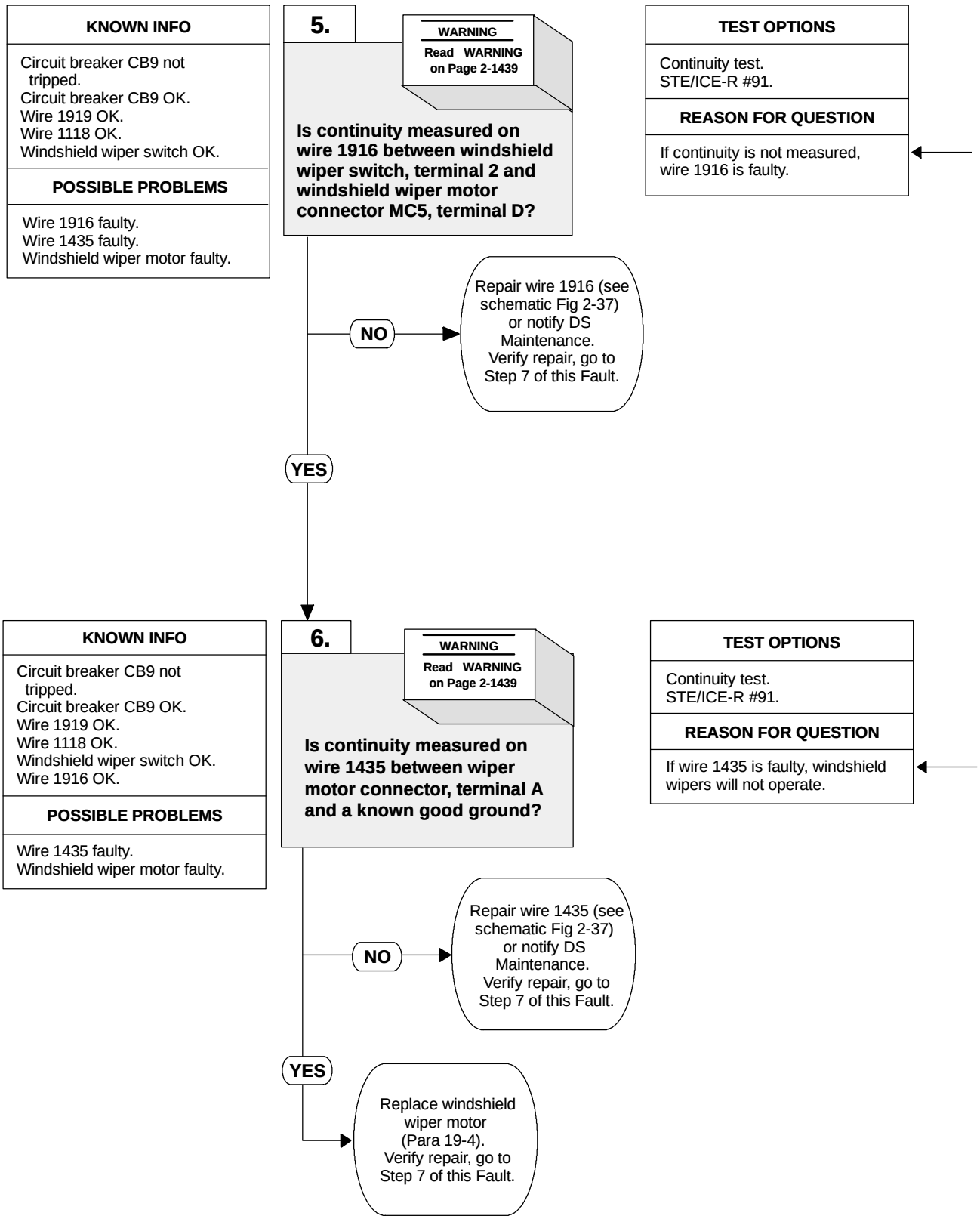
(1) Disconnect windshield wiper switch connector.
(2) Connect positive (+) multimeter lead to wire 1118 at windshield wiper switch connector, terminal 4.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM9-2320-364-10)
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1118 (see schematic Fig 2-37) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1118 is OK.
(5) Turn OFF ENGINE switch.
(6) Install windshield wiper switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Set windshield wiper switch to high position (TM 9-2320-364-10).
(3) Is there continuity between windshield wiper switch, terminals 4 and 2 and 4 and 6?
  (a) If there is no continuity, replace windshield wiper switch (Para 7-27).
  (b) If there is continuity, go to Step (4) below.
(4) Is there continuity between windshield wiper switch, terminals 6 and 8?
  (a) If there is no continuity, replace windshield wiper switch (Para 7-27).
  (b) If there is continuity, windshield wiper switch is OK.



31. WINDSHIELD WIPERS DO NOT OPERATE AT HIGH OR LOW SPEED (CONT).

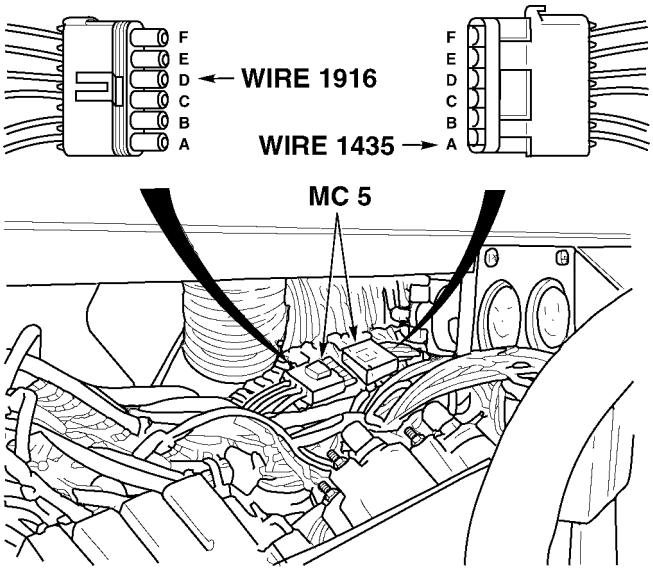


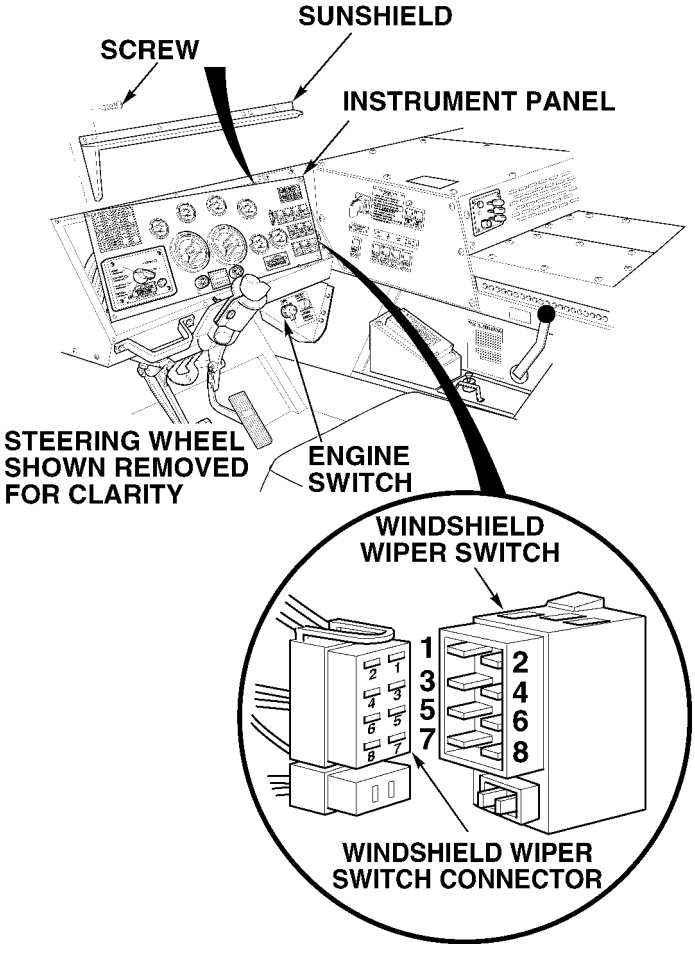
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Is there continuity between connector MC5, terminal D and windshield wiper switch, terminal 2?
   (a) If there is no continuity, repair wire 1916 (see schematic Fig 2-37) or notify DS Maintenance.
   (b) If there is continuity, wire 1916 is OK.
(2) Connect windshield wiper switch connector.

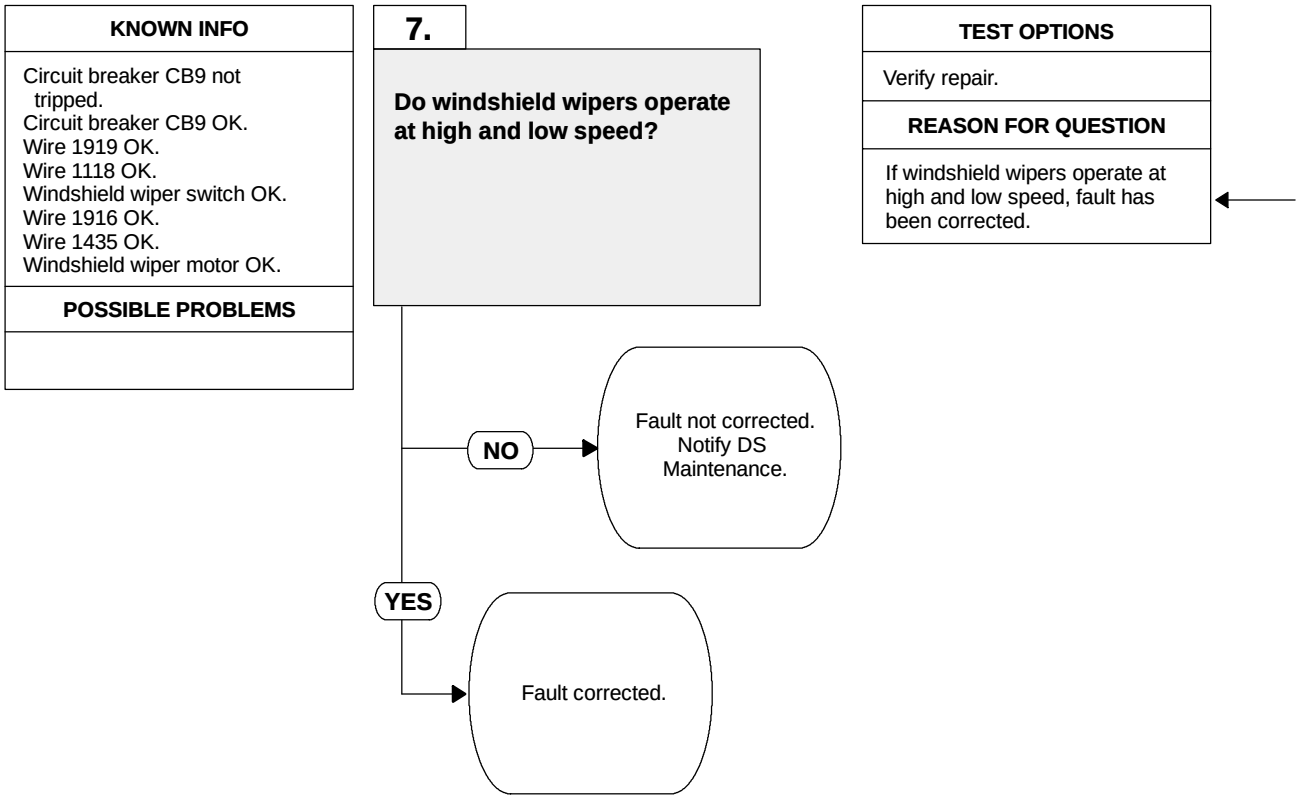




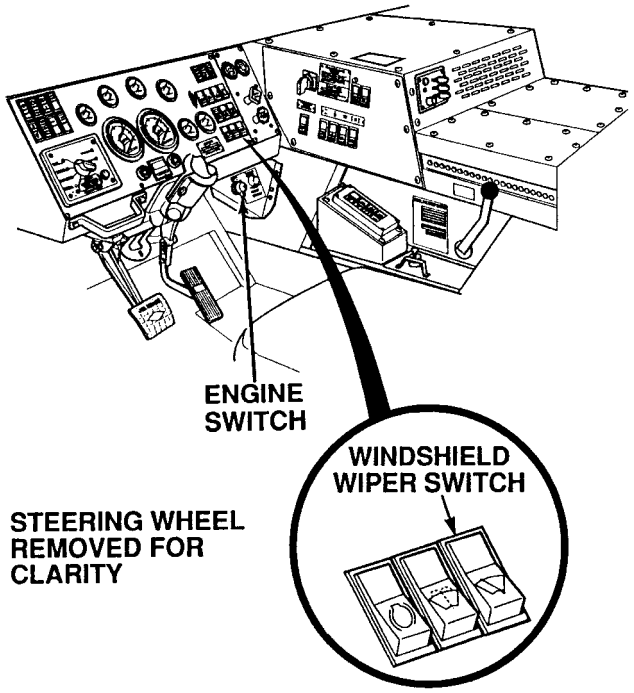
CONTINUITY TEST

(1) Is there continuity between windshield wiper motor connector MC5, terminal A and a known good ground?
   (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-37) or notify DS Maintenance.
   (b) If there is continuity, replace windshield wiper motor (Para 19-4).
(2) Connect windshield wiper motor connector MC5.
(3) Install instrument panel and sunshield with ten screws.
(4) Install ECB covers and 15 screws.

31. WINDSHIELD WIPERS DO NOT OPERATE AT HIGH OR LOW SPEED (CONT).



VERIFY REPAIR
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Set windshield wiper switch to low and high position. (a) If windshield wipers do not operate at low and high speed, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance. (b) If windshield wipers operate at low and high speed, fault has been corrected. (3) Turn off windshield wiper switch. (4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

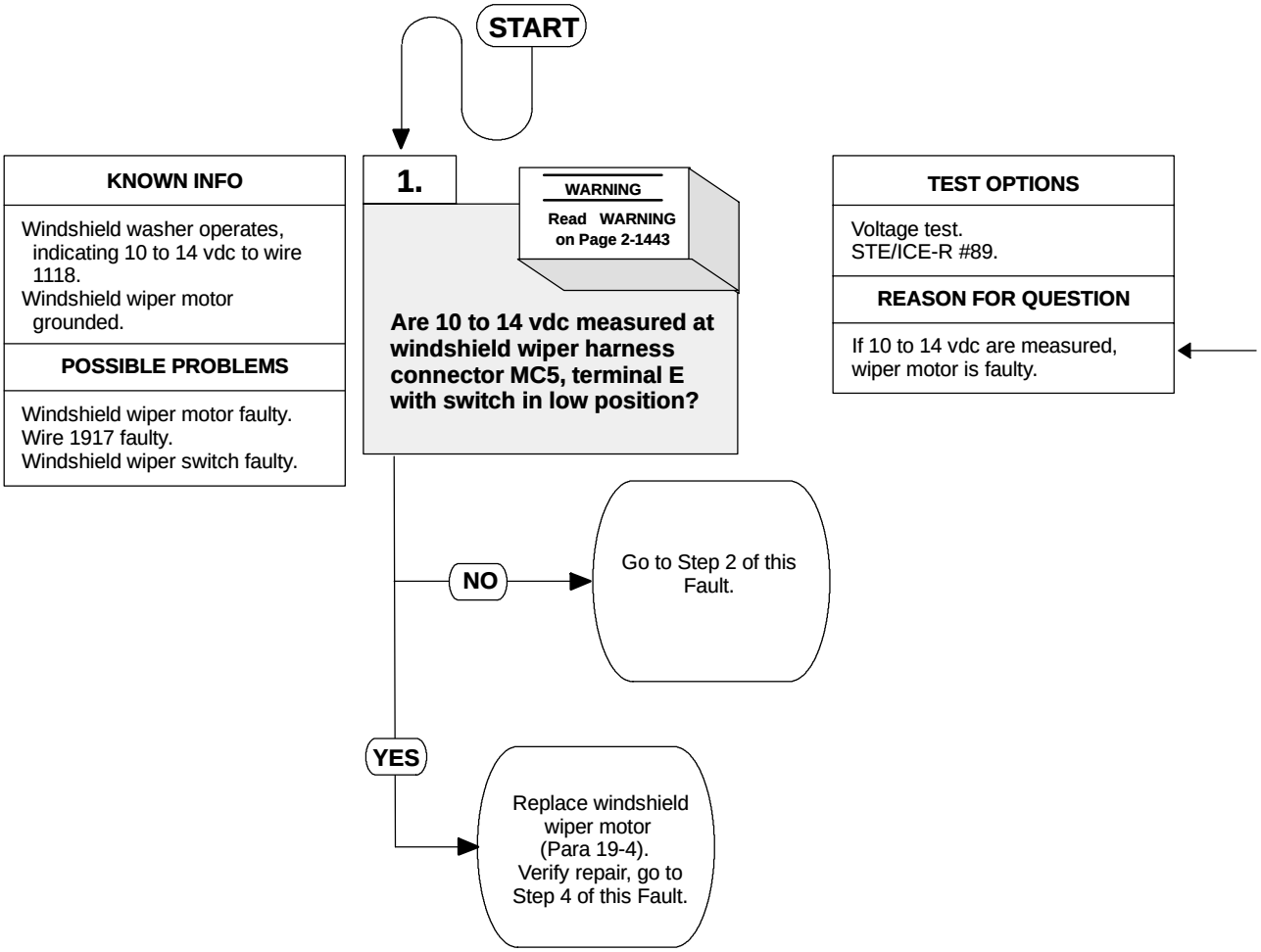
32. WINDSHIELD WIPERS DO NOT OPERATE (LOW SPEED).

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

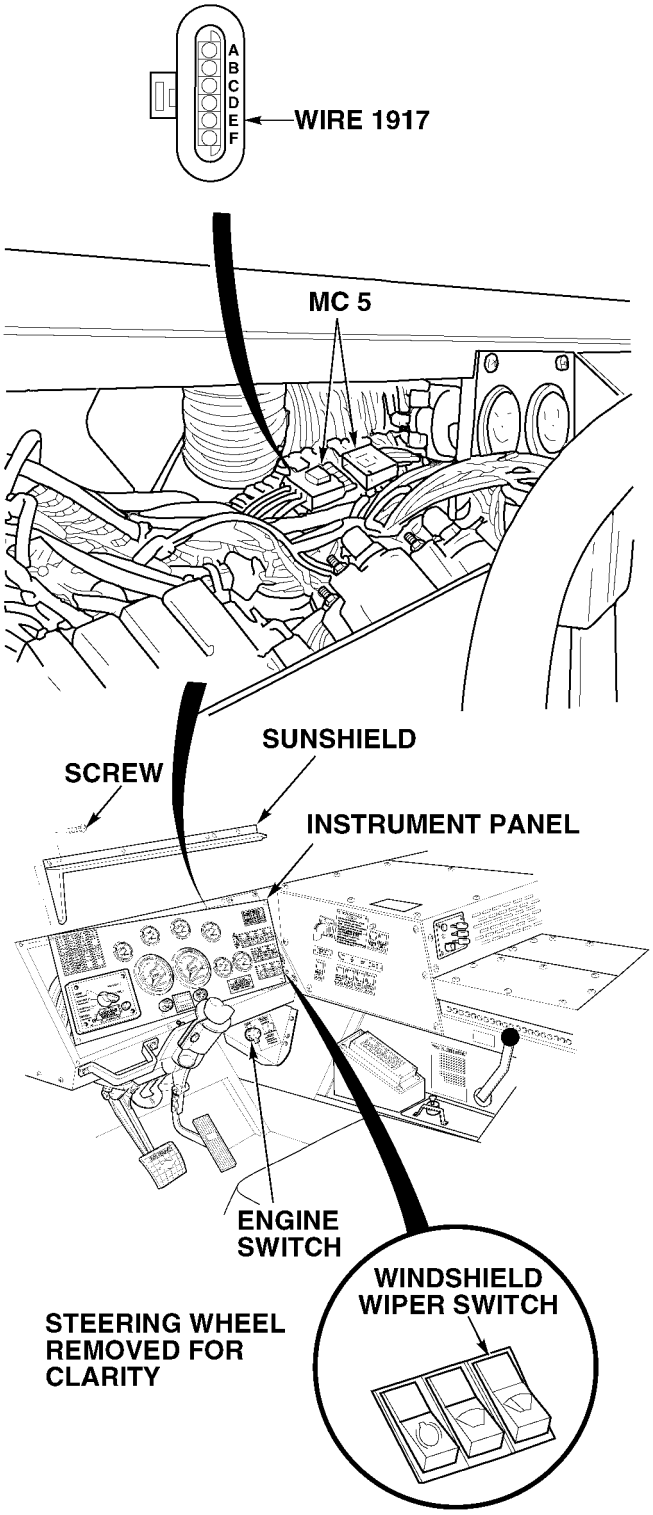


WARNING

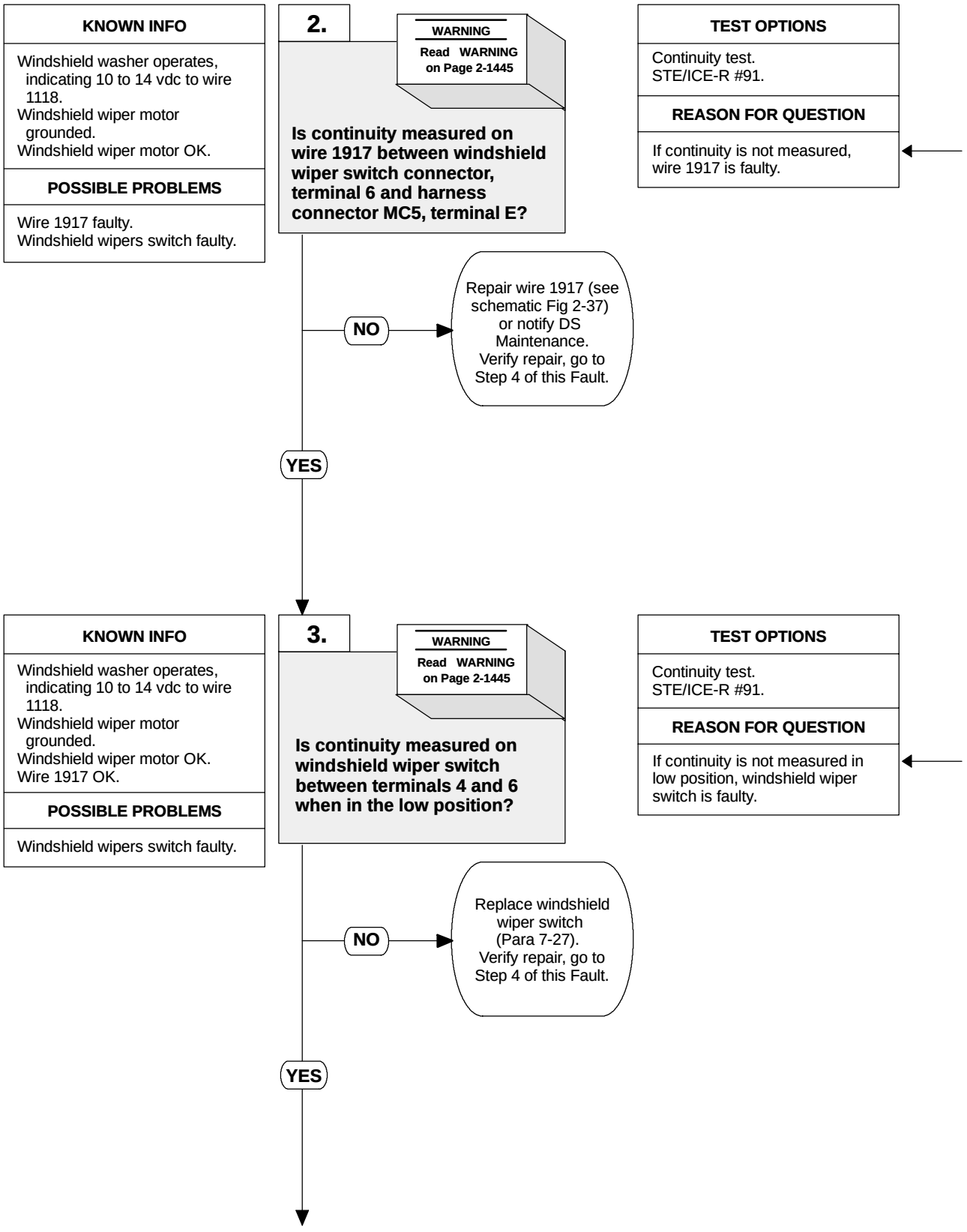
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect connector MC5.
(4) Set multimeter selector switch to volts dc.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) Set windshield wipers switch to low position.
(7) Connect positive (+) multimeter lead to wire 1917 at harness connector MC5, terminal E.
(8) Connect negative (–) multimeter lead to a known good ground.
    (a) If 10 to 14 vdc are not present, perform Steps (9) and (10) below and go to Step 2 of this Fault.
    (b) If 10 to 14 vdc are present, replace windshield wiper motor (Para 19-4).
(9) Set windshield wipers switch to OFF position.
(10) Turn OFF ENGINE switch (TM 9-2320-364-10).



32. WINDSHIELD WIPERS DO NOT OPERATE (LOW SPEED) (CONT).



WARNING

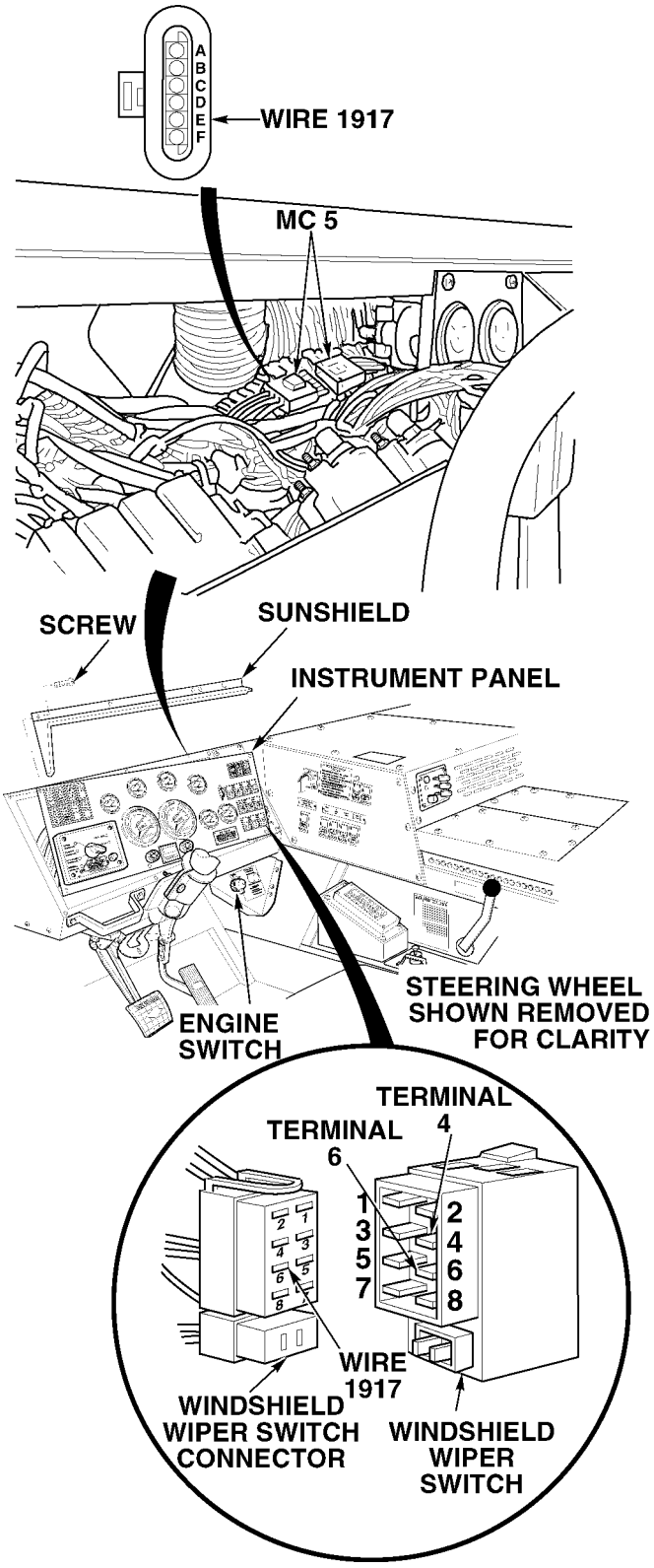
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

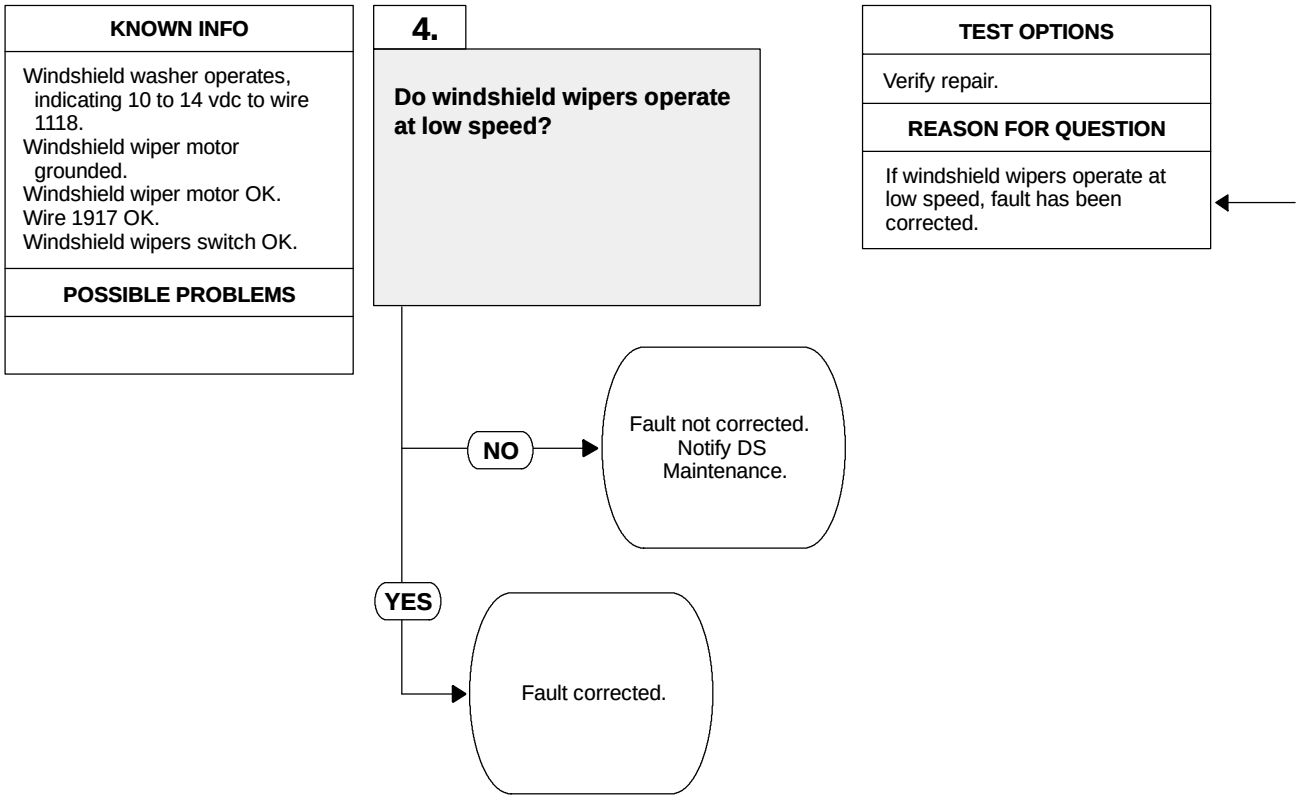
(1) Disconnect windshield wiper motor connector MC5.
(2) Set multimeter selector switch to ohms.
(3) Is there continuity between harness connector MC5, terminal E and windshield wiper switch connector, terminal 6?
  (a) If there is no continuity, repair wire 1917 (see schematic Fig 2-37) or notify DS Maintenance.
  (b) If there is continuity, wire 1917 is OK.
(4) Connect connector MC5.

CONTINUITY TEST

(1) Set windshield wiper switch to low position (TM 9-2320-364-10).
(2) Disconnect windshield wiper switch connector.
(3) Is there continuity measured between terminals 4 and 6 at windshield wiper switch?
  (a) If there is no continuity, replace windshield wiper switch (Para 7-27).
  (b) If there is continuity, windshield wiper switch is OK.
(4) Connect windshield wiper switch connector
(5) Set windshield wiper switch to off position.
(6) Install instrument panel and sunshield with ten screws.

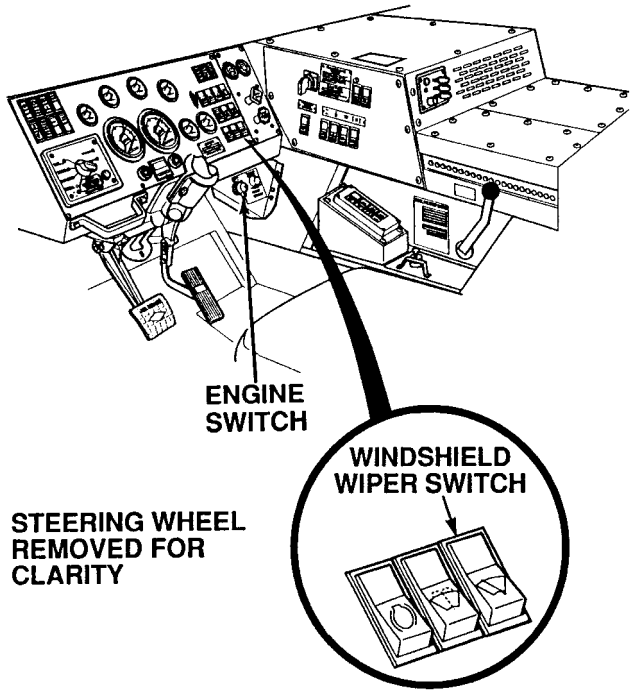


32. WINDSHIELD WIPERS DO NOT OPERATE (LOW SPEED) (CONT).



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Set windshield wiper switch to low position and observe windshield wipers.
    (a) If windshield wipers do not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
    (b) If windshield wipers operate, fault has been corrected.
(3) Set windshield wiper switch to off position.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

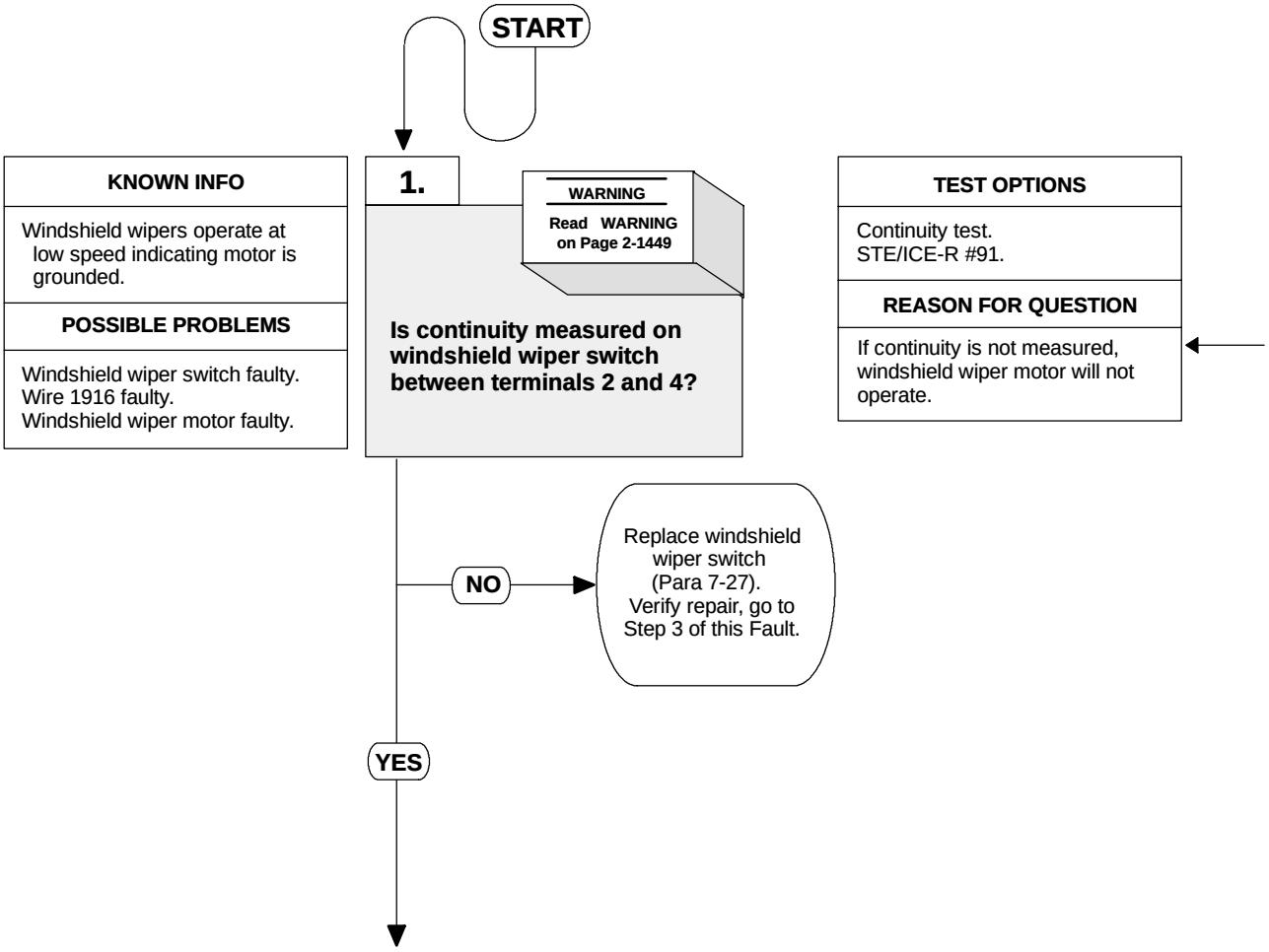
33. WINDSHIELD WIPERS DO NOT OPERATE (HIGH SPEED).

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

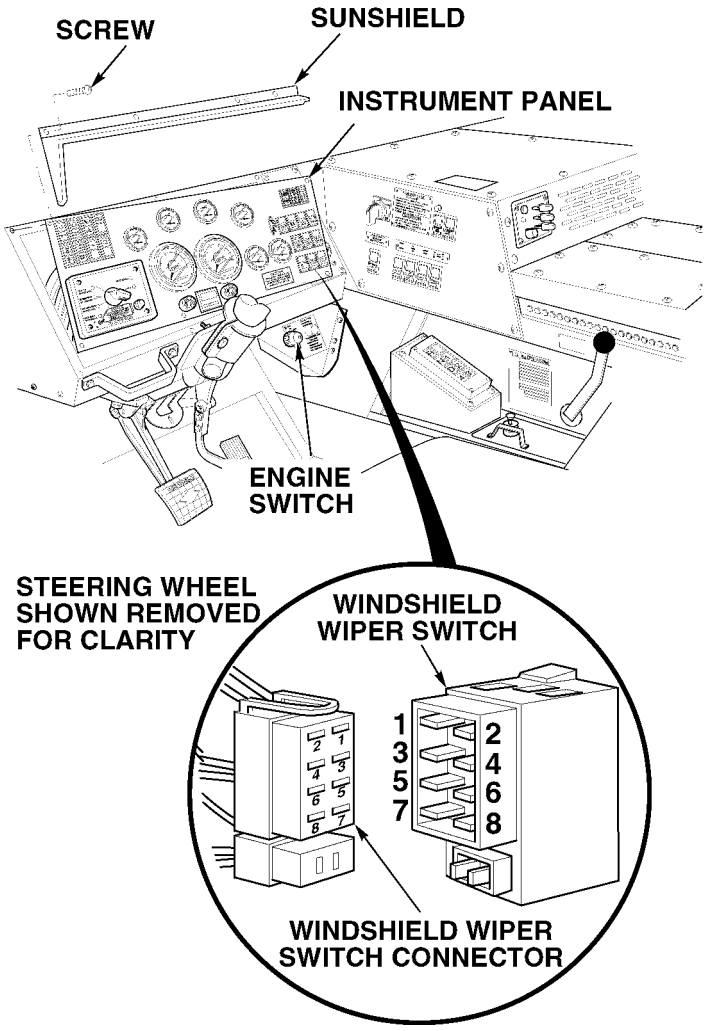


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Disconnect windshield wiper switch connector.
(4) Set multimeter select switch to ohms.
(5) Set windshield wipers switch to high position (TM 9-2320-364-10).
(6) Is there continuity measured between terminals 2 and 4 at windshield wiper switch?
    (a) If continuity is not measured, replace windshield wiper switch (Para 7-27).
    (b) If continuity is measured, switch is OK.
(7) Connect windshield wiper switch connector.



33. WINDSHIELD WIPERS DO NOT OPERATE (HIGH SPEED) (CONT).

KNOWN INFO
Windshield wipers operate at low speed indicating motor is grounded. Windshield wiper switch OK.
POSSIBLE PROBLEMS
Wire 1916 faulty. Windshield wiper motor faulty.

2.

WARNING
Read WARNING on Page 2-1451

Are 10 to 14 vdc measured on wire 1916 at windshield wiper motor, terminal D with switch in high position?

TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 10 to 14 vdc are not measured, windshield wiper motor will not operate.

NO → Repair wire 1916 (see schematic Fig 2-37) or notify DS Maintenance. Verify repair, go to Step 3 of this Fault.

YES → Replace windshield wiper motor (Para 19-4). Verify repair, go to Step 3 of this Fault.

KNOWN INFO
Windshield wipers operate at low speed indicating motor is grounded. Windshield wiper switch OK. Wire 1916 OK. Windshield wiper motor OK.
POSSIBLE PROBLEMS

3.

Do windshield wipers operate at high speed?

TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If windshield wipers operate at high speed, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

WARNING

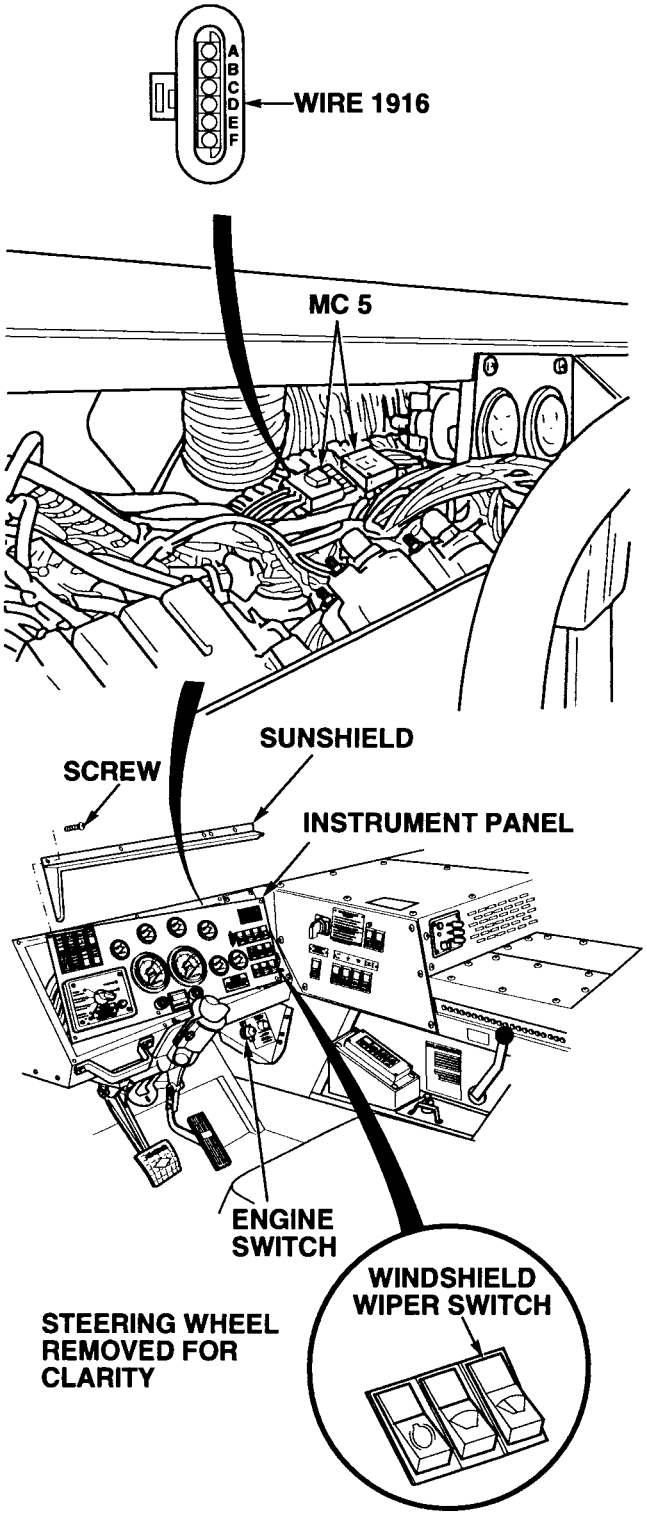
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Disconnect windshield wiper motor connector MC5.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead wire 1916 at windshield wiper motor terminal D.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Set windshield wiper switch to high position.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, perform Steps (7) and (8) below and repair wire 1916 (see schematic Fig 2-37) or notify DS Maintenance.
  (b) If 10 to 14 VDC are measured, perform Steps (7) and (8) below and replace windshield wiper motor (Para 19-4).
(7) Set windshield wiper switch to off position.
(8) Turn OFF ENGINE switch.
(9) Connect connector MC5.
(10) Install instrument panel and sunshield with ten screws.

VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Set windshield wiper switch to high position and observe windshield wipers.
  (a) If windshield wipers do not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If windshield wipers operate, fault has been corrected.
(3) Set windshield wiper switch to off position.
(4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

34. ENGINE BRAKE DOES NOT OPERATE IN LOW.

INITIAL SETUP

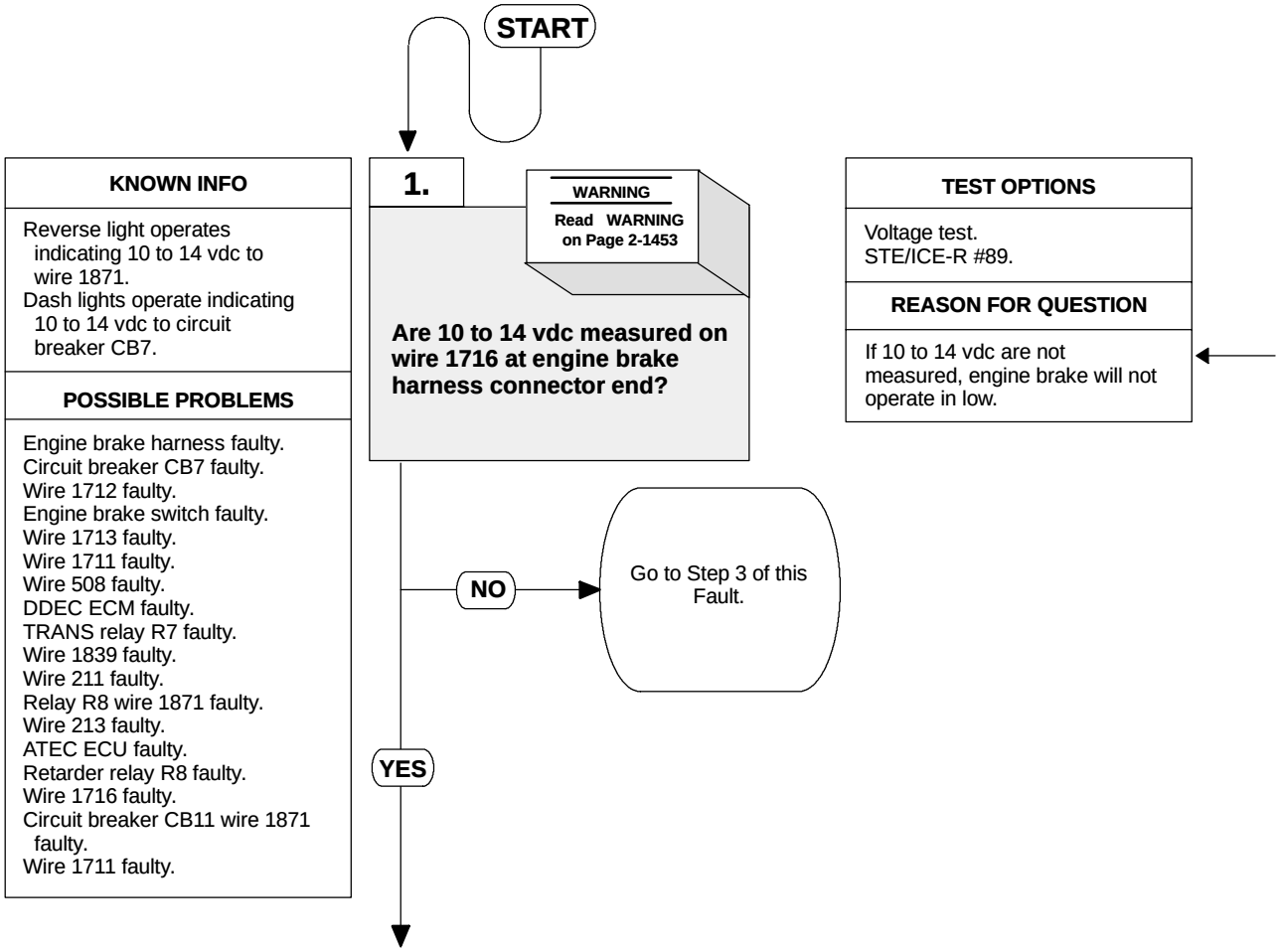
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

Personnel Required
Two

Materials/Parts
Lockwasher (8) (Item 195, Appendix F)

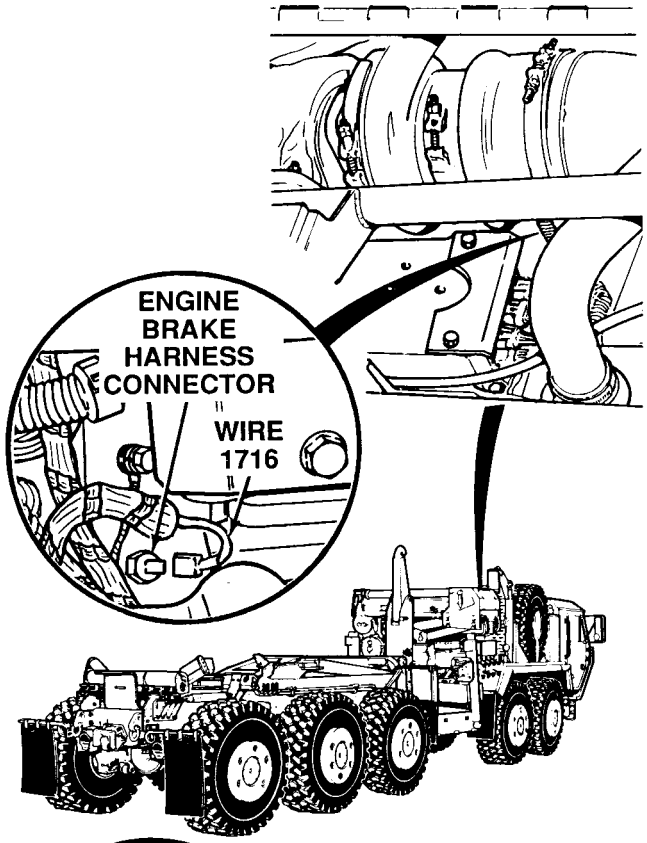
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover opened, (TM 9-2320-364-10)



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

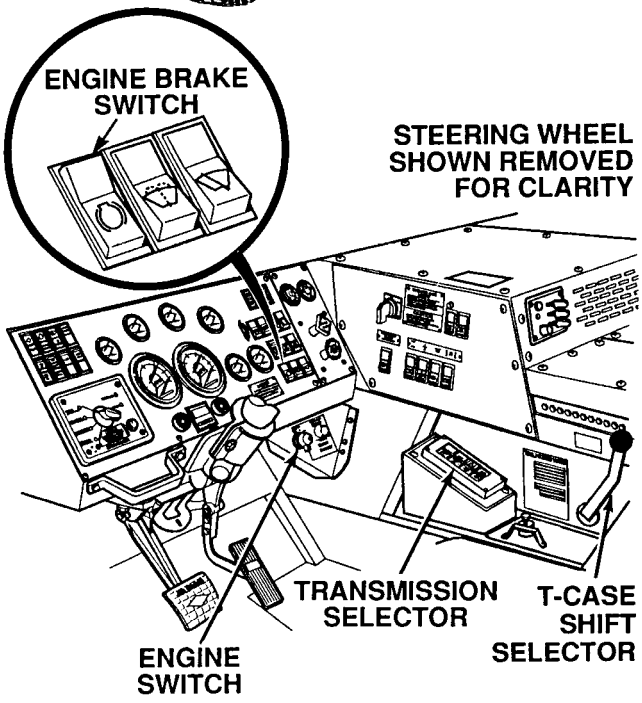


NOTE

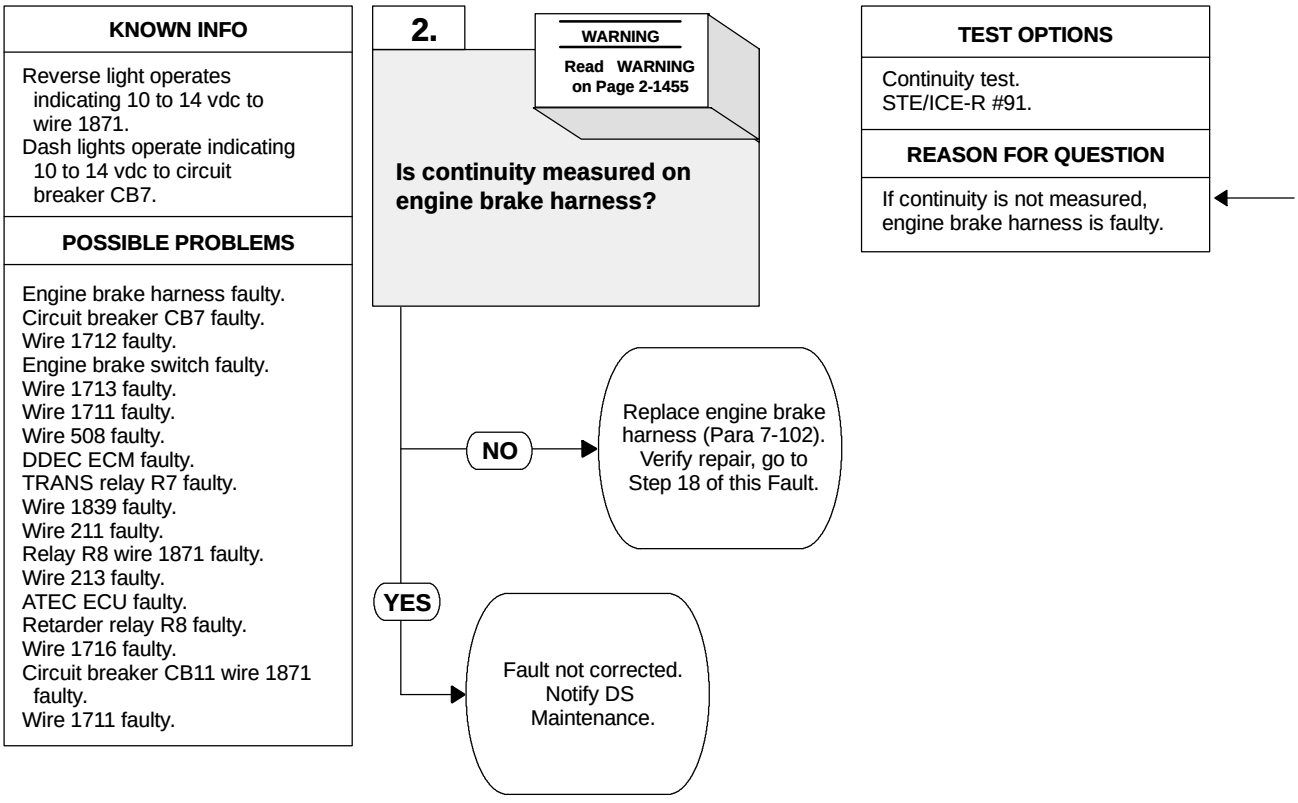
Connector is removed by gently prying on tab and pulling apart connector.

VOLTAGE TEST

(1) Disconnect wire 1716 from engine brake harness connector.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to harness connector end wire 1716.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Start engine (TM 9-2320-364-10).
(6) Shift transfer case to N (Neutral).
(7) Shift transmission to D (Drive).
(8) Set engine brake switch to low position.
(9) While assistant applies throttle control for ten seconds at 2000 rpm and quickly releases throttle control, observe multimeter.
    (a) If 10 to 14 vdc are not present while engine decelerates, perform Steps (10) and (11) and go to Step 3 of this Fault.
    (b) If 10 to 14 vdc are present, wire 1716 is OK.
(10) Turn OFF ENGINE switch.
(11) Connect wire 1716 to engine brake harness connector.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).

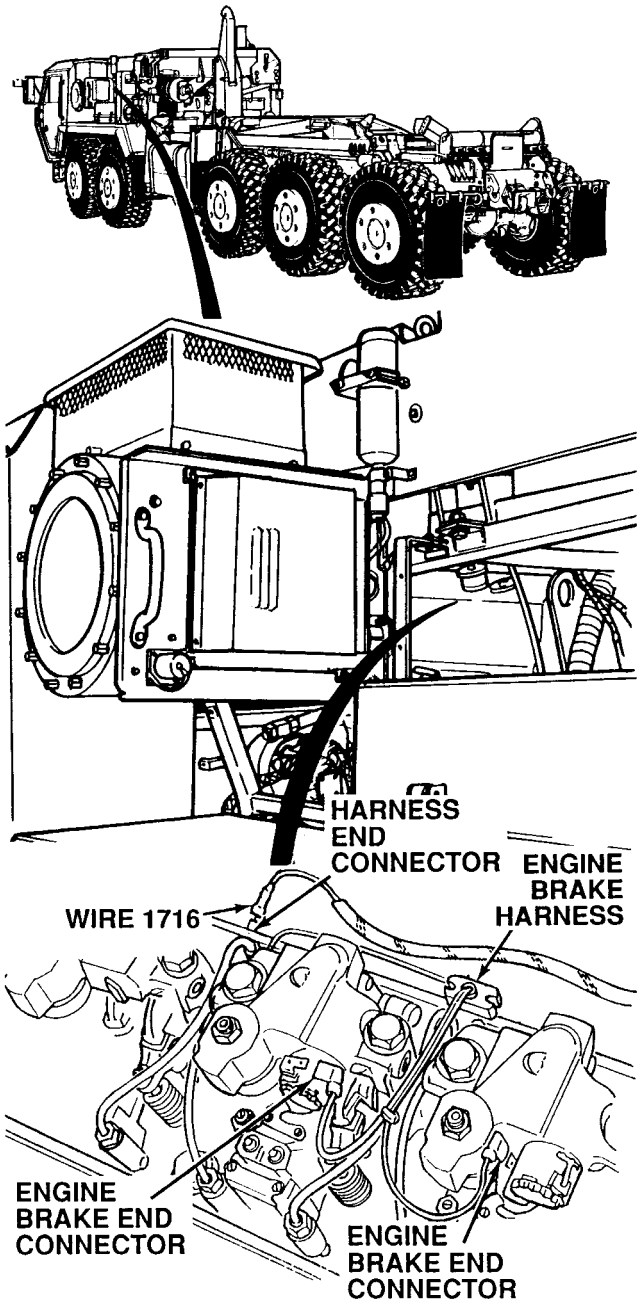


WARNING

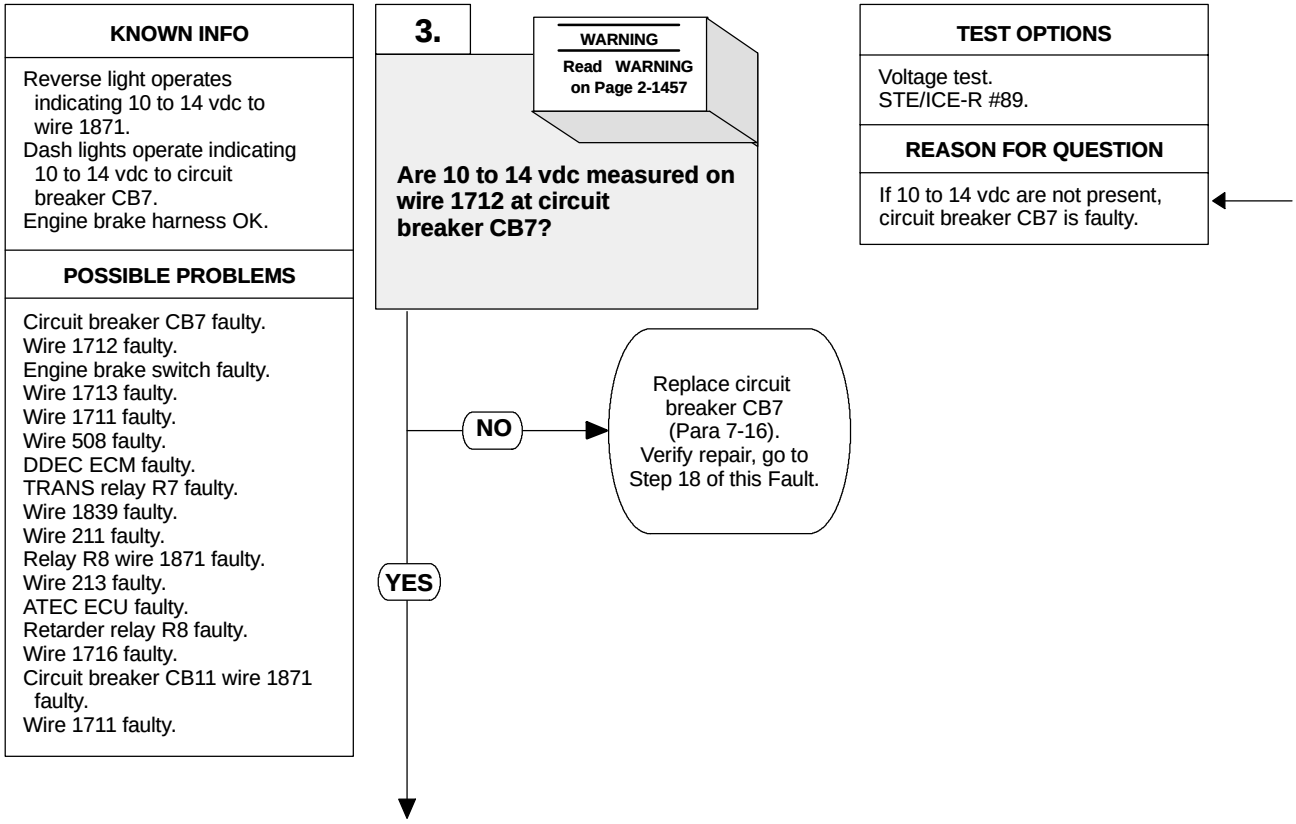
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

CONTINUITY TEST

(1) Remove eight screws, lockwashers, washers and left side noise panel. Discard lockwashers.
(2) Remove left side rocker cover (Para 3-4).
(3) Disconnect two connectors from engine brake.
(4) Set multimeter select switch to ohms.
(5) Is there continuity between harness end connector and engine brake end connectors of engine brake harness?
    (a) If there is no continuity, replace engine brake harness (Para 7-102).
    (b) If there is continuity, engine brake harness is OK. Fault not corrected. Notify DS Maintenance.
(6) Connect two connectors to engine brakes.
(7) Connect wire 1716 to engine brake harness connector.
(8) Install left side rocker cover (Para 3-4).
(9) Install left side noise panel, eight washers, lockwashers and screws.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).

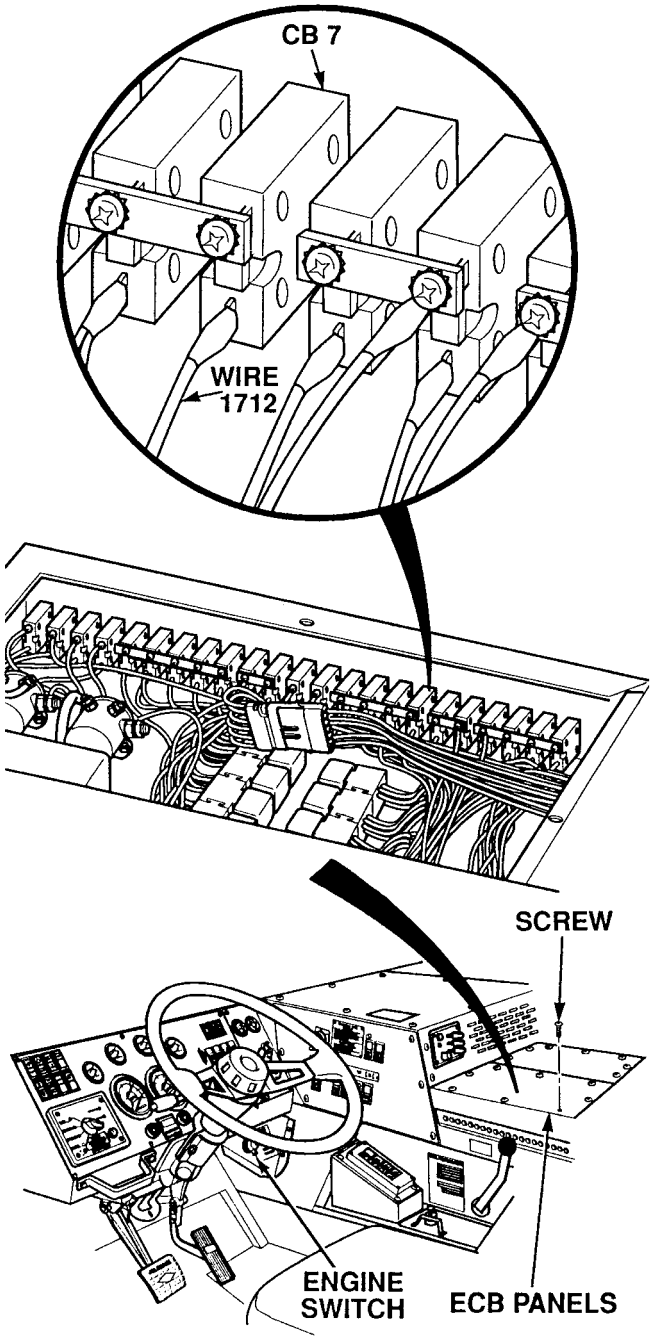


WARNING

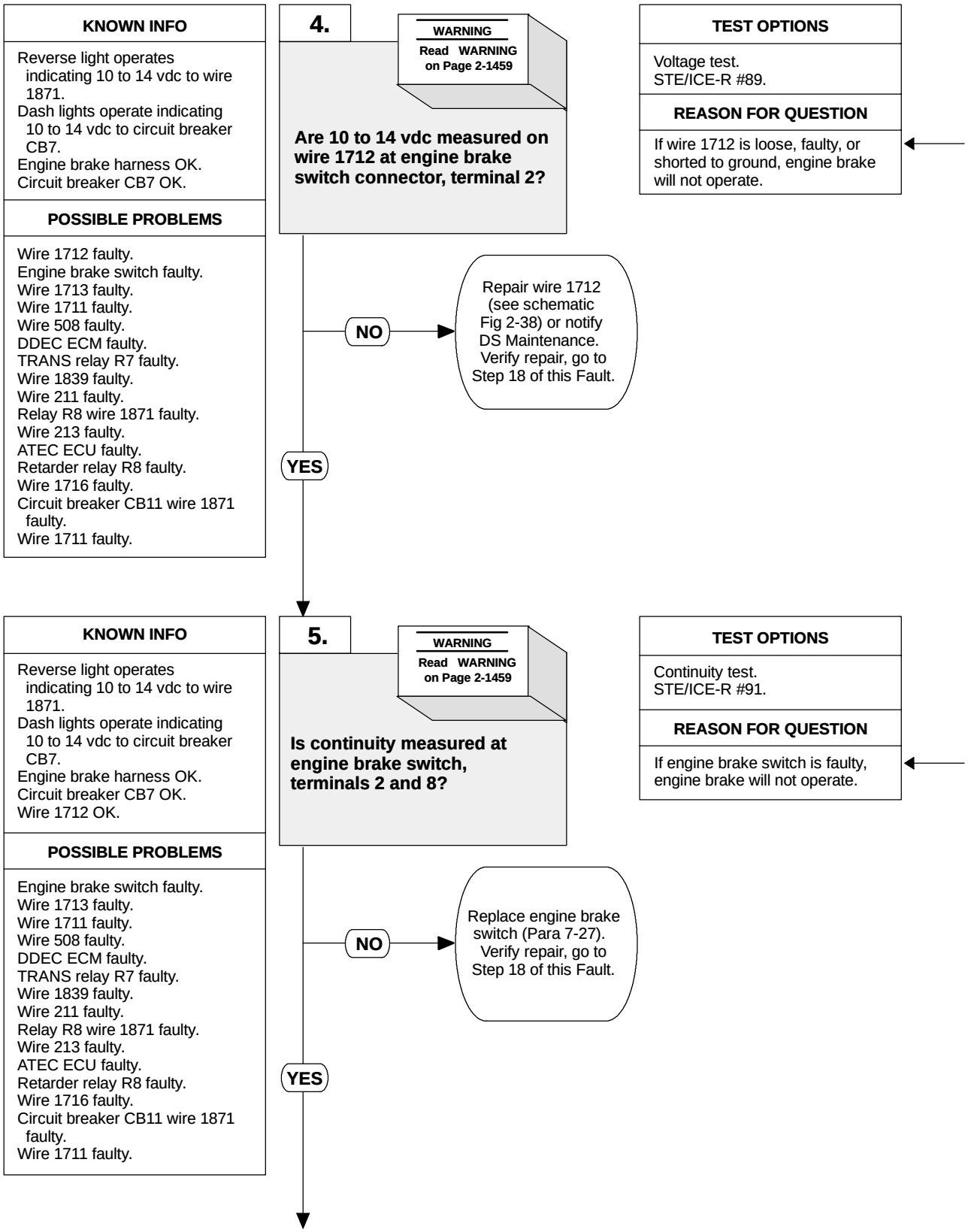
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1712 at circuit breaker CB7.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace circuit breaker CB7 (Para 7-16).
  (b) If 10 to 14 vdc are present, circuit breaker CB7 is OK.
(6) Turn OFF ENGINE switch.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

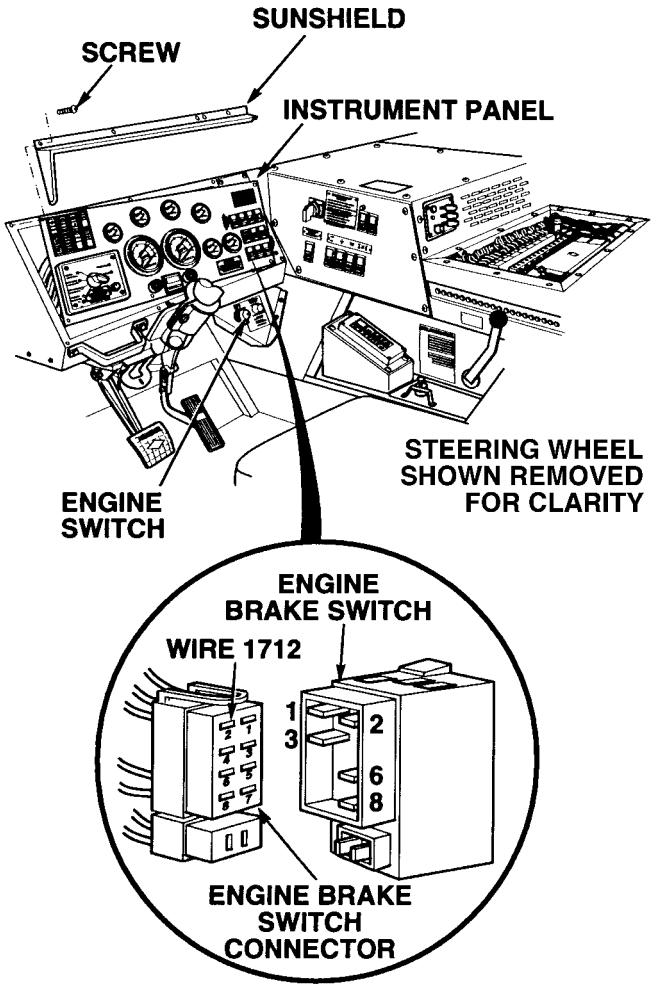
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

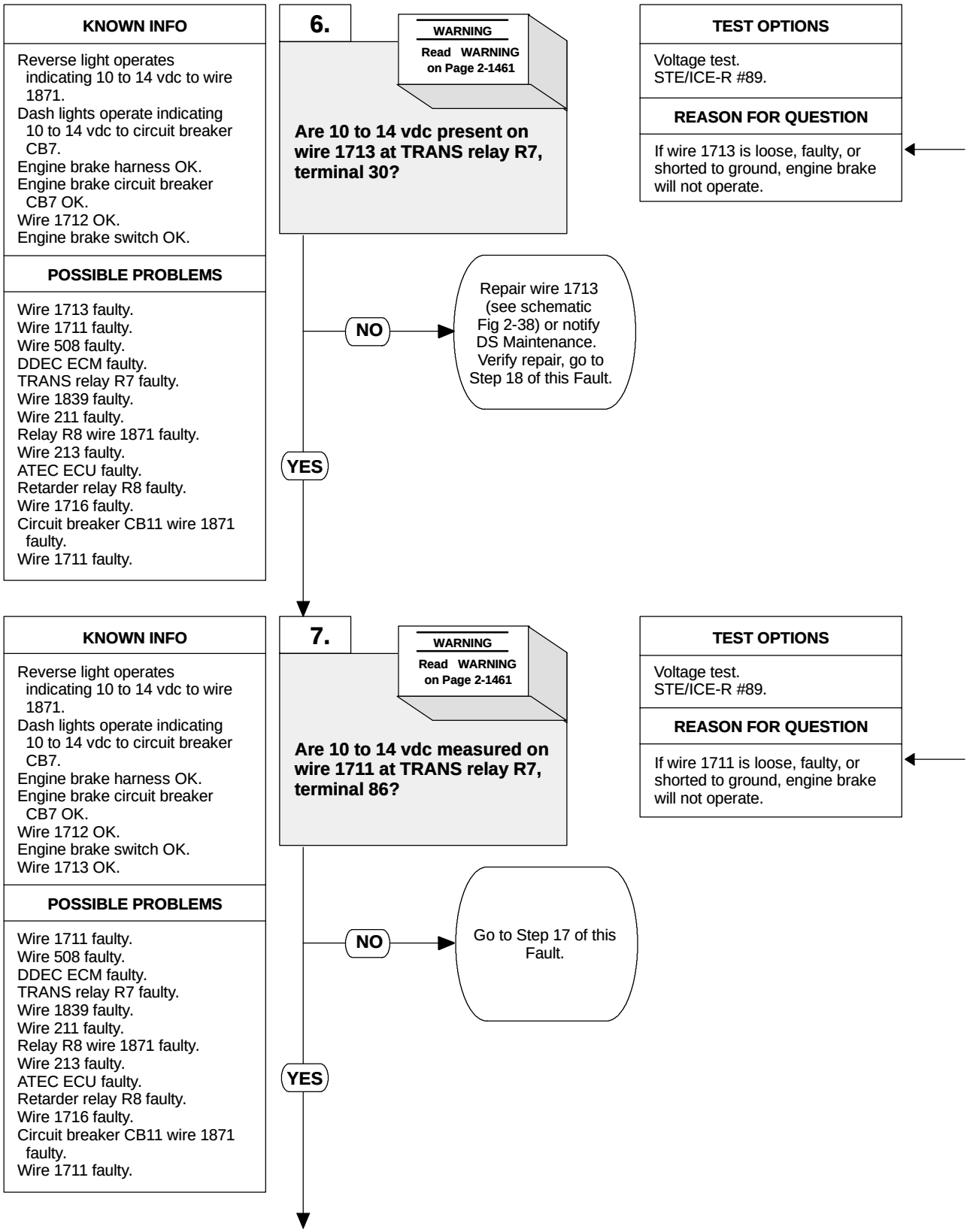
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove engine brake switch.
(4) Connect positive (+) multimeter lead to wire 1712 at engine brake switch connector, terminal 2.
(5) Connect negative (–) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1712 (schematic Fig 2-38) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1712 is OK.
(7) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Set engine brake switch to low position.
(3) Is there continuity between engine brake switch terminals 2 and 8?
  (a) If there is no continuity, replace engine brake switch (Para 7-27) perform Step (5) below.
  (b) If there is continuity, engine brake switch is OK.
(4) Install engine brake switch.
(5) Install instrument panel and sunshield with ten screws.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



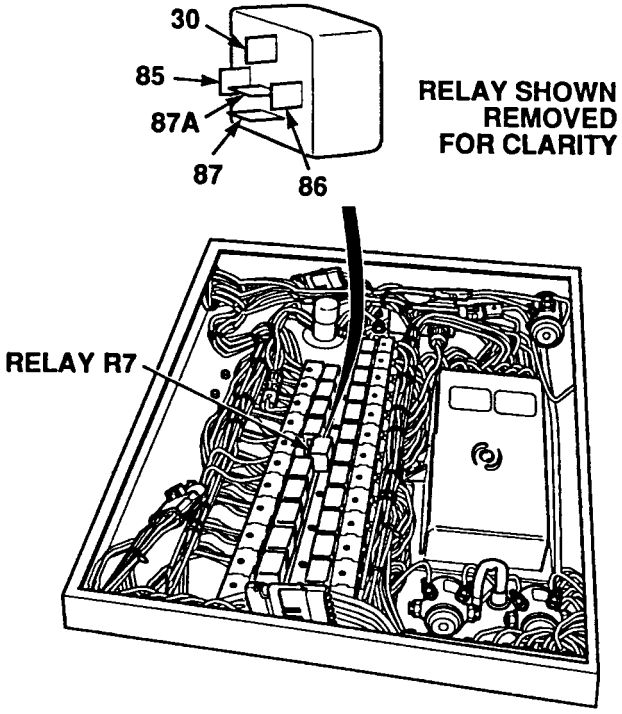
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

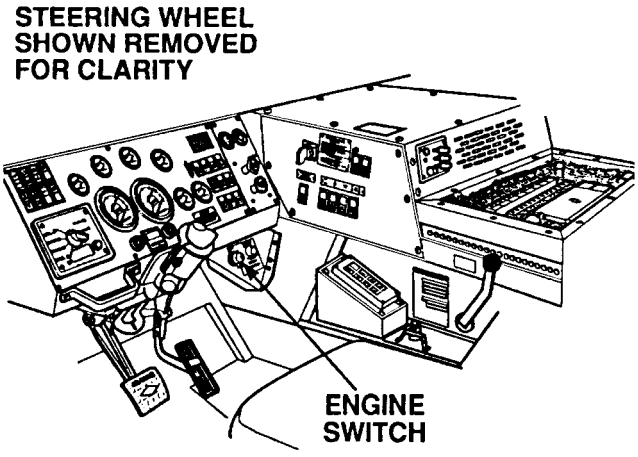
VOLTAGE TEST
(1) Set multimeter select switch to volts dc. (2) Connect positive (+) multimeter lead to wire 1713 at TRANS relay R7, terminal 30. (3) Connect negative (–) multimeter lead to a known good ground. (4) Turn ON ENGINE switch (TM 9-2320-364-10). (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1713 (see schematic Fig 2-38) or notify DS Maintenance. (b) If 10 to 14 vdc are present, wire 1713 is OK. (5) Turn OFF ENGINE switch.



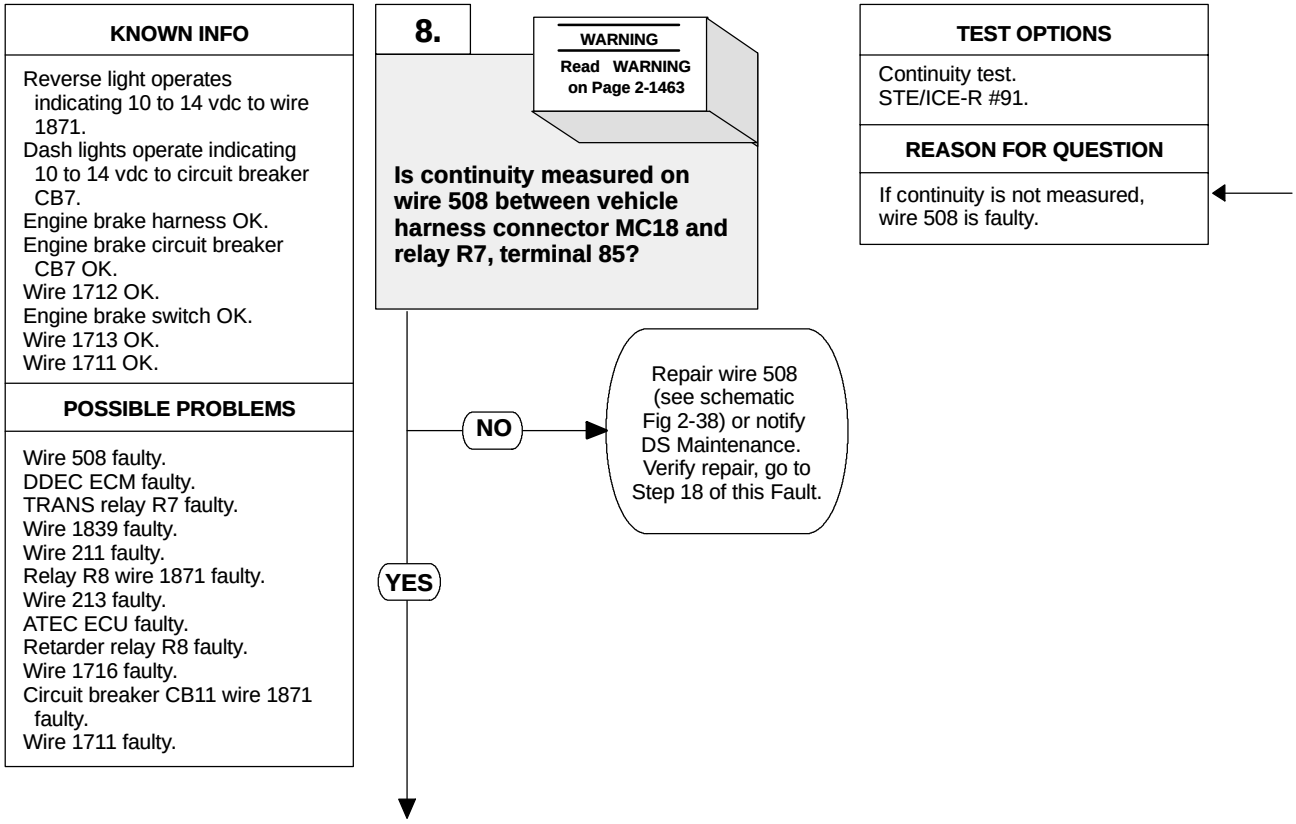
NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST
(1) Connect positive (+) multimeter lead to wire 1711 at TRANS relay R7, terminal 86. (2) Connect negative (–) multimeter lead to a known good ground. (3) Turn ON ENGINE switch (TM 9-2320-364-10). (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 17 of this Fault. (b) If 10 to 14 vdc are present, wire 1711 is OK. (4) Turn OFF ENGINE switch.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

CAUTION

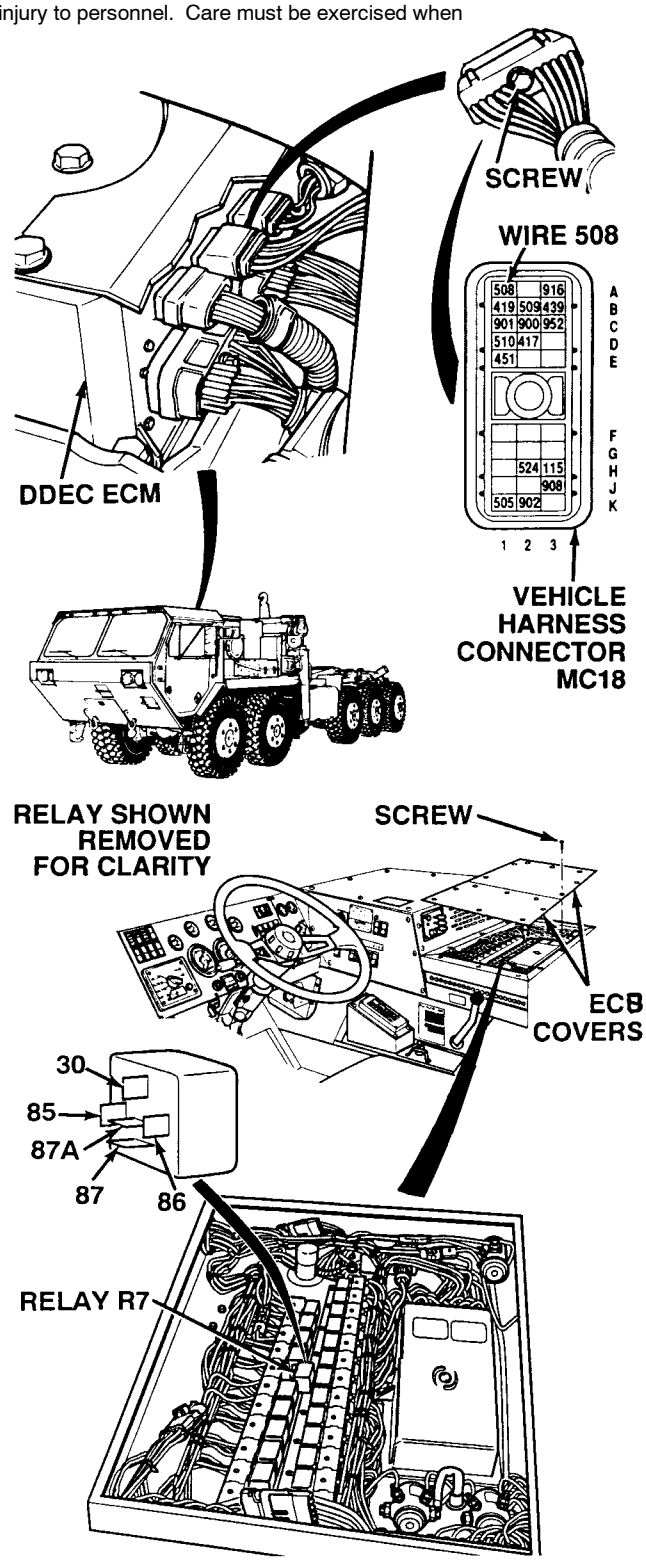
Connector terminals are easily damaged. Use care when connecting or disconnecting terminals.

NOTE

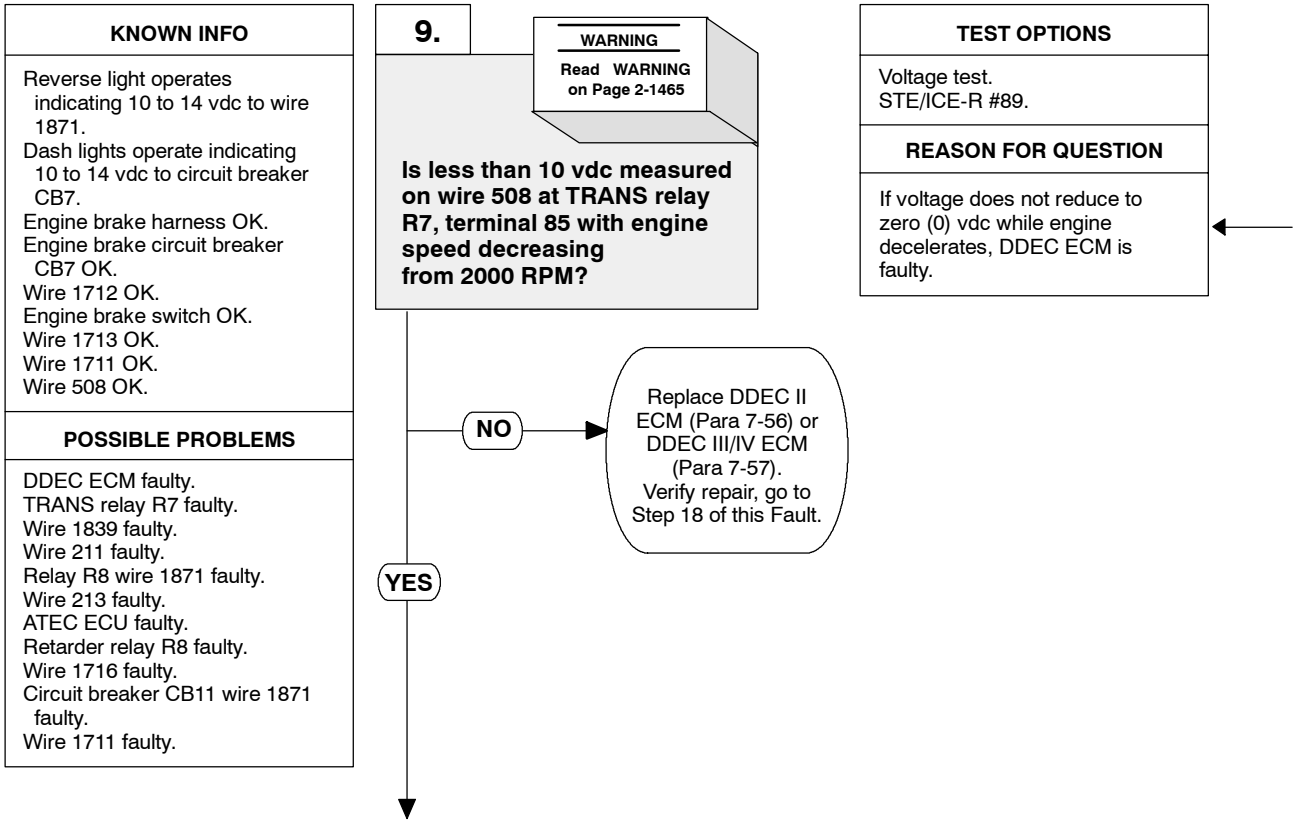
- Relay test must be performed with relay partially removed.
- On DDEC III/IV trucks, wire 988 replaces wire 508.

CONTINUITY TEST

(1) Loosen screw and disconnect vehicle harness connector MC18.
(2) Connect a jumperwire between wire 508 at vehicle harness connector MC18, terminal A, and a known good ground.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between relay R7, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 508 (see schematic Fig 2-38) or notify DS Maintenance.
  (b) If there is continuity, wire 508 is OK.
(5) Connect vehicle harness connector MC18 and tighten screw.
(6) Close engine top cover.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

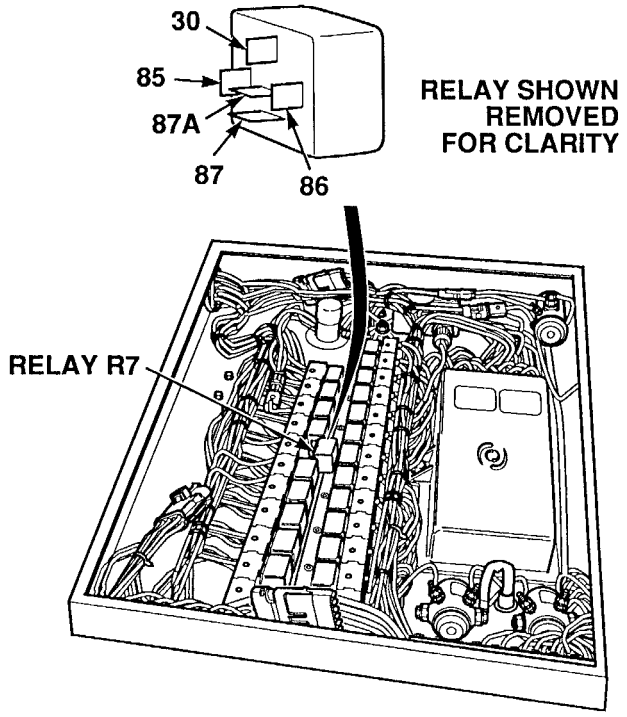
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

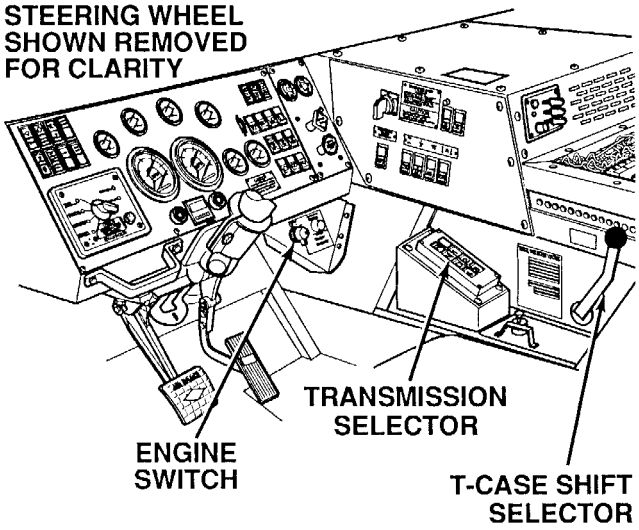
NOTE

- The DDEC 508 circuit grounds when the engine drops to zero (0) throttle and remains 150 rpm above a normal idle. This will provide a ground for the TRANS relay R7 coil.
- Relay test must be performed with relay partially removed.
- On DDEC III/IV trucks, wire 988 replaces wire 508.

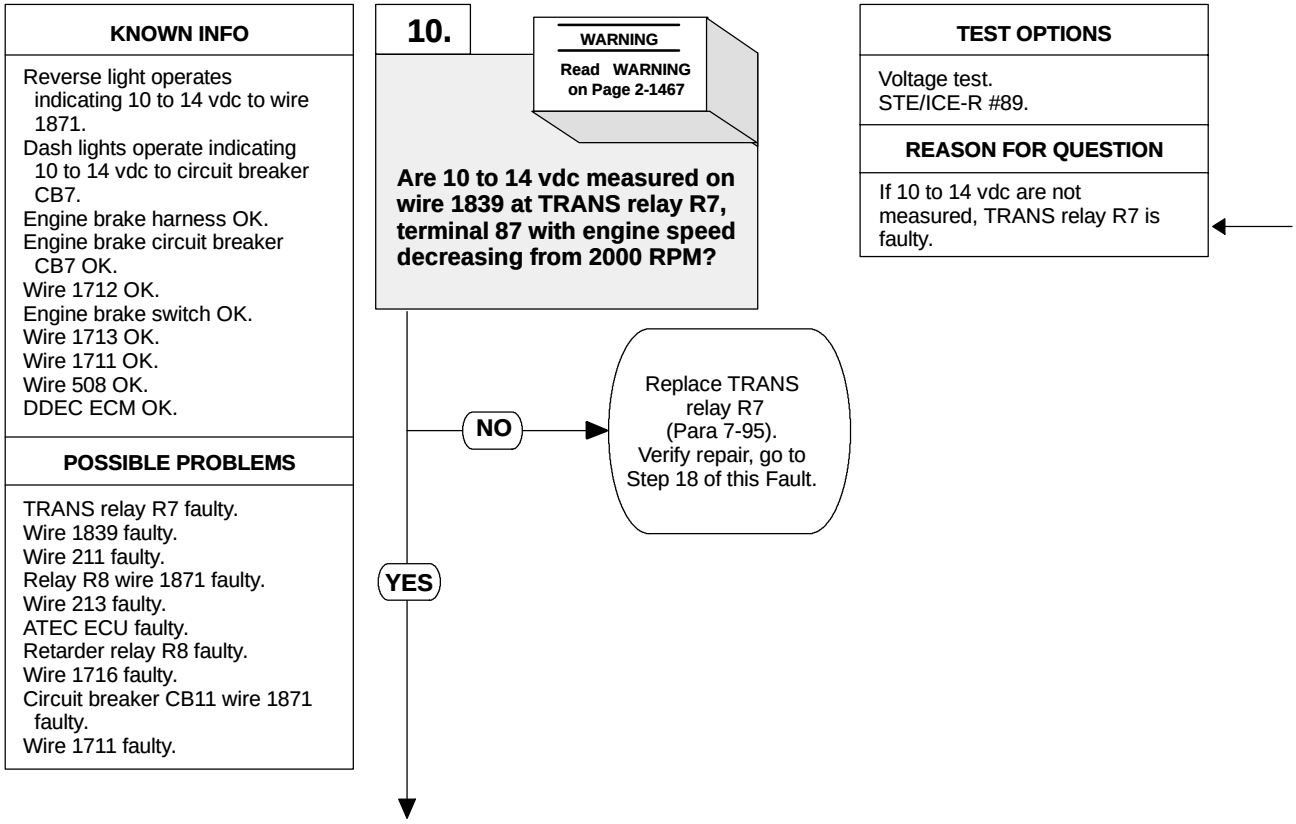
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to TRANS relay R7, terminal 85.
(3) Connect negative (-) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, perform Step (8) below and replace DDEC II ECM (Para 7-56) or DDEC III/IV ECM (Para 7-57).
  (b) If 10 to 14 vdc are present, perform Steps (4) through (8) below.
(4) Start ENGINE (TM 9-2320-364-10).
(5) Shift transfer case to N (Neutral).
(6) Shift transmission to D (Drive).
(7) While assistant applies throttle control for 10 seconds at 2000 rpm then quickly releases throttle control, observe multimeter.
  (a) If 10 to 14 vdc are still present, perform Step (8) below and replace DDEC II ECM (Para 7-56) or DDEC III/IV ECM (Para 7-57).
  (b) If 10 to 14 vdc momentarily drops to zero (0) vdc, DDEC 508 circuit is OK.
(8) Turn OFF ENGINE switch.



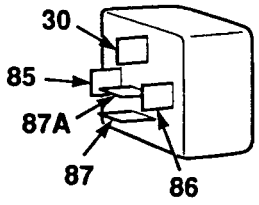


34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.



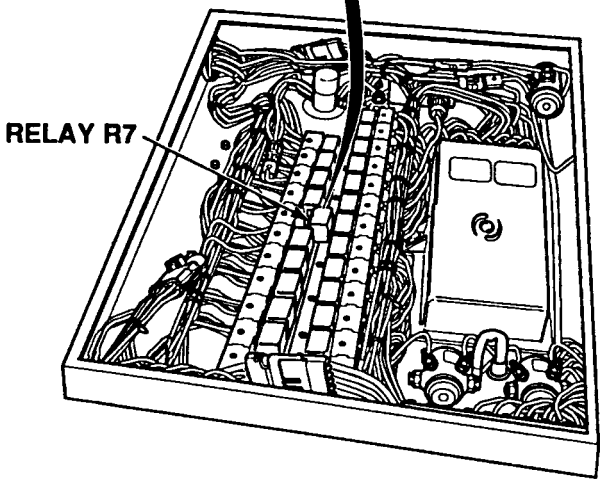
RELAY SHOWN REMOVED FOR CLARITY

NOTE

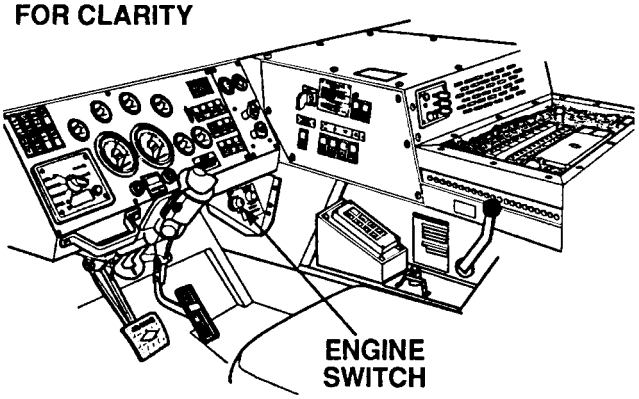
Relay test must be performed with relay partially removed.

VOLTAGE TEST

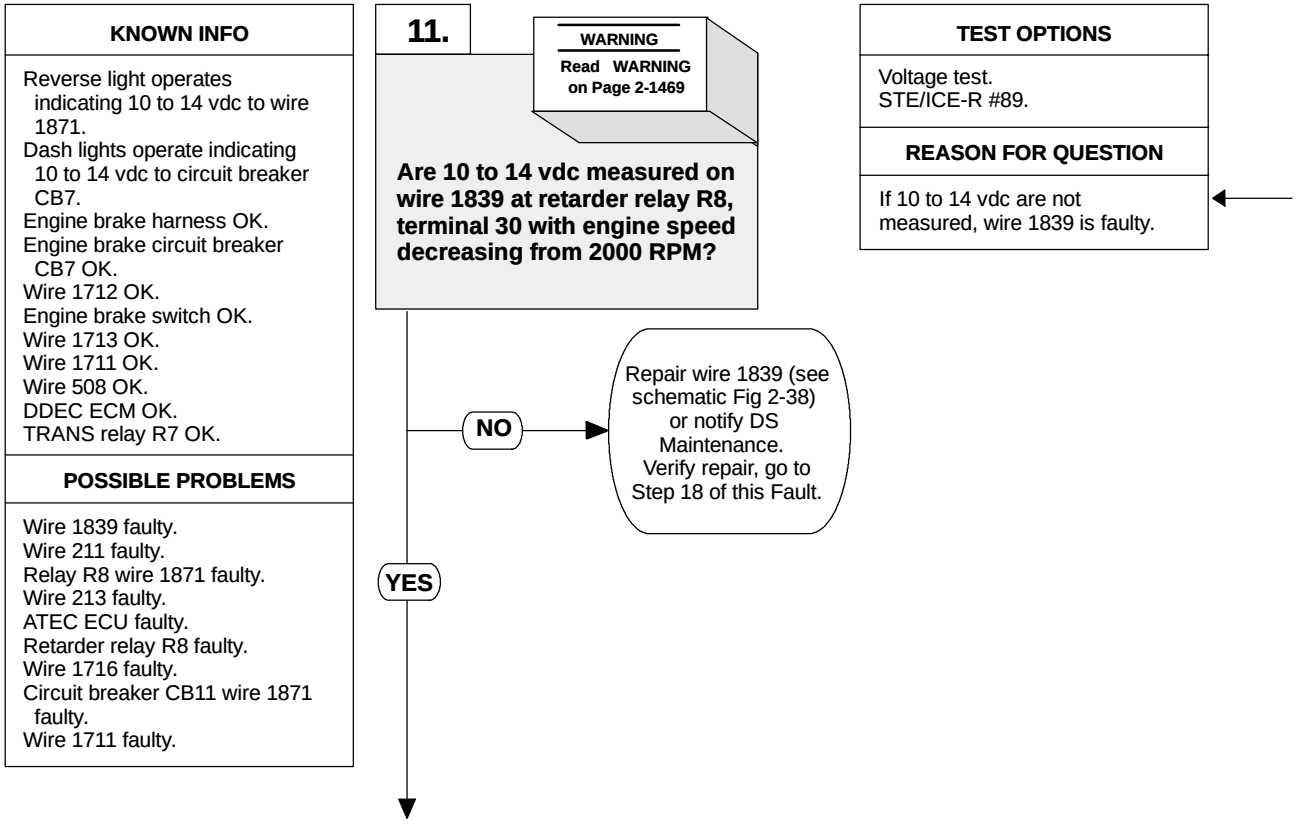
(1) Connect positive (+) multimeter lead to wire 1839 at TRANS relay R7, terminal 87 (Para 2-11).
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Start engine (TM 9-2320-364-10).
(4) While assistant applies throttle control for ten seconds at 2000 rpm and quickly releases throttle control, observe multimeter.
  (a) If 10 to 14 vdc are not present while engine decelerates, turn OFF ENGINE switch and replace TRANS relay R7 (Para 7-95).
  (b) If 10 to 14 vdc are present while engine decelerates, TRANS relay R7 is OK.
(5) Turn OFF ENGINE switch.



STEERING WHEEL SHOWN REMOVED FOR CLARITY



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

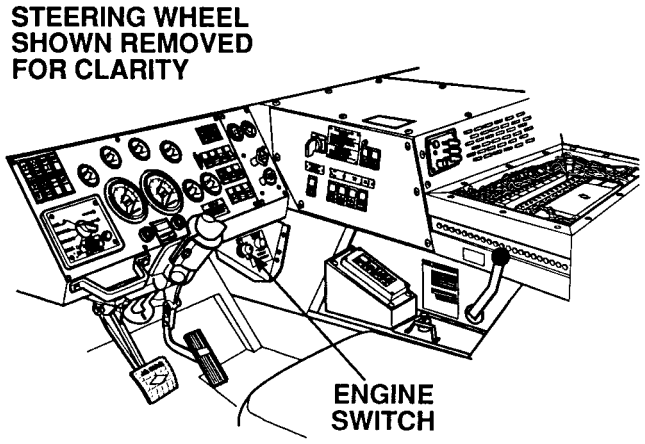
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

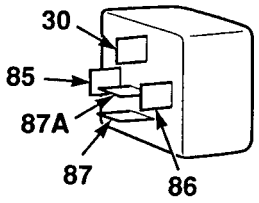
NOTE

Relay test must be performed with relay partially removed.

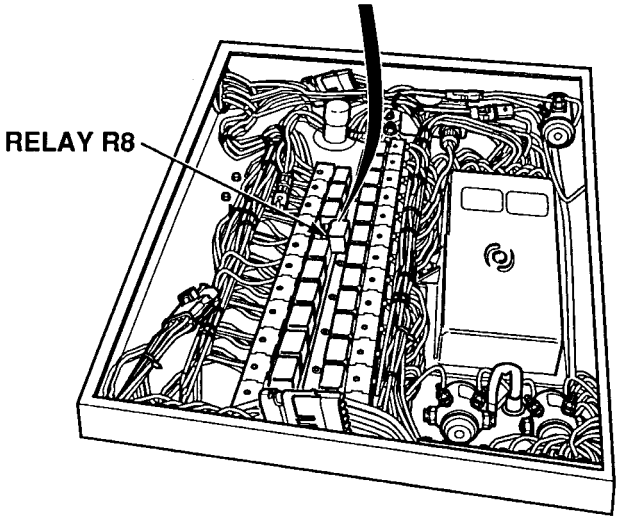
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1839 at retarder relay R8, terminal 30.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Start engine (TM 9-2320-364-10).
(4) While assistant applies throttle control for ten seconds at 2000 rpm and quickly releases throttle control, observe multimeter.
  (a) If 10 to 14 vdc are not present while engine decelerates, turn OFF ENGINE switch and repair wire 1839 (see schematic Fig 2-38) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present while engine decelerates, wire 1839 is OK.
(5) Turn OFF ENGINE switch.

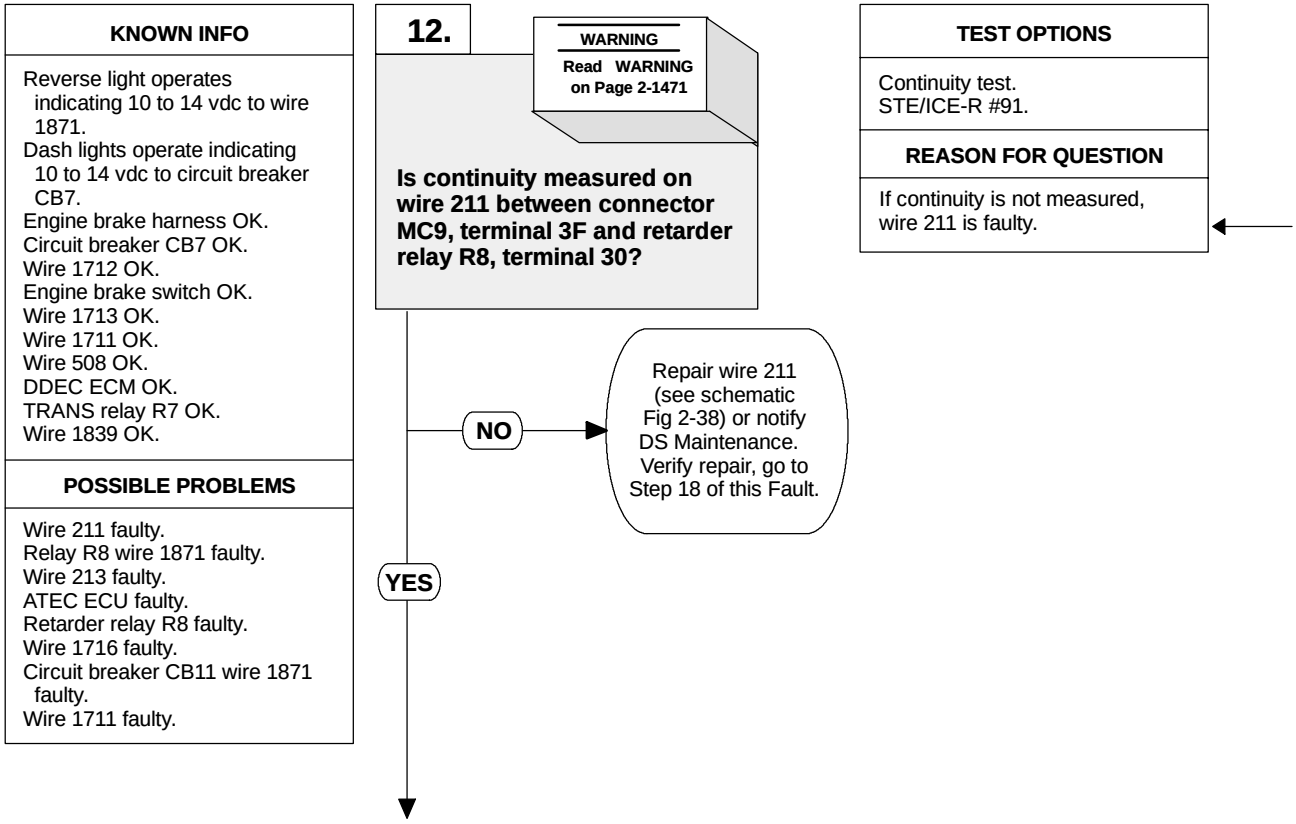




RELAY SHOWN REMOVED FOR CLARITY



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

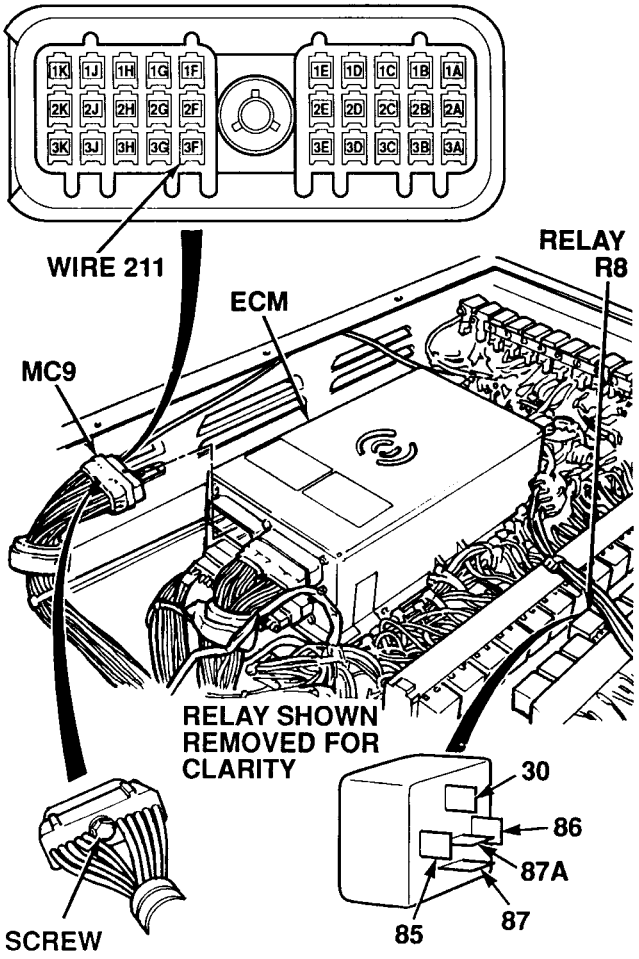
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

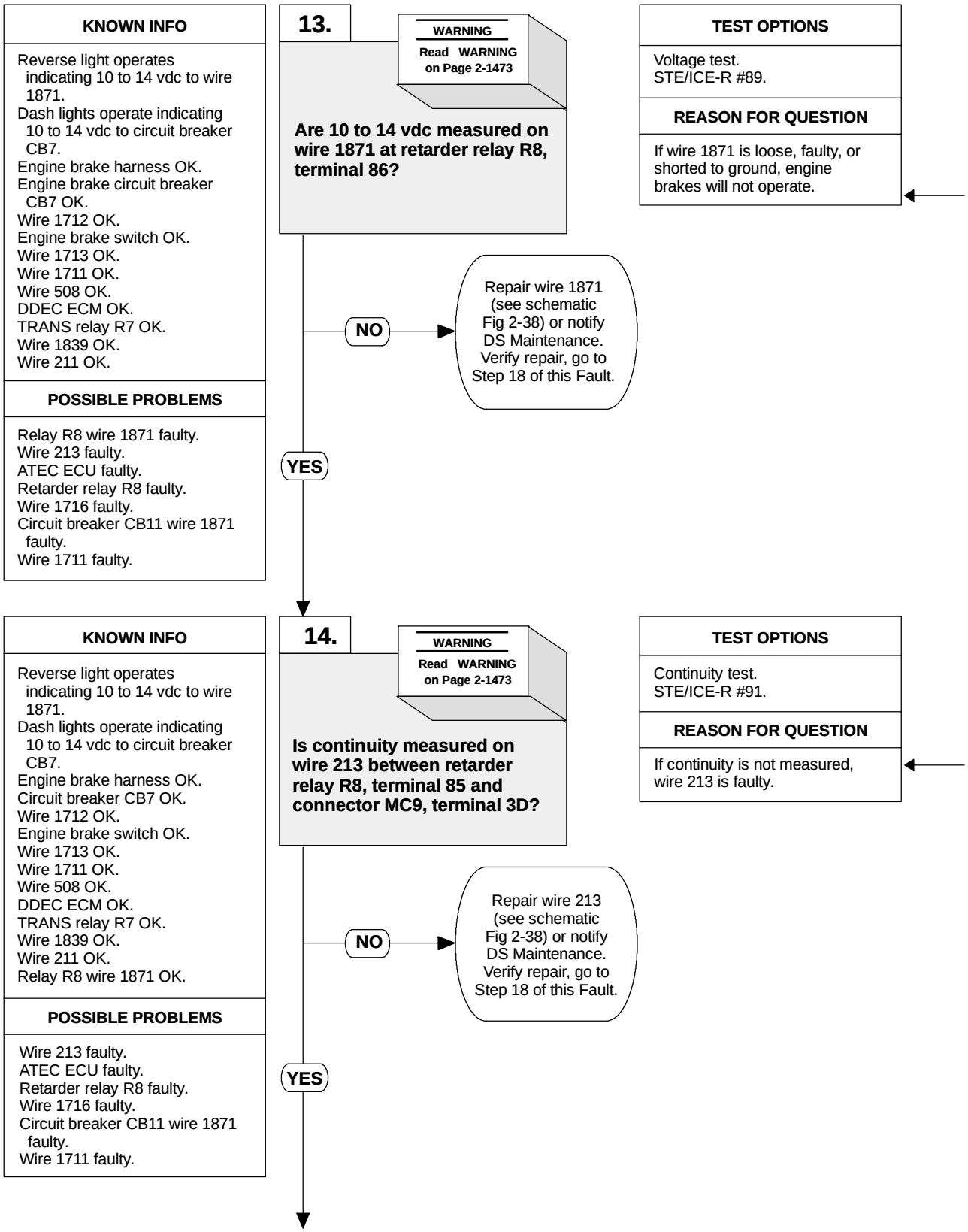
Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Loosen screw and disconnect harness connector MC9.
(2) Connect a jumperwire between harness connector MC9 terminal 3F wire 211 and a known good ground.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between connector MC9, terminal 3F and retarder relay R8, terminal 30?
   (a) If there is no continuity, repair wire 211 (see schematic Fig 2-38) or notify DS Maintenance.
   (b) If there is continuity, wire 211 is OK.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

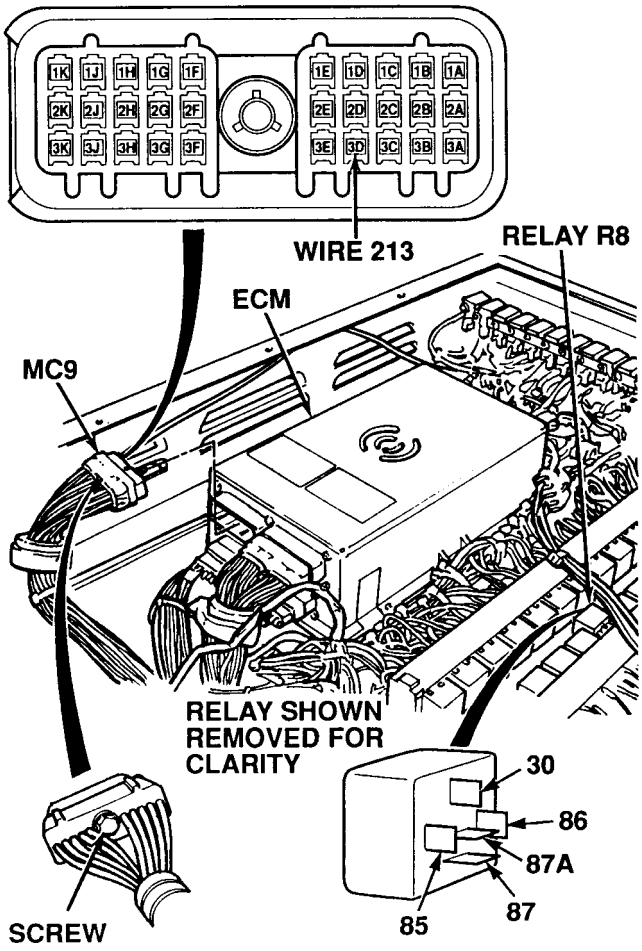
(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1871 at retarder relay R8, terminal 86.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1871 (see schematic Fig 2-38) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1871 is OK.
(5) Turn OFF ENGINE switch.

NOTE

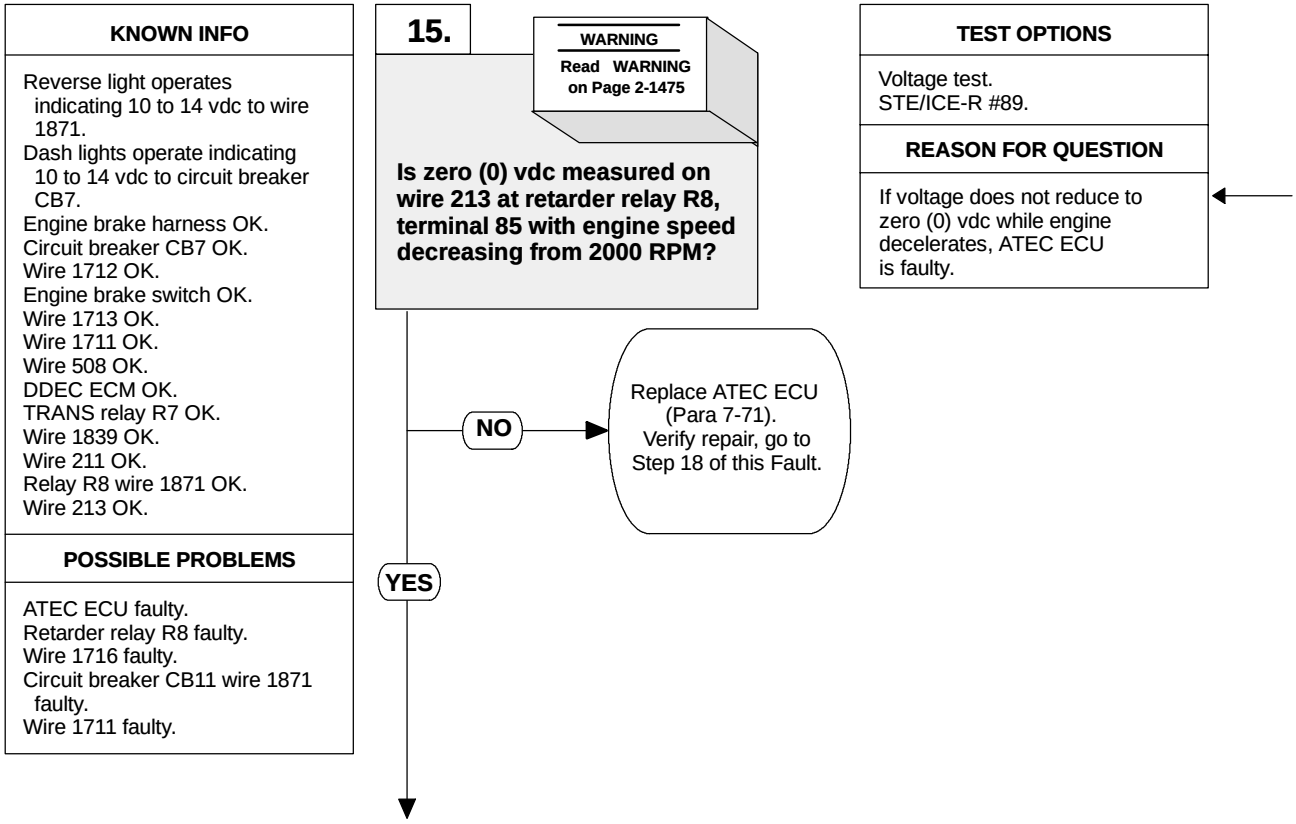
Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Install jumperwire on wire 213 at connector MC9, terminal 3D end and a known good ground.
(2) Set multimeter select switch to ohms.
(3) Is there continuity between retarder relay R8, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 213 (see schematic Fig 2-38) or notify DS Maintenance.
  (b) If there is continuity, wire 213 is OK.
(4) Connect connector MC9 and tighten screw.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

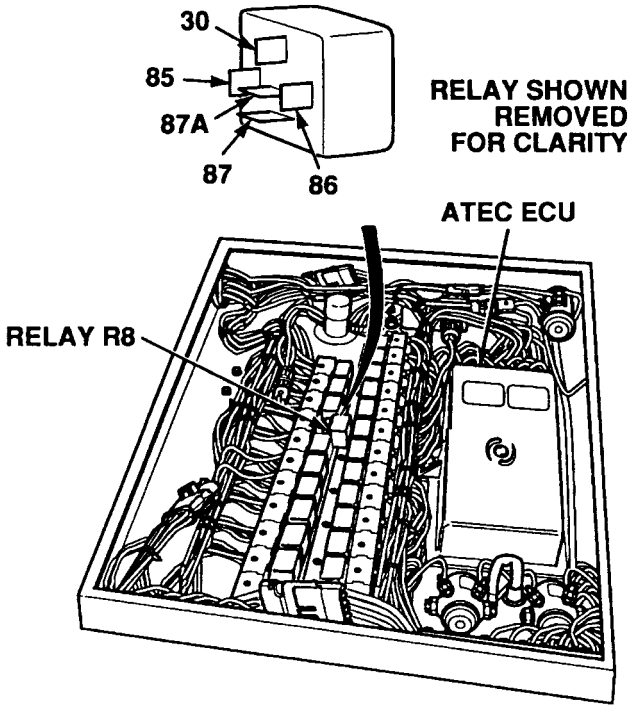
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

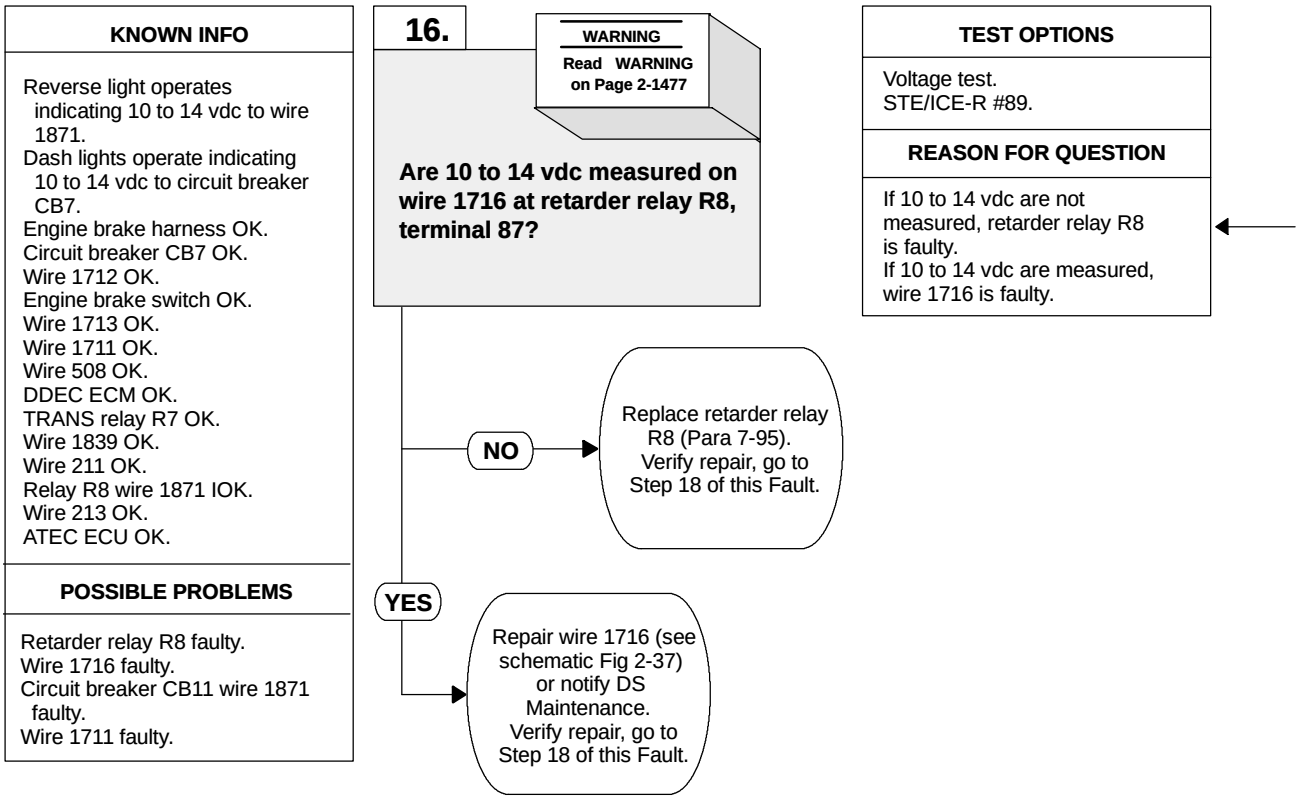
- The ATEC 213 circuit goes to ground when the engine drops to zero (0) throttle and remains 150 rpm above a normal idle. This will provide a ground for the retarder relay R8 coil.
- Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 213 at retarder relay R8, terminal 85.
(3) Connect negative (-) multimeter lead to a known good ground.
  (a) If 10 to 14 vdc are not present, replace ATEC ECU (Para 7-71).
  (b) If 10 to 14 vdc are present, perform Steps (4) through (6) below.
(4) Start engine (TM 9-2320-364-10).
(5) While assistant applies throttle control for 10 seconds at 2000 rpm and quickly releases throttle control, observe multimeter.
  (a) If 10 to 14 vdc are still present, turn OFF ENGINE switch and replace ATEC ECU (Para 7-71).
  (b) If 10 to 14 vdc momentarily drops to zero (0) vdc, ATEC ECU is OK.
(6) Turn OFF ENGINE switch.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



WARNING

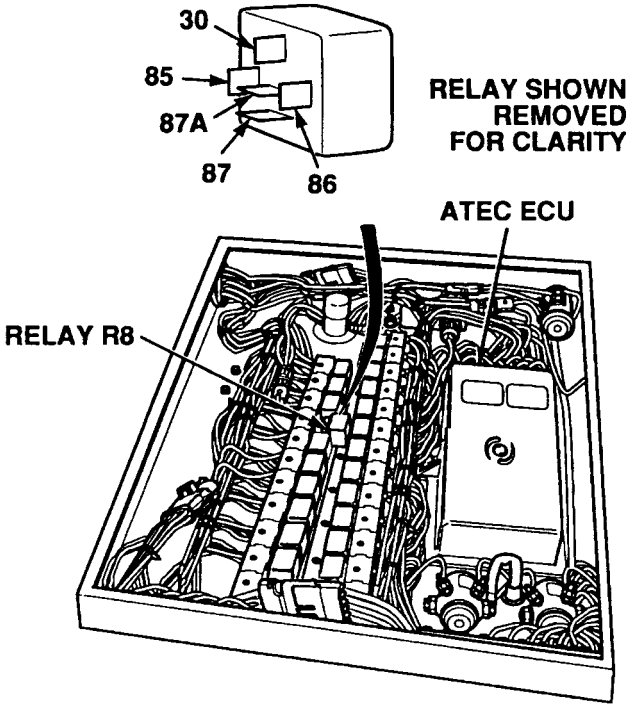
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1716 at retarder relay R8, terminal 87.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Start engine (TM 9-2320-364-10).
(4) While assistant applies throttle control for ten seconds at 2000 rpm and quickly releases throttle control, observe multimeter.
   (a) If 10 to 14 vdc are not present while engine decelerates, turn OFF ENGINE switch and replace retarder relay (Para 7-95).
   (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and repair wire 1716 (see schematic Fig 2-38) or notify DS Maintenance.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).

KNOWN INFO

Reverse light operates indicating 10 to 14 vdc to wire 1871.
Dash lights operate indicating 10 to 14 vdc to circuit breaker CB7.
Engine brake harness OK.
Engine brake(s) OK.
Circuit breaker CB7 OK.
Wire 1712 OK.
Engine brake switch OK.
Wire 1713 OK.
Wire 1711 OK.
Wire 508 OK.
DDEC ECM OK.
TRANS relay R7 OK.
Wire 1839 OK.
Wire 211 OK.
Relay R8 wire 1871 OK.
Wire 213 OK.
ATEC ECU OK.
Retarder relay R8 OK.
Wire 1716 OK.

POSSIBLE PROBLEMS

Circuit breaker CB11 wire 1871 faulty.
Wire 1711 faulty.

17.

WARNING

Read WARNING on Page 2-1479

Are 10 to 14 vdc measured on wire 1871 at DDEC trans circuit breaker CB11?

NO → Repair wire 1871 (see schematic Fig 2-38) or notify DS Maintenance. Verify repair, go to Step 18 of this Fault.

YES → Repair wire 1711 (see schematic Fig 2-38) or notify DS Maintenance. Verify repair, go to Step 18 of this Fault.

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

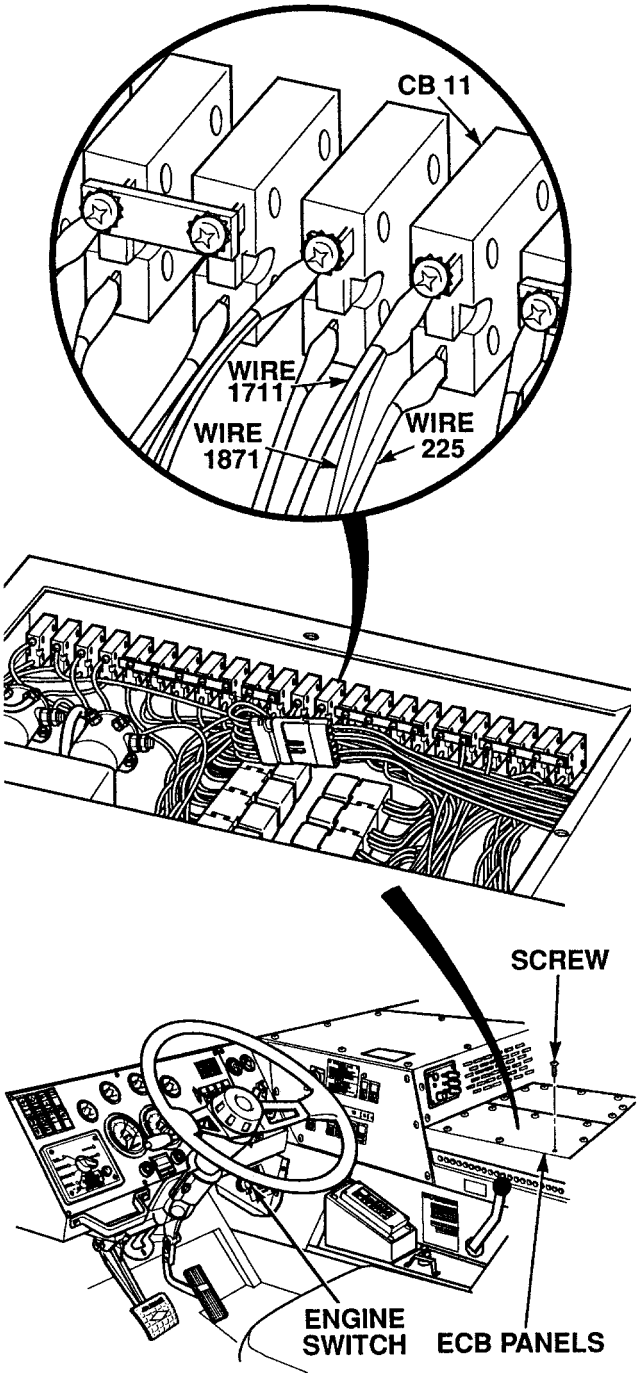
If 10 to 14 vdc are not measured, wire 1871 is faulty.
If 10 to 14 vdc are measured, wire 1711 is faulty.

WARNING

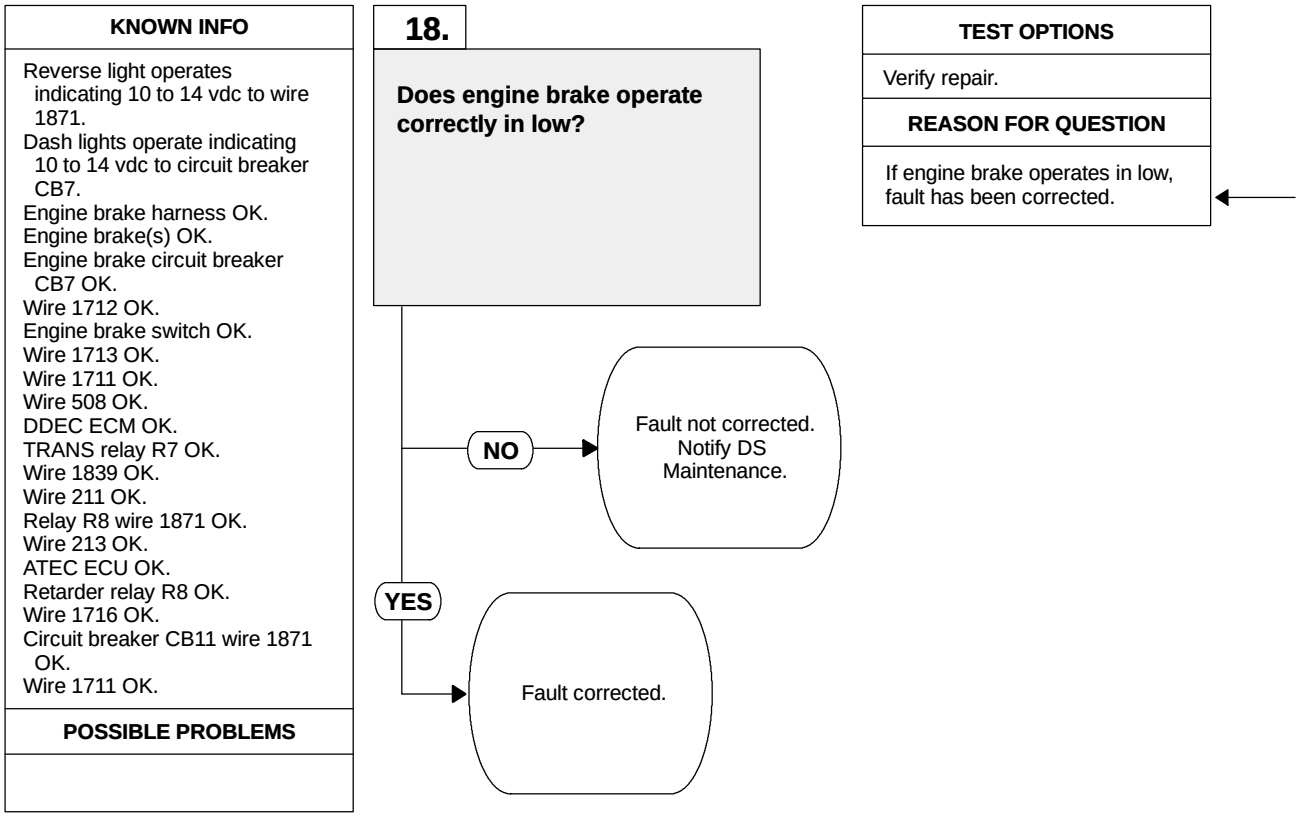
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

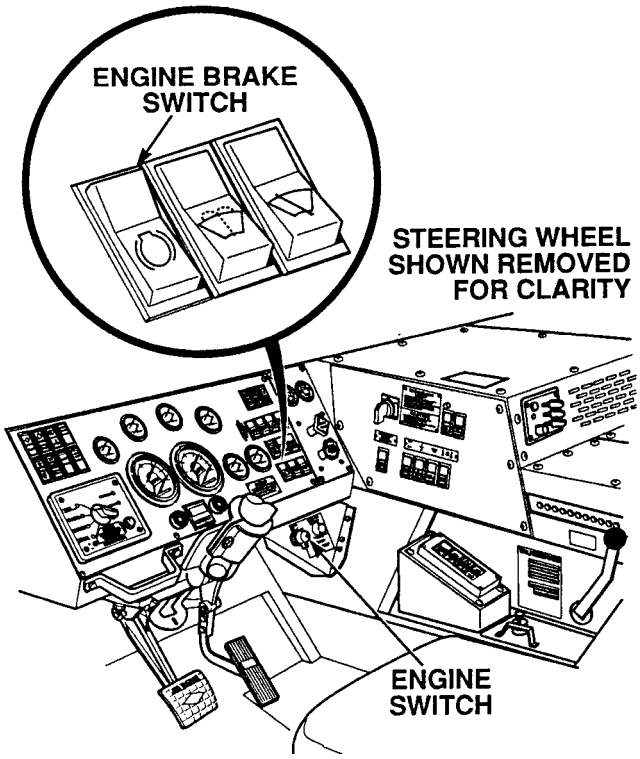
(1) Connect positive (+) multimeter lead to wire 1871 at DDEC trans circuit breaker CB11.
(2) Connect negative (–) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1871 (see schematic Fig 2-38) or notify DS Maintenance.
  (b) If there are 10 to 14 vdc present, wire 1871 is OK. Repair wire 1711 (see schematic Fig 2-38) or notify DS Maintenance.
(4) Turn OFF ENGINE switch.
(5) Install two ECB covers and 15 screws.



34. ENGINE BRAKE DOES NOT OPERATE IN LOW (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10). (2) Set engine brake switch to low position. (3) Drive truck and allow engine brake to apply. (a) If engine brake does not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If engine brake operates, fault has been corrected. (4) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

35. ENGINE BRAKE DOES NOT OPERATE IN HIGH.

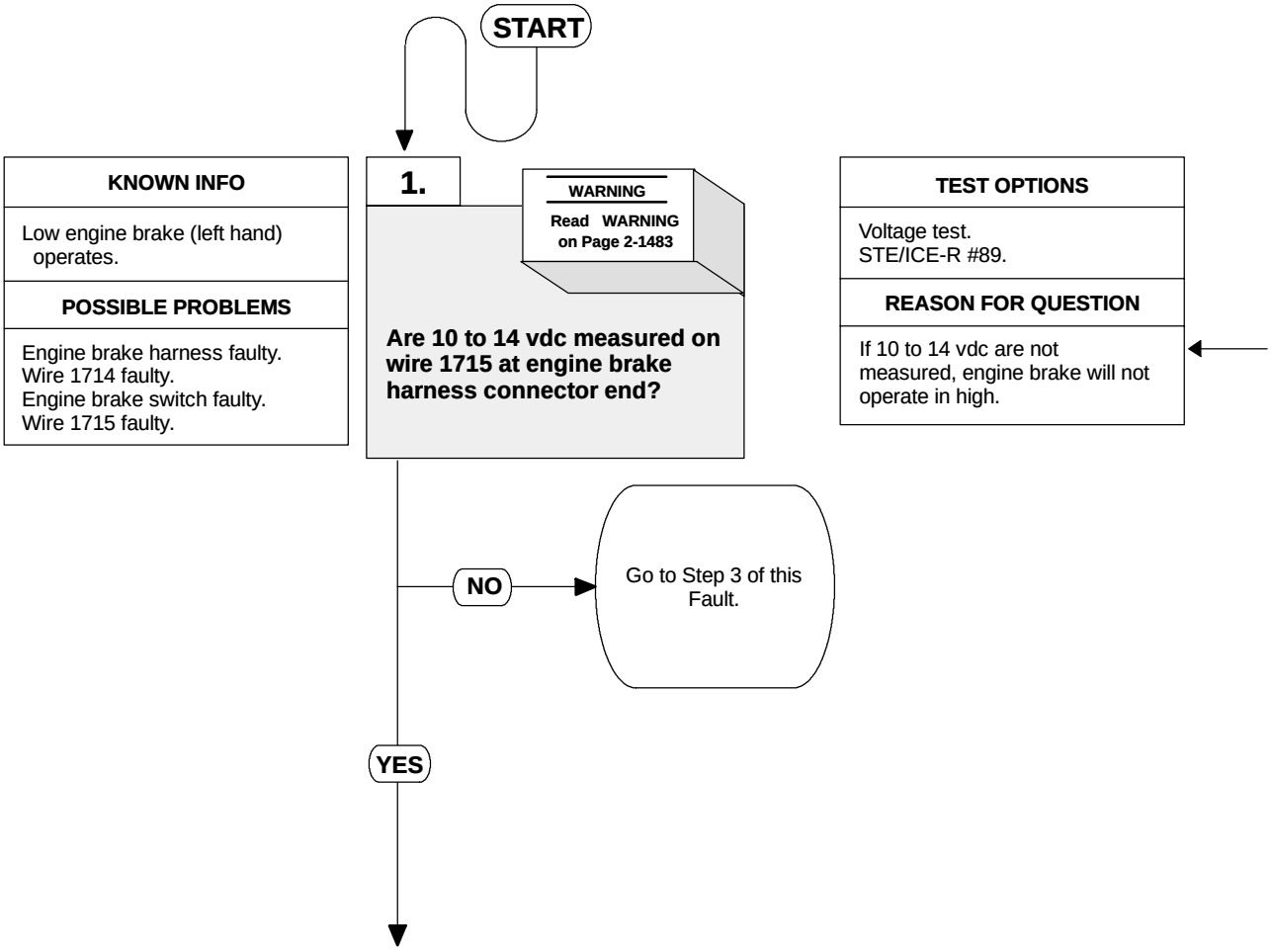
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Top engine access cover opened, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)



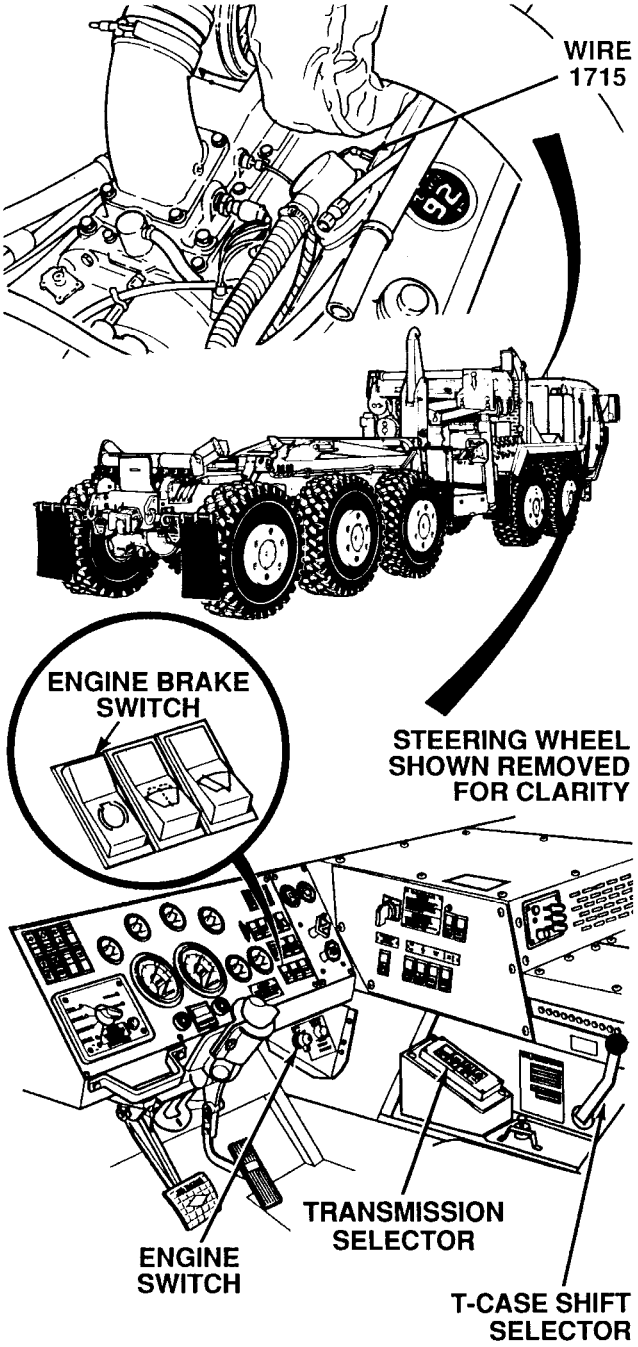
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

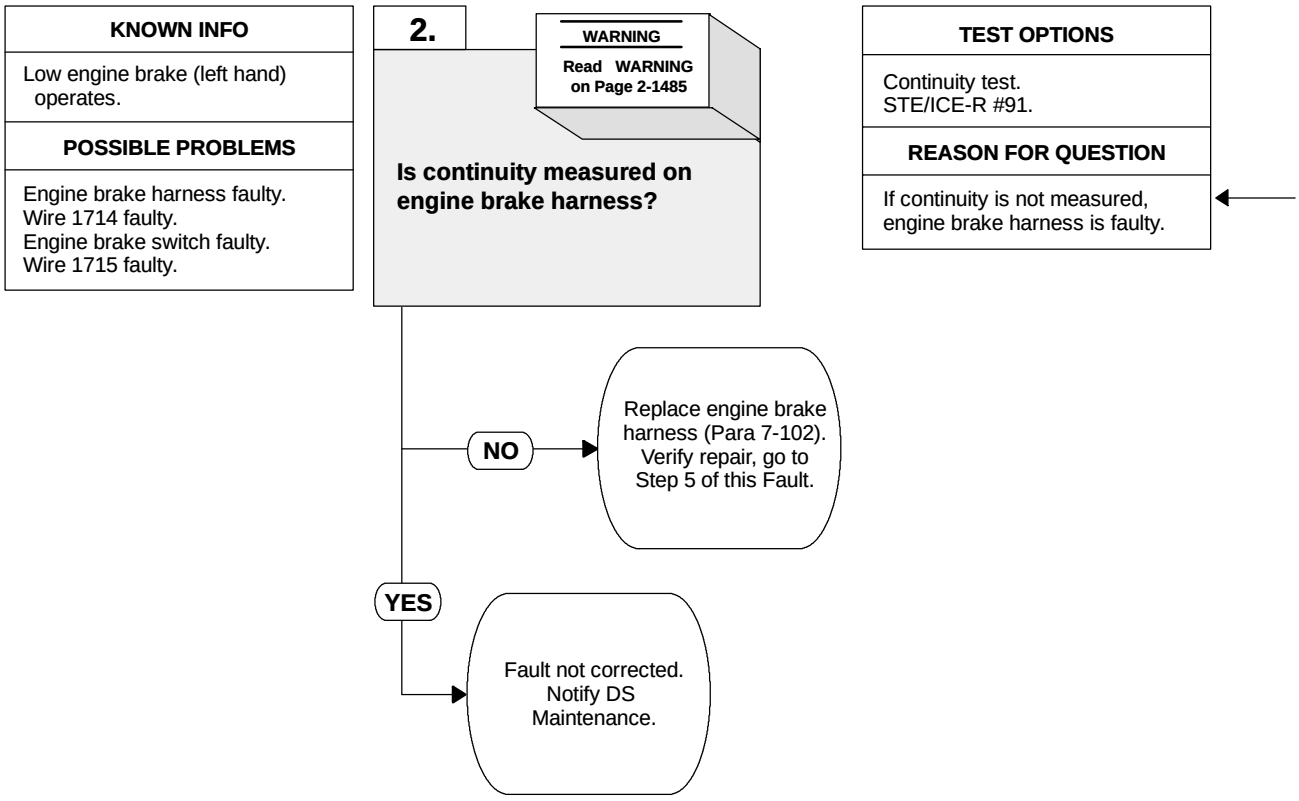
NOTE

Connector is removed by gently prying on tab and pulling apart connector.

VOLTAGE TEST
(1) Disconnect wire 1715 from engine brake harness connector. (2) Set multimeter select switch to volts dc. (3) Connect positive (+) multimeter lead to harness connector end wire 1715. (4) Connect negative (–) multimeter lead to a known good ground. (5) Start engine (TM 9-2320-364-10). (6) Shift transfer case to N (Neutral). (7) Shift transmission to D (Drive). (8) Set engine brake switch to high position. (9) While assistant applies throttle control for ten seconds at 2000 rpm and quickly releases throttle control, observe multimeter. (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and go to Step 3 of this Fault. (b) If 10 to 14 vdc are present, wire 1715 is OK. (10) Turn OFF ENGINE switch.



35. ENGINE BRAKE DOES NOT OPERATE IN HIGH (CONT).

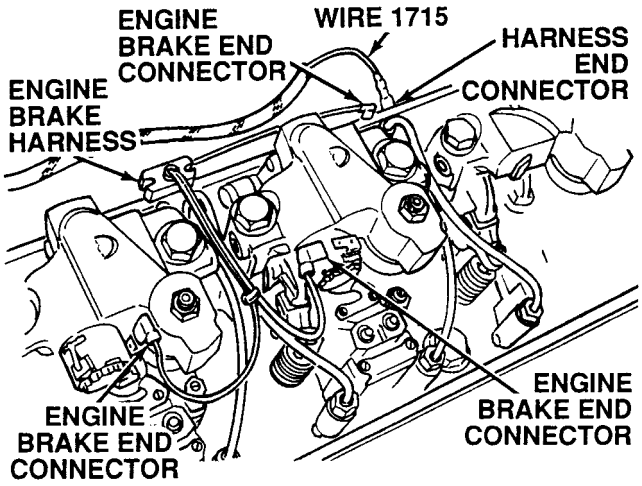


WARNING

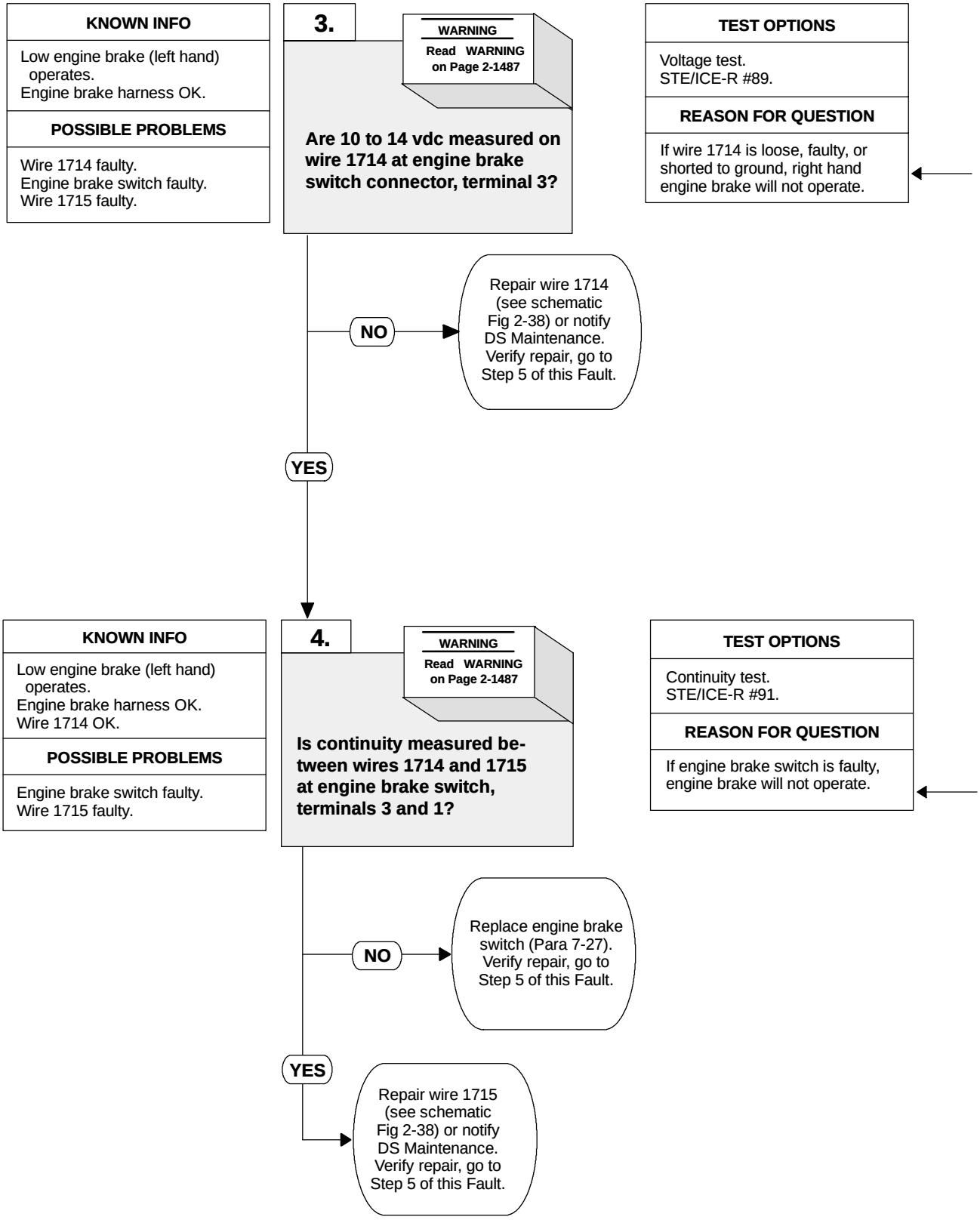
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove right side rocker cover (Para 3-5).
(2) Disconnect three connectors from engine brakes.
(3) Set multimeter select switch to ohms.
(4) Is there continuity between harness end connector and engine brake end connector of engine brake harness?
  (a) If there is no continuity, replace engine brake harness (Para 7-102).
  (b) If there is continuity, engine brake harness is OK. Notify DS Maintenance.
(5) Repeat Step (4) above for remaining engine brake harness leads.
(6) Reconnect engine brake end connectors.
(7) Connect wire 1715 to engine brake harness connector.
(8) Install right rocker cover (Para 3-5).



35. ENGINE BRAKE DOES NOT OPERATE IN HIGH (CONT).



WARNING

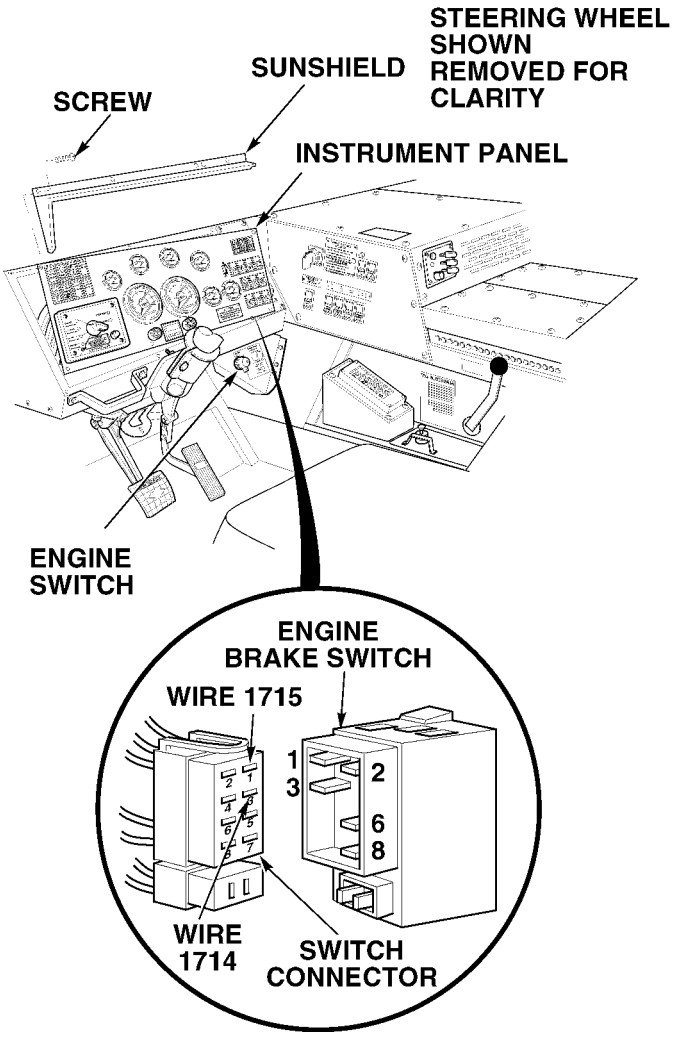
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

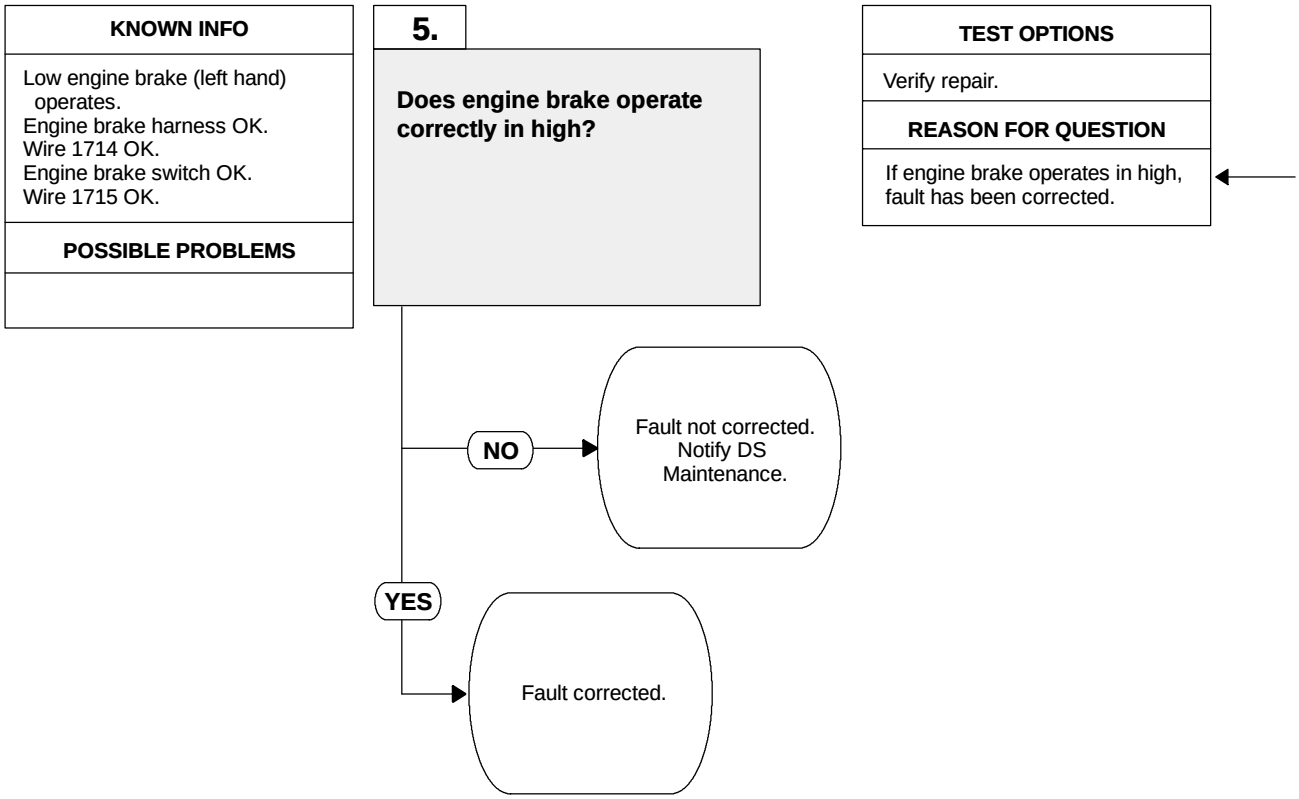
(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove engine brake switch.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter to wire 1714 at engine brake switch connector, terminal 3.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Start engine (TM 9-2320-364-10).
(8) Shift tranfer case to N (Neutral).
(9) Shift transmission to D (Drive).
(10) While assistant applies throttle control for ten seconds at 2000 rpm and quickly releases throttle control, observe multimeter.
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1714 (see schematic Fig 2-38) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1714 is OK.
(11) Turn OFF ENGINE switch.
(12) Close top engine access cover.
(13) Install right side noise panel (Para 17-26).

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Set engine brake switch to high position.
(3) Is there continuity between terminals 3 and 1 at engine brake switch?
  (a) If there is no continuity, replace engine brake switch (Para 7-27).
  (b) If there is continuity, repair wire 1715 (see schematic Fig 2-38) or notify DS Maintenance.
(4) Install engine brake switch.
(5) Install instrument panel and sunshield with ten screws.

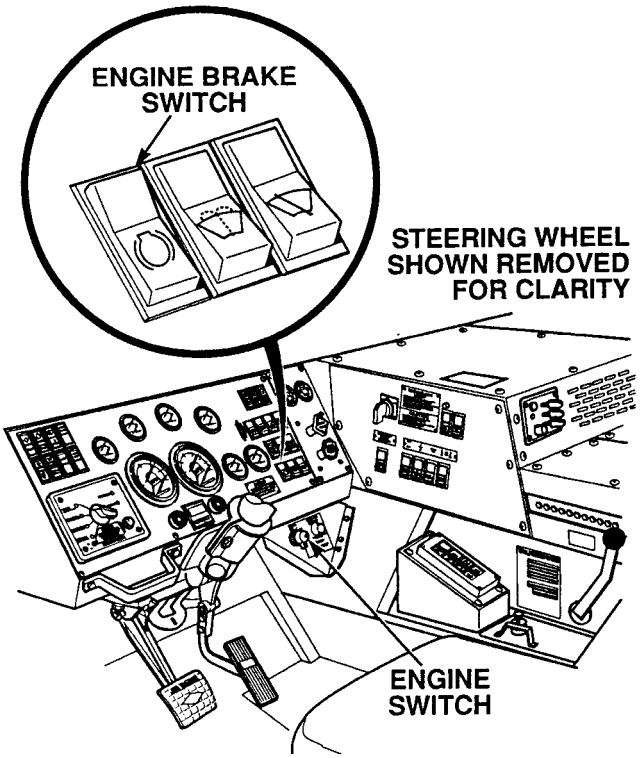


35. ENGINE BRAKE DOES NOT OPERATE IN HIGH (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Set engine brake switch to high position.
(3) Drive truck and allow engine brake to apply.
    (a) If engine brake does not operate, fault not corrected. Perform Steps (4) and (5) below and notify DS Maintenance.
    (b) If engine brake operates, fault has been corrected.
(4) Turn OFF ENGINE switch.
(5) Turn OFF engine brake switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

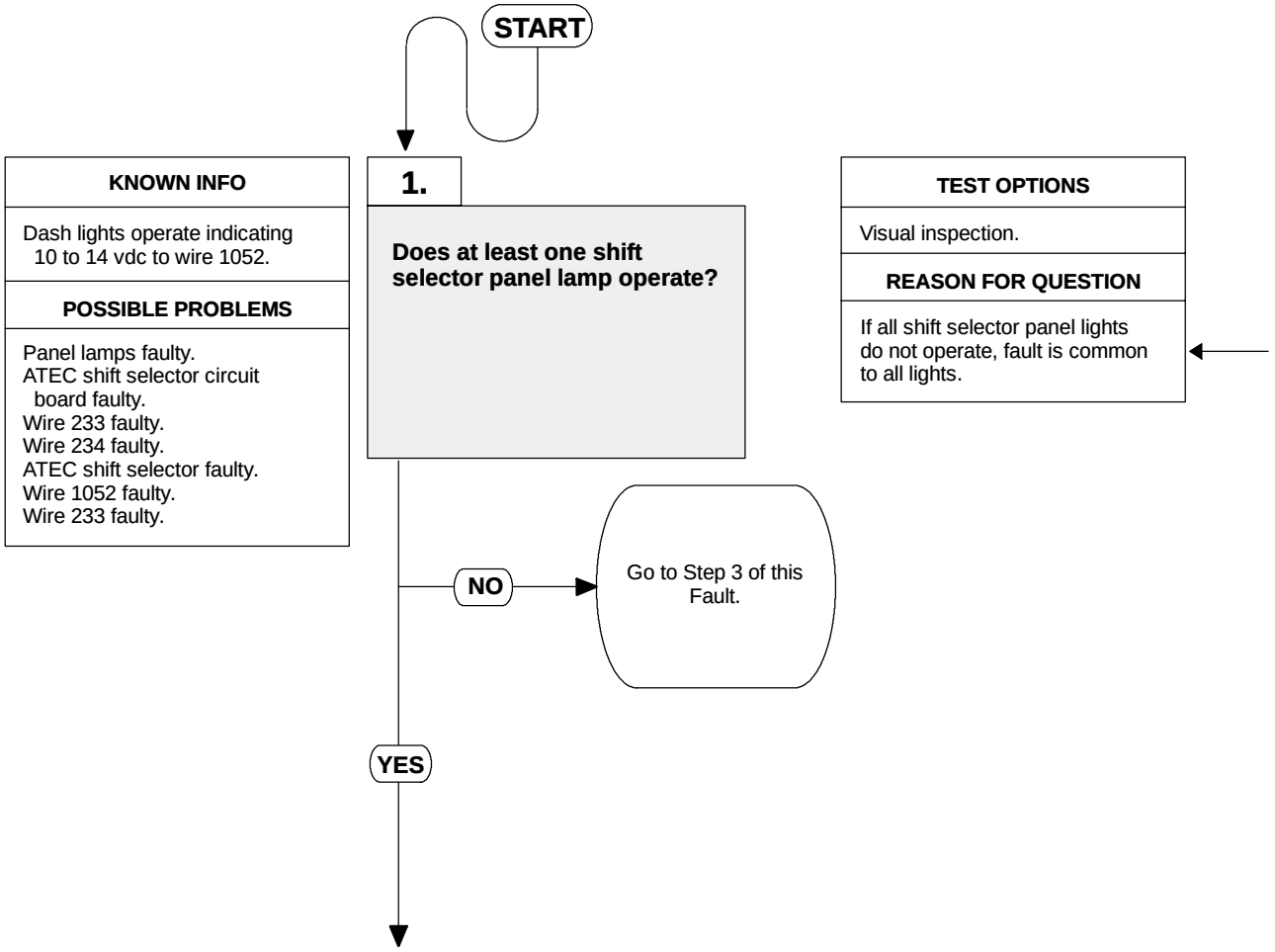
36. SHIFT SELECTOR PANEL LAMPS DO NOT OPERATE.

INITIAL SETUP

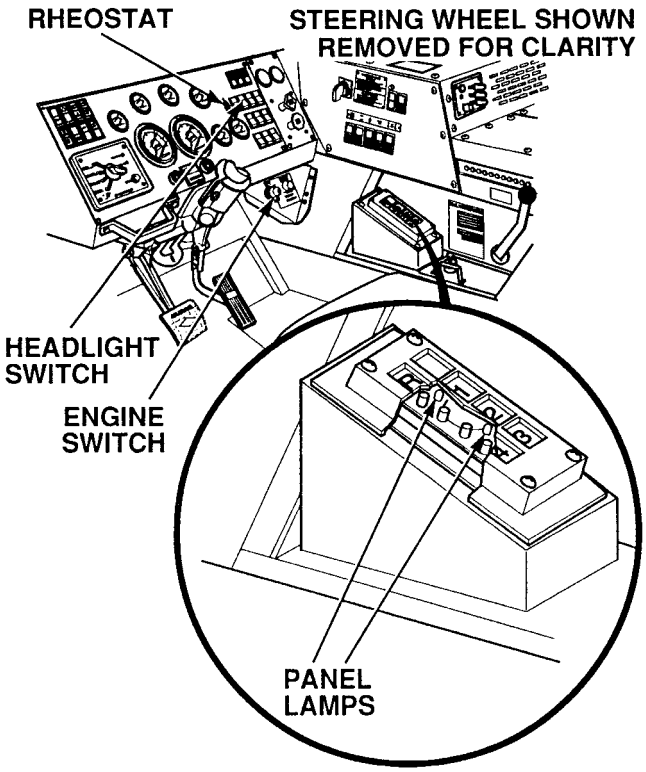
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

References
TM 9-2320-364-10
TM 9-4910-571-12&P



VISUAL INSPECTION
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Turn on headlight switch. (3) Turn rheostat to full bright. (4) Are all shift selector panel lamps lit? (a) If all shift selector panel lamps are not lit, turn OFF ENGINE switch and go to Step 3 of this Fault. (b) If one shift selector panel lamp light is lit, turn OFF ENGINE switch and go to Step 2 of this Fault.



36. SHIFT SELECTOR PANEL LAMPS DO NOT OPERATE (CONT).

KNOWN INFO

Dash lights operate indicating 10 to 14 vdc to wire 1052.

POSSIBLE PROBLEMS

Panel lamps faulty.
ATEC shift selector circuit board faulty.

2.

Is panel lamp free of damage?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If lamp filament is faulty, the lamp will not light.

NO → Replace panel lamp (Para 8-2). Verify repair, go to Step 6 of this Fault.

YES → Replace ATEC shift selector circuit board (Para 8-2). Verify repair, go to Step 6 of this Fault.

KNOWN INFO

Dash lights operate indicating 10 to 14 vdc to wire 1052.
Panel lamps OK.
ATEC shift selector circuit board OK.

POSSIBLE PROBLEMS

Wire 233 faulty.
Wire 234 faulty.
ATEC shift selector faulty.
Wire 1052 faulty.
Wire 233 faulty.

3.

WARNING
Read WARNING on Page 2-1493

Are 10 to 14 vdc measured on wire 233 at connector MC12, terminal 13?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If wire 233 is loose, faulty, or shorted to ground, panel lights will not operate.

NO → Go to Step 5 of this Fault.

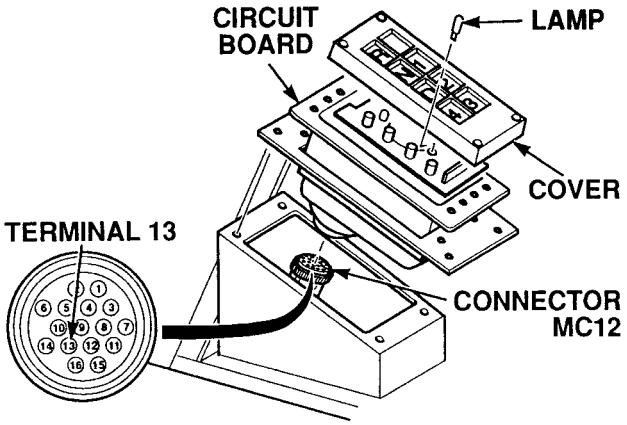
YES

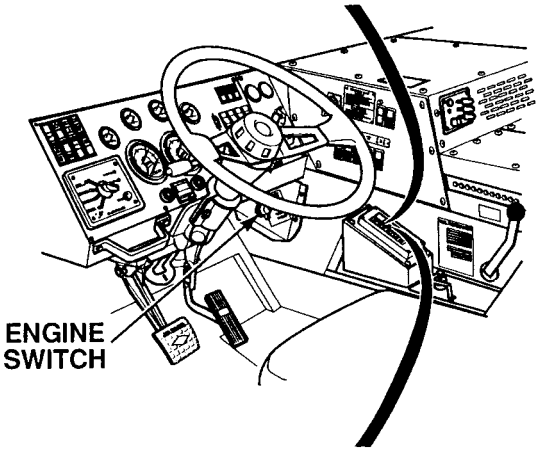
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

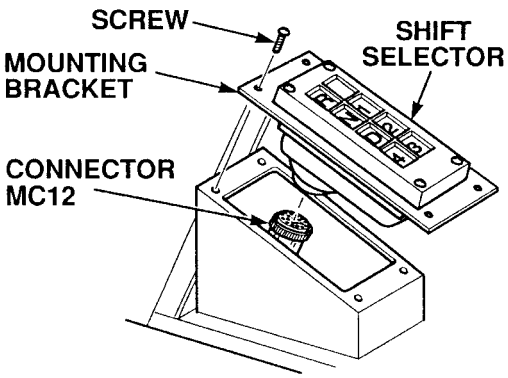
(1) Disassemble shift selector (Para 8-2).
(2) Remove panel lamp.
(3) Set multimeter select switch to ohms.
(4) Is continuity measured across panel lamp?
  (a) If there is no continuity, replace panel lamp (Para 8-2).
  (b) If there is continuity, replace ATEC shift selector circuit board (Para 8-2).



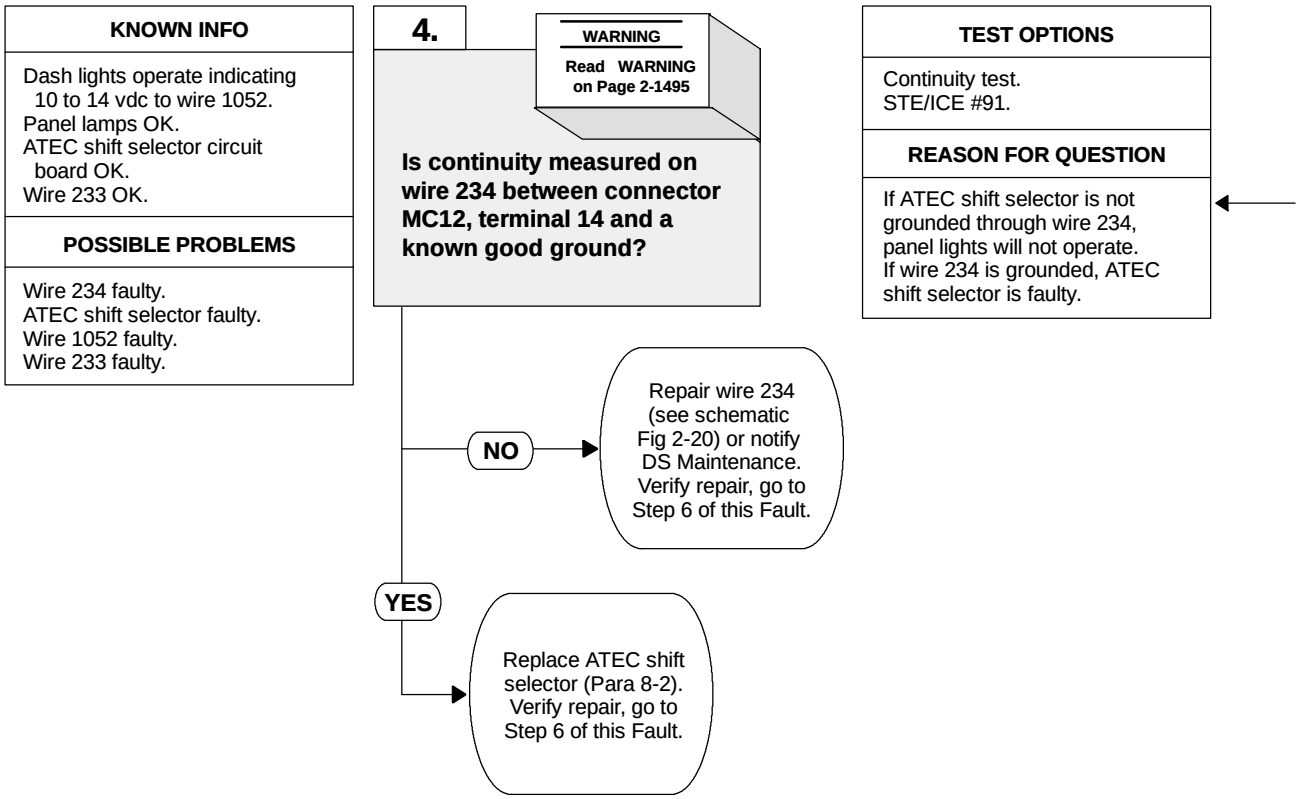


VOLTAGE TEST

(1) Remove four screws and disconnect connector MC12 from shift selector.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 233 at connector MC12, terminal 13.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 233 (see schematic Fig 2-20) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 233 is OK.
(6) Turn OFF ENGINE switch.



36. SHIFT SELECTOR PANEL LAMPS DO NOT OPERATE (CONT).

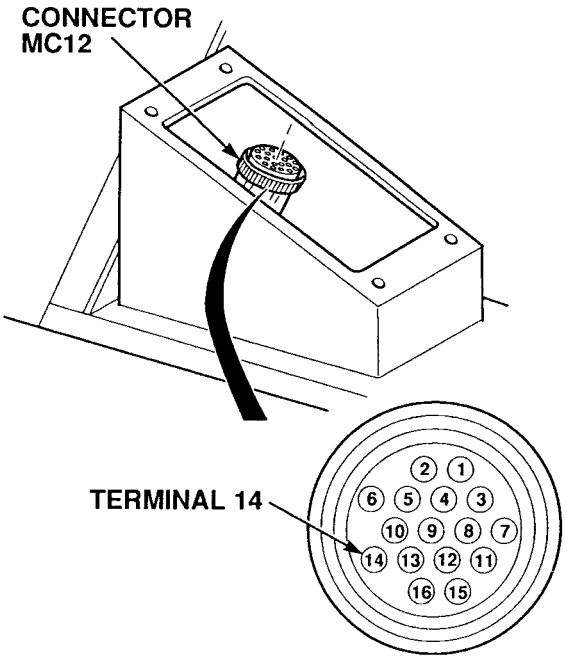


WARNING

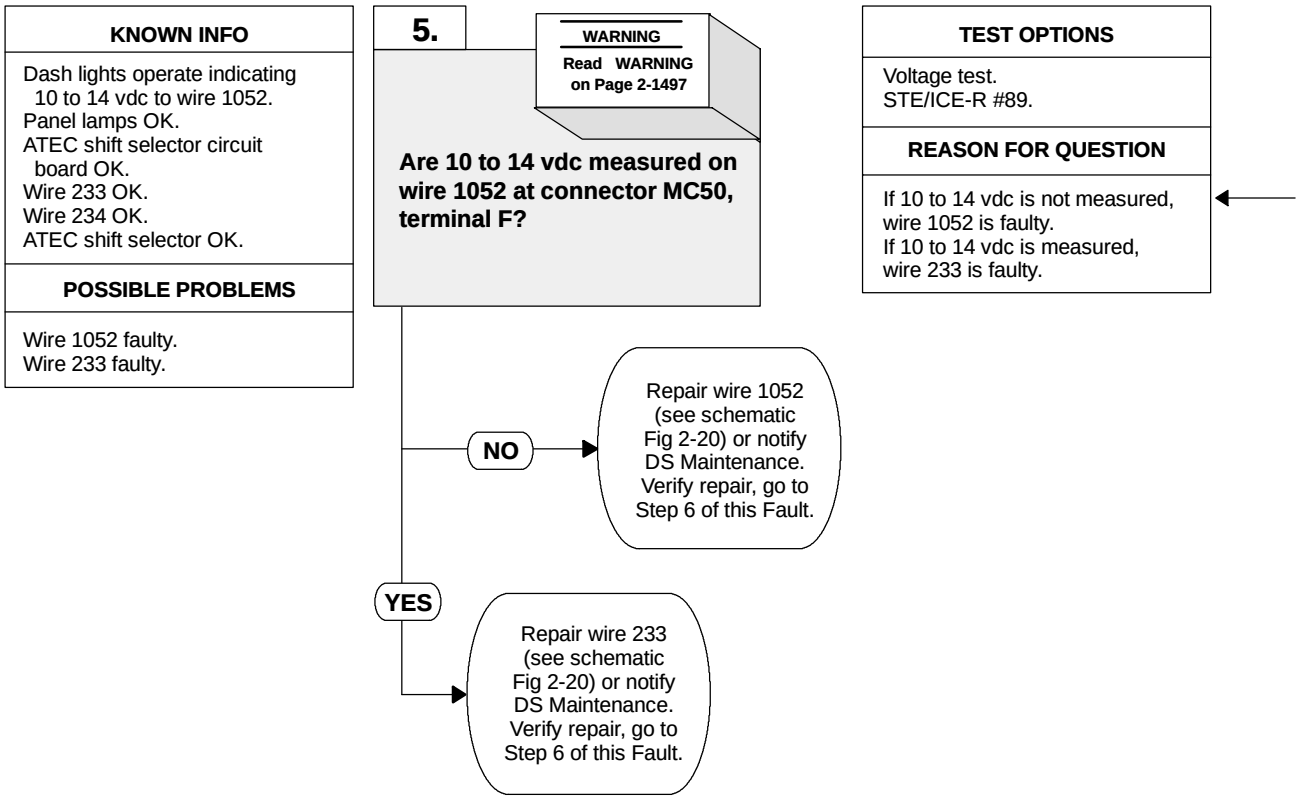
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 234 between connector MC12, terminal 14 and a known good ground?
   (a) If there is no continuity, repair wire 234 (see schematic Fig 2-20) or notify DS Maintenance.
   (b) If there is continuity, wire 234 is OK. Replace ATEC shift selector (Para 8-2).

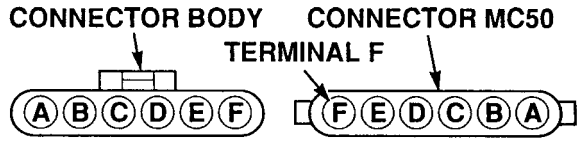


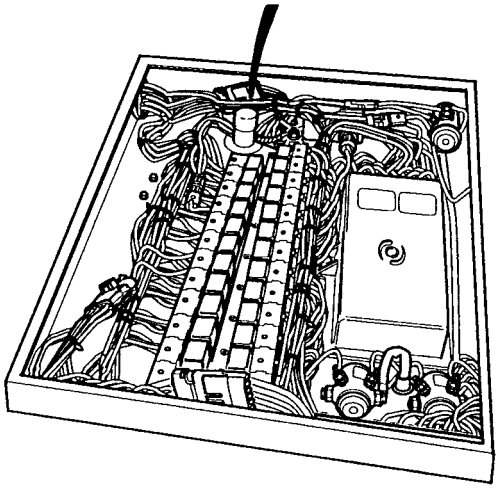
36. SHIFT SELECTOR PANEL LAMPS DO NOT OPERATE (CONT).



WARNING

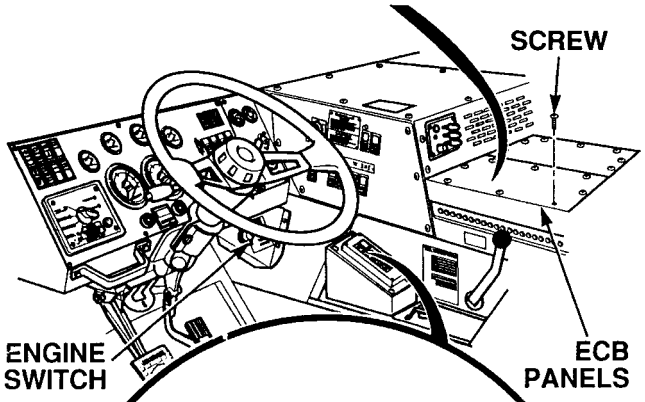
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

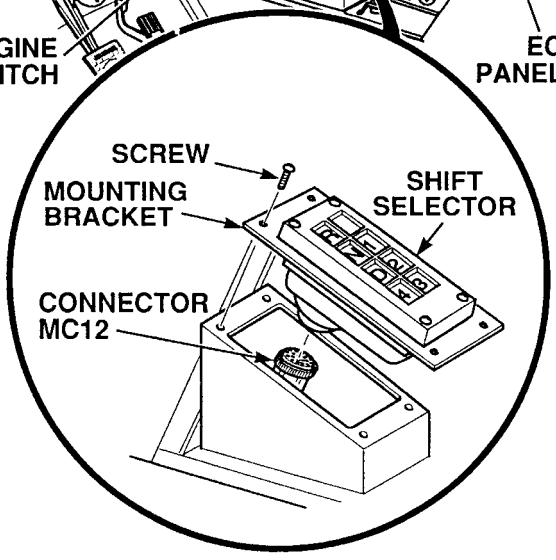




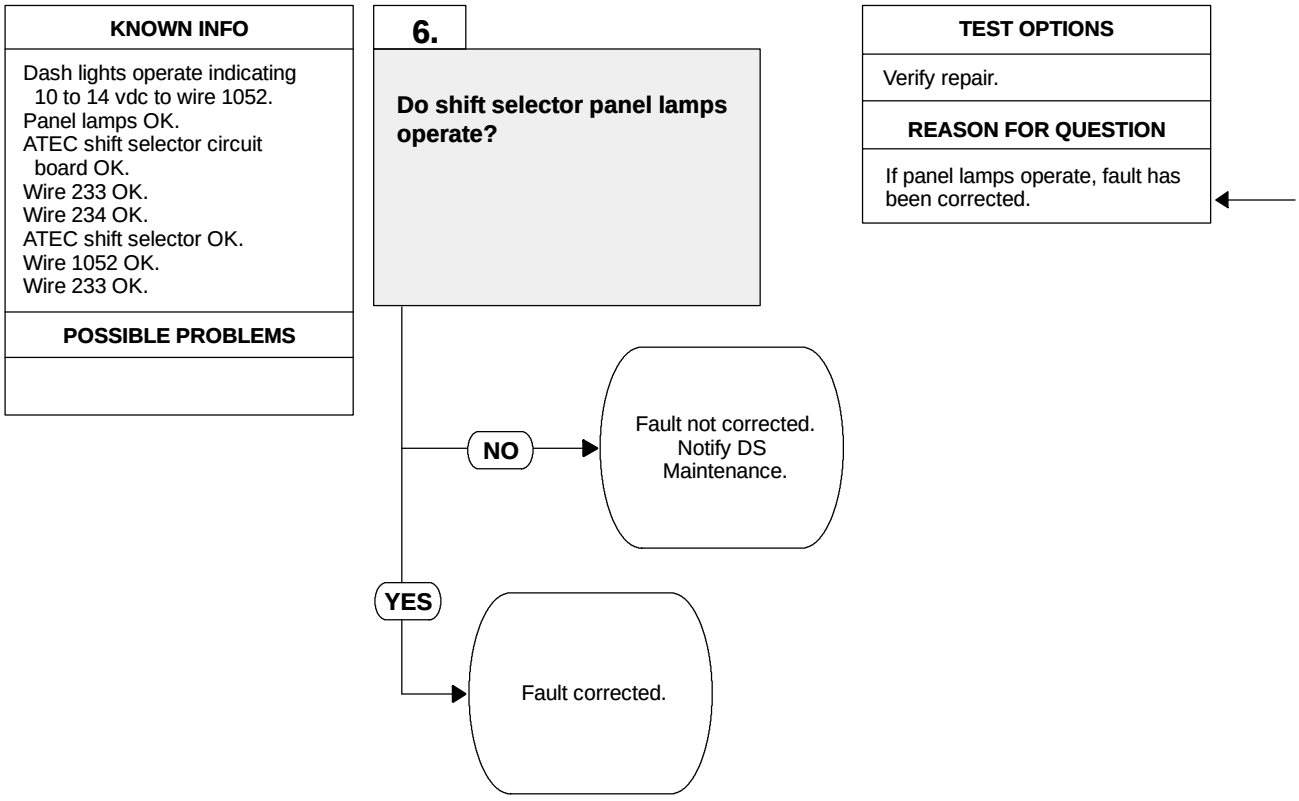
VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Disconnect connector MC50.
(3) Set multimeter select switch to volts dc.
(4) Connect positive (+) multimeter lead to wire 1052 at harness connector MC50, terminal F.
(5) Connect negative (-) multimeter lead to a known good ground.
(6) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1052 (see schematic Fig 2-20) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, turn OFF ENGINE switch and repair wire 233 (see schematic Fig 2-20) or notify DS Maintenance.
(7) Connect connector MC50.
(8) Install two ECB covers and 15 screws.
(9) Connect connector MC12 and install shift selector and four screws.

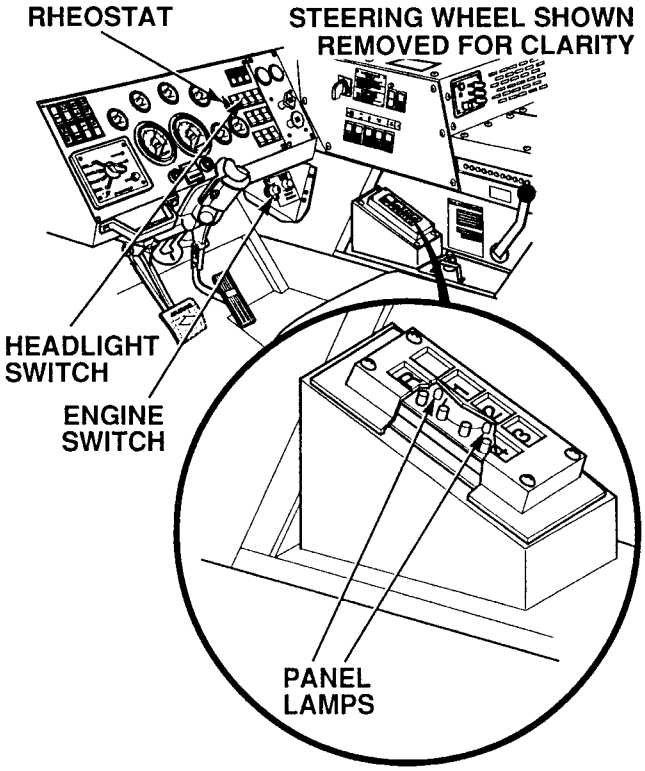




36. SHIFT SELECTOR PANEL LAMPS DO NOT OPERATE (CONT).



VERIFY REPAIR
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Inspect panel lamps for operation. (a) If all panel lamps are not lit, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance. (b) If all panel lamps are lit, fault has been corrected. (3) Turn OFF ENGINE switch. (4) Turn off headlights switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

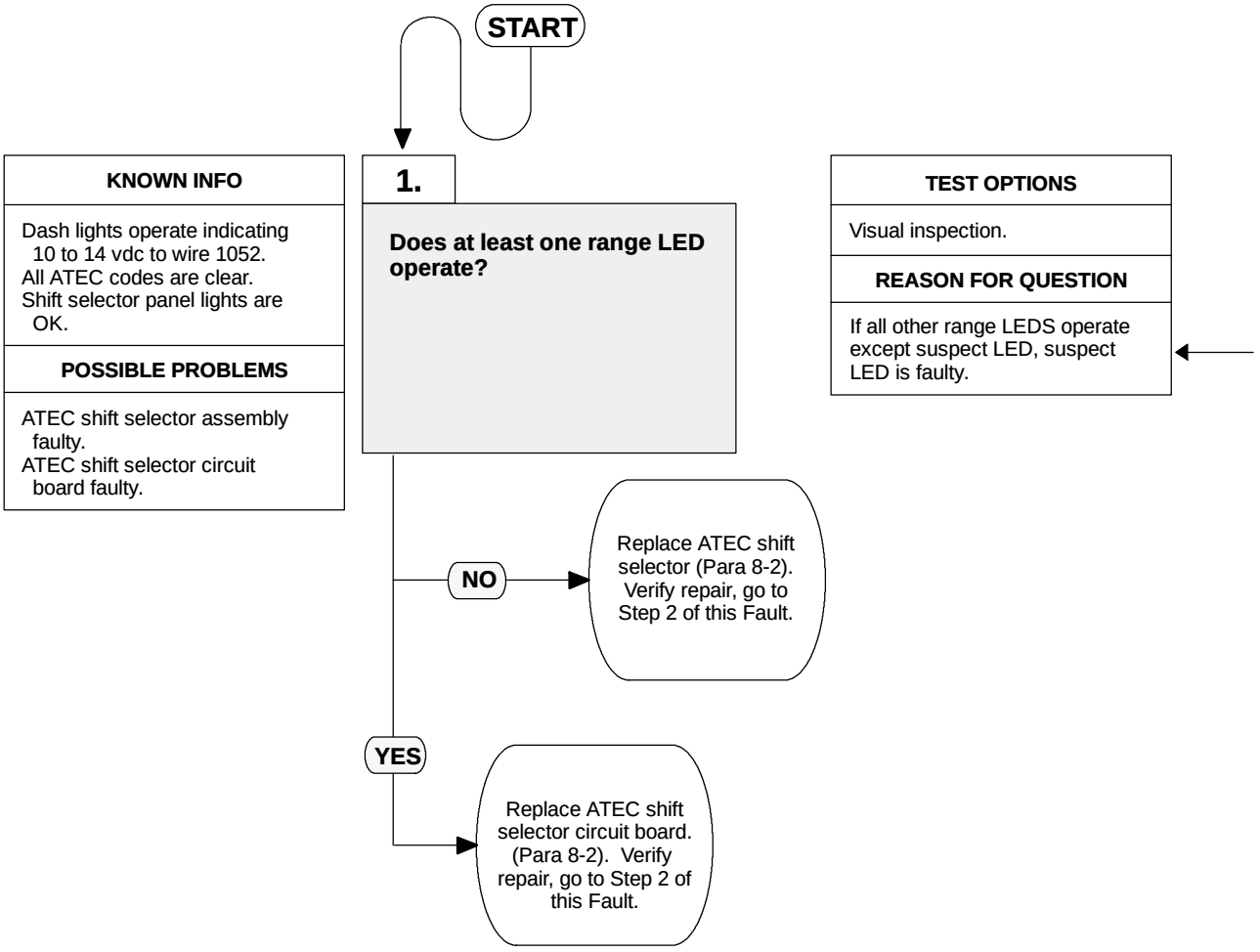
37. SHIFT SELECTOR RANGE LED(S) DO NOT OPERATE.

INITIAL SETUP

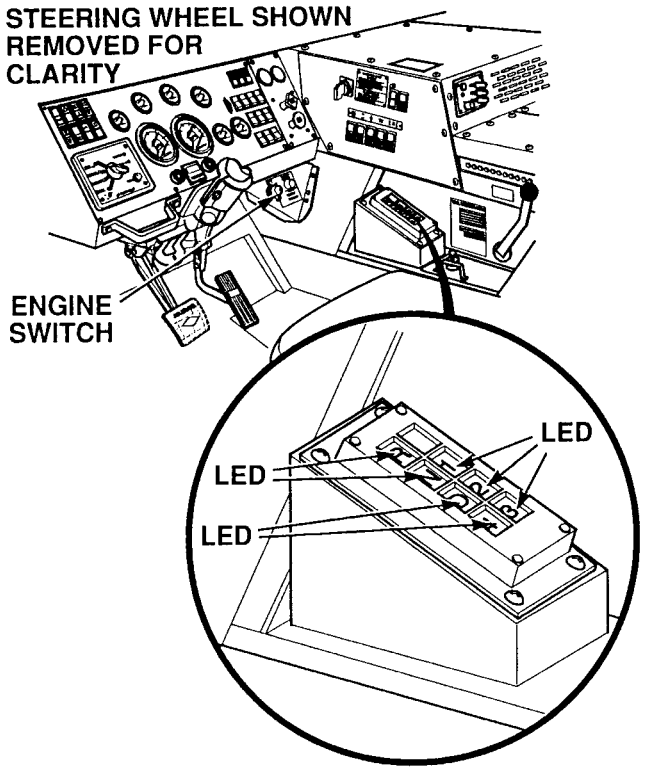
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

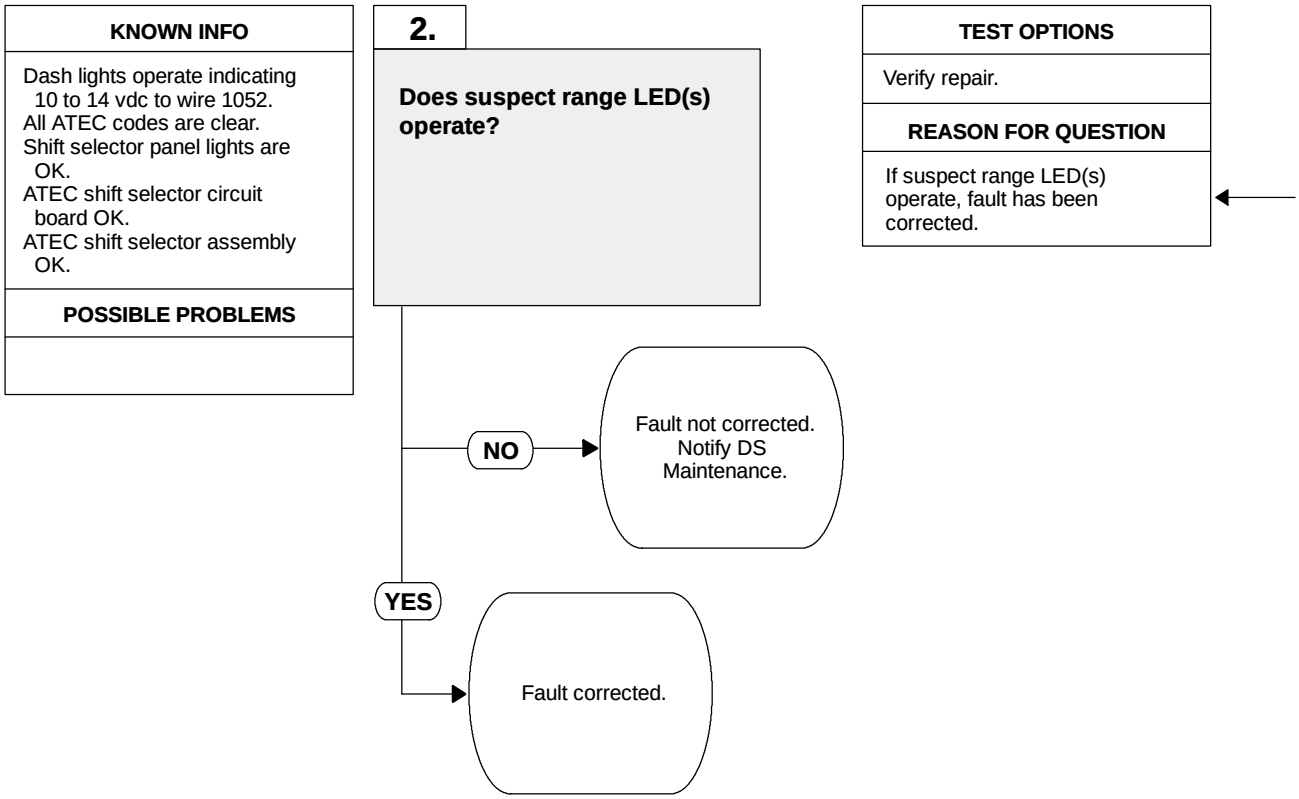
References
TM 9-2320-364-10
TM 9-4910-571-12&P



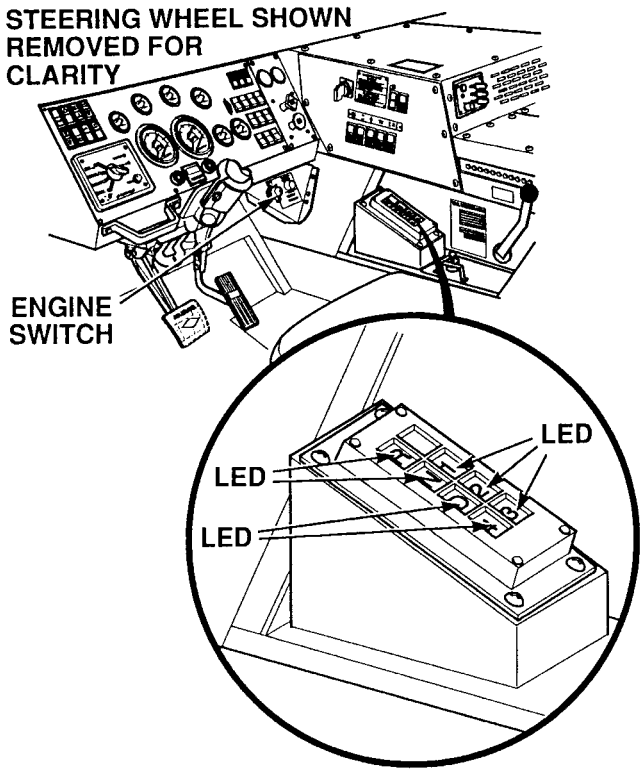
VISUAL INSPECTION
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Press suspect selection(s) and inspect LED(s) for operation. (a) If no range LED(s) operate, turn OFF ENGINE switch and replace ATEC shift selector (Para 8-2). (b) If at least one range LED operates, turn OFF ENGINE switch and replace ATEC shift selector circuit board (Para 8-2).



37. SHIFT SELECTOR LED(S) DO NOT OPERATE (CONT).



VERIFY REPAIR
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Press suspect selection(s) and inspect range LED(s) for operation. (a) If suspect range LED(s) do not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If suspect range LED(s) operate, fault has been corrected. (3) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

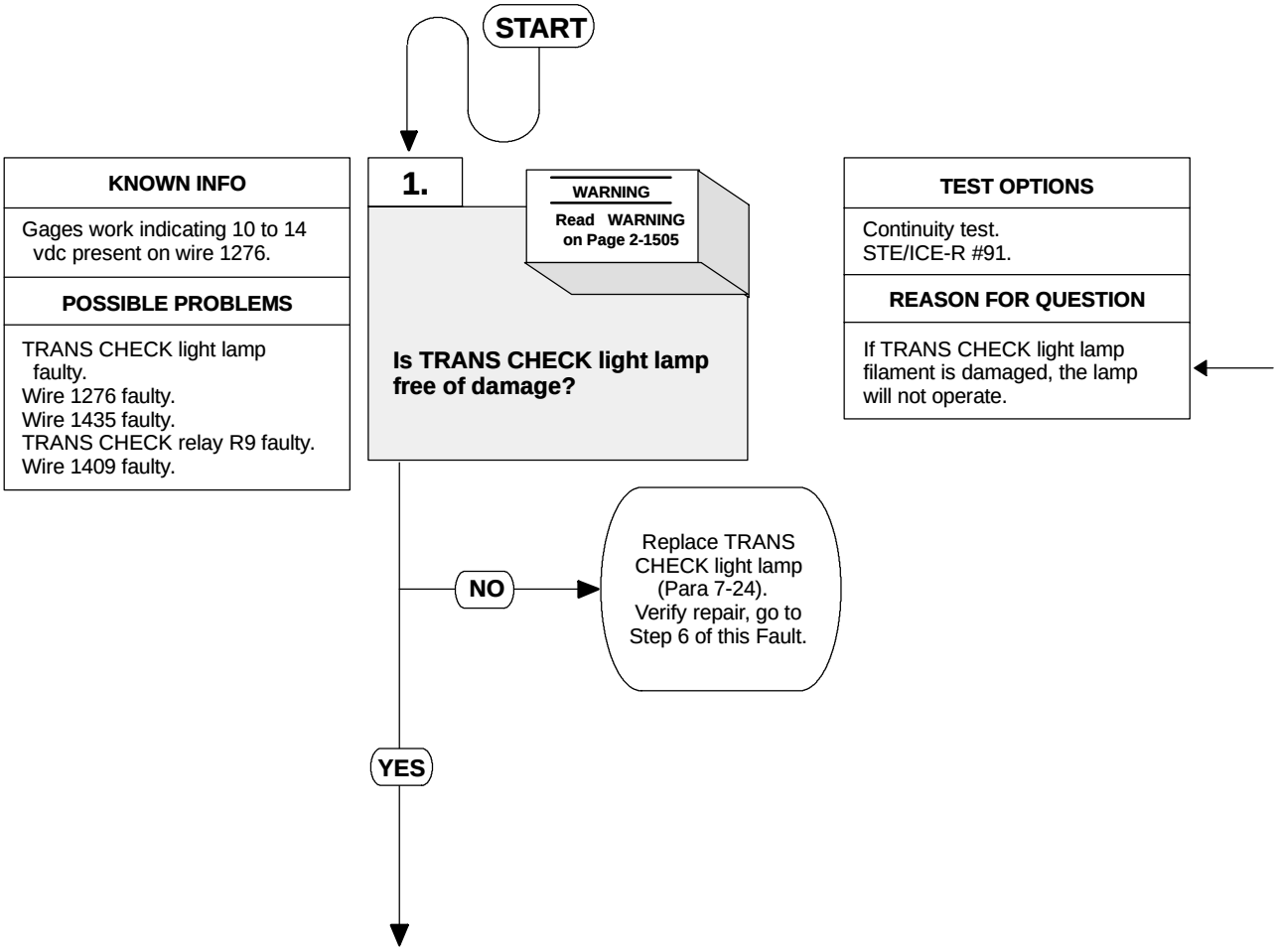
38. TRANS CHECK LIGHT WILL NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

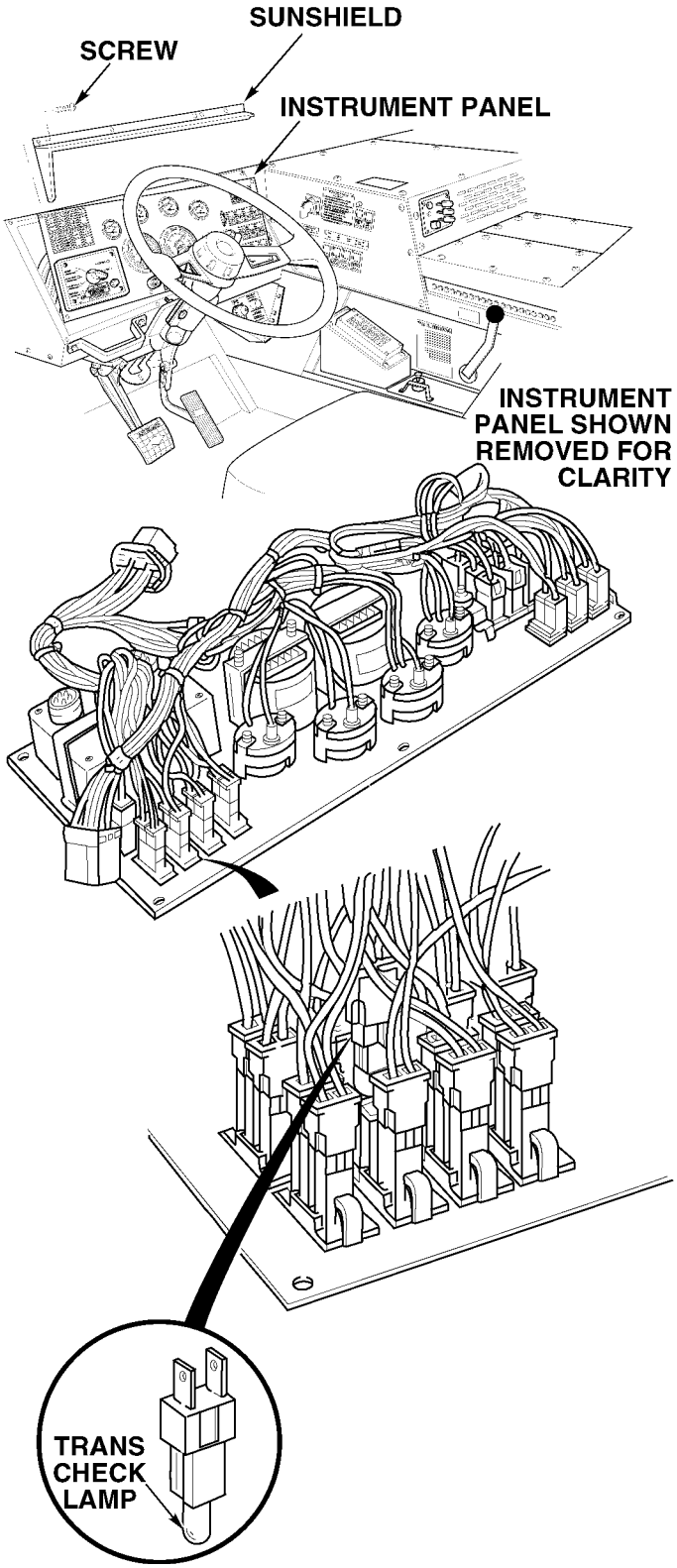
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove TRANS CHECK lamp.
(4) Set multimeter select switch to ohms.
(5) Is continuity measured across terminals of lamp?
    (a) If there is no continuity, replace lamp (Para 7-24).
    (b) If there is continuity, go to Step 2 of this Fault.

38. TRANS CHECK LIGHT WILL NOT OPERATE (CONT).

KNOWN INFO

Gages work indicating 10 to 14 vdc present on wire 1276.
TRANS CHECK light lamp OK.

POSSIBLE PROBLEMS

Wire 1276 faulty.
Wire 1435 faulty.
TRANS CHECK relay R9 faulty.
Wire 1409 faulty.

2.

WARNING
Read WARNING on Page 2-1507

Are 10 to 14 vdc measured on wire 1276 at TRANS CHECK light lamp socket?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If wire 1276 is loose or faulty, TRANS CHECK light will not operate.

NO → Repair wire 1276 (see schematic Fig 2-41) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

YES

KNOWN INFO

Gages work indicating 10 to 14 vdc present on wire 1276.
TRANS CHECK light lamp OK.
Wire 1276 OK.

POSSIBLE PROBLEMS

Wire 1435 faulty.
TRANS CHECK relay R9 faulty.
Wire 1409 faulty.

3.

WARNING
Read WARNING on Page 2-1507

Is continuity measured on wire 1409 between TRANS CHECK light socket and a known good ground?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If wire 1409 is loose or faulty, TRANS CHECK light will not operate.

NO → Go to Step 4 of this Fault.

YES → Fault corrected. Verify repair, go to Step 6 of this Fault.

WARNING

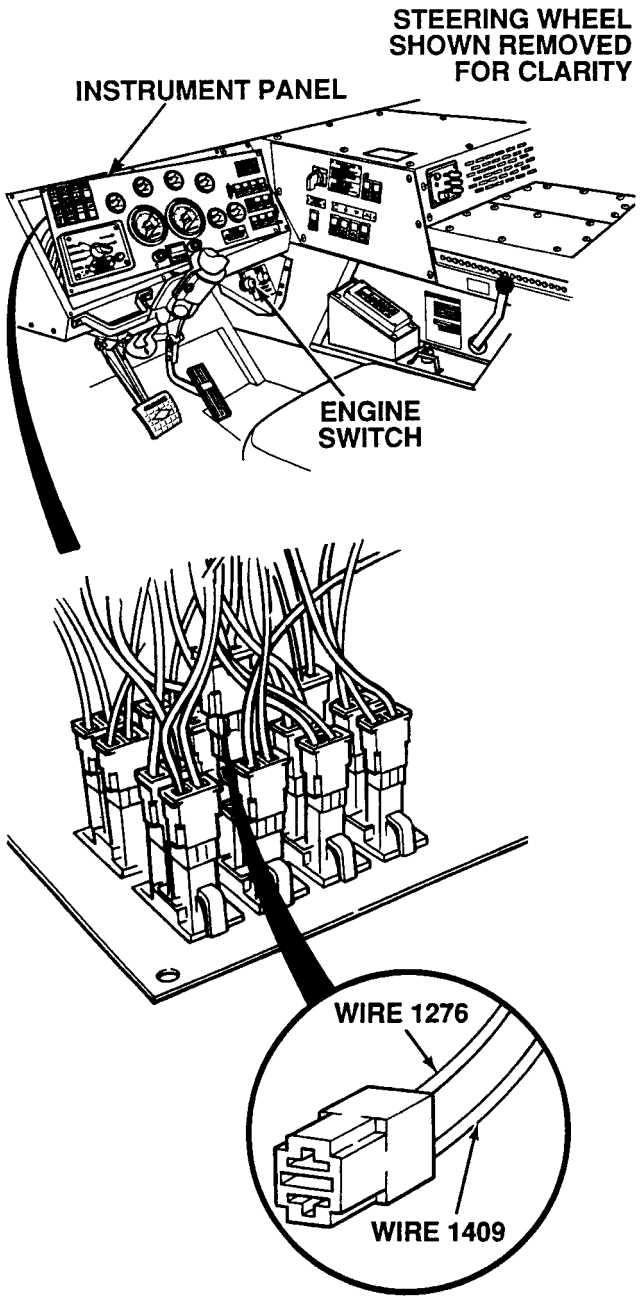
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1276 contact of TRANS CHECK light socket.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1276 (see schematic Fig 2-41) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, TRANS CHECK light connector is OK.
(5) Turn OFF ENGINE switch.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) is continuity measured from TRANS CHECK light connector wire 1409 to a known good ground?
  (a) If there is no continuity, go to Step 4 of this Fault.
  (b) If there is continuity, go to Step 6 of this Fault.



38. TRANS CHECK LIGHT WILL NOT OPERATE (CONT).

KNOWN INFO

Gages work indicating 10 to 14 vdc present on wire 1276.
TRANS CHECK light lamp OK.
Wire 1276 OK.

POSSIBLE PROBLEMS

Wire 1435 faulty.
TRANS CHECK relay R9 faulty.
Wire 1409 faulty.

4.

WARNING
Read WARNING on Page 2-1509

Is continuity measured on wire 1435 between TRANS CHECK relay R9, terminal 87A and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If relay R9 is not grounded through wire 1435, TRANS CHECK light will not operate.

NO → Repair wire 1435 (see schematic Fig. 2-41) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

YES

KNOWN INFO

Gages work indicating 10 to 14 vdc present on wire 1276.
TRANS CHECK light lamp OK.
Wire 1276 OK.
Relay R9 wire 1435 OK.
Wire 1435 OK.

POSSIBLE PROBLEMS

TRANS CHECK relay R9 faulty.
Wire 1409 faulty.

5.

WARNING
Read WARNING on Page 2-1509

Is continuity measured on wire 1409 between CK TRANS relay R9, terminal 30 and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If continuity is not measured, TRANS CHECK relay R9 is faulty.

NO → Replace TRANS CHECK relay (Para 7-95). Verify repair, go to Step 6 of this Fault.

YES → Repair wire 1409 (see schematic Fig 2-41) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

WARNING

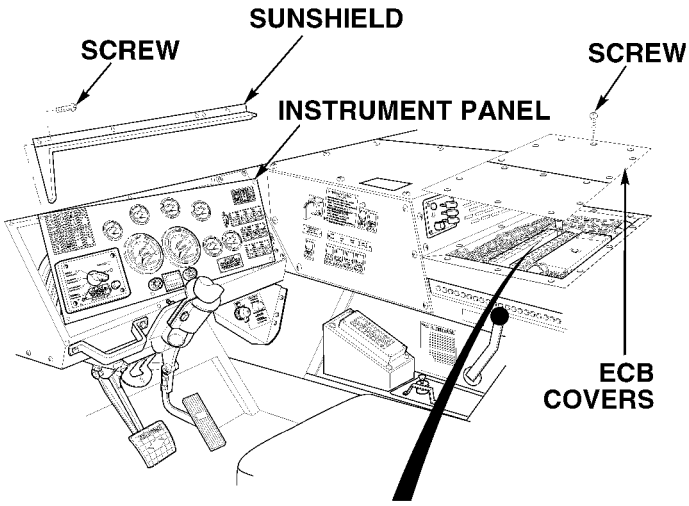
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

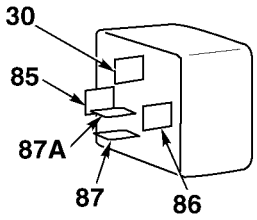
NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Remove 15 screws and two ECB covers.
(2) Is there continuity on wire 1435 between TRANS CHECK relay R9, terminal 87A and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-41) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.





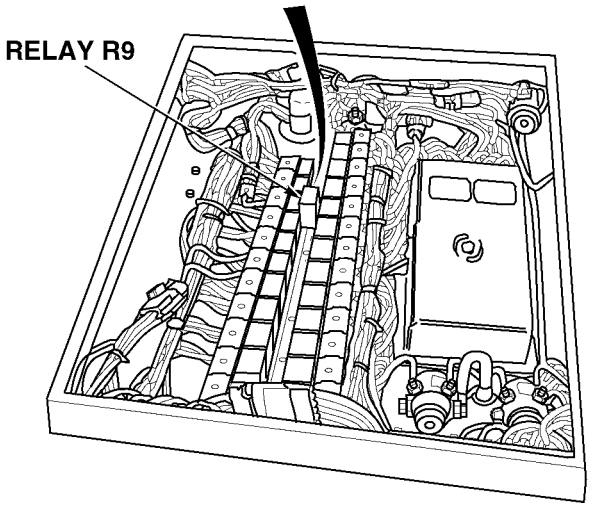
RELAY SHOWN REMOVED FOR CLARITY

NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Is there continuity on wire 1409 between TRANS CHECK relay R9, terminal 30 and a known good ground?
  (a) If there is no continuity, perform Step (3) below and replace relay R9 (Para 7-95).
  (b) If there is continuity, repair wire 1409 (see schematic Fig 2-41) or notify DS Maintenance.
(2) Install two ECB covers and 15 screws.
(3) Install instrument panel and sunshield with ten screws.



38. TRANS CHECK LIGHT WILL NOT OPERATE (CONT).

KNOWN INFO
Gages work indicating 10 to 14 vdc present on wire 1276. TRANS CHECK light lamp OK. Wire 1276 OK. Relay R9 wire 1435 OK. Wire 1435 OK. TRANS CHECK relay R9 OK. Wire 1409 OK.
POSSIBLE PROBLEMS

6.

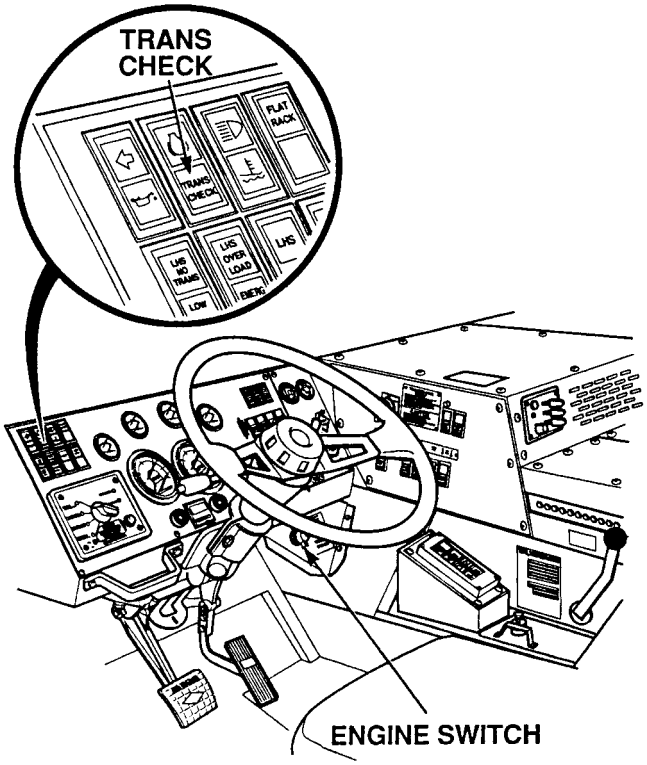
Does TRANS CHECK light operate?

TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If TRANS CHECK light operates, fault has been corrected.

NO → Fault not corrected. Notify DS Maintenance.

YES → Fault corrected.

VERIFY REPAIR
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Inspect TRANS CHECK light operation. (a) If TRANS CHECK llight does not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If TRANS CHECK light operates, fault has been corrected. (3) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

39. TRANS CHECK LIGHT WILL NOT GO OUT.

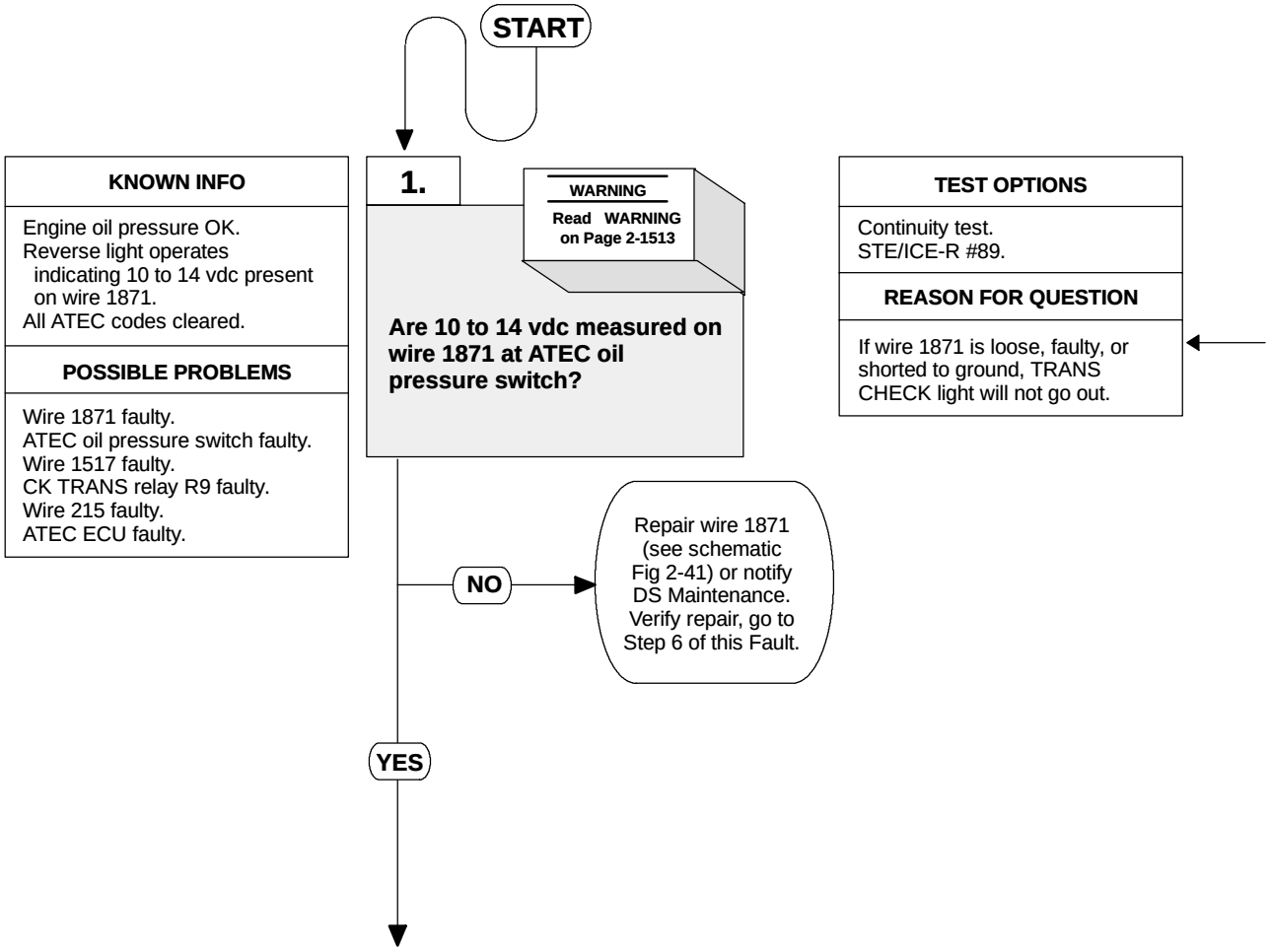
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left rear skirt removed, (Para 17-34)

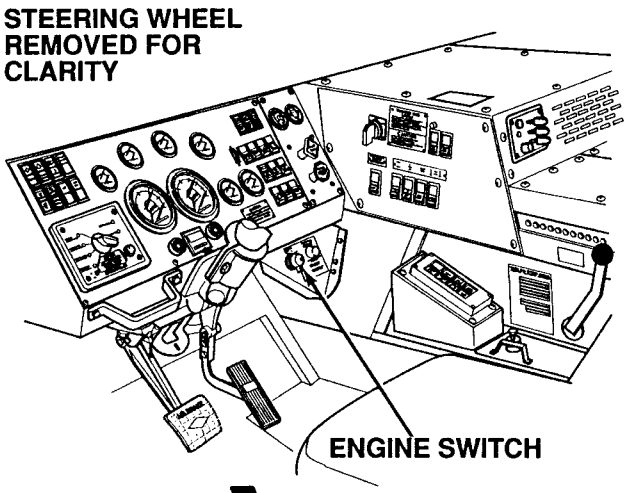


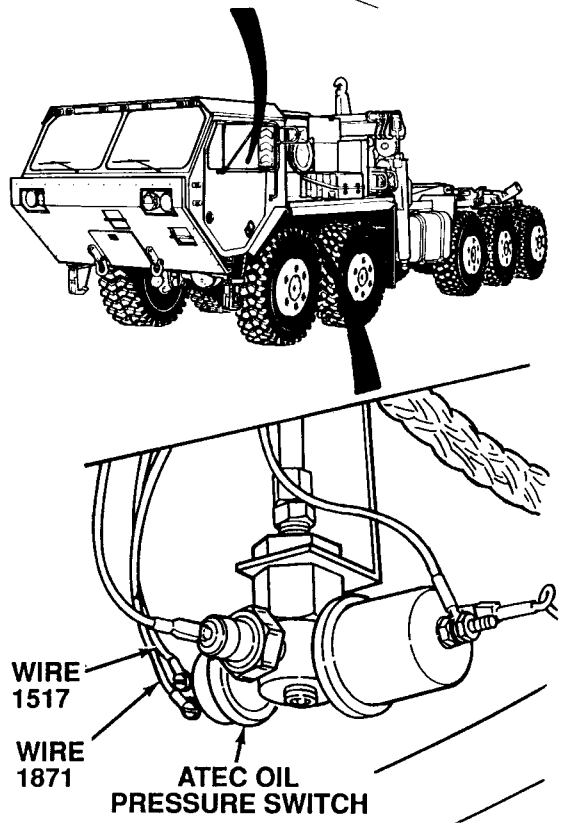
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

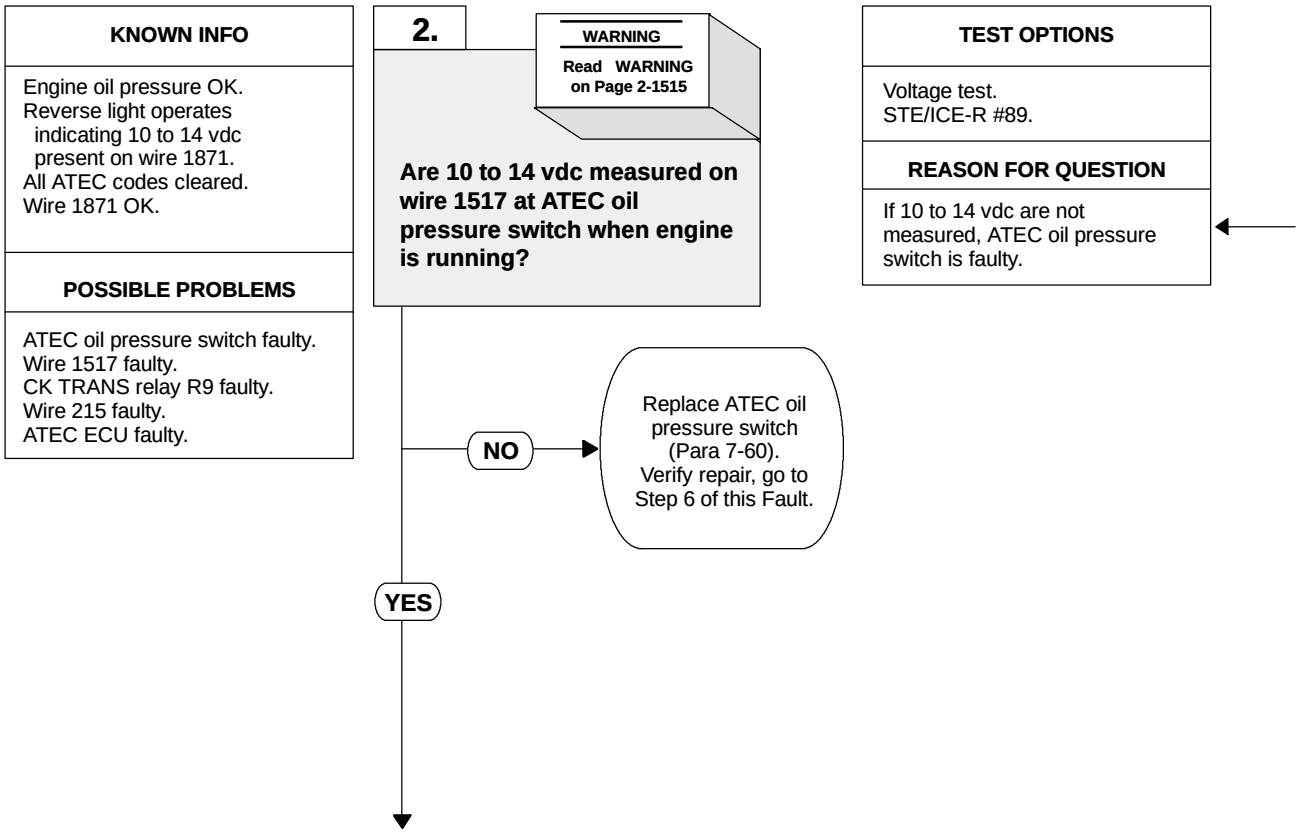
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1871 at ATEC oil pressure switch.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Start engine (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1871 (see schematic Fig 2-41) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1871 is OK.
(5) Turn OFF ENGINE switch.





39. TRANS CHECK LIGHT WILL NOT GO OUT (CONT).

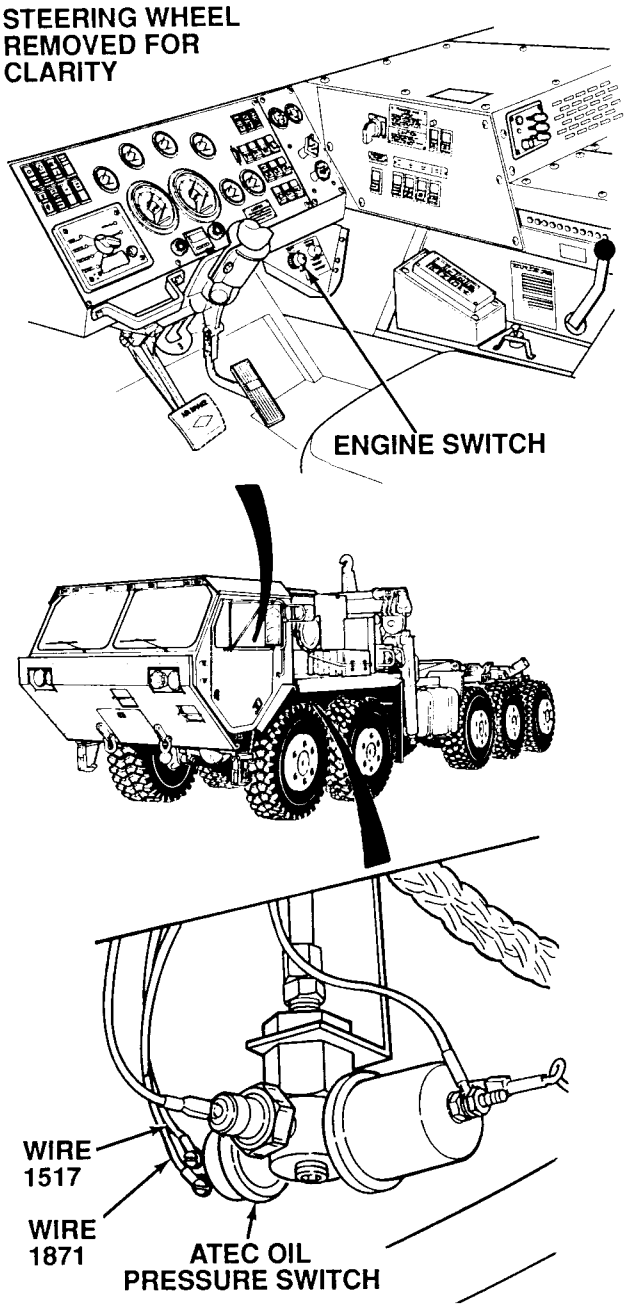


WARNING

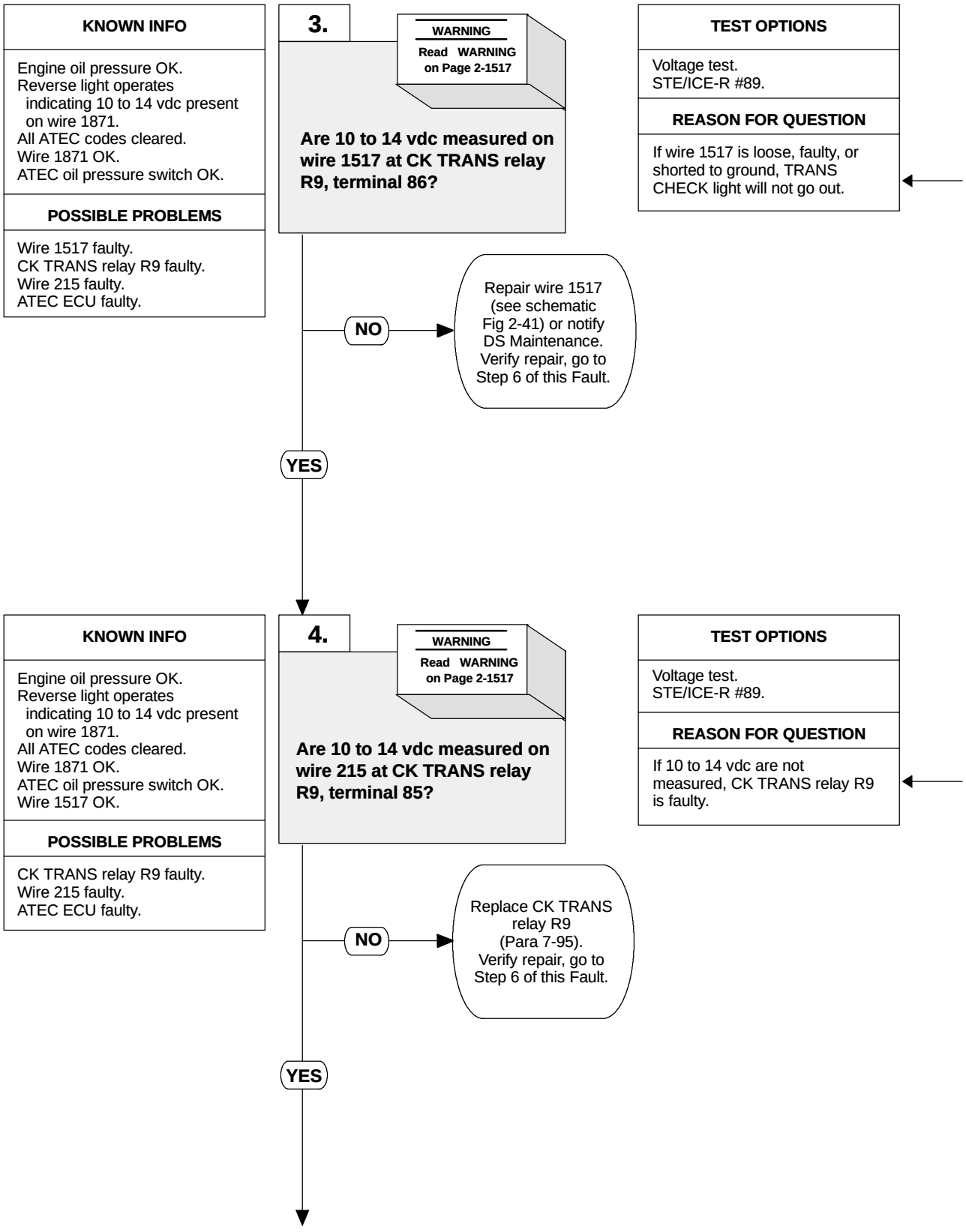
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1517 at ATEC oil pressure switch.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Start engine (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace ATEC oil pressure switch (Para 7-60).
  (b) If 10 to 14 vdc are present, ATEC oil pressure switch is OK.
(4) Turn OFF ENGINE switch.



39. TRANS CHECK LIGHT WILL NOT GO OUT (CONT).



WARNING

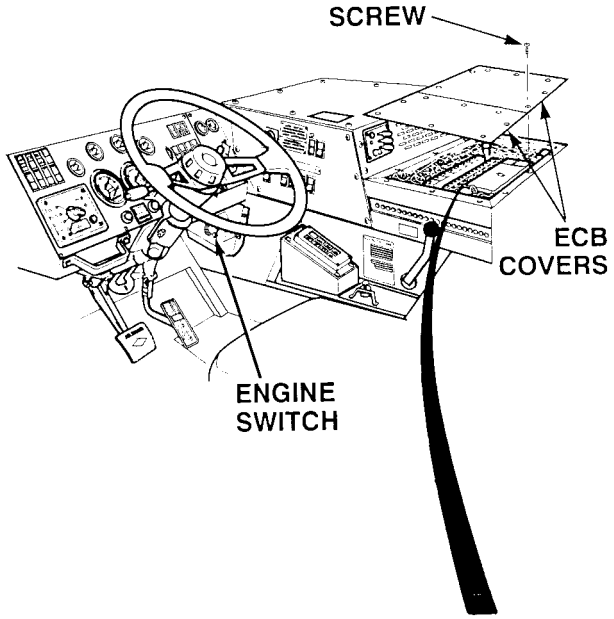
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Remove 15 screws and two ECB covers.
(2) Pull CK TRANS relay out of socket enough to access terminals with a test probe.
(3) Connect positive (+) multimeter lead to wire 1517 at CK TRANS relay R9, terminal 86.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Start engine (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1517 (see schematic Fig 2-41) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1517 is OK.
(6) Turn OFF ENGINE switch.

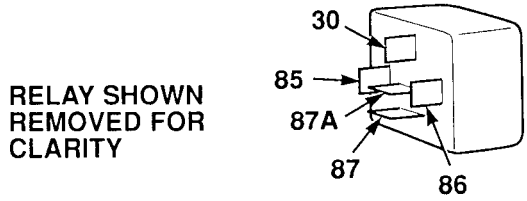


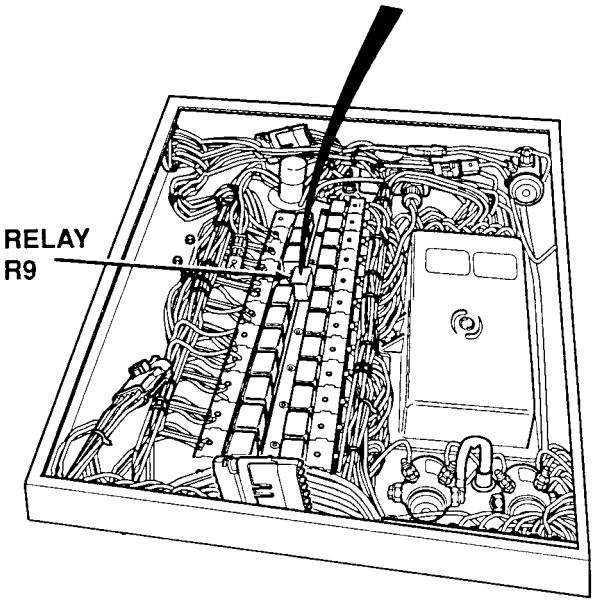
NOTE

Relay test must be performed with relay partially removed.

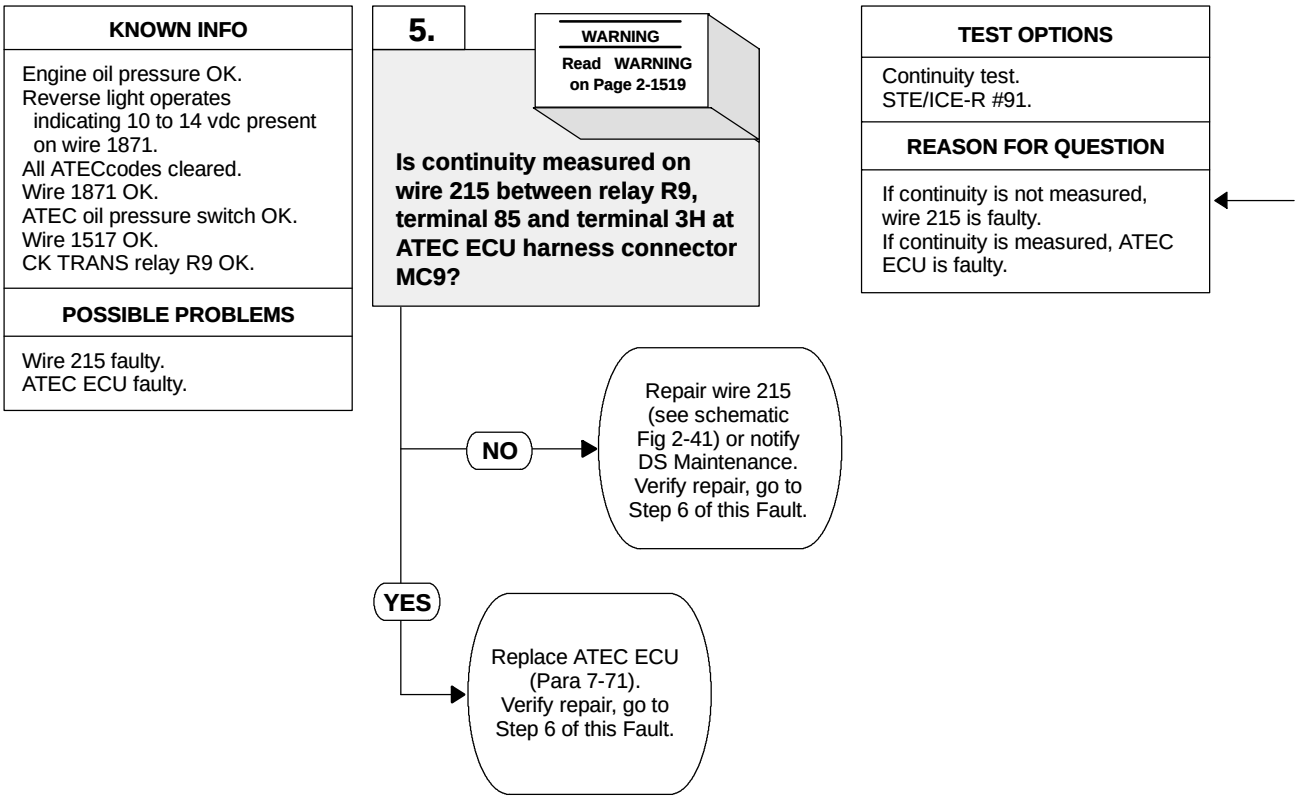
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 215 at CK TRANS relay R9, terminal 85.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and replace CK TRANS relay (Para 7-95).
  (b) If 10 to 14 vdc are present, CK TRANS relay R9 is OK.
(4) Turn OFF ENGINE switch.



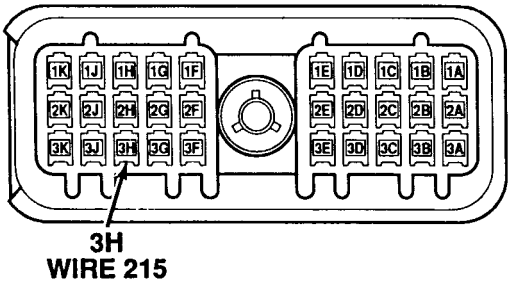


39. TRANS CHECK LIGHT WILL NOT GO OUT (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

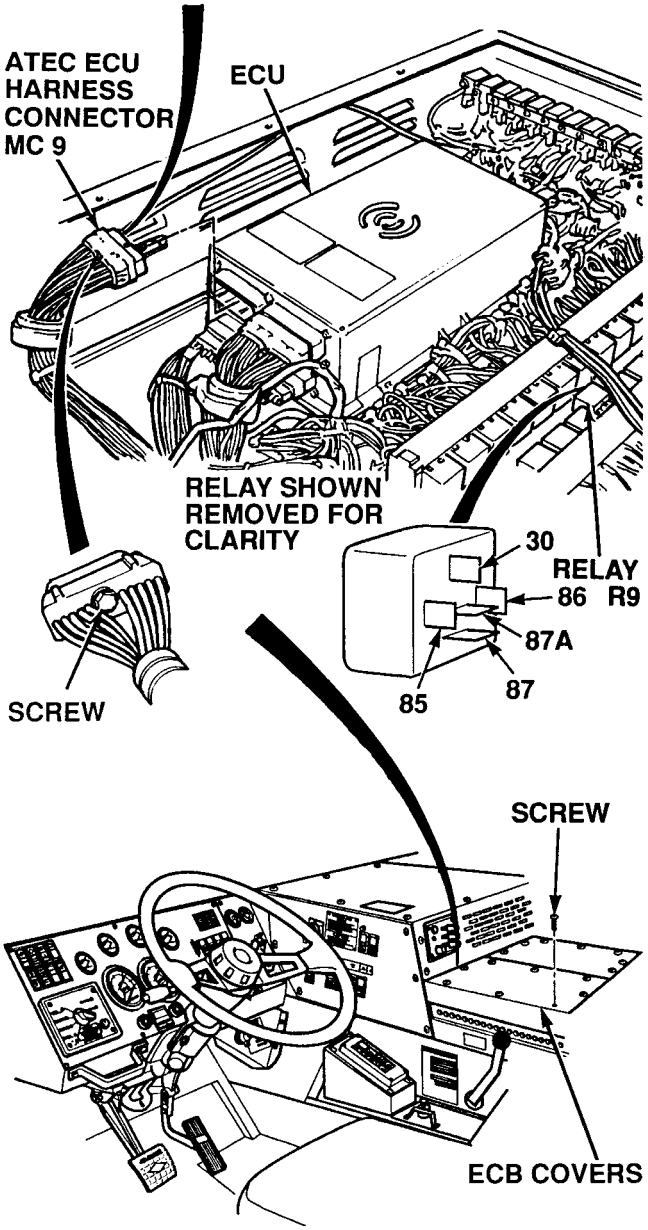


NOTE

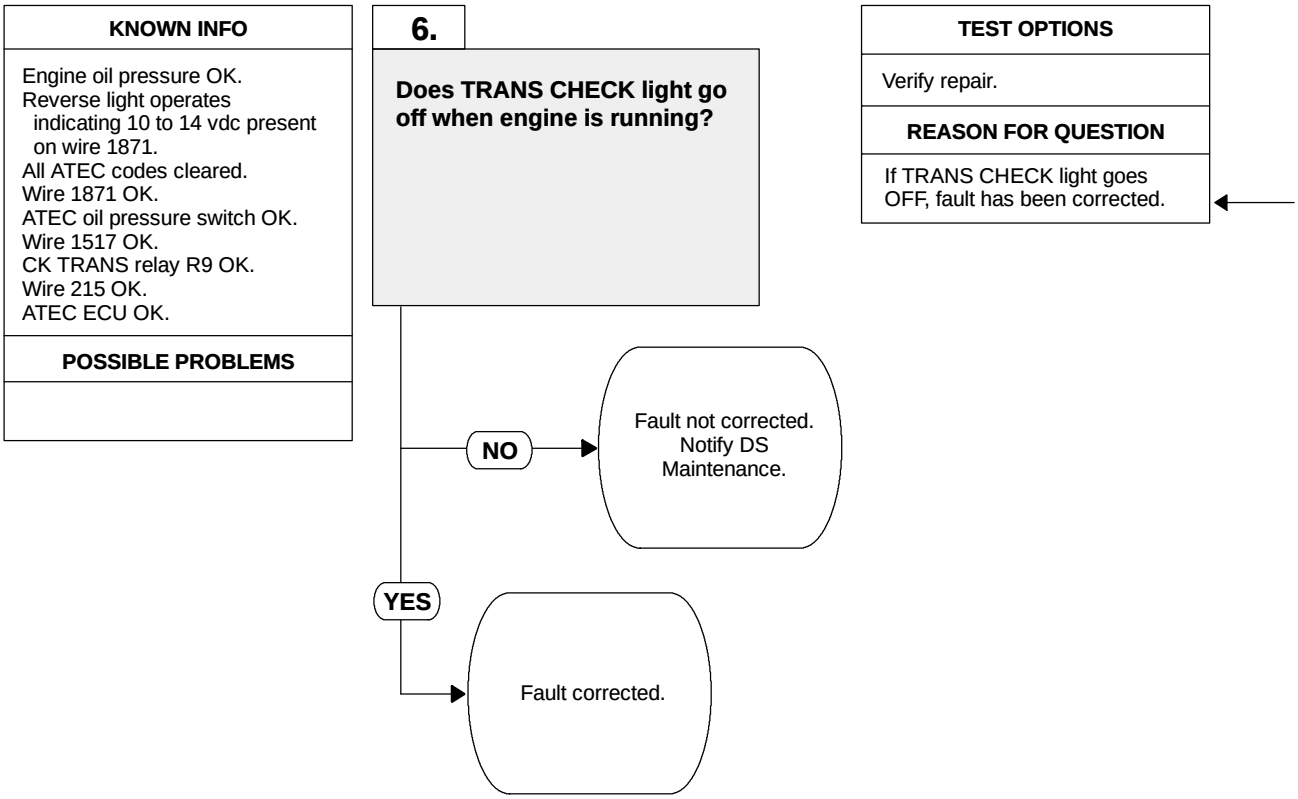
Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Loosen screw and disconnect ATEC ECU harness connector MC9.
(2) Set multimeter select switch to ohms.
(3) Is there continuity on wire 215 between relay R9, terminal 85 and terminal 3H at ATEC ECU connector MC9?
  (a) If there is no continuity, repair wire 215 (see schematic Fig 2-41) or notify DS Maintenance.
  (b) If there is continuity, replace ATEC ECU (Para 7-71).
(4) Connect connector MC9 and tighten screw.
(5) Install two ECB covers and 15 screws.

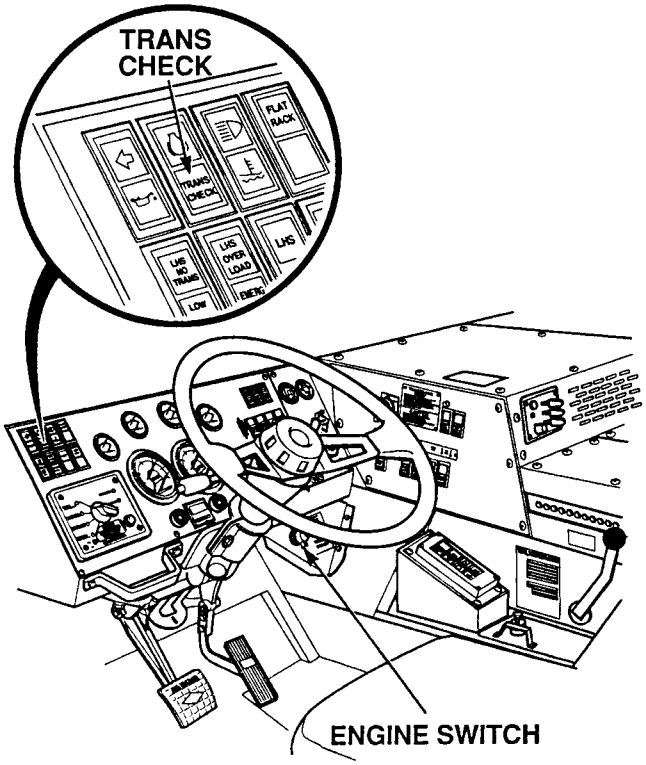


39. TRANS CHECK LIGHT WILL NOT GO OUT (CONT).



VERIFY REPAIR

(1) Start engine and observe TRANS CHECK light (TM 9-2320-364-10).
   (a) If light stays on, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
   (b) If light turns off, fault has been corrected.
(2) Turn OFF ENGINE switch.
(3) Install left rear skirt (Para 17-34).



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

40. EMERG STEER LIGHT WILL NOT GO OUT.

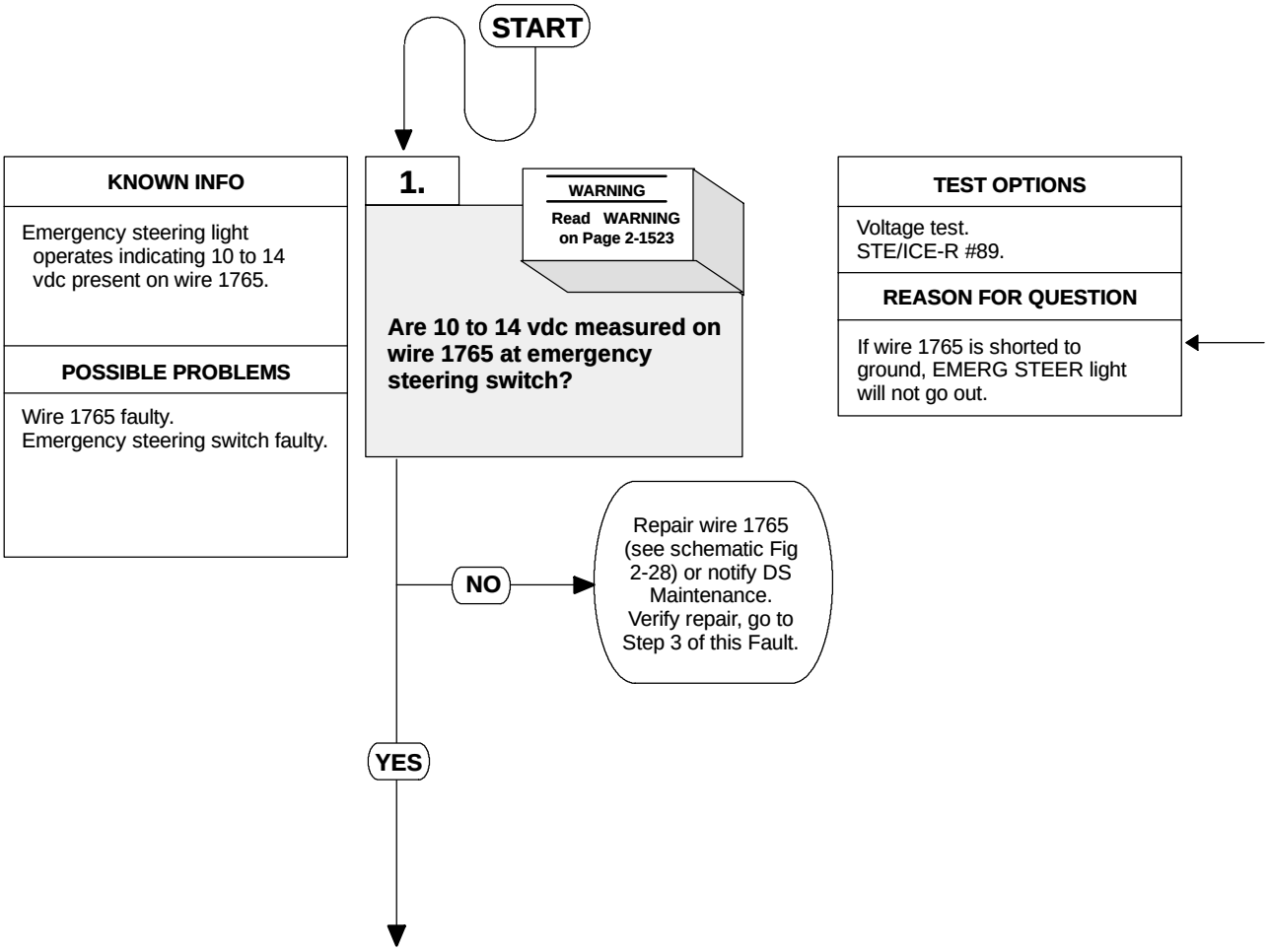
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

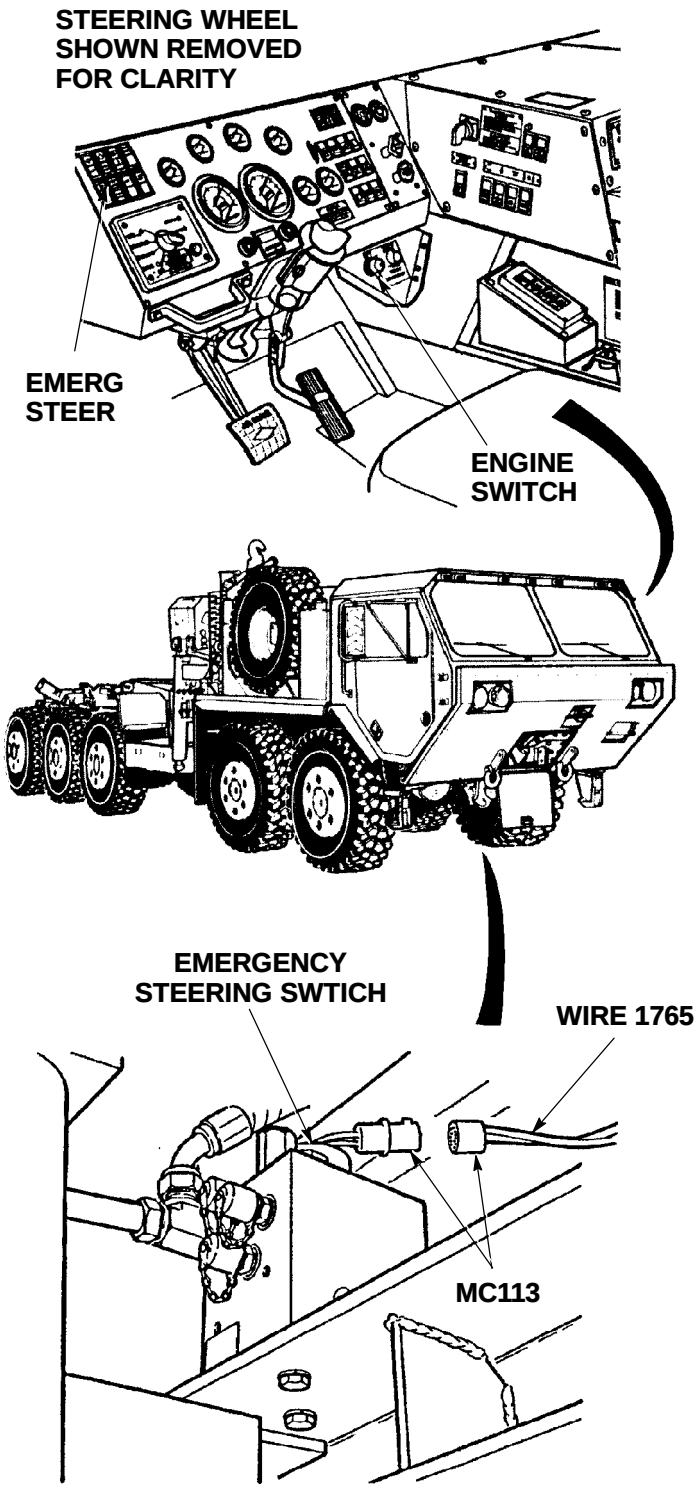
References
TM 9-2320-364-10

Equipment Condition
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

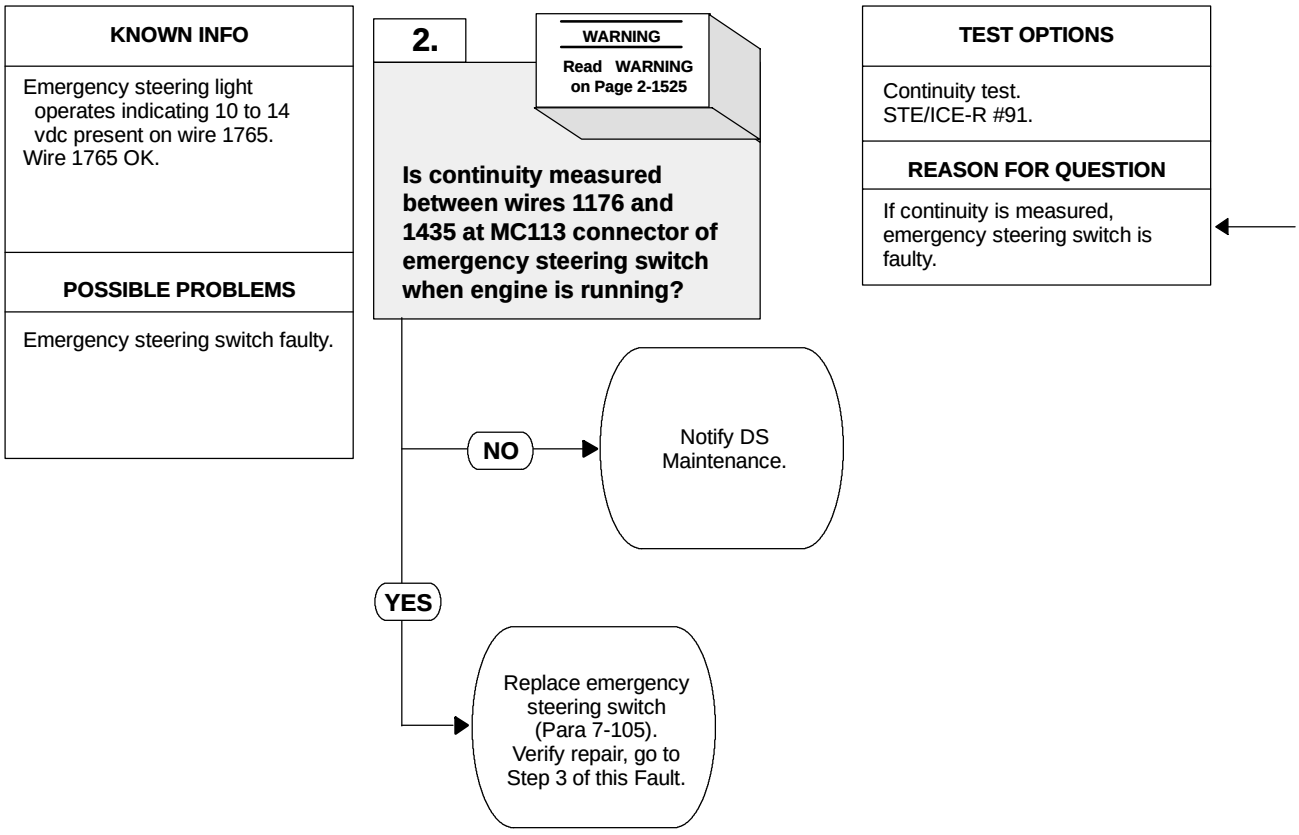
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



VOLTAGE TEST

(1) Disconnect MC113 at emergency steering switch.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1765 at emergency steering switch.
(4) Connect negative (-) multimeter lead to a known good ground.
(5) Start engine (TM 9-2320-364-10).
    (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1765 (see schematic Fig 2-28) or notify DS Maintenance.
    (b) If 10 to 14 vdc are present, wire 1765 is OK.
(6) Turn OFF ENGINE switch.

40. EMERG STEER LIGHT WILL NOT GO OUT (CONT).

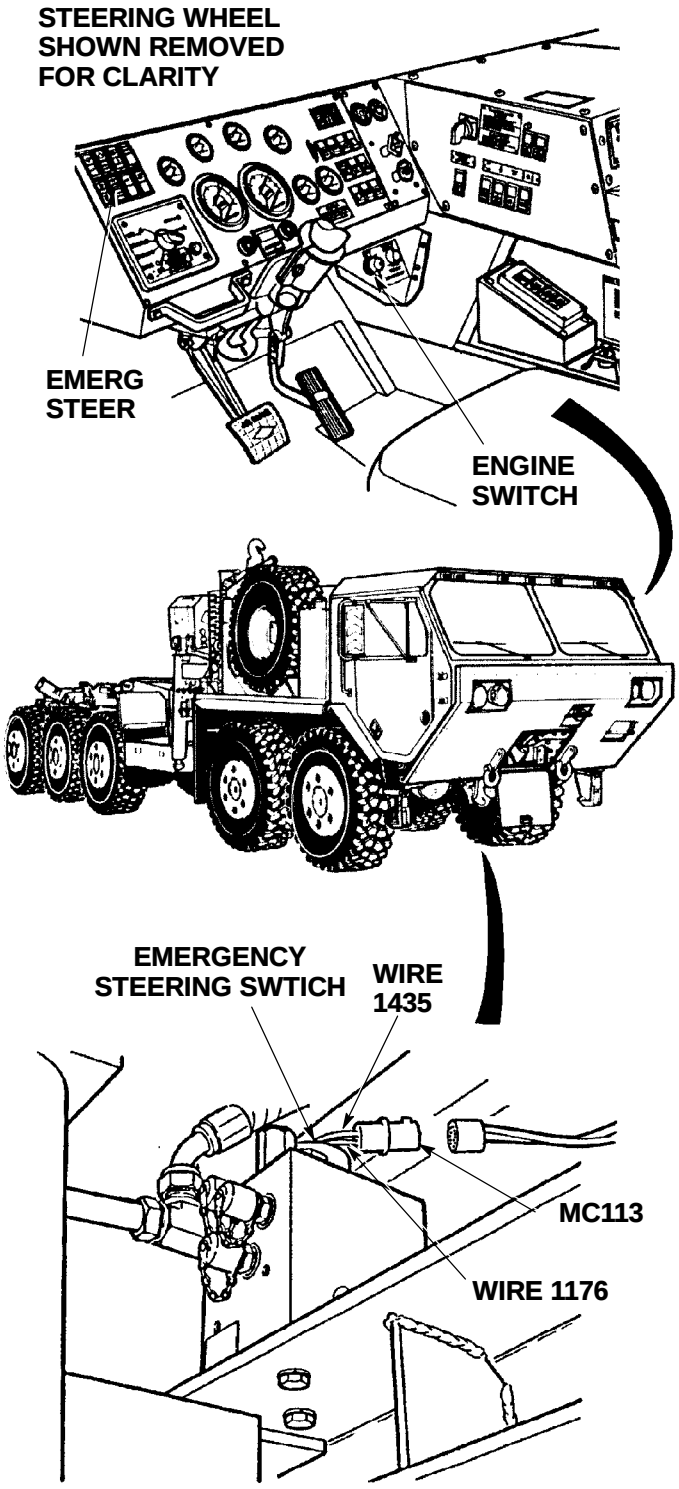


WARNING

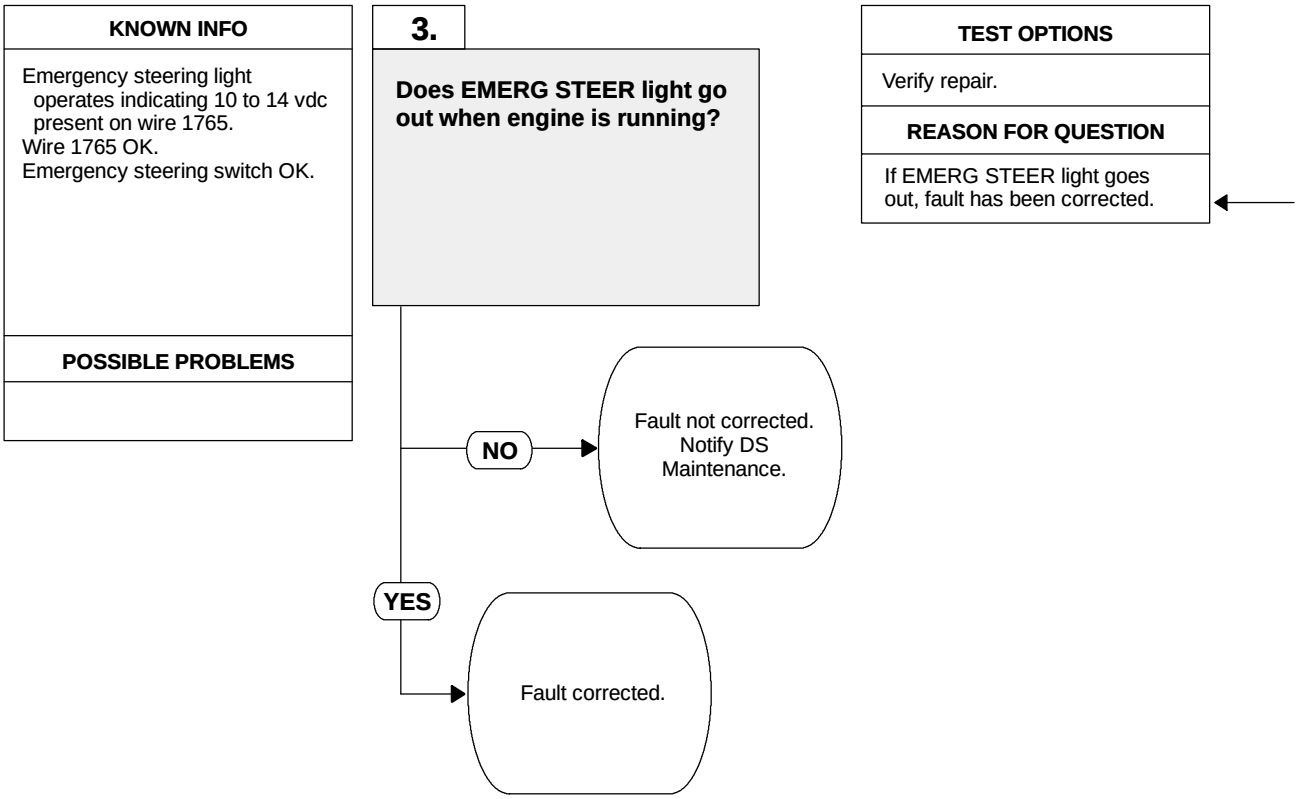
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Start engine (TM 9-2320-364-10).
(3) Is there continuity between wires 1176 and 1435 at MC113 connector of emergency steering switch?
   (a) If there is continuity, turn engine off and replace emergency steering switch (Para 7-105).
   (b) If there is no continuity, emergency steering switch is OK.
(4) Turn OFF ENGINE switch.

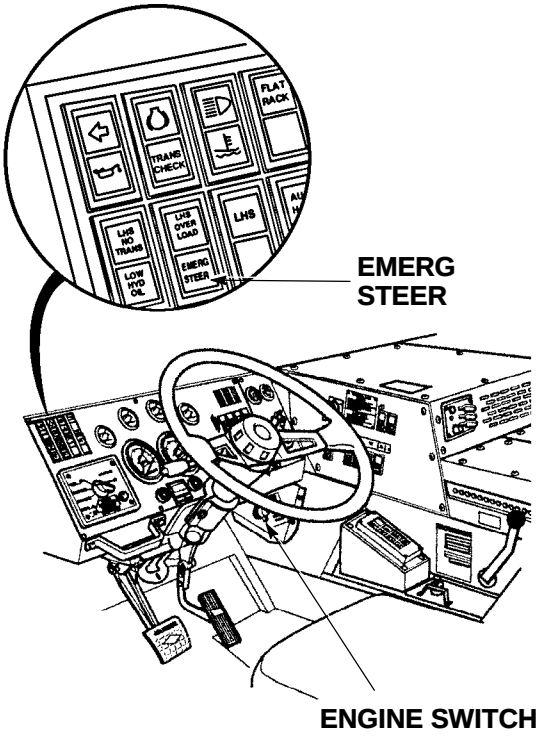


40. EMERG STEER LIGHT WILL NOT GO OUT (CONT).



VERIFY REPAIR

(1) Start engine and observe EMERG STEER light (TM 9-2320-364-10).
   (a) If light stays on, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
   (b) If light goes out, fault has been corrected.
(2) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

41. TRAILER MARKER LIGHTS DO NOT OPERATE.

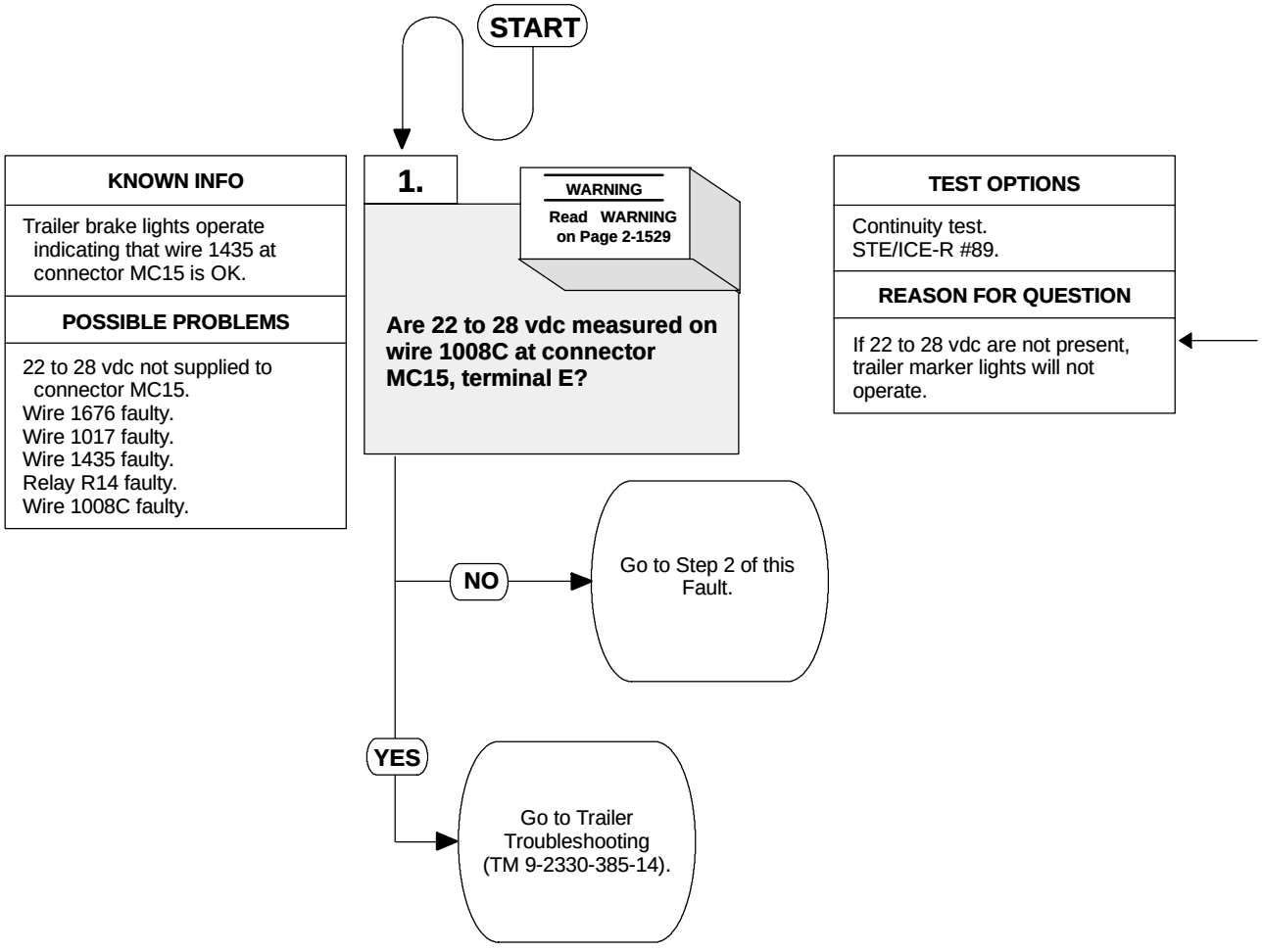
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P
TM 9-2330-385-14

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
BLACKOUT LIGHTS selector switch off, (TM 9-2320-364-10)

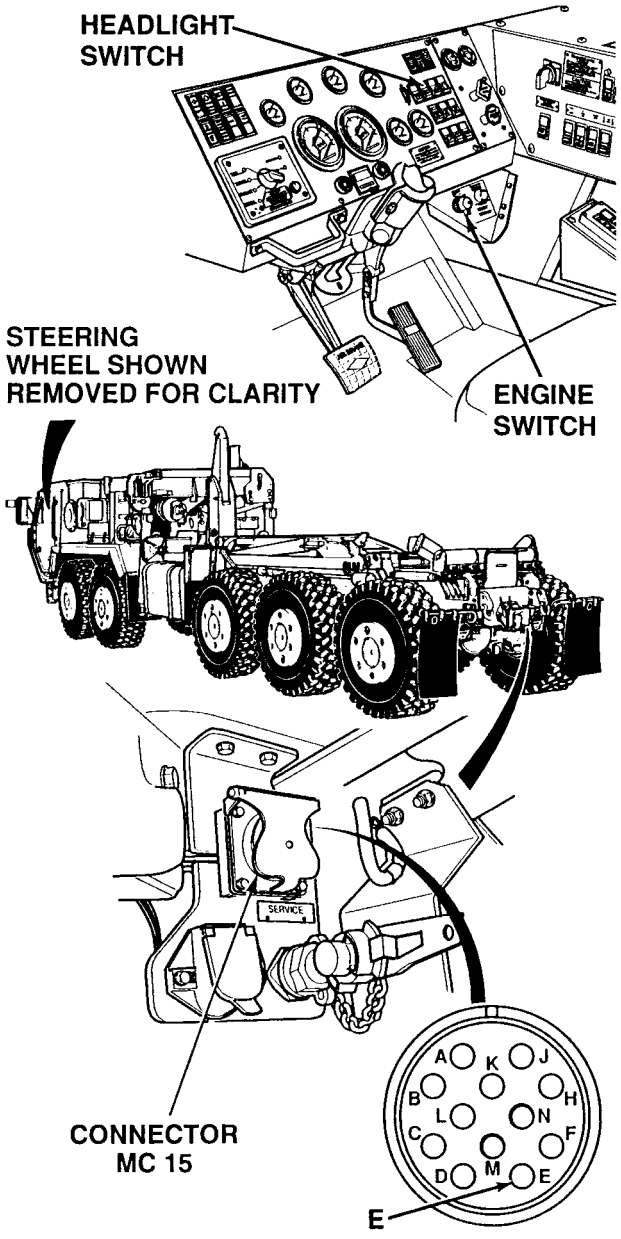


WARNING

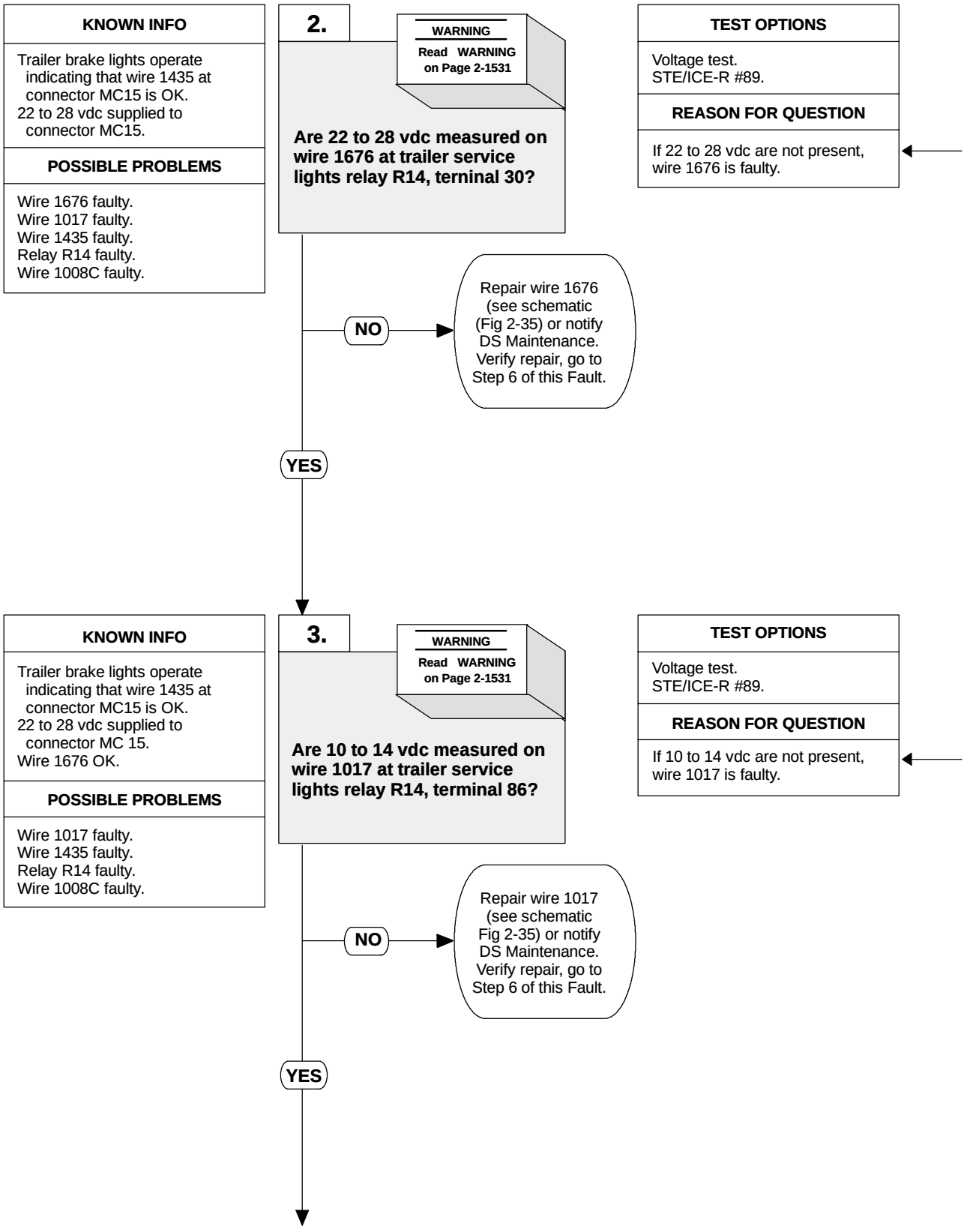
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select swtich to volts dc.
(2) Connect positive (+) multimeter lead to terminal E of connector MC15.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn on headlight switch.
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and go to Step 2 of this Fault.
  (b) If 22 to 28 vdc are present, wire 1008C is OK. Perform Steps (6) and (7) below and go to Trailer Troubleshooting.
(6) Turn off headlight switch.
(7) Turn OFF ENGINE switch.



41. TRAILER MARKER LIGHTS DO NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

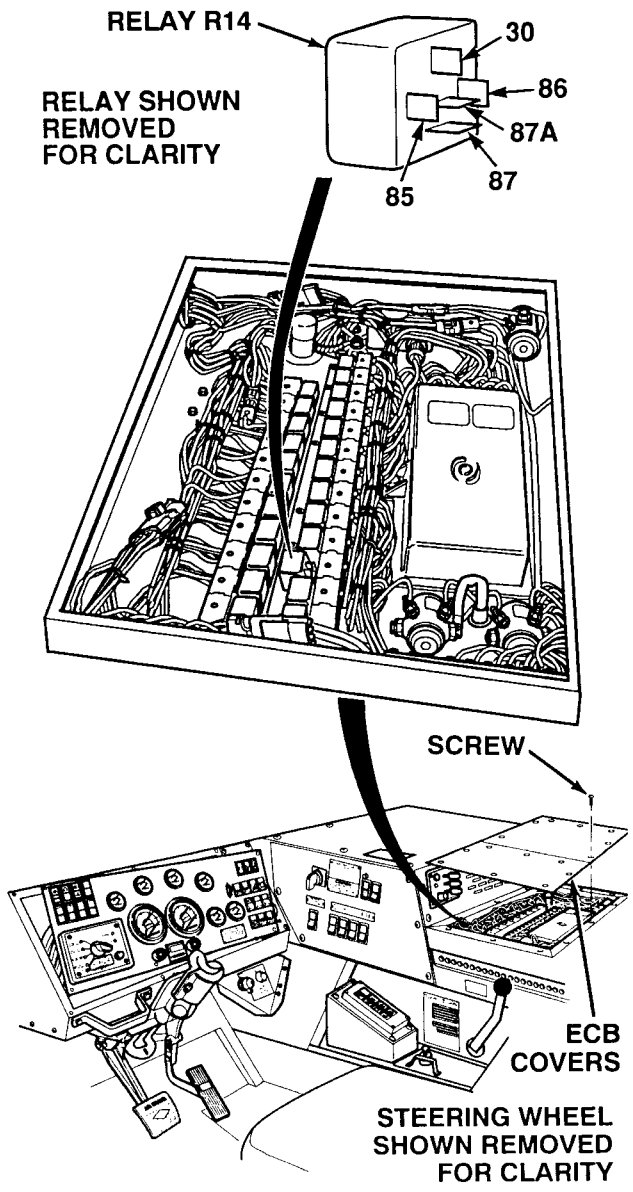
(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1676 at trailer service lights relay R14, terminal 30.
(3) Connect negative (-) multimeter lead to known good ground.
  (a) If 22 to 28 vdc are not present, repair wire 1676 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1676 splice is OK from relay R14, terminal 30 to splice.

NOTE

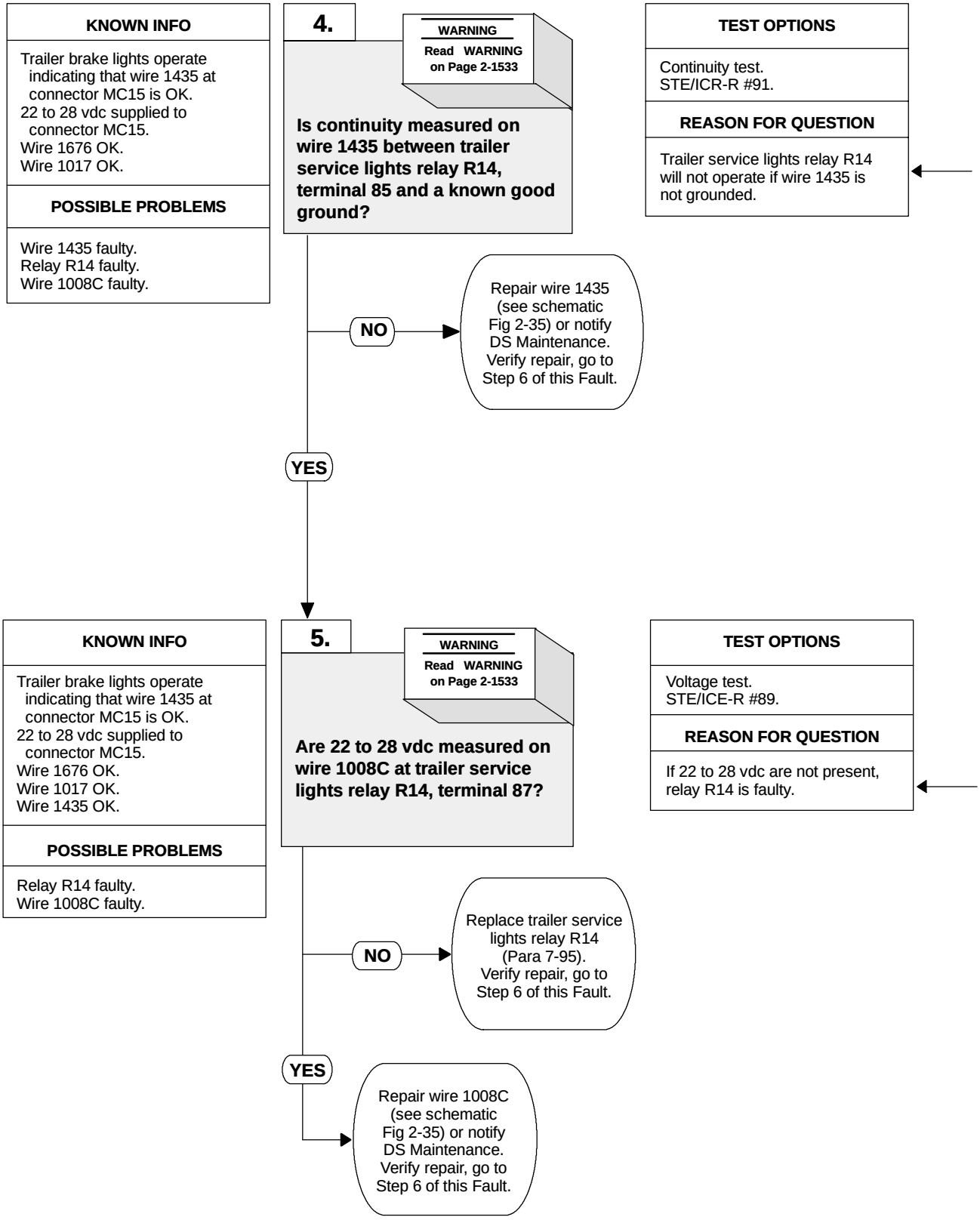
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1017 at trailer service lights relay R14, terminal 86.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1017 (see schematic (Fig 2-35) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1017 is OK.
(5) Turn OFF ENGINE switch.



41. TRAILER MARKER LIGHTS DO NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

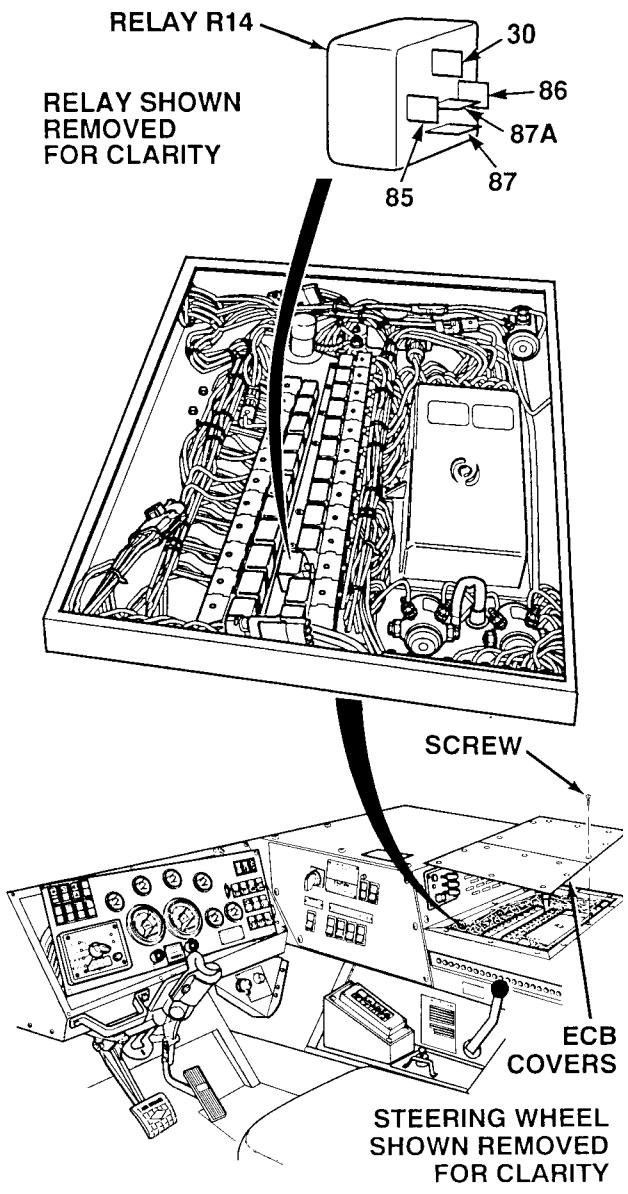
(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between trailer service lights relay R14, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.

NOTE

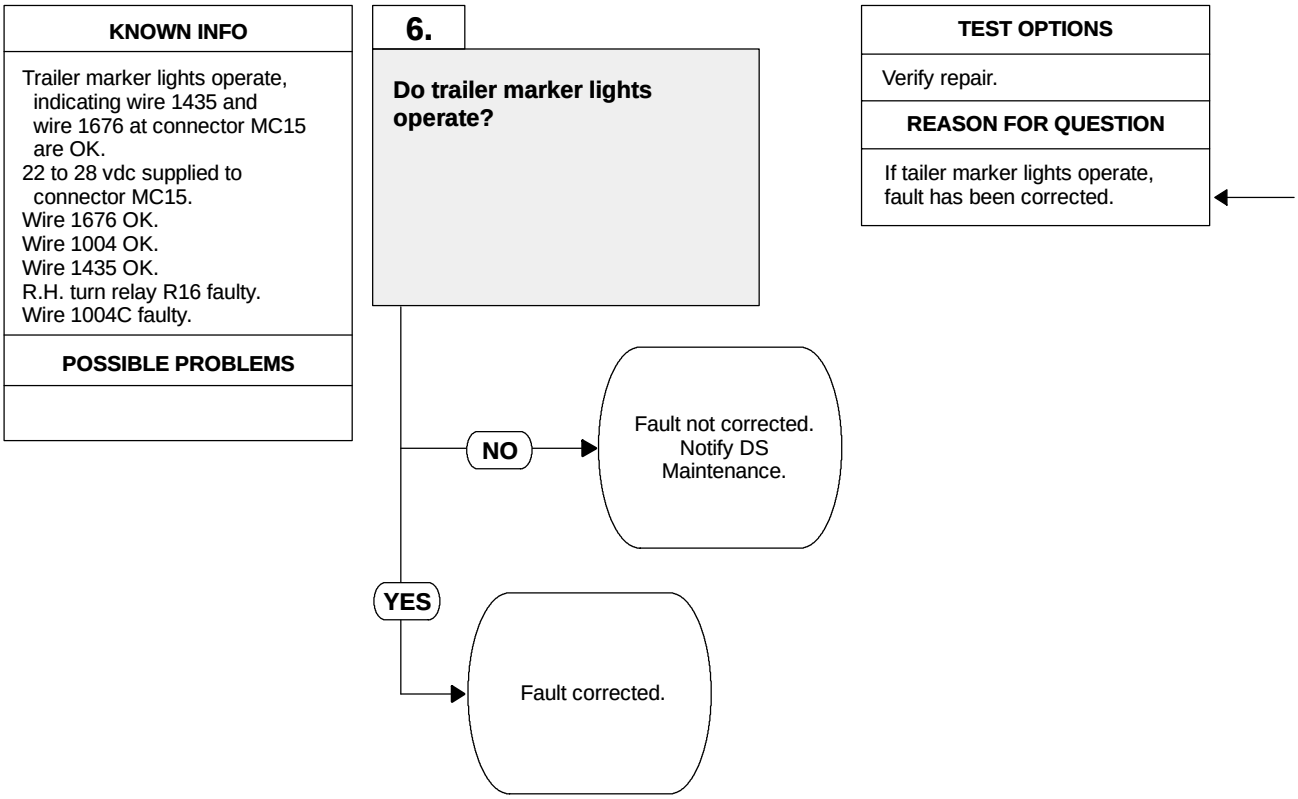
Relay test must be performed with relay partially removed.

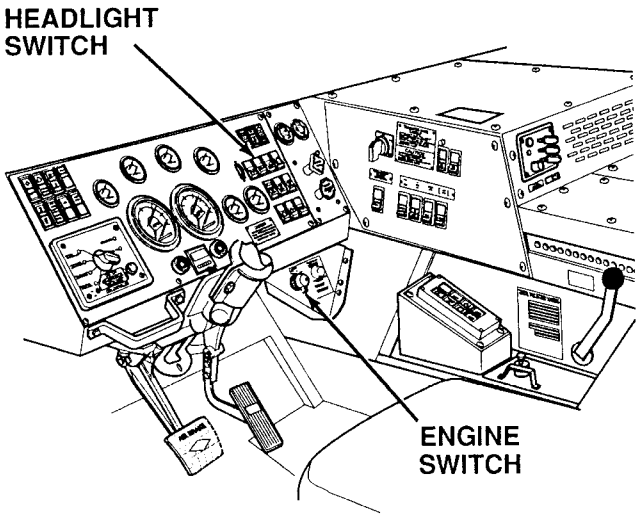
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1008C at trailer service lights relay R14, terminal 87.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and replace relay R14 (Para 7-95) and perform Step (5) below.
  (b) If 22 to 28 vdc are present, turn OFF ENGINE switch and repair wire 1008C (see schematic Fig 2-35) or notify DS Maintenance.
(5) Install two ECB covers and 15 screws.



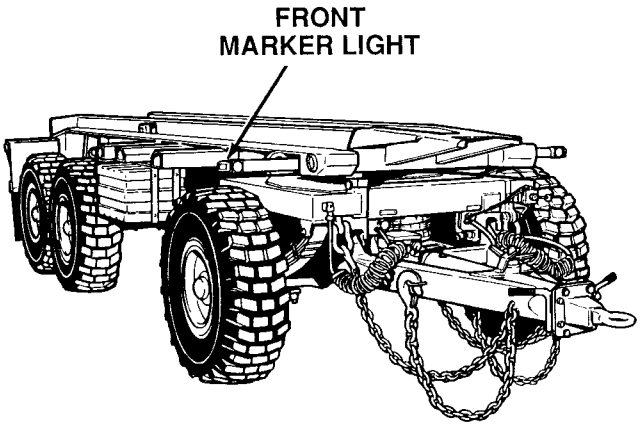
41. TRAILER MARKER LIGHTS DO NOT OPERATE (CONT).

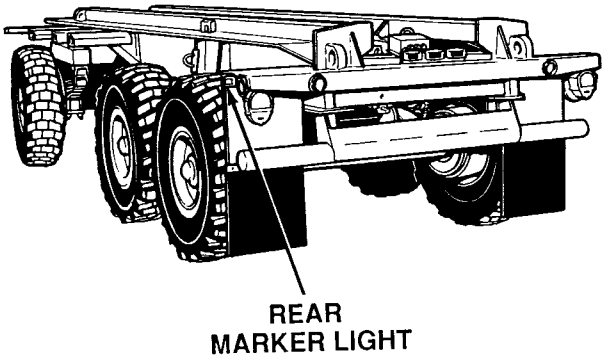




VERIFY REPAIR

(1) Connect 24 vdc cable to truck and trailer (TM 9-2330-385-14).
(2) While assistant turns ON ENGINE switch, observe trailer marker lights (TM 9-2320-364-10).
  (a) If trailer marker lights do not operate, fault not corrected. Perform Steps (3) through (5) below and notify DS Maintenance.
  (b) If trailer marker lights operate, fault has been corrected.
(3) Turn off headlight switch.
(4) Turn OFF ENGINE switch.
(5) Disconnect 24 vdc cable from truck and trailer.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

42. TRAILER R.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE.

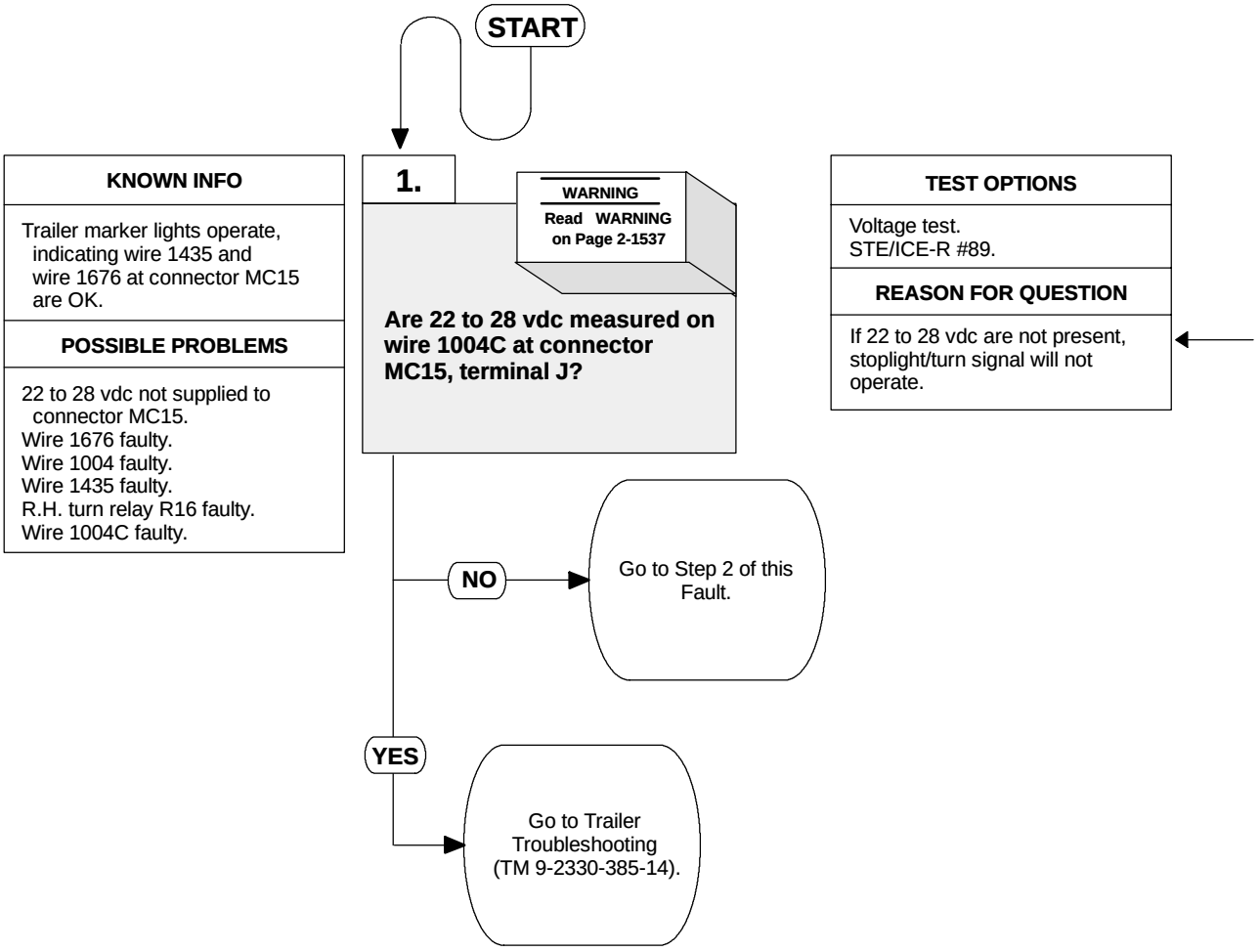
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-2330-385-14
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
BLACKOUT LIGHTS selector switch off, (TM 9-2320-364-10)

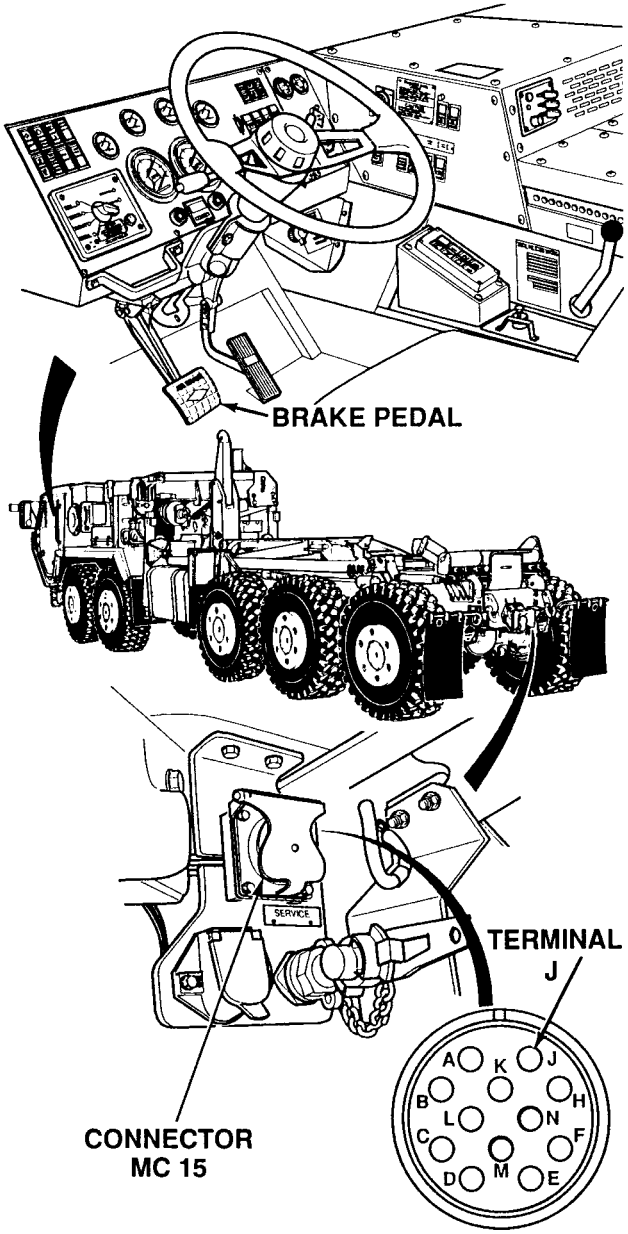


WARNING

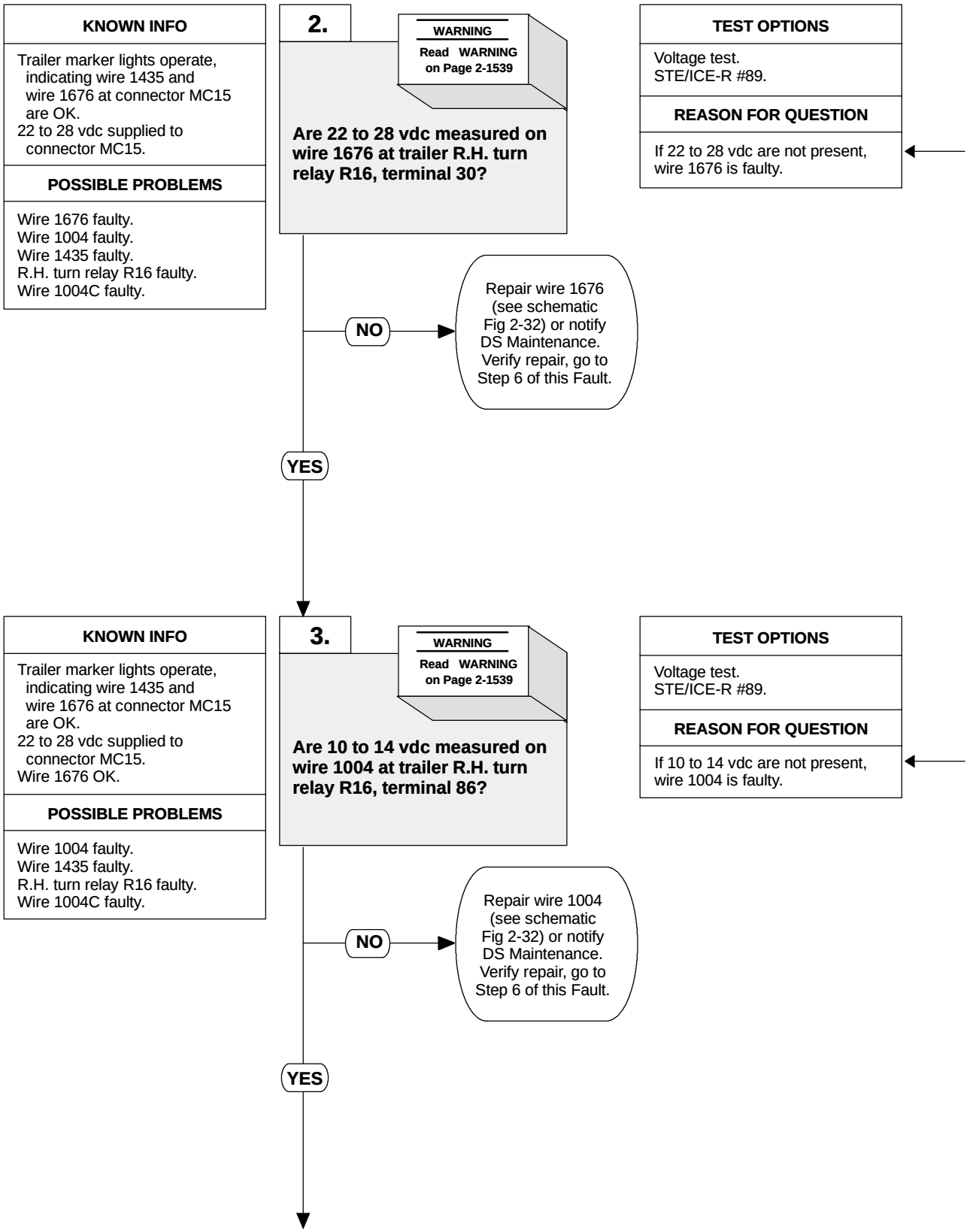
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to connector MC15, terminal J.
(3) Connect negative (-) multimeter lead to known good ground.
(4) While assistant applies brake pedal, observe multimeter.
   (a) If 22 to 28 vdc are not present, release brake pedal and go to Step 2 of this Fault.
   (b) If 22 to 28 are present, wire 1004C is OK. Release brake pedal and go to Trailer Troubleshooting (TM 9-2330-385-14).



42. TRAILER R.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

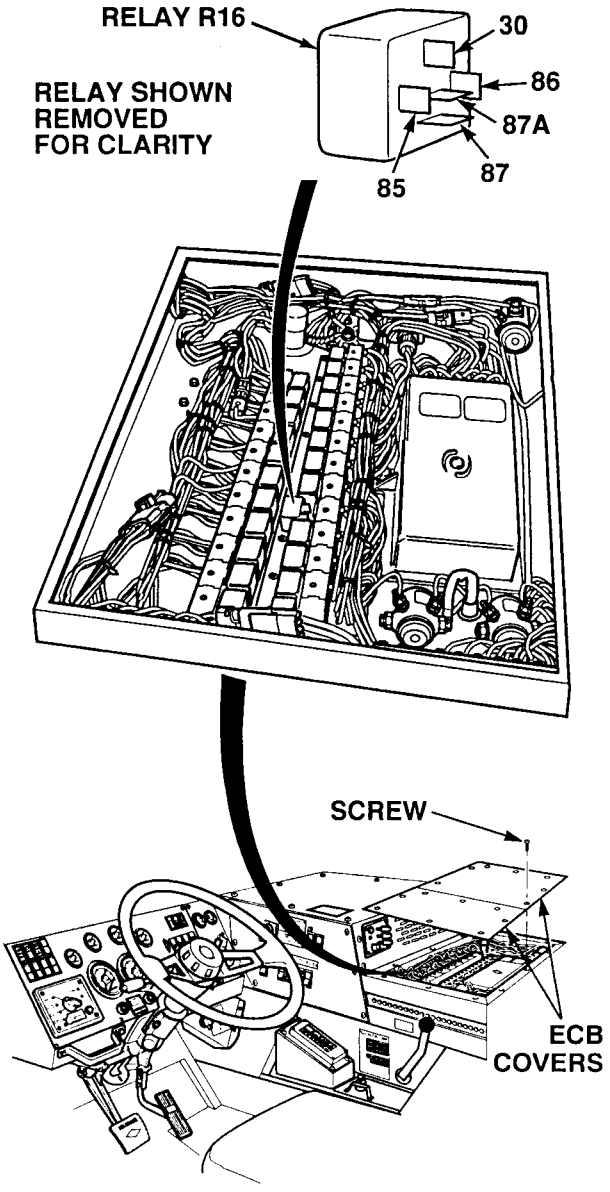
(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1676 at trailer R.H. turn relay R16, terminal 30.
(3) Connect negative (–) multimeter lead to known good ground.
(4) Observe multimeter.
  (a) If 22 to 28 vdc are not present, repair wire 1676 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1676 is OK.

NOTE

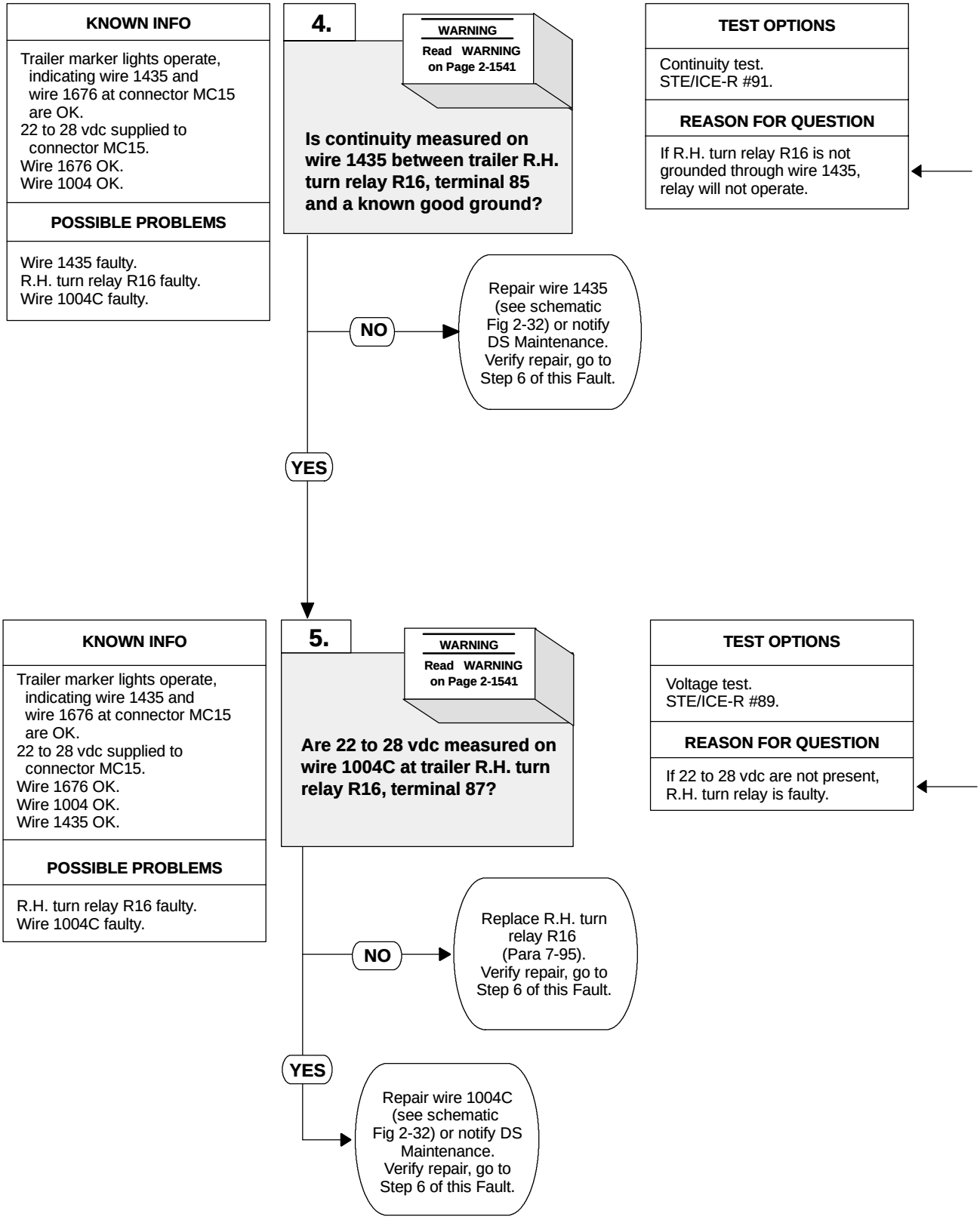
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1004 at trailer R.H. turn relay R16, terminal 86.
(2) Connect negative (–) multimeter lead to known good ground.
(3) While assistant applies brake pedal, observe multimeter.
  (a) If 10 to 14 vdc are not present, release brake pedal and repair wire 1004 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1004 is OK between relay R16, terminal 86 and splice before connector MC7.
(4) Release brake pedal.



42. TRAILER R.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE (CONT).



WARNING

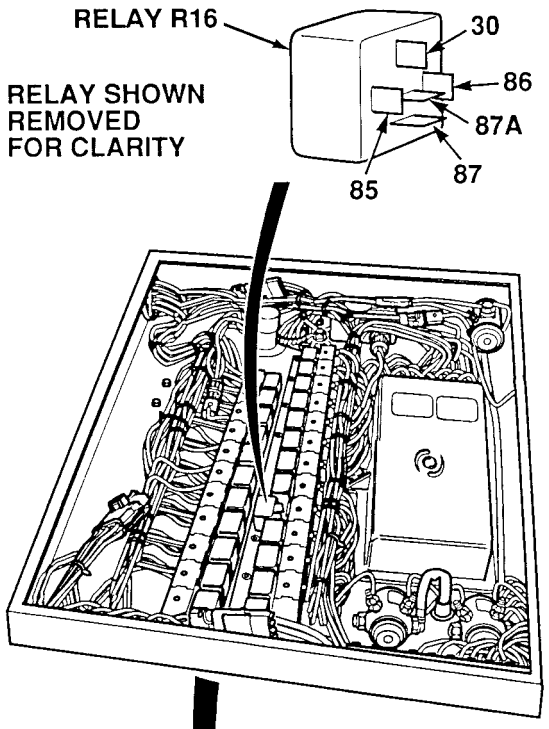
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between trailer R.H. turn relay R16, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.

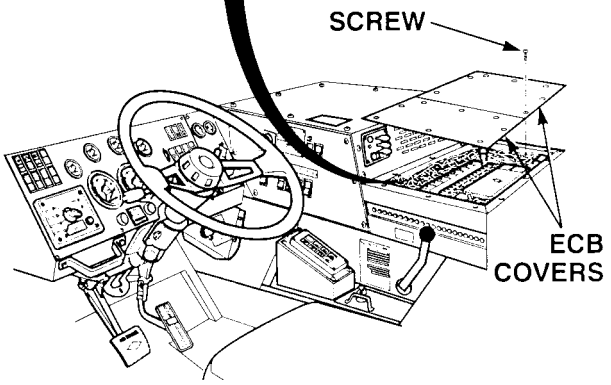


NOTE

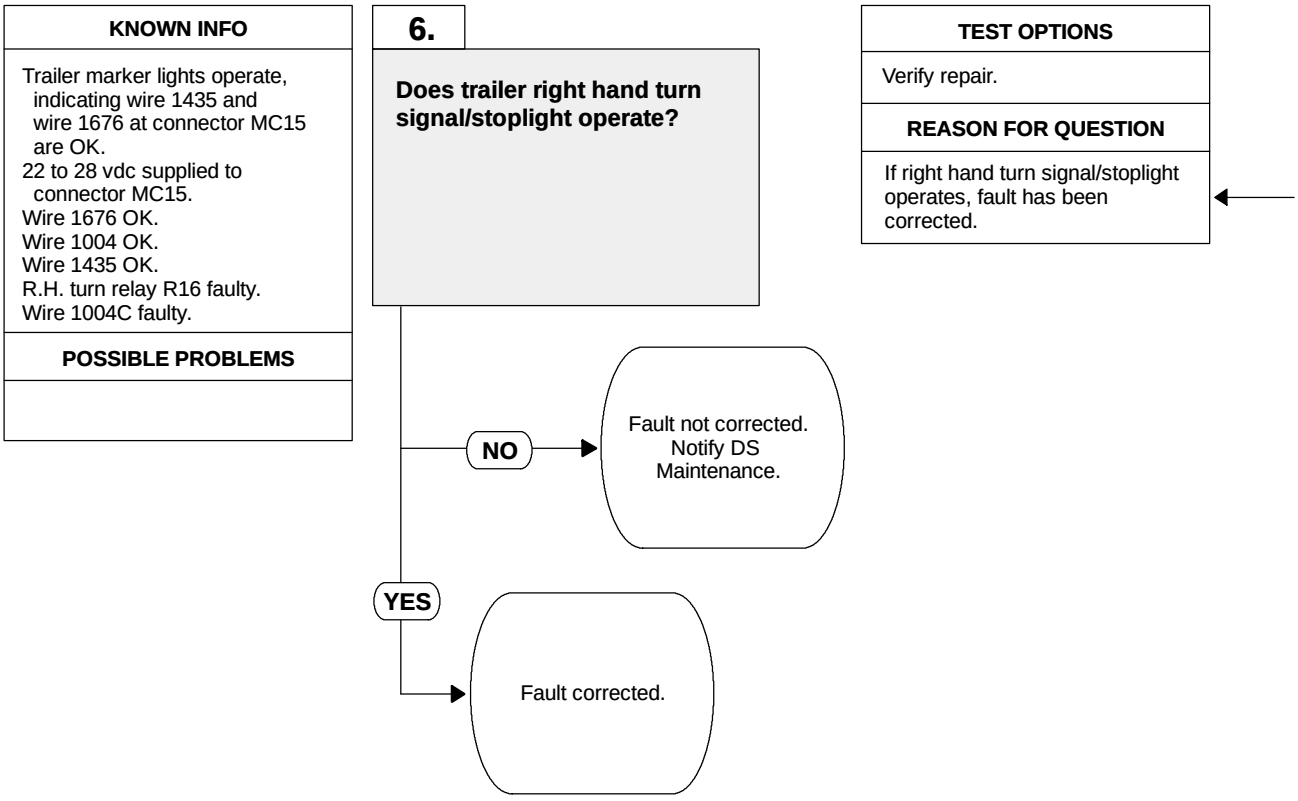
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1004C at trailer R.H. turn relay R16, terminal 87.
(3) Connect negative (-) multimeter lead to known good ground.
(4) While assistant applies brake pedal, observe multimeter.
  (a) If 22 to 28 vdc are not present, release brake pedal and replace relay R16 (Para 7-95).
  (b) If 22 to 28 vdc are present, release brake pedal and repair wire 1004C (see schematic Fig 2-32) or notify DS Maintenance.
(5) Install two ECB covers and 15 screws.

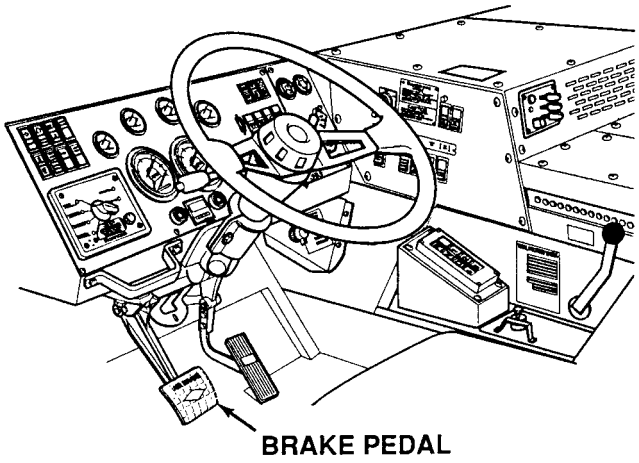


42. TRAILER R.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Connect 24 vdc cable to truck and trailer (TM 9-2320-364-10).
(2) While assistant applies brake pedal, observe right trailer signal/stoplight.
  (a) If right signal/stoplight does not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If right signal/stoplight operates, fault has been corrected.
(3) Release brake pedal.
(4) Remove 24 vdc cable from truck and trailer.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

43. TRAILER L.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE.

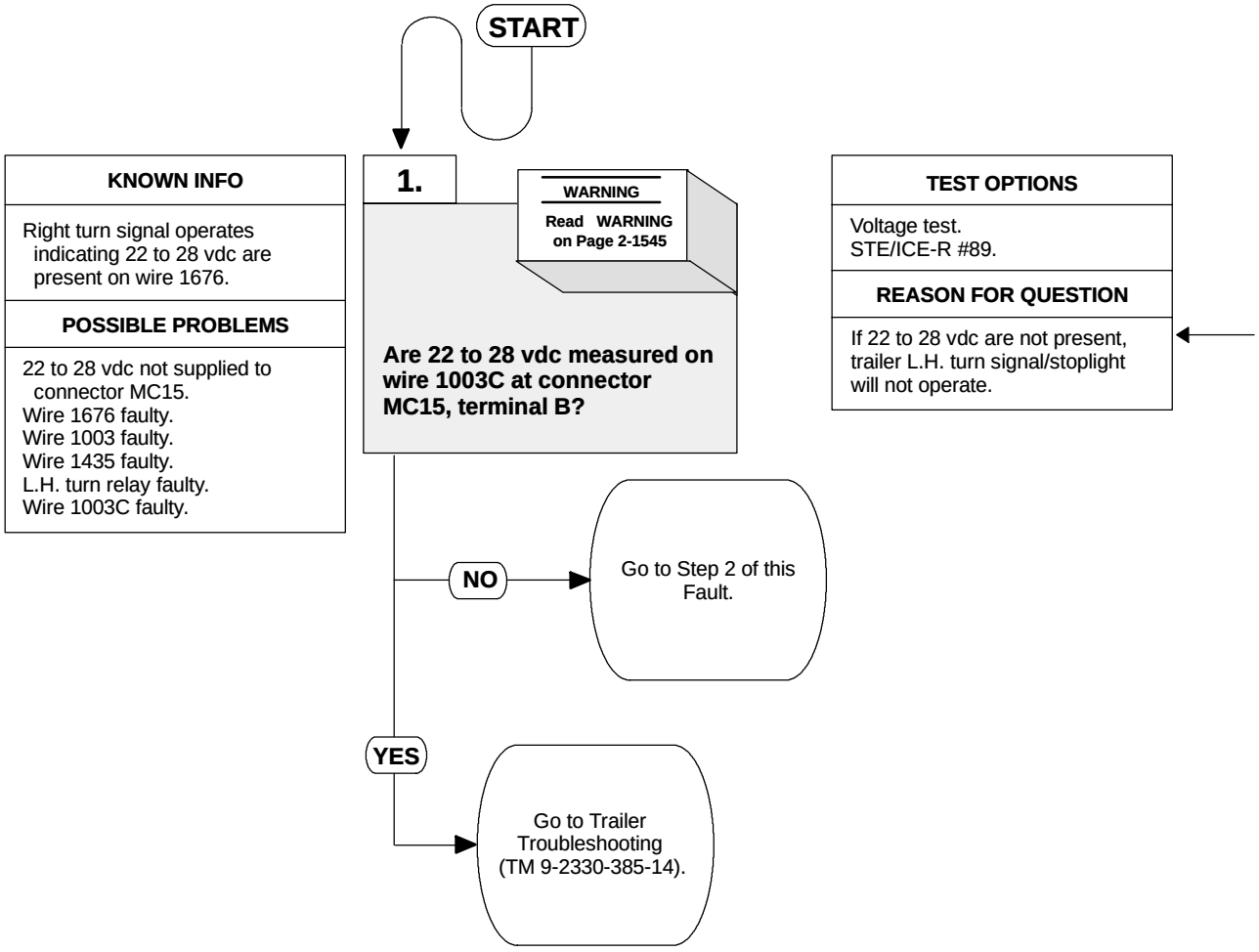
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P
TM 9-2330-385-14

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
BLACKOUT LIGHTS selector switch off, (TM 9-2320-364-10)

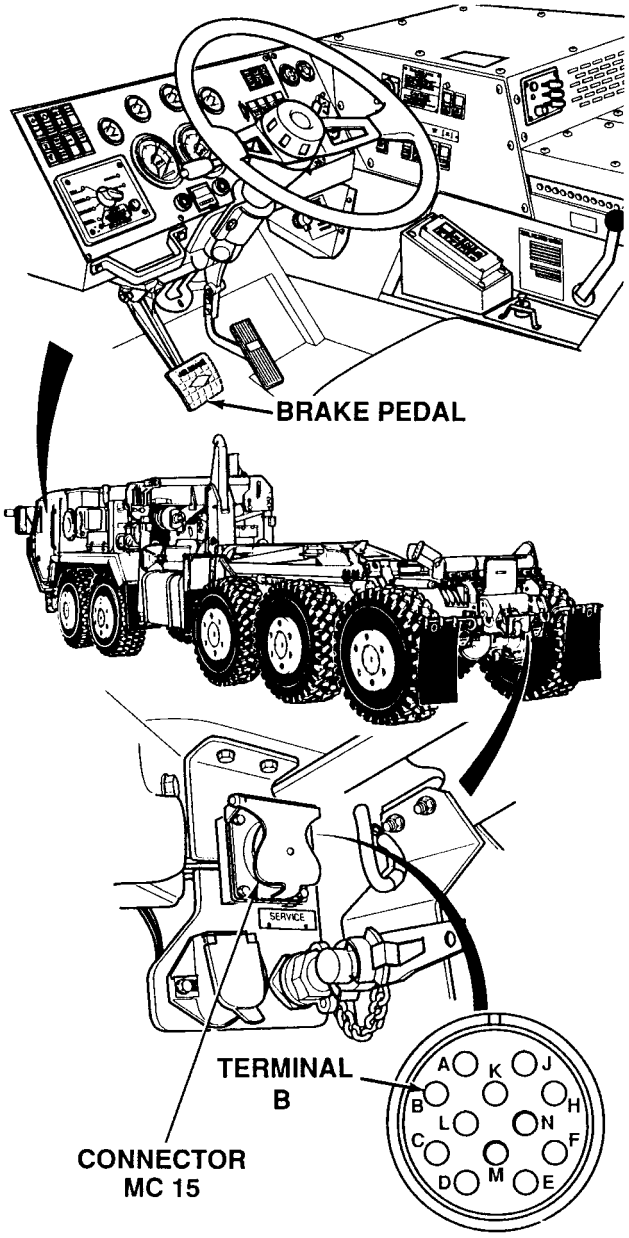


WARNING

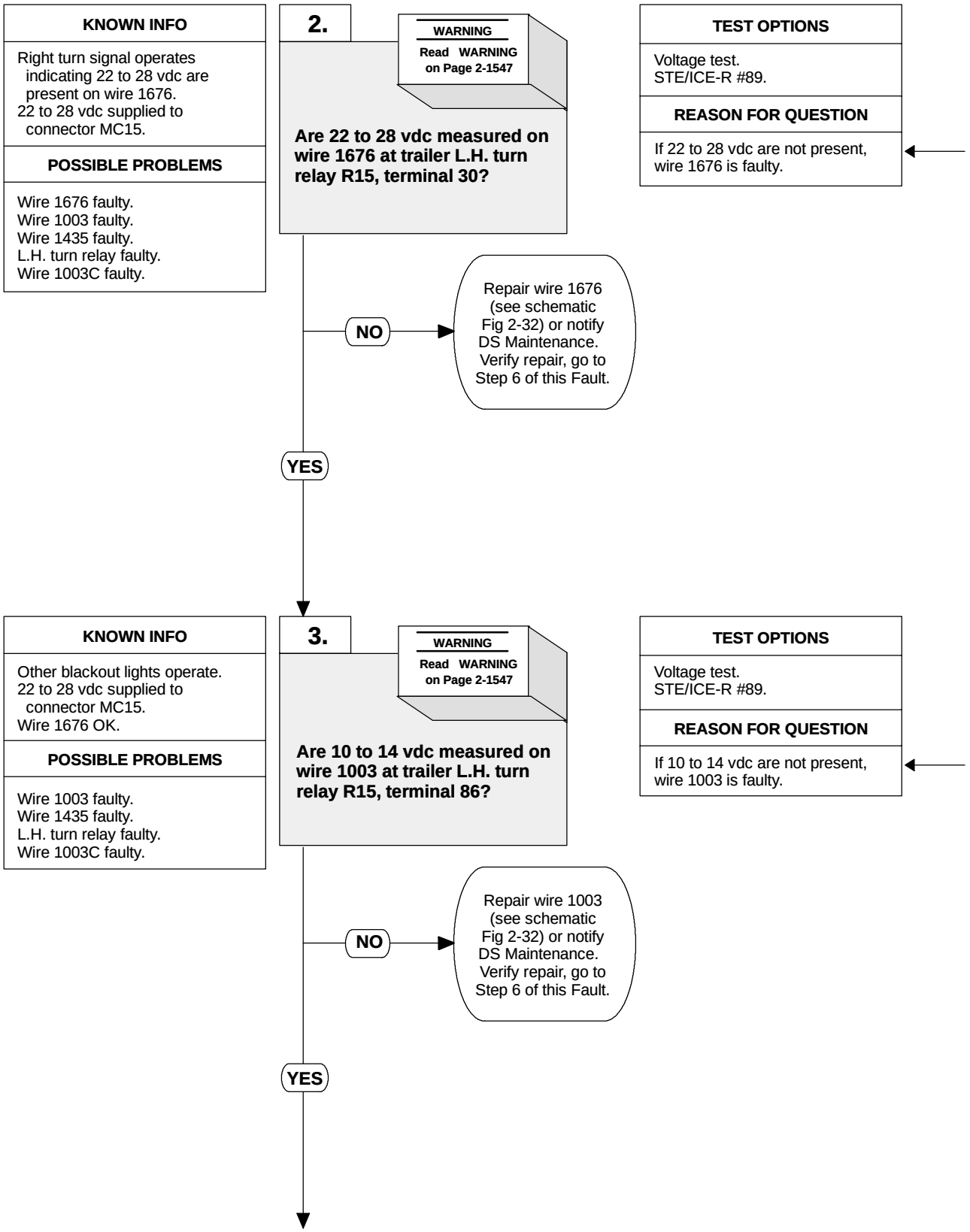
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to connector MC15, terminal B.
(3) Connect negative (–) multimeter lead to known good ground.
(4) While assistant applies brake pedal, observe multimeter.
   (a) If 22 to 28 vdc are not present, release brake pedal and go to Step 2 of this Fault.
   (b) If 22 to 28 vdc are present, wire 1003C is OK. Release brake pedal and go to Trailer Troubleshooting (TM 9-2330-385-14).



43. TRAILER L.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

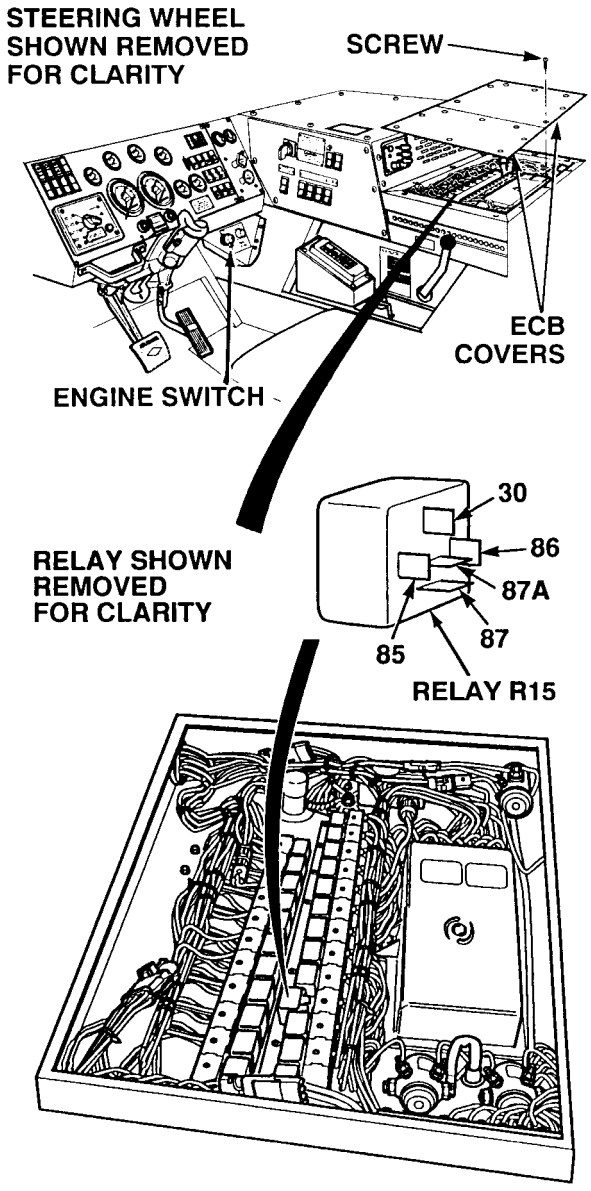
(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1676 at trailer L.H. turn relay R15, terminal 30.
(3) Connect negative (–) multimeter lead to known good ground.
  (a) If 22 to 28 vdc are not present, repair wire 1676 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1676 is OK.

NOTE

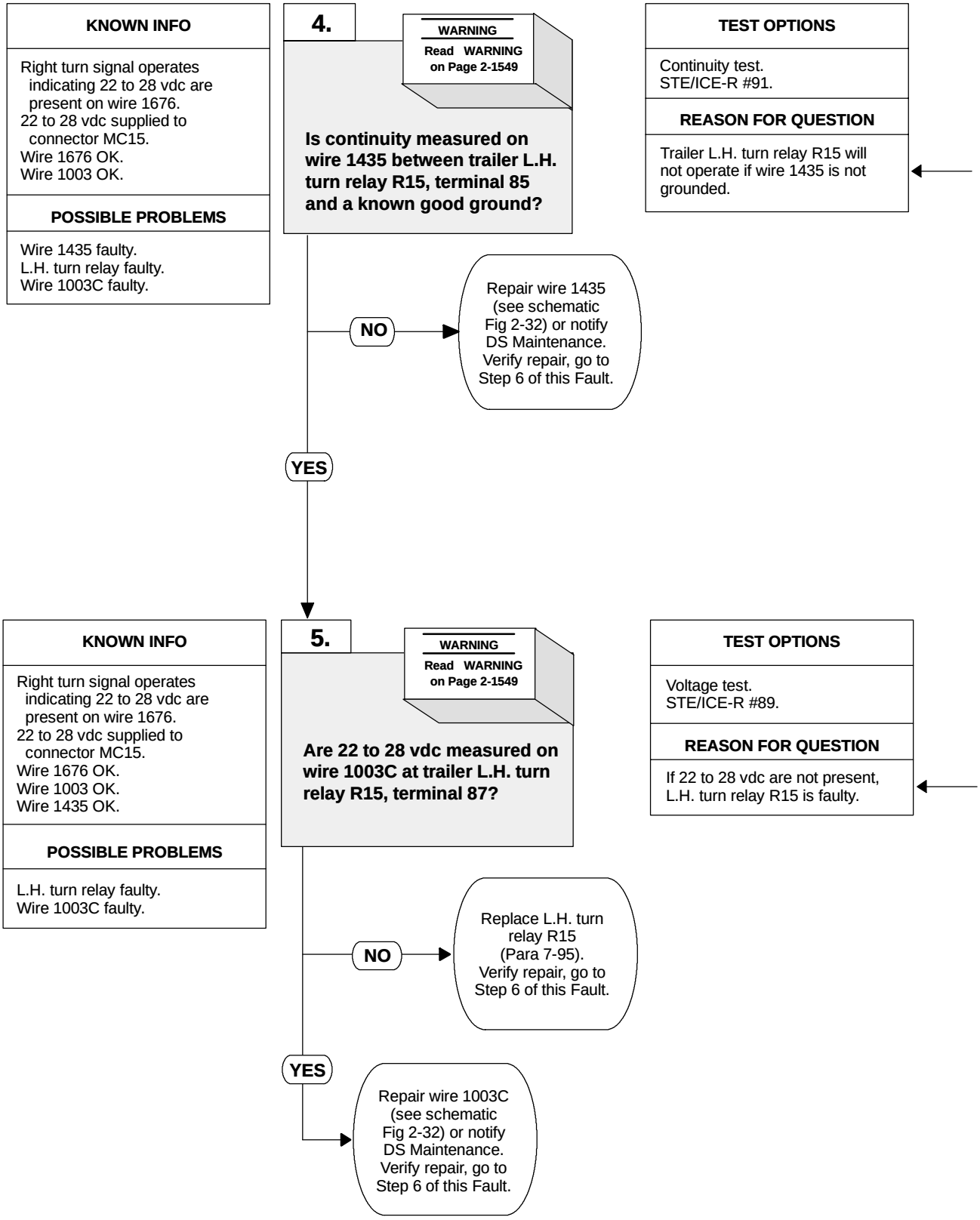
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1003 at trailer L.H. turn relay R15, terminal 86.
(2) Connect negative (–) multimeter lead to known good ground.
(3) While assistant applies brake pedal, observe multimeter.
  (a) If 10 to 14 vdc are not present, release brake pedal and repair wire 1003 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1003 is OK.
(4) Release brake pedal.



43. TRAILER L.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE (CONT).



WARNING

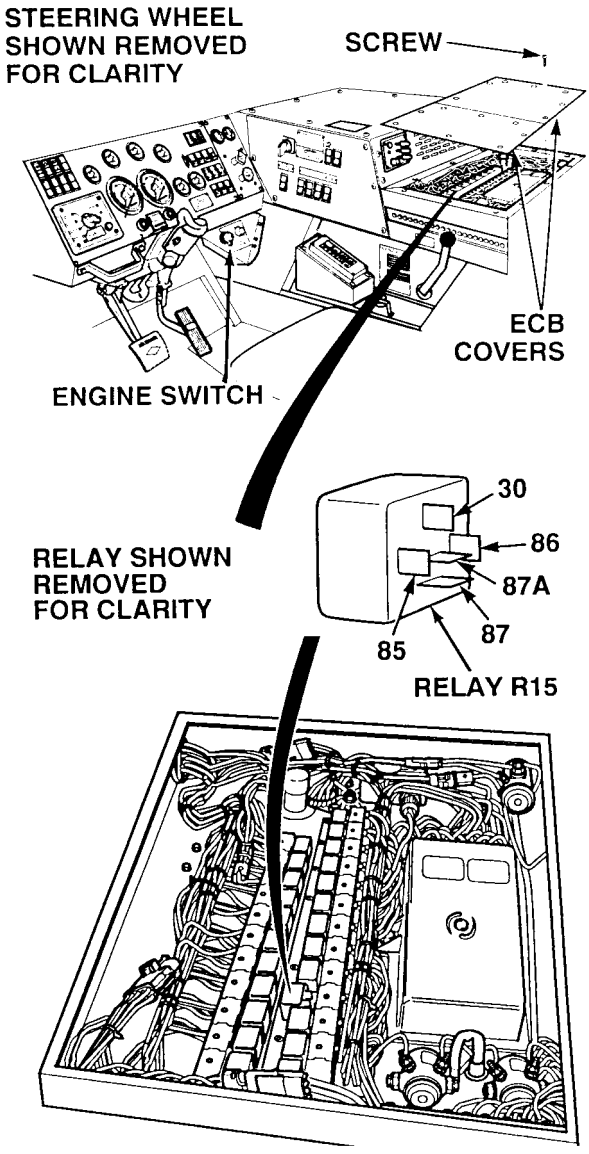
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between trailer L.H. turn relay R15, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-32) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.



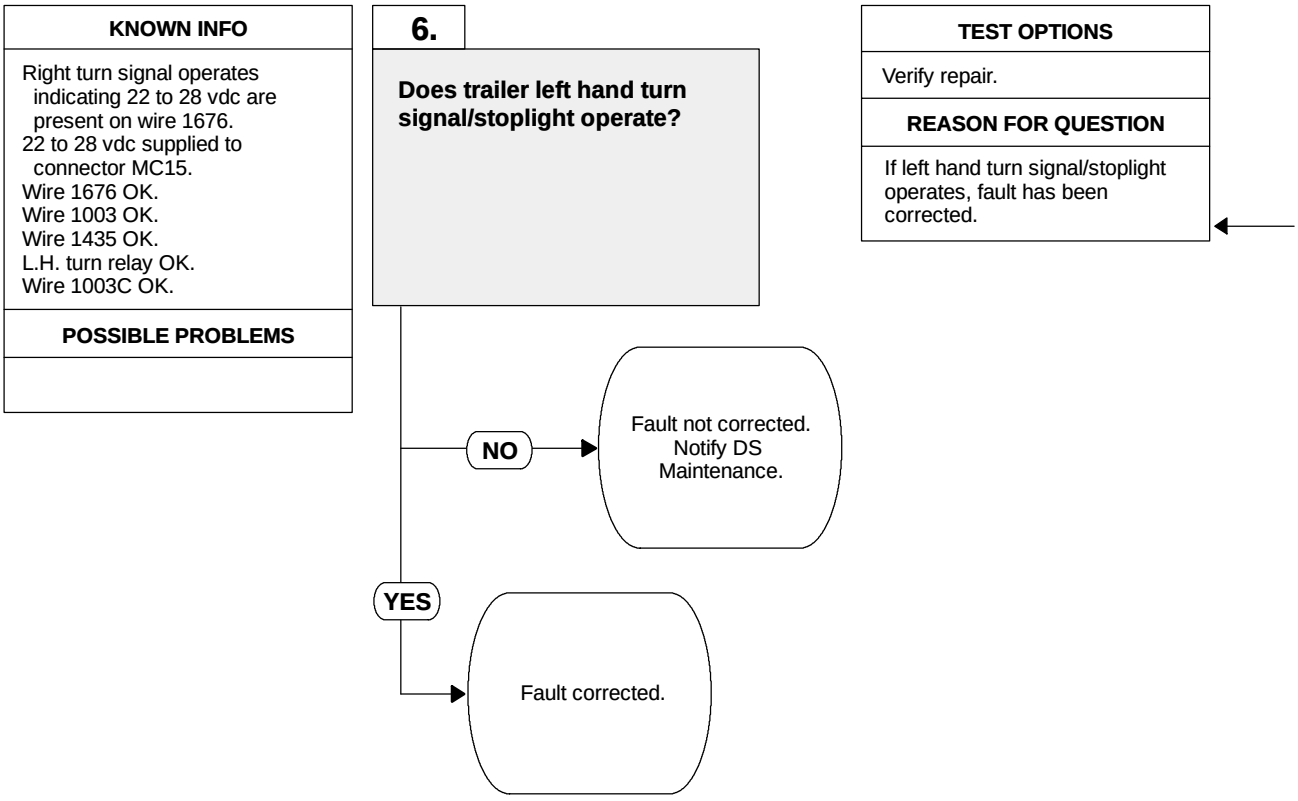
NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

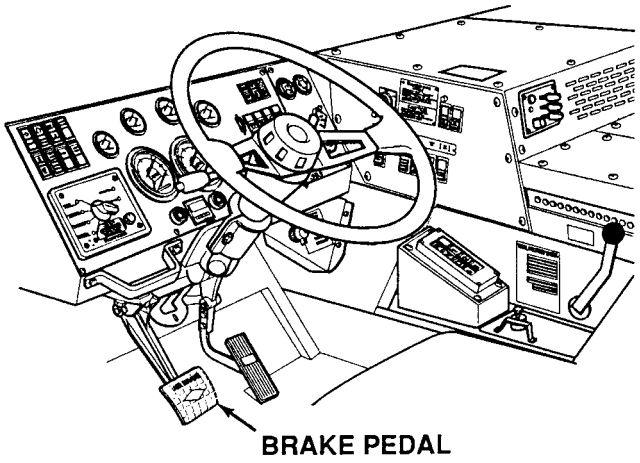
(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1003C at trailer L.H. turn relay R15, terminal 87.
(3) Connect negative (-) multimeter lead to known good ground.
(4) While assistant applies brake pedal, observe multimeter.
  (a) If 22 to 28 vdc are not present, release brake pedal and replace relay R15 (Para 7-95).
  (b) If 22 to 28 vdc are present, release brake pedal and repair wire 1003C (see schematic Fig 2-32) or notify DS Maintenance.
(5) Install two ECB covers and 15 screws.

43. TRAILER L.H. TURN SIGNAL/STOPLIGHT DOES NOT OPERATE (CONT).



VERIFY REPAIR

(1) Connect 24 vdc cable to truck and trailer (TM 9-2320-364-10).
(2) While assistant applies brake pedal, observe left trailer signal/stoplight.
    (a) If left signal/stoplight does not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
    (b) If left signal/stoplight operates, fault has been corrected.
(3) Release brake pedal.
(4) Disconnect 24 vdc cable from truck and trailer.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

44. TRAILER BLACKOUT TAILLIGHTS DO NOT OPERATE.

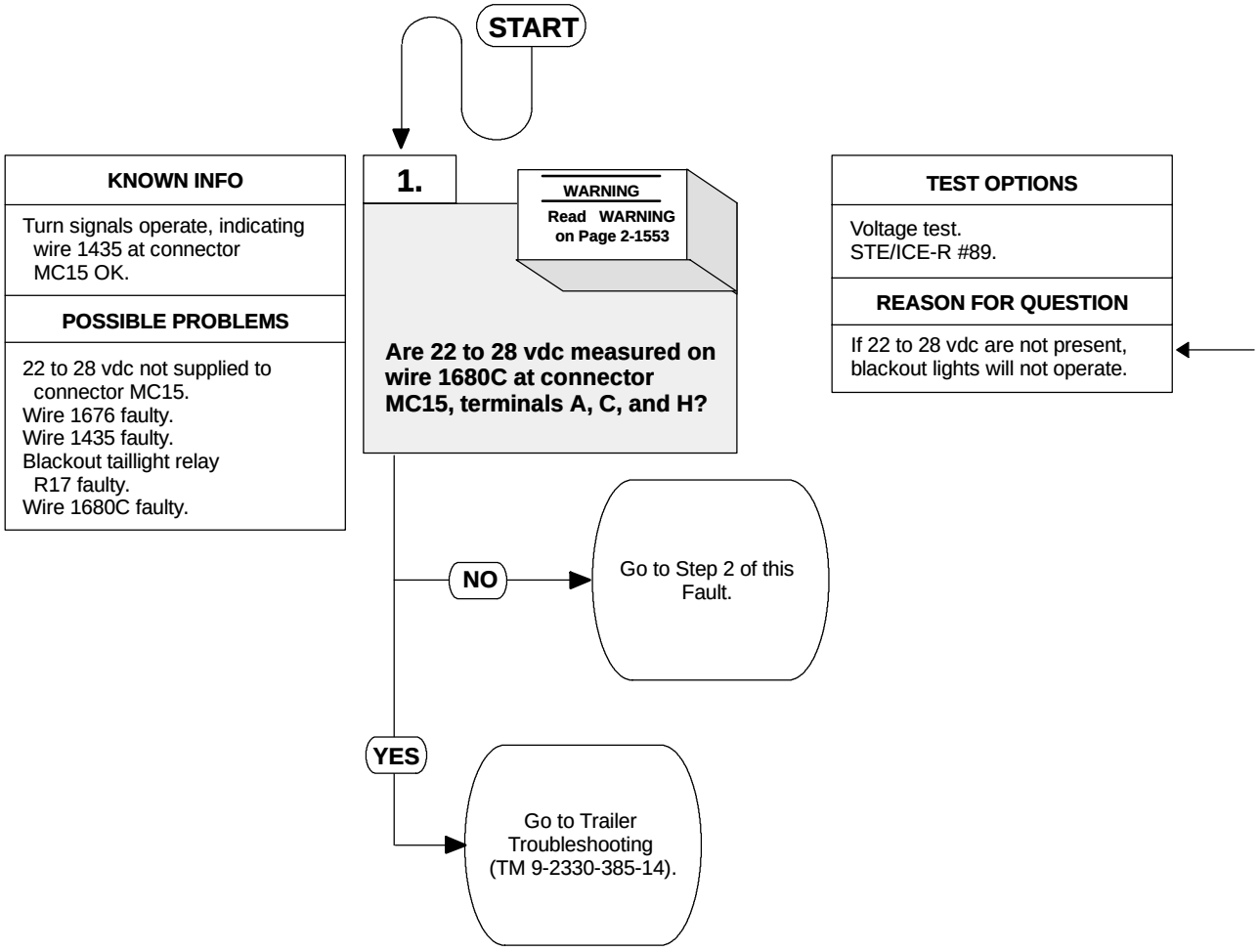
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-4910-571-12&P
TM 9-2330-385-14

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
BLACKOUT LIGHTS selector switch on, (TM 9-2320-364-10)

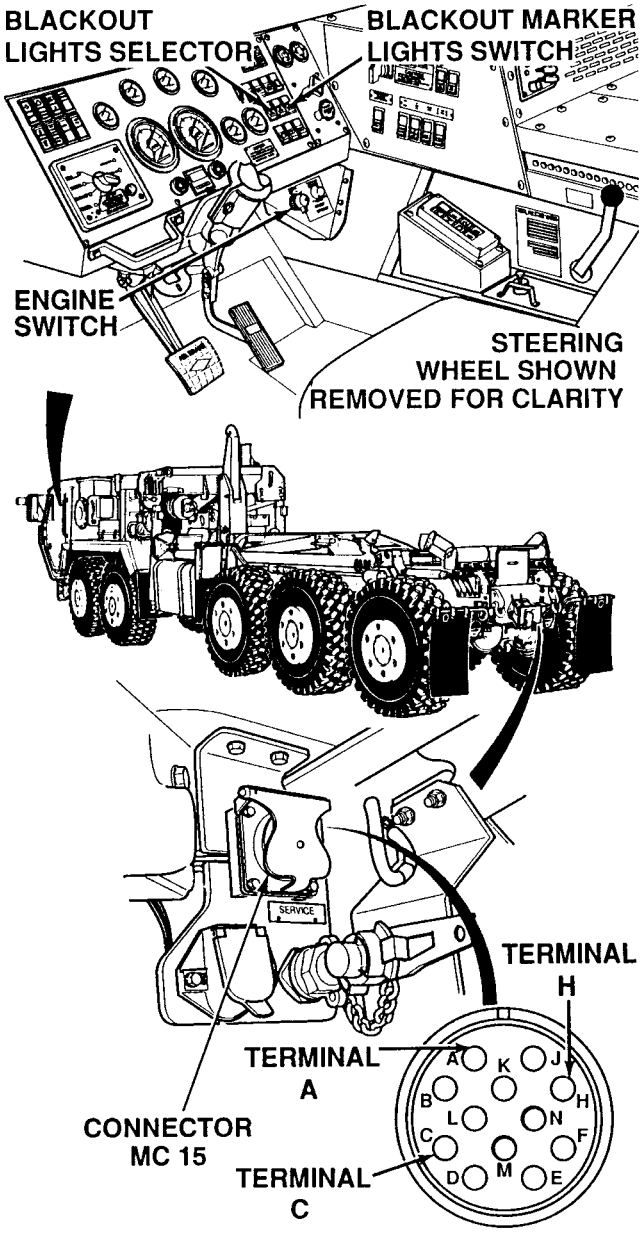


WARNING

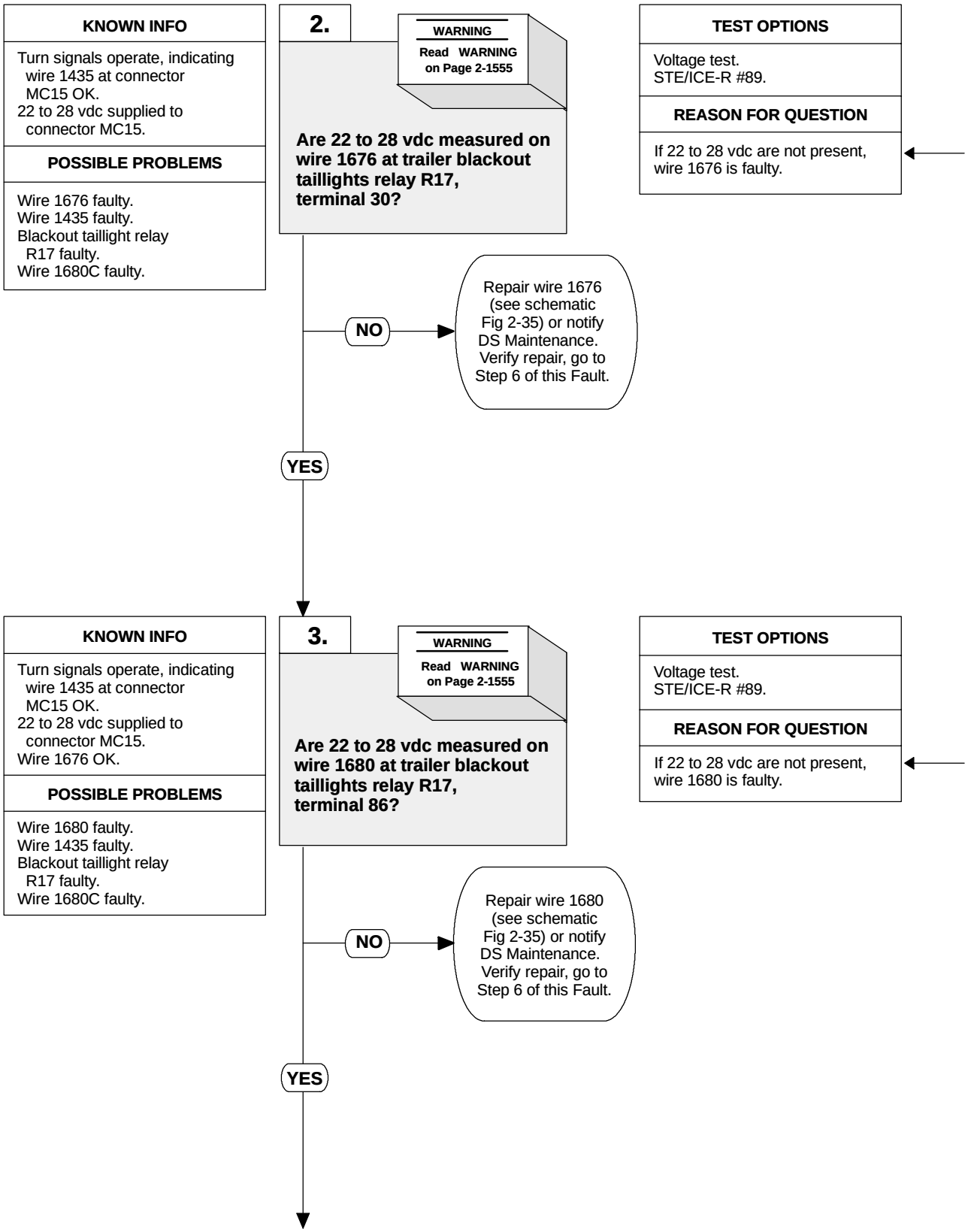
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to connector MC15, terminals A, C, and H.
(3) Connect negative (–) multimeter lead to known good ground.
(4) Turn on BLACKOUT LIGHTS selector switch (TM 9-2320-364-10).
(5) Turn on BLACKOUT MARKER lights switch.
(6) Observe multimeter.
    (a) If 22 to 28 vdc are not present at all of these terminals, perform Steps (7) through (9) below and go to Step 2 of this Fault.
    (b) If 22 to 28 vdc are not present at any one of these terminals, perform Steps (7) through (9) below and repair wire 1680C at connector MC15 and wire splices at connector MC25 wire (see schematic Fig 2-35) or notify DS Maintenance.
    (c) If 22 to 28 vdc are present, perform Steps (7) through (9) below and go to Trailer Troubleshooting (TM 9-2330-385-14).
(7) Turn OFF ENGINE switch.
(8) Turn off BLACKOUT LIGHTS selector switch.
(9) Turn off BLACKOUT MARKER lights switch.



44. TRAILER BLACKOUT TAILLIGHTS DO NOT OPERATE (CONT).



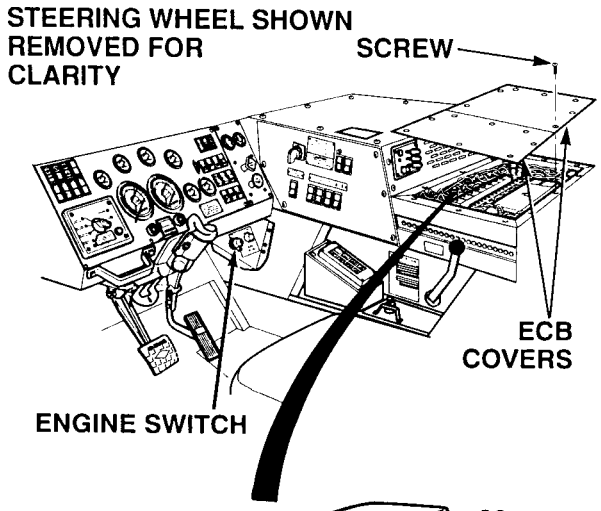
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE
Relay test must be performed with relay partially removed.

VOLTAGE TEST

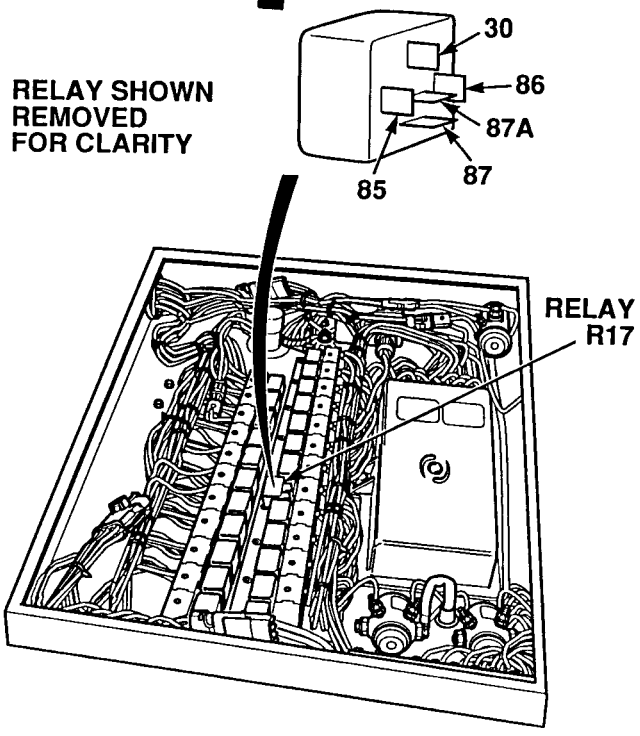
(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1676 at trailer blackout taillight relay R17, terminal 30.
(3) Connect negative (-) multimeter lead to known good ground.
  (a) If 22 to 28 vdc are not present, repair wire 1676 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1676 is OK.



NOTE
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1680 at trailer blackout taillight relay R17, terminal 86.
(2) Connect negative (-) multimeter lead to known good ground.
(3) Turn on BLACKOUT MARKER lights switch. (TM 9-2320-364-10).
(4) Turn on BLACKOUT LIGHTS selector switch.
(5) Turn ON ENGINE switch.
  (a) If 22 to 28 vdc are not present, perform Steps (6) through (8) below and repair wire 1680 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1680 is OK.
(6) Turn OFF ENGINE switch.
(7) Turn off BLACKOUT LIGHTS selector switch.
(8) Turn off BLACKOUT MARKER lights switch.



44. TRAILER BLACKOUT TAILLIGHTS DO NOT OPERATE (CONT).

KNOWN INFO

Turn signals operate, indicating wire 1435 at connector MC15 OK.
22 to 28 vdc supplied to connector MC15.
Wire 1676 OK.
Wire 1680 OK.

POSSIBLE PROBLEMS

Wire 1435 faulty.
Blackout taillight relay R17 faulty.
Wire 1680C faulty.

4.

WARNING
Read WARNING on Page 2-1557

Is continuity measured on wire 1435 between trailer blackout taillights relay R17, terminal 85 and a known good ground?

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

If blackout taillights relay R17 is not grounded through wire 1435, relay will not operate.

NO → Repair wire 1435 (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

YES

KNOWN INFO

Turn signals operate, indicating wire 1435 at connector MC15 OK.
22 to 28 vdc supplied to connector MC15.
Wire 1676 OK.
Wire 1680 OK.
Wire 1435 OK.

POSSIBLE PROBLEMS

Blackout taillight relay R17 faulty.
Wire 1680C faulty.

5.

WARNING
Read WARNING on Page 2-1557

Are 22 to 28 vdc measured from wire 1680C at trailer blackout taillight relay R17, terminal 87?

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If 22 to 28 vdc are not present, trailer blackout taillight relay R17 is faulty.

NO → Replace trailer blackout taillight relay (Para 7-95). Verify repair, go to Step 6 of this Fault.

YES → Repair wire 1680C (see schematic Fig 2-35) or notify DS Maintenance. Verify repair, go to Step 6 of this Fault.

WARNING

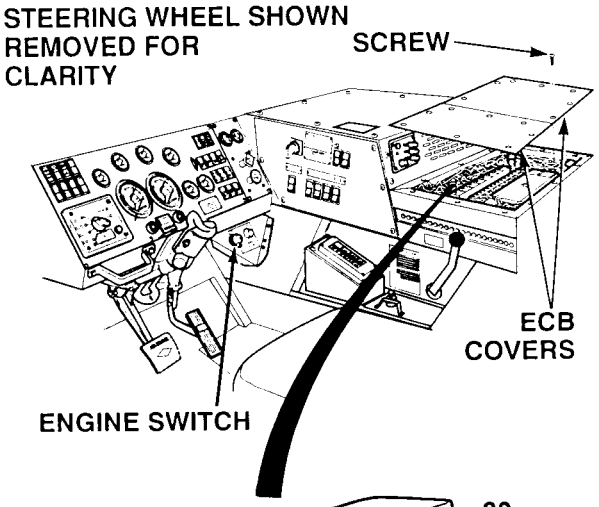
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity on wire 1435 between trailer blackout taillight relay R17, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK between relay R17, terminal 85 and first splice.

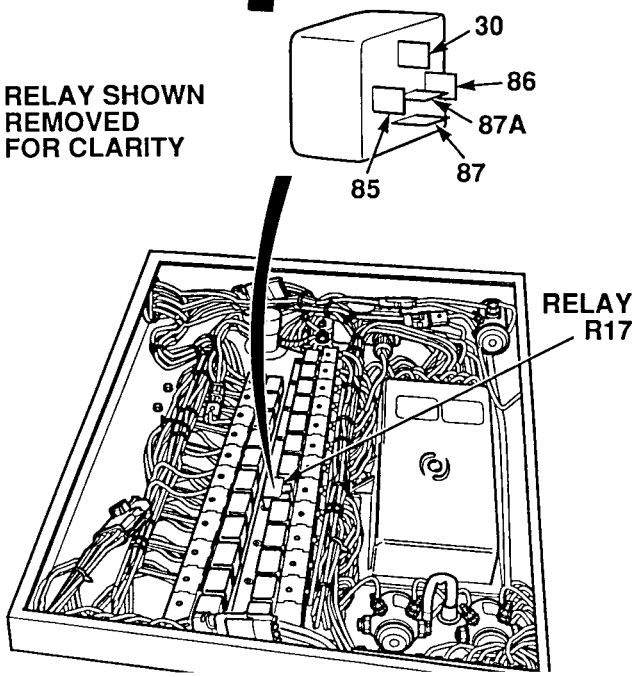


NOTE

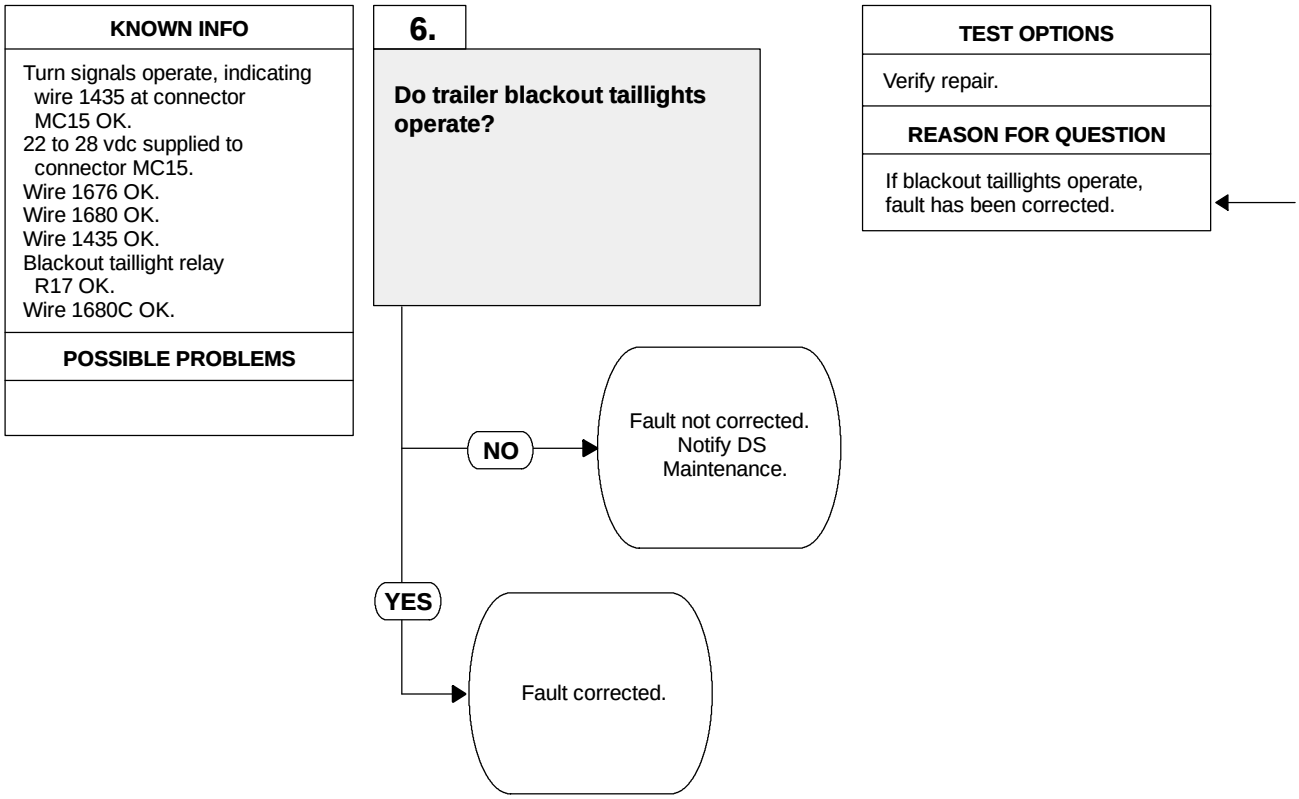
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1680C at trailer blackout taillight relay R17, terminal 87.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Turn on BLACKOUT MARKER switch (TM 9-2320-364-10).
(5) Turn on BLACKOUT LIGHTS selector switch.
(6) Turn ON ENGINE switch.
  (a) If 22 to 28 vdc are not present, perform Steps (7) through (10) below and replace relay R17 (Para 7-95).
  (b) If 22 to 28 vdc are present, perform Steps (7) through (10) below and repair wire 1680C (see schematic Fig 2-35) or notify DS Maintenance.
(7) Turn OFF ENGINE switch.
(8) Turn off BLACKOUT LIGHTS selector switch.
(9) Turn off BLACKOUT MARKER lights switch.
(10) Install two ECB covers and 15 screws.

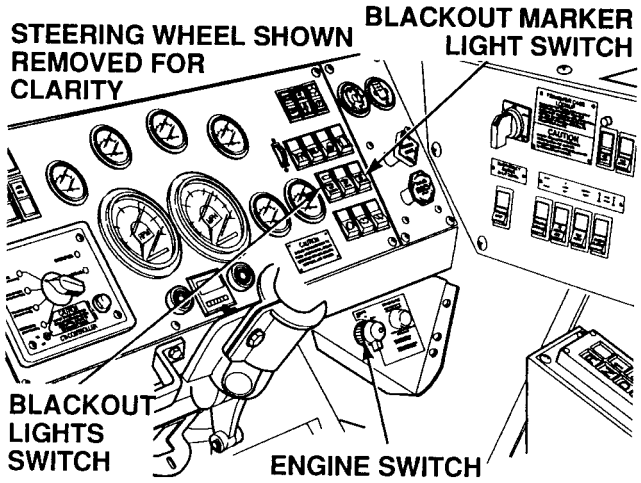


44. TRAILER BLACKOUT TAILLIGHTS DO NOT OPERATE (CONT).



VERIFY REPAIR

(1) Connect 24 vdc cable to truck and trailer (TM 9-2320-364-10).
(2) Turn on BLACKOUT MARKER switch.
(3) Turn on BLACKOUT LIGHTS selector switch.
(4) While assistant turns ON ENGINE switch, observe blackout taillights.
  (a) If blackout taillights do not operate, fault not corrected. Perform Steps (5) through (8) below and notify DS Maintenance.
  (b) If blackout taillights operate, fault has been corrected.
(5) Turn OFF ENGINE switch.
(6) Turn off BLACKOUT LIGHTS selector switch.
(7) Turn off BLACKOUT MARKER lights switch.
(8) Disconnect 24 vdc cable from trailer and truck.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

45. TRAILER BLACKOUT STOPLIGHTS DO NOT OPERATE.

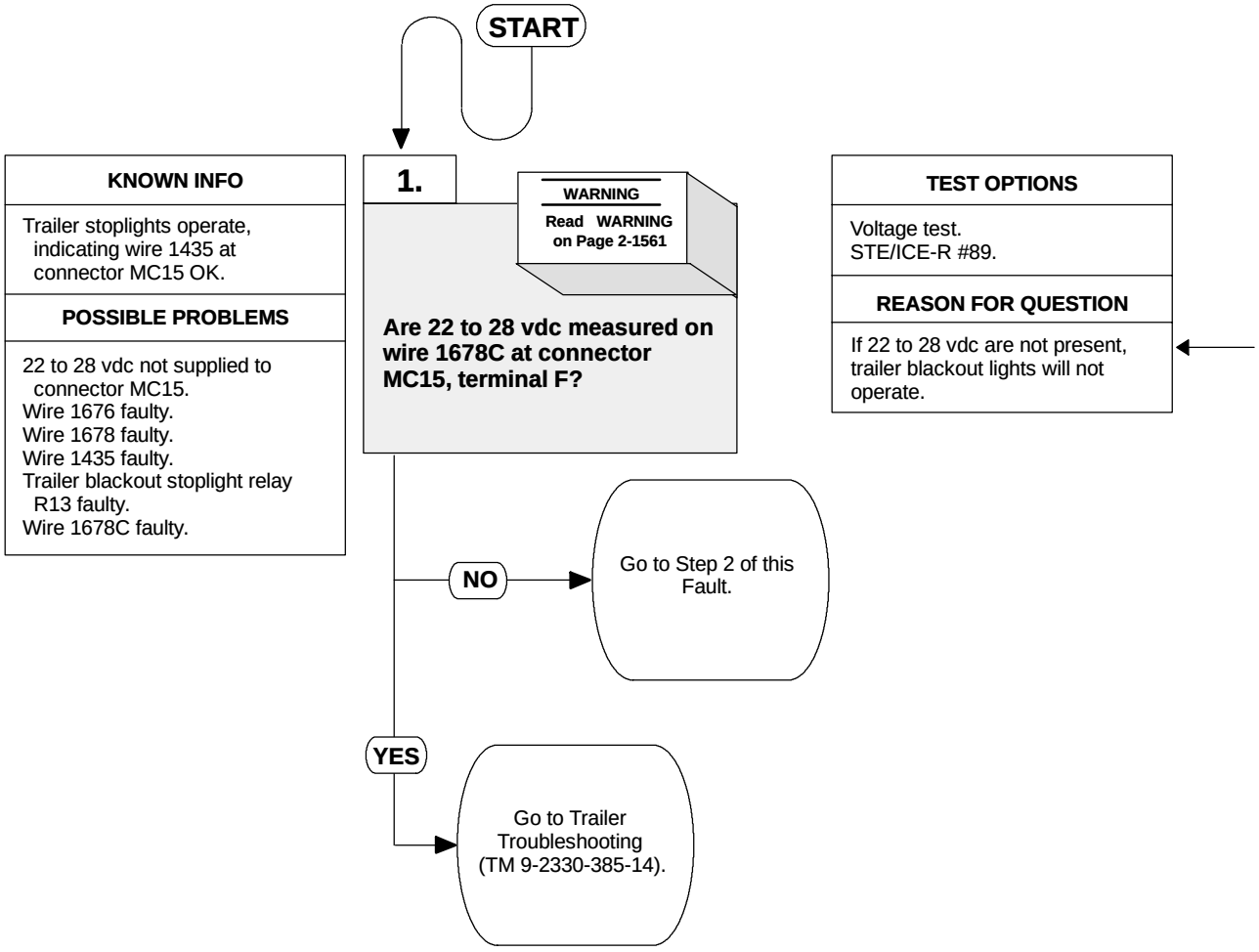
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Personnel Required
Two

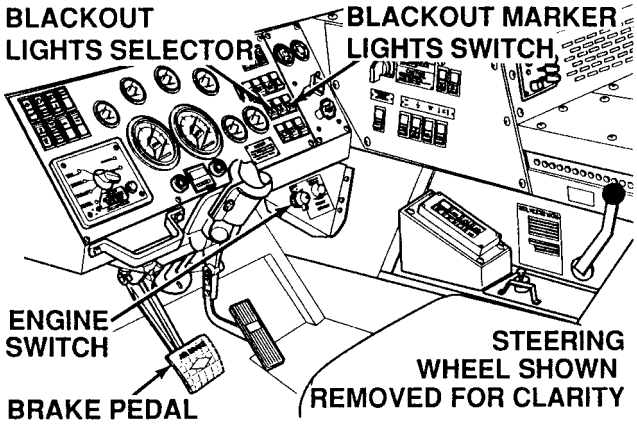
References
TM 9-2320-364-10
TM 9-2330-385-14
TM 9-4910-571-12&P

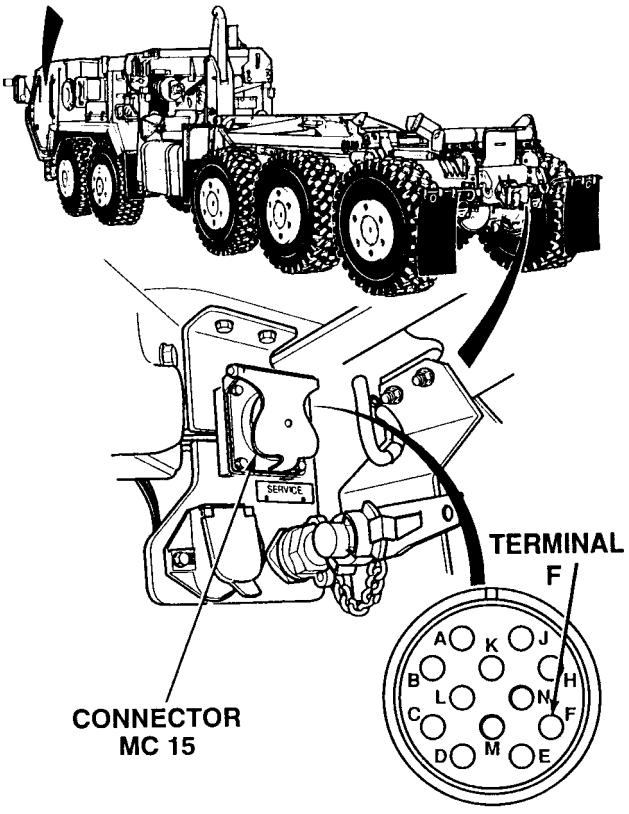
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

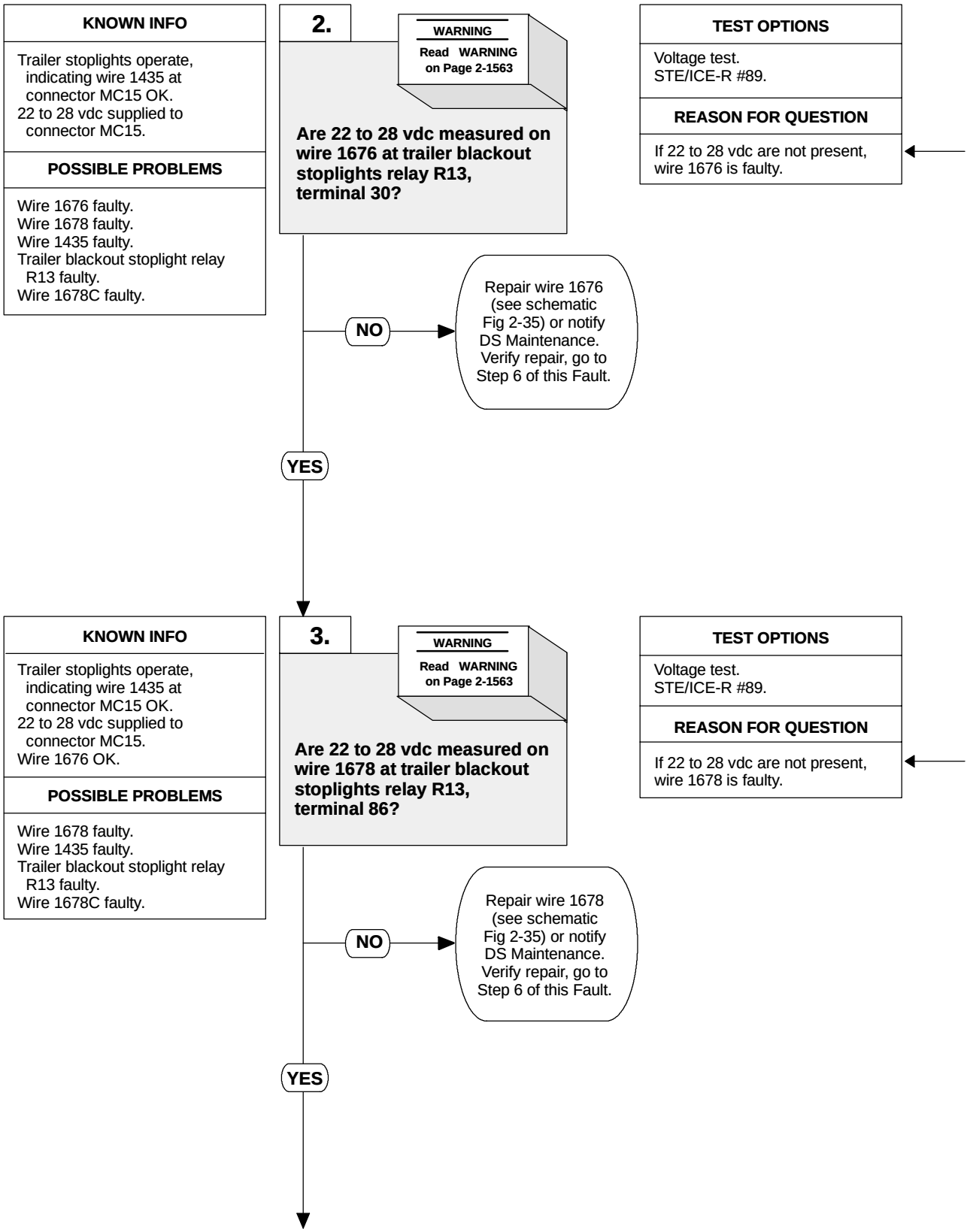




VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to connector MC15, terminal F.
(3) Connect negative (–) multimeter lead to known good ground.
(4) Turn on BLACKOUT LIGHTS selector switch (TM 9-2320-364-10).
(5) Turn on BLACKOUT MARKER lights switch.
(6) Turn ON ENGINE switch.
(7) While assistant applies brake pedal, observe multimeter.
    (a) If 22 to 28 vdc are not present, perform Steps (8) through (11) below and go to Step 2 of this Fault.
    (b) If 22 to 28 vdc are present, wire 1678C is OK. Perform Steps (8) through (11) below and go to Trailer Troubleshooting (TM 9-2330-385-14).
(8) Release brake pedal.
(9) Turn OFF ENGINE switch.
(10) Turn off BLACKOUT LIGHTS selector switch.
(11) Turn off BLACKOUT MARKER lights switch.

45. TRAILER BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19, R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

VOLTAGE TEST

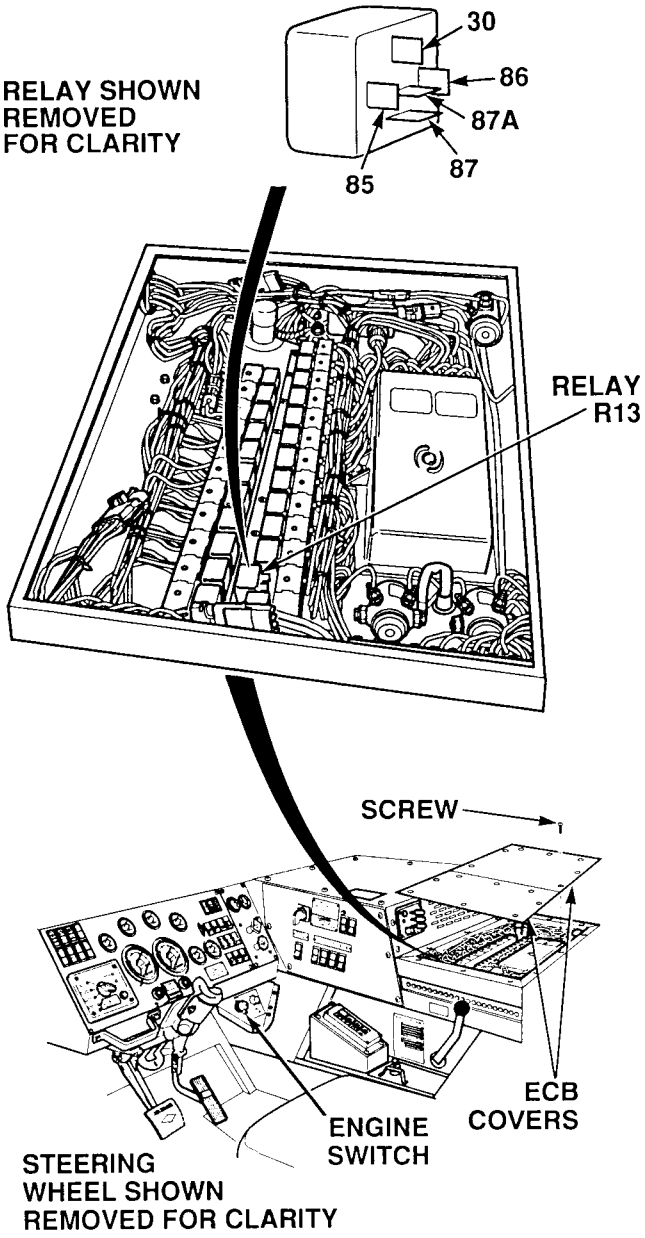
(1) Remove 15 screws and two ECB covers.
(2) Connect positive (+) multimeter lead to wire 1676 at trailer blackout stoplight relay R13, terminal 30.
(3) Connect negative (–) multimeter lead to known good ground.
(4) Turn ON ENGINE switch and observe multimeter (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, turn OFF ENGINE switch and repair wire 1676 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1676 is OK.
(5) Turn OFF ENGINE switch.

NOTE

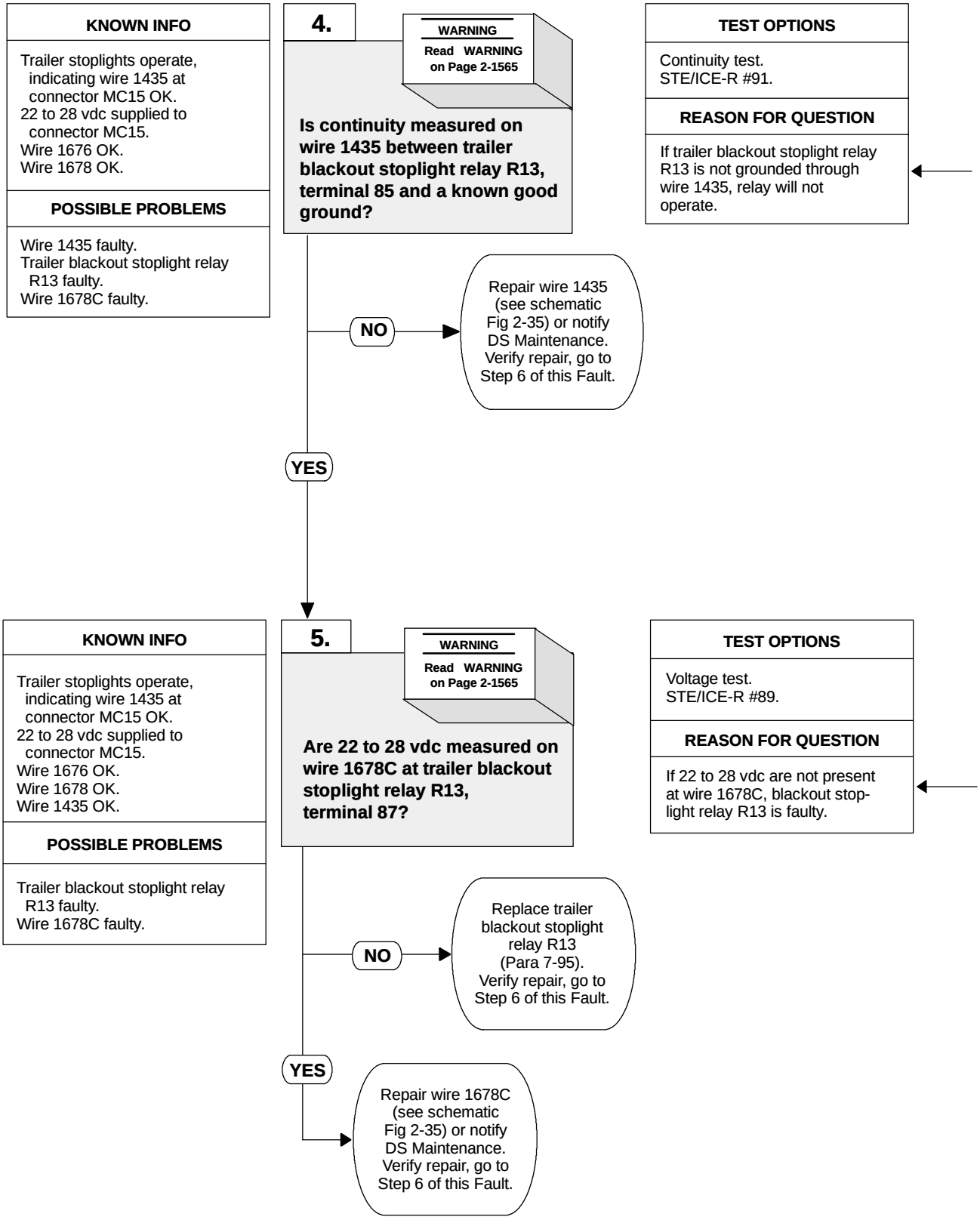
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1678 at relay R13, terminal 86.
(3) Connect negative (–) multimeter lead to known good ground.
(4) Turn on BLACKOUT MARKER lights switch (TM 9-2320-364-10).
(5) Turn on BLACKOUT LIGHTS selector switch.
(6) Turn ON ENGINE switch
(7) While assistant applies brake pedal, observe multimeter.
  (a) If 22 to 28 vdc are not present, perform Steps (8) through (11) below and repair wire 1678 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1678 is OK.
(8) Release brake pedal.
(9) Turn OFF ENGINE switch.
(10) Turn off BLACKOUT LIGHTS selector switch.
(11) Turn off BLACKOUT MARKER lights switch.



45. TRAILER BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Circuit breakers CB5, CB6, CB12, CB20, CB22, CB23 and relays R3, R13 - R19,R26, R28, R32, R33 are always electrically hot and can cause severe injury to personnel. Care must be exercised when working under the electrical circuit board cover.

NOTE

Relay test must be performed with relay partially removed.

CONTINUITY TEST

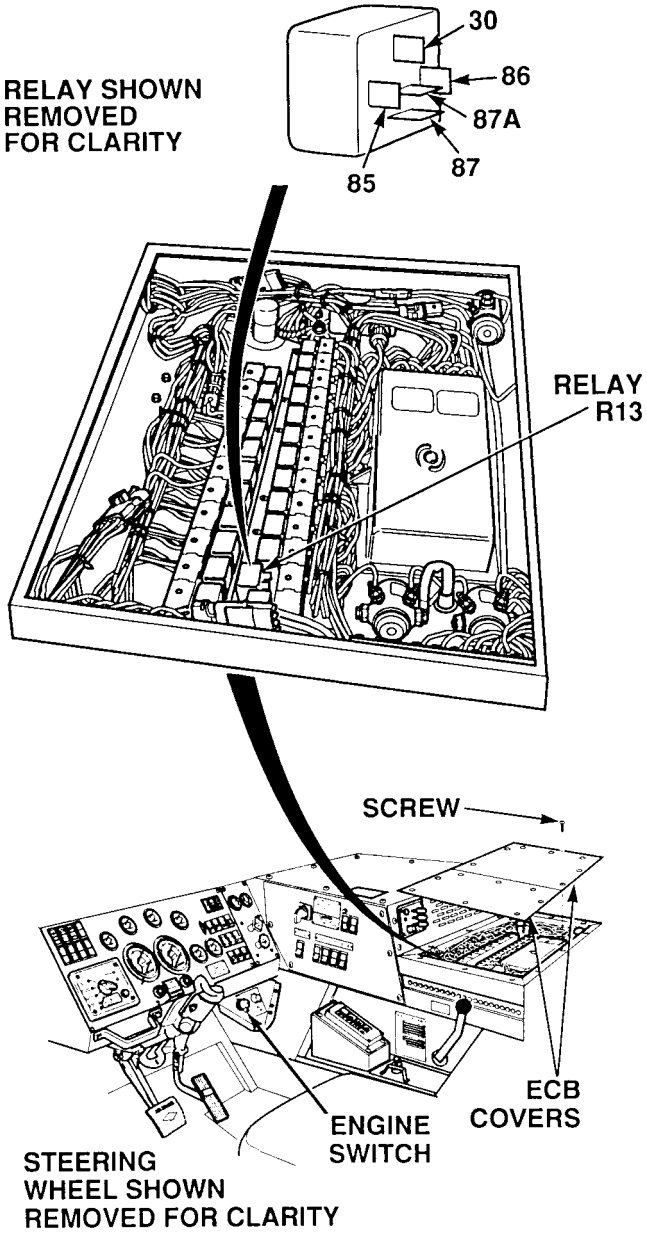
(1) Set multimeter select switch to ohms.
(2) Is there continuity between trailer blackout stoplight relay R13, terminal 85 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-35) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.

NOTE

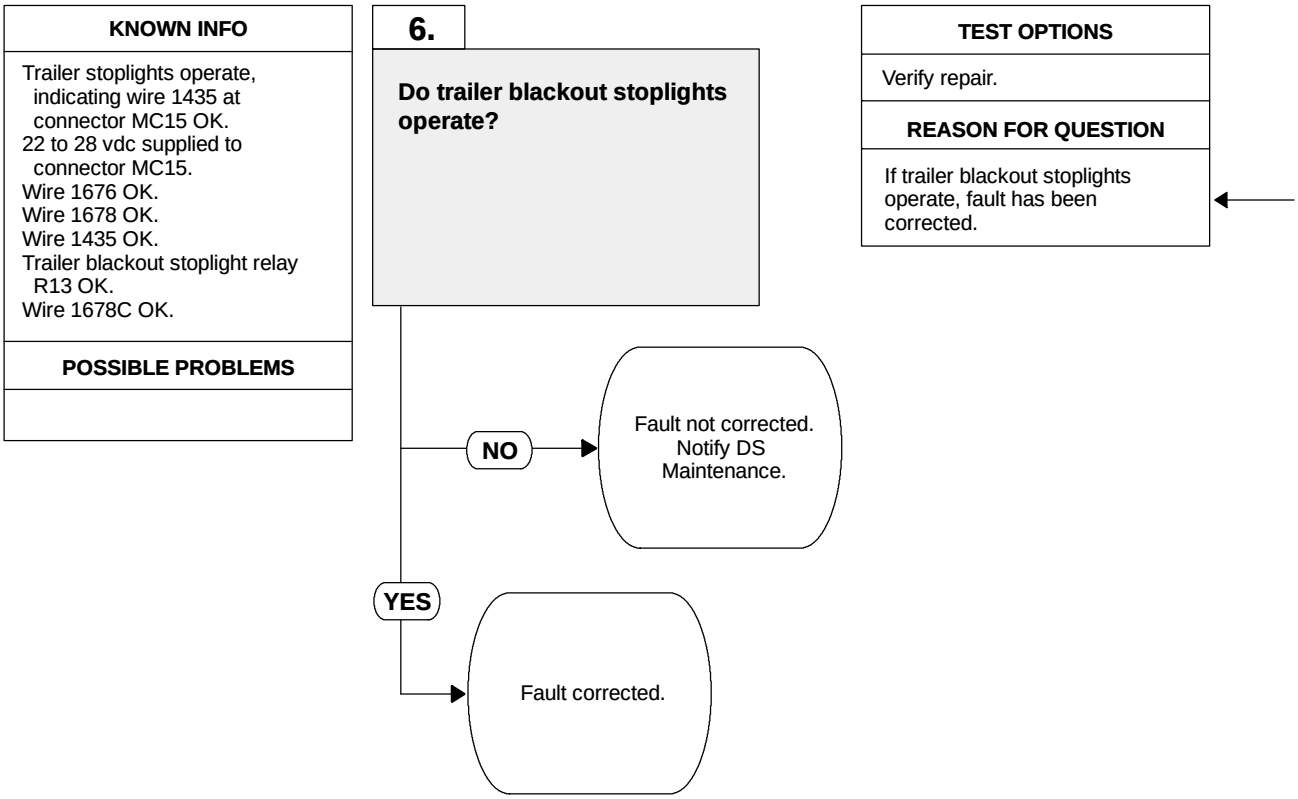
Relay test must be performed with relay partially removed.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1678C at relay R13, terminal 87 (Para 2-11).
(3) Connect negative (-) multimeter lead to known good ground.
(4) Turn on BLACKOUT MARKER lights switch (TM 9-2320-364-10).
(5) Turn on BLACKOUT LIGHTS selector switch.
(6) Turn ON ENGINE switch.
(7) While assistant applies brake pedal, observe multimeter.
  (a) If 22 to 28 vdc are not present, perform Steps (8) through (11) below and replace relay R13 (Para 7-95).
  (b) If 22 to 28 vdc are present, perform Steps (8) through (11) below and repair wire 1678C (see schematic Fig 2-35) or notify DS Maintenance.
(8) Turn OFF ENGINE switch.
(9) Turn off BLACKOUT LIGHTS selector switch.
(10) Turn off BLACKOUT MARKER lights switch.
(11) Install two ECB covers and 15 screws.

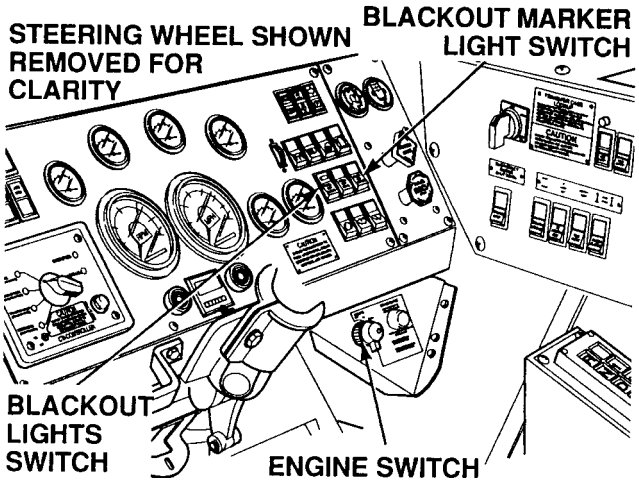


45. TRAILER BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT).



VERIFY REPAIR

(1) Connect 24 vdc cable to truck and trailer (TM 9-2320-364-10).
(2) Turn on BLACKOUT MARKER lights switch (TM 9-2320-364-10).
(3) Turn on BLACKOUT LIGHTS selector switch.
(4) Turn ON ENGINE switch.
(5) While assistant applies brake pedal, observe trailer blackout stoplights.
    (a) If trailer blackout stoplights do not operate, fault not corrected. Perform Steps (6) through (10) below and notify DS Maintenance.
    (b) If trailer blackout stoplights operate, fault has been corrected.
(6) Release brake pedal.
(7) Turn OFF ENGINE switch.
(8) Turn off BLACKOUT LIGHTS selector switch.
(9) Turn off BLACKOUT MARKER lights switch.
(10) Disconnect 24 vdc cable from truck and trailer.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

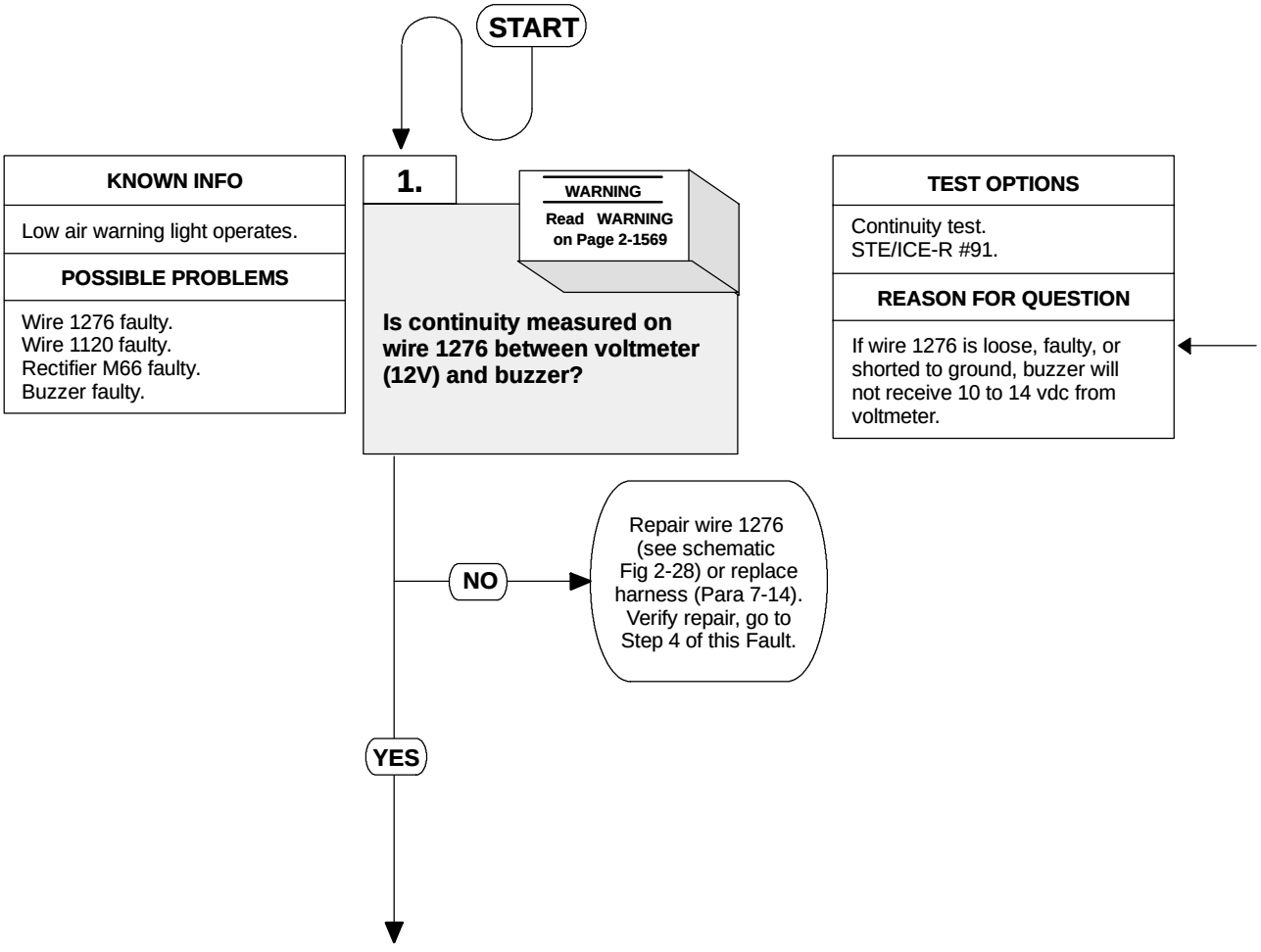
46. LOW AIR/HYDRAULIC OIL ALARM DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

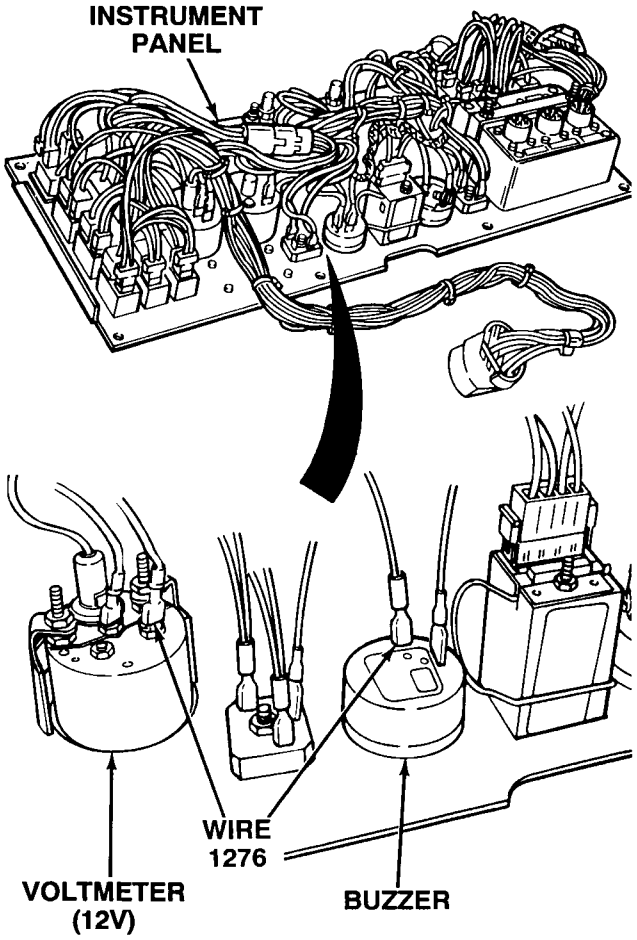


WARNING

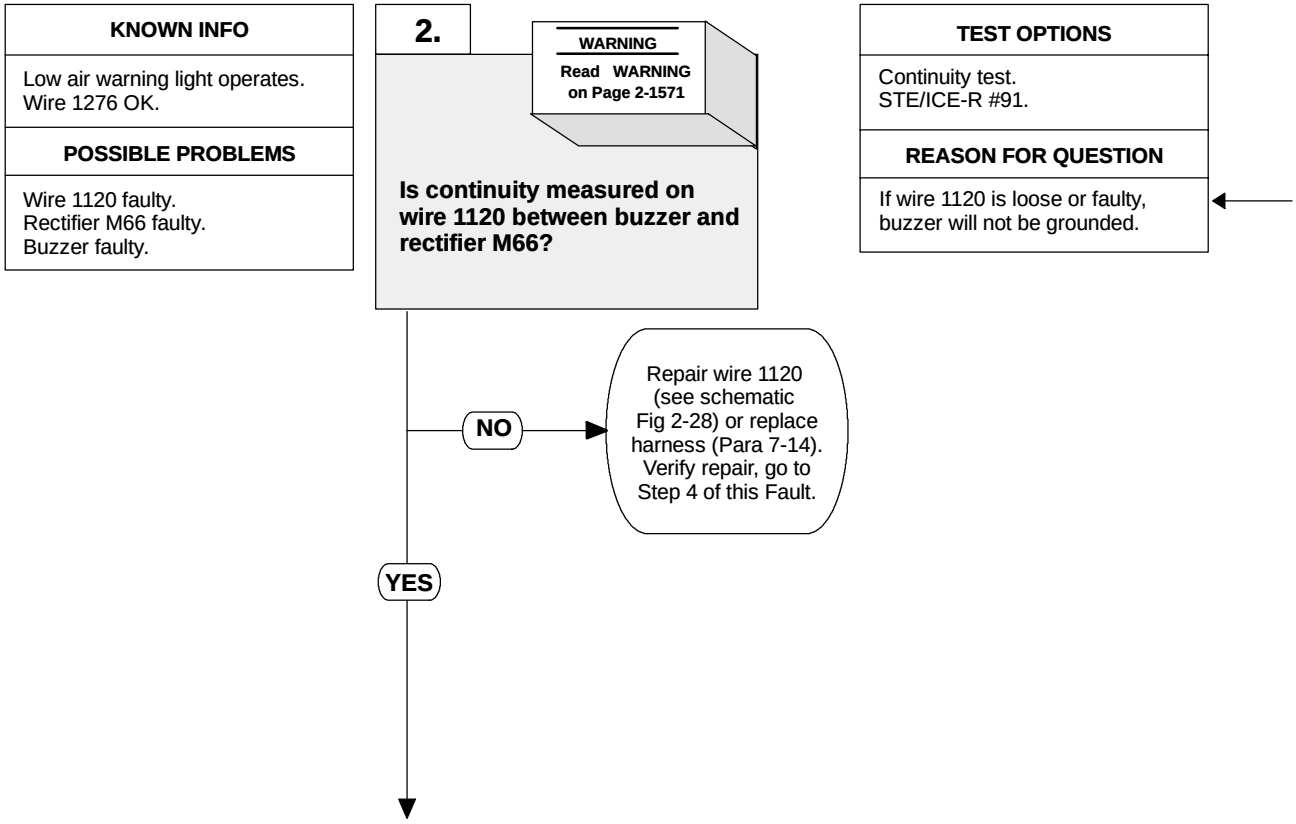
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove instrument panel from truck (Para 7-13).
(2) Set multimeter select switch to ohms.
(3) Is continuity measured on wire 1276 between voltmeter (12V) and buzzer?
   (a) If there is no continuity, repair wire 1276 (see schematic Fig 2-28) or replace harness (Para 7-14).
   (b) If there is continuity, go to Step 2 of this fault.



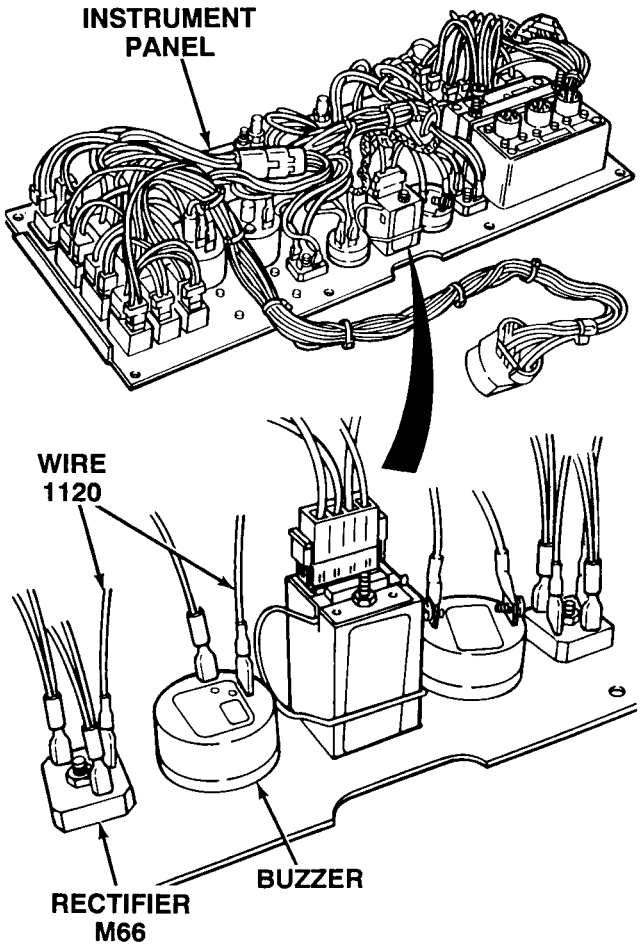
46. LOW AIR/HYDRAULIC OIL ALARM DOES NOT OPERATE (CONT).



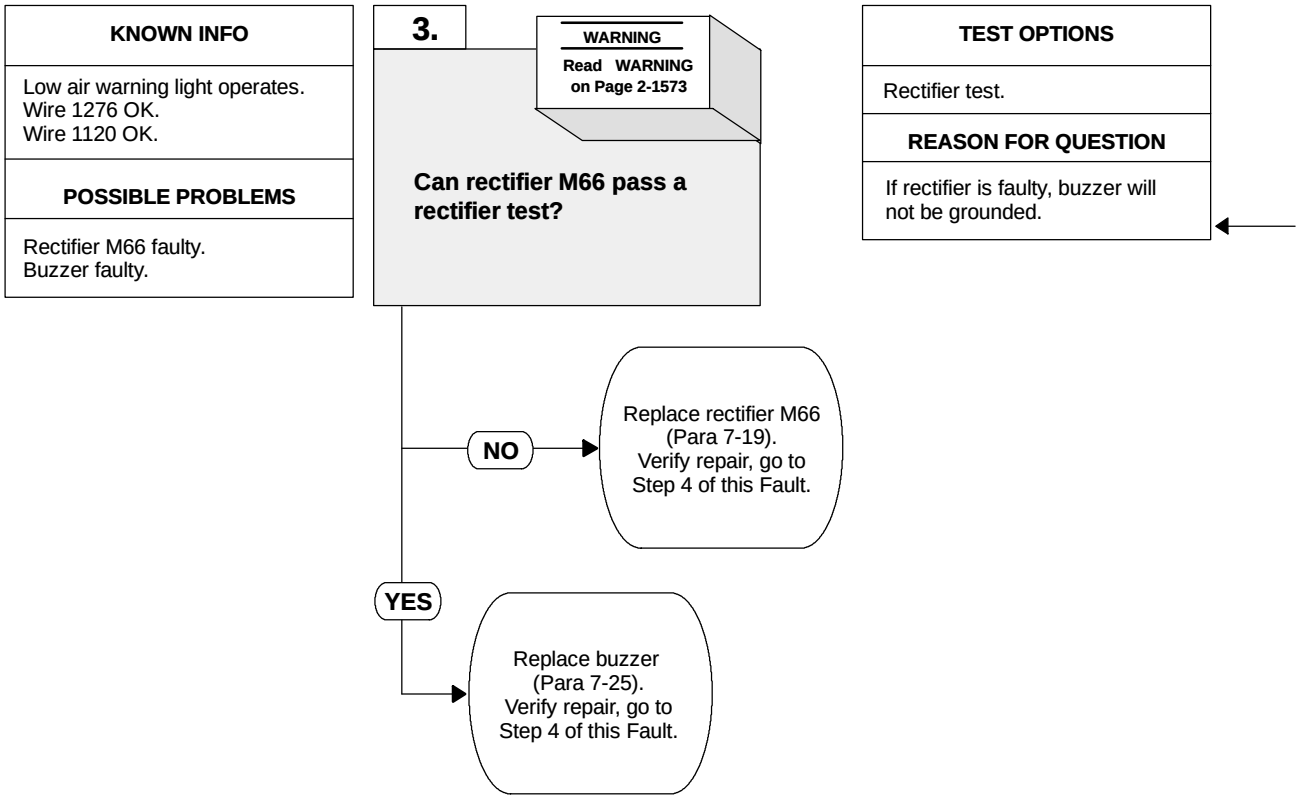
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST
Is continuity measured on wire 1120 between rectifier M66 and buzzer? (1) If there is no continuity, repair wire 1120 (see schematic Fig 2-28) or replace harness (Para 7-14). Verify repair, go to Step 4 of this Fault. (2) If there is continuity, go to Step 3 of this Fault.



46. LOW AIR/HYDRAULIC OIL ALARM DOES NOT OPERATE (CONT).

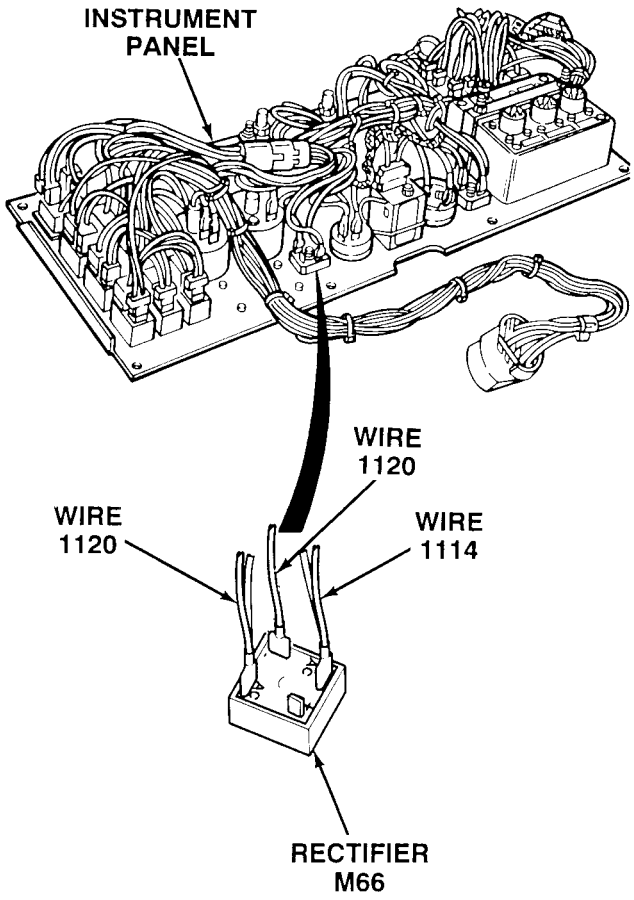


WARNING

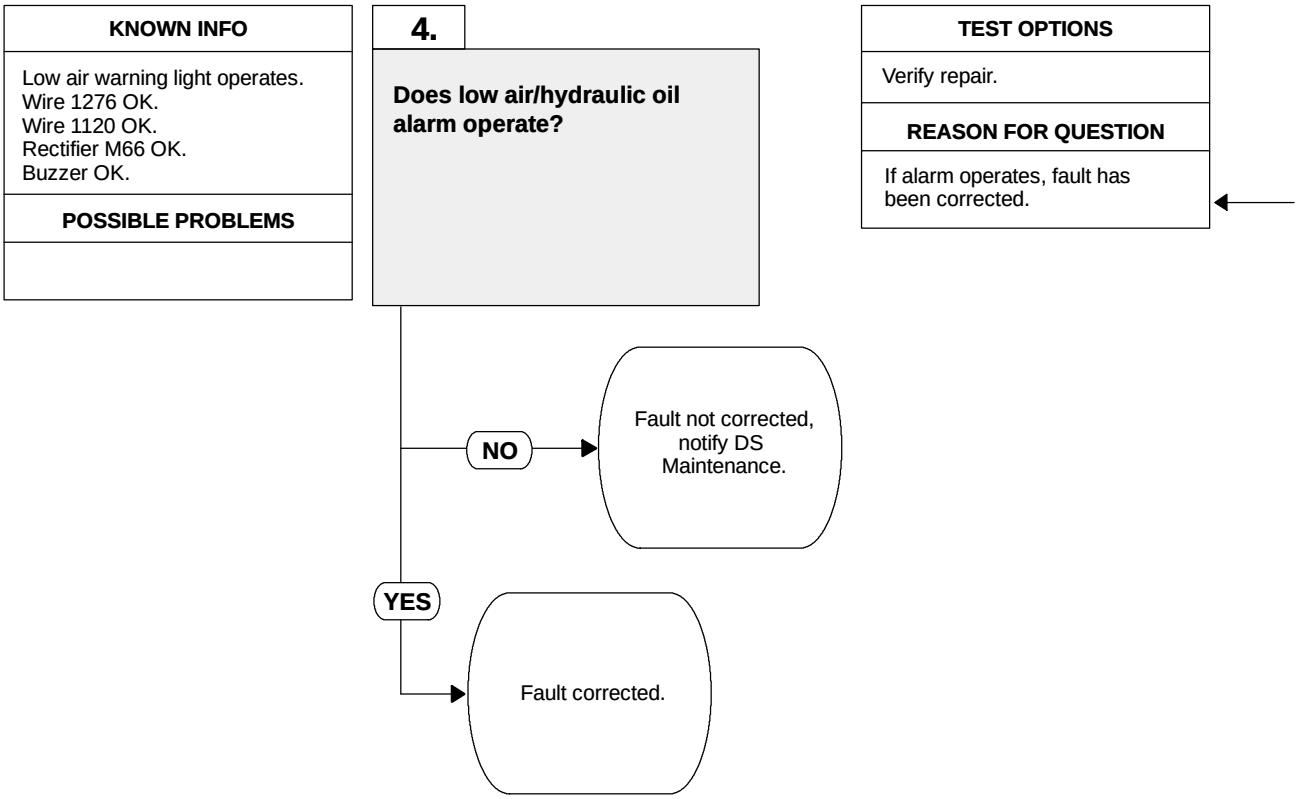
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits a direct short may result. Damage to equipment, injury or death to personnel may occur.

RECTIFIER TEST

(1) Tag, mark and disconnect wires from rectifier M66.
(2) Set multimeter select switch to DIODE CHECK.
(3) Connect positive (+) multimeter lead to negative rectifier terminal.
(4) Connect negative (-) multimeter lead to each rectifier AC terminal one at a time.
    (a) If vdc are not present, at either AC terminal, replace rectifier (Para 7-19).
    (b) If vdc are present at both AC terminals, go to Step (5) below.
(5) Connect negative (-) multimeter lead to positive (+) rectifier terminal.
(6) Connect positive (+) multimeter lead, to each rectifier AC terminal one at a time.
    (a) If vdc are not present at either AC terminal, replace rectifier (Para 7-19).
    (b) If vdc are present at both AC terminals, replace buzzer (Para 7-25).
(7) Connect wires to rectifier.



46. LOW AIR/HYDRAULIC OIL ALARM DOES NOT OPERATE (CONT).

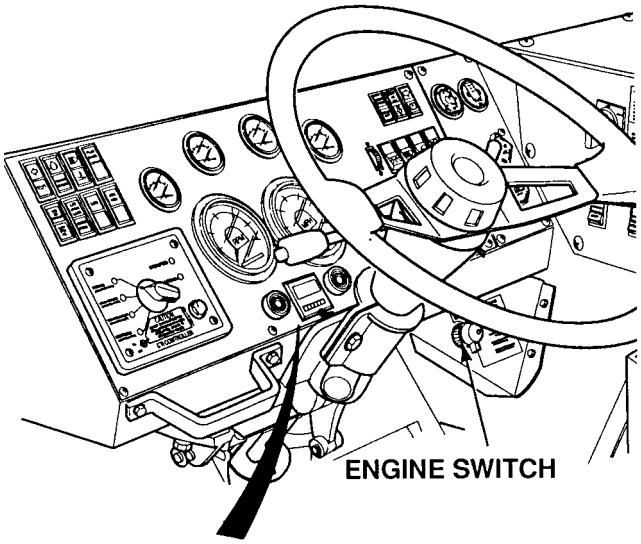


NOTE

Do not perform Step (2) below if air pressure gage indicates less than 60 psi (414 kPa).

VERIFY REPAIR

(1) Install instrument panel (Para 7-13).
(2) Bleed air system pressure until green and red needles in gage are below 60 psi (414 kPa) (TM 9-2320-364-10).
(3) Turn ON ENGINE switch.
    (a) If LOW AIR/HYDRAULIC OIL alarm does not operate, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
    (b) If LOW AIR/HYDRAULIC OIL alarm does operate, fault corrected.
(4) Turn OFF ENGINE switch.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

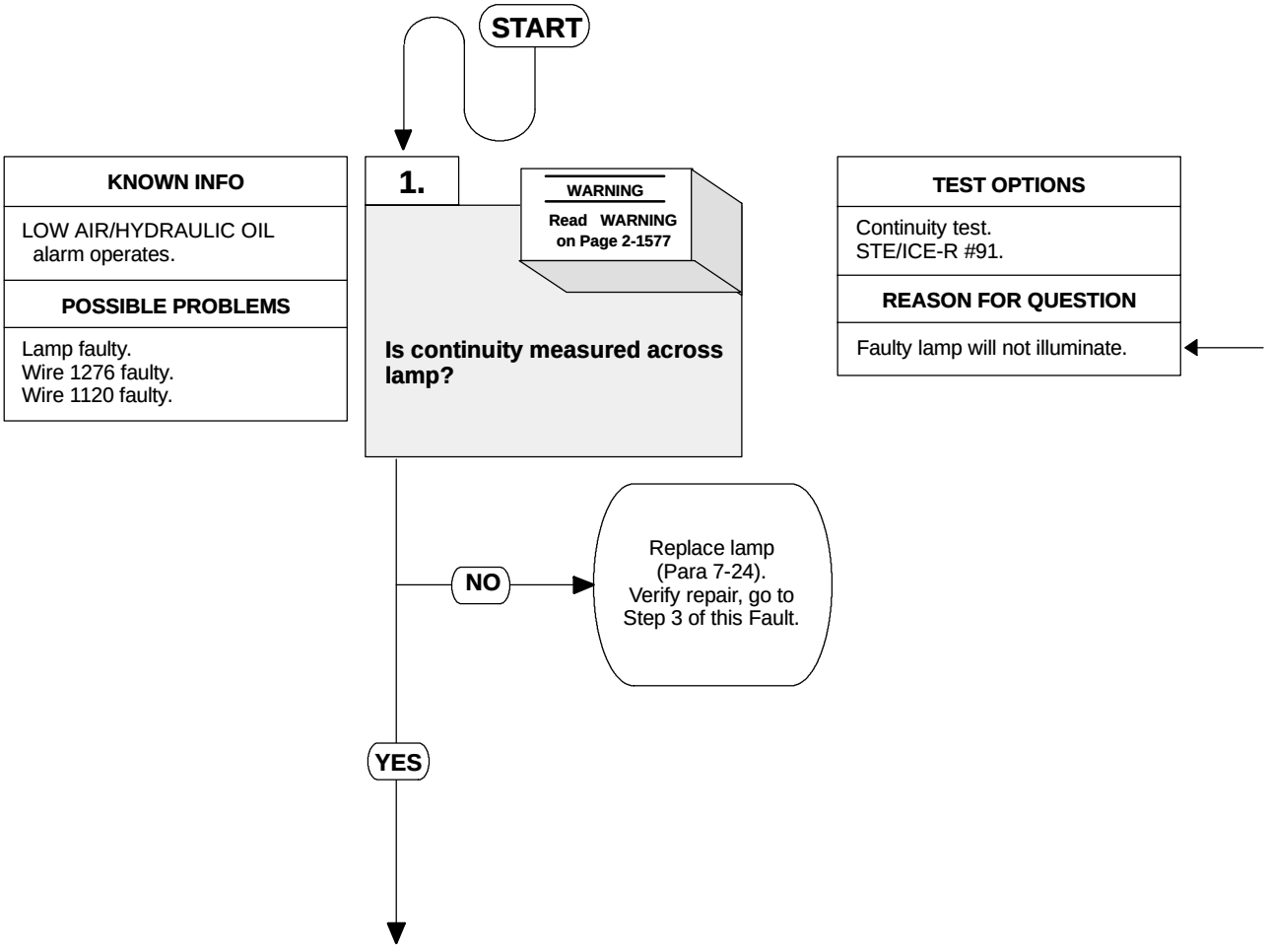
47. LOW AIR WARNING LIGHT DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

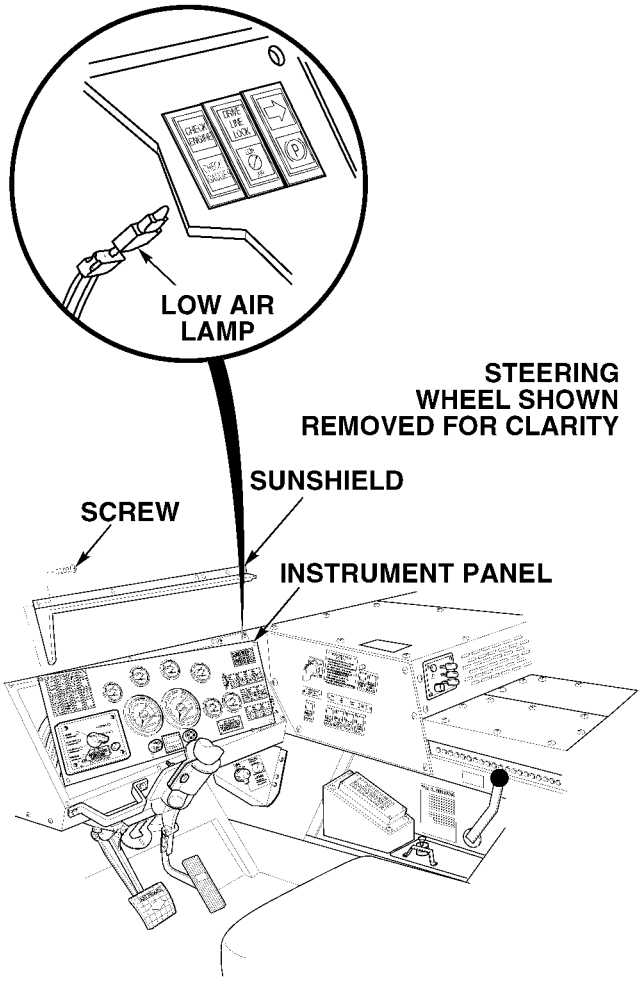
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

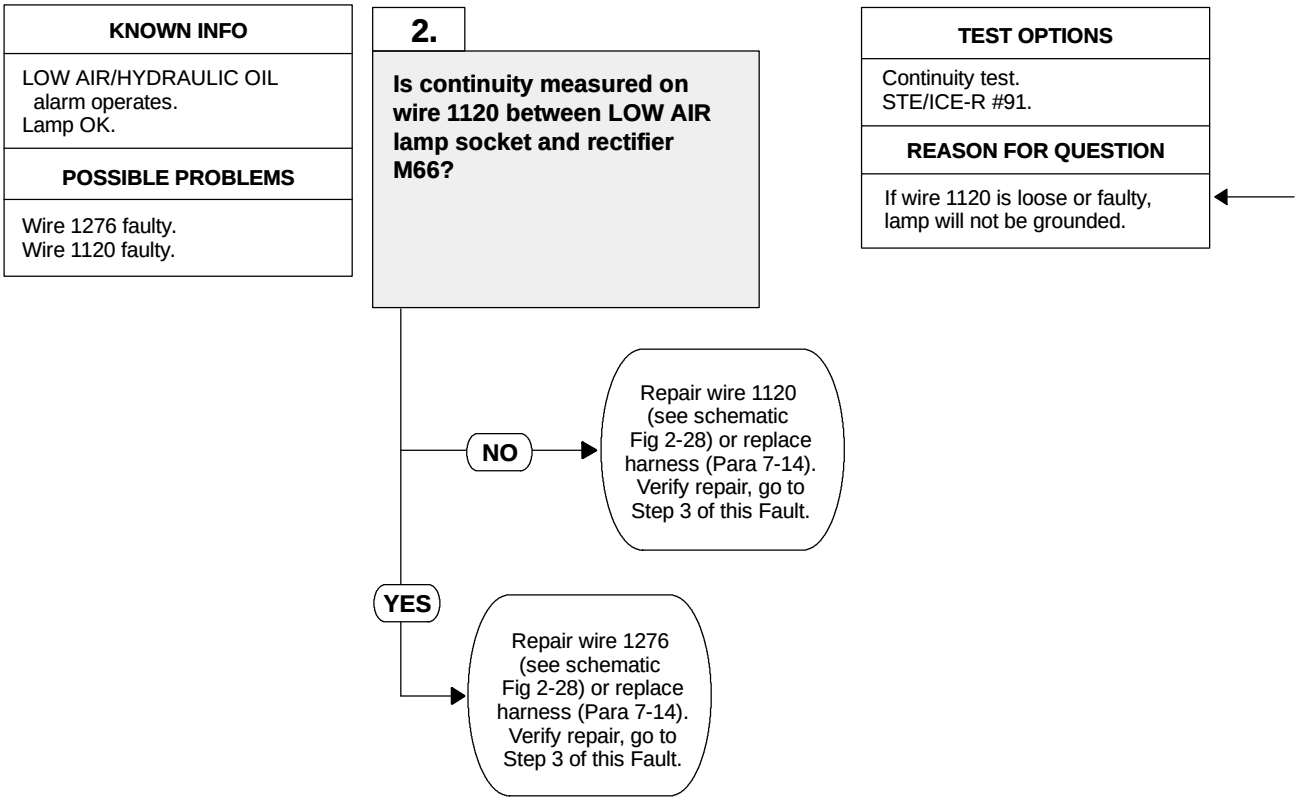
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits a direct short may result. Damage to equipment, injury or death to personnel may occur.



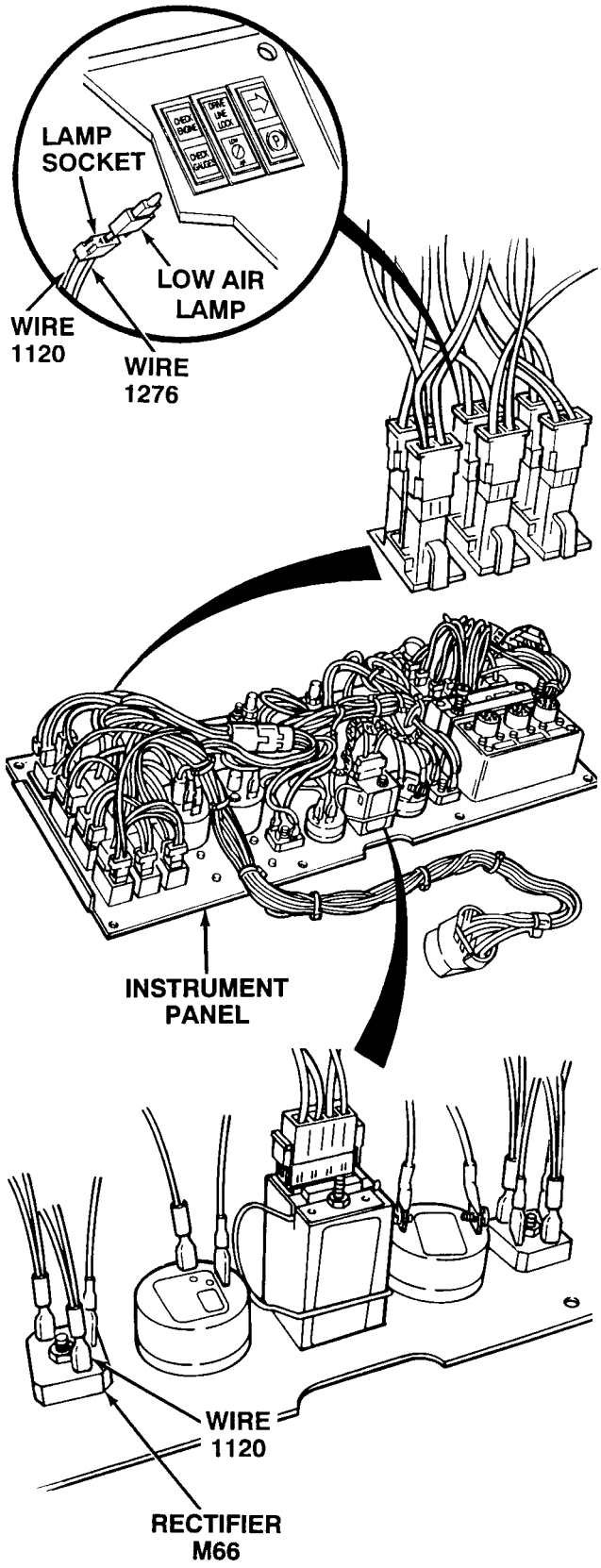
CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel towards steering wheel.
(3) Remove LOW AIR lamp.
(4) Set multimeter select switch to ohms.
(5) Is continuity measured between lamp terminals?
    (a) If there is no continuity, replace lamp (Para 7-24).
    (b) If there is continuity, go to Step 2 of this Fault.

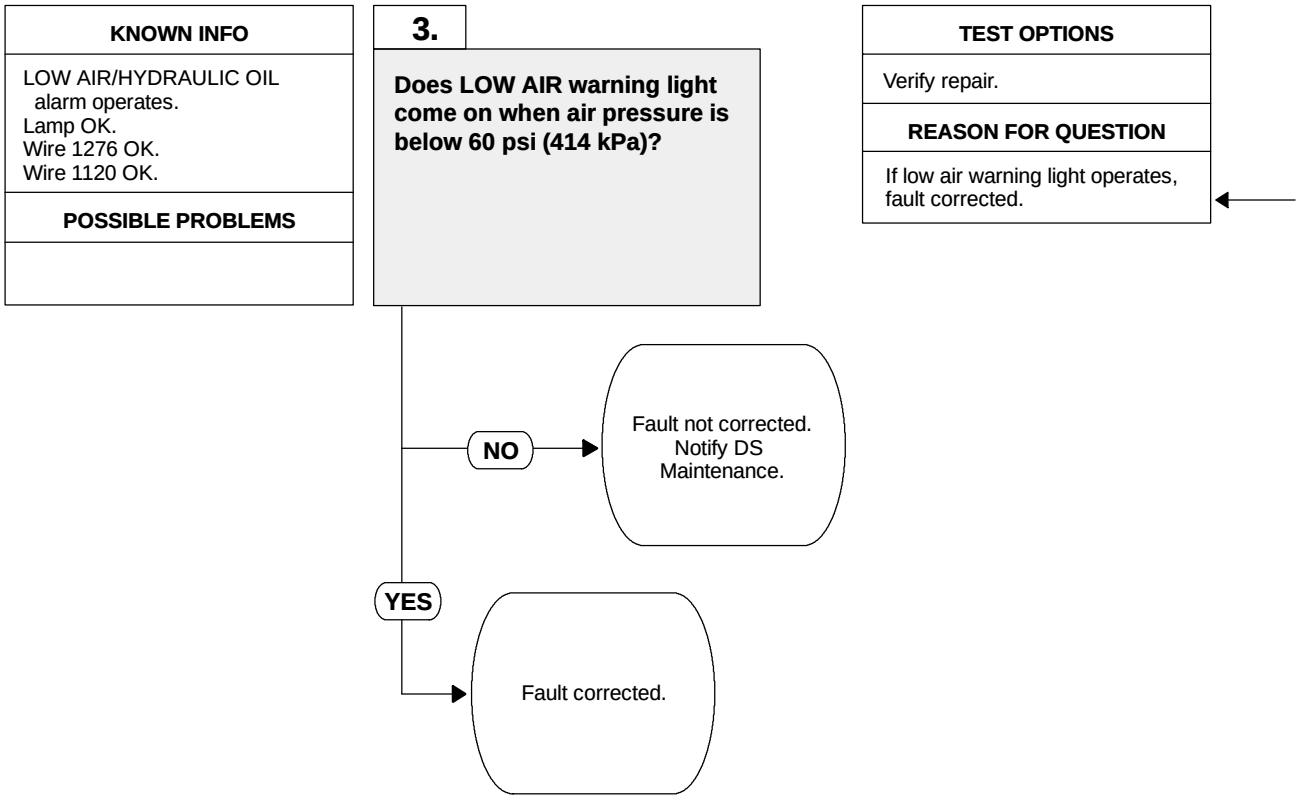
47. LOW AIR WARNING LIGHT DOES NOT OPERATE (CONT).

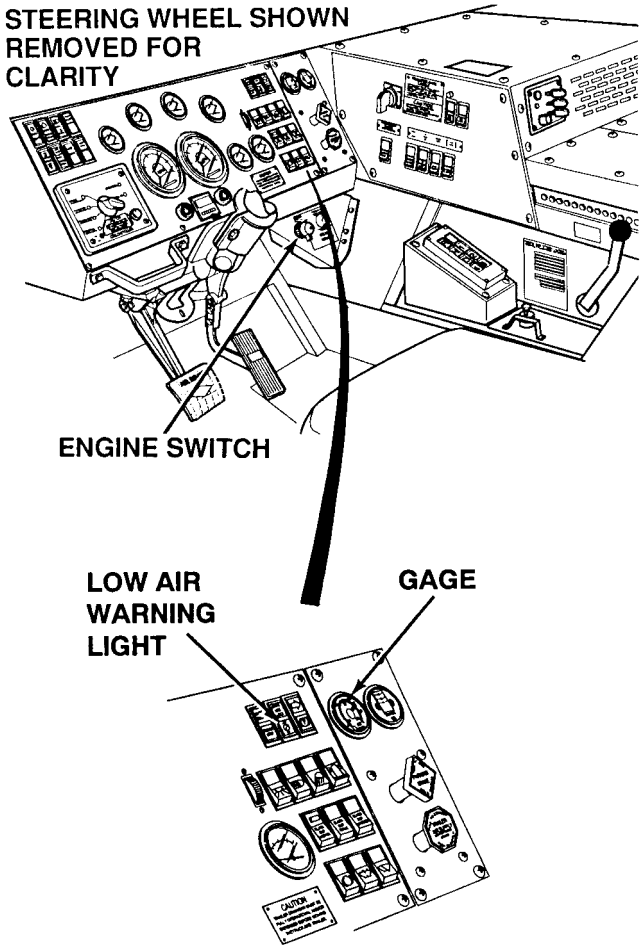


CONTINUITY TEST
(1) Remove instrument panel from truck (Para 7-13). (2) Is continuity measured on wire 1120 between LOW AIR lamp socket and rectifier M66? (a) If there is no continuity, repair wire 1120 (see schematic Fig 2-28) or replace harness (Para 7-14). (b) If there is continuity, repair wire 1276 (see schematic Fig 2-28) or replace harness (Para 7-14) and install LOW AIR lamp. (3) Replace LOW AIR lamp.



47. LOW AIR WARNING LIGHT DOES NOT OPERATE (CONT).





NOTE

Do not perform Step (2) below if air pressure gage indicates less than 60 psi (414 kPa).

VERIFY REPAIR

(1) Install instrument panel (Para 7-13).
(2) Bleed air system pressure until green and red needles in gage are below 60 psi (414 kPa) (TM 9-2320-364-10).
(3) Turn ON ENGINE switch.
  (a) If low air light does not operate, fault not corrected. Notify DS Maintenance.
  (b) If low air operates, fault corrected.
(4) Turn OFF ENGINE switch.

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

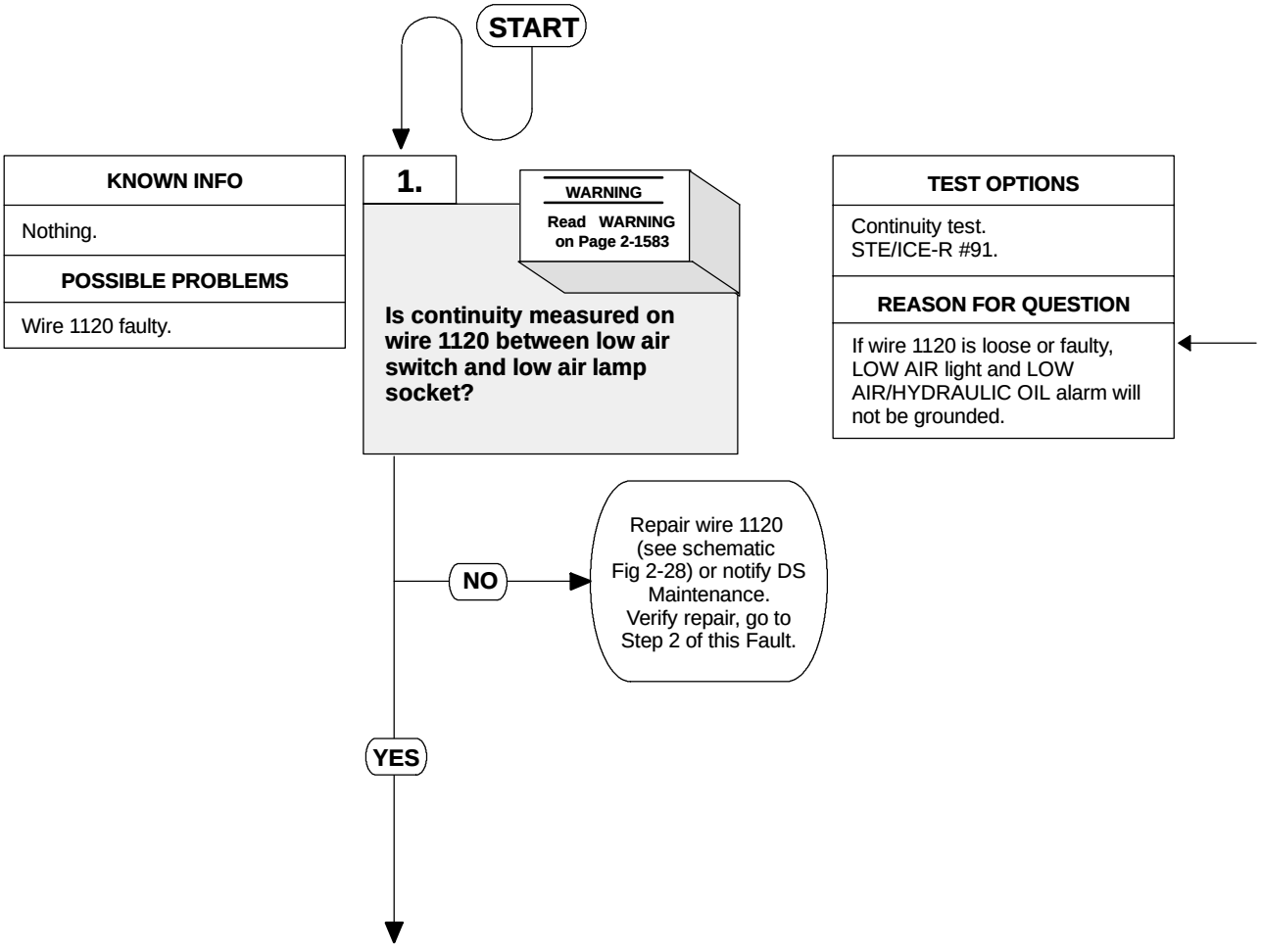
48. LOW AIR LIGHT AND LOW AIR/HYDRAULIC OIL ALARM DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

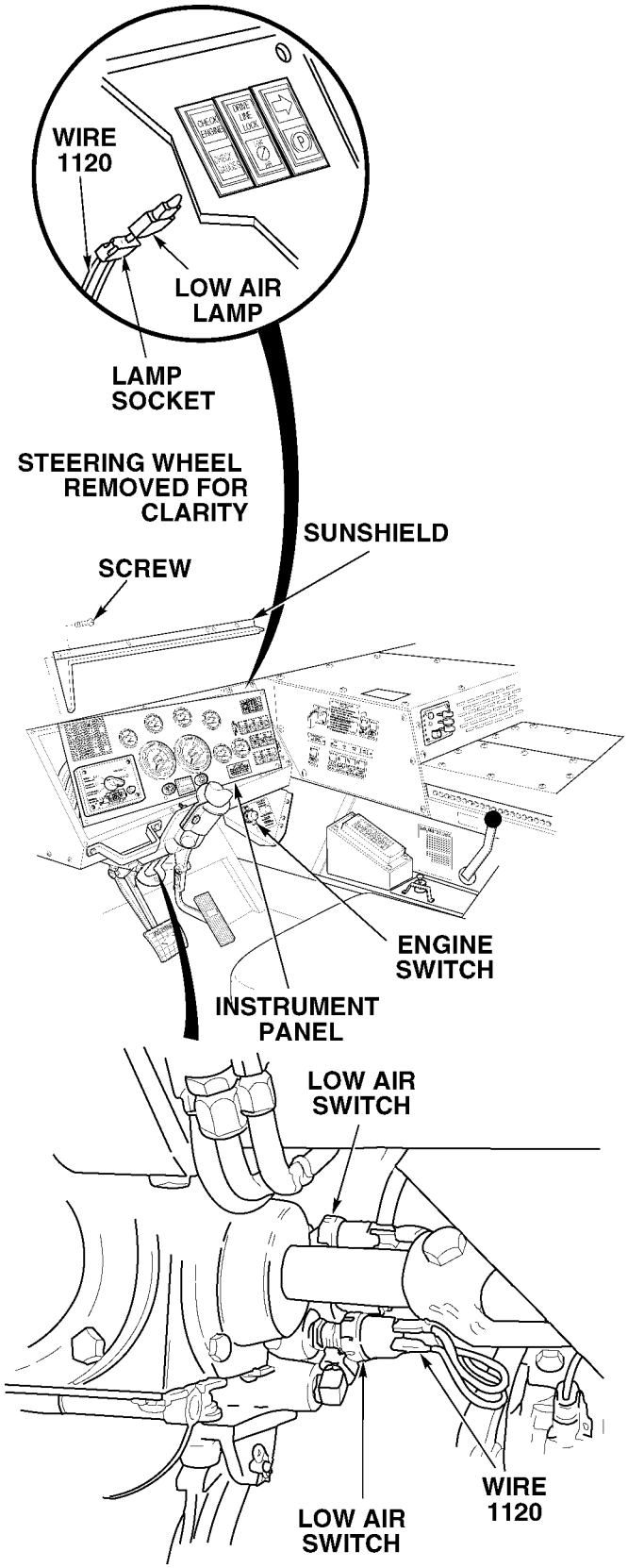


WARNING

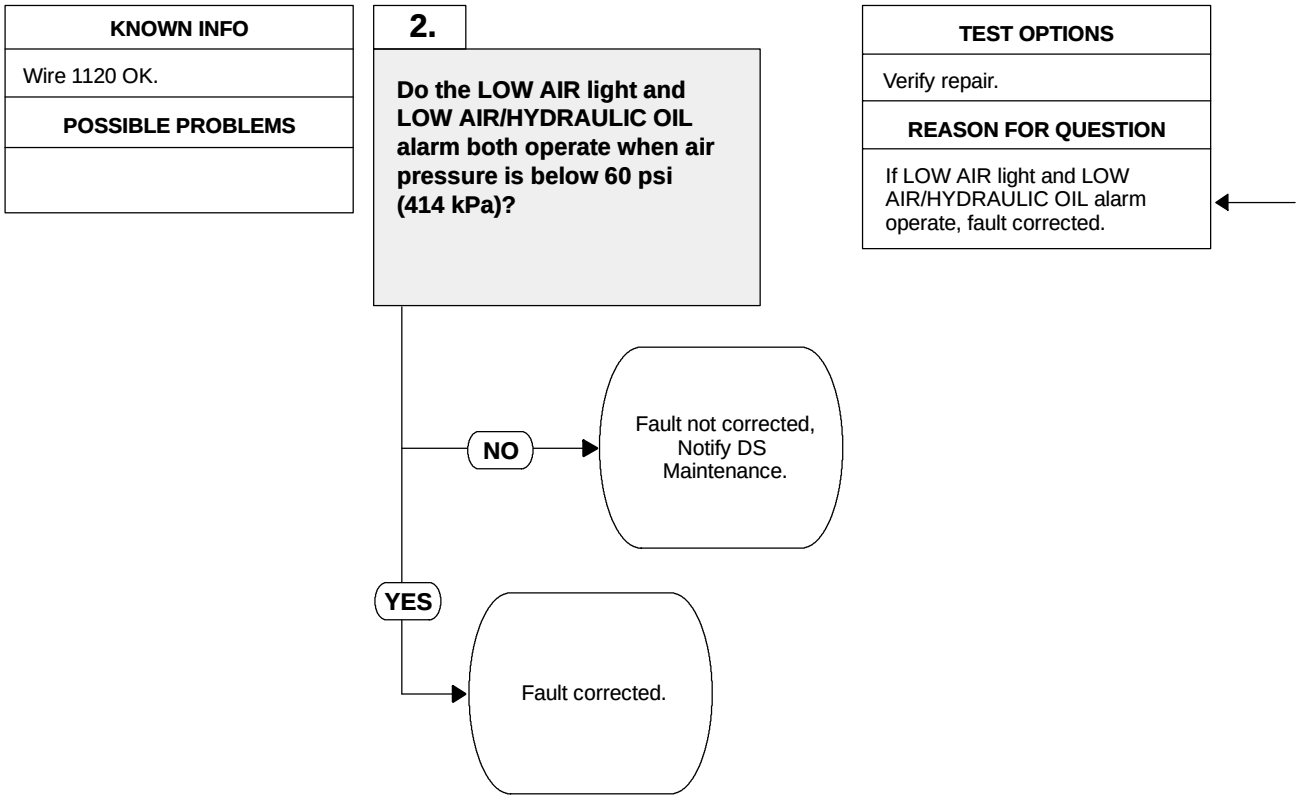
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may result.

CONTINUITY TEST

(1) Remove ten screws and sunshield from instrument panel.
(2) Pull top of instrument panel (2) towards steering wheel (3).
(3) Remove LOW AIR lamp.
(4) Disconnect wire 1120 from one of the two low air switches.
(5) Is continuity measured on wire 1120 between LOW AIR lamp socket and low air switch?
    (a) If there is no continuity, repair wire 1120 (see schematic Fig 2-28) or notify DS Maintenance. Verify repair, go to Step 2 of this Fault.
    (b) If there is continuity, perform Steps (6) through (8) below and go to Step 2 of this Fault.
(6) Connect wire 1120 to low air switch.
(7) Install LOW AIR lamp.
(8) Install instrument panel and sunshield with ten screws.



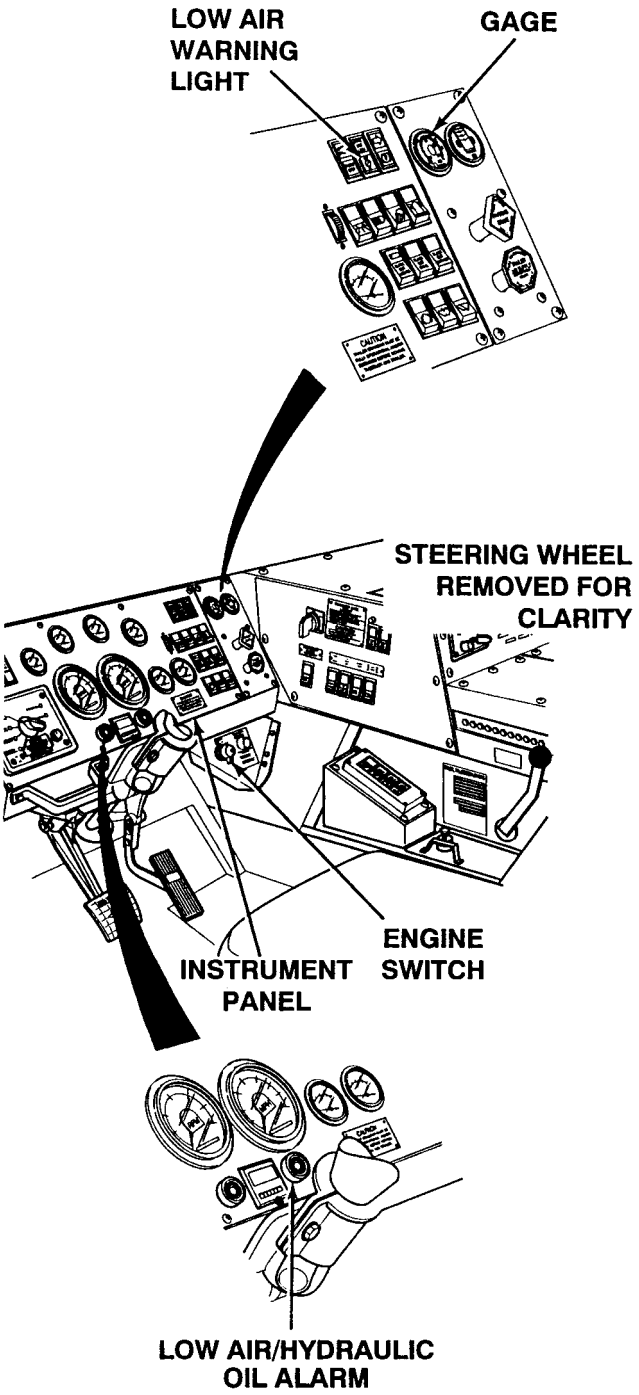
48. LOW AIR LIGHT AND LOW AIR/HYDRAULIC OIL ALARM DO NOT OPERATE (CONT).



NOTE

Do not perform Step (1) below if air pressure gage indicates less than 60 psi (414 kPa).

VERIFY REPAIR
(1) Bleed air system pressure until green and red needles in gage are below 60 psi (414 kPa) (TM 9-2320-364-10). (2) Turn ON ENGINE switch. (a) If LOW AIR light and LOW AIR/HYDRAULIC OIL alarm do not operate, fault not corrected. Notify DS Maintenance. (b) If LOW AIR and LOW AIR/HYDRAULIC OIL alarm operate, fault corrected. (3) Turn OFF ENGINE switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS.

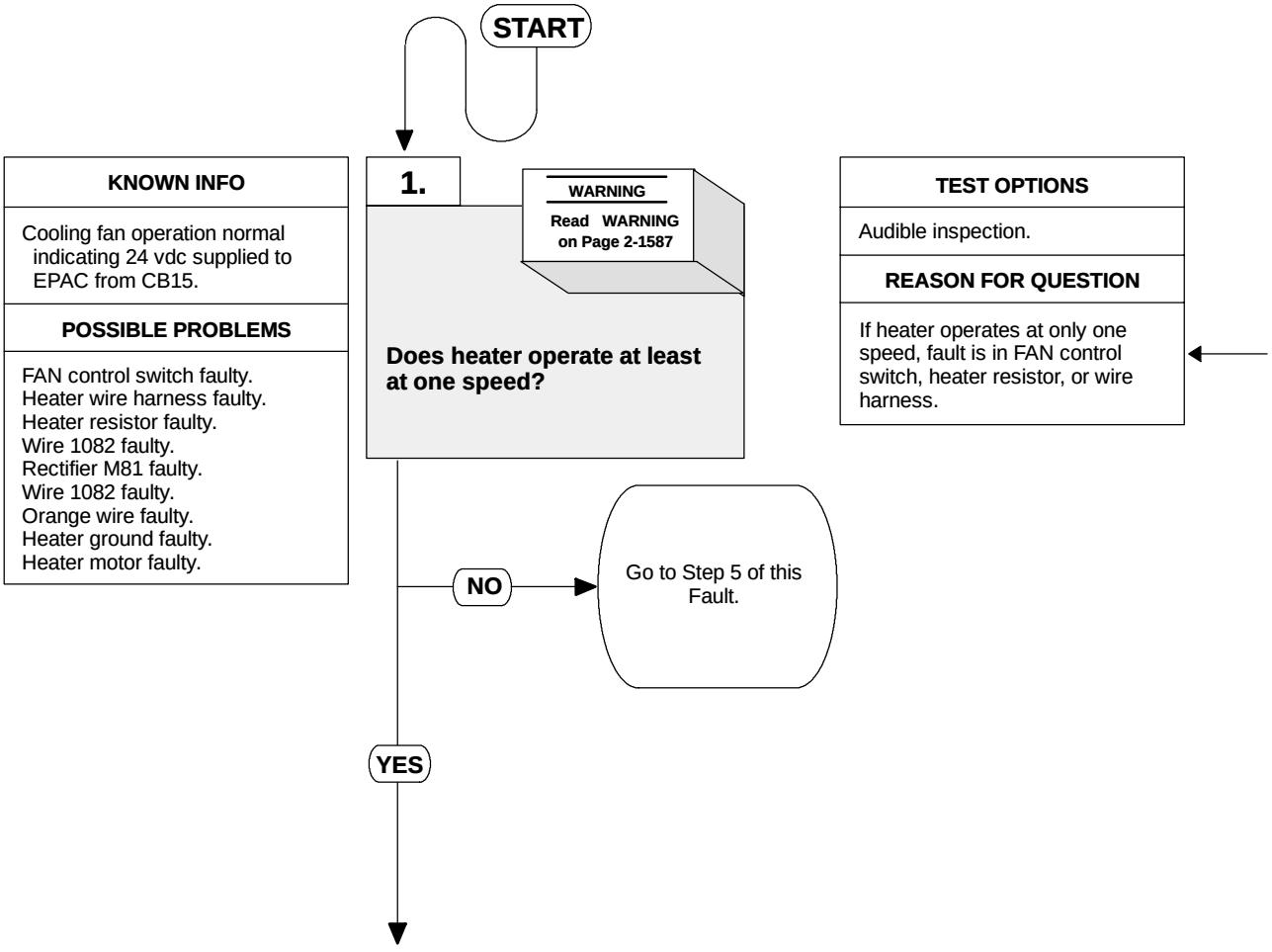
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Lockwasher (6) (Item 182, Appendix F)

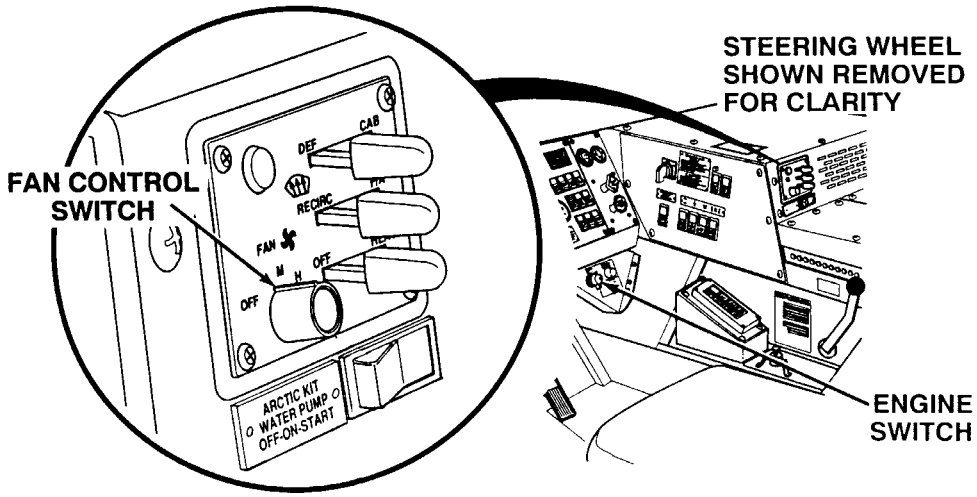
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



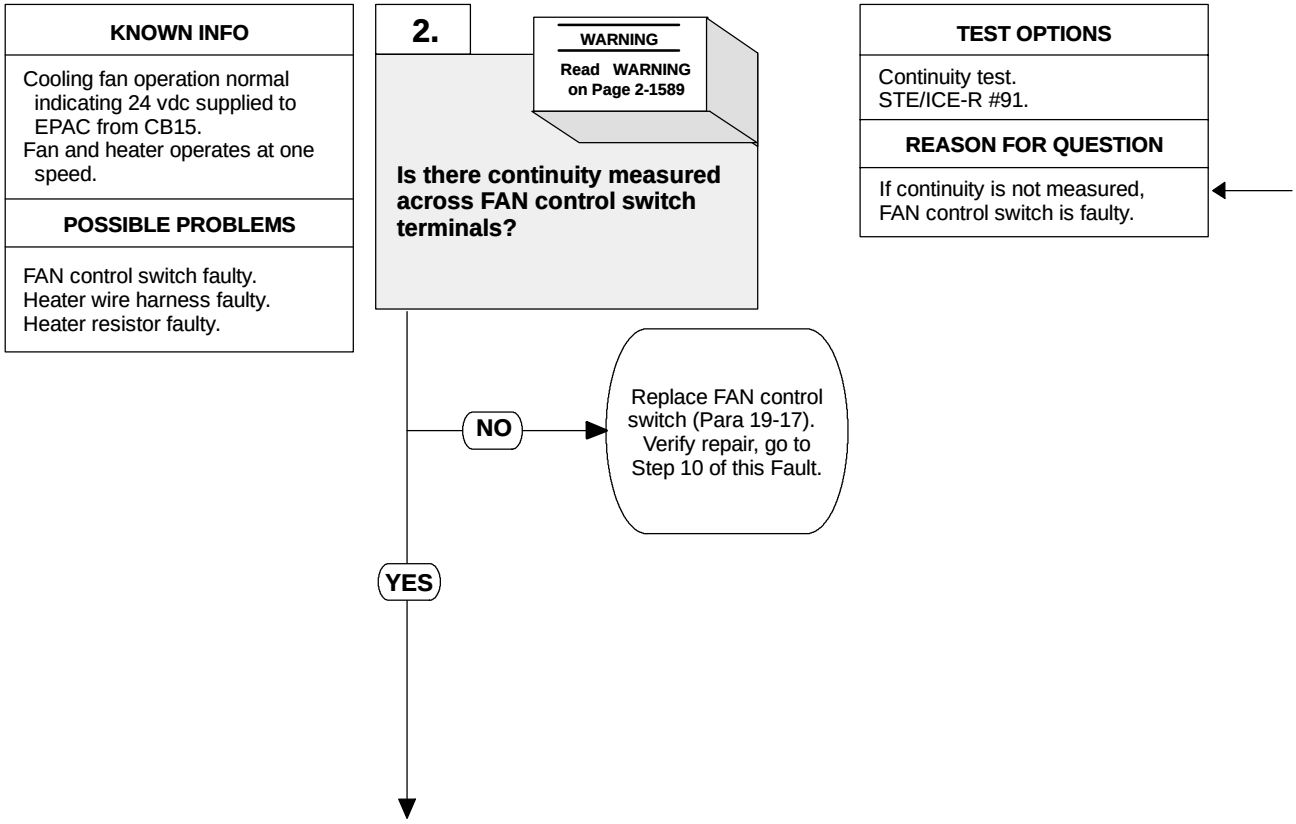
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



OPERATION TEST
(1) Turn ON ENGINE switch (TM 9-2320-364-10). (2) Set FAN control switch to L (low), M (medium), and H (high) and listen to fan. (a) If fan does not operate at least at one speed, go to Step 5 of this Fault. (b) If fan operates at least at one speed, turn off engine switch and go to Step 2 of this Fault.

49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS (CONT).

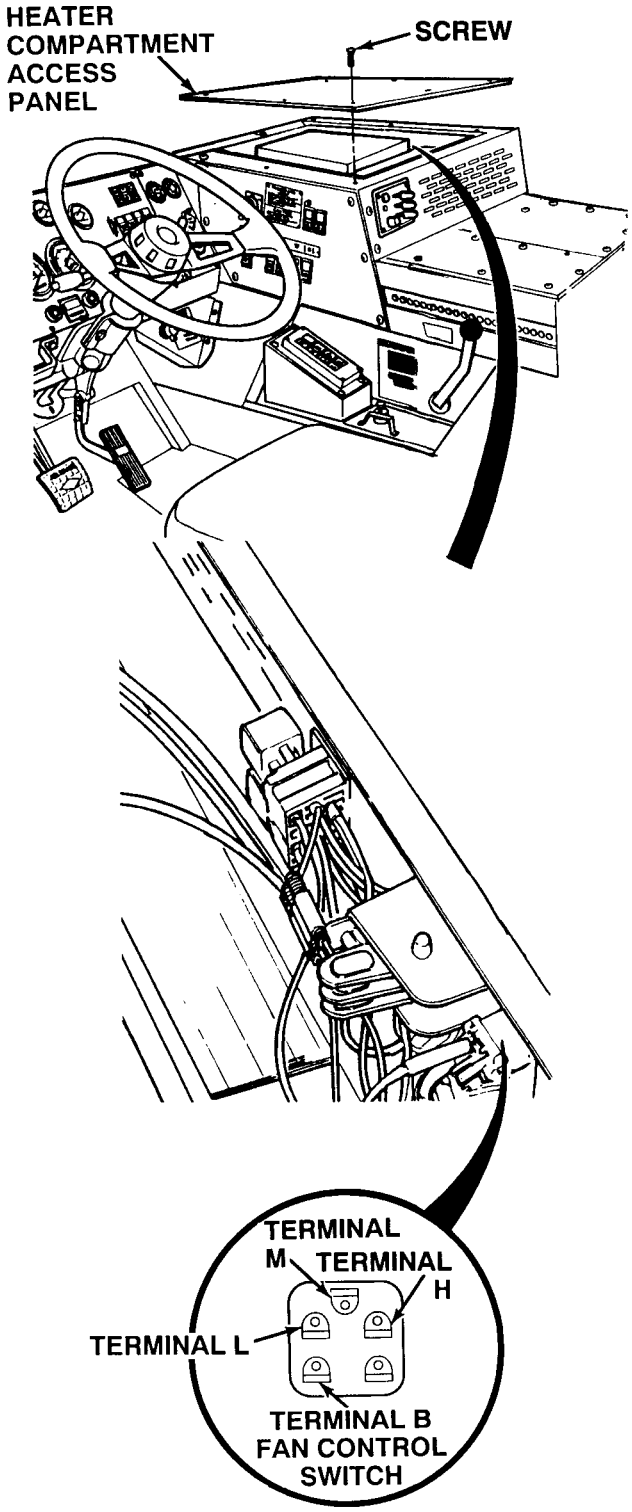


WARNING

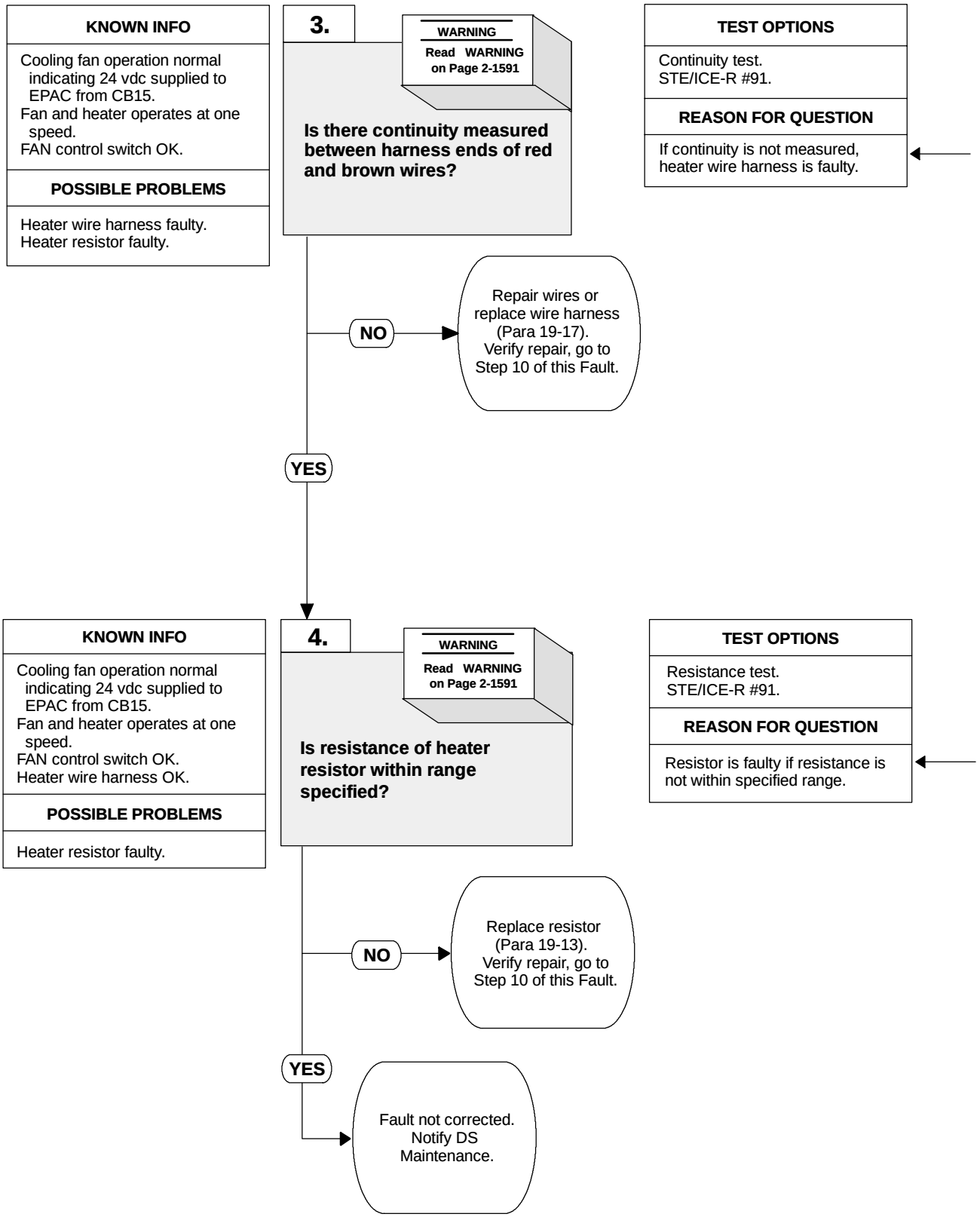
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove eight screws and heater compartment access panel.
(2) Tag, mark and remove wires from FAN control switch.
(3) Set multimeter select switch to ohms.
(4) Is there continuity across terminals B and L with FAN control switch in L (low), across B and M with FAN control switch in M (medium) and across B and H with FAN control switch in H (high)?
    (a) If there is no continuity across all terminals, replace FAN control switch (Para 19-17).
    (b) If there is continuity across all terminals, FAN control switch is OK.



49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS (CONT).



WARNING

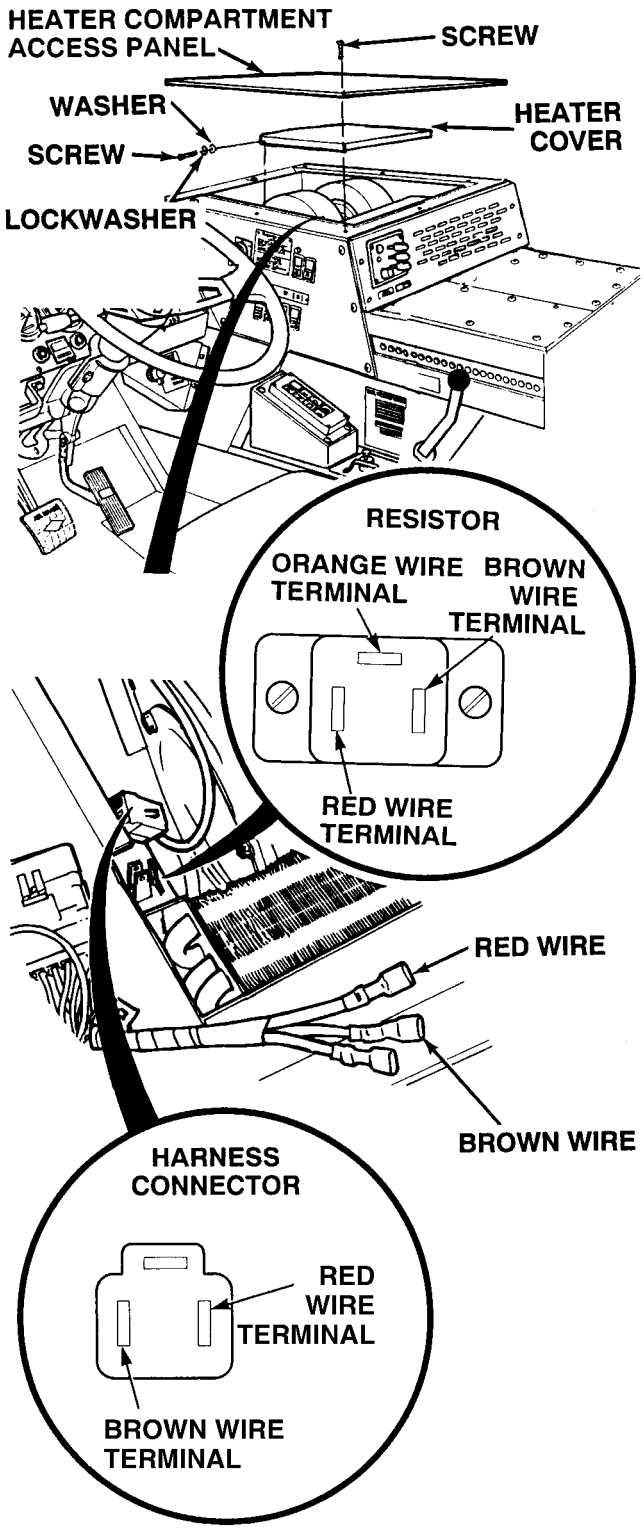
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

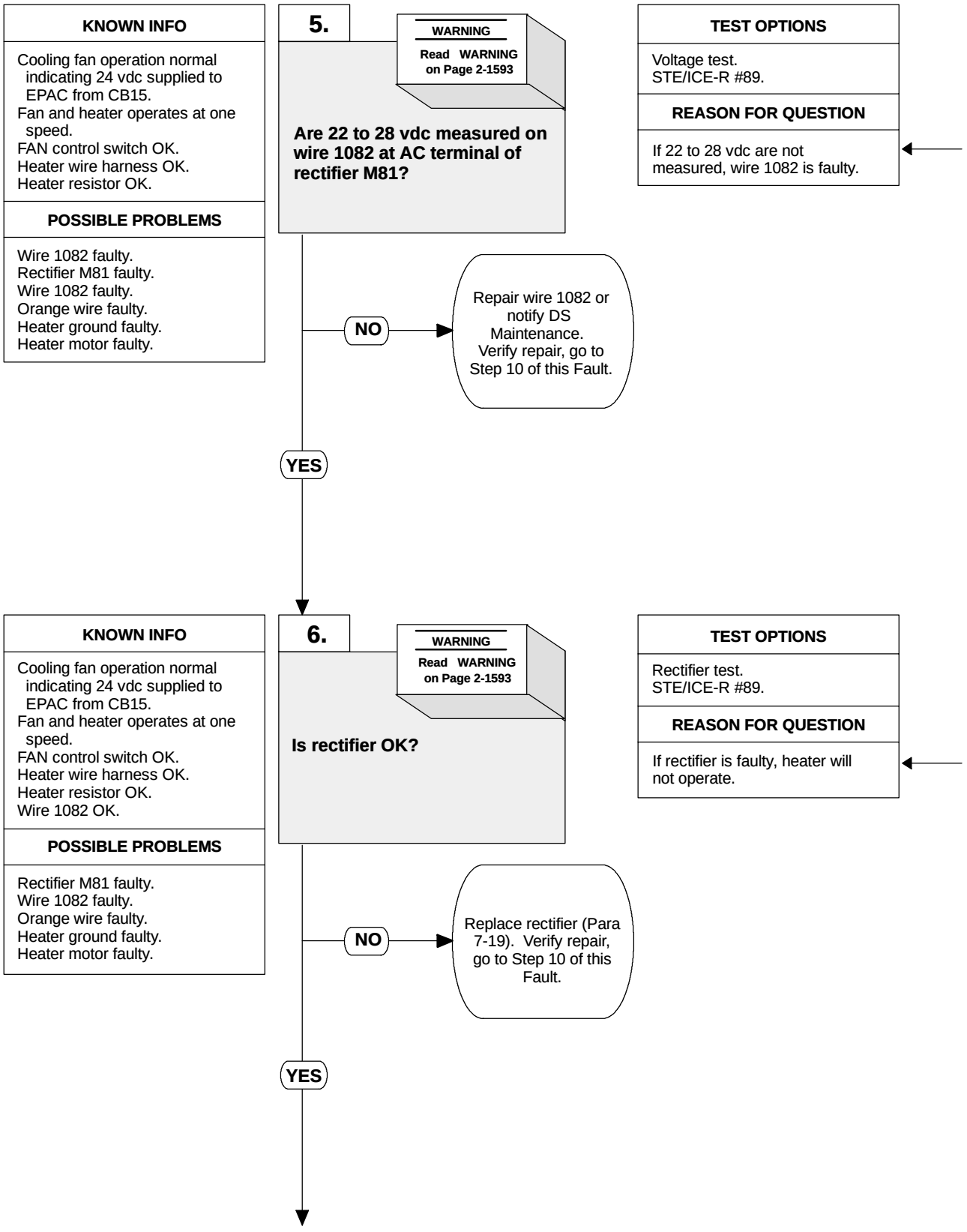
(1) Remove six screws, lockwashers, washers and heater cover. Discard lockwashers.
(2) Disconnect harness connector at resistor.
(3) Is there continuity measured between FAN control switch and harness ends of red and brown wires?
  (a) If there is no continuity, repair wires or replace heater wire harness (Para 19-17).
  (b) If there is continuity, heater wire harness is OK.
(4) Connect harness wires to heater switch.

RESISTANCE TEST

(1) Read resistance between orange wire terminal and red wire terminal of heater resistor.
  (a) If 4 to 5 ohms are not measured, replace resistor (Para 19-13).
  (b) If 4 to 5 ohms are measured, go to Step (2) below.
(2) Read resistance between orange wire terminal and brown wire terminal of heater resistor.
  (a) If 1 to 2 ohms are not measured, replace resistor (Para 19-13).
  (b) If 1 to 2 ohms are measured, resistor is OK. Notify DS Maintenance
(3) Connect harness connector to resistor.
(4) Install heater cover, six washers, lockwashers and screws.
(5) Install heater compartment access cover and eight screws.



49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS (CONT).



WARNING

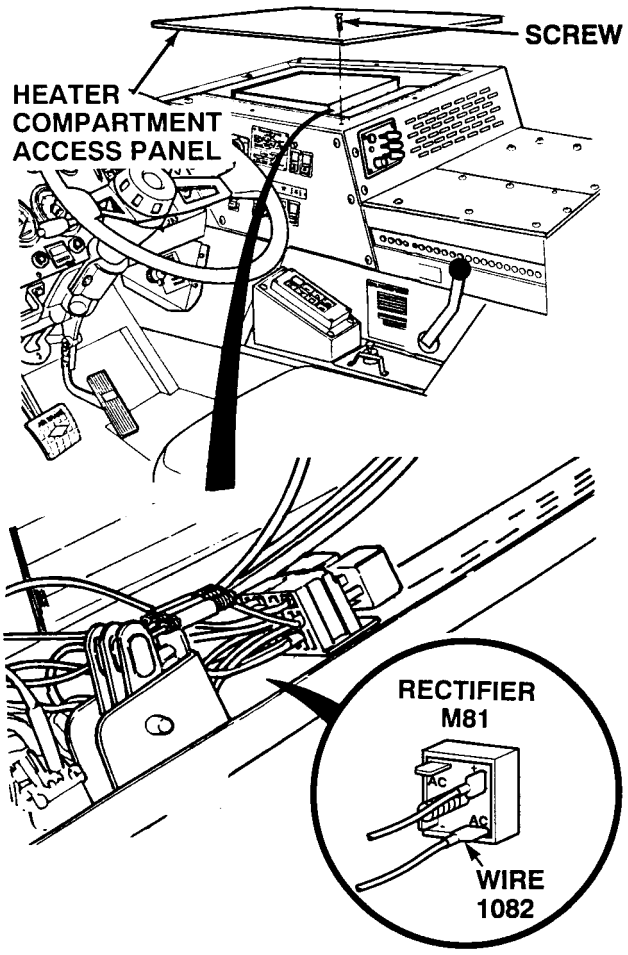
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

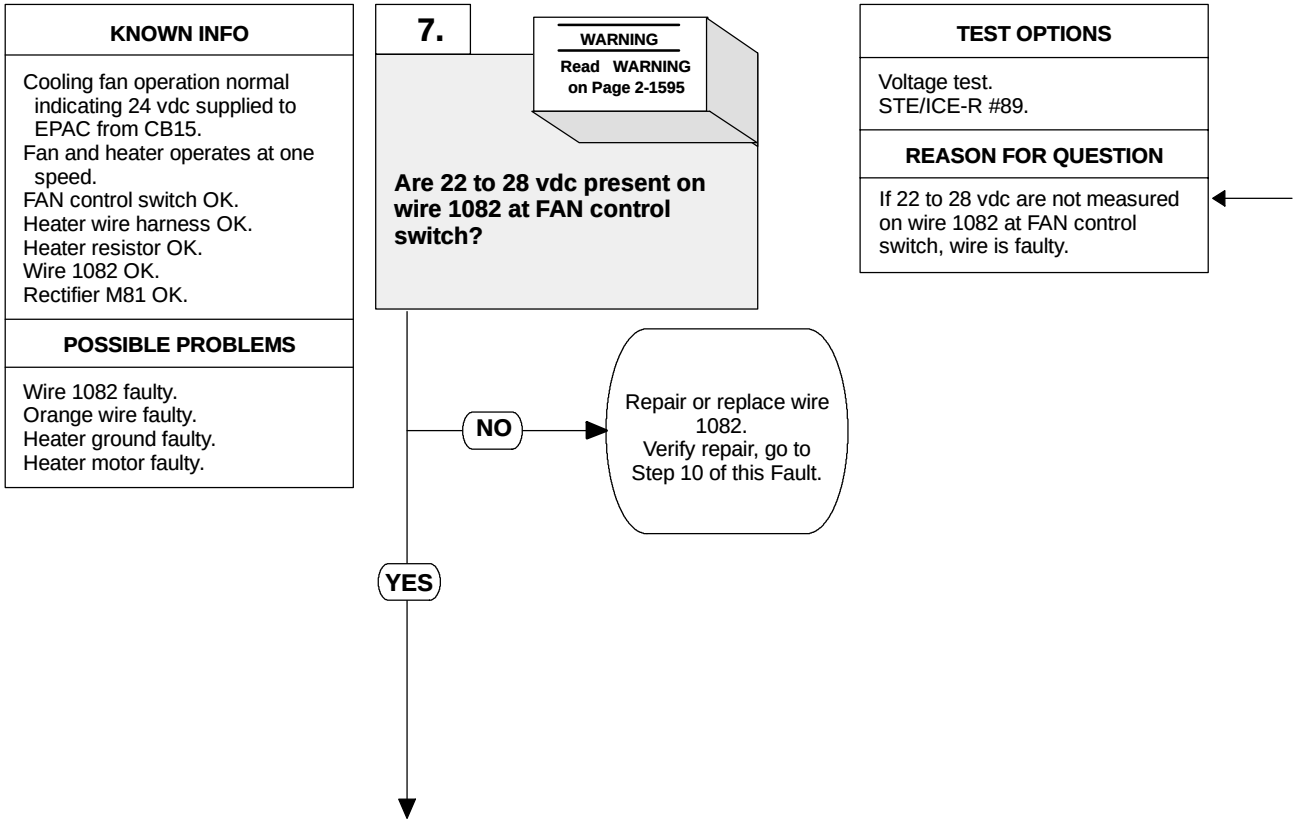
(1) Remove eight screws and heater compartment access panel.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1082 at AC terminal of rectifier.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, perform Step (6) below and repair wire 1082 or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1082 is OK.
(6) Turn OFF ENGINE switch.

RECTIFIER TEST

(1) Tag, mark and remove wires from rectifier M81.
(2) Set multimeter select switch to diode check.
(3) Connect positive (+) multimeter lead to rectifier negative terminal.
(4) Connect negative (–) multimeter lead to rectifier AC terminals one at a time.
  (a) If any vdc are not present, replace rectifier (Para 7-19).
  (b) If any vdc are present, go to Step (5) below.
(5) Connect negative (–) multimeter lead to rectifier positive terminal.
(6) Connect positive (+) multimeter lead to rectifier AC terminals one at a time.
  (a) If any vdc are not present, replace rectifier (Para 7-19).
  (b) If any vdc are present, rectifier is OK.
(7) Connect wires to rectifier.

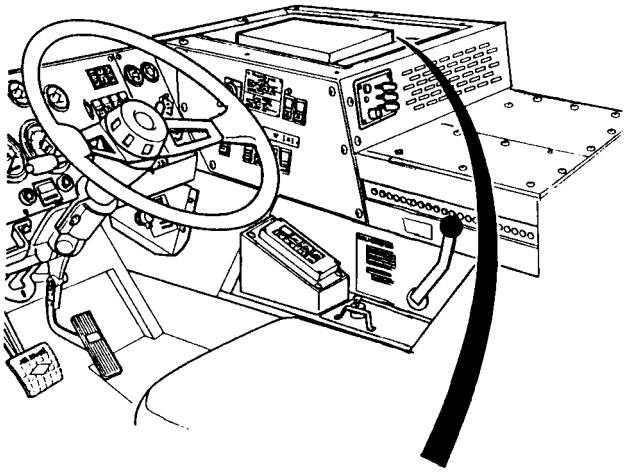


49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS (CONT).



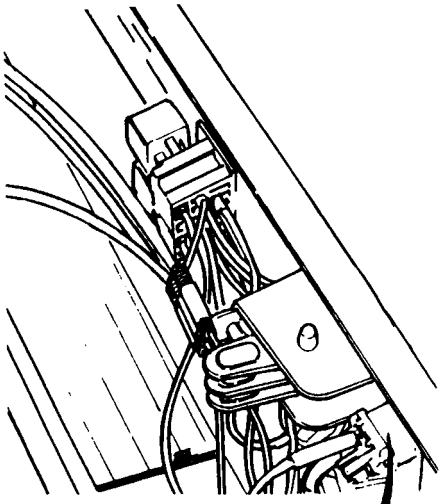
WARNING

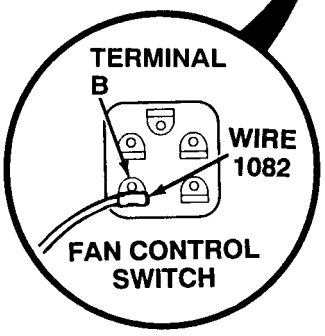
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



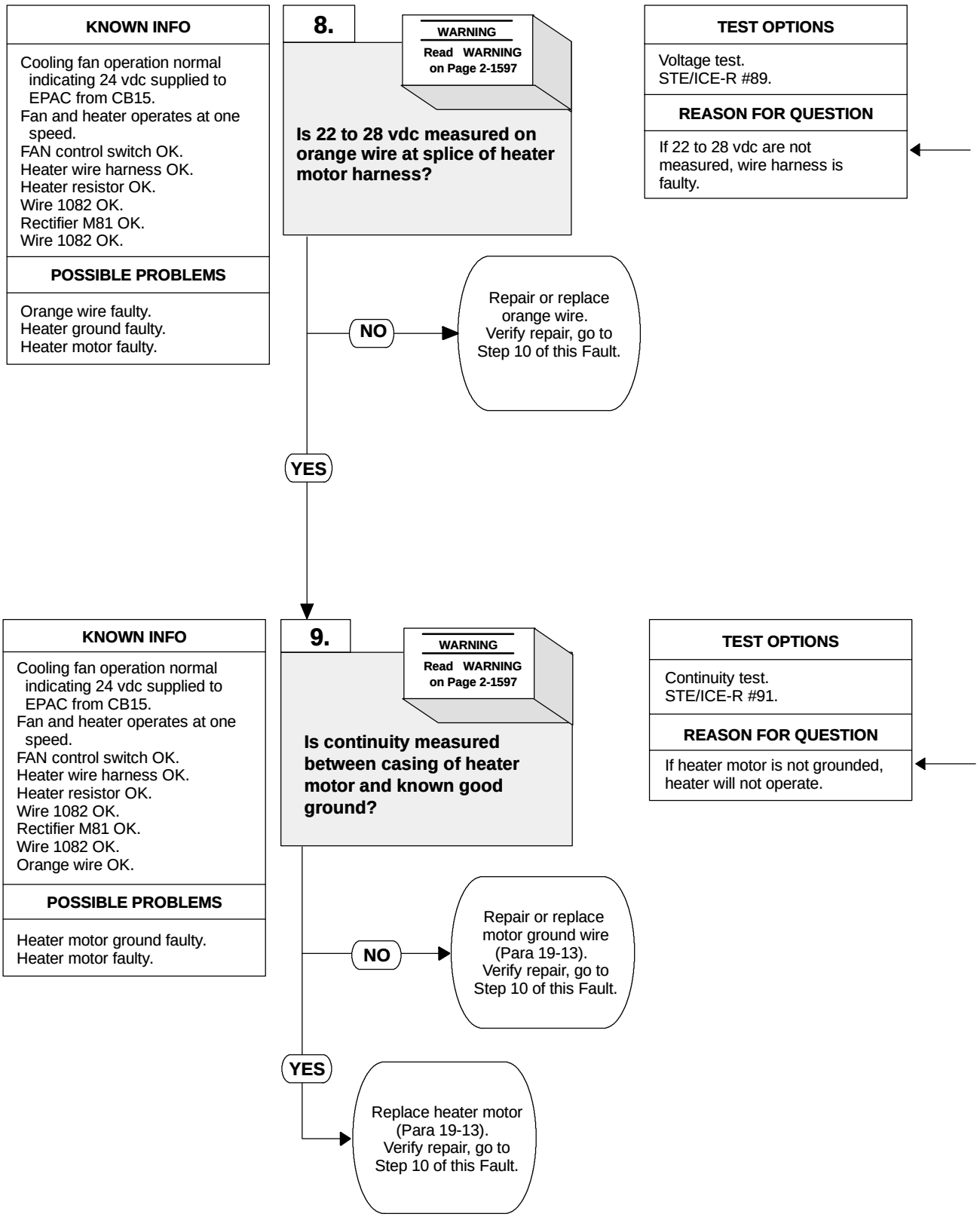
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1082 at FAN control switch terminal B.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
    (a) If 22 to 28 vdc are not present, perform Step (5) below and repair or replace wire 1082.
    (b) If 22 to 28 vdc are present, wire 1082 is OK.
(5) Turn OFF ENGINE switch.





49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS (CONT).



WARNING

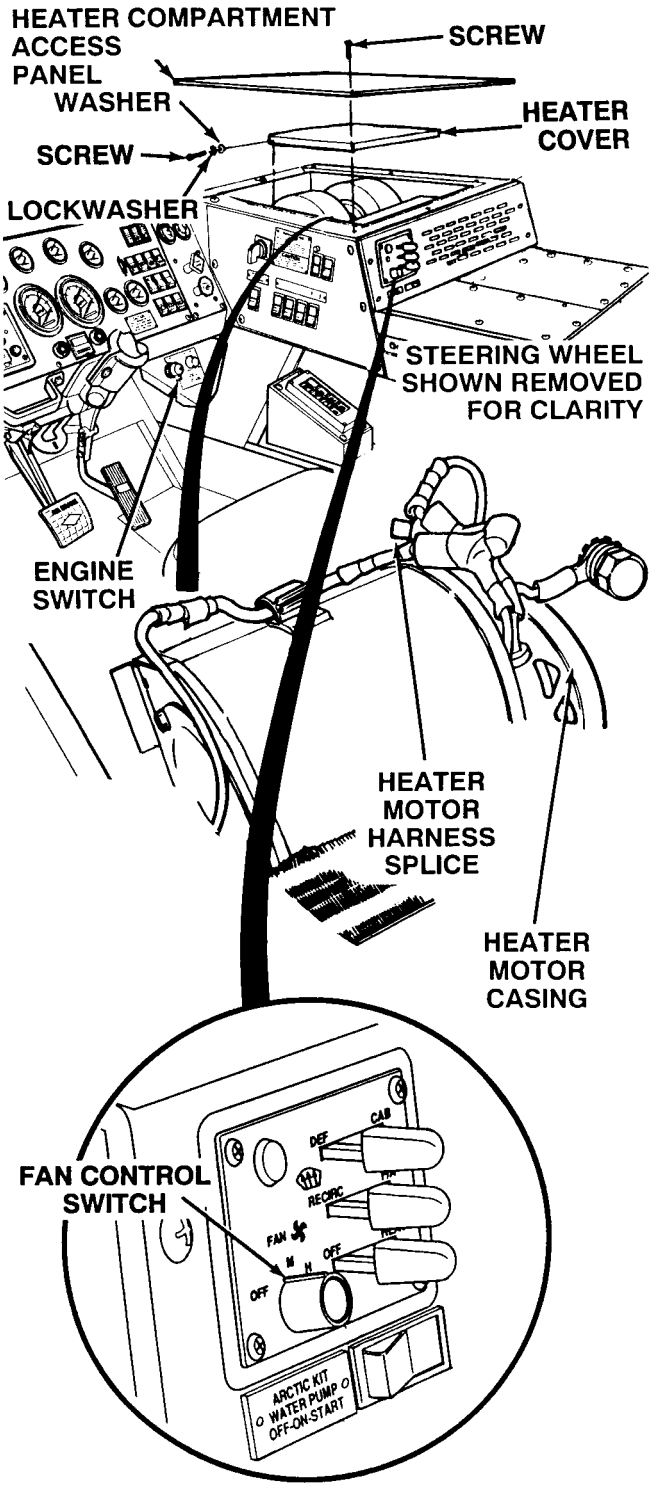
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

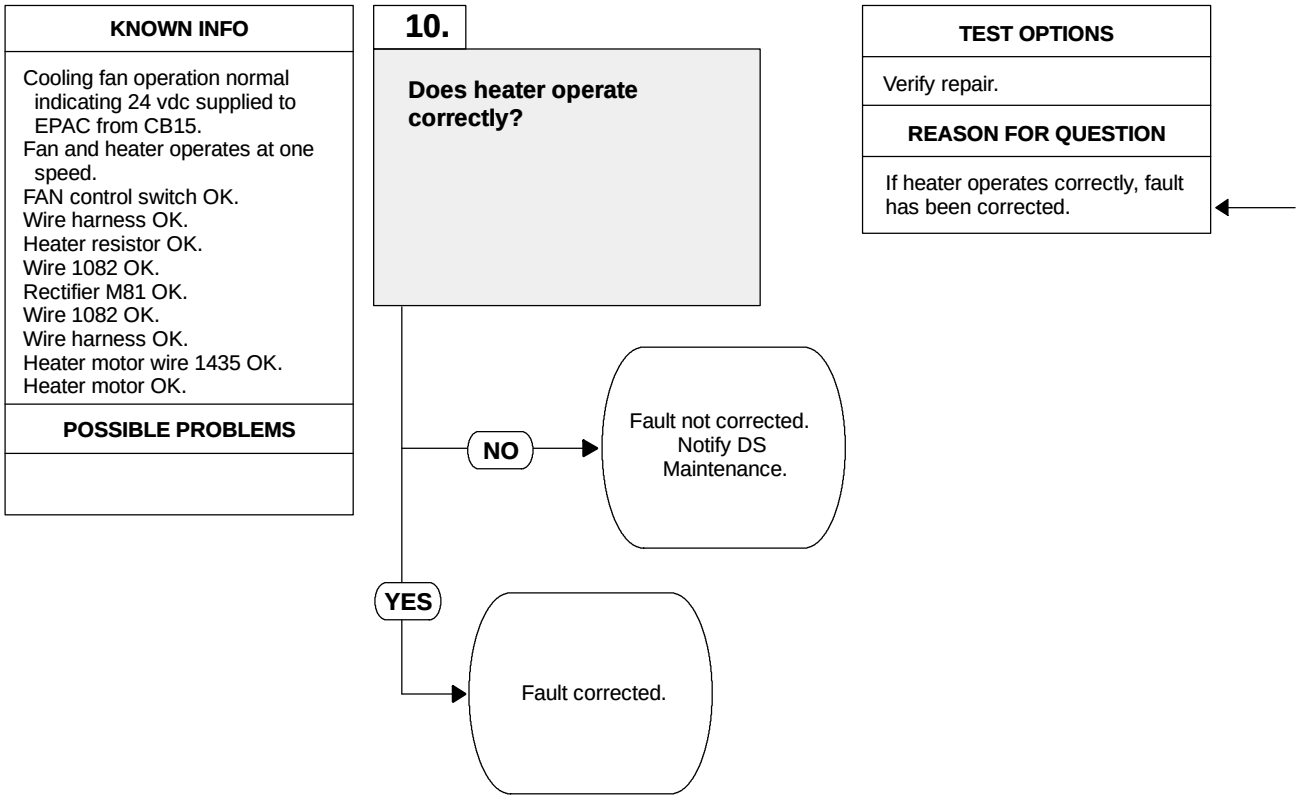
(1) Remove six screws, lockwashers, washers and heater cover. Discard lockwashers.
(2) Connect positive (+) multimeter lead to orange wire at heater motor harness splice.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE switch (TM 9-2320-364-10).
(5) Turn fan control switch to high.
  (a) If 22 to 28 vdc are not present, perform Step (5) below and repair or replace orange wire.
  (b) If 22 to 28 vdc are present, orange wire is OK.
(6) Turn off fan control switch.
(7) Turn OFF ENGINE switch.

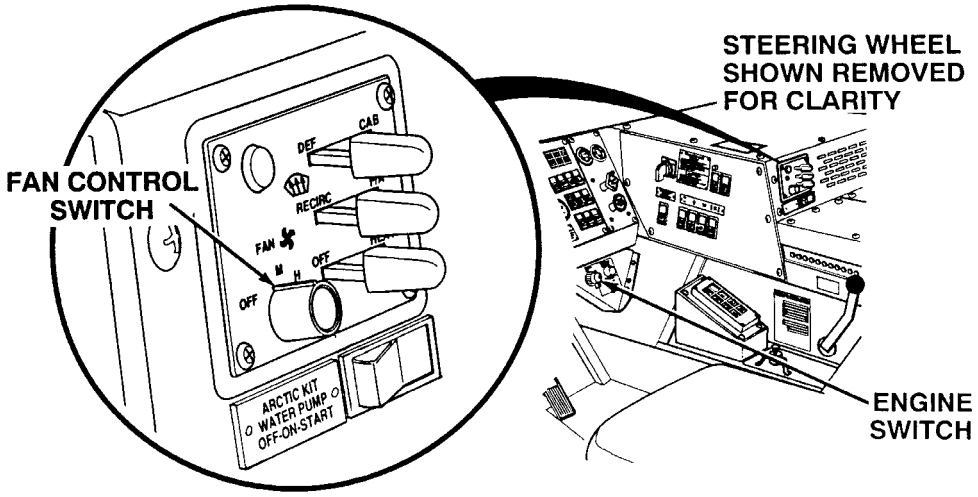
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity measured between heater motor casing and known good ground?
  (a) If there is no continuity, repair or replace ground wire (Para 19-13).
  (b) If there is continuity, replace heater motor (Para 19-13).
(3) Install heater cover, six washers, lockwashers and screws.
(4) Install heater compartment panel and eight screws.



49. HEATER DOES NOT OPERATE OR WILL NOT CHANGE SPEEDS (CONT).





VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Set FAN control switch to L (Low), M (Medium), and H (High) and listen to fan.
  (a) If heater does not operate, fault not corrected. Perform Steps (3) and (4) below and notify DS Maintenance.
  (b) If heater does operate, fault corrected.
(3) Turn OFF FAN control switch.
(4) Turn OFF ENGINE switch.

2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP).

INITIAL SETUP

Tools and Special Tools
- Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
- STE/ICE-R (Optional) (Item 3, Appendix G)
- Gage, Belt Tension (Item 26, Appendix G)
- Multimeter (Item 44, Appendix G)
- Jumperwire

Materials/Parts
- Tag, Identification (Item 88, Appendix C)
- Lockwasher (2) (Item 149, Appendix F)
- Lockwasher (28) (Item 171, Appendix F)
- Lockwasher (2) (Item 193, Appendix F)
- Lockwasher (Item 198, Appendix F)

References
- TM 9-2320-364-10
- TM 9-4910-571-12&P

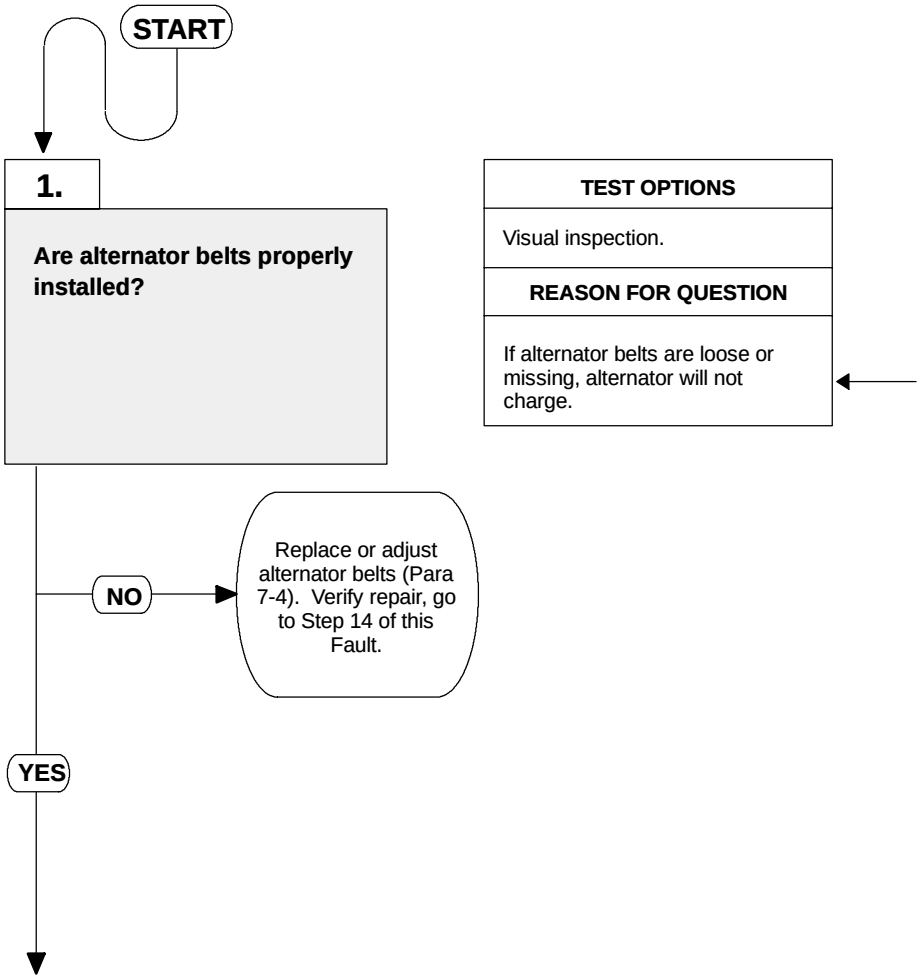
Equipment Condition
- Engine OFF, (TM 9-2320-364-10)
- Parking brake applied, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)

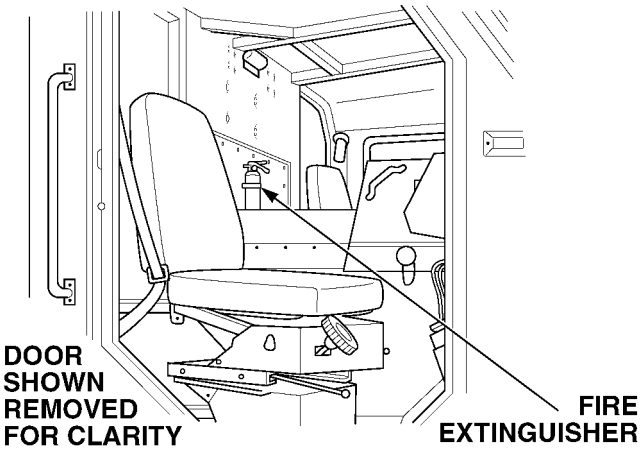
KNOWN INFO

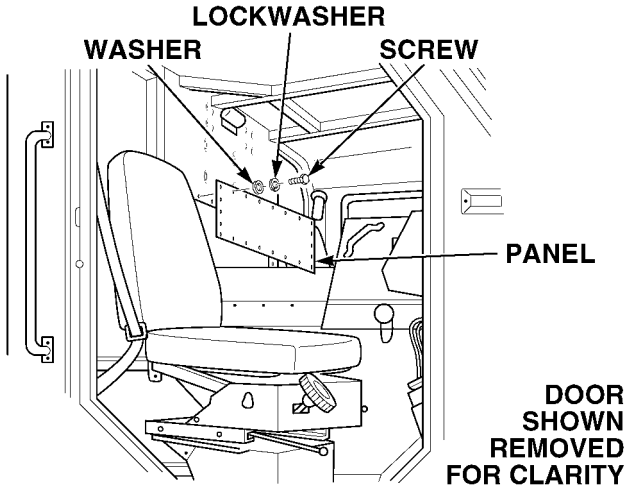
Both voltmeters indicate low charge.
Batteries OK.
Fuel pump operates indicating 24 vdc present at DUVAC controller IGN terminal.

POSSIBLE PROBLEMS

Alternator belts loose or missing.
DUVAC controller faulty.
Wire 1278 between alternator positive (+) terminal and DUVAC (A) terminal faulty.
Wire 1275 from alternator negative (-) terminal to battery negative faulty.
Jumperwire from alternator field coil negative terminal to alternator negative (-) terminal faulty.
Alternator faulty.
Wire 1344 between alternator and regulator faulty.
Wire 1274 between DUVAC controller and batteries faulty.
Brown wire between DUVAC controller and regulator faulty.
Wire 1435 between DUVAC controller and ground faulty.
Black wire between regulator and ground faulty.
Red wire between DUVAC controller and regulator faulty.
Orange wire between DUVAC controller and regulator faulty.
Regulator faulty.

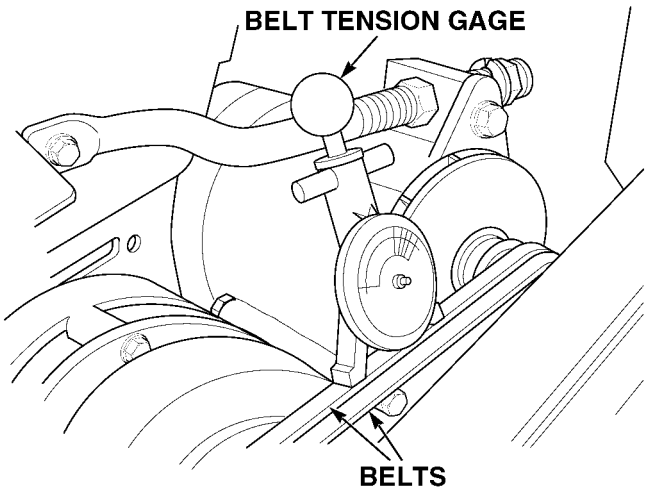






VISUAL INSPECTION

(1) Remove fire extinguisher (TM 9-2320-364-10).
(2) Remove 22 screws, lockwashers, washers and cab engine access panel from cab. Discard lockwashers.
(3) Inspect that both belts are installed and are in good condition.
  (a) If both belts are not installed or are not in good condition, install new belts (Para 7-4).
  (b) If both belts are installed and are in good condition, perform Step (4) below.
(4) Install belt tension gage on each belt. Belt tension gage must read between 55 to 65 lbs (245-289 N).
  (a) If belt tension gage does not measure between 55 to 65 lbs (245-289 N), adjust alternator belts (Para 7-4).
  (b) If belt tension gage does measure between 55 to 65 lbs (245-289 N), go to Step 2 of this Fault.



50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).

KNOWN INFO

Both voltmeters indicate low charge.
Batteries OK.
Fuel pump operates indicating 24 vdc present at DUVAC controller IGN terminal.
Alternator belts OK.

POSSIBLE PROBLEMS

DUVAC controller faulty.
Wire 1278 between alternator positive (+) terminal and DUVAC terminal A faulty.
Wire 1275 from alternator negative (–) terminal to battery negative faulty.
Jumperwire from alternator field coil negative terminal to alternator negative (–) terminal faulty.
Alternator faulty.
Wire 1344 between alternator and regulator faulty.
Wire 1274 between DUVAC controller and batteries faulty.
Brown wire between DUVAC controller and regulator faulty.
Wire 1435 between DUVAC controller and ground faulty.
Black wire between regulator and ground faulty.
Red wire between DUVAC controller and regulator faulty.
Orange wire between DUVAC controller and regulator faulty.
Regulator faulty.

2.

WARNING

Read WARNING on Page 2-1603

Is continuity measured between terminal A of DUVAC controller and a known good ground?

NO → Go to Step 3 of this Fault.

YES → Replace DUVAC controller (Para 7-9). Verify repair, go to Step 14 of this Fault.

TEST OPTIONS

Continuity test.
STE/ICE-R #91.

REASON FOR QUESTION

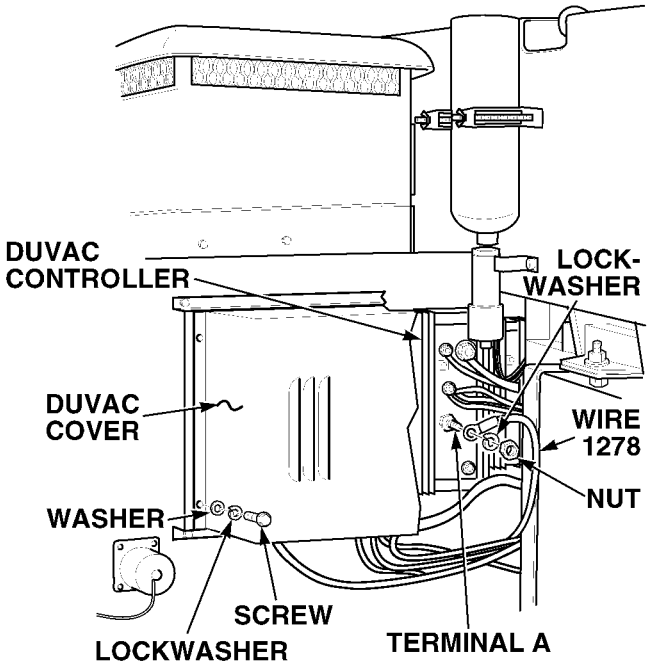
If continuity is measured, then terminal A of DUVAC is shorted to ground and batteries will not charge.

WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure DUVAC cover does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

(1) Remove four screws, lockwashers, washers and DUVAC cover. Discard lockwashers.
(2) Remove nut, lockwasher and wire 1278 from terminal A of DUVAC controller. Discard lockwasher.
(3) Set multimeter select switch to ohms.
(4) Is there continuity measured on terminal A of DUVAC controller and a known good ground?
    (a) If there is no continuity, DUVAC controller is OK.
    (b) If there is continuity, replace DUVAC controller (Para 7-9).
(5) Install wire 1278 on A terminal of DUVAC controller with lockwasher and nut.



50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).

KNOWN INFO

Both voltmeters indicate low charge.
Batteries OK.
Fuel pump operates indicating 24 vdc present at DUVAC controller IGN terminal.
Alternator belts OK.
DUVAC controller OK.

POSSIBLE PROBLEMS

Wire 1278 between alternator positive (+) terminal and DUVAC terminal A faulty.
Wire 1275 from alternator negative (-) terminal to battery negative faulty.
Jumperwire from alternator field coil negative terminal to alternator negative (-) terminal faulty.
Alternator faulty.
Wire 1344 between alternator and regulator faulty.
Wire 1435 faulty between DUVAC controller and ground.
Brown wire between DUVAC controller and regulator faulty.
Black wire between regulator and ground faulty.
Wire 1274 between DUVAC controller and batteries faulty.
Red wire between DUVAC controller and regulator faulty.
Orange wire between DUVAC controller and regulator faulty.
Regulator faulty.

3.

WARNING
Read WARNING on Page 2-1605

Are at least 26 vdc measured at positive (+) terminal of alternator while charging in the 24 vdc mode?

NO → Go to Step 4 of this Fault.

YES → Repair wire 1278 (see schematic Fig 2-39) or notify DS Maintenance. Verify repair, go to Step 14 of this Fault.

TEST OPTIONS

Voltage test.
STE/ICE-R #89.

REASON FOR QUESTION

If at least 26 vdc are measured at alternator positive terminal, wire 1278 is faulty.

WARNING

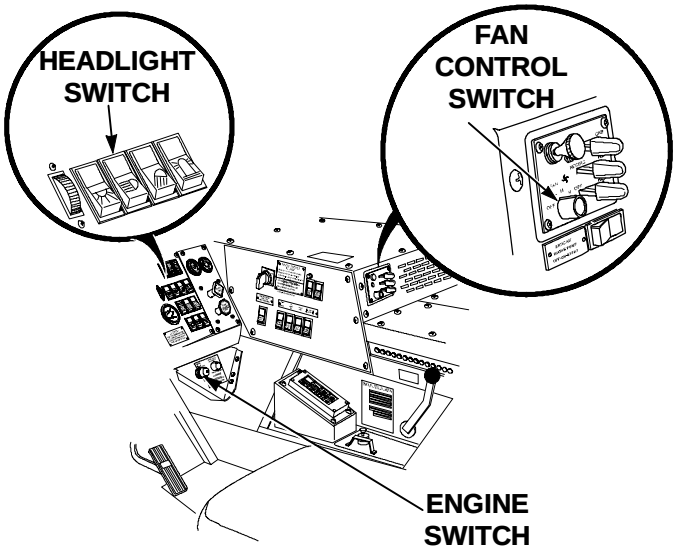
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.

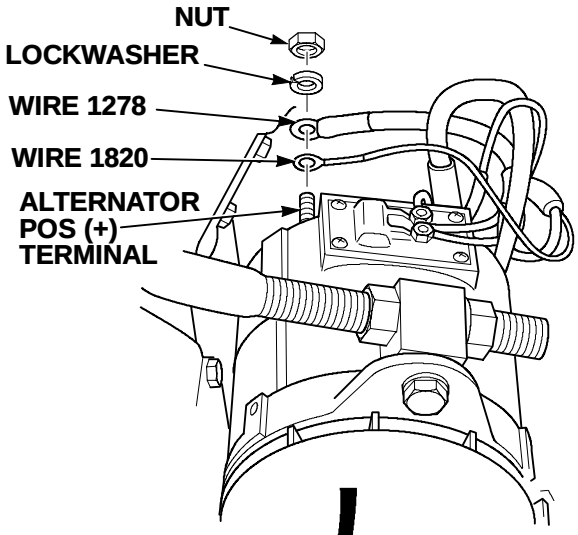
NOTE

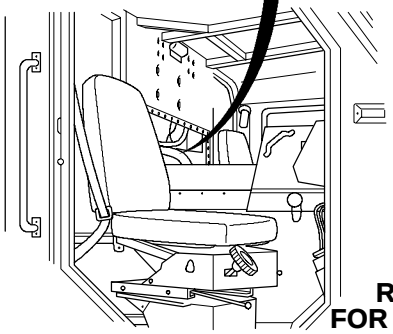
- DUVAC controller resets to the 24 vdc charge mode approximately every 55 seconds. Take the voltage reading for at least a minute to make sure voltage reading is taken during the 24 vdc charge mode.
- Tag and mark all wires prior to removal.

VOLTAGE TEST

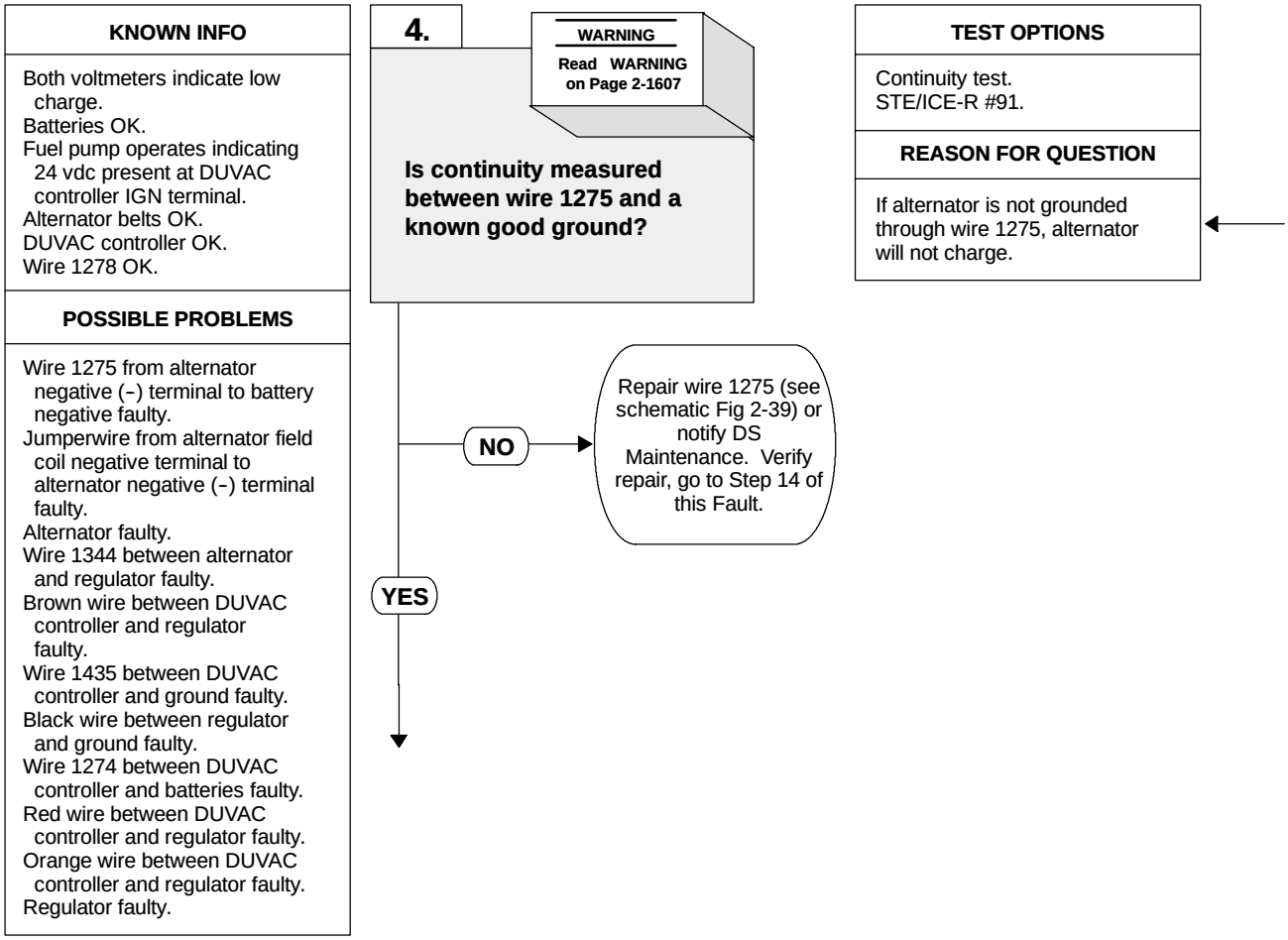
(1) Remove nut, lockwasher and wires 1820 and 1278 from alternator positive terminal. Discard lockwasher.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to the positive (+) terminal of the alternator.
(4) Connect negative (–) multimeter lead to known good ground.
(5) Start engine and turn on headlights and heater (TM 9-2320-364-10).
  (a) If at least 26 vdc are not present, turn off heater, headlights and engine and go to Step 4 of this Fault.
  (b) If at least 26 vdc are present, turn off heater, headlights and engine. Repair wire 1278 (see schematic Fig 2-39) or notify DS Maintenance.
(6) Install wires 1278 and 1820 on alternator positive (+) terminal with lockwasher and nut.







50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

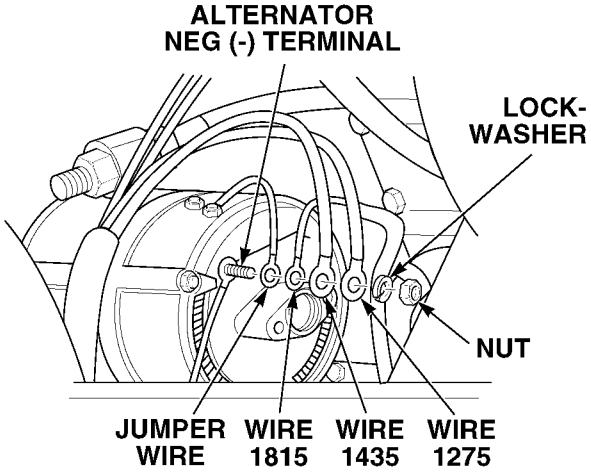
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

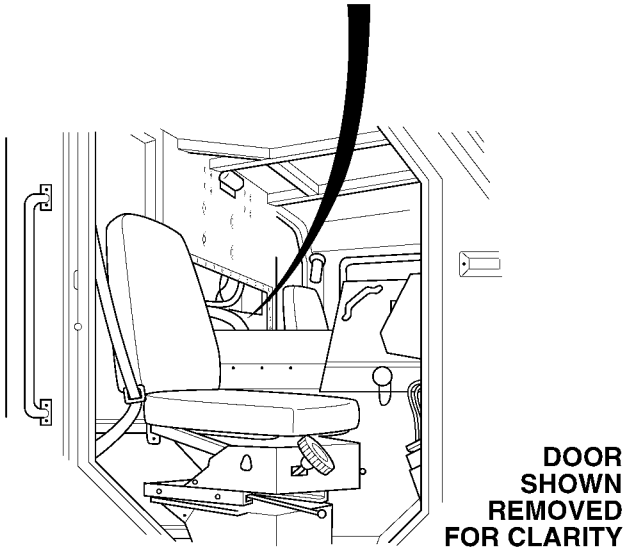
NOTE

Tag and mark wires before removal.

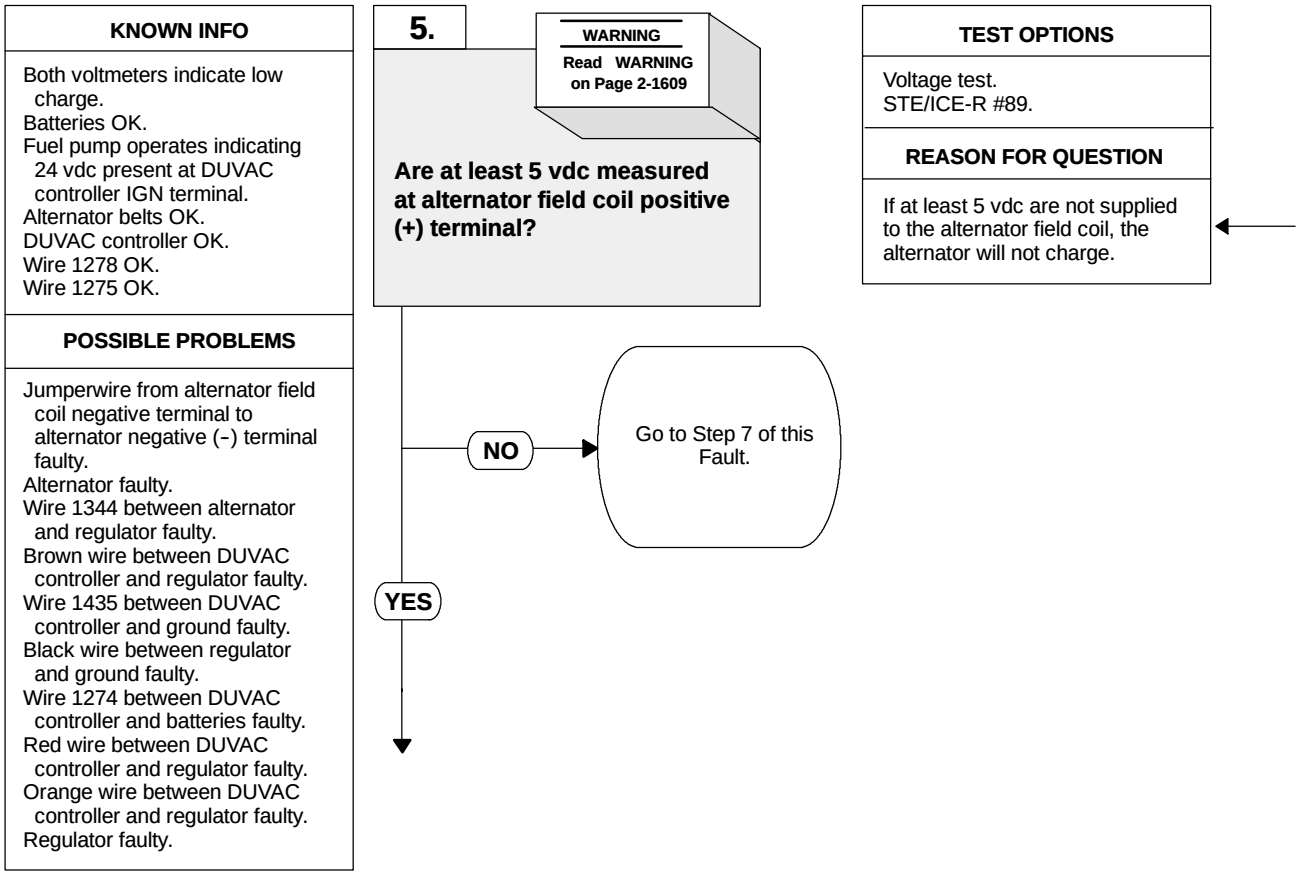
CONTINUITY TEST

(1) Remove nut, lockwasher and wires 1275, 1435, 1815, and jumperwire from alternator negative (-) terminal. Discard lockwasher.
(2) Set multimeter select switch to ohms.
(3) Is there continuity measured on wire 1275 and a known good ground?
  (a) If there is no continuity, repair wire 1275 (see schematic Fig 2-39) or notify DS Maintenance.
  (b) If there is continuity, wire 1275 is OK.
(4) Install wires 1275, 1815, 1435, and jumperwire on alternator negative (-) terminal with lockwasher and nut.





50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).

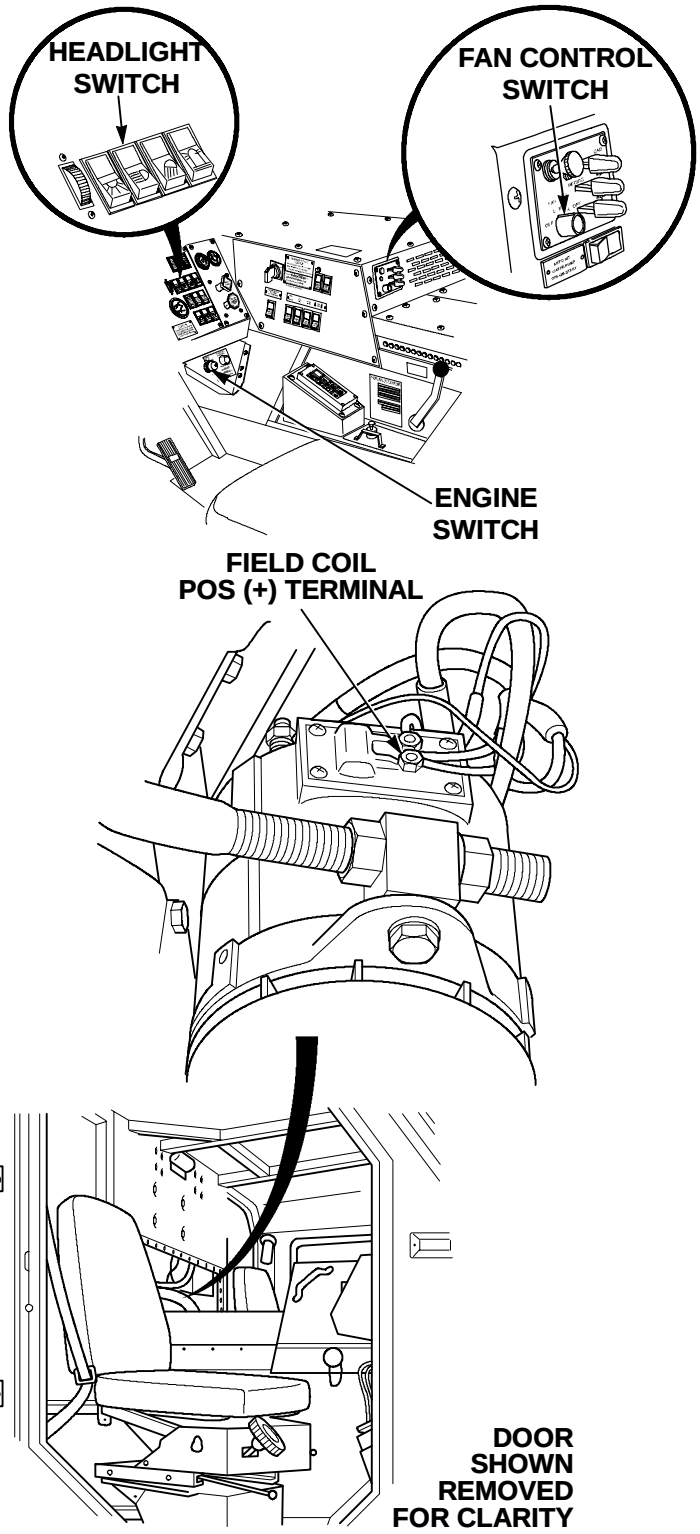


WARNING

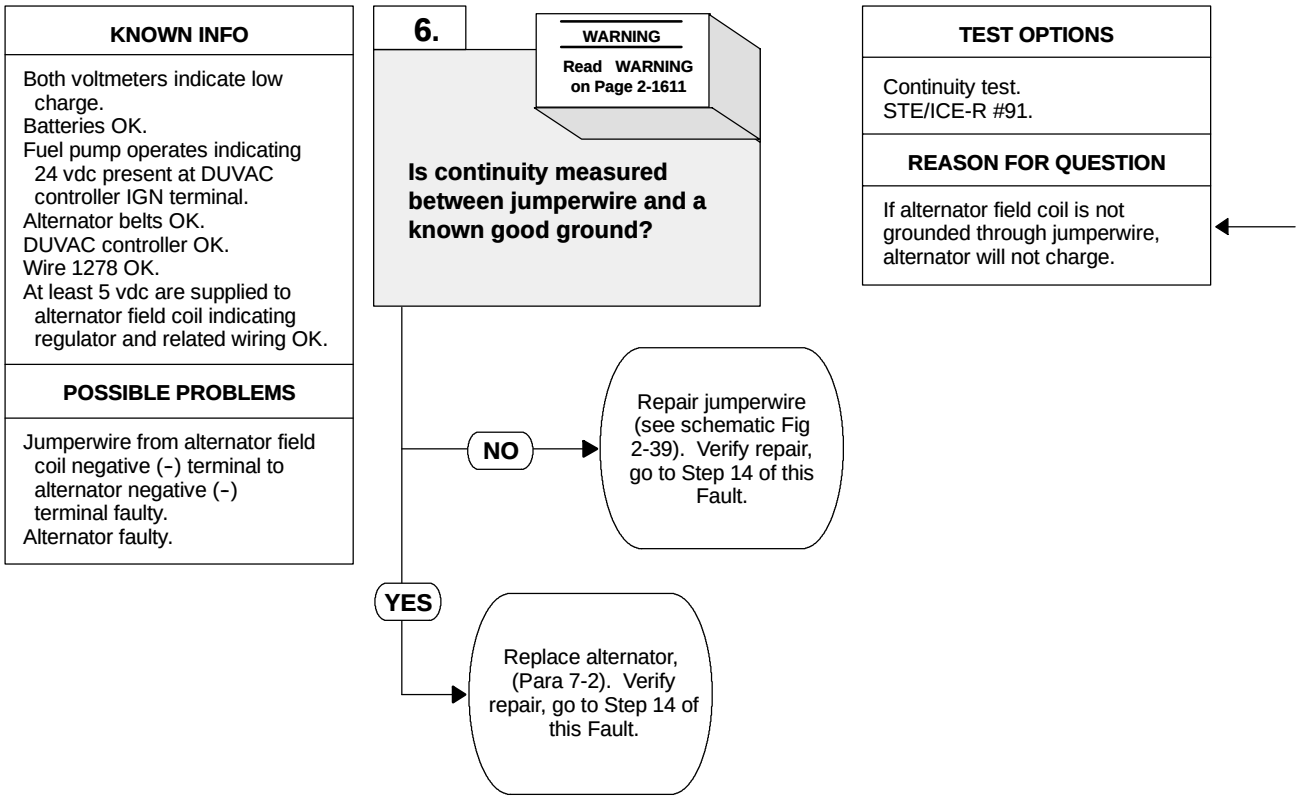
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to the field coil positive (+) terminal of the alternator.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Start engine and turn on headlights and heater (TM 9-2320-364-10).
   (a) If at least 5 vdc are not present, turn off heater, headlights and engine. Go to Step 7 of this Fault.
   (b) If at least 5 vdc are present, turn off heater, headlights and engine. Go to Step 6 of this Fault.

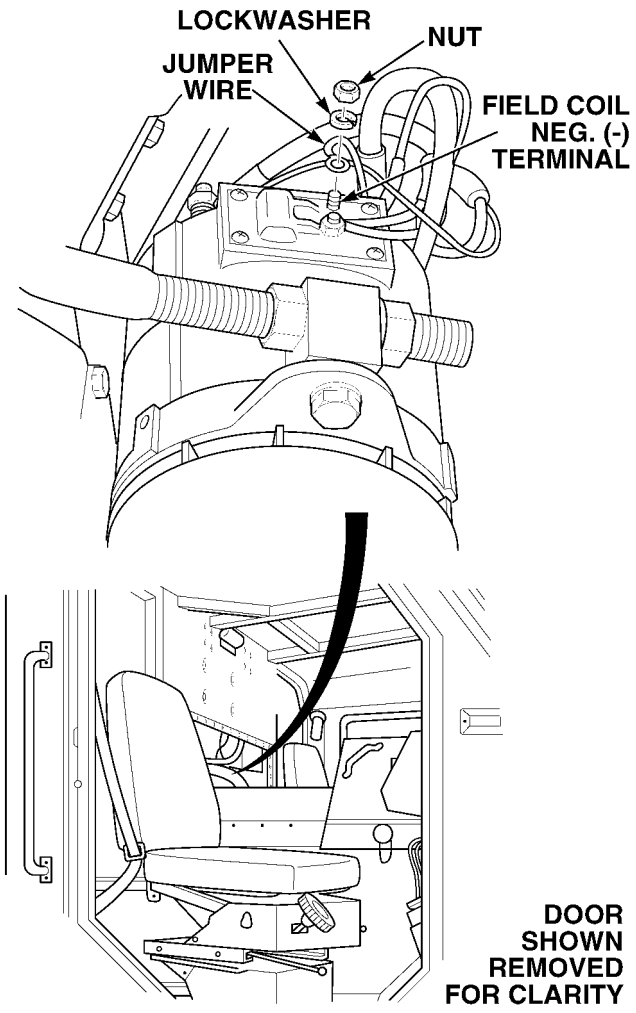


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



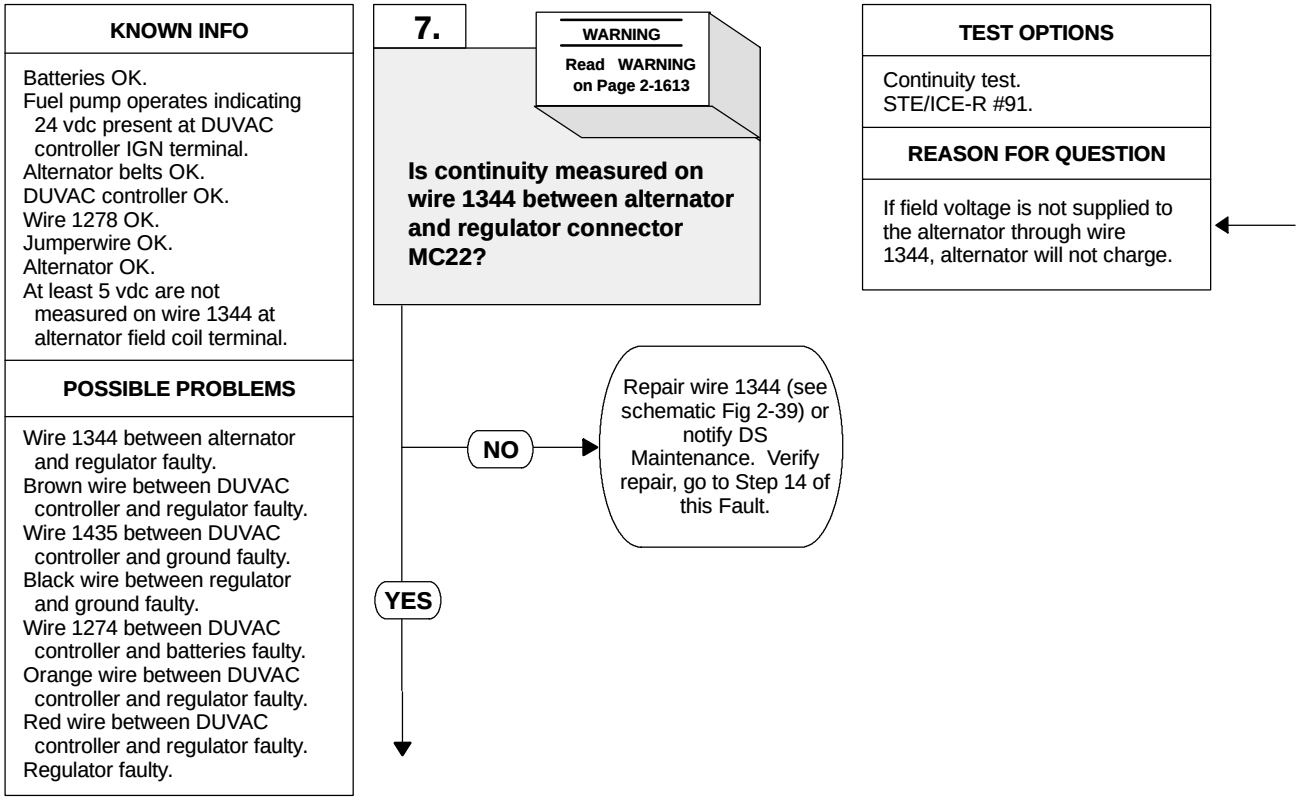
NOTE

Tag and mark wires before removal.

CONTINUITY TEST

(1) Remove nut, lockwasher and jumperwire from field coil negative (-) terminal. Discard lockwasher.
(2) Set multimeter select switch to ohms.
(3) Is there continuity measured on jumperwire at field coil negative (-) terminal and a known good ground?
  (a) If there is no continuity, repair jumperwire (see schematic Fig 2-39).
  (b) If there is continuity, jumperwire is OK. Replace alternator (Para 7-2).
(4) Install jumperwire on field coil negative (-) terminal with lockwasher and nut.

50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

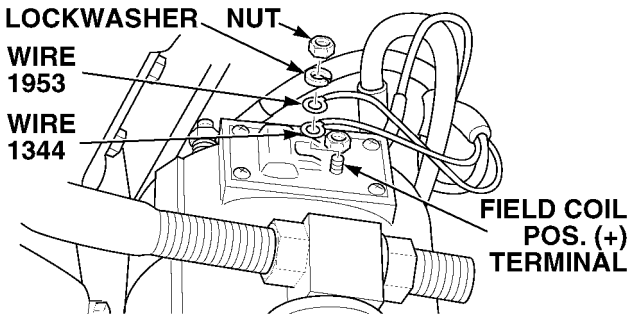
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure bracket does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

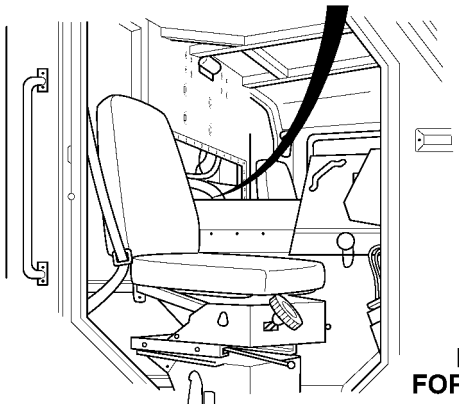
NOTE

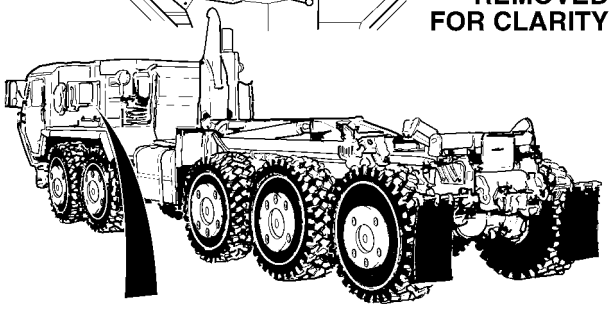
- Wire 1344 splices into the green wire which goes to connector MC22. If repair of wire is required, it could be either the 1344 or green wire.
- Tag and mark all wires prior to removal.

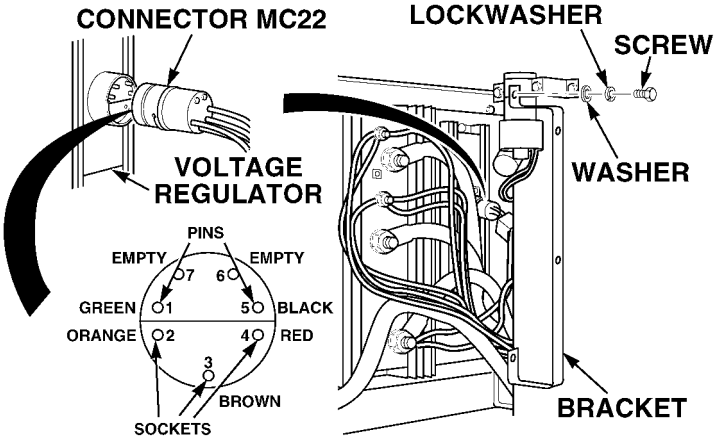
CONTINUITY TEST

(1) Remove nut, lockwasher, wire 1344 and wire 1953 from field coil positive (+) terminal. Discard lockwasher.
(2) Install jumperwire on wire 1344 and a known good ground.
(3) Remove two screws, lockwashers, washers and bracket. Discard lockwashers.
(4) Disconnect connector MC22 from voltage regulator.
(5) Set multimeter select switch to ohms.
(6) Is there continuity measured on pin in position 1 on connector MC22 and a known good ground?
  (a) If there is no continuity, repair wire 1344 (see schematic Fig 2-39) or notify DS Maintenance.
  (b) If there is continuity, wire 1344 is OK.
(7) Connect connector MC22.
(8) Remove jumperwire.
(9) Install wires 1344 and 1953 on field coil positive (+) terminal with lockwasher and nut.

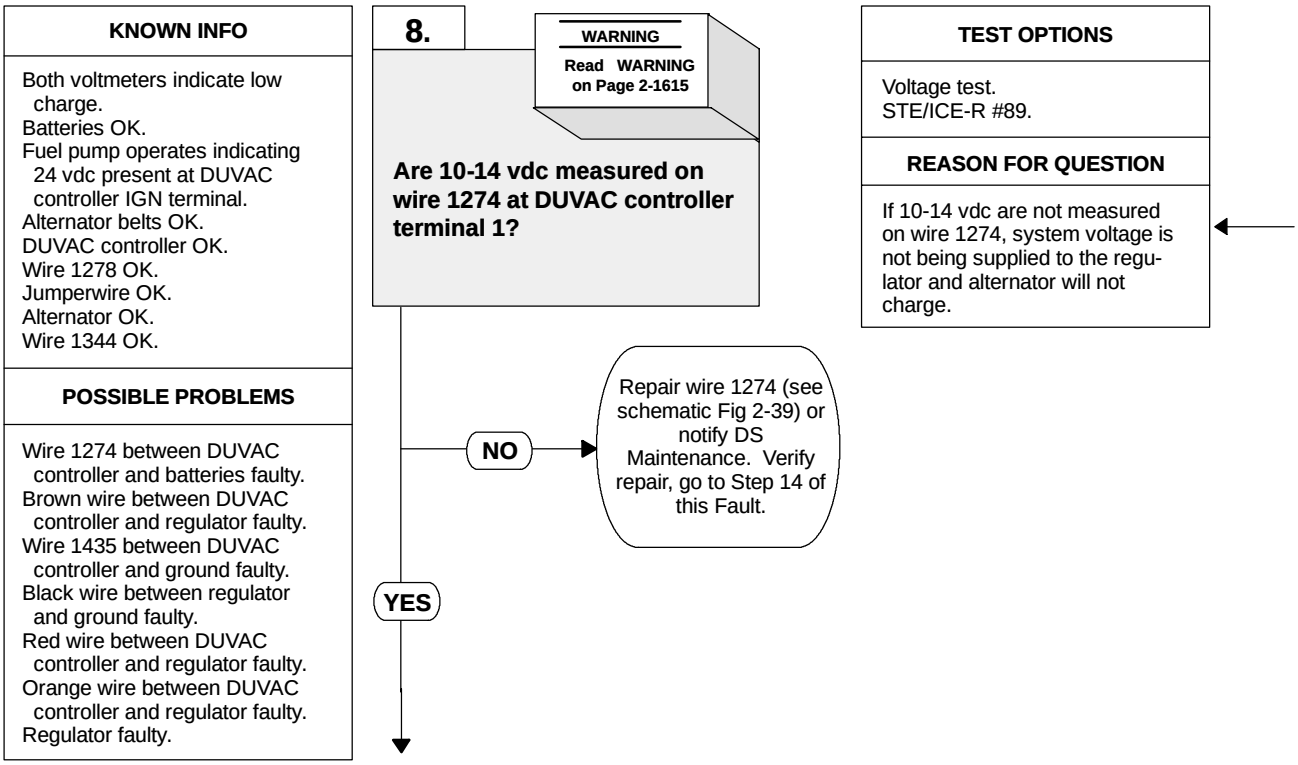






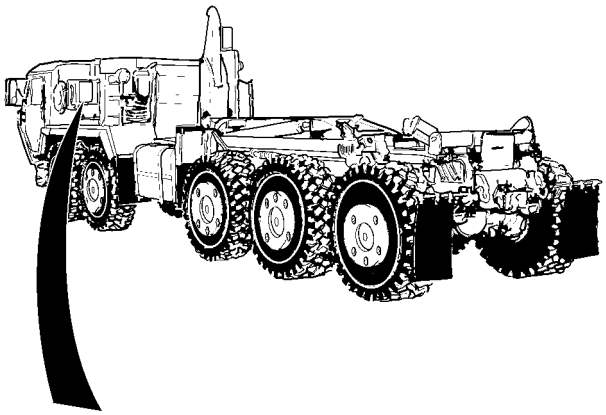


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

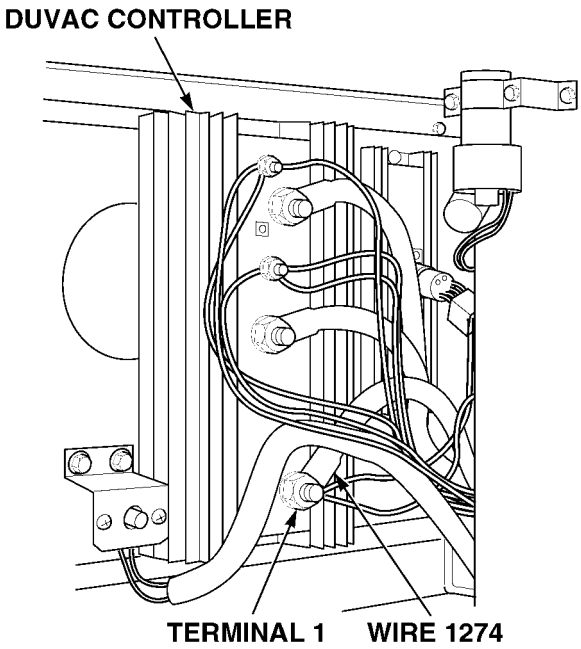
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



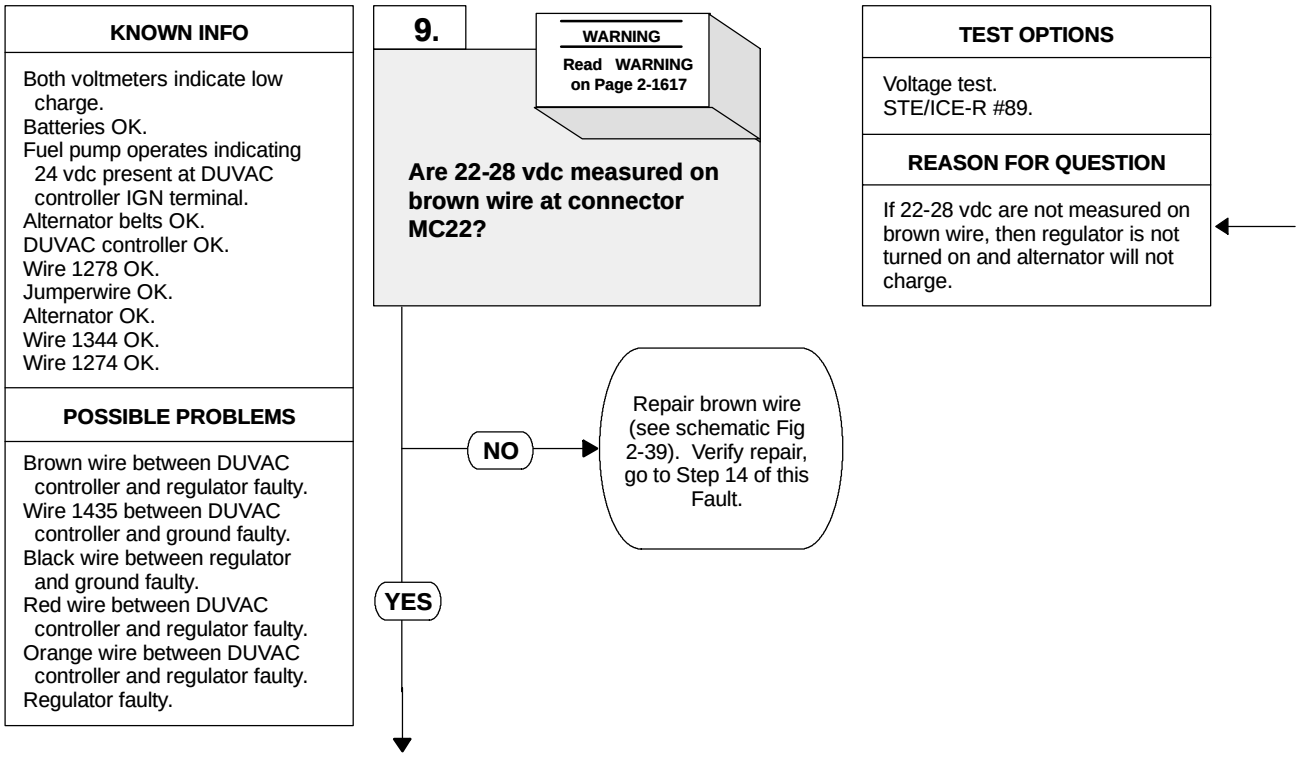
NOTE

Wire 1274 splices into wire 1566 which goes to the positive terminal of the A batteries. If repair of wire is required, it could be either the 1274 or 1566 wire.

VOLTAGE TEST
(1) Set multimeter select switch to volts dc. (2) Connect positive (+) multimeter lead to wire 1274 on DUVAC controller terminal 1. (3) Connect negative (-) multimeter lead to known good ground. (a) If 10-14 vdc are not present, repair wire 1274 (see schematic Fig 2-39) or notify DS Maintenance. (b) If 10-14 vdc are present, wire 1274 is OK.

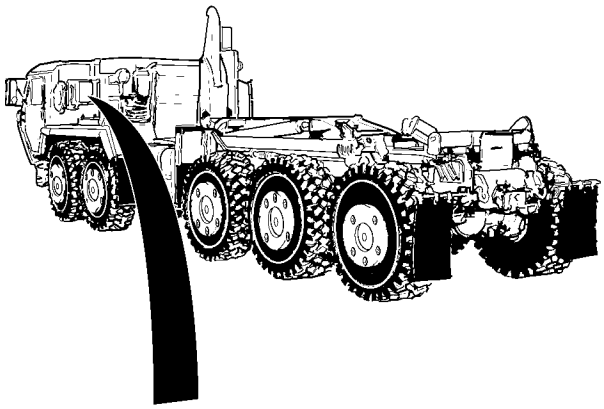


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



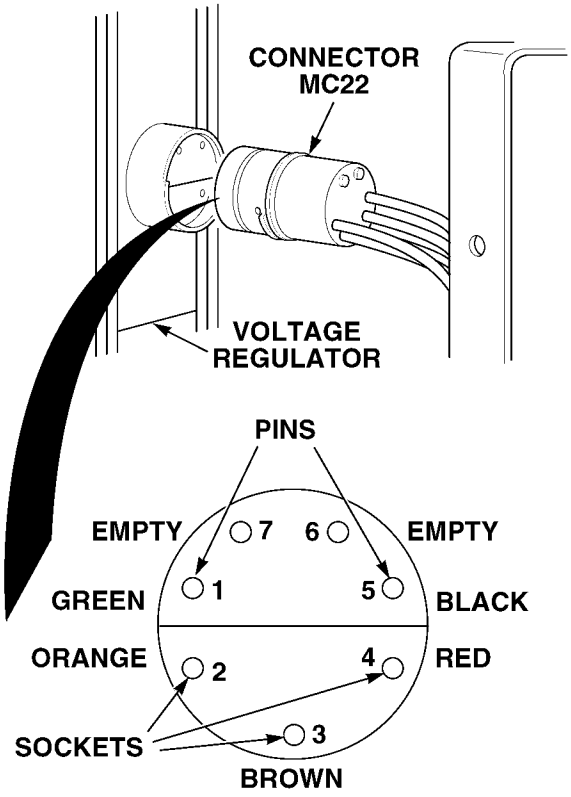
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

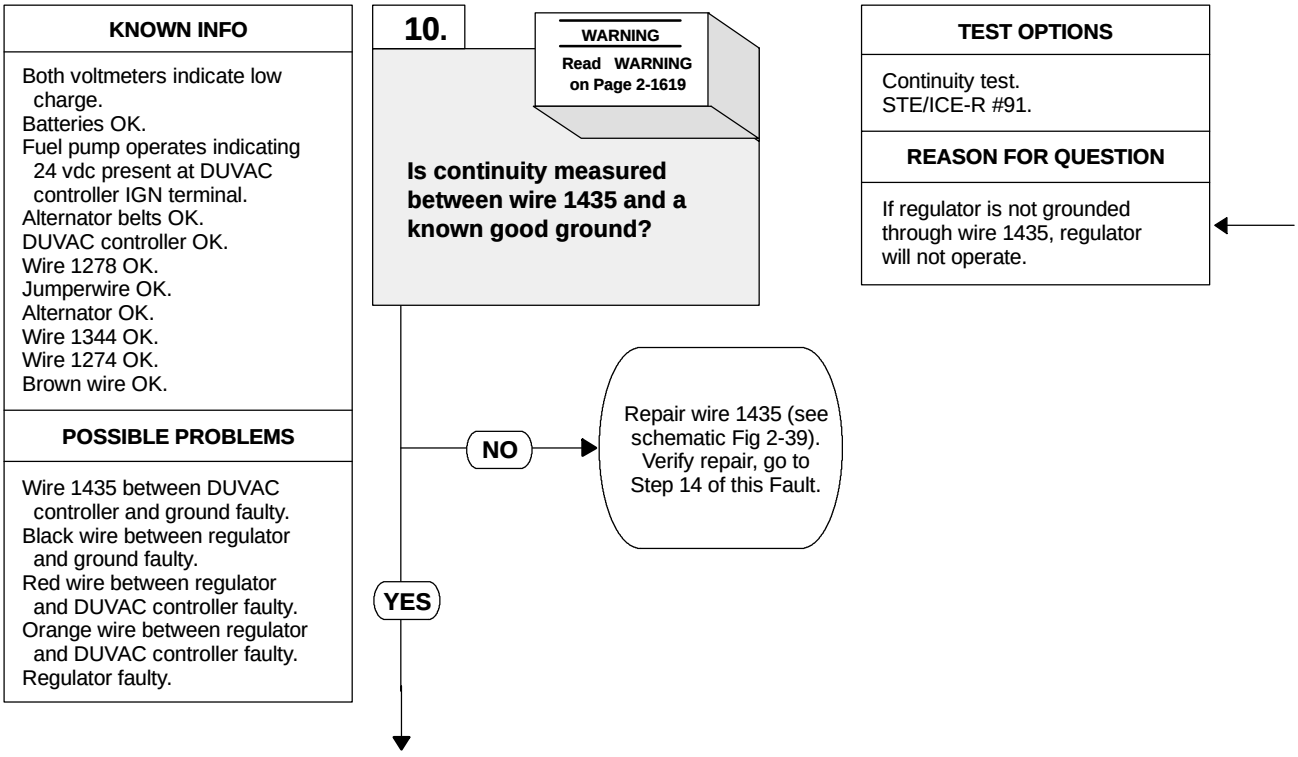


VOLTAGE TEST

(1) Disconnect connector MC22 from voltage regulator.
(2) Connect positive (+) multimeter lead to socket in position 3 on connector MC22.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Turn ON ENGINE switch.
  (a) If 22-28 vdc are not present, repair brown wire (see schematic Fig 2-39).
  (b) If 22-28 vdc are present, brown wire is OK.
(5) Turn OFF ENGINE switch.
(6) Connect connector MC22.

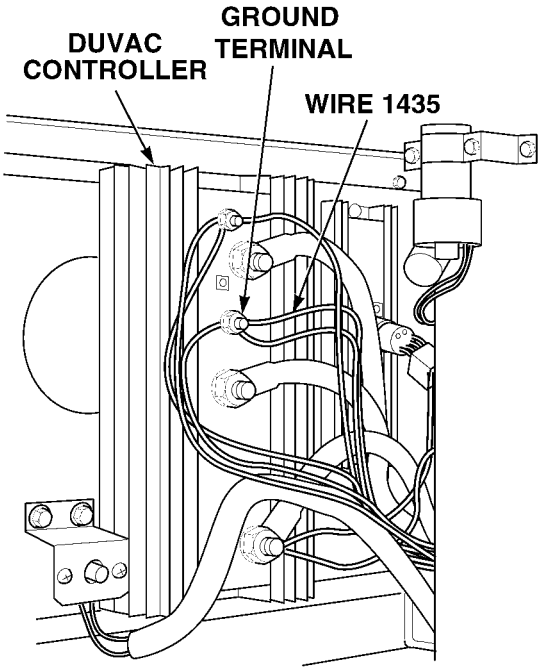


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

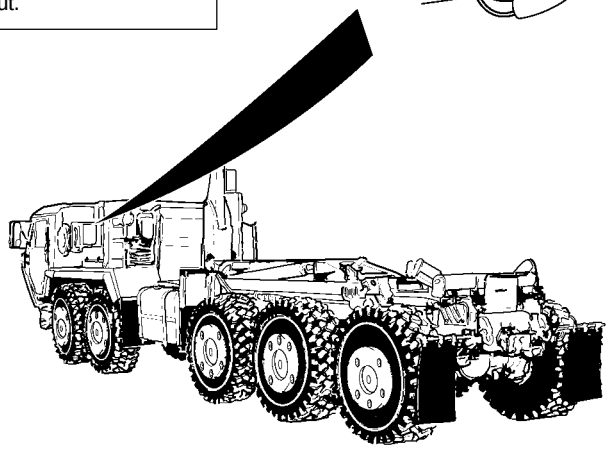


NOTE

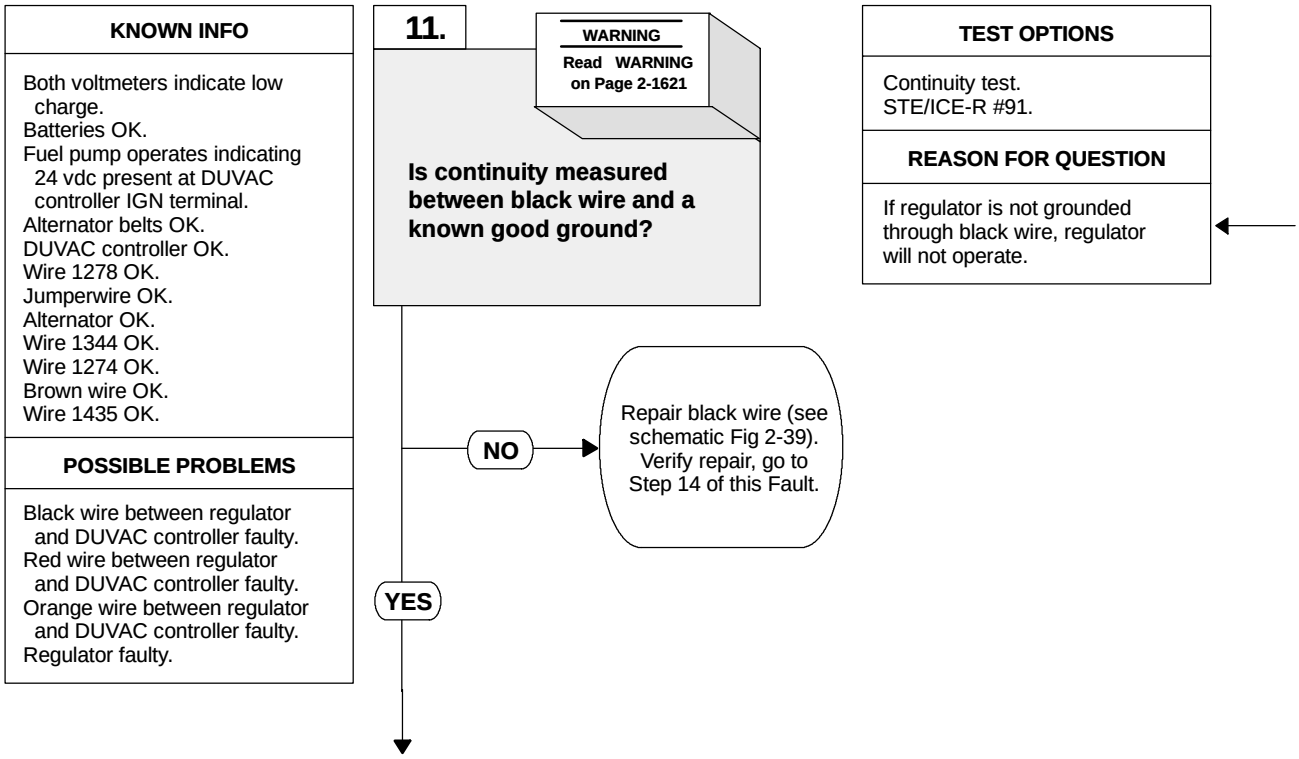
- 1435 wire being tested is connected to mounting bracket.
- Tag and mark all wires prior to removal.

CONTINUITY TEST

(1) Remove nut, lockwasher and wire 1435 from DUVAC controller ground terminal. Discard lockwasher.
(2) Set multimeter select switch to ohms.
(3) Is there continuity measured on wire 1435 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-39).
  (b) If there is continuity, wire 1435 is OK.
(4) Install wire 1435 on DUVAC controller ground terminal with lockwasher and nut.

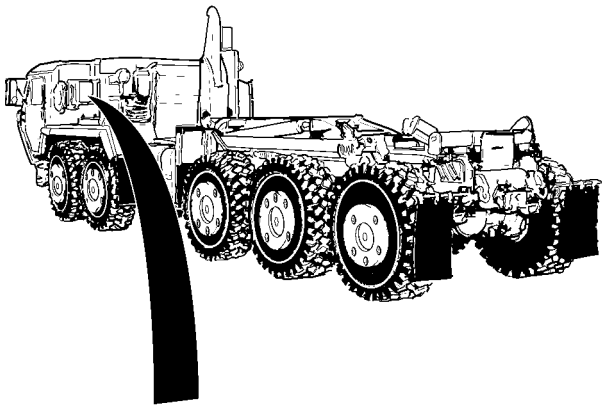


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



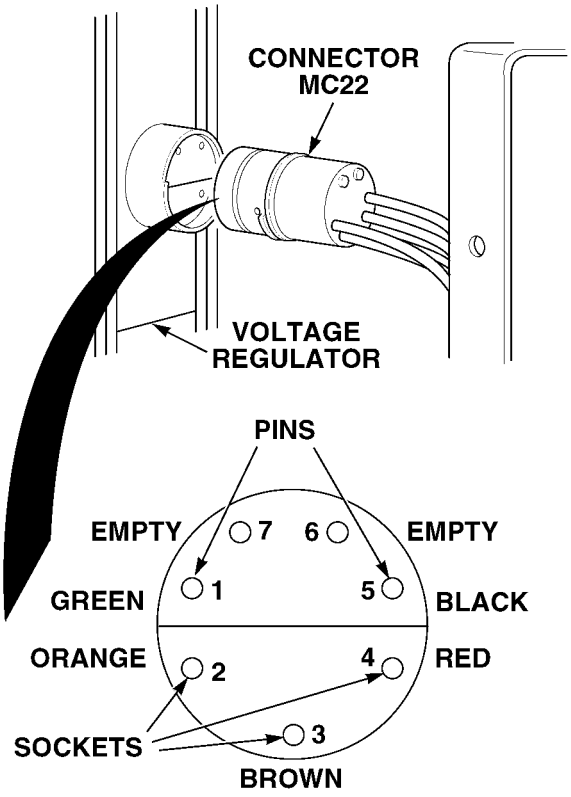
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

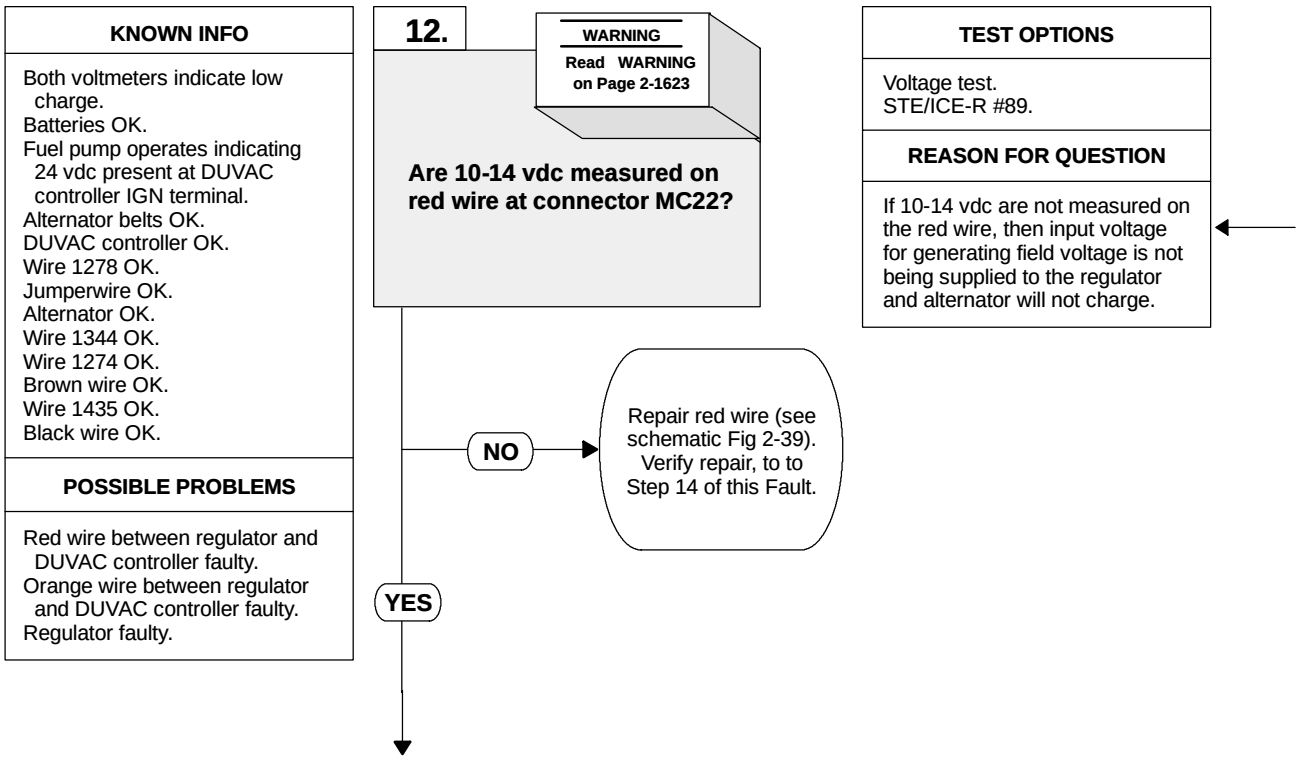


CONTINUITY TEST

(1) Disconnect connector MC22.
(2) Set multimeter select switch to ohms.
(3) Is there continuity measured on pin in position 5 on connector MC22 and a known good ground?
   (a) If there is no continuity, repair black wire (see schematic Fig 2-39) and connect connector MC22.
   (b) If there is continuity, black wire is OK.

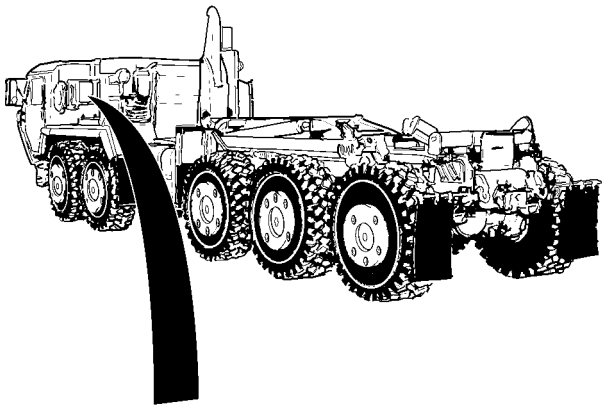


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



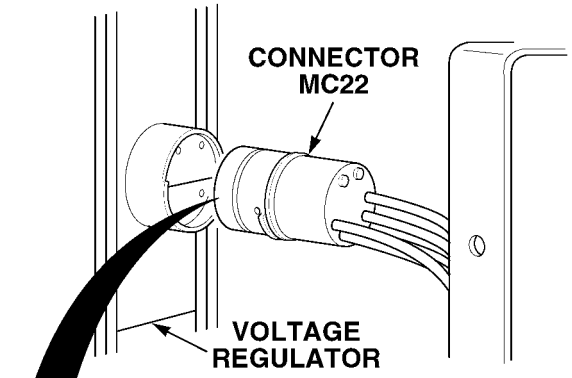
WARNING

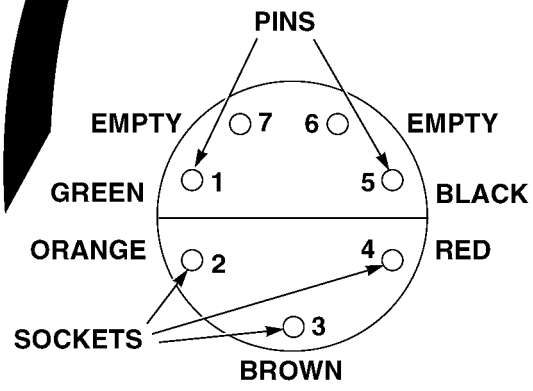
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



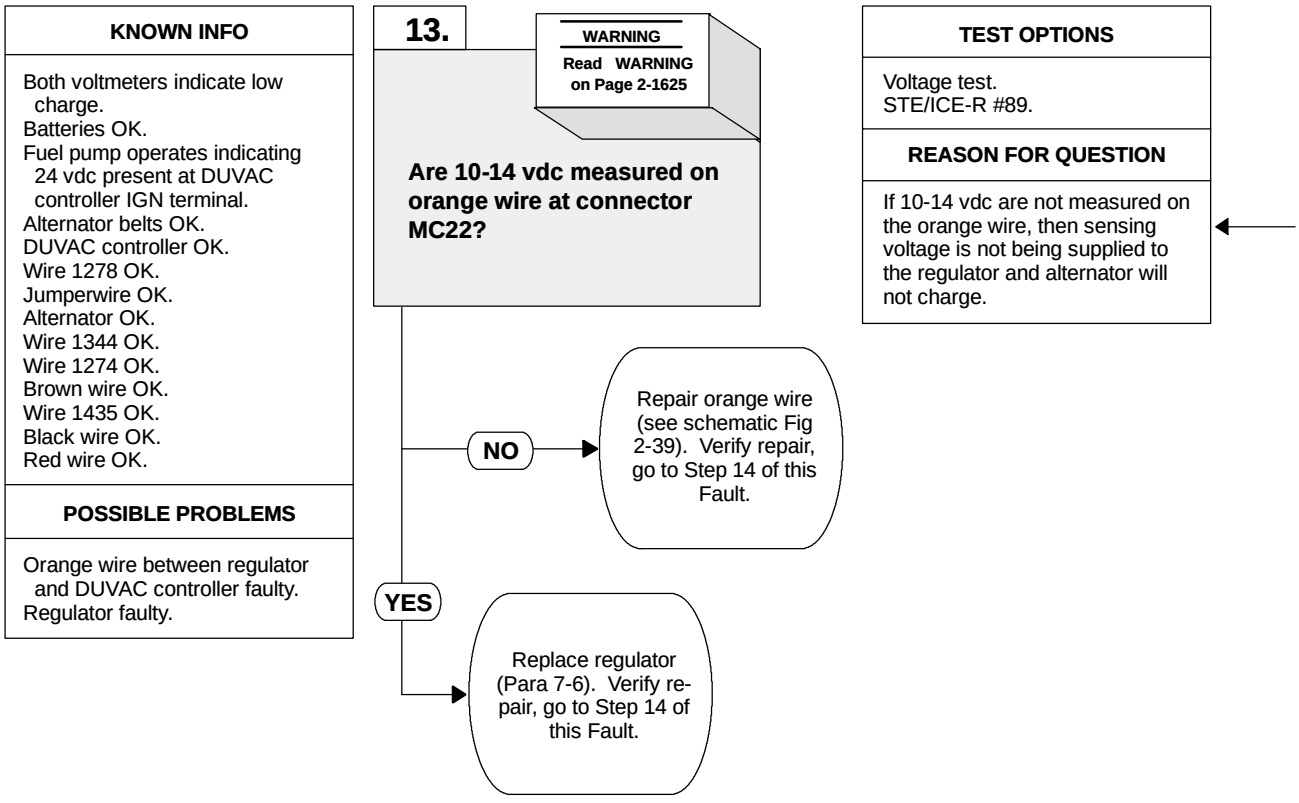
VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to socket in position 4 on connector MC22.
(3) Connect negative (-) multimeter lead to known good ground.
   (a) If 10-14 vdc are not present, repair red wire (see schematic Fig 2-39) and connect connector MC22.
   (b) If 10-14 vdc are present, red wire is OK.



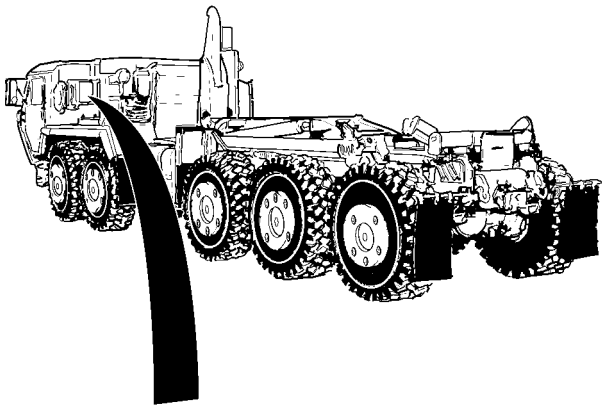


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



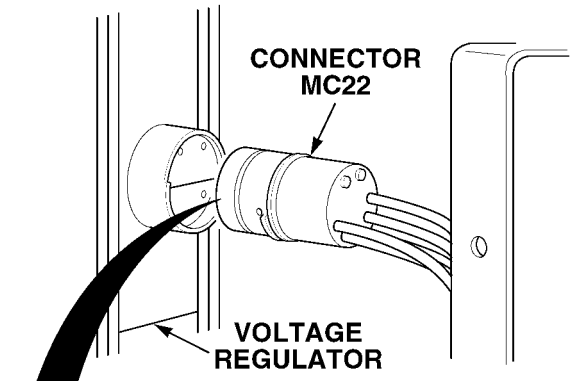
WARNING

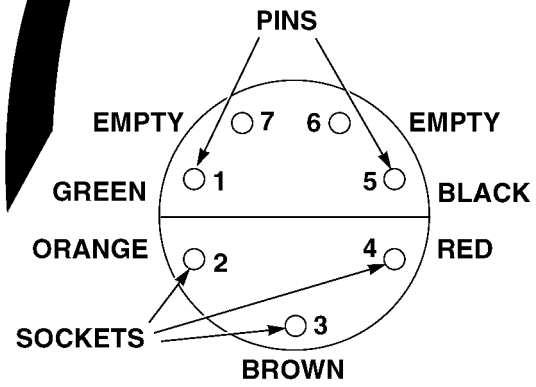
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.



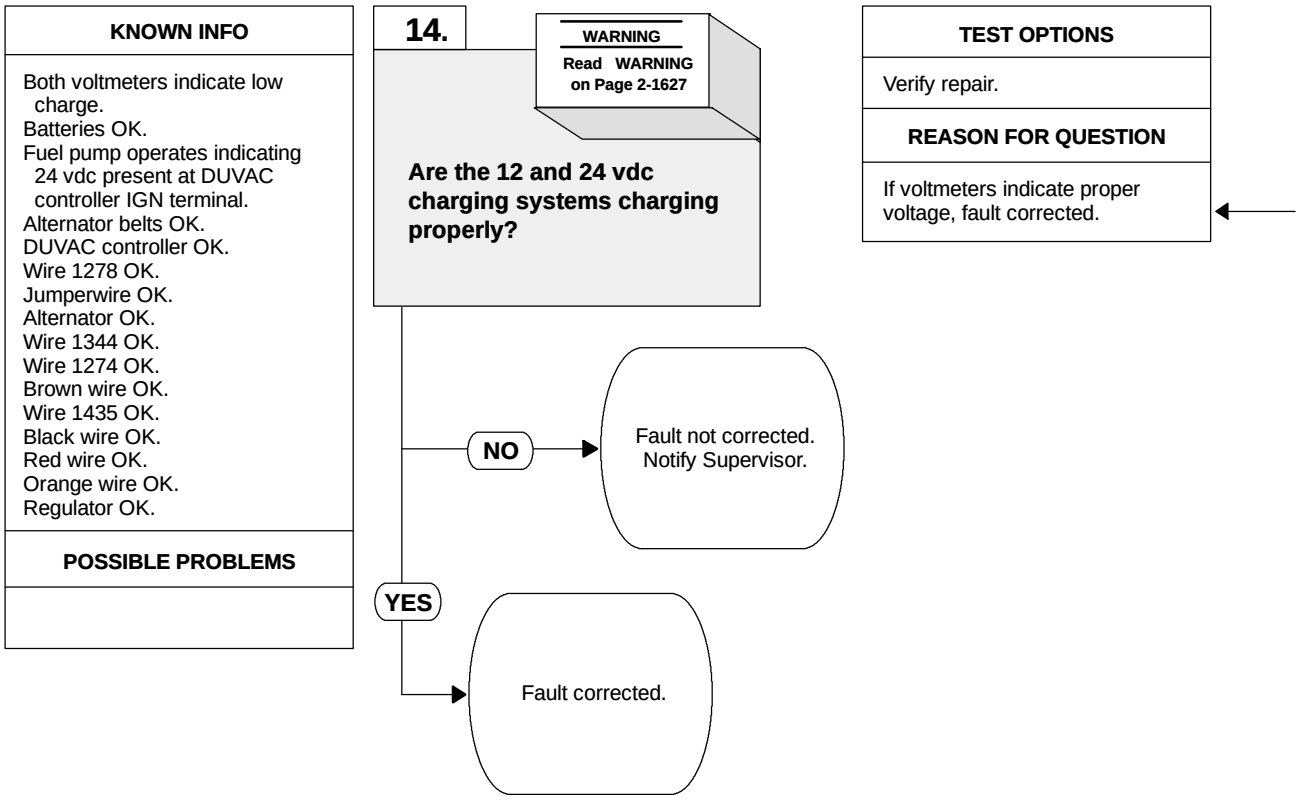
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to socket in position 2 on connector MC22.
(2) Connect negative (–) multimeter lead to known good ground.
  (a) If 10-14 vdc are not present, repair orange wire (see schematic Fig 2-39).
  (b) If 10-14 vdc are present, orange wire is OK. Replace regulator (Para 7-6).
(3) Connect connector MC22.



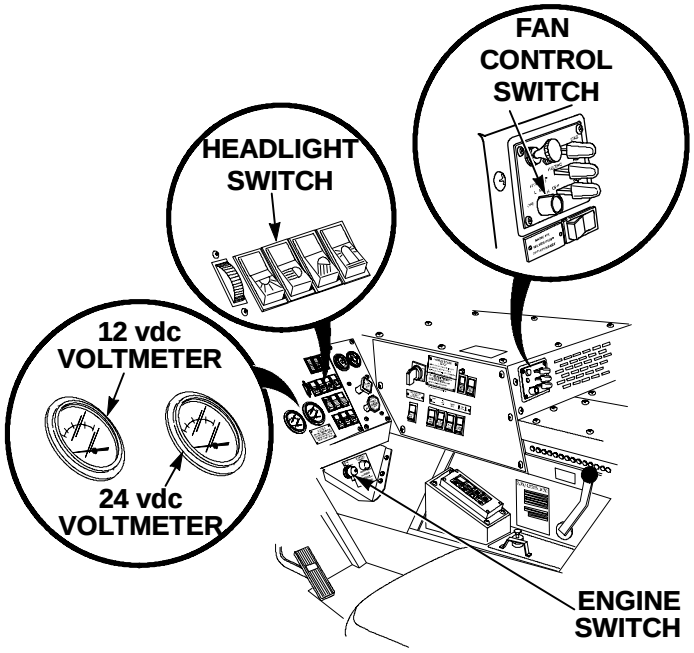


50. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure DUVAC cover or bracket does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

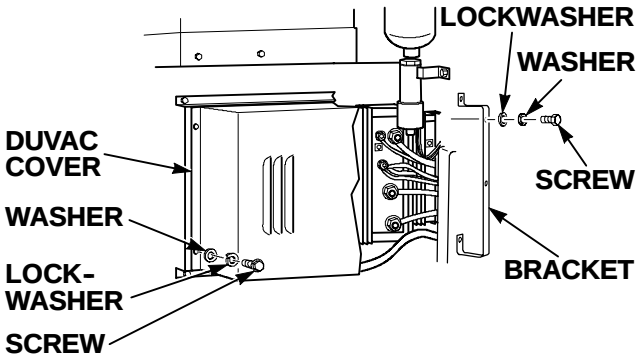


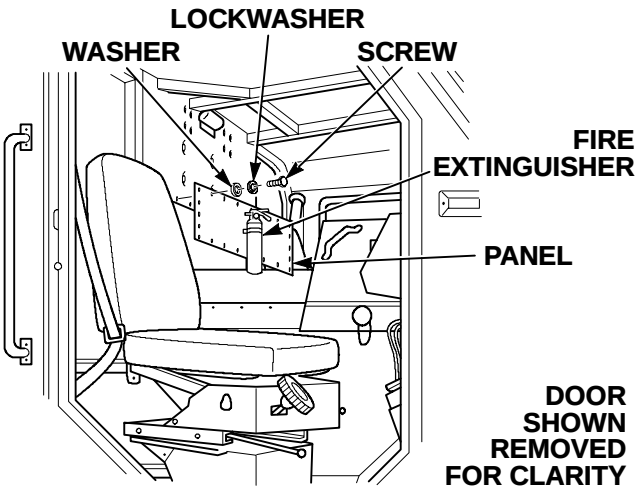
NOTE

DUVAC controller should reset to the 24 vdc charge mode approximately every 55 to 60 seconds. Observe 24 vdc voltmeter for at least two minutes to allow the regulator timer to cycle.

VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
  (a) If 13-14 vdc are not indicated on 12 vdc voltmeter and 26-28 vdc are not indicated on 24 vdc voltmeter, fault not corrected. Perform Steps (2) through (6) below and notify Supervisor.
  (b) If 13-14 vdc are indicated on 12 vdc voltmeter and 26-28 vdc are indicated on 24 vdc voltmeter, fault has been corrected.
(2) Turn off heater, headlights and engine switch.
(3) Install bracket with two screws, lockwashers and washers.
(4) Install DUVAC cover with four screws, lockwashers and washers.
(5) Install cab engine access panel with 22 screws, lockwashers and washers.
(6) Install fire extinguisher.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT.)

51. 12 VOLT SYSTEM OVER OR UNDER CHARGING (145 AMP).

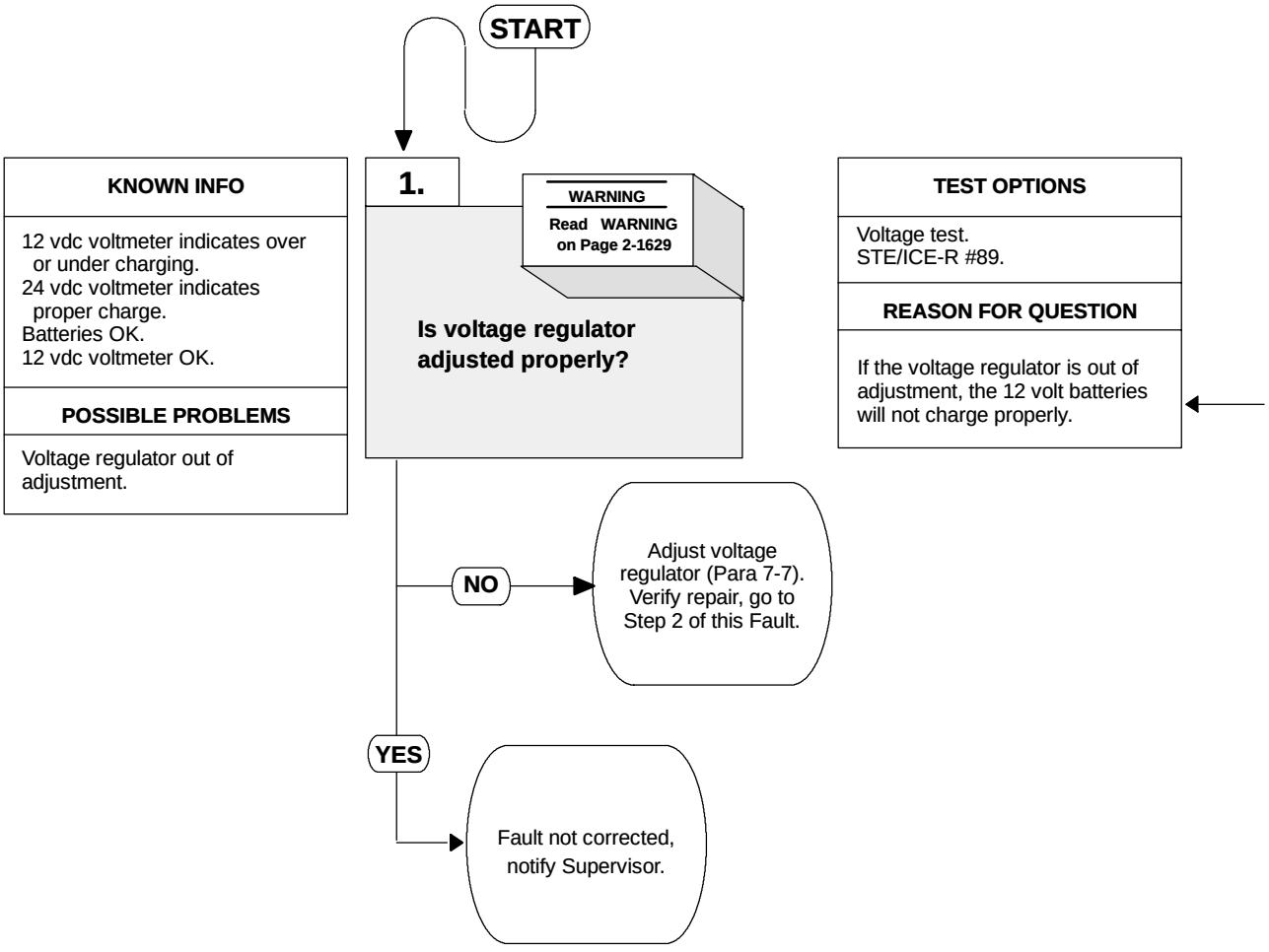
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (2) (Item 44, Appendix G)

Materials/Parts
Lockwasher (4) (Item 171, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

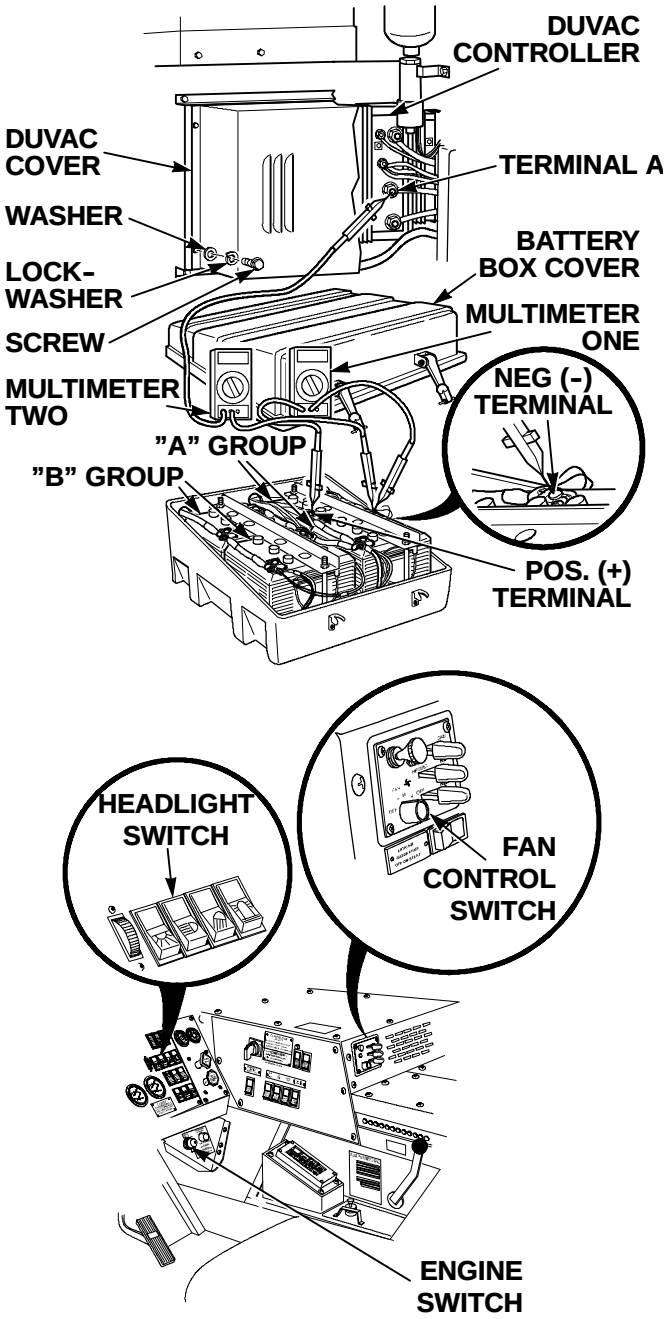
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure DUVAC cover does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

NOTE

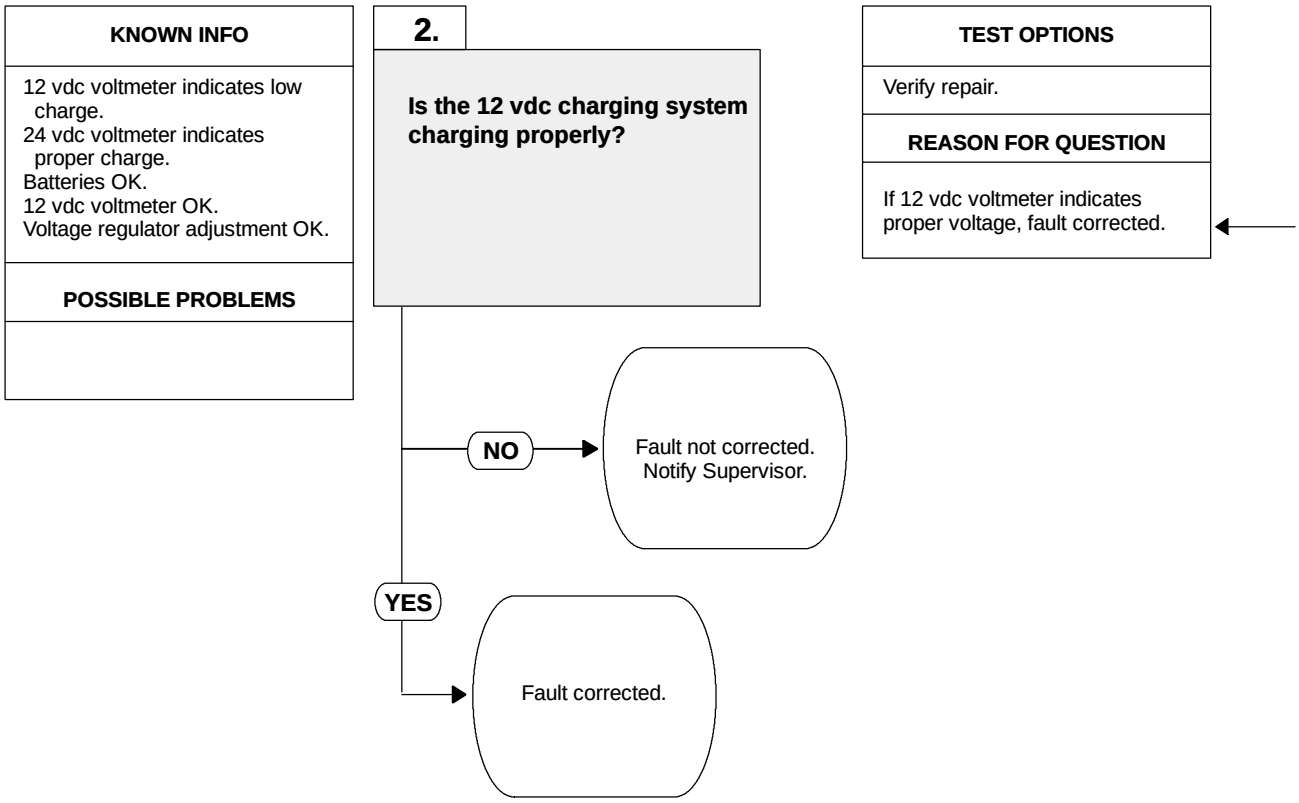
DUVAC controller resets to the 24 vdc charge mode approximately every 55 seconds. Make sure multimeter two reads 13-15 vdc indicating the system is in the 12 vdc charge mode while reading on multimeter one is taken.

VOLTAGE TEST

(1) Remove battery box cover (TM 9-2320-364-10).
(2) Set multimeter select switch to volts dc.
(3) Connect multimeter one positive (+) lead to positive (+) terminal and multimeter one negative (–) lead to negative (–) terminal on group "A" batteries.
(4) Remove four screws, lockwashers, washers and DUVAC cover. Discard lockwashers.
(5) Set multimeter select switch to volts dc.
(6) Connect multimeter two positive (+) lead to terminal A of DUVAC controller and multimeter two negative (–) lead to negative (–) terminal of group "A" batteries.
(7) Start engine and turn on headlights and heater.
(8) Observe voltage indicated on multimeter one.
    (a) If 13.8 - 14.2 vdc are not present, adjust voltage regulator (Para 7-7).
    (b) If 13.8 - 14.2 vdc are present, voltage regulator adjustment is OK.
(9) Turn off heater, headlights and engine switch.
(10) Install DUVAC cover with four screws, lockwashers and washers.
(11) Install battery box cover.

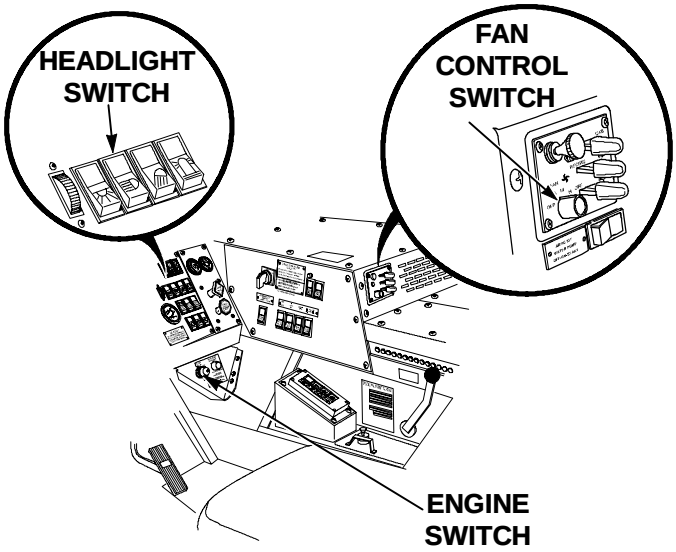


51. 12 VOLT SYSTEM OVER OR UNDER CHARGING (145 AMP) (CONT).



VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
   (a) If 13-14 vdc are not indicated on 12 vdc voltmeter, fault not corrected. Perform Step (2) below and notify supervisor.
   (b) If 13-14 vdc are indicated on 12 vdc voltmeter, fault has been corrected.
(2) Turn off heater, headlights and engine switch.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT.)

52. 24 VOLT SYSTEM NOT CHARGING OR UNDER CHARGING (145 AMP).

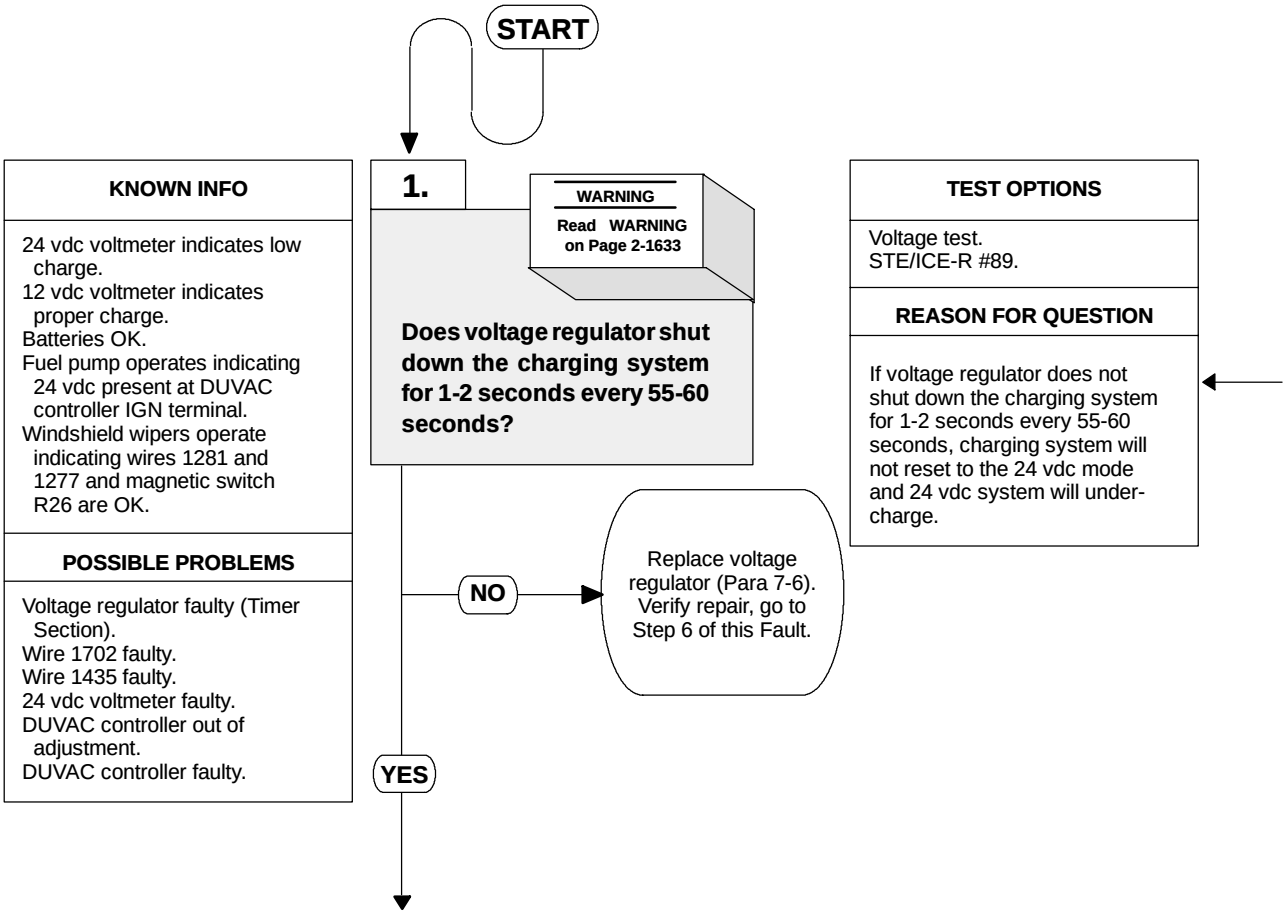
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (2) (Item 44, Appendix G)

Materials/Parts
Lockwasher (4) (Item 171, Appendix F)

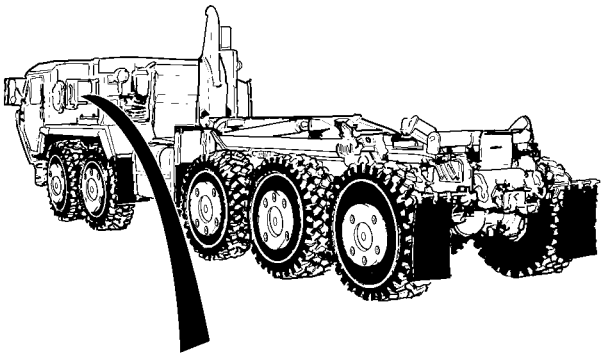
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Terminal 1 and terminal 2 at DUVAC controller are electrically hot all of the time. Ensure DUVAC cover does not contact either terminal. Damage to equipment, injury or death to personnel may occur.

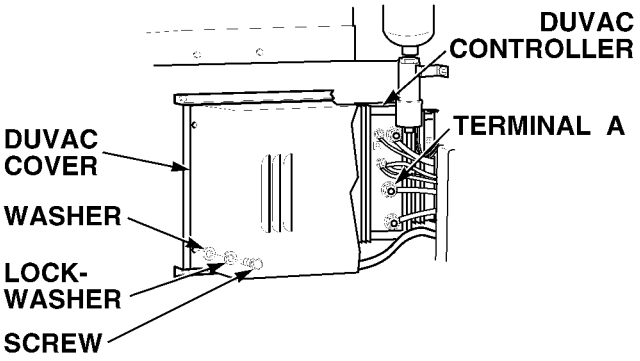


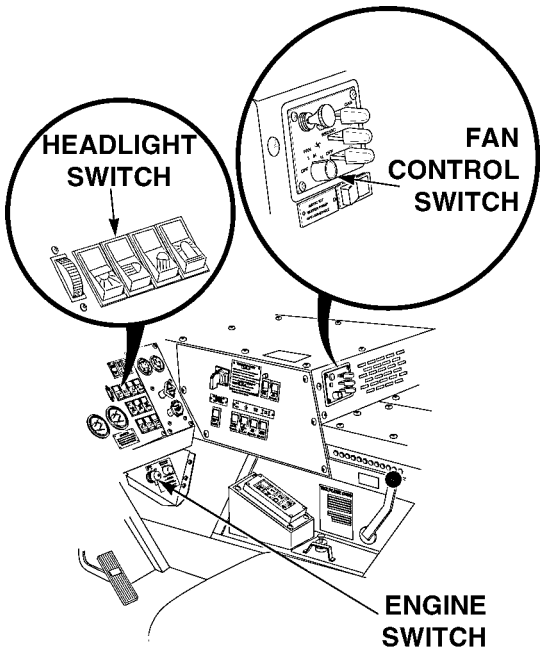
NOTE

- DUVAC controller should reset to the 24 vdc charge mode approximately every 55 seconds. Take the voltage reading for at least two minutes to allow the regulator timer to cycle.
- Every 55-60 seconds you will see momentary drop in voltage as regulator resets from 12 to 24 vdc charging mode.
- Charging voltage could drop as low as 0 vdc.

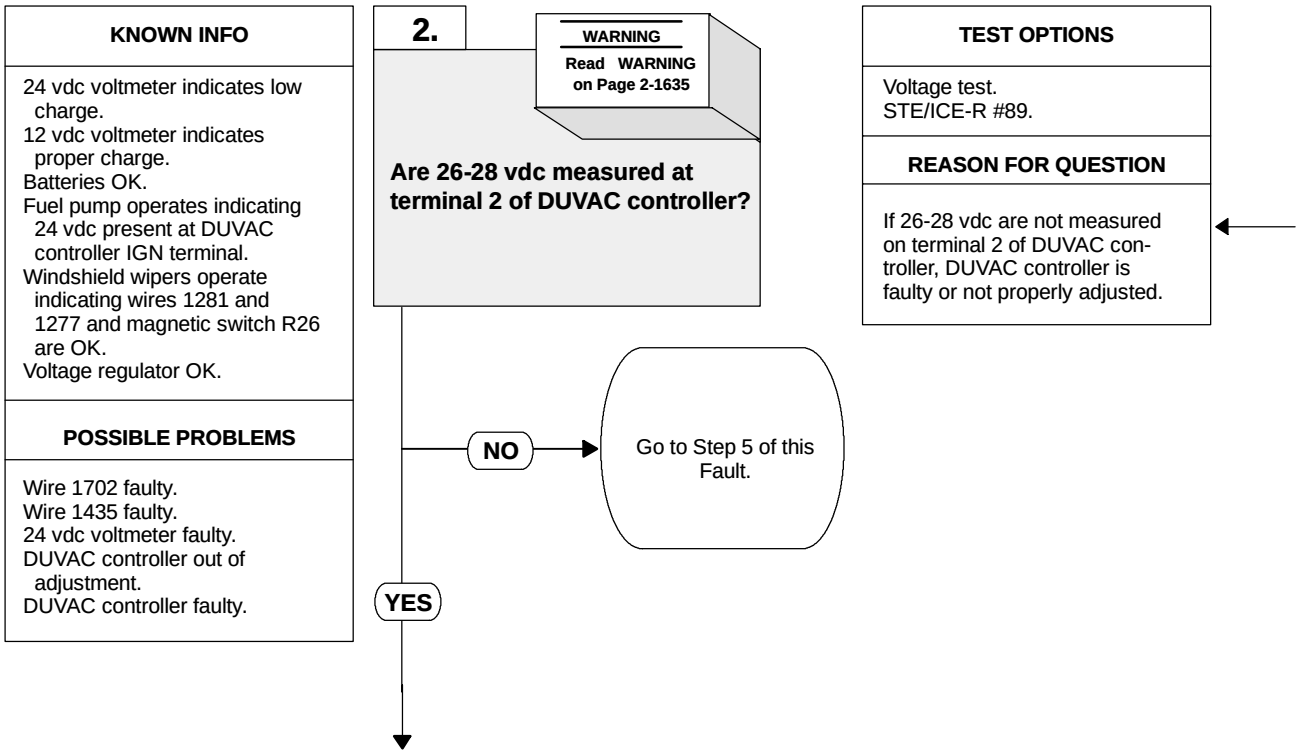
VOLTAGE TEST

(1) Remove four screws, lockwashers, washers and DUVAC cover.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to terminal A on DUVAC controller.
(4) Connect negative (-) multimeter lead to known good ground.
(5) Start engine and turn on headlights and heater (TM 9-2320-364-10).
  (a) If voltage reading does not drop momentarily every 55-60 seconds, voltage regulator is faulty. Turn off heater, headlights and engine and replace voltage regulator (Para 7-6).
  (b) If voltage reading does drop momentarily every 55-60 seconds, voltage regulator is OK. Turn off heater, headlights and engine.



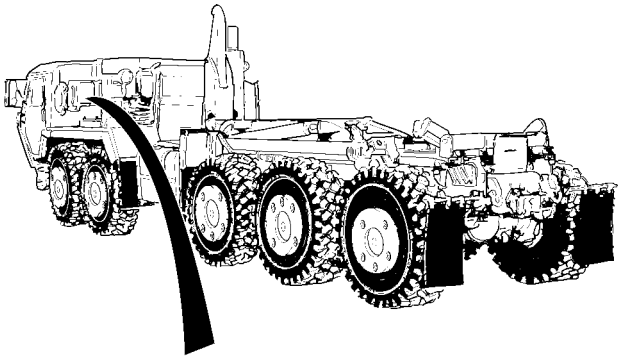


52. 24 VOLT SYSTEM NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

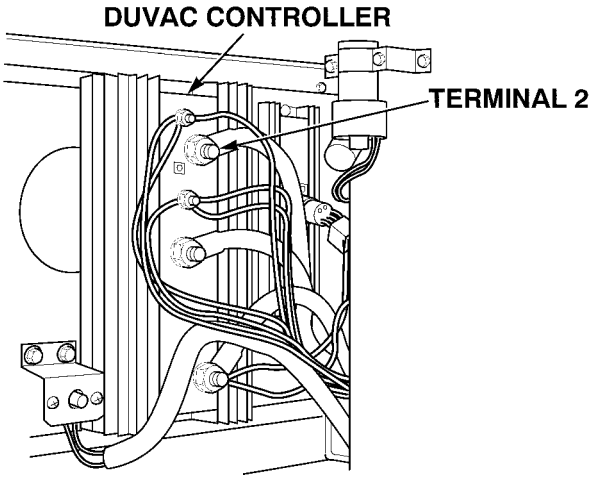


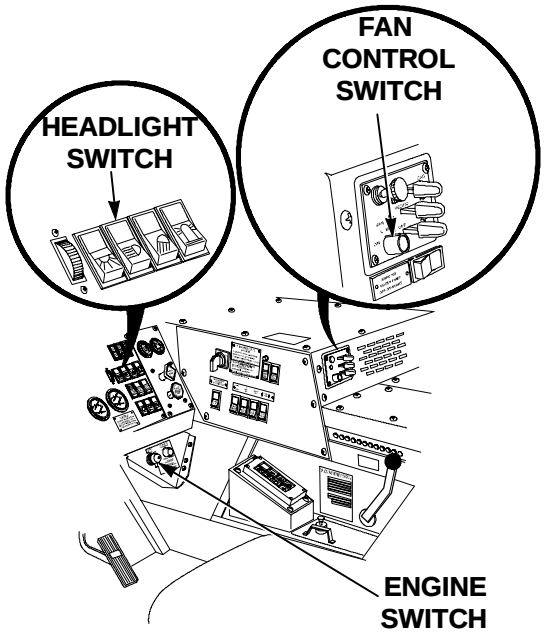
NOTE

DUVAC controller resets to the 24 vdc charge mode approximately every 55 seconds. Take the voltage reading for at least two minutes to ensure voltage reading is taken during the 24 vdc charge mode. The charging voltage reading may only last for a few seconds because the DUVAC controller will automatically switch to the 12 vdc charge mode when the 24 vdc system is fully charged.

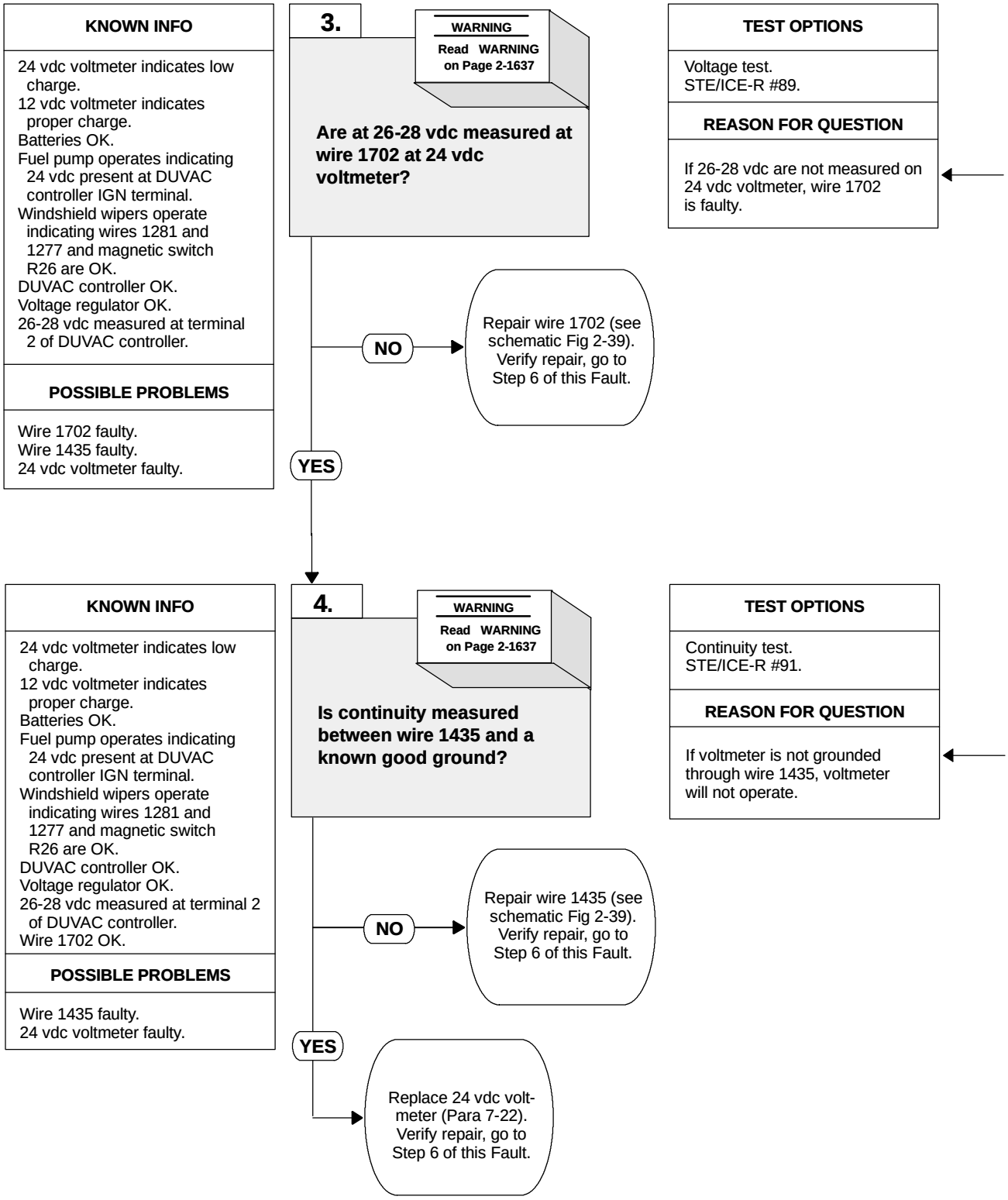
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to terminal 2 on DUVAC controller.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Start engine and turn on headlights and heater. (TM 9-2320-364-10)
   (a) If 26-28 vdc are not present, shut off heater, headlights and engine and go to Step 5 of this fault.
   (b) If 26-28 vdc are present, DUVAC controller is OK. Shut off heater, headlights and engine.





52. 24 VOLT SYSTEM NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).

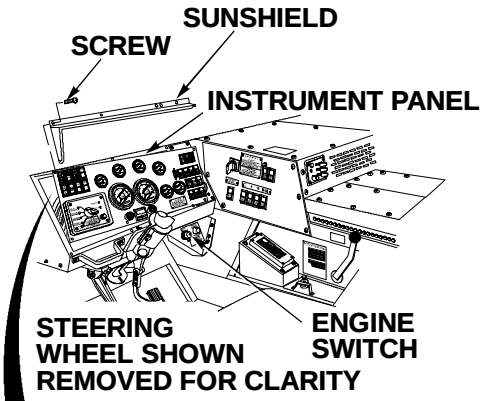


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

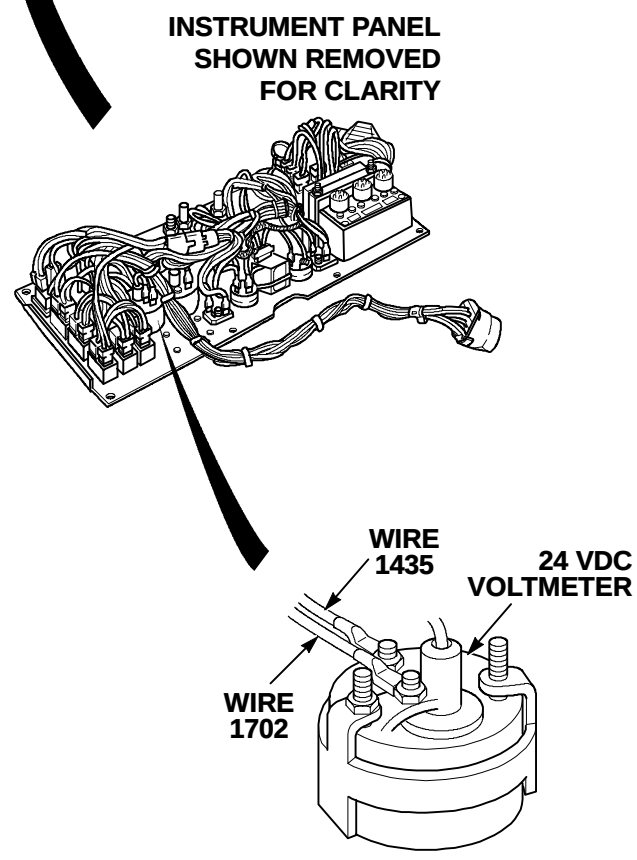
VOLTAGE TEST

(1) Remove ten screws, sunshield and tilt instrument panel.
(2) Connect positive (+) multimeter lead to wire 1702 on 24 vdc voltmeter.
(3) Connect negative (–) multimeter lead to a known good ground.
(4) Turn ON ENGINE SWITCH.
  (a) If 26-28 vdc are not present, repair wire 1702 (see schematic Fig 2-39).
  (b) If 26-28 vdc are present, wire 1702 is OK.
(5) Turn OFF ENGINE switch.

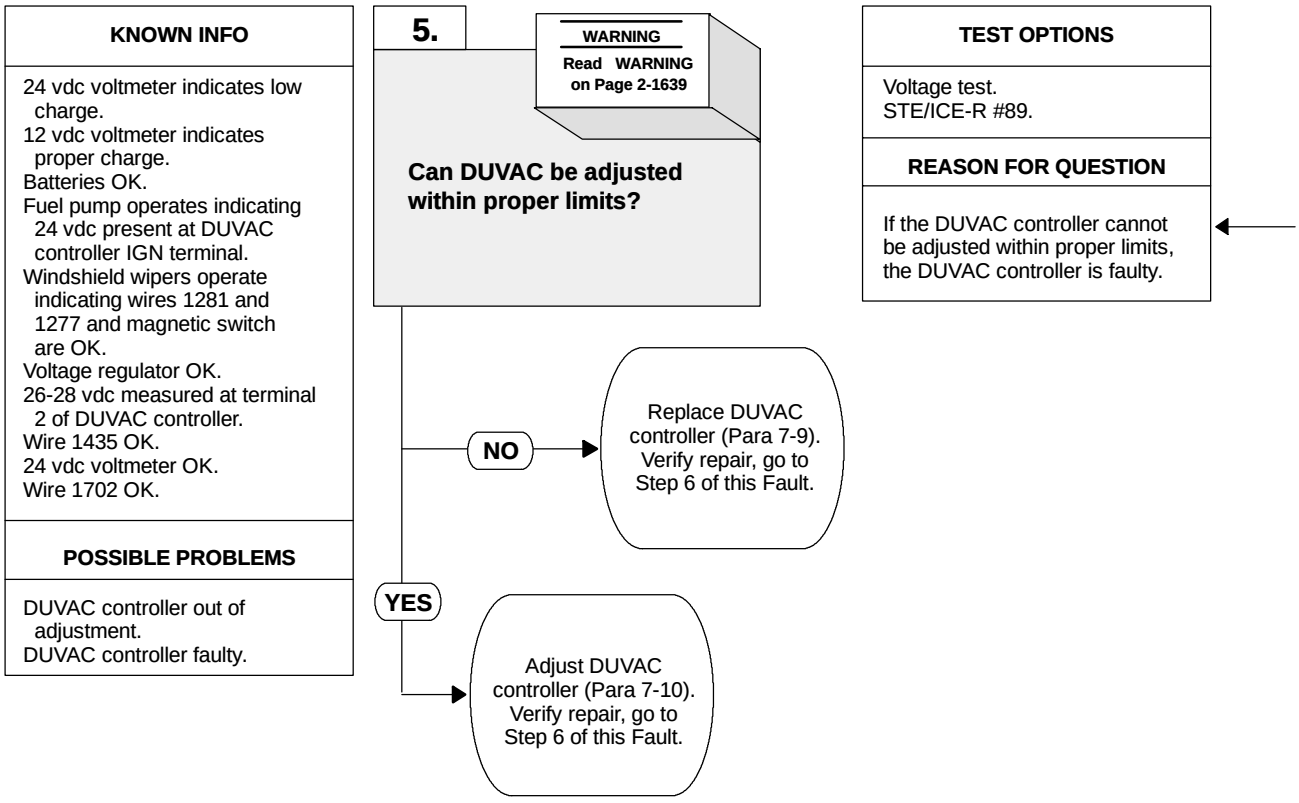


CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity measured on wire 1435 at 24 vdc voltmeter ground terminal and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-39).
  (b) If there is continuity, wire 1435 is OK. Replace 24 vdc voltmeter (Para 7-22).



52. 24 VOLT SYSTEM NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CAUTION

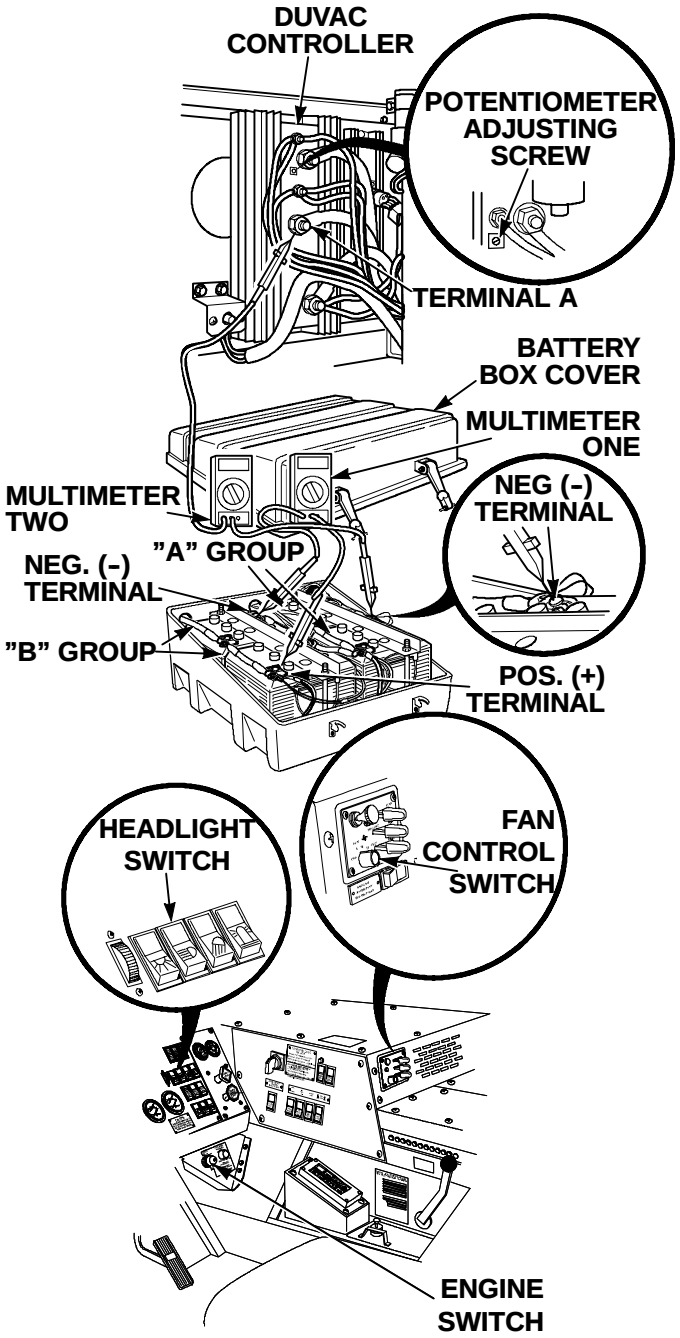
Use caution when turning adjusting screw of potentiometer. Turning adjusting screw with too much force may damage potentiometer.

NOTE

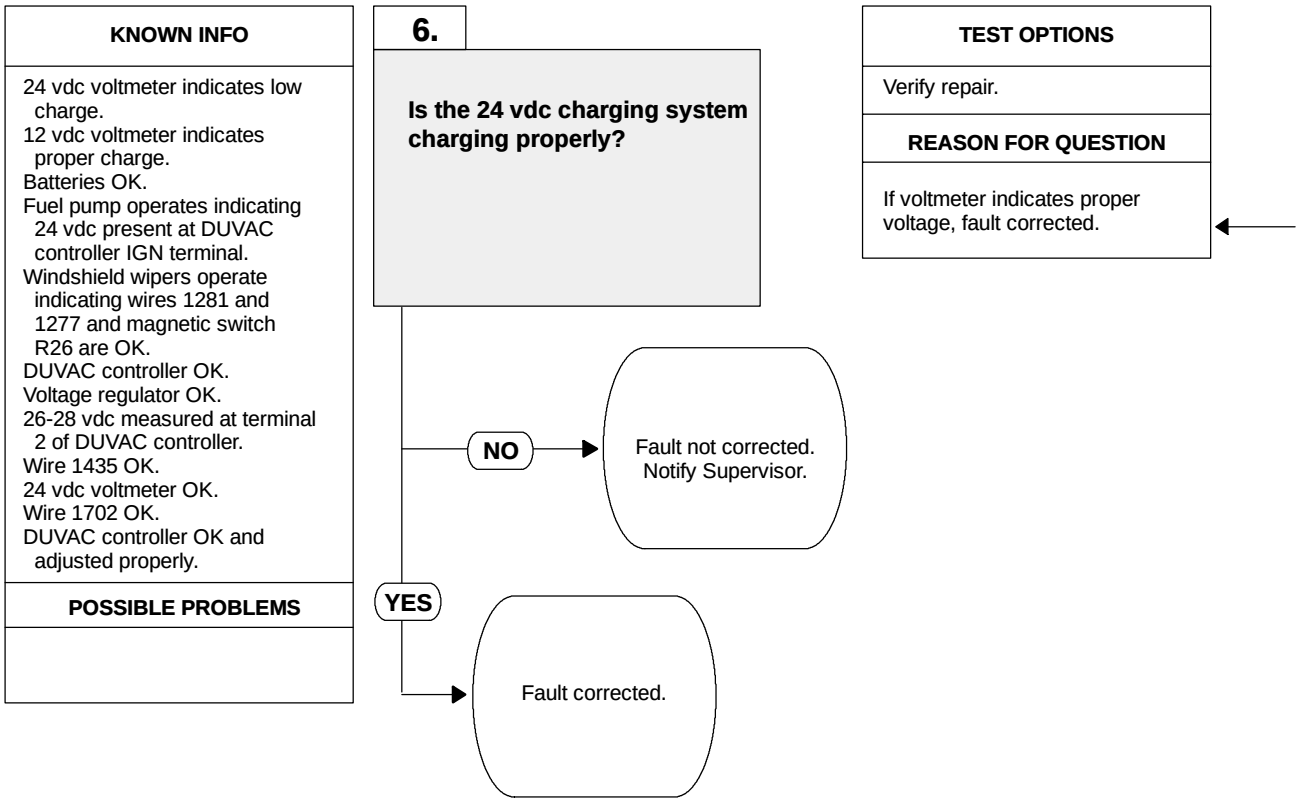
- DUVAC controller resets to the 24 vdc charge mode approximately every 55 seconds. Make sure multimeter reads 26-30 vdc indicating the system is in the 24 vdc charge mode while reading on multimeter one is taken.
- Charging voltage is adjusted by turning adjusting screw on potentiometer on DUVAC controller. Turning to the right increases voltage. Turning to the left decreases voltage.

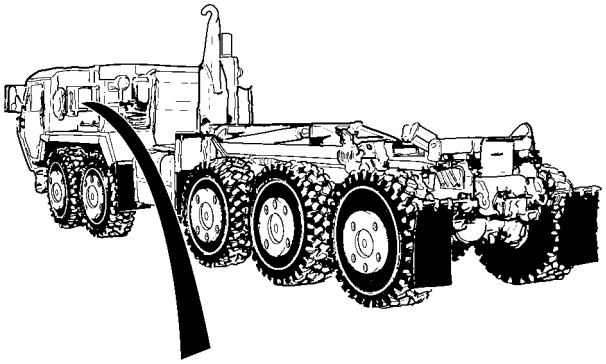
VOLTAGE TEST

(1) Remove battery box cover. (TM 9-2320-364-10).
(2) Connect multimeter one positive (+) lead to positive (+) terminal on "B" batteries and multimeter one negative (-) lead to negative (-) terminal on group "B" batteries.
(3) Connect multimeter two positive (+) lead to terminal A of DUVAC controller and multimeter two negative lead to negative (-) terminal of group "A" batteries.
(4) Start engine and turn on headlights and heater.(TM 9-2320-364-10).
(5) Attempt to adjust DUVAC controller until multimeter one reads 14.3-14.6 vdc.
    (a) If 14.3-14.6 vdc cannot be obtained, turn off heater, headlights and engine switch and replace DUVAC controller (Para 7-9).
    (b) If 14.3-14.6 vdc can be obtained, fault corrected. Turn off heater, headlights and engine switch.



52. 24 VOLT SYSTEM NOT CHARGING OR UNDER CHARGING (145 AMP) (CONT).



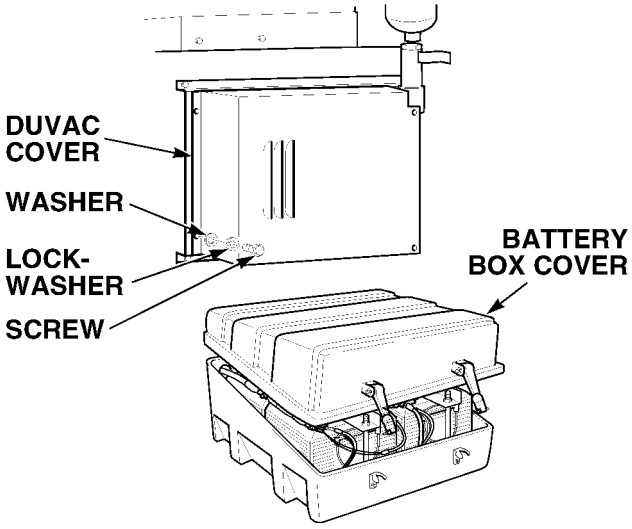


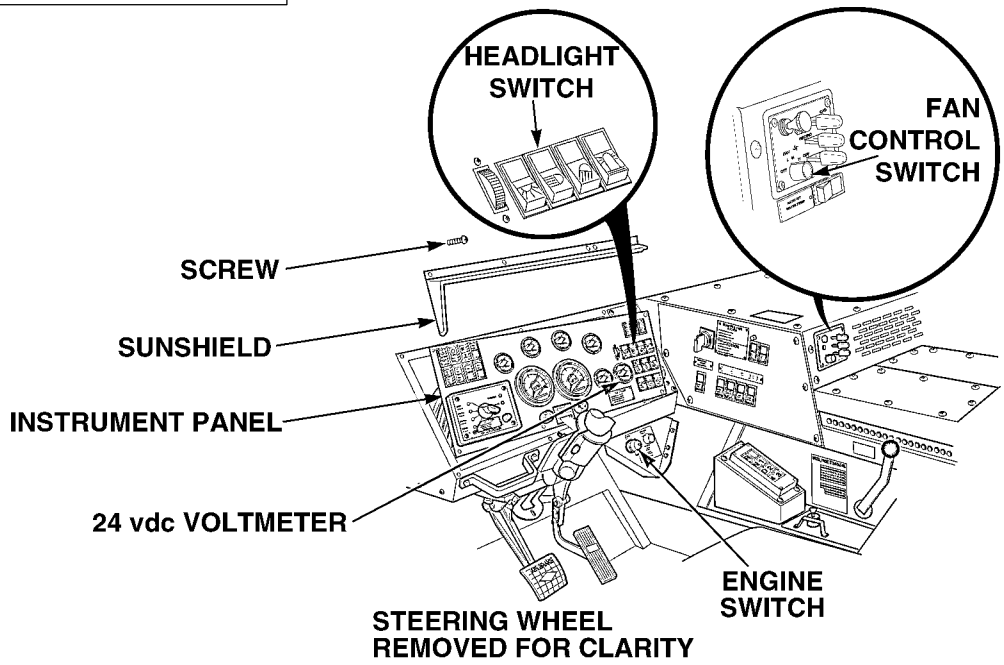
NOTE

DUVAC controller should reset to the 24 vdc charge mode approximately every 55-60 seconds. Observe 24 vdc voltmeter for at least two minutes to allow the regulator timer to cycle.

VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
   (a) If 26-28 vdc are not indicated on 24 vdc voltmeter, fault not corrected. Perform Steps (2) through (5) below and notify Supervisor.
   (b) If 26-28 vdc are indicated on 24 vdc voltmeter, fault has been corrected. Perform Steps (2) through (5) below.
(2) Turn off heater, headlights and engine switch.
(3) Install battery box cover.
(4) Install DUVAC cover with four screws, lockwashers and washers.
(5) Install instrument panel, sunshield, and ten screws.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT.)

53. 24 VOLT SYSTEM OVER CHARGING (145 AMP) (VOLTMETER READS OVER 28 VDC).

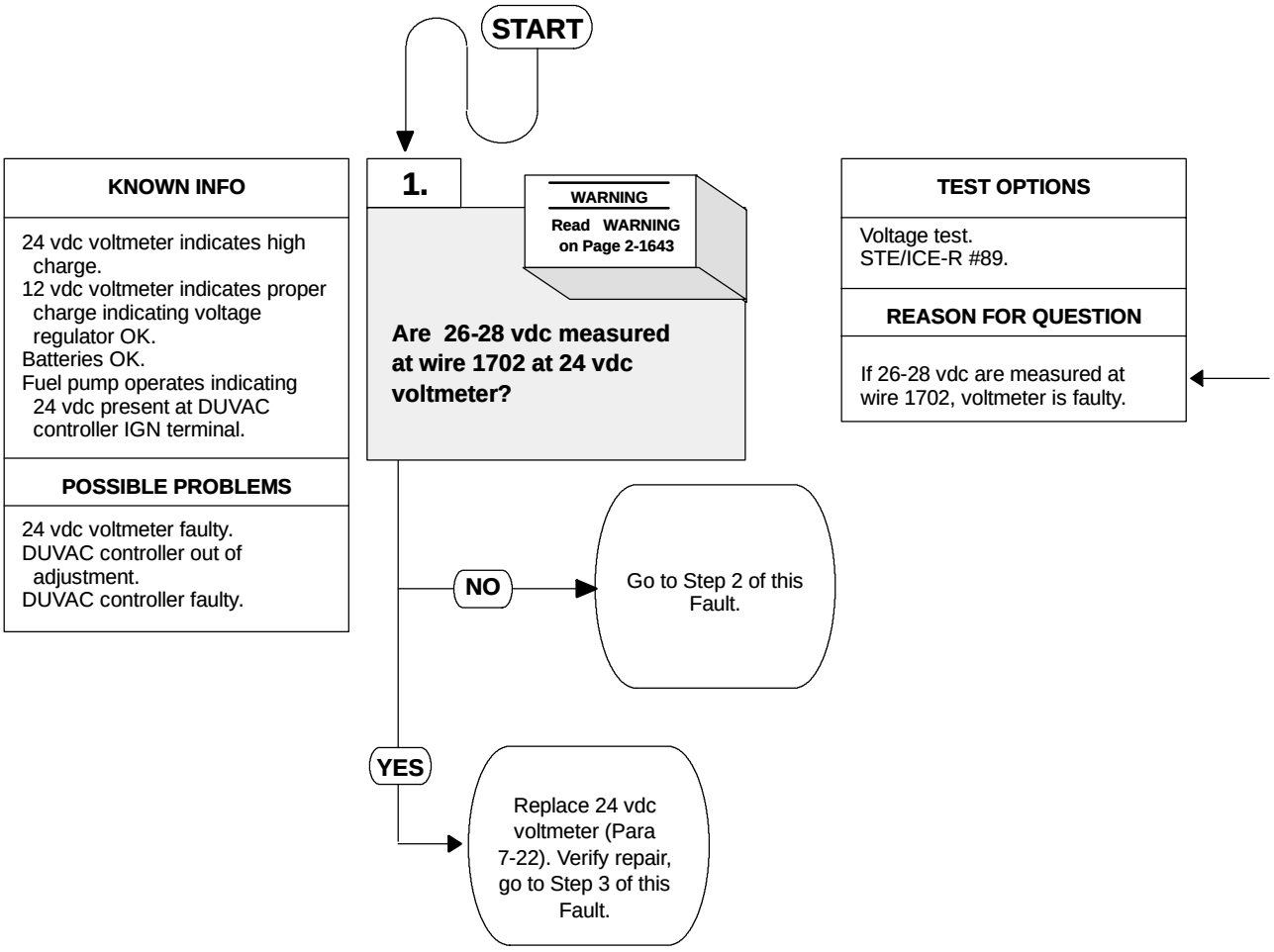
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (2) (Item 44, Appendix G)

Materials/Parts
Lockwasher (4) (Item 171, Appendix F)

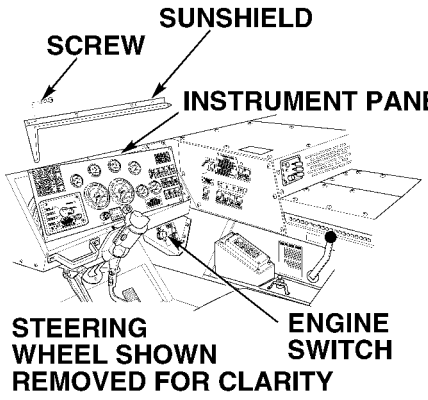
References
TM 9-2320-364-10
TM 9-4910-571-12&P

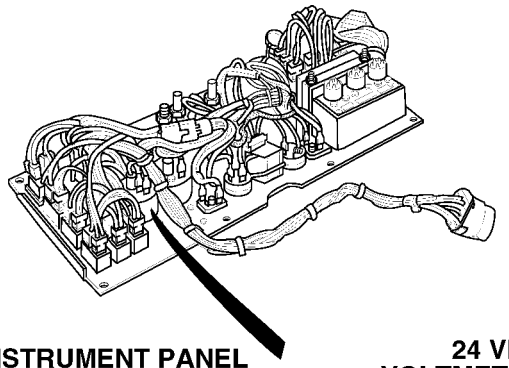
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

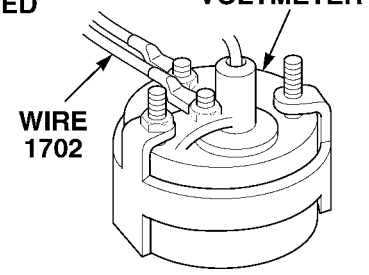


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.





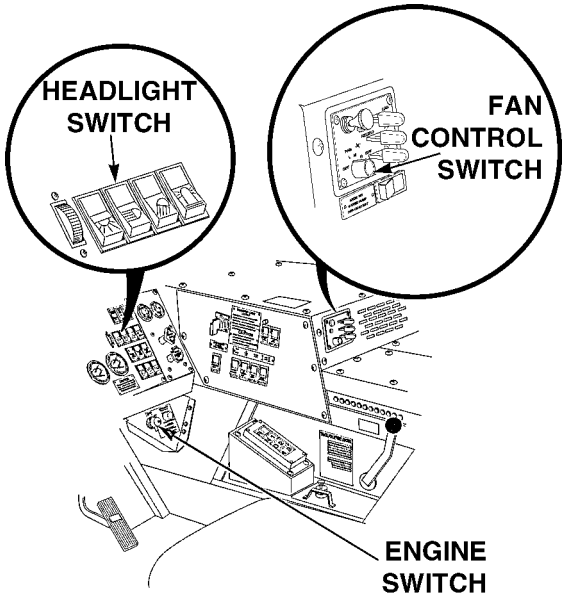


NOTE

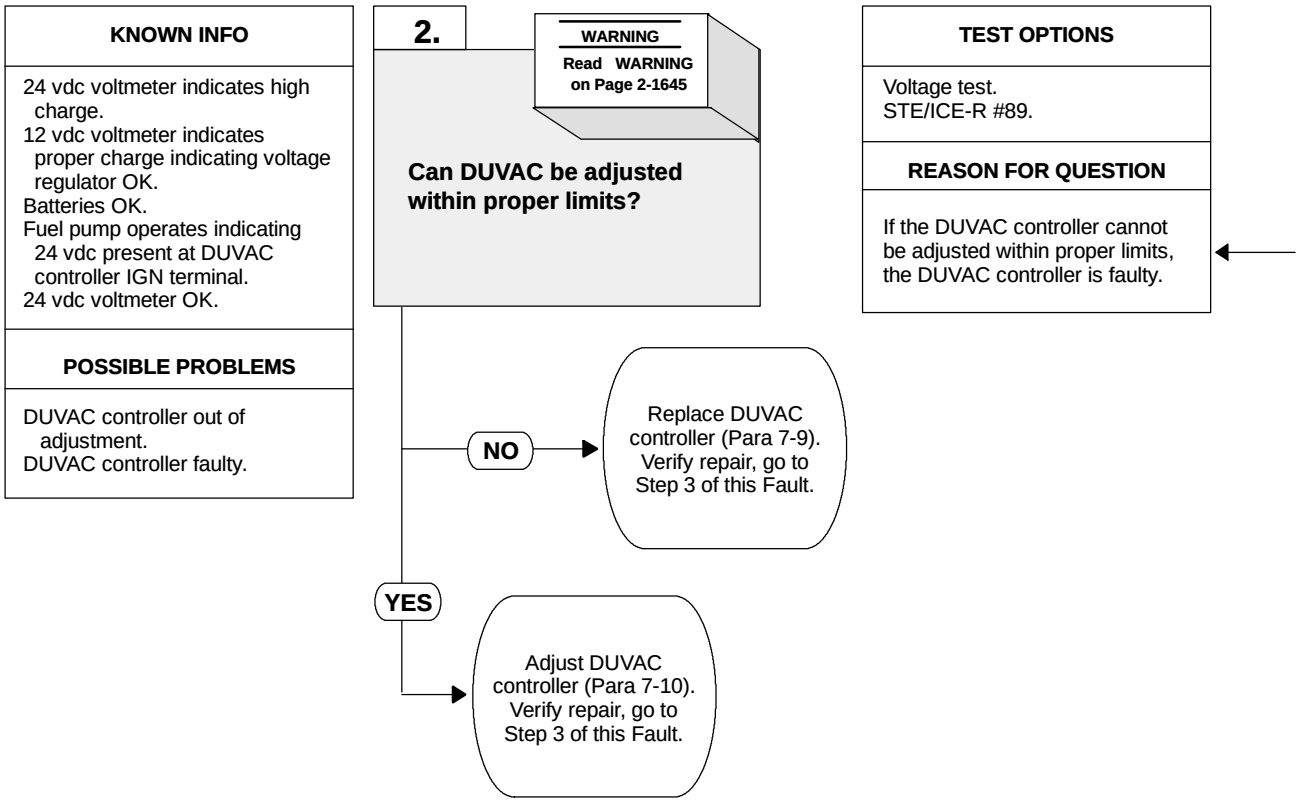
DUVAC controller should reset to the 24 vdc charge mode approximately every 55-60 seconds. Observe 24 vdc voltmeter for at least two minutes to allow the regulator timer to cycle.

VOLTAGE TEST

(1) Remove ten screws, sunshield and tilt instrument panel.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1702 on 24 vdc voltmeter.
(4) Connect negative (–) multimeter lead to known good ground.
(5) Start engine and turn on headlights and heater. (TM 9-2320-364-10)
  (a) If 26-28 vdc are not present, 24 vdc voltmeter is OK. Turn off heater, headlights and engine and go to Step 2 of this fault.
  (b) If 26-28 vdc are present, turn off heater, headlights and engine and replace 24 vdc voltmeter. (Para 7-22)



53. 24 VOLT SYSTEM OVER CHARGING (145 AMP) (CONT.)



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CAUTION

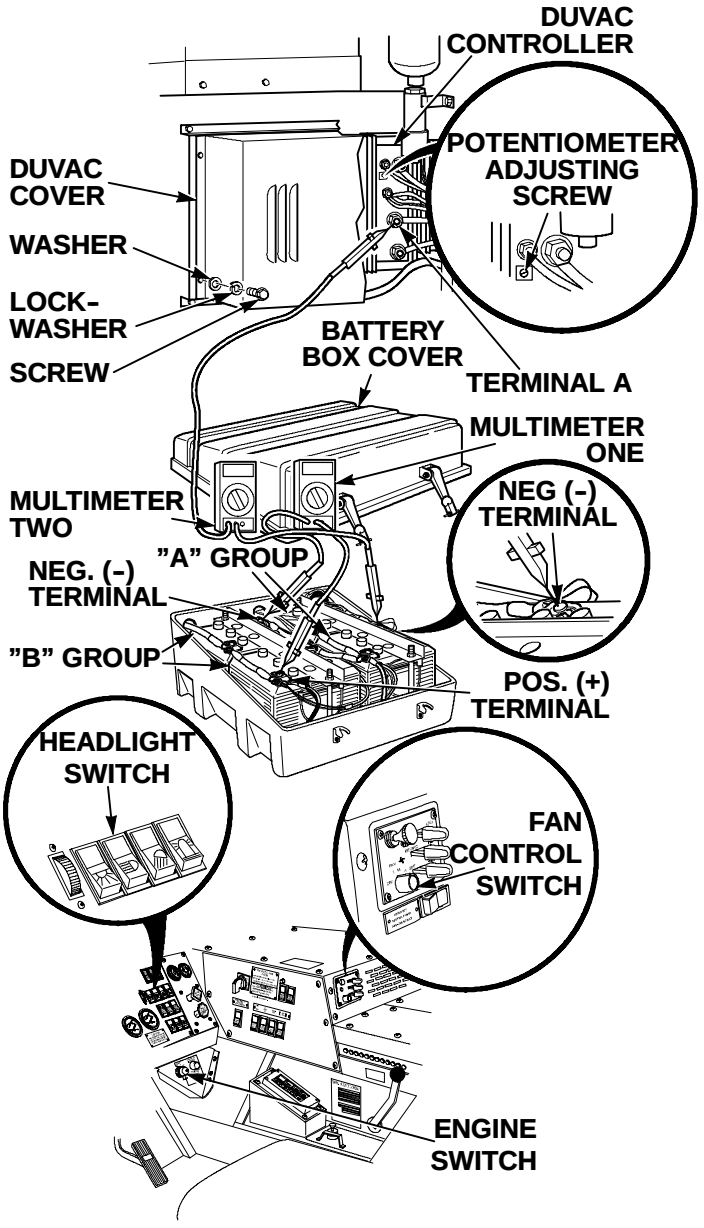
Use caution when turning adjusting screw of potentiometer. Turning adjusting screw with too much force may damage potentiometer.

NOTE

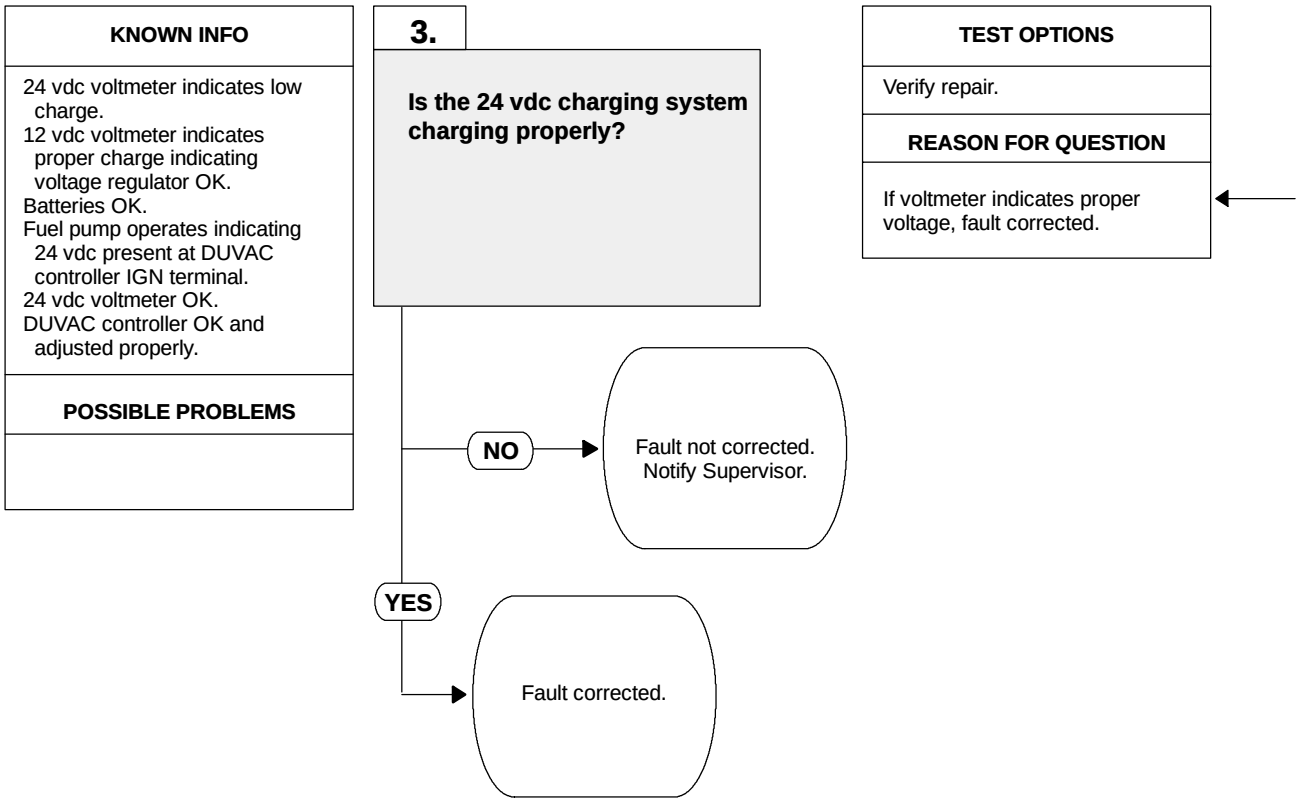
- DUVAC controller resets to the 24vdc charge mode approximately every 55 seconds. Make sure multimeter two reads 26-30 vdc indicating the system is in the 24 vdc charge mode while reading on multimeter one is taken.
- Charging voltage is adjusted by turning adjusting screw on potentiometer on DUVAC controller. Turning to the right increases voltage. Turning to the left decreases voltage.

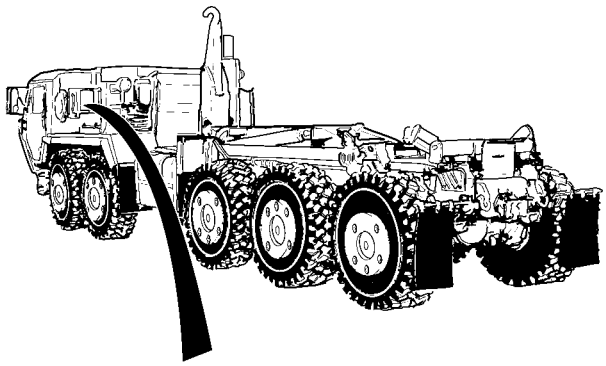
VOLTAGE TEST

(1) Remove four screws, lockwashers, washers and DUVAC cover. Discard lockwashers.
(2) Remove battery box cover and connect multimeter one positive (+) lead to positive (+) terminal of group "B" batteries and multimeter one negative (-) lead to negative (-) terminal on group "B" batteries.
(3) Connect multimeter two positive (+) lead to "A" terminal of DUVAC controller and multimeter two negative (-) lead to negative (-) terminal of group "A" batteries.
(4) Start engine and turn on head lights and heater (TM 9-2320-364-10).
(5) Attempt to adjust DUVAC controller until voltmeter one reads 14.3-14.6 vdc.
    (a) If 14.3-14.6 vdc cannot be obtained, turn off heater, headlights and engine switch and replace DUVAC controller. (Para 7-9)
    (b) If 14.3-14.6 vdc can be obtained, fault corrected. Turn off heater, headlights and engine switch.



53. 24 VOLT SYSTEM OVER CHARGING (145 AMP) (CONT.)



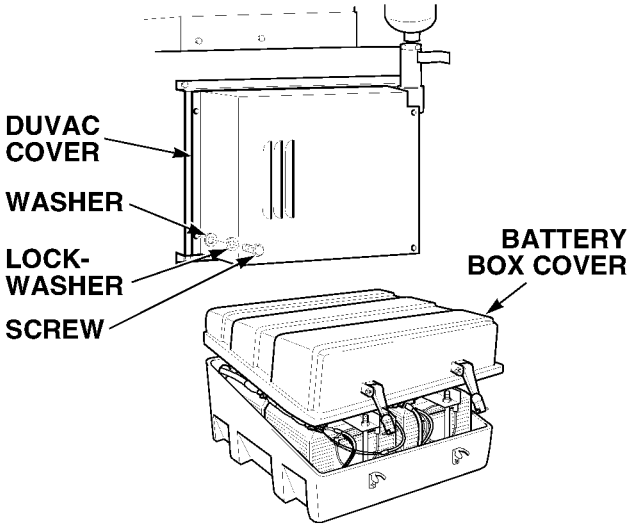


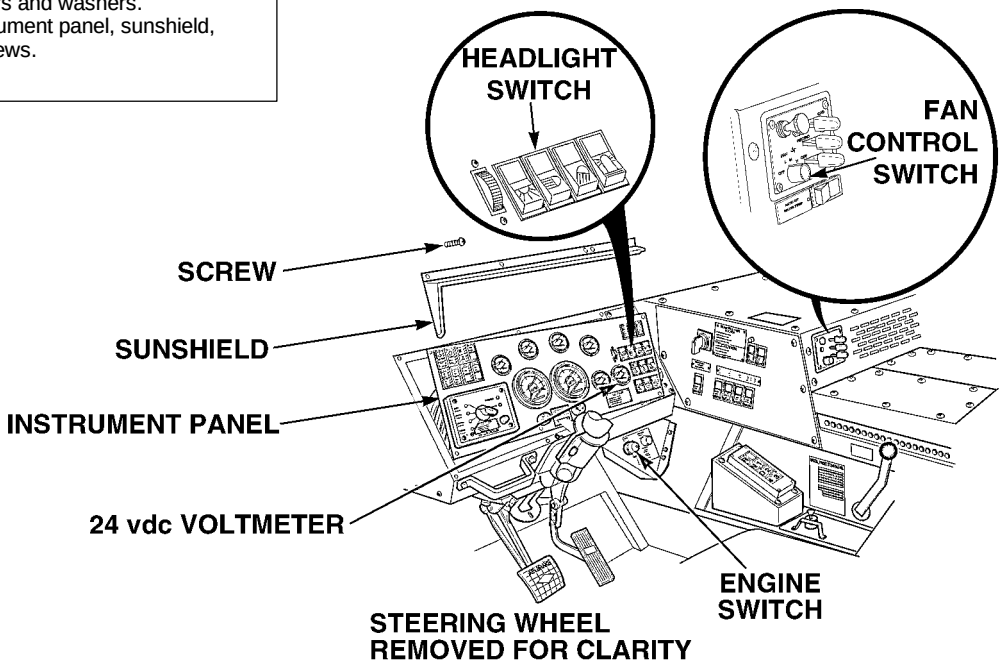
NOTE

DUVAC controller should reset to the 24 vdc charge mode approximately every 55-60 seconds. Observe 24 vdc voltmeter for at least two minutes to allow the regulator timer to cycle.

VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
   (a) If 26-28 vdc are not indicated on 24 vdc voltmeter, fault not corrected. Perform Steps (2) through (5) below and notify Supervisor.
   (b) If 26-28 vdc are indicated on 24 vdc voltmeter, fault has been corrected.
(2) Turn off heater, headlights and engine switch.
(3) Install battery box cover.
(4) Install DUVAC cover with four screws, lockwashers and washers.
(5) Install instrument panel, sunshield, and 10 screws.





2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT).

54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP).

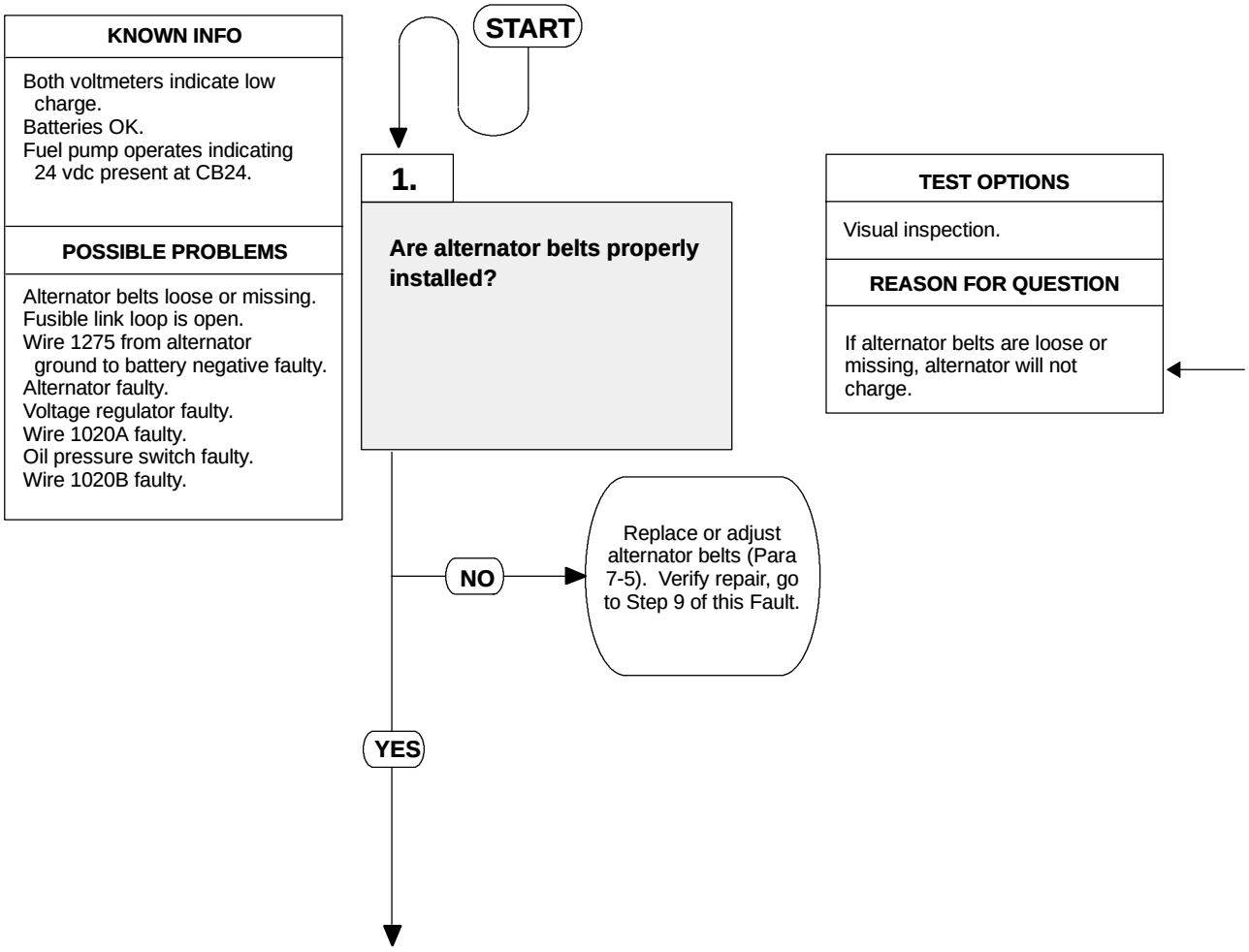
INITIAL SETUP

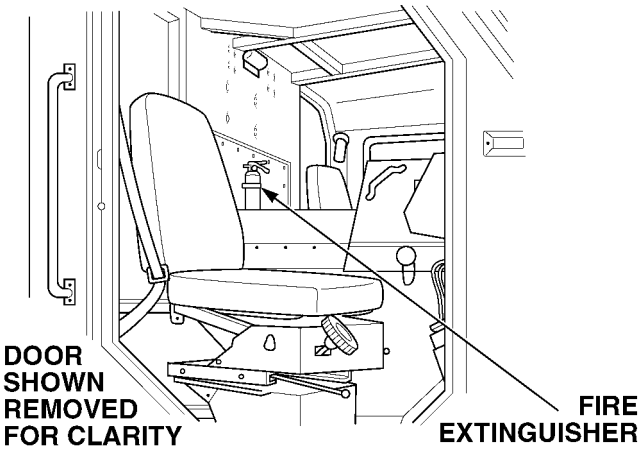
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (Optional) (Item 3, Appendix G)
Gage, Belt Tension (Item 26, Appendix G)
Multimeter (Item 44, Appendix G)
Jumperwire

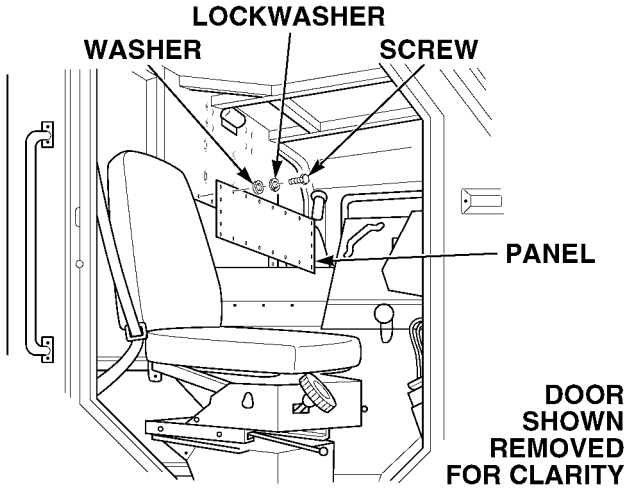
Materials/Parts
Tag, Identification (Item 88, Appendix C)
Lockwasher (22) (Item 171, Appendix F)
Lockwasher (Item 208, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

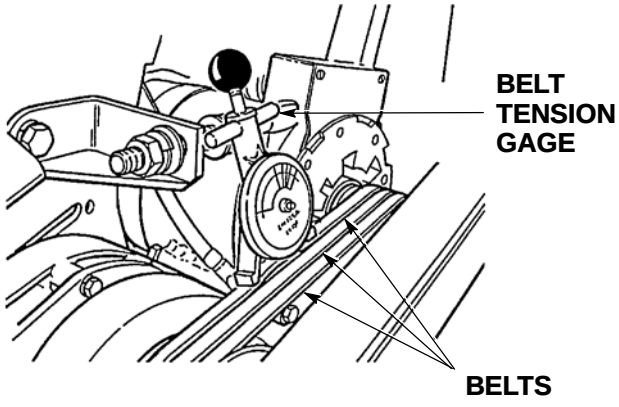




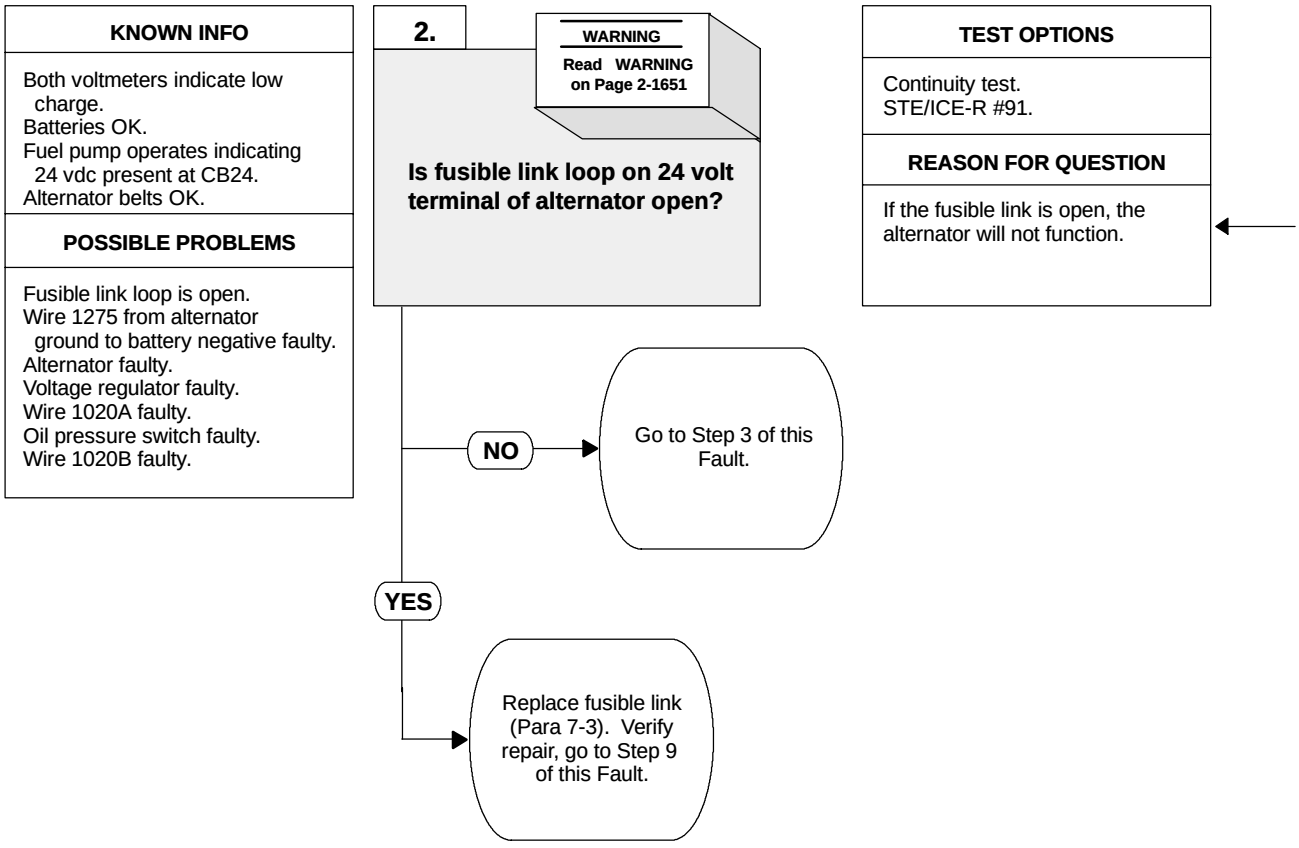


VISUAL INSPECTION

(1) Remove fire extinguisher (TM 9-2320-364-10).
(2) Remove 22 screws, lockwashers, washers and cab engine access panel from cab. Discard lockwashers.
(3) Inspect that belts are installed and are in good condition.
  (a) If belts are not installed or are not in good condition, install new belts (Para 7-5).
  (b) If belts are installed and are in good condition, perform Step (4) below.
(4) Install belt tension gage on each belt. Belt tension gage must read between 60 to 65 lbs (260-289 N).
  (a) If belt tension gage does not measure between 60 to 65 lbs (260-289 N), adjust alternator belts (Para 7-5).
  (b) If belt tension gage does measure between 60 to 65 lbs (260-289 N), go to Step 2 of this Fault.



54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).

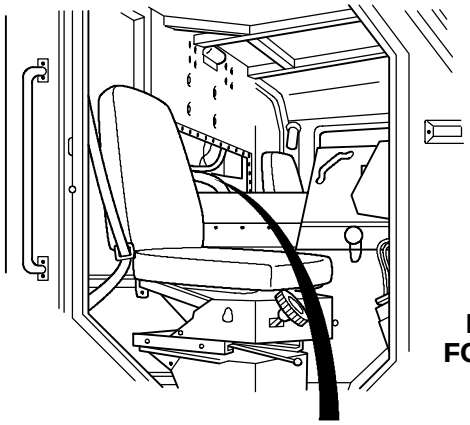


WARNING

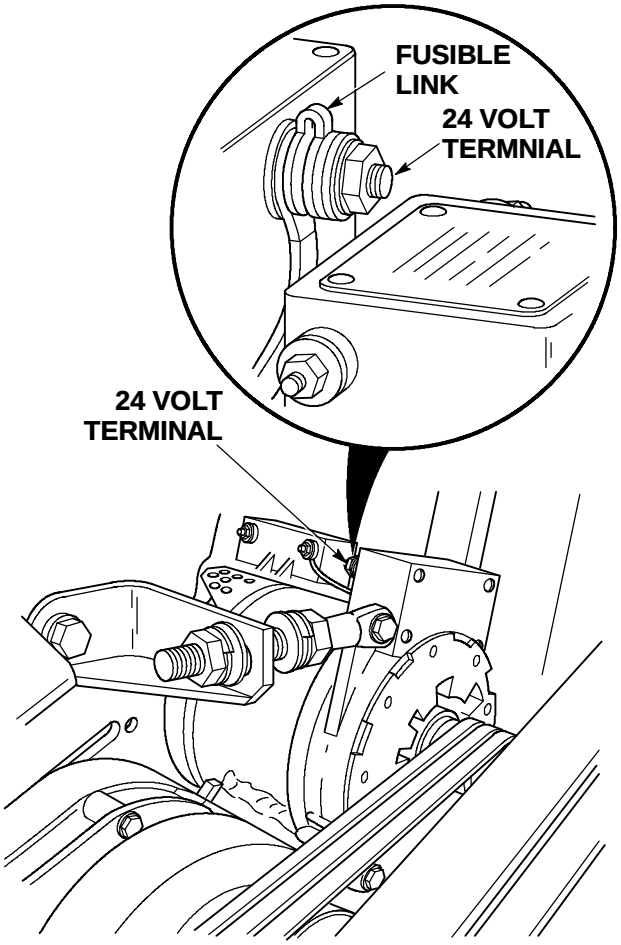
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CONTINUITY TEST

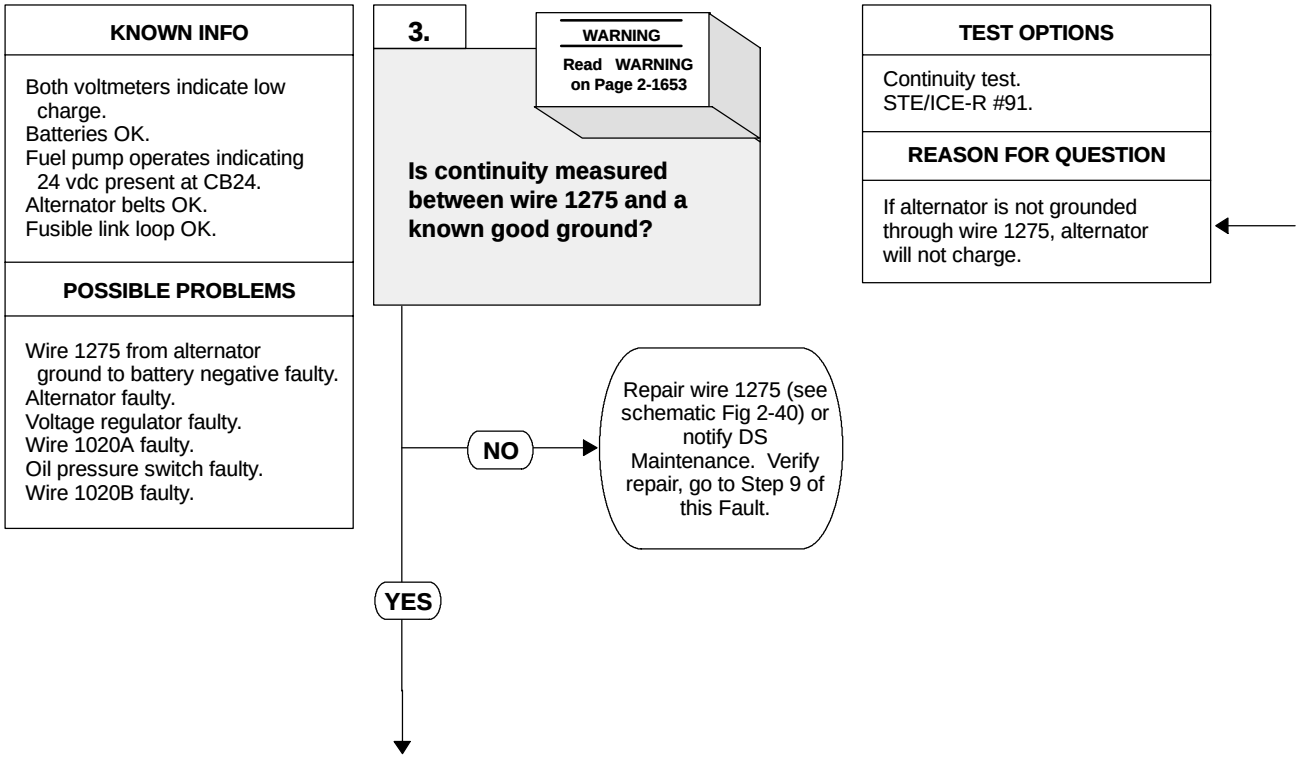
(1) Set multimeter select switch to ohms.
(2) Is there continuity between each side of the fusible link located on the 24 volt terminal of the alternator?
   (a) If there is no continuity replace fusible link (Para 7-3).
   (b) If there is continuity, fusible link is OK.



DOOR SHOWN REMOVED FOR CLARITY



54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).



WARNING

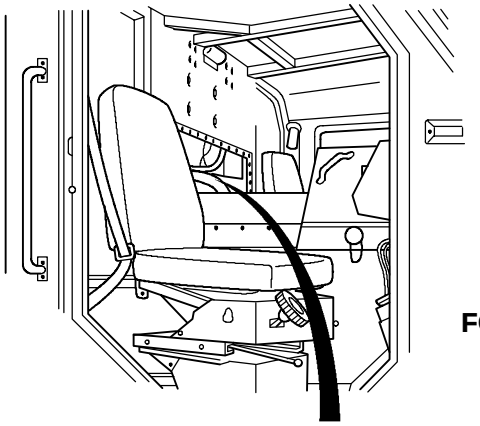
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

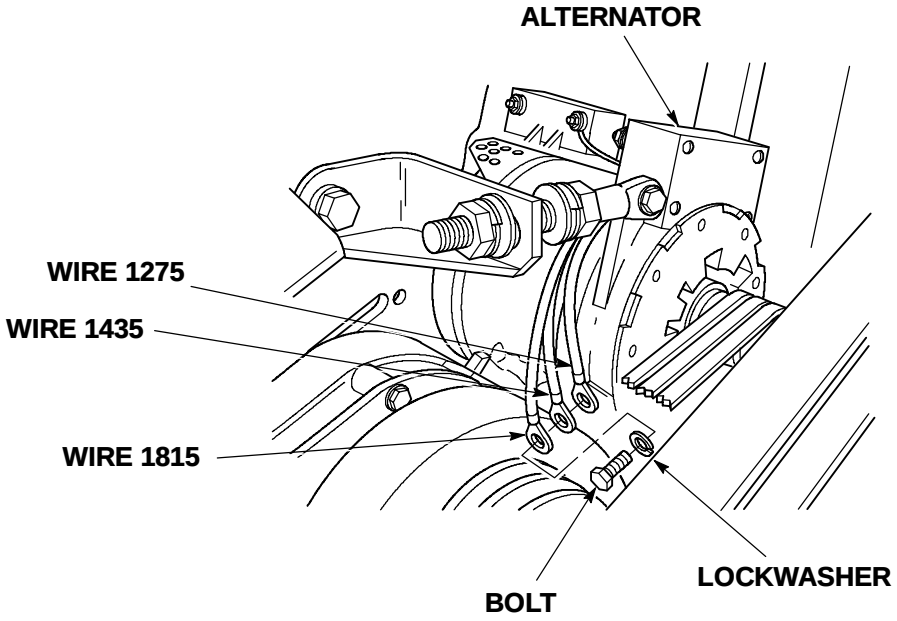
Tag and mark wires before removal.

CONTINUITY TEST

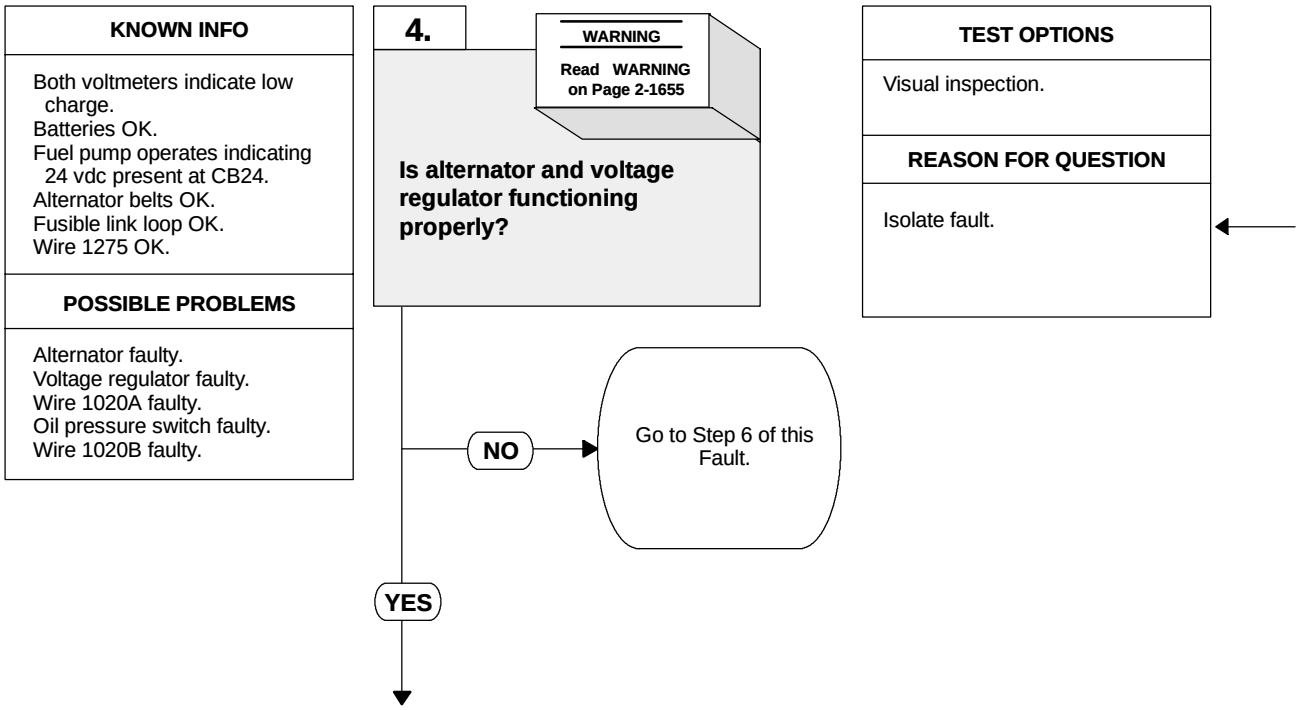
(1) Remove bolt, lockwasher and wires 1275, 1435 and 1815 from alternator. Discard lockwasher.
(2) Set multimeter select switch to ohms.
(3) Is there continuity measured on wire 1275 and a known good ground?
   (a) If there is no continuity, repair wire 1275 (see schematic Fig 2-40) or notify DS Maintenance.
   (b) If there is continuity, wire 1275 is OK.
(4) Install wires 1275, 1815, and 1435 on alternator with lockwasher and bolt.



DOOR SHOWN REMOVED FOR CLARITY



54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

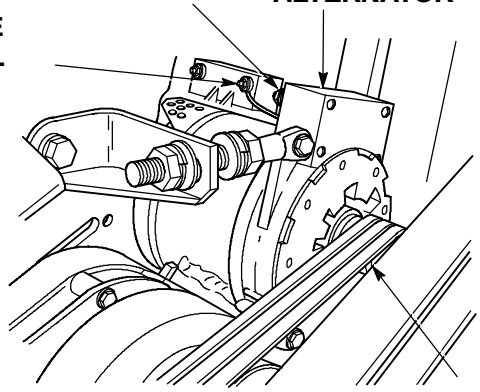
Make a jumperwire 12 inches long from 14 AWG wire with alligator clips at each end.

VISUAL INSPECTION

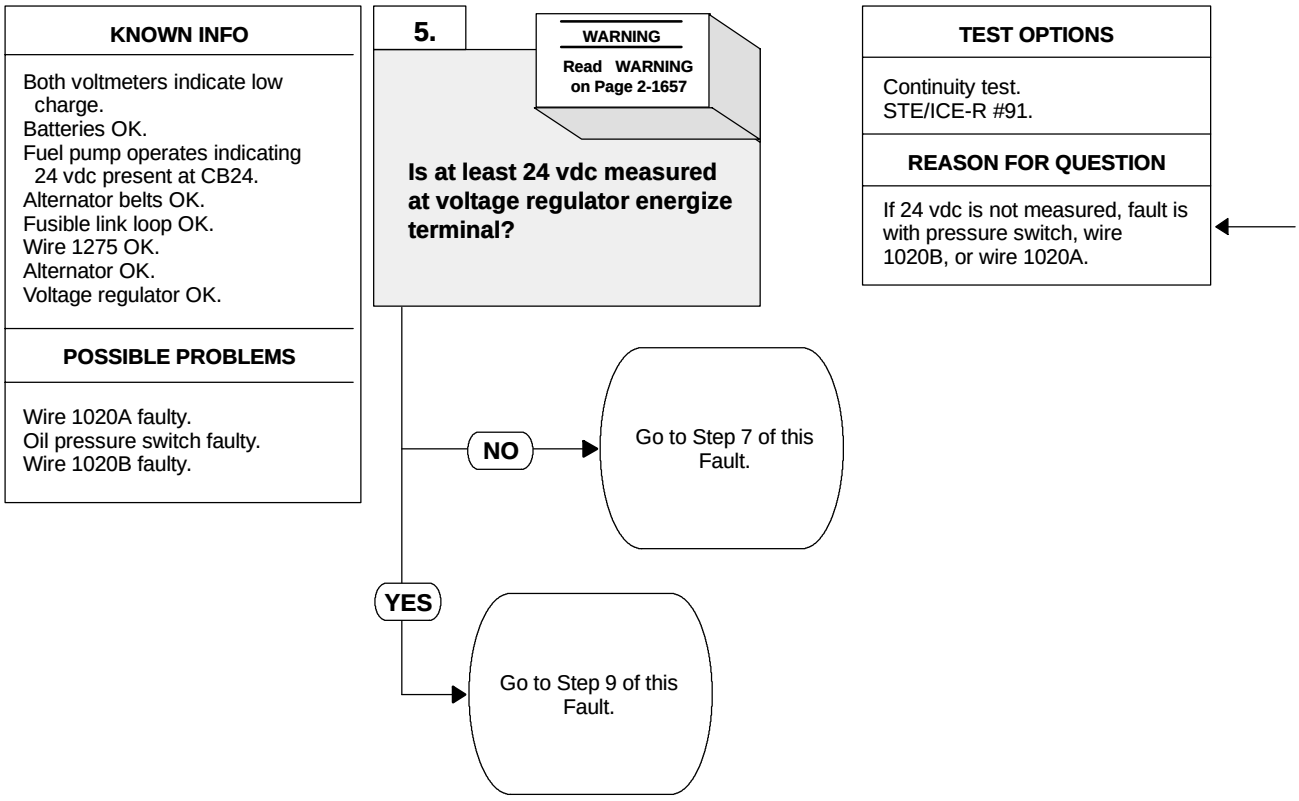
(1) Position jumperwire on 24 volt terminal of alternator and on energize terminal of voltage regulator.
(2) Hold a steel screwdriver or wrench next to alternator pulley.
   (a) If steel tool is attracted, disconnect jumperwire to release steel tool and go to Step 5 of this Fault.
   (b) If steel tool is not attracted, fault may be with alternator or voltage regulator. Disconnect jumperwire and go to Step 6 of this Fault.



DOOR SHOWN REMOVED FOR CLAIRTY



54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).



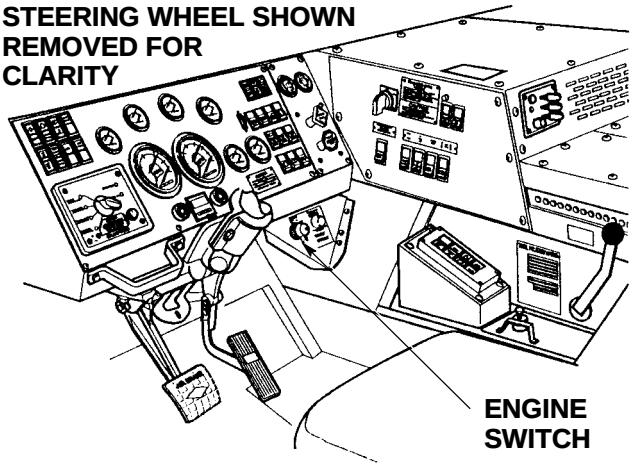
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.

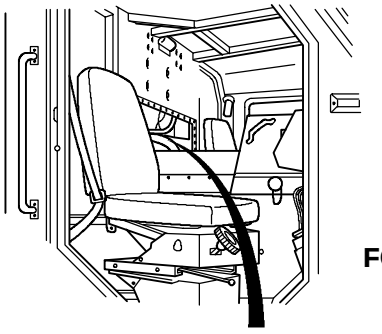
CONTINUITY TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to the energize terminal of the voltage regulator.
(3) Connect negative (-) multimeter lead to known good ground.
(4) Start engine (TM 9-2320-364-10).
  (a) If at least 24 vdc are not present, turn off engine and go to Step 9 of this Fault.
  (b) If at least 24 vdc are present, turn off engine and go to Step 11 of this Fault.
(5) Turn OFF ENGINE switch.

STEERING WHEEL SHOWN REMOVED FOR CLARITY

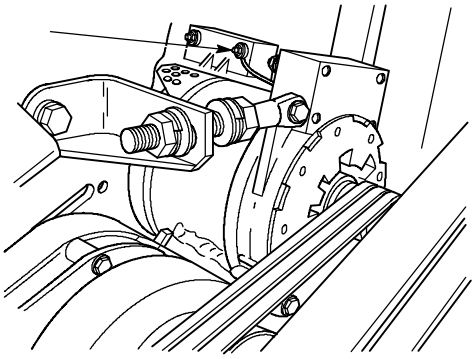


ENGINE SWITCH

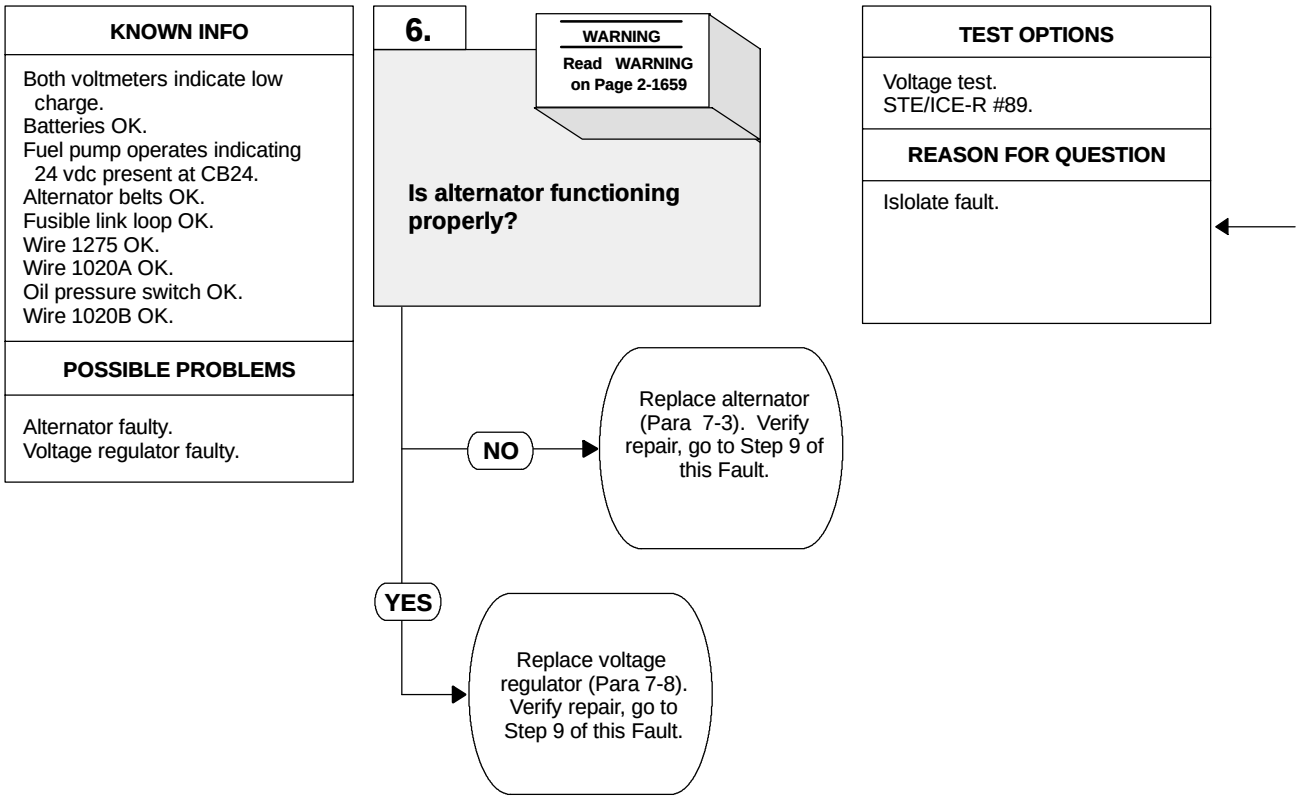


DOOR SHOWN REMOVED FOR CLAIRTY

ENERGIZE TERMINAL



54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).

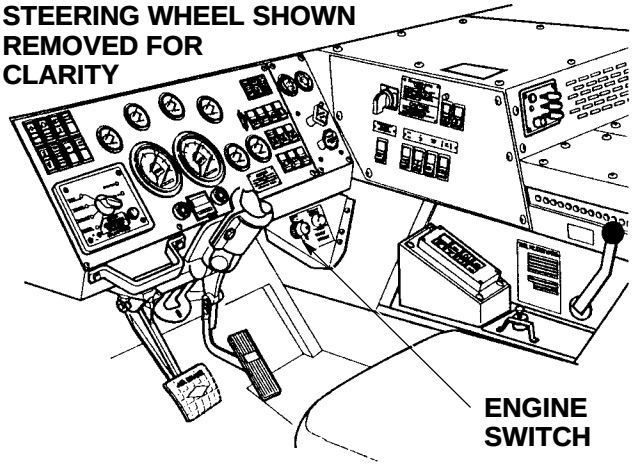


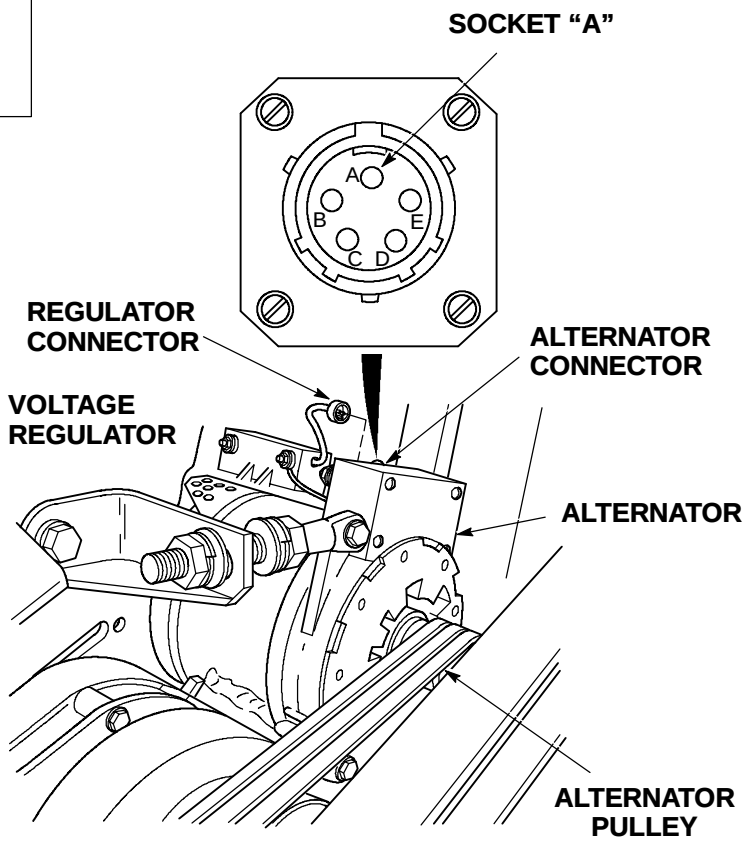
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

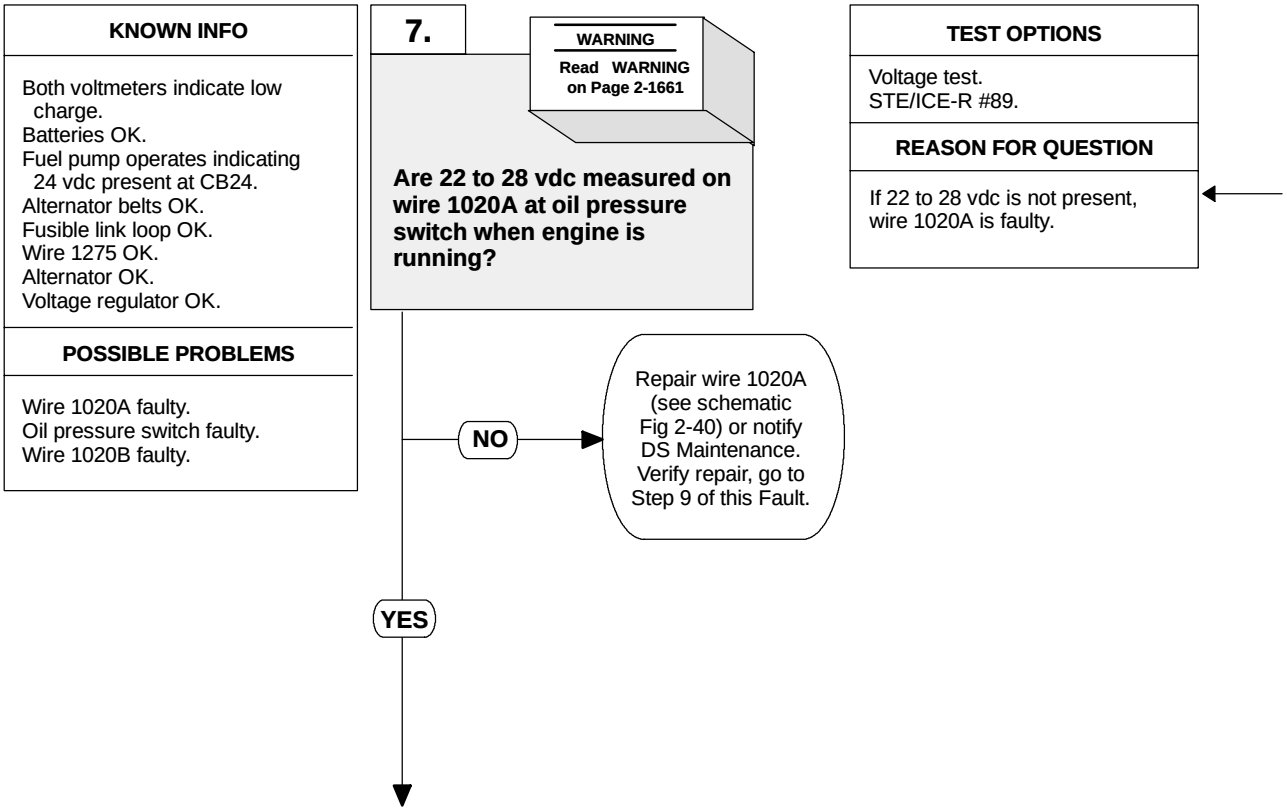
VOLTAGE TEST

(1) Remove voltage regulator connector from alternator connector.
(2) Position positive (+) multimeter lead to socket in position "A" on alternator connector.
(3) Position negative (–) multimeter lead to a known good ground.
  (a) If 22 to 28 vdc are present, replace voltage regulator (Para 7-8).
  (b) If 22 to 28 vdc are not present, replace alternator (Para 7-3).
(4) Connect voltage regulator connector to alternator connector.



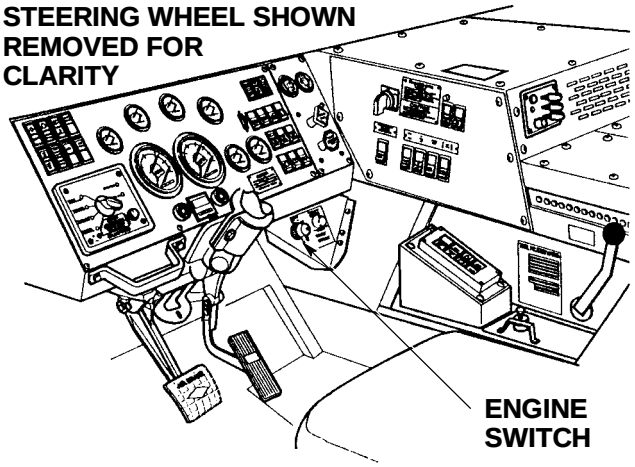


54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).



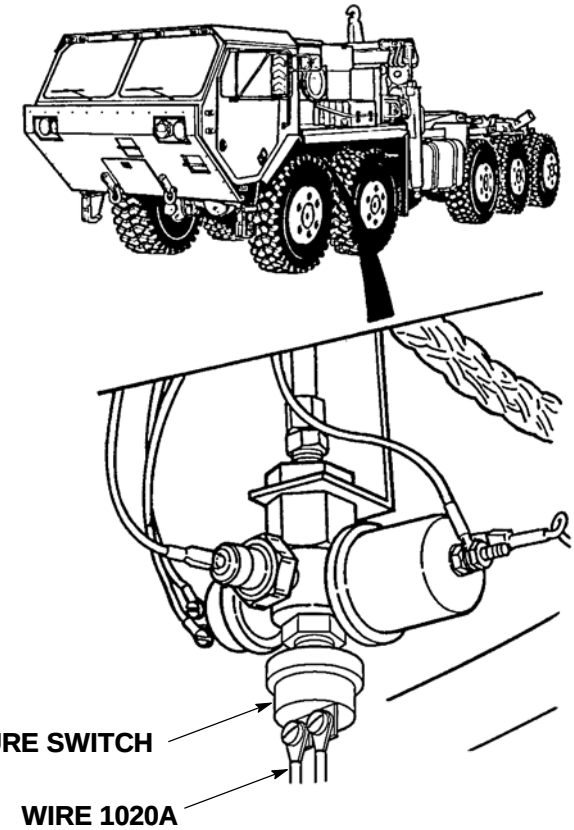
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.

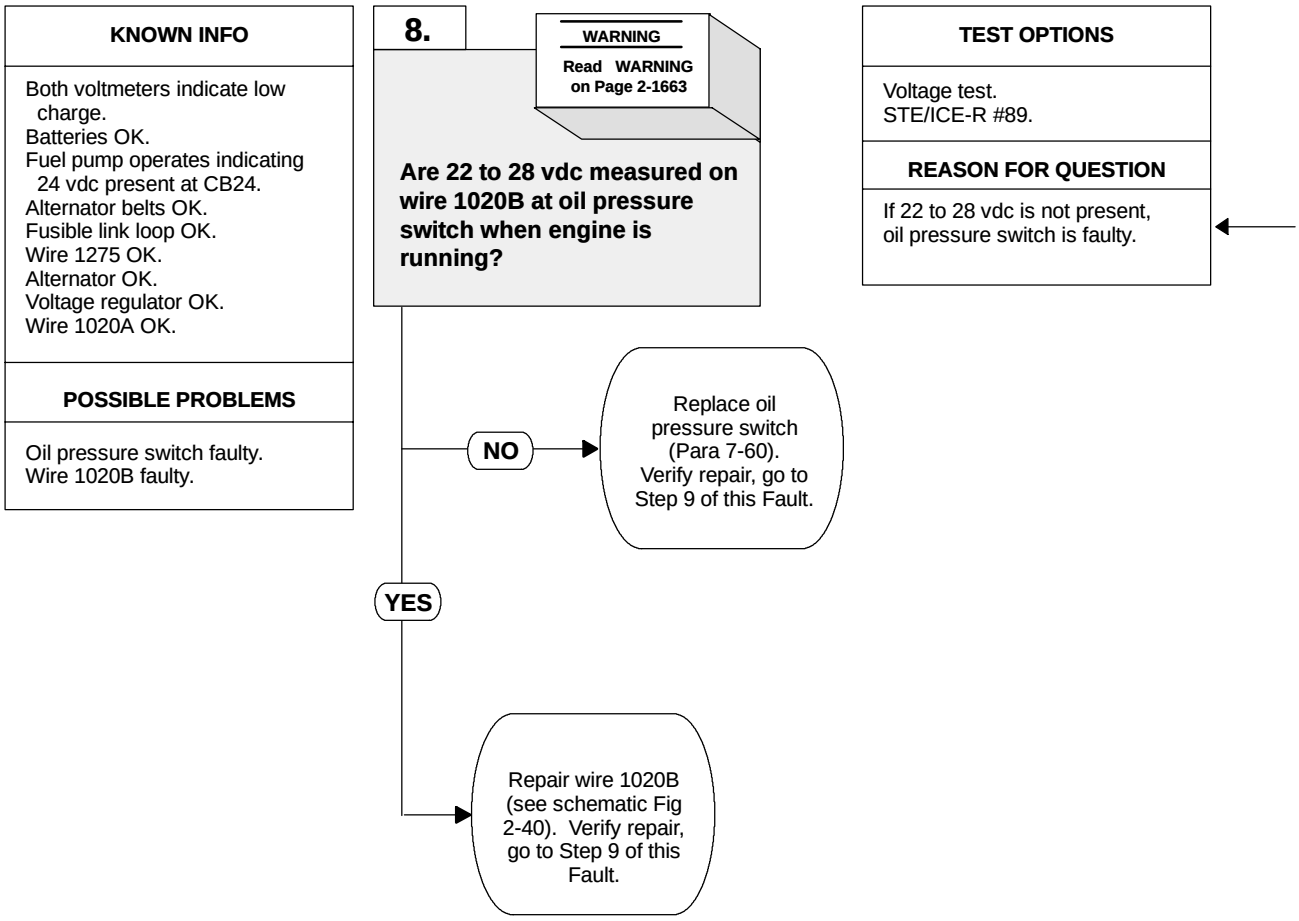


VOLTAGE TEST

(1) Set multimeter select switch to volts dc.
(2) Connect positive (+) multimeter lead to wire 1020A at oil pressure switch.
(3) Connect negative (-) multimeter lead to a known good ground.
(4) Turn ON engine switch (TM 9-2320-364-10).
  (a) If 22 to 28 vdc are not present, perform Step (5) below and and repair wire 1020A (see schematic Fig 2-40) or notify DS Maintenance.
  (b) If 22 to 28 vdc are present, wire 1020A is OK.
(5) Turn OFF ENGINE switch.



54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).

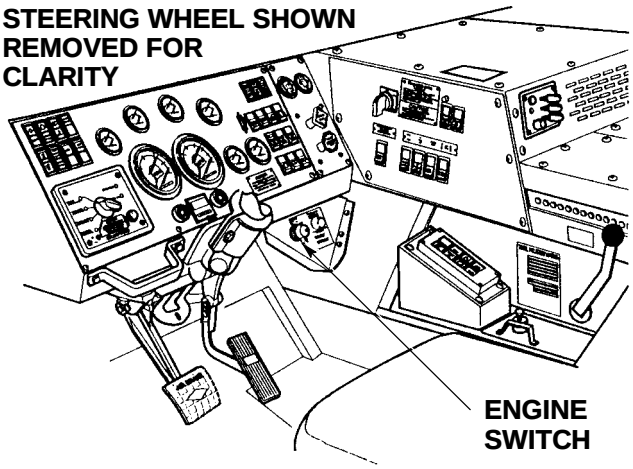


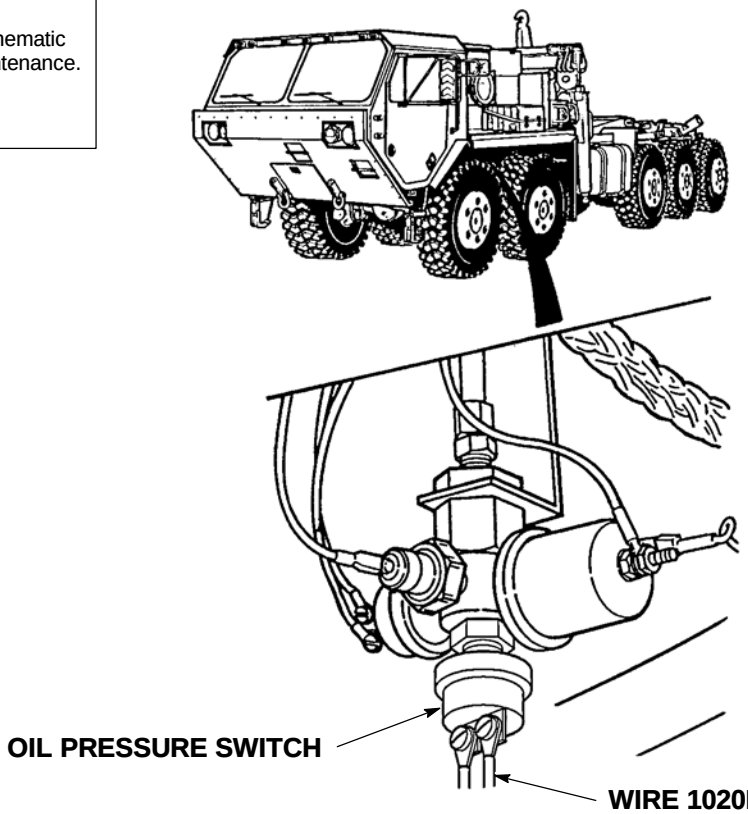
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

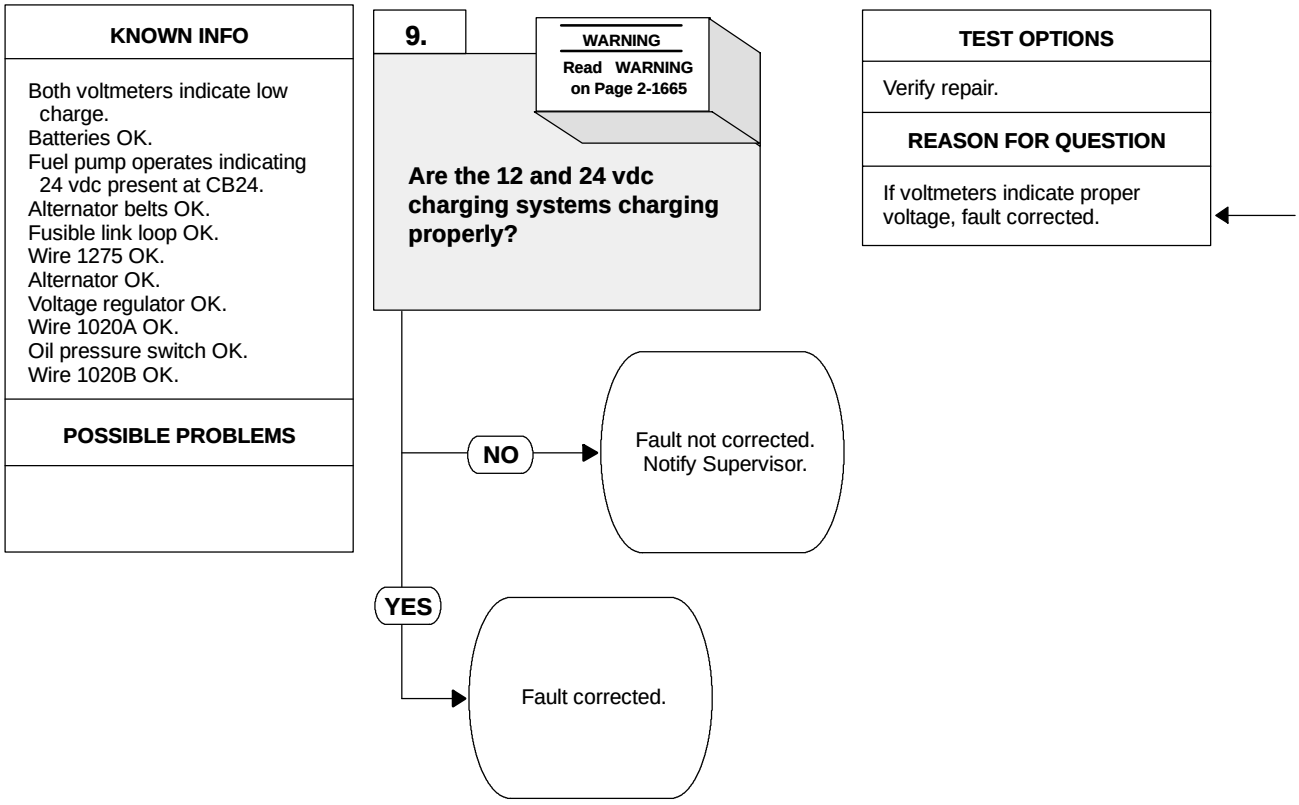
VOLTAGE TEST

(1) Connect positive (+) multimeter lead to wire 1020B at oil pressure switch.
(2) Connect negative (-) multimeter lead to a known good ground.
(3) Start engine (TM 9-2320-364-10).
  (a) If 22 to 28 vdc is not present, perform Step (4) below and replace oil pressure switch (Para 7-60).
  (b) If 22 to 28 vdc is present, repair wire 1020B (see schematic Fig 2-40) or notify DS Maintenance.
(4) Turn OFF ENGINE switch.



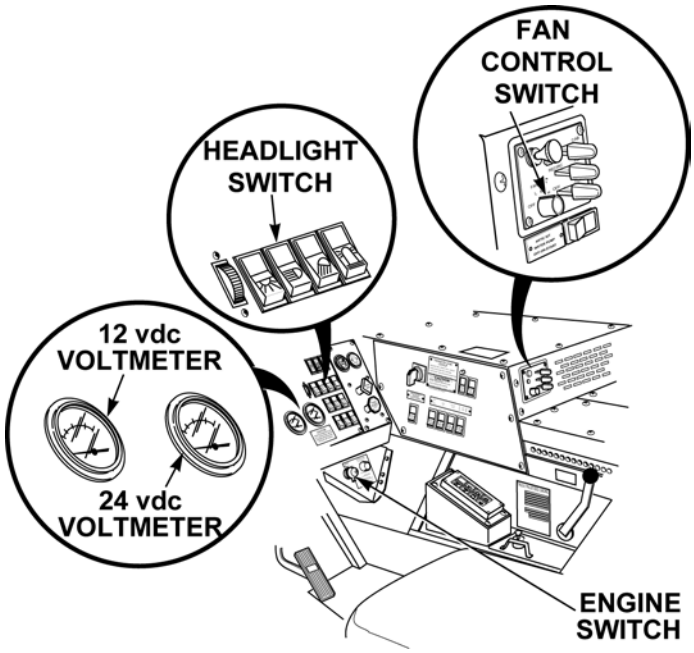


54. 12 AND 24 VOLT SYSTEMS NOT CHARGING OR UNDER CHARGING (200 AMP) (CONT).



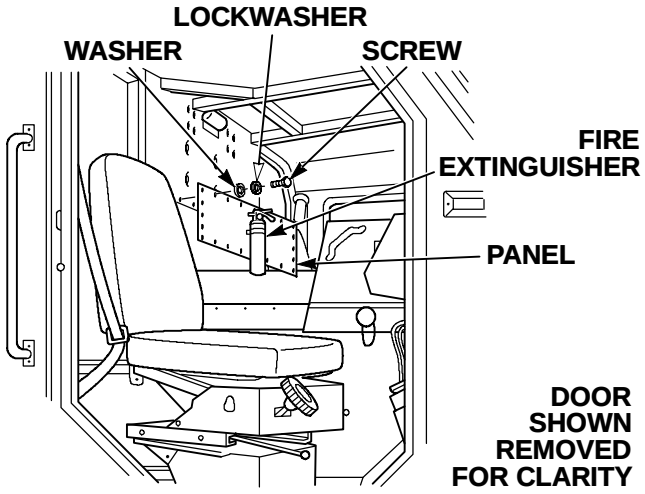
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.



VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
  (a) If 13-14 vdc are not indicated on 12 vdc voltmeter and 26-28 vdc are not indicated on 24 vdc voltmeter, fault not corrected. Perform Steps (2) through (4) below and notify Supervisor.
  (b) If 13-14 vdc are indicated on 12 vdc voltmeter and 26-28 vdc are indicated on 24 vdc voltmeter, fault has been corrected.
(2) Turn off heater, headlights and engine switch.
(3) Install cab engine access panel with 22 screws, lockwashers and washers.
(4) Install fire extinguisher.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT.)

55. 12 VOLT SYSTEM OVER OR UNDER CHARGING (200 AMP).

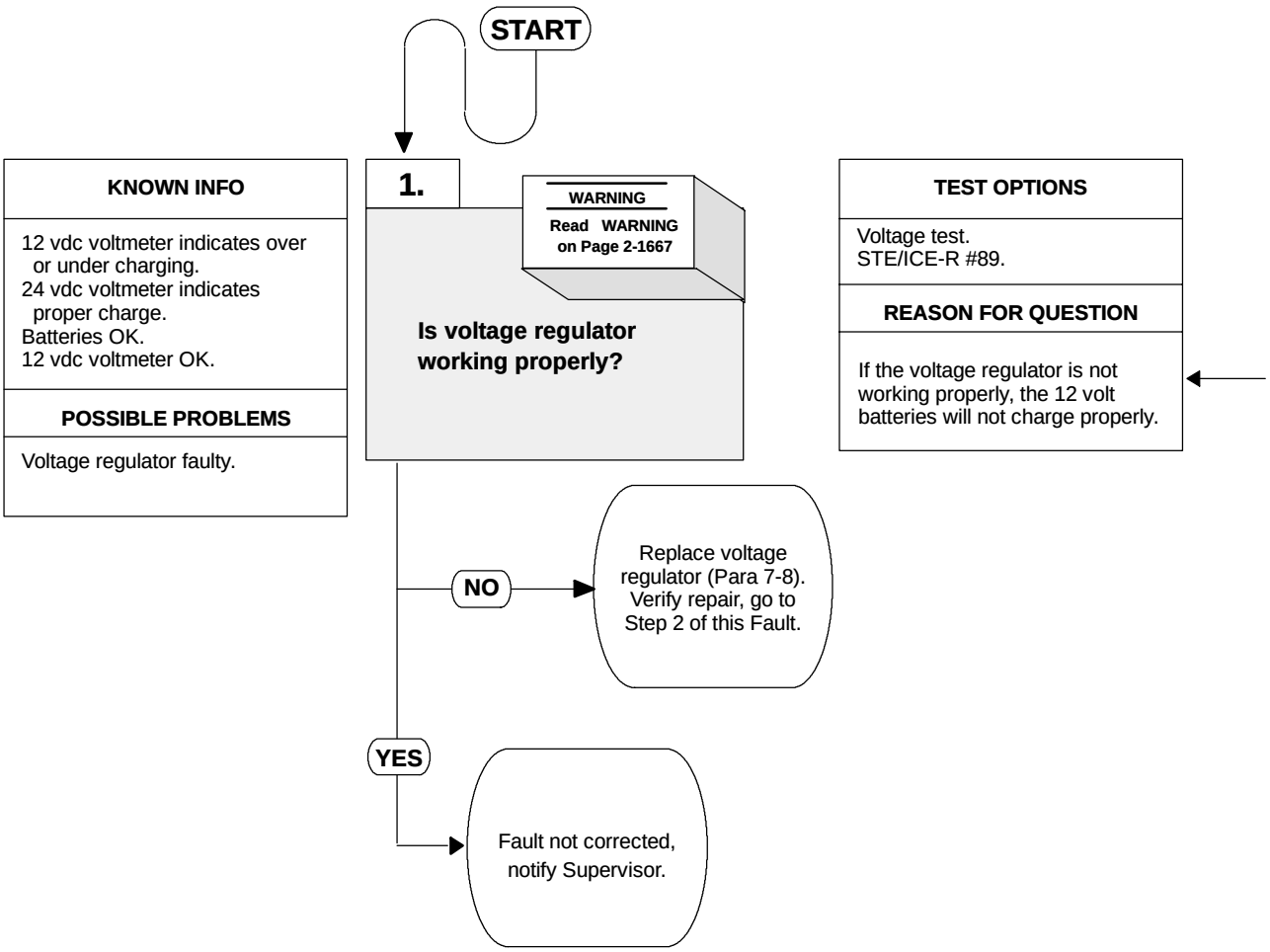
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Lockwasher (4) (Item 171, Appendix F)

References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

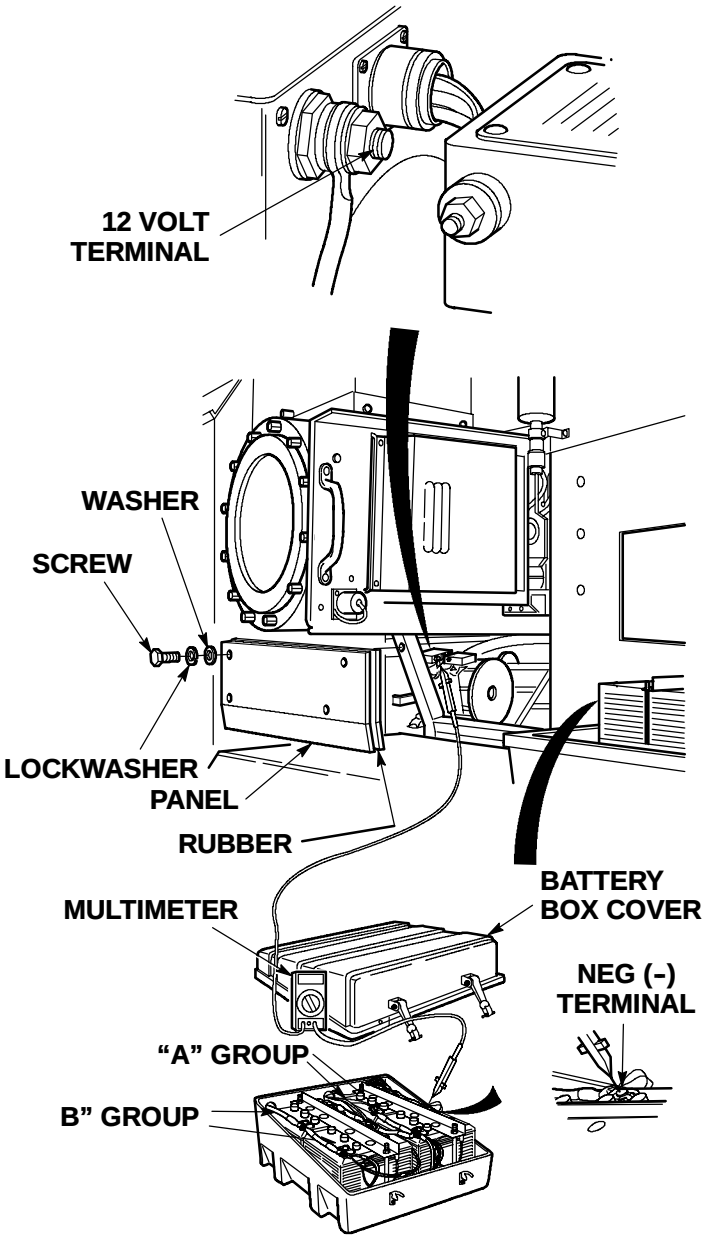


WARNING

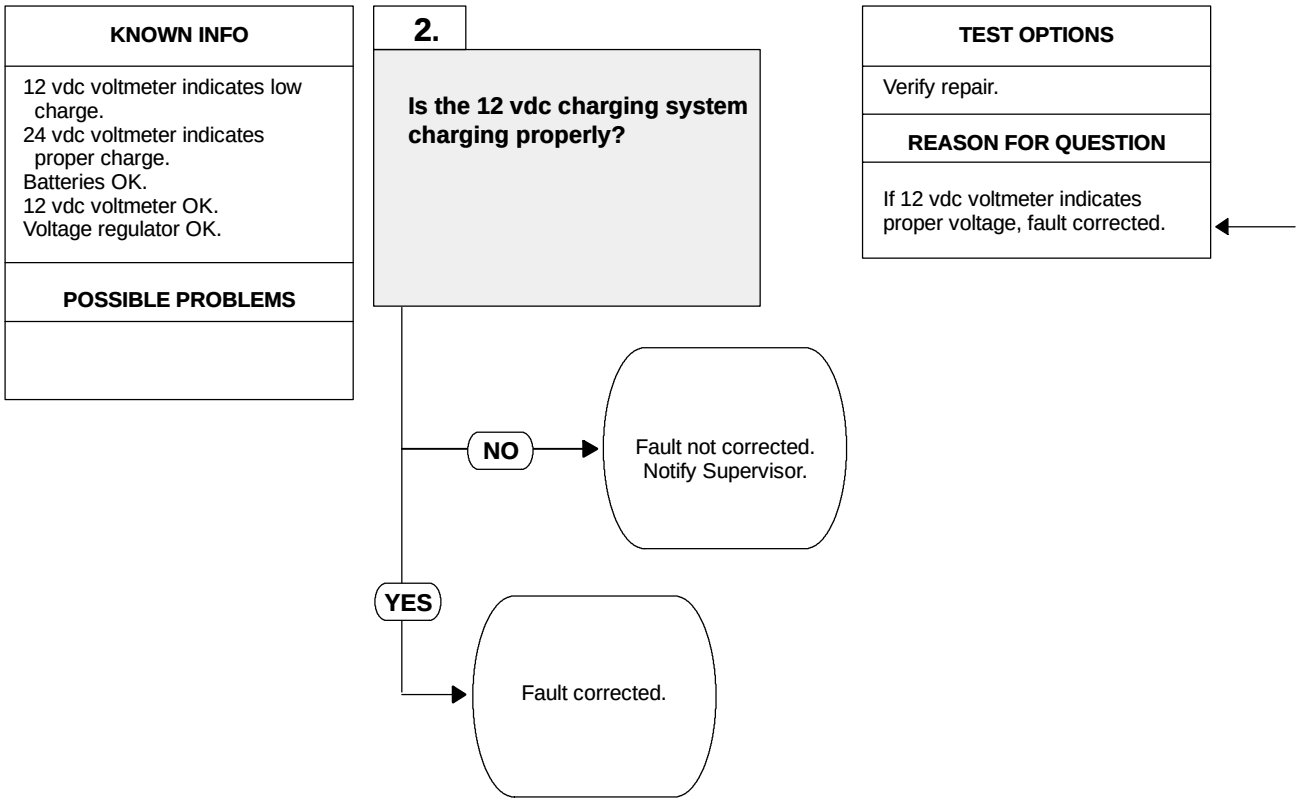
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.

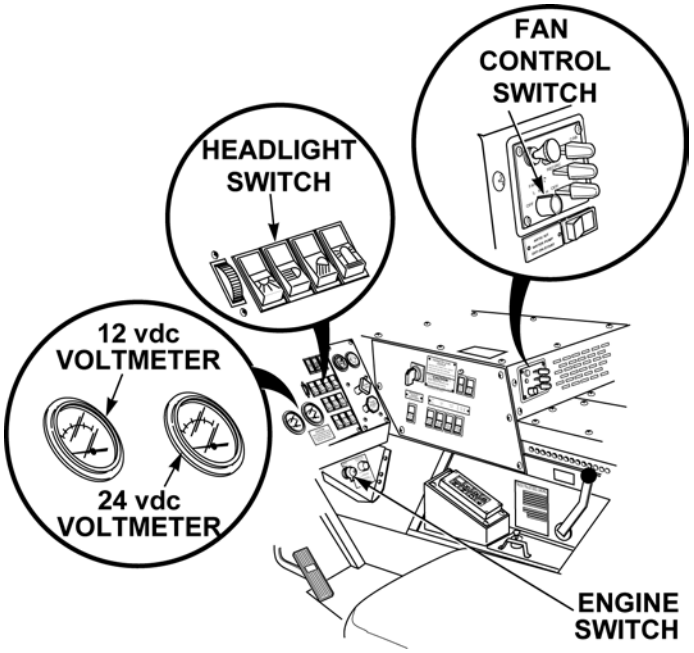
VOLTAGE TEST

(1) Remove battery box cover (TM 9-2320-364-10).
(2) Remove four screws, lockwashers, washers, rubber and left front side noise panel. Discard lockwashers.
(3) Set multimeter select switch to volts dc on multimeter.
(4) Connect multimeter positive (+) lead to 12 volt terminal of alternator and multimeter negative (-) lead to negative (-) terminal of group "A" batteries.
(5) Start engine and turn on headlights and heater.
(6) Observe voltage indicated on multimeter.
  (a) If 13.8 - 14.2 vdc are not present, replace voltage regulator (Para 7-8).
  (b) If 13.8 - 14.2 vdc are present, voltage regulator is OK.
(7) Turn off heater, headlights and engine.



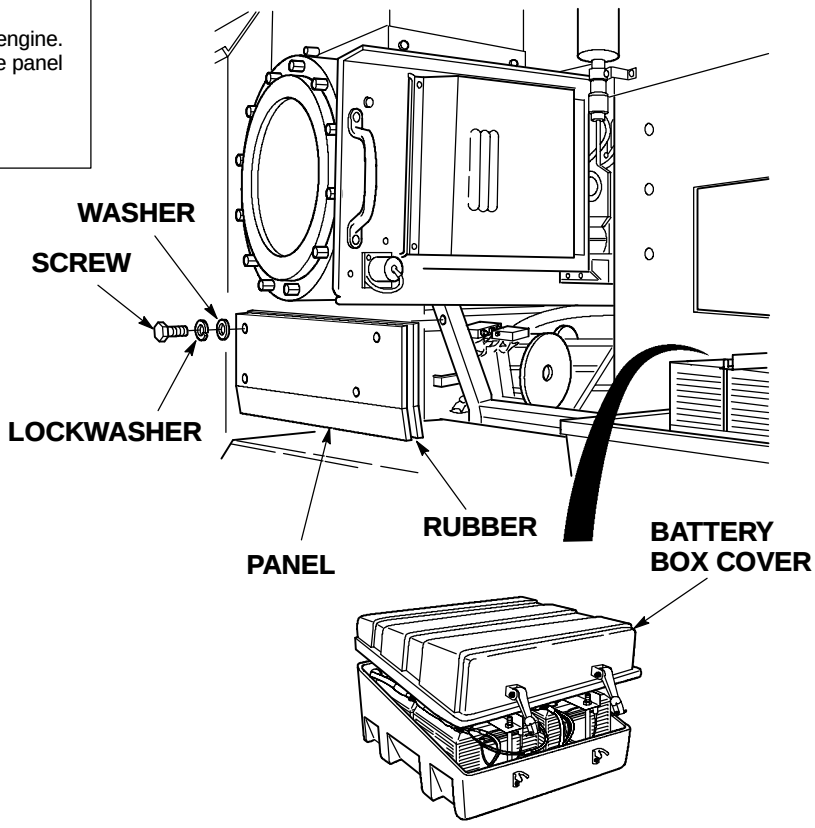
55. 12 VOLT SYSTEM OVER OR UNDER CHARGING (200 AMP) (CONT).





VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
  (a) If 13-14 vdc are not indicated on 12 vdc voltmeter, fault not corrected. Perform Step (2) below and notify supervisor.
  (b) If 13-14 vdc are indicated on 12 vdc voltmeter, fault has been corrected.
(2) Turn off heater, headlights and engine.
(3) Install rubber and left front noise panel with four screws, lockwashers and washers.
(4) Install battery box cover.



2-20. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT.)

56. 24 VOLT SYSTEM OVER OR UNDER CHARGING (200 AMP).

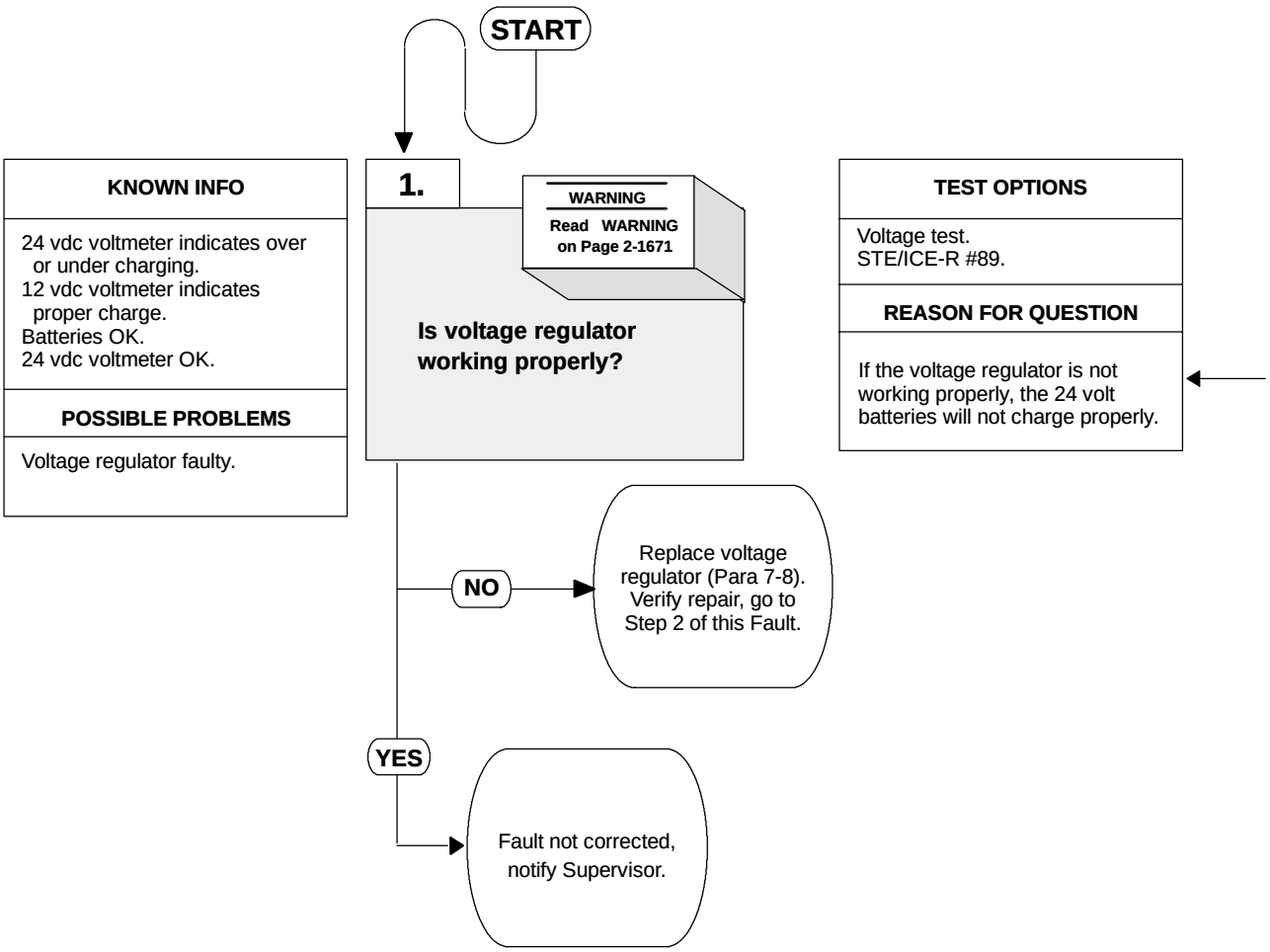
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
STE/ICE-R (optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Lockwasher (4) (Item 171, Appendix F)

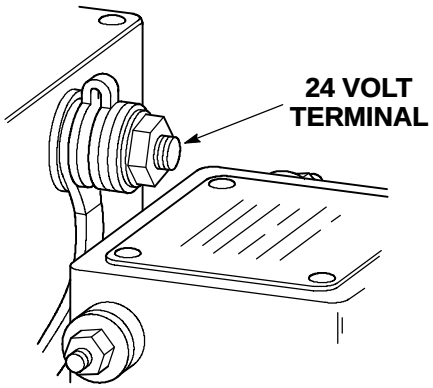
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



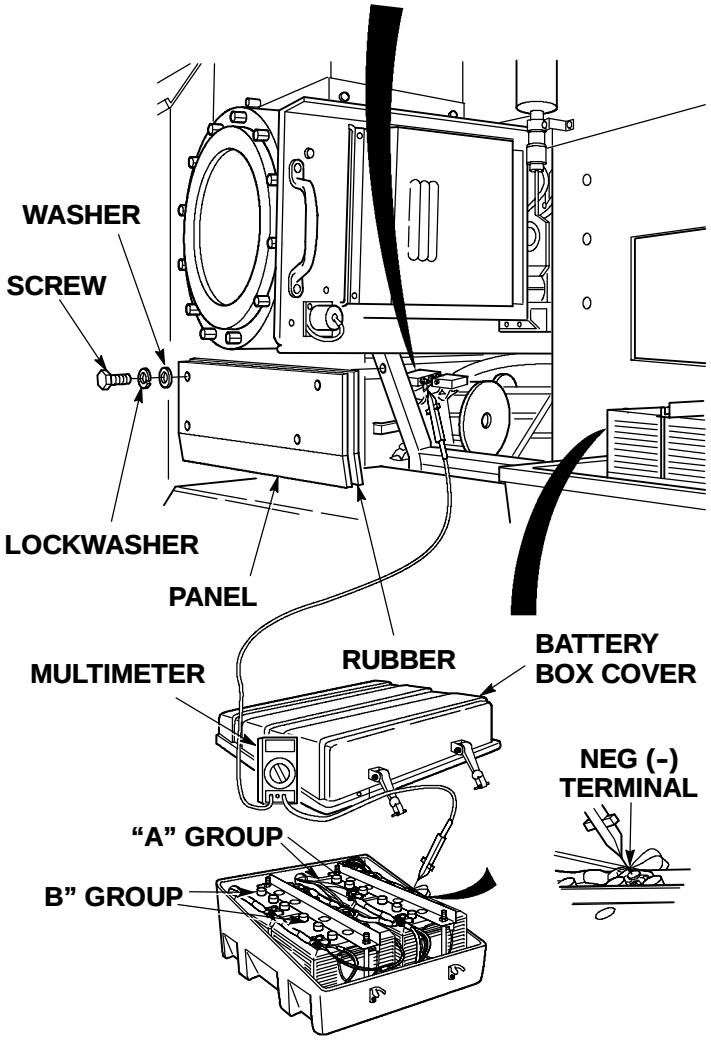
WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Alternator is capable of producing over 40 vdc. Be careful when taking a voltage reading not to get shocked.

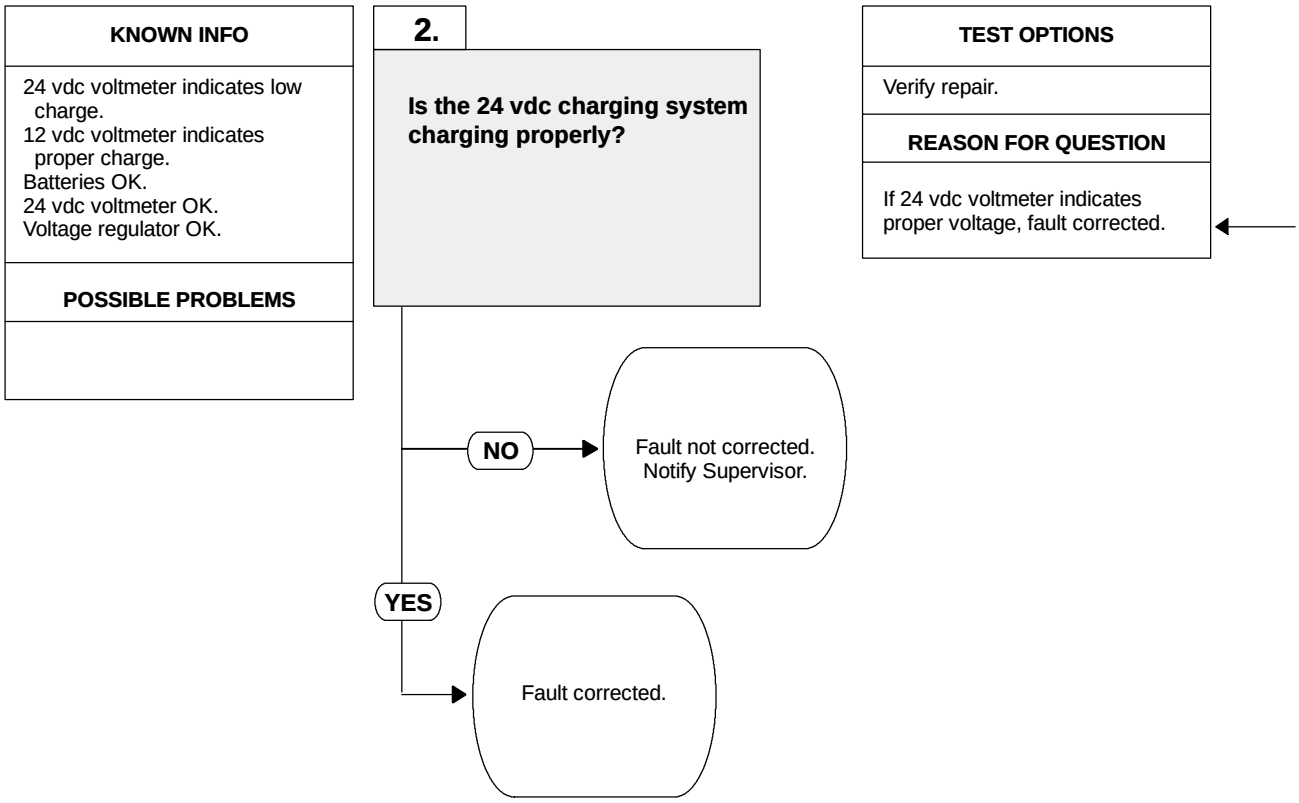


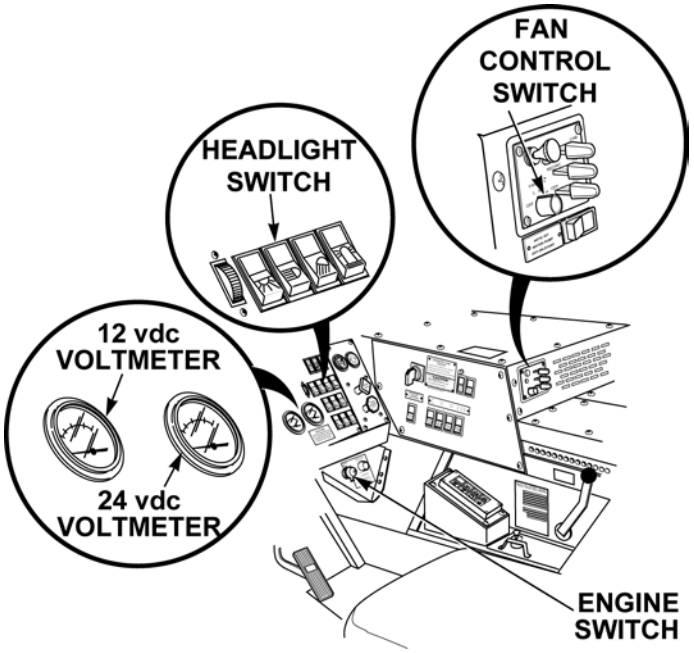
VOLTAGE TEST

(1) Remove battery box cover (TM 9-2320-364-10).
(2) Remove four screws, lockwashers, washers, rubber and left front side noise panel. Discard lockwashers.
(3) Set multimeter select switch to volts dc on multimeter.
(4) Connect multimeter positive (+) lead to 24 volt terminal of alternator and multimeter negative (-) lead to negative (-) terminal of group "A" batteries.
(5) Start engine and turn on headlights and heater.
(6) Observe voltage indicated on multimeter.
  (a) If 26 - 28 vdc are not present, replace voltage regulator (Para 7-8).
  (b) If 26 - 28 vdc are present, voltage regulator is OK.
(7) Turn off heater, headlights and engine.



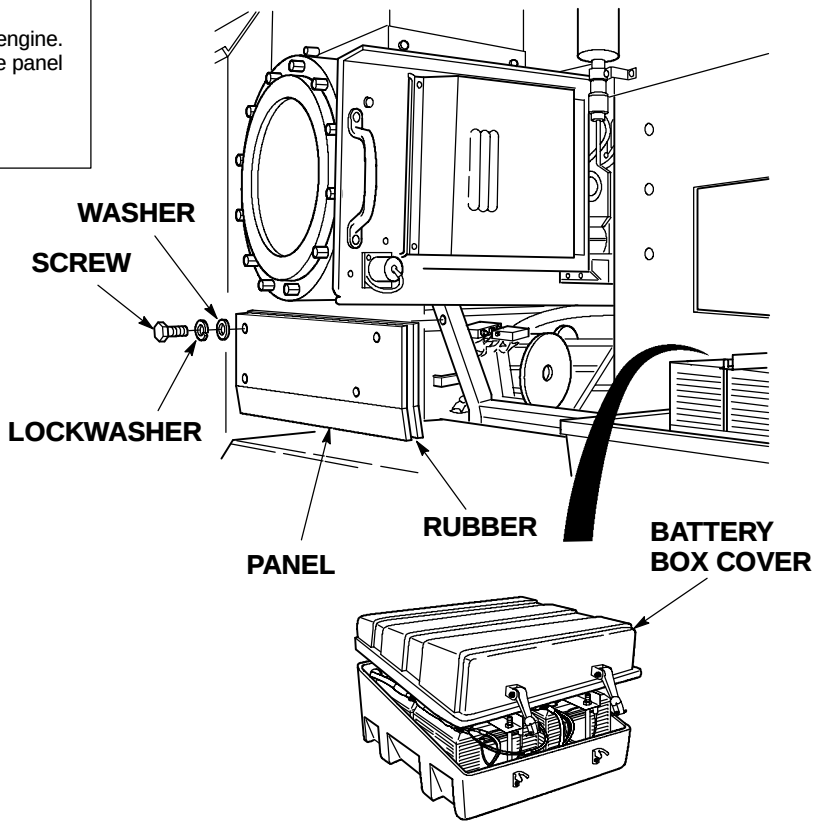
56. 24 VOLT SYSTEM OVER OR UNDER CHARGING (200 AMP) (CONT).





VERIFY REPAIR

(1) Start engine and turn on headlights and heater (TM 9-2320-364-10).
   (a) If 26-28 vdc are not indicated on 24 vdc voltmeter, fault not corrected. Perform Step (2) below and notify supervisor.
   (b) If 26-28 vdc are indicated on 12 vdc voltmeter, fault has been corrected.
(2) Turn off heater, headlights and engine.
(3) Install rubber and left front noise panel with four screws, lockwashers and washers.
(4) Install battery box cover.



2-21. TRANSMISSION TROUBLESHOOTING.

This paragraph covers Transmission System Troubleshooting. The Transmission System Fault Index, Table 2-40, lists faults for the transmission system of the PLS truck. Refer to schematic when performing tests and corrective actions.

Table 2-40. Transmission System Fault Index

Fault No.	Description	Page
1.	Transmission Overheats (Trans Temp Gage Continuously Reads Over 220°F (104°C)	2-1676
2.	Transmission Will Not Shift Into Gear, Slips Into And Out Of Gear, Does Not Respond To Shift Selector Key Pad, Or Do Not Shift Light Illuminates	2-1682
3.	Transmission Shifts Roughly	2-1688
4.	Automatic Shifts Occur At Too High Or Low Of A Speed	2-1694

2-21. TRANSMISSION TROUBLESHOOTING (CONT).

1. TRANSMISSION OVERHEATS (TRANS TEMP GAGE CONTINUOUSLY READS OVER 220°F (104°C)).

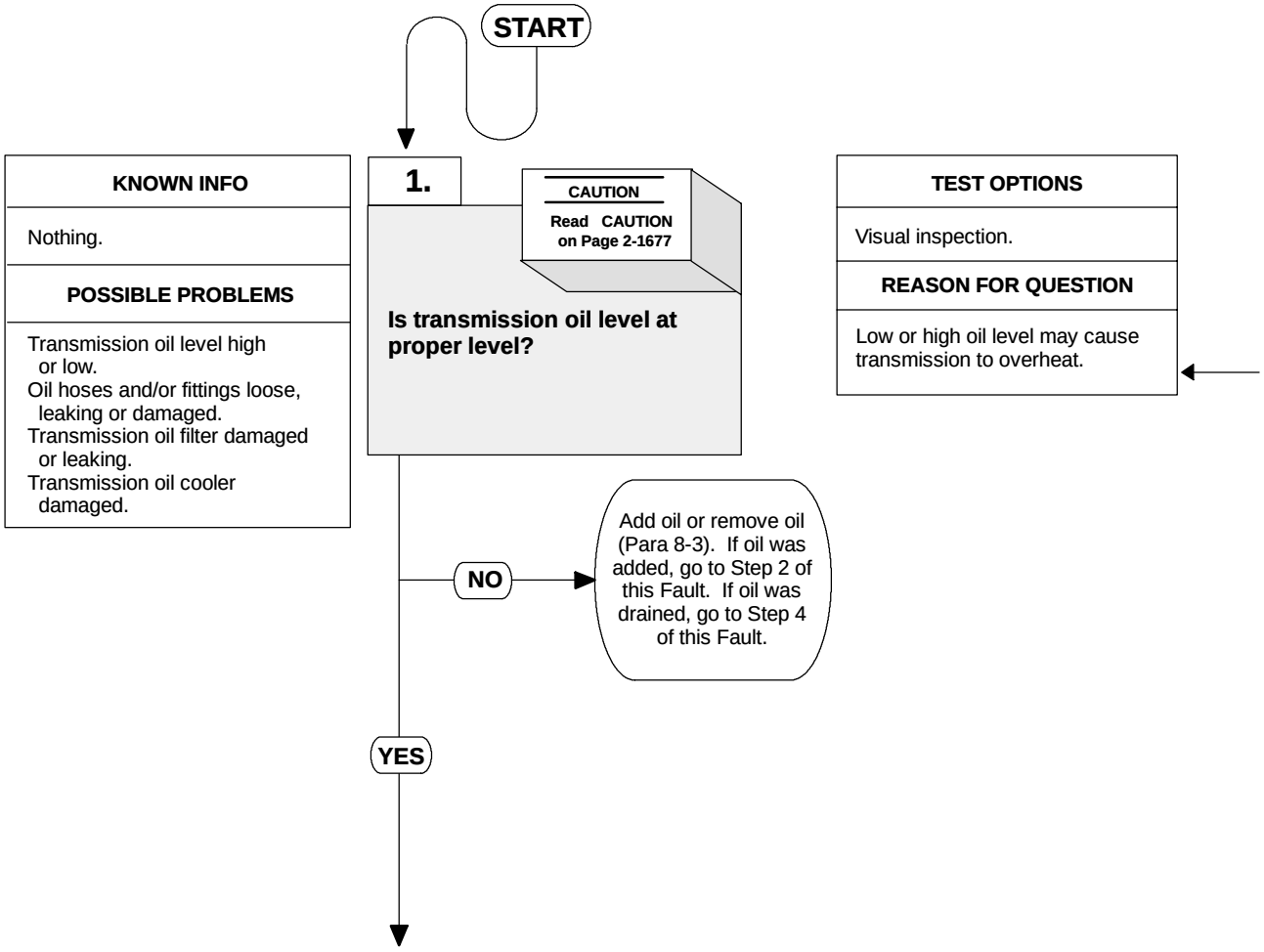
INITIAL SETUP

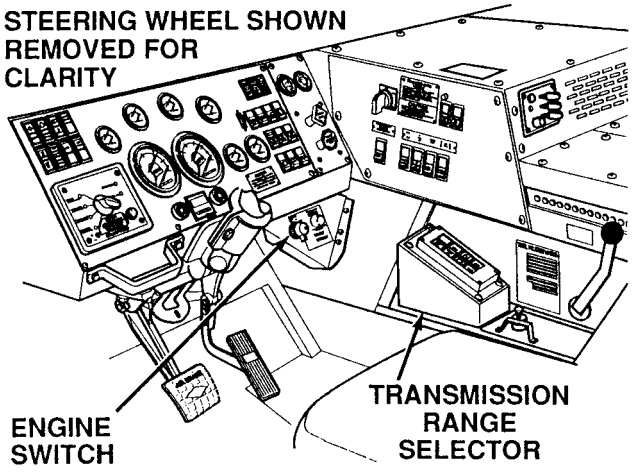
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pan, Drain (Item 47, Appendix G)

Materials/Parts
Lockwasher (8) (Item 195, Appendix F)

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-9)

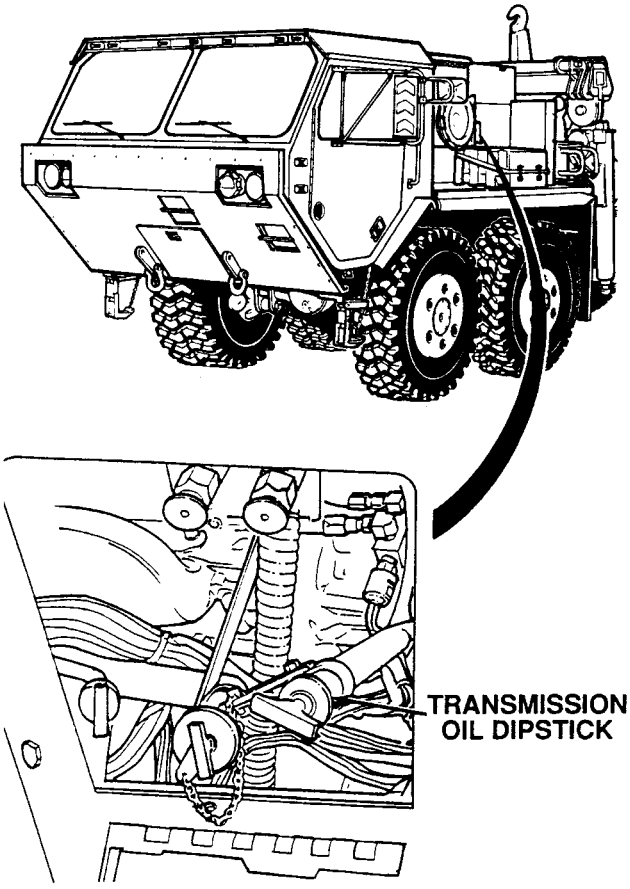




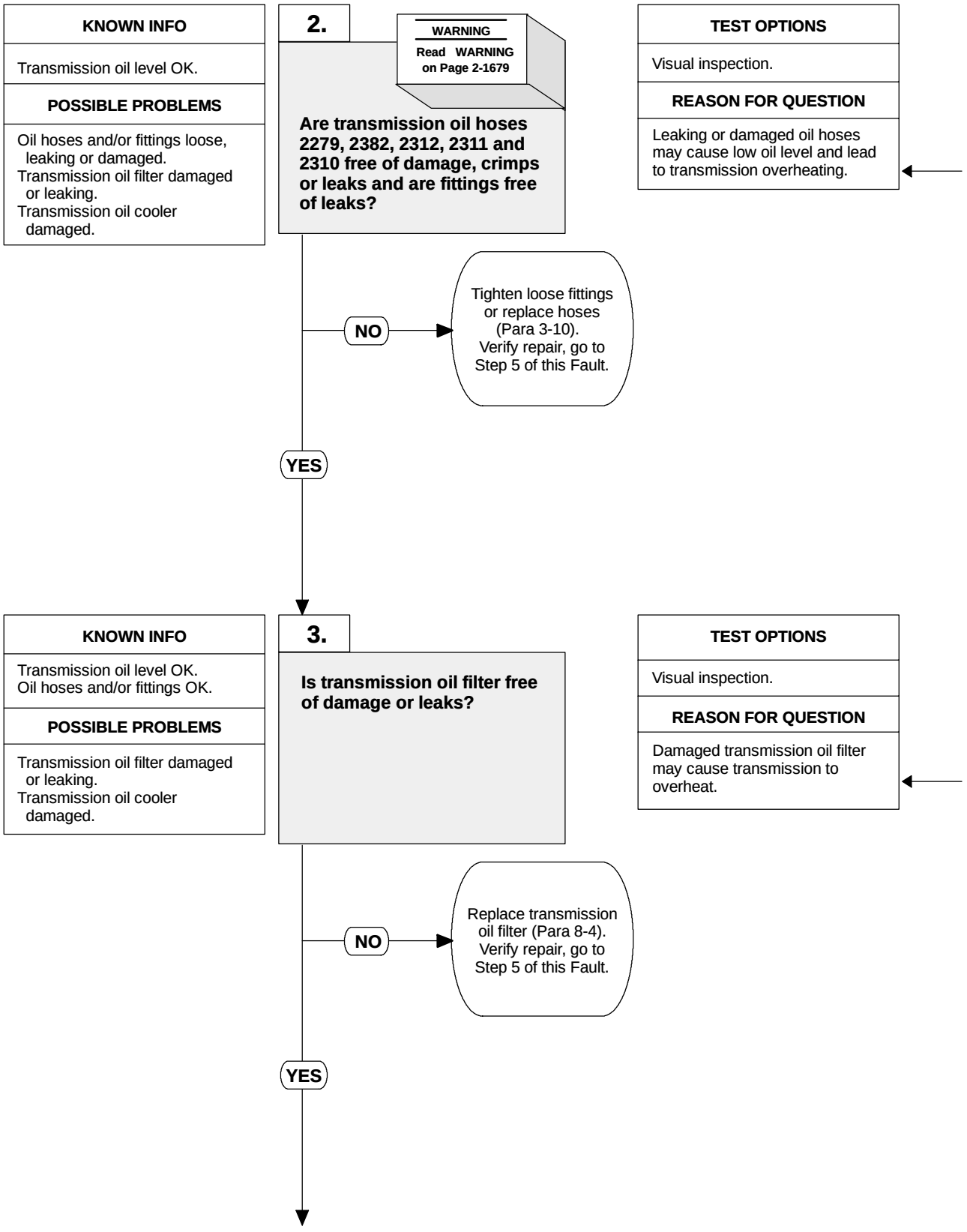
CAUTION

A cold oil and hot oil check must be made. Oil expands when hot. Overfilling transmission when cold will cause transmission to overheat when transmission warms up, causing damage to transmission.

VISUAL INSPECTION
Check transmission oil level (Para 8-3). (1) If transmission oil level is low, turn OFF ENGINE switch and add oil to correct level (Para 8-3) and go to Step 2 of this Fault. (2) If transmission oil level is too high, turn OFF ENGINE switch and drain oil to correct level (Para 8-3) and go to Step 5 of this Fault. (3) If transmission oil level is OK, turn OFF ENGINE switch and go to Step 2 of this Fault.



1. TRANSMISSION OVERHEATS (TRANS TEMP GAGE CONTINUOUSLY READS OVER 220°F (104°C)) (CONT).

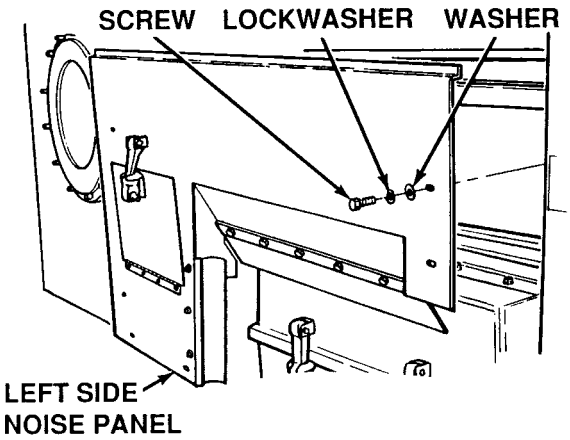


WARNING

Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

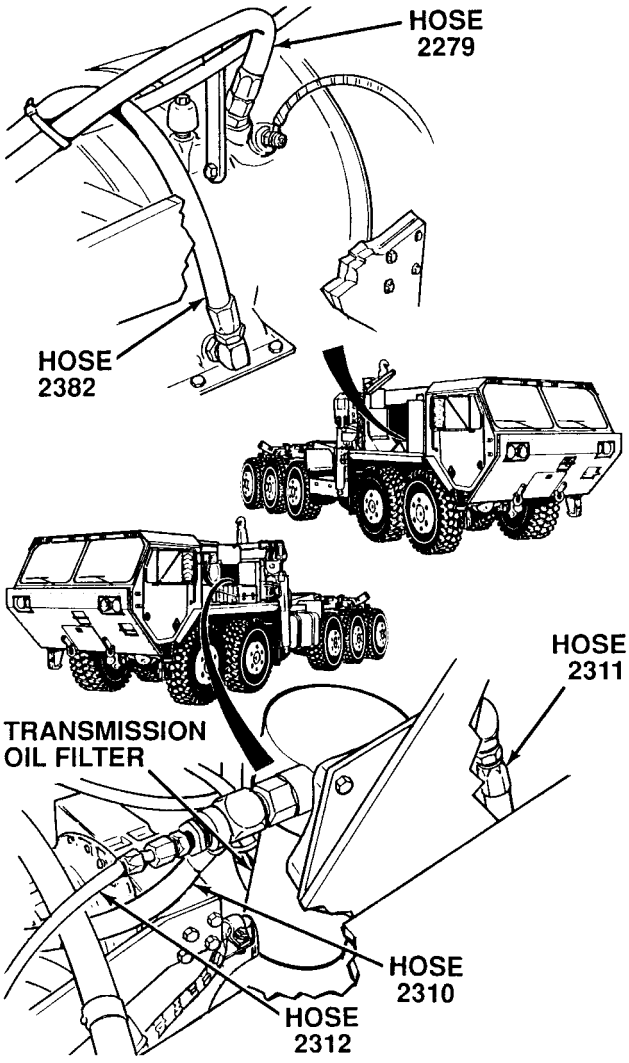
VISUAL INSPECTION

(1) Remove eight screws, lockwashers, washers and left side noise panel. Discard lockwashers.
(2) Check transmission oil hoses 2279, 2382, 2312, 2311 and 2310 for damage, crimps or leaks.
  (a) If hoses are damaged, crimped or leaking, tighten fittings or replace hoses (Para 3-10).
  (b) If there are no leaks, crimps or damage, hoses and fittings are OK.

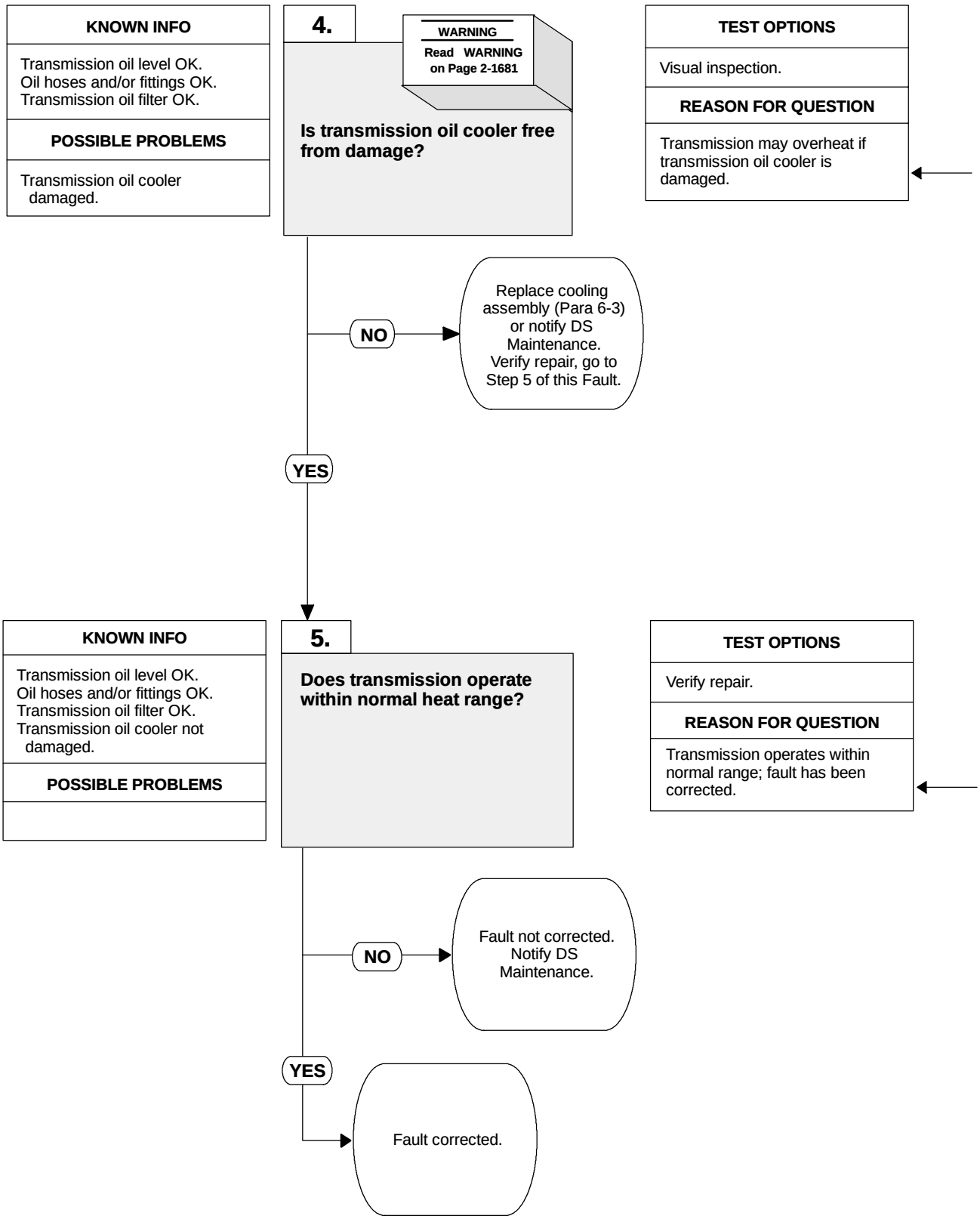


VISUAL INSPECTION

Check transmission oil filter for leaks and damage.
  (1) If oil filter is leaking or damaged, tighten or replace filter (Para 8-4).
  (2) If there are no leaks or damage, oil filter is OK.



1. TRANSMISSION OVERHEATS (TRANS TEMP GAGE CONTINUOUSLY READS OVER 220°F (104°C)) (CONT).



WARNING

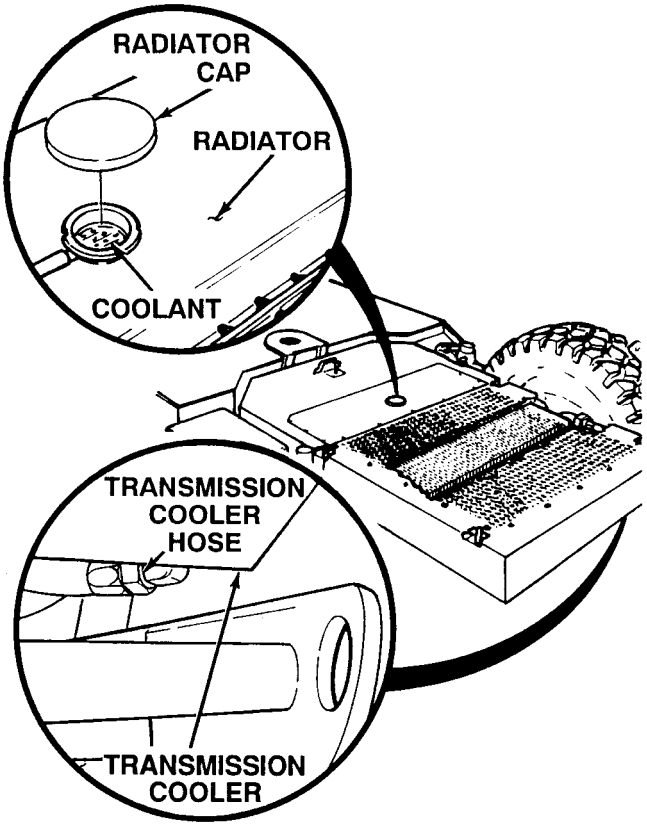
- Hot transmission oil can cause severe burns and injury to personnel. Transmission should be allowed to cool before oil is drained.
- Use extreme care when removing the radiator pressure cap. Sudden release or pressure can cause a steam flash which could seriously injure personnel. Slowly loosen cap to the first stop to relieve pressure before removing cap completely. After use, securely tighten cap.

NOTE

Transmission oil cooler is contained inside radiator bottom tank.

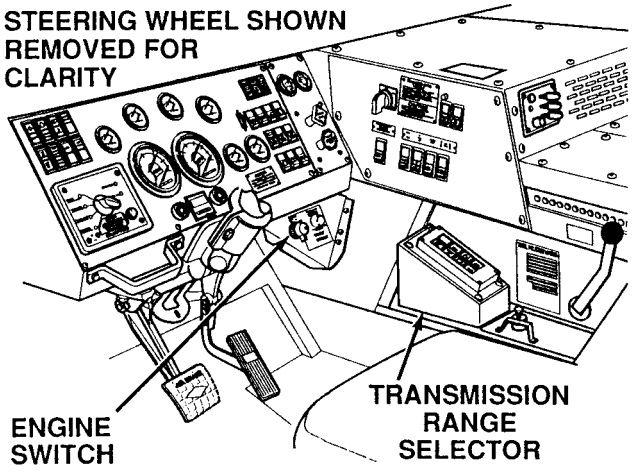
VISUAL INSPECTION

(1) Check transmission oil cooler for leaks and damage.
  (a) If transmission oil cooler is leaking or damaged, replace cooling assembly (Para 6-3).
  (b) If transmission oil cooler is not leaking or damaged, perform Steps (2) through (6) below.
(2) Remove radiator cap (TM 9-2320-364-10).
(3) Observe coolant for transmission oil, indicating transmission oil cooler leak.
  (a) If transmission oil cooler is leaking into radiator, notify DS Maintenance.
  (b) If transmission oil is not leaking into radiator, perform Steps (4) through (6) below and go to Step 5 of this Fault.
(4) Install radiator cap.
(5) Install left side noise panel, eight washers, lockwashers and screws.
(6) Install right side noise panel (Para 17-26).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Operate truck at normal speeds to verify if transmission overheats.
(3) Observe transmission temperature gage.
  (a) If gage reads over 220°F (104°C), fault not corrected. Perform Step (4) below and notify DS Maintenance.
  (b) If gage reads under 220°F (104°C), fault has been corrected.
(4) Turn OFF ENGINE switch.



2-21. TRANSMISSION TROUBLESHOOTING (CONT).

2. TRANSMISSION WILL NOT SHIFT INTO GEAR, SLIPS INTO AND OUT OF GEAR, DOES NOT RESPOND TO SHIFT SELECTOR KEY PAD, DO NOT SHIFT LIGHT ILLUMINATES, OR STARTS IN HIGH (HI) RANGE.

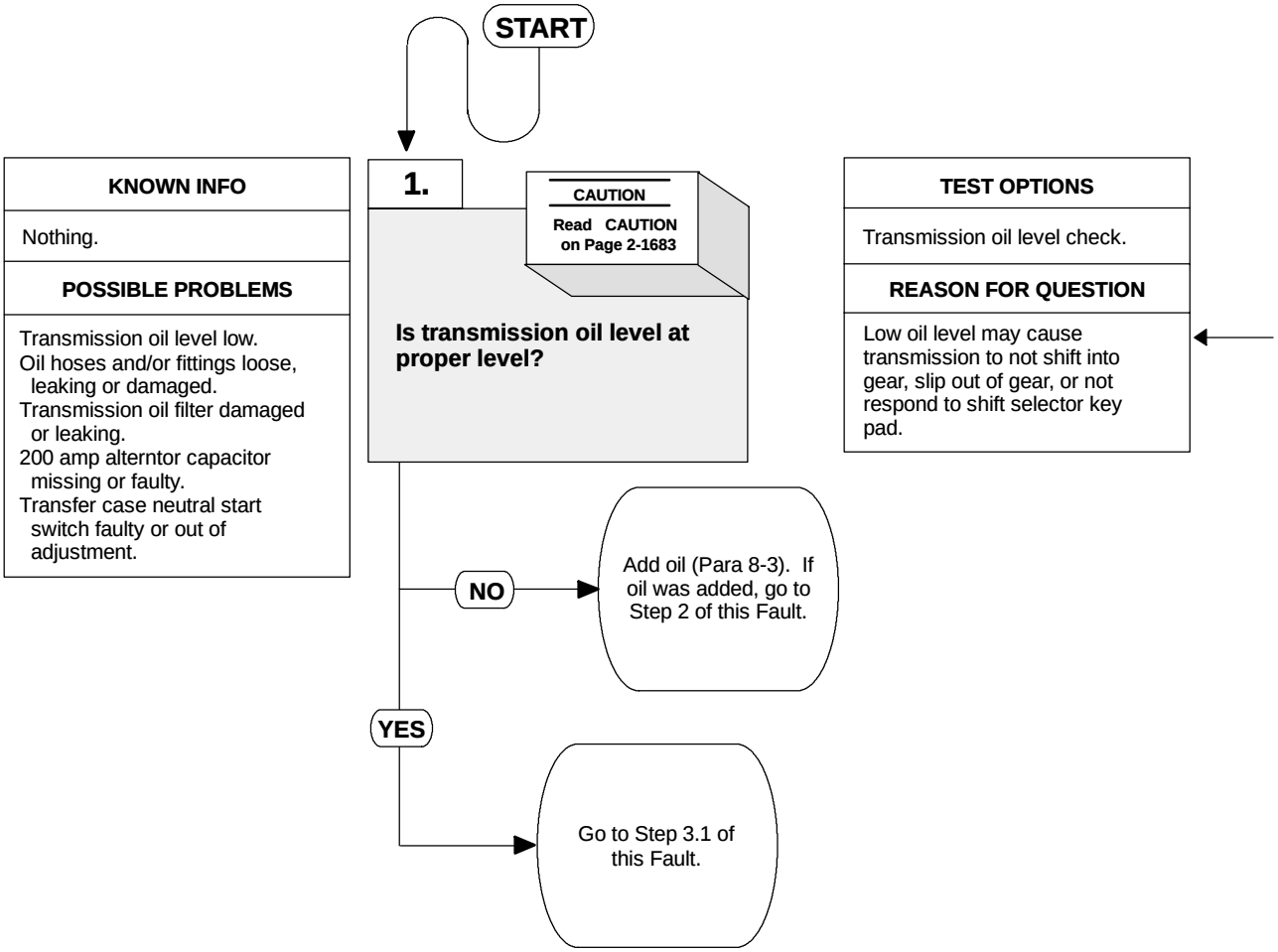
INITIAL SETUP

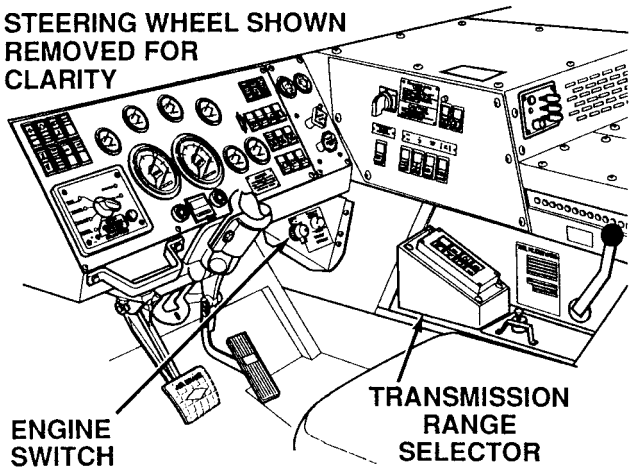
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pan, Drain (Item 47, Appendix G)

Materials/Parts
Lockwasher (8) (Item 195, Appendix F)

References
TM 9-2320-364-10
TM 9-2320-364-20

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)

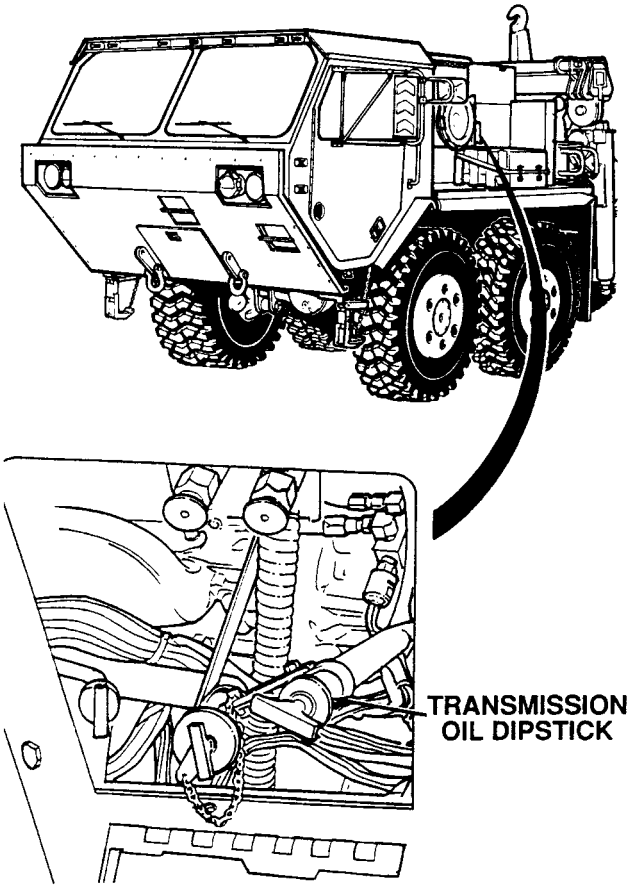




CAUTION

A cold oil and hot oil check must be made. Oil expands when hot. Overfilling transmission when cold will cause transmission to overheat when transmission warms up, causing damage to transmission.

TRANSMISSION OIL LEVEL CHECK
Check transmission oil level (Para 8-3). (1) If transmission oil level is low, turn OFF ENGINE switch and add oil to correct level (Para 8-3) and go to Step 2 of this Fault. (2) If transmission oil level is OK, turn OFF ENGINE switch and go to Step 3.1 of this Fault.



2. TRANSMISSION WILL NOT SHIFT INTO GEAR, SLIPS INTO AND OUT OF GEAR DOES NOT RESPOND TO SHIFT SELECTOR KEY PAD, DO NOT SHIFT LIGHT ILLUMINATES, OR STARTS IN HIGH (HI) RANGE (CONT).

KNOWN INFO

Transmission oil level OK.

POSSIBLE PROBLEMS

Oil hoses and/or fittings loose, leaking or damaged.
Transmission oil filter damaged or leaking.
200 amp alternator capacitor missing or faulty.
Transfer case neutral start switch faulty or out of adjustment.

2.

WARNING
Read WARNING on Page -1

Are transmission oil hoses 2279, 2382, 2312, 2311 and 2310 free of damage, crimps or leaks and are fittings free of leaks?

TEST OPTIONS

Visual inspection.

REASON FOR QUESTION

Leaking or damaged oil hoses will cause low oil level and cause transmission to slip out of gear or not shift.

NO → Tighten loose fittings or replace hoses (Para 3-10). Verify repair, go to Step 4 of this Fault.

YES

KNOWN INFO

Transmission oil level OK.
Oil hoses and/or fittings OK.

POSSIBLE PROBLEMS

Transmission oil filter damaged or leaking.
200 amp alternator capacitor missing or faulty.
Transfer case neutral start switch faulty or out of adjustment.

3.

Is transmission oil filter free from leaks or damage?

TEST OPTIONS

Visual inspection.

REASON FOR QUESTION

Damaged transmission oil filter may cause transmission to slip out of gear or not shift.

NO → Replace transmission oil filter (Para 8-4). Verify repair, go to Step 4 of this Fault.

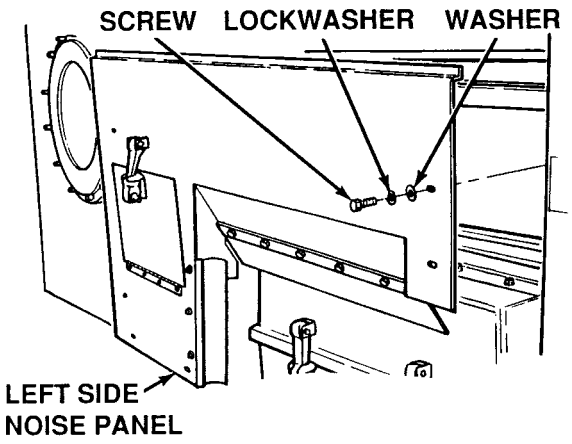
YES

WARNING

Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

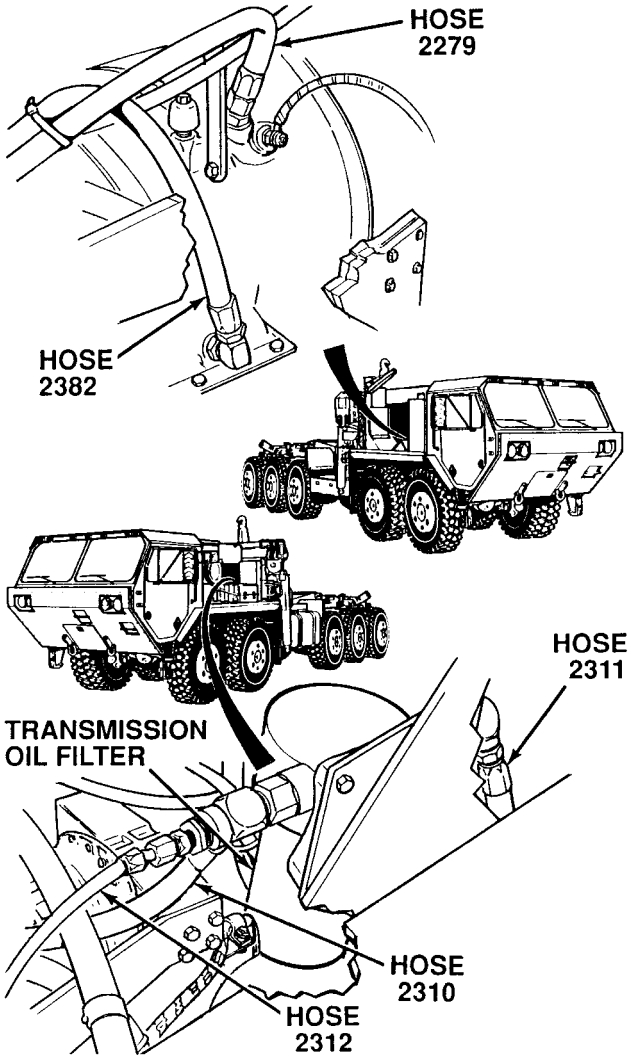
VISUAL INSPECTION

(1) Remove eight screws, lockwashers, washers and left side noise panel. Discard lockwashers.
(2) Check transmission oil hoses 2279, 2382, 2312, 2311 and 2310 for damage, crimps or leaks.
   (a) If hoses are damaged, crimped or leaking, tighten fittings or replace hoses (Para 3-10).
   (b) If there are no leaks, crimps or damage, hoses and fittings are OK.

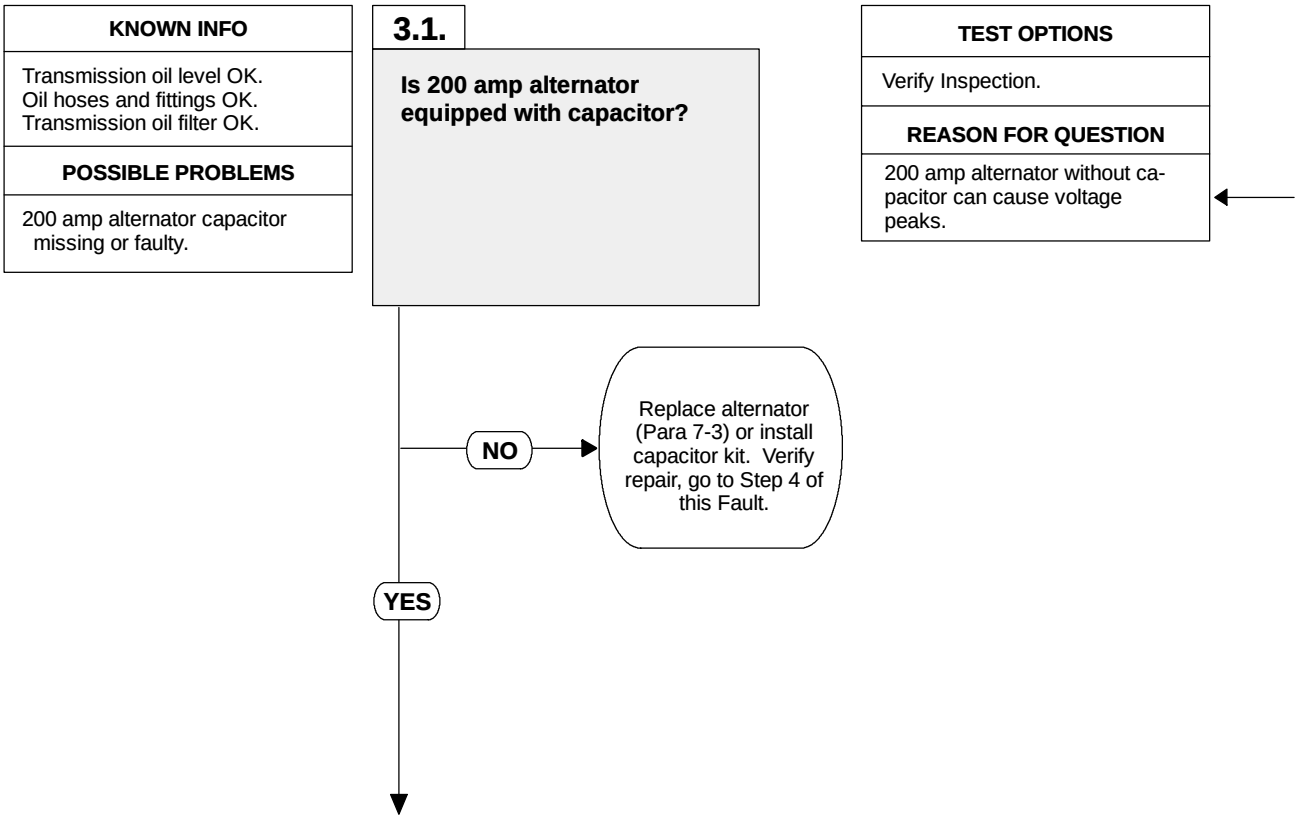


VISUAL INSPECTION

(1) Check transmission oil filter for leaks and damage.
   (a) If oil filter is leaking or damaged, tighten or replace filter (Para 8-4).
   (b) If there are no leaks or damage, oil filter is OK.
(2) Install left side noise panel and eight washers, lockwashers and screws.
(3) Install right side noise panel (Para 17-26).

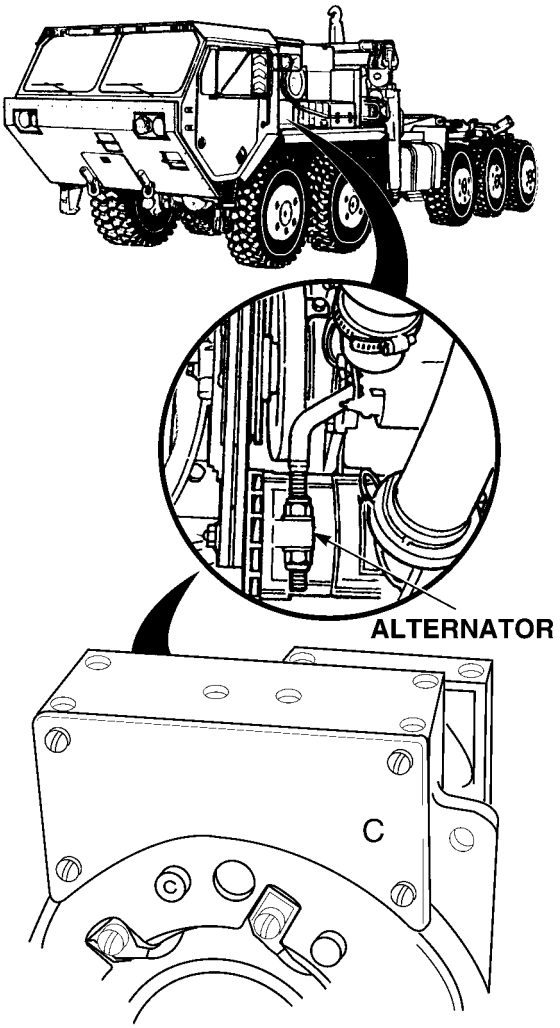


3. TRANSMISSION WILL NOT SHIFT INTO GEAR, SLIPS INTO AND OUT OF GEAR DOES NOT RESPOND TO SHIFT SELECTOR KEY PAD, DO NOT SHIFT LIGHT ILLUMINATES, OR STARTS IN HIGH (HI) RANGE (CONT).

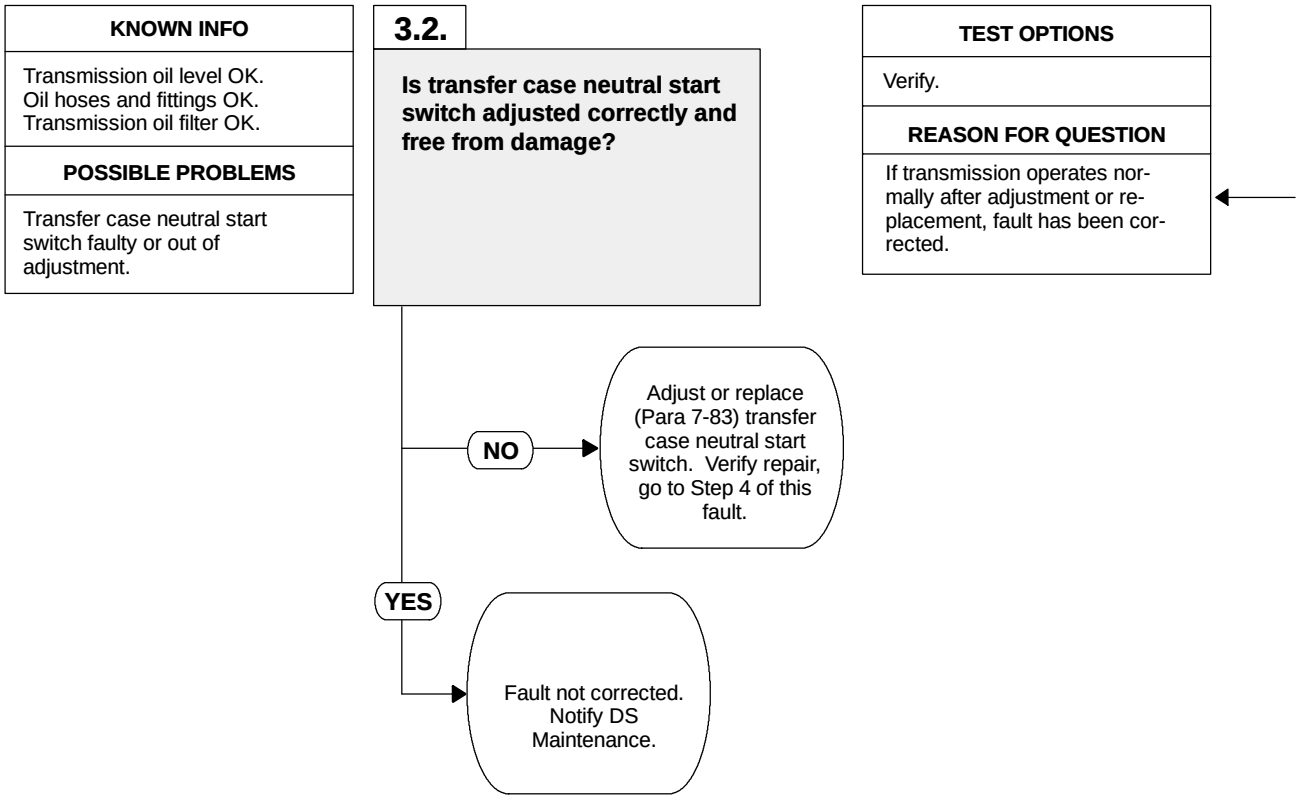


VISUAL INSPECTION

(1) Check alternator serial number
   (a) If serial number is 317 or higher, replace alternator (Para 7-3).
   (b) If serial number is 316 or lower, go to Step (2).
(2) Check if there is a “C” stamped on front housing cover.
   (a) If there is not a “C”, replace alternator (Para 7-3) or notify Oshkosh Truck Service Dept. and ask for kit number N8052. Install kit.
   (b) If there is a “C” stamped on front housing cover, replace alternator (Para 7-3).

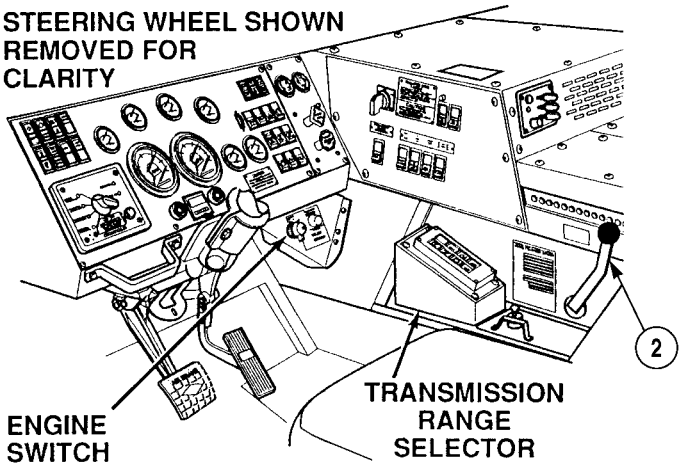


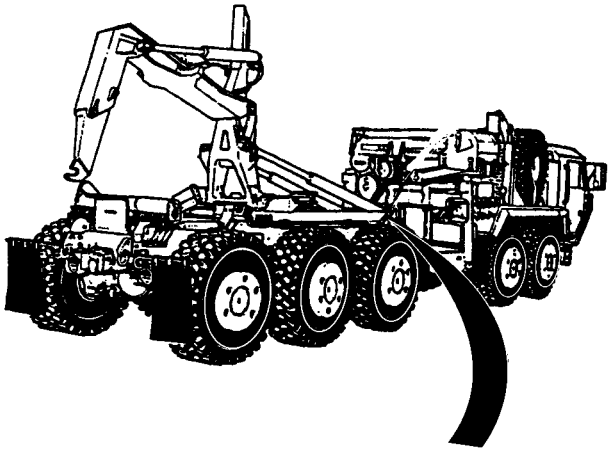
3. TRANSMISSION WILL NOT SHIFT INTO GEAR, SLIPS INTO AND OUT OF GEAR DOES NOT RESPOND TO SHIFT SELECTOR KEY PAD, DO NOT SHIFT LIGHT ILLUMINATES, OR STARTS IN HIGH (HI) RANGE (CONT).

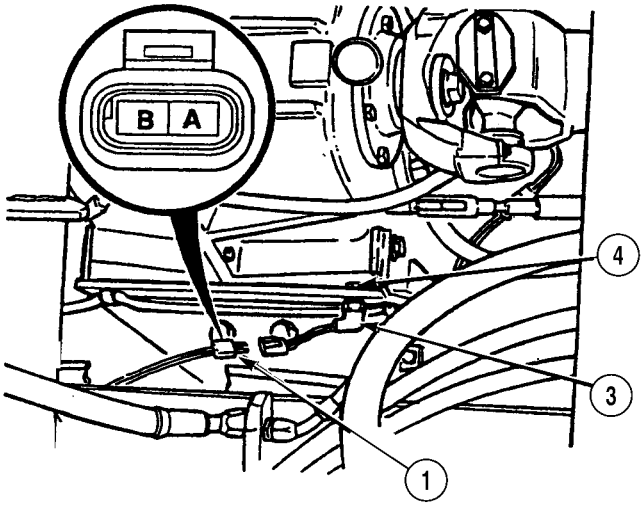


TRANSFER CASE NEUTRAL START SWITCH CHECK

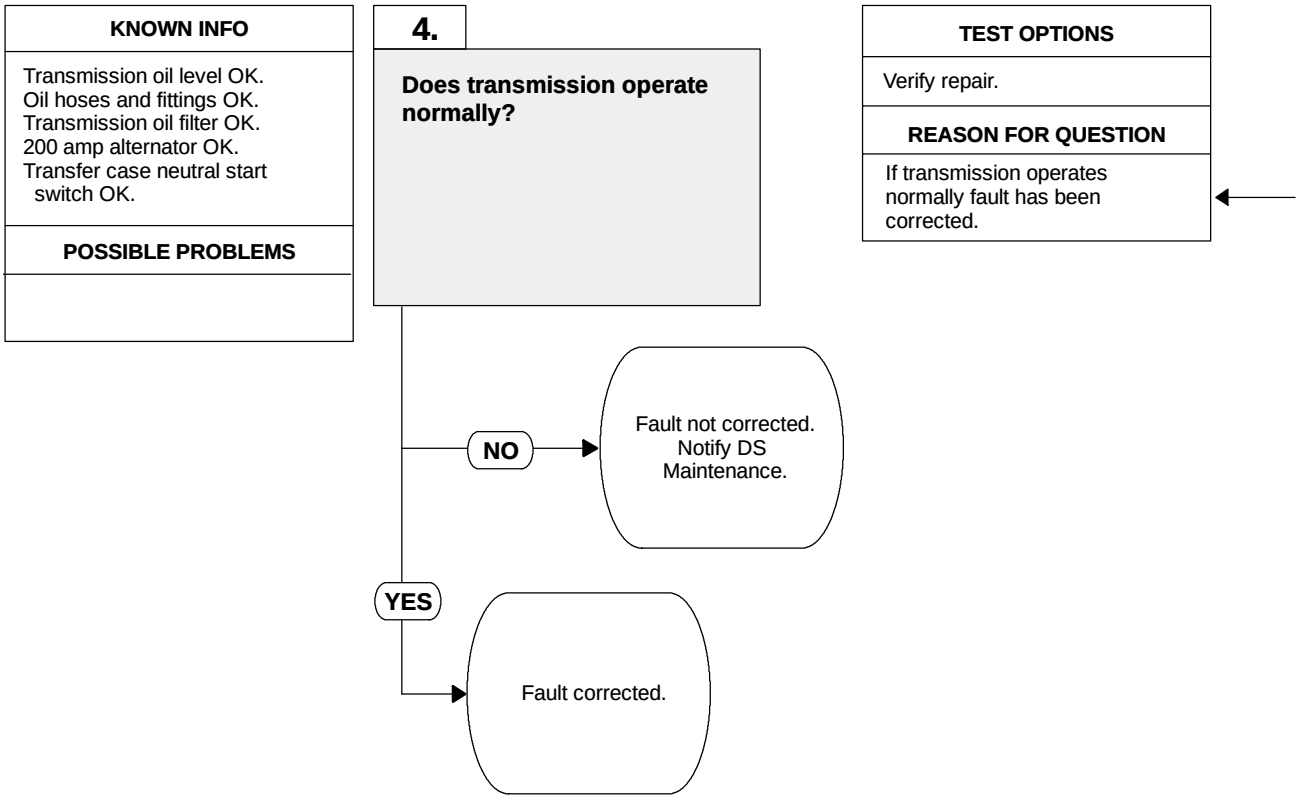
(1) Disconnect MC57 connector (1). (TM 9-2320-364-20-4).
(2) Shift transfer case shifter (2) to HI range.
(3) Connect multimeter on MC57 connector (1). Multimeter should indicate no continuity.
  (a) If no continuity is measured, proceed with Step (4).
  (b) If continuity is measured, turn out neutral start switch (3) 3/4 of a turn beyond the point where multimeter measures continuity.
(4) With the aid of an assistant, shift transfer case out of HI range. Multimeter should measure continutiy.
  (a) If continuity is measured, proceed with Step (5).
  (b) If no continuity is measured, tighten neutral start switch (3) and adapter (4) 3/4 of a turn past the point where multimeter measures continuity.
(5) Shift transfer case shifter (2) into Hi range. Multimeter should measure no continuity.
(6) Remove multimeter form MC57 connector (6).
(7) If neutral start switch can not be adjusted, replace switch (Para 7-83) and repeat Steps (2) through (6).
(8) Connect MC57 connector (1).



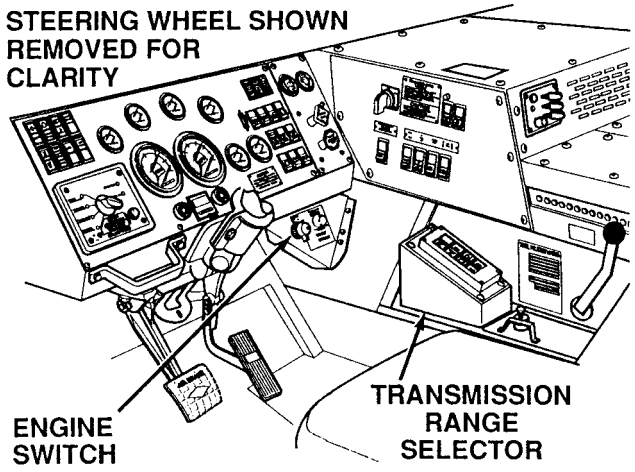




3. TRANSMISSION WILL NOT SHIFT INTO GEAR, SLIPS INTO AND OUT OF GEAR, DOES NOT RESPOND TO SHIFT SELECTOR KEY PAD, DO NOT SHIFT LIGHT ILLUMINATES, OR STARTS IN HIGH (HI) RANGE (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10). (2) Operate truck, shifting transmission throughout selection range. (a) If transmission will not shift, slips into and out of gear or does not respond to shift selector key pad, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If transmission operates normally, fault has been corrected. (3) Turn OFF ENGINE switch.



2-21. TRANSMISSION TROUBLESHOOTING (CONT).

4. TRANSMISSION SHIFTS ROUGHLY.

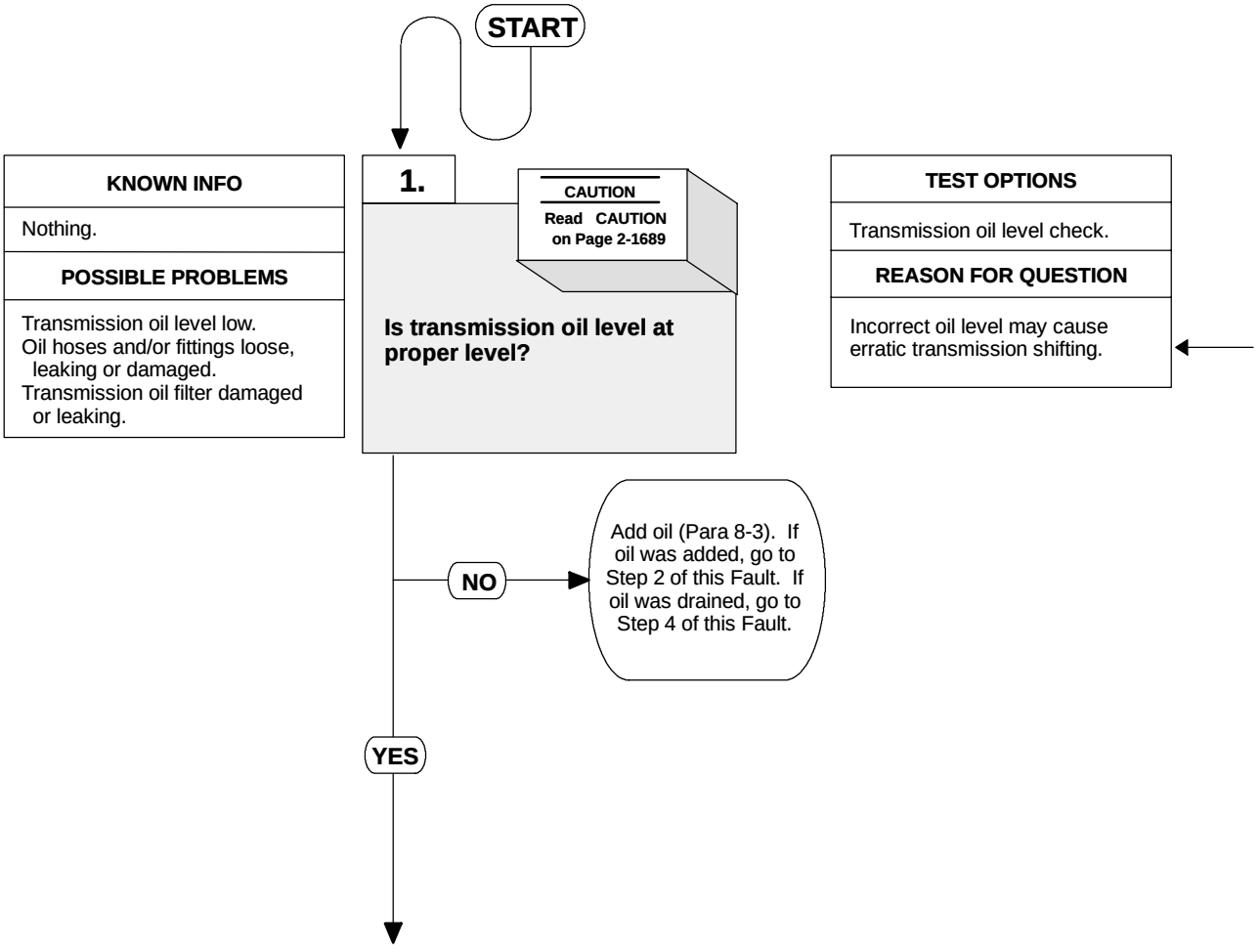
INITIAL SETUP

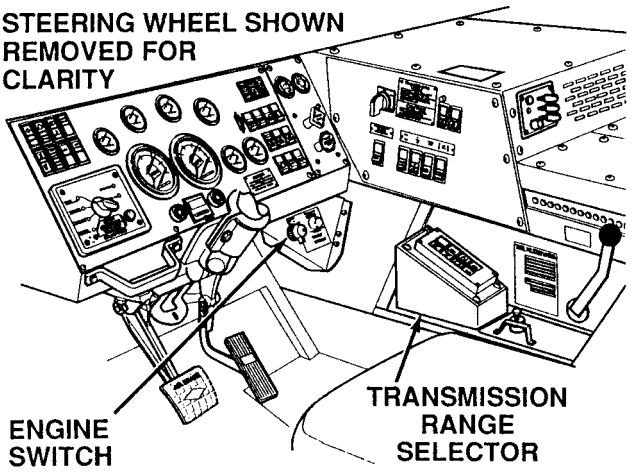
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pan, Drain (Item 47, Appendix G)

Material/Parts
Lockwasher (8) (Item 195, Appendix F)

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)

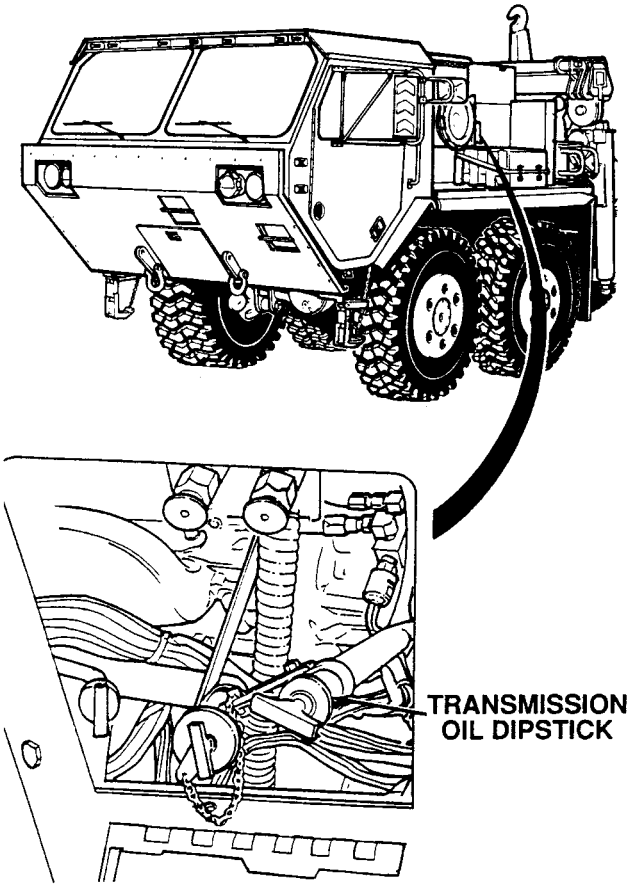




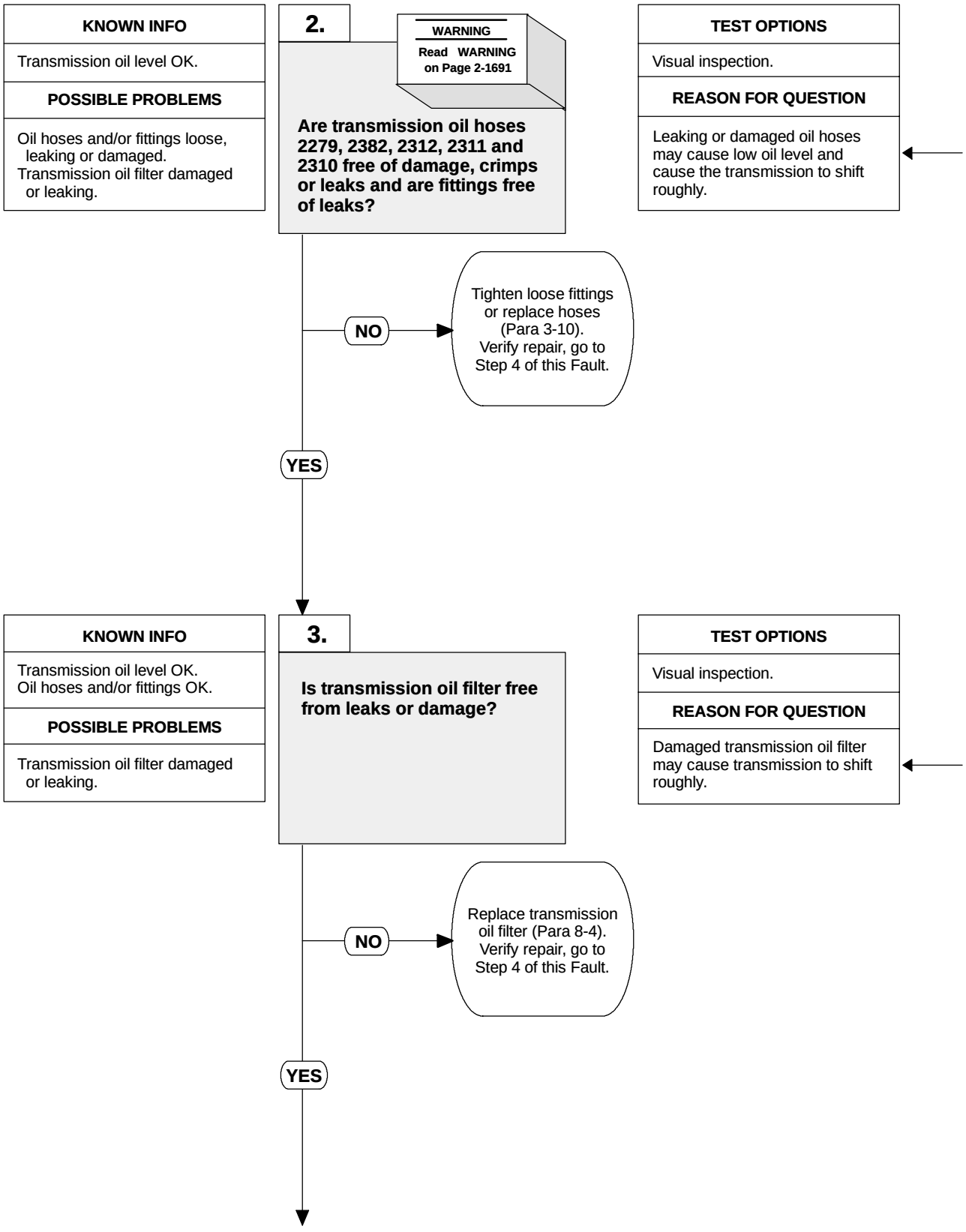
CAUTION

A cold oil and hot oil check must be made. Oil expands when hot. Overfilling transmission when cold will cause transmission to overheat when transmission warms up, causing damage to transmission.

TRANSMISSION OIL LEVEL CHECK
Check transmission oil level (Para 8-3). (1) If transmission oil level is low, turn OFF ENGINE switch and add oil to correct level (Para 8-3) and go to Step 2 of this Fault. (2) If transmission oil level is too high, turn OFF ENGINE switch and drain oil to correct level (Para 8-3) and go to Step 4 of this Fault. (3) If transmission oil level is OK, turn OFF ENGINE switch and go to Step 2 of this Fault.



4. TRANSMISSION SHIFTS ROUGHLY (CONT).

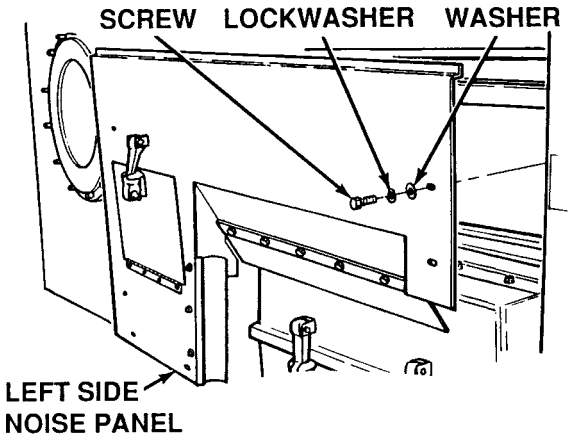


WARNING

Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

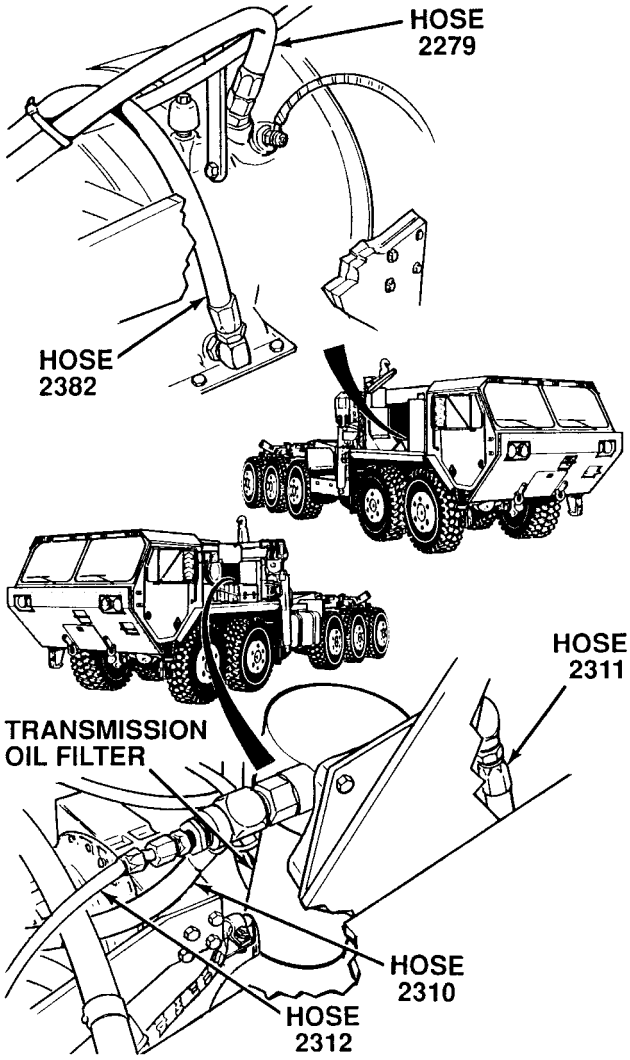
VISUAL INSPECTION

(1) Remove eight screws, lockwashers, washers and left side noise panel. Discard lockwashers.
(2) Check transmission oil hoses 2279, 2382, 2312, 2311 and 2310 for damage, crimps or leaks.
  (a) If hoses are damaged, crimped or leaking, tighten fittings or replace hoses (Para 3-10).
  (b) If there are no leaks, crimps or damage, hoses and fittings are OK.

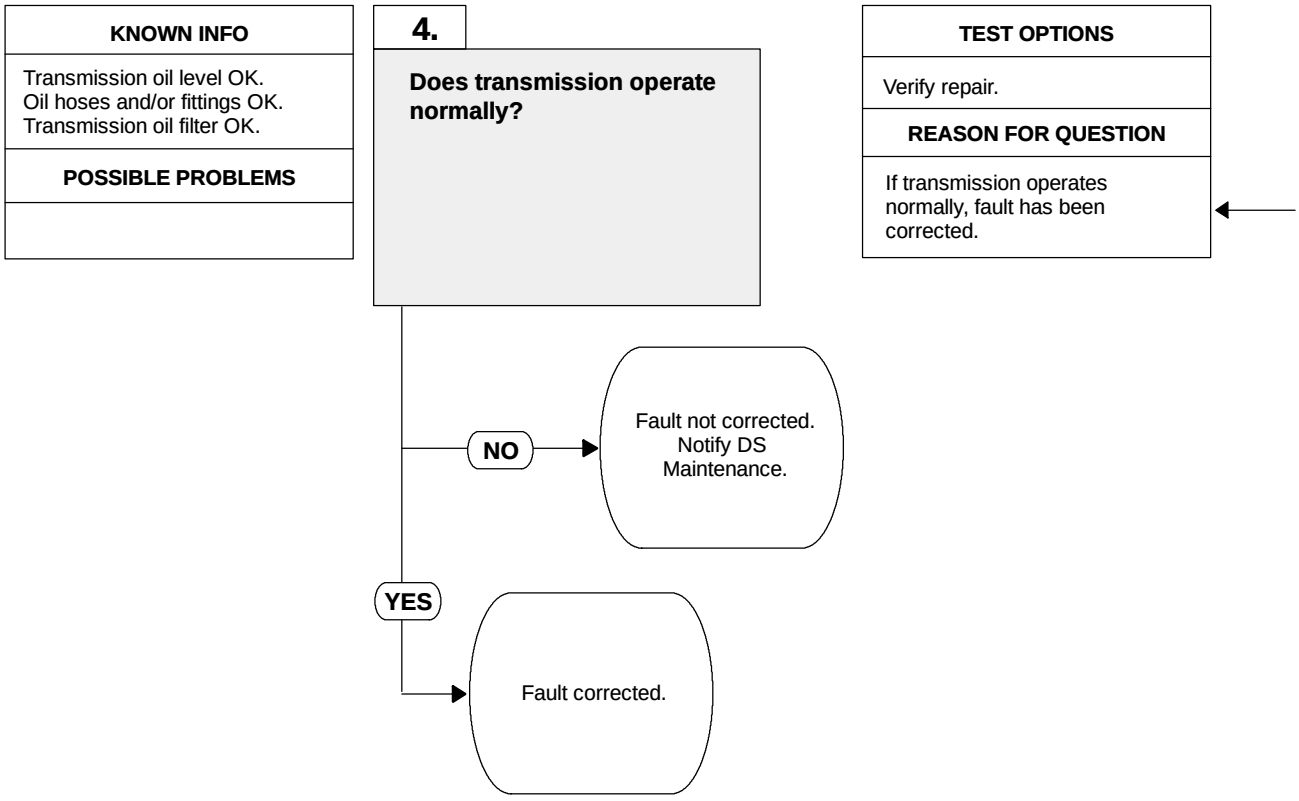


VISUAL INSPECTION

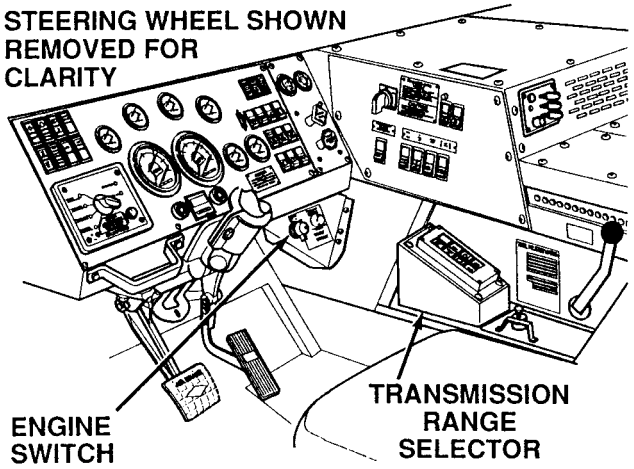
(1) Check transmission oil filter for leaks and damage.
  (a) If oil filter is leaking or damaged, tighten or replace filter (Para 8-4).
  (b) If there are no leaks or damage, oil filter is OK.
(2) Install left side noise panel and eight washers, lockwashers and screws.
(3) Install right side noise panel (Para 17-26).



4. TRANSMISSION SHIFTS ROUGHLY (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10). (2) Operate truck shifting transmission throughout selection range. (a) If transmission continues to shift roughly, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If transmission operates normally, fault has been corrected. (3) Turn OFF ENGINE switch.



2-21. TRANSMISSION TROUBLESHOOTING (CONT).

5. AUTOMATIC SHIFTS OCCUR AT TOO HIGH OR LOW OF A SPEED.

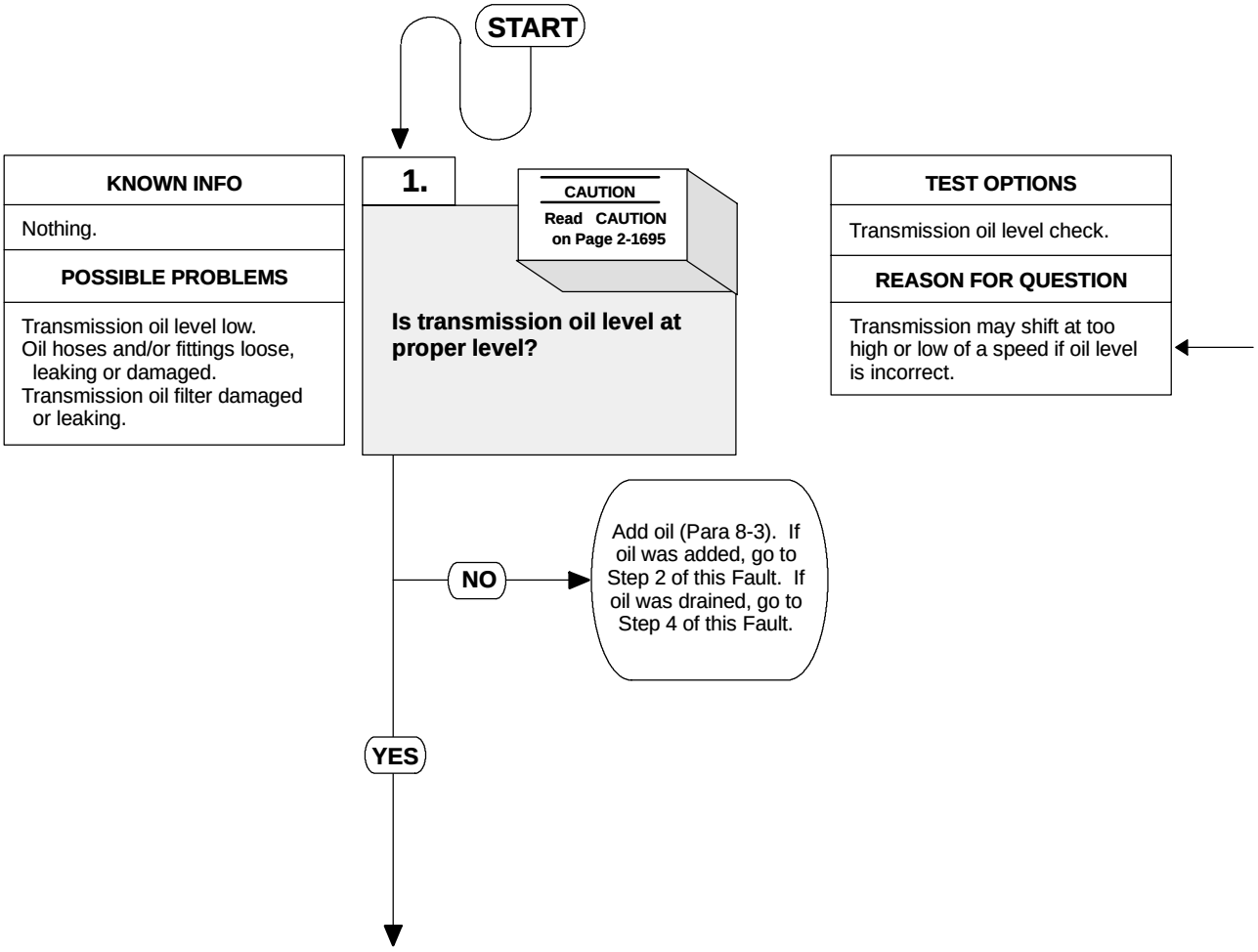
INITIAL SETUP

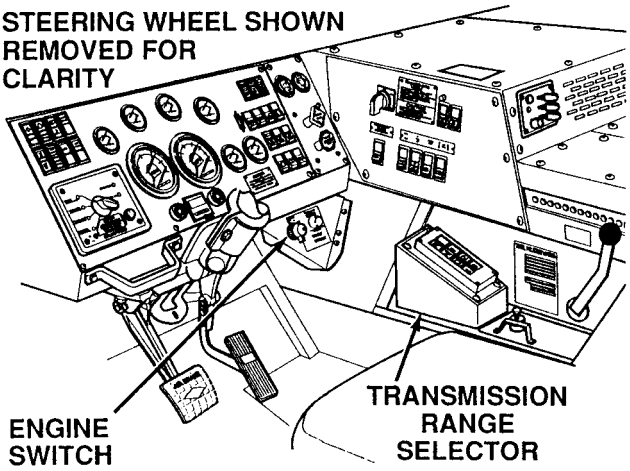
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pan, Drain (Item 47, Appendix G)

Materials/Parts
Lockwasher (8) (Item 195, Appendix F)

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Right side noise panel removed, (Para 17-26)

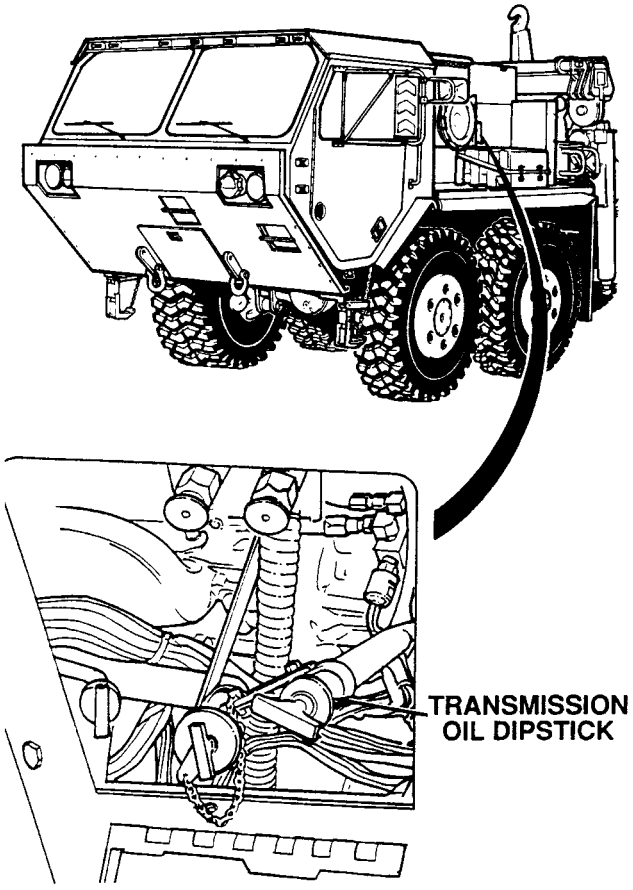




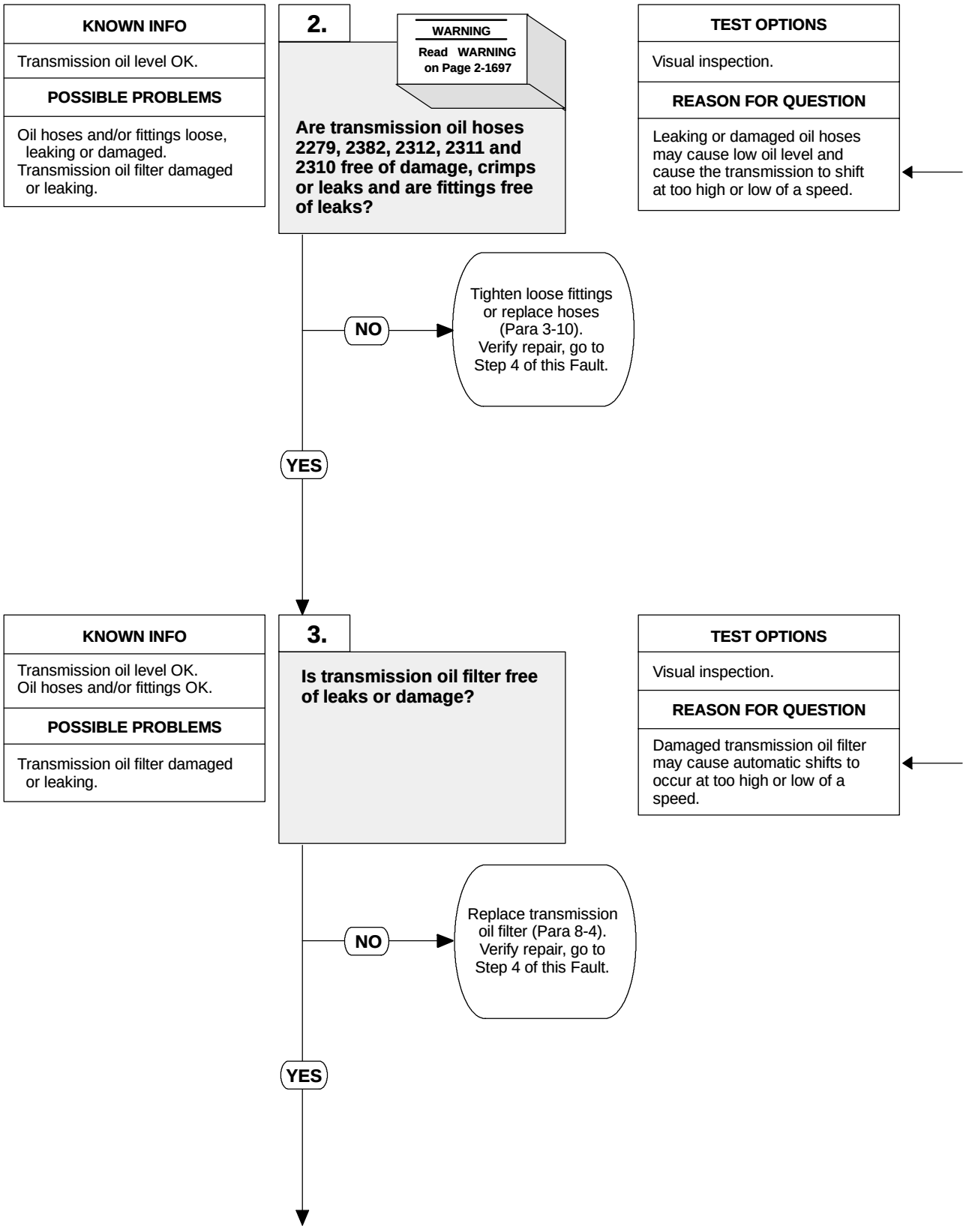
CAUTION

A cold oil and hot oil check must be made. Oil expands when hot. Overfilling transmission when cold will cause transmission to overheat when transmission warms up, causing damage to transmission.

TRANSMISSION OIL LEVEL CHECK
Check transmission oil level (Para 8-3). (1) If transmission oil level is low, turn OFF ENGINE switch and add oil to correct level (Para 8-3) and go to Step 2 of this Fault. (2) If transmission oil level is too high, turn OFF ENGINE switch and drain oil to correct level (Para 8-3) and go to Step 4 of this Fault. (3) If transmission oil level is OK, turn OFF ENGINE switch and go to Step 2 of this Fault.



5. AUTOMATIC SHIFTS OCCUR AT TOO HIGH OR LOW OF A SPEED (CONT).

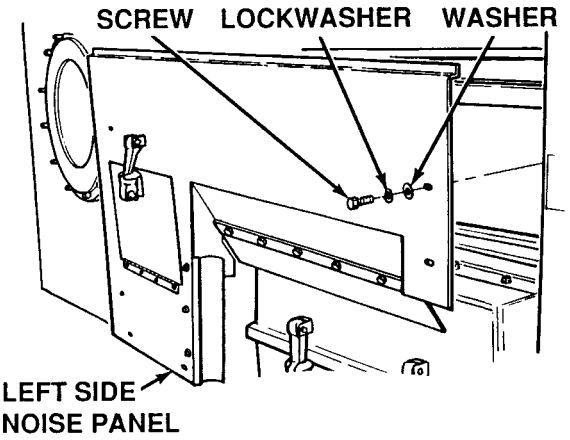


WARNING

Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

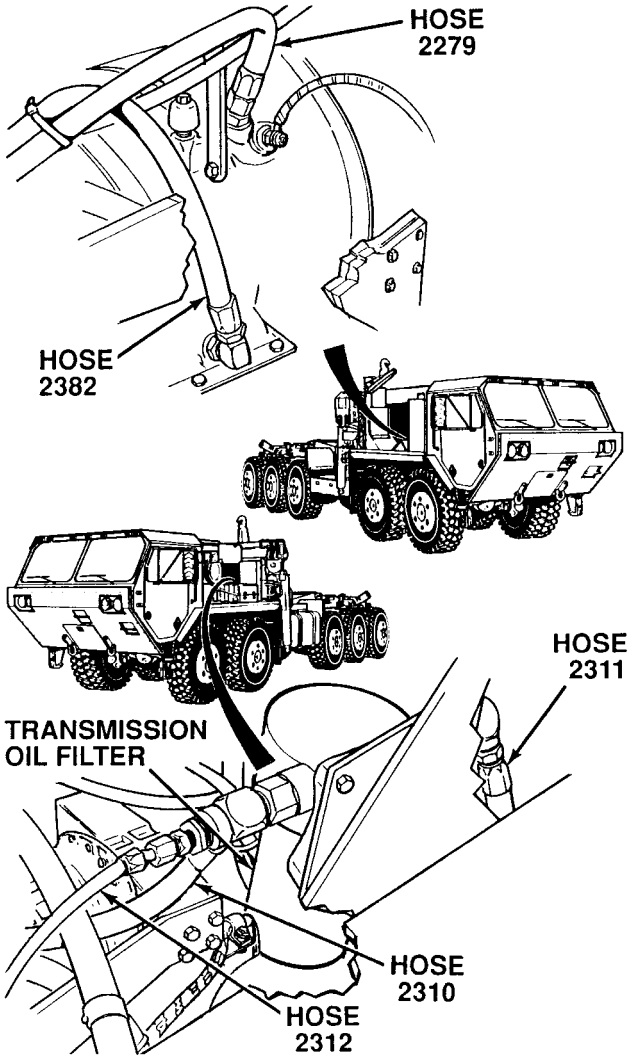
VISUAL INSPECTION

(1) Remove eight screws, lockwashers and washers and left side noise panel. Discard lockwashers.
(2) Check transmission oil hoses 2279, 2382, 2312, 2311 and 2310 for damage, crimps or leaks.
   (a) If hoses are damaged, crimped or leaking, tighten fittings or replace hoses (Para 3-10).
   (b) If there are no leaks, crimps or damage, hoses and fittings are OK.

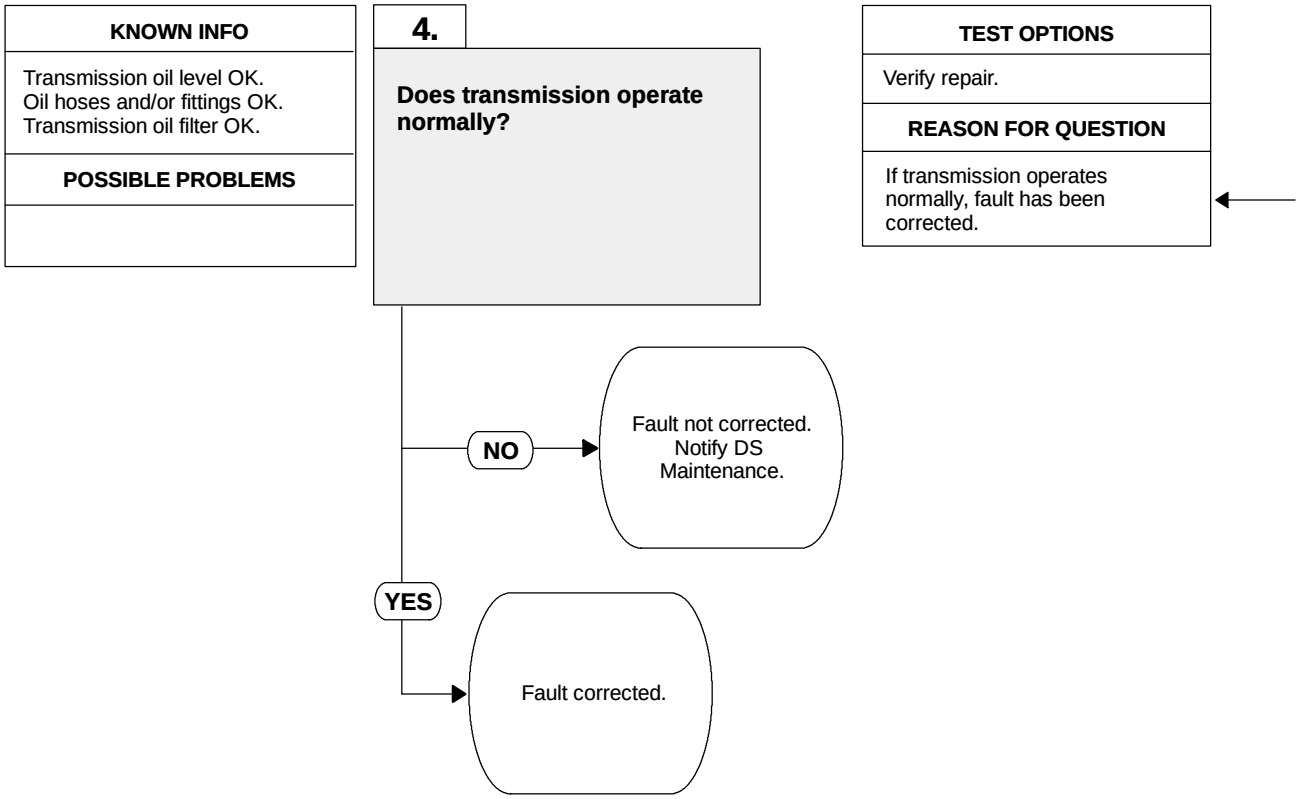


VISUAL INSPECTION

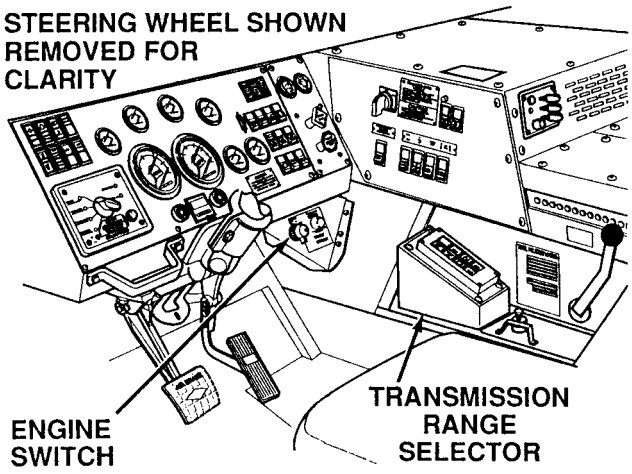
(1) Check transmission oil filter for leaks and damage.
   (a) If oil filter is leaking or damaged, tighten or replace filter (Para 8-4).
   (b) If there are no leaks or damage, oil filter is OK.
(2) Install left side noise panel and eight washers, lockwashers and screws.
(3) Install right side noise panel (Para 17-26).



5. AUTOMATIC SHIFTS OCCUR AT TOO HIGH OR LOW OF A SPEED (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10). (2) Operate truck, shifting transmission throughout selection range. (a) If transmission continues to shift at too high or too low of a speed, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If transmission operates normally, fault has been corrected. (3) Turn OFF ENGINE switch.



2-23. TRANSFER CASE TROUBLESHOOTING.

This paragraph covers Transfer Case Troubleshooting. The Transfer Case Fault Index, Table 2-42, lists faults for the Transfer Case of the PLS truck. Refer to schematic Figure 2-43 when performing tests and corrective actions. Refer to TM 9-4910-571-12&P.

Table 2-42. Transfer Case System Fault Index

Fault No.	Description	Page
1.	Transfer Case Unusually Noisy When Operating	2-1702
2.	Transfer Case Does Not Shift Into High Or Low Or Slips Out Of Gear	2-1712
3.	Transfer Case Will Not Lockup	2-1718

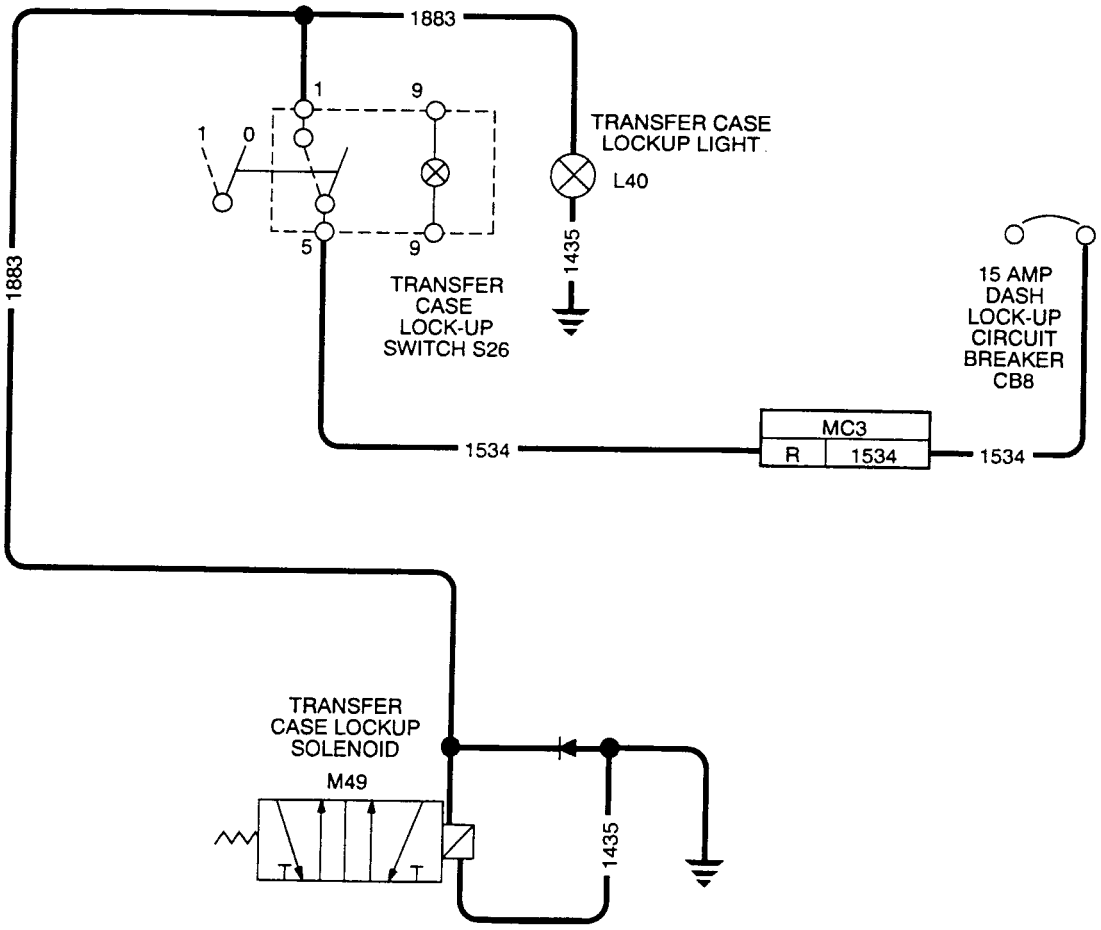


Figure 2-43. Transfer Case Lockup Electrical Schematic

2-23. TRANSFER CASE TROUBLESHOOTING (CONT).

1. TRANSFER CASE UNUSUALLY NOISY WHEN OPERATING.

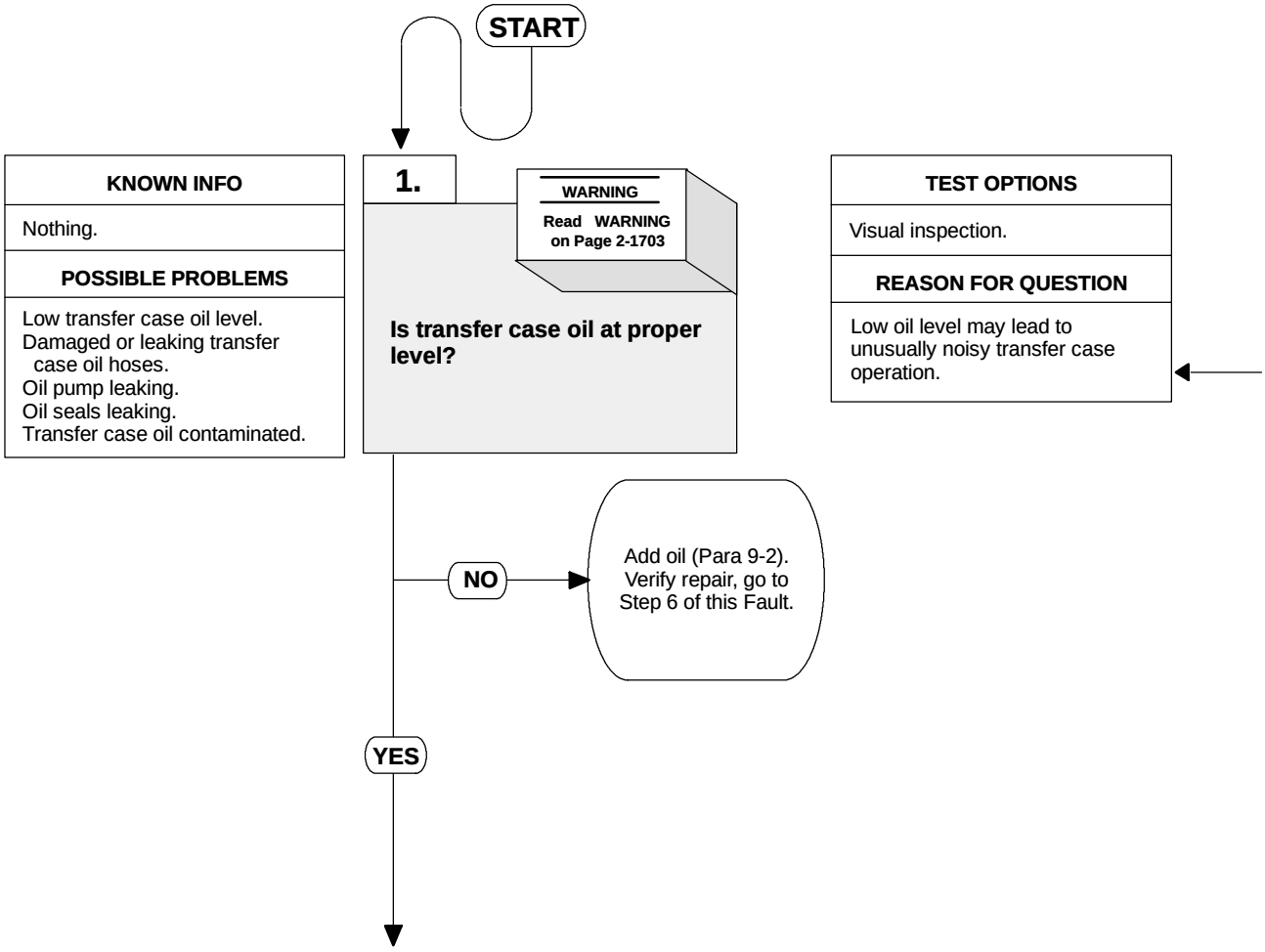
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pan, Drain (Item 47, Appendix G)

Materials/Parts
Sealing Compound (Item 72, Appendix C)

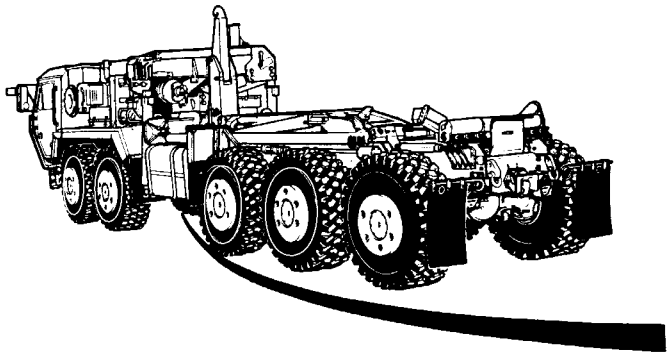
References
TM 9-2320-364-10

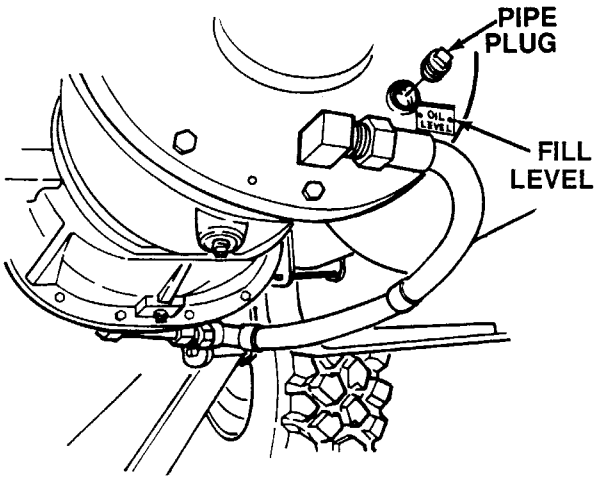
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

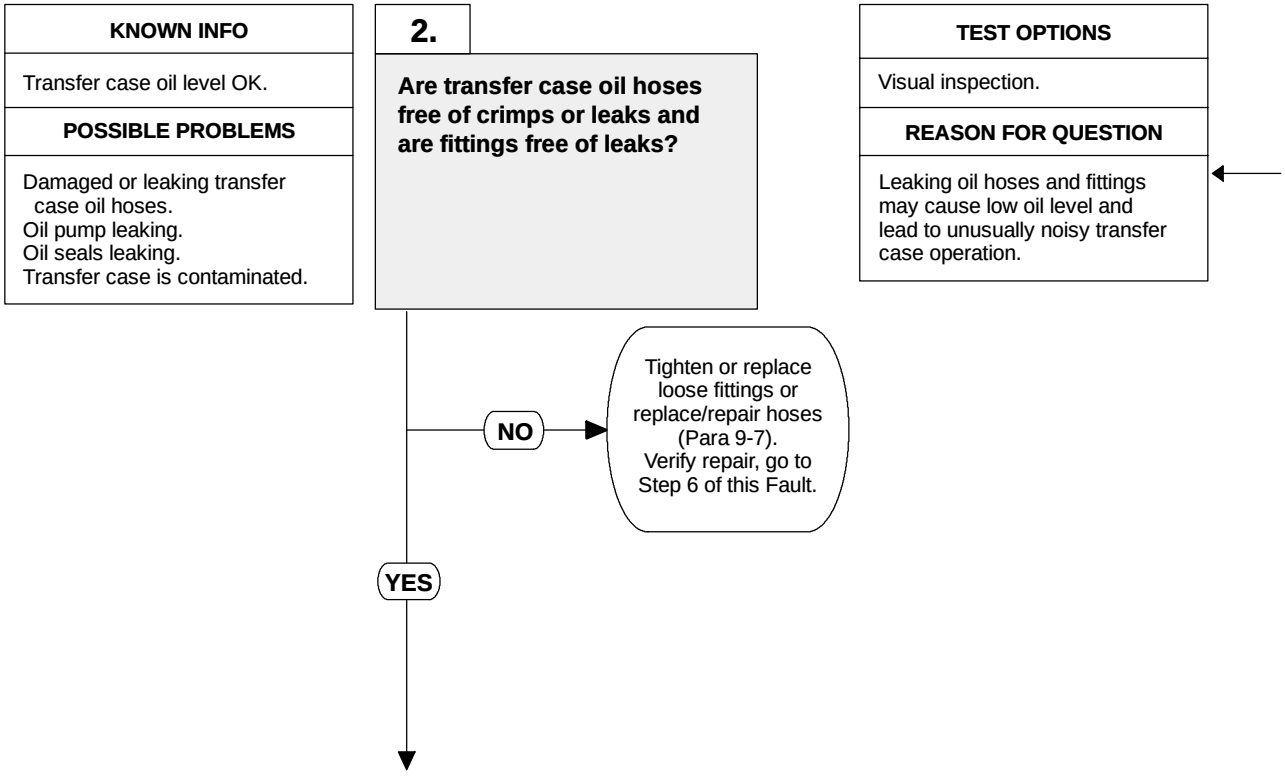


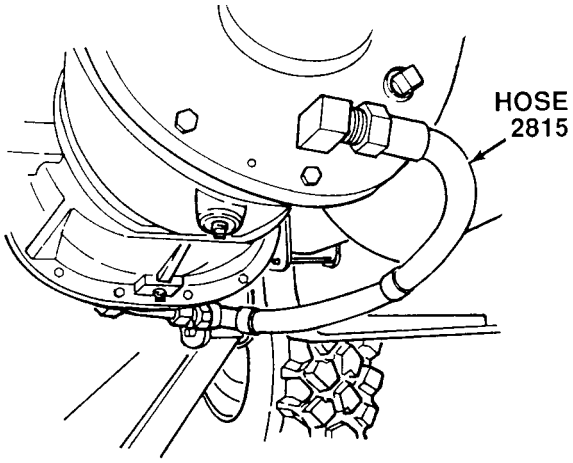


VISUAL INSPECTION

(1) Place drain pan under transfer case oil level pipe plug.
(2) Remove pipe plug.
(3) Check oil for correct level (Para 2-9).
  (a) Add oil as required (Para 9-2).
  (b) If oil level is OK, go to Step (4) below.
(4) Apply thread sealing compound to pipe plug and install in transfer case.

1. TRANSFER CASE UNUSUALLY NOISY WHEN OPERATING (CONT).

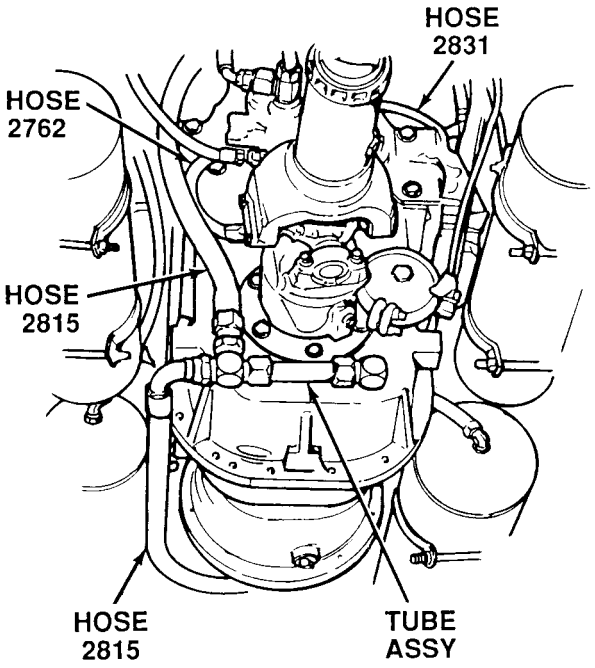


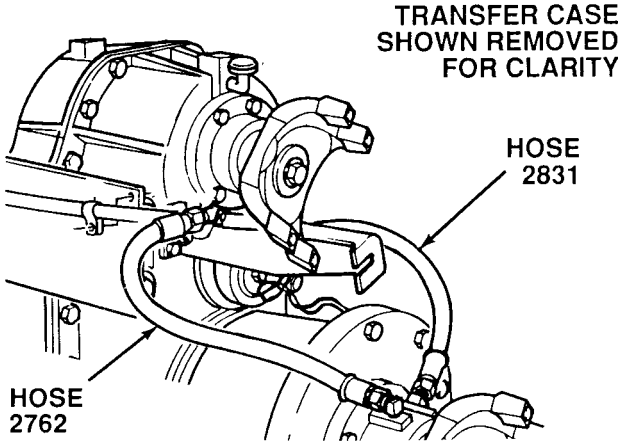


VISUAL INSPECTION

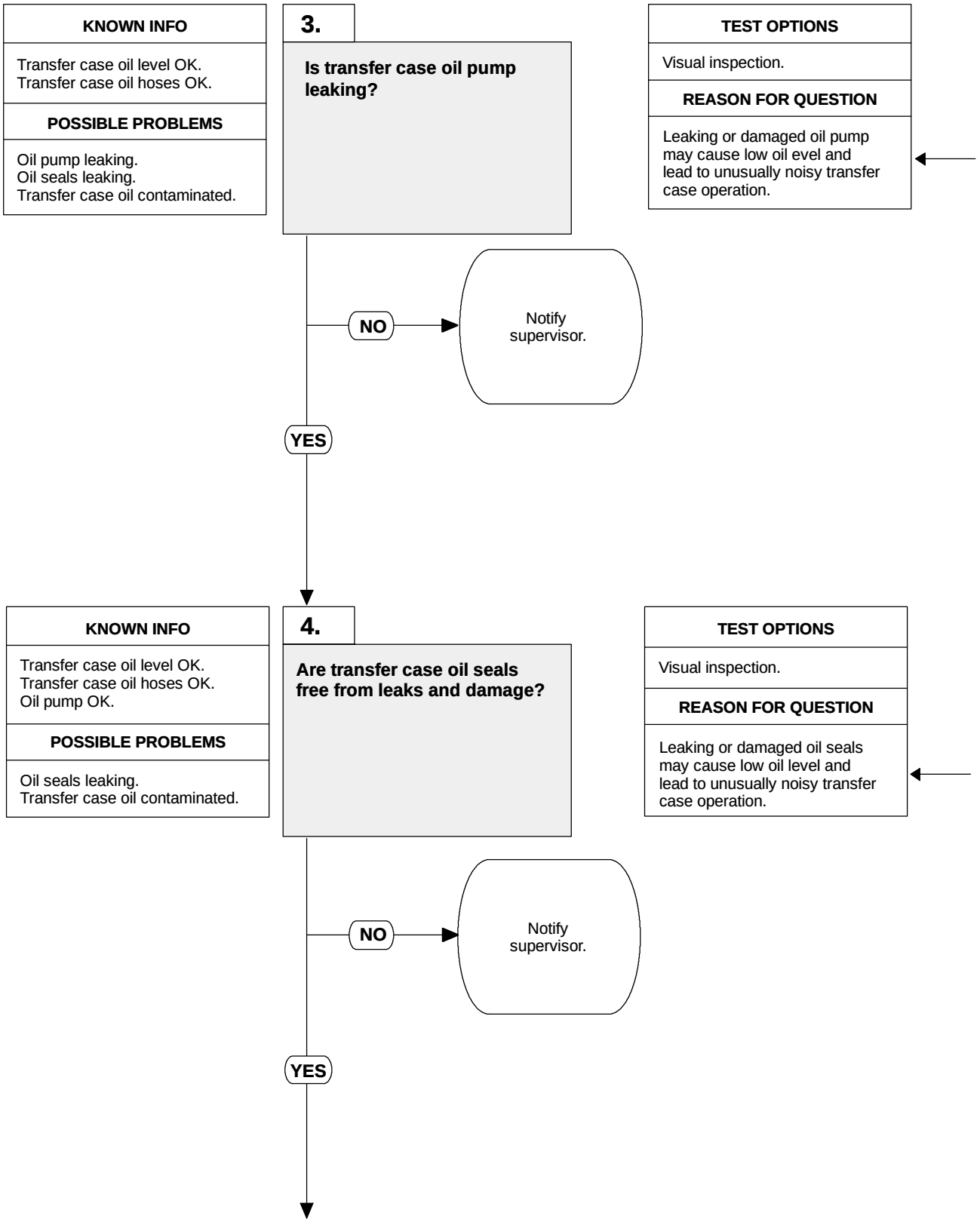
Check transfer case oil hoses for crimping and/or leaks.

(1) If there are crimps or leaks, repair/replace hoses and/or tighten/replace fittings (Para 9-7).
(2) If there are no leaks, oil hoses and fittings are OK.

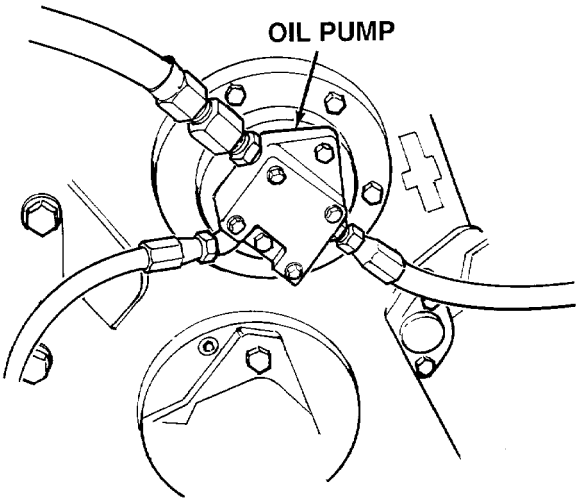




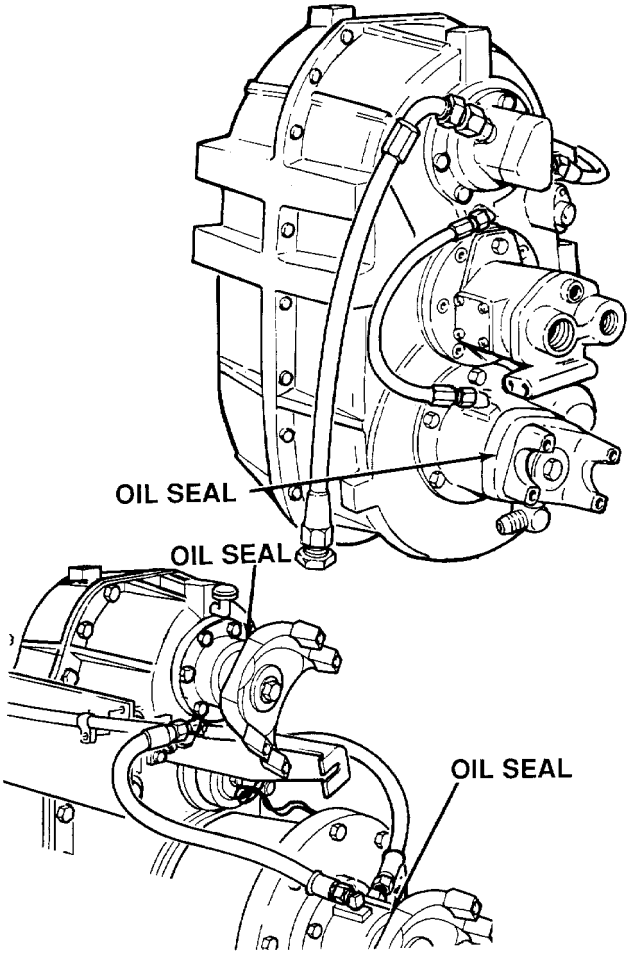
1. TRANSFER CASE UNUSUALLY NOISY WHEN OPERATING (CONT).



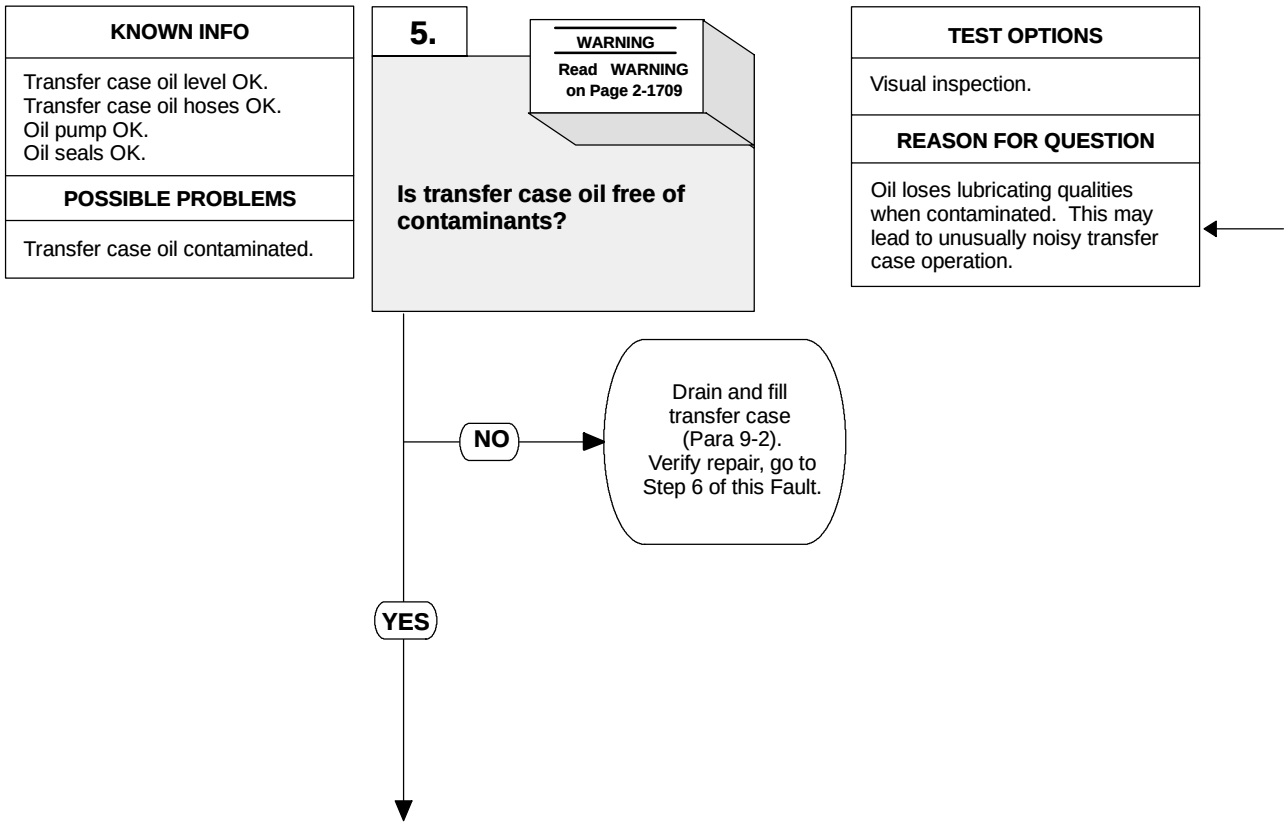
VISUAL INSPECTION
Check oil pump for leaks and damage.



VISUAL INSPECTION
Check all three oil seals for leaks.



1. TRANSFER CASE UNUSUALLY NOISY WHEN OPERATING (CONT).

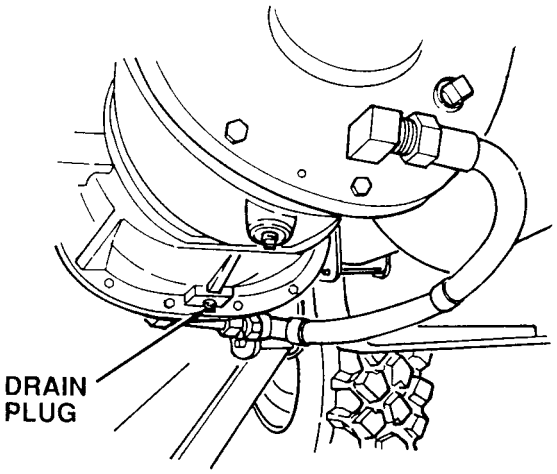


WARNING

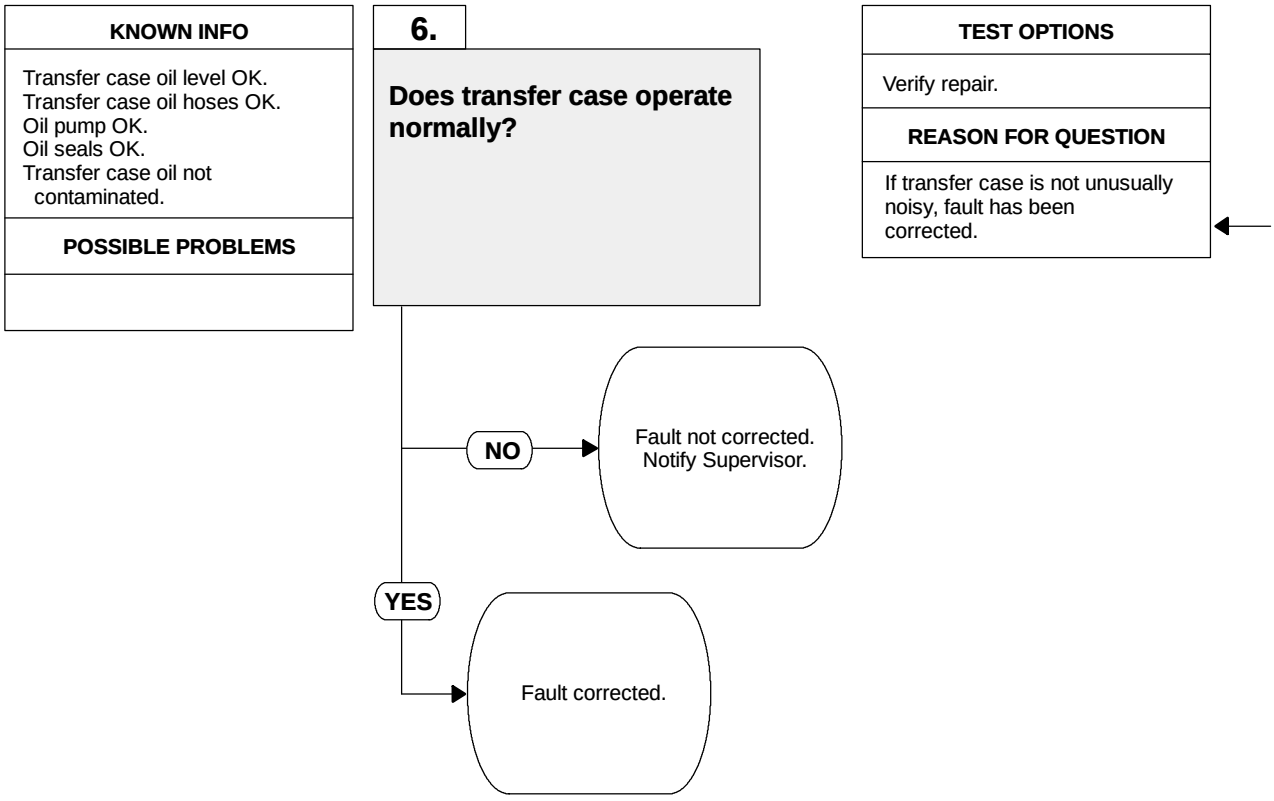
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

VISUAL INSPECTION

(1) Place clean drain pan under transfer case drain plug.
(2) Remove drain plug and allow approximately 1 qt (0.9 L) to drain into drain pan (Para 9-2).
(3) Apply thread sealing compound to pipe plug and install in transfer case.
(4) Inspect oil for contamination.
    (a) If oil is good, add it back into transfer case.
    (b) If oil is contaminated, drain and fill transfer case (Para 9-2).

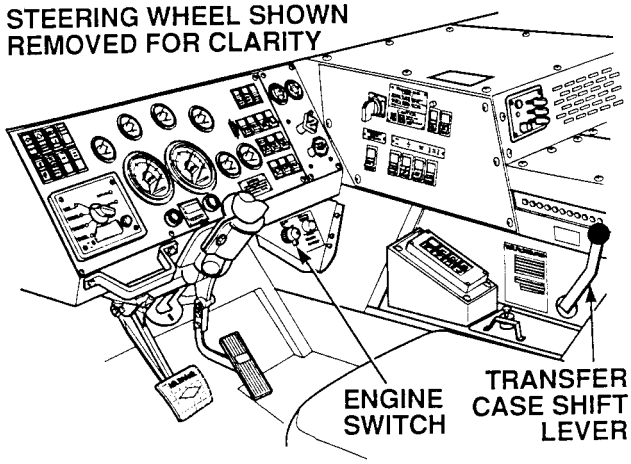


1. TRANSFER CASE UNUSUALLY NOISY WHEN OPERATING (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Operate truck observing transfer case noise level.
    (a) If transfer case continues to operate noisily, fault not corrected. Turn OFF ENGINE switch and notify Supervisor.
    (b) If transfer case operates normally, fault has been corrected.
(3) Turn OFF ENGINE switch.



2-23. TRANSFER CASE TROUBLESHOOTING (CONT).

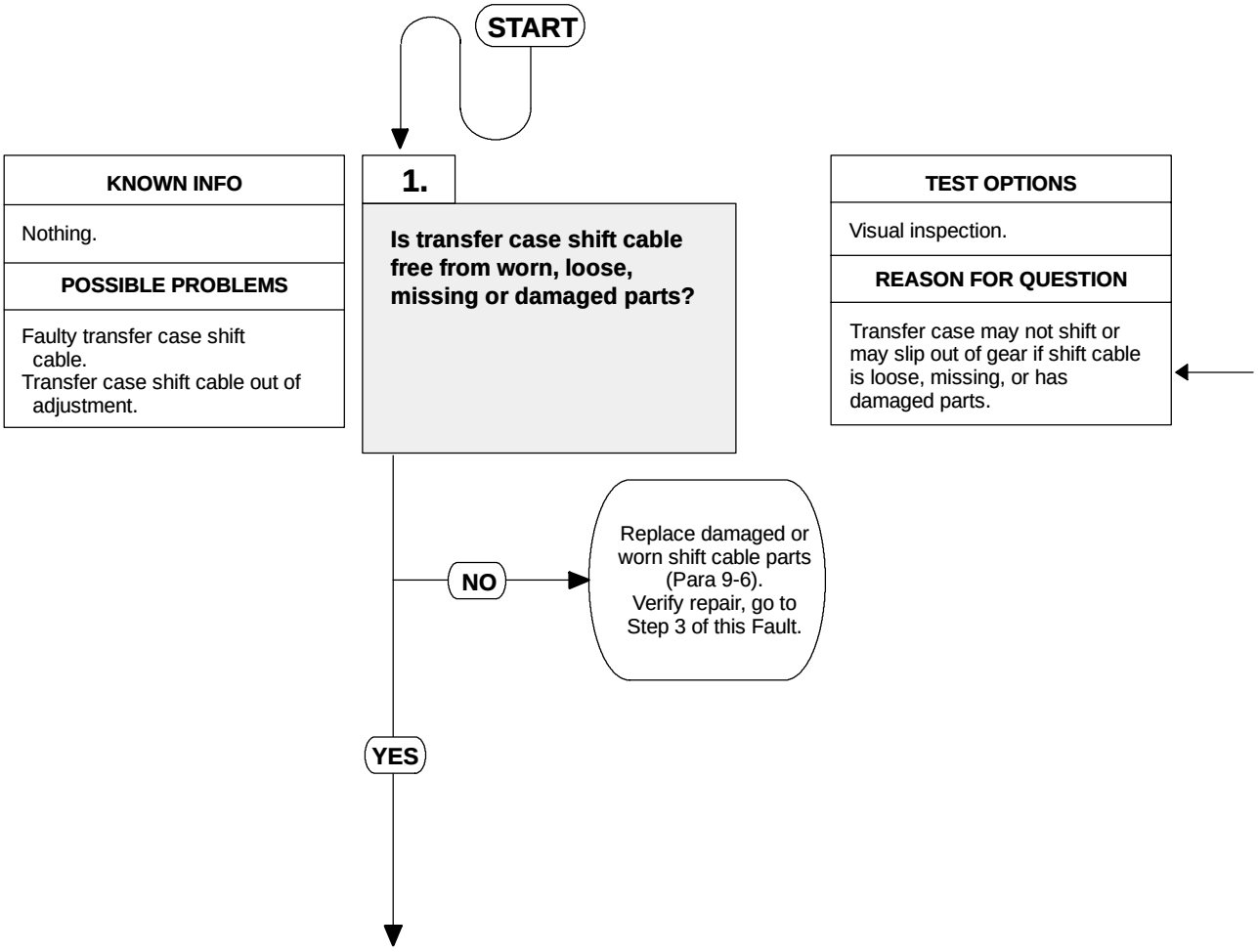
2. TRANSFER CASE DOES NOT SHIFT INTO HIGH OR LOW OR SLIPS OUT OF GEAR.

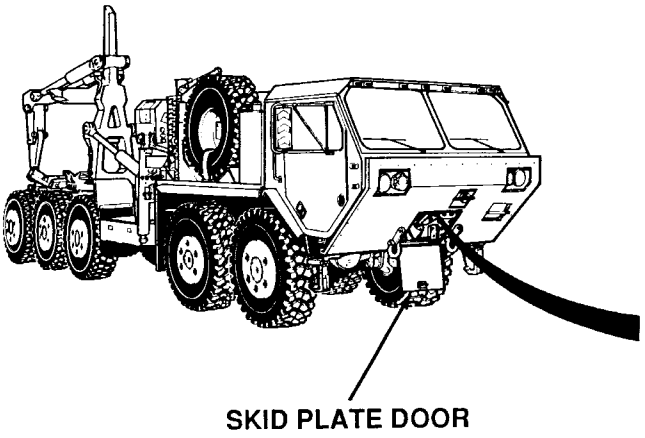
INITIAL SETUP

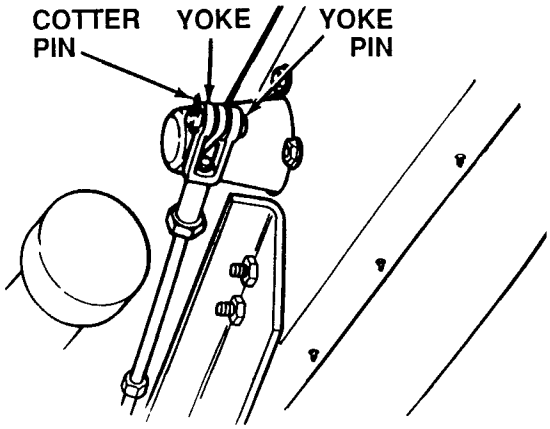
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

References
TM 9-2320-364-10

Equipment Condition
Load Handling System (LHS) extended fully, (TM 9-2320-364-10)
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

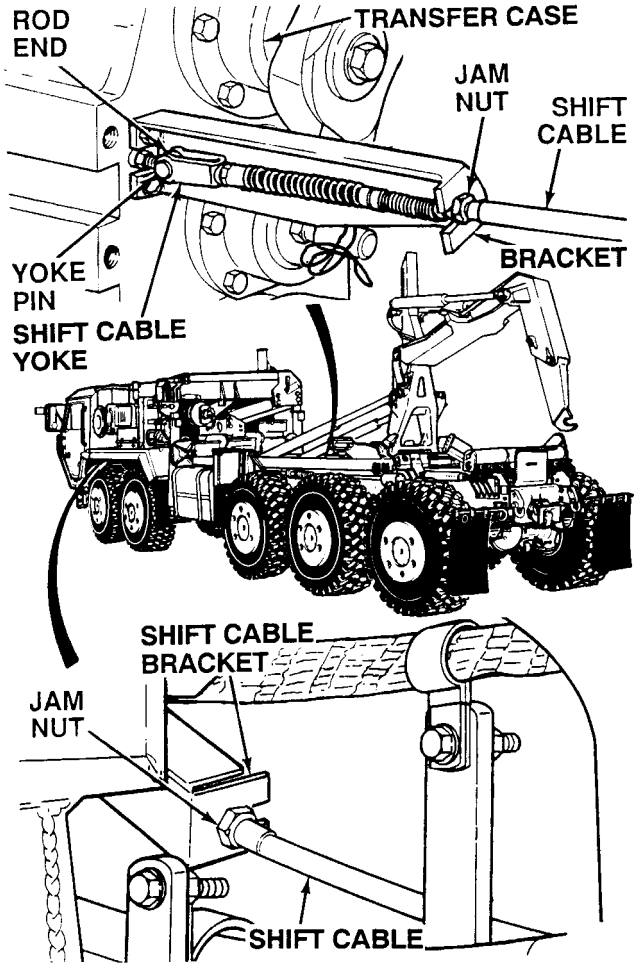




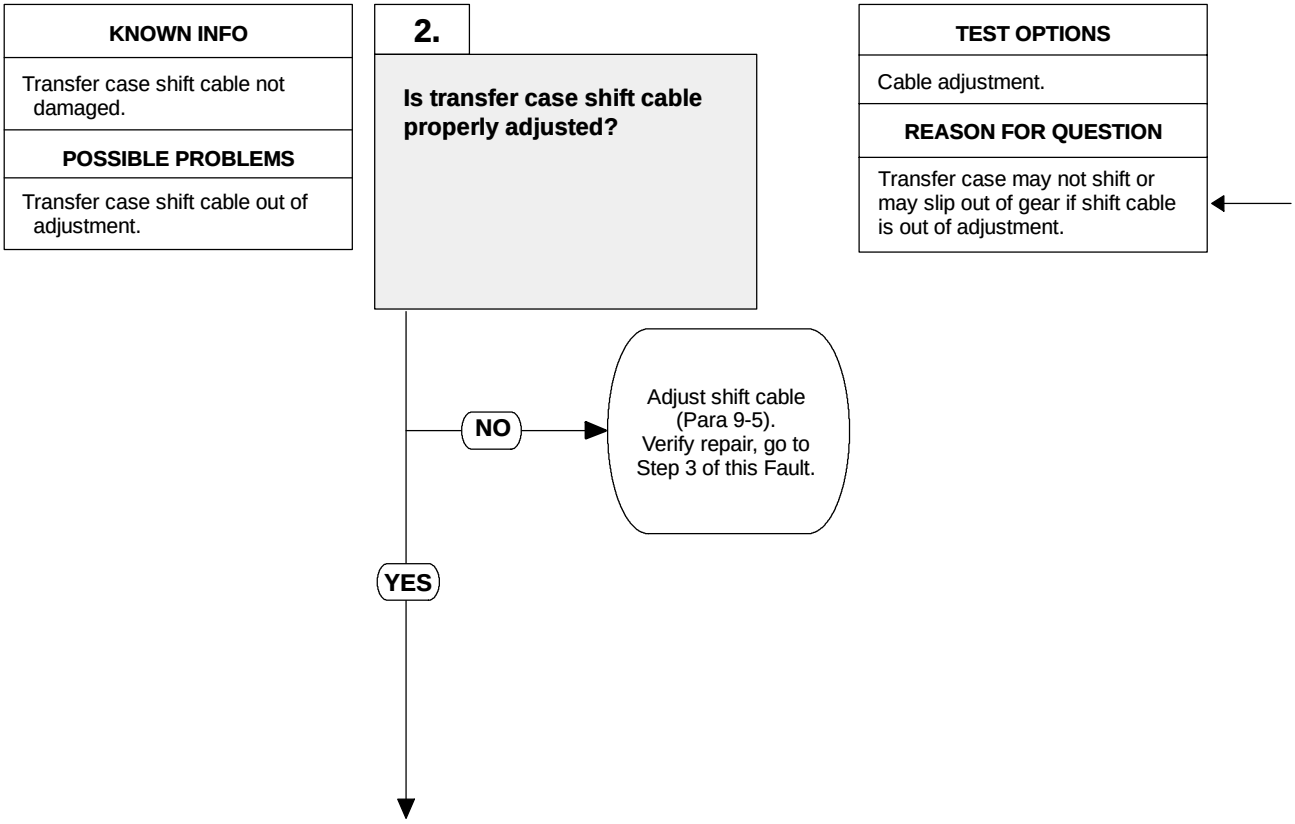


VISUAL INSPECTION

(1) Open skid plate door.
(2) Check cable at transfer case shift lever under cab.
(3) Check transfer case shift cable for crimps and breaks.
(4) Check shift cable brackets, jam nuts, and washers for wear or damage.
(5) Check shift cable yoke, rod end, yoke pin, and cotter pin for wear or damage.
  (a) If any of the components listed in Steps (2) through (5) are damaged, replace damaged transfer case parts, (Para 9-6).
  (b) If none of the components listed in Steps (2) through (5) are damaged, go to Step 2 of this Fault.



2. TRANSFER CASE DOES NOT SHIFT INTO HIGH OR LOW OR SLIPS OUT OF GEAR (CONT).

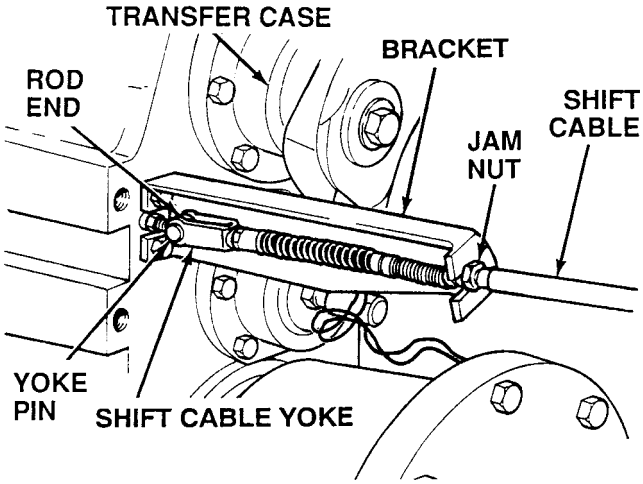


CABLE ADJUSTMENT

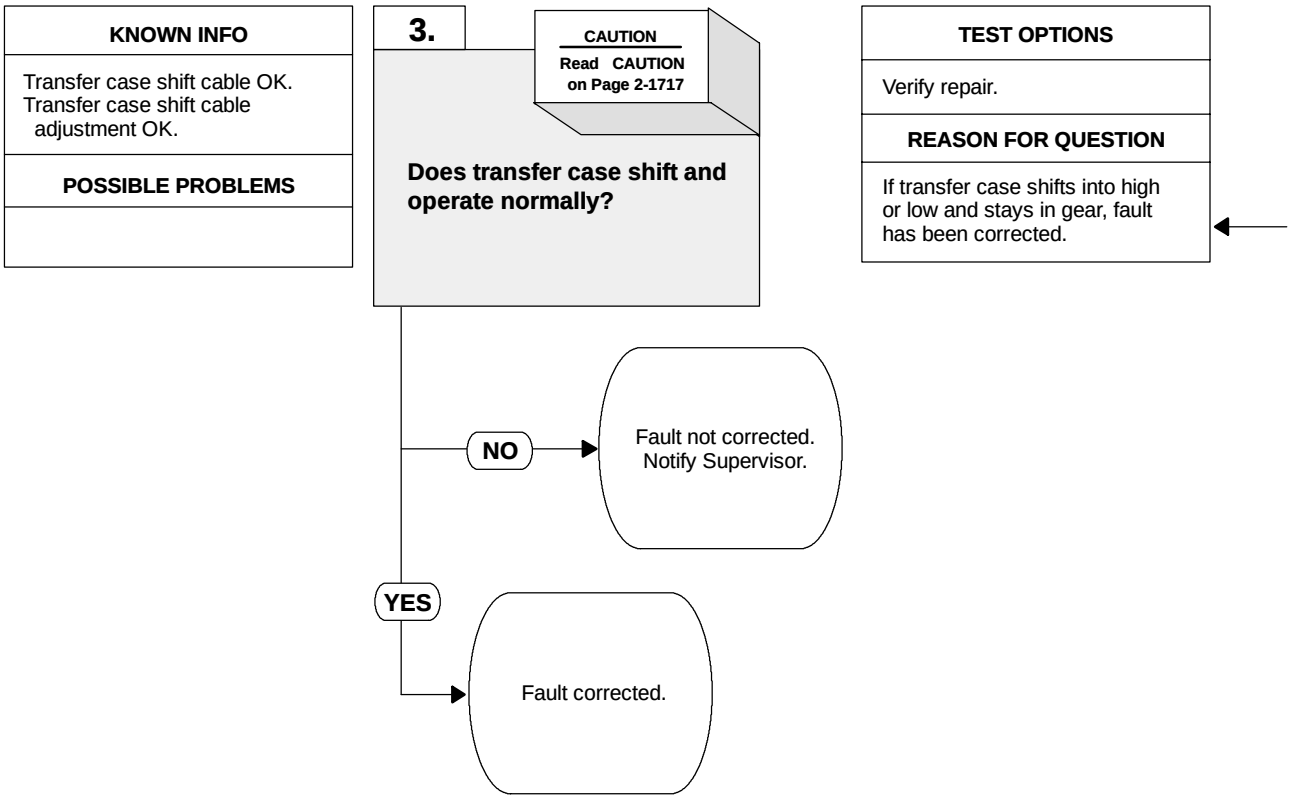
Check transfer case shift cable adjustment (Para 9-5).

(1) If transfer case shift cable is out of adjustment, adjust cable as necessary (Para 9-5).

(2) If transfer case shift cable is adjusted properly, cable is OK.



2. TRANSFER CASE DOES NOT SHIFT INTO HIGH OR LOW OR SLIPS OUT OF GEAR (CONT).

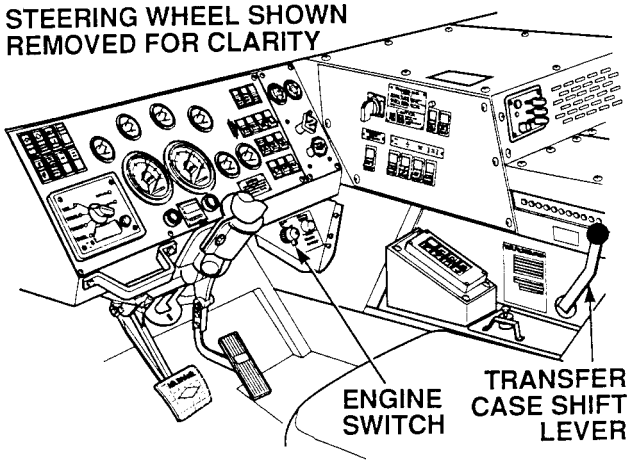


CAUTION

Do not move TRANSFER CASE shift lever when truck is moving or when transmission is in gear. Severe damage to drive line will result.

VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Put LHS in transit position.
(3) Operate truck, shifting transfer case into high and low gear.
    (a) If transfer case continues to slip out of gear or does not shift into high or low, fault not corrected. Turn OFF ENGINE switch and notify Supervisor.
    (b) If transfer case operates normally, fault has been corrected.
(4) Turn OFF ENGINE switch.



2-23. TRANSFER CASE TROUBLESHOOTING (CONT).

3. TRANSFER CASE WILL NOT LOCKUP.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Apendix G)
STE/ICE-R (Optional) (Item 3, Appendix G)
Multimeter (Item 44, Appendix G)

Materials/Parts
Adhesive (Item 6, Appendix C)
Soap solution (Item 86, Appendix C)

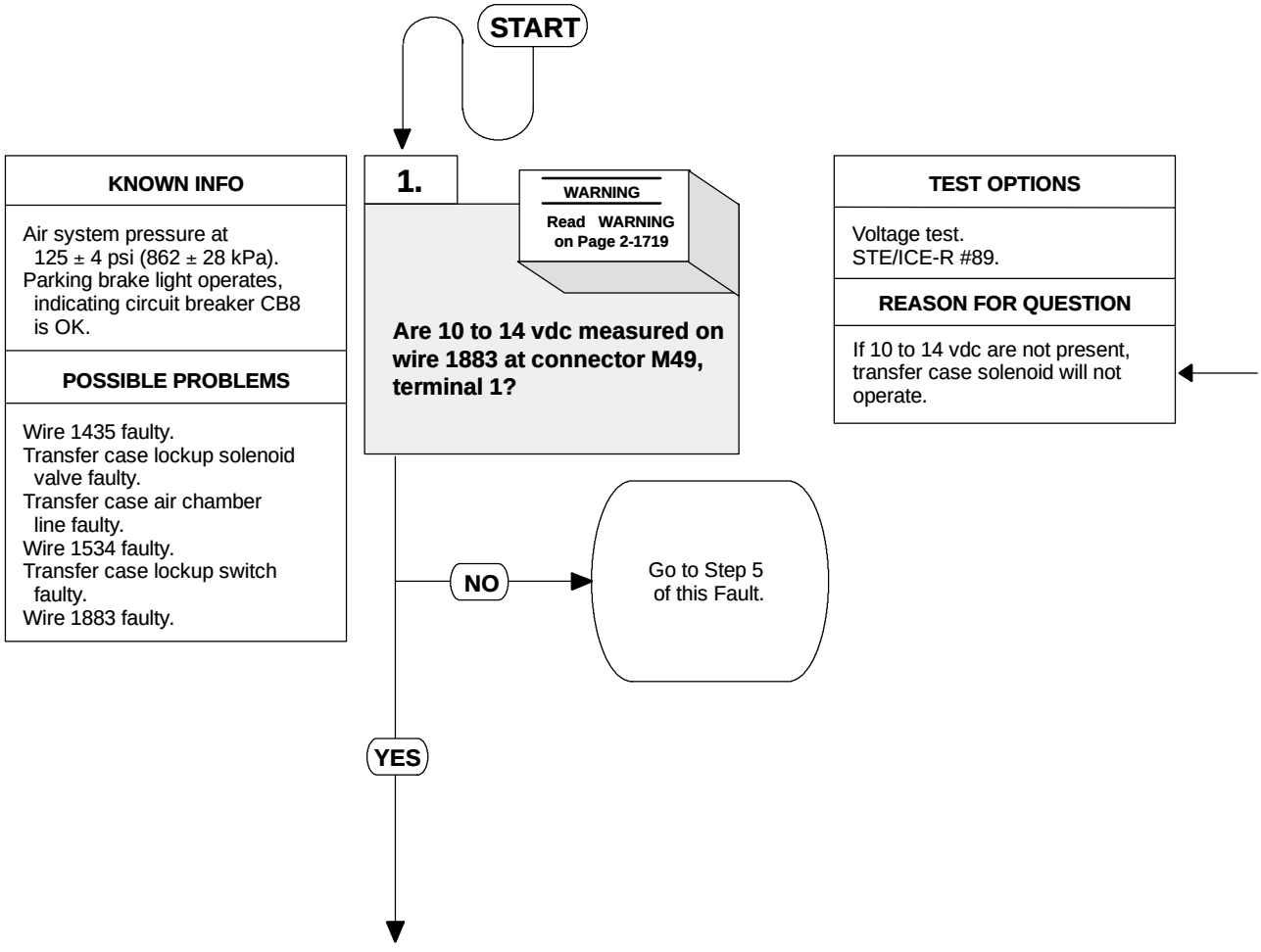
References
TM 9-2320-364-10
TM 9-4910-571-12&P

Personnel Required
Two

Equipment Condition
Wheels chocked, (TM 9-2320-364-10)
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)

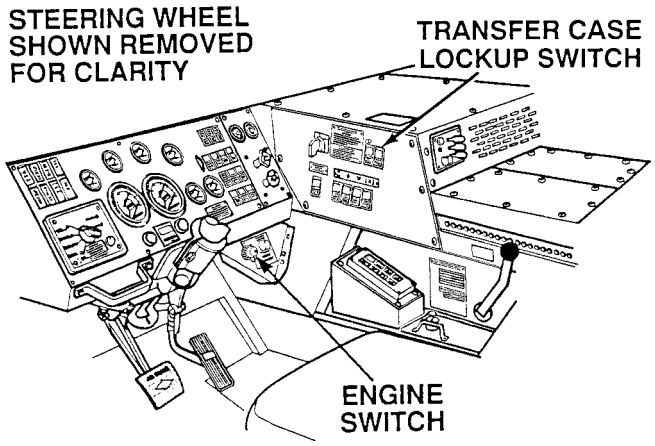
Note

A soap and water solution should be used for visual air leak inspections.



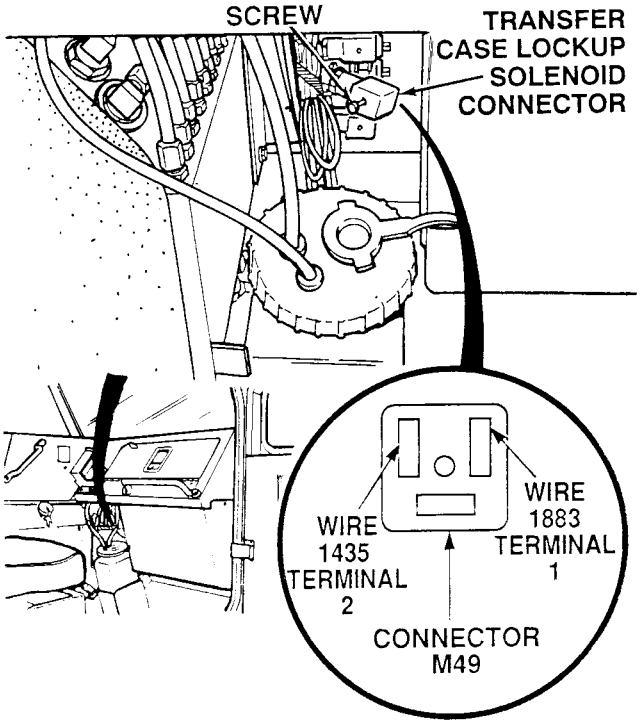
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

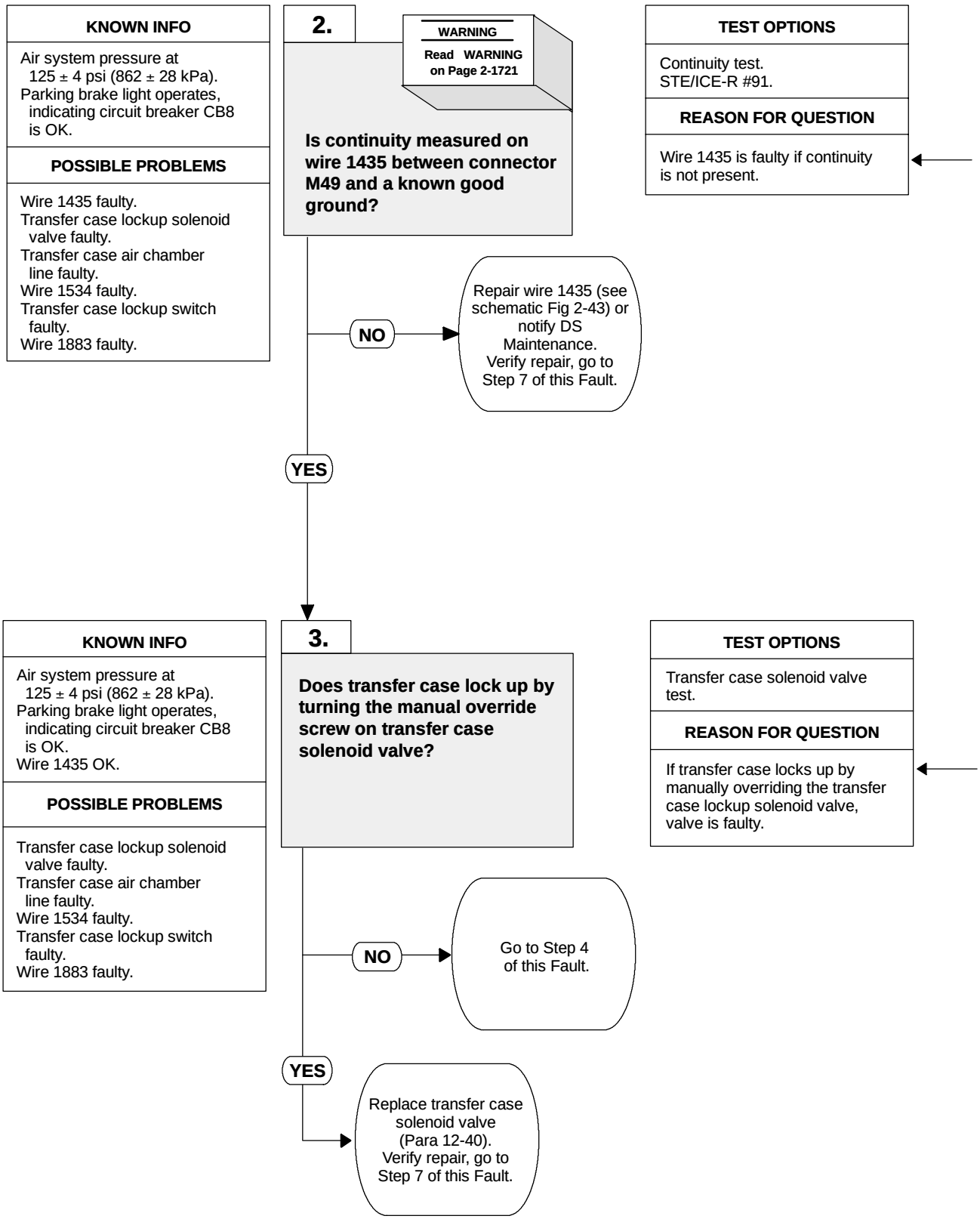


VOLTAGE TEST

(1) Loosen screw and disconnect transfer case lockup solenoid connector M49 from transfer case solenoid.
(2) Set multimeter select switch to volts dc.
(3) Connect positive (+) multimeter lead to wire 1883 at connector M49, terminal 1.
(4) Connect negative (–) multimeter lead to a known good ground.
(5) Turn ON ENGINE switch (TM 9-2320-364-10).
(6) Turn on TRANSFER CASE LOCKUP switch.
  (a) If 10 to 14 vdc are not present, perform Steps (7) and (8) below and go to Step 5 of this Fault.
  (b) If 10 to 14 vdc are present, perform Steps (7) and (8) below and go to Step 2 of this Fault.
(7) Turn OFF ENGINE switch.
(8) Turn off TRANSFER CASE LOCKUP switch.



3. TRANSFER CASE WILL NOT LOCKUP (CONT).

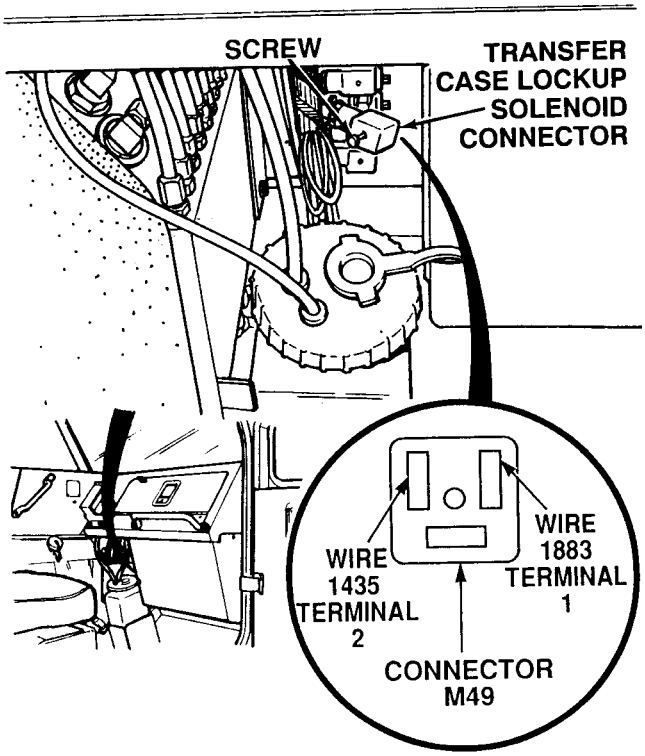


WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

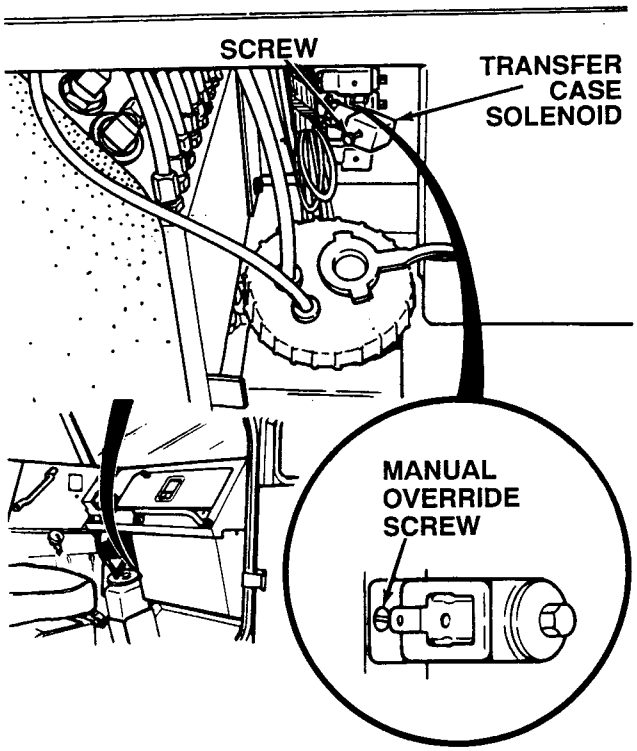
CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Is there continuity between transfer case lockup solenoid connector M49, terminal 2 and a known good ground?
  (a) If there is no continuity, repair wire 1435 (see schematic Fig 2-43) or notify DS Maintenance.
  (b) If there is continuity, wire 1435 is OK.

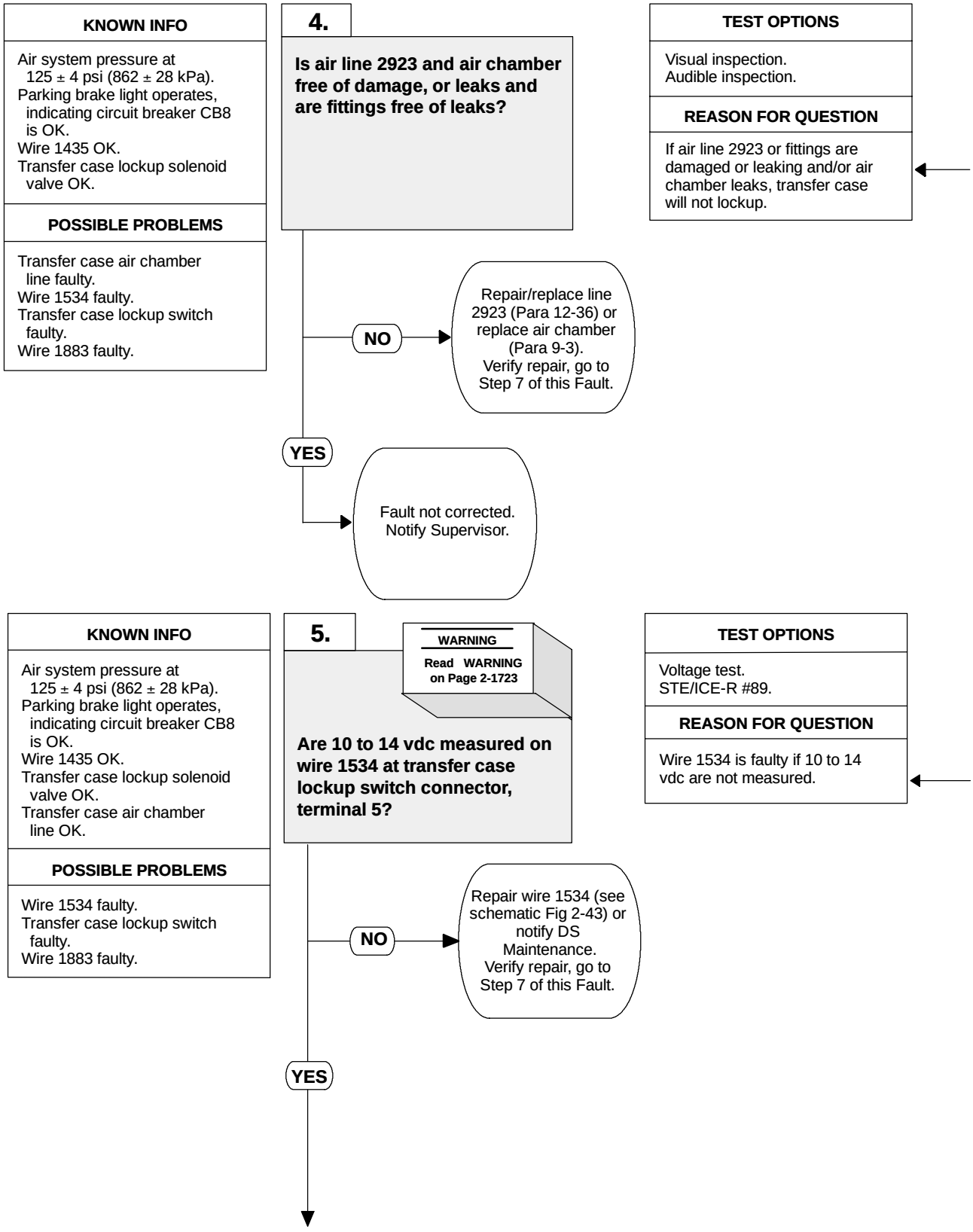


TRANSFER CASE SOLENOID VALVE TEST

(1) Turn transfer case solenoid valve manual override screw counter-clockwise and listen for air passing through valve.
  (a) If air passes through valve, valve is OK. Perform Steps (2) through (4) below and go to Step 4 of this Fault.
  (b) If air does not pass through valve, perform Step (2) below and replace valve (Para 12-40).
(2) Turn solenoid valve manual override screw clockwise all the way.
(3) Install connector M49.
(4) Tighten screw and coat head of screw with adhesive.



3. TRANSFER CASE WILL NOT LOCKUP (CONT).

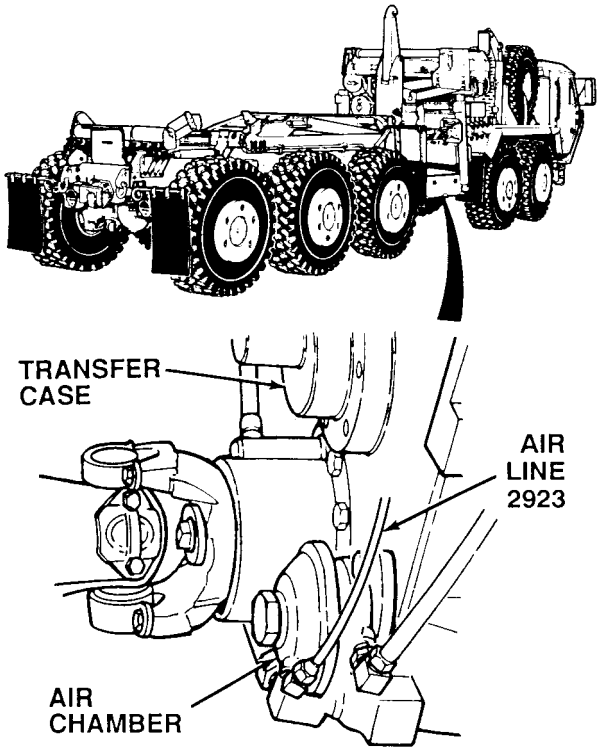


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

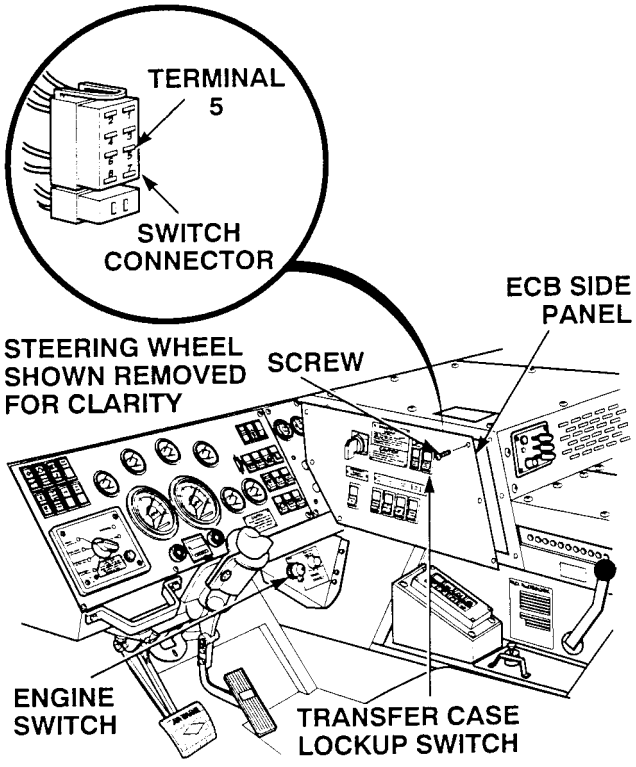
VISUAL/AUDIBLE INSPECTION

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Listen to air chamber for operation and air line 2923 for leaks while assistant turns on TRANSFER CASE LOCKUP switch.
  (a) If air line 2923 leaks, perform Steps (3) and (4) below, and tighten fittings and/or replace line (Para 12-36).
  (b) If air chamber does not operate, perform Steps (3) and (4) below and replace air chamber (Para 9-3).
  (c) If air chamber operates, perform Steps (3) and(4) below and notify Supervisor.
(3) Turn off TRANSFER CASE LOCKUP switch.
(4) Turn OFF ENGINE switch.

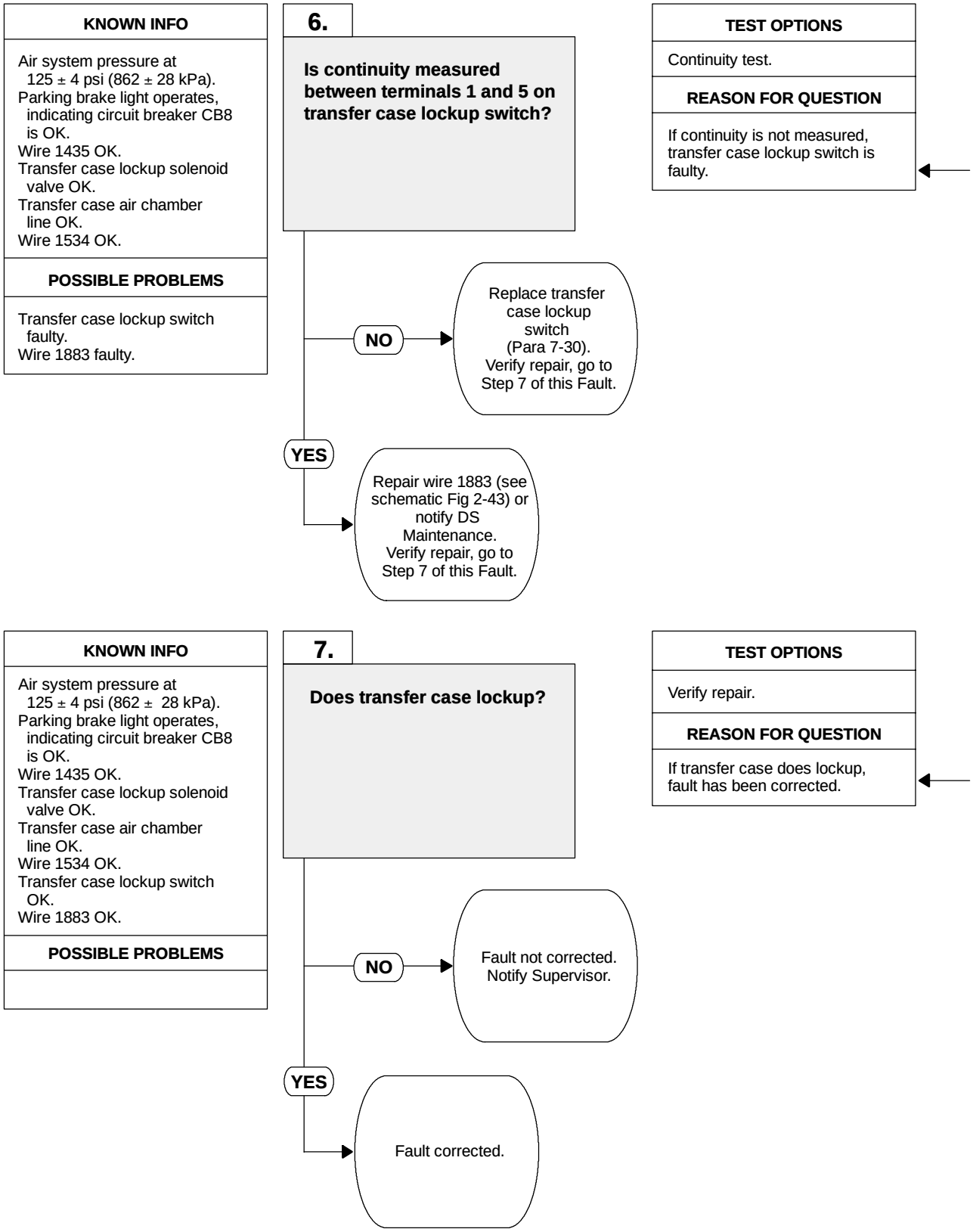


VOLTAGE TEST

(1) Remove six screws and tilt ECB side panel.
(2) Remove TRANSFER CASE LOCKUP switch.
(3) Disconnect connector from TRANSFER CASE LOCKUP switch.
(4) Set multimeter select switch to volts dc.
(5) Connect positive (+) multimeter lead to wire 1534 at connector, terminal 5.
(6) Connect negative (–) multimeter lead to a known good ground.
(7) Turn ON ENGINE switch (TM 9-2320-364-10).
  (a) If 10 to 14 vdc are not present, turn OFF ENGINE switch and repair wire 1534 (see schematic Fig 2-43) or notify DS Maintenance.
  (b) If 10 to 14 vdc are present, wire 1534 is OK.
(8) Turn OFF ENGINE switch.

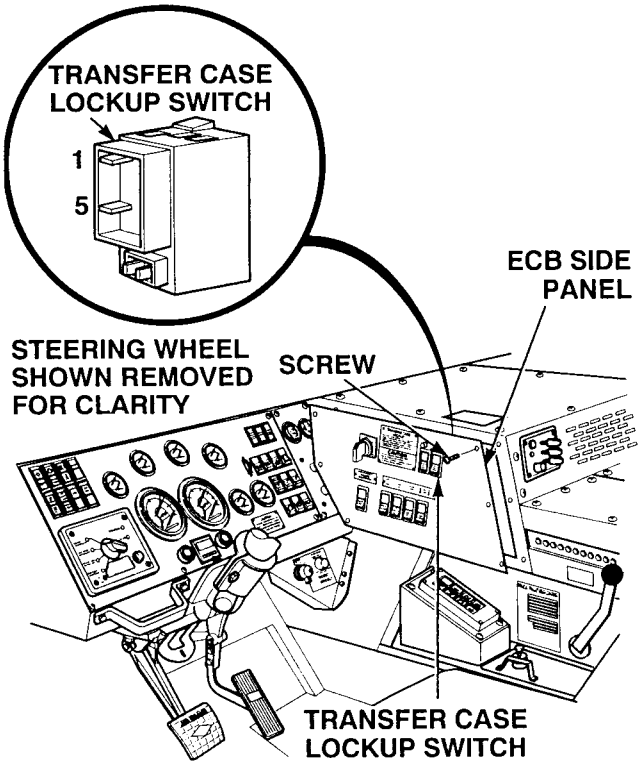


3. TRANSFER CASE WILL NOT LOCKUP (CONT).



CONTINUITY TEST

(1) Set multimeter select switch to ohms.
(2) Turn on TRANSFER CASE LOCKUP switch (TM 9-2320-364-10).
(3) Is there continuity between transfer case lockup switch, terminals 1 and 5.
  (a) If there is no continuity, perform Steps (4) and (5) below and replace transfer case lockup switch (Para 7-30).
  (b) If there is continuity, repair wire 1883 (see schematic Fig 2-43) or notify DS Maintenance.
(4) Connect transfer case lockup switch to harness connector.
(5) Install ECB side panel and six screws.



VERIFY REPAIR

(1) Turn ON ENGINE switch (TM 9-2320-364-10).
(2) Turn on TRANSFER CASE LOCKUP switch.
  (a) If transfer case does not lockup, fault not corrected. Perform Steps (3) and (4) below and notify Supervisor.
  (b) If transfer case does lockup, fault has been corrected.
(3) Turn off TRANSFER CASE LOCKUP switch.
(4) Turn OFF ENGINE switch.

2-23. DRIVESHAFTS AND UNIVERSAL JOINTS TROUBLESHOOTING.

This paragraph covers Driveshafts and Universal Joints Troubleshooting. The Driveshafts System Fault Index, Table 2-42, lists faults for the driveshafts of the PLS truck.

Table 2-42. Driveshafts System Fault Index

Fault No.	Description	Page
1.	Driveshafts or Universal Joints Unusually Noisy When Operating	2-1728

2-23. DRIVESHAFTS AND UNIVERSAL JOINTS TROUBLESHOOTING (CONT).

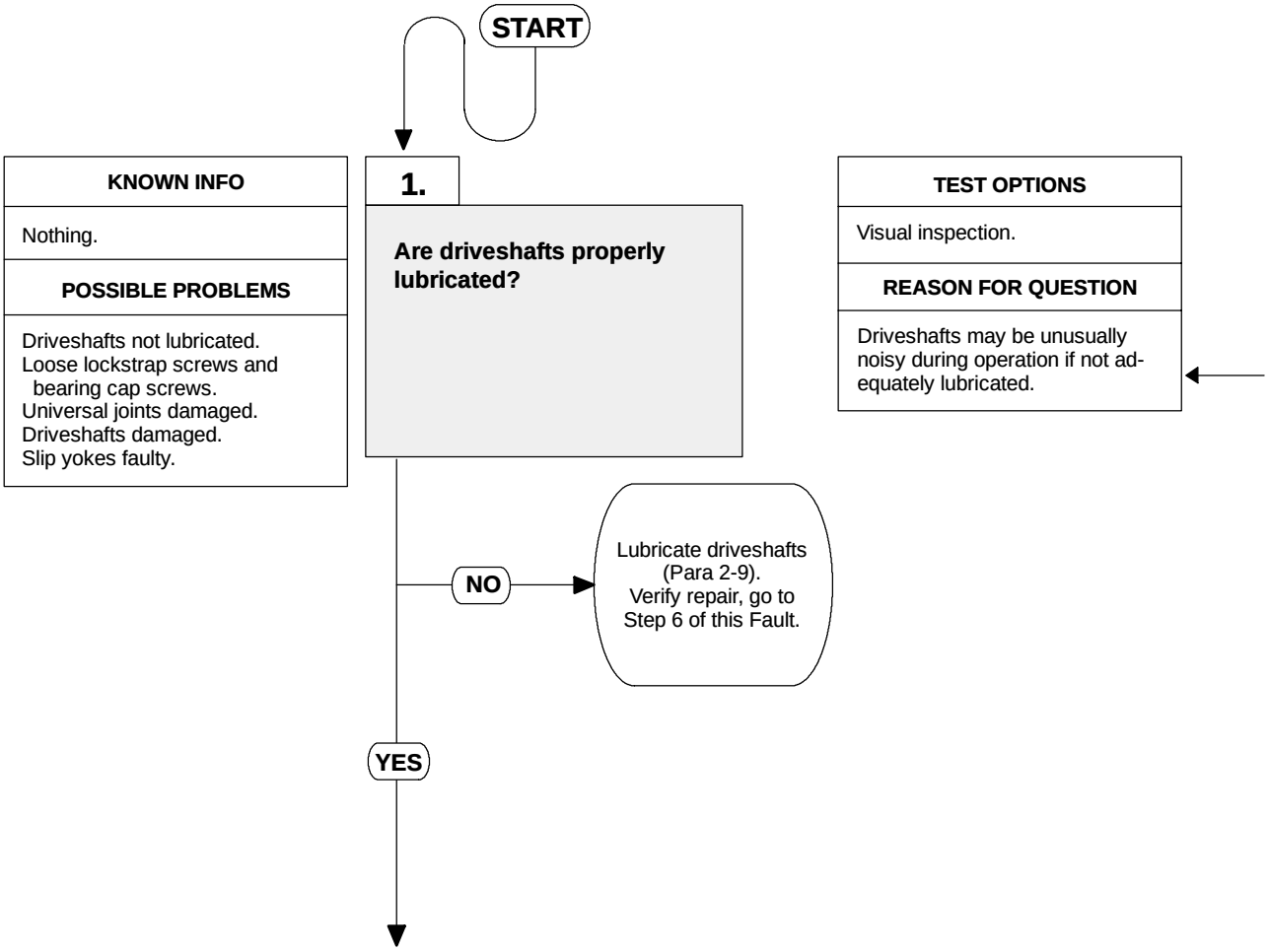
1. DRIVESHAFTS OR UNIVERSAL JOINTS UNUSUALLY NOISY WHEN OPERATING.

INITIAL SETUP

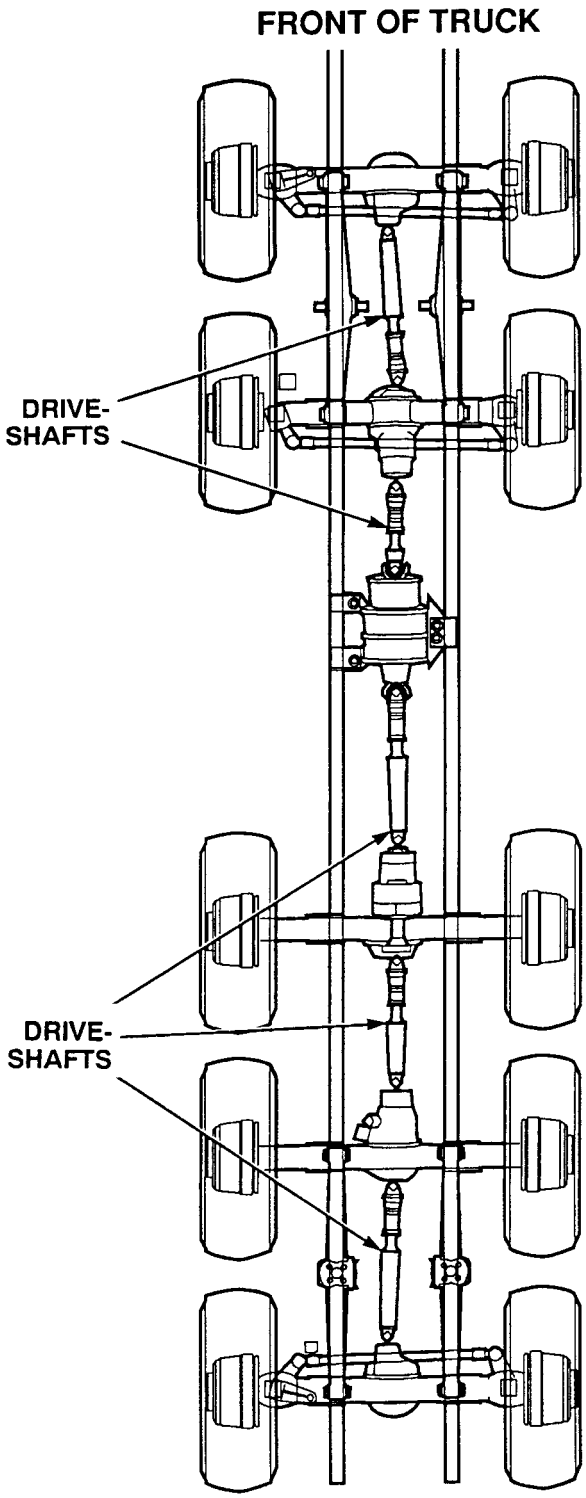
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

References
TM 9-2320-364-10

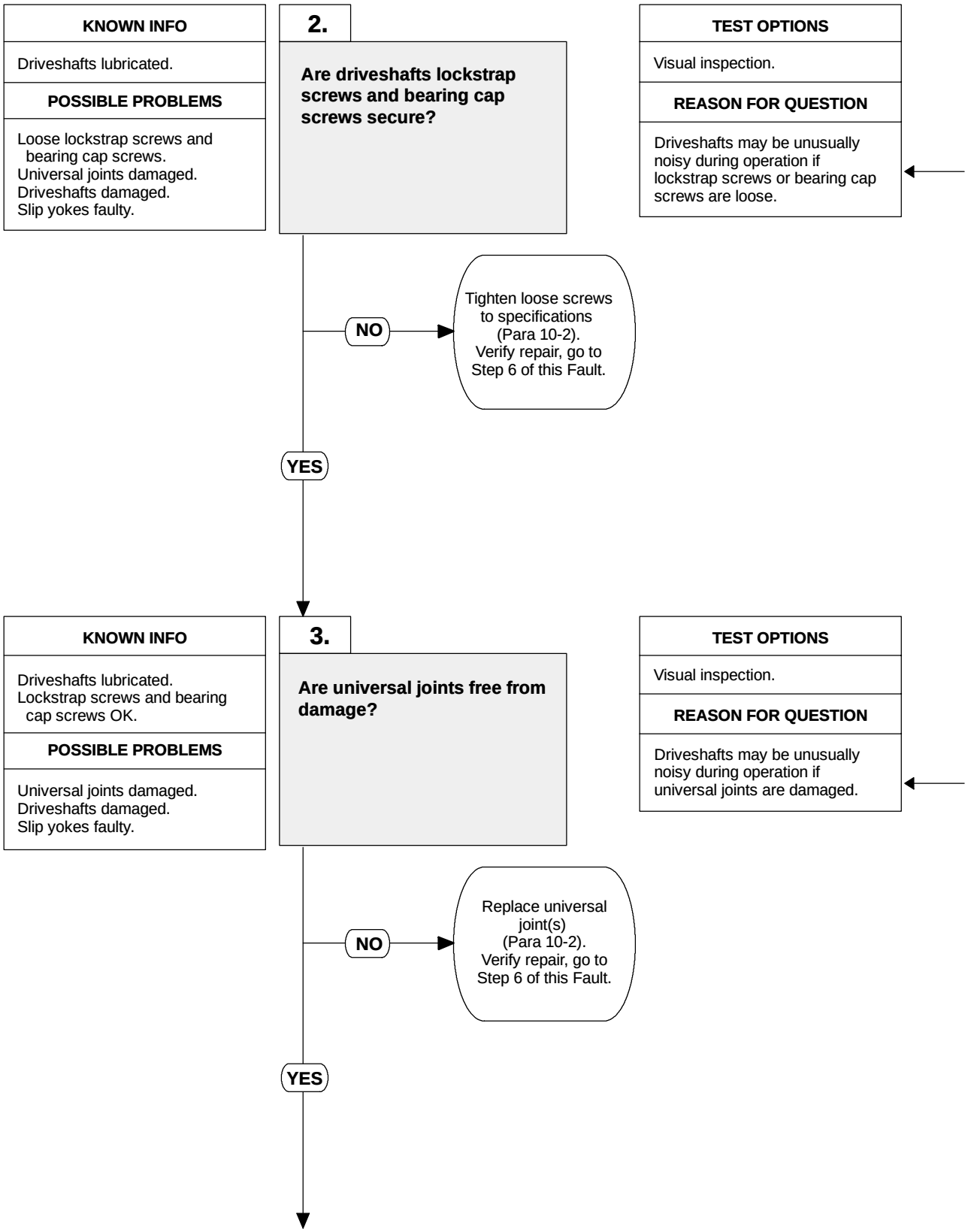
Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



VISUAL INSPECTION
Check driveshafts lubrication (Para 2-9). (1) If driveshafts are not lubricated, lubricate driveshafts. (2) If driveshafts are lubricated, go to Step 2 of this Fault.



1 DRIVESHAFTS OR UNIVERSAL JOINTS UNUSUALLY NOISY WHEN OPERATING (CONT).

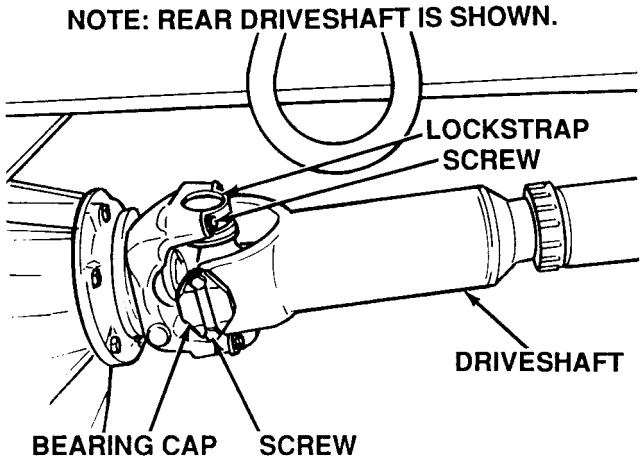


VISUAL INSPECTION

Check driveshafts, lockstraps, screws and bearing cap for looseness (Para 2-9).

(1) If screws are loose, tighten to specifications (Para 10-2).

(2) If screws are not loose, go to Step 3 of this Fault.

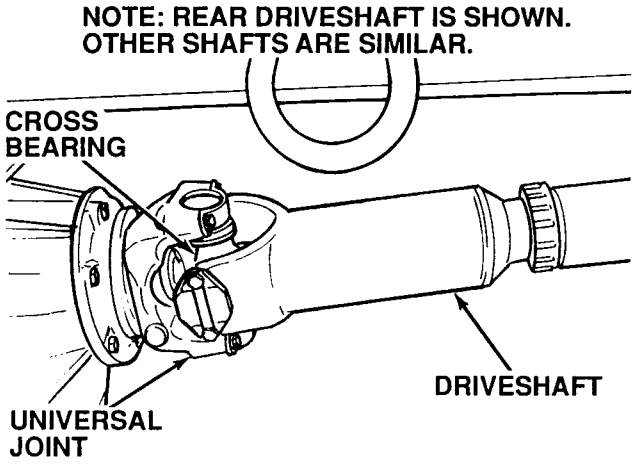


VISUAL INSPECTION

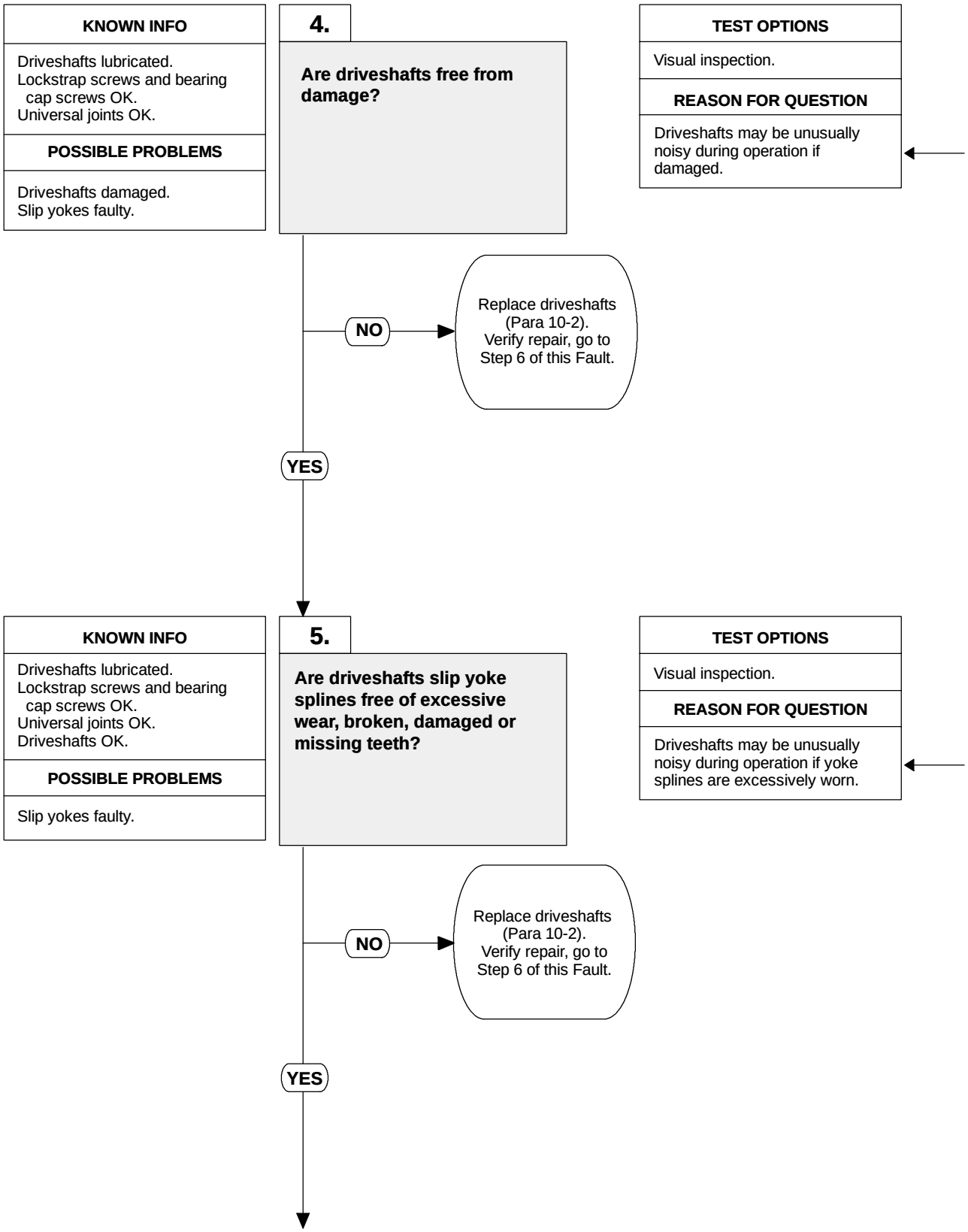
Check universal joints for damage (Para 2-9).

(1) If universal joint(s) are worn, replace universal joint(s) (Para 10-2).

(2) If universal joint(s) are not worn, go to Step 4 of this Fault.

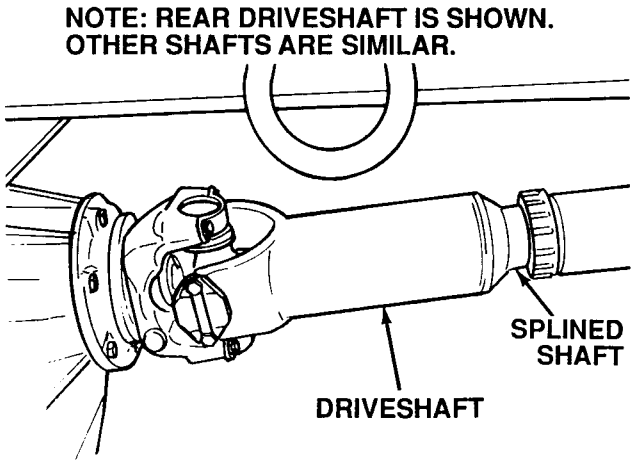


1 DRIVESHAFTS OR UNIVERSAL JOINTS UNUSUALLY NOISY WHEN OPERATING (CONT).



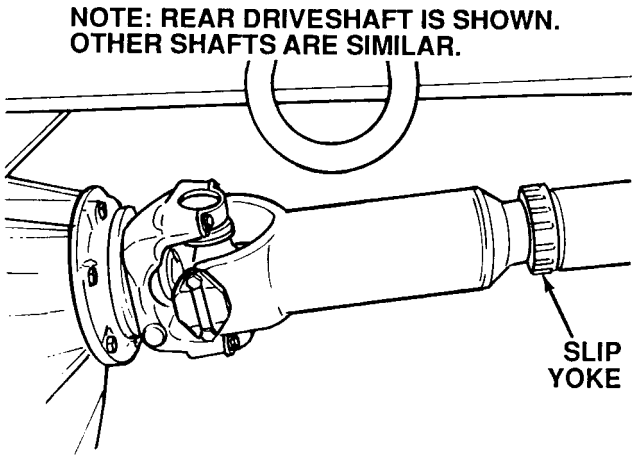
VISUAL INSPECTION

Check driveshafts for damage (Para 2-9).
(1) If driveshafts are damaged, replace driveshafts (Para 10-2).
(2) If driveshafts are not damaged, go to Step 5 of this Fault.

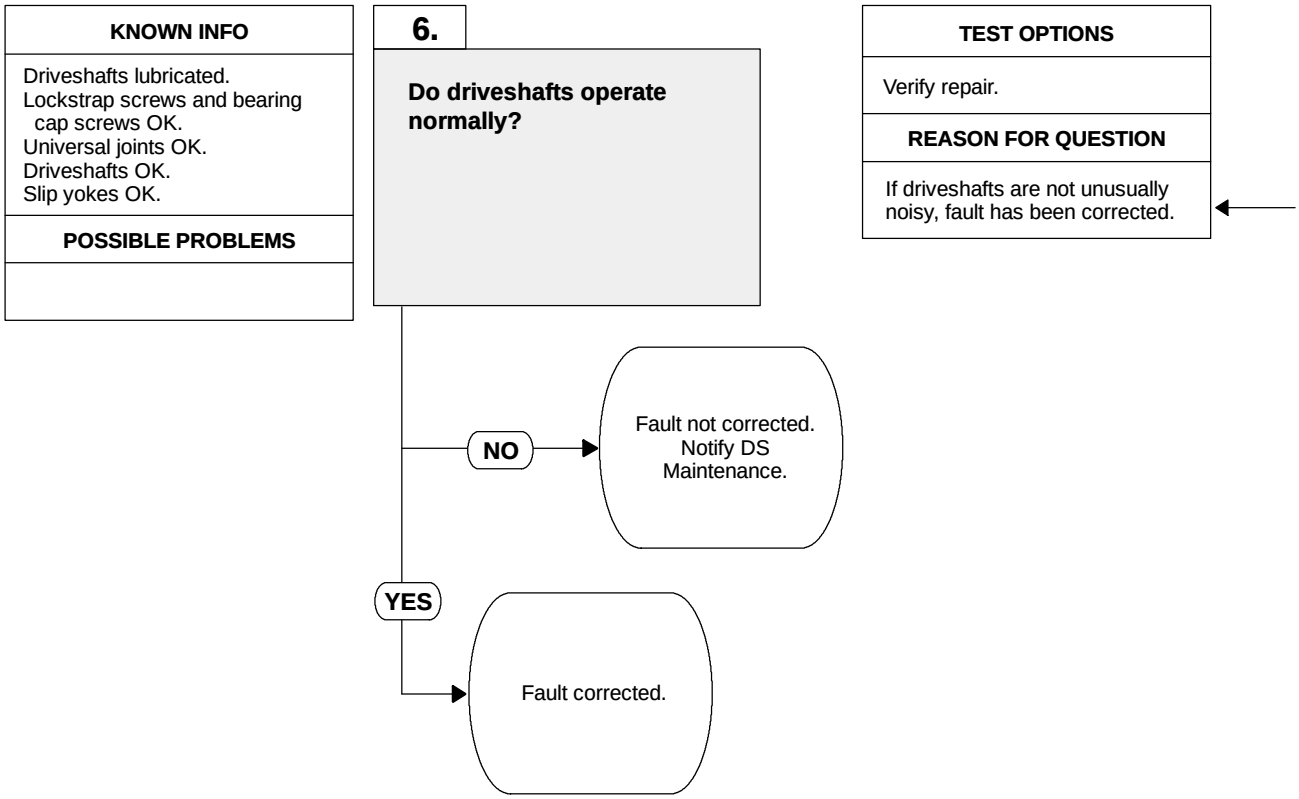


VISUAL INSPECTION

Check slip yoke splines for damage, wear or broken teeth (Para 2-9).
(1) If yoke spline(s) are damaged, replace driveshafts (Para 10-2).
(2) If yoke spline(s) are not damaged, go to Step 6 of this Fault.

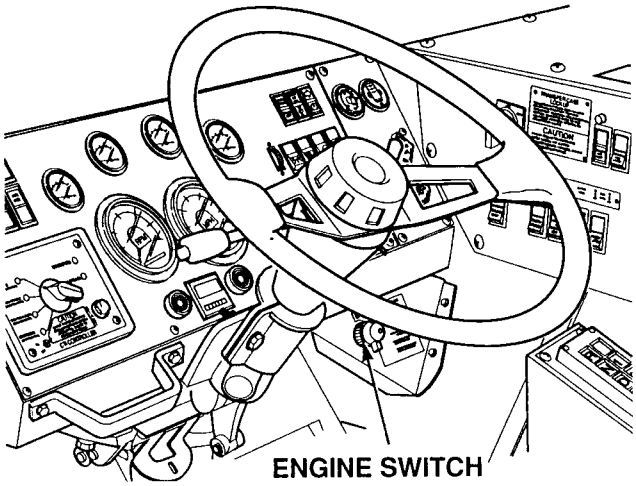


1 DRIVESHAFTS OR UNIVERSAL JOINTS UNUSUALLY NOISY WHEN OPERATING (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Operate truck, observing driveshaft noise level.
   (a) If driveshafts continue to operate noisily, fault not corrected. Notify DS Maintenance.
   (b) If driveshafts operate normally, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING.

This paragraph covers Brakes System Troubleshooting. The Brakes System Fault Index, Table 2-43, lists faults for the brakes system of the PLS truck. Refer to schematics Figures 2-43 through 2-46 when performing tests and corrective actions.

Table 2-43. Brakes System Fault Index

Fault No.	Description	Page
1.	Parking Brakes On Axles No. 3 Through No. 5 Do Not Release	2-1742
2.	Parking Brakes On Axles No. 3 Do Not Release	2-1750
3.	Parking Brakes On Axles No. 4 And No. 5 Do Not Release	2-1762
4.	Parking Brakes On Axles No. 3 Through No. 5 Do Not Apply	2-1772
5.	Parking Brakes On Axle No. 3 Do Not Apply	2-1778
6.	Parking Brakes On Axles No. 4 And No. 5 Do Not Apply	2-1786
7.	Trailer Service Brakes Do Not Apply When Hand Control Valve Is Operated	2-1796
8.	Service Brakes On Axles No. 3 Through No. 5 Do Not Apply	2-1804
9.	Service Brakes On Axles No. 3 Through No. 5 Do Not Release	2-1812
10.	Service Brakes On Axle No. 3 Do Not Apply	2-1818
11.	Service Brakes On Axle No. 3 Do Not Release	2-1828
12.	Service Brakes On Axles No. 4 And No. 5 Do Not Apply	2-1838
13.	Service Brakes On Axles No. 4 And No. 5 Do Not Release	2-1848
14.	Service Brakes On Axles No. 1 And No. 2 Do Not Apply	2-1858
15.	Service Brakes On Axles No. 1 And No. 2 Do Not Release	2-1868
16.	Truck Brakes Unevenly; Pulls To One Side	2-1878
17.	Excessive Braking Distance	2-1884
18.	Brake Drums Overheat	2-1890

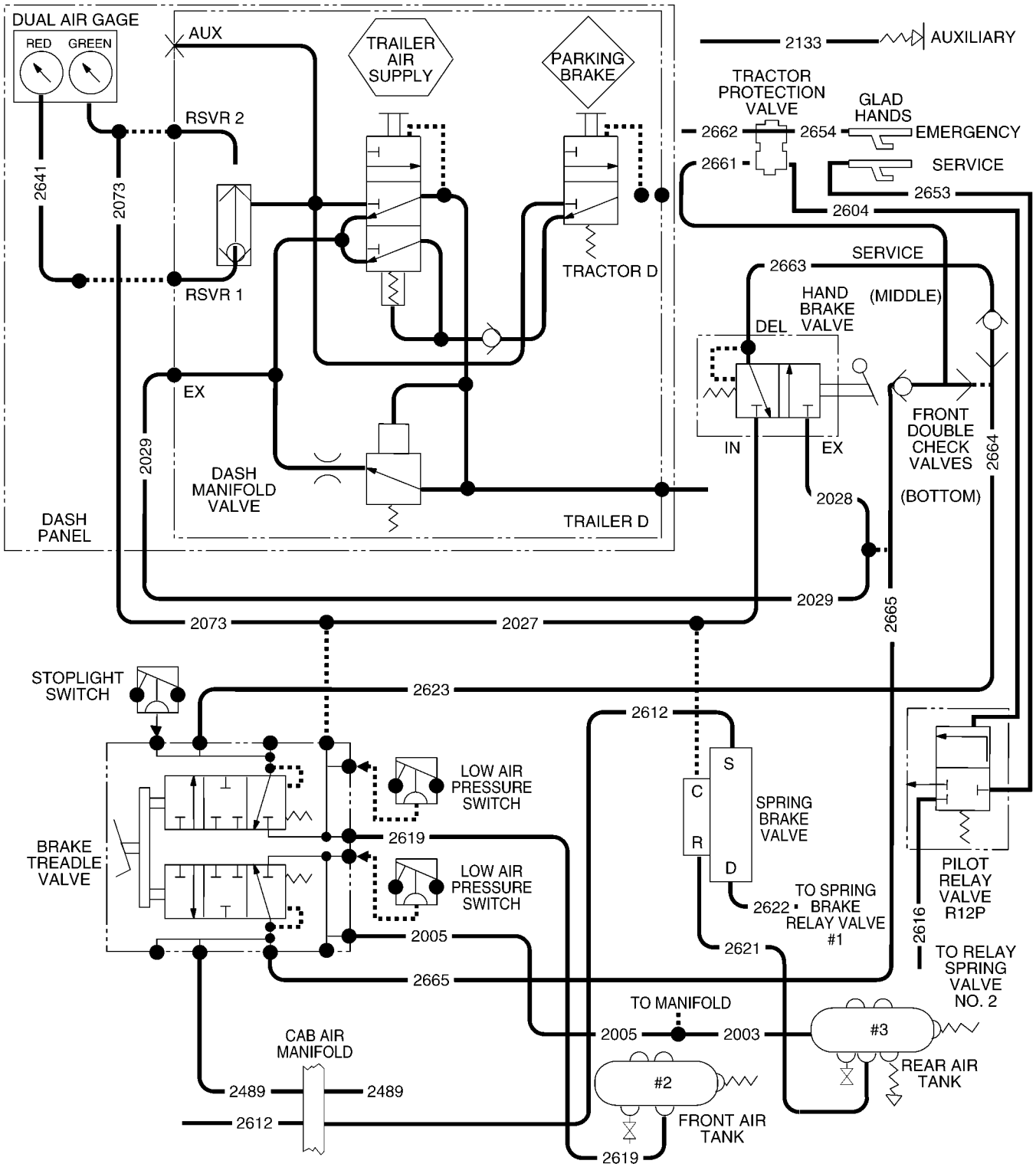


Figure 2-43. Truck to Trailer Air Supply Diagram

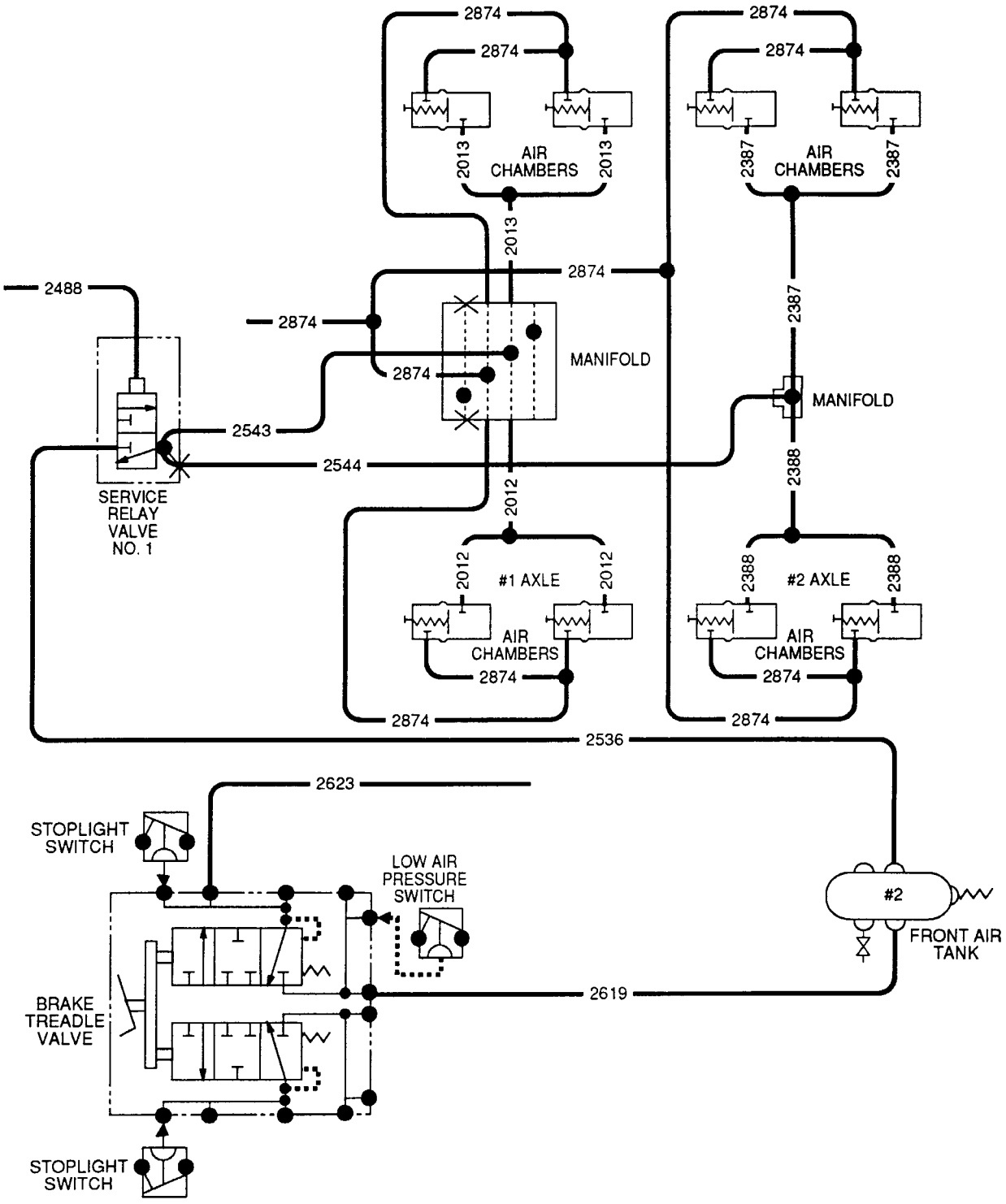


Figure 2-44. Axles No. 1 and No. 2 Brakes Air Diagram

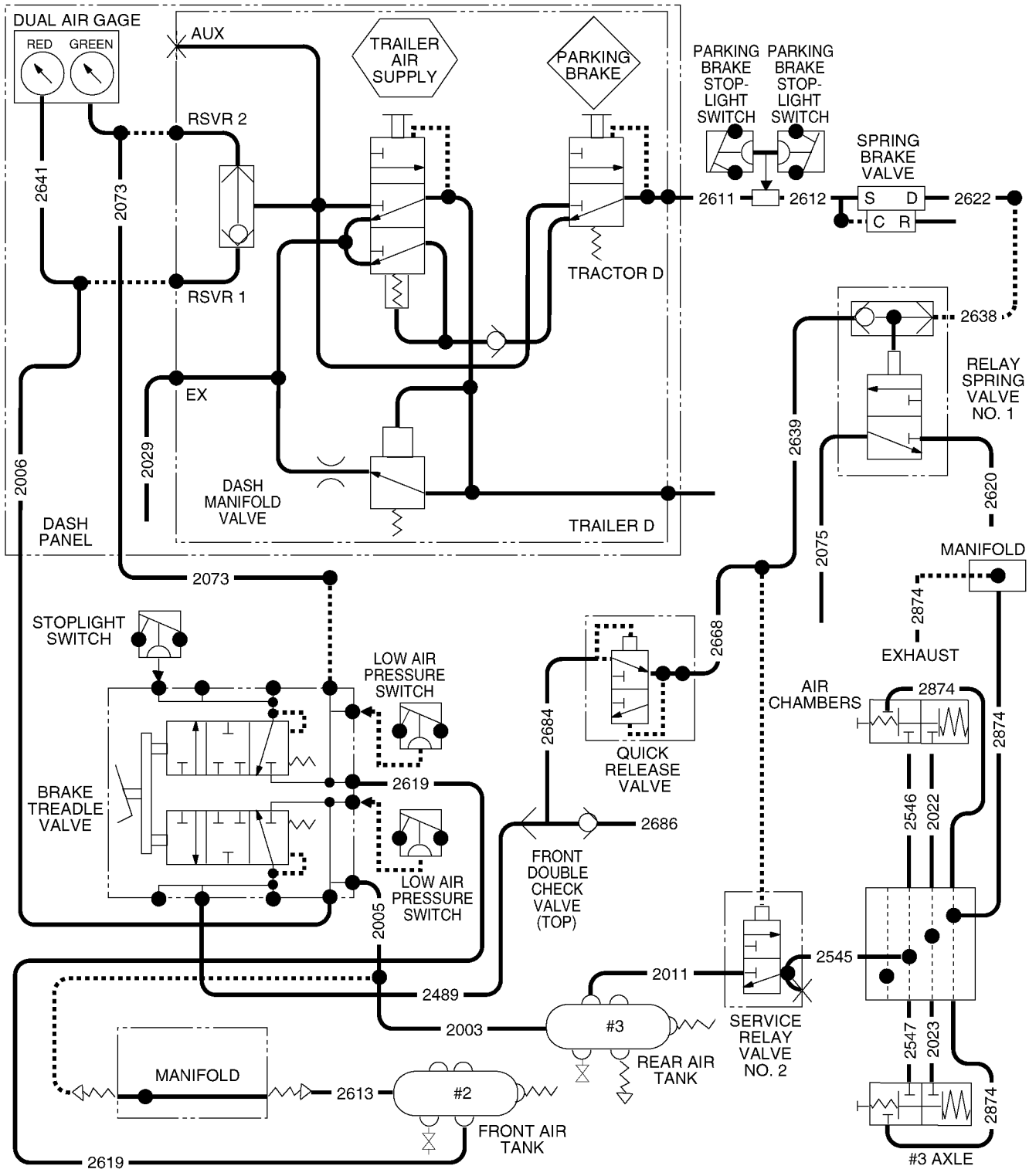


Figure 2-45. Axle No.3 Brakes Air Diagram

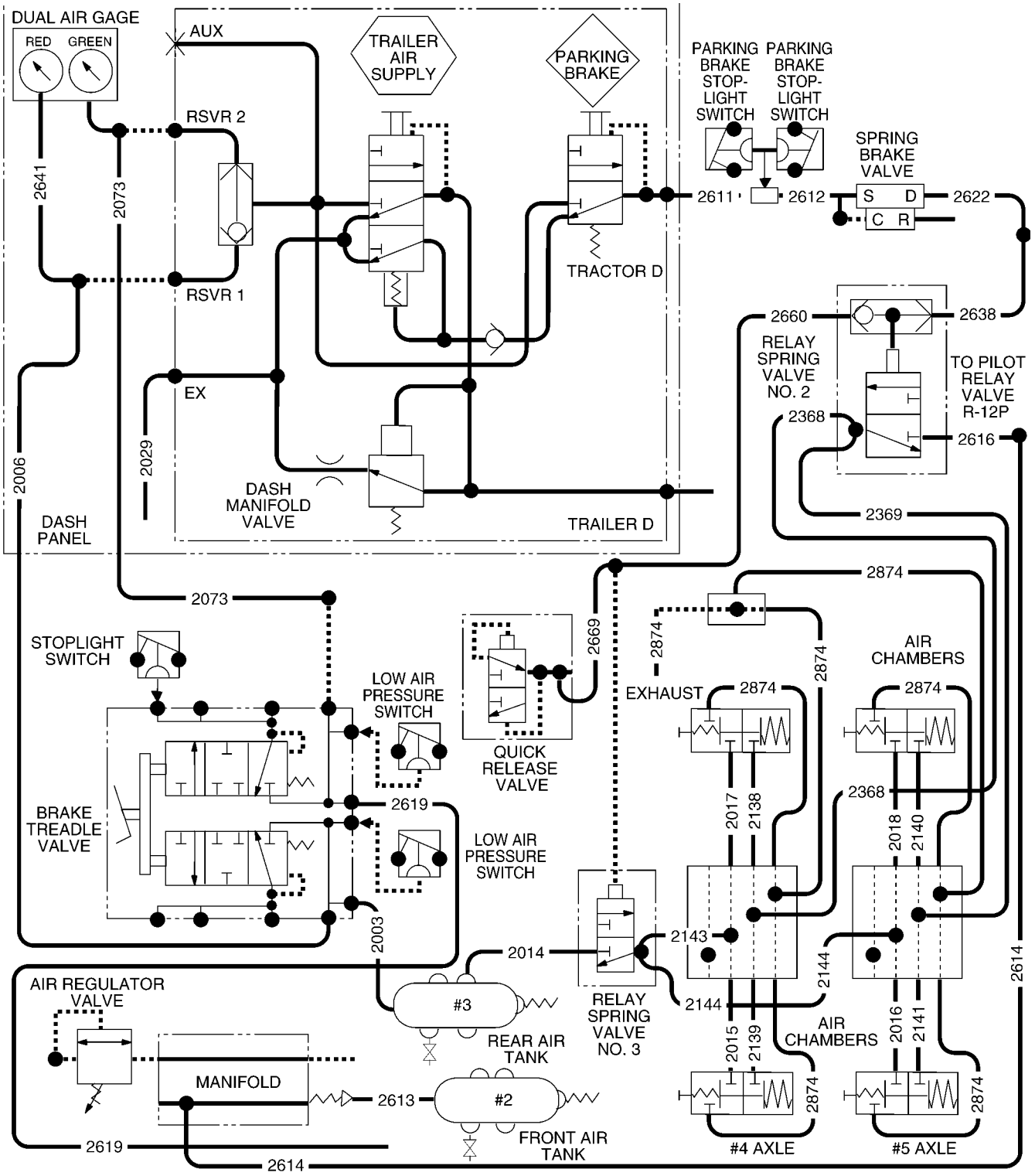


Figure 2-46. Axles No.4 and No.5 Brakes Air Diagram

2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

1. PARKING BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE.

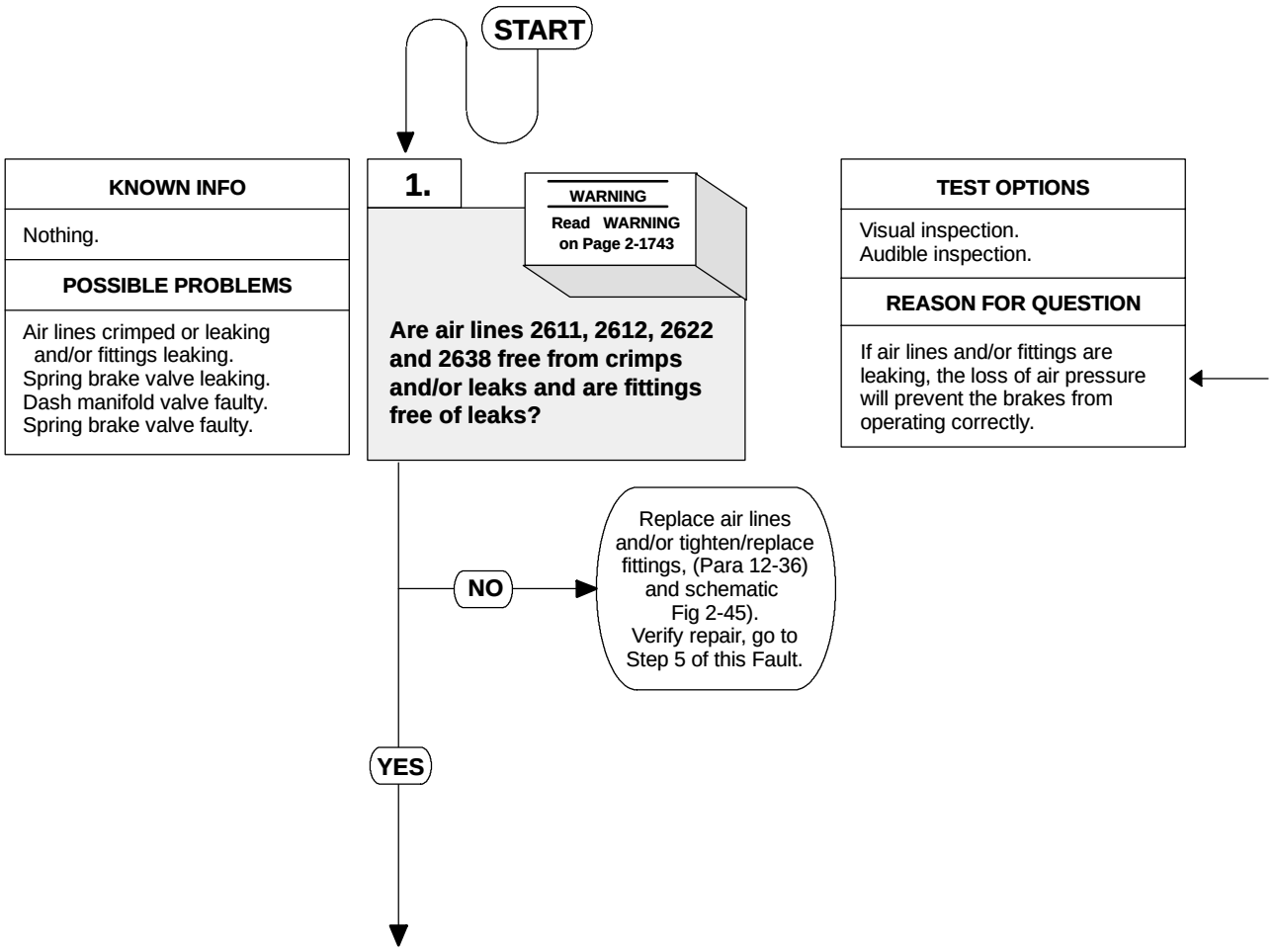
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
LHS fully extended, (TM 9-2320-364-10)

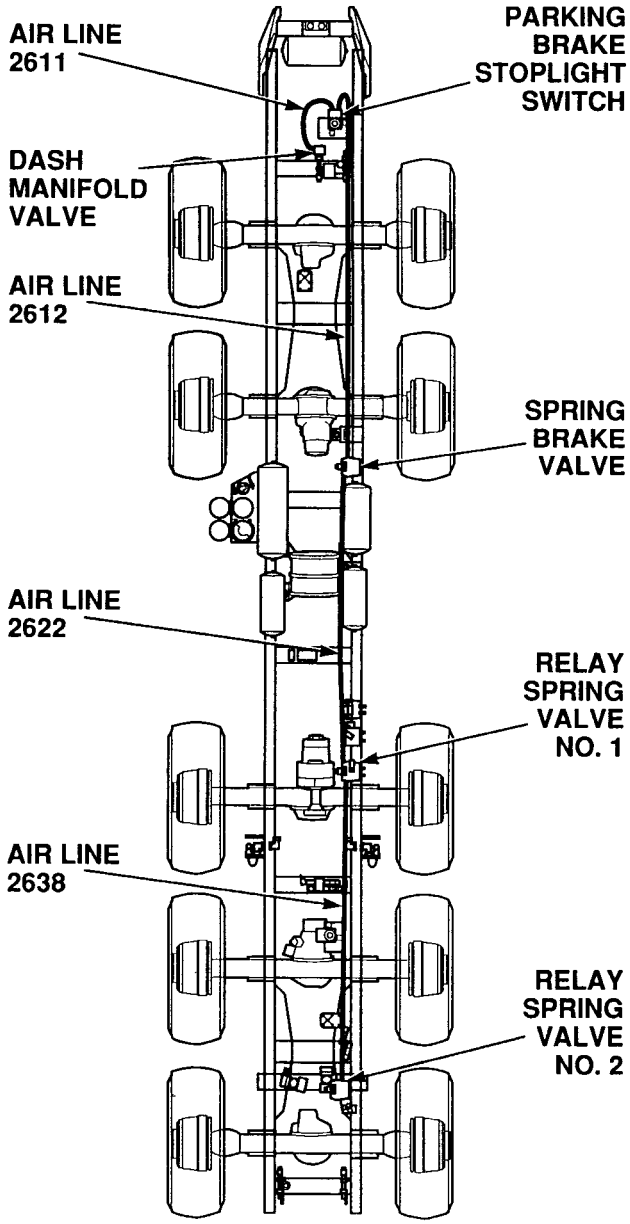


WARNING

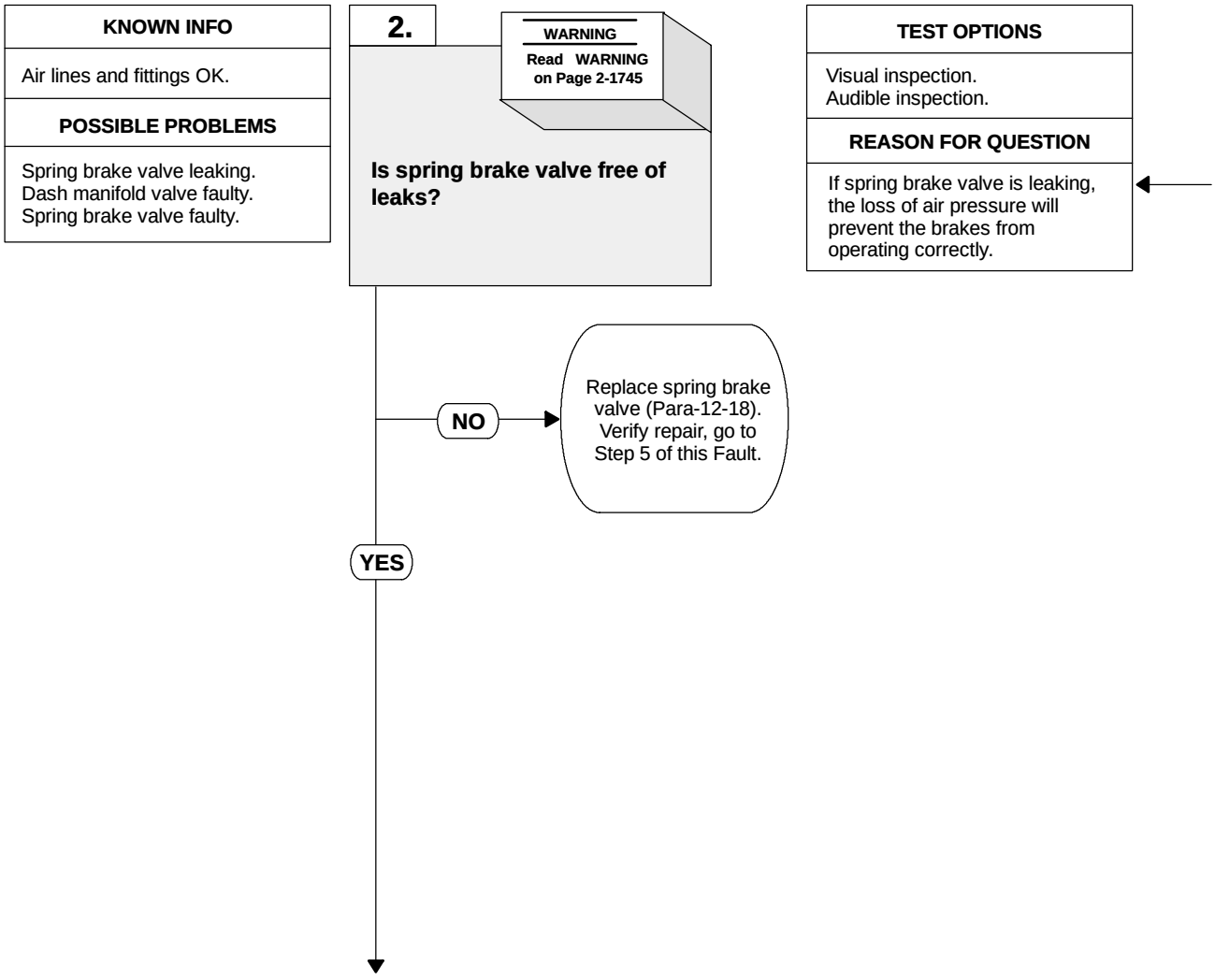
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

VISUAL/AUDIBLE INSPECTION

(1) Start engine and build air pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Release PARKING BRAKE.
(4) Check fittings and air lines 2611, 2612, 2622 and 2638 for crimping and/or leaks (see schematic Fig 2-45).
  (a) If there are crimps or leaks, replace air lines and/or tighten/replace fittings (Para 12-36).
  (b) If there are no leaks, air lines and fittings are OK.



1. PARKING BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE (CONT).

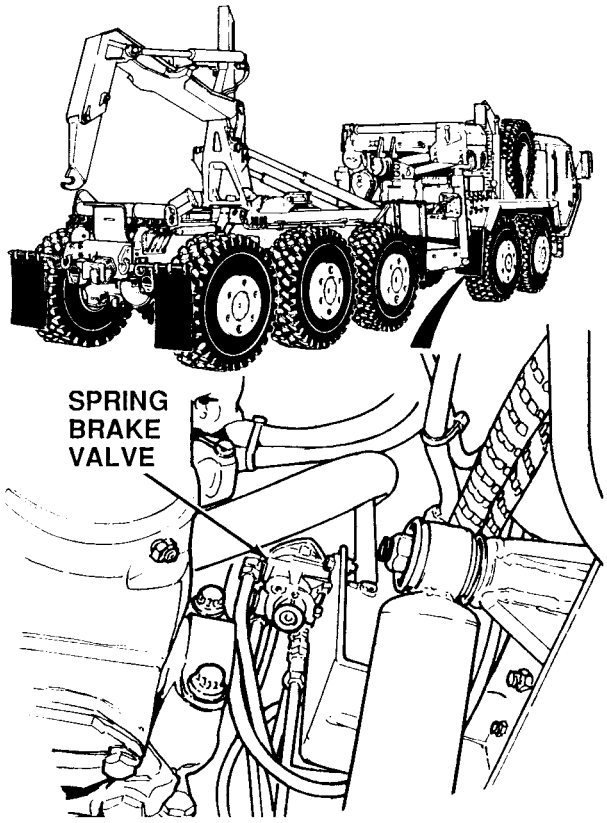


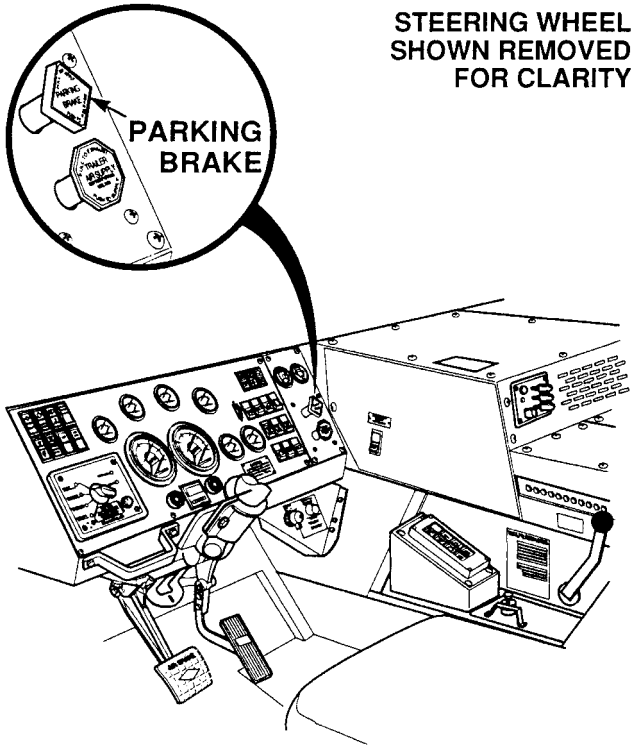
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

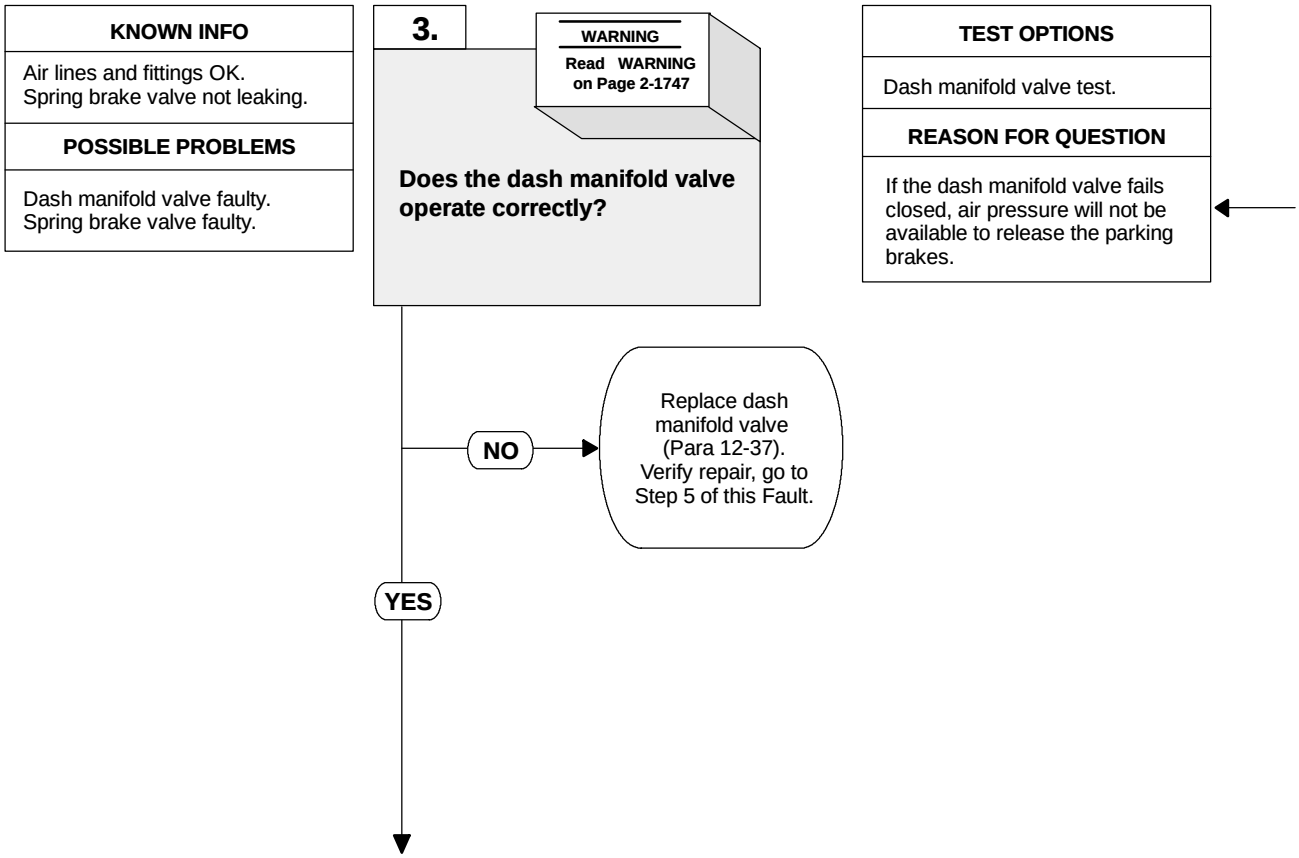
VISUAL/AUDIBLE INSPECTION

(1) Check spring brake valve for leaks (see schematic Fig 2-45).
   (a) If there are leaks, replace spring brake valve (Para 12-18).
   (b) If there are no leaks, valve is OK.
(2) Apply PARKING BRAKE (TM 9-2320-364-10).





1. PARKING BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE (CONT).

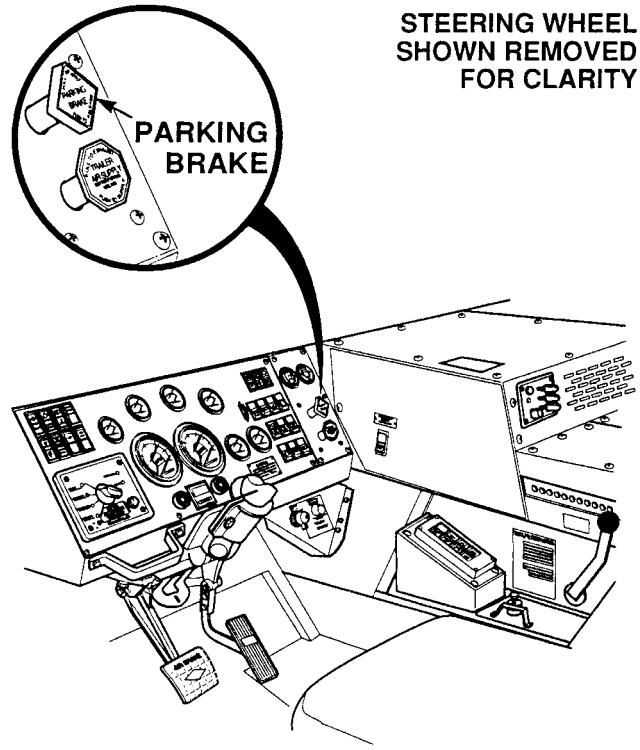


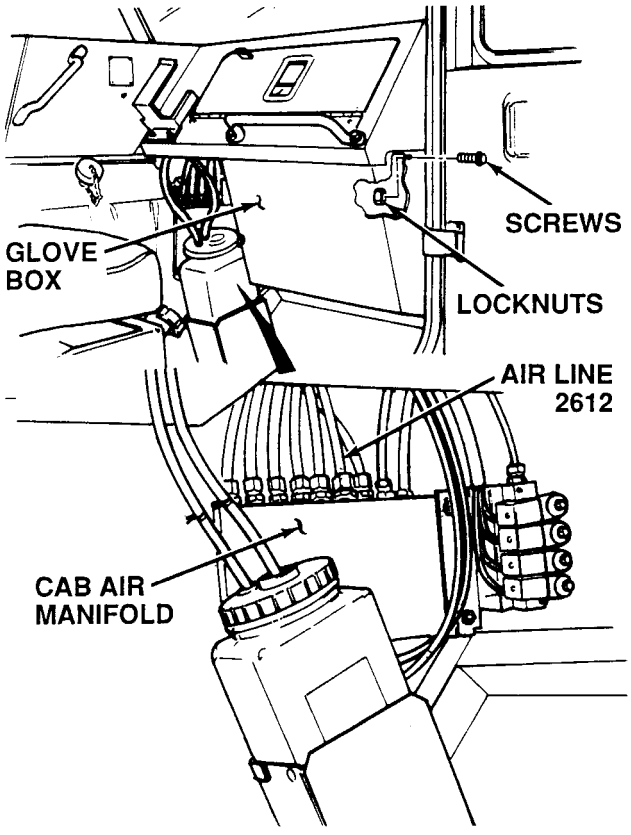
WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

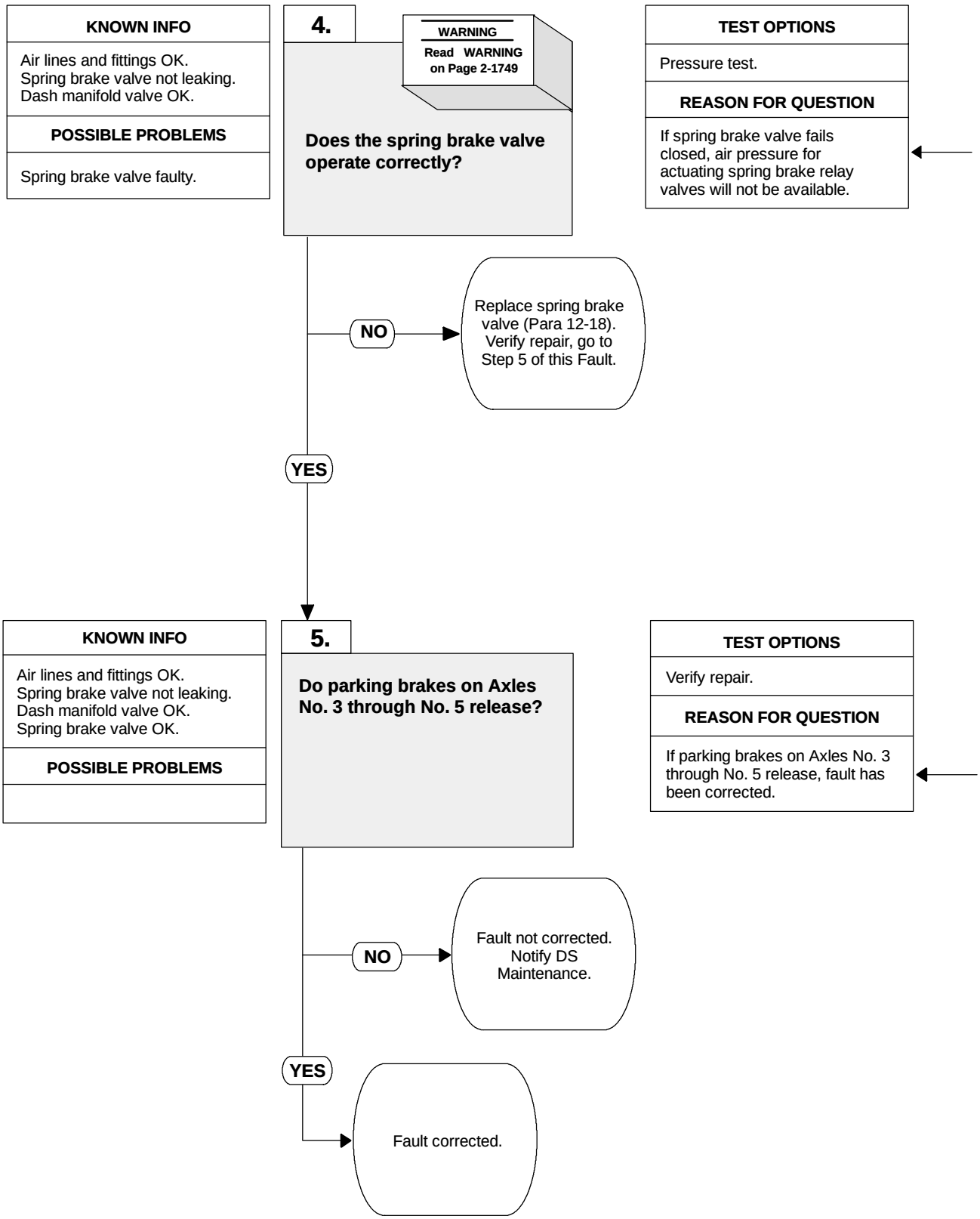
DASH MANIFOLD VALVE TEST

(1) Remove locknuts, six screws and glove box. Discard locknuts.
(2) Disconnect air line 2612 from input side of cab air manifold.
(3) Connect a 0 to 160 psi (0-1103 kPa) gage to air line 2612.
(4) Release PARKING BRAKE (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2612, perform Steps (5) and (6) below and replace dash manifold valve (Para 12-37).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2612, dash manifold valve is OK.
(5) Apply PARKING BRAKE.
(6) Remove gage and connect air line 2612 to cab air manifold.
(7) Install glove box, six screws and locknuts.



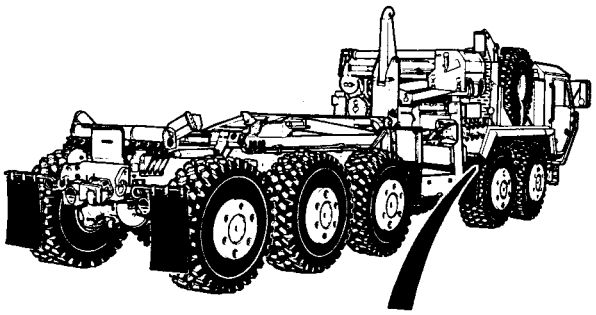


1. PARKING BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE (CONT).



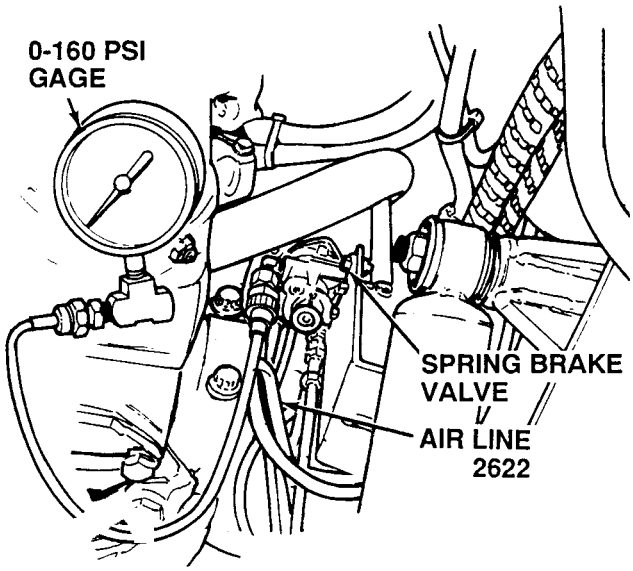
WARNING

- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.



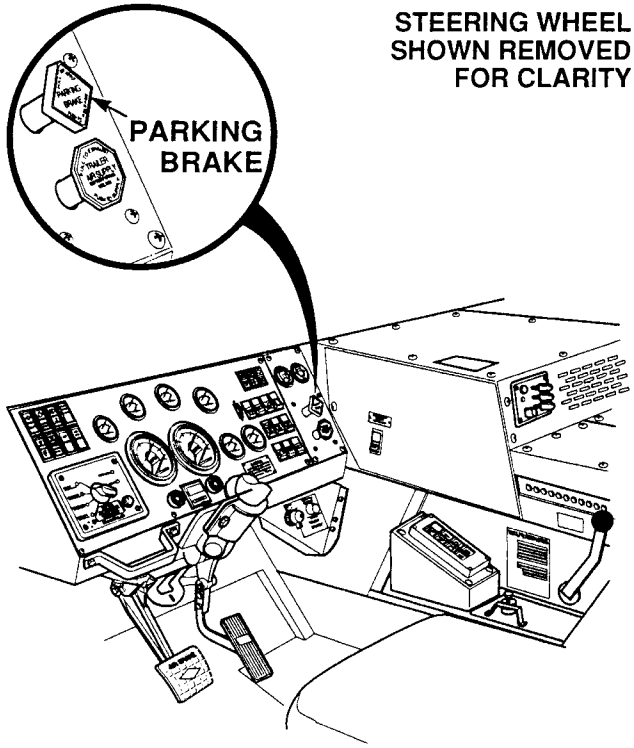
PRESSURE TEST

(1) Disconnect air line 2622 from spring brake valve.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to spring brake valve.
(3) Have assistant release PARKING BRAKE (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at spring valves, perform Steps (4) and (5) below and replace spring brake valve (Para 12-18).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present, spring brake valve is OK.
(4) Apply PARKING BRAKE.
(5) Remove gage and connect air line 2622 to spring brake valve.



VERIFY REPAIR

Release PARKING BRAKE (TM 9-2320-364-10).
  (1) If parking brakes on Axles No. 3 through No. 5 do not release, fault not corrected. Perform Step (3) below and notify DS Maintenance.
  (2) If parking brakes on Axles No. 3 through No. 5 release, fault has been corrected.
  (3) Place LHS in transit position.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

2. PARKING BRAKES ON AXLE NO. 3 DO NOT RELEASE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

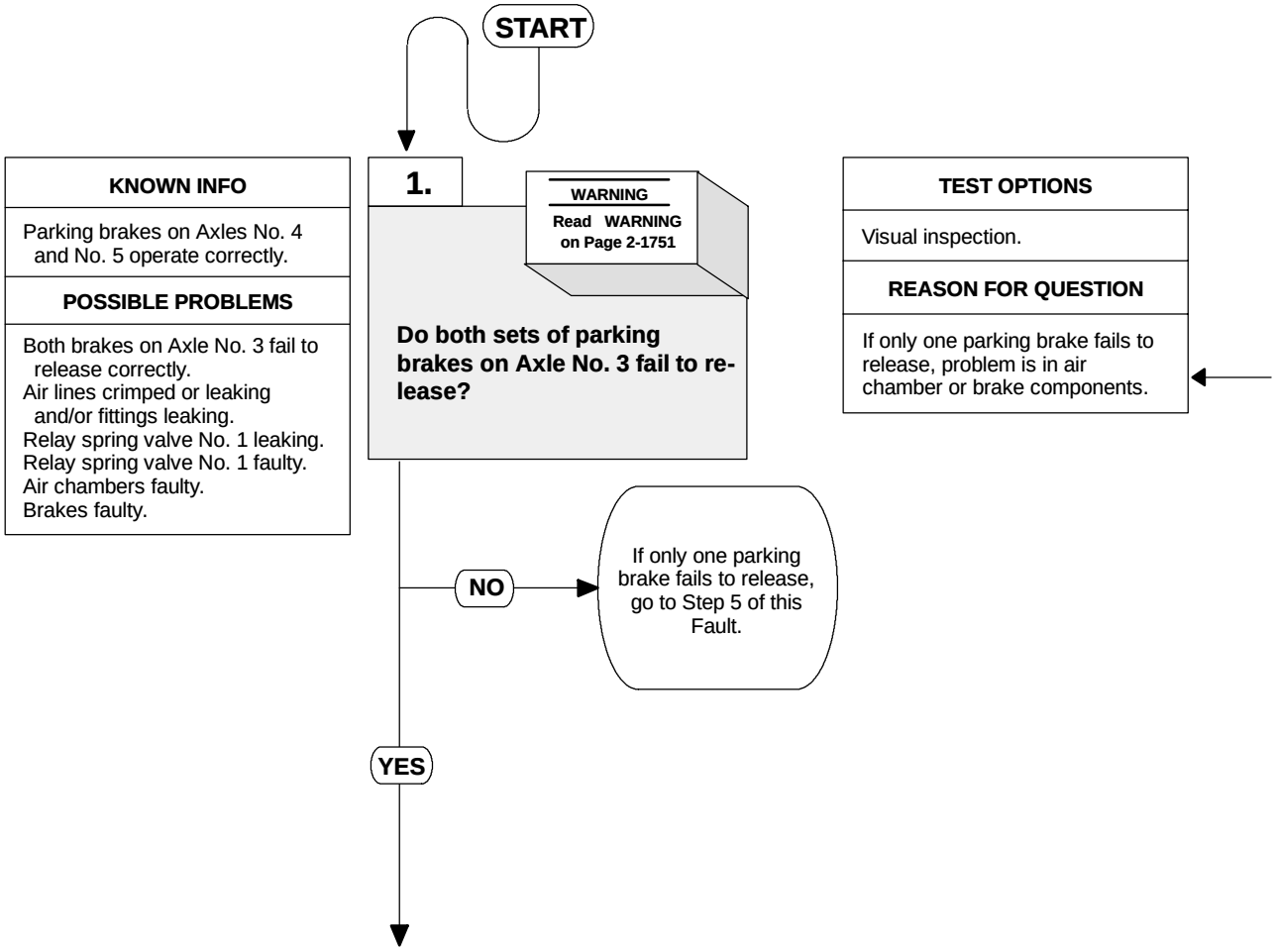
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

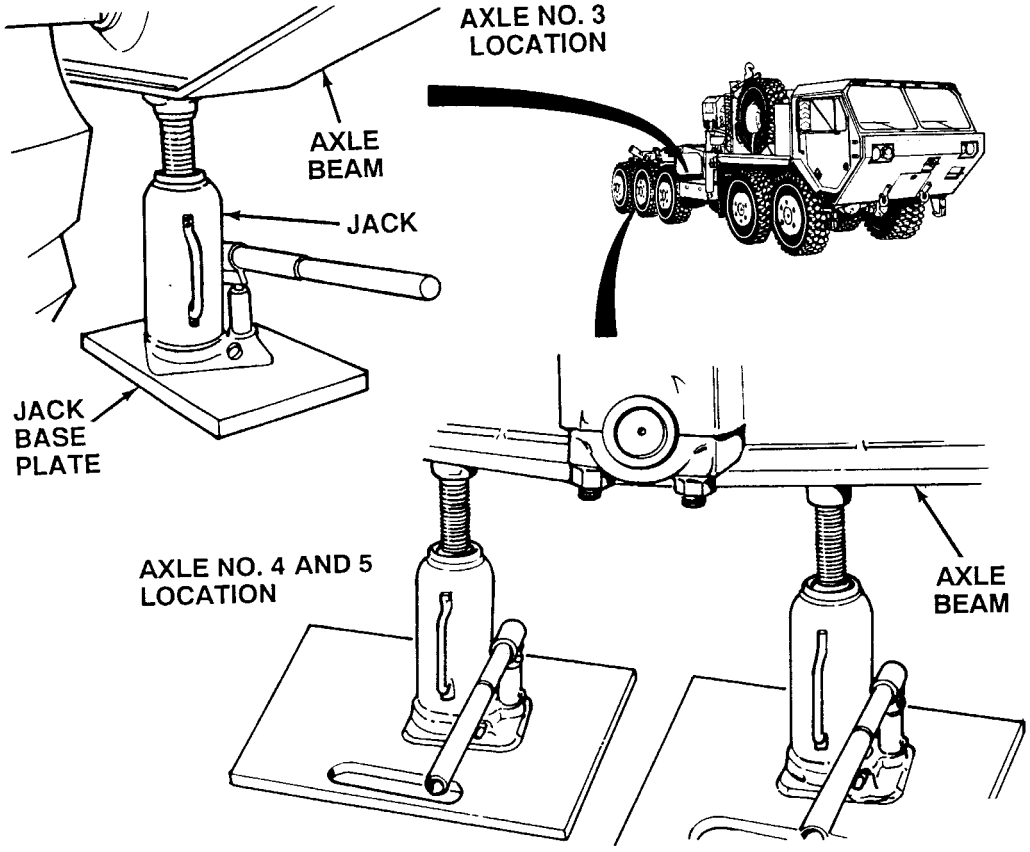
NOTE

The following troubleshooting procedures cover one set of brakes for Axle No. 3, but they apply to both sets of brakes.



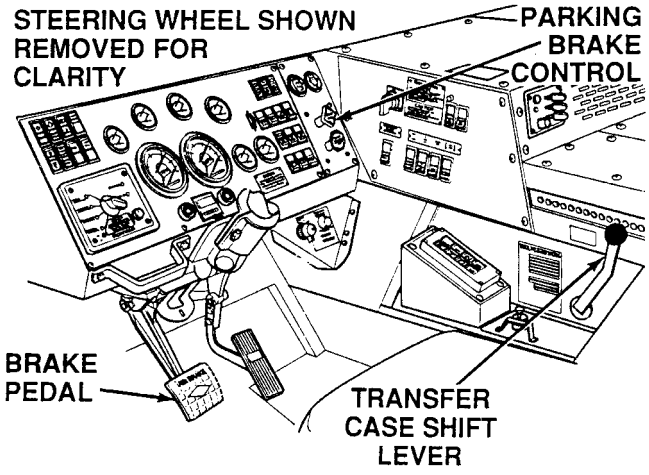
WARNING

Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

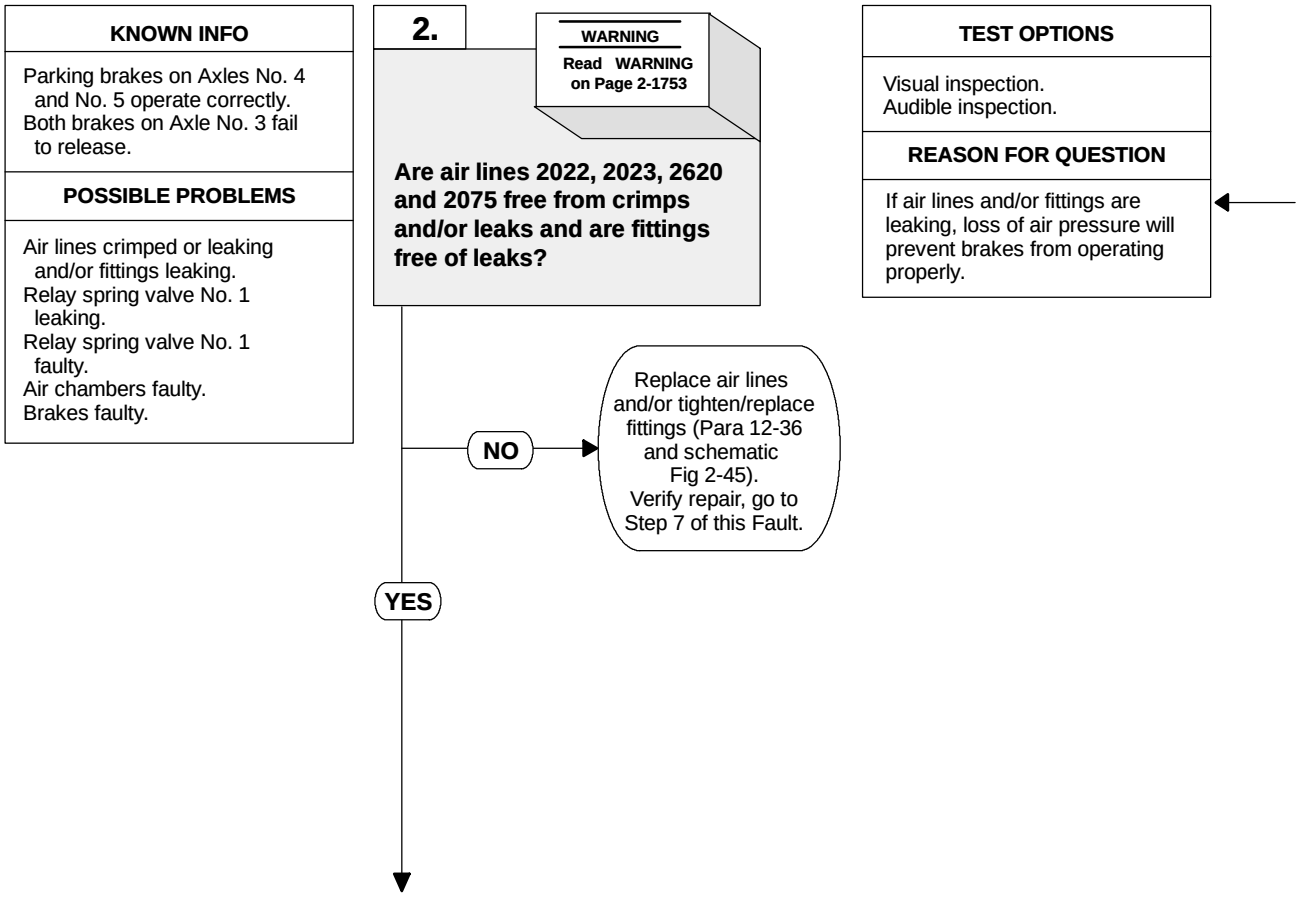


VISUAL INSPECTION

(1) Jack-up three rear axles until wheels are off ground (TM 9-2320-364-10).
(2) Shift transfer case to N (neutral).
(3) Release PARKING BRAKE.
(4) Try to turn wheel on Axle No. 3 by hand.
  (a) If one wheel fails to turn, perform Step (5) below and go to Step 5 of this Fault.
  (b) If both wheels fail to turn, perform Step (5) below and go to Step 2 of this Fault.
(5) Lower wheels to the ground.



2. PARKING BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).

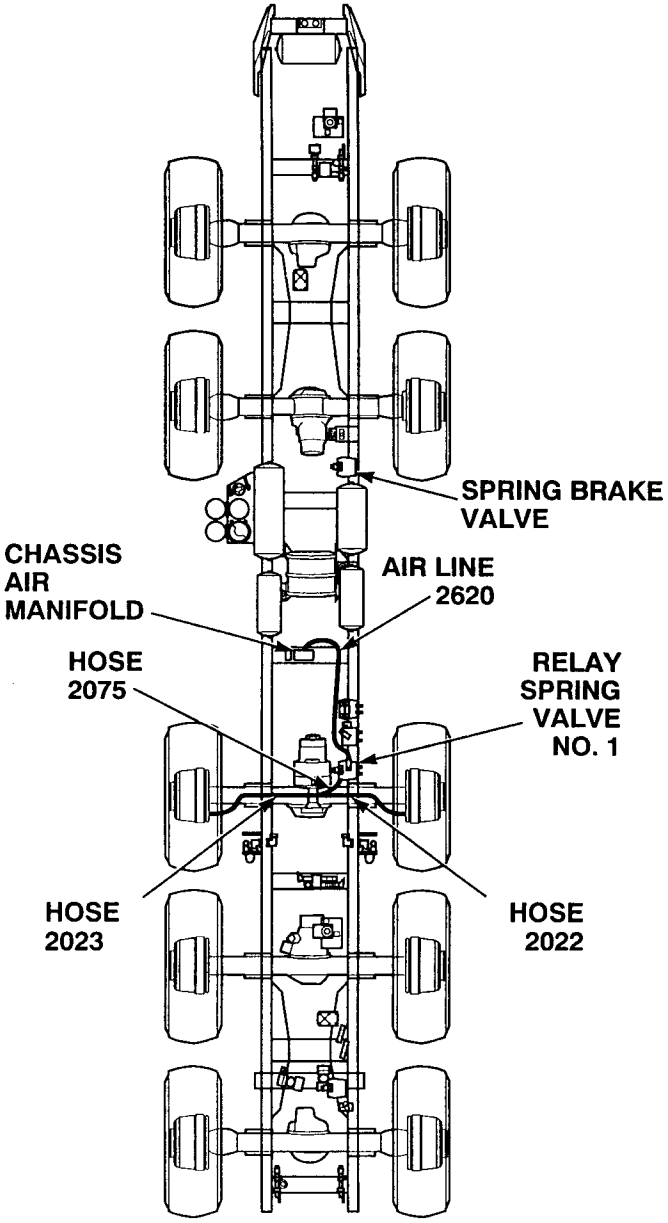


WARNING

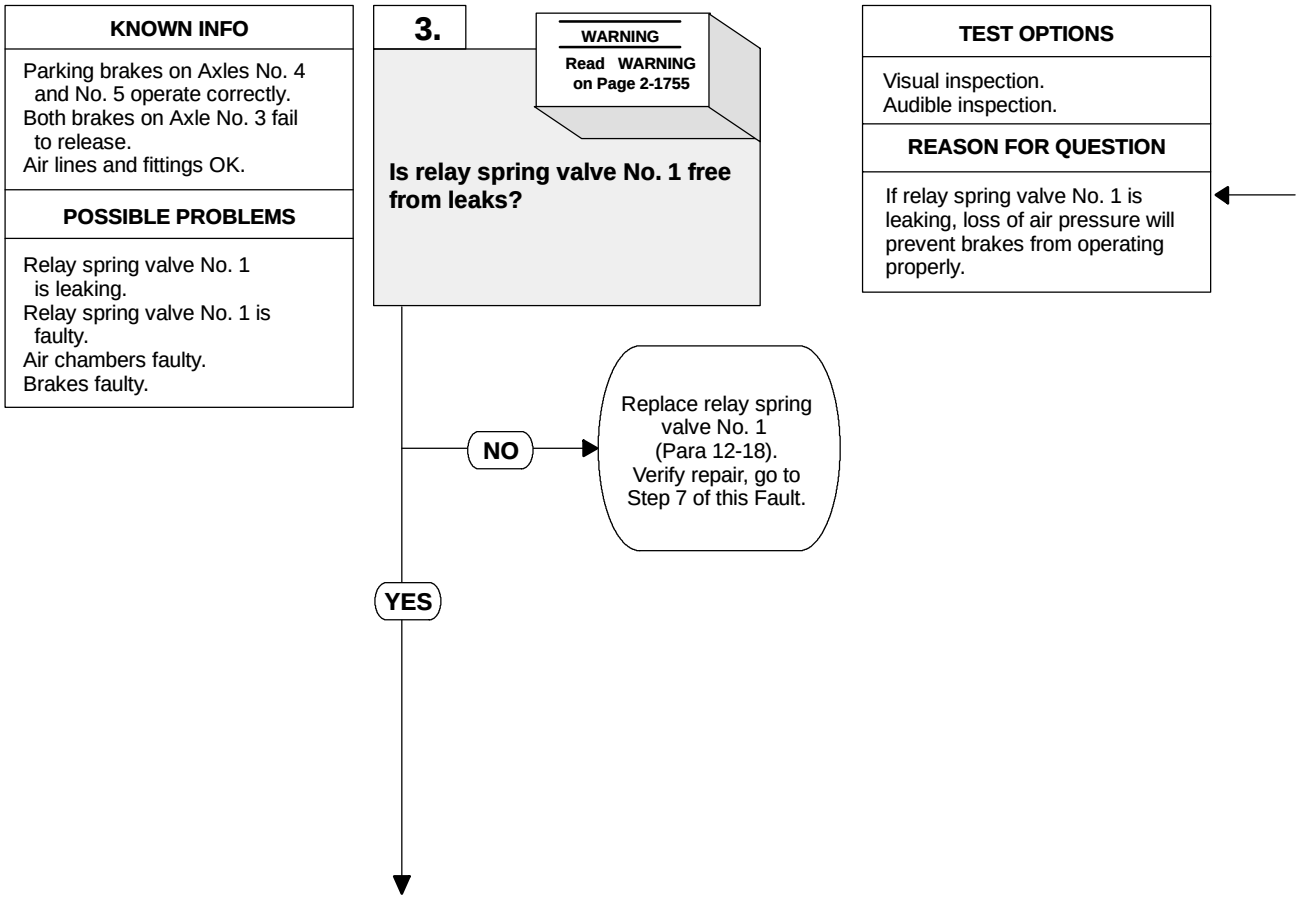
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

VISUAL/AUDIBLE INSPECTION

(1) Start engine and build air pressure to 125 ±4psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Release PARKING BRAKE.
(4) Check fittings and air lines 2022, 2023, 2620 and 2075 for crimping and/or leaks (see schematic Fig 2-45).
  (a) If there are crimps or leaks, replace air lines and/or tighten/replace fittings (Para 12-36).
  (b) If there are no crimps or leaks, air lines and fittings are OK.



2. PARKING BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).

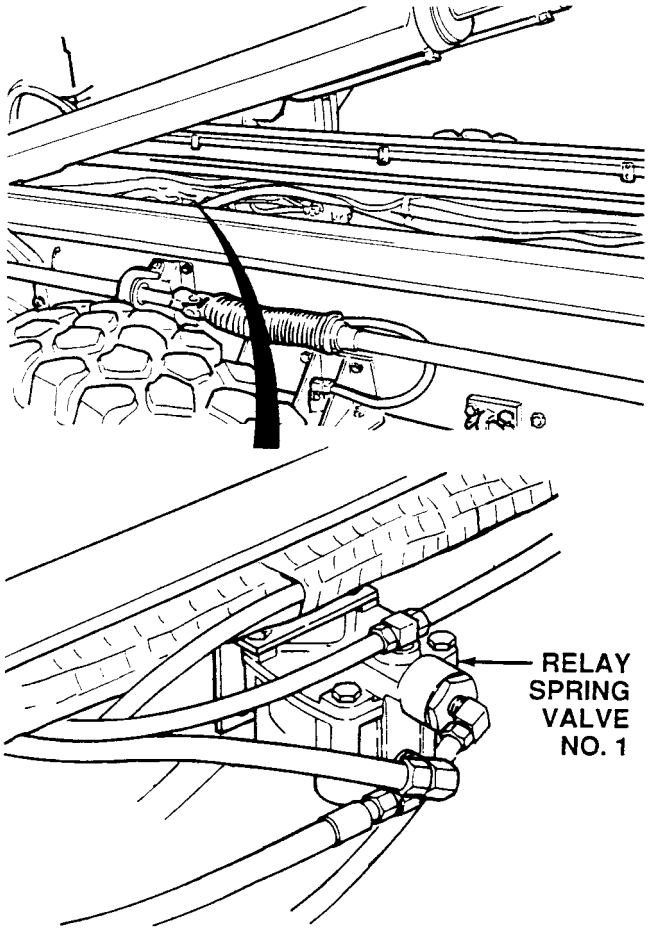


WARNING

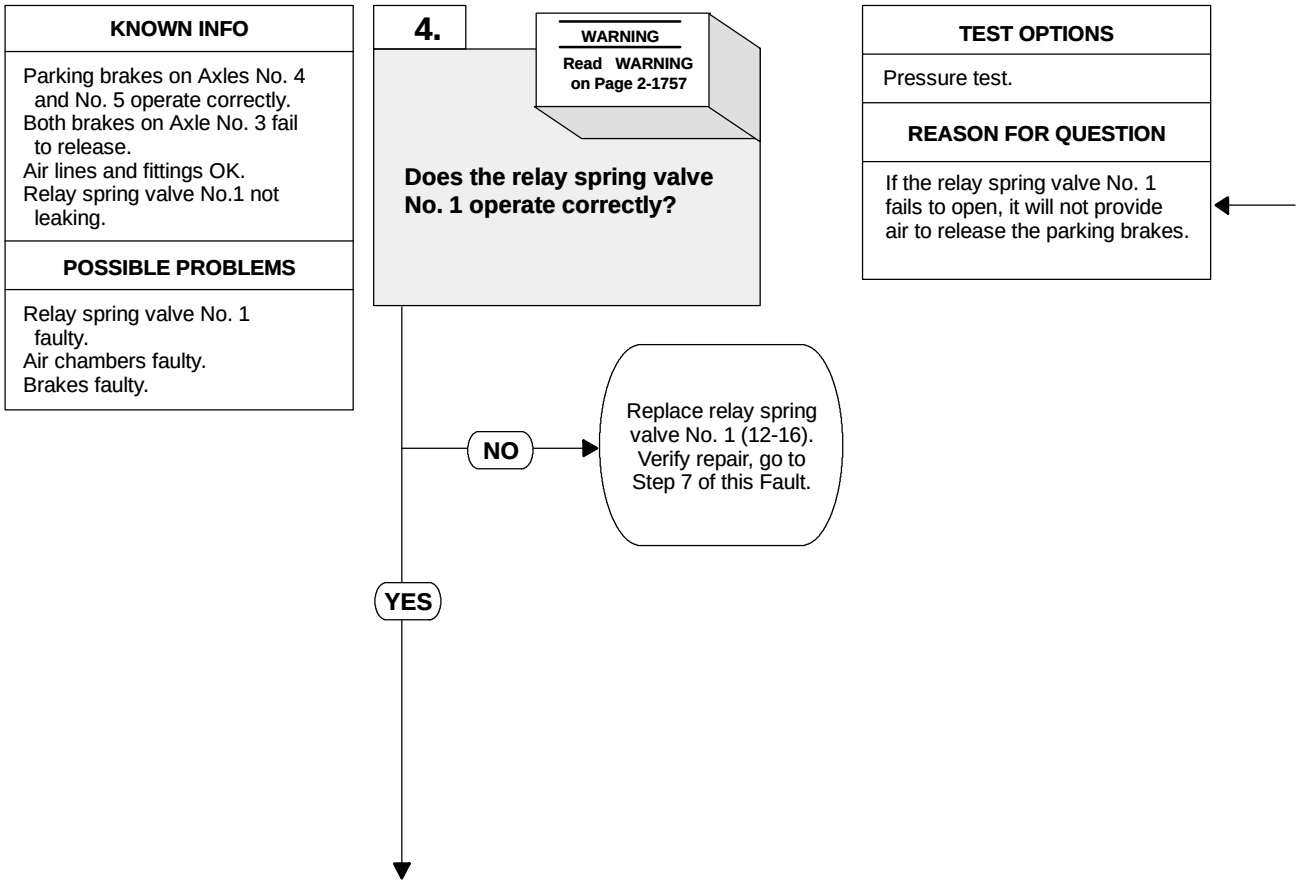
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL/AUDIBLE INSPECTION

(1) Check relay spring valve No. 1 for leaks (see schematic Fig 2-45).
   (a) If there are leaks at relay spring valve No. 1, perform Step (2) below and replace relay spring valve No.1 (Para 12-18).
   (b) If there are no leaks, perform Step (2) below.
(2) Apply PARKING BRAKE (TM 9-2320-364-10).



2. PARKING BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).

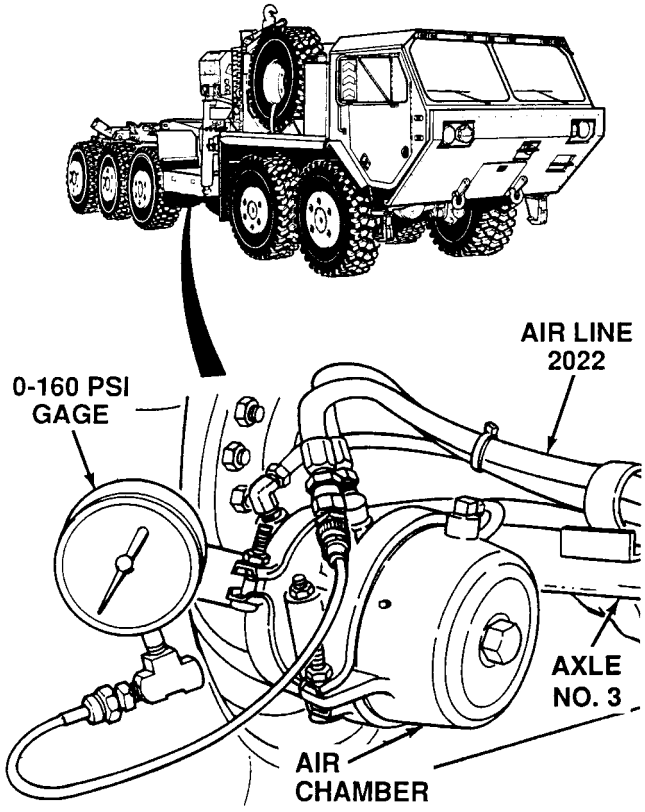


WARNING

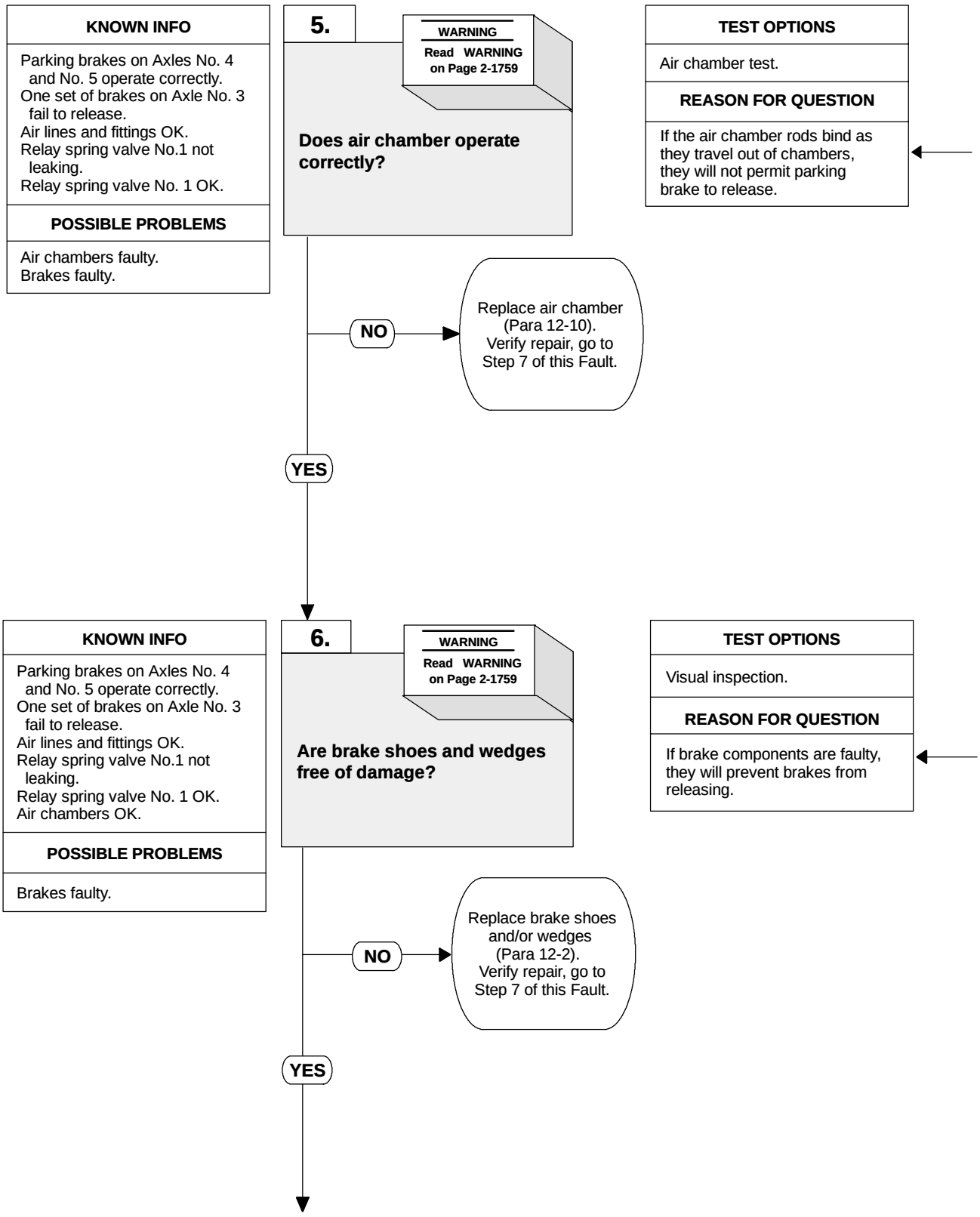
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Exercise extreme caution when working around wheels or under truck while engine is operating. Movement of truck may cause injury or death to personnel.

PRESSURE TEST

(1) Disconnect air line 2022 from right air chamber on Axle No. 3.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2022.
(3) Release PARKING BRAKE (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2022, perform Steps (4) and (5) below and replace relay spring valve No. 1 (Para 12-16).
  (b) If there are 125 ±4 psi 861 ±28 kPa) present at air line 2022, relay spring valve No. 1 is OK.
(4) Apply PARKING BRAKE.
(5) Remove gage and connect air line 2022 to air chamber.



2. PARKING BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).

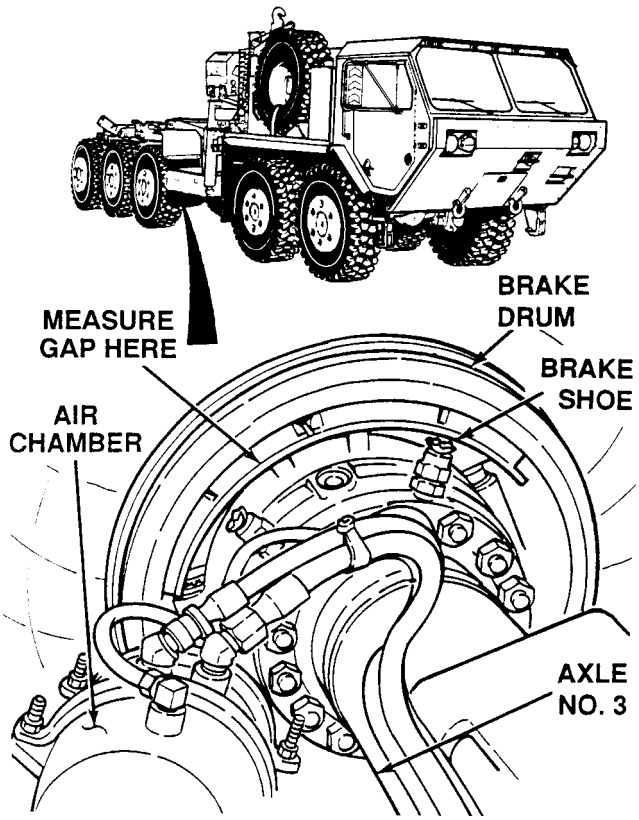


WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

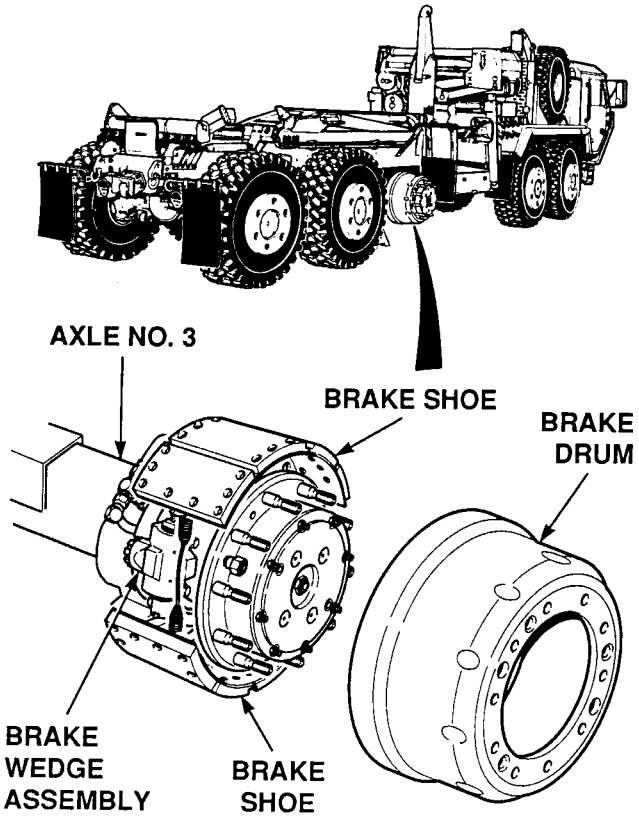
AIR CHAMBER TEST

(1) Listen to air chamber and observe brake shoe movement while assistant releases and applies PARKING BRAKE (TM 9-2320-364-10).
   (a) If mechanic cannot hear air chamber operate, chamber leaks air or brake shoe does not move when parking brake control valve is pushed and pulled, perform Step (2) below and replace faulty air chamber (Para 12-10).
   (b) If air chamber operates correctly, perform Steps (2) below and go to Step 6 of this Fault.
(2) Release PARKING BRAKE.

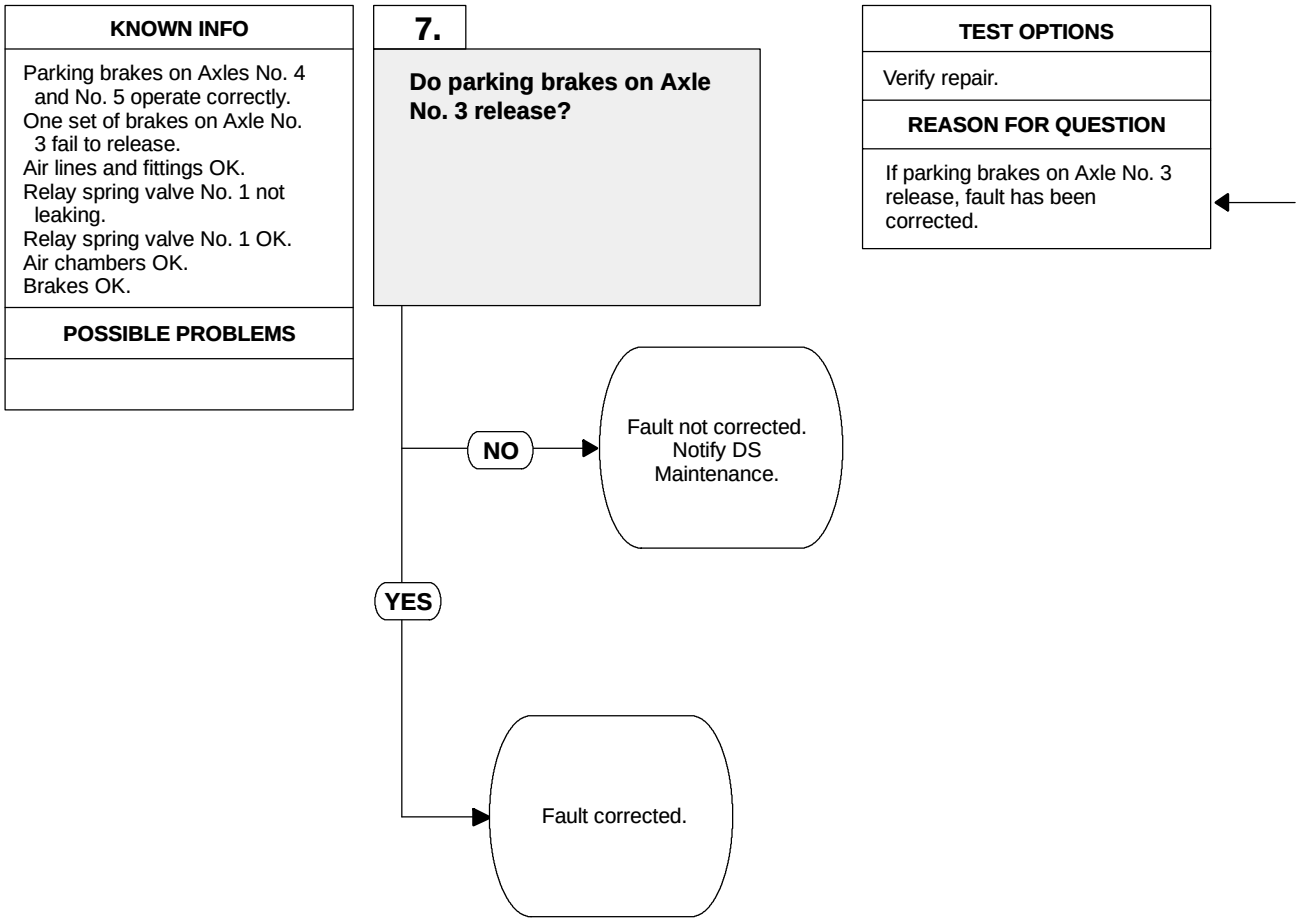


VISUAL INSPECTION

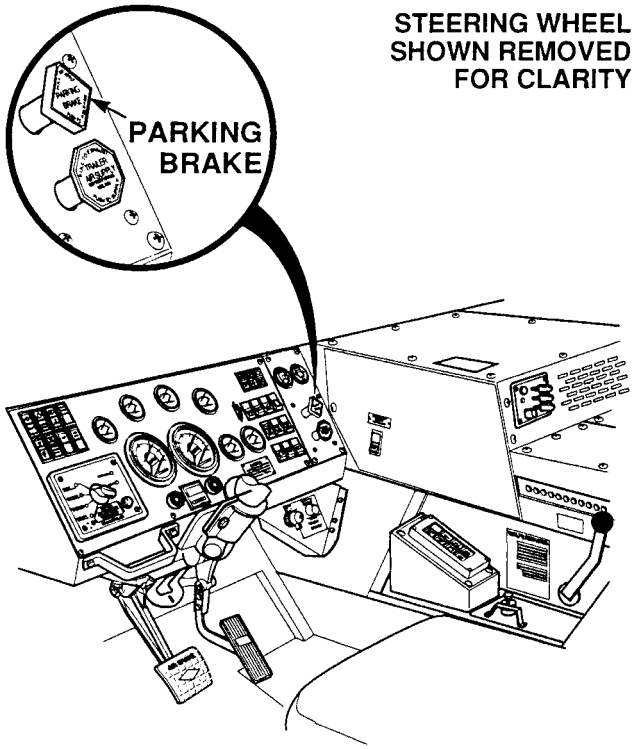
(1) Measure gap between brake shoe and drum (Para 12-2).
   (a) If there is no gap, adjust brakes (Para 12-2).
   (b) If there is a gap, perform Steps (2) through (5) below.
(2) Cage air chamber (Para 12-10).
(3) Remove brake drum and air chamber (Para 13-3 and 12-10).
(4) Inspect brake shoes and wedges (Para 12-2).
   (a) If brake shoes and/or wedges are faulty, replace brake shoes and/or wedges (Para 12-2).
   (b) If shoes and wedges are OK, go to Step 7 of this Fault.
(5) Install brake drum and air chamber (Para 13-3 and 12-10).



2. PARKING BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).



VERIFY REPAIR
Release PARKING BRAKE (TM 9-2320-364-10). (1) If parking brakes on Axle No. 3 do not release, fault not corrected. Notify DS Maintenance. (2) If parking brakes on Axle No. 3 do release, fault has been corrected.



STEERING WHEEL
SHOWN REMOVED
FOR CLARITY

2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

3. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

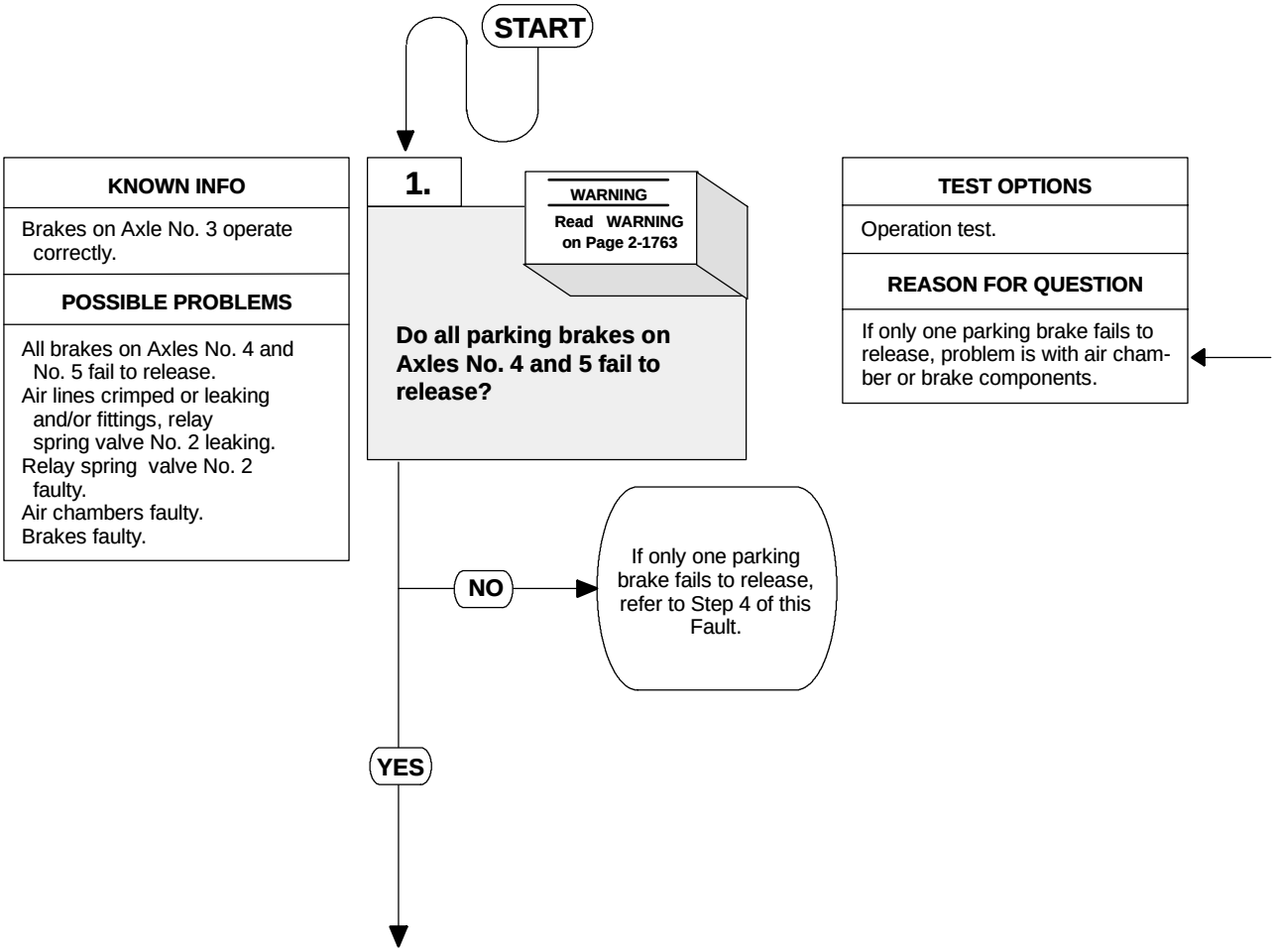
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

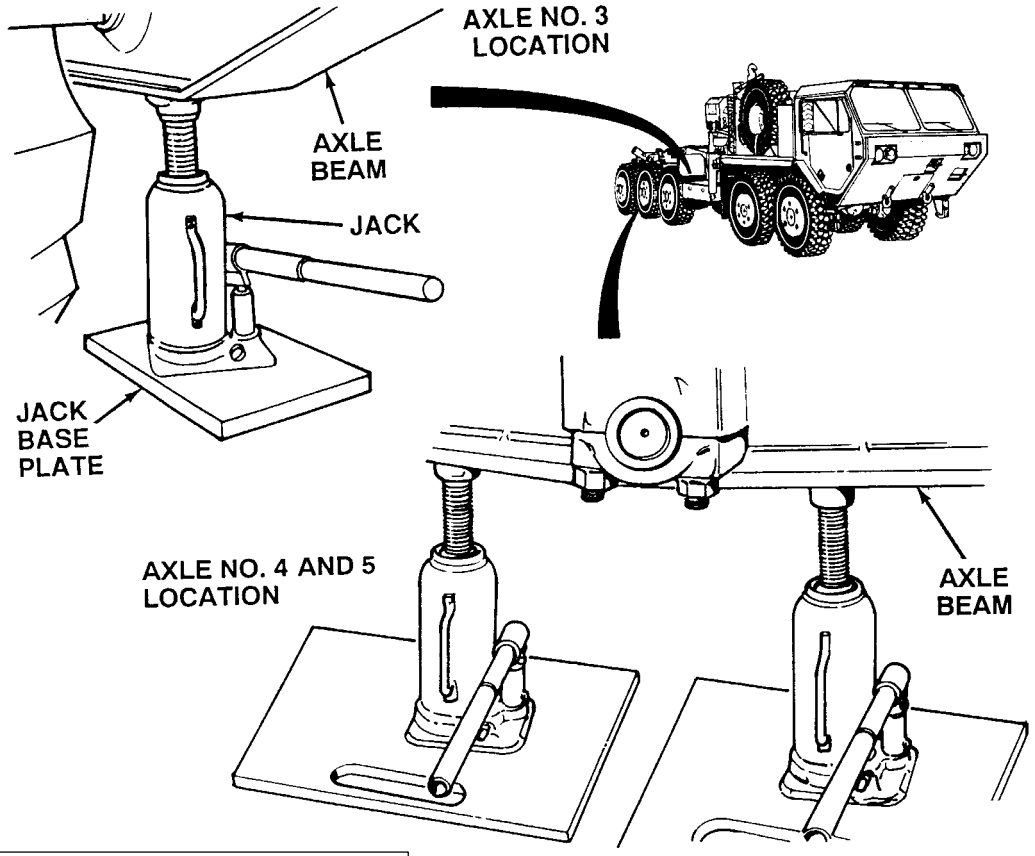
NOTE

The following troubleshooting procedures cover one set of brakes for Axles No. 4 and 5, but they apply to all four sets of brakes.



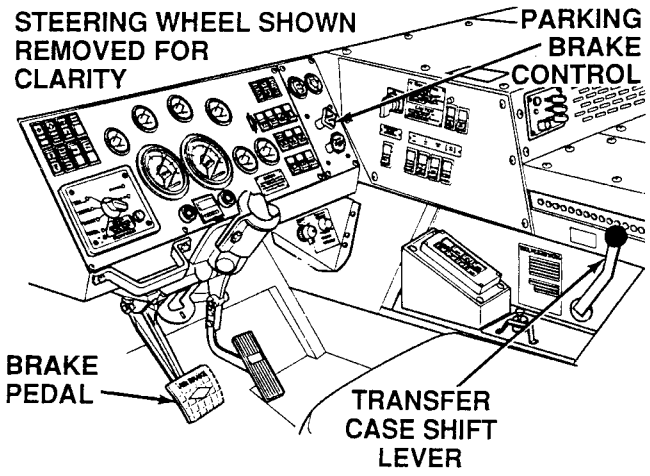
WARNING

- Exercise extreme caution when working around wheels or under truck while engine is operating. Movement of truck may cause injury or death to personnel.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

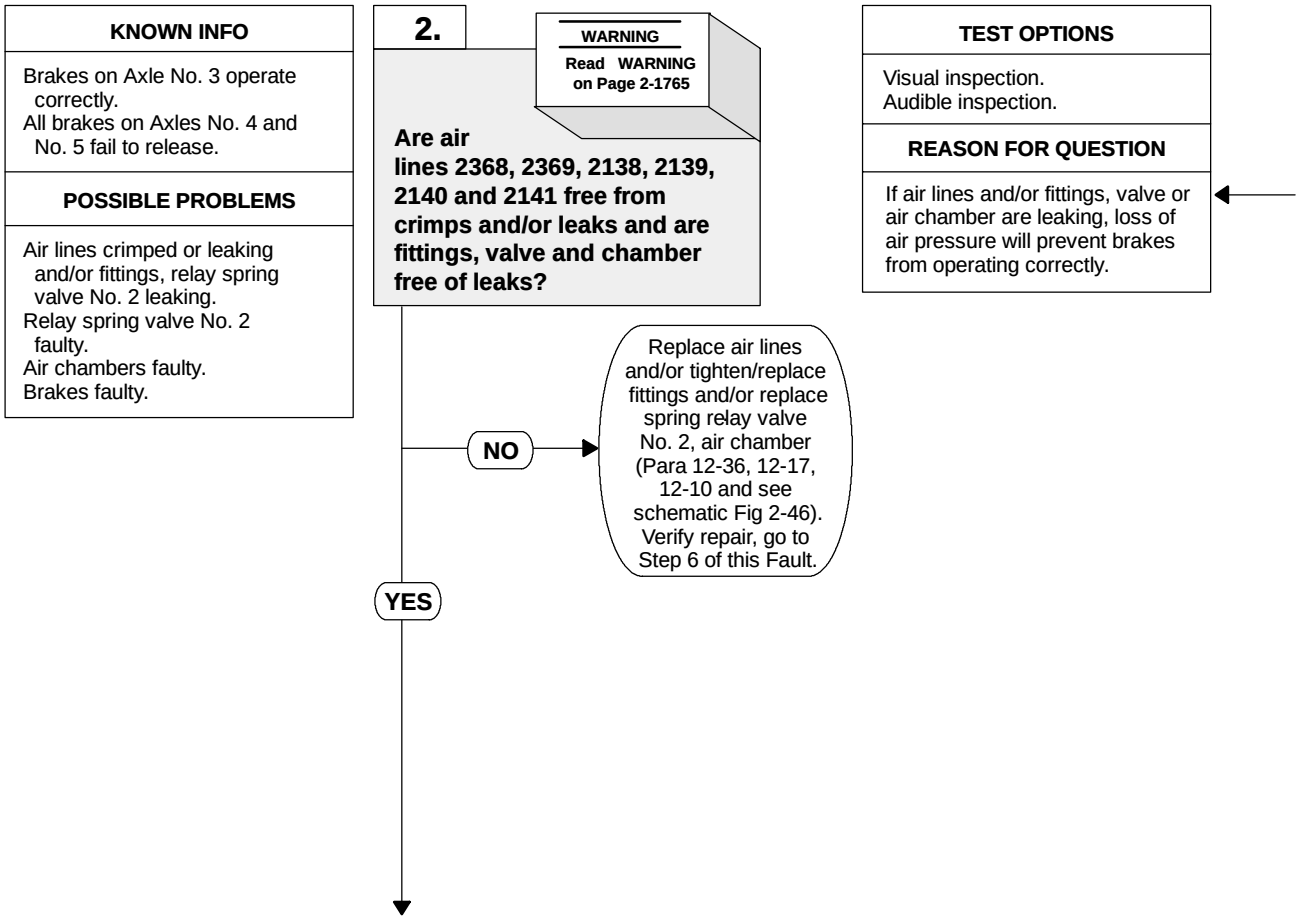


OPERATION TEST

(1) Jack-up three rear axles until wheels are off ground (TM 9-2320-364-10).
(2) Shift transfer case to N (neutral).
(3) Release PARKING BRAKE.
(4) Try to turn each wheel by hand.
  (a) If one wheel fails to turn, perform Step (5) below and go to Step 4 of this Fault.
  (b) If all four wheels fail to turn, perform Step (5) below and go to Step 2 of this Fault.
(5) Lower wheels to ground.

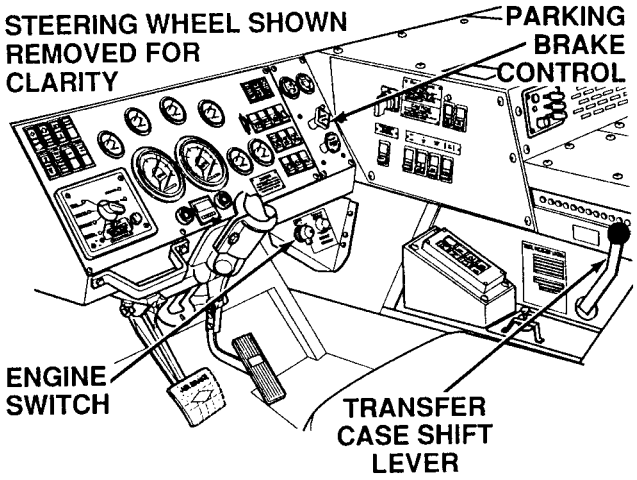


3. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).



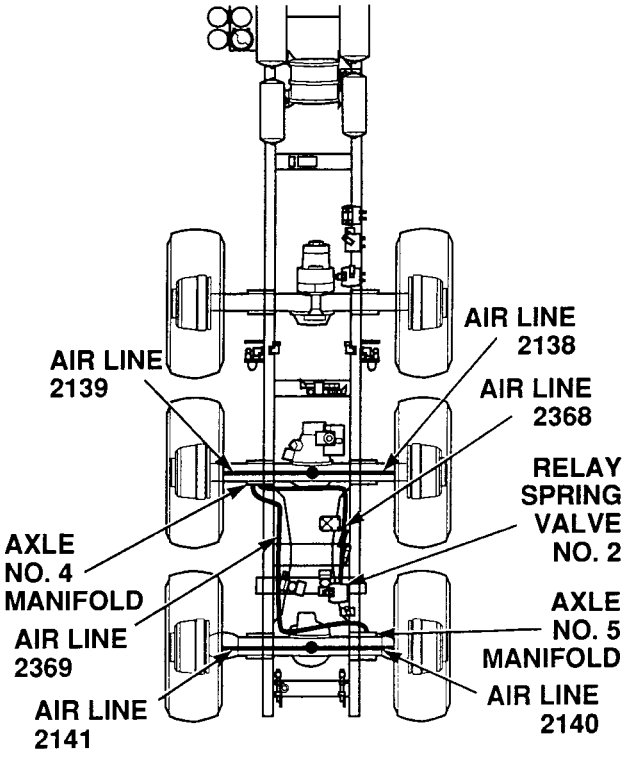
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

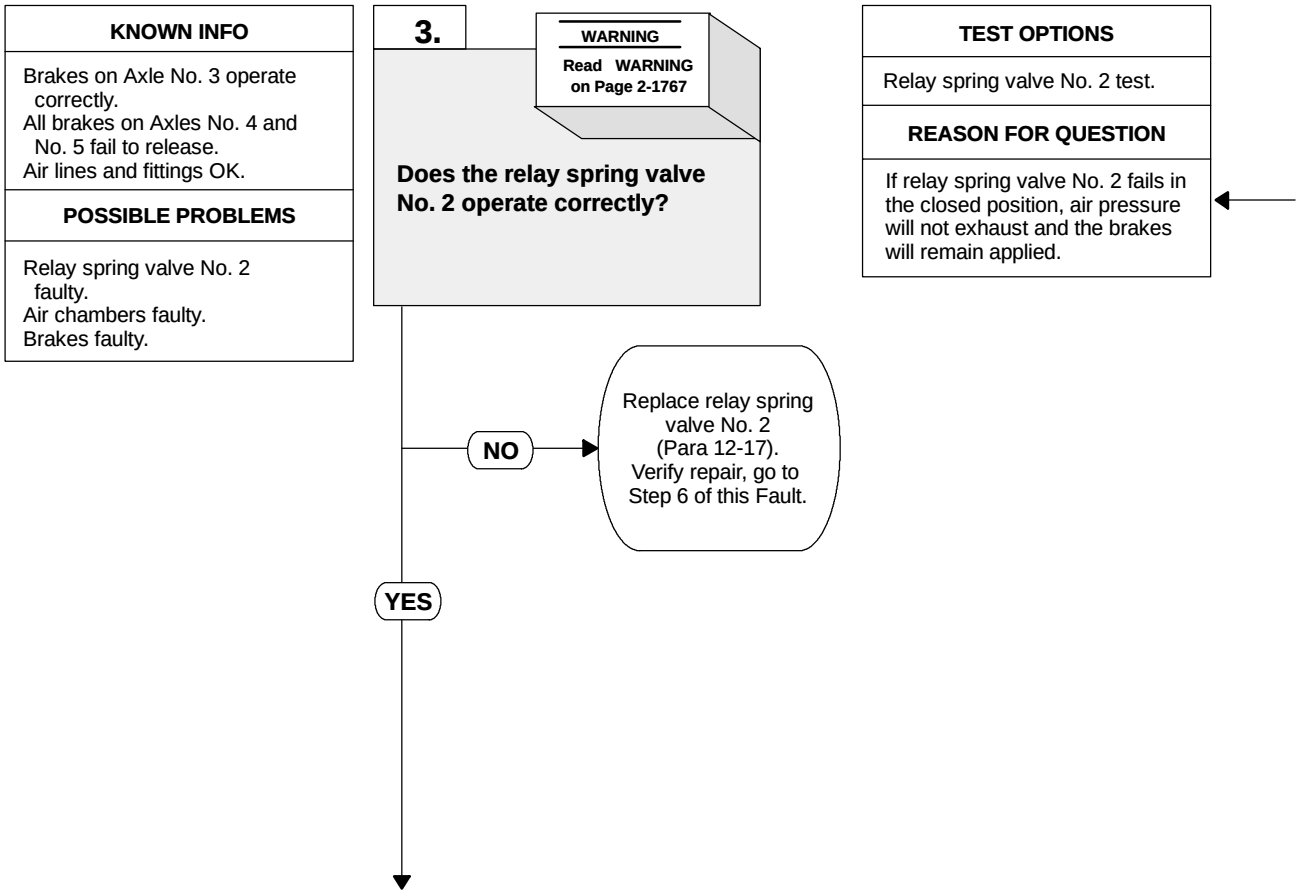


VISUAL/AUDIBLE INSPECTION

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Apply PARKING BRAKE.
(4) Check fittings and air lines 2368, 2369, 2138, 2139, 2140 and 2141 for crimping and/or leaks (see schematic Fig 2-46).
  (a) If there are crimps or leaks, perform Step (5) below and replace air lines and/or tighten/replace fittings (Para 12-36).
  (b) If there are no crimps or leaks, air lines and fittings are OK. Perform Steps (5) and (6) below.
(5) Release PARKING BRAKE.
(6) Check relay spring valve No.2, air chamber fittings and air lines 2368, 2369, 2138, 2139, 2140 and 2141 for leaks (see schematic Fig 2-46).
  (a) If the relay spring valve No. 2 leaks, replace valve (Para 12-17).
  (b) If the air chamber leaks, replace air chamber (Para 12-10).
  (c) If air lines or fittings leak, replace air lines and/or tighten/replace fittings (Para 12-36).
  (d) If there are no leaks, go to Step 3 of this Fault.



3. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).

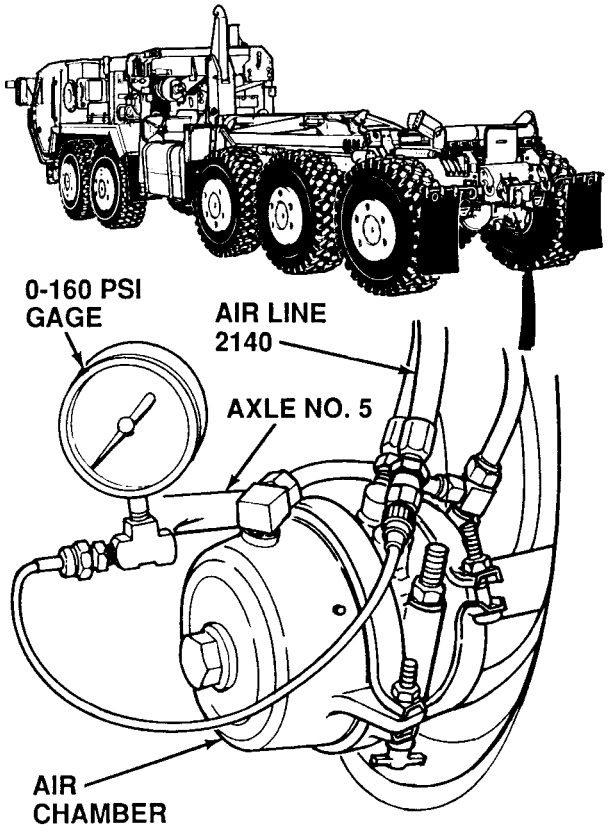


WARNING

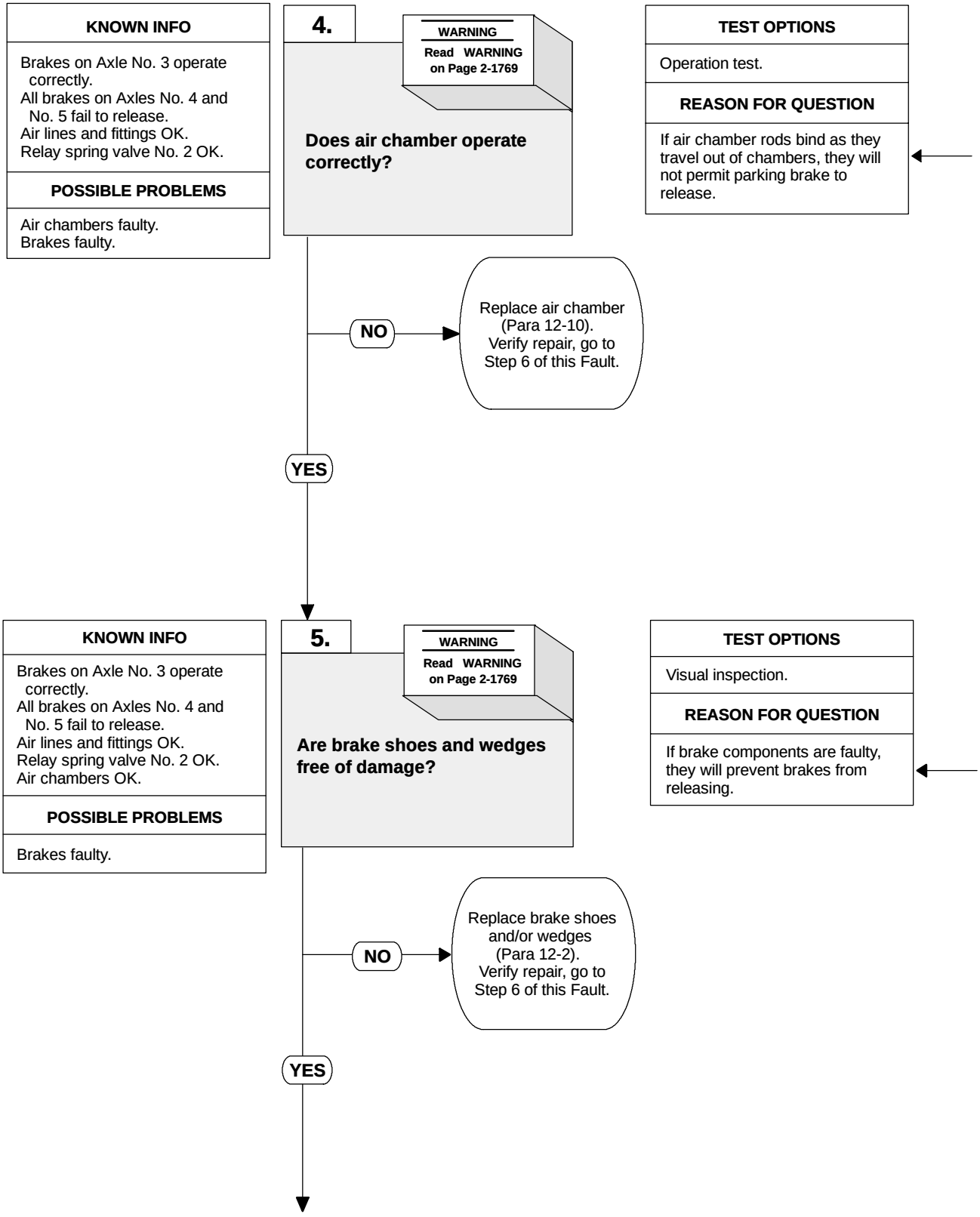
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

RELAY SPRING VALVE NO. 2 TEST

(1) Apply PARKING BRAKE (TM 9-2320-364-10).
(2) Disconnect air line 2140 from right air chamber.
(3) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2140.
(4) Release PARKING BRAKE.
  (a) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2140, perform Step (5) below and replace relay spring valve No. 2 (Para 12-17).
  (b) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2140, relay spring valve No. 2 is OK.
(5) Apply PARKING BRAKE.
(6) Remove gage and connect air line 2140 to right air chamber.



3. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).

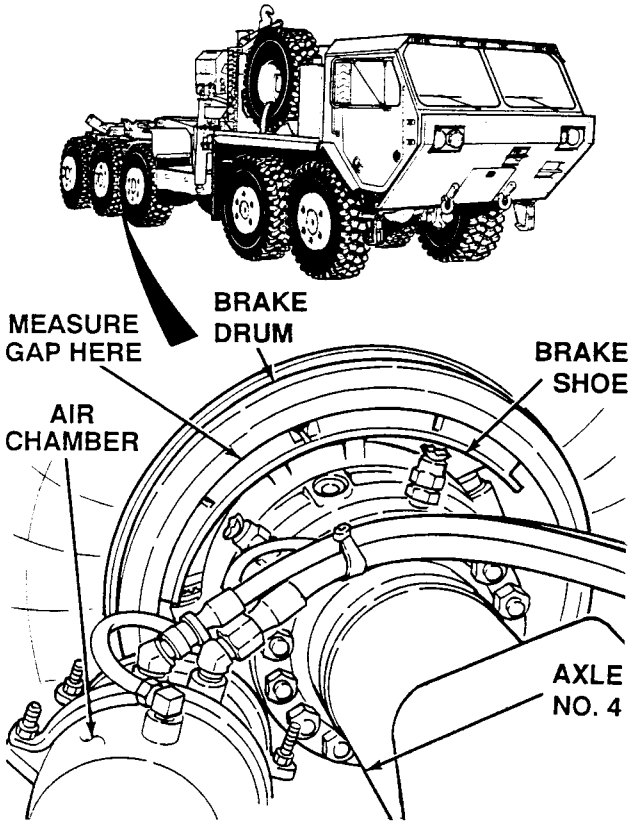


WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

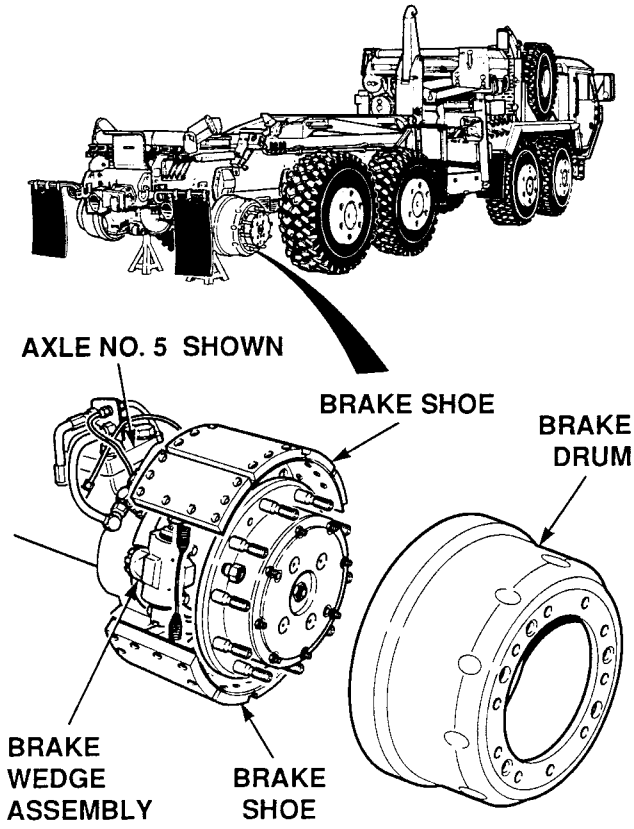
OPERATION TEST

(1) Listen to air chamber and observe brake shoe movement while assistant releases and applies PARKING BRAKE (TM 9-2320-364-10).
  (a) If assistant cannot hear air chamber operate or brake shoe does not move when parking brake control valve is pushed and pulled, perform Step (2) below and replace faulty air chamber (Para 12-10).
  (b) If air chamber operates correctly, perform Step (2) below and go to Step 5 of this Fault.
(2) Release PARKING BRAKE.

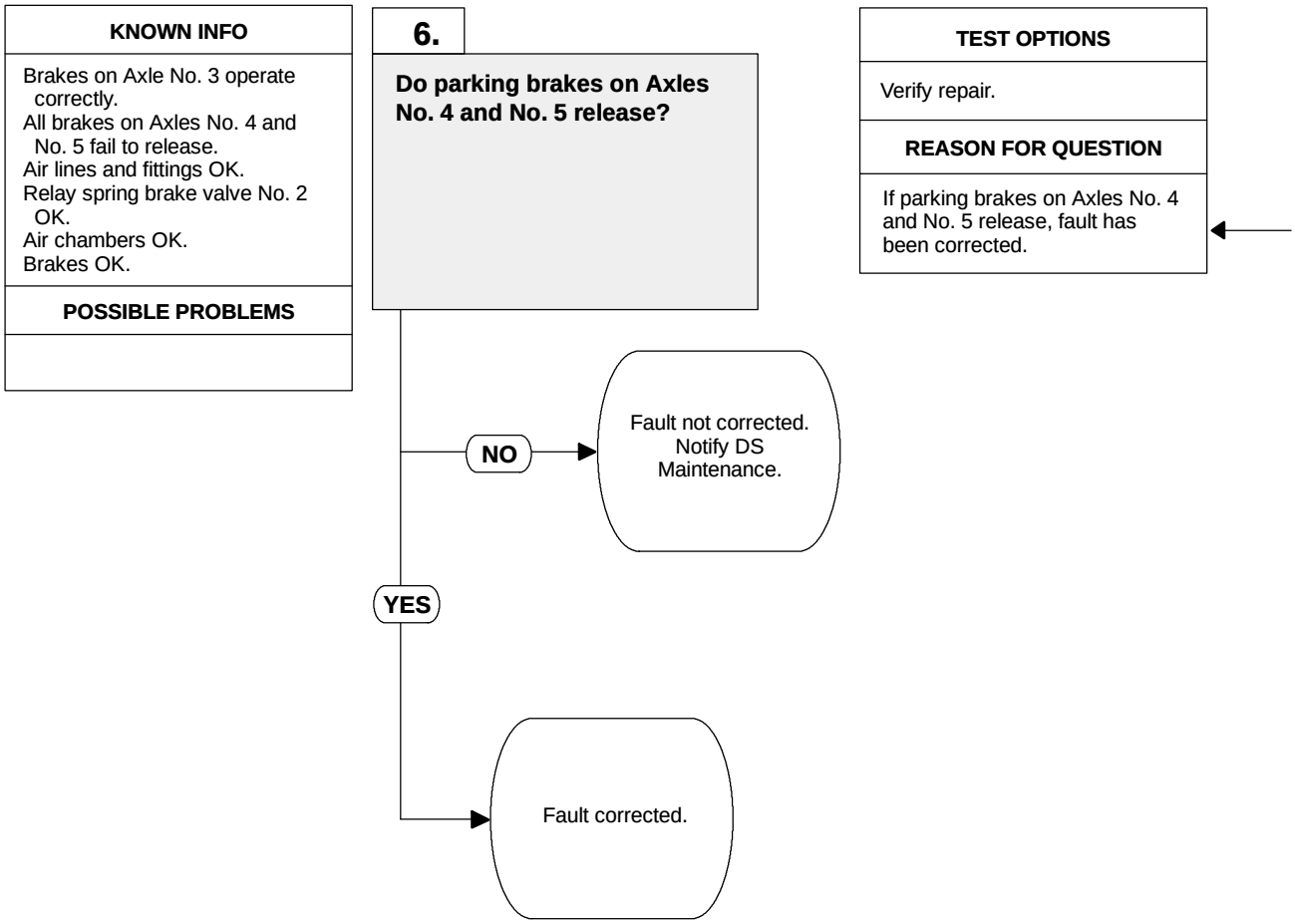


VISUAL INSPECTION

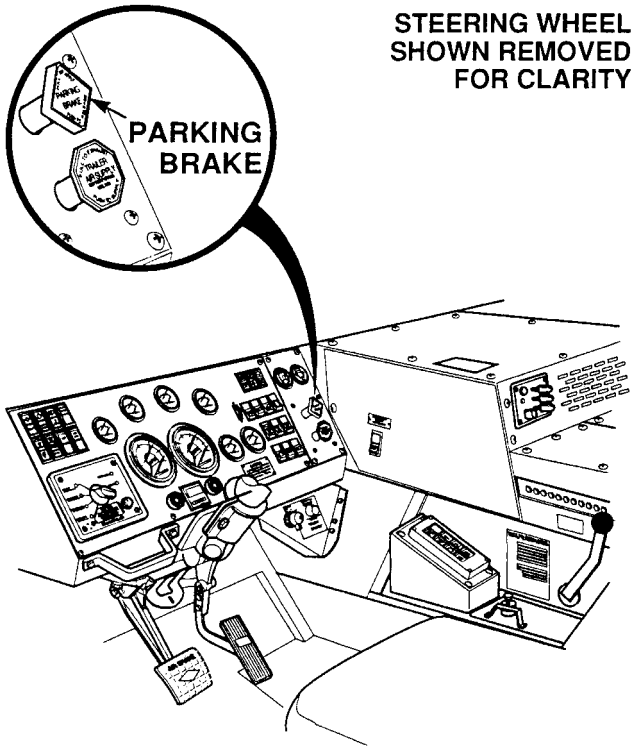
(1) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is no gap, adjust brakes (Para 12-3).
  (b) If there is a gap, perform Steps (2) through (5) below.
(2) Cage air chamber (Para 12-10).
(3) Remove brake drum and air chamber (Para 13-3 and 12-10).
(4) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoe and/or wedges (Para 12-2).
  (b) If shoes and wedges are OK, perform Step (5) below and notify DS Maintenance.
(5) Install brake drum and air chamber (Para 13-3 and 12-10).



3. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).



VERIFY REPAIR
Apply and release PARKING BRAKE (TM 9-2320-364-10). (1) If parking brakes on Axles No. 4 and No. 5 do not release, fault not corrected. Notify DS Maintenance. (2) If parking brakes on Axles No. 4 and No.5 do release, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

4. PARKING BRAKES ON AXLES NO. 3 AND NO. 5 DO NOT APPLY.

INITIAL SETUP

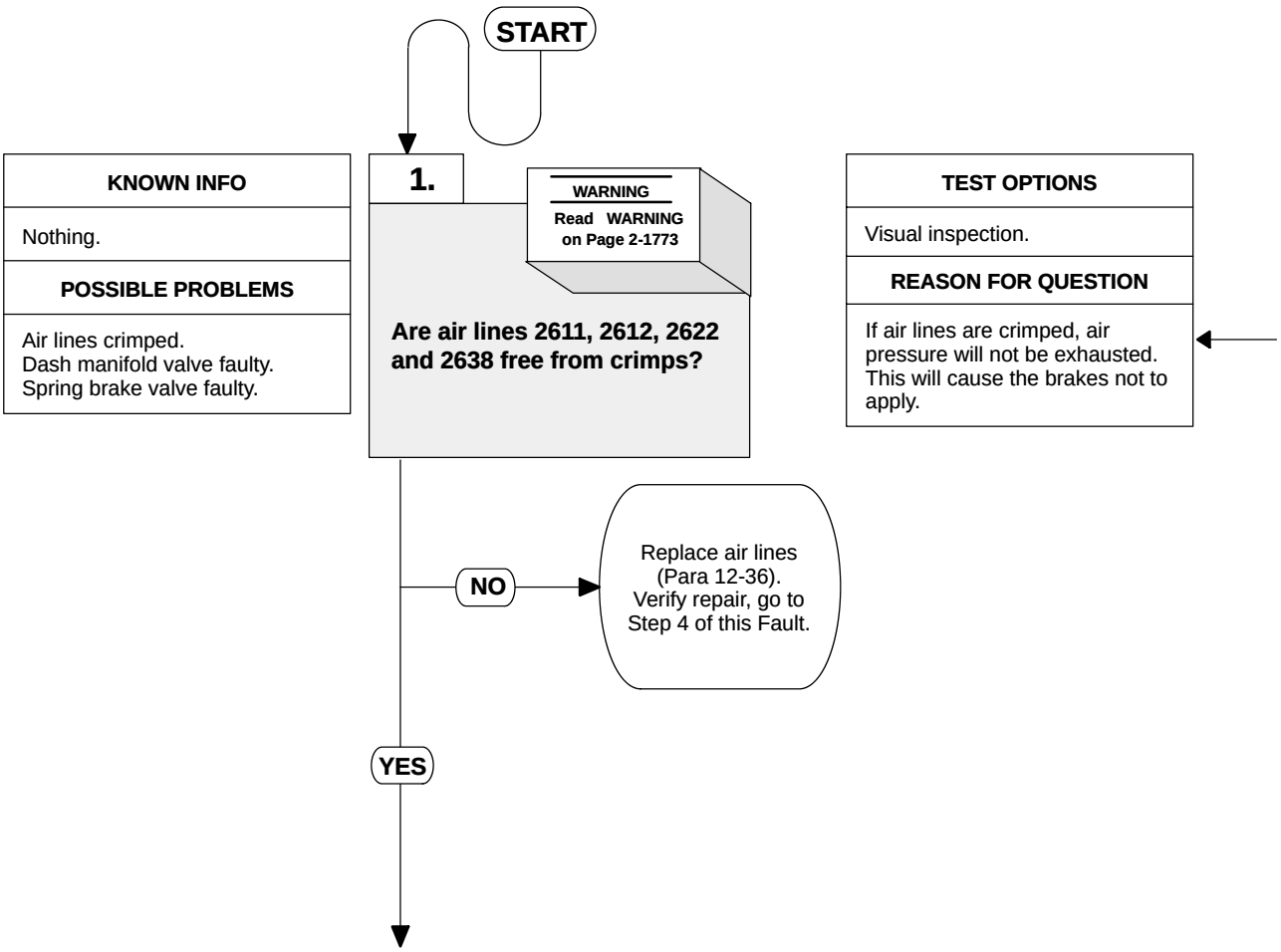
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

Materials/Parts
Locknuts (6) (Item 110, Appendix F)

Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

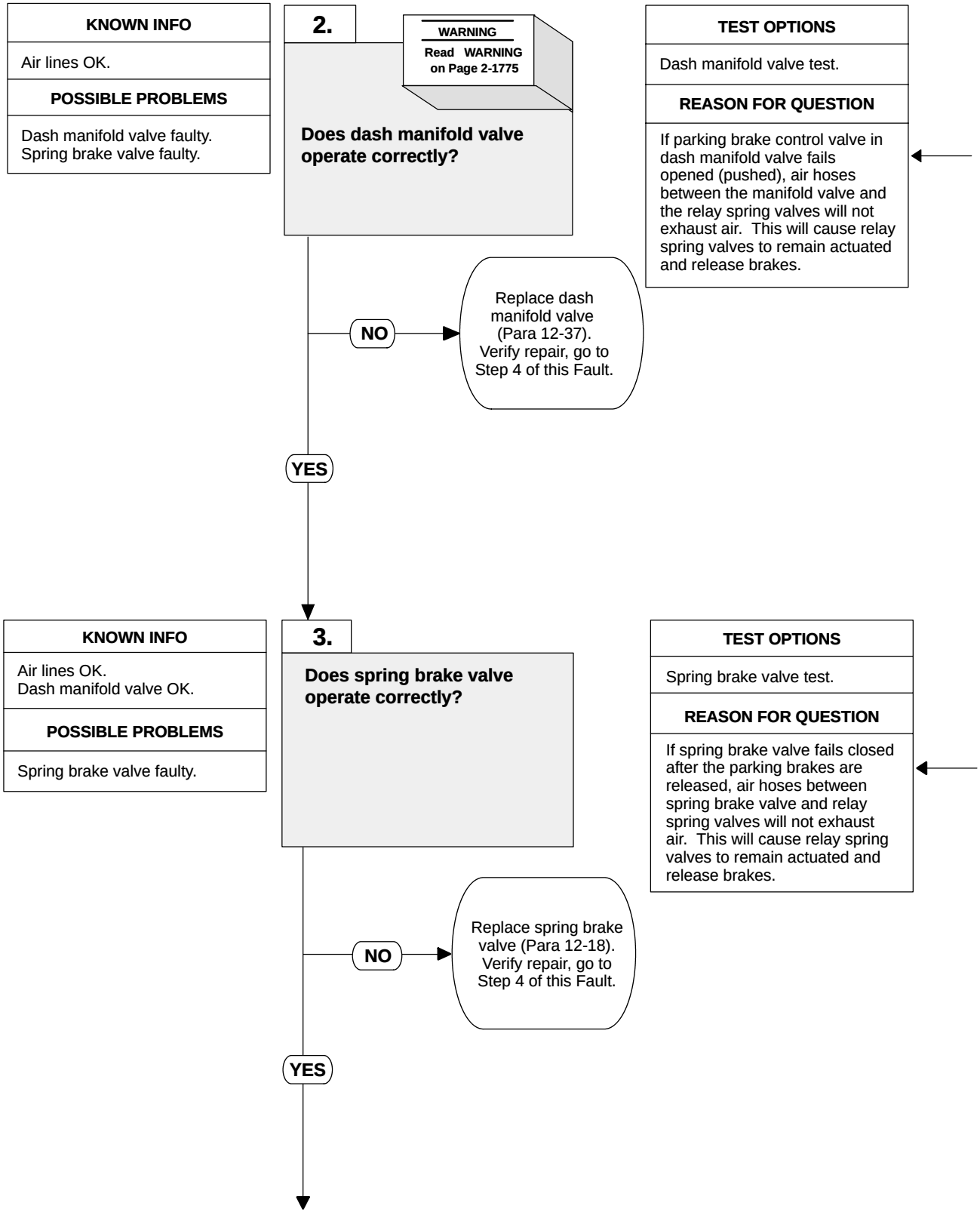


WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL INSPECTION
Check air lines 2611, 2612, 2622 and 2638 for crimping (see schematic Fig 2-45). (1) If there are crimps in air lines, replace air lines (Para 12-36). (2) If there are no crimps in air lines, air lines are OK.

4. PARKING BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT APPLY (CONT).



WARNING

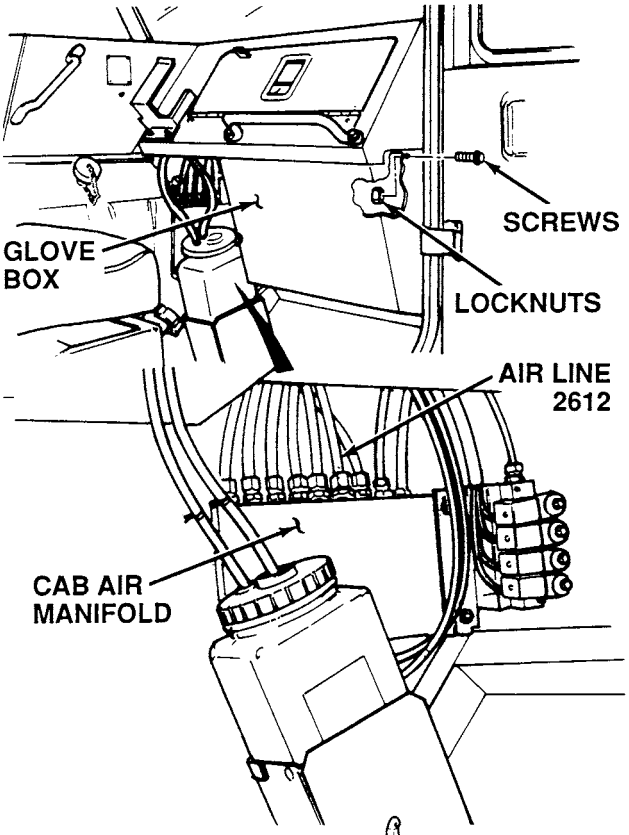
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

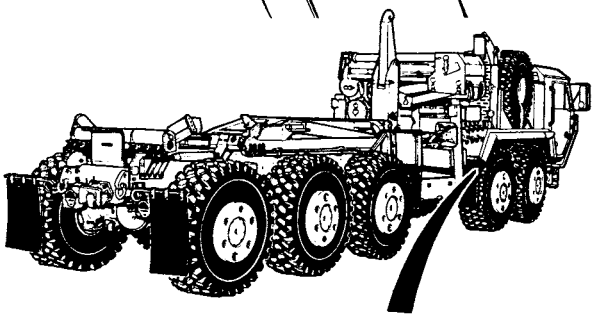
DASH MANIFOLD VALVE TEST

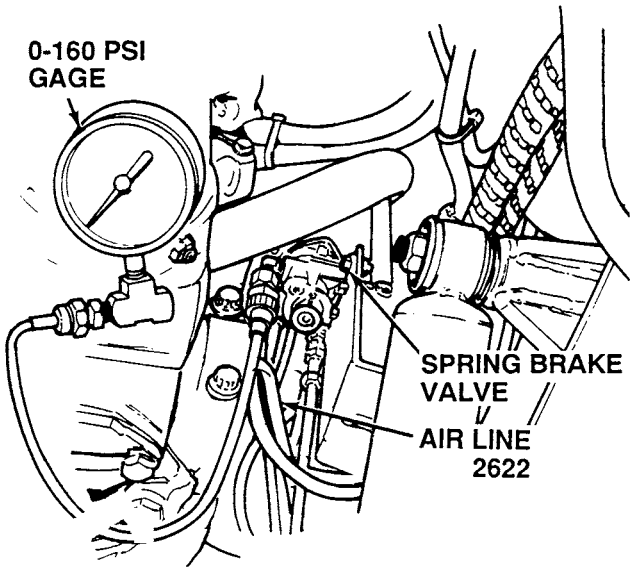
(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9 2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Remove six screws, locknuts and glove box. Discard locknuts.
(4) Loosen air line 2612 on cab air manifold enough to allow air to leak from fitting, while assistant observes AIR PRESS gage.
  (a) If there is a constant flow of air and a drop in AIR PRESS, replace dash manifold valve (Para 12-37).
  (b) If there is a small amount of air flow and no drop in AIR PRESS, dash manifold valve is OK.
(5) Tighten air line on cab air manifold.
(6) Install glove box, six screws and locknuts.

SPRING BRAKE VALVE TEST

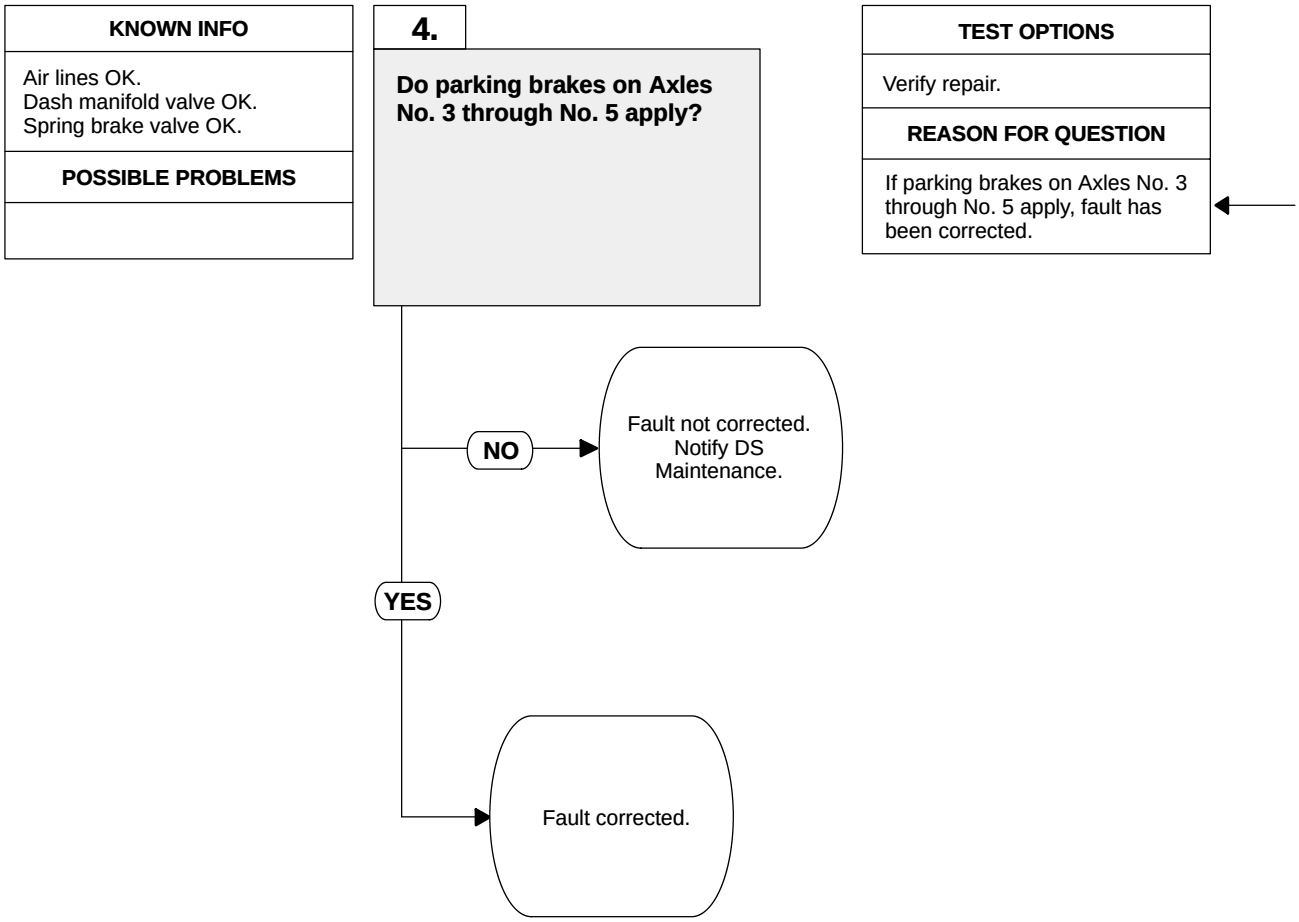
(1) Disconnect air line 2622 from spring brake valve.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to spring brake valve outlet.
(3) Release PARKING BRAKE (TM 9-2320-364-10).
  (a) If there are 125 ±4 psi (861 ±28 kPa) present at outlet of spring brake valve, perform Steps (4) and (5) below and replace spring brake valve (Para 12-18).
  (b) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2622, spring brake valve is OK.
(4) Apply PARKING BRAKE.
(5) Remove pressure gage and connect air line 2622 to spring brake valve.



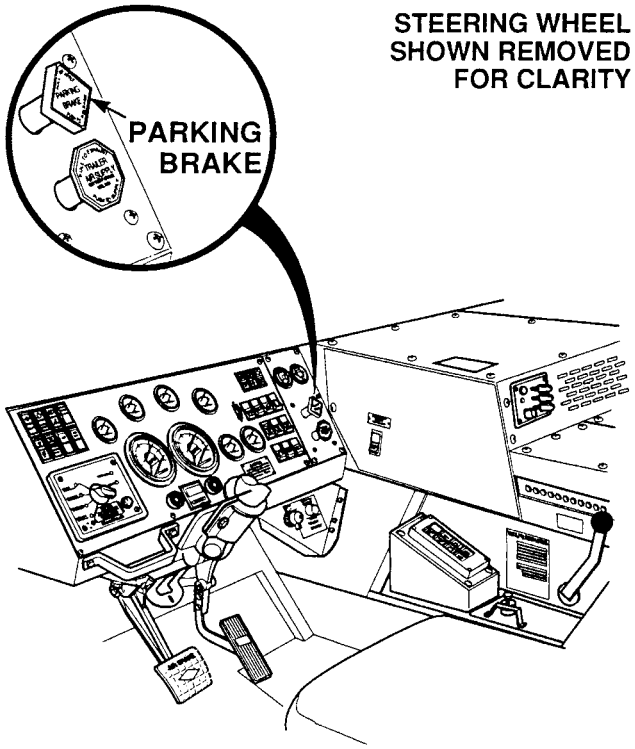




4. PARKING BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT APPLY (CONT).



VERIFY REPAIR
Apply PARKING BRAKE (TM 9-2320-364-10). (1) If parking brakes on Axles No. 3 through No. 5 do not apply, fault not corrected. Notify DS Maintenance. (2) If parking brakes on No. 3 through No.5 Axles do apply, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

5. PARKING BRAKES ON AXLE NO. 3 DO NOT APPLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50 Appendix G)

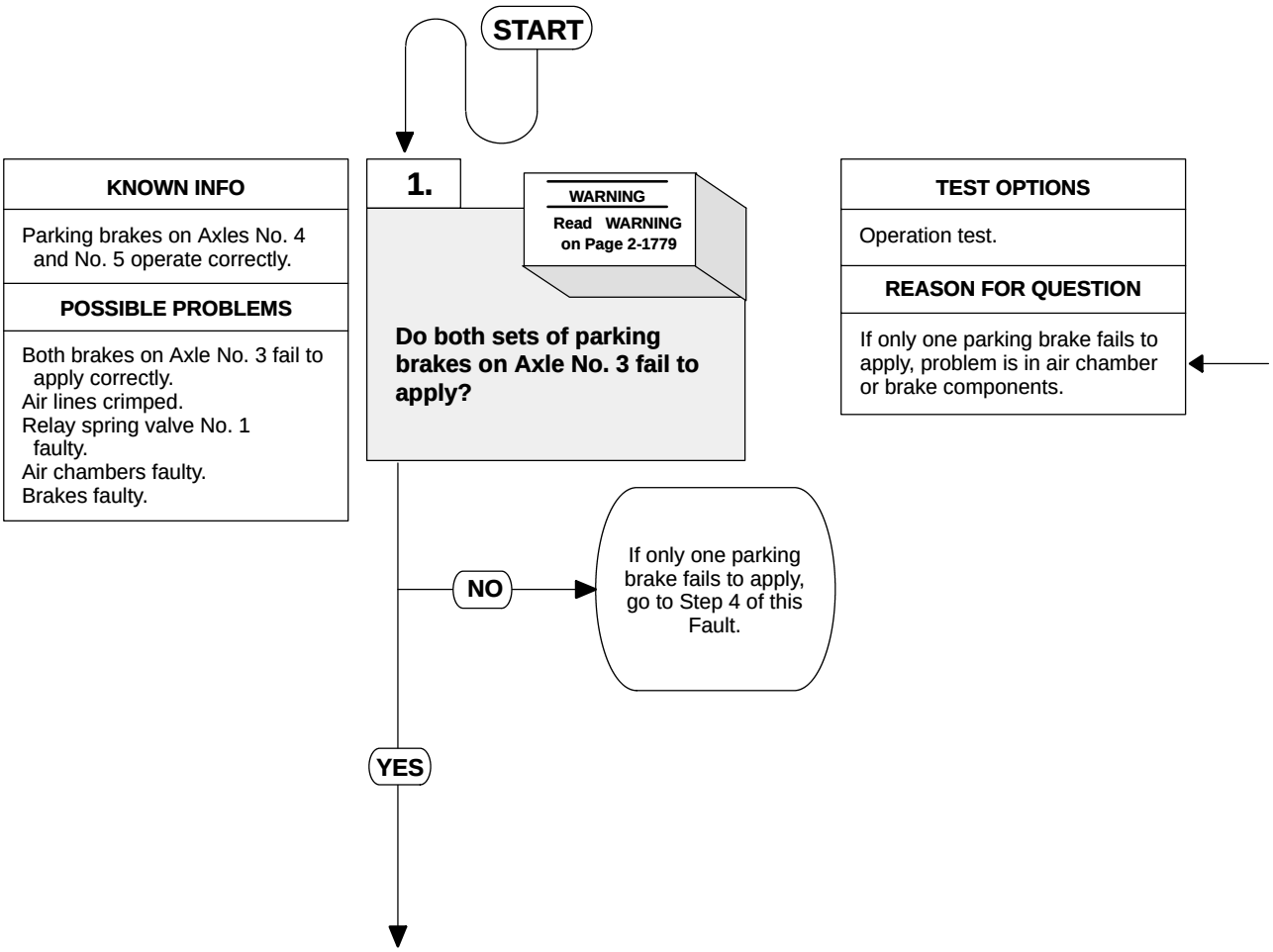
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

The following troubleshooting procedures cover one set of brakes for Axle No. 3, but they apply to both sets of brakes.

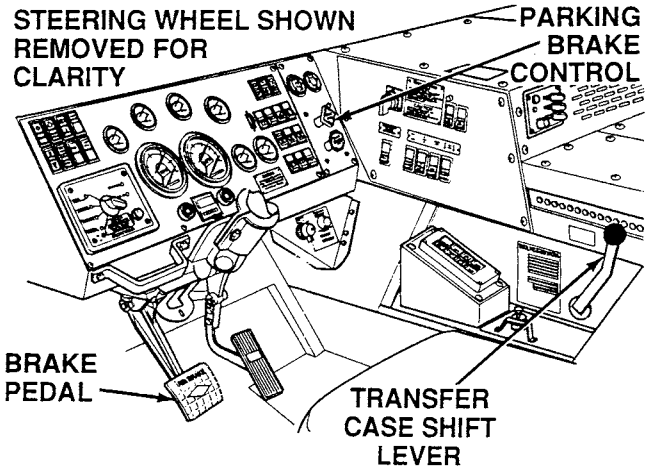


WARNING

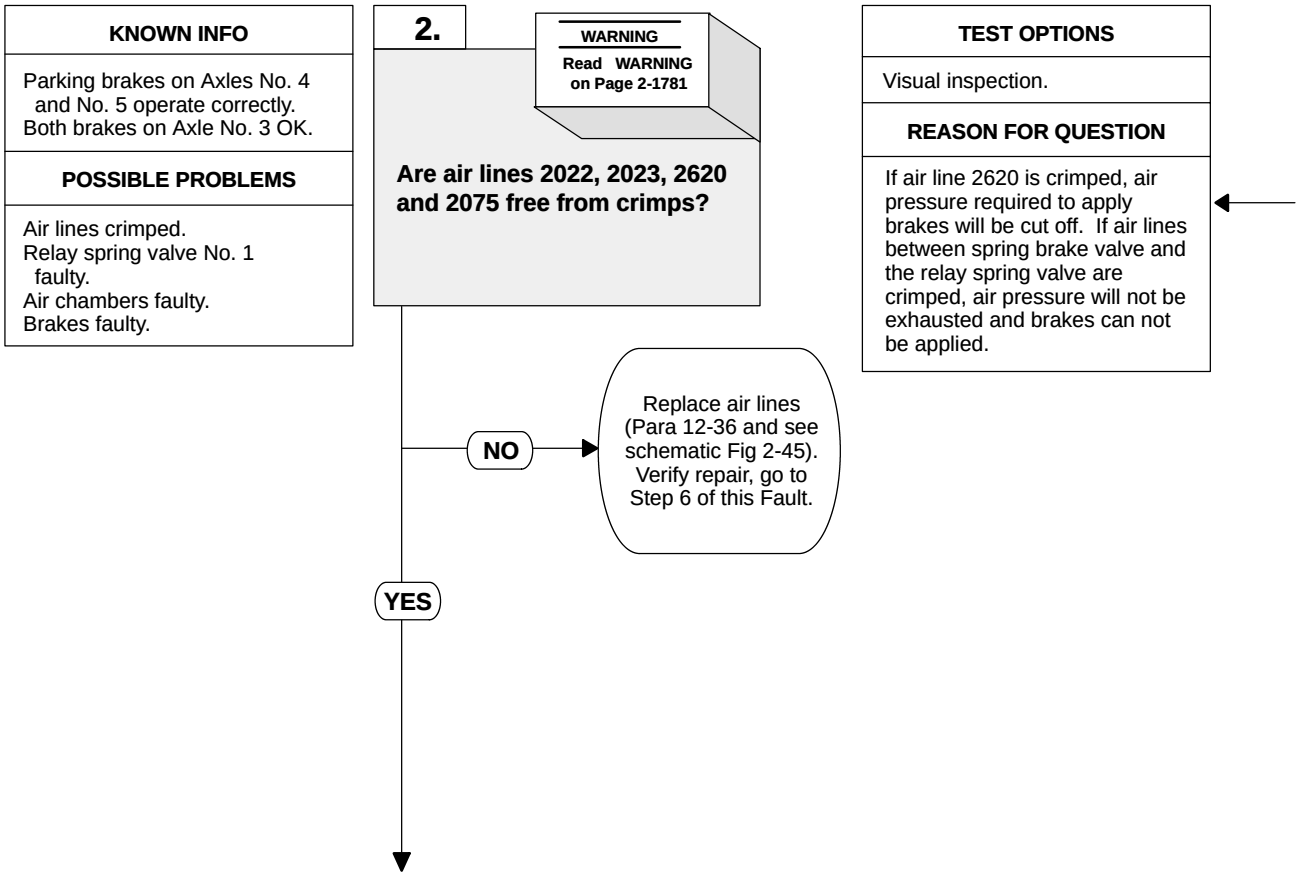
Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

OPERATION TEST

(1) Jack-up three rear axles until wheels are off ground (TM 9-2320-364-10).
(2) Shift transfer case to N (neutral).
(3) Release PARKING BRAKE.
(4) Turn each wheel by hand.
    (a) If one wheel turns, perform Steps (5) and (6) below and go to Step 4 of this Fault.
    (b) If both wheels turn, perform Steps (5) and (6) below and go to Step 2 of this Fault.
(5) Lower wheels to ground.
(6) Apply PARKING BRAKE.



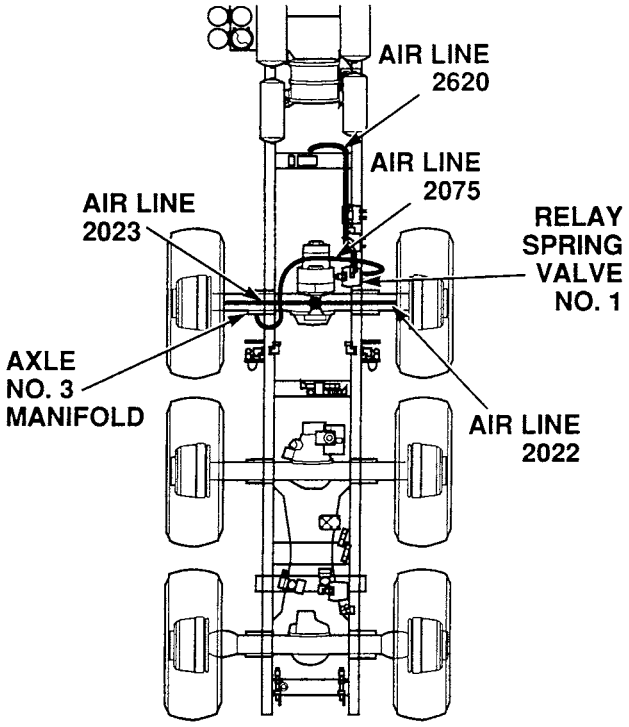
5. PARKING BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).



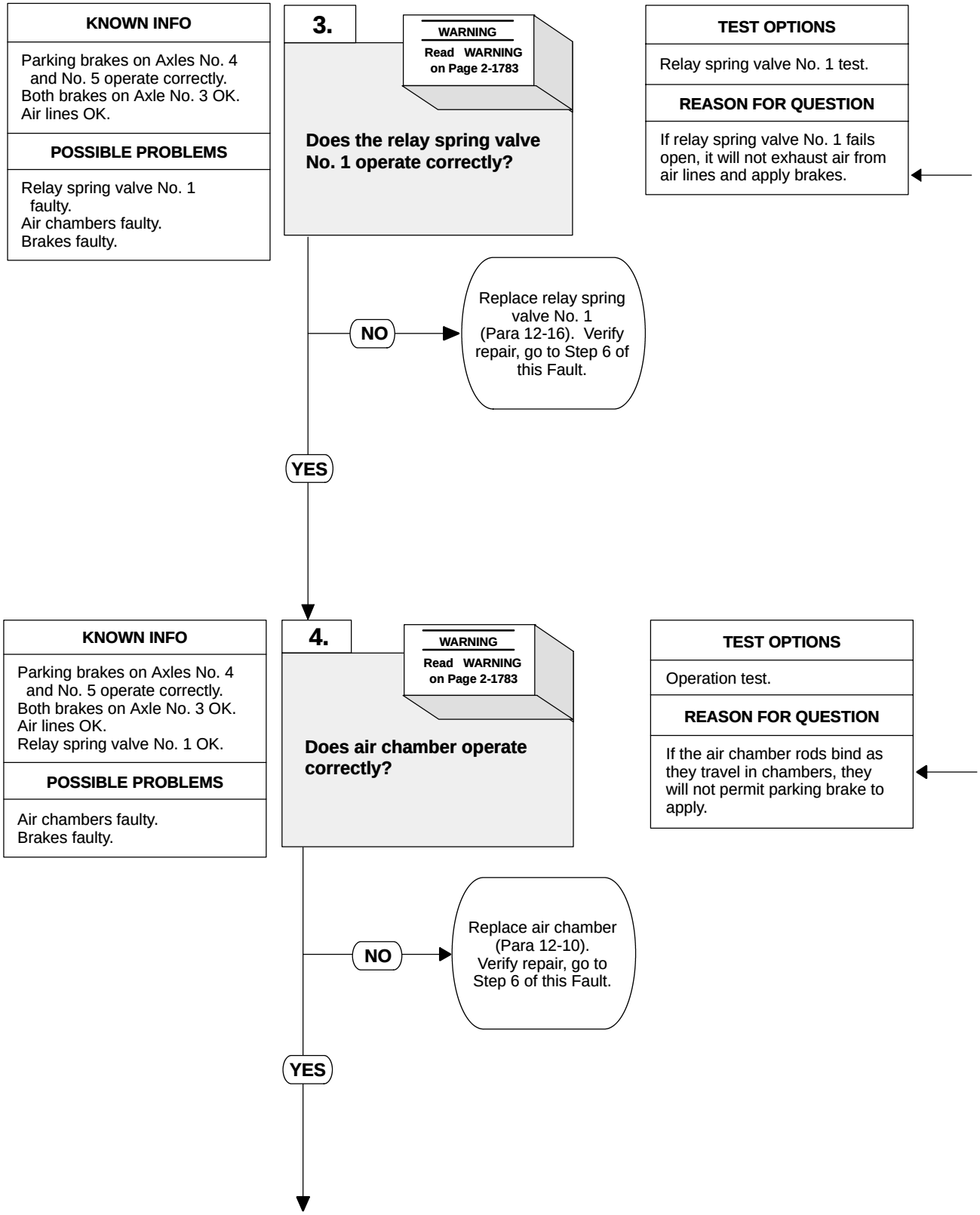
WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

VISUAL INSPECTION
Check air lines 2022, 2023, 2620 and 2075 for crimping (see schematic Fig 2-45). (1) If there are crimps in air lines, replace air lines (Para 12-36). (2) If there are no crimps in air lines, air lines are OK.



5. PARKING BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).



WARNING

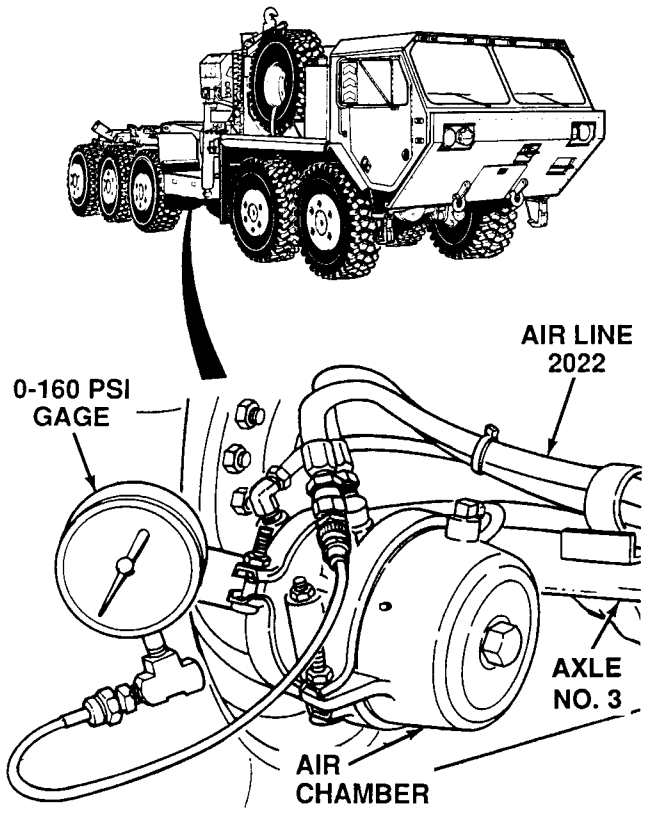
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

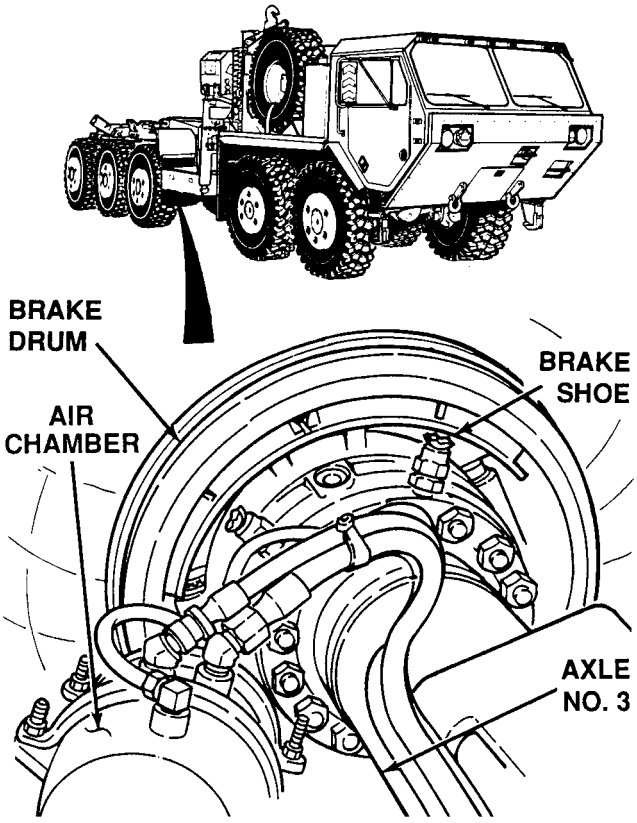
RELAY SPRING VALVE NO. 1 TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Disconnect air line 2022 from right air chamber on Axle No. 3.
(4) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2022.
(5) Release and apply PARKING BRAKE.
  (a) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2022, perform Steps (6) and (7) below and replace relay spring valve No. 1 (Para 12-16).
  (b) If there are not 125 ±4 psi (861 ±28 kPa) at air line 2022, relay spring valve No.1 is OK.
(6) Apply PARKING BRAKE.
(7) Remove gage and connect air hose 2022 to air chamber.

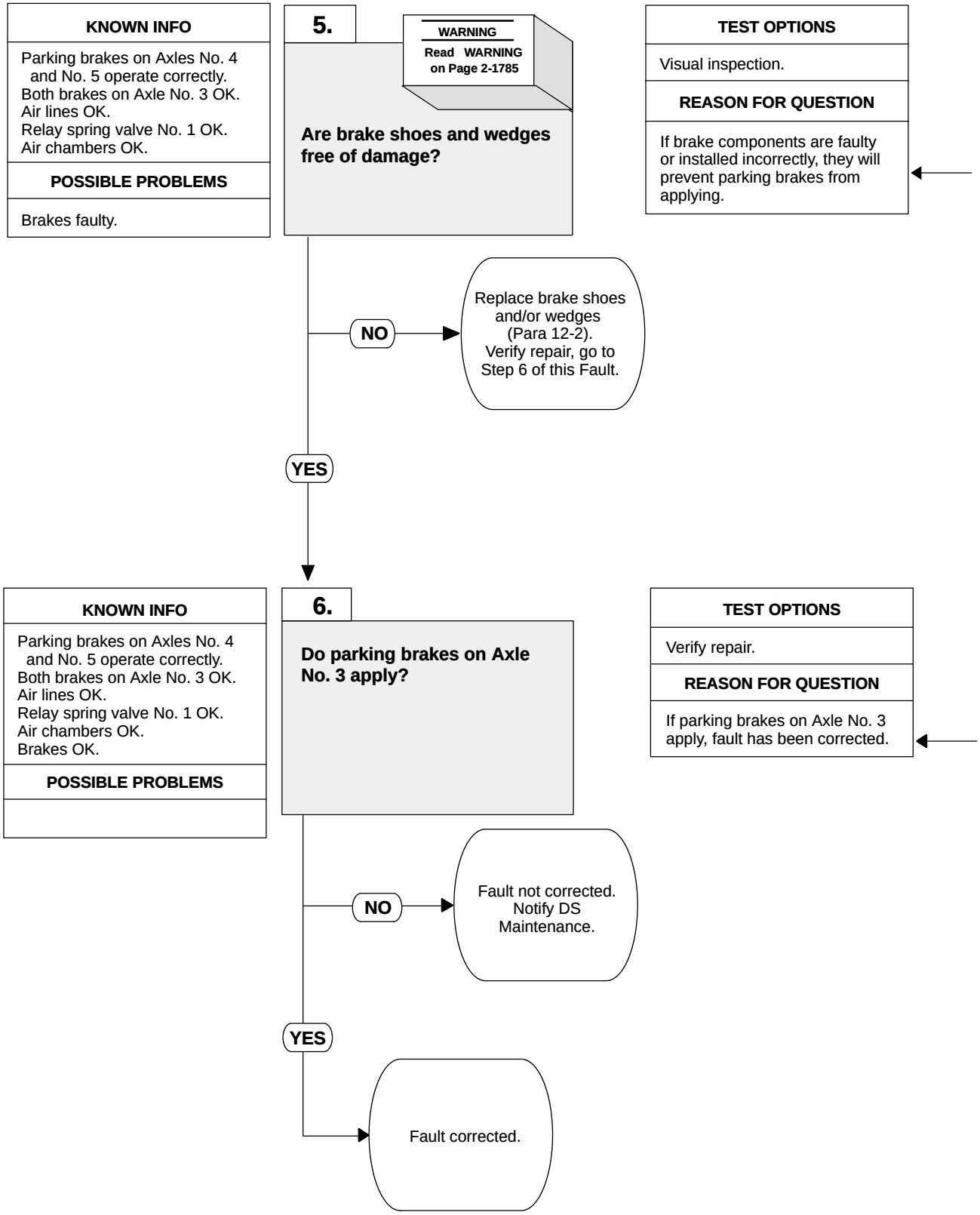
OPERATION TEST

(1) Listen to air chamber while assistant releases and applies PARKING BRAKE.
  (a) If assistant cannot hear air chamber operate, or the brake shoe does not move when parking brake control is pushed and pulled, perform Step (2) below and replace air chamber (Para 12-10).
  (b) If air chamber operates correctly, air chamber is OK.
(2) Release PARKING BRAKE.





5. PARKING BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).

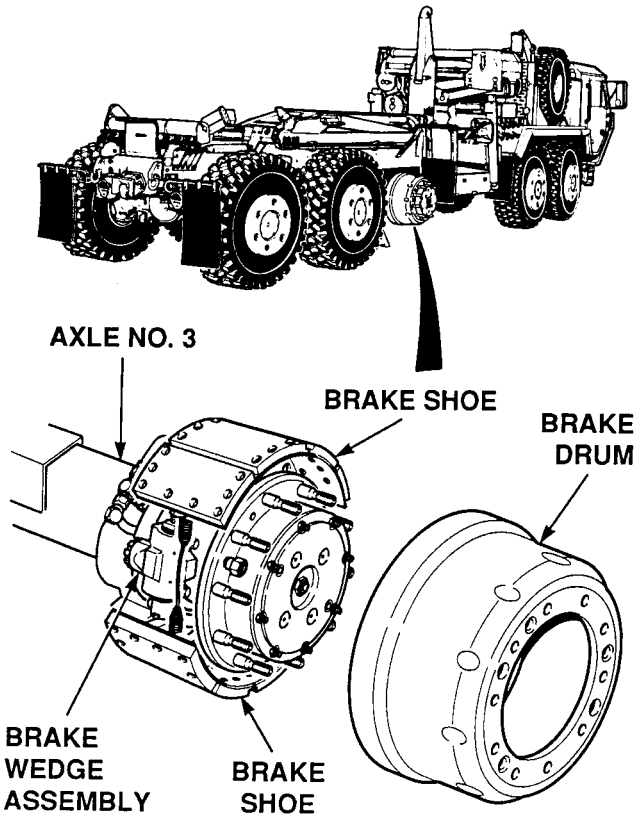


WARNING

Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

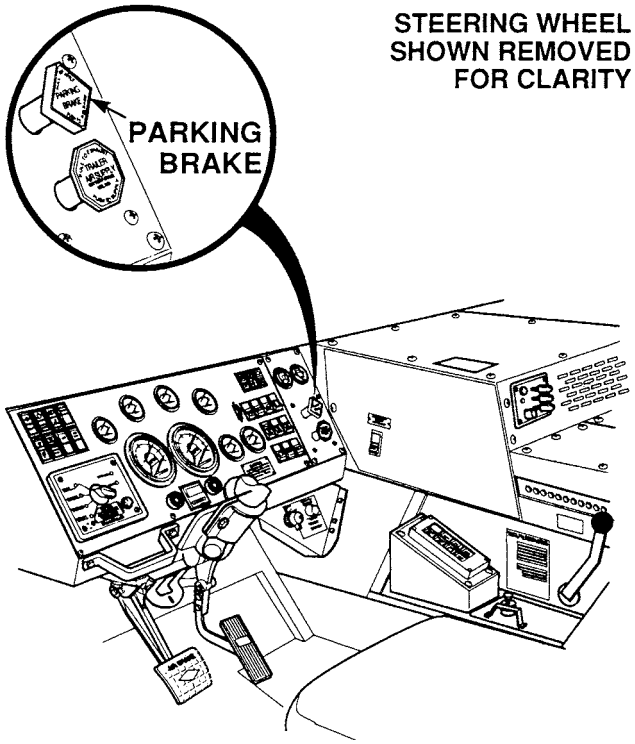
VISUAL INSPECTION

(1) Measure gap between brake shoe and drum (Para 12-3).
   (a) If there is no gap, adjust brakes (Para 12-3).
   (b) If there is a gap, perform Steps (2) through (5) below.
(2) Cage air chamber (Para 12-10).
(3) Remove brake drum and air chamber (Para 13-3 and 12-10).
(4) Inspect brake shoes and wedges (Para 12-2).
   (a) If brake shoes and/or wedges are faulty, replace brakes shoes and/or wedges (Para 12-2).
   (b) If shoes and wedges are OK, notify DS Maintenance.
(5) Install brake drum and air chamber (Para 13-3 and 12-10).



VERIFY REPAIR

Apply PARKING BRAKE (TM 9-2320-364-10).
   (1) If parking brakes on Axle No. 3 do not apply, fault not corrected. Notify DS Maintenance.
   (2) If parking brakes on Axle No. 3 do apply, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

6. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

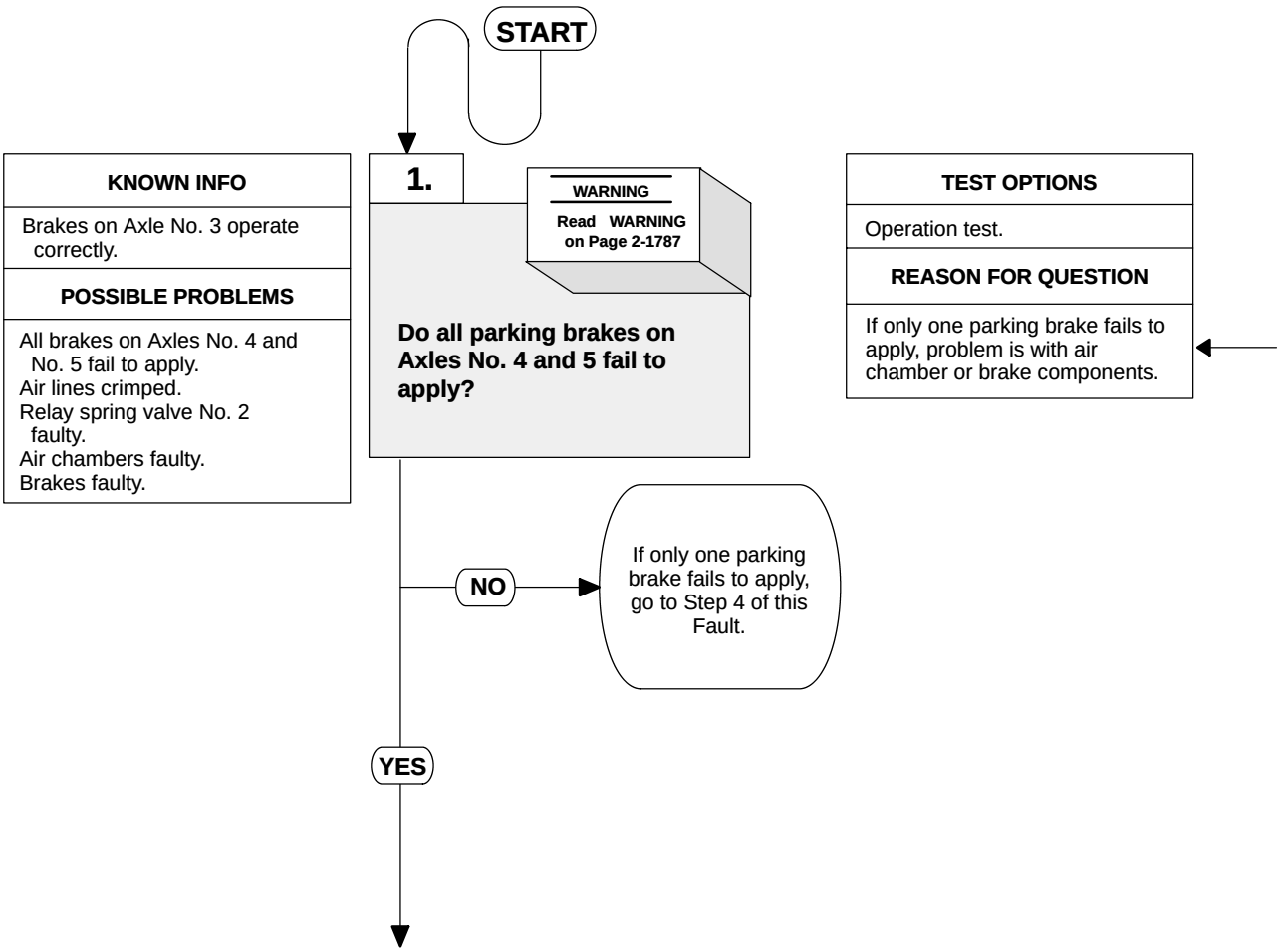
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

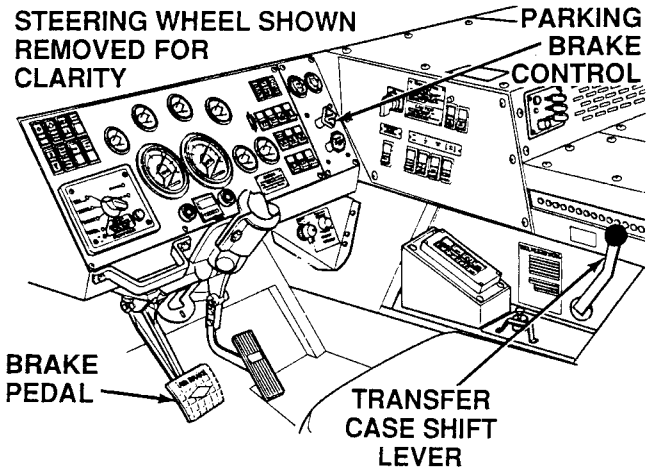
The following troubleshooting procedures cover one set of brakes for Axles No. 4 and 5, but they apply to all four sets of brakes.



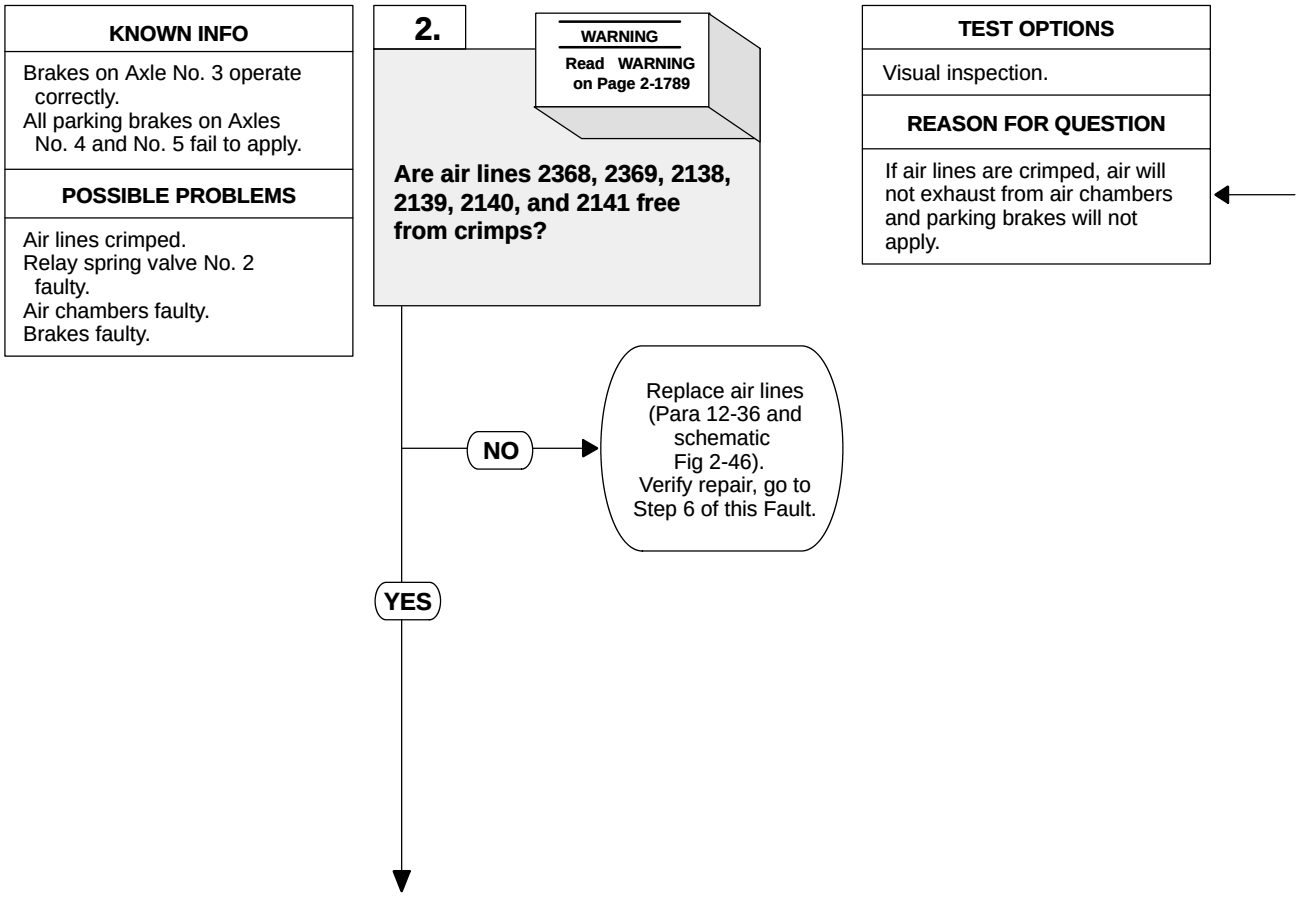
WARNING

Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

OPERATION TEST
(1) Jack-up three rear Axles until wheels are off ground. (2) Shift transfer case to N (neutral) (TM 9-2320-364-10). (3) Try to turn each wheel by hand. (a) If one wheel turns, perform Step (4) below and go to Step 4 of this Fault. (b) If all wheels turn perform Step (4) below and go to Step 2 of this Fault. (4) Lower wheels to ground.



6. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).



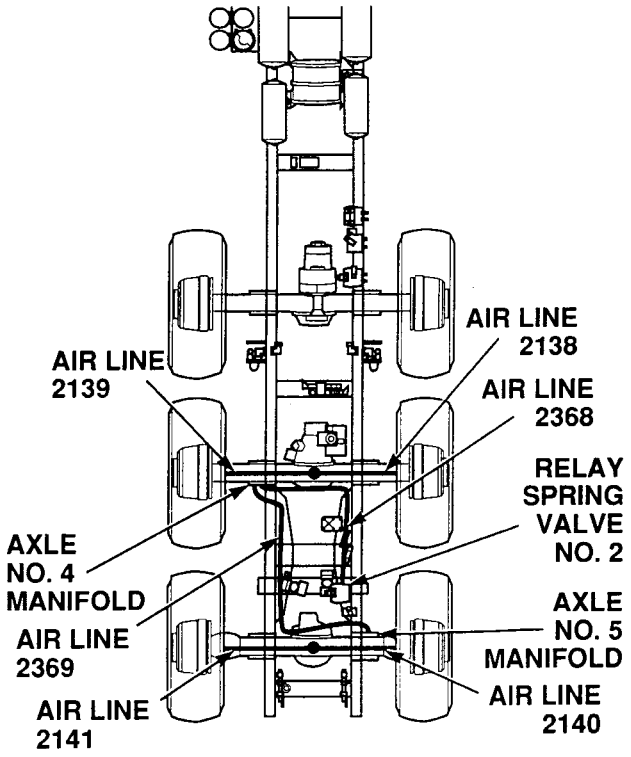
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

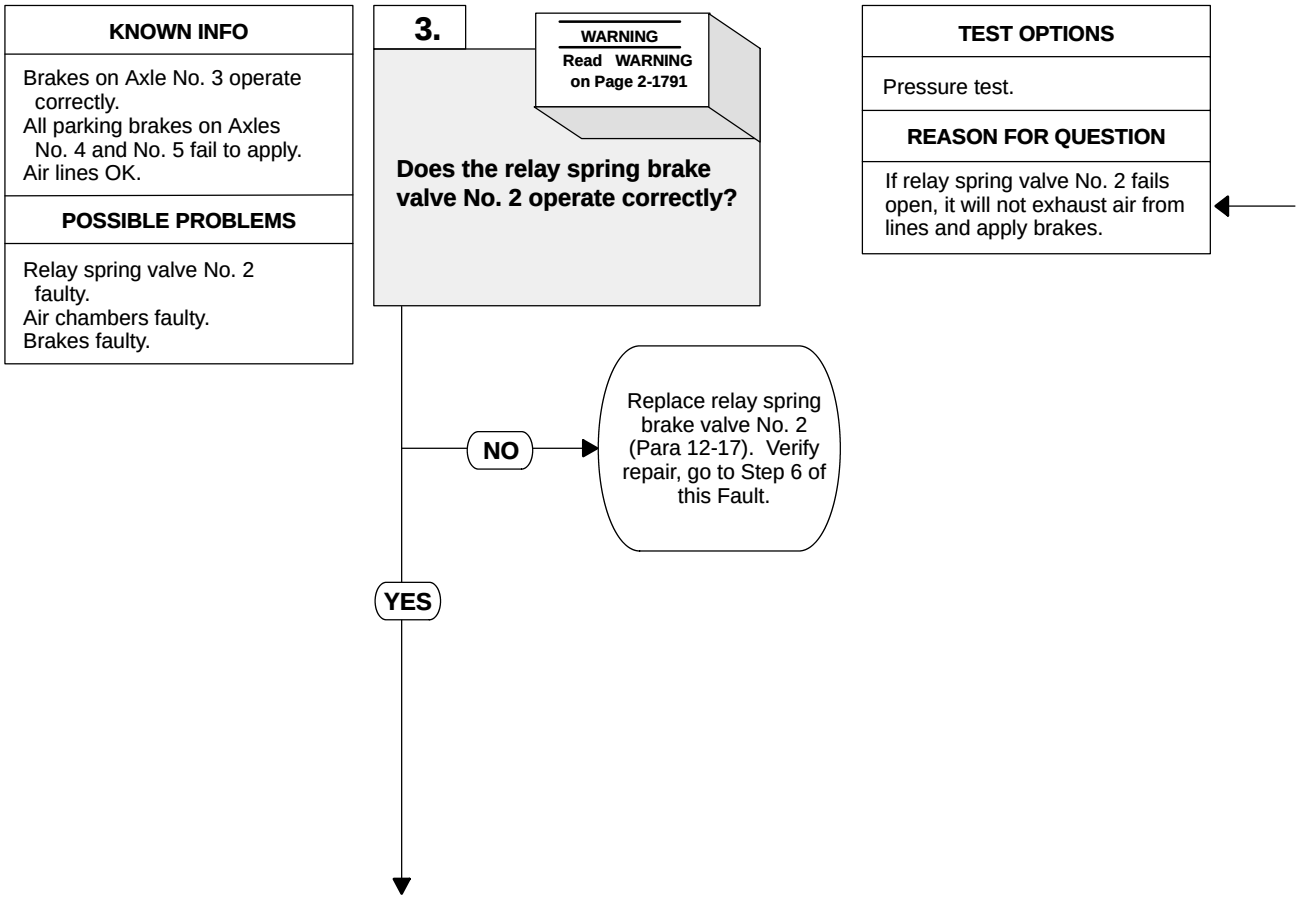
VISUAL INSPECTION

Check air lines 2368, 2369, 2138, 2139, 2140 and 2141 for crimping (see schematic Fig 2-46).

(1) If there are crimps in air lines, replace air lines (Para 12-36).
(2) If there are no crimps in air lines, air lines are OK.



6. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).

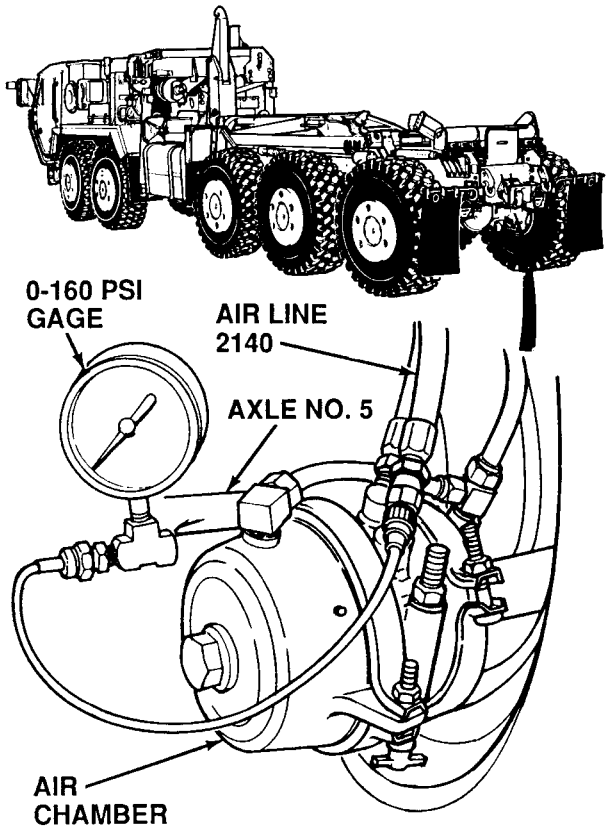


WARNING

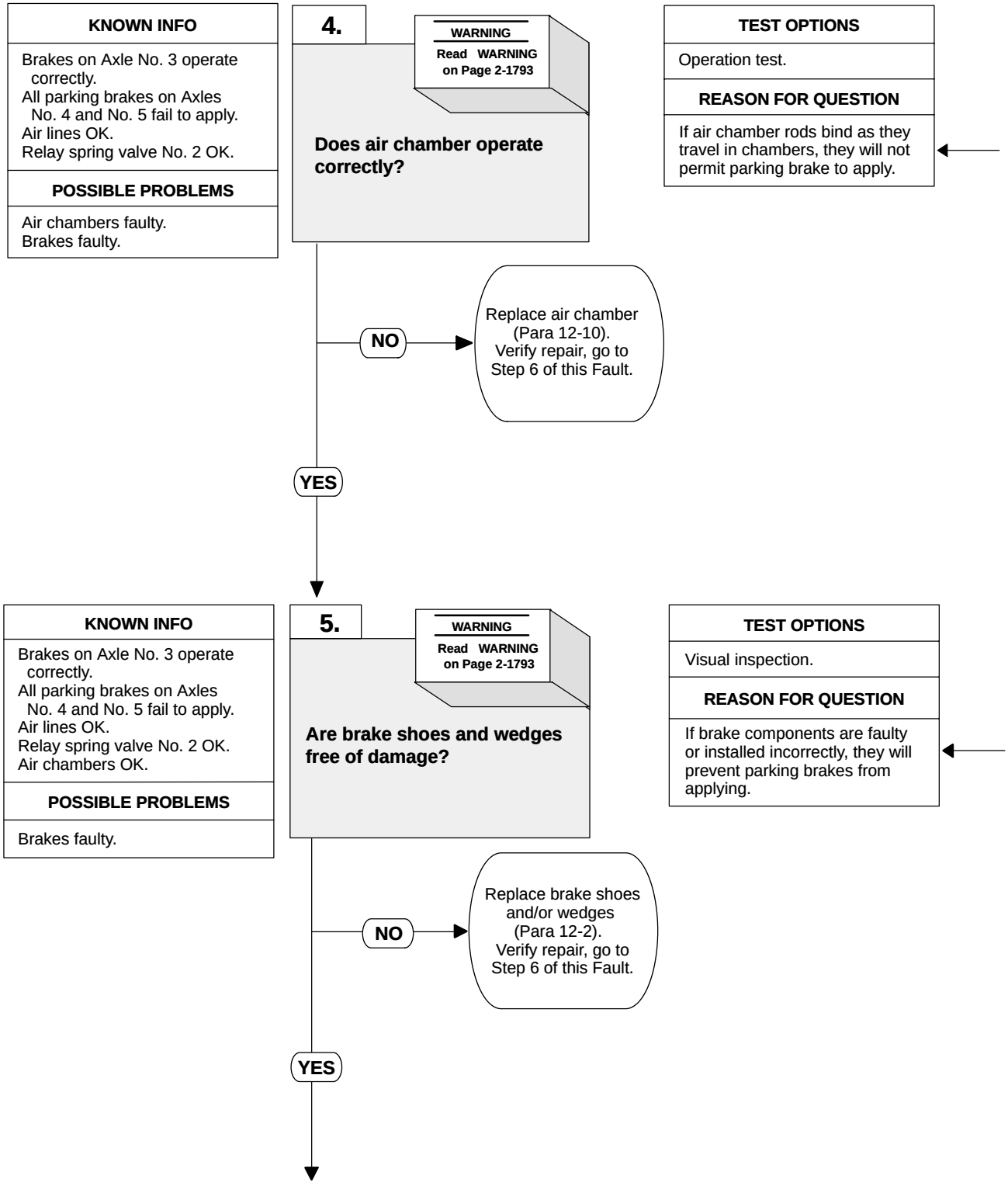
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

PRESSURE TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Disconnect air line 2140 from right air chamber.
(4) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2140.
(5) Release and apply PARKING BRAKE.
  (a) If there are 125 ±4 psi (861 ±28 kPa) at air line 2140, perform Steps (6) through (8) below and replace relay spring valve No. 2 (Para 12-17).
  (b) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2140, relay spring valve No. 2 is OK.
(6) Apply PARKING BRAKE.
(7) Loosen gage at air line 2140 enough to allow air to completely leak from air line.
(8) Remove gage and connect air line 2140 to right air chamber.



6. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).

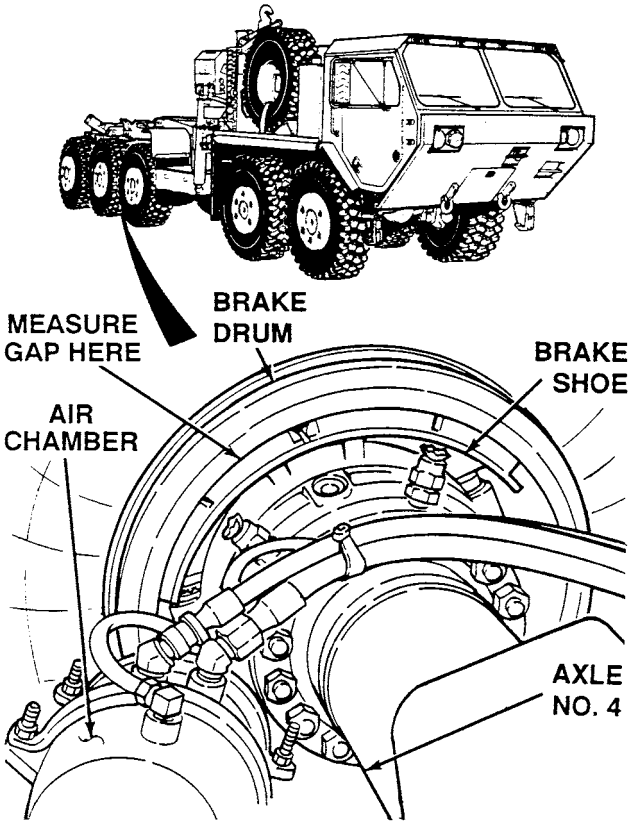


WARNING

- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

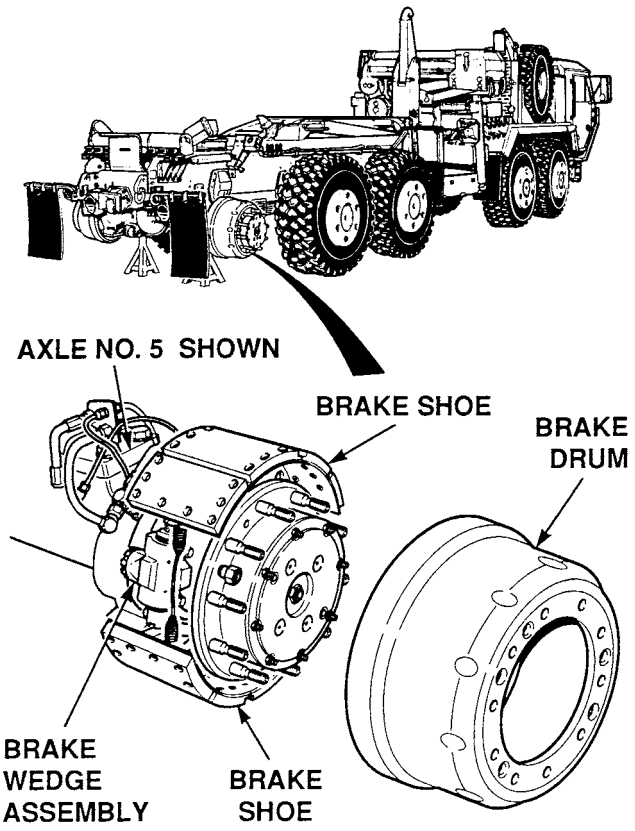
OPERATION TEST

(1) Listen to air chamber and observe brake shoe movement while assistant releases and applies PARKING BRAKE (TM 9-2320-364-10).
  (a) If assistant cannot hear air chamber operate, or brake shoe does not move when parking brake control is pushed and pulled, perform Step (2) below and replace air chamber (Para 12-10).
  (b) If air chamber operates correctly, air chamber is OK.
(2) Release PARKING BRAKE.

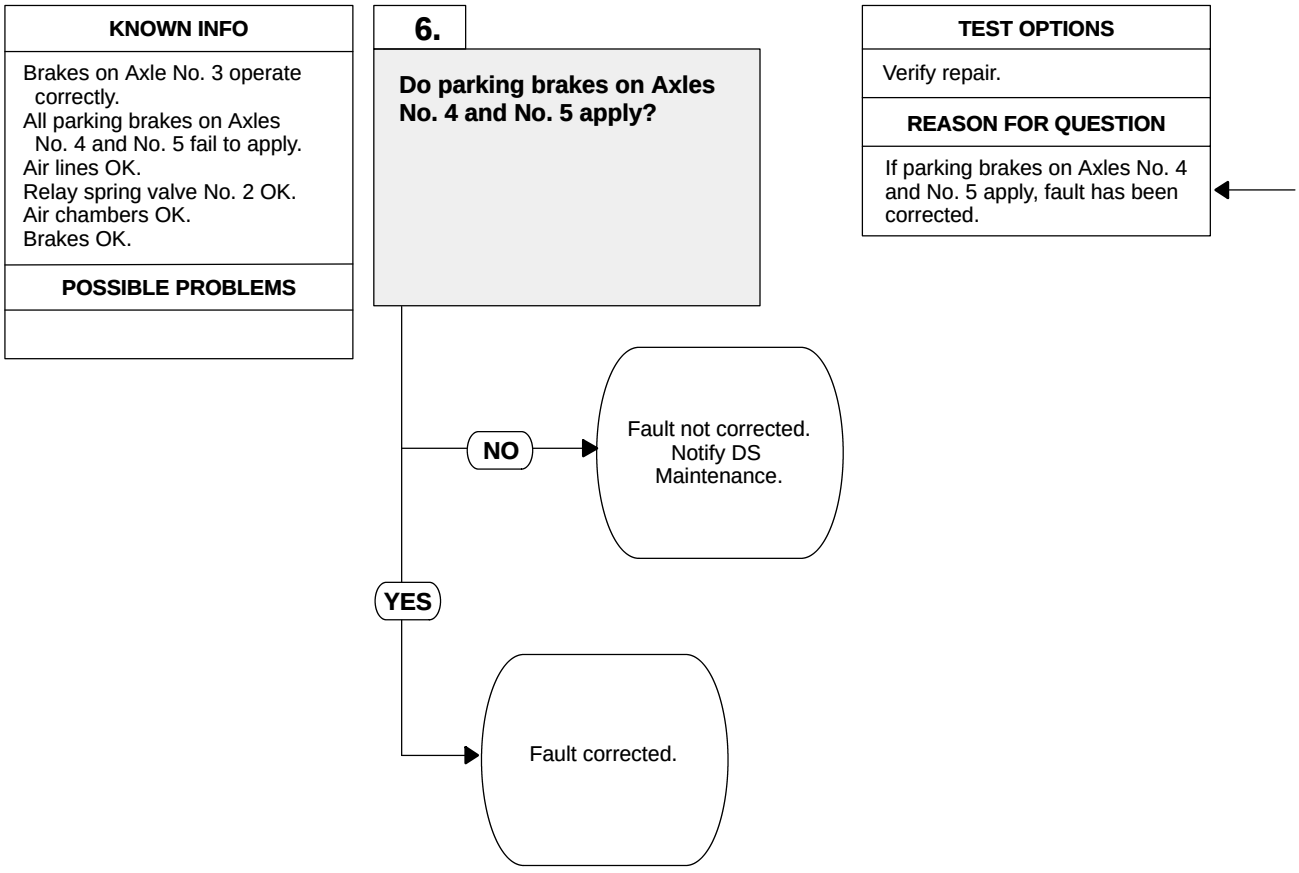


VISUAL INSPECTION

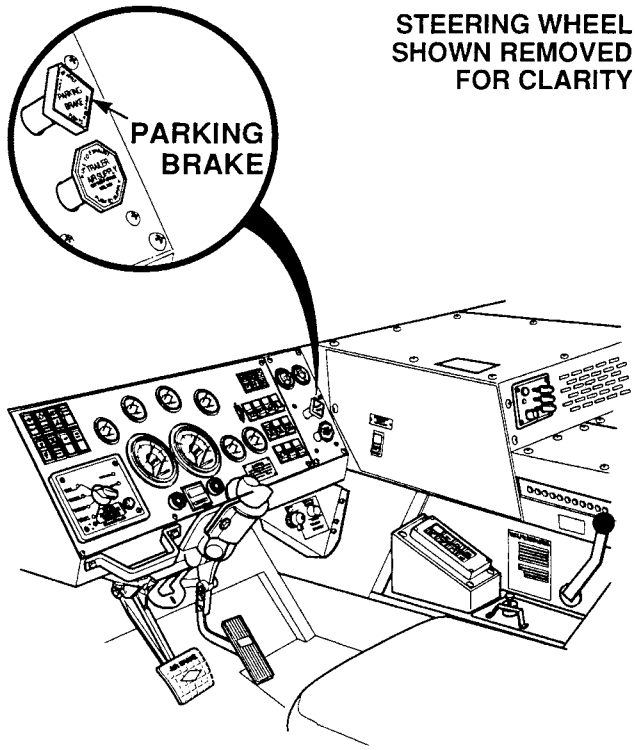
(1) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is no gap, adjust brakes (Para 12-3).
  (b) If there is a gap, perform Steps (2) through (5) below.
(2) Cage air chamber (Para 12-10).
(3) Remove brake drum and air chamber (Para 13-3 and 12-10).
(4) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoes and/or wedges (Para 12-2).
  (b) If brake shoes and wedges are OK, go to Step 6 of this Fault.
(5) Install brake drums and air chamber (Para 13-3 and 12-10).



6. PARKING BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).



VERIFY REPAIR
Release and apply PARKING BRAKE (TM 9-2320-364-10). (1) If parking brakes on Axles No. 4 and No. 5 do not apply, fault not corrected. Notify DS Maintenance. (2) If parking brakes on Axles No. 4 and No. 5 do apply, fault has been corrected.



STEERING WHEEL
SHOWN REMOVED
FOR CLARITY

2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

7. TRAILER SERVICE BRAKES DO NOT APPLY WHEN HAND CONTROL VALVE IS OPERATED.

INITIAL SETUP

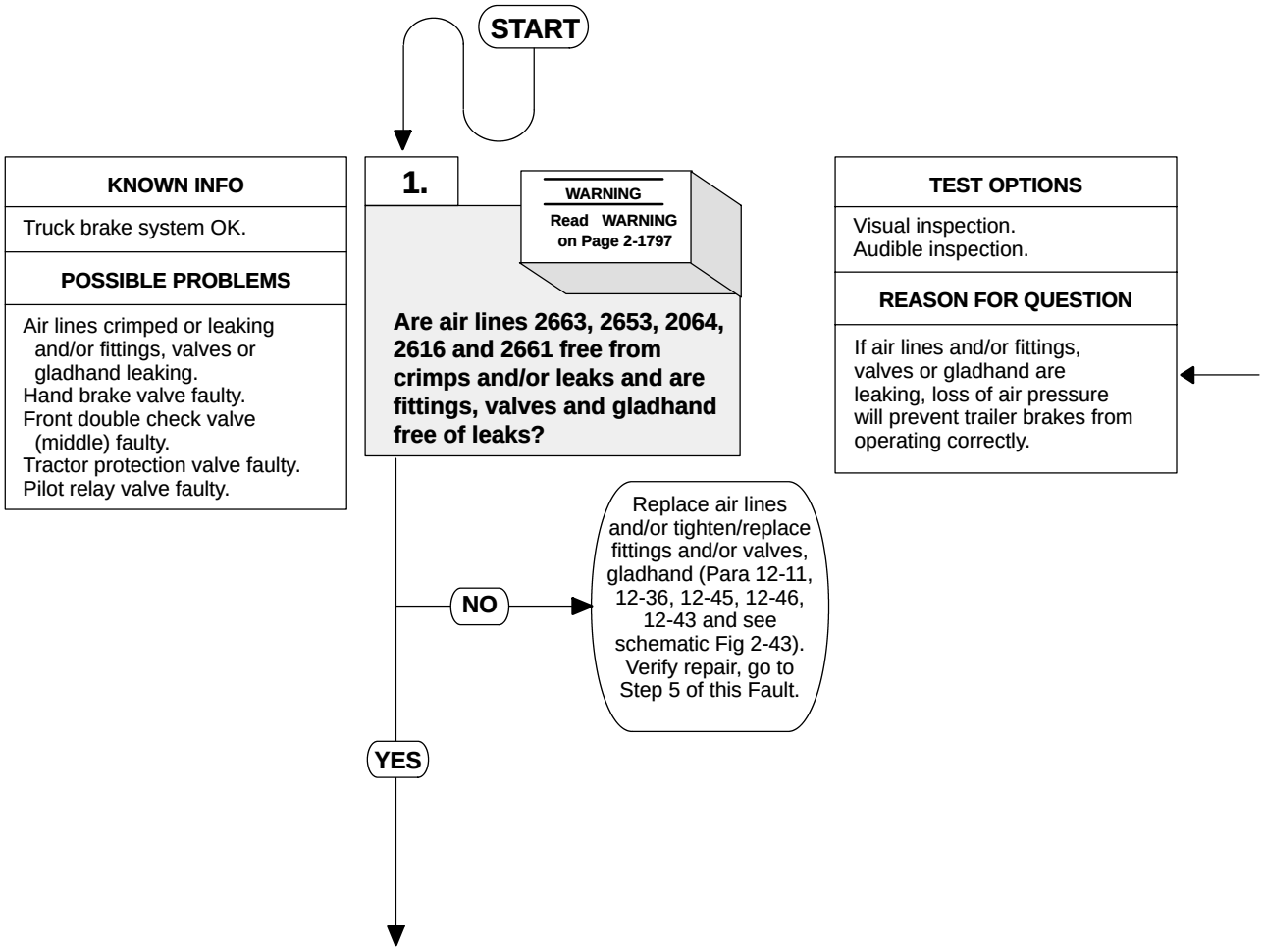
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

Materials/Parts
Locknuts (6) (Item 110, Appendix F)

Personnel Required
Two

References
TM 9-2320-364-10
TM 9-2320-385-14

Equipment Condition
Engine OFF, (TM 9-232-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

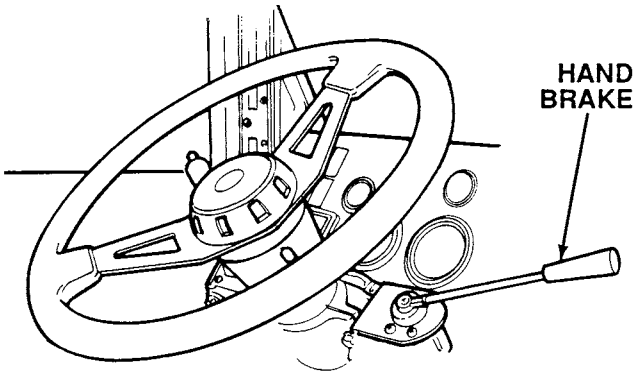


WARNING

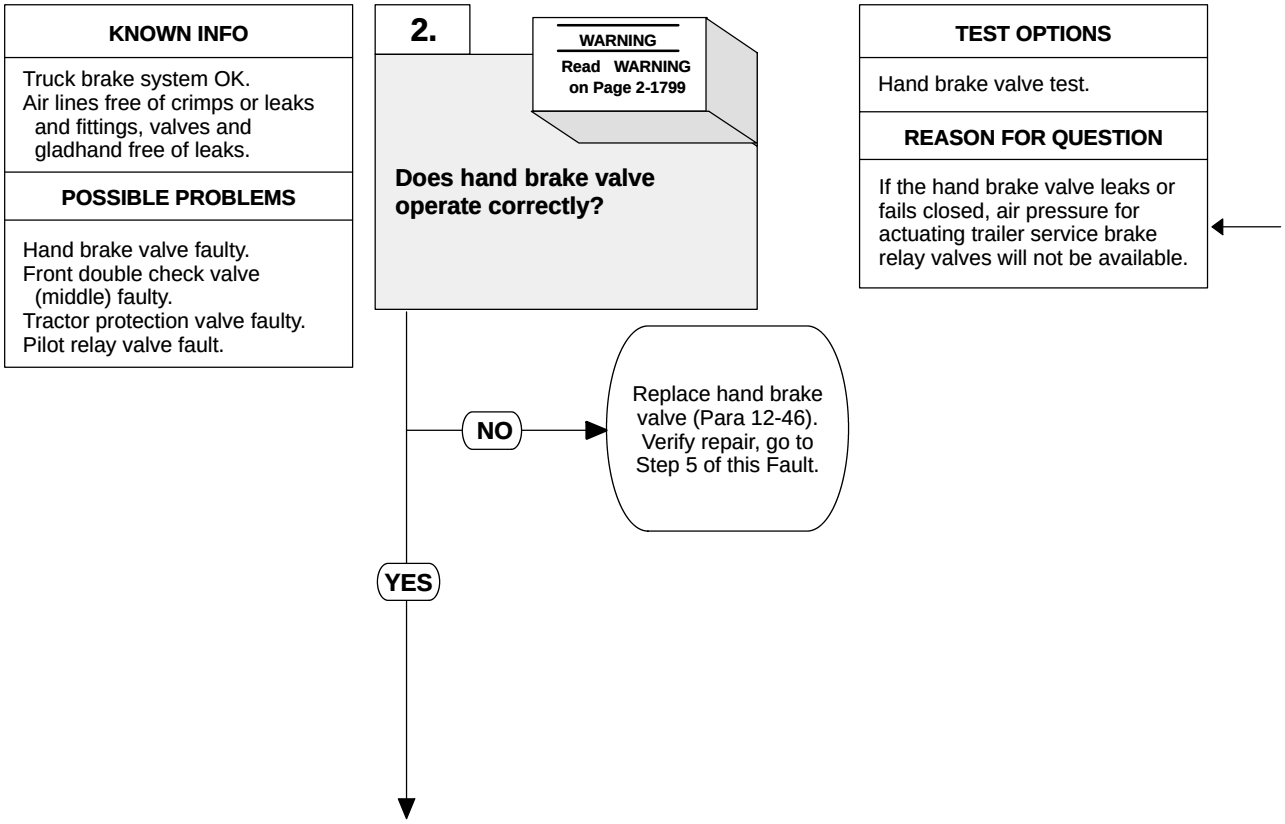
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high presssure air.

VISUAL/AUDIBLE INSPECTION

(1) Start engine and build air pressure to 125 ±4 psi (861 ± 28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Check air lines 2663, 2653, 2064, 2616 and 2661 for crimps (see schematic Fig 2-43).
  (a) If there are crimps in air lines, replace air lines (Para 12-36).
  (b) If there are no crimps in air lines, perform Steps (4) and (5) below.
(4) Apply hand brake.
(5) Check fittings and air lines 2663, 2653, 2064, 2616 and 2661 for leaks.
  (a) If there are leaks at fittings, perform Step (11) below and tighten/replace fittings (Para 12-36).
  (b) If there are leaks in air lines, perform Step (11) below and replace air lines (Para 12-36).
  (c) If there are no leaks, air lines and fittings are OK. Perform Step (6) below.
(6) Check hand brake valve for leaks.
  (a) If hand brake valve leaks, perform Step (11) below and replace hand brake valve (Para 12-46).
  (b) If there are no leaks, perform Step (7) below.
(7) Check front double check valve (middle) for leaks.
  (a) If front double check valve (middle) leaks, perform Step (11) below and replace valve (Para 12-11).
  (b) If there are no leaks, perform Step (8) below.
(8) Check tractor protection valve for leaks.
  (a) If tractor protection valve leaks, perform Step (11) below and replace valve (Para 12-45).
  (b) If there are no leaks, perform Step (9) below.
(9) Check pilot relay valve for leaks.
  (a) If pilot relay valve leaks, perform Step (11) below and replace valve (Para 12-11.1)
  (b) If there are no leaks, perform Step (10) below.
(10) Check service gladhand for leaks.
  (a) If service gladhand leaks, perform Step (11) below and replace service gladhand (Para 12-43).
  (b) If there are no leaks, perform Step (11) below.
(11) Release hand brake.



7. TRAILER SERVICE BRAKES DO NOT APPLY WHEN HAND BRAKE VALVE IS OPERATED (CONT).

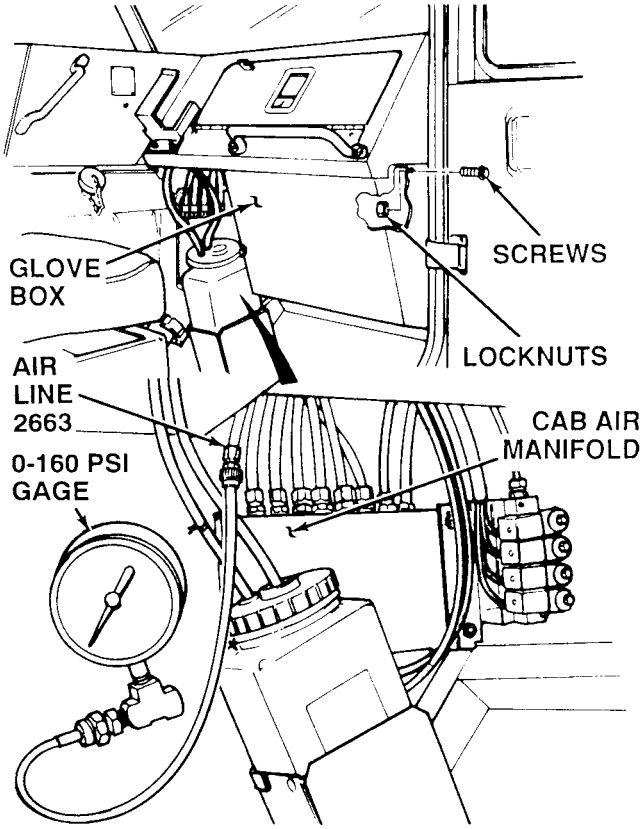


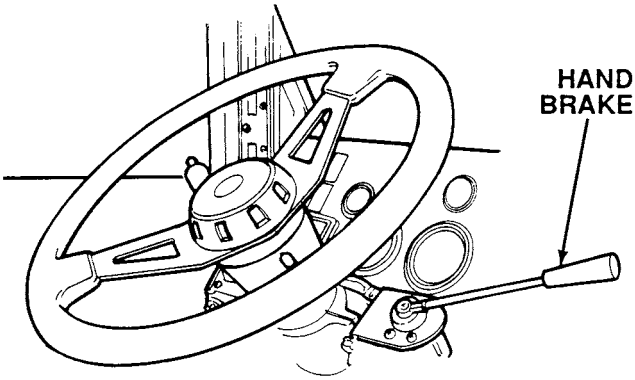
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

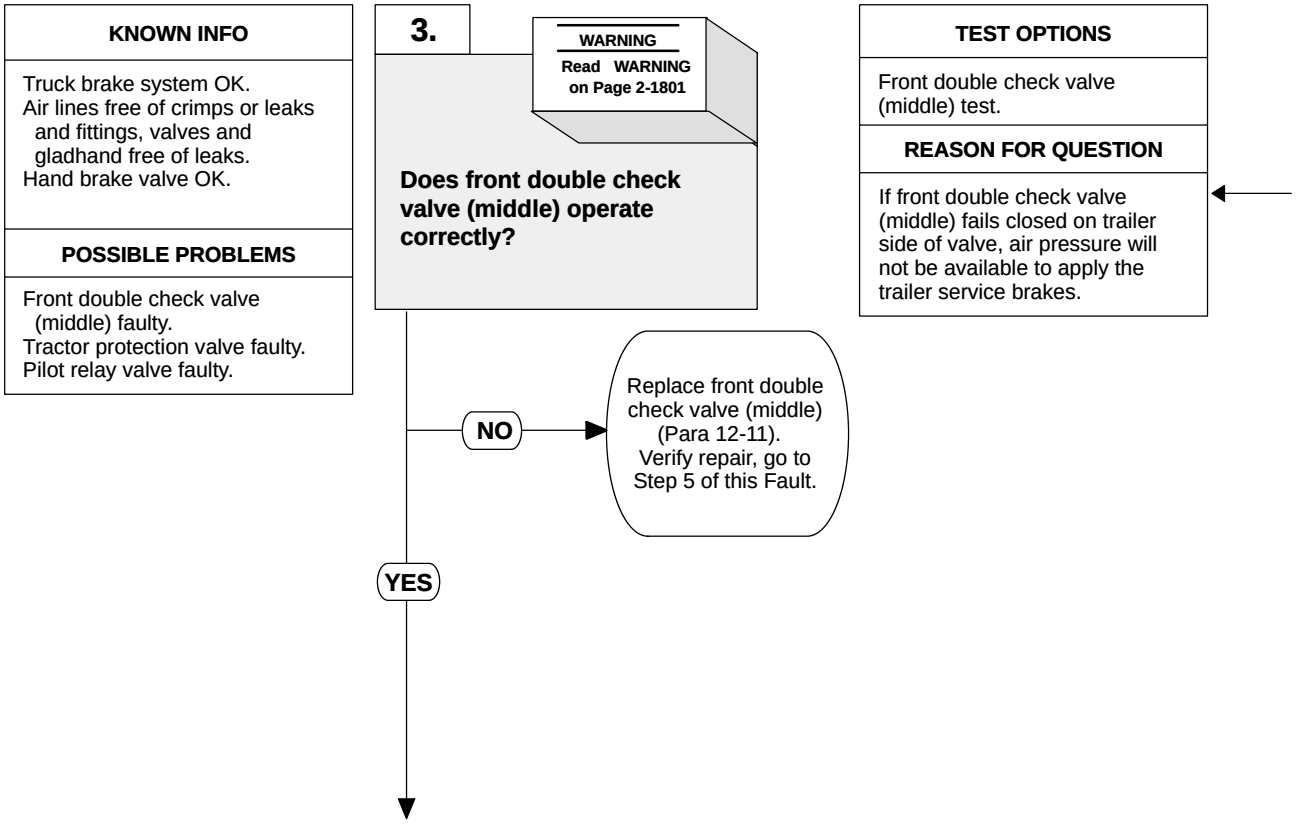
HAND BRAKE VALVE TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Remove six screws, locknuts and glove box. Discard locknuts.
(4) Disconnect air line 2663 from CAB air manifold.
(5) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2663.
(6) Apply hand brake (TM 9-2320-364-10).
    (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2663, perform Steps (7) and (8) below and replace hand brake valve (Para 12-46).
    (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2663, hand brake valve is OK.
(7) Release hand brake.
(8) Remove gage and connect air line 2663 to CAB air manifold.
(9) Install glove box, six screws and locknuts.





7. TRAILER SERVICE BRAKES DO NOT APPLY WHEN HAND BRAKE VALVE IS OPERATED (CONT).



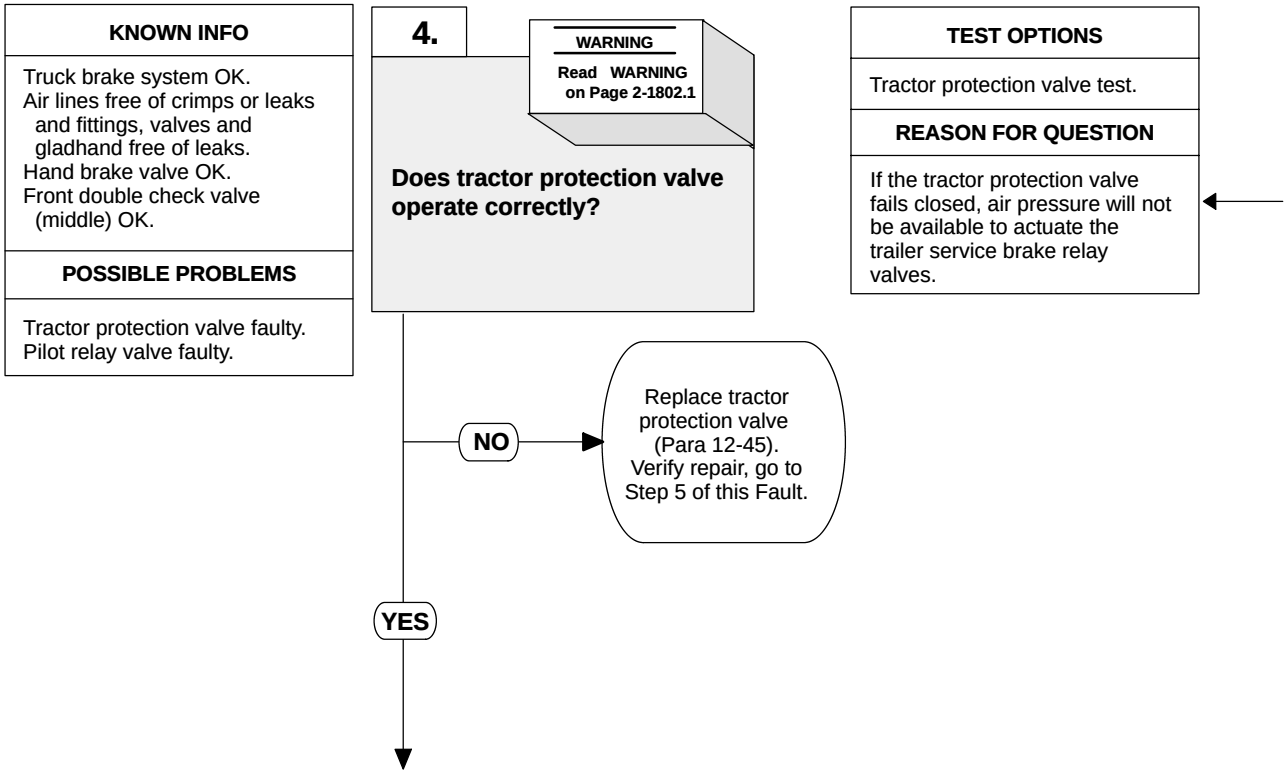
WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

FRONT DOUBLE CHECK VALVE (MIDDLE) TEST

(1) Disconnect air line 2661 from front double check valve (middle).
(2) Connect 0-160 psi (0-1103 kPa) gage to valve.
(3) Push TRAILER AIR SUPPLY control (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at front double check valve (middle), perform Steps (6) and (7) below and replace valve (Para 12-11).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at front double check valve (middle), perform Steps (4) and (5) below.
(4) Pull TRAILER AIR SUPPLY control.
(5) Have assistant apply hand brake.
  (a) If there are not 125 ±4 psi (861 ± 28 kPa) present at front double check valve (middle), perform Step (6) below and replace valve (Para 12-11).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at front double check valve (middle), valve is OK. Perform Steps (6) and (7) below.
(6) Release hand brake.
(7) Remove gage and connect air line 2661 to front double check valve (middle).

7. TRAILER SERVICE BRAKES DO NOT APPLY WHEN HAND BRAKE VALVE IS OPERATED (CONT).

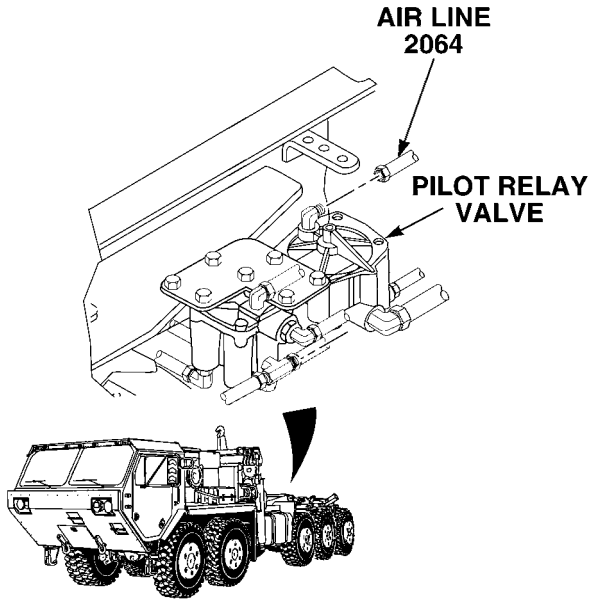


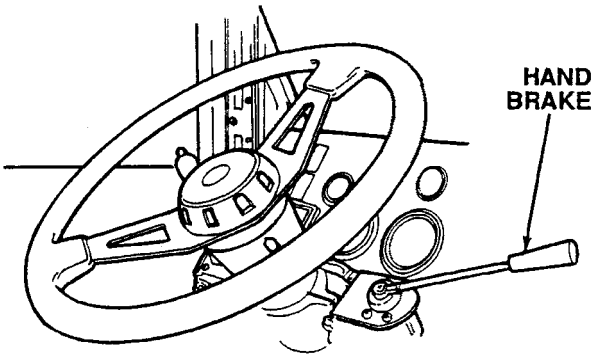
WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

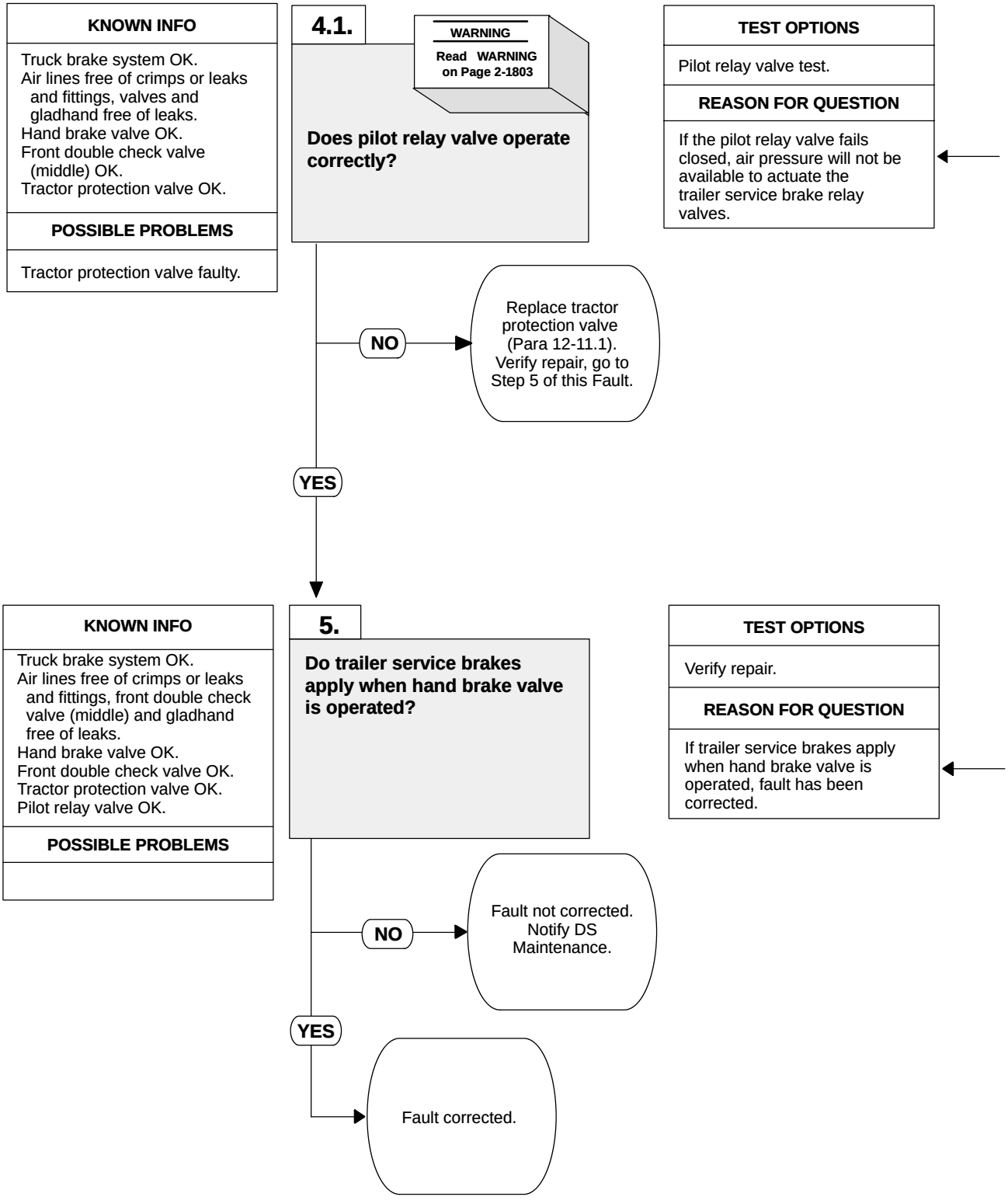
TRACTOR PROTECTION VALVE TEST

(1) Disconnect air line 2064 from pilot relay valve
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2064.
(3) Release PARKING BRAKE (TM 9-2320-364-10).
(4) Push TRAILER AIR SUPPLY control.
(5) Apply hand brake.
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2653, perform Steps (6), (7) and (8) below and replace tractor protection valve (Para 12-45).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2653, tractor protection valve is OK. Perform Steps (6), (7) and (8) below
(6) Release hand brake.
(7) Remove gage from air line 2064.
(8) Install air line 2064 on pilot relay valve.





7. TRAILER SERVICE BRAKES DO NOT APPLY WHEN HAND BRAKE VALVE IS OPERATED (CONT).



WARNING

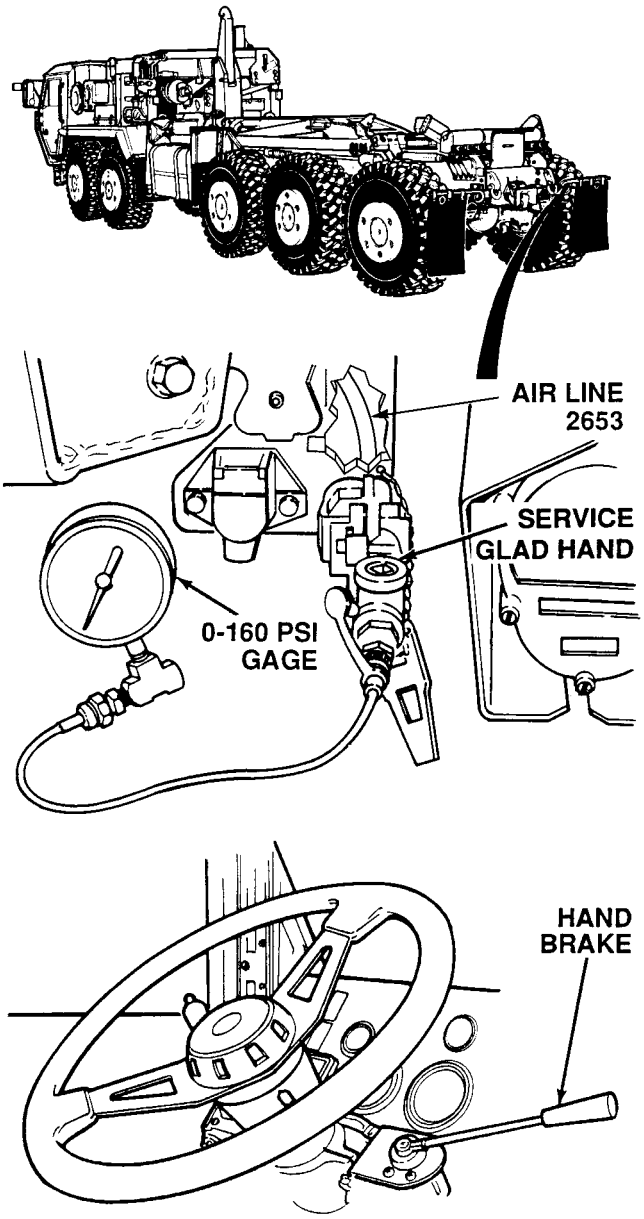
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

TRACTOR PROTECTION VALVE TEST

(1) Disconnect air line 2653 from gladhand fitting.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2653.
(3) Release PARKING BRAKE (TM 9-2320-364-10).
(4) Push TRAILER AIR SUPPLY control.
(5) Apply hand brake.
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2653, perform Steps (6), (7) and (8) below and replace pilot relay valve (Para12-11.1).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2653, refer to trailer troubleshooting (TM 9-2330-385-14).
(6) Release hand brake.
(7) Remove gage from air line 2653.
(8) Install air line 2653 on gladhand fitting.

VERIFY REPAIR

Operate hand brake (TM 9-2320-364-10).
(1) If trailer service brakes do not apply, fault not corrected. Notify DS Maintenance.
(2) If trailer service brakes do apply, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

8. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT APPLY.

INITIAL SETUP

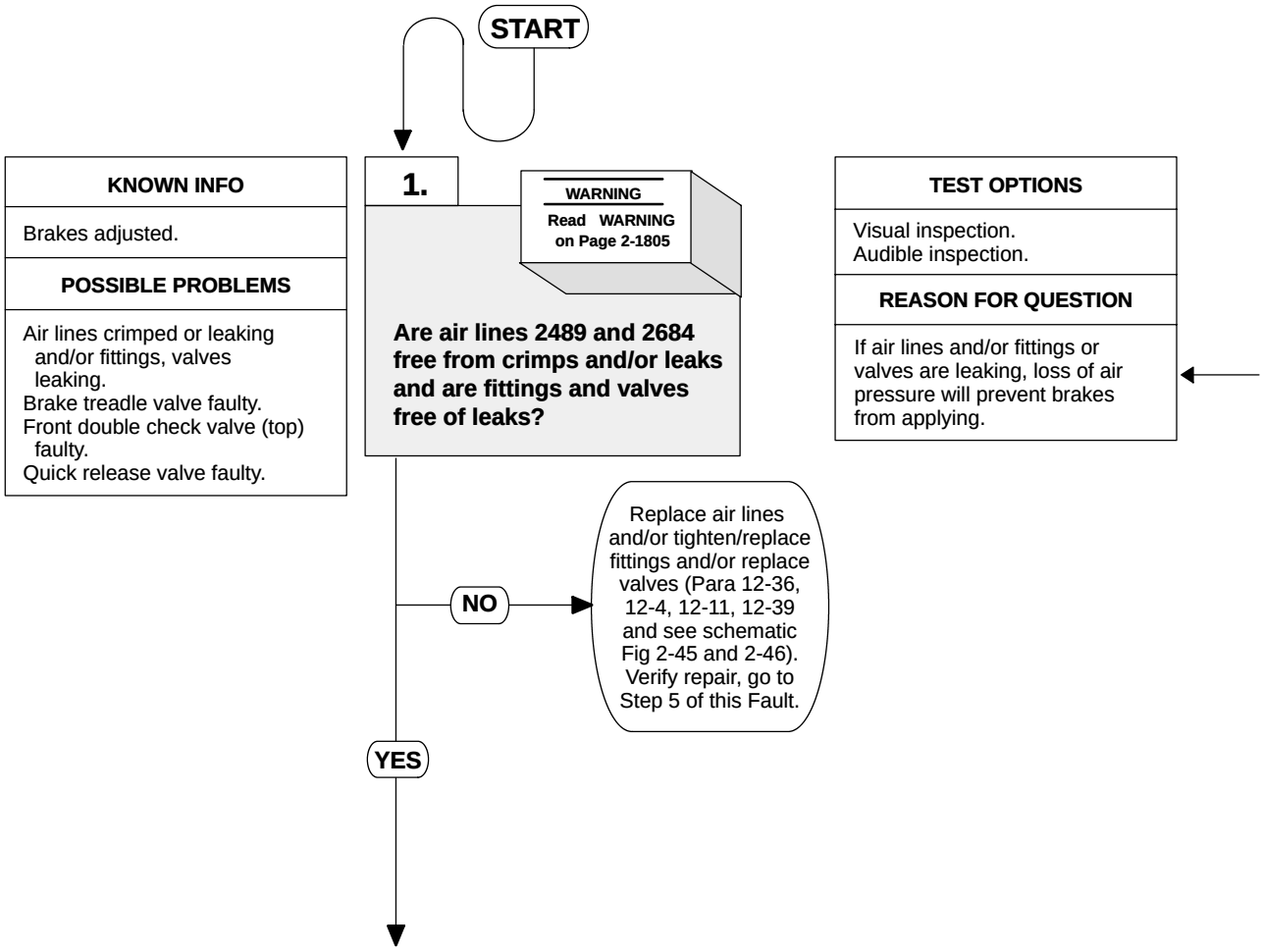
Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

Materials/Parts
Locknuts (6) (Item 110, Appendix F)

Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

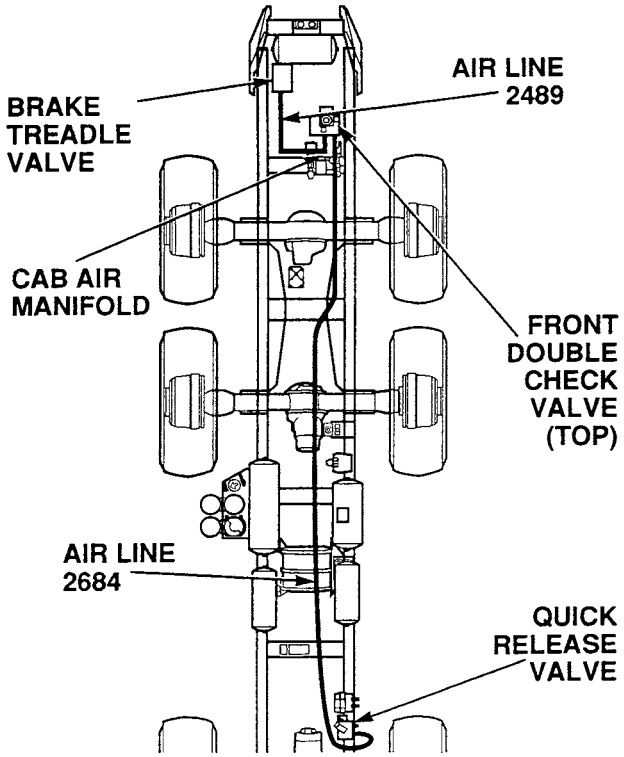


WARNING

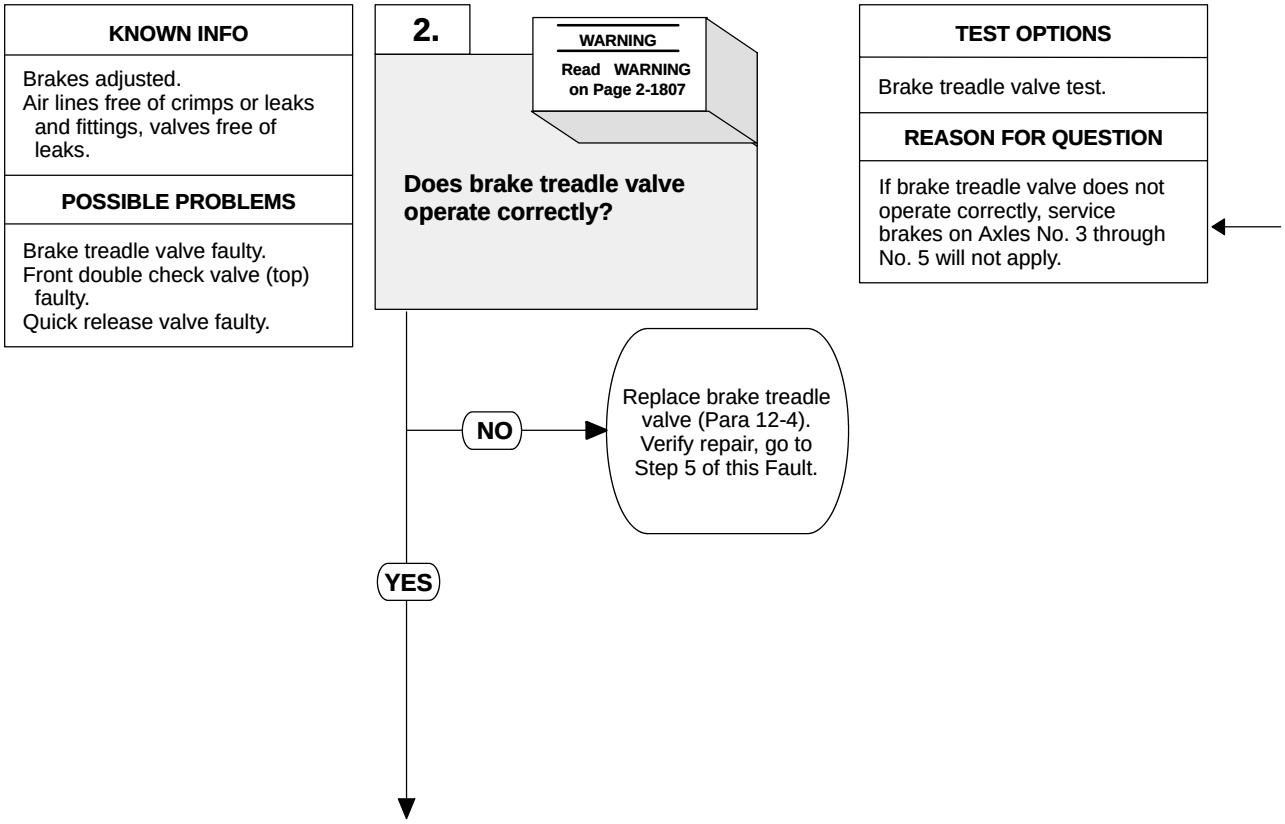
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

VISUAL/AUDIBLE INSPECTION

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Check air lines 2489 and 2684 for crimps (see schematic Fig 2-45).
  (a) If there are crimps in air lines, replace air lines (Para 12-36).
  (b) If there are no crimps in air lines, perform Steps (4) and (5) below.
(4) Have assistant apply service brakes.
(5) Check fittings and air lines 2489 and 2684 for leaks (see schematic Fig 2-45).
  (a) If fittings or air lines are leaking, perform Step (9) below and tighten/replace fittings and/or replace air lines (Para 12-36).
  (b) If there are no leaks, air lines and fittings are OK. Perform Step (6) below.
(6) Check brake treadle valve for leaks (see schematic Fig 2-45 and 2-46).
  (a) If brake treadle valve leaks, perform Step (9) below and replace valve (Para 12-4).
  (b) If there are no leaks, perform Step (7) below.
(7) Check front double check valve (top) for leaks (see schematic Fig 2-45).
  (a) If front double check valve (top) leaks, perform Step (9) below and replace valve (Para 12-11).
  (b) If there are no leaks, perform Step (8) below.
(8) Check quick release valve for leaks (see schematic Fig 2-45 and 2-46).
  (a) If quick release valve leaks, perform Step (9) below and replace valve (Para 12-39).
  (b) If there are no leaks, perform Step (9) below.
(9) Release service brakes.



8. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT APPLY (CONT).

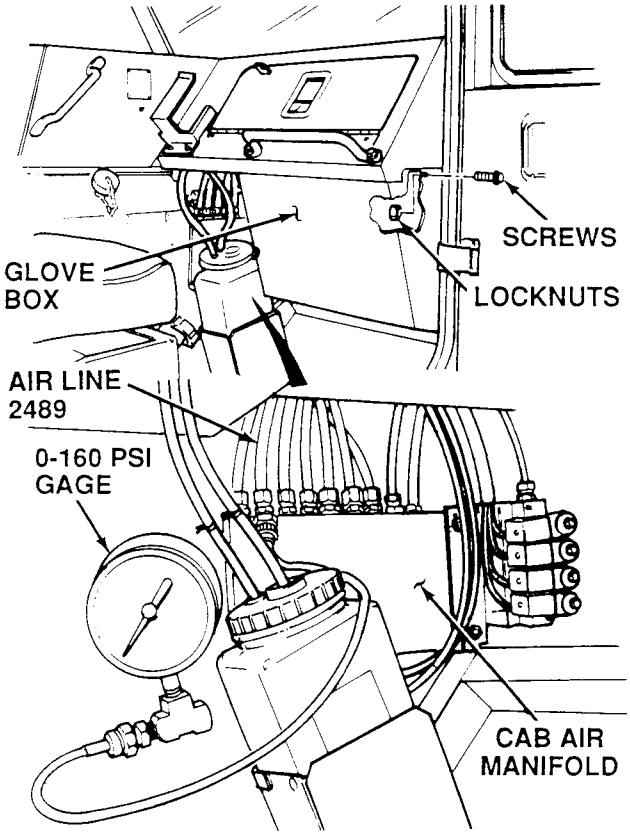


WARNING

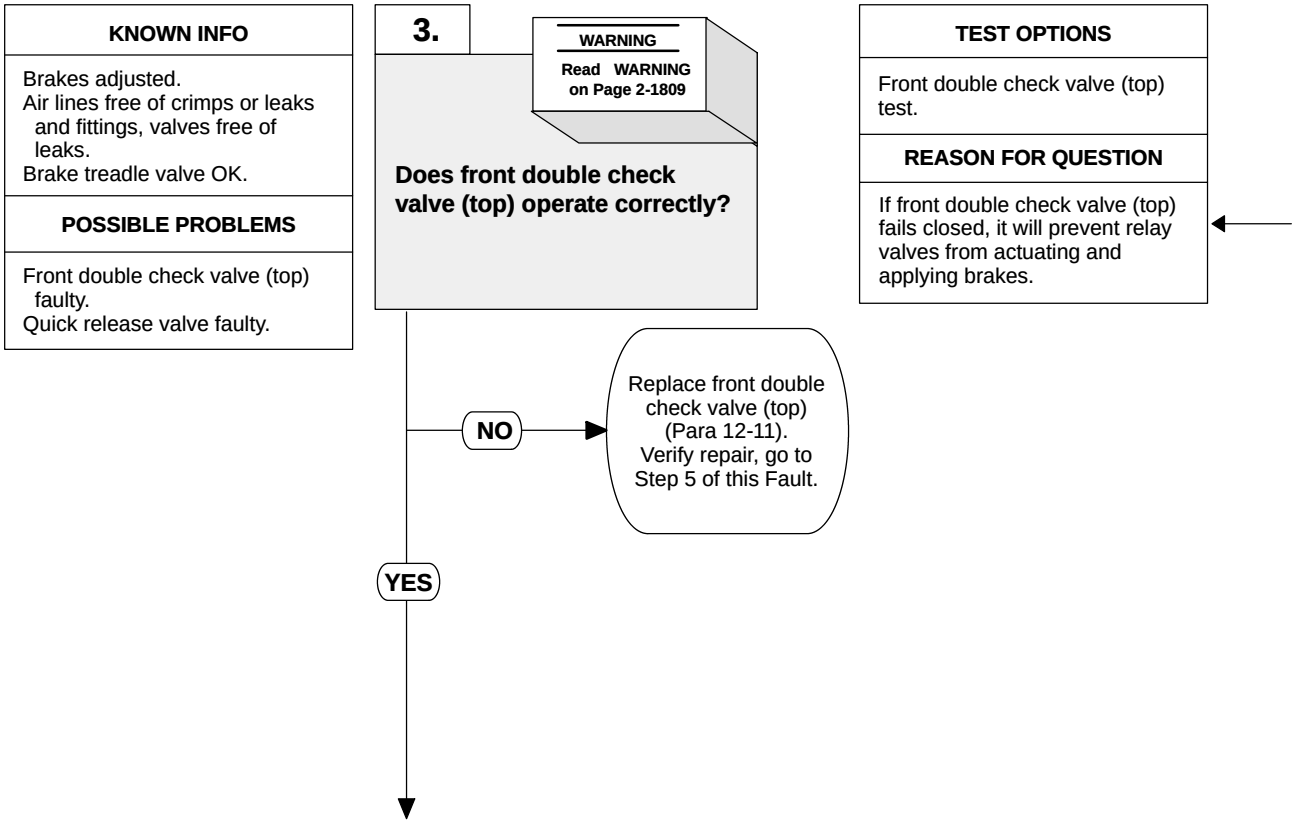
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

BRAKE TREADLE VALVE TEST

(1) Remove six screws, locknuts and glove box. Discard locknuts.
(2) Disconnect air line 2489 from cab air manifold.
(3) Connect 0 to 160 psi (0 to 1103 kPa) gage to air line 2489.
(4) Apply service brakes (TM 9-2320-364-10).
    (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2489, perform Steps (5) and (6) below and replace brake treadle valve (Para 12-4).
    (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2489, brake treadle valve is OK.
(5) Release service brakes.
(6) Remove gage and connect air line 2489 to cab air manifold.
(7) Install glove box, six screws and locknuts.



8. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT APPLY (CONT).

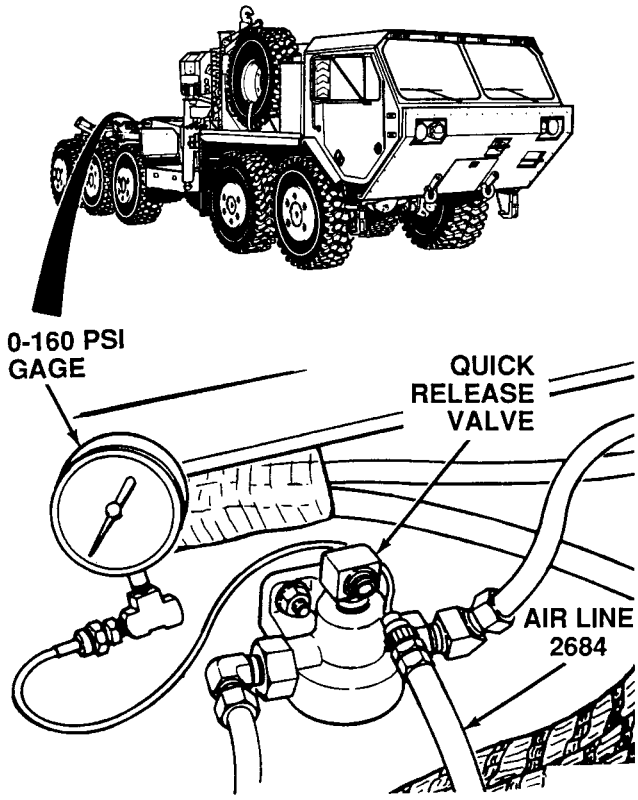


WARNING

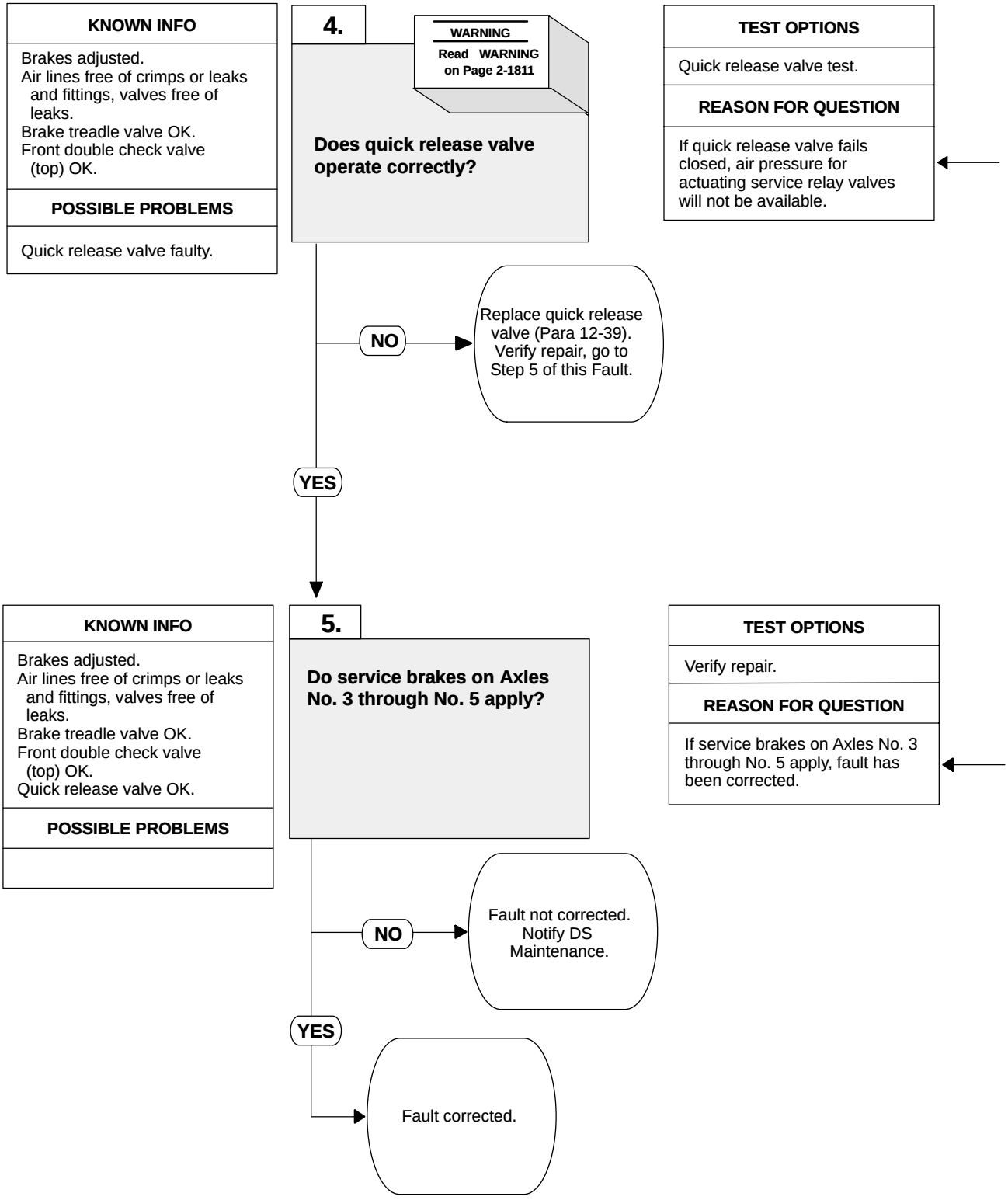
If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

FRONT DOUBLE CHECK VALVE (TOP) TEST

(1) Disconnect air line 2684 from quick release valve.
(2) Connect 0 to 160 psi (0 to 1103 kPa) gage to air line 2684.
(3) Have assistant apply service brakes (TM 9-2320-364-10).
   (a) If there are not 125 ±4 psi (861 ±28 kPa) at air hose 2684, perform Steps (4) and (5) below and replace front double check valve (top) (Para 12-11).
   (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2684, valve is OK.
(4) Release service brakes.
(5) Remove gage and connect air line 2684 to quick release valve.



8. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT APPLY (CONT).

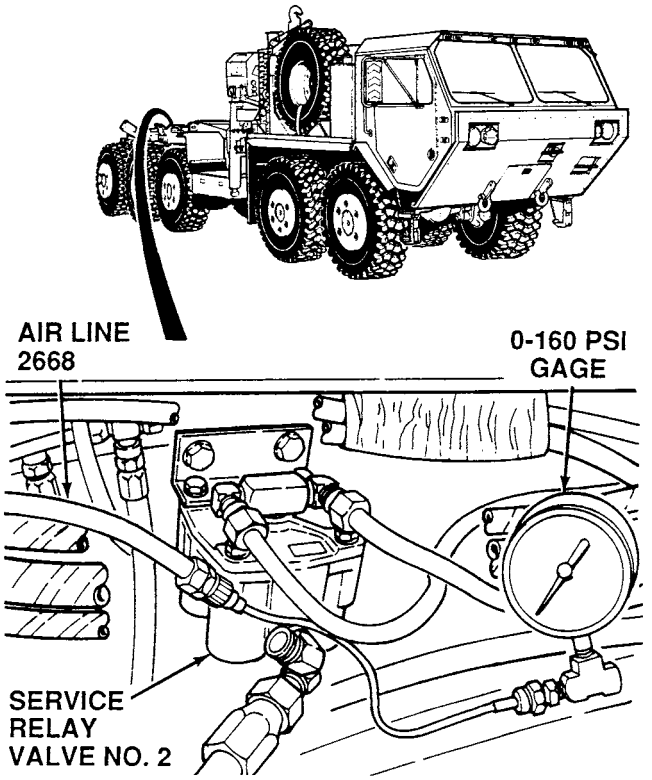


WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

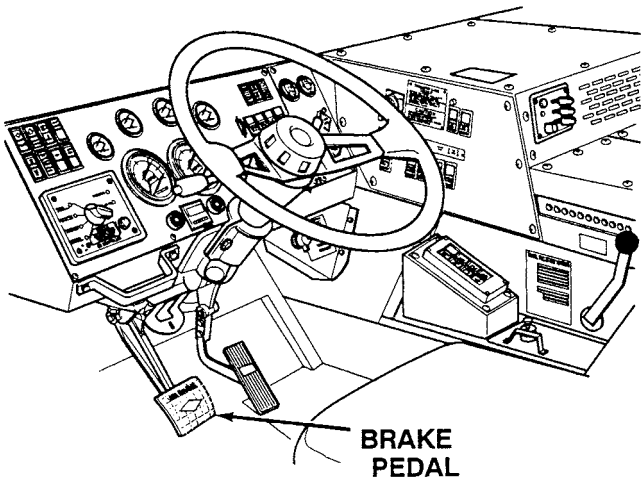
QUICK RELEASE VALVE TEST

(1) Disconnect air line 2668 from service relay valve No. 2.
(2) Connect 0 to 160 psi (0 to 1103 kPa) gage to air line 2668.
(3) Apply service brakes while observing pressure gage (TM 9-2320-364-10).
    (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2668, perform Steps (4) and (5) below and replace quick release valve (Para 12-39).
    (b) If there are 125 ±4 psi (861 ±28 kPa) at air line 2668, quick release valve is OK.
(4) Release service brakes.
(5) Remove gage and connect air line 2668 to service relay valve No. 2.



VERIFY REPAIR

Apply brake pedal (TM 9-2320-364-10).
(1) If service brakes on Axles No. 3 through No. 5 do not apply, fault not corrected. Release brake pedal and notify DS Maintenance.
(2) If service brakes on Axles No. 3 through No. 5 do apply, fault has been corrected. Release brake pedal.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

9. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE.

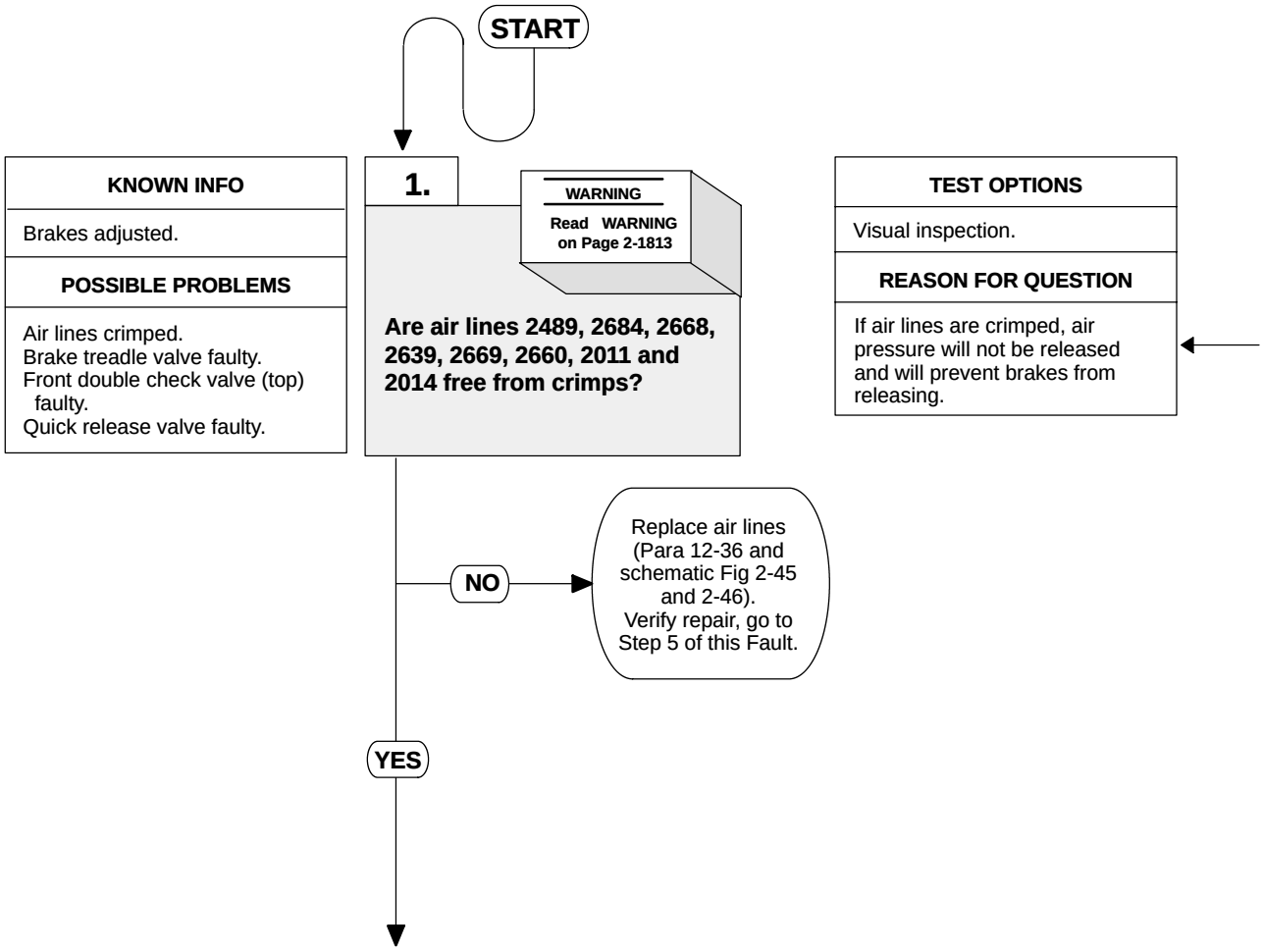
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

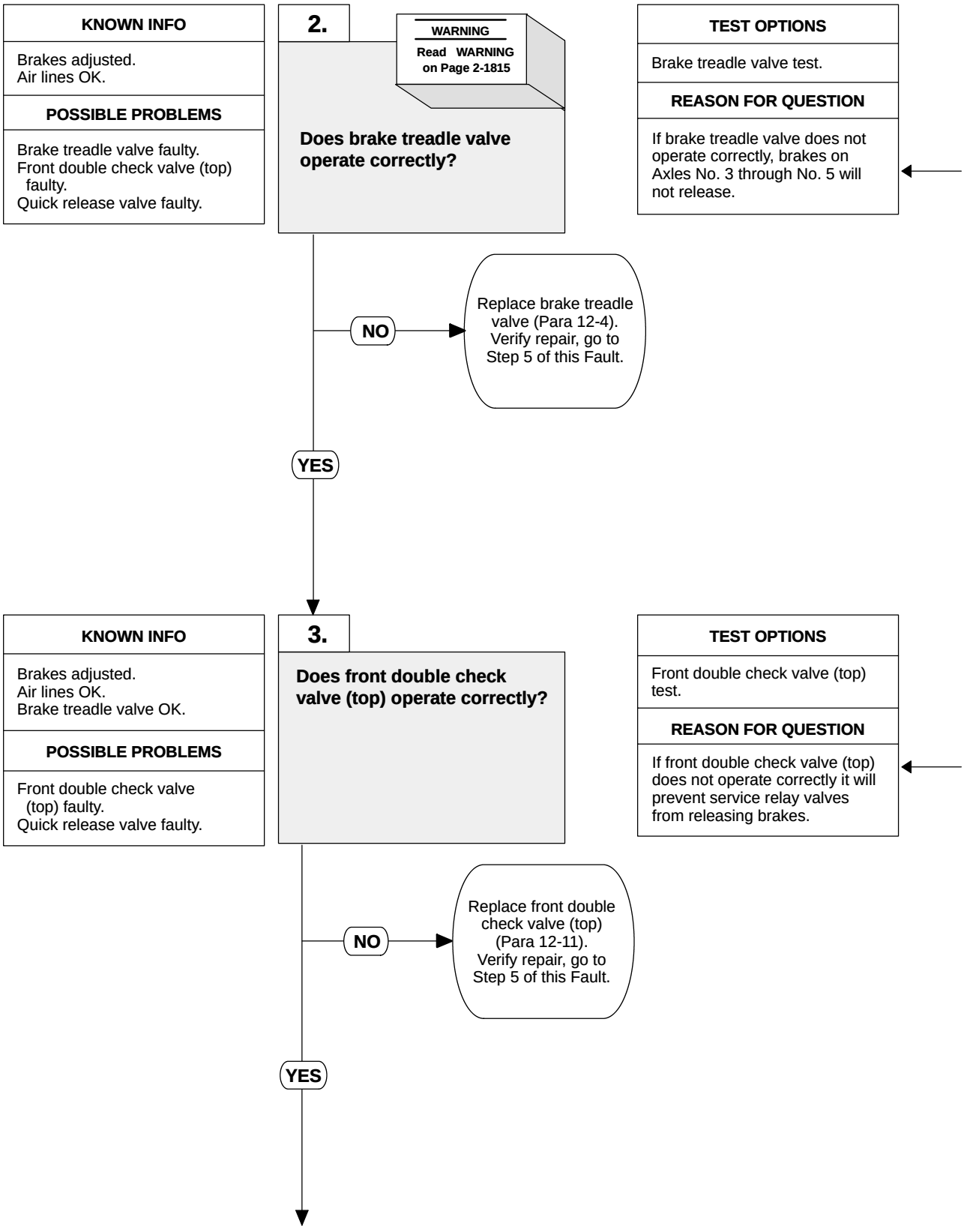
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL INSPECTION

Check air lines 2489, 2684, 2668, 2639, 2669, 2660, 2011 and 2014 for crimping (see schematic Fig 2-45 and 2-46).

(1) If there are crimps in air lines, replace air lines (Para 12-36).
(2) If there are no crimps in air lines, air lines are OK.

9. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE (CONT).

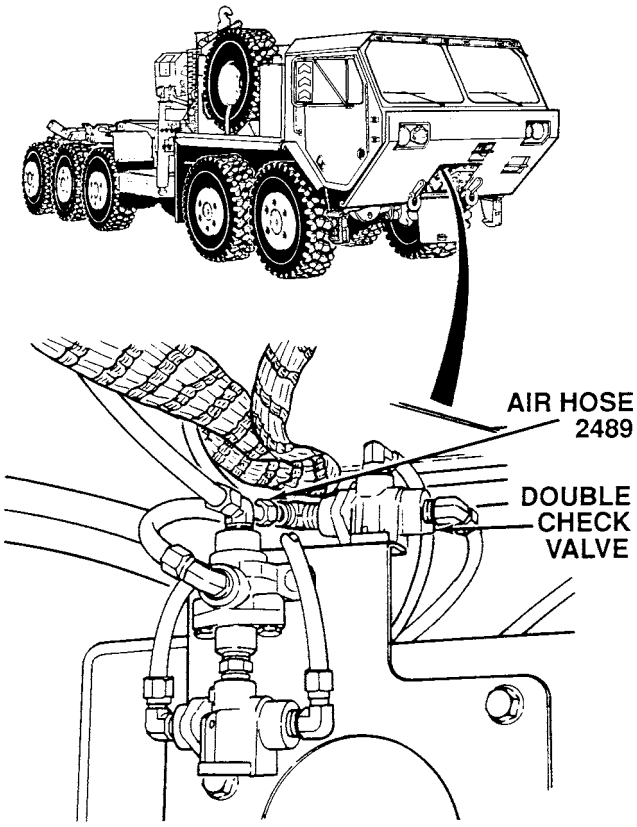


WARNING

- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

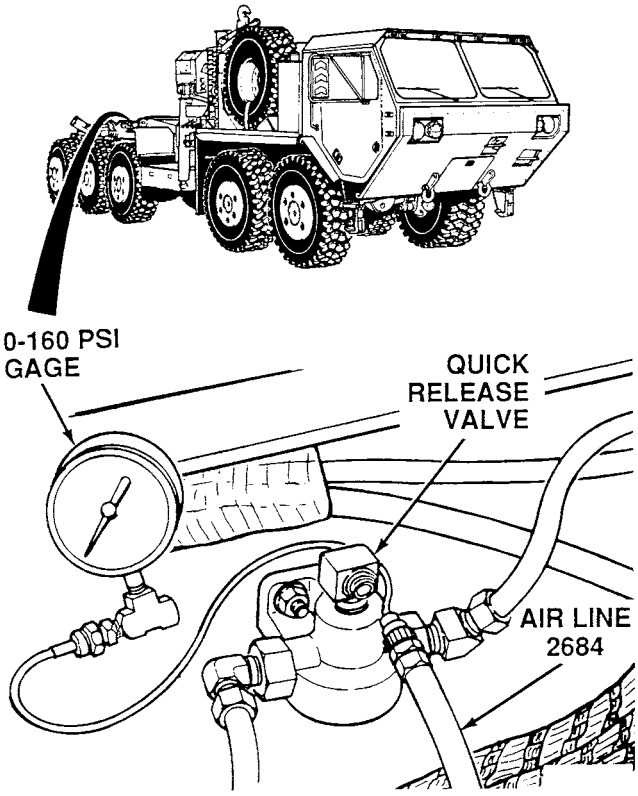
BRAKE TREADLE VALVE TEST

(1) Start engine and build air pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Release PARKING BRAKE.
(4) Fully apply then release service brakes.
(5) Disconnect air line 2489 from front double check valve (top).
  (a) If air escapes from air line 2489, perform Step (6) below and replace brake treadle valve (Para 12-4).
  (b) If air does not escape from air line 2489, brake treadle valve is OK.
(6) Connect air line 2489 to front double check valve (top).

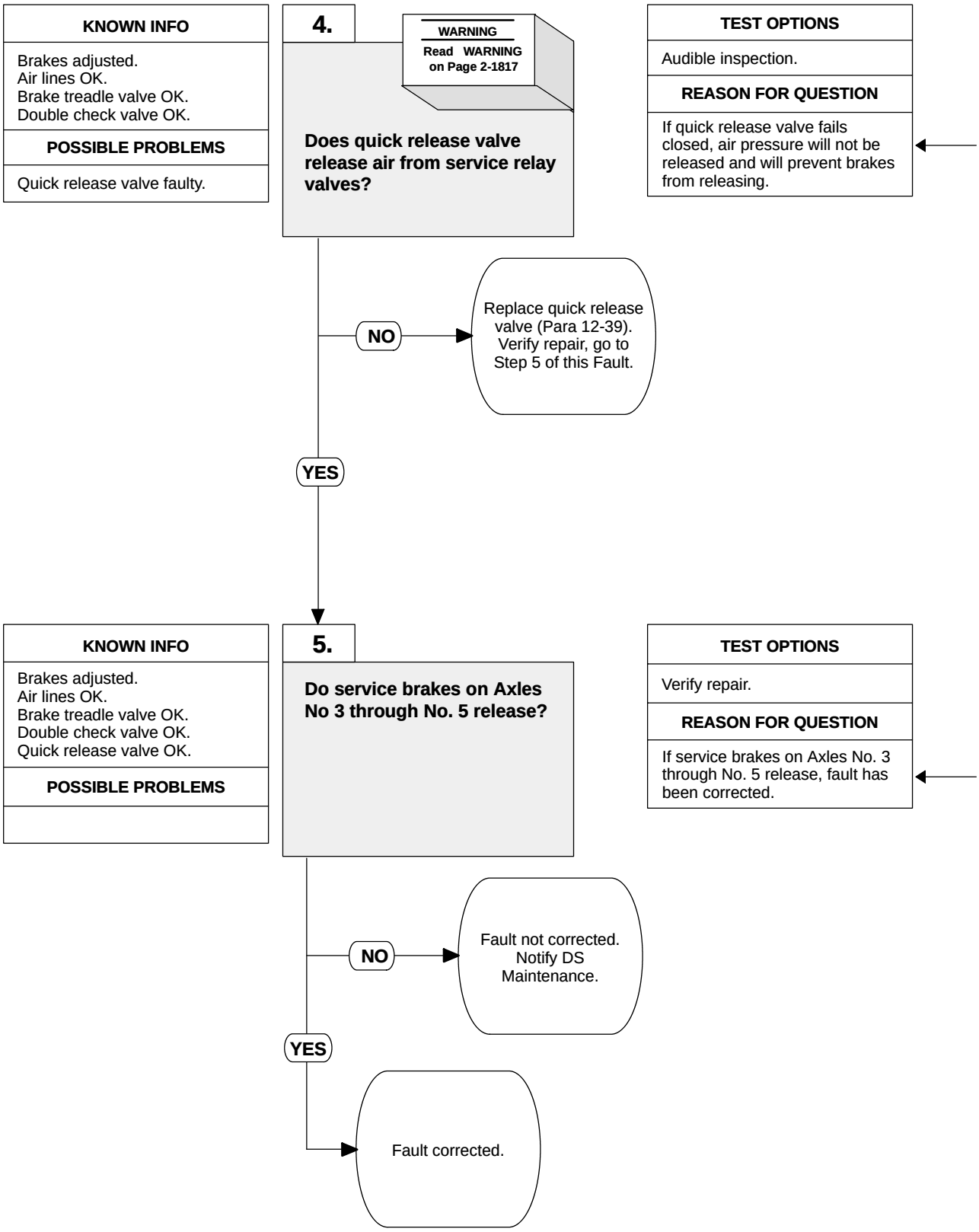


FRONT DOUBLE CHECK VALVE (TOP) TEST

(1) Disconnect air line 2684 from quick release valve.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2684.
(3) Observe pressure gage while assistant applies then releases service brakes (TM 9-2320-364-10).
  (a) If air pressure is not released from 125 ±4 psi (861 ±28 kPa) to 0 psi quickly, perform Step (4) below and replace front double check valve (top) (Para 12-11).
  (b) If air pressure is released quickly, valve is OK.
(4) Remove gage and connect air line 2684 to quick release valve.



9. SERVICE BRAKES ON AXLES NO. 3 THROUGH NO. 5 DO NOT RELEASE (CONT).



WARNING

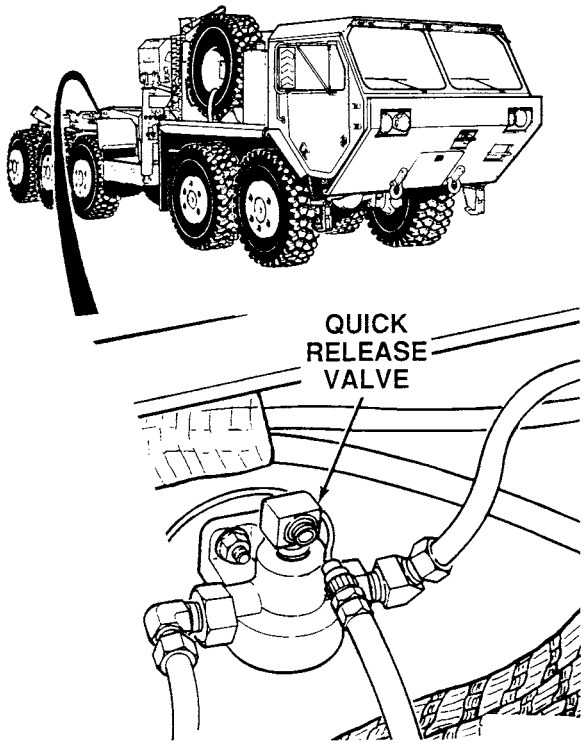
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

AUDIBLE INSPECTION

Listen for air pressure releasing from quick release valve while assistant fully applies and releases service brakes (TM 9-2320-364-10).

(1) If air pressure is not released from quick release valve, replace quick release valve (Para 12-39).

(2) If air pressure is released from quick release valve, quick release valve is OK.

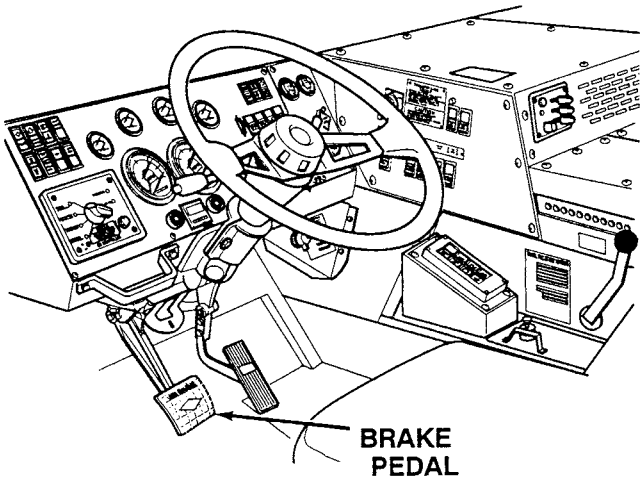


VERIFY REPAIR

Apply and release brake pedal (TM 9-2320-364-10).

(1) If service brakes on Axles No. 3 through No. 5 do not release, fault not corrected. Notify DS Maintenance.

(2) If service brakes on Axles No. 3 through No. 5 do release, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

10. SERVICE BRAKES ON AXLE NO. 3 DO NOT APPLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

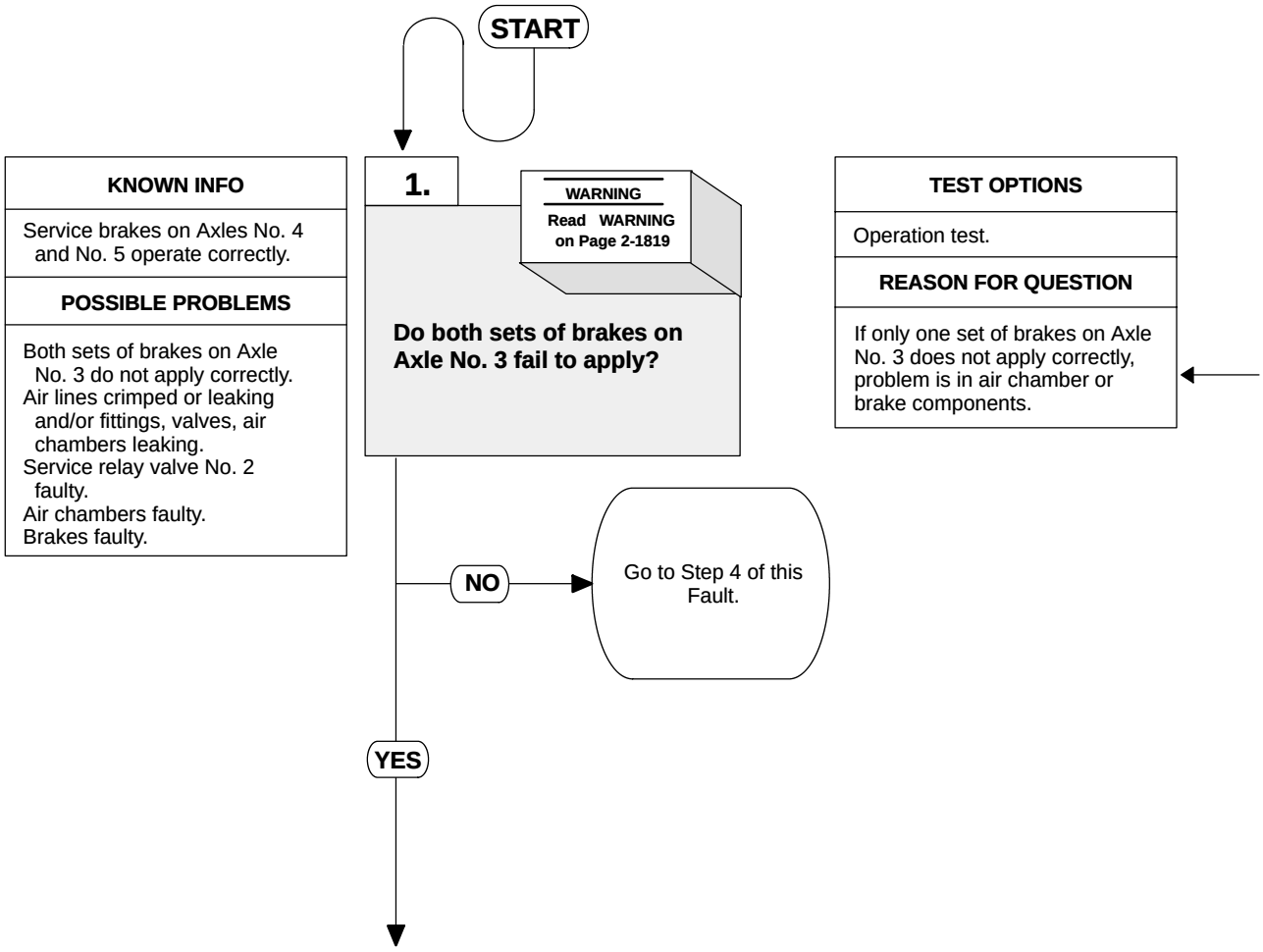
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

The following troubleshooting procedures cover one set of brakes for Axle No. 3, but they apply to both sets of brakes.

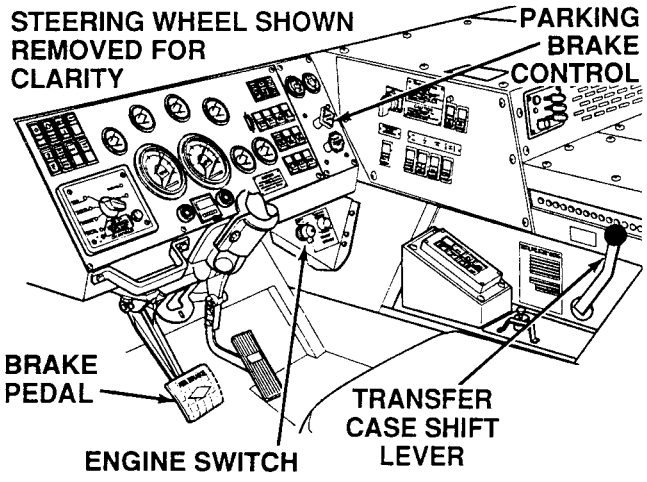


WARNING

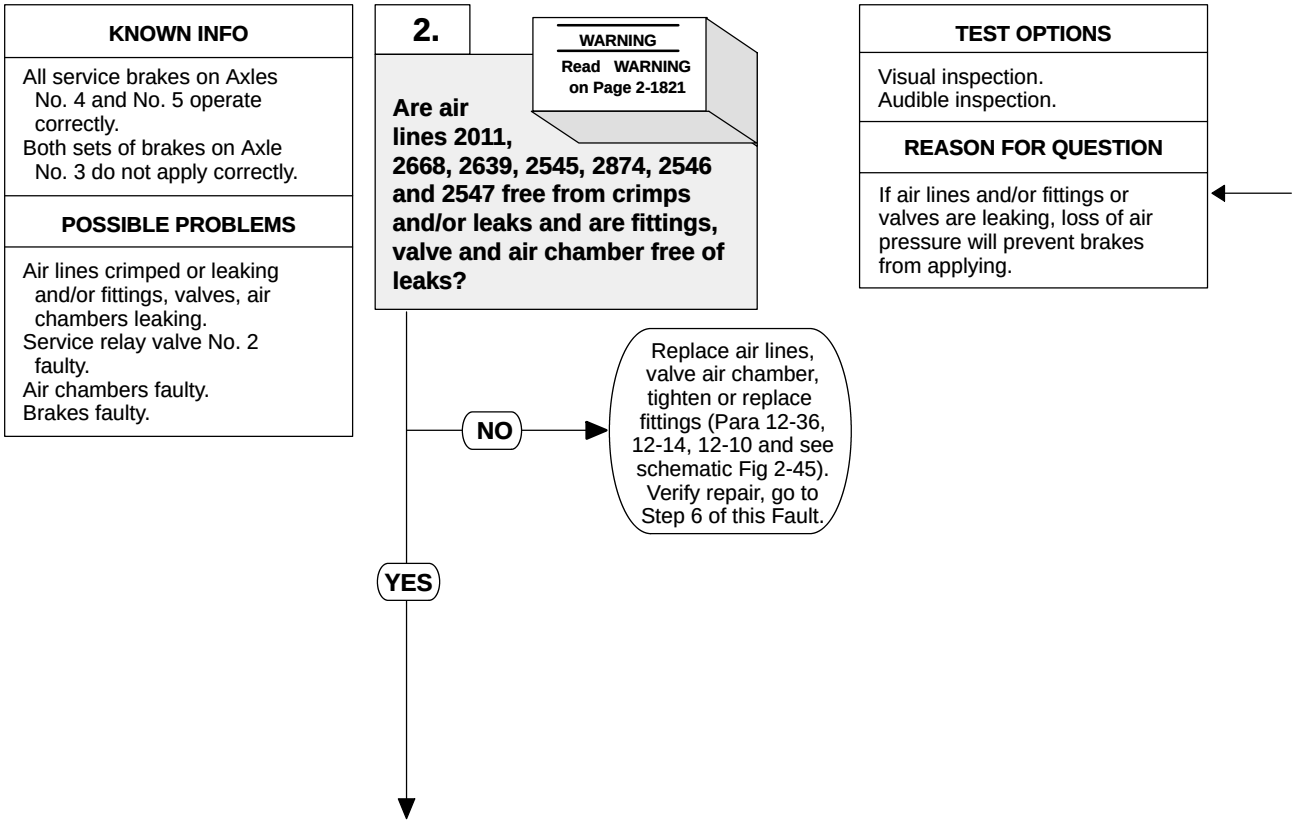
Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.

OPERATION TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Jack-up three rear Axles until wheels are off the ground.
(4) Shift transfer case to neutral (N).
(5) Release PARKING BRAKE.
(6) While assistant applies service brakes, try to turn wheels on Axle No. 3 by hand.
    (a) If one wheel turns, perform Step (7) below and go to Step 4 of this Fault.
    (b) If all wheels turn, perform Step (7) below and go to Step 2 of this Fault.
(7) Lower wheels to the ground.



10. SERVICE BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).

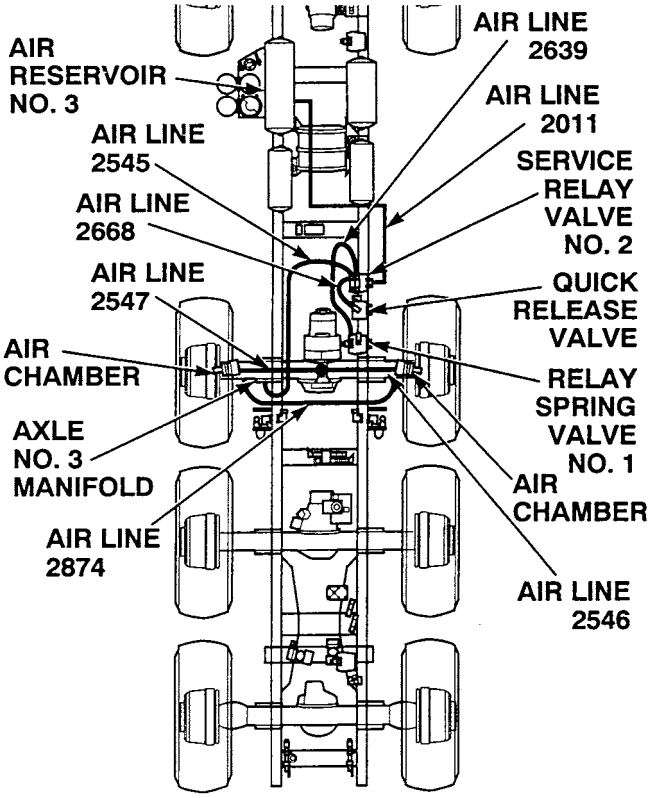


WARNING

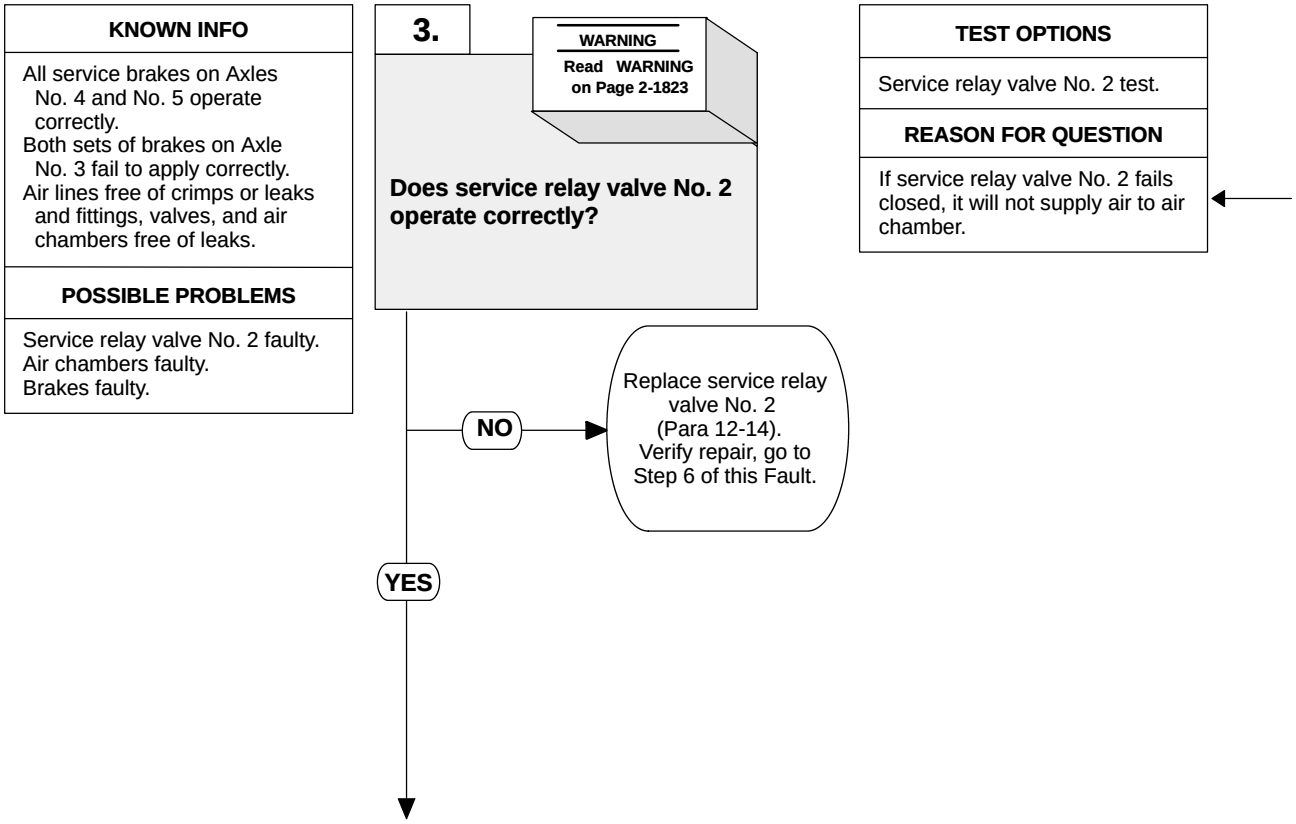
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL/AUDIBLE INSPECTION

(1) Check air lines 2011, 2668, 2639, 2545, 2874, 2546 and 2547 for crimps (see schematic Fig 2-45).
  (a) If there are crimps in air lines, replace air lines (Para 12-36).
  (b) If there are no crimps in air lines, perform Steps (2) and (3) below.
(2) Apply service brakes (TM 9-2320-364-10).
(3) Check fittings and air lines 2011, 2668, 2639, 2545, 2874, 2546, and 2547 for leaks.
  (a) If there are leaks at fittings, perform Step (6) below and tighten/replace fittings (Para 12-36).
  (b) If there are leaks in air lines perform Step (6) below and replace air lines (Para 12-36).
  (c) If there are no leaks, air lines and fittings are OK. Perform Step (4) below.
(4) Check service relay valve No. 2 for leaks.
  (a) If valve leaks, perform Step (6) below and replace valve (Para 12-14).
  (b) If there are no leaks, perform Step (5) below.
(5) Check air chambers for leaks.
  (a) If air chamber leaks, perform Step (6) below and replace air chamber (Para 12-10).
  (b) If there are no leaks, perform Step (6) below.
(6) Release service brakes.



10. SERVICE BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).

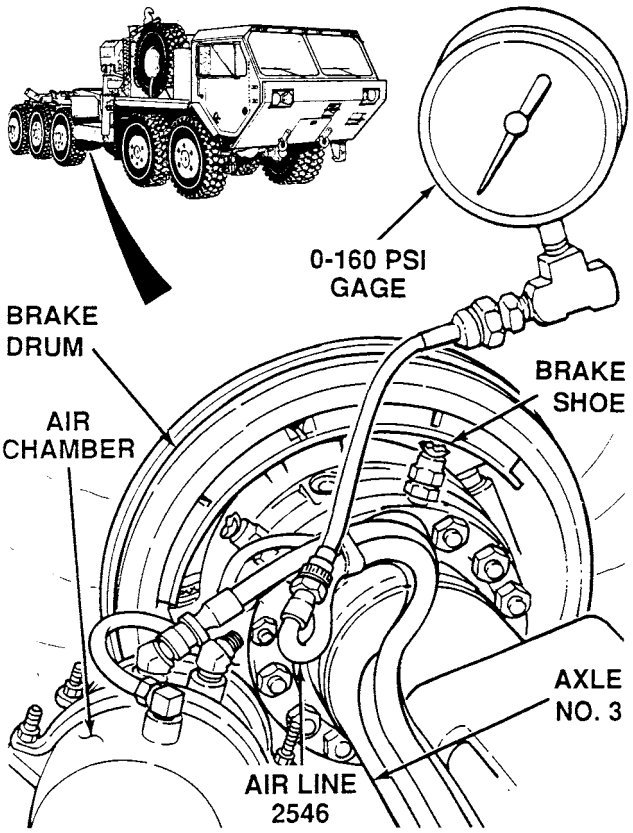


WARNING

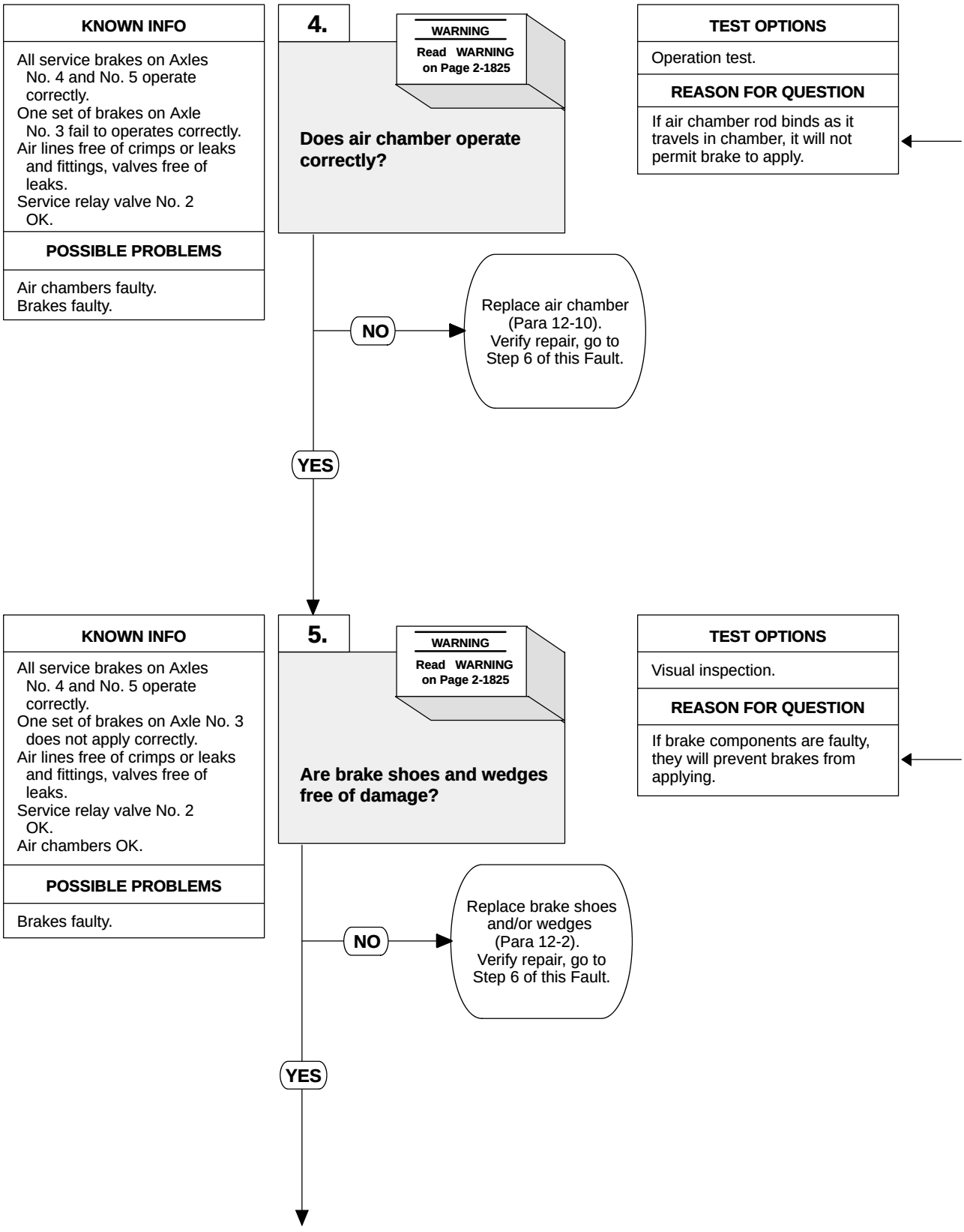
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

SERVICE RELAY VALVE NO. 2 TEST

(1) Disconnect air line 2546 from right air chamber on No. 3 Axle.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2546.
(3) Observe gage while assistant applies service brakes (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2546, perform Steps (4) and (5) below and replace service relay valve No. 2 (Para 12-14).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2546, valve is OK.
(4) Release service brakes.
(5) Remove gage and connect air line 2546 to No. 3 Axle right air chamber.



10. SERVICE BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).



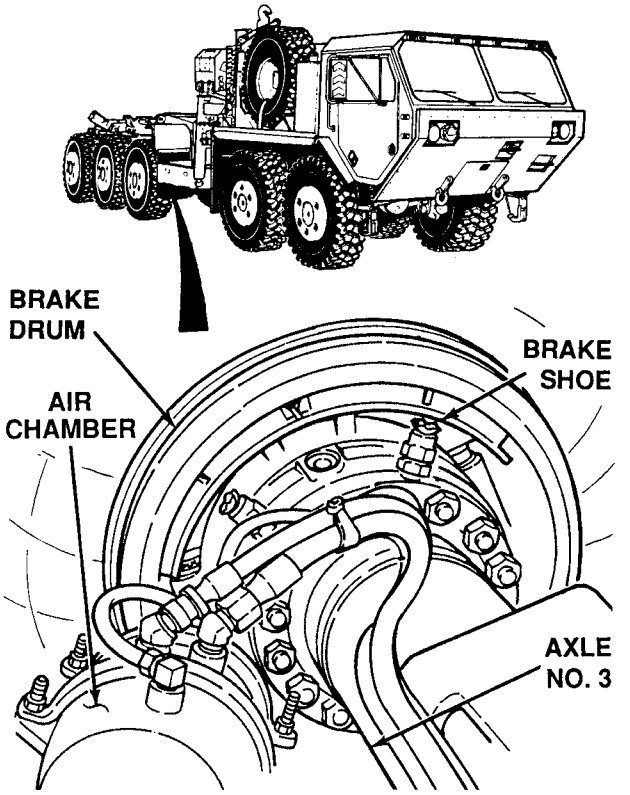
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

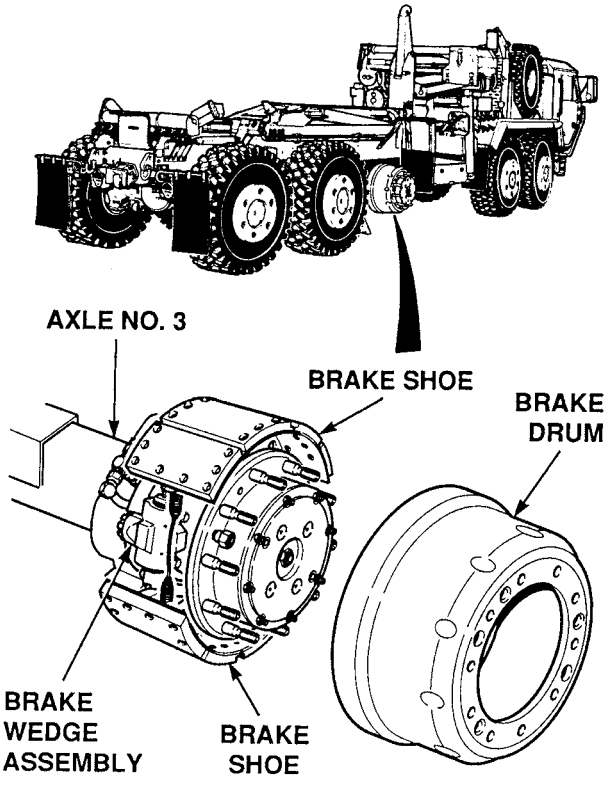
Apply service brakes while assistant listens to air chamber and observes brake shoe movement (TM 9-2320-364-10).

(1) If assistant cannot hear air chamber apply when service brakes are applied, replace air chamber (Para 12-10).
(2) If air chamber applies correctly, air chamber is OK.

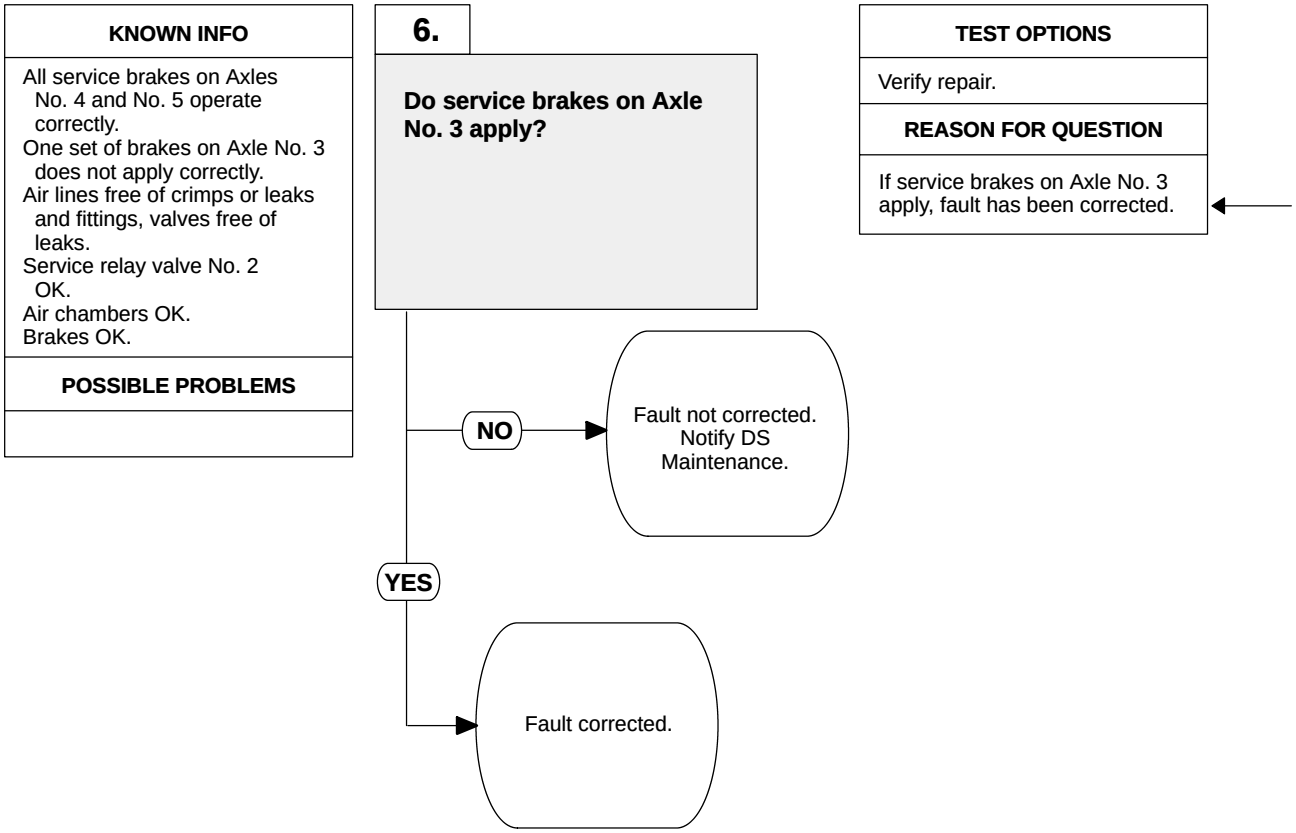


VISUAL INSPECTION

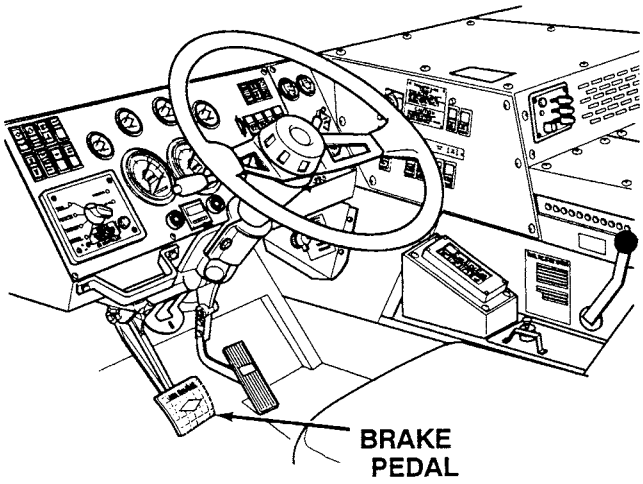
(1) Apply service brakes (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is no gap, perform Steps (3) through (7) below.
  (b) If there is a gap, perform Step (3) below and adjust brakes (Para 12-3).
(3) Release service brakes.
(4) Cage air chamber (Para 12-10).
(5) Remove brake drum and air chamber (Para 13-3 and 12-10).
(6) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoes or wedges (Para 12-2).
  (b) If shoes and wedges are OK, notify DS Maintenance.
(7) Install brake drum and air chamber (Para 13-3 and 12-10).



10. SERVICE BRAKES ON AXLE NO. 3 DO NOT APPLY (CONT).



VERIFY REPAIR
Apply brake pedal (TM 9-2320-364-10). (1) If service brakes on Axle No. 3 do not apply, fault not corrected. Release brake pedal and notify DS Maintenance. (2) If service brakes on Axle No. 3 do apply, fault has been corrected. Release brake pedal.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

11. SERVICE BRAKES ON AXLE NO. 3 DO NOT RELEASE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

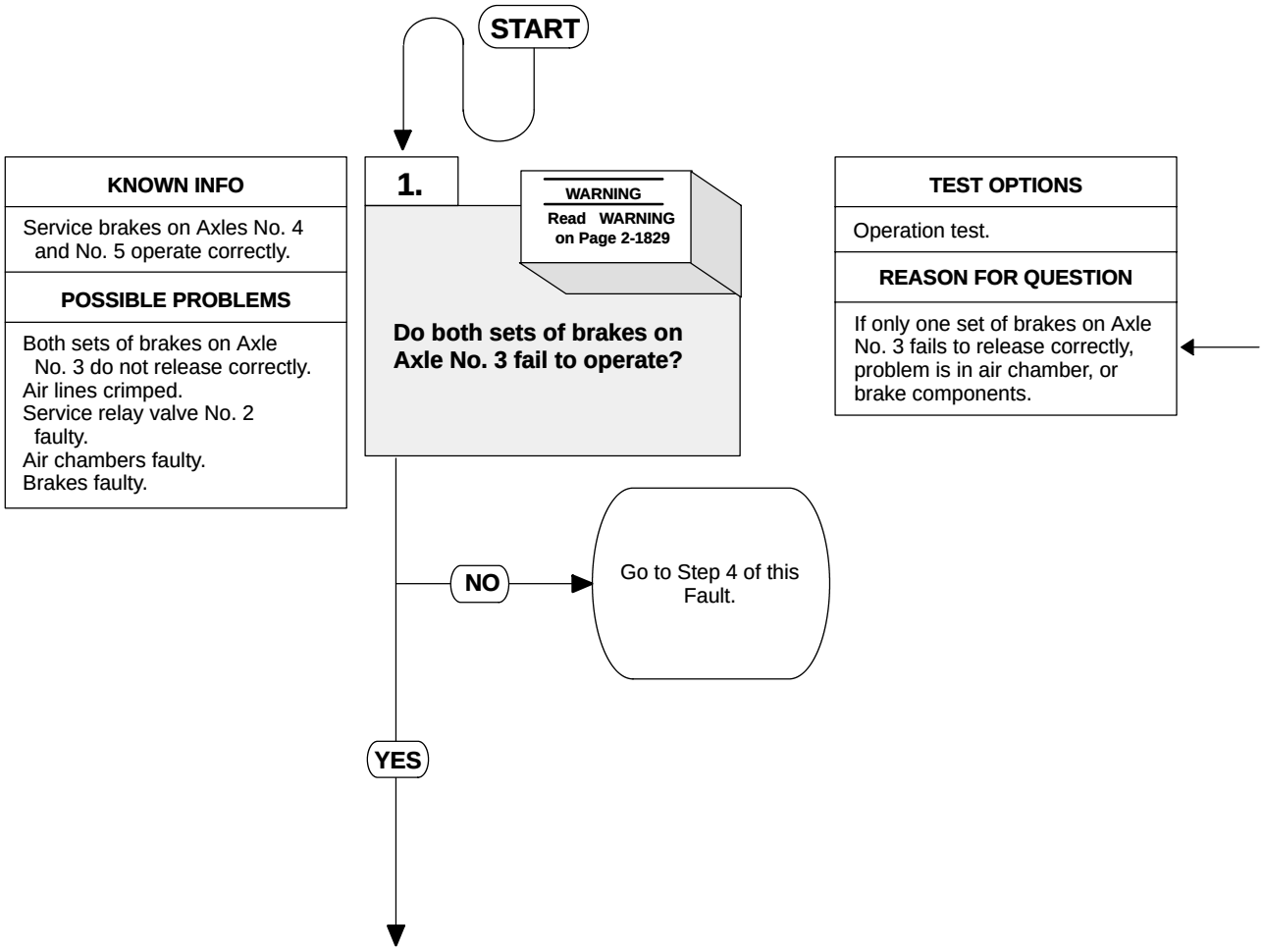
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

The following troubleshooting procedures cover one set of brakes for Axle No. 3, but they apply to both sets of brakes.

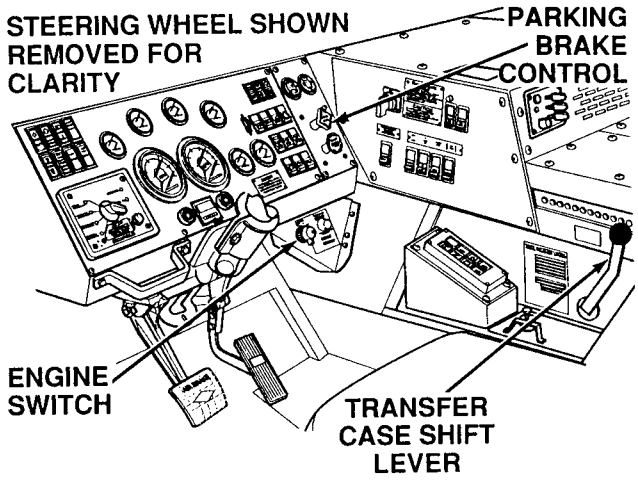


WARNING

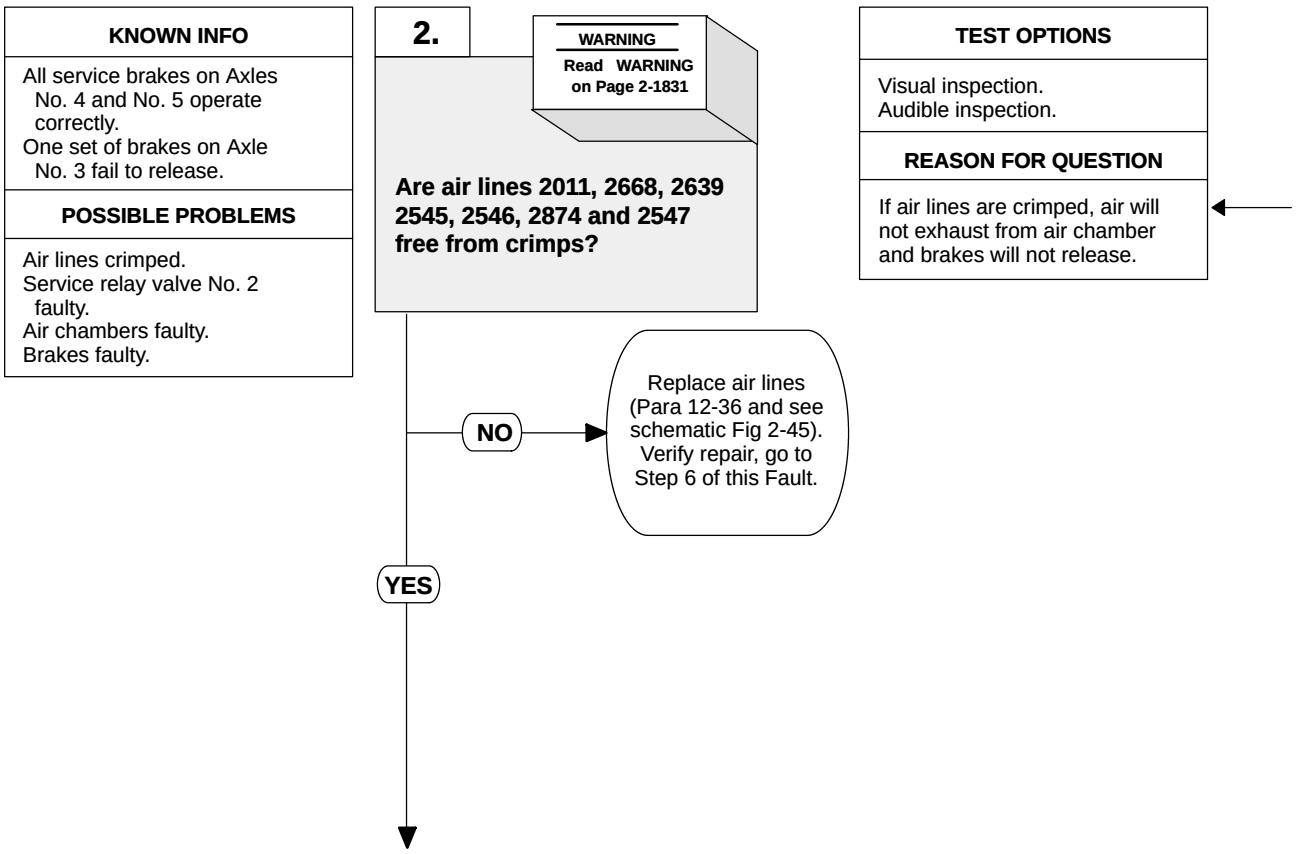
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Jack-up three rear Axles until wheels are off ground.
(4) Shift transfer case to N (neutral).
(5) Release PARKING BRAKE.
(6) Try to turn wheels by hand.
  (a) If one wheel fails to turn, perform Step (7) below and go to Step 4 of this Fault.
  (b) If both wheels fail to turn, perform Step (7) below and go to Step 2 of this Fault.
(7) Lower wheels to the ground.



11. SERVICE BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).



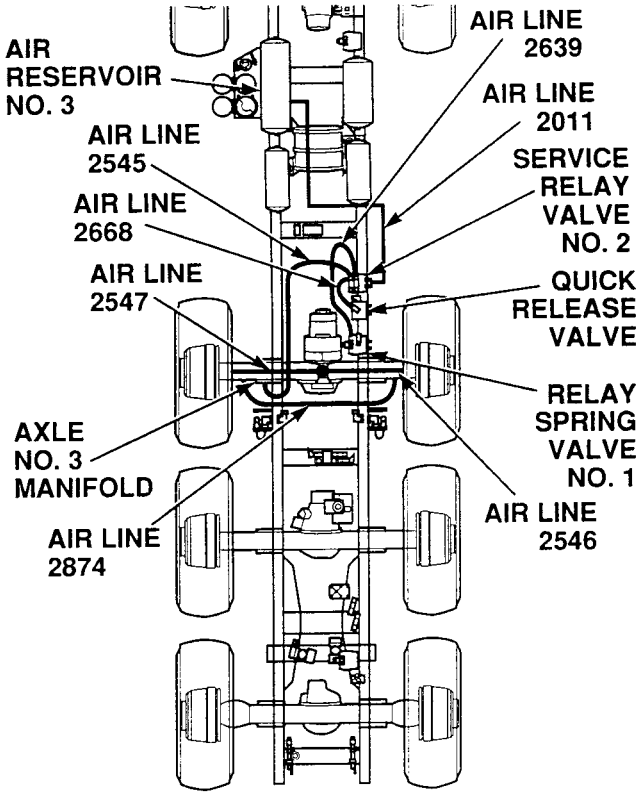
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

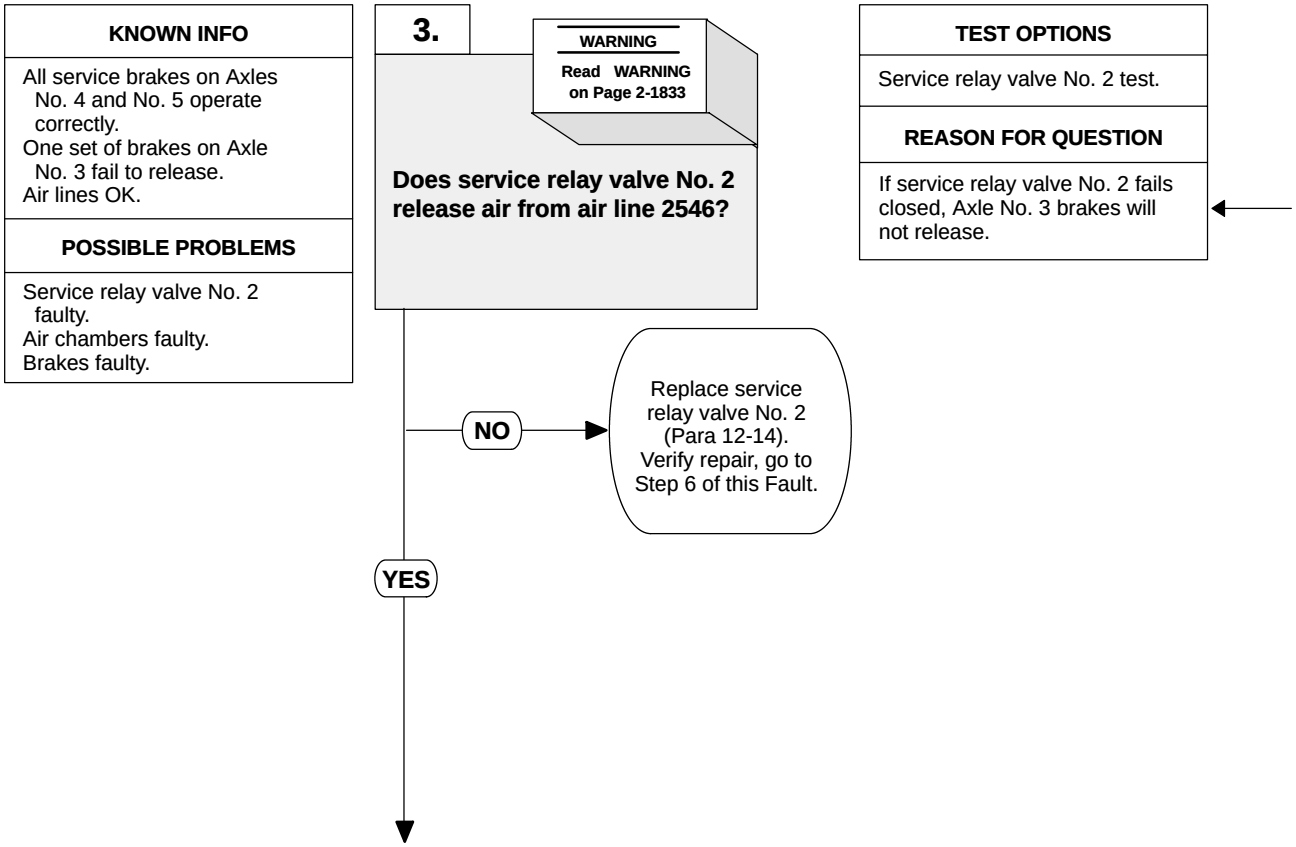
VISUAL/AUDIBLE INSPECTION

Check air lines 2011, 2668, 2639, 2545, 2874, 2546 and 2547 for crimping (see schematic Fig 2-45).

(1) If there are crimps in air lines, replace air lines (Para 12-36).
(2) If there are no crimps in air lines, air lines are OK.



11. SERVICE BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).

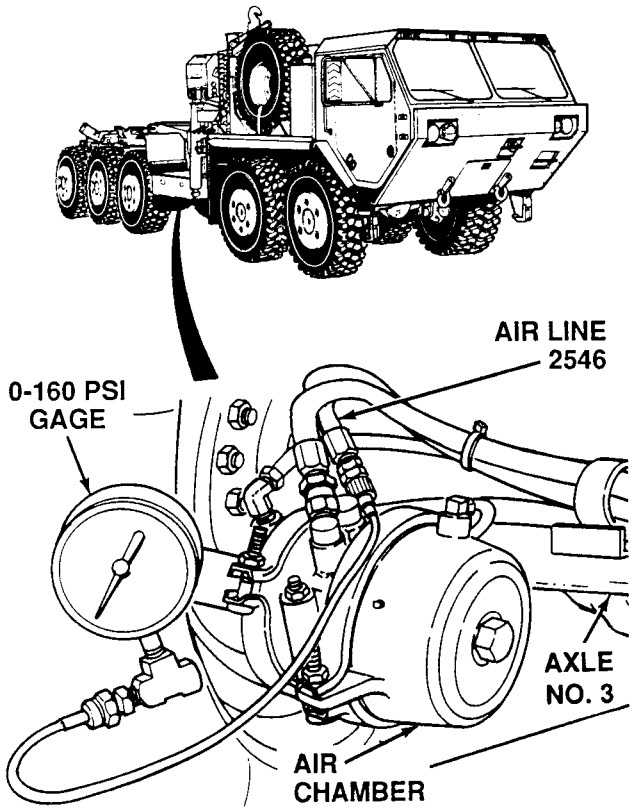


WARNING

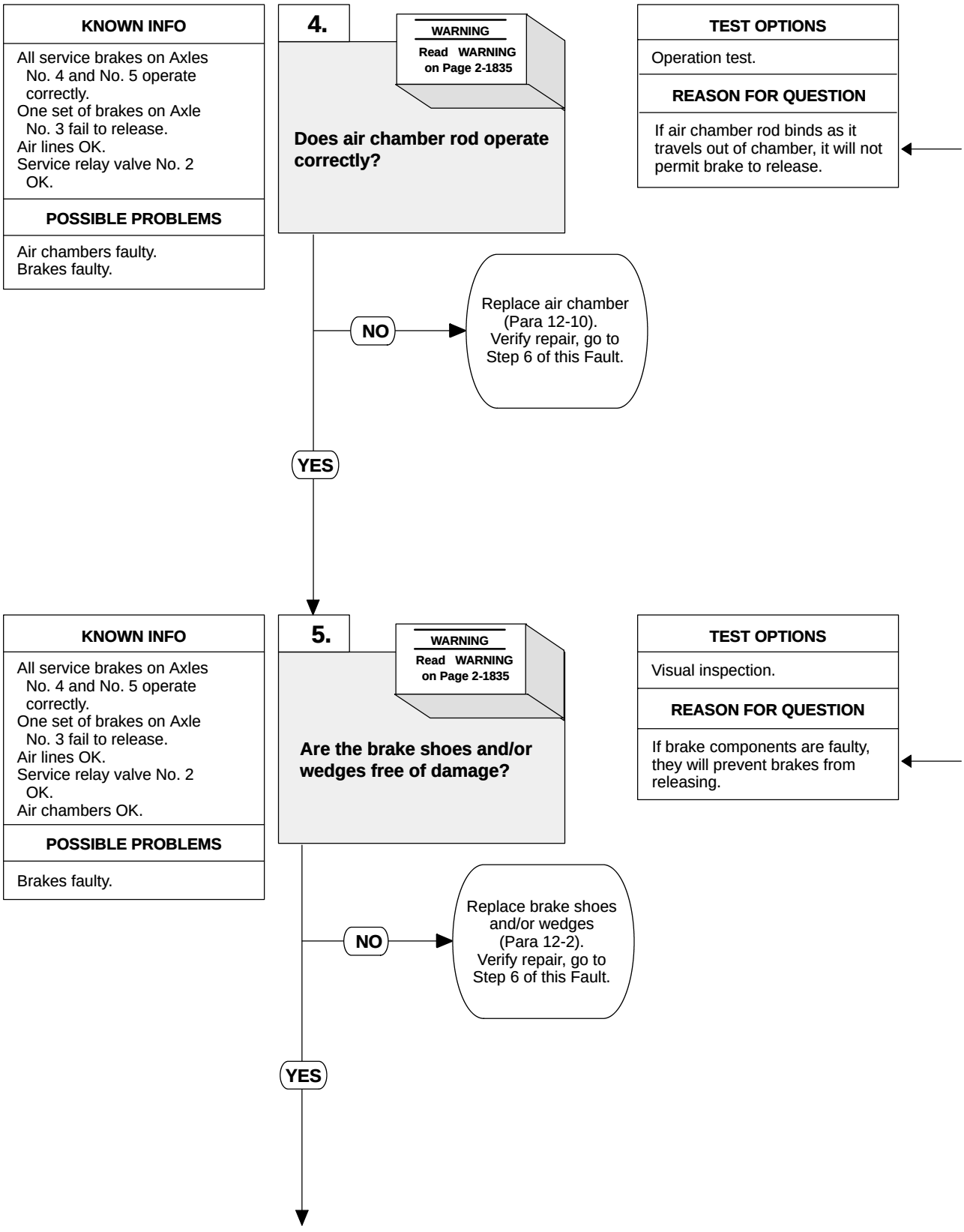
- If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

SERVICE RELAY VALVE NO. 2 TEST

(1) Disconnect air line 2546 from right air chamber on Axle No. 3.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2546.
(3) Observe gage while assistant applies then releases service brakes (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2546, perform Step (4) below and replace service relay valve No. 2 (Para 12-14).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2546, service relay valve No. 2 is OK.
(4) Release service brakes.
(5) Remove the gage and connect air line 2546 to Axle No. 3 right air chamber.



11. SERVICE BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).

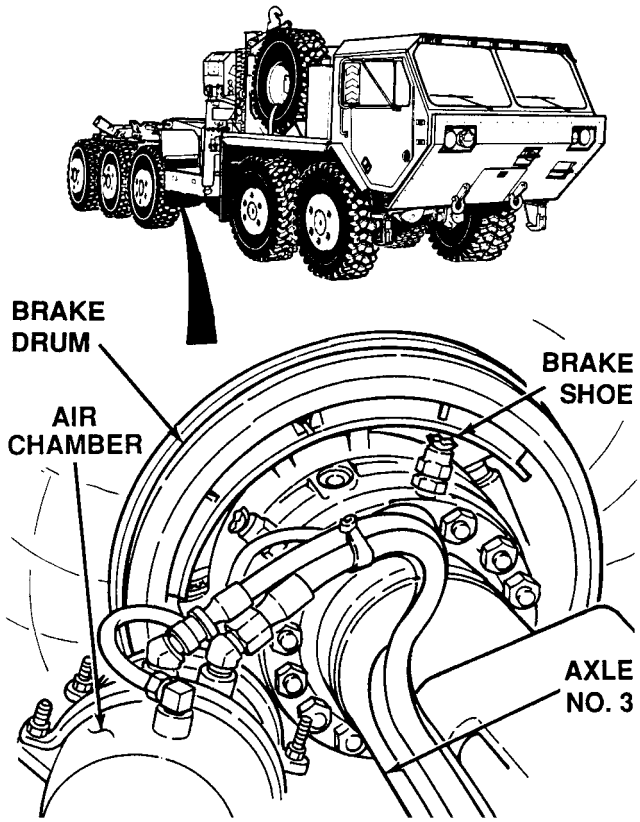


WARNING

- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

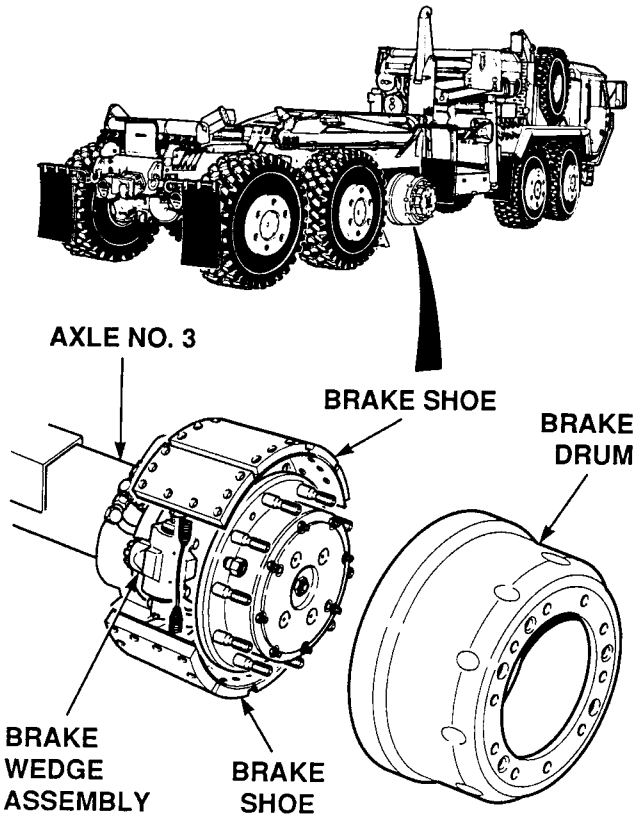
OPERATION TEST

(1) Release PARKING BRAKE (TM 9-2320-364-10).
(2) Listen to air chamber while assistant applies then releases service brakes.
  (a) If mechanic cannot hear air chamber operate when the brake is applied and released, replace air chamber (Para 12-10).
  (b) If air chamber operates correctly, go to Step 5 of this Fault.

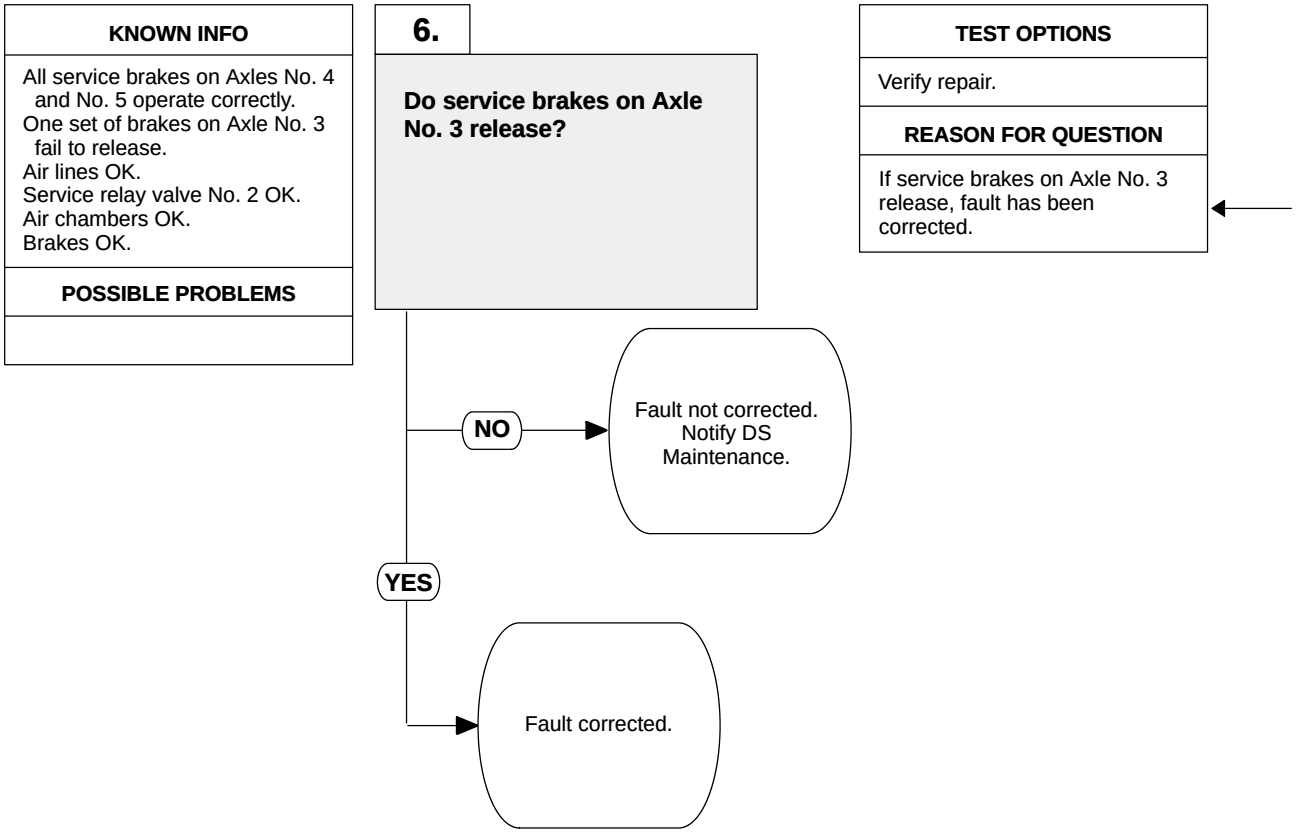


VISUAL INSPECTION

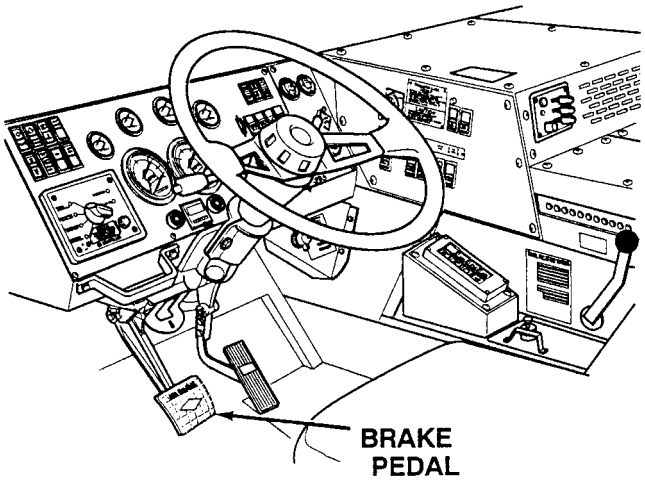
(1) Apply service brakes (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-2).
  (a) If there is no gap, perform Steps (3) through (7) below.
  (b) If there is a gap, adjust brakes (Para 12-2).
(3) Release service brakes.
(4) Cage air chamber (Para 12-10).
(5) Remove brake drum and air chamber (Para 13-3 and 12-10).
(6) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoes and/or wedges (Para 12-2).
  (b) If shoes and wedges are OK, notify DS Maintenance.
(7) Install brake drum and air chamber (Para 13-3 and 12-10).



11. SERVICE BRAKES ON AXLE NO. 3 DO NOT RELEASE (CONT).



VERIFY REPAIR
Apply and release brake pedal (TM 9-2320-364-10). (1) If service brakes on Axle No. 3 do not release, fault not corrected. Notify DS Maintenance. (2) If service brakes on Axle No. 3 release, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

12. SERVICE BRAKES ON AXLES NO. 4 AND 5 DO NOT APPLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

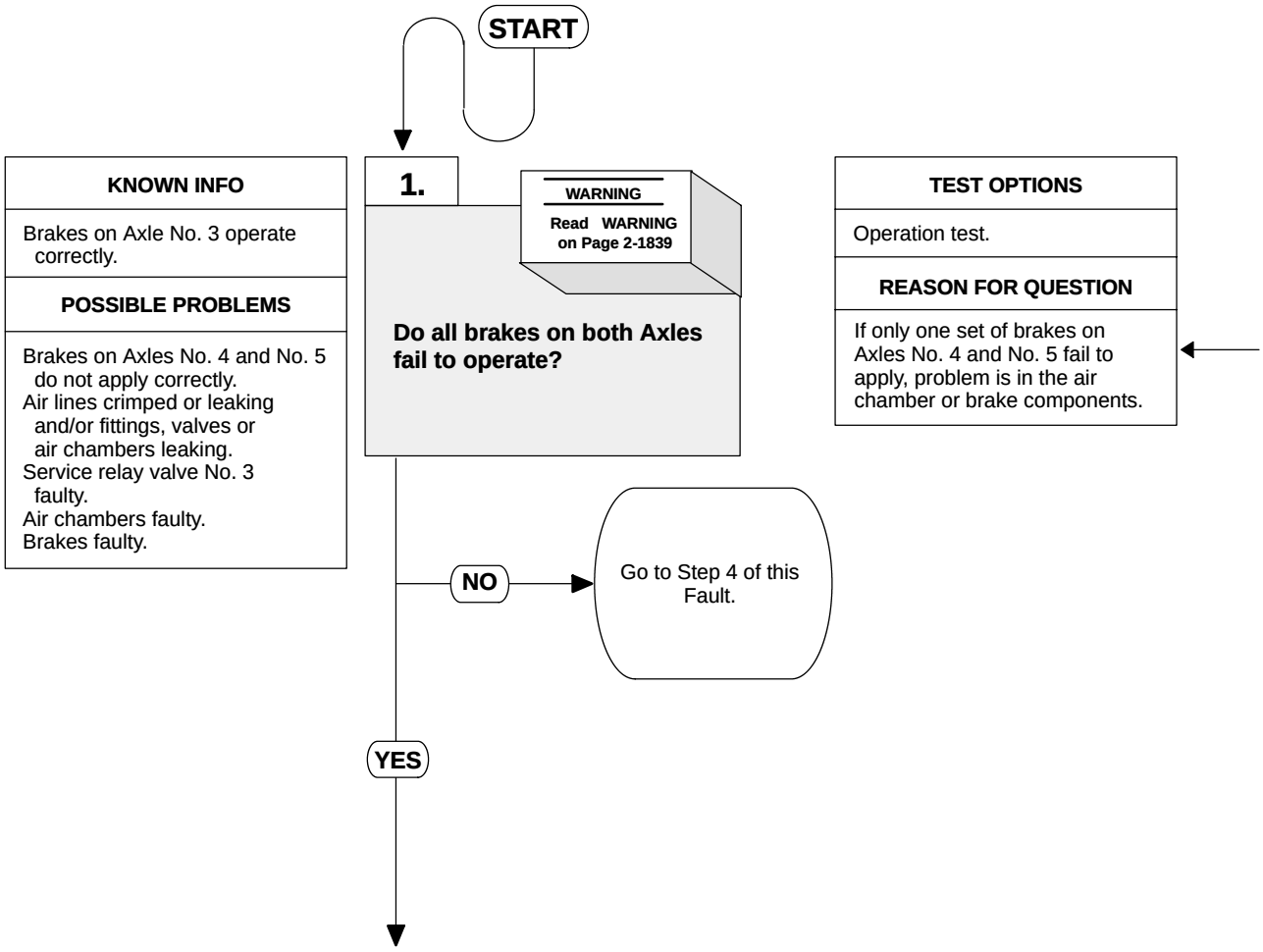
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

The following troubleshooting procedures cover one set of brakes for Axles No. 4 and 5, but they apply to all four sets of brakes.

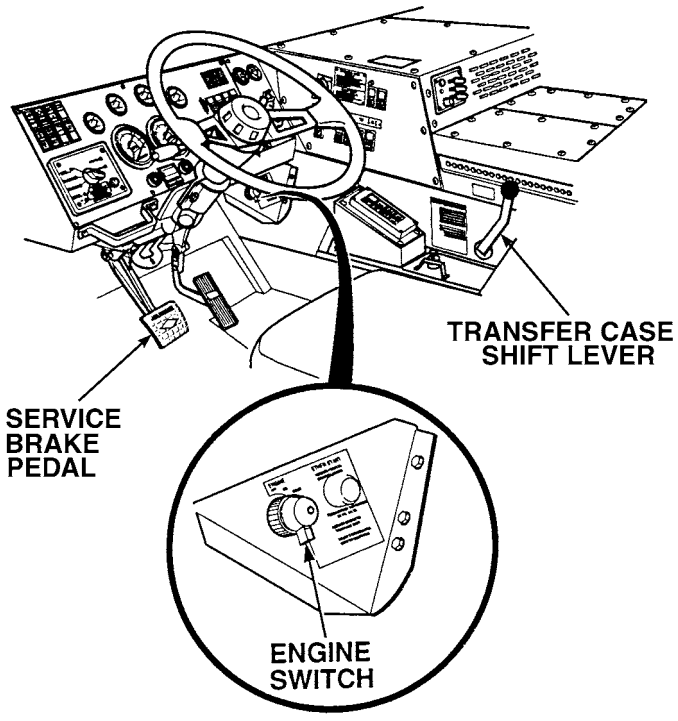


WARNING

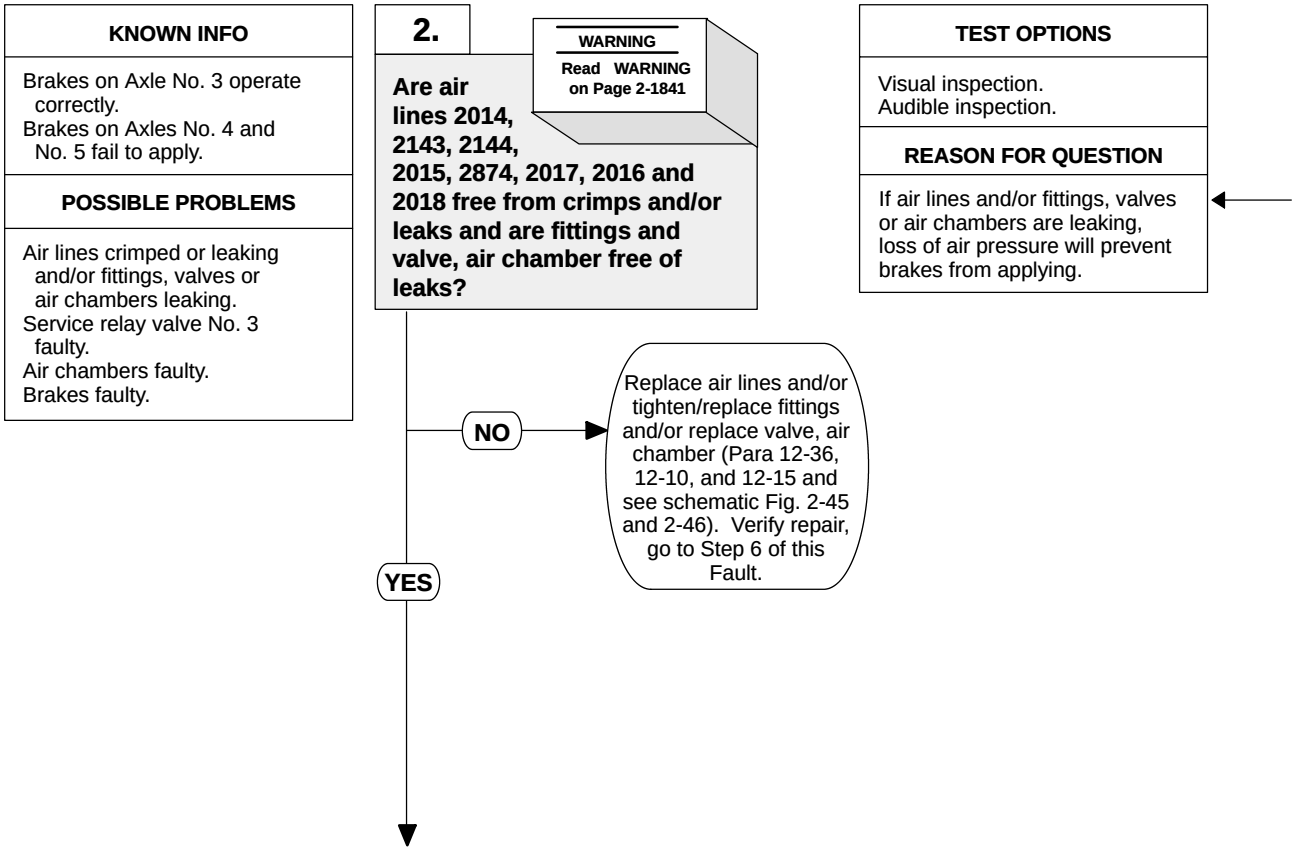
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Jack-up rear three Axles until wheels are off the ground.
(4) Shift transfer case to N (neutral).
(5) Release PARKING BRAKE.
(6) While assistant applies service brakes, try to turn the wheels by hand.
  (a) If one wheel turns, perform Step (7) below and go to Step 4 of this Fault.
  (b) If both wheels turn, perform Step (7) below and go to Step 2 of this Fault.
(7) Lower wheels to ground.



12. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).

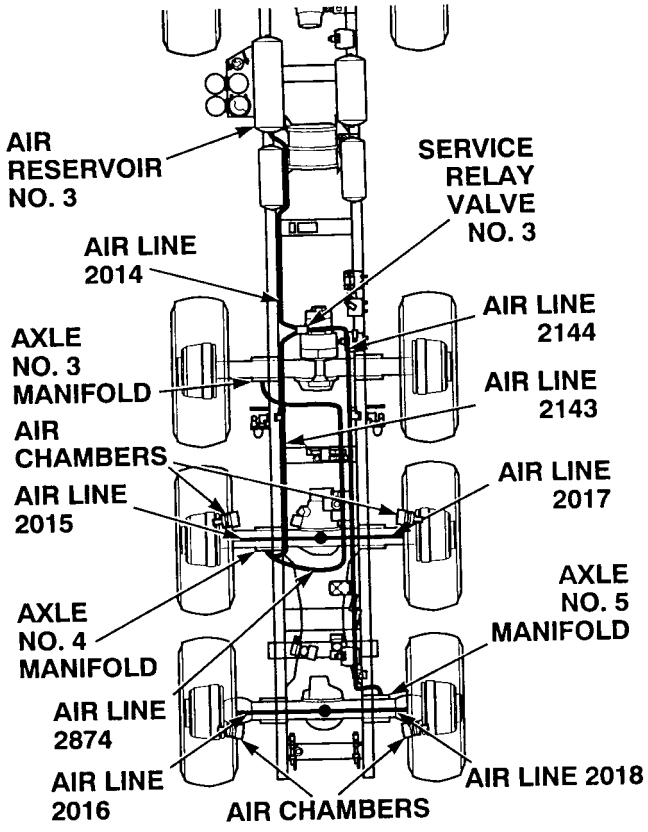


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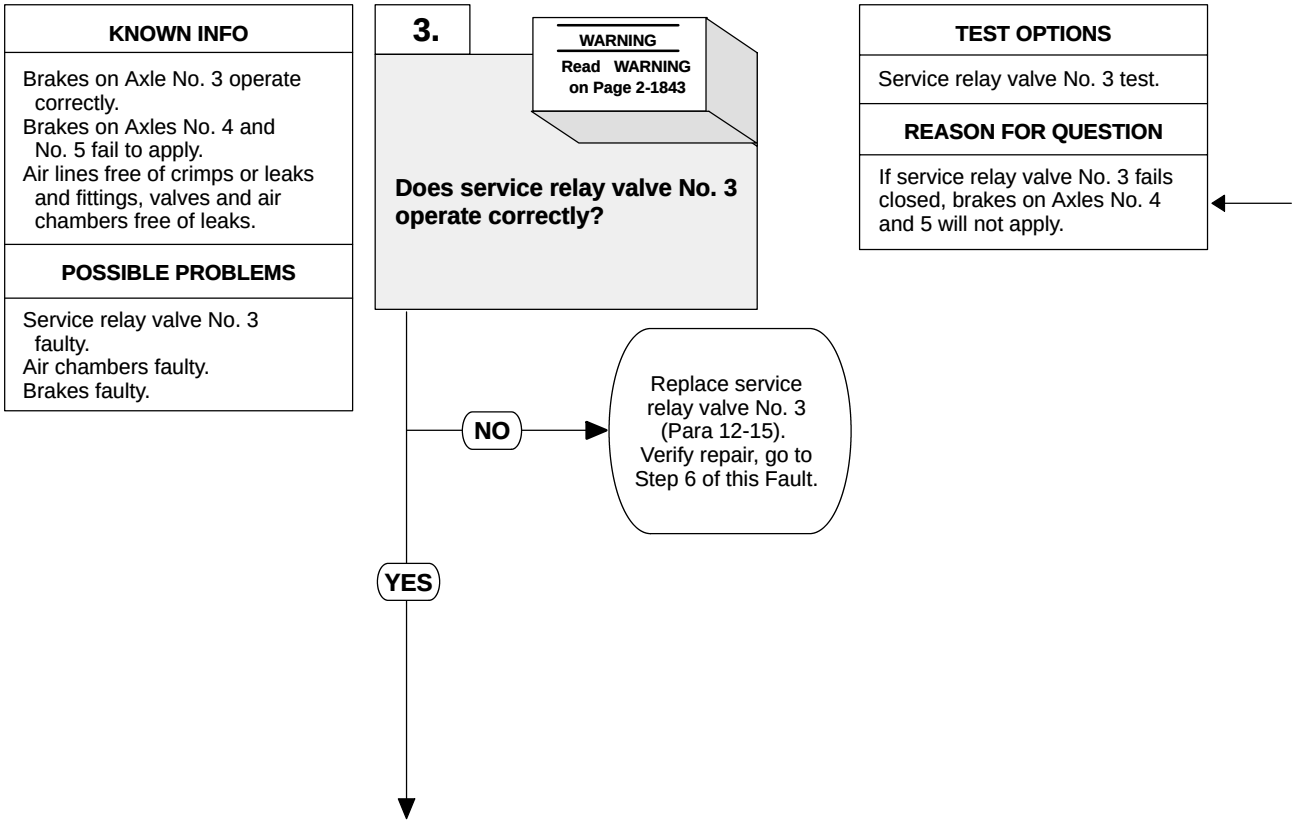
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL/AUDIBLE INSPECTION

(1) Check air lines 2014, 2143, 2144, 2015, 2874, 2017, 2016 and 2018 for crimps (see schematic Fig. 2-45 and 2-46).
  (a) If there are crimps in air lines, repair or replace air lines (Para 12-36).
  (b) If there are no crimps in air lines, perform Steps (2) and (3) below.
(2) Apply service brakes (TM 9-2320-364-10).
(3) Check fittings and air lines 2014, 2143, 2144, 2015, 2874, 2017, 2016, 2018 for leaks (see schematic Fig 2-45 and 2-46).
  (a) If there are leaks at fittings or air lines, perform Step (6) below and tighten/replace fittings and/or repair or replace air lines (Para 12-36).
  (b) If there are no leaks, air lines and fittings are OK. Perform Step (4) below.
(4) Check service relay valve No. 3 for leaks (Para 12-15).
  (a) If service relay valve No. 3 leaks, perform Step (6) below and replace valve (Para 12-15).
  (b) If there are no leaks, perform Step (5) below.
(5) Check air chambers for leaks.
  (a) If air chamber leaks, perform Step (6) below and replace air chamber (Para 12-10).
  (b) If there are no leaks, perform Step (6) below.
(6) Release service brakes.



12. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).

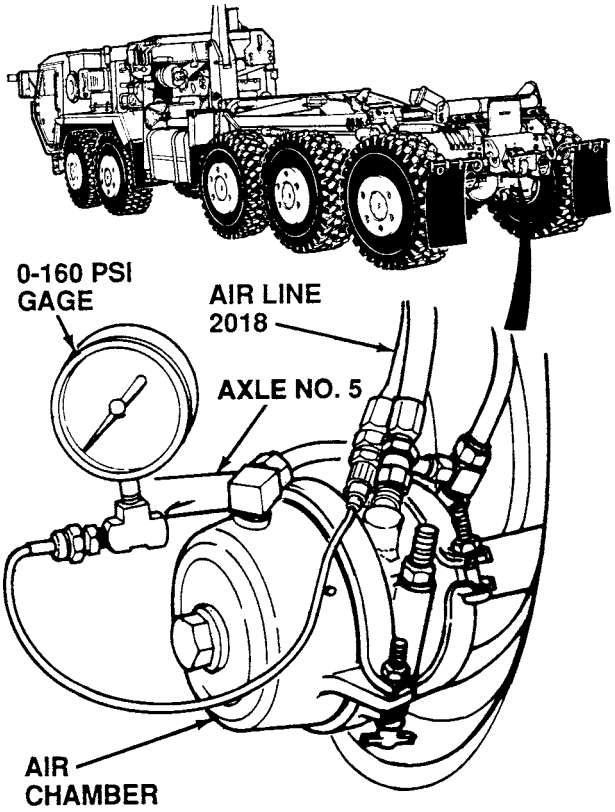


WARNING

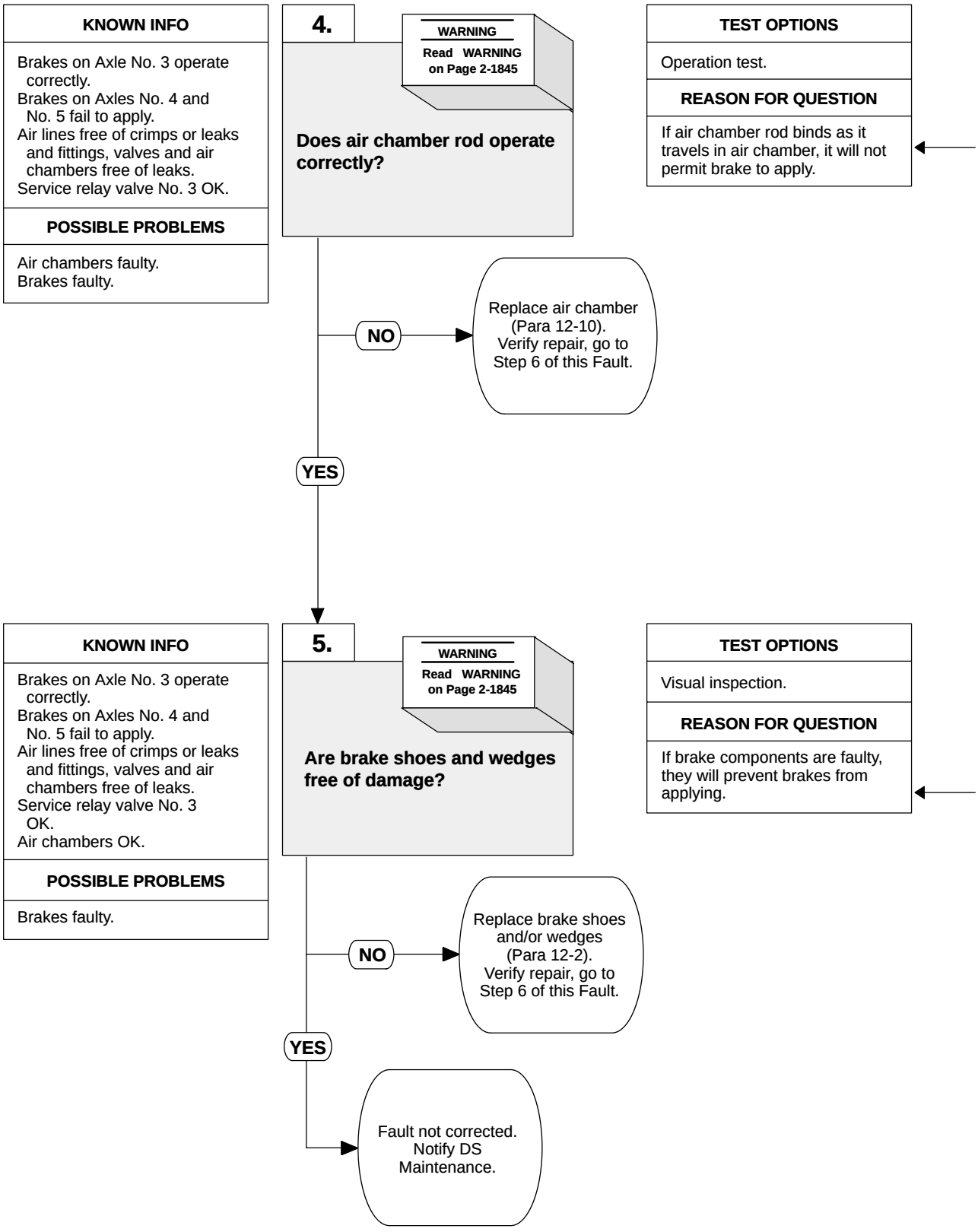
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

SERVICE RELAY VALVE NO. 3 TEST

(1) Disconnect air line 2018 from right air chamber on Axle No. 5.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2018.
(3) Apply service brakes while observing gage (TM 9-2320-364-10).
    (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2018, perform Steps (4) and (5) below and replace service relay valve No. 3 (Para 12-15).
    (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2018, service relay valve No. 3 is OK.
(4) Release service brakes.
(5) Remove gage and connect air line 2018 to Axle No. 5 right air chamber.



12. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).



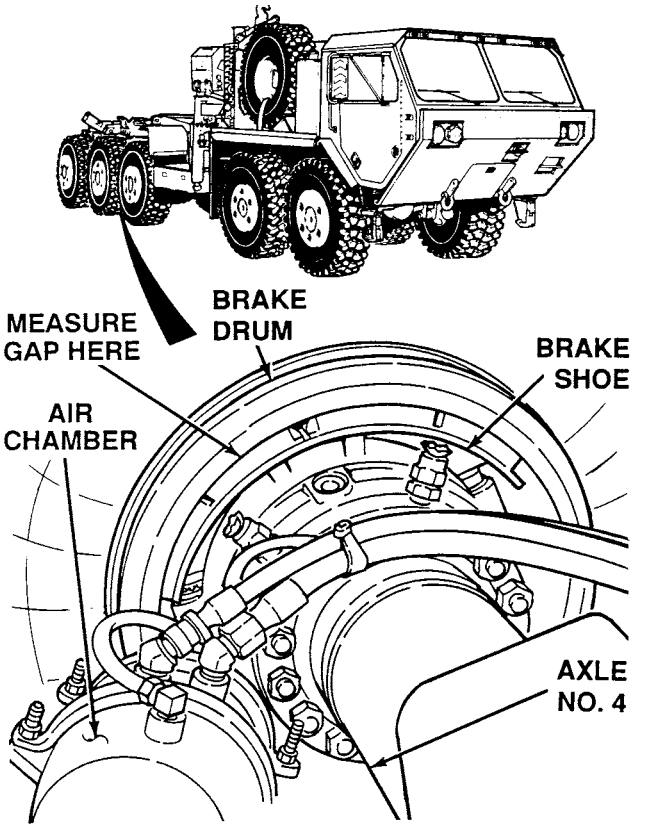
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

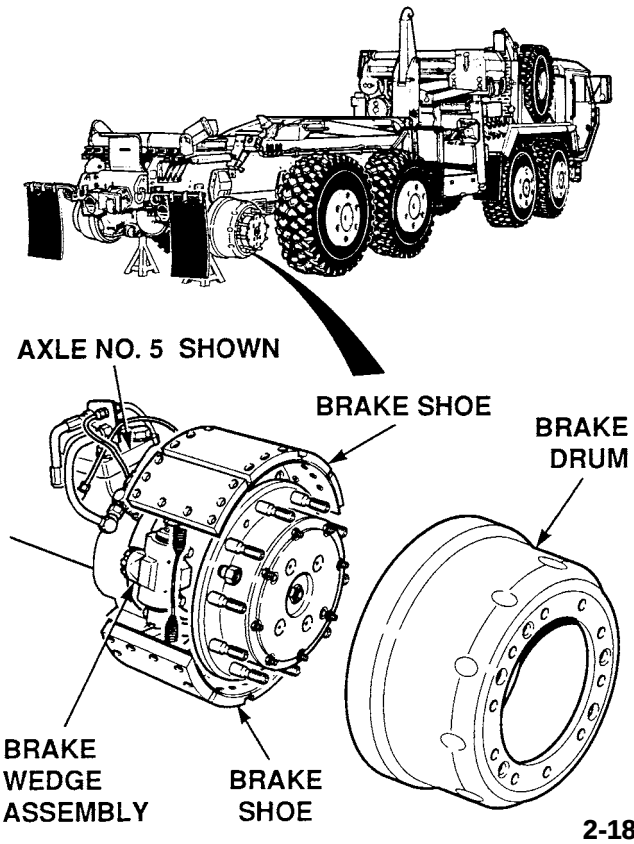
Listen to air chamber while assistant fully applies service brakes (TM 9-2320-364-10).

(1) If assistant cannot hear air chamber operate when service brakes are applied, replace air chamber (Para 12-10).
(2) If air chamber operates correctly, air chamber is OK.

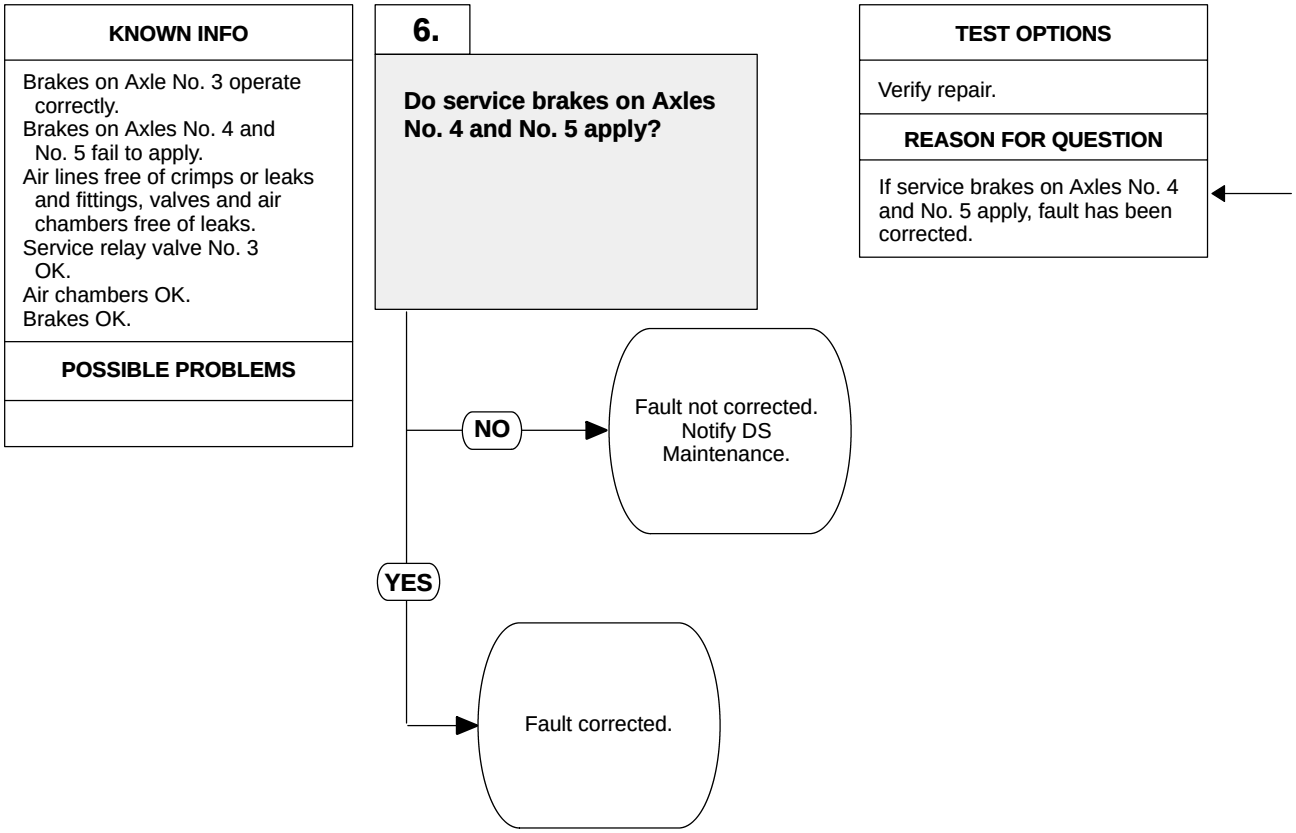


VISUAL INSPECTION

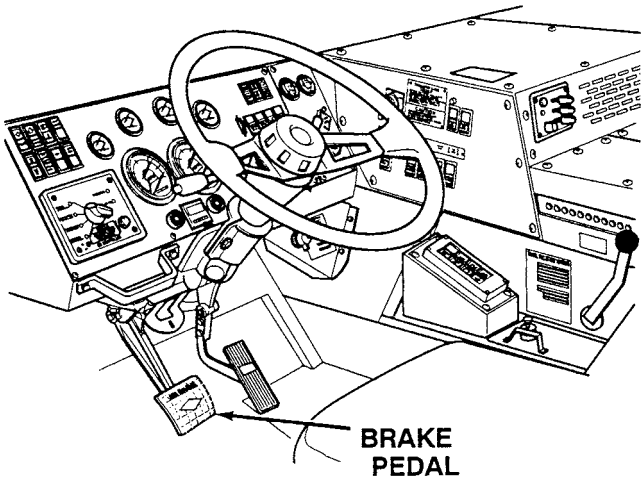
(1) Apply service brakes (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is no gap, perform Steps (3) through (7) below.
  (b) If there is a gap, adjust brakes (Para 12-3).
(3) Release service brake.
(4) Cage air chamber (Para 12-10).
(5) Remove brake drum and air chamber (Para 13-3 and 12-10).
(6) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoes and/or wedges (Para 12-2).
  (b) If shoes and wedges are OK, notify DS Maintenance.
(7) Install brake drum and air chamber (Para 13-3 and 12-10).



12. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT APPLY (CONT).



VERIFY REPAIR
Apply brake pedal (TM 9-2320-364-10). (1) If service brakes on Axles No. 4 and No. 5 do not apply, fault not corrected. Release brake pedal and notify DS Maintenance. (2) If service brakes on Axles No. 4 and No. 5 do apply, fault has been corrected. Release brake pedal.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

13. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

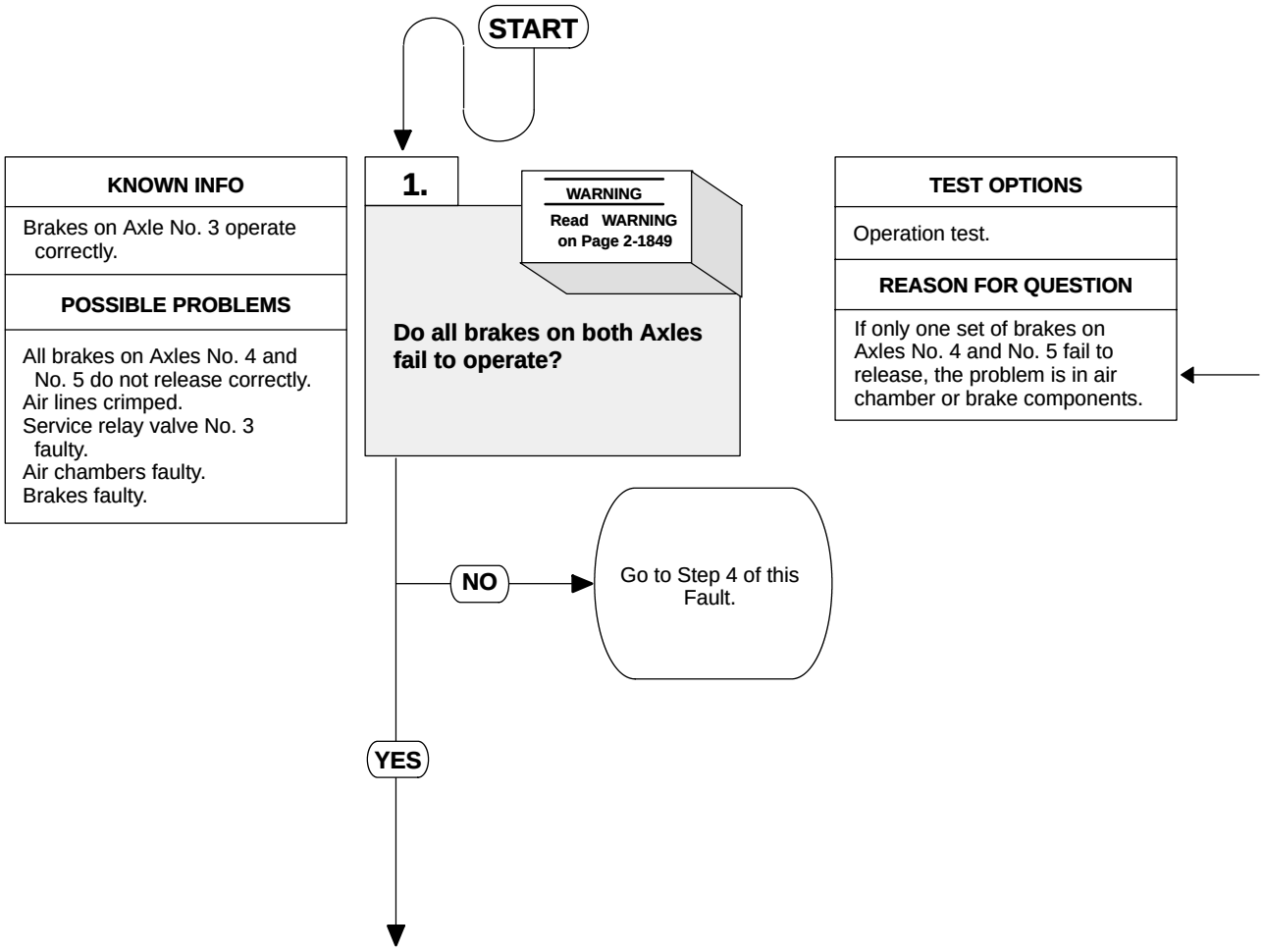
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

The following troubleshooting procedures cover one set of brakes for Axles No. 4 and 5, but they apply to all four sets of brakes

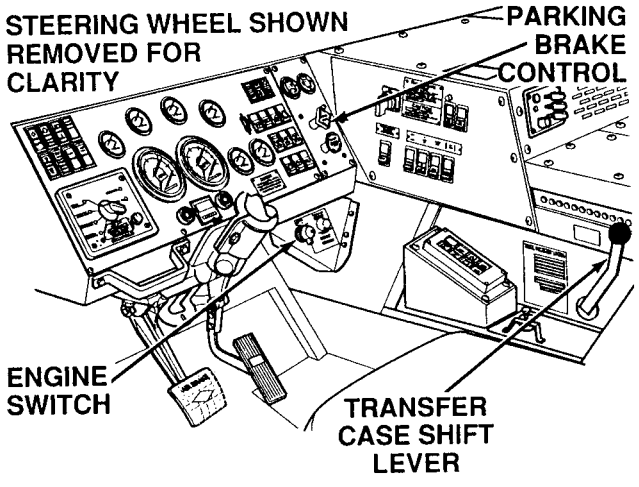


WARNING

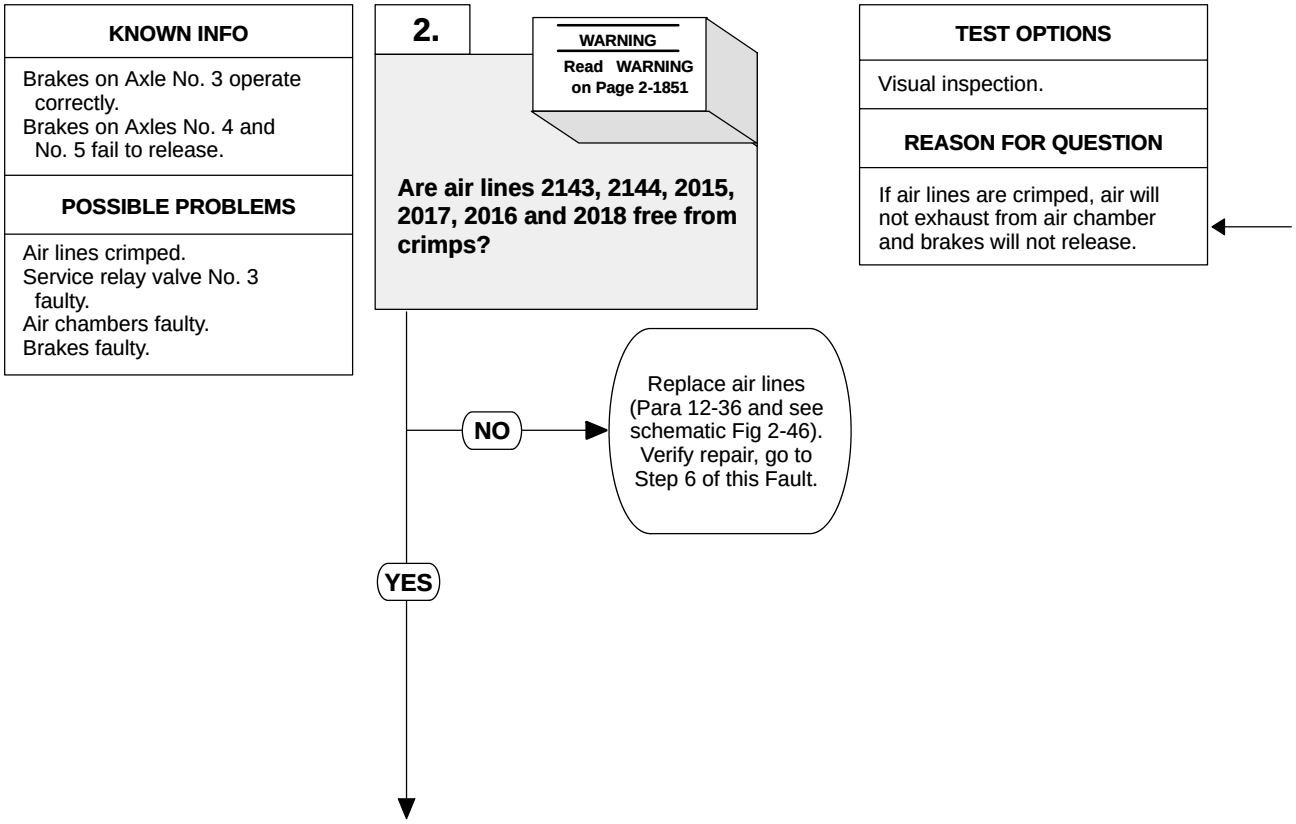
- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Jack-up three rear Axles until wheels are off the ground.
(4) Shift transfer case to N (neutral) (TM 9-2320-364-10).
(5) Release PARKING BRAKE.
(6) Try to turn all wheels by hand.
  (a) If only one wheel fails to turn, perform Step (7) below and go to Step 4 of this Fault.
  (b) If all wheels fail to turn, perform Step (7) below and go to Step 2 of this Fault.
(7) Lower rear wheels to ground.



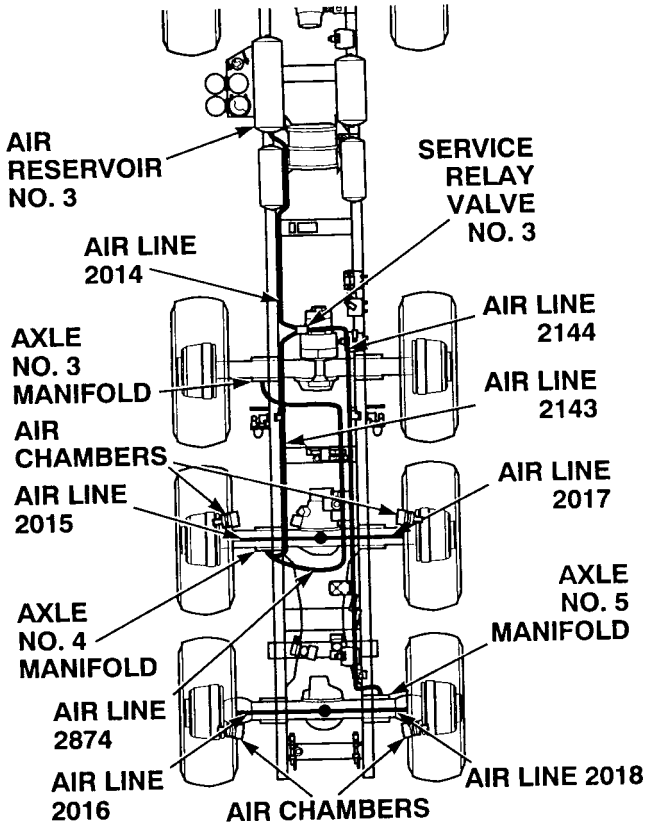
13. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).



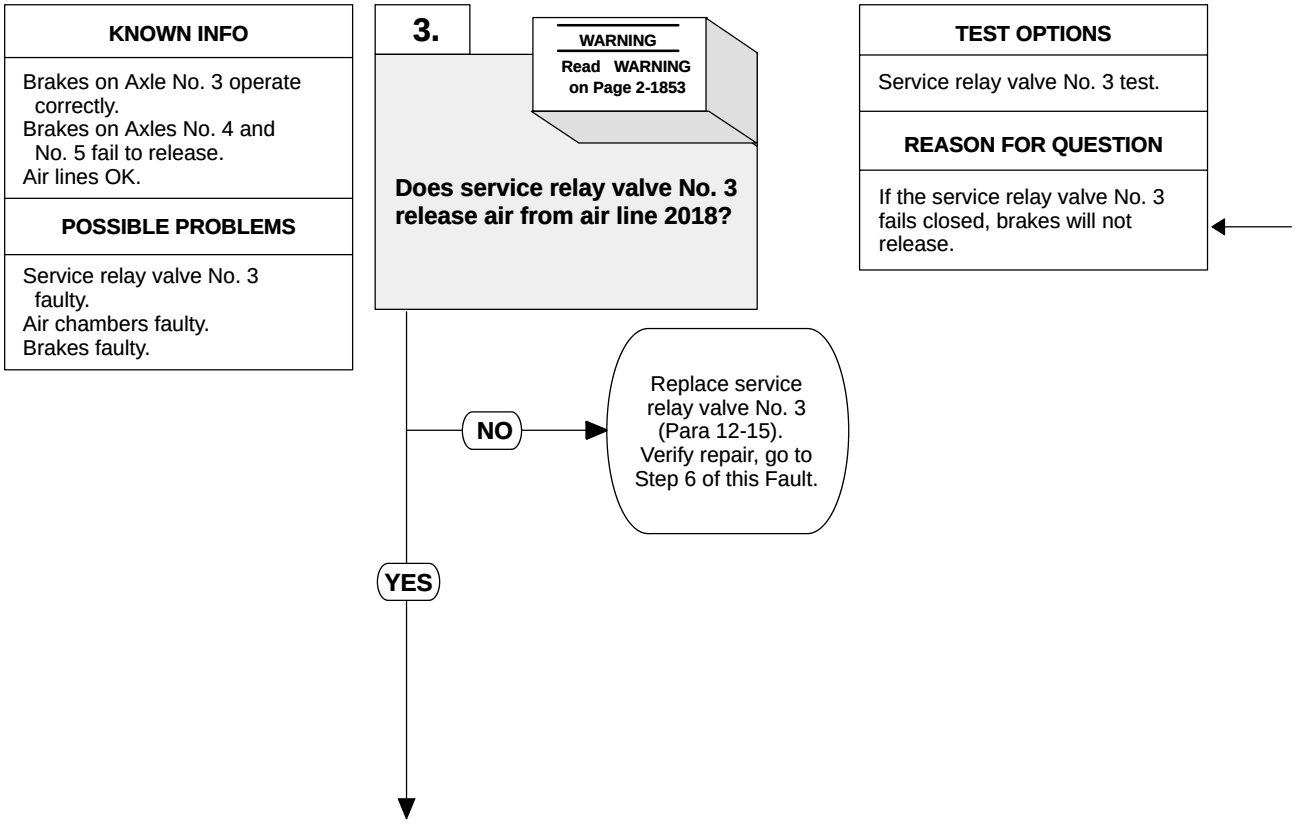
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL INSPECTION
Check air lines 2143, 2144, 2015, 2017, 2016 and 2018 for crimping (see schematic Fig 2-46). (1) If there are crimps in air lines, replace air lines (Para 12-36). (2) If there are no crimps in air lines, air lines are OK.



13. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).

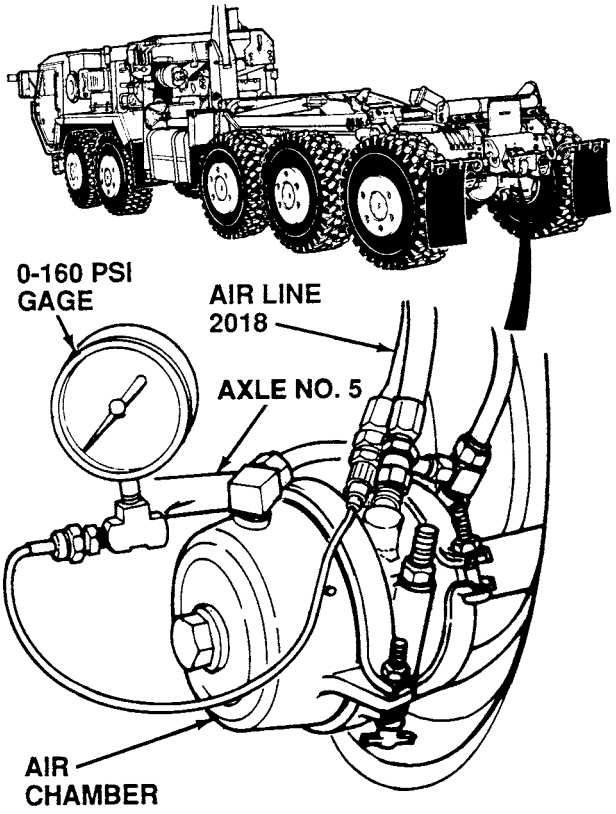


WARNING

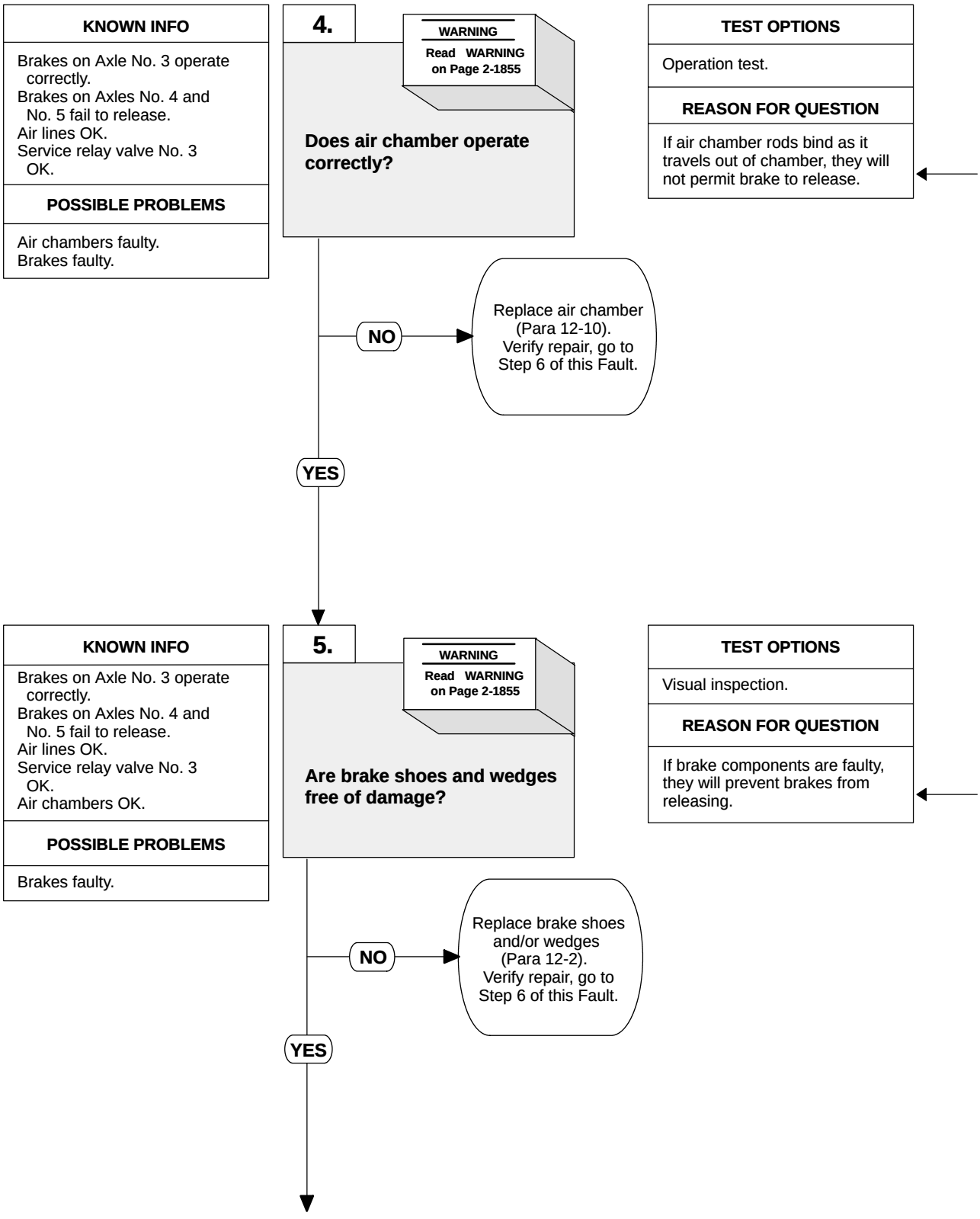
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

SERVICE RELAY VALVE NO. 3 TEST

(1) Disconnect air line 2018 from right air chamber on Axle No. 5.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2018.
(3) Observe gage while assistant applies then releases service brakes (TM 9-2320-364-10).
  (a) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2018, perform Step (4) below and replace service relay valve No. 3 (Para 12-15).
  (b) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2018, service relay valve No. 3 is OK.
(4) Remove gage and connect air line 2018 to Axle No. 5 right air chamber.



13. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).



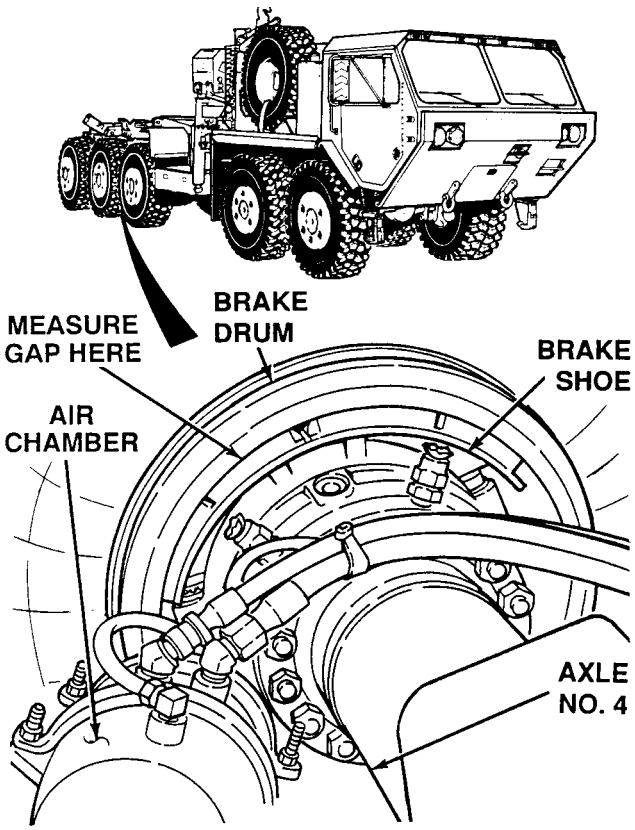
WARNING

- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

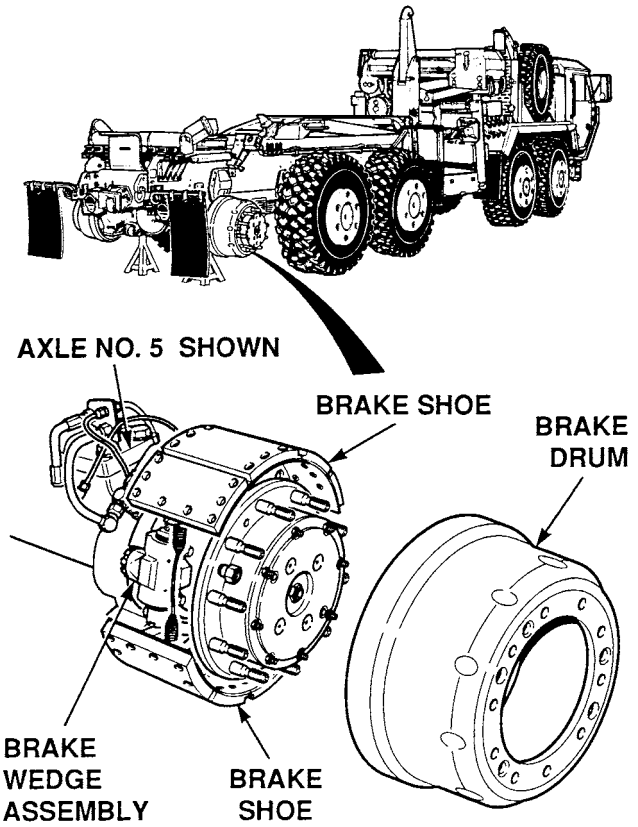
Listen to air chamber and observe brake shoe while assistant applies then release service brakes (TM 9-2320-364-10).

(1) If assistant cannot hear air chamber operate, or brake shoe does not move when brake is applied, replace air chamber (Para 12-10).
(2) If air chamber operates correctly, go to Step 5 of this Fault.

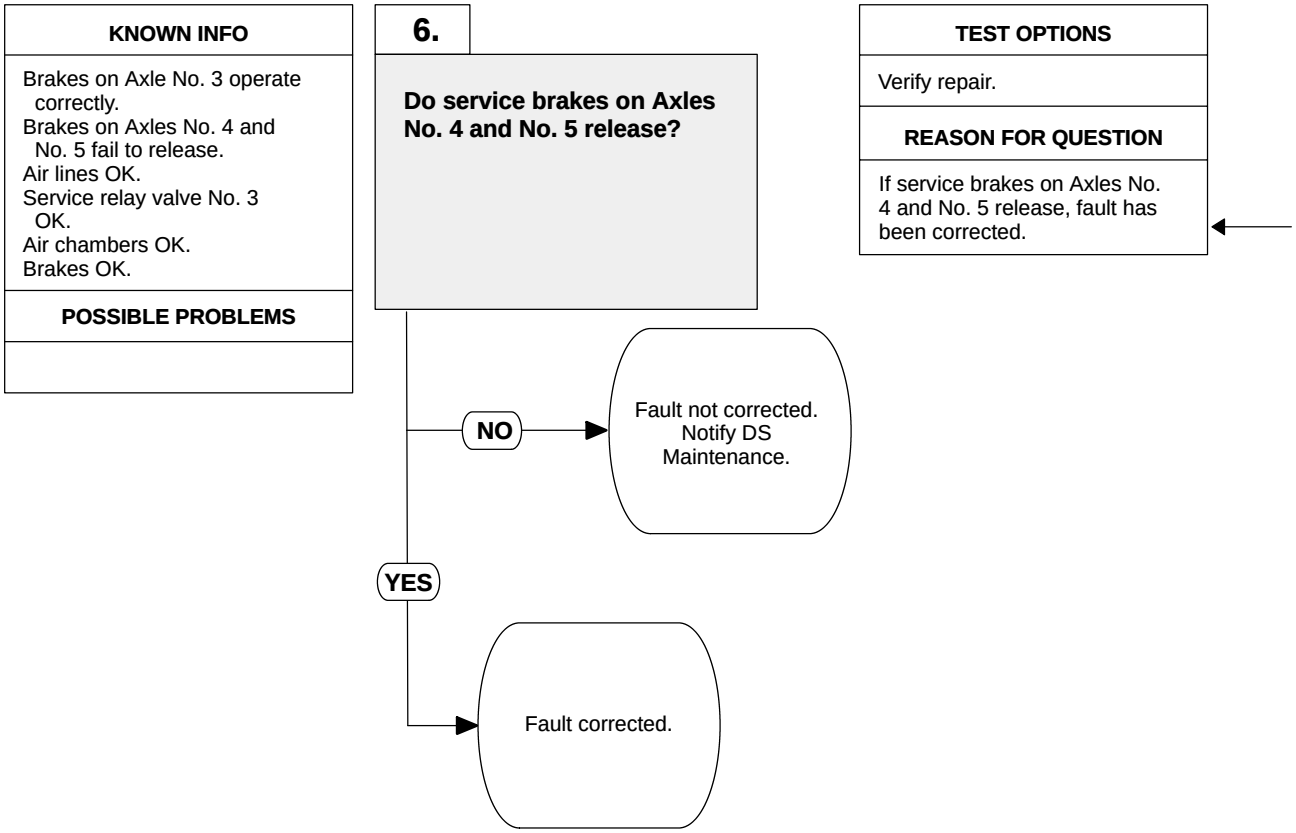


VISUAL INSPECTION

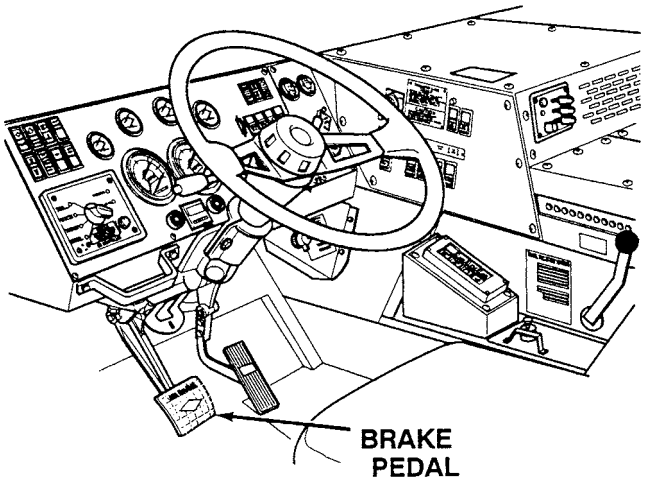
(1) Apply service brake (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is no gap, perform Steps (3) through (7) below.
  (b) If there is a gap, adjust brakes (Para 12-3).
(3) Release service brake.
(4) Cage air chamber (Para 12-10).
(5) Remove brake drum and air chamber (Para 13-3 and 12-10).
(6) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoes and/or wedges (Para 12-2).
  (b) If brake shoes and wedges are OK, notify DS Maintenance.
(7) Install brake drum and air chamber (Para 13-3 and 12-10).



13. SERVICE BRAKES ON AXLES NO. 4 AND NO. 5 DO NOT RELEASE (CONT).



VERIFY REPAIR
Apply and release brake pedal (TM 9-2320-364-10). (1) If service brakes do not release, fault not corrected. Release brake pedal and notify DS Maintenance. (2) If service brakes on Axles No. 4 and No. 5 release, fault has been corrected. Release brake pedal.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

14. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT APPLY.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

Materials/Parts
Locknuts (6) (Item 110, Appendix F)

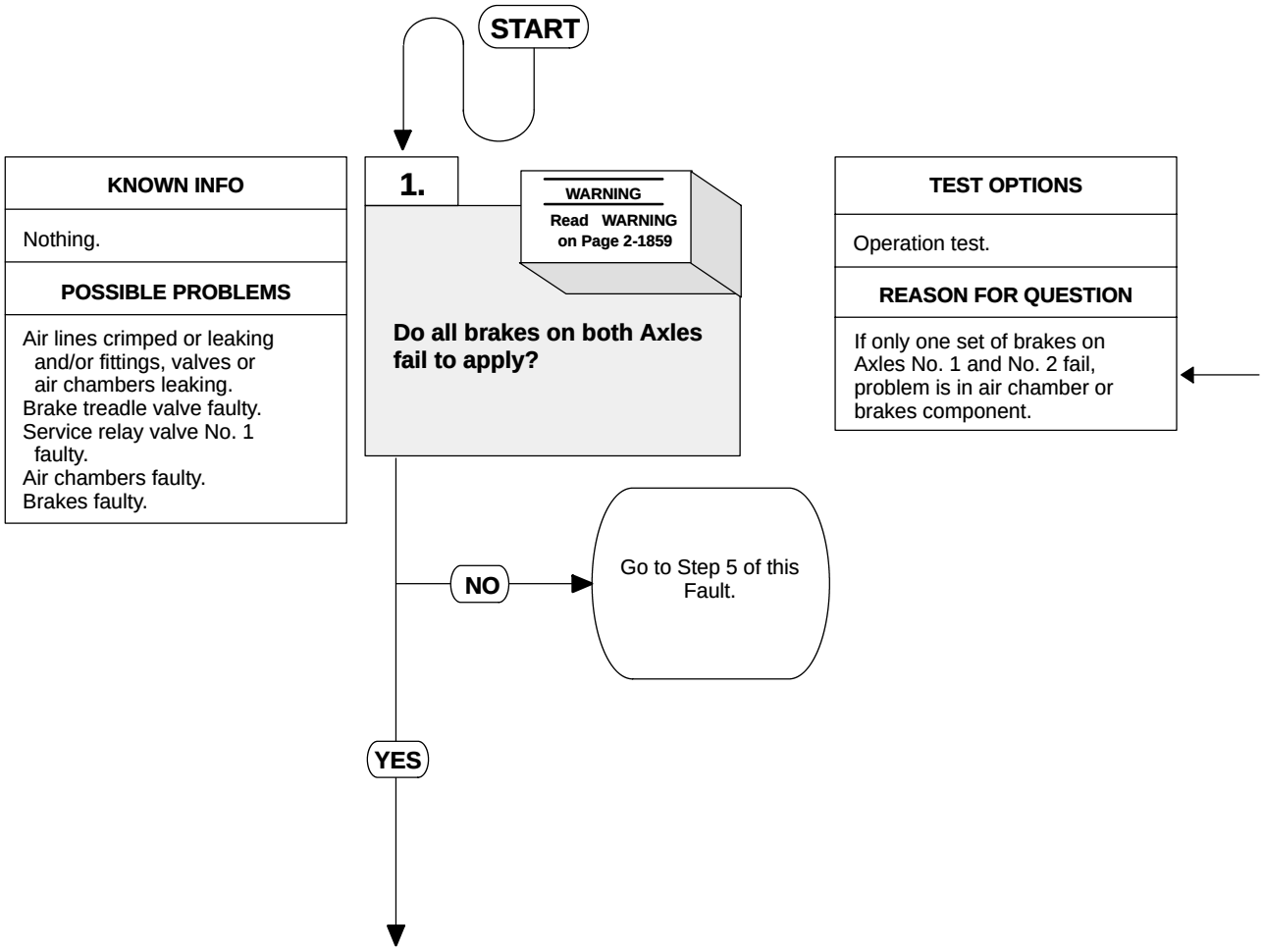
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

NOTE

The following troubleshooting procedures cover one set of brakes on Axles No. 1 and 2, but they apply to
all four sets of brakes.

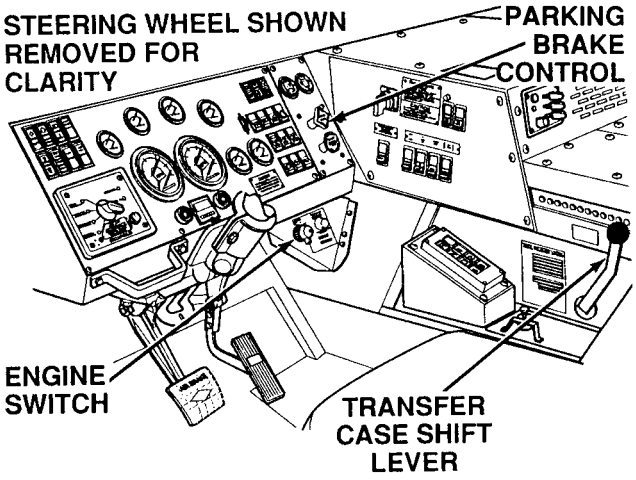


WARNING

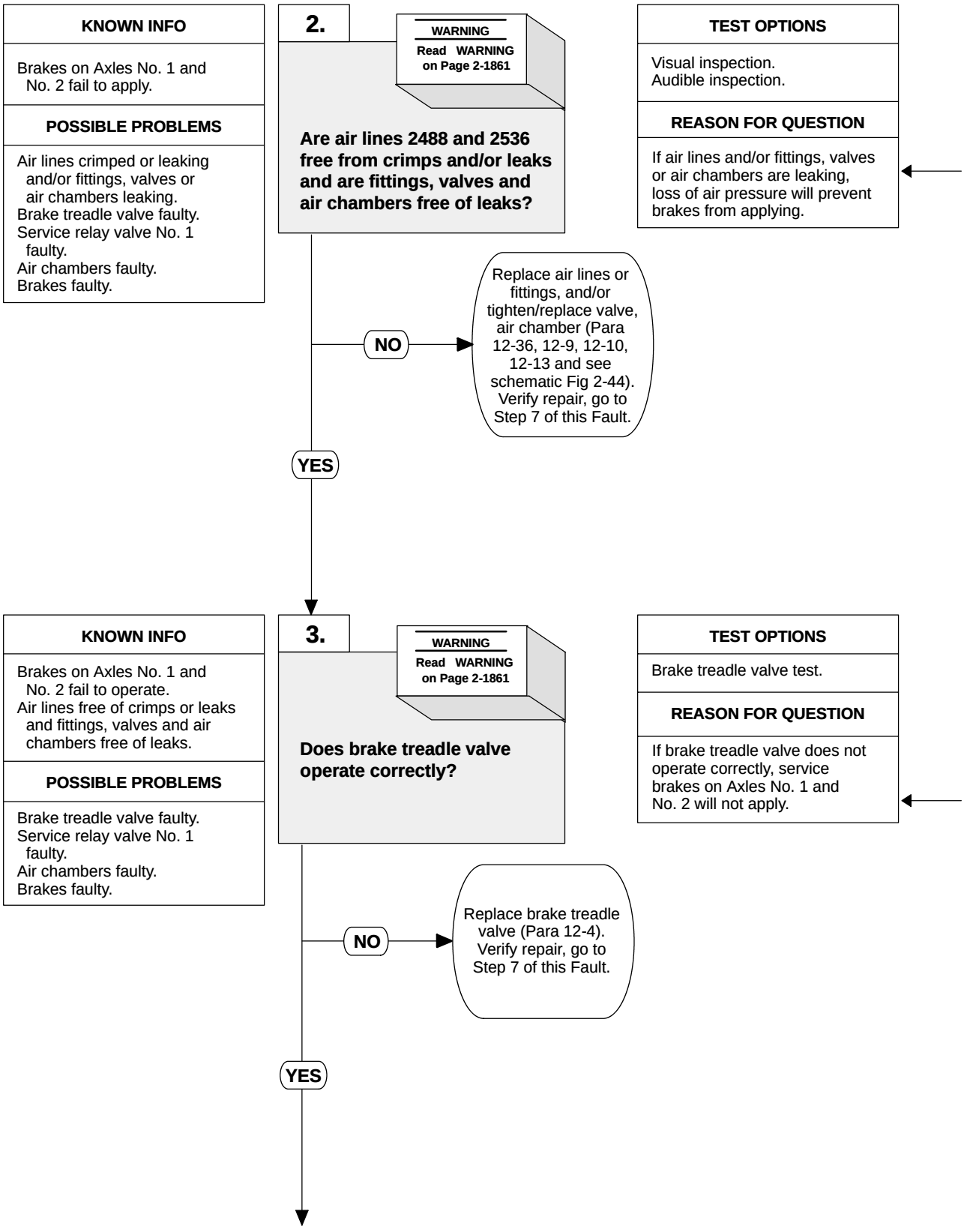
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Jack-up two front Axles until all wheels are off ground.
(4) Shift transfer case to N (neutral) (TM 9-2320-364-10).
(5) While assistant applies service brakes, try to turn all wheels by hand.
  (a) If only one wheel turns, perform Step (6) below and go to Step 5 of this Fault.
  (b) If all wheels fail to turn, perform Step (6) below and go to Step 2 of this Fault.
(6) Lower front wheels to ground.



14. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT APPLY (CONT).

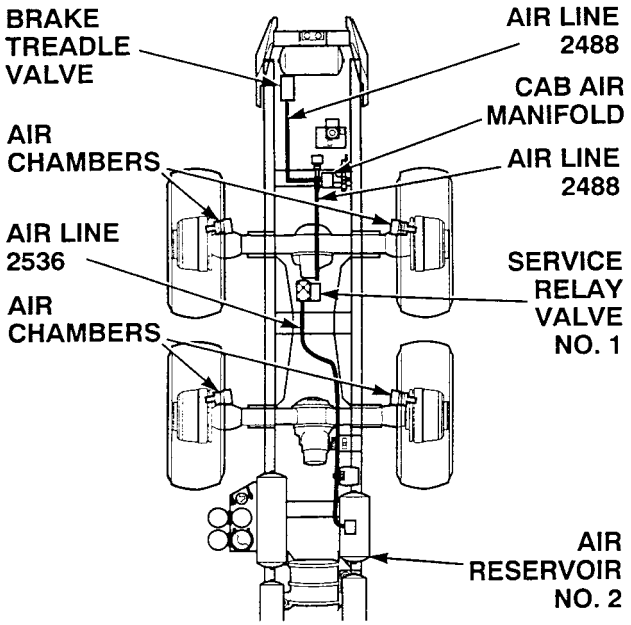


WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

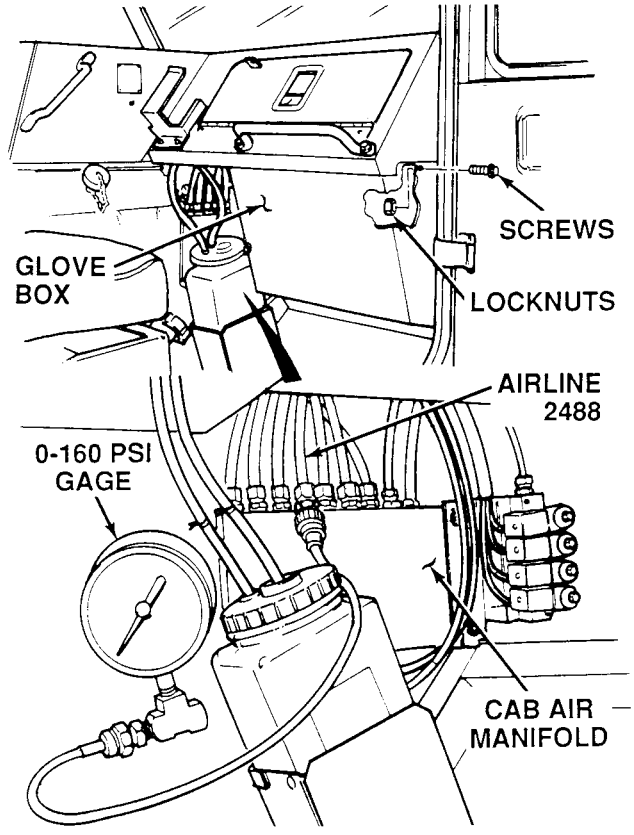
VISUAL/AUDIBLE INSPECTION

(1) Check air lines 2488 and 2536 for crimps (see schematic Fig 2-44).
  (a) If there are crimps in air lines, replace air lines (Para 12-36).
  (b) If there are no crimps in air lines, perform Steps (2) and (3) below.
(2) Apply service brakes (TM 9-2320-364-10).
(3) Check fittings and air lines 2488, 2536 for leaks (see schematic Fig 2-44).
  (a) If fittings or air lines are leaking, perform Step (6) below and tighten/replace fittings and/or replace air lines (Para 12-36).
  (b) If there are no leaks, fittings and air lines are OK. Perform Step (4) below.
(4) Check service relay valve No. 1 for leaks.
  (a) If service relay valve No. 1 leaks, perform Step (6) below and replace valve (Para 12-13).
  (b) If there are no leaks, perform Step (5) below.
(5) Check air chambers for leaks.
  (a) If air chamber leaks, perform Step (6) below and replace air chamber (Para 12-9).
  (b) If there are no leaks, perform Step (6) below.
(6) Release service brakes.

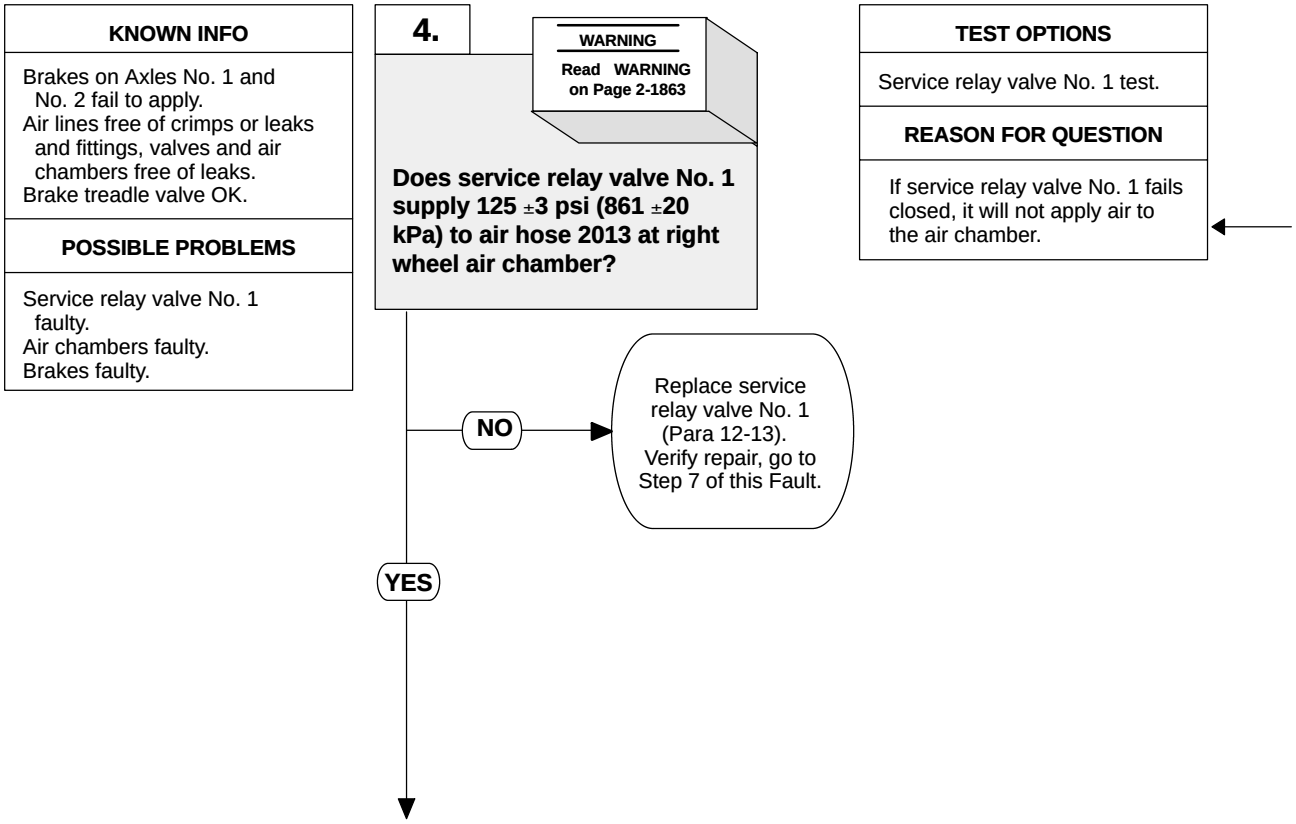


BRAKE TREADLE VALVE TEST

(1) Remove six screws, locknuts and glove box. Discard locknuts.
(2) Disconnect air line 2488 from cab air manifold.
(3) Connect 0 to 160 psi (0-1103 kPa) gage to air line 2488.
(4) Apply service brakes (TM 9-2320-364-10).
  (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2488, perform Steps (5) through (7) below and replace brake treadle valve (Para 12-4).
  (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2488, brake treadle valve is OK.
(5) Release service brakes.
(6) Remove gage and connect air line 2488 to cab air manifold.
(7) Install glove box, six screws and locknuts.



14. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT APPLY (CONT).

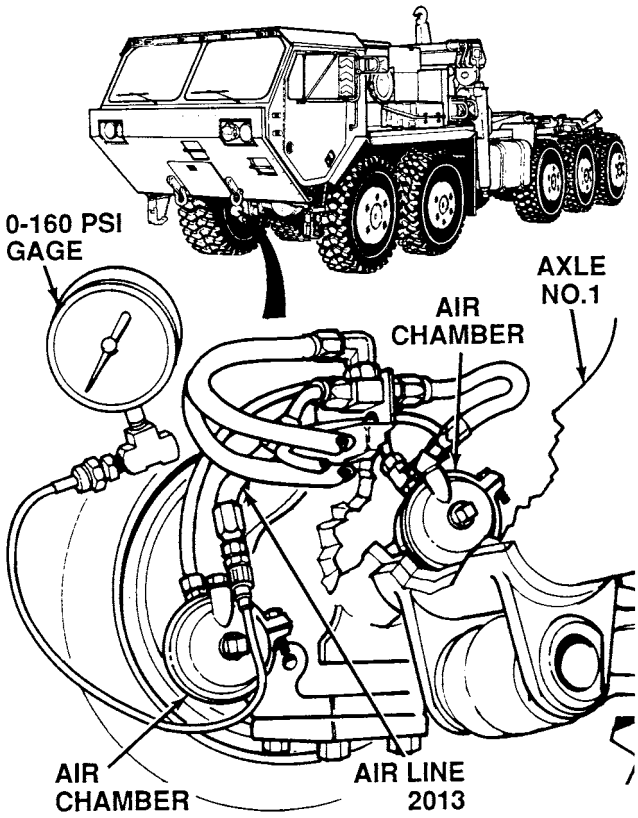


WARNING

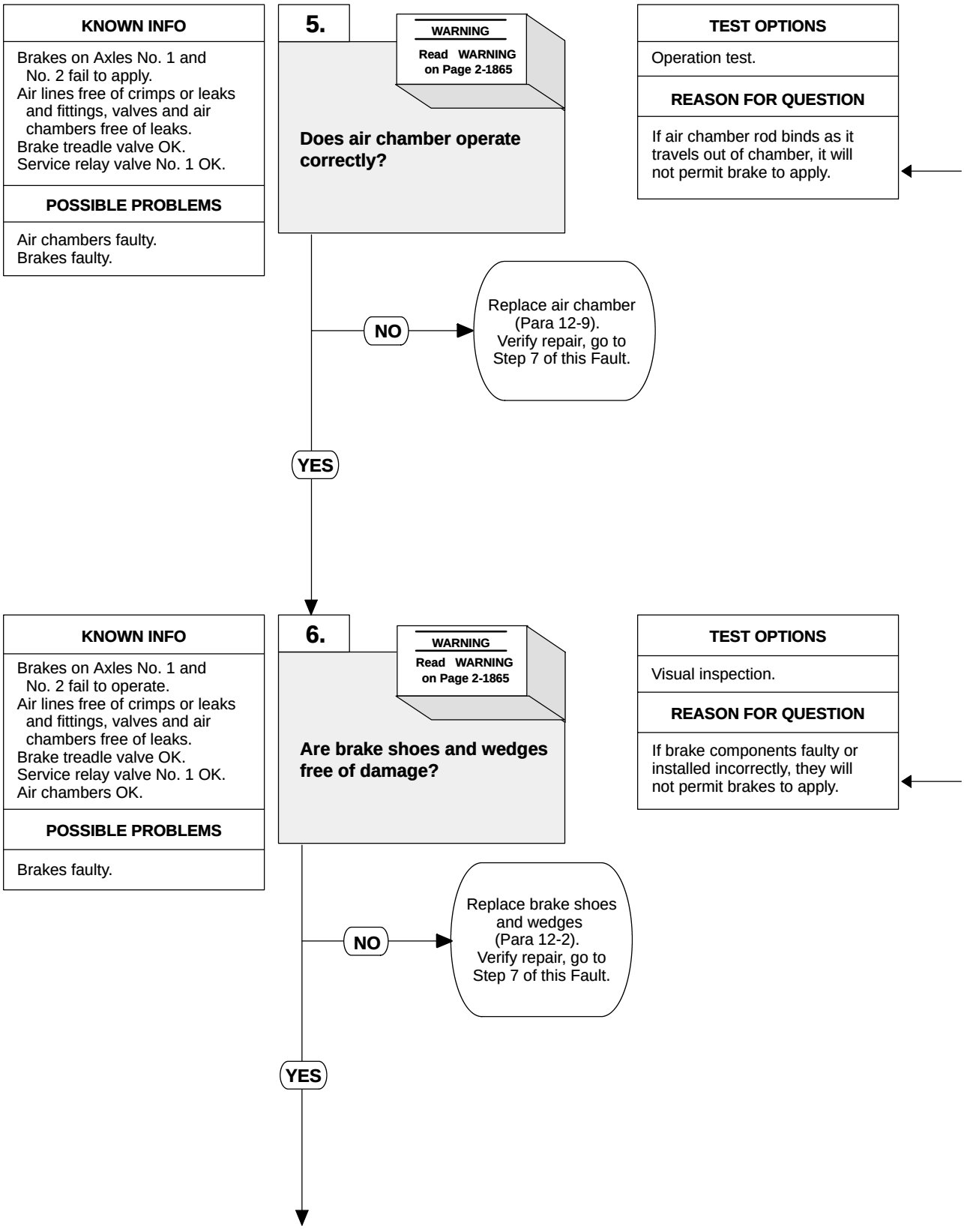
If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

SERVICE RELAY VALVE NO. 1 TEST

(1) Disconnect air line 2013 from right air chamber on Axle No. 1.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2013.
(3) Observe gage while assistant applies service brakes (TM 9-2320-364-10).
    (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2013, perform Step (4) below and replace service relay valve No. 1 (Para 12-13).
    (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2013, service relay valve No. 1 is OK.
(4) Release brakes.
(5) Remove gage and connect air line 2013 to No. 1 Axle air chamber.



14. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT APPLY (CONT).



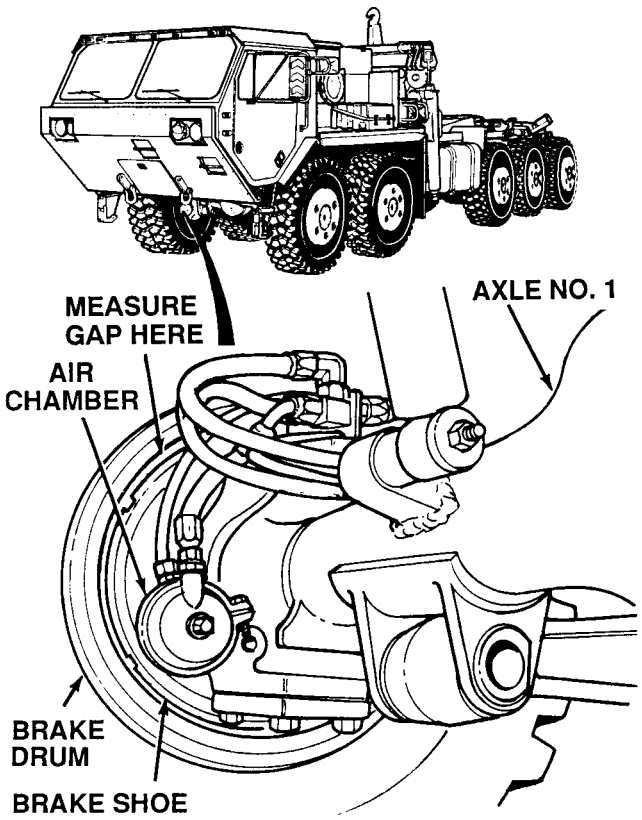
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

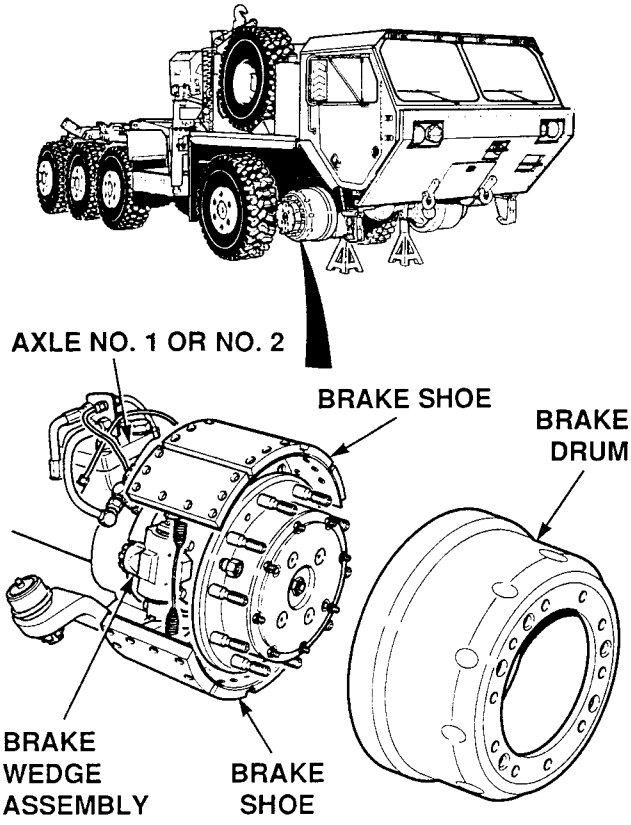
Listen to air chamber while assistant applies service brakes (TM 9-2320-364-10).

(1) If assistant cannot hear air chamber operate when service brakes are applied, replace air chamber (Para 12-9).
(2) If air chamber operates correctly, air chamber is OK.

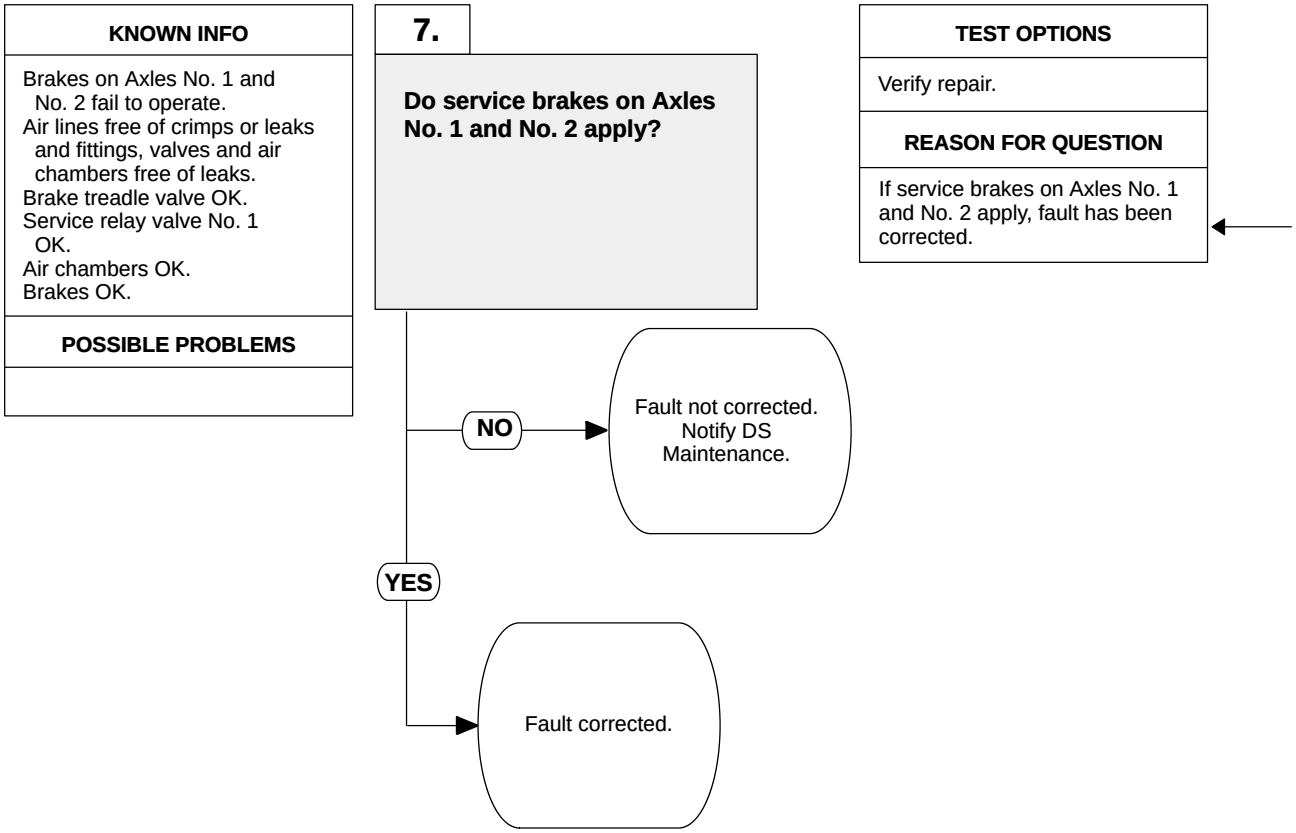


VISUAL INSPECTION

(1) Apply service brakes (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-2).
  (a) If there is no gap, perform Steps (3) through (6) below.
  (b) If there is a gap, adjust brakes (Para 12-2).
(3) Release service brake.
(4) Remove brake drum and air chamber (Para 13-3 and 12-9).
(5) Inspect brake shoes and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoe and/or wedges (Para 12-2).
  (b) If shoes and wedges are OK, notify DS Maintenance.
(6) Install brake drum and air chamber (Para 13-3 and 12-9).



14. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT APPLY (CONT).

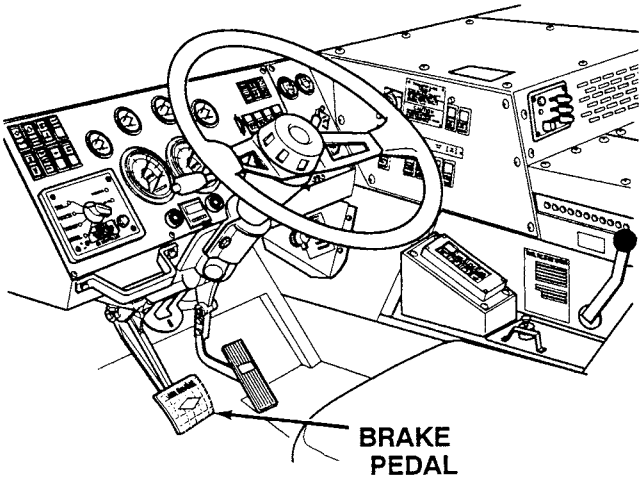


VERIFY REPAIR

Apply brake pedal (TM 9-2320-364-10).

(1) If service brakes on Axles No. 1 and No. 2 do not apply, fault not corrected. Release brake pedal and notify DS Maintenance.

(2) If service brakes on Axles No. 1 and No. 2 do apply, fault has been corrected. Release brake pedal.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

15. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT RELEASE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Pressure Test Kit (Item 50, Appendix G)

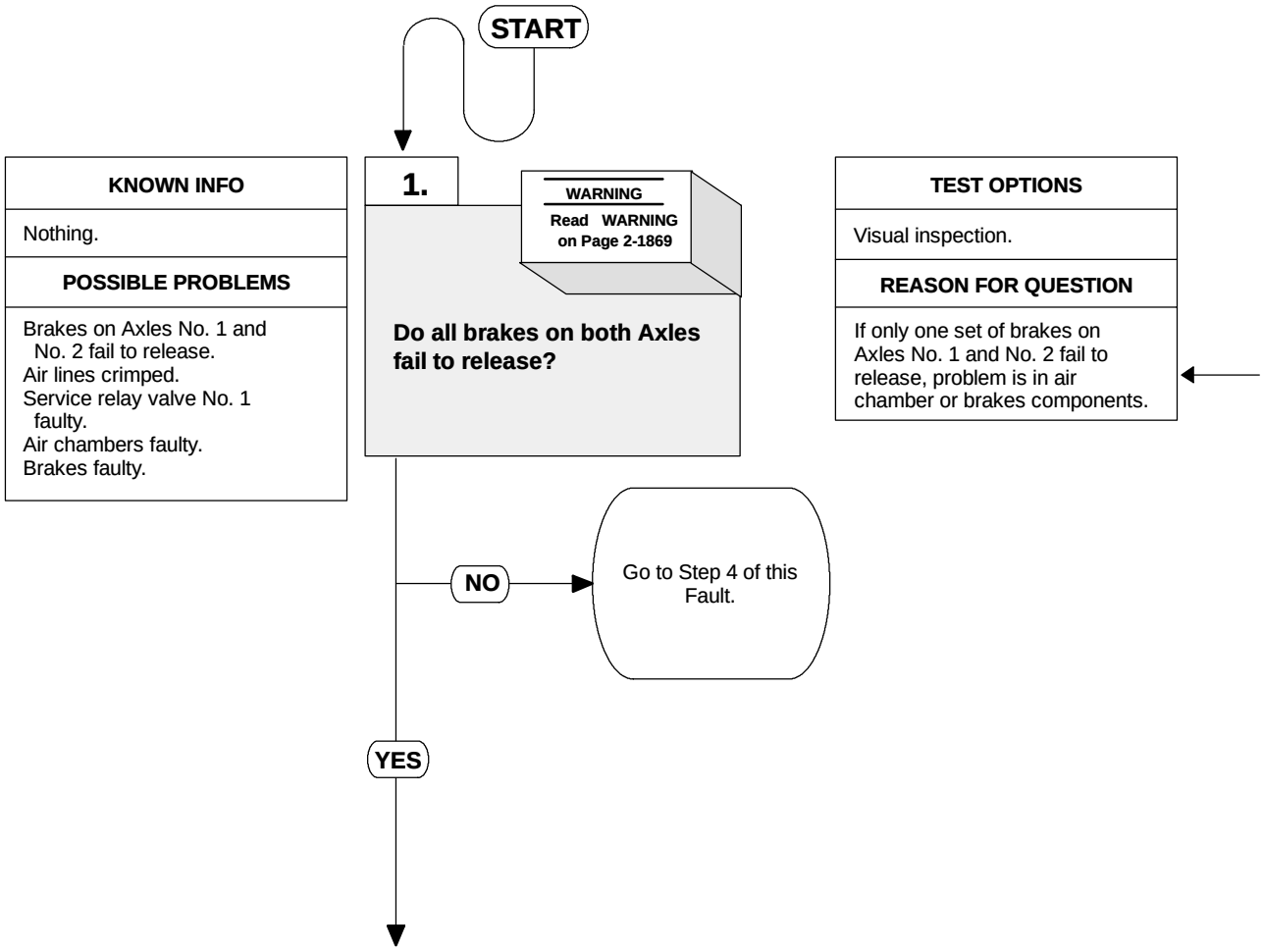
Personnel Required
Two

References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

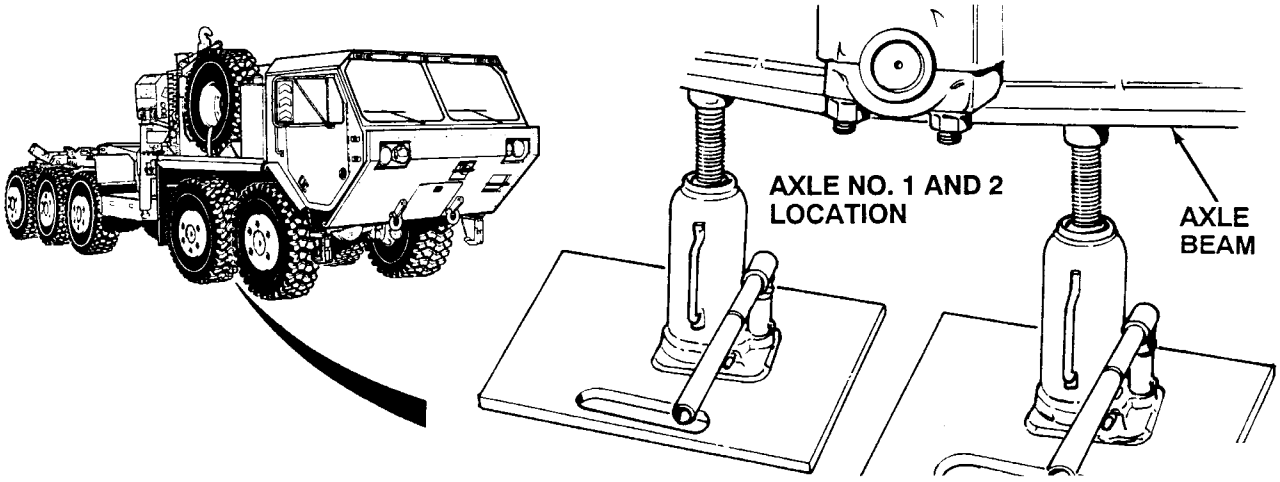
NOTE

The following troubleshooting procedures cover one set of brakes on Axles No. 1 and No. 2, but they apply to all four sets of brakes.



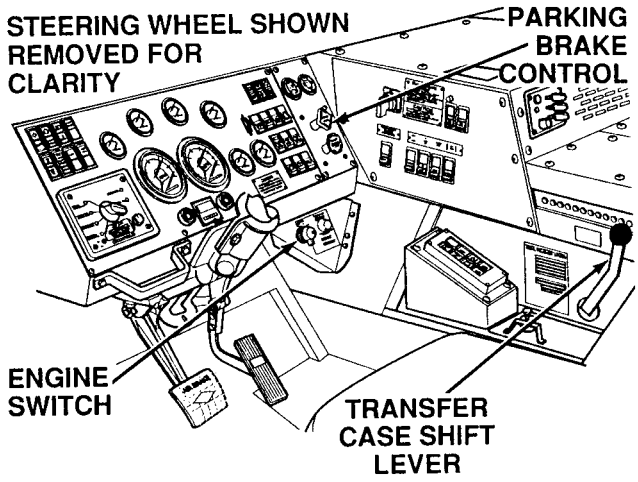
WARNING

- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

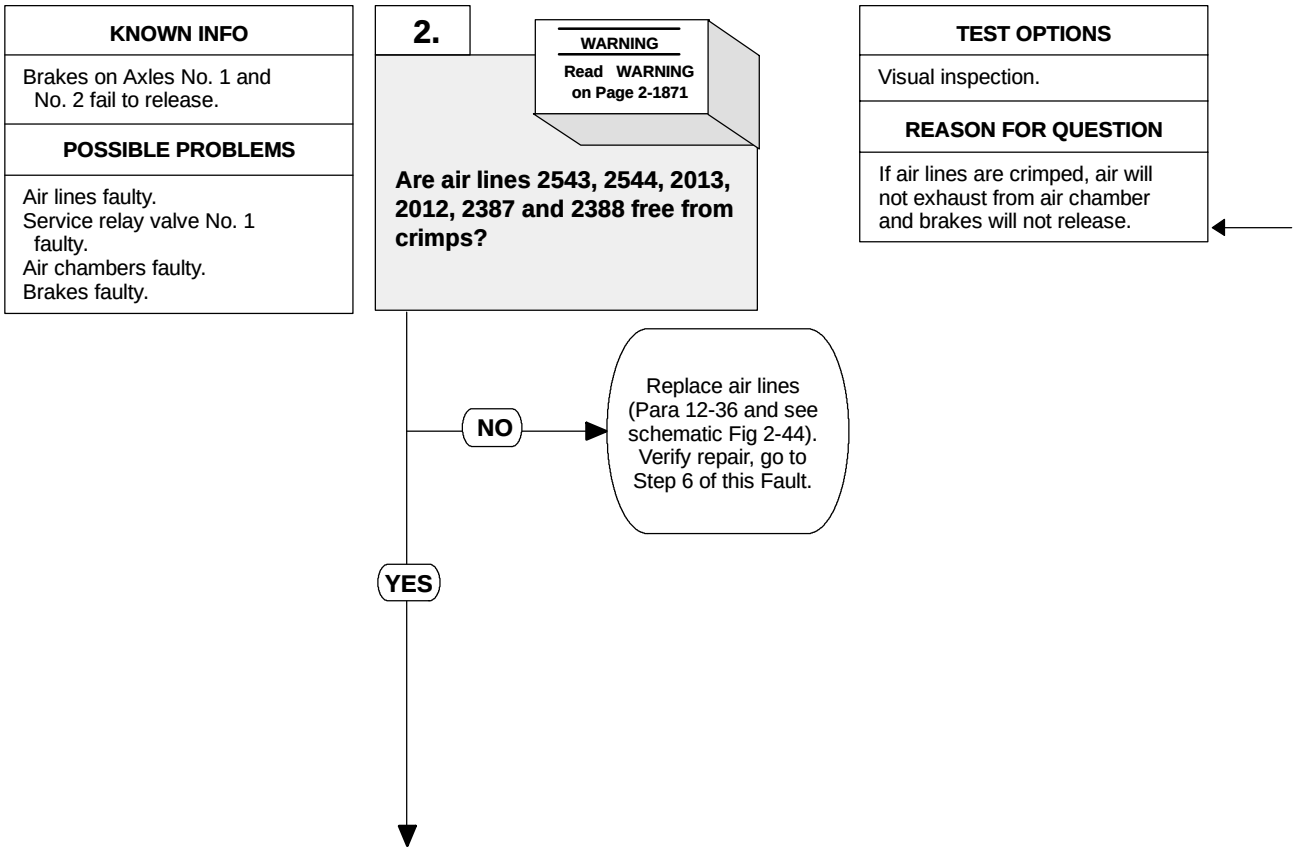


VISUAL INSPECTION

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa).
(2) Turn OFF ENGINE switch.
(3) Jack-up two front Axles until wheels are off ground (TM 9-2320-364-10).
(4) Shift transfer case to N (neutral).
(5) Release PARKING BRAKE.
(6) Turn all wheels by hand.
  (a) If only one wheel fails to turn, perform Step (7) below and go to Step 4 of this Fault.
  (b) If all wheels fail to turn, perform Step (7) below and go to Step 2 of this Fault.
(7) Lower wheels to ground.



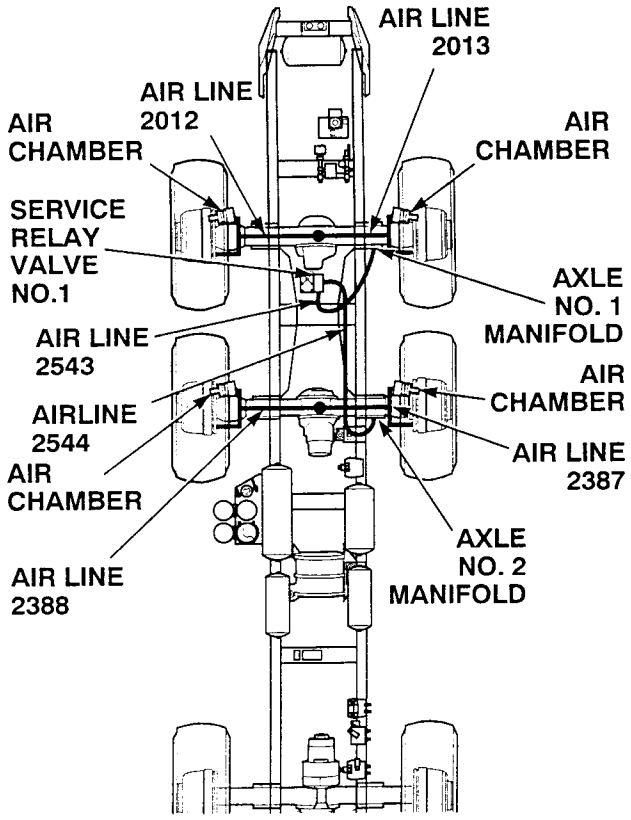
15. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT RELEASE (CONT).



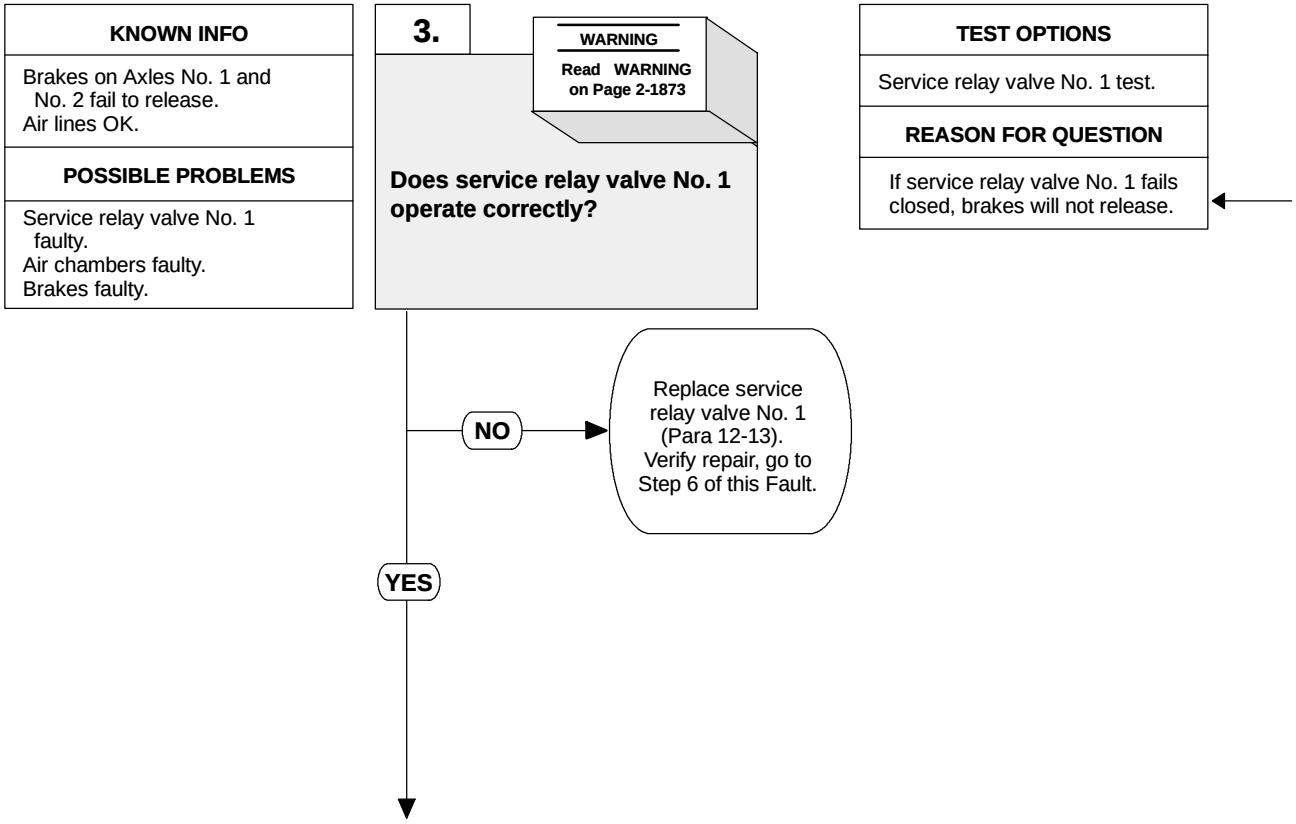
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

VISUAL INSPECTION
Check air lines 2543, 2544, 2013, 2012, 2387 and 2388 for crimping (see schematic Fig 2-44). (1) If there are crimps in air lines, replace air lines (Para 12-36). (2) If there are no crimps in air lines, air lines are OK.



15. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT RELEASE (CONT).

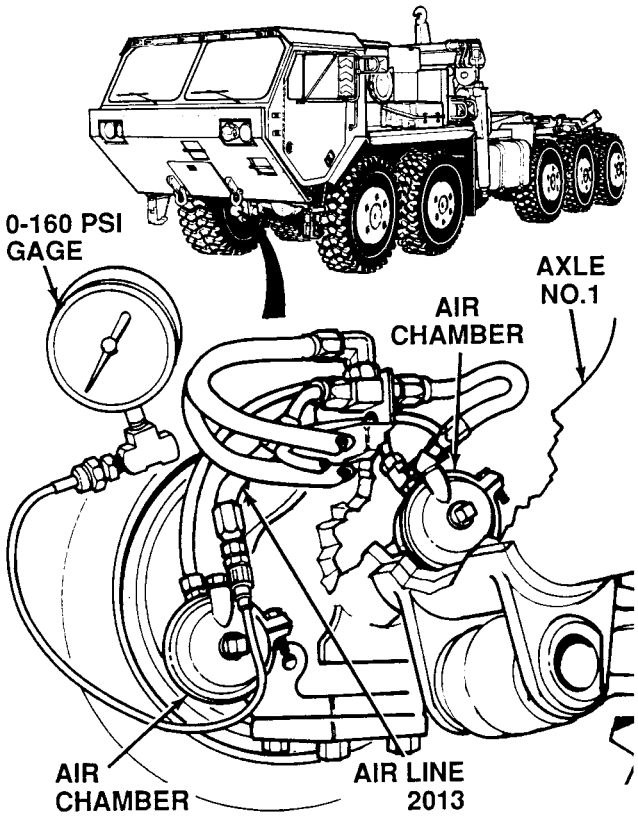


WARNING

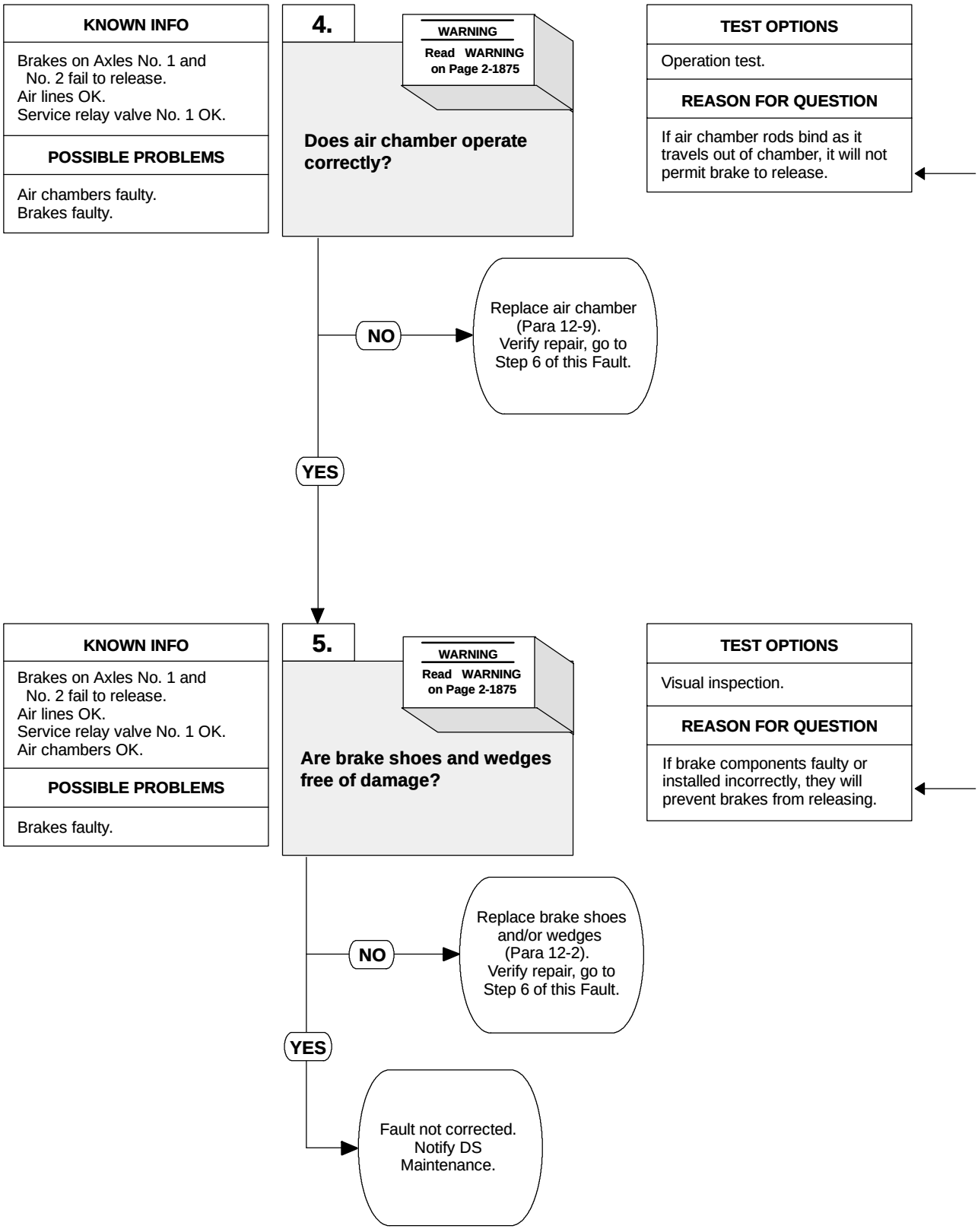
If air lines are under high pressure when they are disconnected, they can whip around and cause injury to personnel. Caution should be exercised when loosening or disconnecting air line fittings.

SERVICE RELAY VALVE NO. 1 TEST

(1) Disconnect air line 2013 from right air chamber on Axle No. 1.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) gage to air line 2013.
(3) Observe gage while assistant applies then releases service brakes (TM 9-2320-364-10).
    (a) If there are not 125 ±4 psi (861 ±28 kPa) present at air line 2013, perform Step (4) below and replace service relay valve No. 1 (Para 12-13).
    (b) If there are 125 ±4 psi (861 ±28 kPa) present at air line 2013, service relay valve No. 1 is OK.
(4) Remove gage and connect air line 2013 to Axle No. 1 right air chamber.



15. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT RELEASE (CONT).



WARNING

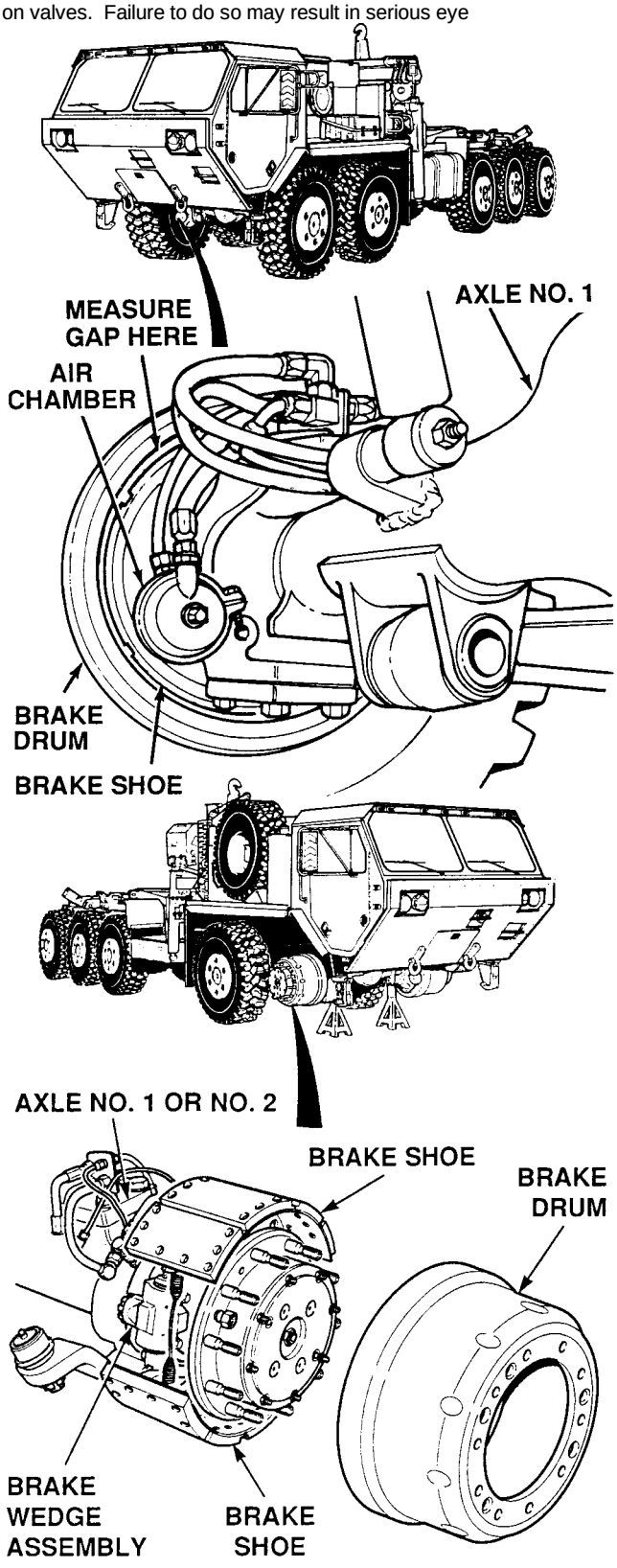
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

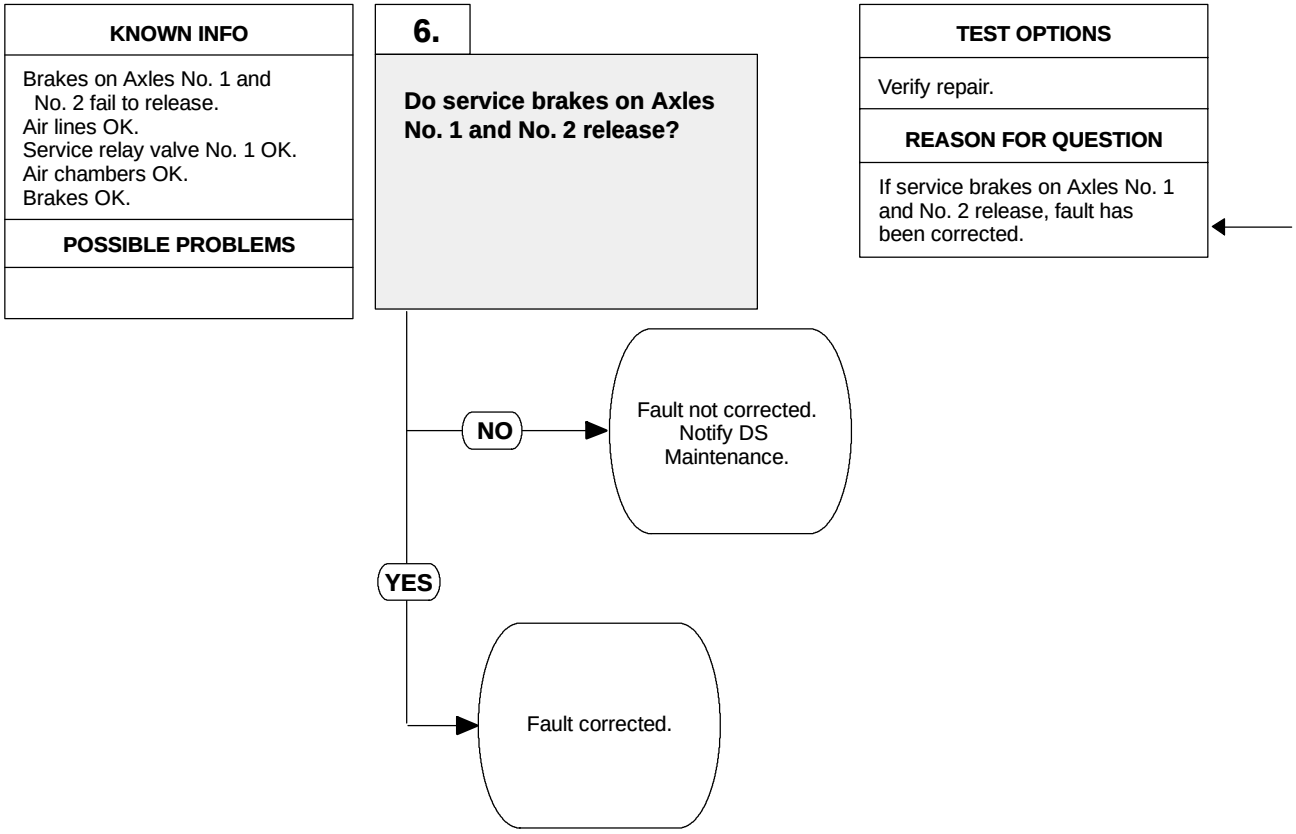
(1) Apply and release service brakes (TM 9-2320-364-10).
(2) Listen to air chamber while assistant applies then releases service brakes.
  (a) If assistant cannot hear air chamber operate, or brake shoe does not move when brake is applied and released, replace air chamber (Para 12-9).
  (b) If air chamber operates correctly, air chamber is OK.

VISUAL INSPECTION

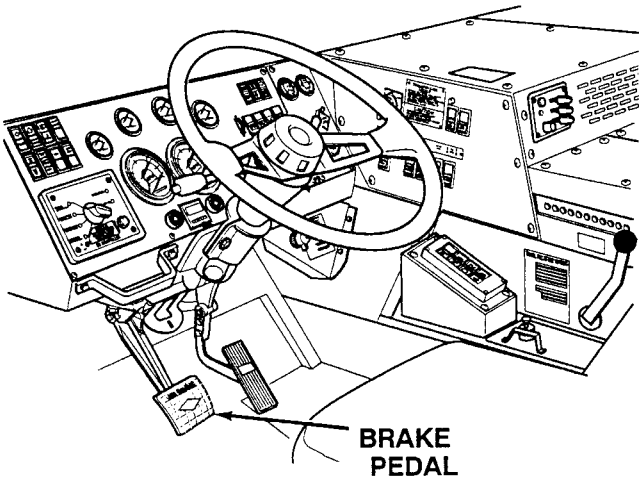
(1) Apply service brake (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is a gap, adjust brakes (Para 12-3).
  (b) If there is no gap, perform Steps (3) through (6) below.
(3) Release service brake.
(4) Remove brake drum and air chamber (Para 13-3 and 12-9).
(5) Inspect brake shoes and wedges.
  (a) If brake shoes and/or wedges are faulty, replace brake shoes and/or wedges (Para 12-2).
  (b) If shoes and wedges are OK, notify DS Maintenance.
(6) Install brake drum and air chamber 13-3 and 12-9.



15. SERVICE BRAKES ON AXLES NO. 1 AND NO. 2 DO NOT RELEASE (CONT).



VERIFY REPAIR
Apply and release brake pedal (TM 9-2320-364-10). (1) If service brakes on Axles No. 1 and No. 2 do not release, fault not corrected. Notify DS Maintenance. (2) If service brakes on Axles No. 1 and No. 2 do release, fault has been corrected.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

16. TRUCK BRAKES UNEVENLY; PULLS TO ONE SIDE.

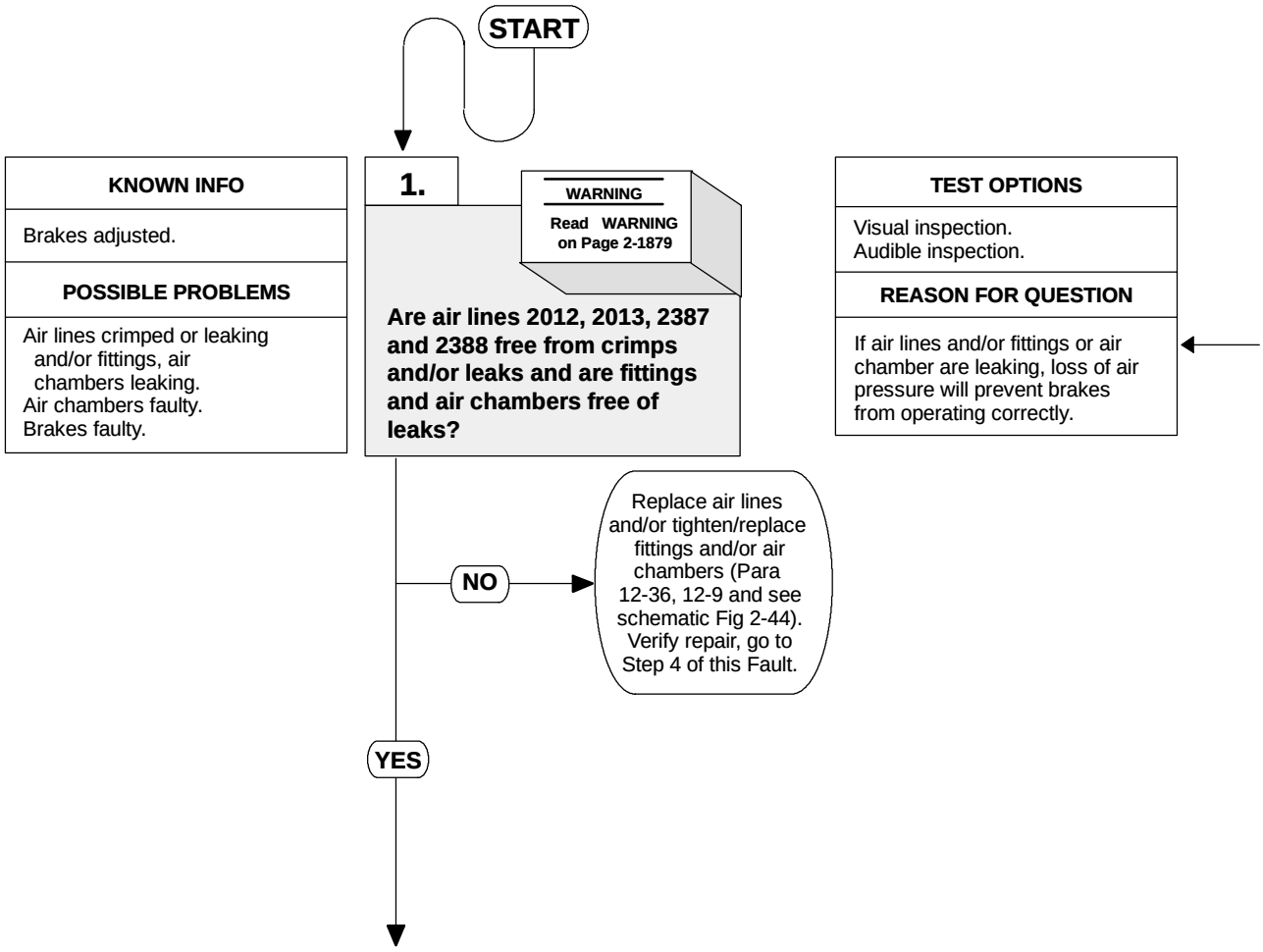
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

Personnel Required
Two

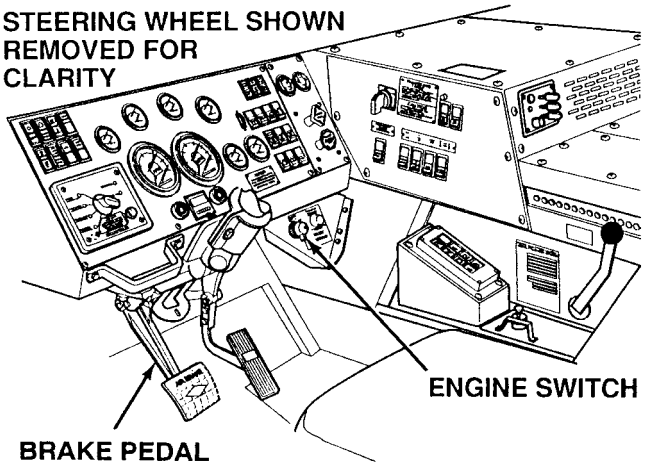
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



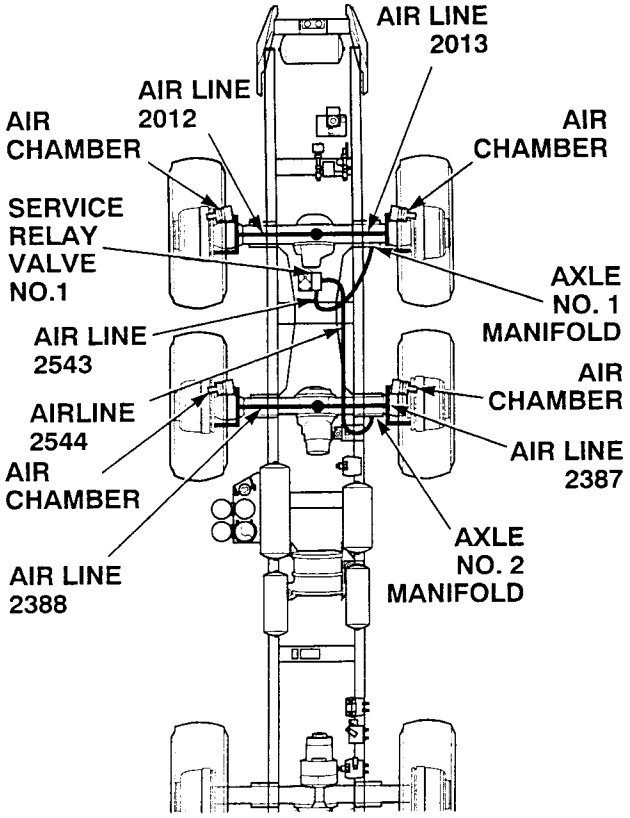
WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

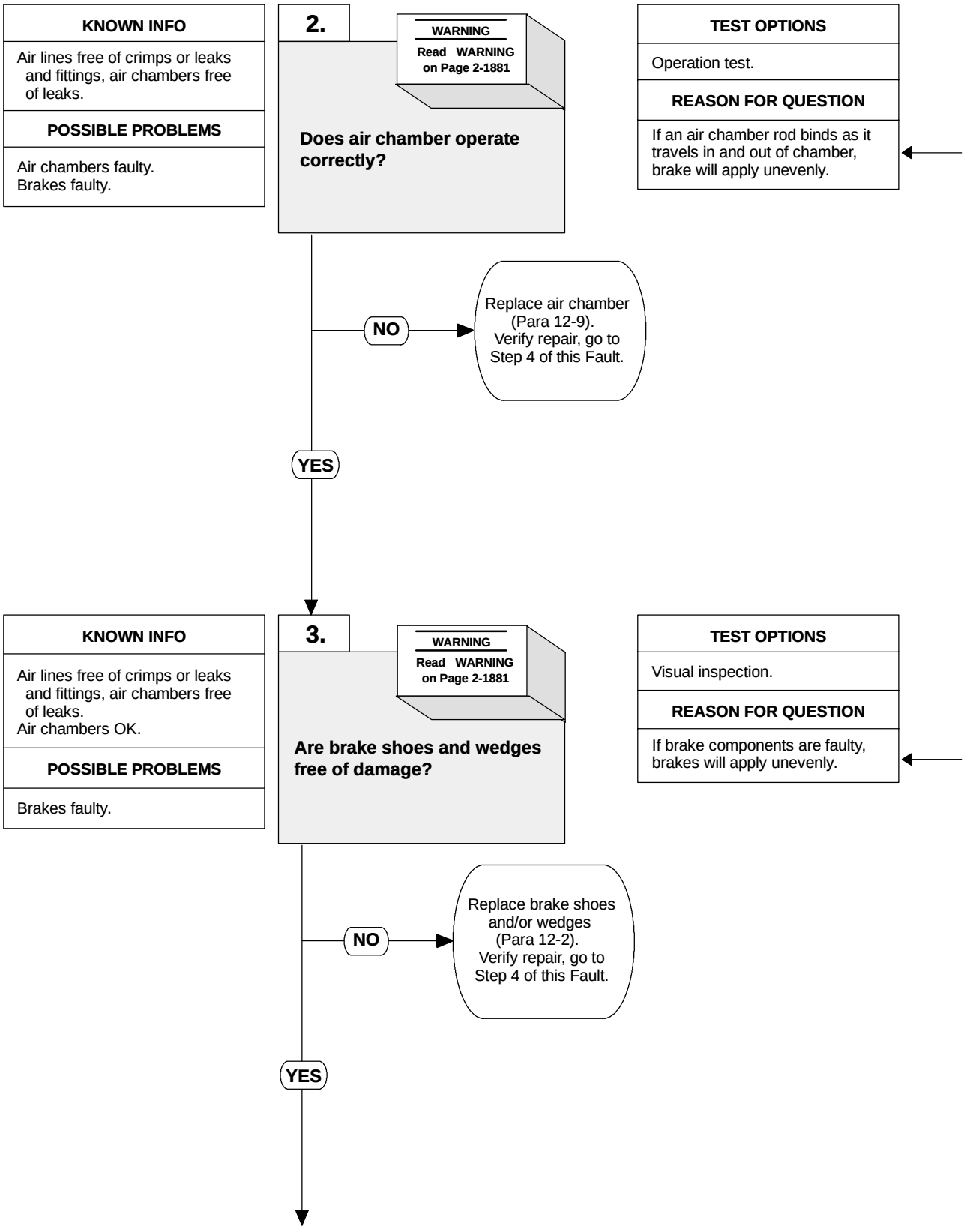


VISUAL/AUDIBLE INSPECTION

(1) Start engine and build pressure to 125 ± 4 psi (861 ± 28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Check air lines 2012, 2013, 2387 and 2388 for crimping (see schematic Fig 2-44).
  (a) If there are crimps in air lines, replace air lines (Para 12-36).
  (b) If there are no crimps in air lines, perform Steps (4) and (5) below.
(4) Apply service brakes (TM 9-2320-364-10).
(5) Check fittings and air lines 2012, 2013, 2387, 2388 for leaks.
  (a) If there are leaks, perform Step (7) below and tighten/replace fittings and/or replace air lines (Para 12-36).
  (b) If there are no leaks, air lines and fittings are OK. Perform Step (6) below.
(6) Check air chambers for leaks.
  (a) If air chambers leak, perform Step (7) below and replace air chambers (Para 12-9).
  (b) If there are no leaks, perform Step (7) below.
(7) Release service brakes.



16. TRUCK BRAKES UNEVENLY; PULLS TO ONE SIDE (CONT).



WARNING

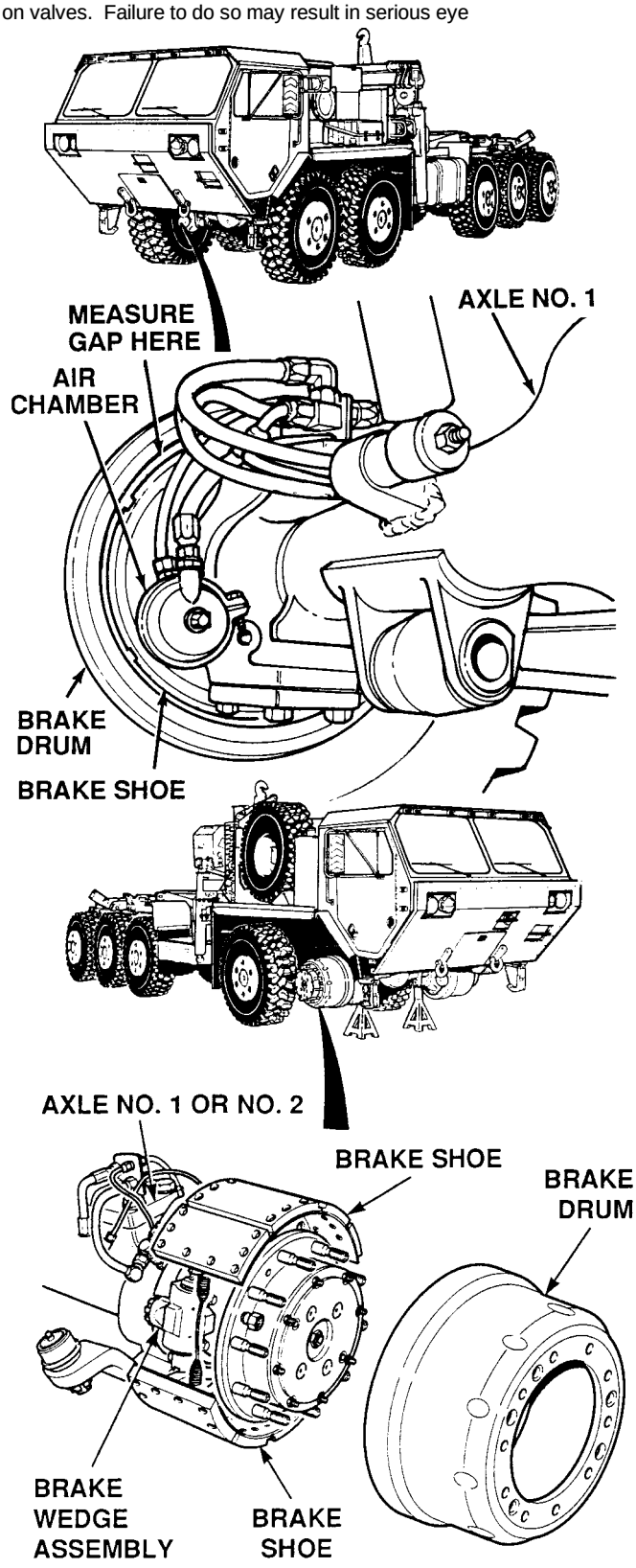
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

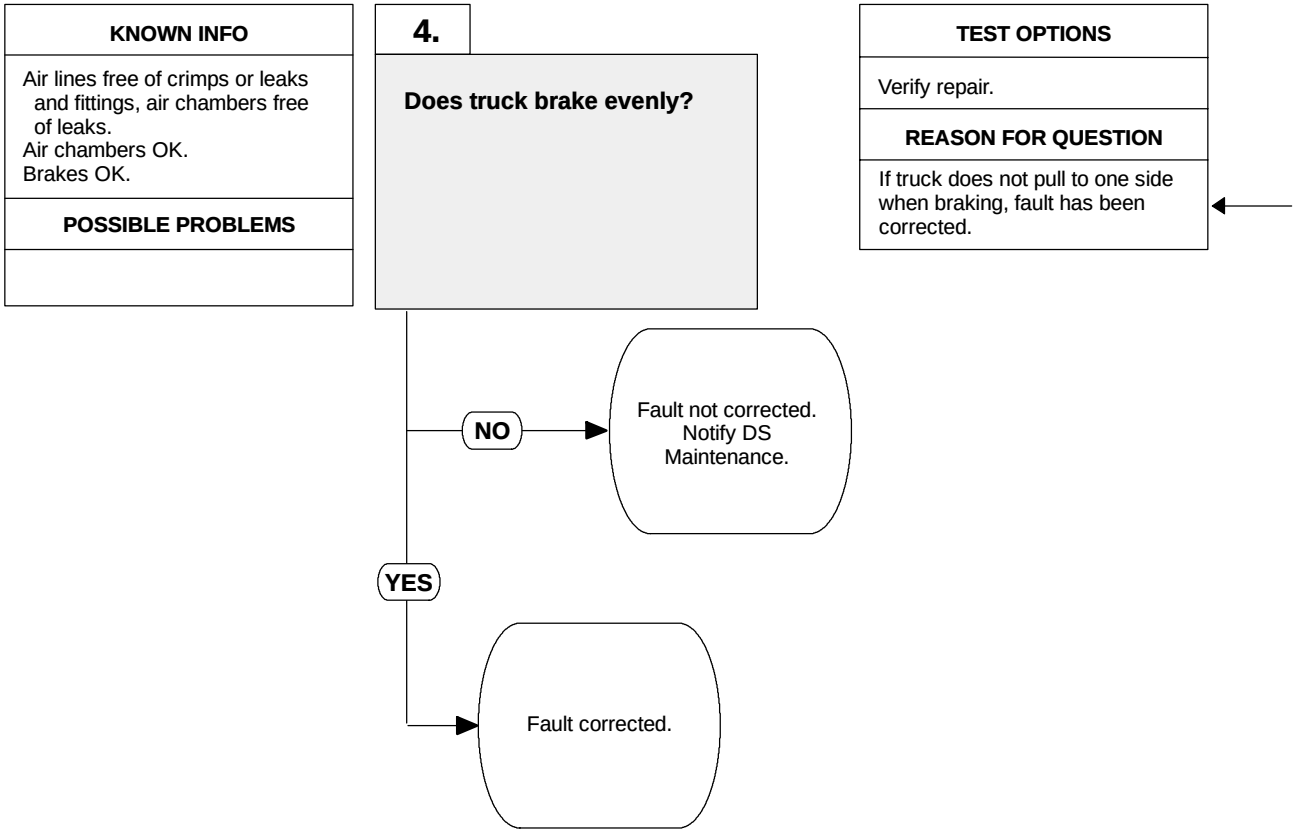
(1) Release PARKING BRAKE (TM 9-2320-364-10).
(2) Listen to air chamber while assistant applies then releases service brakes.
  (a) If assistant cannot hear air chamber operate when brakes are applied, replace air chamber (Para 12-9).
  (b) If air chamber operates correctly, air chamber is OK.

VISUAL INSPECTION

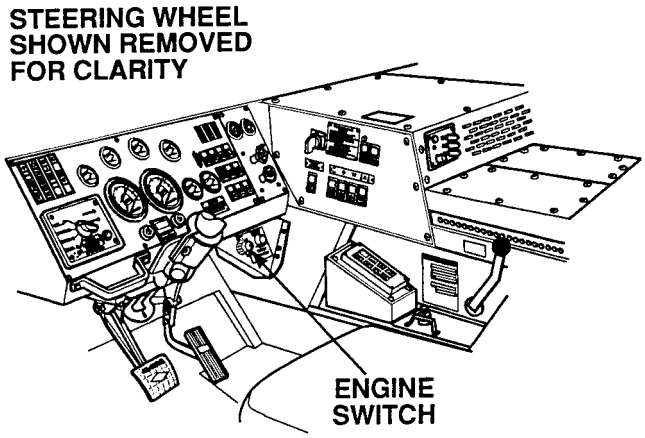
(1) Apply service brake (TM 9-2320-364-10).
(2) Measure gap between brake shoe and drum (Para 12-3).
  (a) If there is a gap, adjust brakes (Para 12-3).
  (b) If there is no gap, perform Steps (3) through (6) below.
(3) Release service brake.
(4) Remove brake drum and air chamber (Para 13-3 and 12-9).
(5) Inspect brake shoes, and wedges (Para 12-2).
  (a) If brake shoes and/or wedges are faulty, replace brake shoe and/or wedges (Para 12-2).
  (b) If shoes and wedges are OK, notify DS Maintenance.
(6) Install brake drum and air chamber (Para 13-3 and 12-9).



16. TRUCK BRAKES UNEVENLY; PULLS TO ONE SIDE (CONT).



VERIFY REPAIR
(1) Start engine (TM 9-2320-364-10). (2) Operate truck for 10 minutes and apply brakes at 10 mph (16 km/hr), 20 mph (32 km/hr), 30 mph (48 km/hr) and 45 mph (72 km/hr). (a) If truck still pulls to one side, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance. (b) If truck brakes evenly, fault has been corrected. (3) Turn OFF ENGINE switch.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

17. EXCESSIVE BRAKING DISTANCE.

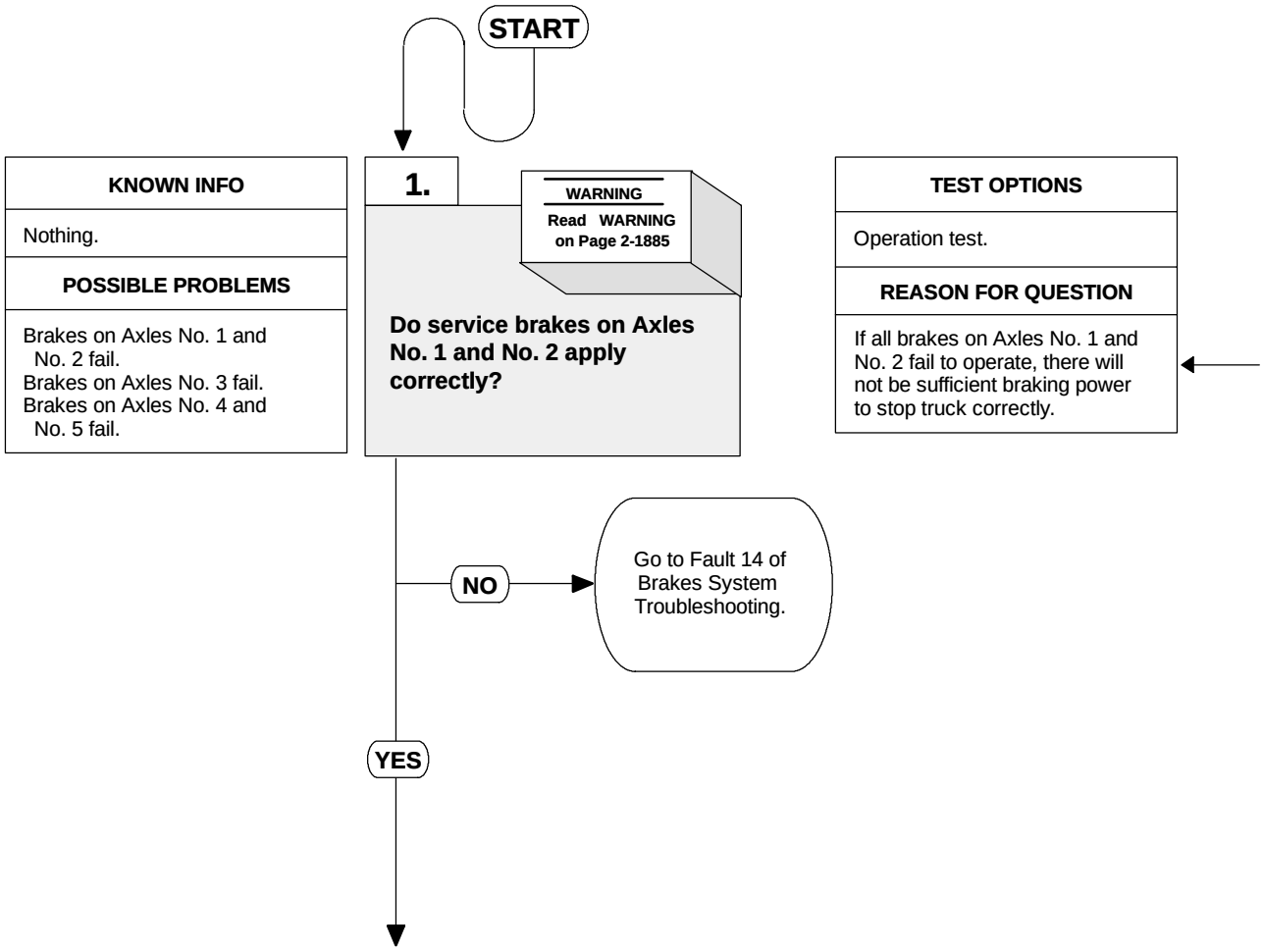
INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)

Personnel Required
Two

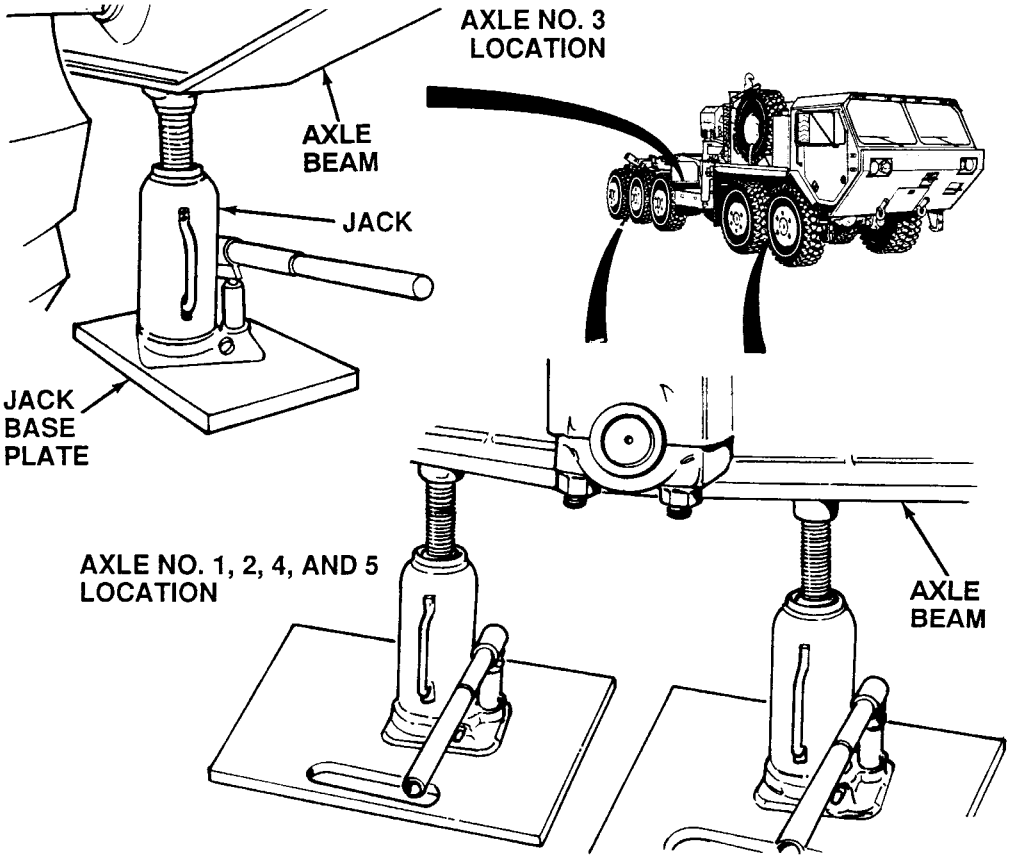
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



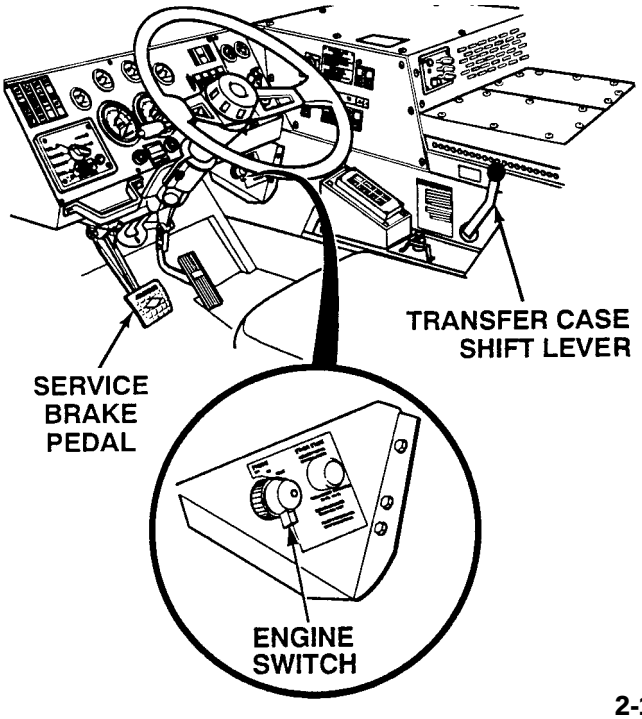
WARNING

- Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.
- Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

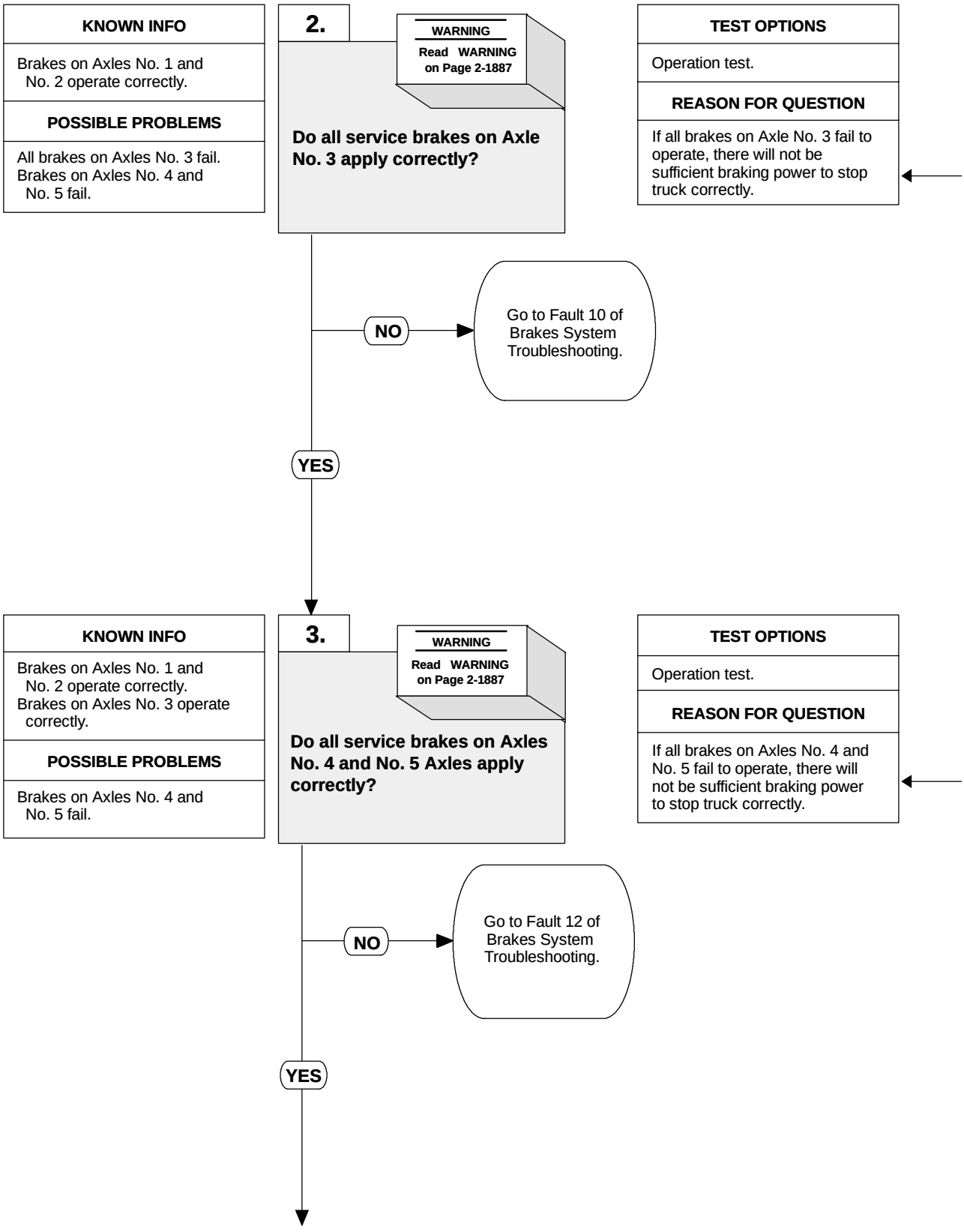


OPERATION TEST

(1) Start engine and build pressure to 125 ±4 psi (861 ±28 kPa) (TM 9-2320-364-10).
(2) Turn OFF ENGINE switch.
(3) Jack-up all Axles until wheels are off ground.
(4) Shift transfer case to N (neutral) (TM 9-2320-364-10).
(5) Release PARKING BRAKE.
(6) While assistant applies service brakes, try to turn all wheels on Axle No. 1 and No. 2 by hand.
  (a) If one or both wheels turn, go to Fault 14 of Brakes System Troubleshooting.
  (b) If no wheels turn, go to Step 2 of this Fault.
(7) Release service brake.



17. EXCESSIVE BRAKING DISTANCE (CONT).

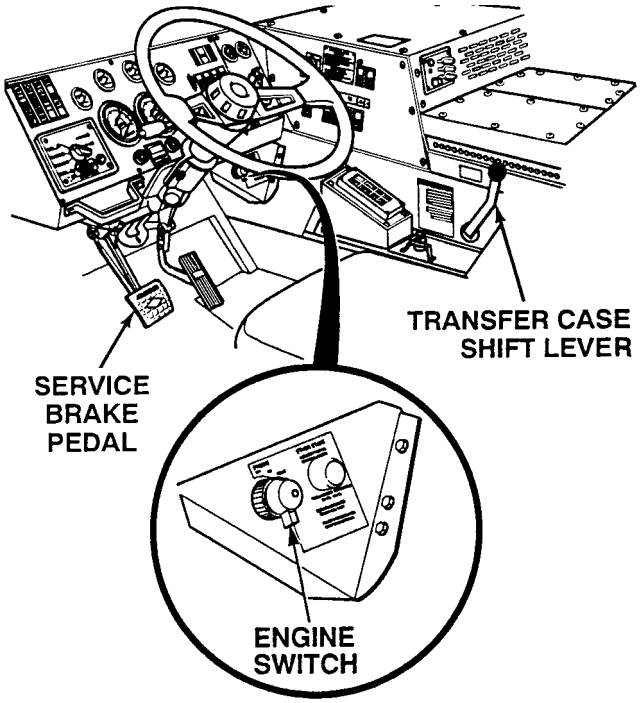


WARNING

Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

OPERATION TEST

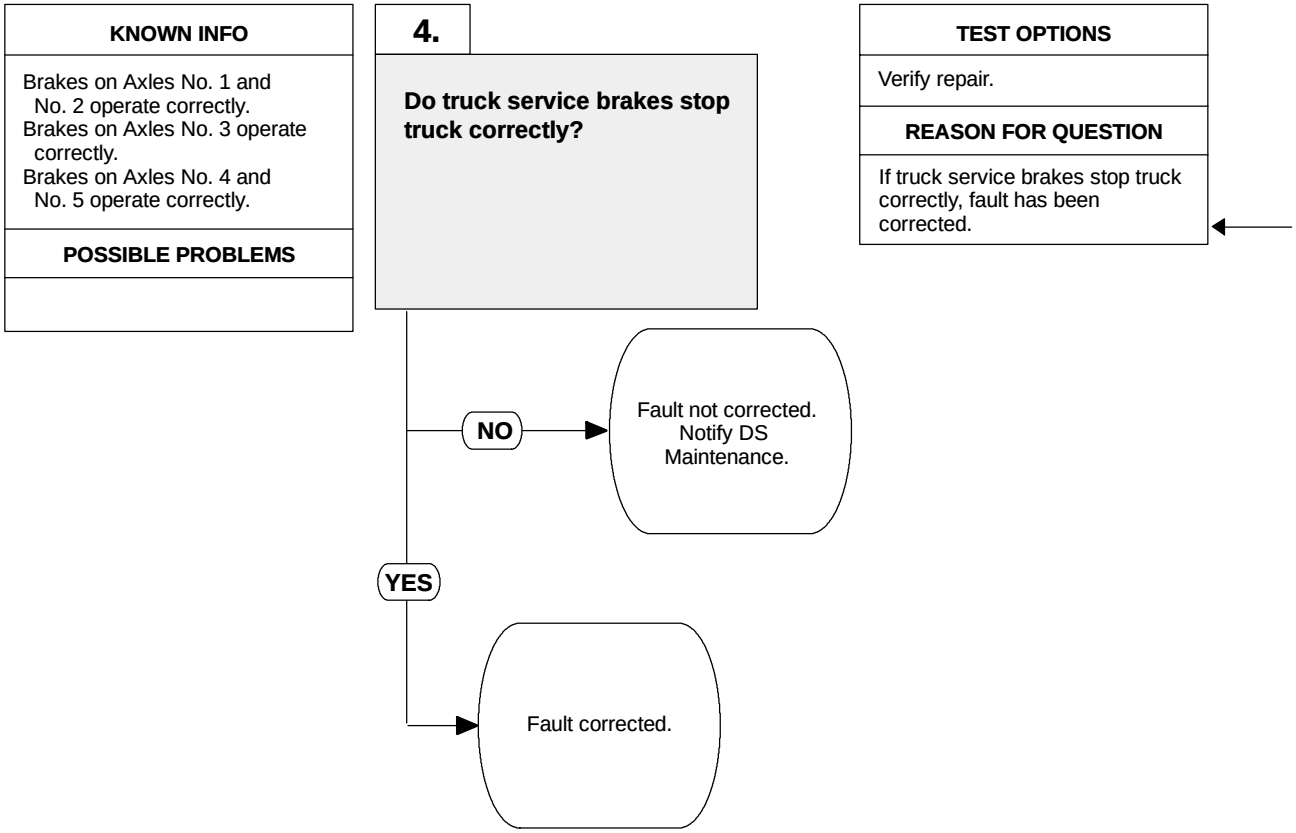
(1) While assistant applies service brakes, try to turn wheels on Axle No. 3 (TM 9-2320-364-10).
   (a) If one or both wheels turn, go to Fault 10 of Brakes System Troubleshooting.
   (b) If no wheels turn, go to Step 3 of this Fault.
(2) Release service brake.



OPERATION TEST

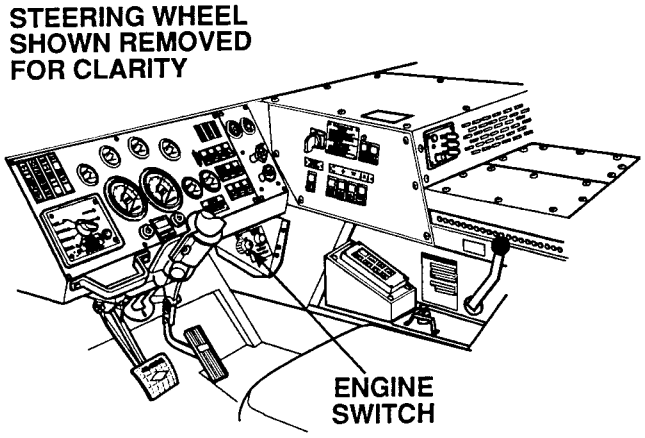
(1) While assistant applies service brakes, try to turn all four wheels on Axles No. 4 and No. 5 (TM 9-2320-364-10).
   (a) If one or more wheels turn, perform Step (2) below and go to Fault 12 of Brakes System Troubleshooting.
   (b) If no wheels turn, brakes are OK.
(2) Release service brake.
(3) Lower wheels to ground.

17. EXCESSIVE BRAKING DISTANCE (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Operate unloaded truck and apply brakes at 20 mph (32 km/hr) on a flat paved surface.
(3) Measure distance required to stop truck from point brakes were applied to where truck stops.
    (a) If distance is greater than 30 ft (9 m), fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.
    (b) If distance is 30 ft (9 m) or less, fault has been corrected.
(4) Turn OFF ENGINE switch.



2-24. BRAKES SYSTEM TROUBLESHOOTING (CONT).

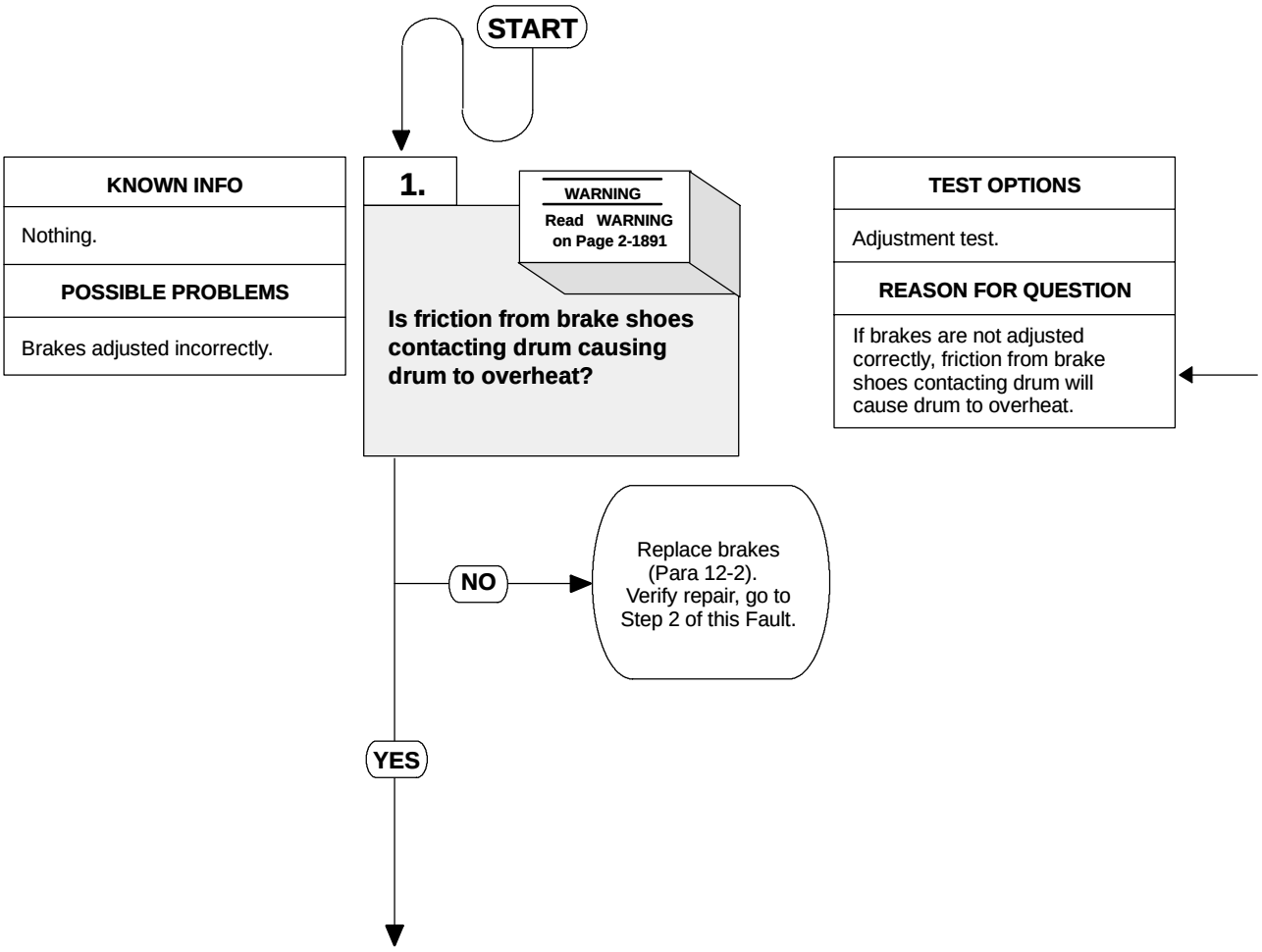
18. BRAKE DRUMS OVERHEAT.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive
(Item 74, Appendix G)

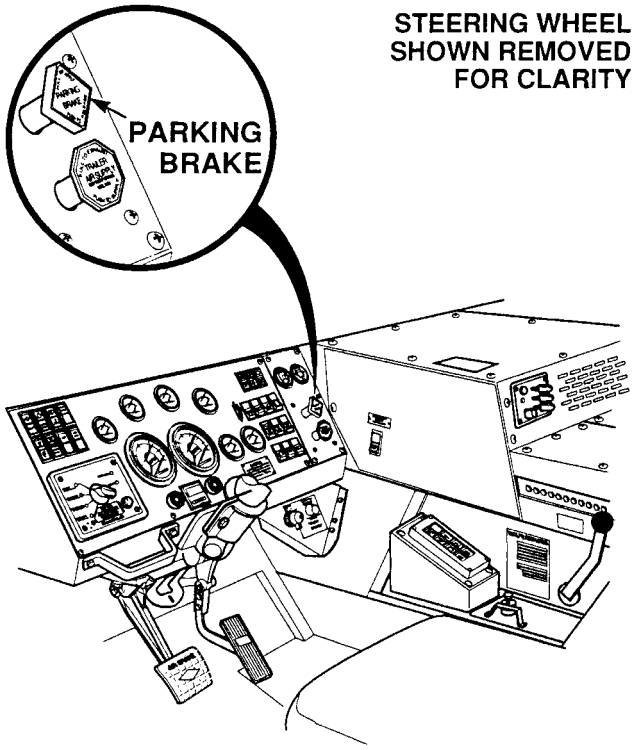
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake applied, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)



WARNING

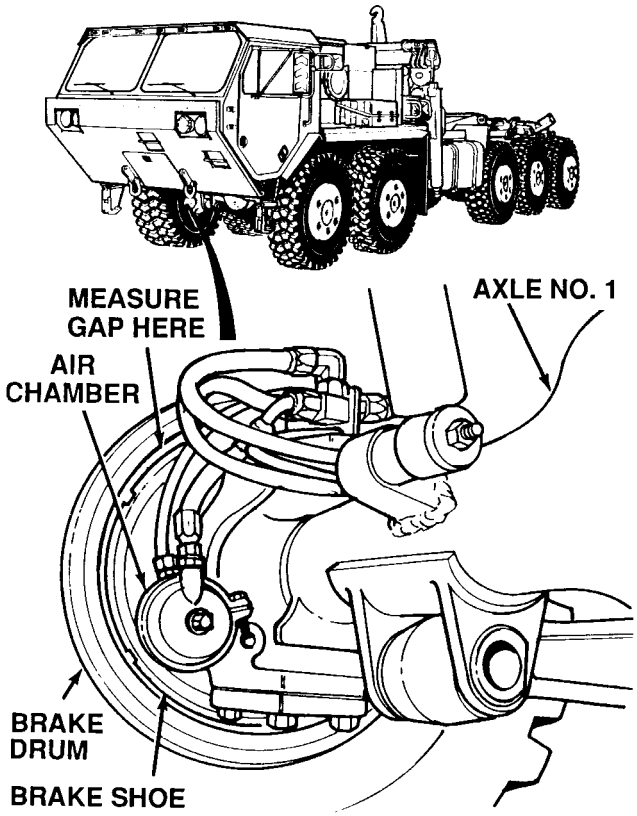
Truck must be on level ground and wheels must be chocked before parking brake is released. Otherwise, truck may roll and cause injury to personnel.



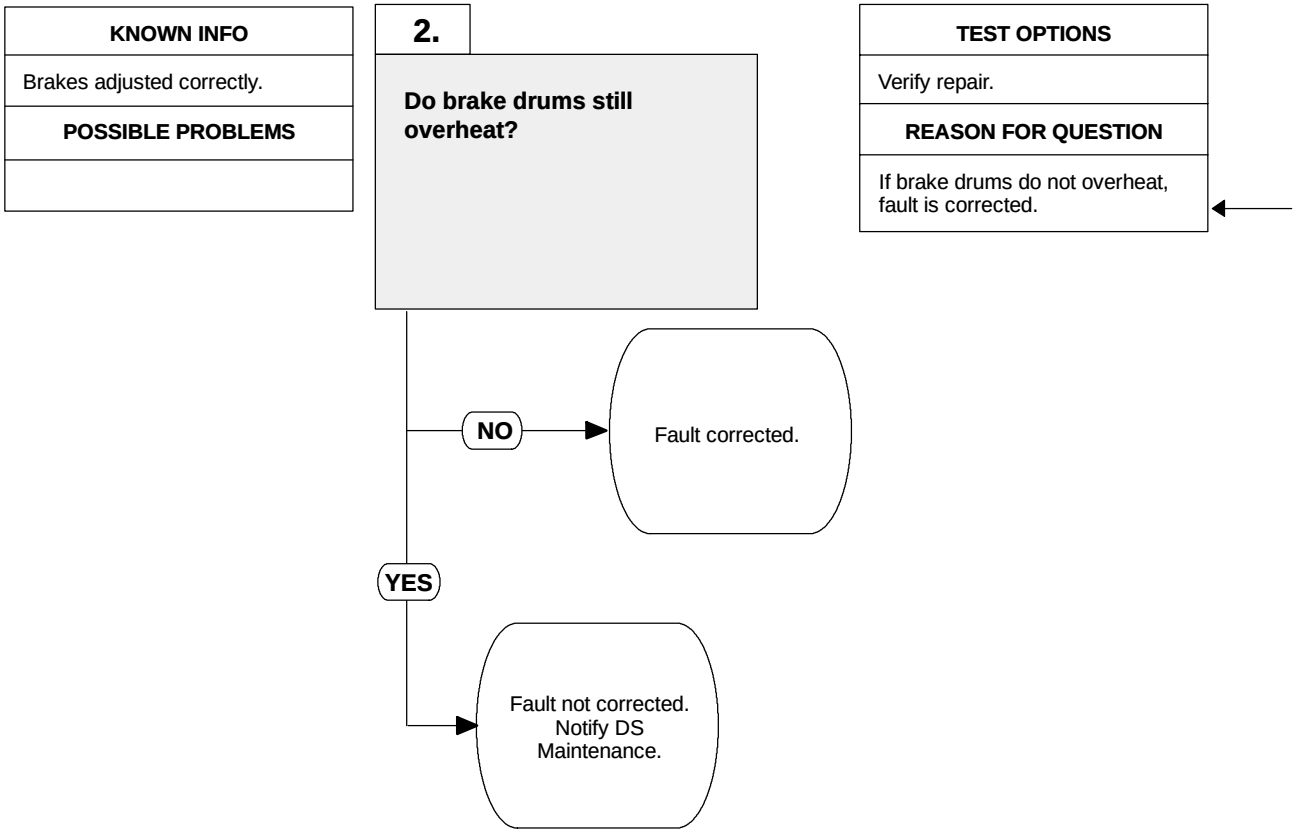
NOTE

PLS truck air system pressure must be between 90 and 125 psi (620 and 861 kPa) to begin troubleshooting brake system. If air system pressure cannot be maintained within this range,refer to Air System Troubleshooting Procedures (Para 2-27).

ADJUSTMENT TEST
(1) Release PARKING BRAKE (TM 9-2320-364-10). (2) Check gap between brake shoe and brake drum (Para 12-3). (a) If the gap is less than 0.0315 in. (0.08 mm), replace brakes (Para 12-2). (b) If gap is greater than 0.0315 in. (0.08 mm), brakes are OK.

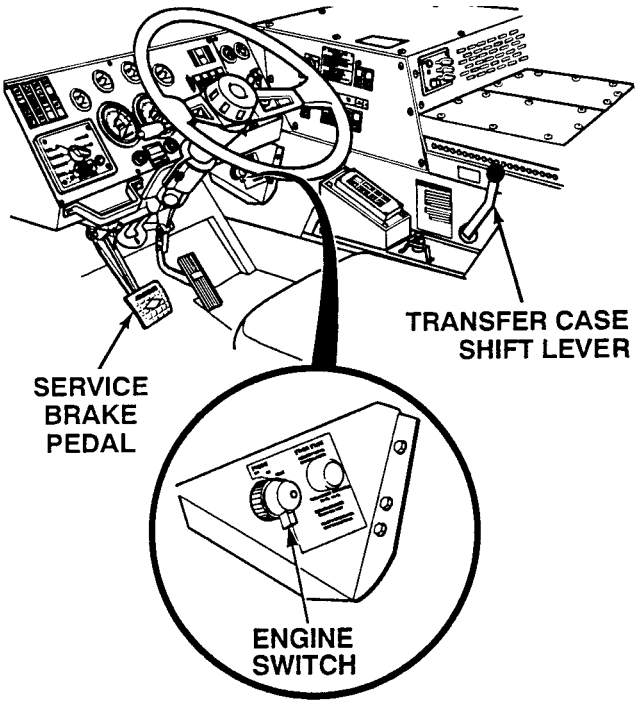


18. BRAKE DRUMS OVERHEAT (CONT).



VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
(2) Operate truck and apply brakes at 10 mph (16 km/hr), 20 mph (32km/hr), 30 mph (48 km/hr) and 45 mph (72 km/hr).
(3) Check brake drums for indications of discoloring, blueing or smoking.
    (a) If there are no indications of discoloring, blueing or smoking of brake drums, fault has been corrected. Turn OFF ENGINE switch.
    (b) If there are indications of brake drum lining discolored, blueing or smoking, fault not corrected. Turn OFF ENGINE switch and notify DS Maintenance.



2-25. AXLE NO. 3 AIR BAG TROUBLESHOOTING.

This paragraph covers Axle No. 3 Air Bag Troubleshooting. The Axle No. 3 Air Bag System Fault Index, Table 2-44, lists faults for the Axle No. 3 air bag system of the PLS truck. Refer to Air Bags Schematic Figure 2-47 when performing tests and corrective actions.

Table 2-44. Axle No. 3 Air Bag System Fault Index

Fault No.	Description	Page
1.	Axle No. 3 Air Bag(s) Will Not Inflate	2-1896
2.	One Axle No. 3 Air Bag Will Not Deflate	2-1908

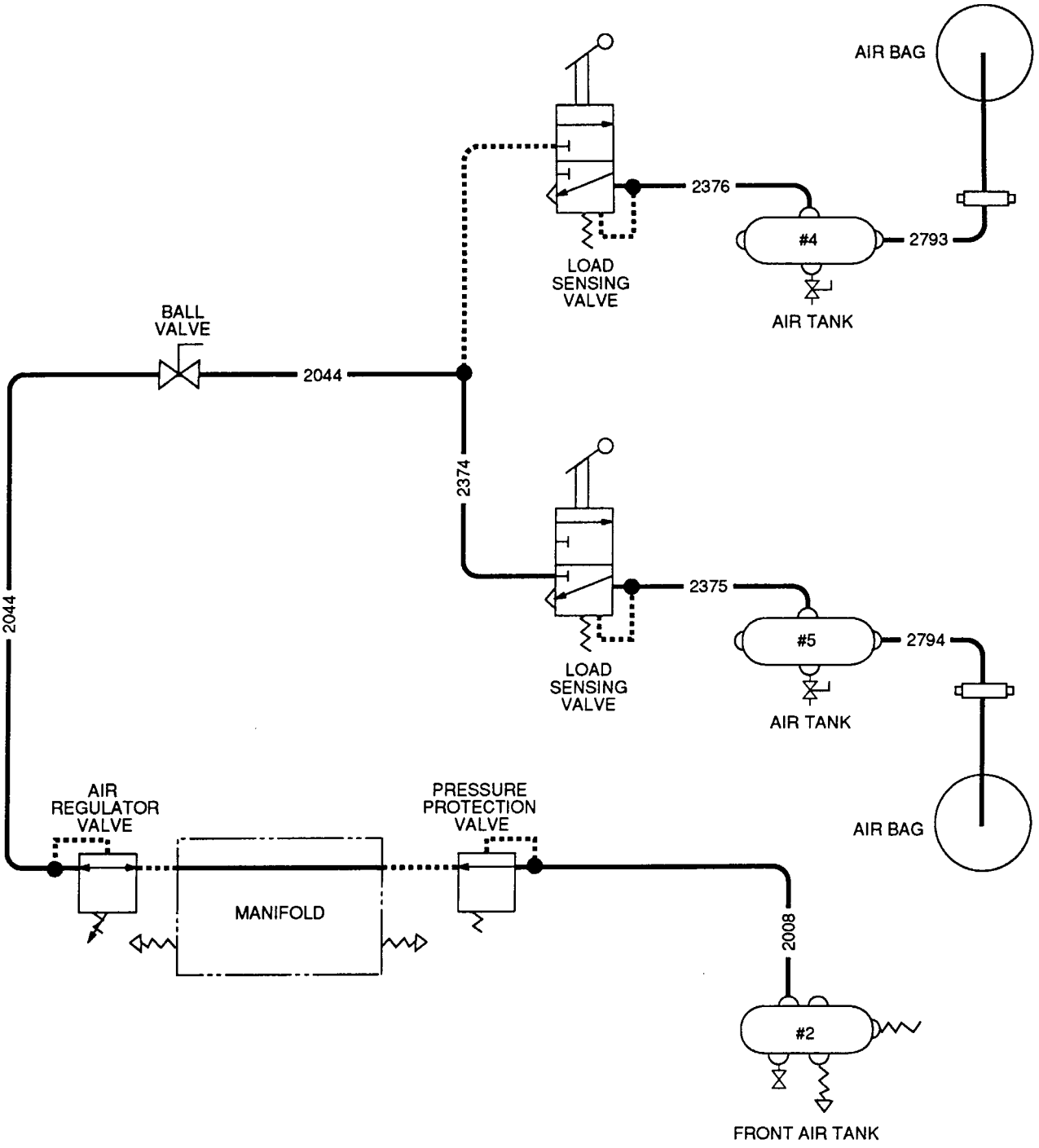


Figure 2-47. Axle No. 3 Air Bags Air Diagram

2-25. AXLE NO. 3 AIR BAG TROUBLESHOOTING (CONT).

1. AXLE NO. 3 AIR BAG(S) WILL NOT INFLATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Test Kit, Pressure (Item 50, Appendix G)

Materials/Parts
Solution, Soap (Item 86, Appendix C)

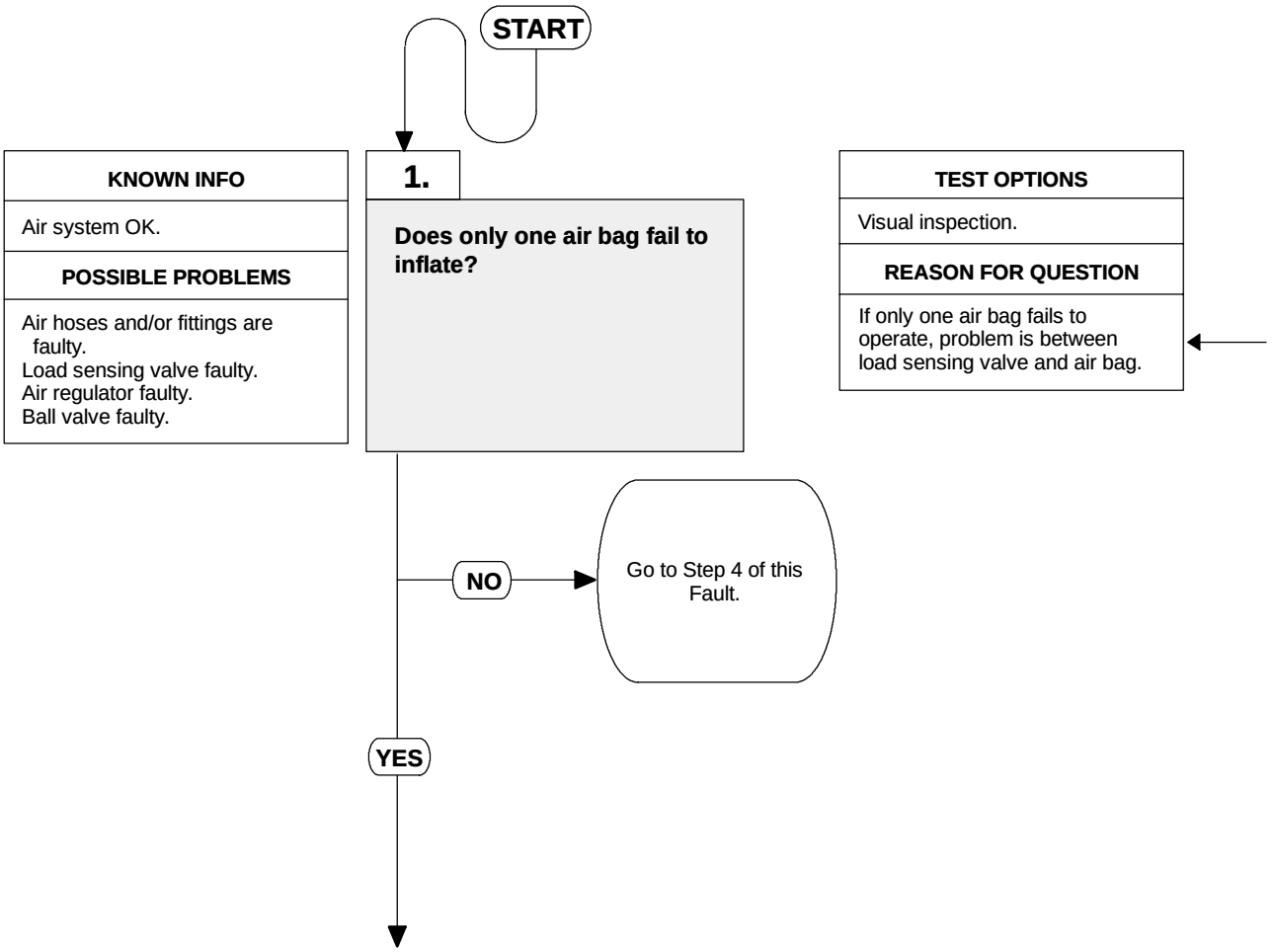
Personnel Required
Two

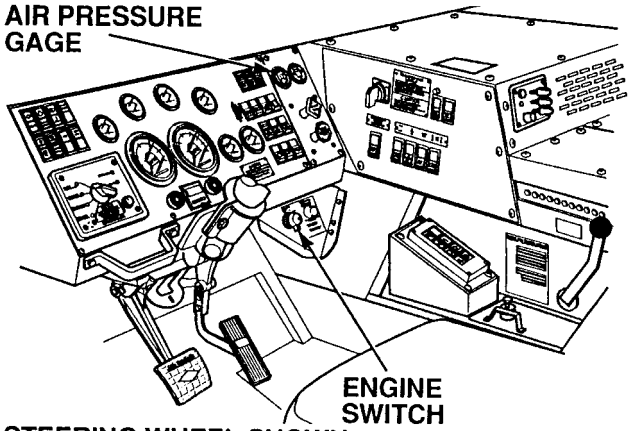
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake ON, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Air system charged, (TM 9-2320-364-10)
Load Handling System (LHS) extended fully, (TM 9-2320-364-10)

NOTE

- The following troubleshooting procedures cover the left side air bag. The same procedures apply to the right side air bag.
- Use soap solution to inspect for air leaks.

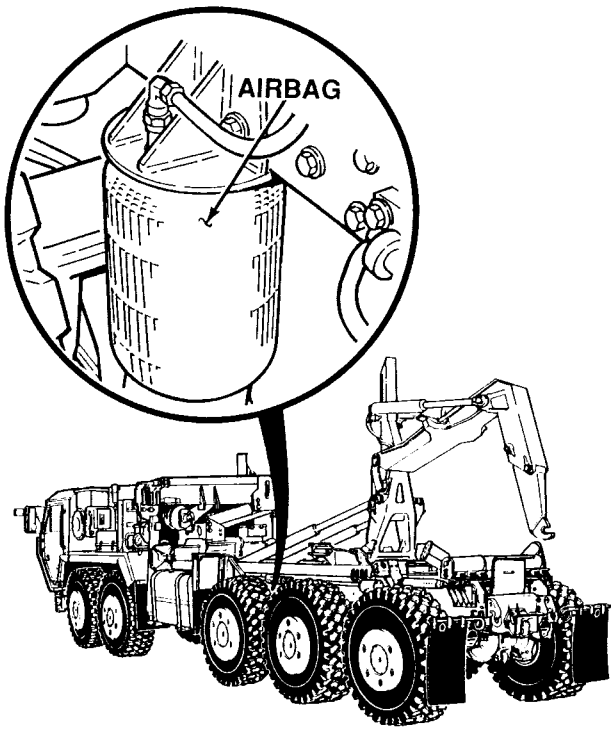




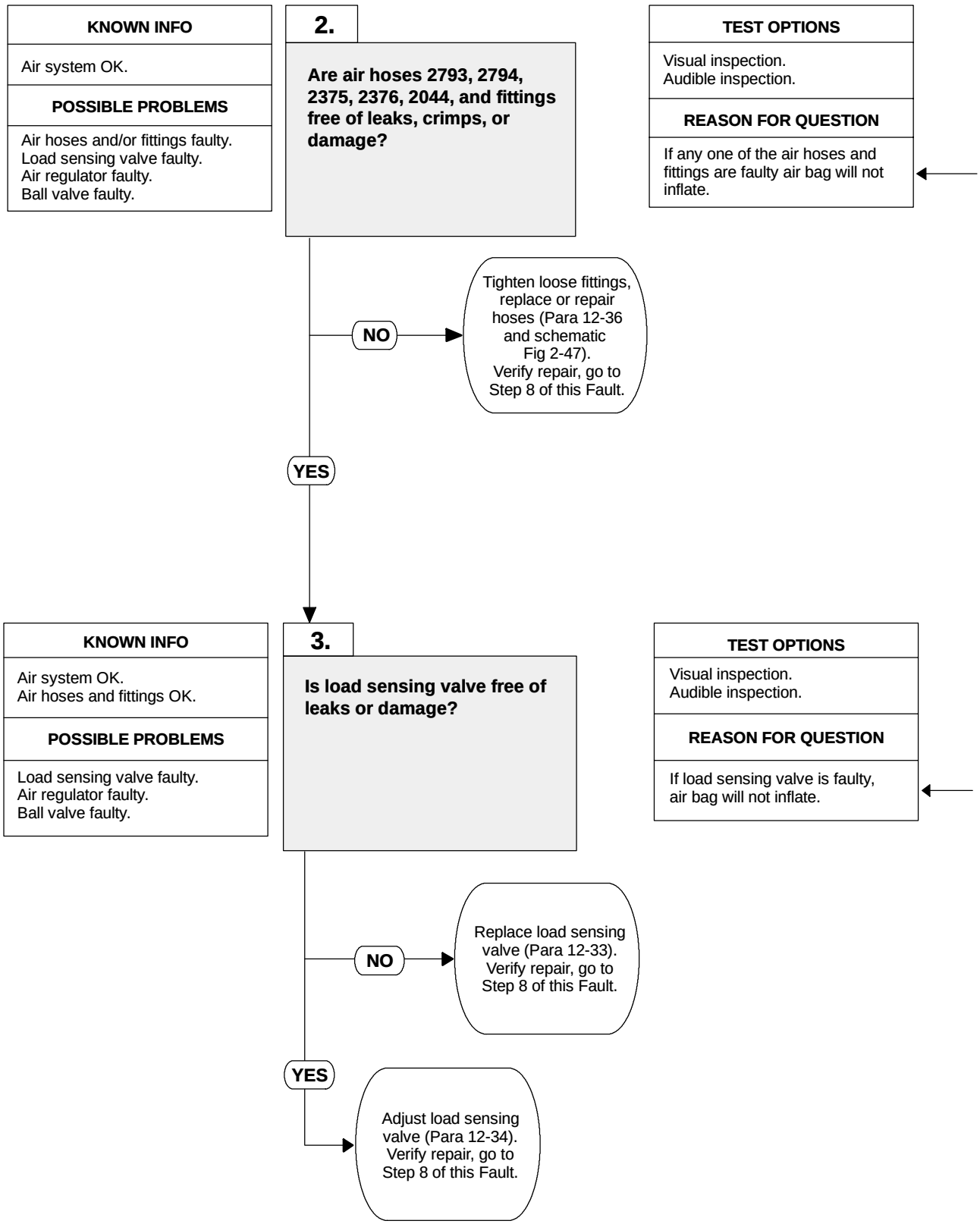
NOTE

PLS vehicle system pressure must be between
90 and 125 ± 4 psi (620 and 861 ± 28 kPa) to begin troubleshooting the air system. If air system pressure cannot be maintained within this range, refer to Air System Troubleshooting.
Air hoses and valves listed in this troubleshooting procedure are illustrated and located in Figure 2-47.

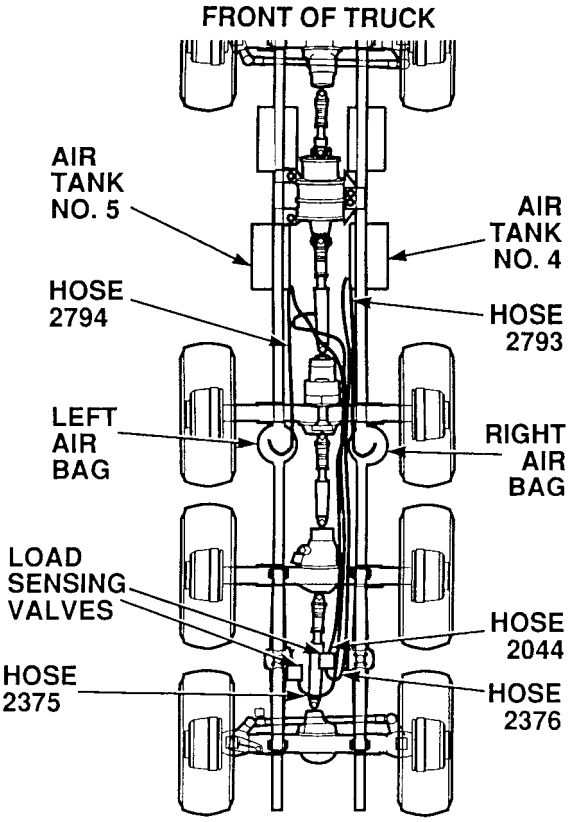
VISUAL INSPECTION
(1) Start engine and build pressure to 125 ± 4 psi (861 ± 28 kPa) (TM 9-2320-364-10). (2) Turn OFF ENGINE switch. (a) If both air bags fail to inflate, go to Step 4 of this Fault. (b) If only one air bag inflates, go to Step 2 of this Fault.



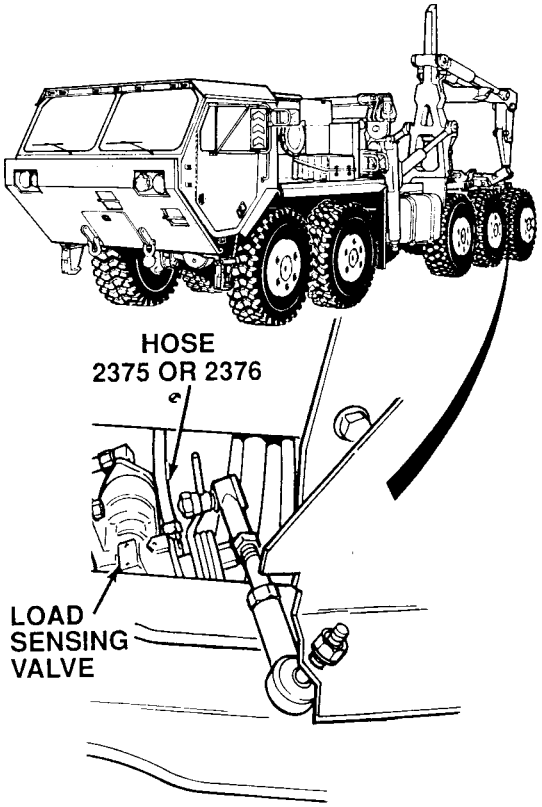
1. AXLE NO. 3 AIR BAG(S) WILL NOT INFLATE (CONT).



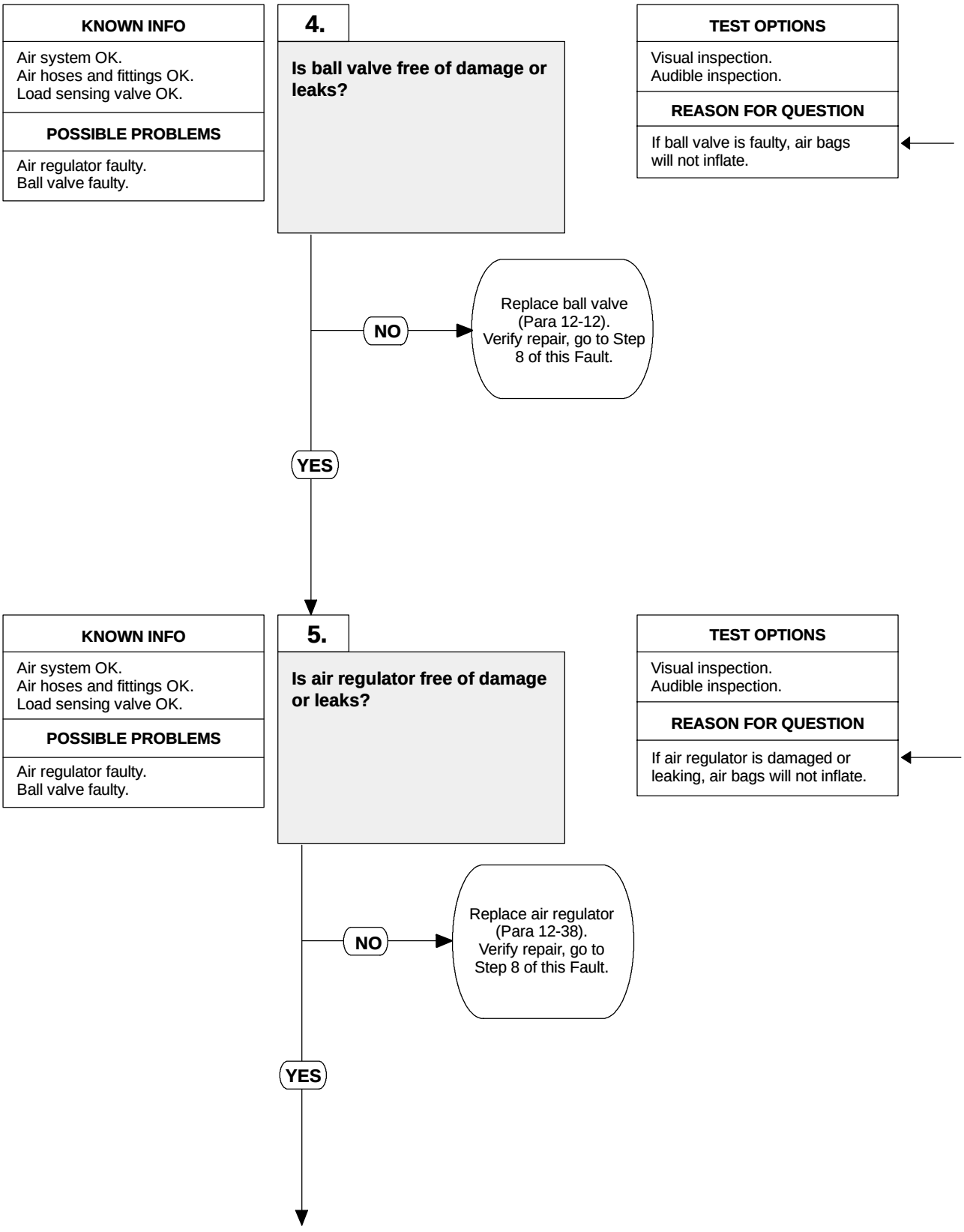
VISUAL/AUDIBLE INSPECTION
Check air hoses 2793, 2794, 2375, 2376 and 2044 for damage, crimps or leaks (Para 12-36 and schematic Fig 2-47). (1) If air hose(s) are damaged, crimped or leaking; tighten fittings, replace hoses (Para 12-36 and schematic Fig 2-47). (2) If there are no leaks, crimps or damage, air hoses and fittings are OK.



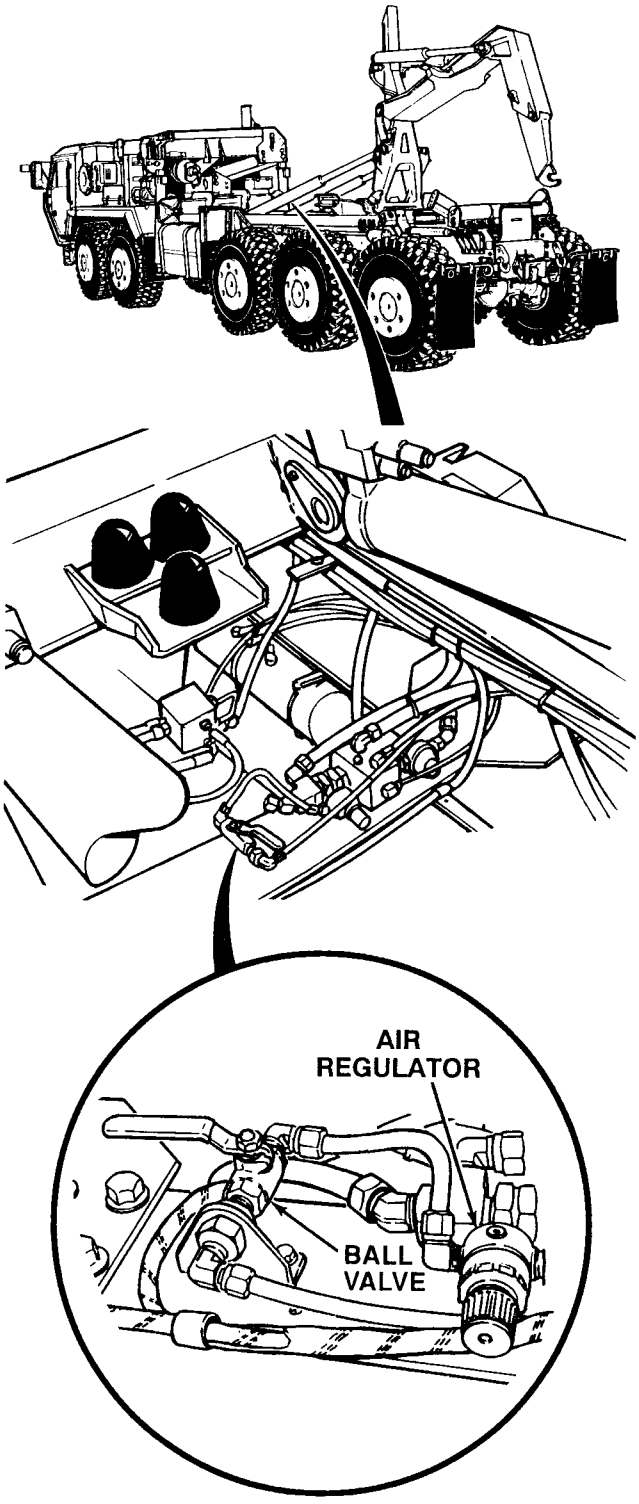
VISUAL/AUDIBLE INSPECTION
Check load sensing valve for damage or leaks (Para 12-33). (1) If load sensing valve is damaged or leaking, replace load sensing valve (Para 12-33). (2) If load sensing valve is not leaking or damaged, adjust load sensing valve (Para 12-34).



1. AXLE NO. 3 AIR BAG(S) WILL NOT INFLATE (CONT).

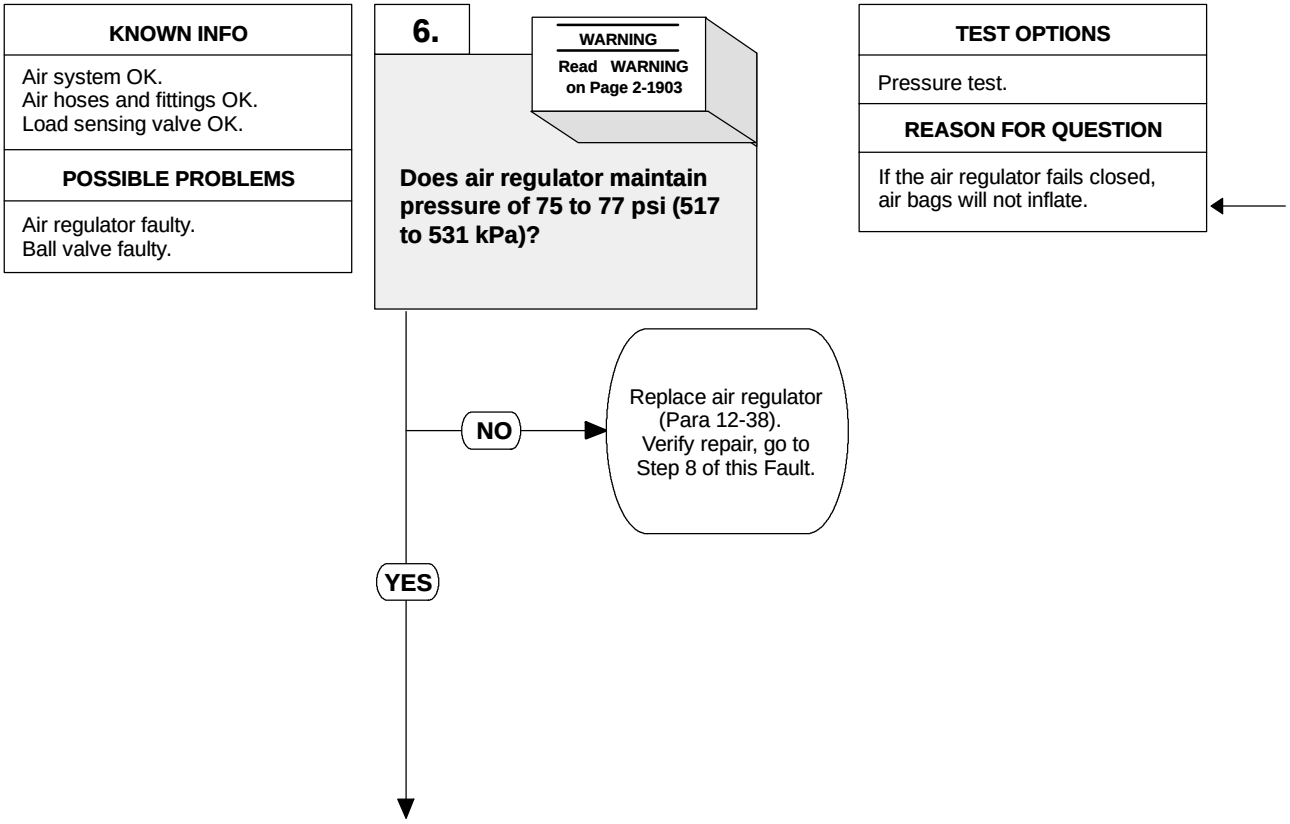


VISUAL/AUDIBLE INSPECTION
Check ball valve for leaks or damage (Para 12-12). (1) If ball valve is damaged or leaking, replace valve (Para 12-12). (2) If ball valve is not damaged or leaking, go to Step 5 of this Fault.



VISUAL/AUDIBLE INSPECTION
Check air regulator for leaks or damage (Para 12-38). (1) If air regulator is damaged or leaking, replace regulator (Para 12-38). (2) If air regulator is not leaking or damaged, go to Step 6 of this Fault.

1. AXLE NO. 3 AIR BAG(S) WILL NOT INFLATE (CONT).

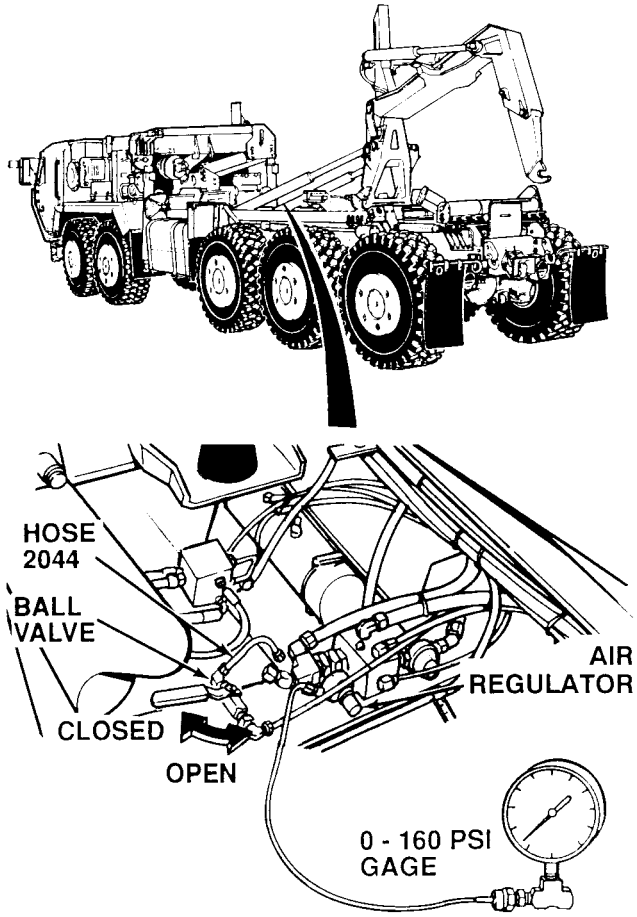


WARNING

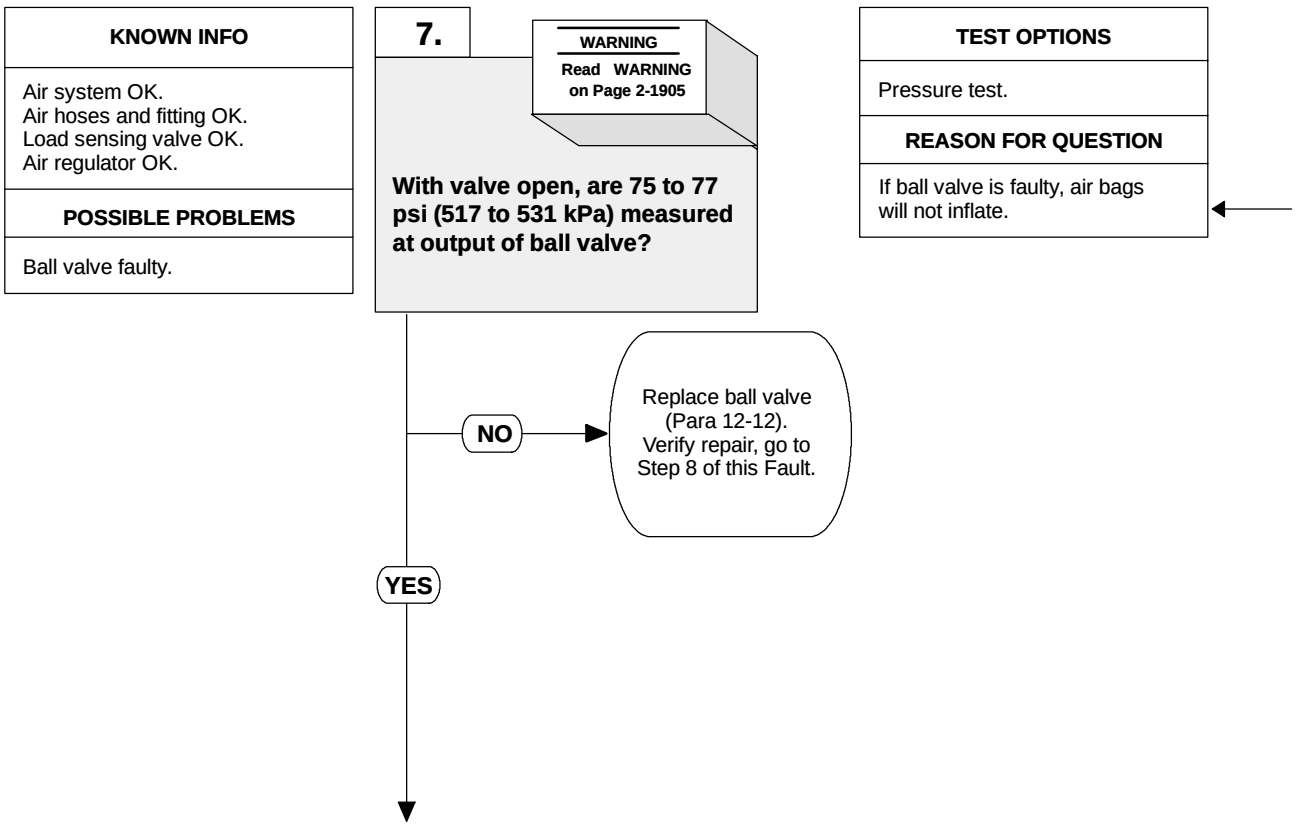
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

PRESSURE TEST

(1) Drain air system (TM 9-2320-364-10).
(2) Disconnect air hose 2044 from air regulator.
(3) Connect 0 to 160 psi (0-1103 kPa) pressure gage to air regulator.
(4) While assistant starts engine, observe pressure gage.
    (a) If pressure is not 75 to 77 psi (517-531 kPa), turn OFF ENGINE switch and replace air regulator (Para 12-38).
    (b) If pressure is 75 to 77 psi (517-531 kPa), air regulator is OK.
(5) Turn OFF ENGINE switch.
(6) Drain air system.
(7) Disconnect pressure gage from air regulator.
(8) Connect air hose 2044 to air regulator.



1. AXLE NO. 3 AIR BAG(S) WILL NOT INFLATE (CONT).

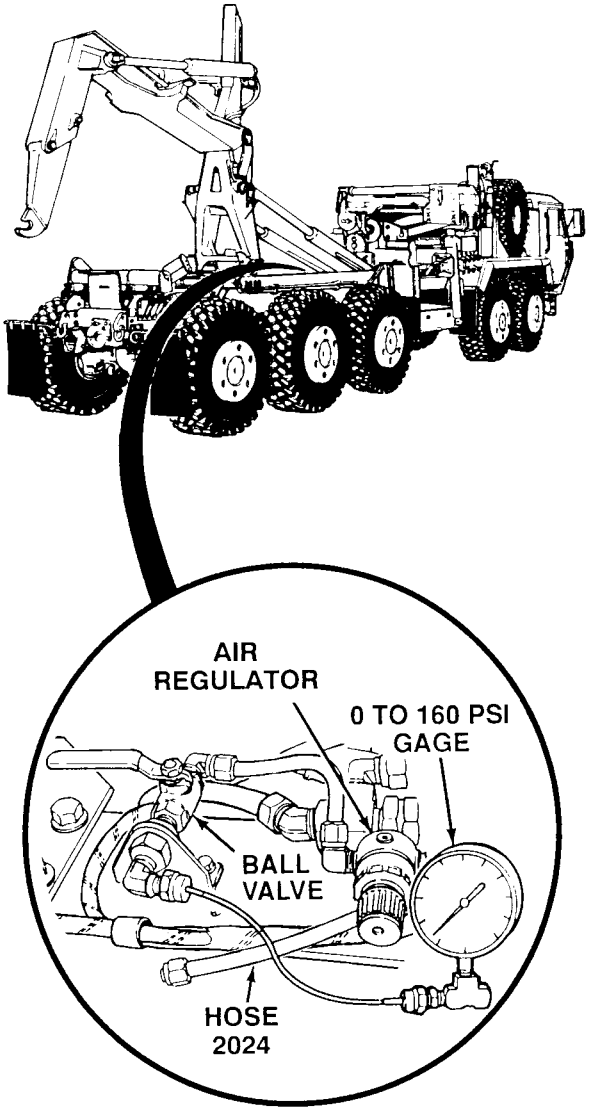


WARNING

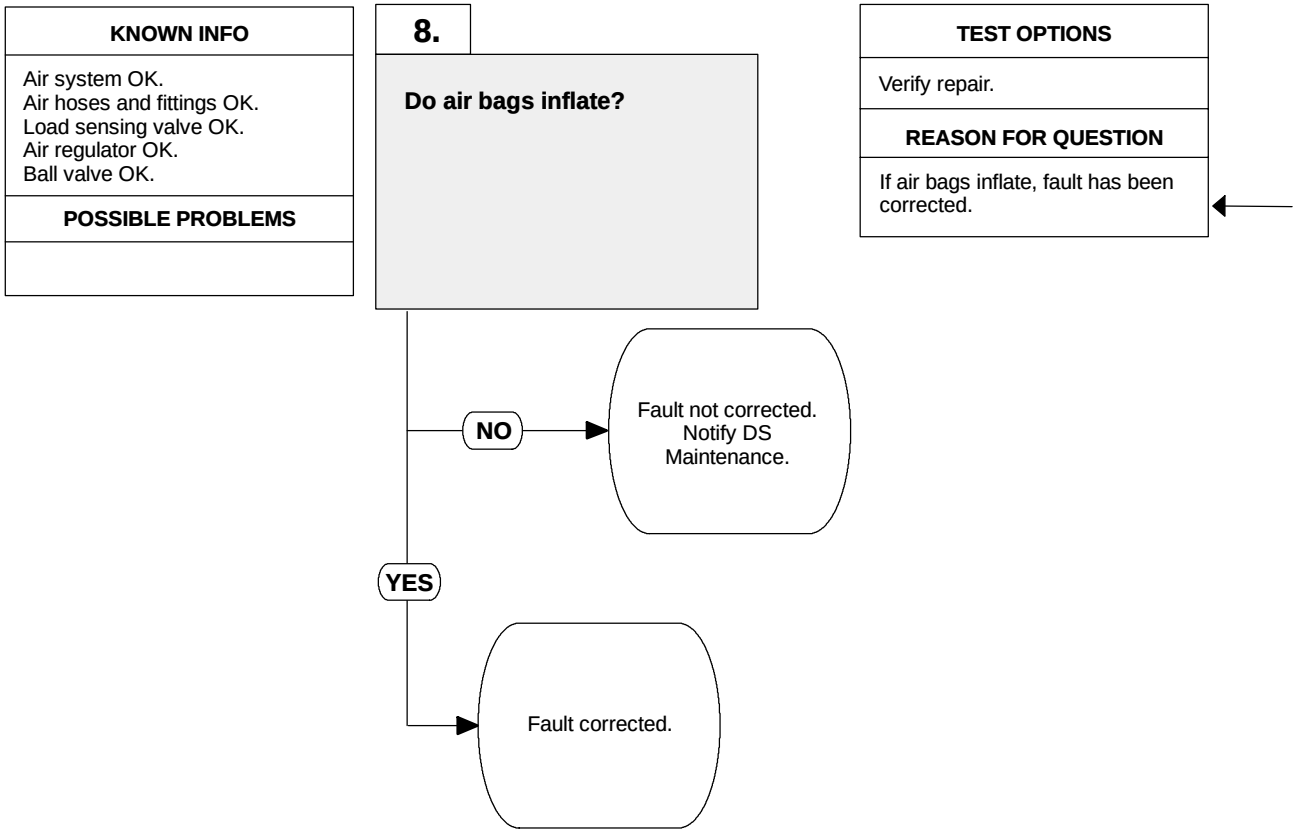
Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure air.

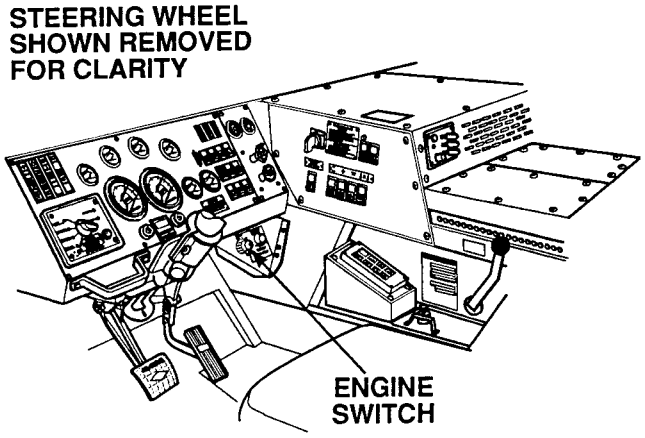
PRESSURE TEST

(1) Disconnect air hose 2044 from output side of ball valve.
(2) Connect a 0 to 160 psi (0 to 1103 kPa) pressure gage to output side of ball valve.
(3) Open air bag ball valve.
(4) Observe pressure gage while assistant starts engine.
    (a) If pressure is not 75 to 77 psi (517 to 531 kPa), turn OFF ENGINE switch and replace ball valve (Para 12-12).
    (b) If pressure is 75 to 77 psi (517 to 531 kPa), ball valve is OK.
(5) Turn OFF ENGINE switch.
(6) Drain air system (TM 9-2320-364-10).
(7) Disconnect pressure gage from ball valve.
(8) Connect air hose 2044 to output side of ball valve.



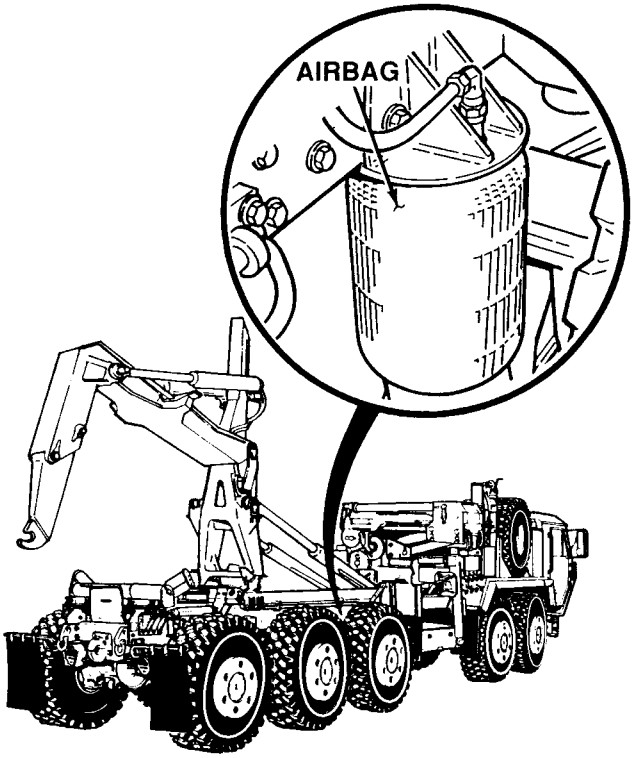
1. AXLE NO. 3 AIR BAG(S) WILL NOT INFLATE (CONT).





VERIFY REPAIR

(1) Start engine (TM 9-2320-364-10).
  (a) If air bags fail to inflate, fault not corrected. Perform Steps (2) and (3) below and notify DS Maintenance.
  (b) If air bags inflate, fault has been corrected.
(2) Put LHS in transit position.
(3) Turn OFF ENGINE switch.



2-25. AXLE NO. 3 AIR BAG TROUBLESHOOTING (CONT).

2. ONE AXLE NO. 3 AIR BAG WILL NOT DEFLATE.

INITIAL SETUP

Tools and Special Tools
Tool Kit, General Mechanic's: Automotive (Item 74, Appendix G)
Test Kit, Pressure (Item 50, Appendix G)

Materials/Parts
Solution, soap (Item 86, Appendix C)

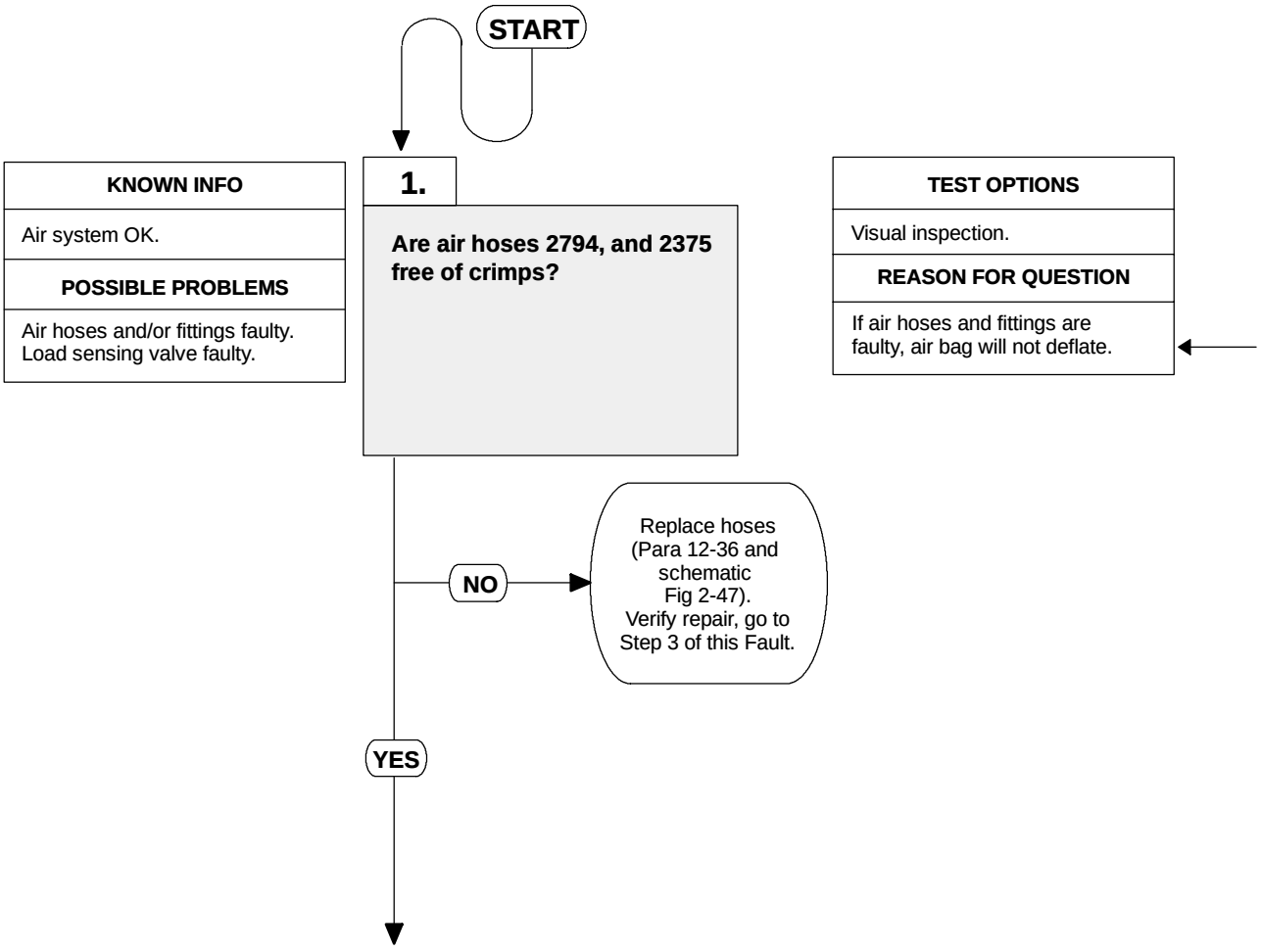
Personnel Required
Two

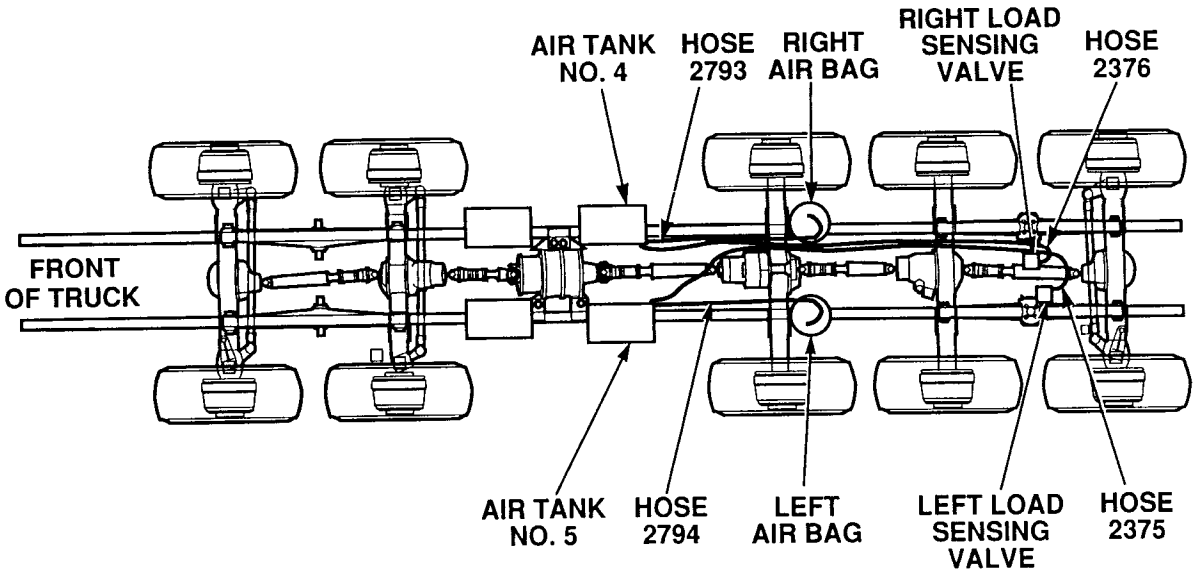
References
TM 9-2320-364-10

Equipment Condition
Engine OFF, (TM 9-2320-364-10)
Parking brake ON, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Air system charged, (TM 9-2320-364-10)
Load Handling System (LHS) extended fully, (TM 9-2320-364-10)

NOTE

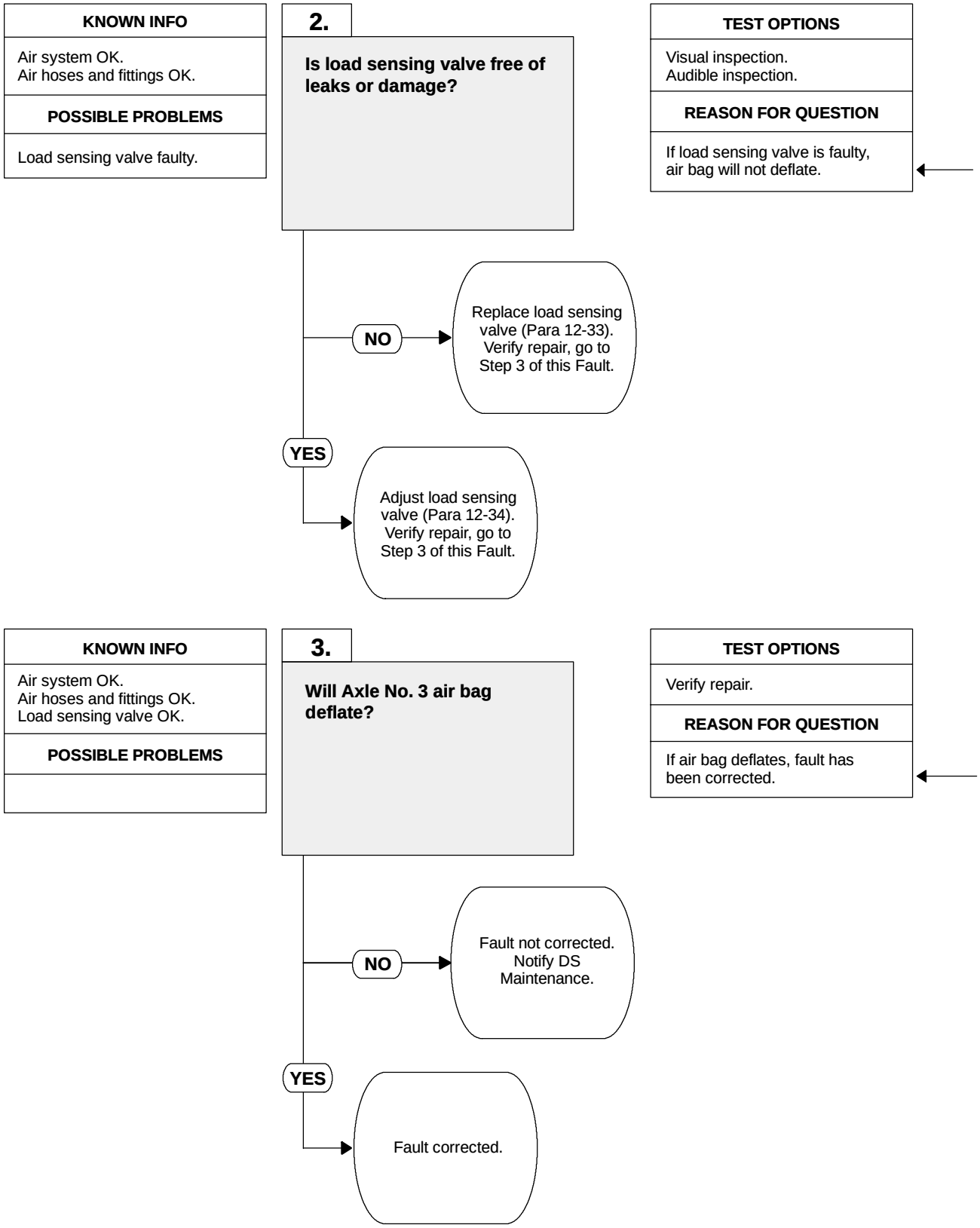
- The following troubleshooting procedures cover the left side air bag. The same procedures apply to the right side air bag.
- Use soap solution to inspect for air leaks.





VISUAL INSPECTION
Check air hoses 2794 and 2375 for crimps (Para 12-36 and schematic Fig 2-47). (1) If air hoses are crimped, replace hoses (Para 12-36 and schematic Fig 2-47). (2) If there are no crimps, air hoses are OK.

2. ONE AXLE NO. 3 AIR BAG WILL NOT DEFLATE (CONT).



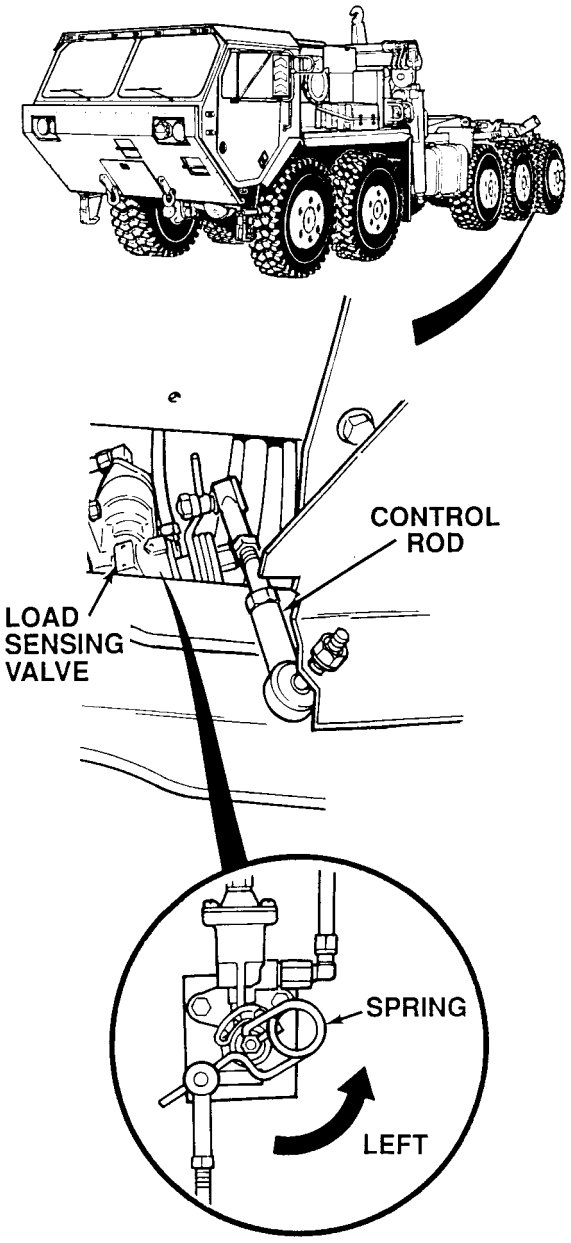
VISUAL/AUDIBLE INSPECTION

Check load sensing valve for damage or leaks.

(1) If load sensing valve is damaged or leaking, replace load sensing valve (Para 12-33).
(2) If load sensing valve is not damaged or leaking, adjust load sensing valve (Para 12-34).

VERIFY REPAIR

(1) Start engine and build air pressure to 125 ± 4 psi (861 ± 28 kPa).
(2) Turn OFF ENGINE switch.
(3) While assistant manually turns left load sensing valve spring to left, observe left side air bag.
   (a) If air bag fails to deflate, fault not corrected. Notify DS Maintenance.
   (b) If air bag deflates, fault has been corrected.



APPENDIX A

REFERENCES

A-1. SCOPE.

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

Military Publication Indexes.

Consolidated Index of Army Publications and Forms ..... DA PAM 310-1

A-2. FORMS.

Refer to DA PAM 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to the vehicle.

A-3. FIELD MANUALS.

The following publications contain information pertinent to the vehicle material.

Camouflage ..... FM 20-3

Manual for Wheel Vehicle Driver ..... FM 21-305

Nuclear, Biological, and Chemical Defense ..... FM 21-40

Basic Cold Weather Manual ..... FM 31-70

Northern Operations ..... FM 31-71

Chemical, Biological, and Radiological (CBR) Decontamination ..... FM 3-5

Nuclear, Biological, and Chemical (NBC) Reconnaissance and Decontamination Operations (How to Fight) ..... FM 3-87 (HTF)

Army Motor Transport Units and Operations ..... FM 55-30

Operation and Maintenance of Ordnance Materiel in Cold Weather 0°F to -65°F ..... FM 9-207

A-4. TECHNICAL MANUALS.

Painting Instructions ..... TM 43-0139

General Shop Practice Requirements for Repair, Maintenance, and Test of Electronic Equipment ..... TM 43-0158

A-4. TECHNICAL MANUALS (CONT).

Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-Automotive Command) ..... TM 750-244-6

Inspection, Care, and Maintenance of Antifriction Bearings ..... TM 9-214

Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordinance Material and Related Materials Including Chemicals ..... TM 9-247

Operator/Unit/Direct Support/General Support Maintenance Manual for Care, Maintenance, Repair, and Inspection of Pneumatic Tires and Inner Tubes ..... TM 9-2610-200-14

Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List for Simplified Test Equipment for Internal Combustion Engines ..... TM 9-4910-571-12&P

Maintenance and Repair for Lead-Acid Storage Batteries ..... TM 9-6140-200-14

Cooling System: Tactical Vehicles ..... TM 750-254

A-5. MISCELLANEOUS PUBLICATIONS.

Description, Use, Bonding Techniques, and Properties of Adhesives ..... TB ORD1032

Safety Inspection and Testing of Lifting Devices ..... TB 43-0142

Operator's Circular for Welding Theory and Application ..... TC 9-237

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

THE ARMY MAINTENANCE SYSTEM (AMS)

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.

The MAC (immediately following the 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 on the MAC in column 4 as:

Field - includes two subcolumns, Unit C (operator/crew) and O (unit/organizational maintenance) and Direct Support (F) maintenance

Sustainment - includes two subcolumns, general support (H) and depot (D).

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. 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).

2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.

3. 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.

4. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

MAINTENANCE FUNCTIONS - Continued

6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of 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.

7. 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.

8. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

NOTE

The following definitions are applicable to the "repair" maintenance function:

Services. Inspect, test, service, adjust, align, calibrate, and/or replace.

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).

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).

Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

9. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions 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.

10. 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. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

11. 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.

EXPLANATION OF COLUMNS IN THE MAC

Column 1, Group Number. Column 1 lists FGC numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

Column 2, Component/Assembly. Column 2 contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For a detailed explanation of these functions, refer to "Maintenance Functions" outlined above.)

EXPLANATION OF COLUMNS IN THE MAC - Continued

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 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 or crew maintenance
O Unit maintenace
F Direct support maintenance

Sustainment:
H General support maintenance
D Depot maintenance

NOTE

The “L” maintenance level is not included in Column 4 of the MAC. Functions to this level of maintenance are identified by a work time figure in the “H” column of Column 4, and an associated reference code is used in the REMARKS Column 6. This code is keyed to the remarks and the SRA complete repair application is explained there.

Column 5, Tools and Equipment Reference Code. Column 5 specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

Column 6, Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIPMENTS

Column 1, Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in Column 5 of the MAC.

Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Column 3, Nomenclature. Name or identification of the tool or test equipment.

Column 4, National Stock Number (NSN). The NSN of the tool or test equipment.

Column 5, Tool Number. The manufacturer's part number, model number, or type number.

Explanation of Columns in the Remarks

Column 1, Remarks Code. The code recorded in Column 6 of the MAC.

Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
01	ENGINE								
0100	Engine Assembly:								
	Engine Assembly	Inspect	0.4						
		Test		1.0				23, 31, 148	A
		Service		1.0				1, 126	
		Adjust			2.0			5, 6, 79	
		Replace			21.5			5, 6, 7, 205	B
		Repair				44.4		5, 14, 86, 179	D
		Overhaul					*		
0101	Crankcase, Block, Cylinder Head:								
	Cylinder Block Assembly	Replace				4.0			
		Repair				3.0		5, 6, 10, 12, 67, 81, 97 117, 133, 166, 187	
	Cylinder Head Assembly (One)	Replace			17.7			5, 6, 41, 62, 100, 128	
		Repair				3.0		5, 6, 10, 29, 64	
	Cylinder Liner	Replace				1.0		5, 155	C
		Repair				2.0		5, 6, 10, 28, 67, 68, 87	C
0102	Crankshaft:								
	Crankshaft and Main Bearing	Replace				6.8		5, 6, 144	
		Repair				*		5, 6, 24, 26	C
	Crankcase Front Cover And Oil Seal	Inspect	0.2					5, 6, 107	
		Replace			6.5				
0103	Flywheel Assembly:								
	Flexplate Assembly	Replace			25.9			5, 6	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0103	Flywheel Assembly - CONT:								
	Rear Oil Seal	Inspect Replace	0.2		 26.2			 5, 6, 53, 81, 102, 163	
0104	Pistons, Connecting Rods:								
	Piston and Connecting Rods	Replace Repair				4.4 *		5, 6, 155 5, 6, 10, 22, 46, 73, 115	 C
0105	Valves, Camshafts and Timing System								
	Rocker Covers	Replace Repair		3.2		 *		1, 2, 4 5, 6, 10	 C
	Exhaust Valve Bridge	Replace Repair			7.1	 *		5, 6 5, 6, 10	 C
	Exhaust Bridge Guide	Repair				*		5, 6, 113, 151, 156	C
	Exhaust Valve	Replace Repair				25.6 *		5, 6, 10, 100 5, 6, 42, 95, 106, 179	 C
	Exhaust Valve Guide	Repair				*		5, 100, 157	C
	Valve Seat Insert	Repair				*		5, 116, 153	C
	Camshaft Assembly	Replace Repair				1.5 *		5, 6 5, 6, 10	 C
	Cam Follower/ Push Rod	Replace Repair			23.5	 *		5, 6 5, 6, 10	 C
	Rocker Arm	Replace Repair			5.4	 0.5		5 5, 6, 10	
	Idler Gear Assembly	Replace Repair				0.5 0.3		5, 6 5, 6, 10, 130	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0106	Engine Lubrication System:								
	Adapter Assembly	Replace		1.1				1, 2	
	Oil Filter	Repair		*				2, 4	C
	Oil Cooler Assembly	Replace			4.9			5, 6	
	Engine	Test				*		5, 6, 10	A
0108	Manifolds:								
	Exhaust Manifold	Inspect		0.3					
		Replace			4.6			5, 6	
0112	Engine Brake:								
	Engine Brake Retarder	Adjust			0.9			5	
		Replace			4.2			5, 6	
		Repair				*		5, 6, 10	C
03	FUEL SYSTEM								
0301	Carburetor, Fuel Injector:								
	Fuel Injector	Adjust			0.5			5	
		Test			1.5			1, 4, 5, 31, 42, 91, 148	
		Replace			4.9			5, 6, 30, 208	
0302	Fuel Pumps:								
	Fuel Pump Assembly	Replace			3.2			5, 6, 20	
	Fuel Pump, Priming	Replace		1.5				1, 2, 30	
0304	Air Cleaner:								
	Air Cleaner Assembly	Replace		1.6				1, 4	
		Repair		2.8				1, 2, 4	
0305	Supercharger, Blower, Turbocharger or Altitude Compensator:								
	Blower Assembly	Replace			12.1			5, 6, 20	
		Repair				3.0		5, 6, 10, 14, 117, 189	
	Blower Drive Assembly	Replace			12.4			5, 6	
		Repair				1.0		5, 6, 10	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0305	Supercharger, Blower, Turbocharger or Altitude Compensator - CONT:								
	Turbocharger Assembly	Inspect	0.1					5, 6	
		Replace			5.6			5, 6, 10, 61	
		Repair				2.0		89, 132	
0306	Tanks, Lines, Fittings, Headers:								
	Fuel Lines and Fittings (each)	Inspect	0.1						
		Replace		0.2				1, 30	
0309	Fuel Filters:								
	Fuel Strainer	Service		0.1				1, 4	
	Fuel/Water Separator	Inspect	0.1						
		Service	0.4					1, 2, 30	
		Replace		2.0				1, 2, 30	
		Repair			0.8			5, 6	
0311	Engine Starting Aids:								
	Ether Starting Aid	Replace		1.0				1	
04	EXHAUST SYSTEM								
0401	Muffler and Pipes:								
	Muffler	Inspect	0.1						
		Replace		1.9				1, 2, 4	
	Pipes	Inspect	0.1						
		Replace		1.5				1	
05	COOLING SYSTEM								
0501	Radiator, Evaporative Cooler or Heat Exchanger:								
	Cooling Assembly	Inspect	0.1					1, 15, 186	
		Test		0.2				1, 2, 4, 30,	
		Replace		1.9				126	
	Radiator	Service	0.3					1, 2, 52	
		Test			0.5	0.5		186	
		Replace		6.6				1, 2, 4, 30, 126	
		Repair				1.0		5, 6, 30	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0503	Water Manifold, Headers, Thermo-Stats and Housing Gaskets:								
	Right Thermostat Housing	Replace			8.4			5, 6, 84, 109	
	Left Thermostat Housing	Replace			2.4			5, 6, 84, 109	
	Cooling System Hoses And Tubes (each)	Inspect Replace	0.1	 0.4				 1, 4, 30	
	Aftercooler	Inspect Replace			* 13.1			 5, 6	A
0504	Water Pump:								
	Water Pump Assembly	Replace Repair			2.0	 0.6		5, 6, 30 5, 6, 15, 49 84, 114, 143, 158	
0505	Fan Assembly:								
	Fan	Inspect Adjust Replace	0.1		 0.5 1.9			 5, 6	
	Fan Control Solenoid Valve	Inspect Test Replace		0.1 0.5 0.5				 1 1, 30, 126	
06	ELECTRICAL SYSTEM								
0601	Generator, Alternator:								
	Alternator Assembly	Test Replace Repair		0.3 2.0		 3.2		2 1, 2, 65 6, 8, 10	
	Alternator Belts	Inspect Adjust Replace	0.1	 0.2 1.2				 1, 2, 65 1, 2, 65	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0602	Generator Alternator (Voltage):								
	Voltage Regulator	Adjust		0.3				1, 4	
		Test		0.5				4	A
		Replace		0.1				1	
	Polarity Protection Control (145 AMP)	Adjust		0.3				1, 4	
		Test		0.5					A
		Replace		1.5				1	
	Polarity Protection Control (200 AMP)	Test		0.5				4	A
		Replace		1.5				1	
0603	Starting Motor:								
	Starter Motor	Test		0.3				4	
		Replace		2.6				1, 2, 4	
		Repair				4.0		6, 8, 10	
0607	Instrument or Engine Control Panel:								
	Instrument Panel Gages Wire Harness	Replace		2.5				1	
		Repair		*					C, E
	Instrument Panel Switch Wire Harness	Replace		1.0				1	
		Repair		*					C, E
0608	Miscellaneous Items:								
	Ether Start Aid Switch	Service		0.4					
		Replace		1.2				1	
	Crane Junction Box	Replace		2.0				5, 6	
		Repair		1.0				5, 6	
	Proximity Switches (LHS) (each)	Replace		0.5				1, 2, 71	
		Adjust		*					C
		Test		0.5				1, 4	
	Proximity Switch (Outrigger)	Replace		0.5				1	
		Adjust		*					C
		Test		0.5				1, 2	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0609	Lights:								
	Head Light Assembly (each)	Inspect	0.1						
		Adjust		0.2				1	
		Replace		0.2				1, 4	
	Lights (each)	Inspect	0.1						
		Replace		0.5				1	
		Repair		*				1, 4	C
	Work Lamp	Replace		1.0				1, 4	
		Repair		0.3				1, 4	
0610	Sending Units and Warning Switches:								
	Engine Cold Plate/ECM	Inspect		0.2					
		Test		*				1, 4, 23, 31, 148	
		Replace		2.0				1, 2, 4, 42	
	Warning Buzzer	Inspect	0.1						
		Replace		0.5				1	
	TRS/SRS	Replace			3.0			5, 6	
		Test			*			1, 4, 23, 31, 32, 148	A
		Adjust			*			88, 194	A
	Engine Throttle Sensor	Test		0.3				1, 4, 23, 31, 32, 148	
		Replace		0.8				1	
	Fuel Temperature Sensor	Test		0.4				1, 4, 23, 31, 32, 148	
		Replace		0.4				1	
	Engine Water Temperature Sensor	Test		0.3				1, 4	
		Replace		0.5				1	
	Engine Oil Temperature Sensor	Test		0.3				1, 4	
		Replace		0.5				1, 2	
	DDEC Engine Oil Pressure Sensor	Test		0.3				1, 4, 23, 31, 32, 42, 148	
		Replace		0.5				1, 2	
	Manifold Pressure	Test		0.3				1, 4, 23, 31, 32, 148	
		Replace		0.5				1, 4	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0610	Sending Units and Warning Switches-CONT:								
	Engine Fuel Pressure Sensor	Test Replace		0.3 1.0				1, 4 1	
	Transmission Electronic Control Unit (ECU)	Test Replace		0.5 1.0				1, 4 1	
	Magnetic Speed Sensor	Test Replace			0.3 0.7			5 5, 6	
	Tachometer Drive Assembly	Test Replace		* 1.1					A
	Sending Units (each)	Test Replace		* 0.5				1, 4	A
	EPAC	Test Adjust Replace			* * *			5, 6 5 5	A C C
	Differential Pressure Switch	Test Replace		* 0.9				1, 2, 4, 30	A
0611	Horn, Siren:								
	Electric Horn	Replace		0.2				1	
	Horn Relay	Replace		0.4				1	
	Horn Button	Replace		0.1				1	C
0612	Batteries, Storage (Wet or Dry):								
	Batteries	Inspect Test Service Replace	0.1	 0.3 0.3 1.0				 1, 4, 23, 31, 32, 42, 148 1, 4 1	
	Battery Box Assembly	Inspect Replace Repair	0.1	 1.6 1.0				 1 1, 2	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0613	Hull or Chassis Wiring Harness								
	Engine Wiring Harness	Test		*				1, 4, 23, 31, 32, 42, 148	A
		Replace			12.0			5	F
		Repair		*	*			1, 4, 45, 96	C, E
	DDEC Wiring Harness	Test		*				1, 4, 23, 31, 32, 148	A
		Replace			0.5			5, 42	
		Repair		0.5				1, 4, 42, 43, 44, 56, 57, 183, 184, 185, 197, 198	
	Cab Wiring Harness	Test		*				1, 4, 23, 31, 32, 42, 148	A
		Replace			12.0			2, 5	F
		Repair		*	*			1, 4, 45, 96	C, E
	STE/ICE Wiring Harness	Test		*					A
		Replace			2.0			5	F
		Repair		*	*			1, 4, 45, 96	C, E
	Chassis Wiring Harness	Test		*					A
		Replace			4.0			5	F
		Repair		*	*			1, 4, 45, 96	C, E
	Crane Wiring Harness	Replace			*			5	C
		Repair		*	*			1, 4	C, E
	LHS/Cab Interface Harness	Replace			0.8			5	
		Repair		0.5				1, 4, 45, 96	
07	TRANSMISSION								
0705	Transmission Shifting Components:								
	Transmission Shift Selector	Replace		0.4				1	
		Repair		0.2				1	
	Electronic Shifter Harness	Replace			*			5, 6	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0710	Transmission Assy:								
	Flywheel	Replace			0.8			5, 6, 121 127	
		Repair				0.2		5, 6	
	Torque Converter Stator	Replace				1.0		5, 10, 86	
		Repair				*			C
	Torque Converter Housing	Replace				0.6		5, 6	
		Repair				0.3		5, 6, 10, 41, 73, 82, 83, 99, 108, 127, 152	G
	Torque Converter Pump	Replace				1.0		5, 6, 142, 164	
		Repair				0.3		5, 10, 150	G
	Transmission Assembly	Inspect	0.1						
		Test		0.5	*			5, 6, 32, 85, 148	A
		Service		1.0				1, 2, 4, 126	
		Replace			3.0			5, 6	
		Repair				27.4		5, 6, 30, 61 86, 177	B
		Overhaul					*		D
	Output Shaft Assembly	Replace				0.2		5	
		Repair				0.2		5, 6	
	Rear Transmission Cover Assembly	Replace				0.2		5, 6	
		Repair				*		5, 6, 10, 41, 83, 99, 104, 111, 137	C
	Transmission Yoke/ Dust Shield/Oil Seal	Replace			3.0			5, 6, 16, 84, 103, 143, 169	
0713	Intermediate Clutch:								
	First Clutch Assembly	Replace				0.1		5	
		Repair				*		5, 6, 10, 101	C
	Adapter Housing	Replace				0.2		5	
		Repair				*		5, 6	C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0713	Intermediate Clutch-CONT:								
	Forward Clutch And Input Shaft	Replace Repair				0.1 0.7		5, 6, 10, 192 5, 10, 21, 39, 138	
	Fifth Clutch	Replace Repair				0.1 0.3		5, 6, 123 5, 39	
	Fourth Clutch	Replace Repair				0.6 2.5		5, 6, 39 5, 10, 39	
	Third Clutch	Replace Repair				0.6 2.5		5, 27 5, 105	
	Center Support	Replace Repair				0.1 1.0		5, 6, 27, 123 5, 6, 10, 35, 66, 72, 101, 122	
0714	Servo Unit:								
	Control Valve Assembly	Replace Repair				* *		5, 6 5, 6	C C
	Front Plate Assembly	Replace Repair				0.5 *		5, 6 5	 C
	First Shift Valve Body Assembly	Replace Repair				* *		5 5, 6, 10	C C
	First Trimmer Valve Body Assembly	Replace Repair				0.1 0.1		5 5, 6, 10	
0721	Coolers, Pumps, Motors:								
	Oil Pump Assembly	Replace Repair				* *		5 5, 6	C C
	Low Oil Sensor Assembly	Test Replace			0.1 3.2			5 5, 6	
08	TRANSFER, FINAL DRIVE, PLANETARY AND DROP GEARBOX ASSEMBLIES (ON VEHICLE)								

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0801	Power Transfer and Final Drive Assy:								
	Transfer Case Assembly	Inspect	0.1					1, 2, 126	
		Service		0.3				5, 6, 30	C
		Replace			*			5, 6, 19	B
		Repair				8.0		58, 59, 60, 61, 177	C
		Overhaul					*		D
	Yokes	Replace			2.8			5, 6	C
	Oil Seats	Inspect	0.1						
		Replace			1.6			5	
	Upper Shaft Assembly	Repair				1.0		5, 6, 10	
	Center Shaft Assembly	Repair				0.5		5, 6, 10, 58	
	Rear Shaft Assembly	Repair				1.0		5, 6, 10	
	Differential Shaft Assembly	Repair				1.0		5, 6, 10	
	Front Shaft Assembly	Repair				1.0		5, 6, 10	
	Differential Assembly	Repair				0.6		5, 6, 10, 60	
0803	Gear Shift, Vacuum Booster and Controls:								
	Air Chamber, Differential	Inspect	0.3						
		Adjust		0.5				1	
		Replace		1.0				1, 2, 4	
	Upper Shift Rod Assembly	Repair				1.0		5, 6, 10	
	Lower Shift Rod Assembly	Repair				1.0		5, 6, 10	
	Shift Control Cable	Adjust		0.3				1	
		Replace		2.5				1, 2	
0804	Lubrication, Cooling, Or Hyd Components:								
	Lube Pump	Replace			0.8			5, 6, 30	
		Repair				0.5		5, 6	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0804	Lubrication, Cooling Or Hyd Components- CONT:								
	Lube Hoses (each)	Inspect	0.1					1, 2, 4, 30	
		Replace		0.5					
	Breather	Inspect	0.1					1	
		Service		0.1					
		Replace		0.1				1	
09	PROPELLER, PROPELLER SHAFTS, UNIVERSAL JOINTS, COUPLER ASSEMBLY								
0900	Propeller Shafts:								
	Propeller Shafts and Universal Joints	Inspect	0.2						
		Service		0.1				1	
		Replace		0.9				1, 2, 4	
		Repair		0.9				1, 2, 4	
10	FRONT AXLE								
1000	Front Axle Assembly:								
	Axle No. 1 Assy	Inspect	0.1						
		Service		0.6				1, 2	
		Replace			15.2			5, 6, 119	
		Repair				10.0		5, 176	
	Axle No. 2 Assy	Inspect	0.1						
		Service		0.5				1, 2	
		Replace			11.0			5, 6, 119	
		Repair				10.0		5, 176	
1002	Differential:								
	Axle No. 1	Replace				1.0		5, 6	
		Repair				5.5		5, 6, 10, 13, 19, 177	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1002	Differential: (CONT)								
	Axle No. 2 Differential Assembly	Replace Repair				1.5 9.8		5, 6 5, 6, 10, 13, 19, 177	
	Axle No. 2 Rear Output Assembly	Replace Repair				1.0 1.0		5, 6 5	
1003	Planetary or Final Drive:								
	Axles No. 1 and 2 Planetary Hub Gears	Service Replace		*	2.9			2, 5, 58	A
1004	Steering and Leaning Wheel Mechanism:								
	Constant Velocity Joint	Service Replace Repair	0.2		4.5 2.0			5, 6 6, 54, 55	
	Pivot and Spindle Assembly	Inspect Service Replace Repair		0.1 *	3.0	3.0		2, 4 5, 6, 54, 55, 69, 191 5, 6, 54, 55, 91	A
11	REAR AXLE								
1100	Rear Axle Assembly:								
	Axle No. 3 Assy	Inspect Service Replace	0.1	0.5	8.0			1, 2 5, 6, 119, 201	
	Axle No. 4 Assy	Inspect Service Replace	0.1	0.5	8.0			1, 2 5, 6, 119	
	Axle No. 5 Assy	Inspect Service Replace	0.1	0.5	11.0			1, 2 5, 6, 119	
	Axles No. 3 and 4 Spindle Assembly	Replace Repaire			3.2 *			5, 6 5, 6, 142	C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1102	Differential: (CONT)								
	Axle No. 3 Differential Assembly	Replace Repair				1.6 4.9		5, 6 5, 6, 10, 13, 19, 51, 142, 173, 174, 175, 176	
	Axle No. 4 Differential Assembly	Replace Repair				1.6 4.9		5, 6 5, 6, 10, 13, 19, 177	
	Axle No. 5 Differential Assembly	Replace Repair				1.0 5.5		5, 6 5, 6, 10, 13, 19, 177	
1103	Planetary or Final Drive:								
	Axles No. 3, 4 and 5 Planetary Hub Gears	Service Replace		*	 2.9			 2, 5, 58	A
1104	Steering, Sideshift, and Wheel Leaning Mechanisms								
	Axle No. 5 Constant Velocity, Pivot & Spindle Assembly	Replace Repair			*	 *		5, 6, 54, 55, 69, 191 5, 6, 10, 165	C C
12	BRAKES								
1202	Service Brakes:								
	Brakes	Inspect		0.2				1	
	Brake Assemblies (all)	Replace Repair			1.0 7.5			5, 6 5, 6,	
	Brake Shoes	Inspect Adjust Replace		0.2 0.5 1.0				1, 71 1, 4, 71	
1206	Mechanical Brake System:								
	Pneumatic Brake Valve	Replace Repair		3.0		 1.5		1 1, 6, 135	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1208	Air Brake System:								
	Air Dryer	Inspect	0.1					1	
		Service		0.6				1, 2	
		Replace		3.0				1, 2, 4	
		Repair		1.0					
	Coalescing Filter/ Aftercooler	Inspect		0.1					
		Replace		0.7				1, 2	
		Repair		0.1				1, 4	
1209	Air Compressor Assembly:								
	Air Compressor	Inspect	0.2						
		Replace			3.2			5, 6, 30	
		Repair				4.0		5, 6, 10, 36, 117	
	Air Governor Assembly	Adjust		0.2				1	
		Replace		1.5				1, 30	
	Air Lines	Replace		*				1, 30	C
		Repair		*				1, 4	C
1211	Trailer Brake Connections And Controls:								
	Load Sensing Valve	Adjust		1.0				1, 135	
		Replace		2.0				1, 4	
13	WHEELS AND TRACKS								
1311	Wheel Assembly:								
	Wheel Assembly	Inspect	0.1						
		Replace	0.2						
		Repair		1.0				1, 4, 74	
	Wheel Hub Assembly	Inspect		0.2					
		Service		0.1				1, 4	
		Replace			3.4			5, 6, 169	
		Repair			2.1			5, 6, 50, 51, 81, 139	
	Brake Drums (all axles)	Inspect		0.2				5, 6	
		Replace		1.2				1, 4	
		Repair				*			C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1311	Wheel Assembly - CONT:								
	Central Tire Inflation System (CTIS)	Inspect	0.2						
	CTIS Controller	Replace		0.2				1	
		Repair		0.1				1	
	CTIS Front Manifold	Replace		0.7				1, 4, 30, 206	
		Repair		0.7				1	
		Test		2.0				1	
	CTIS Rear Manifold	Replace		0.3				1, 4, 30, 206	
		Repair		0.7				1	
1313	Tires, Tubes, Tire Chains:								
	Tire	Inspect	0.1						
		Replace		*				1	C
		Repair		*					C
14	STEERING								
1400	Steering System	Inspect	0.2						
		Service		0.6				1, 2	
		Adjust		*	3.5			1, 2, 4 5, 136	A
1401	Mechanical Steering Gear Assembly:								
	Steering Column	Inspect	0.2						
		Service		*					A
		Replace		2.2				1, 2	
	Drag Links	Inspect		0.1					
		Service			*				A
		Replace			*			5, 6	C
		Repair			*			5, 6, 10	C
	Intergear Link	Inspect		0.1					
		Service		*					A
		Replace			*			5, 6	C
		Repair			*			5, 6, 10	C
	Steering Shafts	Inspect		0.2					
		Service		*					A
		Replace		1.5				1, 2	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1401	Mechanical Steering Gear Assembly - CONT:								
	Tie-Rod	Inspect		0.1					
		Service		*					A
		Adjust		2.5				1, 2	
		Replace		1.3				1, 2, 4, 119	
		Repair		2.2				1, 2, 4	
	90 Degree Gear Box	Replace		1.0				1, 2	
		Repair			3.2			5, 6, 10	
	2.21:1 Gear Reducer	Service		*					A
		Replace			0.5			5, 6	
		Repair				0.1		5, 6, 10, 143	
	Axle No. 1	Align			4.0			5, 6, 26 134	
	Axle No. 2	Align			4.0			5, 6, 26, 134	
	Axle No. 5	Align			1.0			5, 6, 26, 134	
1407	Power Steering Gear Assembly:								
	Front Steering Gear Assembly	Inspect		0.1					
		Service		*					A
		Adjust			0.5			5	
		Replace			1.3			5, 6, 30, 196	
		Repair				2.1		5, 6, 10, 143, 196	
	Intermediate Steering	Inspect		0.1					
		Service		*					A
		Replace			1.0			5, 6, 30, 196	
		Repair				0.7		5, 6, 10 143, 196	
	Rear Steering	Inspect		0.1					
		Service		*					A
		Adjust			0.5			5	
		Replace			1.0			5, 6, 30, 196	
		Repair				2.2		5, 6, 10 143, 196	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1410	Hydraulic Pump or Fluid Motor Assembly:								
	Emergency Steering Hydraulic Pump	Adjust Replace		1.0 2.0				1 1	
	Emergency Steering Hydraulic Valve	Adjust Replace			1.0 1.5			5 5, 6, 205	
1411	Hoses, Lines, and Fittings:								
	Hydraulic Lines And Fittings	Replace		*				1, 30	C
1413	Tanks, Reservoirs:								
	Steering Reservoir	Inspect Service Replace Repair	0.1	 * 1.2 1.3				 1, 2, 4, 30, 126, 205 1, 2, 4, 205	 A
	Steering Hydraulic Filter	Service Replace		* 0.2				 1, 2, 4	A
	Steering Hydraulic Manifold	Replace Repair			1.3 0.3			5, 6, 30 5, 6	
15	FRAME, TOWING ATTACHMENTS, DRAWBARS, AND ARTICULATION SYSTEMS								
1501	Frame Assembly:								
	Cab Step Assembly	Replace Repair		0.5 0.2				1 1	
	Frame Assembly	Inspect Repair	0.1					 5, 6, 9, 205	
1503	Pintles and Towing Attachments:								
	Self-Guided Coupler	Inspect Service Replace Repair	0.1	 0.1 1.0 1.5				 1 1, 2, 4 1, 2, 4, 6	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1504	Spare Wheel Carrier And Tire Lock:								
	Tire Carrier and Davit	Inspect Service Replace	0.1	 * 2.3				 1	 A
16	SPRINGS AND SHOCKS ABSORBERS								
1601	Springs:								
	Spring Hangers	Inspect Service Replace	0.1	 *	 *			 5	 A C
	Springs	Inspect Replace	0.1		 *			 5, 6, 118	 C
	No. 3 Axle Suspension Air Bags	Inspect Replace	0.1		 1.0			 5, 6	
1604	Shock Absorber Equipment:								
	Shock Absorber and Bushings (each)	Inspect Replace		0.1 0.3				 1, 2	
1605	Torque, Radius, and Stabilizer Rods:								
	Equalizer Beam (each)	Replace Repair			2.2 2.0			5, 6, 118 5, 93, 190	
	No. 3 Axle Air Suspension Beam Assembly	Replace Repair			3.0 1.5			5, 6 5	
	No. 3 Axle Suspension Arm	Inspect Replace Repair	0.1		 * 3.0			5, 6 5, 6 35, 202	 C
	Torque Rods (each)	Inspect Replace		0.1	 1.3			 5, 6, 119	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
18	BODY, CAB, HOOD AND HULL								
1801	Body, Cab, Hood, and Hull Assemblies:								
	Cab Assembly	Inspect	0.2						
		Service	0.1						
		Replace			7.5			5, 6	
	Cab Door	Adjust		0.3				1	
		Replace		1.5				1	
		Repair		2.5				1, 4	
	Engine Cover Assembly	Replace		0.1				1	
		Repair		0.4				1	
1802	Fenders, Running Boards with Mounting and Attaching Parts, Windshield, Glass, Etc.:								
	Windshield Glass	Inspect	0.1						
		Replace			1.4			5	
1806	Upholstery Seats and Carpets:								
	Seat Assembly	Replace		0.6				1, 4	
		Repair		1.5				1, 4	
		Alignment		0.4				1, 4	
	Sun Visor Assembly	Inspect		0.1					
		Replace		0.3				1	
1808	Stowage Racks, Boxes, Straps, Carrying Cases, Cable Reels, Hose Reels:								
	Ladder Support	Replace		0.5				1, 2	
		Repair		*				1, 2	
	Stowage Box, Crane	Replace		0.5				1, 4	
		Repair		0.4				1, 2, 4	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
20	HOIST, WINCH, CAPSTAN, WINDLASS, POWER CONTROL UNIT, AND POWER TAKE-OFF								
2001	Hoist, Capstan, Windlass, Crane or Winch Assembly:								
	Crane Assembly	Inspect	0.1						
		Service		0.5				1	
		Test		*	*			1, 5, 158	A
		Adjust			0.5			5, 6	
		Replace			4.0			5, 6, 30, 201	
	Boom Assembly	Replace			2.0			5, 6, 30	
		Repair			4.8			5, 6	
	Erection Cylinder	Replace			0.6			5, 6, 30	
		Repair				1.5		5, 6	
	Lift Cylinder Assembly	Replace			0.7			5, 6, 30	
		Repair				0.9		5, 6, 196	
	Tension Link Assembly	Replace			0.2			5, 6	
		Repair				0.5		5, 6	
	Mast Assembly	Replace			0.6			5, 6, 30	
		Repair				*		5, 6	C
	Telescope Cylinder	Replace			0.7			5, 6, 30	
		Repair				0.8		5, 6	
	Hoist Assembly	Inspect	0.1						
		Service		0.3				1	
		Replace			1.4			5, 6	
		Repair				1.6		5, 6, 10	
	Hydraulic Hoist Motor	Replace			0.2			5, 6, 30	
		Repair				1.0		5, 6	
	Remote Control Box	Replace		0.3				1	
		Repair		1.0				1, 2, 4, 202	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
2001	Hoist, Capstan, Windlass Crane Or Winch Assembly - CONT:								
	Crane Cable	Inspect		*					A
		Service		*					A
		Replace		1.0				1, 4	
	Motor Valve Assembly	Replace			0.1			5, 6, 30	
		Repair			0.4			5, 6	
	Hoist Brake Assembly	Replace			0.4			5, 6, 30	
		Repair				1.4		5, 6	
	Cable Follower Assembly	Replace			0.7			5, 6, 30	
		Repair			0.6			5, 6	
	Sub-Frame Assembly	Replace			1.7			5. 6	
		Repair				7.0		5, 6	
	Swing Drive Brake	Replace			2.0			5, 6	
		Repair				1.0		5, 6	
	Gear Reducer	Replace			1.7			5, 6, 30, 172	
		Repair				1.2		5, 6, 175	
	Override Solenoid	Replace			1.3			5, 6, 30	
		Repair			2.1			5, 6	
		Test			0.5			6	
	Hook Block Assembly	Replace		0.5				1, 2	
		Repair		0.5				1, 2, 4, 132	
	Hoist Motor	Replace			0.5			5, 6, 30, 201	
		Repair			0.1			5, 6	
	Hand Pump	Replace		1.5				1, 2, 30	
		Repair		0.5				1, 2, 4	
	Accumulator	Service			*			1, 33	A
		Replace		0.2				1	
	Remote Control Box Cable Assembly	Replace		0.3				1	
		Repair		0.2				1	
		Test		0.5				2	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
2001	Hoist, Capstan, Windlass, Crane or Winch Assembly: CONT:								
	Self-Recovery Winch Assembly	Inspect	0.1						
		Service		0.3					
		Replace		4.5				1, 2, 4, 30, 201	
		Repair				*		5, 6, 10	C
	Counter Balance Valve	Replace			0.9			5, 6, 30	
		Repair			0.9			5, 6, 10	
	Winch Brake	Replace				1.0		4, 5	
		Repair				*		5, 6, 10	
	Front Tensioner Assembly	Service		*					A
		Replace		1.0				1	
		Repair		0.4				1, 2, 4	
	Front Cable Guide	Service		*					A
		Replace		0.1				1, 4	
	Rear Tensioner	Service		*					A
		Replace		1.0				1, 4	
		Repair		0.4				1, 2, 4	
	Rear Cable Guide	Service		*					A
		Replace		1.0				1	
	Winch Cable	Inspect	*						A
		Service		*					A
		Replace		0.8				1, 4	
	Hook Machining Arm	Replace			1.8			5, 6, 207	
		Repair			*			5, 6	C
	Middle Mach Frame	Replace			6.8			5, 6, 30, 204	
		Repair			*			5	C
2006	Bulldozer Tripod, Main Frame, Jack And Mounting:								
	Outrigger Cylinder	Replace			1.0			5, 6, 30	
		Repair				4.1		5, 6	
	Outrigger Pad Assembly	Replace		0.2					
		Repair		0.2				1, 2, 4	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
22	BODY, CHASSIS, AND HULL ACCESSORY ITEMS								
2202	Accessory Items:								
	Heater	Replace		1.3				1, 30	
		Repair		3.2				1	
	Heater Blower Motor	Replace		1.0				1	
		Repair		*				1, 4	C
	Heater Control Panel	Replace		0.8				1	
		Repair		*				1	C
2210	Data Plates and Instruction Holders:								
	Data Plate (each)	Replace		0.2				1, 2	
24	HYDRAULIC AND FLUID SYSTEMS								
2400	Major Assemblage (Load Handling System):								
	Load Handling System	Inspect	0.1						
		Service		*					A
		Test			0.6				
		Replace			2.0			5, 6	
		Repair			2.0			5, 6, 30, 201	
2401	Hydraulic Pump:								
	Main Hydraulic Pump Assembly	Inspect		0.2					
		Replace			12			5, 6, 30, 146	
		Repair			19.3			5, 6, 10, 199	
	Pump Driveshaft	Inspect		*					A
		Service		*					C
		Replace		1.0				1, 2	
		Repair		0.5				1, 2, 4	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
2402	Manifold and/or Control Valves:								
	LHS Load Sensing Valve	Replace		*				1, 2	C
		Test		0.5					
	Multifunction Manifold	Replace			3.0			5, 6	
		Repair			*			5, 6	C
2405	Mast Column:								
	LHS Hook Arm Cylinder	Service		*					A
		Replace			1.4			5, 6, 131, 210	
		Repair			2.5			5, 6, 23, 196	
2406	Strainers, Filters, Lines and Fittings, Etc.:								
	LHS Main Manifold Relief Valve	Adjust			0.5			6	
		Replace			1.0			5, 6	
		Test			0.5			6	
	LHS Main Cylinder	Replace			1.1			5	
		Repair			2.5			5, 6, 23, 196	
	Hose Assembly, Low Pressure	Replace		1.0				1, 30, 126	
		Repair		*					C
	High Pressure Hydraulic Filter Head	Replace		2.0				1, 4	
		Repair		*					C
	LHS Hook Arm Manifold Assembly	Replace			1.6			1, 201, 205	
		Repair			1.6				
	LHS Main Manifold	Replace			0.6			5, 6, 30	
		Repair			0.6			5	
2408	Liquid Tanks or Reservoirs:								
	Hydraulic Reservoir Assembly	Service		0.5				1, 2, 4, 52 126	
		Replace		5.9				1, 2, 4, 201 205, 207	
		Repair		0.5				1	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
33	SPECIAL PURPOSE KITS								
3303	Winterization Kits:								
	Engine Arctic Kits	Inspect	0.1						
		Install			*			5, 6	C
		Replace		4.5				1	
		Repair		*				1, 2, 4	C
3307	Special Purpose Kits:								
	EMM Power Interface Kit	Replace							
		Repair							
		Install							
	CHU Control Box	Repair		*				1	C
	CHU Proximity Switch And Sensing Plate (Hook Arm Up)	Adjust		*				1, 71	A
		Replace		*					C
	CHU Mode Switch	Adjust		*				1	A
		Replace		*					C
	CHU Rear Lock Limit Switch	Adjust		*				1	A
		Replace		*					C
	CHU Light Bar and Brackets Assembly	Repair		*				1	C
	CHU Container Guide	Repair		*				1	C
	CHU Slider/Pivot Assembly	Repair		*		*		1, 132	C
	CHU Short Strut and Pin Bracket Assembly	Repair		*				1, 132	C
	CHU Slider Arm Assembly	Repair		*		*		1, 132	C
	CHU Long Strut Bracket Assembly	Repair		*				1, 132	C
	CHU Lifting Frame Lower Container Lock Plate	Repair		*				1	C
	CHU Lifting Frame Flipper Bracket and Lock Plate	Repair		*				1	C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
3307	Special Purpose Kits - CONT:								
	CHU Air Cylinder and Rotary Paddle	Adjust Replace		* *				1, 132	A C
	CHU Pivot	Repair		*				1	C
	CHU Lifting Frame Lower Container Lock Handle	Repair		*				1	C
	CHU Rail Transport ISO Corner Locks	Repair		*				1	C
34	ARMAMENT AND SIGHTING AND FIRE CONTROL (ELECTRIC/ ELECTRONIC MATERIAL)								
3402	Small Arms:								
	Machine Gun Mounting Kit	Inspect Replace	0.1	 1.0				 1, 2	
47	GAGES (NON-ELECTRICAL) WEIGHING AND MEASURING DEVICES								
4702	Gages, Mounting, Lines, and Fittings:								
	Restrictor Indicator Assembly	Inspect Replace	0.1	 0.5				 1	
68	RADIO TELEPHONE SYSTEMS								
6809	Radio Telephone System:								
	Radio Kit	Replace Install		1.0	 *			1, 2 5	 C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
91	CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT								
9111	Gas Particulate Filter Kits:								
	Gas Particulate Filter Unit Kit	Inspect	0.2						
		Install			2.0			5	
		Replace		2.2				1	
9131	Chemical Agent Alarms:								
	Chemical Alarm Kit	Inspect	0.2						
		Install			2.3			5, 6	
		Replace		1.8				1	
	Decontamination Kit	Inspect	0.2						
		Install			1.0			5	
		Replace		0.5				1, 2	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Table B-1. Tool and Test Equipment Requirements

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
1	O	TOOL KIT, General Mechanic's: Automotive	5180-00-177-7033	SC 5180-90-N26
2	O	SHOP EQUIPMENT, Automotive Maint and Repair: Common No. 1	4910-00-754-0654	SC 4910-95-A74
3	O	SHOP EQUIPMENT, Automotive Maintenance and Repair: Supp. 1	4910-00-754-0653	SC 4910-95-A73
4	O	SHOP EQUIPMENT, Automotive Maint and Repair: Common No. 2	4910-00-754-0650	SC 4910-95-A72-HR
5	F	TOOL KIT, General Mechanic's	5180-00-699-5273	SC 5180-90-N05-HR
6	F	SHOP EQUIPMENT, Automotive Maintenance and Repair: Field Maintenance, Basic	4910-00-754-0705	SC 4910-95-A31
7	F	SHOP EQUIPMENT, Automotive Maintenance and Repair: Field Maintenance	4910-00-754-0706	SC 4910-95-A62
8	F	SHOP EQUIPMENT, Fuel and Electrical System, Engine: Field Maintenance, Basic	4940-00-754-0714	SC 4940-95-B20-HR
9	F	SHOP WELDING SET	3433-00-357-6311	SC 3433-90-N01-HR
10	H	SHOP EQUIPMENT, Automotive Maintenance and Repair: Field Maintenance, Supp. 2	4910-00-754-0707	SC 4910-95-A63
11	F	SHOP EQUIPMENT, Machine Shop	3470-00-754-0708	SC 3470-95-A02
12	H	ADAPTER, Engine Stand	4910-00-146-9624	J33850
13	H	ADAPTER, Maintenance Stand, Differential	4910-01-384-6264	J-39929-A
14	F	ADAPTER, Mechanical Puller	5120-00-733-8890	J7932
15	F	ADAPTER, Quick Disconnect	5935-01-297-2481	J33765
16	O	ADAPTER, Radiator	4910-01-170-4929	J29003-A
17	F	ADAPTER, Socket (3/4 in. Female to 1/2 in. Male)	5120-00-227-8088	97-3725
18	F	ADAPTER, Socket (3/4 in. Female to 1 in. Male)	5120-00-227-8104	A-A-2172
19	H	ADAPTER KIT, Transfer Case	4910-01-385-6779	J-39911
20	F	ALIGNMENT TOOL, Blower	5120-01-158-3991	J33001

Table B-1. Tool and Test Equipment Requirements (Cont).

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
21	H	ALIGNMENT TOOL, Clutch	5120-01-115-1156	J24221
22	H	ALIGNMENT TOOL, Pin	5120-01-232-0007	J24285
23	O	ANALYZER SET, STE/ICE-R	1910-01-222-6589	12259266
24	H	ATTMENT, BALL, MICRO	5120-00-221-1921	J4757
25	H	BRACKET, Lifting	5306-01-338-6292	J24408-A
26	F	BOX, Chalk, Reel and Line	5210-00-273-9793	GGG-C-291
27	H	BRACKET, Lifting	5120-01-115-1157	J24196
28	H	BRACKET, Mounting, Cylinder Liner	5340-01-158-3984	J24565-02
29	H	BRUSH, Wire, Valve Cylinder	5120-00-766-2141	J5437
30	O	CAP AND PLUG SET	5340-00-450-5718	10935405
31	O	CARTRIDGE, DDEC	7030-01-354-6174	J38500-750
32	O	CARTRIDGE, ATEC	4940-01-367-6194	J38500-300
33	F	CHARGING KIT, Pressure	4910-01-046-7109	12252157
34	F	COMPRESSOR, Air Unit	4130-00-752-9633	MIL-C-13874
35	H	COMPRESSOR SET, Snap Ring	5120-01-116-5016	J24208-D
36	H	COMPRESSOR, Ring	5120-01-048-3129	J24204-1
37	H	COMPRESSOR, Ring	4910-01-158-3974	J24227
38	F	COMPRESSOR, Ring, Piston	5120-00-250-6055	RC40C
39	H	COMPRESSOR, Seal	5120-01-048-2159	J24204-3
40	F	COMPRESSOR, Spring Valve	5120-01-297-2397	J7455-A
41	H	COMPRESSOR, Spring	5120-01-048-2160	J24219
42	O	CONNECTOR REMOVER	5120-01-355-3012	J38384
43	O	CONNECTOR REMOVER Electrical Contact	5120-01-158-4707	114010
44	O	CRIMPING TOOL	5120-01-355-0844	J35123
45	O	CRIMPING TOOL (CANNON)		995-0001-904
46	H	DETECTOR, Leak, Vacuum Gage	6685-01-061-4253	J23987-B
47	F	DRILL MACHINE, Upright	3413-00-165-4117	MIL-D-80038
48	F	DRIVER	5120-01-374-6200	2HE496
49	H	DRIVER BEARING, Gear	5120-01-033-8902	J25257
50	F	DRIVER, CTIS Seal	5120-01-355-0857	J41112
51	F	DRIVER, CTIS Seal	5120-01-355-0858	J41113
52	O	DRUM, Storage 57 gal	8110-00-082-2626	MIL-D-6054
53	F	EXPANDER, Seal, Oil	5120-00-336-0445	J4239
54	F	EXTRACTOR, Inertial		2HE226

Table B-1. Tool and Test Equipment Requirements (Cont).

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
55	F	EXTRACTOR, Inertial	5120-01-354-9543	2HE227
56	O	EXTRACTOR TOOL, Elect	5120-01-015-2154	91019-3
57	O	EXTRACTOR TOOL, Elect	5120-00-020-5926	305183R
58	F	EYES, Lifting	5306-01-197-6569	3016T39
59	F	EYES, Lifting	5306-01-333-5486	8891T82
60	F	EYES, Lifting	5306-01-239-5053	3016T65
60.1	O	FAULT CODE RETRIEVAL DEVICE (FCRD)		CA1 05 020
61	H	FIXTURE, Holding	5120-01-115-1165	J24310
62	F	FIXTURE, Lifting, Cylinder Head	4910-00-456-7620	J22062-01
63	H	FIXTURE, PTO, Gear	4910-01-158-3969	J26899
64	H	FIXTURE, Test, Head	4910-01-158-3985	J28454
65	O	GAGE, Belt Tension	4935-01-254-9808	BT-33-73-BF
66	H	GAGE, Center and Front	5210-01-133-6888	J29198-3
67	H	GAGE, Cylinder, Bore	5210-01-070-4543	J5347-B
68	H	GAGE, Depth Cylinder, Liner	5210-01-174-4498	J24898
69	F	GAGE, Depth	5210-00-023-4798	J22273-01
70	F	GAGE, Dial	5120-00-494-1846	J-8165-2
71	O	GAGE, Feeler, Jacobs Brake	5210-01-214-2138	007958
72	F	GAGE, Feeler	5120-00-671-2275	J3174-02
73	H	GAGE, Groove	5220-01-028-1109	J24599
74	O	GAGE, Inflation	4910-00-204-2644	100708
75	F	GAGE Set, Feeler	5210-01-119-7601	FB310B
76	F	GAGE Set, Feeler	5210-01-245-9564	J1698-02
77	F	GAGE Set, Feeler, Piston	5210-00-416-1631	J5438-01
78	F	GAGE, Timing, Injector	5220-01-348-1638	J25502
79	F	GAGE, Valve, Adjustable	5220-00-176-0638	J9708-15
80	F	HAMMER, Slide	5120-01-112-2165	J6125-16
81	F	HANDLE, Driver	5120-00-677-2259	J8092
82	H	HANDLE, Driver	5120-00-808-5082	J3154-1
83	H	HANDLE, Driver	5120-01-054-4048	J24202-4
84	O	HANDLE, Installer	5120-00-977-5578	J7079-2
85	O	HARNESS, Breakout	6150-01-373-7771	J34517
86	F	HOLDER, Stator, Roller	5120-01-115-1158	J24218-2
87	H	HONING UNIT	5130-00-629-9782	J5902-01
88	F	INDICATOR, Dial, Timing Tool	2815-01-355-6628	J34930-A

Table B-1. Tool and Test Equipment Requirements (Cont).

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
89	F	INDICATOR, Dial	5120-00-402-9619	J7872
90	H	INDICATOR, Dial, Set	5120-00-794-9178	J5959-01
91	F	RECONDITIONING SET Injector, Tube	5180-00-146-9619	J22525-B
92	F	INSERTER AND REMOVER	5120-01-166-0572	J33080
93	H	INSERTER, Bearing and Bushing	5120-01-158-3946	J25562
94	H	INSERTER, PLUG, Cylinder Block	5120-01-166-5419	J21850
95	H	INSERTER, SEAL	5120-01-340-1820	J35373
96	O	INSERTION TOOL (CANNON)	5120-01-374-8968	CIT-SS-10
97	H	INSTALLER AND REMOVER	5120-01-048-2180	J25275
98	H	INSTALLATION TOOL, Cup Plug	5120-01-297-2457	J33420
99	H	INSTALLER, Bearing	5120-01-115-1160	J24197
100	F	INSTALLER, Guide, Valve	5120-00-999-8617	J21520
101	H	INSTALLER, Lock Ring	5120-01-054-4050	J24453
102	F	INSTALLER, Oil Seal	5120-01-227-8483	J21983
103	H	INSTALLER, Output Shaft	5120-01-054-4042	J24202-1A
104	H	INSTALLER, Plug	5120-01-385-7288	J24411
105	H	INSTALLER, Plug	5120-01-054-4053	J24369
106	F	INSTALLER, Seal	5120-01-054-4049	J24198
107	F	INSTALLER, Seal, Crankshaft, Front	5120-00-936-4377	J9783
108	F	INSTALLER, Seal	5120-01-013-1678	J9791
109	O	INSTALLER, Seal	5120-00-977-5579	J8550
110	F	INSTALLER, Seal, Flywheel	4910-01-176-4230	J21112-B
111	H	INSTALLER, Seal, Oil	5120-00-937-7267	J8501
112	H	INSTALLER, Seal, Transfer Case	5120-01-383-7878	TRS6227
113	H	INSTALLER, Valve Bridge	5120-00-999-8616	J7482
114	H	INSTALLER, Water Pump Seal	5120-01-365-4079	J-38858
115	H	INSTALLING TOOL, Piston	5120-00-127-7757	J23762-A
116	H	INSTALLING TOOL, Valve	5120-01-048-3118	J24357
117	H	INSTALLING/REMOVING Tool	5120-01-130-8864	J23019
118	F	JACK, Stabilizer	2590-00-23-7418	10876244
119	O	JACK KIT, Hydraulic, Hand	5120-00-587-4144	GGG-J-60
120	F	LEVEL	4920-00-064-8974	2579573-002
121	F	LIFTING BRACKET, Flywheel	5120-01-116-6049	J24365

Table B-1. Tool and Test Equipment Requirements (Cont).

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
122	H	LIFTING Bracket, Center	5120-01-116-6048	J24195
123	H	LIFTING Fixture, Clutch	5120-01-115-1159	J24209
124	H	MAG INS. UNIT, Stat	6635-00-566-9772	MIL-M-6867C
125	F	OIL, Seal, Expander	5120-01-232-0005	J8682
126	O	PAN, DRAIN 6 Gal	4910-00-287-2944	MIL-P-45819
127	F	PIN, Guide Set	5120-01-115-1163	J24315
128	F	STUDS, Guide	5315-01-162-3630	J24748
129	H	PIN, GUIDE	5315-01-165-1469	J1126
130	H	PLATE KIT, Gear Bearing	5180-01-167-4285	2SK900
131	F	PLIERS, Channel Lock	5120-00-287-2512	GGG-W-649
132	O	PLIERS, Retaining Ring	5120-01-375-5699	2BH945
133	F	PLUG, Cylinder Block	5120-01-166-5421	J24597
134	F	PLUMB BOB	5210-00-007-8229	GGG-P-501
135	O	PRESSURE TEST KIT	4910-01-378-9068	3SK911
136	F	PRESSURE TEST KIT	4910-01-378-8863	3SK912
137	H	PROTECTOR, Piston	5120-01-048-2156	J24210
138	H	PROTECTOR, Seal	5120-01-048-2157	J24216-01
139	F	PROTECTOR, Spindle	3830-01-349-7390	2HE234
140	F	PROTRACTOR, Magnetic	5210-01-415-0075	2150A251
141	F	PROTRACTOR, Square	5210-00-273-1937	05-12INCH
142	F	PULLER, Bolts	5120-01-185-6811	J26901-A
143	H	PULLER, Mech	5120-00-219-8397	J1902-B
144	F	PULLEY REMOVER	5120-00-944-0363	J5356
145	F	PUMP, FORCE	4130-01-192-0496	466-46485
146	O	PULLEY KIT, Pump, Roof Mount	5120-01-375-5700	2HP645
147	F	PUNCH, DRIFT	5120-00-004-4921	PWA14920
148	O	READER, Diagnostic (DDEC)	4910-01-343-3508	J38500-1
149	H	REMOVER, Bearing, Front Support	5120-01-117-2523	J28557
150	H	REMOVER, Snap Ring	4910-01-158-3996	J26598-A
151	H	REMOVER, Valve Bridge	5120-00-999-8615	J7453
152	H	REMOVER, Valve Pin	5120-01-048-3128	J-24412-2
153	H	REMOVER, Valve Seat	5120-01-165-1935	J23479-E
154	F	REMOVER AND INSTALLER, Piston Ring	5120-00-494-1846	7950177

Table B-1. Tool and Test Equipment Requirements (Cont).

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
155	F	REMOVER ASSEMBLY	4910-01-158-3982	J24563-A
156	H	REMOVER SET, Valve Bridge	5120-00-999-8614	J7091-01
157	H	REMOVER, Guide Valve	5120-00-733-8880	J6569
158	H	REMOVER, Seal, Waterpump	4910-01-158-3979	J22150-B
159	H	COLLECTOR RING, Installer/Stalking SET	5120-01-048-3126	J24200
160	F	RIVET GUN	5130-00-982-8078	352
161	F	RULE, STEEL, Machinist	5120-00-204-1283	GGG-R-791
162	F	SCALE, TENSION	4910-00-779-6832	J-8129
163	F	SCREW, Guide	5120-01-144-4483	J1927-01
164	H	SLEEVE, Puller	4910-01-162-3633	J25007-4
165	H	SOCKET, 1-11/16 in.	5120-01-024-0168	GGG-W-641
166	H	SOCKET WRENCH Attachment, Screwdriver	5120-01-297-2374	J34650
167	H	SOCKET, 55mm	5120-01-386-5999	J39938
168	H	SOCKET, 63mm	5120-01-386-5988	J39939
169	F	SOCKET, Spindle Nut	5120-01-354-9451	J41111
170	H	SOCKET, Socket Head Screw	4470-01-350-0895	LAW124A
171	H	SOCKET, 12mm Hex Head	5120-00-240-6148	849550-3-8AF
172	F	SOCKET, Swivel 13/16 in.	5120-00-236-7619	A-A-1396
173	H	SPANNER	5120-01-354-9452	12379639
174	H	SPANNER	5120-01-354-9450	12379638
175	H	SPANNER	5120-01-354-9449	12379637
176	H	STAND, Maintenance, Axle	4910-00-241-3329	150-AX
177	H	STAND, Maintenance, Engine	4910-00-808-3372	J29109
178	H	STEAM CLEANER	7910-01-157-8272	PRO 12-5
179	H	STONE, Abrasive Cylinder	5130-00-937-7280	J5902-14
180	H	STONE, Sharpening	5345-00-584-4607	A6F0
181	H	STUD SET	5120-01-048-2155	J25002
182	F	TAP AND DIE SET	5136-01-119-0005	TDM99117
183	O	TERMINAL CRIMPER	5120-01-355-0845	J35688
184	O	TERMINAL REMOVER	5120-01-357-2937	J35689-A
185	O	TERMINAL REMOVER	5120-01-353-2534	J33095
186	O	TESTER, Pressure, Radiator	4910-01-170-4928	J24460-01
187	H	TESTING KIT, Cylinder	5180-01-252-9800	2SK737

Table B-1. Tool and Test Equipment Requirements (Cont).

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ NATO Stock Number	Tool Number
188	F	OSS TESTER	4910-01-370-4908	13189
189	H	TOOL SET, Blower	4940-00-611-7945	J6270-G
190	F	TOOL SET, Equalizer Beam	4940-01-386-6108	1764
191	F	TOOL, Knuckle, Adjusting	5120-01-355-6571	J41115
192	H	TOOL, Lifting	5120-01-159-1736	J33079-1
193	H	TOOL, Staking	5120-01-359-2757	J24200-1
194	O	TOOL, SRS/TRS Alignment	5120-01-343-1001	J39815
195	F	TORCH, Propane	3433-01-161-4998	737-1-0000
196	F	VISE, Pipe, Chain	5120-00-078-6662	CV12
197	O	WEATHERPAC CRIMPER	5120-01-374-8936	J38852
198	O	WEATHER TERMINAL REMOVER	5120-01-374-8969	J36400-5
199	F	WINCH, Cable, Hand Operating	3950-00-079-1202	415526-1
200	F	WRENCH, Chain	5120-01-192-9403	CW24
201	O	WRENCH, Combination 1 5/8 in.	5120-01-016-7144	1180
202	O	WRENCH, Combination 1 11/16 in.	5120-00-184-8566	A-A-1351
203	O	WRENCH, Combination 1 3/4 in.	5120-00-020-8658	1256
204	F	WRENCH, Combination 1 13/16 in.	5120-00-081-9099	GGG-W-636
205	O	WRENCH, Combination 1 7/8 in.	5120-00-020-8632	1260
206	O	WRENCH, Combination 2 in.		
207	O	WRENCH, Combination 2 1/8 in.	5120-00-203-4795	1268
208	O	WRENCH, Fuel Line	5120-00-019-5232	J-8932-B
209	F	WRENCH SET, Pushrod	5120-00-132-2109	J21100-D
210	H	WRENCH, Spanner	5120-01-375-4502	J41108

Section IV. REMARKS

REFERENCE CODE	REMARK
A	No specific times established. Times required for inspection, service, or test will depend on extent of testing required.
B	This task covers the entire on-stand repair. Use tools listed in the individual tasks for those tasks.
C	No specific times established. Times required for replacement or repair will depend on extent of work required.
D	No specific times established. Times required for overhaul will depend on extent of work required.
E	In the “O” category repair is limited to splicing of wires, taping of the harness or wires, and the replacement of wire ends.
F	At the “F” level the entire wire harnes is replaced.
G	Repair consists of replacing individual items.
H	High pressure hoses are non-repairable.
I	Repair of the gas particulate filter is covered in TM-(TBD).
J	Repair of the M-8 chemical alarm is covered in TM 3-6665-225-12.
K	Repair of the M-13 decontamination unit is covered in TM 3-4230-214-12&P.

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION.

C-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the PLS. These items are authorized to you by CTA50-970, Expendable Items (Except Medical, Class V, Repair parts and Heraldic Items) or CTA8-100, 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 task box to identify the material (e.g., "Compound, Cleaning, Item 5, Appendix C").

b. Column (2) - Level. This is the maintenance level approved to use the item listed.

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 Commercial and Government Entity (CAGE) code in parentheses followed by the part number.

e. Column (5) - Unit of Measure. Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in. or pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	O		Adhesive (45152) 1490170 Sikaflex 221 gray	gl
1.1	O		Adhesive No. 380 (05972) OTC P/N 3303334	
		8040-01-388-8704	3 gm tube (05972), 38004	gm
		8040-01-406-8424	1 oz bottle (05972), ITEM 3850	oz
		8040-01-284-3984	1 oz can (05972), 3850	
2	O		Adhesive (05972) Loctite #409	
		8040-01-321-1254	20 gram tube	gm
3	O		Deleted	
4	O		Adhesive (05972) Loctite #44581	
		8040-01-046-5061	4 gram kit	gm
5	O		Adhesive (04963) 1300	
		8040-00-148-7182	5 ounce tube	oz
6	O		Adhesive (71984) RTV 732 Black	
		8040-00-851-0211	5 oz kit	oz
		8040-00-865-8991	12 oz kit	oz
			(80244) MIL-A-46106 Group 1 Type 1	
		8040-01-331-7470	5 oz tube	oz
7	O		Adhesive (71984) RTV 732 Clear	
		8040-00-701-9546	5 oz kit	oz
		8040-01-010-8758	12 oz kit	oz
			(80244) MIL-A-46106 Group 1 Type 1	
		8040-01-331-7469	3 oz tube	oz
		8040-01-331-7475	12 oz cartridge	oz
8	O		Adhesive (71984) RTV 738	
		8040-01-260-1939	5 oz tube	oz
9	O		Adhesive (01139) RTV-162 (71984) Silastic 738 RTV (81349) MIL-A-46146	
		8040-00-118-2695	3 oz kit	oz

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
10	O		Adhesive	
			(01139) RTV 108	
		8040-00-843-0802	3 ounce kit	oz
		8040-01-173-9815	12 ounce tube	oz
11	O		Adhesive	
			(18876) 13086263	
		8040-00-390-7959	1 quart can	qt
12	O	8040-01-515-1050	Adhesive, Insulation	
			(28112) 540 (OTC P/N 1372150)	
			10.3 oz (305 ml) cartridge	oz
13	O		Adhesive, Retaining	
			(05972) 68035	
		8030-01-303-0502	50 ml bottle	bt
14	O		Adhesive Sealant	
			(45152) 24758FX	oz
15	O		Adhesive, (0PMN0) Sika 255 FC Blk	
			(45152) 3145938	oz
16	O		Adhesive Spray	
			(45152) 1537350	oz
17	O		Alcohol, Isopropyl	
			(53390) 7618-19-4	
		6810-01-075-5546	40 oz bottle	oz
18	O		Antifreeze	
			(81349) MIL-A-11755	
		6850-00-174-1806	55 gallon drum	gl
19	O		Antifreeze (81349) MIL-A-46153	
		6850-00-181-7929	1 gallon bottle	gl
		6850-00-181-7940	55 gallon drum	gl
20	O		Antiseize Compound	
			(81349) MIL-A-907	
		8030-00-155-6444	16 oz aerosol can	oz
21	O		Antiseize Compound	
			(81349) MIL-A-907	
		8030-00-251-3980	1 lb can	lb
22	O		Antiseize Compound, High Temperature	
			(81349) MIL-A-907	
		8030-00-597-5367	2-1/2 lb can	lb
23	O		Brush, Paint	
		8020-00-178-8305	(96906) MS16866	ea
24	O		Biocide, Fuel Preservative	
			(OU7J1) Biobar J.F.	
		6840-00-300-6373	1 quart	qt
		6840-01-173-6940	5 gallon	gl

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
25	O		Cable Ties (96906) MS3367-3	
		5975-01-273-8133	12 inches long, 100 per package	hd
26	O		Cable Ties (96906) MS3367-1	
		5975-00-074-2072	6 inches long, 100 per package	hd
27	O		Cable Ties	
		4310-01-115-2297	(56501) TY525MX	ea
28	O		Chalk, Marking, White	
		7510-00-537-6426	(83030) 1400	ea
29	O		Cleaner, Lubricant A (81349) MIL-L-63460	
		9150-01-079-6124	4 oz bottle, w/extender tube	oz
30	O		Cloth, Abrasive (Crocus) (58536) A-A-1206	
		5350-00-221-0872	50 sheet package	sh
31	O		Cloth, Cleaning (81349) MIL-C-85043	
		7920-00-165-7195	Type 1 - 10 lb box	lb
		7920-00-044-9281	Type 2 - 10 lb box	lb
32	O		Coating Compound, Bituminous, Solvent Type (70842) 765-1505	
		8030-00-546-8621	21 ounce aerosol can	oz
33	O		Coating, Rust Arresting (81349) MIL-R-10036	
		8030-00-231-2349	1 gallon can	gl
		8030-00-231-2344	5 gallon can	gl
		8030-00-174-3242	55 gallon drum	gl
34	O		Corrosion Preventive Compound (81349) MIL-C-16173	
		8030-00-062-6950	Grade 1 - 1 quart can	qt
		8030-01-149-1731	Grade 2 - 1 quart can	qt
		8030-00-837-6557	Grade 3 - 1 pint can	pt
		8030-00-903-0931	Grade 4 - 1 pint can	pt
35	O		Corrosion Preventive Compound (13548) 97940	
			8 ounce can	oz
36	O		Corrosion Preventive Compound (81349) MIL-C-11796	
		8030-00-231-2353	5 lb	lb
		8030-00-285-1570	35 lb	lb
37	O		Dye, Prussian Blue	
		8010-00-652-3626	(81349) MIL-P-30501	oz

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
38	O		Epoxy	
		8040-00-092-2816	(96900) 04001	ea
39	O		Gasket, Forming Compound	
			(0597) Loctite #515	
		5330-01-325-6993	50 ml tube	ml
40	O		Gasket, Strip	
			(45152) 2011160	
			50 ft. roll	in
41			Grease	
			(45152) 1864450	
		9150-01-197-7688	2.25 oz tube	oz
		9150-01-197-7690	1.75 lb can	lb
		9150-01-197-7689	6.5 lb can	lb
42	O		Grease, Automotive And Artillery	
			(70878) 5542P	
			(81349) MIL-G-10924	
		9150-01-197-7688	2.25 oz tube	oz
		9150-01-197-7690	1.75 lb can	lb
		9150-01-197-7689	6.5 lb can	lb
43	O		Grease, General Purpose	
			(81349) MIL-G-23549	
		9150-01-306-9202	1 pound can	lb
		9150-00-235-5555	6.5 pound can	lb
		9150-00-823-8047	35 pound can	lb
44	O		Grease, High Temperature	
		9150-01-154-1259	(81349) DOD-G-85733	qt
45	O		Grease, Instrument	
			(97343) SRI2	
		9150-01-235-5057	1 pint can	pt
46	O		Grease, Lubriplate	
		9150-00-076-1887	(73219) 06706	oz
47	O		Grease, Molybdenum Disulfide	
			(58372) 60G	
		9150-01-091-9336	1.5 lb can	lb
			(81349) MIL-G-21164	
		9150-00-754-2595	1.75 lb can	lb
		9150-00-223-4004	6.5 lb can	lb
		9150-00-965-2003	35 lb can	lb
48	O		Heatshrink, Sealed	
		5970-00-815-1295	(45152) 1704950	ea
48.1	O		Heatshrink, Sealed	
			(45152) 1704940	ea
49	O		Hot Melt	
			(04963) 3783	oz

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
50	O		Hydraulic Oil, OE/HDO 10	
			(81349) MIL-L-2104	
		9150-00-189-6727	1 quart can	qt
		9150-01-177-3988	12 quart box	qt
		9150-00-191-2772	55 gallon drum	gl
		9150-00-183-7807	Bulk	gl
51	O		Injector Test Oil	
		6850-00-779-6851	(33287) J-26400-5	oz
52	O		Insulation, Cab	
			(40501) MC5150-1/2 blk	ft
53	O		Lubricant, Tire	
			(96980) AA20	
		2540-00-256-5529	5 gallon can	gl
		2540-00-256-5526	1 quart can	qt
			(96980) AA17	
		2540-00-256-5527	1 gallon can	gl
54	O		Lubricating Oil, Engine OE/HDO 30	
			(81349) MIL-L-2104	
		9250-00-186-6681	1 quart can	qt
		9150-00-188-9858	5 gallon can	gl
		9150-00-189-6729	55 gallon drum	gl
55	O		Lubricating Oil, Engine OE/HDO 40	
			(81349) MIL-L-2104	
		9150-00-189-6730	1 quart can	qt
		9150-00-188-9862	55 gallon drum	gl
		9150-00-405-2987	Bulk	gl
56	O		Lubricating Oil, Engine OE/HDO 15W/40	
			(81349) MIL-L-2104	
		9150-01-152-4117	1 quart can	qt
		9150-01-178-4725	12 quart box	qt
		9150-01-152-4118	5 gallon can	gl
		9150-01-152-4119	55 gallon drum	gl
57	O		Lubricating Oil, Engine OEA	
			(81349) MIL-L-46167	
		9150-00-402-4478	1 quart can	qt
		9150-00-402-2372	5 gallon can	gl
		9150-00-491-7197	55 gallon can	gl
58	O		Lubricating Oil, Gear GO 75W	
			(81349) MIL-L-2105	
		9150-01-035-5390	1 quart can	qt
		9150-01-048-4593	1 gallon can	gl
		9150-01-035-5391	5 gallon can	gl

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
59	O		Lubricating Oil, Gear GO 80W/90 (81349) MIL-L-2105	
		9150-01-035-5392	1 quart can	qt
		9150-01-313-2191	1 gallon can	gl
		9150-00-001-9395	5 gallon can	gl
60	O		Lubricating Oil, Preservative (15W40) (Engine) (81349) MIL-L-21260C	
		9150-01-293-7696	5 gallon	gl
		9150-01-293-2792	55 gallon	gl
61	C		Oil, Fuel, Diesel Winter	
		9140-00-286-5286	Bulk	gl
62	C		Oil, Fuel, Diesel Regular	gl
		9140-00-286-5294	Bulk	
63	O		Petrolatum, Technical (81348) VV-P-236	
		9150-00-250-0931	8 ounce tube	oz
		9150-00-250-0926	1.75 pound can	lb
		9150-00-250-0933	7.5 pound can	lb
64	O		Primer, (0PMN0) Sika Cleaner 205 (45152) 3145939	oz
65	O		Primer, “T” 7471	oz
		8030-01-388-5604	(05972) 19267	
66	O		Protective Coating (45152) 1412020	
			1 quart can	qt
67	O		Rags, Wiping (58536) A-A-531	
		7920-00-205-1711	50 pound bale	lb
68	O		Sealant, Electrical (00CE9) RTV200-257	
69	O		Sealant, Metal (45152) 1317520	
70	O		Sealant, Rubber (45152) 1494320	
71	O		Sealant, Teflon Pipe (19207) 12297953	
		1015-01-255-4144	50 ml tube	ml

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
72	O		Sealing Compound (05972) Loctite #567	
		8030-01-054-0740	50 ml bottle	ml
		8030-00-204-9149	250 ml tube	ml
			(05972) Loctite #567-47	
		8030-01-166-0675	50 ml tube	ml
73	O		Sealing Compound (05972) Loctite #290 (80244) MIL-S-46163 Type 3 Grade R	
		8030-00-111-2763	10 ml bottle	ml
		8030-00-111-2762	50 ml bottle	ml
		8030-01-050-8288	150 ml bottle	ml
74	O		Sealing Compound (05972) Loctite #271 (80244) MIL-S-46163 Type 1 Grade K	
		8030-00-148-9833	10 ml bottle	ml
		8030-01-158-6070	50 ml bottle	ml
75	O		Sealing Compound (77247) Permatex-3D (80244) MIL-S-45180 Type 3	
		8030-00-656-1426	1 pint can	pt
76	O		Sealing Compound (05972) Loctite #262	
		8030-01-159-4374	10 ml bottle	ml
		8030-01-142-9830	50 ml bottle	ml
		8030-01-142-3131	250 ml bottle	ml
77	O		Sealing Compound (05972) Loctite #242 (80244) MIL-S-46163A Type 2 Grade N	
		8030-01-104-5392	10 ml bottle	ml
		8030-01-014-5869	50 ml bottle	ml
		8030-01-025-1692	250 ml bottle	ml
78	O		Sealing Compound (05972) Loctite 222 (80244) MIL-S-46163A Type II Grade M	
		8030-01-054-3968	10 ml bottle	ml
		8030-01-069-3046	50 ml bottle	ml
		8030-01-055-6126	250 ml bottle	ml
79			Sealing Compound (05972) Loctite #680	
		8030-01-303-0502	50 ml bottle	ml
		8030-01-387-2007	250 ml bottle	ml
80	O		Sealing Compound	
		8030-01-023-4535	(04963) 3M2084	oz

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
81	O		Sealing Compound (77247) 51D	
		8030-00-954-9371	1 pint can	pt
82	O		Sealing Compound (45152) 079-820400	
		8030-01-104-5392	10 ml bottle	ml
		8030-01-014-5869	50 ml bottle	ml
		8030-01-025-1692	250 ml bottle	ml
83	O		Sealing Compound (45152) 65270AX	
		8030-01-104-5392	10 ml bottle	ml
		8030-01-014-5869	50 ml bottle	ml
		8030-01-025-1692	250 ml bottle	ml
84	O		Silicone Compound (72984) DC 111	
		6850-00-294-0860	5 ounce Tube	oz
85	O		Silicone Compound, Anti-Corrosion (71984) DC4-2OZ	
		6850-00-177-5094	2 ounce tube	oz
86	O		Solution, Soap (81349) MIL-W-15000 Class C	
		6810-00-252-1345	1 quart bottle	qt
87	O		Solvent, Drycleaning (58536) A-A-711 (81348) P-D-680	
		6850-00-664-5685	1 quart can	qt
		6850-00-264-9038	5 gallon can (Environmentally Compliant Solvent) (0K209) Breakthrough	gl
		6850-01-378-0679	5 gallon can	gl
88	O		Tag, Identification (16956) 12-105	
		9905-00-720-3577	white	ea
89	O		Tags, Identification (81349) MIL-T-12755	
		9905-00-537-8957	white	ea
		9905-00-537-8955	yellow	ea
90	O		Tape, Adhesive (26066) 4516	
		7510-00-079-7604	36 yard roll	yd
91	O		Tape, Foam 36 yard roll	yd

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
92	O	5330-01-084-5058	Tape, Foam (45152) 107685A	in
93	O	8030-00-889-3535	Tape, Antiseizing (81755) P5025-2R (81349) MIL-T-27730 260 inch spool	in
94	O	7510-01-358-8770	Tape, Pressure Sensitive (52152) 4950 36 yard roll	yd
95			Deleted	
96			Deleted	
97	O	8010-00-401-0421	Varnish (79819) FIXATIF 1 quart can	qt
98	C	6850-00-926-2275	Washer Fluid (81348) O-C-1901 1 gallon bottle	gl
99	O	6145-01-074-7535	Wire, 16 Gage (45152) 1927FX	ft
100	O	9505-00-331-3275	Wire, Safety (96906) MS20995C41	lb
101	O	5330-01-325-6993	Wrench, Loctite #515 (05972) 25824AX	ml

APPENDIX D

ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

D-1. SCOPE.

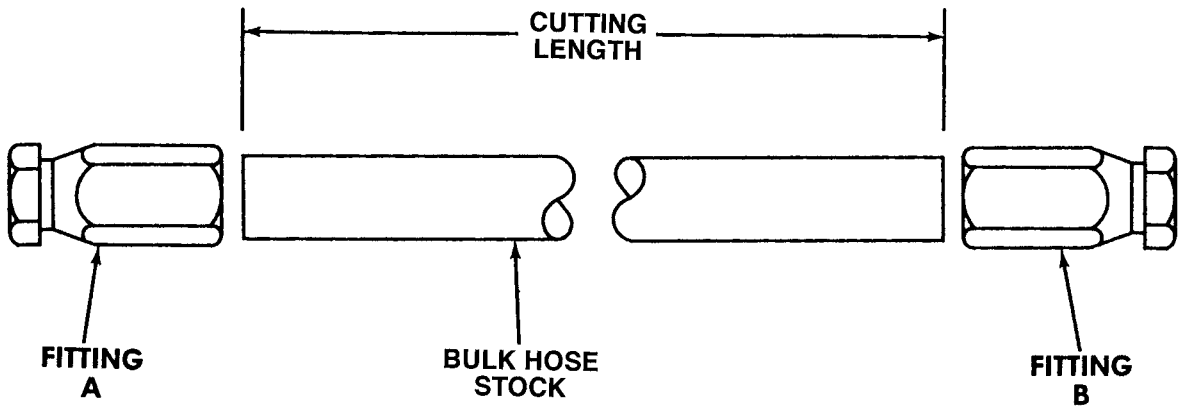
This appendix includes complete instructions for manufacturing or fabricating authorized items locally. All bulk materials needed to manufacture an item are listed by part number or specification number in a tabular list with an illustration, as needed.

Section II. MANUFACTURED ITEMS

D-2. FUEL HOSE FABRICATION.

The following hoses are cut from bulk hose using a fine toothed hacksaw or suitable cutting device. Locations and installation instructions for fuel hoses are found in Para 4-12. Table D-1 lists the fuel hoses.

Table D-1. Fuel System Hoses



Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
65068AX-024	2575-48RL	24	61
47371AXU-018	FC350-04	18	46
EU102958-025	FC350-06	25	64
EU102958-052	FC350-06	52	132
1924600U-034	FC350-10	34	86
56845AXU-005	FC350-10	5	13

D-3. AIR INTAKE HOSE FABRICATION.

There are two hoses in the air intake system that require fabrication. Both hoses can be cut from bulk stock using a fine-toothed hacksaw or suitable cutting device. Refer to Para 4-7 for locations and installation instructions.

Table D-2. Air Intake Hoses

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
21033FXW-120	21020FX	120	305
1732400U-067	FC300-16	67	170

D-4. COOLING SYSTEM HOSES FABRICATION.

The following hoses for the cooling system are cut from bulk hose using a fine-toothed hacksaw or suitable cutting device. Locations and installation instructions are found in Para 6-8.

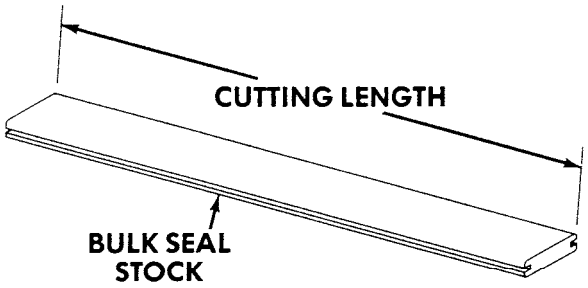
Table D-3. Cooling System Hoses

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
69940AX-048	3230-0293	48	122
4811FX-100	4811FX	100	254
46754AX-U-020	FC350-06	20	51

D-5. SEAL FABRICATION.

Fabricate seals from bulk seal stock listed in Table D-4. Use a suitable cutting tool to cut seal to length required.

Table D-4. Seal, Nonmetallic

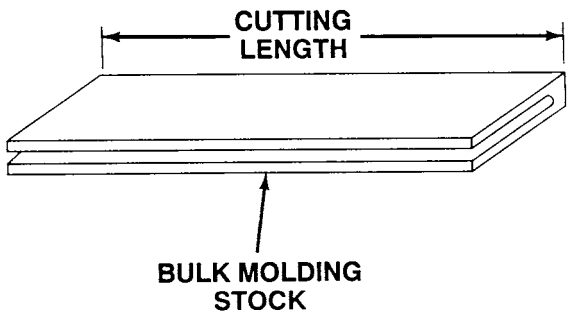


Seal Part Number	Seal Bulk Part Number	Cutoff Length	
		Inches	cm
59747AX-040	101-2203	40	102
59747AX-055	101-2203	55	140
59745AX-040	75000519	40	102
59745AX-055	75000519	55	140
125865A-047	75001366	47	119
125865A-116	75001366	116	295
125865A-160	75001366	160	409

D-6. EDGING AND MOLDING FABRICATION.

Edging and molding can be fabricated from bulk stock listed in Table D-5. Use suitable cutting tool to cut to length required.

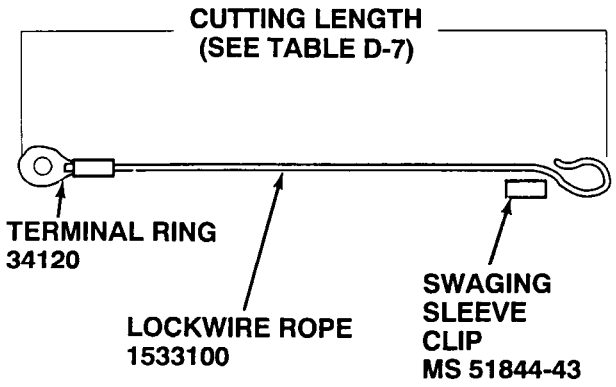
Table D-5. Edging and Molding



Edging/Molding Part Number	Edging/Molding Part Number	Cutoff Length	
		Inches	cm
1339700-011	1339700	11	28
26927AX-026	26927AX	26	66
26947BX-002	75000317	2	5
26947BX-003	75000317	3	8
26947BX-004	75000317	4	10
26947BX-005	75000317	5	13
26947BX-006	75000317	6	15
26947BX-017	75000317	17	43
26947BX-018	75000317	18	46
1467160-012	75000317	12	31
42925AX-005	OR40	5	13
27022AX-002	R-422-N	2	5
27002AX-019	R-422-N	19	48
27022AX-024	R-422-N	24	61
27022AX-043	R-422-N	43	109
27022AX-093	R-422-N	93	236
27022AX-101	R-422-N	101	257
27022AX-130	R-422-N	130	330

D-7. LOCKWIRE ROPE FABRICATION.

The lockwire length is shown in Table D-6. Crimped button stop caps are used to attach the lockwire to other components. Each application requires two swaging sleeve clips.



NOTES:

1. OBTAIN ALL COMPONENTS REQUIRED TO FABRICATE LOCKWIRE.
2. USE A FINE TOOTHED HACKSAW OR SUITABLE CUTTING DEVICE, AND CUT LOCKWIRE TO LENGTH REQUIRED.
3. SLIDE WIRE THROUGH HOLE IN COMPONENT, UNTIL LOCKWIRE COMES THROUGH OTHER SIDE.
4. SLIDE CAP ONTO LOCKWIRE, UNTIL CAP BOTTOMS AGAINST COMPONENT AND WIRE COMES THROUGH CAP.
5. CRIMP CAP TO LOCKWIRE.
6. SLIDE OPPOSITE END OF WIRE THROUGH ASSEMBLY, AND SLIDE OTHER CAP OVER END OF WIRE.
7. SLIDE WIRE THROUGH HOLE IN COMPONENT, UNTIL LOCKWIRE COMES THROUGH OTHER SIDE.
8. SLIDE CAP ONTO LOCKWIRE, UNTIL CAP BOTTOMS AGAINST COMPONENT AND WIRE COMES THROUGH CAP.
9. CRIMP CAP TO LOCKWIRE.

The following wire rope is cut from bulk stock. Refer to Table D-6 for cutting lengths.

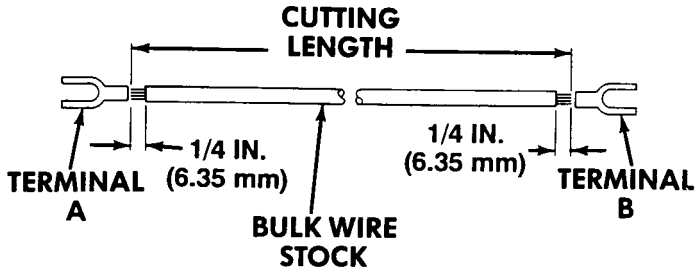
Table D-6. Lockwire Rope

Lockwire Rope Part Number	Lockwire Rope Part Number	Cutoff Length	
		Inches	cm
1533100-010	1533100	10	25
1533100-015	1533100	15	38
1533100-020	1533100	20	51
1533100-024	1533100	24	61

D-8. WIRE AND WIRE ASSEMBLIES FABRICATION.

Fabricate from bulk wire stock listed in Table D-7. Use wire cutters to cut wire to required length, then strip ends of wire ¼ in. (6.35 mm). Crimp the required lugs or terminals onto wire ends.

Table D-7. Wire And Wire Assemblies

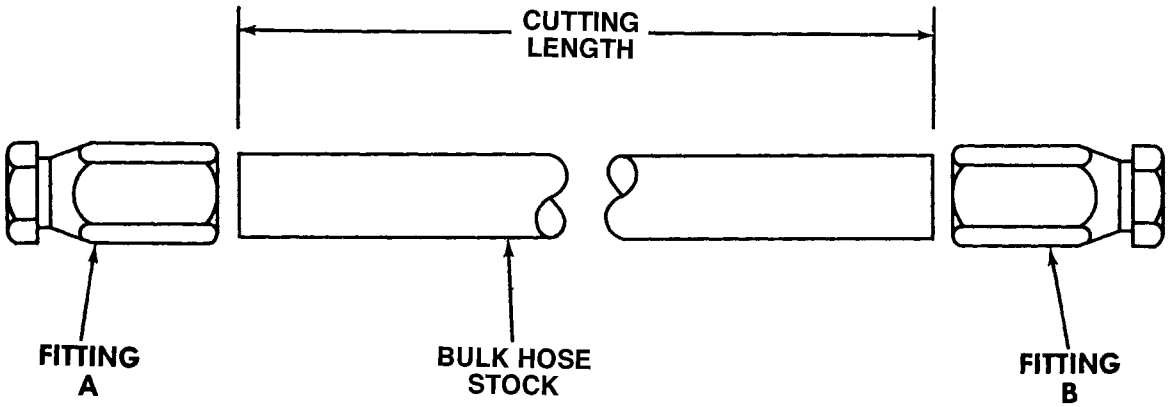


Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length	
		Inches	cm
1884540W-012	121782A	12	31
1947560W-012	121782A	12	31
1959390W-012	121782A	12	31
1969600W-012	121782A	12	31
1977300W-010	4127FX	10	25
1974580-013	R-64951	13	33
1974590-005	R-64951	5	13
1978470W-005	R-64951	5	13

D-9. HOSES AND TUBES.

Fabricate hoses and tubes from bulk hose or tube stock listed in Table D-8. Use a fine toothed hacksaw or suitable cutting device and cut hose/tube to desired length. Place fitting A in vise and screw hose/tube counterclockwise until hose/tube bottoms out in fitting. Back off ¼ turn. Repeat for fitting B.

Table D-8. Hoses and Tubes



Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
5113689-12	1525-6	12	31
21021FX-026	2102CFX	26	66
32850AX-014	22020	14	36
32850AX-016	22020	16	41
32850AX-030	22020	30	76
32850AX-036	22020	36	91
32850AX-51	22020	51	130
31270AX-029	31270AX	29	74
31270AX-082	31270AX	82	208
31270AX-096	31270AX	96	244
31270AX-140	31270AX	140	356
69940AX-006	3230-0293	6	15
69940AX-065	3230-0293	65	165
31271AX-040	3250-101	40	102
31271AX-047	3250-101	47	119
31271AX-053	3250-101	53	135
31271AX-092	3250-101	92	234
31271AX-150	3250-101	150	381
AAAC0085	51995757	85	216

Table D-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
AAAC0105	5199575	105	267
AAAC0190	5199575	190	483
AAAC0260	5199575	260	660
AAAE0090	5199575	90	229
1944510	70-062		Variable
1944520	70-062		Variable
23319FX-012	C604-200 BLK	12	31
23319FX-023	C604-200 BLK	23	58
23319FX-029	C604-200 BLK	29	74
23319FX-244	C604-200 BLK	244	620
23319FX-257	C604-200 BLK	257	653
23323FX-008	C606 BLACK	8	20
23323FX-008	C606 BLACK	8	20
23323FX-010	C606 BLACK	10	25
23323FX-010	C606 BLACK	10	25
23323FX-012	C606 BLACK	12	31
23323FX-014	C606 BLACK	14	36
23323FX-019	C606 BLACK	19	48
23323FX-022	C606 BLACK	22	56
23323FX-026	C606 BLACK	26	66
23323FX-030	C606 BLACK	30	76
23323FX-033	C606 BLACK	33	84
23323FX-042	C606 BLACK	42	107
23323FX-042	C606 BLACK	42	107
23323FX-044	C606 BLACK	44	112
23323FX-046	C606 BLACK	46	117
23323FX-050	C606 BLACK	50	127
23323FX-052	C606 BLACK	52	132
23323FX-055	C606 BLACK	55	140
23323FX-057	C606 BLACK	57	145
23323FX-060	C606 BLACK	60	152
23323FX-060	C606 BLACK	60	152
23323FX-082	C606 BLACK	82	208
23323FX-087	C606 BLACK	87	221
23323FX-089	C606 BLACK	89	226
23323FX-148	C606 BLACK	148	376

Table D-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
23323FX-159	C606 BLACK	159	404
23323FX-163	C606 BLACK	163	414
23323FX-200	C606 BLACK	200	508
23323FX-335	C606 BLACK	335	851
23323FX-377	C606 BLACK	377	958
198872A U-200	FC300-04	20	51
115134A W-004	FC300-04	4	10
1732400 U-067	FC300-16	67	170
1620950 U-099	FC350-04	99	252
47371AX U-055	FC350-04	5	13
47371AX U-006	FC350-04	6	15
47371AX U-012	FC350-04	12	31
47371AX U-017	FC350-04	17	43
47371AX U-018	FC350-04	18	46
47371AX U-120	FC350-04	120	305
60264AX U-031	FC350-04	31	79
60264AX U-034	FC350-04	34	86
60264AX U-054	FC350-04	54	137
60264AX U-057	FC350-04	57	145
60264AX U-063	FC350-04	63	160
60264AX U-082	FC350-04	82	208
60296AX U-029	FC350-04	29	74
60296AX U-036	FC350-04	36	91
60296AX U-061	FC350-04	61	155
1780700 U-032	FC350-06	32	81
1780700 U-035	FC350-06	35	89
1780700 U-039	FC350-06	39	99
1780700 U-041	FC350-06	41	104
1782400 U-022	FC350-06	22	56
1782410 U-021	FC350-06	21	53
1782450 U-025	FC350-06	25	64
47336AX-060	FC350-06	60	152
47554AX U-020	FC350-06	20	51
118971A U-022	FC350-06	22	56
118971A U-095	FC350-06	95	241
119784A U-010	FC350-06	10	25

Table D-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
119784A U-021	FC350-08	21	53
119784A U-047	FC350-08	47	119
1782340 U-019	FC350-08	19	48
1782360 U-020	FC350-08	20	51
1921290 U-025	FC350-08	25	64
1936150 U-032	FC350-08	32	81
1936150 U-034	FC350-08	34	86
1936150 U-038	FC350-08	38	97
1936150 U-040	FC350-08	40	102
69390AX U-006	FC350-08	6	15
69390AX U-019	FC350-08	19	48
69390AX U-020	FC350-08	20	51
69390AX U-020	FC350-08	20	51
69390AX U-021	FC350-08	21	53
69390AX U-025	FC350-08	25	37
1780720 U-020	FC350-10	20	51
1780720 U-051	FC350-10	51	130
1782370 U-037	FC350-10	37	94
1782380 U-031	FC350-10	31	79
1782390 U-020	FC350-10	20	51
1782420 U-039	FC350-10	39	99
1782430 U-031	FC350-10	31	79
1782440 U-019	FC350-10	19	48
1924600 U-090	FC350-10	90	229
47750AX U-009	FC350-10	9	23
58989AX U-020	FC350-10	20	51
58989AX U-034	FC350-10	34	86
58989AX U-064	FC350-10	64	163
66798AX U-020	FC350-10	20	51
66798AX U-025	FC350-10	25	64
66798AX U-030	FC350-10	30	76
66798AX U-077	FC350-10	77	196
1780710 U-082	FC350-12	82	208
1780710 U-083	FC350-12	83	211
47369AX U-127	FC350-12	127	323
61608AX U-093	FC350-12	93	236

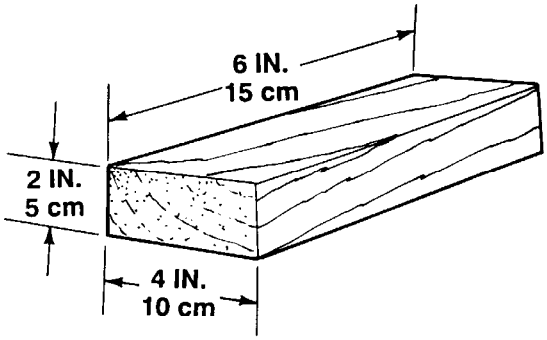
Table D-8. Hoses and Tubes (Cont)

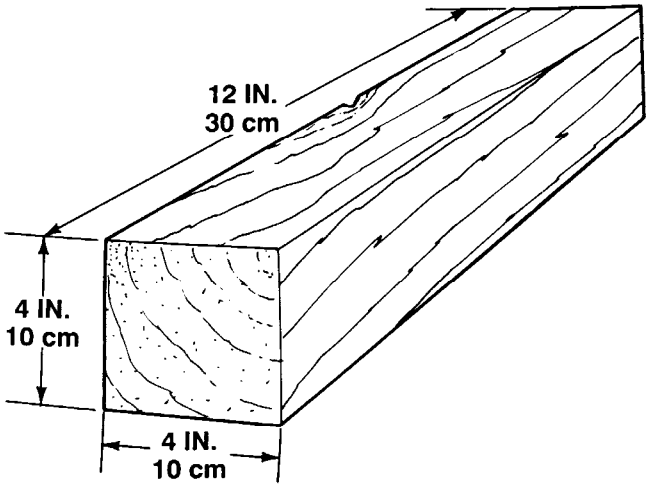
Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
61608AX U-142	FC350-12	142	361
47468AX U-011	FC350-16	11	28
47468AX U-022	FC350-16	22	56
47468AX U-045	FC350-16	45	114
47468AX U-046	FC350-16	46	117
47468AX U-089	FC350-16	89	226
47213AX-012	NT10012-50FT	12	31
47213AX-015	NT10012-50FT	16	41
47213AX-021	NT10012-50FT	21	53
47213AX-023	NT10012-50FT	23	58
47213AX-025	NT10012-50FT	25	64
47213AX-025	NT10012-50FT	25	64
47213AX-060	NT10012-50FT	60	152
47213AX-073	NT10012-50FT	73	185
47213AX-073	NT10012-50FT	73	185
47213AX-173	NT10012-50FT	173	439
47213AX-194	NT10012-50FT	194	493
1656500-128	PFT-10B-GRN	128	325
1656500-183	PFT-10B-GRN	183	465
1656490-102	PFT-10B-RED	102	259
1656490-202	PFT-10B-RED	202	513
1656490-257	PFT-10B-RED	257	653
1656470-030	PFT-4A-BLU	30	76
1656470-104	PFT-4A-BLU	104	264
1656470-115	PFT-4A-BLU	115	292
1656470-139	PFT-4A-BLU	139	353
1605260-008	PFT-4A-GRN	8	20
1605330-020	PFT-4A-ORG	20	51
1605330-040	PFT-4A-ORG	40	102
1605330-071	PFT-4A-ORG	71	180
1605330-112	PFT-4A-ORG	112	285
1605330-124	PFT-4A-ORG	124	315
1605170-007	PFT-4A-RED	7	18
1605270-023	PFT-6B-GRN	23	58
1605270-028	PFT-6B-GRN	28	71
1605270-056	PFT-6B-GRN	56	142

Table D-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
1605270-057	PFT-6B-GRN	57	145
1605270-100	PFT-6B-GRN	100	254
1605270-108	PFT-6B-GRN	108	274
1605270-146	PFT-6B-GRN	146	371
1605320-205	PFT-6B-ORG	205	521
1605160-012	PFT-6B-RED	12	31
1605160-014	PFT-6B-RED	14	36
1605160-030	PFT-6B-RED	30	76
1605160-031	PFT-6B-RED	31	79
1605160-047	PFT-6B-RED	47	119
1605160-048	PFT-6B-RED	48	122
1605160-049	PFT-6B-RED	49	125
1605160-055	PFT-6B-RED	55	140
1605160-102	PFT-6B-RED	102	259
1605160-103	PFT-6B-RED	103	262
1605160-114	PFT-6B-RED	114	290
1605160-165	PFT-6B-RED	165	419
1605160-213	PFT-6B-RED	213	541
1605300-026	PFT-6B-YEL	26	66
1605300-066	PFT-6B-YEL	66	168
1605300-070	PFT-6B-YEL	70	178
1605300-129	PFT-6B-YEL	129	328
1605300-132	PFT-6B-YEL	132	335
1605300-150	PFT-6B-YEL	150	381
1605300-022	PFT-8B-BLU	22	56
1605300-316	PFT-8B-BLU	316	803
W-22-13	W-22	13	33
W-22-9	W-22	9	23
40AW168-010	W-22-L	10	25
40AW168-050	W-22-L	50	127
40AW168-19	W-22-L	19	48
40AW168-27	W-22-L	27	69
40AW168-45	W-22-L	45	114

D-10. WOODEN BLOCKS.





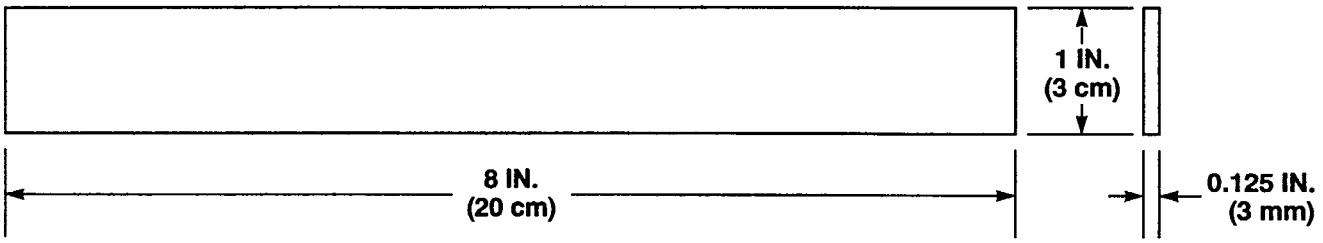
a. Fabricate from MML751 lumber stock.

b. Using saw and standard planing machine, cut stock to size required in Table D-9.

Table D-9. Wooden Blocks

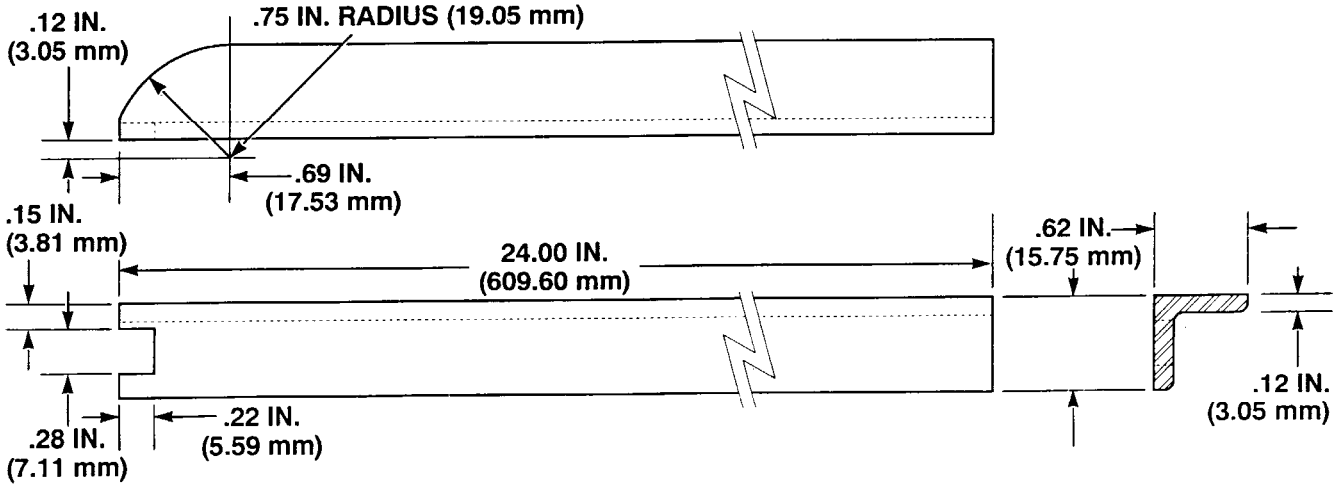
Para Number	Finished Dimensions of Block In. (cm)
2-28	4 by 4 by 12 in. (10 by 10 by 30 cm)
5-2	2 by 4 by 6 in. (5 by 10 by 15 cm)
13-2	4 by 4 by 12 in. (10 by 10 by 30 cm)

D-11. STEERING STOP PLATE.



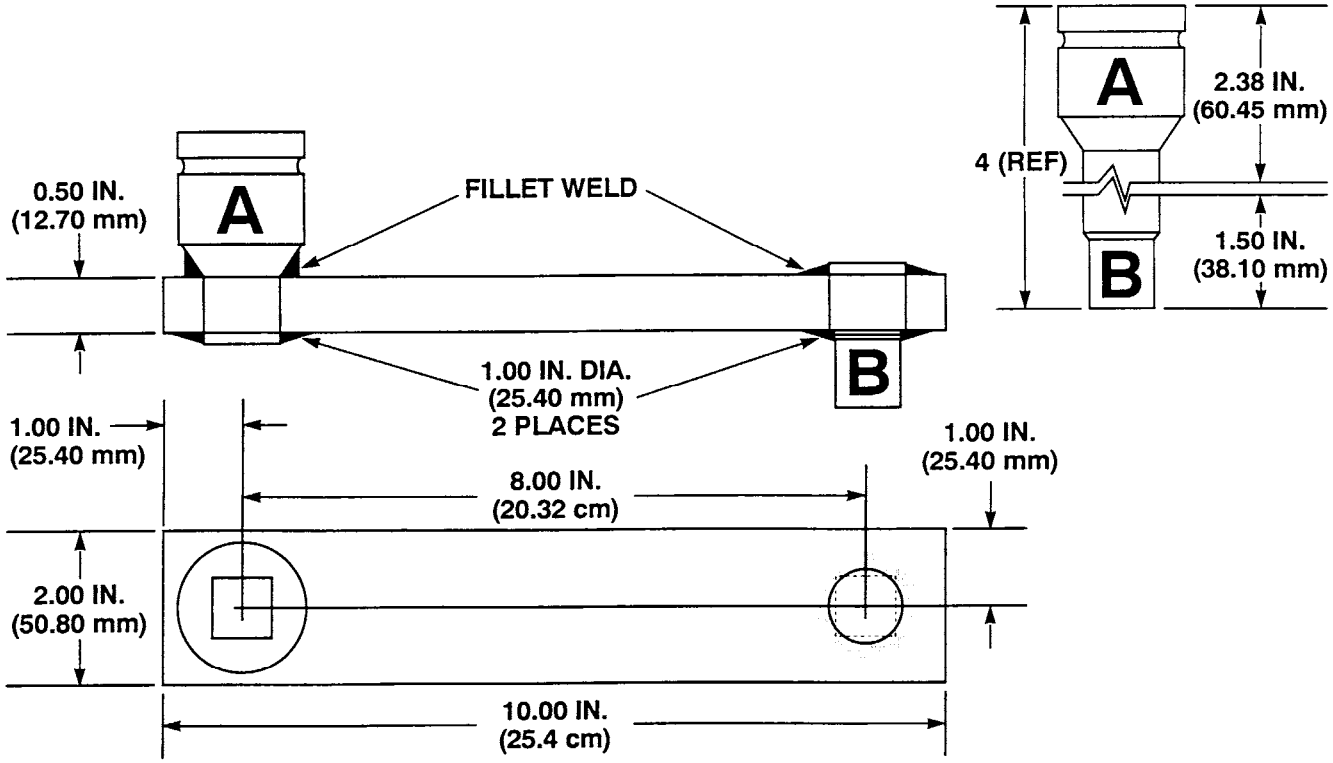
Fabricate steering stop plate from 1/8 in. (3mm) thick mild steel stock. Using a hacksaw, cut to dimension shown. File off rough edges.

D-12. BAR-BRAKE RETURN SPRING REMOVAL TOOL.



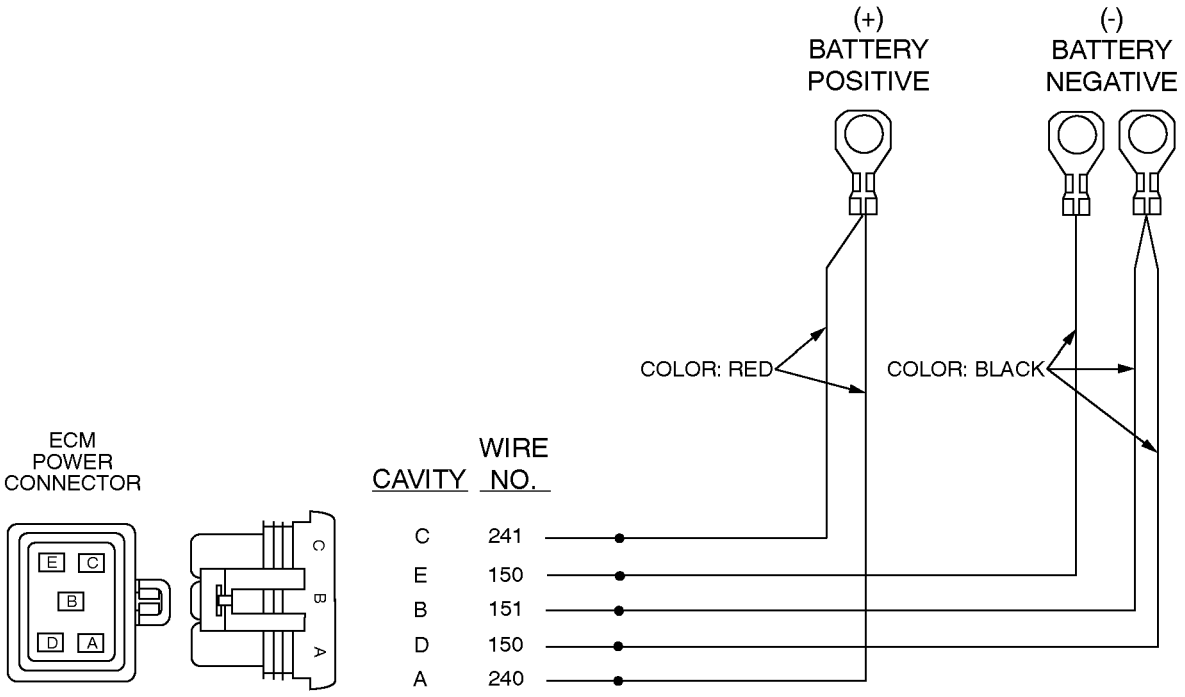
Fabricate bar-brake return spring removal tool from ASTM A36 angle aluminum. Using a hacksaw, cut to dimension shown. File off rough edges.

D-13. ADAPTER,TORQUE, 3/4 IN. DRIVE.



Fabricate torque adapter from Extension, P/N L32, NSN 5120-00-273-9208, and bar stock, Spec 23 or better. Cut part A and part B to dimensions shown.

D-14. JUMPER HARNESS (DDEC III/IV).



(1) Fabricate from 16-gage wire.

(2) Using wire cutters, cut five pieces of 16-gage wire to 180 in. (457 cm).

(3) Strip both ends of each wire .25 inch (6.4 mm).

(4) Crimp five terminals (PN 12077413) and five cable seals (PN 12015193) on wires.

(5) Insert terminals and cable seals into connector body (PN 12124634) as illustrated.

(6) Secure terminals and cable seals in connector body with secondary lock (PN 12052816).

(7) Attach terminals (PN-D-351-38) to other end of wires 150, 150 & 151, and 240 & 241, as illustrated.

APPENDIX E

TORQUE LIMITS

E-1. SCOPE.

This section provides general torque limits for the screws, hoses and fittings used on the truck. 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.

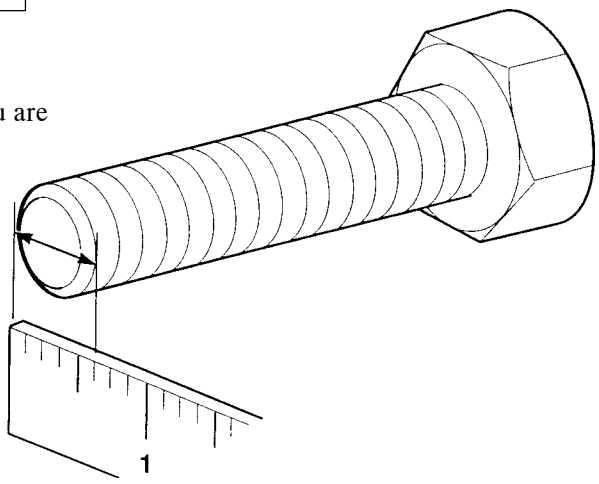
E-2. TORQUE LIMITS.

Table E-1 lists the torque limits for wet flange nuts. Table E-2 lists the torque limits for wet socket head capscrews. Table E-3 lists dry torque limits for capscrews. Dry torque limits are used on screws that do not have high pressure lubricants applied to the threads. Table E-4 lists wet torque limits for capscrews. Wet torque limits are used on screws that have high pressure lubricants applied to the threads. Table E-5 lists the torque limits for SAE 37 degree flare hose connections. Table E-6 lists the torque limits for SAE 45 degree flare hose connections. Table E-7 lists the torque limits for ORS preformed packing face seal hose connections. Table E-8 lists the torque limits for NPSM swivel connections.

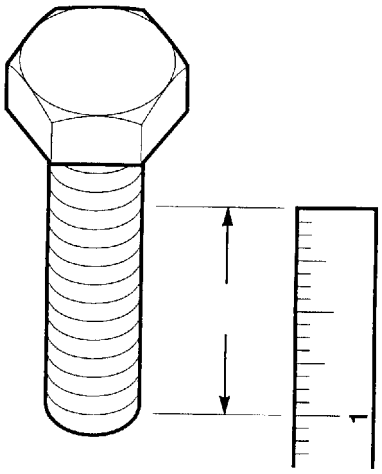
E-3. HOW TO USE TORQUE TABLE.

a. Screws and Nuts.

(1) Measure the diameter of the screw you are installing with a ruler.



E-3. HOW TO USE TORQUE TABLE (CONT).



(2) Measure out one inch with a ruler and count the number of threads per inch.

(3) 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).

(4) 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 2. (Not required for metric screws).

(5) 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.

(6) Look down the column under the picture you found in Step 5. until you find the torque limit (lb-ft or N·m) for the diameter and threads per inch of the screw you are installing.

(7) Use wet torque values.

CAPSCREW HEAD MARKINGS

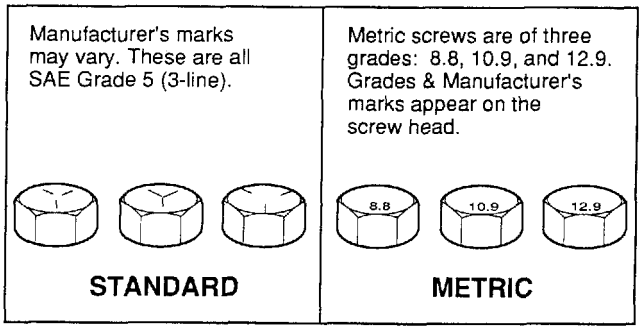


Table E-1. Torque Limits For Wet Flange Nuts

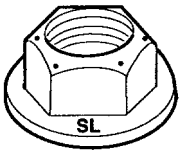
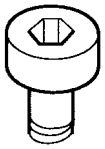
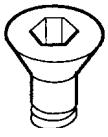
SPIRALOCK FLANGE NUT MARKINGS GRADE 8	DIAMETER		THREADS PER INCH	TORQUE	
	IN.	MM		LB-FT	N·m
	1/4	6.35	20	15	20
	5/16	7.94	18	25	34
	3/8	9.65	16	45	61
	1/2	12.70	13	110	149
	5/8	15.87	11	210	285
	3/4	19.05	10	375	508

Table E-2. Torque Limits For Wet Socket Head Cap Screws

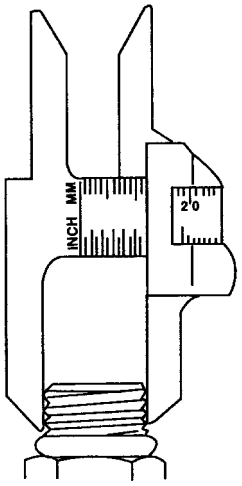
SOC HEAD/12 PT.	TORQUE IN FT. LBS. (CAP SCREWS) LUBED		
	SIZE	SOC HD OR 12 PT	SOC FLAT HD
	.10-24	5	2.5
	.25-20	12	6
	.31-18	25	12
	.38-16	44	22
SOC FLAT HEAD	.50-13	70	36
	.56-12	106	53
	.62-11	212	106
	.75-10	375	187
	1.00-8	781	

b. Hoses and Fittings.

NOTE

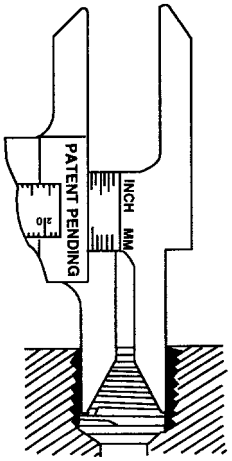
Most fluid piping system sizes are measured by dash numbers. These are universally used abbreviations for the size of the component expressed as the numerator of the fraction with the denominator always being 16. For example, a -04 port is 4/16 or 1/4-inch. Dash numbers are usually nominal (in name only) and are abbreviations that make ordering of components easier.

(1) Measure the I.D./O.D. diameter with a caliper as shown.



O.D.
(MALE THREADS)

(2) Under the heading MALE THREAD O.D. and FEMALE THREAD I.D., match the measurements with the row in table to determine proper torque.



I.D.
(FEMALE THREADS)

(3) To find the sealing surface angle, use a protractor and measure the sealing surface parallel to the center line of the fitting.

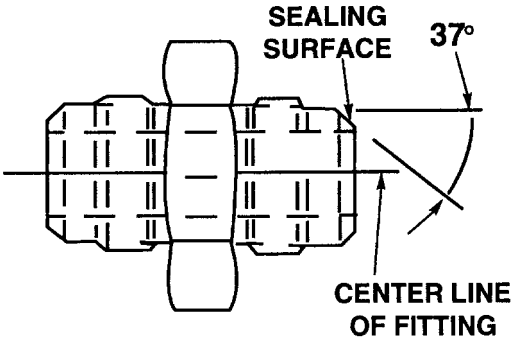
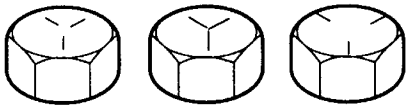
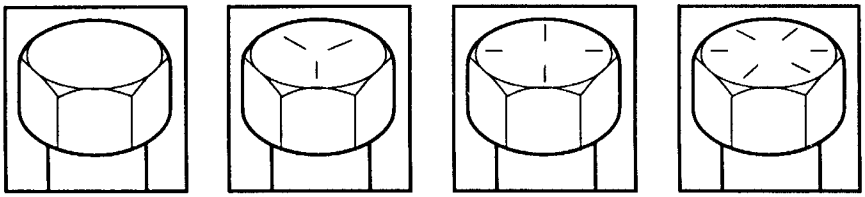


Table E-3. Torque Limits For Dry Fasteners

CAPSCREW HEAD MARKINGS



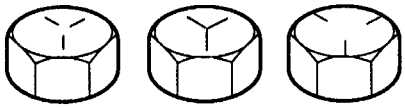
Manufacturer's marks may vary.
These are all SAE Grade 5 (3-line).



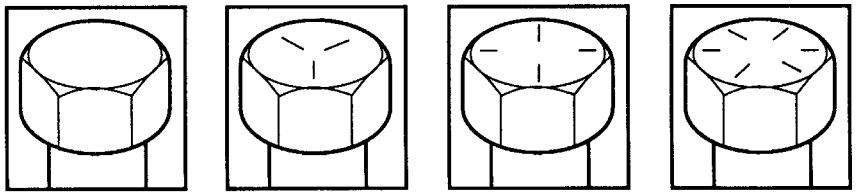
SIZE			TORQUE							
			SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	5	7	8	11	10	14	12	16
1/4	28	6.35	6	9	10	14	12	16	14	19
5/16	18	7.94	11	15	17	23	21	28	25	34
5/16	24	7.94	12	16	19	26	24	33	25	34
3/8	16	9.53	20	27	30	41	40	54	45	61
3/8	24	9.53	23	31	35	47	45	61	50	68
7/16	14	11.11	30	41	50	68	60	81	70	95
7/16	20		35	47	55	75	70	95	80	108
1/2	13	12.70	50	68	75	102	95	129	110	149
1/2	20		55	75	90	122	100	136	120	163
9/16	12	14.29	65	88	110	149	135	183	150	203
9/16	18		75	102	120	163	150	203	170	231
5/8	11	15.88	90	122	150	203	190	258	220	298
5/8	18		100	136	180	244	210	285	240	325
3/4	10	19.05	160	217	260	353	320	434	380	515
3/4	16		180	244	300	407	360	488	420	569
7/8	9	22.23	140	190	400	542	520	705	600	814
7/8	14		155	210	440	597	580	786	660	895
1	8	25.40	220	298	580	786	800	1085	900	1220
1	12		240	325	640	868	860	1166	1000	1356
1-1/8	7	25.58	300	407	800	1085	1120	1519	1280	1736
1-1/8	12		340	461	880	1193	1260	1709	1440	1953
1-1/4	7	31.75	420	597	1120	1519	1580	2142	1820	2468
1-1/4	12		460	624	1240	1681	1760	2387	2000	2712
1-3/8	6	34.93	560	759	1460	1980	2080	2820	2380	3227
1-3/8	12		640	868	1680	2278	2380	3227	2720	3688
1-1/2	6	38.10	740	1003	1940	2631	2780	3770	3160	4285
1-1/2	12		840	1139	2200	2983	3100	4204	3560	4827

Table E-4. Torque Limits For Wet Fasteners

CAPSCREW HEAD MARKINGS

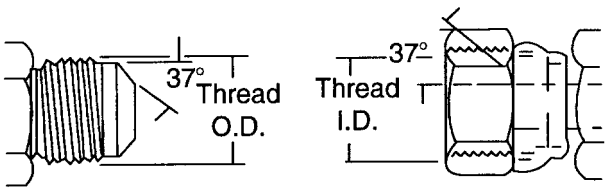


Manufacturer's marks may vary.
These are all SAE Grade 5 (3-line).



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	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	4	6	6	8	8	11	9	12
1/4	28	6.35	5	7	7	9	9	12	10	14
5/16	18	7.94	8	11	13	18	16	22	18	24
5/16	24	7.94	9	12	14	19	18	24	20	27
3/8	16	9.53	15	20	23	31	30	41	35	47
3/8	24	9.53	17	23	25	34	30	41	35	47
7/16	14	11.11	24	33	35	47	45	61	55	75
7/16	20		25	34	40	54	50	68	60	81
1/2	13	12.70	35	47	55	75	70	95	80	108
1/2	20		40	54	65	88	80	108	90	122
9/16	12	14.29	50	68	80	108	100	136	110	149
9/16	18		55	75	90	122	110	149	130	176
5/8	11	15.88	70	95	110	149	140	190	170	231
5/8	18		80	108	130	176	160	217	180	244
3/4	10	19.05	120	163	200	271	240	325	280	380
3/4	16		140	190	220	298	280	380	320	434
7/8	9	22.23	110	149	300	407	400	542	460	624
7/8	14		120	163	320	434	440	597	500	678
1	8	25.40	160	217	440	597	600	814	680	922
1	12		170	231	480	651	660	895	740	1003
1-1/8	7	25.58	220	298	600	814	840	1139	960	1320
1-1/8	12		260	353	660	895	940	1275	1080	1464
1-1/4	7	31.75	320	434	840	1139	1100	1492	1360	1844
1-1/4	12		360	488	920	1248	1320	1790	1500	2034
1-3/8	6	34.93	420	570	1100	1492	1560	2115	1780	2414
1-3/8	12		460	624	1260	1709	1780	2414	2040	2776
1-1/2	6	38.10	560	760	1460	1980	2080	2820	2360	3200
1-1/2	12		620	841	1640	2224	2320	3146	2660	3607

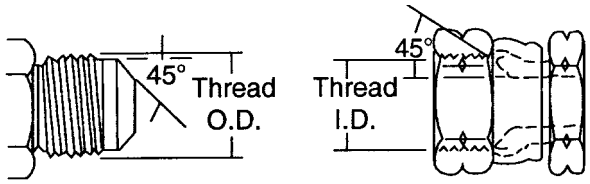
Table E-5. Torque Limits For 37 Degree Flare Hose Connections



Male Half **Female Half**

INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/4	04	7/16-20	11-12	15-16
3/8	06	9/16-18	18-21	24-28
1/2	08	3/4-16	36-39	49-53
5/8	10	7/8-14	57-62	77-84
3/4	12	1 1/16-12	79-87	107-118
7/8	14	1 3/16-12	83-91	113-123
1	16	1 5/16-12	108-113	146-153
1 1/4	20	1 5/8-12	127-133	172-180
1 1/2	24	1 7/8-12	158-167	214-224
2	32	2 1/2-12	245-258	332-350

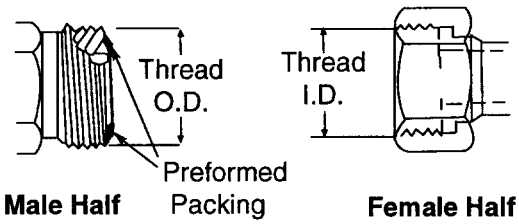
Table E-6. Torque Limits For 45 Degree Flare Hose Connections



Male Half **Female Half**

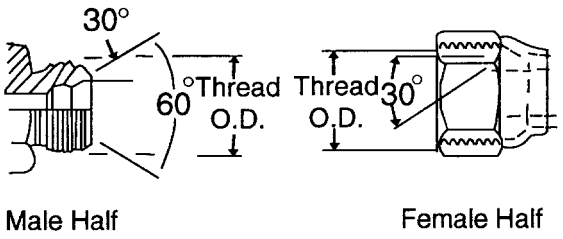
INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/4	04	7/16-20	8-9	11-12
3/8	06	5/8-18	18-20	24-27
1/2	08	3/4-16	36-38	49-51
5/8	10	7/8-14	52-54	70-73
3/4	12	1 1/16-14	71-74	97-100

Table E-7. Torque Limits For ORS Preformed Packing Face Seal Hose Connections



INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/4	04	9/16-18	10-12	14-16
3/8	06	11/16-16	18-20	24-27
1/2	08	13/16-16	32-35	43-47
5/8	10	1-14	46-50	62-68
3/4	12	1 3/16-12	65-70	88-95
1	16	1 7/16-12	108-113	146-153
1 1/4	20	1 11/16-12	127-133	172-180
1 1/2	24	2-12	158-167	214-226

Table E-8. Torque Limits For NPSM Swivel Connections



INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/8	02	1/8-27	3-4	4-5
1/4	04	1/4-18	10-11	14-15
3/8	06	3/8-18	16-18	22-24
1/2	08	1/2-14	25-27	34-37
3/4	12	3/4-14	46-48	62-65
1	16	1-1 1/2	80-83	108-113
1 1/4	20	1 1/4-11/2	130-134	176-182
1 1/2	24	1 1/2-11/2	160-164	217-222
2	32	2-11/2	170-174	231-240

APPENDIX F

MANDATORY REPLACEMENT PARTS

Section I. INTRODUCTION

F-1. SCOPE.

This appendix lists all mandatory replacement parts required for performance of Unit Support Maintenance of the PLS truck. It authorizes the requisitioning, issue, and disposition of consumable repair parts. All consumable repair parts listed in the maintenance tasks are listed here for ease of reference.

F-2. EXPLANATION OF COLUMNS (SECTION II).

a. Column (1) - Replacement Part Reference Code. This number is assigned to the entry in the listing and is referenced in the narrative task box to identify the part e.g., Clamp (Item 12, Appendix F).

b. Column (2) - Nomenclature. Indicates the federal item name and, if required, a description to identify the item.

c. Column (3) - Part Number. This is the vendor number assigned to the item.

d. Column (4) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

Section II. MANDATORY REPLACEMENT PARTS LIST

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
1	Belt Set, (3)	3113452	
2	Belt Set, Vee, (2)	1934800	3030-00-492-8106
3	Bushing	1X1/4PTR-B	4730-01-338-1459
4	Bushing	12406FX	5365-00-402-5376
5	Bypass Valve	A-DF-216	4820-01-359-1067
6	Cable, Drain Valve	SN-153	4010-01-348-6039
7	Cap, End Splice	7040700	
8	Capacitor	1972630	5910-01-364-9163
9	Channel	AS-1340	5330-01-111-2281
10	Channel, Rubber	101-2203	5330-01-267-7542
11	Channel, Rubber	126890	5330-01-155-1938
12	Clamp	24433	5340-01-131-8313
13	Clamp	32664AX	5340-01-131-8312
14	Clamp	5137620	5340-01-114-5623
15	Clamp	700-118	4730-01-212-8276
16	Clamp	700-120	4730-01-199-1458
17	Clamp	700-88	5340-01-355-7648
18	Clamp	90359-A	4730-01-353-9723
19	Clamp	B54-32780	4730-00-278-2523
20	Clamp	C0V-2515	5340-01-060-8686
21	Clamp	51689AX	5340-01-167-4146
22	Clamp, Loop	H360-4-2	5340-01-151-8391
23	Clip, Cable	57972	5340-01-193-9654
24	Clip, Push	H360-7-2	5340-01-224-8368
25	Contact, Electrical	12034051	5940-01-342-0712
26	Contact, Electrical	12084563	5999-01-321-1925
27	Contact, Electrical	12089305	5999-01-319-7394
28	Cross and Bearing	5-103X	2530-01-244-4949
29	Dust Boot	12010293	5975-01-226-8078
30	Dust Boot	12015323	5975-01-310-5011
31	Element, Filter	100696-E	2940-01-213-1135
32	Element, Filter	1317673	2940-01-347-7460

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
33	Element, Filter	2020-PMOR	2910-01-344-5791
34	Element, Strainer	5106910	4730-01-160-5668
35	Fastener And Seal Kit	50009501	5340-01-363-9215
36	Fastener And Seal Kit	50009503	5330-01-358-9309
37	Fastener And Seal Kit	50009504	5330-01-358-9308
38	Filter and Gasket	23518524	2940-01-314-1345
39	Filter Element Kit	MTP-95-551	4330-01-026-6371
40	Filter, Fuel	23518481	2910-01-423-2859
41	Filter, Hydraulic	1314130	4330-01-232-8305
42	Fitting, Lubrication	MS15002-3	4730-00-172-0015
43	Gasket	02343-02	5330-01-193-5315
44	Gasket	0-615C46XA	5330-01-348-8345
45	Gasket	11007B	5330-01-344-0539
46	Gasket	1198559	5330-01-358-8219
47	Gasket	1199479	5330-01-234-2618
48	Gasket	12357897	6220-01-319-5509
49	Gasket	14079550	5330-00-107-3925
50	Gasket	1728230	5330-01-347-9858
51	Gasket	1958330	5330-01-358-5561
52	Gasket	23016336	5330-01-328-7634
53	Gasket	5100860	5300-01-058-8267
54	Gasket	5104081	5330-01-078-7186
55	Gasket	5117786	5330-00-781-7117
56	Gasket	5130995	5330-00-980-1546
57	Gasket	5136678	5330-00-198-7953
58	Gasket	5766-1211-6	5330-01-242-2698
59	Gasket	731740-002	
60	Gasket	7716570	5330-00-771-6570
61	Gasket	8921312	5330-01-206-3263
62	Gasket	8924413	
63	Gasket	92-158	5330-01-058-7118
64	Gasket	A/281	5330-01-352-1997

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
65	Gasket	DIN7603A 14X18	
66	Gasket	EE100969	9330-01-185-4466
67	Gasket	M25988/1-246	5330-01-189-6351
68	Gasket	NE-71A	5330-01-277-5103
69	Gasket Strip	2050690	5330-01-394-8346
70	Gasket, Breather Filler	FB-7	5330-01-406-8221
71	Gasket, Headlight	1400940	5330-01-234-7640
72	Grommet	459-A	5330-01-049-0550
73	Guide Assy, Pawl	NA1779M195	3040-01-351-4061
74	Guide Assy, Pawl	NA22297U4597	3040-01-350-3980
75	Hardware, Mounting	GS-2655	5340-01-365-3144
76	Housing, Tach	5106771	6680-01-086-4470
77	Insulation	1949200	2540-01-370-6144
78	Insulation	1949220	2540-01-367-7392
79	Insulation	1949230	2540-01-368-9962
80	Insulation	C04610	2510-01-389-0708
81	Isolator	23512307	5340-01-414-2177
82	Journal And Bearing Kit	5-438X	2520-01-339-0533
83	Journal And Bearing Kit	5-510X	2520-01-339-0532
84	Journal And Bearing Kit	5-515X	2520-01-289-8307
85	Key	1363190	5315-01-165-2188
86	Kit, Mounting	893236	4810-01-400-6041
87	Kit, Packing	SK-10-4	
88	Lamp	E-013-001	6210-01-345-6315
89	Locknut	0-952A14	5310-00-725-9479
90	Locknut	10095	5310-01-063-1755
91	Locknut	110310A	5310-01-159-8178
92	Locknut	110311A	5310-01-111-0645
93	Locknut	110312A	5310-01-150-5918
94	Locknut	112556A	5310-01-372-6378
95	Locknut	114358AX	
96	Locknut	115307A	5310-01-151-1036

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
97	Locknut	1244954-2	5310-00-074-1387
98	Locknut	1333510	5310-01-340-5671
99	Locknut	1334320	5310-01-161-9123
100	Locknut	1408910	5310-01-111-0645
101	Locknut	1437220	
102	Locknut	1525130	5310-01-357-8840
103	Locknut	1571850	5310-01-288-5096
104	Locknut	1571870	5310-01-352-7732
105	Locknut	1598030	5310-01-342-8595
106	Locknut	1600460	5310-01-346-9445
107	Locknut	1605420	5310-00-542-0087
107.1	Locknut	1HT191	5310-01-383-6080
108	Locknut	203145	5310-00-012-0368
109	Locknut	21NE-040	5310-01-066-6759
110	Locknut	22NM04	5310-00-207-9341
111	Locknut	2-X-5731	5310-00-447-4251
112	Locknut	40X-1239	5310-01-377-1996
113	Locknut	41NE120	5310-00-530-0239
114	Locknut	434-A	5310-01-063-8970
115	Locknut	44NTE-1210	5310-01-346-3789
116	Locknut	5340910	5310-01-280-6538
117	Locknut	60860AX	
118	Locknut	60861A	5310-01-061-5678
119	Locknut	7-660-082504	5310-01-354-8734
120	Locknut	767HX1	5310-01-058-3183
121	Locknut	76985	5310-00-432-3959
122	Locknut	88881	5310-01-349-0759
123	Locknut	93604342	5310-01-081-5351
124	Locknut	AN365-1024A	5310-00-208-1918
125	Locknut	ATS2-518	5340-01-196-0380
126	Locknut	F41NE2076-1216	5310-01-357-4700
127	Locknut	L-10-MNS-500-X-1	5310-01-345-2350

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
128	Locknut	MS17828-7C	5310-01-117-5055
129	Locknut	MS21044C08	5310-00-982-6814
130	Locknut	MS51849-74	5305-00-470-3321
131	Locknut	MS51922-1	5310-00-088-1251
132	Locknut	MS51922-17	5310-00-087-4652
133	Locknut	MS51922-9	5310-00-984-3806
134	Locknut	MS51943-31	5310-00-061-4560
135	Locknut	MS51968-14	5310-00-732-0560
136	Locknut	N08	5310-00-185-6389
137	Locknut	N9406	5310-01-362-6171
138	Locknut	N9410	5310-01-348-8398
139	Locknut	SN104-NM-22	5310-01-355-0217
140	Locknut	T893R	5310-01-288-1116
141	Locknut	TLA-1213-GRC	5310-01-081-8244
142	Locknut	TLA-3410-GRC	5310-01-080-5747
143	Locknut	TLA-3816-GRC	5310-01-222-9097
144	Locknut	TLA-7809-GRC	5310-01-107-3586
145	Locknut	V75700689	5310-01-345-3757
146	Locknut	XB-769	5310-01-150-8599
147	Lockscrew	11504603	5305-01-336-6757
148	Lockscrew	31 WLFS 1420	5310-01-393-7077
149	Lockwasher	100-0000-051	5310-00-045-3299
150	Lockwasher	114021	5310-01-081-0798
151	Lockwasher	1244954-2	5310-00-074-1387
152	Lockwasher	1344950	5305-01-155-6107
153	Lockwasher	138526	5310-00-013-8526
154	Lockwasher	1459-254	5310-00-171-1734
155	Lockwasher	16FW008032	5310-00-988-8820
156	Lockwasher	1978HX	
157	Lockwasher	201506	5310-01-373-2539
158	Lockwasher	201946	5310-00-013-8572
159	Lockwasher	202210	5310-01-101-2490
160	Lockwasher	210104	5310-01-K49-2583

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
161	Lockwasher	2239HX	5310-00-209-1218
162	Lockwasher	2249HX	
162.1	Lockwasher	2250HX	
163	Lockwasher	2251HX	5310-01-354-3729
164	Lockwasher	2434	5310-00-775-5139
165	Lockwasher	318B	5310-01-061-5302
166	Lockwasher	318BX	
167	Lockwasher	3231	5310-00-032-1814
168	Lockwasher	351AX	5310-01-129-0450
169	Lockwasher	352A	5310-01-081-1283
170	Lockwasher	352AX	5310-01-081-1283
171	Lockwasher	353AX	5310-00-582-5965
172	Lockwasher	354AX	5310-01-068-8446
173	Lockwasher	355AX	5310-01-133-2130
174	Lockwasher	362AX	5310-01-062-3379
175	Lockwasher	371AX	5310-00-775-5139
176	Lockwasher	62ANBH-4	4730-01-349-7765
177	Lockwasher	777-A	5310-01-061-4481
178	Lockwasher	7-950-160050	5310-01-292-4150
179	Lockwasher	8104200064	5310-01-358-6624
180	Lockwasher	93613642	5310-01-068-8446
180.1	Lockwasher	CA300302	5310-01-478-2605
181	Lockwasher	C-972	5310-01-210-7427
182	Lockwasher	HLKW025EG	5310-01-105-2652
183	Lockwasher	L051275	5310-10-244-8747
184	Lockwasher	MS35333-37	5310-00-579-0079
185	Lockwasher	MS35333-40	5310-00-550-1130
186	Lockwasher	MS35333-51	5310-00-655-6927
187	Lockwasher	MS35335-30	5310-00-209-0788
188	Lockwasher	MS35335-31	5310-00-596-7693
189	Lockwasher	MS35335-49	5310-00-582-6714
190	Lockwasher	MS35338-100	5310-00-261-8278
191	Lockwasher	MS35338-103	5310-00-184-8971

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
192	Lockwasher	MS35338-15	5310-00-012-1326
193	Lockwasher	MS35338-42	5310-00-045-3299
194	Lockwasher	MS35338-43	5310-00-045-3296
195	Lockwasher	MS35338-44	5310-00-582-5965
196	Lockwasher	MS35338-45	5310-00-407-9566
197	Lockwasher	MS35338-46	5310-00-637-9541
198	Lockwasher	MS35338-48	5310-00-584-5272
199	Lockwasher	MS35338-50	5310-00-820-6653
200	Lockwasher	MS35338-51	5310-00-584-7888
201	Lockwasher	MS35338-6	5310-00-010-3319
202	Lockwasher	MS35338-8	5310-00-261-7340
203	Lockwasher	MS35649-204	5310-00-954-9760
204	Lockwasher	MS45904-60	5310-00-080-9786
205	Lockwasher	MS51413-8	
206	Lockwasher	MS51848-12	5310-00-688-2195
207	Lockwasher	N405P13C16	5310-01-044-2295
208	Lockwasher	N9015	5310-01-046-0186
209	Lockwasher	N9018	5310-01-032-4827
210	Lockwasher	N9461	5310-01-348-8392
211	Lockwasher	W08	5310-01-355-8794
212	Lockwasher (#10 Stud)	85020	5310-01-373-6180
213	Nut	MS35650-103	5310-00-988-2652
214	Nut	MS51967-32	5310-00-762-6242
215	Nut	MS51967-35	5310-00-762-6241
216	Nut	MS51967-38	5310-00-762-6247
217	Nut, Push On	C12044-017-4	5310-00-110-8742
218	Nut, Stop	A1300R	
219	Nut, Tenz	1244954-2	5310-00-074-1387
220	Packing, Preformed	0526453-00	5330-00-071-6651
221	Packing, Preformed	11-222	5330-00-198-6190
222	Packing, Preformed	11350	5330-01-147-6003
223	Packing, Preformed	11639519-1	5330-00-463-0200

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
224	Packing, Preformed	11639519-2	5330-00-462-0907
225	Packing, Preformed	2014N103-70	5330-00-213-8722
226	Packing, Preformed	2-016N552-90	5330-01-115-8225
227	Packing, Preformed	2-021N0552	4730-00-541-0938
228	Packing, Preformed	22012-6	5330-00-200-8125
229	Packing, Preformed	22012-8	5330-00-996-8627
230	Packing, Preformed	2-238N674-70	5330-00-172-7223
231	Packing, Preformed	22617-10	5330-01-040-4772
232	Packing, Preformed	22617-12	5330-00-228-7196
233	Packing, Preformed	22617-16	5330-01-168-0885
234	Packing, Preformed	22617-20	5330-01-168-1802
235	Packing, Preformed	22617-4	
236	Packing, Preformed	22617-6	5330-01-198-8439
237	Packing, Preformed	22617-8	5330-01-224-2273
238	Packing, Preformed	2282320	
239	Packing, Preformed	2282330	
240	Packing, Preformed	23017303	5330-01-334-9946
241	Packing, Preformed	23504641	5330-01-336-2997
242	Packing, Preformed	235063	5330-00-454-0370
243	Packing, Preformed	262332	5330-00-443-2045
244	Packing, Preformed	3-916N0552	
245	Packing, Preformed	3-924N552-90	5330-01-038-3074
246	Packing, Preformed	52-49529-00	5330-01-348-8331
247	Packing, Preformed	A-103	5330-00-115-6327
248	Packing, Preformed	A307777000-8	5330-00-920-4157
249	Packing, Preformed	ARP568-014	5330-01-213-6795
250	Packing, Preformed	FF9446-14	
251	Packing, Preformed	FF9446-18	5330-01-092-5503
252	Packing, Preformed	FF9446-21	5330-01-269-4323
253	Packing, Preformed	FF9446-219	5330-00-013-7784
254	Packing, Preformed	FF9446-222	5330-00-984-3808
255	Packing, Preformed	FF9446-25	5330-01-269-6152

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
256	Packing, Preformed	FF9855-12	5330-01-376-9629
257	Packing, Preformed	GG108-NP04-10	4730-01-346-4684
258	Packing, Preformed	MS28775-013	5331-00-684-3420
259	Packing, Preformed	MS28775-223	5330-00-171-6649
260	Packing, Preformed	MS29512-16	5330-00-263-8034
261	Packing, Preformed	V75500858	5330-01-350-6007
262	Packing, Preformed	VS-1087-4	5330-01-371-5119
263	Packing, Pump Piston	P4-4	5330-00-122-0624
264	Pad, Rubber	1946480	5330-01-363-7020
265	Pin, Cotter	0900806-1	5315-00-254-1657
266	Pin, Cotter	126761A	5315-01-157-0960
267	Pin, Cotter	1749HX	
268	Pin, Cotter	1840070	
269	Pin, Cotter	L6451-101	5315-00-187-9591
270	Pin, Cotter	MS24665-134	5315-00-839-5820
271	Pin, Cotter	MS24665-151	5315-00-815-1405
272	Pin, Cotter	MS24665-319	5315-01-267-7570
273	Pin, Cotter	MS24665-353	5315-00-839-5822
274	Pin, Cotter	MS24665-491	5315-00-059-0206
275	Pin, Cotter	MS24665-498	5315-00-849-9854
276	Pin, Cotter	MS24665-624	5315-00-059-0217
277	Pin, Cotter	MS24665-627	5315-00-013-7508
278	Pin, Cotter	XB-T-60	5315-01-204-4893
279	Pin, Roll	1840070	
280	Pin, Roll	XB-21-S-187-1250	5315-01-448-0604
281	Pin, Roll	XB-21-S-312-1250	
282	Pin, Roll	XB-21-S-312-2500	
283	Pin, Roll	XB-21-S-500-1000	5315-01-448-0599
284	Pin, Roll	XB-S05742	
285	Pin, Spring	3145955	
286	Plug	A-LF-2550	5330-01-276-7351
287	Preformed Packing Kit	RN-60-A	4440-01-337-7324

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
288	Preformed Packing Kit	RN-60-V	5330-01-377-2460
289	Quick Edge	75000317	2510-01-176-1177
290	Retainer, Packing	8-238N300-90	5330-01-065-5959
291	Rubber Liner	124660A	
292	Rubber Strip	70-17-30	9320-00-491-5351
293	Screw	118941A	5305-01-156-5099
294	Screw	1344950	5305-01-155-6107
295	Screw	1778HX	5305-01-133-2114
296	Screw	23512308	5306-01-411-6384
297	Screw	5103642	5305-01-078-1999
298	Screw	59030AX	5305-00-984-6210
299	Screw	B71-10015-002	5305-01-352-2066
300	Screw	MS35206-267	5305-00-984-6214
301	Screw	MS35207-267	5305-00-993-1851
302	Screw	MS90725-34	5306-00-225-8499
303	Screw	MS90725-60	5305-00-269-3211
304	Screw	MS90725-8	5305-00-225-3839
305	Screw	SPLE101D05	5306-01-156-8678
306	Screw (Sheet Metal)	1381HX1	5305-01-134-2052
307	Screw Washer Assembly	1756840	5305-01-354-5708
308	Screw Washer Assembly	2050700	5305-01-394-3551
309	Screw, Self-locking	02092	5305-00-696-5115
310	Screw, Self-locking	1367HX1	5305-01-062-1017
311	Screw, Self-locking	23015458	5306-01-363-4057
312	Screw, Self-locking	96-212	5305-01-205-0041
313	Screw, Self-tapping	1324510	5305-01-157-5624
314	Screw, Self-tapping	1345280	5305-01-159-8544
315	Screw, Self-tapping	1354490	5305-01-274-0028
316	Screw, Self-tapping	1723180	5305-01-145-4003
317	Screw, Self-tapping	54067AX	5305-01-150-8714
318	Screw, Tapping	2763HX	5305-01-353-6120
319	Screws, Self-locking	31 WLFS 51618-062	5306-01-350-8223

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
320	Seal	1862760	
321	Seal	1941570	5330-01-363-7019
322	Seal	2282340	
323	Seal	2282350	
324	Seal	23504641	5330-01-336-2997
325	Seal	3S9643-00	5330-00-246-6380
326	Seal	5104105	5330-01-163-8178
327	Seal	75001366	9390-01-179-4508
328	Seal	NE-71A	5330-01-277-5103
329	Seal, Door	75001366	9390-01-179-4508
330	Seal, Plain	5103646	5330-01-088-2740
331	Seal, Preformed	101-2203	5330-01-267-7542
332	Seal, Ring	N1205B1666	5330-01-351-7881
333	Seal, Ring	N1205C1667	5330-01-350-5385
334	Splice, Conductor	327025	5940-01-368-9579
335	Stem, Valve	N-1268	2640-01-354-9424
336	Strip, Nut	128757A	5310-01-157-0894
337	Strip, Rubber	350907	5330-01-156-5266
338	Strip, Rubber	352731	5330-00-114-2073
339	Stud	52-49523-00	5307-01-348-7046
340	Tape, Rubber Adhesive	SJ5816	9320-01-299-3332
341	U-joint Kit	5-471X	2520-01-359-8444
342	Valve Core	8500V	2640-00-004-8297
343	Washer	1605640	5310-01-383-7327
344	Washer	MS27183-10	5310-00-809-4058
345	Washer	MS27183-7	5310-00-809-8544
346	Washer	MS27183-8	5310-00-809-8546
347	Washer	MS37183-62	5310-01-380-3474
348	Washer	V75503675	5310-01-389-2364
349	Washer, Copper	31425BX	2520-01-041-3542
350	Washer, Key	TW107	5310-01-014-5136
351	Washer, Plastic	16FW008032	5310-00-988-8820

Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
352	Washer, Rubber	8-325N300-90	5330-00-156-3208
353	Washer, Sealing	1760040	5310-01-353-2062
353.1	Washer, Special	3264358	5310-01-372-6391
354	Washer, Star	50001716	5310-01-372-6391

APPENDIX G

TOOL IDENTIFICATION LIST

Section I. INTRODUCTION

G-1. SCOPE.

This appendix lists all of the tools needed to repair the truck.

G-2. GENERAL.

This appendix is a list of tools, both common and special, test equipment and tool kits used at unit level to repair the truck. This list is arranged alphabetically and shows the nomenclature, part number (P/N), National Stock Number (NSN) and references when applicable. The index number corresponds to the index number found in the task box of maintenance procedures.

Section II. COMMON TOOLS, TEST EQUIPMENT AND TOOL KITS

Item No.	Description	Part No.	NSN	Reference
1	Adapter, Torque Wrench	J-8932-B	5120-00-019-5232	
2	Adapter, Radiator	J-29003-A	4910-01-170-4929	
3	Analyzer Set, STE/ICE-R	12259266	4910-01-222-6589	
4	Bar, Crow	10501985	5120-00-224-1390	SC 4910-95-A74
5	Bar, Wrecking	130	5120-00-293-0665	SC 4910-95-A72-HR
6	Bit, Set	38699-1	5120-01-170-4454	SC 4910-95-A72-HR
7	Caliper, Micrometer, Inside	124B	5120-00-221-1921	
8	Cap And Plug Set	10935405	5340-00-450-5718	
9	Caps, Vise Jaw	GGG-C-137	5120-00-221-1506	SC 4910-95-A74
10	Clamp, Machinist's	GGG-C-406	5120-00-222-1612	SC 4910-95-A72-HR
11	Compressor Unit, Air	MIL-C-13874	4130-00-752-9633	SC 4910-95-A72-HR
12	Connector Remover (DEUTSCH)	114010	5120-01-158-4707	
13	Crimping Tool	J35123	5120-01-355-0844	
14	Crimping Tool (Cannon)	995-0001-904	5120-01-374-8937	
15	DDEC Repair Kit	J-35888	2815-01-355-5993	
16	Dispensing Pump	FEDXXD370	4930-00-287-8293	SC 4910-95-A72-HR
17	Drill, Electric, Portable	WD00661	5130-00-293-1849	SC 4910-95-A74
18	Drill, Electric, Portable, 1/4 in.	1070	5130-00-889-8993	SC 4910-95-A31
19	Drill Set, Twist	GGG-D-751	5133-00-293-0983	SC 4910-95-A74
20	Drill Set, Twist	GGG-D-751	5133-00-449-6775	SC 3470-95-A02
21	Drum, Storage 57 Gal	MIL-D-6054	8110-00-082-2626	
22	Extractor Tool, Electrical	901019-3	5120-01-015-2154	
23	Extractor Tool, Electrical	305183	5120-01-020-5926	

Section II. COMMON TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
23.1	Fault Code Retrieval Device (FCRD)	CA1 05 020		
24	Funnel	L-F-1593	7240-00-404-9795	SC 4910-95-A74
25	Gage, Air Inflation	1506	4910-00-204-2644	
26	Gage, Belt Tension (Tensiometer)	BT-33-73BF	4935-01-254-9808	
27	Gage, Feeler	007958	5210-01-214-2138	
28	Gloves, Chemical Oil Protective	ZZ-G-381	8415-00-641-4601	SC 4910-95-A74
29	Gloves, Heavy Duty	A-A-50022	8415-00-268-7859	SC 4910-95-A72-HR
30	Goggles, Industrial	GGG-G-13	4140-00-269-7912	SC 4910-95-A74
31	Gun, Air Blow	GGG-G-770	4940-00-333-5541	SC 4910-95-A72-HR
32	Gun, Heat	500	4940-00-561-1002	
33	Hammer, Hand Soft Plastic	3-HD	5120-01-065-9037	SC 4910-95-A72-HR
34	Handle, Driver	J-3154-1	5120-00-808-5082	
35	Handler, Installer	J7079-2	5120-01-977-5578	
36	Harness, Breakout	J34517	6150-01-373-7771	
37	Hose, Drain	ZZ-H-461	4720-00-356-8557	SC 4910-95-A74
38	Insertion Tool, (Cannon)	CIT-SS-10	5120-01-374-8968	
39	Installer, Seal	J8550	5120-00-977-5579	
40	Jack, Hydraulic, Hand	5029209-111-101	5120-00-224-7330	SC 4910-95-A74
41	Jack, Kit, Hydraulic, Hand	GGG-J-60	5120-00-587-4144	
42	Jackstand, Trestle	306	4910-00-251-8013	SC 4910-95-A74
43	Measure, Liquid	MIL-M-43530	7240-00-138-7984	
44	Multimeter	ANURM105C	6625-00-999-6282	SC 4910-95-A72-HR
45	Multiplier, Torque	292	5120-00-574-9318	SC 4910-95-A72-HR
46	Pan, Drain (6 Gal)	MIL-P-45819	4940-00-795-3595	
47	Pan, Drain (4 Gal)	450	4940-00-387-9592	SC 4910-95-A74
48	Pliers, Brake Repair	131A	5120-00-690-8044	SC 4910-95-A74
49	Pliers, Retaining Ring	2BH945	5120-01-375-5699	
50	Pressure Test Kit	3SK911	4910-01-378-9068	
51	Puller Kit, Universal	1677	5180-00-423-1596	SC 4910-95-A73
52	Pulley Kit, Pump, Roof Mount	2HP645	5120-01-375-5700	
53	Reader, Diagnostic	J38500-1	4910-01-343-3508	
54	Removal Tool, Oil Filter	2304	5120-00-865-0933	SC 4910-95-A72-HR
55	Remover, Connector	J38384	5120-01-355-3012	
56	Repair Tool, Pneumatic Tire, Valve	7471	5120-00-308-3809	SC 4910-95-A74
57	Respirator, Air Filter	GGG-M-125/6	4240-00-022-2524	SC 4910-95-A72-HR
58	Rivet Gun	352	5130-00-982-8078	
59	Scriber, Machinist's, 8 To 9 In Long	68A	5120-00-221-7063	
60	Socket Set, Deepwell, 1/2 In.	GGG-W-641	5120-00-596-8622	SC 4910-95-A72-HR
61	Socket Set, 3/4 In.	GGG-W-641	5120-00-204-1999	SC 4910-95-A72-HR
62	Socket Set, 3/8 In.	221FSMY	5120-01-117-3876	SC 4910-95-A72-HR

Section II. COMMON TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
63	Socket, Wheel Bearing Adj. Nut 3 1/4 In. 6 Pt.	1908	5120-01-144-5331	SC 4910-95-A74
64	Soldering Kit, Torch	LP-999G	3439-00-542-0531	SC 4910-94-A74
65	Strainer Tool	FC 88A	5120-01-328-2504	
66	Tape, Measurer	GGG-T-106	5120-01-554-7085	SC 4910-95-A72-HR
67	Terminal Crimper	J35688	5120-01-355-0845	
68	Terminal Remover	J33095	5120-01-353-2534	
69	Terminal Remover	J35689-A	5120-01-357-2937	
70	Terminal Remover, Weatherpac	J36400-5	5120-01-374-8969	
71	Tester, Pressure, Radiator	J24460-01	4910-01-170-4928	
72	Tool Kit, Blind Rivet	D-100-MIL-1	5180-01-201-4978	SC 4910-95-A74
73	Tool Kit, Electric	7550526	5180-00-876-9336	SC 4910-95-A72-HR
74	Tool Kit, General Mechanic's: Automotive	SC-5180-90-N26	5180-00-177-7033	SC 5180-90-N26
75	Vise, Machinist's	504M2	5120-00-293-1439	SC 4910-95-A74
76	Weatherpac Crimper	J38852	5120-01-374-8936	
77	Wrench, Box 1/2 In.	J4242	5120-00-591-2685	
78	Wrench, Combination 1 1/16 In.	1234	5120-00-228-9515	SC 4910-95-A74
79	Wrench, Combination 1 1/8 In.	1172	5120-00-228-9516	SC 4910-95-A74
80	Wrench, Combination 1 1/4 In.	1173	5120-00-228-9517	SC 4910-95-A74
81	Wrench, Combination 1 5/16 In.	1174	5120-00-228-9518	SC 4910-95-A74
82	Wrench, Combination 1 3/8 In.	1176A	5120-00-228-9519	SC 4910-95-A74
83	Wrench, Combination 1 1/2 In.	1178	5120-00-277-8834	SC 4910-95-A74
84	Wrench, Combination 1 5/8 In.	1180	5120-01-016-7144	
85	Wrench, Combination 1 11/16 In.	A-A-1351	5120-00-184-8566	
86	Wrench, Combination 1 3/4 In.	1256	5120-00-020-8658	
87	Wrench, Combination 1 7/8 In.	1260	5120-00-020-8632	
88	Wrench, Combination 2 In.	1190	5120-00-957-3115	
89	Wrench, Combination 2 1/8 In.	1268	5120-00-203-4795	
90	Wrench, Crowfoot 1/2 In., 3/8 In Drive	FRH-1605	5120-01-114-4933	SC 4910-95-A74
91	Wrench, Pipe 3 1/2 In. Opening	GGG-W-651	5120-00-277-1485	
92	Wrench, Set, Combination	GGG-W-00645	5120-00-895-9566	SC 4910-95-CL-A74
93	Wrench Set, Socket 3/8 In. Drive	51200017510	5120-00-322-6231	SC 4910-95-A31
94	Wrench, Spanner	J41108	5120-01-375-4502	
95	Wrench, Torque (0 To 175 Lb-Ft [0-237 N·M])	1753LDF	5120-00-640-6364	SC 4910-95-A74
96	Wrench, Torque (0 To 300 Lb-Ft [0-407 N·M])	6134A	5120-00-555-1523	SC 4910-95-A72-HR
97	Wrench, Torque (0 To 600 Lb-Ft [0-814 N·M])	SW130-301	5120-00-221-7983	SC 4910-95-A31

Section II. COMMON TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
98	Wrench, Torque, 3/8 In. Drive (0 To 60 N·M)	TESI60	5120-01-112-9531	SC 4910-95-A72-HR
99	Zonal Separator, Oil And Water Spray Gun (Variable Air Supply)	MIL-S-12928CLASS1	4940-00-242-4100	SC 4910-95-A73

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Work Lamp, Hand Held, Assembly, Repair, 7-55

SCHEMATICS

The following sections contain the schematics which are the same in all volumes of TM 9-2320-364-20 and TM 9-2320-364-34.

Section I contains the schematics for trucks equipped with the 145 amp alternator and the DDEC II engine.

Section II contains the schematics for trucks equipped with the 200 amp alternator and the DDEC III/IV engine.

SCHEMATICS

Section I. 145 AMP ALTERNATOR AND DDEC II ENGINE.

Section I contains the schematics for trucks equipped with the 145 amp alternator and the DDEC II engine.

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MULTIPLE CONNECTORS

NUMBER	ZONE	SH	DESCRIPTION
MC1	H3	3	CAB/ELECTRICAL BOX
MC1	C26	4	CAB/ELECTRICAL BOX
MC2	D3	3	CAB/ELECTRICAL BOX
MC2	D26	4	CAB/ELECTRICAL BOX
MC3	C3	3	CHASSIS
MC3	H17	6	CHASSIS
MC4	G10	3	SWITCHES
MC5	B12	3	WIPER MOTOR
MC6	D15	3	THROTTLE SENSOR
MC7	H8	3	TURN SIGNAL
MC8	F19	3	GAUGES
MC9	G4	4	ECU ATEC
MC10	G4	4	ECU ATEC
MC11	D3	4	DDEC
MC11	D26	5	DDEC
MC12	H26	4	SHIFT CONT ATEC
MC13	F6	3	DIGN CONN DDEC
MC15	B4	6	MILITARY CONNECTOR
MC16	D4	6	TRAILER
MC17	G11	5	DDEC
MC18	E11	5	DDEC
MC19	E13	5	TRANSMISSION
MC20	E12	5	TRANSMISSION
MC21	E2	3	ENGINE SENSOR
MC21	H26	5	ENGINE SENSOR
MC22	G21	5	REGULATOR
MC23	B23	5	ETHER START
MC24	G19	5	ALTERNATOR
MC25	C17	6	TRAILER 24VDC
MC27	F18	6	FRONT TOW
MC28	E6	3	BEACON LIGHT
MC29	F8	6	CRANE
MC30	C5	6	TRAILER
MC31	B21	3	CAB/CHASSIS
MC32	B23	3	CTI CHASSIS
MC33	F17	7	LHS CAB
MC34	C19	3	24V METERS
MC35	D24	3	CTI
MC36	A5	4	THROTTLE SENSOR
MC38	C15	3	VERNIER CONTROL
MC39	H7	5	STE/ICE
MC40	G5	5	STE/ICE MODULE
MC41	G2	5	PULSE TACH DRIVE
MC42	H4	5	DIFFERENTIAL PRESS
MC43	F2	5	FUEL PRESSURE
MC44	C5	3	CAB/TRANSMISSION
MC44	F26	4	CAB/TRANSMISSION
MC45	D5	4	ECU ATEC

MULTIPLE CONNECTORS

NUMBER	ZONE	SH	DESCRIPTION
MC50	C7	4	RELAYS/ATEC
MC51	C6	4	ECU ATEC
MC52	B23	4	HEATER/DIMMER
MC53	F23	3	ENGINE BRAKE
MC54	F8	6	WORK LIGHT
MC55	B13	6	SELF RECOVERY WINCH
MC56	C23	5	ETHER THERMOSTAT
MC57	F6	6	DRIVE LINE LOCK
MC58	E7	3	GAS PART FILTER
MC59	G13	6	FAN CONTROL
MC60	G24	5	REVERSE PLRT PROTR
MC61	G10	6	FAN CONTL WTR TEMP
MC62	F13	5	DDEC ENGINE POWER
MC63	G11	6	FAN CONTROL
MC64	D15	6	AUXILIARY CTI MANF
MC65	E5	5	STE/ICE ENGINE
MC66	G2	5	TURBO OUTLET PSI
MC67	E2	5	AIR CLEANER
MC68	D2	5	AIR BOX PSI
MC69	D2	5	FUEL RETURN
MC70	C2	5	ENGINE OIL TEMP
MC71	B2	5	ENGINE WATER TEMP
MC73	F13	6	FAN CONTROL
MC76	F11	6	FAN CONTROL VALVE
MC77	E3	6	BACK UP LIGHT
MC78	F4	6	REAR LIGHT GROUP
MC79	G7	6	WORK LIGHT
MC80	G4	6	REAR LIGHT GROUP
MC81	E13	7	LHS
MC82	E12	7	LHS
MC83	E14	7	LHS
MC84	E15	7	LHS
MC85	E9	7	LHS
MC86	E7	7	LHS
MC87	D5	7	LHS
MC88	E6	7	LHS
MC90	C3	6	REAR LIGHT GP HARN
MC91	G8	3	STRN COL.-CAB HARN
MC92	F8	3	STRG COL.-CAB HARN
MC93	C17	7	LHS
MC94	B17	7	LHS
MC95	B15	5	DDEC BATTERY POWER
MC96	C2	3	LOW HYD OIL
MC97	B10	6	AIR DRYER
MC98	B9	6	AIR DRYER
MC99	B8	6	AFTER COOLER
MC102	A3	4	DDEC 6.8K RESISTOR
MC103	E5	3	CHEM DETECTOR
MC104	E5	3	CHEM ALARM

MULTIPLE CONNECTORS

NUMBER	ZONE	SH	DESCRIPTION
MC105	E24	3	CTI ACCESS OUTPUT
MC106	H4	3	DDEC DIAGNOSTIC
MC107	D6	6	FUEL WATER SEP
MC108	C20	5	FUEL PUMP
MC109	C15	6	CTI POWER MANIFOLD
MC110	C24	3	CTI AUX MANF CAB
MC111	B24	3	CTI POWER MANF CAB
MC112	B19	3	LHS LIGHTS
MC113	F16	6	EMERGENCY STEER SW
MC114	G18	5	200 AMP OPTION
MC115	H16	5	200 AMP OPTION
MC116	B12	4	EMER ENG SHUT DOWN
MC118	A9	5	STE/ICE
MC119	B22	4	ARCTIC PUMP
MC120	B7	6	ARCTIC PUMP
MC121	C12	6	SELF RECOVERY WINCH
MC122	D12	6	SELF RECOVERY WINCH
MC123	D12	6	SELF RECOVERY WINCH
MC124	E3	6	BACK-UP LIGHT/ALARM
MC125	G18	3	AIR RESTRICTION LT
MC126	E11	3	STOP LIGHTS
MC127	B15	3	THROTTLE POSN SW
MC128	G10	6	AUX WATER TEMP SW

LIGHTS

NUMBER	ZONE	SH	DESCRIPTION
L1	G16	3	PARKING BRAKE IND
L2	G17	3	LOW AIR INDICATOR
L3	G17	3	CHECK GAUGES IND
L4	G17	3	RH TURN INDICATOR
L5	G24	3	TRANS CHECK IND
L6	G18	3	CHECK ENGINE IND
L7	G17	3	DRIVE LINE LOCK IND
L8	G24	3	HI WATER TEMP IND
L9	G24	3	LOW OIL PSI IND
L10	G25	3	HI BEAM INDICATOR
L11	G28	3	LH TURN INDICATOR
L12	F27	3	RH HEADLIGHT
L13	G27	3	RH SIDE TURN SIGNAL
L14	F27	3	RH COMPOSITE
L15	E27	3	BLACKOUT DRIVE
L16	D27	3	LH COMPOSITE
L17	C27	3	LH HEADLIGHT
L18	C27	3	LH SIDE TURN SIGNAL
L19	B27	3	ID & CLEARANCE
L20	H10	3	DOME
L21	G7	6	RH WORK LIGHT
L22	G2	6	RH REAR COMPOSITE
L23	G2	6	BACK UP
L24	F2	6	LH REAR COMPOSITE
L25	C2	6	ID/CLEARANCE REAR
L26	E22	3	LHS INDICATOR
L27	E22	3	AUXILLARY HYDR IND
L28	E23	3	TRANSIT INDICATOR
L29	E23	3	LHS OVERLOAD IND
L31	D2	6	RH REAR S MKR (RED)
L32	H4	6	RH SIDE MKR (AMBER)
L33	B2	6	LH SIDE MKR (AMBER)
L34	H4	6	LH REAR S MKR (RED)
L35	G16	3	EMERGENCY STEERING
L36	G16	3	LOW HYD OIL
L37	D21	3	ENGINE BRAKE
L38	D21	3	FLAT RACK
L39	F7	6	LH WORK LIGHT
L40	F7	3	T.C. LOCKUP
L41	C2	6	L.H. B.O. CL LIGHT
L42	D2	6	R.H. B.O. CL LIGHT
L43	B5	3	POST LIGHT
L44	F5	3	HEATER PANEL LIGHT

SWITCHES

NUMBER	ZONE	SH	DESCRIPTION
S1	H6	3	TURN SIGNAL/DIMMER
S2	E13	3	IGNITION
S3	F5	3	HEATER
S4	D8	3	SELF RECOVERY CRANE
S5	H12	3	BEACON LIGHT
S6	H13	3	WORK LIGHT
S7	H14	3	WINDSHIELD WASHER
S8	G15	3	WINDSHIELD WIPER
S9	F16	3	BLACK OUT SVCE SEL
S10	F54	3	BLACK OUT MARKER
S11	F14	3	BLACK OUT DRIVE
S12	F14	3	HEADLIGHTS
S13	F5	6	DRIVE LINE LOCK
S14	F12	3	RHEOSTAT
S15	F7	3	HORN
S16	F13	3	ENGINE BRAKE
S18	D7	3	SELF RECOVERY WINCH
S19	D6	3	GAS PARTIULATE FLTR
S20	D5	3	CHEMICAL ALARM
S21	H15	3	DOME LIGHT
S22	C8	5	STE/ICE ZEROING
S23	C22	7	PROX SW HOOK ARM UP
S24	C23	7	PROX SW MDL FR DOWN
S25	D13	3	ETHER START
S26	F7	3	TC LOCKUP
S27	E5	7	HOOK ARM DOWN
S28	G8	7	OVERLOAD PSI
S29	B19	4	ARCTIC PUMP
S30	E9	3	EMER ENG SHUT DOWN
S31	C16	3	THROTTLE POSITION

PRESSURE SWITCHES

NUMBER	ZONE	SH	DESCRIPTION
PS1	G9	3	FRONT BRAKE
PS2	F9	3	REAR BRAKE
PS3	F9	3	HAND BRAKE
PS4	C14	3	PARKING BRAKE
PS5	B15	3	PARKING BRAKE SW
PS6	D17	3	LOW AIR PRESSURE
PS7	D17	3	LOW AIR PRESSURE
PS8	C22	5	ATEC OIL PRESSURE
PS9	D22	5	ENGINE OIL
PS10			GOVERNOR PRESSURE
PS11			GOVERNOR PRESSURE
PS13	F15	6	EMERGENCY STEER
PS15	F26	5	BOOST PRESSURE

TEMPERATURE SWITCHES

NUMBER	ZONE	SH	DESCRIPTION
TS1	C23	5	ETHER START
TS2	D23	5	ENGINE WATER
TS3	F10	6	ENGINE WATER
TS4	G10	6	ENGINE WATER

RELAYS

NUMBER	ZONE	SH	DESCRIPTION
R1	G24	4	HEADLIGHTS
R2	G23	4	ID/CLEARANCE LIGHTS
R3	G22	4	HORN
R4	G21	4	WORK LIGHTS
R5	G20	4	DIMMER
R6	G19	4	BEACON LIGHTS
R7	G18	4	TRANSMISSION
R8	G18	4	RATARDER
R9	G18	4	CK TRANSMISSION
R10	G17	4	REVERSE
R11	G16	4	NEUTRAL START
R12	G15	4	12 V MAG SWITCH
R13	G15	4	B.O. STOP
R14	G14	4	BO SERVICE TAIL LTS
R15	G13	4	LH TURN SIGNAL
R16	G12	4	RH TURN SIGNAL
R17	G12	4	BLACK OUT TAIL LTS
R18	G11	4	DDEC
R19	G10	4	TRANS DDEC
R20	G9	4	INTER AXLE
R21	G9	4	DIFFERENTIAL LOCK
R22	G8	4	CRANE HI IDLE
R23	G7	4	HIGH RANGE LOCKOUT
R24	G6	4	T.C. DUAL MODE
R25	B17	4	MAGNETIC SWITCH
R26	B18	4	MAGNETIC SWITCH
R27	D19	5	MAGNETIC SWITCH
R28	C21	4	MAGNETIC SWITCH
R29	C10	7	MIDDLE FR LOCKOUT
R32	B21	4	ARCTIC PUMP
R33	B20	4	ARCTIC PUMP

SENDING UNIT

NUMBER	ZONE	SH	DESCRIPTION
SU1	E21	5	WATER TEMPERATURE
SU2	D21	5	TRANSMISSION TEMP
SU3	D21	5	ENGINE OIL PRESSURE
SU4	F6	6	SPEEDOMTER
SU5	D6	6	FUEL LEVEL

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CIRCUIT BREAKERS

NUMBER	ZONE	SH	DESCRIPTION
CB1	D22	4	15 AMP
CB2	D22	4	15 AMP
CB3	D21	4	15 AMP
CB4	D21	4	15 AMP
CB5	D20	4	20 AMP
CB6	D20	4	15 AMP
CB7	D19	4	10 AMP
CB8	D19	4	15 AMP
CB9	D18	4	10 AMP
CB10	D17	4	3 AMP
CB11	D16	4	8 AMP
CB12	D16	4	8 AMP
CB13	D15	4	8 AMP
CB14	D14	4	15 AMP
CB15	D13	4	15 AMP
CB16	D12	4	15 AMP
CB17	D12	4	3 AMP
CB18	D11	4	10 AMP
CB19	D10	4	15 AMP
CB20	D9	4	15 AMP
CB21	D9	4	30 AMP
CB22	D7	4	20 AMP
CB23	D7	4	20 AMP
CB24	C20	5	3 AMP

GAUGES

NUMBER	ZONE	SH	DESCRIPTION
G1	G20	3	WATER TEMPERATURE
G2	G21	3	OIL PRESSURE
G3	G22	3	FUEL LEVEL
G4	G22	3	TACHOMETER
G5	G23	3	SPEEDOMTER
G6	G19	3	VOLTMETER 12V
G7	G19	3	VOLTMETER 24V
G10	G20	3	XMSN OIL TEMP
G11	G18	3	AIR PRESSURE
G12	H18	3	AIR RESTRICTION

MISCELLANEOUS

NUMBER	ZONE	SH	DESCRIPTION
M1	B6	3	WINDSHIELD WSHR SOL
M2	B13	3	WIPER MOTOR
M3	E17	3	LOW OIL & AIR ALARM
M4	A5	4	THROTTLE POSN CONT
M5	C20	4	FLASHER
M6	C16	5	BATTERIES
M7	E17	5	STARTER
M8	B22	5	ETHER START
M9	D6	6	FUEL/WATER SEP
M10	C10	6	LHS SOLENOID VALVE
M11	C8	6	AFTERCOOLER
M12	C20	5	FUEL PUMP
M13	B10	6	AIR DRYER
M14	E6	3	CHEMICAL DETECTOR
M14	B9	6	AIR DRYER
M15	D1	3	HORN
M16	D16	3	VERNIER CONTROL
M17	F5	3	HEATER MOTOR
M18	F24	3	LOW OIL PRESS ALARM
M19	F21	5	REGULATOR/DVS
M20	G22	5	ALTERNATOR,STD
M21	C25	5	RH SIDE ENG BK COIL
M22	C24	5	LH SIDE ENG BK COIL
M23	D18	5	SLAVE CONNECTER
M24	B15	6	CTI POWER MANIFOLOD
M25	D15	6	CTI AUXILIARY MANF
M26	E13	7	LHS CAB CONTROLLER
M27	B13	6	SELF RECOVERY WINCH
M28	E25	3	CTI CONTROLLER
M29	G14	7	CHEMICAL ALARM
M30	D11	3	GAS PART FILTER
M31	D11	3	AIR HEATER DRIVER
M32	D12	3	AIR HEATER PASS
M33	D3	7	SRW SOLENOID VALVE
M35	E15	3	THROTTLE POSITIONER
M36	C9	4	DIODE
M39	F9	4	RECTIFIER
M40	G2	5	PULSE TACH DRIVE
M41	H5	5	DIFFERENTIAL PRESS
M42	F2	5	FUEL PRESSURE
M43	G5	5	STE/ICE MODULE
M45	F10	6	FAN CONTROL VALVE
M48	D16	5	SHUNT
M49	B9	3	XFR CASE LKUP SOL
M50	B8	3	INTER AXLE SOL V
M51	B8	3	DIFF SOLENOID VALVE
M51	C11	6	FAN
M52	A21	4	RECTIFIER
M53	G11	7	LHS HOOK ARM B
M54	G10	7	LHS HOOK ARM A
M55	G10	7	LHS MAIN CYLINDER B
M56	G10	7	LHS MAIN CYLINDER A

MISCELLANEOUS

NUMBER	ZONE	SH	DESCRIPTION
M57	G9	7	LHS FREEFLOW
M58	G9	7	LHS TRANSIT
M59	F3	7	LHS LH HOOK ARM A
M60	F3	7	LHS LH HOOK ARM B
M61	F2	7	LHS RH HOOK ARM A
M62	F2	7	LHS RH HOOK ARM B
M64	H21	5	DUVAC CONTROLLER
M65	G17	5	ALTNTR 200 AMP OPT.
M66	G16	3	RECTIFIER
M67	C8	3	RECTIFIER
M68	G12	7	RECTIFIER
M70	F2	5	TURBO OUTLET PSI
M71	E2	5	AIR CLEANER
M72	D2	5	AIR BOX PSI
M73	C2	5	FUEL RETURN
M74	C2	5	ENGINE OIL TEMP
M75	B2	5	ENGINE WATER TEMP
M76	E10	4	RECTIFIER
M77	B17	5	ARCTIC BATTERIES
M78	E2	6	BACK-UP ALARM
M80	B7	6	ARCTIC PUMP
M81	F4	3	RECTIFIER
M82	E13	3	ISOLATOR

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
104	MC36-M4	4	THROTTLE SENSOR
104	MC10-MC36	4	THROTTLE SENSOR
105	MC10-MC19	4/5	ATEC
106A	MC10-MC36	4	THROTTLE SENSOR
106A	MC36-M4	4	THROTTLE SENSOR
106A	MC10-106B	4/5	ATEC
106B	106A-MC19	4/5	ATEC
107	MC10-MC19	4/5	ATEC
108	MC10-MC19	4/5	ATEC
109	MC10-MC19	4/5	ATEC
110	MC10-MC19	4/5	ATEC
111	MC10-MC19	4/5	ATEC
112	MC10-MC20	4/5	ATEC
113	MC10-MC20	4/5	ATEC
114	MC10-MC19	4/5	ATEC
115	MC11-MC18	5	ECM
115	MC11-MC102	4	6.8K RESISTOR
115	MC10-MC19	4/5	ATEC
116	MC10-MC19	4/5	ATEC
117	MC10-MC19	4/5	ATEC
118	MC10-MC19	4/5	ATEC
119	MC10-MC19	4/5	ATEC
120	MC10-MC19	4/5	ATEC
121	MC10-MC19	4/5	ATEC
122	MC10-MC19	4/5	ATEC
123	MC10-MC19	4/5	ATEC
124	MC36-M4	4	THROTTLE SENSOR
124	MC10-MC36	4	THROTTLE SENSOR
150	MC62-MC62	5/4	
150	MC17-MC62	5	
195	MC5-M2	3	
201	MC51-GROUND	4	
201	MC9-MC51	4	
202A	MC9-SPLICE	4	
203	MC9-MC51	4	
203	MC51-CB12	4	
204	MC9-MC12	4	ATEC
206	MC9-MC12	4	ATEC
207A	MC51-MC106	4	ATEC
207A	MC9-MC51	4	ATEC
207A	MC106-MC13	4	
208/209	MC11-SPLICE	4	
208/209	SPLICE-MC51	4	
208/209	M6-MC95	5	
208/209	MC95-MC11	5	
208/209	MC51-MC9	4	
210A	MC9-MC12	4	
211	R8-MC50	4	
211	MC50-R8	4	RETARDER
211	MC9-MC50	4	

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
212	MC9-MC12	4	
213	MC50-R8	4	RETARDER
213	MC9-MC50	4	
214	MC50-R10	4	REVERSE
214	MC9-MC50	4	
215	MC9-MC50	4	
215	MC50-R9	4	CHECK TRANSMISSION
216A	MC106-MC13	3	
216A	MC9-MC51	4	ATEC
216A	MC51-MC106	4	ATEC
218	MC9-MC12	4	ATEC
219	MC9-MC12	4	ATEC
220	MC9-MC12	4	ATEC
221	MC9-MC12	4	ATEC
222	MC9-GROUND	4	ATEC
223A	MC51-CB14	4	TRANSMISSION
223A	MC51-SPLICE	4	
223A	SPLC-SPLC	4	
223A	SPLC-SPLC	4	
223A	SPLC-SPLC	4	
223A	SPLICE-MC9	4	
223B	MC12-SPLICE	4	
225	CB11-MC12	4	
230	MC12-234	4	
231	MC50-MC12	4	
231	MC50-R22	4	CRANE HI IDLE
231	MC50-M36	4	
231	M36-R11	4	NEUTRAL START
233	MC50-MC12	4	
234	MC12-GROUND	4	
240	MC62-CB23	5/4	
240	CB23-M6	4/5	
240	MC17-MC62	5	
240	MC62-M6	5	
241	MC62-CB22	5/4	
241	MC62-M6	5	
241	MC17-MC62	5	
241	CB22-M6	4/5	
309	MC45-R24	4	TC DUAL MODE
313	MC45-R24	4	TC DUAL MODE
315	MC45-R24	4	TC DUAL MODE
417	MC6-M35	3	
417	MC11-MC44	4	
417	MC11-MC18	5	ECM
417	MC44-MC6	3	THROTTLE SENSOR
419	MC11-MC18	5	ECM
419	MC11-MC44	4	
419	MC44-MC8	3	
419	MC8-L6	3	CHECK ENGINE LIGHT

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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
439	MC116-MC106	4	EMERGENCY ENG STOP
439	MC116-S30	3	EMERGENCY ENG STOP
439	MC116-S30	3	EMERGENCY ENG STOP
439	MC116-CB13	4	DDEC
439	MC106-MC13	3	
439	SPLC-MC106	4	
439	MC11-MC18	5	ECM
439	MC8-L6	3	CHECK ENGINE LIGHT
439	MC8-L3	3	ENGINE STOP LIGHT
439	MC44-MC8	3	
439	MC11-SPLICE	4	
439	SPLICE-MC44	4	
439	SPLC-MC116	4	
451	MC11-MC18	5	ECM
451	MC106-MC13	3	
451	MC11-MC106	4	
505	MC106-MC13	3	
505	MC11-MC106	4	
505	MC11-MC18	5	ECM
508	MC11-R7	4	TRANSMISSION
508	MC11-MC18	5	ECM
509	MC11-MC18	5	ECM
509	MC8-L3	3	ENGINE STOP LIGHT
509	MC44-MC8	3	
509	MC11-MC44	4	
510	MC11-MC18	5	ECM
510	MC44-PS4	3	PARKING BRAKE
510	R22-MC44	4	
510	MC11-R22	4	
900	MC11-MC106	4	
900	MC11-MC18	5	ECM
900	MC106-MC13	3	
901	MC11-MC18	5	ECM
901	MC106-MC13	3	
901	MC11-MC106	4	
908	MC11-MC18	5	ECM
908	MC11-M4	4	THROTTLE POSN CONT
916	MC44-MC6	3	
916	MC11-MC44	4	
916	MC38-M16	3	
916	MC6-MC38	3	VERNIER CONTROL
916	MC6-M35	3	THROTTLE SENSOR
916	MC11-MC18	5	ECM
952	MC38-M16	3	
952	MC11-MC44	4	
952	MC44-MC6	3	THROTTLE SENSOR
952	MC11-MC18	5	ECM
952	MC6-MC38	3	VERNIER CONTROL
1001	MC8-L4	3	
1001	MC7-SPLICE	3	
1001	MC8-SPLICE	3	
1001	SPLICE-L13	3	
1001	SPLICE-L14	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1001	S1-MC7	3	RH HEADLIGHT
1002	S1-MC7	3	LH HEADLIGHT
1002	MC8-L11	3	
1002	MC7-SPLICE	3	
1002	SPLICE-MC8	3	
1002	SPLICE-L18	3	
1002	SPLICE-L16	3	
1003	MC7-MC3	3	
1003	S1-MC7	3	LH RR TURN SIGNAL
1003	MC3-MC80	6	
1003	MC3-MC16	6	TRAILER CONN 12VDC
1003	MC1-R15	4	LH TURN LIGHT
1003	MC80-L24	6	LH STOP LIGHT
1003	MC27-MC3	6	FRONT TOW
1003	MC7-MC1	3	
1003C	MC25-R17	4	LH TURN LIGHT
1003C	MC25-MC15	6	TRAILER CONN 12VDC
1004	MC7-MC1	3	
1004	MC7-MC3	3	
1004	S1-MC7	3	
1004	MC3-MC80	6	
1004	MC80-L22	6	RH STOP LIGHT
1004	MC27-MC3	6	
1004	MC3-MC78	6	
1004	MC3-MC16	6	
1004	MC1-R16	4	
1004C	MC25-R16	4	RH TURN LIGHT
1004C	MC25-MC15	6	TRAILER CONN 24VDC
1005	MC126-S9	3	
1005	PS3-MC3	3	
1005	MC3-MC16	6	TRAILER CONN 24VDC
1005	MC126-PS1	3	
1005	PS2-PS3	3	
1005	MC27-MC3	6	FRONT TOW
1005	PS1-PS2	3	
1005A	MC7-MC126	3	
1005A	MC126-S9	3	
1005A	S1-MC7	3	TURN SIGNAL/DIM SW
1006	MC2-SPLICE	3	
1006	SPLICE-L12	3	
1006	SPLICE-L17	3	
1006	MC2-R5	4	DIMMER
1007	MC2-R5	4	DIMMER
1007	MC2-SPLICE	3	
1007	SPLICE-L12	3	
1007	SPLICE-L17	3	
1008	MC3-MC78	6	
1008	MC4-S12	3	HEADLIGHTS

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1008	MC27-MC3	6	FRONT TOW
1008	MC3-SPLICE	3	
1008	MC3-MC4	3	
1008	MC3-MC16	6	TRAILER CONN 12VDC
1008	MC78-L22	6	RH TAIL LIGHT
1008	MC78-L24	6	LH TAIL LIGHT
1008C	MC25-MC15	6	TRAILER CONN 24VDC
1008C	MC25-R14	4	B.O. SERVICE
1009	PS2-PS3	3	
1009	PS1-PS2	3	
1009	MC2-PS1	3	
1009	MC2-CB6	4	STOP LIGHT
1012	MC3-SPLICE	3	
1012	SPLC-SPLC	3	
1012	MC2-SPLICE	3	
1012	SPLC-SPLC	3	
1012	SPLICE-L19	3	
1012	MC2-R2	4	CLEARANCE LIGHTS
1012	MC3-SPLICE	6	
1012	SPLICE-MC27	6	
1012	SPLICE-MC80	6	
1012	SPLICE-L32	6	RH SIDE MARKER
1012	SPLICE-L34	6	LH SIDE MARKER
1012	MC90-L31	6	RR SIDE MARKER
1012	MC90-L25	6	ID LIGHTS
1012	MC80-MC90	6	
1012	MC90-L33	6	RR SIDE MARKER
1016	MC92-MC2	3	
1016	S15-MC92	3	
1016	MC2-R3	4	HORN
1017	SPLICE-R5	4	
1017	MC52-R14	4	
1017	R2-MC52	4	
1017	MC2-SPLICE	4	
1017	SPLICE-R1	4	
1017	MC91-MC2	3	
1017	S1-MC91	3	
1017A	MC91-MC2	3	
1017A	S1-MC91	3	
1017A	MC2-R5	4	
1018	MC8-L10	3	HIGH BEAM
1018	MC8-1007	3	
1019	L15-1679	3	
1020	L14-L16	3	
1020	DUVAC IGN	5	FUEL PUMP
1020	S2-MC21	3	
1020	R27-MC48	5	
1020	MC60-IGN	5	DUVAC CONTROLLER
1020	MC21-MC60	5	
1020	MC108-M81	5	
1020	M81-MC60	5	
1021	MC2-S2	3	
1021	MC2-R11	4	
1021	R11-M76	4	

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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1021	MC52-R11	4	FRONT TOW
1021A	R11-MC1	4	
1021A	MC1-MC21	3	
1021A	MC21-MC60	5	
1021A	MC60-R27	5	
1026	MC52-CB16	4	
1029	MC2-R6	4	BEACON
1029	MC2-MC28	3	
1031	R3-SPLICE	4	
1032	MC8-MC21	3	
1032	M39-L9	3	LOW OIL PSI
1032	MC8-M39	3	
1032	PS9-MC21	5	ENGINE OIL PSI SW
1033	M39-M18	3	OIL PSI/H WTR ALM
1036	MC23-M8	5	
1036	MC23-M7	5	
1036	MC21-MC56	5	ETHER START
1036	MC21-S25	3	
1040	CB4-R4	4	WORKLIGHT
1040A	S6-MC4	3	
1040A	MC2-R4	4	WORKLIGHT
1040A	MC4-MC2	3	
1040B	MC3-MC79	6	RH WORKLIGHT
1040B	MC2-MC3	3	
1040B	MC2-R4	4	WORKLIGHT
1040B	MC3-MC54	6	LH WORKLIGHT
1045	R27-M7	5	
1049	MC2-R1	4	HEADLIGHTS
1049	MC4-MC2	3	
1049	S12-MC4	3	
1052	S20-S19	3	CHEM ALM-GPF
1052	S19-S18	3	GAS PART FLTR-SRW
1052	S18-S4	3	SRW-SRW/MHC
1052	S4-S30	3	SRW/MHC-EMER ENG S D
1052	S30-SPLICE	3	EMER ENG SHUT DOWN
1052	SPLICE-G11	3	AIR PRESSURE GAUGE
1052	MC4-SPLICE	3	
1052	SPLICE-L44	3	HEATER PANEL LIGHT
1052	S5-S6	3	BEACON LT-WORK LT
1052	S6-S7	3	WORK LT-WSHLD WSHR
1052	S7-S8	3	WSHLD WASHER-WIPERS
1052	S8-S21	3	WIPERS-DOME LIGHT
1052	S21-S9	3	DOME LT-B.O.SERV SEL
1052	S9-S10	3	BO SERV SEL-BO MKR
1052	S10-S11	3	B.O. MARKER-B.O. DR
1052	S11-S12	3	B.O. DRIVE-HEADLTS
1052	S12-S16	3	HEADLIGHTS-ENG BK
1052	S16-S14	3	ENG BRAKE-RHEO/DOME
1052	S14-SPLICE	3	RHEOSTAT/DOME
1052	SPLICE-G6	3	VOLTMETER 12V
1052	SPLC-SPLC	3	
1052	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1052	SPLICE-G1	3	WATER TEMP GAUGE
1052	SPLICE-G2	3	OIL PRESSURE GAUGE
1052	SPLICE-G4	3	TACHOMETER
1052	SPLICE-G5	3	SPEEDOMETER
1052	SPLICE-G3	3	FUEL GAUGE

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1052	MC1-SPLICE	3	
1052	SPLICE-L43	3	POST LIGHT
1052	SPLC-MC125	3	
1052	MC125-G12	3	AIR RESTRICTION GA
1052	MC1-SPLICE	3	
1052	MC1-CB1	4	15 AMP HEADLIGHT
1052	MC50-MC1	4	
1055	MC115-M7	5	
1055	M7-1277	5	
1055	M7-1281	5	
1056	MC111-MC32	3	
1056	MC32-MC109	6	CTI POWER MANIFOLD
1057	M20-M20	5	
1057	MC111-MC32	3	
1057	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC111-MC32	3	
1059	MC32-MC109	6	CTI POWER MANIFOLD
1059	MC111-MC32	3	
1061	MC22-MC109	6	CTI POWER MANIFOLD
1061	MC111-MC32	3	
1062	MC32-MC109	6	CTI POWER MANIFOLD
1062	MC111-MC32	3	
1063	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC111-MC32	3	
1065	MC32-MC109	6	CTI POWER MANIFOLD
1065	MC111-MC32	3	
1066	MC32-MC64	6	CTI AUX MANIFOLD
1066	MC110-MC32	3	
1067	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC110-MC32	3	
1070	MC32-MC64	6	CTI AUX MANIFOLD
1070	MC110-MC32	3	
1071	MC110-MC32	3	
1071	MC32-MC64	6	CTI AUX MANIFOLD
1072	R26-R25	3	
1072	MC110-MC32	3	
1072	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC110-MC32	3	
1074	MC110-MC32	3	
1074	R25-CB10	4	
1074	MC32-MC64	6	CTI AUX MANIFOLD
1075	M6-R25	4/3	
1075B	R25-R18	4	
1076	MC110-MC32	3	
1076	MC32-MC64	6	CTI AUX MANIFOLD
1079	CB5-M6	4	HAZARD LIGHTS
1080	MC7-MC2	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1080	MC2-M5	4	TURN SIGNAL/FLASHER
1082	MC2-MC52	4	
1082	MC2-M81	3	
1082	M81-S3	3	
1082	MC52-CB15	4	HEATER
1084	MC1-CB5	4	B.O. LIGHTS
1084	MC4-MC1	3	
1084	MC4-S9	3	
1091	L17-GROUND	3	
1092	L7-MC8	3	
1092	MC8-M51	3	
1093	MC31-MC57	6	
1093	MC1-MC31	3	
1093	MC1-CB16	4	
1093	MC57-S13	6	DRIVE LINE LOCK-UP
1094	S5-S14	3	
1095	R23-R24	4	
1095	MC44-R23	4	
1095	MC31-MC44	3	
1095	MC57-S13	6	DRIVE LINE LOCK-UP
1095	MC31-MC57	6	
1108	MC44-MC8	3	
1108	505-MC44	4	
1108	MC8-G4	3	TACHOMETER
1113	MC8-MC21	3	
1113	G2-MC8	3	OIL PSI GAUGE
1113	SU3-MC21	5	ENG OIL PSI SNDG UN
1114	M66-MC8	3	
1114	MC96-MC8	3	LOW OIL LEVEL LIGHT
1114	MC8-L36	3	
1114	L36-M66	3	
1118	MC4-1919	3	
1118	S8-MC4	3	
1120	M66-MC8	3	
1120	M66-M3	3	
1120	PS6-PS7	3	
1120	PS6-MC8	3	
1120	L2-M66	3	
1137	M6(1)-M6(2)	5	
1137	M6(3)-M6(4)	5	
1138	M48-M7	5	SHUNT
1138	M7-M23	5	SLAVE
1138	M6-M48	5	SHUNT
1138	M77-M7	5	ARCTIC BATTERIES
1139	M7-M23	5	SLAVE
1139	M6-M7	5	
1139	M77-M7	5	ARCTIC BATTERIES
1147	TS2-MC21	5	ENG WTR TEMP SNDG UN
1147	M39-L8	3	HIGH WATER TEMP
1147	MC8-MC21	3	
1147	MC8-M39	3	
1149	MC1-R10	4	REVERSE
1149	MC3-MC78	6	
1149	MC1-MC124	3	
1149	MC78-MC77	6	REVERSE LIGHT
1149	MC124-MC77	6	

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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1153	S21-MC4	3	
1153	MC4-L20	3	DOME LIGHT
1168	MC2-R3	4	HORN
1168	MC2-M15	3	
1174	BUS BAR	4	
1175	R28-CB5	4	
1176	MC113-PS13	6	EMERGENCY STEER
1184	S5-MC4	3	
1184	MC2-R6	4	
1184	MC2-MC4	3	
1189	MC4-S9	3	
1189	MC44-R28	4	
1189	MC4-SPLICE	3	
1189	MC4-S21	3	
1189	MC2-SPLICE	3	
1189	MC2-M5	4	
1189	SPLICE-MC44	3	
1274	MC115-SPLC.	5	
1274	M64-SPLICE	5	
1274	M8-SPLICE	5	
1275	M6-M20	5	
1275	M6-200 AMP	5	
1276	MC2-MC4	3	
1276	MC2-CB8	3	
1276	SPLICE-S14	3	
1276	SPLICE-MC53	3	
1276	MC4-SPLICE	3	
1276	MC2-SPLICE	4	
1276	MC53-SPLICE	3	
1276	SPLC-SPLC	3	
1276	SPLC-SPLC	3	
1276	SPLICE-M3	3	LOW AIR ALARM
1276	SPLICE-G5	3	SPEEDOMETER
1276	SPLICE-L1	3	PARKING BRAKE
1276	SPLICE-L2	3	LOW AIR
1276	SPLICE-L35	3	EMERGENCY STEERING
1276	SPLICE-L36	3	LOW HYDR OIL
1276	SPLC-SPLC	3	
1276	SPLICE-L5	3	XMSN CHECK
1276	SPLICE-L8	3	HIGH WATER TEMP
1276	SPLICE-L9	3	LOW OIL PSI
1276	SPLICE-G3	3	FUEL GAUGE
1276	SPLICE-G6	3	VOLTMETER 12V
1276	SPLICE-G1	3	WATER TEMP GAUGE
1276	SPLICE-G2	3	OIL PRESSURE GAUGE
1276	SPLICE-G4	3	TACHOMETER
1276	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1276	SPLICE-M18	3	ALARM
1277	MC115-SPLC	5	
1277	MC8-SPLICE	5	
1278	M20-M79	5	
1278	MC8-SPLICE	5	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1279	PS14-1277	5	
1279	MC115-PS14	5	
1279	M64-1280	5	
1280	CB21-R26	4	
1280	1281-R26	5	
1281	1280-MC47	5	
1281	R27-M81	5	
1281	1281-1281	5	
1292	MC4-S6	3	
1292	CB4-MC2	4	
1292	MC2-MC4	3	
1292	MC4-S12	3	
1314	1118-S7	3	
1318	MC3-MC8	3	
1318	MC3-G3	3	FUEL GAUGE
1318	MC3-SU6	6	FUEL LEVEL
1320	SU1-MC2	5	WATER TEMP SNDG UN
1320	G1-MC8	3	WATER TEMP
1320	MC8-MC21	3	
1340	CB15-MC14	4	SWING FIRE
1344	M20-MC22	5	
1362	R27-M64	5	
1371	MC8-PS5	3	
1371	L1-MC8	3	
1409	MC8-MC1	3	
1409	L5-MC8	3	
1409	MC1-R9	4	
1413	CB3-SPLICE	4	
1413	SPLICE-R6	4	
1430	R28-SH5	4/5	
1430	1832-R28	5	
1431	MC3-S2	3	
1431	MC3-M6	6	BATTERIES
1431	MC3-M6	6	BATTERIES
1431	MC1-MC119	4	
1431	MC119-R32	4	
1431	R32-S29	4	ARCTIC PUMP
1431	MC119-CB20	4	
1435	MC78-MC124	6	
1435	MC124-M78	6	
1435	MC77-MC124	6	
1435	MC85-MC86	7	
1435	MC86-MC87	7	
1435	MC33-MC84	7	
1435	GROUND	3	
1435	MC81-MC82	7	
1435	MC84-MC83	7	
1435	MC81-MC82	7	
1435	MC108-GND	5	
1435	GND	5	
1435	MC22-GND	5	
1435	M52-R26	4	
1435	M52-R28	4	
1435	R27-GND	5	
1435	MC125-GND	3	
1449	MC8-MC21	3	
1449	G10-MC8	3	TRANS OIL TEMP

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1449	SU2-MC21	5	TRANS TEMP SNDG UN
1454	MC81-MC82	7	
1460	MC81-MC82	7	
1461	MC86-MC87	7	
1461	MC85-MC86	7	
1462	MC81-MC82	7	
1463	MC81-MC82	7	
1464	MC81-MC82	7	
1465	MC81-MC82	7	
1466	MC85-MC86	7	
1466	MC86-MC87	7	
1467	MC81-MC82	7	
1468	MC81-MC82	7	
1469	MC81-MC82	7	
1469	MC86-MC87	7	
1469	MC85-MC86	7	
1470	MC86-MC87	7	
1470	MC85-MC86	7	
1471	MC85-MC86	7	
1471	MC86-MC87	7	
1471	MC81-MC82	7	
1472	MC85-MC86	7	
1472	MC81-MC82	7	
1472	MC86-MC88	7	
1475	MC85-MC86	7	
1475	MC86-MC87	7	
1480	MC84-MC93	7	
1480	MC84-MC83	7	
1481	MC84-MC83	7	
1481	MC84-MC93	7	
1482	MC84-MC93	7	
1482	MC84-MC83	7	
1483	MC83-MC84	7	
1483	MC84-MC93	7	
1484	MC83-MC84	7	
1484	MC84-MC93	7	
1485	MC84-MC94	7	
1485	MC83-MC84	7	
1486	MC84-MC94	7	
1486	MC83-MC84	7	
1487	MC1-S25	3	
1487	MC1-CB15	4	
1487	MC83-MC84	7	
1487	MC84-MC94	7	
1488	MC84-MC94	7	
1488	MC83-MC84	7	
1489	MC83-MC84	7	
1489	MC84-MC94	7	
1490	MC84-MC94	7	
1490	MC83-MC84	7	
1491	L16-1008	3	
1491	L14-1008	3	
1517	PS8-MC11	5	ATEC OIL PSI SWITCH
1517	MC11-R9	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1519	MC8-MC35	3	CTI OVERSPEED
1519	MC3-MC8	3	SPEEDOMETER
1519	MC8-MC35	3	CTI OVERSPEED
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1525	M16-PS4	3	
1534	MC107-M9	6	FUEL/WATER SEP
1534	MC2-SPLICE	4	
1534	SPLICE-CB8	4	
1534	MC3-MC107	6	
1534	MC2-MC3	3	
1534	MC3-S22	3	T-CASE LOCK-UP
1534	CB15-M76	4	
1538	MC97-M13	6	AIR DRYER
1538	MC25-MC97	6	
1538	MC25-CB15	4	
1538	MC25-MC98	6	
1538	MC99-M11	6	AFTER COOLER
1538	MC98-M14	6	AIR DRYER
1538	MC25-MC99	6	
1538	MC25-MC73	6	FAN CONTROL
1538	M76-MC25	4	
1640	MC119-SPLC	4	
1640	SPLICE-R26	4	
1640	SPLICE-MC44	4	
1640	MC44-S2	3	
1640	MC119-R32	4	
1644	MC119-R33	4	
1644	R33-R33	4	
1644	MC119-S29	4	ARCTIC PUMP
1644	R33-S29	4	ARCTIC PUMP
1644	MC119-MC25	4	
1644	MC25-MC120	6	
1644	MC120-M80	6	ARCTIC PUMP
1645	S29-R33	4	ARCTIC PUMP
1665C	MC25-MC15	6	TRAILER CONN 24VDC
1665C	MC25-CB20	4	
1674	S11-S10	3	
1674	S11-S9	3	
1676	R17-R16	4	
1676	R16-R15	4	
1676	R14-R3	4	
1676	R15-R14	4	
1676	CB20-R17	4	
1678	MC3-MC78	6	
1678	MC1-SPLICE	3	
1678	MC78-L24	6	LH B.O. STOP LIGHT

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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1678	MC78-L22	6	RH B.O. STOP LIGHT
1678	SPLICE-MC3	3	
1678	MC1-R13	4	
1678	SPLICE-MC4	3	
1678	MC4-S9	3	
1678C	MC25-R13	4	B.O. STOP LIGHT
1678C	MC25-MC15	6	TRAILER CONN 24VDC
1679	L15-MC4	3	
1679	MC4-S11	3	
1680	MC3-SPLICE	3	
1680	SPLICE-MC1	3	
1680	SPLC-SPLC	3	
1680	SPLICE-MC4	3	
1680	SPLC-SPLC	3	
1680	SPLC-SPLC	3	
1680	SPLICE-L19	3	
1680	SPLICE-L19	3	
1680	MC3-MC78	6	
1680	MC4-S10	3	
1680	MC78-L24	6	LH B.O. TAIL LIGHT
1680	MC1-R17	4	B.O. LIGHTS
1680	MC78-L22	6	RH B.O. TAIL LIGHT
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-R17	4	B.O. TAIL LIGHTS
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1702	MC44-MC34	3	
1702	MC34-G7	3	
1702	MC44-R26	4	
1708	M32-1709	3	PASSENGER AIR HTR
1709	MC58-S19	3	GAS PART FILTER SW
1709	MC58-M30	3	
1710	M31-1709	3	DRIVER AIR HEATER
1711	CB11-R7	4	
1712	MC1-CB7	4	ENGINE BRAKE
1712	MC4-MC1	3	
1713	MC53-L37	3	
1713	MC4-MC1	3	
1713	S16-MC4	3	ENGINE BRAKE
1713	MC1-R7	4	TRANSMISSION
1713	S16-MC53	3	
1714	MC1-1716	4	
1714	MC4-MC1	3	ENGINE BRAKE
1714	S16-MC4	3	ENGINE BRAKE
1715	MC4-MC1	3	ENGINE BRAKE
1715	S16-MC4	3	ENGINE BK RH COILS
1715	MC11-MC1	4	
1715	MC11-M21	5	LH ENGINE BRAKE
1716	MC11-R5	4	RETARDER
1716	MC11-M22	5	RH ENGINE BRAKE
1717	MC44-S20	3	CHEMICAL ALARM SW
1717	MC44-CB19	4	
1718	M76-M77	6	BACK-UP ALARM
1722	MC34-1734	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1722	L26-MC34	3	
1722	MC33-MC84	7	
1722	MC84-MC83	7	
1723	MC44-S18	3	SELF RECOVERY WN SW
1723	MC44-CB18	4	
1724	MC112-SPLC	3	
1724	SPLICE-MC33	3	
1724	MC33-MC93	7	
1724	L27-MC112	3	
1724	M67-SPLICE	3	
1724	SPLC-MC112	3	
1724	M67-MC33	3	
1725	L28-MC112	3	
1725	MC84-MC83	7	
1725	MC33-MC84	7	
1725	MC112-MC33	3	
1726	MC33-MC84	7	
1726	MC84-MC83	7	
1726	MC112-MC33	3	
1726	L29-MC112	3	
1729	MC31-S18	3	SELF RECOVERY WINCH
1729	MC31-MC55	6	
1729	MC55-MC121	6	SELF RECOVERY WINCH
1730	MC31-S18	3	SELF RECOVERY WINCH
1730	MC55-MC122	6	SELF RECOVERY WINCH
1730	MC31-MC55	6	
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-MC29	6	CRANE
1732	MC55-MC123	6	SELF RECOVERY WINCH
1732	S4-MC31	3	SELF RECOVERY WINCH
1732	MC31-MC55	6	
1733	MC31-M67	3	
1733	MC31-M51	6	
1734	M67-SPLICE	3	
1734	SPLC-SPLC	3	
1734	SPLICE-MC31	3	
1734	MC31-M10	6	
1736	MC39-MC39	5	
1737	MC31-MC1	3	
1737	MC1-R22	4	CRANE HI IDLE
1737	MC31-MC29	6	CRANE
1738	MC44-1755	4	
1738	MC44-MC31	3	
1738	MC31-MC29	6	CRANE
1739	MC44-CB21	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1739	MC44-S19	3	GAS PARTICULATE SW
1744	S4-M67	3	
1745	MC103-S20	3	CHEMICAL ALARM
1746	MC103-M29	3	CHEMICAL ALARM
1747	MC103-M29	3	CHEMICAL ALARM
1755	MC84-MC83	7	
1755	MC44-CB18	4	
1755	MC33-MC84	7	
1755	MC33-MC44	3	
1765	MC3-MC113	6	
1765	L35-MC8	3	
1765	MC3-MC8	3	
1809	MC41-MC65	5	PULSE TACH DRIVE
1809	MC65-MC39	5	STE/ICE
1809	MC41-M40	5	PULSE TACH DRIVE
1810	MC65-MC39	5	STE/ICE
1810	MC41-M40	5	PULSE TACH DRIVE
1810	MC41-MC65	5	PULSE TACH DRIVE
1811	MC42-M41	5	DIFFERENTIAL PSI
1811	MC42-MC39	5	STE/ICE
1812	MC42-M41	5	DIFFERENTIAL PSI
1812	MC42-MC39	5	STE/ICE
1813	MC39-M6	5	
1814	MC39-M6	5	BATTERIES
1815	MC39-MC24	5	
1815	MC24-MC114	5	
1815	MC24-M20	5	
1816	MC39-MC65	5	STE/ICE
1816	MC39-M7	5	STARTER

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1818	MC39-M7	5	STARTER
1818	MC39-MC65	5	STE/ICE
1819	MC39-M7	5	
1820	MC24-M20	5	
1820	MC24-M20	5	
1820	MC39-MC24	5	
1821	MC39-M6	5	
1822	MC39-M6	5	BATTERIES
1824	SPLICE-MC67	5	
1824	MC66-M70	5	
1824	MC68-M72	5	
1824	SPLICE-MC70	5	
1824	SPLICE-MC71	5	
1824	MC65-MC39	5	STE/ICE
1824	SPLICE-MC68	5	
1824	MC67-M71	5	
1824	MC43-M42	5	FUEL PSI
1824	MC69-M73	5	
1824	MC70-M74	5	
1824	MC71-M75	5	
1824	SPLICE-MC69	5	
1824	MC66-SPLICE	5	
1824	SPLICE-MC65	5	
1824	SPLICE-MC43	5	
1825	MC68-MC69	5	
1825	MC70-MC71	5	
1825	MC65-MC43	5	
1825	MC43-MC67	5	
1825	MC67-MC68	5	
1825	MC70-M74	5	
1825	MC69-MC70	5	
1825	MC41-MC65	5	
1825	MC68-M72	5	
1825	MC66-M70	5	TURBO OUTLET PSI
1825	MC65-MC39	5	STE/ICE
1825	MC69-M73	5	
1825	MC67-M71	5	
1825	MC39-MC40	5	STE/ICE MODULE
1825	MC43-M42	5	FUEL PSI
1825	MC71-M75	5	
1825A	MC39-MC40	5	STE/ICE MODULE
1826	MC40-MC39	5	
1827	MC40-MC39	5	
1828	MC39-M48	5	SHUNT
1829	MC39-M48	5	SHUNT
1835	R2-CB2	4	
1839	R7-R8	4	
1860	MC39-MC24	5	
1860	MC24-MC114	5	
1861	MC24-MC114	5	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 6 OF 35
ENGINEERING DWG 1878290 SHEET 2
FP-11/FP-12 BLANK

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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1861	MC39-MC24	5	
1866	CB12-M6	4	
1866	M6-CB12	4/3	
1867	R19-CB12	4	
1871	MC11-CB11	4	DDEC TRANS
1871	PS8-MC11	5	ATEC OIL PSI SWITCH
1871	MC11-R8	4	
1871	MC11-R11	4	
1871	MC11-R10	4	
1871	MC11-R18	4	
1872	R19-MC44	4	
1872	MC44-R18	4	DDEC
1872	MC44-1020	3	
1875	CB14-R19	4	
1880	MC4-MC35	3	
1880	MC44-CB17	4	CTI
1882	MC52-R21	4	
1882	MC52-SPLICE	4	
1882	MC52-R20	4	
1883	S26-L40	3	TC LOCK-UP LIGHT
1883	S26-M49	3	TC LOCK-UP
1884	MC1-R20	4	INTER AXLE
1884	MC1-M39	4	
1884	MC1-MC105	3	
1885	MC1-M39	4	
1885	MC1-MC105	3	
1885	R23-R21	4	
1885	MC1-R23	4	
1888	CB16-R21	4	DIFFERENTIAL LOCK
1888	CB16-R20	4	INTER AXLE
1889	MC44-R20	4	INTER AXLE
1889	MC44-M50	3	INTER AXLE LOCK
1890	MC44-M51	3	DIFFERENTIAL LOCK
1890	MC44-R21	4	DIFFERENTIAL LOCK
1891	MC52-SPLICE	4	
1891	MC52-R10	4	REVERSE
1916	S8-MC4	3	
1916	MC5-M2	3	WIPER MOTOR
1916	MC5-MC4	3	WIPER MOTOR
1917	MC5-M2	3	
1917	MC5-MC4	3	
1917	S8-MC4	3	
1919	MC2-MC5	3	
1919	MC5-M2	3	
1919	MC5-1118	3	
1919	MC2-CB10	4	
1920	MC2-1008	3	
1920	MC2-R2	4	CLEARANCE LIGHTS
1921	S7-MC4	3	
1921	M1-MC4	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1926	MC56-MC23	5	ETHER START
1927	R1-CB1	4	HEADLIGHTS
1928	MC34-MC31	3	
1928	L38-MC34	3	
1928	MC31-MC30	6	TRAILER
1929	MC31-MC30	6	TRAILER
1929	MC34-MC31	3	
1932	MC128-MC61	6	WATER TEMP
1932	MC61-TS3	6	WATER TEMP
1932	MC59-MC63	6	
1932	MC63-MC128	6	
1933	MC61-TS3	6	WATER TEMP
1933	MC63-MC61	6	
1933	MC59-MC63	6	
1935	MC76-M45	6	FAN CONTROL VALVE
1935	MC59-MC76	6	
1935	MC76-M45	6	FAN CONTROL VALVE
1935	MC59-MC76	6	
1938	MC70-M74	5	
1938	MC70-MC65	5	
1938	MC65-MC39	5	
1938B	MC39-S22	5	STE/ICE ZEROING
1939	MC71-M75	5	ENGINE WATER TEMP
1939	MC65-MC39	5	STE/ICE
1939	MC71-MC65	5	
1939B	MC39-S22	5	STE/ICE ZEROING
1940	MC71-MC65	5	
1940	MC71-M75	5	ENGINE WATER TEMP
1940	MC65-MC39	5	STE/ICE
1940B	MC39-S22	5	STE/ICE ZEROING
1941	MC43-M42	5	FUEL PSI
1941	MC43-MC65	5	
1941	MC65-MC39	5	STE/ICE
1942	MC43-MC65	5	
1942	MC65-MC39	5	
1942	MC43-M42	5	FUEL PSI
1943	MC65-MC39	5	STE/ICE
1943	MC66-M70	5	TURBO OUTLET PSI
1943	MC66-MC65	5	TURBO OUTLET PSI
1944	MC66-M70	5	
1944	MC65-MC39	5	STE/ICE
1944	MC66-MC65	5	TURBO OUTLET PSI
1945	MC68-MC65	5	
1945	MC68-M72	5	AIR BOX PSI
1945	MC65-MC39	5	STE/ICE
1946	MC67-M71	5	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1946	MC65-MC39	5	STE/ICE
1946	MC68-M72	5	AIR BOX PSI
1946	MC68-MC65	5	
1947	MC67-MC65	5	
1947	MC65-MC39	5	STE/ICE
1947	MC67-M71	5	AIR CLEANER
1948	MC67-MC65	5	
1948	MC65-MC39	5	STE/ICE
1949	MC69-MC65	5	FUEL RETURN
1949	MC69-MC65	5	
1949	MC65-MC39	5	STE/ICE
1950	MC5-MC4	3	
1950	S8-MC4	3	
1951	MC65-MC39	5	STE/ICE
1951	MC69-M73	5	FUEL RETURN
1951	MC69-MC65	5	
1952	MC65-MC39	5	
1952	MC70-M74	5	ENGINE OIL TEMP
1952	MC70-MC65	5	
1952B	MC39-S22	5	STE/ICE ZEROING
1953	MC39-MC24	5	
1953	MC24-MC114	5	
1953	MC24-M20	5	
1955	M67-MC21	3	FAN SPEED CONTROL
1956	MC127-MC44	3	FAN SPEED CONTROL
1957	MC127-MC21	3	FAN SPEED CONTROL
SHIELD	MC32-MC64	6	CTI AUX MANIFOLD
SHIELD	MC32-MC109	6	CTI POWER MANIFOLD

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 35
ENGINEERING DWG 1878290 SHEET 2
FP-13/FP-14 BLANK

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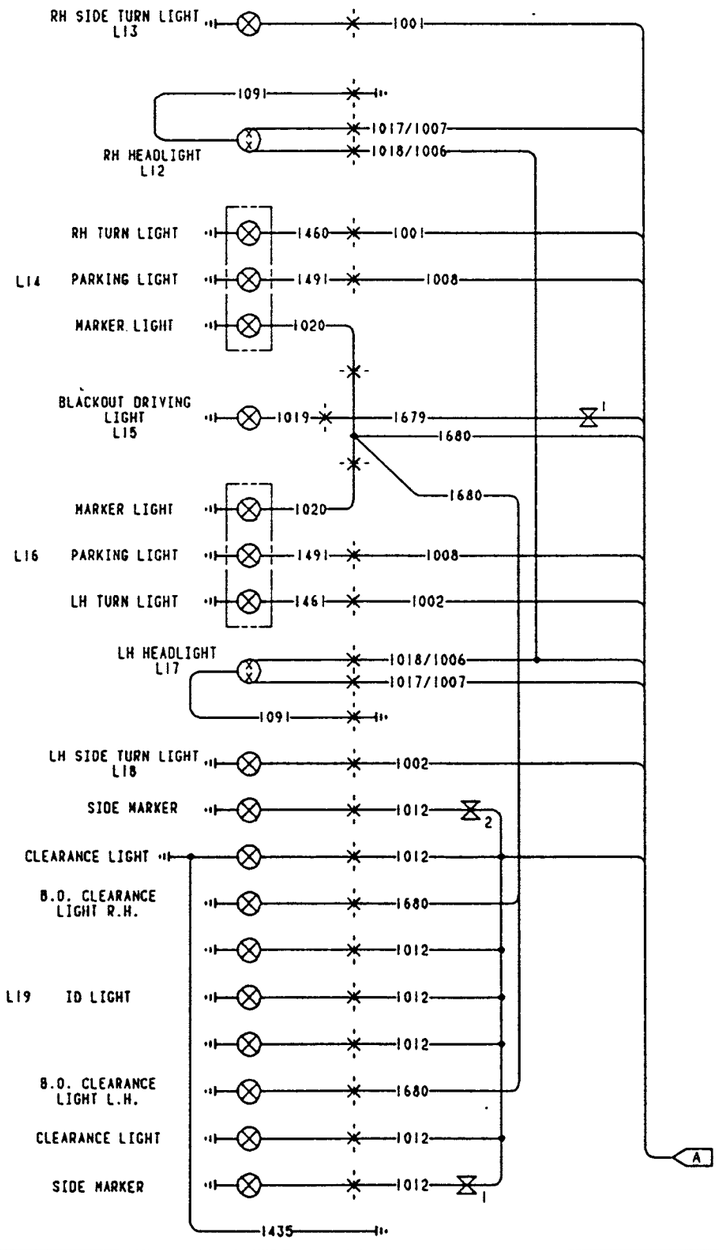


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 35
ENGINEERING DWG 1878290 SHEET 3
FP-15/FP-16 BLANK

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LH TURN L11 · HIGH BEAM L10 · LOW OIL PSI L9 · HIGH WATER TEMP L8 · TRANS CHECK L5

SPEEDOMETER G5 · TACH G4 · FUEL GAUGE G3 · OIL PRESSURE GAUGE G2 · WATER TEMP GAUGE G1 · XMSN OIL TEMP GAUGE G10 · VOLTMETER 12V G6 · VOLTMETER 24V G7 · AIR RESTRICTION GAUGE G12 · AIR PRESSURE GAUGE G11

CHECK ENGINE L6 · DRIVE-LINE L7 · RH TURN L4

24VDC · KPM · 18 GA SHIELD

AC M39

LOW OIL PSI/HI WATER TEMP ALARM CONTINUOUS TONE M18

LOW HYD OIL & LOW AIR ALARM INTERMITENT TONE M3

CTI CONTROLLER M28

LHS OVERLOAD L29 · NO TRANSIT L28 · AUXILLARY HYDRAULIC L27 · LOAD HANDLING SYSTEM L26 · FLAT RACK L38 · ENGINE BRAKE L37

BRAID

MC53	
POS	CODE
A	1713
B	1435
C	1276

MC125	
POS	CODE
A	1052
B	1435

WHITE MC8

GAUGES	
POS	CODE
A	1519
B	1519
C	1435
D	1147
E	1318
F	1320
G	1449
H	1113
I	1765
J	1114
K	1108
L	439
M	419
N	1409
O	1001
P	509
Q	1120
R	1371
S	1002
T	1018
U	1032
V	1092

MC105	
POS	CODE
1	1435
2	
3	1884
4	1885

MC35	
POS	CODE
1	1519
2	1519
3	
4	
5	PLUG
6	
7	1435
8	1435
9	
10	1880

MC110	
POS	CODE
1	1072
2	1073
3	1076
4	1071
5	PLUG
6	1070
7	1066
8	SHIELD
9	1068
10	1074

MC111	
POS	CODE
1	1056
2	1057
3	1058
4	1059
5	PLUG
6	1061
7	1062
8	SHIELD
9	1064
10	1065

MC32	
POS	CODE
A	1056
B	1063/1067
C	1065
D	PLUG
E	1074
F	1076
G	1072
H	1071
I	1070
J	1068
K	SHIELD
L	PLUG
M	1066
N	1061
O	1058
P	1064
Q	1062
R	1059
S	SHIELD
T	1057
U	1073
V	PLUG

SEE SHEET 6

CAB ⟷ CHASSIS

MC31	
POS	CODE
A	
B	
C	
D	
E	1435
F	1435
G	
H	
I	
J	1729
K	1730
L	1734
M	1733
N	1732
O	
P	1738
Q	1737
R	1095
S	1093
T	1928
U	1929
V	1435

SEE SHEET 6 CHASSIS

MC33	
POS	CODE
A	1755
B	1435
C	1722
D	1724
E	1725
F	1726

SEE SHEET 7 LHS

CHASSIS

MC34	
POS	CODE
A	
B	
C	1702
D	1928
E	1929
F	1722

DASH ⟷ CAB

MC112	
POS	CODE
A	1724
B	1725
C	1726
D	
E	
F	1435

DASH ⟷ CAB

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 35
ENGINEERING DWG 1878290 SHEET 3
FP-17/FP-18 BLANK

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CHECK GUAGES L3
LOW AIR L2
PARKING BRAKE L1
LOW HYD OIL L36
EMERGENCY STEERING L35

DOME LIGHT S21
WINDSHIELD WIPERS S8
WINDSHIELD WASHER S7
WORK LIGHT S6
BEACON LIGHT S5
DOME LIGHT L20
DASH → CAB

MC4

POS	CODE
A	1153
B	1049
C	1040A
D	1715
E	1921
F	1052
G	1118
H	1950
I	1916
J	1917
K	1184
L	1678
M	1189
N	1680
O	1679
P	1276
Q	1292
R	1713
S	1084
T	1008
U	1714
V	1712

AC M66 AC

BLACK OUT SERVICE SELECT S9
B.O. MARKER S10
B.O. DRIVE S11
HEADLIGHTS S12
ENGINE BRAKE S16
RHEOSTAT/DOME LIGHT S14
OFF DIM BRIGHT

MC126

POS	CODE
A	1005
B	1005A

PS6 LOW AIR PSI SWITCH
PS7

SENSOR THROTTLE M35

MC6

POS	CODE
A	916
B	417
C	952

VERNIER CONTROL M16

MC38

POS	CODE
A	952
B	1525
C	916

PARKING BRAKE PS4

ISOLATOR M62
IGNITION SWITCH 24 VDC S2
BATT IGN ACC ST
ETHER START BUTTON S25

AIR HEATER (PASSENGER) M32
GAS PARTICULATE FILTER M30
AIR HEATER (DRIVER) M31

SEE SHEET 4 ZONE B13

THROTTLE POSITION SWITCH S31

MC127

POS	CODE
A	1956
B	1957

PARKING BRAKE SWITCH PS5

WIPER MOTOR M2

MC5

WIPER MOTOR	
POS	CODE
A	1435
B	1950
C	1919
D	1916
E	1917
F	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 10 OF 35
ENGINEERING DWG 1878290 SHEET 3
FP-19/FP-20 BLANK

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CAB HARNESS | TURN SIGNAL ASSY

MC7	
POS	CODE
A	1001
B	1004
C	1002
D	1003
E	1005A
F	1080

TURN SIGNAL/ DIMMER S1

L.H. FRONT LT
R.H. FRONT LT
L.H. REAR LT
R.H. REAR LT
DIMMER

MC91	
POS	CODE
A	1017
B	1017A

MC92	
POS	CODE
A	1016

HORN SWITCH S15

FRONT BRAKE PS1
REAR BRAKE PS2
HAND BRAKE PS3

S26 SFER CASE LOCK UP

L40

DIAG CONN DDEC

MC13	
POS	CODE
A	435
B	216A
C	
D	505
E	207A
F	
G	
H	439
J	900
K	901
L	
M	451

M17 HEATER MOTOR 24VDC
FERRITE BEAD
ORANGE
HEATER SWITCH S3
OFF / LOW / MED / HIGH

MC28 BEACON LIGHT
L44
M81

MC106	
POS	CODE
A	216A
B	505
C	207A
D	
E	439
F	900
G	901
H	451
J	
K	

SEE SHEET 4

CAB → CONTROL BOX

MC1	
POS	CODE
A	1084
B	1052
C	1712
D	1052
E	1021A
F	1149
G	1409
H	1714
I	1093
J	
K	
L	1678
M	1713
N	1715
O	1431
P	1680
Q	1003
R	1004
S	1487
T	1884
U	1885
V	1737

SEE SHEET 4 CONTROL BOX

MC21	
POS	CODE
A	1320
B	1449
C	1113
D	1021A
E	1032
F	1147
G	1020
H	1036
I	
J	
K	
L	
M	1957
N	1955
O	
P	
Q	
R	
S	
T	
U	
V	

SEE SHEET 5 ENGINE

CAB → CONTROL BOX

MC2	
POS	CODE
A	1017A
B	1049
C	1012
D	1189
E	1168
F	1016
G	10408
H	1040A
I	1017
J	1009
K	1080
L	1007
M	1006
N	1029
O	1184
P	1919
Q	1292
R	1534
S	1021
T	1276
U	1082
V	1920

SEE SHEET 4 CONTROL BOX

1168 → CHASSIS
HORN M15

MC58	
POS	CODE
A	1709
B	1435

CHEM DET M14

MC103	
POS	CODE
A	1746
B	1435
C	1747
D	1745

MC104	
POS	CODE
A	1746
B	1747

CHEMICAL ALARM M29
RED
GREEN

S30 EMER ENG SHUTDOWN
CRANE SRC
SRV/MHC (SEE NOTES 1-3) S4
SRV S18
GAS PART FILTER S19
CHEMICAL ALARM S20

M67

MC44	
POS	CODE
A	1108
B	509
C	419
D	439
E	510
F	916
G	417
H	952
I	1723
J	1738
K	
L	1755
M	1739
N	1717
O	1095
P	1702
Q	1889
R	1890
S	1640
T	1872
U	1880
V	1189

SEE SHEET 4 CONTROL BOX

M49 T.C.
M50 INTER AXLE
M51 DIFF
M1 WINDSHIELD WASHER
.1 μf
100 Ω

L43 POST LIGHT

LOW OIL LEVEL GUAGE

MC96	
POS	CODE
A	
B	1114
C	1435

MC3	
POS	CODE
A	1678
B	1008
C	1004
D	1680
E	1003
F	1149
G	1012
H	1731
I	1005
J	1318
K	
L	
M	
N	
O	10408
P	1519
Q	1519
R	1534
S	
T	1765
U	1431
V	1431

SEE SHEET 6 CHASSIS

NOTE:

1. SWITCH IS ONLY REQUIRED ON VEHICLES EQUIPPED WITH BOTH CRANE AND SELF RECOVERY WINCH.
2. WHEN ONLY CRANE IS INSTALLED SWITCH S4 IS ELIMINATED. CONNECT 1744 AND 1731 TOGETHER.
3. WHEN ONLY SELF RECOVERY WINCH IS INSTALLED SWITCH S4 IS ELIMINATED. CONNECT 1744 AND 1732 TOGETHER.
4. GROUND LOCATION:
   - ⚠1 @ LH HEAD LIGHT
   - ⚠2 @ LH SIDE CONTROL BOX
   - ⚠3 DIODES TO BE 1N4001
5. GROMMET:
   - ⧖1 LH SIDE OF HEATER
   - ⧖2 RH SIDE OF HEATER
   - ▽ SPLICE
   - EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 35
ENGINEERING DWG 1878290 SHEET 3
FP-21/FP-22 BLANK

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9-9-94

MC12
POS	CODE
1	210A
2	204
3	221
4	206
5	220
6	218
7	219
8	2238
9	231
10	230
11	212
12	225
13	233
14	234
15	

SHIFT CONTROLLER ATEC 12VDC

MC44
POS	CODE
A	1108
B	509
C	419
D	439
E	510
F	916
G	417
H	952
I	1723
J	1738
K	
L	1755
M	1739
N	1717
O	1095
P	1702
Q	1889
R	1890
S	1640
T	1872
U	1880
V	1189

SEE SHEET 3

MC2
POS	CODE
A	1017A
B	1049
C	1012
D	1189
E	1168
F	1016
G	10408
H	1040A
I	1017
J	1009
K	1080
L	1007
M	1006
N	1029
O	1184
P	1919
Q	1292
R	1534
S	1021
T	1276
U	1082
V	1920

BLACK

MC1
POS	CODE
A	1084
B	1052
C	1712
D	1052
E	1021A
F	1149
G	1409
H	1714
I	1093
J	
K	
L	1678
M	1713
N	1715
O	1431
P	1680
Q	1003
R	1004
S	1487
T	1884
U	1885
V	1737

WHITE

MC52
POS	CODE
A	1017
B	1082
C	1026
D	1021
E	1891
F	1882

HEADLIGHTS R1 — CLEARANCE LIGHTS R2 — HORN R3 — WORK LIGHT R4 — DIMMER R5 — BEACON R6 — XMSN R7 — RETARDER R8 (87A, 87, 85, 30, 86; 12 VDC)

CB1 15 AMP HEAD LIGHTS
CB2 15 AMP C.L. LIGHTS
CB3 15 AMP BEACON BACK UP
CB4 15 AMP WORK LIGHT
CB5 20 AMP TURN SIGNAL
CB6 15 AMP STOP LIGHT
CB7 10 AMP ENG. BRAKE
CB8 15 AMP DASH LOCK UP

SEE SHEET 5 — 1430 — 12 VDC — 1189 — MAG SWITCH R28 12 VDC CIRCUITS — >1μf — .01μf

1079 SEE SHEET 5 — TURN SIGNAL FLASHER M5 (A, B, C)

MC119
POS	CODE
A	1431
B	1640
C	1644
D	1435

R32 — R33 (87A, 87, 85, 30, 86)

S29 ARCTIC PUMP (1644, 1645, 1435; 2, 4, 7, 10, 5, 9)

M52 — AC

>1μf — .01μf — 24 VDC IGN SEE SHEET 5 — 1281 — 24 VDC ACC — 1640

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 35
ENGINEERING DWG 1878290 SHEET 4
FP-23/FP-24 BLANK

REVISION AA
CN 24575
9-9-94

CK XMSN R9
REVERSE R10
NEUTRAL START R11
12V MAG R12
BLACK OUT STOP LIGHTS R13
BLACK OUT SERVICE LIGHTS R14
LH TURN LIGHT R15
RH TURN LIGHT R16
BLACK OUT TAIL LIGHTS R17
DDEC R18
TRANS DDEC R19

CB9 10 AMP WIPER
CB10 3 AMP IGN
CB11 8 AMP DDEC TRANS
CB12 8 AMP TRANS
CB13 8 AMP DDEC
CB14 15 AMP TRANS
CB15 15 AMP HEATER
CB16 15 AMP DRIVE LINE
CB17 3 AMP CTI
CB18 10 AMP LHS CRANE
CB19 15 AMP CHEM ALARM RADIO

SWING FIRE MC101

POS	CODE
A	1340
B	1435

EMERGENCY ENGINE SHUTDOWN MC116

POS	CODE
A	439
B	439

24 VDC CIRCUITS
MAG SWITCH R26
24 VDC MAG SWITCH R25
12 VDC
.1µf
.01µf
M76
AC
BATT ATEC SEE SHEET 5
SEE SHEET 3 ZONE 9E
RADIO LEAD 9 AMP

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 35
ENGINEERING DWG 1878290 SHEET 4
FP-25/FP-26 BLANK

REVISION P
CN 23873
5-14-92

DIFF LOCK R21
CRANE HI IDLE 24 VDC R22
HIGH RANGE LOCK OUT R23
T.C. DUAL MODE R24
INTER AXLE R20
M39
M36
M4
CB21 30 AMP GAS PARTICULATE
CB20 15 AMP TRAILER LIGHTING
DDEC CB22 20 AMP
DDEC CB23 20 AMP
24V

MC9 J1A

POS	CODE
1A	208
1B	209
1C	238
1D	239
1E	217
1F	204
1G	206
1H	218
1J	207A
1K	222
2A	202A
2B	223A
2C	210A
2D	214
2E	
2F	221
2G	220
2H	219
2J	216A
2K	201
3A	203
3B	240
3C	241
3D	213
3E	
3F	211
3G	205
3H	215
3J	212
3K	224

MC10 J1B

POS	CODE
1L	112
1M	113
1N	106A
1P	124
1R	116
1S	110
1T	115
1W	105
1X	
1Y	107
2L	123
2L	108
2N	101
2P	104
2R	
2S	
2T	120
2W	119
2X	
2Y	109
3L	114
3M	111
3N	122
3P	118
3R	
3S	
3T	121
3W	
3X	
3Y	117

MC45 J3

POS	CODE
A	301
B	302
C	303
D	304
E	305
F	306
G	307
H	308
J	309
K	310
L	311
M	312
N	313
P	314
R	315
S	316

ECU ATEC

CONTROL BOX — CHASSIS

MC25

POS	CODE
A	1680C
B	1003C
C	1680C
D	1435
E	1008C
F	1678C
G	1680C
H	1004C
I	1665C
J	1435
K	1538
L	1644
M	1435
N	
O	
P	
Q	
R	
S	
T	
U	
V	

SEE SHEET 6
24V TRAILER

KNIT LOOM W/COPPER

TO XSMN CONNECTOR SEE SHEET 5

MC50

POS	CODE
A	213
B	211
C	215
D	214
E	231
F	233

MC51

POS	CODE
A	238/209
B	207A
C	223A
D	216A
E	201
F	203

MC106

POS	CODE
A	216A
B	505
C	207A
D	
E	439
F	900
G	901
H	451
J	
K	

SEE SHEET 3

THROTTLE SENSOR

MC36

POS	CODE
A	124
B	104
C	106A

THROTTLE POSITION CONTROL

6.8K

MC102

POS	CODE
A	115
B	1435

CONTROL BOX — CHASSIS/ENG

MC11

POS	CODE
A	
B	916
C	419
D	509
E	439
F	901
G	900
H	952
J	417
K	451
L	908
M	505
N	
O	510
P	1517
Q	1871
R	1715
S	1716
T	508
U	208/209
V	115
W	
X	

SEE SHEET 5

X = UNUSED SEALED POSITIONS

POS	CODE
1	1000
2	
3	
4	1000
5	
6	
7	

GROUND LOCATION
1 @ LH HEAD LIGHT
2 @ RH SIDE CONTROL BOX
4 FERRISHIELD FAIRRITE PN SS2882032
5 FERRISHIELD FAIRRITE PN TC2881500
EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 14 OF 35
ENGINEERING DWG 1878290 SHEET 4
FP-27/FP-28 BLANK

REVISION AA
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9-9-94

MC21	
POS	CODE
A	1320
B	1449
C	1113
D	1021A
E	1032
F	1147
G	1020
H	1036
J	X
K	X
L	X
M	1957
N	1955
O	X
P	X
Q	X
R	X
S	X
T	X
U	X
V	X

MC60	
POS	CODE
A	1021A
B	1020

MC56	
POS	CODE
A	1036
B	1926

MC23	
POS	CODE
A	1926
B	1435

MC22	
POS	CODE
1	GREEN
2	ORANGE
3	BROWN
4	RED
5	BLACK
6	PLUG ×
7	PLUG ×

MC24	
POS	CODE
1	1860
2	1820
3	1815
4	1861
5	1953

MC114		
POS	CODE	
A	1860	+12V OUTPUT A
B	1820	+24V OUTPUT B
C	1815	GROUND C
D	1861	SCR GATE D
E	1953	FIELD E

MC108	
POS	CODE
A	1020
B	1435

POS	CODE
A	1020
B	1435

MC11		
POS	CODE	
A		X
B	916	
C	419	
D	509	
E	439	
F	901	
G	900	
H	952	
J	417	
K	451	
L	908	
M	505	
N		X
O	510	
P	1517	
Q	1871	
R	1715	
S	1716	
T	508	
U	208/209	
V	115	
W		X
X		X

DUVAC CONTROLLER WITH REVERSE POLARITY PROTECTION M64

M20 145 AMP ALTERNATOR

JUMPER

REGULATOR M19

BOOST PRESSURE SWITCH PS15 SPST-N.C. @ 7.5 PSI ± .5 PSI ON RISING PRESSURE

WATER TEMPERATURE SENDING UNIT SU1

ENGINE OIL PRESSURE SWITCH PS9

TRANSMISSION TEMPERATURE SENDING UNIT SU2

ENGINE WATER TEMP SWITCH TS2

OIL MANIFOLD

ENGINE OIL PRESSURE SENDING UNIT SU3

ATEC OIL PRESSURE SWITCH PS8

R27 MAGNETIC SWITCH 24V

5 MFD 200 VDC

2 MFD

.01 MFD

C824 3 AMP

ENGINE BRAKE

RH COILS M21

LH COILS M22

TS1 ETHER START

ETHER START M8

FUEL PUMP M12

4.7 MFD

CONTROL BOX ← → CHASSIS/ ENGINE

SEE SHEET 4

14 GA

18 GA

1820 1277 1055 1281 1020 1278 1274 1435 1815 1953 1344 1021A 1032 1113 1320 1449 1147 1036 1020 1275 1281 1517 1871 1715 1716 1926 1435 1866/1075 1430 150 240/240 241/241

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 35
ENGINEERING DWG 1878290 SHEET 5
FP-29/FP-30 BLANK

REVISION AA
CN 24575
9-9-94

200 AMP OPTION

RECTIFIER
STATOR
STATOR
"R" TERMINAL (PHASE)
ENERGIZE
FIELD
M65
+12 VOLT CIRCUIT
+24 VOLT CIRCUIT
REGULATOR

MC115
POS	CODE
G	1277
D	PLUG
B	1279
C	1055
A	1274
H	PLUG
E	PLUG
F	PLUG

ENGINE RUN OIL PSI SW PS14

REVERSE POLARITY PROTECTION 200 A M8

STARTER M7

SLAVE CONNECTOR M23

M48 SHUNT

BATTERIES M6

ARCTIC BATTERIES M77
OPTION

SEE MC3 SHEET 6

SEE C85 SHEET 4

ECM

12" MAX TO SPLICE (TYP)

16 GA WIRE

TWISTED PAIR SHIELDED

TWISTED PAIR 901/900

KNIT LOOM W/COPPER

TRANSMISSION

SEE SHEET 4

MC62
POS	CODE
A	240
B	150
C	241
D	150

MC17
POS	CODE
A	241
B	241
C	150
D	150
E	240
F	240

MC19
POS	CODE
A	123
B	114
C	121
D	111
E	101
F	118
G	116
H	122
J	
K	108
L	109
M	119
N	117
O	107
P	1068
Q	
R	
S	
T	115
U	105
V	120
W	110
X	

MC20
POS	CODE
A	113
B	112

MC18
POS	CODE
A1	508
A2	555
A3	916
B1	419
B2	509
B3	439
C1	901
C2	900
C3	952
D1	510
D2	417
D3	953
E1	451
E2	
E3	
F1	542
F2	544
F3	903
G1	528
G2	543
G3	545
H1	
H2	
H3	115
J1	541
J2	531
J3	908
K1	505
K2	
K3	972

12066317

12040947
POS	CODE
A	612
B	614
C	618
D	616
E	620

20651143
POS	CODE
L	611
K	613
J	617
H	615
G	619

12034398
POS	CODE
L1	
L2	
L3	925
M1	
M2	
M3	926
N1	
N2	
N3	
P1	432
P2	530
P3	
R1	
R2	120
R3	472
S1	112
S2	111
S3	
T1	109
T2	110
T3	
W1	416
W2	
W3	
X1	
X2	
X3	
Y1	
Y2	452
Y3	

MC95
POS	CODE
A	208/209

INJECTOR 4R
INJECTOR 3R
INJECTOR 2R
INJECTOR 1R
INJECTOR 1L
INJECTOR 2L
INJECTOR 3L
INJECTOR 4L

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 16 OF 35
ENGINEERING DWG 1878290 SHEET 5
FP-31/FP-32 BLANK

REVISION V
CN 24138
11-24-92

1819

STE/ICE CONNECTOR MCJ9

POS	CODE	
A		X
B		X
C		X
D	1825A	
E	1822	
F	1821	
G		X
H		X
J		X
K		X
L	1860	
M	1819	
N	1820	
O	1953	
P	1815	
R	1861	
S	1816	
T	1818	
U	1736	
V	1814	
W	1813	
X	1828	
Y	1829	
Z	1736	
A	1736	
B	1736	
C	1809	
D	1810	
E		X
F	1824	
G	1825	
H	1826	
J	1827	
K	1952	
M	1938	
N	1939	
P	1940	
Q		X
R		X
S	1811	
T	1812	
U	1941	
V	1942	
W	1943	
X	1944	
Y	1945	
Z	1946	
AA	1947	
AB	1948	
AC	1949	
AD	1951	
AE	900	
AF	901	
AG		X

DIFFERENTIAL PRESSURE M41

MC42

POS	CODE
1	1811
2	1812

STE/ICE MODULE M43

MC40

POS	CODE	
1		X
2	1826	
3	1827	
4		X
5		X
6	1825A	
7	1825	
8		X
9		X

R3

MC65

POS	CODE
A	
B	1944
C	
D	1816
E	1818
F	1809
G	1810
H	1824
I	1825
J	1941
K	1942
L	1947
M	1948
N	1945
O	1946
P	1949
Q	1951
R	1952
S	1938
T	1939
U	1940
V	1943

MC41

POS	CODE
1	1809
2	1810

PULSE TACH DRIVE M40

MC66

POS	CODE
1	1824
2	1825
3	1943
4	1944

TURBO OUTLET PSI M70

MC43

POS	CODE
1	1824
2	1825
3	1941
4	1942

FUEL PRESSURE M42

MC67

POS	CODE
1	1824
2	1825
3	1947
4	1948

AIR CLEANER M71

MC68

POS	CODE
1	1824
2	1825
3	1945
4	1946

AIR BOX PSI M72

MC69

POS	CODE
1	1824
2	1825
3	1949
4	1951

FUEL RETURN M73

MC70

POS	CODE
1	1824
2	1825
3	1952
4	1938

ENGINE OIL TEMP M74

MC71

POS	CODE
1	1824
2	1825
3	1939
4	1940

ENGINE WATER TEMP M75

X = UNUSED SEALED POSITIONS

	POS	CODE
	1	1000
X	2	
	3	
	4	1000
X	5	
X	6	
X	7	

416 GRA / 432 LT GRN / 452 BLK — TURBO BOOST

109 PPL / 110 DK GRN — SENSOR TIMING

112 WHT / 111 LTBLU — SENSOR SYNC

452 BLK / 530 BRN / 416 GRA/BLK — SENSOR OIL PSI

452 BLK / 120 TAN — SENSOR OIL TEMP

452 / 472 — FUEL TEMP

STE/ICE ZEROING S22

1828/1829
1813/1821
1814/1822
1816/1818
1935/1820/1815/1860/1861

MC118

POS	CODE
A	900
B	901
C	SHIELD

1816
1818

⚠ DIODES TO BE IN4001

EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 35
ENGINEERING DWG 1878290 SHEET 5
FP-33/FP-34 BLANK

REVISION M
CN 23742
02-10-92

CAB ◄► CHASSIS

MC3

POS	CODE
A	1678
B	1008
C	1004
D	1680
E	1003
F	1149
G	1012
H	1731
I	1005
J	1318
K	
L	
M	
N	
O	1040B
P	1519
Q	1519
R	1534
S	
T	1765
U	1431
V	1431

1005 1012 1003 1004 1008

BATTERIES
M6

1431
1431

1 2 3 4

BATTERIES SHOWN FOR REFERENCE ONLY
SEE SHEET 5

FRONT TOW

MC27

POS	CODE
WHITE	1435
BLACK	1012
YELLOW	1003
RED	1005
GREEN	1004
BROWN	1008
BLUE	

1435

MC113

POS	CODE
A	1765
B	1435

1765 1765

EMER STRG
PS13

1435

1435

CAB ◄► CHASSIS

MC31

POS	CODE
A	
B	
C	
D	
E	1435
F	1435
G	
H	
I	
J	1729
K	1730
L	1734
M	1733
N	1732
O	
P	1738
Q	1737
R	1095
S	1093
T	1928
U	1929
V	1435

MC32

POS	CODE
A	1056
B	1063/1067
C	1065
D	PLUG
E	1074
F	1076
G	1072
H	1071
I	1070
J	1068
K	SHIELD
L	PLUG
M	1066
N	1061
O	1058
P	1064
Q	1062
R	1059
S	SHIELD
T	1057
U	1073
V	PLUG

MC25

POS	CODE
A	1680C
B	1003C
C	1680C
D	1435
E	1008C
F	1678C
G	1680C
H	1004C
I	1665C
J	1435
K	1538
L	1644
M	1435
N	
O	
P	
Q	
R	
S	
T	
U	
V	

TRAILER
CONN 24V

BRAIDED SHIELD
1067

REAR

MC64

POS	CODE
1	1072
2	1073
3	1076
4	1071
5	PLUG
6	1070
7	1066
8	SHIELD
9	1068
10	1074

CTI
AUXILIARY
MANIFOLD
M25

GROUND IS
ATTACHED TO
AUXILIARY
MANIFOLD

FRONT

MC109

POS	CODE
1	1056
2	1057
3	1058
4	1059
5	1063
6	1061
7	1062
8	SHIELD
9	1064
10	1065

CTI
POWER
MANIFOLD
M24

1063

GROUND IS ATTACHED
TO POWER MANIFOLD

BRAIDED SHIELD

FAN
CONTROL

MC59

POS	CODE
A	1932
B	1933
C	1935
D	1936

MC73

POS	CODE
A	1538
B	1435

MC63

POS	CODE
A	1932
B	1933
C	DRAIN

MC128

POS	CODE
A	1933
B	1932

WATER
TEMP.
N.C.

TS4

MC61

POS	CODE
A	1932
B	1932

WATER
TEMP.

TS3

MC76

POS	CODE
A	1936
B	1935

FAN CONTROL
VALVE
M45

MC123

POS	CODE
A	1732
B	1435

MC122

POS	CODE
A	1730
B	1435

MC121

POS	CODE
A	1729
B	1435

1911980

SELF RECOVERY
WINCH
M27

MC55

POS	CODE
A	1729
B	1730
C	1732
D	1435

FAN
M51

LHS
M10

1899700

AIR DRYER M13

MC97

POS	CODE
A	1538
B	1435

1733 1435 1734 1435

1435
1538
1435

A B C D

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 35
ENGINEERING DWG 1878290 SHEET 6
FP-35/FP-36 BLANK

REVISION M
CN 23742
02-10-92

A

L32
1012
SIDE MARKER
1012
L34

MC79
POS	CODE
A	10408
B	1435

WORK LIGHT RH
L21

MC54
POS	CODE
A	10408
B	1435

L39
WORK LIGHT LH

CRANE MC29
P		R
1737	A	THROTTLE WHITE
1435	B	GROUND GREEN
1738	C	+24 VDC BLACK
1731	D	SHUTOFF VALVE FEED RED
1435	E	SHIELD

TWISTED PAIR

1519
G SPEEDOMETER GENERATOR SU4
1519
18 GA SHIELDED

MC57
POS	CODE
A	1095
B	1093

S13
DRIVE LINE LOCK TRANSFER CASE HI/LO

1318
1435
FUEL LEVEL SU5

MC107
POS	CODE
A	1534
B	1435

1534
FUEL/WATER SEPERATOR M9
1435

TRAILER CONNECTION 12 VDC

MC16
POS	CODE
1435	WHITE
1012	BLACK
1003	YELLOW
1005	RED
1004	GREEN
1008	BROWN
	BLUE

TRAILER MC30
POS	CODE
A	1928
B	1929
C	PLUG
D	PLUG

MC80
POS	CODE
A	1012
B	1003
C	1004

1678/23
1008/21
1004/22
1680/24
L22
B.O. STOP LIGHT
TAIL LIGHT
STOP LIGHT
B.O. TAIL LIGHT
R.H.

1012
1003
1680/24

MC78
POS	CODE
A	1680
B	1678
C	1149
D	1008
E	1435
F	1435

1678/23
1008/21
1003/22
1680/24
L24
B.O. STOP LIGHT
TAIL LIGHT
STOP LIGHT
B.O. TAIL LIGHT
L.H.
1435
1435
1149

MC124
POS	CODE
A	1149
B	1435

MC77
POS	CODE
A	1149
B	1435

BACK UP LIGHT L23

718
1435
BACK UP ALARM M78

1435

1012 L31 REAR SIDE MARKER
1012 CLEARANCE LIGHTS
1680 L42 B.O. CLEARANCE LIGHT
1012
1012 L25 ID LIGHTS
1012
1680 L41 B.O. CLEARANCE LIGHT
1012 L33 CLEARANCE LIGHTS
1012 REAR SIDE MARKER
1435

MC90
POS	CODE
A	1012
B	1435
C	1680

AIR DRYER M14

MC98
POS	CODE
A	1538
B	1435

AFTERCOOLER M11

MC99
POS	CODE
A	1538
B	1435

MC120
POS	CODE
A	1644
B	1435

M80 ARCTIC PUMP
1644/1435

B
C
D

MC15
POS	CODE	
A	1680C	24-484
B	1003C	22-461
C	1680C	24-483
D	1435C	90
E	1008C	21-489
F	1678C	23
H	1680C	490
J	1004C	22-460
K	1665C	37
L	1435C	90
M		53
N		53

MILITARY CONNECTOR
TRAILER CONNECTION 24 VDC
SEPERATE LOOMED HARNESS

⧖1 GROMMET LOCATED LH SIDE OF HEATER
⚠ DIODES TO BE IN4001
EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 35
ENGINEERING DWG 1878290 SHEET 6
FP-37/FP-38 BLANK

REVISION AA
CN 24575
9-9-94

1877480 (7140) HOOKARM SOL A M53

1877470 (7150) HOOKARM SOL B M54

1480

1463

M68

1435/WHITE
1464/BLACK

1435/WHITE
1467/BLACK

1478

HOOK ARM ELECTRIC SAFE LOWERING

MAIN RAM ELECTRIC SAFE LOWERING

1477

1479

1883440

MC33	
POS	CODE
A	1755
B	1435
C	1722
D	1724
E	1725
F	1726

(24 VDC IN)
(GROUND)
(LHS IND & VA.)
(SRW-CRANE & VA.)
(TRANS LIGHT NO)
(OVER LOAD)

SEE SHEET 3

1860810 (7200)

MC84	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	—

1860800 (7190)

MC83	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	—

M26

CAB CONTROL BOX
1891370

M.R. "A" SOLENOID
H.A. "B" SOLENOID
M.R. "B" SOLENOID
H.A. "A" SOLENOID
SEQUENCING (3)
24 VOLT +
SEQUENCING (6)
TRANSIT VALVE
FREE FLOW VALVE
0 VOLTS
0 VOLTS
PROXIMITY H.A. DOWN

MC81	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	—

1860790 (7170)

GREEN
RED
WHITE
DRAIN WIRE

MC82	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	—

A B C D E F G H J K L M N P Q R S T U V W X Y

1465

1465

SEE SHEET 8 FOR DETAIL OF CAB CONTROL BOX

1884570 U
MAIN JUNCTION BOX

MC93	
POS	CODE
A	1724
B	1480
C	1481
D	1482
E	1483
F	1484

1724 — 22 — 21
18 — 17
1487 — 14 — 13
10 — 9
1481 — 12 — 11
1480 — 24 — 23
6 — 5
1486 — 8 — 7
1482 — 20 — 19
2 — 1
1484 — 4 — 3
1485 — 16 — 15

5 4 3 2 1 0

MC94	
POS	CODE
A	1485
B	1486
C	1487
D	1488
E	1489
F	1490

1891360 U
MULTI FUNCTION SWITCH ASSY

0 OFF
1 AUTO
2 MAN HA
3 MAN MF
4 MAN TRAN
5 CRANE/SRW

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 35
ENGINEERING DWG 1878290 SHEET 7
FP-39/FP-40 BLANK

REVISION U
CN 23966
12-1-92

1877450 (7130) MAIN CYLINDER SOL B M56
1877460 (7120) MAIN CYLINDER SOL A M55
1877440 (7110) FREEFLOW M57
1877490 (7160) TRANSIT M58

1435/WHITE 1468/BLACK
1435/WHITE 1465/BLACK
1435/WHITE 1462/BLACK
1435/WHITE 1480/BLACK

OVERLOAD PRESSURE SWITCH N.O. S28

1479/BLACK
1460/WHITE

POS
A
B
C 1
D 2
E 3
F 4
G 5
H 6
J 7
K 8
L 9
M 10
N 11
P 12
Q 13
R 14
S 15
T 16
U 17
V 18
W

1883450

MC85

POS	CODE
A	1461
B	1472
C	1435
D	1471
E	1435
F	1435
G	1469
H	1466
I	1470
J	1475

1860780 (7100)

MC86

POS	CODE
A	1461
B	1472
C	1435
D	1471
E	1435
F	1435
G	1469
H	1466
I	1470
J	1475

MC88

POS	CODE
A	1472
B	1471
C	1435

1891910 W
HOOK ARM DOWN PROXIMITY SW NORMALLY OPEN S27

+ BROWN
S BLACK
– BLUE

1860820 (7370)

MC87

POS	CODE
A	1461
B	1435
C	1435
D	1469
E	1466
F	1470
G	1475
H	—
I	—
J	—

1891410

POS
1
2
3
4
5
6
7

1891530 U
LHS JUNCTION BOX

1891930 W
MIDDLE FRAME PROXIMITY SW NORMALLY OPEN S24

1435/BLUE
1461/BROWN
1469/BLACK

1891920 W
HOOK ARM UP PROXIMITY SW NORMALLY OPEN S23

1435/BLUE
1474/BROWN
1466/BLACK

1878910 LH HOOK ARM
A M59 M60 B

1435/WHITE 1470/BLACK
1435/WHITE 1470/BLACK

1878900 RH HOOK ARM
A M61 M62 B

1435/WHITE 1475/BLACK
1435/WHITE 1475/BLACK

1435

X
Y

87A 87 85
30 86

1480

R29
MIDDLE FRAME LOCK-OUT

EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 35
ENGINEERING DWG 1878290 SHEET 7
FP-41/FP-42 BLANK

REVISION 0

MC83	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	----

MAN. HOOK ARM UP
MAN. MID FRAME DOWN
MAN. HOOK ARM DOWN
MAN. MID FRAME UP
+24V IN
COMMON
MAN./AUTO MODE
AUTO LOAD IN
AUTO UNLOAD IN
LHS LIGHT
MAN. TRANS IN
24V OUT
UNLOAD OUT
LOAD OUT
OVERLOAD LIGHT
NO TRANSIT LIGHT
AUX MODE IN

CR1-MR2400
FU1
RP1 2.7K
R1-3.3K
LED5
Q1 2N3906
RP2 3.3K
RP3 2.7K
LED15
CR16 1.5KE39
+24V
RP1-2.7K LED3
RP1-2.7K LED1
CR2-1.5KE39
RP1-2.7K LED2
CR3-1.5KE39
CR4-1.5KE39
RP1-2.7K LED4
CR5-1.5KE39
RP1-2.7K LED6
CR7-1.5KE39
RP1-2.7K LED7
CR6-1.5KE39
RP2-2.7K LED10
CR10-1.5KE39
RP2-2.7K LED9
CR9-1.5KE39
RP2-2.7K LED8
CR8-1.5KE39

CR24-1N4007
CR27-1N5400
CR28-1N5400
CR22-1N5400
CR23-1N5400
CR29-1N5400
K1
K2
K3
K4
K5
K6
K7
DP1
RP4 1M
U1
C1-1.5µf TANT.
R4 1K
C2 1.5µf TANT
CR25 1N4743 13V
Q2 VN10KM
CR30 1N4007
CR31 1N4753 36V
C3 .022µf
RP4-1M
R3-1K
CR26 1N4148
C4 1.5µf TANT

RELAY BOARD

JS-13
JS-14
JS-24
JS-23
LOAD
UNLOAD
JOYSTICK

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 22 OF 35
ENGINEERING DWG 1878290 SHEET 8
FP-43/FP-44 BLANK

REVISION O

MC81

A — MAIN RAM A SOL.
RP3-2.7K (8, 7) LED14
CR14-1.5KE39

B — HOOK ARM B SOL
RP2-2.7K (9, 6) LED13
CR13-1.5KE39

C — MAIN RAM B SOL.
RP2-2.7K (10, 5) LED12
CR12-1.5KE39

D — HOOK ARM A SOL.
RP2-2.7K (11, 4) LED11
CR11-1.5KE39

E — HOOK ARM UP
RP3-2.7K (9, 6) LED15
CR15-1.5KE39

F — +24V OUT
+24V

G — MID FRAM DOWN
RP3-2.7K (10, 5) LED21
CR21-1.5KE39

H — TRANSIT VALVE
RP3-2.7K (12, 13) LED19
CR19-1.5KE39

J — FREE FLOW VALVE
RP3-2.7K (14, 1) LED17
CR17-1.5KE39

K — 0 VOLTS

L — 0 VOLTS

M — HOOK ARM DOWN
RP3-2.7K (13, 2) LED18
CR18-1.5KE39

N — OVERLOAD IN
RP3-2.7K (11, 4) LED20
CR20-1.5KE39

P
R
S
T

MC81	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	---

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 23 OF 35
ENGINEERING DWG 1878290 SHEET 8
FP-45/FP-46 BLANK

REVISION 0

SYSTEM SHUTDOWN RELAY

CONTROL LOCKOUT RELAY

THROTTLE RELAY

GROUND

POWER CABLE TO VEHICLE

MC29	
POS	CODE
A	WHT
B	GRN
C	BLK
D	RED
E	SHIELD

PASSENGER SIDE REMOTE CABLE

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

OVERLOAD SHUTDOWN SYSTEM

POS	CODE
A	BLK
B	WHT
C	GRN
D	RED

POS	CODE
A	BLU
B	BLK
C	BRN

HOIST LAYER SENSING SWITCH

POS	CODE
A	WHT
B	BLK
C	RED
D	GRN
E	SHIELD

HOIST LOAD CELL

CRANE FUNCTION SOLENOIDS

CCW SWING CW — OUT TELE IN — UP LIFT DWN — UP HOIST DWN — MHC MAIN HYD PRESS — OVERLOAD SOLENOIDS: LIFT UP & DOWN, HOIST UP, TELE OUT, CRANE FUNCTION L/O

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 24 OF 35
ENGINEERING DWG 1878290 SHEET 9
FP-47/FP-48 BLANK

REVISION O

JUNCTION BOX ASSY

A
B
C
D
E
F
G
H
J
K
L
M
N

BLU
BRN
BLK
19/3
E

BRN
BLU
BLK
DRIVER SIDE O/R ENGAGED SENSING SWITCH

D6
D7
WHT
WHT

D9
D8
RED/GRN

GRN
RED
BLK
WHT
BLK
LINE LOAD
POWER SWITCH 10 AMP MAGNETIC CIRCUIT BREAKER

GRN
RED
RED
GRN
HIGH IDLE SWITCH LATCH-UNLATCH

BLK
WHT
RED
GRN
16/4
D

18/15
F

DRIVER SIDE REMOTE CABLE

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

BRN
BLK
BLU

REMOTE CONTROL CABLE
18/15

C
19/3
BRN
BLU
BLK
PASSENGER SIDE O/R ENGAGED SENSING SWITCH

O
18/2
D2
WHT
BLK
O/R MAST SHUTDOWN SOLENOID

REMOTE CONTROL BOX

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

2

SWING

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	CCW
4	BLU	CW

8
2
9
10

TELE

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	OUT
4	BLU	IN

8
2
11
12

ON
4
26
20
SHUT DOWN

BOOM

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	UP
4	BLU	DWN

8
2
13
14

HOIST

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	UP
4	BLU	DWN

8
2
15
16

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 35
ENGINEERING DWG 1878290 SHEET 9
FP-49/FP-50 BLANK

REVISION F
CN 24526
3-28-94

DUAL AIR GAGE
RED GRN
RESTRICTION INDICATOR GAGE
.25 TBG RED
2641
2610 .25 TBG GREEN
.16 ID HOSE
2381
.38 TBG GREEN
2073
.38 TBG RED
2006
.38 TBG BLACK
2029
DASH PANEL
AUX
RSVR 2
RSVR 1
EX
TRAILER CHARGE
SYSTEM PARK
TRACTOR D
TRAILER D
2611 .38 TBG YELLOW
2662 .38 TBG BLACK
PARKING BRAKE STOPLIGHT SWITCH
PARKING BRAKE STOPLIGHT SWITCH
2612 .38 TBG YELLOW
2027 .38 TBG GREEN
DEL
IN EX
HAND CONTROL VALVE
STOPLIGHT SWITCH
2663 .38 TBG BLACK
2028 .38 TBG BLACK
CAB MANIFOLD
2662 .38 TBG BLACK
2663 .38 TBG BLACK
2612 .38 TBG YELLOW
2028 .38 TBG BLACK
2029
2073 .38 TBG GREEN
2027 .38 TBG GREEN
2381 .16 ID HOSE
2623 .38 TBG GREEN
2488 .38 TBG GREEN
ENGINE AIR INTAKE
#4 HOSE
2381
2623 .38 TBG GREEN
2488 .38 TBG GREEN
A
B
C
D
E
F
G
H
STOPLIGHT SWITCH
TREADLE VALVE
FRONT
REAR
LOW AIR PRESSURE SWITCH
LOW AIR PRESSURE SWITCH
STOPLIGHT SWITCH
2619 .62 TBG GREEN
2005 .62 TBG RED
2665 .38 TBG RED
2006 .38 TBG RED
2489 .38 TBG RED
2619 .62 TBG GREEN
2005 .62 TBG RED
2665 .38 TBG RED
2489 .38 TBG RED
2684 .38 TBG RED
2686 .38 TBG RED
DOUBLE CHECK VALVE
J
K
M
P
FOUR POSITION SOLENOID VALVE
2074 .25 TBG BLACK
DIFF LOCK
INTER AXLE LOCK
TRANSFER CASE LOCK
2071 .25 TBG BLACK
2412 .25 TBG ORANGE
2069 .25 TBG BLUE
2923 .25 TBG ORANGE
WINDSHIELD WASHER BOTTLE
2071 .25 TBG BLACK
OUT IN
AIR REGULATOR
2074 .25 TBG BLACK
SEE SHEET 2 (CTI FRONT MANIFOLD)
2074 .25 TBG BLUE
2005 .62 TBG RED
2005 .62 TBG RED
2005 .62 TBG RED
INLET
QUICK RELEASE VALVE
SERVICE
EMERGENCY
2894 .38 TBG RED
2895 .38 TBG RED
GLAD HANDS
2923 .25 TBG ORANGE
2923 .25 TBG ORANGE
2069 .25 TBG BLUE
2069 .25 TBG BLUE
2412 .25 TBG ORANGE
2412 .25 TBG ORANGE
2619 .62 TBG GREEN
2619 .62 TBG GREEN
K
L
M
N
P

NOTES:
1. A DASHED LINE WITH A LARGE ARROW SIGNIFIES A HARD CONNECTION DIRECTLY TO THE COMPONENT (WITH A TEE FITTING). THIS SYMBOL DOES NOT REPRESENT THE PRESENCE OF NYLON TUBING.
2. SEE DOD-STD-100 FOR DRAWING INTERPRETATION STANDARDS
3. PARENTHETICAL IDENTITIES ARE FOR REFERENCE ONLY

FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 26 OF 35
ENGINEERING DWG 1878300 SHEET 1
FP-51/FP-52 BLANK

REVISION D
CN 24303
6-25-93

2933
2069
2412
2133
2662 .38 TBG BLACK
2661 .38 TBG BLACK
2622 .38 TBG YELLOW
2663 .38 TBG BLACK
2661 .38 TBG BLACK
DOUBLE CHECK VALVE
DOUBLE CHECK VALVE
2664 .38 TBG GREEN
2622 .38 TBG YELLOW
SPRING BRAKE VALVE
S D C R
2612 .38 TBG YELLOW
2621 .38 TBG YELLOW
2665 .38 TBG RED
2623 .38 TBG GREEN
2874 .38 TBG BLACK
2874 .38 TBG BLACK EX
2013 #8 HOSE
2013 #8 HOSE
2013 #8 HOSE
2874 .38 TBG BLACK
EXHAUST
2874 .50 TBG BLACK
2874 .38 TBG BLACK
MANIFOLD
2012 #8 HOSE
2012 #8 HOSE
2012 #8 HOSE
2012 #8 HOSE
2012 #8 HOSE
2012 #8 HOSE
2874 .38 TBG BLACK
2874 .38 TBG BLACK
2874 .38 TBG BLACK
.38 TBG BLACK 2874
#1 AXLE
2874 .38 TBG BLACK
2874 .38 TBG BLACK EX
2387 #8 HOSE
2387 #8 HOSE
2387 #8 HOSE
MANIFOLD
2388 #8 HOSE
2388 #8 HOSE
2388 #8 HOSE
2388 #8 HOSE
2874 .38 TBG BLACK
.38 TBG BLACK 2874
#2 AXLE
.38 TBG GREEN
2188
2543 #10 HOSE
2544 #10 HOSE
SERVICE BRAKE RELAY VALVE R-12
.62 TBG BLACK
2536 .62 TBG BLACK
BALL VALVE
2044 .38 TBG BLACK
2044 .38 TBG BLACK
LOAD SENSING VALVE
.38 TBG BLACK
2376
#4
2793
AIR TANK 836 CU IN
.75 TBG BLACK
2793
AIR BAG
.38 TBG BLACK
2374
LOAD SENSING VALVE
.38 TBG BLACK
2375
#5
.75 TBG BLACK
2794
AIR TANK 836 CU IN
#3 AXLE SUSPENSION
.75 TBG BLACK
2793
AIR BAG
EXHAUST
2668 .38 TBG RED
2684 .38 TBG RED
QUICK RELEASE VALVE
2639 .38 TBG RED
2668 .38 TBG RED
2669 .38 TBG RED
2011 .62 TBG RED
2874 .38 TBG BLACK EX
2022 #6 HOSE
#8 HOSE 2546
2874 .38 TBG BLACK
SERVICE BRAKE RELAY VALVE R-12
2545 #10 HOSE
MANIFOLD
#6 HOSE
2023 #6 HOSE
#8 HOSE 2547
2874
2874 .38 TBG BLACK EX
#3 AXLE
SPRING BRAKE RELAY VALVE R-14
2874 .38 TBG BLACK
2075 #8 HOSE
.62 TBG RED
2669
.62 TBG BLACK
2620
2014 .62 TBG RED
2011 .62 TBG RED
2620 .62 TBG BLACK
2614 .62 TBG BLACK
2014 .62 TBG RED
2003 .62 TBG BLACK
2003 .62 TBG BLACK
#3
REAR AIR TANK 2500 CU IN
2621 .38 TBG YELLOW
2895 .38 TBG RED
.75 TBG BLACK
2007
2536 .62 TBG BLACK
2044 .38 TBG BLACK
AIR REGULATOR VALVE
PRESET 77 PSIG
2074 .25 TBG BLACK
2133 .38 TBG ORANGE
MANIFOLD
PRESSURE PROTECTION VALVE
2008 .50 TBG BLACK
2613 .62 TBG BLACK
#2
FRONT AIR TANK 1791 CU IN
2619 .62 TBG GREEN
2184 .75 TBG BLACK
2184 .75 TBG BLACK
2620 .62 TBG BLACK
2614 .62 TBG BLACK

FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 27 OF 35
ENGINEERING DWG 1878300 SHEET 1
FP-53/FP-54 BLANK

REVISION D
CN 24303
6-25-93

TRACTOR PROTECTION VALVE
2133 .38 TBG ORANGE — AUXILLARY
2654 .38 TBG BLACK — GLAD HANDS — EMERGENCY
2653 .38 TBG BLACK — SERVICE
2638 .38 TBG YELLOW
2874 .50 TBG BLACK
2874 .38 TBG BLACK
2923 .25 TBG ORANGE
2412 .25 TBG ORANGE
2069 .25 TBG BLUE
MANIFOLD
EXHAUST
2660 .38 TBG RED
SERVICE BRAKE RELAY VALVE R-12
SPRING BRAKE RELAY VALVE R-14
#10 HOSE 2143
2144 #10 HOSE
2368 #8 HOSE
2369
2614 .62 TBG BLACK
#8 HOSE 2017
2138 #6 HOSE
2139 #6 HOSE
2015 #8 HOSE
#4 AXLE
#8 HOSE 2018
2140 #6 HOSE
2016 #8 HOSE
2141 #6 HOSE
#5 AXLE
XFER CASE
AXLE #1
AXLE #2
AXLE #3
AXLE #4
AXLE #5
2419 #4 HOSE
2420 #4 HOSE
2056 #4 HOSE
2421 #4 HOSE
2339 #4 HOSE
2359 #4 HOSE
2422 #4 HOSE
2338 #4 HOSE
2031 .38 TBG BLACK
2030 .38 TBG BLACK
PURGE TANK 390 CU IN
2035 .75 TBG BLACK
2037 .75 TBG BLACK
2036 .75 TBG BLACK
2032 .38 TBG BLACK
AIR DRYER
AIR DRYER
COALESCING FILTER
.75 TBG BLACK 2034
AFTERCOOLER
2001 #16 TEFLON HOSE
AIR COMPRESSOR
2600 #16 TEFLON HOSE
ENGINE AIR INTAKE
2114 #4 HOSE
2033 .38 TBG BLACK
2040 .38 TBG BLACK
RSVR UNL
RES UNL
EXH
RSVR UNL
GOVERNOR:
CUT IN: 105±3 PSI
CUT OUT: 125±4 PSI
WET TANK 1224 CU IN
#1
2002 .75 TBG BLACK
2159 #4 HOSE
2994 .50 TBG BLUE
2993 .50 TBG BLUE
2184 .75 TBG BLACK
SEE SHEET 2 (CTI REAR MANIFOLD)
SEE SHEET 2 (CTI FRONT MANIFOLD)

FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 28 OF 35
ENGINEERING DWG 1878300 SHEET 1
FP-55/FP-56 BLANK

REVISION B
CN 23468
8-8-91

STEEL TBG .62 OD
STEEL TBG .62 OD
STEEL TBG .62 OD
STEEL TBG .62 OD
.25 TBG BLACK 2893
2097 #10 HOSE
2097 #10 HOSE
.25 TBG BLACK 2893
2099 #10 HOSE
2099 #10 HOSE
SEE SHEET 1 — 2994 .50 TBG BLUE
SEE SHEET 1 — 2993 .50 TBG BLUE
A
FRONT CTI MANIFOLD 1888660
2098 #12 HOSE
MANIFOLD 1579630
SEE SHEET 1 — 2074 .25 TBG BLUE
2096 #12 HOSE
STEEL TBG 1.25 OD
2101 #10 HOSE
2103 #10 HOSE
.25 TBG BLACK 2893
.25 TBG BLACK 2893
2101 #10 HOSE
2103 #10 HOSE
STEEL TBG .62 OD
STEEL TBG .62 OD
STEEL TBG .62 OD
STEEL TBG .62 OD
#1 AXLE
#2 AXLE

FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 29 OF 35
ENGINEERING DWG 1878300 SHEET 2
FP-57/FP-58 BLANK

REVISION B
CN 23468
8-8-91

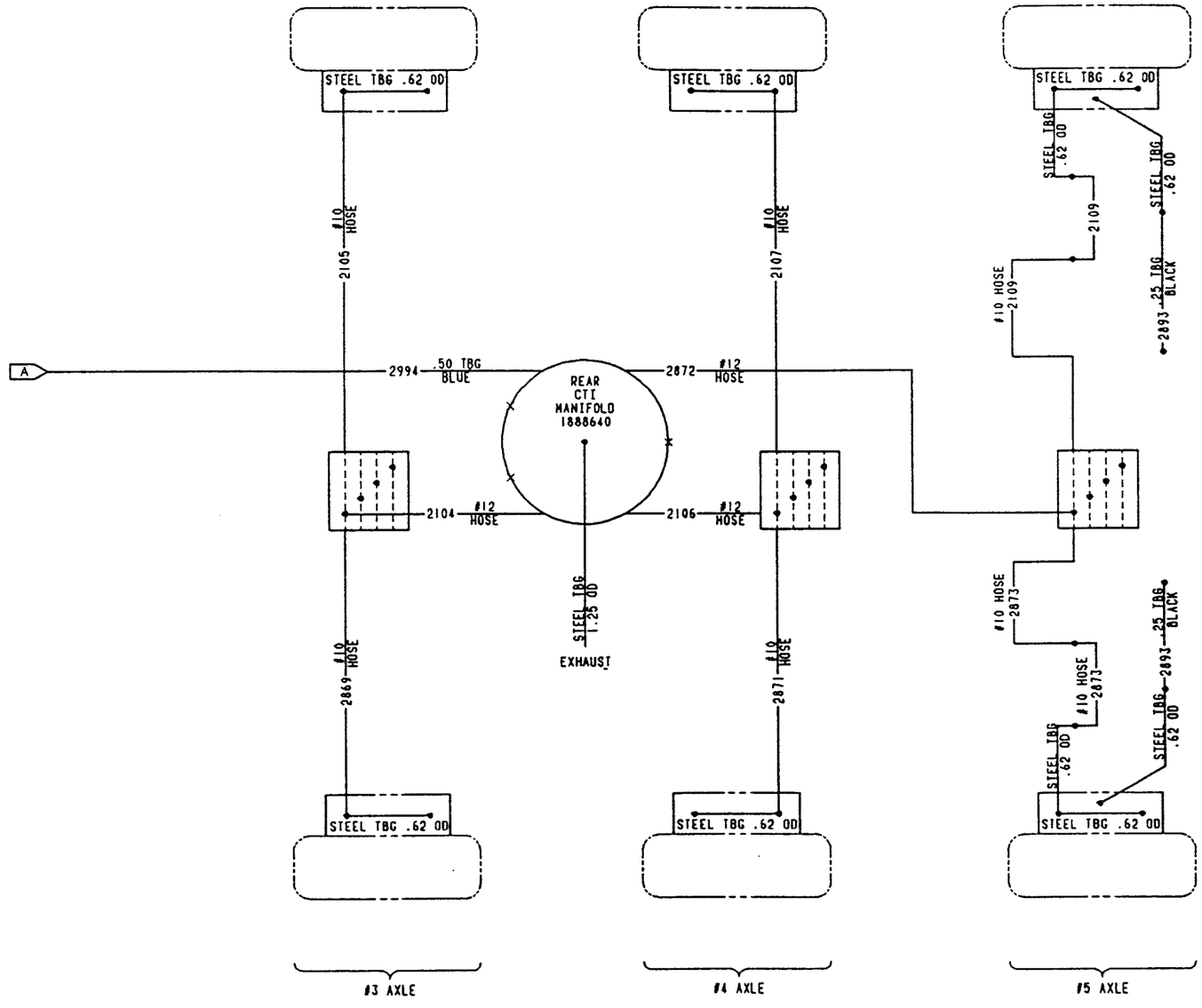


FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 30 OF 35
ENGINEERING DWG 1878300 SHEET 2
FP-59/FP-60 BLANK

REVISION H
CN 24303
6-25-93

MAIN HYDR PUMP 1899690
COMPENSATOR SET APPROX. 3675 PSI
HIGH PRESSURE FILTER 1929250
IN
OUT
SOLENOID VALVE 1913660 U
CRACKING PRESSURE 65PSI
OIL COOLER 2028850
FAN MOTOR 1945260
FAN MANIFOLD 1945240
RETURN FILTER
1905170 U
MAIN RESERVOIR
MULTI-FUNCTION MANIFOLD 1959140
10-12 GPM
30 GPM
MAIN CYLINDER Ø125/Ø63-1665 STROKE
MAIN CYLINDER MANIFOLD RH
MANIFOLD
STEEL TBG .75 OD
RH HOOK ARM CYLINDER MANIFOLD
LH HOOK ARM CYLINDER MANIFOLD
HOOK ARM CYLINDER Ø125/Ø 63-870 STROKE
HOOK ARM CYLINDER Ø125/Ø 63-870 STROKE

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 31 OF 35
ENGINEERING DWG 1878310 SHEET 1
FP-61/FP-62 BLANK

REVISION H
CN 2225
4/14/00

MAIN CYLINDER
Ø125/Ø63-1665 STROKE
CB
CA
MAIN CYLINDER MANIFOLD LH
VB
T
VA
2889 #8 HOSE
2889 #8 HOSE
2890 #8 HOSE
T1
T2
2588 #8 HOSE
2888 #8 HOSE
TPMB
TPMA
2588 #8 HOSE
2588 #8 HOSE
MA1
#8 HOSE 2666
2666 #8 HOSE
MA2
#8 HOSE 2888
2888 #8 HOSE
MB2
2887 #8 HOSE
2887 #8 HOSE
MB1
STEEL TBG 1.00 OD
2892 #12 HOSE
B1
STEEL TBG 1.00 OD
2891 #12 HOSE
A1
LOAD HANDLING SYSTEM CONTROL MANIFOLD
LOAD HANDLING SYSTEM
TPP
TPT
P
T
STEEL TUBE 1.00 OD .120 WALL
1923580
1923570
STEEL TUBE 1.00 OD .120 WALL
1495720
1495730
1495730
QUICK DISCONNECTS
1495720
2777 #16 HOSE
2902 #12 HOSE
2902 #12 HOSE
2694 #8 HOSE
#12 HOSE 2904
#16 HOSE 2724
1757360
RETURN LINE MANIFOLD
2917 #16 HOSE
2886 #16 HOSE
2776 #4 HOSE
LOAD SENSE LINE TO PUMP
2902 #12 HOSE
MAIN SUPPLY LINE 19 GPM
CRANE
2724 #16 HOSE
MAIN RETURN LINE
SUCTION LINE HAND PUMP
#12 2902 HOSE
2694 #8 HOSE
2724 #16 HOSE
2809 #4 HOSE
2809 #4 HOSE
2809A #4 HOSE
2899 #12 HOSE
2899 #12 HOSE
2899A #12 HOSE
2886 #16 HOSE
2886A #16 HOSE
LS
DS1
P
A
B
T
WINCH SUPPLY VALVE 1911980
12 GPM
SELF RECOVERY WINCH
STEEL TBG 1916430 .62 OD .083 WALL
STEEL TBG 1916440 .62 OD .083 WALL
V2
V1
.031
.031
TELESCOPE CYLINDERS
PILOT RATIO 7.35:1
2
1
Pe
.030
.030
PILOT RATIO 4.60:1
LIFT CYLINDERS
GROVE HOIST
SERVICE RELEASE
4 TO 6 PSI CRACK
M
MOTOR DRAIN
BP
.020
V1
V2
PILOT RATIO 7.35:1

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 32 OF 35
ENGINEERING DWG 1878310 SHEET 1
FP-63/FP-64 BLANK

REVISION H
CN 24303
6-25-93

SWING DRIVE
BRAKE RELEASE
.089 .089
1780 1780
1780
5 CU. IN. PRECHARGE
190 TO 210 PSI
ACC
LS G1 X1 X2
3000 TO
3100 PSI
CRACK
SWING
TELESCOPE
LIFT
HOIST
X.128
X.147
X.154
X.234
2100
PSI
FULL
FLOW
CW 5 GPM A
CCW 5 GPM B
EXTEND 7 GPM A
RETRACT 5 GPM B
P
T
UP 7 GPM A
DOWN 5 GPM B
RAISE 12 GPM A
LOWER 12 GPM B
Z3
X.040
S1
S2
HP
PILOT RATIO 2.31:1
LEFT
STABILIZER
(JACK)
CYLINDER
EXTEND
7 GPM
RETRACT
MAST
ERECTION
.030
RIGHT
STABILIZER
(JACK)
CYLINDER
7 GPM
PILOT RATIO 7.35:1
THERMAL 4400
TO 4700 PSI
X.062
RIGHT STABILIZER
RATIO 2.97:1
THERMAL 3750
TO 4250 PSI
PILOT RATIO 7.35:1
THERMAL 4400
TO 4700 PSI
X.062
LEFT STABILIZER
RATIO 2.97:1
THERMAL 3750
TO 4250 PSI
RETRACT
EXTEND
PRESSURE
TANK
RETRACT
EXTEND
.147
.147
LEFT
STABILIZER
7 GPM
MAIN
RELIEF
RIGHT
STABILIZER
7 GPM
PILOT RATIO 3.75:1
THERMAL 2350 TO 2650 PSI
RETRACT
.50 GPM
X.015
X.015
EXTEND
.75 GPM
MAST ERECTION
CYLINDER

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 33 OF 35
ENGINEERING DWG 1878310 SHEET 1
FP-65/FP-66 BLANK

REVISION E
CN 23777
2-14-92

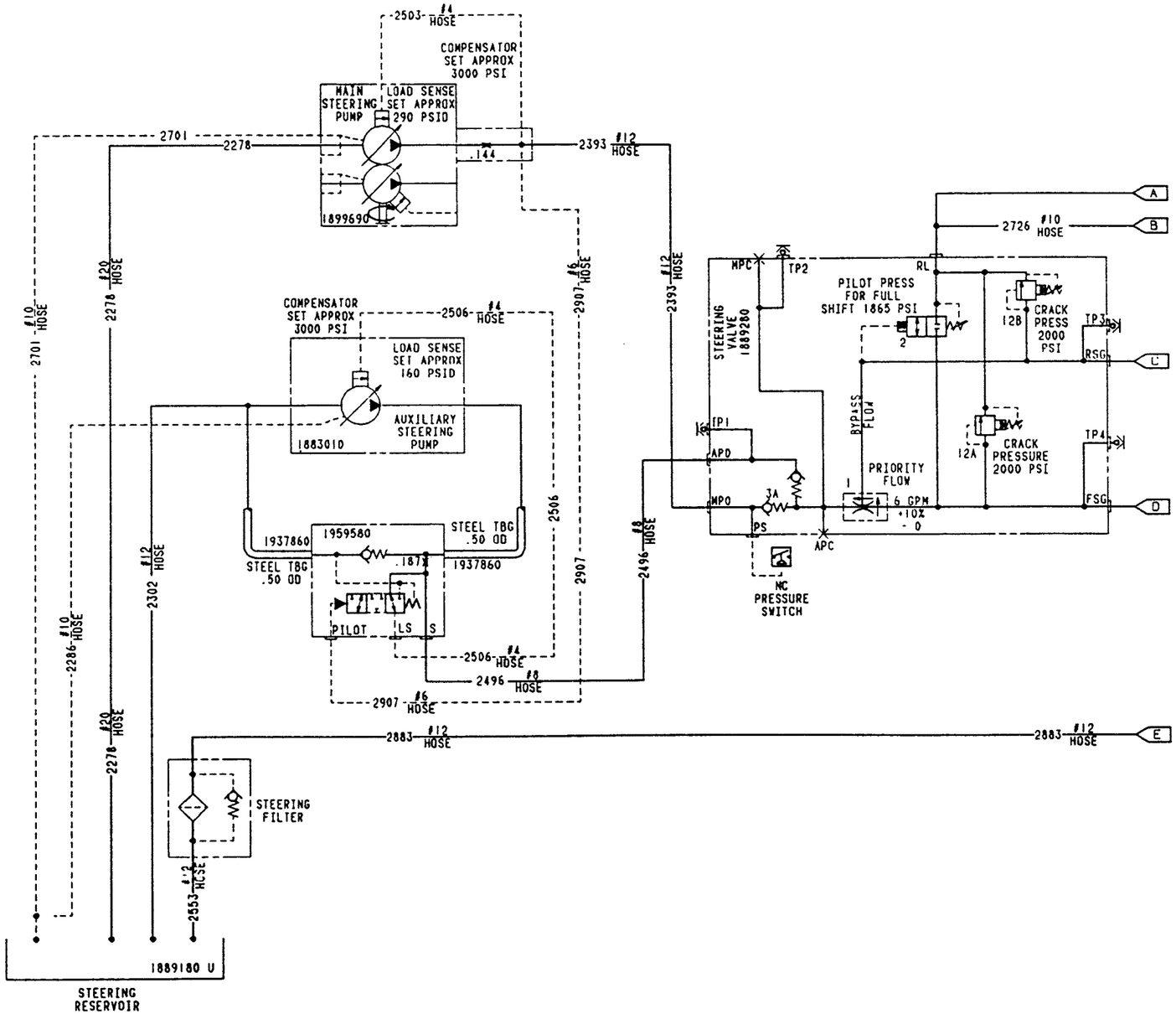


FIGURE FO-3. HYDRAILIC SYSTEM SCHEMATIC
FOLDOUT 34 OF 35
ENGINEERING DWG 1878310 SHEET 2
FP-67/FP-68 BLANK

REVISION E
CN 23777
2-14-92

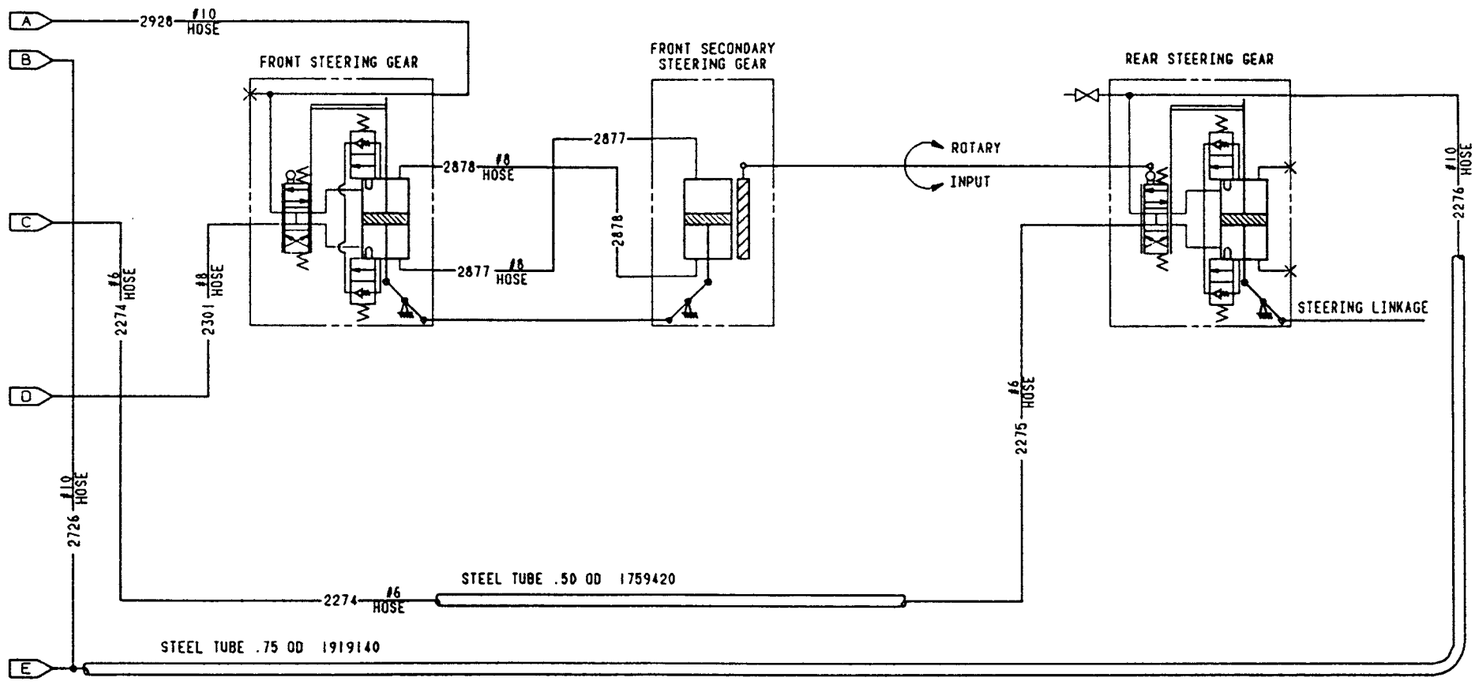


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 35 OF 35
ENGINEERING DWG 1878310 SHEET 2
FP-69/FP-70 BLANK

SCHEMATICS

Section II. 200 AMP ALTERNATOR AND DDEC III/IV ENGINE.

Section II contains the schematics for trucks equipped with the 200 amp alternator and the DDEC III/IV engine.

REVISION H
CN 2225
4/14/00

MULTIPLE CONNECTORS

NUMBER	ZONE	SH	DESCRIPTION
MC1	H3	3	CAB/ELECTRICAL BOX
MC1	C26	4	CAB/ELECTRICAL BOX
MC2	D3	3	CAB/ELECTRICAL BOX
MC2	D26	4	CAB/ELECTRICAL BOX
MC3	C3	3	CHASSIS
MC3	H17	6	CHASSIS
MC4	G10	3	SWITCHES
MC5	B12	3	WIPER MOTOR
MC6	D15	3	THROTTLE SENSOR
MC7	H8	3	TURN SIGNAL
MC8	F19	3	GAUGES
MC9	G4	4	ECU ATEC
MC10	G4	4	ECU ATEC
MC11	D3	4	DDEC
MC11	D26	5	DDEC
MC12	H26	4	SHIFT CONT ATEC
MC13	F6	3	DIGN CONN DDEC
MC14	B4	4	DDEC SIGNAL GROUND
MC15	B4	6	MILITARY CONNECTOR
MC16	D4	6	TRAILER
MC17	G11	5	DDEC
MC18	E11	5	DDEC
MC19	E13	5	TRANSMISSION
MC20	E12	5	TRANSMISSION
MC21	E2	3	ENGINE SENSOR
MC21	H26	5	ENGINE SENSOR
MC23	B23	5	ETHER START
MC24	G19	5	ALTERNATOR
MC25	C17	6	TRAILER 24VDC
MC27	F18	6	FRONT TOW
MC28	E6	3	BEACON LIGHT
MC29	F8	6	CRANE
MC30	C5	6	TRAILER
MC31	B21	3	CAB/CHASSIS
MC32	B23	3	CTI CHASSIS
MC33	F17	7	LHS CAB
MC34	C19	3	24V METERS
MC35	D24	3	CTI
MC36	A5	4	THROTTLE SENSOR
MC38	C15	3	VERNIER CONTROL
MC39	H7	5	STE/ICE
MC40	G5	5	STE/ICE MODULE
MC41	G2	5	PULSE TACH DRIVE
MC42	H4	5	DIFFERENTIAL PRESS
MC43	F2	5	FUEL PRESSURE
MC44	C5	3	CAB/TRANSMISSION
MC44	F26	4	CAB/TRANSMISSION
MC45	D5	4	ECU ATEC

MULTIPLE CONNECTORS

NUMBER	ZONE	SH	DESCRIPTION
MC50	C7	4	RELAYS/ATEC
MC51	C6	4	ECU ATEC
MC52	B23	4	HEATER/DIMMER
MC53	F23	3	ENGINE BRAKE
MC54	F8	6	WORK LIGHT
MC55	B13	6	SELF RECOVERY WINCH
MC56	C23	5	ETHER THERMOSTAT
MC57	F6	6	DRIVE LINE LOCK
MC58	E7	3	GAS PART FILTER
MC59	G13	6	FAN CONTROL
MC60	G24	5	REVERSE PLRT PROTR
MC61	G10	6	FAN CONTL WTR TEMP
MC62	F13	5	DDEC ENGINE POWER
MC63	G11	6	FAN CONTROL
MC64	D15	6	AUXILIARY CTI MANF
MC65	E5	5	STE/ICE ENGINE
MC66	G2	5	TURBO OUTLET PSI
MC67	E2	5	AIR CLEANER
MC68	D2	5	AIR BOX PSI
MC69	D2	5	FUEL RETURN
MC70	C2	5	ENGINE OIL TEMP
MC71	B2	5	ENGINE WATER TEMP
MC73	F13	6	FAN CONTROL
MC76	F11	6	FAN CONTROL VALVE
MC77	E3	6	BACK UP LIGHT
MC78	F4	6	REAR LIGHT GROUP
MC79	G7	6	WORK LIGHT
MC80	G4	6	REAR LIGHT GROUP
MC81	E13	7	LHS
MC82	E12	7	LHS
MC83	E14	7	LHS
MC84	E15	7	LHS
MC85	E9	7	LHS
MC86	E7	7	LHS
MC87	D5	7	LHS
MC88	E6	7	LHS
MC90	C3	6	REAR LIGHT GP HARN
MC91	G8	3	STRN COL.-CAB HARN
MC92	F8	3	STRG COL.-CAB HARN
MC93	C17	7	LHS
MC94	B17	7	LHS
MC95	B15	5	DDEC BATTERY POWER
MC96	C2	3	LOW HYD OIL
MC97	B10	6	AIR DRYER
MC98	B9	6	AIR DRYER
MC99	B8	6	AFTER COOLER
MC102	A3	4	DDEC 6.8K RESISTOR
MC103	E5	3	CHEM DETECTOR
MC104	E5	3	CHEM ALARM

MULTIPLE CONNECTORS

NUMBER	ZONE	SH	DESCRIPTION
MC105	E24	3	CTI ACCESS OUTPUT
MC106	H4	3	DDEC DIAGNOSTIC
MC107	D6	6	FUEL WATER SEP
MC108	C20	5	FUEL PUMP
MC109	C15	6	CTI POWER MANIFOLD
MC110	C24	3	CTI AUX MANF CAB
MC111	B24	3	CTI POWER MANF CAB
MC112	B19	3	LHS LIGHTS
MC113	F16	6	EMERGENCY STEER SW
MC116	B12	4	EMER ENG SHUT DOWN
MC118	A9	5	STE/ICE
MC119	B22	4	ARCTIC PUMP
MC120	B7	6	ARCTIC PUMP
MC121	C12	6	SELF RECOVERY WINCH
MC122	D12	6	SELF RECOVERY WINCH
MC123	D12	6	SELF RECOVERY WINCH
MC124	E3	6	BACK-UP LIGHT/ALARM
MC125	G18	3	AIR RESTRICTION LT
MC126	E11	3	STOP LIGHTS
MC127	B15	3	THROTTLE POSN SW
MC128	G10	6	AUX WATER TEMP SW

LIGHTS

NUMBER	ZONE	SH	DESCRIPTION
L1	G16	3	PARKING BRAKE IND
L2	G17	3	LOW AIR INDICATOR
L3	G17	3	CHECK GAUGES IND
L4	G17	3	RH TURN INDICATOR
L5	G24	3	TRANS CHECK IND
L6	G18	3	CHECK ENGINE IND
L7	G17	3	DRIVE LINE LOCK IND
L8	G24	3	HI WATER TEMP IND
L9	G24	3	LOW OIL PSI IND
L10	G25	3	HI BEAM INDICATOR
L11	G28	3	LH TURN INDICATOR
L12	F27	3	RH HEADLIGHT
L13	G27	3	RH SIDE TURN SIGNAL
L14	F27	3	RH COMPOSITE
L15	E27	3	BLACKOUT DRIVE
L16	D27	3	LH COMPOSITE
L17	C27	3	LH HEADLIGHT
L18	C27	3	LH SIDE TURN SIGNAL
L19	B27	3	ID & CLEARANCE
L20	H10	3	DOME
L21	G7	6	RH WORK LIGHT
L22	G2	6	RH REAR COMPOSITE
L23	G2	6	BACK UP
L24	F2	6	LH REAR COMPOSITE
L25	C2	6	ID/CLEARANCE REAR
L26	E22	3	LHS INDICATOR
L27	E22	3	AUXILLARY HYDR IND
L28	E23	3	TRANSIT INDICATOR
L29	E23	3	LHS OVERLOAD IND
L31	D2	6	RH REAR S MKR (RED)
L32	H4	6	RH SIDE MKR (AMBER)
L33	B2	6	LH SIDE MKR (AMBER)
L34	H4	6	LH REAR S MKR (RED)
L35	G16	3	EMERGENCY STEERING
L36	G16	3	LOW HYD OIL
L37	D21	3	ENGINE BRAKE
L38	D21	3	FLAT RACK
L39	F7	6	LH WORK LIGHT
L40	F7	3	T.C. LOCKUP
L41	C2	6	L.H. B.O. CL LIGHT
L42	D2	6	R.H. B.O. CL LIGHT
L43	B5	3	POST LIGHT
L44	F5	3	HEATER PANEL LIGHT

SWITCHES

NUMBER	ZONE	SH	DESCRIPTION
S1	H6	3	TURN SIGNAL/DIMMER
S2	E13	3	IGNITION
S3	F5	3	HEATER
S4	D8	3	SELF RECOVERY CRANE
S5	H12	3	BEACON LIGHT
S6	H13	3	WORK LIGHT
S7	H14	3	WINDSHIELD WASHER
S8	G15	3	WINDSHIELD WIPER
S9	F16	3	BLACK OUT SVCE SEL
S10	F54	3	BLACK OUT MARKER
S11	F14	3	BLACK OUT DRIVE
S12	F14	3	HEADLIGHTS
S13	F5	6	DRIVE LINE LOCK
S14	F12	3	RHEOSTAT
S15	F7	3	HORN
S16	F13	3	ENGINE BRAKE
S17	F7	3	DIAGNOSTIC REQUEST
S18	D7	3	SELF RECOVERY WINCH
S19	D6	3	GAS PARTIULATE FLTR
S20	D5	3	CHEMICAL ALARM
S21	H15	3	DOME LIGHT
S22	C8	5	STE/ICE ZEROING
S23	C22	7	PROX SW HOOK ARM UP
S24	C23	7	PROX SW MDL FR DOWN
S25	D13	3	ETHER START
S26	F7	3	TC LOCKUP
S27	E5	7	HOOK ARM DOWN
S28	G8	7	OVERLOAD PSI
S29	B19	4	ARCTIC PUMP
S30	E9	3	EMER ENG SHUT DOWN
S31	C16	3	THROTTLE POSITION
S32	C17	5	BATTERY DISCONNECT

PRESSURE SWITCHES

NUMBER	ZONE	SH	DESCRIPTION
PS1	G9	3	FRONT BRAKE
PS2	F9	3	REAR BRAKE
PS3	F9	3	HAND BRAKE
PS4	C14	3	PARKING BRAKE
PS5	B15	3	PARKING BRAKE SW
PS6	D17	3	LOW AIR PRESSURE
PS7	D17	3	LOW AIR PRESSURE
PS8	C22	5	ATEC OIL PRESSURE
PS9	D22	5	ENGINE OIL
PS10			GOVERNOR PRESSURE
PS11			GOVERNOR PRESSURE
PS13	F15	6	EMERGENCY STEER
PS12	D23	5	ALTER. OIL PRESSURE
PS15	F26	5	BOOST PRESSURE

TEMPERATURE SWITCHES

NUMBER	ZONE	SH	DESCRIPTION
TS1	C23	5	ETHER START
TS2	D23	5	ENGINE WATER
TS3	F10	6	ENGINE WATER
TS4	G10	6	ENGINE WATER

RELAYS

NUMBER	ZONE	SH	DESCRIPTION
R1	G24	4	HEADLIGHTS
R2	G23	4	ID/CLEARANCE LIGHTS
R3	G22	4	HORN
R4	G21	4	WORK LIGHTS
R5	G20	4	DIMMER
R6	G19	4	BEACON LIGHTS
R7	G18	4	TRANSMISSION
R8	G18	4	RATARDER
R9	G18	4	CK TRANSMISSION
R10	G17	4	REVERSE
R11	G16	4	NEUTRAL START
R12	G15	4	12 V MAG SWITCH
R13	G15	4	B.O. STOP
R14	G14	4	BO SERVICE TAIL LTS
R15	G13	4	LH TURN SIGNAL
R16	G12	4	RH TURN SIGNAL
R17	G12	4	BLACK OUT TAIL LTS
R18	G11	4	DDEC
R19	G10	4	TRANS DDEC
R20	G9	4	INTER AXLE
R21	G9	4	DIFFERENTIAL LOCK
R22	G8	4	CRANE HI IDLE
R23	G7	4	HIGH RANGE LOCKOUT
R24	G6	4	T.C. DUAL MODE
R25	B17	4	MAGNETIC SWITCH
R26	B18	4	MAGNETIC SWITCH
R27	D19	5	MAGNETIC SWITCH
R28	C21	4	MAGNETIC SWITCH
~~R29~~	~~C10~~	~~7~~	~~MIDDLE FR LOCKOUT~~
R32	B21	4	ARCTIC PUMP
R33	B20	4	ARCTIC PUMP
R40	G5	10	CRANE/SRW RELAY

SENDING UNIT

NUMBER	ZONE	SH	DESCRIPTION
SU1	E21	5	WATER TEMPERATURE
SU2	D21	5	TRANSMISSION TEMP
SU3	D21	5	ENGINE OIL PRESSURE
SU4	F6	6	SPEEDOMTER
SU5	D6	6	FUEL LEVEL

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 1 OF 26
ENGINEERING DWG 3053493 SHEET 1
FP-1/FP-2 BLANK

REVISION D
CN 15194
12/23/97

CIRCUIT BREAKERS

NUMBER	ZONE	SH	DESCRIPTION
CB1	D22	4	15 AMP
CB2	D22	4	15 AMP
CB3	D21	4	15 AMP
CB4	D21	4	15 AMP
CB5	D20	4	20 AMP
CB6	D20	4	15 AMP
CB7	D19	4	10 AMP
CB8	D19	4	15 AMP
CB9	D18	4	10 AMP
CB10	D17	4	3 AMP
CB11	D16	4	8 AMP
CB12	D16	4	8 AMP
CB13	D15	4	8 AMP
CB14	D14	4	15 AMP
CB15	D13	4	15 AMP
CB16	D12	4	15 AMP
CB17	D12	4	3 AMP
CB18	D11	4	10 AMP
CB19	D10	4	15 AMP
CB20	D9	4	15 AMP
CB21	D9	4	30 AMP
CB22	D7	4	20 AMP
CB23	D7	4	20 AMP
CB24	C20	5	3 AMP
CB25	A14	4	15 AMP
CB26	A13	4	15 AMP

GAUGES

NUMBER	ZONE	SH	DESCRIPTION
G1	G20	3	WATER TEMPERATURE
G2	G21	3	OIL PRESSURE
G3	G22	3	FUEL LEVEL
G4	G22	3	TACHOMETER
G5	G23	3	SPEEDOMTER
G6	G19	3	VOLTMETER 12V
G7	G19	3	VOLTMETER 24V
G10	G20	3	XMSN OIL TEMP
G11	G18	3	AIR PRESSURE
G12	H18	3	AIR RESTRICTION

MISCELLANEOUS

NUMBER	ZONE	SH	DESCRIPTION
M1	B6	3	WINDSHIELD WSHR SOL
M2	B13	3	WIPER MOTOR
M3	E17	3	LOW OIL & AIR ALARM
M4	A5	4	THROTTLE POSN CONT
M5	C20	4	FLASHER
M6	C16	5	BATTERIES
M7	E17	5	STARTER
M8	B22	5	ETHER START
M9	D6	6	FUEL/WATER SEP
M10	C10	6	LHS SOLENOID VALVE
M11	C8	6	AFTERCOOLER
M12	C20	5	FUEL PUMP
M13	B10	6	AIR DRYER
M14	E6	3	CHEMICAL DETECTOR
M14	B9	6	AIR DRYER
M15	D1	3	HORN
M16	D16	3	VERNIER CONTROL
M17	F5	3	HEATER MOTOR
M18	F24	3	LOW OIL PRESS ALARM
M20	G22	5	ALTERNATOR,STD
M21	C25	5	RH SIDE ENG BK COIL
M22	C24	5	LH SIDE ENG BK COIL
M23	D18	5	SLAVE CONNECTER
M24	B15	6	CTI POWER MANIFOLOD
M25	D15	6	CTI AUXILIARY MANF
M26	E13	7	LHS CAB CONTROLLER
M27	B13	6	SELF RECOVERY WINCH
M28	E25	3	CTI CONTROLLER
M29	G14	7	CHEMICAL ALARM
M30	D11	3	GAS PART FILTER
M31	D11	3	AIR HEATER DRIVER
M32	D12	3	AIR HEATER PASS
M33	D3	7	SRW SOLENOID VALVE
M35	E15	3	THROTTLE POSITIONER
M36	C9	4	DIODE
M39	F9	4	RECTIFIER
M40	G2	5	PULSE TACH DRIVE
M41	H5	5	DIFFERENTIAL PRESS
M42	F2	5	FUEL PRESSURE
M43	G5	5	STE/ICE MODULE
M45	F10	6	FAN CONTROL VALVE
M48	D16	5	SHUNT
M49	B9	3	XFR CASE LKUP SOL
M50	B8	3	INTER AXLE SOL V
M51	B8	3	DIFF SOLENOID VALVE
M51	C11	6	FAN
M52	A21	4	RECTIFIER
M53	G11	7	LHS HOOK ARM B
M54	G10	7	LHS HOOK ARM A
M55	G10	7	LHS MAIN CYLINDER B
M56	G10	7	LHS MAIN CYLINDER A

MISCELLANEOUS

NUMBER	ZONE	SH	DESCRIPTION
M57	G9	7	LHS FREEFLOW
M58	G9	7	LHS TRANSIT
M59	F3	7	LHS LH HOOK ARM A
M60	F3	7	LHS LH HOOK ARM B
M61	F2	7	LHS RH HOOK ARM A
M62	F2	7	LHS RH HOOK ARM B
M64	C19	5	POLARITY PROTECTION
M66	G16	3	RECTIFIER
M67	C8	3	RECTIFIER
M68	G12	7	RECTIFIER
M70	F2	5	TURBO OUTLET PSI
M71	E2	5	AIR CLEANER
M72	D2	5	AIR BOX PSI
M73	C2	5	FUEL RETURN
M74	C2	5	ENGINE OIL TEMP
M75	B2	5	ENGINE WATER TEMP
M76	E10	4	RECTIFIER
M77	B17	5	ARCTIC BATTERIES
M78	E2	6	BACK-UP ALARM
M80	B7	6	ARCTIC PUMP
M81	F4	3	RECTIFIER
M83	F3	10	LHS FUSE - 5 AMP

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
104	MC36-M4	4	THROTTLE SENSOR
104	MC10-MC36	4	THROTTLE SENSOR
105	MC10-MC19	4/5	ATEC
106A	MC10-MC36	4	THROTTLE SENSOR
106A	MC36-M4	4	THROTTLE SENSOR
106A	MC10-106B	4/5	ATEC
106B	106A-MC19	4/5	ATEC
107	MC10-MC19	4/5	ATEC
108	MC10-MC19	4/5	ATEC
109	MC10-MC19	4/5	ATEC
110	MC10-MC19	4/5	ATEC
111	MC10-MC19	4/5	ATEC
112	MC10-MC20	4/5	ATEC
113	MC10-MC20	4/5	ATEC
114	MC10-MC19	4/5	ATEC
115	MC11-MC18	5	ECM
115	MC11-MC102	4	6.8K RESISTOR
115	MC10-MC19	4/5	ATEC
116	MC10-MC19	4/5	ATEC
117	MC10-MC19	4/5	ATEC
118	MC10-MC19	4/5	ATEC
119	MC10-MC19	4/5	ATEC
120	MC10-MC19	4/5	ATEC
121	MC10-MC19	4/5	ATEC
122	MC10-MC19	4/5	ATEC
123	MC10-MC19	4/5	ATEC
124	MC36-M4	4	THROTTLE SENSOR
124	MC10-MC36	4	THROTTLE SENSOR
150	MC62-MC62	5/4	
150	MC17-MC62	5	
195	MC5-M2	3	
201	MC51-GROUND	4	
201	MC9-MC51	4	
202A	MC9-SPLICE	4	
203	MC9-MC51	4	
203	MC51-CB12	4	
204	MC9-MC12	4	ATEC
206	MC9-MC12	4	ATEC
207A	MC51-MC106	4	ATEC
207A	MC9-MC51	4	ATEC
207A	MC106-MC13	4	
208/209	MC11-SPLICE	4	
208/209	SPLICE-MC51	4	
208/209	M6-MC95	5	
208/209	MC95-MC11	5	
208/209	MC51-MC9	4	
210A	MC9-MC12	4	
211	R8-MC50	4	
211	MC50-R8	4	RETARDER
211	MC9-MC50	4	

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
212	MC9-MC12	4	
213	MC50-R8	4	RETARDER
213	MC9-MC50	4	
214	MC50-R10	4	REVERSE
214	MC9-MC50	4	
215	MC9-MC50	4	
215	MC50-R9	4	CHECK TRANSMISSION
216A	MC106-MC13	3	
216A	MC9-MC51	4	ATEC
216A	MC51-MC106	4	ATEC
218	MC9-MC12	4	ATEC
219	MC9-MC12	4	ATEC
220	MC9-MC12	4	ATEC
221	MC9-MC12	4	ATEC
222	MC9-GROUND	4	ATEC
223A	MC51-CB14	4	TRANSMISSION
223A	MC51-SPLICE	4	
223A	SPLC-SPLC	4	
223A	SPLC-SPLC	4	
223A	SPLC-SPLC	4	
223A	SPLICE-MC9	4	
223B	MC12-SPLICE	4	
225	CB11-MC12	4	
230	MC12-234	4	
231	MC50-MC12	4	
231	MC50-R22	4	CRANE HI IDLE
231	MC50-M36	4	
231	M36-R11	4	NEUTRAL START
233	MC50-MC12	4	
234	MC12-GROUND	4	
240	MC62-CB23	5/4	
240	CB23-M6	4/5	
240	MC17-MC62	5	
240	MC62-M6	5	
241	MC62-CB22	5/4	
241	MC62-M6	5	
241	MC17-MC62	5	
241	CB22-M6	4/5	
309	MC45-R24	4	TC DUAL MODE
313	MC45-R24	4	TC DUAL MODE
315	MC45-R24	4	TC DUAL MODE
417	MC6-M35	3	
417	MC11-MC44	4	
417	MC11-MC18	5	ECM
417	MC44-MC6	3	THROTTLE SENSOR
419	MC11-MC18	5	ECM
419	MC11-MC44	4	
419	MC44-MC8	3	
419	MC8-L6	3	CHECK ENGINE LIGHT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 2 OF 26
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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
439	MC116-MC106	4	EMERGENCY ENG STOP
439	MC116-S30	3	EMERGENCY ENG STOP
439	MC116-S30	3	EMERGENCY ENG STOP
439	MC116-CB13	4	DDEC
439	MC106-MC13	3	
439	SPLC-MC106	4	
439	MC11-MC18	5	ECM
439	MC8-L6	3	CHECK ENGINE LIGHT
439	MC8-L3	3	ENGINE STOP LIGHT
439	MC44-MC8	3	
439	MC11-SPLICE	4	
439	SPLICE-MC44	4	
439	SPLC-MC116	4	
505	MC44-MC8	3	TACHOMETER
505	MC11-MC44	4	
505	MC8-G4	3	
505	MC11-MC18	5	
509	MC11-MC18	5	ECM
509	MC8-L3	3	ENGINE STOP LIGHT
509	MC44-MC8	3	
509	MC11-MC44	4	
510	MC11-MC18	5	ECM
510	MC44-PS4	3	PARKING BRAKE
510	R22-MC44	4	
510	MC11-R22	4	
528	MC11-MC18	5	DIAG. REQ.
528	MC106-S17	3	
528	MC11-MC106	4	
900	MC11-MC106	4	
900	MC11-MC18	5	ECM
900	MC106-MC13	3	
901	MC11-MC18	5	ECM
901	MC106-MC13	3	
901	MC11-MC106	4	
908	MC11-MC18	5	ECM
908	MC11-M4	4	THROTTLE POSN CONT
916	MC44-MC6	3	
916	MC11-MC44	4	
916	MC38-M16	3	
916	MC6-MC38	3	VERNIER CONTROL
916	MC6-M35	3	THROTTLE SENSOR
916	MC11-MC18	5	ECM
952	MC38-M16	3	
952	MC11-MC44	4	
952	MC44-MC6	3	THROTTLE SENSOR
952	MC11-MC18	5	ECM
952	MC6-MC38	3	VERNIER CONTROL
953	M6-MC14	5	DDEC SIGNAL GROUND
953	MC14-SPLICE	4	
953	SPLICE-MC102	4	
953	SPLICE-R22	4	
953	SPLICE-MC106	4	
953	MC106-S17	3	
953	S17-MC13	3	
988	MC11-R7	4	TRANSMISSION
988	MC11-MC18	5	ECM
1001	MC8-L4	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1001	MC7-SPLICE	3	
1001	MC8-SPLICE	3	
1001	SPLICE-L13	3	
1001	SPLICE-L14	3	
1001	S1-MC7	3	RH HEADLIGHT
1002	S1-MC7	3	LH HEADLIGHT
1002	MC8-L11	3	
1002	MC7-SPLICE	3	
1002	SPLICE-MC8	3	
1002	SPLICE-L18	3	
1002	SPLICE-L16	3	
1003	MC7-MC3	3	
1003	S1-MC7	3	LH RR TURN SIGNAL
1003	MC3-MC80	6	
1003	MC3-MC16	6	TRAILER CONN 12VDC
1003	MC1-R15	4	LH TURN LIGHT
1003	MC80-L24	6	LH STOP LIGHT
1003	MC27-MC3	6	FRONT TOW
1003	MC7-MC1	3	
1003C	MC25-R17	4	LH TURN LIGHT
1003C	MC25-MC15	6	TRAILER CONN 12VDC
1004	MC7-MC1	3	
1004	MC7-MC3	3	
1004	S1-MC7	3	
1004	MC3-MC80	6	
1004	MC80-L22	6	RH STOP LIGHT
1004	MC27-MC3	6	
1004	MC3-MC78	6	
1004	MC3-MC16	6	
1004	MC1-R16	4	
1004C	MC25-R16	4	RH TURN LIGHT
1004C	MC25-MC15	6	TRAILER CONN 24VDC
1005	MC126-S9	3	
1005	PS3-MC3	3	
1005	MC3-MC16	6	TRAILER CONN 24VDC
1005	MC126-PS1	3	
1005	PS2-PS3	3	
1005	MC27-MC3	6	FRONT TOW
1005	PS1-PS2	3	
1005A	MC7-MC126	3	
1005A	MC126-S9	3	
1005A	S1-MC7	3	TURN SIGNAL/DIM SW
1006	MC2-SPLICE	3	
1006	SPLICE-L12	3	
1006	SPLICE-L17	3	
1006	MC2-R5	4	DIMMER
1007	MC2-R5	4	DIMMER
1007	MC2-SPLICE	3	
1007	SPLICE-L12	3	
1007	SPLICE-L17	3	
1008	MC3-MC78	6	
1008	MC4-S12	3	HEADLIGHTS

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1008	MC27-MC3	6	FRONT TOW
1008	MC3-SPLICE	3	
1008	MC3-MC4	3	
1008	MC3-MC16	6	TRAILER CONN 12VDC
1008	MC78-L22	6	RH TAIL LIGHT
1008	MC78-L24	6	LH TAIL LIGHT
1008C	MC25-MC15	6	TRAILER CONN 24VDC
1008C	MC25-R14	4	B.O. SERVICE
1009	PS2-PS3	3	
1009	PS1-PS2	3	
1009	MC2-PS1	3	
1009	MC2-CB6	4	STOP LIGHT
1012	MC3-SPLICE	3	
1012	SPLC-SPLC	3	
1012	MC2-SPLICE	3	
1012	SPLC-SPLC	3	
1012	SPLICE-L19	3	
1012	MC2-R2	4	CLEARANCE LIGHTS
1012	MC3-SPLICE	6	
1012	SPLICE-MC27	6	
1012	SPLICE-MC80	6	
1012	SPLICE-L32	6	RH SIDE MARKER
1012	SPLICE-L34	6	LH SIDE MARKER
1012	MC90-L31	6	RR SIDE MARKER
1012	MC90-L25	6	ID LIGHTS
1012	MC80-MC90	6	
1012	MC90-L33	6	RR SIDE MARKER
1016	MC92-MC2	3	
1016	S15-MC92	3	
1016	MC2-R3	4	HORN
1017	SPLICE-R5	4	
1017	MC52-R14	4	
1017	R2-MC52	4	
1017	MC2-SPLICE	4	
1017	SPLICE-R1	4	
1017	MC91-MC2	3	
1017	S1-MC91	3	
1017A	MC91-MC2	3	
1017A	S1-MC91	3	
1017A	MC2-R5	4	
1018	MC8-L10	3	HIGH BEAM
1018	MC8-1007	3	
1019	L15-1679	3	
1020	L14-L16	3	
1020	S2-MC21	3	
1020	MC60-CB24	5	
1020	MC21-MC60	5	
1020	M12-MC60	5	
1020A	CB24-PS12	5	
1020B	PS12-ENG	5	ALTERNATOR
1021	MC2-S2	3	
1021	MC2-R11	4	
1021	R11-M76	4	
1021A	R11-MC1	4	
1021A	MC1-MC21	3	
1021B	MC21-MC60	5	
1021B	MC60-R27	5	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1021	MC52-R11	4	FRONT TOW
1021A	R11-MC1	4	
1021A	MC1-MC21	3	
1021A	MC21-MC60	5	
1021A	MC60-R27	5	
1026	MC52-CB16	4	
1029	MC2-R6	4	BEACON
1029	MC2-MC28	3	
1031	R3-SPLICE	4	
1032	MC8-MC21	3	
1032	M39-L9	3	LOW OIL PSI
1032	MC8-M39	3	
1032	PS9-MC21	5	ENGINE OIL PSI SW
1033	M39-M18	3	OIL PSI/H WTR ALM
1036	MC23-M8	5	
1036	MC23-M7	5	
1036	MC21-MC56	5	ETHER START
1036	MC21-S25	3	
1040	C84-R4	4	WORKLIGHT
1040A	S6-MC4	3	
1040A	MC2-R4	4	WORKLIGHT
1040A	MC4-MC2	3	
1040B	MC3-MC79	6	RH WORKLIGHT
1040B	MC2-MC3	3	
1040B	MC2-R4	4	WORKLIGHT
1040B	MC3-MC54	6	LH WORKLIGHT
1045	R27-M7	5	
1049	MC2-R1	4	HEADLIGHTS
1049	MC4-MC2	3	
1049	S12-MC4	3	
1052	S20-S19	3	CHEM ALM-GPF
1052	S19-S18	3	GAS PART FLTR-SRW
1052	S18-S4	3	SRW-SRW/WHC
1052	S4-S30	3	SRW/WHC-EMER ENG S D
1052	S30-SPLICE	3	EMER ENG SHUT DOWN
1052	SPLICE-G11	3	AIR PRESSURE GAUGE
1052	MC4-SPLICE	3	
1052	SPLICE-L44	3	HEATER PANEL LIGHT
1052	S5-S6	3	BEACON LT-WORK LT
1052	S6-S7	3	WORK LT-WSHLD WSHR
1052	S7-S8	3	WSHLD WASHER-WIPERS
1052	S8-S21	3	WIPERS-DOME LIGHT
1052	S21-S9	3	DOME LT-B.O.SERV SEL
1052	S9-S10	3	BO SERV SEL-BO MKR
1052	S10-S11	3	B.O. MARKER-B.O. DR
1052	S11-S12	3	B.O. DRIVE-HEADLTS
1052	S12-S16	3	HEADLIGHTS-ENG BK
1052	S16-S14	3	ENG BRAKE-RHEO/DOME
1052	S14-SPLICE	3	RHEOSTAT/DOME
1052	SPLICE-G6	3	VOLTMETER 12V
1052	SPLC-SPLC	3	
1052	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1052	SPLICE-G1	3	WATER TEMP GAUGE
1052	SPLICE-G2	3	OIL PRESSURE GAUGE
1052	SPLICE-G4	3	TACHOMETER
1052	SPLICE-G5	3	SPEEDOMETER
1052	SPLICE-G3	3	FUEL GAUGE

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1052	MC1-SPLICE	3	
1052	SPLICE-L43	3	POST LIGHT
1052	SPLC-MC125	3	
1052	MC125-G12	3	AIR RESTRICTION GA
1052	MC1-SPLICE	3	
1052	MC1-CB1	4	15 AMP HEADLIGHT
1052	MC50-MC1	4	
1055	M7-R27	5	
1056	MC111-MC32	3	
1056	MC32-MC109	6	CTI POWER MANIFOLD
1057	MC111-MC32	3	
1057	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC111-MC32	3	
1059	MC32-MC109	6	CTI POWER MANIFOLD
1059	MC111-MC32	3	
1061	MC22-MC109	6	CTI POWER MANIFOLD
1061	MC111-MC32	3	
1062	MC32-MC109	6	CTI POWER MANIFOLD
1062	MC111-MC32	3	
1063	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC111-MC32	3	
1065	MC32-MC109	6	CTI POWER MANIFOLD
1065	MC111-MC32	3	
1066	MC32-MC64	6	CTI AUX MANIFOLD
1066	MC110-MC32	3	
1067	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC110-MC32	3	
1070	MC32-MC64	6	CTI AUX MANIFOLD
1070	MC110-MC32	3	
1071	MC110-MC32	3	
1071	MC32-MC64	6	CTI AUX MANIFOLD
1072	R26-R25	3	
1072	MC110-MC32	3	
1072	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC110-MC32	3	
1074	MC110-MC32	3	
1074	R25-CB10	4	
1074	MC32-MC64	6	CTI AUX MANIFOLD
1075	M6-R25	4/3	
1075B	R25-R18	4	
1076	MC110-MC32	3	
1076	MC32-MC64	6	CTI AUX MANIFOLD
1079	CB5-M6	4	HAZARD LIGHTS
1080	MC7-MC2	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1080	MC2-M5	4	TURN SIGNAL/FLASHER
1082	MC2-MC52	4	
1082	MC2-M81	3	
1082	M81-S3	3	
1082	MC52-CB15	4	HEATER
1084	MC1-CB5	4	B.O. LIGHTS
1084	MC4-MC1	3	
1084	MC4-S9	3	
1091	L17-GROUND	3	
1092	L7-MC8	3	
1092	MC8-M51	3	
1093	MC31-MC57	6	
1093	MC1-MC31	3	
1093	MC1-CB16	4	
1093	MC57-S13	6	DRIVE LINE LOCK-UP
1094	S5-S14	3	
1095	R23-R24	4	
1095	MC44-R23	4	
1095	MC31-MC44	3	
1095	MC57-S13	6	DRIVE LINE LOCK-UP
1095	MC31-MC57	6	
1113	MC8-MC21	3	
1113	G2-MC8	3	OIL PSI GAUGE
1113	SU3-MC21	5	ENG OIL PSI SNDG UN
1114	M66-MC8	3	
1114	MC96-MC8	3	LOW OIL LEVEL LIGHT
1114	MC8-L36	3	
1114	L36-M66	3	
1118	MC4-1919	3	
1118	S8-MC4	3	
1120	M66-MC8	3	
1120	M66-M3	3	
1120	PS6-PS7	3	
1120	PS6-MC8	3	
1120	L2-M66	3	
1137	M6(1)-M6(2)	5	
1137	M6(3)-M6(4)	5	
1138	M48-M7	5	SHUNT
1138	M7-M23	5	SLAVE
1138	M6-M48	5	SHUNT
1138	M77-M7	5	ARCTIC BATTERIES
1139	M7-M23	5	SLAVE
1139	M6-M7	5	
1139	M77-M7	5	ARCTIC BATTERIES
1147	TS2-MC21	5	ENG WTR TEMP SNDG UN
1147	M39-L8	3	HIGH WATER TEMP
1147	MC8-MC21	3	
1147	MC8-M39	3	
1149	MC1-R10	4	REVERSE
1149	MC3-MC78	6	
1149	MC1-MC124	3	
1149	MC78-MC77	6	REVERSE LIGHT
1149	MC124-MC77	6	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
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CODE SORT

CODE	ROUTING	SH	DESCRIPTION
1153	S21-MC4	3	
1153	MC4-L20	3	DOME LIGHT
1168	MC2-R3	4	HORN
1168	MC2-M15	3	
1174	BUS BAR	4	
1175	R28-CB5	4	
1176	MC113-PS13	6	EMERGENCY STEER
1184	S5-MC4	3	
1184	MC2-R6	4	
1184	MC2-MC4	3	
1189	MC4-S9	3	
1189	MC44-R28	4	
1189	MC4-SPLICE	3	
1189	MC4-S21	3	
1189	MC2-SPLICE	3	
1189	MC2-M5	4	
1189	SPLICE-MC44	3	
1274	M20-M6	5	
1274	M8-SPLICE	5	
1275	M6-M20	5	
1276	MC2-MC4	3	
1276	MC2-CB8	3	
1276	SPLICE-S14	3	
1276	SPLICE-MC53	3	
1276	MC4-SPLICE	3	
1276	MC2-SPLICE	4	
1276	MC53-SPLICE	3	
1276	SPLC-SPLC	3	
1276	SPLC-SPLC	3	
1276	SPLICE-M3	3	LOW AIR ALARM
1276	SPLICE-G5	3	SPEEDOMETER
1276	SPLICE-L1	3	PARKING BRAKE
1276	SPLICE-L2	3	LOW AIR
1276	SPLICE-L35	3	EMERGENCY STEERING
1276	SPLICE-L36	3	LOW HYDR OIL
1276	SPLC-SPLC	3	
1276	SPLICE-L5	3	XMSN CHECK
1276	SPLICE-L8	3	HIGH WATER TEMP
1276	SPLICE-L9	3	LOW OIL PSI
1276	SPLICE-G3	3	FUEL GAUGE
1276	SPLICE-G6	3	VOLTMETER 12V
1276	SPLICE-G1	3	WATER TEMP GAUGE
1276	SPLICE-G2	3	OIL PRESSURE GAUGE
1276	SPLICE-G4	3	TACHOMETER
1276	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1276	SPLICE-M18	3	ALARM
1279	PS14-1277	5	
1279	MC115-PS14	5	
1279	M64-1280	5	
1280	CB21-R26	4	

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
1280	1281-R26	5	
1281	1280-MC47	5	
1281	R27-M81	5	
1281A	M6-S32	5	BATTERIES
1281A	S32-SPLICE	5	
1281A	SPLICE-M64	5	
1281A	SPLICE-M20	5	
1292	MC4-S6	3	
1292	CB4-MC2	4	
1292	MC2-MC4	3	
1292	MC4-S12	3	
1314	1118-S7	3	
1318	MC3-MC8	3	
1318	MC3-G3	3	FUEL GAUGE
1318	MC3-SU5	6	FUEL LEVEL
1320	SU1-MC2	5	WATER TEMP SNDG UN
1320	G1-MC8	3	WATER TEMP
1320	MC8-MC21	3	
1340	CB15-MC14	4	SWING FIRE
1344	M20-MC22	5	
1362	R27-M64	5	
1371	MC8-PS5	3	
1371	L1-MC8	3	
1409	MC8-MC1	3	
1409	L5-MC8	3	
1409	MC1-R9	4	
1413	CB3-SPLICE	4	
1413	SPLICE-R6	4	
1430	R28-SH5	4/5	
1430	1832-R28	5	
1431	MC3-S2	3	
1431	MC3-M64	5/6	POLARITY PROTECTION
1431	MC3-M64	5/6	POLARITY PROTECTION
1431	MC1-MC119	4	
1431	MC119-R32	4	
1431	R32-S29	4	ARCTIC PUMP
1431	MC119-CB20	4	
1435	MC78-MC124	6	
1435	MC124-M78	6	
1435	MC77-MC124	6	
1435	MC85-MC86	7	
1435	MC86-MC87	7	
1435	MC33-MC84	7	
1435	GROUND	3	
1435	MC81-MC82	7	
1435	MC84-MC83	7	
1435	MC81-MC82	7	
1435	MC108-GND	5	
1435	GND	5	
1435	MC22-GND	5	
1435	M52-R26	4	
1435	M52-R28	4	
1435	R27-GND	5	
1435	MC125-GND	3	
1435	MC23-M7	5	
1435	MC23-M8	5	EITHER START

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
1449	MC8-MC21	3	
1449	G10-MC8	3	TRANS OIL TEMP
1449	SU2-MC21	5	TRANS TEMP SNDG UN
1454	MC81-MC82	7	
1460	MC81-MC82	7	
1461	MC86-MC87	7	
1461	MC85-MC86	7	
1462	MC81-MC82	7	
1463	MC81-MC82	7	
1464	MC81-MC82	7	
1465	MC81-MC82	7	
1466	MC85-MC86	7	
1466	MC86-MC87	7	
1467	MC81-MC82	7	
1468	MC81-MC82	7	
1469	MC81-MC82	7	
1469	MC86-MC87	7	
1469	MC85-MC86	7	
1470	MC86-MC87	7	
1470	MC85-MC86	7	
1471	MC85-MC86	7	
1471	MC86-MC87	7	
1471	MC81-MC82	7	
1472	MC85-MC86	7	
1472	MC81-MC82	7	
1472	MC86-MC88	7	
1475	MC85-MC86	7	
1475	MC86-MC87	7	
1480	MC84-MC93	7	
1480	MC84-MC83	7	
1481	MC84-MC83	7	
1481	MC84-MC93	7	
1482	MC84-MC93	7	
1482	MC84-MC83	7	
1483	MC83-MC84	7	
1483	MC84-MC93	7	
1484	MC83-MC84	7	
1484	MC84-MC93	7	
1485	MC84-MC94	7	
1485	MC83-MC84	7	
1486	MC84-MC94	7	
1486	MC83-MC84	7	
1487	MC1-S25	3	
1487	MC1-CB15	4	
1487	MC83-MC84	7	
1487	MC84-MC94	7	
1488	MC84-MC94	7	
1488	MC83-MC84	7	
1489	MC83-MC84	7	
1489	MC84-MC94	7	
1490	MC84-MC94	7	
1490	MC83-MC84	7	
1491	L16-1008	3	
1491	L14-1008	3	
1517	PS8-MC11	5	ATEC OIL PSI SWITCH
1517	MC11-R9	4	

CODE SORT

CODE	ROUTING	SH	DESCRIPTION
1519	MC8-MC35	3	CTI OVERSPEED
1519	MC3-MC8	3	SPEEDOMETER
1519	MC8-MC35	3	CTI OVERSPEED
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1525	M16-PS4	3	
1534	MC107-M9	6	FUEL/WATER SEP
1534	MC2-SPLICE	4	
1534	SPLICE-CB8	4	
1534	MC3-MC107	6	
1534	MC2-MC3	3	
1534	MC3-S22	3	T-CASE LOCK-UP
1534	CB15-M76	4	
1538	MC97-M13	6	AIR DRYER
1538	MC25-MC97	6	
1538	MC25-CB15	4	
1538	MC25-MC98	6	
1538	MC99-M11	6	AFTER COOLER
1538	MC98-M14	6	AIR DRYER
1538	MC25-MC99	6	
1538	MC25-MC73	6	FAN CONTROL
1538	M76-MC25	4	
1640	MC119-SPLC	4	
1640	SPLICE-R26	4	
1640	SPLICE-MC44	4	
1640	MC44-S2	3	
1640	MC119-R32	4	
1644	MC119-R33	4	
1644	R33-R33	4	
1644	MC119-S29	4	ARCTIC PUMP
1644	R33-S29	4	ARCTIC PUMP
1644	MC119-MC25	4	
1644	MC25-MC120	6	
1644	MC120-M80	6	ARCTIC PUMP
1645	S29-R33	4	ARCTIC PUMP
1665C	MC25-MC15	6	TRAILER CONN 24VDC
1665C	MC25-CB20	4	
1674	S11-S10	3	
1674	S11-S9	3	
1676	R17-R16	4	
1676	R16-R15	4	
1676	R14-R3	4	
1676	R15-R14	4	
1676	CB20-R17	4	
1678	MC3-MC78	6	
1678	MC1-SPLICE	3	
1678	MC78-L24	6	LH B.O. STOP LIGHT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 26
ENGINEERING DWG 3053493 SHEET 2
FP-9/FP-10 BLANK

REVISION 0

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1678	MC78-L22	6	RH B.O. STOP LIGHT
1678	SPLICE-MC3	3	
1678	MC1-R13	4	
1678	SPLICE-MC4	3	
1678	MC4-S9	3	
1678C	MC25-R13	4	B.O. STOP LIGHT
1678C	MC25-MC15	6	TRAILER CONN 24VDC
1679	L15-MC4	3	
1679	MC4-S11	3	
1680	MC3-SPLICE	3	
1680	SPLICE-MC1	3	
1680	SPLC-SPLC	3	
1680	SPLICE-MC4	3	
1680	SPLC-SPLC	3	
1680	SPLC-SPLC	3	
1680	SPLICE-L19	3	
1680	SPLICE-L19	3	
1680	MC3-MC78	6	
1680	MC4-S10	3	
1680	MC78-L24	6	LH B.O. TAIL LIGHT
1680	MC1-R17	4	B.O. LIGHTS
1680	MC78-L22	6	RH B.O. TAIL LIGHT
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-R17	4	B.O. TAIL LIGHTS
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1702	MC44-MC34	3	
1702	MC34-G7	3	
1702	MC44-R26	4	
1708	M32-1709	3	PASSENGER AIR HTR
1709	MC58-S19	3	GAS PART FILTER SW
1709	MC58-M30	3	
1710	M31-1709	3	DRIVER AIR HEATER
1711	CB11-R7	4	
1712	MC1-CB7	4	ENGINE BRAKE
1712	MC4-MC1	3	
1713	MC53-L37	3	
1713	MC4-MC1	3	
1713	S16-MC4	3	ENGINE BRAKE
1713	MC1-R7	4	TRANSMISSION
1713	S16-MC53	3	
1714	MC1-1716	4	
1714	MC4-MC1	3	ENGINE BRAKE
1714	S16-MC4	3	ENGINE BRAKE
1715	MC4-MC1	3	ENGINE BRAKE
1715	S16-MC4	3	ENGINE BK RH COILS
1715	MC11-MC1	4	
1715	MC11-M21	5	LH ENGINE BRAKE
1716	MC11-R5	4	RETARDER
1716	MC11-M22	5	RH ENGINE BRAKE
1717	MC44-S20	3	CHEMICAL ALARM SW
1717	MC44-CB19	4	
1718	M76-M77	6	BACK-UP ALARM
1722	MC34-1734	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1722	L26-MC34	3	
1722	MC33-MC84	7	
1722	MC84-MC83	7	
1723	MC44-S18	3	SELF RECOVERY WN SW
1723	MC44-CB18	4	
1724	MC112-SPLC	3	
1724	SPLICE-MC33	3	
1724	MC33-MC93	7	
1724	L27-MC112	3	
1724	M67-SPLICE	3	
1724	SPLC-MC112	3	
1724	M67-MC33	3	
1725	L28-MC112	3	
1725	MC84-MC83	7	
1725	MC33-MC84	7	
1725	MC112-MC33	3	
1726	MC33-MC84	7	
1726	MC84-MC83	7	
1726	MC112-MC33	3	
1726	L29-MC112	3	
1729	MC31-S18	3	SELF RECOVERY WINCH
1729	MC31-MC55	6	
1729	MC55-MC121	6	SELF RECOVERY WINCH
1730	MC31-S18	3	SELF RECOVERY WINCH
1730	MC55-MC122	6	SELF RECOVERY WINCH
1730	MC31-MC55	6	
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-MC29	6	CRANE
1732	MC55-MC123	6	SELF RECOVERY WINCH
1732	S4-MC31	3	SELF RECOVERY WINCH
1732	MC31-MC55	6	
1733	MC31-M67	3	
1733	MC31-M51	6	
1734	M67-SPLICE	3	
1734	SPLC-SPLC	3	
1734	SPLICE-MC31	3	
1734	MC31-M10	6	
1736	MC39-MC39	5	
1737	MC31-MC1	3	
1737	MC1-R22	4	CRANE HI IDLE
1737	MC31-MC29	6	CRANE
1738	MC44-1755	4	
1738	MC44-MC31	3	
1738	MC31-MC29	6	CRANE
1739	MC44-CB21	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1739	MC44-S19	3	GAS PARTICULATE SW
1744	S4-M67	3	
1745	MC103-S20	3	CHEMICAL ALARM
1746	MC103-M29	3	CHEMICAL ALARM
1747	MC103-M29	3	CHEMICAL ALARM
1755	MC84-MC83	7	
1755	MC44-CB18	4	
1755	MC33-MC84	7	
1755	MC33-MC44	3	
1765	MC3-MC113	6	
1765	L35-MC8	3	
1765	MC3-MC8	3	
1809	MC41-MC65	5	PULSE TACH DRIVE
1809	MC65-MC39	5	STE/ICE
1809	MC41-M40	5	PULSE TACH DRIVE
1810	MC65-MC39	5	STE/ICE
1810	MC41-M40	5	PULSE TACH DRIVE
1810	MC41-MC65	5	PULSE TACH DRIVE
1811	MC42-M41	5	DIFFERENTIAL PSI
1811	MC42-MC39	5	STE/ICE
1812	MC42-M41	5	DIFFERENTIAL PSI
1812	MC42-MC39	5	STE/ICE
1813	MC39-M6	5	
1814	MC39-M6	5	BATTERIES
1815	MC39-MC24	5	
1815	MC24-MC114	5	
1815	MC24-M20	5	
1816	MC39-MC65	5	STE/ICE
1816	MC39-M7	5	STARTER

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1818	MC39-M7	5	STARTER
1818	MC39-MC65	5	STE/ICE
1819	MC39-M7	5	
1820	MC24-M20	5	
1820	MC24-M20	5	
1820	MC39-MC24	5	
1821	MC39-M6	5	
1822	MC39-M6	5	BATTERIES
1824	SPLICE-MC67	5	
1824	MC66-M70	5	
1824	MC68-M72	5	
1824	SPLICE-MC70	5	
1824	SPLICE-MC71	5	
1824	MC65-MC39	5	STE/ICE
1824	SPLICE-MC68	5	
1824	MC67-M71	5	
1824	MC43-M42	5	FUEL PSI
1824	MC69-M73	5	
1824	MC70-M74	5	
1824	MC71-M75	5	
1824	SPLICE-MC69	5	
1824	MC66-SPLICE	5	
1824	SPLICE-MC65	5	
1824	SPLICE-MC43	5	
1825	MC68-MC69	5	
1825	MC70-MC71	5	
1825	MC65-MC43	5	
1825	MC43-MC67	5	
1825	MC67-MC68	5	
1825	MC70-M74	5	
1825	MC69-MC70	5	
1825	MC41-MC65	5	
1825	MC68-M72	5	
1825	MC66-M70	5	TURBO OUTLET PSI
1825	MC65-MC39	5	STE/ICE
1825	MC69-M73	5	
1825	MC67-M71	5	
1825	MC39-MC40	5	STE/ICE MODULE
1825	MC43-M42	5	FUEL PSI
1825	MC71-M75	5	
1825A	MC39-MC40	5	STE/ICE MODULE
1826	MC40-MC39	5	
1827	MC40-MC39	5	
1828	MC39-M48	5	SHUNT
1829	MC39-M48	5	SHUNT
1835	R2-CB2	4	
1839	R7-R8	4	
1860	MC39-MC24	5	
1860	MC24-MC114	5	
1861	MC24-MC114	5	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 6 OF 26
ENGINEERING DWG 3053493 SHEET 2
FP-11/FP-12 BLANK

REVISION D

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1861	MC39-MC24	5	
1866	CB12-M6	4	
1866	M6-CB12	4/3	
1867	R19-CB12	4	
1871	MC11-CB11	4	DDEC TRANS
1871	PS8-MC11	5	ATEC OIL PSI SWITCH
1871	MC11-R8	4	
1871	MC11-R11	4	
1871	MC11-R10	4	
1871	MC11-R18	4	
1872	R19-MC44	4	
1872	MC44-R18	4	DDEC
1872	MC44-1020	3	
1875	CB14-R19	4	
1880	MC4-MC35	3	
1880	MC44-CB17	4	CTI
1882	MC52-R21	4	
1882	MC52-SPLICE	4	
1882	MC52-R20	4	
1883	S26-L40	3	TC LOCK-UP LIGHT
1883	S26-M49	3	TC LOCK-UP
1884	MC1-R20	4	INTER AXLE
1884	MC1-M39	4	
1884	MC1-MC105	3	
1885	MC1-M39	4	
1885	MC1-MC105	3	
1885	R23-R21	4	
1885	MC1-R23	4	
1888	CB16-R21	4	DIFFERENTIAL LOCK
1888	CB16-R20	4	INTER AXLE
1889	MC44-R20	4	INTER AXLE
1889	MC44-M50	3	INTER AXLE LOCK
1890	MC44-M51	3	DIFFERENTIAL LOCK
1890	MC44-R21	4	DIFFERENTIAL LOCK
1891	MC52-SPLICE	4	
1891	MC52-R10	4	REVERSE
1916	S8-MC4	3	
1916	MC5-M2	3	WIPER MOTOR
1916	MC5-MC4	3	WIPER MOTOR
1917	MC5-M2	3	
1917	MC5-MC4	3	
1917	S8-MC4	3	
1919	MC2-MC5	3	
1919	MC5-M2	3	
1919	MC5-1118	3	
1919	MC2-CB10	4	
1920	MC2-1008	3	
1920	MC2-R2	4	CLEARANCE LIGHTS
1921	S7-MC4	3	
1921	M1-MC4	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1926	MC56-MC23	5	ETHER START
1927	R1-CB1	4	HEADLIGHTS
1928	MC34-MC31	3	
1928	L38-MC34	3	
1928	MC31-MC30	6	TRAILER
1929	MC31-MC30	6	TRAILER
1929	MC34-MC31	3	
1932	MC128-MC61	6	WATER TEMP
1932	MC61-TS3	6	WATER TEMP
1932	MC59-MC63	6	
1932	MC63-MC128	6	
1933	MC61-TS3	6	WATER TEMP
1933	MC63-MC61	6	
1933	MC59-MC63	6	
1935	MC76-M45	6	FAN CONTROL VALVE
1935	MC59-MC76	6	
1935	MC76-M45	6	FAN CONTROL VALVE
1935	MC59-MC76	6	
1938	MC70-M74	5	
1938	MC70-MC65	5	
1938	MC65-MC39	5	
1938B	MC39-S22	5	STE/ICE ZEROING
1939	MC71-M75	5	ENGINE WATER TEMP
1939	MC65-MC39	5	STE/ICE
1939	MC71-MC65	5	
1939B	MC39-S22	5	STE/ICE ZEROING
1940	MC71-MC65	5	
1940	MC71-M75	5	ENGINE WATER TEMP
1940	MC65-MC39	5	STE/ICE
1940B	MC39-S22	5	STE/ICE ZEROING
1941	MC43-M42	5	FUEL PSI
1941	MC43-MC65	5	
1941	MC65-MC39	5	STE/ICE
1942	MC43-MC65	5	
1942	MC65-MC39	5	
1942	MC43-M42	5	FUEL PSI
1943	MC65-MC39	5	STE/ICE
1943	MC66-M70	5	TURBO OUTLET PSI
1943	MC66-MC65	5	TURBO OUTLET PSI
1944	MC66-M70	5	
1944	MC65-MC39	5	STE/ICE
1944	MC66-MC65	5	TURBO OUTLET PSI
1945	MC68-MC65	5	
1945	MC68-M72	5	AIR BOX PSI
1945	MC65-MC39	5	STE/ICE
1946	MC67-M71	5	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1946	MC65-MC39	5	STE/ICE
1946	MC68-M72	5	AIR BOX PSI
1946	MC68-MC65	5	
1947	MC67-MC65	5	
1947	MC65-MC39	5	STE/ICE
1947	MC67-M71	5	AIR CLEANER
1948	MC67-MC65	5	
1948	MC65-MC39	5	STE/ICE
1949	MC69-MC65	5	FUEL RETURN
1949	MC69-MC65	5	
1949	MC65-MC39	5	STE/ICE
1950	MC5-MC4	3	
1950	S8-MC4	3	
1951	MC65-MC39	5	STE/ICE
1951	MC69-M73	5	FUEL RETURN
1951	MC69-MC65	5	
1952	MC65-MC39	5	
1952	MC70-M74	5	ENGINE OIL TEMP
1952	MC70-MC65	5	
1952B	MC39-S22	5	STE/ICE ZEROING
1953	MC39-MC24	5	
1953	MC24-MC114	5	
1953	MC24-M20	5	
1955	M67-MC21	3	FAN SPEED CONTROL
1956	MC127-MC44	3	FAN SPEED CONTROL
1957	MC127-MC21	3	FAN SPEED CONTROL
SHIELD	MC32-MC64	6	CTI AUX MANIFOLD
SHIELD	MC32-MC109	6	CTI POWER MANIFOLD

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 26
ENGINEERING DWG 3053493 SHEET 2
FP-13/FP-14 BLANK

REVISION D

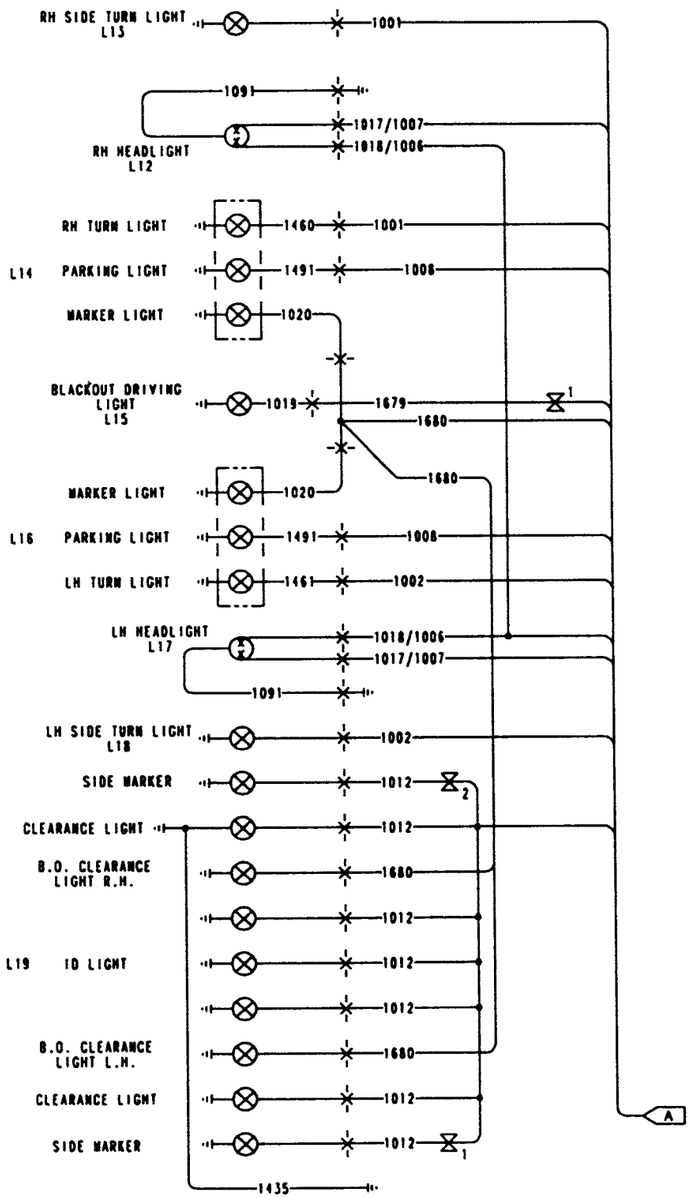


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 26
ENGINEERING DWG 3053493 SHEET 3
FP-15/FP-16 BLANK

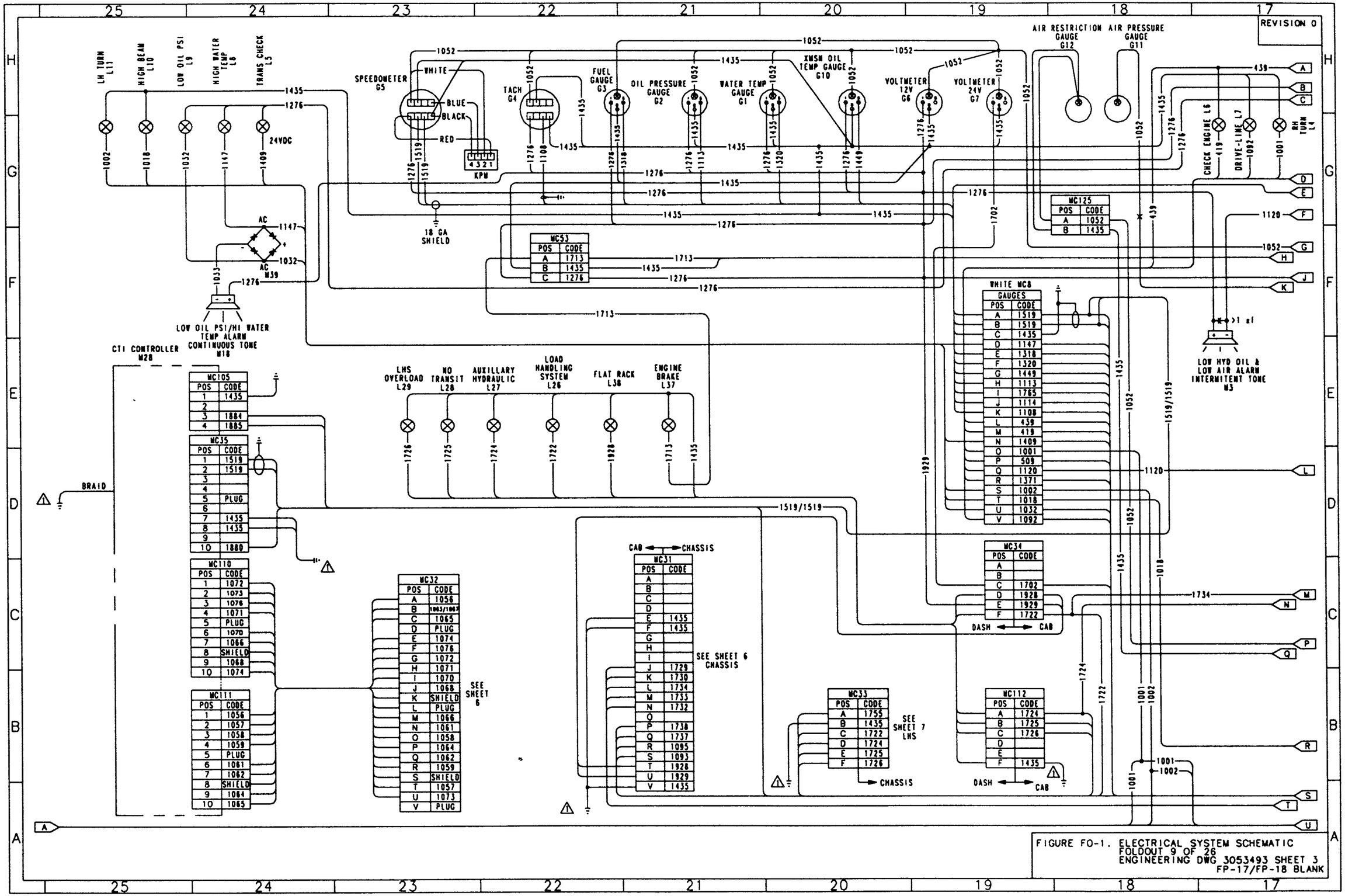


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 26
ENGINEERING DWG 3053493 SHEET 3
FP-17/FP-18 BLANK

REVISION D

CHECK GUAGES L3 · LOW AIR L2 · PARKING BRAKE L1 · LOW HYD OIL L36 · EMERGENCY STEERING L35

DOME LIGHT S21 · WINDSHIELD WIPERS S8 · WINDSHIELD WASHER S7 · WORK LIGHT S6 · BEACON LIGHT S5

DASH → CAB · BLACK

MC4 POS	CODE
A	1153
B	1049
C	1040A
D	1715
E	1921
F	1052
G	1118
H	1950
I	1916
J	1917
K	1184
L	1678
M	1189
N	1680
O	1679
P	1276
Q	1292
R	1713
S	1084
T	1008
U	1714
V	1712

DOME LIGHT L20

BLACK OUT SERVICE SELECT S9 · B.O. MARKER S10 · B.O. DRIVE S11 · HEADLIGHTS S12 · ENGINE BRAKE S16 · RHEOSTAT/DOME LIGHT S14 (OFF, BRIGHT, DIM)

MC126 POS	CODE
A	1005
B	1005A

SENSOR THROTTLE M35

MC6 POS	CODE
A	916
B	417
C	952

ISOLATOR M82 · IGNITION SWITCH 24 VDC S2 (BATT, IGN, ACC, ST) · ETHER START BUTTON S25

AIR HEATER (PASSENGER) M32 · GAS PARTICULATE FILTER M30 · AIR HEATER (DRIVER) M31

PS6 · PS7 · LOW AIR PSI SWITCH

VERNIER CONTROL M16

MC38 POS	CODE
A	952
B	1525
C	916

PARKING BRAKE PS4

THROTTLE POSITION SWITCH S31

MC127 POS	CODE
A	1956
B	1957

PARKING BRAKE SWITCH PS5

WIPER MOTOR M2

MC5 WIPER MOTOR POS	CODE
A	1435
B	1950
C	1919
D	1916
E	1917
F	

SEE SHEET 4 ZONE B13

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 10 OF 26
ENGINEERING DWG 3053493 SHEET 3
FP-19/FP-20 BLANK

REVISION O

CAB HARNESS | TURN SIGNAL ASSY

MC7	
POS	CODE
A	1001
B	1004
C	1002
D	1003
E	1005A
F	1080

TURN SIGNAL/ DIMMER S1

L.H. FRONT LT
R.H. FRONT LT
L.H. REAR LT
R.H. REAR LT
DIMMER

MC106	
POS	CODE
A	216A
B	
C	207A
D	953
E	439
F	900
G	901
H	528
J	
K	

SEE SHEET 4

CAB ◄► CONTROL BOX

MC1	
POS	CODE
A	1084
B	1052
C	1712
D	1052
E	1021A
F	1149
G	1409
H	1714
I	1093
J	
K	
L	1678
M	1713
N	1715
O	1431
P	1680
Q	1003
R	1004
S	1487
T	1884
U	1885
V	1737

SEE SHEET 4 CONTROL BOX

MC91	
POS	CODE
A	1017
B	1017A

MC92	
POS	CODE
A	1016

FRONT BRAKE PS1
REAR BRAKE PS2
HAND BRAKE PS3

HORN SWITCH S15

DIAG CONN DDEC

MC13	
POS	CODE
A	953
B	216A
C	
D	
E	207A
F	
G	
H	439
J	900
K	901
L	
M	

M17 HEATER MOTOR 24VDC
FERRITE BEAD
ORANGE
HEATER SWITCH S3
OFF
LOW
MED
HIGH

S26 SFER CASE LOCK UP
L40
1435
1534
1883

MC28 BEACON LIGHT
L44
1052
1029
1678
M81
AC

MC21	
POS	CODE
A	1320
B	1449
C	1113
D	1021A
E	1032
F	1147
G	1020
H	1036
I	
J	
K	
L	
M	1957
N	1955
O	
P	
Q	
R	
S	
T	
U	
V	

SEE SHEET 5 ENGINE

CAB ◄► CONTROL BOX

MC2	
POS	CODE
A	1017A
B	1049
C	1012
D	1189
E	1168
F	1016
G	10408
H	1040A
I	1017
J	1009
K	1080
L	1007
M	1006
N	1029
O	1184
P	1919
Q	1292
R	1534
S	1021
T	1276
U	1082
V	1920

SEE SHEET 4 CONTROL BOX

1168 → CHASSIS
HORN M15

MC58	
POS	CODE
A	1709
B	1435

CHEM DET M14

MC103	
POS	CODE
A	1746
B	1435
C	1747
D	1745

MC104	
POS	CODE
A	1746
B	1747

CHEMICAL ALARM M29
RED
GREEN

MC44	
POS	CODE
A	1108
B	509
C	419
D	439
E	510
F	916
G	417
H	952
I	1723
J	1738
K	
L	1755
M	1739
N	1717
O	1095
P	1702
Q	1889
R	1890
S	1640
T	1872
U	1880
V	1189

SEE SHEET 4 CONTROL BOX

S30 EMER ENG SHUTDOWN
CRANE SRC
SRW/WHC (SEE NOTES 1-3) S4
SRW S18
GAS PART FILTER S19
CHEMICAL ALARM S20
M67
AC

LOW OIL LEVEL GUAGE

MC96	
POS	CODE
A	
B	1114
C	1435

MC3	
POS	CODE
A	1678
B	1008
C	1004
D	1680
E	1003
F	1149
G	1012
H	1731
I	1005
J	1318
K	
L	
M	
N	
O	10408
P	1519
Q	1519
R	1534
S	
T	1765
U	1431
V	1431

SEE SHEET 6 CHASSIS

M49 T.C.
M50 INTER AXLE
M51 DIFF
M1 WINDSHIELD WASHER
.1 uf
100 Ω
L43 POST LIGHT

NOTE:

1. SWITCH IS ONLY REQUIRED ON VEHICLES EQUIPPED WITH BOTH CRANE AND SELF RECOVERY WINCH.
2. WHEN ONLY CRANE IS INSTALLED SWITCH S4 IS ELIMINATED. CONNECT 1744 AND 1731 TOGETHER.
3. WHEN ONLY SELF RECOVERY WINCH IS INSTALLED SWITCH S4 IS ELIMINATED. CONNECT 1744 AND 1732 TOGETHER.
4. GROUND LOCATION:
   - ⚠1 • LH HEAD LIGHT
   - ⚠2 • LH SIDE CONTROL BOX
   - ⚠ DIODES TO BE 1N4001
5. GROMMET:
   - ⧖1 LH SIDE OF HEATER
   - ⧖2 RH SIDE OF HEATER
   - ▽ SPLICE
   - ⬭ EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 26
ENGINEERING DWG 3053493 SHEET 3
FP-21/FP-22 BLANK

REVISION C
CN 14815
12-15-97

SHIFT CONTROLLER ATEC 12VDC

MC12 POS	CODE
1	210A
2	204
3	221
4	206
5	220
6	218
7	219
8	2238
9	231
10	230
11	212
12	225
13	233
14	234
15	

SEE SHEET 3

MC44 POS	CODE
A	1108
B	509
C	419
D	439
E	510
F	916
G	417
H	952
I	1723
J	1738
K	
L	1755
M	1739
N	1717
O	1095
P	1702
Q	1889
R	1890
S	1640
T	1872
U	1880
V	1189

BLACK

MC2 POS	CODE
A	1017A
B	1049
C	1012
D	1189
E	1168
F	1016
G	1040B
H	1040A
I	1017
J	1009
K	1080
L	1007
M	1006
N	1029
O	1184
P	1919
Q	1292
R	534
S	1021
T	1276
U	1082
V	1920

WHITE

MC1 POS	CODE
A	1084
B	1052
C	1712
D	1052
E	1021A
F	1149
G	1409
H	1714
I	1093
J	
K	
L	1678
M	1713
N	1715
O	1431
P	1680
Q	1003
R	1004
S	1487
T	1884
U	1885
V	1737

MC52 POS	CODE
A	1017
B	1082
C	1026
D	1021
E	1891
F	1882

MC119 POS	CODE
A	1431
B	1640
C	1644
D	1435

HEADLIGHTS R1 · CLEARANCE LIGHTS R2 · HORN R3 · WORK LIGHT R4 · DIMMER R5 · BEACON R6 · XMSN R7 · RETARDER R8 — 12 VDC

CB1 15 AMP HEAD LIGHTS
CB2 15 AMP C.L. LIGHTS
CB3 15 AMP BEACON BACK UP
CB4 15 AMP WORK LIGHT
CB5 20 AMP TURN SIGNAL
CB6 15 AMP STOP LIGHT
CB7 10 AMP ENG. BRAKE
CB8 15 AMP DASH LOCK UP

SEE SHEET 5 — 1430 — 12 VDC — MAG SWITCH R28 12 VDC CIRCUITS — >1uf — .01uf

1079 SEE SHEET 5 — TURN SIGNAL FLASHER M5

R32 · R33

S29 ARCTIC PUMP

24 VDC IGN SEE SHEET 5 — 1281 — 24 VDC ACC

M52 — AC

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 26
ENGINEERING DWG 3053493 SHEET 4
FP-23/FP-24 BLANK

REVISION C
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CK XMSN R9
REVERSE R10
NEUTRAL START R11
12V MAG R12
BLACK OUT STOP LIGHTS R13
BLACK OUT SERVICE LIGHTS R14
LH TURN LIGHT R15
RH TURN LIGHT R16
BLACK OUT TAIL LIGHTS R17
DDEC R18
TRANS DDEC R19

CB9 10 AMP WIPER
CB10 3 AMP IGN
CB11 8 AMP DDEC TRANS
CB12 8 AMP TRANS
CB13 8 AMP DDEC
CB14 15 AMP TRANS
CB15 15 AMP HEATER
CB16 15 AMP DRIVE LINE
CB17 3 AMP CTI
CB18 10 AMP LHS CRANE
CB19 15 AMP CHEM ALARM RADIO
CB25 15 AMP 12V AUX
CB26 15 AMP 24V AUX

SWING FIRE

MC101	
POS	CODE
A	1340
B	1435

EMERGENCY ENGINE SHUTDOWN

MC116	
POS	CODE
A	439
B	439

24 VDC CIRCUITS
12 VDC
MAG SWITCH R26
24 VDC MAG SWITCH R25
BATT ATEC SEE SHEET 5
SEE SHEET 5
SEE SHEET 3 ZONE 9E
RADIO LEAD 9 AMP
M76

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 26
ENGINEERING DWG 3053493 SHEET 4
FP-25/FP-26 BLANK

REVISION C
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INTER AXLE R20 87A 87 85 30 86 — 1883, 1884, 1665C, 1882, 1888
DIFF LOCK R21 87A 87 85 30 86 — 1890, 1885, 1538, 1882, 1888
CRANE HI IDLE 24 VDC R22 87A 87 85 30 86 — 510, 1737, 231
HIGH RANGE LOCK OUT R23 87A 87 85 30 86 — 1435, 1885, 1095
T.C. DUAL MODE R24 87A 87 85 30 86 — 1435, 1095, 315/313

234 — 2238 — 2238 — 223A — 225 — 231/233 — 1885 — 1095 — 309

M39 AC 1884 1885
1538 — 1676 — 1665C
1885

CB21 30 AMP GAS PARTICULATE — 24V — 1280 — 1739
CB20 15 AMP TRAILER LIGHTING — 24V — 1431
DDEC CB22 20 AMP — 241 — 241
DDEC CB23 20 AMP — 240 — 240
150 — SEE SHEET #5 — 150

M36 — 1052

MC9 J1A

POS	CODE
1A	208
1B	209
1C	238
1D	239
1E	217
1F	204
1G	206
1H	218
1J	207A
1K	222
2A	202A
2B	223A
2C	210A
2D	214
2E	
2F	221
2G	220
2H	219
2J	216A
2K	201
3A	203
3B	240
3C	241
3D	215
3E	
3F	211
3G	205
3H	215
3J	212
3K	224

MC10 J1B

POS	CODE
1L	112
1M	113
1N	106A
1P	124
1R	116
1S	110
1T	115
1W	105
1X	
1Y	107
2L	123
2L	108
2N	101
2P	104
2R	
2S	
2T	120
2W	119
2X	
2Y	109
3L	114
3M	111
3N	122
3P	118
3R	
3S	
3T	121
3W	
3X	
3Y	117

MC45 J3

POS	CODE
A	301
B	302
C	303
D	304
E	305
F	306
G	307
H	308
J	309
K	310
L	311
M	312
N	313
P	314
R	315
S	316

ECU ATEC

CONTROL BOX | CHASSIS

MC25

POS	CODE
A	1680C
B	1003C
C	1680C
D	1435
E	1008C
F	1678C
G	1680C
H	1004C
I	1665C
J	1435
K	1538
L	1644
M	1435
N	
O	
P	
Q	
R	
S	
T	
U	
V	

SEE SHEET 6
24V TRAILER

KNIT LOOM W/COPPER
TO XSMN CONNECTOR SEE SHEET 5

1068

CONTROL BOX | CHASSIS/EMG

MC11

POS	CODE
A	
B	916
C	419
D	509
E	439
F	901
G	900
H	952
J	417
K	451
L	908
M	505
N	
O	510
P	1517
Q	1871
R	1715
S	1716
T	508
U	208/209
V	115
W	
X	

1644 — 439 — 439 — 439 — 955

SEE SHEET 5

X = UNUSED SEALED POSITIONS

POS	CODE
1	1000
2	
3	
4	1000
5	
6	
7	

GROUND LOCATION
1 • LH HEAD LIGHT
2 • RH SIDE CONTROL BOX
1 FERRISHIELD FAIRRITE PN SS28B2032
2 FERRISHIELD FAIRRITE PN TC28B1500
EMI SHIELDED WIRES

MC50

POS	CODE
A	213
B	211
C	215
D	214
E	231
F	233

MC51

POS	CODE
A	206/204
B	207A
C	223A
D	216A
E	201
F	203

MC106

POS	CODE
A	216A
B	
C	207A
D	953
E	439
F	900
G	901
H	526
J	
K	

SEE SHEET 5

THROTTLE POSITION CONTROL M4 — 908 — 6.8K

THROTTLE SENSOR MC36

POS	CODE
A	124
B	104
C	106A

MC14

POS	CODE
A	953

MC102

POS	CODE
A	115
B	953

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 14 OF 26
ENGINEERING DWG 3053493 SHEET 4
FP-27/FP-28 BLANK

REVISION C
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MC21	
POS	CODE
A	1320
B	1449
C	1113
D	1021A
E	1032
F	1147
G	1020
H	1036
J	X
K	X
L	X
M	1957
N	1955
O	X
P	X
Q	X
R	X
S	X
T	X
U	X
V	X

MC60	
POS	CODE
A	1021A
B	1020

BOOST PRESSURE SWITCH PS15
SPST-N.C.
@ 7.5 PSI ± .5 PSI
ON RISING PRESSURE

200 AMP ALTERNATOR M20
RECTIFIER
STATOR
SCR
FIELD
+24 VOLTS
+12 VOLTS
ENG
DUAL VOLTAGE REGULATOR
FIELD SENSE (NEGATIVE)
SCR REGULATOR RECEPTACLE

STE/ICE

MC24	
POS	CODE
1	1860
2	1820
3	1815
4	1861
5	1953

WATER TEMPERATURE SENDING UNIT SU1
ENGINE OIL PRESSURE SWITCH PS9
TRANSMISSION TEMPERATURE SENDING UNIT SU2
OIL MANIFOLD
ENGINE WATER TEMP SWITCH TS2
ENGINE OIL PRESSURE SENDING UNIT SU3
ALT OIL PSI SW PS12
ATEC OIL PRESSURE SWITCH PS8

R27 MAGNETIC SWITCH 24V
5 MFD 200 VDC
2 MFD
.01 MFD

CONTROL BOX ↔ CHASSIS/ENGINE

MC11	
POS	CODE
A	X
B	916
C	419
D	509
E	439
F	901
G	900
H	952
J	417
K	528
L	908
M	505
N	X
O	510
P	1517
Q	1871
R	1715
S	1716
T	988
U	208/209
V	115
W	X
X	X

ENGINE BRAKE
RH COILS M21
LH COILS M22
TS1 ETHER START

MC56	
POS	CODE
A	1036
B	1926

MC23	
POS	CODE
A	1926
B	1435

WHITE
BLACK
ETHER START M8

CB24 3 AMP

MC108	
POS	CODE
A	1020
B	1435

FUEL PUMP M12
4.7 MFD

A	1020
B	1435

SEE WC3 SHEET 6 — 1431/1431

24 VDC
12 VDC
POLARITY PROTECTION DEVICE M64
1079 SEE CB5 SHEET 4

SEE SHEET 4

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 26
ENGINEERING DWG 3053493 SHEET 5
FP-29/FP-30 BLANK

REVISION G6
CN 20233
10/12/99

ECM

MC17
POS	CODE
A	240
B	151
C	241
D	150
E	150

MC62
POS	CODE
A	240
B	151
C	241
D	150
E	150

MC18
POS	CODE
A1	988
A2	555
A3	916
B1	419
B2	509
B3	439
C1	901
C2	900
C3	952
D1	510
D2	417
D3	749
E1	451
E2	
E3	
F1	542
F2	544
F3	499
G1	528
G2	543
G3	545
H1	
H2	
H3	115
J1	541
J2	531
J3	908
K1	505
K2	
K3	

12066317

12040947
POS	CODE
A	612
B	614
C	618
D	616
E	620

620 614 INJECTOR 4R
620 612 INJECTOR 3R
620 616 INJECTOR 2R
620 618 INJECTOR 1R

2065143
POS	CODE
L	611
K	613
J	617
H	615
G	619

619 611 INJECTOR 1L
619 617 INJECTOR 2L
619 613 INJECTOR 3L
619 615 INJECTOR 4L

12034398
POS	CODE
L1	
L2	
L3	925
M1	
M2	
M3	926
N1	
N2	
N3	
P1	432
P2	530
P3	
R1	
R2	120
R3	472
S1	112
S2	111
S3	
T1	109
T2	110
T3	
W1	416
W2	
W3	
X1	
X2	
X3	
Y1	
Y2	452
Y3	

MC19
POS	CODE
A	123
B	114
C	121
D	111
E	101
F	118
G	116
H	122
J	
K	108
L	109
M	119
N	117
O	107
P	106B
Q	
R	
S	
T	115
U	105
V	120
W	110
X	

MC20
POS	CODE
A	113
B	112

MC14
POS	CODE
A	953

MC95
POS	CODE
A	208/209

TWISTED PAIR SHIELDED
TWISTED PAIR 901/900
TRANSMISSION
KNIT LOOM W/COPPER
SEE SHEET 4
18AWG
18AWG
STARTER M7
SLAVE CONNECTOR M23
M48 SHUNT
BATTERIES M6
B1 (2)
B2 (1)
A1 (4)
A2 (3)
ARCTIC BATTERIES M77
OPTION
BATTERY DISCONNECT SWITCH S32
10 GA
4 GA
1275
1281A
1274
1566
1813/1821
1814/1822
1816/1818
240/241
150/150
151
953
208/209
1137
1138
1139
1045
1055
1816
1818
1828
1829
1435
1138
000
901

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 16 OF 26
ENGINEERING DWG 3053493 SHEET 5
FP-31/FP-32 BLANK

REVISION C
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STE/ICE CONNECTOR MC39

POS	CODE	
A		X
B		X
C		X
D	1825A	
E	1822	
F	1821	
G		X
H		X
J		X
K		X
L	1860	
M	1819	
N	1820	
O	1953	
P	1815	
R	1861	
S	1816	
T	1818	
U	1736	
V	1814	
W	1813	
X	1828	
Y	1829	
Z	1736	
A	1736	
B	1736	
C	1809	
D	1810	
E		X
F	1824	
G	1825	
H	1826	
J	1827	
K	1952	
M	1938	
N	1939	
P	1940	
Q		X
R		X
S	1811	
T	1812	
U	1941	
V	1942	
W	1943	
X	1944	
Y	1945	
Z	1946	
AA	1947	
AB	1948	
AC	1949	
AD	1951	
AE	900	
AF	901	
AG		X

DIFFERENTIAL PRESSURE M41

MC42

POS	CODE
1	1811
2	1812

STE/ICE MODULE M43

MC40

	POS	CODE
X	1	
	2	1826
	3	1827
X	4	
X	5	
	6	1825A
	7	1825
X	8	
X	9	

R3

MC65

POS	CODE
A	
B	1944
C	
D	1816
E	1818
F	1809
G	1810
H	1824
I	1825
J	1941
K	1942
L	1947
M	1948
N	1945
O	1946
P	1949
Q	1951
R	1952
S	1938
T	1939
U	1940
V	1943

MC41

POS	CODE
1	1809
2	1810

PULSE TACH DRIVE M40

MC66

POS	CODE
1	1824
2	1825
3	1943
4	1944

TURBO OUTLET PSI M70

MC43

POS	CODE
1	1824
2	1825
3	1941
4	1942

FUEL PRESSURE M42

MC67

POS	CODE
1	1824
2	1825
3	1947
4	1948

AIR CLEANER M71

MC68

POS	CODE
1	1824
2	1825
3	1945
4	1946

AIR BOX PSI M72

MC69

POS	CODE
1	1824
2	1825
3	1949
4	1951

FUEL RETURN M73

MC70

POS	CODE
1	1824
2	1825
3	1952
4	1938

ENGINE OIL TEMP M74

MC71

POS	CODE
1	1824
2	1825
3	1939
4	1940

ENGINE WATER TEMP M75

X = UNUSED SEALED POSITIONS

	POS	CODE
	1	1000
X	2	
	3	
	4	1000
X	5	
X	6	
X	7	

⚠ DIODES TO BE 1N4001

A — 416 GRA, C; 432 LT GRN, B; 452 BLK, A — TURBO BOOST

E — 109 PPL, A; 110 DK GRN, B — SENSOR TIMING

D — 112 WHT, A; 111 LTBLU, B — SENSOR SYNC

I — 452 BLK, A; J — 530 BRN, B; K — 416 GRA/BLK, C — SENSOR OIL PSI

C — L — 452 BLK, A; M — 120 TAN, B — SENSOR OIL TEMP

N — 452, A; O — 472, B — FUEL TEMP

STE/ICE ZEROING S22

1940B, 1952B, 1939B, 1938B

P — 1828/1829

Q — 1813/1821

R — 1814/1822

S — 1816/1818

T — 1935/1820/1815/1860/1861

U

1816

MC118

POS	CODE
A	900
B	901
C	SHIELD

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 26
ENGINEERING DWG 3053493 SHEET 5
FP-33/FP-34 BLANK

REVISION O

CAB ◄ ► CHASSIS

MC3

POS	CODE
A	1678
B	1008
C	1004
D	1680
E	1003
F	1149
G	1012
H	1731
I	1005
J	1318
K	
L	
M	
N	
O	1040B
P	1519
Q	1519
R	1534
S	
T	1765
U	1431
V	1431

1005 1012 1003 1004 1008

BATTERIES M6

1431
1431

1 2 3 4

BATTERIES SHOWN FOR REFERENCE ONLY SEE SHEET 5

FRONT TOW

MC27

POS	CODE
WHITE	1435
BLACK	1012
YELLOW	1003
RED	1005
GREEN	1004
BROWN	1008
BLUE	

1435

MC113

POS	CODE
A	1765
B	1435

1765 1765

EMER STRG PS13

1435

1765

1435

CAB ◄ ► CHASSIS

MC31

POS	CODE
A	
B	
C	
D	
E	1435
F	1435
G	
H	
I	
J	1729
K	1730
L	1734
M	1733
N	1732
O	
P	1738
Q	1737
R	1095
S	1093
T	1928
U	1929
V	1435

MC32

POS	CODE
A	1056
B	1063/1067
C	1065
D	PLUG
E	1074
F	1076
G	1072
H	1071
I	1070
J	1068
K	SHIELD
L	PLUG
M	1066
N	1061
O	1058
P	1064
Q	1062
R	1059
S	SHIELD
T	1057
U	1073
V	PLUG

MC25 TRAILER CONN 24V

POS	CODE
A	1680C
B	1003C
C	1680C
D	1435
E	1008C
F	1678C
G	1680C
H	1004C
I	1665C
J	1435
K	1538
L	1644
M	1435
N	
O	
P	
Q	
R	
S	
T	
U	
V	

BRAIDED SHIELD

1067

REAR

MC84

POS	CODE
1	1072
2	1073
3	1076
4	1071
5	PLUG
6	1070
7	1066
8	SHIELD
9	1068
10	1074

CTI AUXILIARY MANIFOLD M25

GROUND IS ATTACHED TO AUXILIARY MANIFOLD

FRONT

MC109

POS	CODE
1	1056
2	1057
3	1058
4	1059
5	1063
6	1061
7	1062
8	SHIELD
9	1064
10	1065

CTI POWER MANIFOLD M24

1063

GROUND IS ATTACHED TO POWER MANIFOLD

BRAIDED SHIELD

FAN CONTROL

MC59

POS	CODE
A	1932
B	1933
C	1935
D	1936

MC73

POS	CODE
A	1538
B	1435

MC128

POS	CODE
A	1933
B	1932

WATER TEMP. N.C.

TS4

MC63

POS	CODE
A	1932
B	1933
C	DRAIN

MC61

POS	CODE
A	1932
B	1932

WATER TEMP.

TS3

MC76

POS	CODE
A	1936
B	1935

FAN CONTROL VALVE M45

MC123

POS	CODE
A	1732
B	1435

MC122

POS	CODE
A	1730
B	1435

MC121

POS	CODE
A	1729
B	1435

1911980

SELF RECOVERY WINCH M27

MC55

POS	CODE
A	1729
B	1730
C	1732
D	1435

1435 1538

FAN M51

1899700

LHS M10

AIR DRYER M13

1733 1734 1435 1435

MC97

POS	CODE
A	1538
B	1435

1435

1538

1435

A B C D

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 26
ENGINEERING DWG 3053493 SHEET 6
FP-35/FP-36 BLANK

REVISION O

L32 1012 SIDE MARKER 1012 L34

MC80 POS CODE A 1012 B 1003 C 1004

1678/23 1008/21 1004/22 1680/24 L22 B.O. STOP LIGHT TAIL LIGHT STOP LIGHT B.O. TAIL LIGHT R.H.

1678/23 1008/21 1003/22 1680/24 L24 B.O. STOP LIGHT TAIL LIGHT STOP LIGHT B.O. TAIL LIGHT L.H.

1012 1003 1680/24 1435 1149

MC78 POS CODE A 1680 B 1678 C 1149 D 1008 E 1435 F 1435

1435

MC124 POS CODE A 1149 B 1435

MC77 POS CODE A 1149 B 1435

1718 1435 BACK UP LIGHT L23 BACK UP ALARM M78

MC79 POS CODE A 1040B B 1435 WORK LIGHT RH L21

MC54 POS CODE A 1040B B 1435 L39 WORK LIGHT LH

CRANE MC29

P		R	
1737	A		THROTTLE WHITE
1435	B		GROUND GREEN
1738	C		+24 VDC BLACK
1731	D		SHUTOFF VALVE FEED RED
1435	E		SHIELD

TWISTED PAIR

1519 SPEEDOMETER GENERATOR SU4 1519 18 GA SHIELDED

MC57 POS CODE A 1095 B 1093 S13 DRIVE LINE LOCK TRANSFER CASE HI/LO

1318 1435 FUEL LEVEL SU5

MC107 POS CODE A 1534 B 1435 FUEL/WATER SEPERATOR M9 1534 1435

TRAILER CONNECTION 12 VDC

MC16

POS	CODE
1435	WHITE
1012	BLACK
1003	YELLOW
1005	RED
1004	GREEN
1008	BROWN
	BLUE

TRAILER MC30 POS CODE A 1928 B 1929 C PLUG D PLUG

1012 L31 REAR SIDE MARKER

1012 CLEARANCE LIGHTS

1680 L42 B.O. CLEARANCE LIGHT

1012 1012 L25 10 LIGHTS 1012 1012

1680 L41 B.O. CLEARANCE LIGHT

MC90 POS CODE A 1012 B 1435 C 1680

1012 L33 CLEARANCE LIGHTS

1012 REAR SIDE MARKER 1435

AFTERCOOLER M11 AIR DRYER M14

MC98 POS CODE A 1538 B 1435

MC99 POS CODE A 1538 B 1435

MC120 POS CODE A 1644 B 1435 M80 ARCTIC PUMP 1644/1435

MC15

POS	CODE	
A	1680C	24-484
B	1003C	22-461
C	1680C	24-483
D	1435C	90
E	1908C	21-489
F	1678C	23
H	1680C	490
J	1004C	22-460
K	1665C	37
L	1435C	90
M		53
N		53

MILITARY CONNECTOR

TRAILER CONNECTION 24 VDC

SEPERATE LOOMED HARNESS

B C D

X1 GROMMET LOCATED LH SIDE OF HEATER

DIODES TO BE 1N4001

EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 26
ENGINEERING DWG 3053493 SHEET 6
FP-37/FP-38 BLANK

REVISION 0

MC33	
POS	CODE
A	1755
B	1435
C	1722
D	1724
E	1725
F	1726

(24 VDC IN)
(GROUND)
(LHS IND & VA.)
(SRW-CRANE & VA.)
(TRANS LIGHT NO)
(OVER LOAD)

SEE SHEET 3

1860810 (7200)

MC84	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	—

1860800 (7190)

MC83	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	—

M26
CAB CONTROL BOX
1891370

M.R. "A" SOLENOID	
H.A. "B" SOLENOID	
M.R. "B" SOLENOID	
H.A. "A" SOLENOID	
SEQUENCING (3)	
24 VOLT +	
SEQUENCING (6)	
TRANSIT VALVE	
FREE FLOW VALVE	
0 VOLTS	
0 VOLTS	
PROXIMITY H.A. DOWN	

SEE SHEET 8 FOR DETAIL OF CAB CONTROL BOX

MC81	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	—

1860790 (7170)

GREEN
RED
WHITE
DRAIN WIRE

MC82	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	—

1883440

1877480 (7140) HOOKARM SOL A M53

1877470 (7150) HOOKARM SOL B M54

1435/WHITE
1464/BLACK

1435/WHITE
1467/BLACK

1480
1463
M68
1478
1477
1479

HOOK ARM ELECTRIC SAFE LOWERING

MAIN RAM ELECTRIC SAFE LOWERING

A B C D E F G H J K L M N P Q R S T U V W X Y

1465

1465

1884570 U
MAIN JUNCTION BOX

MC93	
POS	CODE
A	1724
B	1480
C	1481
D	1482
E	1483
F	1484

MC94	
POS	CODE
A	1485
B	1486
C	1487
D	1488
E	1489
F	1490

1724 — 22 — 21
18 — 17
1487 — 14 — 13
10 — 9
1481 — 12 — 11
1480 — 24 — 23
6 — 5
1486 — 8 — 7
1482 — 20 — 19
2 — 1
1484 — 4 — 3
1485 — 16 — 15

5
4
3
2
1
0

0 OFF
1 AUTO
2 MAN HA
3 MAN MF
4 MAN TRAN
5 CRANE/SRW

1891360 U
MULTI FUNCTION SWITCH ASSY

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 26
ENGINEERING DWG 3053493 SHEET 7
FP-39/FP-40 BLANK

REVISION 0

1877450 (7130) MAIN CYLINDER SOL B M56
1877460 (7120) MAIN CYLINDER SOL A M55
1877440 (7110) FREEFLOW M57
1877490 (7160) TRANSIT M58

1435/WHITE 1468/BLACK
1435/WHITE 1465/BLACK
1435/WHITE 1462/BLACK
1435/WHITE 1480/BLACK

OVERLOAD PRESSURE SWITCH N.O. S28

1479/BLACK
1460/WHITE

POS
A 1
B 2
C 3
D 4
E 5
F 6
G 7
H 8
J 9
K 10
L 11
M 12
N 13
P 14
Q 15
R 16
S 17
T 18
U
V
W

1883450

MC85

POS	CODE
A	1461
B	1472
C	1435
D	1471
E	1435
F	1435
G	1469
H	1466
I	1470
J	1475

1860780 (7100)

MC86

POS	CODE
A	1461
B	1472
C	1435
D	1471
E	1435
F	1435
G	1469
H	1466
I	1470
J	1475

1891910 W HOOK ARM DOWN PROXIMITY SW NORMALLY OPEN S27

MC88

POS	CODE
A	1472
B	1471
C	1435

+ BROWN
S BLACK
- BLUE

1860820 (7370)

MC87

POS	CODE
A	1461
B	1435
C	1435
D	1469
E	1466
F	1470
G	1475
H	—
I	—
J	—

1891410

POS
1
2
3
4
5
6
7

1891530 U LHS JUNCTION BOX

1891930 W MIDDLE FRAME PROXIMITY SW NORMALLY OPEN S24
1435/BLUE 1461/BROWN 1469/BLACK

1891920 W HOOK ARM UP PROXIMITY SW NORMALLY OPEN S23
1435/BLUE 1474/BROWN 1466/BLACK

1878910 LH HOOK ARM
A M59 M60 B
1435/WHITE 1470/BLACK
1435/WHITE 1470/BLACK

1878900 RH HOOK ARM
A M61 M62 B
1435/WHITE 1475/BLACK
1435/WHITE 1475/BLACK

1435

1480

87A 87 85
30 86

R29 MIDDLE FRAME LOCK-OUT

EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 26
ENGINEERING DWG 3053493 SHEET 7
FP-41/FP-42 BLANK

REVISION 0

MC83

POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	....

MAN. HOOK ARM UP
MAN. MID FRAME DOWN
MAN. HOOK ARM DOWN
MAN. MID FRAME UP
+24V IN
COMMON
MAN./AUTO MODE
AUTO LOAD IN
AUTO UNLOAD IN
LHS LIGHT
MAN. TRANS IN
24V OUT
UNLOAD OUT
LOAD OUT
OVERLOAD LIGHT
NO TRANSIT LIGHT
AUX MODE IN

CR1-MR2400, FU1, RP1 2.7K, LED5, R1-3.3K, Q1 2N3906, RP2 3.3K, RP3 2.7K, LED15, CR16 1.5KE39, +24V
RP1 2.7K, LED3
RP1-2.7K, LED1, CR2-1.5KE39
RP1-2.7K, LED2, CR3-1.5KE39
CR4-1.5KE39
RP1-2.7K, LED4, CR5-1.5KE39
RP1-2.7K, LED6, CR7-1.5KE39
RP1-2.7K, LED7, CR6-1.5KE39
RP2-2.7K, LED10, CR10-1.5KE39
RP2-2.7K, LED9, CR9-1.5KE39
RP2-2.7K, LED8, CR8-1.5KE39

CR24-1N4007
CR27-1N5400
CR28-1N5400
CR22-1N5400
CR23-1N5400
CR29-1N5400
K1, K2, K3, K4, K5, K6, K7
DP1
RP4 1M
U1
C1-1.5uf TANT.
R4 1K
C2 1.5uf TANT
CR25 1N4743 13V
Q2 VN10KM
CR30 1N4007
CR31 1N4753 36V
C3 .022uf
RP4 1M
RP4-1M
R5-1K
CR26 1N4148
C4 1.5uf TANT
RELAY BOARD

JS-13, JS-14 LOAD
JS-24, JS-23 UNLOAD
JOYSTICK

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 22 OF 26
ENGINEERING DWG 3053493 SHEET 8
FP-43/FP-44 BLANK

REVISION O

MC81

A — MAIN RAM A SOL. — RP3-2.7K — LED14 — CR14-1.5KE39
B — HOOK ARM B SOL — RP2-2.7K — LED13 — CR13-1.5KE39
C — MAIN RAM B SOL. — RP2-2.7K — LED12 — CR12-1.5KE39
D — HOOK ARM A SOL. — RP2-2.7K — LED11 — CR11-1.5KE39
E — HOOK ARM UP — RP3-2.7K — LED15 — CR15-1.5KE39
F — +24V OUT — +24V
G — MID FRAM DOWN — RP3-2.7K — LED21 — CR21-1.5KE39
H — TRANSIT VALVE — RP3-2.7K — LED19 — CR19-1.5KE39
J — FREE FLOW VALVE — RP3-2.7K — LED17 — CR17-1.5KE39
K — 0 VOLTS
L — 0 VOLTS
M — HOOK ARM DOWN — RP3-2.7K — LED18 — CR18-1.5KE39
N — OVERLOAD IN — RP3-2.7K — LED20 — CR20-1.5KE39
P
R
S
T

MC81	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	---

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 23 OF 35
ENGINEERING DWG 1878290 SHEET 8
FP-45/FP-46 BLANK

REVISION D

SYSTEM SHUTDOWN RELAY

CONTROL LOCKOUT RELAY

THROTTLE RELAY

GROUND

POWER CABLE TO VEHICLE

MC29	
POS	CODE
A	WHT
B	GRN
C	BLK
D	RED
E	SHIELD

PASSENGER SIDE REMOTE CABLE

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

POS	CODE
A	BLK
B	WHT
C	GRN
D	RED

OVERLOAD SHUTDOWN SYSTEM

POS	CODE
A	BLU
B	BLK
C	BRN

HOIST LAYER SENSING SWITCH

POS	CODE
A	WHT
B	BLK
C	RED
D	GRN
E	SHIELD

HOIST LOAD CELL

CRANE FUNCTION SOLENOIDS

SWING: CCW, CW

TELE: OUT, IN

LIFT: UP, DWN

HOIST: UP, DWN

OVERLOAD SOLENOIDS: MHC MAIN HYD PRESS, LIFT UP & DOWN, HOIST UP, TELE OUT, CRANE FUNCTION L/O

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 24 OF 26
ENGINEERING DWG 3053493 SHEET 9
FP-47/FP-48 BLANK

REVISION 0

JUNCTION BOX ASSY

A
B
C
D
E
F
G
H
J
K
L
M
N

BLU
BRN
BLK
19/3
E

DRIVER SIDE O/R ENGAGED SENSING SWITCH

D6 WHT
D7
D9
D8
RED/GRN

GRN
RED
BLK
WHT
LINE LOAD
POWER SWITCH 10 AMP MAGNETIC CIRCUIT BREAKER

HIGH IDLE SWITCH LATCH-UNLATCH

BLK
WHT
RED
16/4
D

18/15
F

DRIVER SIDE REMOTE CABLE

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

BRN BLK BLU

REMOTE CONTROL CABLE
18/15

C
19/3
BRN
BLU
BLK
PASSENGER SIDE O/R ENGAGED SENSING SWITCH

N
O
18/2
D22
WHT
BLK
O/R MAST SHUTDOWN SOLENOID

REMOTE CONTROL BOX

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

SWING

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	CCW
4	BLU	CW

8 2 9 10

TELE

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	OUT
4	BLU	IN

8 2 11 12

ON
4
26
20
SHUT DOWN

BOOM

POS	CODE	
1	RED	+
2	GRN	-
3	WHT	UP
4	BLU	DWN

8 2 13 14

HOIST

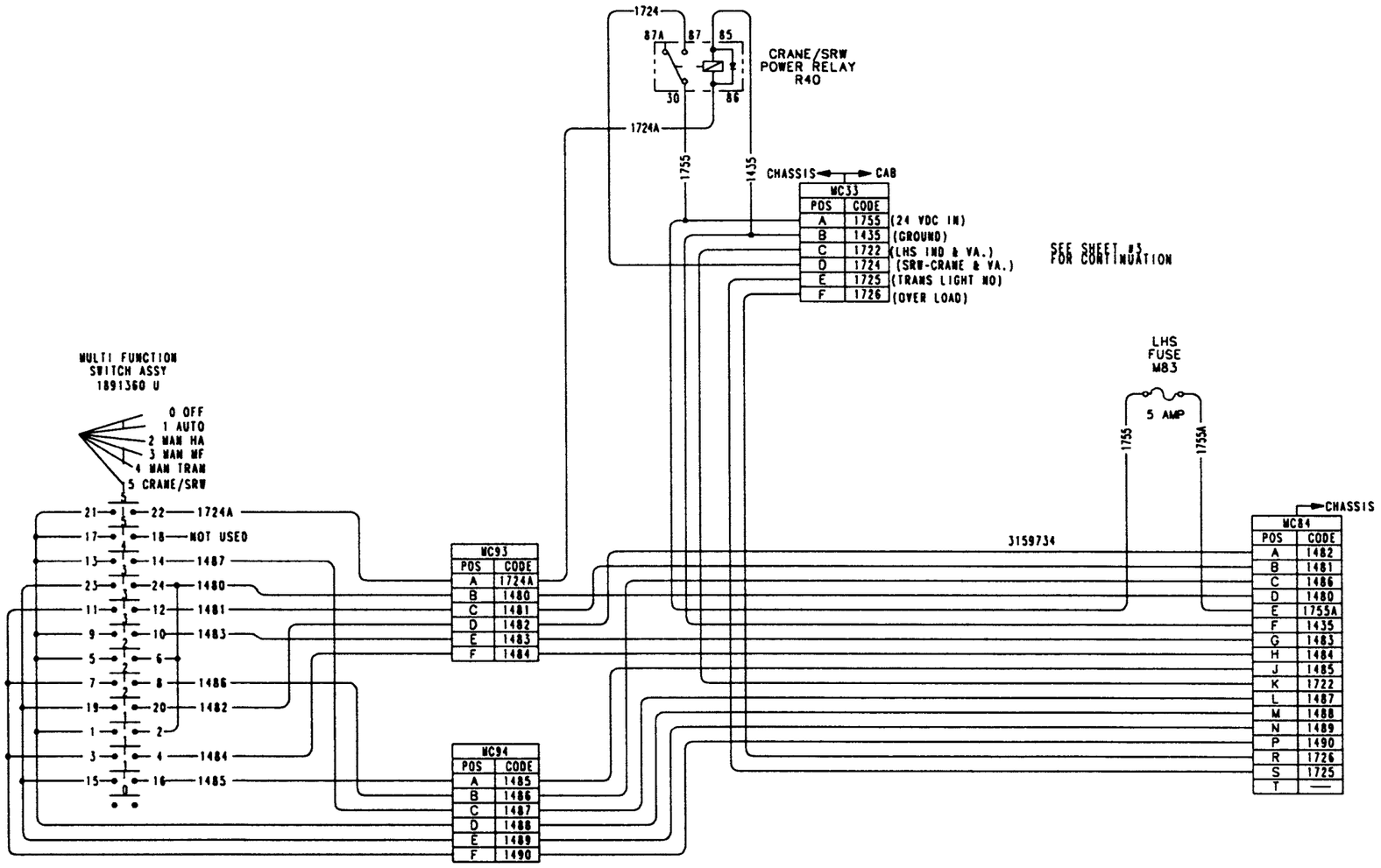
POS	CODE	
1	RED	+
2	GRN	-
3	WHT	UP
4	BLU	DWN

8 2 15 16

2

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 26
ENGINEERING DWG 3053493 SHEET 9
FP-49/FP-50 BLANK

REVISION 0



FOR LHS CIRCUIT
PROTECTION CONFIGURATION

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 26 OF 26
ENGINEERING DWG 3053493 SHEET 10
FP-51/FP-52 BLANK

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
0525704

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Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.

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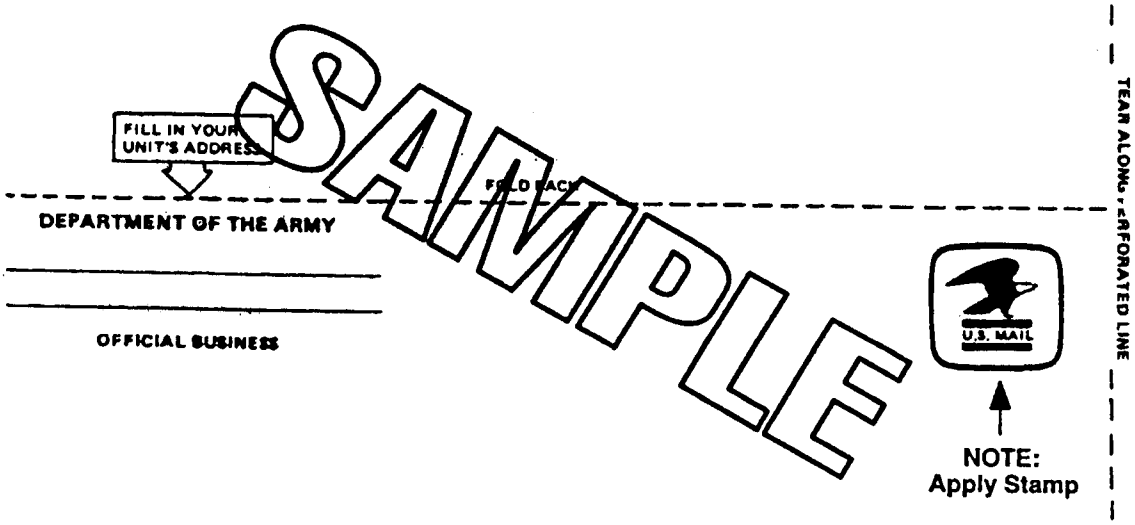
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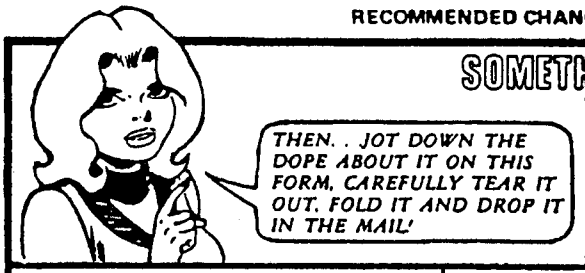
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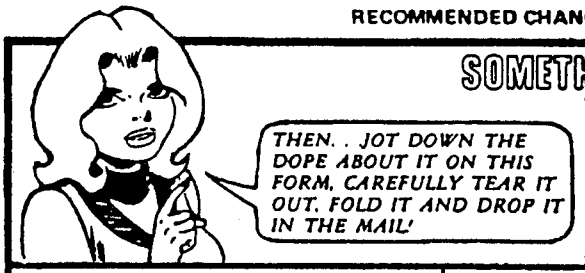
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TEAR ALONG PERFORATION LINE

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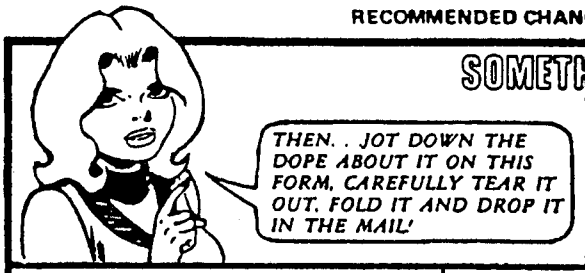
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TEAR ALONG PERFORATION LINE

FILL IN YOUR UNIT'S ADDRESS

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE
1 Centimeter=10 Millimeters=0.01 Meters=0.3937 Inches
1 Meter=100 Centimeters=1000 Millimeters=39.37 Inches
1 Kilometer=1000 Meters=0.621 Miles

WEIGHTS
1 Gram=0.001 Kilograms=1000 Milligrams=0.035 Ounces
1 Kilogram=1000 Grams=2.2 Lb
1 Metric Ton=1000 Kilograms=1 Megagram=1.1 Short Tons

LIQUID MEASURE
1 Milliliter=0.001 Liters=0.0338 Fluid Ounces
1 Liter=1000 Milliliters=33.82 Fluid Ounces

SQUARE MEASURE
1 Sq Centimeter=100 Sq Millimeters=0.155 Sq Inches
1 Sq Meter=10,000 Sq Centimeters=10.76 Sq Feet
1 Sq Kilometer=1,000,000 Sq Meters=0.386 Sq Miles

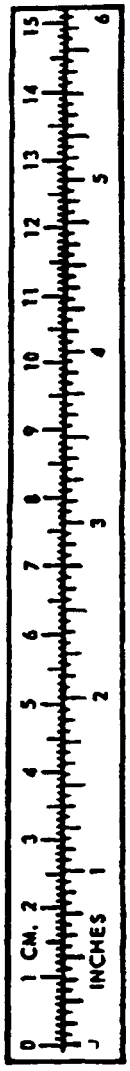
CUBIC MEASURE
1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches
1 Cu Meter=1,000,000 Cu Centimeters=35.31 Cu Feet

TEMPERATURE
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
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds/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



PIN: 072632-000