# ARMY TM 9-2320-365-20-1
# AIR FORCE T.O. 36A12-1B-1095-2-1

# TECHNICAL MANUAL
# MAINTENANCE INSTRUCTIONS
# UNIT MAINTENANCE
# M1078 SERIES, 2 1/2-TON, 4 X 4,
# LIGHT MEDIUM TACTICAL VEHICLES (LMTV)
# VOLUME NO. 1 OF 5

| MODEL | NSN | EIC |
|---|---|---|
| TRK, CAR., LMTV, M1078 | | |
| W/WN | 2320-01-360-1898 | BHH |
| W/O WN | 2320-01-354-3385 | BHD |
| TRK, VAN, LMTV, M1079 | | |
| W/WN | 2320-01-360-1891 | BHG |
| W/O WN | 2320-01-354-3384 | BHE |
| TRK, CHAS, LMTV, M1080 | 2320-01-353-9098 | BHC |
| TRK, CAR., LMTV, AIR DROP, M1081 | | |
| W/WN | 2320-01-360-1899 | BHJ |
| W/O WN | 2320-01-355-3064 | BHF |


HOW TO USE THIS MANUAL
PAGE vii

GENERAL INFORMATION
PAGE 1-1

EQUIPMENT DESCRIPTION AND DATA
PAGE 1-6

SERVICE UPON RECEIPT
PAGE 2-3

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION PAGE 2-6.1

INTRODUCTION TO LOGIC TREE TROUBLESHOOTING
PAGE 2-53

ENGINE SYSTEM TROUBLESHOOTING
PAGE 2-63

FUEL SYSTEM TROUBLESHOOTING
PAGE 2-101

ELECTRICAL SYSTEM TROUBLESHOOTING
PAGE 2-147



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## HEADQUARTERS, DEPARTMENTS OF THE ARMY AND THE AIR FORCE

**JUNE 1998**

## WARNING SUMMARY

**WARNING**

**EXHAUST GASES CAN KILL**

1. **DO NOT** operate your vehicle engine in an enclosed area.
2. **DO NOT** idle vehicle engine with cab windows closed.
3. **DO NOT** drive vehicle with inspection plates or covers removed.
4. **BE ALERT** at all times for exhaust odors.
5. **BE ALERT** for exhaust poisoning symptoms, they are:

   Headache

   Dizziness

   Sleepiness

   Loss of Muscular Control

6. **IF YOU SEE** another person with exhaust poisoning symptoms:

   Remove person from area.

   Expose to open air.

   Keep person warm.

   Do not permit person to move.

   Administer cardiopulmonary resuscitation, if necessary.*

* For cardiopulmonary resuscitation, refer to FM 21-11.

**WARNING**

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

**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 SUMMARY (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. Failure to comply may result in injury to personnel.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 degrees F (38 degrees C) and for Type II is 130 degrees F (50 degrees C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using Dry Cleaning Solvent, immediately get fresh air and medical help. If Dry Cleaning Solvent contacts skin or clothes, flush with cold water. If Dry Cleaning Solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

**WARNING**

**Diesel fuel is flammable. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.**

**WARNING**

**After Nuclear, Biological, or Chemical (NBC) exposure of vehicle, all air filters shall be handled with extreme caution. Unprotected personnel may experience serious injury or death if residual toxic agents or radioactive material are present. If vehicle 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. Failure to comply may result in serious injury or death to personnel.**

**WARNING**

**Diesel fuel is flammable. Do not fill fuel tank with engine running, while smoking, or when near an open flame. Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.**

**WARNING**

**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

**WARNING**

**Use care when removing/installing springs. Springs are under tension and can act as projectiles when being removed. Failure to comply can cause injury to personnel.**

**WARNING**

**Retaining rings are under tension and can act as projectiles when released causing severe eye injury. Use care when removing retaining rings. Failure to comply may result in injury to personnel.**

**WARNING**

**Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.**

**WARNING**

**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

**WARNING**

**Do not operate LMTV vehicle with muffler removed. Toxic exhaust fumes may enter cab, resulting in serious injury or death to personnel.**

**WARNING**

**Do not work on fuel system when engine is hot; fuel can be ignited by a hot engine.**

## WARNING SUMMARY (CONT)

**WARNING**

**Post signs that read "NO SMOKING WITHIN 50 FEET" when working with open fuel, fuel lines or fuel tanks. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Exhaust pipe, transmission oil lines, and transmission scavenge pump hose may be hot to the touch. Extreme care should be taken when checking exhaust pipe, transmission oil lines, and transmission scavenge pump hose for leaks. Failure to comply may result in injury to personnel.**

**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**

**Wheel drum weighs approximately 90 lb (41 Kg). Use the aid of an assistant to help remove wheel drum. Failure to comply may result in injury to personnel.**

**WARNING**

**Wheel drum weighs approximately 90 lb (41 kg). Use the aid of an assistant to help install wheel drum. 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 used compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury to personnel.**

**WARNING**

**Cage spring brake before air chamber is removed or severe injury to personnel will occur.**

**WARNING**

**Ensure air chamber is caged prior to installation. Failure to comply may result in injury to personnel.**

**WARNING**

**Ensure that tire is totally deflated before removing self-locking nuts. Failure to comply may result in serious injury or death to personnel.**

**WARNING**

**Spring brakes must be caged before attempting replacement of a rear axle wheel stud. Failure to comply may result in severe injury to personnel.**

**WARNING**

**Wear protective goggles to protect against possible injury from release of high pressure air. 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. Failure to comply may result in injury to personnel.**

**WARNING**

**Hydraulic fluid (MIL-H-5606) is TOXIC. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes. Skin and clothing that come in contact with hydraulic oil should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.**

**WARNING**

**Wire rope can become frayed or contain broken wires. Wear heavy leather-palmed gloves when handling wire rope. Frayed or broken wires can injure hands. Failure to comply may result in injury to personnel.**

**WARNING**

**Never let moving wire rope slide through hands, even when wearing gloves. A broken wire could cut through gloves and cut hands.**

**WARNING SUMMARY (CONT)**

**WARNING**

**Wear appropriate eye protection when removing rivets. Failure to comply may result in injury to personnel.**

**WARNING**

**Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.**

**WARNING**

**Wear leather gloves at all times when handling winch cable. Do not allow cable to slide through hands even with gloves on. Broken wires may cause injury to personnel.**

**WARNING**

**Use extreme caution when working around moving cable. Failure to do so may result in serious injury to personnel.**

**WARNING**

**Caution must be exercised while cab is raised. Ensure that locking mechanism is functioning properly before proceeding. Failure to comply may result in death or serious injury to personnel and damage to equipment.**

**WARNING**

**Coolant may be very hot and under pressure from engine operation. Ensure engine is cool before performing maintenance. Failure to comply may result in injury to personnel.**

**WARNING**

**Do not remove oil filter while engine is hot. Failure to comply may result in injury to personnel.**

**WARNING**

**Sling spreader weighs approximately 200 lbs (91 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Remove all loose equipment from van body. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Van body weighs approximately 3,360 lbs (1525 kgs) empty. Attach a suitable lifting device prior to removal. Failure to comply may result in serious injury or death to personnel.**

**WARNING**

**Guide ropes must be attached at opposite corners of van body to aid in controlling van body during removal. Failure to comply may result in serious injury or death to personnel.**

**WARNING**

**Center of gravity will change depending on equipment installed in van body. Attach and adjust lifting device so that van body lifts level. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

**WARNING**

**Pod frame weighs approximately 80 lbs (36 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Do not install pod frame on van body for 72 hours after installing blind rivet nuts and spacers. Failure to comply may result in injury to personnel and/or damage to equipment.**

**WARNING**

**Goggles and gloves must be worn when working with glass. Failure to comply may result in injury to personnel.**

## WARNING SUMMARY (CONT)

**WARNING**

**RH door assembly weighs approximately 85 lbs (39 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**LH door assembly weighs approximately 85 lbs (39 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Wear appropriate eye protection when handling fluorescent lamps. Failure to comply may result in injury to personnel.**

**WARNING**

**Heavy objects/loads, such as tool boxes and heavy parts, must always be carried on the floor with the weight distributed as equally as possible between left and right sides of M1079 van. Failure to comply decreases the stability of the M1079 van and will increase the likelihood of a rollover.**

**Heavy cabinets must always be mounted as low as possible with the weight distributed as equally as possible between left and right sides of M1079 van. Remember to consider the weight of the items that will be stored in the cabinets. Failure to comply decreases the stability of the M1079 van and will increase the likelihood of a rollover.**

**Always keep in mind, when placing items inside the M1079 van, that heavier items must always be positioned as low as possible and the weight distributed as equally as possible between left and right sides of M1079 van. Failure to comply decreases the stability of the M1079 van and will increase the likelihood of a rollover.**

**WARNING**

**Extreme care must be taken when lowering gravel deflector. Coolant hoses could be pulled loose. Failure to comply could result in serious eye injury.**

**WARNING**

- **Do not open coolant fill cap if temperature reads above 110°F (43°C). Steam or hot coolant is under pressure. Failure to comply may result in injury to personnel.**
- **Pressure in reservoir tank must be released before removing cap. Failure to comply may result in injury to personnel.**

**WARNING**

**Heater weighs approximately 120 lbs (54 kgs). Use the aid of an assistant when lifting. Failure to comply may result in injury to personnel.**

**WARNING**

**200 amp alternator weighs approximately 70 lbs (32 kgs). The aid of an assistant is required to install 200 amp alternator. Failure to comply may result in injury to personnel.**

**WARNING**

**Light Material Handling Crane (LMHC) mast weighs approximately 110 lbs (50 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Light Material Handling Crane (LMHC) boom assembly weighs approximately 150 lbs (68 kgs). Use an assistant when removing LMHC boom assembly. Failure to comply may result in injury to personnel.**

## WARNING SUMMARY (CONT)

**WARNING**

**Light Material Handling Crane (LMHC) boom weighs approximately 60 lbs (27 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**WARNING**

**Light Material Handling Crane (LMHC) weighs approximately 250 lbs (114 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel.**

**WARNING**

**Use care when removing/installing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

**WARNING**

**Air conditioner weighs approximately 300 lbs (136 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel.**

**WARNING**

**Ensure cargo bed is free of equipment and debris, and is not warped or damaged in any way. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

**WARNING**

**S-280 shelter weighs approximately 1500 lbs (680 kgs) empty. Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

**CHANGE NO. 2**

**HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE**
Washington, D.C., 20 August 2005

# TECHNICAL MANUAL
# MAINTENANCE INSTRUCTIONS
# UNIT MAINTENANCE
# M1078 SERIES, 2 1/2-TON, 4x4,
# LIGHT MEDIUM TACTICAL VEHICLE
# (LMTV)

## VOLUME NO. 1 OF 5

TM 9-2320-365-20-1, 17 June 1998, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the out margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration.

| Remove Pages | Insert Pages |
|---|---|
| e thru h | e thru h |
| A thru J | A thru J |
| none | K thru M/(N Blank) |
| none | Change 2 Authentication Sheet |
| 2-9 thru 2-12 | 2-9 thru 2-12 |
| 2-21 and 2-22 | 2-21 and 2-22 |
| 2-33 and 2-34 | 2-33 and 2-34 |
| 2-37 and 2-38 | 2-37 and 2-38 |
| 2-41 thru 2-48 | 2-41 thru 2-48 |
| 2-51 and 2-52 | 2-51 and 2-52 |
| 2-55 thru 2-62 | 2-55 thru 2-62 |
| 2-129 thru 2-142 | 2-129 thru 2-142 |
| 2-147 and 2-148 | 2-147 and 2-148 |
| 2-325 thru 2-328 | 2-325 thru 2-328 |
| none | 2-328.1 and 2-328.2 |
| 2-329 thru 2-332 | 2-329 thru 2-332 |
| 2-370.3 and 2-370.4 | 2-370.3 and 2-370.4 |
| 2-370.5 thru 2-370.10 | 2-370.5 and 2-370.10 |
| none | 2-408.1 thru 2-408.16 |
| 2-409 and 2-410 | 2-409 and 2-410 |
| 2-905 thru 2-918.6 | 2-905 thru 2-918.6 |
| none | 2-918.7 thru 2-918.20 |
| 2-919 and 2-920 | 2-919 and 2-920 |
| 2-945 thru 2-1010 | 2-945 thru 2-1010 |
| B-5 and B-6 | B-5 and B-6 |
| B-17 thru B-19/ | B-17 thruB-19/ |
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| C-1 thru C-4 | C-1 thru C-4 |
| D-1 and D-2 | D-1 and D-2 |
| D-5 and D-6 | D-5 and D-6 |
| G-1 thru G-10 | G-1 thru G-10 |
| G-11/(G-12 Blank) | G-11/(G-12 Blank) |
| H-1 thru H-12 | H-1 thru H-12 |
| H-15 thru H-21/ | H-15 thru H-21/ |
| (H-22 Blank) | (H-22 Blank) |
| K-1 thru K-4 | K-1 thru K-4 |
| INDEX-5 thru INDEX-16 | INDEX-5 thru INDEX-16 |
| INDEX-19 thru INDEX-36 | INDEX-19 thru INDEX-36 |
| FO-1 FP-3/(FP-4 Blank) | FO-1 FP-3/(FP-4 Blank) |
| FO-1 FP-61/(FP-62 Blank) | FO-1 FP-61/(FP-62 Blank) |
| Metric Conversion Chart | Metric Conversion Chart |
| /PIN | /PIN |

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

By Order of the Secretary of the Army:

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*Chief of Staff*

*O*fficial:



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*Commander, Air Force Materiel Command*

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**CHANGE NO. 1**

**HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE**

Washington, D.C., 1 July 2003

# TECHNICAL MANUAL
# MAINTENANCE INSTRUCTIONS
# UNIT MAINTENANCE
# M1078 SERIES, 2 1/2-TON, 4x4,
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|---|---|
| i and j | i and j |
| none | A thru J |
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| 2-1 thru 2-6 | 2-1 thru 2-6 |
| none | 2-6.1/(2-6.2 blank) |
| 2-7 and 2-8 | 2-7 and 2-8 |
| 2-15 thru 2-22 | 2-15 thru 2-22 |
| 2-53 thru 2-70 | 2-53 thru 2-69/(2-70 Blank) |
| 2-71 thru 2-74 | (2-71 Blank)/2-72 thru 2-74 |
| 2-99/(2-100 Blank) | 2-99 and 2-100 |
| none | 2-100.1 thru 2-100.7/(2-100.8 Blank) |
| 2-101 thru 2-106 | 2-101 thru 2-106 |
| none | 2-106.1 thru 2-106.8 |
| 2-107 and 2-108 | 2-107 and 2-108 |
| 2-119 and 2-120 | 2-119 and 2-120 |
| 2-129 thru 2-144 | 2-129 thru 2-144 |
| none | 2-144.1 thru 2-144.4 |
| 2-145/(2-146 Blank) | 2-145/(2-146 Blank) |
| 2-147 thru 2-152 | 2-147 thru 2-152 |
| none | 2-152.1 thru 2-152.6 |
| 2-153 thru 2-256 | 2-153 thru 2-256 |
| none | 2-256.1 thru 2-256.34 |
| 2-257 thru 2-274 | 2-257 thru 2-274 |
| none | 2-274.1 thru 2-274.24 |
| 2-275 and 2-276 | 2-275/(2-276 Blank) |
| 2-277 thru 2-298 | none |
| 2-299 and 2-300 | (2-299 Blank)/2-300 |
| 2-301 thru 2-306 | 2-301 thru 2-306 |
| none | 2-306.1 thru 2-306.4 |
| 2-307 thru 2-312 | 2-307 thru 2-312 |
| none | 2-312.1 and 2-312.2 |
| 2-313 thru 2-316 | 2-313 thru 2-316 |
| none | 2-316.1 thru 2-316.4 |
| 2-317 thru 2-320 | 2-317 thru 2-320 |
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| 2-321 thru 2-324 | 2-321 thru 2-324 |
| none | 2-324.1 thru 2-324.8 |
| 2-325 and 2-326 | 2-325 and 2-326 |
| 2-331 thru 2-344 | 2-331 thru 2-344 |
| none | 2-344.1 thru 2-344.6 |
| 2-345 and 2-346 | 2-345 and 2-346 |
| none | 2-346.1 thru 2-346.6 |
| 2-347 thru 2-356 | 2-347 thru 2-356 |
| none | 2-356.1 thru 2-356.8 |
| 2-357 thru 2-370 | 2-357 thru 2-370 |
| none | 2-370.1 thru 2-370.12 |
| 2-371 thru 2-376 | 2-371 thru 2-376 |
| none | 2-376.1 thru 2-376.14 |
| 2-377 thru 2-380 | 2-377 thru 2-380 |
| none | 2-380.1 thru 2-380.26 |
| 2-381 thru 2-384 | 2-381 thru 2-384 |
| none | 2-384.1 thru 2-384.6 |
| 2-385 and 2-386 | 2-385 and 2-386 |
| 2-389 thru 2-392 | 2-389 thru 2-392 |
| none | 2-392.1 thru 2-392.4 |
| 2-393 and 2-394 | 2-393 and 2-394 |
| 2-443 thru 2-460 | 2-443 thru 2-460 |
| 2-491 thru 2-496 | 2-491 thru 2-496 |
| none | 2-496.1 and 2-496.2 |
| 2-497 thru 2-502 | 2-497 thru 2-502 |
| none | 2-502.1 and 2-502.2 |
| 2-503 and 2-504 | 2-503 and 2-504 |
| 2-511 thru 2-518 | 2-511 thru 2-518 |
| none | 2-518.1 and 2-518.2 |
| 2-519 and 2-520 | 2-519 and 2-520 |
| 2-541 and 2-542 | 2-541 and 2-542 |

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| Remove Pages | Insert Pages |
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| none | 2-542.1 and 2-542.2 |
| 2-543 thru 2-546 | 2-543 and 2-546 |
| none | 2-546.1 and 2-546.2 |
| 2-547 aand 2-548 | 2-547 and 2-548 |
| none | 2-548.1 thru 2-548.6 |
| 2-549 thru 2-556 | 2-549 thru 2-556 |
| none | 2-556.1 thru 2-556.4 |
| 2-557 thru 2-560 | 2-557 thru 2-560 |
| none | 2-560.1 thru 2-560.6 |
| 2-561 thru 2-574 | 2-561 thru 2-574 |
| none | 2-574.1 thru 2-574.2 |
| 2-575 thru 2-578 | 2-575 thru 2-578 |
| none | 2-578.1 thru 2-578.14 |
| 2-579 thru 2-584 | 2-579 thru 2-584 |
| none | 2-584.1 thru 2-584.64 |
| 2-585 thru 2-594 | 2-585 thru 2-594 |
| none | 2-594.1 thru 2-594.20 |
| 2-595 and 2-596 | 2-595 and 2-596 |
| 2-615 thru 2-622 | 2-615 thru 2-621/(2-622 Blank) |
| 2-623 thru 2-626 | (2-623 Blank)/2-624 thru 2-626 |
| 2-637 thru 2-674 | 2-637 thru 2-673/(2-674 Blank) |
| 2-675 thru 2-686 | (2-675 Blank)/2-676 thru 2-685/(2-686 Blank) |
| 2-687 thru 2-690 | (2-687 Blank)/2-688 thru 2-690 |
| 2-709 thru 2-714 | 2-709 thru 2-714 |
| none | 2-714.1 and 2-714.2 |
| 2-715 and 2-716 | 2-715 and 2-716 |
| none | 2-716.1 and 2-716.2 |
| 2-717 and 2-718 | 2-717 and 2-718 |
| none | 2-718.1 and 2-718.2 |
| 2-719 thru 2-722 | 2-719 thru 2-722 |
| none | 2-722.1 and 2-722.2 |
| 2-723 thru 2-726 | 2-723 thru 2-726 |
| none | 2-726.1 and 2-726.2 |
| 2-727 thru 2-740 | 2-727 thru 2-740 |
| 2-749 thru 2-800 | 2-749 thru 2-800 |
| 2-803 thru 2-822 | 2-803 thru 2-822 |
| 2-905 thru 2-918 | 2-905 thru 2-918 |
| none | 2-918.1 thru 2-918.6 |
| 2-919 and 2-920 | 2-919 and 2-920 |
| 2-1009 thru 2-1016 | 2-1009 thru 2-1016 |
| none | 2-1016.1 thru 2-1016.10 |
| 2-1017 and 2-1018 | 2-1017 and 2-1018 |
| A-1 thru A-4 | A-1 thru A-4 |
| B-13 thru B-20 | B-13 thru B-19/(B-20 Blank) |
| C-3 and C-4 | C-3 and C-4 |
| D-1 thru D-5/(D-6 Blank) | D-1 thru D-6 |
| E3 and E4 | E3 and E4 |
| none | E-21 and E-22 |
| G-1 thru G-10 | G-1 thru G-10 |
| none | G-11/(G-12 Blank) |
| H-1 thru H-8 | H-1 thru H-8 |
| H-17 thru H-21/ (H-22 Blank) | H-17 thru H-21/ (H-22 Blank) |
| none | K-1 thru K-4 |
| INDEX-1 thru INDEX-38 | INDEX-1 thru INDEX-38 |
| Index-39/(Index-40 Blank) | none |
| DA Form 2028-2 Sample | DA Form 2028 Sample |
| DA Form 2028-2 | DA Form 2028 |
| DA Form 2028-2 | DA Form 2028 |
| DA Form 2028-2 | DA Form 2028 |
| FO-1 FP-1/(FP-2 Blank) | FO-1 FP-1/(FP-2 Blank) |
| thru FP-19/(FP-20 Blank) | thru FP-19/(FP-20 Blank) |
| FO-1 FP-23/(FP-24 Blank) | FO-1 FP-23/(FP-24 Blank) |
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| thru FP-61/(FP-62 Blank) | thru FP-61/(FP-62 Blank) |
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| and FP-67/(FP-68 Blank) | and FP-67/(FP-68 Blank) |
| Metric Conversion Chart | Metric Conversion Chart |
| Cover | Cover |

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

**By Order of the Secretary of the Army:**

ERIC K. SHINSEKI
*General, United States Army*
*Chief of Staff*

**Official:**

JOEL B. HUDSON
*Administrative Assistant to the Secretary of the Army*
0110102

**DISTRIBUTION:** To be distributed in accordance with the initial distribution number (IDN) 380934, requirements for TM 9-2320-365-20-1.

# LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

NOTE: New or changed material is indicated by a vertical bar in the outer margin of the page.

Dates of issue for original and changed pages are:

Original ..... 0 ..... 17 June 1998
Change ..... 1 ..... 1 July 2003
Change ..... 2 ..... 20 August 2005

THE TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 5992, CONSISTING OF THE FOLLOWING:

| Page No. | *Change No. |
|---|---|
| **VOLUME 1** | |
| Cover | 1 |
| Blank | 0 |
| a thru e | 0 |
| f | 2 |
| g | 0 |
| h | 2 |
| i | 1 |
| j | 0 |
| A thru J | 2 |
| K thru M Added | 2 |
| N Blank Added | 2 |
| i and ii | 1 |
| iii | 0 |
| iv thru xii | 1 |
| 1-1 thru 1-27 | 0 |
| 1-28 Blank | 0 |
| 2-1 thru 2-6 | 1 |
| 2-6.1 and 2-6.2 Added | 1 |
| 2-7 and 2-8 | 1 |
| 2-9 thru 2-11 | 2 |
| 2-12 thru 2-15 | 0 |
| 2-16 and 2-17 | 1 |
| 2-18 | 0 |
| 2-19 | 1 |
| 2-20 | 0 |
| 2-21 | 2 |
| 2-22 | 1 |
| 2-23 thru 2-32 | 0 |
| 2-33 | 2 |
| 2-34 thru 2-36 | 0 |
| 2-37 | 2 |
| 2-38 thru 2-40 | 0 |
| 2-41 | 2 |
| 2-42 | 0 |
| 2-43 | 2 |
| 2-44 | 0 |
| 2-45 | 2 |
| 2-46 | 0 |
| 2-47 and 2-48 | 2 |
| 2-49 and 2-50 | 0 |
| 2-51 | 2 |
| 2-52 | 0 |
| 2-53 | 1 |
| 2-54 | 0 |
| 2-55 | 1 |
| 2-56 | 2 |
| 2-57 | 1 |
| 2-58 and 2-59 | 2 |
| 2-60 | 1 |
| 2-61 and 2-62 | 2 |
| 2-63 thru 2-69 | 1 |
| 2-70 Blank | 1 |
| 2-71 Blank | 1 |
| 2-72 and 2-73 | 1 |
| 2-74 thru 2-98 | 0 |
| 2-99 and 2-100 | 1 |
| 2-100.1 thru 2-100.7 Added | 1 |
| 2-100.8 Blank Added | 1 |
| 2-101 thru 2-106 | 1 |
| 2-106.1 thru 2-106.8 Added | 1 |
| 2-107 | 1 |
| 2-108 thru 2-117 | 0 |
| 2-118 Blank | 0 |
| 2-119 | 1 |
| 2-120 thru 2-127 | 0 |
| 2-128 Blank | 0 |
| 2-129 | 1 |
| 2-130 | 2 |
| 2-131 | 1 |
| 2-132 thru 2-136 | 2 |
| 2-137 | 1 |
| 2-138 thru 2-140 | 2 |
| 2-141 thru 2-144 | 1 |
| 2-144.1 thru 2-144.4 Added | 1 |
| 2-145 | 1 |
| 2-146 Blank | 0 |
| 2-147 | 2 |
| 2-148 thru 2-152 | 1 |
| 2-152.1 thru 2-152.6 Added | 1 |
| 2-153 thu 2-256 | 1 |
| 2-256.1 thru 2-256.34 Added | 1 |
| 2-257 thru 2-274 | 1 |
| 2-274.1 thru 2-274.24 Added | 1 |
| 2-275 | 1 |
| 2-276 Blank | 1 |
| 2-277 thru 2-298 Deleted | 1 |
| 2-299 Blank | 1 |
| 2-300 thru 2-306 | 1 |
| 2-306.1 thru 2-306.4 Added | 1 |
| 2-307 thru 2-312 | 1 |
| 2-312.1 and 2-312.2 Added | 1 |
| 2-313 thru 2-316 | 1 |
| 2-316.1 thru 2-316.4 Added | 1 |
| 2-317 thru 2-320 | 1 |
| 2-320.1 thru 2-320.8 Added | 1 |
| 2-321 thru 2-324 | 1 |
| 2-324.1 thru 2-324.8 Added | 1 |
| 2-325 | 1 |
| 2-326 thru 2-328 | 2 |
| 2-328.1 and 2-328.2 Added | 2 |
| 2-329 thru 2-331 | 2 |
| 2-332 thru 2-344 | 1 |
| 2-344.1 thru 2-344.6 Added | 1 |
| 2-345 and 2-346 | 1 |
| 2-346.1 thru 2-346.6 Added | 1 |
| 2-347 thru 2-356 | 1 |
| 2-356.1 thru 2-356.8 Added | 1 |
| 2-357 thru 2-370 | 1 |
| 2-3701.1 thru 2-370.3 | 1 |
| 2-370.4 and 2-370.5 | 2 |
| 2-370.6 thru 2-370.9 Deleted | 2 |
| 2-370.10 | 1 |
| 2-370.12 Added | 1 |
| 2-371 thru 2-376 | 1 |
| 2-376.1 thru 2-376.14 Added | 1 |
| 2-377 thru 2-380 | 1 |
| 2-380.1 thru 2-380.26 Added | 1 |
| 2-381 thru 2-384 | 1 |
| 2-384.1 thru 384.6 Added | 1 |

* Zero in this column indicates an original page.

# LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| 2-385 | 1 |
| 2-386 thru 2-389 | 0 |
| 2-390 thru 2-392 | 1 |
| 2-392.1 thru 2-392.4 Added | 1 |
| 2-393 | 1 |
| 2-394 thru 2-408 | 0 |
| 2-408.1 thru 2-408.16 Added | 2 |
| 2-409 | 2 |
| 2-410 thru 2-443 | 0 |
| 2-444 thru 2-459 | 1 |
| 2-460 thru 2-491 | 0 |
| 2-492 thru 2-496 | 1 |
| 2-496.1 and 2-496.2 Added | 1 |
| 2-497 thru 2-502 | 1 |
| 2-502.1 and 2-502.2 Added | 1 |
| 2-503 | 1 |
| 2-504 thru 2-511 | 0 |
| 2-512 thru 2-518 | 1 |
| 2-518.1 and 2-518.2 Added | 1 |
| 2-519 | 1 |
| 2-520 thru 2-541 | 0 |
| 2-542 | 1 |
| 2-542.1 and 2-542.2 Added | 1 |
| 2-543 thru 2-546 | 1 |
| 2-546.1 and 2-546.2 Added | 1 |
| 2-547 and 2-548 | 1 |
| 2-548.1 thru 2-548.6 Added | 1 |
| 2-549 thru 2-556 | 1 |
| 2-556.1 thru 2-556.4 Added | 1 |
| 2-557 thru 2-560 | 1 |
| 2-560.1 thru 2-560.6 Added | 1 |
| 2-561 thru 2-574 | 1 |
| 2-574.1 and 2-574.2 Added | 1 |
| 2-575 thru 2-578 | 1 |
| 2-578.1 thru 2-578.14 Added | 1 |
| 2-579 thru 2-584 | 1 |
| 2-584.1 thru 2-584.64 Added | 1 |
| 2-585 thru 2-594 | 1 |
| 2-594.1 thru 2-594.20 Added | 1 |
| 2-595 | 1 |
| 2-596 thru 2-615 | 0 |
| 2-616 thru 2-621 | 1 |
| 2-622 Blank | 1 |
| 2-623 Blank | 1 |
| 2-624 and 2-625 | 1 |
| 2-626 thru 2-637 | 0 |
| 2-638 thru 2-673 | 1 |
| 2-674 Blank | 1 |
| 2-675 Blank | 1 |
| 2-676 thru 2-685 | 1 |
| 2-686 Blank | 1 |
| 2-687 Blank | 1 |
| 2-688 and 2-689 | 1 |
| 2-690 thru 2-709 | 0 |
| 2-710 thru 2-714 | 1 |
| 2-714.1 and 2-714.2 Added | 1 |
| 2-715 and 2-716 | 1 |
| 2-716.1 and 2-716.2 Added | 1 |
| 2-717 and 2-718 | 1 |
| 2-718.1 and 2-718.2 Added | 1 |
| 2-719 thru 2-722 | 1 |
| 2-722.1 and 2-722.2 Added | 1 |
| 2-723 thru 2-726 | 1 |
| 2-726.1 and 2-726.2 Added | 1 |
| 2-727 thru 2-739 | 1 |
| 2-740 thru 2-749 | 0 |
| 2-750 thru 2-799 | 1 |
| 2-800 thru 2-803 | 0 |
| 2-804 thru 2-821 | 1 |
| 2-822 thru 2-905 | 0 |
| 2-906 thru 2-918 | 2 |
| 2-918.1 thru 2-918.6 | 2 |
| 2-918.7 thru 2-918.20 Added | 2 |
| 2-919 | 2 |
| 2-920 thru 2-945 | 0 |
| 2-946 thru 2-1009 | 2 |
| 2-1010 thru 2-1016 | 1 |
| 2-1016.1 thru 2-1016.10 Added | 1 |
| 2-1017 | 1 |
| 2-1018 thru 2-1085 | 0 |
| 2-1086 Blank | 0 |
| A-1 | 0 |
| A-2 and A-3 | 1 |
| A-4 | 0 |
| B-1 thru B-4 | 0 |
| B-5 | 2 |
| B-6 thru B-13 | 0 |
| B-14 thru B-16 | 1 |
| B-17 thru B-19 | 2 |
| B-20 Blank | 1 |
| C-1 | 0 |
| C-2 thru C-4 | 2 |
| D-1 | 1 |
| D-2 | 2 |
| D-3 thru D-5 | 1 |
| D-6 | 2 |
| E-1 and E-2 | 0 |
| E-3 and E-4 | 1 |
| E-5 thru E-20 | 0 |
| E-21 and E-22 Added | 1 |
| F-1 thru F-8 | 0 |
| G-1 | 2 |
| G-2 | 1 |
| G-3 thru G-7 | 2 |
| G-8 | 1 |
| G-9 thru G-11 | 2 |
| G-12 Blank Added | 1 |
| H-1 thru H-6 | 2 |
| H-7 | 0 |
| H-8 thru H-10 | 2 |
| H-11 | 0 |
| H-12 | 2 |
| H-13 thru H-15 | 0 |
| H-16 thru H-18 | 2 |
| H-19 | 1 |
| H-20 and H-21 | 2 |
| H-22 Blank | 0 |
| J-1 | 0 |
| J-2 Blank | 0 |
| K-1 Added | 1 |
| K-2 and K-3 | 2 |
| K-4 Added | 1 |
| INDEX-1 thru INDEX-4 | 1 |
| INDEX-5 | 2 |
| INDEX-6 | 1 |
| INDEX-7 thru INDEX-11 | 2 |
| INDEX-12 and INDEX-13 | 1 |
| INDEX-14 thru INDEX-16 | 2 |
| INDEX-17 and INDEX-18 | 1 |
| INDEX-19 | 2 |
| INDEX-20 | 1 |
| INDEX-21 thru INDEX-25 | 2 |
| INDEX-26 | 1 |
| INDEX-27 thru INDEX-35 | 2 |
| INDEX-36 thru INDEX-38 | 1 |
| INDEX-39 Deleted | 1 |
| INDEX-40 Blank Deleted | 1 |
| Glossary-1 and Glossary-2 | 0 |
| FO-1 FP-1 | 1 |
| FO-1 FP-2 Blank | 0 |
| FO-1 FP-3 | 2 |
| FO-1 FP-4 Blank | 0 |
| FO-1 FP-5 | 1 |
| FO-1 FP-6 Blank | 0 |
| FO-1 FP-7 | 1 |
| FO-1 FP-8 Blank | 0 |
| FO-1 FP-9 | 1 |
| FO-1 FP-10 Blank | 0 |

* Zero in this column indicates an original page.

# LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| FO-1 FP-11 | 1 |
| FO-1 FP-12 Blank | 0 |
| FO-1 FP-13 | 1 |
| FO-1 FP-14 Blank | 0 |
| FO-1 FP-15 | 1 |
| FO-1 FP-16 Blank | 0 |
| FO-1 FP-17 | 1 |
| FO-1 FP-18 Blank | 0 |
| FO-1 FP-19 | 1 |
| FO-1 FP-20 Blank | 0 |
| FO-1 FP-21 | 0 |
| FO-1 FP-22 Blank | 0 |
| FO-1 FP-23 | 1 |
| FO-1 FP-24 Blank | 0 |
| FO-1 FP-25 | 0 |
| FO-1 FP-26 Blank | 0 |
| FO-1 FP-27 | 1 |
| FO-1 FP-28 Blank | 0 |
| FO-1 FP-29 | 1 |
| FO-1 FP-30 Blank | 0 |
| FO-1 FP-31 | 1 |
| FO-1 FP-32 Blank | 0 |
| FO-1 FP-33 | 1 |
| FO-1 FP-34 Blank | 0 |
| FO-1 FP-35 | 1 |
| FO-1 FP-36 Blank | 0 |
| FO-1 FP-37 | 1 |
| FO-1 FP-38 Blank | 0 |
| FO-1 FP-39 | 1 |
| FO-1 FP-40 Blank | 0 |
| FO-1 FP-41 | 1 |
| FO-1 FP-42 Blank | 0 |
| FO-1 FP-43 | 1 |
| FO-1 FP-44 Blank | 0 |
| FO-1 FP-45 | 1 |
| FO-1 FP-46 Blank | 0 |
| FO-1 FP-47 | 1 |
| FO-1 FP-48 Blank | 0 |
| FO-1 FP-49 | 1 |
| FO-1 FP-50 Blank | 0 |
| FO-1 FP-51 | 1 |
| FO-1 FP-52 Blank | 0 |
| FO-1 FP-53 | 1 |
| FO-1 FP-54 Blank | 0 |
| FO-1 FP-55 | 1 |
| FO-1 FP-56 Blank | 0 |
| FO-1 FP-57 | 1 |
| FO-1 FP-58 Blank | 0 |
| FO-1 FP-59 | 1 |
| FO-1 FP-60 Blank | 0 |
| FO-1 FP-61 | 2 |
| FO-1 FP-62 Blank | 0 |
| FO-1 FP-63 | 0 |
| FO-1 FP-64 Blank | 0 |
| FO-1 FP-65 | 1 |
| FO-1 FP-66 Blank | 0 |
| FO-1 FP-67 | 1 |
| FO-1 FP-68 Blank | 0 |
| FO-2 FP-1 | 0 |
| FO-2 FP-2 Blank | 0 |
| FO-2 FP-3 | 0 |
| FO-2 FP-4 Blank | 0 |
| FO-2 FP-5 | 0 |
| FO-2 FP-6 Blank | 0 |
| FO-2 FP-7 | 0 |
| FO-2 FP-8 Blank | 0 |
| FO-3 FP-1 | 0 |
| FO-3 FP-2 Blank | 0 |
| FO-3 FP-3 | 0 |
| FO-3 FP-4 Blank | 0 |
| FO-3 FP-5 | 0 |
| FO-3 FP-6 Blank | 0 |
| FO-4 FP-1 | 0 |
| FO-4 FP-2 Blank | 0 |
| FO-4 FP-3 | 0 |
| FO-4 FP-4 Blank | 0 |
| FO-5 FP-1 | 0 |
| FO-5 FP-2 Blank | 0 |
| FO-5 FP-3 | 0 |
| FO-5 FP-4 Blank | 0 |
| FO-5 FP-5 | 0 |
| FO-5 FP-6 Blank | 0 |
| **VOLUME 2** | |
| Cover | 1 |
| Blank | 0 |
| a thru e | 0 |
| f | 2 |
| g | 0 |
| h | 2 |
| i | 1 |
| j | 0 |
| A thru C | 2 |
| D Blank | 2 |
| i | 1 |
| ii | 0 |
| iii and iv | 1 |
| v and vi Added | 1 |
| 2-1086.1 Added | 1 |
| 2-1086.2 Blank Added | 1 |
| 2-1087 | 1 |
| 2-1088 thru 2-1103 | 0 |
| 2-1104 thru 2-1107 | 1 |
| 2-1108 and 2-1175 | 0 |
| 2-1176 thru 2-1221 | 1 |
| 2-1222 thru 2-1229 | 0 |
| 2-1230 thru 2-1243 | 1 |
| 2-1244 thru 2-1357 | 0 |
| 2-1358 Blank | 0 |
| 2-1359 and 2-1360 | 2 |
| 2-1361 Blank | 0 |
| 2-1362 and 2-1363 | 0 |
| 2-1364 thru 2-1399 | 1 |
| 2-1400 | 2 |
| 2-1401 | 1 |
| 2-1402 | 2 |
| 2-1403 thru 2-1440 | 1 |
| 2-1441 | 2 |
| 2-1442 thru 2-1462 | 1 |
| 2-1462.1 and 2-1462.2 Added | 1 |
| 2-1463 thru 2-1482 | 1 |
| 2-1482.1 thru 2-1482.42 Added | 1 |
| 2-1483 | 1 |
| 2-1484 and 2-1485 | 0 |
| 2-1486 | 1 |
| 2-1486.1 thru 2-1486.4 Added | 1 |
| 2-1487 thru 2-1521 | 1 |
| 2-1522 thru 2-1525 | 2 |
| 2-1526 thru 2-1568 | 1 |
| 2-1568.1 and 1568.2 Added | 1 |
| 2-1569 thru 2-1593 | 1 |
| 2-1594 | 0 |
| 2-1595 and 2-1596 | 1 |
| 2-1596.1 thru 2-1596.29 Added | 1 |
| 2-1596.30 Blank Added | 1 |
| 2-1597 thru 2-1601 | 1 |
| 2-1602 Blank | 0 |
| 2-1603 | 1 |
| 2-1604 thru 2-1605 | 0 |
| 2-1606 Blank | 0 |
| 2-1607 | 1 |
| 2-1608 thru 2-1643 | 0 |
| 2-1644 | 2 |
| 2-1645 | 1 |
| 2-1646 | 2 |
| 2-1647 | 1 |
| 2-1648 | 2 |
| 2-1649 | 1 |
| 2-1650 | 2 |
| 2-1651 | 1 |
| 2-1652 | 2 |

* Zero in this column indicates an original page.

## LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| 2-1653 | 1 |
| 2-1654 | 2 |
| 2-1655 | 1 |
| 2-1656 | 2 |
| 2-1657 | 1 |
| 2-1658 | 2 |
| 2-1659 | 1 |
| 2-1660 | 2 |
| 2-1661 | 1 |
| 2-1662 | 2 |
| 2-1663 | 1 |
| 2-1664 | 2 |
| 2-1665 | 1 |
| 2-1666 Blank | 1 |
| 2-1667 and 2-1668 Deleted | 1 |
| 2-1669 Blank | 1 |
| 2-1670 thru 2-1695 | 1 |
| 2-1696 Blank | 1 |
| 2-1697 Blank | 1 |
| 2-1698 and 2-1699 | 1 |
| 2-1700 thru 2-1711 | 0 |
| 2-1712 | 1 |
| 2-1712.1 Added | 1 |
| 2-1712.2 Blank Added | 1 |
| 2-1713 thru 2-1729 | 1 |
| 2-1730 thru 2-1737 | 0 |
| 2-1738 thru 2-1742 | 1 |
| 2-1742.1 thru 2-1742.30 Added | 1 |
| 2-1743 thru 2-1747 | 1 |
| 2-1748 thru 2-1751 | 0 |
| 2-1752 Blank | 0 |
| 2-1753 | 1 |
| 2-1754 thru 2-1759 | 0 |
| 2-1760 Blank | 0 |
| 2-1761 | 1 |
| 2-1762 thru 2-1765 | 0 |
| 2-1766 Blank | 0 |
| 2-1767 thru 2-1769 | 1 |
| 2-1770 thru 2-1821 | 0 |
| 2-1822 thru 2-1826 | 2 |
| 2-1827 | 1 |
| 2-1828 | 2 |
| 2-1829 | 1 |
| 2-1830 | 2 |
| 2-1831 | 1 |
| 2-1832 Blank | 1 |
| 2-1833 thru 2-1852 Deleted | 1 |
| 2-1853 Blank | 1 |
| 2-1854 | 2 |
| 2-1855 | 1 |
| 2-1856 thru 2-1861 | 0 |
| 2-1862 thru 2-1869 | 1 |
| 2-1870 Blank | 1 |
| 2-1871 Blank | 1 |
| 2-1872 and 2-1873 | 1 |
| 2-1874 thru 2-1893 | 0 |
| 2-1894 Blank | 0 |
| 2-1895 thru 2-1901 | 1 |
| 2-1902 Blank | 0 |
| 2-1903 | 1 |
| 2-1904 thru 2-1923 | 0 |
| 2-1924 Blank | 0 |
| 2-1925 | 1 |
| 2-1926 thru 2-1943 | 0 |
| 2-1944 Blank | 0 |
| 2-1945 | 1 |
| 2-1946 thru 2-1951 | 0 |
| 2-1952 Blank | 0 |
| 2-1953 | 1 |
| 2-1954 thru 2-1957 | 0 |
| 2-1958 Blank | 0 |
| 2-1959 thru 2-1968 | 1 |
| 2-1968.1 thru 2-1968.18 Added | 1 |
| 2-1969 and 2-1970 | 1 |
| 2-1970.1 thru 2-1970.14 | 1 |
| 2-1971 thru 2-1974 | 1 |
| 2-1974.1 thru 2-1974.22 Added | 1 |
| 2-1975 | 1 |
| 2-1976 Blank | 0 |
| 2-1977 and 2-1978 | 2 |
| 2-1979 thru 2-2013 Added | 2 |
| 2-2014 Blank Added | 2 |
| 2-2015 thru 2-2076 Deleted | 1 |
| 2-2077 Blank | 1 |
| 2-2078 | 1 |
| 2-2079 thru 2-2113 | 0 |
| 2-2114 Blank | 0 |
| 2-2115 and 2-2116 | 1 |
| 2-2116.1 Added | 1 |
| 2-2116.2 Blank Added | 1 |
| 2-2116.3 thru 2-2116.9 Added | 1 |
| 2-2116.10 Blank Added | 1 |
| 2-2116.11 and 2-2116.12 Added | 1 |
| 2-2117 and 2-2118 | 1 |
| 2-2118.1 Added | 1 |
| 2-2118.2 Blank Added | 1 |
| 2-2118.3 thru 2-2118.7 Added | 1 |
| 2-2118.8 Blank Added | 1 |
| 2-2118.9 and 2-2118.10 Added | 1 |
| 2-2119 | 1 |
| 2-2120 Blank | 0 |
| 2-2121 | 1 |
| 2-2122 thru 2-2125 | 0 |
| 2-2126 Blank | 0 |
| 2-2127 thru 2-2132 | 0 |
| 2-2132.1 Added | 1 |
| 2-2132.2 Blank Added | 1 |
| 2-2133 | 1 |
| 2-2134 thru 2-2136 | 0 |
| 3-1 | 1 |
| 3-2 thru 3-14 | 0 |
| 3-15 thru 3-17 | 1 |
| 3-18 thru 3-21 | 0 |
| 3-22 Blank | 0 |
| A-1 | 0 |
| A-2 and A-3 | 1 |
| A-4 | 0 |
| B-1 thru B-4 | 0 |
| B-5 | 2 |
| B-6 thru B-13 | 0 |
| B-14 thru B-16 | 1 |
| B-17 thru B-19 | 2 |
| B-20 Blank | 1 |
| C-1 | 0 |
| C-2 thru C-4 | 2 |
| D-1 | 1 |
| D-2 | 2 |
| D-3 thru D-5 | 1 |
| D-6 | 2 |
| E-1 and E-2 | 0 |
| E-3 and E-4 | 1 |
| E-5 thru E-20 | 0 |
| E-21 and E-22 Added | 1 |
| F-1 thru F-8 | 0 |
| G-1 | 2 |
| G-2 | 1 |
| G-3 thru G-7 | 2 |
| G-8 | 1 |
| G-9 thru G-11 | 2 |
| G-12 Blank Added | 1 |
| H-1 thru H-6 | 2 |
| H-7 | 0 |
| H-8 thru H-10 | 2 |

* Zero in this column indicates an original page.

# LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| H-11 | 0 |
| H-12 | 2 |
| H-13 thru H-15 | 0 |
| H-16 thru H-18 | 2 |
| H-19 | 1 |
| H-20 and H-21 | 2 |
| H-22 Blank | 0 |
| J-1 | 0 |
| J-2 Blank | 0 |
| K-1 Added | 1 |
| K-2 and K-3 | 2 |
| K-4 Added | 1 |
| INDEX-1 | 1 |
| INDEX-2 thru INDEX-4 | 2 |
| INDEX-5 | 1 |
| INDEX-6 thru INDEX-11 | 2 |
| INDEX-12 | 1 |
| Glossary-1 and Glossary-2 | 0 |
| FO-1 FP-1 | 1 |
| FO-1 FP-2 Blank | 0 |
| FO-1 FP-3 | 2 |
| FO-1 FP-4 Blank | 0 |
| FO-1 FP-5 | 1 |
| FO-1 FP-6 Blank | 0 |
| FO-1 FP-7 | 1 |
| FO-1 FP-8 Blank | 0 |
| FO-1 FP-9 | 1 |
| FO-1 FP-10 Blank | 0 |
| FO-1 FP-11 | 1 |
| FO-1 FP-12 Blank | 0 |
| FO-1 FP-13 | 1 |
| FO-1 FP-14 Blank | 0 |
| FO-1 FP-15 | 1 |
| FO-1 FP-16 Blank | 0 |
| FO-1 FP-17 | 1 |
| FO-1 FP-18 Blank | 0 |
| FO-1 FP-19 | 1 |
| FO-1 FP-20 Blank | 0 |
| FO-1 FP-21 | 0 |
| FO-1 FP-22 Blank | 0 |
| FO-1 FP-23 | 1 |
| FO-1 FP-24 Blank | 0 |
| FO-1 FP-25 | 0 |
| FO-1 FP-26 Blank | 0 |
| FO-1 FP-27 | 1 |
| FO-1 FP-28 Blank | 0 |
| FO-1 FP-29 | 1 |
| FO-1 FP-30 Blank | 0 |
| FO-1 FP-31 | 1 |
| FO-1 FP-32 Blank | 0 |
| FO-1 FP-33 | 1 |
| FO-1 FP-34 Blank | 0 |
| FO-1 FP-35 | 1 |
| FO-1 FP-36 Blank | 0 |
| FO-1 FP-37 | 1 |
| FO-1 FP-38 Blank | 0 |
| FO-1 FP-39 | 1 |
| FO-1 FP-40 Blank | 0 |
| FO-1 FP-41 | 1 |
| FO-1 FP-42 Blank | 0 |
| FO-1 FP-43 | 1 |
| FO-1 FP-44 Blank | 0 |
| FO-1 FP-45 | 1 |
| FO-1 FP-46 Blank | 0 |
| FO-1 FP-47 | 1 |
| FO-1 FP-48 Blank | 0 |
| FO-1 FP-49 | 1 |
| FO-1 FP-50 Blank | 0 |
| FO-1 FP-51 | 1 |
| FO-1 FP-52 Blank | 0 |
| FO-1 FP-53 | 1 |
| FO-1 FP-54 Blank | 0 |
| FO-1 FP-55 | 1 |
| FO-1 FP-56 Blank | 0 |
| FO-1 FP-57 | 1 |
| FO-1 FP-58 Blank | 0 |
| FO-1 FP-59 | 1 |
| FO-1 FP-60 Blank | 0 |
| FO-1 FP-61 | 2 |
| FO-1 FP-62 Blank | 0 |
| FO-1 FP-63 | 0 |
| FO-1 FP-64 Blank | 0 |
| FO-1 FP-65 | 1 |
| FO-1 FP-66 Blank | 0 |
| FO-1 FP-67 | 1 |
| FO-1 FP-68 Blank | 0 |
| FO-2 FP-1 | 0 |
| FO-2 FP-2 Blank | 0 |
| FO-2 FP-3 | 0 |
| FO-2 FP-4 Blank | 0 |
| FO-2 FP-5 | 0 |
| FO-2 FP-6 Blank | 0 |
| FO-2 FP-7 | 0 |
| FO-2 FP-8 Blank | 0 |
| FO-3 FP-1 | 0 |
| FO-3 FP-2 Blank | 0 |
| FO-3 FP-3 | 0 |
| FO-3 FP-4 Blank | 0 |
| FO-3 FP-5 | 0 |
| FO-3 FP-6 Blank | 0 |
| FO-4 FP-1 | 0 |
| FO-4 FP-2 Blank | 0 |
| FO-4 FP-3 | 0 |
| FO-4 FP-4 Blank | 0 |
| FO-5 FP-1 | 0 |
| FO-5 FP-2 Blank | 0 |
| FO-5 FP-3 | 0 |
| FO-5 FP-4 Blank | 0 |
| FO-5 FP-5 | 0 |
| FO-5 FP-6 Blank | 0 |
| **VOLUME 3** | |
| Cover | 1 |
| Blank | 0 |
| a thru e | 0 |
| f | 2 |
| g | 0 |
| h | 2 |
| i | 1 |
| j | 0 |
| A thru D | 2 |
| i | 1 |
| ii | 0 |
| iii thru vi | 1 |
| 4-1 | 1 |
| 4-2 thru 4-4 | 0 |
| 4-5 | 1 |
| 4-6 thru 4-8 | 0 |
| 4-9 | 1 |
| 4-10 | 0 |
| 4-10.1 and 4-10.2 Added | 1 |
| 4-11 | 0 |
| 4-12 and 4-13 | 1 |
| 4-14 | 0 |
| 4-15 | 1 |
| 4-16 and 4-17 | 0 |
| 4-18 | 1 |
| 4-19 thru 4-41 | 0 |
| 4-42 and 4-43 | 1 |
| 4-44 | 0 |
| 4-45 | 1 |
| 4-46 | 0 |
| 4-47 | 1 |
| 4-48 thru 4-59 | 0 |
| 4-60 | 1 |
| 4-61 and 4-62 | 0 |
| 4-63 | 1 |
| 4-64 thru 4-68 | 0 |
| 4-69 | 1 |
| 4-70 thru 4-81 | 0 |

* Zero in this column indicates an original page.

## LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| 4-82 thru 4-84 | 1 |
| 4-85 thru 4-105 | 0 |
| 4-106 Blank | 0 |
| 5-1 | 1 |
| 5-2 thru 5-6 | 0 |
| 5-7 and 5-8 | 1 |
| 5-9 | 0 |
| 5-10 and 5-11 | 1 |
| 5-12 and 5-13 | 0 |
| 5-14 and 5-15 | 1 |
| 5-16 Blank | 0 |
| 6-1 thru 6-3 | 1 |
| 6-4 | 0 |
| 6-4.1 and 6-4.2 Added | 1 |
| 6-5 | 1 |
| 6-6 | 0 |
| 6-7 | 1 |
| 6-8 and 6-9 | 0 |
| 6-10 thru 6-13 | 1 |
| 6-14 | 0 |
| 6-15 thru 6-18 | 1 |
| 6-19 | 0 |
| 6-20 thru 6-22 | 1 |
| 6-22.1 Added | 1 |
| 6-22.2 Blank Added | 1 |
| 6-23 thru 6-25 | 1 |
| 6-26 and 6-27 | 0 |
| 6-28 | 1 |
| 6-29 thru 6-31 | 0 |
| 6-32 | 1 |
| 6-33 | 0 |
| 6-34 | 1 |
| 6-35 thru 6-38 | 0 |
| 6-39 | 1 |
| 6-40 thru 6-45 | 0 |
| 6-46 | 2 |
| 6-47 and 6-48 | 0 |
| 6-49 | 1 |
| 6-50 thru 6-52 | 0 |
| 6-53 | 1 |
| 6-54 thru 6-62 | 0 |
| 6-63 | 2 |
| 6-64 thru 6-66 | 0 |
| 6-67 | 1 |
| 6-68 and 6-69 | 0 |
| 6-70 | 2 |
| 6-71 | 1 |
| 6-72 | 0 |
| 6-72.1 Added | 1 |
| 6-72.2 Blank Added | 1 |
| 6-73 thru 6-78 | 1 |
| 7-1 and 7-2 | 1 |
| 7-3 and 7-4 | 2 |
| 7-5 and 7-6 | 0 |
| 7-7 | 2 |
| 7-8 and 7-9 | 1 |
| 7-10 thru 7-17 | 0 |
| 7-18 | 2 |
| 7-19 | 0 |
| 7-20 | 2 |
| 7-21 thru 7-24 | 0 |
| 7-25 thru 7-31 | 1 |
| 7-32 thru 7-35 | 0 |
| 7-36 | 1 |
| 7-36.1 thru 7-36.4 Added | 1 |
| 7-37 and 7-38 | 0 |
| 7-39 | 2 |
| 7-40 | 0 |
| 7-41 | 1 |
| 7-42 thru 7-44 | 0 |
| 7-45 | 1 |
| 7-46 thru 7-51 | 0 |
| 7-52 | 1 |
| 7-53 thru 7-55 | 0 |
| 7-56 | 1 |
| 7-57 | 0 |
| 7-58 | 2 |
| 7-59 thru 7-62 | 0 |
| 7-63 | 2 |
| 7-64 | 0 |
| 7-65 | 1 |
| 7-66 | 0 |
| 7-67 and 7-68 | 1 |
| 7-69 thru 7-74 | 0 |
| 7-75 | 1 |
| 7-76 thru 7-78 | 0 |
| 7-79 | 1 |
| 7-80 | 0 |
| 7-81 | 2 |
| 7-82 thru 7-86 | 0 |
| 7-87 and 7-88 | 2 |
| 7-89 | 1 |
| 7-90 thru 7-102 | 0 |
| 7-103 | 1 |
| 7-104 | 2 |
| 7-105 thru 7-107 | 0 |
| 7-108 | 2 |
| 7-109 thru 7-118 | 0 |
| 7-119 | 1 |
| 7-120 thru 7-142 | 0 |
| 7-143 and 7-144 | 1 |
| 7-145 | 0 |
| 7-146 and 7-147 | 1 |
| 7-148 | 0 |
| 7-149 | 1 |
| 7-150 | 0 |
| 7-151 | 1 |
| 7-152 thru 7-159 | 0 |
| 7-160 | 1 |
| 7-160.1 Added | 1 |
| 7-160.2 Blank Added | 1 |
| 7-161 | 1 |
| 7-162 and 7-163 | 2 |
| 7-164 and 7-165 | 1 |
| 7-166 thru 7-168 | 0 |
| 7-169 | 1 |
| 7-170 and 7-171 | 0 |
| 7-172 | 1 |
| 7-173 | 0 |
| 7-174 | 2 |
| 7-175 thru 7-183 | 0 |
| 7-184 thru 7-187 | 2 |
| 7-188 | 0 |
| 7-189 and 7-190 | 1 |
| 7-191 and 7-192 | 0 |
| 7-193 | 1 |
| 7-194 | 0 |
| 7-195 thru 7-200 | 1 |
| 7-200.1 and 7-200.2 Added | 1 |
| 7-201 thru 7-203 | 1 |
| 7-204 thru 7-218 | 0 |
| 7-219 thru 7-223 | 1 |
| 7-224 thru 7-228 | 0 |
| 7-229 thru 7-231 | 1 |
| 7-232 | 0 |
| 7-233 thru 7-237 | 1 |
| 7-238 | 0 |
| 7-239 | 1 |
| 7-240 thru 7-242 | 0 |
| 7-243 and 7-244 | 1 |
| 7-245 | 0 |
| 7-246 | 1 |
| 7-247 thru 7-253 | 0 |
| 7-254 thru 7-256 | 2 |
| 7-257 and 7-258 | 0 |
| 7-259 | 1 |
| 7-260 thru 7-268 | 0 |
| 7-269 | 1 |
| 7-270 thru 7-274 | 0 |
| 7-275 and 7-276 | 1 |

* Zero in this column indicates an original page.

## LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| 7-277 | 0 |
| 7-278 | 1 |
| 7-279 | 0 |
| 7-280 | 2 |
| 7-281 and 7-282 | 0 |
| 7-283 | 2 |
| 7-284 and 7-285 | 0 |
| 7-286 | 2 |
| 7-286.1 Added | 2 |
| 7-286.2 Blank Added | 2 |
| 7-287 | 0 |
| 7-288 | 1 |
| 7-289 | 0 |
| 7-290 and 7-291 | 1 |
| 7-292 and 7-293 | 0 |
| 7-294 | 1 |
| 7-295 thru 7-297 | 0 |
| 7-298 | 1 |
| 7-299 thru 7-302 | 0 |
| 7-303 thru 7-316 | 1 |
| 7-316.1 thru 7-316.4 Added | 1 |
| 7-317 and 7-318 | 1 |
| 7-319 thru 7-326 | 0 |
| 7-327 and 7-328 | 1 |
| 7-329 | 2 |
| 7-330 thru 7-342 | 0 |
| 7-343 thru 7-346 | 1 |
| 7-347 and 7-348 | 0 |
| 7-349 and 7-350 | 1 |
| 7-350.1 and 7-350.2 Added | 1 |
| 7-351 | 1 |
| 7-352 and 7-353 | 0 |
| 7-354 thru 7-356 | 1 |
| 7-357 | 0 |
| 7-358 and 7-359 | 1 |
| 7-360 | 0 |
| 7-361 | 1 |
| 7-362 | 0 |
| 7-363 | 1 |
| 7-364 | 0 |
| 7-365 thru 7-368 | 1 |
| 7-369 thru 7-380 | 0 |
| 7-381 thru 7-383 Added | 1 |
| 7-384 Blank Added | 1 |
| 8-1 | 1 |
| 8-2 thru 8-9 | 0 |
| 8-10 | 1 |
| 8-11 | 0 |
| 8-12 | 2 |
| 8-12.1 Added | 1 |
| 8-12.2 Blank Added | 1 |
| 8-13 thru 8-15 | 0 |
| 8-16 | 2 |
| 8-16.1 Added | 1 |
| 8-16.2 Blank Added | 1 |
| 8-17 thru 8-20 | 0 |
| 8-20.1 Added | 2 |
| 8-20.2 Blank Added | 2 |
| 8-21 thru 8-31 | 0 |
| 8-32 | 2 |
| 8-33 | 0 |
| 8-34 thru 8-40 | 1 |
| 8-40.1 Added | 1 |
| 8-40.2 Blank Added | 1 |
| 8-41 thru 8-47 | 1 |
| 8-48 and 8-49 | 0 |
| 8-50 | 1 |
| 8-51 and 8-52 | 0 |
| 8-53 and 8-54 | 1 |
| 8-55 thru 8-69 Added | 1 |
| 8-70 Blank Added | 1 |
| 9-1 | 1 |
| 9-2 | 2 |
| 9-2.1 | 2 |
| 9-2.2 | 1 |
| 9-2.3 and 9-2.4 Added | 2 |
| 9-3 and 9-4 | 2 |
| 9-5 Added | 1 |
| 9-6 Blank Added | 1 |
| 10-1 | 2 |
| 10-2 | 0 |
| 10-3 and 10-4 | 1 |
| 10-5 | 0 |
| 10-6 and 10-7 | 1 |
| 10-8 | 0 |
| 10-9 | 1 |
| 10-10 and 10-11 | 0 |
| 10-12 | 2 |
| 10-13 | 0 |
| 10-14 | 1 |
| 10-15 and 10-16 | 0 |
| 10-17 | 2 |
| 10-18 | 1 |
| 10-19 and 10-20 | 2 |
| 10-21 thru 10-27 Added | 2 |
| 10-28 Blank Added | 2 |
| 11-1 | 1 |
| 11-2 thru 11-8 | 0 |
| 11-9 and 11-10 | 1 |
| 11-11 | 0 |
| 11-12 | 1 |
| 11-13 | 0 |
| 11-14 | 1 |
| 11-15 | 0 |
| 11-16 | 1 |
| 11-17 thru 11-20 | 0 |
| 11-21 | 2 |
| 11-22 thru 11-30 | 0 |
| 11-31 | 1 |
| 11-32 | 0 |
| 11-33 thru 11-39 | 1 |
| 11-40 thru 11-42 | 0 |
| 11-43 thru 11-45 | 1 |
| 11-46 | 0 |
| 11-47 thru 11-53 | 1 |
| 11-54 | 0 |
| 11-55 thru 11-57 | 1 |
| 11-58 | 0 |
| 11-58.1 and 11-58.2 Added | 1 |
| 11-59 | 1 |
| 11-60 Blank | 1 |
| 11-61 and 11-62 | 1 |
| 11-63 thru 11-65 | 0 |
| 11-66 thru 11-68 | 1 |
| 11-69 | 0 |
| 11-70 thru 11-72 | 1 |
| 11-73 | 0 |
| 11-74 | 1 |
| 11-75 | 0 |
| 11-76 and 11-77 | 1 |
| 11-78 and 11-79 | 0 |
| 11-80 thru 11-83 | 1 |
| 11-84 thru 11-86 | 0 |
| 11-86.1 Added | 2 |
| 11-86.2 Blank Added | 2 |
| 11-87 thru 11-90 | 2 |
| 11-91 | 1 |
| 11-92 | 0 |
| 11-93 and 11-94 | 1 |
| 11-95 and 11-96 | 0 |
| 11-97 thru 11-104 | 1 |
| 11-105 | 0 |
| 11-106 | 1 |
| 11-106.1 Added | 1 |
| 11-106.2 Blank Added | 1 |
| 11-107 | 1 |
| 11-108 thru 11-110 | 0 |
| 11-111 and 11-112 | 1 |
| 11-112.1 Added | 1 |
| 11-112.2 Blank Added | 1 |

* Zero in this column indicates an original page.

## LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| 11-113 | 0 |
| 11-114 thru 11-116 | 1 |
| 11-117 | 0 |
| 11-118 and 11-119 | 1 |
| 11-120 thru 11-122 | 0 |
| 11-123 | 1 |
| 11-124 | 0 |
| 11-125 and 11-126 | 1 |
| 11-127 | 0 |
| 11-128 and 11-129 | 1 |
| 11-130 | 0 |
| 11-131 | 1 |
| 11-132 and 11-133 | 0 |
| 11-134 and 11-135 | 1 |
| 11-136 thru 11-138 | 0 |
| 11-139 thru 11-142 | 1 |
| 11-143 | 0 |
| 11-144 | 1 |
| 11-144.1 thru 11-144.4 Added | 1 |
| 11-145 and 11-146 | 1 |
| 12-1 | 2 |
| 12-2 | 0 |
| 12-3 and 12-4 | 2 |
| 12-5 thru 12-7 | 0 |
| 12-8 | 2 |
| 12-9 thru 12-13 | 0 |
| 12-14 | 2 |
| 12-15 | 0 |
| 12-16 | 1 |
| 12-16.1 Added | 1 |
| 12-16.2 Blank Added | 1 |
| 12-17 thru 12-19 | 1 |
| 12-20 and 12-21 | 0 |
| 12-22 | 1 |
| 12-23 and 12-24 | 0 |
| 12-25 and 12-26 Added | 2 |
| 13-1 | 2 |
| 13-2 and 13-3 | 0 |
| 13-4 | 1 |
| 13-4.1 Added | 1 |
| 13-4.2 Blank Added | 1 |
| 13-5 thru 13-8 | 1 |
| 13-8.1 Added | 1 |
| 13-8.2 Blank Added | 1 |
| 13-9 and 13-10 | 0 |
| 13-11 | 2 |
| 13-12 | 0 |
| 13-13 | 2 |
| 13-14 | 0 |
| 13-15 thru 13-22 | 2 |
| 13-23 and 13-24 | 0 |
| 13-25 | 2 |
| 13-26 | 1 |
| 13-27 and 13-28 | 2 |
| 13-28.1 and 13-28.2 Added | 2 |
| 13-29 and 13-30 | 2 |
| 13-30.1 Added | 2 |
| 13-30.2 Blank Added | 2 |
| 13-31 | 2 |
| 13-32 | 1 |
| 13-33 and 13-34 | 1 |
| 13-35 and 13-36 | 2 |
| 13-37 and 13-38 Added | 2 |
| 14-1 thru 14-8 | 1 |
| 14-9 and 14-10 Deleted | 1 |
| 14-11 Blank | 1 |
| 14-12 thru 14-20 | 1 |
| 14-20.1 thru 14-20.4 Added | 1 |
| 14-21 | 1 |
| 14-22 thru 14-34 | 0 |
| 14-35 and 14-36 | 2 |
| 14-37 and 14-38 Added | 1 |
| 15-1 | 1 |
| 15-2 | 2 |
| 15-2.1 thru 15-2.3 Added | 2 |
| 15-2.4 Blank Added | 2 |
| 15-3 | 2 |
| 15-4 | 1 |
| 15-5 thru 15-13 | 0 |
| 15-14 Blank | 0 |
| A-1 | 0 |
| A-2 and A-3 | 1 |
| A-4 | 0 |
| B-1 thru B-4 | 0 |
| B-5 | 2 |
| B-6 thru B-13 | 0 |
| B-14 thru B-16 | 1 |
| B-17 thru B-19 | 2 |
| B-20 Blank | 1 |
| C-1 | 0 |
| C-2 thru C-4 | 2 |
| D-1 | 1 |
| D-2 | 2 |
| D-3 thru D-5 | 1 |
| D-6 | 2 |
| E-1 and E-2 | 0 |
| E-3 and E-4 | 1 |
| E-5 thru E-20 | 0 |
| E-21 and E-22 Added | 1 |
| F-1 thru F-8 | 0 |
| G-1 | 2 |
| G-2 | 1 |
| G-3 thru G-7 | 2 |
| G-8 | 1 |
| G-9 and G-10 | 2 |
| G-11 | 2 |
| G-12 Blank Added | 1 |
| H-1 thru H-6 | 2 |
| H-7 | 0 |
| H-8 thru H-10 | 2 |
| H-11 | 0 |
| H-12 | 2 |
| H-13 thru H-15 | 0 |
| H-16 thru H-18 | 2 |
| H-19 | 1 |
| H-20 and H-21 | 2 |
| H-22 Blank | 0 |
| J-1 | 0 |
| J-2 Blank | 0 |
| K-1 Added | 1 |
| K-2 and K-3 | 2 |
| K-4 Added | 1 |
| INDEX-1 thru INDEX-3 | 1 |
| INDEX-4 | 2 |
| INDEX-5 and INDEX-6 | 1 |
| INDEX-7 thru INDEX-9 | 2 |
| INDEX-10 | 1 |
| INDEX-11 | 2 |
| INDEX-12 | 1 |
| Glossary-1 and Glossary-2 | 0 |
| FO-1 FP-1 | 1 |
| FO-1 FP-2 Blank | 0 |
| FO-1 FP-3 | 2 |
| FO-1 FP-4 Blank | 0 |
| FO-1 FP-5 | 1 |
| FO-1 FP-6 Blank | 0 |
| FO-1 FP-7 | 1 |
| FO-1 FP-8 Blank | 0 |
| FO-1 FP-9 | 1 |
| FO-1 FP-10 Blank | 0 |
| FO-1 FP-11 | 1 |
| FO-1 FP-12 Blank | 0 |
| FO-1 FP-13 | 1 |
| FO-1 FP-14 Blank | 0 |
| FO-1 FP-15 | 1 |
| FO-1 FP-16 Blank | 0 |
| FO-1 FP-17 | 1 |
| FO-1 FP-18 Blank | 0 |
| FO-1 FP-19 | 1 |

* Zero in this column indicates an original page.

## LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
| FO-1 FP-20 Blank | 0 |
| FO-1 FP-21 | 0 |
| FO-1 FP-22 Blank | 0 |
| FO-1 FP-23 | 1 |
| FO-1 FP-24 Blank | 0 |
| FO-1 FP-25 | 0 |
| FO-1 FP-26 Blank | 0 |
| FO-1 FP-27 | 1 |
| FO-1 FP-28 Blank | 0 |
| FO-1 FP-29 | 1 |
| FO-1 FP-30 Blank | 0 |
| FO-1 FP-31 | 1 |
| FO-1 FP-32 Blank | 0 |
| FO-1 FP-33 | 1 |
| FO-1 FP-34 Blank | 0 |
| FO-1 FP-35 | 1 |
| FO-1 FP-36 Blank | 0 |
| FO-1 FP-37 | 1 |
| FO-1 FP-38 Blank | 0 |
| FO-1 FP-39 | 1 |
| FO-1 FP-40 Blank | 0 |
| FO-1 FP-41 | 1 |
| FO-1 FP-42 Blank | 0 |
| FO-1 FP-43 | 1 |
| FO-1 FP-44 Blank | 0 |
| FO-1 FP-45 | 1 |
| FO-1 FP-46 Blank | 0 |
| FO-1 FP-47 | 1 |
| FO-1 FP-48 Blank | 0 |
| FO-1 FP-49 | 1 |
| FO-1 FP-50 Blank | 0 |
| FO-1 FP-51 | 1 |
| FO-1 FP-52 Blank | 0 |
| FO-1 FP-53 | 1 |
| FO-1 FP-54 Blank | 0 |
| FO-1 FP-55 | 1 |
| FO-1 FP-56 Blank | 0 |
| FO-1 FP-57 | 1 |
| FO-1 FP-58 Blank | 0 |
| FO-1 FP-59 | 1 |
| FO-1 FP-60 Blank | 0 |
| FO-1 FP-61 | 2 |
| FO-1 FP-62 Blank | 0 |
| FO-1 FP-63 | 0 |
| FO-1 FP-64 Blank | 0 |
| FO-1 FP-65 | 1 |
| FO-1 FP-66 Blank | 0 |
| FO-1 FP-67 | 1 |
| FO-1 FP-68 Blank | 0 |
| FO-2 FP-1 | 0 |
| FO-2 FP-2 Blank | 0 |
| FO-2 FP-3 | 0 |
| FO-2 FP-4 Blank | 0 |
| FO-2 FP-5 | 0 |
| FO-2 FP-6 Blank | 0 |
| FO-2 FP-7 | 0 |
| FO-2 FP-8 Blank | 0 |
| FO-3 FP-1 | 0 |
| FO-3 FP-2 Blank | 0 |
| FO-3 FP-3 | 0 |
| FO-3 FP-4 Blank | 0 |
| FO-3 FP-5 | 0 |
| FO-3 FP-6 Blank | 0 |
| FO-4 FP-1 | 0 |
| FO-4 FP-2 Blank | 0 |
| FO-4 FP-3 | 0 |
| FO-4 FP-4 Blank | 0 |
| FO-5 FP-1 | 0 |
| FO-5 FP-2 Blank | 0 |
| FO-5 FP-3 | 0 |
| FO-5 FP-4 Blank | 0 |
| FO-5 FP-5 | 0 |
| FO-5 FP-6 Blank | 0 |
| **VOLUME 4** | |
| Cover | 1 |
| Blank | 0 |
| a thru e | 0 |
| f | 2 |
| g | 0 |
| h | 2 |
| i | 1 |
| j | 0 |
| A and B | 2 |
| C Added | 2 |
| D Blank Added | 2 |
| i thru iv | 1 |
| v Added | 1 |
| vi Blank Added | 1 |
| 16-1 | 1 |
| 16-2 | 2 |
| 16-3 and 16-4 | 1 |
| 16-4.1 Added | 1 |
| 16-4.2 Blank Added | 1 |
| 16-5 | 1 |
| 16-6 and 16-7 | 0 |
| 16-8 | 2 |
| 16-9 | 0 |
| 16-10 thru 16-12 | 1 |
| 16-12.1 | 2 |
| 16-12.2 Blank Added | 1 |
| 16-13 thru 16-15 | 0 |
| 16-16 | 2 |
| 16-17 | 0 |
| 16-18 | 2 |
| 16-19 thru 16-21 | 0 |
| 16-22 | 1 |
| 16-23 | 0 |
| 16-24 and 16-25 | 1 |
| 16-26 thru 16-30 | 0 |
| 16-31 and 16-32 | 1 |
| 16-33 | 0 |
| 16-34 | 1 |
| 16-35 | 2 |
| 16-36 | 1 |
| 16-37 | 0 |
| 16-38 | 1 |
| 16-39 | 2 |
| 16-40 | 0 |
| 16-40.1 | 2 |
| 16-40.2 Blank Added | 1 |
| 16-41 | 1 |
| 16-42 | 0 |
| 16-42.1 Added | 1 |
| 16-42.2 Blank Added | 1 |
| 16-43 thru 16-55 | 1 |
| 16-56 | 2 |
| 16-56.1 Added | 2 |
| 16-56.2 Blank Added | 2 |
| 16-57 and 16-58 | 2 |
| 16-59 | 0 |
| 16-60 thru 16-62 | 1 |
| 16-62.1 Added | 1 |
| 16-62.2 Blank Added | 1 |
| 16-63 thru 16-68 | 1 |
| 16-69 | 2 |
| 16-70 thru 16-72 | 1 |
| 16-73 and 16-74 | 2 |
| 16-74.1 Added | 2 |
| 16-74.2 Blank Added | 2 |
| 16-75 thru 16-77 | 1 |
| 16-78 | 2 |
| 16-79 | 0 |
| 16-80 | 1 |
| 16-81 | 0 |
| 16-82 | 1 |
| 16-83 thru 16-96 | 0 |
| 16-96.1 and 16-96.2 Added | 1 |
| 16-97 | 1 |
| 16-98 thru 16-104 | 0 |
| 16-105 thru 16-110 | 1 |

* Zero in this column indicates an original page.

## LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

| Page No. | *Change No. |
|---|---|
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| 17-23 thru 17-27 | 0 |
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**TECHNICAL MANUAL**
NO. 9-2320-365-20-1

TECHNICAL ORDER
NO. 36A12-1B-1095-2-1

**HEADQUARTERS**
**DEPARTMENTS OF THE ARMY**
**AND THE AIR FORCE**

**Washington, D.C.,17 June 1998**

## Unit Maintenance Manual
# M1078 SERIES, 2 1/2-TON, 4 x 4, LIGHT MEDIUM TACTICAL VEHICLES (LMTV)
## VOLUME NO. 1 OF 5

| MODEL | NSN | EIC |
|---|---|---|
| **TRK, CAR., LMTV, M1078** | | |
| **W/WN** | **2320-01-360-1898** | **BHH** |
| **W/O WN** | **2320-01-354-3385** | **BHD** |
| **TRK, VAN, LMTV, M1079** | | |
| **W/WN** | **2320-01-360-1891** | **BHG** |
| **W/O WN** | **2320-01-354-3384** | **BHE** |
| **TRK, CHAS, LMTV, M1080** | **2320-01-353-9098** | **BHC** |
| **TRK, CAR., LMTV, AIR DROP, M1081** | | |
| **W/WN** | **2320-01-360-1899** | **BHJ** |
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**TABLE OF CONTENTS**

**Page**

**HOW TO USE THIS MANUAL** . . . . . vi

**CHAPTER 1 INTRODUCTION** . . . . . 1-1

**Section I General Information** . . . . . 1-1

**Section II Equipment Description and Data** . . . . . 1-5

**Section III Principles of Operation** . . . . . 1-6

TABLE OF CONTENTS (CONT)

Page

CHAPTER 2 VEHICLE MAINTENANCE . . . . . 2-1

Section I Repair Parts, Special Tools and Test, Measurement and Diagnostic Equipment . . . . . 2-2

Section II Service Upon Receipt . . . . . 2-3

Section III Preventive Maintenance Checks and Services (PMCS) . . . . . 2-6.1

Section IV Troubleshooting . . . . . 2-53

Section V Maintenance Procedures . . . . . 2-2127

CHAPTER 3 ENGINE MAINTENANCE . . . . . 3-1
Section I Introduction . . . . . 3-2
Section II Maintenance Procedures . . . . . 3-2

CHAPTER 4 FUEL SYSTEM MAINTENANCE . . . . . 4-1
Section I Introduction . . . . . 4-1
Section II Maintenance Procedures . . . . . 4-2

CHAPTER 5 EXHAUST SYSTEM MAINTENANCE . . . . . 5-1
Section I Introduction . . . . . 5-1
Section II Maintenance Procedures . . . . . 5-2

CHAPTER 6 COOLING SYSTEM MAINTENANCE . . . . . 6-1
Section I Introduction . . . . . 6-1
Section II Maintenance Procedures . . . . . 6-2

CHAPTER 7 ELECTRICAL SYSTEM MAINTENANCE . . . . . 7-1
Section I Introduction . . . . . 7-2
Section II Maintenance Procedures . . . . . 7-3

CHAPTER 8 TRANSMISSION MAINTENANCE . . . . . 8-1
Section I Introduction . . . . . 8-1
Section II Maintenance Procedures . . . . . 8-2

CHAPTER 9 PROPELLER SHAFT MAINTENANCE . . . . . 9-1
Section I Introduction . . . . . 9-1
Section II Maintenance Procedures . . . . . 9-2

CHAPTER 10 FRONT AND REAR AXLE MAINTENANCE . . . . . 10-1
Section I Introduction . . . . . 10-1
Section II Maintenance Procedures . . . . . 10-2

**CHAPTER 11 BRAKE SYSTEM MAINTENANCE** . . . . . 11-1
**Section I Introduction** . . . . . 11-1
**Section II Maintenance Procedures** . . . . . 11-2

**CHAPTER 12 WHEELS, TIRES, AND HUBS MAINTENANCE** . . . . . 12-1
**Section I Introduction** . . . . . 12-1
**Section II Maintenance Procedures** . . . . . 12-2

**CHAPTER 13 STEERING SYSTEM MAINTENANCE** . . . . . 13-1
**Section I Introduction** . . . . . 13-1
**Section II Maintenance Procedures** . . . . . 13-2

**CHAPTER 14 FRAME, TOWING ATTACHMENTS, AND DRAWBARS MAINTENANCE** . . . . . 14-1
**Section I Introduction** . . . . . 14-1
**Section II Maintenance Procedures** . . . . . 14-2

**CHAPTER 15 SUSPENSION SYSTEM MAINTENANCE** . . . . . 15-1
**Section I Introduction** . . . . . 15-1
**Section II Maintenance Procedures** . . . . . 15-2

**CHAPTER 16 BODY AND CAB MAINTENANCE** . . . . . 16-1
**Section I Introduction** . . . . . 16-2
**Section II Maintenance Procedures** . . . . . 16-3

**CHAPTER 17 11K SELF-RECOVERY WINCH (SRW) MAINTENANCE** . . . . . 17-1
**Section I Introduction** . . . . . 17-2
**Section II Maintenance Procedures** . . . . . 17-3

**CHAPTER 18 BODY, CHASSIS, AND ACCESSORY ITEMS MAINTENANCE** . . . . . 18-1
**Section I Introduction** . . . . . 18-1
**Section II Maintenance Procedures** . . . . . 18-2

**CHAPTER 19 HYDRAULIC SYSTEM MAINTENANCE** . . . . . 19-1
**Section I Introduction** . . . . . 19-1
**Section II Maintenance Procedures** . . . . . 19-2

**CHAPTER 20 SPECIAL PURPOSE KITS MAINTENANCE** . . . . . 20-1
**Section I Introduction** . . . . . 20-2
**Section II Maintenance Procedures** . . . . . 20-3

**CHAPTER 21 ARMAMENT/SIGHTING AND FIRE CONTROL MATERIEL MAINTENANCE** . . . . . 21-1
**Section I Introduction** . . . . . 21-2
**Section II Maintenance Procedures** . . . . . 21-2

**CHAPTER 22 ELECTRICAL ILLUMINATING EQUIPMENT MAINTENANCE** . . . . . 22-1
**Section I Introduction** . . . . . 22-1
**Section II Maintenance Procedures** . . . . . 22-2

**CHAPTER 23 AIR SYSTEM MAINTENANCE** . . . . . 23-1
**Section I Introduction** . . . . . 23-1
**Section II Maintenance Procedures** . . . . . 23-2

## TABLE OF CONTENTS (CONT)

**CHAPTER 24 GAGES (NON-ELECTRICAL) MAINTENANCE** . . . . . 24-1
**Section I Introduction** . . . . . 24-1
**Section II Maintenance Procedures** . . . . . 24-2

**APPENDIXES**
**A. REFERENCES** . . . . . A-1
**B. MAINTENANCE ALLOCATION CHART** . . . . . B-1
**C. TOOLS IDENTIFICATION LIST** . . . . . C-1
**D. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST** . . . . . D-1
**E. ILLUSTRATED LIST OF MANUFACTURED ITEMS** . . . . . E-1
**F. TORQUE LIMITS** . . . . . F-1
**G. MANDATORY REPLACEMENT PARTS** . . . . . G-1
**H. LUBRICATION ORDER** . . . . . H-1
**J. ADDITIONAL AUTHORIZATION LIST (AAL)** . . . . . J-1
**K. TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILTY CHART** . . . . . K-1

**SUBJECT INDEX** . . . . . Index-1
**GLOSSARY** . . . . . Glossary-1

## LIST OF ILLUSTRATIONS

| Figure No. | Figure Title | Page |
|---|---|---|
| 1-1. | M1078 Truck, Cargo: 2 1/2-Ton, 4x4, Dropside | 1-2 |
| 1-2. | M1079 Truck, Van: 2 1/2 ton, 4x4 | 1-3 |
| 1-3. | M1080 Truck, Chassis: 2 1/2-Ton, 4x4 | 1-4 |
| 1-4. | M1081 Truck, Cargo: 2 1/2-Ton, 4x4, Air Drop | 1-5 |
| 1-5. | Powertrain | 1-7 |
| 1-6. | Engine Air Intake System | 1-9 |
| 1-7. | Fuel System | 1-10 |
| 1-8. | Cooling System | 1-12 |
| 1-9. | Electrical System | 1-14 |
| 1-10. | Engine Starting System | 1-15 |
| 1-11. | Service Lighting System | 1-16 |
| 1-12. | Blackout Lighting System | 1-17 |
| 1-13. | Instrument System | 1-18 |
| 1-14. | Troubleshooting Aid | 1-19 |
| 1-15. | Brake System | 1-20 |
| 1-16. | Steering System | 1-22 |
| 1-17. | 11K Self-Recovery Winch (SRW) | 1-23 |
| 1-18. | Air Transportability Hydraulic System | 1-24 |
| 1-19. | Air System | 1-26 |
| 2-1. | Circuit Breaker Locations | 2-151 |
| 7-1. | Power Distribution Panel (PDP) Circuit Breakers, Diodes, and Relays | 7-36 |
| 11-1. | Front Brake Shoe Service Criteria | 11-4 |
| 11-2. | Rear Brake Shoe Service Criteria | 11-11 |
| 11-3. | Rear Brake Air Hose Locations | 11-97 |
| 11-4. | Rear Brake Control Air Hose Locations | 11-99 |
| 11-5. | Front Brake Air Hose Locations | 11-101 |
| 16-1. | M1079 Van Body Interior Accessory Mounting Hardpoints (Serial Numbers 001 through 190) | 16-260 |
| 16-2. | M1079 Van Body Interior Accessory Mounting Hardpoints (Serial Numbers 191 and Higher) | 16-261 |

## LIST OF ILLUSTRATIONS (CONT)


| Figure No. | Figure Title | Page |
|---|---|---|
| 16-3. | M1079 Van Body Interior Accessory Mounting Hardpoints | 16-262 |
| 16-4. | M1079 Van Body Interior Accessory Mounting Hardpoints | 16-263 |
| 16-5. | M1079 Van Body Interior Accessory Mounting Hardpoints (Serial Numbers 001 through 190) | 16-265 |
| 16-6. | M1079 Van Body Interior Accessory Mounting Hardpoints (Serial Numbers 191 and Higher) | 16-266 |
| 17-1. | 11K Self-Recovery Winch (SRW) Hydraulic Hose Locations | 17-29 |
| 19-1. | Hydraulic Manifold PN HFC32598 Rear View | 19-11 |
| 19-1.1. | Hydraulic Manifold PN 65234 Rear View | 19-12 |
| 19-1.2. | Air Transportability Hydraulic Hose Locations | 19-54 |
| 23-1. | Primary Air Supply Hose Locations | 23-3 |
| 23-2. | Central Tire Inflation System (CTIS) Air Hose Locations | 23-5 |
| 23-3. | Air Transportability Air Hose Locations | 23-9 |
| E-1. | Brake Adjusting Tool Support | E-4 |
| E-2. | Brake Plunger Seal Driver | E-5 |
| E-3. | Cab Support Tool Strut and Cab Rest | E-6 |
| E-4. | Cab Support Tool Seat | E-7 |
| E-5. | Cab Support Tool Seat Layout | E-8 |
| E-6. | Cab Support Tool Assembly | E-9 |
| E-7. | Headlight Adjustment Screen | E-10 |
| E-8. | Lanyard Assembly | E-17 |
| E-9. | CTIS Seal Driver | E-19 |
| E-10. | Wheel Hub Grease Seal Driver | E-20 |
| E-11. | Purge Valve Tool | E-22 |


## LIST OF TABLES


| Table No. | Table Title | Page |
|---|---|---|
| 1-1. | Nomenclature Cross-Reference | 1-6 |
| 2-1. | Preventive Maintenance Checks and Services | 2-9 |
| 2-2. | Vehicle Troubleshooting | 2-55 |
| 2-3. | Engine System Fault Index | 2-63 |
| 2-4. | Fuel System Fault Index | 2-101 |
| 2-5. | Exhaust System Fault Index | 2-119 |
| 2-6. | Cooling System Fault Index | 2-129 |
| 2-7. | Electrical System Fault Index | 2-147 |
| 2-8. | Function to Circuit Breaker Cross Reference | 2-152 |
| 2-8.1. | Circuit Breaker to Function Cross Reference | 2-152.3 |
| 2-8.2. | Connector PX33 Ground Continuity Test | 2-249 |
| 2-8.3. | Connector PX33 Continuity Test | 2-251 |
| 2-8.4. | Speedometer Dip Switch Settings | 2-344.1 |
| 2-8.5. | Speedometer Dip Switch Settings | 2-345 |
| 2-9. | Deleted | |
| 2-10. | Deleted | |
| 2-11. | Deleted | |
| 2-11.1. | Cab Clearance and Marker Light Connectors | 2-565 |
| 2-11.2. | Cab Clearance and Marker Light Terminal Lugs | 2-567 |
| 2-12. | Side and Rear Marker Light Connectors | 2-581 |
| 2-12.1. | Side and Rear Marker Light Terminal Lugs | 2-583 |

## LIST OF TABLES (CONT)


| Table No. | Table Title | Page |
|---|---|---|
| 2-13. | Van Body Clearance/Marker Light Location and Connector Number | 2-1107 |
| 2-14. | M1079 Blackout Light Locations and Connector Numbers | 2-1225 |
| 2-15. | M1079 Emergency Light Locations and Connector Numbers | 2-1233 |
| 2-16. | Transmission System Fault Index | 2-1359 |
| 2-17. | Transmission Sump Oil Temperature Sensor Resistance Readings | 2-1395 |
| 2-18. | WTEC II Cab Transmission Harness Transmission Solenoid Test Points | 2-1401 |
| 2-19. | Connector P119 Transmission Solenoid Resistance Test Points | 2-1403 |
| 2-20. | Transmission Solenoid Resistance Readings | 2-1403 |
| 2-21. | Main Code 43 Sub Code 21 and 26 High Side Test Points | 2-1405 |
| 2-22. | Main Code 43 Sub Code 21 and 26 Low Side Test Points | 2-1407 |
| 2-23. | Transmission Solenoid F and G Resistance Test Points | 2-1409 |
| 2-24. | Sub Code Range | 2-1417 |
| 2-25. | WTEC II Cab Transmission Harness Continuity Check | 2-1441 |
| 2-26. | Off-Going Clutch Pressure Tap | 2-1447 |
| 2-27. | Clutch Pressure Tap | 2-1451 |
| 2-28. | Off-Going Clutch Pressure Tap | 2-1455 |
| 2-29. | Clutch Pressure Tap | 2-1461 |
| 2-30. | Clutch Pressure Tap | 2-1467 |
| 2-31. | Clutch Pressure Tap | 2-1473 |
| 2-32. | Transmission Sump Oil Temperature Sensor Resistance Readings | 2-1515 |
| 2-33. | WTEC III Cab Transmission Harness Transmission Solenoid Test Points | 2-1523 |
| 2-34. | Connector P119 Transmission Solenoid Resistance Test Points | 2-1525 |
| 2-35. | Transmission Solenoid Resistance Readings | 2-1525 |
| 2-36. | Sub Code Range | 2-1533 |
| 2-37. | WTEC III Cab Transmission Harness Continuity Check | 2-1547 |
| 2-38. | Off-Going Clutch Pressure Tap | 2-1553 |
| 2-39. | Clutch Pressure Tap | 2-1557 |
| 2-40. | Off-Going Clutch Pressure Tap | 2-1561 |
| 2-41. | Clutch Pressure Tap | 2-1567 |
| 2-42. | Clutch Pressure Tap | 2-1573 |
| 2-43. | Clutch Pressure Tap | 2-1579 |
| 2-44. | Propeller Shaft Fault Index | 2-1597 |
| 2-45. | PTO Fault Index | 2-1603 |
| 2-46. | Brake System Fault Index | 2-1607 |
| 2-47. | Air System Fault Index | 2-1713 |
| 2-48. | Wheel Fault Index | 2-1753 |
| 2-49. | Hydraulic System Fault Index | 2-1761 |
| 2-50. | Central Tire Inflation System (CTIS) Fault Index | 2-1767 |
| 2-51. | Axle Fault Index | 2-1895 |
| 2-52. | Steering Fault Index | 2-1903 |
| 2-53. | Suspension System Fault Index | 2-1925 |
| 2-54. | 11K Self-Recovery Winch (SRW) System Fault Index | 2-1945 |
| 2-55. | Steering Hydraulic System Fault Index | 2-1953 |
| 2-56. | Air Transport Components Fault Index | 2-1959 |
| 2-57. | Special Purpose Kit Fault Index | 2-1977 |
| 2-58. | Cab Tilt and Spare Tire Retainer Fault Index | 2-2115 |
| 2-59. | Frame Fault Index | 2-2121 |
| 7-1. | Power Distribution Panel (PDP) Relays | 7-36.1 |
| 7-1.1. | Power Distribution Panel (PDP) Circuit Breakers | 7-36.2 |
| 7-1.2. | Electrical Gages Connectors | 7-89 |

## LIST OF TABLES (CONT)


| Table No. | Table Title | Page |
|---|---|---|
| 7-2. | Rocker Switch Connectors | 7-90 |
| 7-3. | M1081 Cab Clearance and Marker Light Connectors | 7-230 |
| 7-4. | Cab Clearance and Marker Light Connectors | 7-245 |
| 8-1. | WTEC II Diagnostic Code List and Description | 8-10 |
| 8-2. | WTEC III Diagnostic Code List and Description | 8-15 |
| 11-1. | Air Chamber Pressure Limits | 11-60 |
| 11-2. | Rear Brake Air Hose Locations | 11-97 |
| 11-3. | Rear Brake Control Air Hose Locations | 11-99 |
| 11-4. | Front Brake Air Hose Locations | 11-101 |
| 16-1. | M1079 Van Body Accessory Mounting Blind Rivet Nuts | 16-259 |
| 16-2. | M1079 Interior Field Telephone Binding Post Wire Numbers | 16-315 |
| 16-3. | M1079 24 VDC Binding Post Wire Numbers | 16-326 |
| 16-4. | M1079 110 VAC Outlet Box Location and Wire Numbers | 16-339 |
| 16-5. | M1079 Blackout Switch Location and Wire Numbers | 16-368 |
| 16-6. | M1079 Blackout/Emergency Light Locations and Connectors | 16-372 |
| 16-7. | M1079 Clearance and Marker Lights Location and Connectors | 16-388 |
| 16-8. | M1079 Circuit Breakers and Wire Numbers | 16-418 |
| 16-9. | M1079 Connector J173 Pin Letters and Wire Numbers | 16-474 |
| 17-1. | 11K Self-Recovery Winch (SRW) Hydraulic Hose Locations | 17-29 |
| 19-1. | Air Transportability Hydraulic Hose Locations | 19-54 |
| 23-1. | Primary Air Supply Hose Locations | 23-3 |
| 23-2. | Central Tire Inflation System (CTIS) Air Hose Locations | 23-5 |
| 23-3. | Air Transportability Air Hose Locations | 23-9 |
| E-1. | Pneumatic Tube Lengths | E-13 |
| E-2. | Non-Metallic Electrical Cable Conduit Lengths | E-15 |
| F-1. | Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts | F-2 |
| F-2. | Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts | F-4 |
| F-3. | Dry Torque Limits for Metric Screws and Free Spinning Nuts | F-5 |
| F-4. | Dry Torque Limits for Metric Prevailing Torque Nuts | F-6 |
| F-5. | Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts | F-7 |


# HOW TO USE THIS MANUAL

## OVERVIEW

This technical manual (TM) is provided to help you maintain the LMTV at the Unit Maintenance level. Because of its size, it is divided into five volumes. Volumes 2, 3, 4, and 5 contain information which will assist you in the performance of Unit Maintenance on the LMTV. Volume 1 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual.
- **TABLE OF CONTENTS.** Lists, for all volumes, the chapters, sections, appendixes, and indexes with page numbers in order of appearance.
- **CHAPTER 1, INTRODUCTION.** Describes the LMTV and provides equipment data.

## OVERVIEW (CONT)

- **CHAPTER 2, VEHICLE MAINTENANCE.** This chapter contains information for finding tools; special tools; test, measurement, and diagnostic equipment (TMDE); and repair parts. It also contains the preventive maintenance checks and services (PMCS) and troubleshooting tables.
- **APPENDIX A, REFERENCES.** Lists publications used with the LMTV.
- **APPENDIX B, MAINTENANCE ALLOCATION CHART.** The maintenance allocation chart denotes the level of maintenance which performs specific maintenance tasks and the time required. It also lists tools and special tools required for each task.
- **APPENDIX C, TOOLS IDENTIFICATION LIST.** Lists equipment used in the performance of maintenance and references publications which contain information regarding the equipment.
- **APPENDIX D, EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST.** Lists expendable and durable items used in the performance of maintenance.
- **APPENDIX E, ILLUSTRATED LIST OF MANUFACTURED ITEMS.** Illustrates and describes items that must be fabricated from bulk materials for repair of the LMTV.
- **APPENDIX F, TORQUE LIMITS.** Lists the standard torque values for specific attaching hardware.
- **APPENDIX G, MANDATORY REPLACEMENT PARTS.**
- **APPENDIX H, LUBRICATION ORDER.**
- **APPENDIX J, ADDITIONAL AUTHORIZATION LIST (AAL).**
- **APPENDIX K, TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART**.
- **SUBJECT INDEX.** Lists important subjects contained in volumes 1, 2, 3, 4, and 5 in alphabetical order and gives the associated paragraph number.

Volume 2 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual.
- **CHAPTER 2, VEHICLE MAINTENANCE (CONT).**
- **CHAPTER 3, ENGINE MAINTENANCE.**
- **APPENDIX A, REFERENCES.** Lists publications used with the LMTV.
- **APPENDIX B, MAINTENANCE ALLOCATION CHART.** The maintenance allocation chart denotes the level of maintenance which performs specific maintenance tasks and the time required. It also lists tools and special tools required for each task.
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- **APPENDIX H, LUBRICATION ORDER.**
- **APPENDIX J, ADDITIONAL AUTHORIZATION LIST (AAL).**
- **APPENDIX K, TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART**.
- **SUBJECT INDEX.** Lists important subjects contained in volume 2 in alphabetical order and gives the associated paragraph number.

Volume 3 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual.
- **CHAPTER 4, FUEL SYSTEM MAINTENANCE**
- **CHAPTER 5, EXHAUST SYSTEM MAINTENANCE**
- **CHAPTER 6, COOLING SYSTEM MAINTENANCE**
- **CHAPTER 7, ELECTRICAL SYSTEM MAINTENANCE**
- **CHAPTER 8, TRANSMISSION MAINTENANCE**
- **CHAPTER 9, PROPELLER SHAFT MAINTENANCE**
- **CHAPTER 10, FRONT AND REAR AXLE MAINTENANCE**
- **CHAPTER 11, BRAKE SYSTEM MAINTENANCE**
- **CHAPTER 12, WHEEL, TIRES, AND HUBS MAINTENANCE**
- **CHAPTER 13, STEERING SYSTEM MAINTENANCE**
- **CHAPTER 14, FRAME, TOWING ATTACHMENTS, AND DRAWBARS MAINTENANCE**
- **CHAPTER 15, SUSPENSION SYSTEM MAINTENANCE**
- **APPENDIX A, REFERENCES.** Lists publications used with the LMTV.
- **APPENDIX B, MAINTENANCE ALLOCATION CHART.** The maintenance allocation chart denotes the level of maintenance which performs specific maintenance tasks and the time required. It also lists tools and special tools required for each task.
- **APPENDIX C, TOOLS IDENTIFICATION LIST.** Lists equipment used in the performance of maintenance and references publications which contain information regarding the equipment.

## OVERVIEW (CONT)

- **APPENDIX D, EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST.** Lists expendable and durable items used in the performance of maintenance.
- **APPENDIX E, ILLUSTRATED LIST OF MANUFACTURED ITEMS.** Illustrates and describes items that must be fabricated from bulk materials for repair of the LMTV.
- **APPENDIX F, TORQUE LIMITS.** Lists the standard torque values for specific attaching hardware.
- **APPENDIX G, MANDATORY REPLACEMENT PARTS.**
- **APPENDIX H, LUBRICATION ORDER.**
- **APPENDIX J, ADDITIONAL AUTHORIZATION LIST (AAL).**
- **APPENDIX K, TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART**.
- **SUBJECT INDEX.** Lists important subjects contained in volume 3 in alphabetical order and gives the associated paragraph number.

Volume 4 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual.
- **CHAPTER 16, BODY AND CAB MAINTENANCE**
- **CHAPTER 17, 11K SELF-RECOVERY WINCH (SRW) MAINTENANCE**
- **CHAPTER 18, BODY, CHASSIS, AND ACCESSORY ITEMS MAINTENANCE**
- **CHAPTER 19, HYDRAULIC SYSTEM MAINTENANCE**
- **APPENDIX A, REFERENCES.** Lists publications used with the LMTV.
- **APPENDIX B, MAINTENANCE ALLOCATION CHART.** The maintenance allocation chart denotes the level of maintenance which performs specific maintenance tasks and the time required. It also lists tools and special tools required for each task.
- **APPENDIX C, TOOLS IDENTIFICATION LIST.** Lists equipment used in the performance of maintenance and references publications which contain information regarding the equipment.
- **APPENDIX D, EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST.** Lists expendable and durable items used in the performance of maintenance.
- **APPENDIX E, ILLUSTRATED LIST OF MANUFACTURED ITEMS.** Illustrates and describes items that must be fabricated from bulk materials for repair of the LMTV.
- **APPENDIX F, TORQUE LIMITS.** Lists the standard torque values for specific attaching hardware.
- **APPENDIX G, MANDATORY REPLACEMENT PARTS.**

- **APPENDIX H, LUBRICATION ORDER.**
- **APPENDIX J, ADDITIONAL AUTHORIZATION LIST (AAL).**
- **APPENDIX K, TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART**.
- **SUBJECT INDEX.** Lists important subjects contained in volume 4 in alphabetical order and gives the associated paragraph number.

Volume 5 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual.
- **CHAPTER 20, SPECIAL PURPOSE KITS MAINTENANCE**
- **CHAPTER 21, ARMAMENT/SIGHTING AND FIRE CONTROL MATERIEL MAINTENANCE**
- **CHAPTER 22, ELECTRICAL ILLUMINATING EQUIPMENT MAINTENANCE**
- **CHAPTER 23, AIR SYSTEM MAINTENANCE**
- **CHAPTER 24, GAGES (NON-ELECTRICAL) MAINTENANCE**
- **APPENDIX A, REFERENCES.** Lists publications used with the LMTV.
- **APPENDIX B, MAINTENANCE ALLOCATION CHART.** The maintenance allocation chart denotes the level of maintenance which performs specific maintenance tasks and the time required. It also lists tools and special tools required for each task.
- **APPENDIX C, TOOLS IDENTIFICATION LIST.** Lists equipment used in the performance of maintenance and references publications which contain information regarding the equipment.
- **APPENDIX D, EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST.** Lists expendable and durable items used in the performance of maintenance.
- **APPENDIX E, ILLUSTRATED LIST OF MANUFACTURED ITEMS.** Illustrates and describes items that must be fabricated from bulk materials for repair of the LMTV.
- **APPENDIX F, TORQUE LIMITS.** Lists the standard torque values for specific attaching hardware.
- **APPENDIX G, MANDATORY REPLACEMENT PARTS.**
- **APPENDIX H, LUBRICATION ORDER.**
- **APPENDIX J, ADDITIONAL AUTHORIZATION LIST (AAL).**
- **APPENDIX K, TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART**.
- **SUBJECT INDEX.** Lists important subjects contained in volume 5 in alphabetical order and gives the associated paragraph number.

## FINDING INFORMATION

There are several ways to find the information you need in this manual. They are as follows:

- **FRONT COVER INDEX.** The front cover index contains a list of the most important topics contained in each volume. It features a black box at the right edge of the cover which corresponds with a black box on the page containing the topic. The topics listed on the front cover are highlighted in the table of contents with a box.
- **TABLE OF CONTENTS.** Lists chapters, sections, appendixes, and indexes with page numbers in order of appearance.
- **CHAPTER INDEXES.** List paragraphs contained in the individual chapters with paragraph and page numbers in order of appearance.
- **SYMPTOM INDEX.** Lists malfunctions contained in the troubleshooting table with page numbers in order of appearance.

## TROUBLESHOOTING

Troubleshooting is contained in chapter 2. When a malfunction occurs, look at the symptom index for the vehicle troubleshooting table in chapter 2. Find the malfunction in the index. Turn to the page number listed for the malfunction in the troubleshooting table. Perform the steps required to correct the malfunction. If you can't find the malfunction, or the malfunction is not corrected, notify your supervisor.

## MAINTENANCE

- **SCHEDULED MAINTENANCE.** Your scheduled maintenance is located in **Table 2-1. Preventive Maintenance Checks and Services**. These checks and services are mandatory at the intervals listed. Always follow the WARNINGS and CAUTIONS.
- **UNSCHEDULED MAINTENANCE.** Unscheduled maintenance is located in chapters 3 through 24. The PMCS and troubleshooting tables often reference you to these procedures. When you perform maintenance, look over the entire procedure before starting. Make sure you have the necessary tools and materials at hand. Always follow the WARNINGS and CAUTIONS.

**FOLLOW THESE GUIDELINES WHEN USING THIS MANUAL:**

- Become familiar with the entire maintenance procedure before beginning a maintenance task.
- Read all **WARNINGS** and **CAUTIONS** before performing any procedures.

# CHAPTER 1
# INTRODUCTION


Page

Section I. GENERAL INFORMATION . . . . . 1-1
1-1. SCOPE . . . . . 1-1
1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS . . . . . 1-6
1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE . . . . . 1-6
1-4. OFFICIAL NOMENCLATURE, NAMES AND DESIGNATIONS . . . . . 1-6
1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR) . . . . . 1-6
1-6. WARRANTY INFORMATION . . . . . 1-6

Section II. EQUIPMENT DESCRIPTION AND DATA . . . . . 1-6
1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES . . . . . 1-6
1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS . . . . . 1-7
1-9. DIFFERENCES BETWEEN MODELS . . . . . 1-7

Section III. PRINCIPLES OF OPERATION . . . . . 1-7
1-10. POWERTRAIN . . . . . 1-7
1-11. ENGINE AIR INTAKE SYSTEM . . . . . 1-9
1-12. FUEL SYSTEM . . . . . 1-10
1-13. COOLING SYSTEM . . . . . 1-12
1-14. ELECTRICAL SYSTEM . . . . . 1-14
1-15. BRAKE SYSTEM . . . . . 1-20
1-16. STEERING SYSTEM . . . . . 1-22
1-17. 11K SELF-RECOVERY WINCH (SRW) . . . . . 1-23
1-18. AIR TRANSPORTABILITY HYDRAULIC SYSTEM . . . . . 1-24
1-19. AIR SYSTEM . . . . . 1-26


## Section I. GENERAL INFORMATION

### 1-1. SCOPE

This chapter provides general information, equipment description, and principles of operation for the M1078 series Light Medium Tactical Vehicle (LMTV). The LMTV will herein be referred to as the vehicle.

**a. Type of Manual:** Unit Support Maintenance Instructions, TM 9-2320-365-20-1.

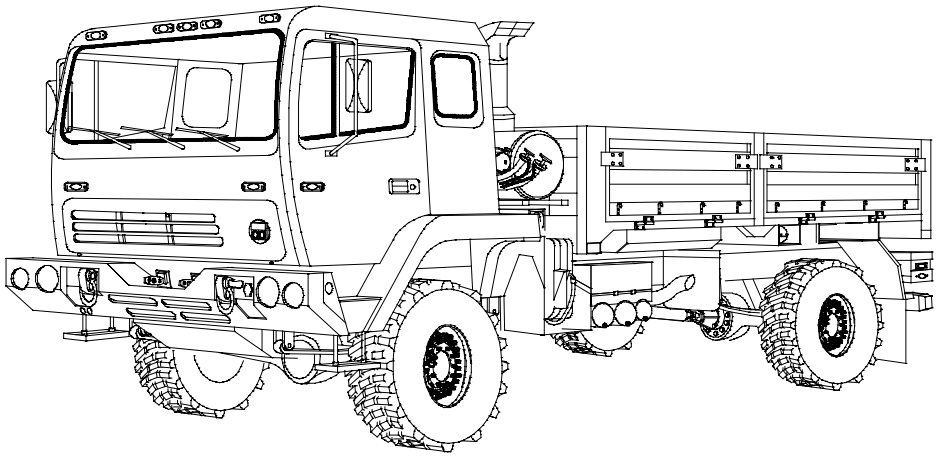
**b. Model Numbers and Equipment Names.** The vehicle model numbers and names are listed below:

M1078 Truck, Cargo: 2 1/2-Ton, 4x4, Dropside (Figure 1-1).
M1079 Truck, Van: 2 1/2-Ton, 4x4 (Figure 1-2).
M1080 Truck, Chassis: 2 1/2-Ton, 4x4 (Figure 1-3).
M1081 Truck, Cargo: 2 1/2-Ton, 4x4, Dropside, AIR DROP (Figure 1-4).

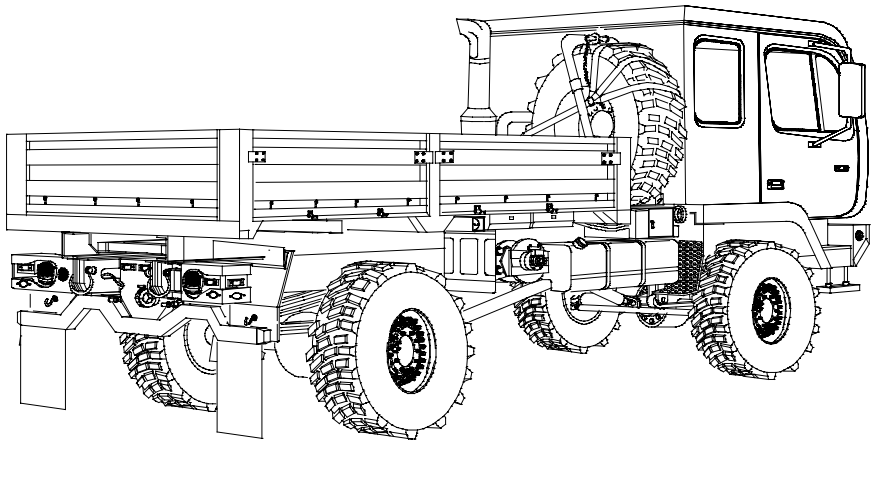
**c. Purpose of Equipment.** The LMTV series is a family of 4x4 wheeled vehicles. The purpose of these vehicles is as follows:

(1) M1078 - Cargo hauling vehicle; can be outfitted for troop transport when equipped with a troopseat kit.
(2) M1079 - Van; can be outfitted with communications equipment or shop equipment.
(3) M1080 - Vehicle chassis; this chassis will accept a cargo bed or may be modified for special missions.
(4) M1081 - Cargo hauling vehicle; can be airdropped and outfitted for troop transport when equipped with a troopseat kit.

## 1-1. SCOPE (CONT)

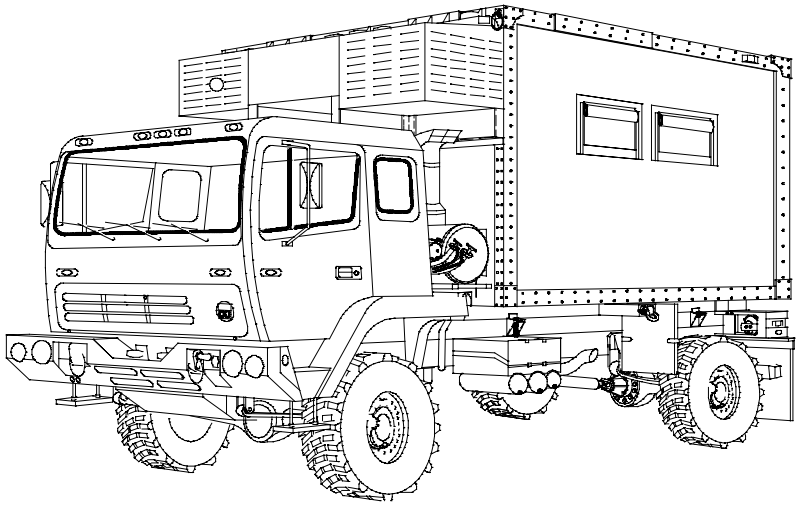



**LEFT FRONT VIEW**

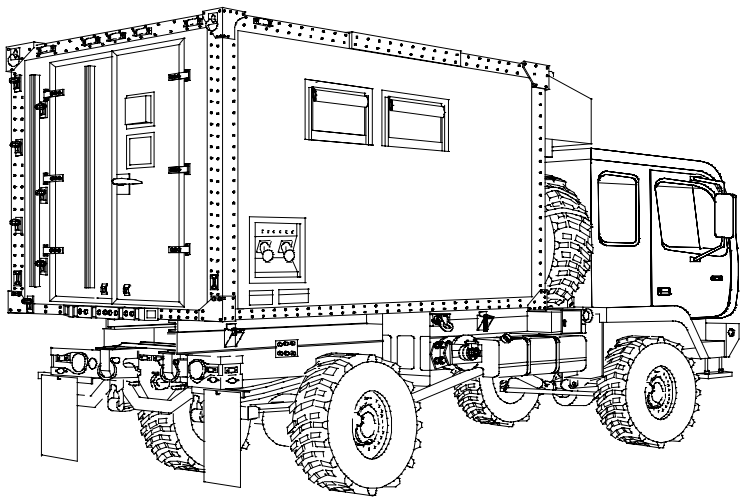



**RIGHT REAR VIEW**

**Figure 1-1. M1078 Truck, Cargo: 2 1/2-Ton, 4x4, Dropside**



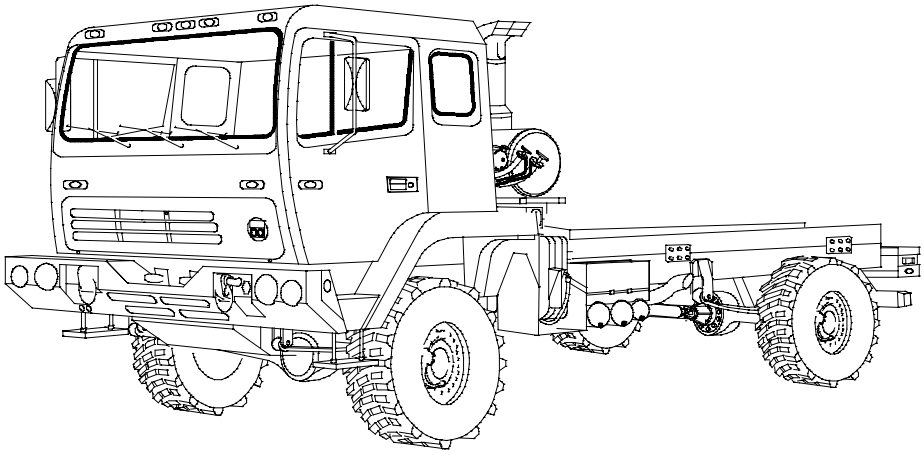

**LEFT FRONT VIEW**



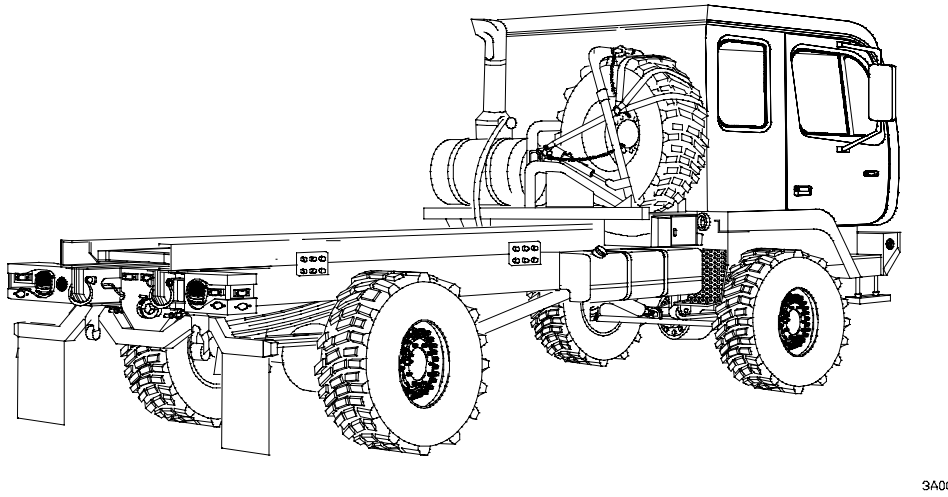

**RIGHT REAR VIEW**

**Figure 1-2. M1079 Truck, Van: 2 1/2 Ton, 4x4**

## 1-1. SCOPE (CONT)

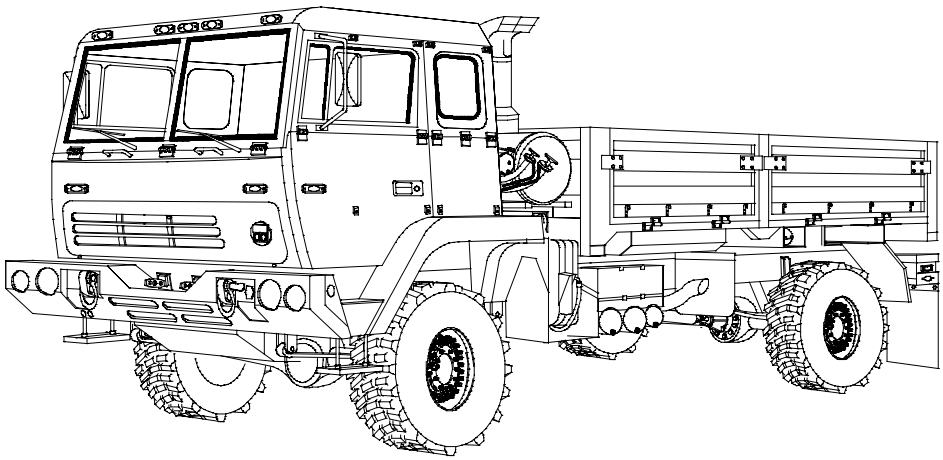



**LEFT FRONT VIEW**



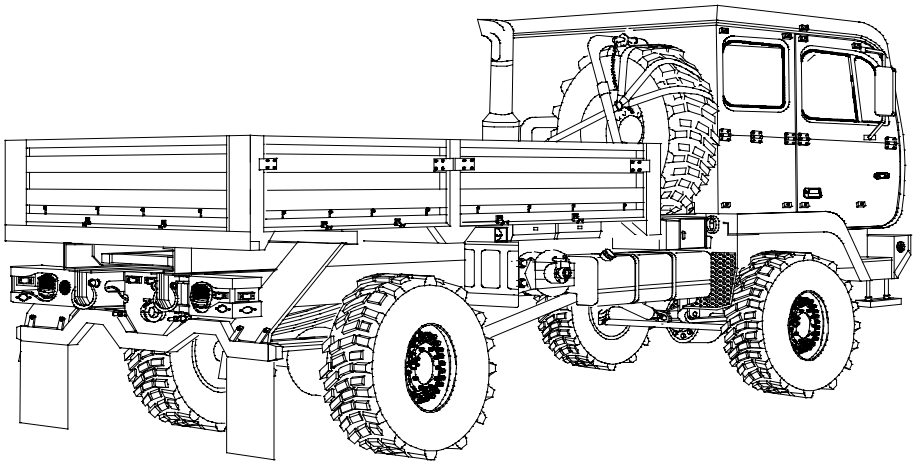

**RIGHT REAR VIEW**

**Figure 1-3. M1080 Truck, Chassis: 2 1/2-Ton, 4x4**



3A00007A

**LEFT FRONT VIEW**



3A00008A

**RIGHT REAR VIEW**

**Figure 1-4. M1081 Truck, Cargo: 2 1/2-Ton, 4x4, AIR DROP**

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

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

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

Command decision, according to the tactical situation, will determine when the destruction plan of the M1078 vehicles will be accomplished. A destruction plan will be prepared by the using organization unless one has been prepared by a higher authority. For general destruction procedures for this equipment, refer to TM 750-224-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-automotive and Armaments Command).

## 1-4. OFFICIAL NOMENCLATURE, NAMES AND DESIGNATIONS

Table 1-1 lists the nomenclature cross-reference used in this manual.

**Table 1-1. Nomenclature Cross-Reference**

| Common Name | Official Nomenclature |
|---|---|
| Cold Start System | Ether Quick-Start System |
| Engine Coolant | Antifreeze, Ethylene, Glycol, Inhibited |
| Gladhand | Quick-Disconnect Coupling |
| Vehicle | Light Medium Tactical Vehicle (LMTV) |

## 1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your Light Medium Tactical Vehicle (LMTV) needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/FMTV/312, Warren, MI 48397-5000. We'll send you a reply.

## 1-6. WARRANTY INFORMATION

Refer to M1078 Series Warranty Program Technical Bulletin, TB 9-2300-365-15, for complete warranty information covering the vehicle. Warranty starts on the date found in block 23, DA Form 2408-9, in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action.

# Section II. EQUIPMENT DESCRIPTION AND DATA

## 1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

Refer to TM 9-2320-365-10 for equipment characteristics, capabilities, and features.

## 1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Refer to TM 9-2320-365-10 for location and description of major components.

## 1-9. DIFFERENCES BETWEEN MODELS

Refer to TM 9-2320-365-10 for differences between models.

# Section III. PRINCIPLES OF OPERATION

## 1-10. POWERTRAIN

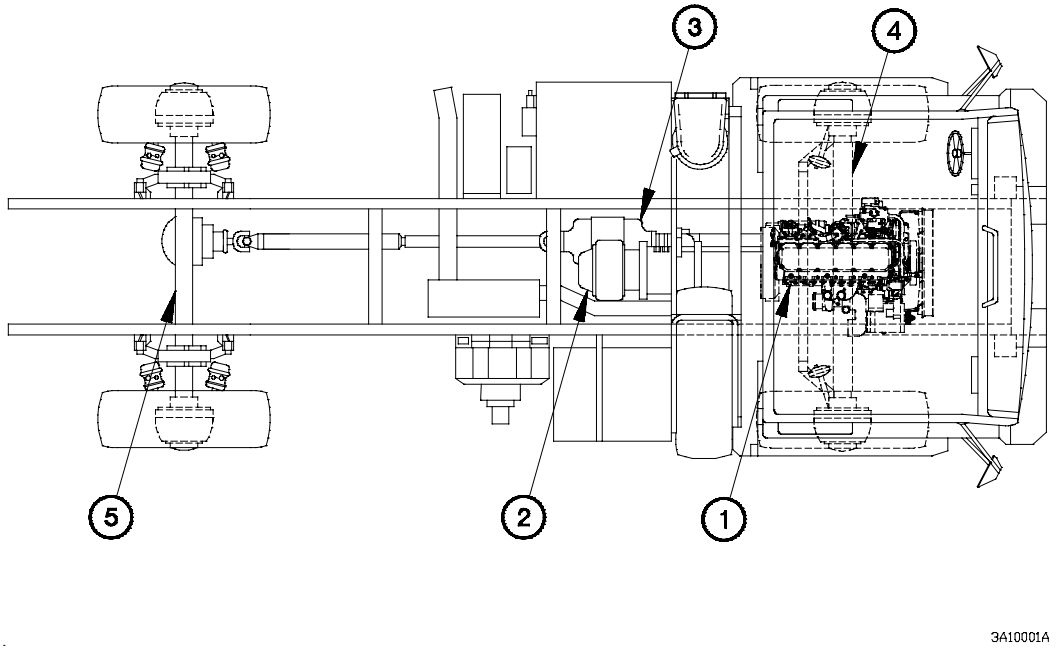



**Figure 1-5. Powertrain**

Power for the vehicle is provided by a diesel engine (1, Figure 1-5) which is coupled directly to an automatic transmission (2). Power from the automatic transmission is transferred to the transfer case (3) and on to the front steering and rear drive axles (4 and 5) through a series of drive shafts and universal joints. The vehicle drive train is enhanced by the use of an electronically controlled seven-speed transmission. The primary components of the Allison MD3070PT transmission consist of a control module located directly beneath the transmission main housing; a Throttle Position Sensor (TPS) which detects the percentage of throttle being used; and engine, turbine, and output speed sensors which, in combination with each other, send information to the transmission ECU to provide the smoothest possible shifting and allow the transmission ECU to monitor overall transmission performance. Transmission shift control is provided by one of two types of pushbutton shift selectors: The WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) which contains an integral transmission ECU or the WTEC III Transmission Pushbutton Shift Selector (TPSS) which is coupled to an external transmission ECU.

## 1-10. POWERTRAIN (CONT)

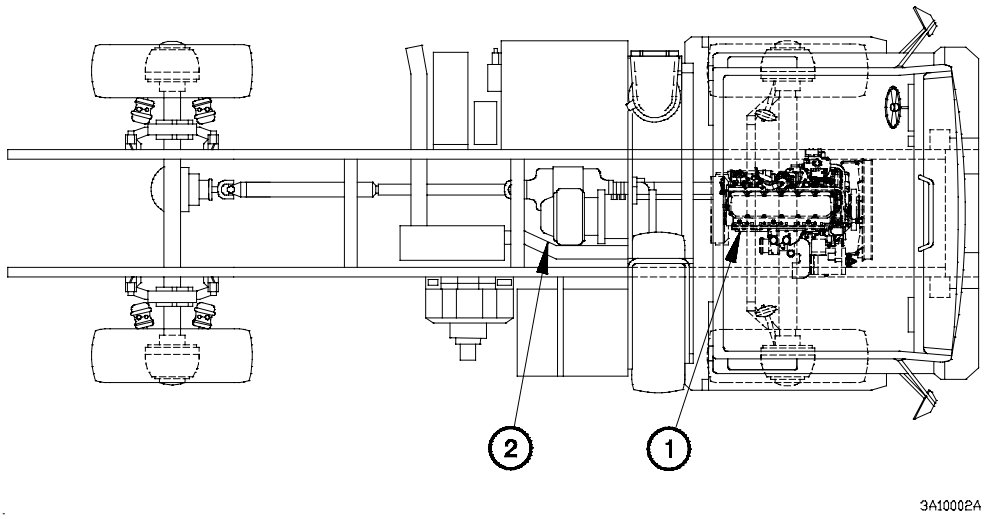



**Figure 1-5. Powertrain (Cont)**

**a. Engine.** The vehicle is equipped with a Caterpillar diesel engine, model 3116 ATAAC (Air-to Air After Cooler) (1, Figure 1-5), rated at 225 HP.

**b. Transmission.** The vehicle is equipped with an Allison automatic transmission, model MD3070PT (2, Figure 1-5). It is a fully automatic electronically controlled seven-speed close-ratio transmission.

(1) The TEPSS contains microprocessor based electronics, and is located in the instrument panel to the driver's left. The TPSS is located in the instrument panel to the driver's left, while the transmission ECU is located behind the kick panel. The ECU receives information, in the form of electrical signals from the various sensors, processes that information, then sends the appropriate signals to the solenoids which control transmission function. The ECU incorporates a diagnostic program which enables it to identify numerous actual and/or potential transmission problems. The TEPSS and TPSS are capable of displaying diagnostic codes in the Light Emitting Diode (LED) display on the pushbutton shift selector. These diagnostic codes are stored in the ECU for later retrieval. The pushbutton shift selector is used for selecting transmission range. The transmission defaults to Neutral (N) whenever electrical power is removed from the vehicle. The Drive (D) gear selection is used for normal driving conditions. The transmission will engage 2nd gear when D is selected and the vehicle is stopped. As the accelerator is depressed and speed increases, the transmission will automatically upshift through 3rd, 4th, 5th, 6th, and 7th gears. Low gear (1st gear), is available only by manual selection. Selecting a specific gear; for example, 3rd; will prevent the transmission upshifting past the selected gear. This is useful if road or load conditions require lower gear range operation. When road conditions improve or load is reduced, the shift selector can be returned to the normal (D) driving position. When electrical power is applied to the TEPSS and a fault is detected in the transmission controls, the TEPSS will emit an eight second series of beeps. When electrical power is applied to the TPSS and a fault is detected in the transmission controls, "--" will appear in the TPSS LED display. In either case, the transmission will not engage a range (forward or reverse) when D or Reverse (R) range is selected on the pushbutton shift selector. TM 9-2320-365-10 provides full operating instructions for the transmission.

(2) The transmission may include a Power Take-Off (PTO). The PTO powers a hydraulic pump which supplies hydraulic pressure for an 11K self-recovery winch (SRW).

**c. Transfer Case.** The transfer case (3, Figure 1-5) provides the transmission (2) with the seventh gear (low gear, or 1st gear) and delivers power from the transmission to the front and rear driveshafts. In normal driving conditions, the transfer case splits the output torque of the transmission, providing 70 percent of the torque to the rear output drive yoke and 30 percent to the front output drive yoke. In low gear the output torque of the transmission is split evenly, with 50 percent going to the front output yoke and 50 percent going to the rear.

**d. Suspension.** The suspension system is designed to maintain tire/ground contact in all types of terrain. the vehicle is equipped with 395/85R20 tires. The tires have a tread pattern designed to maximize traction on all types of terrain.

**e. Axles.** Front and rear axles (4 and 5, Figure 1-5) feature wheel end planetary drives designed to allow the vehicle to carry heavy loads. When the vehicle is operated in MODE, all axles become driving axles. When the vehicle is operated in MODE, 7th gear is unavailable.

## 1-11. ENGINE AIR INTAKE SYSTEM

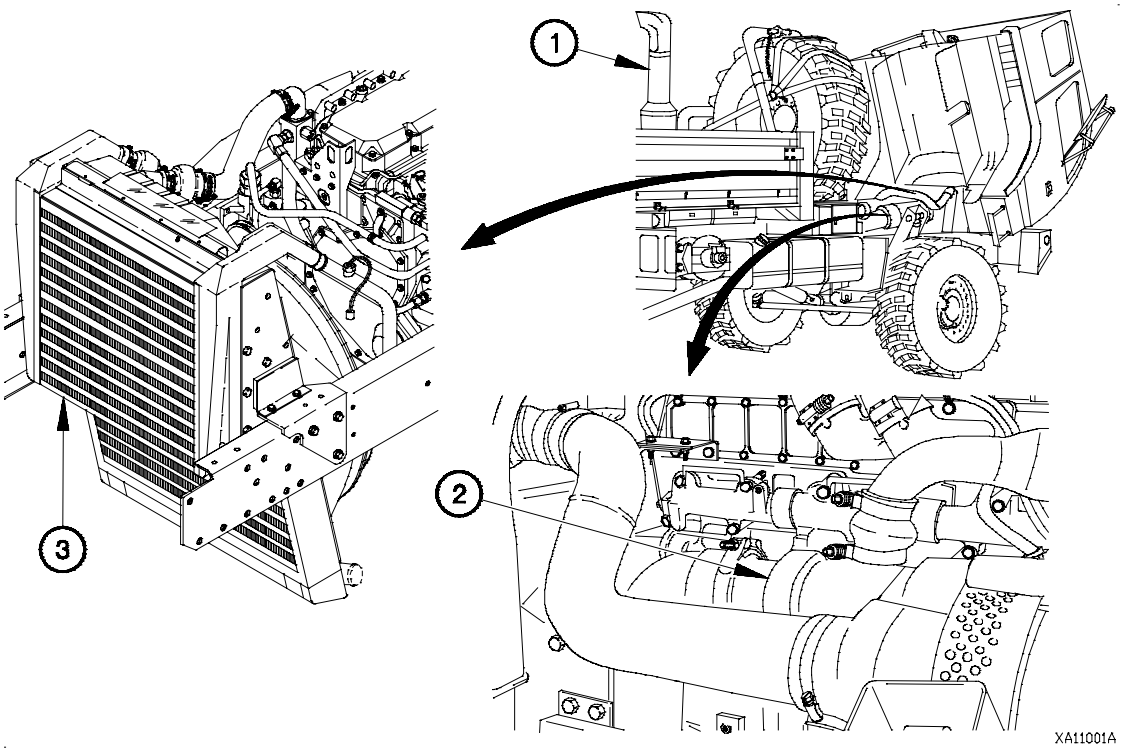



**Figure 1-6. Engine Air Intake System**

The engine air intake system consists of a dry-type air cleaner (1, Figure 1-6), turbocharger (2), and a charge air cooler (3). The turbocharger increases engine horsepower by delivering a higher volume of air to the engine. Engine exhaust gases flow through the turbocharger, causing a turbine wheel to spin. As the turbine wheel spins, a compressor wheel on the opposite end of the turbine wheel shaft spins and draws fresh air through the air cleaner. The compressor wheel compresses the air and delivers it to the charge air cooler. The air flows through the charge air cooler which cools the air before it is delivered to the engine cylinders. The charge air cooler allows a denser charge of air to be delivered to the engine, which also aids in increasing engine horsepower.

## 1-12. FUEL SYSTEM

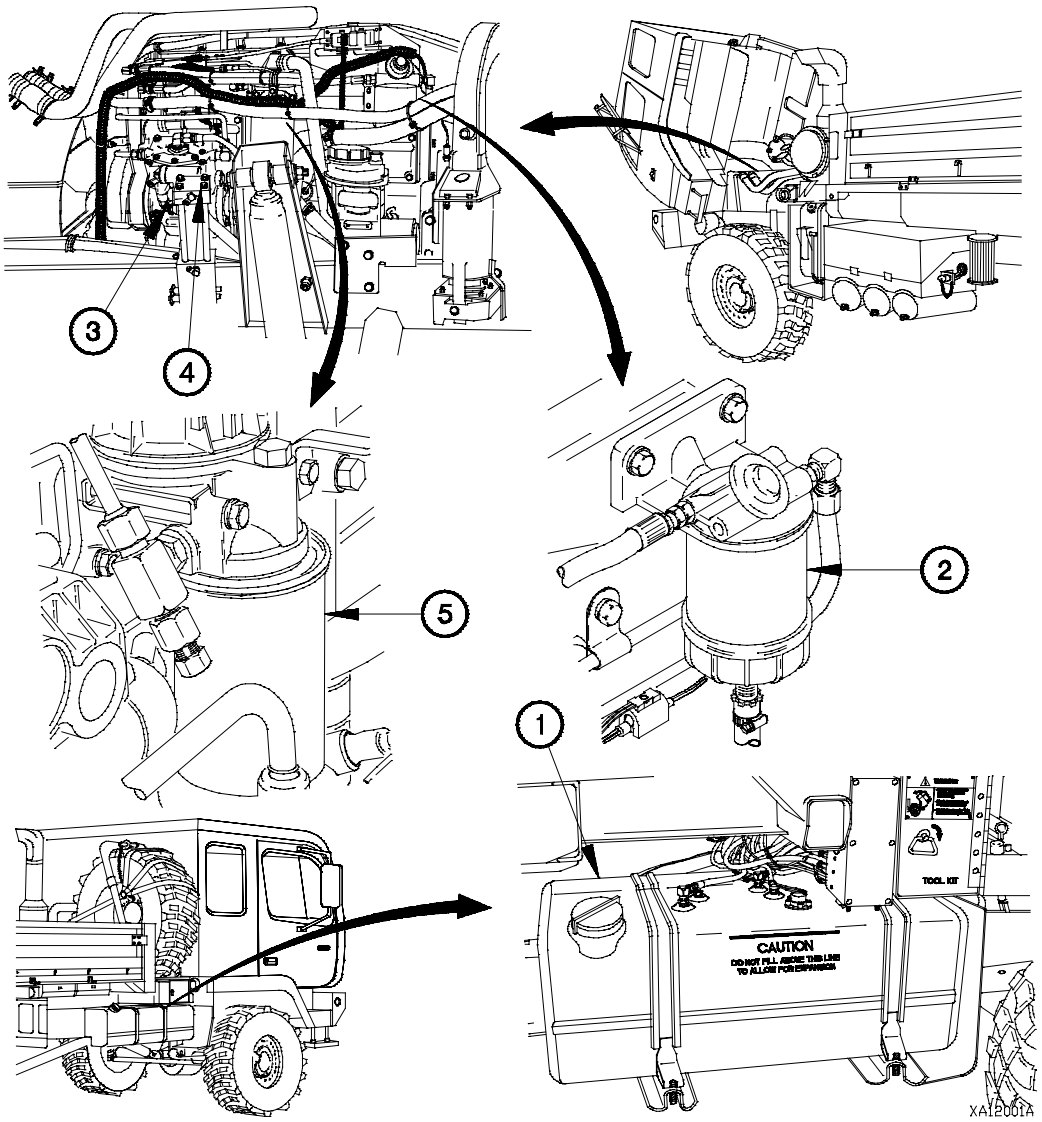



**Figure 1-7. Fuel System**

The primary components of the fuel system are the fuel tank (1, Figure 1-7), fuel priming pump and fuel/water separator (2), fuel shutoff solenoid (3), engine fuel governor (4), and secondary fuel filter (5). The mechanical fuel pump acts as an engine priming feature. The fuel/water separator removes water and large solid particles from the fuel before it is passed to the engine fuel governor. The fuel shutoff solenoid, when energized, frees the governor output shaft to move to the FUEL ON position. When electrical power is removed from the fuel shutoff solenoid, the governor output shaft is locked in the FUEL OFF position. The engine fuel governor contains a mechanical link to the fuel control linkage and fuel transfer pump. The engine fuel governor responds to input from the accelerator pedal and causes the fuel control rack to rotate, resulting in an increase or decrease in engine speed. The governor adjusts the amount of fuel delivered to the engine as engine speed changes. The secondary fuel filter removes finer particles from the fuel before it reaches the cylinder head. A fuel pressure regulator redirects excess fuel, through a fuel return hose, back to the fuel tank.

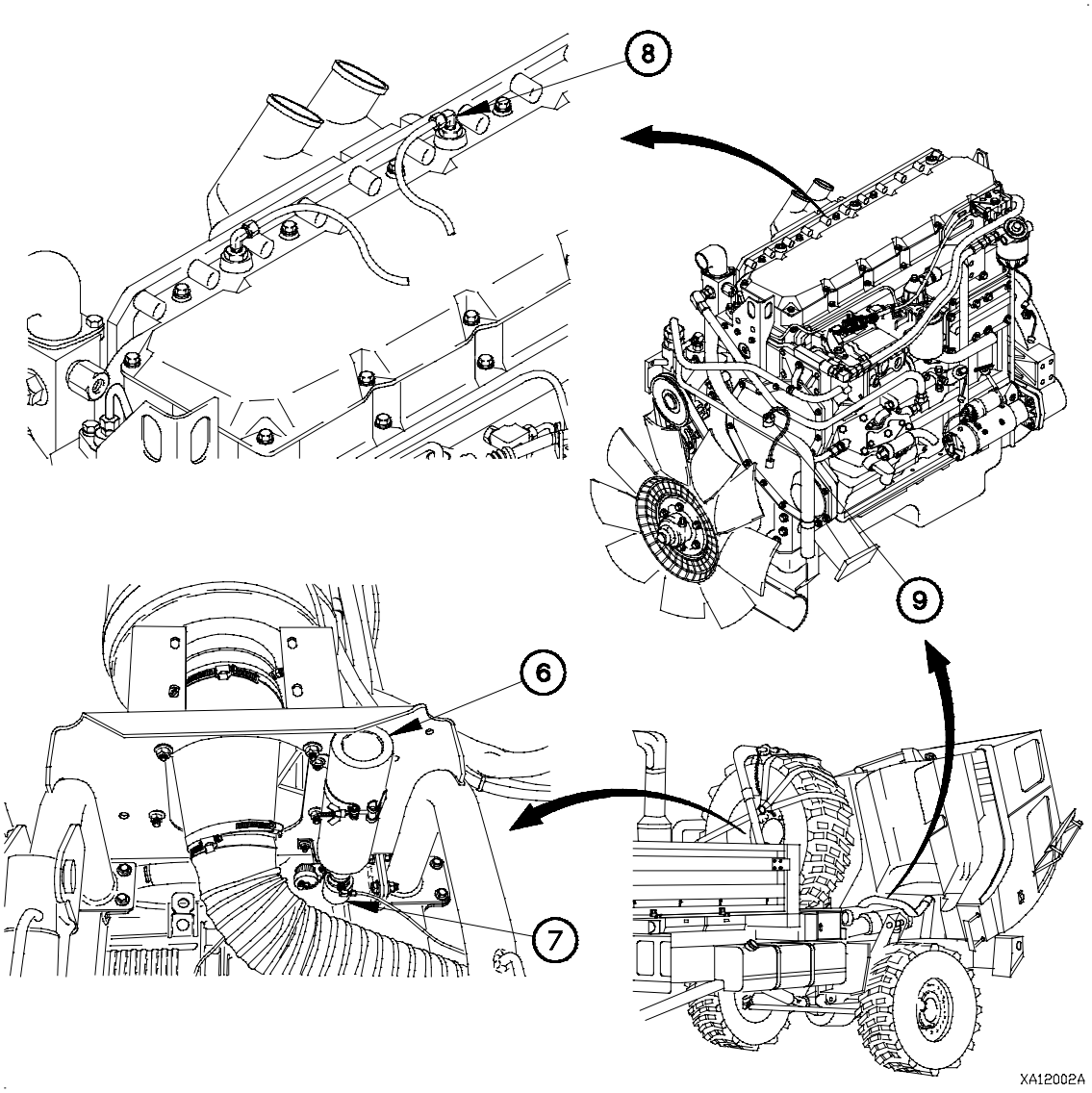



**Figure 1-7. Fuel System (Cont)**

Additionally, the vehicle is equipped with an ether quick start system designed for starting the engine when ambient temperatures are below 32°F (0°C). The ether quick start system is composed of an ether cylinder (6), ether valve (7), two ether nozzles (8), and an ether sensor switch (9). The ether sensor switch detects the temperature of the engine coolant and disables the ether valve above 32°F (0°C). The ether valve delivers a controlled charge of ether to the ether nozzles.

## 1-13. COOLING SYSTEM

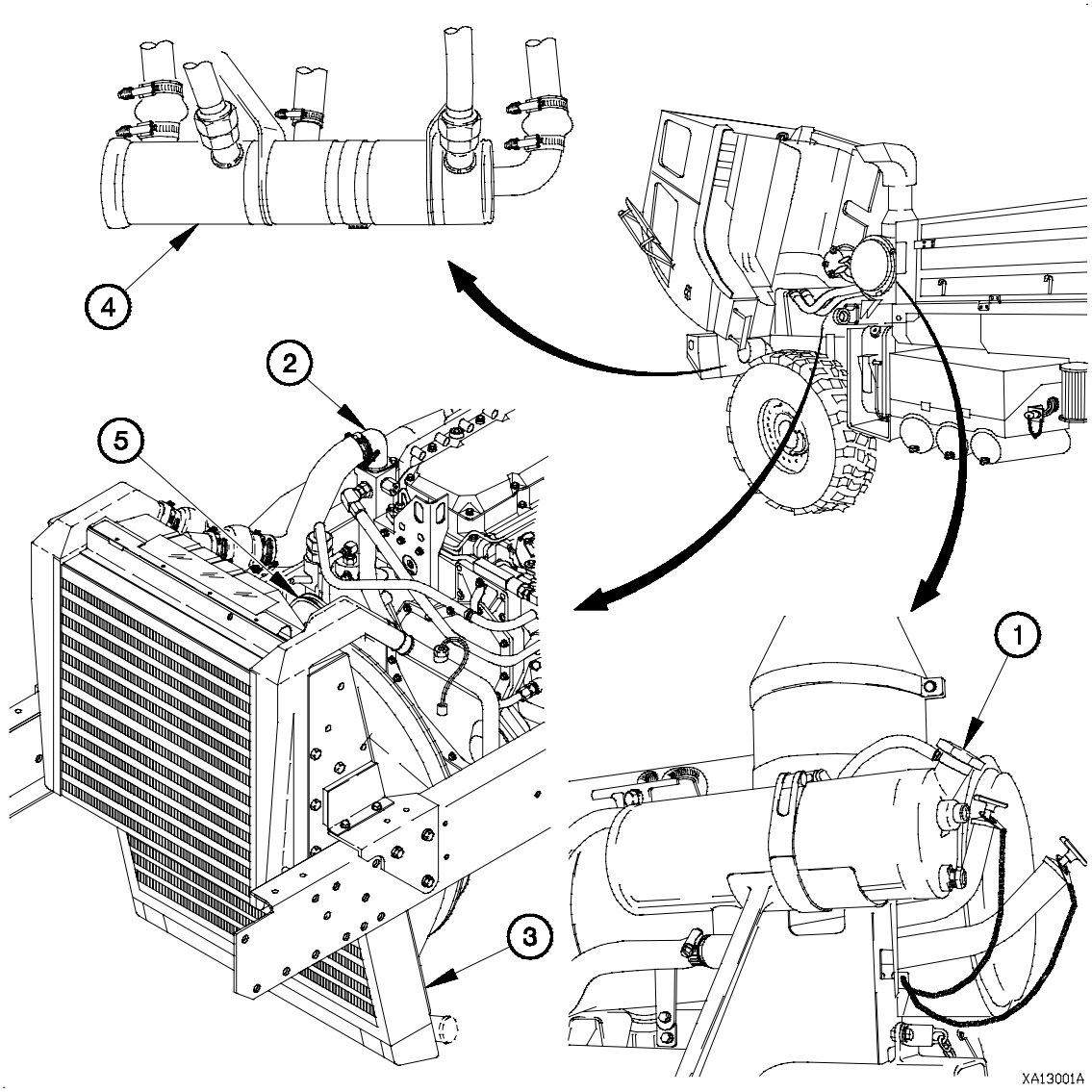



**Figure 1-8. Cooling System**

**a. Cooling System.** The pressurized cooling system protects the engine, transmission, and air compressor by providing a means of dissipating heat generated during operation of the vehicle. The radiator pressure cap (1, Figure 1-8), in combination with the ethylene glycol-based antifreeze, effectively raises the boiling point of the coolant to well above 212°F (100°C). The thermostat (2), located in a housing on the right side of the engine, helps the engine to warm up quickly by remaining closed until the coolant temperature reaches approximately 180°F (82°C). When the coolant reaches 199°F (93°C), the thermostat is fully open and coolant is circulated through the water jackets in the engine to maintain the correct operating temperature for the engine. Coolant is drawn from the radiator (3), through the transmission oil cooler (4), and circulated throughout the cooling system by the water pump (5). The water pump, located on the front of the engine toward the right side, is driven by two V-belts from the crankshaft pulley.

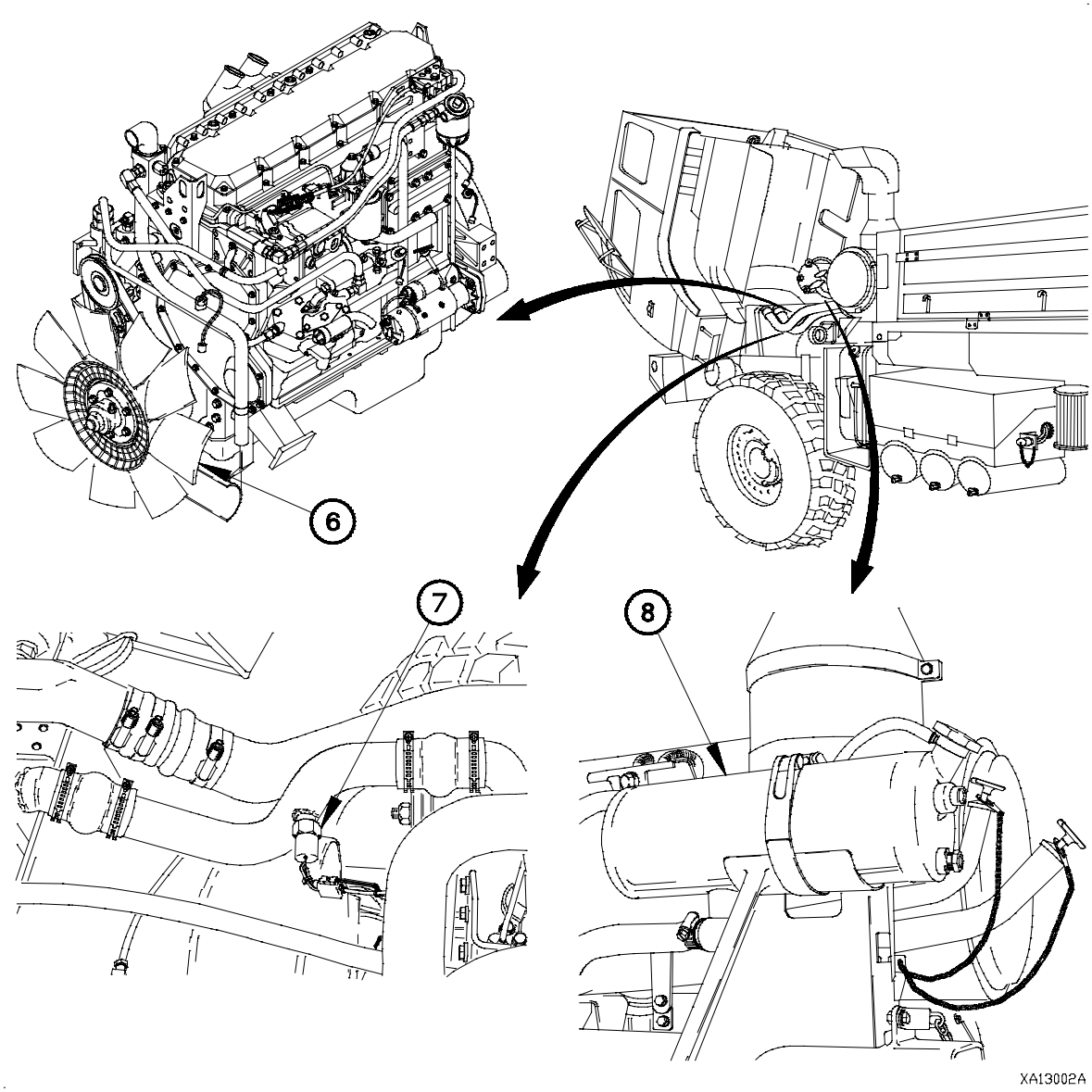



**Figure 1-8. Cooling System (Cont)**

An engine fan (6) with pneumatic clutch is activated by the water temperature switch (7). When this switch detects a high temperature condition, air pressure is removed from the fan clutch and the engine fan is engaged. Excess heat is drawn from the radiator by the flow of air created by the engine fan over the radiator cooling fins. A radiator overflow tank (8) is provided to allow for expansion of the coolant. The radiator overflow tank also serves as the point where new coolant is introduced into the cooling system.

## 1-14. ELECTRICAL SYSTEM

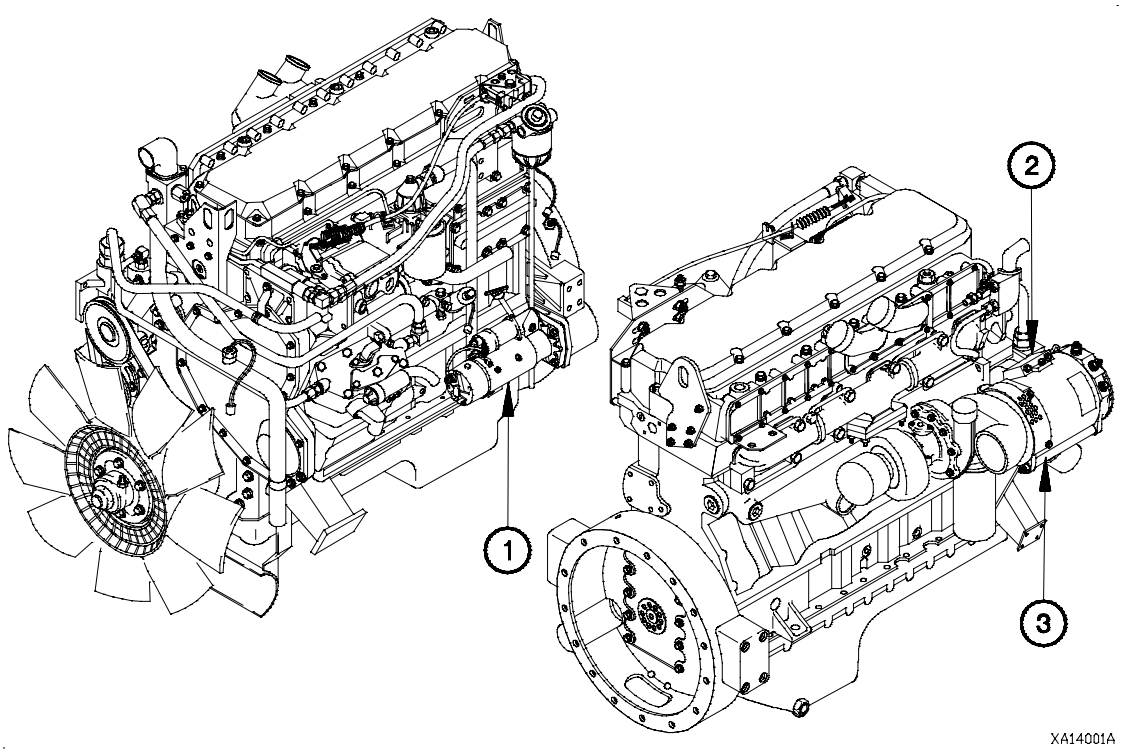



**Figure 1-9. Electrical System**

In the Electrical System, a heavy duty starting motor (1, Figure 1-9) is mounted on the engine flywheel housing and provides the cranking power necessary for starting the engine. The voltage regulator (2) maintains both a 14- and 28-volts level for proper battery charging. The alternator (3) provides sufficient amperage to operate all electrical components and charge the batteries during engine idling. Vehicle exterior lights are mounted in protective locations or are protected to prevent damage. Protection is provided for lights during cross country travel. Polycarbonate lenses are provided for all lights except the sealed beam headlights. The electrical system supplies all of the electrical power needed to operate the vehicle and trailer. The complete Electrical System is made up of the following subsystems:

- Power Storage and Generating
- Engine Starting and Stopping
- Service Lighting
- Blackout Lighting
- Accessory Lighting
- Instruments
- Indicator Lights and Alarm
- Troubleshooting Aid

**a. Power Storage and Generating.** Power storage for the vehicle consists of four 12-volt batteries. The four batteries are divided into two sets. Two batteries in each set are wired in parallel to produce higher amperage. The two sets are then wired in series to produce 24 volts Direct Current (DC). While the batteries can power all of the systems for a limited time, their primary purpose is to supply power to the engine starting system. Once the engine is running, the generating system provides electrical power for all of the systems. The engine driven alternator generates Alternating Current (AC) which is passed through a set of rectifiers that change it into DC current. This DC current is used to charge the batteries and is distributed to the electrical sub-systems of the vehicle. The voltage regulator adjusts alternator output to fit the needs of the electrical system.

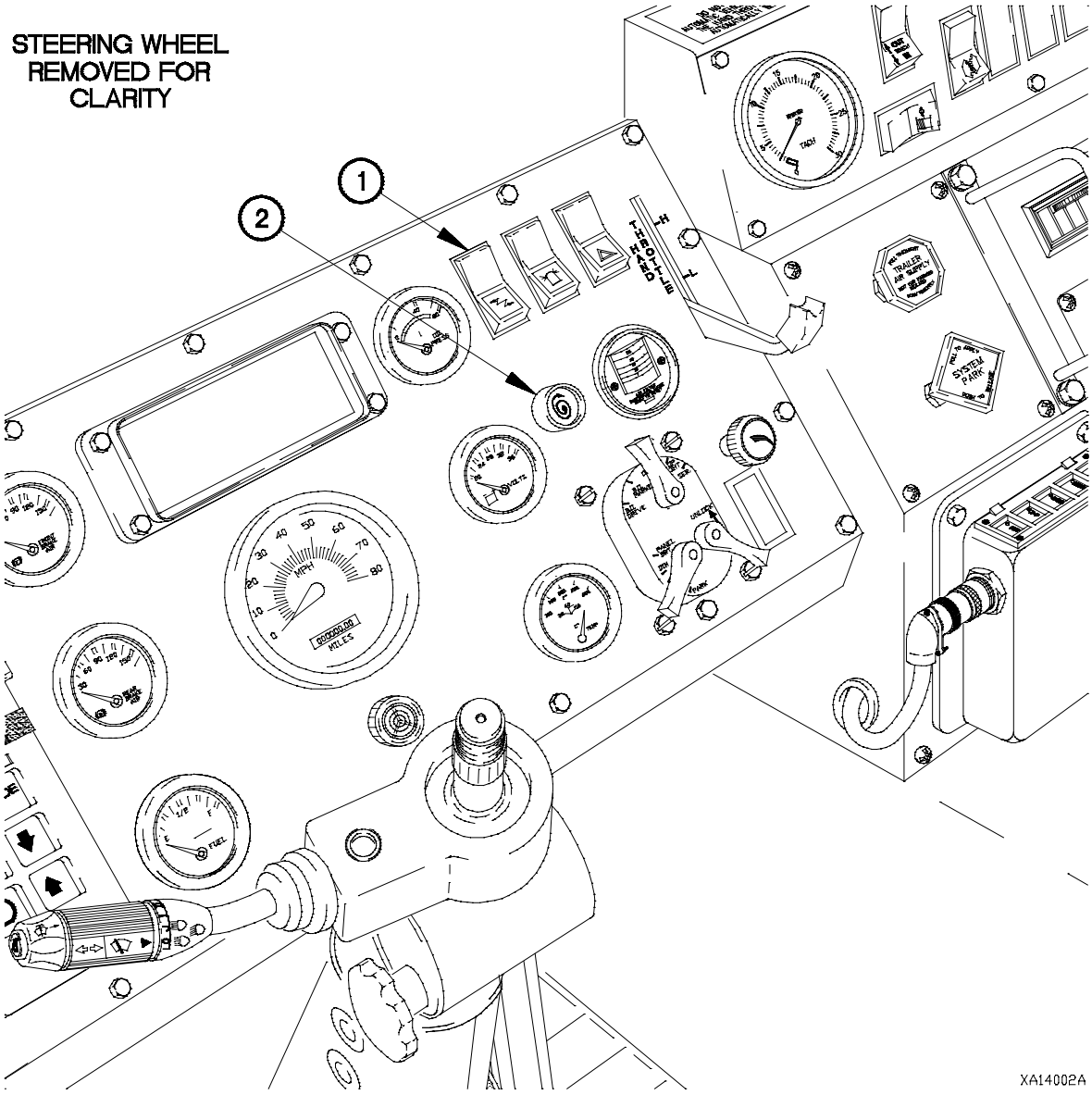



**Figure 1-10. Engine Starting System.**

**b. Engine Starting and Stopping.** The Engine Starting System uses the stored electrical energy of the batteries to the turn the starting motor. When the master power switch (1, Figure 1-10) is positioned to on and the starter pushbutton switch (2) is depressed, electrical power passes through the starter pushbutton to the auxiliary starter solenoid. The auxiliary starter solenoid draws electrical power directly from the batteries and sends it to the starting motor solenoid. When the starting motor solenoid is energized, electrical power from the batteries is supplied to the starting motor and the engine begins cranking. Positioning the master power switch to off stops the engine.

## 1-14. ELECTRICAL SYSTEM (CONT)

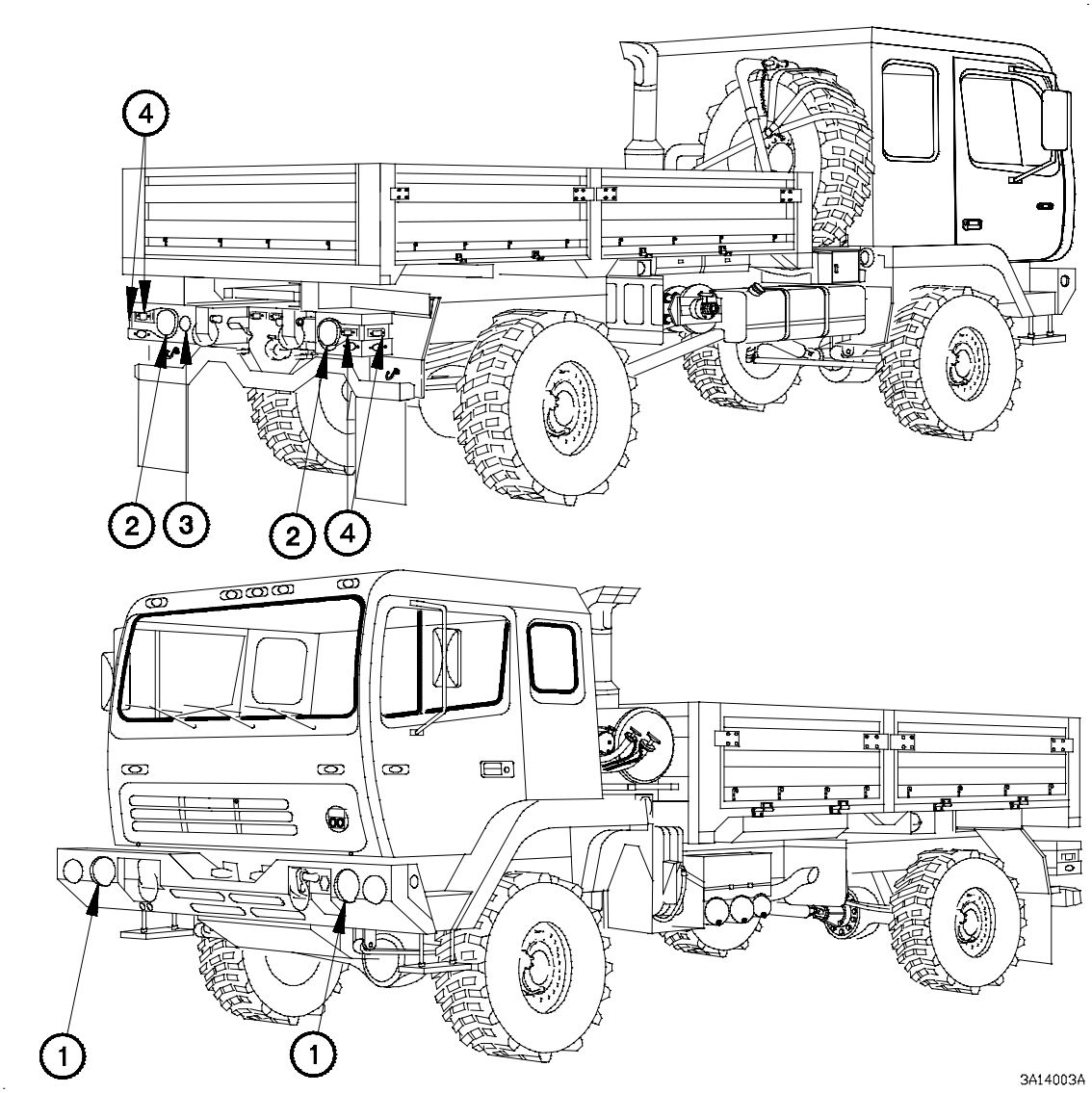



**Figure 1-11. Service Lighting System**

**c. Service Lighting.** The Service Lighting System includes the headlights (1, Figure 1-11), taillights (2), backup light (3), and clearance and marker lights (4). They are energized by positioning the main light switch to the appropriate position (TM 9-2320-365-10).

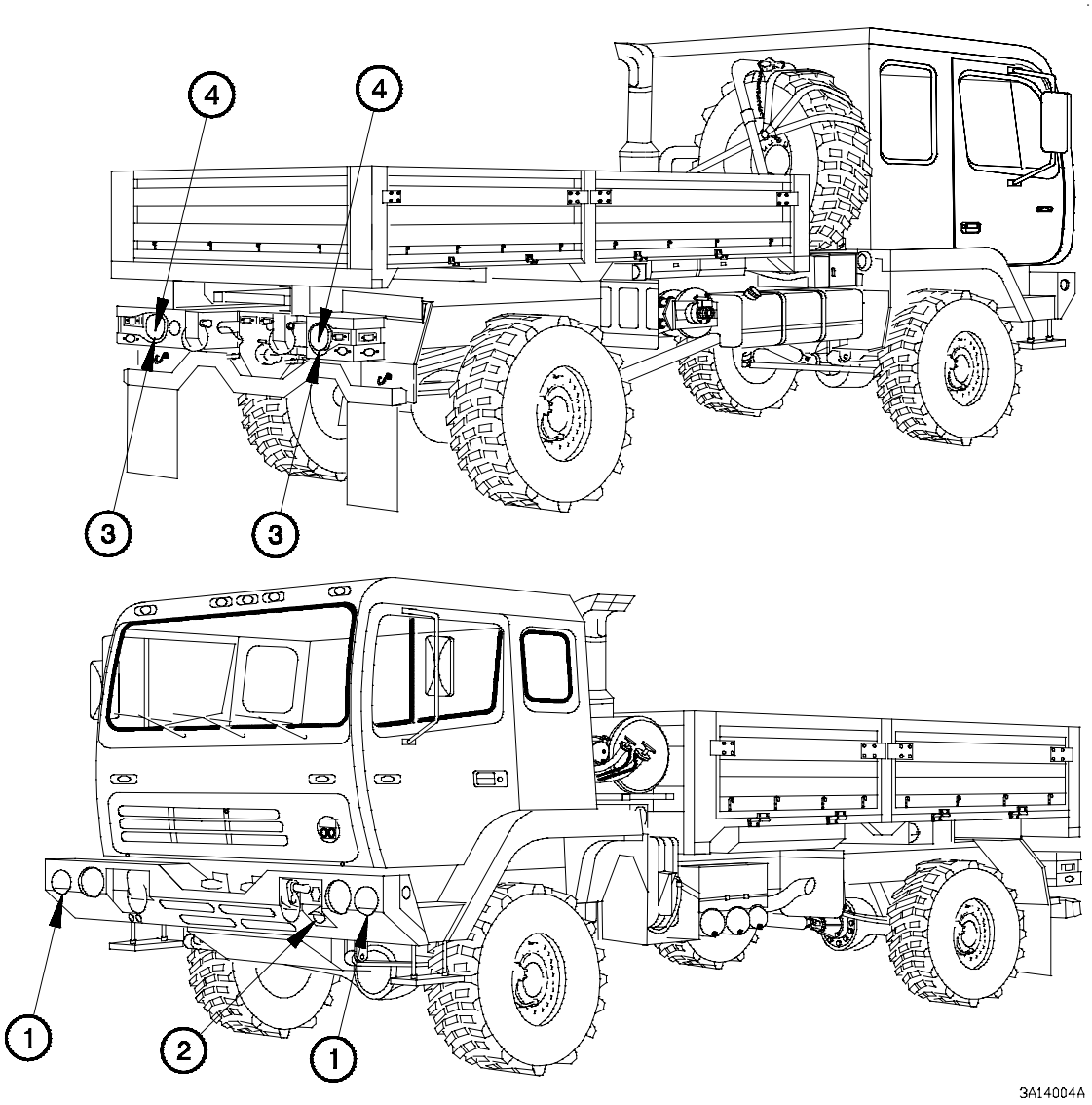



**Figure 1-12. Blackout Lighting System**

**d. Blackout Lighting.** The Blackout Lighting System includes the front blackout marker lights (1, Figure 1-12), blackout drive light (2), rear blackout marker lights (3), and blackout stop lights (4). These lights are energized by positioning the main light switch to the appropriate position (TM 9-2320-365-10).

**e. Accessory Lighting.** The accessory lighting on the vehicle is the warning light. This circuit is energized by positioning the appropriate switch (TM 9-2320-365-10) to on.

## 1-14. ELECTRICAL SYSTEM (CONT)

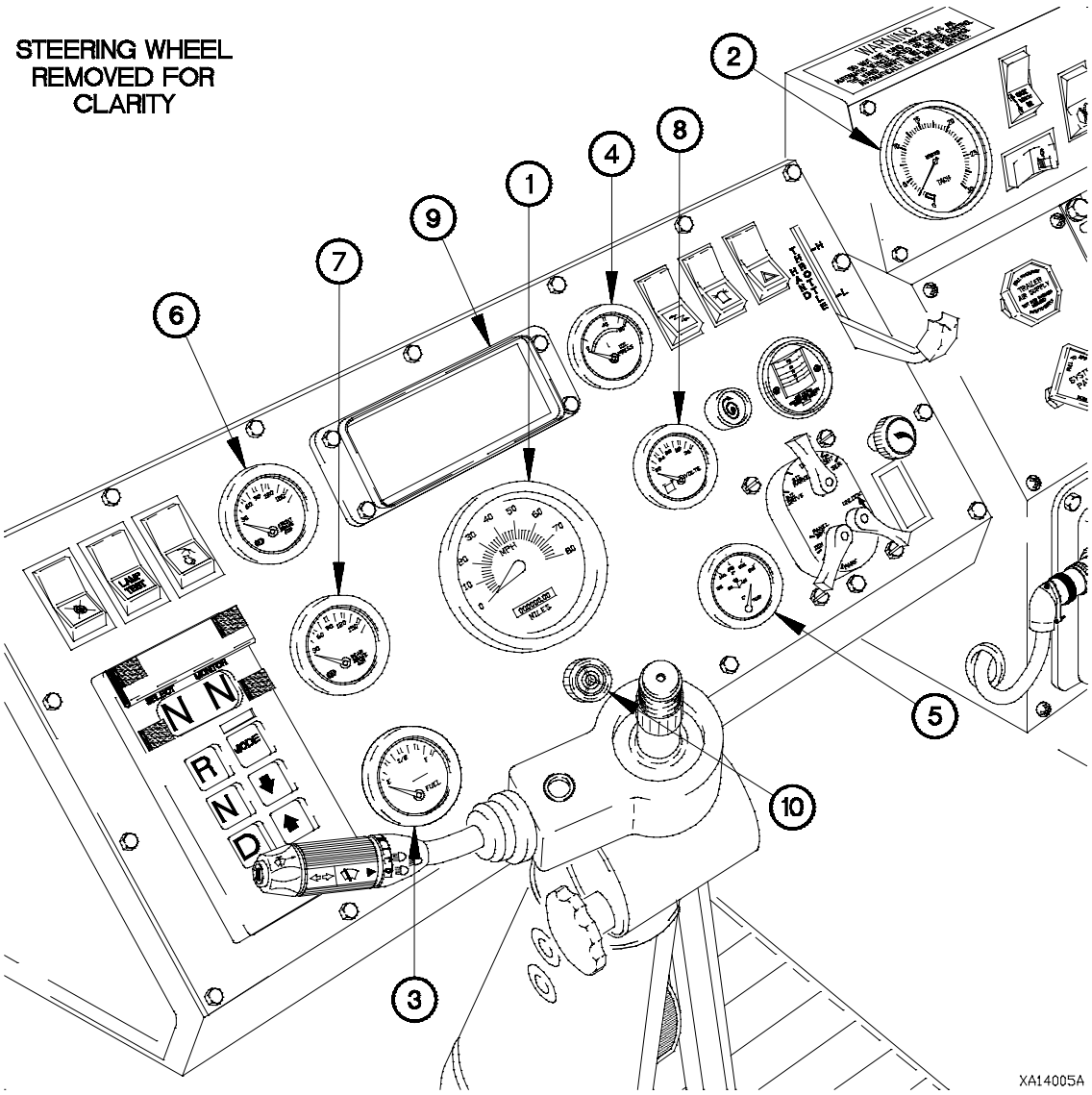



**Figure 1-13. Instrument Panel**

**f. Instruments.** The Instrument Panel includes all gages that provide the operator with information about vehicle condition and operating status. The speedometer (1, Figure 1-13) receives electrical input from the WTEC II Vehicle Interface Module (VIM) on vehicles equipped with WTEC II transmission controls. The speedometer receives electrical input from the WTEC III transmission ECU on vehicles equipped with WTEC III transmission controls. The WTEC II VIM and the WTEC III transmission ECU are both located behind the kick panel. Tachometer (2) input is provided by the engine speed sensor located on the engine flywheel housing. The fuel gage (3), oil pressure gage (4), water temperature gage (5), front brake air pressure gage (6), rear brake air pressure gage (7), and volts gage (8) receive electrical signals from sending units. The sending units respond to changes in fluid level, pressure, temperature, and DC current and send this information to the gages.

**g. Indicator Lights and Alarms.** The lighted indicator display (9) and audible alarm (10), located on the instrument panel assembly, are activated by switches located in various systems. These include, but are not limited to; master stop, low engine oil pressure, low air pressure, high water temperature, engine fan off, and high transmission oil temperature. When any of these switches are activated, they energize the proper indicator and/or alarm, alerting the operator of a potential problem or condition which needs to be monitored.

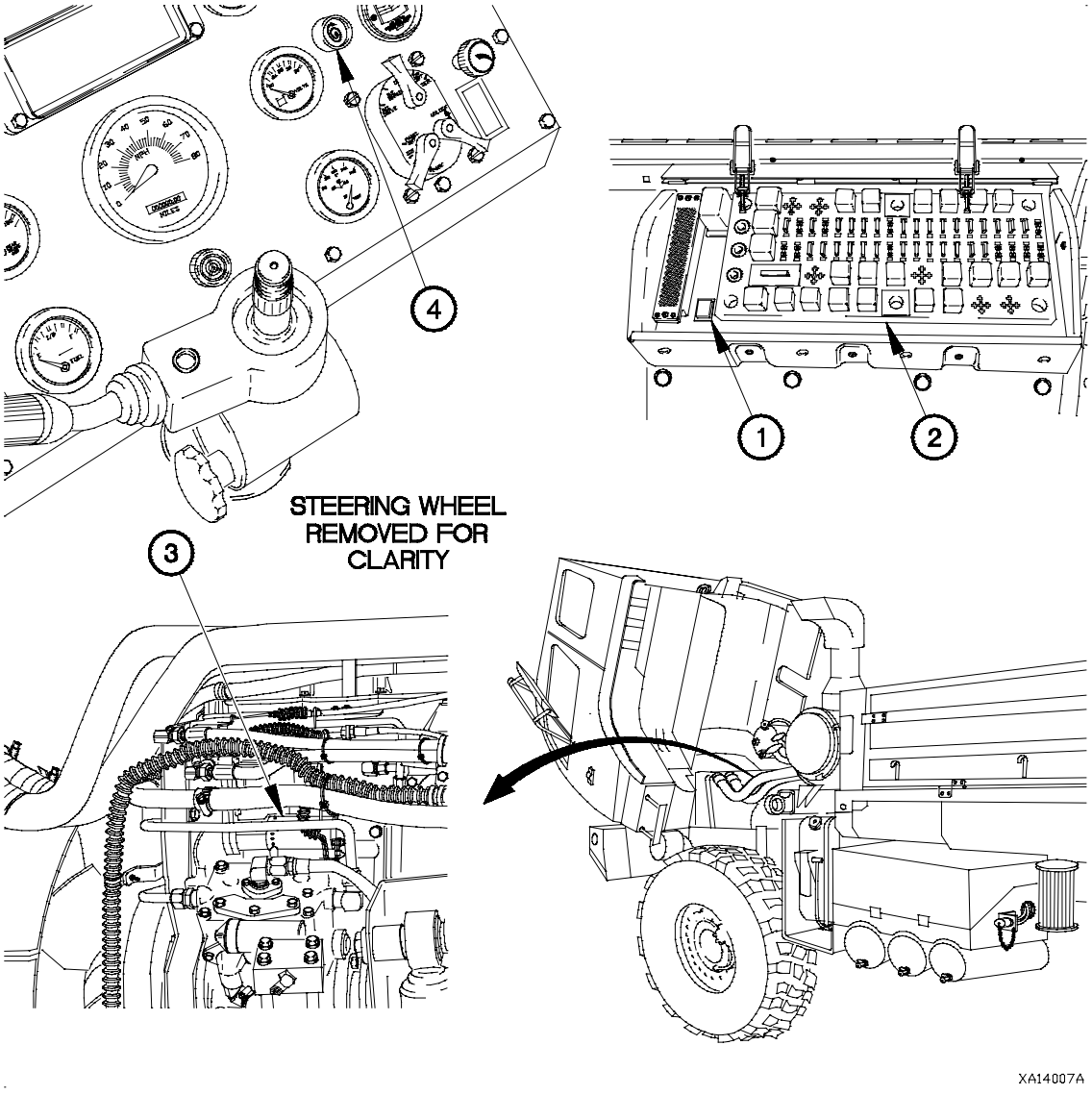



**Figure 1-14. Troubleshooting Aid**

**h. Troubleshooting Aid.** A start inhibit switch (1, Figure 1-14), located on the Power Distribution Panel (PDP) (2), is provided as a troubleshooting aid for the Unit and DS Maintenance levels and as a maintenance tool at the GS Maintenance level to stop fuel flow at the fuel shutoff solenoid (3). By pressing the start inhibit switch first, the starter pushbutton (4) can be pressed and the engine cranked without allowing the engine to be started. The start inhibit switch is reset when the master power switch is positioned to off and then to on again.

## 1-15. BRAKE SYSTEM

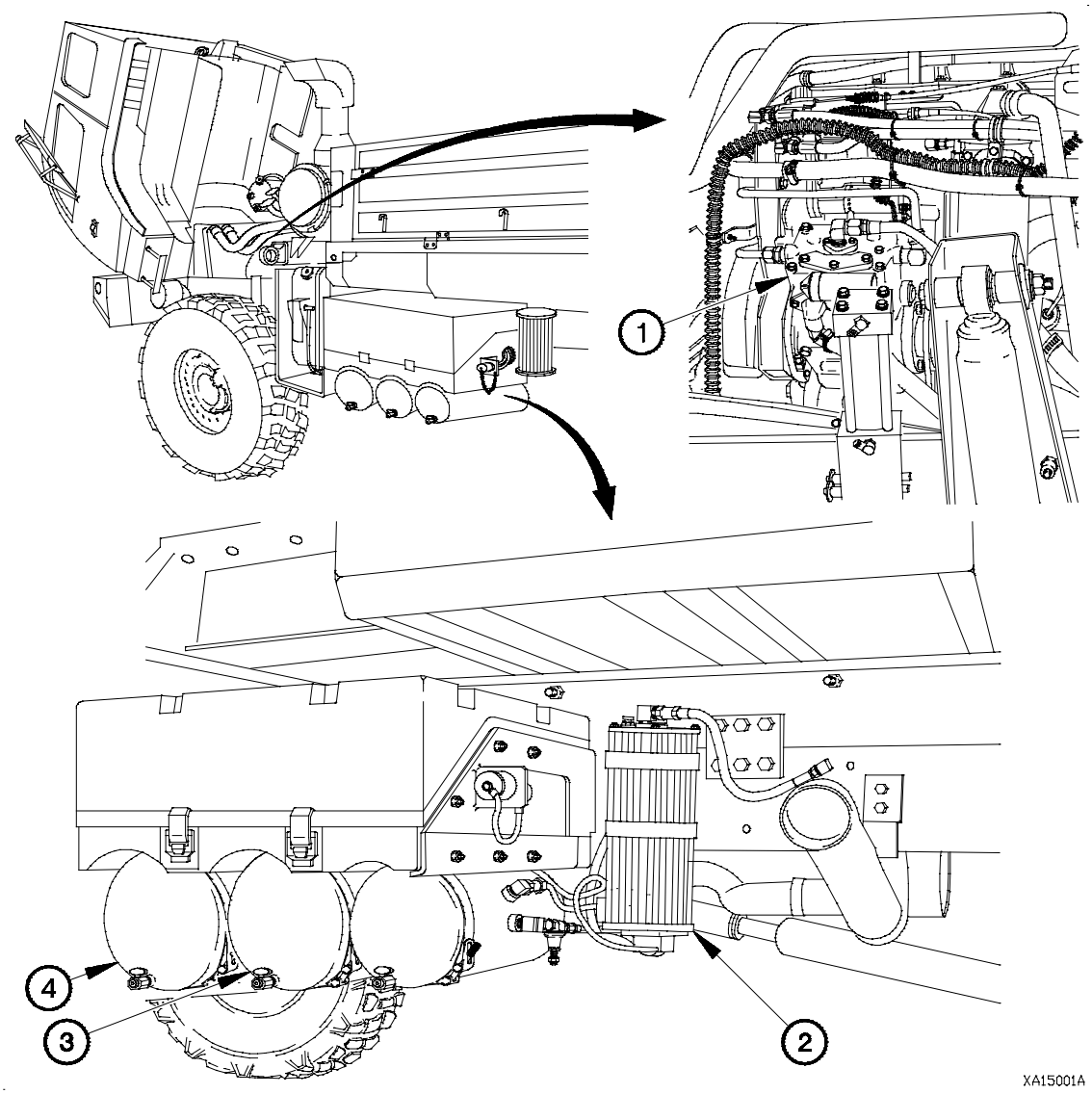



**Figure 1-15. Brake System**

The vehicle is equipped with an air brake system which complies with the Federal Motor Vehicle Safety Standard (FMVSS) 121. The brake system is made up of a number of components including an air compressor, air dryer, primary and secondary air tanks, and several valves which control the application and release of the brakes. The air compressor (1, Figure 1-15) supplies approximately 120 psi (827 kPa) to the air dryer (2). The air dryer contains a heating element and a desiccant cartridge to remove moisture from the air before it is delivered to the primary air tank (3) and secondary air tank (4).

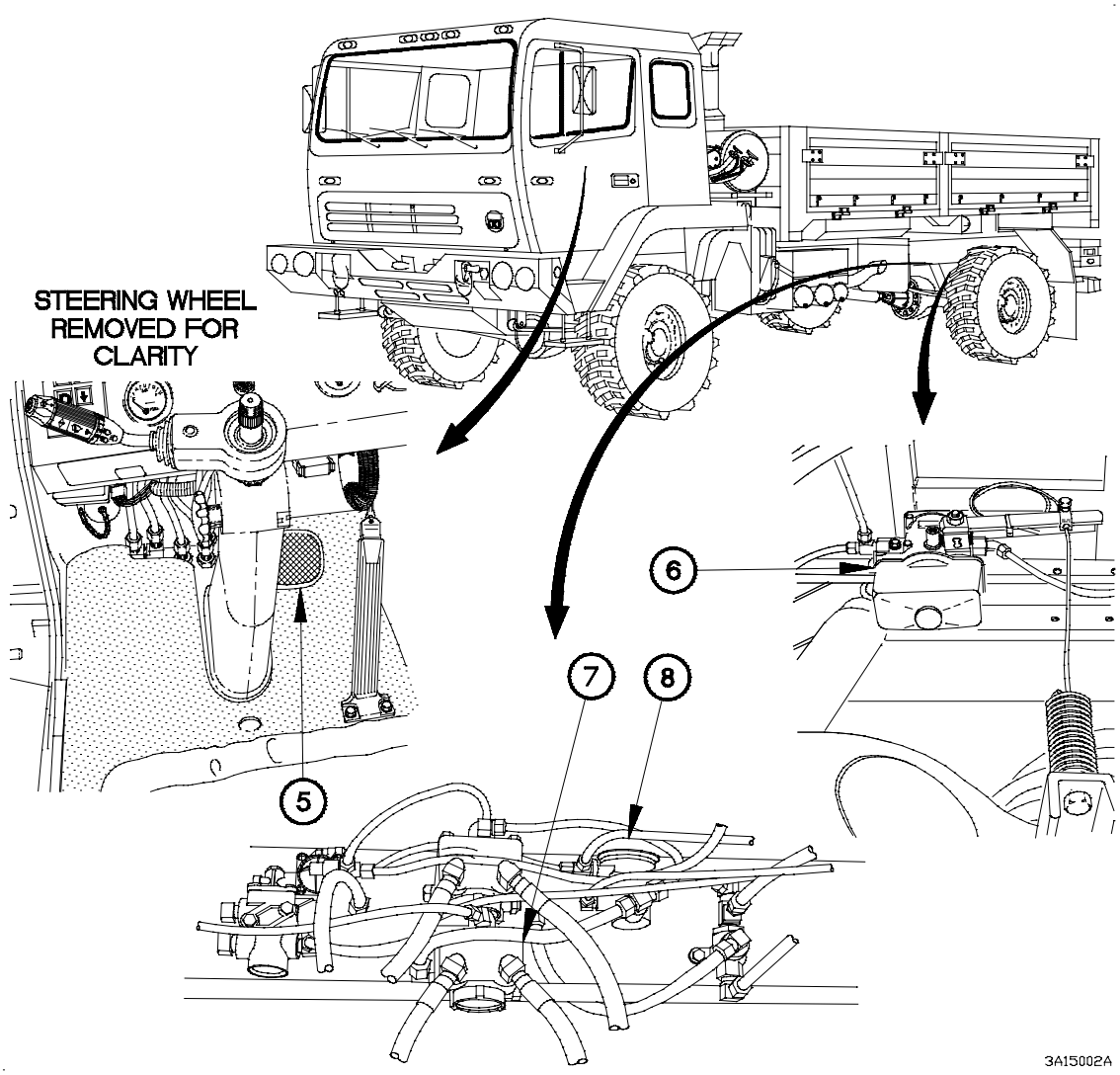



**Figure 1-15. Brake System (Cont)**

The foot control valve is operated by the brake pedal (5) and receives pressurized air from both the primary and secondary air tanks. The foot control valve is a dual activation design, with one set of ports supplying air to the front brakes from the secondary air tank and another set of ports supplying air to the rear brakes from the primary air tank. The plumbing between the primary and secondary air tanks is designed to allow controlled braking in the event of a failure in either the primary (rear brakes) or secondary (front brakes) brake circuit. Air from the foot control valve is supplied to the load sensing valve (6) which, in turn, controls air delivery to the relay valve (7). The load sensing valve is mounted on a crossmember and connected, by a spring and cable, to the rear axle. The arrangement of the load sensing valve provides a mechanical anti-lock feature to the rear brakes by sending less air to the rear brakes when the vehicle is not heavily loaded. The relay valve is used to provide the Operator with quicker brake response. An inversion valve (8) redirects air from the secondary brake circuit to the primary brake circuit in case of loss of pressure in the primary brake circuit. This feature allows control of the spring brakes and prevents early rear brake lock-up.

## 1-16. STEERING SYSTEM

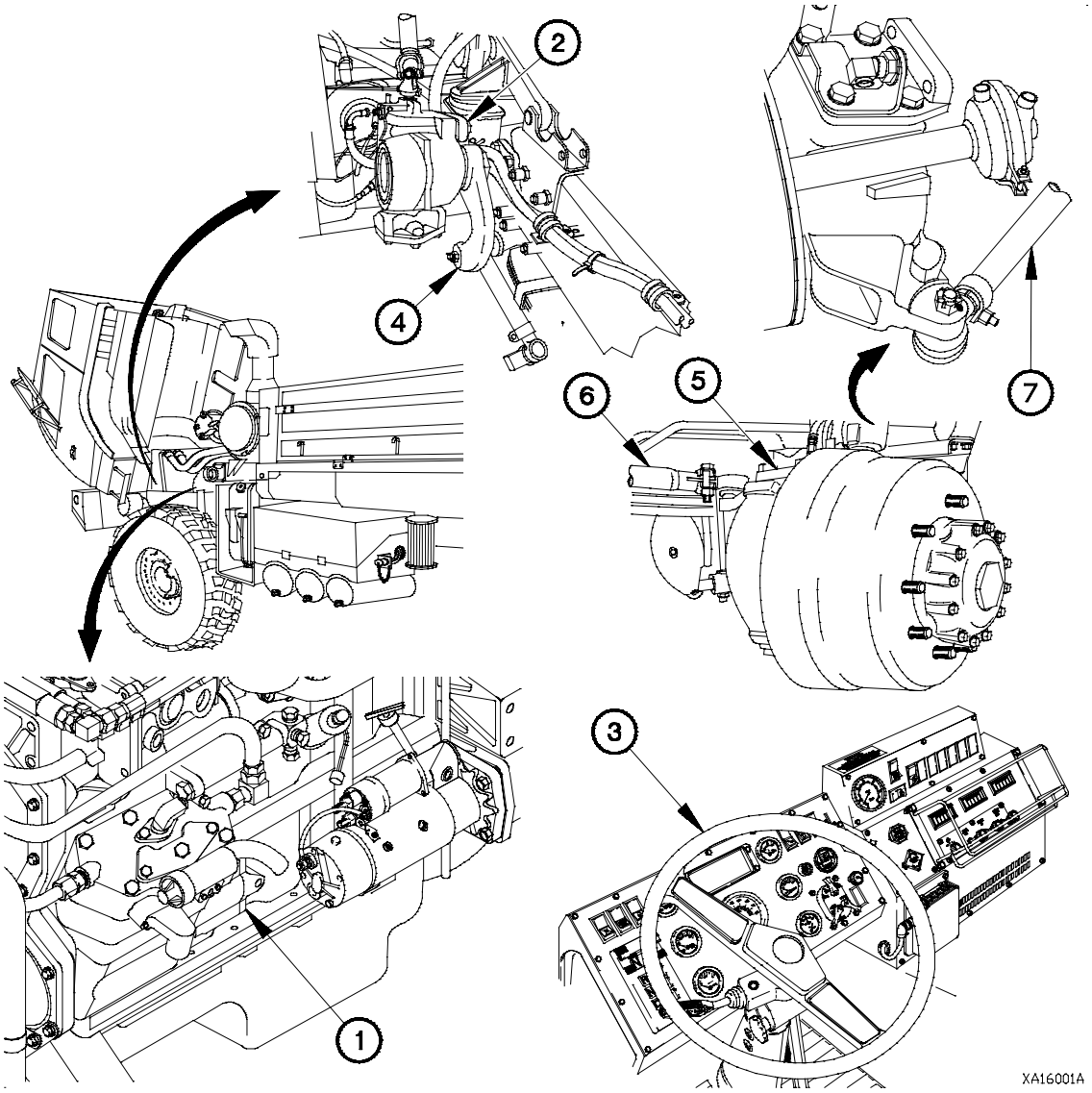



**Figure 1-16. Steering System**

The vehicle is equipped with hydraulically-assisted power steering. The power steering pump (1, Figure 1-16) is driven by a shaft at the rear of the air compressor. The steering gear box (2) is a recirculating ball design. The steering wheel (3) is linked to the steering gear box by a shaft and two universal joints. The power steering pump supplies constant hydraulic pressure to the steering gear box. The steering pitman arm (4) is attached to the left steering knuckle (5) by the drag link (6). The left and right steering knuckles are connected to each other by the tie-rod (7). Turning the steering wheel to the right causes the steering pitman arm to move toward the front of the vehicle and the front wheels to turn right. Turning the steering wheel to the left causes the steering pitman arm to move toward the rear of the vehicle and the front wheels to turn left. The tie-rod allows for front wheel toe-in adjustment.

## 1-17. 11K SELF-RECOVERY WINCH (SRW)

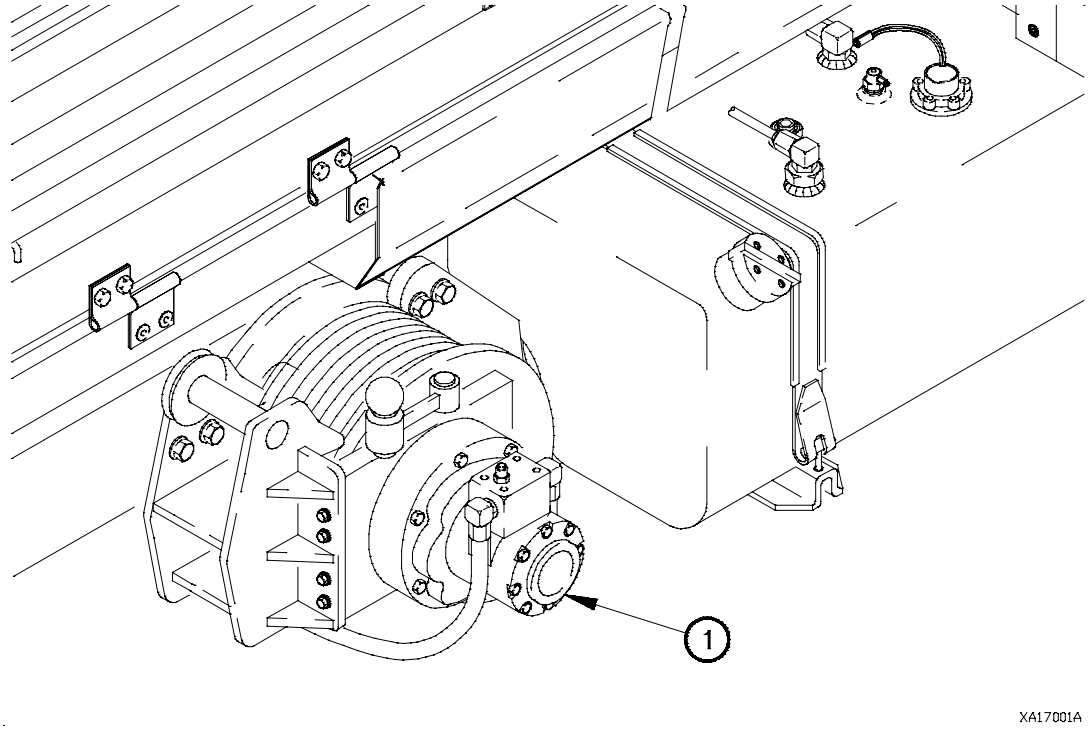



**Figure 1-17. 11K Self-Recovery Winch (SRW)**

When specified, the vehicle is equipped with an 11K Self-Recovery Winch (SRW) (1, Figure 1-17) mounted on the right frame rail. The SRW is rated for 11,000 lbs (48,924 N) pull when the winch drum has one full layer of cable. One full layer of cable is the minimum amount of cable that may be left on the drum when using the SRW. Pulling capacity is reduced with each layer of cable that is added to the winch drum. Pulling capacity with seven full layers of cable on the winch drum is 6,780 lbs (30,157 N). The SRW cable may be routed to the front or rear of the vehicle for recovery operations. The SRW is equipped with a fail-safe brake which is spring applied and hydraulically released. The fail-safe brake is automatically applied when hydraulic pressure falls below 270 psi (1,862 kPa). The fail-safe brake will hold the load until hydraulic pressure is restored. The winch control valve functions as a throttling valve when cable is being payed out. The winch control valve controls the flow of fluid to the winch motor. When cable is being pulled in, the winch control valve acts as a free flow check valve. The winch control valve is preset at the factory and is not to be adjusted under any circumstances.

## 1-18. AIR TRANSPORTABILITY HYDRAULIC SYSTEM

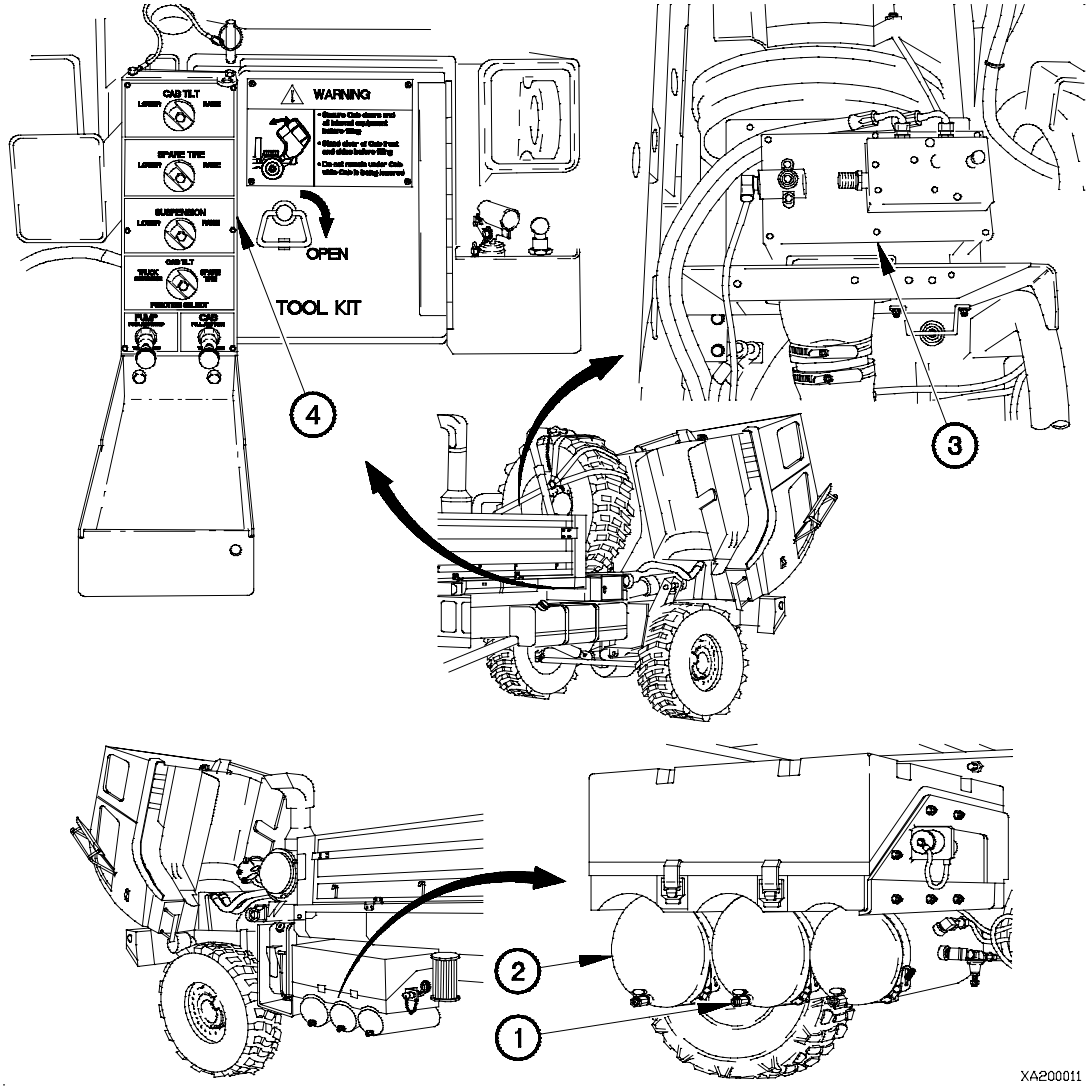



**Figure 1-18. Air Transportability Hydraulic System**

The entire series of M1078 vehicles is equipped with a hydraulic system which allows the vehicle to be prepared for internal air transport in a short time by a minimum number of personnel. Air from the primary and secondary air tanks (1 and 2, Figure 1-18) powers the air/hydraulic power unit (3). The air/hydraulic power unit supplies hydraulic power to the rest of the system. The system is controlled by valves in the hydraulic manifold (4).

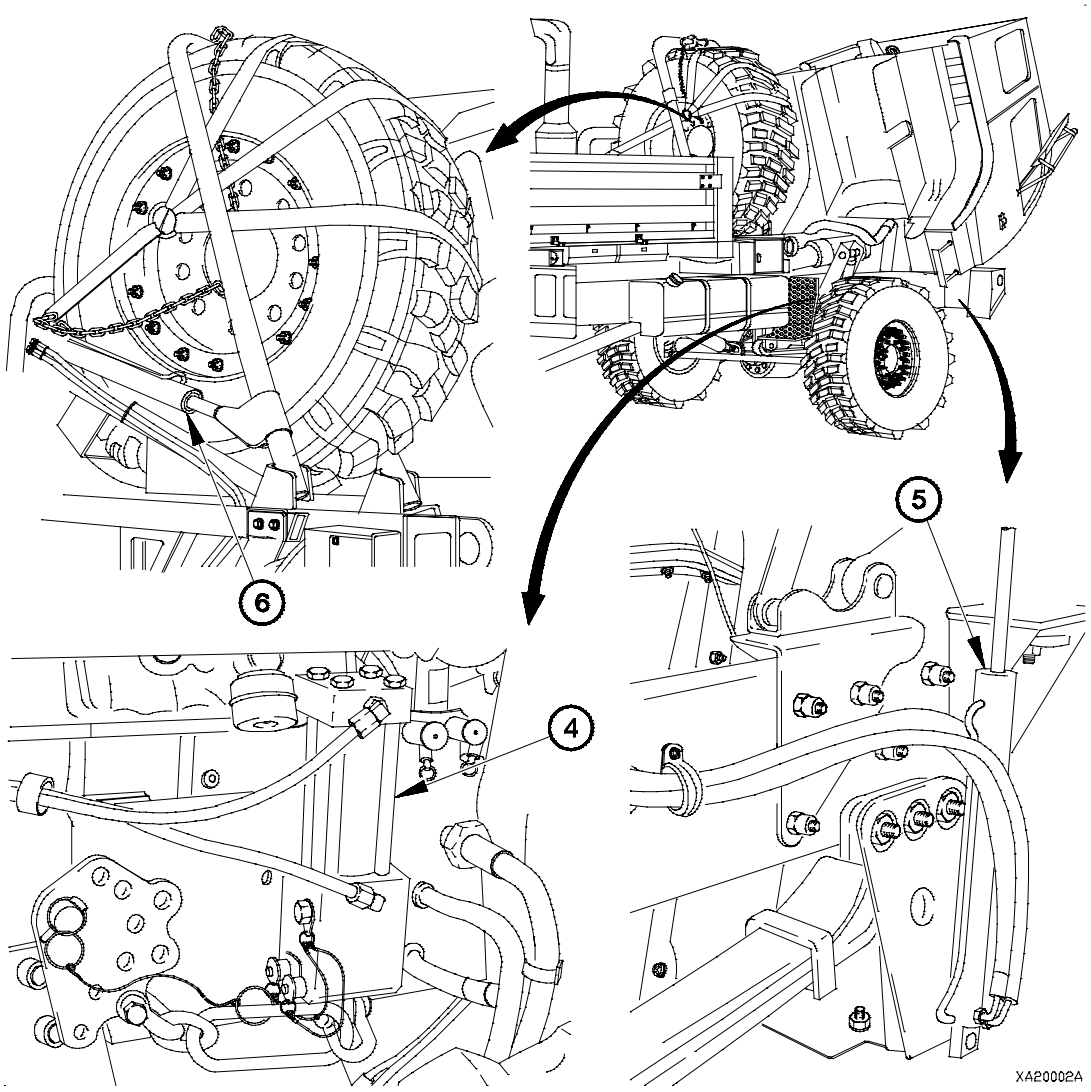



**Figure 1-18. Air Transportability Hydraulic System (Cont)**

Two suspension cylinders (4) mounted on the frame are used to compress the suspension so that the vehicle can be loaded into an aircraft. Valves on the hydraulic manifold control pressure to the cab tilt cylinder (5); to raise and lower the cab, and the spare tire retainer cylinder (6); to lower and raise the spare tire.

## 1-19. AIR SYSTEM

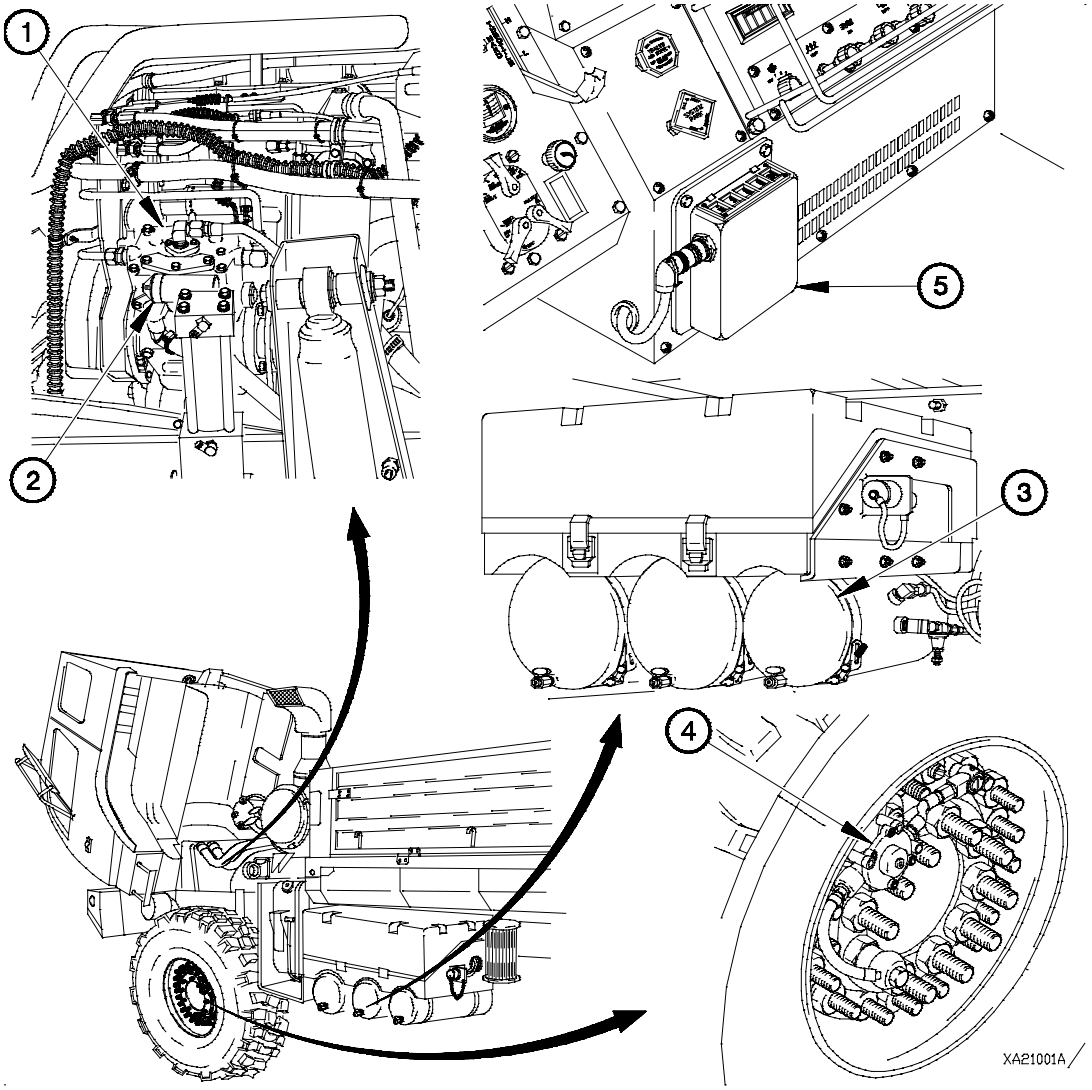



**Figure 1-19. Air System**

The air system provides clean, dry air for use in the air brake system and the Central Tire Inflation System (CTIS). The air system is pressurized by an engine driven air compressor (1, Figure 1-19) with a nominal output pressure of 125 psi (862 kPa). The system pressure is controlled by an unloading type pressure governor (2) which maintains the output pressure between 105 psi (724 kPa) and 125 psi (862 kPa). Air is supplied to the air brake portion of the air system from the primary and secondary air tanks. Air for the CTIS comes from the wet tank (3) and is supplied to the axles by the CTIS manifold valve (4). Air pressure in the tires is controlled by the CTIS Electronic Control Unit (ECU) (5). The CTIS ECU provides for four tire pressure settings.

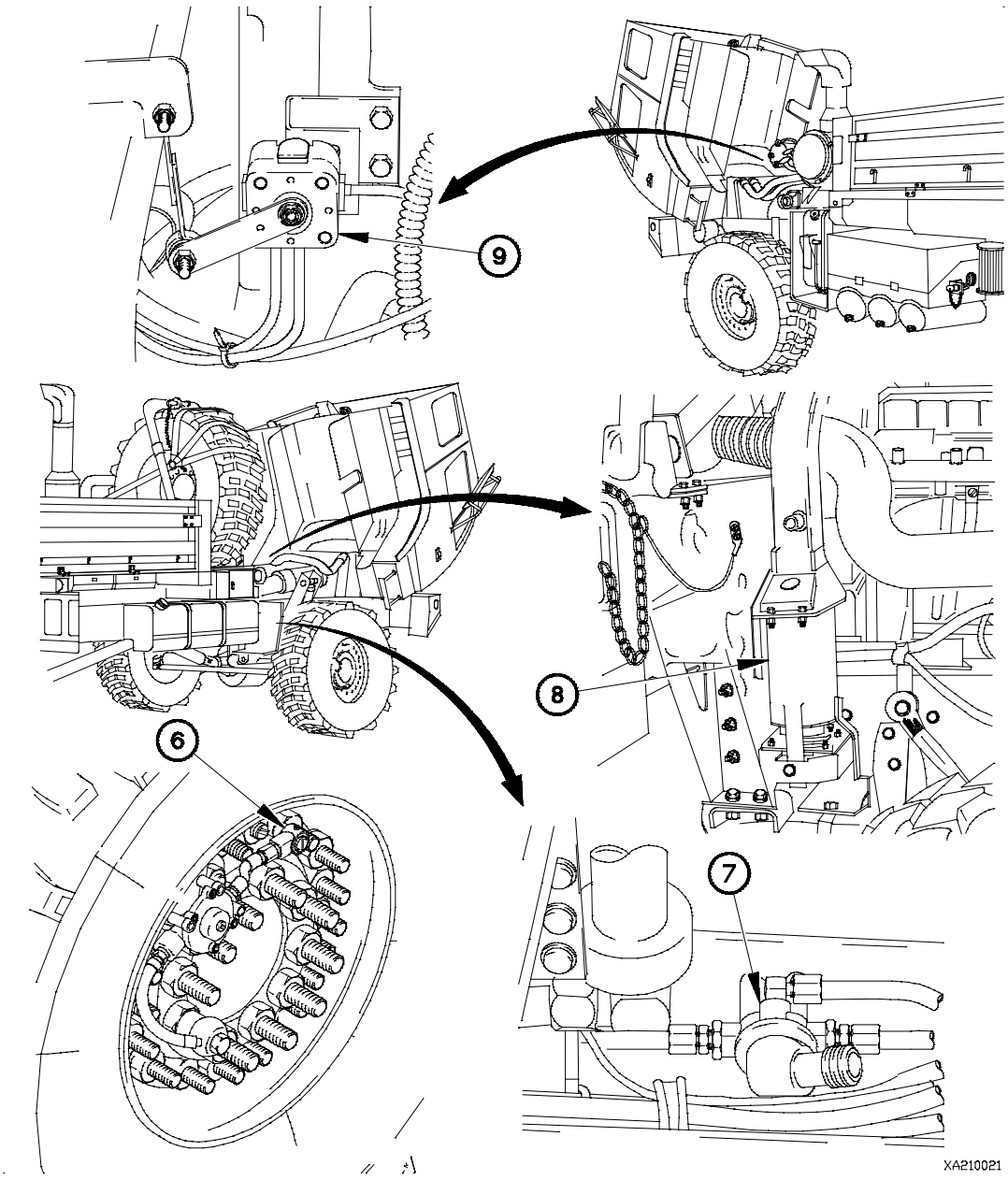



**Figure 1-19. Air System (Cont)**

Kneeling valves (6) on the front tires allow the front of the vehicle to be lowered for internal air transport. Quick release valves (7) are provided for each axle to exhaust air from the CTIS when the Operator selects a mode which requires a lower pressure setting. Air pressure is also used to keep the cab level through the use of air springs (8), mounted below the rear cab support, and a cab leveling valve (9). The air system has enough reserve capacity to keep the vehicle operational in the event of a partial system failure.

# CHAPTER 2
# VEHICLE MAINTENANCE

Section I. REPAIR PARTS, TOOLS, SPECIAL TOOLS, TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT . . . . . 2-2
2-1. COMMON TOOLS AND EQUIPMENT . . . . . 2-2
2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT . . . . . 2-2
2-3. REPAIR PARTS . . . . . 2-2

Section II. SERVICE UPON RECEIPT . . . . . 2-3
2-4. UNPACKING AND DEPROCESSING . . . . . 2-3
2-5. HAND RECEIPT MANUAL AND INVENTORY OF EQUIPMENT . . . . . 2-3
2-6. SERVICE BEFORE OPERATION . . . . . 2-3

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) . . . . . 2-6.1
2-7. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION . . . . . 2-6.1
2-8. GENERAL MAINTENANCE PROCEDURES . . . . . 2-6.2
2-9. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) TABLE . . . . . 2-7

Section IV. TROUBLESHOOTING . . . . . 2-53
2-10. INTRODUCTION TO LOGIC TREE TROUBLESHOOTING . . . . . 2-53
2-11. TROUBLESHOOTING INSTRUCTIONS . . . . . 2-53
2-12. ENGINE SYSTEM TROUBLESHOOTING . . . . . 2-63
2-13. FUEL SYSTEM TROUBLESHOOTING . . . . . 2-101
2-14. EXHAUST SYSTEM TROUBLESHOOTING . . . . . 2-119
2-15. COOLING SYSTEM TROUBLESHOOTING . . . . . 2-129
2-16. ELECTRICAL SYSTEM TROUBLESHOOTING . . . . . 2-147

## Volume 2

2-16. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT) . . . . . 2-1087
2-17. TRANSMISSION SYSTEM TROUBLESHOOTING . . . . . 2-1359
2-18. PROPELLER SHAFT TROUBLESHOOTING . . . . . 2-1597
2-19. POWER TAKE OFF (PTO) TROUBLESHOOTING . . . . . 2-1603
2-20. BRAKE SYSTEM TROUBLESHOOTING . . . . . 2-1607
2-21. AIR SYSTEM TROUBLESHOOTING . . . . . 2-1713
2-22. WHEEL TROUBLESHOOTING . . . . . 2-1753
2-23. HYDRAULIC SYSTEM TROUBLESHOOTING . . . . . 2-1761
2-24. CENTRAL TIRE INFLATION SYSTEM (CTIS) TROUBLESHOOTING . . . . . 2-1767
2-25. AXLE TROUBLESHOOTING . . . . . 2-1895
2-26. STEERING TROUBLESHOOTING . . . . . 2-1903
2-27. SUSPENSION SYSTEM TROUBLESHOOTING . . . . . 2-1925
2-28. 11K SELF-RECOVERY WINCH (SRW) SYSTEM TROUBLESHOOTING . . . . . 2-1945
2-29. STEERING HYDRAULIC SYSTEM TROUBLESHOOTING . . . . . 2-1953
2-30. AIR TRANSPORT TROUBLESHOOTING . . . . . 2-1959
2-31. SPECIAL PURPOSE KIT TROUBLESHOOTING . . . . . 2-1977
2-32. CAB TILT AND SPARE TIRE RETAINER ASSEMBLY TROUBLESHOOTING . . . . . 2-2115
2-33. FRAME TROUBLESHOOTING . . . . . 2-2121

Section V. MAINTENANCE PROCEDURES . . . . . 2-2127
2-34. MAINTENANCE INTRODUCTION . . . . . 2-2127
2-35. GROUND HANDLING . . . . . 2-2127
2-36. GENERAL REMOVAL INSTRUCTIONS . . . . . 2-2127
2-37. GENERAL DISASSEMBLY INSTRUCTIONS . . . . . 2-2128
2-38. GENERAL CLEANING INSTRUCTIONS . . . . . 2-2129

# CHAPTER 2
# VEHICLE MAINTENANCE (CONT)

Section V. MAINTENANCE PROCEDURES (CONT)
2-39. GENERAL INSPECTION INSTRUCTIONS . . . . . 2-2132
2-40. GENERAL REPAIR INSTRUCTIONS . . . . . 2-2132
2-41. GENERAL ASSEMBLY INSTRUCTIONS . . . . . 2-2133
2-42. GENERAL INSTALLATION INSTRUCTIONS . . . . . 2-2134
2-43. PREPARATION FOR STORAGE OR SHIPMENT INTRODUCTION . . . . . 2-2134
2-44. PREPARATION FOR STORAGE OR SHIPMENT . . . . . 2-2135
2-45. STORAGE MAINTENANCE PROCEDURES . . . . . 2-2135

## Section I. REPAIR PARTS, TOOLS, SPECIAL TOOLS, TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

### 2-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE), CTA 50-970, or CTA 8-100 as applicable to your unit.

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

For a listing of special tools, TMDE, and support equipment, refer to the Maintenance Allocation Chart (MAC), Appendix B, of this manual and to the Repair Parts and Special Tools List (RPSTL), TM 9-2320-365-24P.

### 2-3. REPAIR PARTS

Mandatory replacement parts are listed in Appendix G. Repair parts are listed and illustrated in the RPSTL, TM 9-2320-365-24P, covering Unit Maintenance repair parts and special tools for vehicle.

# Section II. SERVICE UPON RECEIPT

## 2-4. UNPACKING AND DEPROCESSING

**WARNING**

- **Heavy objects/loads, such as tool boxes and heavy parts, must always be carried on the floor with the weight distributed as equally as possible between left and right sides of M1079 van. Failure to comply decreases the stability of the M1079 van and will increase the likelihood of a rollover.**

- **Heavy cabinets must always be mounted as low as possible with the weight distributed as equally as possible between left and right sides of M1079 van. Remember to consider the weight of the items that will be stored in the cabinets. Failure to comply decreases the stability of the M1079 van and will increase the likelihood of a rollover.**

- **Always keep in mind, when placing items inside the M1079 van, that heavier items must always be positioned as low as possible and the weight distributed as equally as possible between left and right sides of M1079 van. Failure to comply decreases the stability of the M1079 van and will increase the likelihood of a rollover.**

**a. Unpacking.** Upon receipt of a new vehicle, the receiving organization must see if it has been properly prepared for service and is in good condition. Inspect all assemblies, subassemblies, and accessories to be sure they are in proper working order (TM 9-2320-365-10). Secure, clean, and correctly adjust and/or lubricate as needed (Appendix H). Check all tools and equipment to be sure every item is accounted for (TM 9-2320-365-10-HR) in good condition, clean and properly mounted or stowed (TM 9-2320-365-10).

**b. Deprocessing.** Read "Processing and Deprocessing Record of Shipping, Storage and Issue of Vehicles and Spare Engines" tag, (DD Form 1397) and follow all precautions checked. This tag should be attached to the steering wheel or manual throttle control lever.

## 2-5. HAND RECEIPT MANUAL AND INVENTORY OF EQUIPMENT

When a new vehicle is first received by the using organization, it is necessary to inventory the vehicle equipment. For detailed procedures, refer to Hand Receipt Manual, TM 9-2320-365-10-HR.

## 2-6. SERVICE BEFORE OPERATION

**a. General.**

(1) Refer to TM 9-2320-365-10 for operating instructions for the vehicle.

(2) Upon receipt of a new, used, or reconditioned vehicle, the receiving organization must see if it has been properly prepared for service and is in good condition (TM 9-2320-365-10). Inspect all assemblies, subassemblies, and accessories to be sure they are in proper working order. Secure, clean, correctly adjust, and/or lubricate (TM 9-2320-365-10 and Appendix H) as needed. Check all tools and equipment to be sure every item is there (TM 9-2320-365-10-HR), in good condition, clean and properly mounted or stowed (TM 9-2320-365-10).

(3) Follow general procedures for all services and inspections given in TM 9-2320-365-10.

## 2-6. SERVICE BEFORE OPERATION (CONT)

**b. Inspection and Servicing Equipment.**

**NOTE**

If vehicle has been driven to the using organization, most or all of the following work should have been done.

(1) When vehicle is received, inspect all items for damage that may have occurred during shipping and unloading operations. Pay close attention to any loose or missing nuts, bolts, screws, access plates, drain plugs, draincocks, oil plugs, assemblies, subassemblies, or components that may be easily lost or broken in transit. Check Basic Issue Items (BII) against checklist to make sure all items are accounted for and are in good condition (TM 9-2320-365-10-HR). Carefully list all discrepancies.

**WARNING**

- **Dry Cleaning Solvent P-D-680 is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from open flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using Dry 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. Failure to comply may result in injury to personnel.**

(2) Clean all exterior surfaces coated with rust-preventive compound with Dry Cleaning Solvent (Item 71, Appendix D).

(3) Perform the Semiannual Preventive Maintenance Checks and Services (PMCS), Table 2-1.

(4) Lubricate all points shown in Appendix H regardless of interval. Schedule services in accordance with DA Pam 738-750.

(5) Initial Service Intervals:
a. Initial 500 miles (805 km) of operation:
(1) Perform Front and Rear Axle oil change.
(2) Perform Front Axle Wheel end Planetary Hub oil change.

b. Initial 1,000 miles (1,609 km) of operation:
Tighten self-locking nuts on leaf spring U-bolt to 390-510 lb-ft (529-692 N·m), in 50 lb-ft (68 N·m) increments, in a crisscross pattern.

c. Initial 5,000 miles (8,045 km) of operation:
(1) Perform Engine oil and filter change.
(2) Perform Transmission oil and filter change.

(6) Activate battery if vehicle is delivered with dry-charged battery (TM 9-6140-200-14).

**WARNING**

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

(7) Check radiator coolant. Check if solution is adequate for expected climatic conditions. Refer to TB 750-651 for preparation of antifreeze solutions. Put tag near filler cap with type of antifreeze and degree of protection written on tag.

**c. Special Service Instructions.**

(1) Vehicle Body and Sheet Metal Inspection (TM 9-2320-365-10).

(a) Inspect body and sheet metal for evidence of damage during shipment.

(b) Check doors, latches, and hinges on compartments for proper operation.

(c) Check mounting hardware and tighten as necessary.

(2) Vehicle Cab Inspection (TM 9-2320-365-10).

(a) Inspect cab for evidence of damage during shipment.

(b) Inspect windshields and window glass for cracks or other damage.

(c) Check door latches, hinges, and windows for proper operation.

(d) Check seats and seatbelts mounting hardware to ensure they are securely installed and tighten as necessary.

(e) Check operator's seat adjustments to ensure they are functioning properly.

(f) Unpin cab air springs, stow retaining pins, and inflate cab air springs (TM 9-2320-365-10, Preparation for Internal Air Transport).

(3) Engine Inspection (TM 9-2320-365-10).

(a) Inspect engine and cooling hose connections for evidence of leakage.

(b) Remove any seals, plugs, or tape used to seal air inlets and ports on the engine during shipping.

(c) Check crankcase oil level with dipstick.

(d) Examine air cleaner element for dirty or restricted condition.

(e) Check for obstructions to cooling air flow to radiator.

(4) Transmission Inspection (TM 9-2320-365-10).

(a) Check fluid level with dipstick.

(b) Check external tubes and hoses for evidence of leakage.

## 2-6. SERVICE BEFORE OPERATION (CONT)

(5) Transfer Case Inspection (TM 9-2320-365-10).

(a) Check level of lubricant at fill plug.

(b) Inspect lubrication pump and external hoses for evidence of leakage.

(c) Operate driveline control and observe drive power to front axle.

(d) Inspect bolts on driveline U-joints.

(6) Electrical System Inspection (TM 9-2320-365-10).

(a) Inspect battery cable connections and clean and tighten as necessary.

(b) Check all lights for burned out lamps, loose connections, and dirty or broken lenses.

(c) Check that alternator is charging batteries properly.

(d) Check that all electrical equipment functions properly.

(7) Air System Inspection (TM 9-2320-365-10).

(a) Drain any water from reservoirs.

(b) Inspect all accessible air hose and tubing connections for leakage.

(8) Steering System Inspection (TM 9-2320-365-10).

(a) Check steering hydraulic reservoir for proper fluid level.

(b) Examine steering linkage and steering gear for damage incurred during shipment.

(c) Examine steering hoses and connections for evidence of leakage.

(d) Check steering system for proper operation during road test.

(9) Chassis and Front and Rear Axle Inspection (TM 9-2320-365-10).

(a) Check all lubricant levels.

(b) Check axle housing pressure vents to ensure freedom from foreign matter.

(10) Tire Inspection.

(a) Check tire pressure (TM 9-2320-365-10).

(b) Inspect tires for serious cuts, bubbles, cracks, bruises, dry-rot, foreign objects, or exposure of internal cords. Remove foreign objects lodged between treads (TM 9-2320-365-10).

(c) Check all wheel mounting nuts for proper torque (para 12-4).

(11) Fuel System Inspection (TM 9-2320-365-10).

(a) Check fuel level and replenish, if necessary.

(b) Inspect fuel lines, connections, and filters for evidence of leakage.

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

## 2-7. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

This section contains Unit Maintenance PMCS requirements for the vehicle. The PMCS table contains checks and services necessary to ensure the vehicle is ready for operation. Using the PMCS table, perform maintenance at the specified intervals. Perform preventive maintenance checks and services in TM 9-2320-365-10 before doing the Unit preventive maintenance.

## 2-8. GENERAL MAINTENANCE PROCEDURES

**WARNING**

- **Dry Cleaning Solvent P-D-680 is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from open flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using Dry 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. Failure to comply may result in injury to personnel.**

**a. Cleanliness.** Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Use Dry Cleaning Solvent (Item 71, Appendix D) on metal surfaces and soapy water on rubber.

**b. Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness, missing, bent, or broken condition and replace as necessary. If they cannot be checked with a tool, look for chipped paint, bare metal, or rust around bolt heads.

**c. Welds.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If a bad weld is found, notify your supervisor.

**d. Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and ensure wires are in good shape.

**e. Fluid Lines and Fittings.** Look for wear, damage, and leaks and make sure clamps and fittings are tight. Wet spots show leaks, but a stain around a fitting or connector can mean a leak. If connector or fitting is loose, tighten it. If something is broken or worn out, repair or replace per applicable procedure.

**f. Fluid Leakage.** It is necessary to know how fluid leakage affects the status of fuel, oil, coolant and the hydraulic systems. The following are definitions of the type/classes of leakage necessary to know in order to determine the status of the vehicle. Learn, then be familiar with them and REMEMBER - WHEN IN DOUBT, NOTIFY THE SUPERVISOR!

**CAUTION**

Equipment operation is allowable with minor leakage (Class I or II). Consideration must be given to the fluid capacity in the item/system being checked/inspected. When in doubt, notify the supervisor. When operating with Class I or II leaks, continue to check fluid levels as required in the PMCS. Class III leaks should be repaired per applicable procedure.

(1) Class I. Seepage of fluid as indicated by wetness or discoloration not great enough to form drops.

(2) Class II. Leakage of fluid great enough to form drops but not enough to cause drops to fall from item being checked/inspected.

(3) Class III. Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

**g. Air System Components.** Look for worn, damaged, or leaking components. Make sure clamps and fittings are tight. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, either repair or replace it.

**h. Damage.** Damage is defined as any condition that affects safety or would make the vehicle unserviceable for mission requirements.

## 2-9. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) TABLE

**a.** Do the SEMIANNUAL PREVENTIVE MAINTENANCE (Table 2-1) once every six months.

**b.** Refer to the specified technical manuals for preventive maintenance for special purpose kits.

**c.** Always to the PREVENTIVE MAINTENANCE in the same order until it gets to be a habit. Once practiced, it will be easy to spot anything wrong in a hurry. Perform the checks and services listed in Table 2-1 in the order listed.

**d.** If something does not work, troubleshoot with instructions in Section IV.

**e.** If anything looks wrong and is too hard to fix, notify the supervisor.

**f.** When doing preventive maintenance, take along the tools and supplies needed to make all the checks, including a clean cloth or two.

## 2-9. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) TABLE (CONT)

**g.** The following is a breakdown of the PMCS table:

(1) Item number column. Checks and services are numbered in a logical order for moving around the vehicle. The item number column is used a source of item numbers for the TM Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, for recording results of the PMCS.

(2) Items to be inspected. This column identifies the item to be inspected.

(3) Procedures column. This column contains all the information required to do the check/inspection. Art is integrated into the column to aid the user in identifying items. Whenever replacement parts or repair is recommended, reference is made to the applicable maintenance instructions.

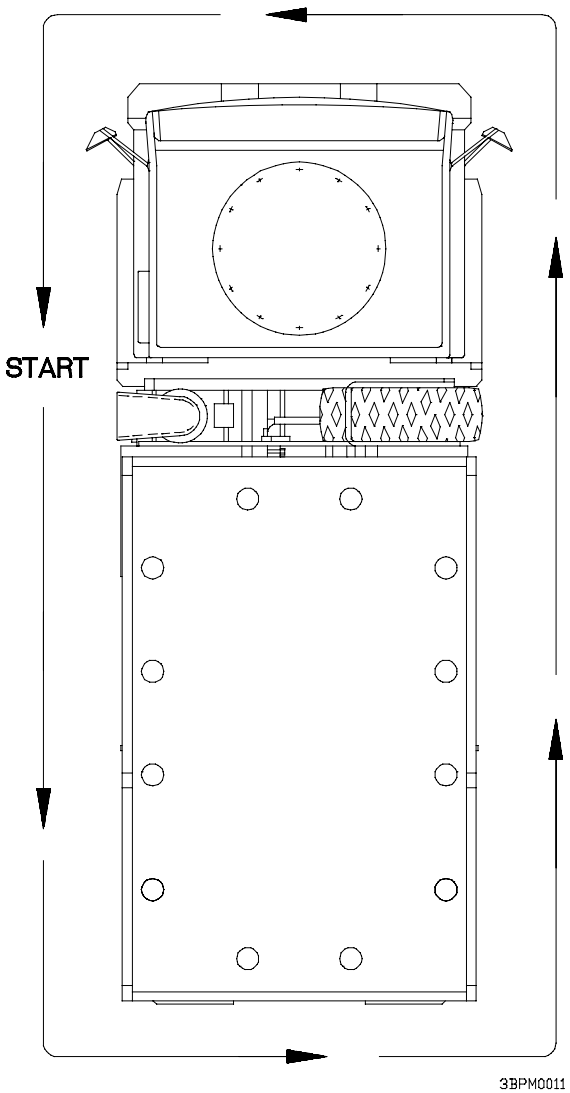


**Table 2-1. Preventive Maintenance Checks and Services**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| | | | **ROAD TEST**<br><br>Maintenance personnel will be with vehicle operator during the road test.<br><br>**NOTE**<br><br>Perform the following during road test.<br><br>For road test, vehicle will be driven at least five miles over different ground to give enough time to detect any malfunctions. | |
| **1** | Semiannual | **Preservice Checks** | **a.** Notice if starter engages smoothly and turns engine at normal cranking speed. | **a.** Starter inoperative or makes excessive grinding sound. |
| | | | **b.** Listen for unusual engine noise at idle, at operating speeds, and under acceleration. Be alert for excessive vibration and the smell of oil, fuel or exhaust. | **b.** Engine knocks, rattles or smokes excessively. |
| | | | **c.** Check for transmission response to shifting and for smoothness of operation in all speed ranges. Be alert for unusual noises and difficulty in shifting in any speed range. | **c.** Transmission shifts improperly, does not shift or makes excessive noises. |
| | | | **d.** Test for accelerator response. Observe for sticking pedal. | **d.** Pedal sticking or binding. |
| | | | **e.** With vehicle speed approximately 5 mph (8 kph) turn steering wheel to left, then right, to detect steering backlash, shimmy or freeplay of more than 1-1/2 in. (38 mm) in either direction. Vehicle should respond instantly. With vehicle moving on straight, level terrain, lightly hold steering wheel to check for pull and wandering. | **e.** Steering binds, grabs, wanders or freeplay is more than 1-1/2 in. (38 mm) in either direction. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 1 | Semiannual | **Preservice Checks (CONT)** | **NOTE**<br>Do not turn tires when turning wheel to check for steering wheel free play. | |
| | | | **f.** Place a strip of tape around steering wheel at 12 O'clock position. Turn steering wheel right until resistance is felt. Place a ruler lightly against outer rim of steering wheel with end of ruler at one edge of tape. Turn steering wheel left until resistance is felt. Measure distance designated edge of tape has traveled. Maximum free play measured at outside rim of steering wheel is 2-1/2 in. (64 mm). | **f.** Steering wheel exceeds 2-1/2 in. (64 mm) free play. |
| | | | **g.** Apply brake pedal with steady force. Vehicle should slow down and stop without pulling to one side or jerking. Release brake pedal. The brakes should release immediately and without difficulty. | **g.** Brakes chatter, pull to one side, will not release, or do not work. |
| | | | **h.** Observe vehicle response to road shocks, side sway or continuous bouncing indicates a malfunction. | **h.** Handling is unstable. |
| | | | **CAUTION**<br>Do not hold steering wheel at full left or right position for longer than 10 seconds. Oil overheating and pump damage can result. Failure to comply may result in damage to equipment. | |
| | | | **i.** With vehicle stopped, turn steering wheel to extreme left, then to extreme right to check for binding or jerking. | **i.** Hard steering is evident. |
| | | | **j.** Check engine operation at all speeds. Ensure that engine does not go over engine governed speed - (55 mph or 2600 rpm). | **j.** Engine exceeds or fails to reach governed speed. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 2 | Semiannual | **WHEELS, HUBS, AND CTIS** | **WARNING**<br>**Completely deflate tires before removing from axles only if there is obvious damage to wheel components. Removing damaged tires from axles without deflating tires may cause wheel components to separate. Failure to comply may result in serious injury or death to personnel.**<br>**a.** Check wheels for obvious cracks around lug holes. If cracks are found, repair wheel (para 12-2).<br>**b.** Replace any loose or damaged wheel studs (para 12-3). Tighten lugnuts (para 12-4).<br>**c.** Check for oil leaks.<br>**d.** Check wheels for CTIS air leaks.<br>**e.** Remove manifold valve (para 12-5) and inspect manifold filter for damage. Clean any debris from manifold filter. | **a.** Cracks are found around lug holes.<br>**b.** More than one lugnut or wheel stud is damaged or missing.<br>**c.** Class III leak is evident. |

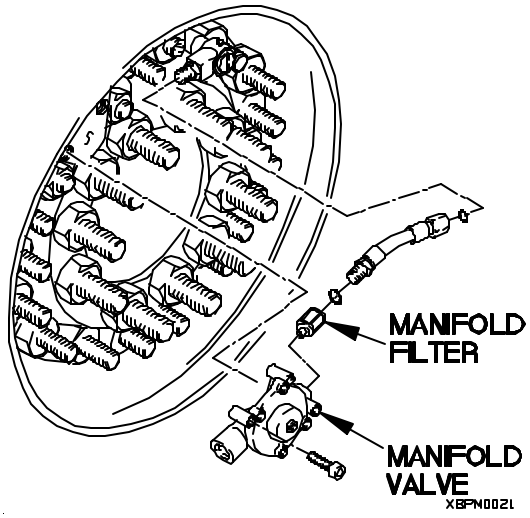


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **3** | Semiannual | **SERVICE BRAKES** | **WARNING**<br>• **Brake shoes may be covered with dust. Breathing this dust may be harmful to your health. Do not used compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury to personnel.**<br>• **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**<br>**a.** Shut down engine (TM 9-2320-365-10) and drain primary air tank. Rear service brakes should not apply. If rear service brakes apply, inversion valve is inoperative. Replace inversion valve (para 11-12). If rear brakes are not applied, depress brake pedal. Depressing brake pedal should apply front brakes and control rear spring brakes through inversion valve and modulation of relay valve. | **a.** Rear portion of brake system fails. |

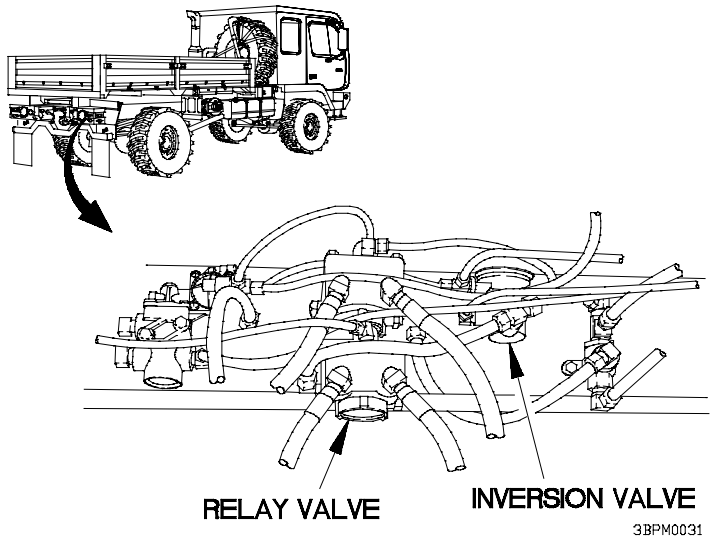


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 3 | Semiannual | **SERVICE BRAKES (CONT)** | **b.** Inspect load sensing valve for signs of corrosion. | |
| | | | **c.** Check security of mounting hardware. | |
| | | | **d.** Check for air leaks around brake hose fittings. | **d.** Air leaks are found. |
| | | | **e.** Inspect control cable for corrosion and abrasions. | **e.** Control cable is damaged or missing. |
| | | | **f.** Check security of control cable upper and lower attaching hardware and adjust (para 11-10). | |
| | | | **g.** Inspect brake air chambers for obvious cracks and corrosion. | **g.** Brake air chamber leaks. |

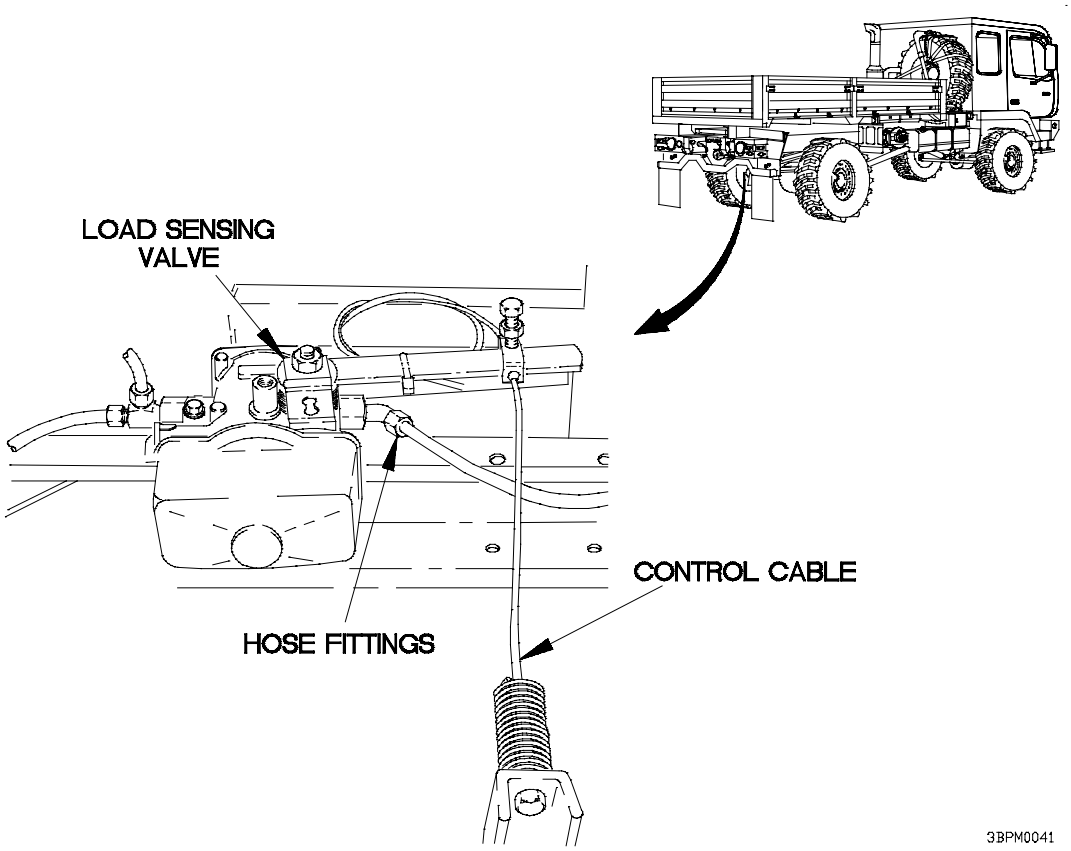


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **3** | Semiannual | **SERVICE BRAKES (CONT)** | **WARNING**<br>**Brake drums can become very hot during vehicle operations. Place hand near drum to check for excessive heat but do not touch drum. Failure to comply may result in injury to personnel.**<br>**CAUTION**<br>Brake drum clearance must be checked along centerline of brake shoe. Failure to comply may result in damage to equipment.<br>**NOTE**<br>Over time a ridge will form on the outer edge of the brake shoes. This is normal and does not affect brake shoe serviceability.<br>**h.** Examine and compare each brake drum for evidence of overheating. Excessive heating of brake drums may indicate a dragging brake shoe. Cool brake drums could mean improper adjustment, defective, or inoperative brakes, or rust on braking surfaces. | **h.** Brake drums are excessively hot, cool, or rusted. |

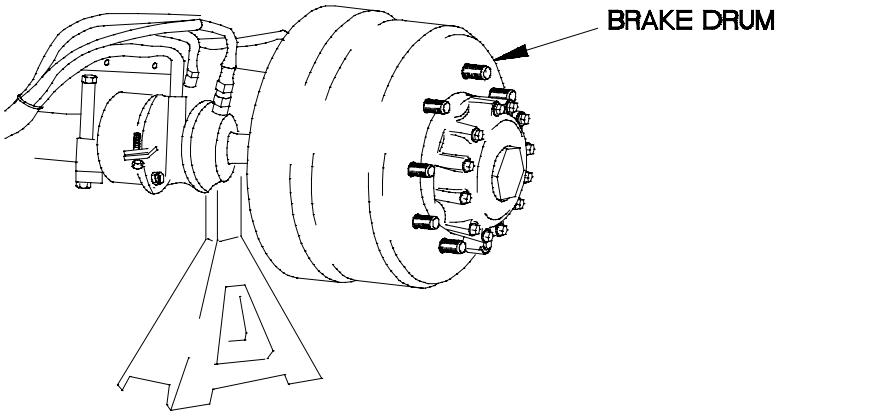


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

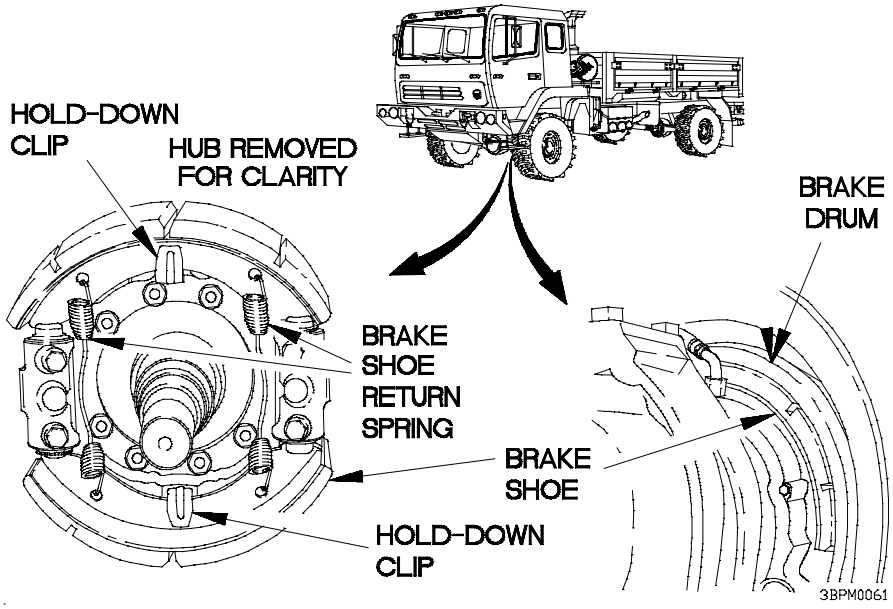
| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| | | |  | |
| **3** | Semiannual | **SERVICE BRAKES (CONT)** | **i.** Check brake lining to brake drum clearance along centerline of shoe at scallop to ensure automatic adjusters are functioning properly. Clearance should be 0.020-0.040 (0.051-0.102 cm) maximum.<br><br>**WARNING**<br><br>**Do not allow grease or oil to contact brake linings. Linings can absorb grease and oil, causing early glazing and very poor braking action. Failure to comply may result in serious injury or death to personnel.** | **i.** Brake shoe adjustment is out of tolerance. |
| | | | **j.** Examine brake shoes for excessive brake lining wear and cracking (para 11-2 and 11-3). | **j.** Brake linings are cracked or excessively worn. |
| | | | **k.** Inspect brake shoe return springs and hold-down clips for cracks. | **k.** Springs or clips are cracked or broken. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 3 | Semiannual | **SERVICE BRAKES (CONT)** | **l.** Inspect actuator plunger seals for cuts, tears, and leaks (para 11-4 and 11-5). | **l.** Plunger seals, adjusting pawl assembly, adjusting plunger or actuator are damaged. |
| 4 | Semiannual | **SHOCK ABSORB-ERS AND SPRINGS** | **a.** Inspect shock absorbers for oil leaks and damage. | **a.** Shock absorber is bent or leak greater than class I is evident. |
| | | | **b.** Check shock absorber mounting hardware for security. | |
| | | | **c.** Check rubber bushings for looseness which may result in inner sleeve contacting eye ring of shock absorber. | **c.** Rubber bushings are loose or inner sleeve is contacting eye ring of shock absorber. |

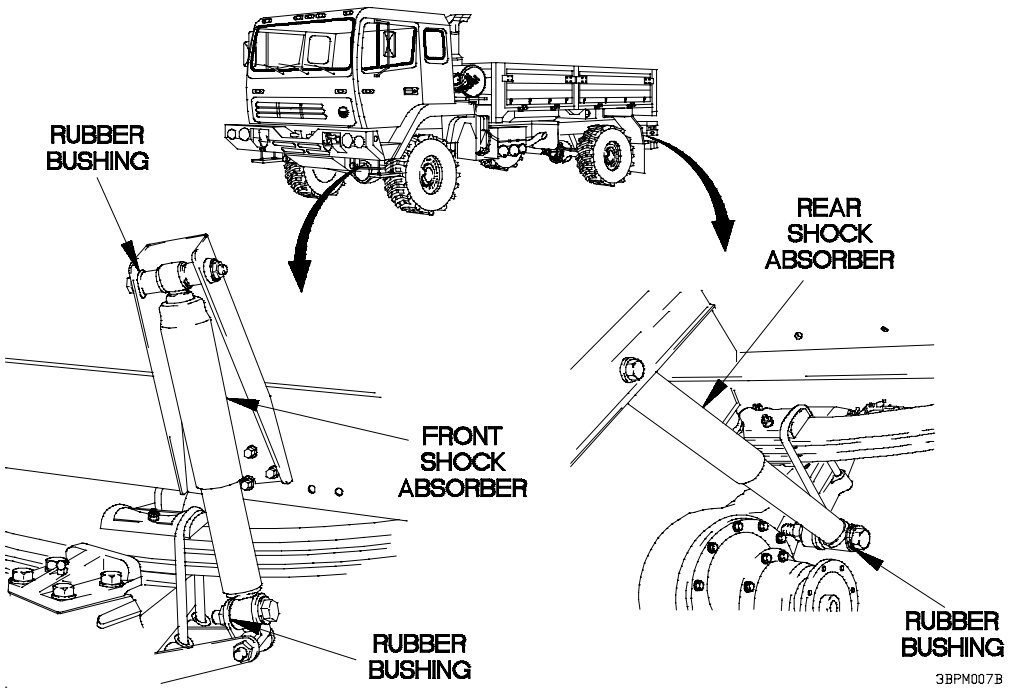
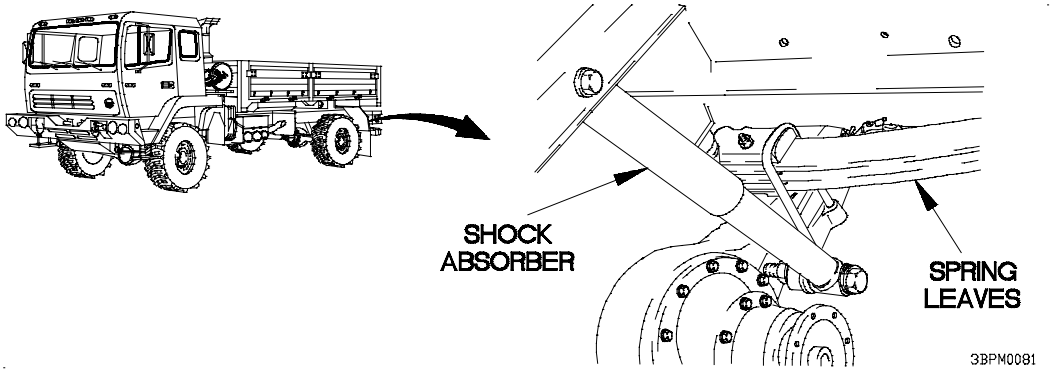


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 4 | Semiannual | **SHOCK ABSORBERS AND SPRINGS (CONT)** | **d.** Inspect spring leaves, spring clips, saddles, saddle caps, and U-bolts for cracks or breaks. | **d.** Cracks or breaks are found. |




| | | | | |
|---|---|---|---|---|
| 5 | Semiannual | **AXLES** | **WARNING**<br>**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**<br>Inspect axles for leaks around wheel end assemblies, pinion seal, drive yoke, and drain plug. | Class III leak is evident. |

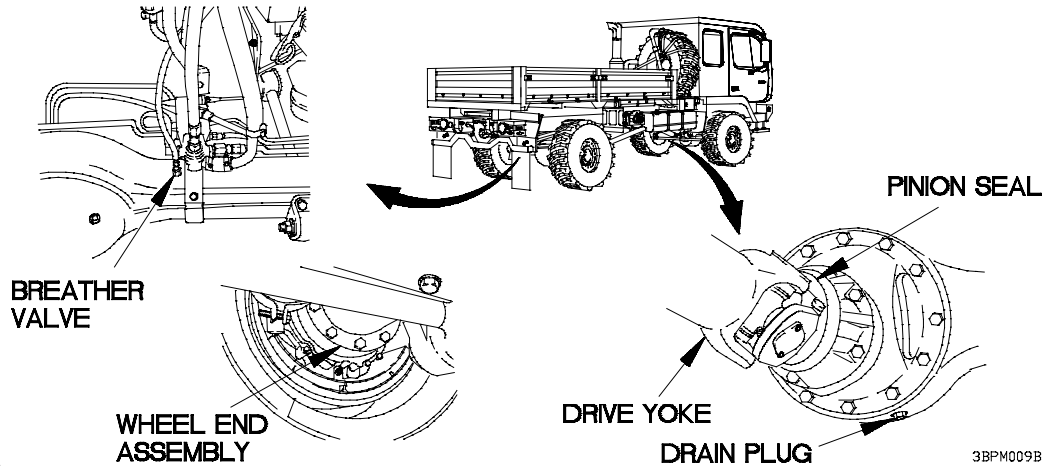


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 6 | Semiannual | **AXLE BREATHER VALVES** | **a.** Inspect axle breather valves to ensure up and down movement. | |

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

| | | | |
|---|---|---|---|
| | | **b.** Remove axle breather valve from fitting. Wash breather in dry cleaning solvent (Item 71, Appendix D) and allow to air dry. | **b.** Axle breather valve missing. |

**WARNING**

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesive, solvents, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.**

| | | | |
|---|---|---|---|
| | | **c.** Coat threads of axle breather valve with antiseize compound (Item 14, Appendix D) and install axle breather valve in fitting. | |

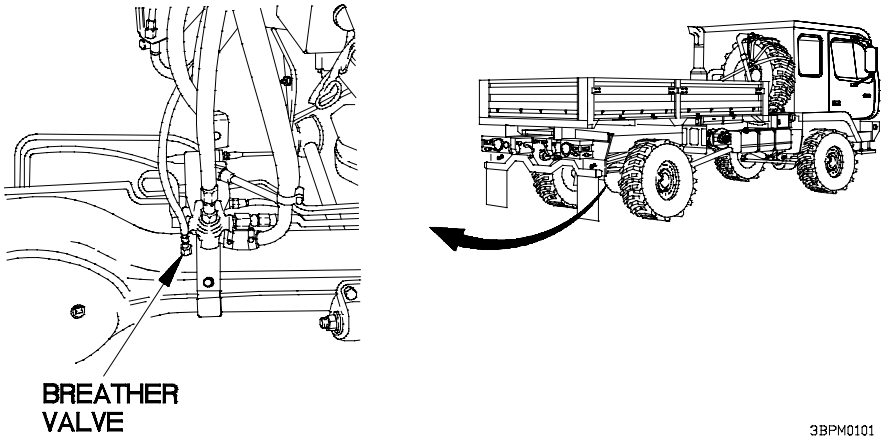


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 7 | Semiannual | **DRIVE SHAFTS** | **WARNING**<br>**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.** | |
| | | | **a.** Inspect U-joints for play, broken and missing lubrication fittings (Appendix H). | **a.** Lubrication fittings, screws or lock tabs are broken or missing, or play is evident. |
| | | | **b.** Peform propeller shaft hinging inspection (para 9-3). | **b.** Hinging reading is greater than 0.2 in. (.5 mm). |
| | | | **c.** Inspect all drive shafts for damage or obvious spline movement. | **c.** Damage or obvious movement evident. |

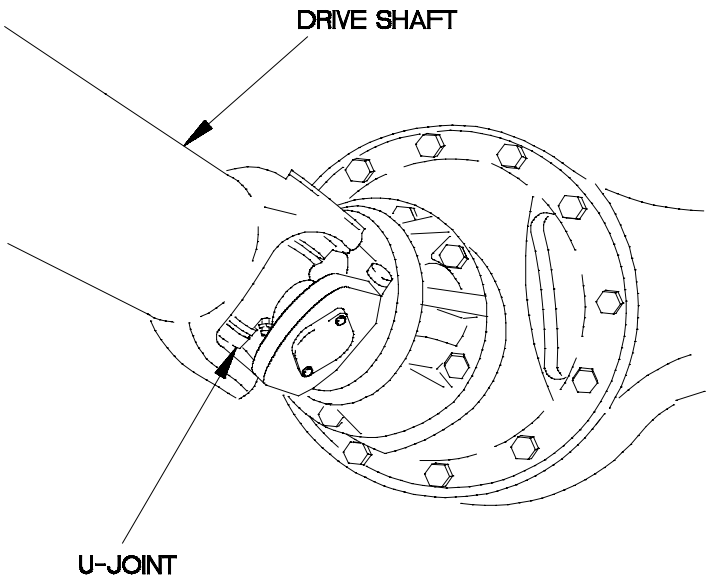


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **8** | Semiannual | **TRANS-MISSION** | **WARNING**<br>**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**<br>**a.** Check transmission for cracks, loose bolts, leaks, and damage.<br>**b.** Check that transmission oil pan bolts and drain plug are tight.<br>**c.** Inspect transmission output shaft seal for damage or leaks. | **a.** Cracks, loose or missing bolts, or Class III leaks.<br>**b.** Oil pan bolts or drain plug are loose or missing.<br>**c.** Damage or Class III leaks are evident. |

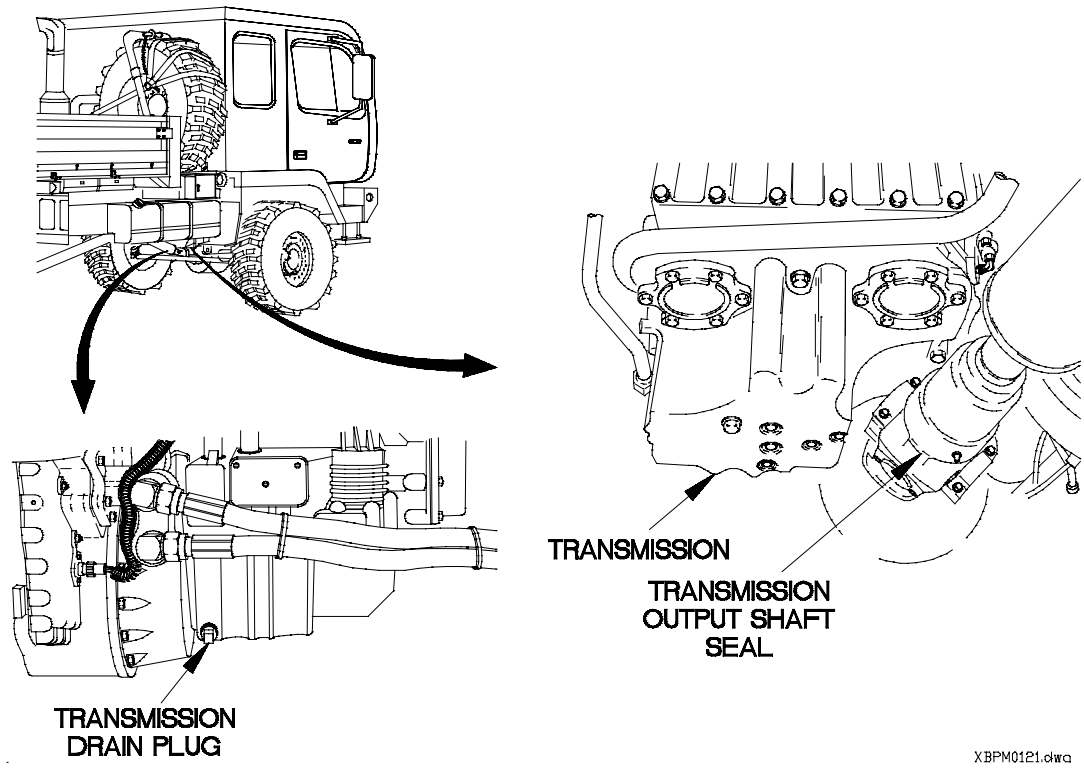


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

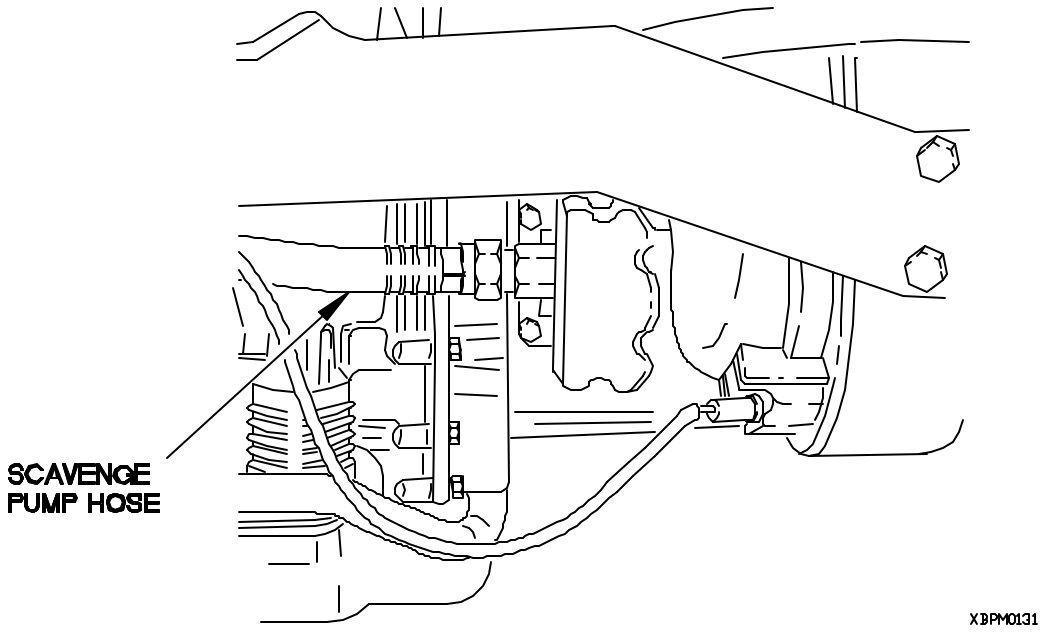
| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **8** | Semiannual | **TRANS-MISSION (Cont)** | **d.** Inspect transmission oil cooler tubes/hoses for leaks. | **d.** Class III leak is evident. |
| | | | **e.** Inspect scavenge pump hose for leaks. | **e.** Class III leak is evident. |
| | | |  | |
| **9** | Deleted | | | |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **10** | Semiannual | **ENGINE CRANK-CASE** | **NOTE**<br><br>COLD TEMPERATURE OPERATION<br><br>For operation of equipment in continuous temperatures below 0°F (-18°C), remove lubricants prescribed in the lubrication key for temperatures above 0°F (-18°C). Relubricate with lubricant specified in the lubrication key for temperatures 0°F to -50°F (-18°C to - 46°C).<br><br>**a.** Start engine (TM 9-2320-365-10) and run for five minutes.<br><br>**b.** Check for oil leaks around top of engine oil filter.<br><br>**c.** Shut down engine (TM 9-2320-365-10).<br><br>**d.** Check oil level on engine oil dipstick.<br><br>**e.** Add engine oil, if required, to bring oil level to full mark on engine oil dipstick. | |

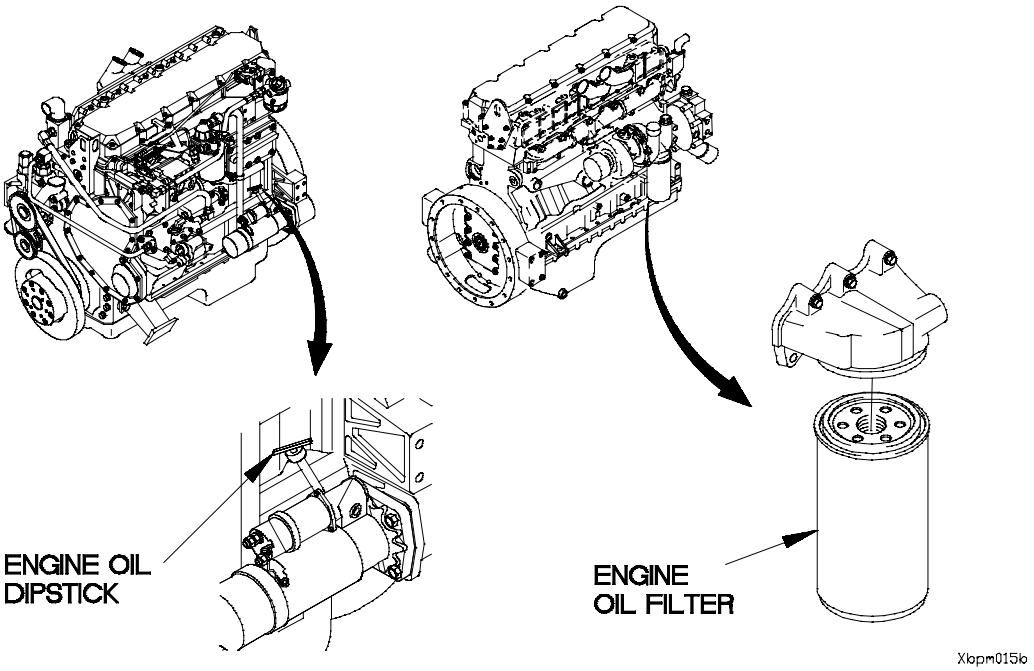
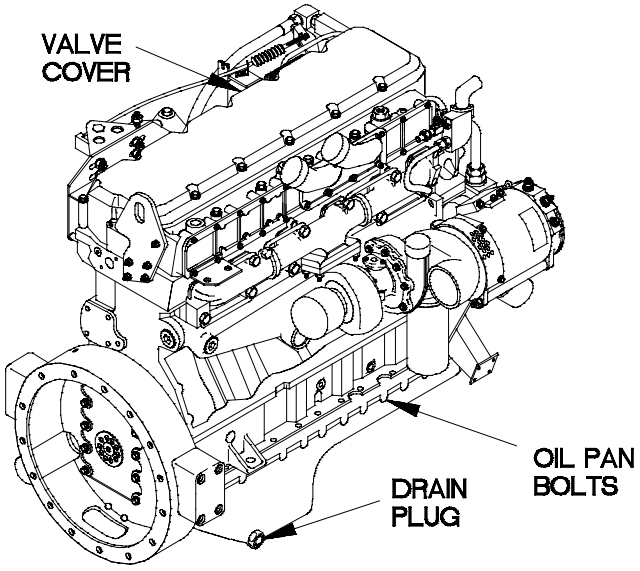


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **10** | Semiannual | **ENGINE CRANK-CASE (Cont)** | **f.** Check oil pan bolts and oil pan drain plug for tightness. | **h.** Drain plug or oil pan bolts are loose or missing. |
| | | | **g.** Check valve cover for evidence of oil leaks. | **i.** Class III leak is evident. |




| | | | | |
|---|---|---|---|---|
| **11** | Semiannual | **ENGINE WIRING** | Check all engine compartment wiring for frays, splits, missing insulation or poor connections. | Insulation missing. Frays, splits, poor connections evident. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **12** | Semiannual | **AIR SYSTEM** | **a.** Observe air dryer purge valve operation and ensure proper functioning.<br>**b.** Inspect purge valve seal for cracks and leaks.<br>**c.** Check wiring to heater portion of air dryer. Ensure there are no loose connections or frayed wires. | **c.** Loose connection cannot be tightened or frayed wires are evident. |

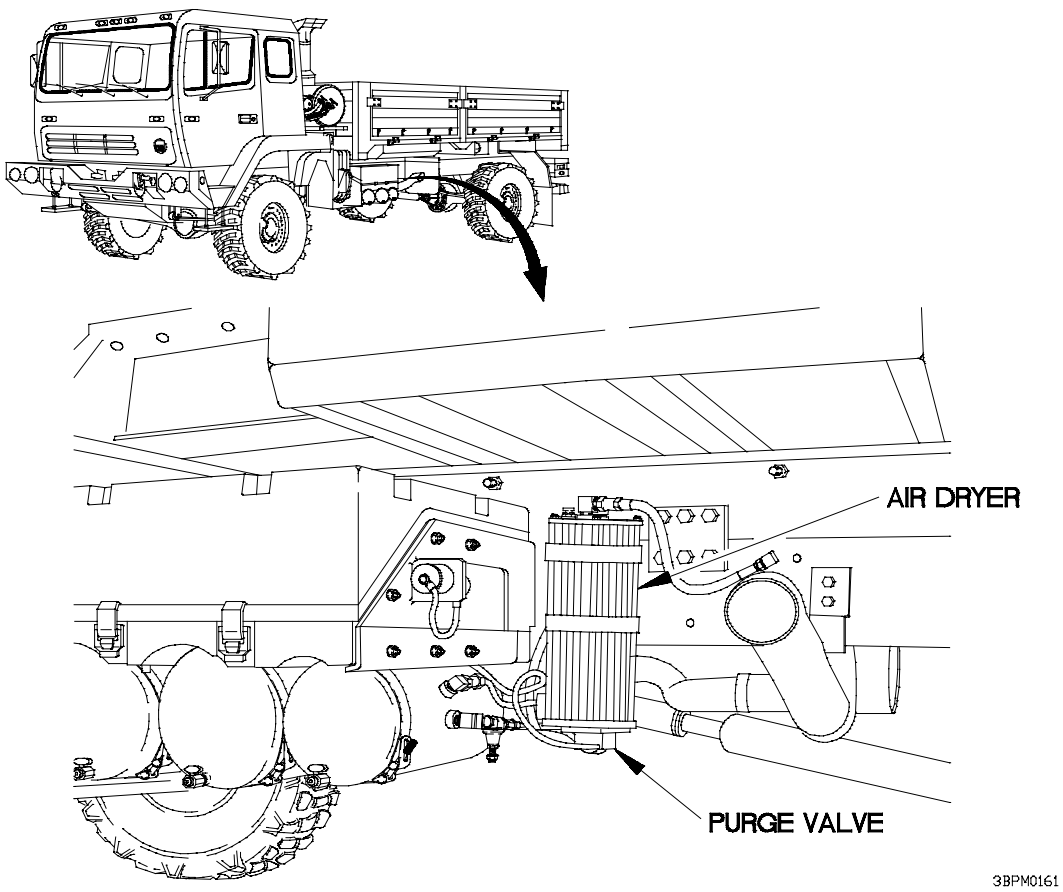


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **13** | Semiannual | **EXHAUST SYSTEM** | **WARNING**<br><br>**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 and muffler. Exhaust system parts can become hot enough to cause serious burns. Failure to comply may result in injury to personnel.**<br><br>**a.** Inspect exhaust manifold, exhaust pipes, muffler, and tailpipe for corrosion, carbon deposits, loose clamps, or leaking gaskets. | |

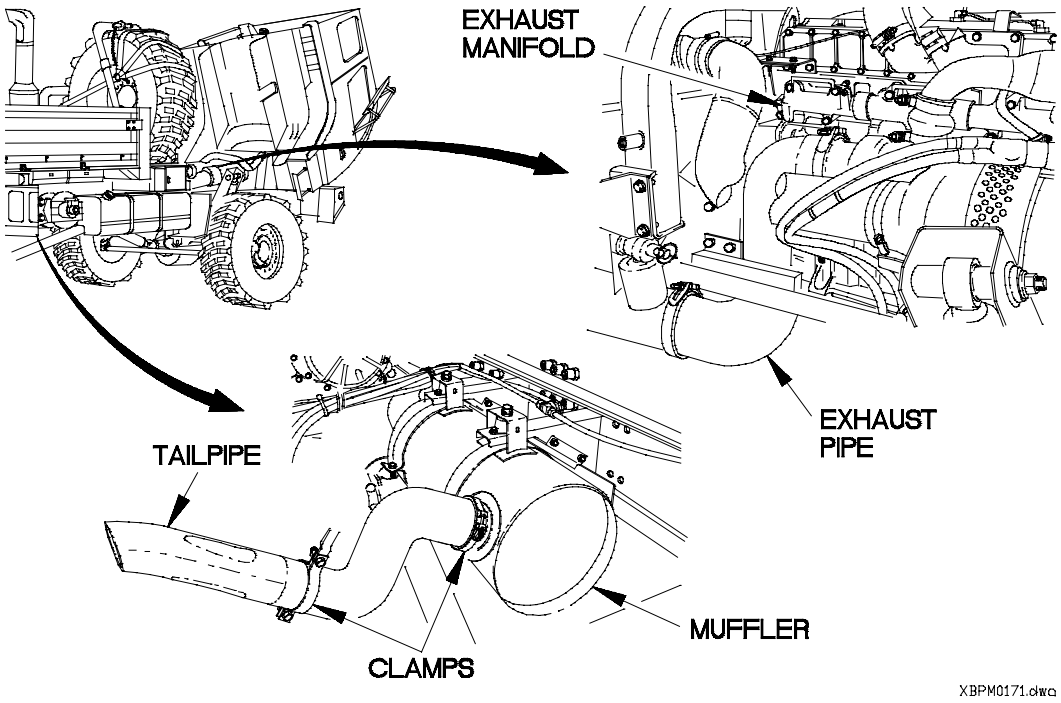


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **14** | Semiannual | **STABI-LIZER BAR** | **a.** Check rear stabilizer bar for secure mounting.<br>**b.** Inspect stabilizer rubber bushings for cracks and dry rot. | |

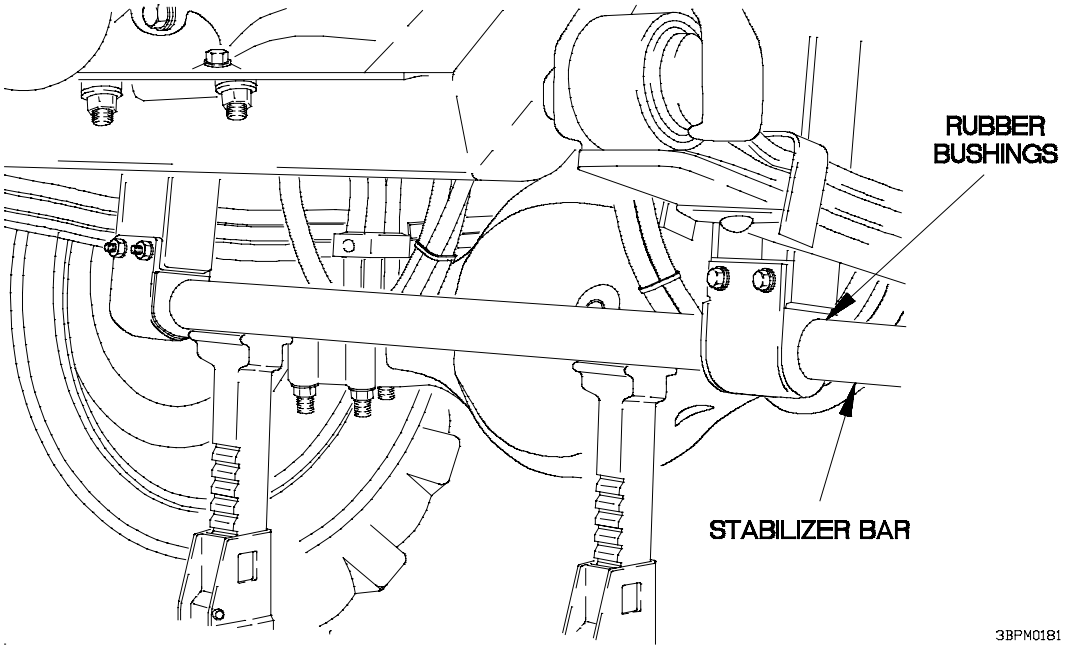


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **15** | Semiannual | **PINTLE TOWING HOOK** | **a.** Check for free rotation and operation of pintle towing hook.<br>**b.** Inspect pintle towing hook and mounting plate for cracks or loose hardware.<br>**c.** Inspect pintle cotter pin for presence. | |

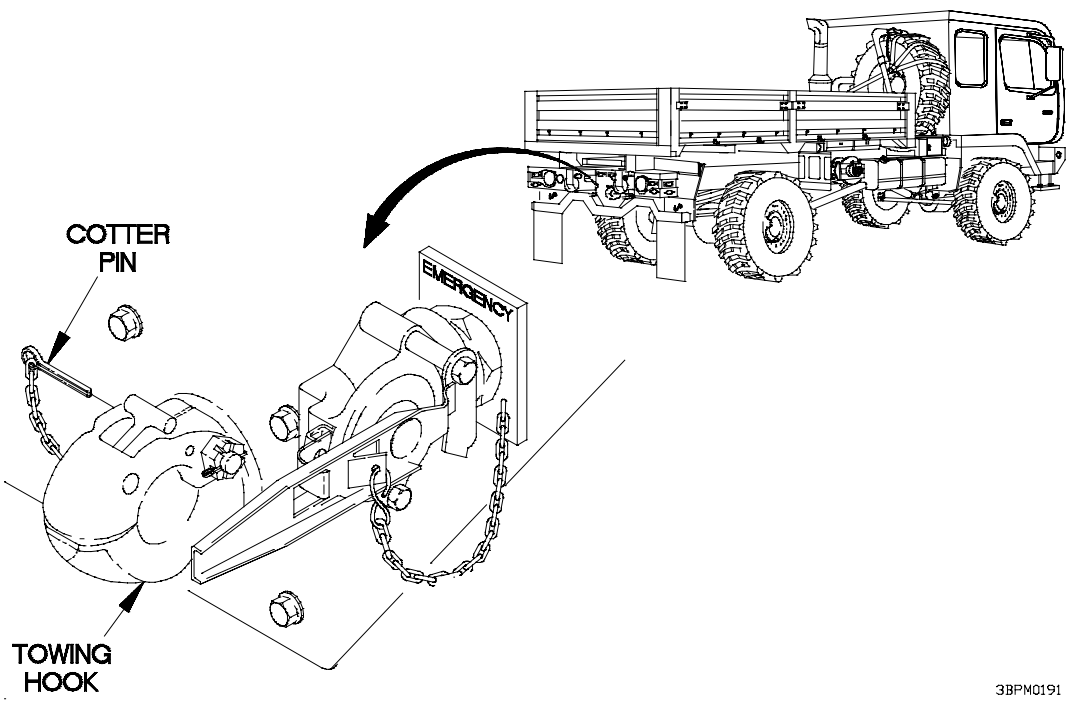


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **16** | Semiannual | **VEHICLE EXTERIOR** | Inspect vehicle exterior for evidence of corrosion damage such as surface color change, surface separation, seam separation, blistered paint, rust through, in accordance with TB 43-0213. | |
| **17** | Semiannual | **AIR CLEANER** | **a.** Remove air cleaner cover and examine air cleaner cover gasket for dry rot and/or missing sections. | **a.** Cover gasket is not intact or capable of making a good seal. |

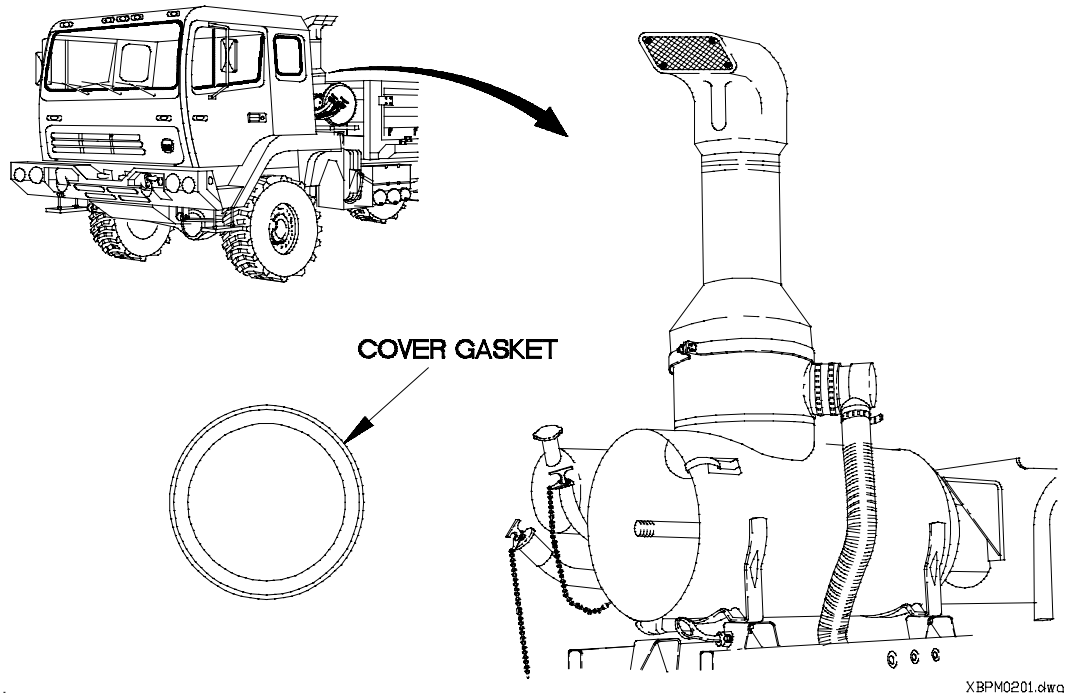


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| 17 | Semiannual | **AIR CLEANER (CONT)** | **b.** Inspect air shutter by loosening one hose clamp, removing cover, and ensuring air shutter moves freely without binding or resistance. | **b.** Air shutter binds or is stuck. |
| | | | **c.** Inspect air shutter gasket for cracking and dry rot. | **c.** Gasket is broken or dry rotted. |
| | | | **d.** Check security of clamps on particle extraction hose between air cleaner and tailpipe. Tighten if loose (35-45 lb-in. (4-5 N·m)), replace if broken. Examine particle extraction hose. Replace if excessively worn. | **d.** Particle extraction pathway between air cleaner and tailpipe is not intact. |

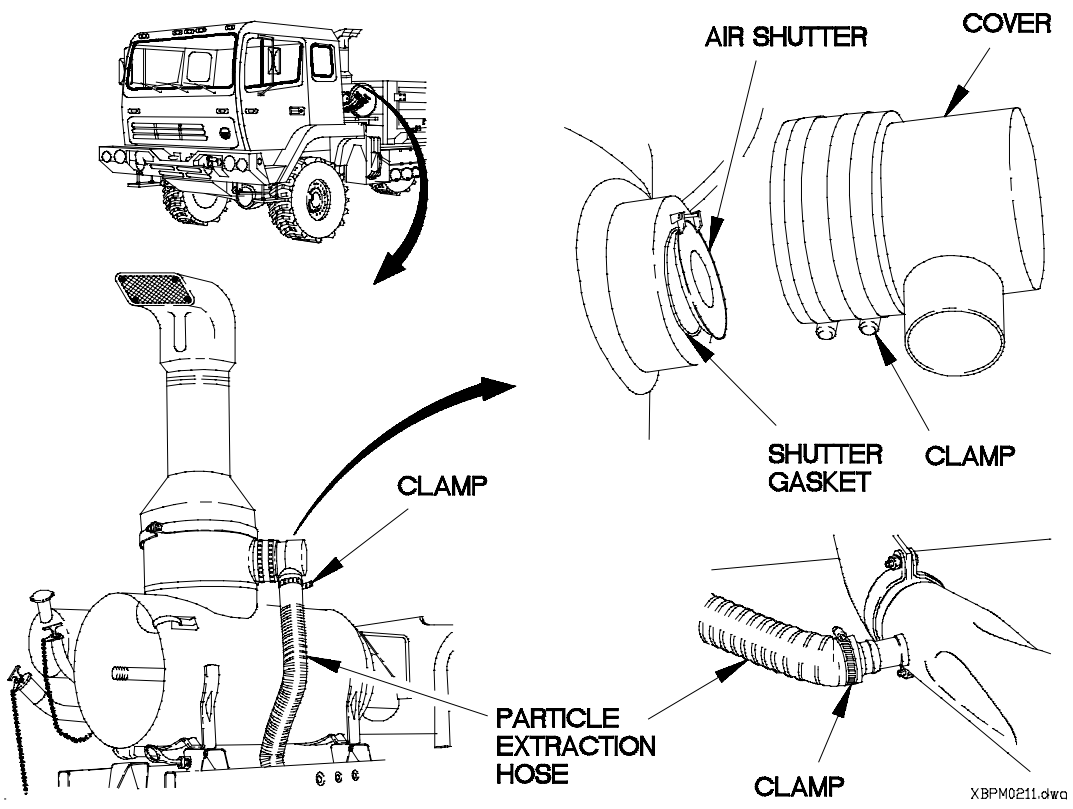


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **18** | Semiannual | **BATTERIES AND BATTERY BOX** | **WARNING**<br>• **Remove or disconnect batteries prior to performing maintenance in battery area or when working on electrical system. Failure to comply may result in severe electrical shock to personnel or damage to equipment.**<br>• **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 serious injury or death to personnel. Failure to comply may result in serious injury to personnel.**<br>• **Wear safety glasses or goggles when checking batteries. Always check electrolyte level with engine shut down. Do not smoke or use exposed flame when checking battery; explosive gases are present and severe injury to personnel can result. Failure to comply may result in injury to personnel.**<br>**a.** Inspect battery box for obvious signs of corrosion and for loose mounting hardware. | |

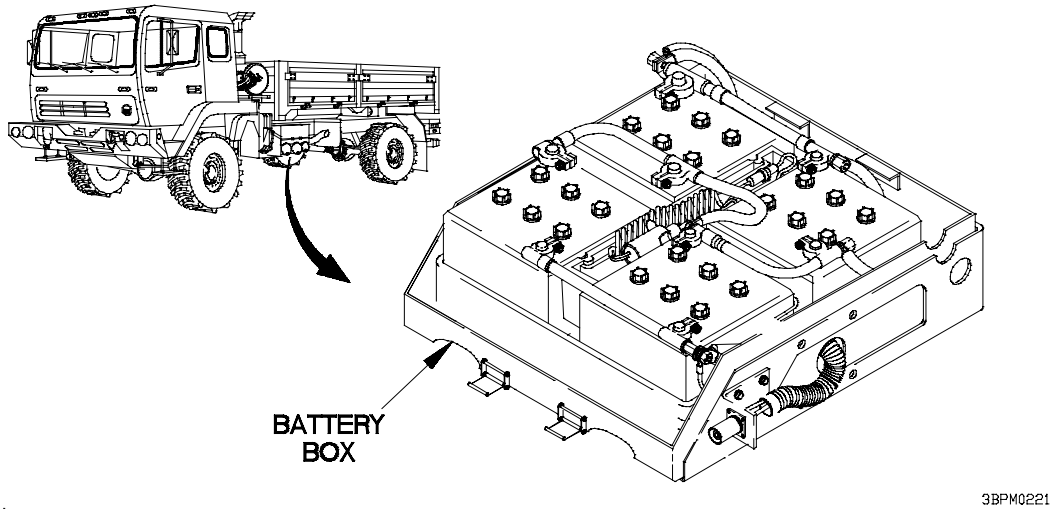


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **18** | Semiannual | **BATTERIES AND BATTERY BOX (CONT)** | **b.** Inspect external condition of batteries; check for cracks and loose or corroded terminal posts.<br><br>**c.** Check and record specific gravity of each cell in all batteries. | **b.** Batteries cracked. |
| | | | **d.** Inspect battery cables for corrosion, frays, splits, chafing and secure attachment. | **d.** Battery cables are worn, frayed or corroded. |

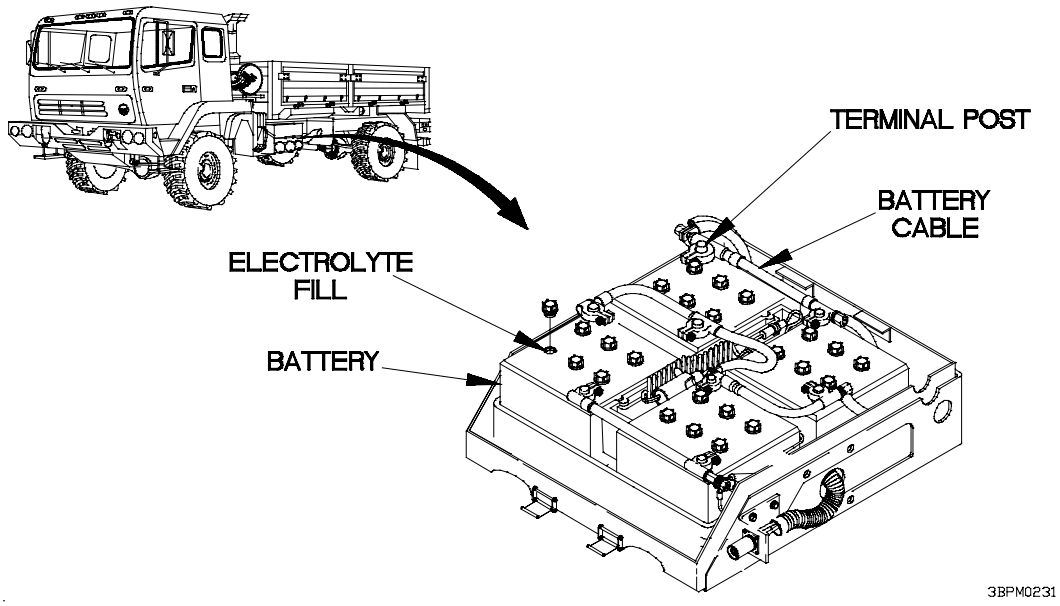


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **19** | Semiannual | **SPARE TIRE RETAINER** | **a.** Inspect hydraulic hoses for cracks and abrasions.<br><br>**b.** Inspect hydraulic cylinder for leaks around cylinder rod and fittings. Check cotter pins for presence. | **a.** Class III leak is evident.<br><br>**b.** Class III leak is evident. |

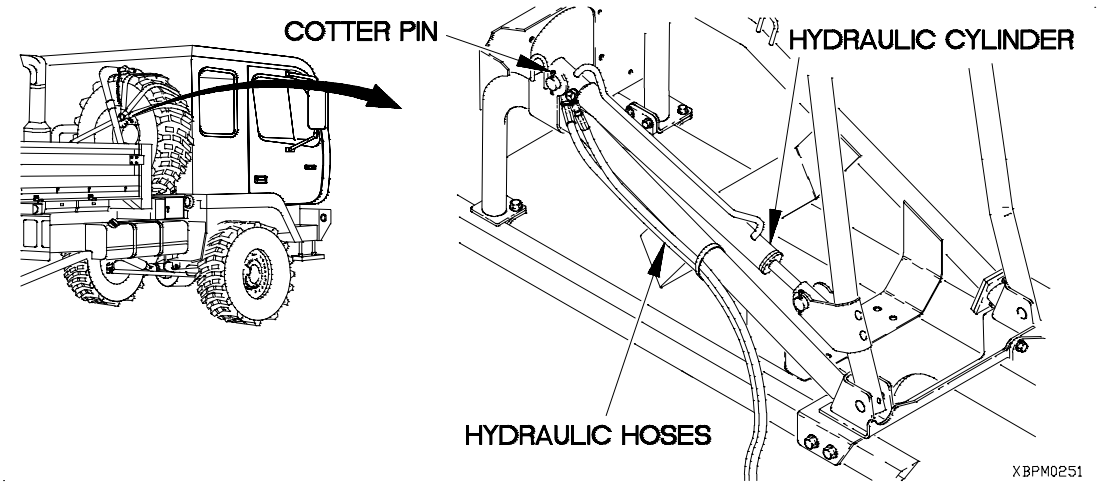
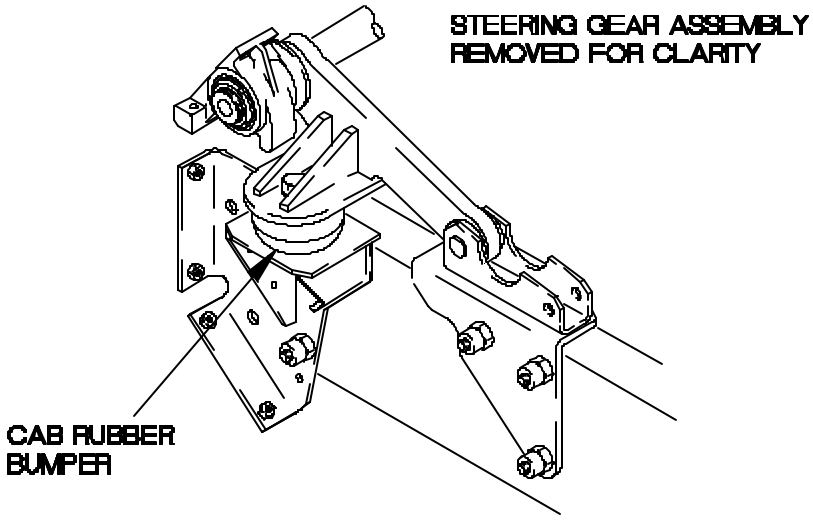


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **20** | Semiannual | **CAB HYDR-AULIC CYLINDER** | **a.** Inspect cab hydraulic cylinder for leakage around cylinder rod.<br><br>**b.** Check security of attaching hardware at cylinder rod end and cotter pin for presence. | **a.** Class III leak is evident.<br><br>**b.** Cab hydraulic cylinder is unsecured. |




| | | | | |
|---|---|---|---|---|
| **20a** | Semiannual | **CAB RUBBER BUMPER** | Check cab rubber bumper for damage or excessive wear. | If cab rubber bumper is damaged or worn. |

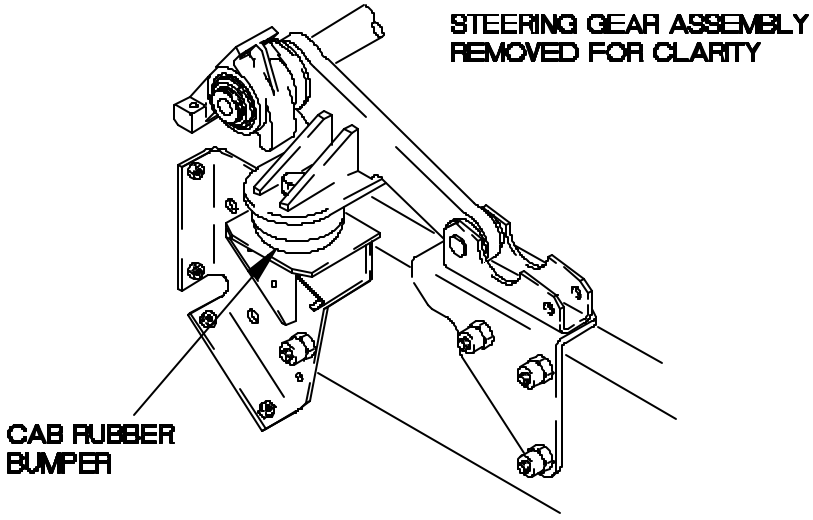


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **21** | Semiannual | **CAB HYDR-AULIC LATCH** | Check security of attaching hardware for hydraulic cab latch. | **a.** If cab will not securely latch.<br><br>**b.** Missing or loose hardware. |

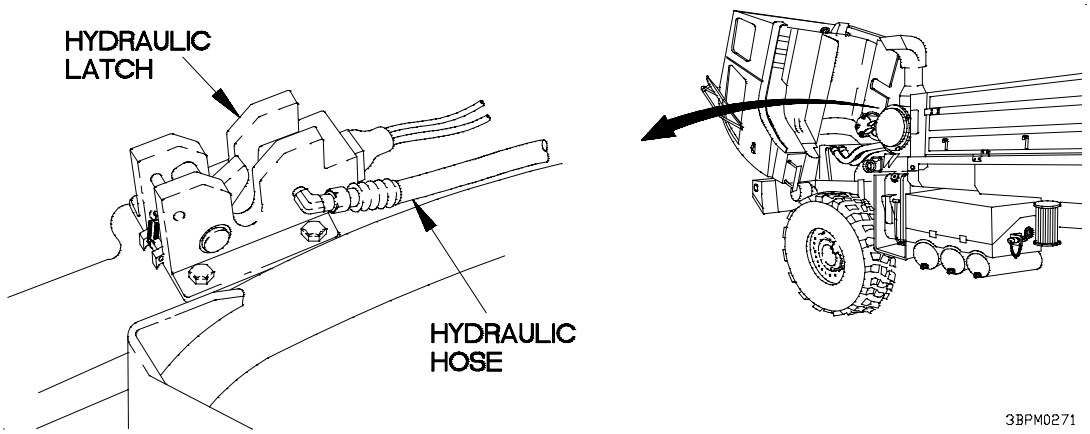
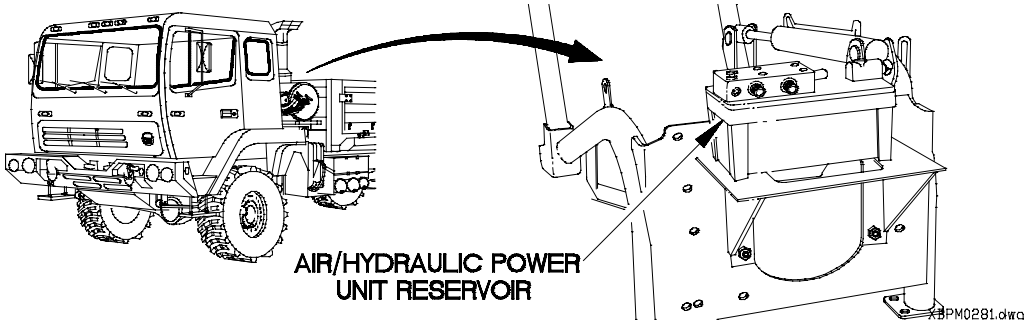


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **22** | Semiannual | **AIR/ HYDRAU-LIC POWER UNIT** | Check air/hydraulic power unit reservoir and refill in accordance with Appendix H. | |




| | | | | |
|---|---|---|---|---|
| **23** | Semiannual | **SUSPEN-SION CYLINDER** | Check suspension cylinder for oil leaks and damage. | Class III leak is evident. |

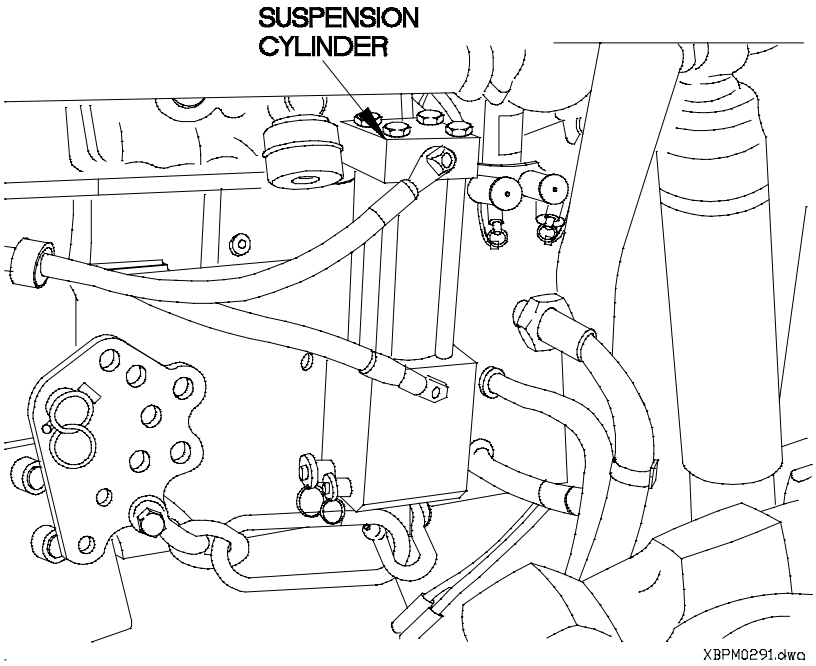


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **24** | Semiannual | **STEERING SYSTEM** | **a.** Inspect steering column universal joint attachment hardware for security. | **a.** Universal joint is loose, broken, cracked, or hardware is missing. |
| | | | **NOTE**<br>Wheels must be centered before performing step b. | |
| | | | **b.** Inspect staking of pitman arm attachment nut. | **b.** Pitman arm nut is loose. |
| | | | **c.** Inspect power steering hoses for leaks, cracks, and chafing. | **c.** Class III leak is evident. Chafing is severe or hoses cracked. |
| | | | **d.** Check steering gear mounting bolts for tightness. | **d.** Bolts loose or missing. |
| | | | **e.** Check steering column U-joint, steering knuckles, tie rod, drag link, pitman arm, and steering gear for tightness, breaks, cracks, rust, and serviceability. | **e.** Bolts are loose. Breaks or cracks are evident. |

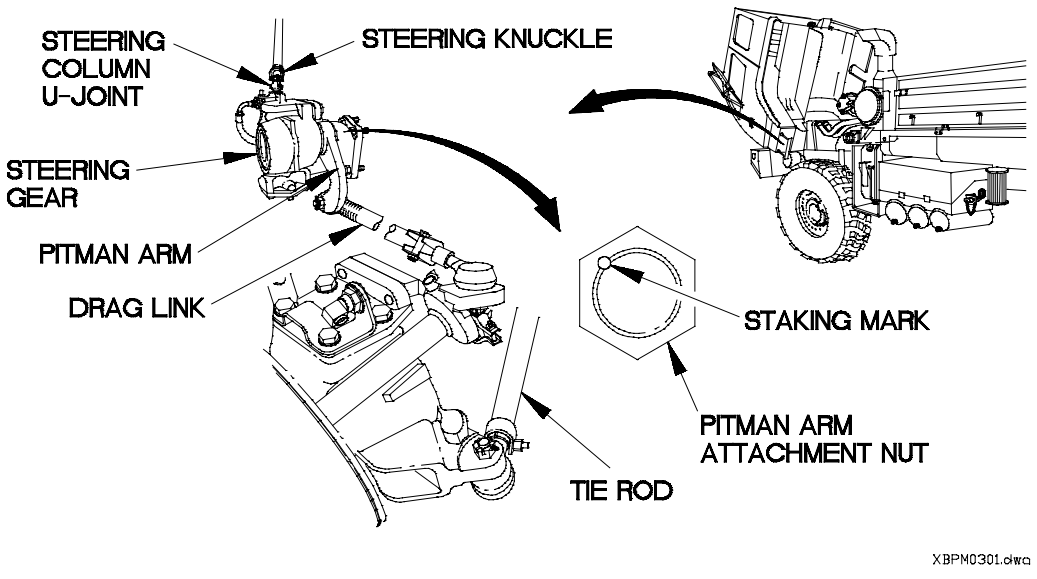


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

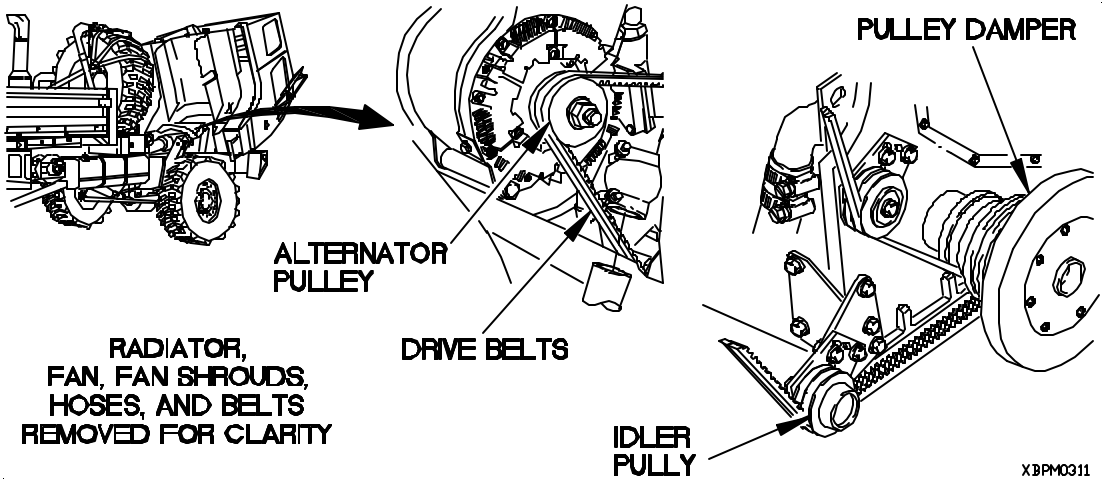
| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **25** | Semiannual | **PULLEY DAMPER** | Inspect pulley damper for dents. | Pulley damper is damaged. |
| | | |  | |
| **26** | Semiannual | **ALTER-NATOR PULLEY** | Inspect alternator pulley for dents, nicks, and cuts in flanges. | Pulley is damaged to the point that it affects belt wear. |
| **27** | Semiannual | **ALTER-NATOR BRACK-ETS** | **a.** Check for loose or cracked mounting hardware on alternator bracket and alternator pulley.<br>**b.** Check idler pulley for dents, nicks, and cuts in flanges. | **a.** Alternator bracket or idler pulley is cracked or loose.<br>**b.** Pulley is damaged to the point that it affects belt wear. |
| **28** | Semiannual | **ALTER-NATOR DRIVE BELTS** | Check alternator drive belts for cracks, frays, and shiny spots. | Any drive belt has more than one crack 1/8 in. (3 mm) in depth or 50 percent of belt thickness, any fray more than 2 in. (51 mm) long, or has excessive play. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

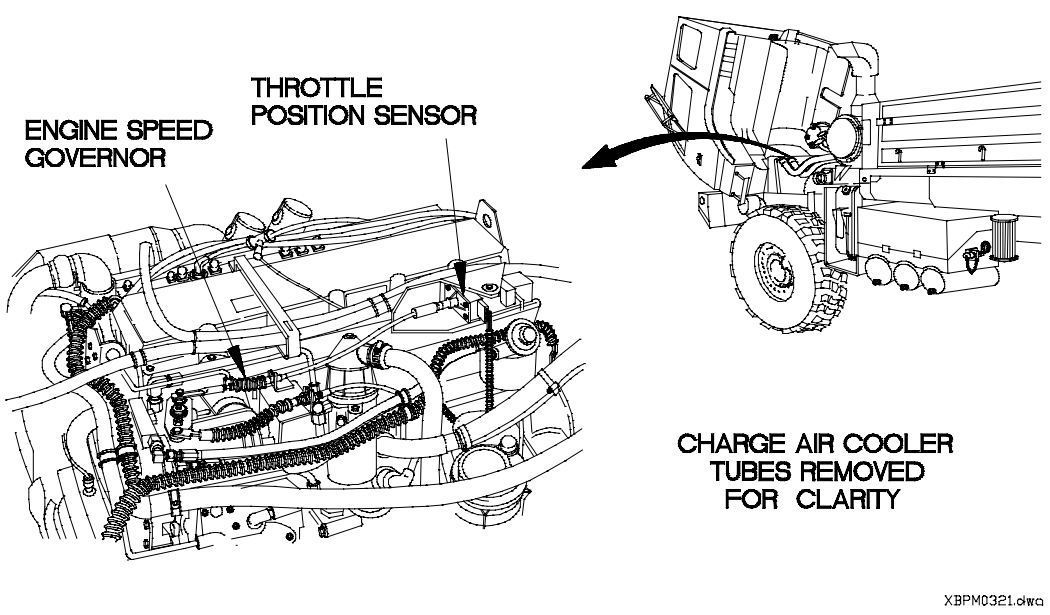
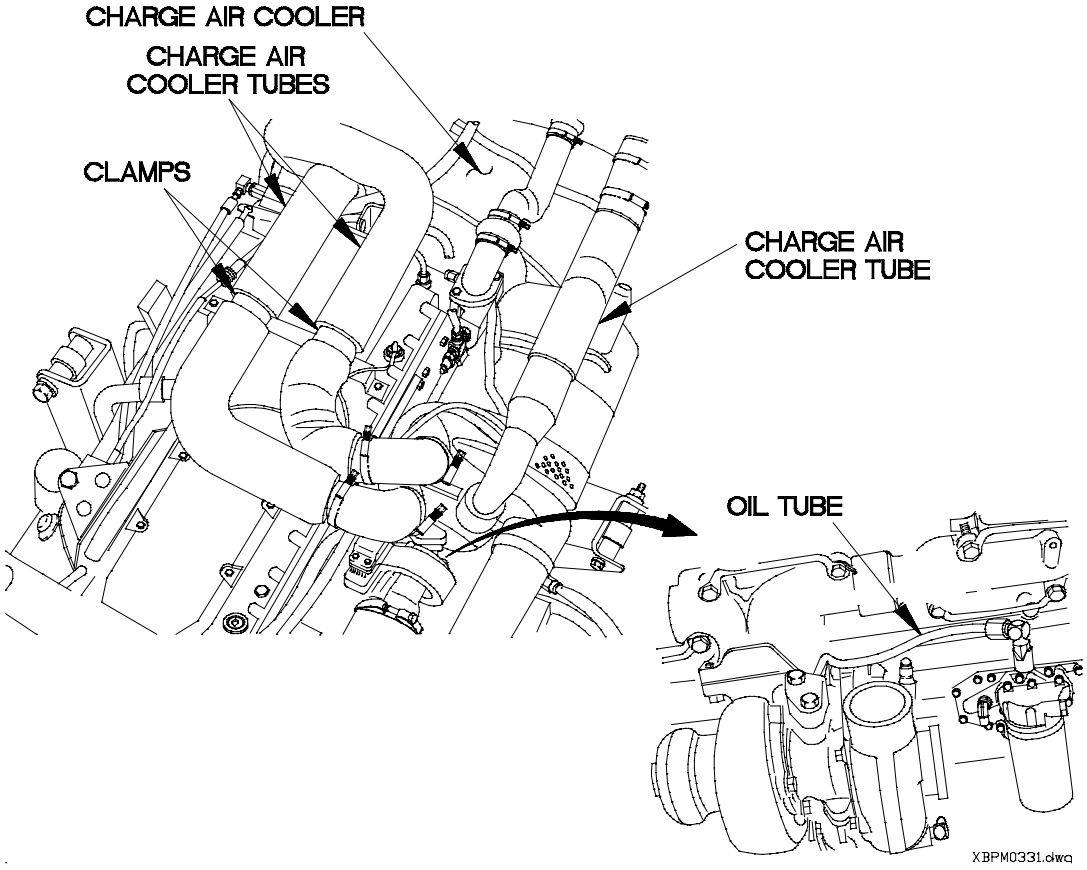
| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **29** | Semiannual | **THROT-TLE POSITION SENSOR** | Check TPS for secure mounting. | TPS is not firmly mounted or securely attached to throttle lever. |
| | | |  | |
| **30** | Semiannual | **ENGINE** | **a.** Inspect engine speed governor for loose mounting hardware. | **a.** Mounting hardware is loose or missing. |
| | | | **b.** Check for fuel leaks around fittings and for abrasion of fuel hoses. | **b.** Fuel leaks are evident. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **30** | Semiannual | **ENGINE (Cont)** | **c.** Check for oil leaks around fittings and for crimps in oil tubes.<br><br>**d.** Check for secure attachment of throttle control cable. | **c.** Class III leak is evident.<br><br>**d.** Control cable is not securely attached. |




| | | | | |
|---|---|---|---|---|
| **31** | Semiannual | **TURBO-CHARGER** | Check turbocharger oil tubes for leaks or crimping which would restrict oil flow. | Class III leak is evident. |
| **32** | Semiannual | **CHARGE AIR COOLER TUBES** | **a.** Inspect charge air cooler tube assembly for obvious signs of corrosion or cracking. | **a.** Charge air cooler tubing is cracked. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

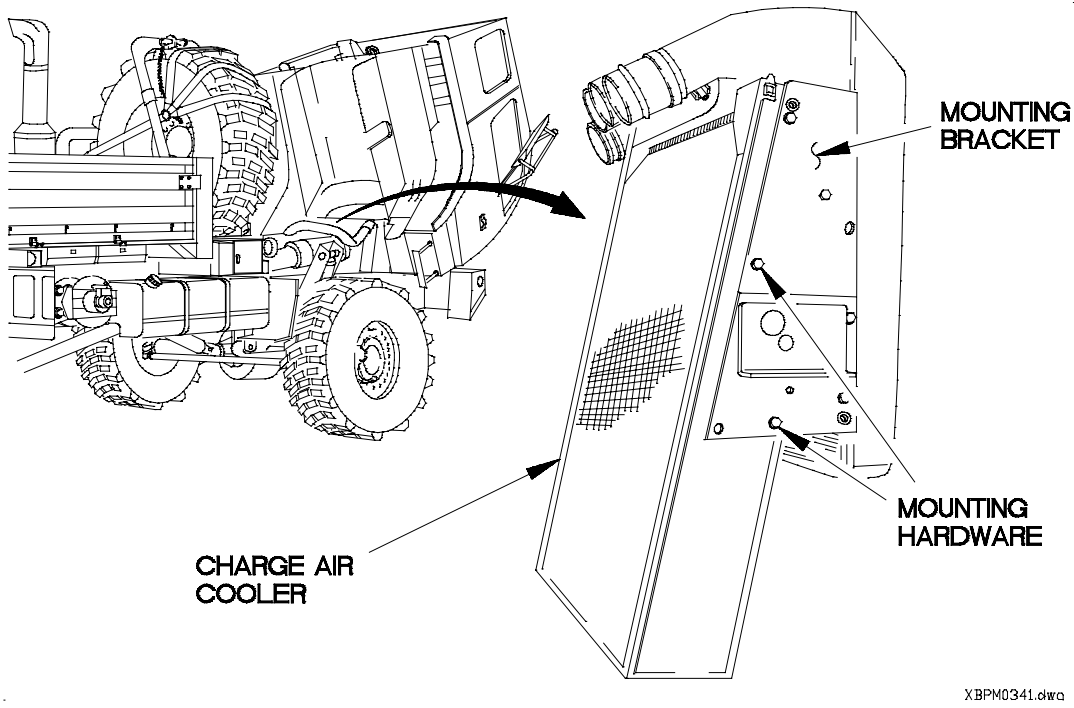
| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **32** | Semiannual | **CHARGE AIR COOLER TUBES (Cont)** | **b.** Check all hose clamps between turbocharger and intake manifold and verify that they are tight (90-100 lb-in. (10-11 N·m)).<br>**c.** Check turbocharger rubber charge air hoses for cracking and chafing. | **c.** Rubber hose(s) is damaged. |
| | | |  | |
| **33** | Semiannual | **CHARGE AIR COOLER** | **a.** Inspect charge air cooler for bent or clogged cooling fins.<br>**b.** Check charge air cooler mounting for security and tighten any loose hardware.<br>**c.** Inspect mounting brackets for cracks and damage. | a. Charge air cooler is damaged. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

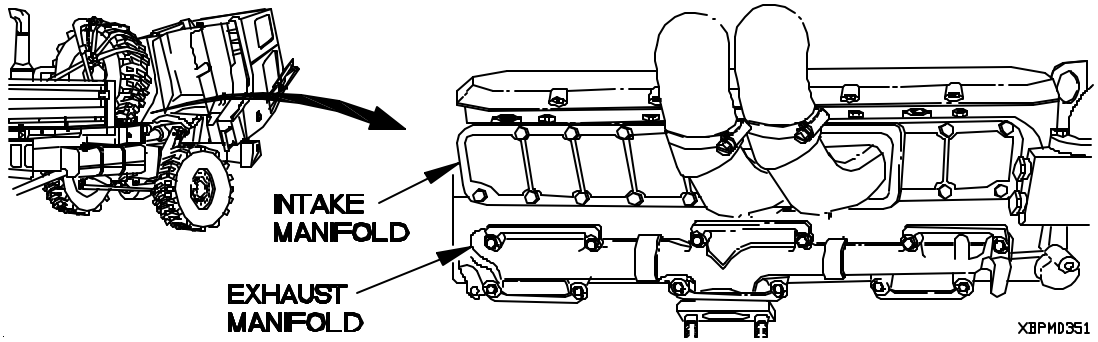
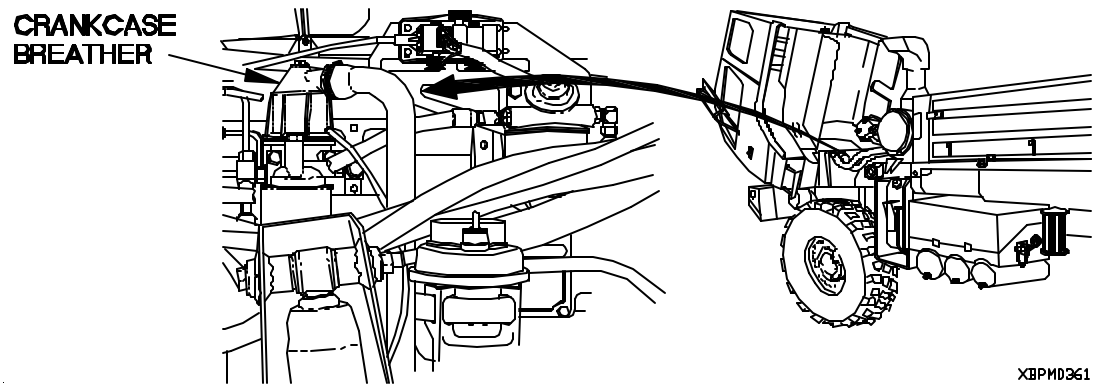
| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **34** | Semiannual | **EXHAUST AND INTAKE MANI-FOLDS** | **a.** Check exhaust manifold for damage, loose mounting bolts and for exhaust leaks.<br><br>**b.** Check intake manifold for loose mounting bolts and damage. | **a.** Exhaust manifold is damaged, exhaust leaks, or mounting hardware is loose.<br><br>**b.** Intake manifold is damaged. Mounting hardware is loose. |
| | | |  | |
| **35** | Semiannual | **ENGINE CRANK-CASE BREATH-ER** | Inspect crankcase breather for oil leaks around base. Check security of mounting hardware. | Class III leak or loose or missing hardware are evident. |
| | | |  | |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **36** | Semiannual | **ENGINE WIRING** | Check all engine wiring for signs of fraying, chafing, cracking, and burnt insulation. | Wiring is burned, cracked, frayed, or broken. |
| **37** | Semiannual | **AIR COMPRESSOR AND GOVERNOR** | **a.** Inspect air compressor and air compressor governor for leaks and loose hardware. | **a.** Class III leak is evident or hardware is missing or loose. |
| | | | **b.** Inspect air compressor oil tube for leaks and kinks/bends which would cause a restriction. | **b.** Class III leak, kinks or bends are evident. |
| | | | **c.** Check air compressor coolant tubes for leaks and kinks/bends. | **c.** Class III leak, kinks or bends are evident. |

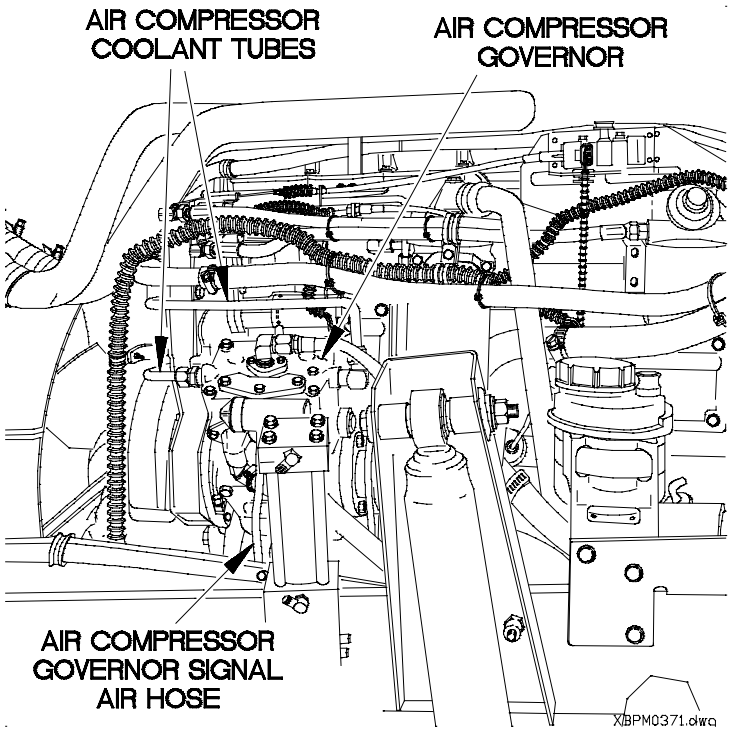


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **38** | Semiannual | **COOLING SYSTEM** | **WARNING**<br>**If vehicle has been operating, use extreme care to avoid being burned when removing radiator cap. Use heavy rags or gloves to protect hands. Turn radiator cap only one-quarter turn to the left and allow pressure to be relieved before fully removing cap. Failure to comply may result in injury to personnel.**<br>**a.** Check coolant condition. Test coolant to see if draining is necessary (TB 750-651).<br>**b.** Replace coolant if required (Appendix H Note 7). | |

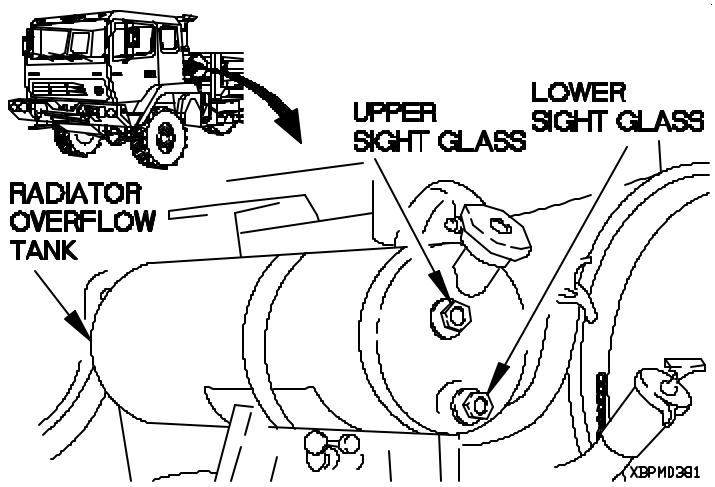


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **39** | Semiannual | **THERMO-STAT HOUSING** | **a.** Check thermostat housing for loose mounting bolts and leaks around base. Tighten loose mounting bolts. | **a.** Class III leak is evident. |
| | | | **b.** Inspect upper coolant tube for cracks and splits. Refer to para 6-9 if clamps are found to be loose. | |
| | | | **c.** Check for leaks around water temperature transducer and coolant temperature switch. | **c.** Class III leak is evident. |

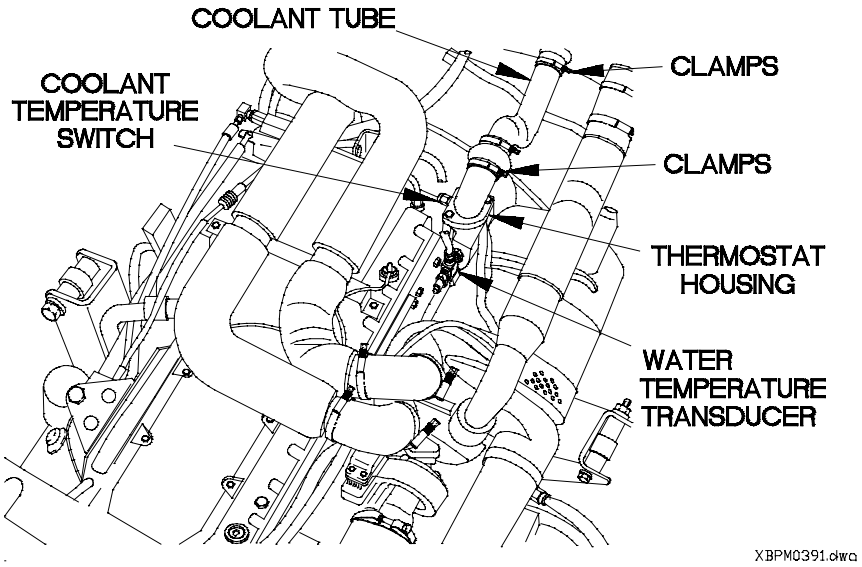


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **40** | Semiannual | **WATER PUMP** | **a.** Check security of water pump attachment bolts and hose clamps. Refer to para 6-12 if clamps are found to be loose. | **a.** Bolts are stripped. |
| | | | **b.** Inspect water pump for leaks around impeller shaft. | **b.** Class III leak is evident. |
| | | | **c.** Inspect water pump pulley and idler pulley for damage. | **c.** Water pump pulley or idler pulley is damaged to the point that it affects belt wear. |
| | | | **d.** Check drive belt for cracks, frays, and shiny spots. | **d.** Drive belt has more than one crack 1/8 in. (3 mm) in depth or 50 percent of belt thickness, any fray more than 2 in. (51 mm) long, or has excessive play. |

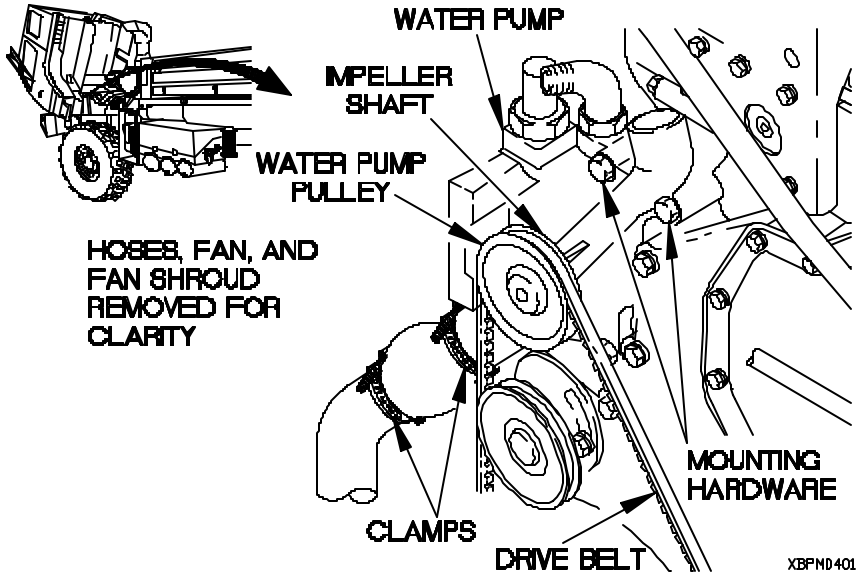
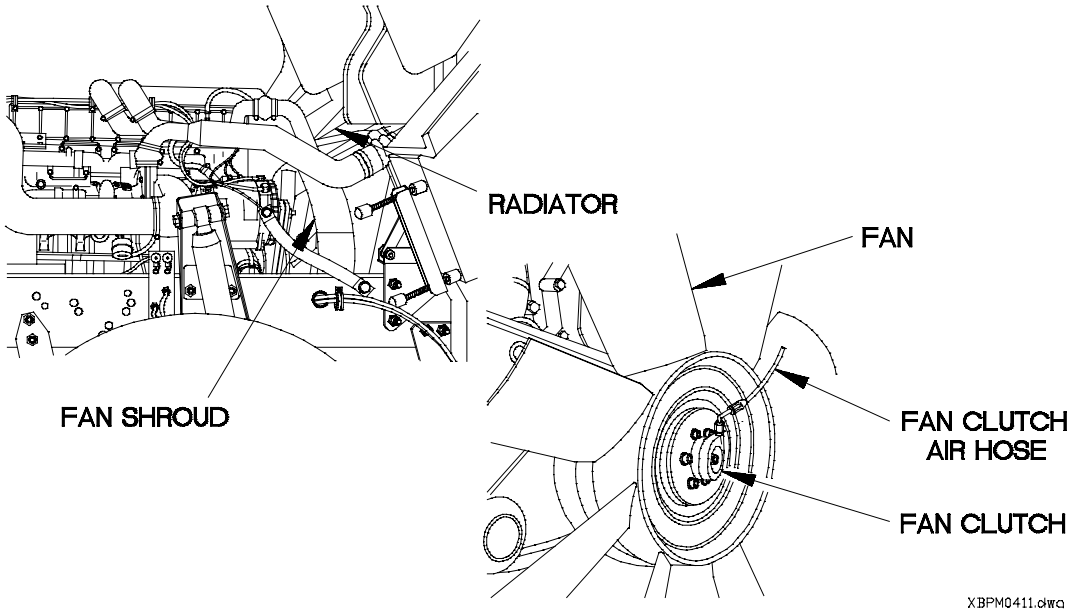


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **41** | Semiannual | **FAN BLADE AND CLUTCH** | **a.** Inspect fan for chipping, cracking, and missing fan blades.<br>**b.** Inspect fan clutch for loose bolts (para 6-14).<br>**c.** Check fan clutch air hose and fitting for leaks. | **a.** Fan blades chipped, cracked, or missing.<br>**b.** Loose or missing bolts. |




| | | | | |
|---|---|---|---|---|
| **42** | Semiannual | **RADIA-TOR** | **a.** Check radiator for leaks and bent or clogged cooling fins.<br>**b.** Check fan shroud for cracks and missing pieces. | **a.** Class III leak is evident. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **43** | Semiannual | **FUEL/ WATER SEPARA-TOR** | **a.** Inspect fuel/water separator assembly for dents and cracks that could cause leaks.<br><br>**b.** Deleted. | **a.** Any leak is evident. |

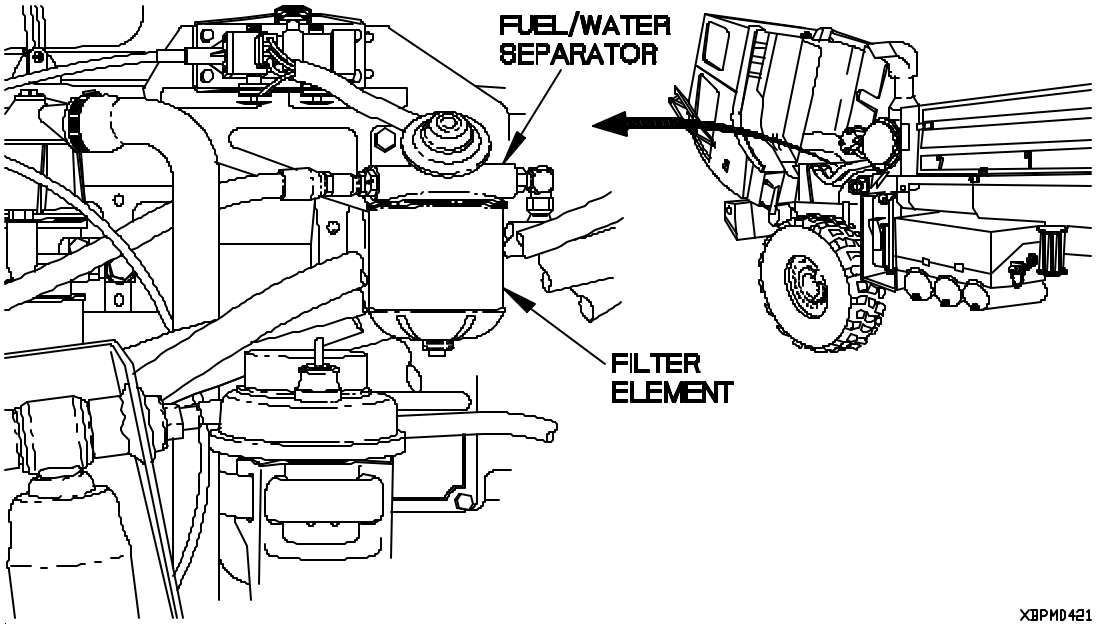
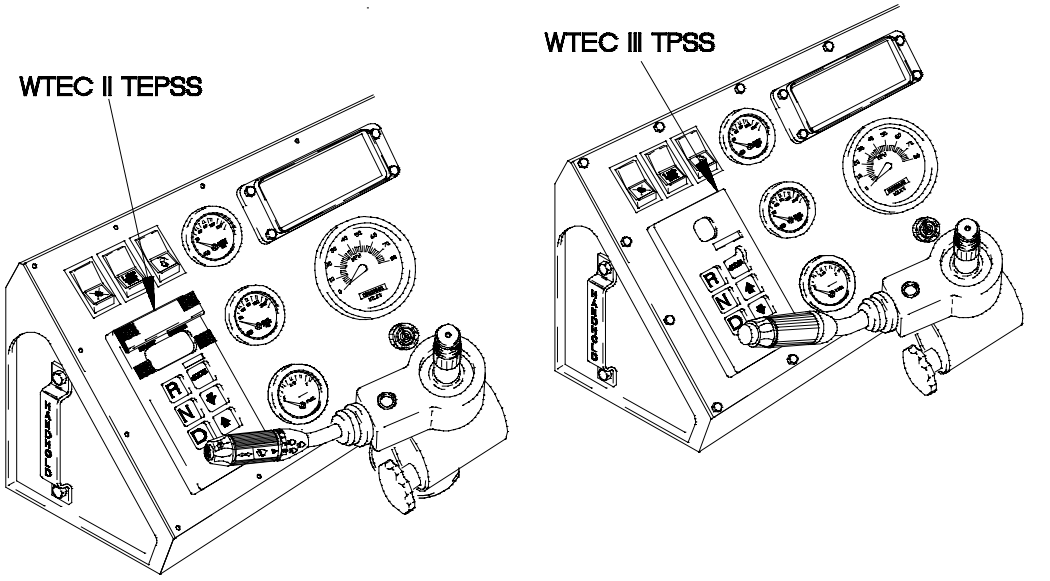


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **44** | Semiannual | **FRONT WHEEL ALIGN-MENT** | Check front wheel alignment (para 13-5). | Front wheels cannot be aligned. |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **45** | Semiannual | **TRANS-MISSION** | Check to see if any diagnostic codes are logged in WTEC II TEPSS (para 8-4) or WTEC III TPSS (para 8-5).<br><br>**a.** Perform Transmission Troubleshooting (para 2-17) for all diagnostic codes logged in WTEC II TEPSS or WTEC III TPSS.<br><br>**b.** Clear all diagnostic codes from WTEC II TEPSS (para 8-4) or WTEC III TPSS (para 8-5). | |




STEERING WHEEL REMOVED FOR CLARITY

3BPM0441

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **46** | Semiannual | **HYDRAULIC RESERVOIR (If Equipped)** | Inspect hydraulic reservoir for leaks, cracks, or dents. | Class III is evident. |

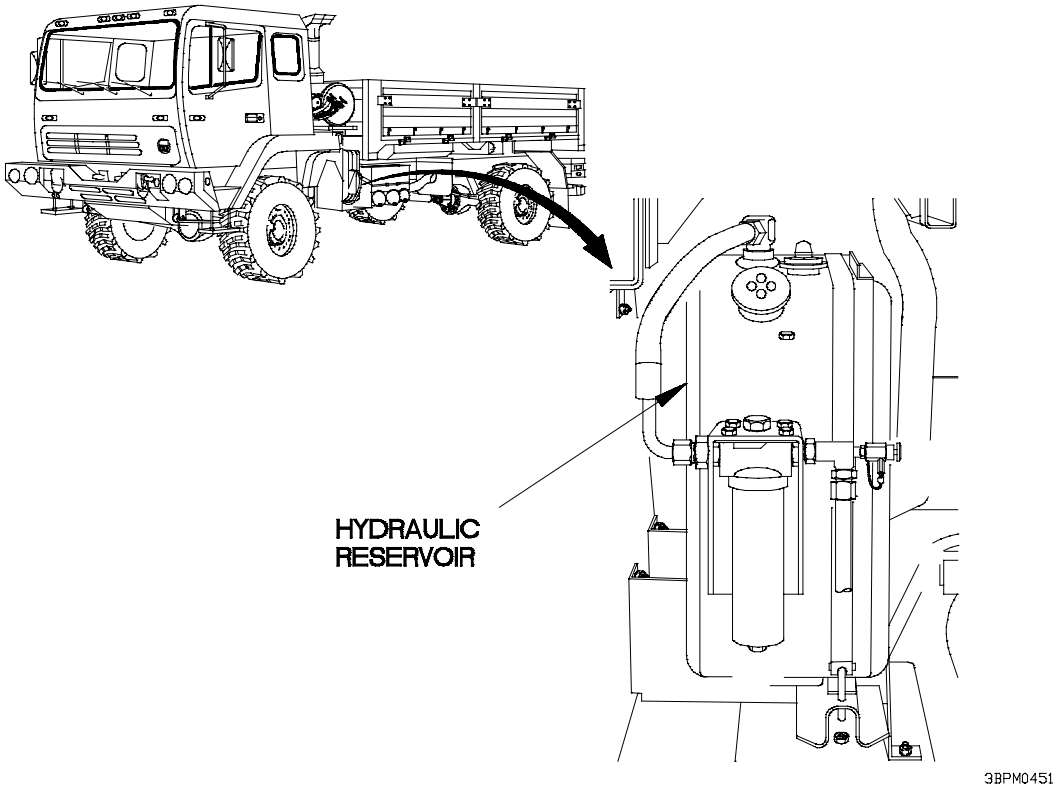
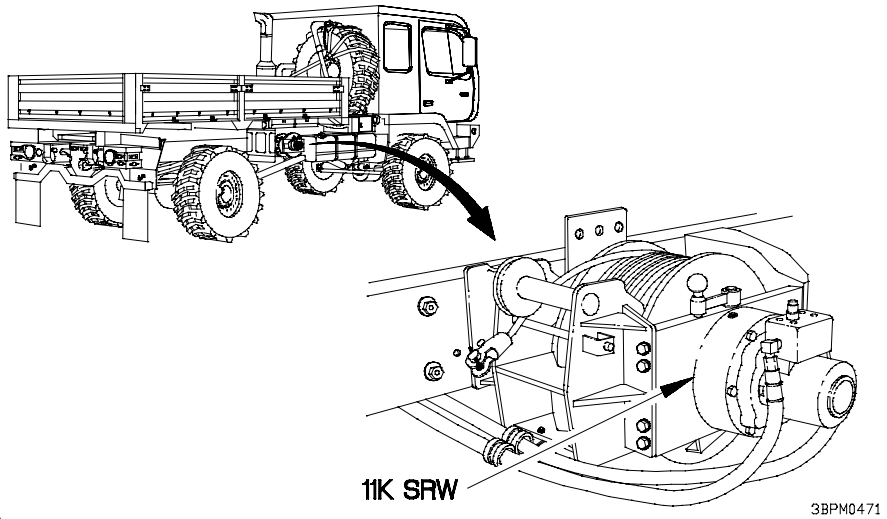
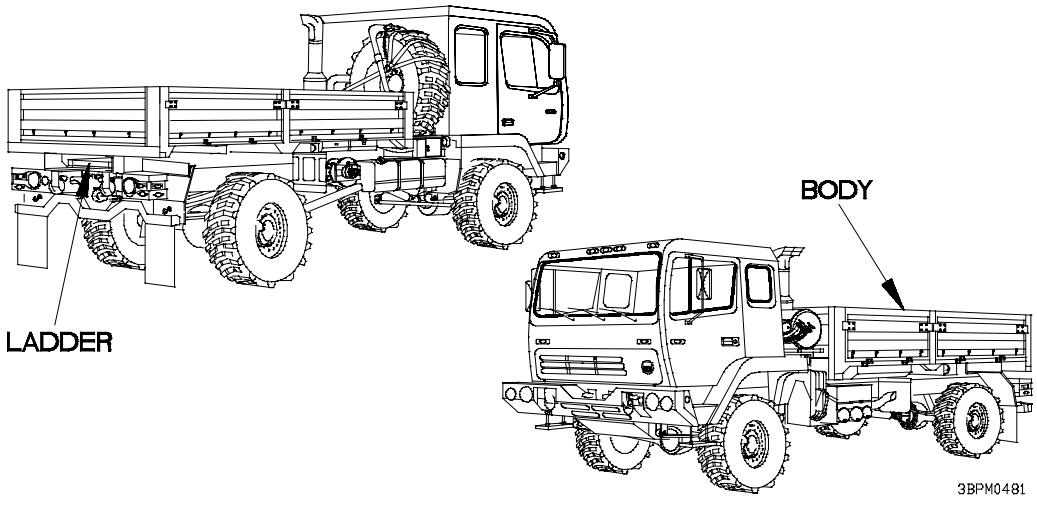


**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **47** | Deleted | | | |

**Table 2-1. Preventive Maintenance Checks and Services (Cont)**

| Item No. | Interval | Location Item to be Checked or Serviced | Procedure | Not Fully Mission Capable If: |
|---|---|---|---|---|
| **48** | Semiannual | **11K SRW** | Check security of 11K SRW mounting hardware. | Mounting hardware broken or missing. |
| | | |  | |
| **49** | Semiannual | **CARGO BODY** | **a.** Check cargo body for corrosion and damage.<br>**b.** Inspect ladder for damage and cracks. | |
| | | |  | |

# Section IV. TROUBLESHOOTING

## 2-10. INTRODUCTION TO LOGIC TREE TROUBLESHOOTING

This section contains step-by-step procedures for identifying, locating, isolating, and repairing equipment malfunctions.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

## 2-11. TROUBLESHOOTING INSTRUCTIONS

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

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

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

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

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

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

(e) **TEST OPTIONS** - This box is located in the top right-hand column. TEST OPTIONS lists tests available for testing parts suspected of failing. When the TEST OPTION is a VOLTAGE TEST, the voltage values listed are nominal values for a 12/24 VDC system. Some variation from these values should be expected. When the TEST OPTION is a CONTINUITY TEST, the expected reading is one of low resistance. If high resistance is noted, further testing should be performed to determine the cause.

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

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

## 2-11. TROUBLESHOOTING INSTRUCTIONS (CONT)

**b. How to Begin Troubleshooting.**

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

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

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

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

**WARNING**

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

**CAUTION**

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

**NOTE**

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

**c. Confidence Tests.** Before performing any STE/ICE-R test, a confidence test must be run to ensure proper operation of the STE/ICE-R. In addition, a confidence test must be performed after each use to ensure the STE/ICE-R is performing properly. Refer to TM 9-4910-571-12&P.

**d. Verifying Repair.** When troubleshooting, there is an additional step that must be performed after taking any corrective action. This step will show that the malfunction has been corrected, or that additional troubleshooting is required, example follows:

On malfunction q1. Wanders, pulls to one side, or shimmies; the question is asked "Are front shock absorbers secure and free from damage?". If the question was answered NO, the damaged shock absorber(s) was replaced. After replacing the damaged shock absorber(s), the vehicle must be checked to determine if the original malfunction is still present. If corrected, troubleshooting is completed. If malfunction is still present, continue troubleshooting.

# Table 2-2. Vehicle Troubleshooting


| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| **a. ENGINE SYSTEM TROUBLESHOOTING** | | |
| a1. | Engine Does Not Crank | 2-64 |
| a2. | Engine Cranks But Does Not Start | 2-68 |
| a3. | Low Engine Oil Pressure | 2-72 |
| a4. | Engine Stalls at Low RPM | 2-74 |
| a5. | Engine Overspeeds on Start | 2-80 |
| a6. | Too Much Engine Vibration | 2-82 |
| a7. | Coolant in Engine Lubrication Oil | 2-84 |
| a8. | Excessive Engine Oil Consumption | 2-86 |
| a9. | Engine Overheats | 2-90 |
| a10. | Excessive Black or Gray Exhaust Smoke | 2-92 |
| a11. | White Exhaust Smoke | 2-96 |
| a12. | Low Engine Power | 2-100 |
| **b. FUEL SYSTEM TROUBLESHOOTING** | | |
| b1. | Engine Cranks But Does Not Start or Engine Stalls After Starting | 2-102 |
| b2. | Ether Starting Aid Does Not Operate | 2-108 |
| b3. | Fuel Consumption Too High | 2-112 |
| b4. | Accelerator Pedal Sticks | 2-114 |
| **c. EXHAUST SYSTEM TROUBLESHOOTING** | | |
| c1. | Exhaust System Unusually Noisy or Vibrates Excessively During Engine Operation | 2-120 |
| c2. | Exhaust Fumes in Cab | 2-124 |
| **d. COOLING SYSTEM TROUBLESHOOTING** | | |
| d1. | Engine Overheats | 2-130 |
| d2. | Oil in Cooling System | 2-142 |
| d3. | Loss of Coolant | 2-144 |
| **e. ELECTRICAL SYSTEM TROUBLESHOOTING** | | |
| e1. | Circuit Breaker Does Not Operate | 2-150 |
| e2. | Engine Does Not Crank | 2-154 |
| e3. | 12 VDC and/or 24 VDC Circuits Do Not Operate | 2-254 |
| e4. | 24 VDC Circuits Do Not Operate | 2-258 |
| e5. | Deleted | |
| e6. | Engine Cranks But Does Not Start | 2-300 |
| e7. | FUEL Gage Does Not Operate or Is Inaccurate | 2-308 |
| e8. | WATER TEMP Gage Does Not Operate or Is Inaccurate | 2-314 |
| e9. | REAR BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate | 2-318 |
| e10. | FRONT BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate | 2-322 |

## Table 2-2. Vehicle Troubleshooting (Cont)


| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| **e. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT)** | | |
| e11. | Engine Oil Pressure Gage Does Not Operate or Is Inaccurate | 2-326 |
| e12. | Speedometer Does Not Operate or Is Inaccurate | 2-332 |
| e13. | VOLTS Gage Does Not Operate or Is Inaccurate | 2-346 |
| e14. | Tachometer Does Not Operate or Is Inaccurate | 2-348 |
| e15. | Audible Alarm Does Not Operate | 2-358 |
| e16. | Troop Transport Audible Alarm Does Not Operate | 2-362 |
| e16A. | Master Power Switch Does Not Shut Down Engine | 2-370.4 |
| e16B. | Lamp Test Switch Does Not Illuminate | 2-370.10 |
| e17. | Radiator Fan Off Switch Does Not Illuminate | 2-372 |
| e17A. | Ether Start Switch Does Not Illuminate | 2-376 |
| e17B. | Hazard Lights Switch Does Not Illuminate | 2-376.4 |
| e17C. | Amber Warning Light Switch Does Not Illuminate | 2-376.8 |
| e17D. | Master Power Switch Does Not Illuminate | 2-376.12 |
| e18. | REAR BRAKE AIR Gage Does Not Illuminate | 2-378 |
| e18A. | FUEL Gage Does Not Illuminate | 2-380.2 |
| e18B. | FRONT BRAKE AIR Gage Does Not Illuminate | 2-380.6 |
| e18C. | Speedometer Does Not Illuminate | 2-380.10 |
| e18D. | VOLTS Gage Does Not Illuminate | 2-380.14 |
| e18E. | WATER TEMP Gage Does Not Illuminate | 2-380.18 |
| e19. | OIL PRESS Gage Does Not Illuminate | 2-382 |
| e20. | Auxiliary Panel, Personnel Heater, and Instrument Panel Do Not Illuminate | 2-386 |
| e21. | Tachometer Does Not Illuminate | 2-390 |
| e22. | Auxiliary Panel Switch Does Not Illuminate | 2-394 |
| e23. | Auxiliary Panel Does Not Illuminate | 2-398 |
| e24. | High Engine Temperature Indicator Does Not Operate | 2-402 |
| e24A. | High Engine Temperature Indicator Illuminates | 2-408.2 |
| e25. | CTIS Overspeed Indicator Does Not Operate | 2-410 |
| e26. | Chemical Detector Indicator Does Not Operate | 2-424 |
| e27. | Left Turn Signal Indicator Does Not Operate | 2-428 |
| e28. | Right Turn Signal Indicator Does Not Operate | 2-432 |
| e29. | Turn Signal Indicators and High Beams On Indicator Do Not Operate | 2-438 |
| e30. | High Beams Indicator Does Not Operate | 2-440 |
| e31. | Parking Brake Indicator and/or Emergency Brake Indicator Does Not Illuminate | 2-444 |
| e32. | PTO Indicator Does Not Operate | 2-460 |
| e33. | Fan Off Indicator Does Not Operate | 2-472 |
| e34. | WTEC II Transmission Temperature Indicator Does Not Operate | 2-478 |
| e35. | WTEC III Transmission Temperature Indicator Does Not Operate | 2-486 |
| e36. | Front Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI | 2-492 |
| e37. | Rear Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI | 2-498 |
| e38. | Engine Oil Pressure Indicator Does Not Operate | 2-504 |
| e39. | Master Stop Indicator Does Not Operate | 2-510 |
| e40. | One or Both Headlights (High and Low Beams) Do Not Illuminate | 2-512 |
| e41. | One or Both Headlight Low Beams Do Not Illuminate | 2-520 |
| e42. | One or Both Headlight High Beams Do Not Illuminate | 2-526 |
| e43. | Parking Lights Do Not Illuminate | 2-534 |
| e44. | LH Door and/or LH Front Marker Lights Do Not Illuminate | 2-542 |
| e45. | RH Door and/or RH Front Marker Lights Do Not Illuminate | 2-552 |
| e46. | One or More Cab Top Marker Lights Do Not Illuminate | 2-562 |

| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| e47. | Side and/or Rear Marker Lights Do Not Illuminate | 2-576 |
| e47A. | All Marker Lights Do Not Illuminate In Normal Mode | 2-584.52 |
| e48. | One or Both Composite Taillights Do Not Illuminate | 2-586 |
| e49. | One or Both Front Blackout Marker Lights Do Not Illuminate | 2-596 |
| e50. | Blackout Drive Light Does Not Illuminate | 2-606 |
| e51. | One or Both Rear Blackout Marker Lights Do Not Illuminate | 2-616 |
| e52. | Warning Light Does Not Illuminate | 2-626 |
| e53. | Backup Light Does Not Illuminate | 2-638 |
| e54. | Blackout Marker Lights Do Not Illuminate | 2-676 |
| e54A. | Front Hazard Lights Do Not Illuminate | 2-678 |
| e55. | Rear Hazard Lights Do Not Illuminate | 2-680 |
| e56. | Front and Rear Hazard Lights Do Not Illuminate | 2-682 |
| e57. | Front and Rear Turn Signals Do Not Operate | 2-690 |
| e58. | Left or Right Front Turn Signals Do Not Operate | 2-702 |
| e59. | One or Both Stoplights Do Not Illuminate | 2-710 |
| e60. | One or Both Blackout Stoplights Do Not Illuminate | 2-728 |
| e61. | Stoplights and Blackout Stoplights Do Not Operate | 2-740 |
| e62. | Trailer Marker/Taillights Do Not Illuminate | 2-750 |
| e63. | Trailer Right Stop/Turn Light Does Not Illuminate | 2-760 |
| e64. | Trailer Left Stop/Turn Light Does Not Illuminate | 2-770 |
| e65. | Trailer Blackout Marker Lights Do Not Illuminate | 2-780 |
| e66. | Trailer Blackout Stoplights Do Not Illuminate | 2-790 |
| e67. | Intervehicle Clearance Lights Do Not Operate | 2-800 |
| e68. | Intervehicle Left Turn Signal Does Not Illuminate | 2-804 |
| e69. | Intervehicle Right Turn Signal Does Not Illuminate | 2-810 |
| e70. | Intervehicle Stoplights Do Not Illuminate | 2-816 |
| e71. | Intervehicle Taillights Do Not Operate | 2-822 |
| e72. | Personnel Heater Control Illumination Does Not Operate | 2-826 |
| e73. | Personnel Heater Fan Does Not Operate | 2-832 |
| e74. | Windshield Washer Does Not Operate | 2-838 |
| e75. | Windshield Wiper Does Not Operate On Low Speed | 2-850 |
| e76. | All Windshield Wiper Speeds Do Not Operate | 2-858 |
| e77. | Windshield Wiper Does Not Operate On Intermittent Speed | 2-864 |
| e78. | Windshield Wiper Does Not Operate On High Speed | 2-874 |
| e79. | Horn Does Not Operate | 2-880 |
| e80. | Chemical Alarm Does Not Operate | 2-892 |
| e81. | Chemical Detector Does Not Operate | 2-900 |
| e82. | Central Tire Inflation System (CTIS) Does Not Operate | 2-906 |
| e83. | CTIS Does Not Inflate Tires | 2-920 |
| e84. | CTIS Does Not Deflate Tires | 2-930 |
| e85. | 11K Self-Recovery Winch (SRW) Does Not Reel In or Pay Out | 2-940 |
| e86. | 11K Self-Recovery Winch (SRW) Does Not Reel In | 2-946 |
| e87. | 11K Self-Recovery Winch (SRW) Does Not Pay Out | 2-958 |
| e88. | PTO Does Not Operate | 2-970 |
| e89. | Electrical System Does Not Maintain a Charge | 2-1010 |
| e90. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Illumination Does Not Dim | 2-1018 |
| e91. | Engine Fan Runs Constantly | 2-1028 |
| e92. | Engine Fan Does Not Turn Off Using Radiator Fan Off Switch | 2-1036 |
| e93. | Ether Start Does Not Operate | 2-1044 |
| e94. | Excessive Condensation In Fuel | 2-1060 |
| e95. | Radio Does Not Operate | 2-1064 |
| e96. | Start Inhibit Pushbutton Does Not Operate | 2-1070 |

## Table 2-2. Vehicle Troubleshooting (Cont)


| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| **e. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT)** | | |
| e97. | Air Dryer Does Not Operate | 2-1076 |
| e98. | Battery Tester Does Not Operate | 2-1082 |
| **Volume 2** | | |
| e99. | M1079 Fan Does Not Operate | 2-1088 |
| e100. | All M1079 Van Body Marker Lights Do Not Operate | 2-1100 |
| e101. | M1079 Van Body Clearance Marker Light Does Not Illuminate | 2-1104 |
| e102. | All M1079 Fluorescent Lights Do Not Operate | 2-1108 |
| e103. | M1079 Lighting Fixture(s) DS80 and/or DS81 Do Not Operate | 2-1118 |
| e104. | M1079 Lighting Fixture(s) DS82 and/or DS83 Do Not Operate | 2-1134 |
| e105. | M1079 110 VAC Outlet J233 Does Not Operate | 2-1152 |
| e106. | M1079 110 VAC Outlet J234 Does Not Operate | 2-1160 |
| e107. | M1079 110 VAC Outlet J235 Does Not Operate | 2-1168 |
| e108. | M1079 110 VAC Outlet J232 Does Not Operate in Normal Mode | 2-1176 |
| e109. | M1079 110 VAC Outlet J232 and J233 Do Not Operate in Blackout Override Mode | 2-1190 |
| e110. | M1079 110 VAC Outlet J231 Does Not Operate | 2-1194 |
| e111. | M1079 110 VAC Outlet J230 Does Not Operate | 2-1208 |
| e112. | M1079 Blackout Light(s) Does Not Operate | 2-1222 |
| e113. | M1079 Emergency Light(s) Does Not Illuminate | 2-1230 |
| e114. | M1079 Field Phone 1 and/or 2 Binding Post Does Not Operate | 2-1244 |
| e115. | M1079 Air Conditioner Does Not Operate | 2-1264 |
| e116. | M1079 Heater Does Not Operate | 2-1276 |
| e117. | M1079 24 VDC Binding Post(s) Does Not Operate | 2-1296 |
| e118. | M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate | 2-1324 |
| e119. | M1079 110 VAC Power Does Not Operate | 2-1338 |
| e120. | M1079 Fluorescent Lights Do Not Operate In Blackout Override Mode | 2-1352 |
| **f. TRANSMISSION SYSTEM TROUBLESHOOTING** | | |
| f1. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Emits Eight Seconds of Beeps and/or Transmission Does Not Shift Gears | 2-1362 |
| f2. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 14 | 2-1364 |
| f3. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 | 2-1372 |
| f4. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16 | 2-1378 |
| f5. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 24 and/or 33 and Any Sub Code | 2-1384 |
| f6. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code | 2-1396 |
| f7. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 41, 42, 44, 45, 66, and/or 69 and Any Sub Code | 2-1400 |
| f8. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 43 and Any Sub Code | 2-1404 |

| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| f9. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 52 and Any Sub Code | 2-1410 |
| f10. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 57 and Any Sub Code | 2-1416 |
| f11. | Transmission Unusually Noisy When Operating | 2-1420 |
| f12. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 21 and Any Sub Code | 2-1430 |
| f13. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 51 Sub Code 10, 12, 21, 43, 45, or 65 | 2-1444 |
| f14. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 25 and Any Sub Code | 2-1448 |
| f15. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 53 and Any Sub Code | 2-1452 |
| f16. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 54 Sub Code 01, 07, 10, 12, 17, 21, 23, 27, 32, 34, 43, 45, 54, 56, 65, 70, 71, 72, 80, 81, 82, 83, 85, 86, 92, 93, 95, 96, or 97 | 2-1456 |
| f17. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 55 and Any Sub Code | 2-1462 |
| f18. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 56 and Any Sub Code | 2-1468 |
| f19. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 13 and Any Sub Code | 2-1474 |
| f19A. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 23 and Any Sub Code | 2-1482.2 |
| f19B. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Does Not Illuminate | 2-1482.16 |
| f20. | Metal Particles Found During Transmission Oil Change | 2-1484 |
| f21. | Transmission Does Not Shift or is Slow To Shift When Cold | 2-1486 |
| f22. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 14 | 2-1488 |
| f23. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 | 2-1494 |
| f24. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16 | 2-1498 |
| f25. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 24 and/or 33 and Any Sub Code | 2-1504 |
| f26. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 32 and Any Sub Code | 2-1516 |
| f27. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 42, 44, 45, 46, 66, and/or 69 and Any Sub Code | 2-1522 |
| f28. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 52 and Any Sub Code | 2-1526 |
| f29. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 57 and Any Sub Code | 2-1532 |
| f30. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 21 and Any Sub Code | 2-1536 |
| f31. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 51 and Any Sub Code | 2-1550 |
| f32. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 25 and Any Sub Code | 2-1554 |
| f33. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 53 and Any Sub Code | 2-1558 |

## Table 2-2. Vehicle Troubleshooting (Cont)


| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| **f. TRANSMISSION SYSTEM TROUBLESHOOTING (CONT)** | | |
| f34. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 54 and Any Sub Code | 2-1562 |
| f35. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 55 and Any Sub Code | 2-1568 |
| f36. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 56 and Any Sub Code | 2-1574 |
| f37. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 13 and Any Sub Code | 2-1580 |
| f38. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Indicator Displays "--" and/or Transmission Does Not Shift Gears | 2-1594 |
| f39. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 23 and Any Sub Code | 2-1596 |
| f40. | WTEC III Transmission Pushbutton Shift Selector (TPSS) Does Not Illuminate | 2-1596.12 |
| **g. PROPELLER SHAFT TROUBLESHOOTING** | | |
| g1. | Drive Shaft or Universal Joint Unusually Noisy When Operating | 2-1598 |
| **h. POWER TAKE OFF (PTO) TROUBLESHOOTING** | | |
| h1. | PTO Does Not Engage | 2-1604 |
| **i. BRAKE SYSTEM TROUBLESHOOTING** | | |
| i1. | Excessive Braking Distance | 2-1608 |
| i2. | Rear Brakes Do Not Apply | 2-1620 |
| i3. | Parking Brake Does Not Release | 2-1644 |
| i4. | Front Brakes Overheat and/or Do Not Release | 2-1670 |
| i5. | Vehicle Brakes Unevenly, Brakes Pull to One Side or Grab | 2-1676 |
| i6. | Front Brakes Do Not Apply | 2-1690 |
| i7. | Rear Brakes Overheat | 2-1700 |
| i8. | Parking Brake Does Not Apply | 2-1708 |
| i9. | Brake System Loses Air When Brakes Are Applied | 2-1712 |
| **j. AIR SYSTEM TROUBLESHOOTING** | | |
| j1. | Air System Loses Pressure During Operation/Slow, No, or Incorrect Air Pressure Buildup | 2-1714 |
| j2. | Large Quantity of Moisture Expelled From Air Reservoirs | 2-1730 |
| j3. | Air Dryer Purges Constantly | 2-1734 |
| j4. | No Air Pressure Present at Rear Gladhands | 2-1738 |
| j5. | Air System Pressure Builds Up More Than 120 PSI (827 kPa) (Compressor Fails to Unload) | 2-1744 |
| j6. | Noisy Air Compressor Operation | 2-1748 |
| **k. WHEEL TROUBLESHOOTING** | | |
| k1. | Tires Wear Unevenly or Excessively | 2-1754 |
| k2. | Wheel Wobbles or Shimmies | 2-1758 |

| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|

## l. HYDRAULIC SYSTEM TROUBLESHOOTING

| | | |
|---|---|---|
| l1. | Loss of Hydraulic Pressure (Single Stage Pump) | 2-1762 |

## m. CENTRAL TIRE INFLATION SYSTEM (CTIS) TROUBLESHOOTING

| | | |
|---|---|---|
| m1. | Two Steady Mode Lights Illuminate on Central Tire Inflation System (CTIS) ECU | 2-1768 |
| m2. | Four CTIS ECU Indicator Lights Flashing | 2-1798 |
| m3. | Five Central Tire Inflation System (CTIS) ECU Indicator Lights Flashing | 2-1822 |
| m4. | CTIS Repeatedly Resumes Cycling 30 Seconds After Indicator Lights Stop Flashing | 2-1856 |
| m5. | Central Tire Inflation System (CTIS) ECU Indicates No Fault Code But Fails to Inflate or Deflate | 2-1862 |
| m6. | No Overspeed Warning Light and/or Overspeed Pressure Change | 2-1874 |

## n. AXLE TROUBLESHOOTING

| | | |
|---|---|---|
| n1. | Axle Differential(s) Noisy | 2-1896 |

## p. STEERING TROUBLESHOOTING

| | | |
|---|---|---|
| p1. | Hard to Steer | 2-1904 |
| p2. | Wanders, Pulls to One Side, or Shimmies | 2-1910 |
| p3. | Excessive Play When Turning Steering Wheel | 2-1916 |
| p4. | No Response When Turning Steering Wheel | 2-1920 |

## q. SUSPENSION SYSTEM TROUBLESHOOTING

| | | |
|---|---|---|
| q1. | Wanders, Pulls to One Side, or Shimmies | 2-1926 |
| q2. | Leans to One Side or Rear of Vehicle Sags | 2-1940 |

## r. 11K SELF-RECOVERY WINCH (SRW) SYSTEM TROUBLESHOOTING

| | | |
|---|---|---|
| r1. | 11K Self-Recovery Winch (SRW) Does Not Work | 2-1946 |

## s. STEERING HYDRAULIC SYSTEM TROUBLESHOOTING

| | | |
|---|---|---|
| s1. | Steering Hard or Does Not Work | 2-1954 |

## t. AIR TRANSPORT TROUBLESHOOTING

| | | |
|---|---|---|
| t1. | Cab Tilt, Spare Tire Retainer, and Suspension Compression Do Not Operate | 2-1960 |
| t2. | Suspension Does Not Compress and/or Return to Normal | 2-1970 |
| t3. | Cab Leveling Air Springs Do Not Operate | 2-1972 |

## u. SPECIAL PURPOSE KIT TROUBLESHOOTING

| | | |
|---|---|---|
| u1. | No Power To Digitization Rack | 2-1978 |
| u2. | No Power To Mobile Tracking System (MTS) Sense | 2-1988 |
| u3. | No Power To Enhanced Position Location Reporting System (EPLRS) | 2-1994 |

## Table 2-2. Vehicle Troubleshooting (Cont)


| Malfunction | | Troubleshooting Procedure (Page) |
|---|---|---|
| **u. SPECIAL PURPOSE KIT TROUBLESHOOTING (CONT)** | | |
| u4. | No Power To Precision Lightweight Global Positioning System Receiver (PLGR) | 2-1998 |
| u5. | No Power To Drivers Visual Enhancement (DVE) | 2-2002 |
| u6. | No Power To SINCGAR/FORCE XXI Battle Command Brigade and Below (FBCB) | 2-2006 |
| u7. | No Power TO Mobile Tracking System (MTS) | 2-2010 |
| u8. | Deleted | |
| u9. | Deleted | |
| u10. | Deleted | |
| u11. | Deleted | |
| u12. | Deleted | |
| u13. | Deleted | |
| u14. | Deleted | |
| u15. | Deleted | |
| u16. | Deleted | |
| u17. | Deleted | |
| u18. | Troop Transport Alarm Does Not Operate | 2-2078 |
| u19. | Light Material Handling Crane (LMHC) Does Not Operate | 2-2088 |
| u20. | Light Material Handling Crane (LMHC) Hoist IN Does Not Operate | 2-2106 |
| u21. | Light Material Handling Crane (LMHC) Hoist OUT Does Not Operate | 2-2110 |
| **v. CAB TILT AND SPARE TIRE RETAINER TROUBLESHOOTING** | | |
| v1. | Cab Does Not Raise | 2-2116 |
| v2. | Cab Does Not Lower | 2-2116.8 |
| v3. | Spare Tire Retainer Does Not Raise | 2-2118 |
| v4. | Spare Tire Retainer Does Not Lower | 2-2118.6 |
| **w. FRAME TROUBLESHOOTING** | | |
| w1. | Tires Continue to Wear After Front End Alignment and/or Vehicle Drives Sideways Down Road | 2-2122 |

## 2-12. ENGINE SYSTEM TROUBLESHOOTING

This paragraph covers Engine System Troubleshooting. The Engine System Fault Index, Table 2-3, lists faults for the engine system of the vehicle.

***Table 2-3. Engine System Fault Index***


| Fault No. | Description | Page |
|---|---|---|
| a1. | Engine Does Not Crank | 2-64 |
| a2. | Engine Cranks But Does Not Start | 2-68 |
| a3. | Low Engine Oil Pressure | 2-72 |
| a4. | Engine Stalls at Low RPM | 2-74 |
| a5. | Engine Overspeeds on Start | 2-80 |
| a6. | Too Much Engine Vibration | 2-82 |
| a7. | Coolant in Engine Lubrication Oil | 2-84 |
| a8. | Excessive Engine Oil Consumption | 2-86 |
| a9. | Engine Overheats | 2-90 |
| a10. | Excessive Black or Gray Exhaust Smoke | 2-92 |
| a11. | White Exhaust Smoke | 2-96 |
| a12. | Low Engine Power | 2-100 |

## a1. ENGINE DOES NOT CRANK

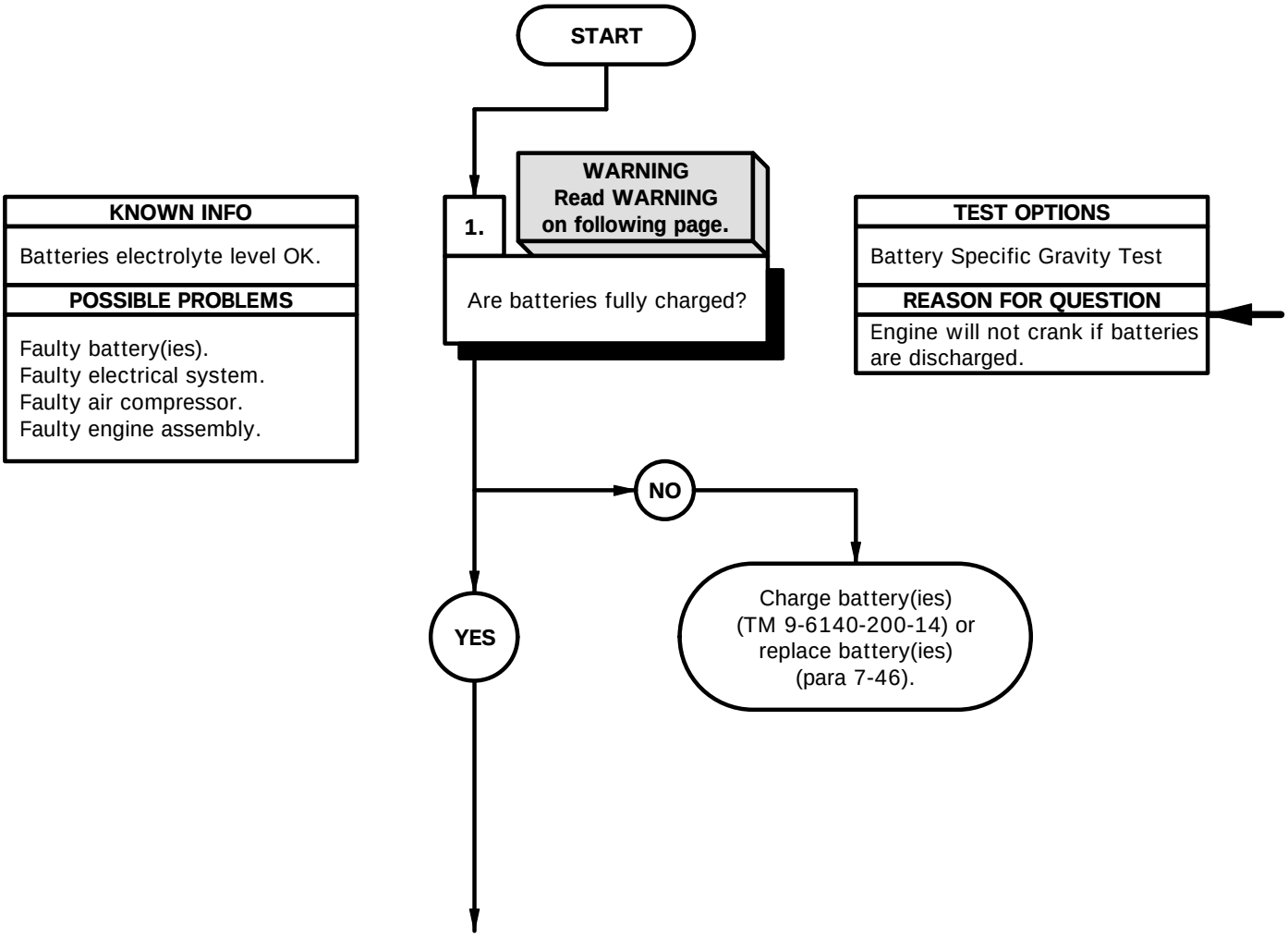
**INITIAL SETUP**

**Equipment Conditions**
Engine shutdown (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-6140-200-14
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Apron, Rubber (Item 3, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Tester, Antifreeze and Battery (Item 41, Appendix C)



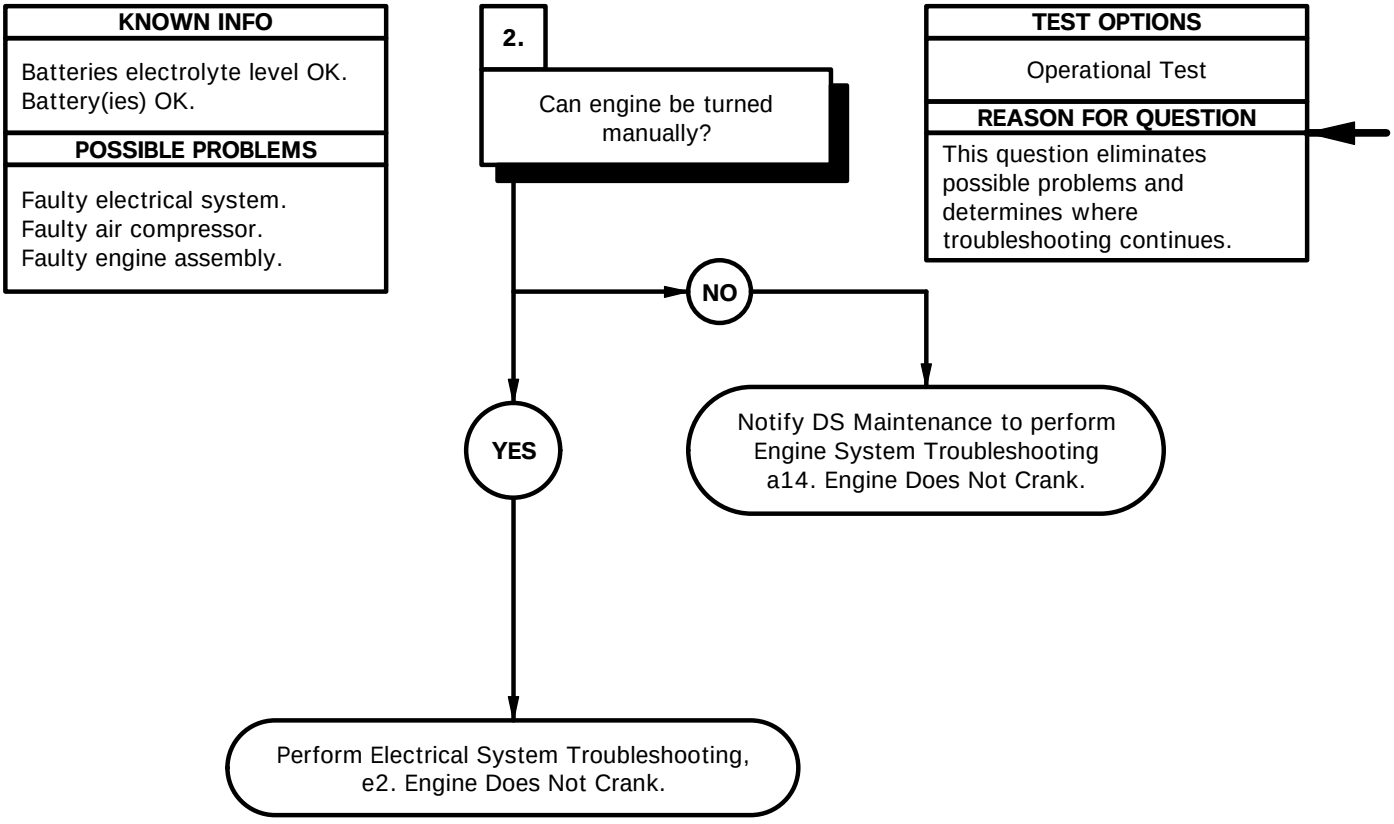
**WARNING**

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

**Battery Specific Gravity Test**

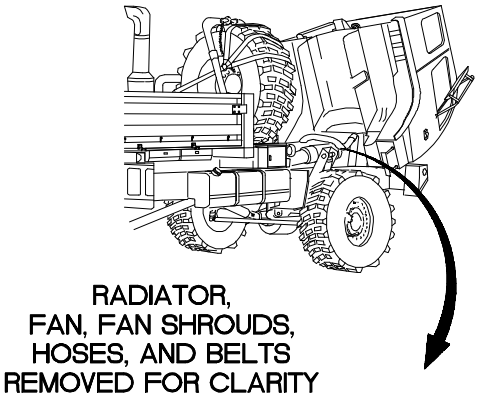
(1) Remove battery box cover from battery box (TM 9-2320-365-10).
(2) Remove four batteries from battery box (para 7-46).
(3) Test batteries for serviceability (TM 9-6140-200-14).
(4) Charge battery(ies) if discharged (TM 9-6140-200-14).
(5) Replace battery(ies) if unserviceable (TM 9-6140-200-14).
(6) Install four batteries in battery box (para 7-46).
(7) Install battery box cover on battery box (TM 9-2320-365-10).

## a1. ENGINE DOES NOT CRANK (CONT)

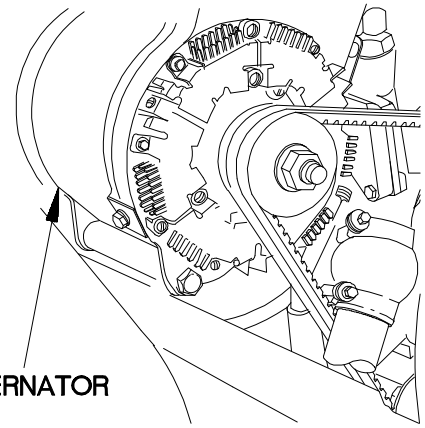


**OPERATIONAL TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Attempt to rotate engine by turning alternator pulley.
(3) If engine can not be turned manually, notify DS Maintenance to perform Engine System Troubleshooting task a14. Engine Does Not Crank.
(4) If engine can be turned manually, perform Electrical System Troubleshooting, e2. Engine Does Not Crank.
(5) Lower cab (TM 9-2320-365-10).



RADIATOR,
FAN, FAN SHROUDS,
HOSES, AND BELTS
REMOVED FOR CLARITY




Xba0101b

## a2. ENGINE CRANKS BUT DOES NOT START

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)

**References**
TM 9-4910-571-12&P

**KNOWN INFO**

Fuel quantity OK.
Fuel/water separator is primed.

**POSSIBLE PROBLEMS**

Air cleaner hose or tube restricted or damaged.
Faulty fuel system.
Faulty electrical system.

START

1. Are air cleaner tube and hose free from restrictions and/or damage?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

Restricted or damaged air cleaner hose or tube may cause engine not to intake enough air to ignite fuel.

NO → Remove restrictions and damaged air cleaner hose or tube (para 4-2).

YES

**KNOWN INFO**

Fuel quantity OK.
Fuel/water separator is primed.
Air cleaner hose or tube OK.

**POSSIBLE PROBLEMS**

Faulty fuel system.
Faulty electrical system.

**WARNING**
**Read WARNING on following page.**

2. Does fuel flow from fuel return hose?

**TEST OPTIONS**

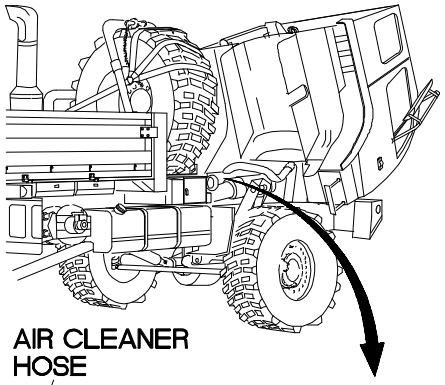
Fuel Return Hose Test

**REASON FOR QUESTION**

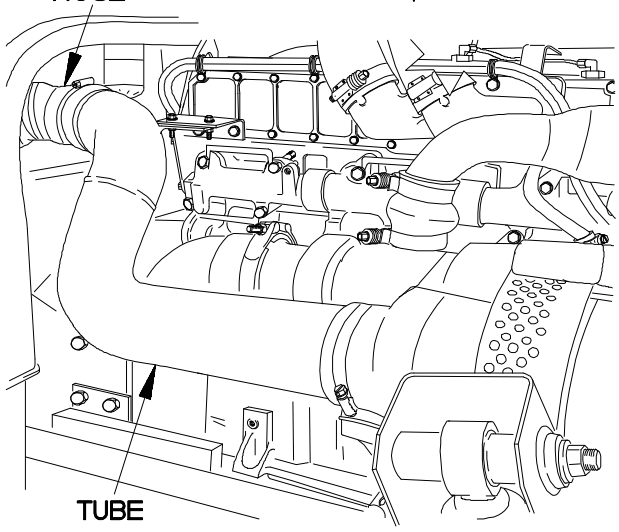
If fuel does not flow from fuel return hose, fuel system is faulty. If fuel does flow from fuel return hose, electrical system is faulty.

NO → Perform Fuel System Troubleshooting task b1. Engine Cranks But Does Not Start or Engine Stalls After Starting.

YES → Perform Electrical System Troubleshooting task e6. Engine Cranks But Does Not Start.




(1) Raise cab (TM 9-2320-365-10).
(2) Remove air cleaner hose and tube and inspect for restrictions and damage which would cause a loss of intake air (para 4-2).
(3) Lower cab (TM 9-2320-365-10).




**WARNING**

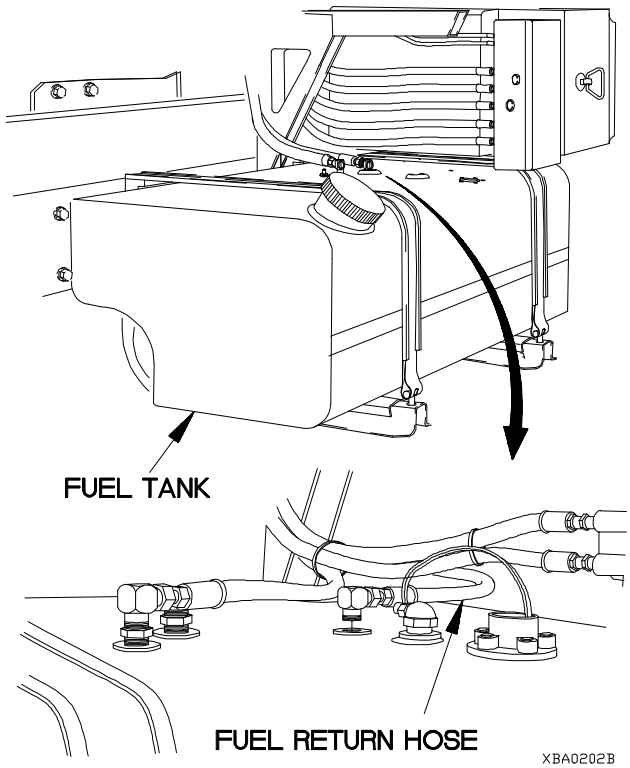
**Fuel is very flammable and can explode easily. To avoid serious injury or death, keep flame away from fuel and keep fire extinguisher within easy reach. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET OF VEHICLE.**

**FUEL RETURN HOSE TEST**

(1) Position drain pan under fuel tank.
(2) Remove fuel return hose from fuel tank.
(3) Place fuel hose in drain pan.

**NOTE**
Fuel should flow freely from fuel hose with no restriction.

(4) Attempt to start engine (TM 9-2320-365-10) and observe fuel flow from fuel return hose.
(5) If fuel does not flow from fuel return hose, perform Fuel System Troubleshooting task b1. Engine Cranks But Does Not Start or Engine Stalls After Starting.
(6) If fuel does flow from fuel return hose, perform Electrical System Troubleshooting task e6. Engine Cranks But Does Not Start.
(7) Install fuel return hose on fuel tank.




**All data on pages 2-70 and 2-71 deleted.**

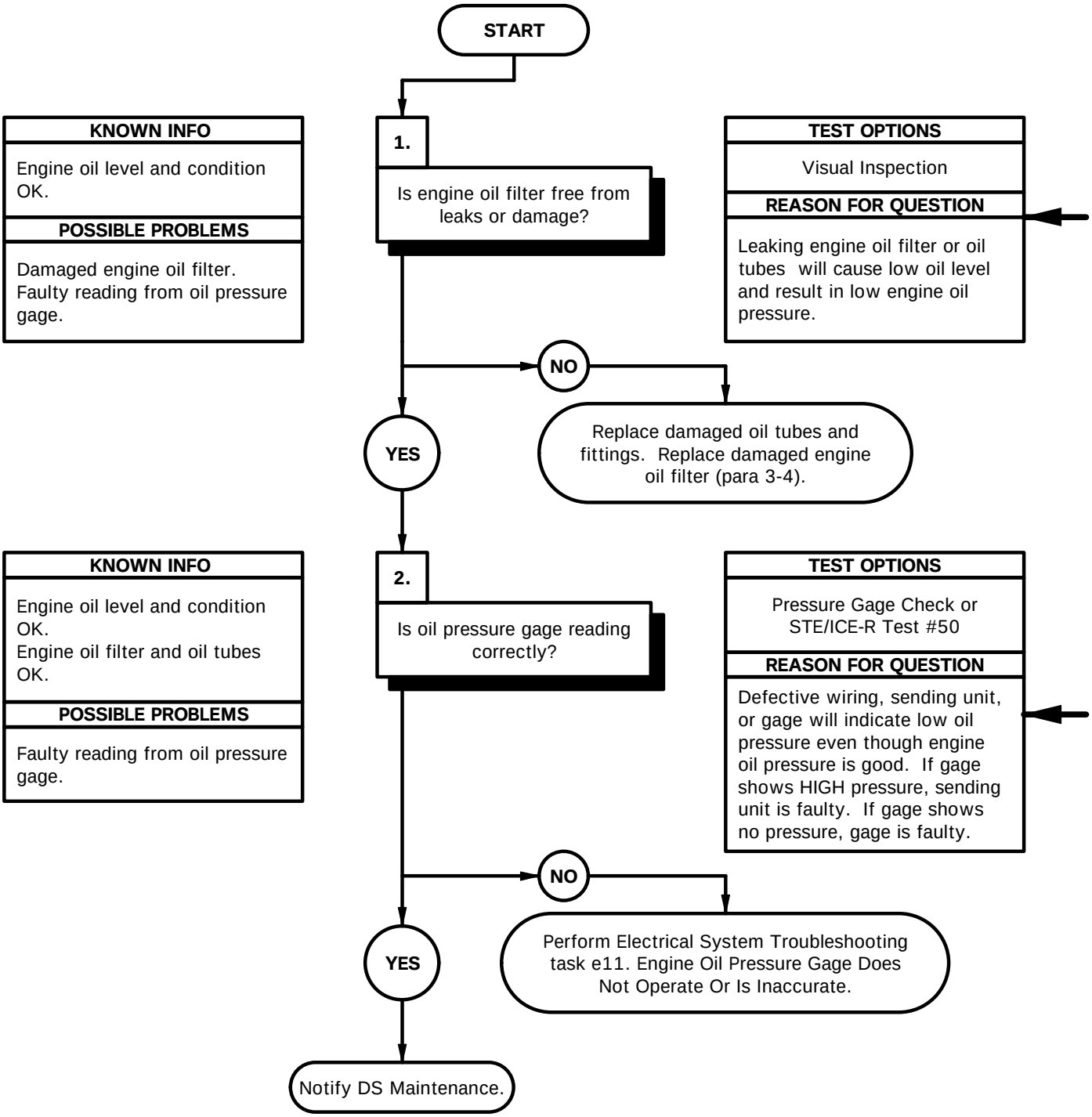
## a3. LOW ENGINE OIL PRESSURE

**INITIAL SETUP**

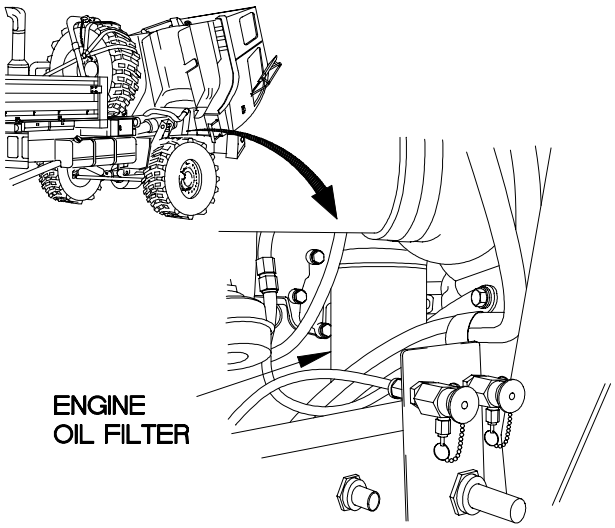
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)

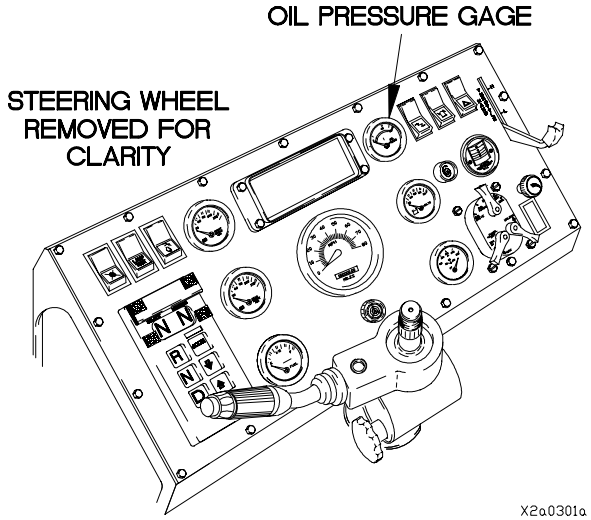


(1) Raise cab (TM 9-2320-365-10).
(2) Check engine oil filter for leaks and damage.
(3) If engine oil filter is not free from leaks and damage, replace engine oil filter (para 3-4).




**PRESSURE GAGE CHECK**

(1) Lower cab (TM 9-2320-365-10).
(2) Start engine (TM 9-2320-365-10).
(3) Perform STE/ICE-R test #50.
(4) Oil pressure gage should read 15 PSI (100 kPa) at 750 RPM and maximum at full load condition of 88 PSI (600 kPa).
(5) If oil pressure gage does not read correctly, perform Electrical System Troubleshooting task e11. Engine Oil Pressure Gagae Does Not Operate Or Is Inaccurate.
(6) If oil pressure gage reads correctly, notify DS Maintenance.
(7) Shut down engine (TM 9-2320-365-10).



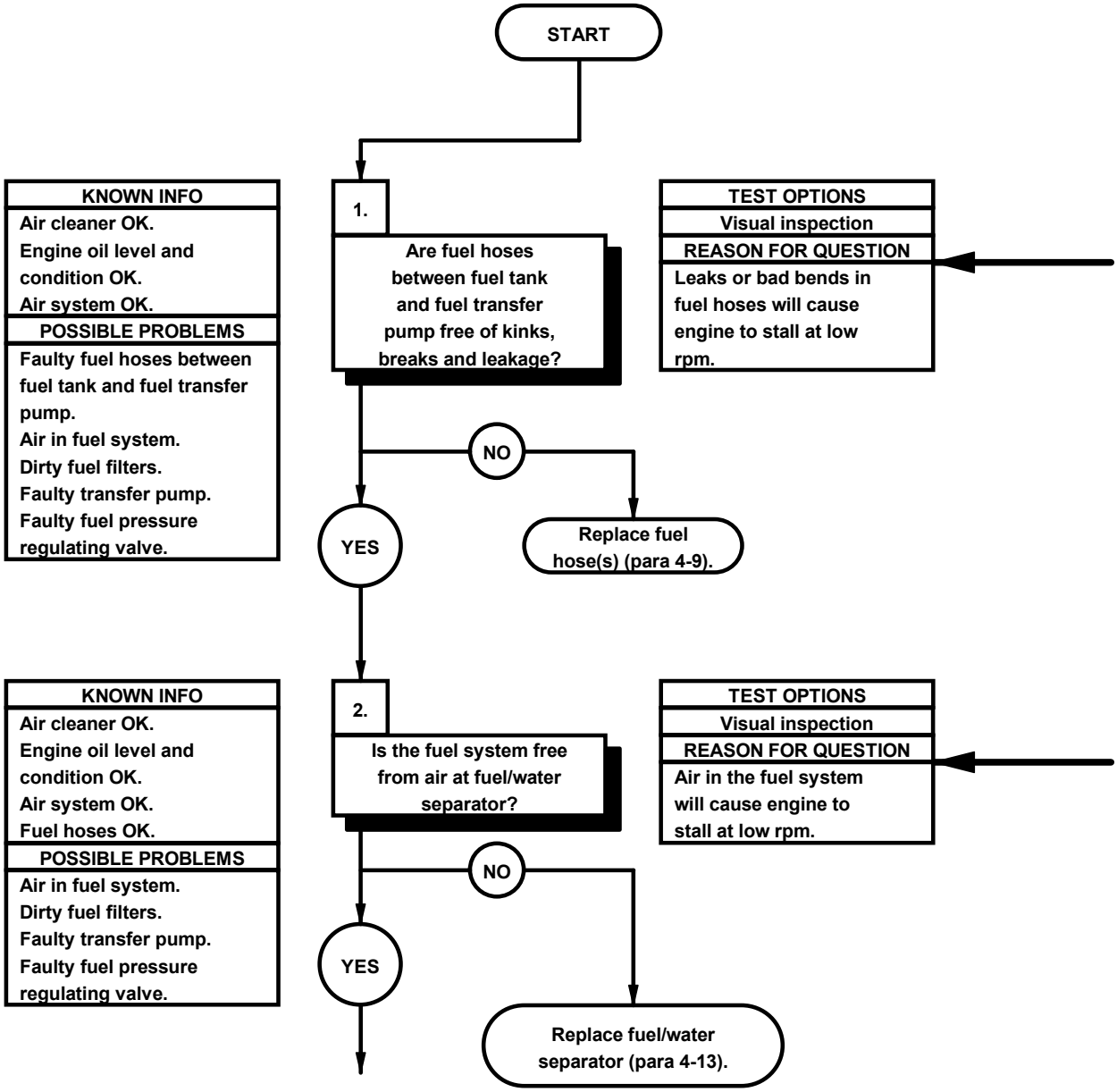
**a4. ENGINE STALLS AT LOW RPM**

**INITIAL SETUP**

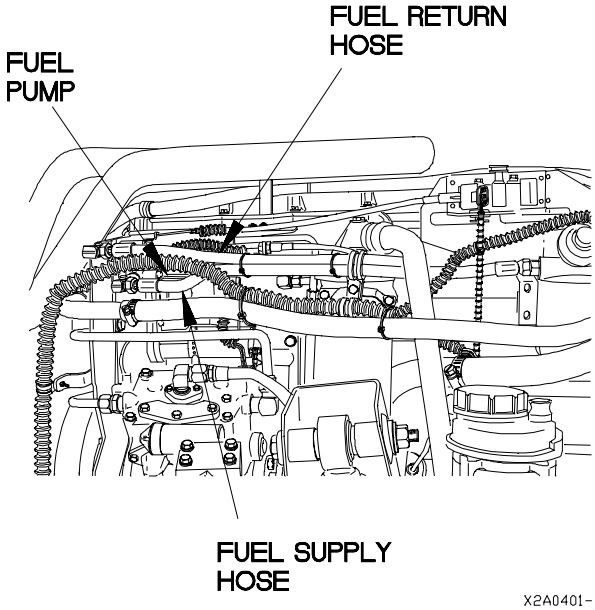
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**References**
TM 9-4910-571-12&P

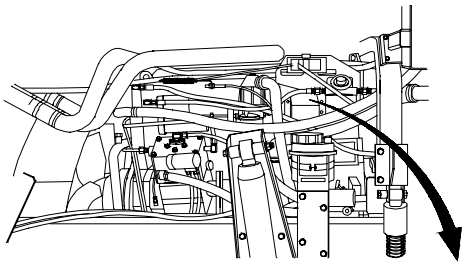
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)

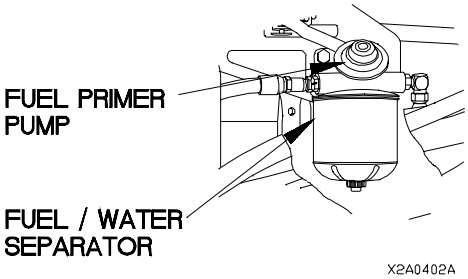


(1) Raise cab (TM 9-2320-365-10).
(2) Check fuel tank and fuel transfer pump hoses for kinks, looseness, and leakage.
(3) If fuel hoses are not free from kinks or leaks, replace fuel hose(s) (para 4-9).

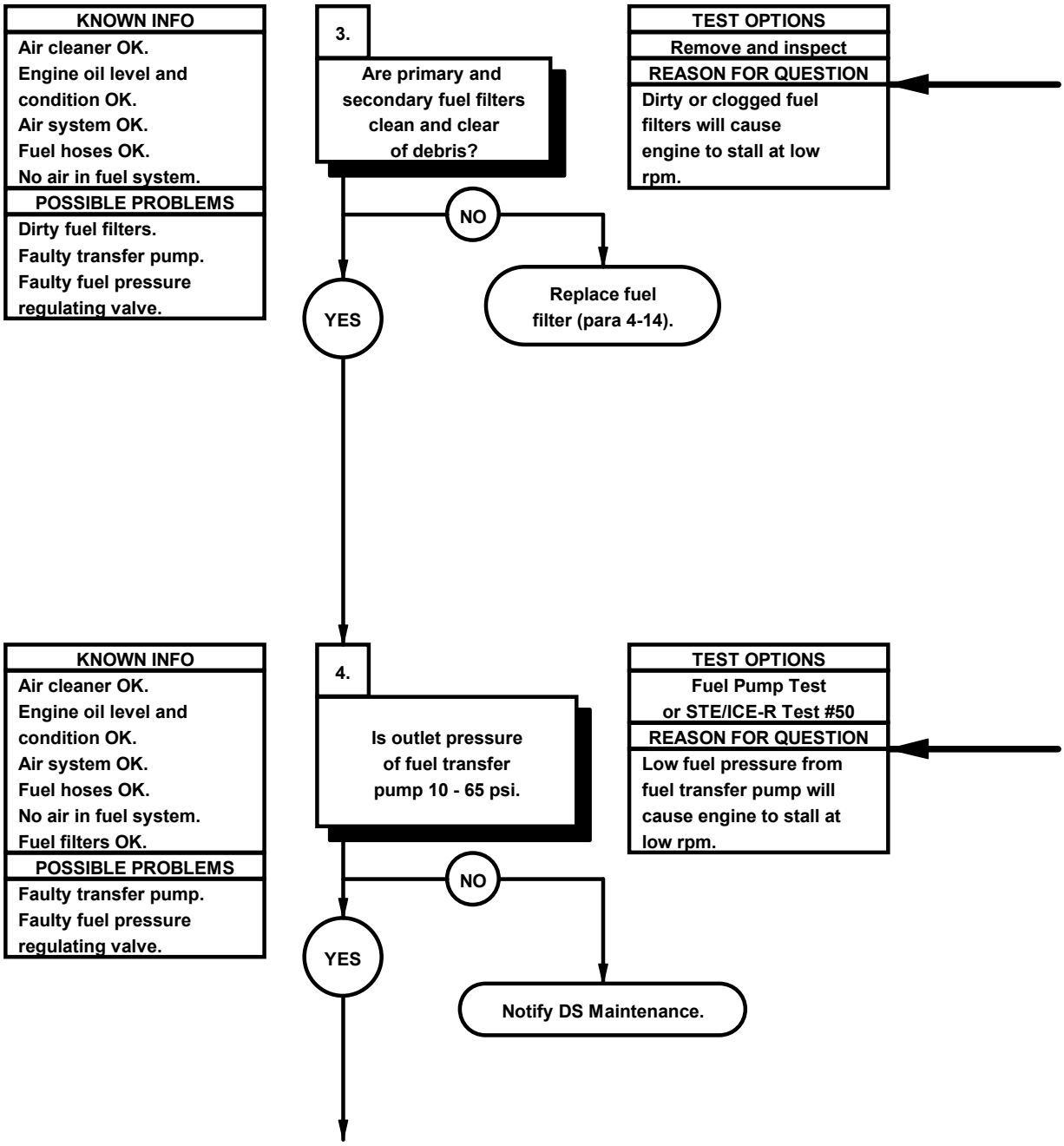



(1) Push in fuel primer pump on fuel/water separator.
(2) Pump fuel primer pump until resistance is felt to purge air from fuel system.
(3) If no resistance is felt, replace fuel/water separator (para 4-13).

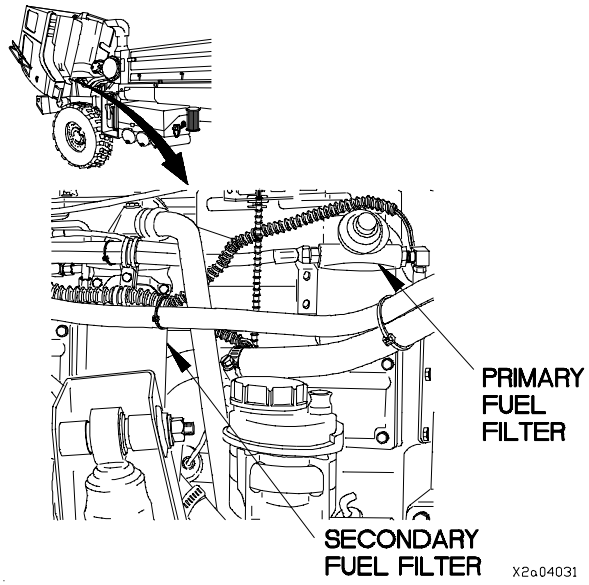




## a4. ENGINE STALLS AT LOW RPM (CONT)

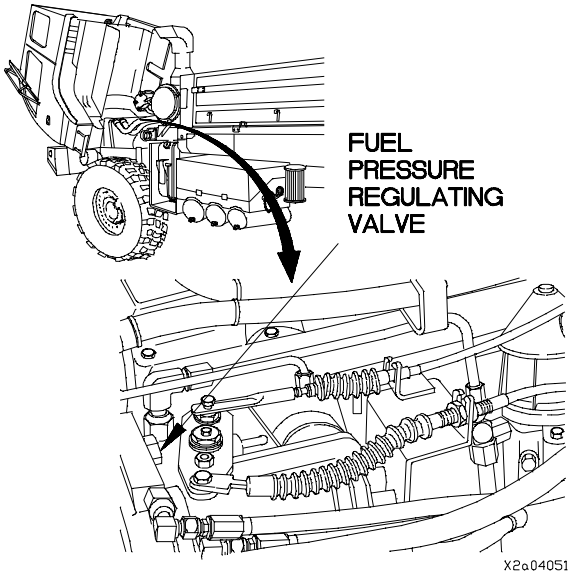


(1) Check primary and secondary fuel filters for dirt and contamination.
(2) Position drain pan under filter.
(3) Remove filter element from base.
(4) Inspect for clogs and debris.
(5) If fuel filter is clogged, replace fuel filter (para 4-14).

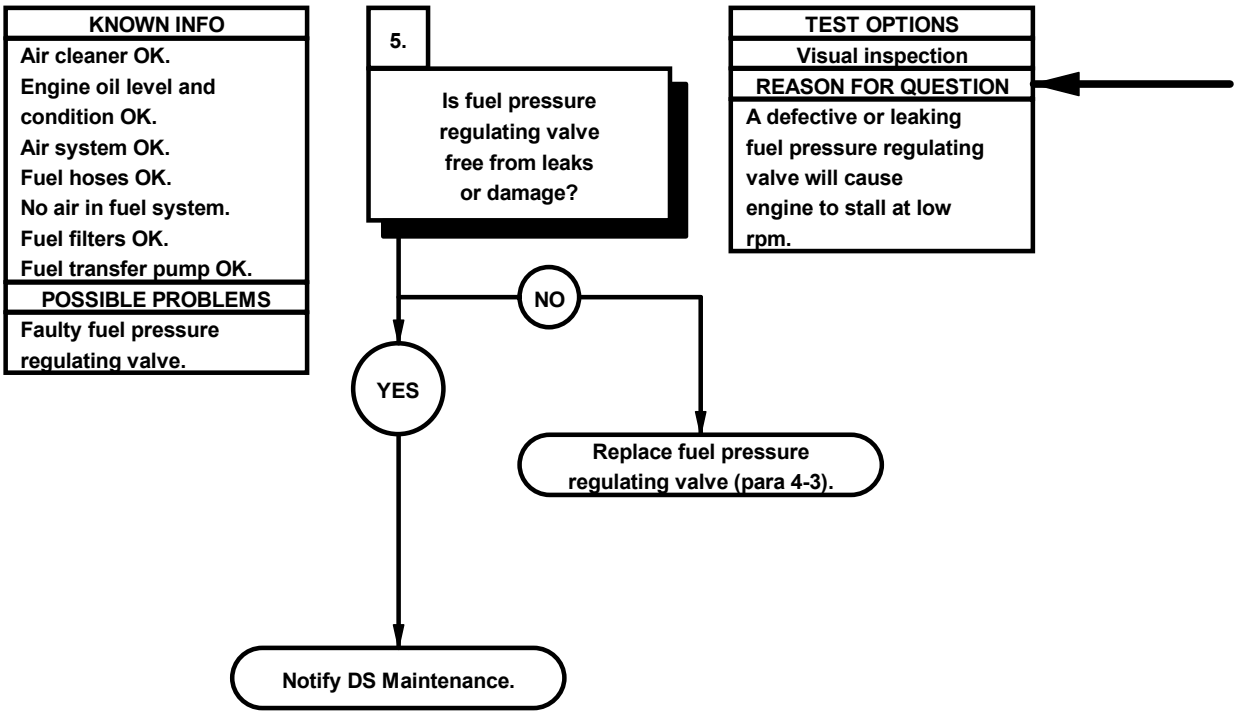



**FUEL PUMP TEST**

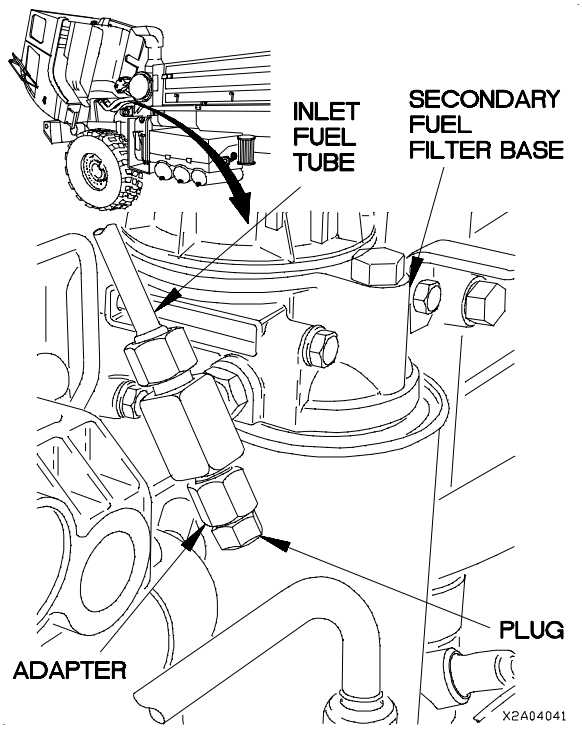
(1) Remove inlet fuel tube from secondary fuel filter base.
(2) Position drain pan under inlet fuel tube.
(3) Attempt to start engine (TM 9-2320-365-10).
(4) Check for fuel flow from inlet fuel tube while attempting to start engine.
(5) If fuel does not flow from inlet fuel tube, notify DS Maintenance.
(6) Install inlet fuel tube on secondary fuel filter base.



## a4. ENGINE STALLS AT LOW RPM (CONT)



(1) Check fuel pressure regulating valve for leaks or damage.
(2) If fuel pressure regulating valve is damaged, replace fuel pressure regulating valve (para 4-3).
(3) If fuel pressure regulating valve is free from leaks and damage, notify DS Maintenance.
(4) Lower cab (TM 9-2320-365-10).

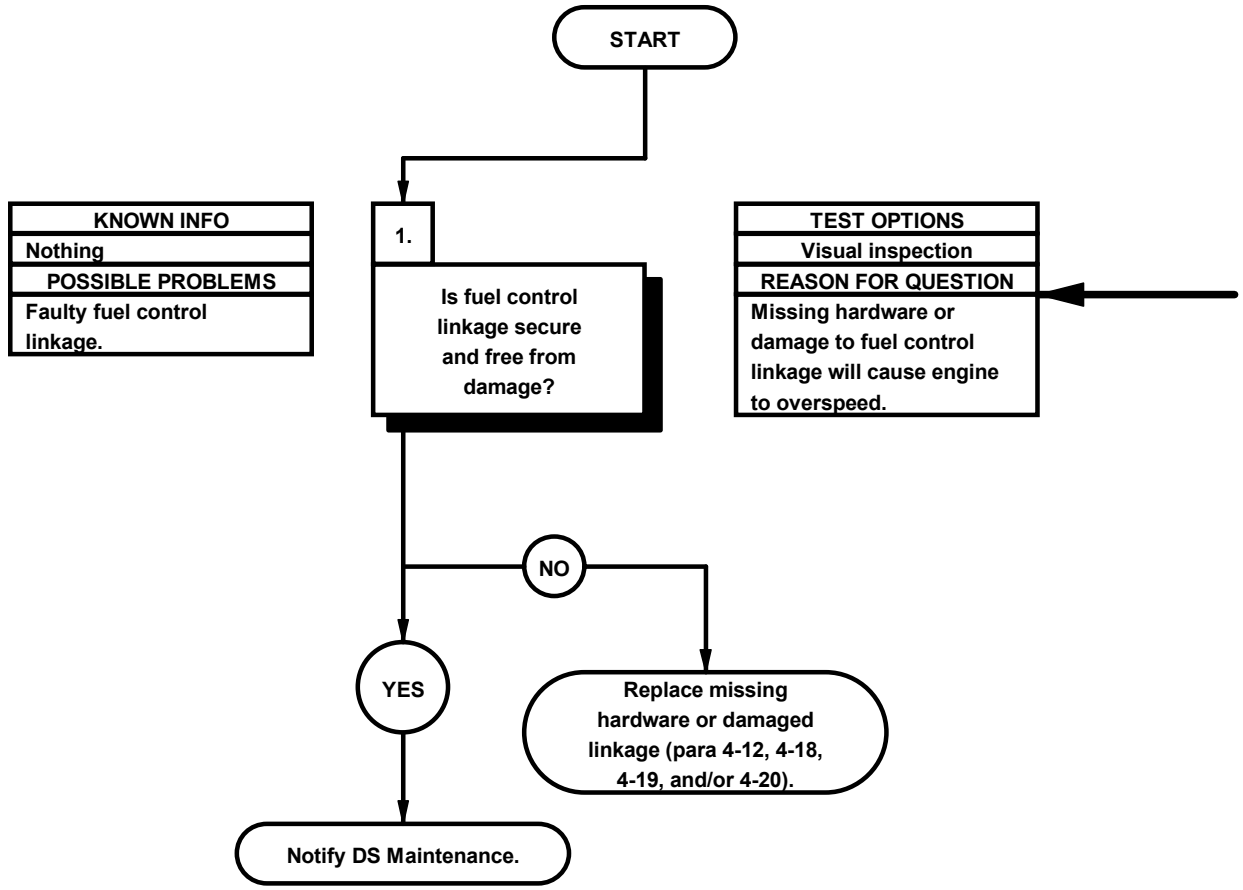


**a5. ENGINE OVERSPEEDS ON START**

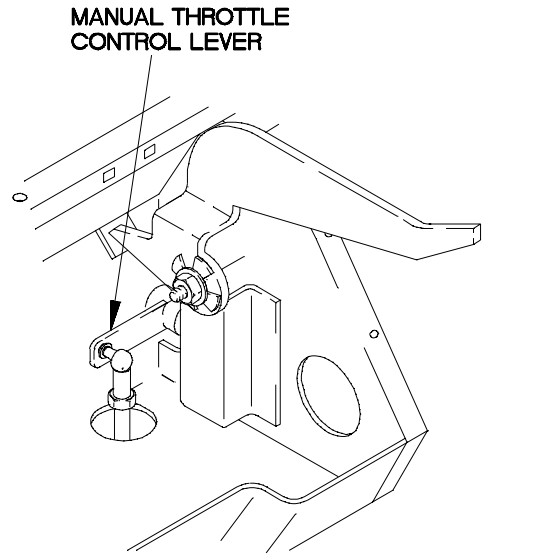
**INITIAL SETUP**

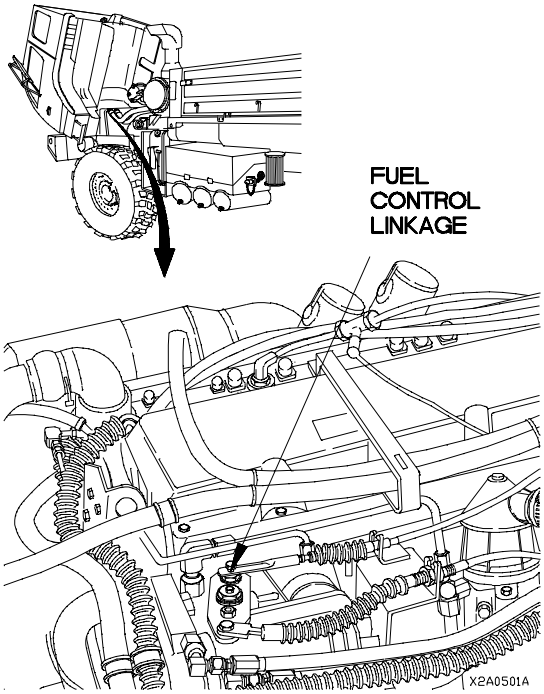
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)

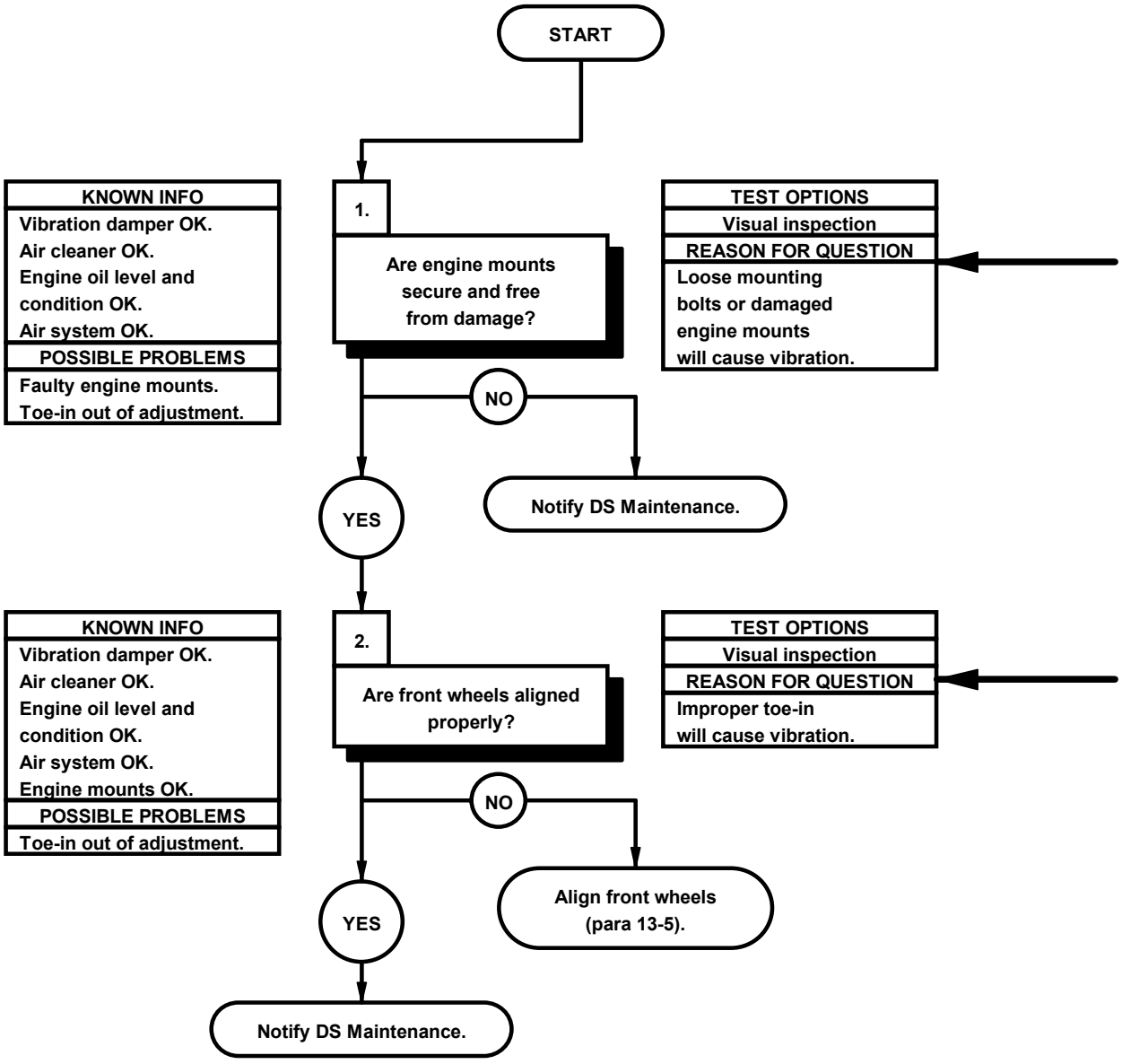


(1) Remove instrument panel assembly for access (para 7-15).
(2) Check fuel control linkage for improper assembly, missing hardware, and damaged parts.
(3) Install instrument panel assembly (para 7-15).
(4) Raise cab (TM 9-2320-365-10).
(5) Check fuel control linkage for improper assembly, missing hardware, and damaged parts.
(6) Lower cab (TM 9-2320-365-10).

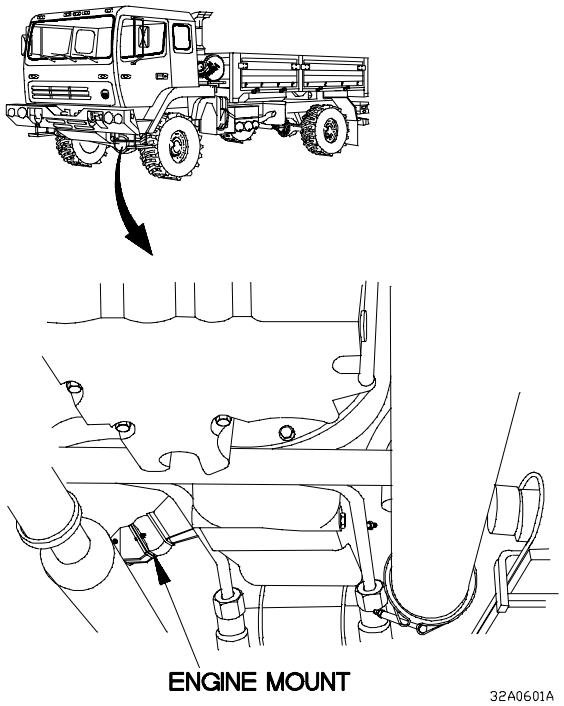


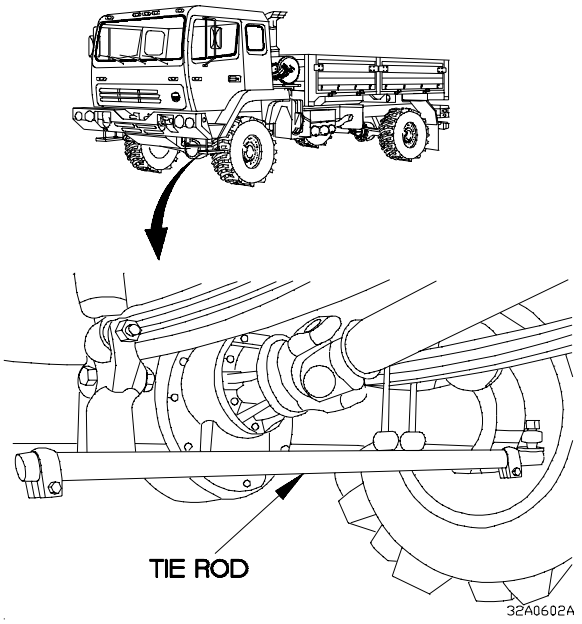
| a6. TOO MUCH ENGINE VIBRATION | |
|---|---|
| INITIAL SETUP | |
| Equipment Conditions<br>Engine shut down (TM 9-2320-365-10). | Tools and Special Tools<br>Tool Kit, Genl Mech (Item 44, Appendix C) |



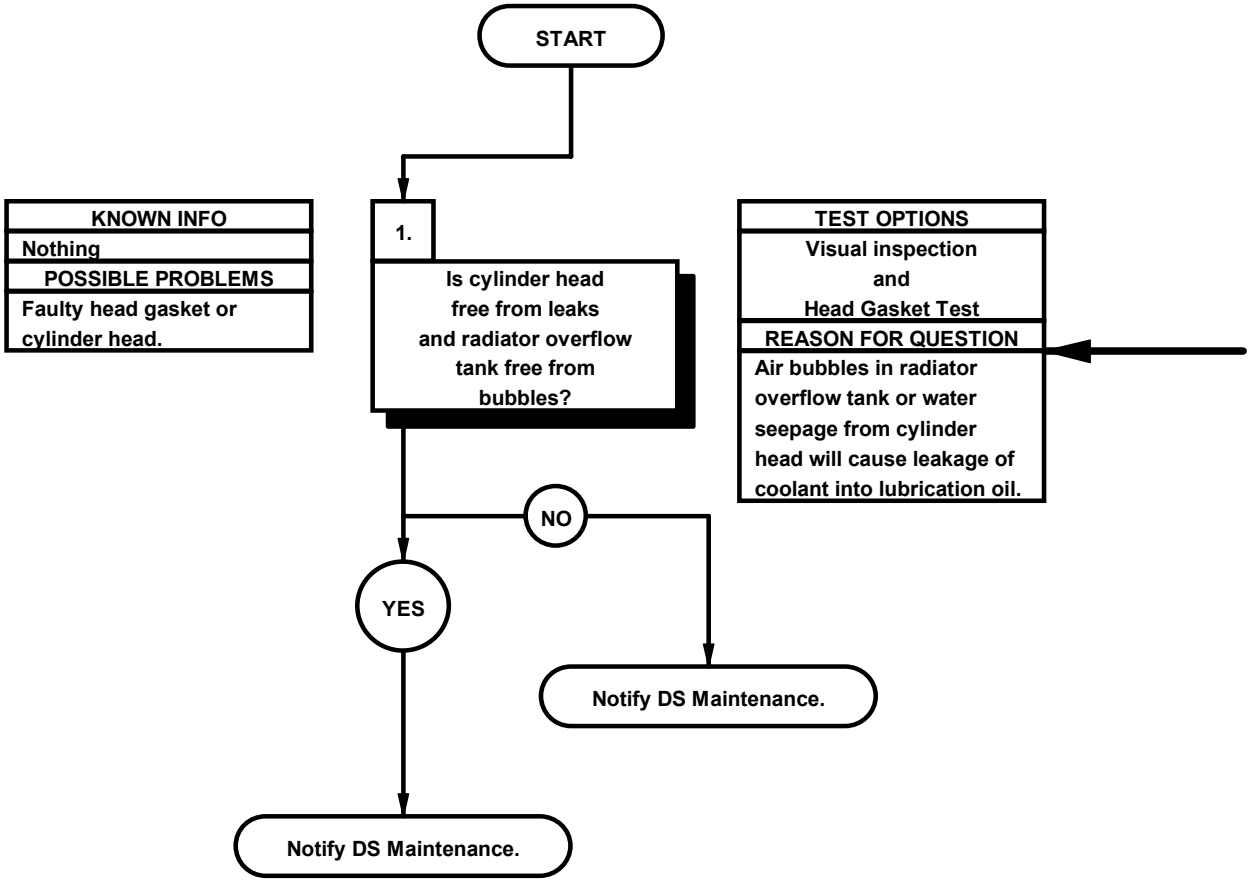
(1) Check engine mounts for loose mounting hardware and damage.
(2) If engine mounts are damaged or mounting hardware is loose, notify DS Maintenance.




(1) Check tires for uneven tire wear.
(2) If uneven tire wear is found, align front wheels (para 13-5).
(3) If front tires do not have uneven wear, notify DS Maintenance.



| a7. COOLANT IN ENGINE LUBRICATION OIL | |
|---|---|
| INITIAL SETUP | |
| Equipment Conditions<br>Engine shut down (TM 9-2320-365-10). | Tools and Special Tools<br>Tool Kit, Genl Mech (Item 44, Appendix C) |



(1) Raise cab (TM 9-2320-365-10).
(2) Check sides of engine block at cylinder head for obvious signs of water leakage.
(3) Lower cab (TM 9-2320-365-10).

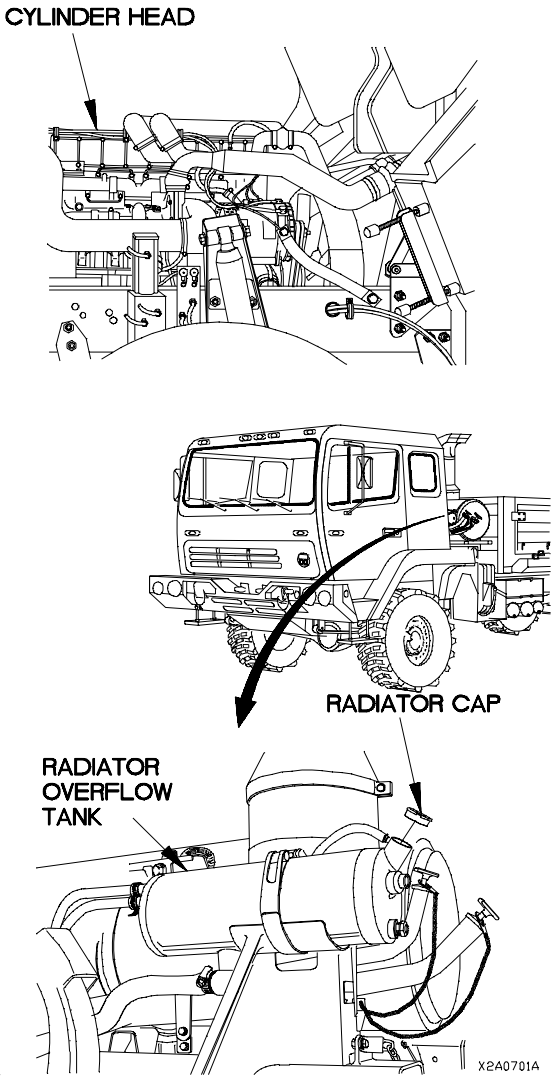
**HEAD GASKET TEST**

(1) Remove radiator cap.
(2) Start engine (TM 9-2320-365-10).

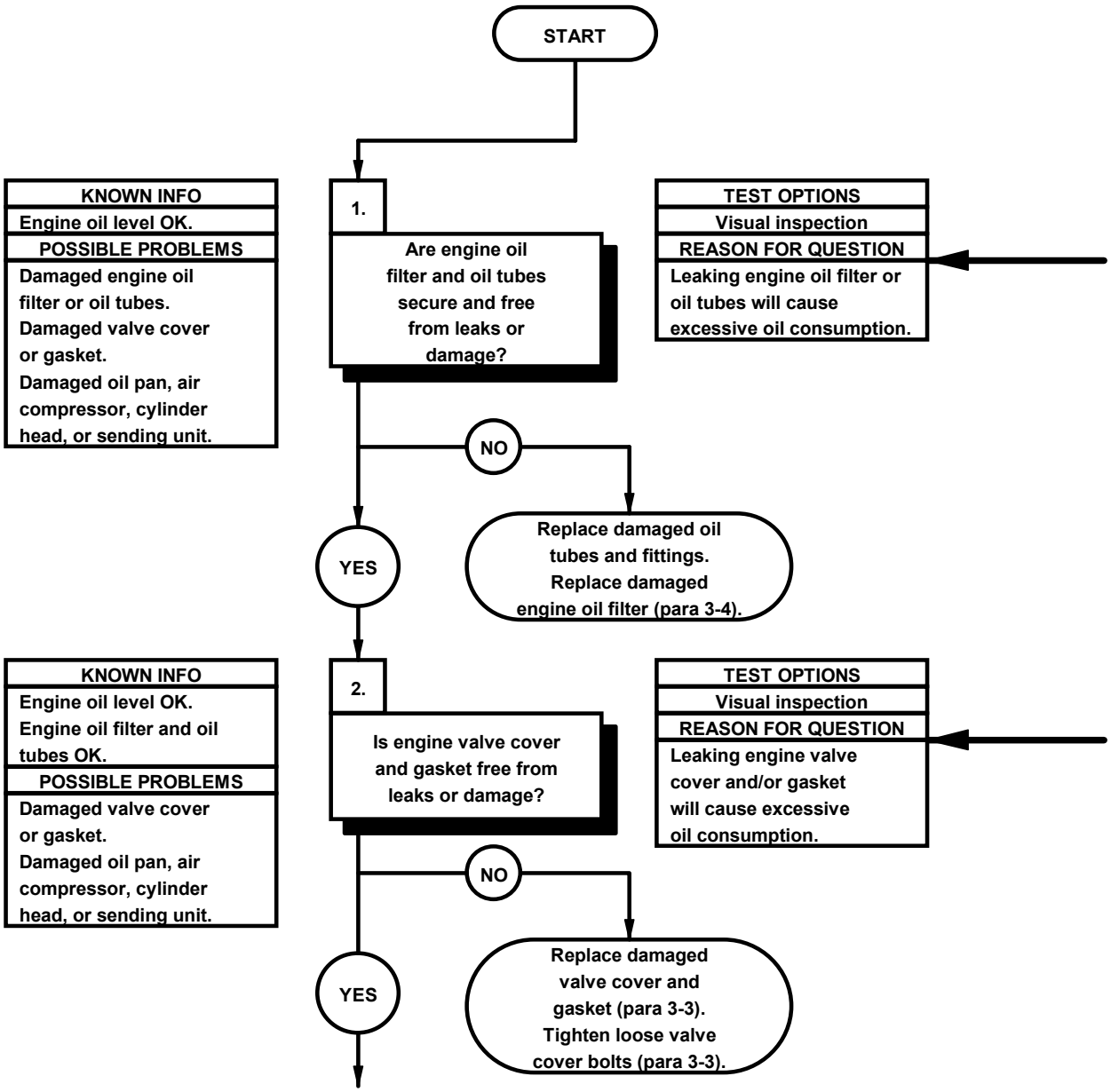
**NOTE**

Air bubbles in the coolant are a sign of probable leakage at the head gasket.

(3) Look for air bubbles in coolant.
(4) Install radiator cap.
(5) Shut down engine (TM 9-2320-365-10).



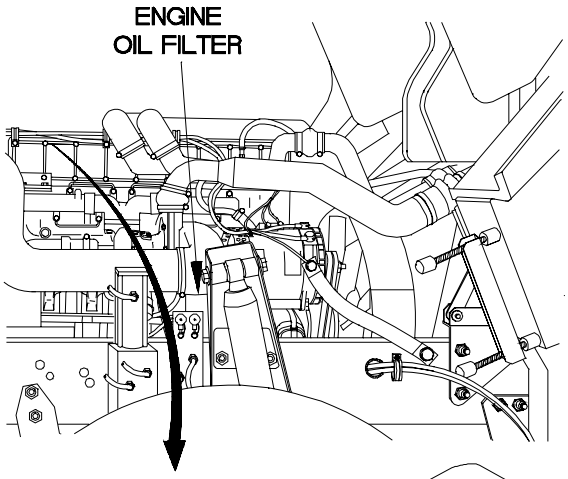
| a8. EXCESSIVE ENGINE OIL CONSUMPTION | |
|---|---|
| INITIAL SETUP | |
| Equipment Conditions<br>Engine shut down (TM 9-2320-365-10). | Tools and Special Tools<br>Tool Kit, Genl Mech (Item 44, Appendix C) |



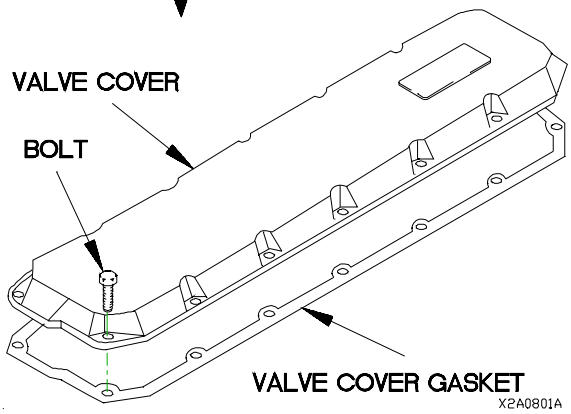
**NOTE**

**Oil consumption is considered normal up to 12,000 mi (19,308 km) at a rate of one qt (one L) of oil per 45 gal (170 L) of fuel. After 12,000 mi (19,308 km), oil consumption is considered normal at a rate of one qt (one L) of oil per 60 gal (227 L) of fuel.**

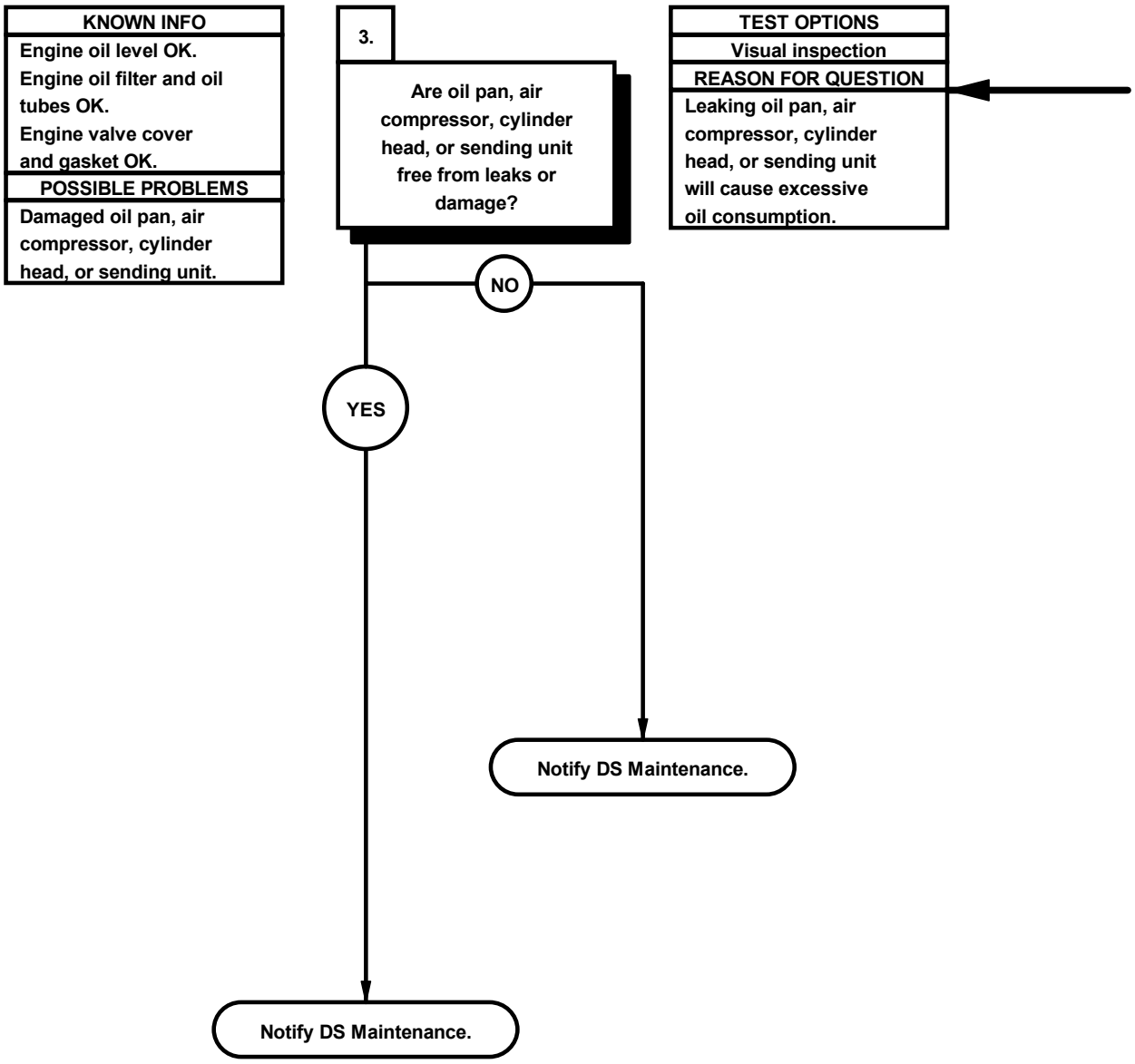
**(1) Raise cab (TM 9-2320-365-10).**
**(2) Check engine oil filter and oil tubes for leakage or damage.**
**(3) If engine oil filter is damaged, replace engine oil filter (para 3-4).**



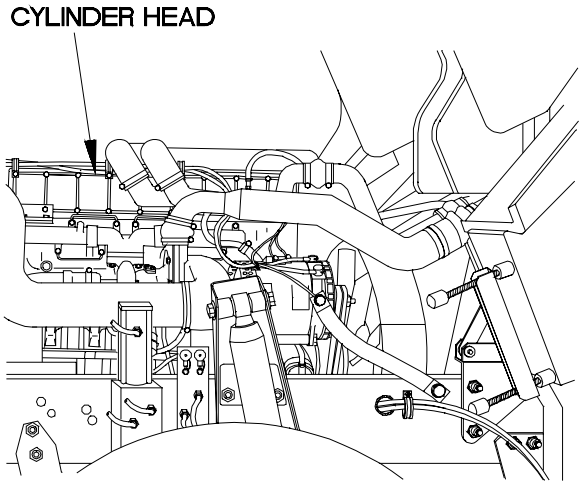

**(1) Check engine valve cover and gasket for leaks and damage.**
**(2) If engine valve cover or gasket leaks, tighten loose valve cover bolts (para 3-3).**
**(3) If engine valve cover or gasket is damaged, replace valve cover and gasket (para 3-3).**



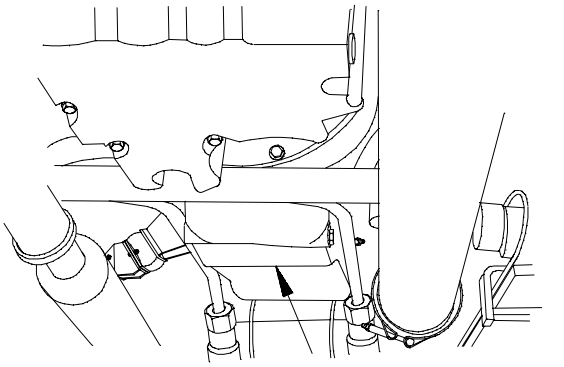
## a8. EXCESSIVE ENGINE OIL CONSUMPTION (CONT)

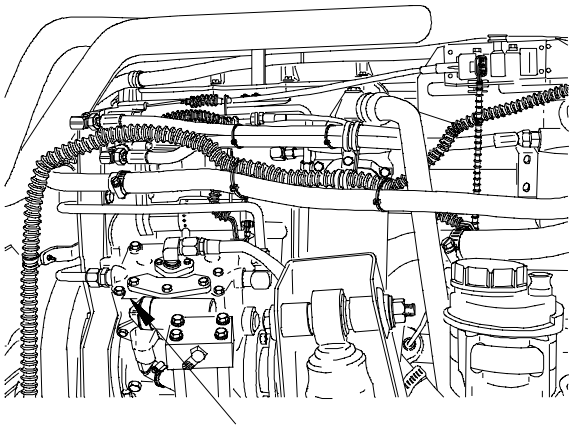


(1) Check oil pan, air compressor, cylinder head, and sending unit for leakage or damage.
(2) If oil pan, air compressor, cylinder head, or sending unit is leaking or damaged, notify DS Maintenance.
(3) If oil pan, air compressor, cylinder head and sending unit are free from leaks and damage, notify DS Maintenance.
(4) Lower cab (TM 9-2320-365-10).



X2A0803A


OIL PAN


AIR COMPRESSOR

X2a08021

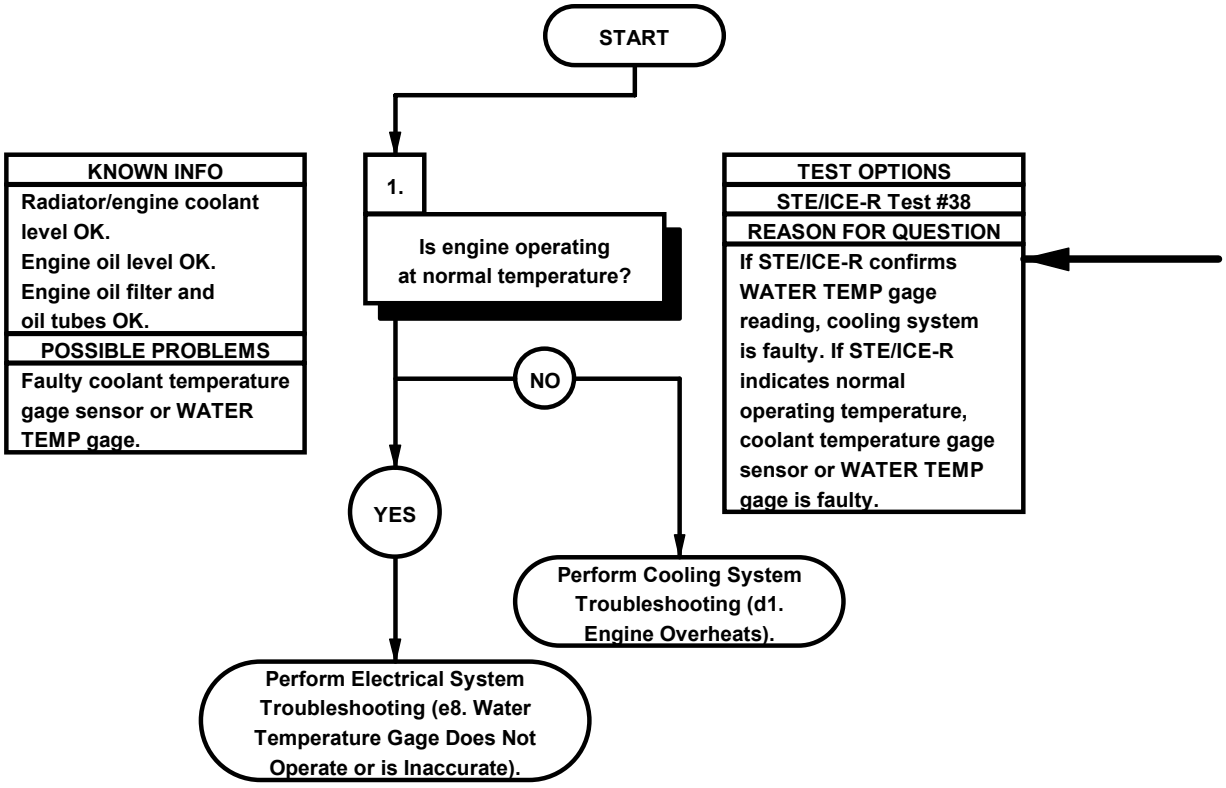
**a9. ENGINE OVERHEATS**

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)

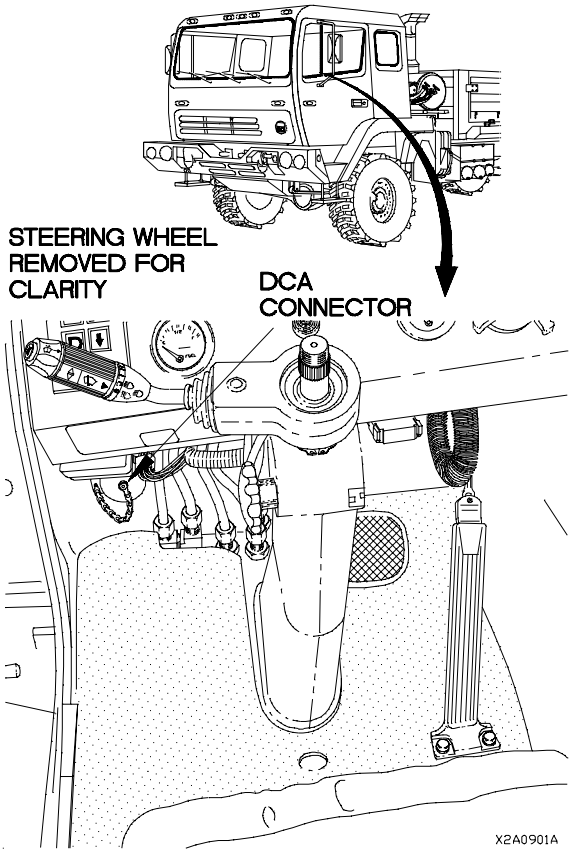
**References**
TM 9-4910-571-12&P



**NOTE**

**STE/ICE-R Test #38 measures engine coolant temperature.**

| STE/ICE-R TEST #38 |
|---|
| (1) Hook up STE/ICE-R to DCA. |
| (2) Press and hold the TEST button on the STE/ICE-R until -45 to +45 appears in the display. This will ensure that the test results are accurate. |
| (3) Start engine (TM 9-2320-365-10) and raise engine idle until engine is at normal operating temperature, 180-205°F (82-96°C). |
| (4) Coolant temperature should read between 160-210°F (71-99°C). |
| (5) Record test results. |
| (6) If coolant temperature is not 160-210°F (71-99°C), perform Cooling System Troubleshooting (d1. Engine Overheats). |
| (7) If coolant temperature is 160-210°F (71-99°C), perform Electrical System Troubleshooting (e8. Water Temperature Gage Does Not Operate or is Inaccurate). |
| (8) Shut down engine (TM 9-2320-365-10). |
| (9) Remove STE/ICE-R from DCA. |

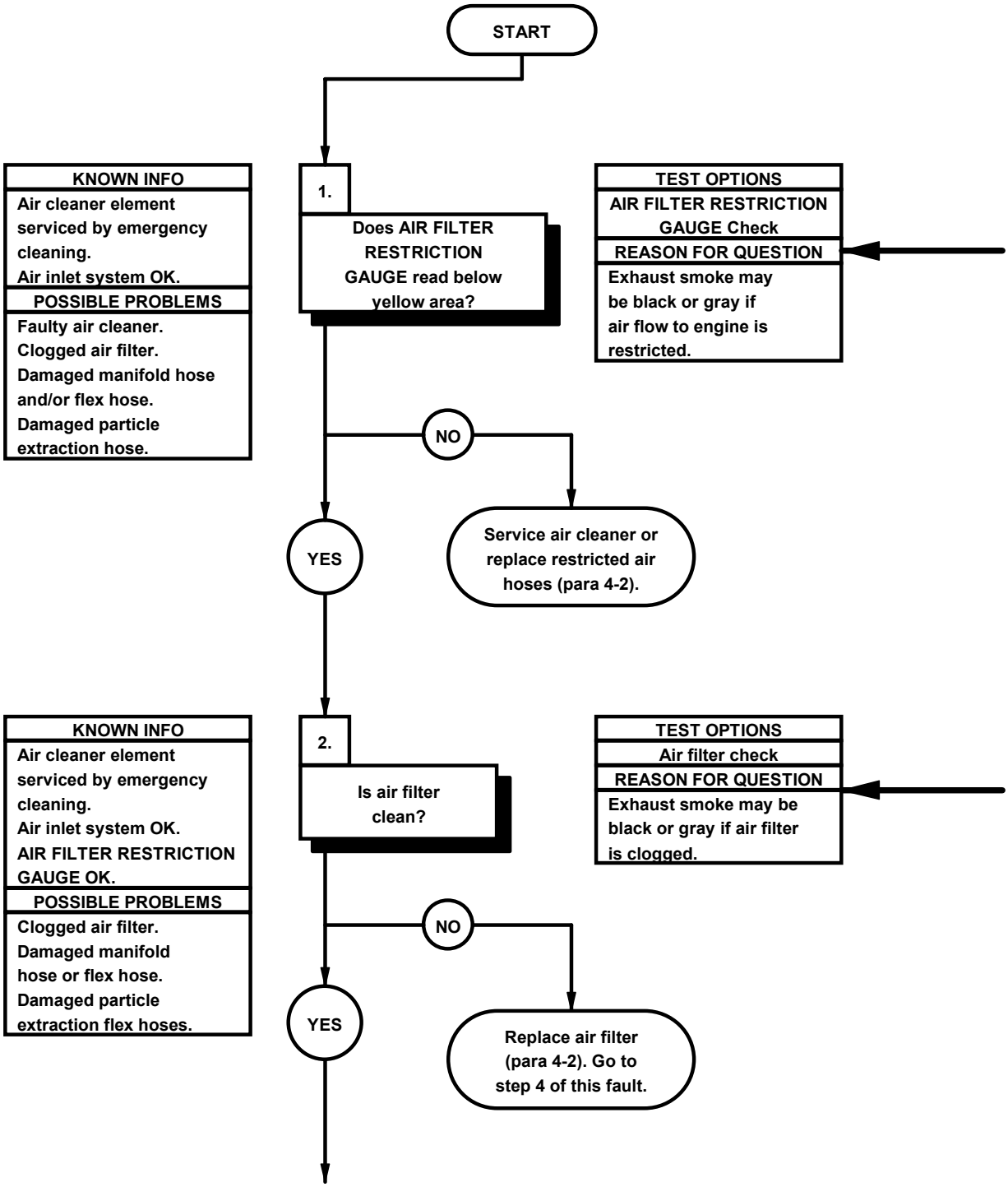


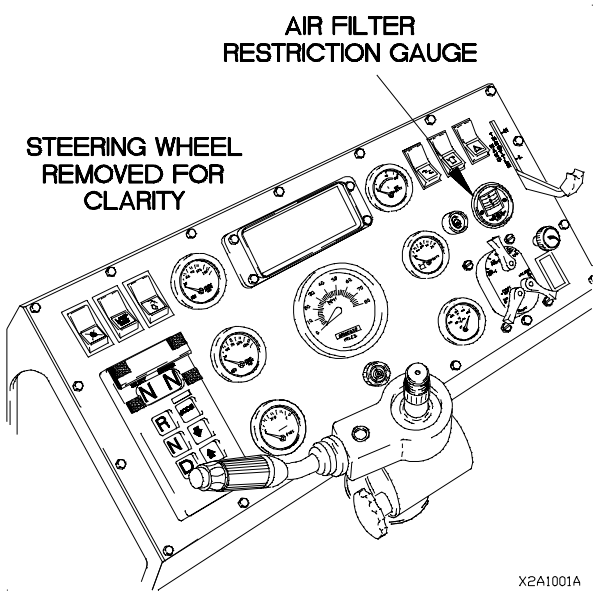
**a10. EXCESSIVE BLACK OR GRAY EXHAUST SMOKE**

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

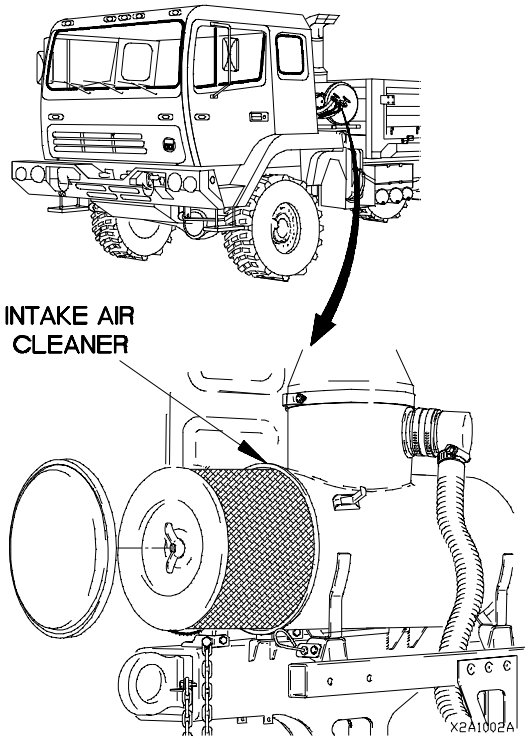
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)






**AIR FILTER RESTRICTION GAUGE CHECK**

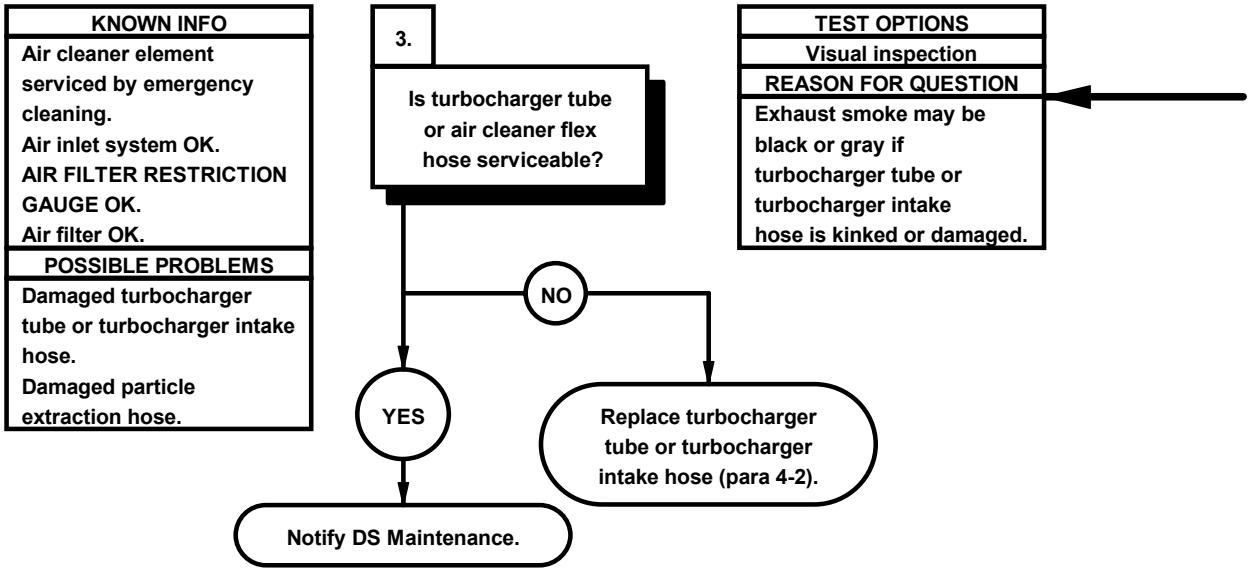
(1) Check reading on AIR FILTER RESTRICTION GAUGE.
(2) Press RESET button on AIR FILTER RESTRICTION GAUGE if reading is between 15 and 20 (in yellow area) or above 20 (in red area).
(3) Start engine (TM 9-2320-365-10) and check AIR FILTER RESTRICTION GAUGE again.
(4) Shut down engine (TM 9-2320-365-10).

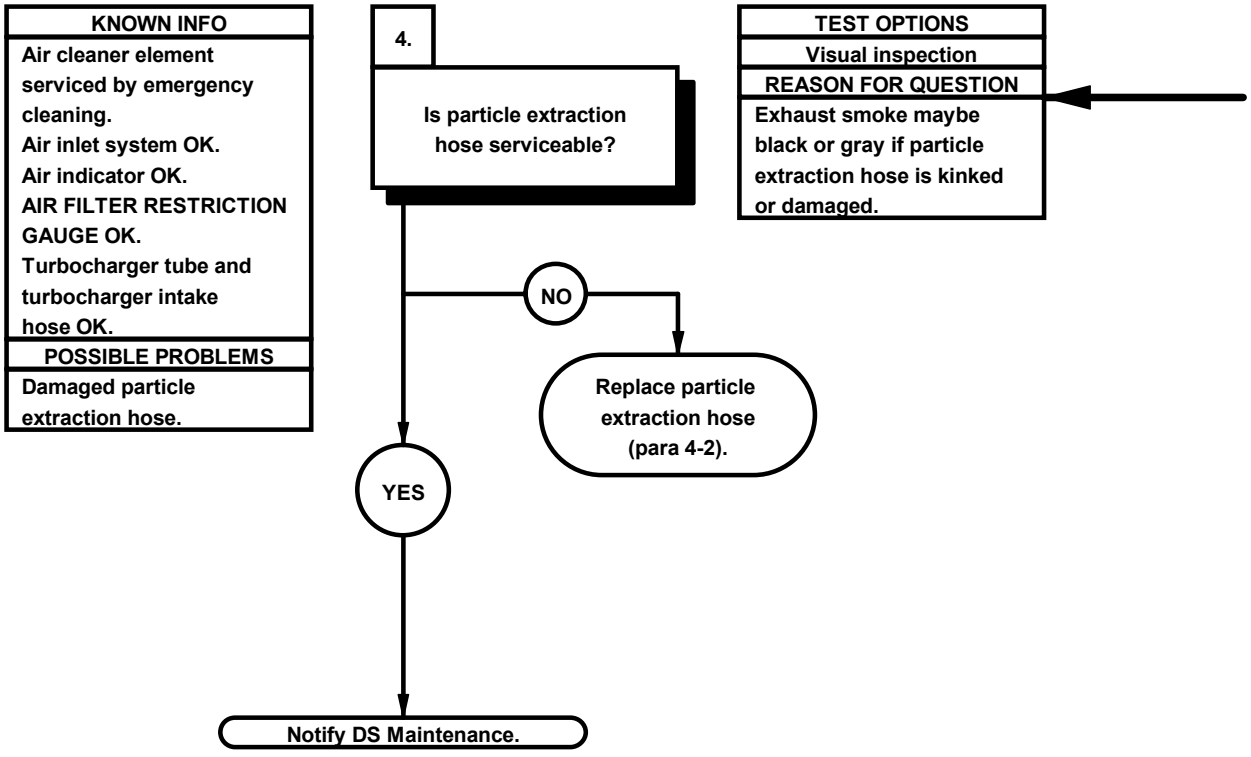



**AIR FILTER CHECK**

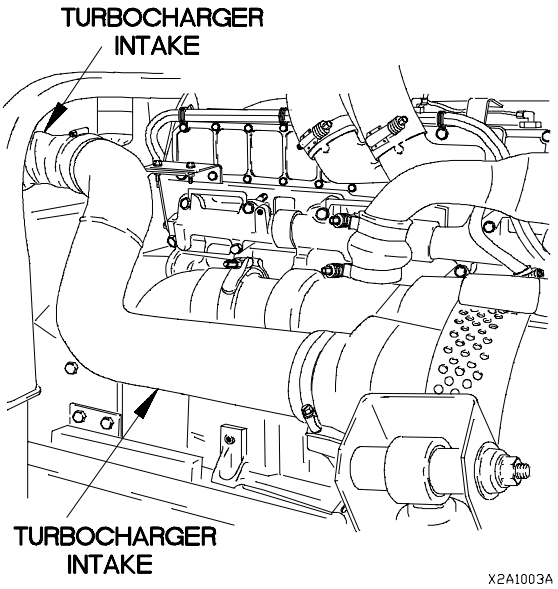
(1) Release three spring latches on intake air cleaner cover.
(2) Remove intake air cleaner cover.
(3) Remove air filter. Replace air filter if clogged (para 4-2).
(4) Install air filter.
(5) Install intake air cleaner cover.
(6) Install three spring latches into intake air cleaner cover.

## a10. EXCESSIVE BLACK OR GRAY EXHAUST SMOKE (CONT)

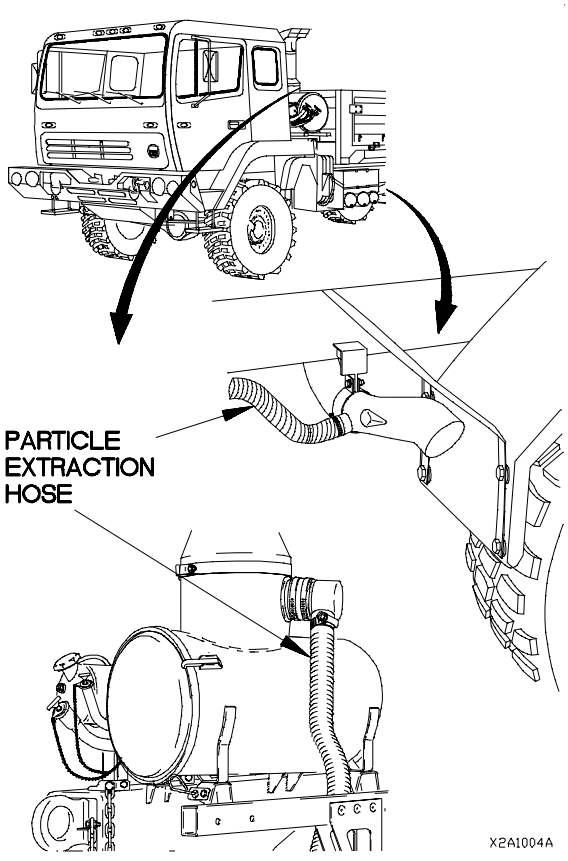


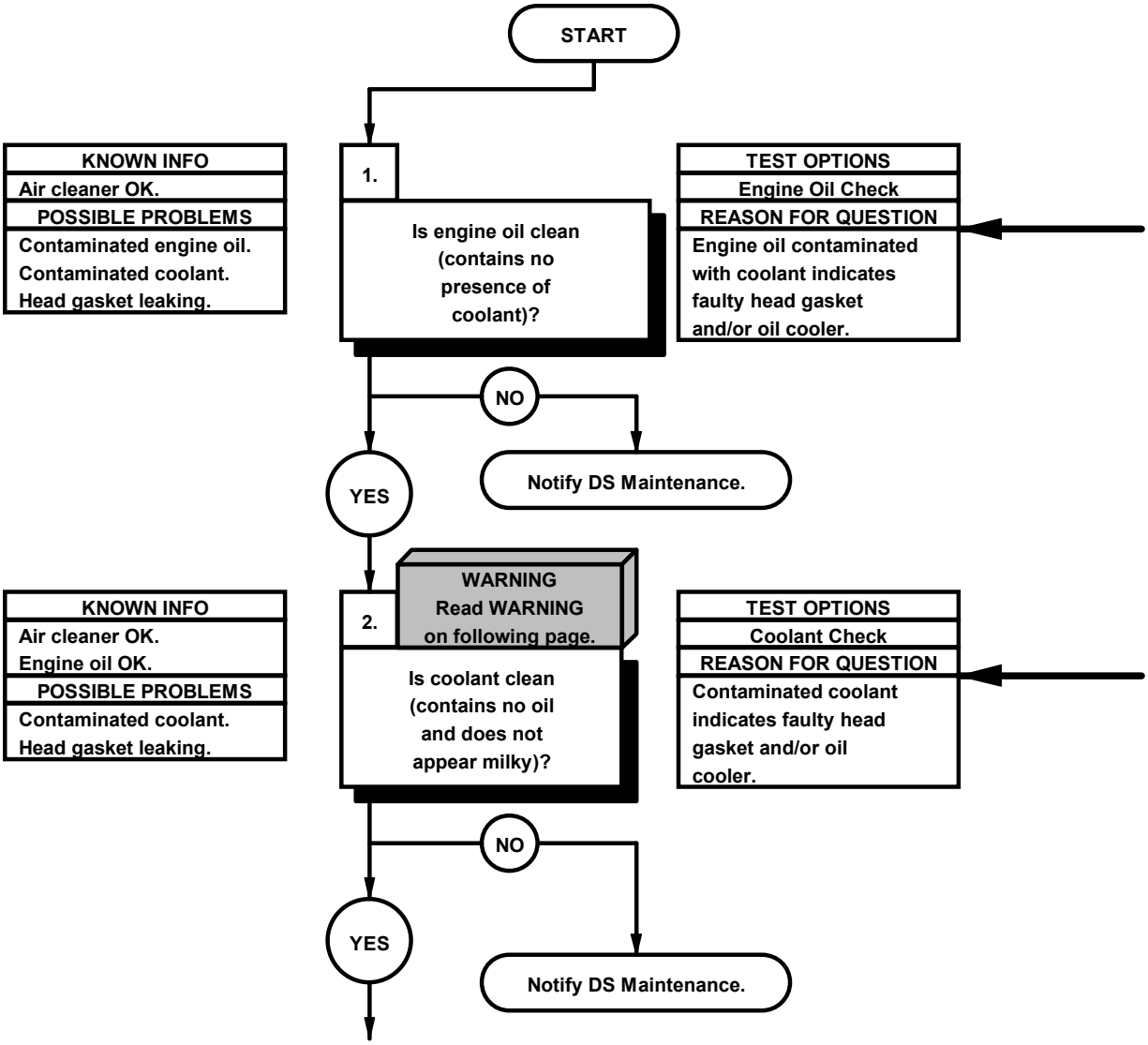
(1) Raise cab (TM 9-2320-365-10).
(2) Check turbocharger tube and turbocharger intake hose for kinks and damage.
(3) If turbocharger tube or turbocharger intake hose is damaged, replace turbocharger tube or turbocharger intake hose (para 4-2).
(4) If turbocharger tube and turbocharger intake hose are free from kinks and damage, notify DS Maintenance.
(5) Lower cab (TM 9-2320-365-10).




(1) Check particle extraction hose for kinks and damage.
(2) If particle extraction hose is damaged, replace particle extraction hose (para 4-2).
(3) If particle extraction hose is OK, notify DS Maintenance.

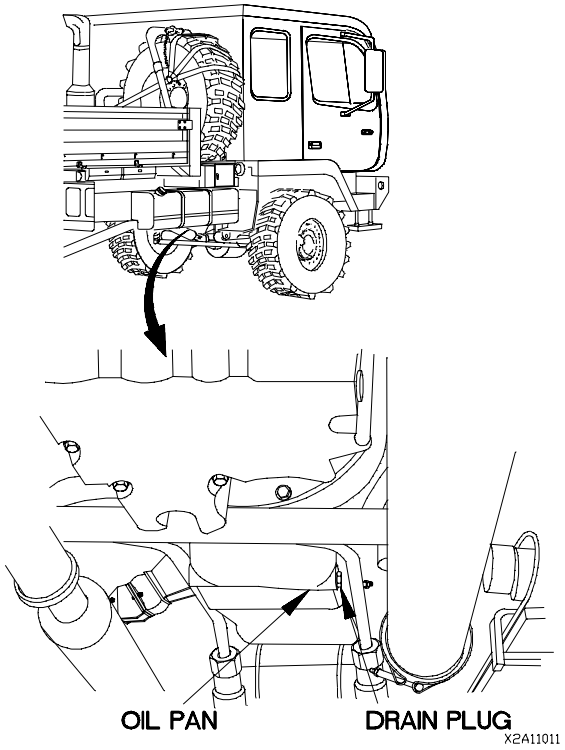


| a11. WHITE EXHAUST SMOKE | |
|---|---|
| INITIAL SETUP | |
| Equipment Conditions<br>Engine shut down (TM 9-2320-365-10). | Tools and Special Tools<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>Container (Capacity 40 qt (38L))<br>Goggles, Industrial (Item 15, Appendix C) |



**ENGINE OIL CHECK**

(1) Position container under engine oil pan.
(2) Remove drain plug from engine oil pan and drain engine oil.
(3) Observe condition of engine oil.
(4) If engine oil is not clean, notify DS Maintenance.
(5) Install drain plug in engine oil pan.
(6) Refill engine with oil (Appendix H).

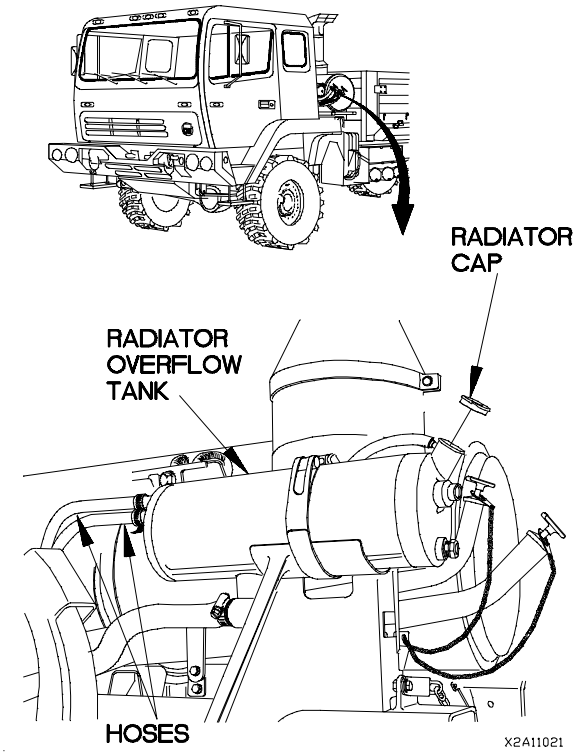



**COOLANT CHECK**

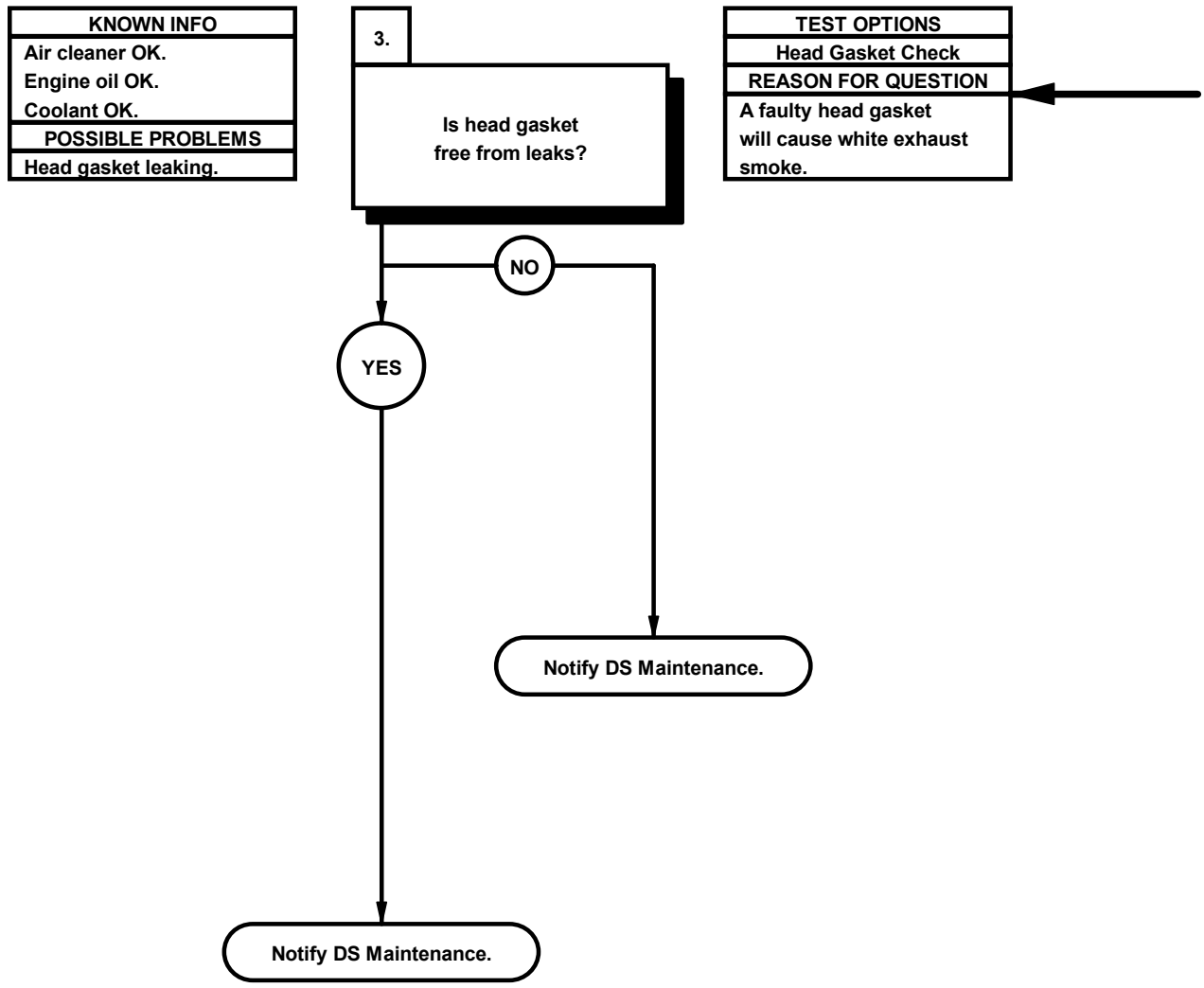
**WARNING**

Do not remove radiator cap when engine is warm. Coolant may be very hot and under pressure. Failure to comply may result in injury to personnel.

(1) Remove radiator cap from radiator overflow tank.
(2) Observe condition of coolant inside radiator overflow tank.
(3) If coolant is not clean, notify DS Maintenance.
(4) Install radiator cap on radiator overflow tank.

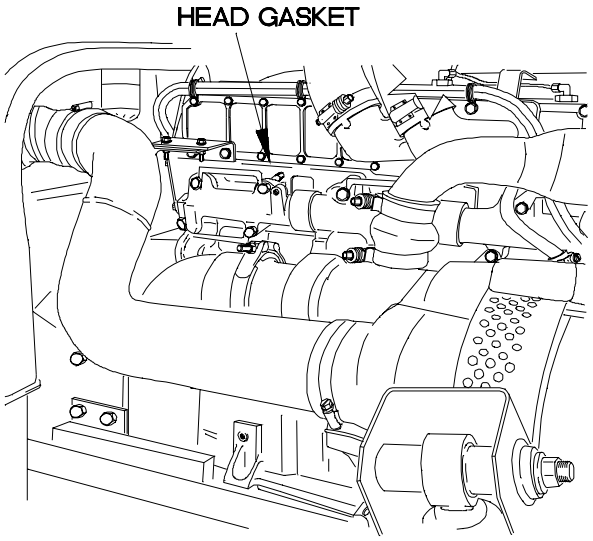


## a11. WHITE EXHAUST SMOKE (CONT)



**HEAD GASKET CHECK**

(1) Start engine (TM 9-2320-365-10).
(2) Raise cab (TM 9-2320-365-10).
(3) Check head gasket for leaks.
(4) If head gasket is leaking, notify DS Maintenance.
(5) If head gasket is not leaking and white exhaust smoke still exists, notify DS Maintenance.
(6) Lower cab (TM 9-2320-365-10).
(7) Shut down engine (TM 9-2320-365-10).




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## a12. LOW ENGINE POWER

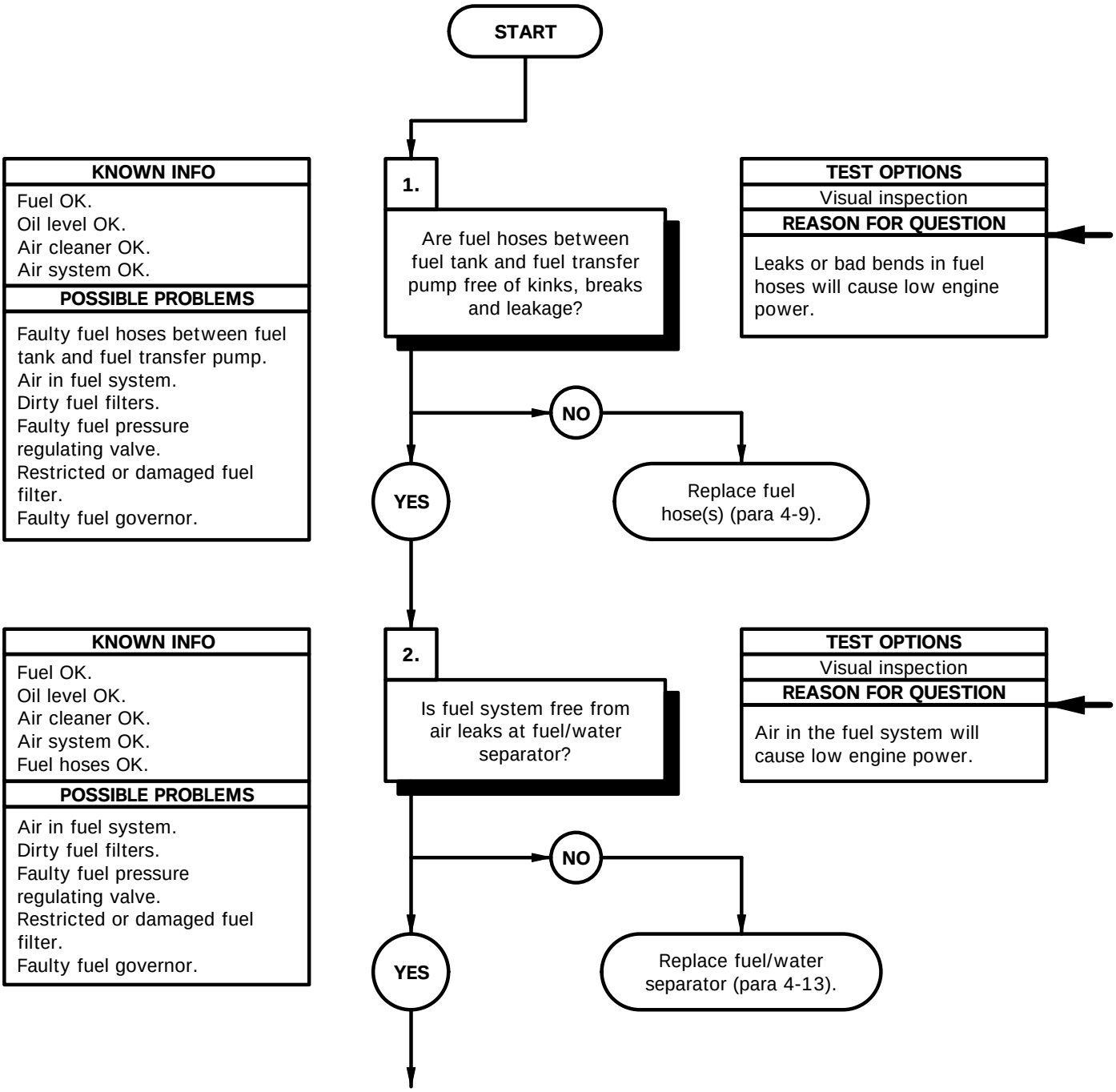
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)

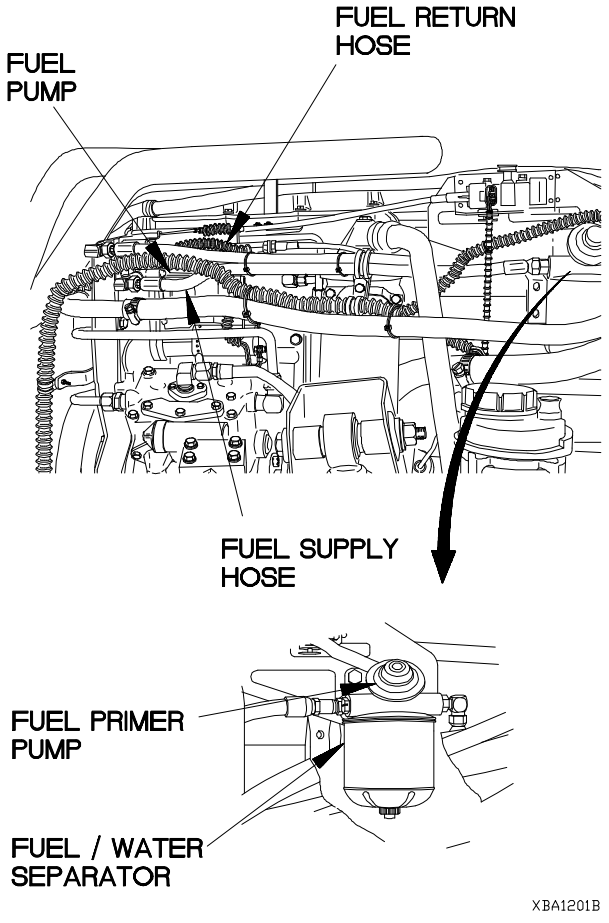
**Materials/Parts**
Packing, Preformed (2) (Item 180, Appendix G)

**References**
TM 9-4910-571-12&P

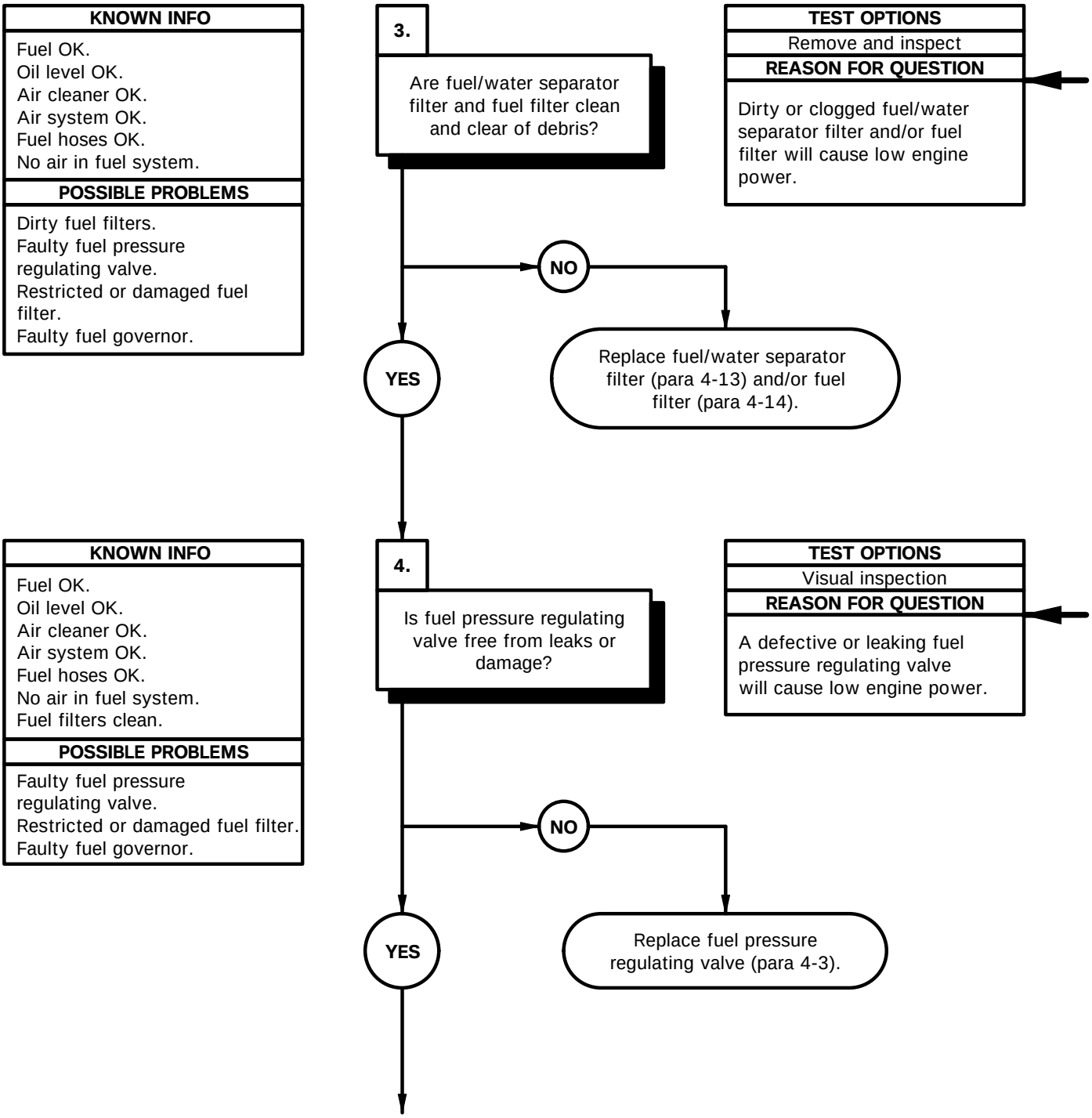


(1) Raise cab (TM 9-2320-365-10).
(2) Check fuel tank and fuel transfer pump hoses for kinks, looseness, and leakage.
(3) If fuel hoses are not free from kinks or leaks, replace fuel hose(s) (para 4-9).

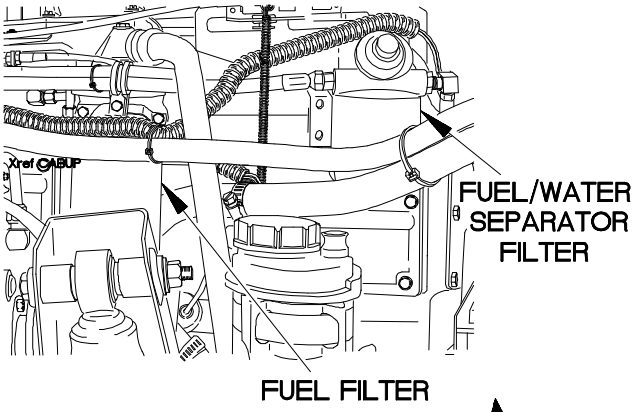
(1) Push in fuel primer pump on fuel/water separator.
(2) Pump fuel primer pump until resistance is felt to purge air from fuel system.
(3) If no resistance is felt, replace fuel/water separator (para 4-13).



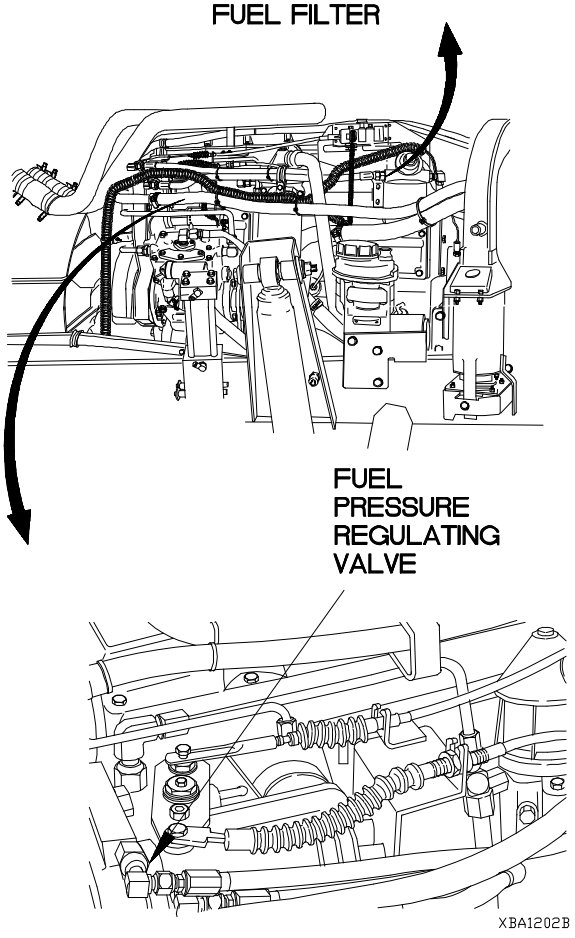
## a12. LOW ENGINE POWER (CONT)



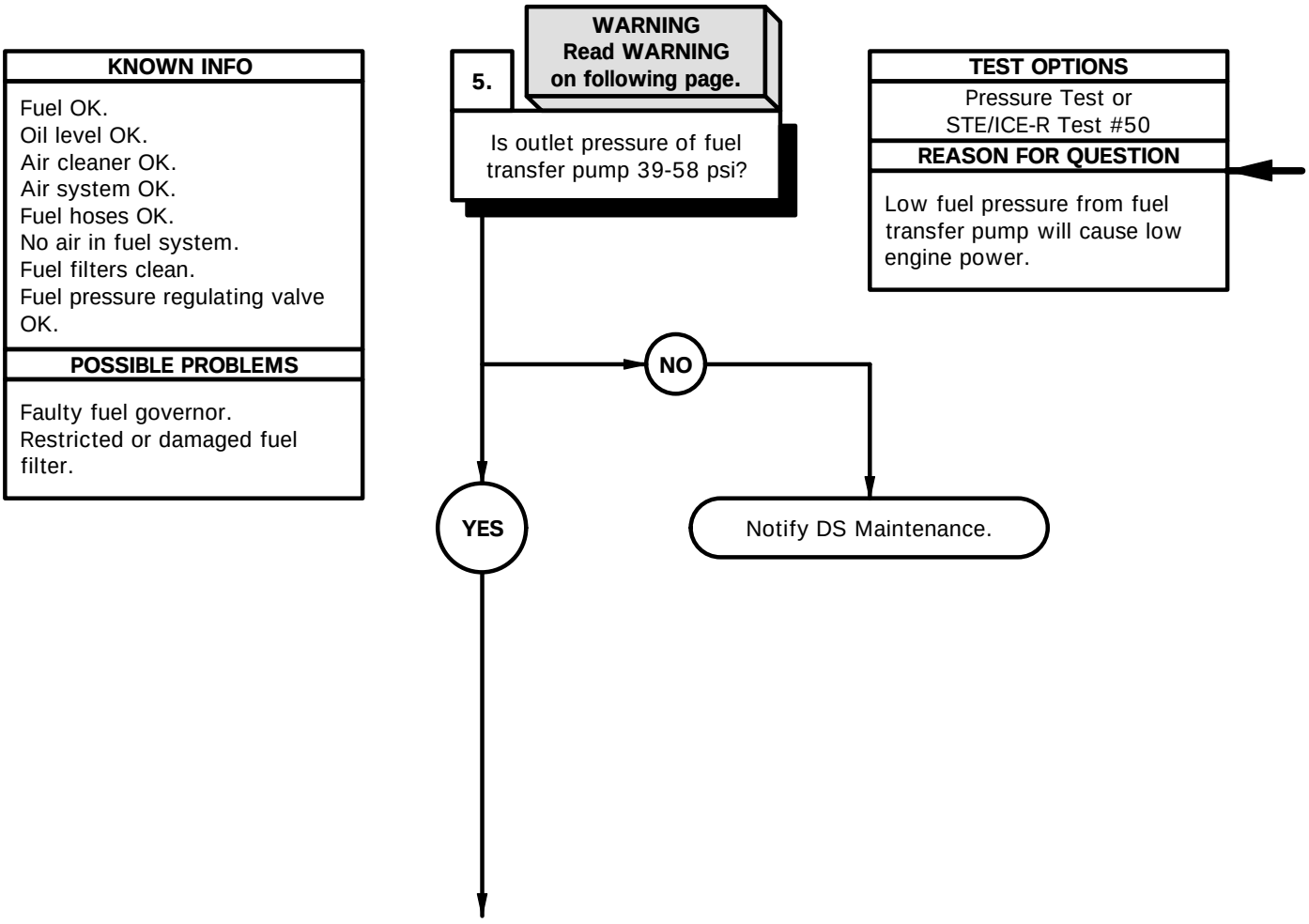
(1) Check fuel/water separator filter and fuel filter for dirt and contamination.
(2) Position drain pan under filter.
(3) Remove filter element from base.
(4) Inspect for clogs and debris.
(5) If fuel water separator filter and/or fuel filter is clogged, replace fuel/water separator filter (para 4-13) and/or fuel filter (para 4-14).




(1) Check fuel pressure regulating valve for leaks or damage.
(2) If fuel pressure regulating valve is damaged, replace fuel pressure regulating valve (para 4-3).



## a12. LOW ENGINE POWER (CONT)

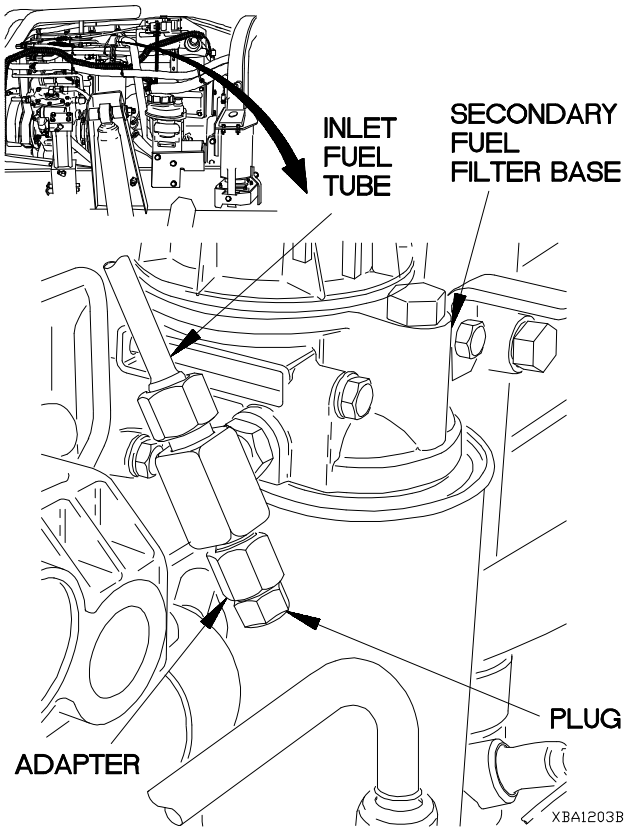


**WARNING**

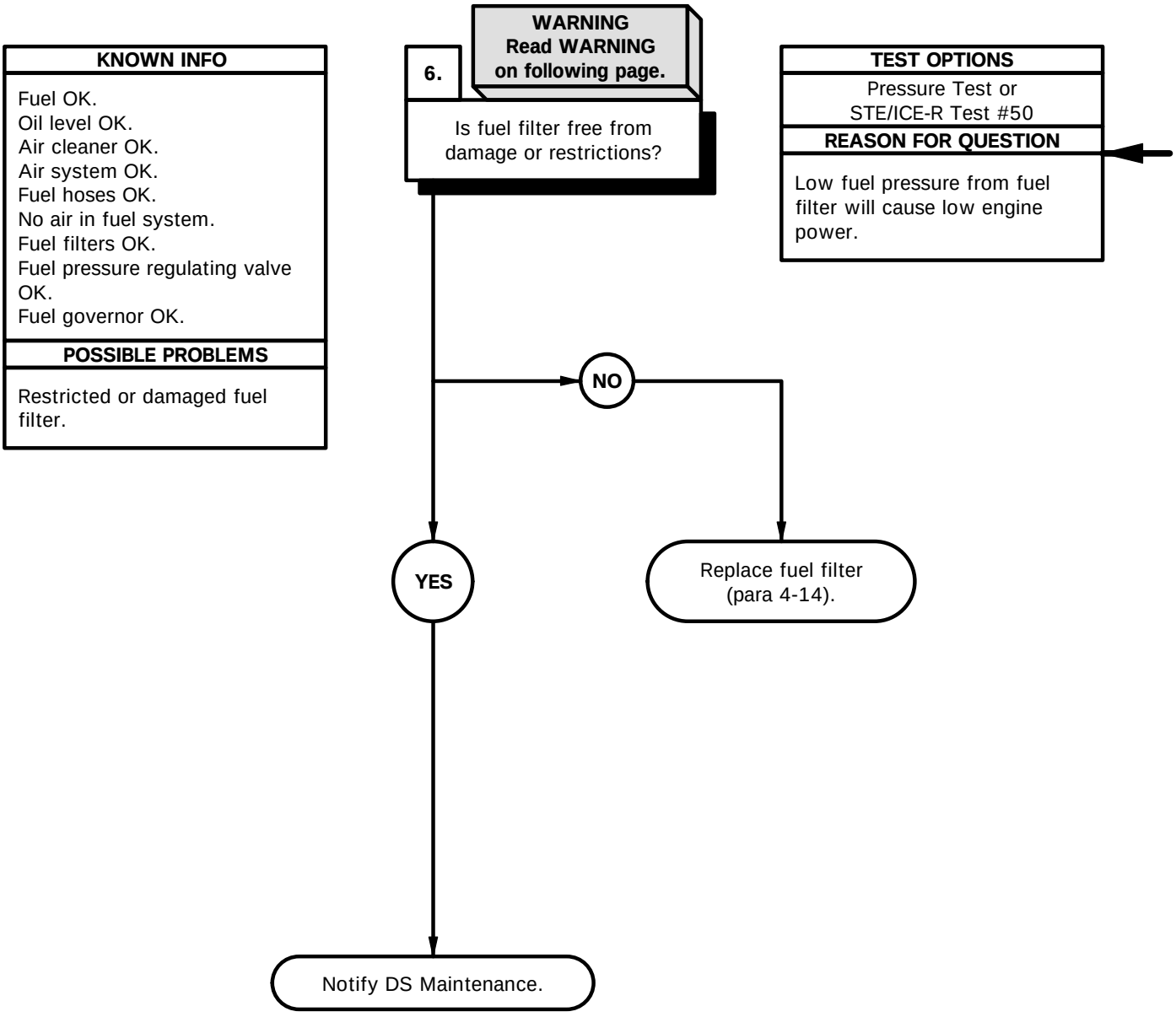
**Diesel fuel is flammable. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.**

**PRESSURE TEST**

(1) Remove plug from adapter fitting on inlet side of fuel filter base.
(2) Prepare STE/ICE-R Test #50 (TM 9-4910-571-12&P) to adapter fitting.
(3) Start engine (TM 9-2320-365-10).
(4) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
(5) Raise idle speed to 2000 rpm for 10 seconds.
(6) Pressure should read between 39 psi and 58 psi.
(7) Record test results.
(8) Shut down engine (TM 9-2320-365-10).
(9) If pressure is below 39 psi, notify DS Maintenance.



## a12. LOW ENGINE POWER (CONT)

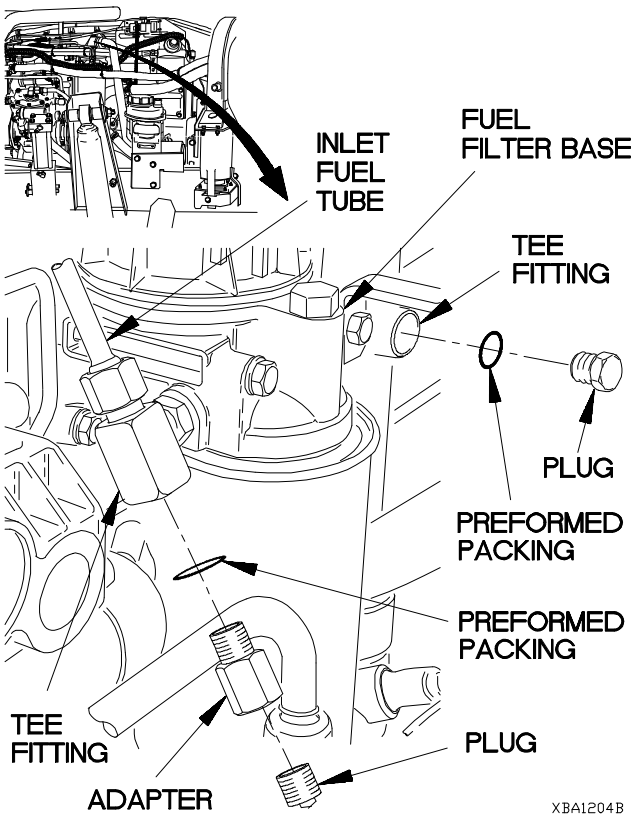


**WARNING**

**Diesel fuel is flammable. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.**

**PRESSURE TEST**

(1) Remove plug from tee fitting on outlet side of fuel filter base.
(2) Remove adapter fitting from tee fitting on inlet side of fuel filter base.
(3) Install plug in tee fitting on inlet side of fuel filter base.
(4) Install adapter fitting in tee fitting on outlet side of fuel filter base.
(5) Prepare STE/ICE-R Test #50 (TM 9-4910-571-12&P) to adapter fitting.
(6) Start engine (TM 9-2320-365-10).
(7) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
(8) Raise idle speed to 2000 rpm for 10 seconds.
(9) Pressure should read between 39 psi and 58 psi.
(10) Record test results.
(11) Shut down engine (TM 9-2320-365-10).
(12) If test results indicate more than 10 psi pressure difference from results of step 5 of this fault, replace fuel filter (para 4-14).
(13) Disconnect STE/ICE-R from adapter fitting.
(14) Remove adapter fitting and preformed packing from tee fitting. Discard preformed packing.
(15) Remove plug and preformed packing from tee fitting on inlet side of fuel filter base. Discard preformed packing.
(16) Install preformed packing, adapter fitting, and plug in tee fitting on inlet side of fuel filter base.
(17) Install preformed packing and plug in tee fitting on outlet side of fuel filter base.
(18) Lower cab (TM 9-2320-365-10).



## 2-13. FUEL SYSTEM TROUBLESHOOTING

This paragraph covers Fuel System Troubleshooting. The Fuel System Fault Index, Table 2-4, lists faults for the fuel system of the vehicle.

***Table 2-4. Fuel System Fault Index***


| Fault No. | Description | Page |
|---|---|---|
| b1. | Engine Cranks But Does Not Start or Engine Stalls After Starting | 2-102 |
| b2. | Ether Starting Aid Does Not Operate | 2-108 |
| b3. | Fuel Consumption Too High | 2-112 |
| b4. | Accelerator Pedal Sticks | 2-114 |

## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).
Cab Raised (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Pan, Drain (Item 24, Appendix C)

**Materials/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)
Packing, Preformed (Item 157, Appendix G)
Packing, Preformed (2) (Item 180, Appendix G)

**NOTE**

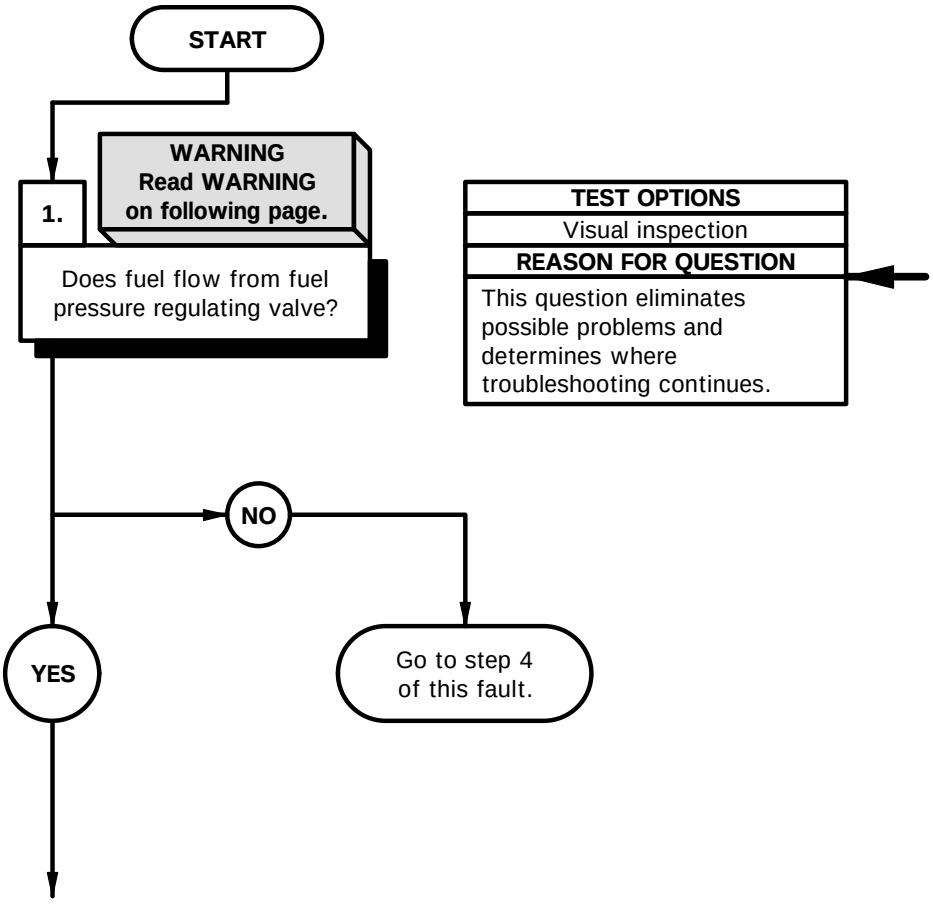
If engine cranks but does not start perform Engine Troubleshooting (a2. Engine Cranks But Does Not Start) prior to beginning this task.

**KNOWN INFO**

Malfunction in fuel system.
Engine cranking speed OK.

**POSSIBLE PROBLEMS**

Fuel contaminated.
Faulty fuel return hose.
Faulty fuel transfer hose.
Faulty fuel transfer pump.
Faulty fuel tubes.
Faulty fuel filter.
Faulty fuel pressure regulating valve.
Faulty orifice tube assembly.
Faulty fuel supply hose.
Faulty fuel tank.
Faulty fuel/water separator.
Faulty cylinder head.




**TEST OPTIONS**
Visual inspection

**REASON FOR QUESTION**
This question eliminates possible problems and determines where troubleshooting continues.

**WARNING**

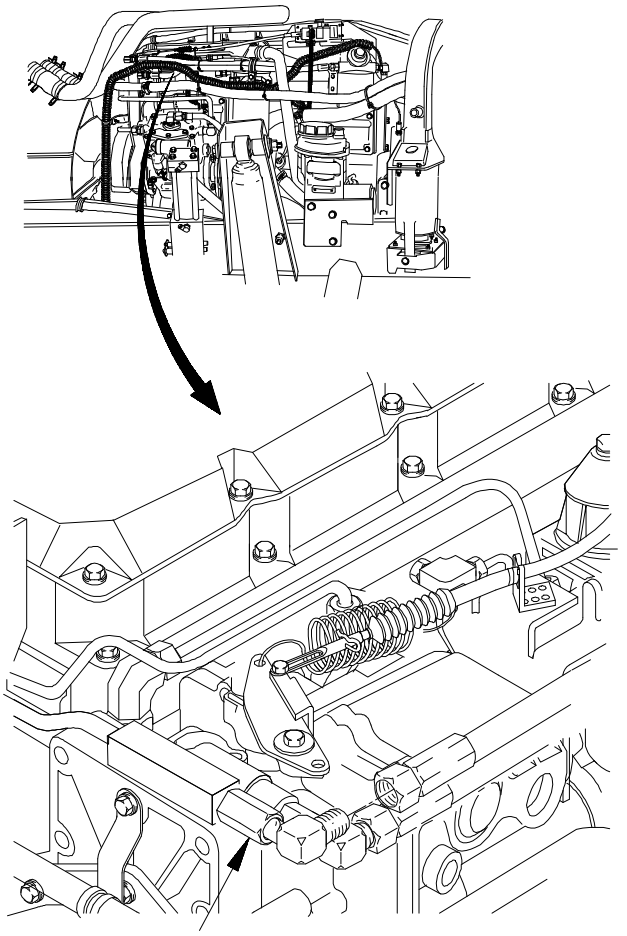
**Post signs that read "NO SMOKING WITHIN 50 FEET" when working with open fuel, fuel lines, or open fuel tanks. Failure to comply may result in injury to personnel or damage to equipment.**

**Diesel fuel is flammable. If fuel is spilled, clean up immediately. Failure to comply may result in serious injury or death to personnel.**

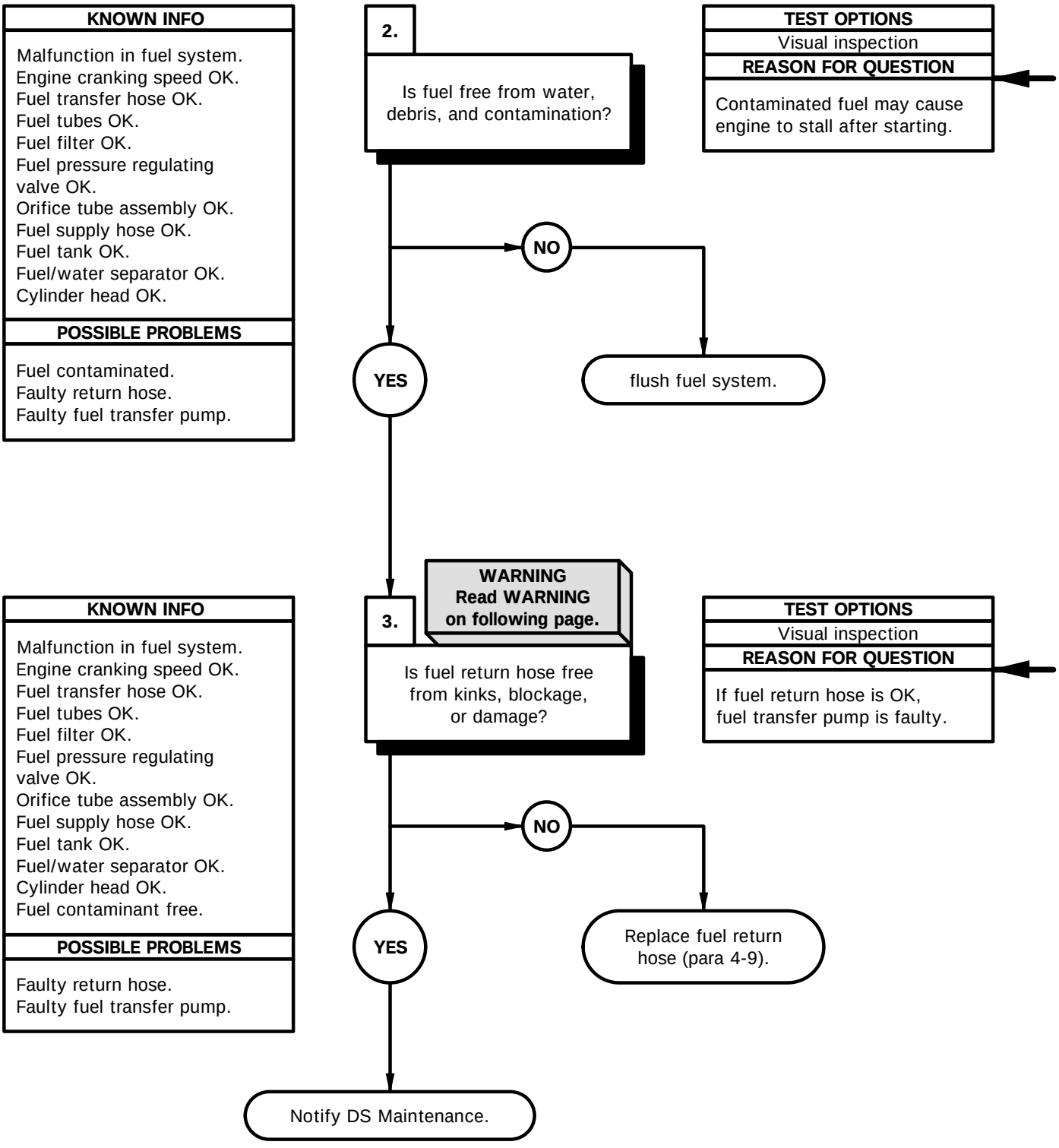
**NOTE**

Remove plastic cable ties as required.

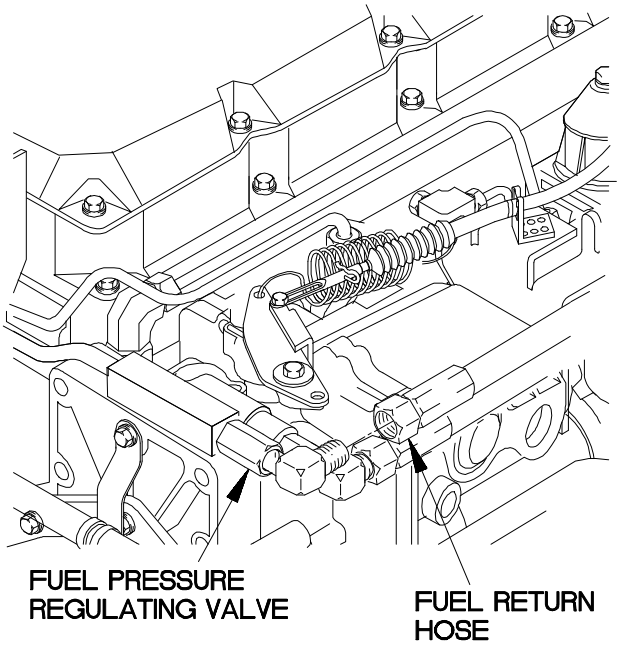
(1) Perform Fuel System Bleeding (para 4-11).
(2) If fuel flow is not present from fuel pressure regulating valve, go to step 4 of this fault.
(3) If fuel flow is present, collect fuel sample.



## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING (CONT)



(1) Check fuel sample from step 1 for water, debris, and contamination.
(2) If fuel is not free from contamination, flush fuel tank, fuel hoses, and replace fuel filters.

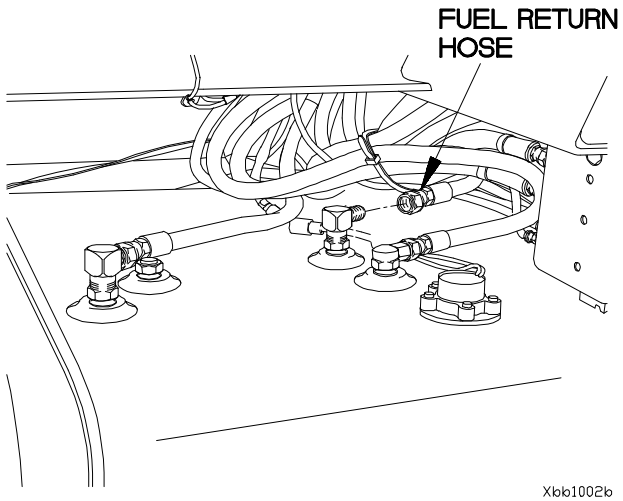



**WARNING**

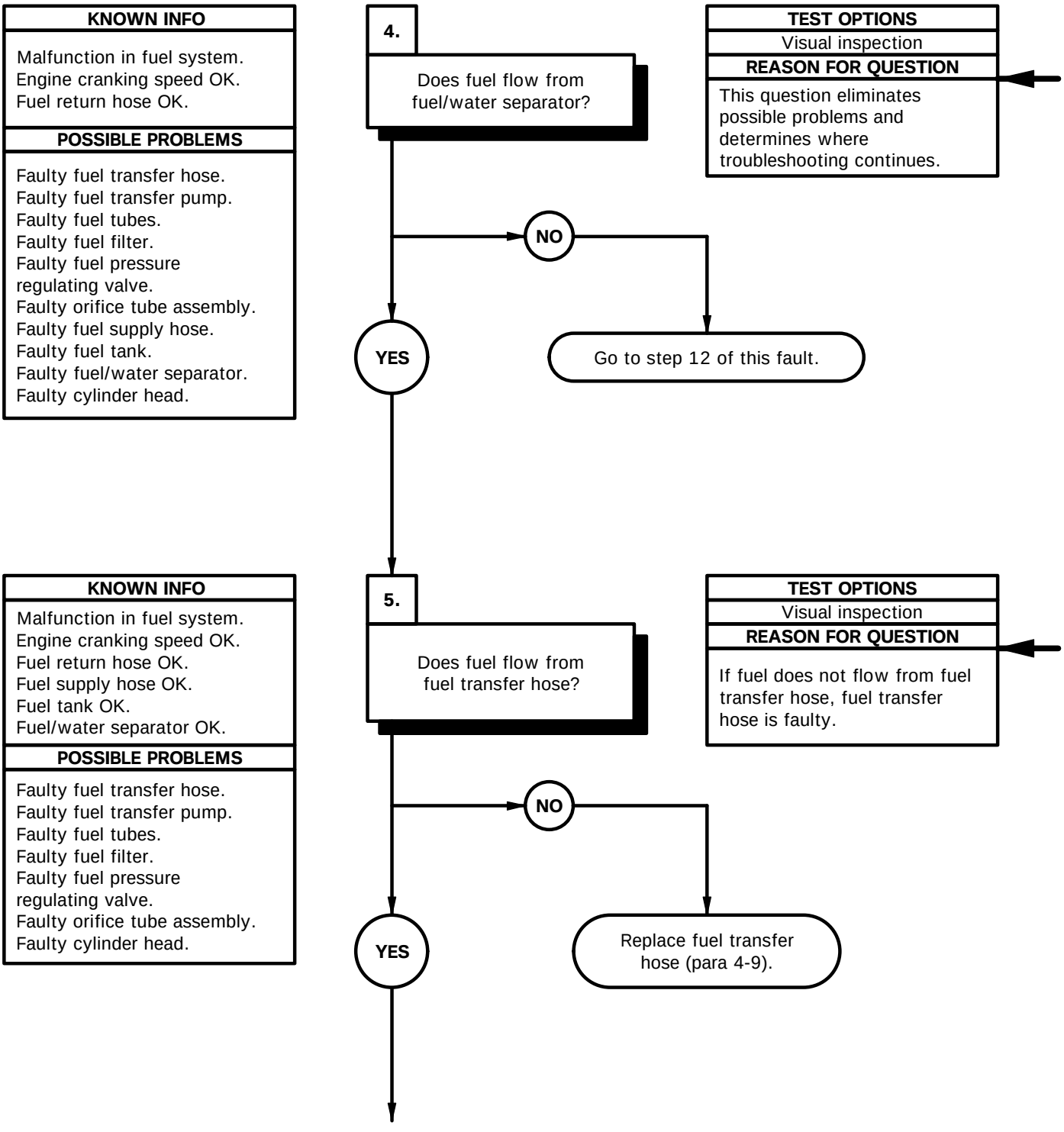
**Compressed air used for cleaning purposes will not exceed 30 psi (207 Kpa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

**Diesel fuel is flammable. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.**

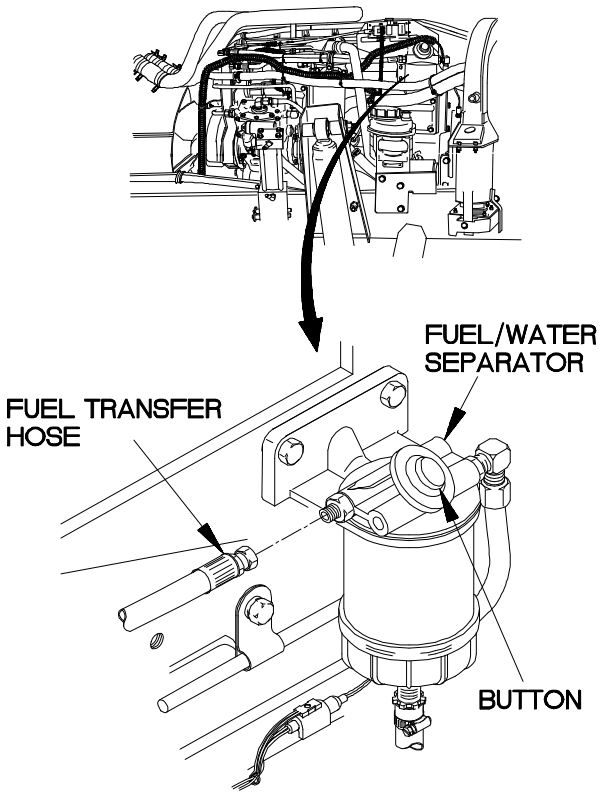
(1) Disconnect fuel return hose from fuel pressure regulating valve.
(2) Disconnect fuel return hose from fuel tank.
(3) Apply compressed air to one end of fuel return hose.
(4) If compressed air does not flow freely through fuel return hose, replace fuel return hose (para 4-9).
(5) If compressed air flows freely through fuel return hose, notify DS Maintenance.
(6) Connect fuel return hose to fuel pressure regulating valve.
(7) Connect fuel return hose to fuel tank.



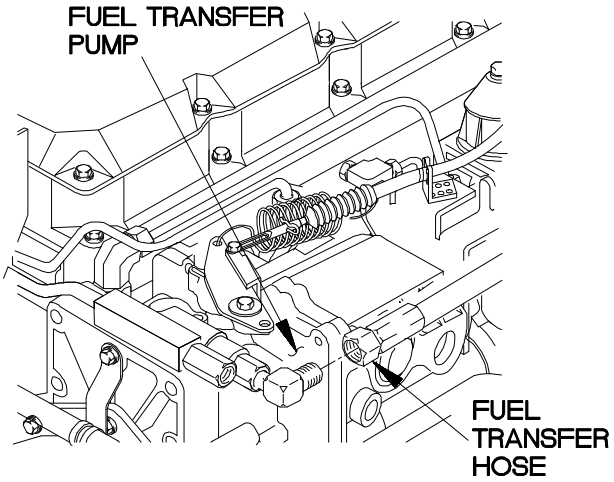
## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING (CONT)



(1) Disconnect fuel transfer hose from fuel/ water separator.
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from fuel/water separator, go to step 12 of this fault.
(4) Connect fuel transfer hose to fuel/water separator.



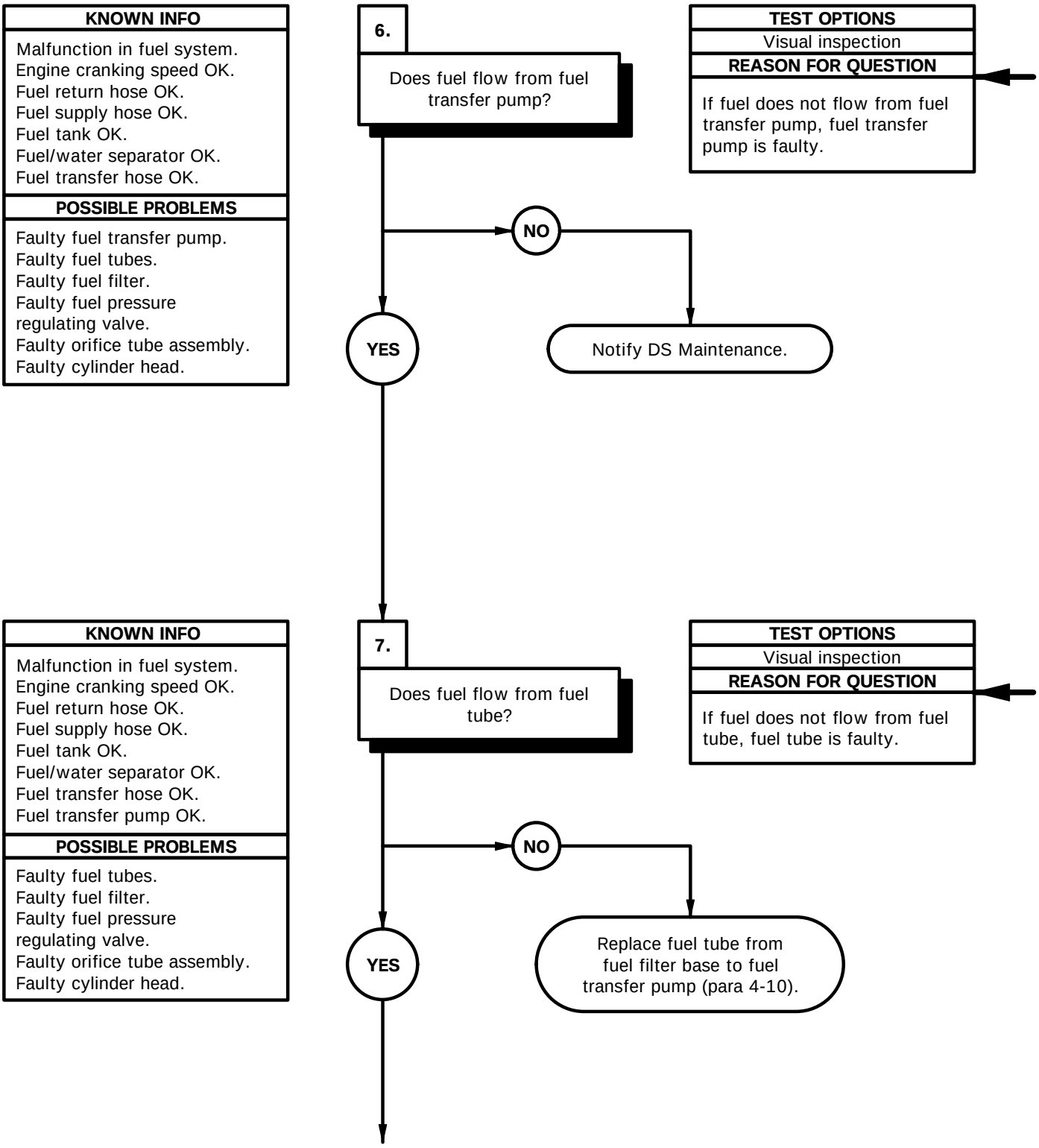

(1) Disconnect fuel transfer hose from fuel transfer pump.
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from fuel transfer hose, replace fuel transfer hose (para 4-9).
(4) Connect fuel transfer hose to fuel transfer pump.



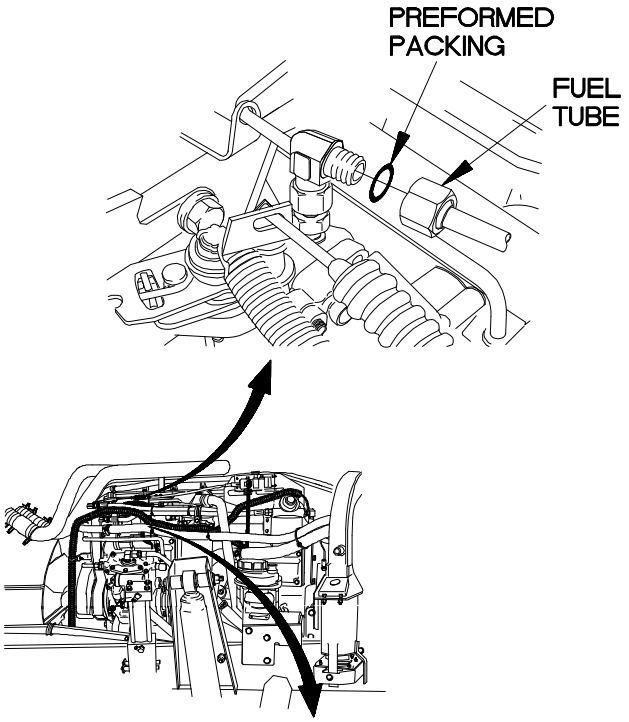

FUEL RETURN HOSE AND FITTING REMOVED FOR CLARITY

Xbb1003b

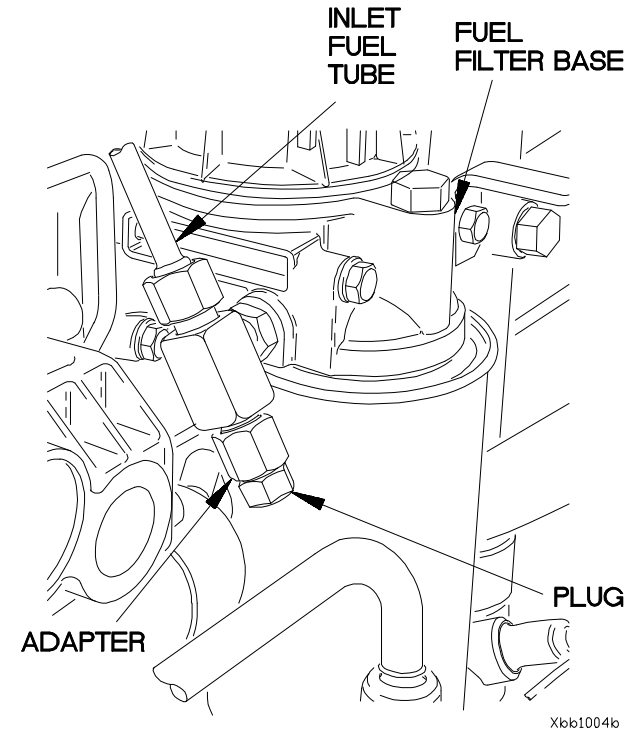
## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING (CONT)



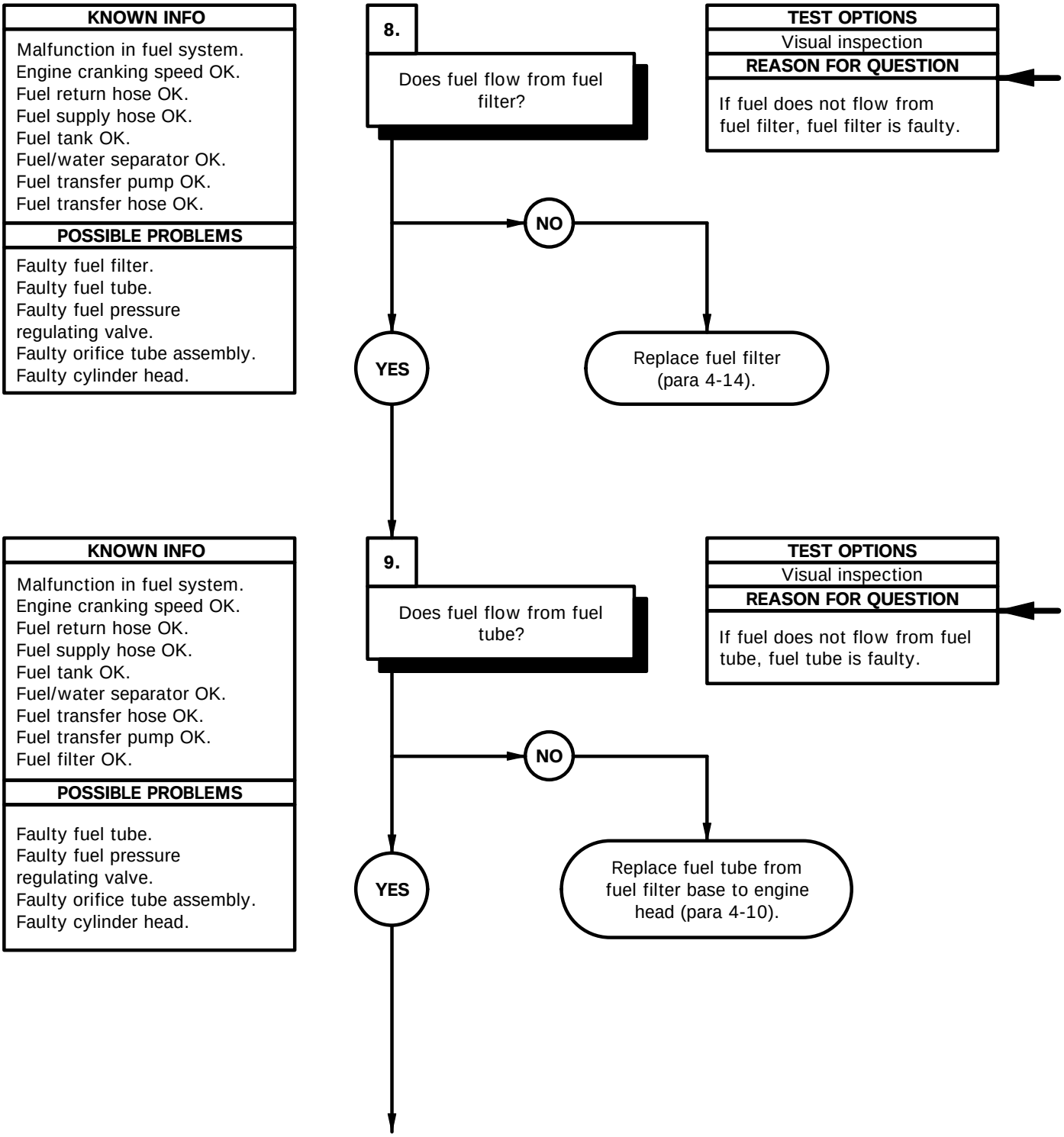
(1) Disconnect fuel tube from fuel transfer pump. discard preformed packing.
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from fuel transfer pump, notify DS Maintenance.
(4) Install preformed packing and fuel tube on fuel transfer pump.



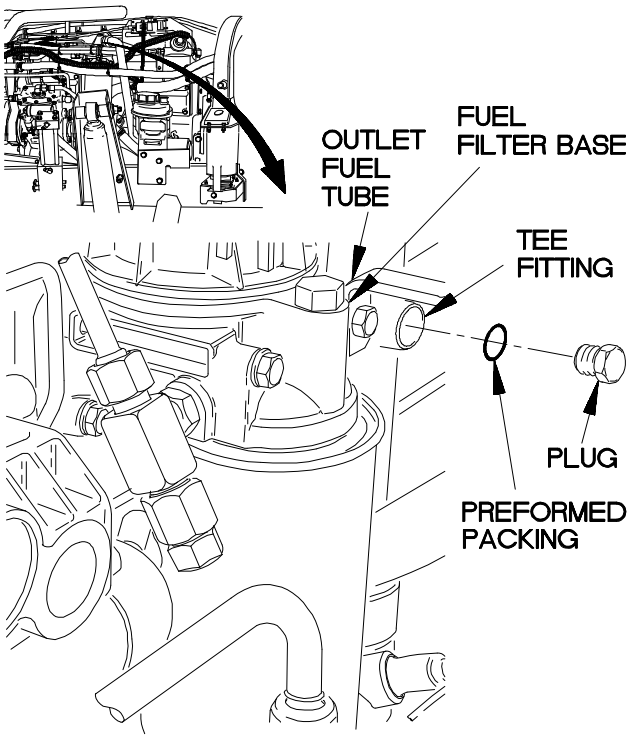

(1) Remove plug from adapter fitting on inlet side of fuel filter base.
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from fuel tube, replace fuel tube from fuel filter base to fuel transfer pump (para 4-10).
(4) Install plug in adapter fitting on inlet side of fuel filter base.



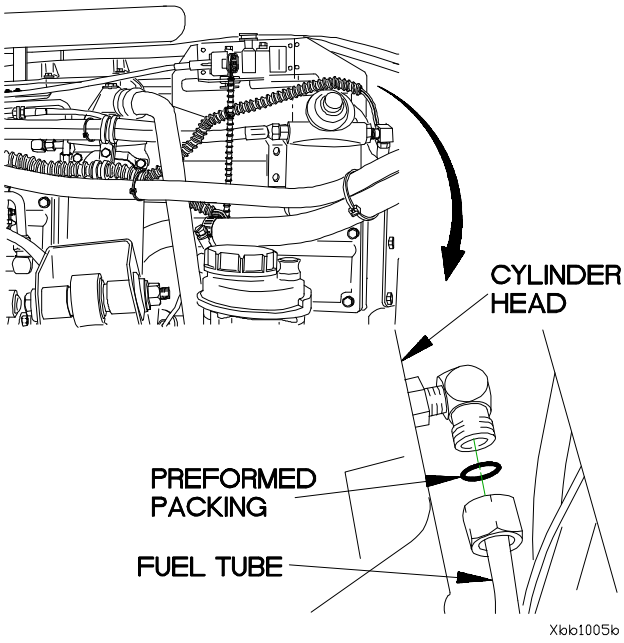
## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING (CONT)



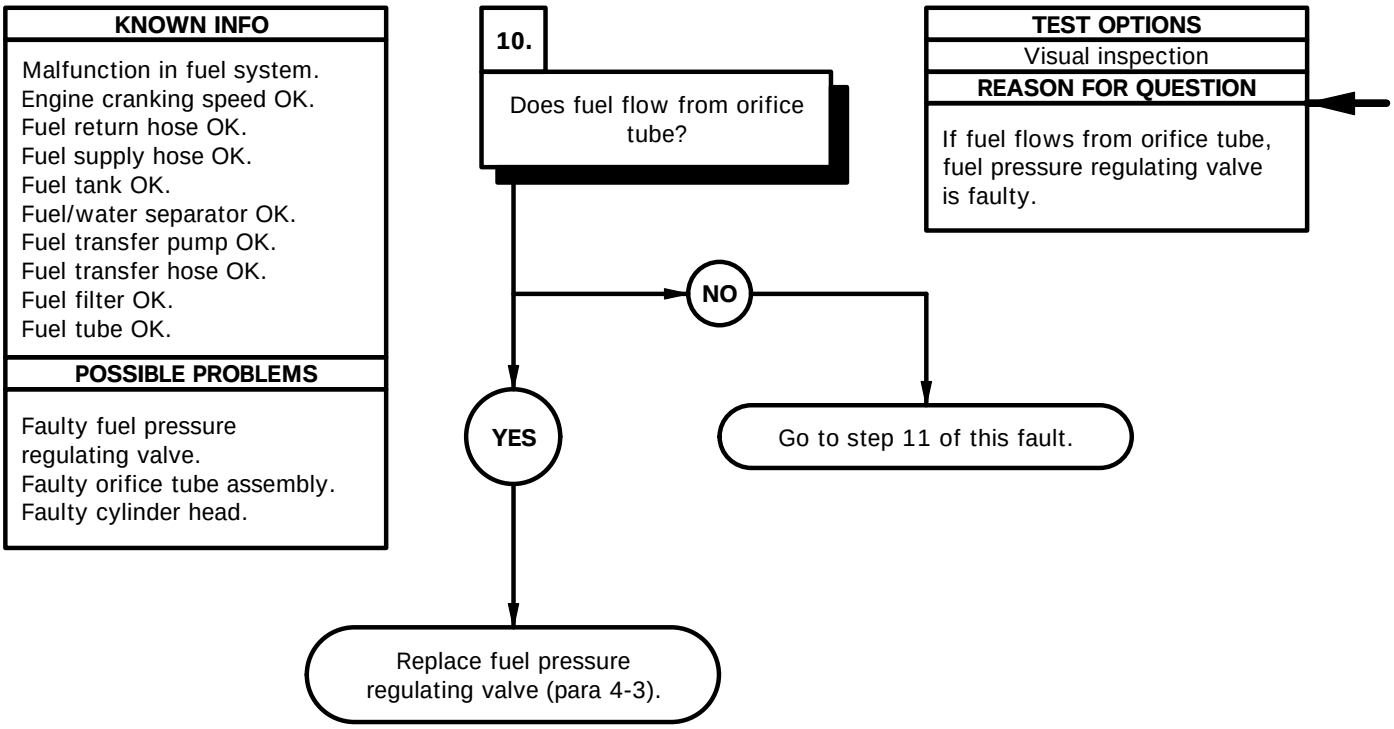
(1) Remove plug and preformed packing from tee fitting on outlet side of fuel filter base. discard preformed packing.
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from fuel filter, replace fuel filter (para 4-14).
(4) Install preformed packing and plug in tee fitting on outlet side of fuel filter base.

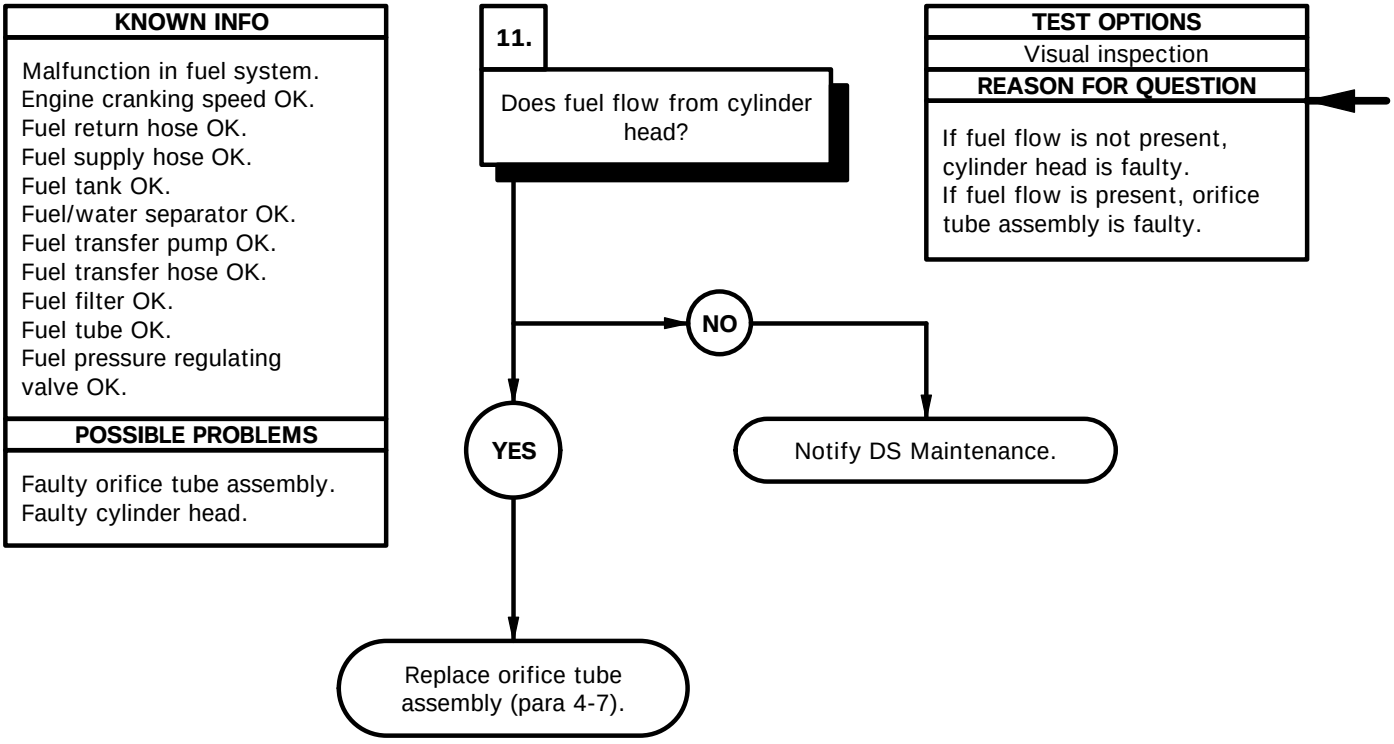



(1) Disconnect fuel tube from cylinder head. Discard preformed packing.
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from fuel tube, replace fuel tube from fuel filter base to cylinder head (para 4-10).
(4) Install preformed packing and fuel tube on cylinder head.

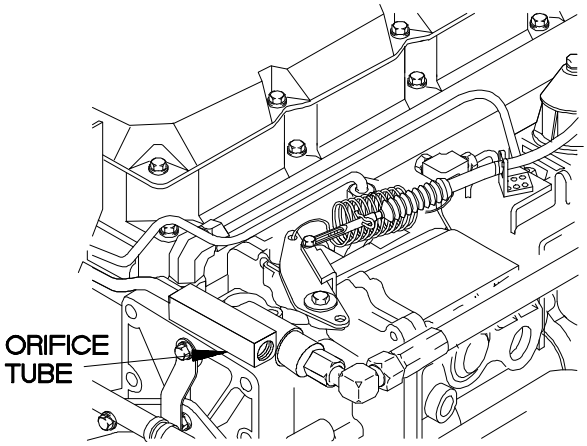


## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING (CONT)

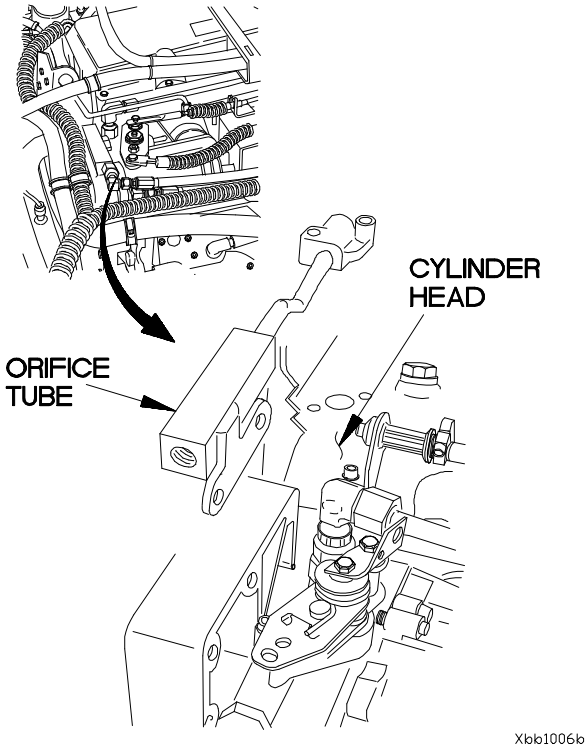


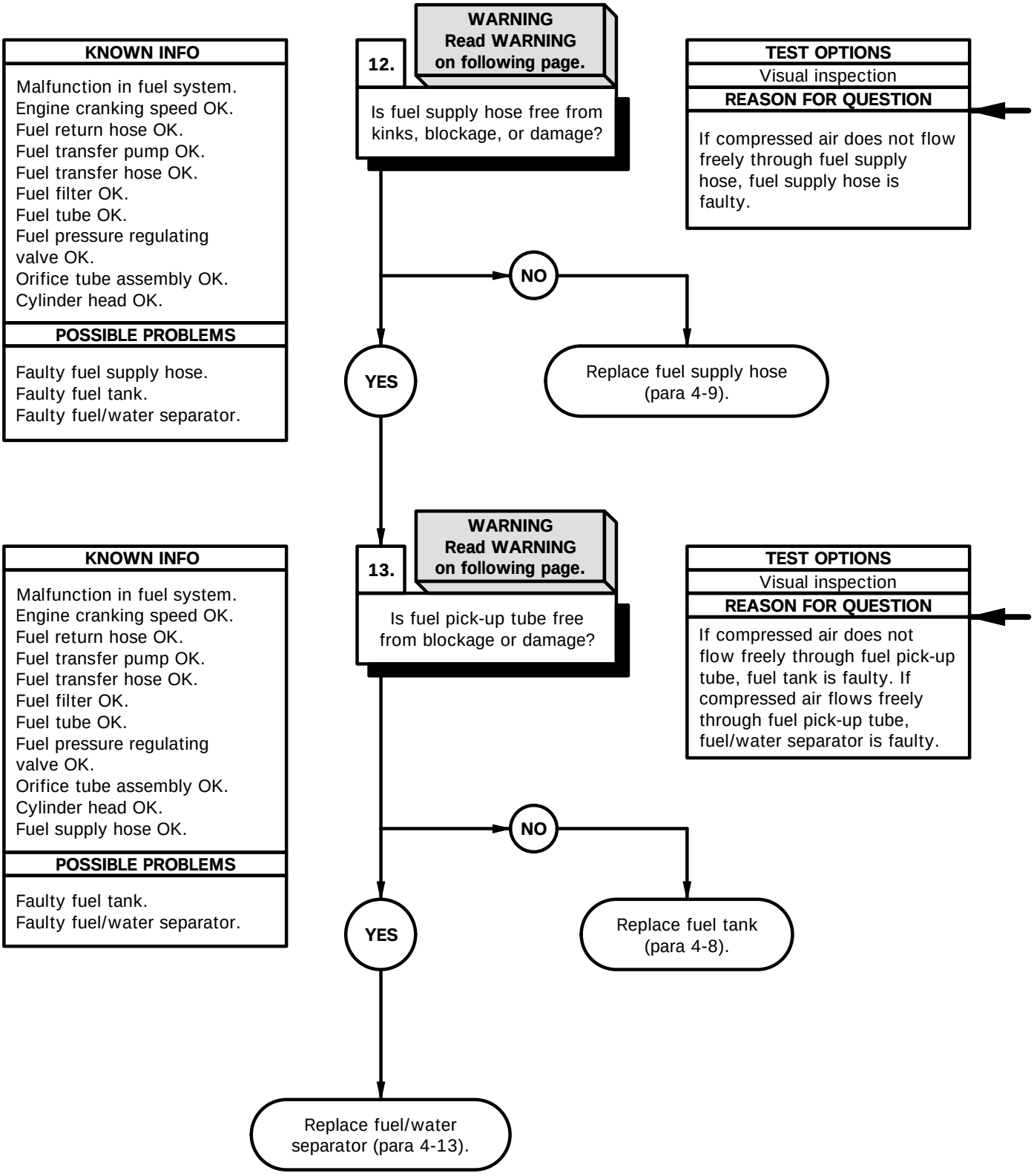
(1) Remove fuel pressure regulating valve (para 4-3).
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from orifice tube, go to step 11 of this fault.
(4) If fuel flow is present, replace fuel pressure regulating valve (para 4-3).




(1) Remove orifice tube assembly (para 4-7).
(2) Depress button on fuel/water separator as many times as necessary to get a steady stream of clear fuel.
(3) If fuel does not flow from cylinder head, notify DS Maintenance.
(4) If fuel flow is present, replace orifice tube assembly (para 4-7).
(5) Install orifice tube assembly (para 4-7).
(6) Install fuel pressure regulating valve (para 4-3).



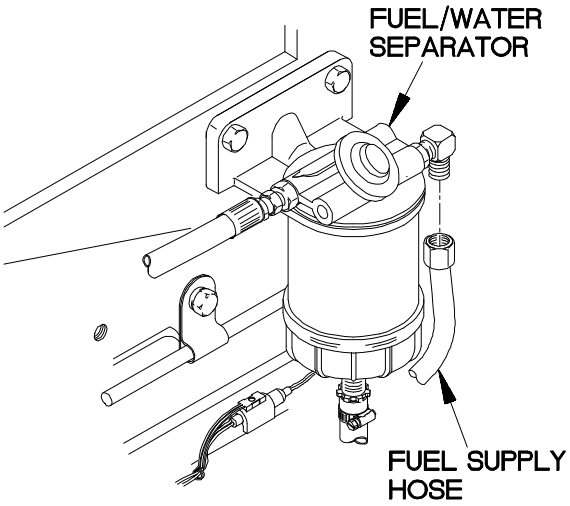
## b1. ENGINE CRANKS BUT DOES NOT START OR ENGINE STALLS AFTER STARTING (CONT)



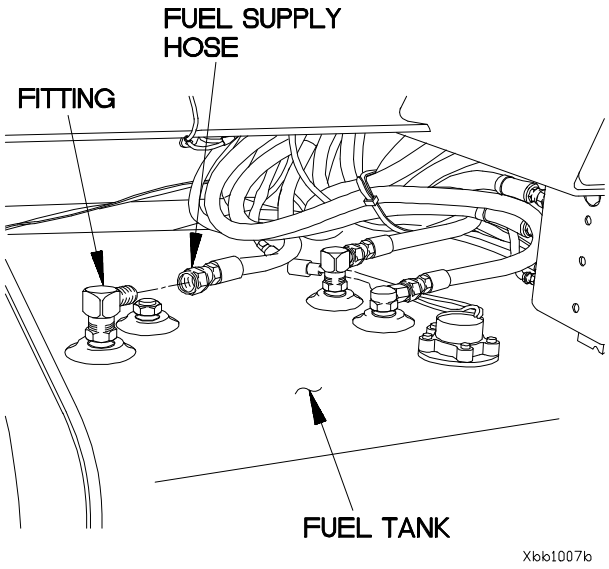
**WARNING**

**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.**

(1) Disconnect fuel supply hose from fuel/water separator.
(2) Disconnect fuel supply hose from fuel tank.
(3) Apply compressed air to one end of fuel supply hose.
(4) If compressed air does not flow freely through fuel supply hose, replace fuel supply hose (para 4-9).
(5) Connect fuel supply hose to fuel/water separator.



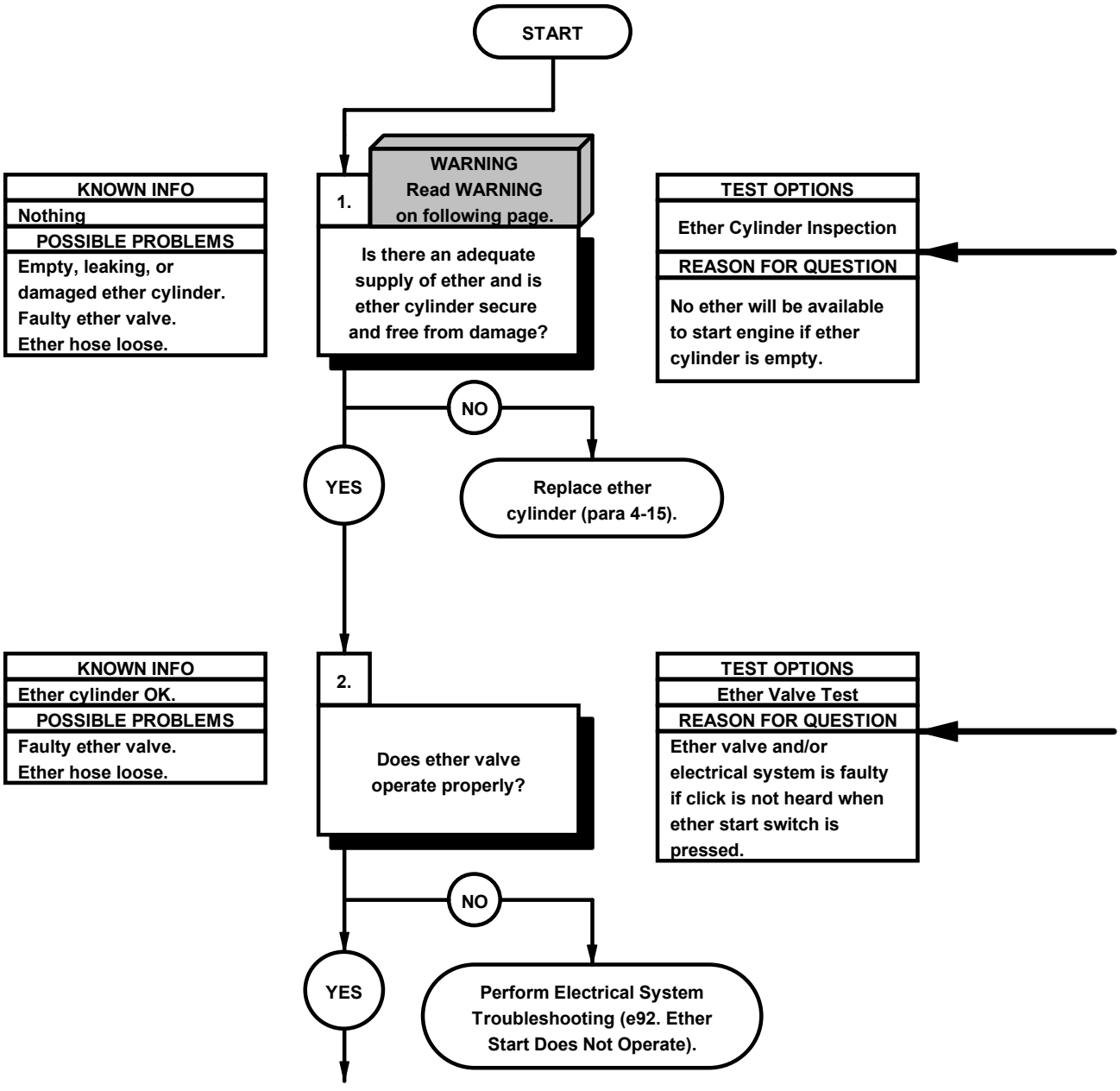

(1) Remove fuel cap from fuel tank.
(2) Apply compressed air to 90° degree fitting on fuel tank and listen for air bubbles in fuel tank.
(3) If air flow is not present, replace fuel tank (para 4-8).
(4) If air flow is present, replace fuel/water separator (para 4-13).
(5) Connect fuel supply hose to fuel tank.
(6) Install fuel cap on fuel tank.



**b2. ETHER STARTING AID DOES NOT OPERATE**

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).
Spare tire lowered (TM 9-2320-365-10).



**WARNING**

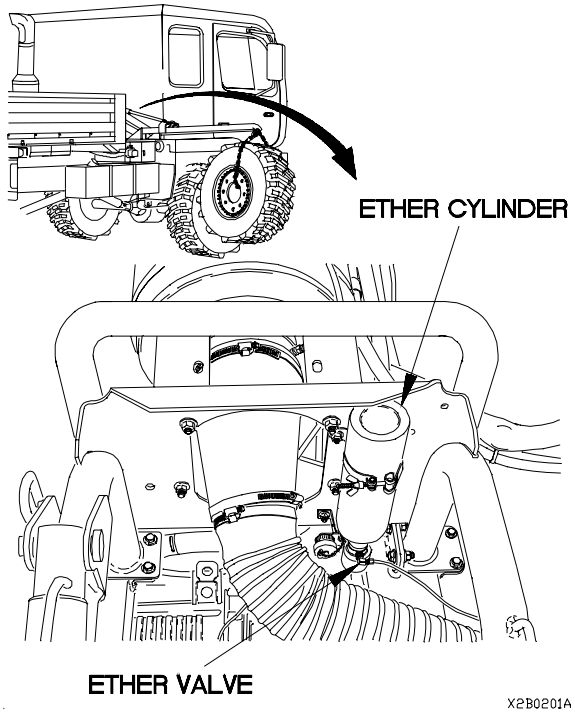
**Starting fluid is toxic and highly flammable. Container is pressurized. NEVER heat container and NEVER discharge starting fluid in confined areas or near open flame. Failure to comply may result in serious injury or death to personnel.**

**NOTE**

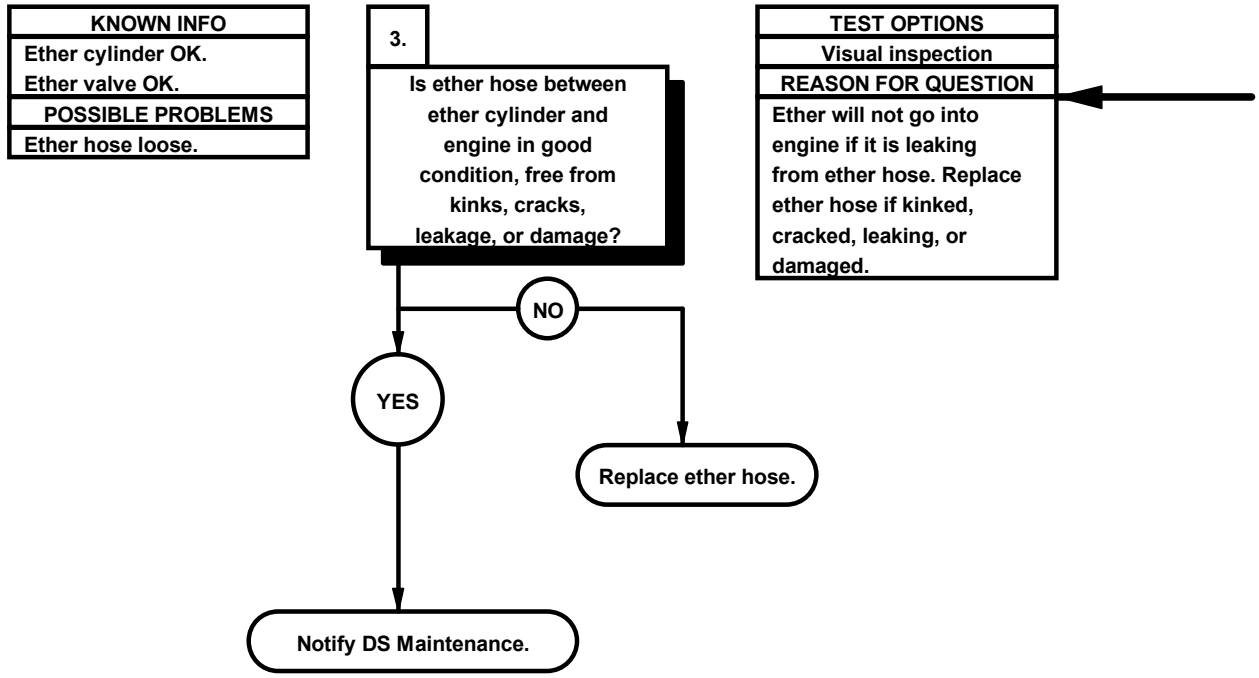
**Temperature at engine block must be below 100° F (38° C) before ether starting aid will work.**

| ETHER CYLINDER INSPECTION |
|---|
| (1) Remove ether cylinder (para 4-15). |
| (2) Shake ether cylinder to determine if ether is present. |
| (3) Check ether cylinder for damage. |
| (4) Install ether cylinder (para 4-15). |

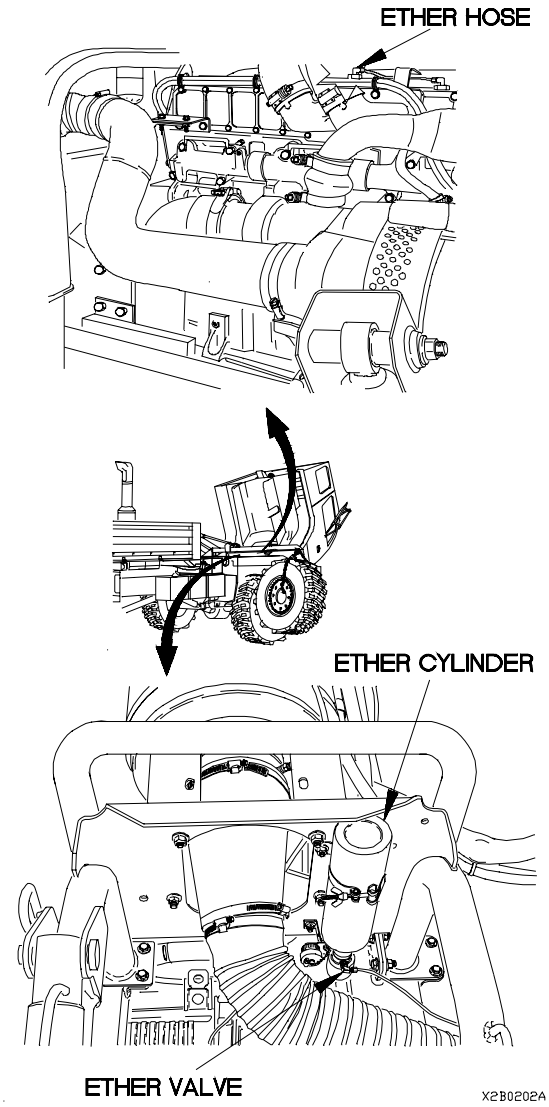
| ETHER VALVE TEST |
|---|
| (1) Position master power switch to on (TM 9-2320-365-10). |
| (2) Press ether start switch (TM 9-2320-365-10) and listen for ether valve to click. |
| (3) Position master power switch to off (TM 9-2320-365-10). |



## b2. ETHER STARTING AID DOES NOT OPERATE (CONT)



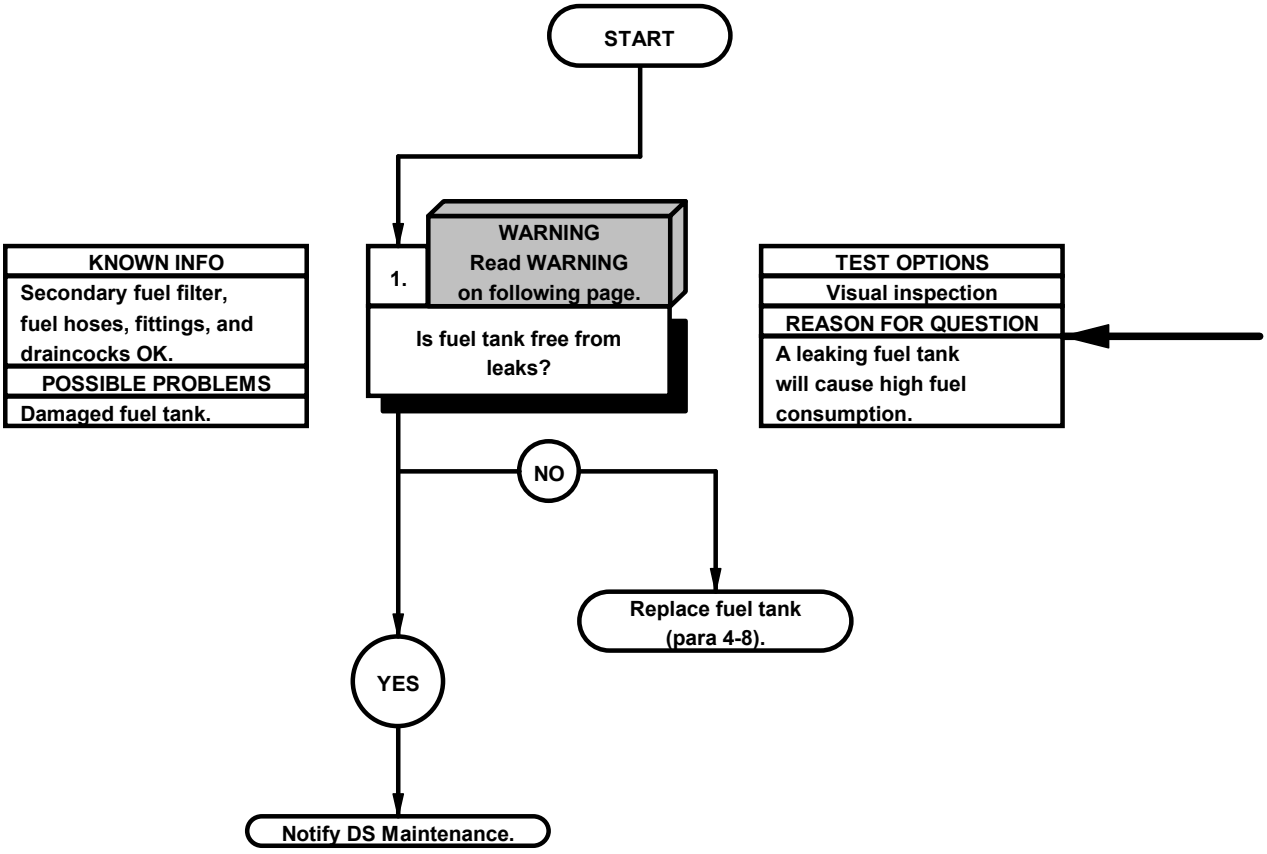
(1) Raise cab (TM 9-2320-365-10).
(2) Check ether hose between ether cylinder and engine for leaks and damage.
(3) Lower cab (TM 9-2320-365-10).



**b3. FUEL CONSUMPTION TOO HIGH**

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

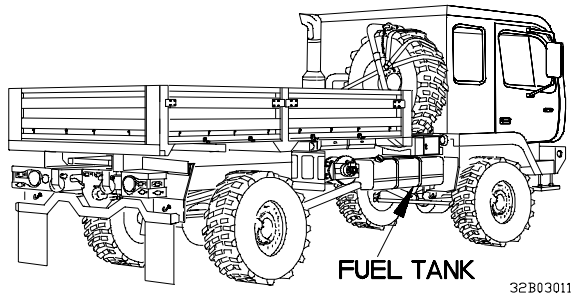


**WARNING**

**Diesel fuel is flammable. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.**

**(1) Check fuel tank for damage, and for loose or missing mounting hardware.**

**(2) If fuel tank is damaged, replace fuel tank (para 4-8).**

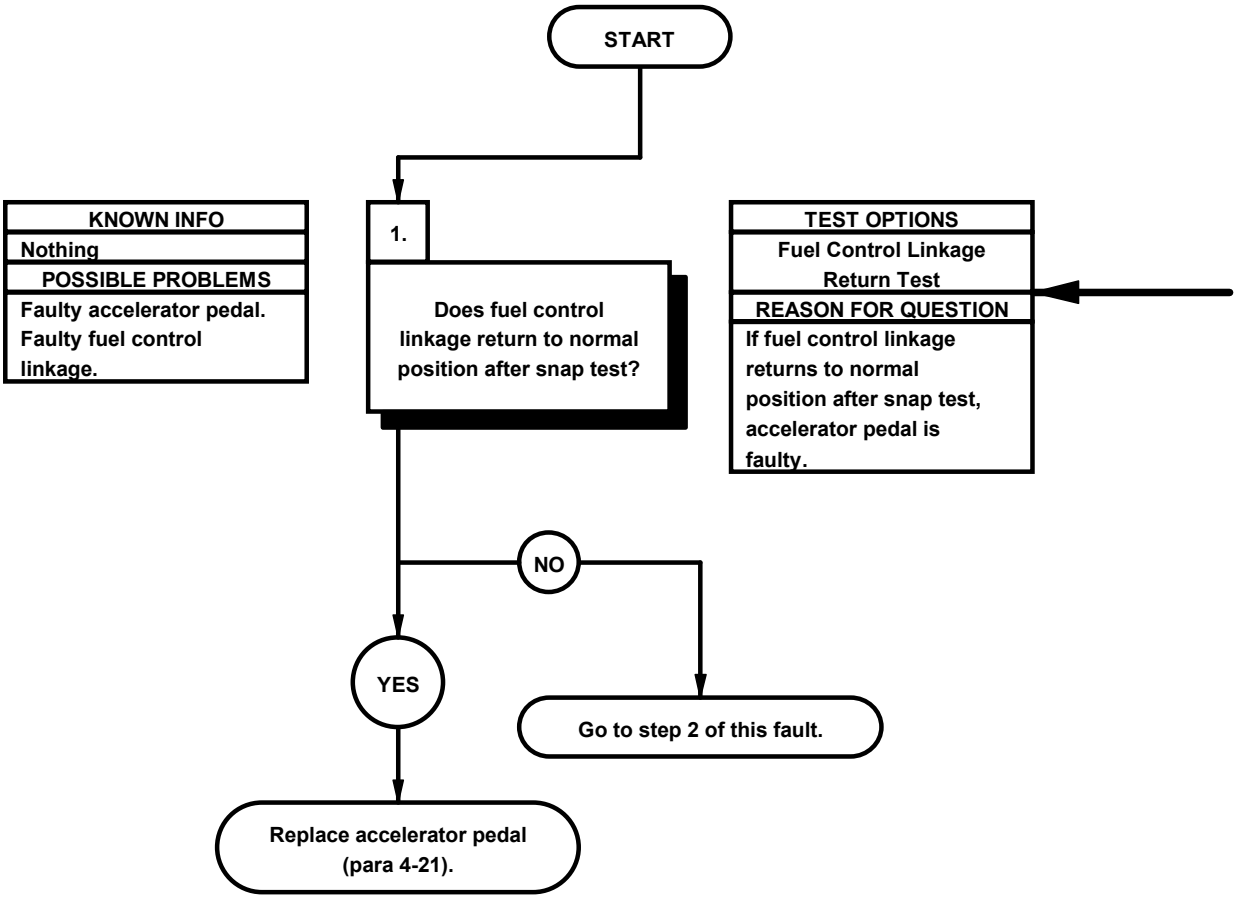


**b4. ACCELERATOR PEDAL STICKS**

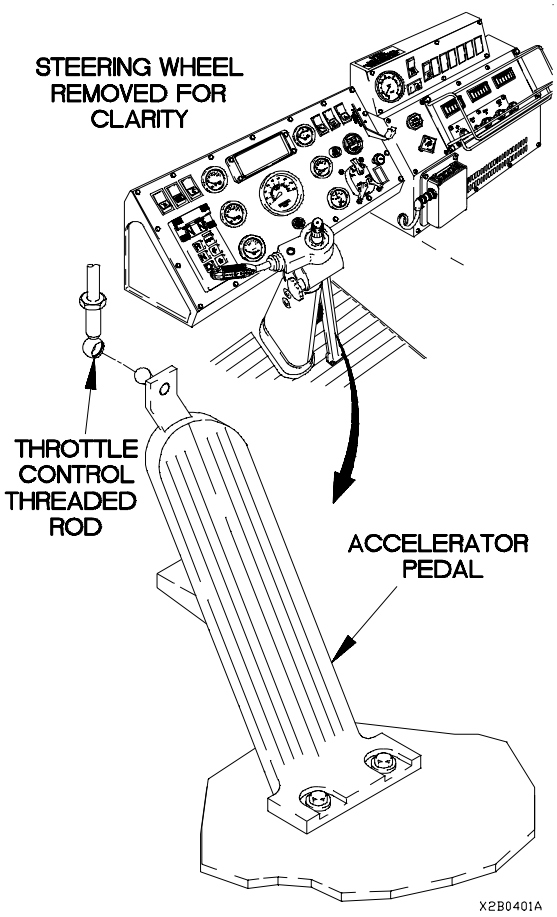
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

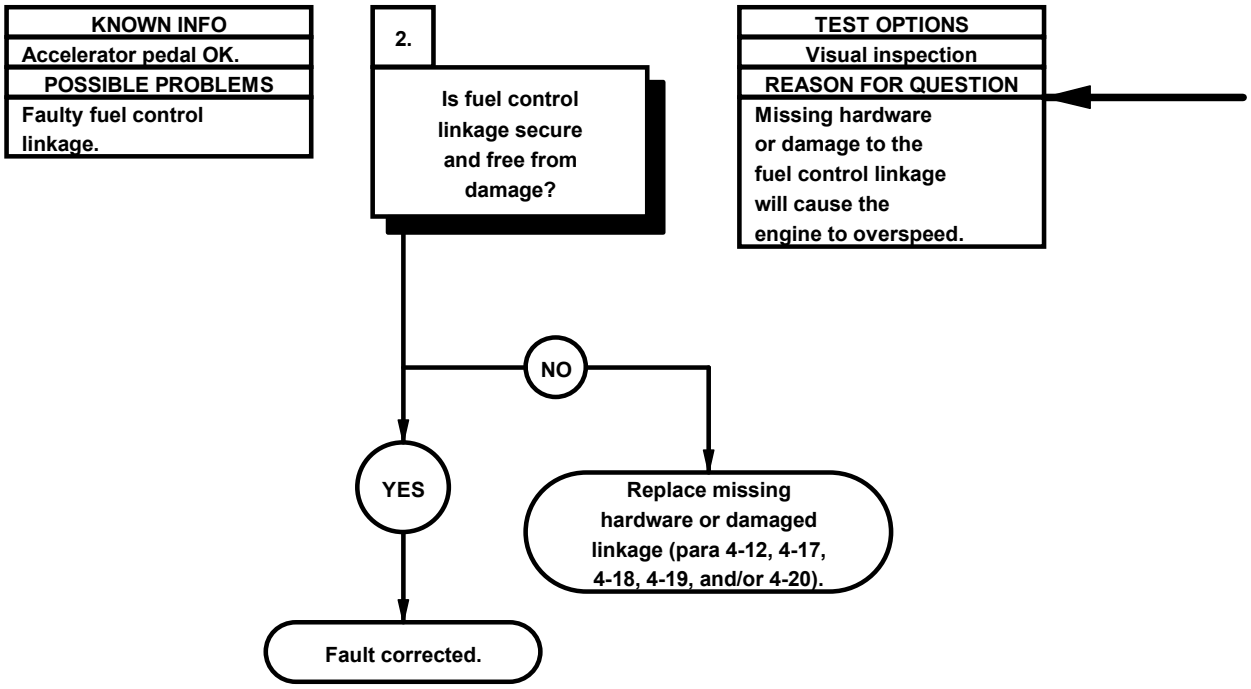
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)



| FUEL CONTROL LINKAGE RETURN TEST |
| --- |
| (1) Disconnect accelerator pedal from throttle control threaded rod (para 4-21). |
| (2) Pull down throttle control threaded rod and release. |
| (3) If throttle control threaded rod snapped back to normal position, replace accelerator pedal (para 4-21). |
| (4) If throttle control threaded rod did not snap back to normal position, go to step 2 of this fault. |
| (5) Connect accelerator pedal to throttle control threaded rod (para 4-21). |



## b4. ACCELERATOR PEDAL STICKS (CONT)



(1) Remove instrument panel assembly (para 7-15).
(2) Check fuel control linkage for improper assembly, missing hardware, damaged parts, and proper lubrication (para 4-17, 4-19, and 4-20).
(3) Install instrument panel assembly (para 7-15).
(4) Raise cab (TM 9-2320-365-10).
(5) Check fuel control linkage for improper assembly, missing hardware, and damaged parts (para 4-16, 4-12, and 4-18).
(6) Lower cab (TM 9-2320-365-10).

## 2-14. EXHAUST SYSTEM TROUBLESHOOTING

This paragraph covers Exhaust System Troubleshooting. The Exhaust System Fault Index, Table 2-5, lists faults for the exhaust system of the vehicle.

***Table 2-5. Exhaust System Fault Index***

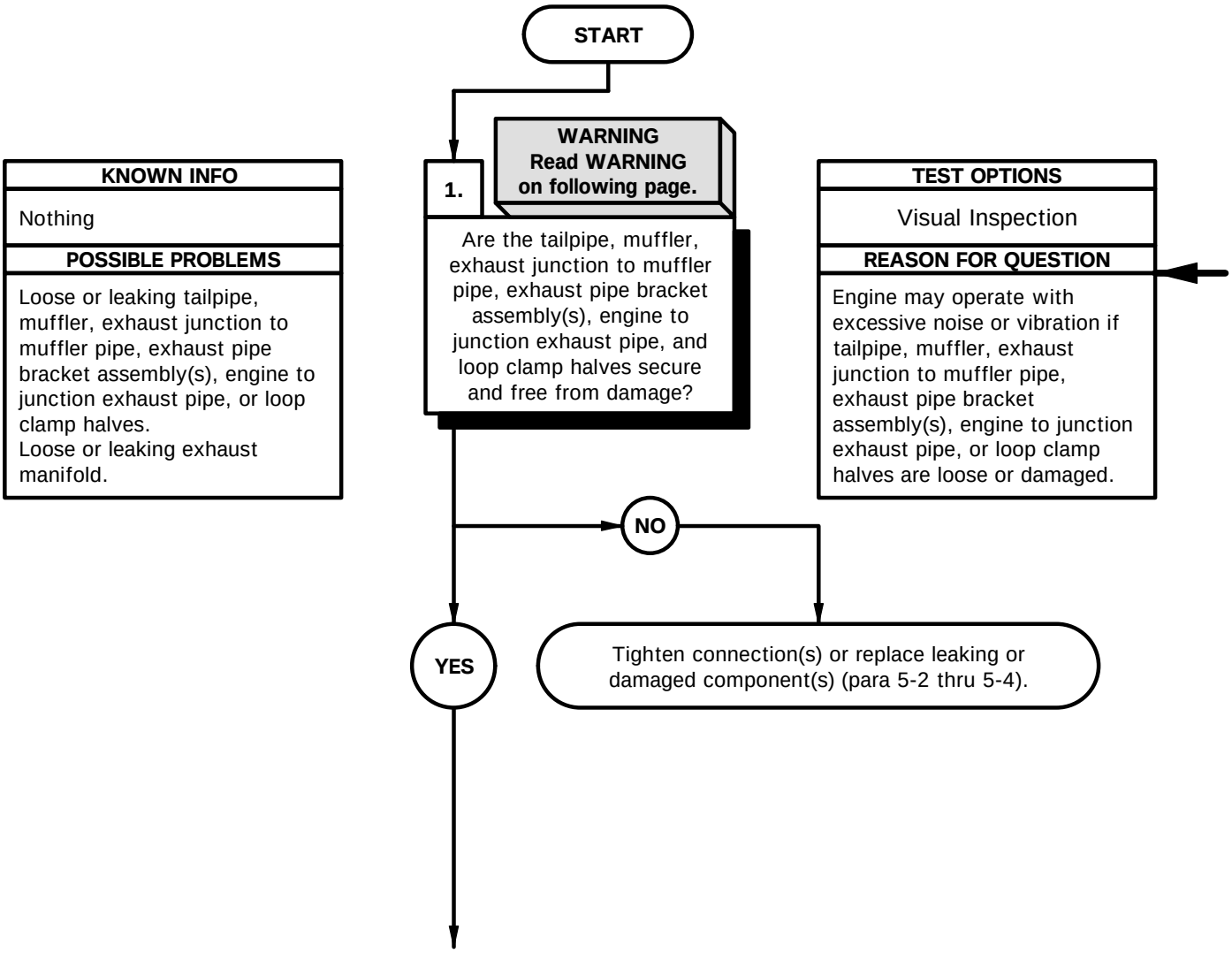

| Fault No. | Description | Page |
|---|---|---|
| c1. | Exhaust System Unusually Noisy or Vibrates Excessively During Engine Operation | 2-120 |
| c2. | Exhaust Fumes in Cab | 2-124 |

## c1. EXHAUST SYSTEM UNUSUALLY NOISY OR VIBRATES EXCESSIVELY DURING ENGINE OPERATION

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Goggles, Industrial (Item 15, Appendix C)



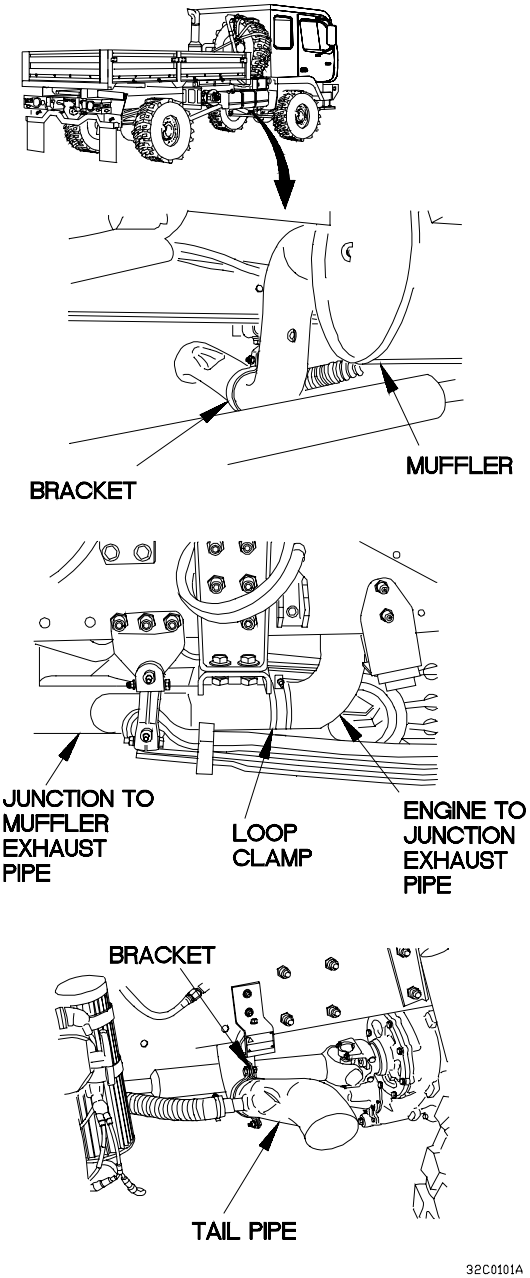
**WARNING**

**Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.**

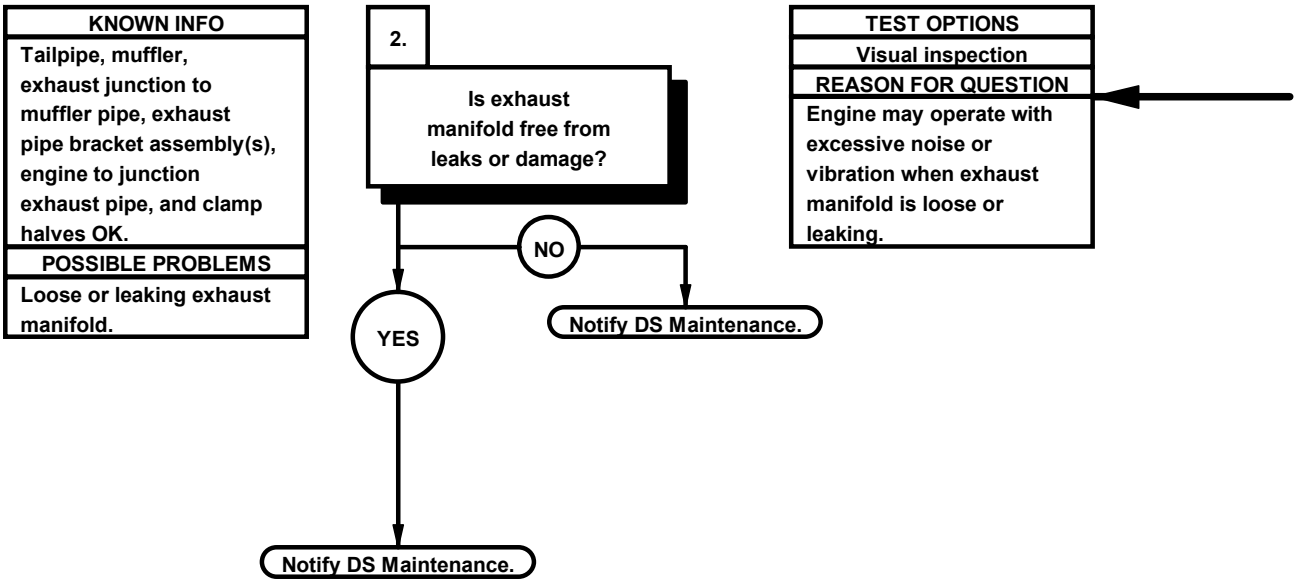
**NOTE**

**Exhaust system component hardware has to be torqued. Refer to para 5-2 thru 5-4.**

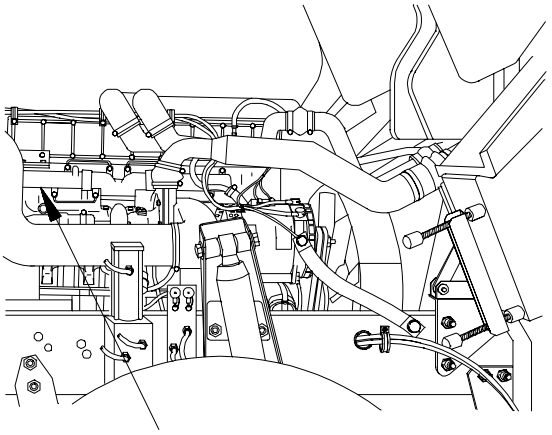
**Check tailpipe, muffler, and exhaust pipes for loose connections and damage.**



## c1. EXHAUST SYSTEM UNUSUALLY NOISY OR VIBRATES EXCESSIVELY DURING ENGINE OPERATION (WITHOUT EXHAUST RESTRICTOR) (CONT)



(1) Start engine (TM 9-2320-365-10).
(2) Check exhaust manifold for looseness or evidence of exhaust leakage.
(3) Shut down engine (TM 9-2320-365-10).
(4) Lower cab (TM 9-2320-365-10).

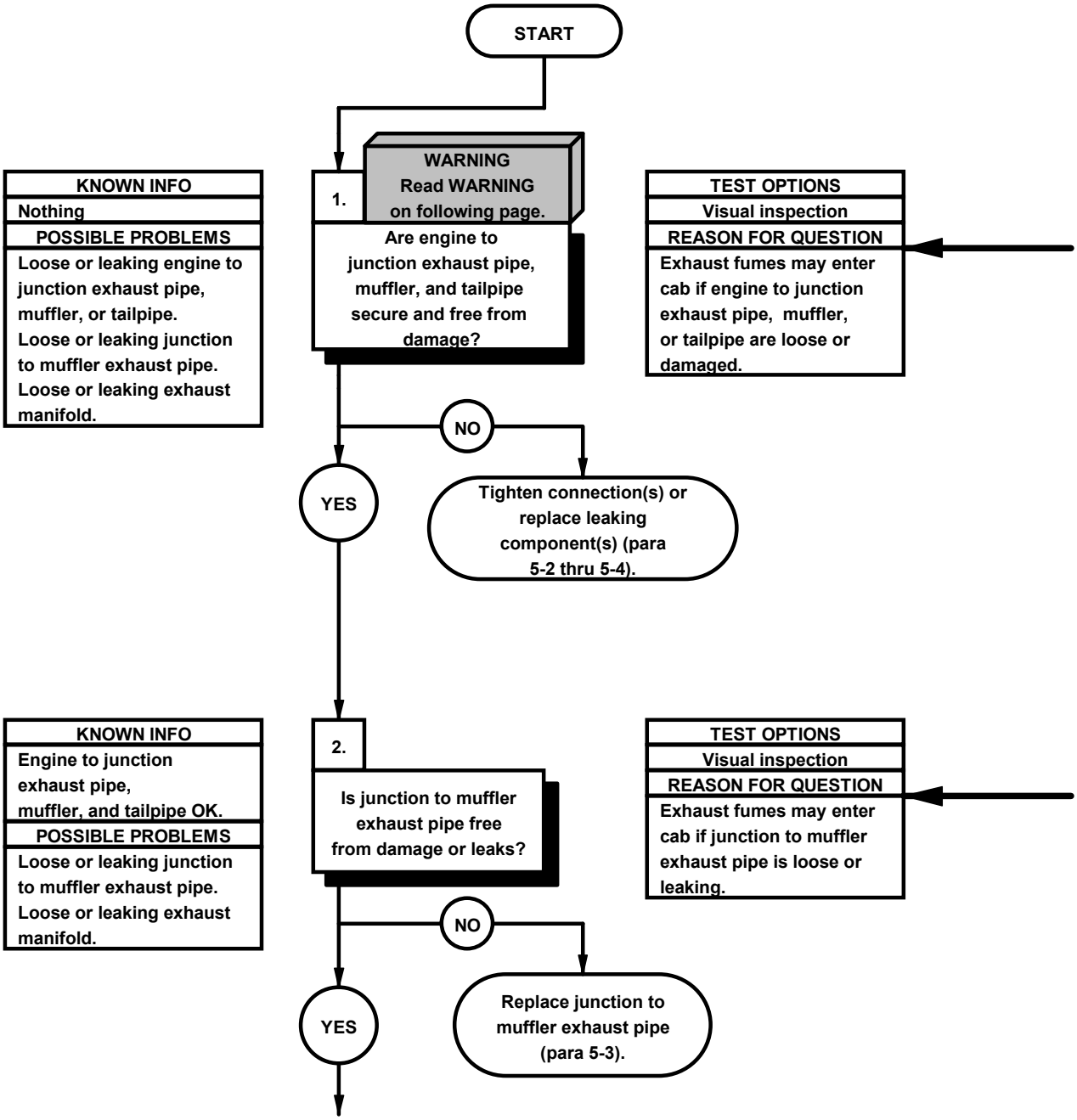



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**c2. EXHAUST FUMES IN CAB**

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).



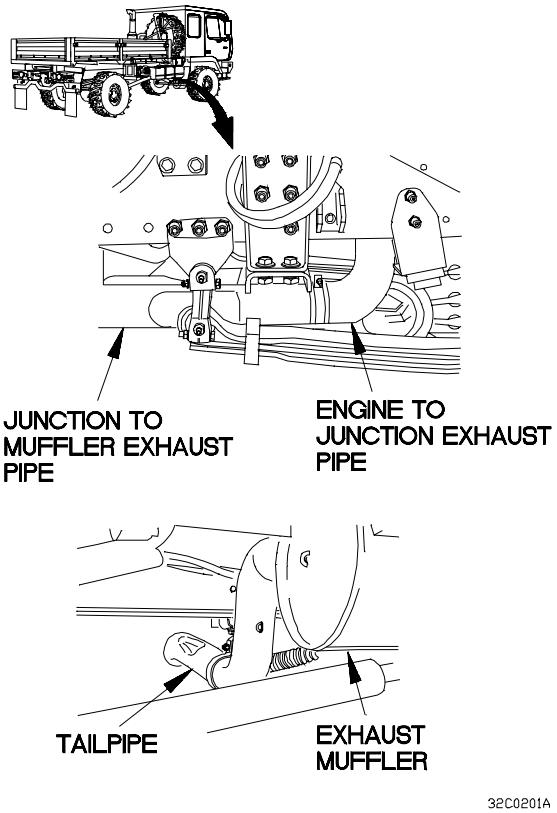
**WARNING**

**Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.**

**NOTE**

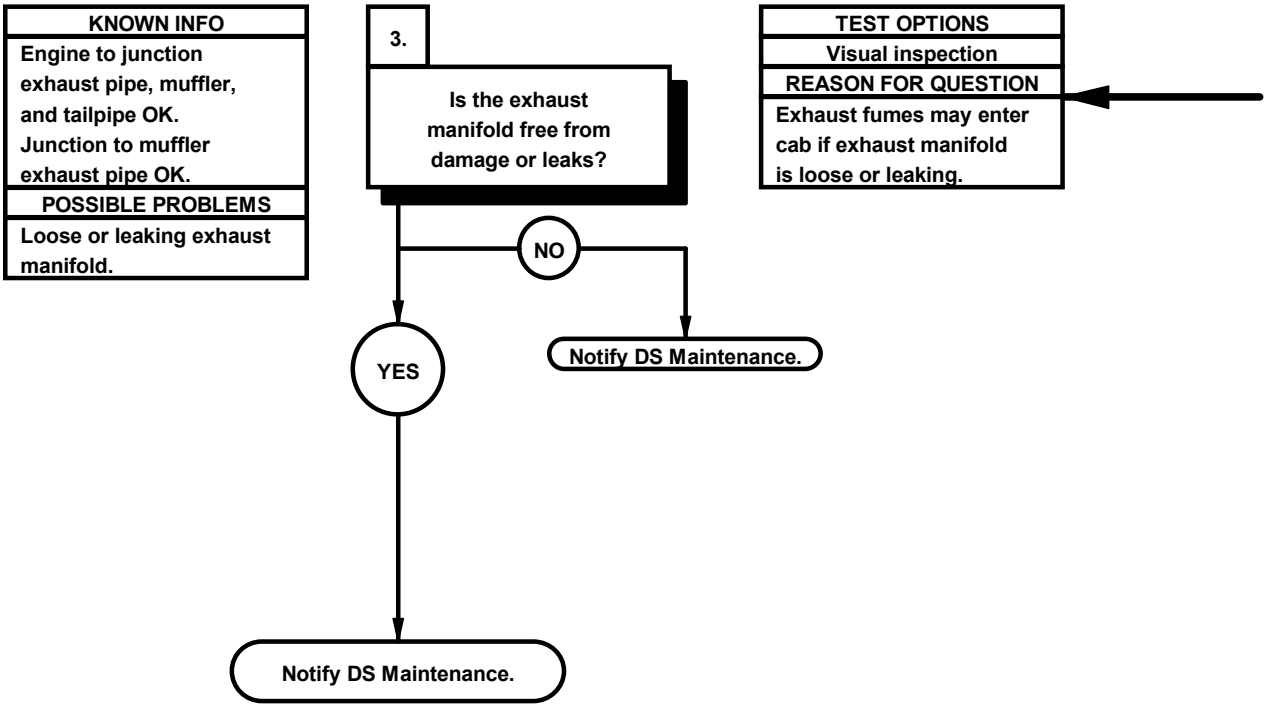
**Exhaust system component hardware has to be torqued. Refer to para 5-2 thru 5-4.**

**Check junction to muffler exhaust pipe, muffler, and tailpipe for loose connections and leaks.**

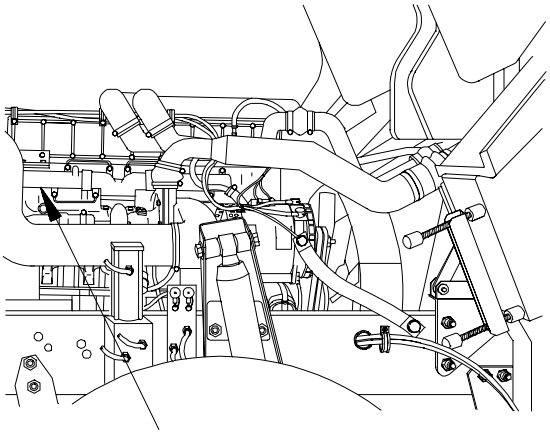



**Check engine to junction exhaust pipe for loose connections or leaks.**

## c2. EXHAUST FUMES IN CAB (WITHOUT EXHAUST RESTRICTOR) (CONT)



(1) Raise cab (TM 9-2320-365-10).
(2) Start engine (TM 9-2320-365-10).
(3) Check exhaust manifold for looseness or leaks.
(4) Shut down engine (TM 9-2320-365-10).
(5) Lower cab (TM 9-2320-365-10).




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## 2-15. COOLING SYSTEM TROUBLESHOOTING

This paragraph covers Cooling System Troubleshooting. The Cooling System Fault Index, Table 2-6, lists faults for the cooling system of the vehicle.

***Table 2-6. Cooling System Fault Index***


| Fault No. | Description | Page |
|---|---|---|
| d1. | Engine Overheats | 2-130 |
| d2. | Oil in Cooling System | 2-142 |
| d3. | Loss of coolant | 2-144 |

## d1. ENGINE OVERHEATS

**INITIAL SETUP**

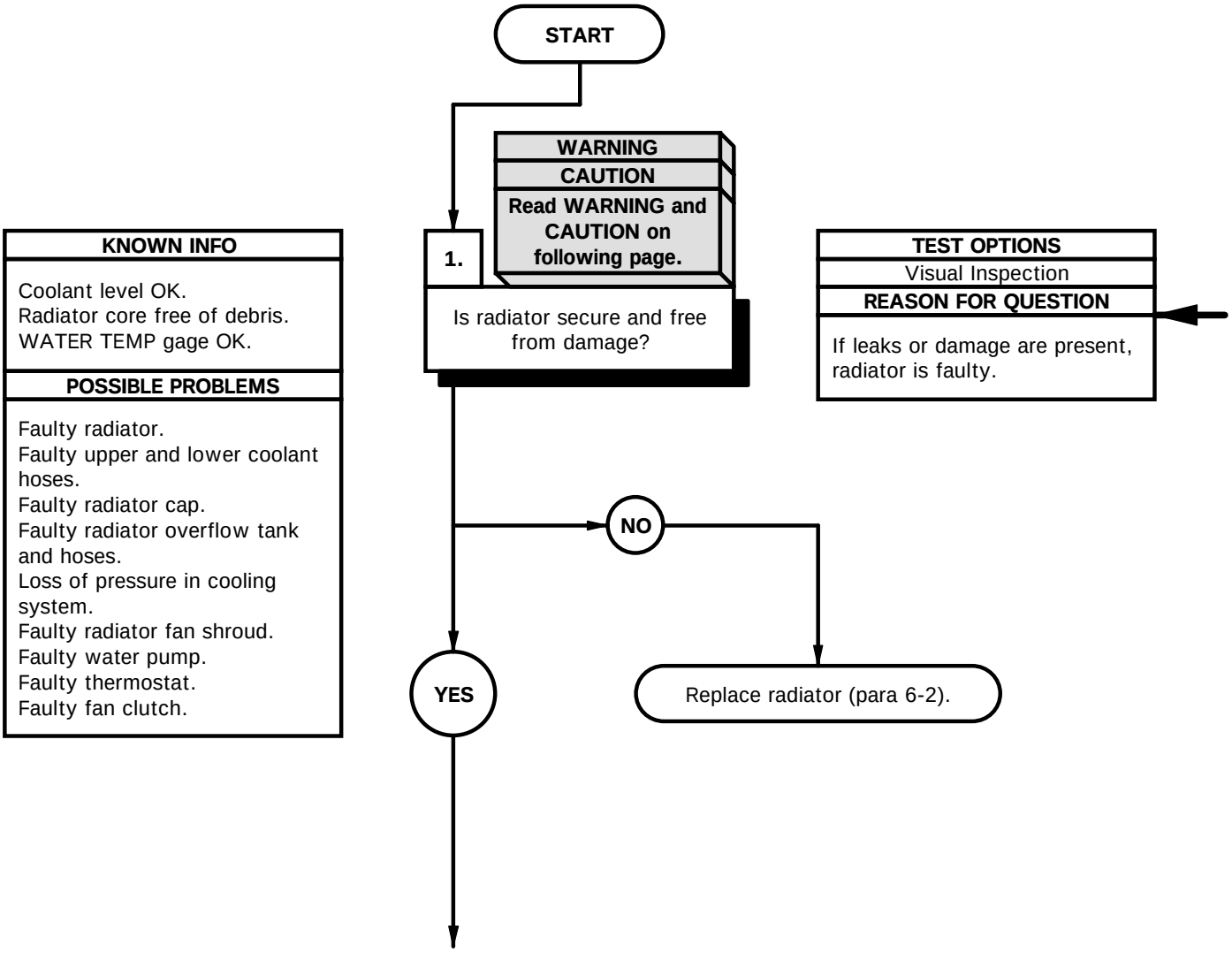
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Test Kit, Radiator (Item 40.1, Appendix C)
Pressure Tester, Radiator (Item 26, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

**NOTE**

Perform Engine System Troubleshooting a9. Engine Overheats prior to beginning this task.



**WARNING**

**Coolant may be very hot and under pressure from engine operation. Ensure engine is cool before performing troubleshooting. Failure to comply may result in injury to personnel.**

(1) Raise cab (TM 9-2320-365-10).
(2) Check radiator for leaks and damage.
(3) Remove radiator cap from radiator overflow tank.
(4) Install test kit on radiator overflow tank.
(5) Install radiator tester on test kit.

**CAUTION**

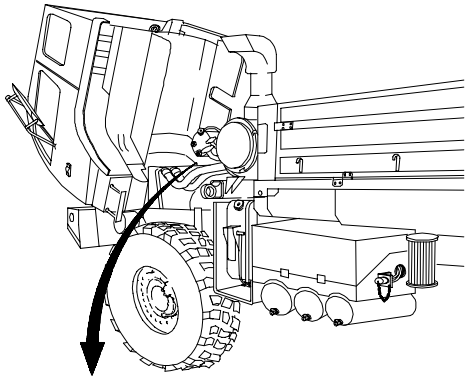
Do not pressurize over 16 psi (110 kPa). Failure to comply may result in damage to cooling system.

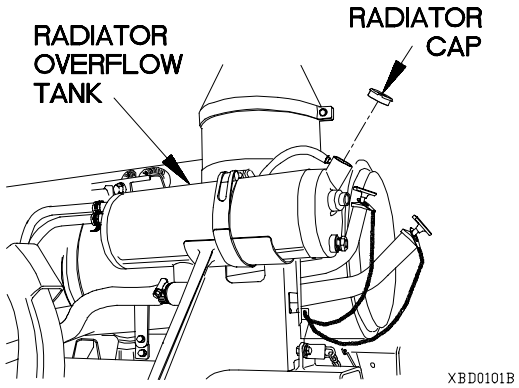
(6) Pressurize radiator overflow tank, using tester, to 15 psi (103 kPa).
(7) Observe radiator for coolant leaks.

**NOTE**

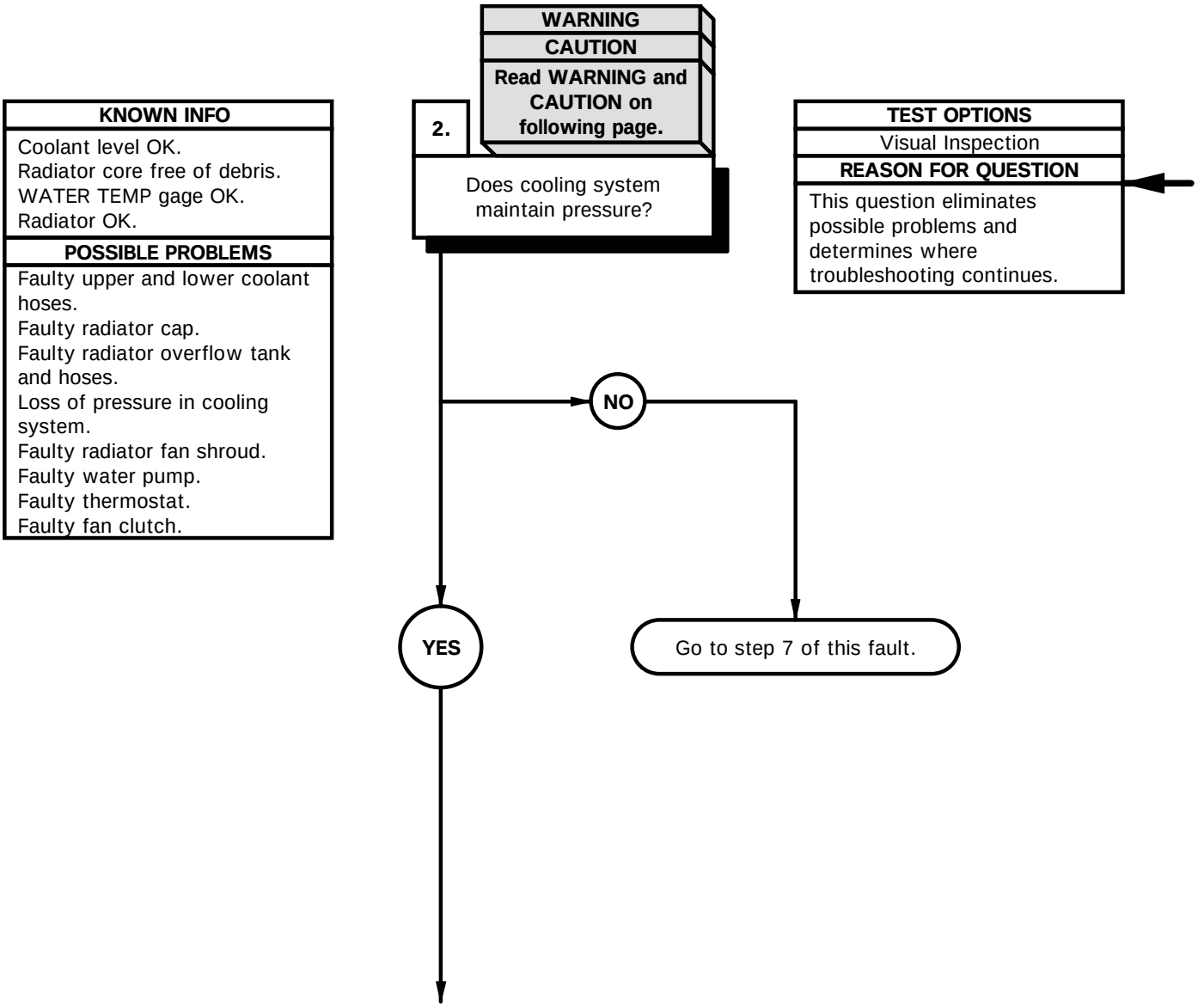
Pressure loss without external leaks indicates engine internal coolant leaks.

(8) Observe radiator tester for loss of pressure.
(9) If leaks or damage are present, replace radiator (para 6-2).





## d1. ENGINE OVERHEATS (CONT)



**WARNING**

**Coolant may be very hot and under pressure from engine operation. Ensure engine is cool before performing troubleshooting. Failure to comply may result in injury to personnel.**

**CAUTION**

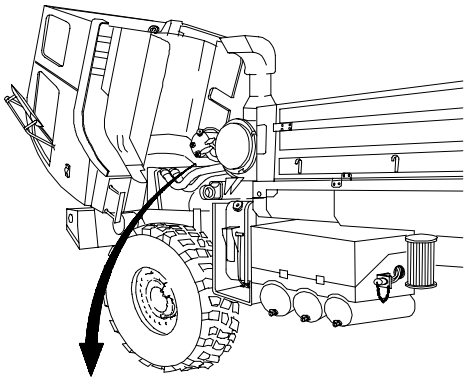
Do not pressurize over 16 psi (110 kPa). Failure to comply may result in damage to cooling system.

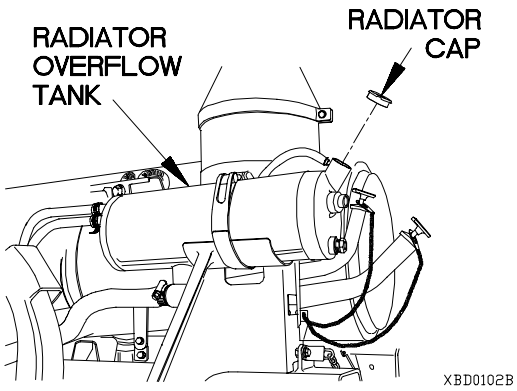
(1) Pressurize radiator overflow tank, using tester, to 15 psi (103 kPa).
(2) Observe radiator overflow tank for coolant leaks.

**NOTE**

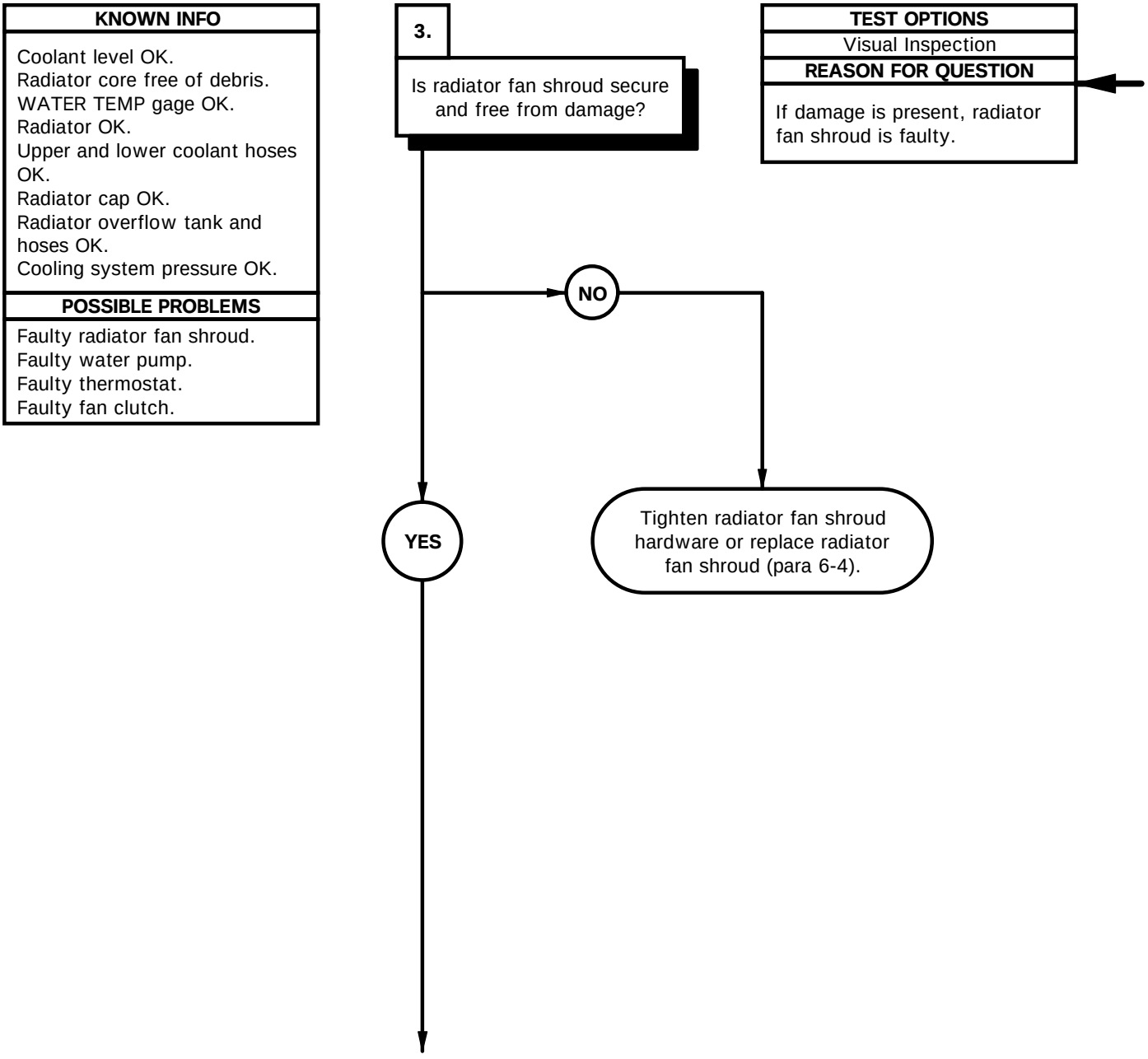
Pressure loss without external leaks indicates engine internal coolant leaks.

(3) Observe radiator tester for loss of pressure.
(4) If cooling system does not maintain pressure, go to step 7 of this fault.
(5) Remove tester and test kit from radiator overflow tank.
(6) Install radiator cap on radiator overflow tank.



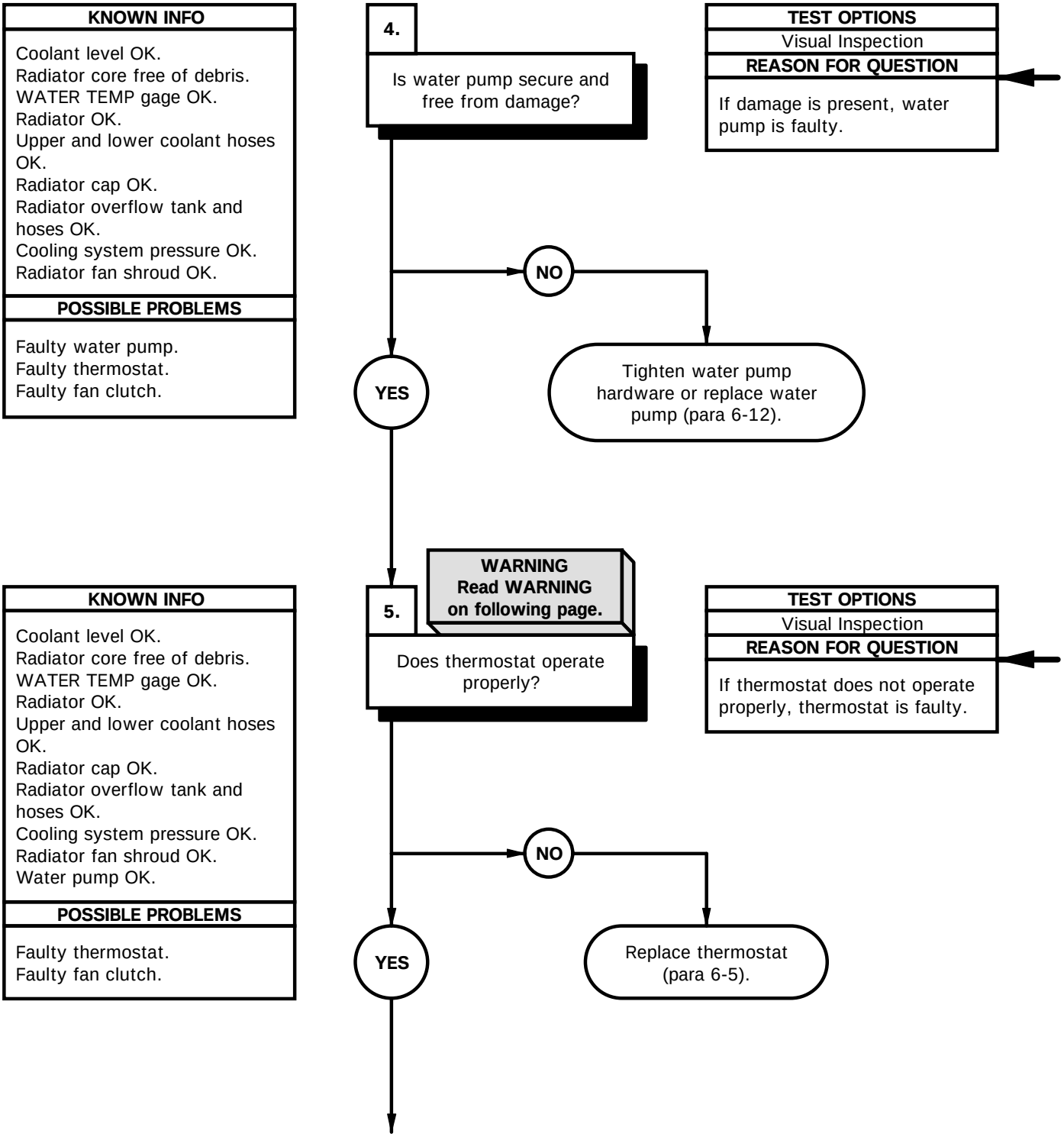


## d1. ENGINE OVERHEATS (CONT)



(1) Check radiator fan shroud for loose hardware and damage.
(2) If radiator fan shroud hardware is loose, tighten hardware.
(3) If radiator fan shroud is damaged, replace radiator fan shroud (para 6-4).

## d1. ENGINE OVERHEATS (CONT)



(1) Check water pump for loose hardware and damage.
(2) If water pump hardware is loose, tighten hardware.
(3) If water pump is damaged, replace water pump (para 6-12).

**WARNING**

**Coolant may be very hot and under pressure from engine operation. Ensure engine is cool before performing troubleshooting. Failure to comply may result in injury to personnel.**

(1) Remove coolant hose from overflow tank to radiator (para 6-3).
(2) Place coolant hose in drain pan.
(3) Start engine (TM 9-2320-365-10).

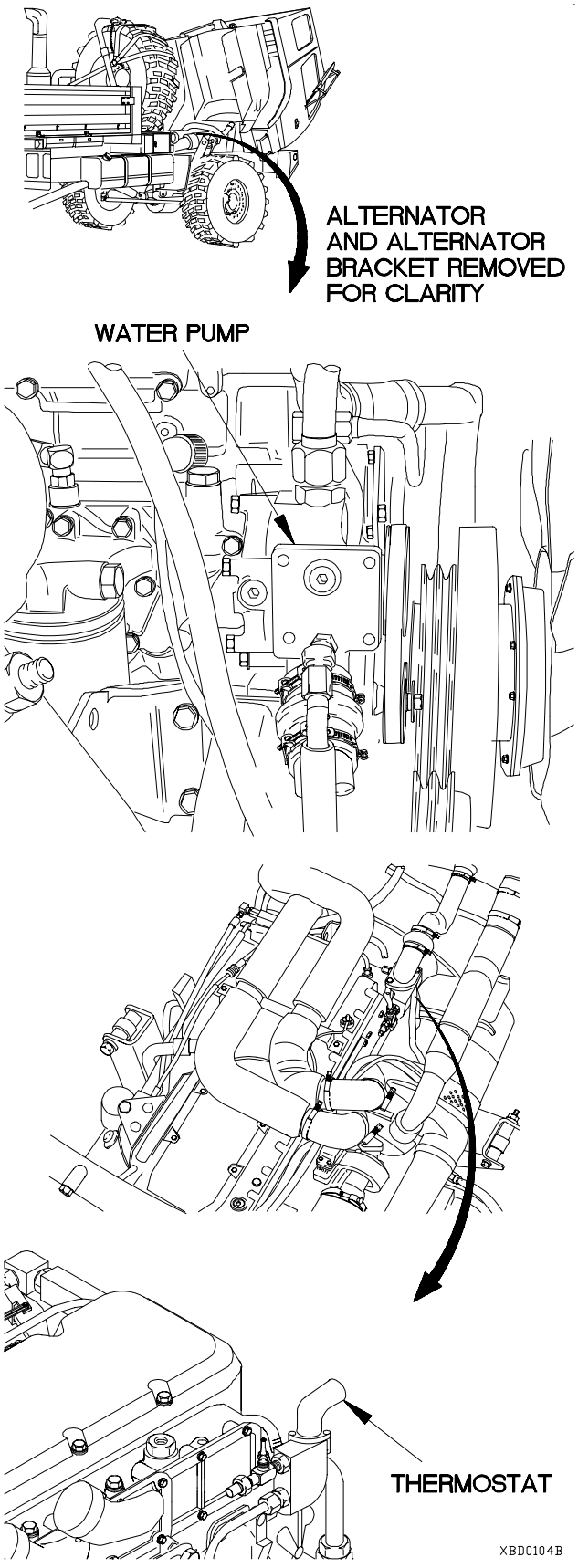
**WARNING**

**Use care when opening door with cab raised. Failure to comply may result in injury to personnel or damage to equipment.**

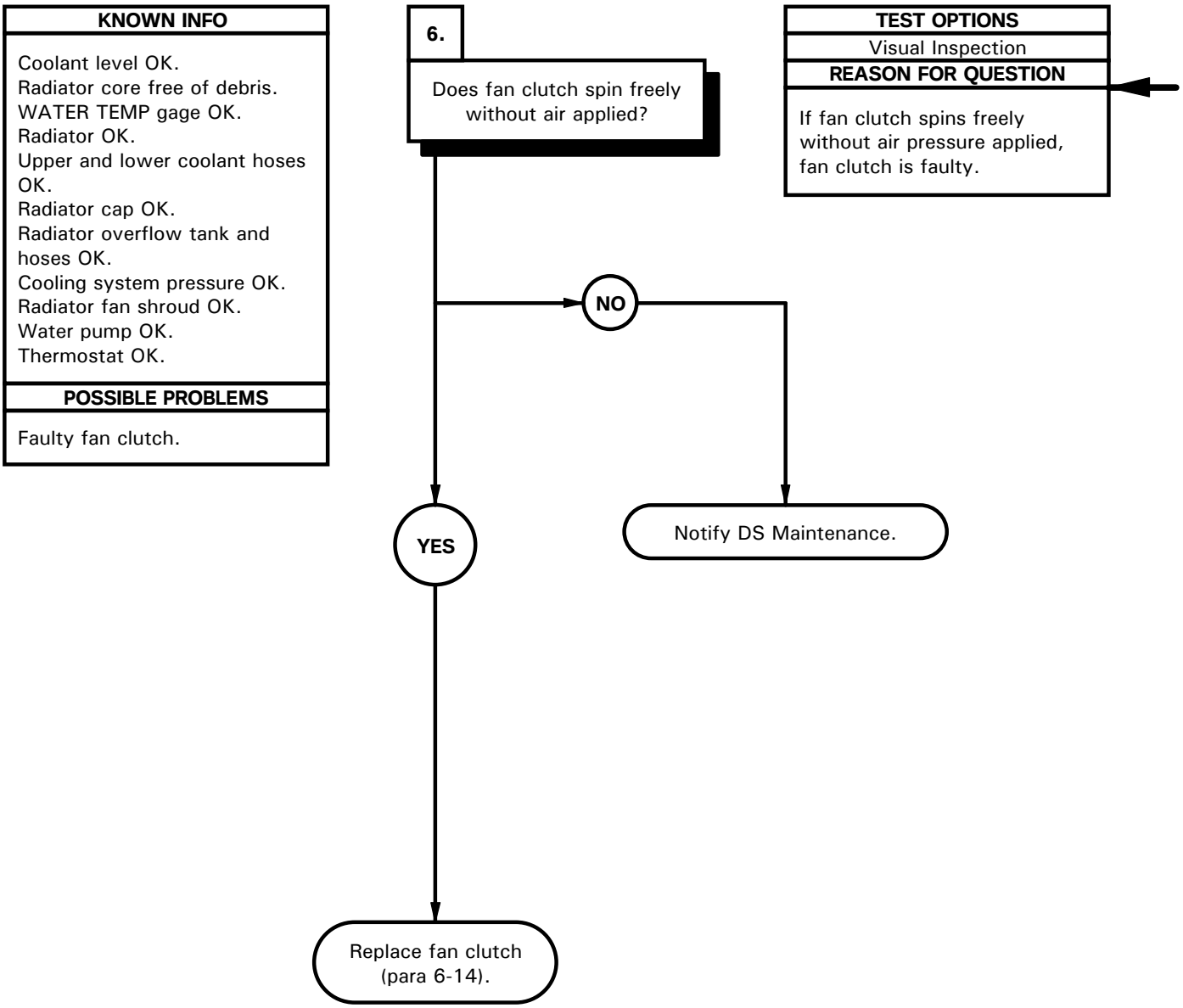
**NOTE**

Coolant flowing constantly through return hose indicates closed thermostat.

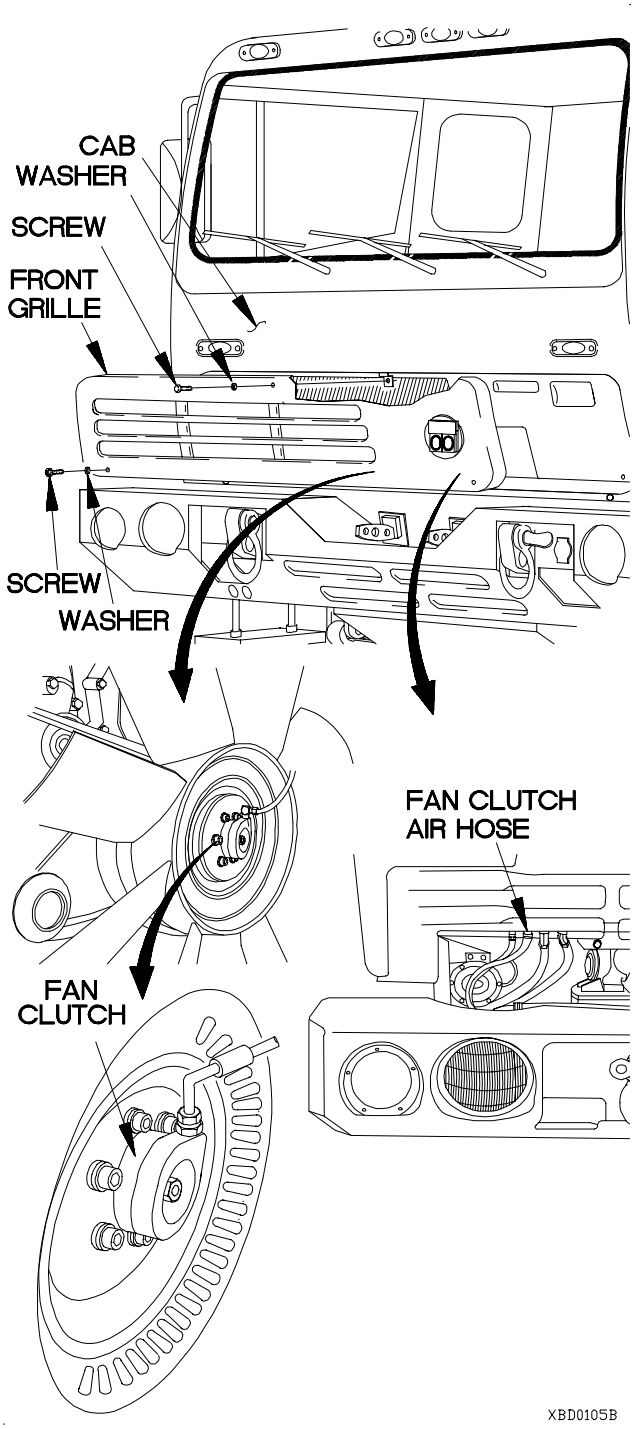
(4) Observe flow of coolant from coolant hose.
(5) If thermostat does not operate properly, replace thermostat (para 6-5).
(6) Shut down engine (TM 9-2320-365-10).
(7) Install coolant hose on overflow tank and radiator (para 6-3).
(8) Refill overflow tank to proper level (TM 9-2320-365-10).
(9) Lower cab (TM 9-2320-365-10).



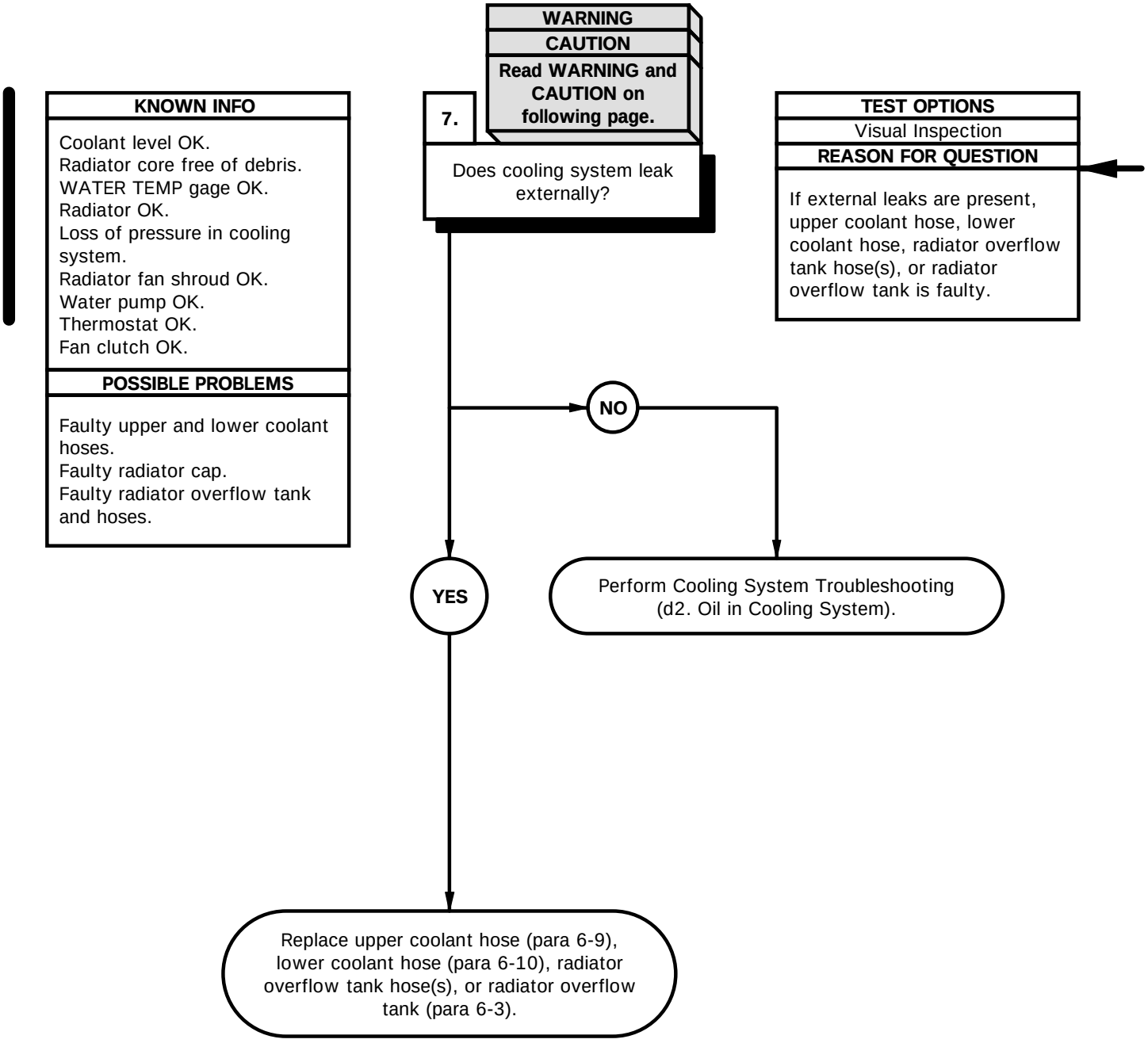
## d1. ENGINE OVERHEATS (CONT)



(1) Remove two screws and washers from front grille.
(2) Remove screw and washer from front grille.
(3) Remove front grille from cab.
(4) Disconnect air hose from fan clutch.
(5) Check to see if fan clutch turns freely.
(6) If fan clutch turns freely without air applied, replace fan clutch (para 6-14).
(7) Connect air hose to fan clutch.
(8) Position front grille on cab with washer and screw.
(9) Position two washers and screws in front grille.
(10) Tighten screw to 48-60 lb-in. (5-7 N·m).
(11) Tighten two screws to 24 lb-in. (3 N·m).



## d1. ENGINE OVERHEATS (CONT)



**WARNING**

**Coolant may be very hot and under pressure from engine operation. Ensure engine is cool before performing troubleshooting. Failure to comply may result in injury to personnel.**

**CAUTION**

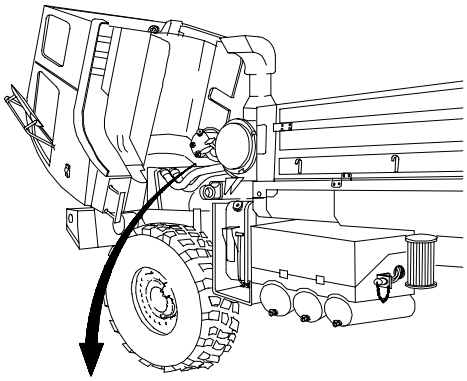
Do not pressurize over 16 psi (110 kPa). Failure to comply may result in damage to cooling system.

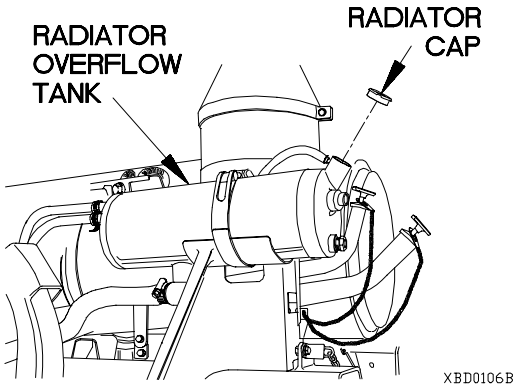
(1) Pressurize radiator overflow tank, using tester, to 15 psi (103 kPa).
(2) Observe hoses for coolant leaks.

**NOTE**

Pressure loss without external leaks indicates engine internal coolant leaks.

(3) Observe radiator tester for loss of pressure.
(4) If no external leaks are present, perform Cooling System Troubleshooting (d2. Oil in Cooling System).
(5) If external leaks are present, replace upper coolant hose (para 6-10), radiator overflow tank hose(s), or radiator overflow tank (para 6-3).
(6) Remove tester and test kit from radiator overflow tank.
(7) Install radiator cap on radiator overflow tank.



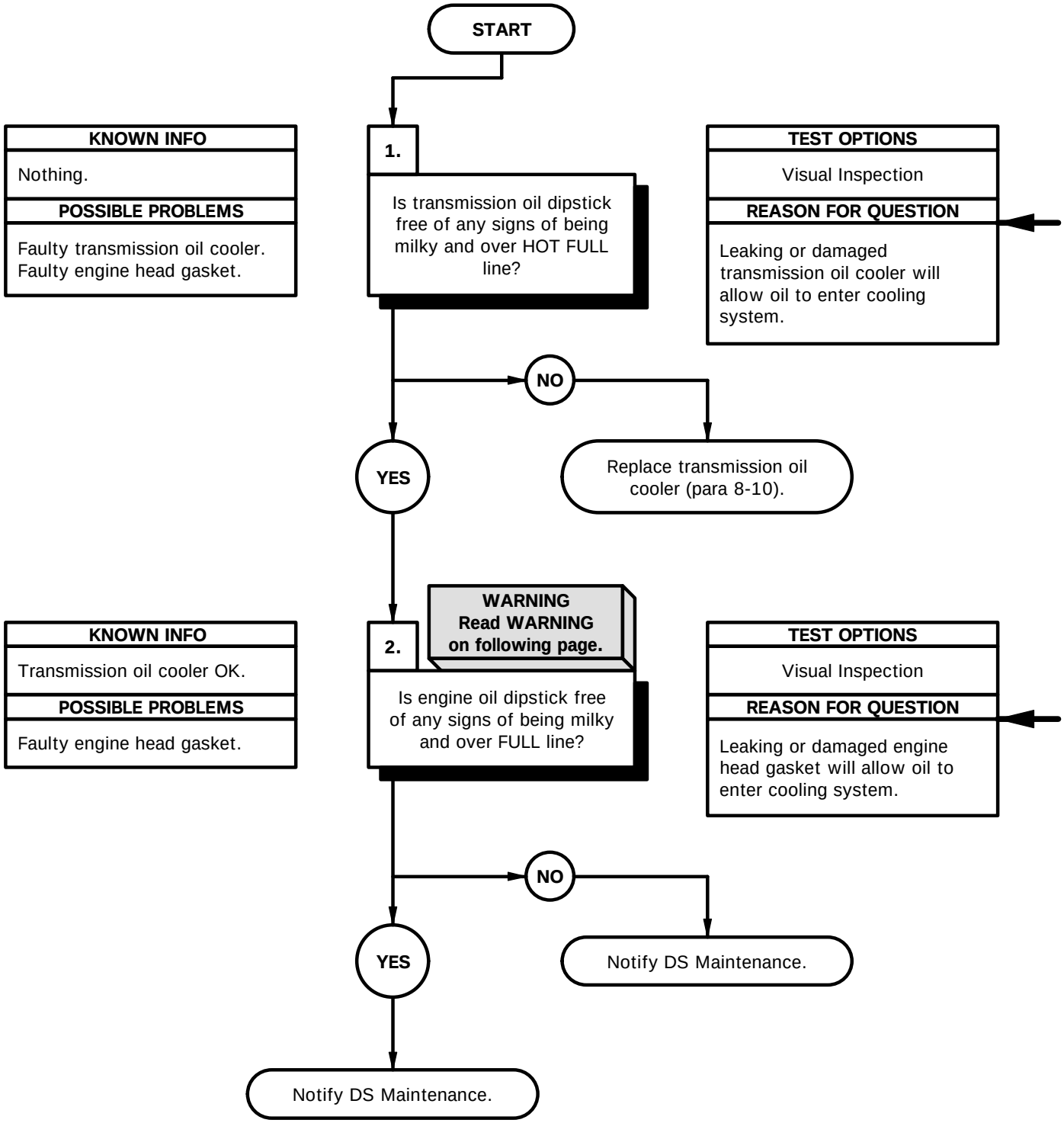


## d2. OIL IN COOLING SYSTEM

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10)

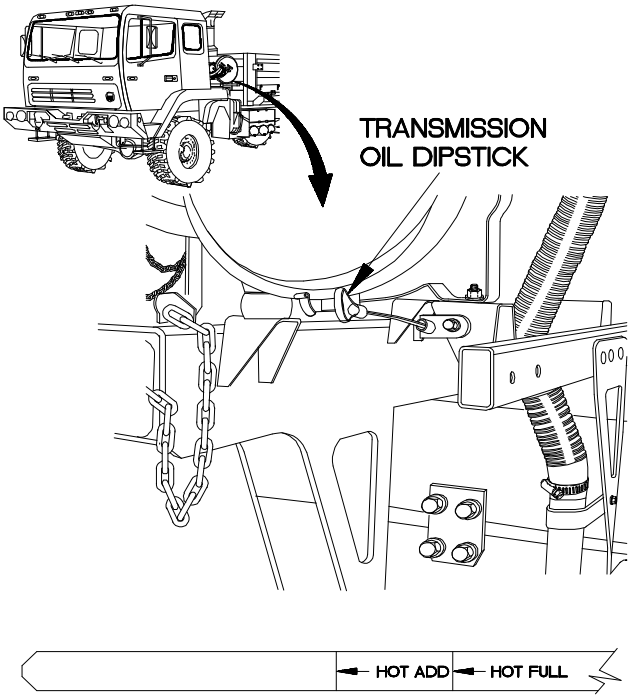
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)



**NOTE**

Perform transmission oil check when engine is at normal operating temperature (160°F-230°F (71°C-110°C)).

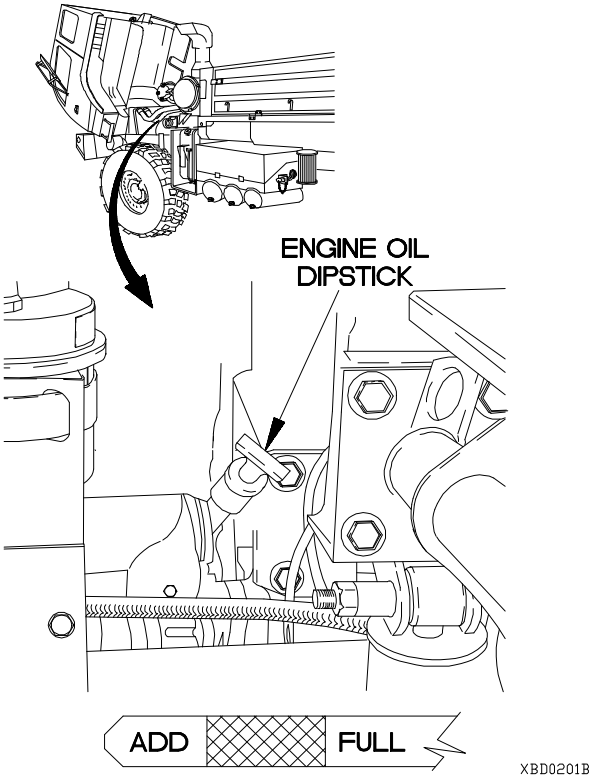
(1) Start engine (TM 9-2320-365-10).
(2) Check transmission oil dipstick for signs of oil being milky and over HOT FULL line.
(3) If transmission oil dipstick shows oil level over HOT FULL line and milky, replace transmission oil cooler (para 8-10).
(4) Shut down engine (TM 9-2320-365-10).




**WARNING**

**Engine oil dipstick is located close to starter solenoid connections which are 24 VDC and high amperage. Use caution removing/installing engine oil dipstick to prevent shorting across starter solenoid connections. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

(1) Raise cab (TM 9-2320-365-10).
(2) Check engine oil dipstick for signs of being milky and over FULL line.
(3) If engine oil dipstick shows engine oil to be milky and over FULL line, notify DS Maintenance.
(4) If engine oil dipstick shows engine oil appears normal and not over FULL line, notify DS Maintenance.
(5) Lower cab (TM 9-2320-365-10).



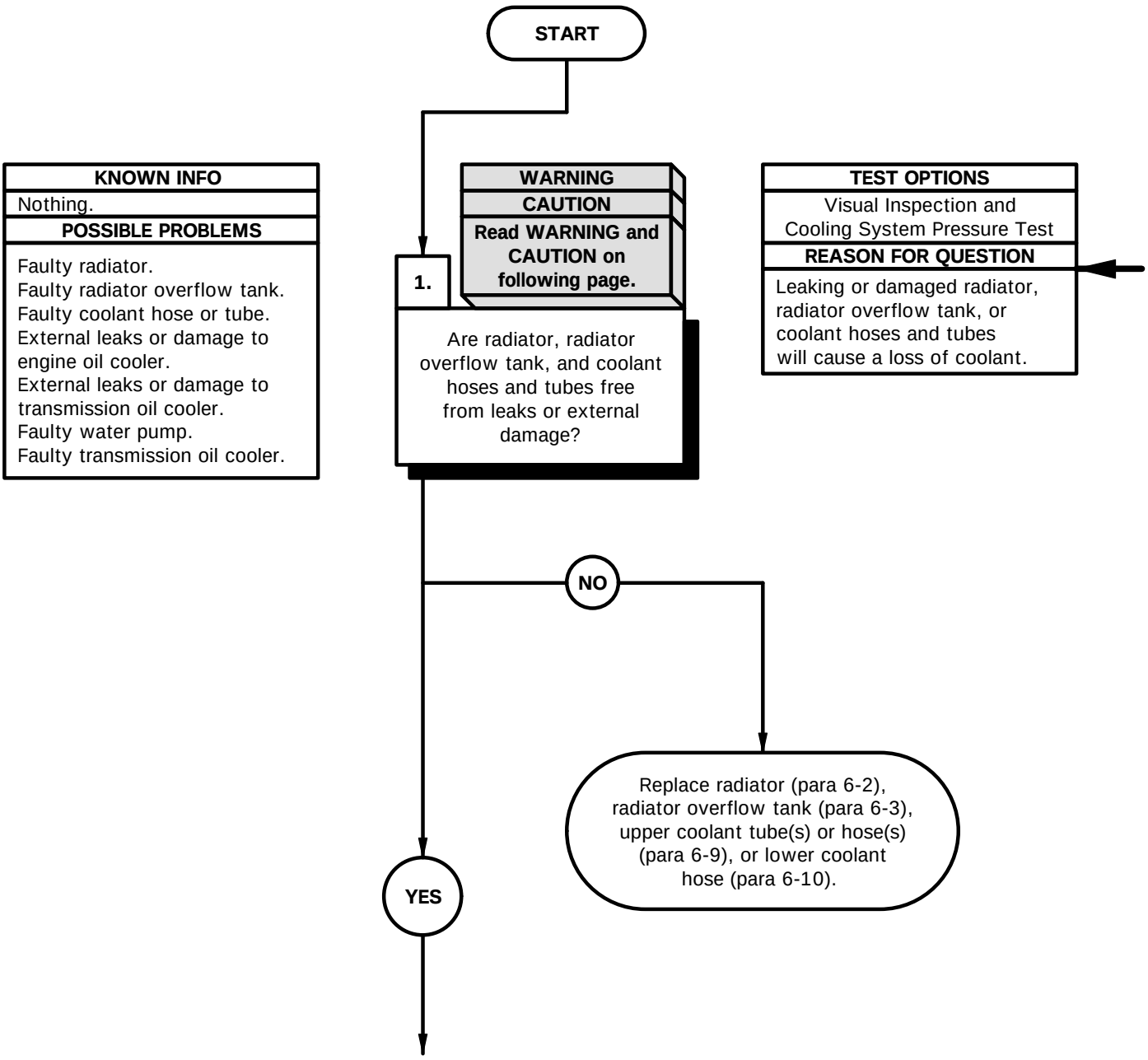
## d3. LOSS OF COOLANT

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Test Kit, Radiator (P/N 4910-00-728-8227)
Pressure Tester, Radiator (Item 26, Appendix C)
Goggles, Industrial (Item 15, Appendix C)



**WARNING**

**Coolant may be very hot and under pressure from engine operation. Ensure engine is cool before performing maintenance. Failure to comply may result in injury to personnel.**

(1) Raise cab (TM 9-2320-365-10).
(2) Check radiator, radiator overflow tank, and coolant hoses and tubes for leaks and damage.

**COOLING SYSTEM PRESSURE TEST**

(1) Remove radiator cap from radiator overflow tank.
(2) Install test kit on radiator overflow tank.
(3) Install pressure tester on test kit.

**CAUTION**

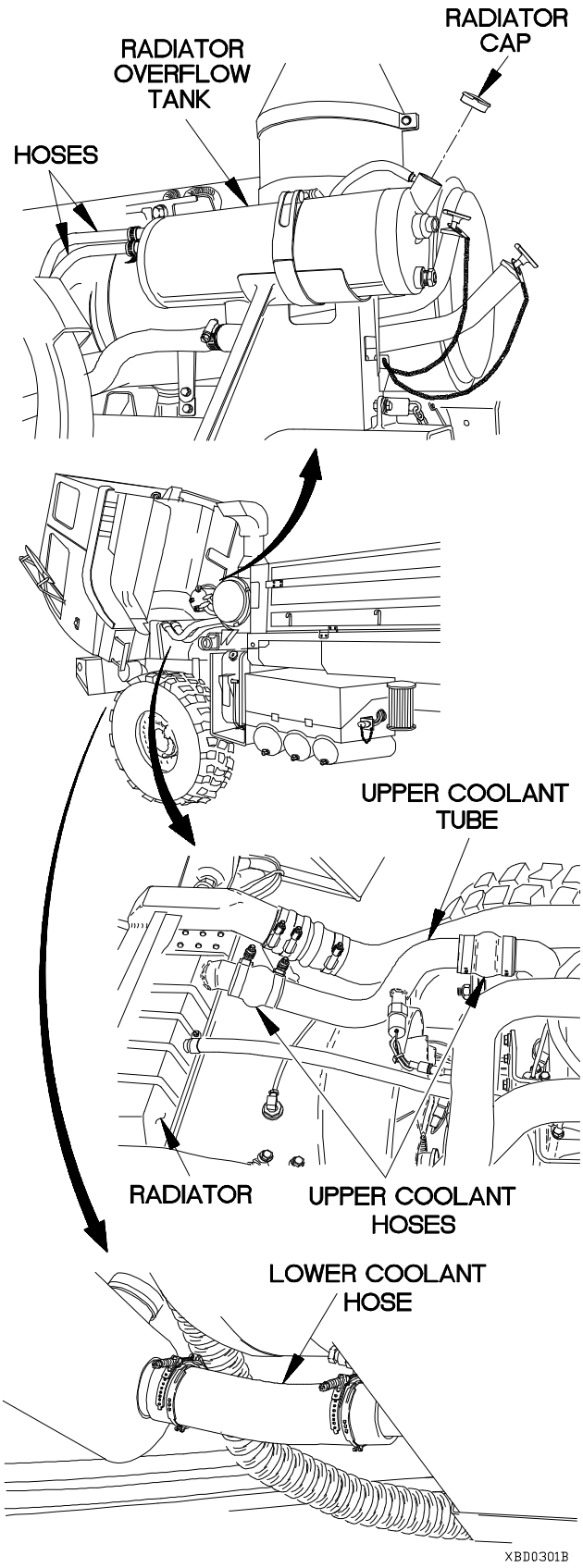
Do not pressurize over 16 psi (110 kPa). Failure to comply may result in damage to cooling system.

(4) Pressurize radiator overflow tank, using tester, to 15 psi (103 kPa).
(5) Observe radiator and radiator overflow tank for coolant leaks.

**NOTE**

Pressure loss without external leaks indicates internal coolant leaks.

(6) Observe radiator tester for loss of pressure.
(7) Remove pressure tester and test kit from radiator overflow tank.
(8) Install radiator cap on radiator overflow tank.



## d3. LOSS OF COOLANT (CONT)

**KNOWN INFO**

Radiator OK.
Radiator overflow tank OK.
Air coolant hoses and tubes OK.

**POSSIBLE PROBLEMS**

External leaks or damage to engine oil cooler.
External leaks or damage to transmission oil cooler.
Faulty water pump.
Faulty transmission oil cooler.

**2.** Is engine oil cooler free from external leaks or damage?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

Leaking or damaged engine oil cooler will cause a loss of coolant.

**NO** → Notify DS Maintenance.

**YES**

**KNOWN INFO**

Radiator OK.
Radiator overflow tank OK.
All coolant hoses and tubes OK.
Engine oil cooler free from external leaks or damage.

**POSSIBLE PROBLEMS**

External leaks or damage to transmission oil cooler.
Faulty water pump.
Faulty transmission oil cooler.

**WARNING**
**Read WARNING on following page.**

**3.** Is transmission oil cooler free from external leaks or damage?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

Leaking or damaged transmission oil cooler will cause a loss of coolant.

**NO** → Replace transmission oil cooler (para 8-10).

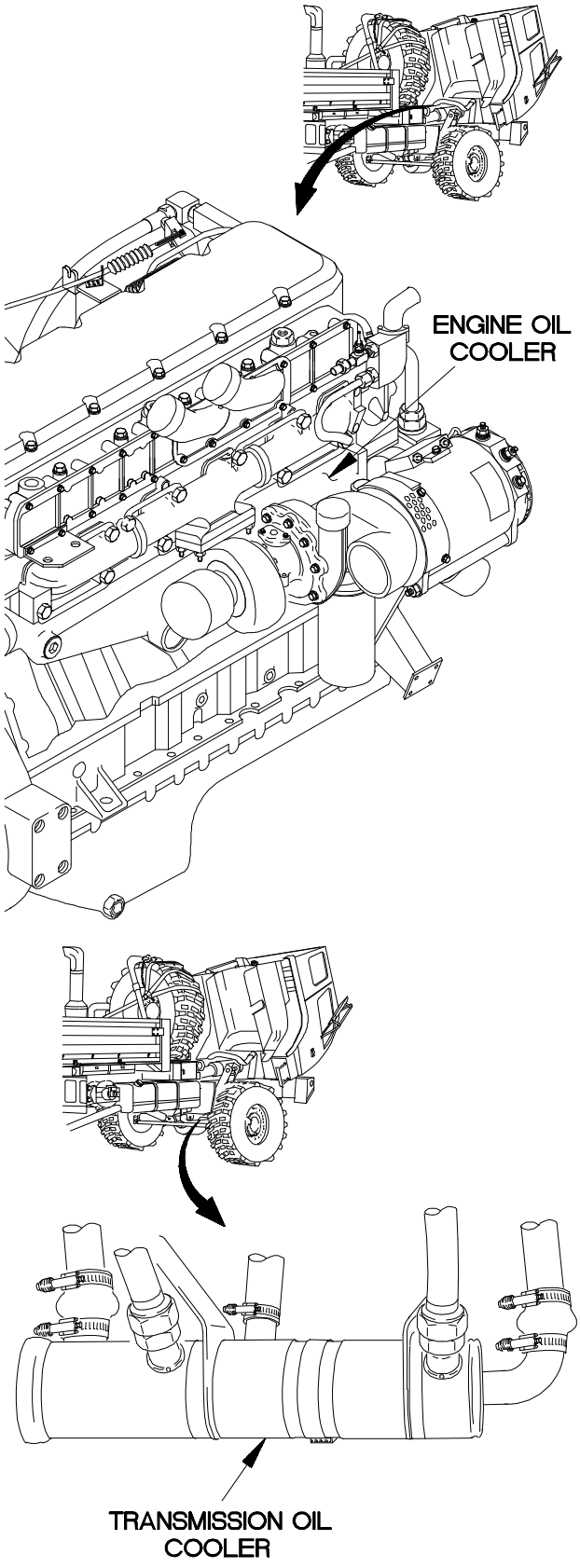
**YES**

(1) Check engine oil cooler for leaks and obvious signs of damage.
(2) If leaks or damage are noted, notify DS Maintenance.

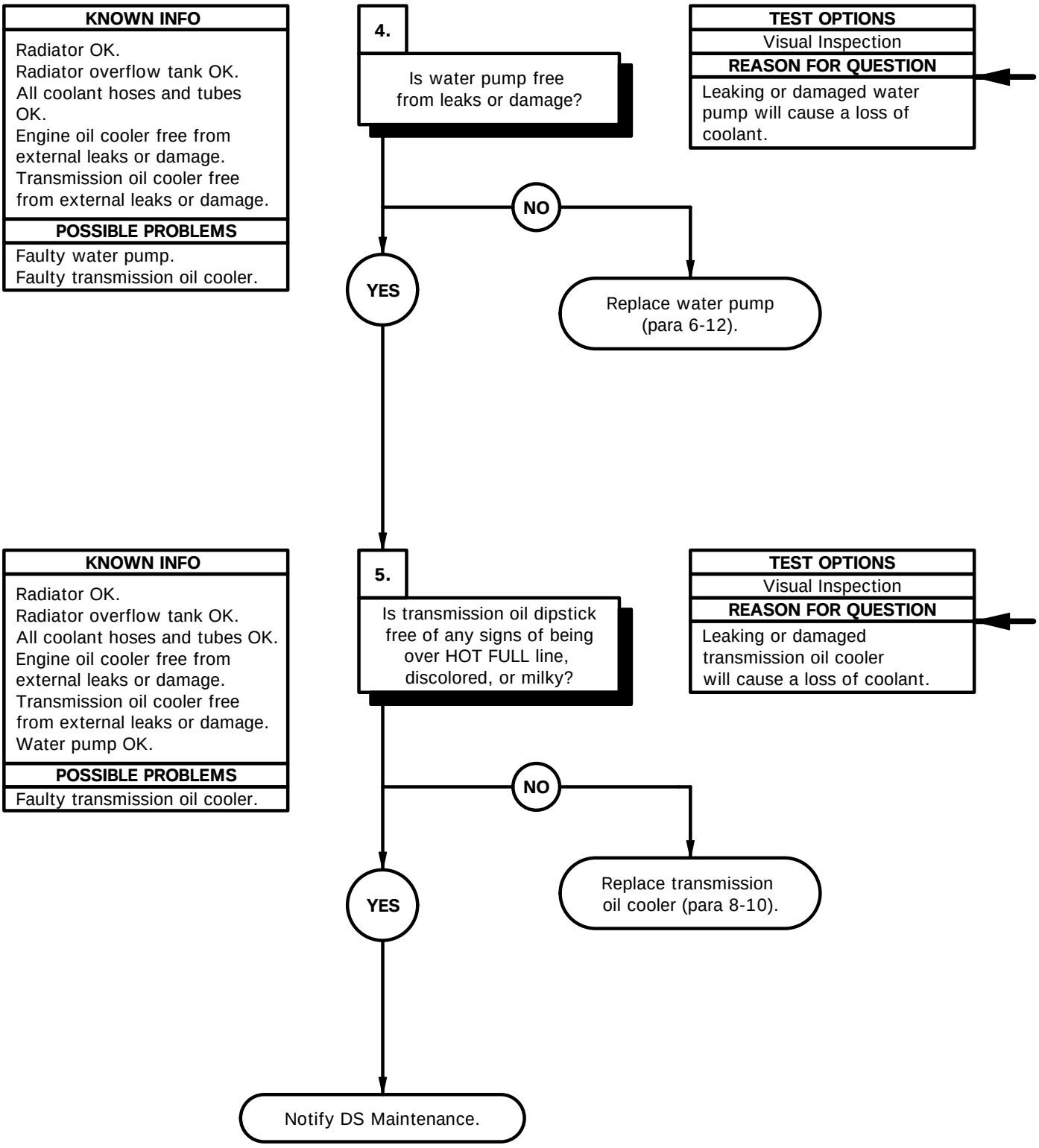
**WARNING**

**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

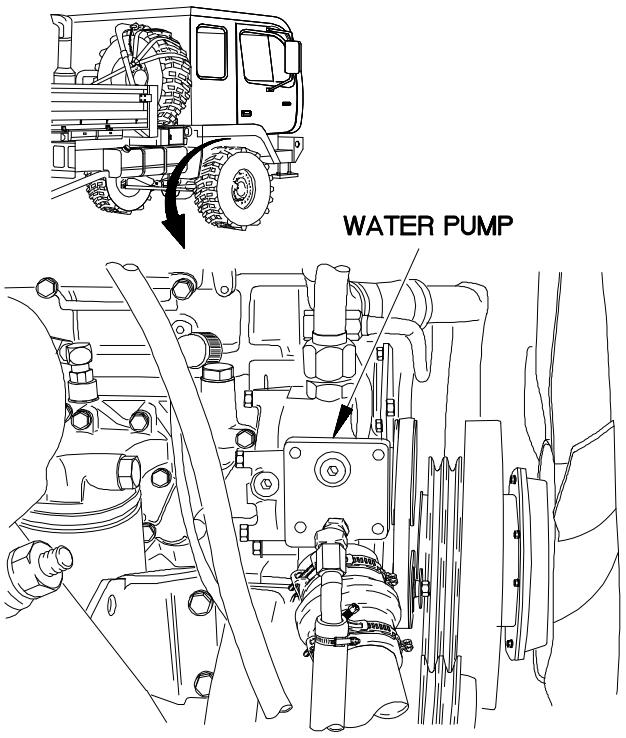
(1) Check transmission oil cooler for obvious signs of damage and leakage.
(2) If leaks or damage are noted, replace transmission oil cooler (para 8-10).
(3) Lower cab (TM 9-2320-365-10).



## d3. LOSS OF COOLANT (CONT)



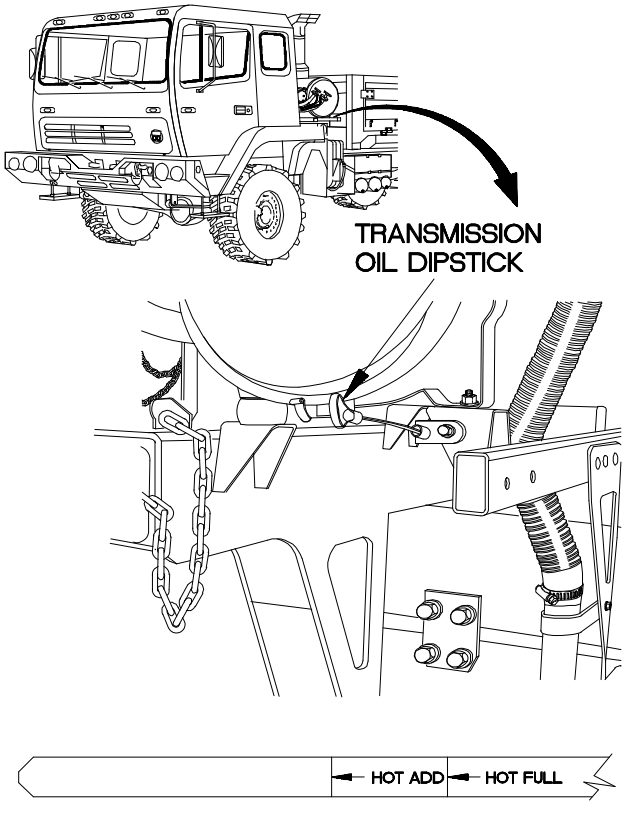
(1) Start engine (TM 9-2320-365-10).
(2) Check water pump for obvious signs of damage and leakage.
(3) If leaks or damage are found, replace water pump (para 6-12).
(4) Shut down engine (TM 9-2320-365-10).




**NOTE**

Perform transmission oil check when engine is at normal operating temperature (160°F-230°F (71°C-110°C)).

(1) Start engine (TM 9-2320-365-10).
(2) Check transmission oil dipstick for signs of being over HOT FULL line, discolored, or milky.
(3) If signs of being over HOT FULL line, discolored, or milky are found, replace transmission oil cooler (para 8-10).
(4) If no signs of being over HOT FULL line, discolored, or milky are found, notify DS Maintenance.
(5) Shut down engine (TM 9-2320-365-10).



## 2-16. ELECTRICAL SYSTEM TROUBLESHOOTING

This paragraph covers Electrical System Troubleshooting. The Electrical System Fault Index, Table 2-7, lists faults for the electrical system of the vehicle.

***Table 2-7. Electrical System Fault Index***


| Fault No. | Description | Page |
|---|---|---|
| e1. | Circuit Breaker Does Not Operate | 2-150 |
| e2. | Engine Does Not Crank | 2-154 |
| e3. | 12 VDC and/or 24 VDC Circuits Do Not Operate | 2-254 |
| e4. | 24 VDC Circuits Do Not Operate | 2-258 |
| e5. | Deleted | 2-276 |
| e6. | Engine Cranks But Does Not Start | 2-300 |
| e7. | FUEL Gage Does Not Operate or Is Inaccurate | 2-308 |
| e8. | WATER TEMP Gage Does Not Operate or Is Inaccurate | 2-314 |
| e9. | REAR BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate | 2-318 |
| e10. | FRONT BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate | 2-322 |
| e11. | Engine Oil Pressure Gage Does Not Operate or Is Inaccurate | 2-326 |
| e12. | Speedometer Does Not Operate or Is Inaccurate | 2-332 |
| e13. | VOLTS Gage Does Not Operate or Is Inaccurate | 2-346 |
| e14. | Tachometer Does Not Operate or Is Inaccurate | 2-348 |
| e15. | Audible Alarm Does Not Operate | 2-358 |
| e16. | Troop Transport Audible Alarm Does Not Operate | 2-362 |
| e16A. | Master Power Switch Does Not Shut Down Engine | 2-370.4 |
| e16B. | Lamp Test Switch Does Not Illuminate | 2-370.10 |
| e17. | Radiator Fan Off Switch Does Not Illuminate | 2-372 |
| e17A. | Ether Start Switch Does Not Illuminate | 2-376 |
| e17B. | Hazard Lights Switch Does Not Illuminate | 2-376.4 |
| e17C. | Amber Warning Light Switch Does Not Illuminate | 2-376.8 |
| e17D. | Master Power Switch Does Not Illuminate | 2-376.12 |
| e18. | REAR BRAKE AIR Gage Does Not Illuminate | 2-378 |
| e18A. | FUEL Gage Does Not Illuminate | 2-380.2 |
| e18B. | FRONT BRAKE AIR Gage Does Not Illuminate | 2-380.6 |
| e18C. | Speedometer Does Not Illuminate | 2-380.10 |
| e18D. | VOLTS Gage Does Not Illuminate | 2-380.14 |
| e18E. | WATER TEMP Gage Does Not Illuminate | 2-380.18 |
| e19. | OIL PRESS Gage Does Not Illuminate | 2-382 |
| e20. | Auxiliary Panel, Personnel Heater, and Instrument Panel Do Not Illuminate | 2-386 |
| e21. | Tachometer Does Not Illuminate | 2-390 |
| e22. | Auxiliary Panel Switch Does Not Illuminate | 2-394 |
| e23. | Auxiliary Panel Does Not Illuminate | 2-398 |
| e24. | High Engine Temperature Indicator Does Not Operate | 2-402 |
| e24A. | High Engine Temperature Indicator Illuminates | 2-408.2 |
| e25. | CTIS Overspeed Indicator Does Not Operate | 2-410 |
| e26. | Chemical Detector Indicator Does Not Operate | 2-424 |
| e27. | Left Turn Signal Indicator Does Not Operate | 2-428 |
| e28. | Right Turn Signal Indicator Does Not Operate | 2-432 |
| e29. | Turn Signal Indicators and High Beams On Indicator Do Not Operate | 2-438 |
| e30. | High Beams On Indicator Does Not Operate | 2-440 |
| e31. | Parking Brake Indicator and/or Emergency Brake Indicator Does Not Illuminate | 2-444 |
| e32. | PTO Indicator Does Not Operate | 2-460 |
| e33. | Fan Off Indicator Does Not Operate | 2-472 |

## 2-16. ELECTRICAL SYSTEM TROUBLESHOOTING (CONT)

*Table 2-7. Electrical System Fault Index (Cont)*


| Fault No. | Description | Page |
|---|---|---|
| e34. | WTEC II Transmission Temperature Indicator Does Not Operate | 2-478 |
| e35. | WTEC III Transmission Temperature Indicator Does Not Operate | 2-486 |
| e36. | Front Brake Air Indicator Does Not Illuminate When Air Pressure is Below 65 PSI | 2-492 |
| e37. | Rear Brake Air Indicator Does Not Illuminate When Air Pressure is Below 65 PSI | 2-498 |
| e38. | Engine Oil Pressure Indicator Does Not Operate | 2-504 |
| e39. | Master Stop Indicator Does Not Operate | 2-510 |
| e40. | One or Both Headlights (High and Low Beams) Do Not Illuminate | 2-512 |
| e41. | One or Both Headlight Low Beams Do Not Illuminate | 2-520 |
| e42. | One or Both Headlight High Beams Do Not Illuminate | 2-526 |
| e43. | Parking Lights Do Not Illuminate | 2-534 |
| e44. | LH Door and/or LH Front Marker Lights Do Not Illuminate | 2-542 |
| e45. | RH Door and/or RH Front Marker Lights Do Not Illuminate | 2-552 |
| e46. | One or More Cab Top Marker Lights Do Not Illuminate | 2-562 |
| e47. | Side and/or Rear Marker Lights Do Not Illuminate | 2-576 |
| e47A. | All Marker Lights Do Not Illuminate in Normal Mode | 2-584.52 |
| e48. | One or Both Composite Taillights Do Not Illuminate | 2-586 |
| e49. | One or Both Front Blackout Marker Lights Do Not Illuminate | 2-596 |
| e50. | Blackout Drive Light Does Not Illuminate | 2-606 |
| e51. | One or Both Rear Blackout Marker Lights Do Not Illuminate | 2-616 |
| e52. | Warning Light Does Not Illuminate | 2-626 |
| e53. | Backup Light Does Not Illuminate | 2-638 |
| e54. | Blackout Marker Lights Do Not Illuminate | 2-676 |
| e54A. | Front Hazard Lights Do Not Illuminate | 2-678 |
| e55. | Rear Hazard Lights Do Not Illuminate | 2-680 |
| e56. | Front and Rear Hazard Lights Do Not Illuminate | 2-682 |
| e57. | Front and Rear Turn Signals Do Not Operate | 2-690 |
| e58. | Left or Right Front Turn Signals Do Not Operate | 2-702 |
| e59. | One or Both Stoplights Do Not Illuminate | 2-710 |
| e60. | One or Both Blackout Stoplights Do Not Illuminate | 2-728 |
| e61. | Stoplights and Blackout Stoplights Do Not Operate | 2-740 |
| e62. | Trailer Marker/Taillights Do Not Illuminate | 2-750 |
| e63. | Trailer Right Stop/Turn Light Does Not Illuminate | 2-760 |
| e64. | Trailer Left Stop/Turn Light Does Not Illuminate | 2-770 |
| e65. | Trailer Blackout Marker Lights Do Not Illuminate | 2-780 |
| e66. | Trailer Blackout Stoplights Do Not Illuminate | 2-790 |
| e67. | Intervehicle Clearance Lights Do Not Operate | 2-800 |
| e68. | Intervehicle Left Turn Signal Does Not Illuminate | 2-804 |
| e69. | Intervehicle Right Turn Signal Does Not Illuminate | 2-810 |
| e70. | Intervehicle Stoplights Do Not Illuminate | 2-816 |
| e71. | Intervehicle Taillights Do Not Operate | 2-822 |
| e72. | Personnel Heater Control Illumination Does Not Operate | 2-826 |
| e73. | Personnel Heater Fan Does Not Operate | 2-832 |
| e74. | Windshield Washer Does Not Operate | 2-838 |
| e75. | Windshield Wiper Does Not Operate On Low Speed | 2-850 |
| e76. | All Windshield Wiper Speeds Do Not Operate | 2-858 |
| e77. | Windshield Wiper Does Not Operate On Intermittent Speed | 2-864 |
| e78. | Windshield Wiper Does Not Operate On High Speed | 2-874 |

*Table 2-7. Electrical System Fault Index (Cont)*


| Fault No. | Description | Page |
|---|---|---|
| e79. | Horn Does Not Operate | 2-880 |
| e80. | Chemical Alarm Does Not Operate | 2-892 |
| e81. | Chemical Detector Does Not Operate | 2-900 |
| e82. | Central Tire Inflation System (CTIS) Does Not Operate | 2-906 |
| e83. | CTIS Does Not Inflate Tires | 2-920 |
| e84. | CTIS Does Not Deflate Tires | 2-930 |
| e85. | 11K Self-Recovery Winch (SRW) Does Not Reel In or Pay Out | 2-940 |
| e86. | 11K Self-Recovery Winch (SRW) Does Not Reel In | 2-946 |
| e87. | 11K Self-Recovery Winch (SRW) Does Not Pay Out | 2-958 |
| e88. | PTO Does Not Operate | 2-970 |
| e89. | Electrical System Does Not Maintain a Charge | 2-1010 |
| e90. | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Illumination Does Not Dim | 2-1018 |
| e91. | Engine Fan Runs Constantly | 2-1028 |
| e92. | Engine Fan Does Not Turn Off Using Radiator Fan Off Switch | 2-1036 |
| e93. | Ether Start Does Not Operate | 2-1044 |
| e94. | Excessive Condensation in Fuel | 2-1060 |
| e95. | Radio Does Not Operate | 2-1064 |
| e96. | Start Inhibit Pushbutton Does Not Operate | 2-1070 |
| e97. | Air Dryer Does Not Operate | 2-1076 |
| e98. | Battery Tester Does Not Operate | 2-1082 |
| | **Volume 2** | |
| e99. | M1079 Fan Does Not Operate | 2-1088 |
| e100. | All M1079 Van Body Marker Lights Do Not Operate | 2-1100 |
| e101. | M1079 Van Body Clearance Marker Light Does Not Illuminate | 2-1104 |
| e102. | All M1079 Fluorescent Lights Do Not Operate | 2-1108 |
| e103. | M1079 Lighting Fixture(s) DS80 and/or DS81 Do Not Operate | 2-1118 |
| e104. | M1079 Lighting Fixture(s) DS82 and/or DS83 Do Not Operate | 2-1134 |
| e105. | M1079 110 VAC Outlet J233 Does Not Operate | 2-1152 |
| e106. | M1079 110 VAC Outlet J234 Does Not Operate | 2-1160 |
| e107. | M1079 110 VAC Outlet J235 Does Not Operate | 2-1168 |
| e108. | M1079 110 VAC Outlet J232 Does Not Operate in Normal Mode | 2-1176 |
| e109. | M1079 110 VAC Outlet J232 and J233 Do Not Operate in Blackout Override Mode | 2-1190 |
| e110. | M1079 110 VAC Outlet J231 Does Not Operate | 2-1194 |
| e111. | M1079 110 VAC Outlet J230 Does Not Operate | 2-1208 |
| e112. | M1079 Blackout Light(s) Does Not Operate | 2-1222 |
| e113. | M1079 Emergency Light(s) Does Not Illuminate | 2-1230 |
| e114. | M1079 Field Phone 1 and/or 2 Binding Post Does Not Operate | 2-1244 |
| e115. | M1079 Air Conditioner Does Not Operate | 2-1264 |
| e116. | M1079 Heater Does Not Operate | 2-1276 |
| e117. | M1079 24 VDC Binding Post(s) Does Not Operate | 2-1296 |
| e118. | M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate | 2-1324 |
| e119. | M1079 110 VAC Power Does Not Operate | 2-1338 |
| e120. | M1079 Fluorescent Lights Do Not Operate in Blackout Override Mode | 2-1352 |

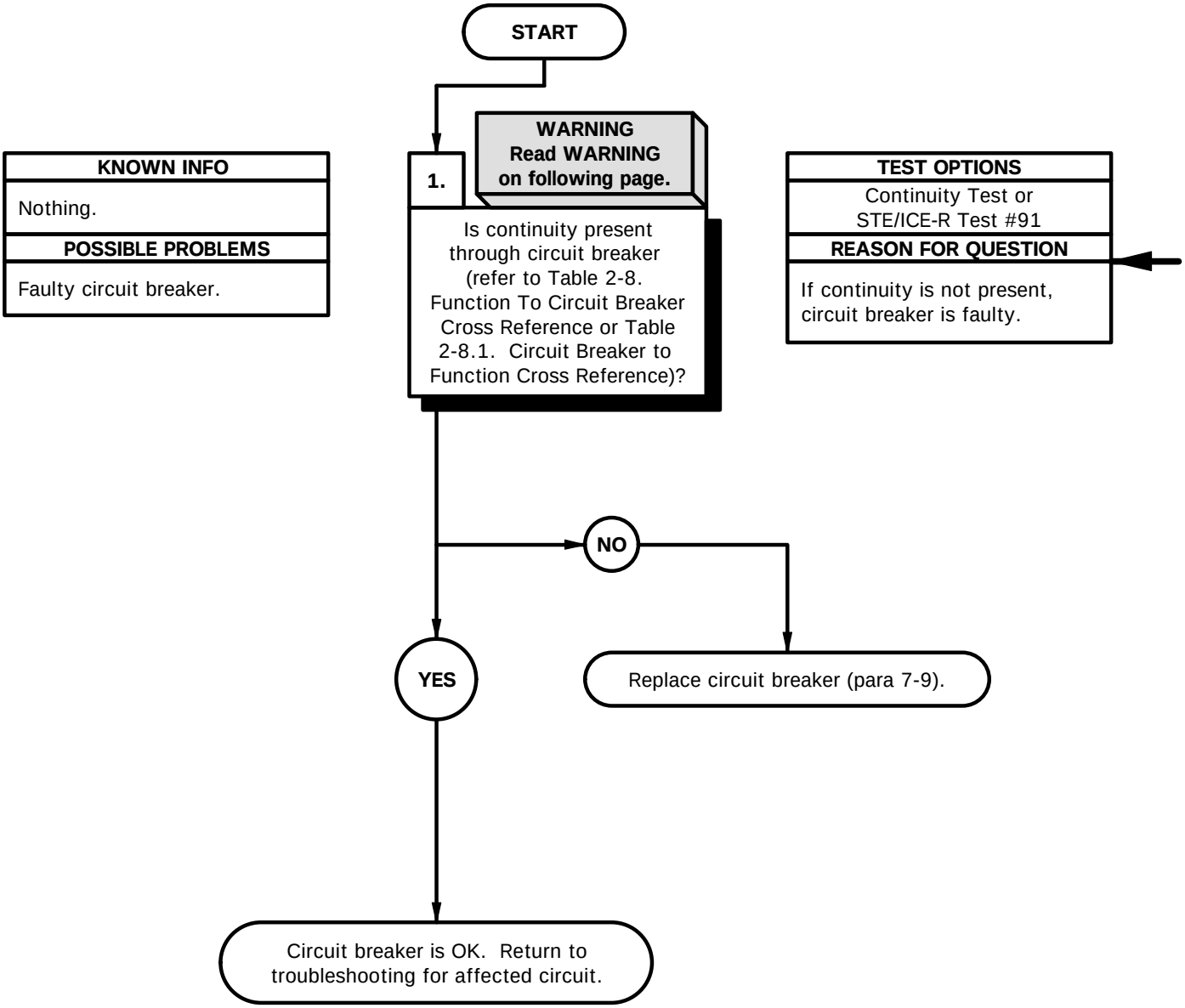
## e1. CIRCUIT BREAKER DOES NOT OPERATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CONTINUITY TEST**

(1) Remove Power Distribution Panel (PDP) cover (para 16-2).
(2) Locate circuit breaker to be tested on PDP (refer to Figure 2-1. Circuit Breaker Locations and Table 2-8. Function to Circuit Breaker Cross Reference or Table 2-8.1. Circuit Breaker to Function Cross Reference).
(3) Check reset button on circuit breaker. If button is up (circuit breaker tripped), press button to reset.
(4) Remove circuit breaker to be tested from PDP.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to one circuit breaker terminal.
(7) Connect negative (-) probe of multimeter to other circuit breaker terminal and note reading on multimeter.
(8) If continuity is not present, replace circuit breaker (para 7-9).
(9) If continuity is present, circuit breaker is OK. Return to troubleshooting for affected circuit.
(10) Install tested circuit breaker in PDP.
(11) Install PDP cover (para 16-2).

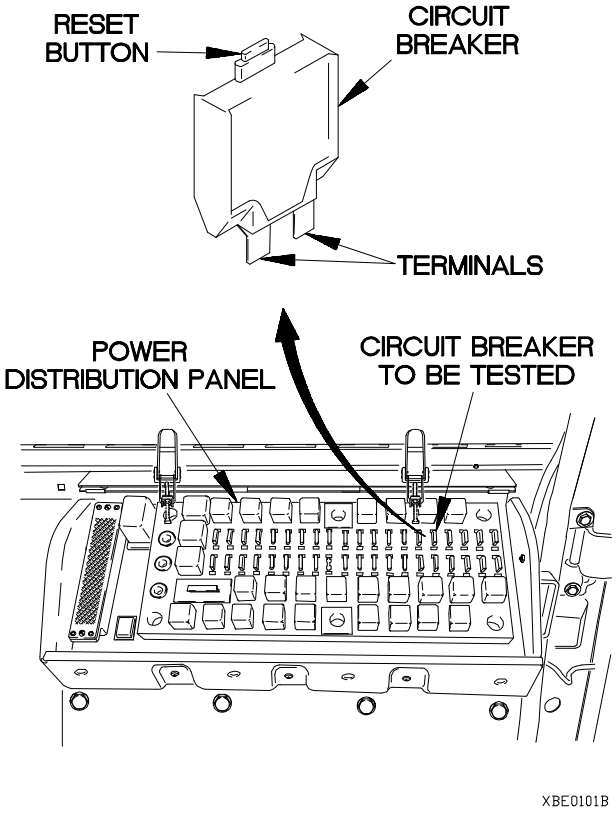
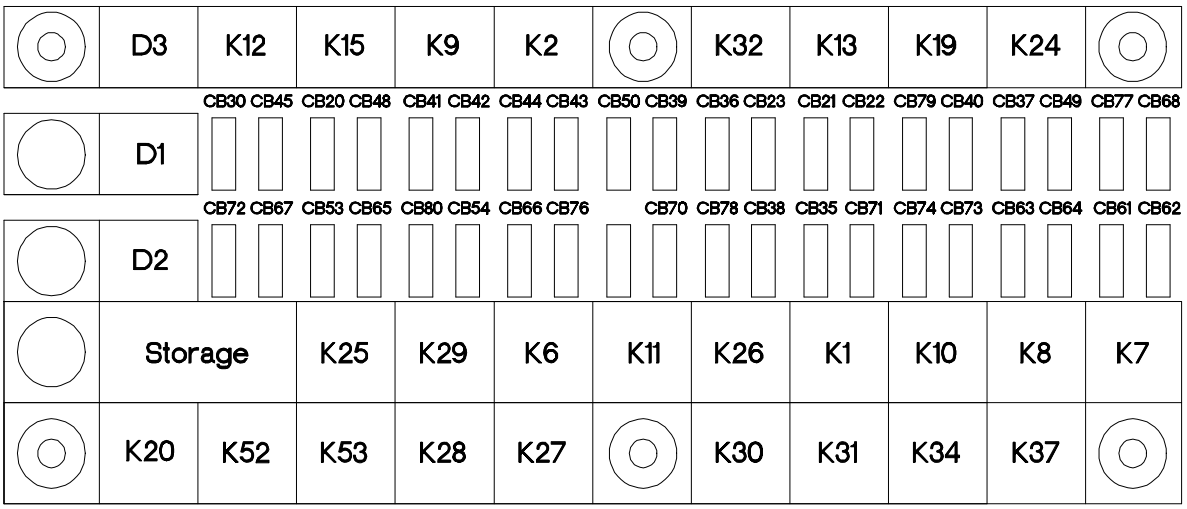



**Figure 2-1. Circuit Breaker Locations**



## e1. CIRCUIT BREAKER DOES NOT OPERATE (CONT)

**Table 2-8. Function to Circuit Breaker Cross Reference**

| Function | Circuit Breaker / AMP |
|---|---|
| 10 AMP Fuse WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) | CB79 / 15 |
| 12 VDC Intervehicular Left Turn Signal | CB76 / 15 |
| 12 VDC Intervehicular Marker Lights | CB67 / 25 |
| 12 VDC Intervehicular Right Turn Signal | CB76 / 15 |
| 12 VDC Intervehicular Stoplight | CB76 / 15 |
| 12 VDC Intervehicular Taillights | CB80 / 25 |
| 24 VDC Intervehicular Auxiliary | CB76 / 15 |
| 24 VDC Intervehicular Blackout Clearance | CB42 / 10 |
| 24 VDC Intervehicular Blackout Stoplight | CB39 / 10 |
| 24 VDC Intervehicular Clearance and Rear Light | CB41 / 15 |
| 24 VDC Intervehicular Left and Right Turn Signals and Stoplights (WTEC III) | CB44 / 15 |
| 24 VDC Intervehicular Left Blackout Marker | CB42 / 10 |
| 24 VDC Intervehicular Left Turn Signal and Stoplight (WTEC II) | CB43 / 15 |
| 24 VDC Intervehicular Right Blackout Marker | CB42 / 10 |
| 24 VDC Intervehicular Right Turn Signal and Stoplight (WTEC II) | CB44 / 15 |
| Air Dryer | CB21 / 15 |

**Table 2-8. Function to Circuit Breaker Cross Reference (Cont)**

| Function | Circuit Breaker / AMP |
|---|---|
| All Marker Lights | CB67 / 25 |
| Audible Alarm | CB77 / 10 |
| Backup Light | CB73 / 8 |
| Blackout Drive Light | CB54 / 8 |
| Blackout Override Switch | CB72 / 15 |
| Blackout Override Switch Light | CB70 / 20 |
| Cab Radio | CB20 / 25 |
| Central Tire Inflation System (CTIS) | CB40 / 10 |
| Central Tire Inflation System (CTIS) Air Pressure Switch | CB40 / 10 |
| Central Tire Inflation System (CTIS) Overspeed Indicator Light | CB40 / 10 |
| Chemical Alarm | CB30 / 10 |
| Chemical Detector | CB30 / 10 |
| Chemical Detector Indicator Light | CB30 / 10 |
| Circuit Breaker CB54 | CB70 / 20 |
| Circuit Breaker CB65 | CB70 / 20 |
| Circuit Breaker CB66 | CB70 / 20 |
| Circuit Breaker CB74 | CB70 / 20 |
| Circuit Breaker CB76 | CB70 / 20 |
| Dimmer Module | CB70 / 20 |
| Emergency Brake Indicator Light | CB77 / 10 |
| Engine Fan Off Indicator Light | CB77 / 10 |

**Table 2-8. Function to Circuit Breaker Cross Reference (Cont)**

| Function | Circuit Breaker / AMP |
|---|---|
| Engine Fan Off Switch (Fan) | CB22 / 10 |
| Engine Fan Off Switch (Indicator Light) | CB77 / 10 |
| Engine Fan Off Switch Light | CB70 / 20 |
| Engine Fan Solenoid | CB22 / 10 |
| Engine Oil Pressure Gage | CB77 / 10 |
| Engine Oil Pressure Gage Light | CB70 / 20 |
| Engine Oil Pressure Indicator Light | CB77 / 10 |
| Engine Oil Pressure Sensor | CB77 / 10 |
| Engine Oil Pressure Switch | CB77 / 10 |
| Ether Sensor | CB22 / 10 |
| Ether Start Solenoid | CB22 / 10 |
| Ether Start Switch | CB22 / 10 |
| Ether Start Switch Light | CB70 / 20 |
| Frequency Divider | CB21 / 15 |
| Front Brake Air Indicator Light | CB77 / 10 |
| Front Brake Air Indicator Light Switch | CB77 / 10 |
| Front Brake Air Pressure Gage | CB77 / 10 |
| Front Brake Air Pressure Gage Light | CB70 / 20 |
| Front Brake Air Pressure Transmitter | CB77 / 10 |
| Front Left Blackout Marker | CB66 / 8 |
| Front Left Parking Light | CB65 / 8 |
| Front Left Turn Signal | CB76 / 15 |

**Table 2-8. Function to Circuit Breaker Cross Reference (Cont)**

| Function | Circuit Breaker / AMP |
|---|---|
| Front Right Blackout Marker | CB66 / 8 |
| Front Right Parking Light | CB65 / 8 |
| Front Right Turn Signal | CB76 / 15 |
| Fuel Gage | CB77 / 10 |
| Fuel Gage Light | CB70 / 20 |
| Fuel Level Sensor | CB77 / 10 |
| Fuel Solenoid | CB79 / 15 |
| Fuel Water Solenoid | CB49 / 15 |
| Hazard Warning Switch | CB71 / 15 |
| Hazard Warning Switch | CB76 / 15 |
| Hazard Warning Switch Light | CB70 / 20 |
| Headlight Dimmer Switch | CB70 / 20 |
| Headlight HI Beam Indicator Light | CB78 / 15 |
| Horn | CB36 / 20 |
| Lamp Test Switch Light | CB70 / 20 |
| Left Blackout Stoplight | CB76 / 15 |
| Left Headlight | CB78 / 15 |
| Left Rear Composite Lamp Taillight | CB80 / 25 |
| Left Turn Signal Indicator Light | CB76 / 15 |
| Magnetic Pickup | CB77 / 10 |
| Main Light Switch | CB70 / 20 |
| Master Power Switch | CB70 / 20 |
| Master Power Switch Light | CB70 / 20 |
| Master Stop Indicator Light | CB77 / 10 |

## e1. CIRCUIT BREAKER DOES NOT OPERATE (CONT)

**Table 2-8. Function to Circuit Breaker Cross Reference (Cont)**

| Function | Circuit Breaker / AMP |
|---|---|
| Parking Brake Indicator Light | CB77 / 10 |
| Parking Brake Switch | CB77 / 10 |
| Personnel Heater | CB23 / 15 |
| Personnel Heater Lights | CB70 / 20 |
| Power Take-Off (PTO) Indicator Light | CB77 / 10 |
| Power Take-Off (PTO) Pressure Switch | CB77 / 10 |
| Power Take-Off (PTO) Solenoid | CB49 / 15 |
| Power Take-Off (PTO) Switch | CB49 / 15 |
| Power Take-Off (PTO) Switch Light | CB70 / 20 |
| Rear Brake Air Indicator Light | CB77 / 10 |
| Rear Brake Air Indicator Light Switch | CB77 / 10 |
| Rear Brake Air Pressure Gage | CB77 / 10 |
| Rear Brake Air Pressure Gage Light | CB70 / 20 |
| Rear Brake Air Pressure Transmitter | CB77 / 10 |
| Rear Left Composite Lamp Turn Signal | CB76 / 15 |
| Rear LH Blackout Marker | CB66 / 8 |
| Rear RH Blackout Marker | CB66 / 8 |
| Rear Right Composite Lamp Turn Signal | CB76 / 15 |
| Right Blackout Stoplight | CB76 / 15 |

**Table 2-8. Function to Circuit Breaker Cross Reference (Cont)**

| Function | Circuit Breaker / AMP |
|---|---|
| Right Headlight | CB78 / 15 |
| Right Rear Composite Lamp Taillight | CB80 / 25 |
| Right Turn Signal Indicator Light | CB76 / 15 |
| Rotating Warning Light | CB38 / 20 |
| Rotating Warning Light Switch | CB70 / 20 |
| Rotating Warning Light Switch Light | CB70 / 20 |
| Speedometer | CB77 / 10 |
| Speedometer Light | CB70 / 20 |
| Start Inhibit Pushbutton Switch | CB79 / 15 |
| Starter Pushbutton Switch | CB21 / 15 |
| Stoplight Switches | CB76 / 15 |
| Tachometer | CB77 / 10 |
| Tachometer Light | CB70 / 20 |
| Transmission Temperature Indicator Light | CB77 / 10 |
| Troop Transport Alarm Switch | CB77 / 10 |
| Turn Signal Flasher ECU | CB71 / 15 |
| Turn Signal Flasher ECU | CB74 / 10 |
| Van Door Indicator Light | CB77 / 10 |
| Van Door Switch | CB50 / 15 |
| Voltmeter | CB77 / 10 |
| Voltmeter Light | CB70 / 20 |

**Table 2-8. Function to Circuit Breaker Cross Reference (Cont)**

| Function | Circuit Breaker / AMP |
|---|---|
| Water Temperature Gage | CB77 / 10 |
| Water Temperature Gage Light | CB70 / 20 |
| Water Temperature Indicator Light | CB77 / 10 |
| Water Temperature Sensor | CB77 / 10 |
| Water Temperature Switch | CB77 / 10 |
| Water Temperature Switch (Fan) | CB22 / 10 |
| Winch In Solenoid | CB49 / 15 |
| Winch In/Out Switch | CB49 / 15 |
| Winch In/Out Switch Light | CB70 / 20 |
| Winch Out Solenoid | CB49 / 15 |
| Winch Switch | CB49 / 15 |
| Winch Switch Light | CB70 / 20 |
| Windshield Wiper ECU | CB37 / 20 |
| Wiper Motor | CB37 / 20 |
| WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) | CB35 / 15 |
| WTEC II Vehicle Interface Module (VIM) | CB35 / 15 |
| WTEC II / WTEC III Transmission Pushbutton Shift Selector (TPSS) Dimmer Module | CB66 / 8 |
| WTEC III Transmission ECU | CB43 / 15 |
| WTEC III Transmission ECU | CB79 / 15 |

## e1. CIRCUIT BREAKER DOES NOT OPERATE (CONT)

**Table 2-8.1. Circuit Breaker to Function Cross Reference**

| Circuit Breaker / AMP | Function |
|---|---|
| CB20 / 25 | Cab Radio |
| CB21 / 15 | Air Dryer |
| CB21 / 15 | Frequency Divider |
| CB21 / 15 | Starter Pushbutton Switch |
| CB22 / 10 | Engine Fan Off Switch (Fan) |
| CB22 / 10 | Engine Fan Solenoid |
| CB22 / 10 | Ether Sensor |
| CB22 / 10 | Ether Start Solenoid |
| CB22 / 10 | Ether Start Switch |
| CB22 / 10 | Water Temperature Switch (Fan) |
| CB23 / 15 | Personnel Heater |
| CB30 / 10 | Chemical Alarm |
| CB30 / 10 | Chemical Detector |
| CB30 / 10 | Chemical Detector Indicator Light |
| CB35 / 15 | WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) |
| CB35 / 15 | WTEC II Vehicle Interface Module (VIM) |
| CB36 / 20 | Horn |
| CB37 / 20 | Windshield Wiper ECU |
| CB37 / 20 | Wiper Motor |
| CB38 / 20 | Rotating Warning Light |
| CB39 / 10 | 24 VDC Intervehicular Blackout Stoplight |

**Table 2-8.1. Circuit Breaker to Function Cross Reference (Cont)**

| Circuit Breaker / AMP | Function |
|---|---|
| CB40 / 10 | Central Tire Inflation System (CTIS) |
| CB40 / 10 | Central Tire Inflation System (CTIS) Air Pressure Switch |
| CB40 / 10 | Central Tire Inflation System (CTIS) Overspeed Indicator Light |
| CB41 / 15 | 24 VDC Intervehicular Clearance and Rear Light |
| CB42 / 10 | 24 VDC Intervehicular Blackout Clearance |
| CB42 / 10 | 24 VDC Intervehicular Left Blackout Marker |
| CB42 / 10 | 24 VDC Intervehicular Right Blackout Marker |
| CB43 / 15 | 24 VDC Intervehicular Left Turn Signal and Stoplight (WTEC II) |
| CB43 / 15 | WTEC III Transmission ECU |
| CB44 / 15 | 24 VDC Intervehicular Left and Right Turn Signals and Stoplights (WTEC III) |
| CB44 / 15 | 24 VDC Intervehicular Right Turn Signal and Stoplight (WTEC II) |
| CB49 / 15 | Fuel Water Solenoid |
| CB49 / 15 | Power Take-Off (PTO) Solenoid |
| CB49 / 15 | Power Take-Off (PTO) Switch |
| CB49 / 15 | Winch In Solenoid |
| CB49 / 15 | Winch In/Out Switch |
| CB49 / 15 | Winch Out Solenoid |

**Table 2-8.1. Circuit Breaker to Function Cross Reference (Cont)**

| Circuit Breaker / AMP | Function |
|---|---|
| CB49 / 15 | Winch Switch |
| CB50 / 15 | Van Door Switch |
| CB54 / 8 | Blackout Drive Light |
| CB65 / 8 | Front Left Parking Light |
| CB65 / 8 | Front Right Parking Light |
| CB66 / 8 | Front Left Blackout Marker |
| CB66 / 8 | Front Right Blackout Marker |
| CB66 / 8 | Rear LH Blackout Marker |
| CB66 / 8 | Rear RH Blackout Marker |
| CB66 / 8 | WTEC II / WTEC III Transmission Pushbutton Shift Selector (TPSS) Dimmer Module |
| CB67 / 25 | 12 VDC Intervehicular Marker Lights |
| CB67 / 25 | All Marker Lights |
| CB70 / 20 | Blackout Override Switch Light |
| CB70 / 20 | Circuit Breaker CB54 |
| CB70 / 20 | Circuit Breaker CB65 |
| CB70 / 20 | Circuit Breaker CB66 |
| CB70 / 20 | Circuit Breaker CB74 |
| CB70 / 20 | Circuit Breaker CB76 |
| CB70 / 20 | Dimmer Module |
| CB70 / 20 | Engine Fan Off Switch Light |
| CB70 / 20 | Engine Oil Pressure Gage Light |
| CB70 / 20 | Ether Start Switch Light |
| CB70 / 20 | Fuel Gage Light |

**Table 2-8.1. Circuit Breaker to Function Cross Reference (Cont)**

| Circuit Breaker / AMP | Function |
|---|---|
| CB70 / 20 | Front Brake Air Pressure Gage Light |
| CB70 / 20 | Hazard Warning Switch Light |
| CB70 / 20 | Headlight Dimmer Switch |
| CB70 / 20 | Lamp Test Switch Light |
| CB70 / 20 | Main Light Switch |
| CB70 / 20 | Master Power Switch |
| CB70 / 20 | Master Power Switch Light |
| CB70 / 20 | Personnel Heater Lights |
| CB70 / 20 | Power Take-Off (PTO) Switch Light |
| CB70 / 20 | Rear Brake Air Pressure Gage Light |
| CB70 / 20 | Rotating Warning Light Switch |
| CB70 / 20 | Rotating Warning Light Switch Light |
| CB70 / 20 | Speedometer Light |
| CB70 / 20 | Tachometer Light |
| CB70 / 20 | Voltmeter Light |
| CB70 / 20 | Water Temperature Gage Light |
| CB70 / 20 | Winch In/Out Switch Light |
| CB70 / 20 | Winch Switch Light |
| CB71 / 15 | Hazard Warning Switch |
| CB71 / 15 | Turn Signal Flasher ECU |
| CB72 / 15 | Blackout Override Switch |
| CB73 / 8 | Backup Light |
| CB74 / 10 | Turn Signal Flasher ECU |

## e1. CIRCUIT BREAKER DOES NOT OPERATE (CONT)

**Table 2-8.1. Circuit Breaker to Function Cross Reference (Cont)**

| Circuit Breaker / AMP | Function |
|---|---|
| CB76 / 15 | 12 VDC Intervehicular Left Turn Signal |
| CB76 / 15 | 12 VDC Intervehicular Right Turn Signal |
| CB76 / 15 | 12 VDC Intervehicular Stoplight |
| CB76 / 15 | 24 VDC Intervehicular Auxiliary |
| CB76 / 15 | Front Left Turn Signal |
| CB76 / 15 | Front Right Turn Signal |
| CB76 / 15 | Hazard Warning Switch |
| CB76 / 15 | Left Blackout Stoplight |
| CB76 / 15 | Left Turn Signal Indicator Light |
| CB76 / 15 | Rear Left Composite Lamp Turn Signal |
| CB76 / 15 | Rear Right Composite Lamp Turn Signal |
| CB76 / 15 | Right Blackout Stoplight |
| CB76 / 15 | Right Turn Signal Indicator Light |
| CB76 / 15 | Stoplight Switches |
| CB77 / 10 | Audible Alarm |
| CB77 / 10 | Emergency Brake Indicator Light |
| CB77 / 10 | Engine Fan Off Indicator Light |
| CB77 / 10 | Engine Fan Off Switch (Indicator Light) |
| CB77 / 10 | Engine Oil Pressure Gage |
| CB77 / 10 | Engine Oil Pressure Indicator Light |

**Table 2-8.1. Circuit Breaker to Function Cross Reference (Cont)**

| Circuit Breaker / AMP | Function |
|---|---|
| CB77 / 10 | Engine Oil Pressure Sensor |
| CB77 / 10 | Engine Oil Pressure Switch |
| CB77 / 10 | Front Brake Air Indicator Light |
| CB77 / 10 | Front Brake Air Indicator Light Switch |
| CB77 / 10 | Front Brake Air Pressure Gage |
| CB77 / 10 | Front Brake Air Pressure Transmitter |
| CB77 / 10 | Fuel Gage |
| CB77 / 10 | Fuel Level Sensor |
| CB77 / 10 | Magnetic Pickup |
| CB77 / 10 | Master Stop Indicator Light |
| CB77 / 10 | Parking Brake Indicator Light |
| CB77 / 10 | Parking Brake Switch |
| CB77 / 10 | Power Take-Off (PTO) Indicator Light |
| CB77 / 10 | Power Take-Off (PTO) Pressure Switch |
| CB77 / 10 | Rear Brake Air Indicator Light |
| CB77 / 10 | Rear Brake Air Indicator Light Switch |
| CB77 / 10 | Rear Brake Air Pressure Gage |
| CB77 / 10 | Rear Brake Air Pressure Transmitter |
| CB77 / 10 | Speedometer |
| CB77 / 10 | Tachometer |

**Table 2-8.1. Circuit Breaker to Function Cross Reference (Cont)**

| Circuit Breaker / AMP | Function |
|---|---|
| CB77 / 10 | Transmission Temperature Indicator Light |
| CB77 / 10 | Troop Transport Alarm Switch |
| CB77 / 10 | Van Door Indicator Switch |
| CB77 / 10 | Voltmeter |
| CB77 / 10 | Water Temperature Gage |
| CB77 / 10 | Water Temperature Indicator Light |
| CB77 / 10 | Water Temperature Sensor |
| CB77 / 10 | Water Temperature Switch |
| CB78 / 15 | Headlight HI Beam Indicator Light |
| CB78 / 15 | Left Headlight |
| CB78 / 15 | Right Headlight |
| CB79 / 15 | 10 AMP Fuse WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) |
| CB79 / 15 | Fuel Solenoid |
| CB79 / 15 | Start Inhibit Pushbutton Switch |
| CB79 / 15 | WTEC III Transmission ECU |
| CB80 / 25 | 12 VDC Intervehicular Taillights |
| CB80 / 25 | Left Rear Composite Lamp Taillight |
| CB80 / 25 | Right Rear Composite Lamp Taillight |

## e2. ENGINE DOES NOT CRANK

**INTIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wire, Elect, 50 ft (Item 77, Appendix D)
Wire, Relay Test (Item 9, Appendix E)

**Materials/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)
Adhesive (Item 8, Appendix D)
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Seal Ring, Metal (Item 251, Appendix G)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.

**POSSIBLE PROBLEMS**

Faulty starting motor.
Faulty auxiliary starter solenoid.
Faulty battery to starter cable assembly.
Faulty oil pressure switch.
Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty engine control cable assembly.
Faulty starter pushbutton switch.
Faulty neutral start relay.
Faulty WTEC II Vehicle Interface Module (VIM).
Faulty WTEC II cab transmission wiring harness.
Faulty WTEC II transmission ECU pushbutton shift selector (TEPSS).
Faulty relay K26.
Faulty dashboard cable assembly.
Faulty WTEC III transmission ECU.
Faulty WTEC III transmission pushbutton shift selector (TPSS).

**NOTE**

Perform Engine System Troubleshooting a1. Engine Does Not Crank and Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breakers CB21 and CB77 prior to beginning this task.

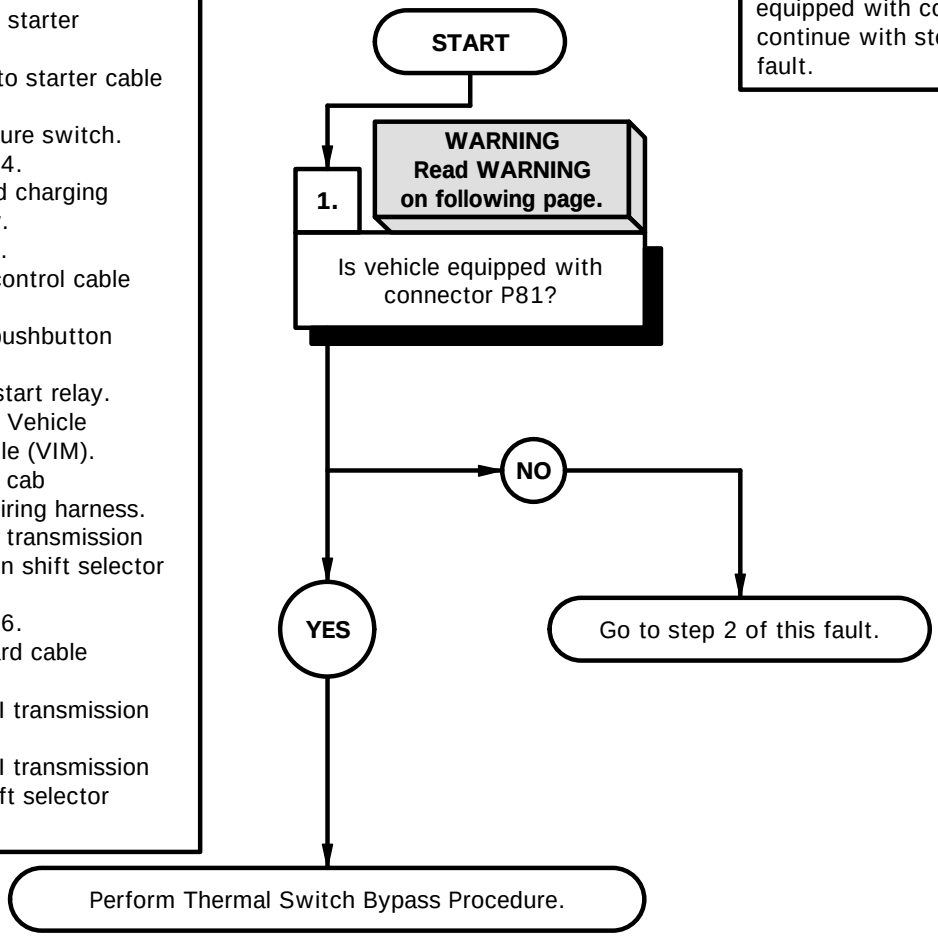
Remove and install plastic cable ties as required.

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

If vehicle is equipped with connector P81, perform Thermal Switch Bypass procedure. If vehicle is not equipped with connector P81, continue with step 2 of this fault.



**WARNING**

**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

(1) If vehicle is not equipped with connector P81 continue with step 2 of this fault.
(2) If vehicle is equipped with connector P81 perform Thermal Switch Bypass Procedure, see below.
(3) After performing Thermal Switch Bypass Procedure, attempt to start engine (TM 9-2320-365-10).
(4) If engine still does not crank, continue with step 2 of this fault.

**THERMAL SWITCH BYPASS PROCEDURE**

**NOTE**

The tools and materials are required to perform the thermal switch bypass:
Heater, Gun type, Electrical (Appendix B, Item 20)
Tape, Insulation, Electrical (Appendix D, Item 75)
Splice, Conductor (Item 261, Appendix G)
Insulation, Sleeving, Electrical (1.5 in. or 3.8 cm) (Item 30.1, Appendix D)

(1) Disconnect batteries (para 7-48).
(2) Disconnect connector P81 from thermal switch connector.
(3) Cut connector P81 from branch of start and charging cable assembly.
(4) Remove band marker from branch of start and charging cable assembly.

**NOTE**

Remove electrical tape as required.

(5) Remove insulation sleeving from convoluted tubing to body of start and charging cable assembly.
(6) Remove insulation sleeving from two wires to body of start and charging cable assembly.

**NOTE**

Measure wires from body of start and charging cable assembly.

(7) Cut one wire 3 in. (7.6 cm).
(8) Cut other wire 4 in. (10.2 cm).
(9) Remove 0.38 in. (1 cm) of insulation from two wires.

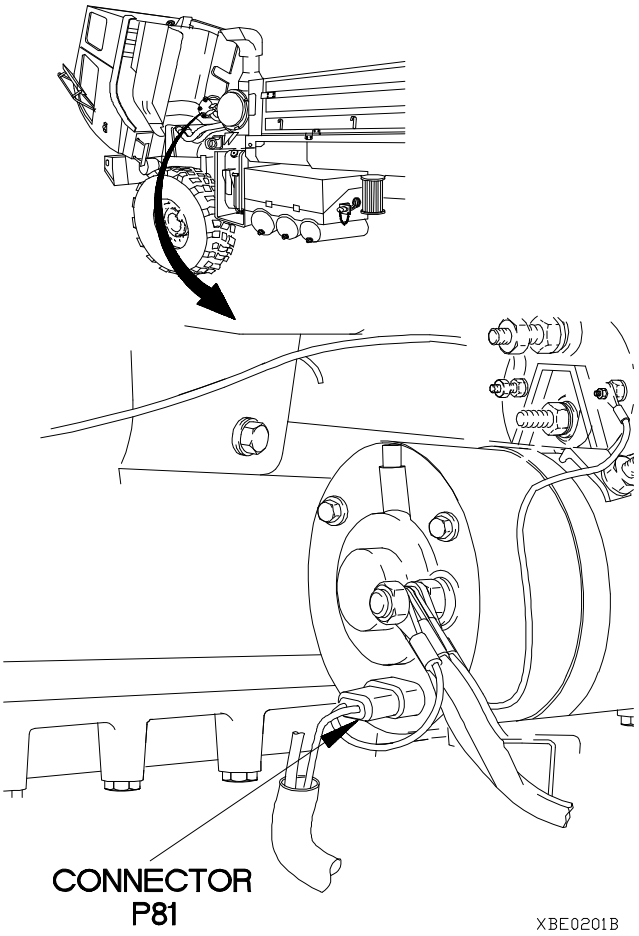
**THERMAL SWITCH BYPASS PROCEDURE (Cont)**

(10) Cut insulation sleeving 1.5 in. (3.8 cm).
(11) Position insulation sleeving on 4 in. (10.2 cm) wire.
(12) Install conductor splice on two wires.
(13) Install insulation sleeving on conductor splice.

**NOTE**

Install electrical tape as required.

(14) Install conductor splice in convoluted tubing.
(15) Lower cab (TM 9-2320-365-10).
(16) Connect batteries (para 7-48).



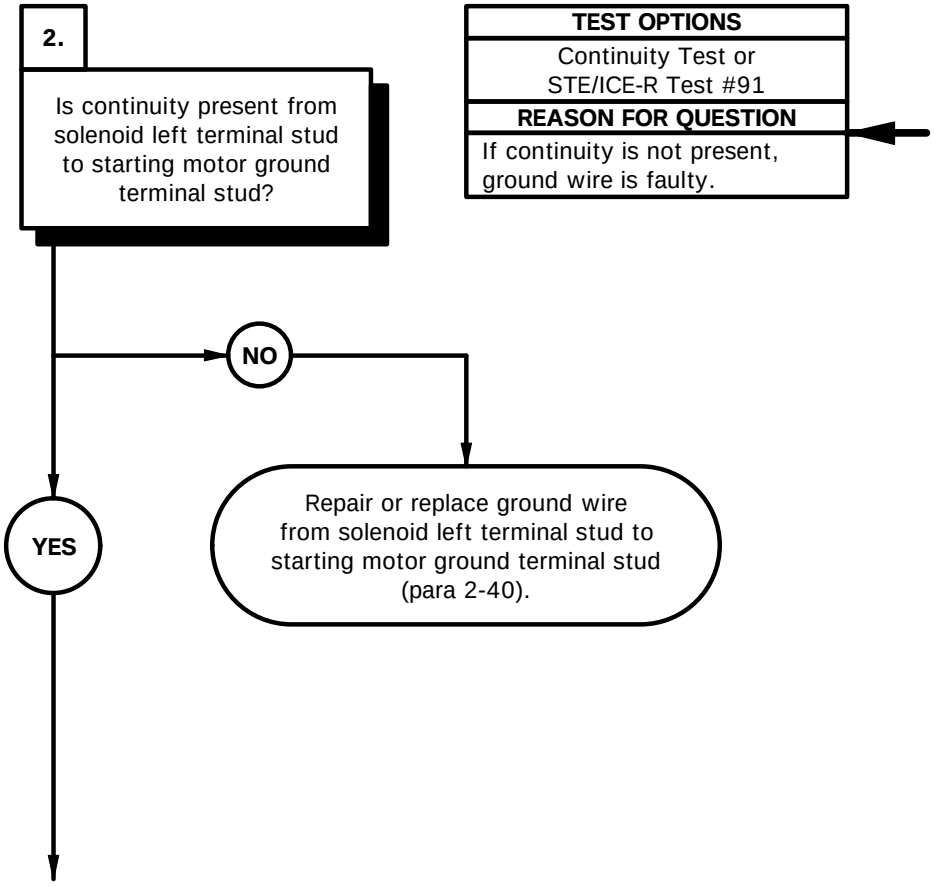
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.

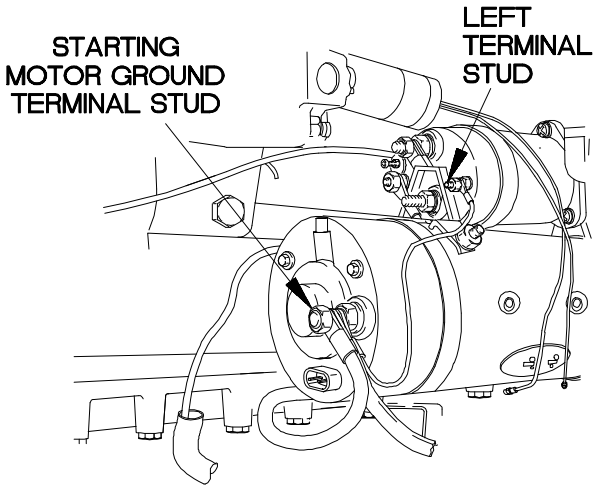
**POSSIBLE PROBLEMS**

Faulty starting motor.
Faulty auxiliary starter solenoid.
Faulty battery to starter cable assembly.
Faulty oil pressure switch.
Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty engine control cable assembly.
Faulty starter pushbutton switch.
Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty WTEC II cab transmission wiring harness.
Faulty WTEC II transmission ECU pushbutton shift selector (TEPSS).
Faulty relay K26.
Faulty dashboard cable assembly.
Faulty WTEC III transmission ECU.
Faulty WTEC III transmission pushbutton shift selector (TPSS).



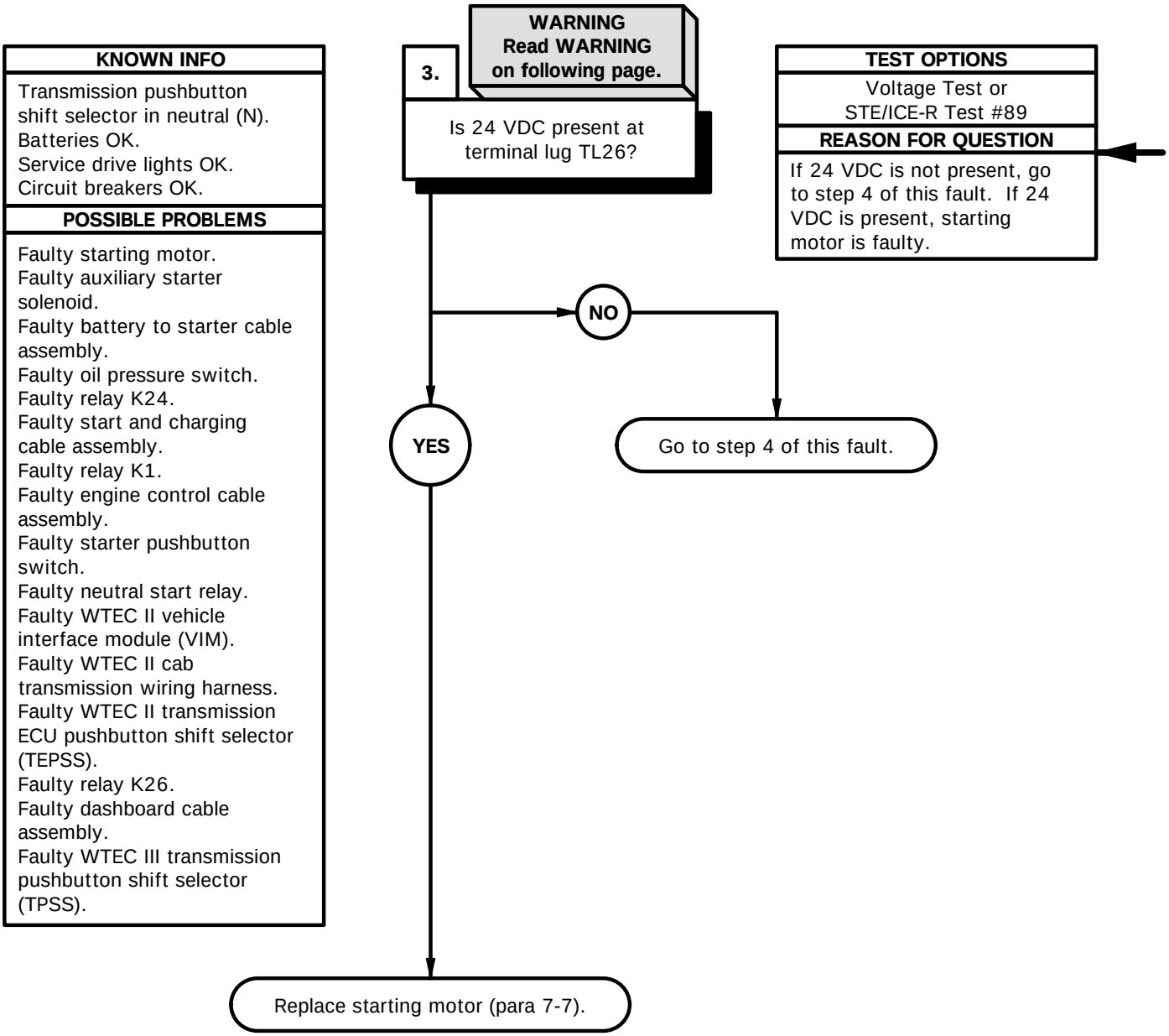
**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to solenoid left terminal stud.
(4) Connect negative (-) probe of multimeter to starting motor ground terminal stud and note reading on multimeter.
(5) If continuity is not present repair or replace ground wire from solenoid left terminal stud to starting motor ground terminal stud (para 2-40).




XBE0202B

## e2. ENGINE DOES NOT CRANK (CONT)

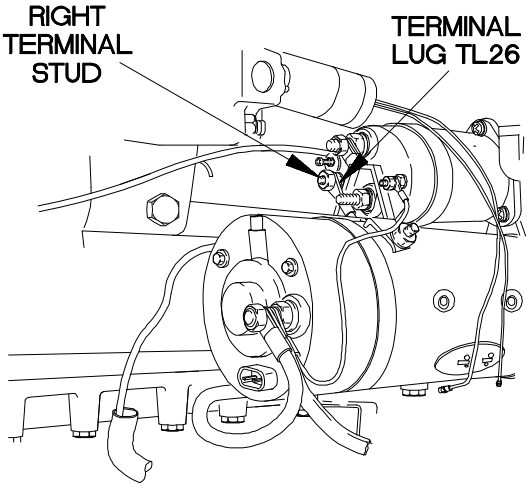


**WARNING**

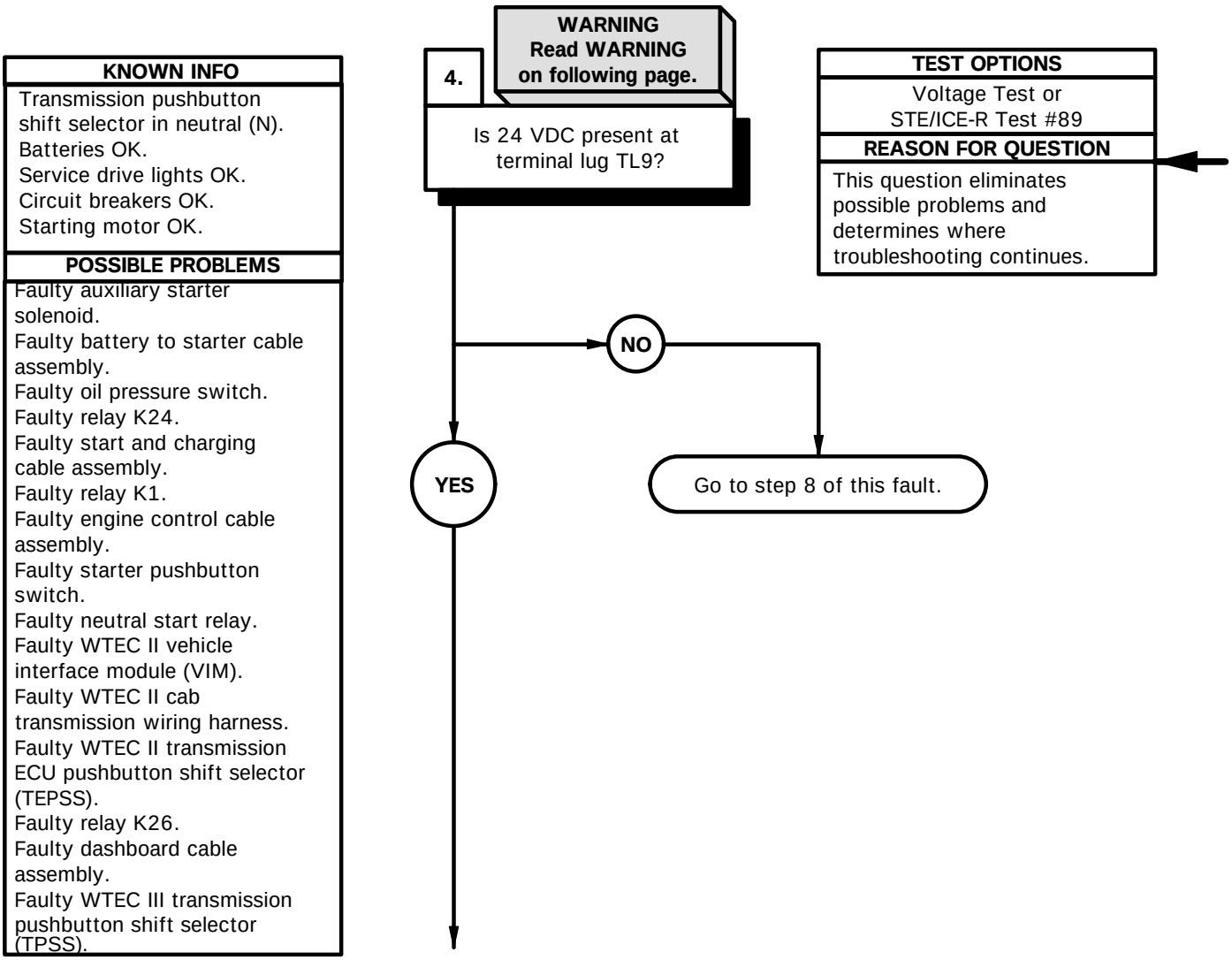
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove adhesive from solenoid right terminal stud.
(2) Connect batteries (para 7-48).
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to terminal lug TL26.
(5) Connect negative (-) probe of multimeter to ground.
(6) Lower cab (TM 9-2320-365-10).
(7) Position master power switch to on (TM 9-2320-365-10).
(8) Press starter pushbutton (TM 9-2320-365-10) and note reading on multimeter.
(9) If 24 VDC is not present go to 4 of this fault.
(10) If 24 VDC is present, replace starting motor (para 7-7).
(11) Position master power switch to off (TM 9-2320-365-10).



## e2. ENGINE DOES NOT CRANK (CONT)

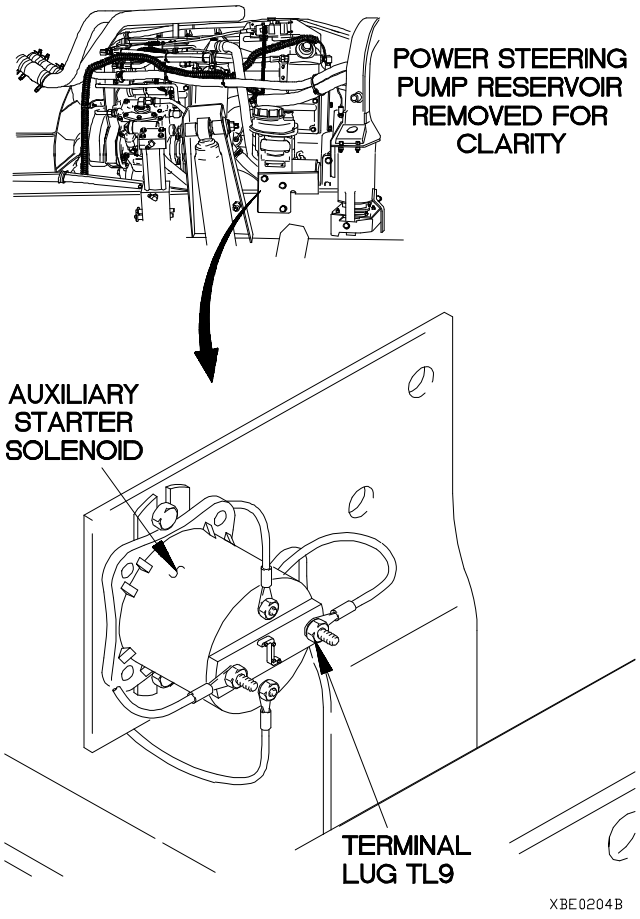


**WARNING**

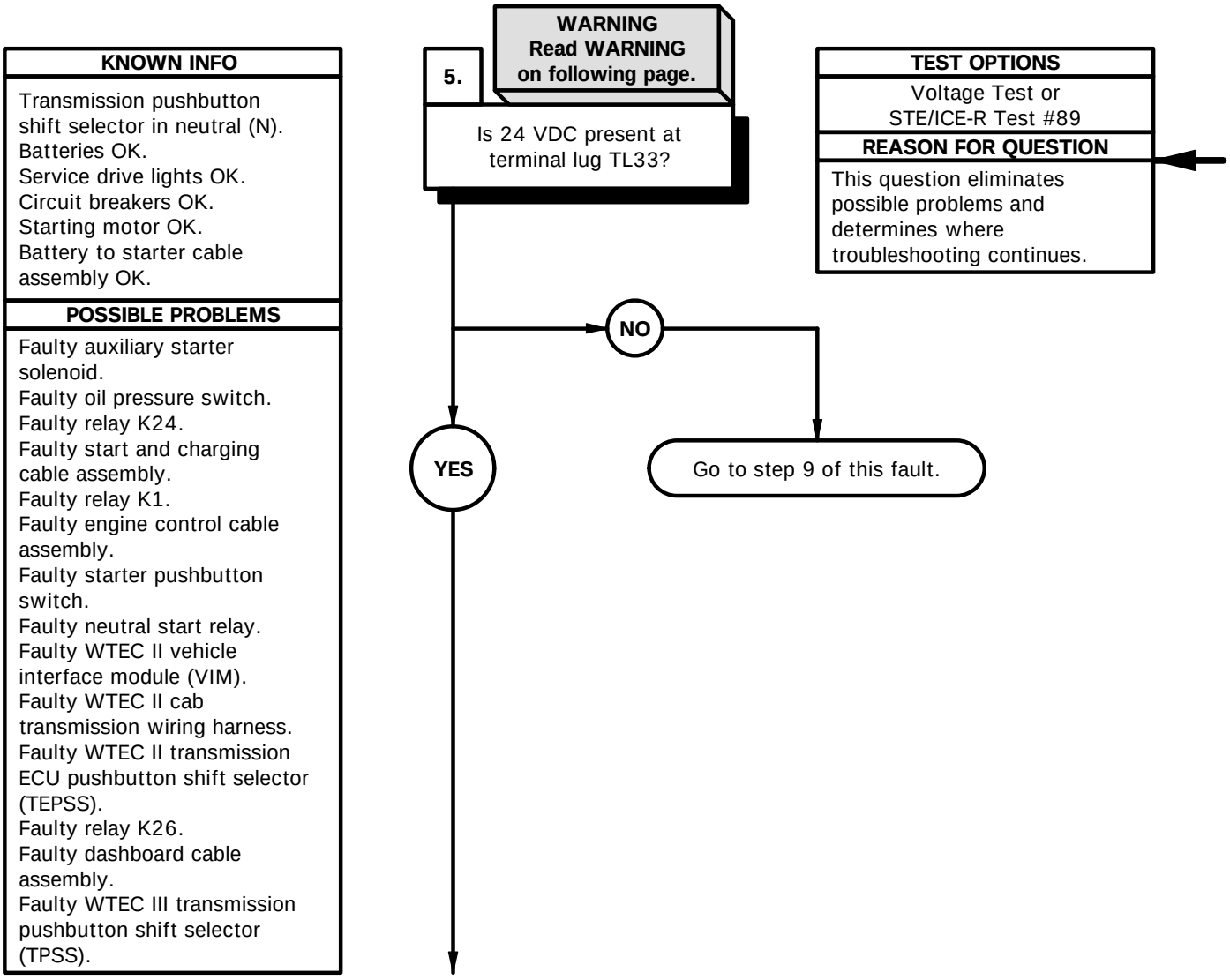
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Disconnect batteries (para 7-48).
(3) Remove adhesive from auxiliary starter solenoid.
(4) Connect batteries (para 7-48).
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to terminal lug TL9.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If 24 VDC is not present, go to step 8 of this fault.



## e2. ENGINE DOES NOT CRANK (CONT)

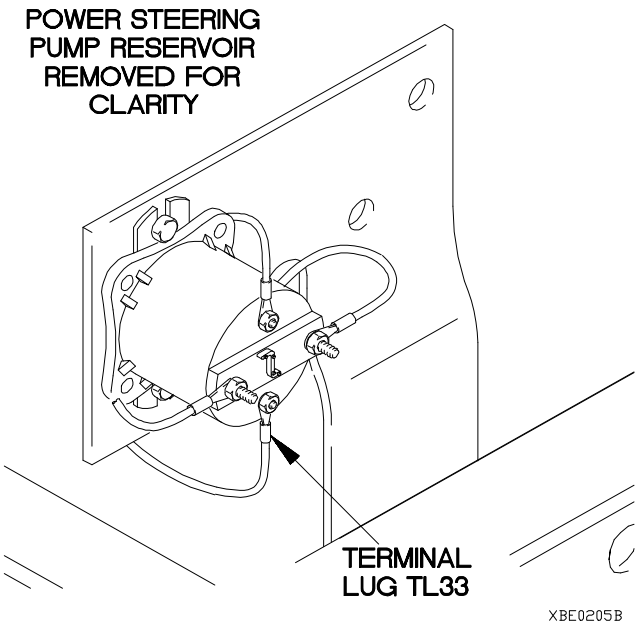


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to terminal lug TL33.
(3) Connect negative (-) probe of multimeter to ground.
(4) Lower cab (TM 9-2320-365-10).
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Press starter pushbutton (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, go to step 9 of this fault.
(8) Position master power switch to off (TM 9-2320-365-10).
(9) Raise cab (TM 9-2320-365-10).



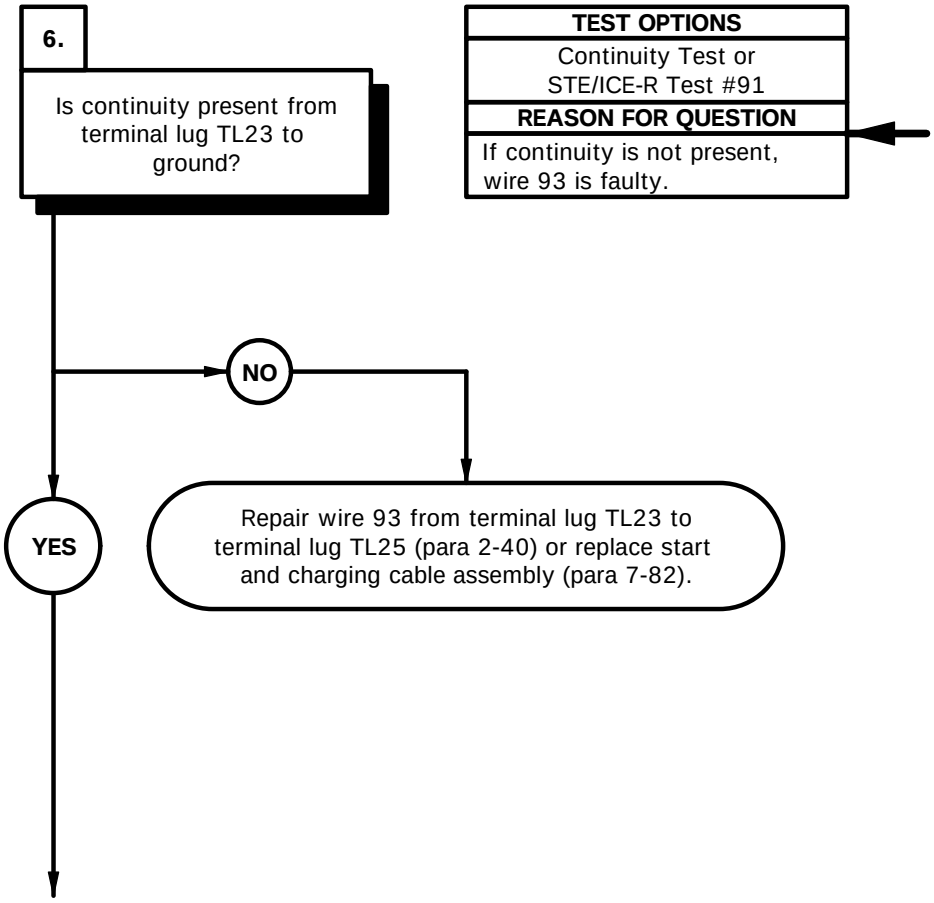
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Relay K24 OK.
Relay K1 OK.
Engine control cable assembly OK.
Starter pushbutton switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
Dashboard cable assembly OK.

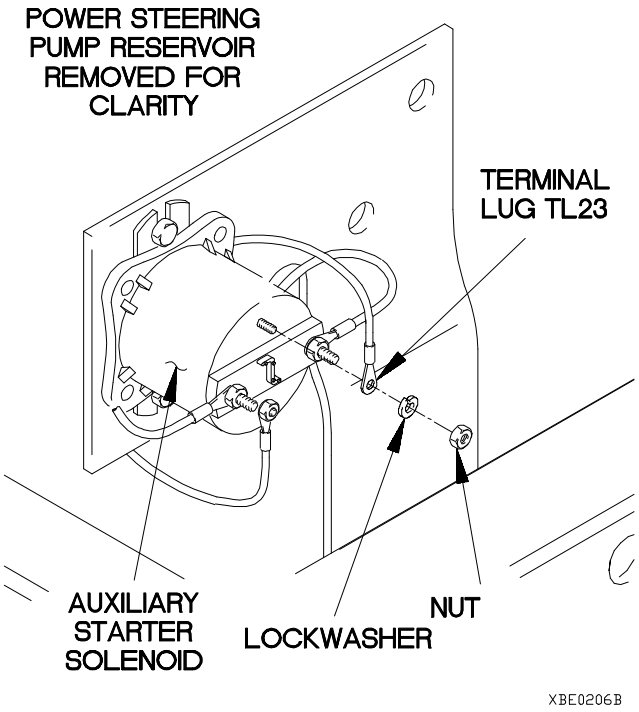
**POSSIBLE PROBLEMS**

Faulty auxiliary starter solenoid.
Faulty start and charging cable assembly.



**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove nut, lockwasher, and terminal lug TL23 from auxiliary starter solenoid. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL23.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, repair wire 93 from terminal lug TL23 to terminal lug TL25 (para 2-40) or replace start and charging cable assembly (para 7-82).
(7) Install terminal lug TL23 on auxiliary starter solenoid with lockwasher and nut.



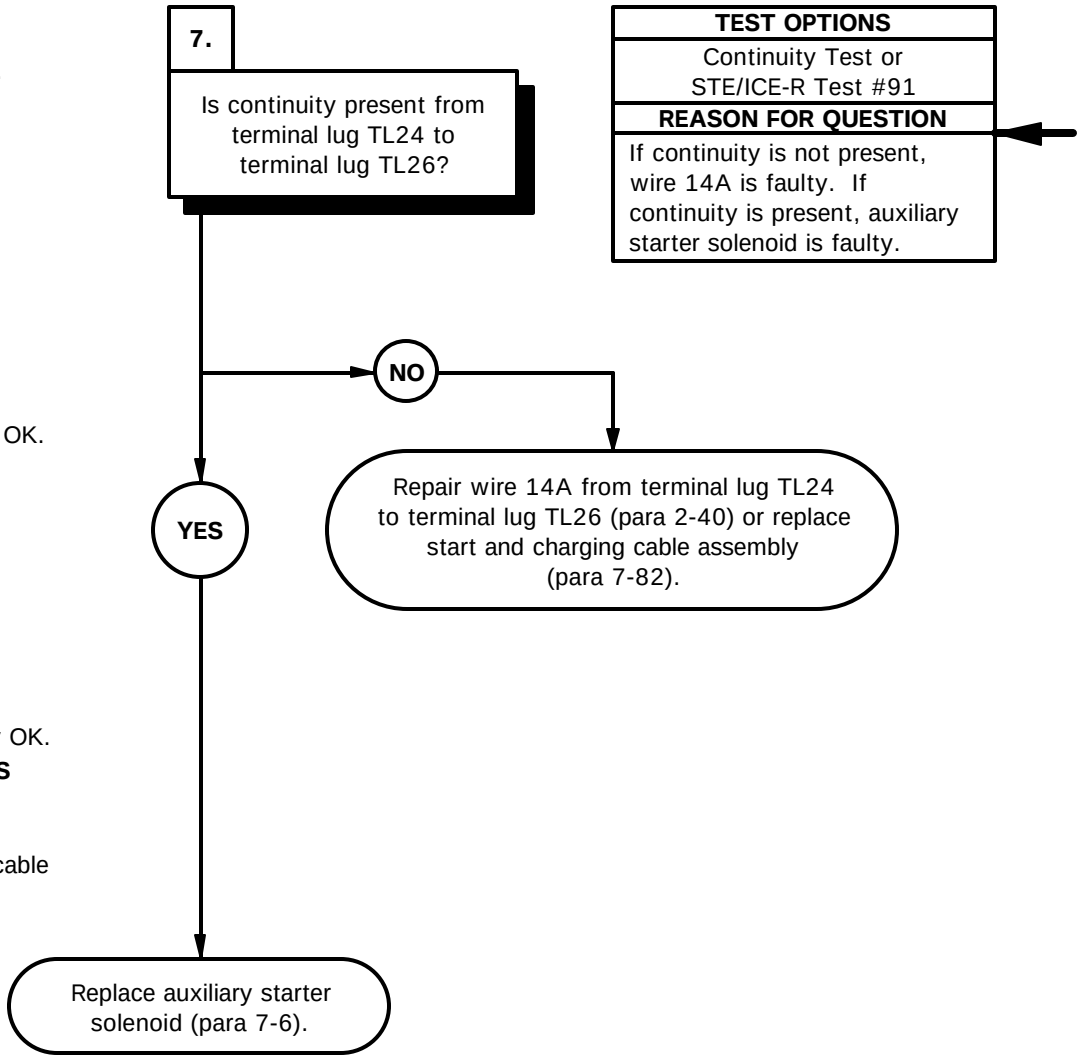
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Relay K24 OK.
Relay K1 OK.
Engine control cable assembly OK.
Starter pushbutton switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
Dashboard cable assembly OK.

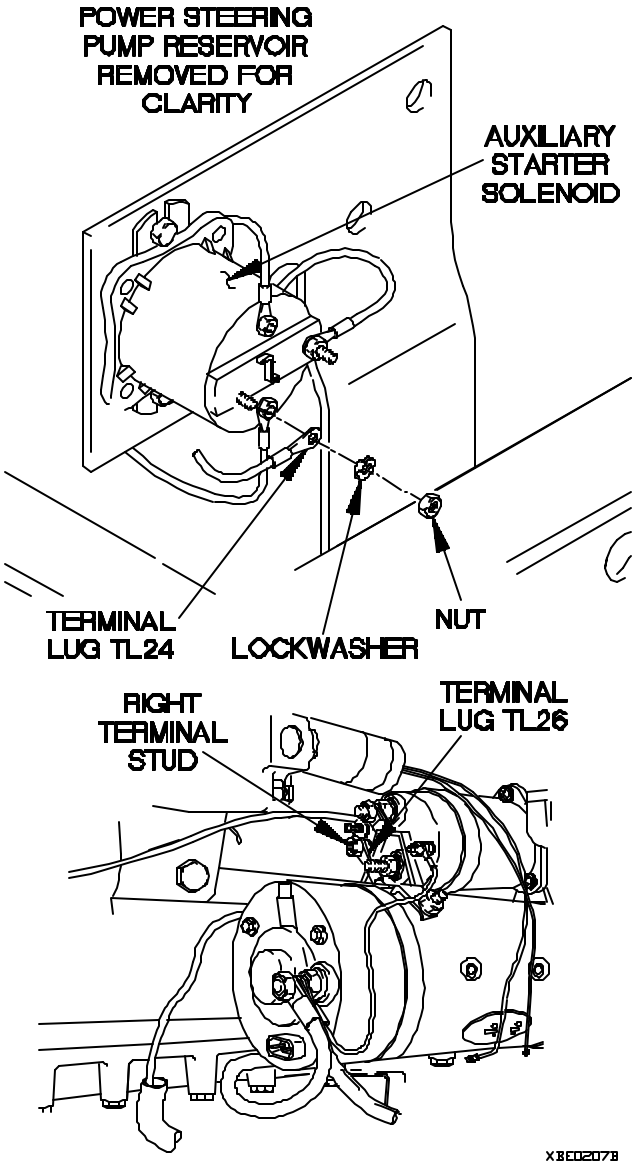
**POSSIBLE PROBLEMS**

Faulty auxiliary starter solenoid.
Faulty start and charging cable assembly.

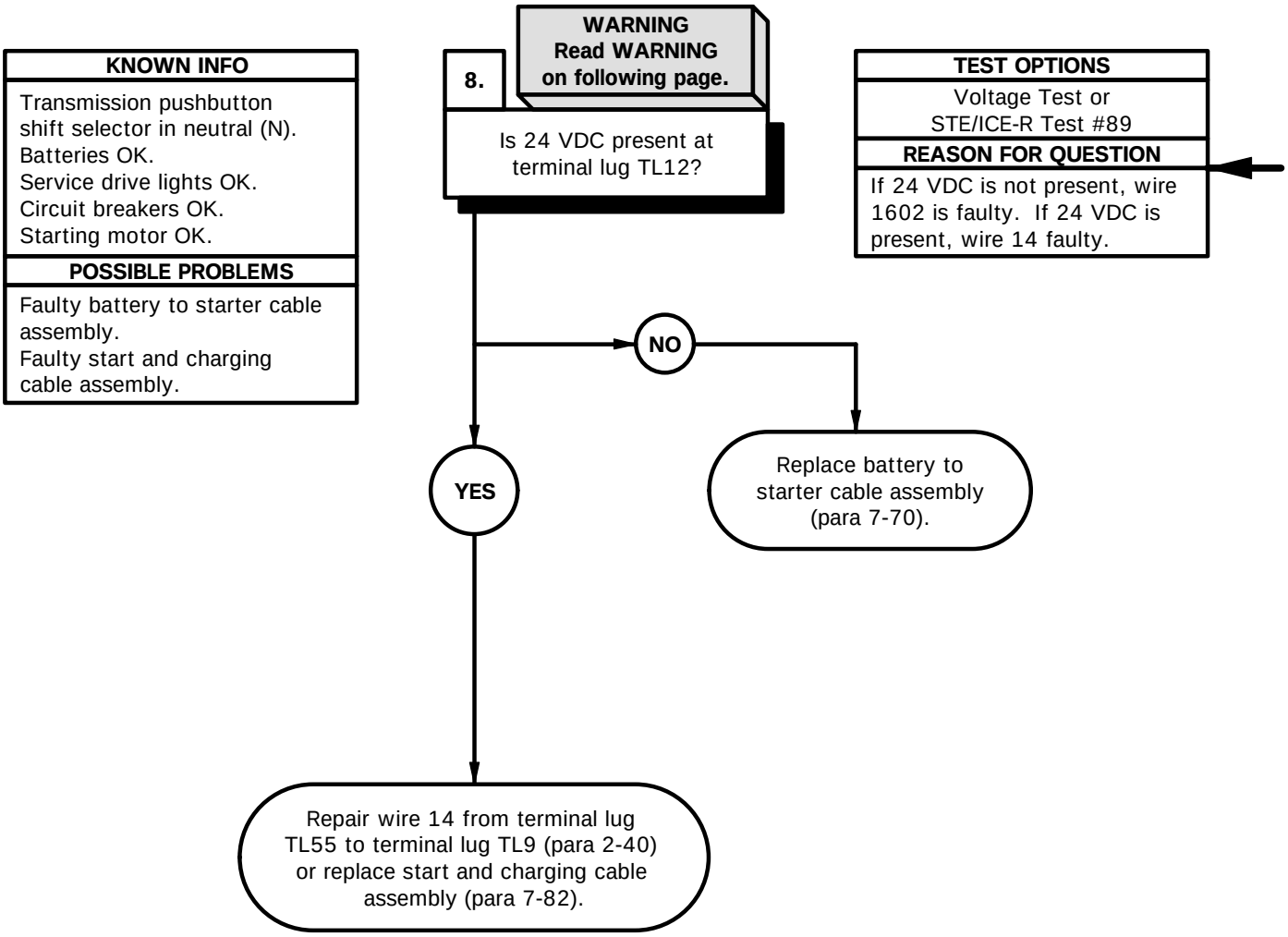


**CONTINUITY TEST**

(1) Remove nut, lockwasher, and terminal lug TL24 from auxiliary starter solenoid. Discard lockwasher.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL24.
(4) Connect negative (-) probe of multimeter to terminal lug TL26 and note reading on multimeter.
(5) If continuity is not present, repair wire 14A from terminal lug TL24 to terminal lug TL26 (para 2-40) or replace start and charging cable assembly (para 7-82).
(6) If continuity is present, replace auxiliary starter solenoid (para 7-6).
(7) Install terminal lug TL24 on auxiliary starter solenoid with lockwasher and nut.
(8) Apply adhesive to auxiliary starter solenoid.
(9) Apply adhesive to solenoid right terminal stud.
(10) Lower cab (TM 9-2320-365-10).
(11) Connect batteries (para 7-48).



## e2. ENGINE DOES NOT CRANK (CONT)

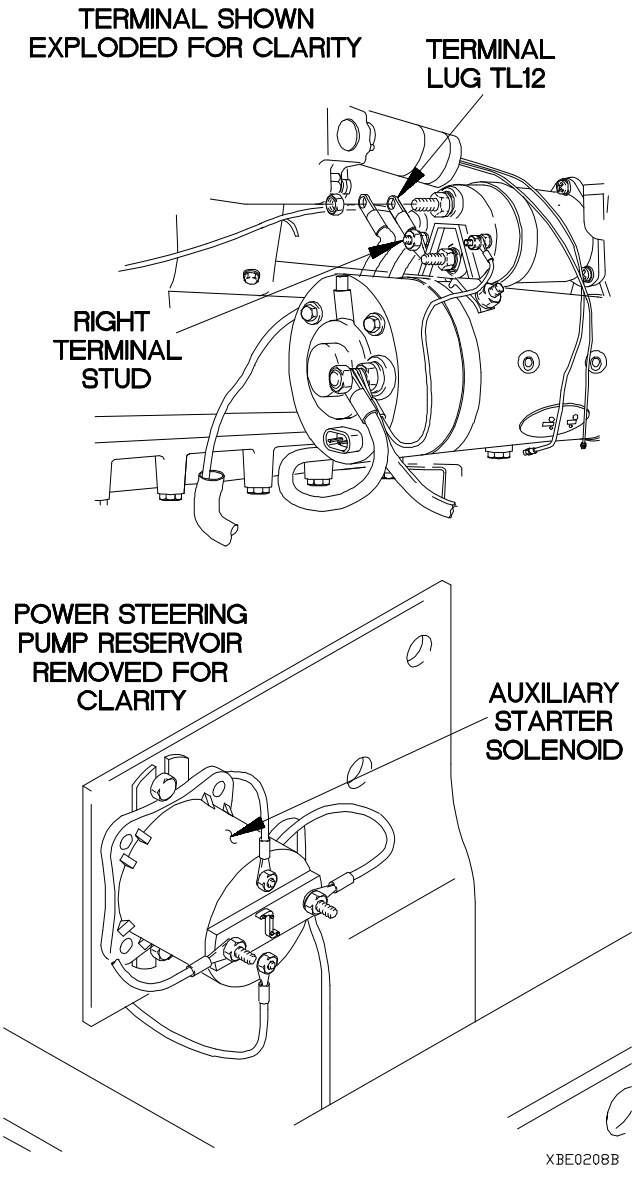


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to terminal lug TL12.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 24 VDC is not present, replace battery to starter cable assembly (para 7-70).
(5) If 24 VDC is present, repair wire 14 from terminal lug TL55 to terminal lug TL9 (para 2-40) or replace start and charging cable assembly (para 7-82).
(6) Disconnect batteries (para 7-48).
(7) Apply adhesive to auxiliary starter solenoid.
(8) Apply adhesive to solenoid right terminal stud.
(9) Connect batteries (para 7-48).
(10) Lower cab (TM 9-2320-365-10).



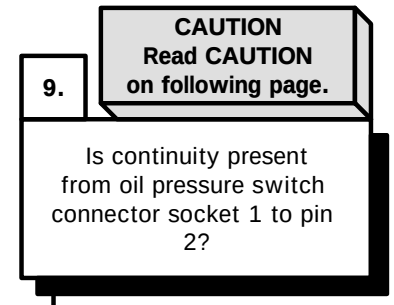
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty oil pressure switch.
Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty engine control cable assembly.
Faulty starter pushbutton switch.
Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty WTEC II cab transmission wiring harness.
Faulty WTEC II transmission ECU pushbutton shift selector (TEPSS).
Faulty relay K26.
Faulty dashboard cable assembly.
Faulty WTEC III transmission pushbutton shift selector (TPSS).




**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, oil pressure switch is faulty.

NO

YES

Replace oil pressure switch (para 7-40).

**CAUTION**

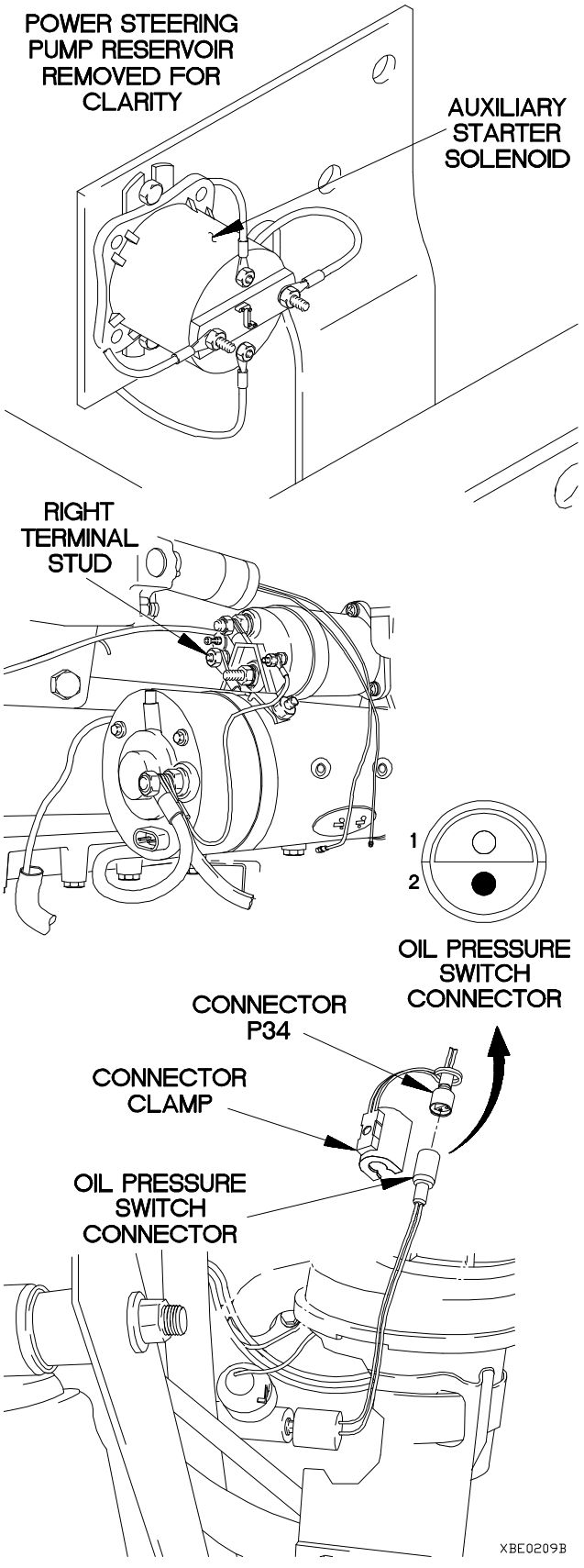
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Apply adhesive to auxiliary starter solenoid.
(3) Apply adhesive to solenoid right terminal stud.
(4) Disconnect connector clamp from oil pressure switch connector.
(5) Disconnect connector P34 from oil pressure switch connector.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to oil pressure switch connector socket 1.
(8) Connect negative (-) probe of multimeter to oil pressure switch connector pin 2 and note reading on multimeter.
(9) If continuity is not present, replace oil pressure switch (para 7-40).



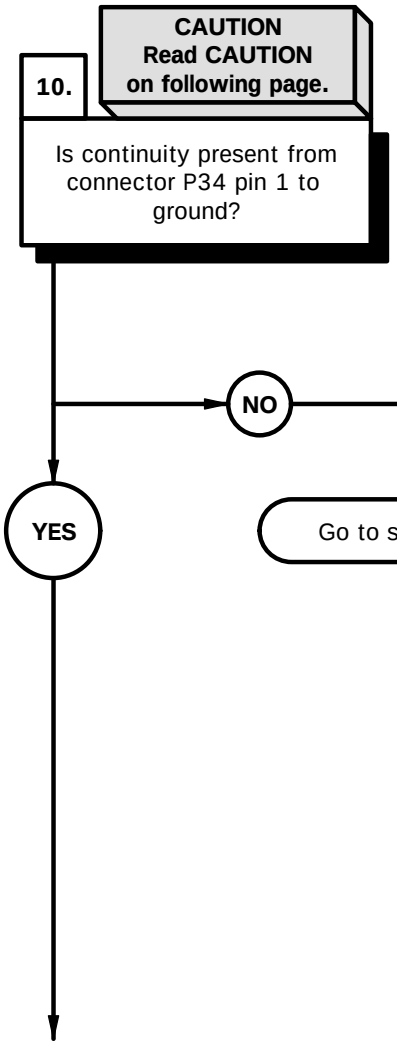
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.

**POSSIBLE PROBLEMS**

Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty engine control cable assembly.
Faulty starter pushbutton switch.
Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty WTEC II cab transmission wiring harness.
Faulty WTEC II transmission ECU pushbutton shift selector (TEPSS).
Faulty relay K26.
Faulty dashboard cable assembly.
Faulty WTEC III transmission pushbutton shift selector (TPSS).




**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

This question eliminates possible problems and determines where to continue troubleshooting.

**CAUTION**

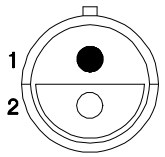
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P34 pin 1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, go to step 20 of this fault.




P34

XBE0210B

## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.

**POSSIBLE PROBLEMS**

Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty engine control cable assembly.
Faulty starter pushbutton switch.
Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty WTEC II cab transmission wiring harness.
Faulty WTEC II transmission ECU pushbutton shift selector (TEPSS).
Faulty relay K26.
Faulty dashboard cable assembly.
Faulty WTEC III transmission pushbutton shift selector (TPSS).

**WARNING**
**Read WARNING on following page.**

**11.** Is 24 VDC present at relay K24 socket 30 on PDP?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where to continue troubleshooting.

NO → Got step 21 of this fault.

YES

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

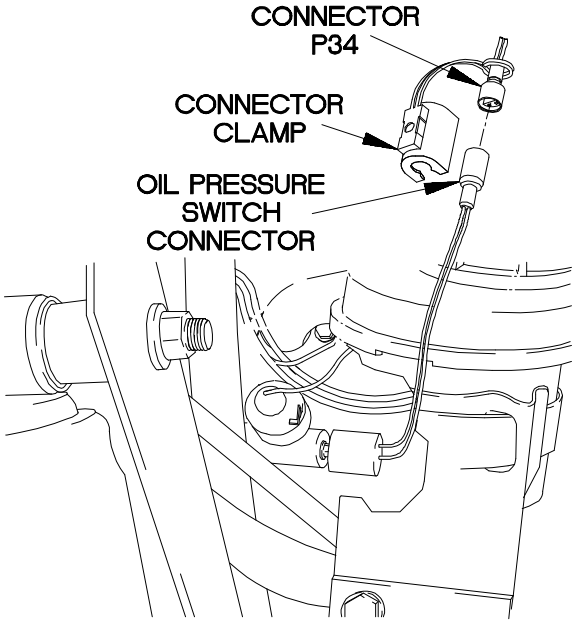
**VOLTAGE TEST**

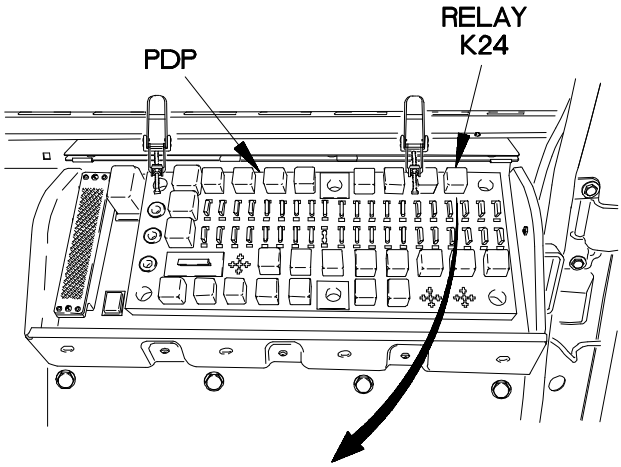
(1) Connect connector P34 to oil pressure switch connector.
(2) Connect connector clamp to oil pressure switch connector.
(3) Lower cab (TM 9-2320-365-10).
(4) Connect batteries (para 7-48).
(5) Remove power distribution panel (PDP) cover (para 16-2).

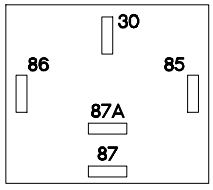
**NOTE**

Tag relays and connection points prior to removal.

(6) Remove relay K24 from PDP.
(7) Set multimeter to volts DC.
(8) Connect positive (+) probe of multimeter to relay K24 socket 30 on PDP.
(9) Connect negative (-) probe of multimeter to ground.
(10) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(11) If 24 VDC is not present, go to step 21 of this fault.
(12) Position master power switch to off (TM 9-2320-365-10).




RELAY K24 CAVITY

XBE0211B

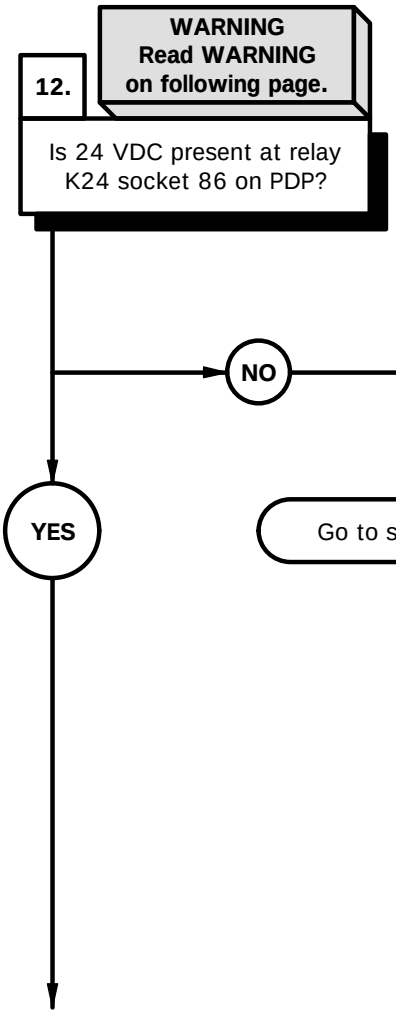
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
WTEC III transmission pushbutton shift selector (TPSS) OK.

**POSSIBLE PROBLEMS**

Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty engine control cable assembly.
Faulty starter pushbutton switch.
Faulty dashboard cable assembly.




**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

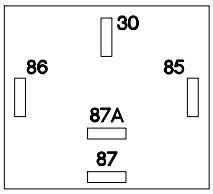
This question eliminates possible problems and determines where to continue troubleshooting.

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K24 socket 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, go to step 23 of this fault.
(6) Position master power switch to off (TM 9-2320-365-10).




RELAY K24 CAVITY

XBE0212B

## e2. ENGINE DOES NOT CRANK (CONT)

| KNOWN INFO |
| --- |
| Transmission pushbutton shift selector in neutral (N).<br>Batteries OK.<br>Service drive lights OK.<br>Circuit breakers OK.<br>Starting motor OK.<br>Battery to starter cable assembly OK.<br>Oil pressure switch OK.<br>Neutral start relay OK.<br>WTEC II vehicle interface module (VIM) OK.<br>WTEC II cab transmission wiring harness OK.<br>WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.<br>Relay K26 OK.<br>WTEC III transmission pushbutton shift selector (TPSS) OK. |
| **POSSIBLE PROBLEMS** |
| Faulty relay K24.<br>Faulty start and charging cable assembly.<br>Faulty relay K1.<br>Faulty engine control cable assembly.<br>Faulty starter pushbutton switch.<br>Faulty dashboard cable assembly. |

**13.**

Is continuity present from relay K24 socket 85 on PDP to ground?

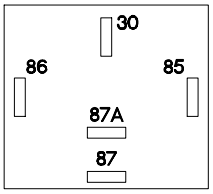
| TEST OPTIONS |
| --- |
| Continuity Test or STE/ICE-R Test #91 |
| **POSSIBLE PROBLEMS** |
| This question eliminates possible problems and determines where to continue troubleshooting. |

**NO** → Go to step 25 of this fault.

**YES**

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to relay K24 socket 85 on PDP.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, go to step 25 of this fault.




RELAY K24 CAVITY

XBE0213B

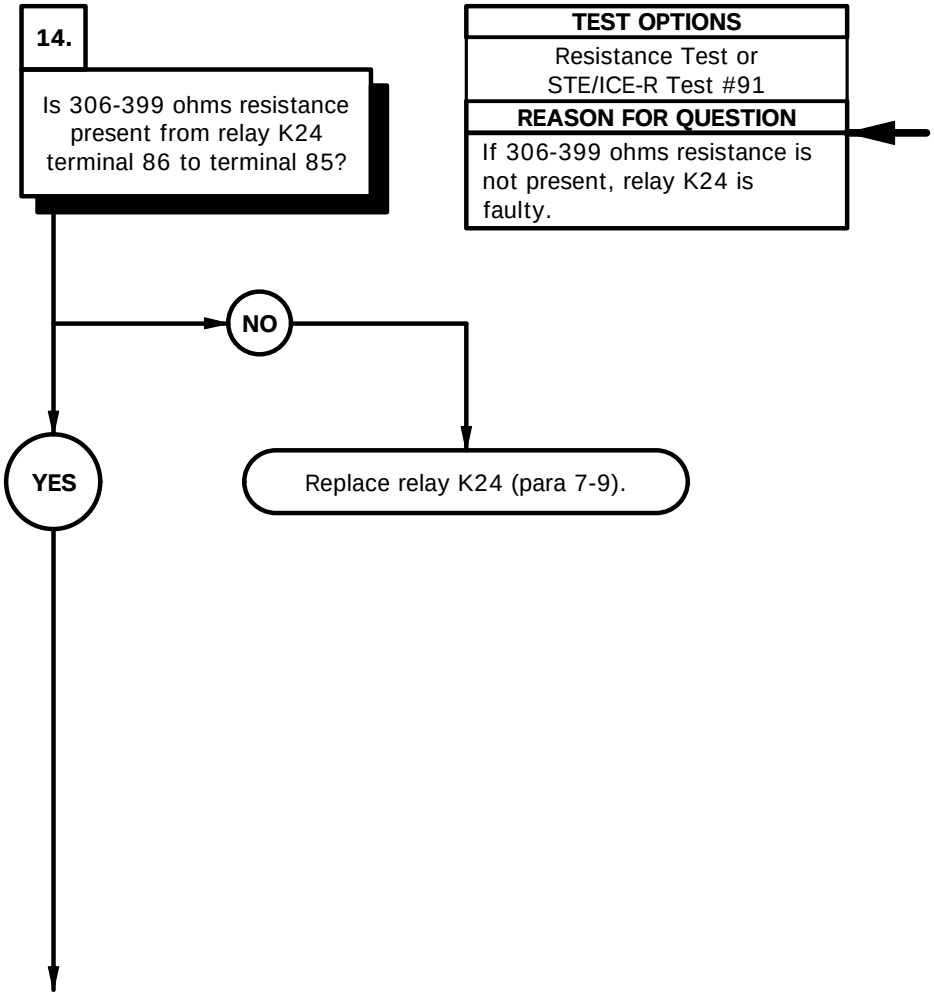
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
WTEC III transmission pushbutton shift selector (TPSS) OK.
Engine control cable assembly OK.

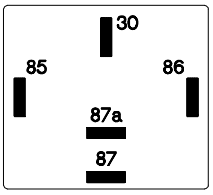
**POSSIBLE PROBLEMS**

Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty starter pushbutton switch.
Faulty dashboard cable assembly.



**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K24 terminal 86.
(3) Connect negative (-) probe of multimeter to relay K24 terminal 85 and note reading on multimeter.
(4) If 306-399 ohms resistance is not present, replace relay K24 (para 7-9).
(5) Connect batteries (para 7-48).



RELAY K24

XBE0214B

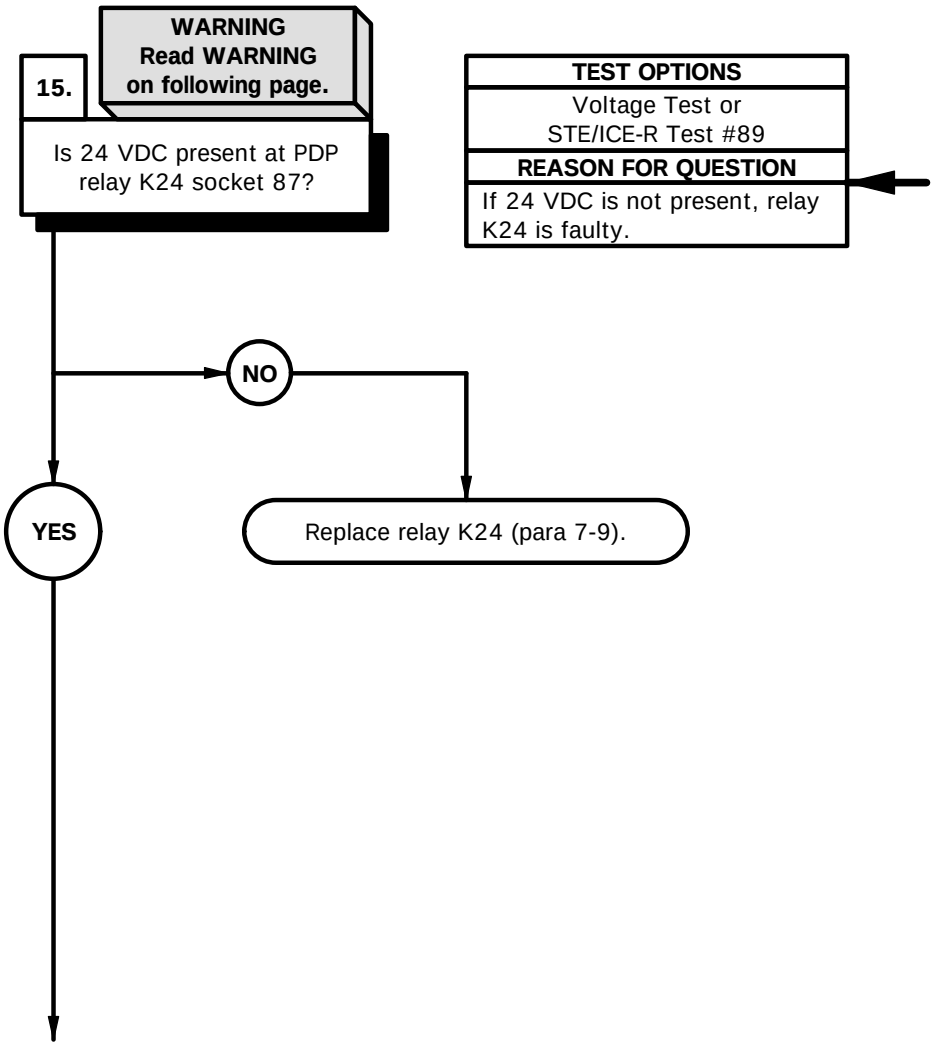
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
WTEC III transmission pushbutton shift selector (TPSS) OK.
Engine control cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty relay K24.
Faulty start and charging cable assembly.
Faulty relay K1.
Faulty starter pushbutton switch.
Faulty dashboard cable assembly.




**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

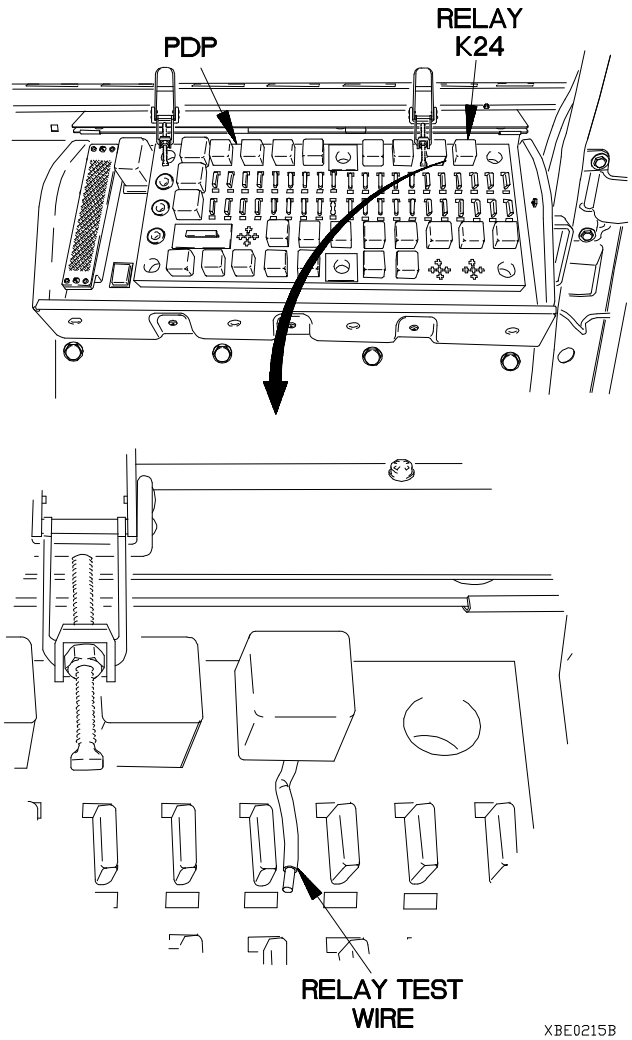
If 24 VDC is not present, relay K24 is faulty.

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay test wire in relay K24 socket 87 on PDP.
(2) Install relay K24 in PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to relay test wire.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, replace relay K24 (para 7-9).
(8) Position master power switch to off (TM 9-2320-365-10).
(9) Remove relay K24 from PDP.
(10) Remove relay test wire from relay K24 socket 87 on PDP.
(11) Install relay K24 in PDP.



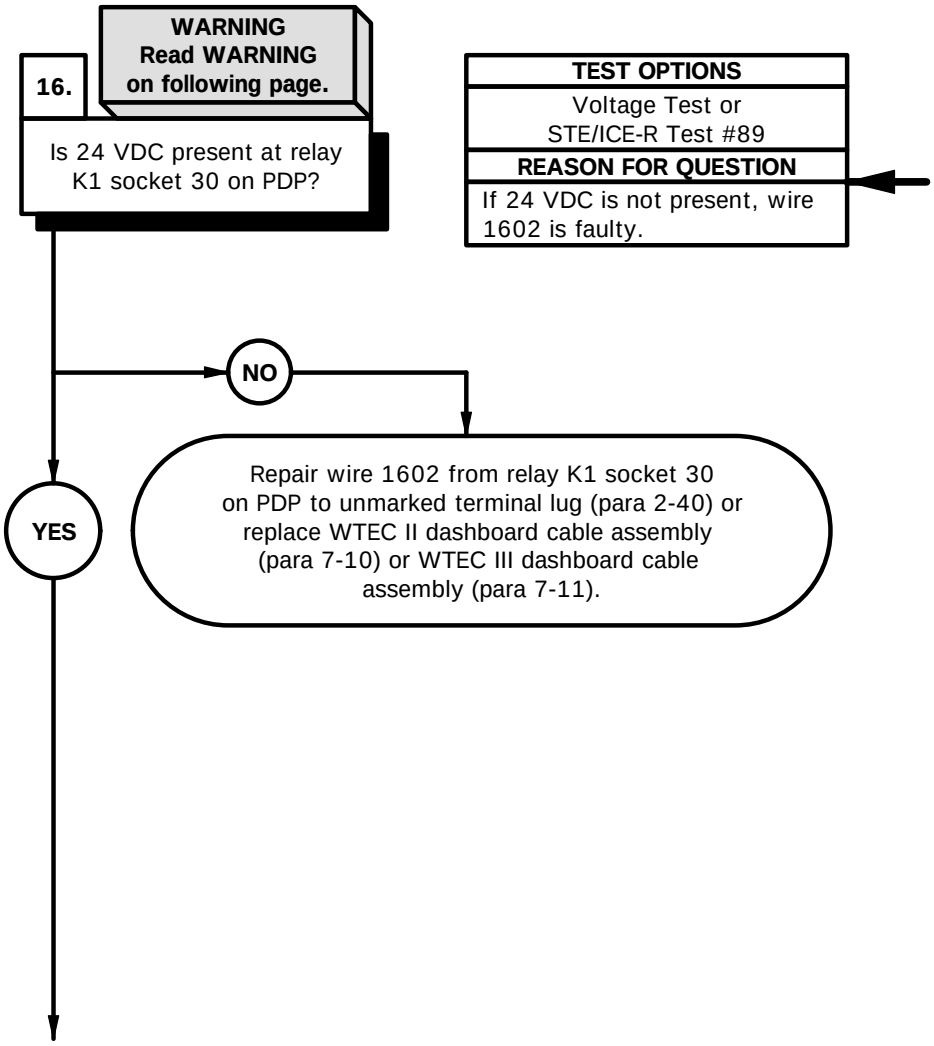
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
WTEC III transmission pushbutton shift selector (TPSS) OK.
Engine control cable assembly OK.
Relay K24 OK.

**POSSIBLE PROBLEMS**

Faulty start and charging cable assembly.
Faulty relay K1.
Faulty starter pushbutton switch.
Faulty dashboard cable assembly.

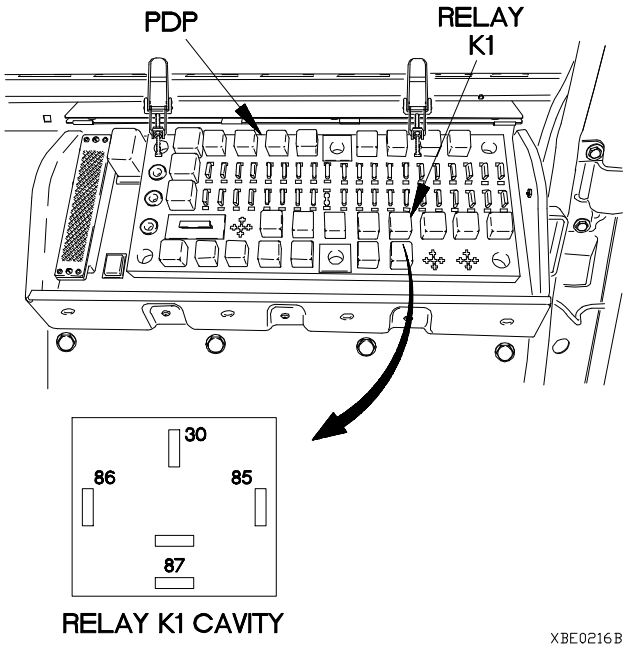


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove relay K1 from PDP.
(3) Connect batteries (para 7-48).
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to PDP relay K1 socket 30.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If 24 VDC is not present, repair wire 1602 from relay K1 socket 30 on PDP to unmarked terminal lug (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



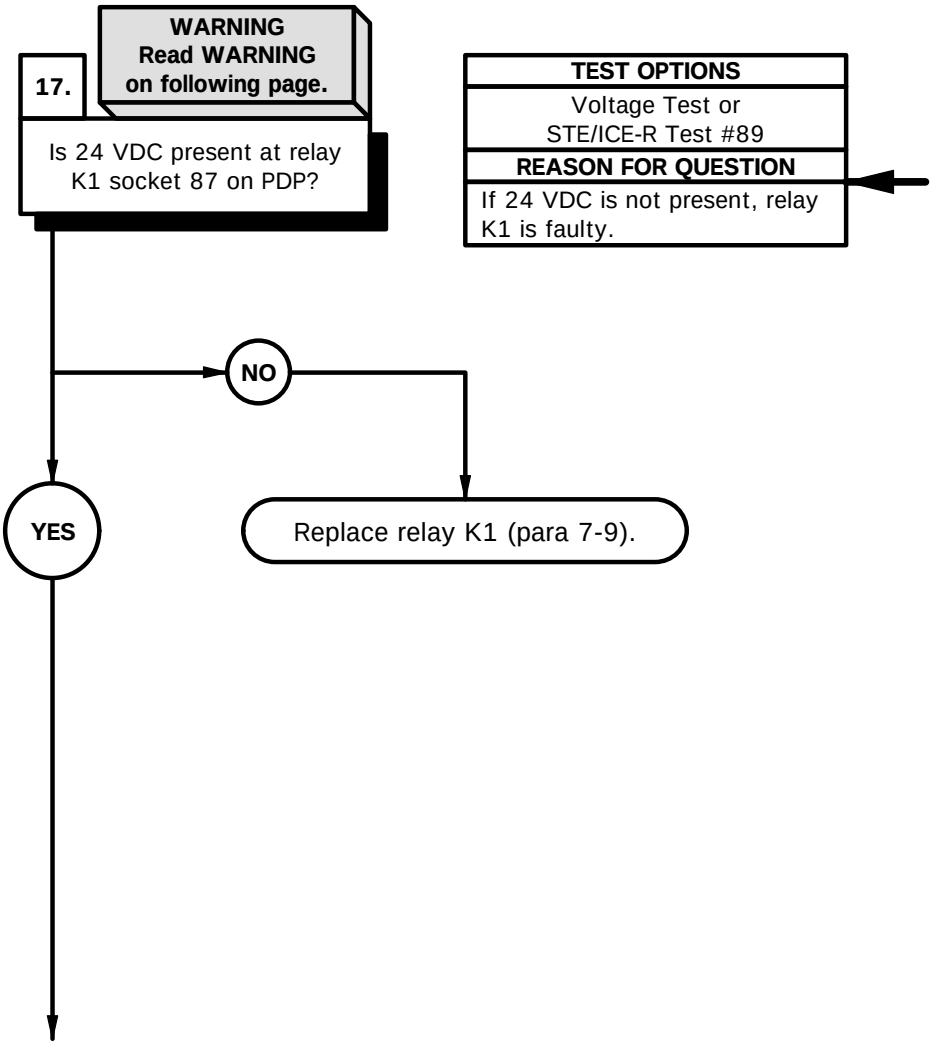
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
WTEC III transmission pushbutton shift selector (TPSS) OK.
Engine control cable assembly OK.
Relay K24 OK.

**POSSIBLE PROBLEMS**

Faulty start and charging cable assembly.
Faulty relay K1.
Faulty starter pushbutton switch.
Faulty dashboard cable assembly.




**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

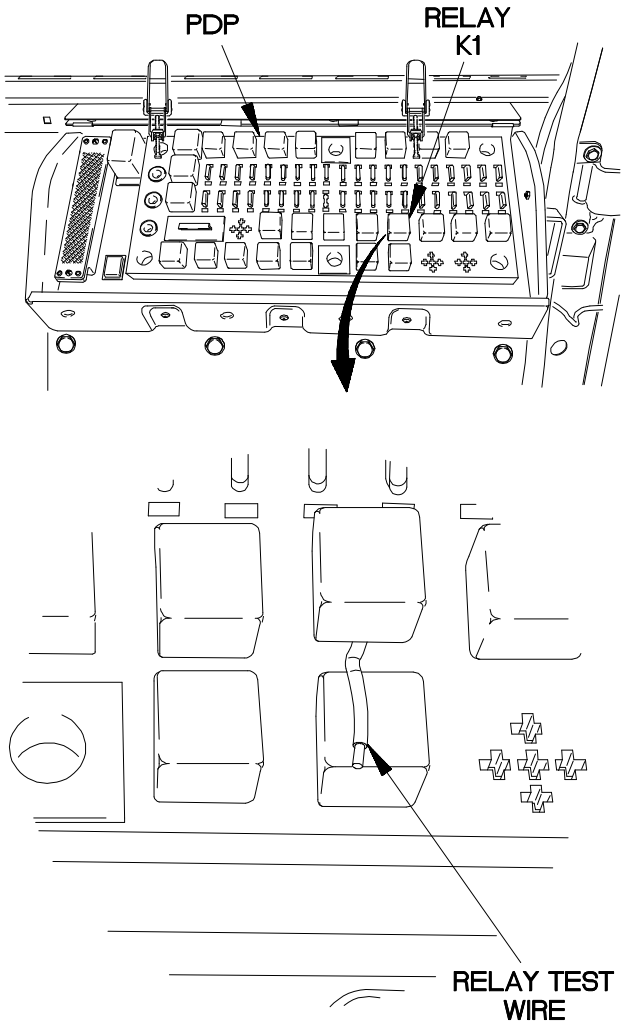
If 24 VDC is not present, relay K1 is faulty.

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect batteries (para 7-48).
(2) Install relay test wire in relay K1 socket 87 on PDP.
(3) Install relay K1 in PDP.
(4) Connect batteries (para 7-48).
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to relay test wire.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Press starter pushbutton (TM 9-2320-365-10) and note reading on multimeter.
(10) If 24 VDC is not present, replace relay K1 (para 7-9).
(11) Position master power switch to off (TM 9-2320-365-10).
(12) Disconnect batteries (para 7-48).
(13) Remove relay K1 from PDP.
(14) Remove relay test wire from relay K1 socket 87 on PDP.
(15) Install relay K1 in PDP.



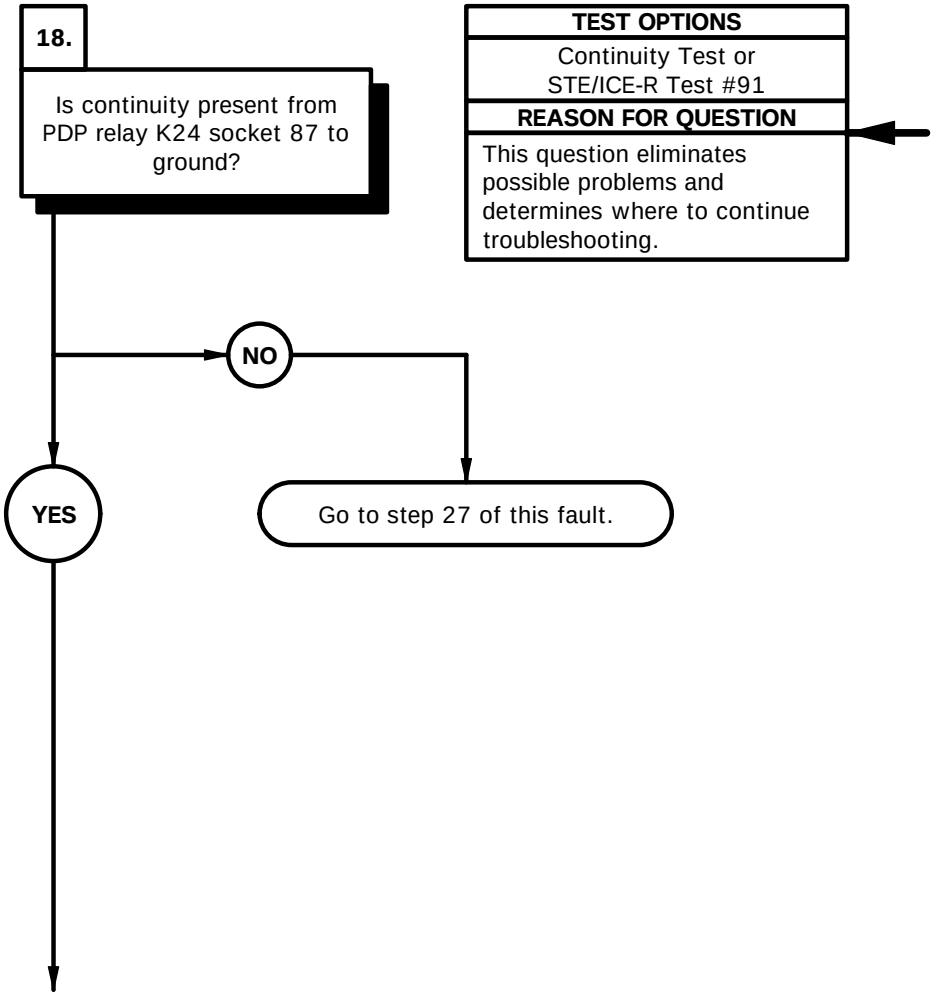
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
Neutral start relay OK.
WTEC II vehicle interface module (VIM) OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.
Relay K26 OK.
WTEC III transmission pushbutton shift selector (TPSS) OK.
Engine control cable assembly OK.
Relay K24 OK.
Relay K1 OK.

**POSSIBLE PROBLEMS**

Faulty start and charging cable assembly.
Faulty starter pushbutton switch.
Faulty dashboard cable assembly.




**TEST OPTIONS**

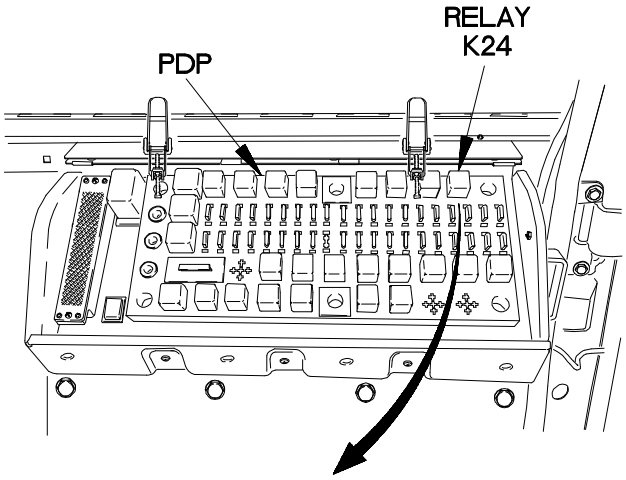
Continuity Test or STE/ICE-R Test #91

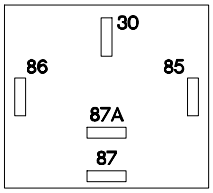
**REASON FOR QUESTION**

This question eliminates possible problems and determines where to continue troubleshooting.

**CONTINUITY TEST**

(1) Remove relay K24 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to relay K24 socket 87 on PDP.
(4) Connect negative (-) probe of multimeter to ground.
(5) Press starter pushbutton (TM 9-2320-365-10) and note reading on multimeter.
(6) If continuity is not present, go to step 27 of this fault.

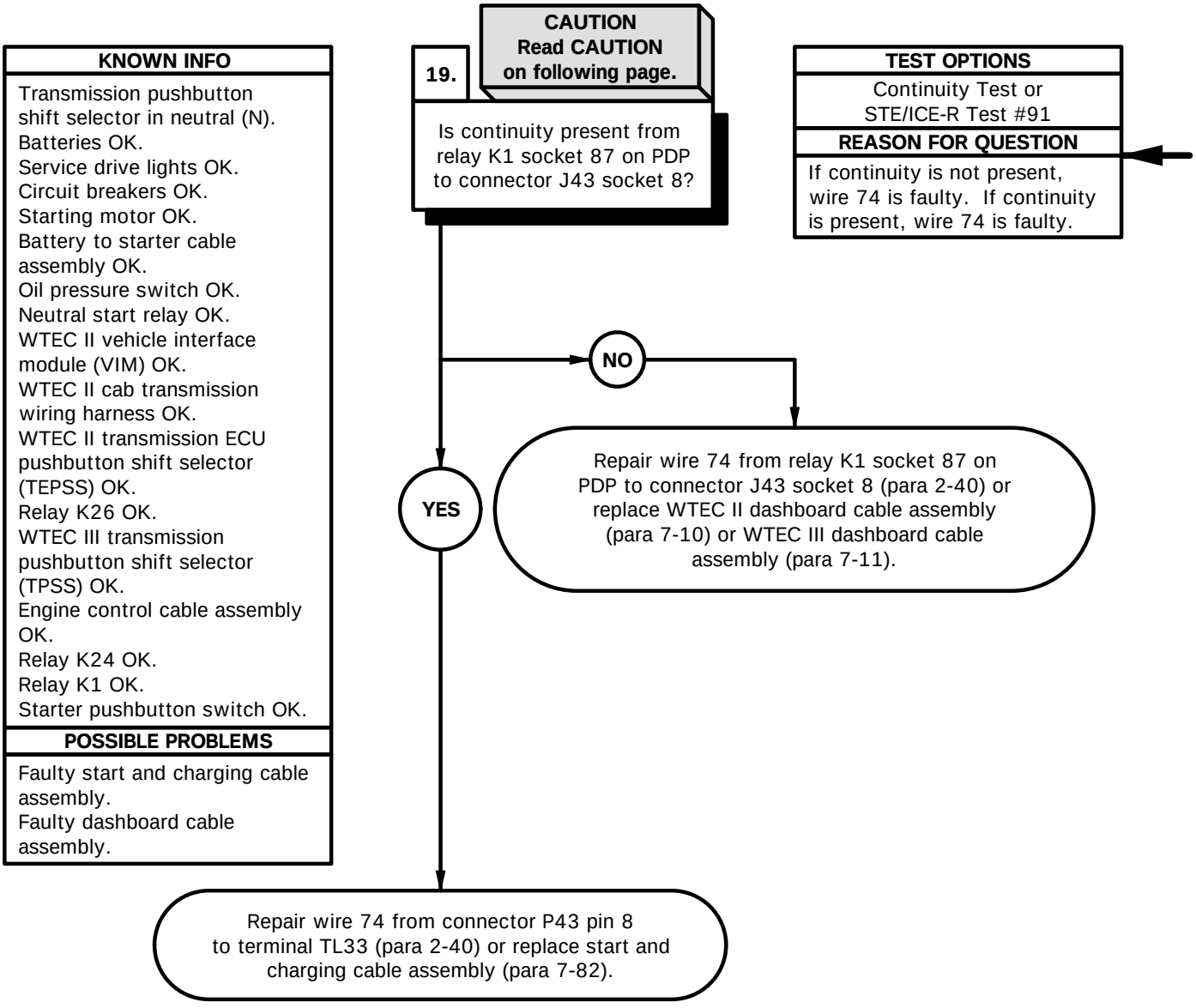



RELAY K24 CAVITY

XBE0218B

## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

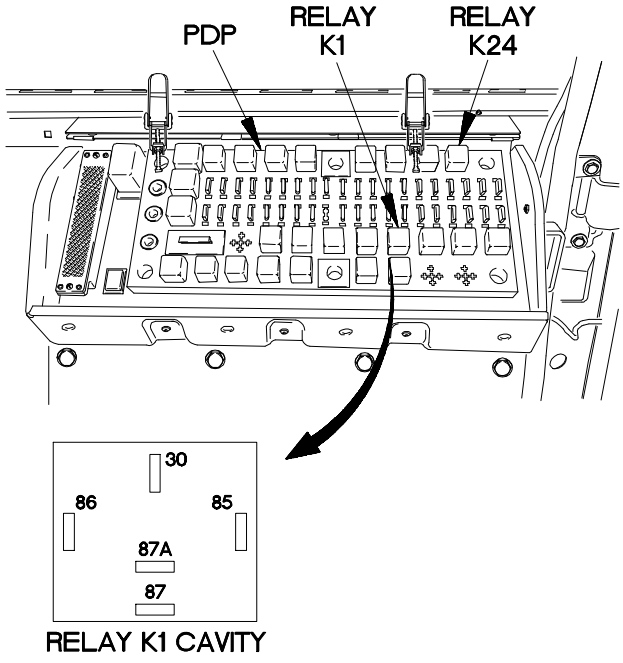
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

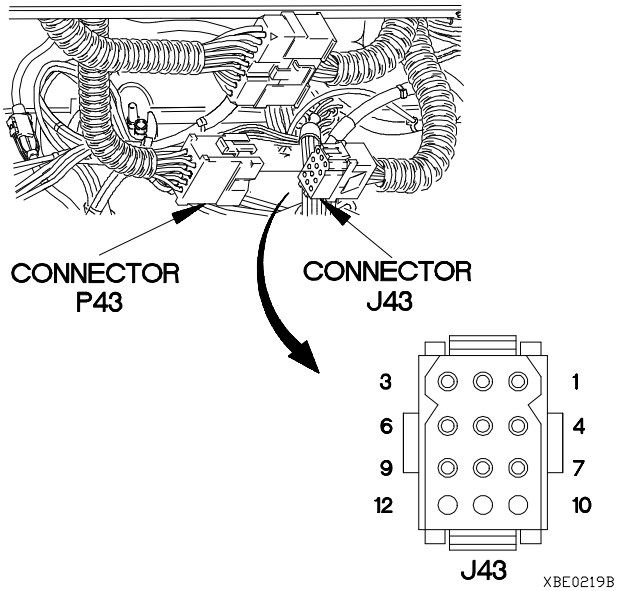
**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

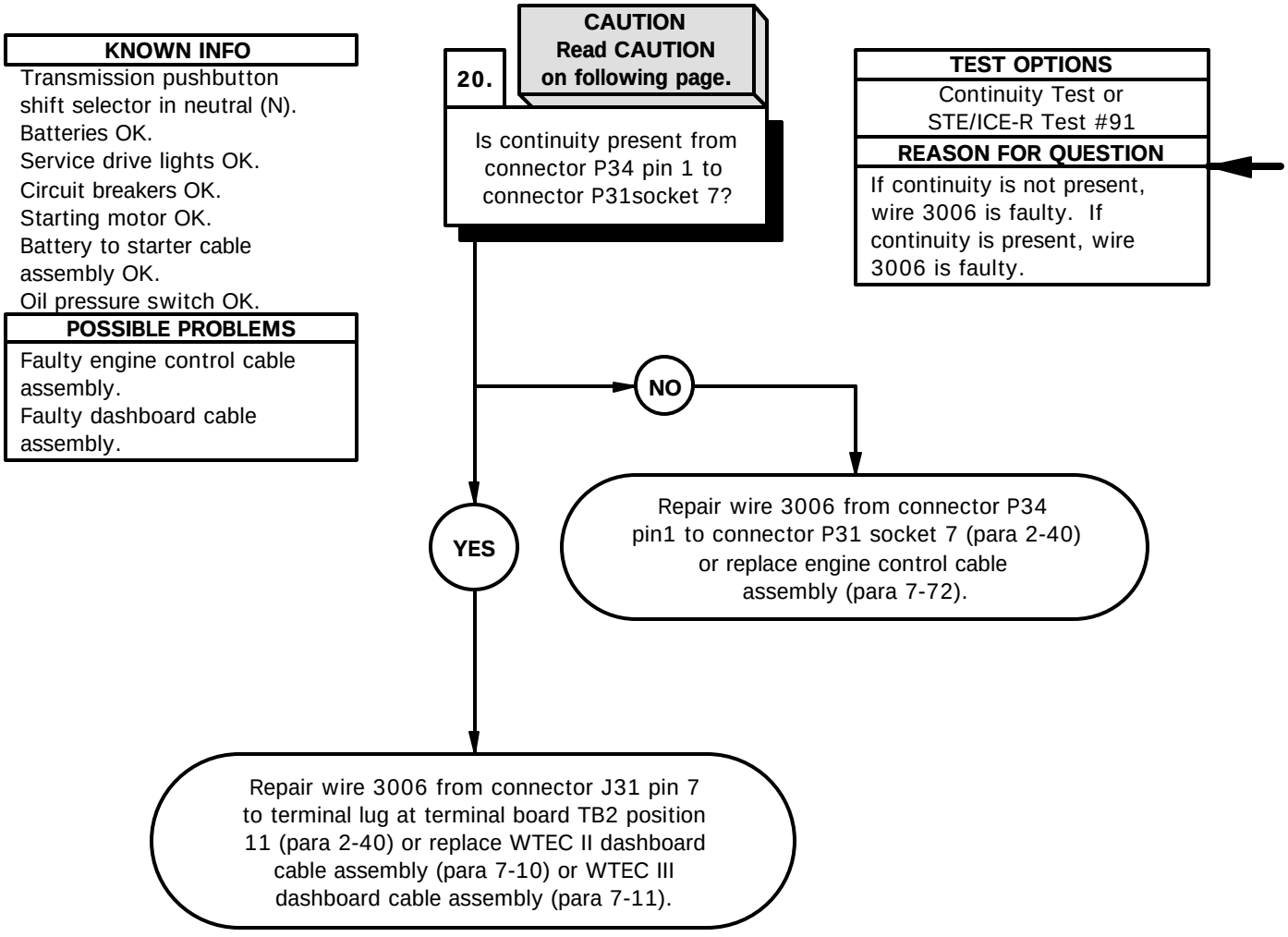
**CONTINUITY TEST**

(1) Install relay K24 in PDP.
(2) Remove relay K1 from PDP.
(3) Remove instrument panel for access (para 7-15).
(4) Disconnect connector J43 from connector P43.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector J43 socket 8.
(7) Connect negative (-) probe of multimeter to relay K1 socket 87 on PDP and note reading on multimeter.
(8) If continuity is not present, repair wire 74 from relay K1 socket 87 on PDP and connector J43 socket 8 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, repair wire 74 from connector P43 pin 8 to terminal TL33 (para 2-40) or replace start and charging cable assembly (para 7-82).
(10) Connect connector J43 to connector P43.
(11) Install instrument panel (para 7-15).
(12) Install relay K1 in PDP.
(13) Install power distribution panel (PDP) cover (para 16-2).
(14) Connect batteries (para 7-48).



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

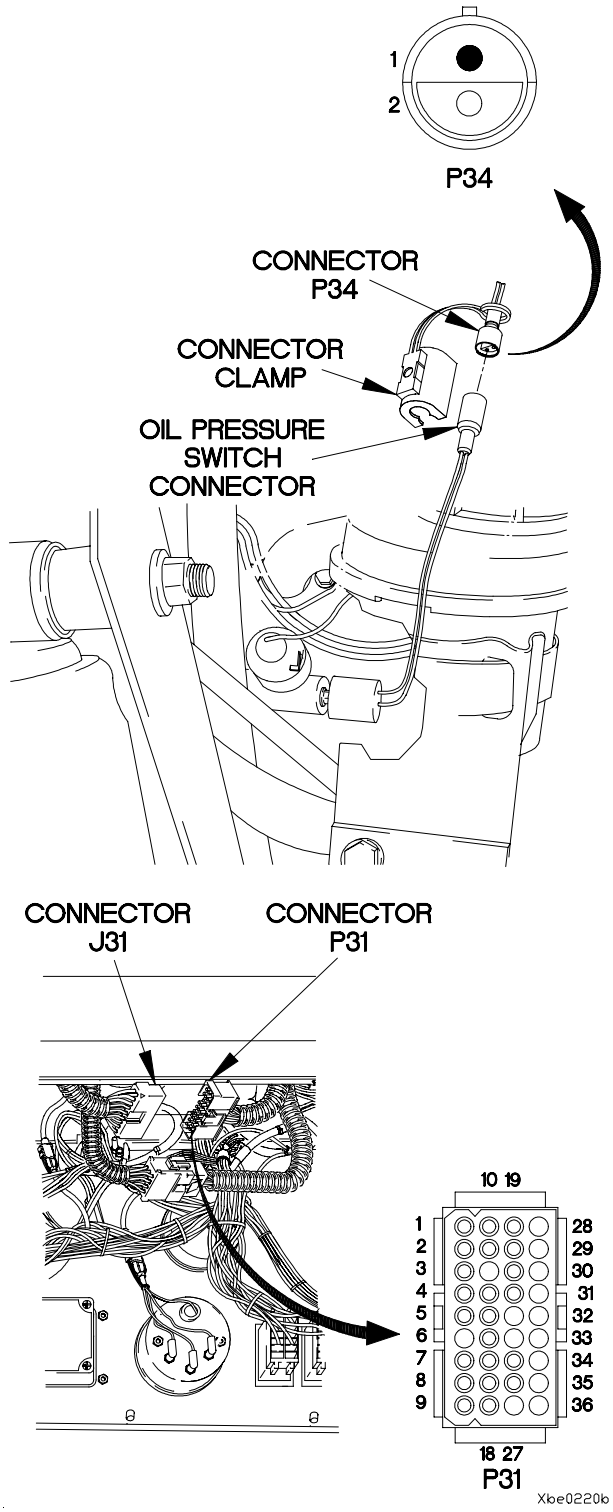
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

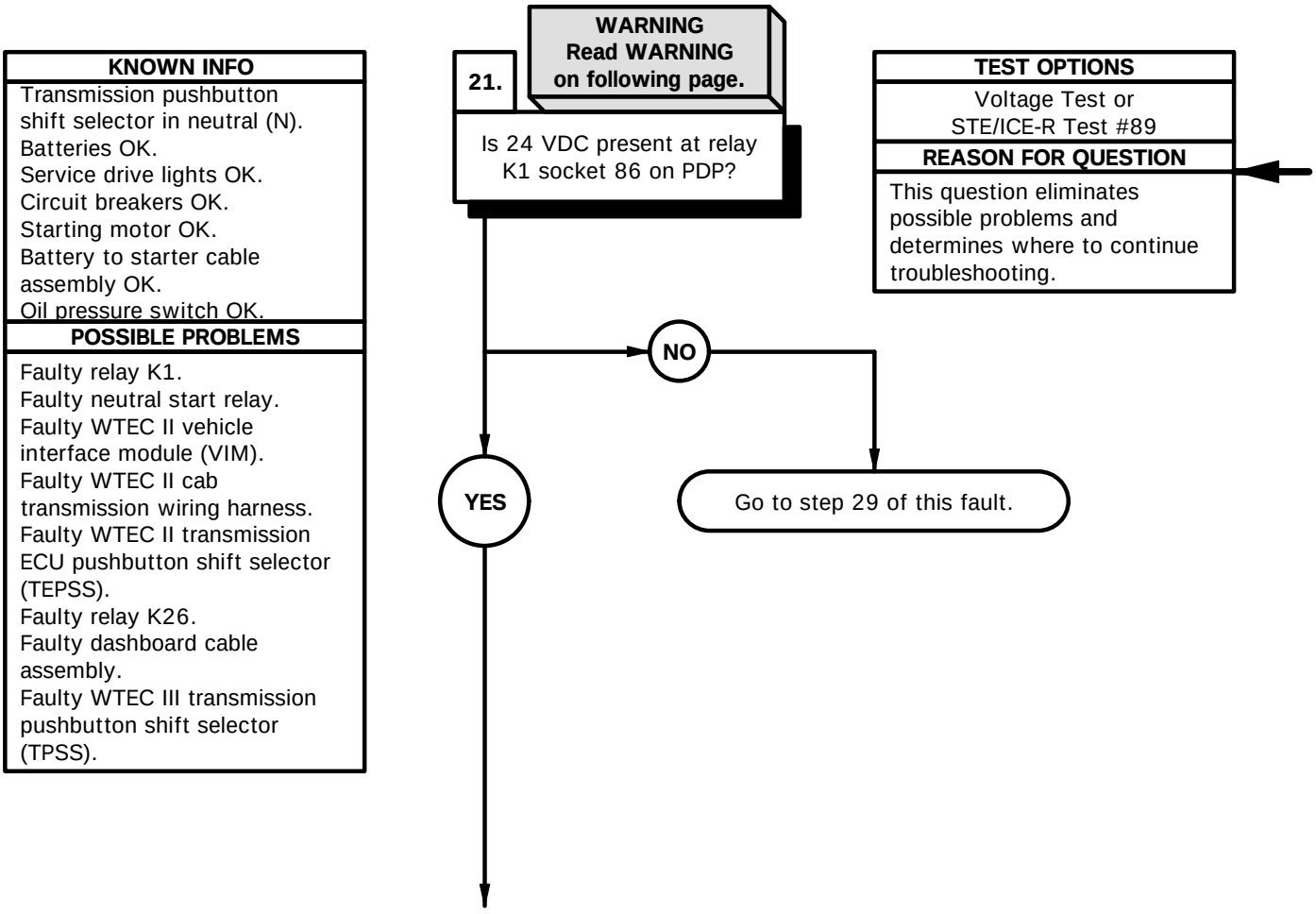
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P34 pin 1.
(3) Lower cab (TM 9-2320-365-10).
(4) Remove instrument panel for access (para 7-15).
(5) Disconnect connector J31 from connector P31.
(6) Connect negative (-) probe of multimeter to connector P31 socket 7 and note reading on multimeter.
(7) If continuity is not present, repair wire 3006 from connector P34 pin 1 to connector P31 socket 7 (para 2-40) or replace engine control cable assembly (para 7-72).
(8) If continuity is present, repair wire 3006 from connector J31 pin 7 to terminal lug at terminal board TB2 position 11 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Connect connector P31 to connector J31.
(10) Install instrument panel (para 7-15).
(11) Raise cab (TM 9-2320-365-10).
(12) Connect connector P34 to oil pressure switch connector.
(13) Connect connector clamp on oil pressure switch connector.
(14) Connect batteries (para 7-48).
(15) Lower cab (TM 9-2320-365-10).



## e2. ENGINE DOES NOT CRANK (CONT)

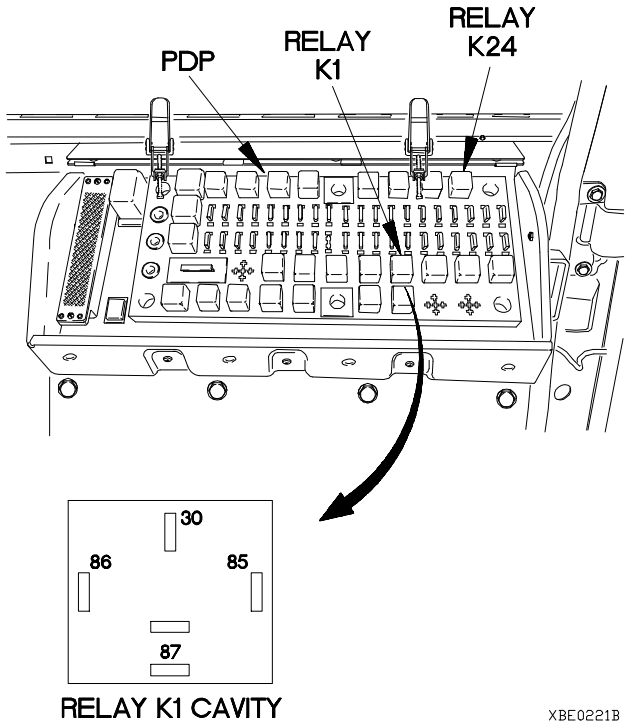


**WARNING**

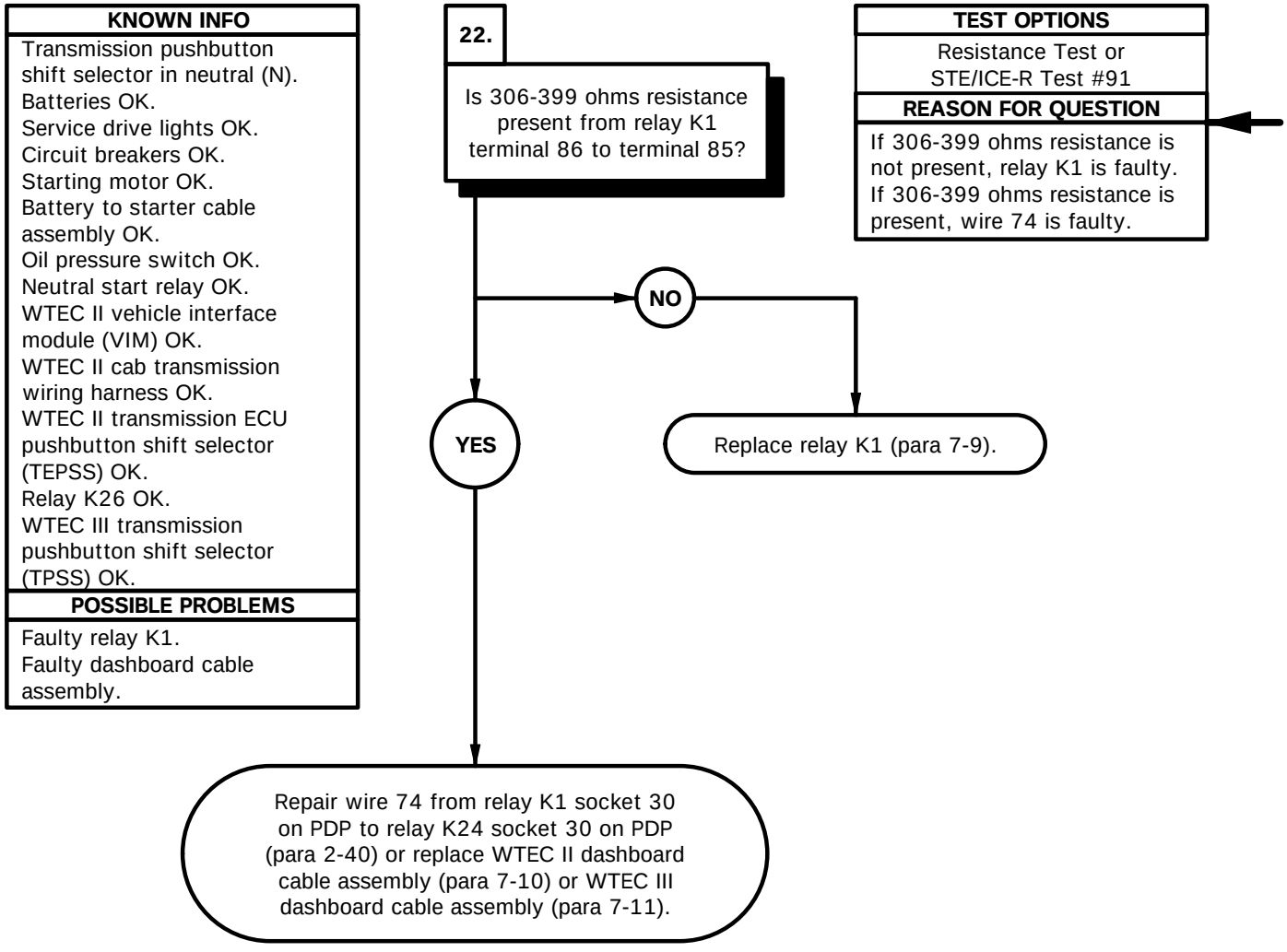
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay K24 in PDP.
(2) Disconnect batteries (para 7-48).
(3) Remove relay K1 from PDP.
(4) Connect batteries (para 7-48).
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to relay K1 socket 86 on PDP.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(9) If 24 VDC is not present, go to step 29 of this fault.
(10) Position master power switch to off (TM 9-2320-365-10).

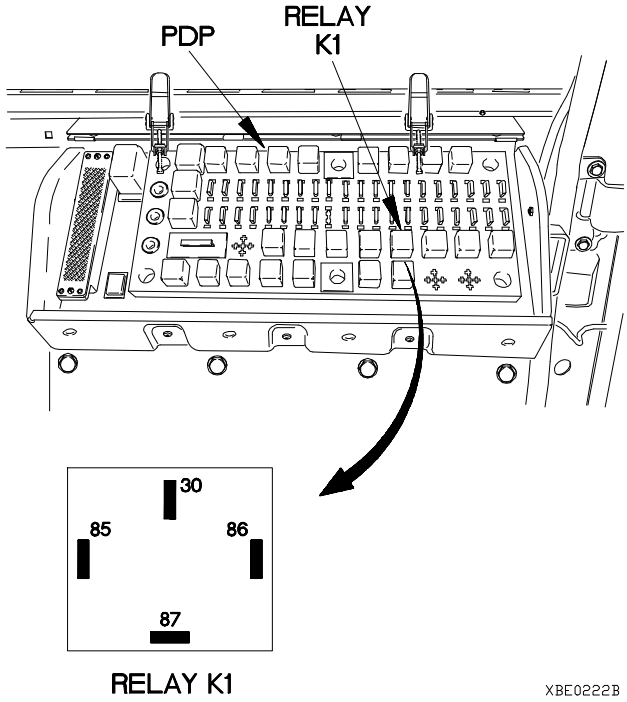


## e2. ENGINE DOES NOT CRANK (CONT)

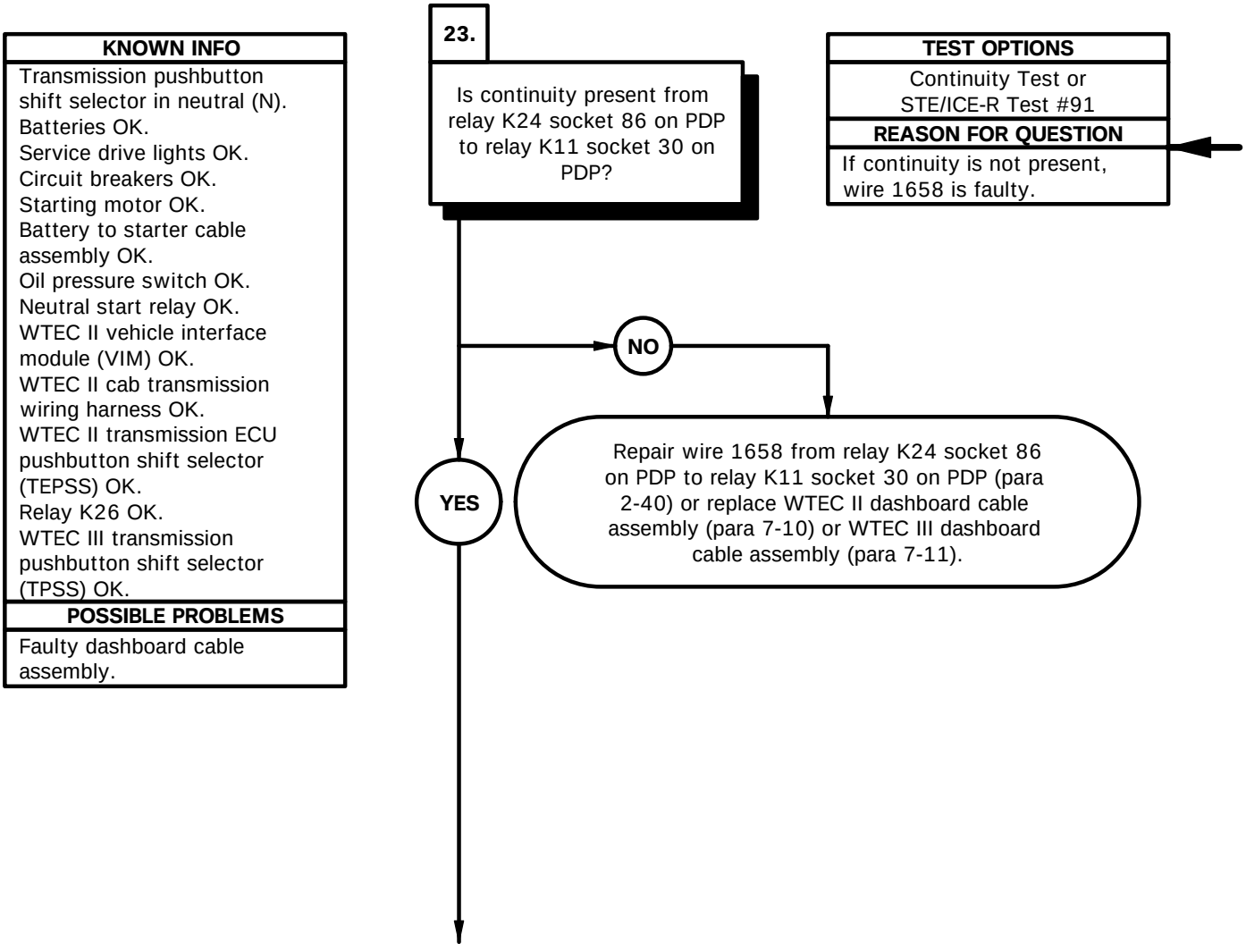


**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K1 terminal 86.
(3) Connect negative (-) probe of multimeter to relay K1 terminal 85 and note reading on multimeter.
(4) If 306-399 ohms resistance is not present, replace relay K1 (para 7-9).
(5) If 306-399 ohms resistance is present, repair wire 74 from relay K1 socket 30 on PDP to relay K24 socket 30 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Disconnect batteries (para 7-48).
(7) Install relay K1 in PDP.
(8) Install PDP cover (para 16-2).
(9) Connect batteries (para 7-48).

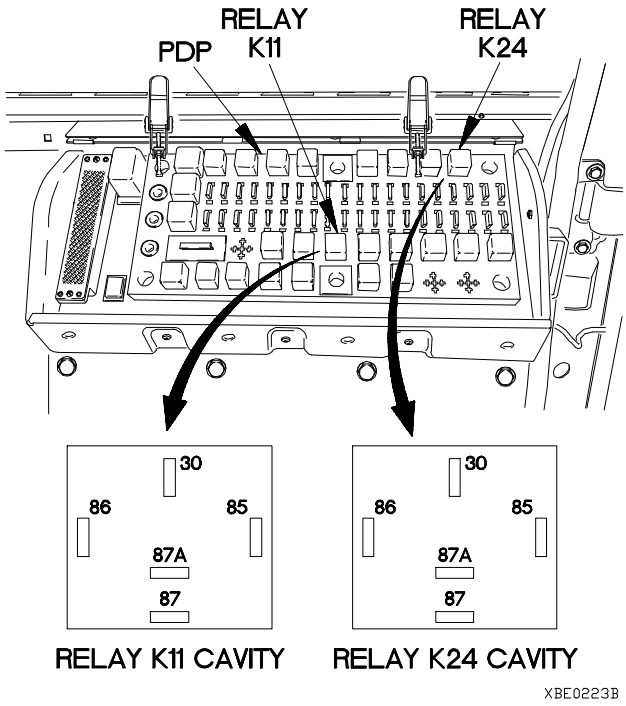


## e2. ENGINE DOES NOT CRANK (CONT)

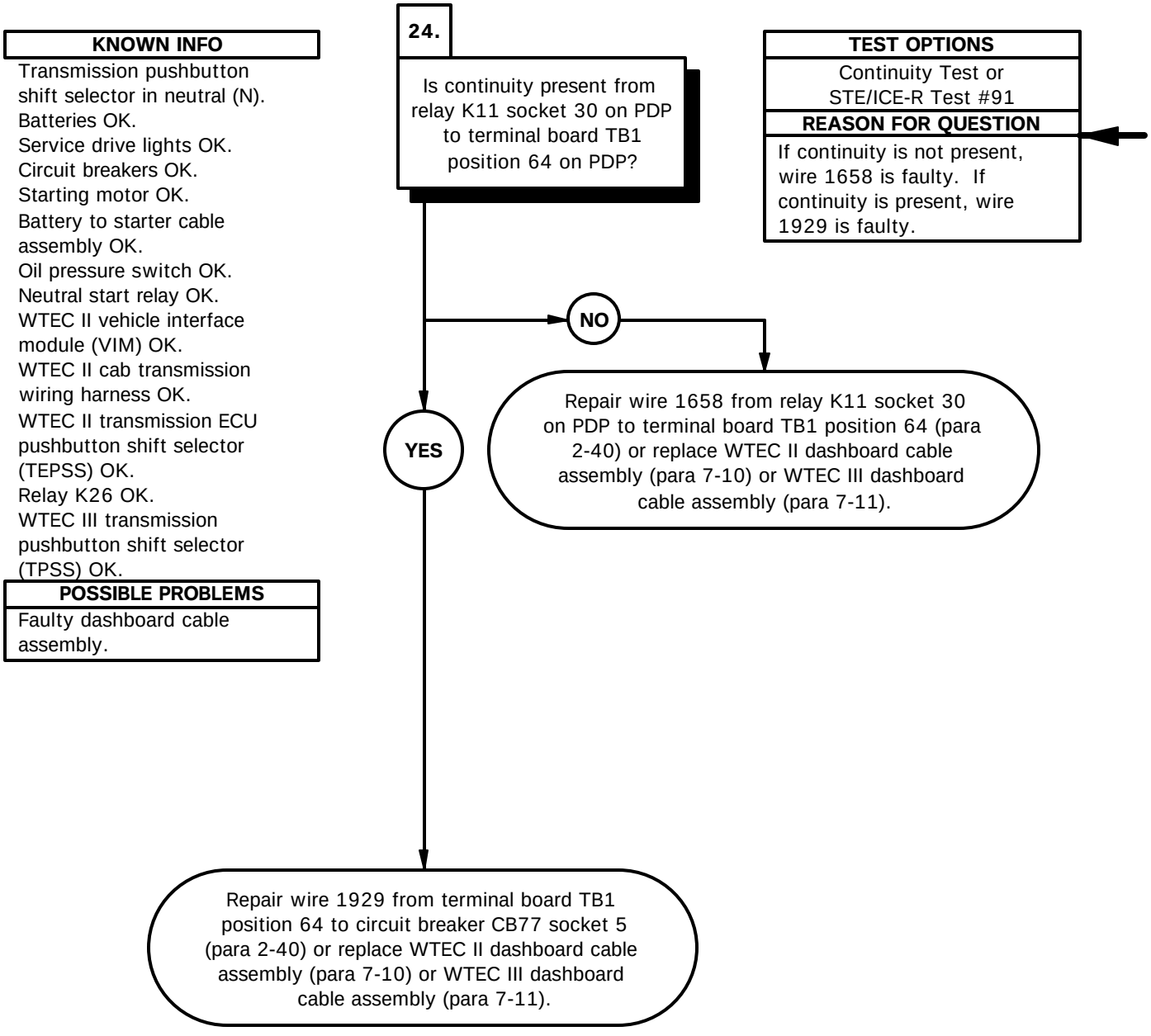


**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove relay K11 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to relay K24 socket 86 on PDP.
(5) Connect negative (-) probe of multimeter to relay K11 socket 30 and note reading on multimeter.
(6) If continuity is not present, repair wire 1658 from relay K24 socket 86 on PDP to relay K30 socket 30 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install relay K24 in PDP.

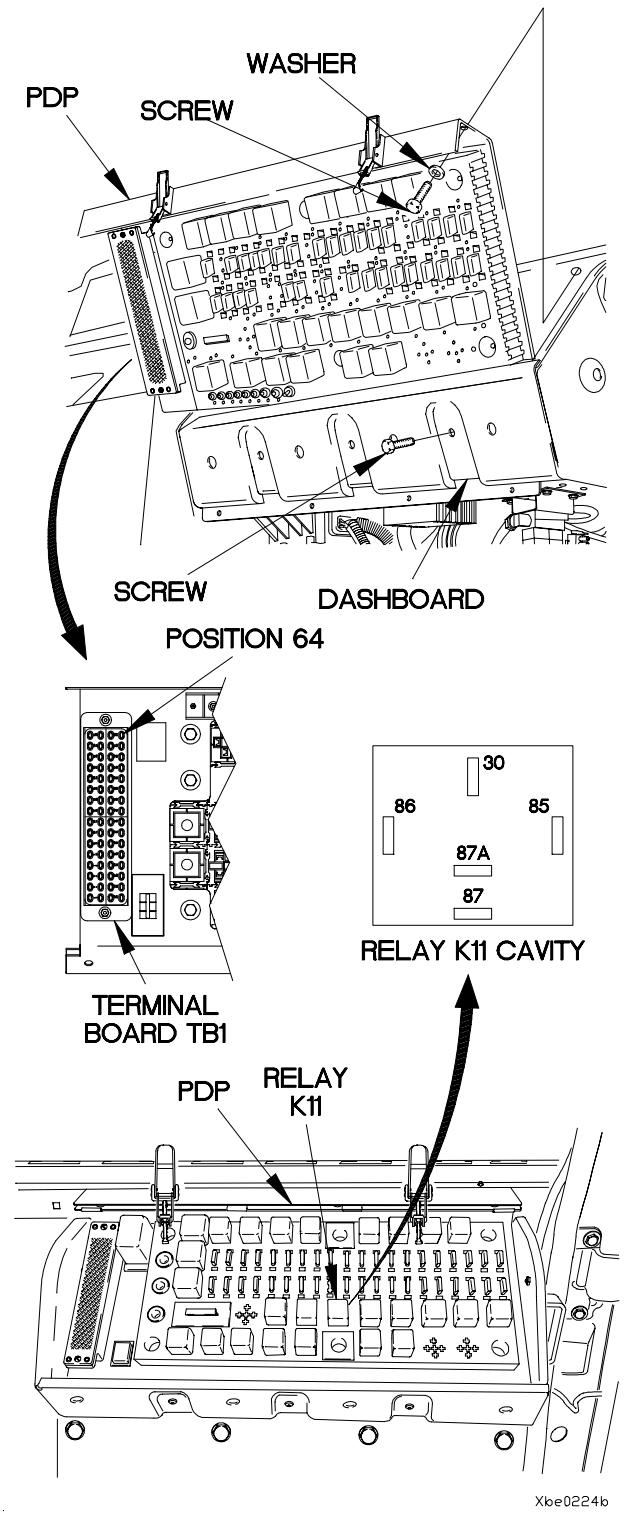


## e2. ENGINE DOES NOT CRANK (CONT)

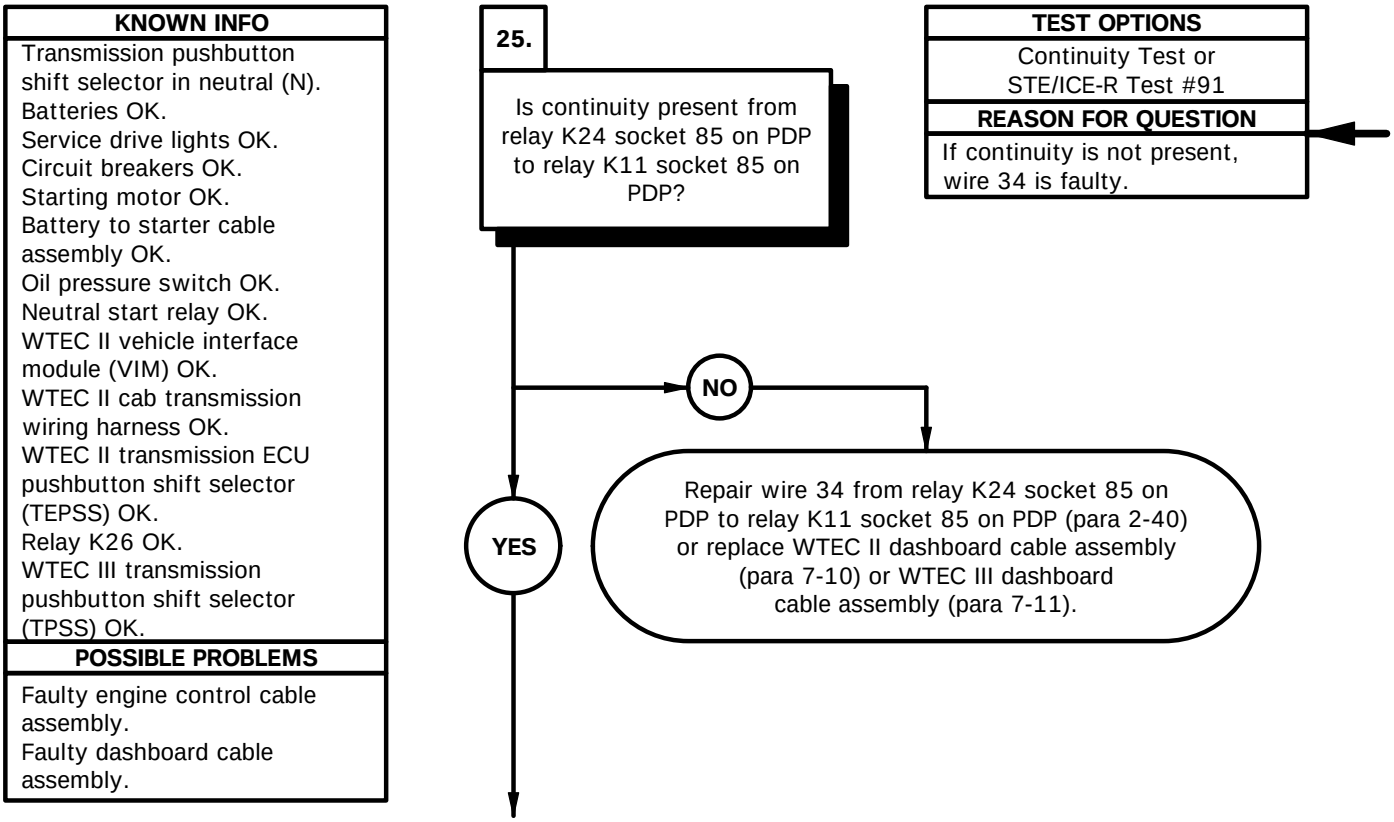


**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to relay K11 socket 30 on PDP.
(6) Connect negative (-) probe of multimeter to terminal board TB1 position 64 on PDP and note reading on multimeter.
(7) If continuity is not present, repair wire 1658 from relay K11 socket 30 on PDP to terminal board TB1 position 64 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 1929 from circuit breaker CB77 socket 5 on PDP to terminal board TB1 position 64 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install relay K11 in PDP.
(12) Install PDP cover (para 16-2).
(13) Connect batteries (para 7-48).

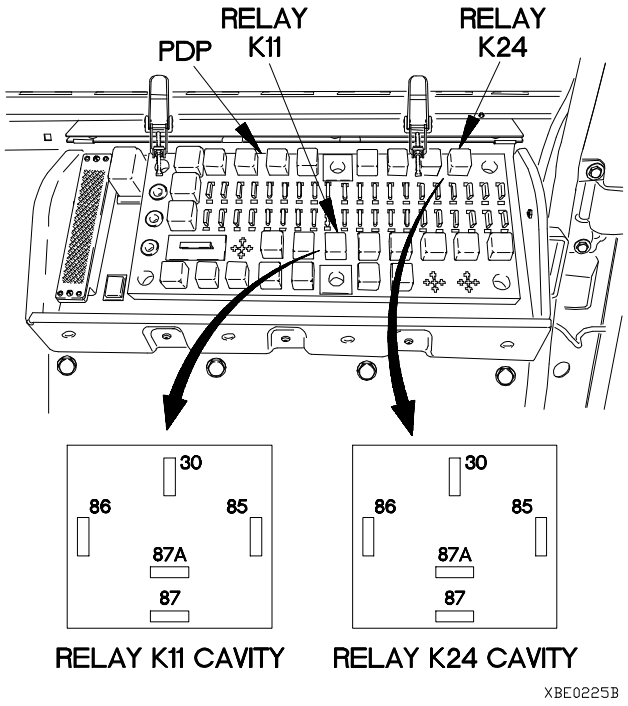


## e2. ENGINE DOES NOT CRANK (CONT)

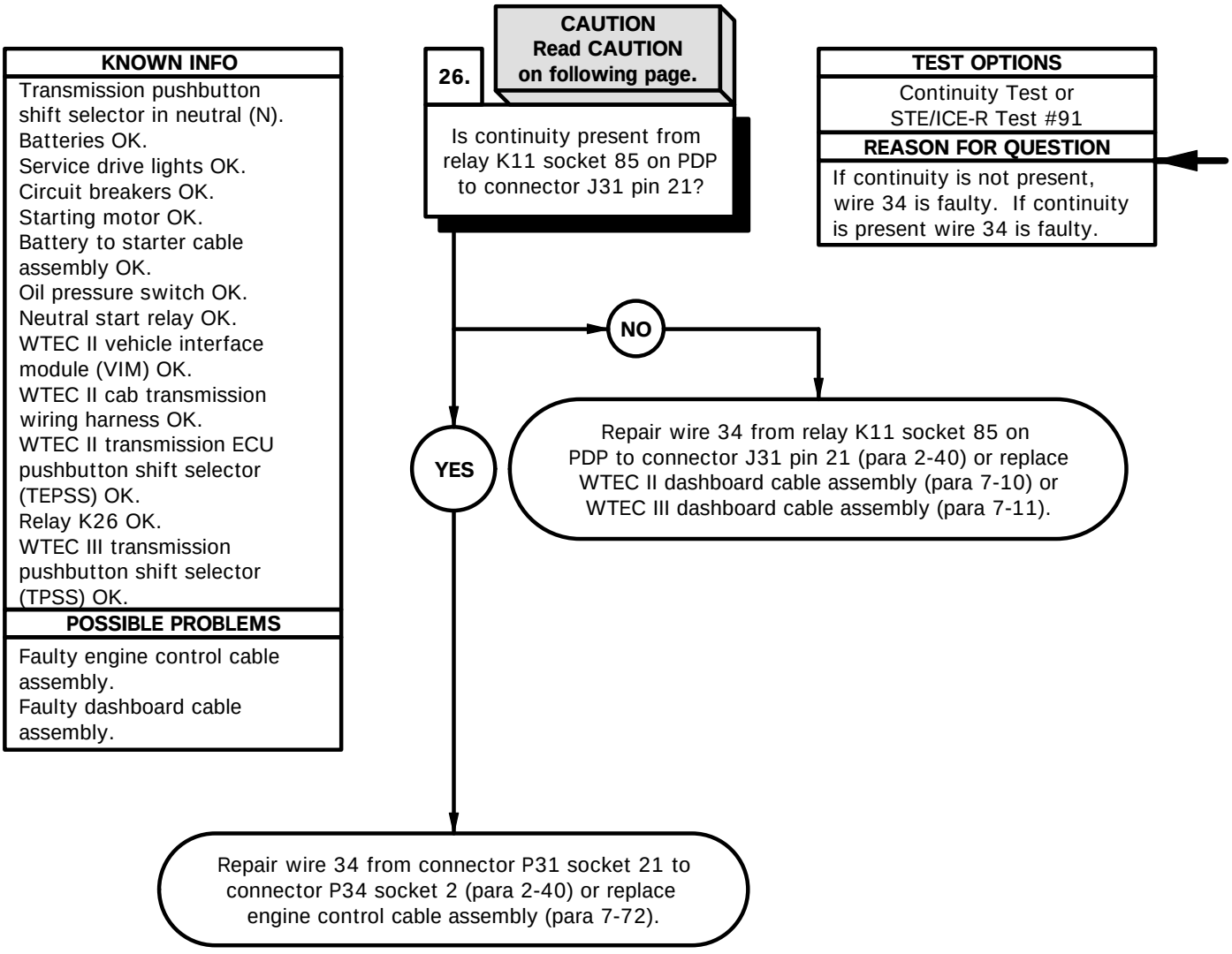


**CONTINUITY TEST**

(1) Remove relay K11 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to relay K24 socket 85 on PDP.
(4) Connect negative (-) probe of multimeter to relay K11 socket 85 on PDP and note reading on multimeter.
(5) If continuity is not present, repair wire 34 from relay K24 socket 85 on PDP to relay K11 socket 85 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Install relay K24 in PDP.



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

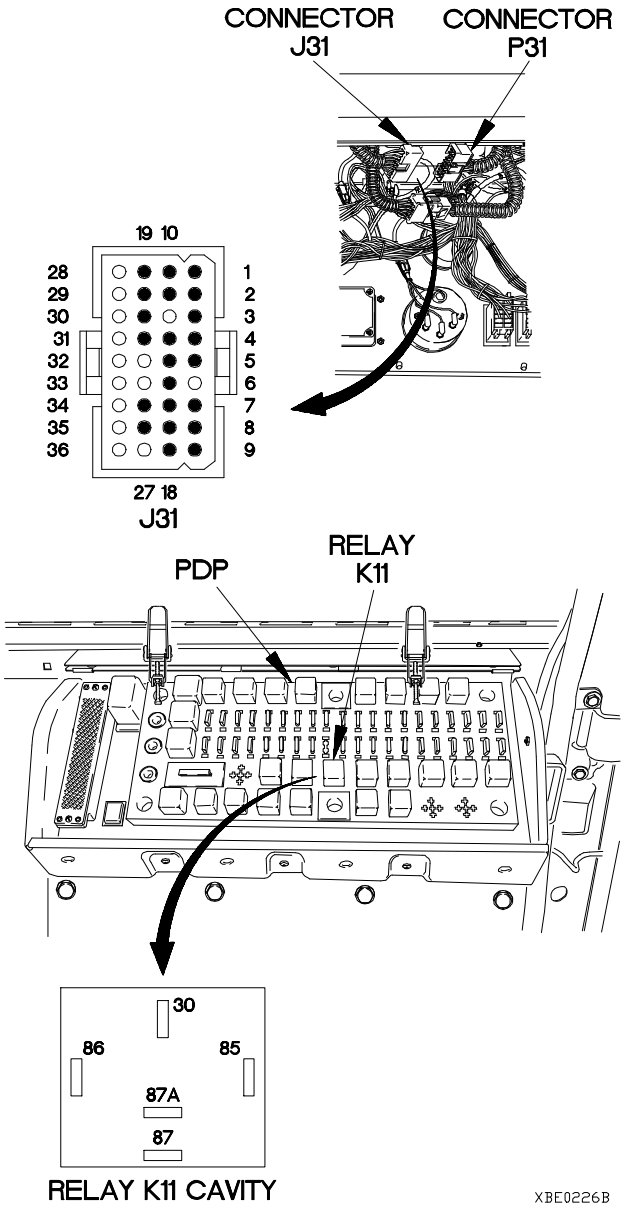
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

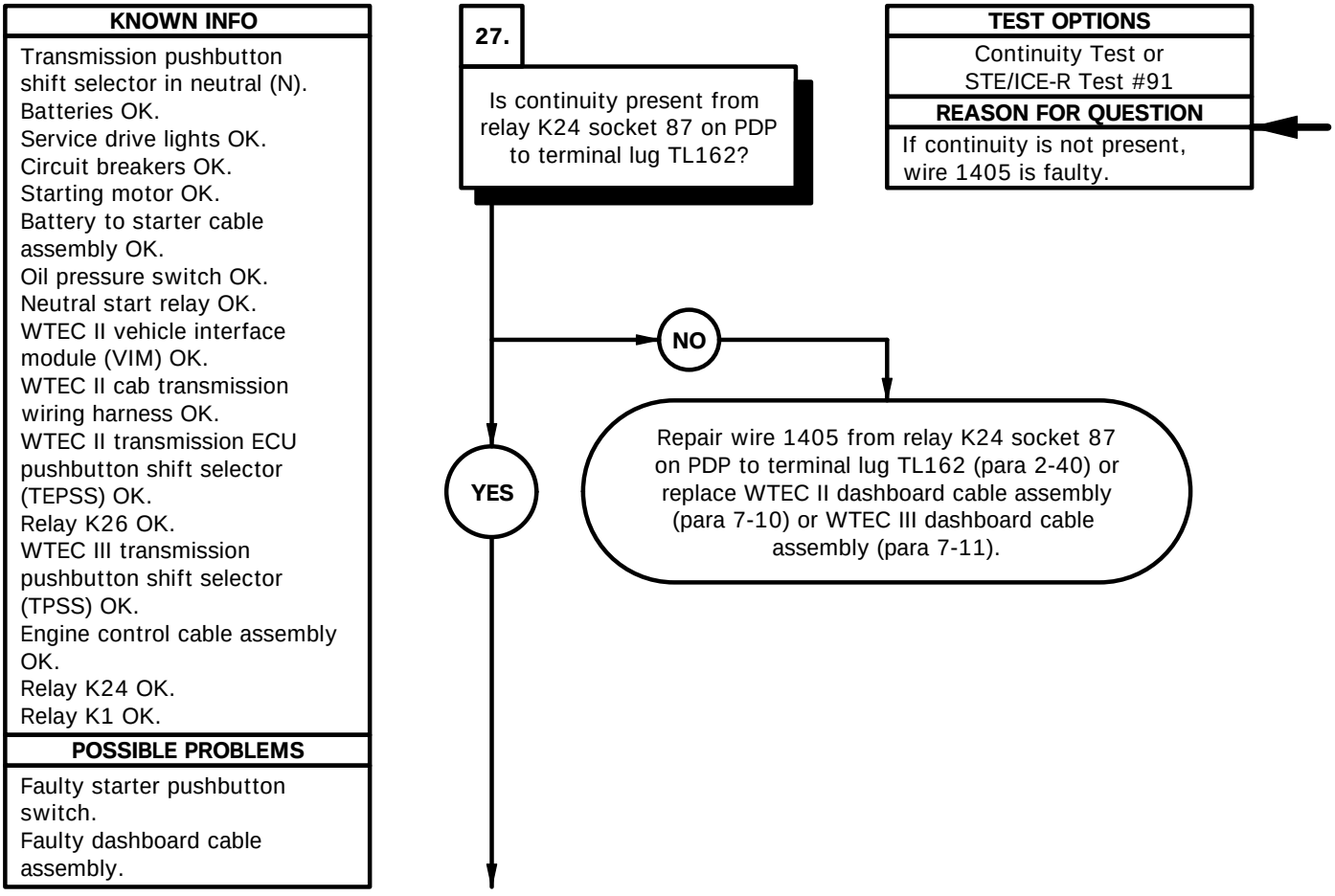
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector J31 from connector P31.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J31 pin 21.
(5) Connect negative (-) probe of multimeter to relay K11 socket 85 on PDP and note reading on multimeter.
(6) If continuity is not present, repair wire 34 from relay K11 socket 85 on PDP to connector J31 pin 21 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, repair wire 34 from connector P31 socket 21 to connector P34 socket 2 (para 2-40) or replace engine control cable assembly (para 7-72).
(8) Connect connector J31 to connector P31.
(9) Install instrument panel (para 7-15).
(10) Install relay K11 in PDP.
(11) Install power distribution panel (PDP) cover (para 16-2).
(12) Connect batteries (para 7-48).

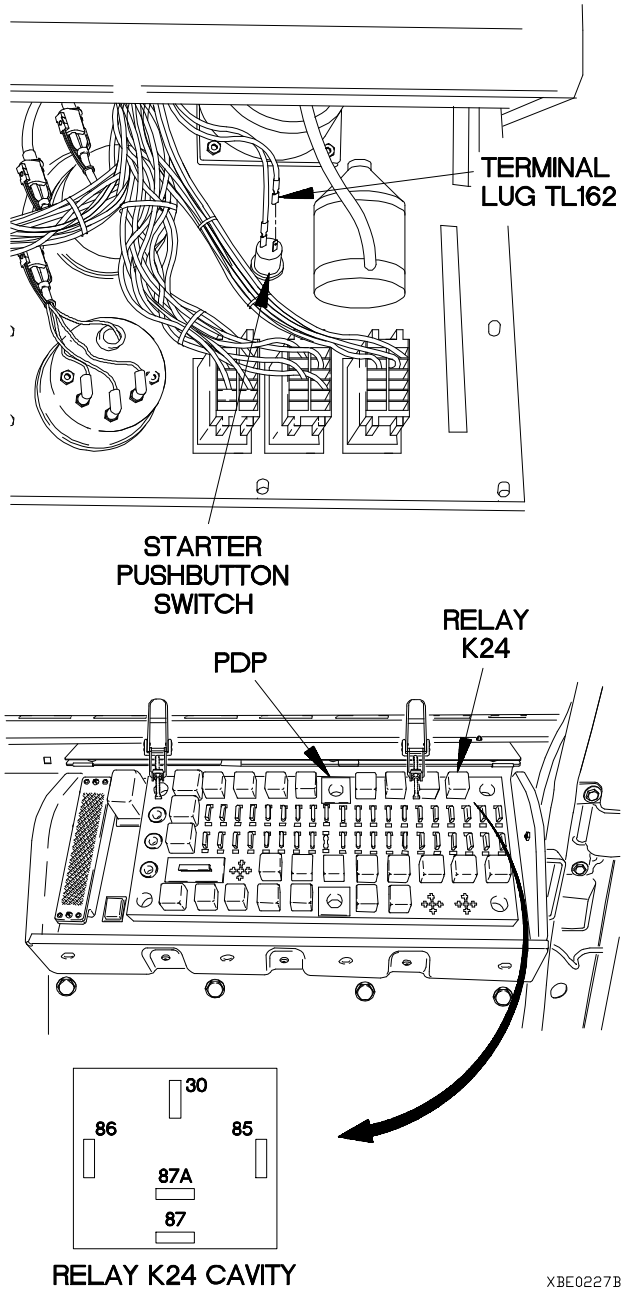


## e2. ENGINE DOES NOT CRANK (CONT)

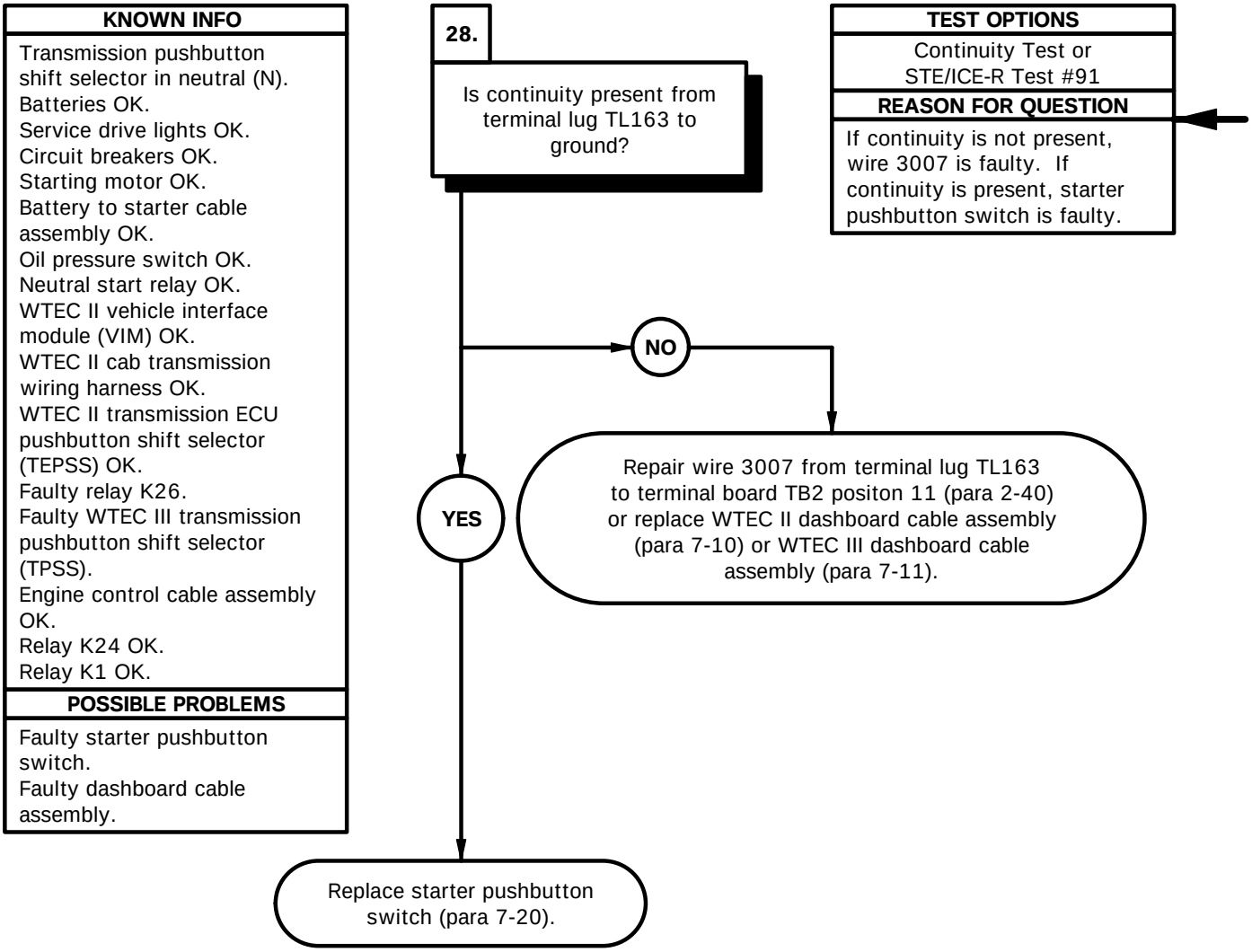


**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect terminal lug TL162 from starter pushbutton switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL162.
(5) Connect negative (-) probe of multimeter to relay K24 socket 87 on PDP and note reading on multimeter.
(6) If continuity is not present, repair wire 1405 from relay K24 socket 87 on PDP to terminal lug TL162 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install relay K24 in PDP.
(8) Connect terminal lug TL162 to starter pushbutton switch.

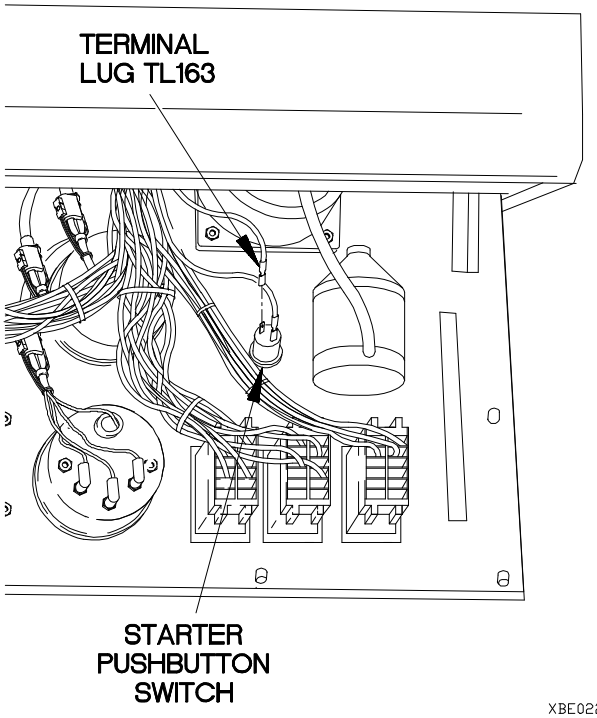


## e2. ENGINE DOES NOT CRANK (CONT)

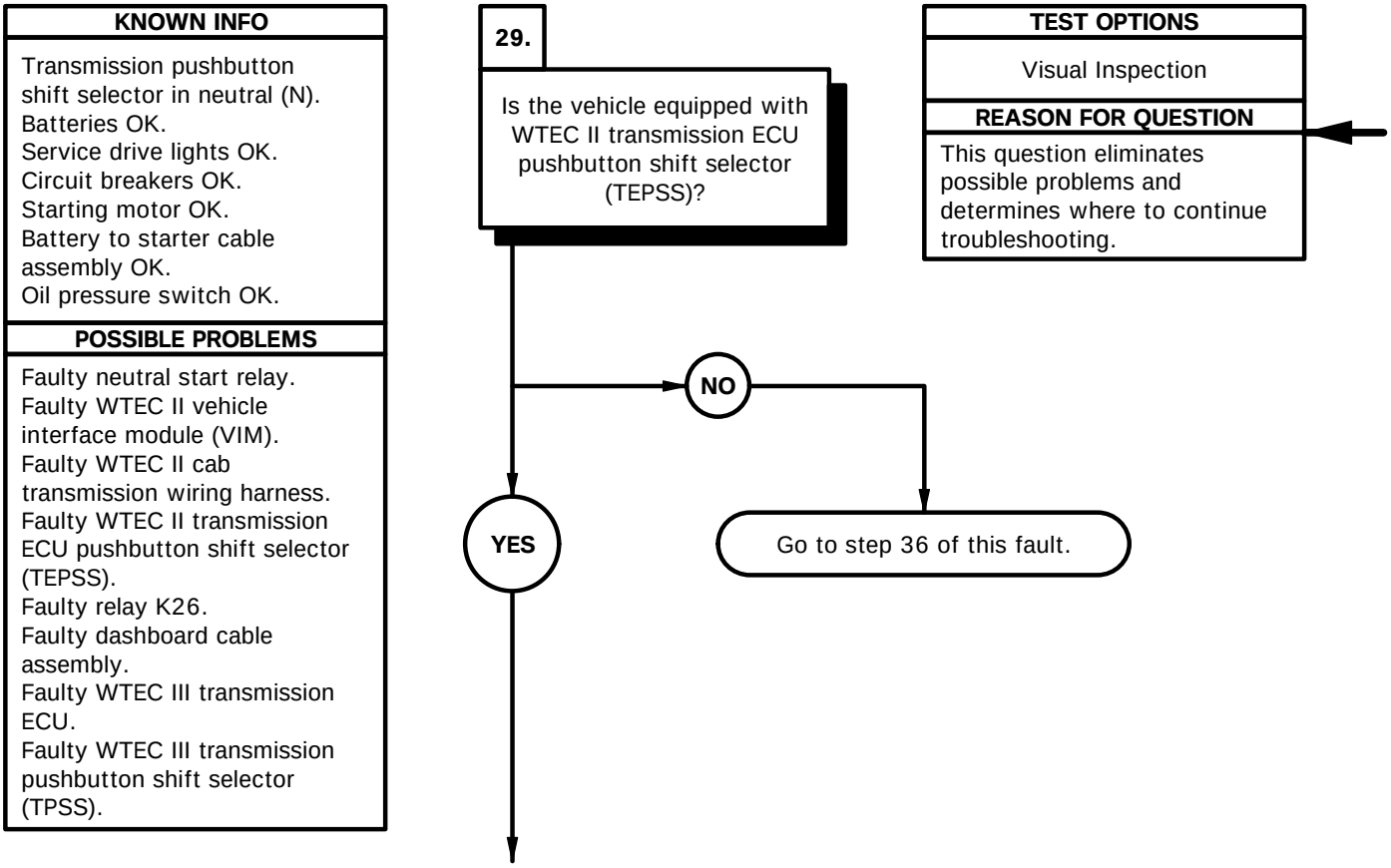


**CONTINUITY TEST**

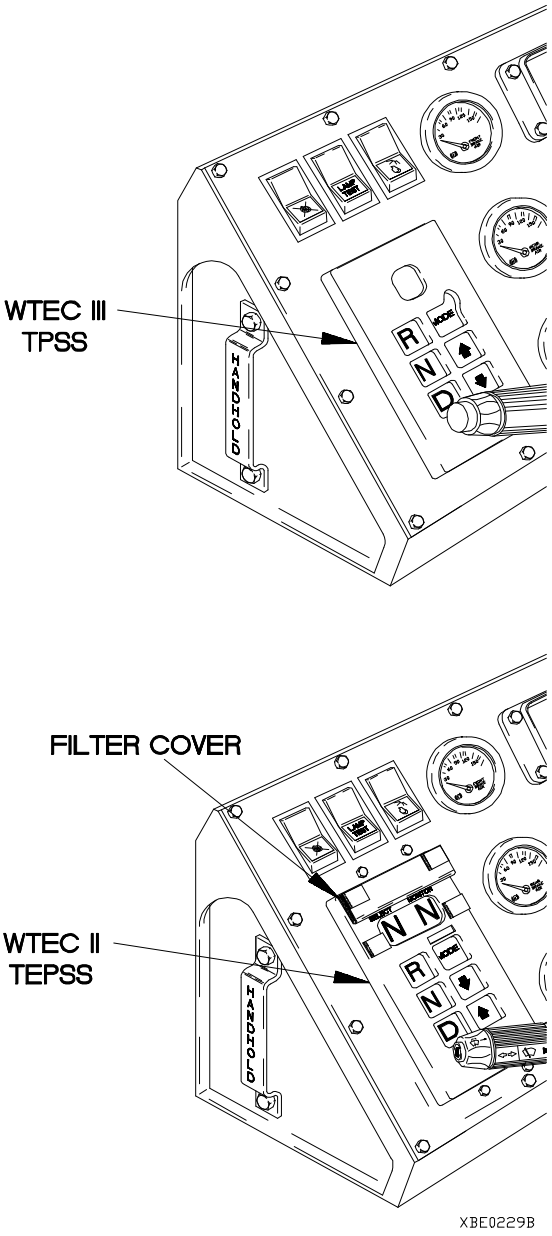
(1) Disconnect terminal lug TL163 from starter pushbutton switch.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL163.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3007 from terminal TL163 to terminal board TB2 position 11 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace starter pushbutton switch (para 7-20).
(7) Connect terminal lug TL163 to starter pushbutton.
(8) Install instrument panel (para 7-15).
(9) Install power distribution panel (PDP) cover (para 16-2).
(10) Connect batteries (para 7-48).



## e2. ENGINE DOES NOT CRANK (CONT)



(1) Check if vehicle is equipped with WTEC II transmission ECU pushbutton shift selector (TEPSS).
(2) If TEPSS is not equipped with a filter cover, go to step 36 of this fault.



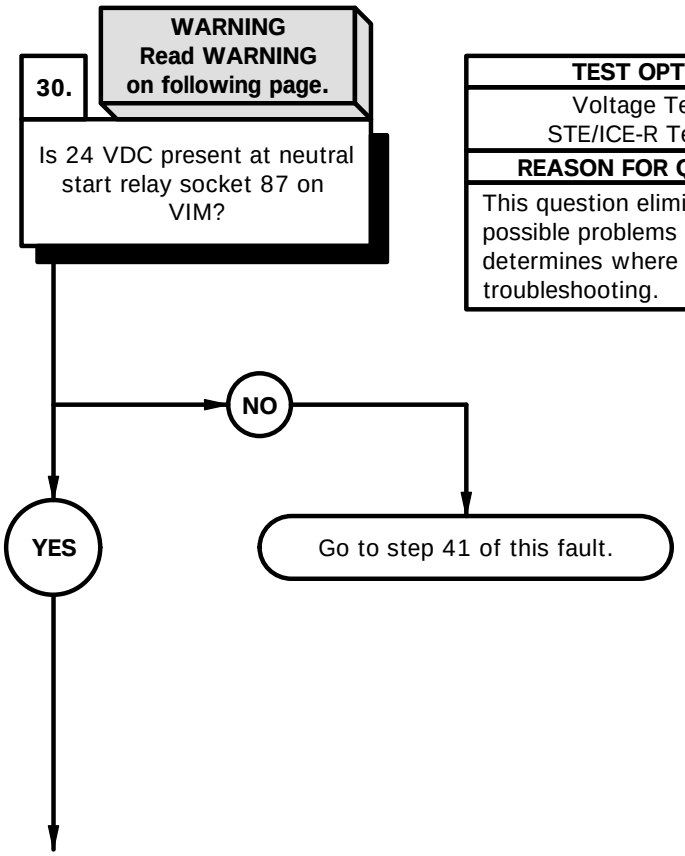
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.

**POSSIBLE PROBLEMS**

Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty WTEC II cab transmission wiring harness.
Faulty WTEC II transmission ECU pushbutton shift selector (TEPSS).
Faulty dashboard cable assembly.




**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

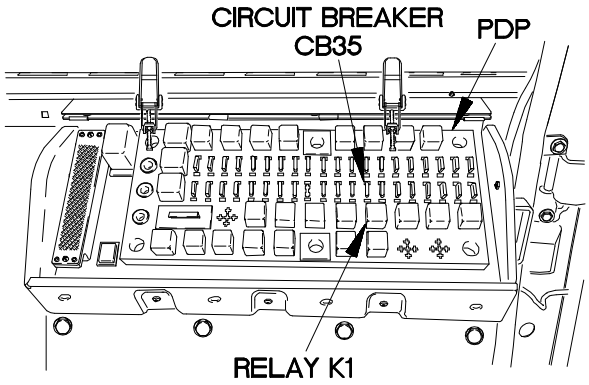
This question eliminates possible problems and determines where to continue troubleshooting.

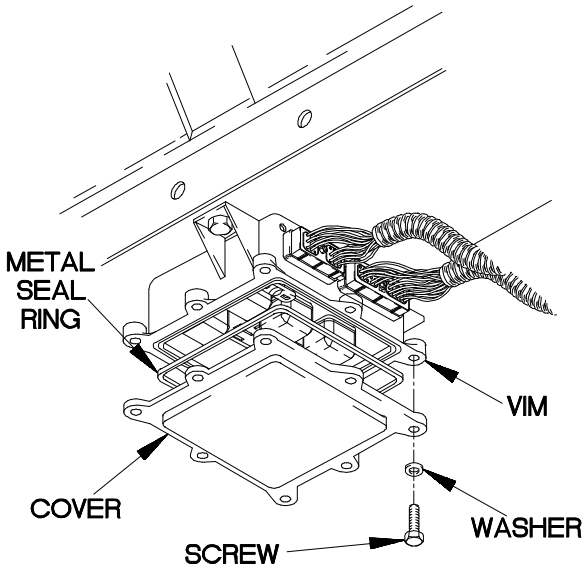
**WARNING**

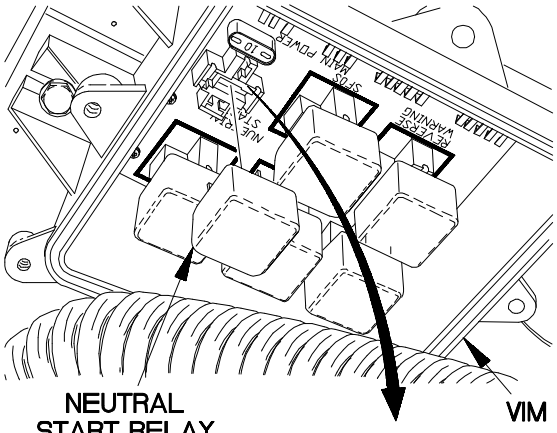
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

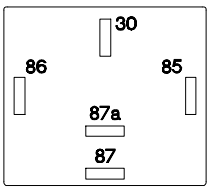
**VOLTAGE TEST**

(1) Install relay K1 in PDP.
(2) Remove kick panel (para 16-3).
(3) Remove circuit breaker CB35 from PDP.
(4) Remove eight screws, washers, cover, and metal seal ring from VIM. Discard metal seal ring.
(5) Remove neutral start relay from VIM.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to neutral start relay socket 87 on VIM.
(8) Connect negative (-) probe of multimeter to ground.
(9) Install circuit breaker CB35 in PDP and note reading on multimeter.
(10) If 24 VDC is not present, go to step 41 of this fault.
(11) Remove circuit breaker CB35 from PDP.



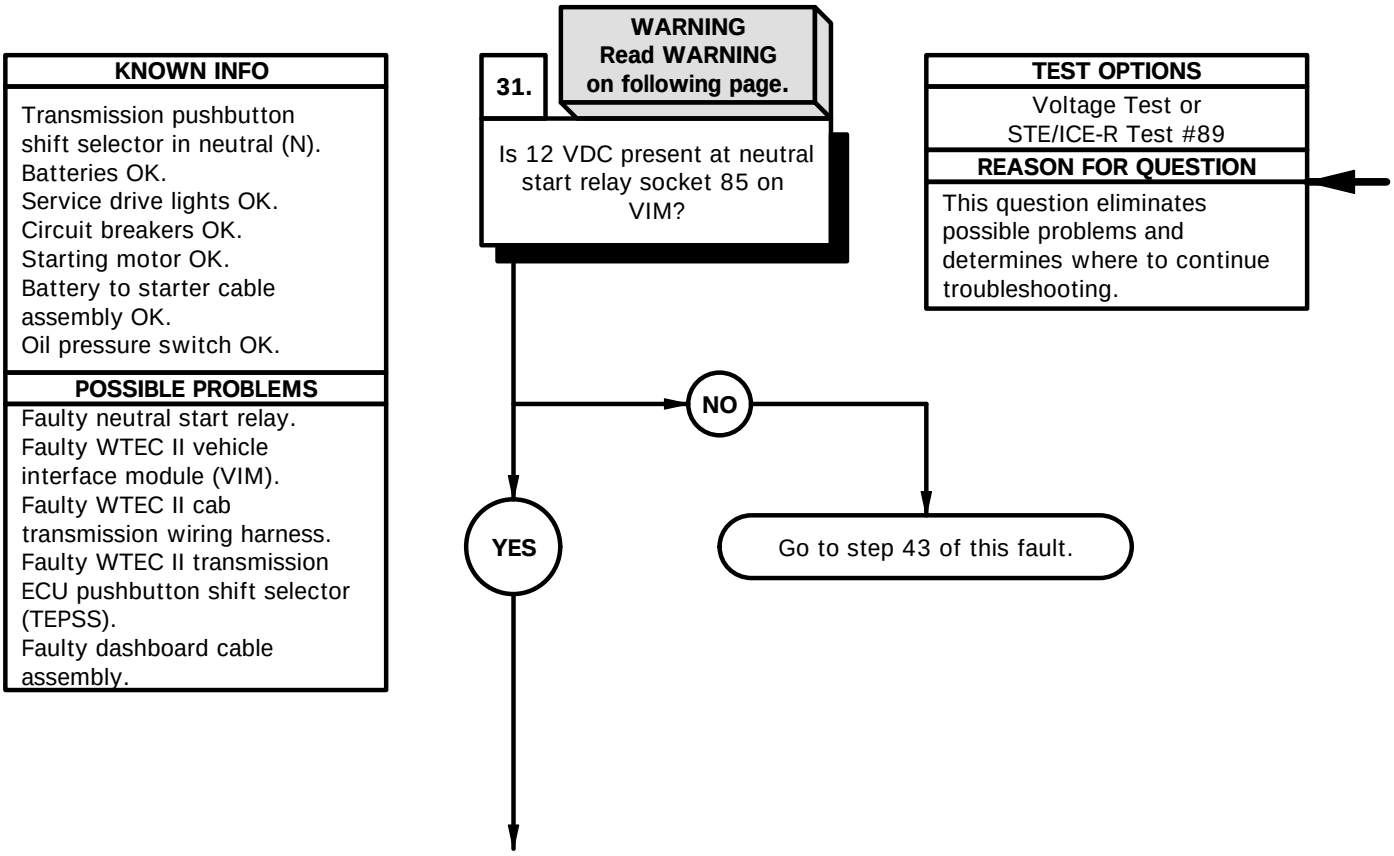




NEUTRAL
START RELAY
CAVITY

XBE0230B

## e2. ENGINE DOES NOT CRANK (CONT)

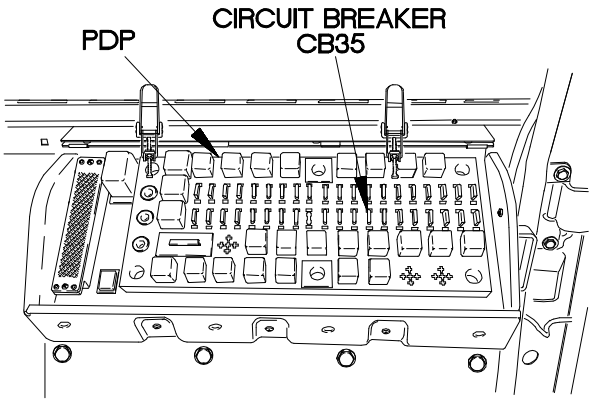


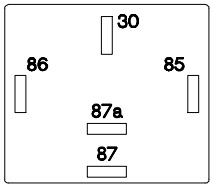
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to neutral start relay socket 85 on VIM.
(3) Connect negative (-) probe of multimeter to ground.
(4) Install circuit breaker CB35 in PDP and note reading on multimeter.
(5) If 12 VDC is not present, go to step 43 of this fault.
(6) Remove circuit breaker CB35 from PDP.




NEUTRAL
START RELAY
CAVITY

XBE0231B

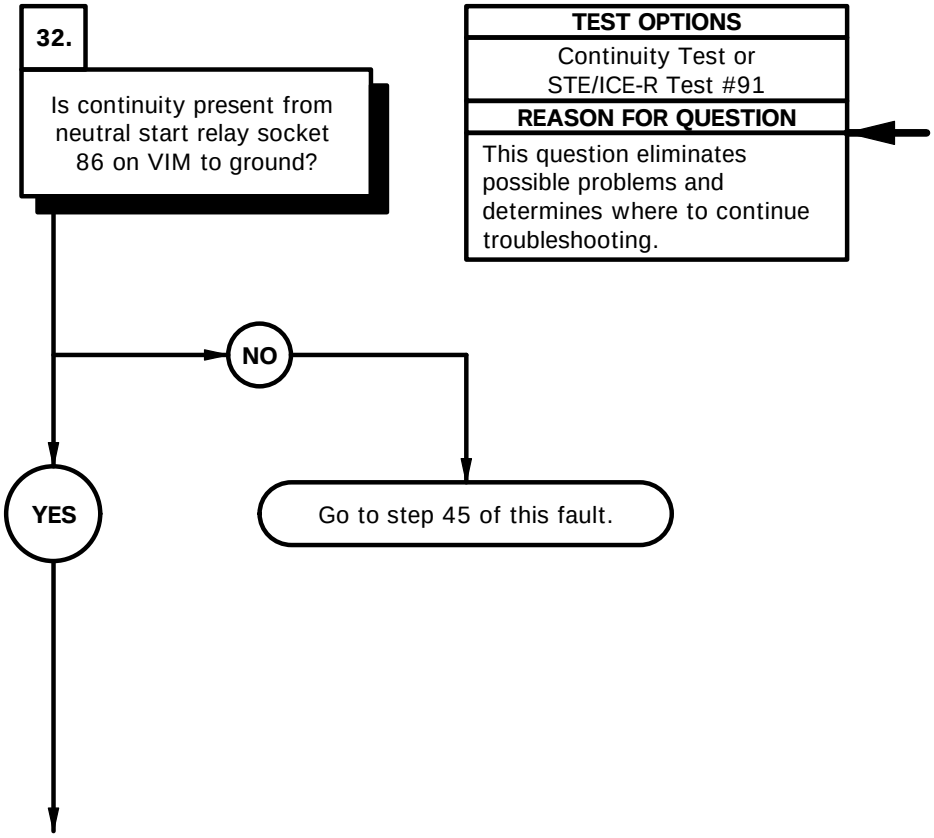
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.

**POSSIBLE PROBLEMS**

Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty dashboard cable assembly.



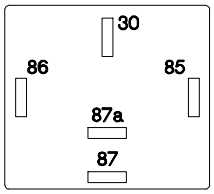

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

This question eliminates possible problems and determines where to continue troubleshooting.

| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to neutral start relay socket 86 on VIM.<br>(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.<br>(4) If continuity is not present, go to step 45 of this fault. |




NEUTRAL
START RELAY
CAVITY

XBE0232B

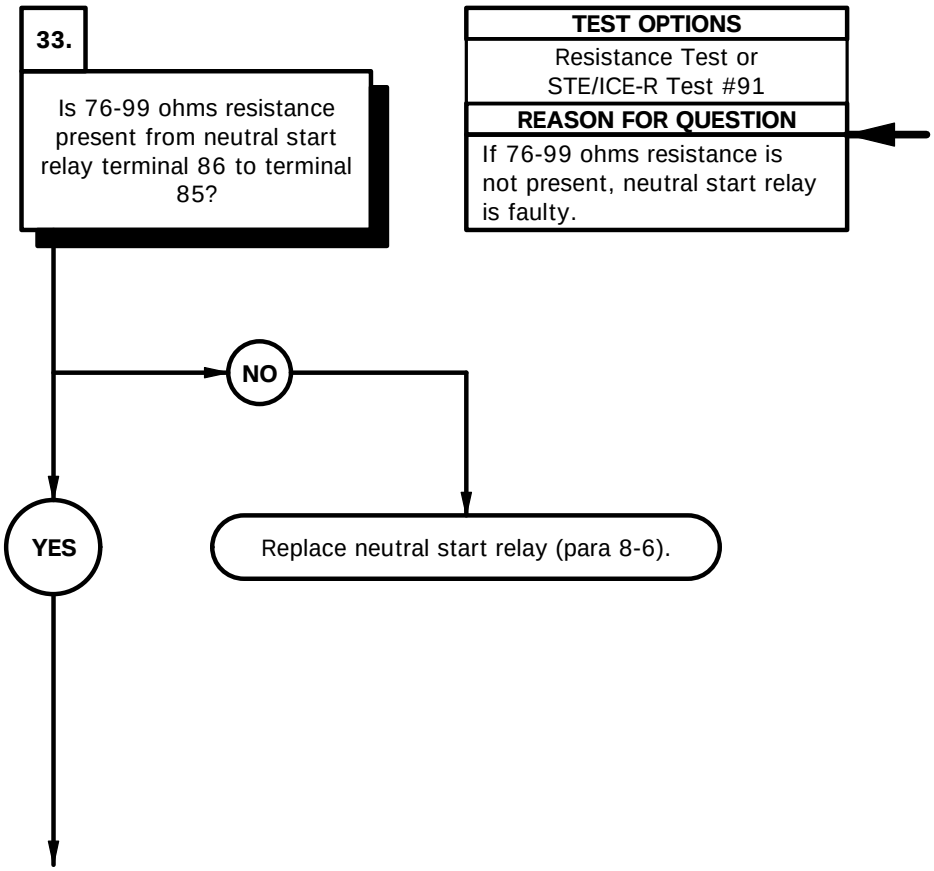
## e2. ENGINE DOES NOT CRANK (CONT)

**KNOWN INFO**

Transmission pushbutton shift selector in neutral (N).
Batteries OK.
Service drive lights OK.
Circuit breakers OK.
Starting motor OK.
Battery to starter cable assembly OK.
Oil pressure switch OK.
WTEC II cab transmission wiring harness OK.
WTEC II transmission ECU pushbutton shift selector (TEPSS) OK.

**POSSIBLE PROBLEMS**

Faulty neutral start relay.
Faulty WTEC II vehicle interface module (VIM).
Faulty dashboard cable assembly.




**TEST OPTIONS**

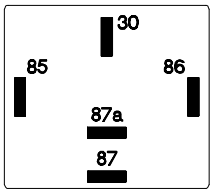
Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If 76-99 ohms resistance is not present, neutral start relay is faulty.

**RESISTANCE TEST**

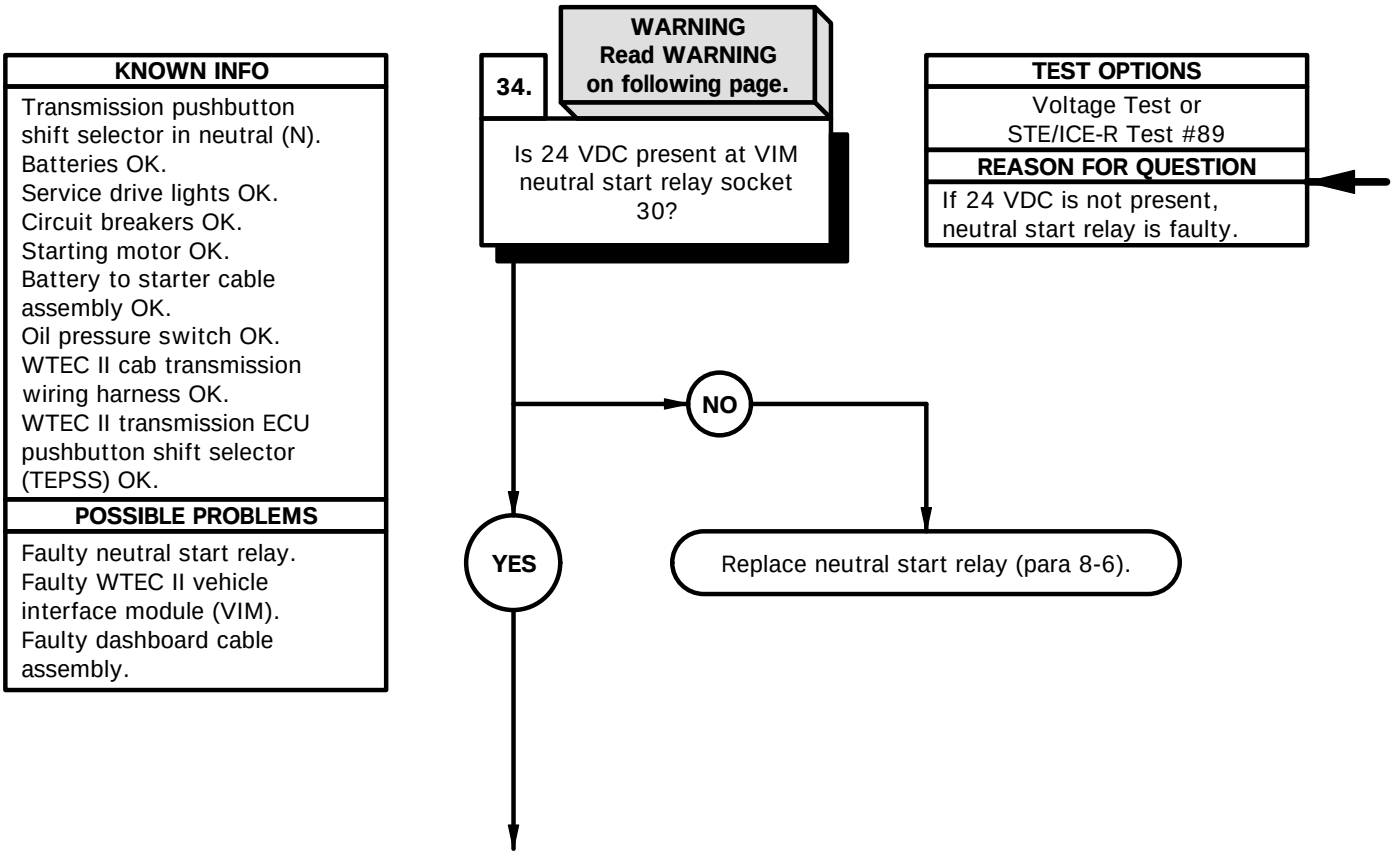
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to neutral start relay terminal 85.
(3) Connect negative (-) probe of multimeter to neutral start relay terminal 86 and note reading on multimeter.
(4) If 76-99 ohms resistance is not present, replace neutral start relay (para 8-6).




NEUTRAL START RELAY

XBE0233B

## e2. ENGINE DOES NOT CRANK (CONT)

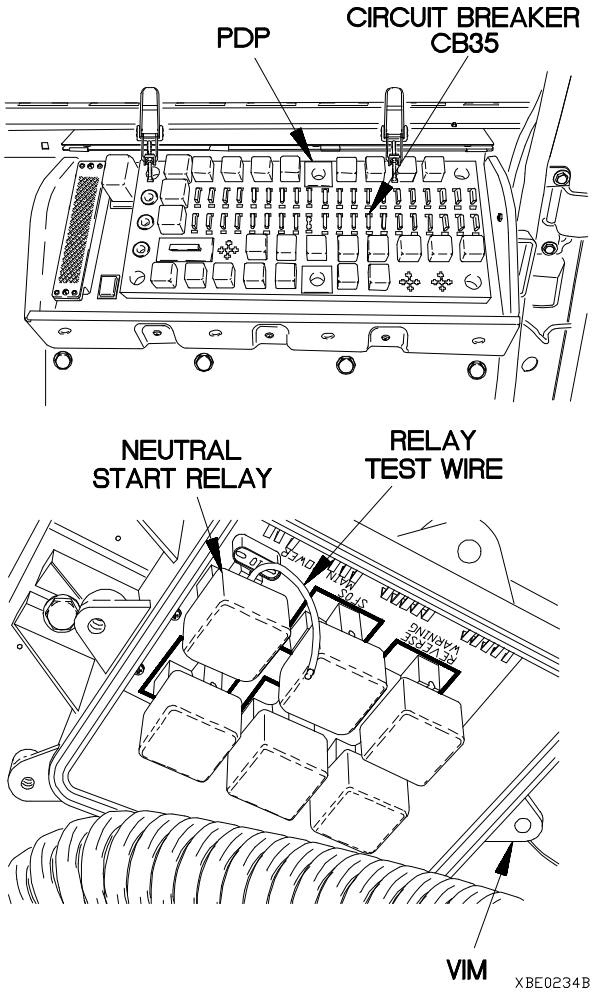


**WARNING**

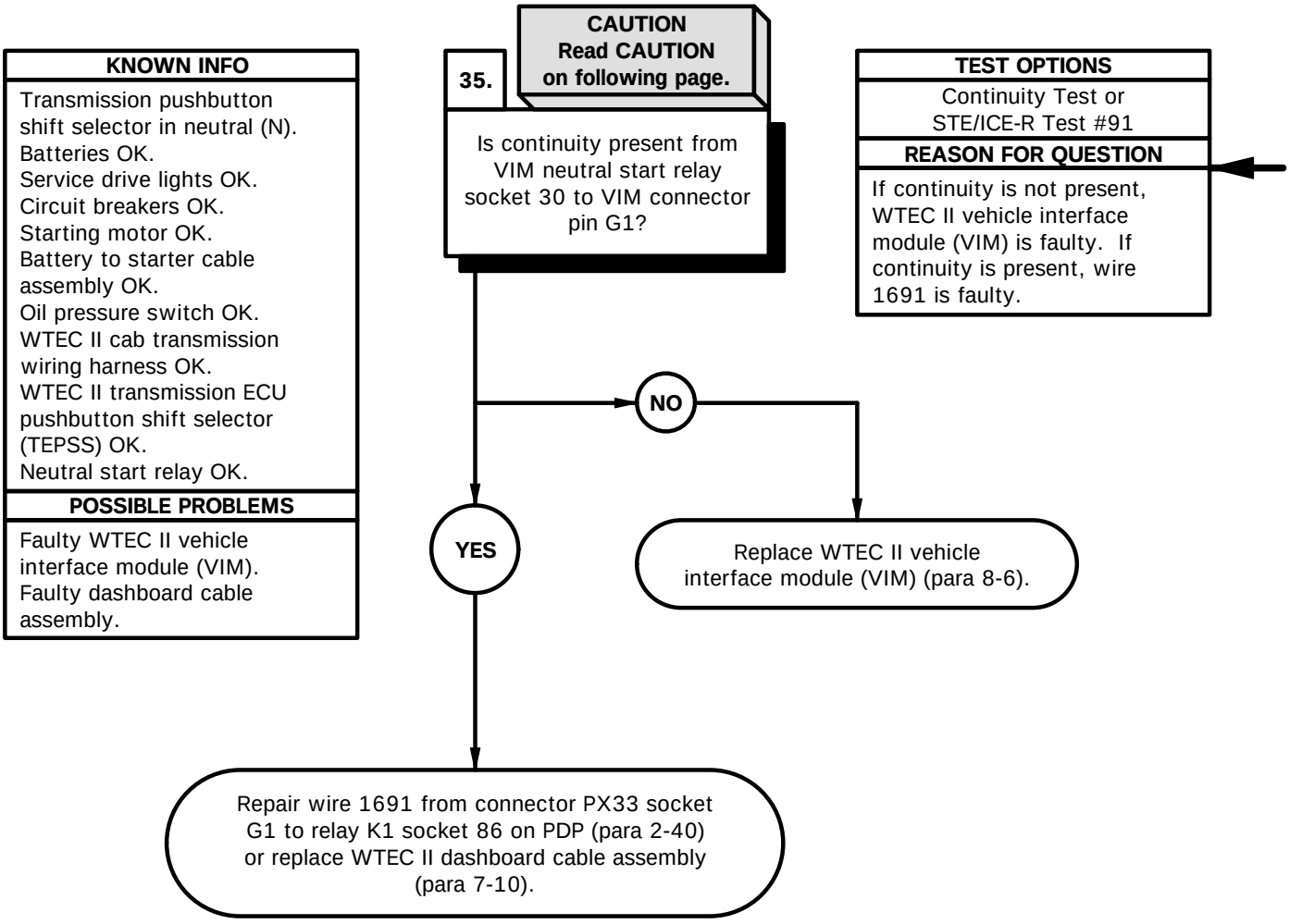
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay test wire in neutral start relay socket 30 on VIM.
(2) Install neutral start relay in VIM.
(3) Install circuit breaker CB35 in PDP.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to relay test wire.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, replace neutral start relay (para 8-6).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Remove circuit breaker CB35 from PDP.
(11) Remove neutral start relay from VIM.
(12) Remove relay test wire from neutral start relay socket 30 on VIM.



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

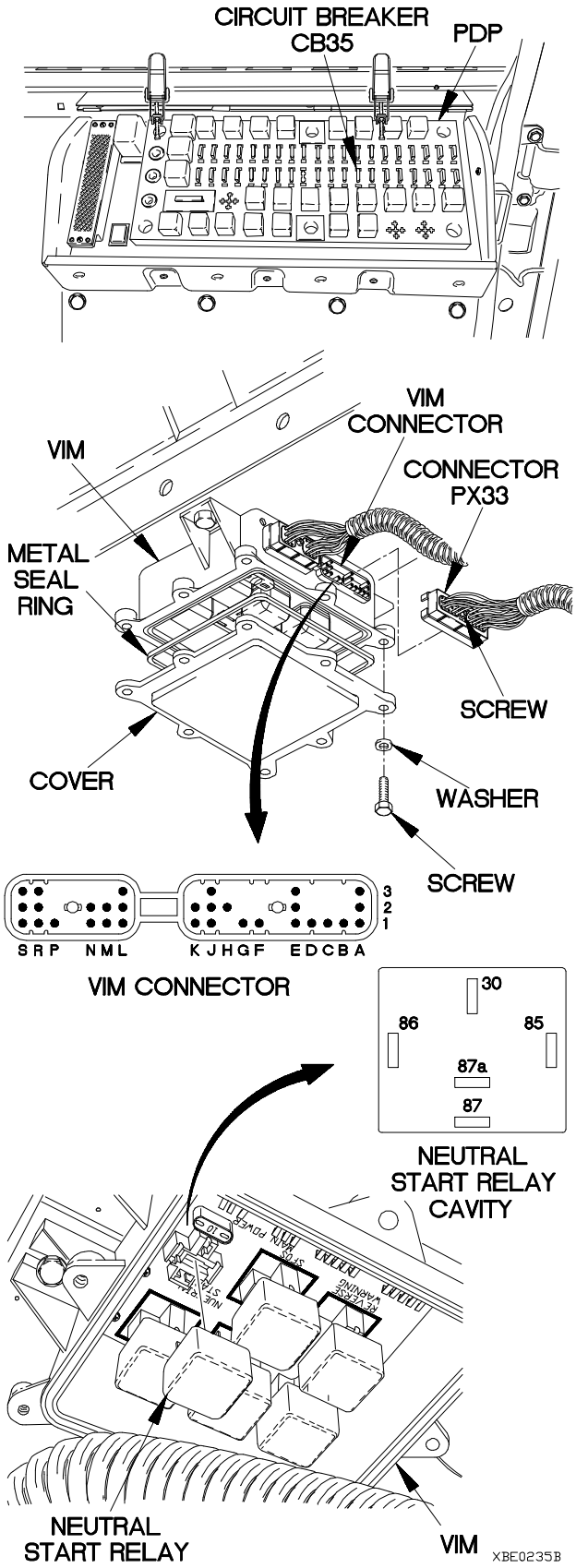
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

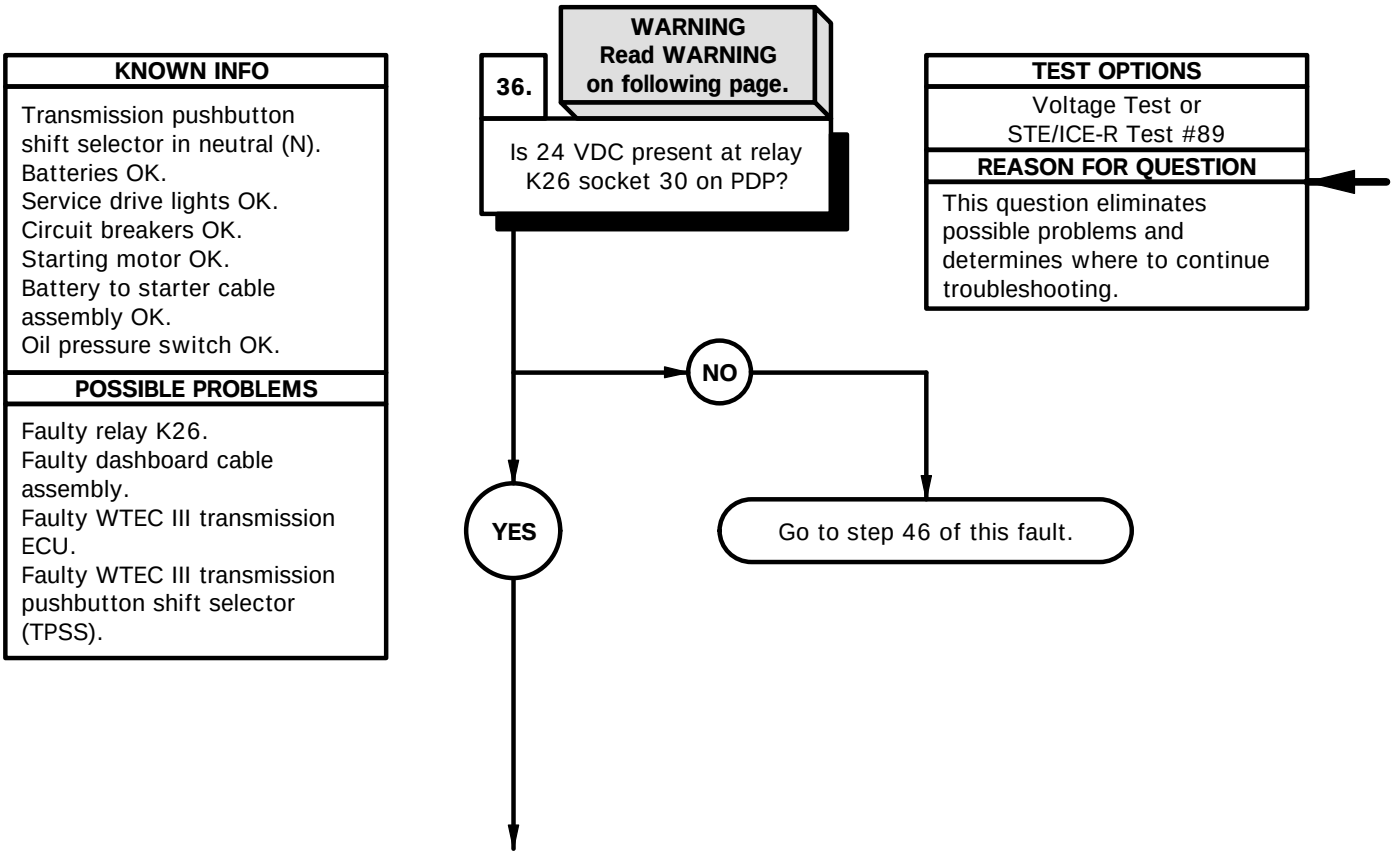
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Loosen screw in connector PX33.
(3) Disconnect connector PX33 from VIM connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to neutral start relay socket 30 on VIM.
(6) Connect negative (-) probe of multimeter to VIM connector pin G1 and note reading on multimeter.
(7) If continuity is not present, replace WTEC II vehicle interface module (VIM) (para 8-6).
(8) If continuity is present, repair wire 1691 from connector PX33 socket G1 to relay K1 socket 86 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(9) Connect connector PX33 to VIM connector.
(10) Tighten screw in connector PX33.
(11) Install neutral start relay in VIM.
(12) Install cover on VIM with metal seal ring, eight washers, and screws.
(13) Install circuit breaker CB35 in PDP.
(14) Install kick panel (para 16-3).
(15) Connect batteries (para 7-48).



## e2. ENGINE DOES NOT CRANK (CONT)

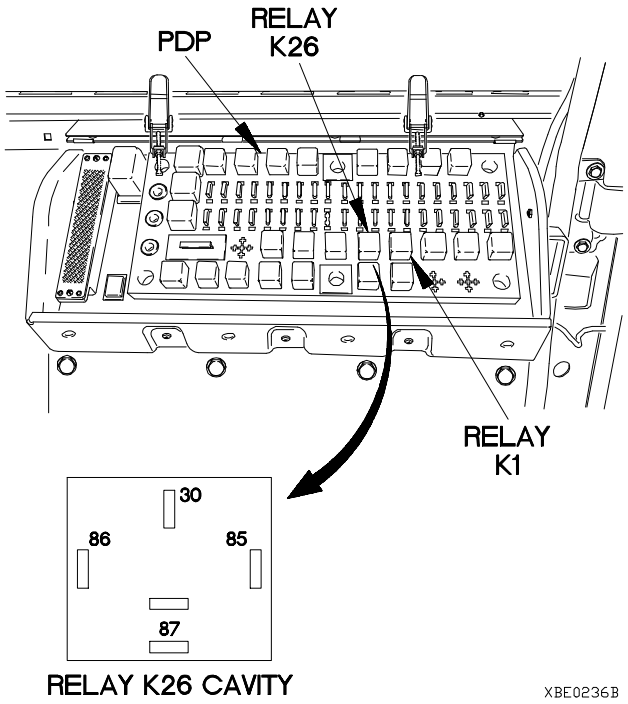


**WARNING**

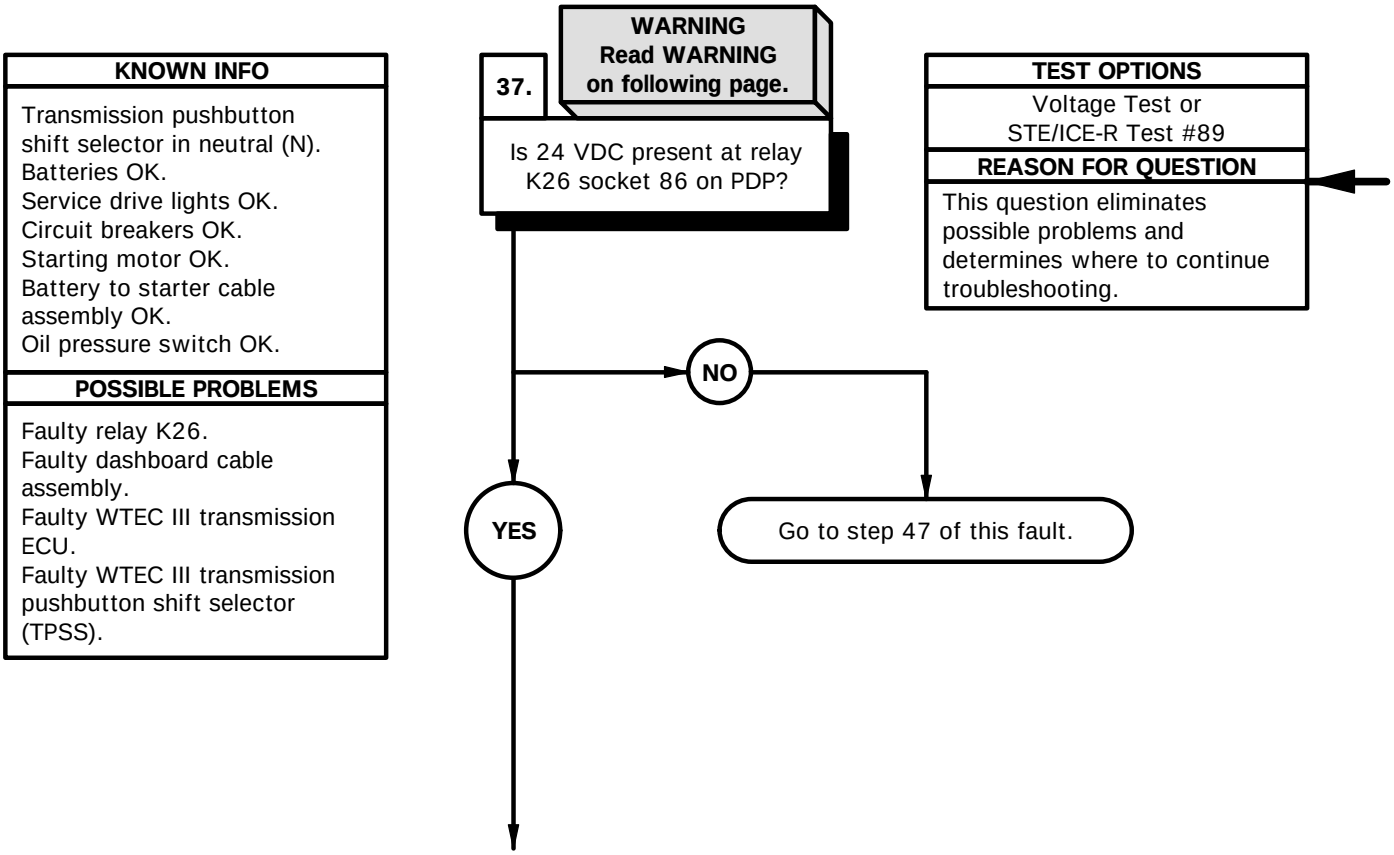
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay K1 in PDP.
(2) Remove relay K26 from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to relay K26 socket 30 on PDP.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, go to step 46 of this fault.
(8) Position master power switch to off (TM 9-2320-365-10).



## e2. ENGINE DOES NOT CRANK (CONT)

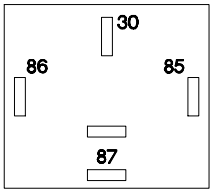


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

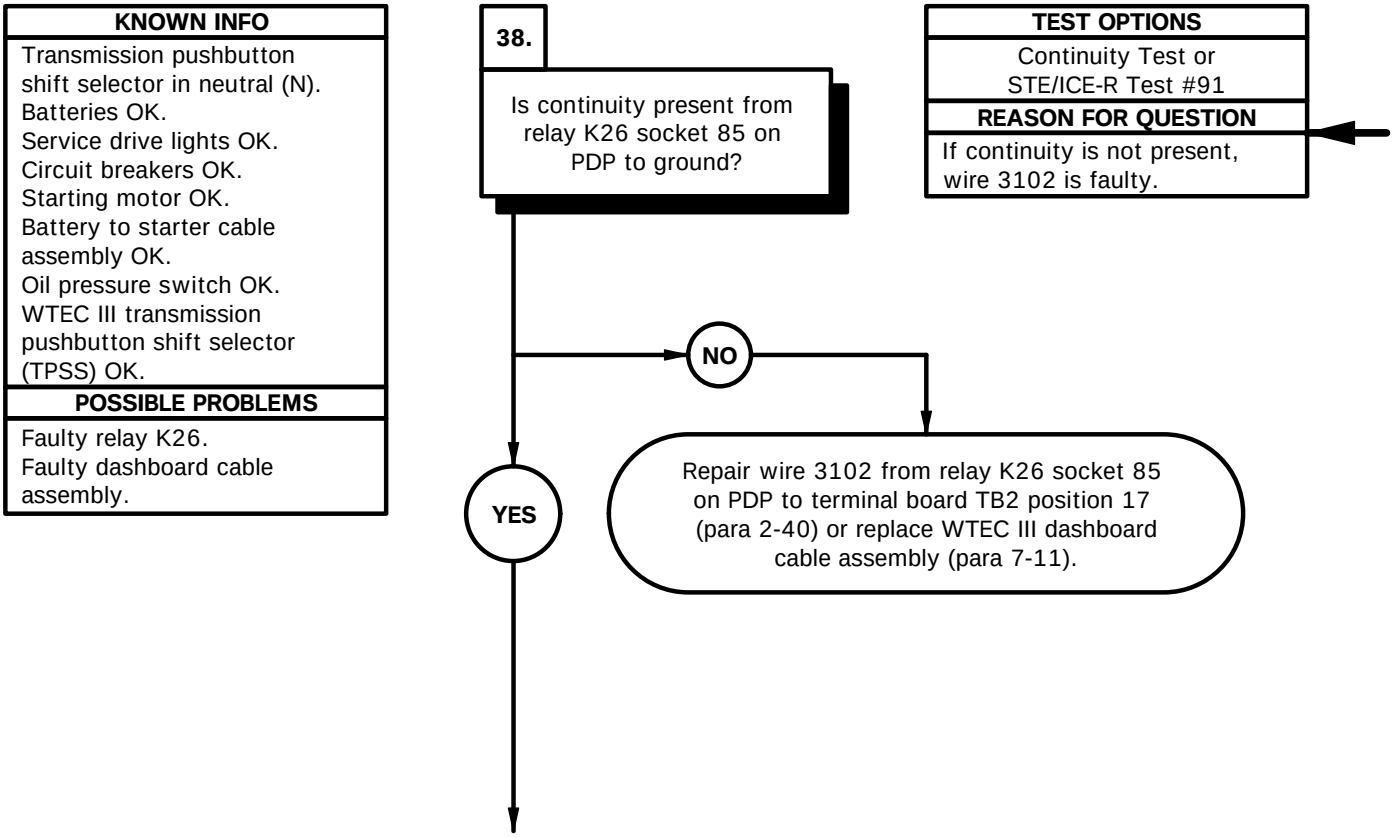
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K26 socket 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, go to step 47 of this fault.
(6) Position master power switch to off (TM 9-2320-365-10).



RELAY K26 CAVITY

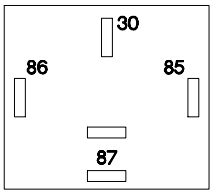
XBE0237B

## e2. ENGINE DOES NOT CRANK (CONT)



**CONTINUITY TEST**

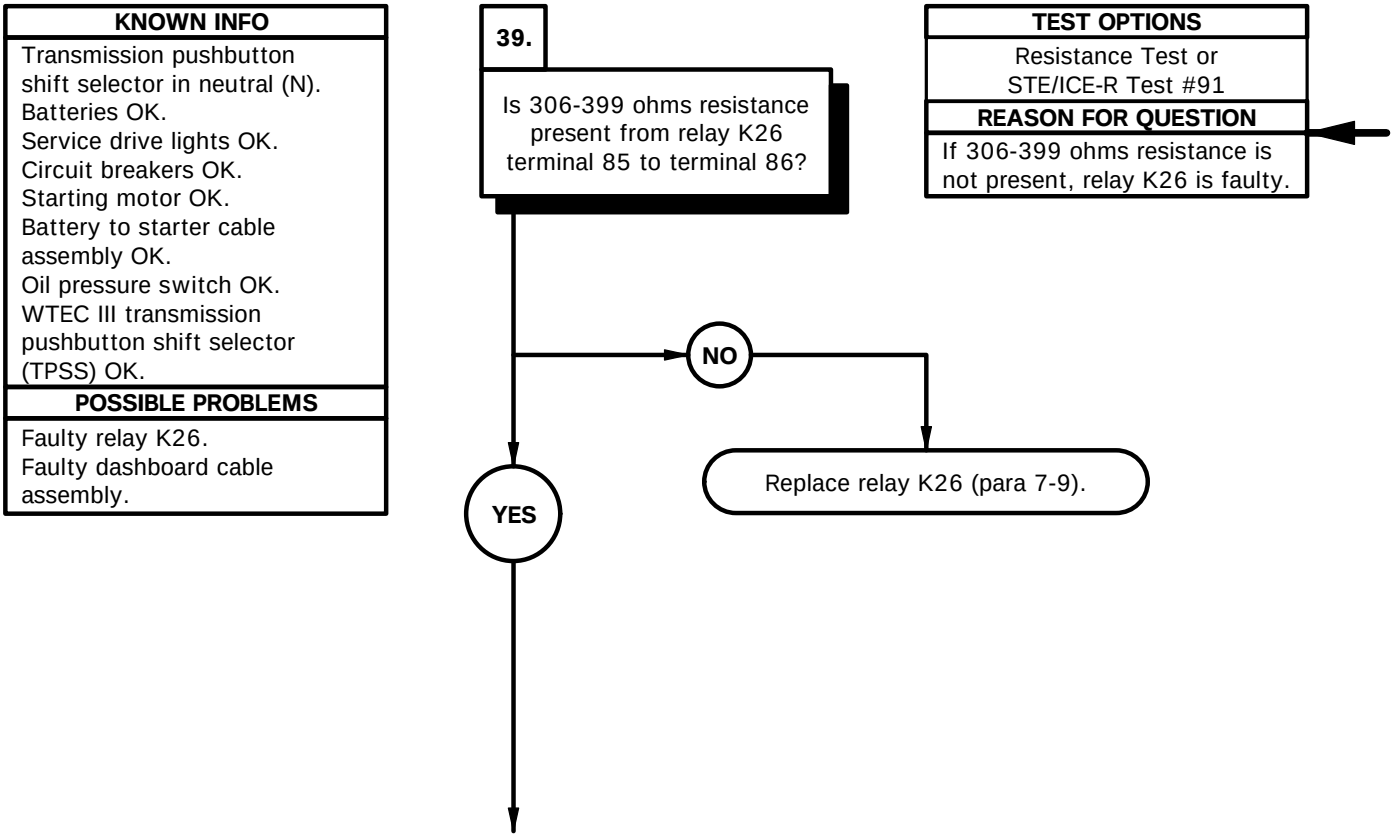
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K26 socket 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3102 from relay K26 socket 85 on PDP to terminal board TB2 position 17 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).



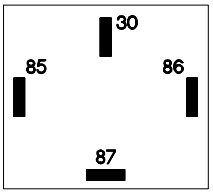
RELAY K26 CAVITY

XBE0238B

## e2. ENGINE DOES NOT CRANK (CONT)



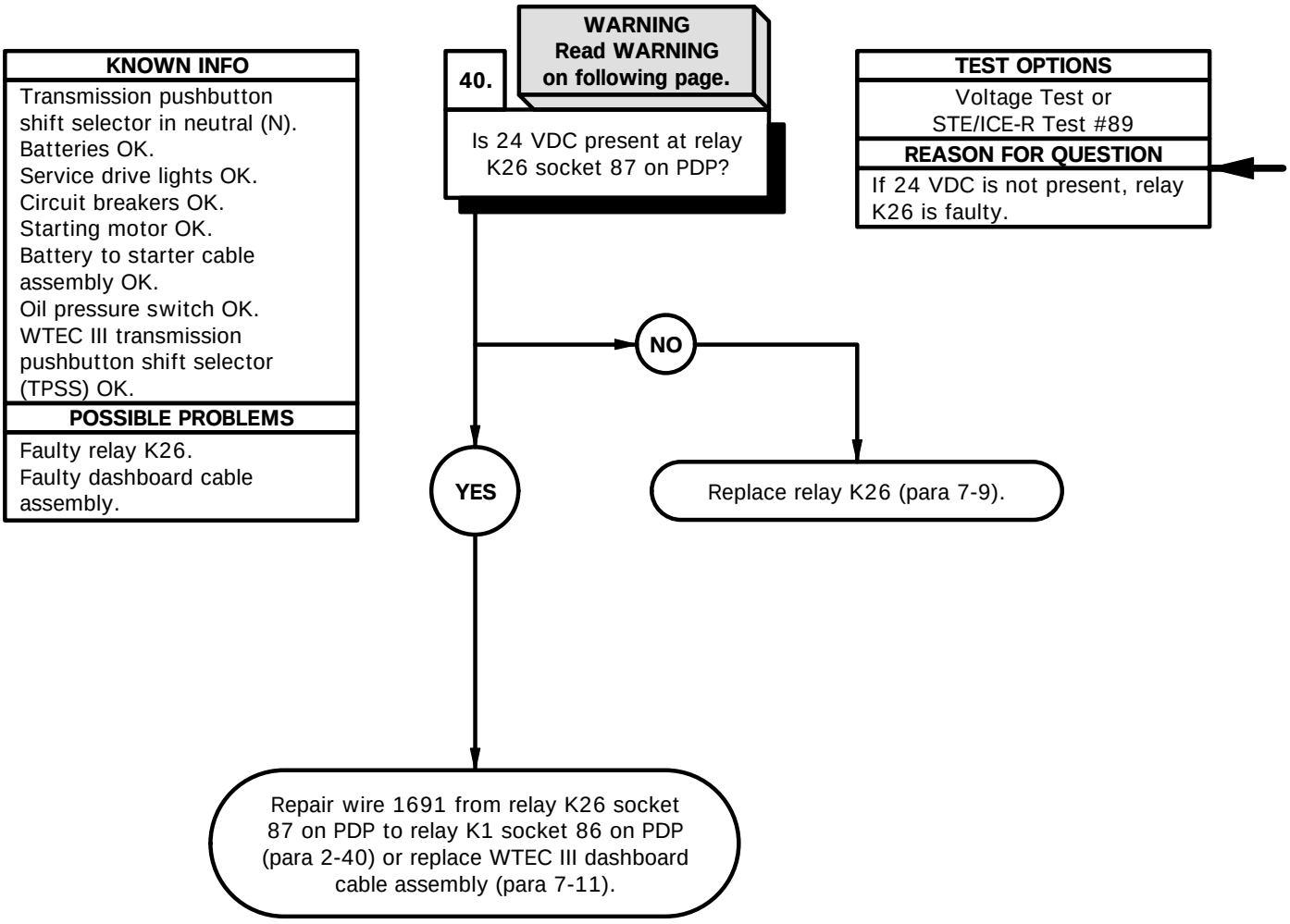
| RESISTANCE TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to relay K26 terminal 85.<br>(3) Connect negative (-) probe of multimeter to relay K26 terminal 86 and note reading on multimeter.<br>(4) If 306-399 ohms resistance is not present, replace relay K26 (para 7-9). |




RELAY K26

XBE0239B

## e2. ENGINE DOES NOT CRANK (CONT)

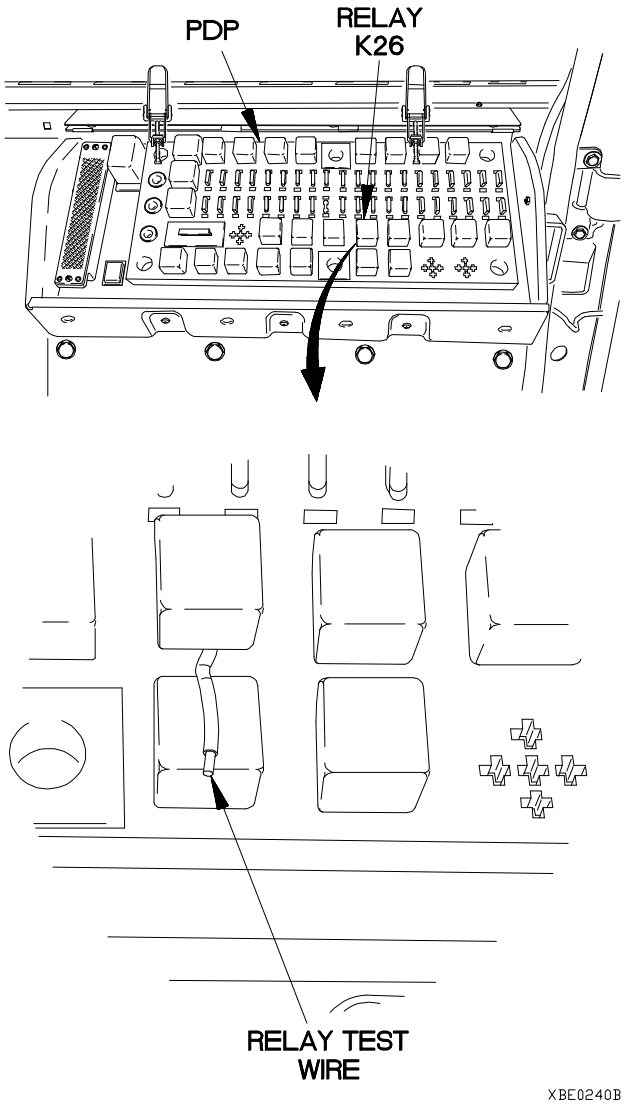


**WARNING**

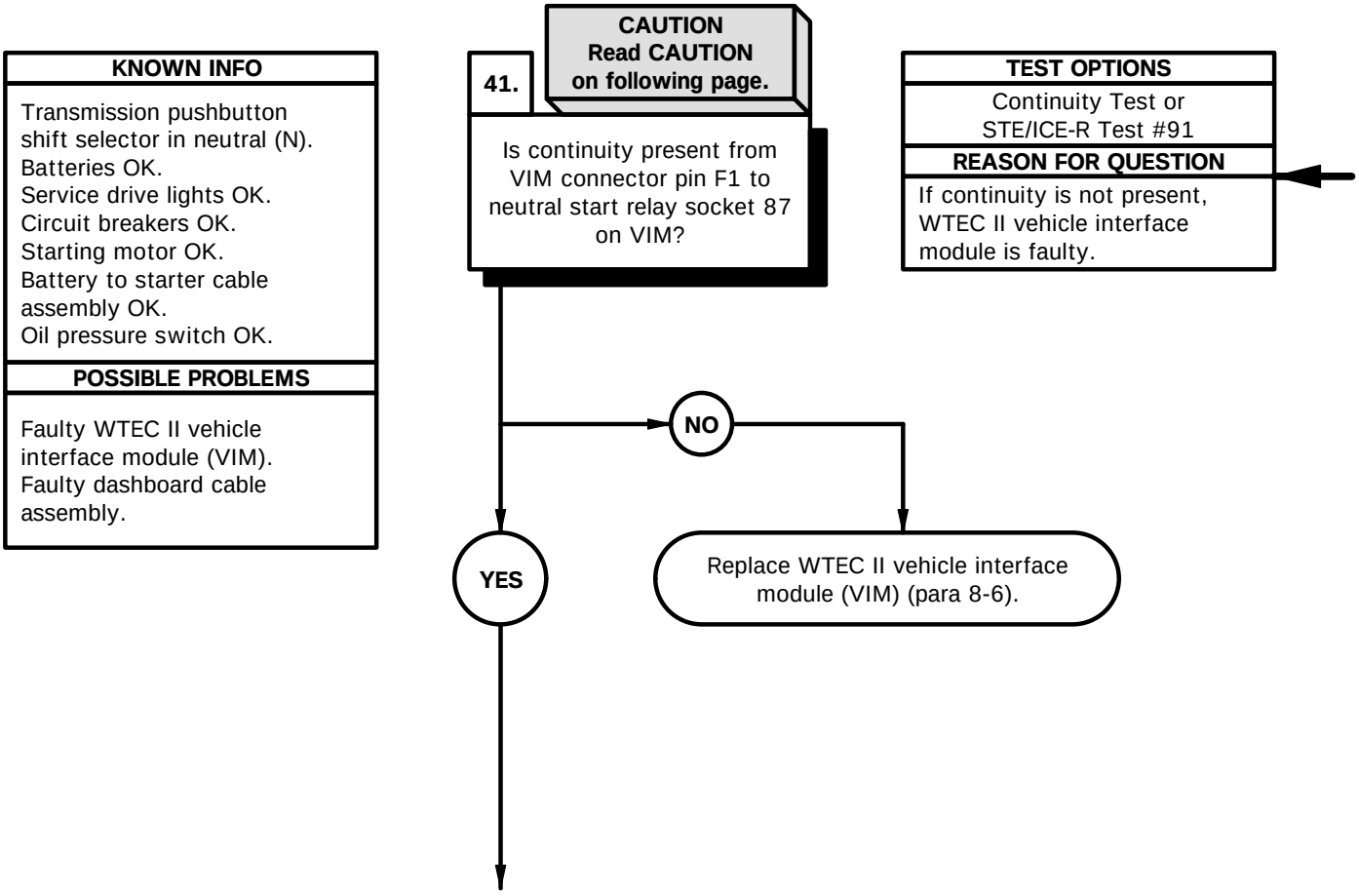
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits, or cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay test wire in relay K26 socket 87 on PDP.
(2) Install relay K26 in PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to relay test wire.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, replace relay K26 (para 7-9).
(8) If 24 VDC is present, repair wire 1691 from relay 26 socket 87 on PDP to relay K1 socket 86 on PDP (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Remove relay K26 from PDP.
(11) Remove relay test wire from relay K26 socket 87 on PDP.
(12) Install relay K26 in PDP.
(13) Install power distribution panel (PDP) cover (para 16-2).



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

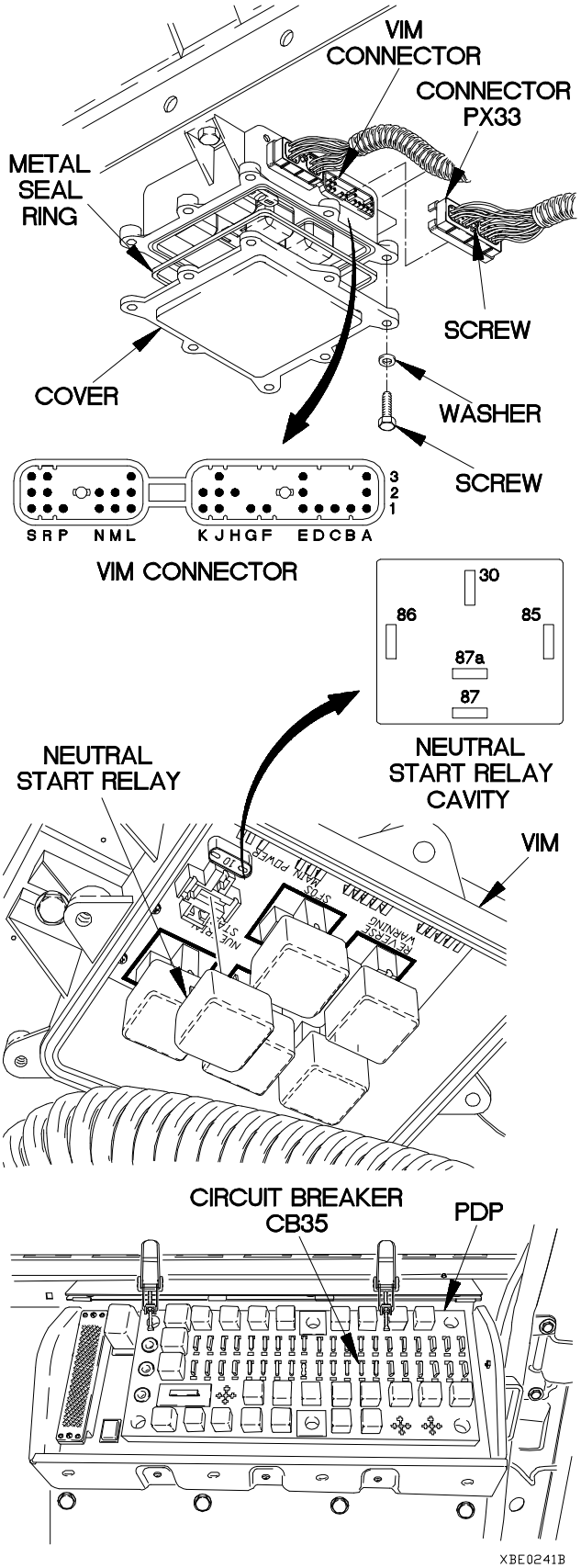
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

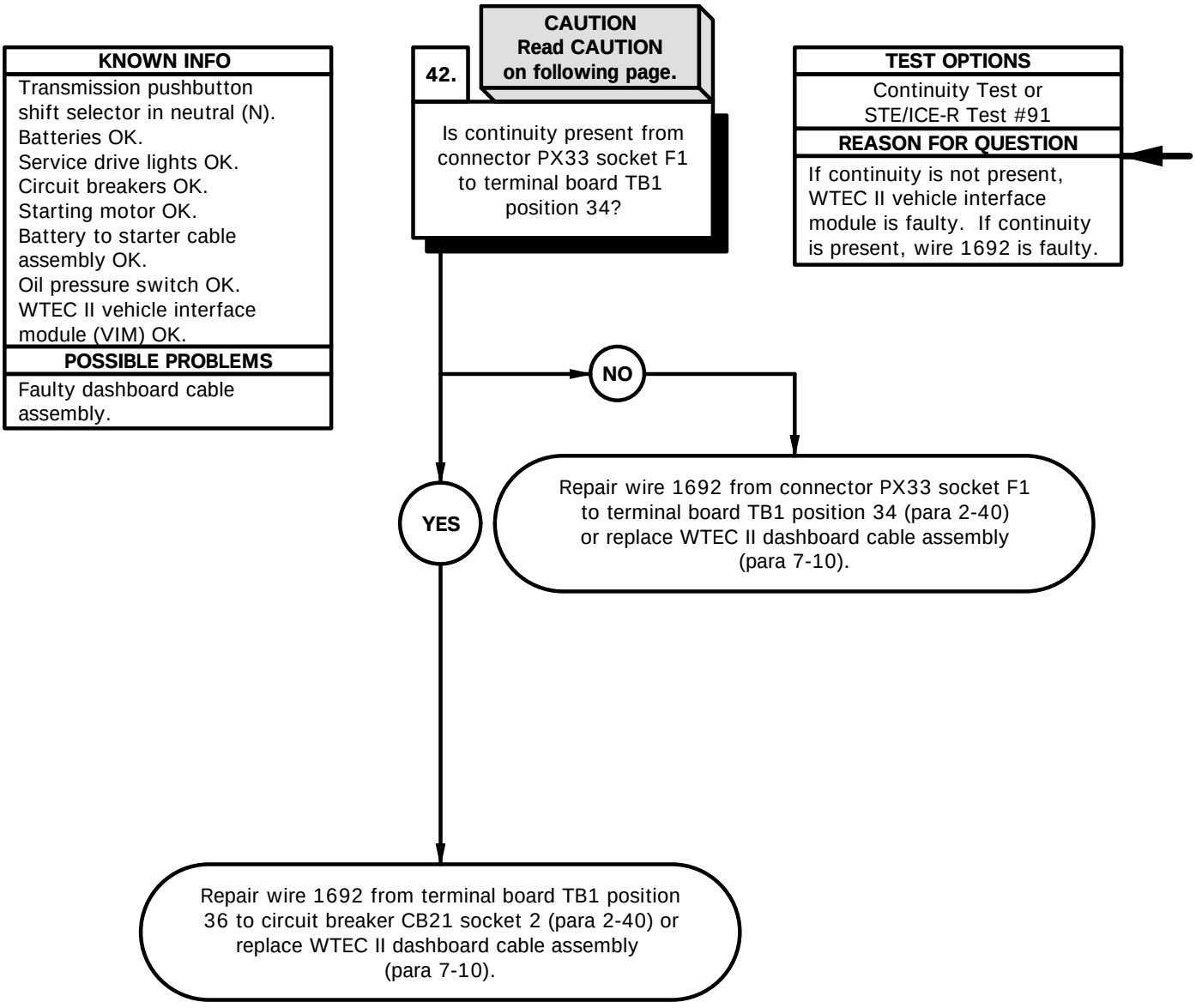
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Loosen screw in connector PX33.
(3) Disconnect connector PX33 from VIM connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to neutral start relay socket 87 on VIM.
(6) Connect negative (-) probe of multimeter to VIM connector PX33 pin F1 and note reading on multimeter.
(7) If continuity is not present, replace WTEC II vehicle interface module (VIM) (para 8-6).
(8) Install neutral start relay in VIM.
(9) Install cover on VIM with metal seal ring, eight washers, and screws.
(10) Install circuit breaker CB35 in PDP.



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

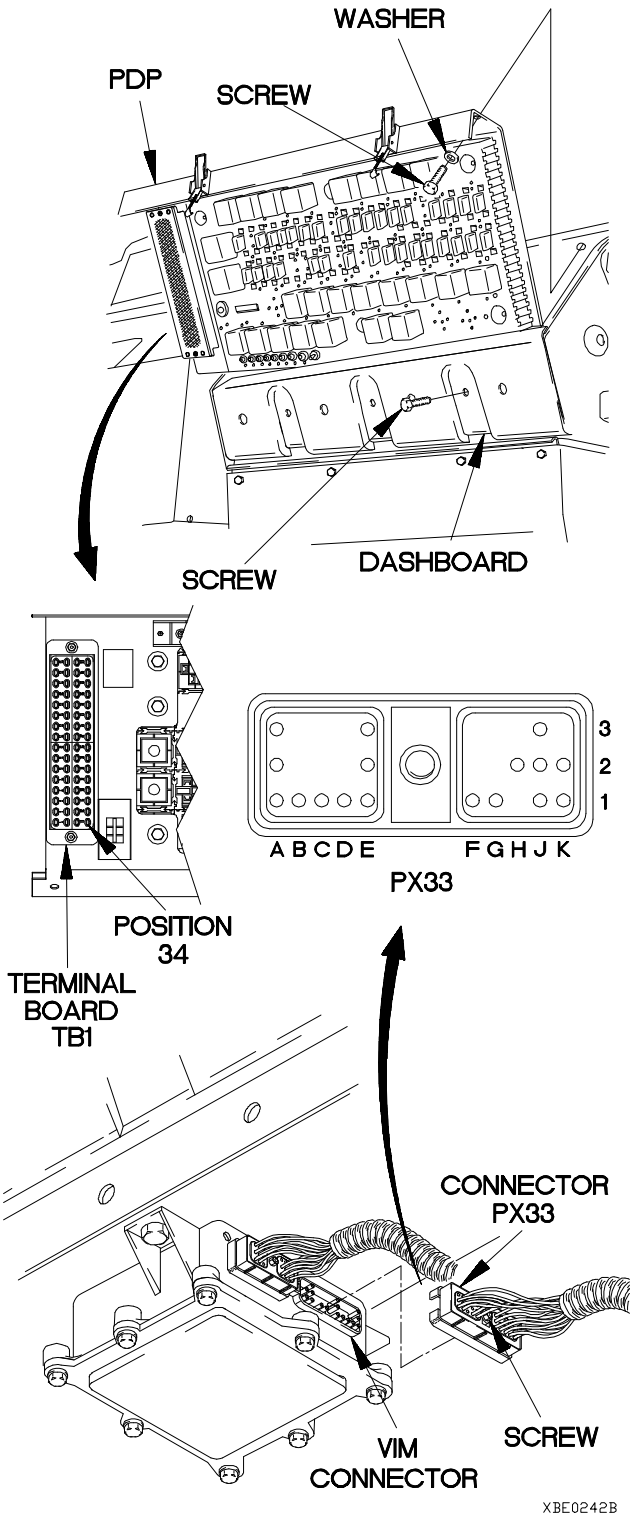
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

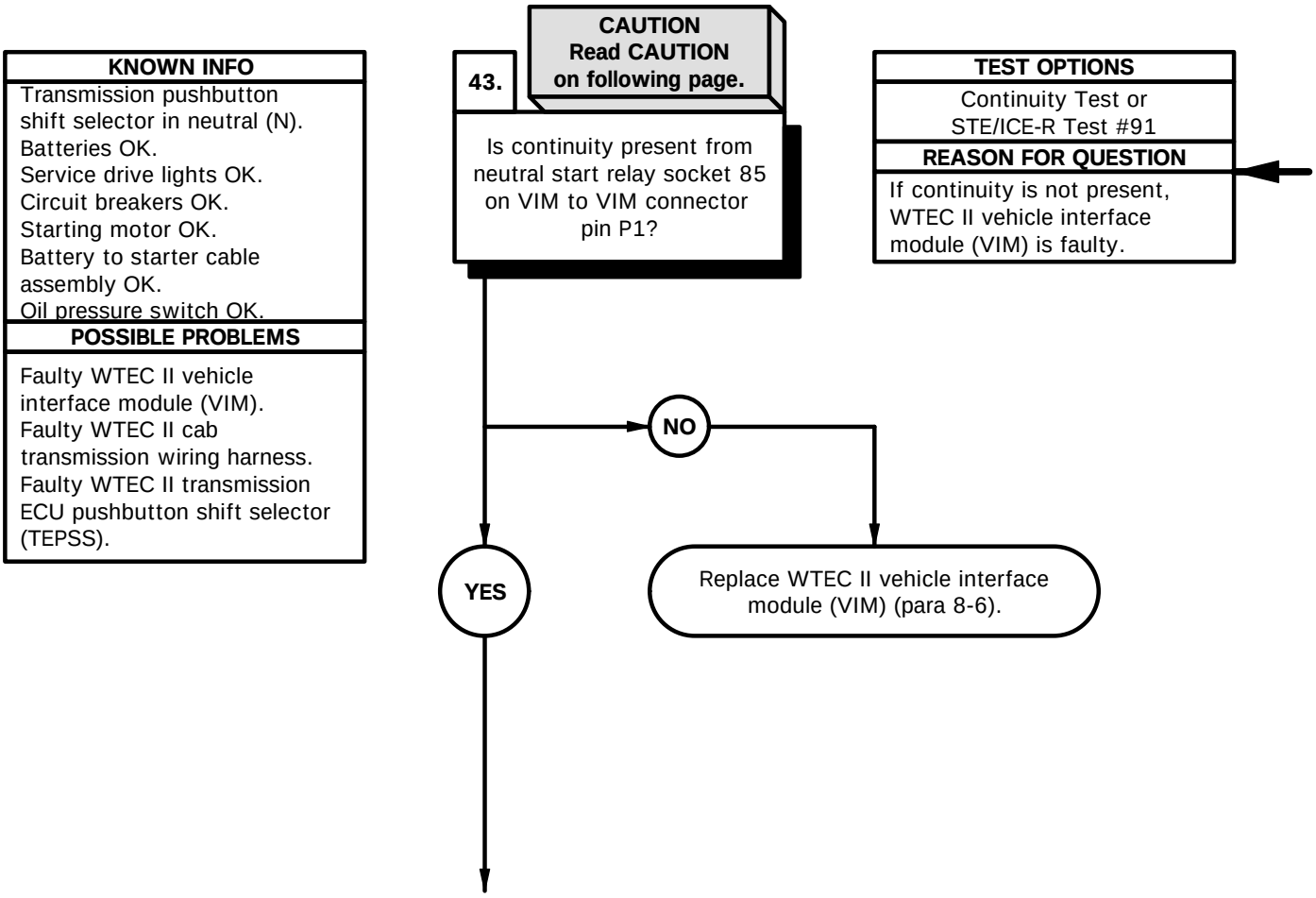
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to terminal board TB1 position 34.
(6) Connect negative (-) probe of multimeter connector PX33 socket F1 and note reading on multimeter.
(7) If continuity is not present, repair wire 1692 from connector PX33 socket F1 to terminal board TB1 position 34 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(8) If continuity is present, repair wire 1692 from terminal board TB1 position 36 and circuit breaker CB21 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Connect connector PX33 to VIM connector.
(12) Tighten screw in connector PX33.
(13) Install kick panel (para 16-3).
(14) Connect batteries (para 7-48).



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

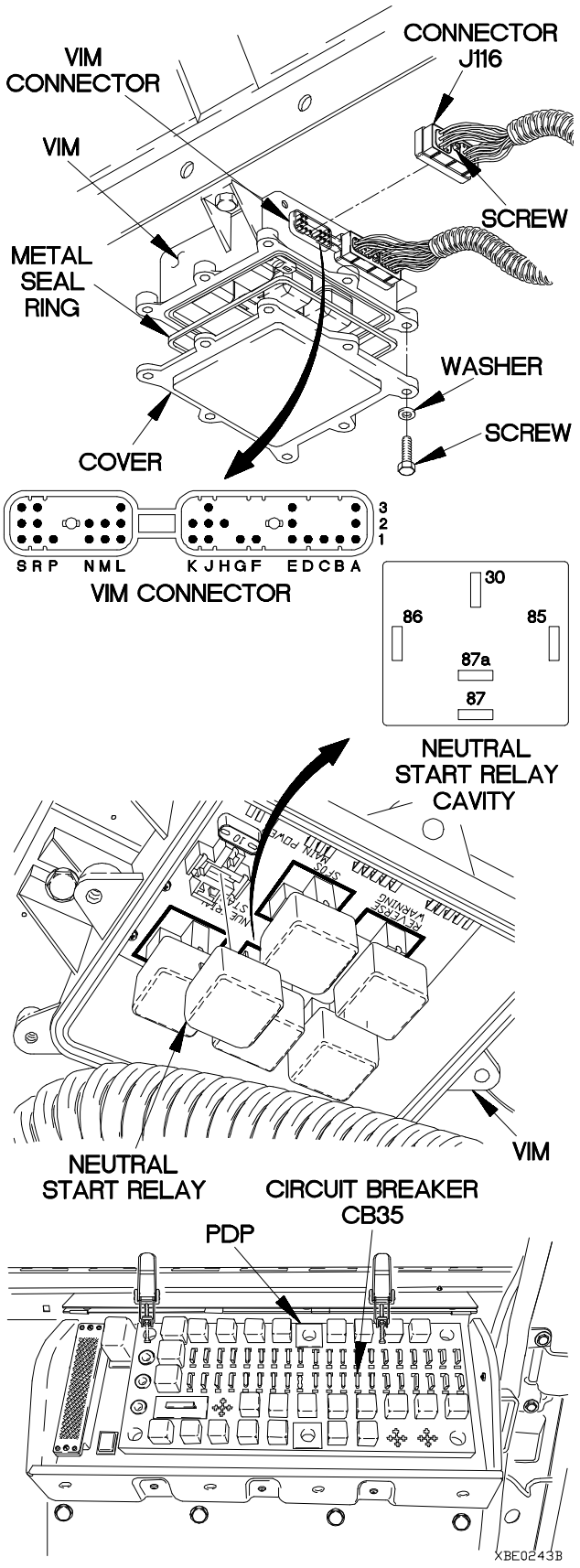
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

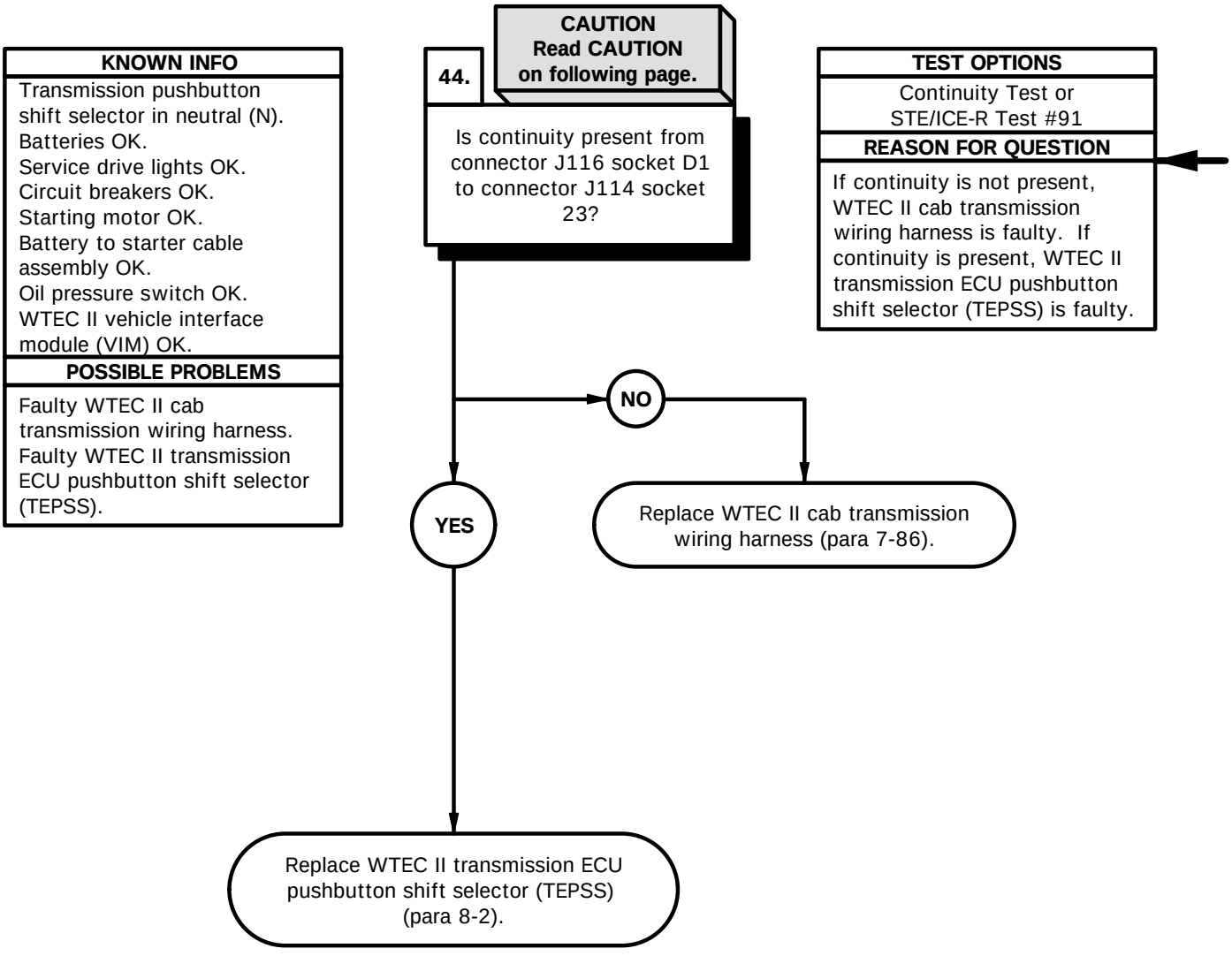
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Loosen screw on connector J116.
(3) Disconnect connector J116 from VIM connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to neutral start relay socket 85 on VIM.
(6) Connect negative (-) probe of multimeter to VIM connector pin P1 and note reading on multimeter.
(7) If continuity is not present, replace WTEC II vehicle interface module (VIM) (para 8-6).
(8) Install neutral start relay in VIM.
(9) Install cover on VIM with metal seal ring, eight washers, and screws.
(10) Install circuit breaker CB35 in PDP.



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

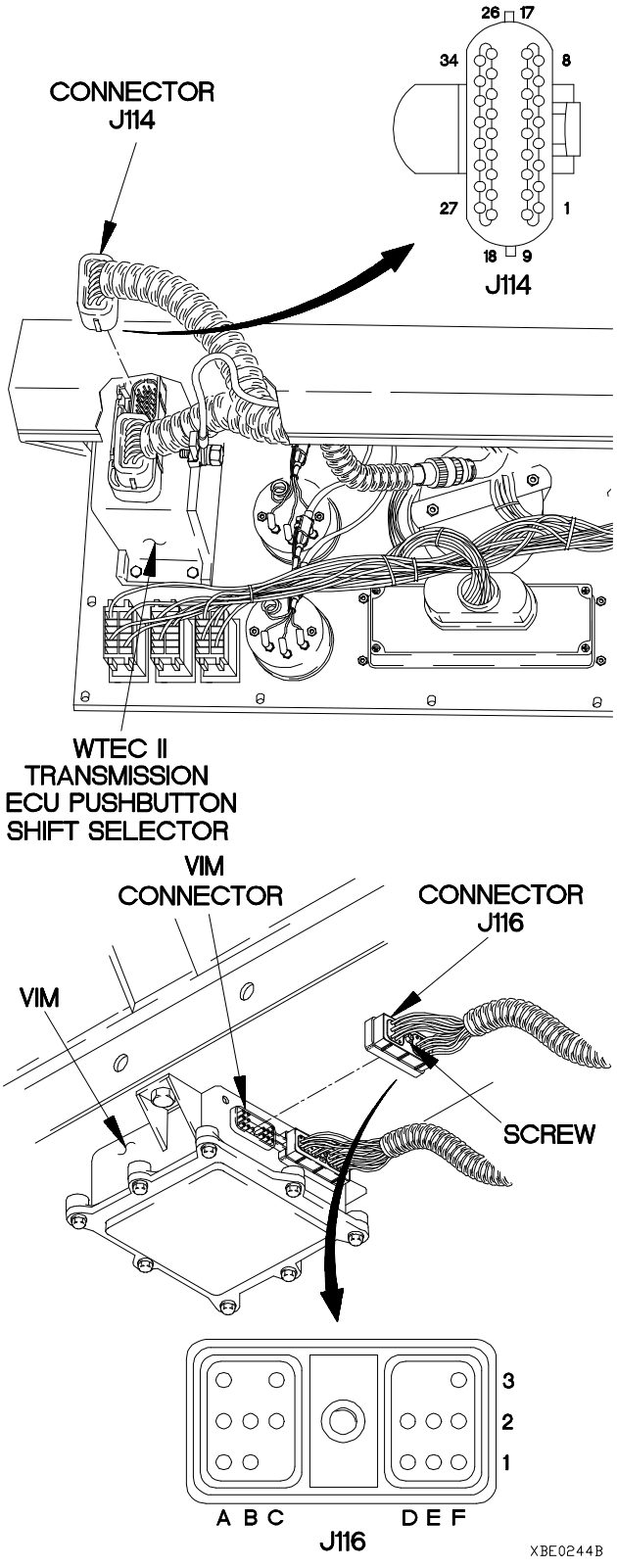
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

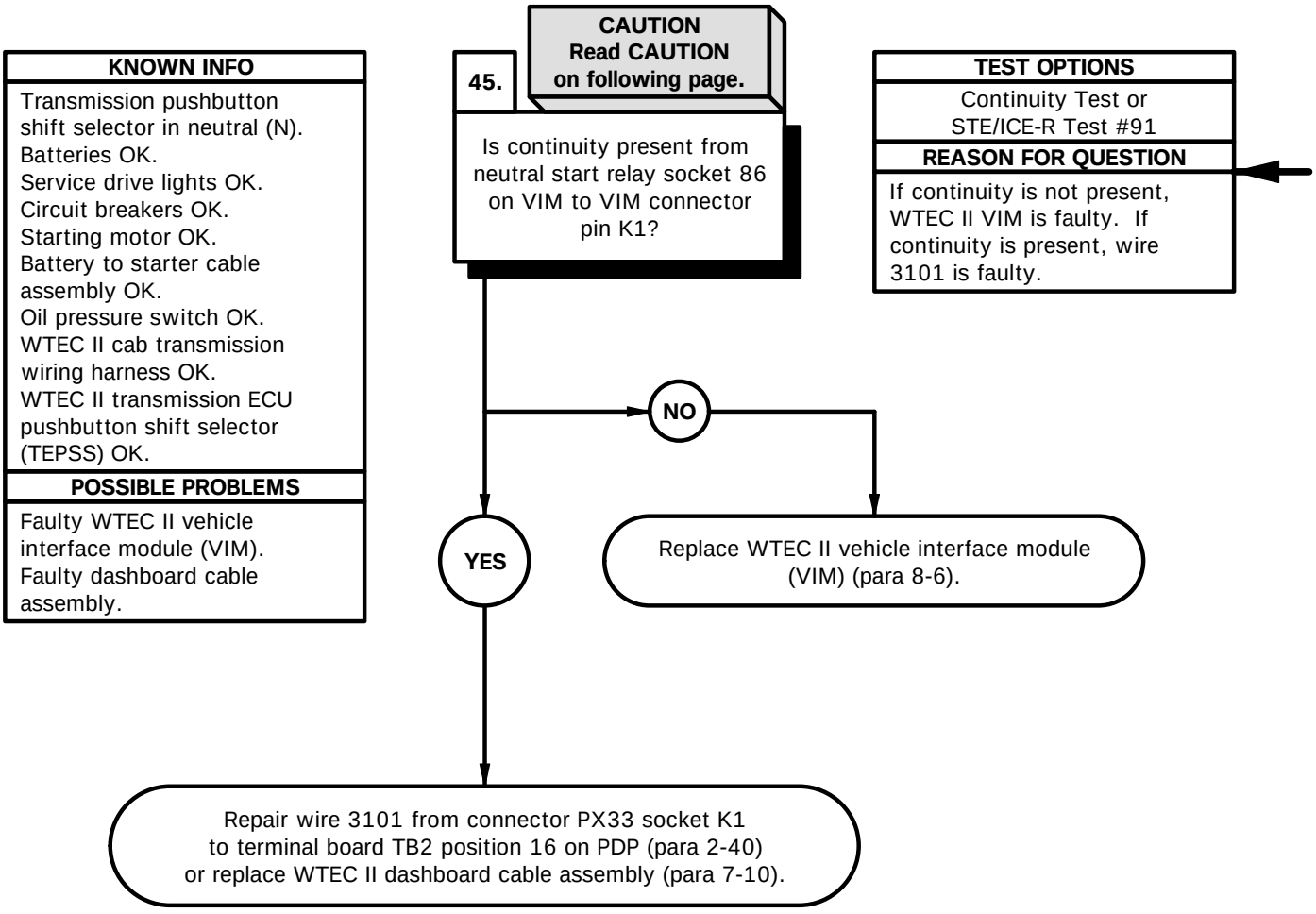
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector J114 from WTEC II transmission ECU pushbutton shift selector (TEPSS).
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J114 socket 23.
(5) Connect negative (-) probe of multimeter to connector J116 socket D1 and note reading on multimeter.
(6) If continuity is not present, replace WTEC II cab transmission wiring harness (para 7-86).
(7) If continuity is present, replace WTEC II transmission ECU pushbutton shift selector (TEPSS) (para 8-2).
(8) Connect connector J114 to WTEC II transmission ECU pushbutton shift selector (TEPSS).
(9) Install instrument panel (para 7-15).
(10) Connect connector J116 to VIM connector.
(11) Tighten screw on connector J116.
(12) Install kick panel (para 16-3).
(13) Connect batteries (para 7-48).



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

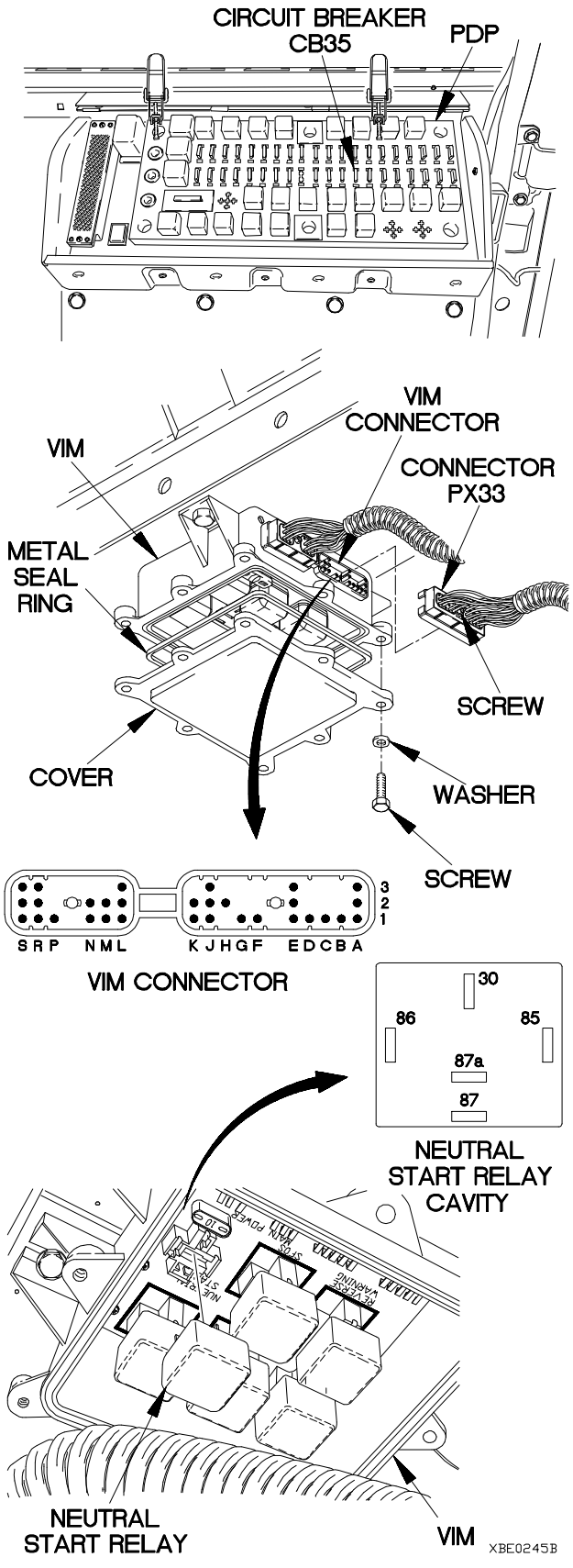
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

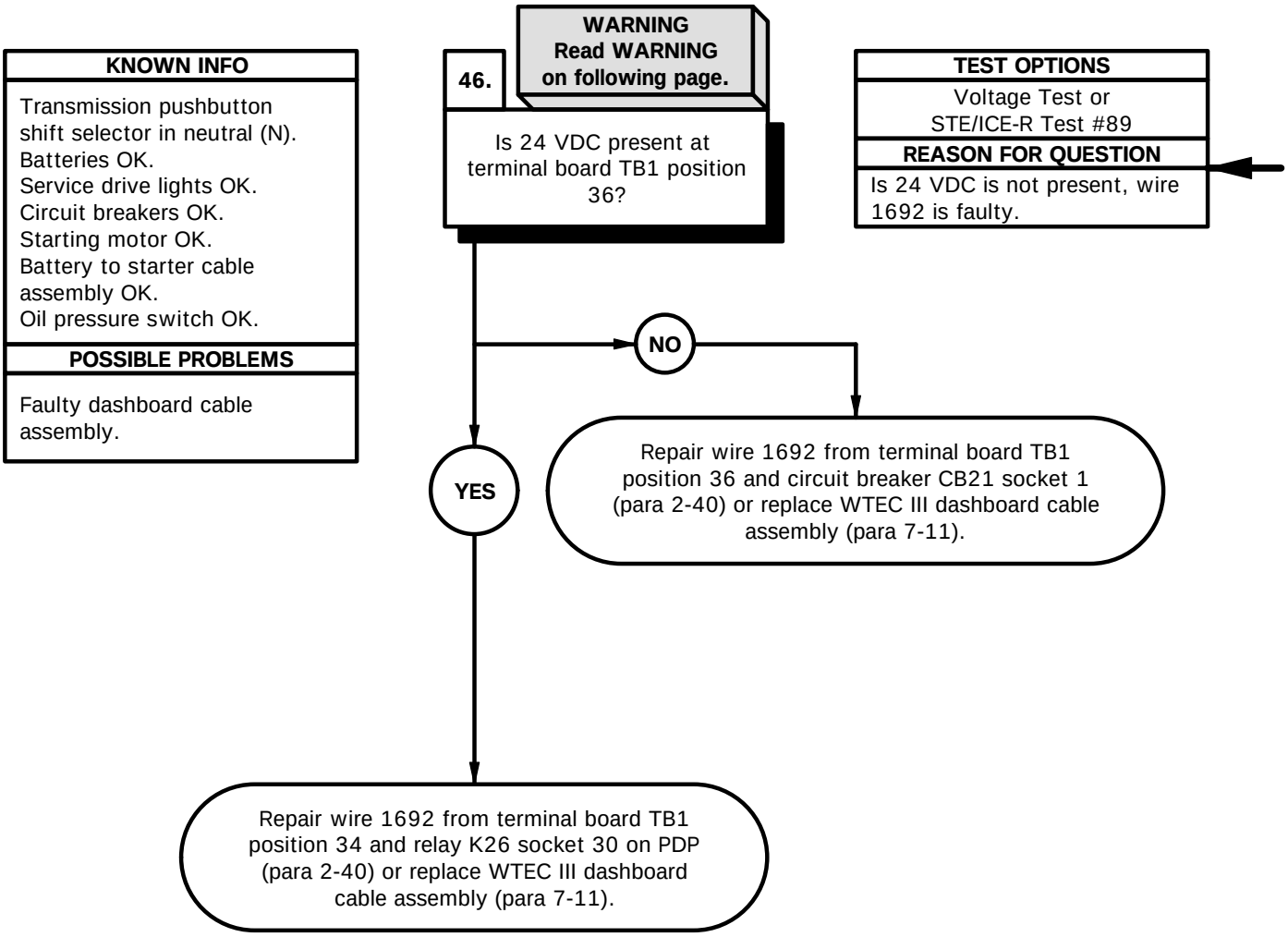
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to neutral start relay socket 86 on VIM.
(3) Connect negative (-) probe of multimeter to VIM connector pin K1 and note reading on multimeter.
(4) If continuity is not present, replace WTEC II vehicle interface module (VIM) (para 8-6).
(5) If continuity is present, repair wire 3101 from connector PX33 socket K1 to terminal board TB2 position 16 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(6) Install neutral start relay in VIM.
(7) Install cover on VIM with metal seal ring, eight washers, and screws.
(8) Connect connector PX33 to VIM connector.
(9) Tighten screw in connector PX33.
(10) Install circuit breaker CB35 in PDP.
(11) Install kick panel (para 16-3).



## e2. ENGINE DOES NOT CRANK (CONT)

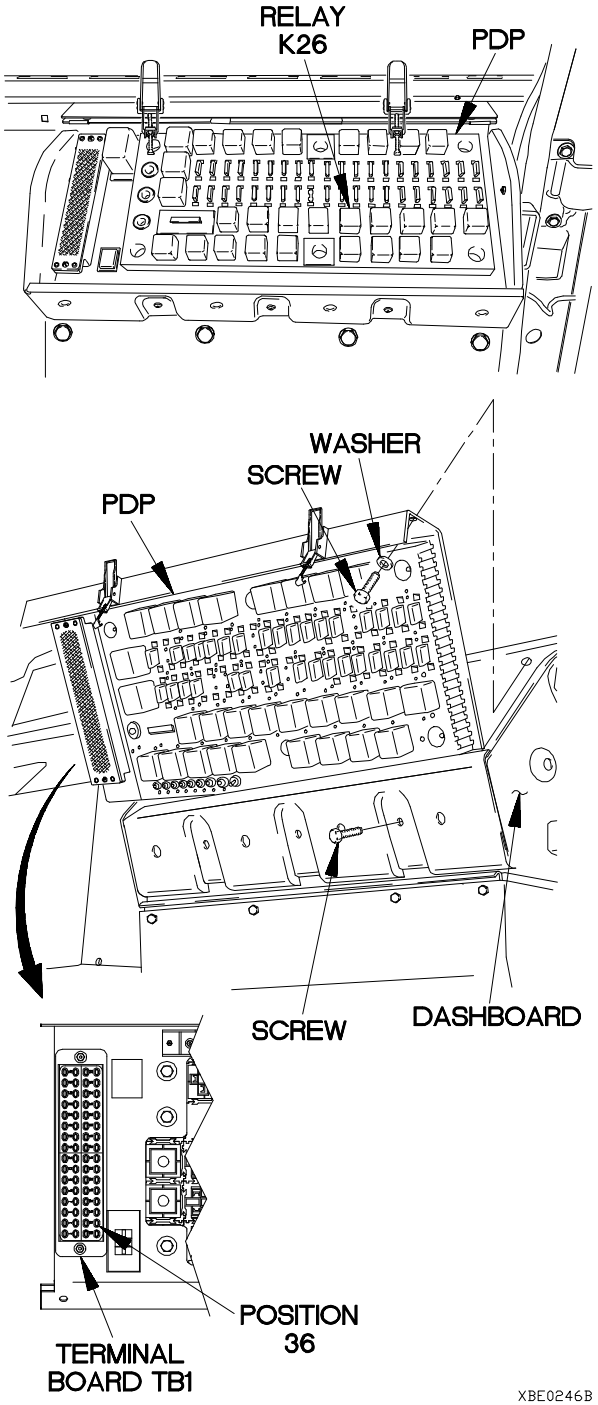


**WARNING**

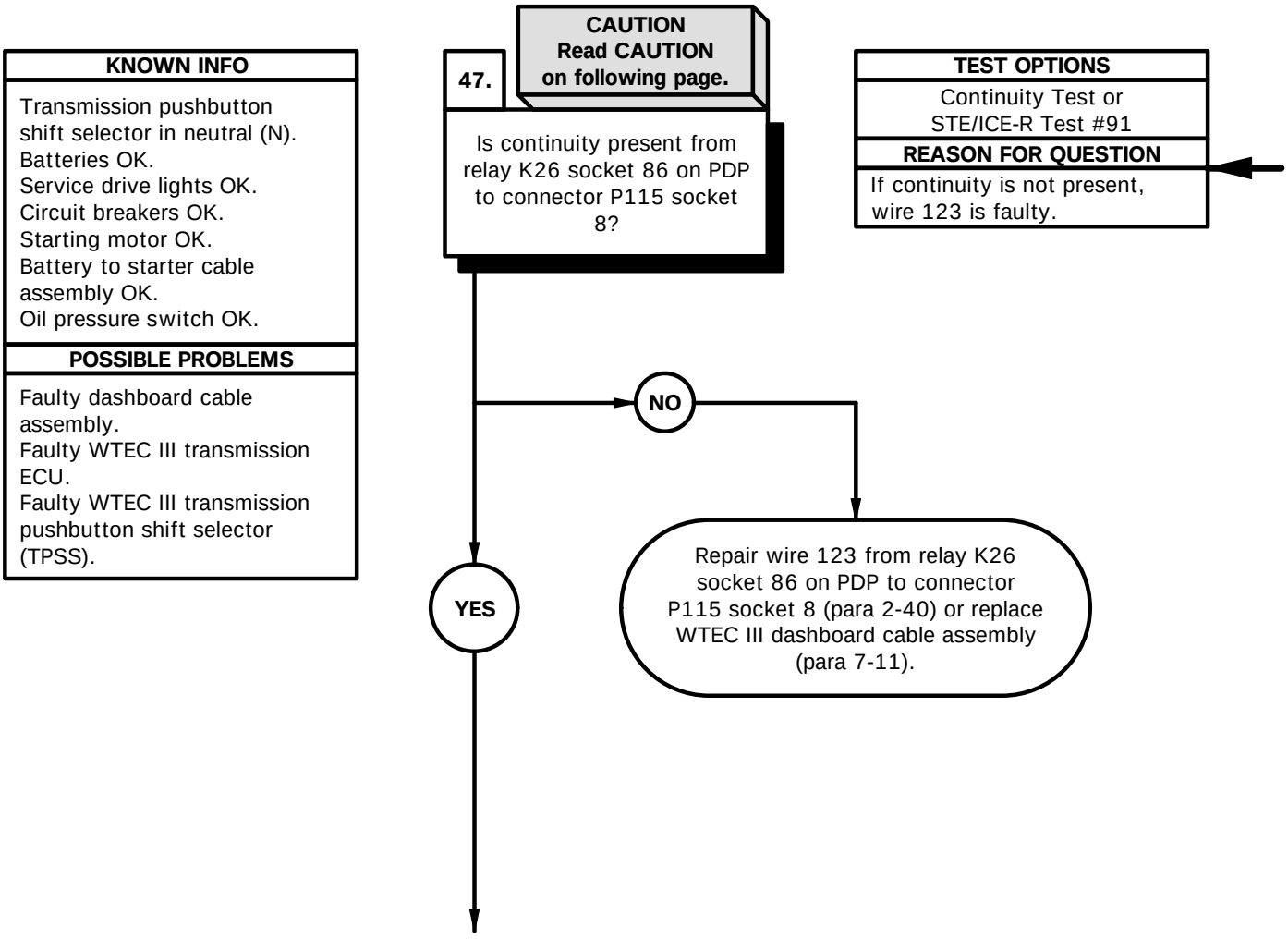
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay K26 in PDP.
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to terminal board TB1 position 36.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(9) If 24 VDC is not present, repair wire 1692 from terminal board TB1 position 36 to circuit breaker CB21 socket 1 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(10) If 24 VDC is present, repair wire 1692 from terminal board TB1 position 34 to relay K26 socket 30 on PDP (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(11) Position master power switch to off (TM 9-2320-365-10).
(12) Install PDP on dashboard with three screws.
(13) Install three washers and screws in PDP.
(14) Install PDP cover (para 16-2).



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

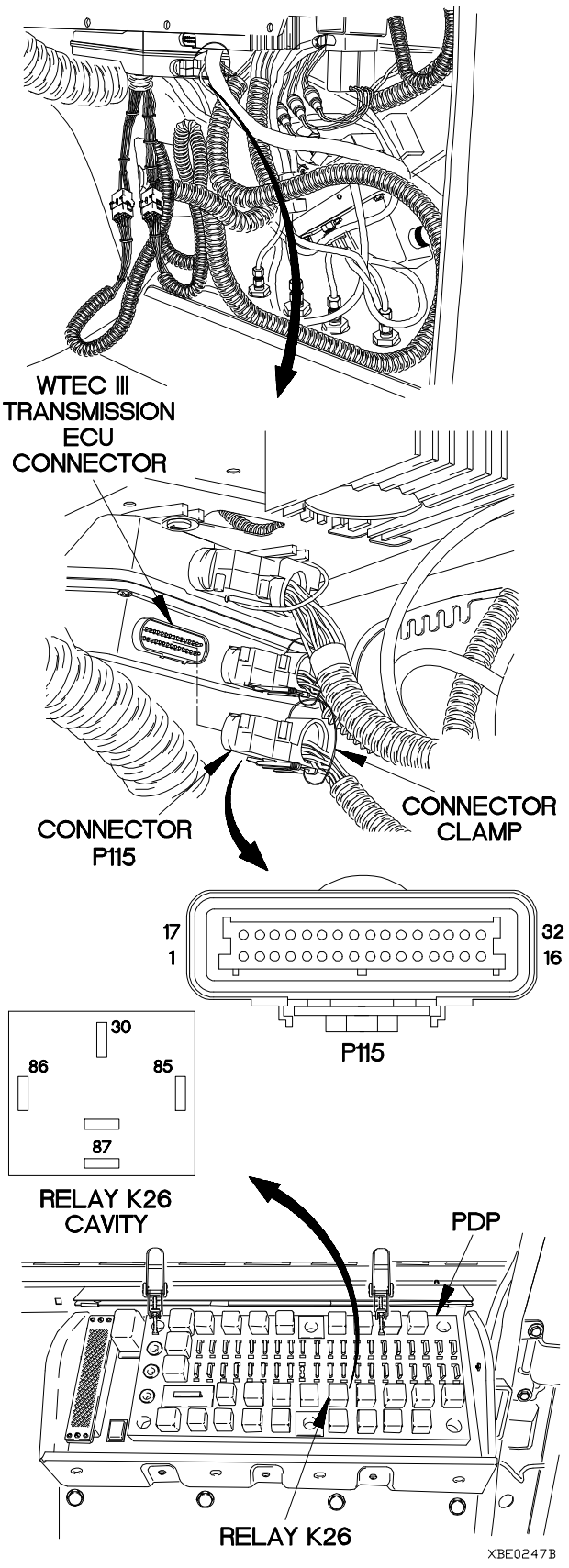
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

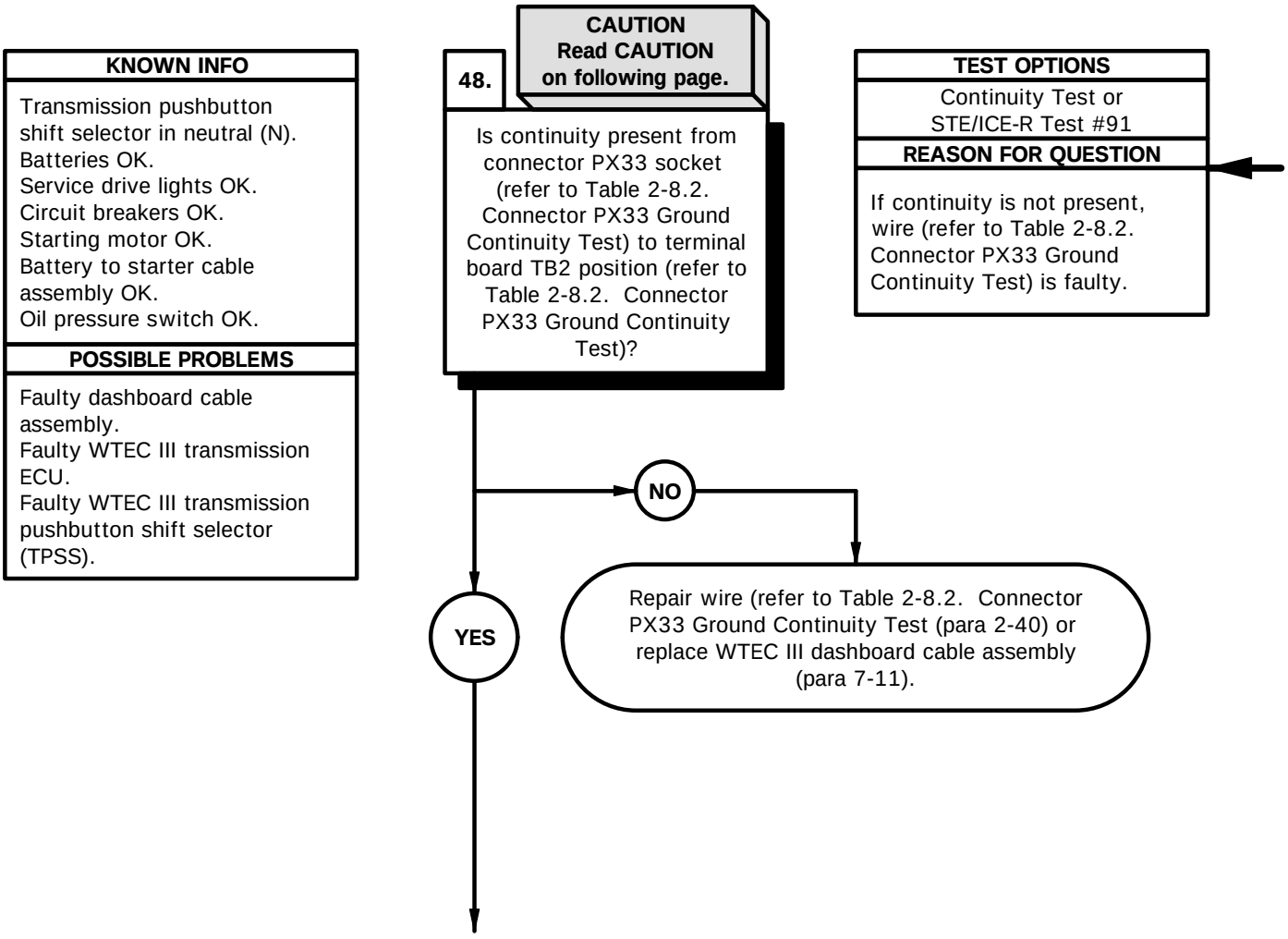
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove kick panel (para 16-3).
(3) Disconnect connector clamp from connector P115.
(4) Disconnect connector P115 from WTEC III transmission ECU connector.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to relay K26 socket 86.
(7) Connect negative (-) probe of multimeter to connector P115 socket 8 and note reading on multimeter.
(8) If continuity is not present, repair wire 123 from relay K26 socket 86 to connector P115 socket 8 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(9) Connect connector P115 to WTEC III transmission ECU connector.
(10) Connect connector clamp to connector P115.
(11) Install relay K26 in PDP.



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

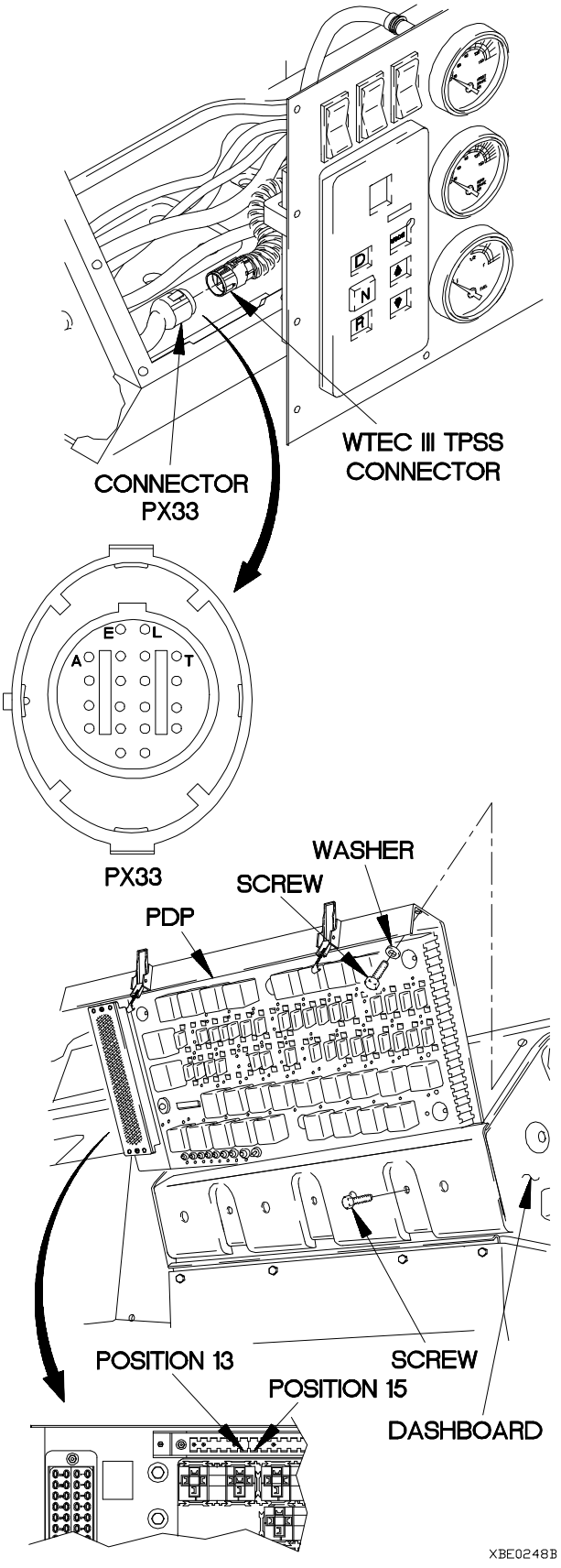
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

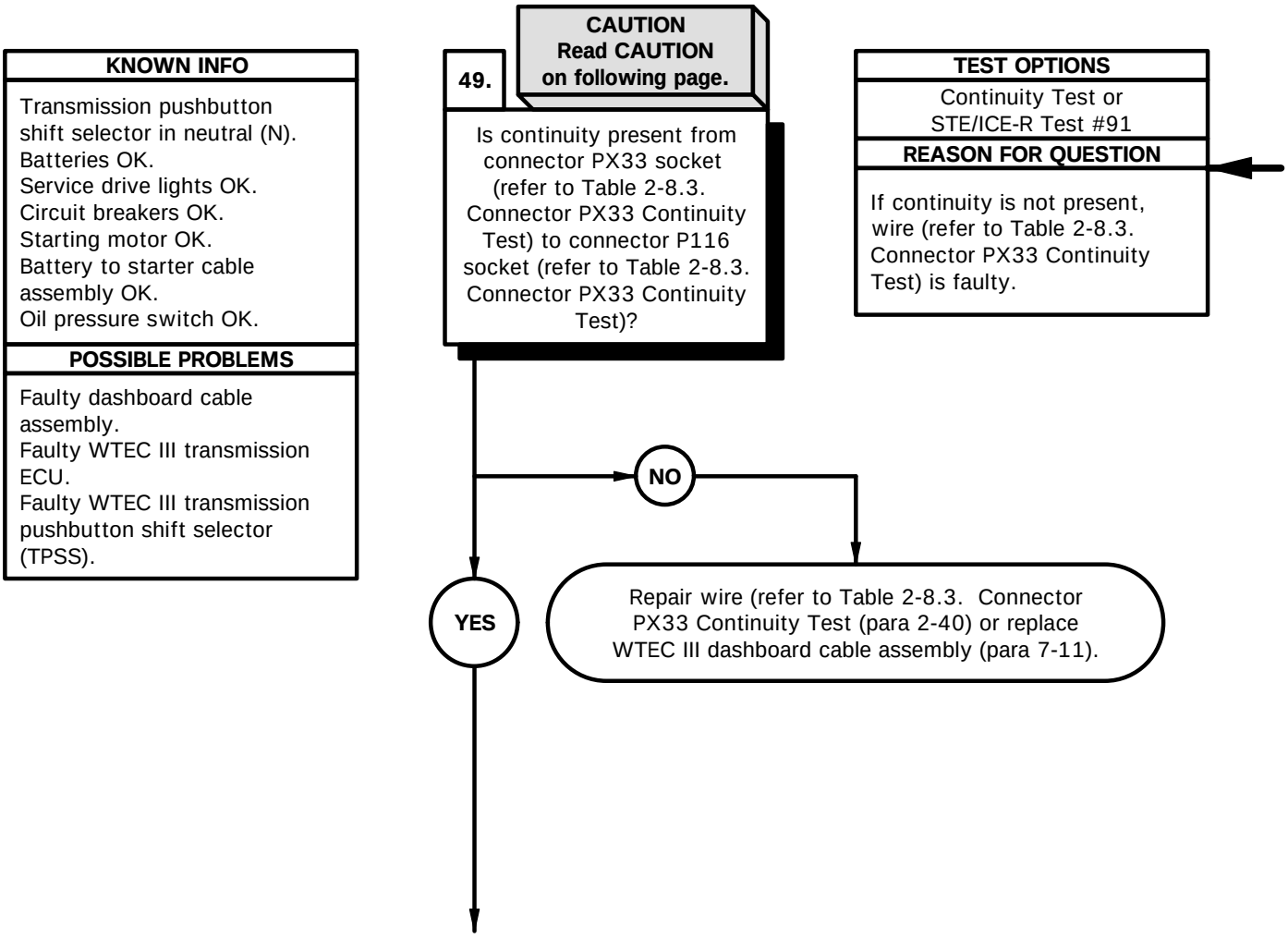
(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX33 from WTEC III TPSS connector.
(3) Remove three screws and washers from PDP.
(4) Remove three screws from PDP.
(5) Lift PDP outward to gain access.
(6) Set multimeter to ohms.
(7) For each line of Table 2-8.2. Connector PX33 Ground Continuity Test perform the following:
  (a) Connect positive (+) probe of multimeter to connector PX33 socket.
  (b) Connect negative (-) probe of multimeter to terminal board TB2 position and not reading on multimeter.
(8) If continuity is not present on either wire in Table 2-8.2. Connector PX33 Ground Continuity Test repair wire (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.

**Table 2-8.2. Connector PX33 Ground Continuity Test**

| Connector PX33 Socket | Terminal Board TB2 Position | Wire |
|---|---|---|
| T | 15 | 186 |
| V | 13 | 188 |



## e2. ENGINE DOES NOT CRANK (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

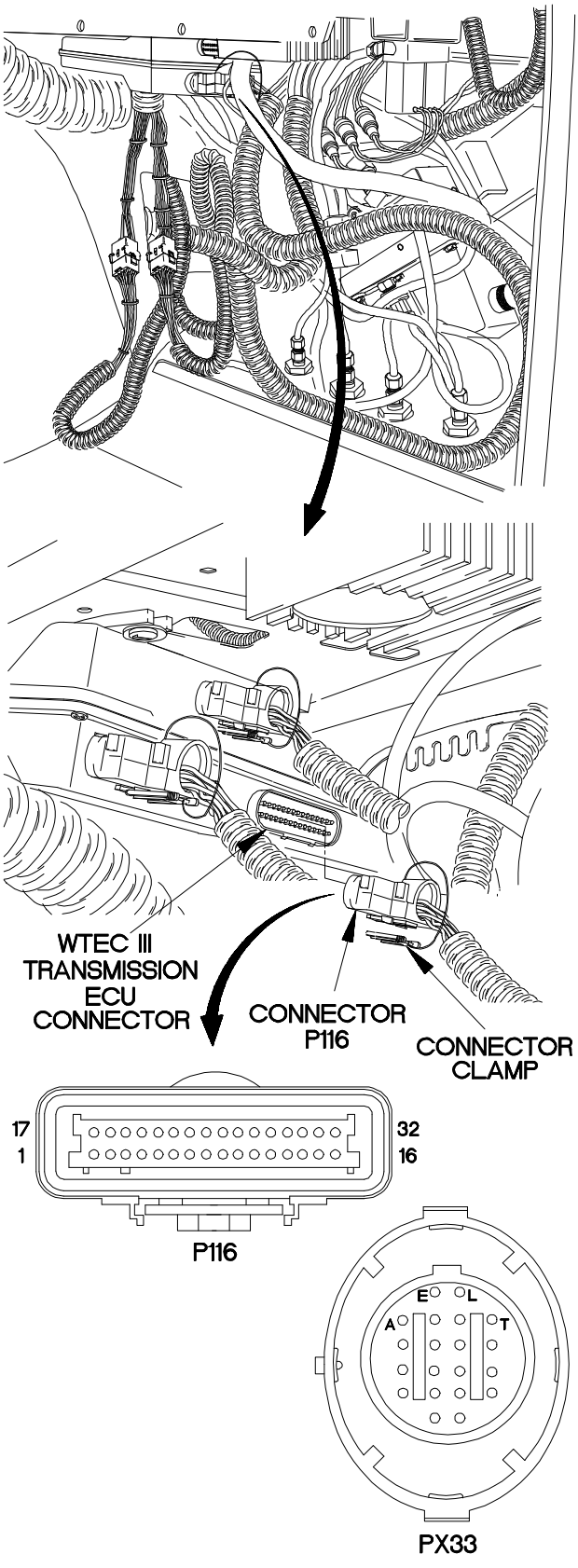
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

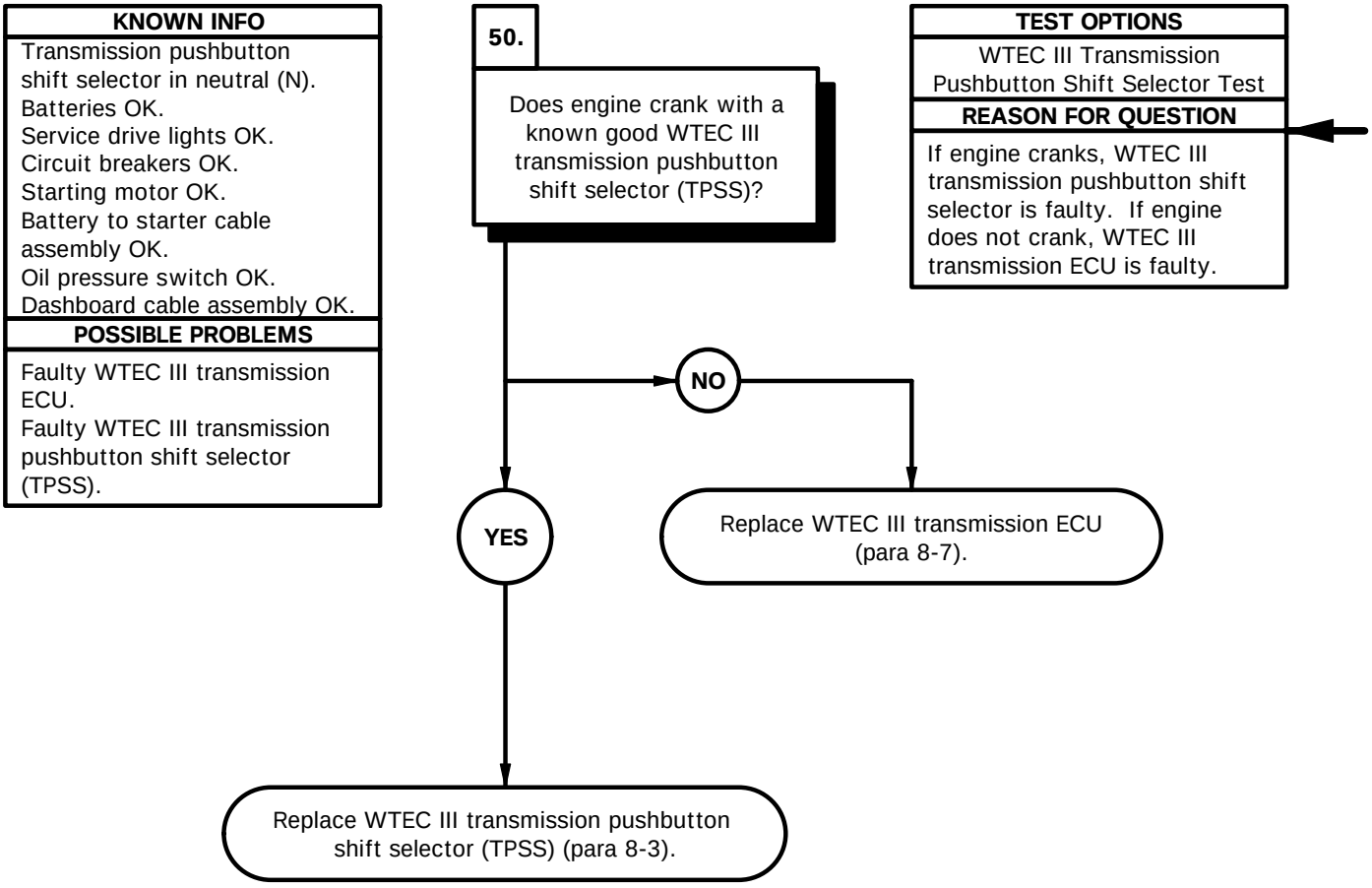
(1) Disconnect connector clamp from connector P116.
(2) Disconnect connector P116 from WTEC III transmission ECU connector.
(3) Set multimeter to ohms.
(4) For each line of Table 2-8.3. Connector PX33 Ground Continuity Test perform the following:
  (a) Connect positive (+) probe of multimeter to connector PX33 socket.
  (b) Connect negative (-) probe of multimeter to connector P116 position and not reading on multimeter.
(5) If continuity is not present on either wire in Table 2-8.3. Connector PX33 Continuity Test repair wire (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(6) Install PDP on dashboard with three screws.
(7) Connect connector P116 to WTEC III transmission ECU connector.
(8) Connect connector clamp to connector P116.

**Table 2-8.3. Connector PX33 Continuity Test**

| Connector PX33 Socket | Connector P116 Socket | Wire |
|---|---|---|
| P | 32 | 143 |
| L | 15 | 176 |
| A | 5 | 170 |
| B | 6 | 171 |
| C | 7 | 172 |
| D | 8 | 173 |
| E | 9 | 174 |
| S | 14 | 180 |
| M | 10 | 175 |
| N | 3 | 124 |
| R | 16 | 136 |



## e2. ENGINE DOES NOT CRANK (CONT)



| WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR TEST (TPSS) |
| --- |
| (1) Replace WTEC III TPSS (para 8-3).<br>(2) Connect batteries (para 7-48).<br>(3) Attempt to start engine (TM 9-2320-365-10).<br>(4) If engine does not crank, replace WTEC III transmission ECU (para 8-7).<br>(5) If engine does crank, replace WTEC III TPSS (para 8-3).<br>(6) Install instrument panel (para 7-15).<br>(7) Install kick panel (para 16-3). |

## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Materials/Parts**
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Lockwasher (Item 66.1, Appendix G)
Lockwasher (Item 73, Appendix G)
Lockwasher (Item 76, Appendix G)
Lockwasher (Item 78, Appendix G)
Lockwasher (4) (Item 92, Appendix G)
Lockwasher (2) (Item 65, Appendix G)
Self-locking Nut (Item 148, Appendix G)
Ties, Cable, Plastic (Item 76 Appendix D)
Wire, Elect, 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Apron, Rubber (Item 3, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)
Tester, Antifreeze and Battery (Item 41, Appendix C)
Wire, Relay Test (Item 9, Appendix E)
Wrench, Torque, 0-175 lb-ft. (Item 57, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

**References**
TM 9-6140-200-14
TM 9-4910-571-12&P

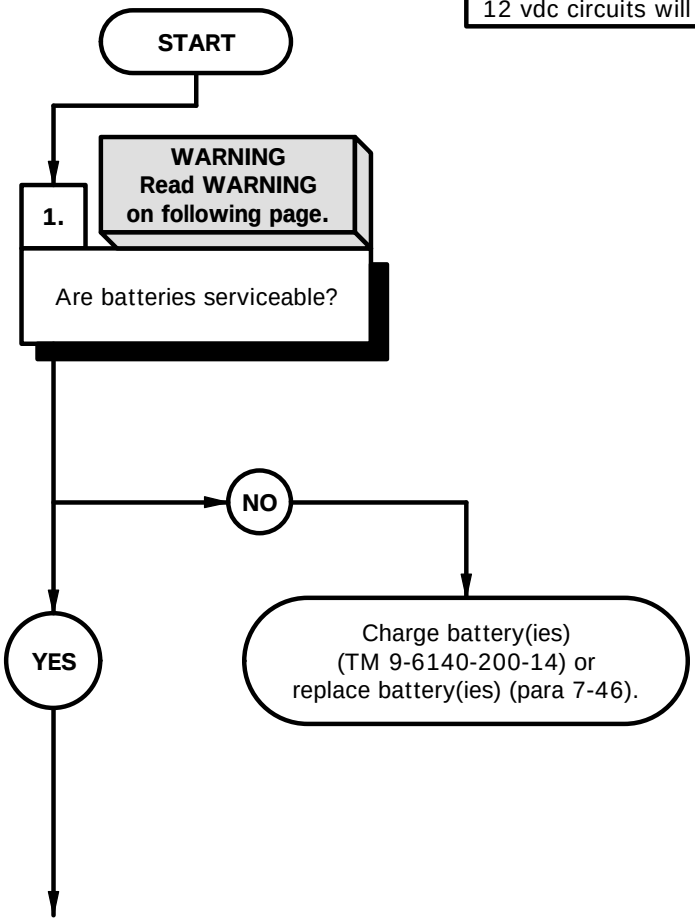
| KNOWN INFO |
|---|
| Circuit breaker CB70 OK. |

| POSSIBLE PROBLEMS |
|---|
| Faulty battery(ies). |
| Faulty cab to chassis ground strap. |
| Faulty PDP to cab ground cable. |
| Faulty dashboard cable assembly. |
| Faulty shunt. |
| Faulty starter to shunt 24 VDC cable. |
| Faulty battery to shunt cable assembly. |
| Faulty starter to chassis ground cable. |
| Faulty 100 AMP reverse polarity relay. |
| Faulty battery to 100 AMP reverse polarity relay 12 VDC cable. |
| Faulty 100 AMP reverse polarity relay to PDP 12 VDC cable. |
| Faulty 200 AMP reverse polarity relay. |
| Faulty 200 AMP terminal block. |
| Faulty 200 AMP terminal block to PDP 12 VDC cable. |
| Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable. |
| Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable. |
| Faulty battery to 200 AMP terminal block 12 VDC cable assembly. |

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB70 prior to beginning this task.

| TEST OPTIONS |
|---|
| Battery Specific Gravity Test |
| **REASON FOR QUESTION** |
| If battery(ies) is unserviceable, 12 vdc circuits will not operate. |



**WARNING**

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

**Battery Specific Gravity Test**

(1) Remove four batteries from battery box (para 7-46).
(2) Test batteries for serviceability (TM 9-6140-200-14).
(3) Replace battery(ies) if unserviceable (TM 9-6140-200-14).
(4) Install four batteries in battery box (para 7-46).

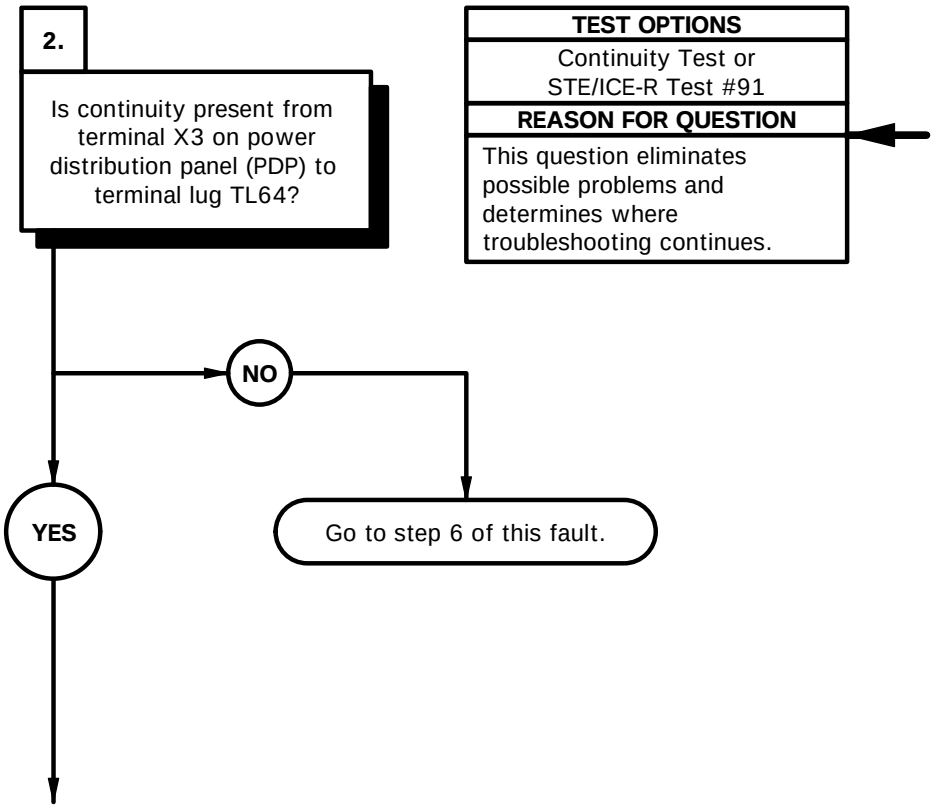
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breakers CB70 OK.
Battery(ies) OK.

**POSSIBLE PROBLEMS**

Faulty cab to chassis ground strap.
Faulty PDP to cab ground cable.
Faulty dashboard cable assembly.
Faulty shunt.
Faulty starter to shunt 24 VDC cable.
Faulty battery to shunt cable assembly.
Faulty starter to chassis ground cable.
Faulty 100 AMP reverse polarity relay.
Faulty battery to 100 AMP reverse polarity relay 12 VDC cable.
Faulty 100 AMP reverse polarity relay to PDP 12 VDC cable.
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.




**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

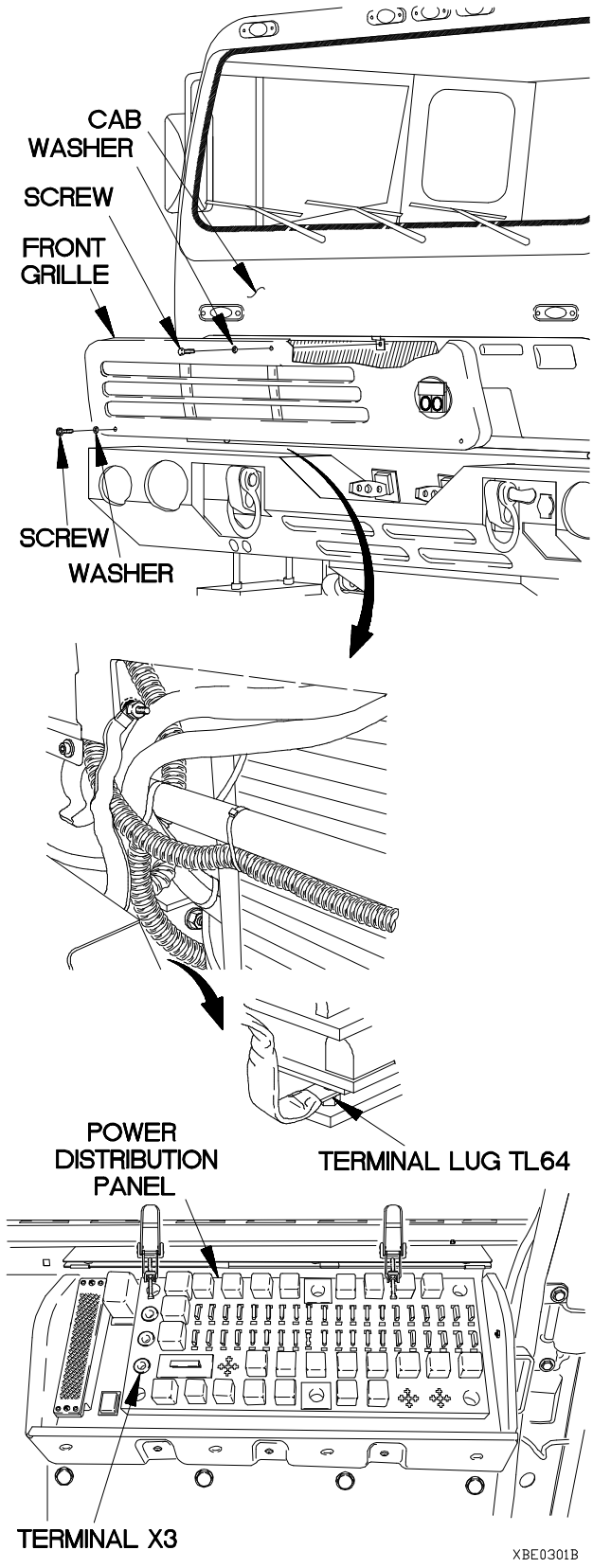
**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).

**NOTE**

Remove plastic cable ties as required.

(2) Remove two screws and washers from front grille.
(3) Remove screw, washer, and front grille from cab.
(4) Remove power distribution panel (PDP) cover (para 16-2).
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to terminal X3 on power distribution panel (PDP).
(7) Connect negative (-) probe of multimeter to terminal lug TL64 and note reading on multimeter.
(8) If continuity is not present, go to step 6 of this fault.



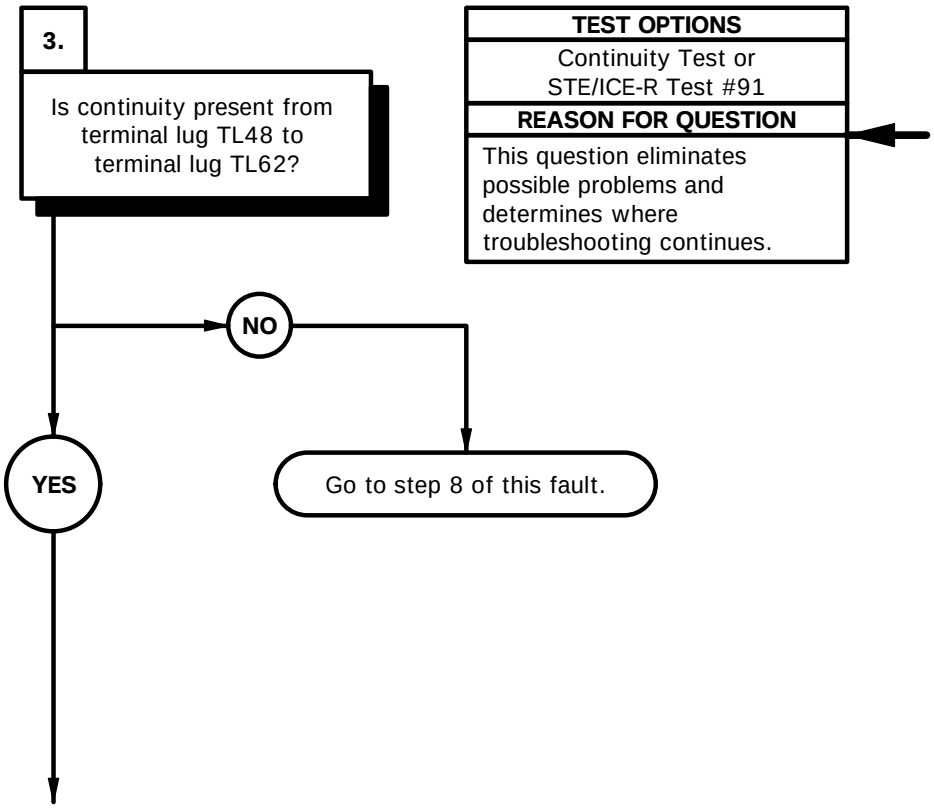
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty shunt.
Faulty starter to shunt 24 VDC cable.
Faulty battery to shunt cable assembly.
Faulty starter to chassis ground cable.
Faulty 100 AMP reverse polarity relay.
Faulty battery to 100 AMP reverse polarity relay 12 VDC cable.
Faulty 100 AMP reverse polarity relay to PDP 12 VDC cable.
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.

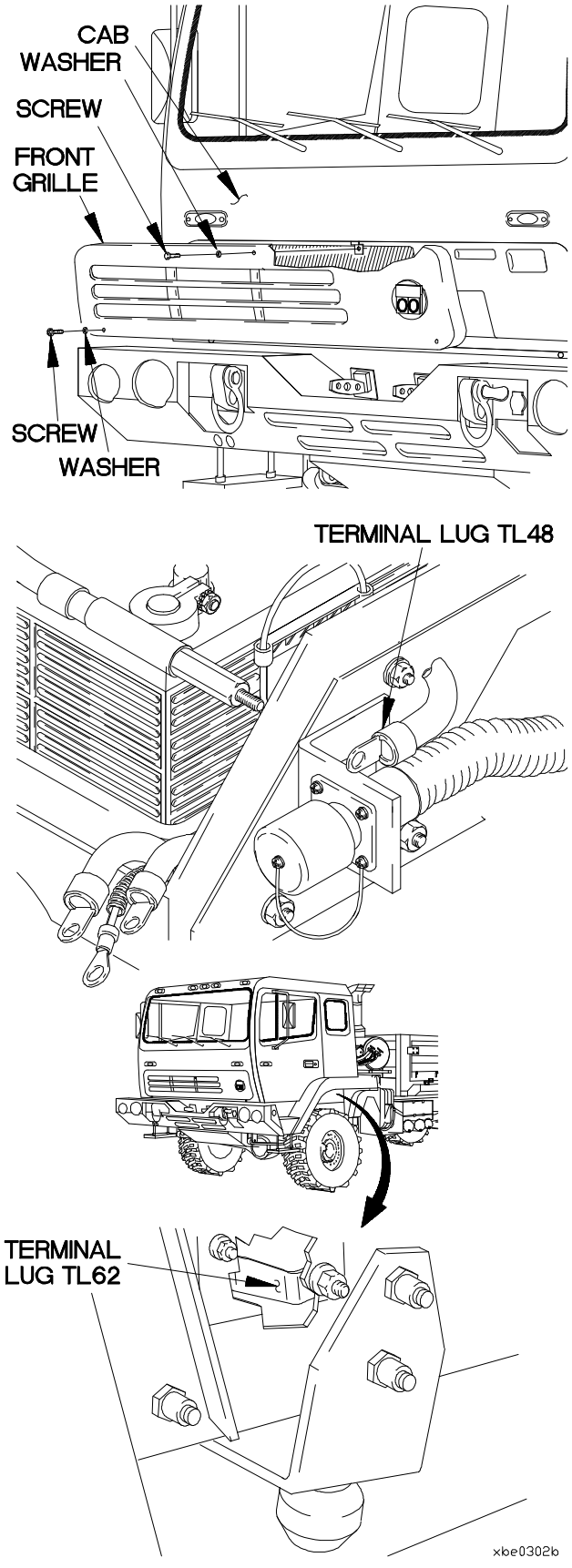


**CONTINUITY TEST**

**NOTE**

Install plastic cable ties as required.

(1) Position front grille on cab with washer and screw.
(2) Position two washers and screws in front grille.
(3) Tighten screw to 48-60 lb-in. (5-7 N.m).
(4) Tighten two screws to 24 lb-in. (3 N.m).
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to terminal lug TL48.
(7) Connect negative (-) probe of multimeter to terminal lug TL62 and note reading on multimeter.
(8) If continuity is not present, go to step 8 of this fault.



## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty 100 AMP reverse polarity relay.
Faulty battery to 100 AMP reverse polarity relay 12 VDC cable.
Faulty 100 AMP reverse polarity relay to PDP 12 VDC cable.
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.

**WARNING**
**CAUTION**
**Read WARNING and CAUTION on following page.**

**4.** Is 12 VDC present at terminal X2 on PDP?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

**NO** → Go to step 11 of this fault.

**YES**

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

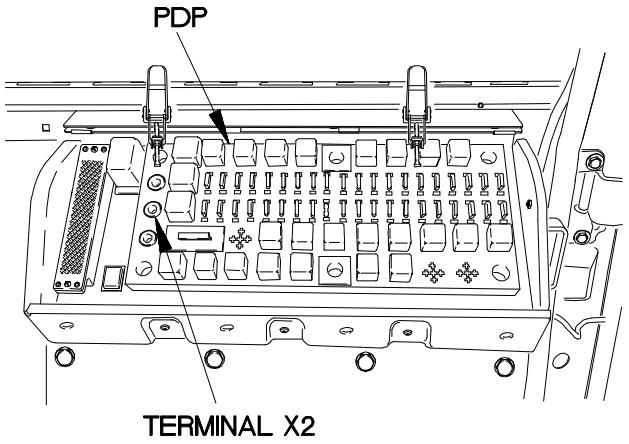
**VOLTAGE TEST**

(1) Connect batteries (para 7-48).
(2) Set multimeter to volts DC.

**CAUTION**

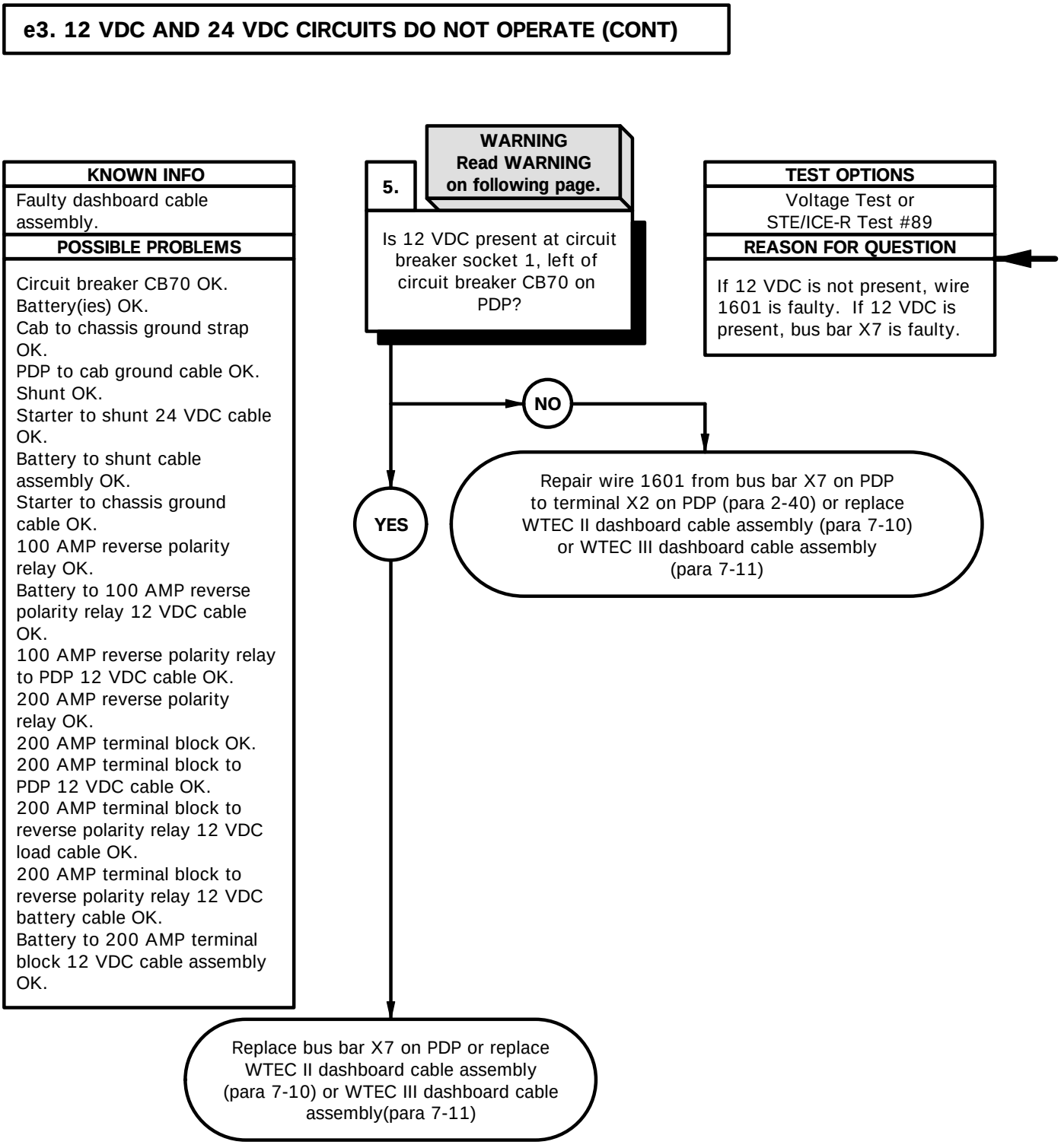
When testing to terminal X2 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(3) Connect positive (+) probe of multimeter to terminal X2 on PDP
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 12 VDC is not present, go to step 11 of this fault.




xbe0303b

## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

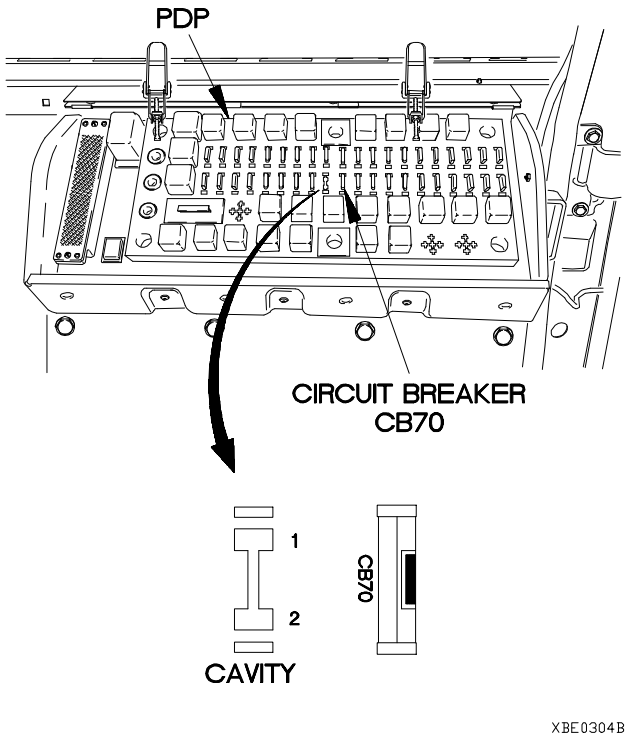


**WARNING**

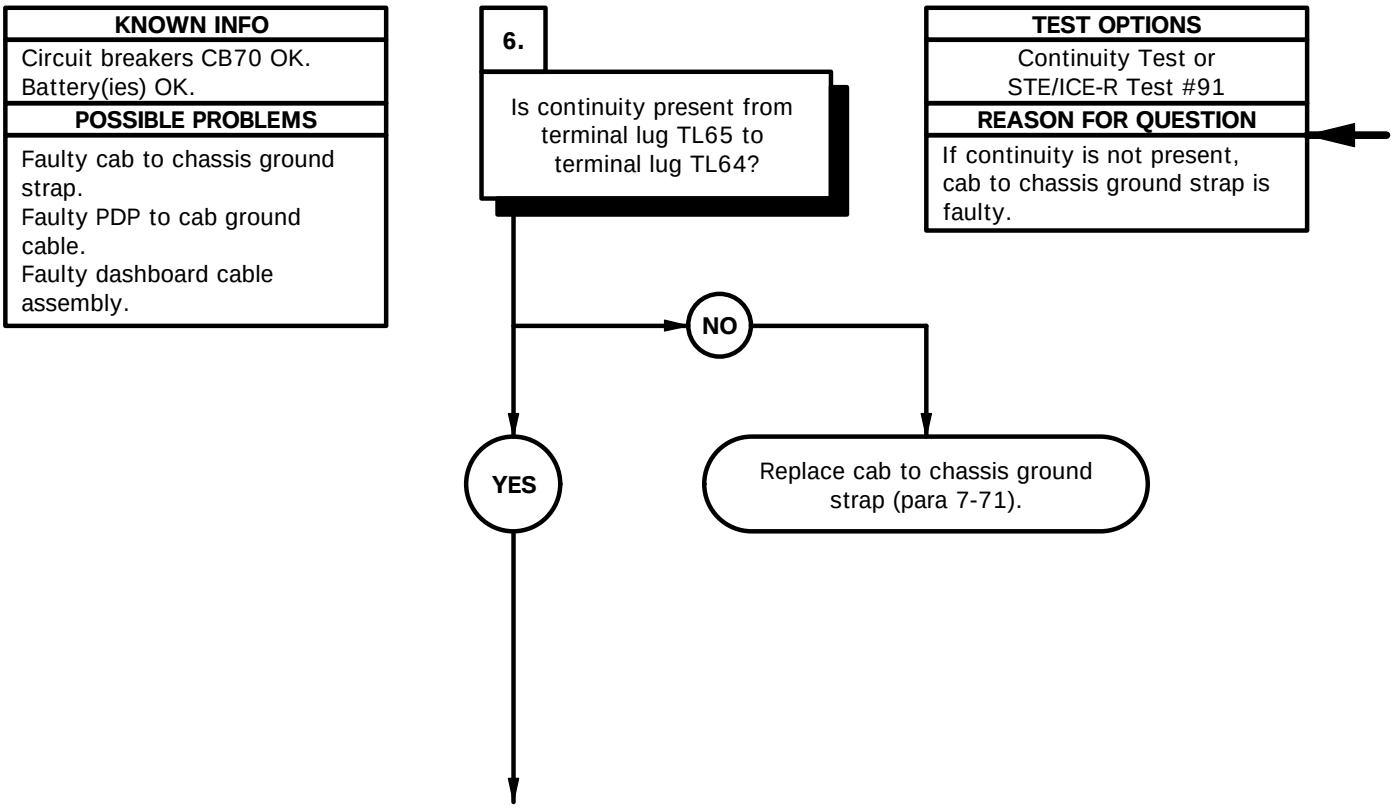
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Position master power switch to on (TM 9-2320-365-10).
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to circuit breaker socket 1, left of circuit breaker CB70 on PDP.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1601 from bus bar X7 on PDP to terminal X2 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If 12 VDC is present, replace bus bar X7 on PDP or WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Install PDP cover (para 16-2).



## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)



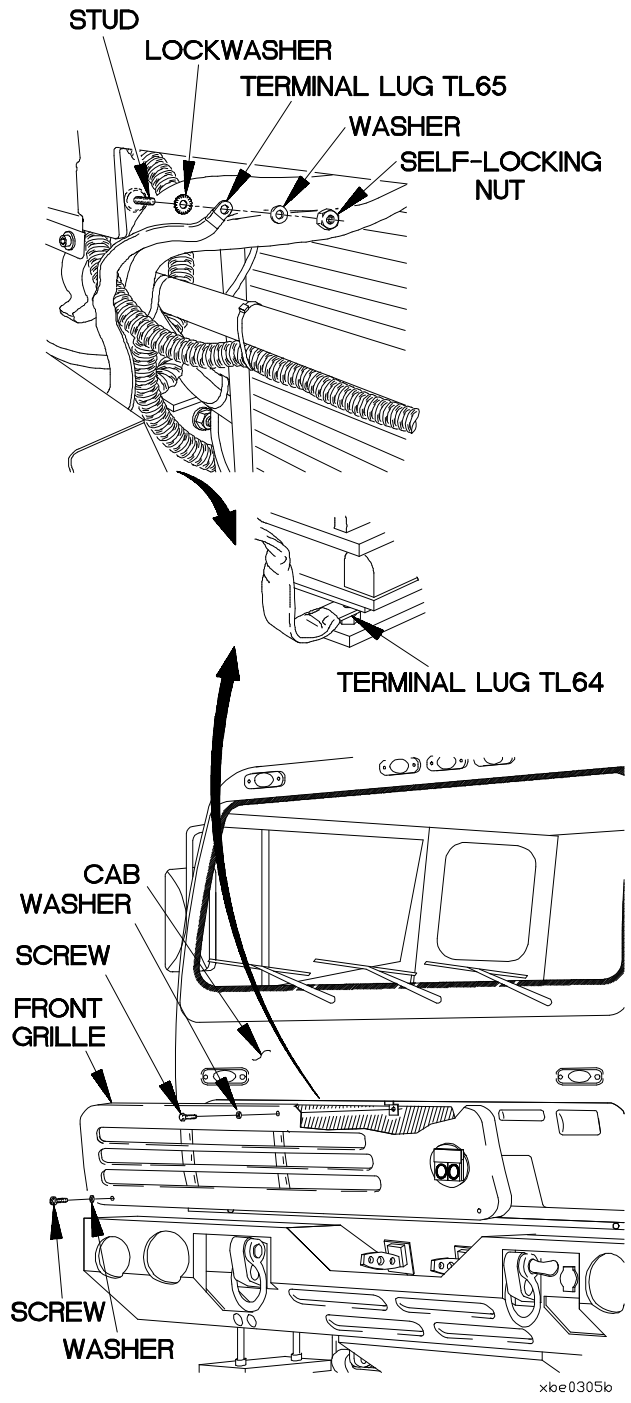
**CONTINUITY TEST**

(1) Remove self-locking nut, washer, terminal lug TL65, and lockwasher from stud. Discard self-locking nut and lockwasher.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL65.
(4) Connect negative (-) probe of multimeter to terminal lug TL64 and note reading on multimeter.
(5) If continuity is not present, replace cab to chassis ground strap (para 7-71).
(6) Install lockwasher and terminal lug TL65 on stud with washer and self-locking nut.

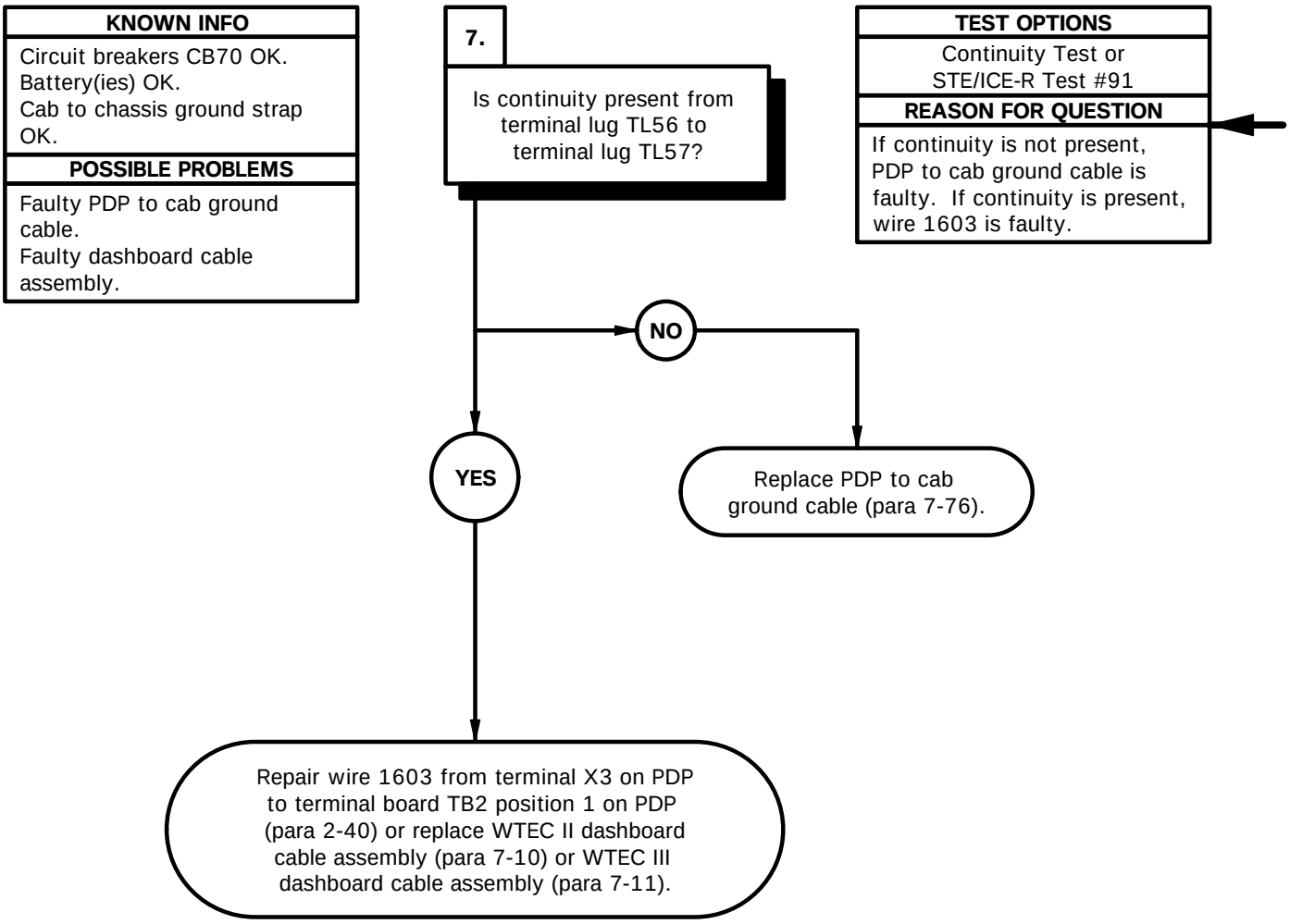
**NOTE**

Install plastic cable ties as required.

(7) Position front grille on cab with washer and screw.
(8) Position two washers and screws in front grille.
(9) Tighten screw to 48-60 lb-in. (5-7 N.m).
(10) Tighten two screws to 24 lb-in. (3 N.m).

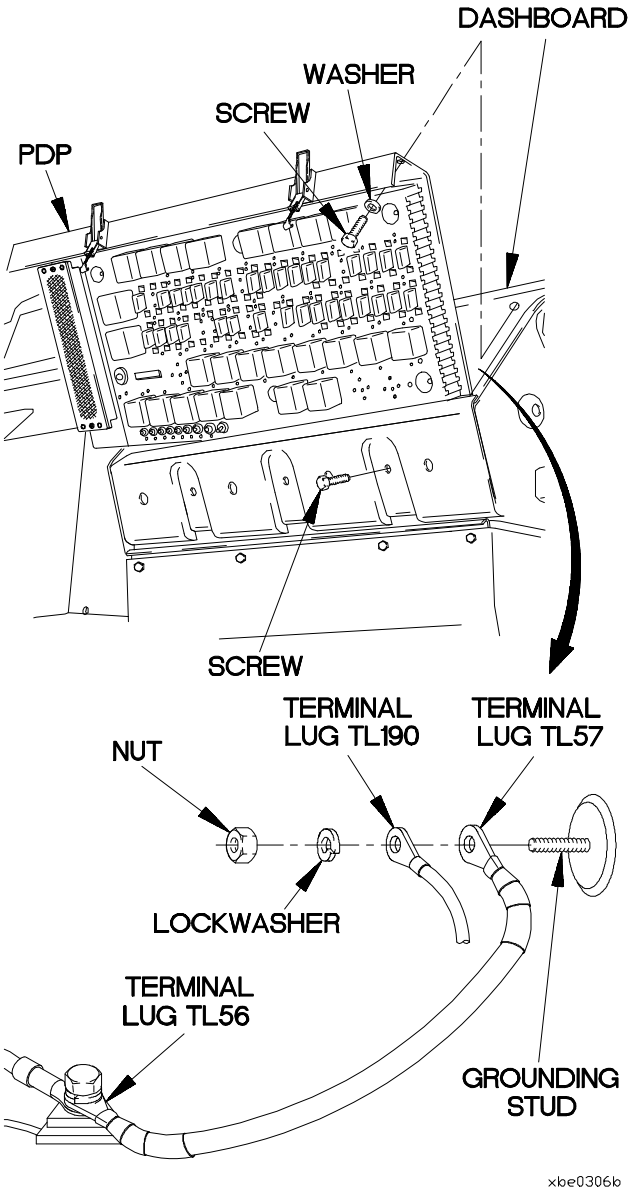


## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift outward to gain access.
(4) Remove nut, lockwasher, terminal lug TL190, and terminal lug TL57 from grounding stud. Discard lockwasher.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to terminal lug TL57.
(7) Connect negative (-) probe of multimeter to terminal lug TL56 and note reading on multimeter.
(8) If continuity is not present, replace PDP to cab ground cable (para 7-76).
(9) If continuity is present, repair wire 1603 from terminal X3 on PDP to terminal board TB2 position 1 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) Install terminal lug TL190 and terminal lug TL57 on grounding stud with lockwasher and nut.
(11) Install PDP on dashboard with three screws.
(12) Install three washers and screws in PDP.
(13) Install PDP cover (para 16-2).
(14) Connect batteries (para 7-48).



## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.

**POSSIBLE PROBLEMS**

Faulty shunt.
Faulty starter to shunt 24 VDC cable.
Faulty battery to shunt cable assembly.
Faulty starter to chassis ground cable.

**8.**

Is continuity present from one end of shunt to other end of shunt?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, shunt is faulty.

NO

Replace shunt (para 7-26).

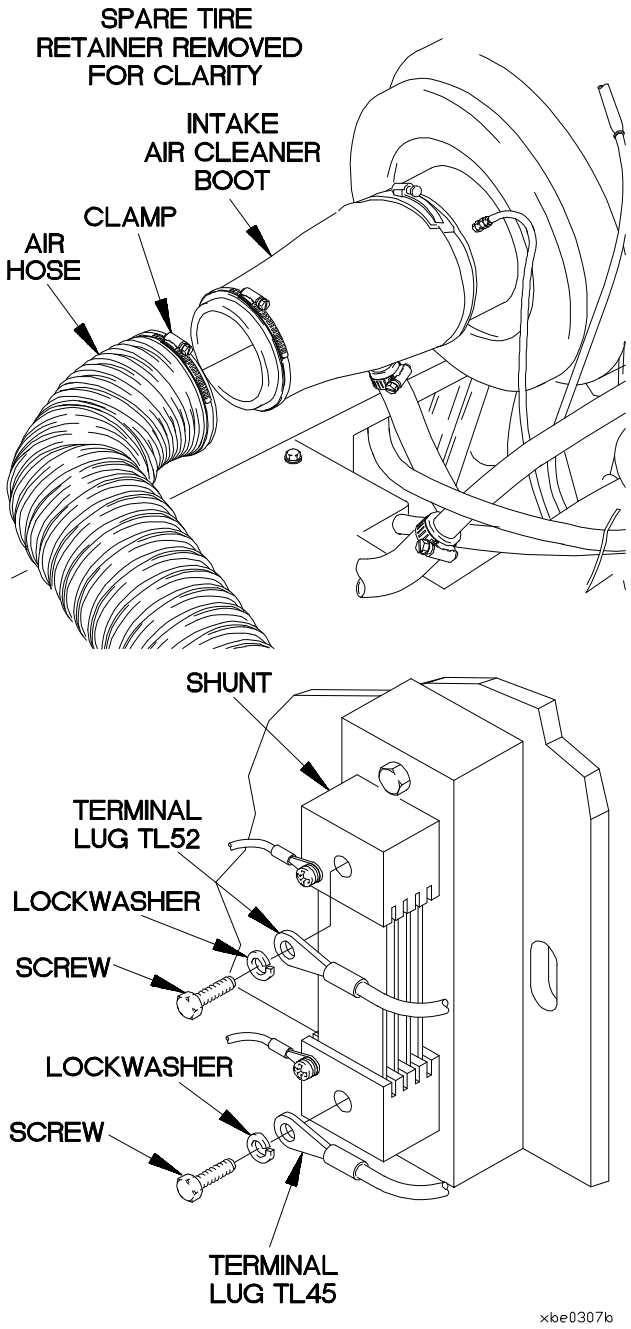
YES

**CONTINUITY TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Lower spare tire (TM 9-2320-365-10).
(3) Install PDP cover (para 16-2).
(4) Loosen clamp on air hose.
(5) Remove air hose from intake air cleaner boot.

**NOTE**
Tag wires and connection points prior to disconnecting.

(6) Remove screw, lockwasher, and terminal lug TL52 from shunt. Discard lockwasher.
(7) Remove screw, lockwasher, and terminal lug TL45 from shunt. Discard lockwasher.
(8) Set multimeter to ohms.
(9) Connect positive (+) probe of multimeter to one end of shunt.
(10) Connect negative (-) probe of multimeter to other end of shunt and note reading of multimeter.
(11) If continuity is not present, replace shunt (para 7-26).



## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.

**POSSIBLE PROBLEMS**

Faulty starter to shunt 24 VDC cable.
Faulty battery to shunt cable assembly.
Faulty starter to chassis ground cable.

**9.**

Is continuity present from starting motor ground terminal stud to terminal lug TL45?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, starter to shunt 24 VDC cable is faulty.

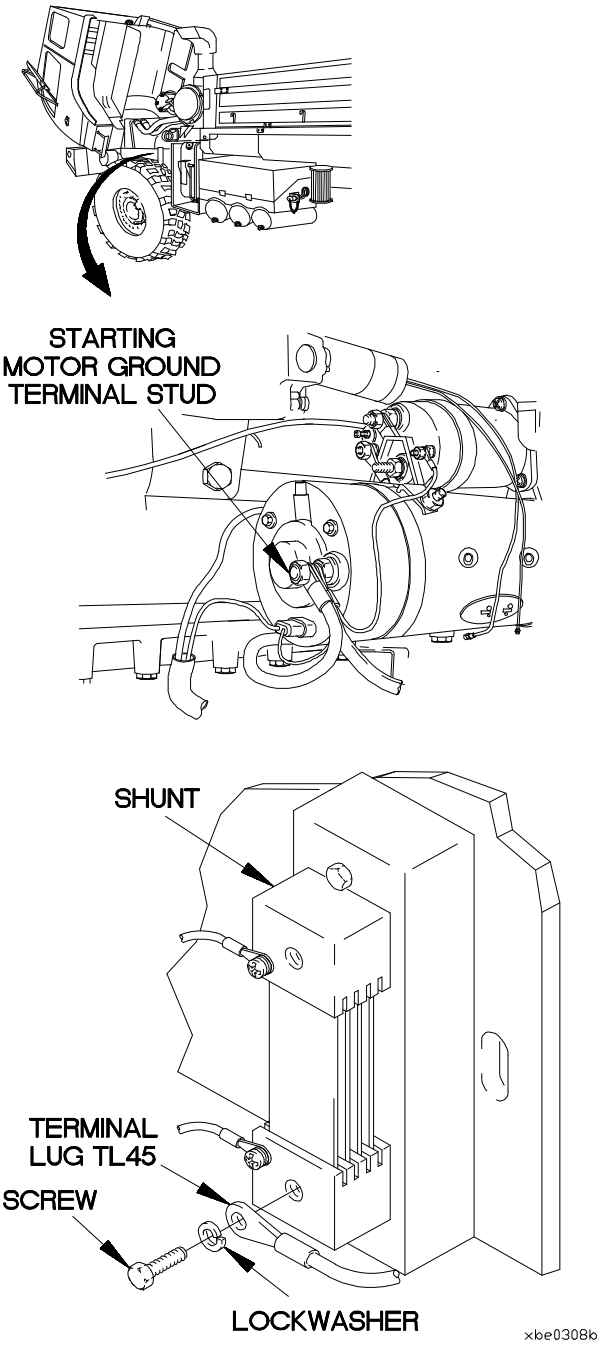
**NO**

Replace starter to shunt 24 VDC cable (para 7-84).

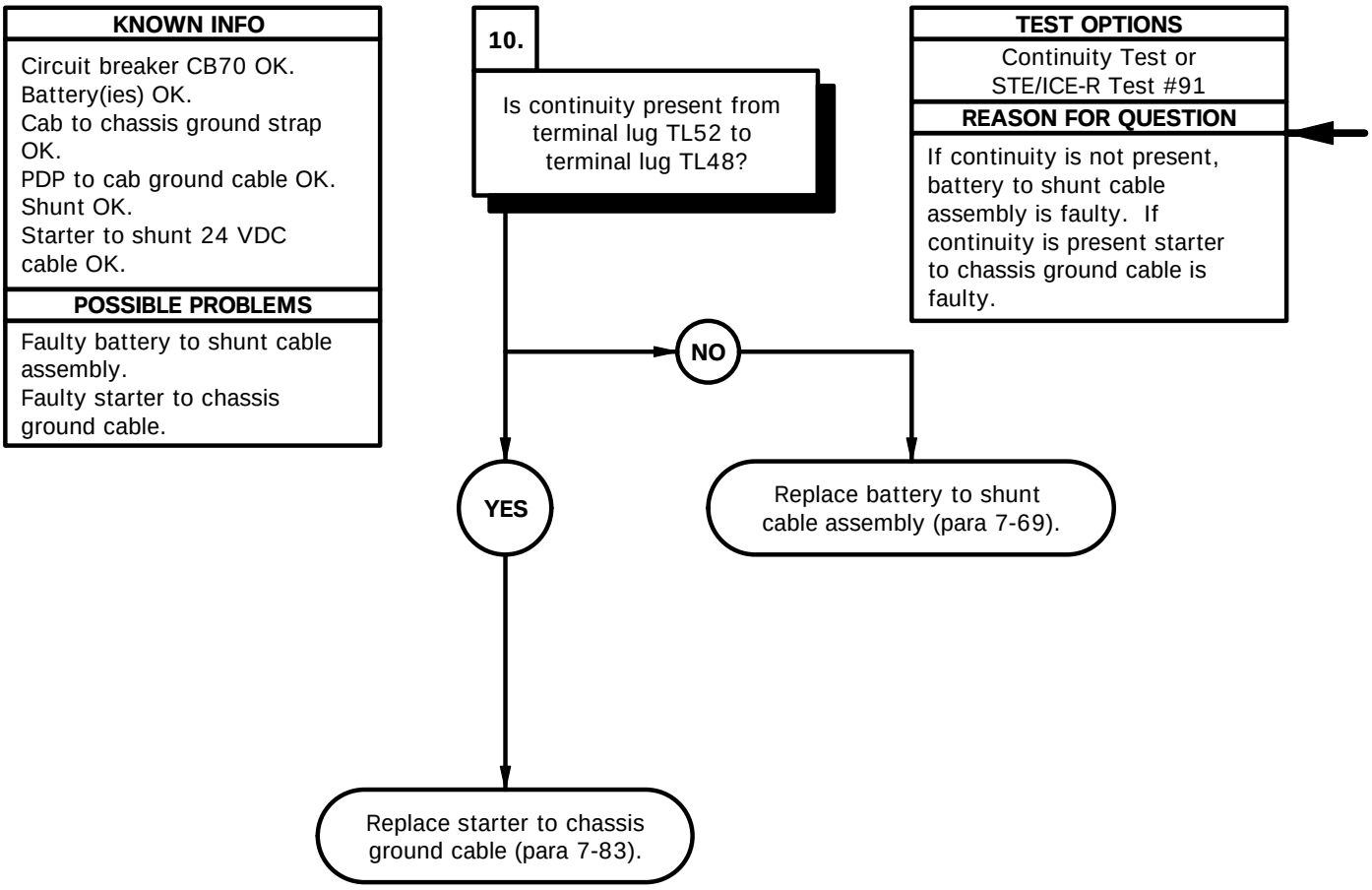
**YES**

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to starting motor ground terminal stud.
(3) Connect negative (-) probe of multimeter to terminal lug TL45 and note reading on multimeter.
(4) If continuity is not present, replace starter to shunt 24 VDC cable (para 7-84).
(5) Lower cab (TM 9-2320-365-10).
(6) Install terminal lug TL45 on shunt with lockwasher and screw.

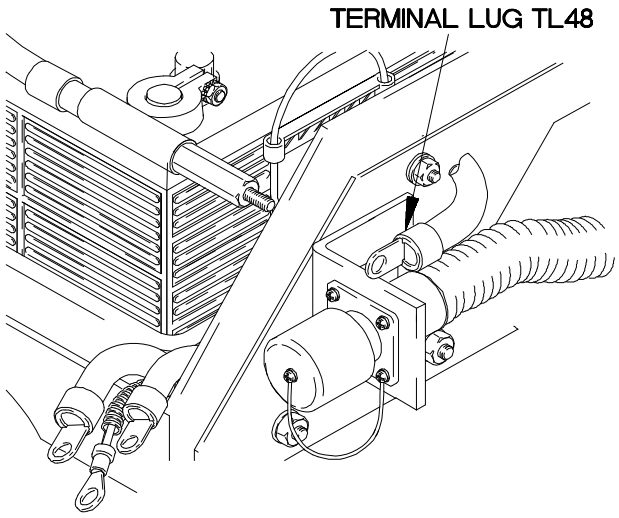


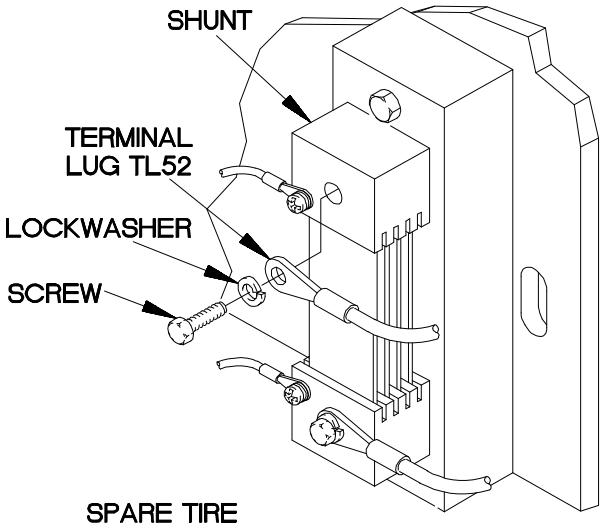
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

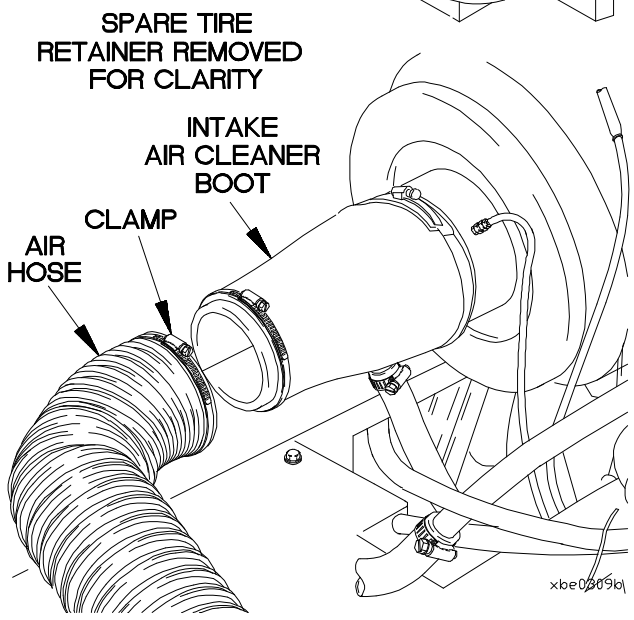


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL52.
(3) Connect negative (-) probe of multimeter to terminal lug TL48 and note reading on multimeter.
(4) If continuity is not present, replace battery to shunt cable assembly (para 7-69) .
(5) If continuity is present, replace starter to chassis ground cable (para 7-83).
(6) Install terminal lug TL52 on shunt with lockwasher and screw.
(7) Position air hose on intake air cleaner boot with clamp.
(8) Tighten clamp to 36-48 lb-in. (4-5 N.m).
(9) Raise spare tire (TM 9-2320-365-10).
(10) Connect batteries (para 7-48).



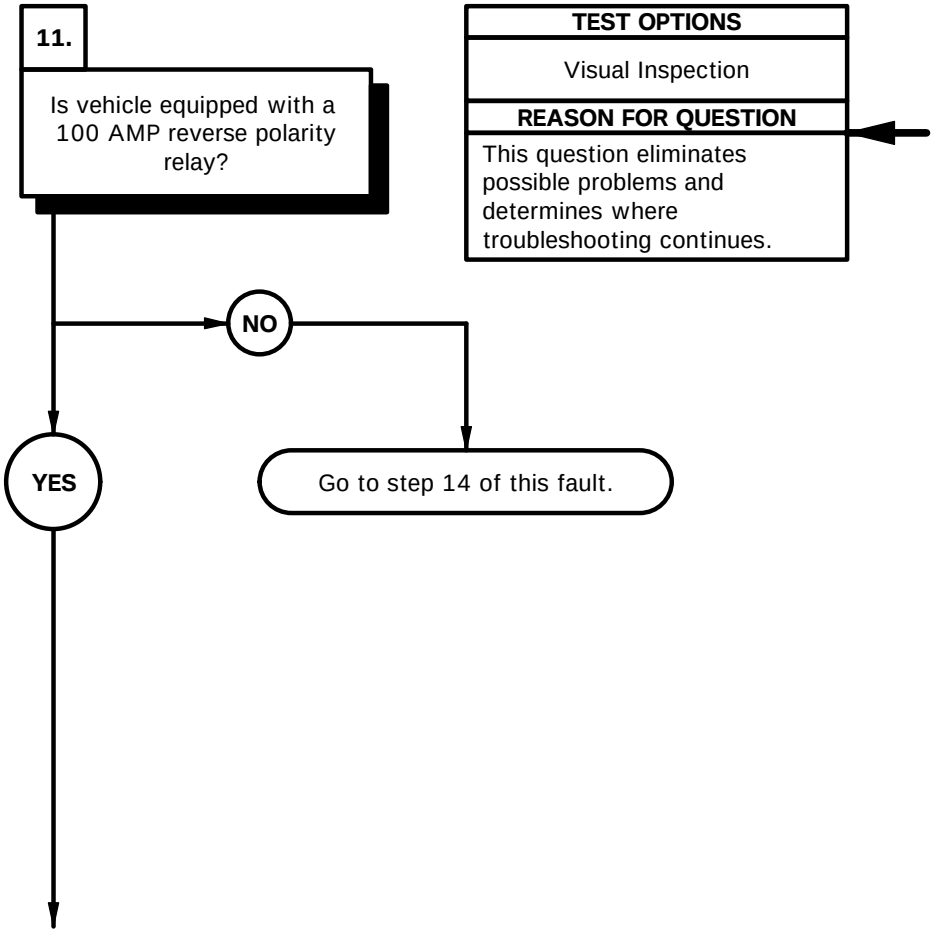
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

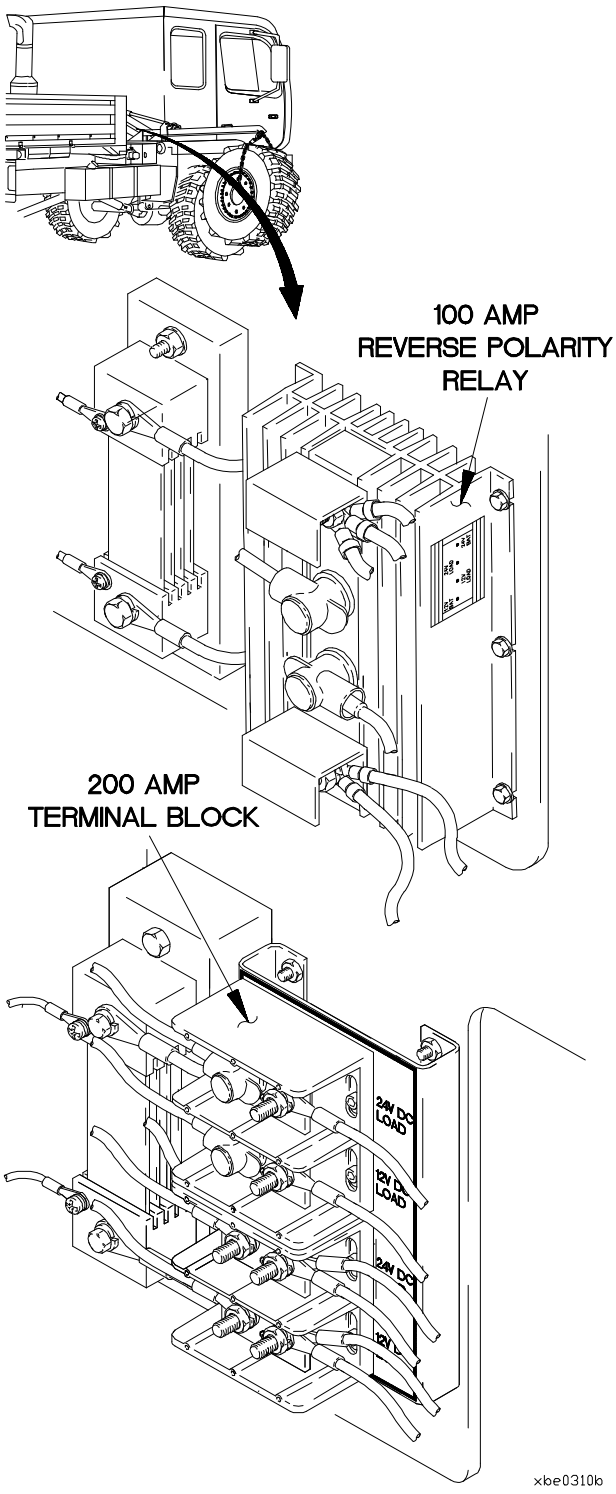
Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.

**POSSIBLE PROBLEMS**

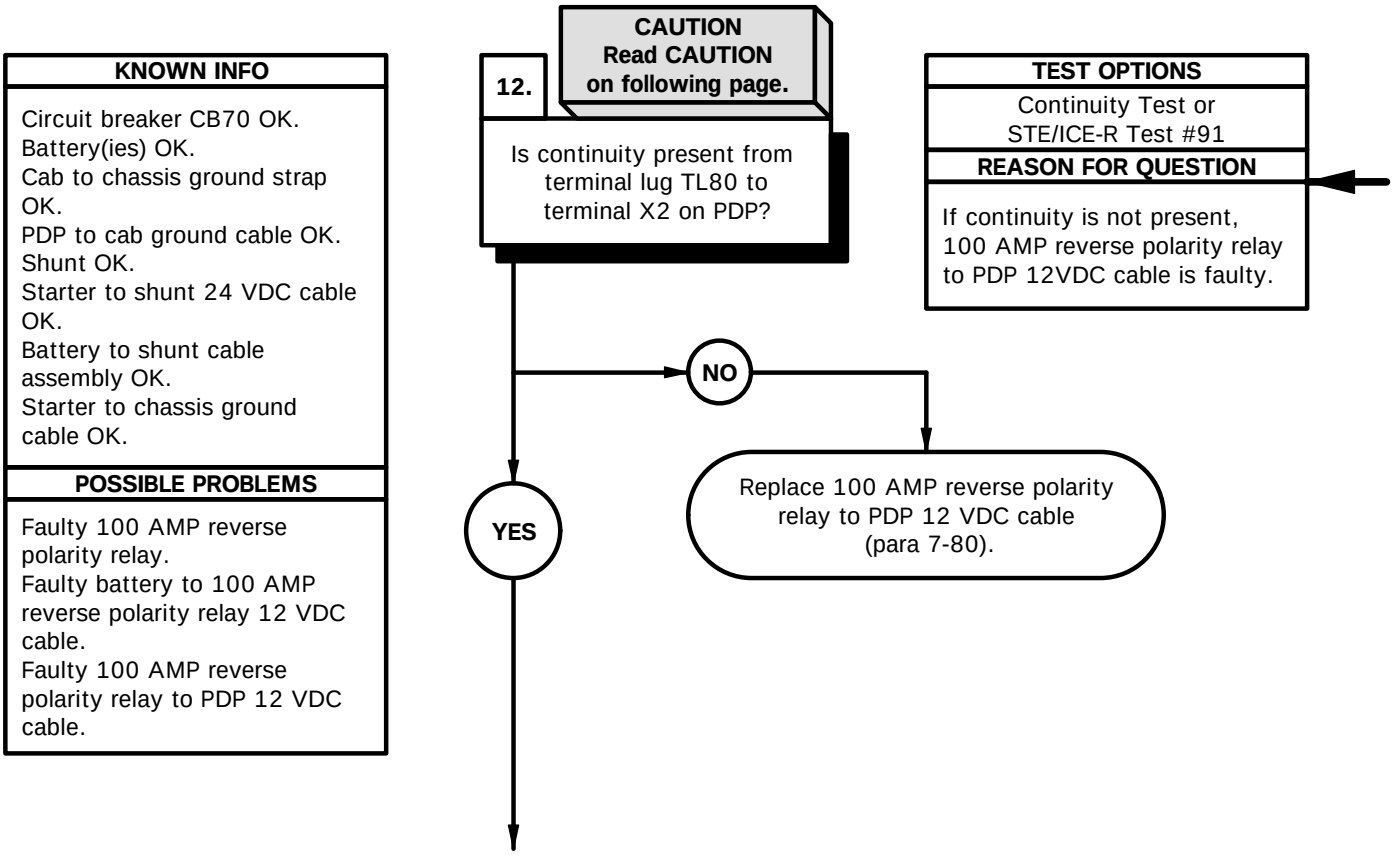
Faulty 100 AMP reverse polarity relay.
Faulty battery to 100 AMP reverse polarity relay 12 VDC cable.
Faulty 100 AMP reverse polarity relay to PDP 12 VDC cable.
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.



(1) Lower spare tire (TM 9-2320-365-10).
(2) Check if vehicle is equipped with 100 AMP reverse polarity relay.
(3) If vehicle is not equipped with 100 AMP reverse polarity relay, go to step 14 of this fault.



## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Loosen clamp on air hose.
(3) Remove air hose from intake air cleaner boot.
(4) Lift dust boot on 12V LOAD terminal stud on 100 AMP reverse polarity relay.

**NOTE**

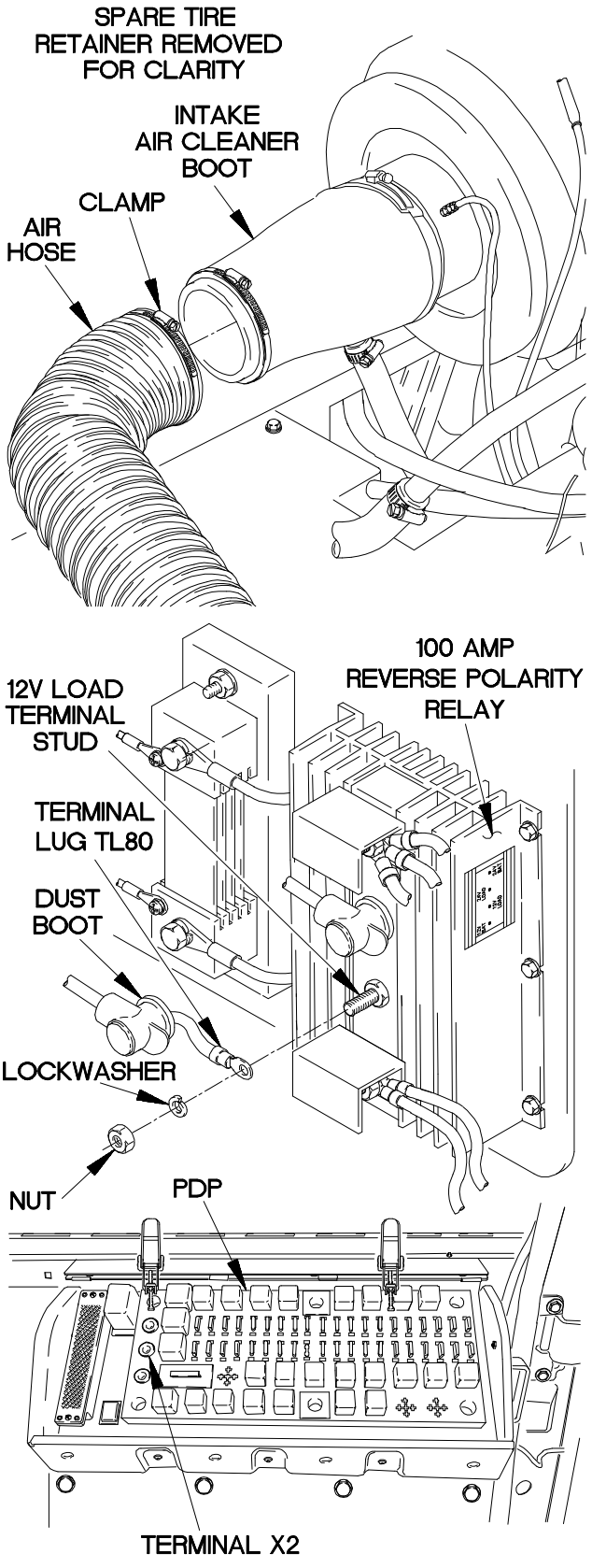
Tag all terminal lugs and connection points prior to disconnecting.

(5) Remove nut, lockwasher, and terminal lug TL80 from 12V LOAD terminal stud on 100 AMP reverse polarity relay.
(6) Set multimeter to ohms.

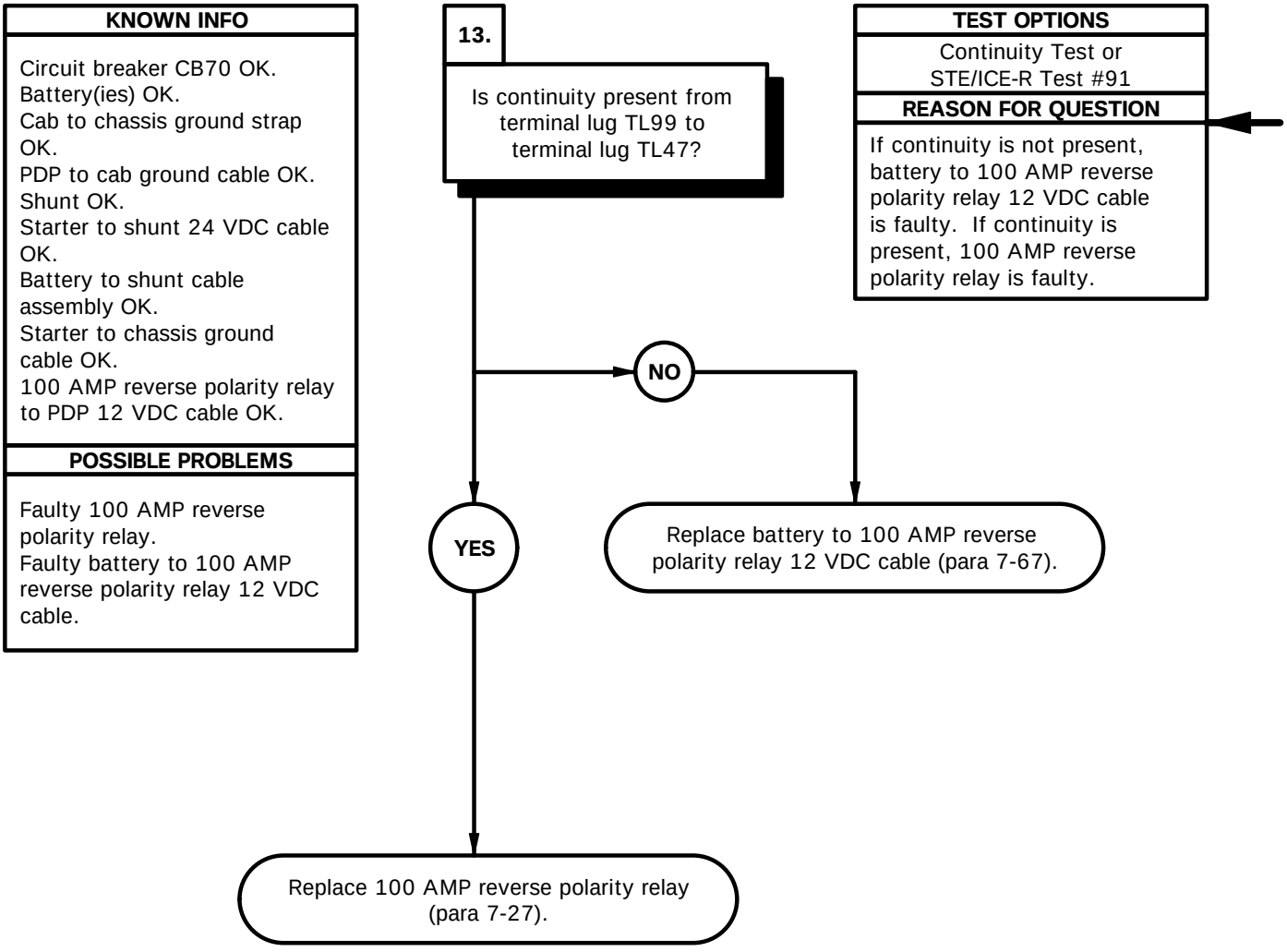
**CAUTION**

When testing to terminal X2 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(7) Connect positive probe (+) of multimeter to terminal X2 on PDP.
(8) Connect negative probe (-) of multimeter to terminal lug TL80 and note reading on multimeter.
(9) If continuity is not present, replace 100 AMP reverse polarity relay to PDP 12 VDC cable (para 7-80).
(10) Position terminal lug TL80 on 12V LOAD terminal stud on 100 AMP reverse polarity relay with lockwasher and nut.
(11) Tighten nut to 120-144 lb-in. (14-16 N.m).
(12) Position dust boot on 12V LOAD terminal stud on 100 AMP reverse polarity relay.
(13) Install PDP cover (para 16-2).

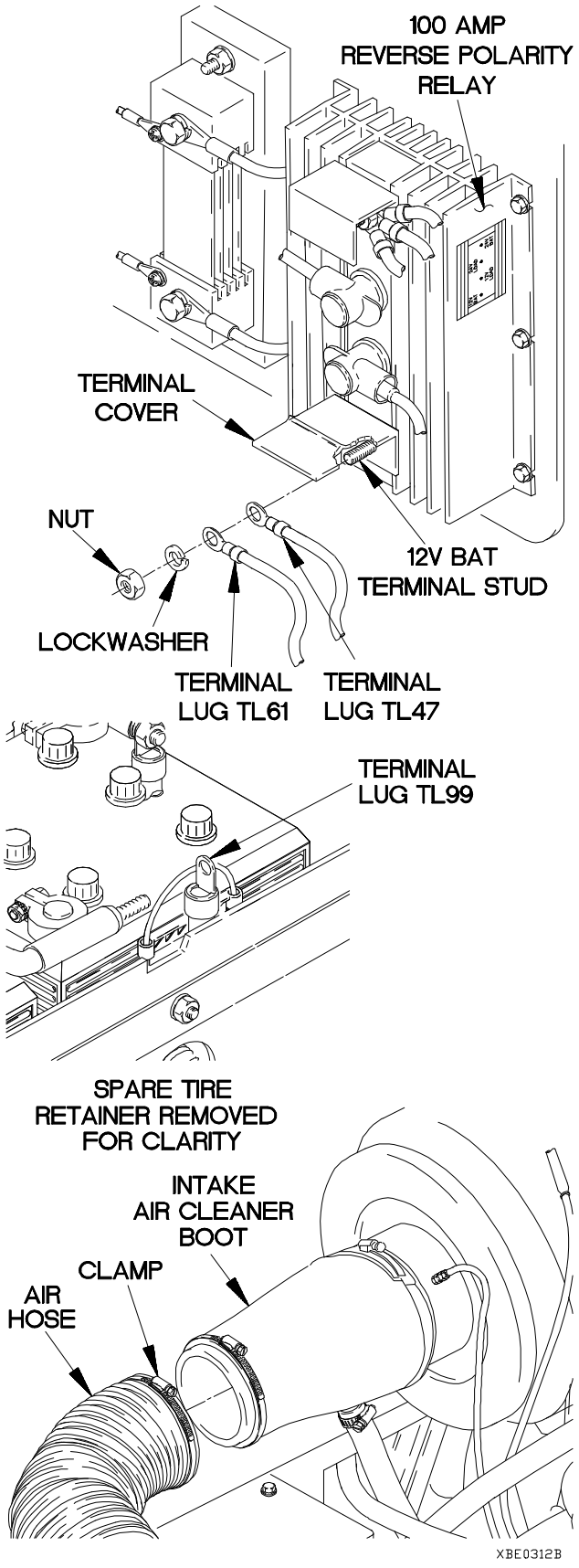


## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Lift terminal cover on 12V BAT terminal stud on 100 AMP reverse polarity relay.
(2) Remove nut, lockwasher, terminal lug TL61, and terminal lug TL47 from 12V BAT terminal stud on 100 AMP reverse polarity relay. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive probe (+) of multimeter to terminal lug TL99.
(5) Connect negative probe (-) of multimeter to terminal lug TL47 and note reading on multimeter.
(6) If continuity is not present, replace battery to 100 AMP reverse polarity relay 12 VDC cable (para 7-67).
(7) If continuity is present, replace 100 AMP reverse polarity relay (para 7-27).
(8) Lift terminal cover on 12V BAT terminal stud on 100 AMP reverse polarity relay.
(9) Position terminal lugs TL47 and TL61 on 12V BAT terminal stud on 100 AMP reverse polarity relay with lockwasher and nut.
(10) Tighten nut to 120-144 lb-in. (14-16 N.m).
(11) Position air hose on intake air cleaner boot with clamp.
(12) Tighten clamp to 36-48 lb-in. (4-5 N.m).
(13) Connect batteries (para 7-48).
(14) Raise spare tire (TM 9-2320-365-10).



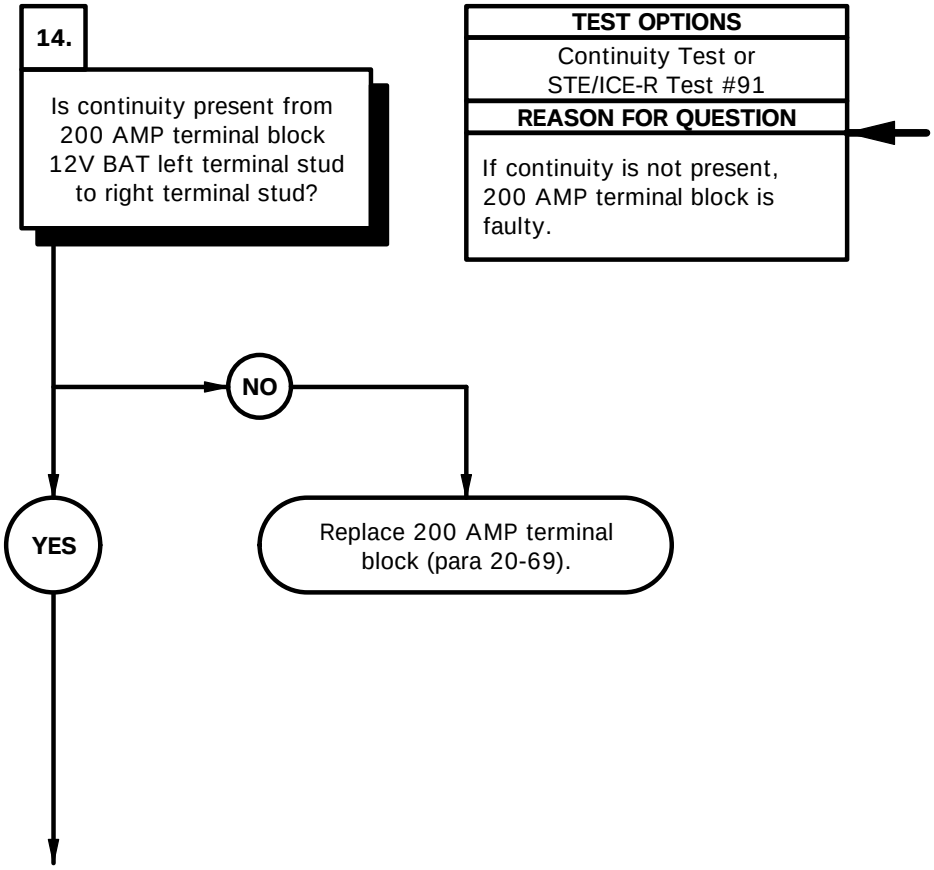
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.

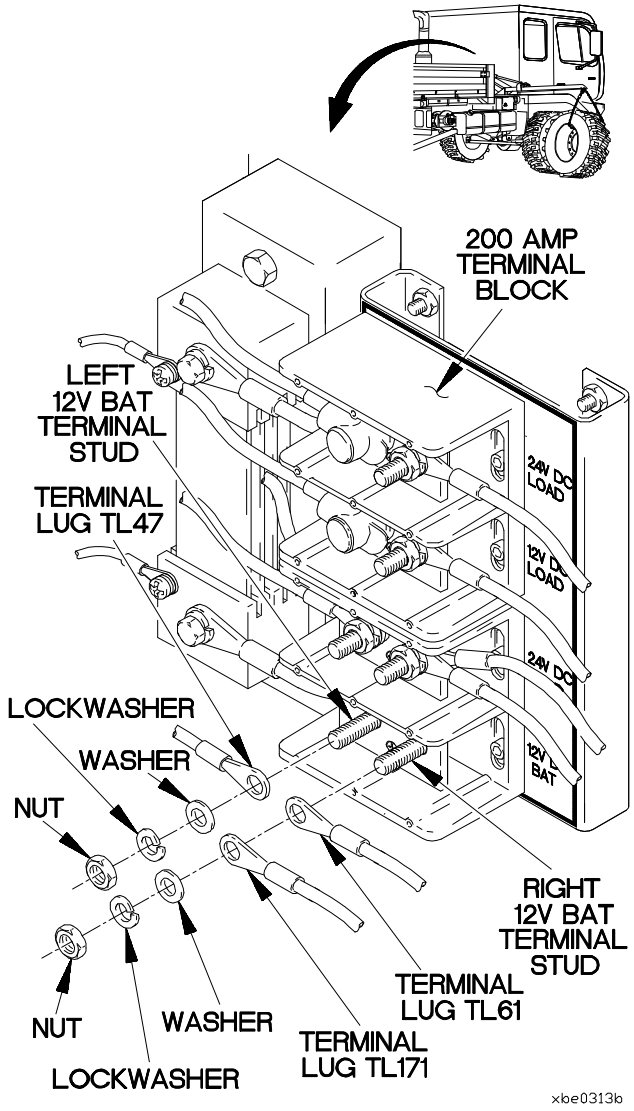
**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.



**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove nut, lockwasher, washer, and terminal lug TL47 from left 12V BAT terminal stud on 200 AMP terminal block. Discard lockwasher.
(3) Remove nut, lockwasher, washer, and terminal lugs TL171 and TL61 from right 12V BAT terminal stud on 200 AMP terminal block. Discard lockwasher.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to left 12V BAT terminal stud on 200 AMP terminal block.
(6) Connect negative (-) probe of multimeter to right 12V BAT terminal stud on 200 AMP terminal block and note reading on multimeter.
(7) If continuity is not present, replace 200 AMP terminal block (para 20-69).
(8) Position terminal lug TL47 on left 12V BAT terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(9) Tighten nut to 15-19 lb-ft (21-25 N.m).



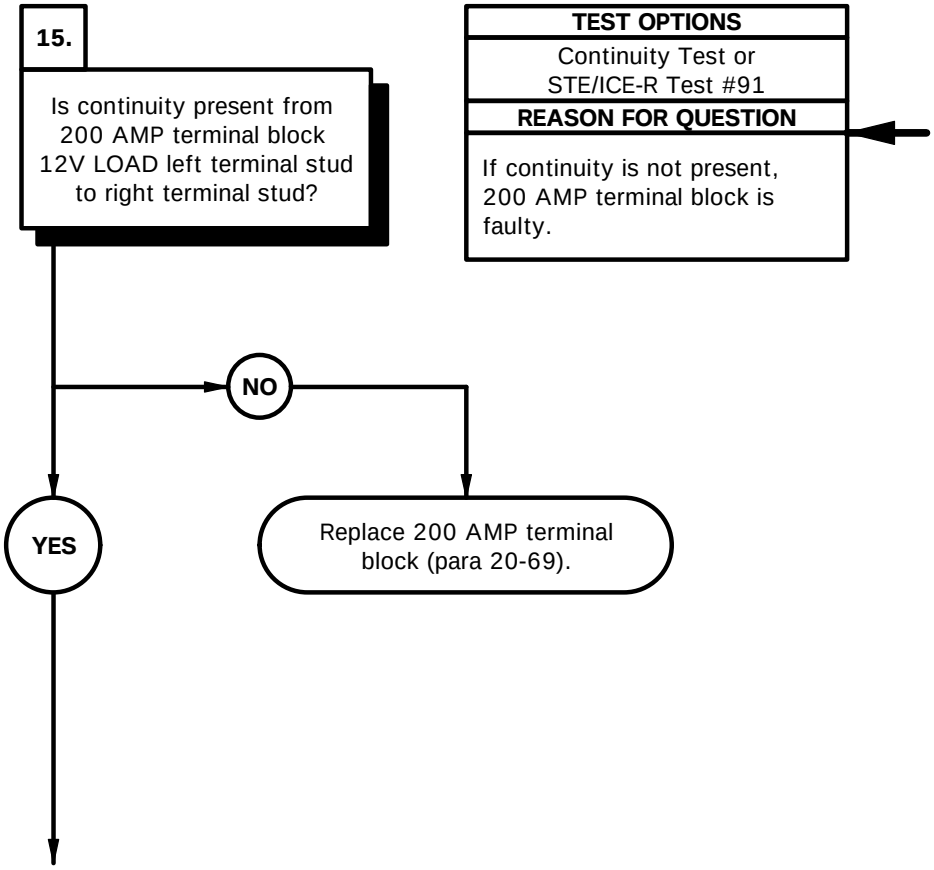
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.

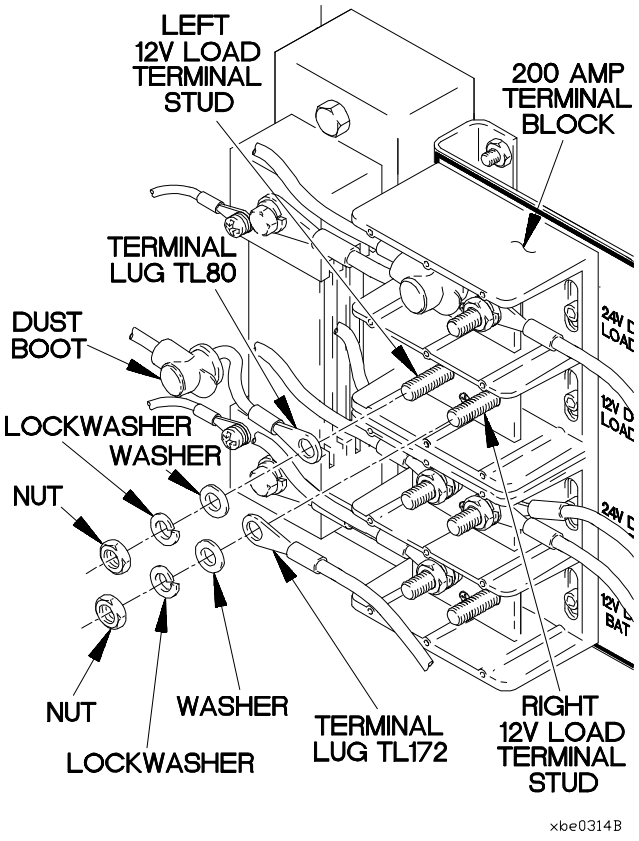
**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.



**CONTINUITY TEST**

(1) Lift dust boot on left 12V LOAD terminal stud on 200 AMP terminal block.
(2) Remove nut, lockwasher, washer, and terminal lug TL80 from left 12V LOAD terminal stud on 200 AMP terminal block. Discard lockwasher.
(3) Remove nut, lockwasher, washer, and terminal lug TL172 from right 12V LOAD terminal stud on 200 AMP terminal block. Discard lockwasher.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to left 12V LOAD terminal stud on 200 AMP terminal block.
(6) Connect negative (-) probe of multimeter to right 12V LOAD terminal stud on 200 AMP terminal block and note reading on multimeter.
(7) If continuity is not present, replace 200 AMP terminal block (para 20-69).



## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.
200 AMP terminal block OK.

**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block to PDP 12 VDC cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.

**CAUTION**
**Read CAUTION on following page.**

**16.** Is continuity present from terminal lug TL80 to terminal X2 on PDP?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, 200 AMP terminal block to PDP is 12 VDC cable is faulty.

NO → Replace 200 AMP terminal block to PDP 12 VDC cable (para 20-65).

YES

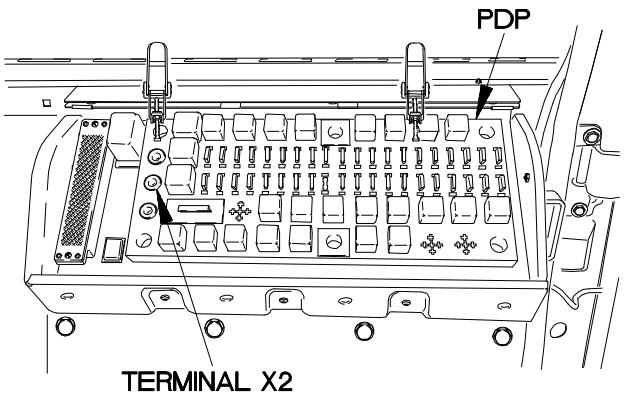
**CONTINUITY TEST**

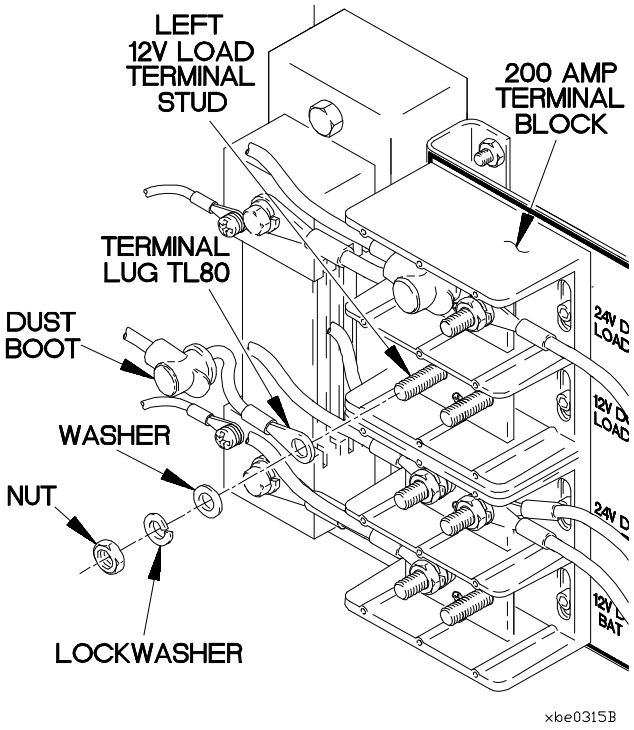
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL80.

**CAUTION**

When testing to terminal X2 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(3) Connect negative (-) probe of multimeter to terminal block X2 on PDP and note reading on multimeter.
(4) If continuity is not present, replace 200 AMP terminal block to PDP 12 VDC cable (para 20-65).
(5) Position terminal lug TL80 on left 12V LOAD terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(6) Tighten nut to 15-19 lb-ft (21-25 N.m).
(7) Position dust boot on left 12V LOAD terminal stud on 200 AMP terminal block.



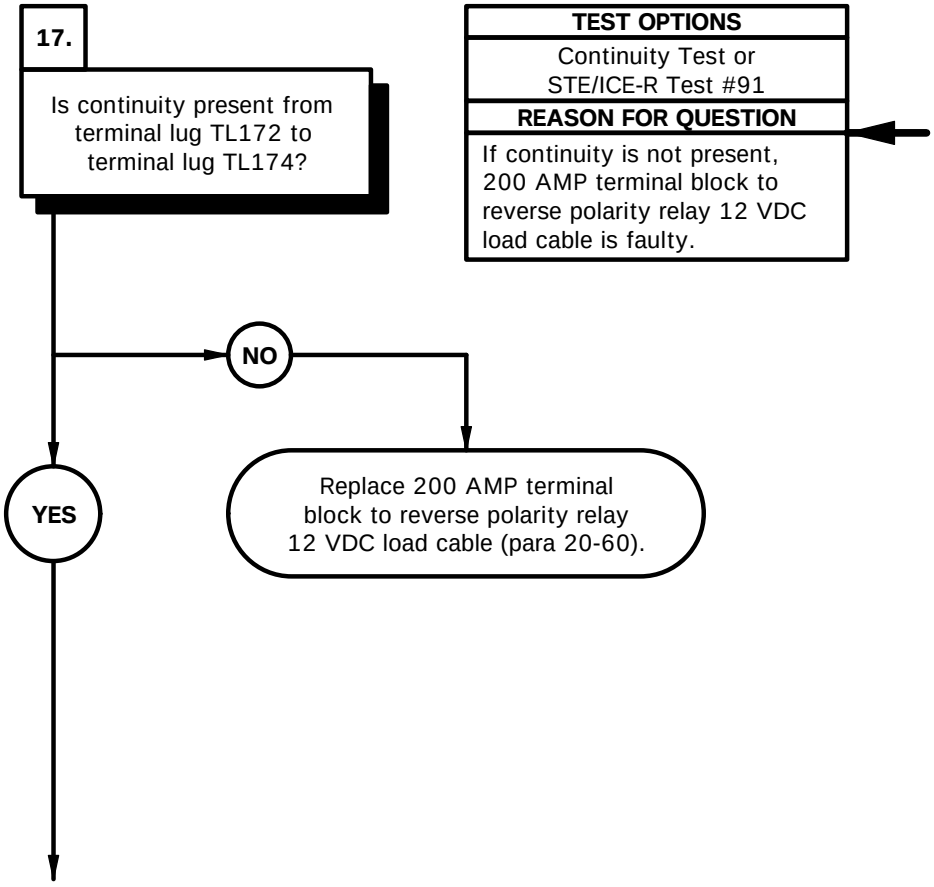
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.
200 AMP terminal block OK.
200 AMP terminal block to PDP 12 VDC cable OK.

**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC load cable.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.




**TEST OPTIONS**

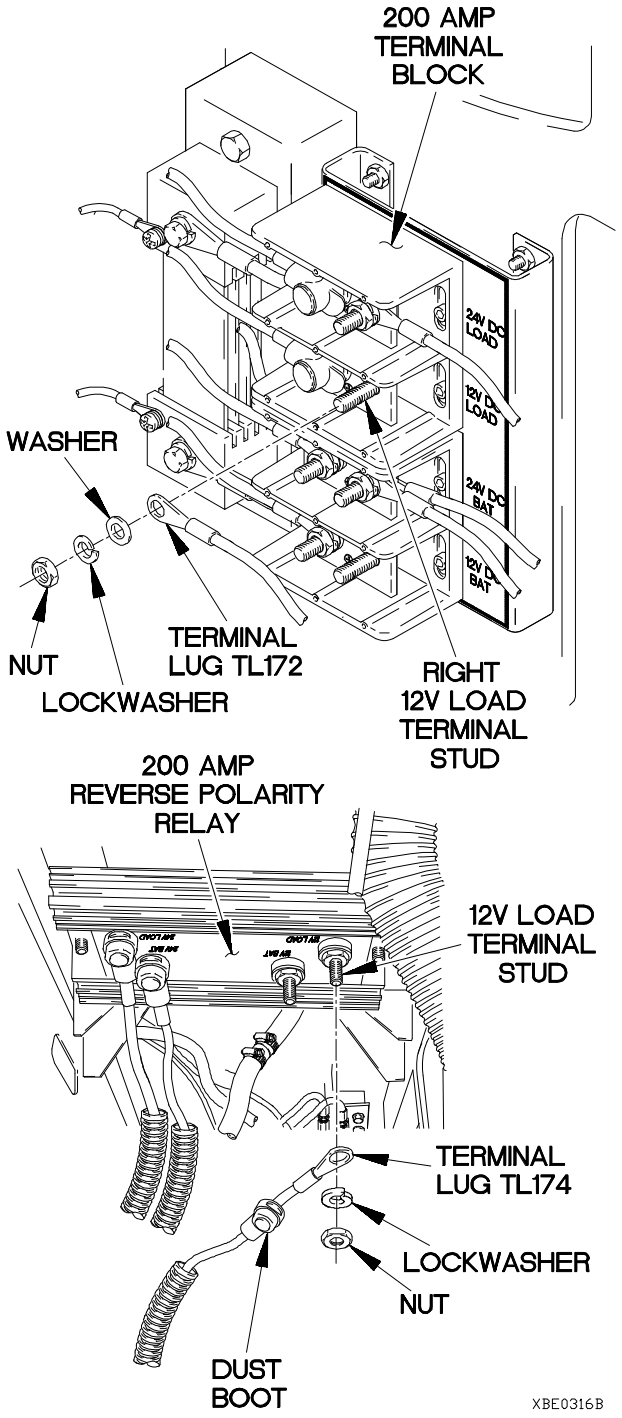
Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, 200 AMP terminal block to reverse polarity relay 12 VDC load cable is faulty.

**CONTINUITY TEST**

(1) Lift dust boot on 12V LOAD terminal stud on 200 AMP reverse polarity relay.
(2) Remove nut, lockwasher, and terminal lug TL174 from 12V LOAD terminal stud on 200 AMP reverse polarity relay. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL172.
(5) Connect negative (-) probe of multimeter to terminal lug TL174 and note reading on multimeter.
(6) If continuity is not present, replace 200 AMP terminal block to reverse polarity relay 12 VDC load cable (para 20-60).
(7) Position terminal lug TL172 on right 12V LOAD terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(8) Tighten nut to 15-19 lb-ft (21-25 N.m).
(9) Position terminal lug TL174 on 12V LOAD terminal stud on 200 AMP reverse polarity relay with lockwasher and nut.
(10) Tighten nut to 108-132 lb-in. (12-15 N.m).
(11) Position dust boot on 12V LOAD terminal stud on 200 AMP reverse polarity relay.



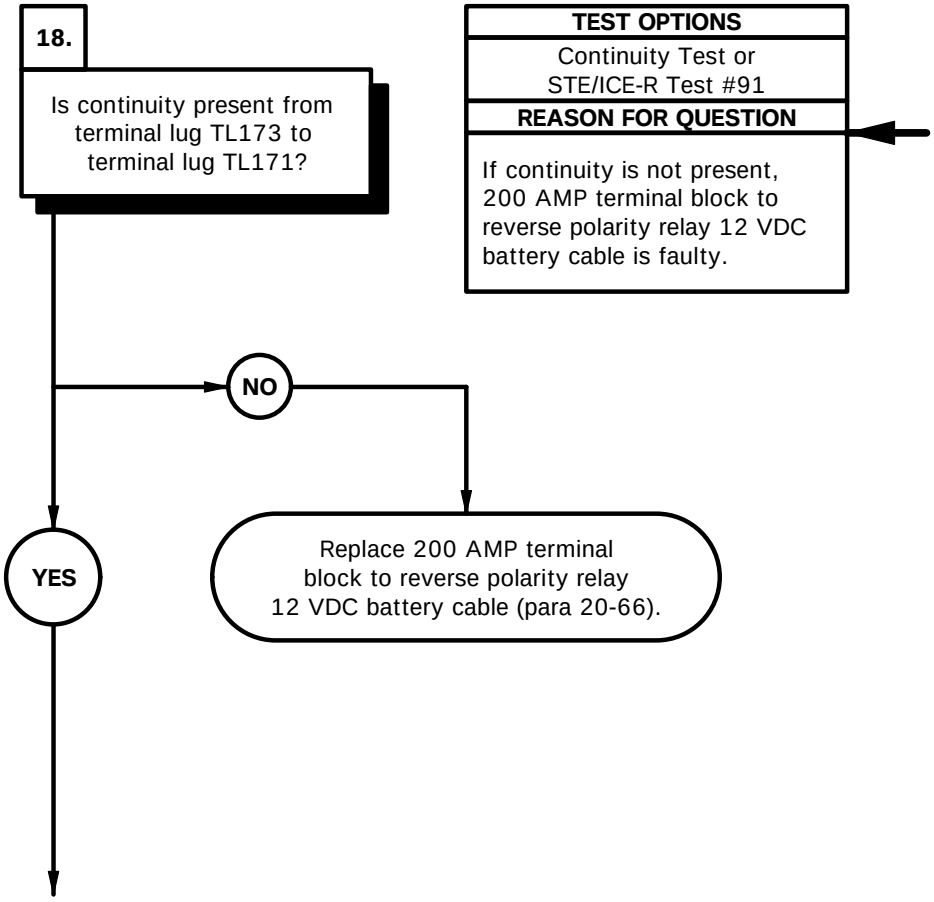
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Battery(ies) OK.
Cab to chassis ground strap OK.
PDP to cab ground cable OK.
Shunt OK.
Starter to shunt 24 VDC cable OK.
Battery to shunt cable assembly OK.
Starter to chassis ground cable OK.
200 AMP terminal block OK.
200 AMP terminal block to PDP 12 VDC cable OK.
200 AMP terminal block to reverse polarity relay 12 VDC load cable OK.

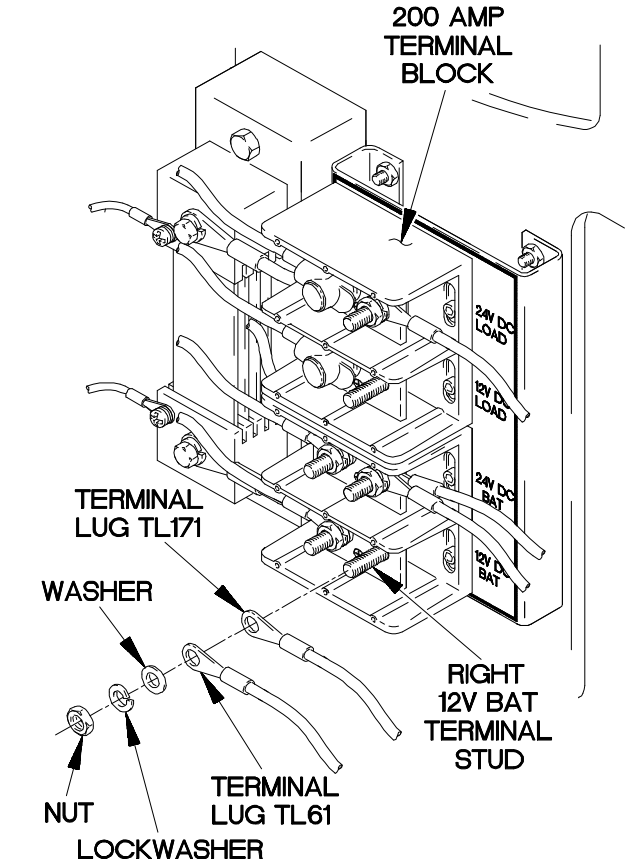
**POSSIBLE PROBLEMS**

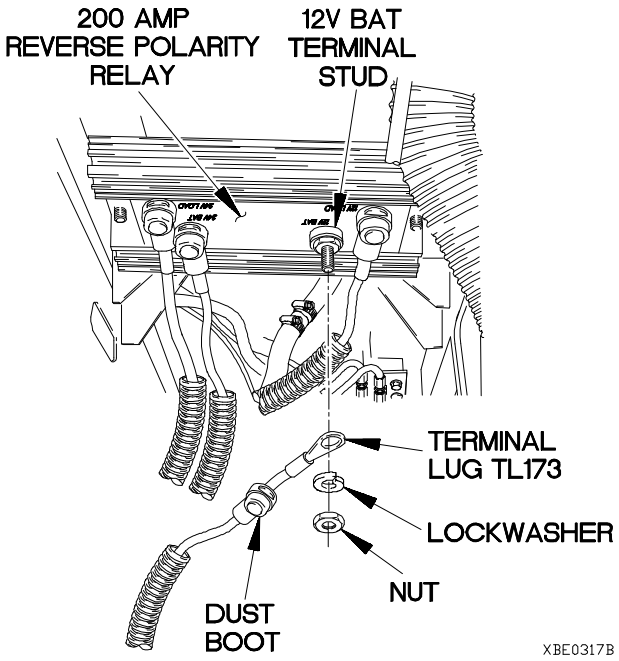
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block to reverse polarity relay 12 VDC battery cable.
Faulty battery to 200 AMP terminal block 12 VDC cable assembly.



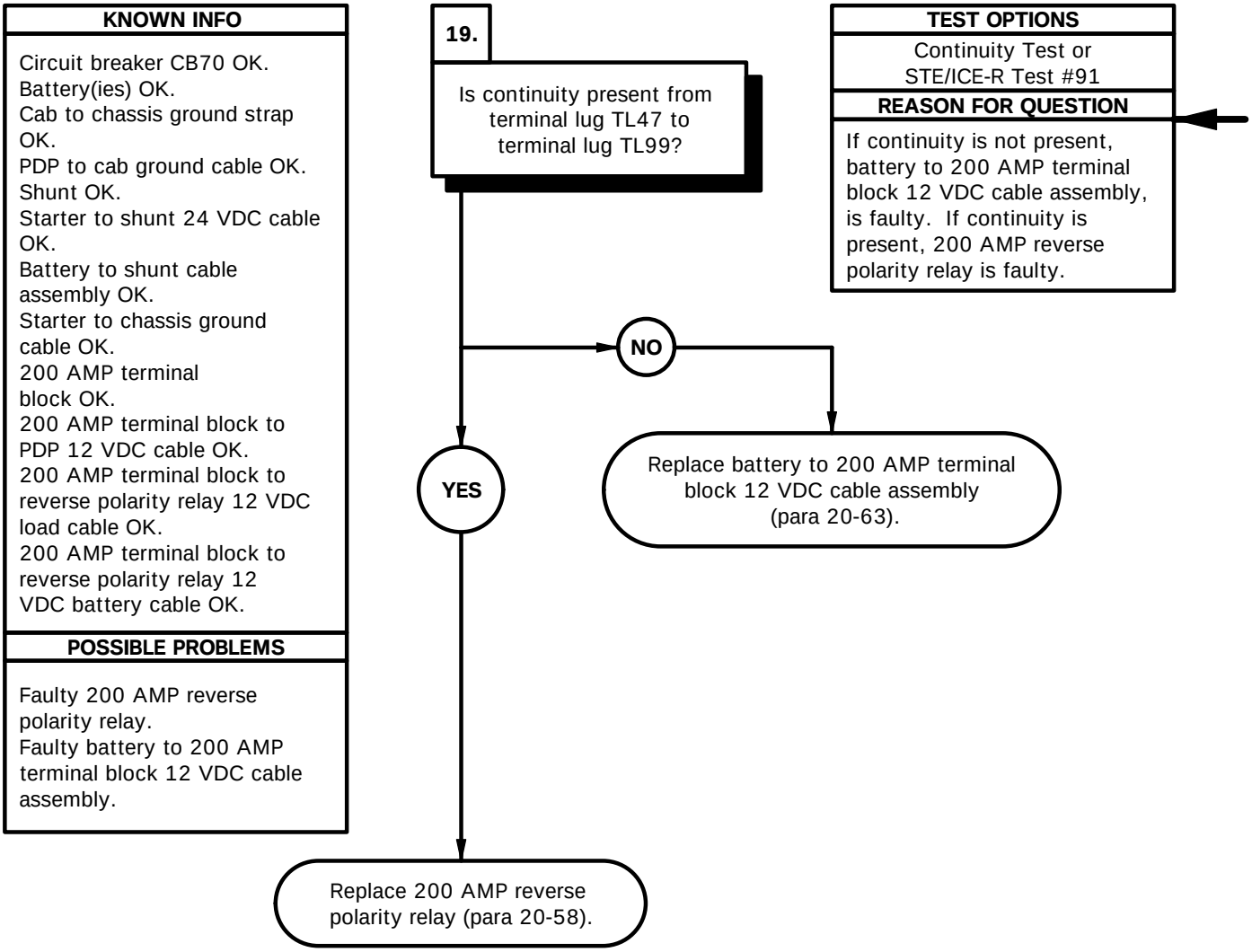
**CONTINUITY TEST**

(1) Lift dust boot on 12V BAT terminal stud on 200 AMP reverse polarity relay.
(2) Remove nut, lockwasher, and terminal lug TL173 from 12V BAT terminal stud on 200 AMP reverse polarity relay. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL173.
(5) Connect negative (-) probe of multimeter to terminal lug TL171 and note reading on multimeter.
(6) If continuity is not present, replace 200 AMP terminal block to reverse polarity relay 12 VDC battery cable (para 20-66).
(7) Position terminal lugs TL171 and TL61 on right 12V BAT terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(8) Tighten nuts to 15-19 lb-ft (21-25 N.m).
(9) Position terminal lug TL173 on 12V BAT terminal stud on 200 AMP reverse polarity relay with lockwasher and nut.
(10) Tighten nut to 108-132 lb-in. (12-15 N.m).
(11) Position dust boot on 12V BAT terminal stud on 200 AMP reverse polarity relay.



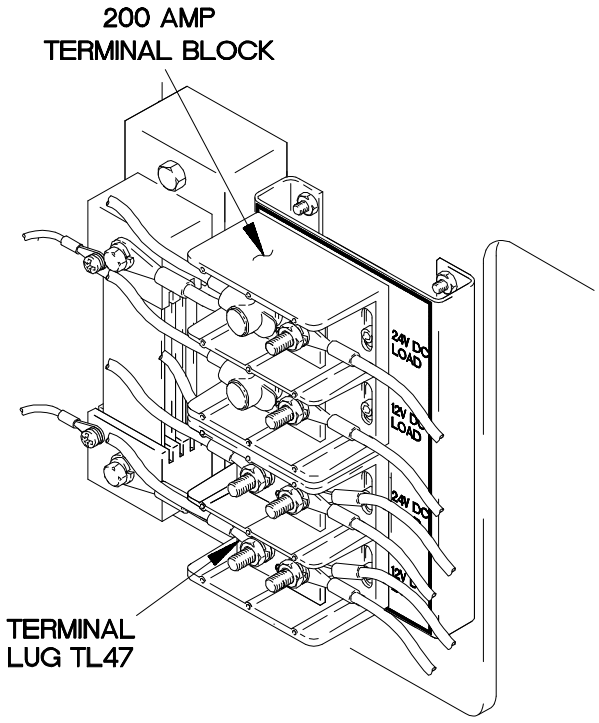



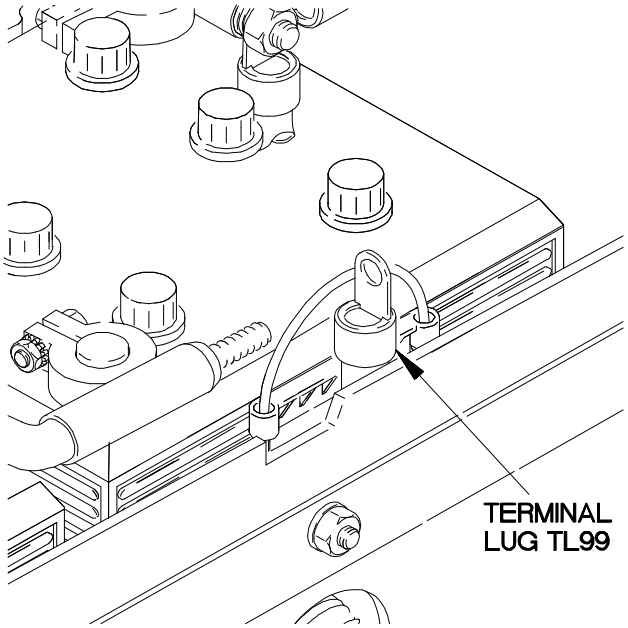
## e3. 12 VDC AND 24 VDC CIRCUITS DO NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL47.
(3) Connect negative (-) probe of multimeter to terminal lug TL99 and note reading on multimeter.
(4) If continuity is not present, replace battery to 200 AMP terminal block 12 VDC cable assembly (para 20-63).
(5) If continuity is present, replace 200 AMP reverse polarity relay (para 20-58).
(6) Install PDP cover (para 16-2).
(7) Connect batteries (para 7-48).
(8) Raise spare tire (TM 9-2320-365-10).



## e4. 24 VDC CIRCUITS DO NOT OPERATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Tester, Antifreeze and Battery (Item 41, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Apron, Rubber (Item 3, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wire, Relay Test (Item 9, Appendix E)

**Materials/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)
Dispenser, Pressure Sensitive Tape (Item 21, Appendix D)
Wire, Elect, 50 ft (Item 77, Appendix D)
Lockwasher (2) (Item 91, Appendix G) (100 AMP)
Lockwasher (2) (Item 66, Appendix G) (200 AMP)
Lockwasher (4) (Item 92, Appendix G) (200 AMP)

**Personnel Required**
(2)

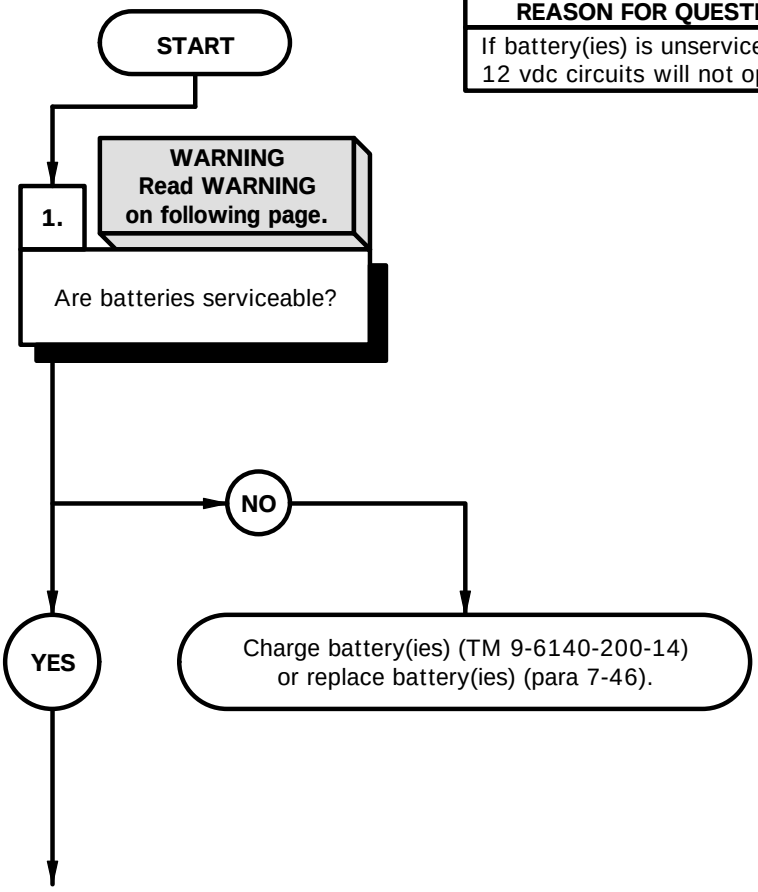
**References**
TM 9-6140-200-14
TM 9-4910-571-12&P

**NOTE**
Perform electrical troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB70 prior to beginning this task.

Remove and install plastic cable ties as required.

| KNOWN INFO |
|---|
| Service drive lights OK.<br>Circuit breaker CB70 OK. |
| **POSSIBLE PROBLEMS** |
| Faulty relay K2.<br>Faulty master power switch.<br>Faulty dashboard cable assembly.<br>Faulty 100 AMP reverse polarity relay.<br>Faulty 100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable.<br>Faulty battery to 100 AMP reverse polarity relay 24 VDC cable.<br>Faulty 200 AMP reverse polarity relay.<br>Faulty 200 AMP terminal block.<br>Faulty battery to 200 AMP terminal block 24 VDC cable assembly.<br>Faulty 200 AMP terminal block to reverse polarity relay 24 VDC battery cable.<br>Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.<br>Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable. |

| TEST OPTIONS |
|---|
| Battery Specific Gravity Test |
| **REASON FOR QUESTION** |
| If battery(ies) is unserviceable, 12 vdc circuits will not operate. |



**WARNING**

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

**BATTERY SPECIFIC GRAVITY TEST**

(1) Remove four batteries from battery box (para 7-46).
(2) Test batteries for serviceability (TM 9-6140-200-14).
(3) Charge battery(ies) if discharged but serviceable (TM 9-6140-200-14).
(4) Replace battery(ies) if unserviceable (para 7-46).
(5) Install four batteries in battery box (para 7-46).

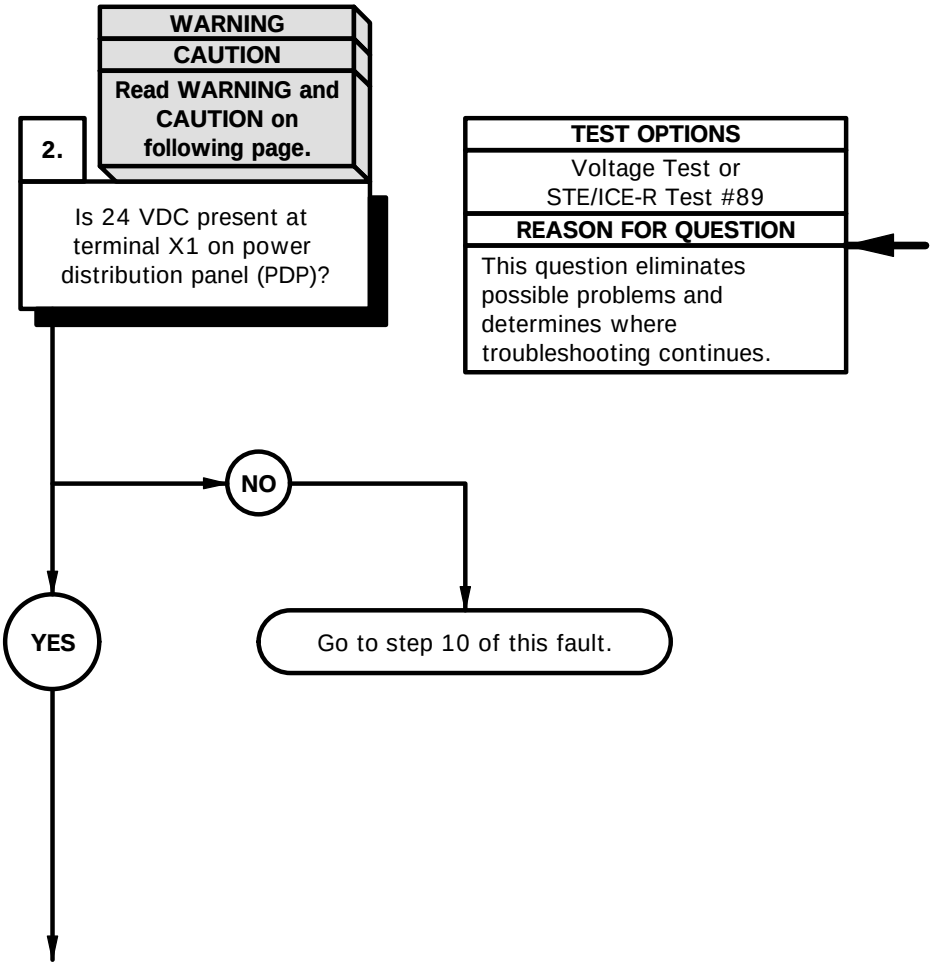
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty master power switch.
Faulty dashboard cable assembly.
Faulty 100 AMP reverse polarity relay.
Faulty 100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable.
Faulty battery to 100 AMP reverse polarity relay 24 VDC cable.
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty battery to 200 AMP terminal block 24 VDC cable assembly.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC battery cable.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.




**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

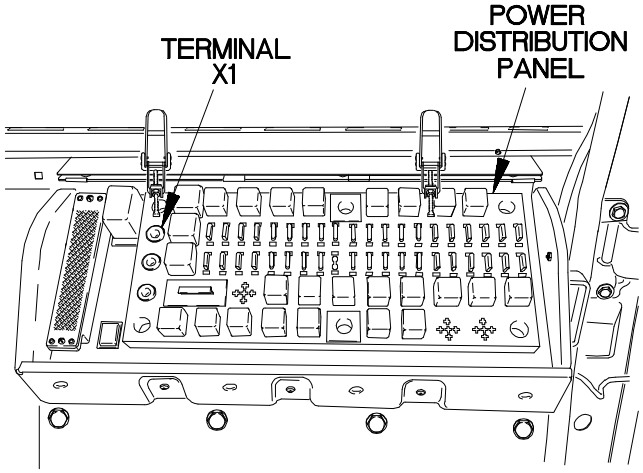
**VOLTAGE TEST**

(1) Remove power distribution panel (PDP) cover (para 16-2).
(2) Set multimeter to volts DC.

**CAUTION**

When testing to terminal X1 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(3) Connect positive (+) probe of multimeter to terminal X1 on power distribution panel (PDP).
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 24 VDC is not present, go to step 10 of this fault.




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## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable OK.

**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty master power switch.
Faulty dashboard cable assembly.

**WARNING**
**Read WARNING on following page.**

**3.** Is 24 VDC present at circuit breaker CB39 socket 3 on PDP?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to step 13 of this fault.

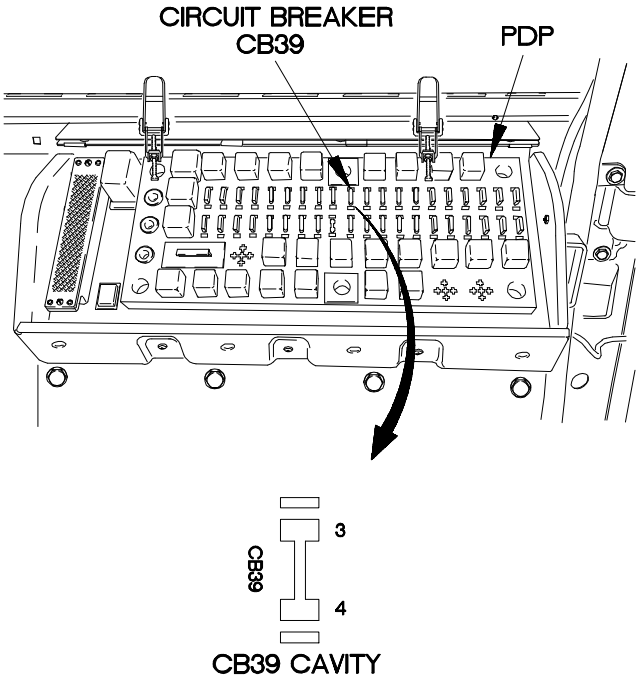
YES

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove circuit breaker CB39 from PDP.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to circuit breaker CB39 socket 3 on PDP.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 24 VDC is not present, go to step 13 of this fault.
(6) Install circuit breaker CB39 in PDP.



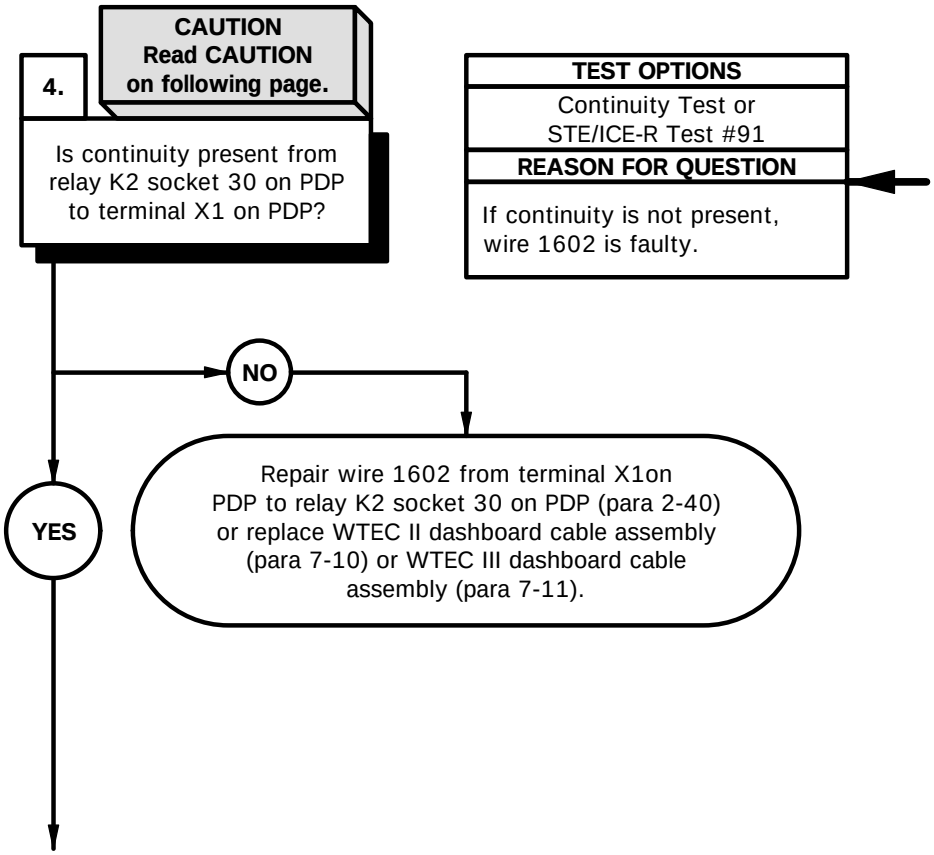
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable OK.

**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty master power switch.
Faulty dashboard cable assembly.



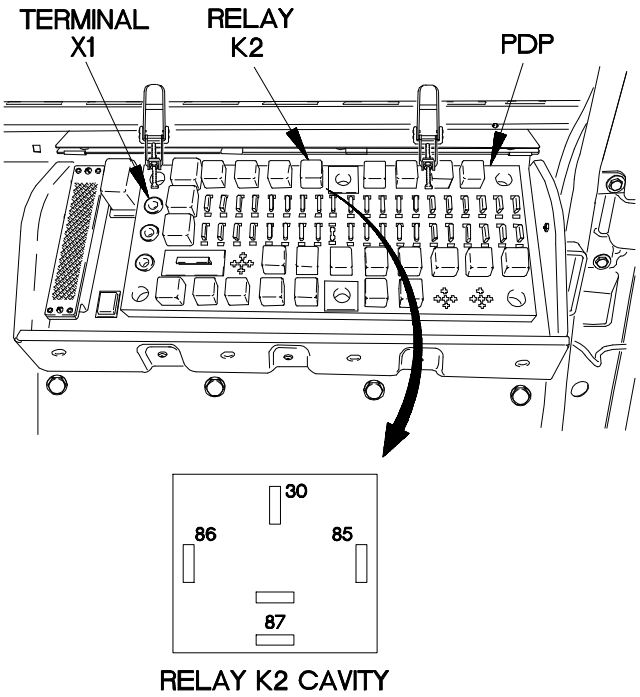
**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48)
(2) Remove relay K2 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to relay K2 socket 30 on PDP.

**CAUTION**

When testing to terminal X1 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(5) Connect negative (-) probe of multimeter to terminal X1 on PDP and note reading on multimeter.
(6) If continuity is not present, repair wire 1602 from terminal X1 on PDP to relay K2 socket 30 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



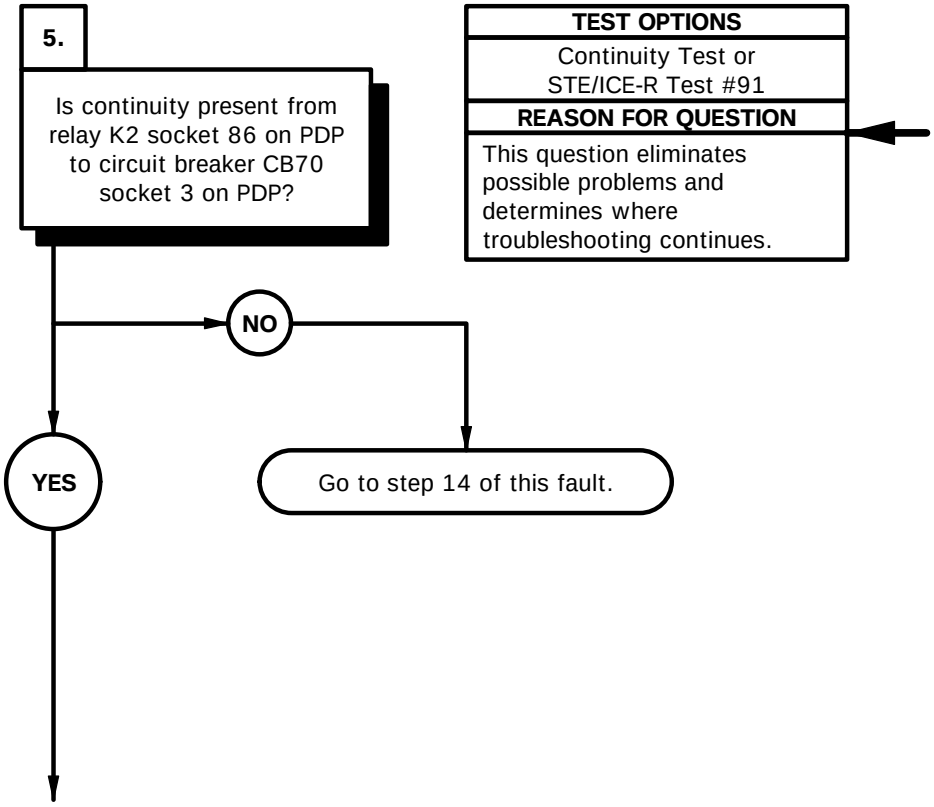
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable OK.

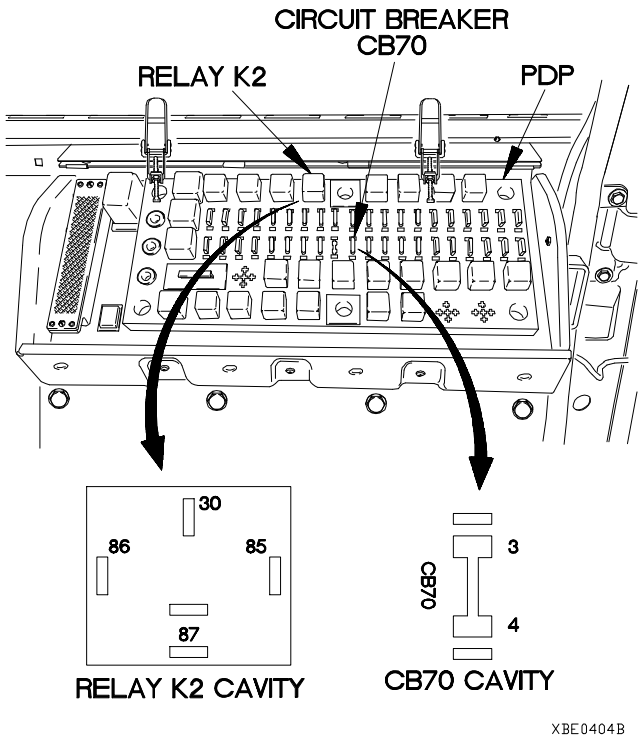
**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty master power switch.
Faulty dashboard cable assembly.



**CONTINUITY TEST**

(1) Remove circuit breaker CB70 from PDP.
(2) Position master power switch to on (TM 9-2320-365-10).
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to relay K2 socket 86 on PDP.
(5) Connect negative (-) probe of multimeter to circuit breaker CB70 socket 4 on PDP and note reading on multimeter.
(6) If continuity is not present, go to step 14 of this fault.
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Install circuit breaker CB70 in PDP.



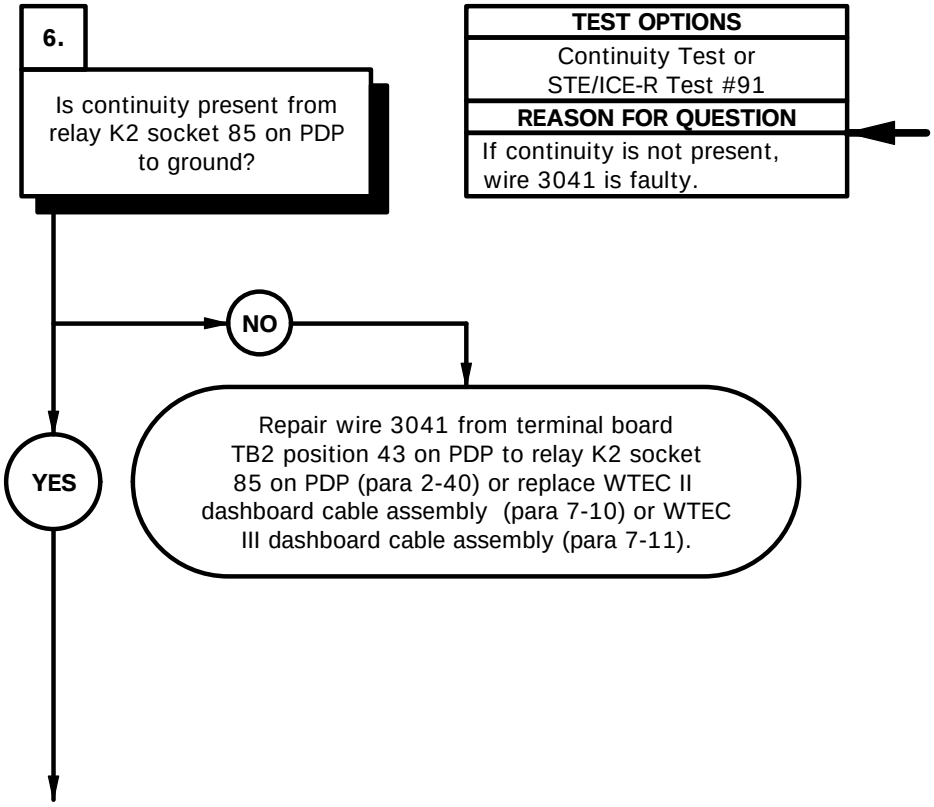
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable OK.
Master power switch OK.

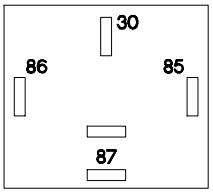
**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty dashboard cable assembly.



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K2 socket 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3041 from terminal board TB2 position 43 on PDP to relay K2 socket 85 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



RELAY K2 CAVITY

XBE0405B

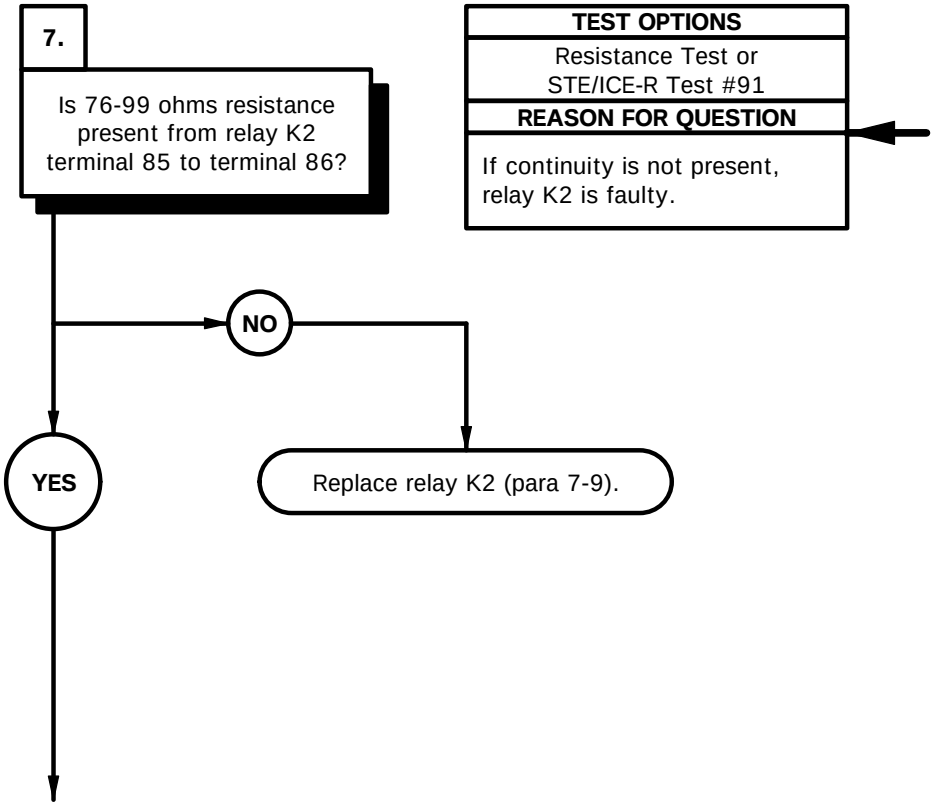
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable OK.
Master power switch OK.

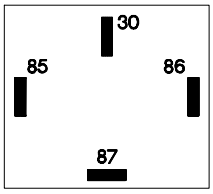
**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty dashboard cable assembly.



**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K2 terminal 85.
(3) Connect negative (-) probe of multimeter to relay K2 terminal 86 and note reading on multimeter.
(4) If 76-99 ohms resistance is not present, replace relay K2 (para 7-9).



RELAY K2

XBE0406B

## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable OK.
Master power switch OK.

**POSSIBLE PROBLEMS**

Faulty relay K2.
Faulty dashboard cable assembly.

**WARNING**
**Read WARNING on following page.**

**8.** Is 24 VDC present at relay K2 socket 87 on PDP?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

If 24 VDC is not present, relay K2 is faulty.

**NO** → Replace relay K2 (para 7-9).

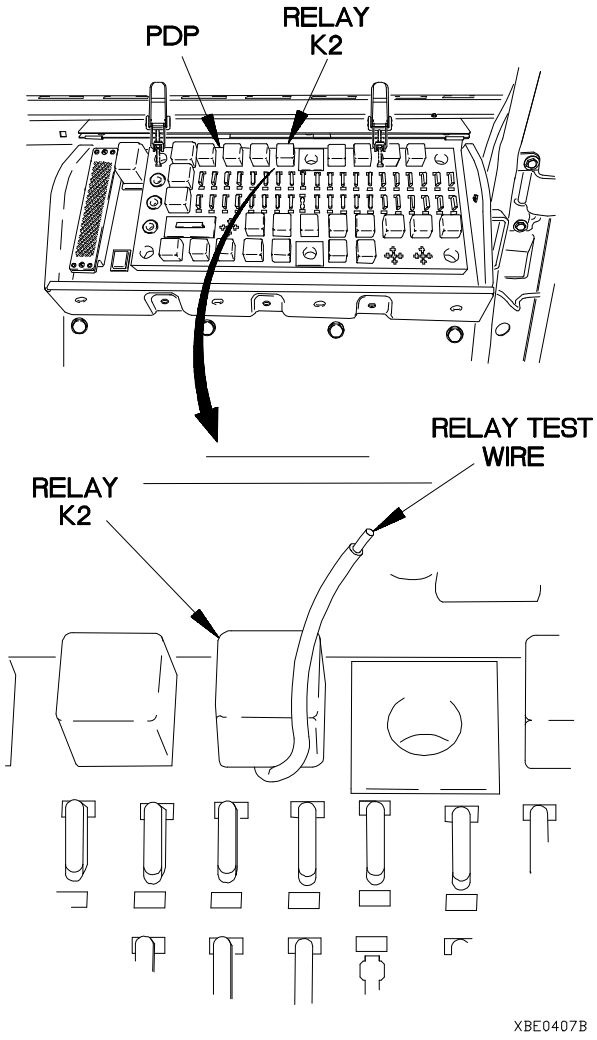
**YES**

**WARNING**

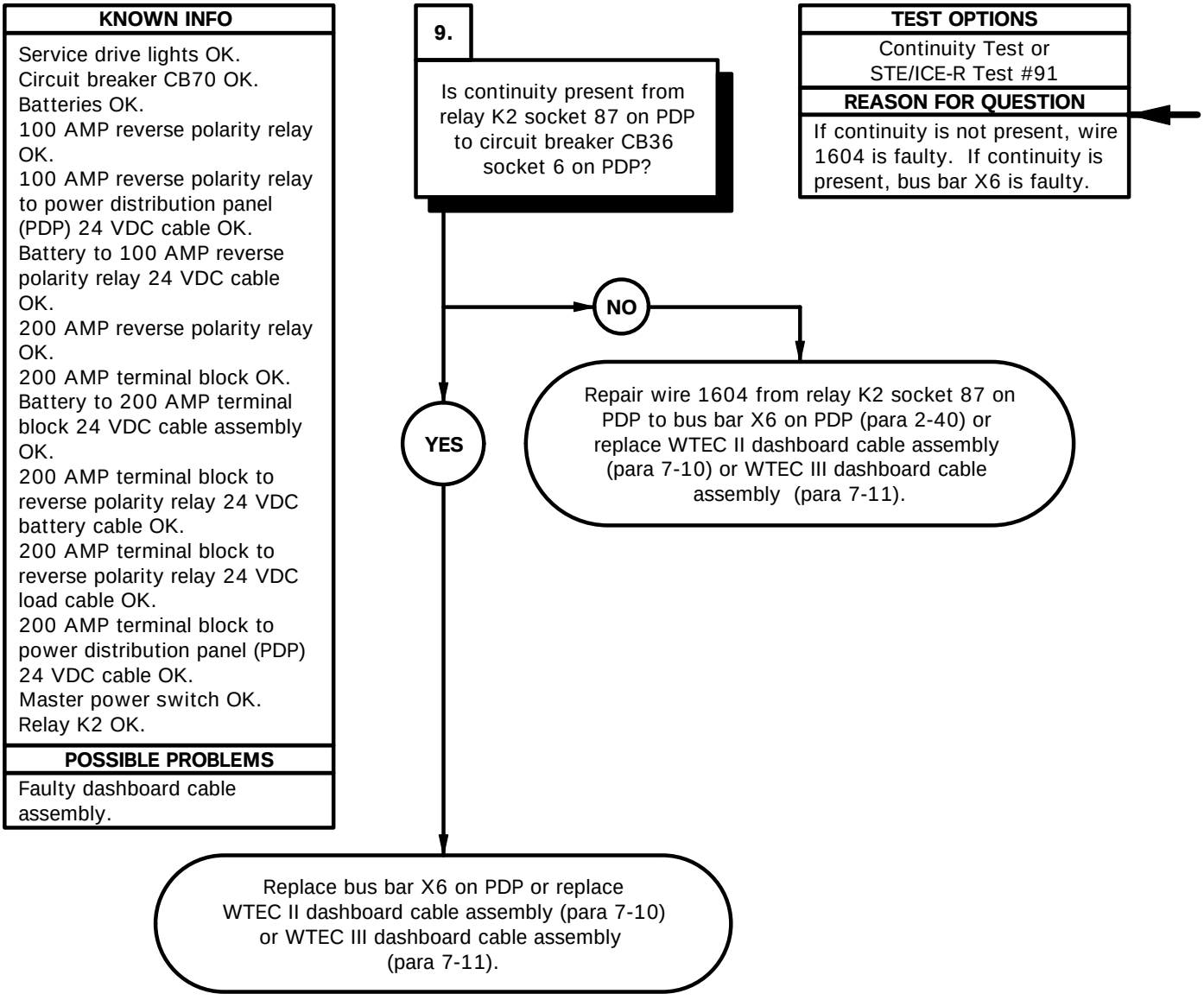
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay test wire in relay K2 socket 87 on PDP.
(2) Install relay K2 in PDP.
(3) Connect batteries (para 7-48).
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to relay test wire.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If 24 VDC is not present, replace relay K2 (para 7-9).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Disconnect batteries (para 7-48).
(11) Remove relay K2 from PDP.
(12) Remove relay test wire from PDP relay K2 socket 87.

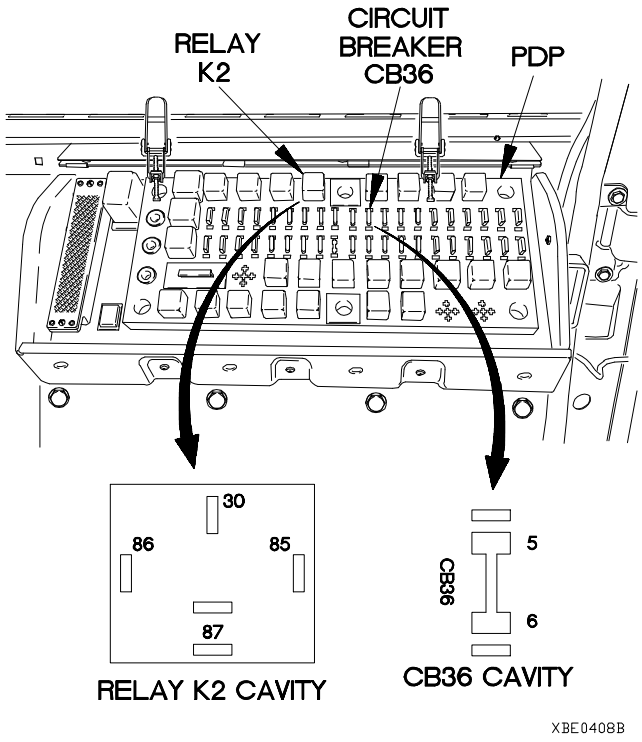


## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove circuit breaker CB36 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to relay K2 socket 87 on PDP.
(4) Connect negative (-) probe of multimeter to circuit breaker CB36 socket 6 on PDP and note reading on multimeter.
(5) If continuity is not present, repair wire 1604 from relay K2 socket 87 on PDP to bus bar X6 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace bus bar X6 on PDP or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install circuit breaker CB36 in PDP.
(8) Install relay K2 in PDP.
(9) Install power distribution panel (PDP) cover (para 16-2).
(10) Connect batteries (para 7-48).



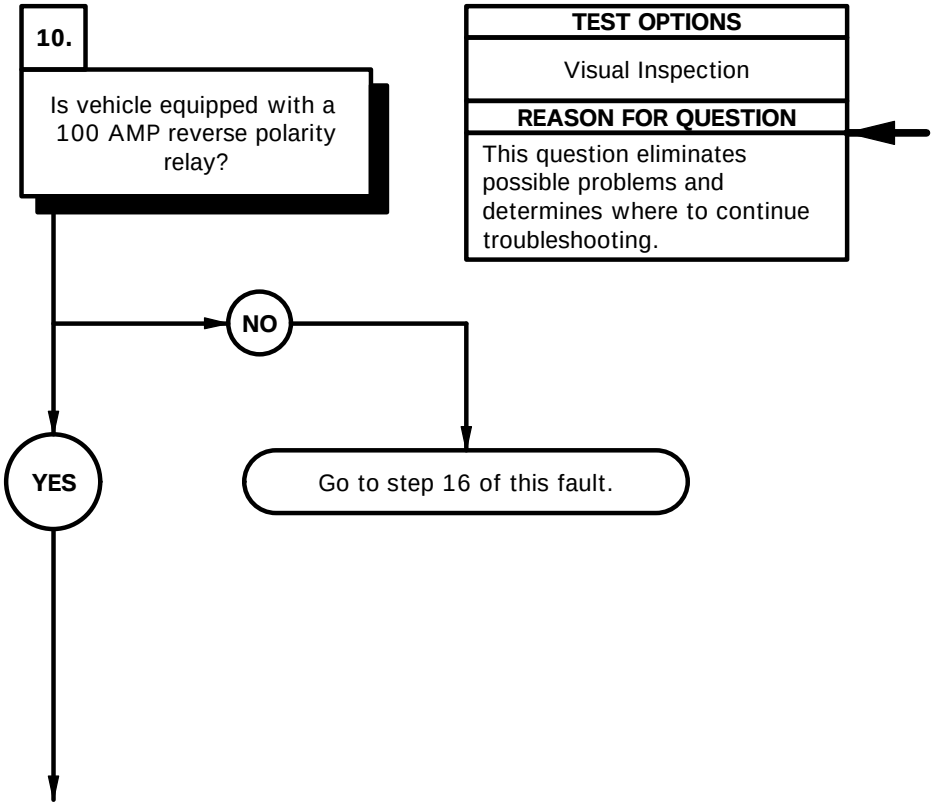
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

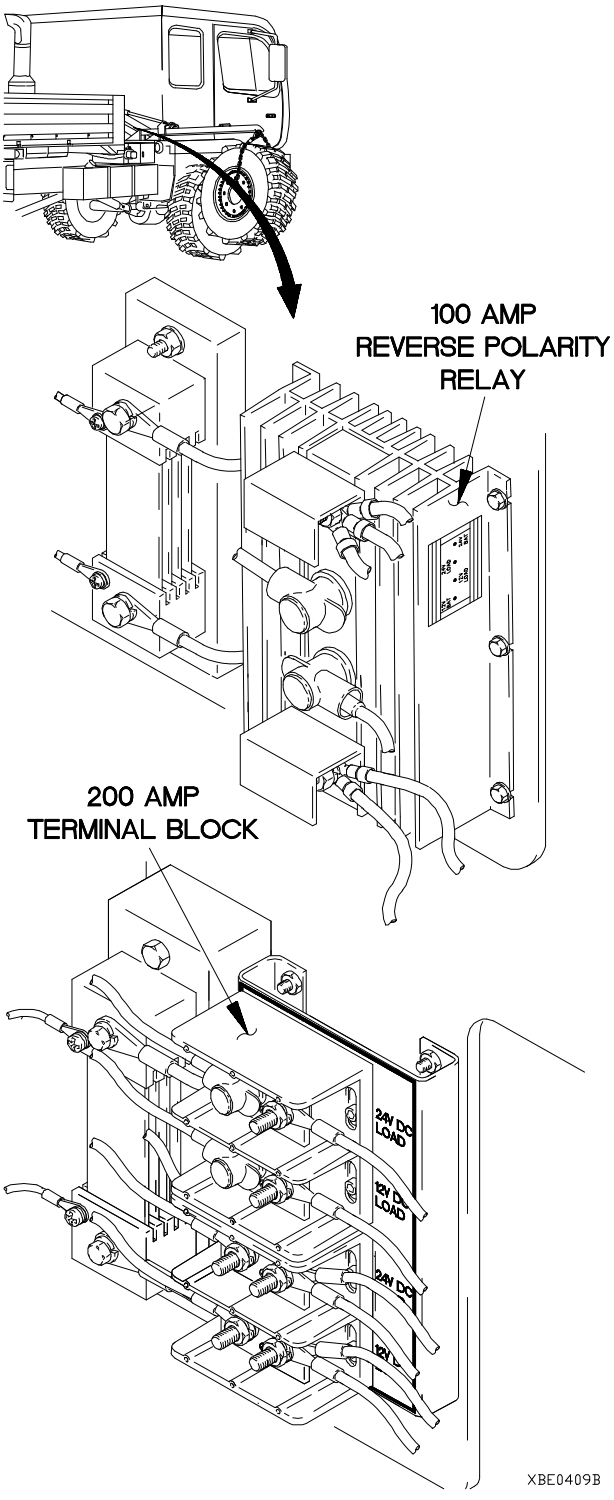
Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty 100 AMP reverse polarity relay.
Faulty 100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable.
Faulty battery to 100 AMP reverse polarity relay 24 VDC cable.
Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty battery to 200 AMP terminal block 24 VDC cable assembly.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC battery cable.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.



(1) Lower spare tire (TM 9-2320-365-10).
(2) Check if vehicle is equipped with 100 AMP reverse polarity relay.
(3) If vehicle is not equipped with 100 AMP reverse polarity relay, go to step 16 of this fault.



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty 100 AMP reverse polarity relay.
Faulty 100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable.
Faulty battery to 100 AMP reverse polarity relay 24 VDC cable.

**11.**

Is continuity present from terminal lug TL39 to terminal lug TL37?

**NO**

Replace battery to 100 AMP reverse polarity relay 24 VDC cable (para 7-68).

**YES**

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

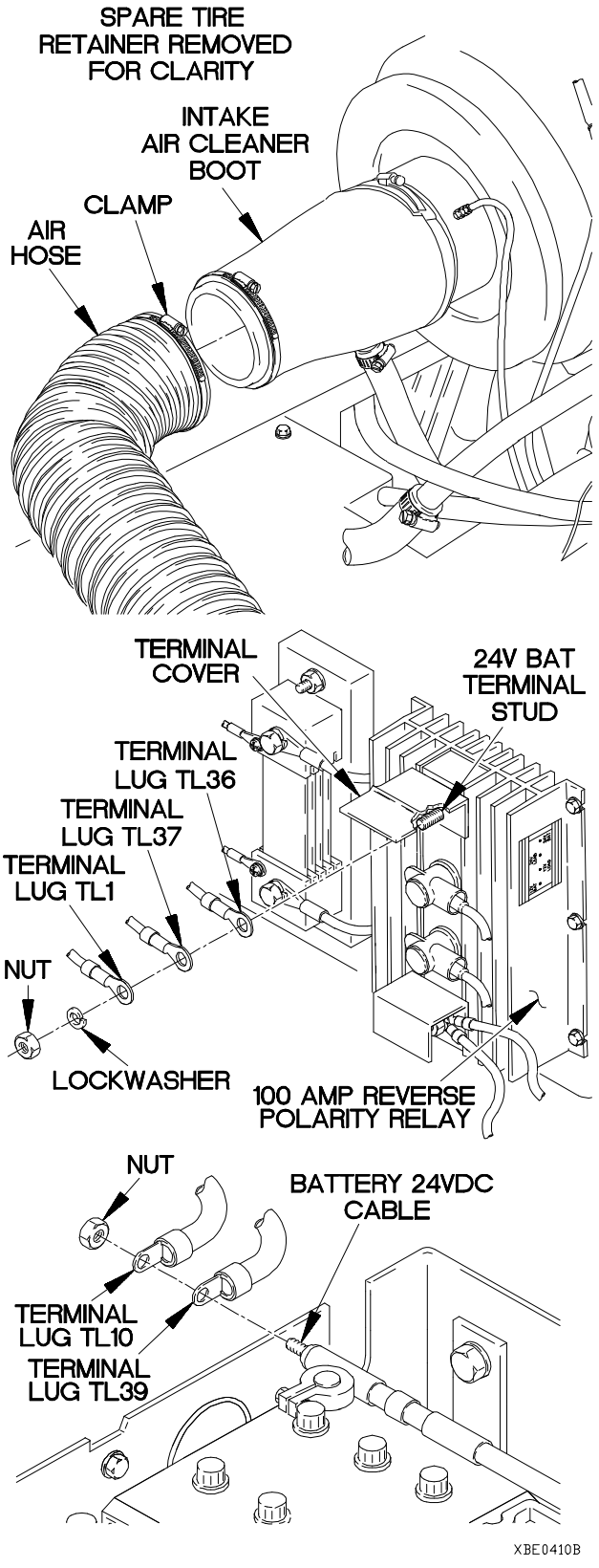
If continuity is not present, battery to 100 AMP reverse polarity relay 24 VDC cable is faulty.

**CONTINUITY TEST**

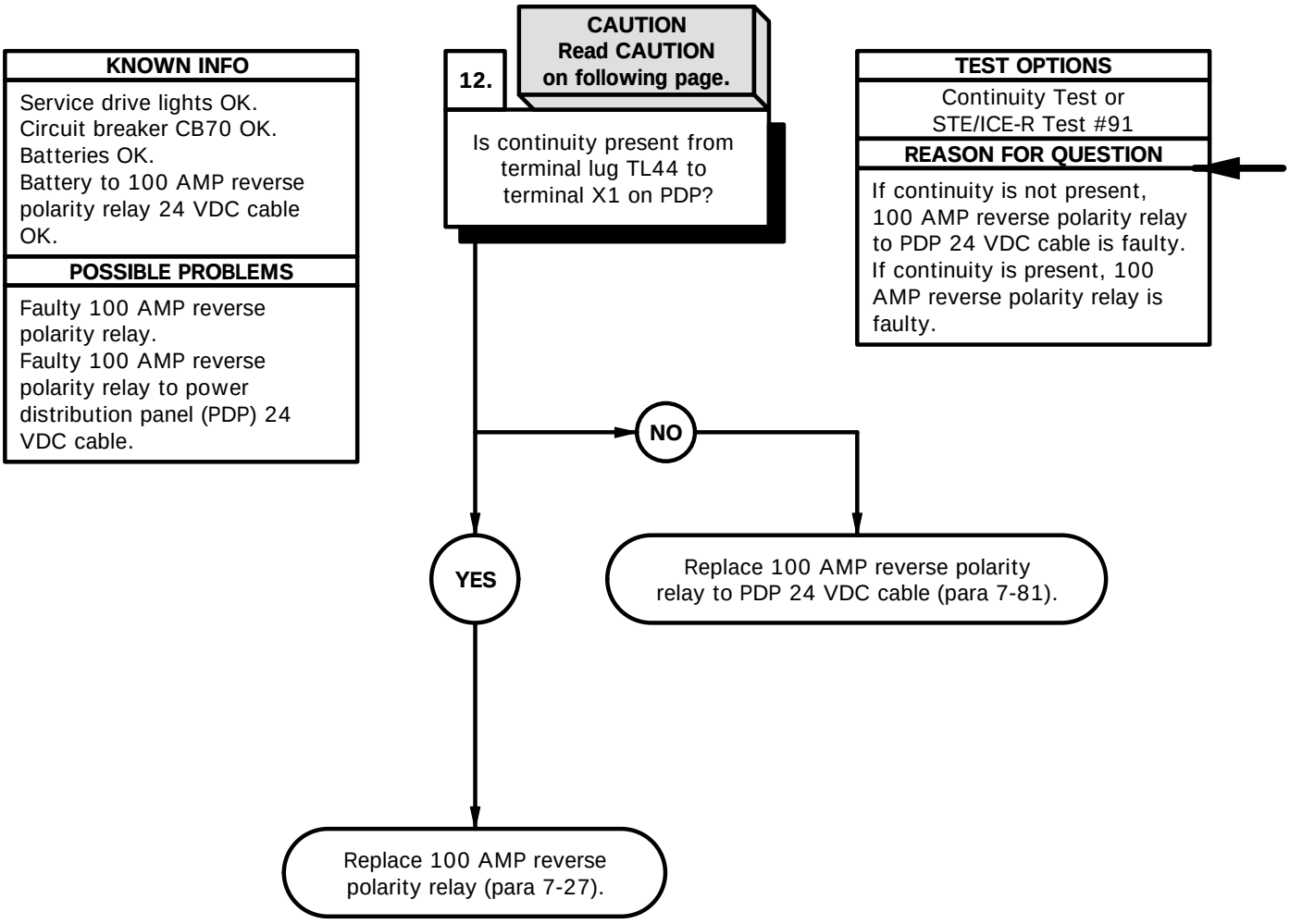
(1) Disconnect batteries (para 7-48)
(2) Remove nut, terminal lug TL10, and terminal lug TL39 from battery 24 VDC cable.
(3) Loosen clamp on air hose.
(4) Remove air hose from intake air cleaner boot.

**NOTE**
Tag all terminal lug and connection points prior to disconnecting.

(5) Lift terminal cover on 24V BAT terminal stud on 100 AMP reverse polarity relay.
(6) Remove nut, lockwasher, and terminal lugs TL1, TL37, and TL36 from 24V BAT terminal stud on 100 AMP reverse polarity relay. Discard lockwasher.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to terminal lug TL37.
(9) Connect negative (-) probe of multimeter to terminal lug TL39 and note reading on multimeter.
(10) If continuity is not present, replace battery to 100 AMP reverse polarity relay 24 VDC cable (para 7-68).
(11) Lift terminal cover on 24V BAT terminal stud on 100 AMP reverse polarity relay.
(12) Position terminal lugs TL36, TL37, and TL1 on 24V BAT terminal stud on 100 AMP reverse polarity relay with lockwasher and nut.
(13) Tighten nut to 120-144 lb-in. (14-16 N.m).
(14) Install terminal lug TL39 and terminal lug TL10 on battery 24 VDC cable with nut.



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)



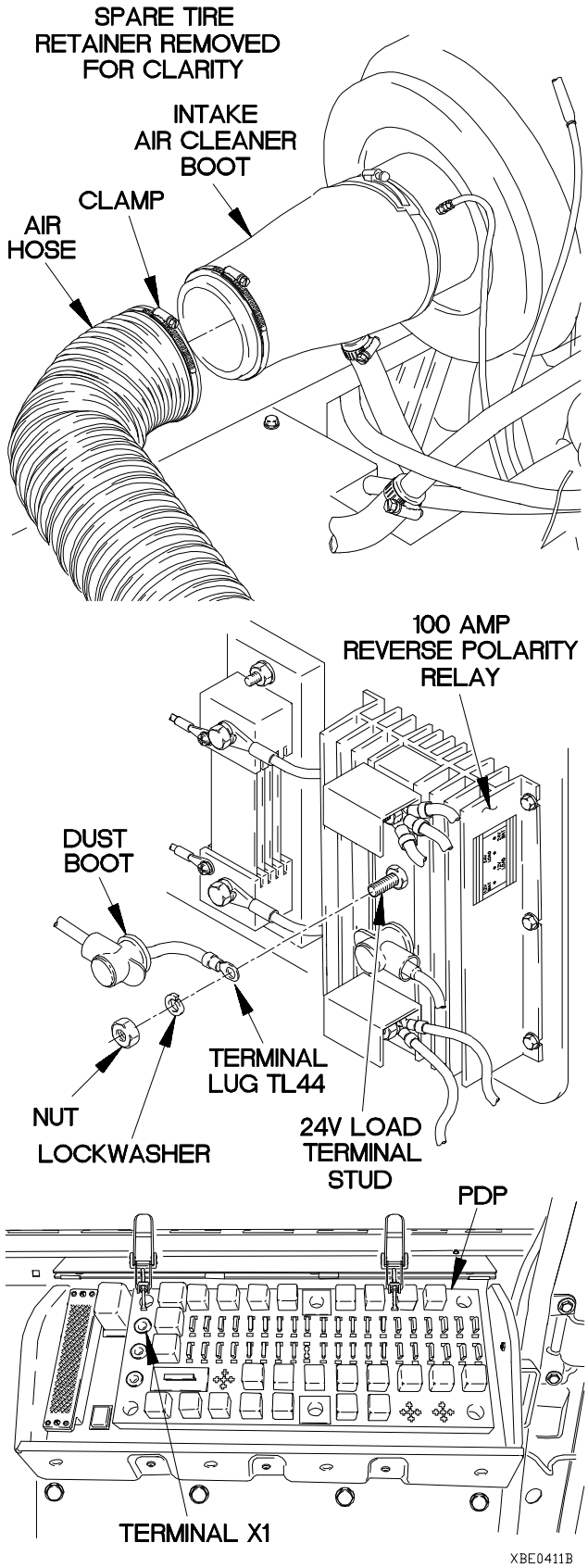
**CONTINUITY TEST**

(1) Lift dust boot on 24V LOAD terminal stud on 100 AMP reverse polarity relay.
(2) Remove nut, lockwasher, and terminal lug TL44 from 24V LOAD terminal stud on 100 AMP reverse polarity relay. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL44.

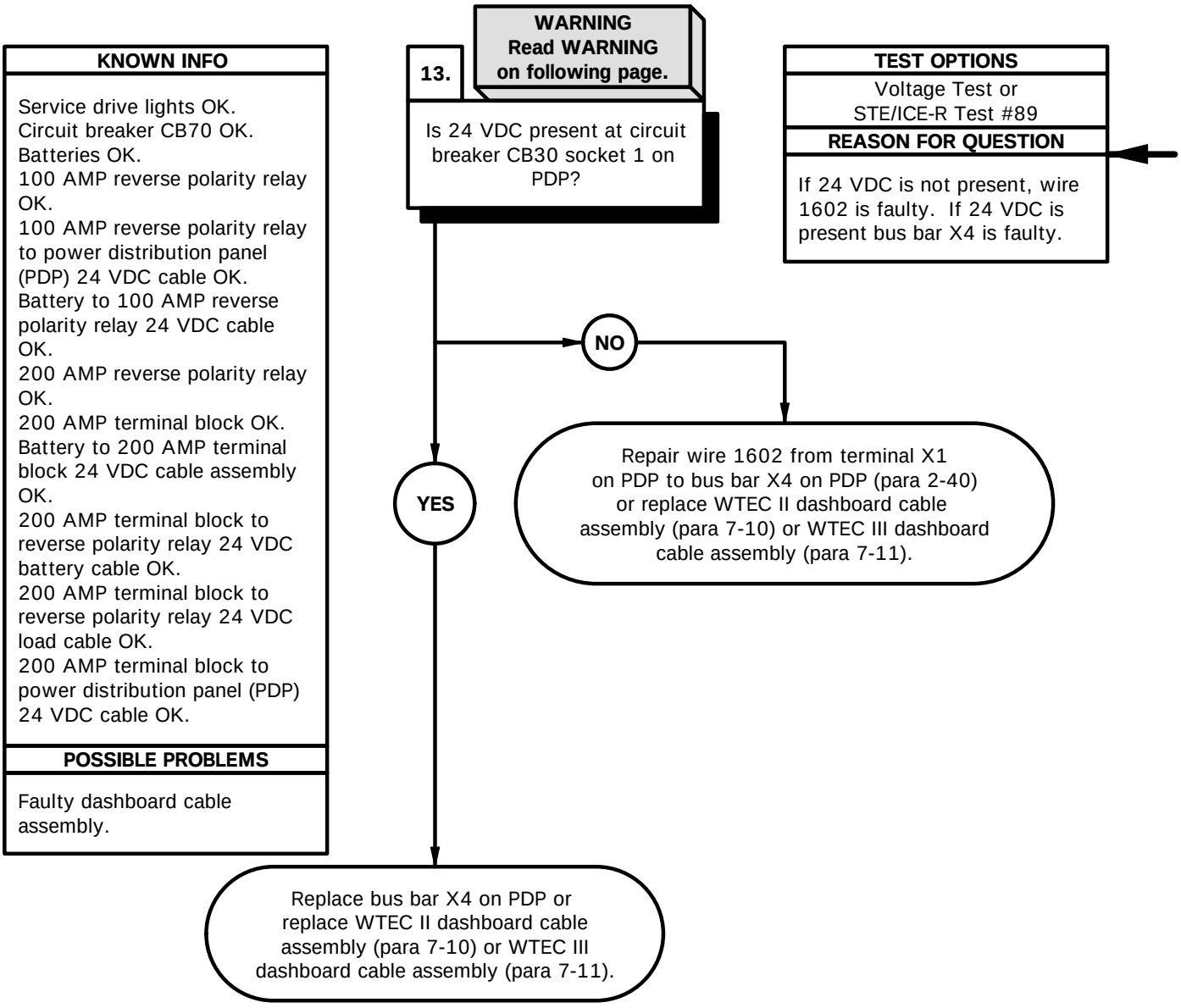
**CAUTION**

When testing to terminal X1 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(5) Connect negative (-) probe of multimeter to terminal X1 on PDP and note reading on multimeter.
(6) If continuity is not present, replace 100 AMP reverse polarity relay to PDP 24 VDC cable (para 7-81).
(7) If continuity is present, replace 100 AMP reverse polarity relay (para 7-27).
(8) Install PDP cover (para 16-2).
(9) Position terminal lug TL44 on 24V LOAD terminal stud on 100 AMP reverse polarity relay with lockwasher and nut.
(10) Tighten nut to 120-144 lb-in. (14-16 N.m).
(11) Position dust boot on 24V LOAD terminal stud on 100 AMP reverse polarity relay.
(12) Position air hose on intake air cleaner boot with clamp.
(13) Tighten clamp to 36-48 lb-in. (4-5 N.m).
(14) Connect batteries (para 7-48)
(15) Raise spare tire (TM 9-2320-365-10).



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

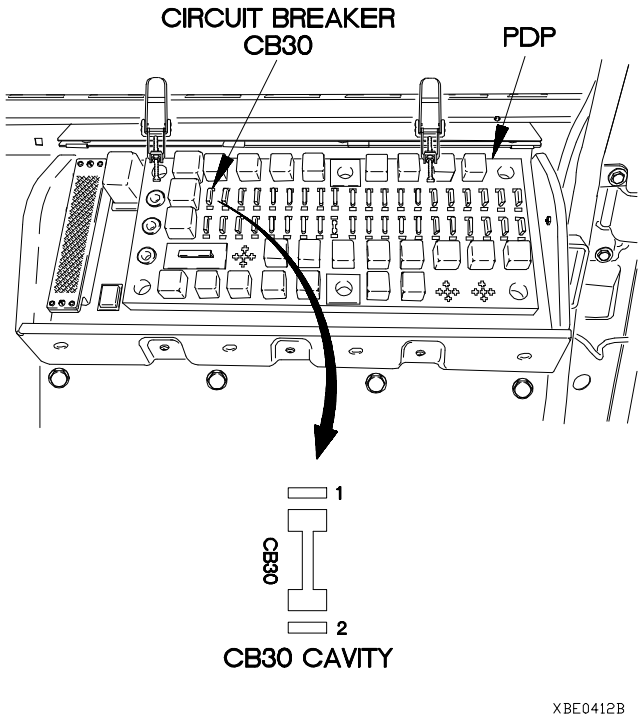


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove circuit breaker CB30 from PDP.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to circuit breaker CB30 socket 1 on PDP.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 24 VDC is not present, Repair wire 1602 from terminal X1on PDP to bus bar X4 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If 24 VDC is present, replace bus bar X4 on PDP or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install circuit breaker CB30 in PDP.
(8) Install PDP cover (para 16-2).



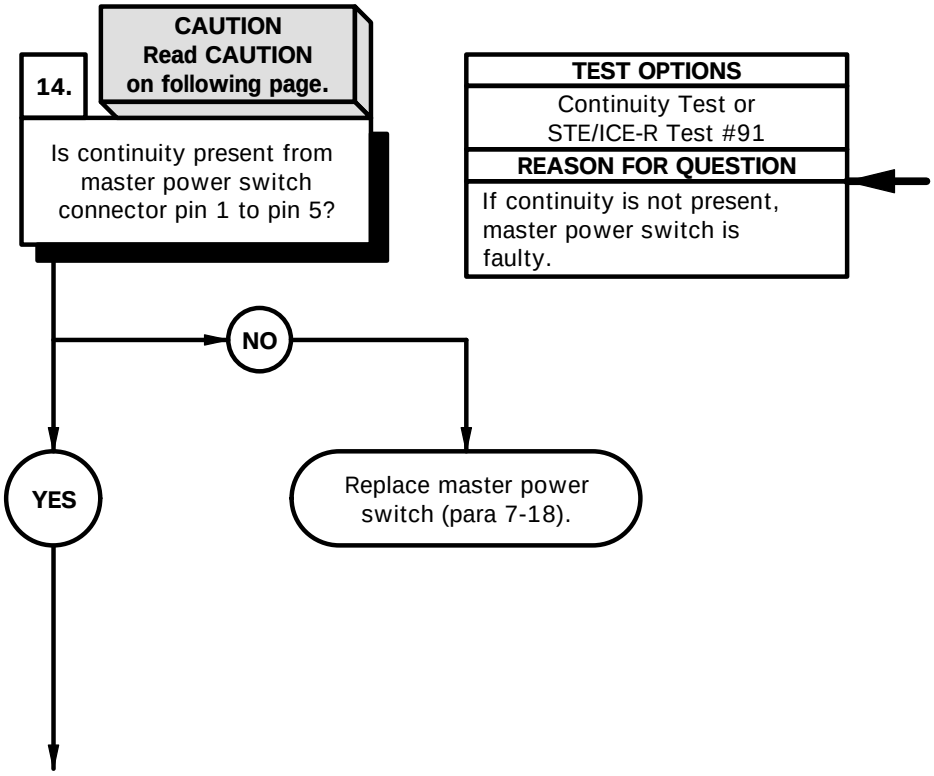
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
100 AMP reverse polarity relay OK.
100 AMP reverse polarity relay to power distribution panel (PDP) 24 VDC cable OK.
Battery to 100 AMP reverse polarity relay 24 VDC cable OK.
200 AMP reverse polarity relay OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
200 AMP terminal block to reverse polarity relay 24 VDC load cable OK.
200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.

**POSSIBLE PROBLEMS**

Faulty master power switch.
Faulty dashboard cable assembly.



**CAUTION**

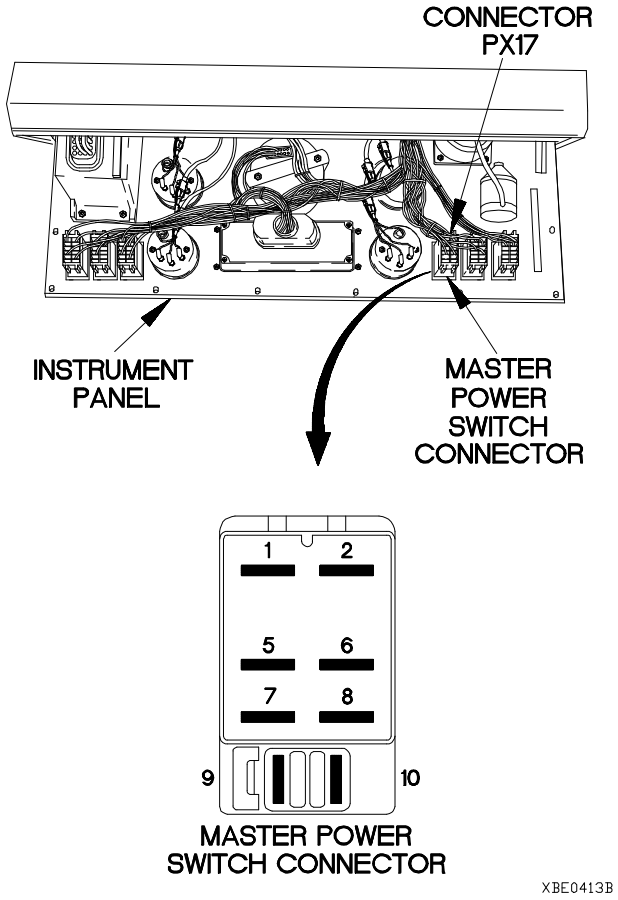
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

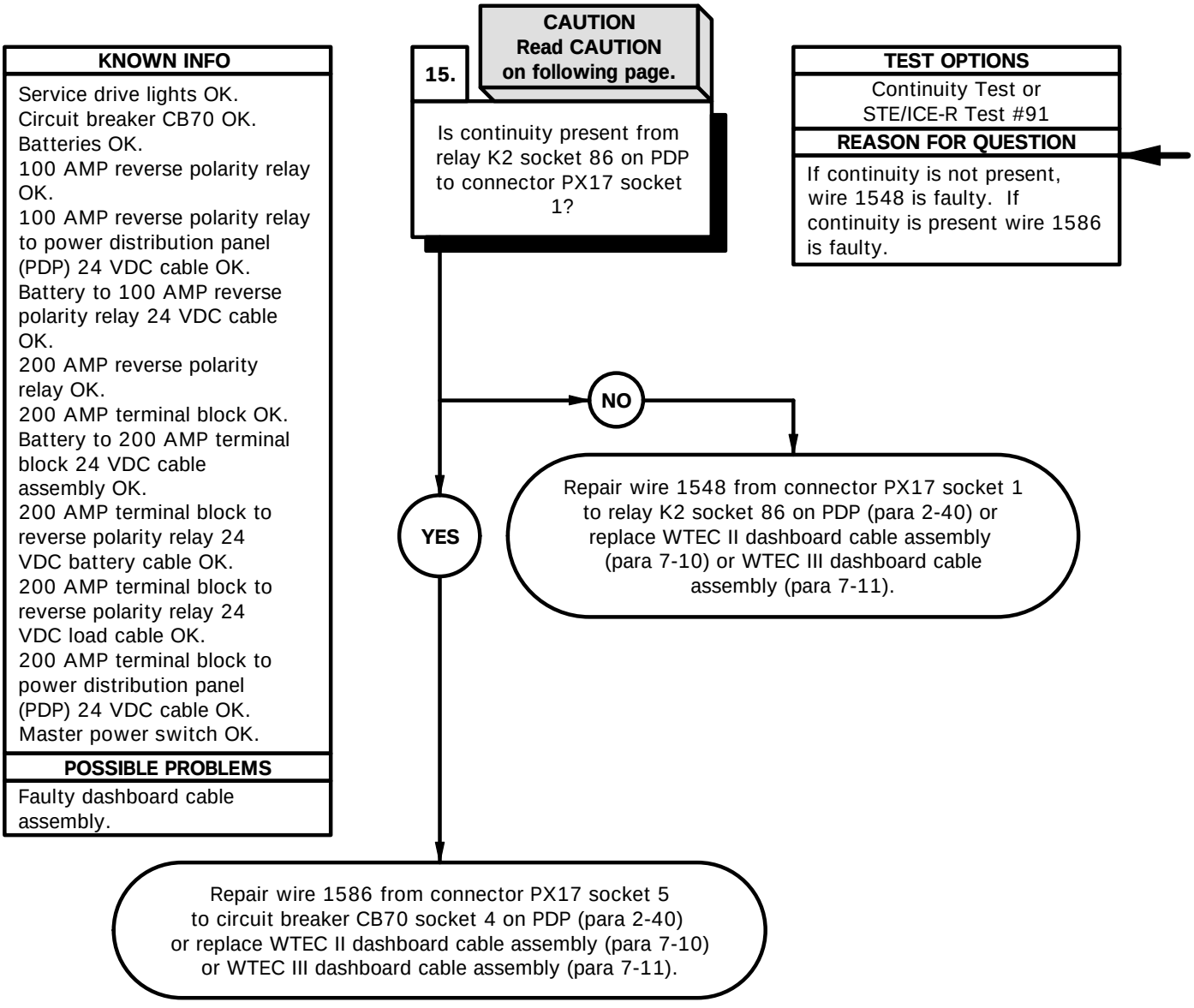
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX17 from master power switch connector.
(3) Position master power switch to on.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to master power switch connector pin 1.
(6) Connect negative (-) probe of multimeter to master power switch connector pin 5 and note reading on multimeter.
(7) If continuity is not present, replace master power switch (para 7-18).
(8) Position master power switch to off.



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)



**CAUTION**

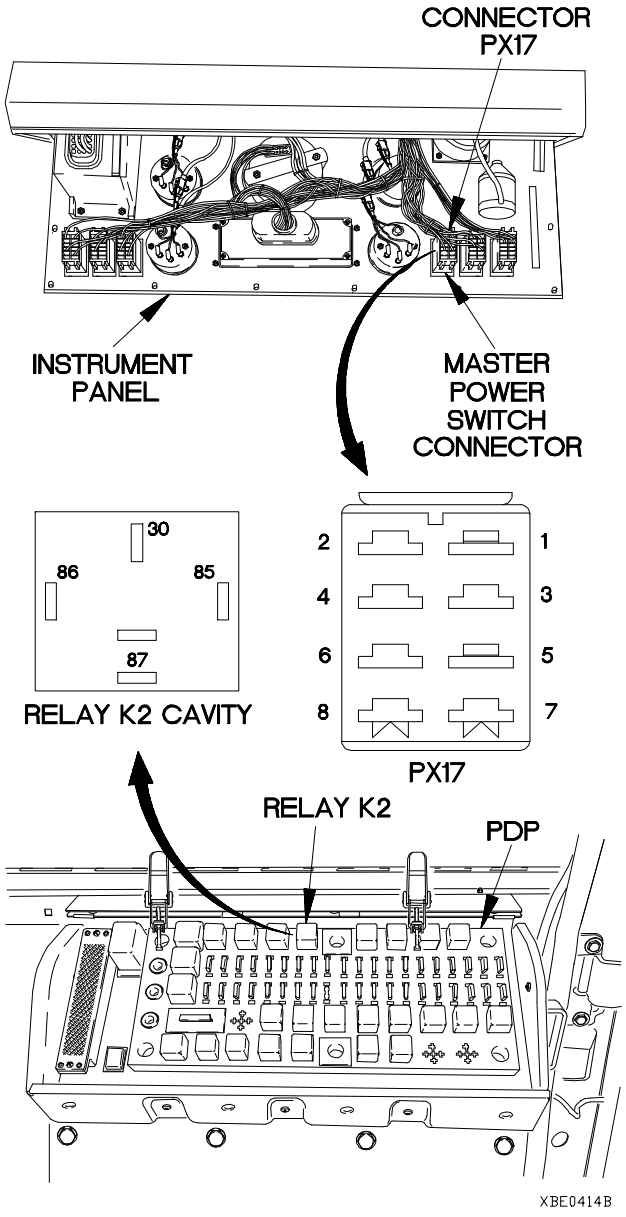
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX17 socket 1.
(3) Connect negative (-) probe of multimeter to relay K2 socket 86 on PDP and note reading on multimeter.
(4) If continuity is not present, repair wire 1548 from connector PX17 socket 1 to relay K2 socket 86 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1586 from connector PX17 socket 5 to circuit breaker CB70 socket 4 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX17 to master power switch connector.
(7) Install instrument panel (para 7-15).
(8) Install relay K2 in PDP.
(9) Install PDP cover (para 16-2).
(10) Connect batteries (para 7-48).



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty battery to 200 AMP terminal block 24 VDC cable assembly.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC battery cable.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.

**16.**

Is continuity present from 200 AMP terminal block 24V BATT left terminal stud to right terminal stud?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, 200 AMP terminal block is faulty.

NO

Replace 200 AMP terminal block (para 20-69).

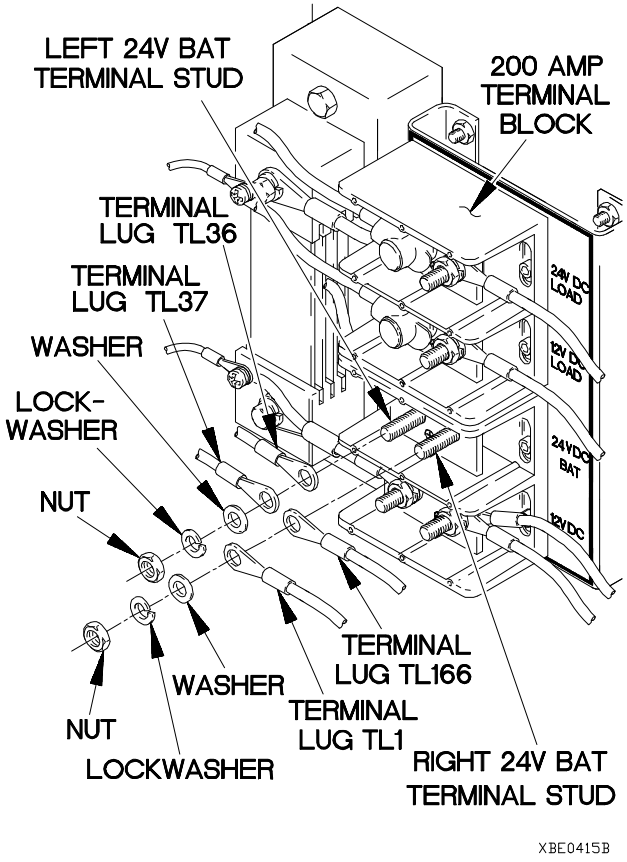
YES

**CONTINUITY TEST**

**NOTE**

Tag terminal lugs and connection points prior to disconnecting.

(1) Disconnect batteries (para 7-48).
(2) Remove nut, lockwasher, washer, and terminal lugs TL37 and TL36 from left 24V BAT terminal stud on 200 AMP terminal block. Discard lockwasher.
(3) Remove nut, lockwasher, washer, and terminal lugs TL1 and TL166 from right 24V BAT terminal stud on 200 AMP terminal block. Discard lockwasher.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to left 24V BAT terminal stud on 200 AMP terminal block.
(6) Connect negative (-) probe of multimeter to right 24V BAT terminal stud on 200 AMP terminal block and note reading on multimeter.
(7) If continuity is not present, replace 200 AMP terminal block (para 20-69).



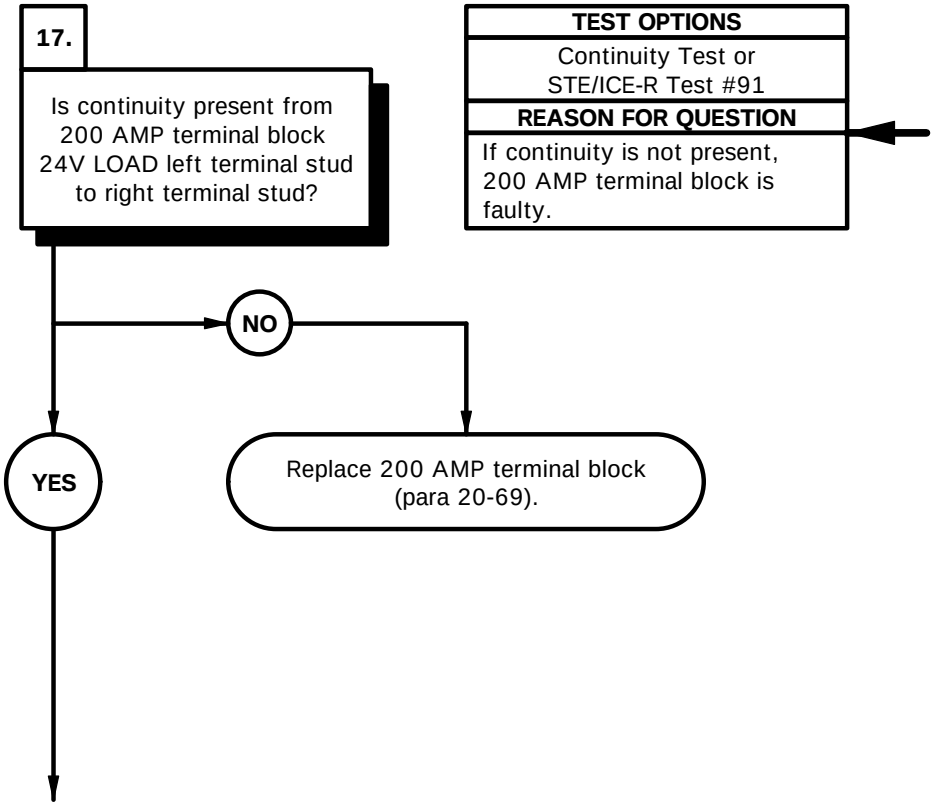
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.

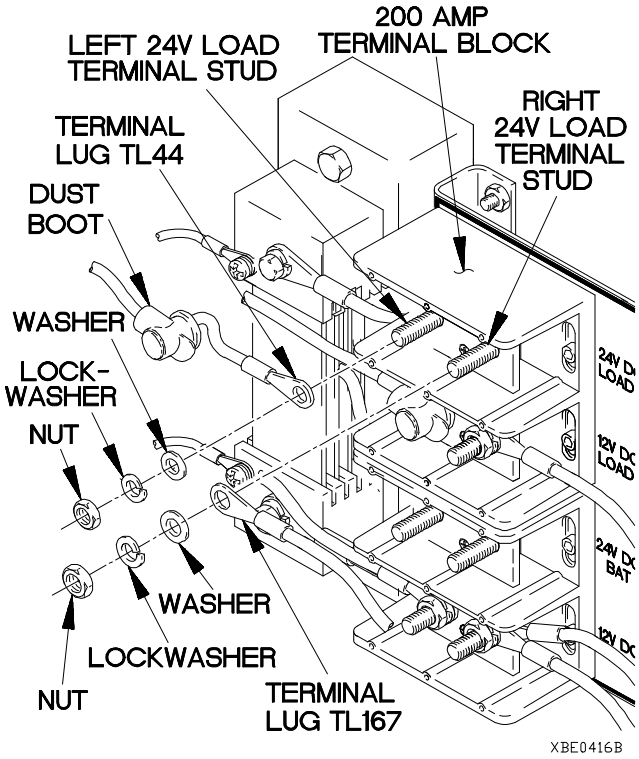
**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block.
Faulty battery to 200 AMP terminal block 24 VDC cable assembly.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC battery cable.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.

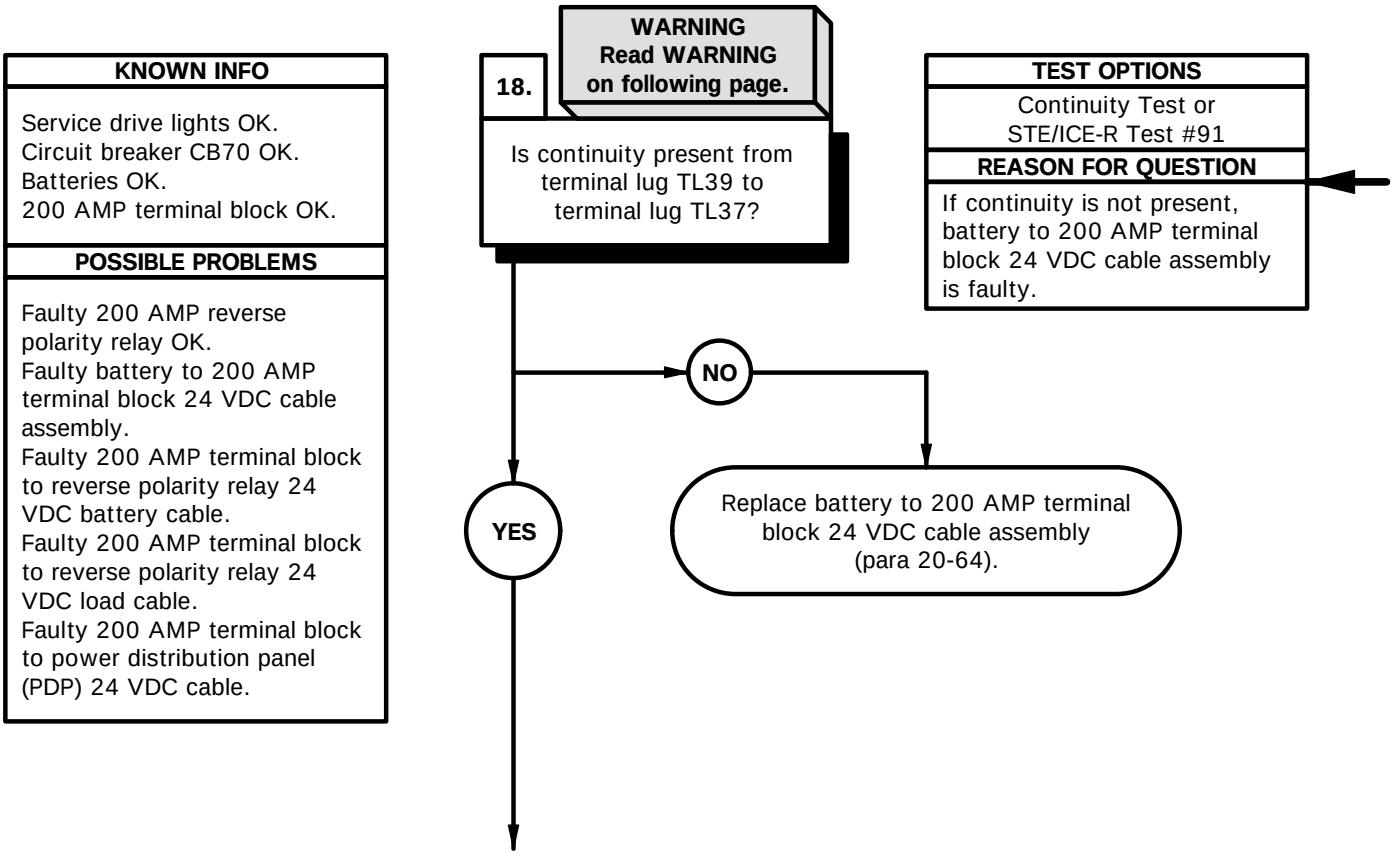


**CONTINUITY TEST**

(1) Lift dust boot from left 24V LOAD terminal stud on 200 AMP terminal block.
(2) Remove nut, lockwasher, washer, and terminal lug TL44 from left 24V LOAD terminal stud on 200 AMP terminal block. Discard lockwasher.
(3) Remove nut, lockwasher, washer, and terminal lug TL167 from right 24V LOAD terminal stud on 200 AMP terminal block. Discard lockwasher.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to left 24V LOAD terminal stud on 200 AMP terminal block.
(6) Connect negative (-) probe of multimeter to right 24V LOAD terminal stud on 200 AMP terminal block and note reading on multimeter.
(7) If continuity is not present, replace 200 AMP terminal block (para 20-69).



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

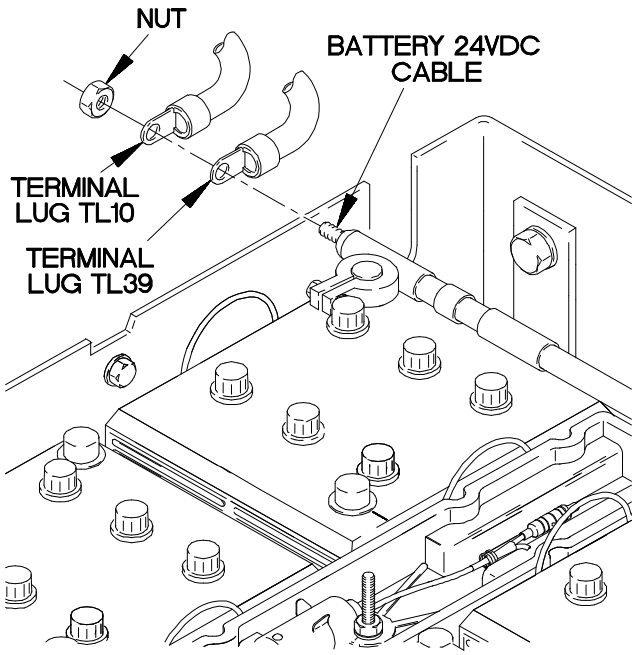


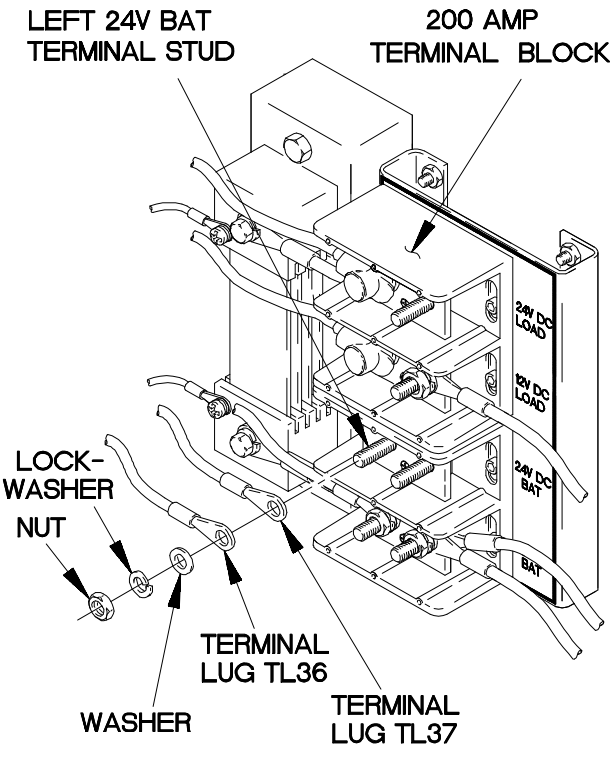
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CONTINUITY TEST**

(1) Remove nut and terminal lugs TL39 and TL10 from battery 24 VDC cable.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL39.
(4) Connect negative (-) probe of multimeter to terminal lug TL37 and note reading on multimeter.
(5) If continuity is not present, replace battery to 200 AMP terminal block 24 VDC cable assembly (para 20-64).
(6) Position terminal lugs TL36 and TL37 on left 24V BAT terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(7) Tighten nut to 15-19 lb-ft (21-25 N.m).
(8) Install terminal lugs TL10 and TL39 on battery 24 VDC cable with nut.



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC battery cable.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.

**19.**

Is continuity present from terminal lug TL166 to terminal lug TL168?

**NO**

Replace 200 AMP terminal block to reverse polarity relay 24 VDC battery cable (para 20-67).

**YES**

**TEST OPTIONS**

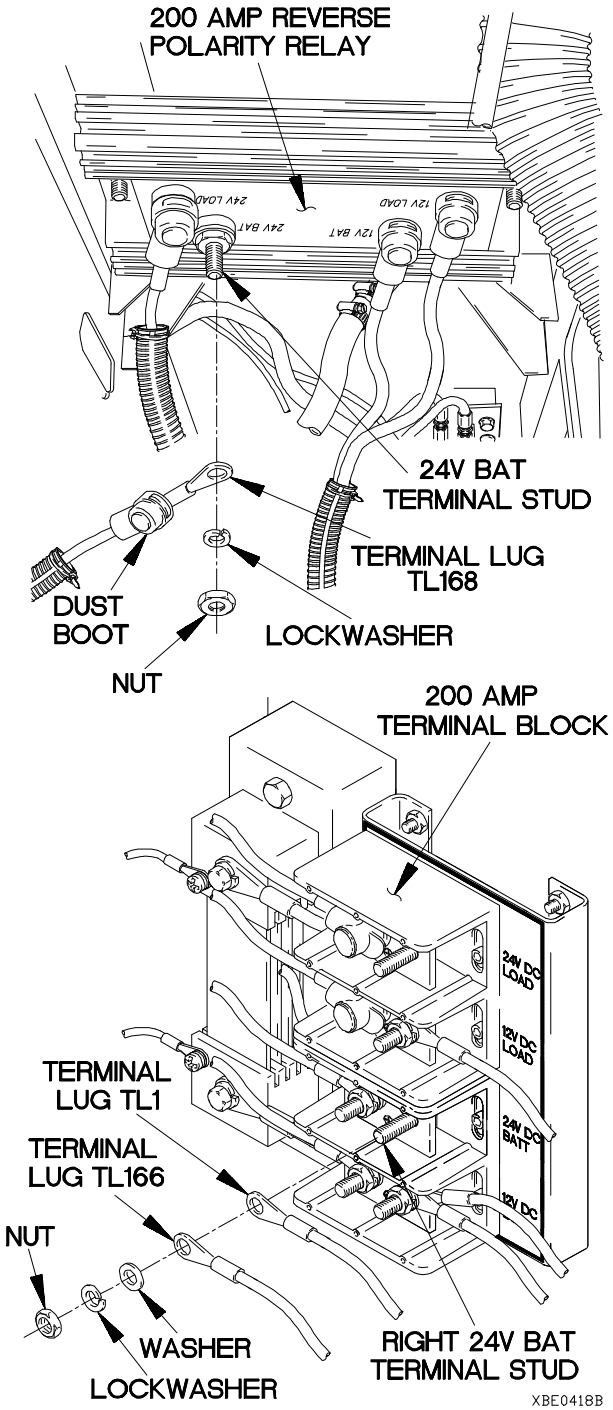
Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, 200 AMP terminal block to reverse polarity relay 24 VDC battery cable is faulty.

**CONTINUITY TEST**

(1) Lift dust boot on 24V BAT terminal stud on 200 AMP reverse polarity relay.
(2) Remove nut, lockwasher, terminal lug TL168 from 24V BAT terminal stud on 200 AMP reverse polarity relay. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL166.
(5) Connect negative (-) probe of multimeter to terminal lug TL168 and note reading on multimeter.
(6) If continuity is not present, replace 200 AMP terminal block to reverse polarity relay 24 VDC battery cable (para 20-67).
(7) Position terminal lug TL168 on 24V BAT terminal stud on 200 AMP reverse polarity relay with lockwasher and nut.
(8) Tighten nut to 27-33 lb-ft (37-45 N.m).
(9) Position dust boot on 24 V BAT terminal stud on 200 AMP reverse polarity relay.
(10) Position terminal lugs TL166 and TL1 on right 24 VDC BAT terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(11) Tighten nut to 15-19 lb-ft (21-25 N.m).



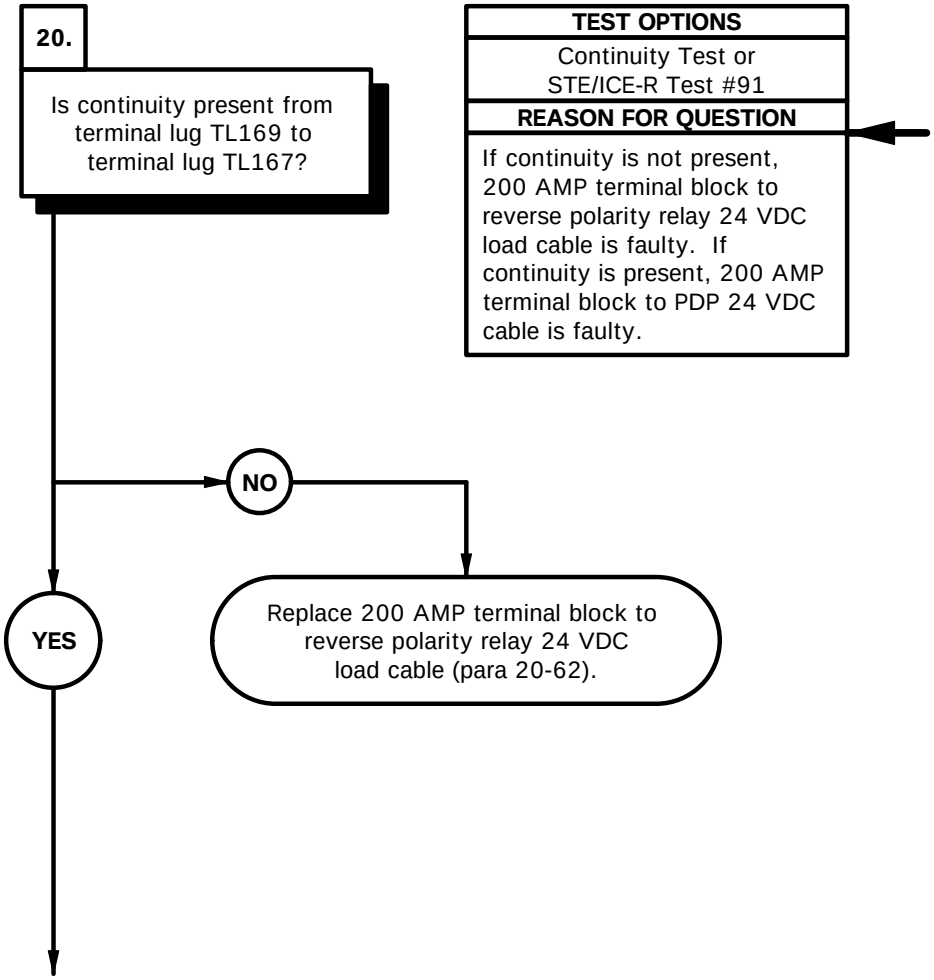
## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.

**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.




**TEST OPTIONS**

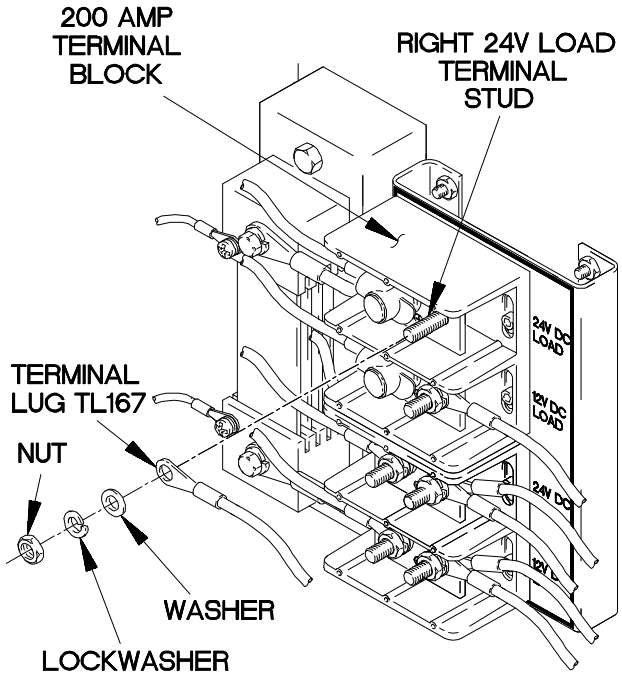
Continuity Test or
STE/ICE-R Test #91

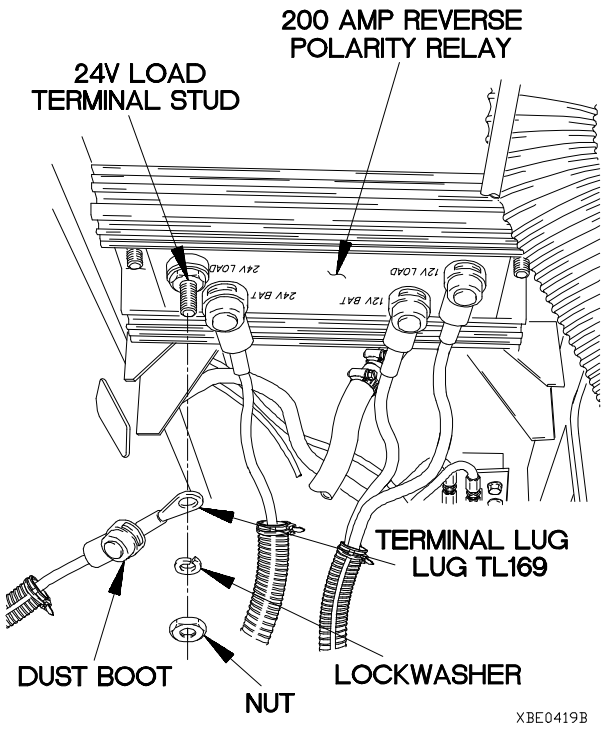
**REASON FOR QUESTION**

If continuity is not present, 200 AMP terminal block to reverse polarity relay 24 VDC load cable is faulty. If continuity is present, 200 AMP terminal block to PDP 24 VDC cable is faulty.

**CONTINUITY TEST**

(1) Lift dust boot on 24V LOAD terminal stud on 200 AMP reverse polarity relay.
(2) Remove nut, lockwasher, and terminal lug TL169 from 24V LOAD terminal stud on 200 AMP reverse polarity relay. Discard lockwasher.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL169.
(5) Connect negative (-) probe of multimeter to terminal lug TL167 and note reading on multimeter.
(6) If continuity is not present, replace 200 AMP terminal block to reverse polarity relay 24 VDC load cable (para 20-62).
(7) If continuity is present, replace 200 AMP terminal block to PDP 24 VDC cable (para 20-62).
(8) Position terminal lug TL167 on right 24V LOAD terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(9) Tighten nut to 15-19 lb-ft (21-25 N.m).
(10) Position terminal lug TL169 on 24V LOAD terminal stud on 200 AMP reverse polarity relay with lockwasher and nut.
(11) Tighten nut to 27-33 lb-ft (37-45 N.m).
(12) Position dust boot on 24V LOAD terminal stud on 200 AMP reverse polarity relay.



## e4. 24 VDC CIRCUITS DO NOT OPERATE (CONT)

**KNOWN INFO**

Service drive lights OK.
Circuit breaker CB70 OK.
Batteries OK.
200 AMP terminal block OK.
Battery to 200 AMP terminal block 24 VDC cable assembly OK.
200 AMP terminal block to reverse polarity relay 24 VDC battery cable OK.
Faulty 200 AMP terminal block to reverse polarity relay 24 VDC load cable.

**POSSIBLE PROBLEMS**

Faulty 200 AMP reverse polarity relay.
Faulty 200 AMP terminal block to power distribution panel (PDP) 24 VDC cable.

**21.**

Is continuity present from terminal X1 on PDP to terminal lug TL44?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, 200 MAP terminal block to PDP 24 VDC cable is faulty. If continuity is present, 200 AMP reverse polarity relay is faulty.

NO

Replace 200 AMP terminal block to PDP 24 VDC cable (para 20-68).

YES

Replace 200 AMP reverse polarity relay (para 20-58).

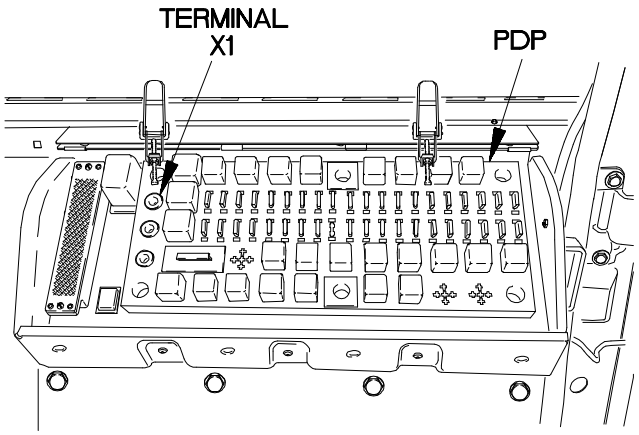
**CONTINUITY TEST**

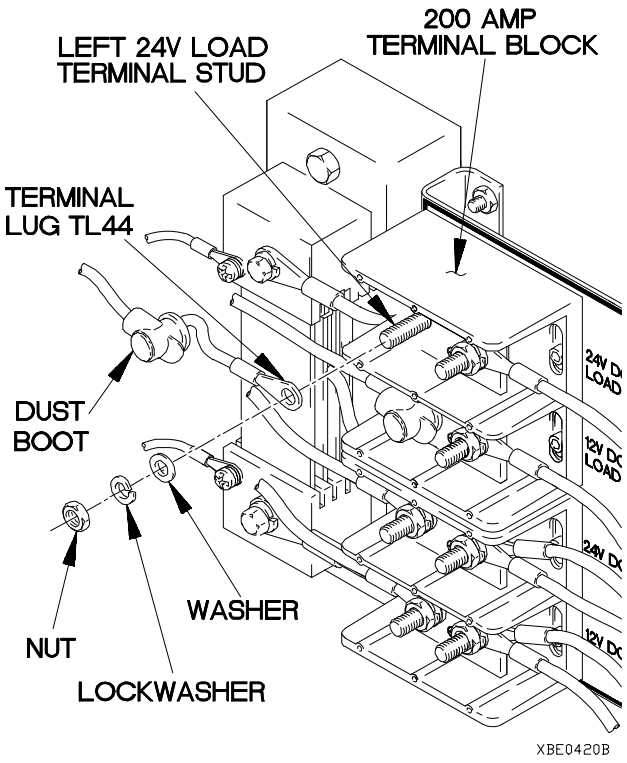
(1) Set multimeter to ohms.

**CAUTION**

When testing to terminal X1 on PDP, ensure that multimeter probes come in contact with the outside metal ring. Failure to comply may result in false troubleshooting test results.

(2) Connect positive (+) probe of multimeter to terminal X1 on PDP.
(3) Connect negative (-) probe of multimeter to terminal lug TL44 and note reading on multimeter.
(4) If continuity is not present, replace 200 AMP terminal block to PDP 24 VDC cable (para 20-68).
(5) If continuity is present, replace 200 AMP reverse polarity relay (para 20-58).
(6) Position terminal lug TL44 on left 24V LOAD terminal stud on 200 AMP terminal block with washer, lockwasher, and nut.
(7) Tighten nut to 15-19 lb-ft (21-25 N.m)
(8) Position dust boot on left 24V LOAD terminal stud on 200 AMP terminal block.
(9) Install PDP cover (para 16-2).
(10) Connect batteries (para 7-48).
(11) Raise spare tire (TM 9-2320-365-10).




**All data on pages 2-276 thru 2-299, including pages 2-277 thru 2-298, deleted.**

## e6. ENGINE CRANKS BUT DOES NOT START

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

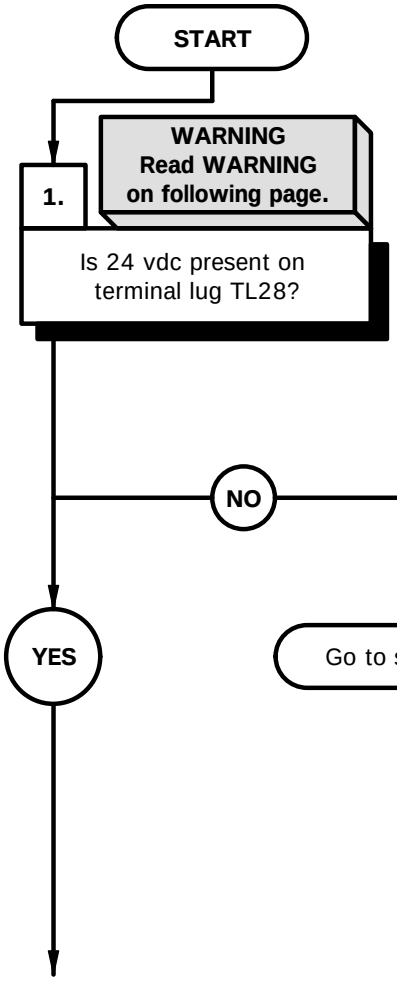
Perform Engine System Troubleshooting a2. Engine Cranks But Does Not Start prior to beginning this task.

**KNOWN INFO**

Fuel quantity OK.
Fuel/water separator primed.
Air cleaner hose or tube OK.

**POSSIBLE PROBLEMS**

Faulty start inhibit pushbutton switch.
Faulty relay K19.
Faulty dashboard cable assembly.
Faulty engine control cable assembly.
Faulty fuel shutoff solenoid.

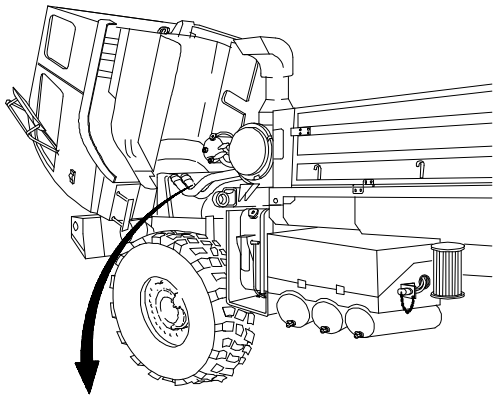



**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

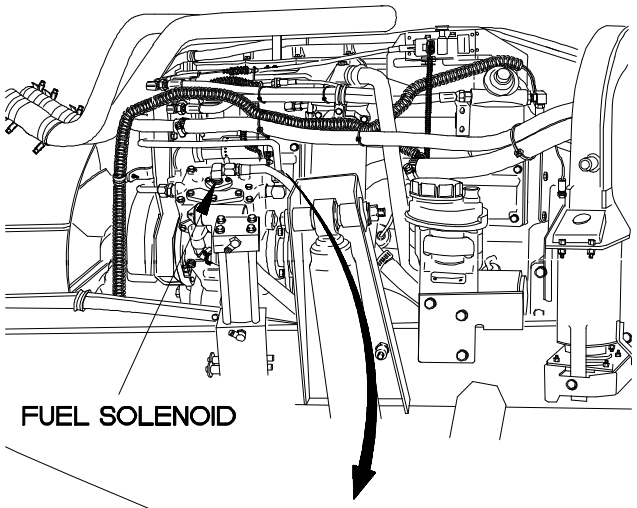


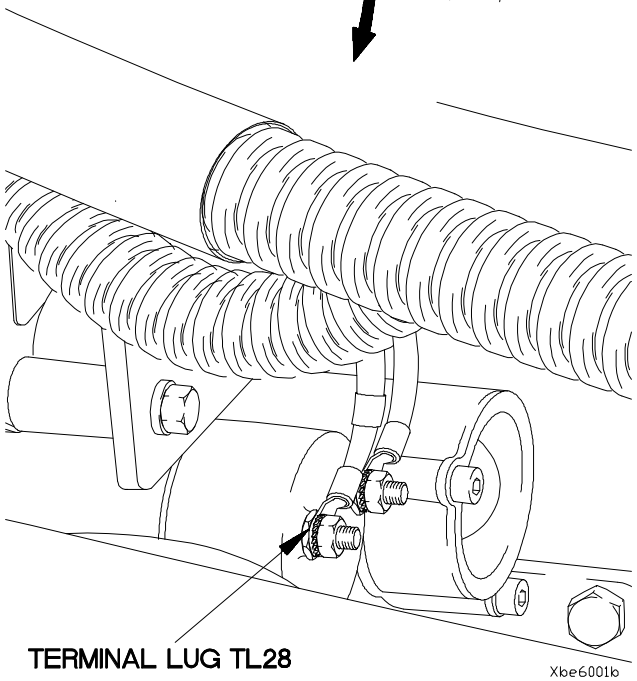
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

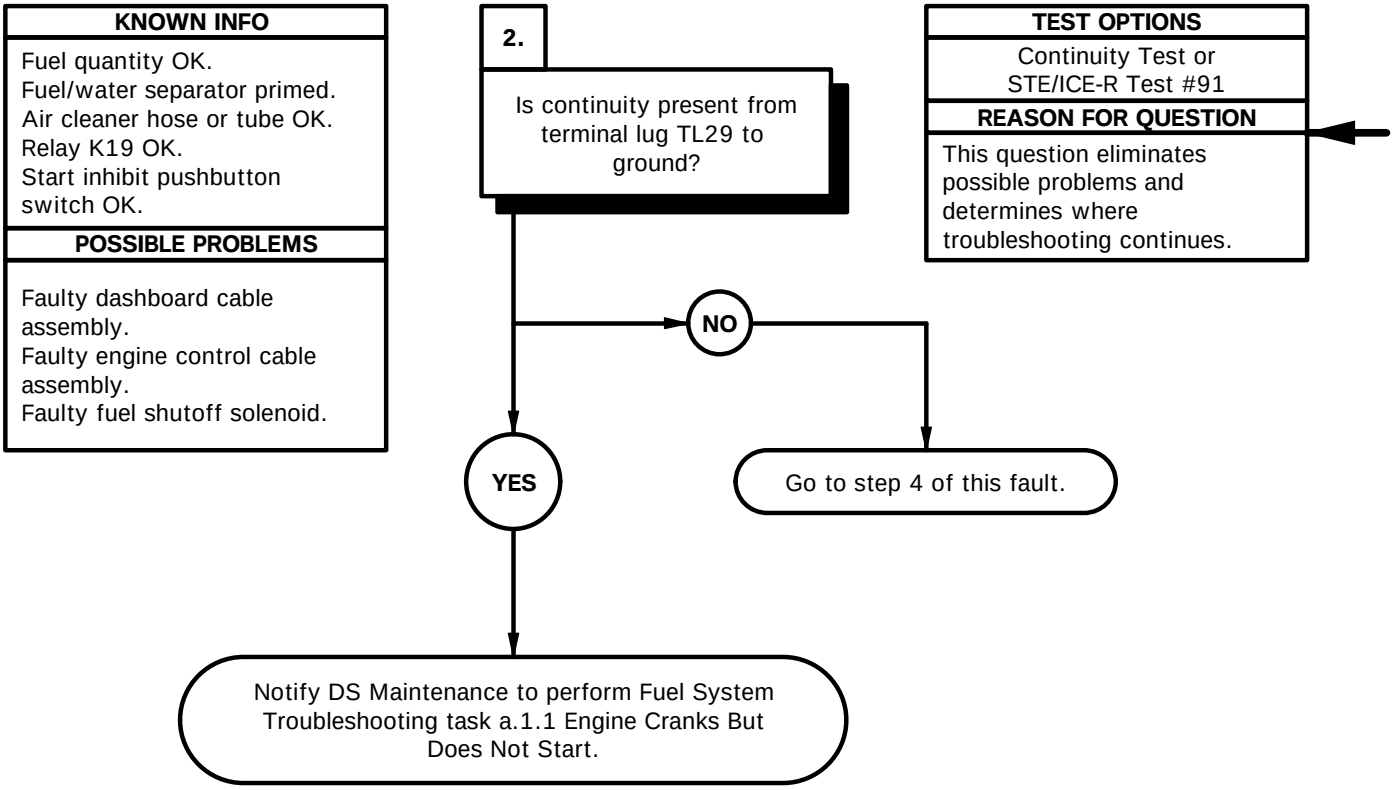
**VOLTAGE TEST**

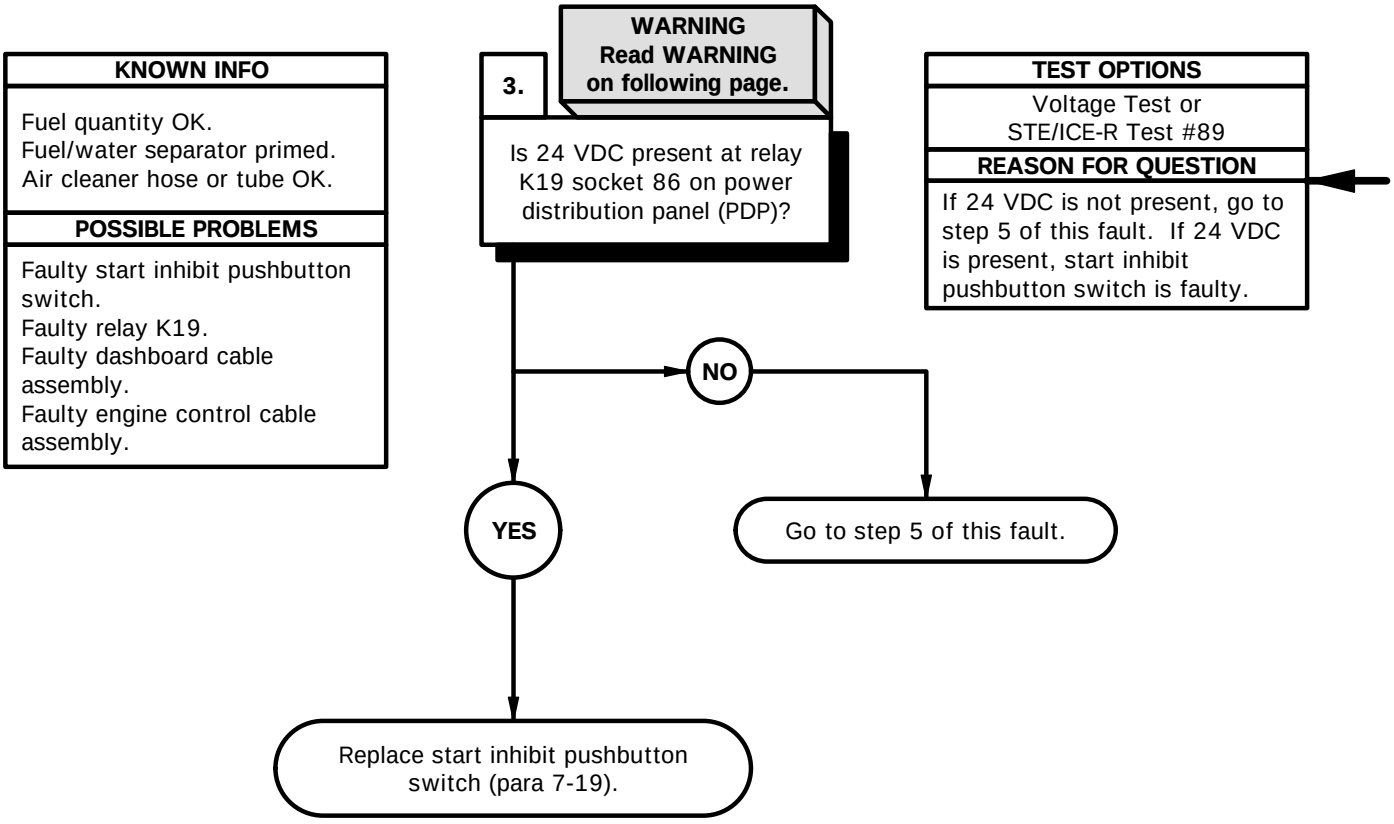
(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to terminal lug TL28 on fuel solenoid.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, go to step 3 of this fault.
(6) Position master power switch to off (TM 9-2320-365-10).



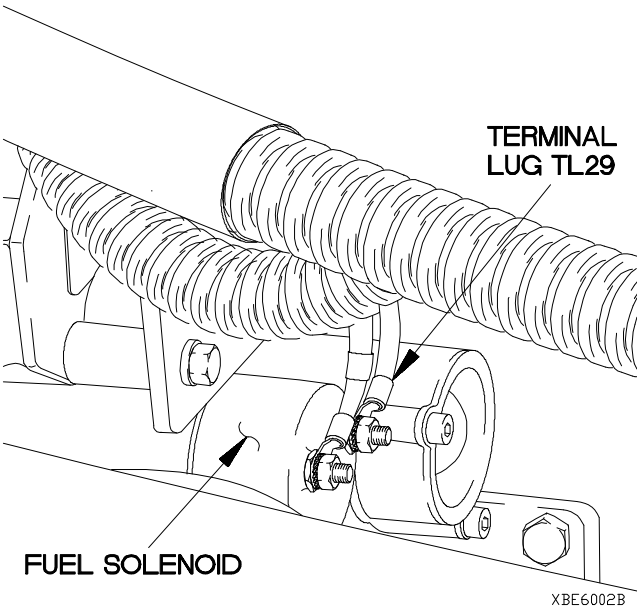
## e6. ENGINE CRANKS BUT DOES NOT START (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL29 on fuel solenoid.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, go to step 4 of this fault.
(5) If continuity is present, fuel solenoid is faulty, notify DS Maintenance.
(6) Lower cab (TM 9-2320-365-10).

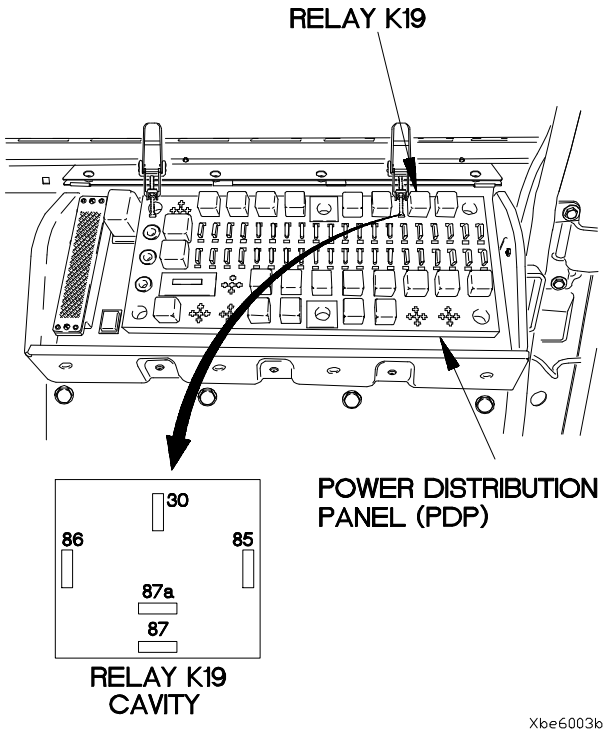



**WARNING**

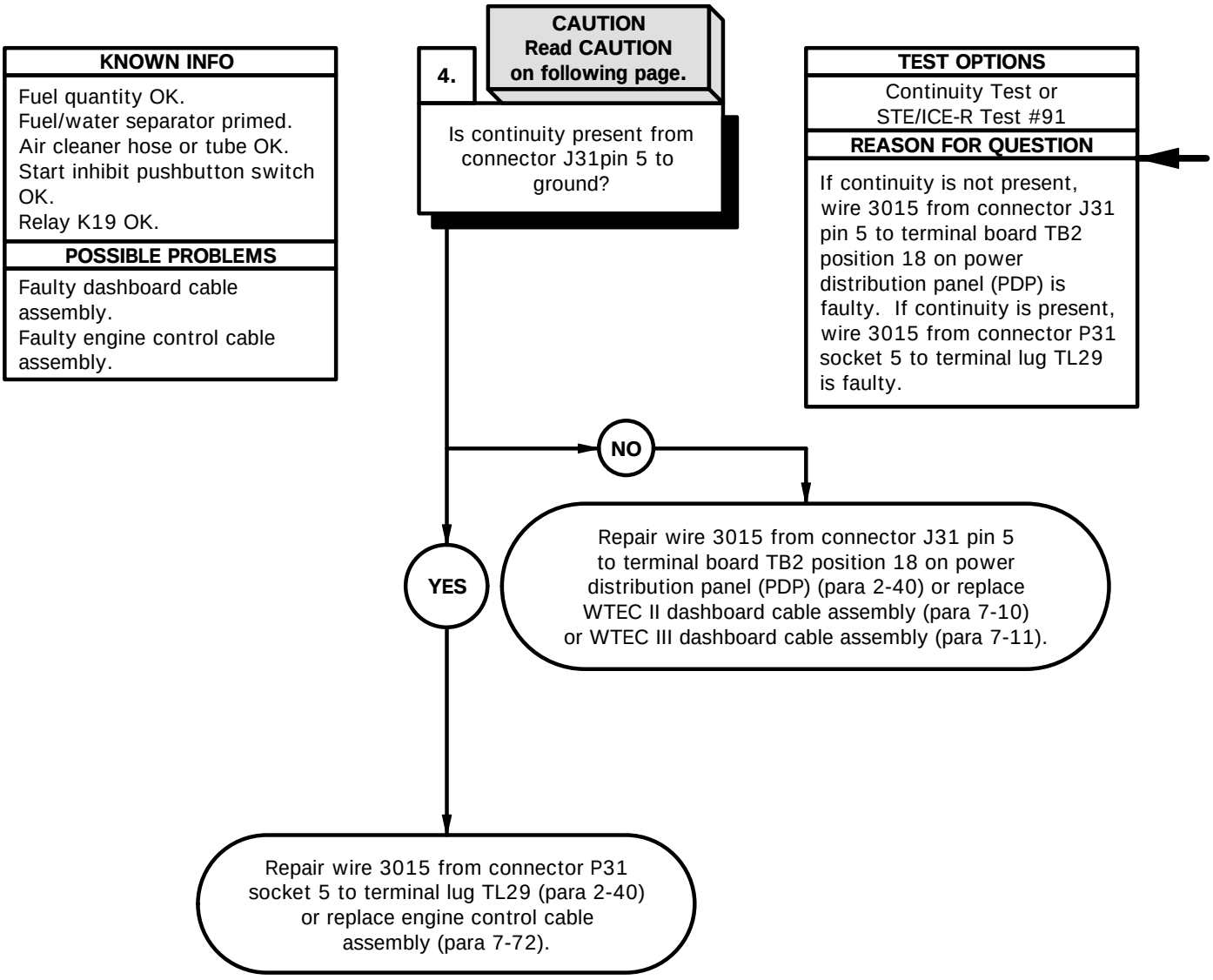
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Lower cab (TM 9-2320-365-10).
(2) Remove power distribution panel (PDP) cover (para 16-2).
(3) Remove relay K19 from power distribution panel (PDP).
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to relay K19 socket 86 on power distribution panel (PDP).
(6) Connect negative (-) probe of multimeter to ground
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, go to step 5 of this fault.
(9) If 24 VDC is present, replace start inhibit pushbutton switch (para 7-19).
(10) Position master power switch to off (TM 9- 2320-365-10).



## e6. ENGINE CRANKS BUT DOES NOT START (CONT)

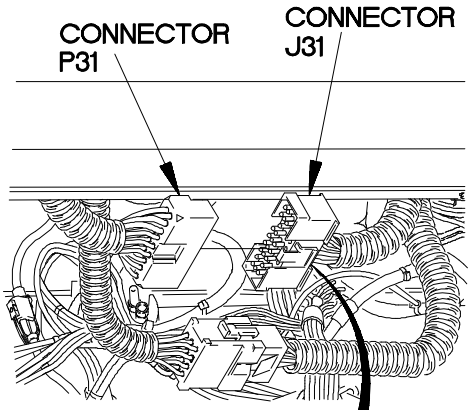


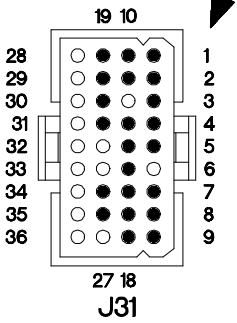
**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

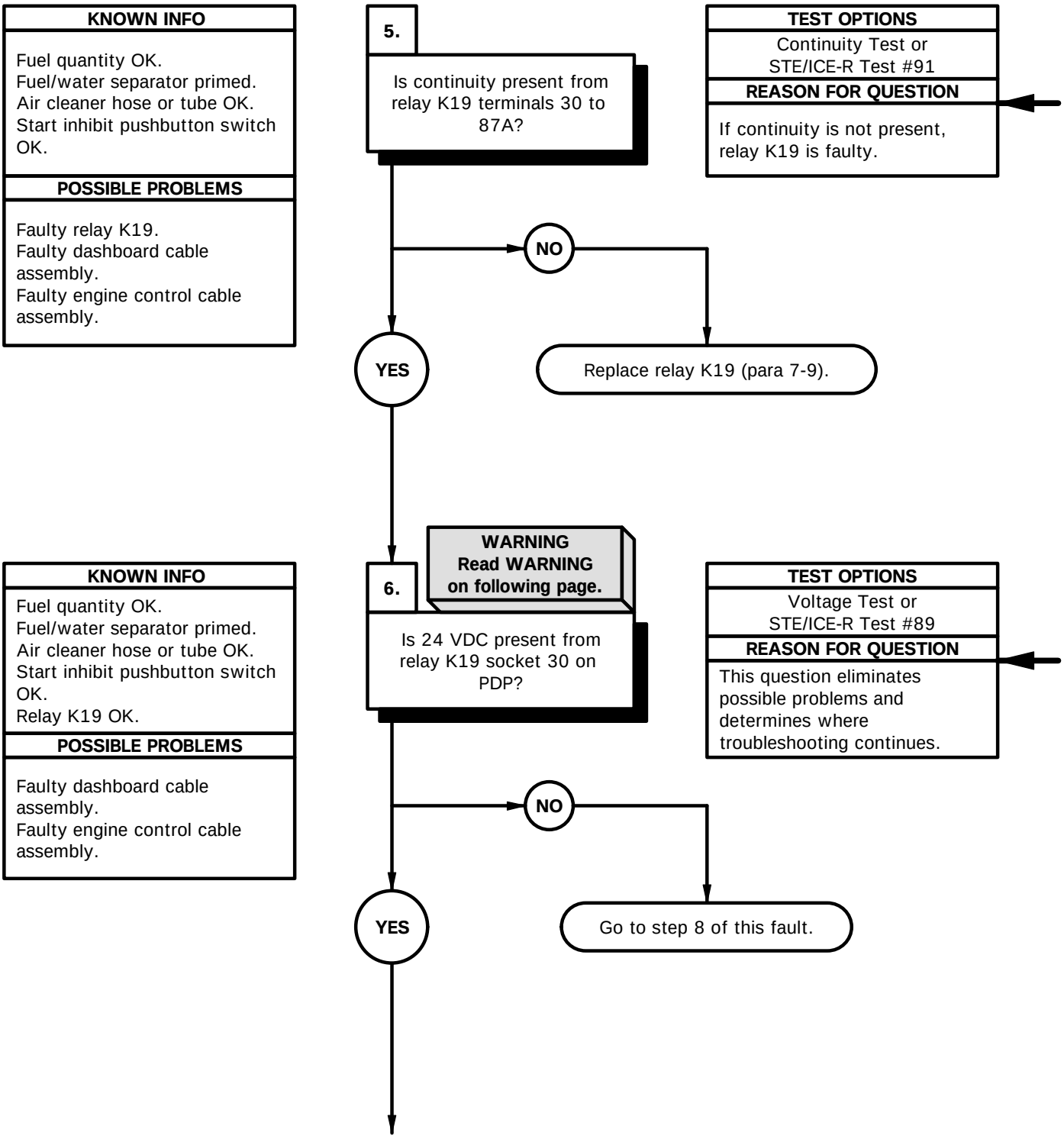
(1) Disconnect batteries (para 7-48).
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector J31pin 5.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3015 from connector J31 pin 5 to terminal board TB2 position 18 on power distribution PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 3015 from connector P31 socket 5 to terminal lug TL29 (para 2-40) or replace engine control cable assembly (para 7-72).
(9) Connect connector J31 to connector P31.
(10) Install instrument panel assembly (para 7-15).
(11) Connect batteries (para 7-48).




XBE6004B

## e6. ENGINE CRANKS BUT DOES NOT START (CONT)



**CONTINUITY TEST**

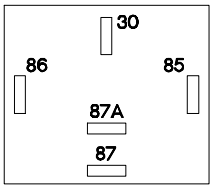
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K19 terminal 87a.
(3) Connect negative (-) probe of multimeter to relay K19 terminal 30 and note reading on multimeter.
(4) If continuity is not present, replace relay K19 (para 7-9).

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

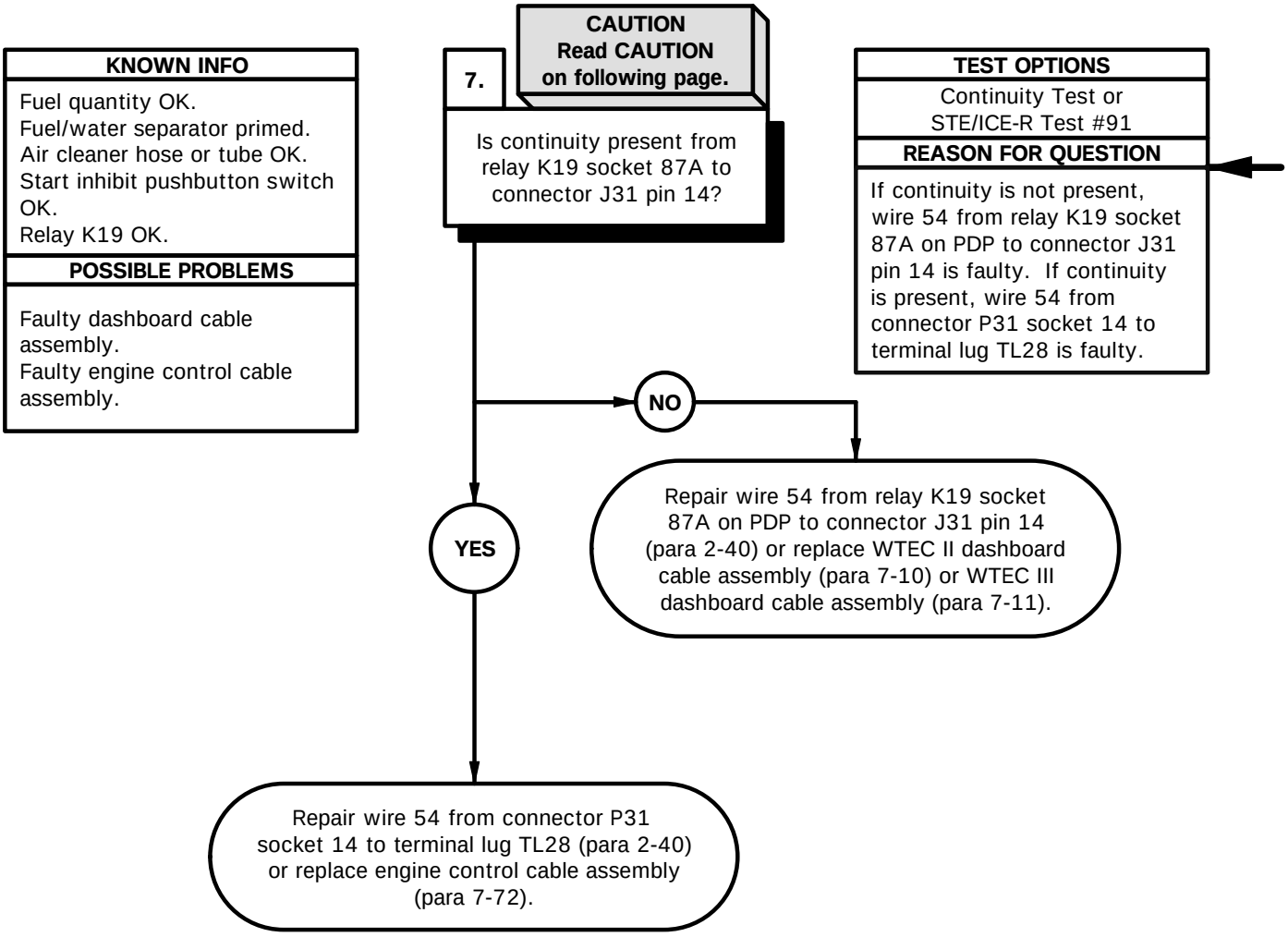
(1) Set multimeter to volts DC.
(2) Connect positive (+) of multimeter to relay K19 socket 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, go to step 8 of this fault.
(6) Position master power switch to off (TM 9-2320-365-10).




RELAY K19
CAVITY

Xbe6006b

## e6. ENGINE CRANKS BUT DOES NOT START (CONT)

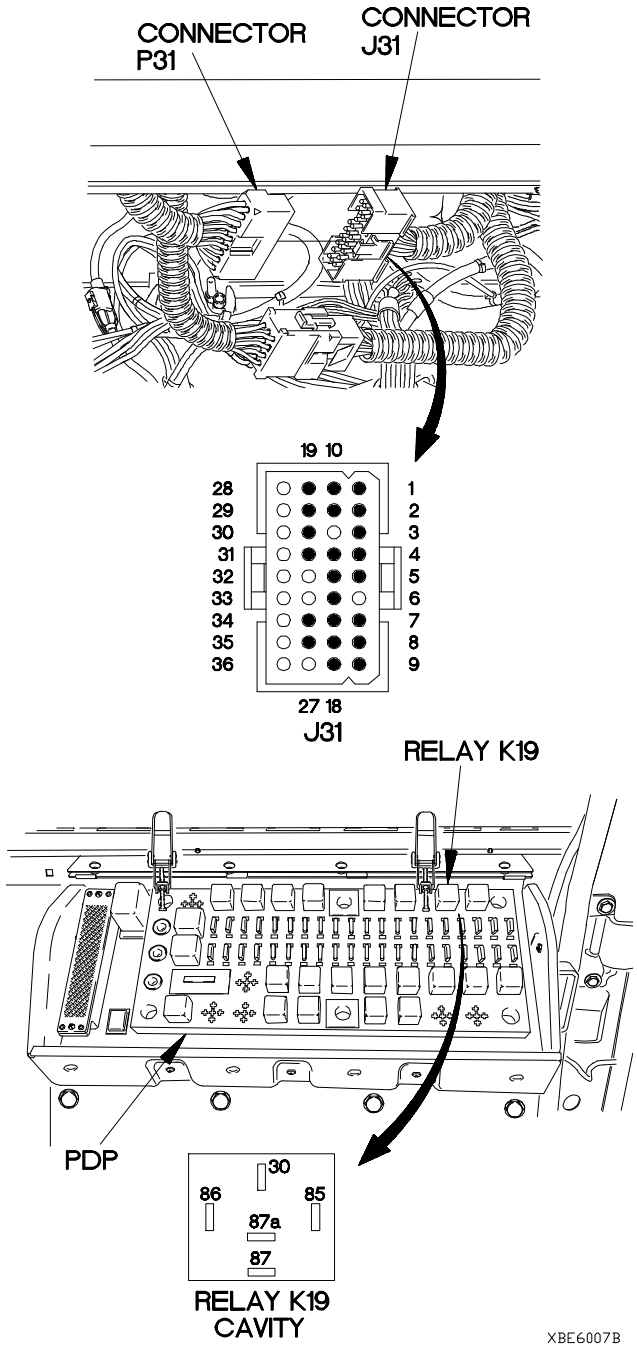


**CAUTION**

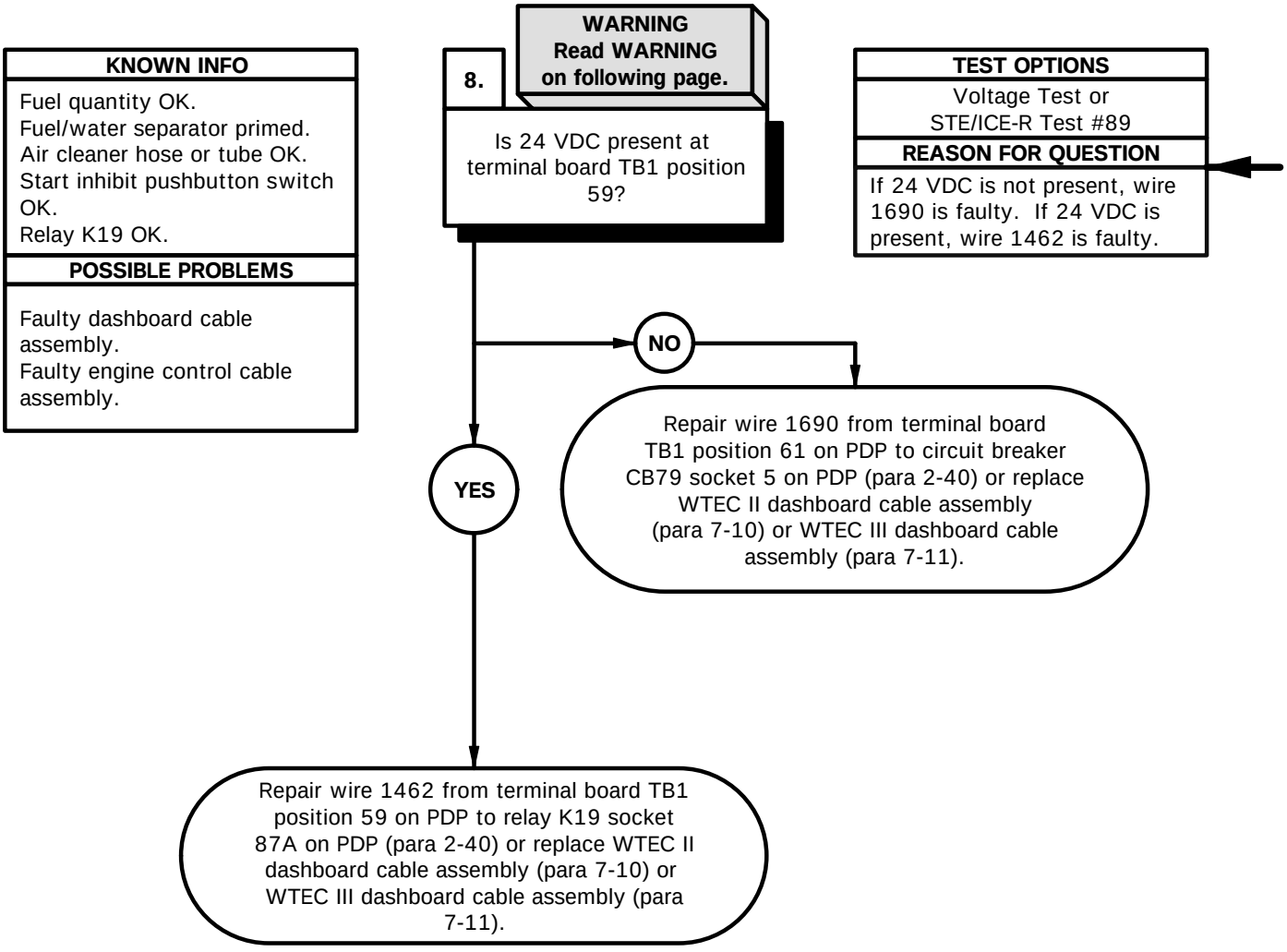
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove instrument panel for access (para 7-15).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to relay K19 socket 87A on PDP.
(6) Connect negative (-) probe of multimeter to connector J31 pin 14 and note reading on multimeter.
(7) If continuity is not present, repair wire 54 from connector J31 pin 14 to relay K19 socket 87A on PDP (para 2-40) or replace WTEC II dashboard cable assembly (7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 54 from connector P31 socket 14 to terminal lug TL 28 (para 2-40) or replace engine control cable assembly (para 7-72).
(9) Connect connector J31 to connector P31.
(10) Install instrument panel (para 7-15).
(11) Install relay K19 in PDP.
(12) Install PDP cover (para 16-2).
(13) Connect batteries (para 7-48).



## e6. ENGINE CRANKS BUT DOES NOT START (CONT)

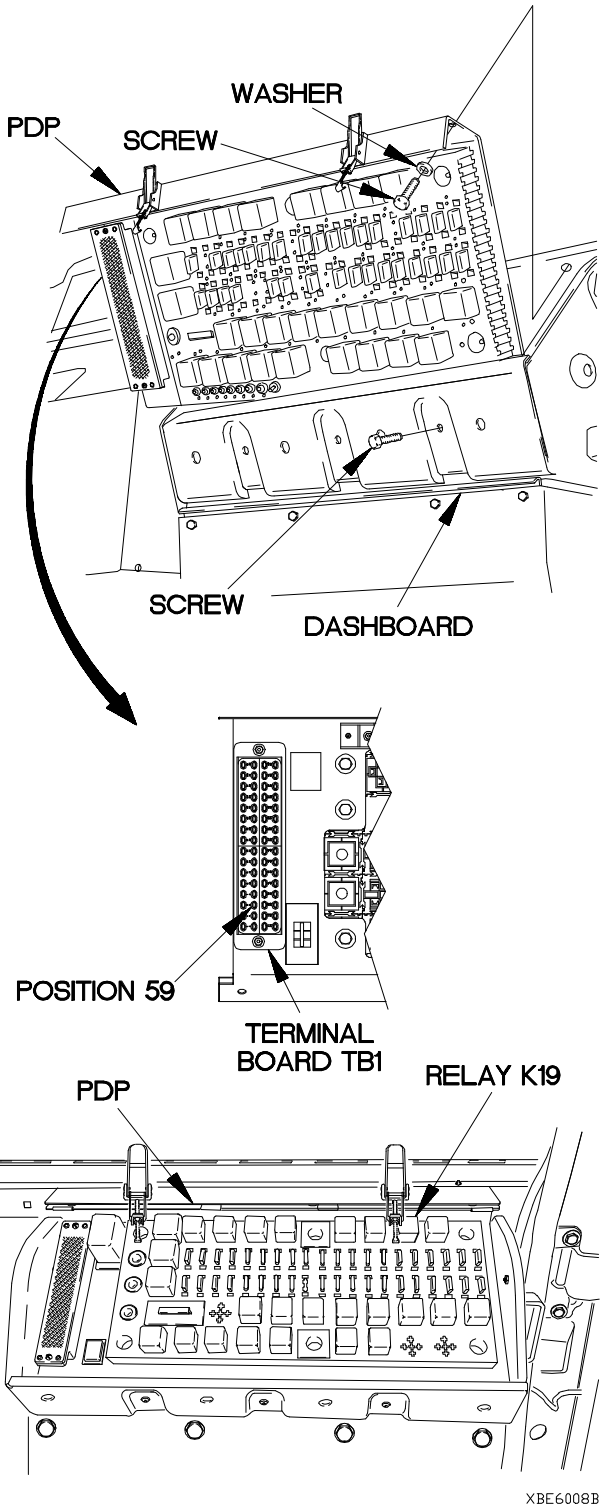


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install relay K19 in PDP.
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to terminal board TB1 position 59 on PDP.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, repair wire 1690 from terminal board TB1 position 61 on PDP to circuit breaker CB79 socket 5 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If 24 VDC is present, repair wire 1462 from terminal board TB1 position 59 on PDP to relay K19 socket 87A on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) Install PDP on dashboard with three washers and screws.
(11) Install three screws in PDP.
(12) Install PDP cover (para 16-2).



## e7. FUEL GAGE DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

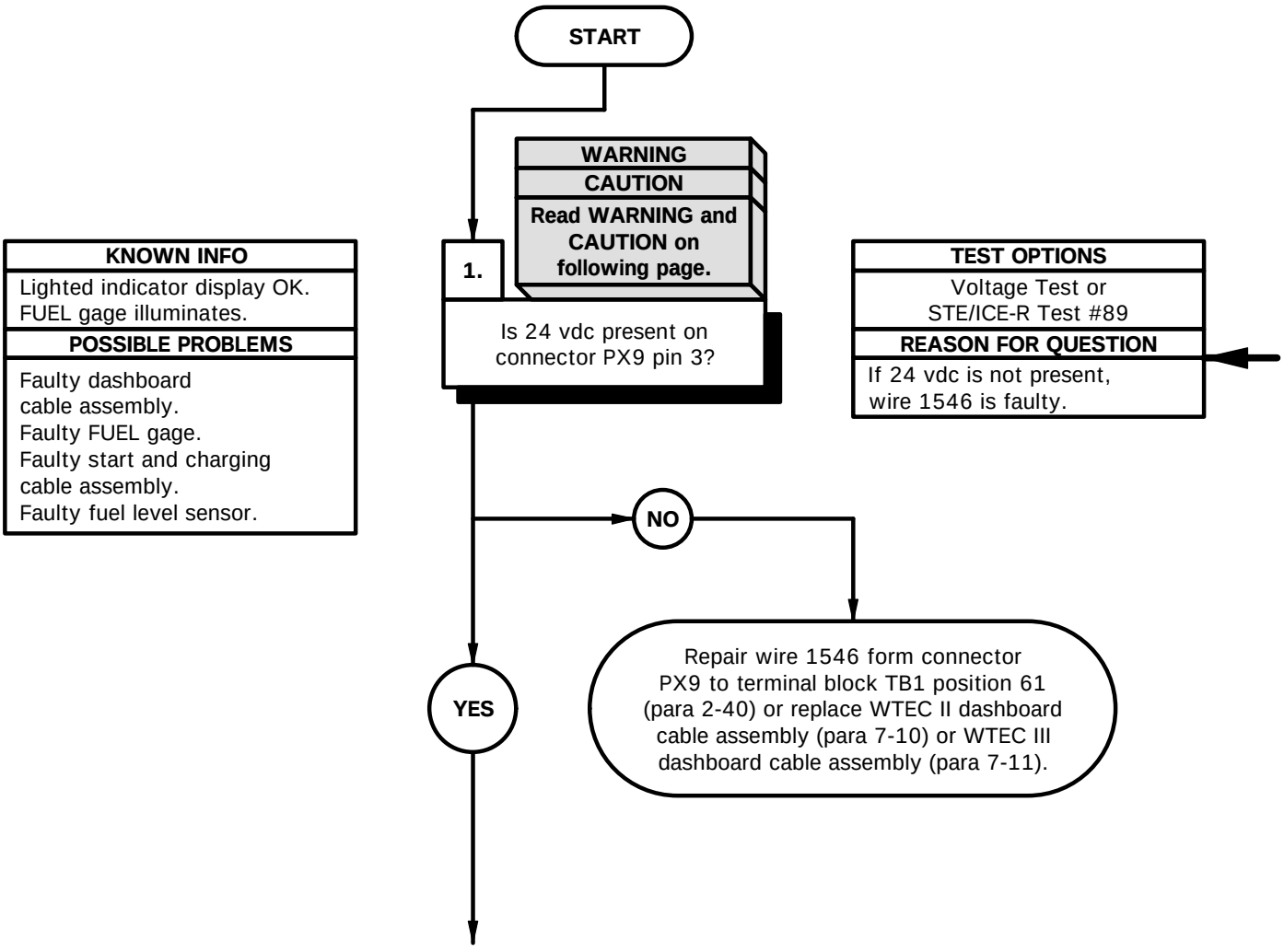
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

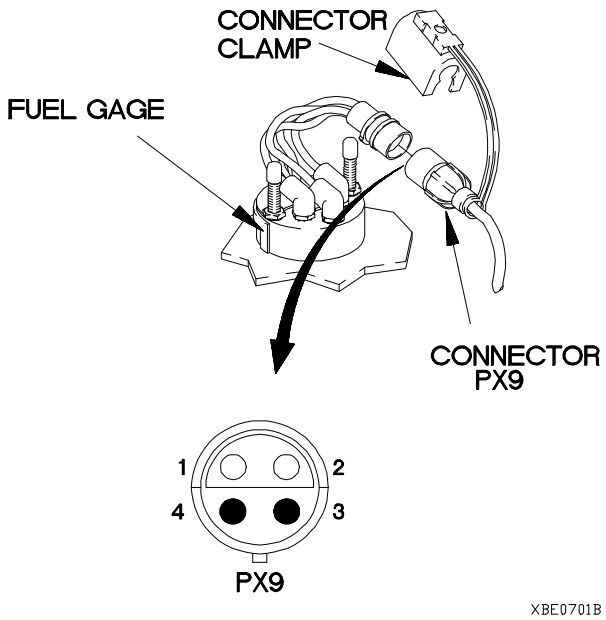
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

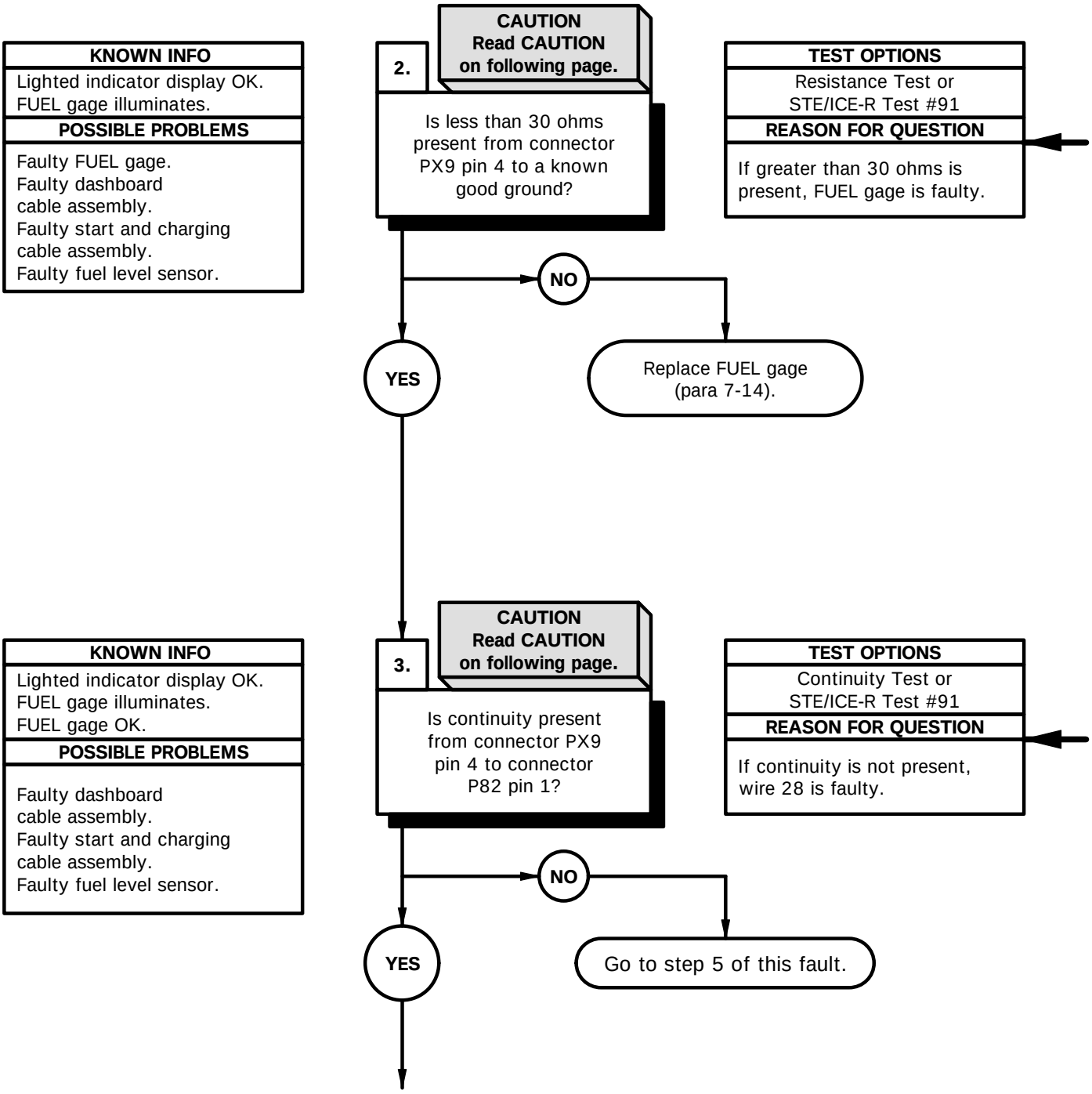
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from fuel gage connector.
(3) Disconnect connector PX9 from fuel gage connector.
(4) Set multimeter to volts dc.
(5) Connect positive (+) probe of multimeter to connector PX9-3.
(6) Connect negative (-) probe of multimeter to a known good ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1546 from connector PX9 pin 3 to terminal board TB1 position 61 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).



## e7. FUEL GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

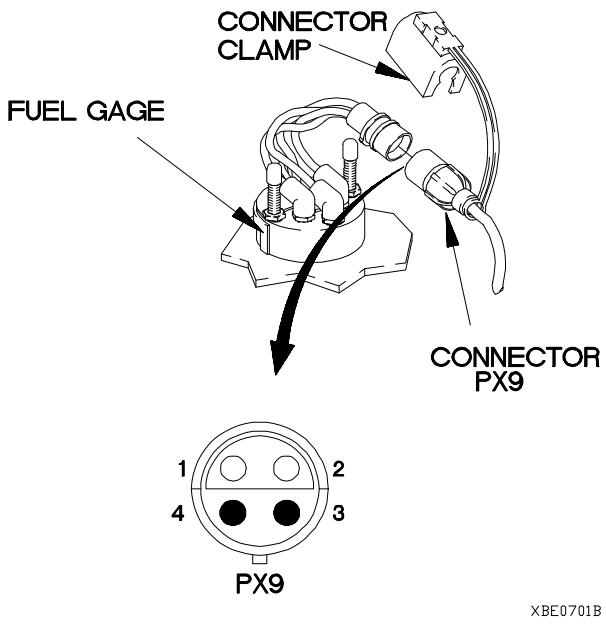
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

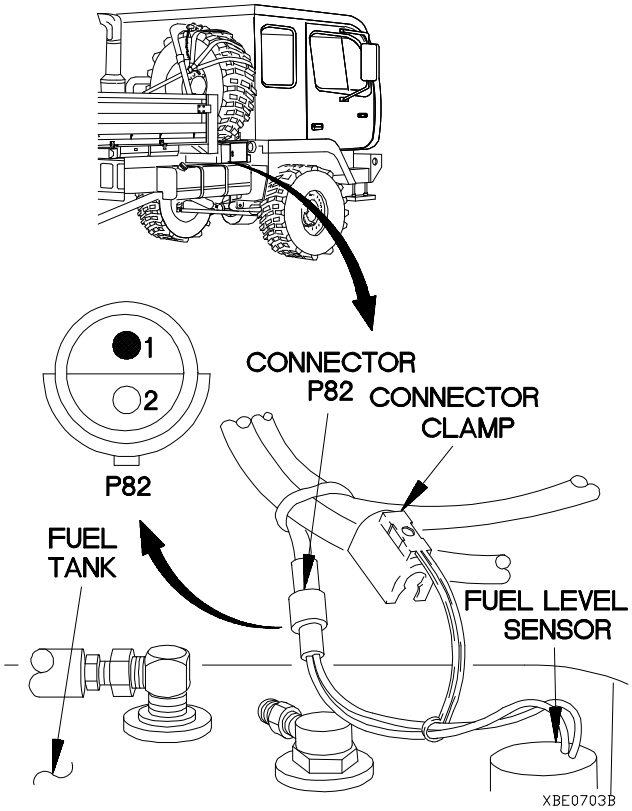
**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX9 pin 4.
(3) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(4) If greater than 30 ohms is present, replace FUEL gage (para 7-14).

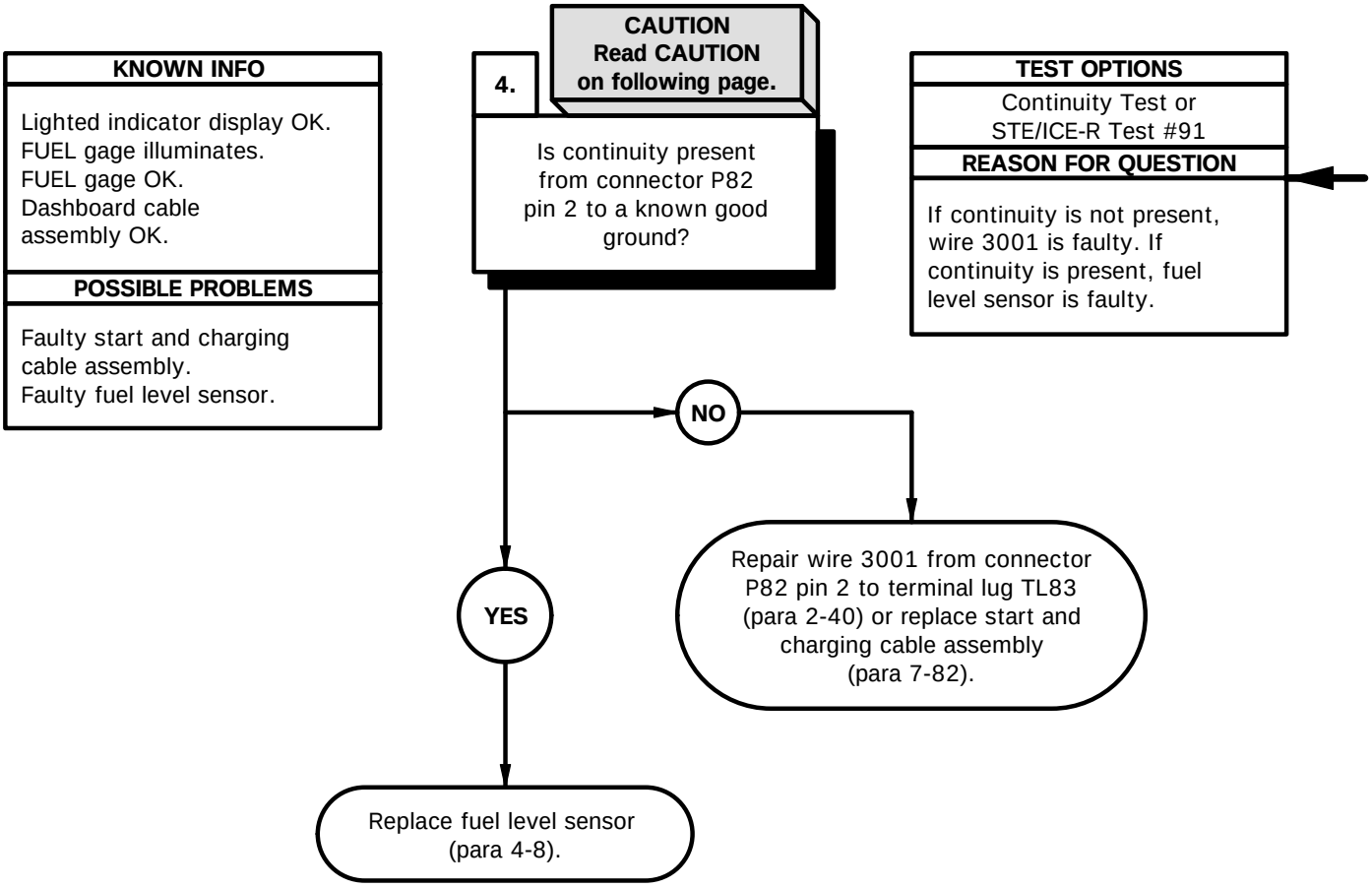



**CONTINUITY TEST**

(1) Disconnect connector clamp from fuel level sensor.
(2) Disconnect connector P82 from fuel level sensor.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX9 pin 4.
(5) Connect negative (-) probe of multimeter to connector P82 pin 1 and note reading on multimeter.
(6) If continuity is not present, go to step 5 of this fault.



## e7. FUEL GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

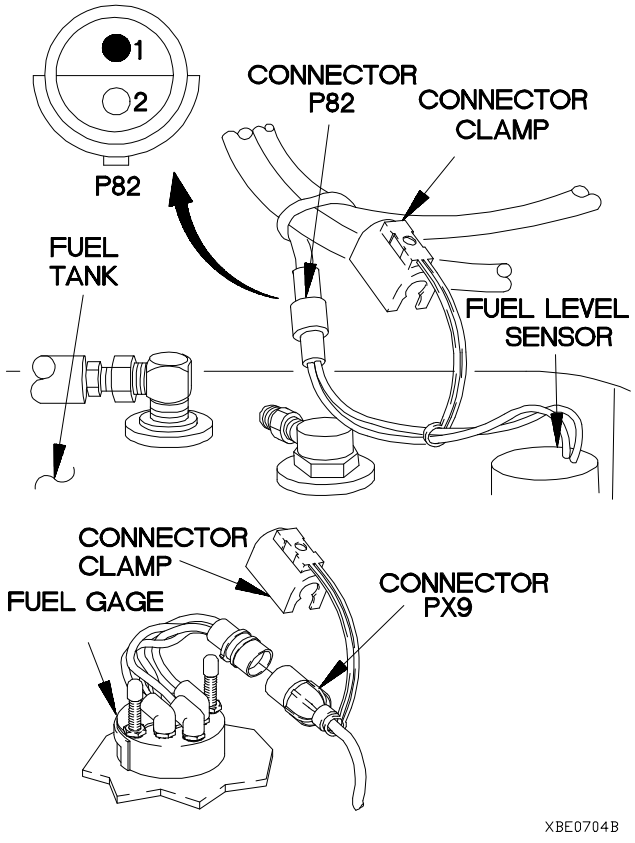
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

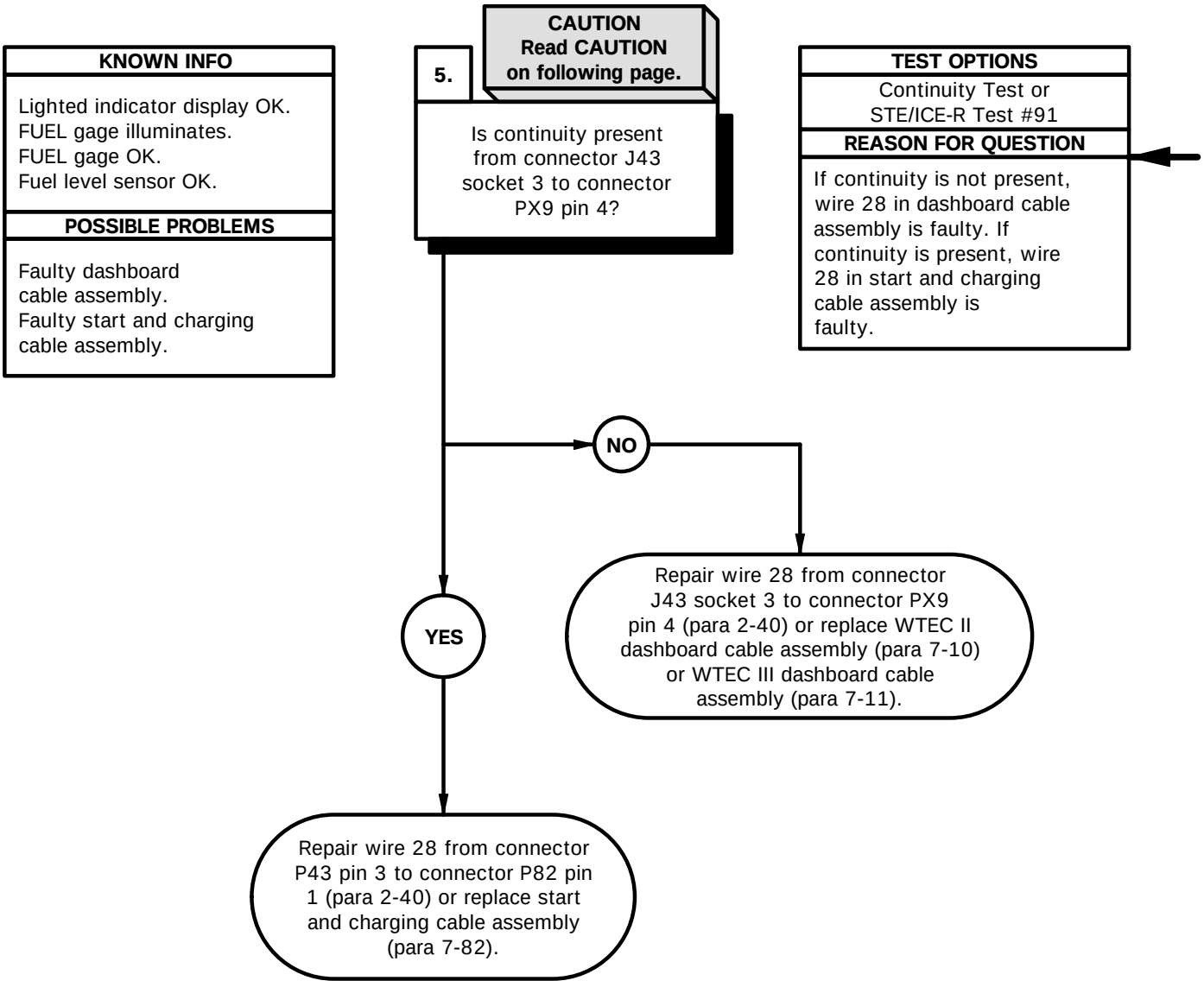
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Connect connector PX9 to fuel gage connector.
(2) Connect connector clamp on fuel gage connector.
(3) Install instrument panel assembly (para 7-15).
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector P82 socket 2.
(6) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3001 from connector P82 socket 2 to terminal lug TL83 (para 2-40) or replace start and charging cable assembly (para 7-82).
(8) If continuity is present, replace fuel level sensor (para 4-8).
(9) Connect connector P82 to fuel level sensor.
(10) Connect connector clamp on fuel level sensor.



## e7. FUEL GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

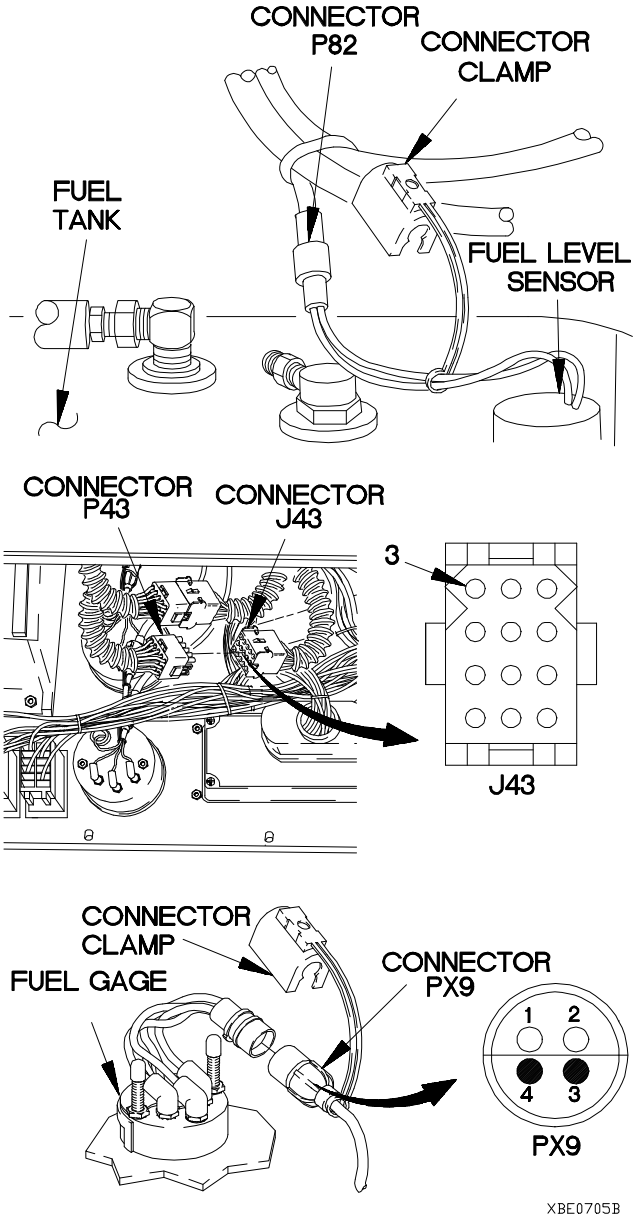
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Connect connector P82 to fuel level sensor.
(2) Connect connector clamp on fuel level sensor.
(3) Disconnect connector J43 from connector P43.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector J43 socket 3.
(6) Connect negative (-) probe of multimeter to PX9 pin 4 and note reading on multimeter.
(7) If continuity is not present, repair wire 28 from connector PX9 pin 4 to connector J43 socket 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 28 from connector P43 pin 3 to connector P82 pin 1(para 2-40) or replace start and charging cable assembly (para 7-82).
(9) Connect connector J43 to connector P43.
(10) Connect connector PX9 to fuel gage connector.
(11) Connect connector clamp on fuel gage connector.
(12) Install instrument panel assembly (para 7-15).



## e8. WATER TEMP GAGE DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

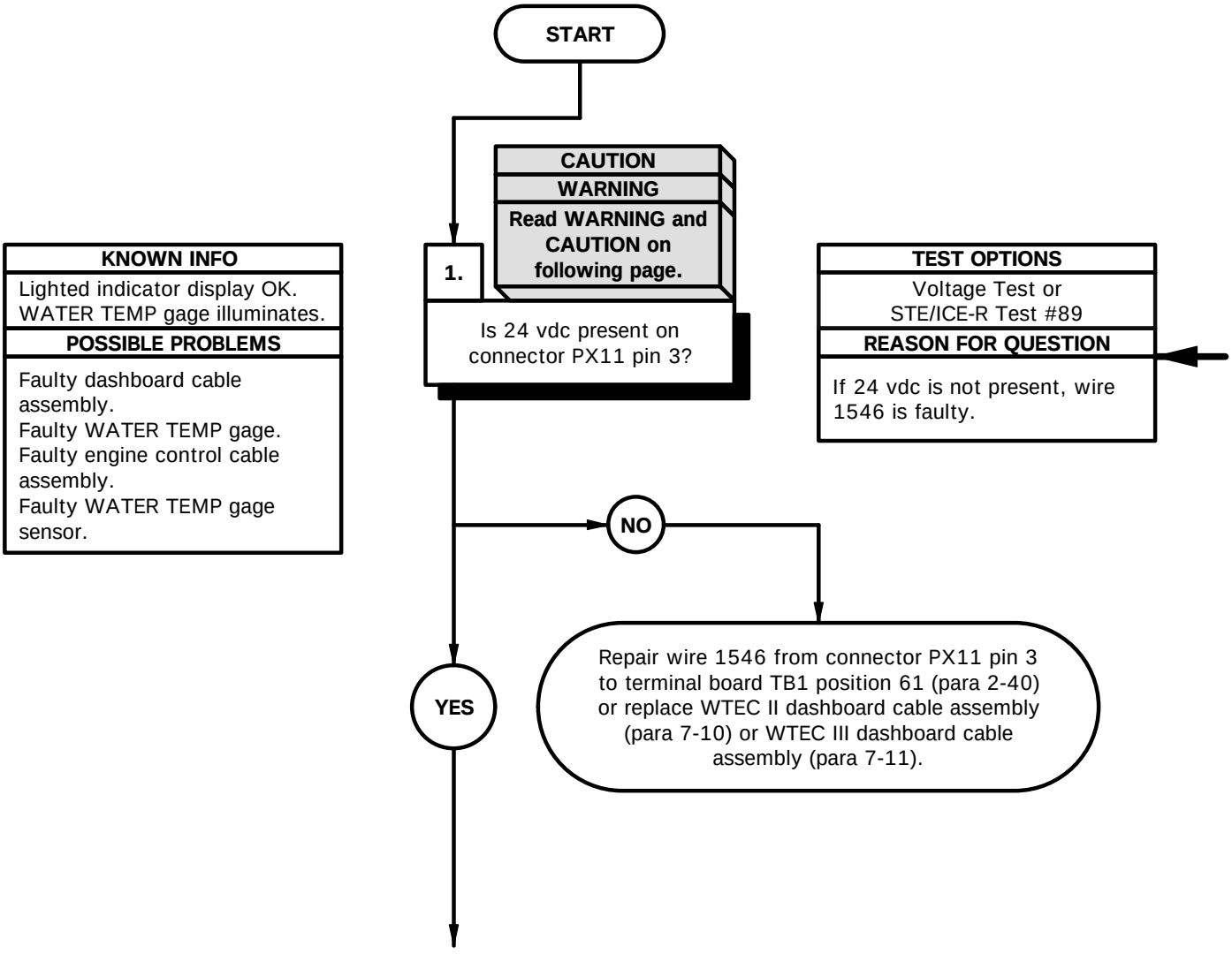
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

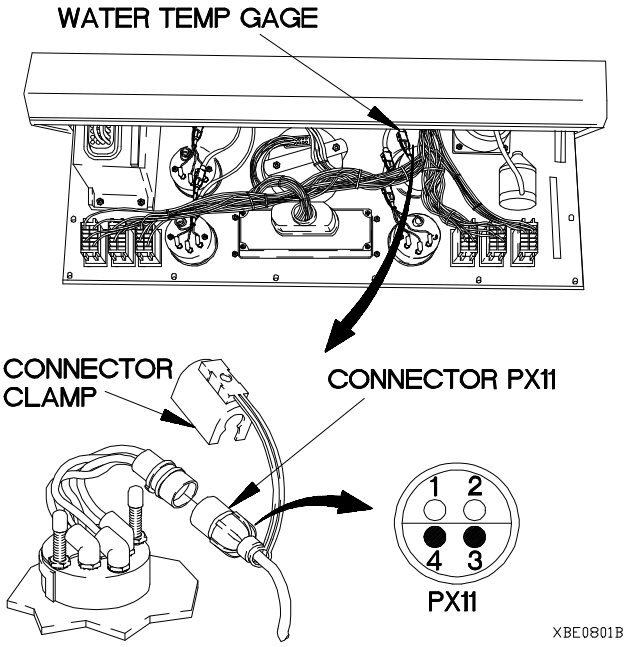
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

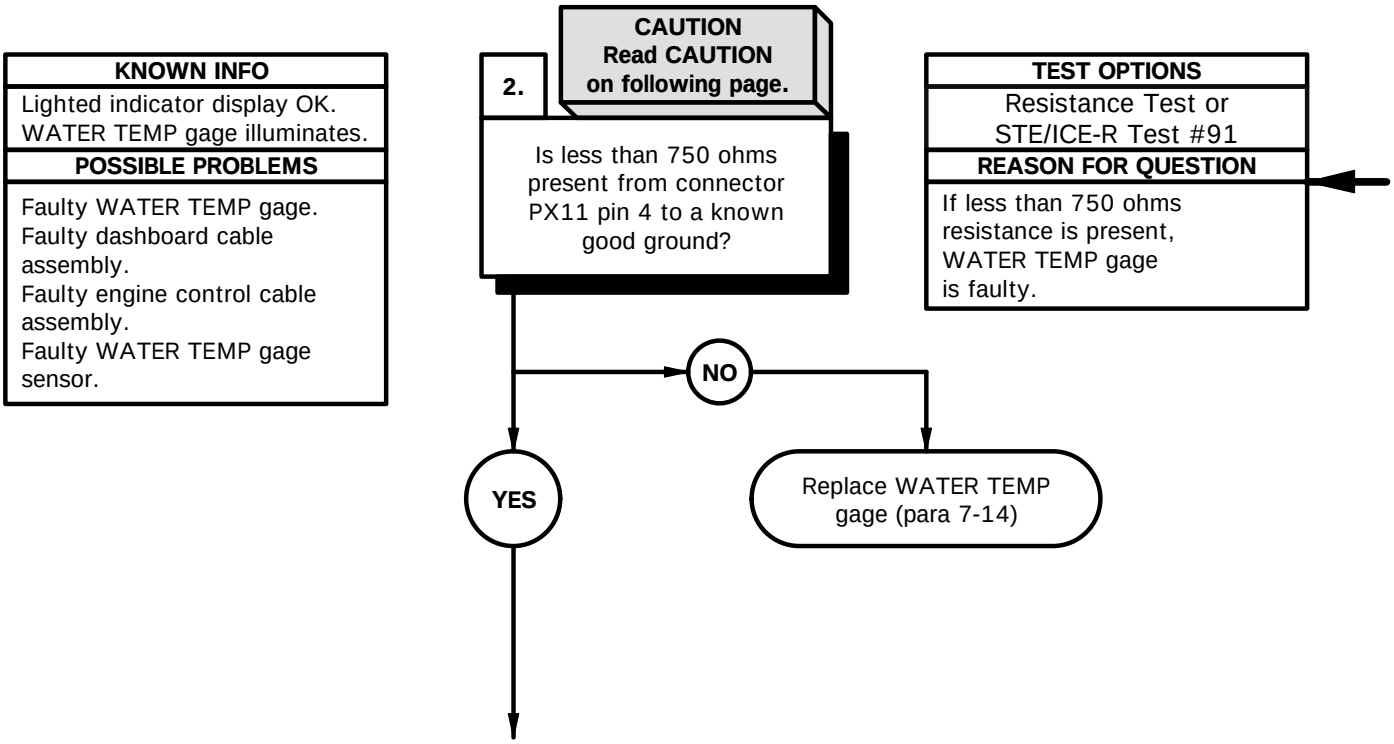
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from WATER TEMP gage connector.
(3) Disconnect connector PX11 from WATER TEMP gage connector.
(4) Set multimeter to volts dc.
(5) Connect positive (+) probe of multimeter to connector PX11 pin 3.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1546 from connector PX11 pin 3 to terminal board TB1 position 61 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).



## e8. WATER TEMP GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

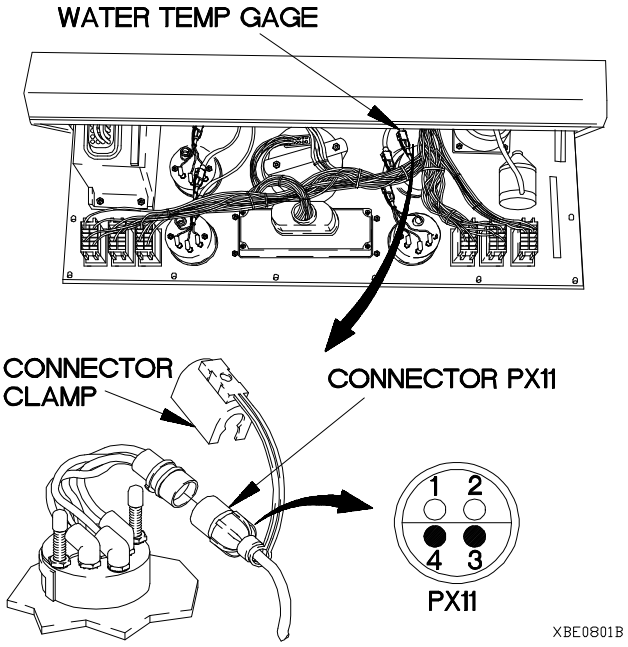
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

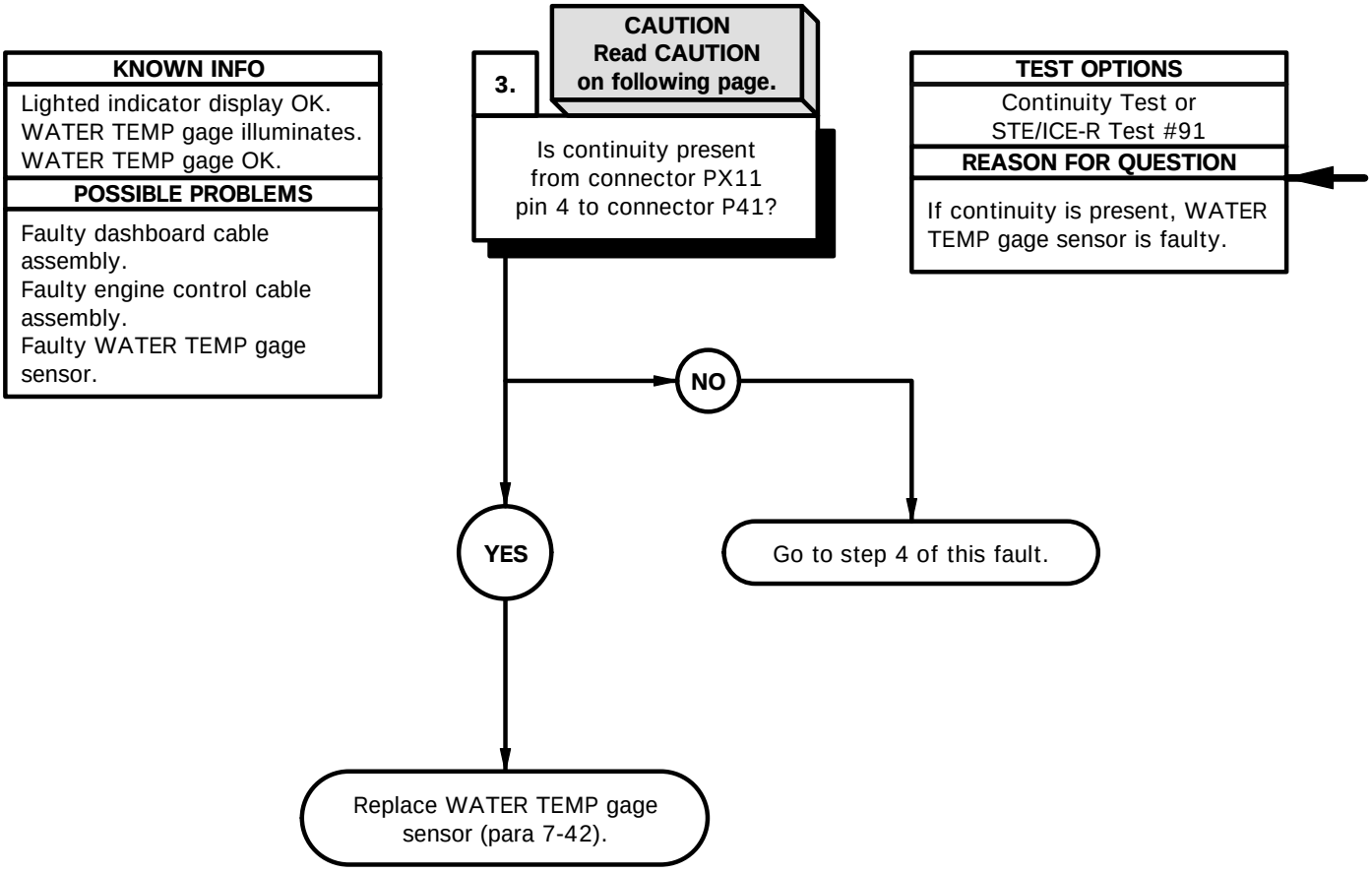
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX11 pin 4.
(3) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(4) If less than 750 ohms is present, go to step 3 of this fault.
(5) If greater than 750 ohms is present, replace WATER TEMP gage (para 7-14).



## e8. WATER TEMP GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

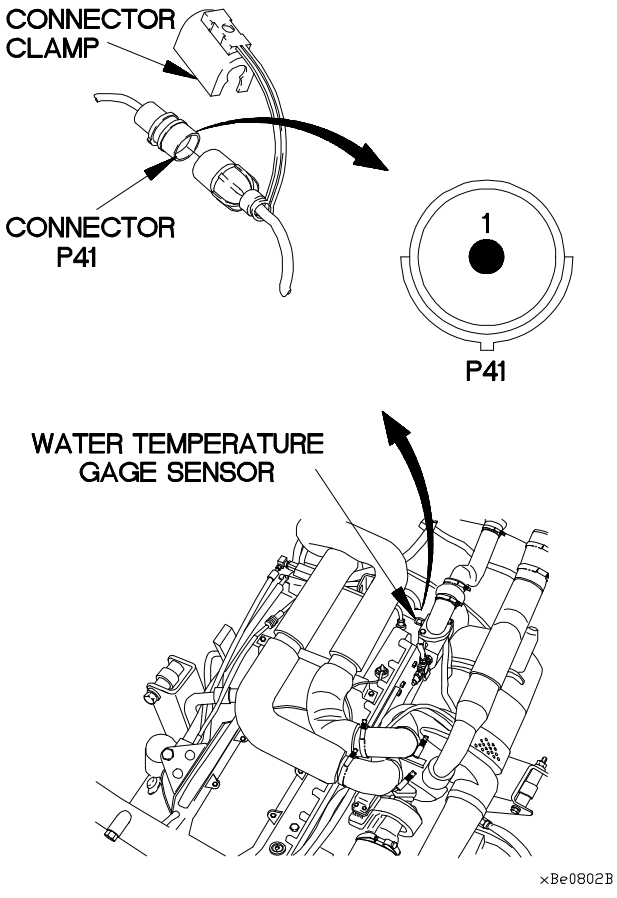
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

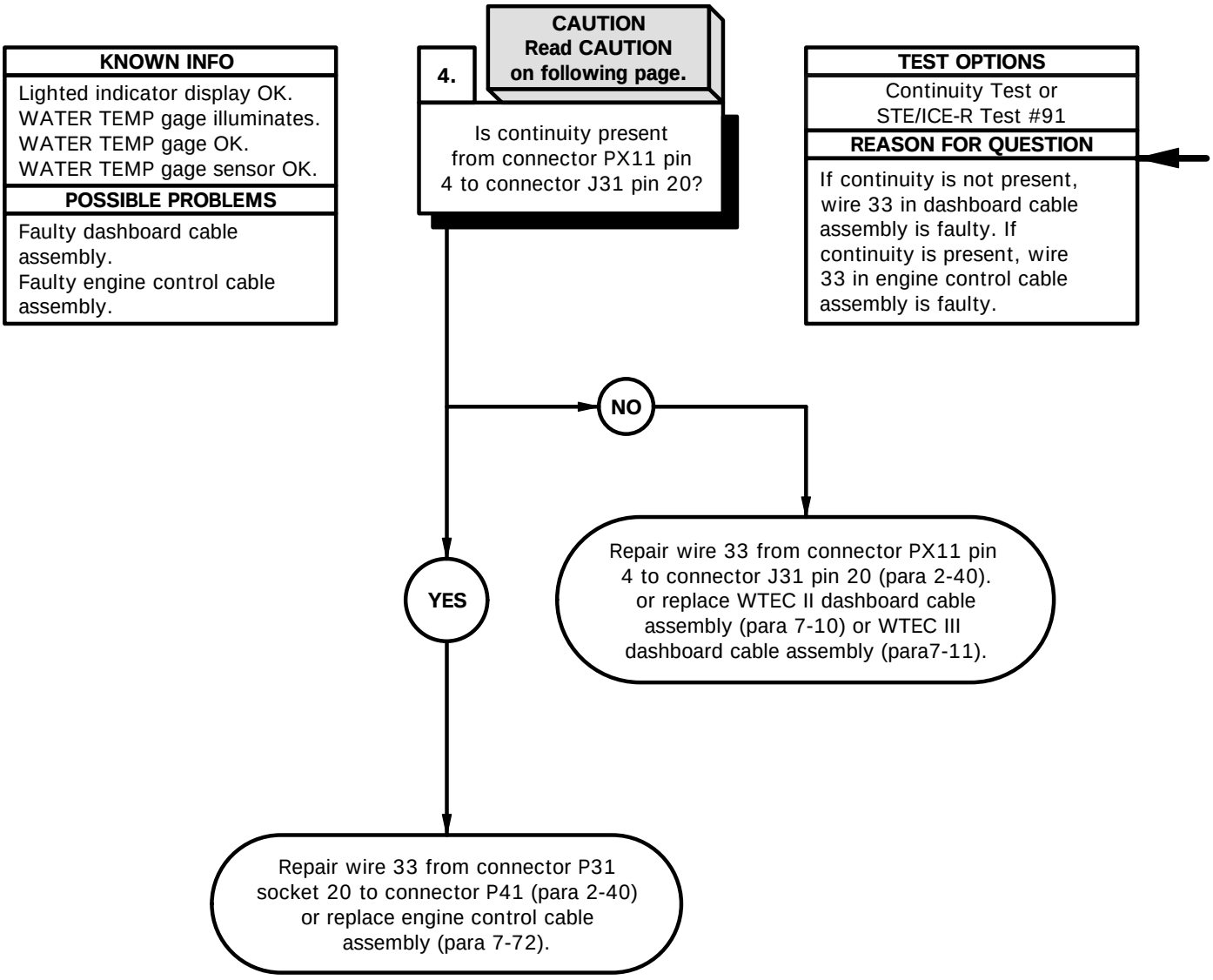
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Disconnect connector clamp from WATER TEMP gage sensor connector, if equipped.
(3) Disconnect connector P41 from WATER TEMP gage sensor connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX11 pin 4.
(6) Connect negative (-) probe of multimeter to connector P41 and note reading on multimeter.
(7) If continuity is not present, go to step 4 of this fault.
(8) If continuity is present, replace WATER TEMP gage sensor (para 7-42).
(9) Connect connector P41 to WATER TEMP gage sensor connector.
(10) Connect connector clamp to WATER TEMP gage sensor connector, if equipped.
(11) Lower cab (TM 9-2320-365-10).



## e8. WATER TEMP GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

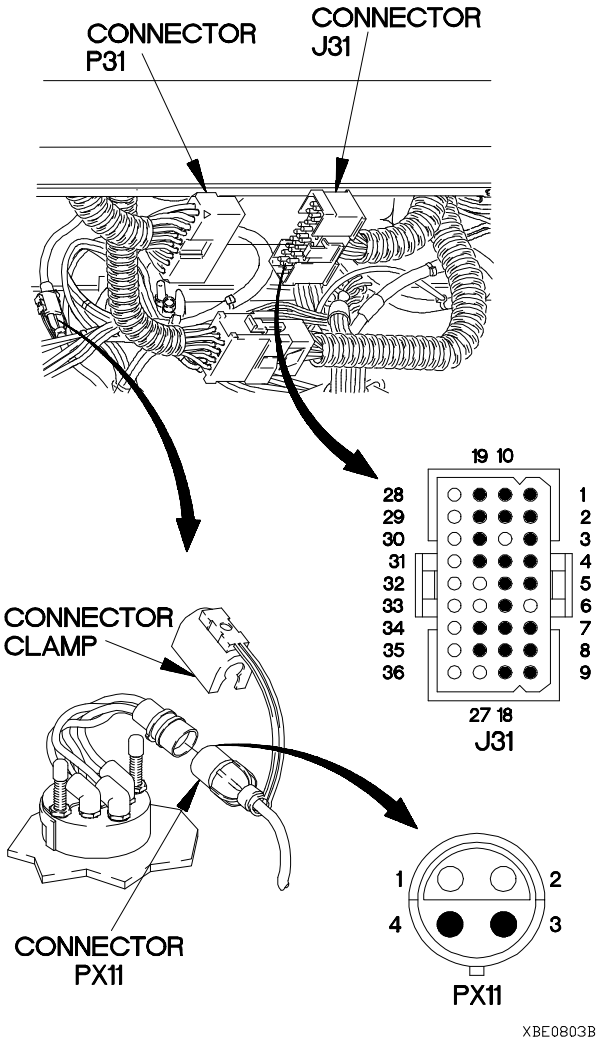
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector J31 from connector P31.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX11 pin 4.
(4) Connect negative (-) probe of multimeter to connector J31 pin 20 and note reading on multimeter.
(5) If continuity is not present, repair wire 33 from connector PX11 pin 4 to connector J31 pin 20 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, repair wire 33 from connector P31 socket 20 to connector P41 (para 2-40) or replace engine control cable assembly (para 7-72).
(7) Connect connector J31 to connector P31.
(8) Connect connector PX11 to WATER TEMP gage connector.
(9) Connect connector clamp on WATER TEMP gage connector.
(10) Install instrument panel assembly (para 7-15).



## e9. REAR BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

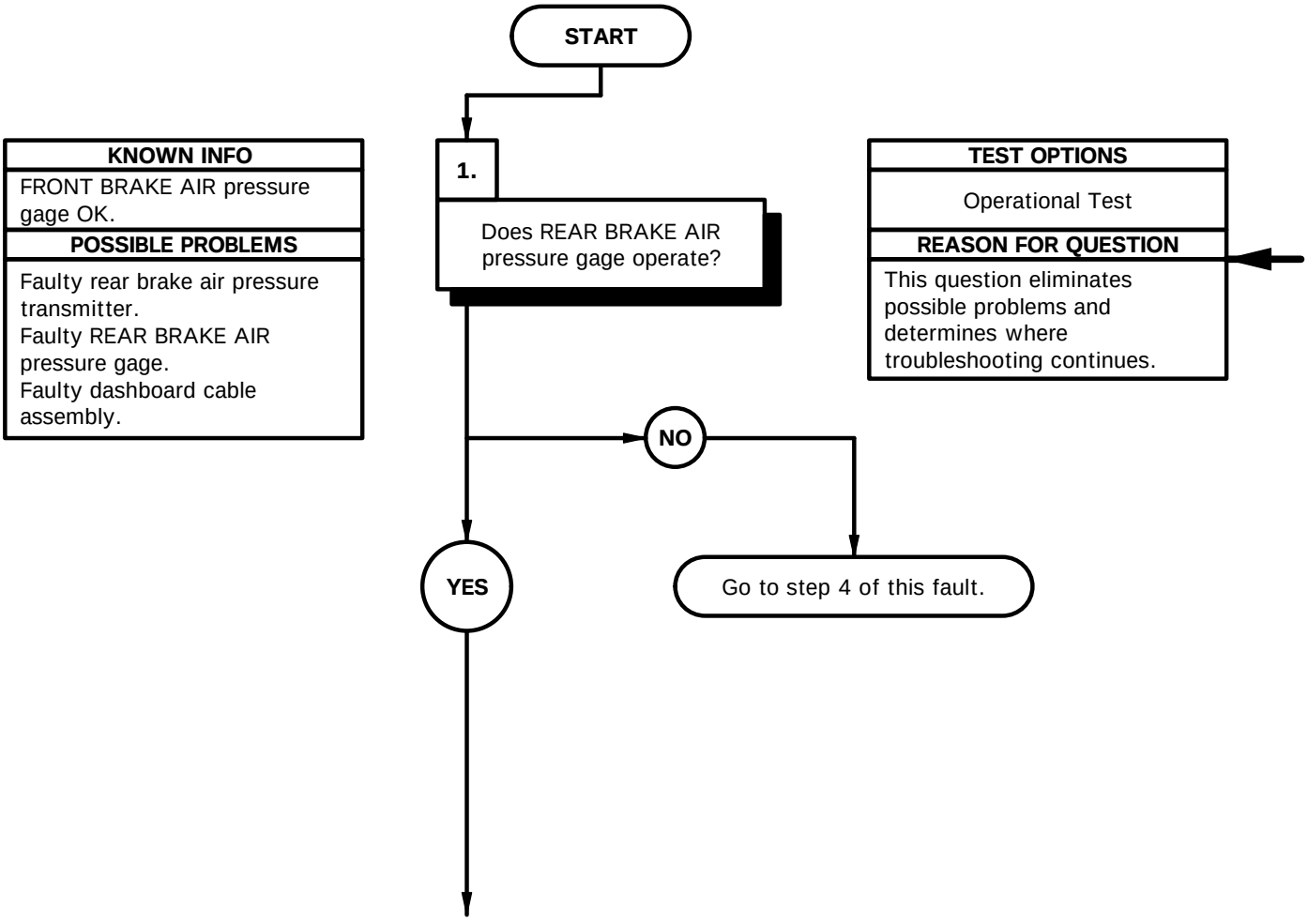
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM9-2320-365-10)

**Personnel Required**
(2)

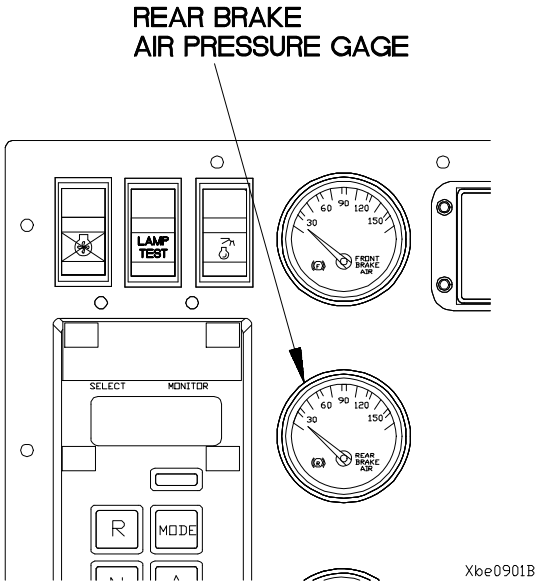
**Materials/Parts**
Nut, Self-Locking (Item 148, Appendix G)
Antiseize Compound (Item 14, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-300 lb-in. (Item 58.1, Appendix C)

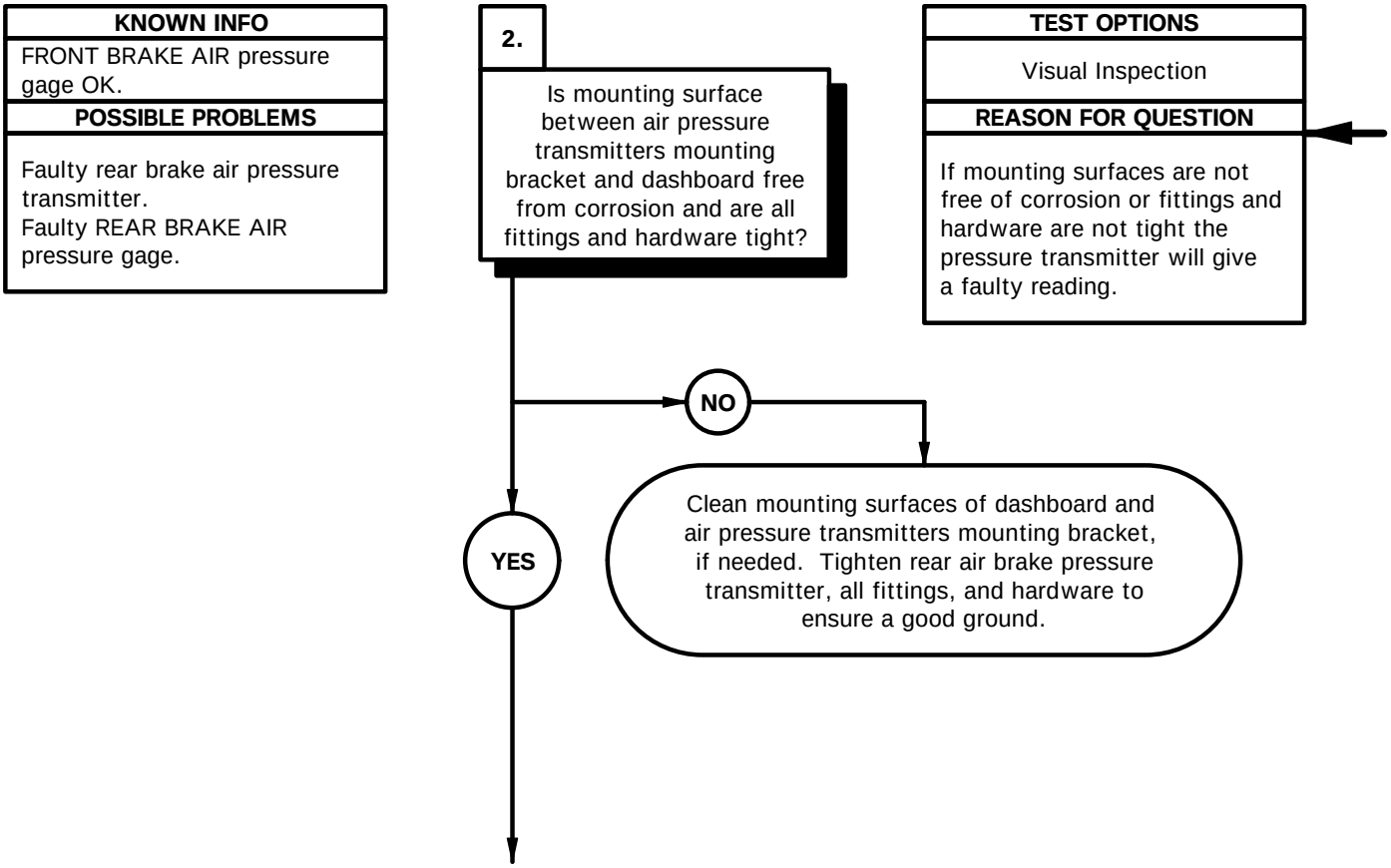
**References**
TM 9-4910-571-12&P



| OPERATIONAL TEST |
| --- |
| (1) Start engine (TM 9-2320-365-10).<br>(2) Allow vehicle to build air pressure.<br>(3) Note reading on REAR BRAKE AIR pressure gage.<br>(4) If REAR BRAKE AIR pressure gage reads 0 PSI, go to step 4 of this fault.<br>(5) Shut down engine (TM 9-2320-365-10). |



## e9. REAR BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



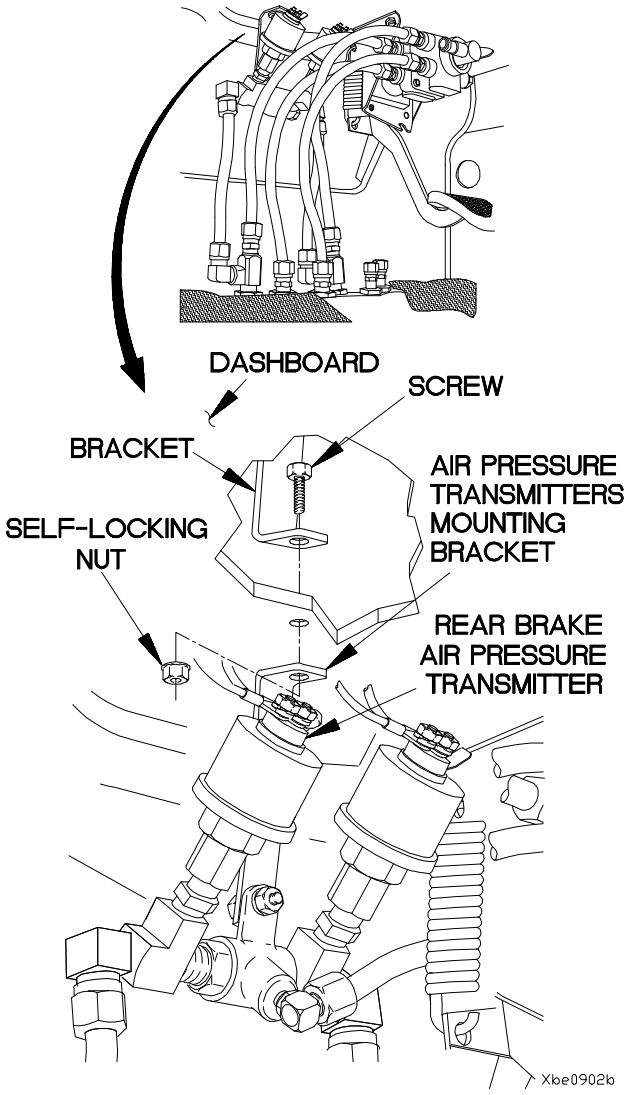
**OPERATIONAL TEST**

(1) Remove instrument panel assembly for access (para 7-15).

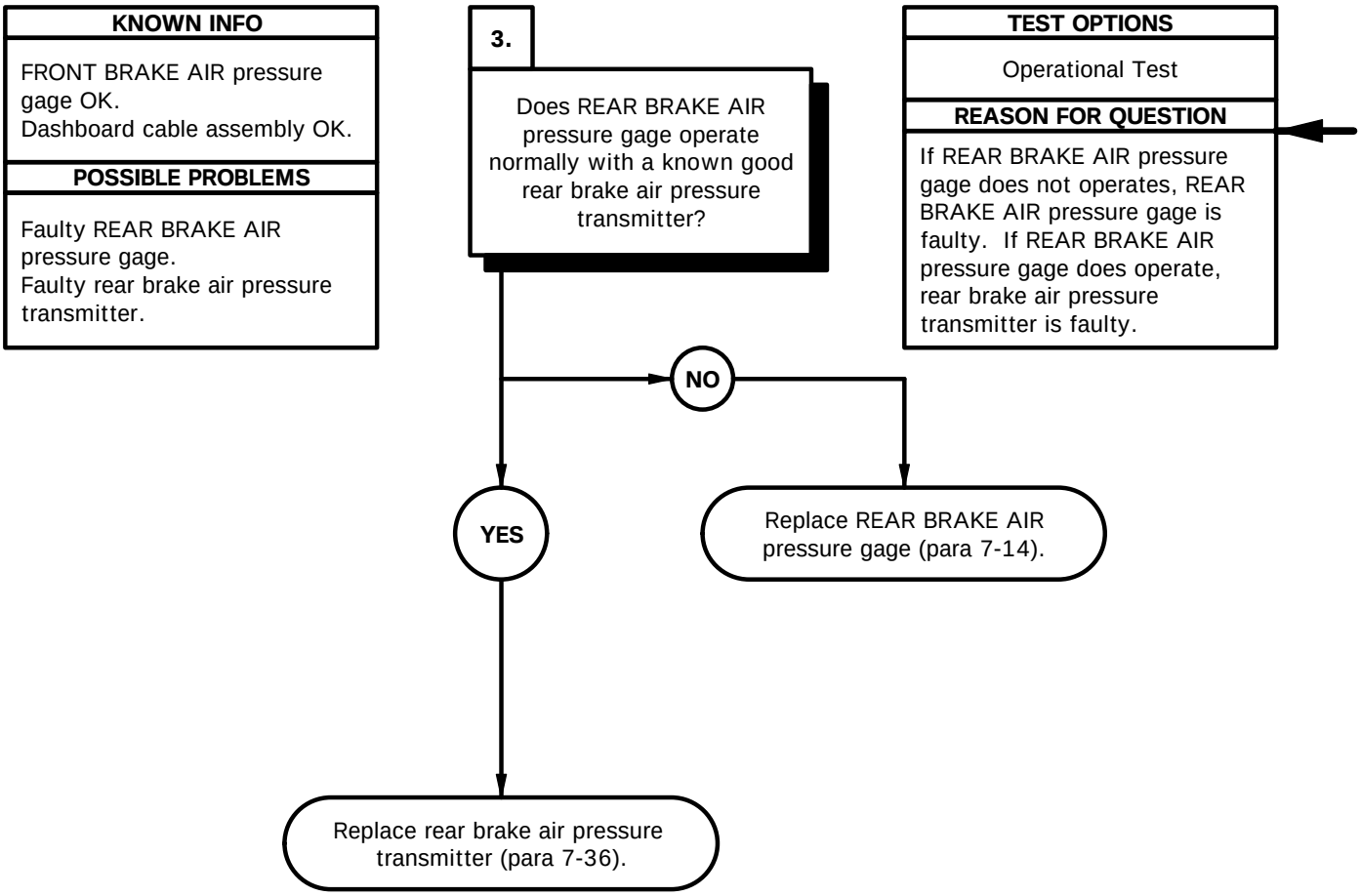
**NOTE**

Note orientation of brackets on dashboard prior to removing.

(2) Remove self-locking nut, air pressure transmitters mounting bracket, screw and bracket from dashboard. Discard self-locking nut.
(3) Inspect dashboard and air pressure transmitters mounting bracket mounting surfaces for corrosion.
(4) If mounting surfaces between air pressure transmitters mounting bracket and dashboard are not free of corrosion or all fittings and hardware are not tight, clean mounting surfaces if needed. Tighten rear brake air pressure transmitter, all fittings, and hardware to ensure a good ground.
(5) Position bracket, screw, air pressure transmitters mounting bracket, and self-locking nut on dashboard.
(6) Tighten self-locking nut to 168-192 lb-in. (19-21 N.m).
(7) Install instrument panel assembly (para 7-15).

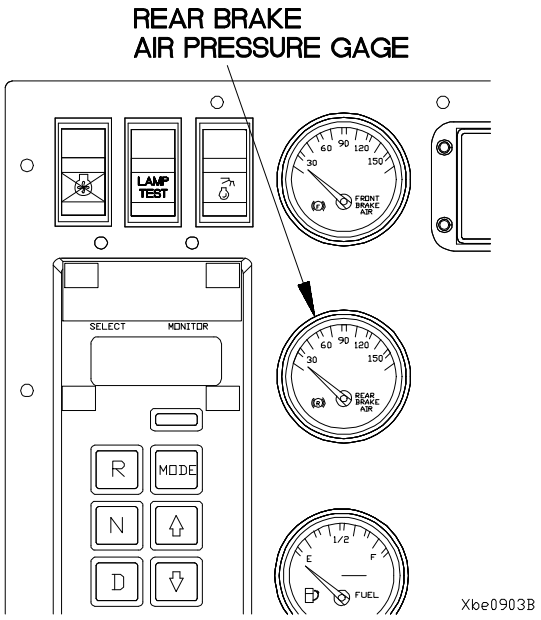


## e9. REAR BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)

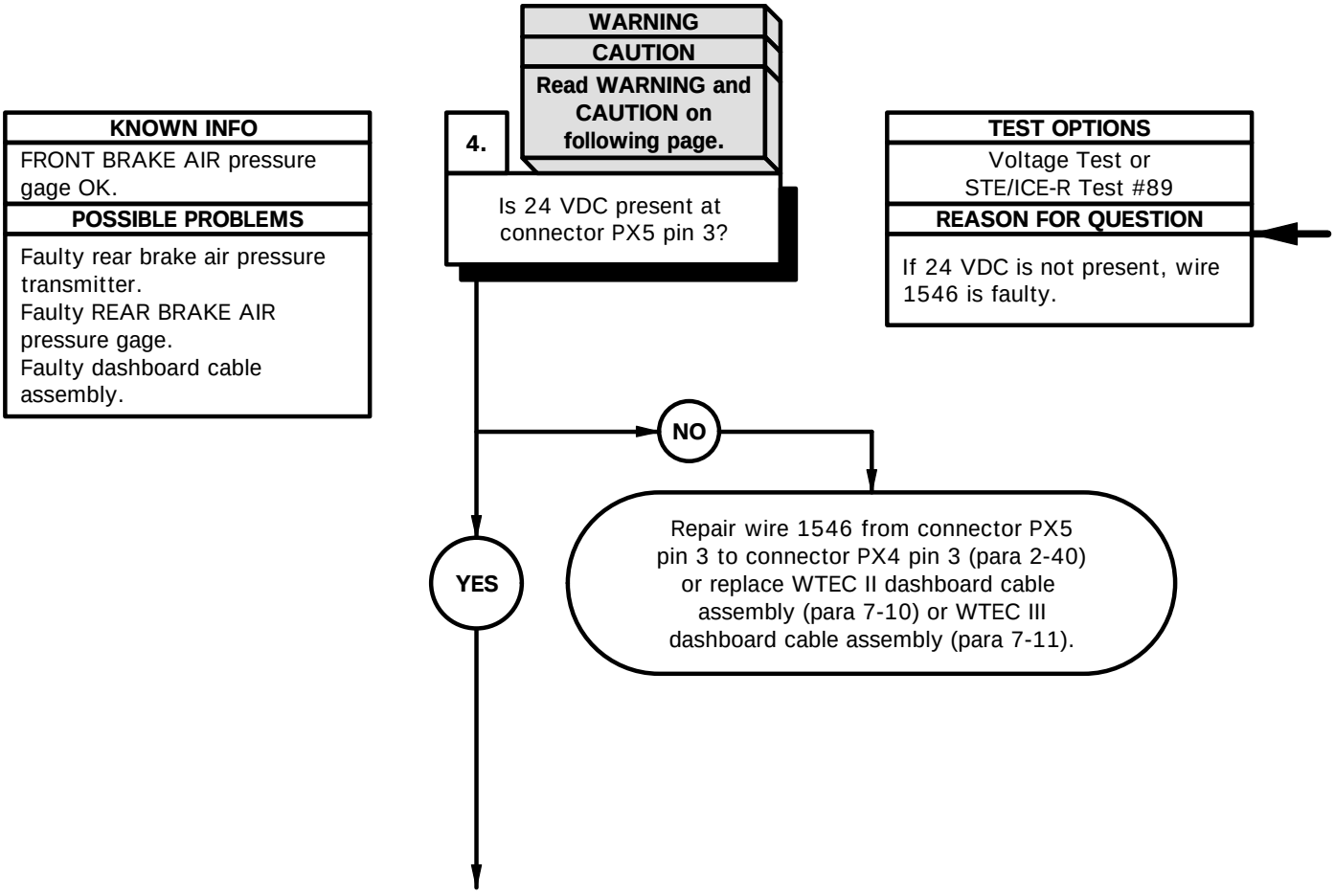


**CONTINUITY TEST**

(1) Replace rear brake air pressure transmitter (para 7-36).
(2) Start engine (TM 9-2320-365-10).
(3) Observe REAR BRAKE AIR pressure gage and allow vehicle to build air pressure.
(4) If REAR BRAKE AIR pressure gage does not operate normally, replace REAR BRAKE AIR pressure gage (para 7-14).
(5) If REAR BRAKE AIR pressure gage does operate normally, replace rear brake air pressure transmitter (para 7-36).
(6) Shut down engine (TM 9-2320-365-10).



## e9. REAR BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

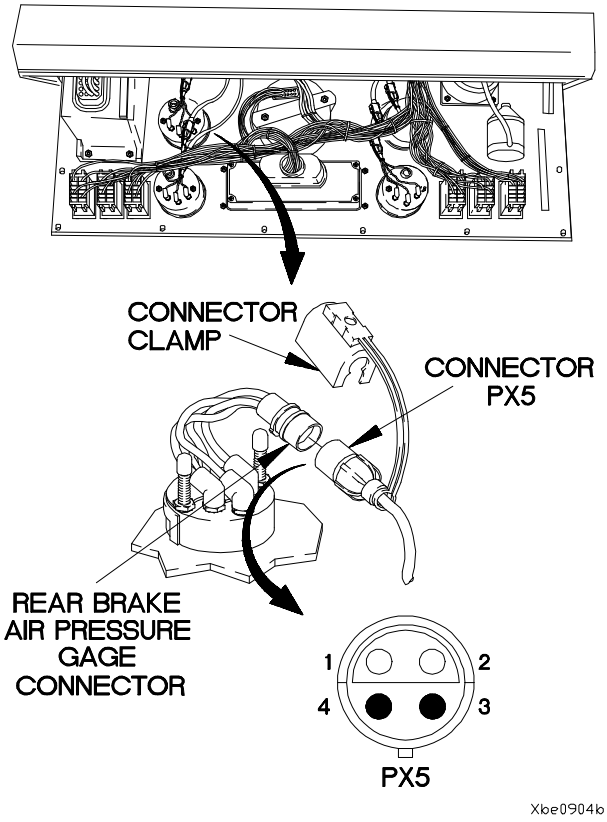
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

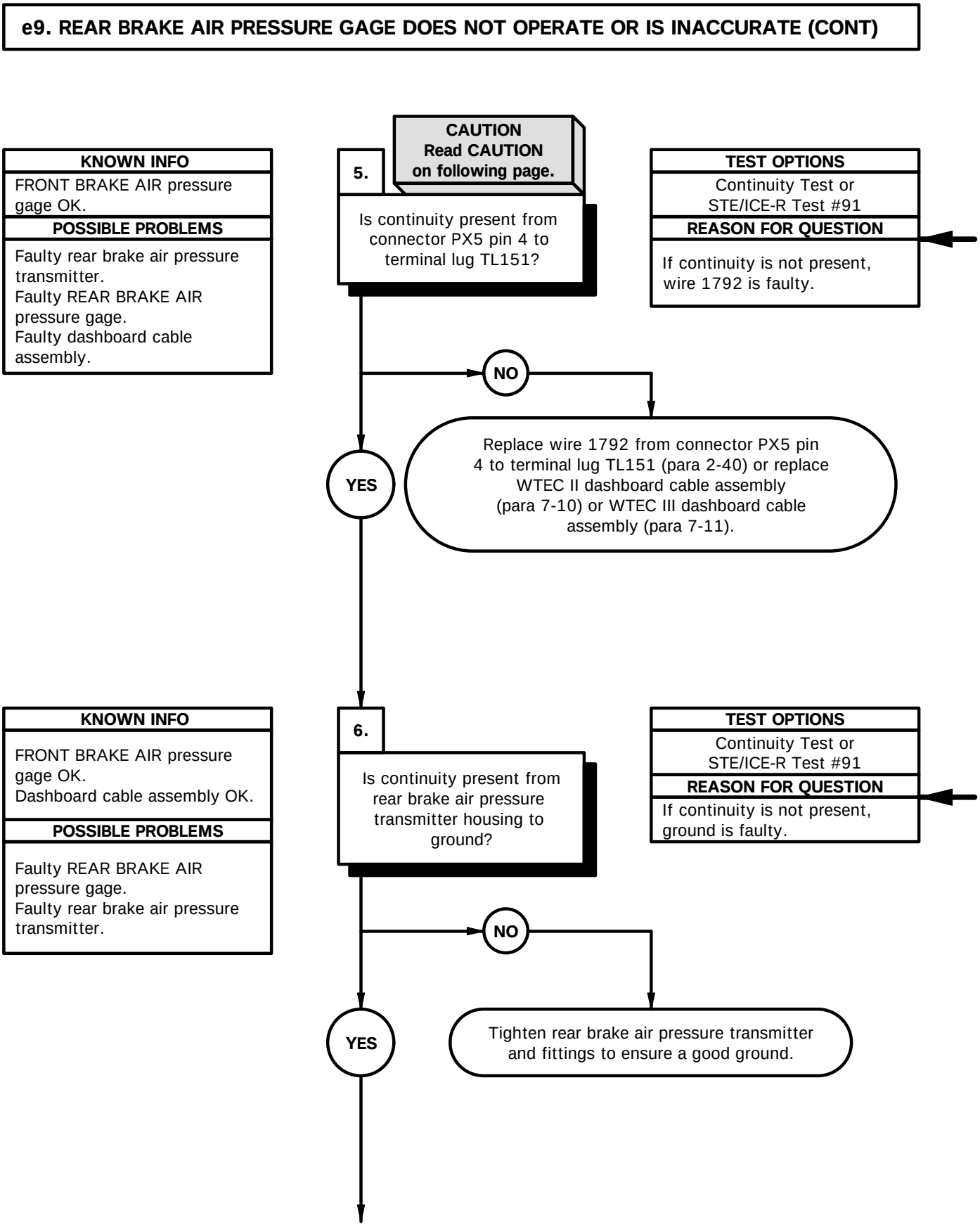
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector clamp from REAR BRAKE AIR pressure gage connector.
(3) Disconnect connector PX5 from REAR BRAKE AIR pressure gage connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector PX5 pin 3.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10).
(8) If 24 VDC is not present, repair wire 1546 from connector PX5 pin 3 to connector PX4 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).



## e9. REAR BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

**NOTE**

Remove plastic cable ties as required.

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX5 pin 4.
(3) Connect negative (-) probe of multimeter to terminal lug TL151 and note reading on multimeter.
(4) If continuity is not present, replace wire 1792 from connector PX5 pin 4 to terminal lug TL151 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

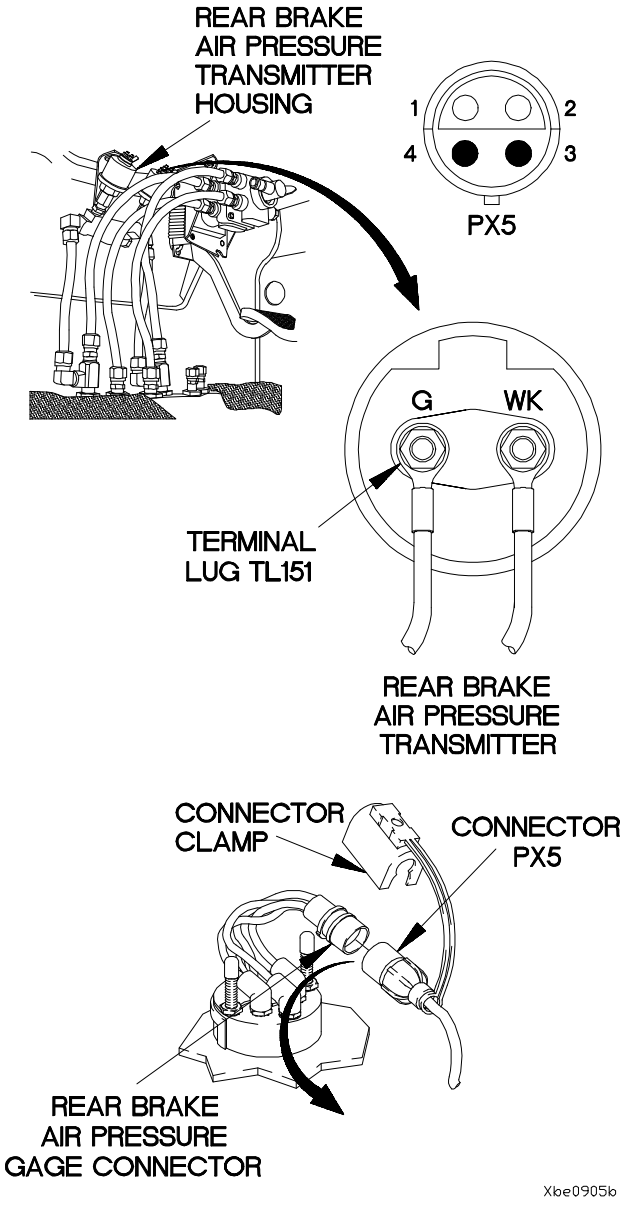
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to rear air brake pressure transmitter housing.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, tighten rear brake air pressure transmitter and fittings to ensure a good ground.
(5) Connect connector PX5 to REAR BRAKE AIR pressure gage connector.
(6) Connect connector clamp to REAR BRAKE AIR pressure gage connector.

**NOTE**

Install plastic cable ties as required.

(7) Install instrument panel assembly (para 7-15).



## e9. REAR BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)

**KNOWN INFO**

FRONT BRAKE AIR pressure gage OK.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty REAR BRAKE AIR pressure gage.
Faulty rear brake air pressure transmitter.

**7.** Does REAR BRAKE AIR pressure gage operate with a known good rear air brake pressure transmitter?

**TEST OPTIONS**

Operational Test

**REASON FOR QUESTION**

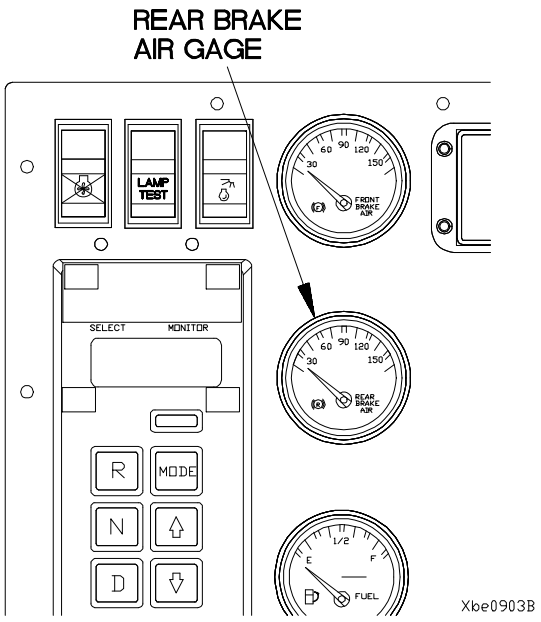
If REAR BRAKE AIR pressure gage does not operates, REAR BRAKE AIR pressure gage is faulty. If REAR BRAKE AIR pressure gage does operate, rear brake air pressure transmitter is faulty.

**NO** → Replace REAR BRAKE AIR pressure gage (para 7-14).

**YES** → Replace rear brake air pressure transmitter (para 7-36).

**CONTINUITY TEST**

(1) Replace rear brake air pressure transmitter (para 7-36).
(2) Start engine (TM 9-2320-365-10).
(3) Allow vehicle to build air pressure.
(4) Note reading on REAR BRAKE AIR pressure gage.
(5) If REAR BRAKE AIR pressure gage does not operate, replace REAR BRAKE AIR pressure gage (para 7-14).
(6) If REAR BRAKE AIR pressure gage does operate, replace rear brake air pressure transmitter (para 7-36).
(7) Shut down engine (TM 9-2320-365-10).



## e10. FRONT BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

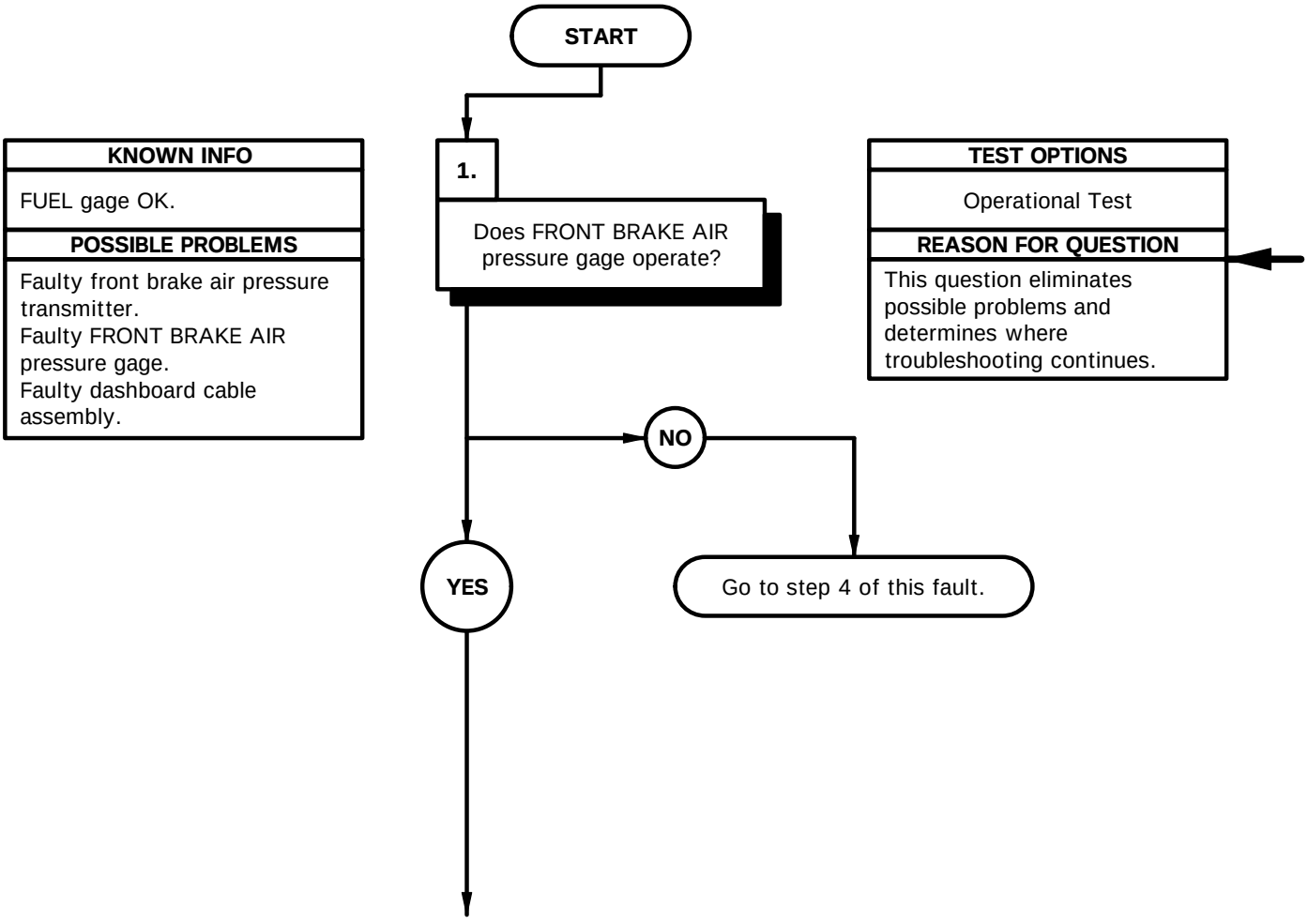
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM9-2320-365-10)

**Personnel Required**
(2)

**Materials/Parts**
Nut, Self-Locking (Item 148, Appendix G)
Antiseize Compound (Item 14, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)

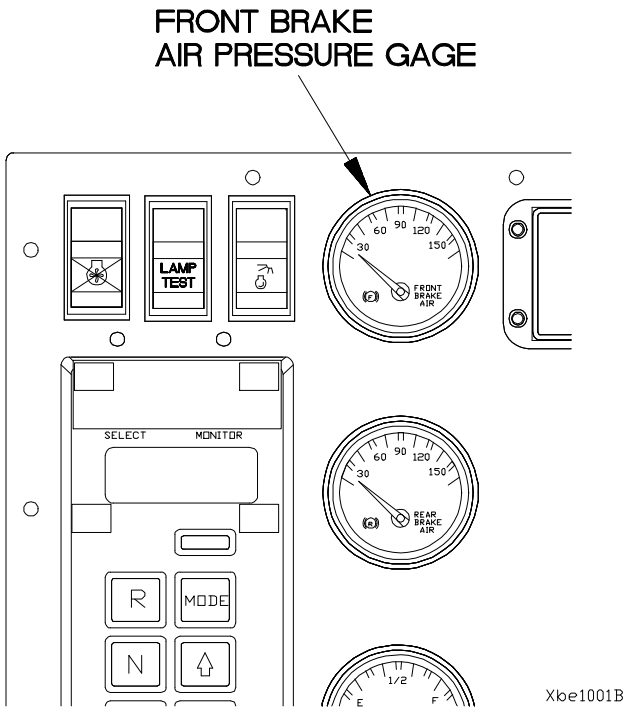
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-300 lb-in. (Item 58.1, Appendix C)

**References**
TM 9-4910-571-12&P

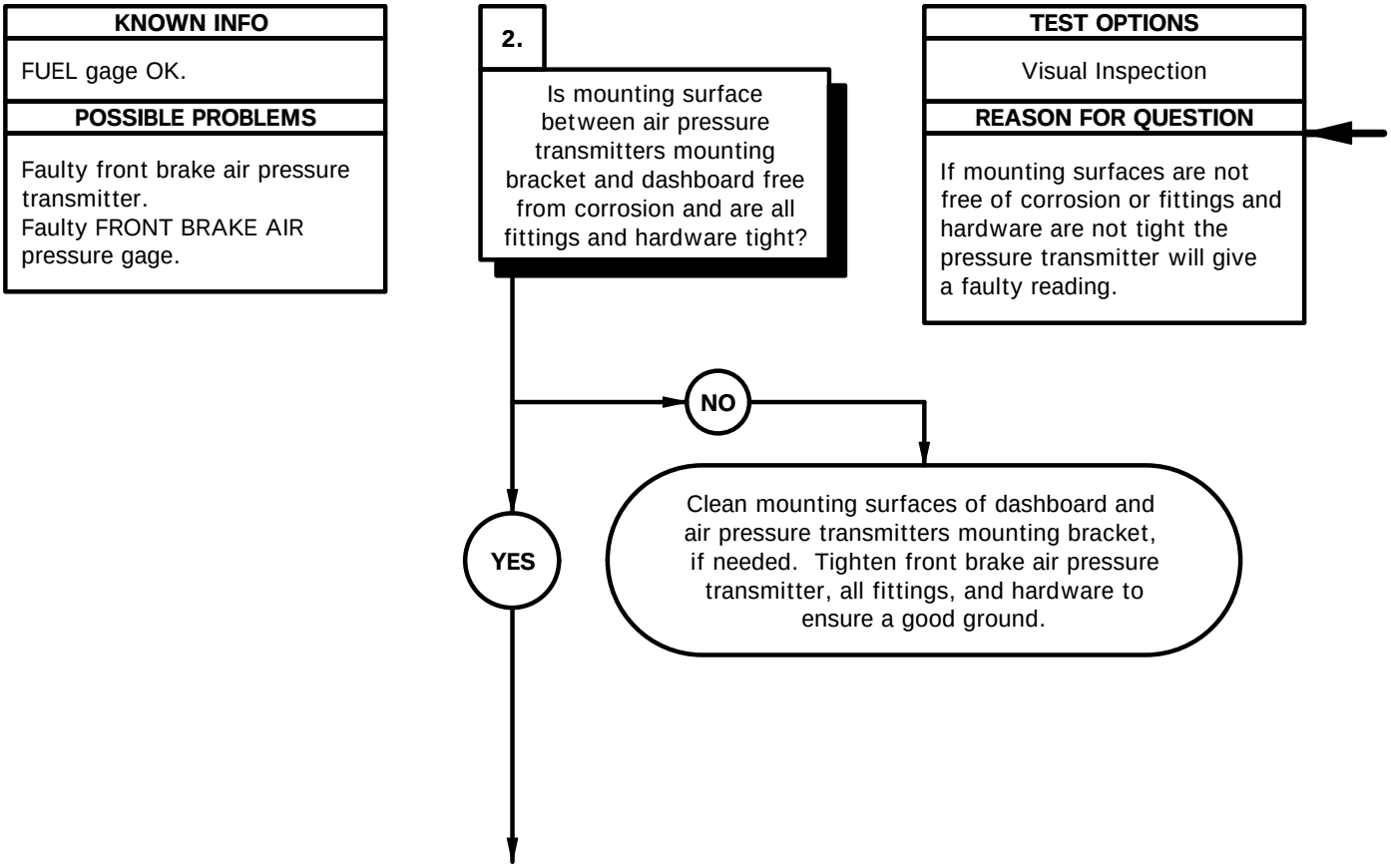


**OPERATIONAL TEST**

(1) Start engine (TM 9-2320-365-10).
(2) Allow vehicle to build air pressure.
(3) Note reading on FRONT BRAKE AIR pressure gage.
(4) If FRONT BRAKE AIR pressure gage reads 0 PSI, go to step 4 of this fault.
(5) Shut down engine (TM 9-2320-365-10).



## e10. FRONT BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



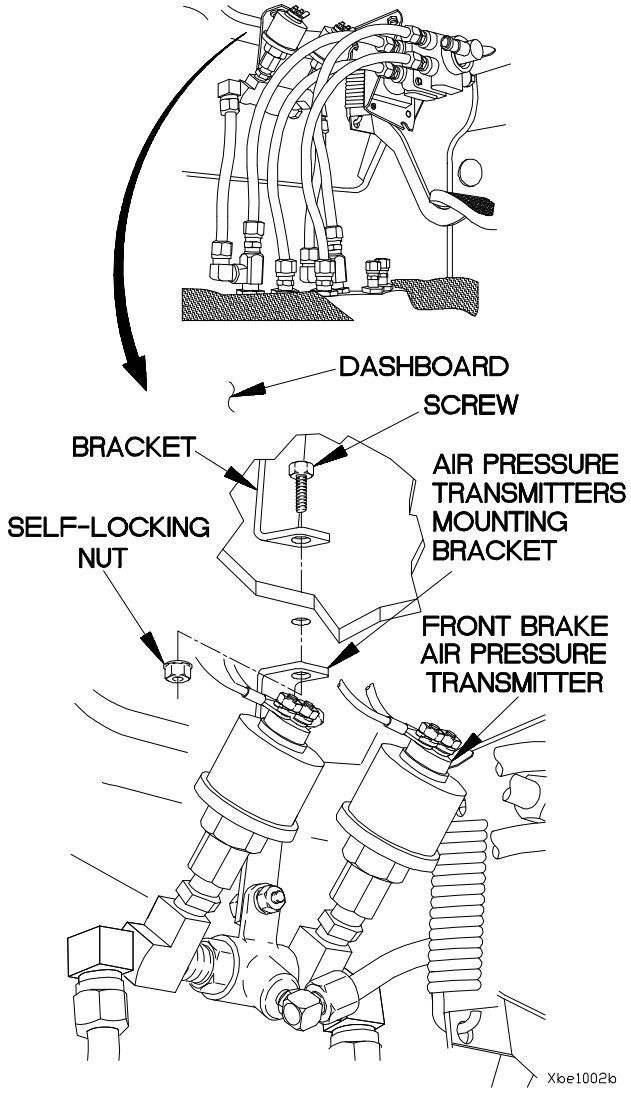
**OPERATIONAL TEST**

(1) Remove instrument panel assembly for access (para 7-15).

**NOTE**

Note orientation of brackets on dashboard prior to removing.

(2) Remove self-locking nut, air pressure transmitters mounting bracket, screw and bracket from dashboard. Discard self-locking nut.
(3) Inspect dashboard and air pressure transmitters mounting bracket mounting surfaces for corrosion.
(4) If mounting surfaces between air pressure transmitters mounting bracket and dashboard are not free of corrosion or all fittings and hardware are not tight, clean mounting surfaces if needed. Tighten front brake air pressure transmitter, all fittings, and hardware to ensure a good ground.
(5) Position bracket, screw, air pressure transmitters mounting bracket, and self-locking nut on dashboard.
(6) Tighten self-locking nut to 168-192 lb-in. (19-21 N.m).
(7) Install instrument panel assembly (para 7-15).



## e10. FRONT BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)

**KNOWN INFO**

FUEL gage OK.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty FRONT BRAKE AIR pressure gage.
Faulty front brake air pressure transmitter.

**3.**

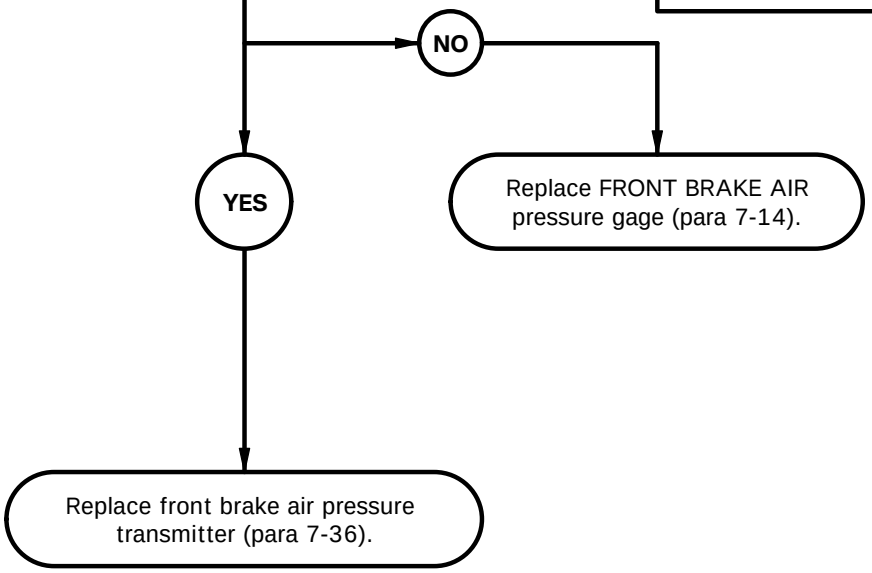
Does FRONT BRAKE AIR pressure gage operate normally with a known good rear air pressure transmitter?

**TEST OPTIONS**

Operational Test

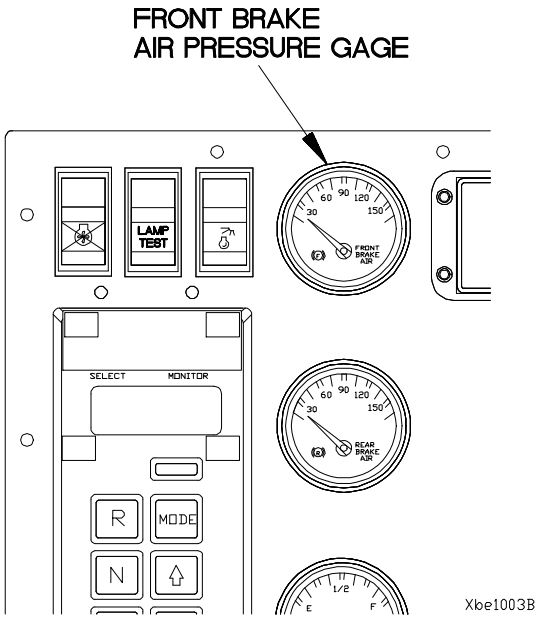
**REASON FOR QUESTION**

If FRONT BRAKE AIR pressure gage does not operates, FRONT BRAKE AIR pressure gage is faulty. If FRONT BRAKE AIR pressure gage does operate, front brake air pressure transmitter is faulty.

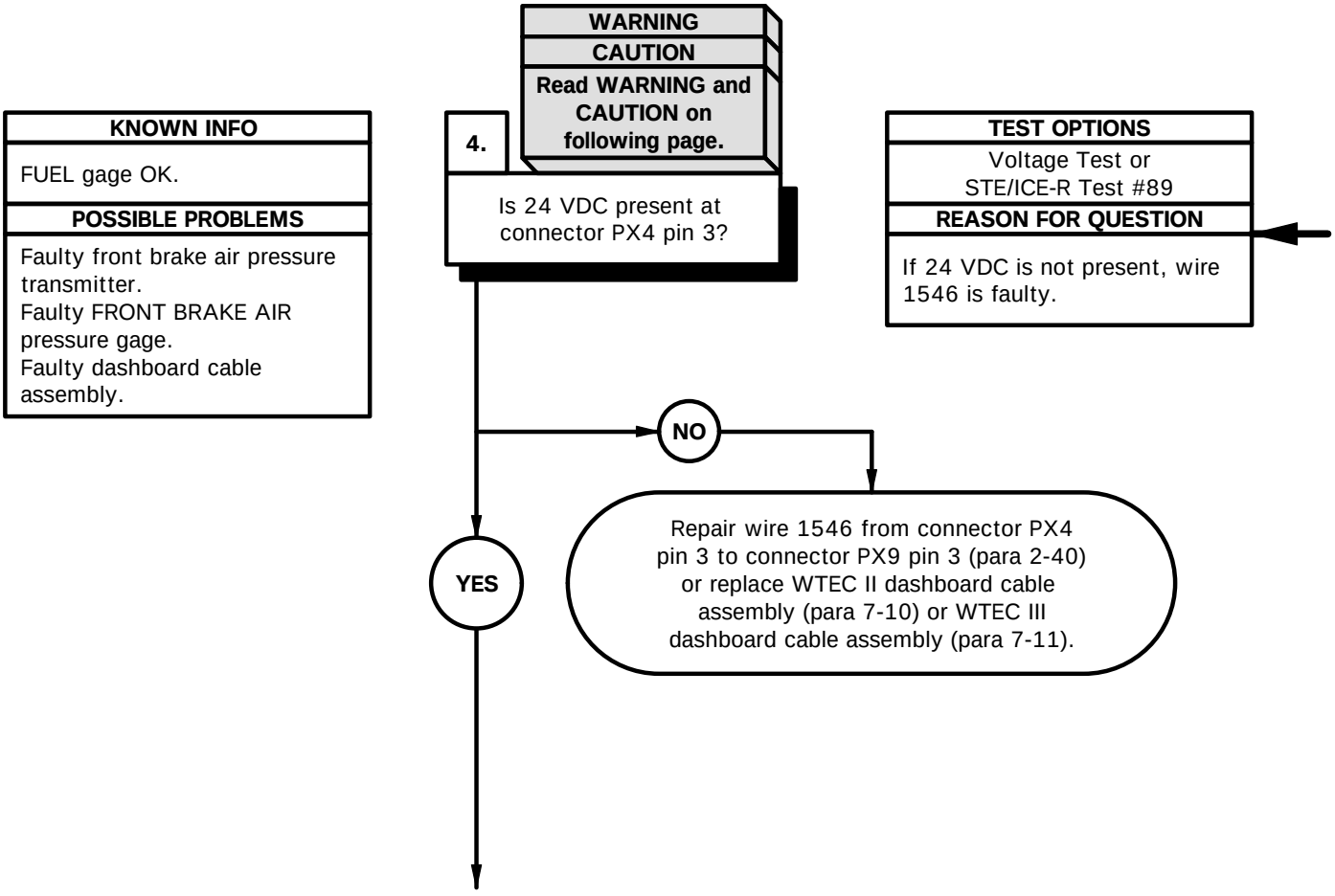


**CONTINUITY TEST**

(1) Replace front brake air pressure transmitter (para 7-36).
(2) Start engine (TM 9-2320-365-10).
(3) Observe FRONT BRAKE AIR pressure gage and allow vehicle to build air pressure.
(4) If FRONT BRAKE AIR pressure gage does not operate normally, replace FRONT BRAKE AIR pressure gage (para 7-14).
(5) If FRONT BRAKE AIR pressure gage does operate normally, replace front brake air pressure transmitter (para 7-36).
(6) Shut down engine (TM 9-2320-365-10).



## e10. FRONT BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

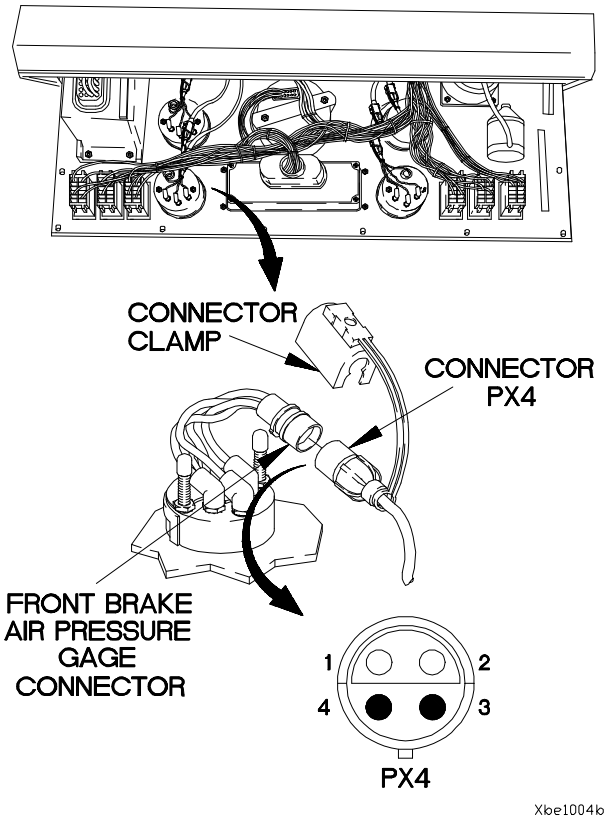
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

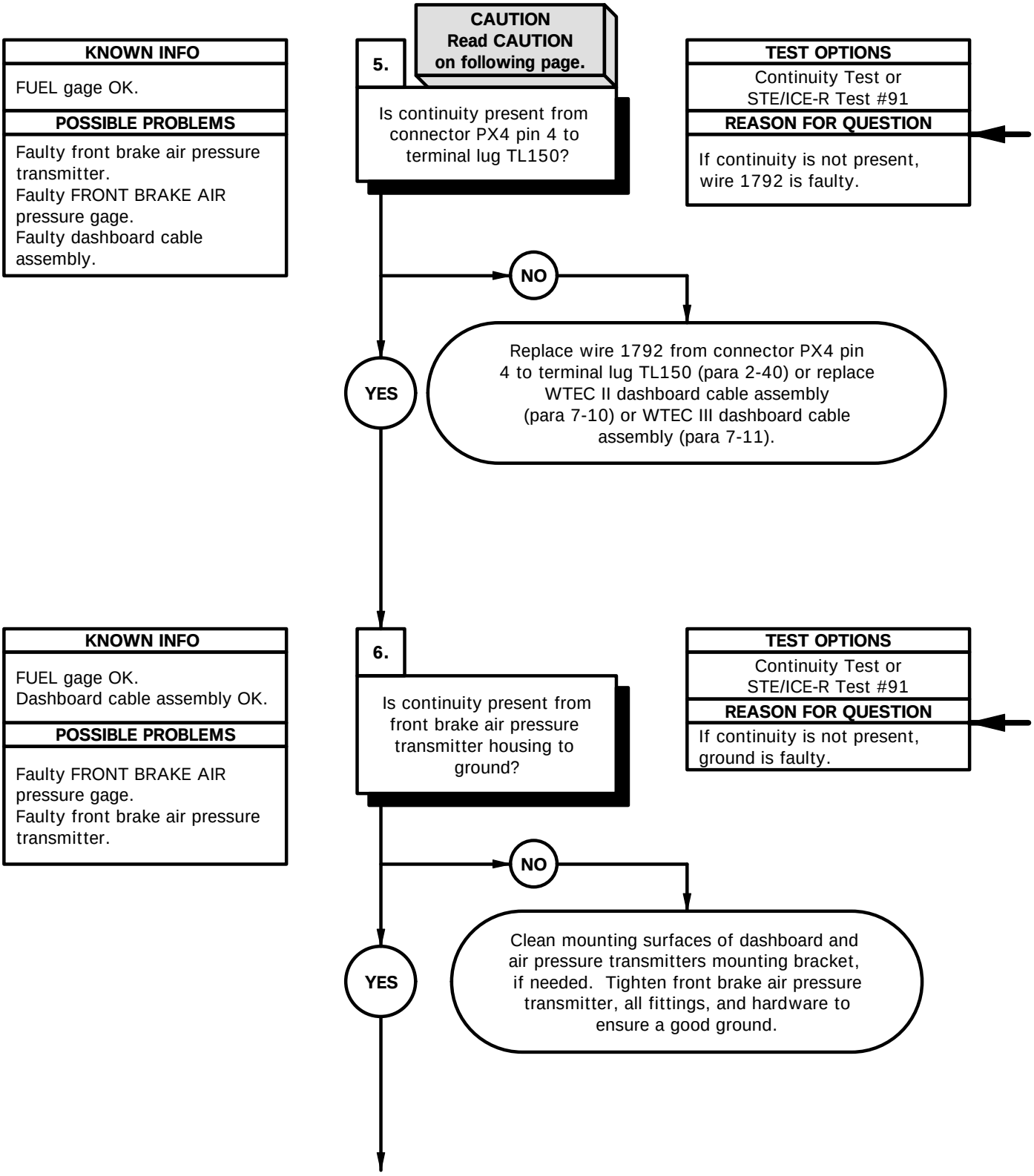
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector clamp from FRONT BRAKE AIR pressure gage connector.
(3) Disconnect connector PX4 from FRONT BRAKE AIR pressure gage connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector PX4 pin 3.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10).
(8) If 24 VDC is not present, repair wire 1546 from connector PX4 pin 3 to connector PX9 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).



## e10. FRONT BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

**NOTE**

Remove plastic cable ties as required.

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX4 pin 4.
(3) Connect negative (-) probe of multimeter to terminal lug TL150 and note reading on multimeter.
(4) If continuity is not present, replace wire 1792 from connector PX4 pin 4 to terminal lug TL150 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to front brake air pressure transmitter housing.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, perform steps (5) through (12).
(5) Remove self-locking nut, air pressure transmitters mounting bracket, screw, and bracket from dashboard. Discard self-locking nut.
(6) Inspect dashboard and air pressure transmitters mounting bracket for corrosion.
(7) If mounting surface is corroded or fittings and hardware are not tight, clean mounting surface if needed. Tighten front brake air pressure transmitter, all fittings, and hardware to ensure a good ground.
(8) Position bracket, screw, air pressure transmitters mounting bracket, and self-locking nut on dashboard.
(9) Tighten self-locking nut to 168-192 lb-in. (19-21 N.m).

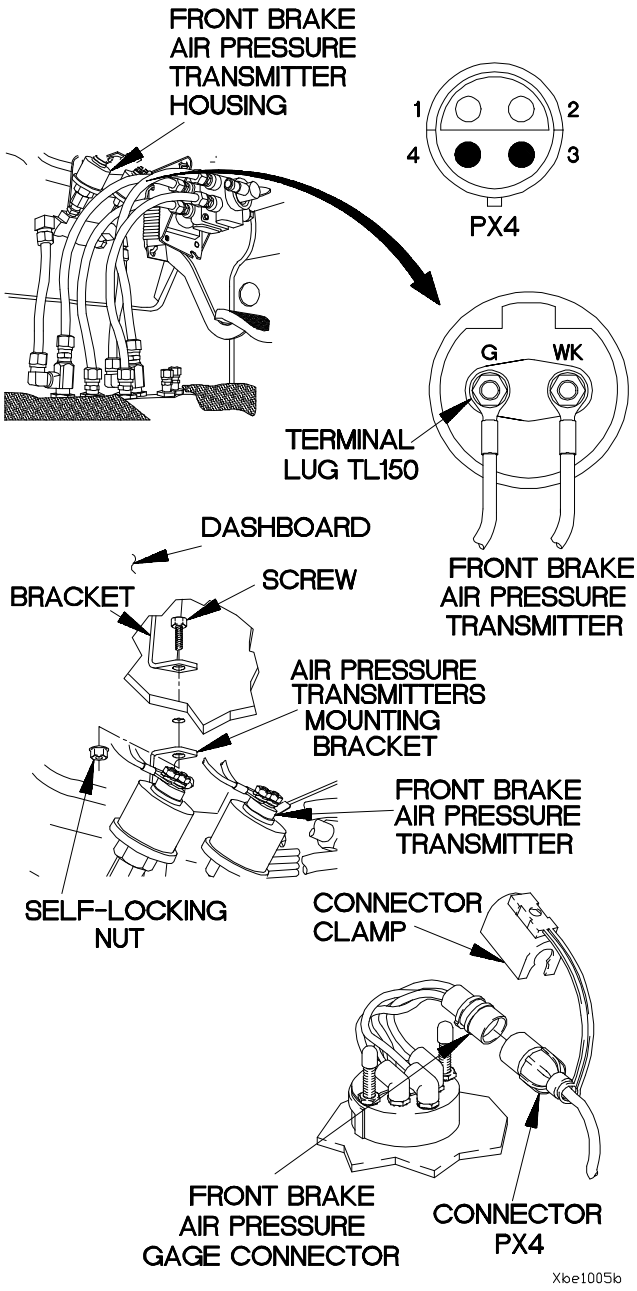
**CONTINUITY TEST (Cont)**

(10) Connect connector PX4 to FRONT BRAKE AIR pressure gage connector.
(11) Connect connector clamp to FRONT BRAKE AIR pressure gage.

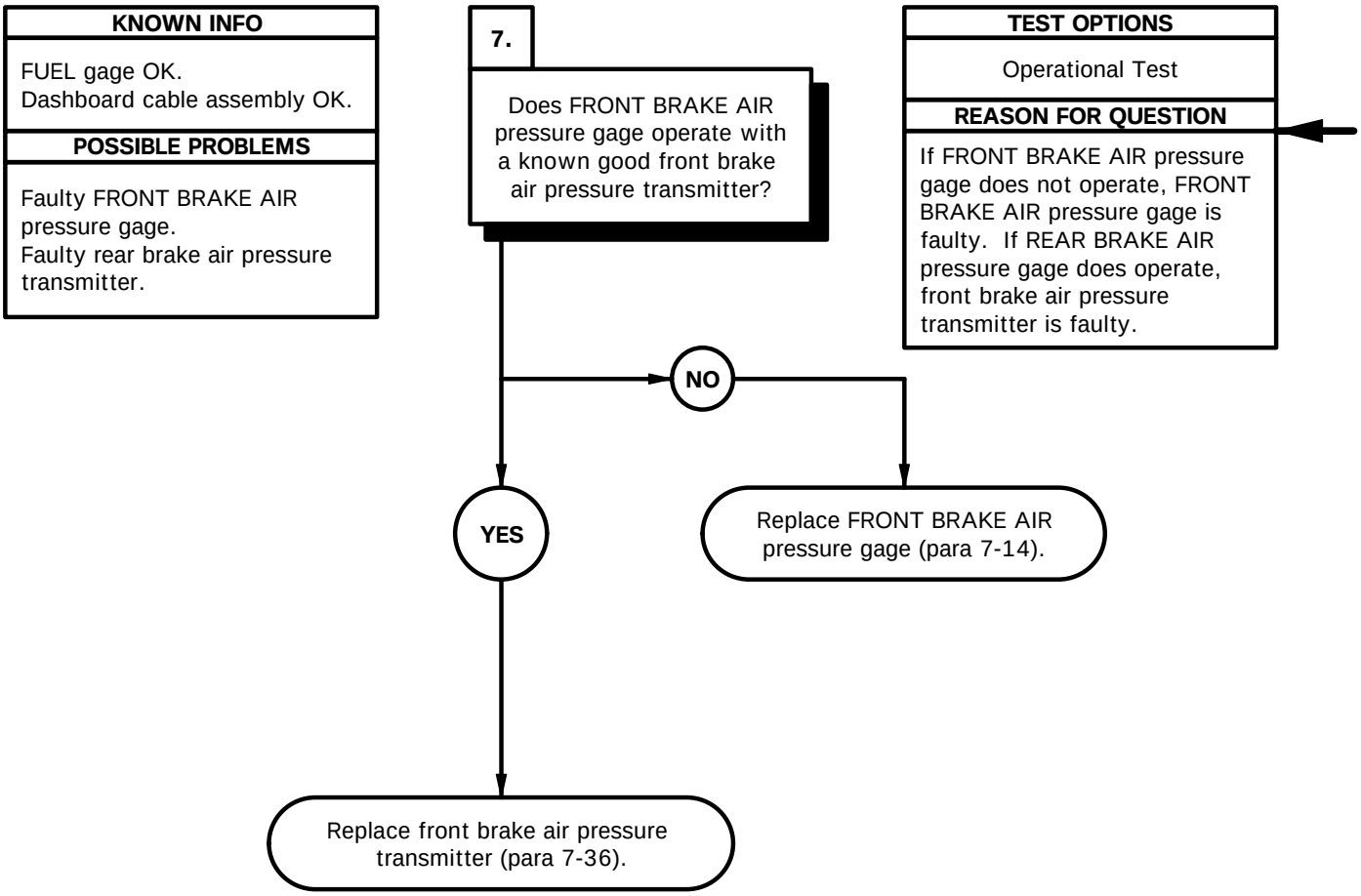
**NOTE**

Install plastic cable ties as required

(12) Install instrument panel assembly (para 7-15).

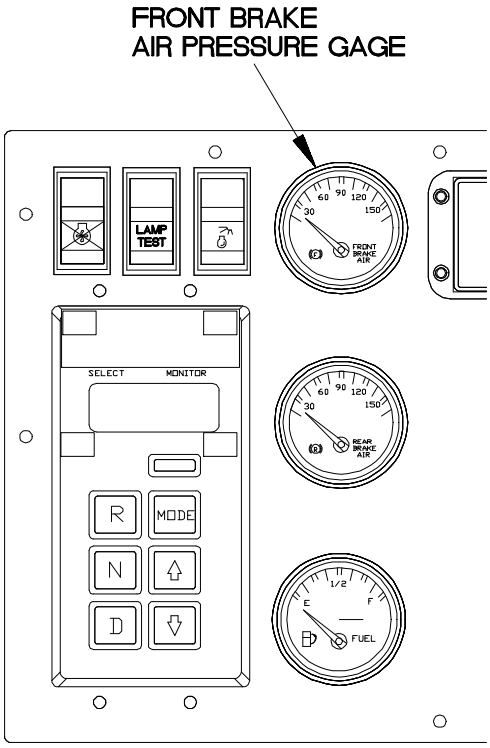


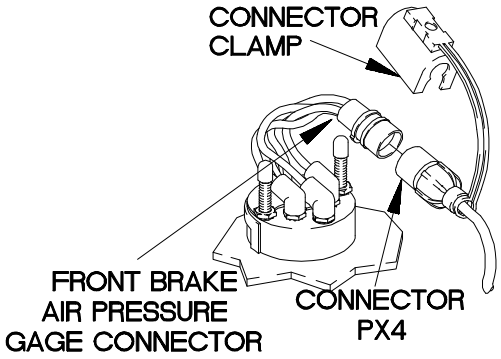
## e10. FRONT BRAKE AIR PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CONTINUITY TEST**

(1) Connect connector PX4 to FRONT BRAKE AIR pressure gage connector.
(2) Connect connector clamp to FRONT BRAKE AIR pressure gage.
(3) Install instrument panel assembly (para 7-15).
(4) Replace front brake air pressure transmitter (para 7-36).
(5) Start engine (TM 9-2320-365-10).
(6) Allow vehicle to build air pressure.
(7) Note reading on FRONT BRAKE AIR pressure gage.
(8) If FRONT BRAKE AIR pressure gage does not operate, replace FRONT BRAKE AIR pressure gage (para 7-14).
(9) If FRONT BRAKE AIR pressure gage does operate, replace front brake air pressure transmitter (para 7-36).
(10) Shut down engine (TM 9-2320-365-10).




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## e11. ENGINE OIL PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE

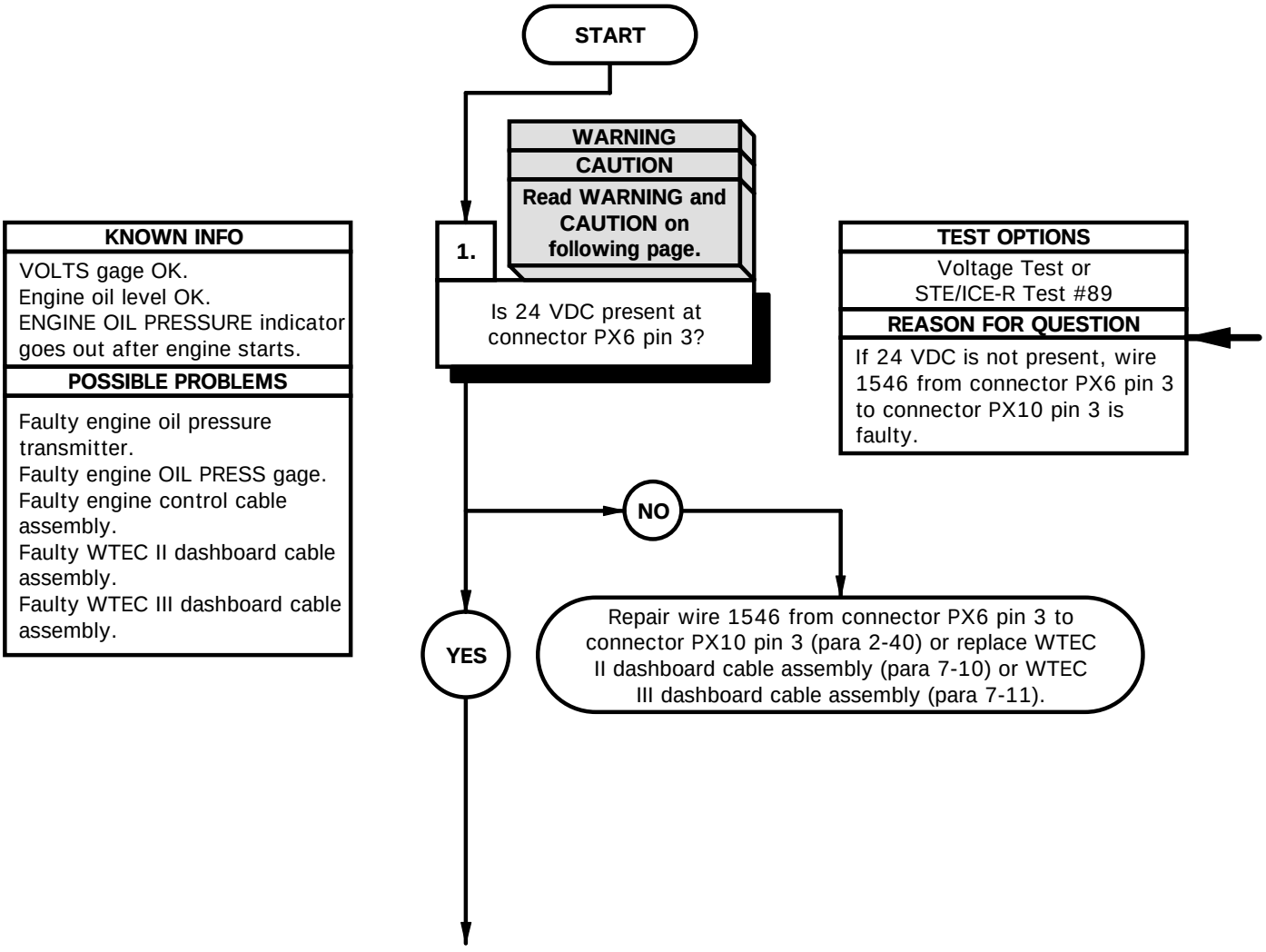
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

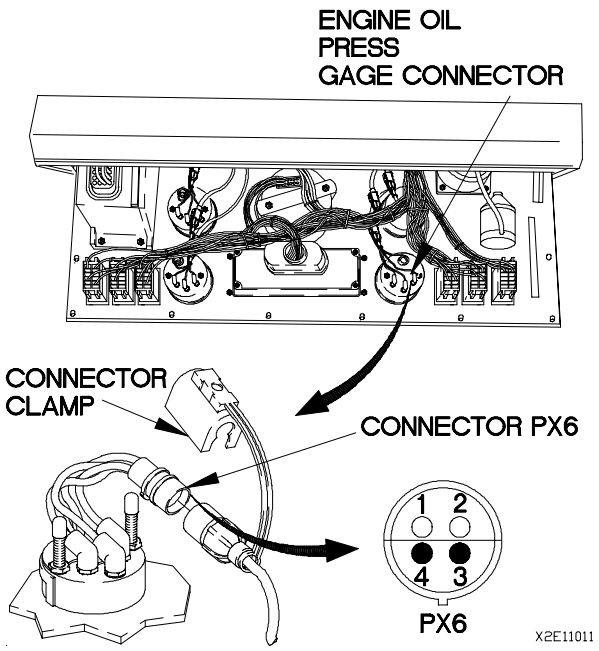
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

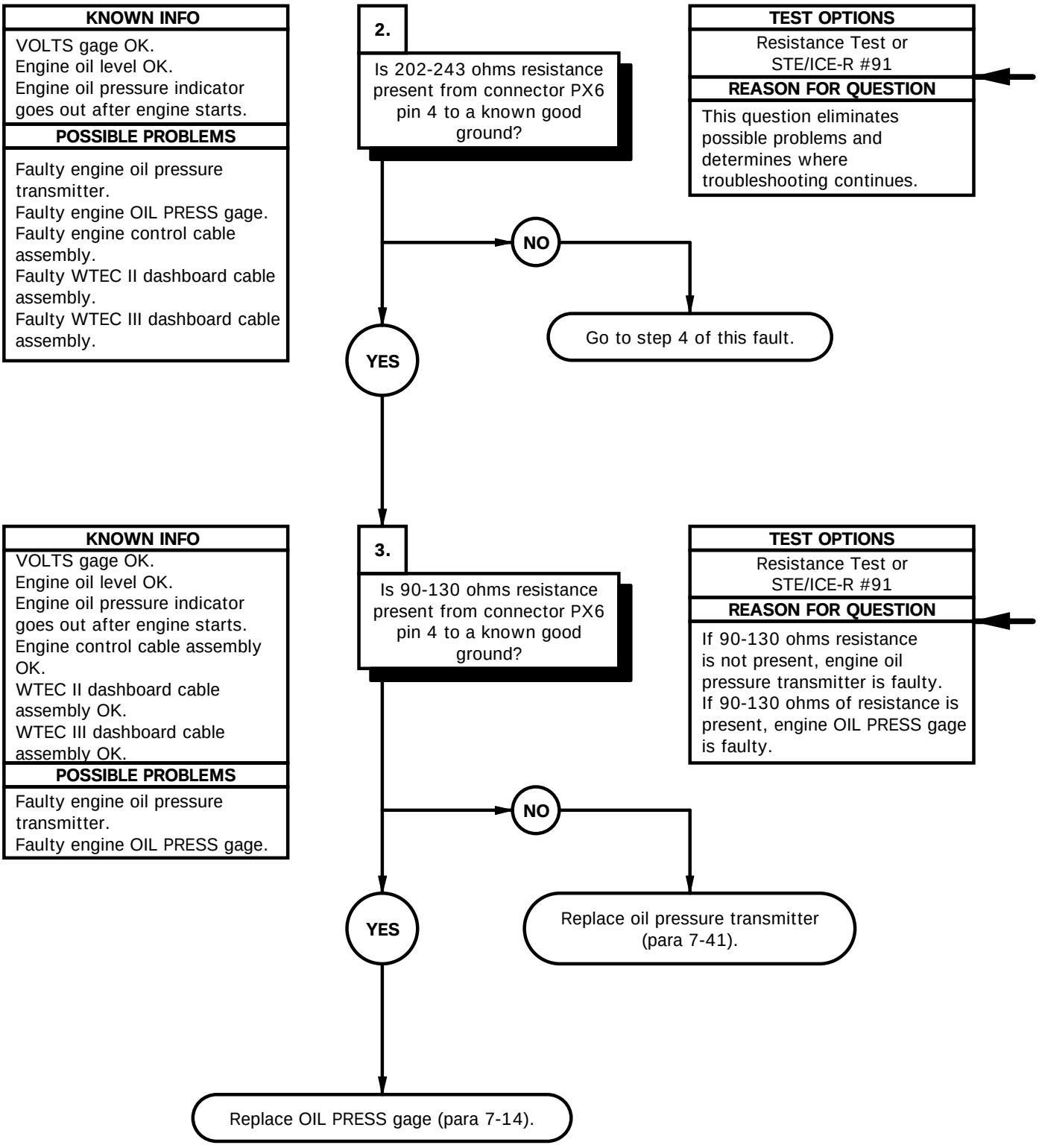
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from engine OIL PRESS gage connector.
(3) Disconnect connector PX6 from engine OIL PRESS gage connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector PX6 pin 3.
(6) Connect negative (-) probe of multimeter to known good ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, repair wire 1546 from connector PX6 pin 3 to connector PX10 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).



## e11. ENGINE OIL PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)

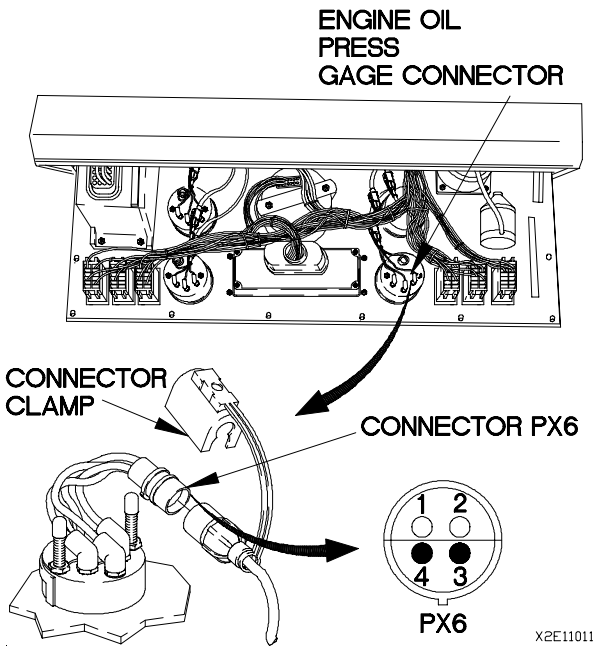


**RESISTANCE TEST**

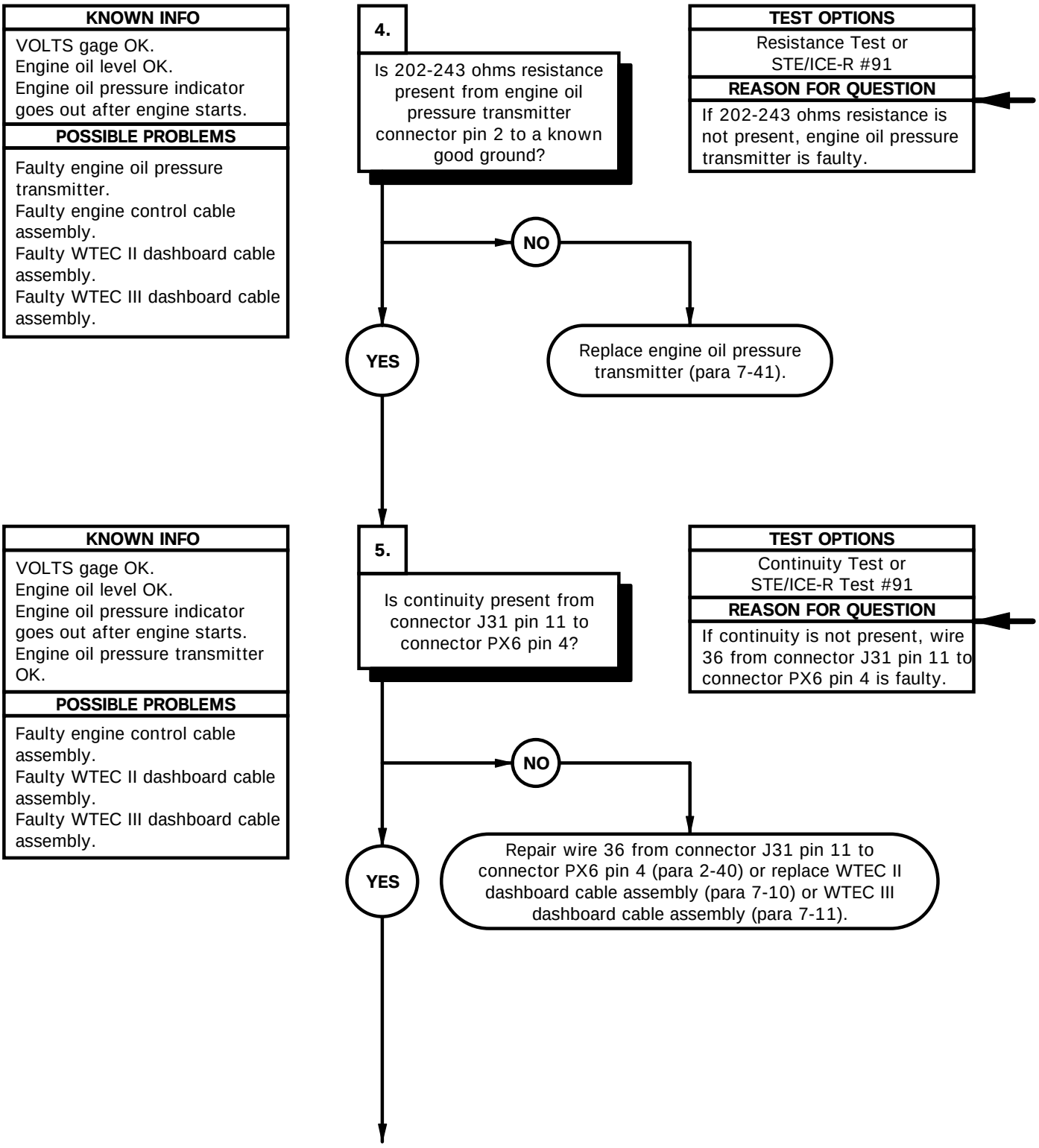
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX6 pin 4.
(3) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(4) If 202-243 ohms resistance is not present, go to step 4 of this fault.

**RESISTANCE TEST**

(1) Start engine (TM 9-2320-365-10).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX6 pin 4.
(4) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(5) If 90-130 ohms resistance is not present, replace engine oil pressure transmitter (para 7-41).
(6) If 90-130 ohms resistance is present, replace engine OIL PRESS gage (para 7-14).
(7) Shut down engine (TM 9-2320-365-10).
(8) Connect connector PX6 to engine OIL PRESS gage connector.
(9) Connect connector clamp to engine OIL PRESS gage connector.
(10) Install instrument panel assembly (para 7-15).



## e11. ENGINE OIL PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**RESISTANCE TEST**

(1) Raise cab (TM 9-2320-365-10)
(2) Set multimeter to ohms.
(3) Disconnect connector P32 from engine oil pressure transmitter connector.
(4) Connect positive (+) probe of multimeter to engine oil pressure transmitter pin 2.
(5) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(6) If 202-243 ohms resistance is not present, replace engine oil pressure transmitter (para 7-41).

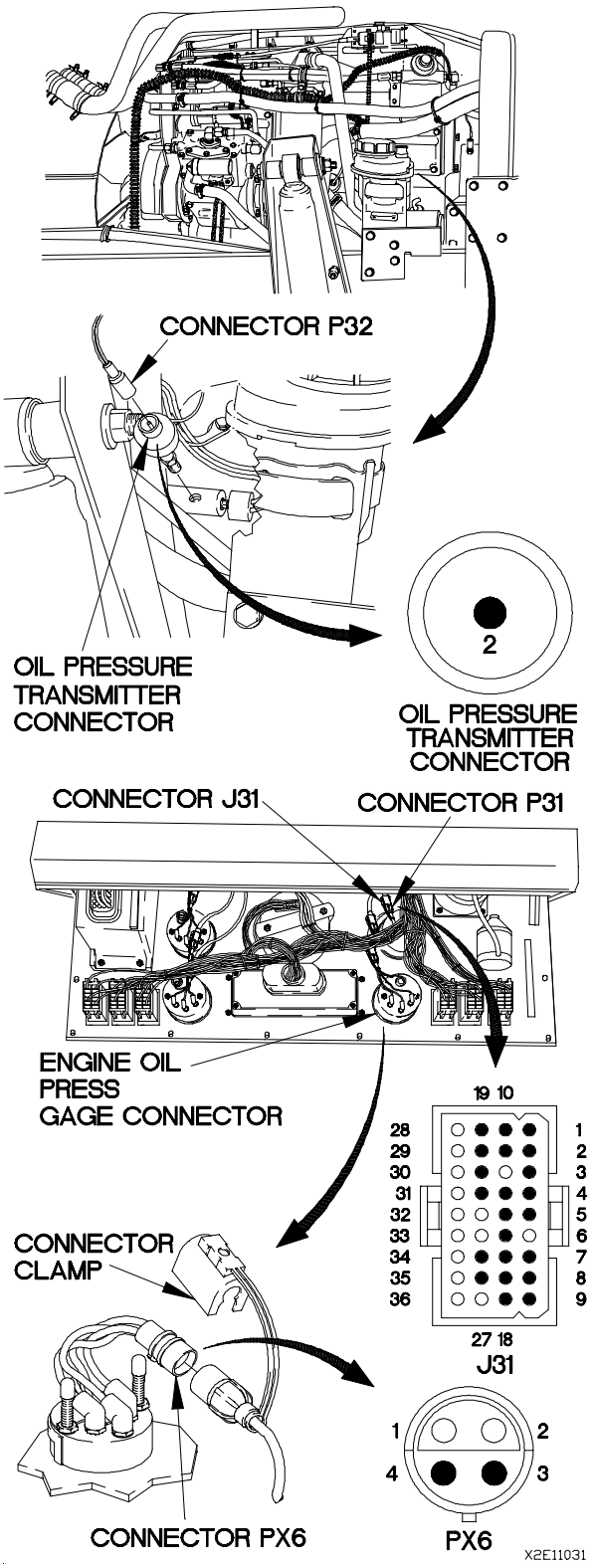
**NOTE**

Perform steps (7) through (9) if 202-243 ohms resistance is not present.

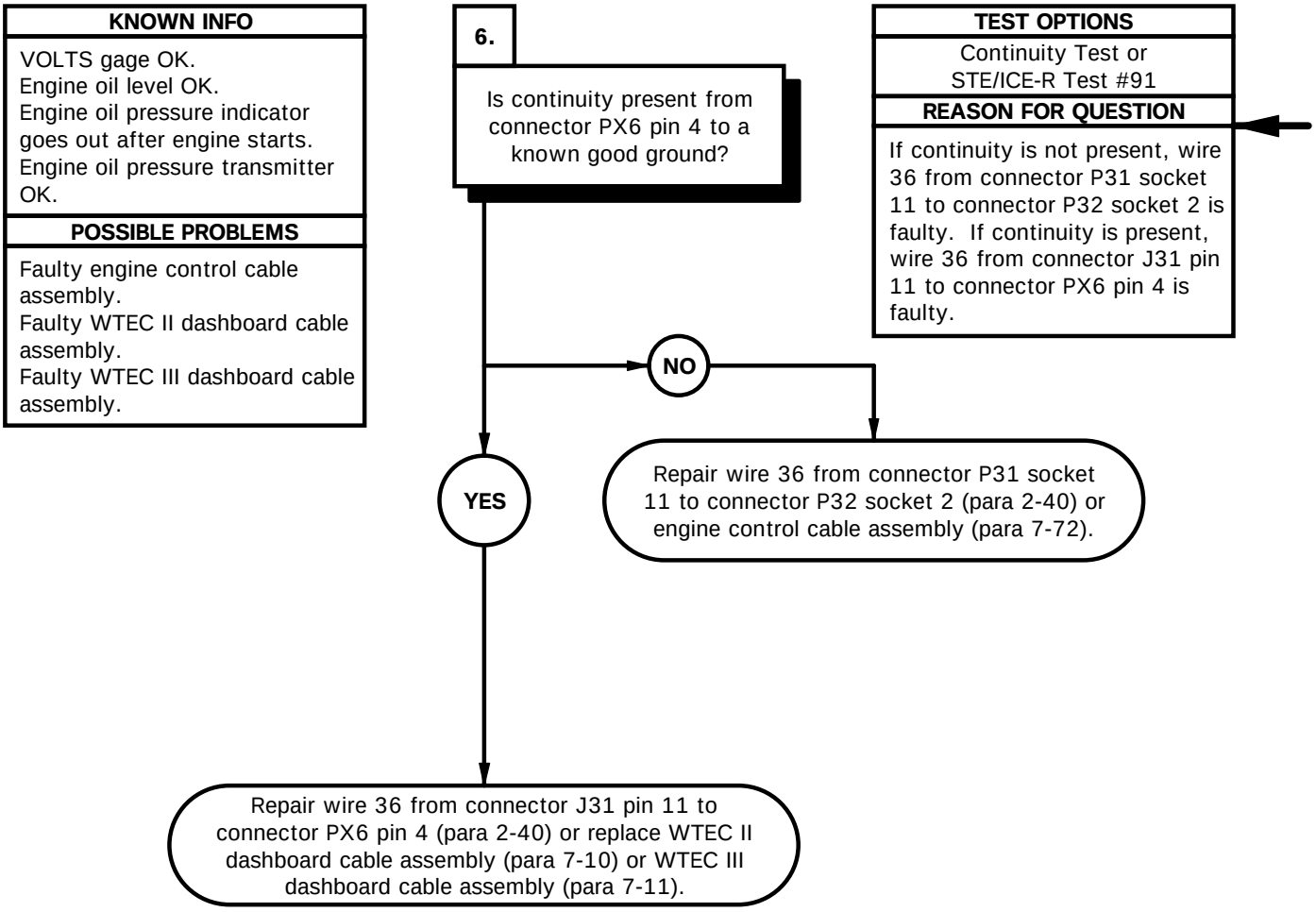
(7) Connect connector PX6 to engine OIL PRESS gage connector.
(8) Connect connector clamp to engine OIL PRESS gage connector.
(9) Install instrument panel assembly (para 7-15).

**CONTINUITY TEST**

(1) Connect connector P32 to engine oil pressure transmitter connector.
(2) Lower cab (TM 9-2320-365-10).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX6 pin 4.
(6) Connect negative (-) probe of multimeter to connector J31 pin 11 and note reading on multimeter.
(7) If continuity is not present, repair wire 36 from connector PX6 pin 4 to connector J31 pin 11 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

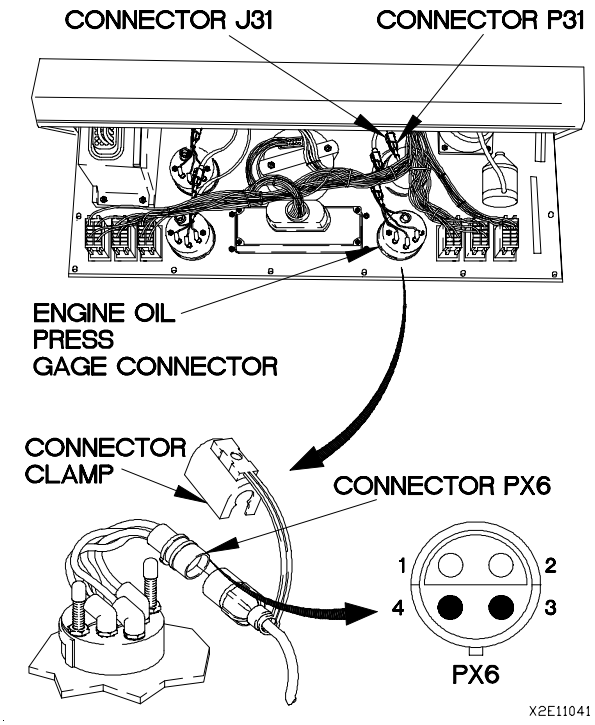


## e11. ENGINE OIL PRESSURE GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX6 pin 4.
(3) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(4) If continuity is not present, repair wire 36 from connector P31 socket 11 to connector P32 socket 2 (para 2-40) or engine control cable assembly (para 7-72).
(5) If continuity is present, repair wire 36 from connector J31 pin 11 to connector PX6 pin 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector J31 to connector P31.
(7) Connect connector PX6 to engine OIL PRESS gage connector.
(8) Connect connector clamp to engine OIL PRESS gage connector.
(9) Install instrument panel assembly (para 7-15).



## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

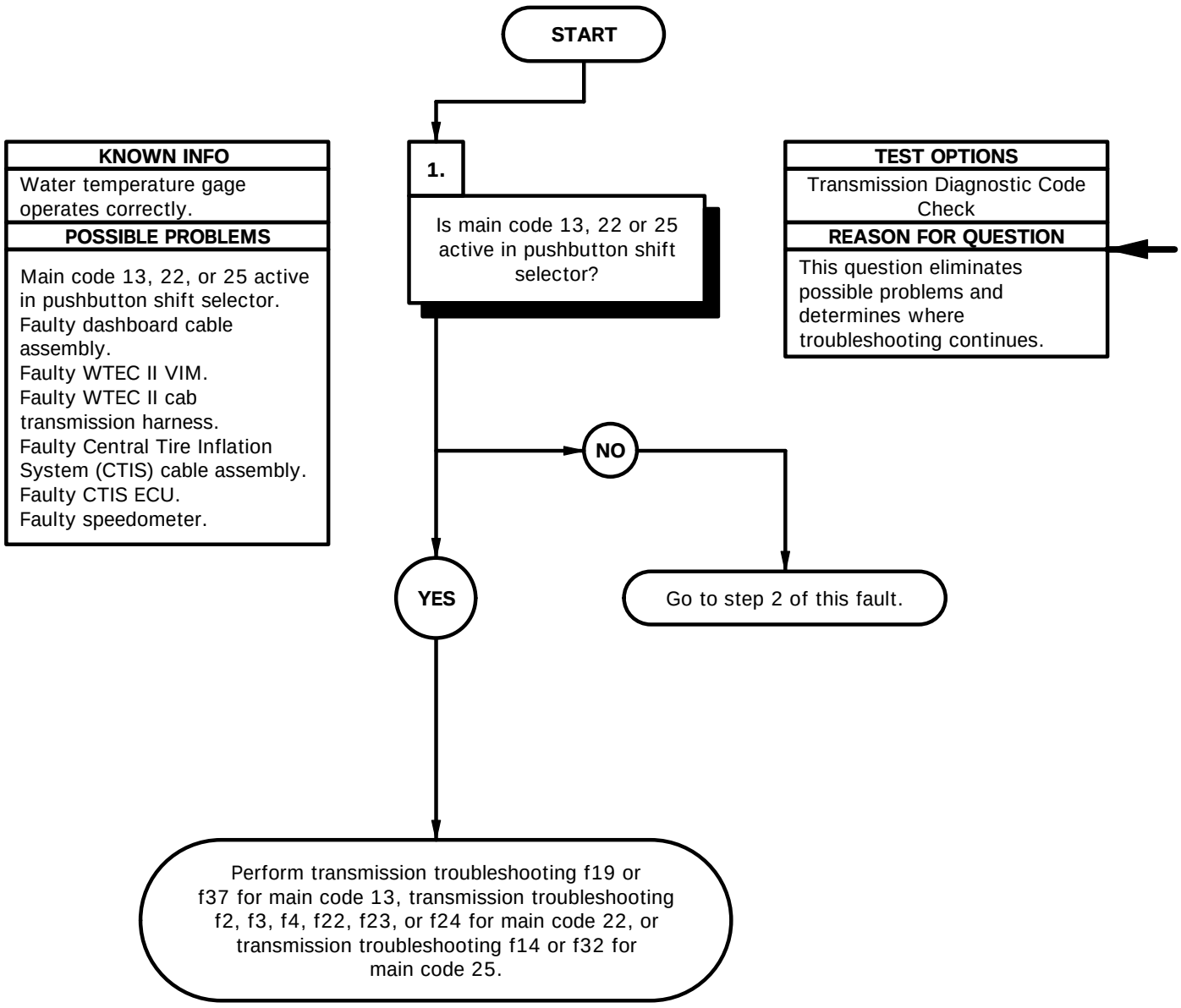
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**Materials/Parts**
Nut, Self-Locking (2) (Item 125, Appendix G)

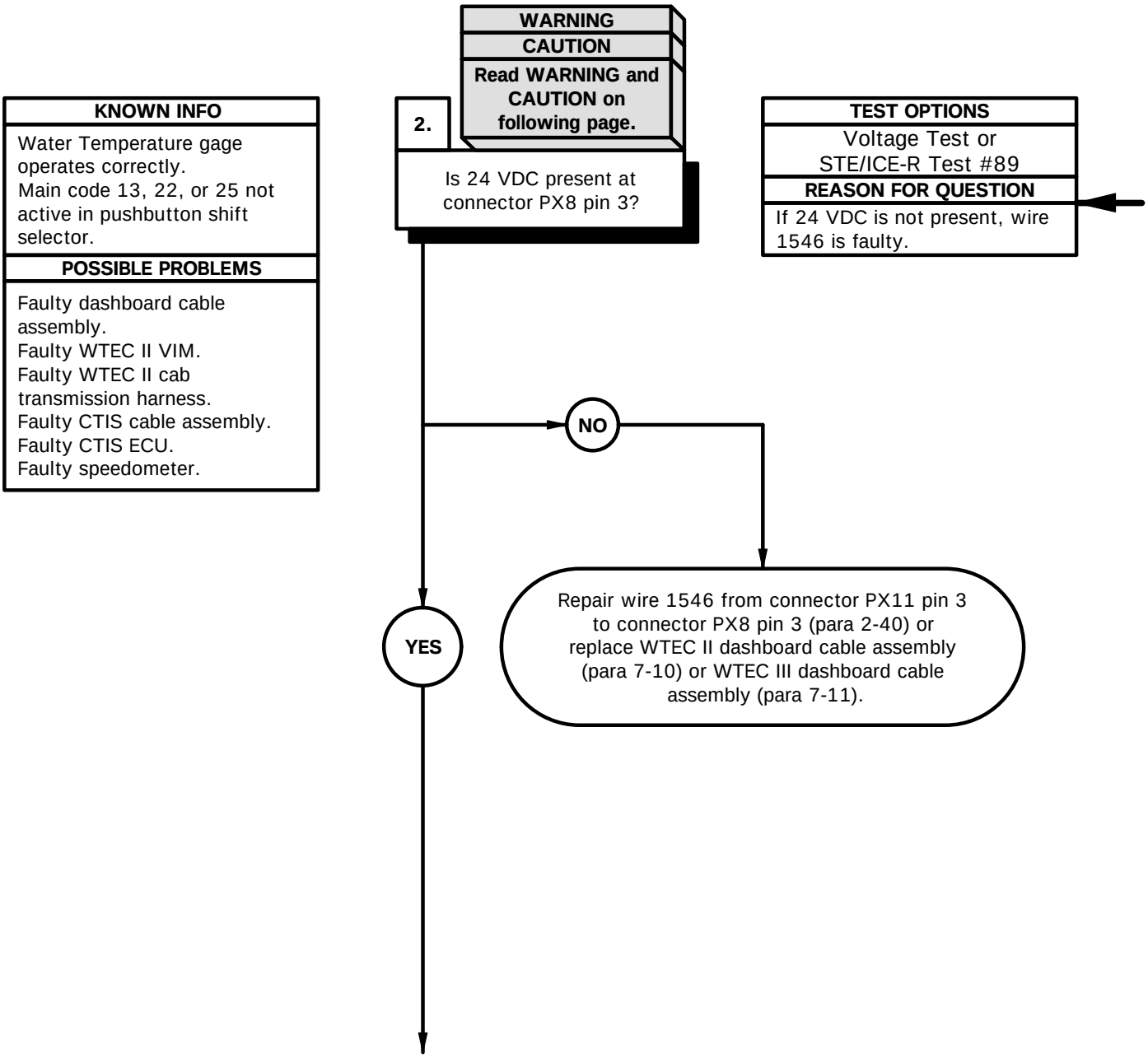
**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



(1) Check for active transmission diagnostic codes (para 8-4 or 8-5).
(2) If main code 13 is active in pushbutton shift selector, perform transmission troubleshooting f19 or f37.
(3) If main code 22 is active in pushbutton shift selector, perform transmission troubleshooting f2, f3, f4, f22, f23, or f24.
(4) If main code 25 is active in pushbutton shift selector, perform transmission troubleshooting f14 or f32.

## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

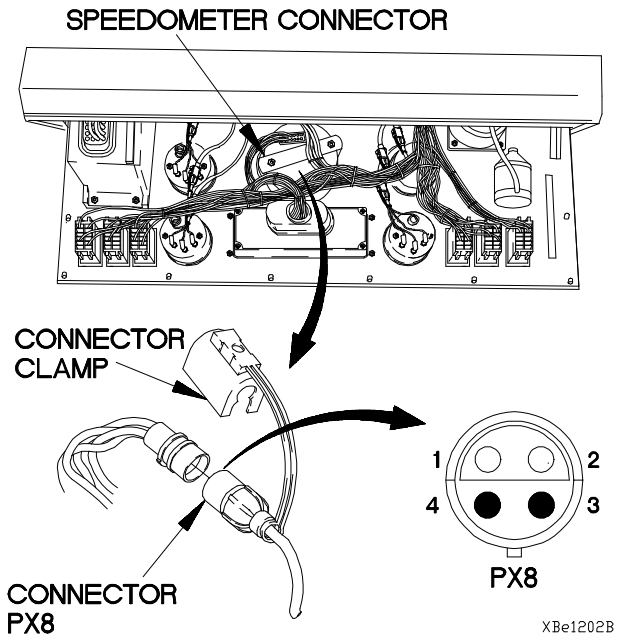
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

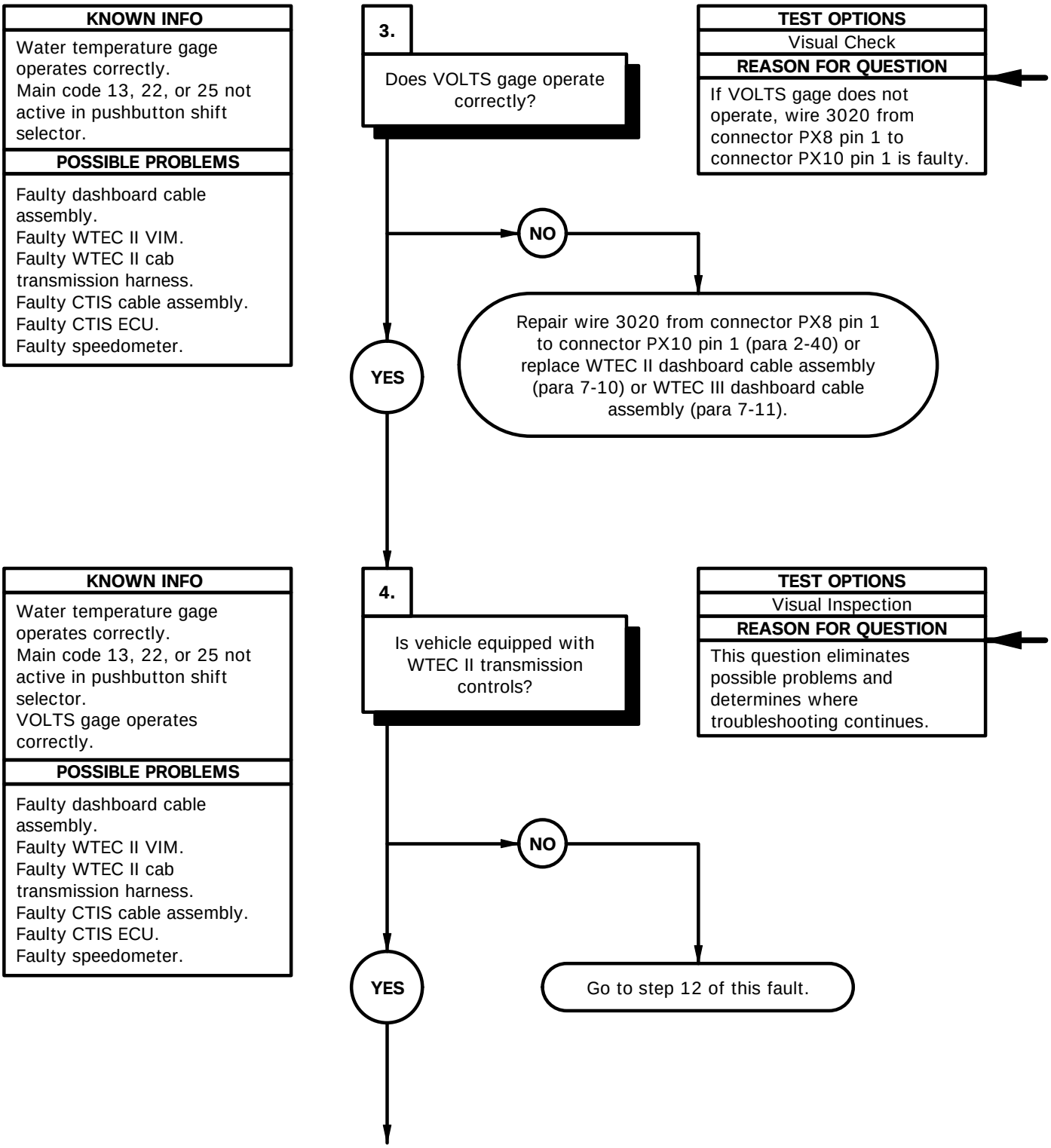
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**VOLTAGE TEST**

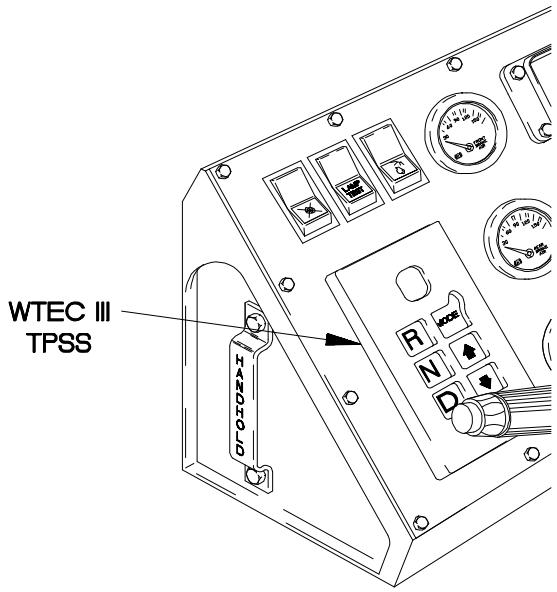
(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from speedometer connector.
(3) Disconnect connector PX8 from speedometer connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector PX8 pin 3.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, repair wire 1546 from connector PX11 pin 3 to connector PX8 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).



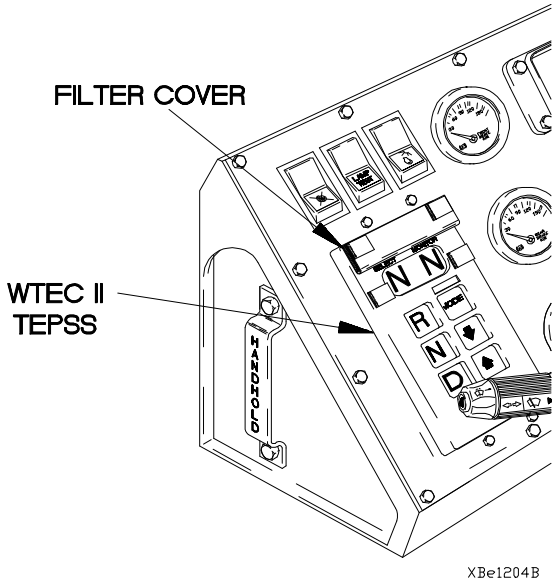
## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



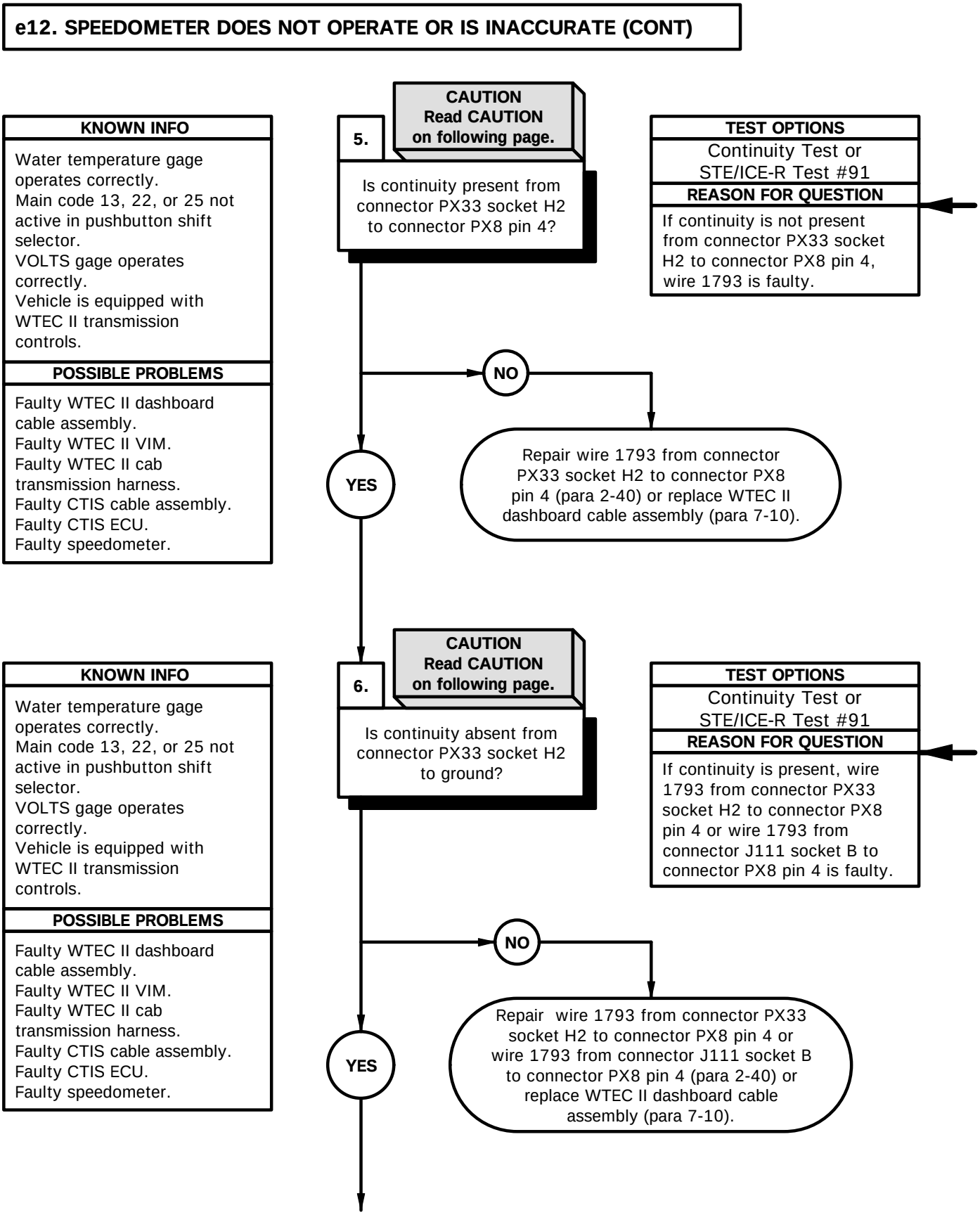
(1) Position master power switch to on (TM 9-2320-365-10).
(2) Observe if VOLTS gage indicator needle moves (TM 9-2320-365-10).
(3) If VOLTS gage indicator needle does not move, repair wire 3020 from connector PX8 pin 1 to connector PX10 pin 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(4) Position master power switch to off (TM 9-2320-365-10).




(1) Check if vehicle is equipped with WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS).
(2) If pushbutton shift selector is not mounted with four screws and is not equipped with a filter cover, go to step 12 of this fault.



## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

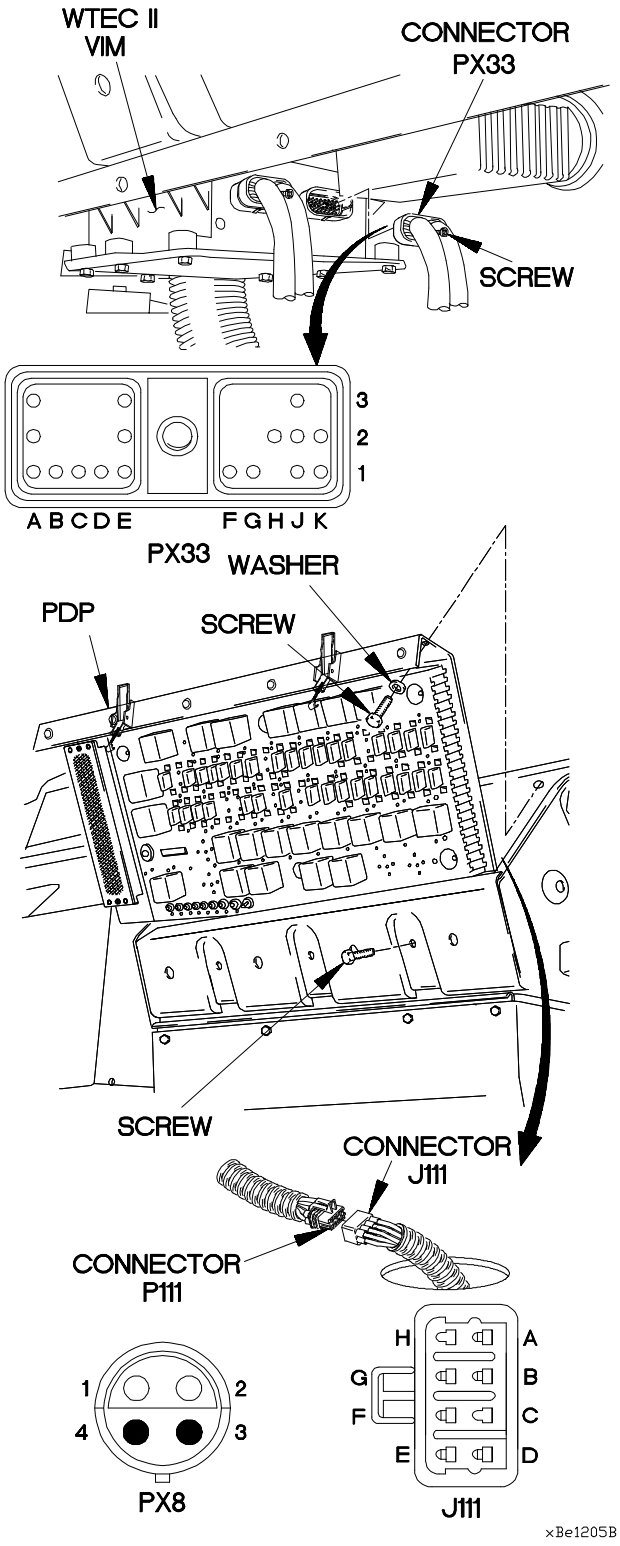
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

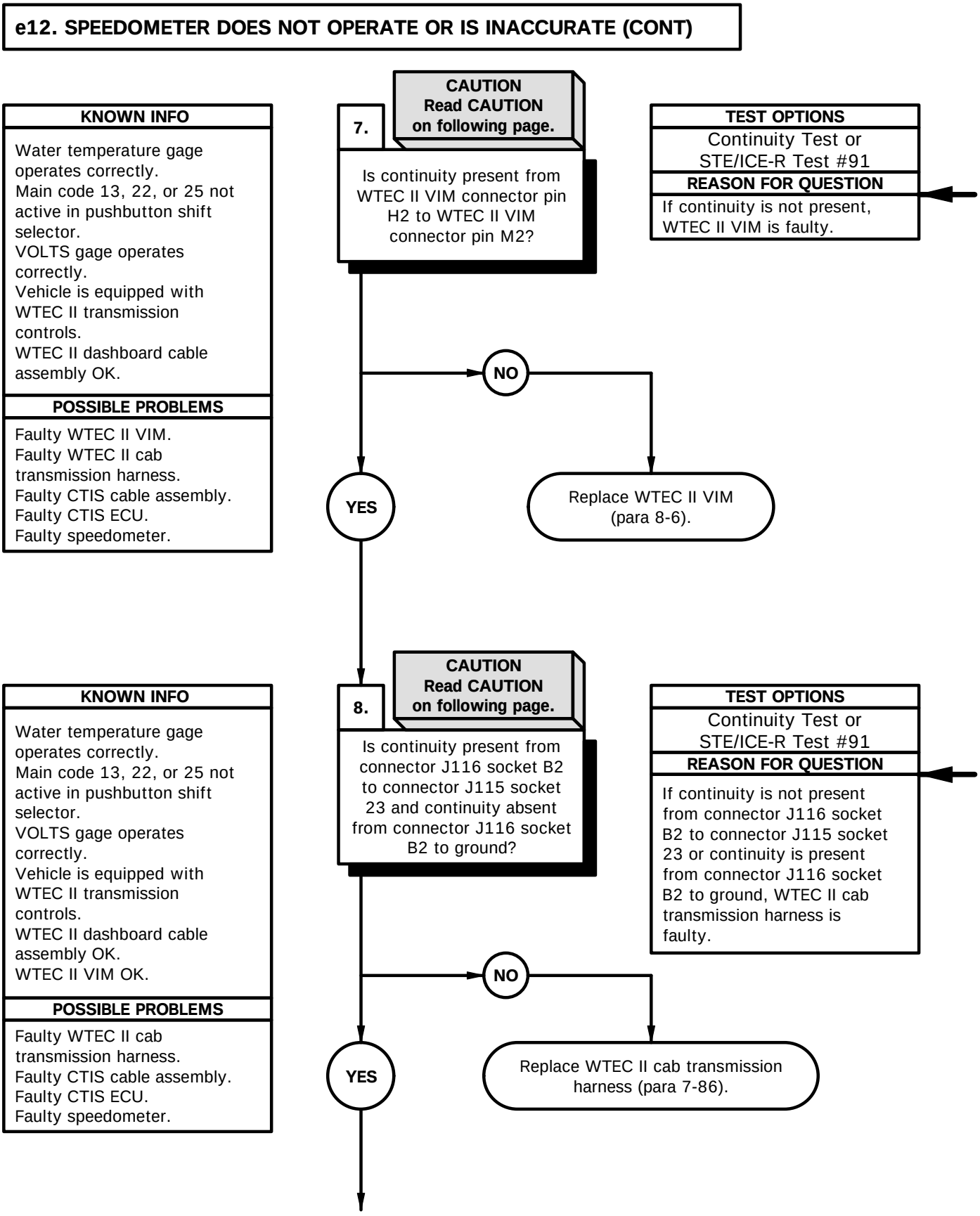
(1) Remove kick panel (para 16-3).
(2) Loosen screw in connector PX33.
(3) Disconnect connector PX33 from WTEC II VIM.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX33 socket H2.
(6) Connect negative (-) probe of multimeter to connector PX8 pin 4 and note reading on multimeter.
(7) If continuity is not present, repair wire 1793 from connector PX33 socket H2 to connector PX8 pin 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

**CONTINUITY TEST**

(1) Remove PDP cover (TM 9-2320-365-10).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector P111 from connector J111.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector PX33 socket H2.
(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(9) If continuity is present, remove plastic cable ties as required and perform visual inspection of wire 1793 from connector PX33 socket H2 to connector PX8 pin 4 and wire 1793 from connector PX8 pin 4 to connector J111 socket B to determine which wire is faulty. Repair wire 1793 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(10) Connect connector PX33 to WTEC II VIM.
(11) Tighten screw in connector PX33.
(12) Install kick panel (para 16-3).



## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

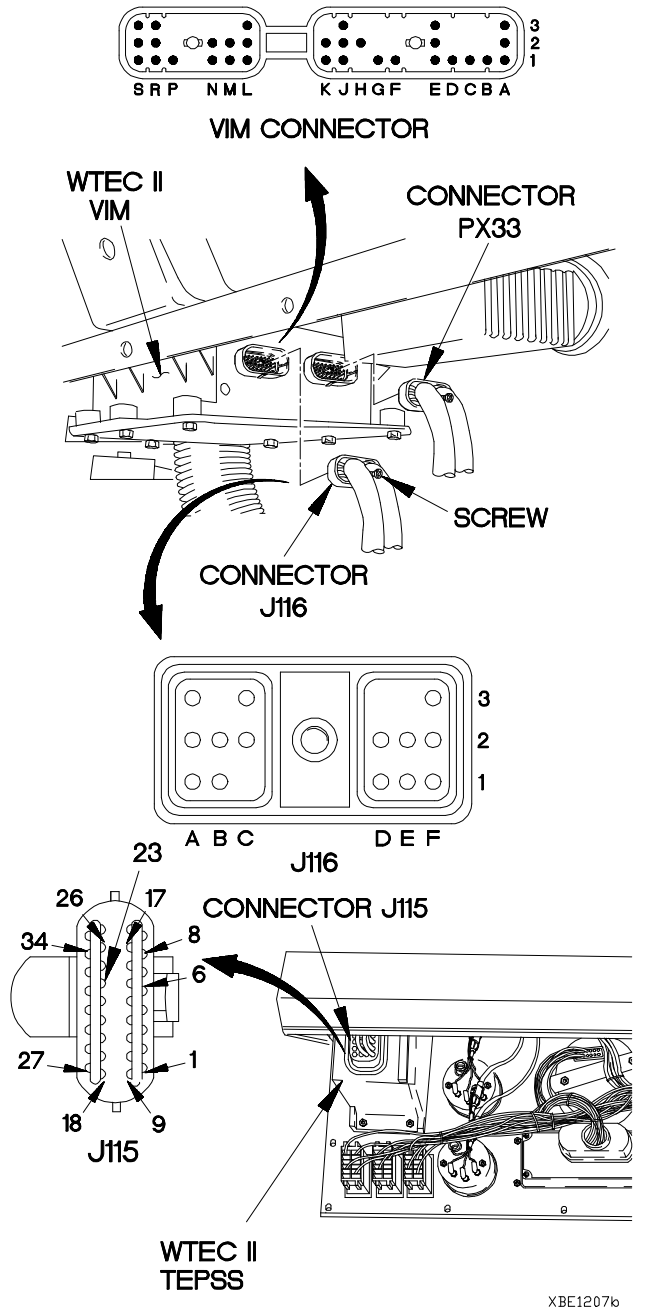
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Loosen screw in connector J116.
(2) Disconnect connector J116 from WTEC II VIM.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to WTEC II VIM connector pin H2.
(5) Connect negative (-) probe of multimeter to WTEC II VIM connector pin M2 and note reading on multimeter.
(6) If continuity is not present, replace WTEC II VIM (para 8-6).
(7) Connect connector PX33 to WTEC II VIM.
(8) Tighten screw in connector PX33.

**CONTINUITY TEST**

(1) Disconnect connector J115 from WTEC II TEPSS.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector J116 socket B2.
(4) Connect negative (-) probe of mulitmeter to connector J115 socket 23 and note reading on multimeter.
(5) If continuity is not present, replace WTEC II cab transmission harness (par 7-86).
(6) Connect positive (+) probe of multimeter to connector J116 socket B2.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If continuity is present, replace WTEC II cab transmission harness (para 7-86).
(9) Connect connector J115 to WTEC II TEPSS.
(10) Connect connector J116 to WTEC II VIM.
(11) Tighten screw in connector J116.



## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)

**KNOWN INFO**

Water temperature gage operates correctly.
Main code 13, 22, or 25 not active in pushbutton shift selector.
VOLTS gage operates correctly.
Vehicle is equipped with WTEC II transmission controls.
WTEC II dashboard cable assembly OK.
WTEC II VIM OK.
WTEC II cab transmission harness OK.

**POSSIBLE PROBLEMS**

Faulty CTIS cable assembly.
Faulty CTIS ECU.
Faulty speedometer.

**CAUTION**
**Read CAUTION on following page.**

**9.** Is continuity absent from connector P110 socket U to ground?

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is present, wire 1793 in CTIS cable assembly is faulty.

**NO** → Repair wire 1793 from connector P110 socket U to connector P111 socket B (para 2-40) or replace CTIS cable assembly (para 7-53).

**YES**

**KNOWN INFO**

Water temperature gage operates correctly.
Main code 13, 22, or 25 not active in pushbutton shift selector.
VOLTS gage operates correctly.
Vehicle is equipped with WTEC II transmission controls.
WTEC II dashboard cable assembly OK.
WTEC II VIM OK.
WTEC II cab transmission harness OK.
CTIS cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty CTIS ECU.
Faulty speedometer.

**10.** Is continuity absent from CTIS ECU connector pin U to ground?

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is present from CTIS ECU connector pin U to ground, CTIS ECU is faulty.

**NO** → Replace CTIS ECU (para 12-6).

**YES**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

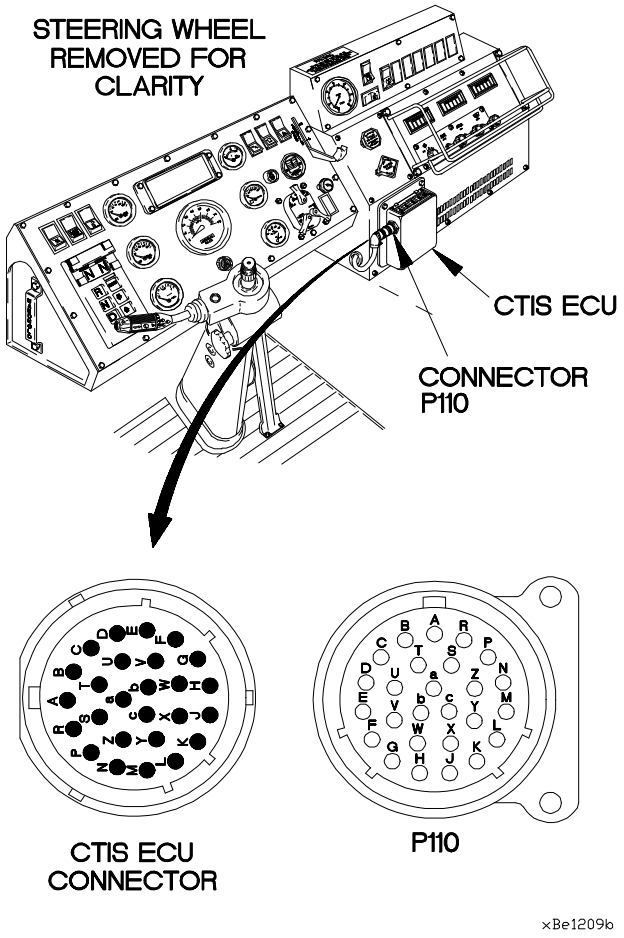
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

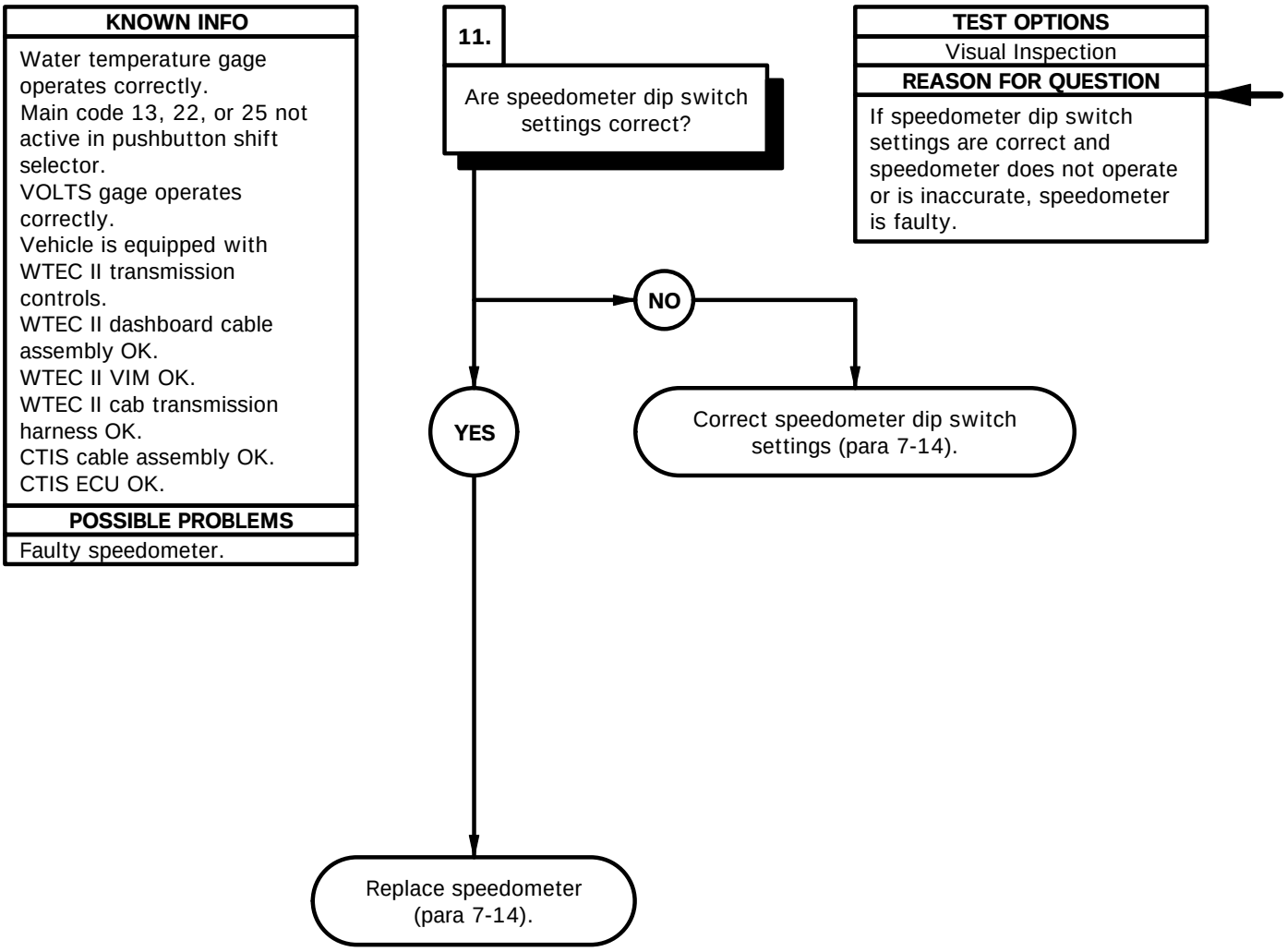
(1) Disconnect connector P110 from CTIS ECU.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P110 socket U.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is present, repair wire 1793 from connector P110 socket U to connector P111 socket B (para 2-40) or replace CTIS cable assembly (para 7-53).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to CTIS ECU connector pin U.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is present, replace CTIS ECU (para 12-6).
(5) Connect connector P110 to CTIS ECU.



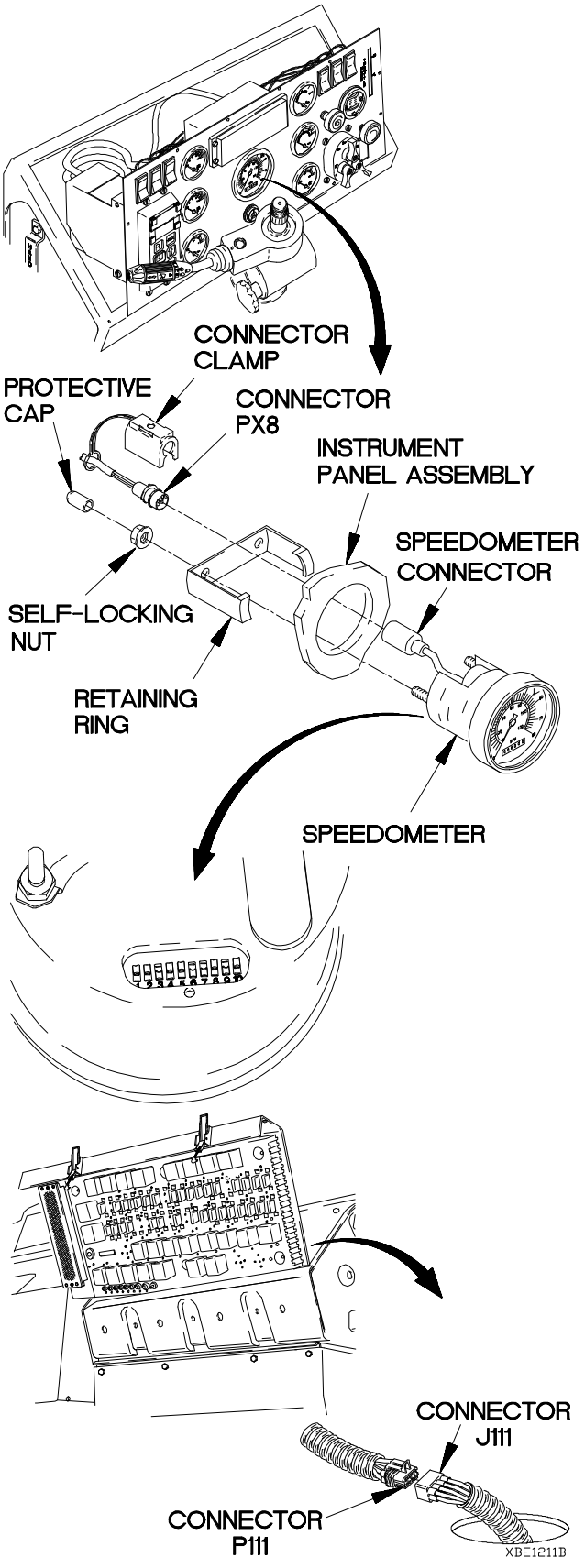
## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



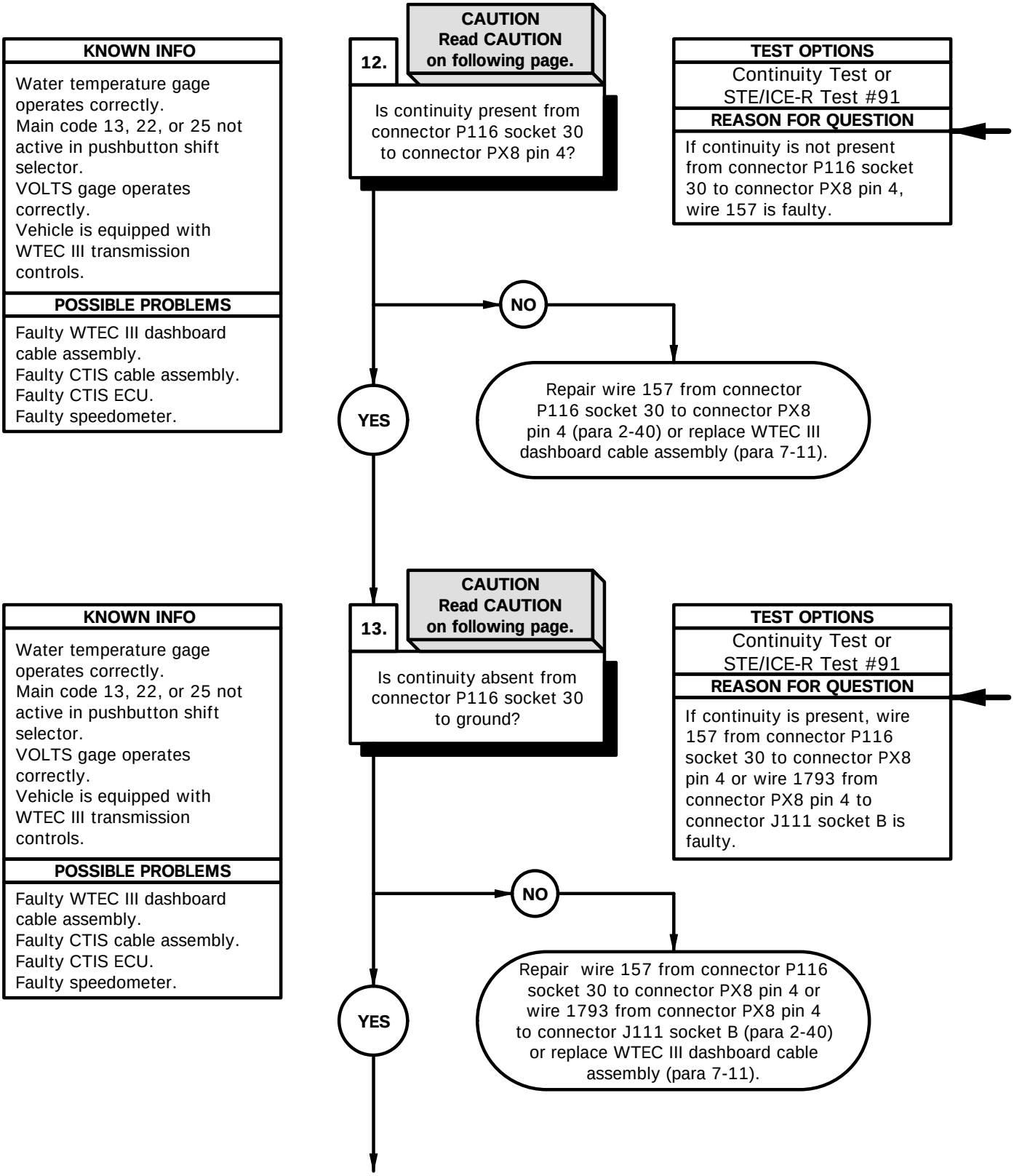
(1) Remove two protective caps, self-locking nuts, retaining ring, and speedometer from instrument panel assembly. Discard self-locking nuts.
(2) Note position of speedometer dip switches. Refer to Table 2-8.4. Speedometer Dip Switch Settings.
(3) If speedometer dip switch setting(s) are incorrect, correct speedometer dip switch setting(s) (para 7-14).
(4) If speedometer dip switch settings are correct, replace speedometer (para 7-14).
(5) Position speedometer in instrument panel assembly with retaining ring and two self-locking nuts.
(6) Tighten two self-locking nuts to 9 lb-in. (1 N·m).
(7) Install two protective caps on speedometer.
(8) Connect connector PX8 to speedometer connector.
(9) Connect connector clamp on speedometer connector.
(10) Install instrument panel assembly (para 7-10).
(11) Connect connector P111 to connector J111.
(12) Install PDP on dashboard with three washers and screws.
(13) Install three screws in PDP.
(14) Install PDP cover (TM 9-2320-365-10).

**Table 2-8.4. Speedometer Dip Switch Settings**

| Switch Number | Switch Setting |
|---|---|
| 1 | Up |
| 2 | Up |
| 3 | Down |
| 4 | Up |
| 5 | Up |
| 6 | Down |
| 7 | Down |
| 8 | Up |
| 9 | Down |
| 10 | Up |



## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

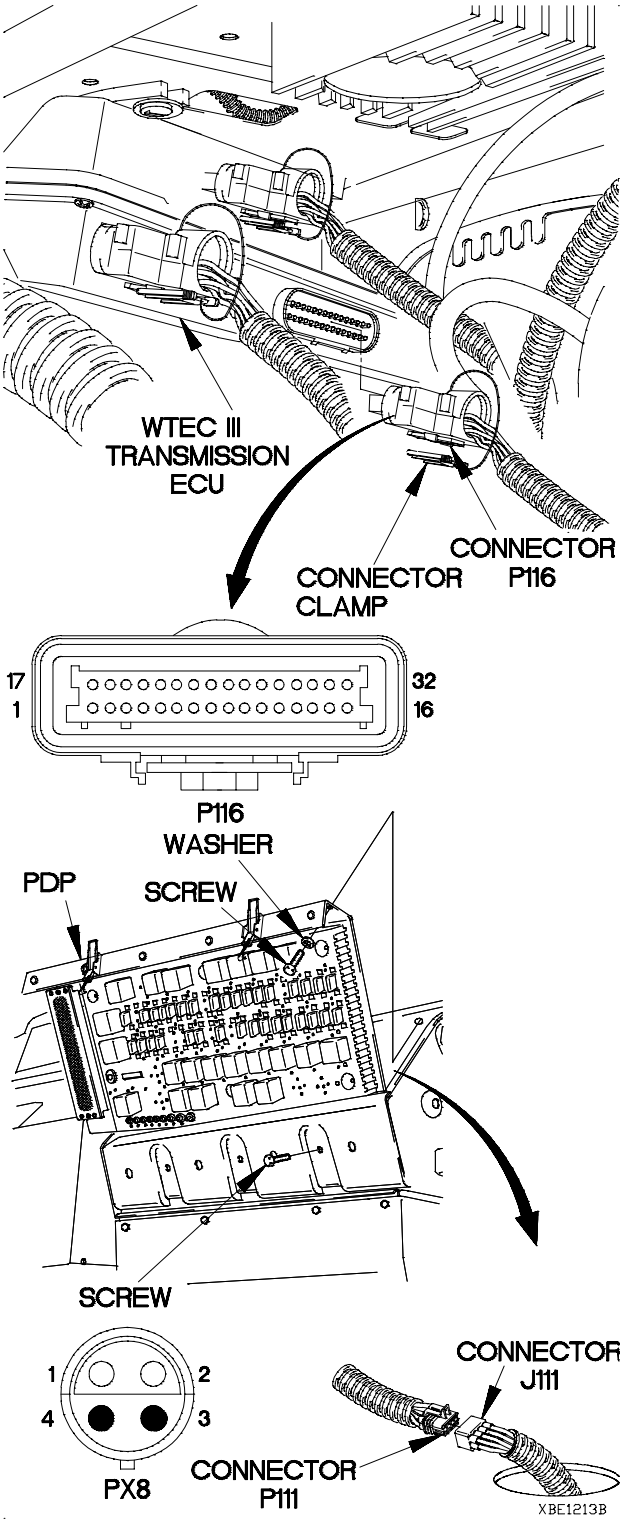
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

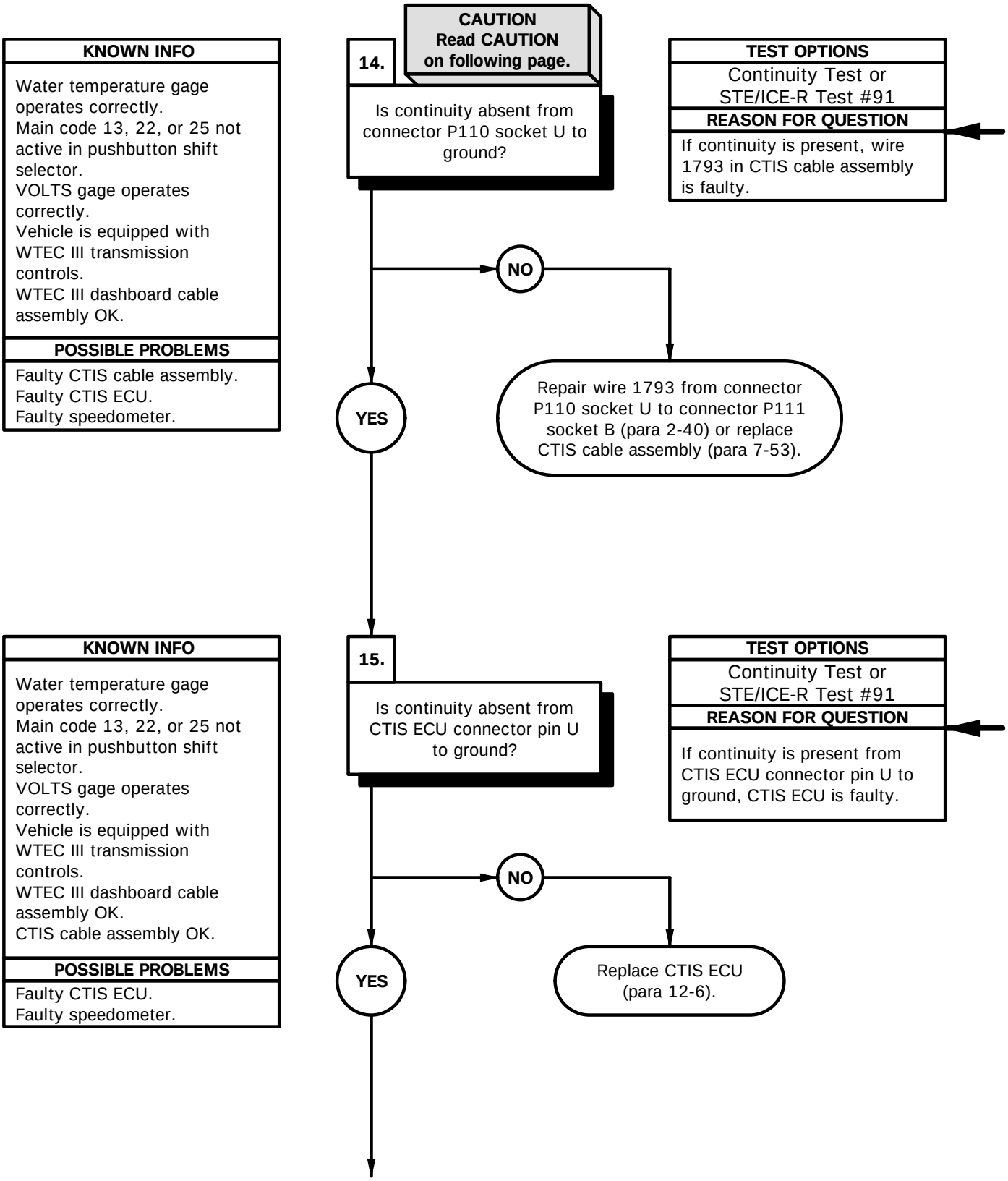
(1) Remove kick panel (para 16-3).
(2) Disconnect connector clamp from connector P116.
(3) Disconnect connector P116 from WTEC III transmission ECU.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector P116 socket 30.
(6) Connect negative (-) probe of multimeter to connector PX8 pin 4 and note reading on multimeter.
(7) If continuity is not present, repair wire 157 from connector P116 socket 30 to connector PX8 pin 4 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

**CONTINUITY TEST**

(1) Remove PDP cover (TM 9-2320-365-10).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector P111 from connector J111.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector P116 socket 30.
(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(9) If continuity is present, remove plastic cable ties as required and perform visual inspection of wire 157 from connector P116 socket 30 to connector PX8 pin 4 and wire 1793 from connector PX8 pin 4 to connector J111 socket B to determine which wire is faulty. Repair wire 157 or 1793 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(10) Connect connector P116 to WTEC III transmission ECU.
(11) Connect connector clamp on connector P116.
(12) Install kick panel (para 16-3).



## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

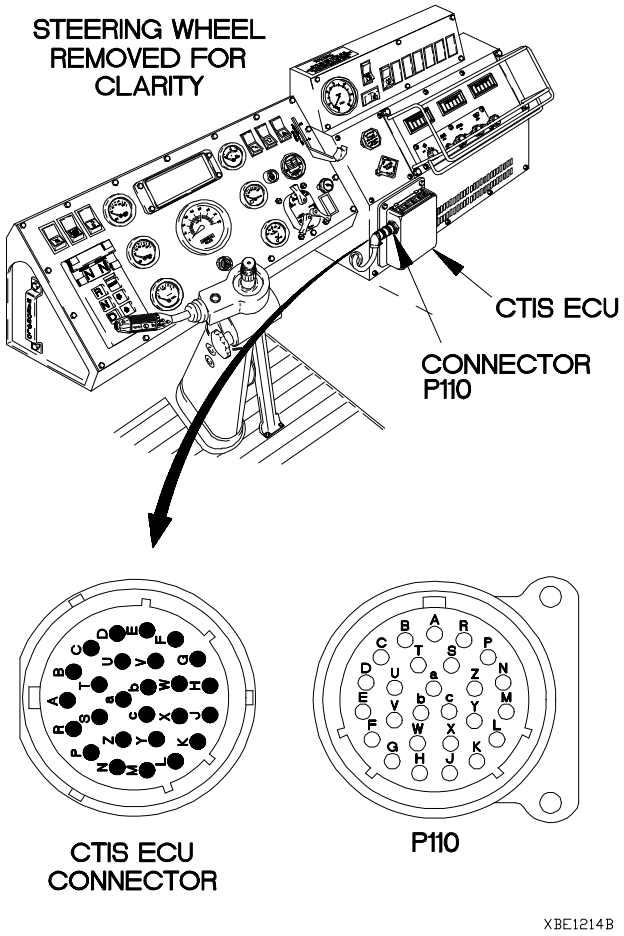
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P110 from CTIS ECU.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P110 socket U.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is present, repair wire 1793 from connector P110 socket U to connector P111 socket B (para 2-40) or replace CTIS cable assembly (para 7-53).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to CTIS ECU connector pin U.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is present, replace CTIS ECU (para 12-6).
(5) Connect connector P110 to CTIS ECU.



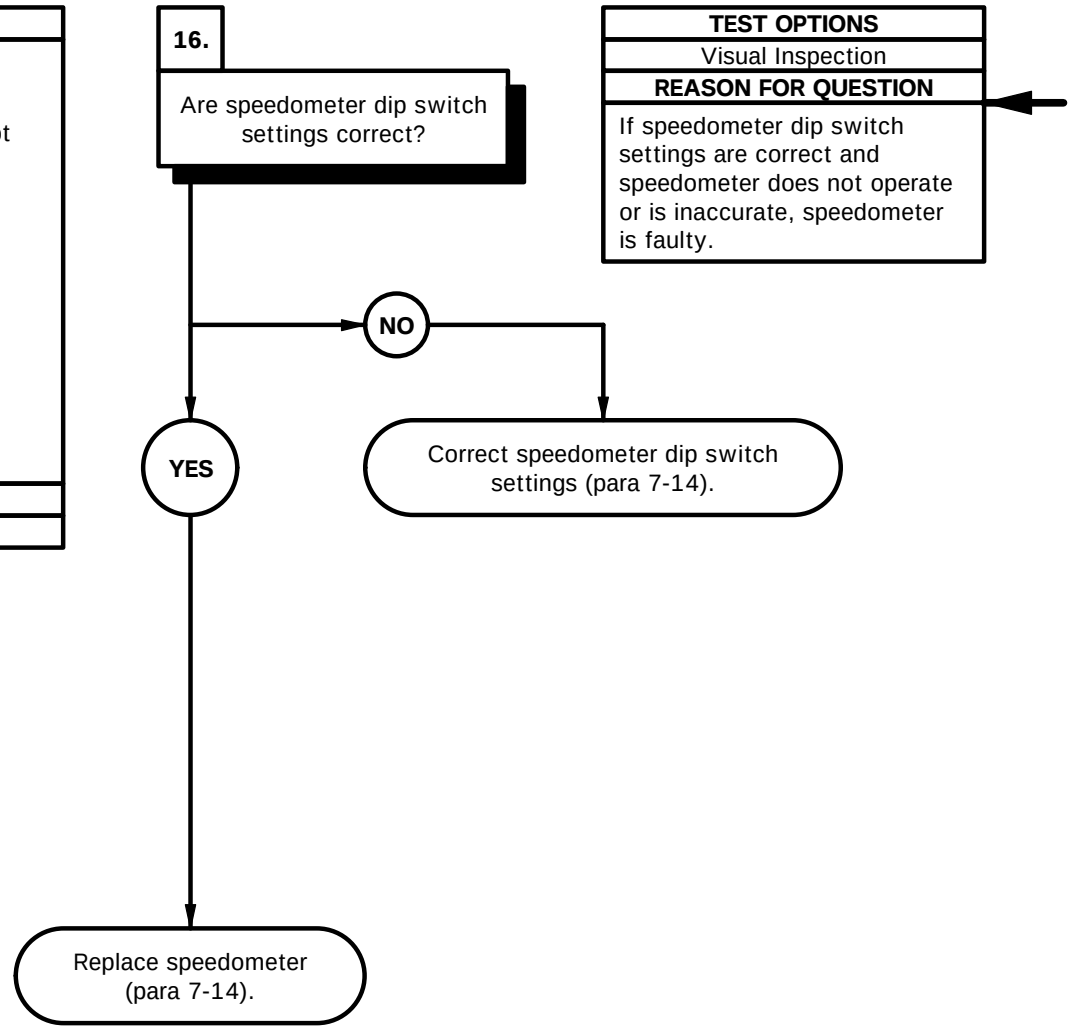
## e12. SPEEDOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)

**KNOWN INFO**

Water temperature gage operates correctly.
Main code 13, 22, or 25 not active in pushbutton shift selector.
VOLTS gage operates correctly.
Vehicle is equipped with WTEC III transmission controls.
WTEC III dashboard cable assembly OK.
CTIS cable assembly OK.
CTIS ECU OK.

**POSSIBLE PROBLEMS**

Faulty speedometer.




**TEST OPTIONS**

Visual Inspection

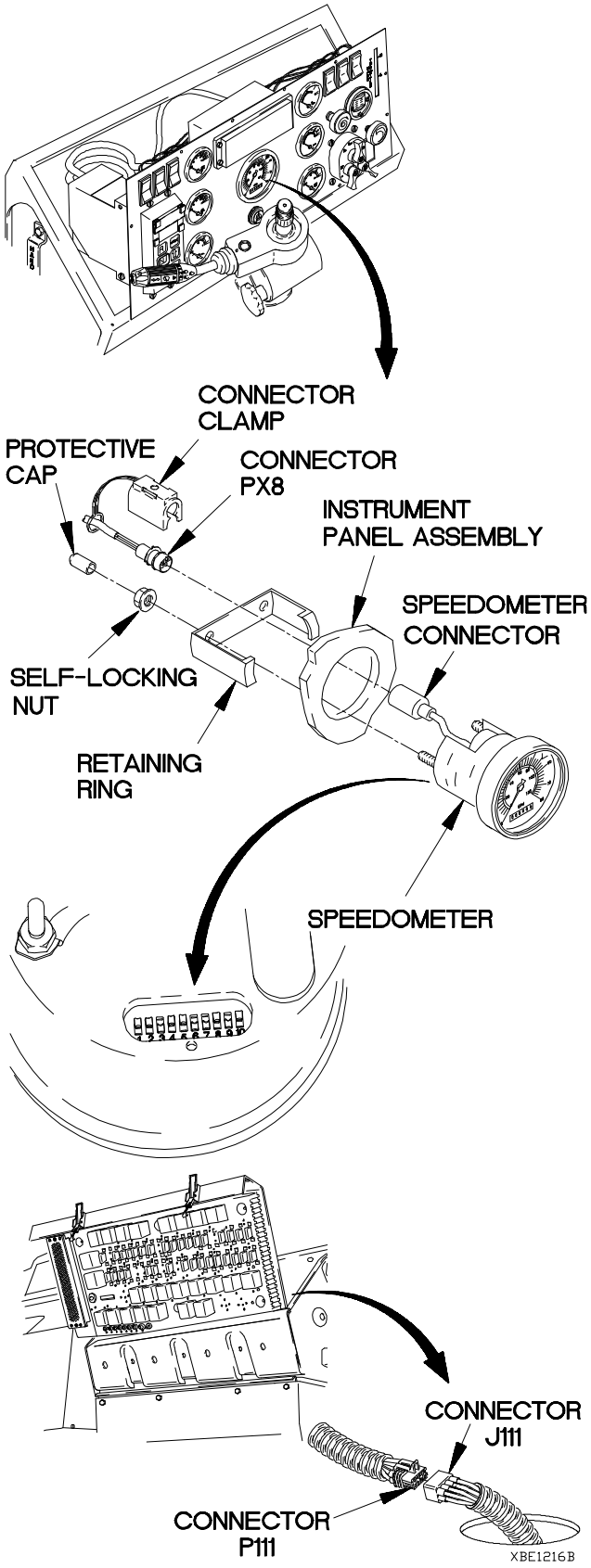
**REASON FOR QUESTION**

If speedometer dip switch settings are correct and speedometer does not operate or is inaccurate, speedometer is faulty.

(1) Remove two protective caps, self-locking nuts, retaining ring, and speedometer from instrument panel assembly. Discard self-locking nuts.
(2) Note position of speedometer dip switches. Refer to Table 2-8.5. Speedometer Dip Switch Settings.
(3) If speedometer dip switch setting(s) are incorrect, correct speedometer dip switch setting(s) (para 7-14).
(4) If speedometer dip switch settings are correct, replace speedometer (para 7-14).
(5) Position speedometer in instrument panel assembly with retaining ring and two self-locking nuts.
(6) Tighten two self-locking nuts to 9 lb-in. (1 N·m).
(7) Install two protective caps on speedometer.
(8) Connect connector PX8 to speedometer connector.
(9) Connect connector clamp on speedometer connector.
(10) Install instrument panel assembly (para 7-10).
(11) Connect connector P111 to connector J111.
(12) Install PDP on dashboard with three washers and screws.
(13) Install three screws in PDP.
(14) Install PDP cover (TM 9-2320-365-10).

**Table 2-8.5. Speedometer Dip Switch Settings**

| Switch Number | Switch Setting |
|---|---|
| 1 | Up |
| 2 | Up |
| 3 | Down |
| 4 | Up |
| 5 | Up |
| 6 | Down |
| 7 | Down |
| 8 | Up |
| 9 | Down |
| 10 | Up |



## e13. VOLTS GAGE DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

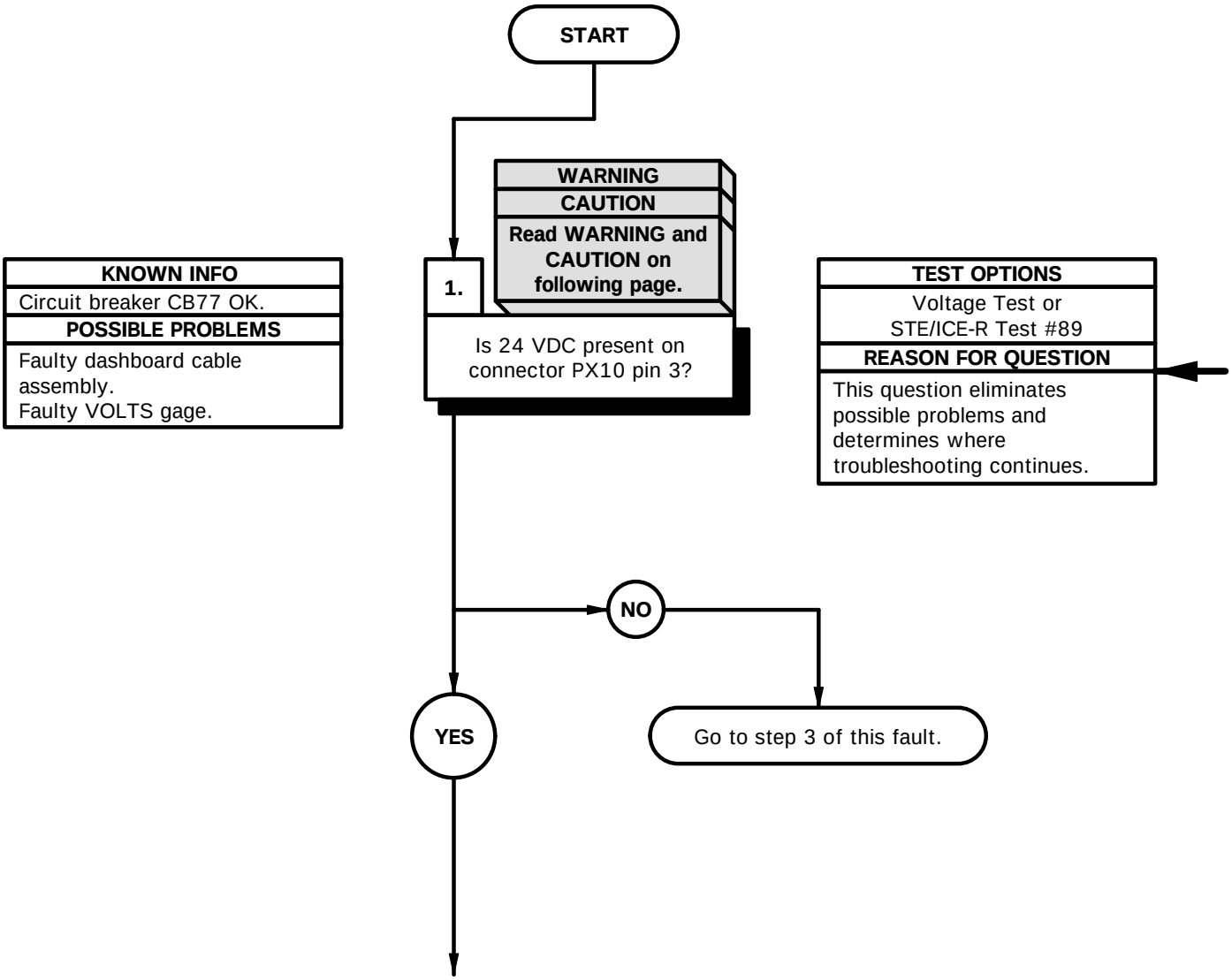
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB77 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

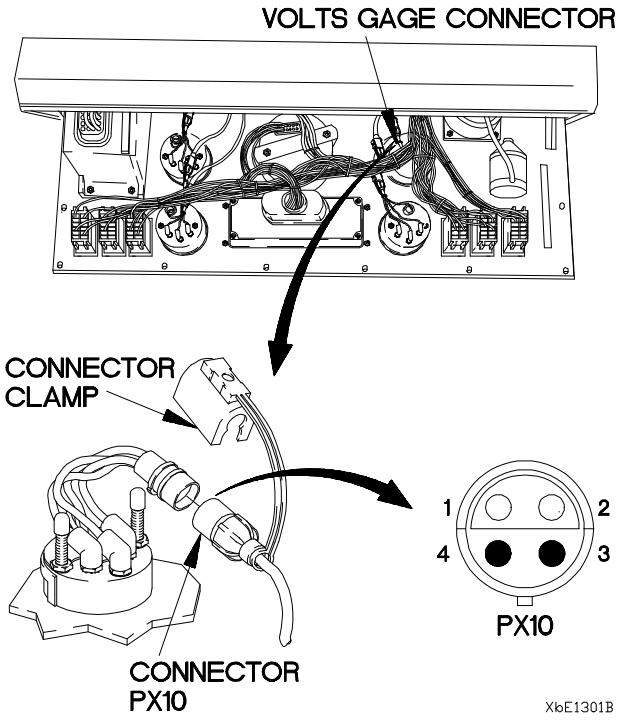
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

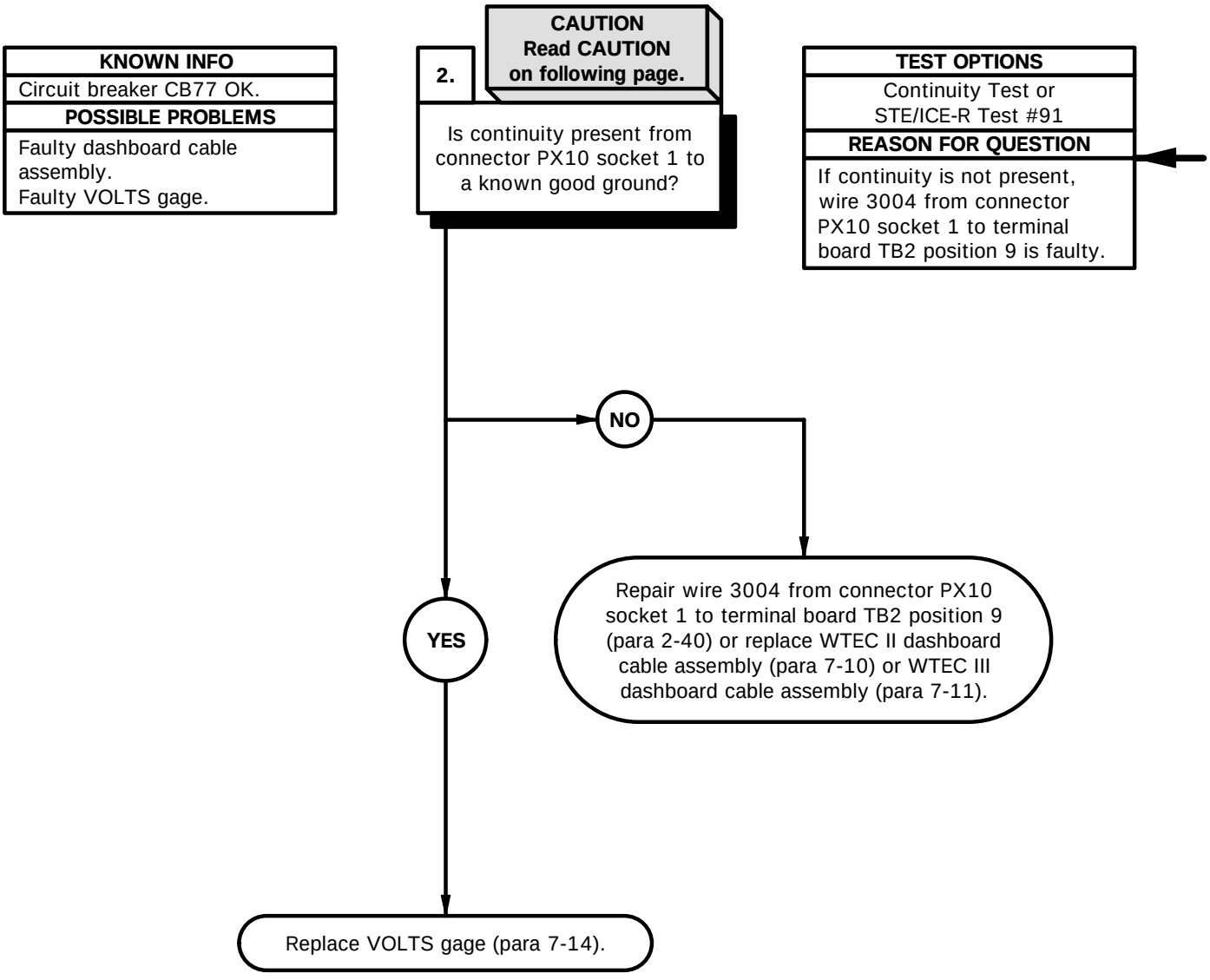
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from VOLTS gage connector.
(3) Disconnect connector PX10 from VOLTS gage connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector PX10 pin 3.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, go to step 3 of this task.
(9) Position master power switch to off (TM 9-2320-365-10).



## e13. VOLTS GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

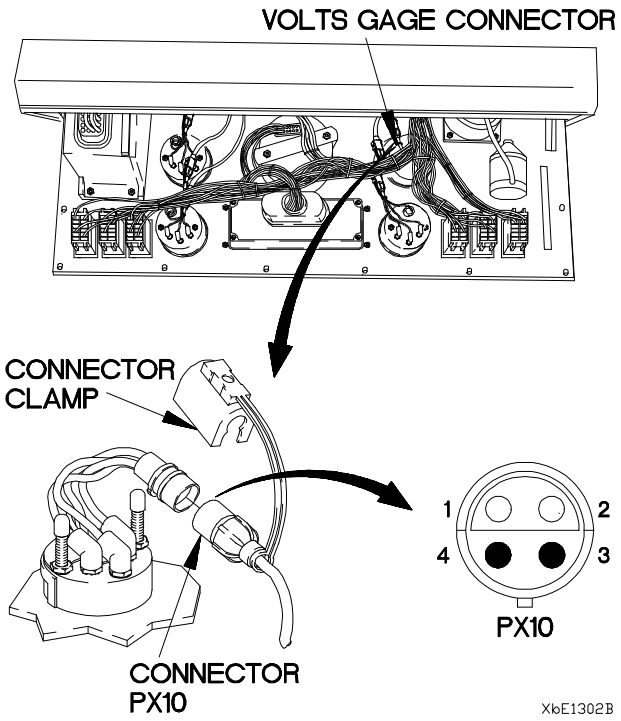
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

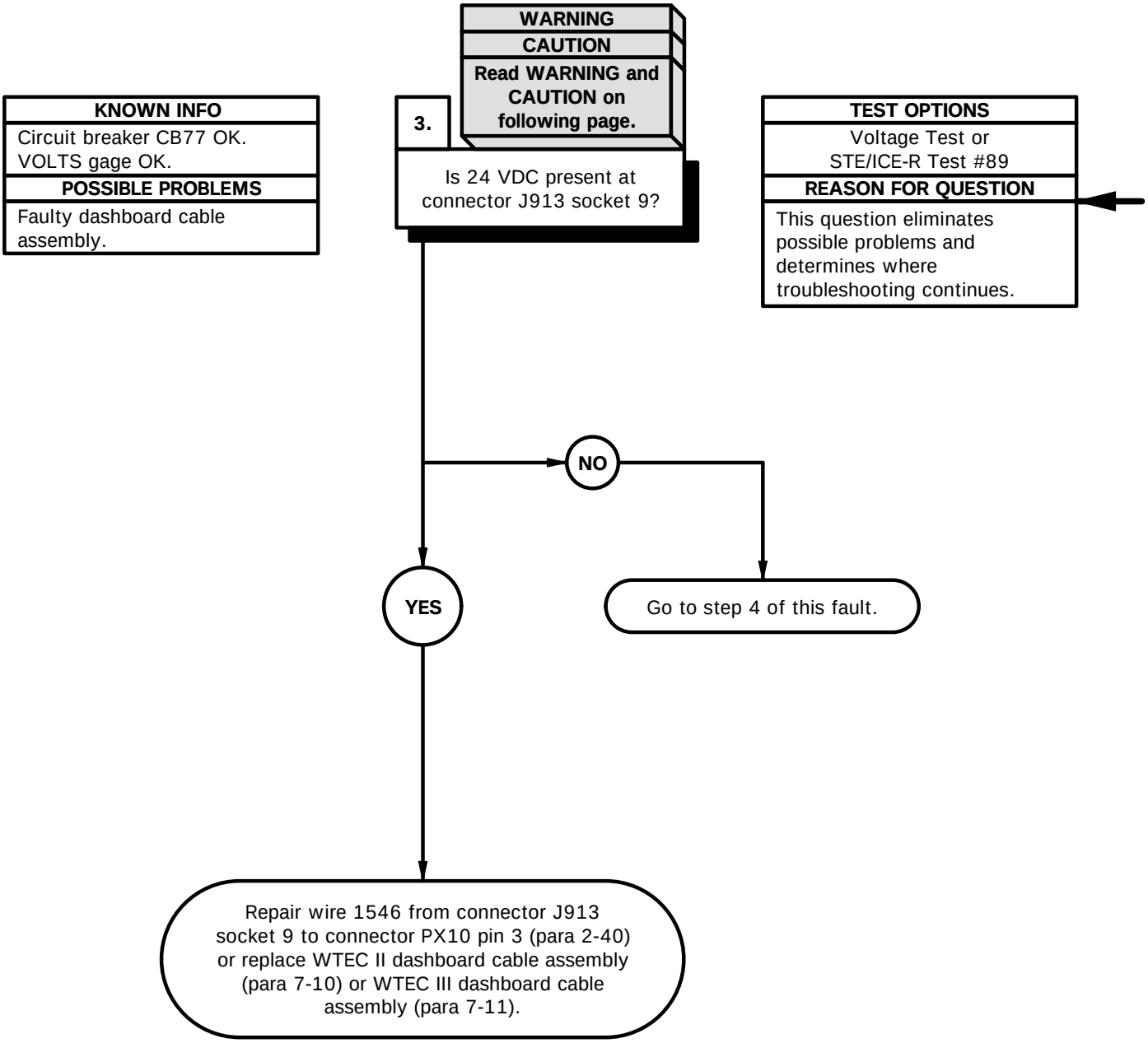
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX10 socket 1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3004 from connector PX10 socket 1 to terminal board TB2 position 9 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly para 7-11).
(5) If continuity is present, replace VOLTS gage (para 7-14).
(6) Connect connector PX10 to VOLTS gage connector.
(7) Connect connector clamp on VOLTS gage connector.
(8) Install instrument panel assembly (para 7-15).



## e13. VOLTS GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

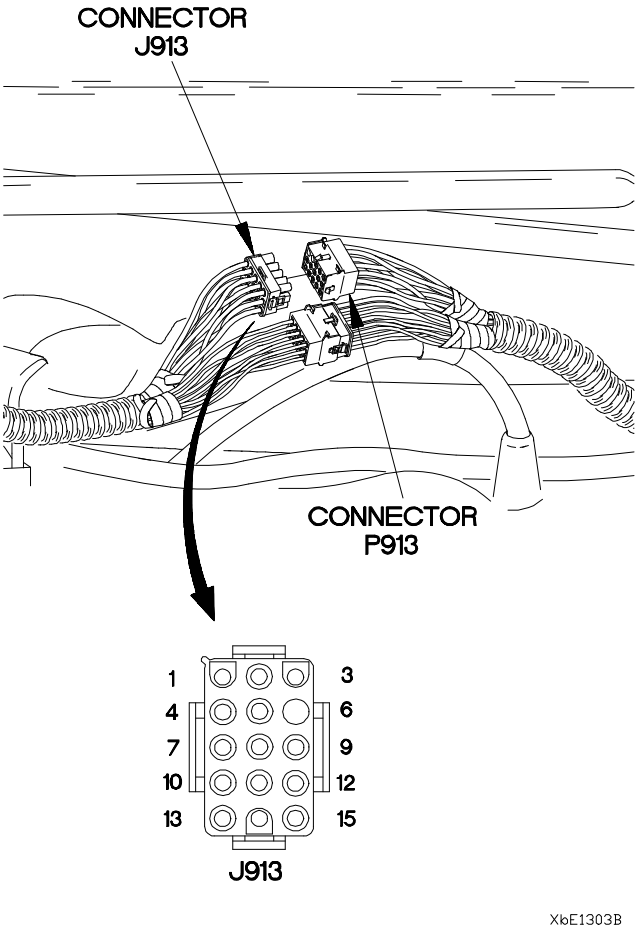
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

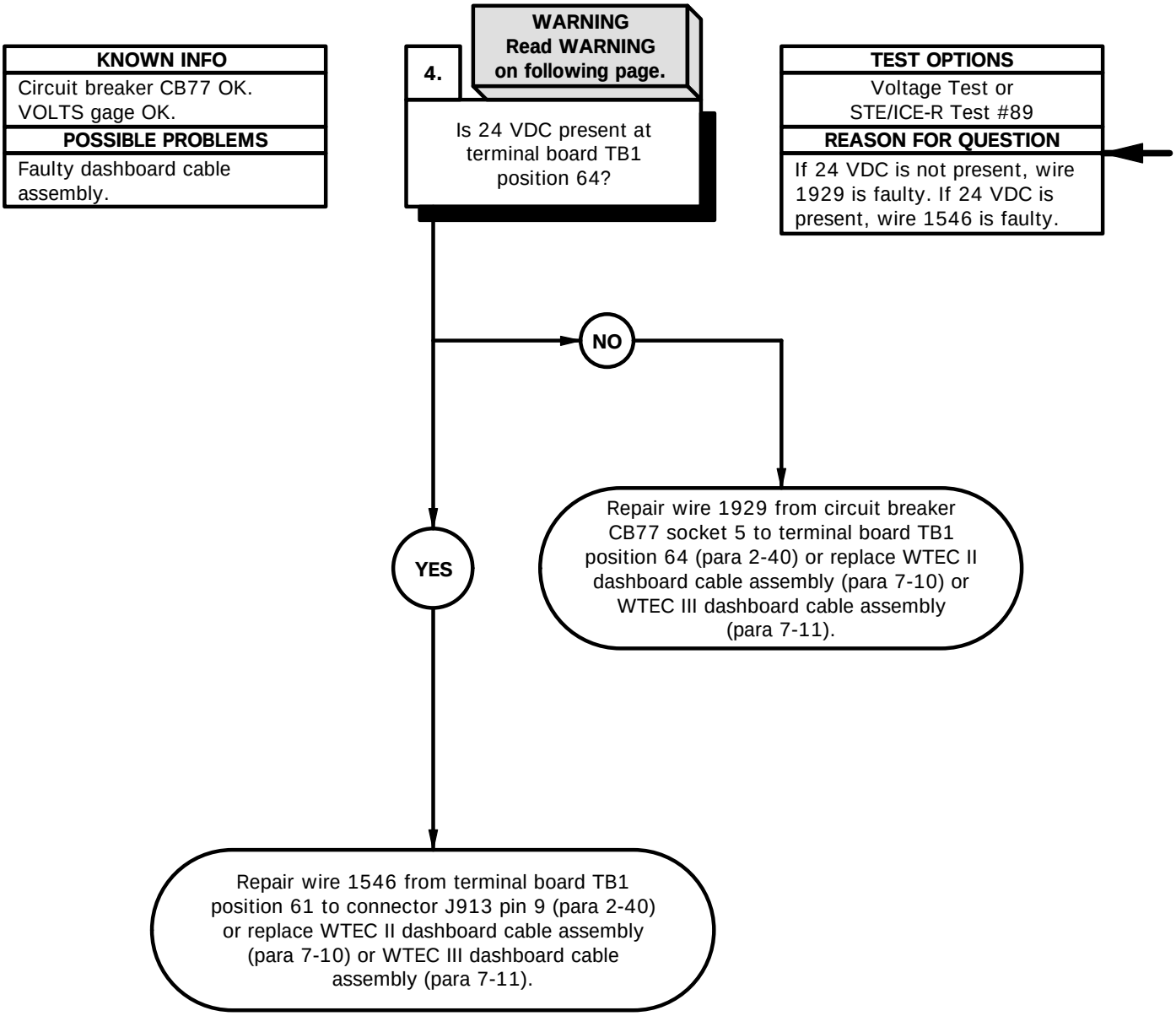
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector P913 from connector J913, if required.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector J913 socket 9.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and not reading on multimeter.
(7) If 24 VDC is not present, go to step 4 of this fault.
(8) If 24 VDC is present, repair wire 1546 from connector J913 socket 9 to connector PX10 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Connect connector PX10 to VOLTS gage connector.
(11) Connect connector clamp on VOLTS gage connector.
(12) Connect connector P913 to connector J913, if required.
(13) Install personnel heater assembly (para 18-9).
(14) Install instrument panel assembly (para 7-15).



## e13. VOLTS GAGE DOES NOT OPERATE OR IS INACCURATE (CONT)

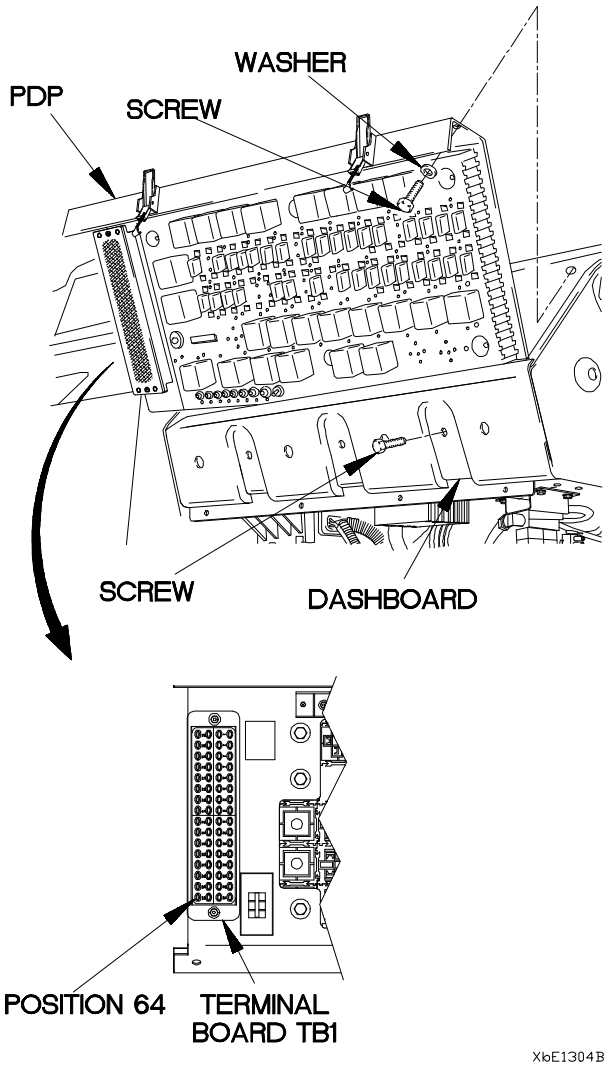


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (TM 9-2320-365-10).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to terminal board TB1 position 64.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(9) If 24 VDC is not present, repair wire 1929 from circuit breaker CB77 socket 5 to terminal board TB1 position 64 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) If 24 VDC is present, repair wire 1546 from terminal board TB1 position 61 to connector J913 socket 9 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(12) Position master power switch to off (TM 9-2320-365-10).
(13) Install PDP on dashboard with three screws.
(14) Install three washers and screws in PDP.



## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

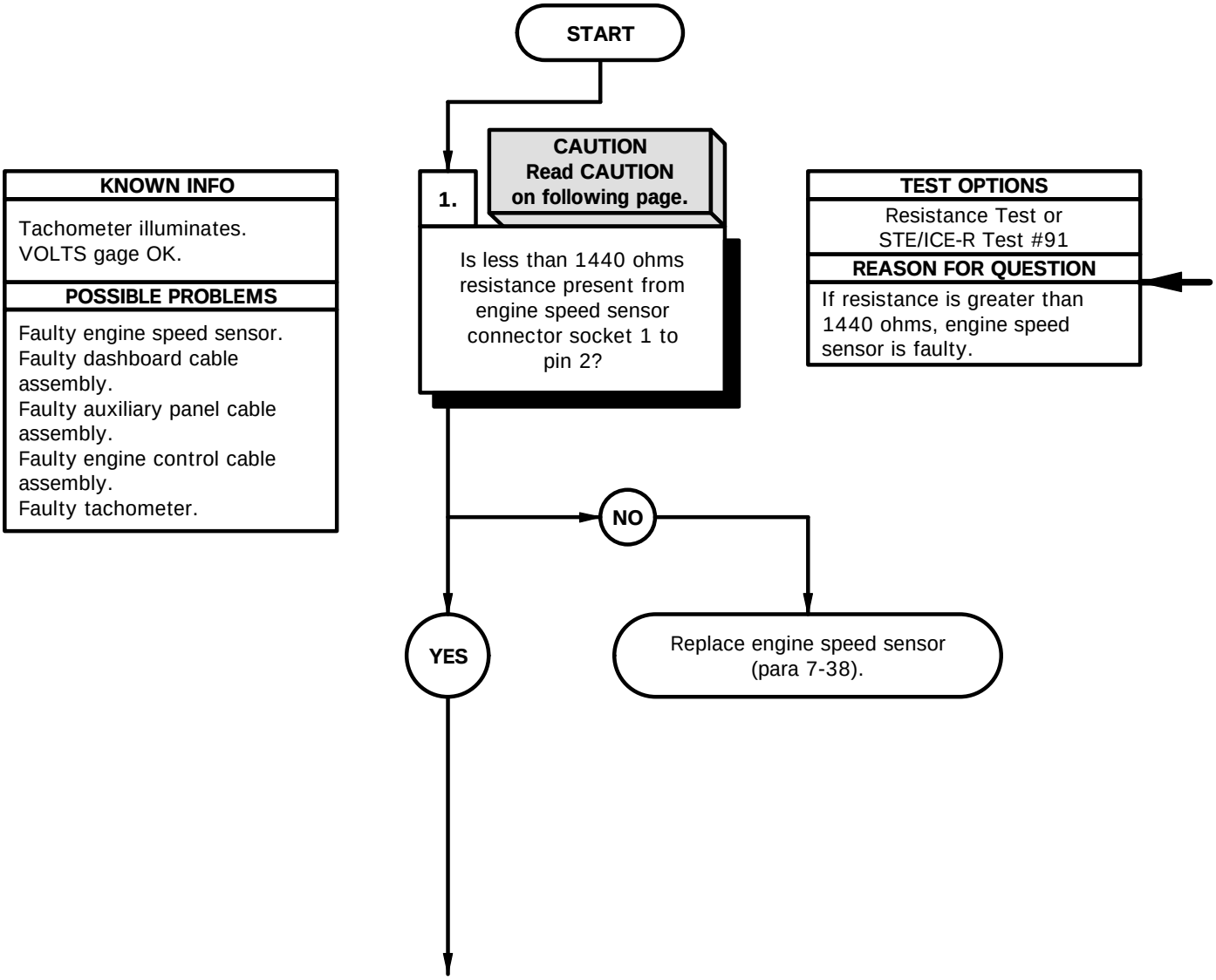
**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

If tachometer does not illuminate, perform Electrical System Troubleshooting e21. Tachometer Does Not Illuminate prior to beginning this task.



**CAUTION**

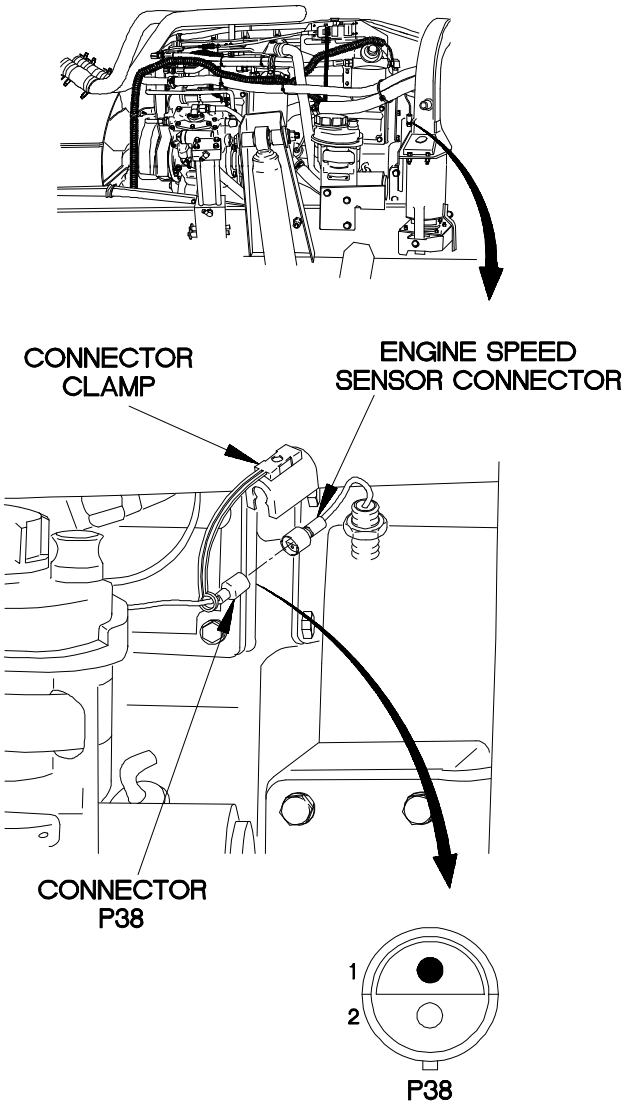
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

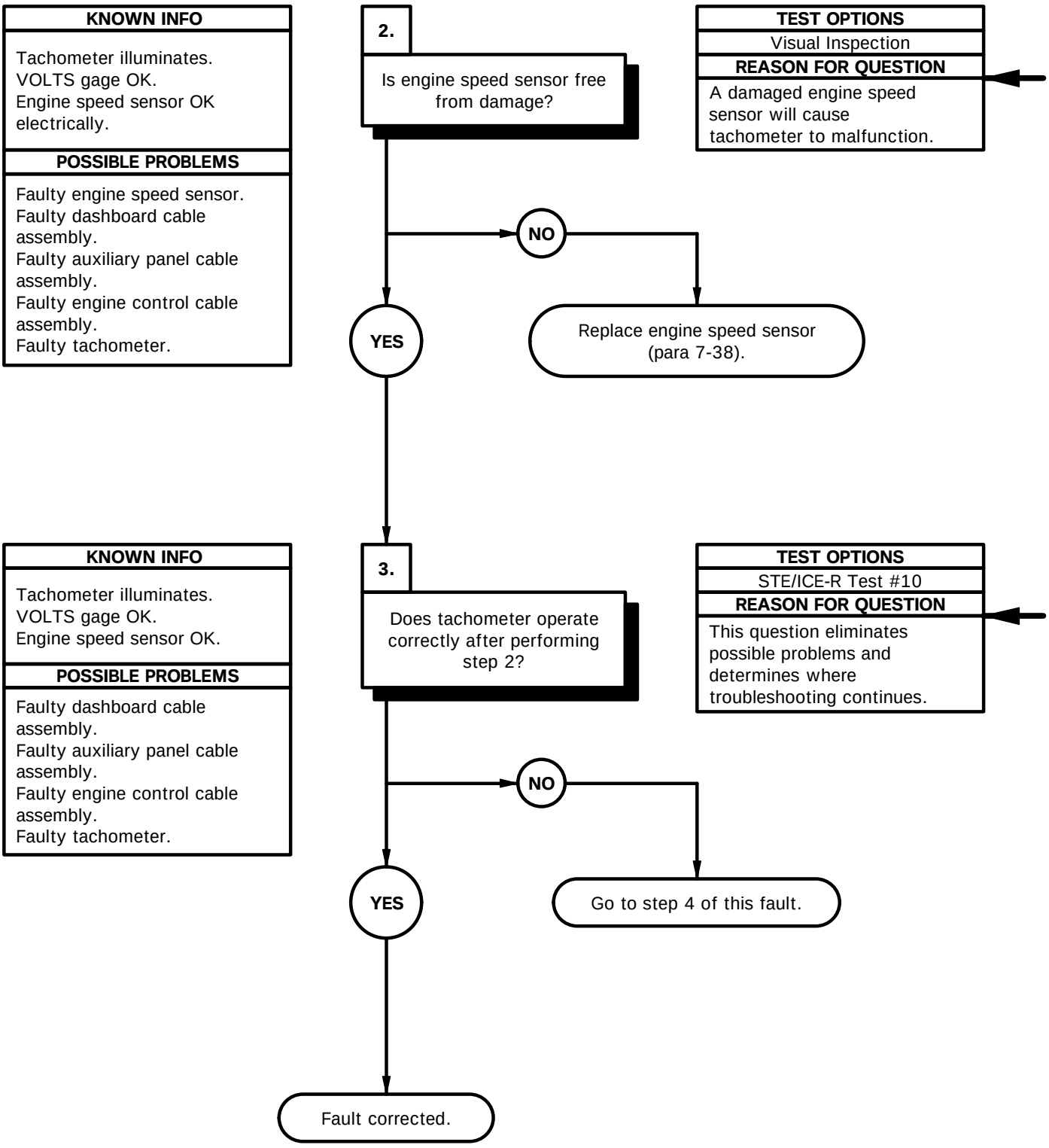
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Disconnect connector clamp from engine speed sensor connector.
(3) Disconnect connector P38 from engine speed sensor connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to socket 1 of engine speed sensor connector.
(6) Connect negative (-) probe of multimeter to pin 2 of engine speed sensor connector and note reading on multimeter.
(7) If greater than 1440 ohms resistance is present, replace engine speed sensor (para 7-38).



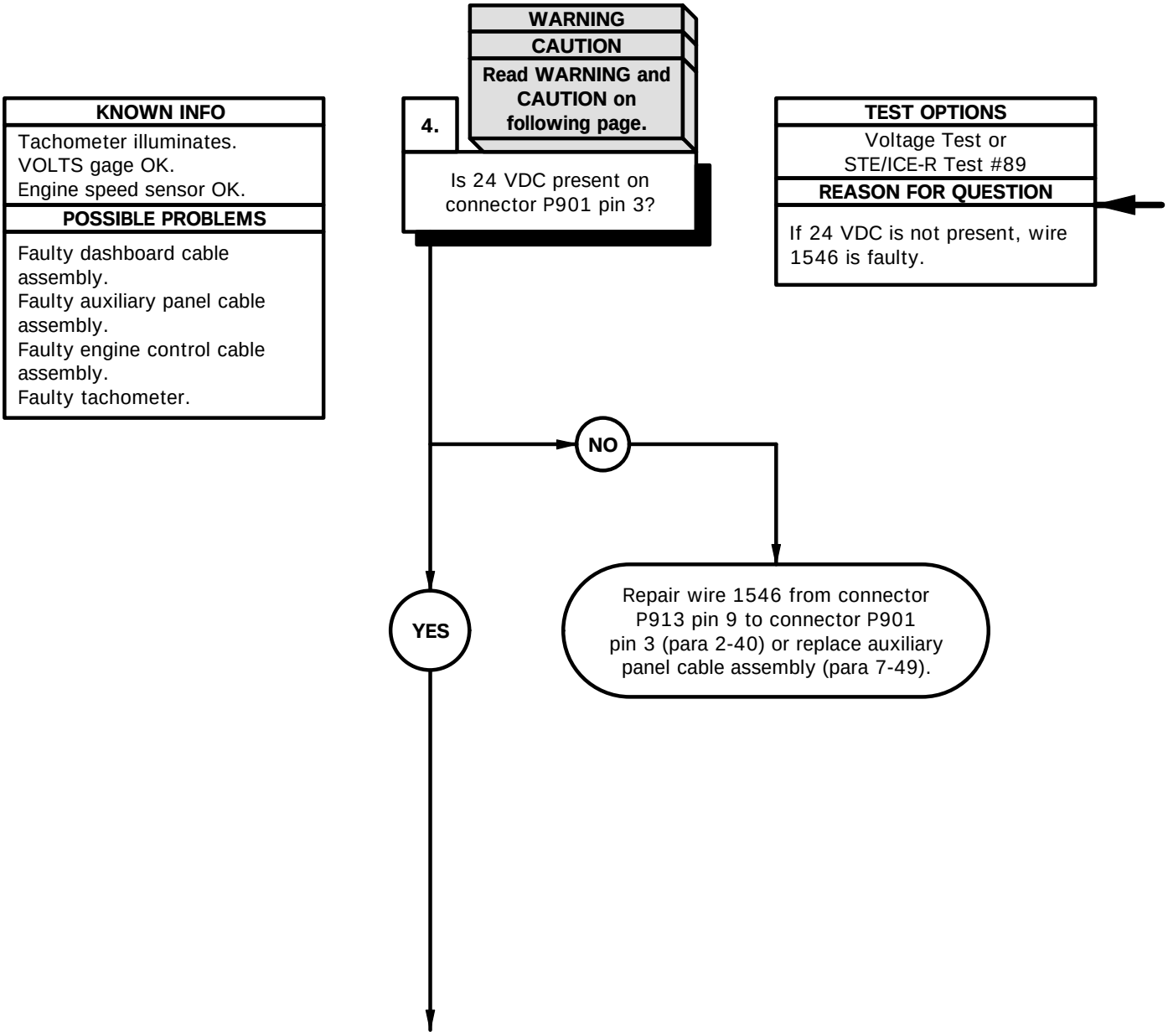
## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



(1) Remove engine speed sensor (para 7-38).
(2) Observe lower end of engine speed sensor for damage caused by contact with engine ring gear.
(3) If engine speed sensor is damaged, replace engine speed sensor (para 7-38).
(4) Install engine speed sensor (para 7-38).
(5) Adjust engine speed sensor (para 7-38).

(1) Perform STE/ICE-R test #10.
(2) Position PTO switch to on (TM 9-2320-365-10).
(3) Observe if STE/ICE-R test #10 results and tachometer reading are in agreement.
(4) Position PTO switch to off (TM 9-2320-365-10).
(5) Shut down engine (TM 9-2320-365-10).
(6) If STE/ICE-R test #10 and tachometer reading are not in agreement, go to step 4 of this fault.

## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

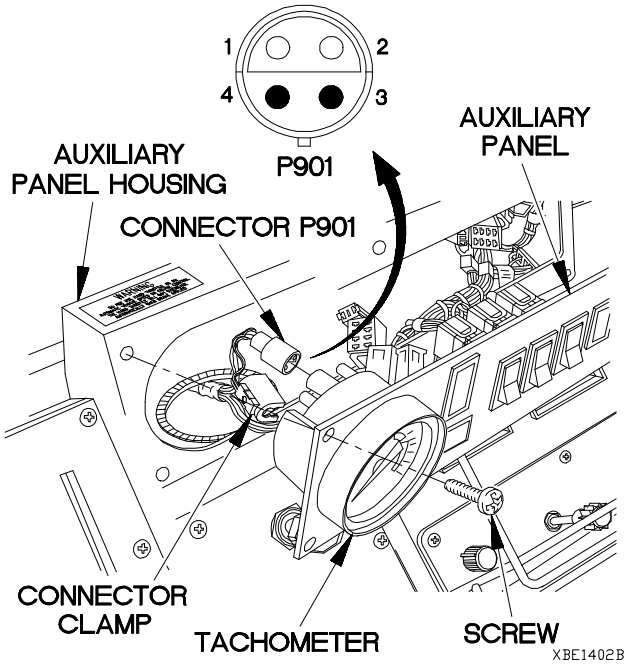
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

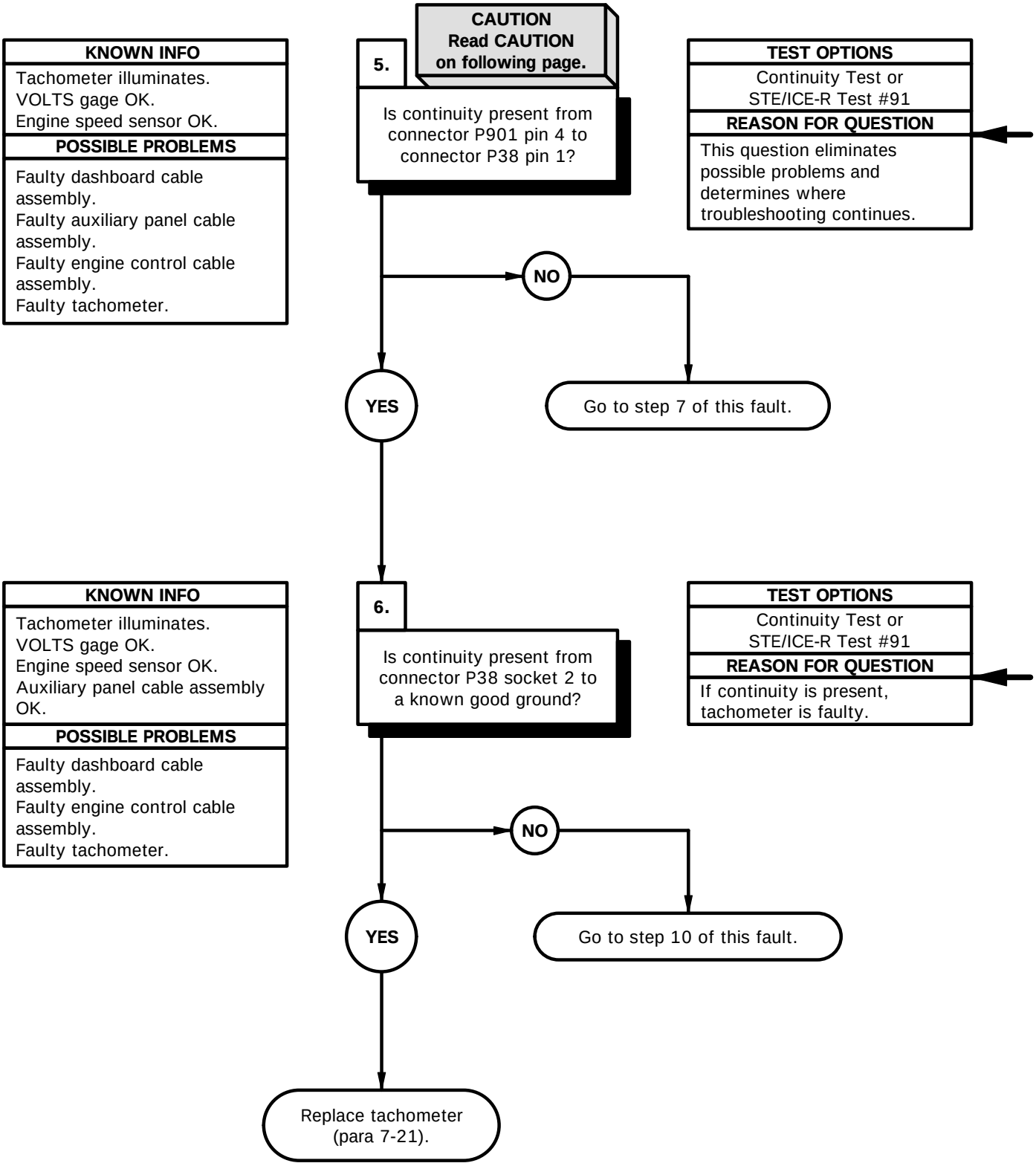
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove six screws from auxiliary panel.
(2) Lift auxiliary panel from auxiliary panel housing to gain access.
(3) Disconnect connector clamp from tachometer connector.
(4) Disconnect connector P901 from tachometer connector.
(5) Set multimeter to VDC.
(6) Connect positive (+) probe of multimeter to connector P901 pin 3.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(9) If 24 VDC is not present, repair wire 1546 from connector P913 pin 9 to connector P901 pin 3 (para 2-40) or replace auxiliary panel cable assembly (para 7-49).
(10) Position master power switch to off (TM 9-2320-365-10).



## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

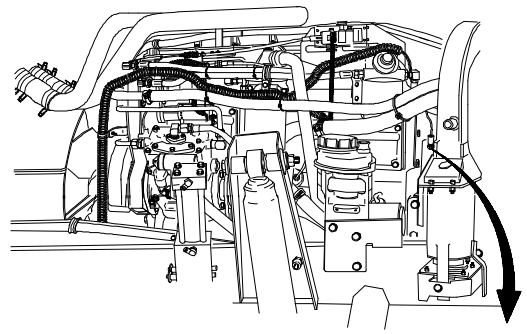
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

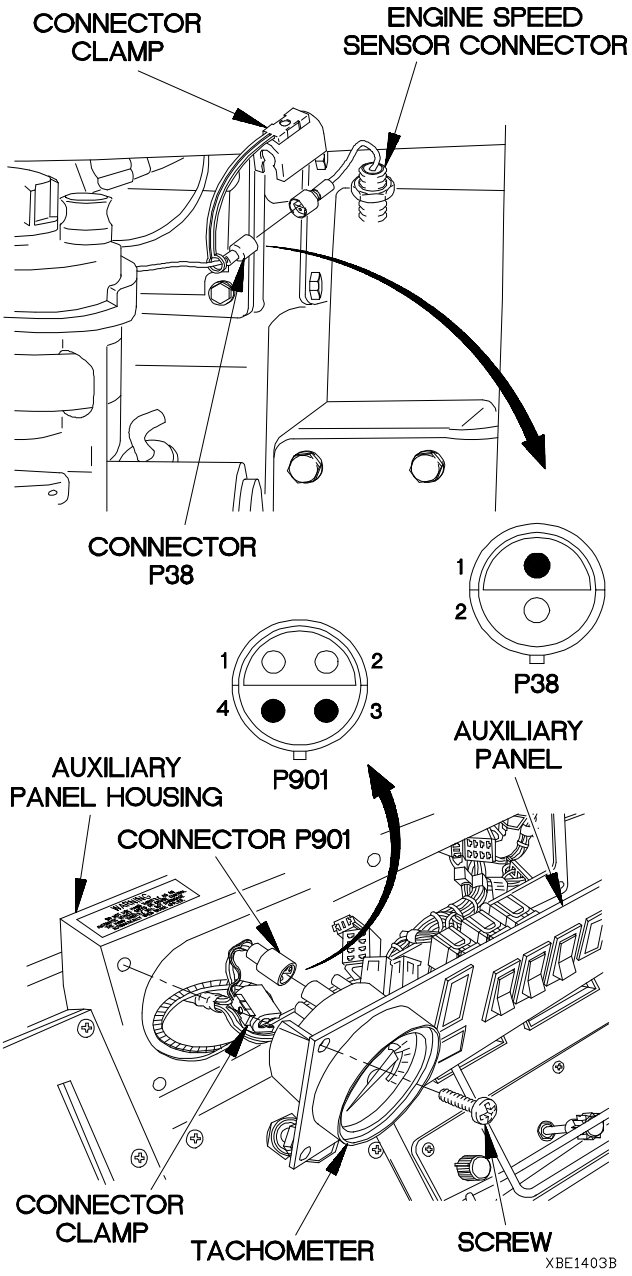
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P901 pin 4.
(3) Raise cab (TM 9-2320-365-10).
(4) Disconnect connector clamp from engine speed sensor connector.
(5) Disconnect connector P38 from engine speed sensor connector.
(7) Connect negative (-) probe of multimeter to connector P38 pin 1 and note reading on multimeter.
(8) If continuity is not present, go to step 7 of this fault.

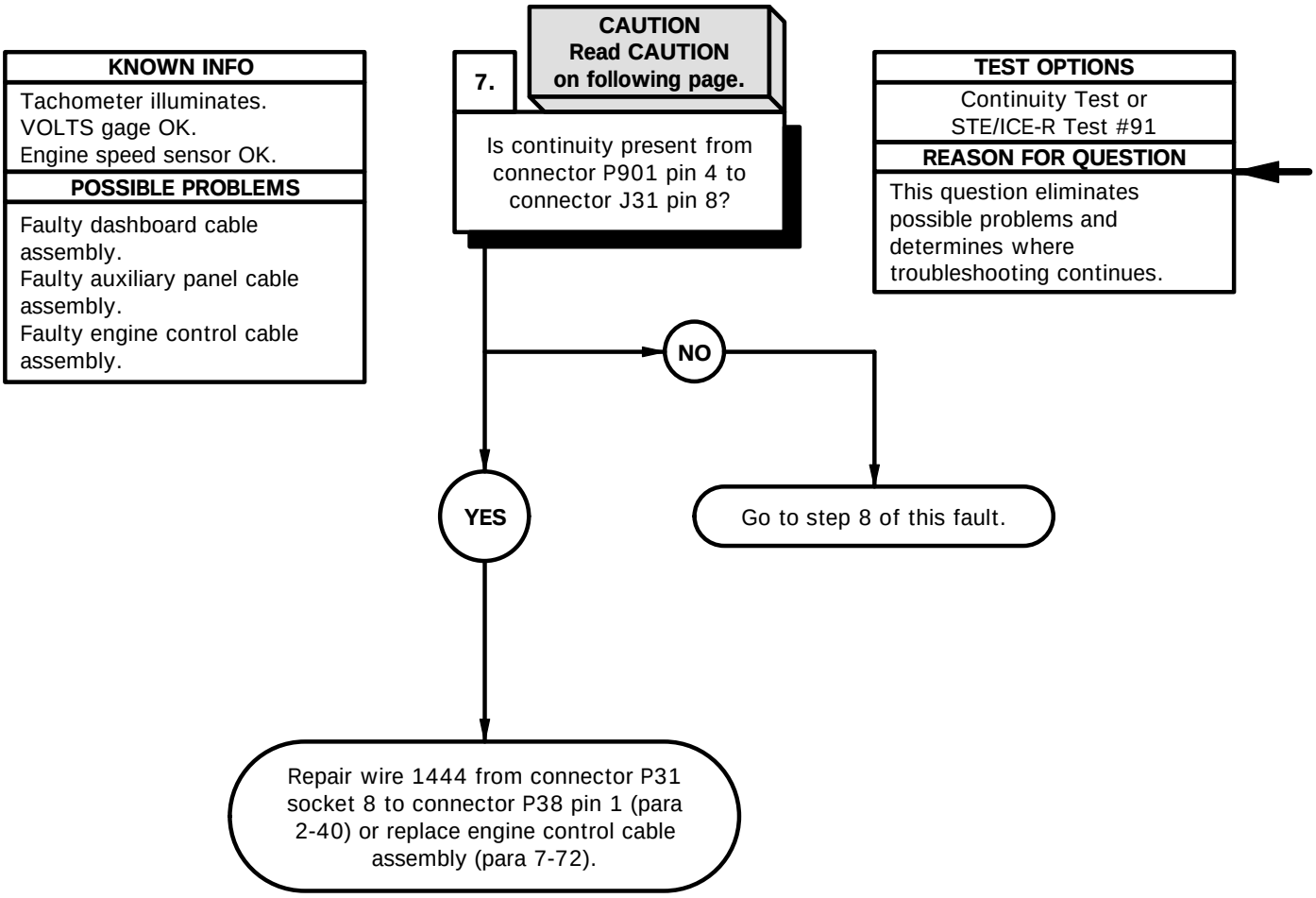
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P38 socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, go to step 10 of this fault.
(5) If continuity is present, replace tachometer (para 7-21).
(6) Connect connector P38 to engine speed sensor connector.
(7) Connect connector clamp on engine speed sensor connector.
(8) Lower cab (TM 9-2320-365-10).
(9) Connect connector P901 to tachometer connector.
(10) Connect connector clamp on tachometer connector.
(11) Position auxiliary panel on auxiliary panel housing with six screws.
(12) Tighten six screws to 18 lb-in. (2 N·m).





## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

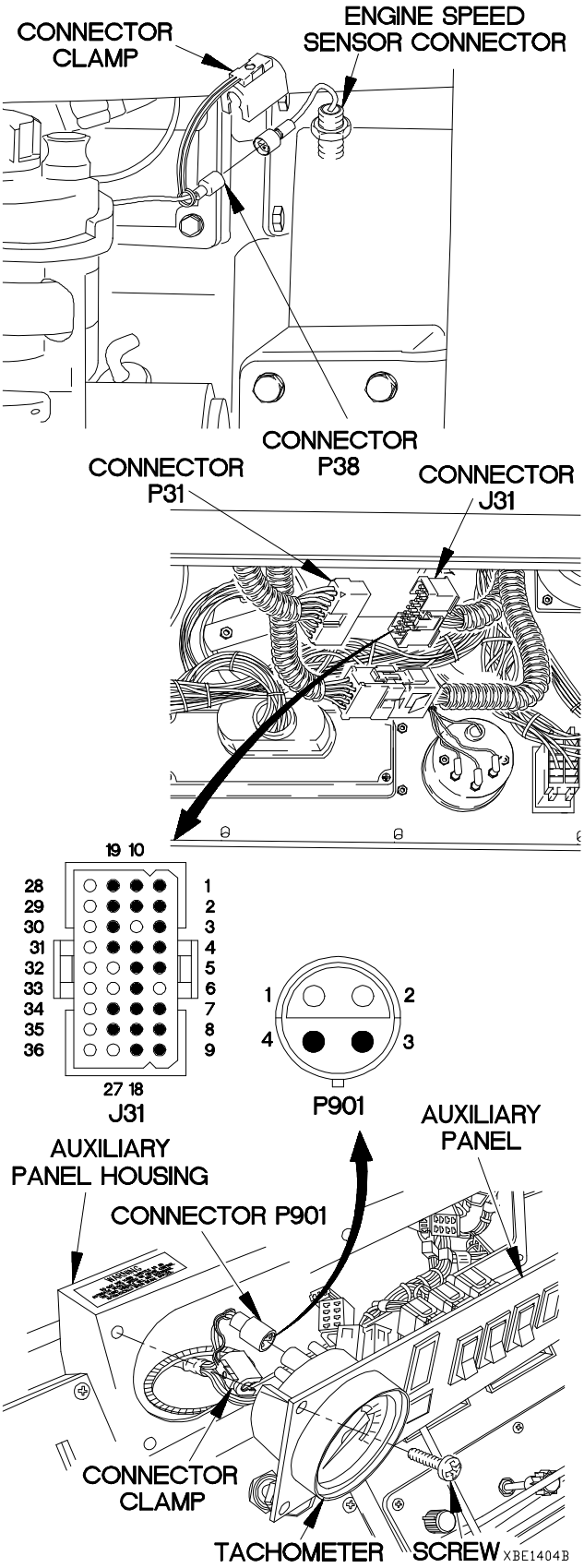
**CONTINUITY TEST**

(1) Connect connector P38 to engine speed sensor connector.
(2) Connect connector clamp on engine speed sensor connector.
(3) Lower cab (TM 9-2320-365-10).
(4) Remove instrument panel assembly for access (para 7-15).
(5) Disconnect connector P31 from connector J31.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector P901 pin 4.
(8) Connect negative (-) probe of multimeter to connector J31 pin 8 and note reading on multimeter.
(9) If continuity is not present, go to step 8 of this fault.
(10) If continuity is present, repair wire 1444 from connector P31 socket 8 to connector P38 pin 1 (para 2-40) or replace engine control cable assembly (para 7-72).
(11) Connect connector P31 to connector J31.
(12) Install instrument panel assembly (para 7-15).

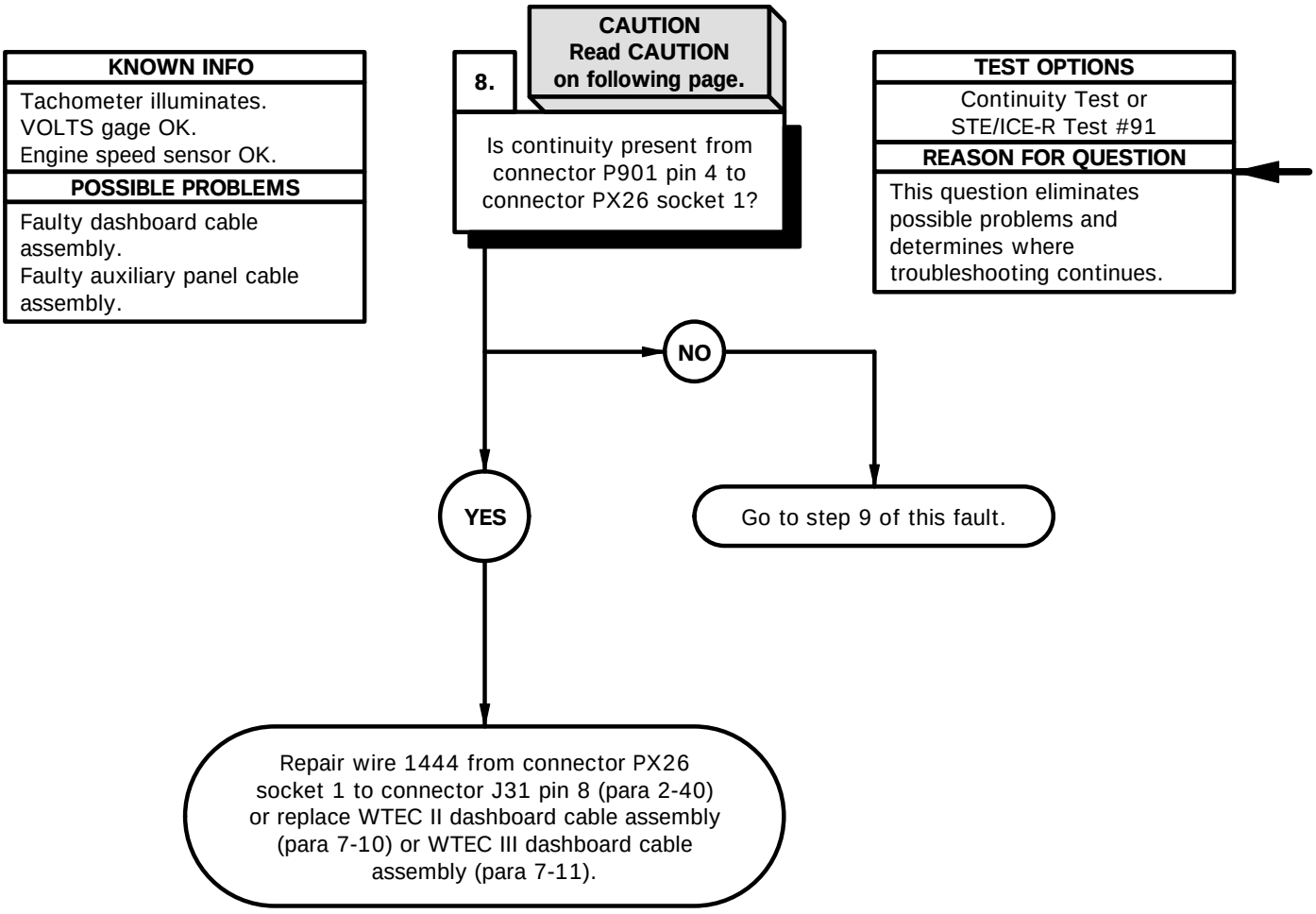
**NOTE**

Perform steps (13) through (16) if continuity is present.

(13) Connect connector P901 to tachometer connector.
(14) Connect connector clamp on tachometer connector.
(15) Position auxiliary panel on auxiliary panel housing with six screws.
(16) Tighten six screws to 18 lb-in. (2 N·m).



## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

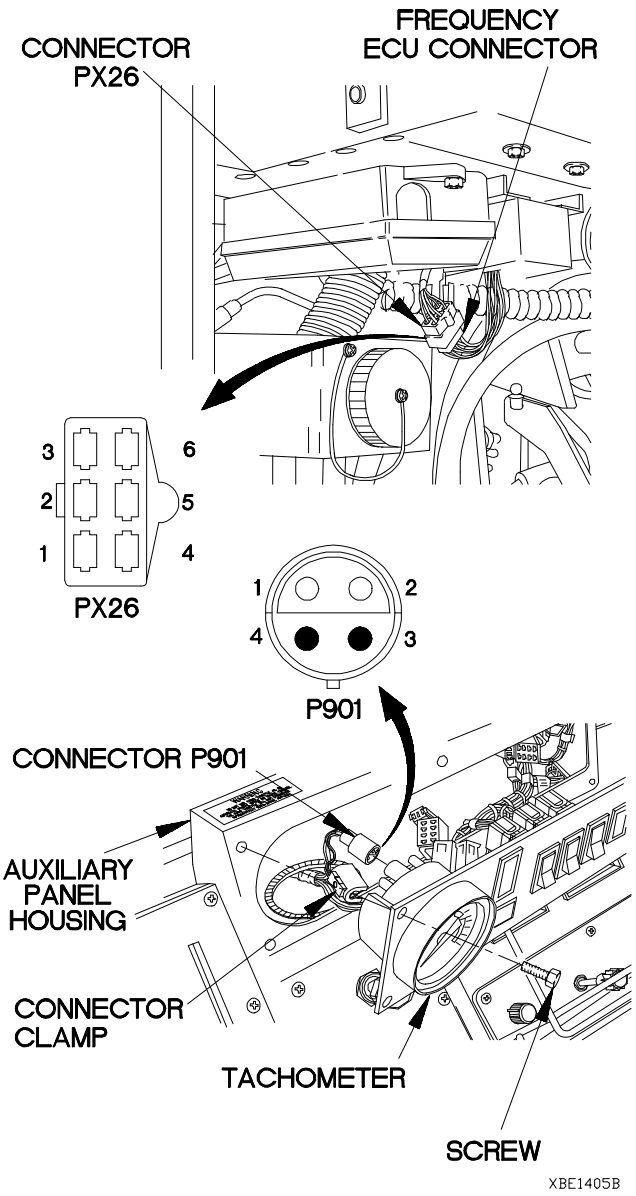
**CONTINUITY TEST**

(1) Disconnect connector PX26 from frequency ECU connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P901 pin 4.
(4) Connect negative (-) probe of multimeter to connector PX26 socket 1 and note reading on multimeter.
(5) If continuity is not present, go to step 9 of this fault.
(6) If continuity is present, repair wire 1444 from connector PX26 socket 1 to connector J31 pin 8 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para7-11).
(7) Connect connector PX26 to frequency ECU connector.

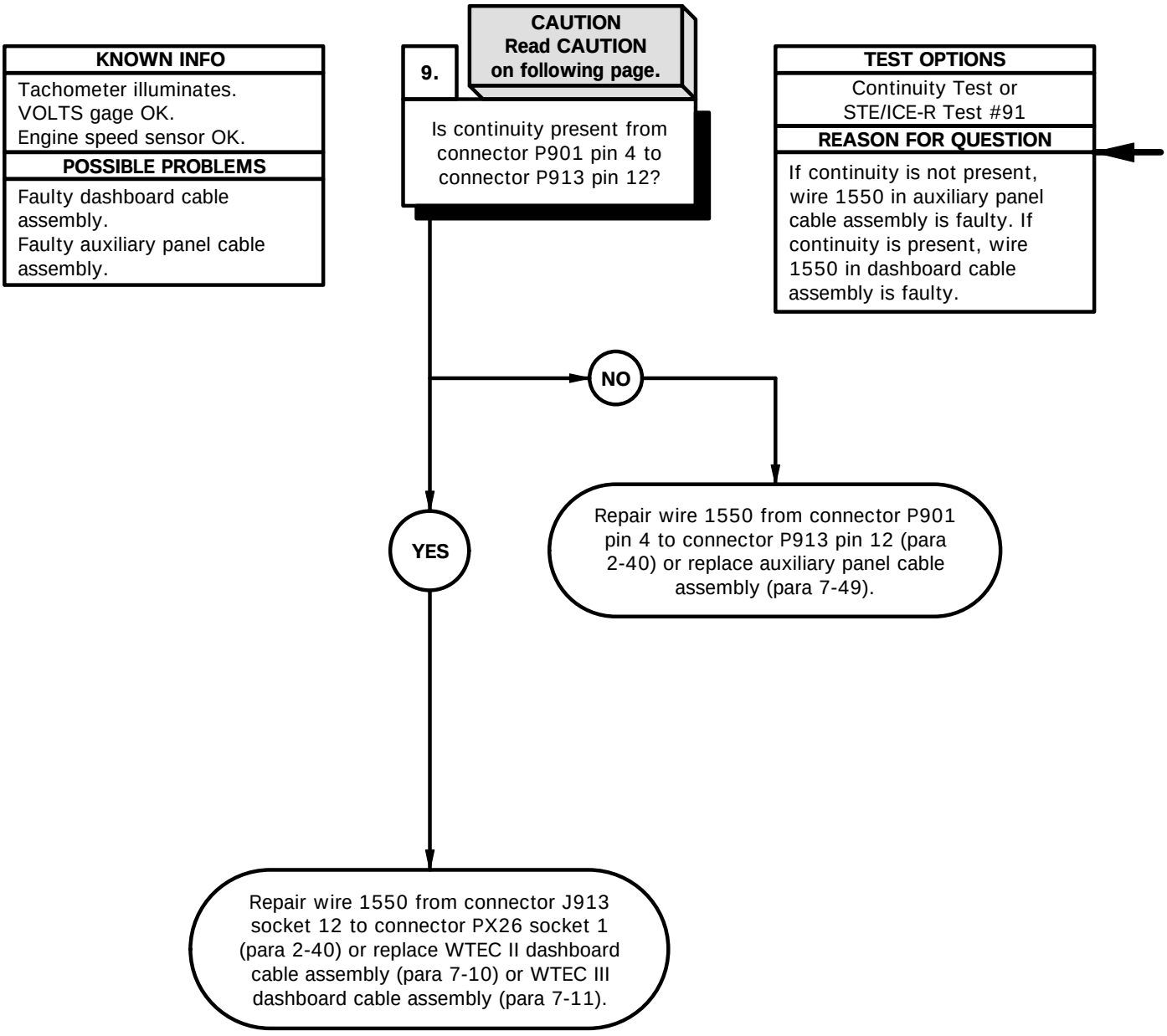
**NOTE**

Perform steps (8) through (11) if continuity is present.

(8) Connect connector P901 to tachometer connector.
(9) Connect connector clamp on tachometer connector.
(10) Position auxiliary panel on auxiliary panel housing with six screws.
(11) Tighten six screws to 18 lb-in. (2 N·m).



## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

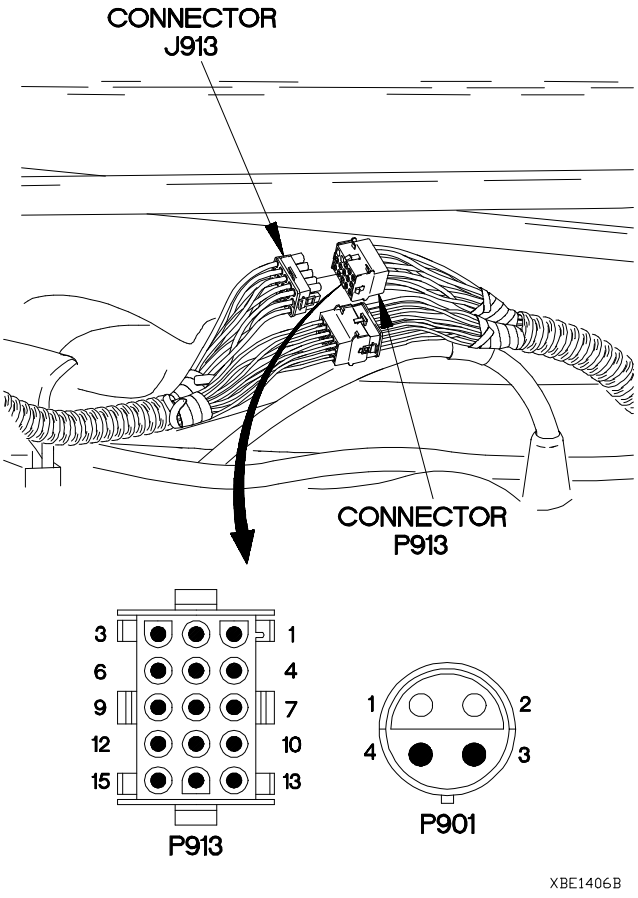
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

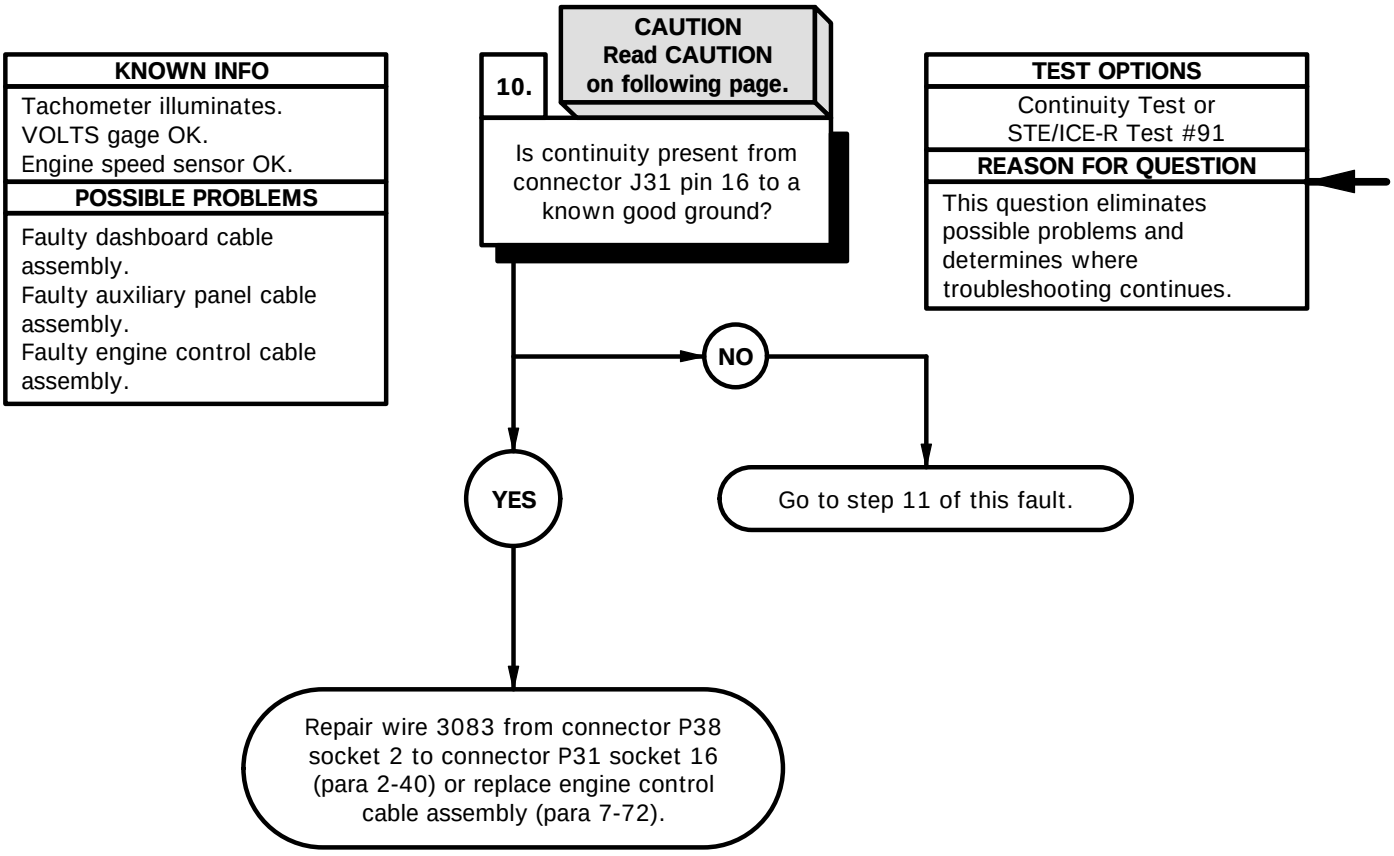
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

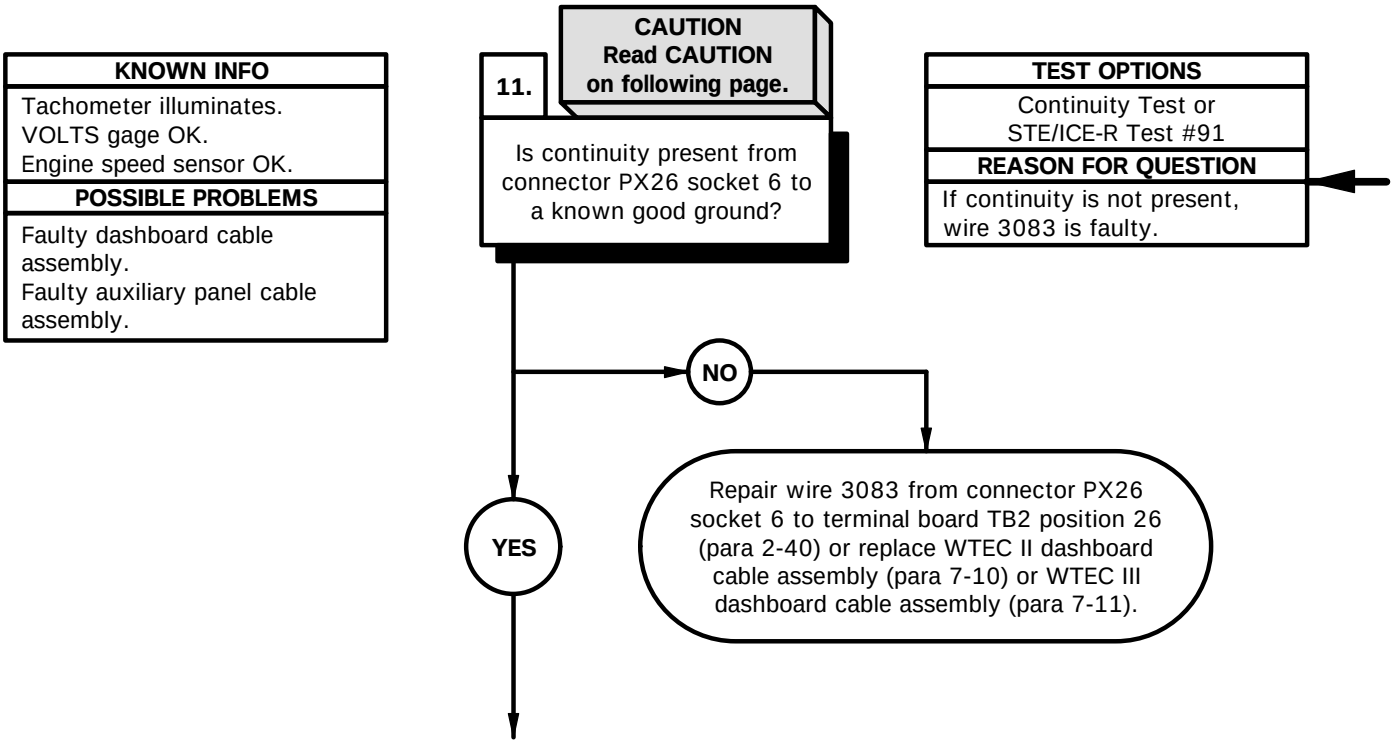
**CONTINUITY TEST**

(1) Remove personnel heater assembly for access (para 18-9).
(2) Disconnect connector P913 from connector J913.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P901 pin 4.
(5) Connect negative (-) probe of multimeter to connector P913 pin 12 and note reading on multimeter.
(6) If continuity is not present, repair wire 1550 from connector P901 pin 4 to connector P913 pin 12 (para 2-40) or replace auxiliary panel cable assembly (para 7-49).
(7) If continuity is present, repair wire 1550 from connector J913 socket 12 to connector PX26 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Connect connector P913 to connector J913.
(9) Install personnel heater assembly (para 18-9).



## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

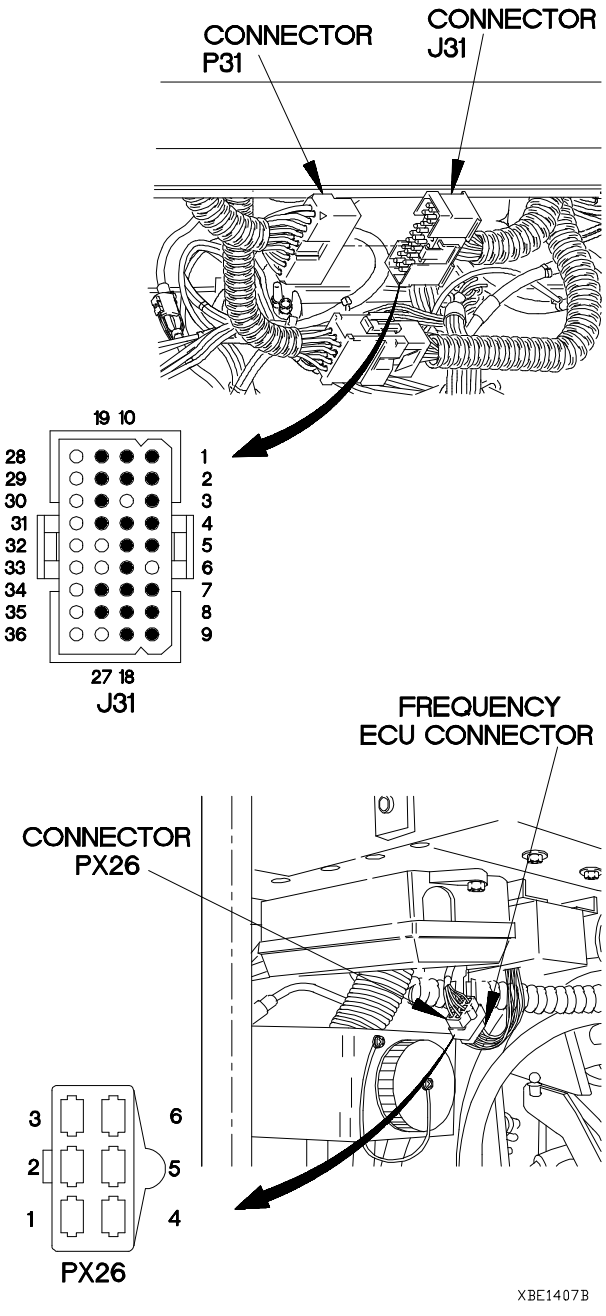
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

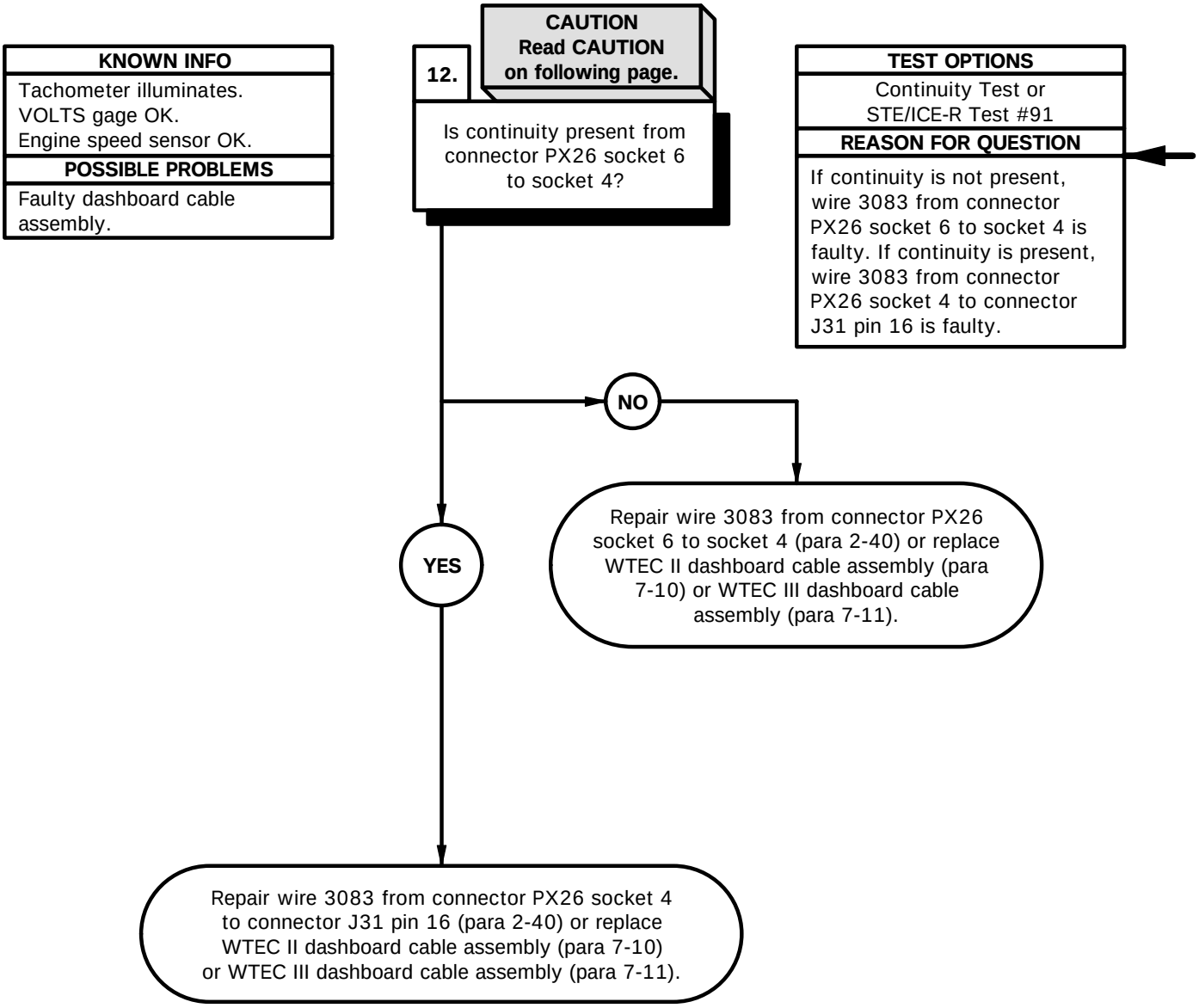
(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector P31 from connector J31.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J31 pin 16.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, go to step 11 of this fault.
(7) If continuity is present, repair wire 3083 from connector P38 socket 2 to connector P31 socket 16 (para 2-40) or replace engine control cable assembly (para 7-72).
(8) Connect connector P31 to connector J31.
(9) Install instrument panel assembly (para 7-15).

**CONTINUITY TEST**

(1) Disconnect connector PX26 from frequency ECU connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX26 socket 6.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3083 from connector PX26 socket 6 to terminal board TB2 position 26 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e14. TACHOMETER DOES NOT OPERATE OR IS INACCURATE (CONT)



**CAUTION**

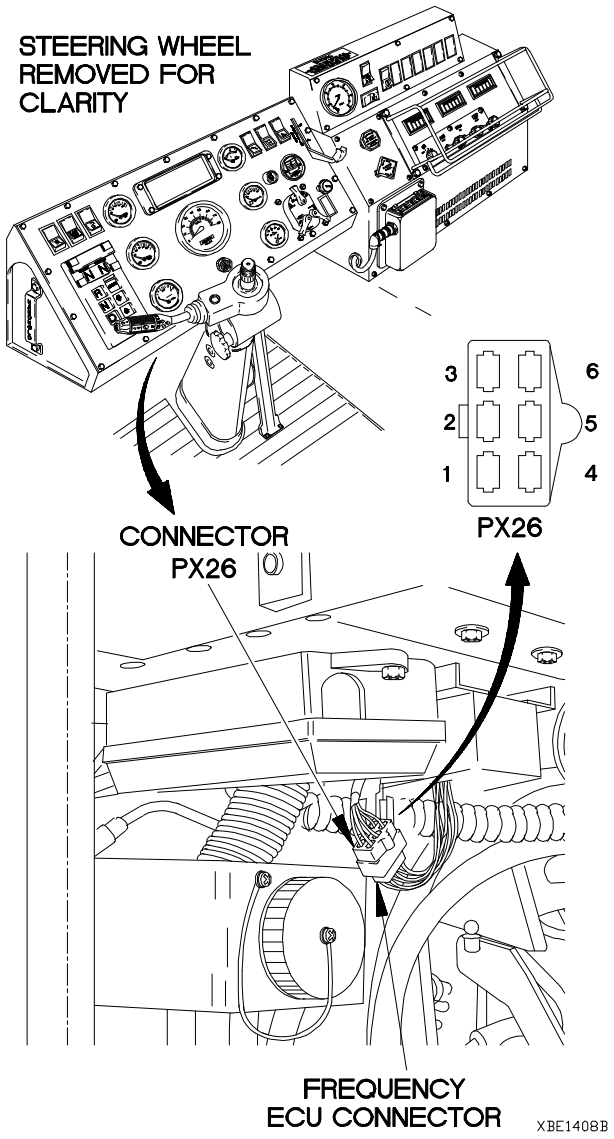
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX26 socket 6.
(3) Connect negative (-) probe of multimeter to connector PX26 socket 4 and note reading on multimeter.
(4) If continuity is not present, repair wire 3083 from connector PX26 socket 6 to socket 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 3083 connector PX26 socket 4 to connector J31 pin 16 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX26 to frequency ECU connector.



## e15. AUDIBLE ALARM DOES NOT OPERATE

**INITIAL SETUP**

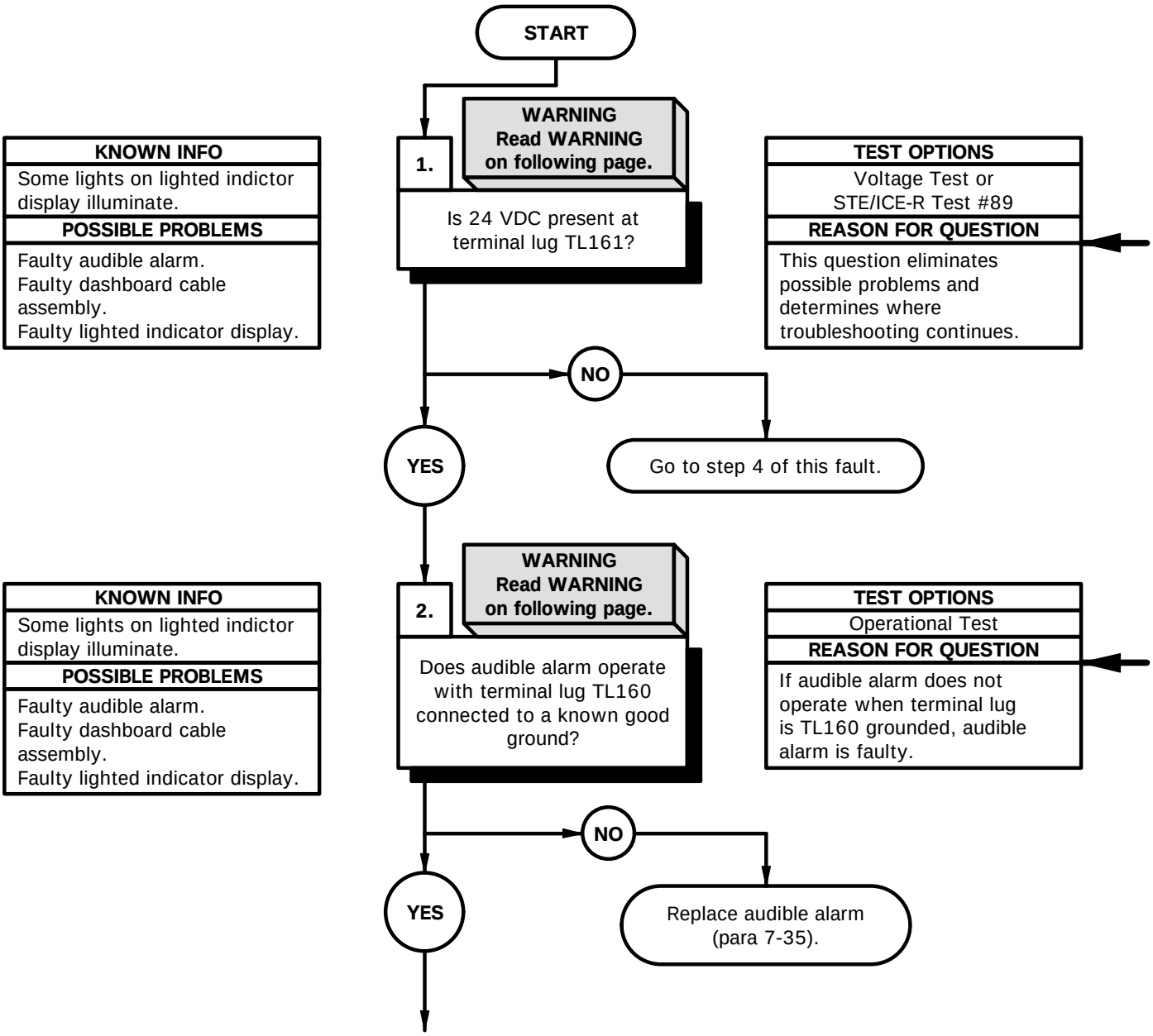
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**WARNING**

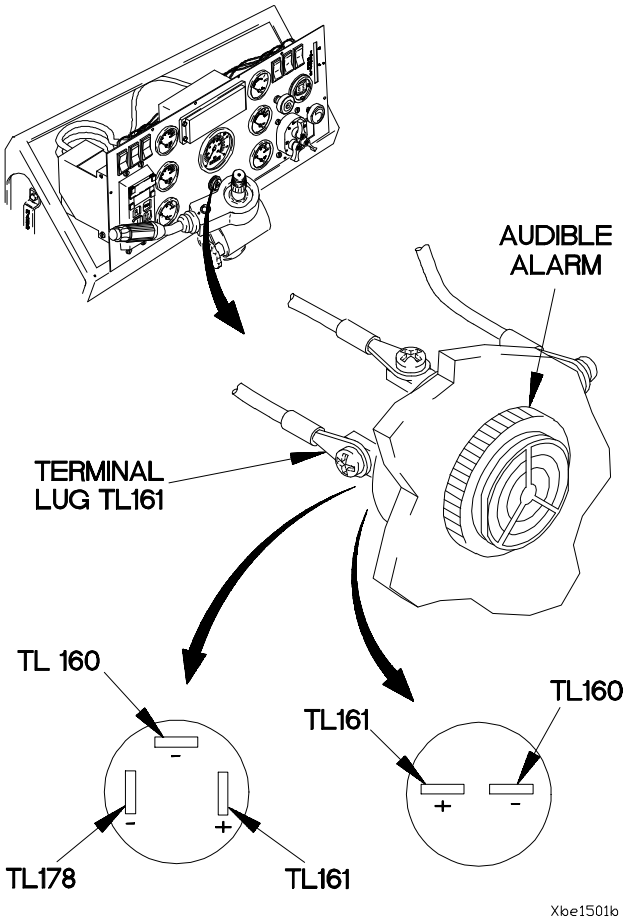
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

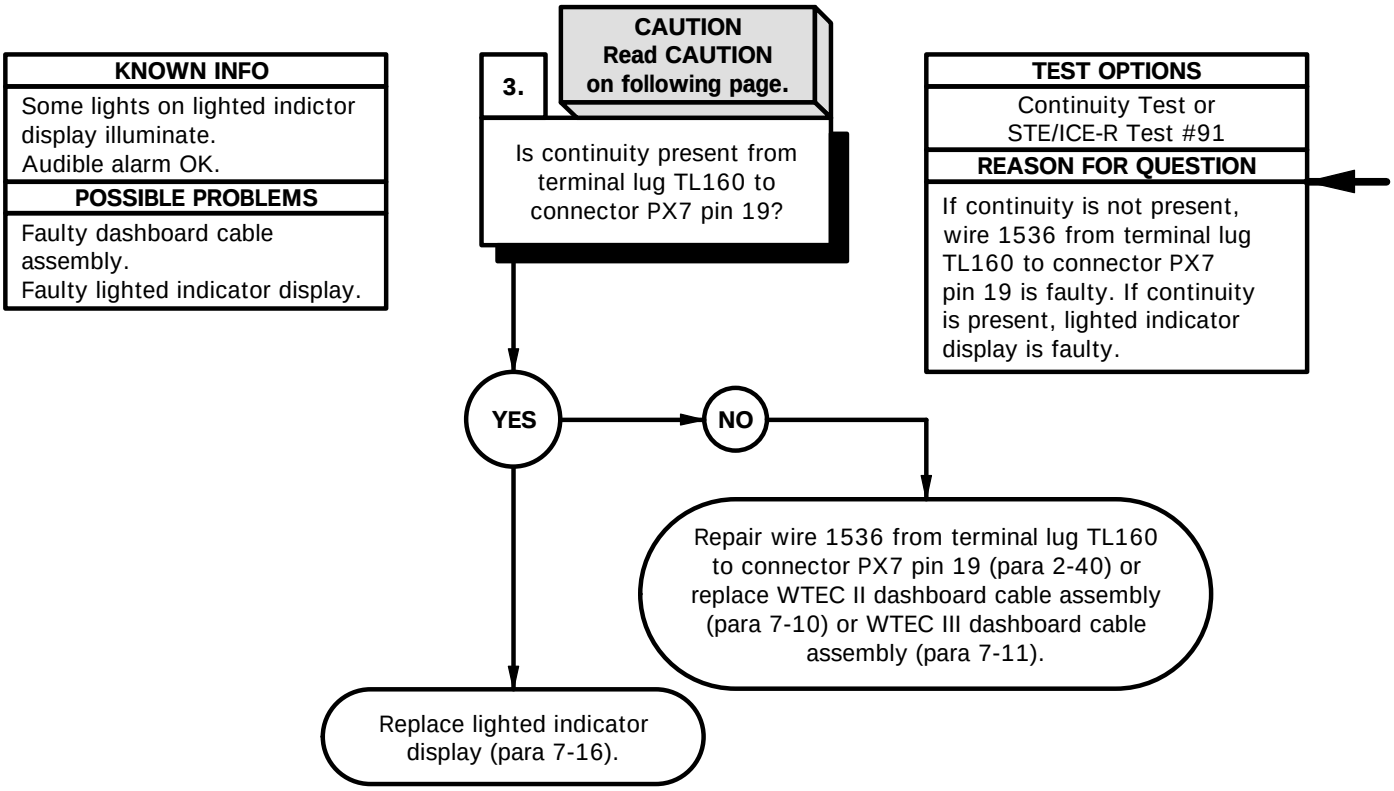
(1) Remove instrument panel assembly for access (para 7-15).
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to terminal lug TL161.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 VDC is not present, go to step 4 of this fault.
(7) Position master power switch to off (TM 9-2320-365-10).

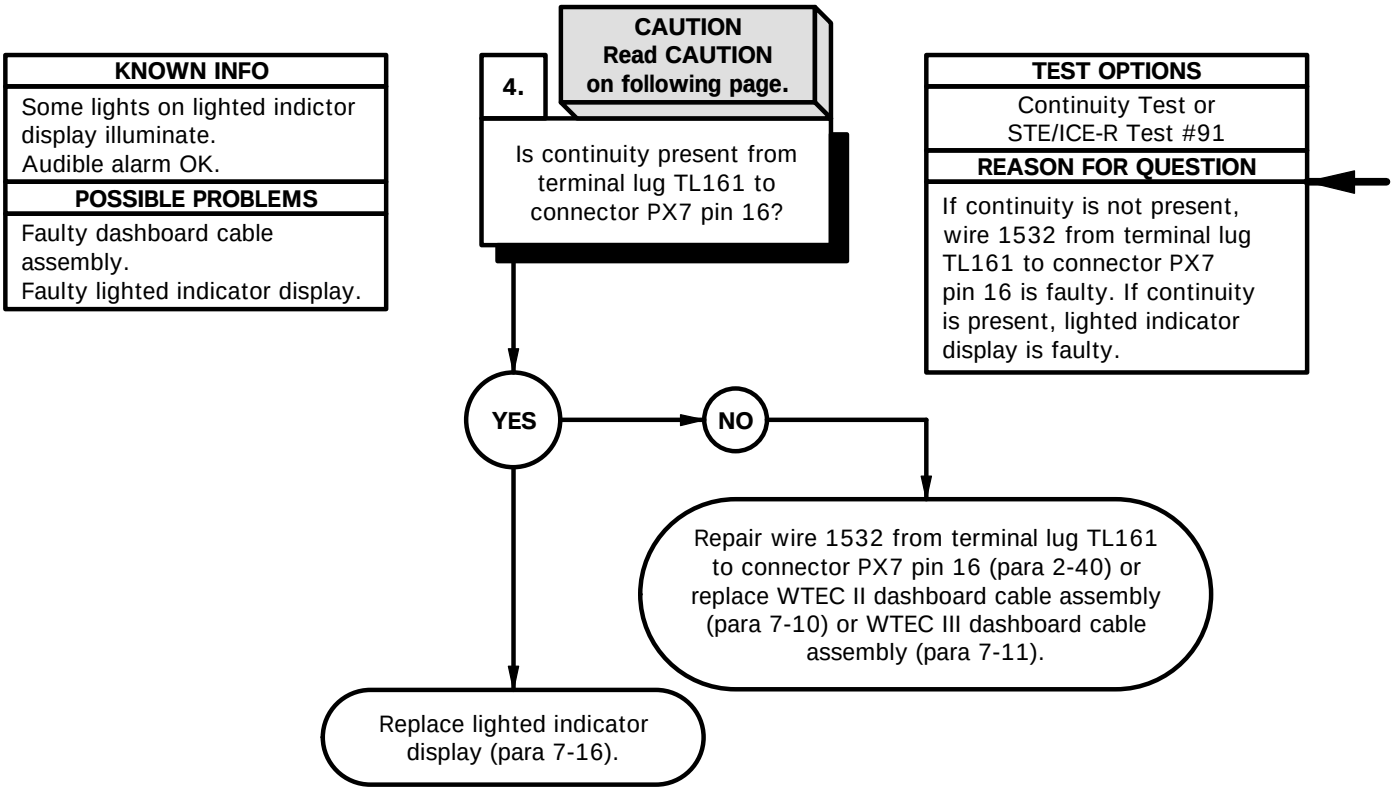
**OPERATIONAL TEST**

(1) Connect one end of electrical wire to terminal lug TL160.
(2) Connect opposite end of electrical wire to ground.
(3) Position master power switch to on (TM 9-2320-365-10).
(4) If audible alarm does not operate, replace audible alarm (para 7-35).
(5) Position master power switch to off (TM 9-2320-365-10).



## e15. AUDIBLE ALARM DOES NOT OPERATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

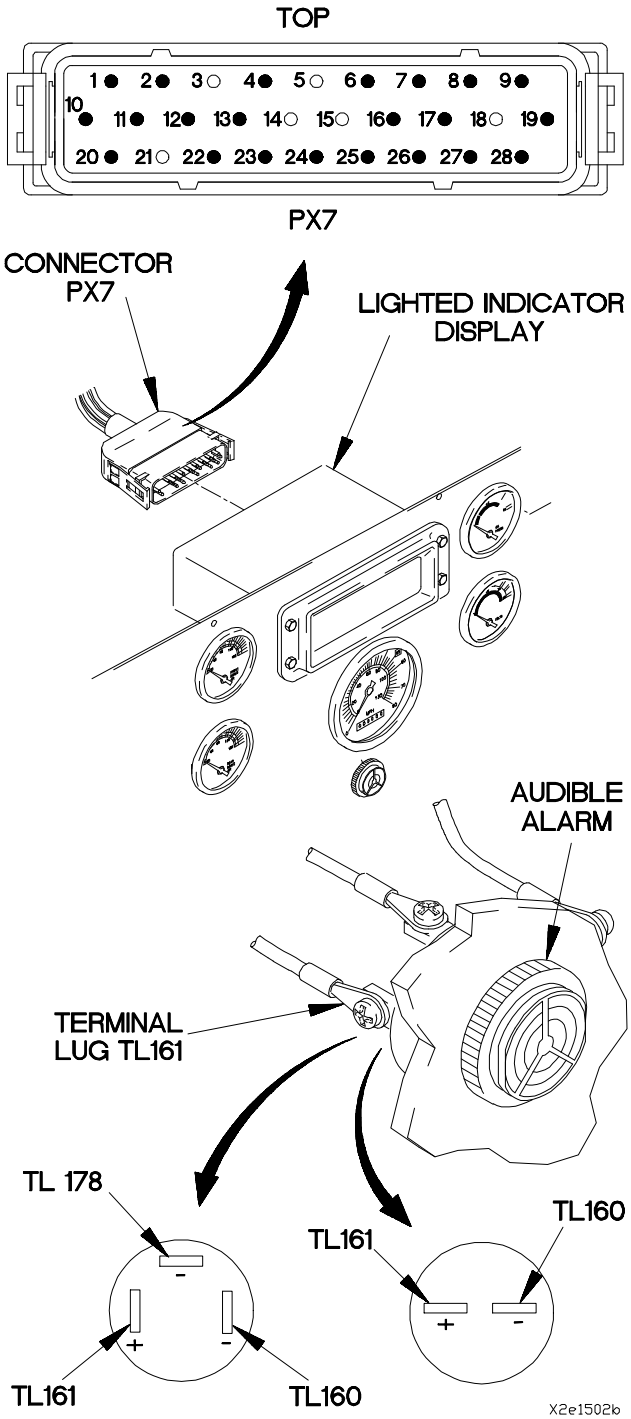
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector PX7 from lighted indicator display.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL160.
(4) Connect negative (-) probe of multimeter to connector PX7 pin 19 and note reading on multimeter.
(5) If continuity is not present, repair wire 1536 from terminal lug TL160 to connector PX7 pin 19 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace lighted indicator display (para 7-16).
(7) Connect connector PX7 to lighted indicator display.
(8) Install instrument panel assembly (para 7-15).

**CONTINUITY TEST**

(1) Disconnect connector PX7 from lighted indicator display.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL161.
(4) Connect negative (-) probe of multimeter to connector PX7 pin 16 and note reading on multimeter.
(5) If continuity is not present, repair wire 1532 from terminal lug TL161 to connector PX7 pin 16 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace lighted indicator display (para 7-16).
(7) Connect connector PX7 to lighted indicator display.
(8) Install instrument panel assembly (para 7-15).



## e16. TROOP TRANSPORT AUDIBLE ALARM DOES NOT OPERATE

**INITIAL SETUP**

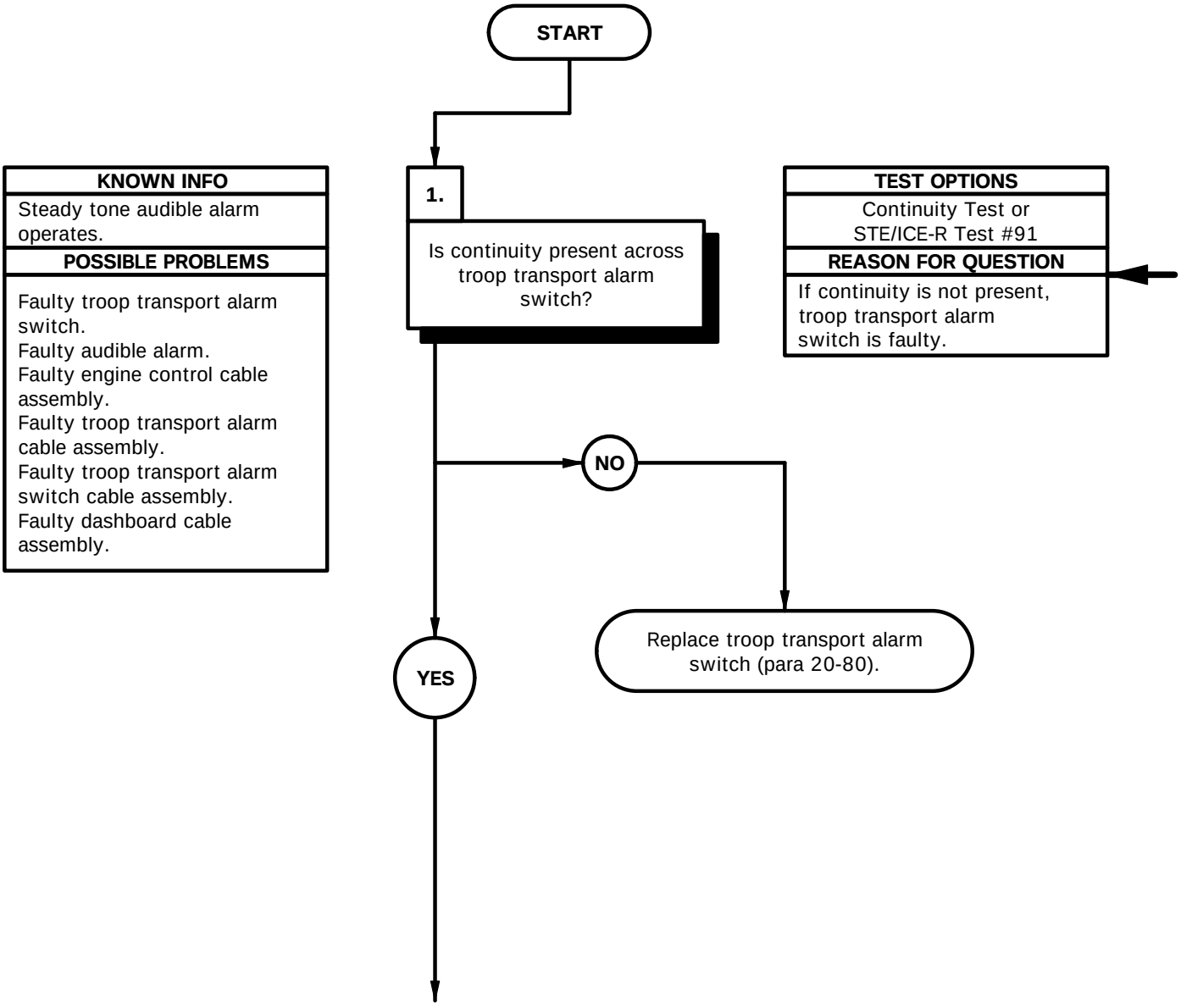
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**Materials/Parts**
Lockwasher (2) (Item 72, Appendix G)
Wire, Elect, 50 ft (Item 77, Appendix D)

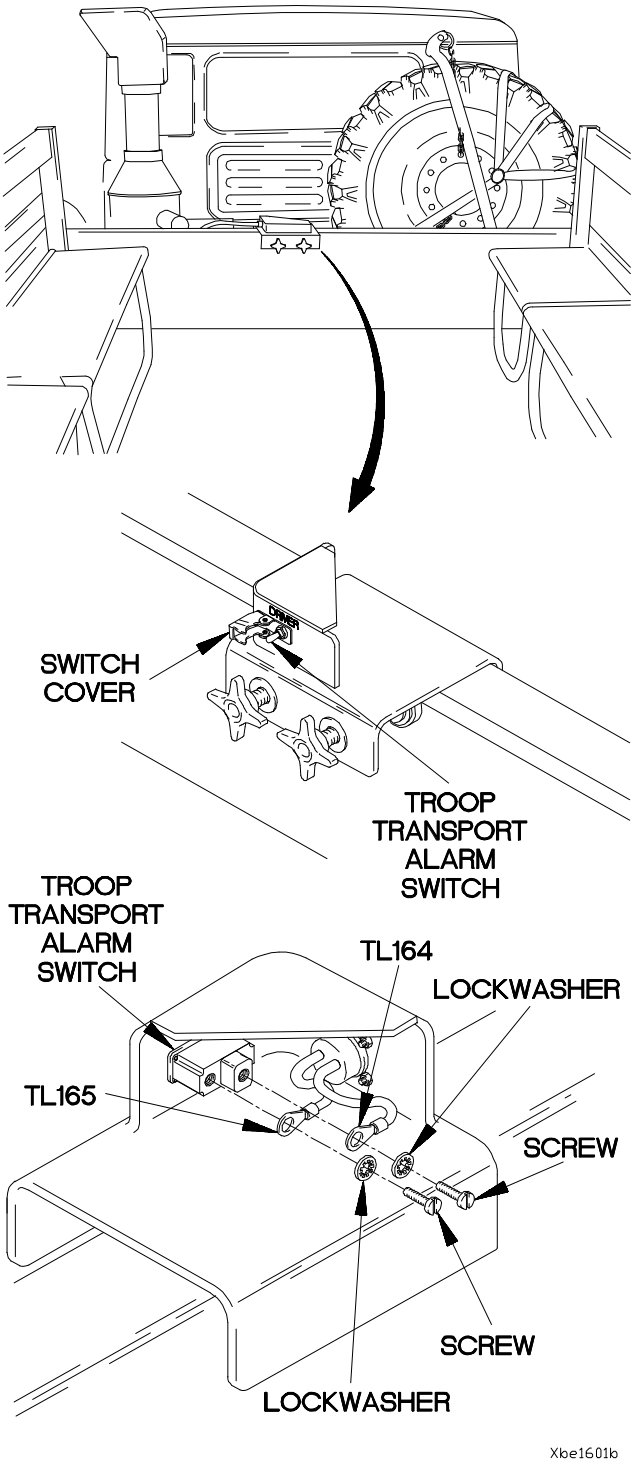
**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

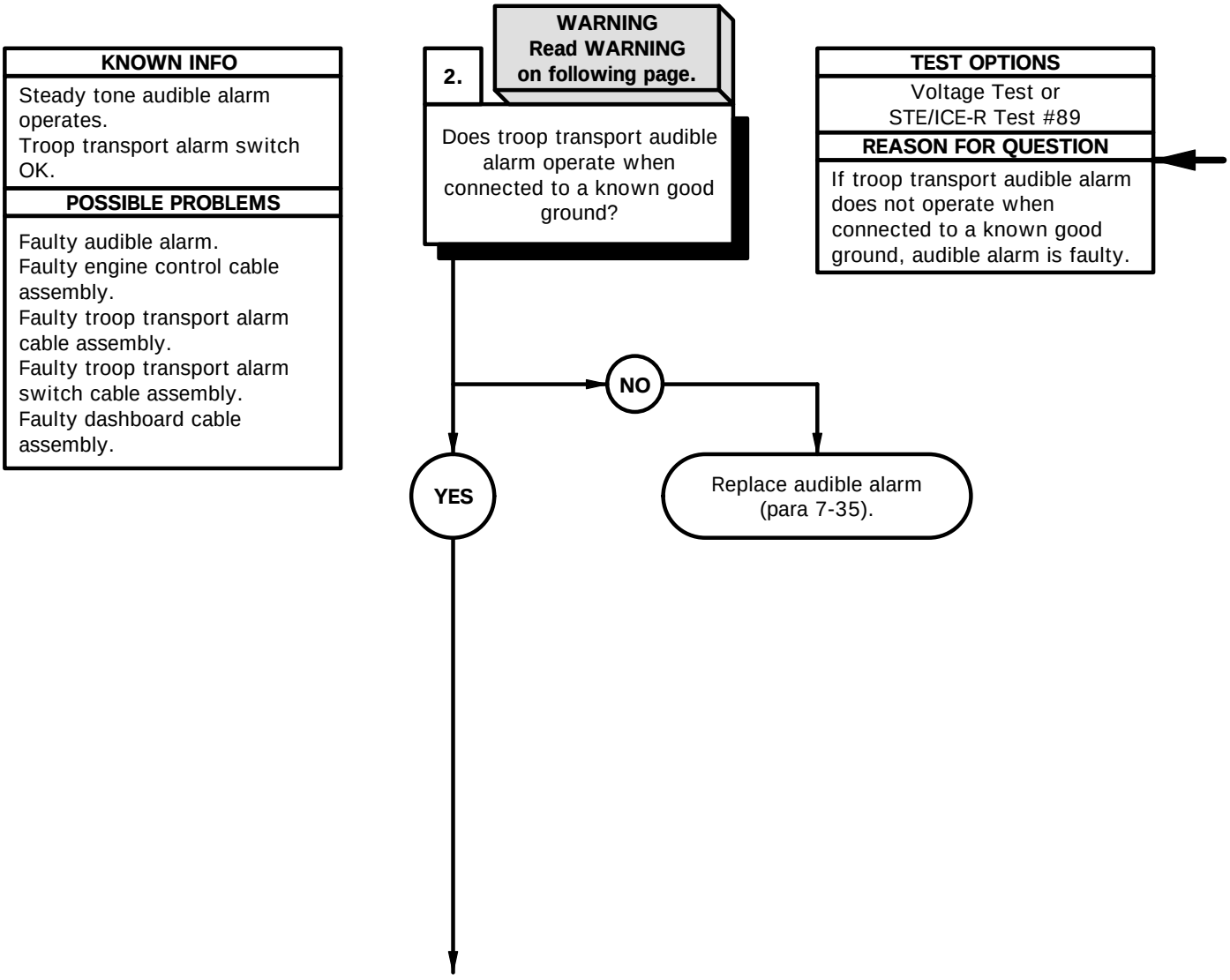


**CONTINUITY TEST**

(1) Remove two screws, lockwashers, and terminal lugs TL164 and TL165 from troop transport alarm switch. Discard lockwashers.
(2) Lift switch cover on troop transport alarm switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of troop transport alarm switch.
(5) Connect negative (-) probe of multimeter to second terminal of troop transport alarm switch.
(6) Position troop transport alarm switch to on and note reading on multimeter.
(7) If continuity is not present, replace troop transport alarm switch (para 20-80).
(8) Install terminal lugs TL165 and TL164 on troop transport alarm switch with two lockwashers and screws.
(9) Close switch cover on troop transport alarm switch.



## e16. TROOP TRANSPORT AUDIBLE ALARM DOES NOT OPERATE (CONT)

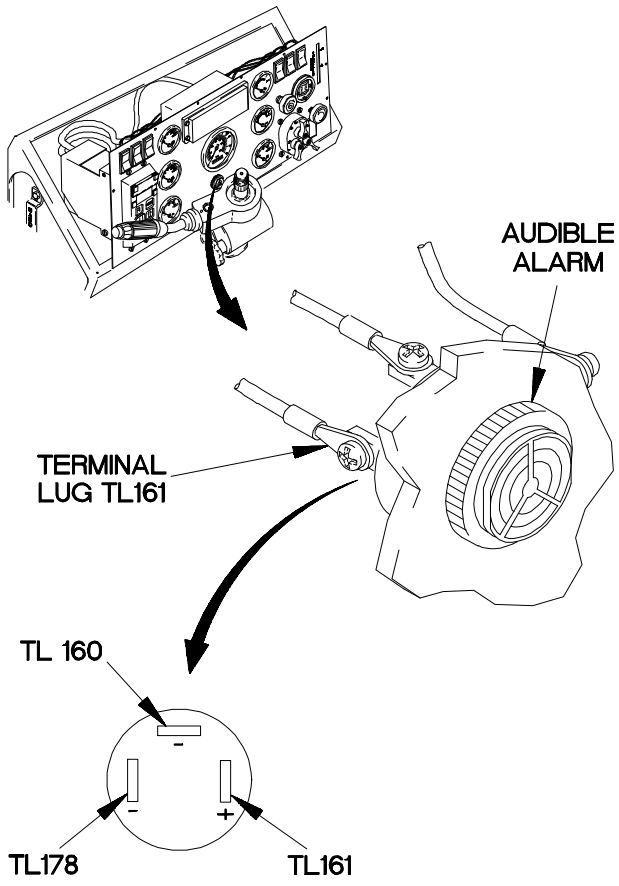


**WARNING**

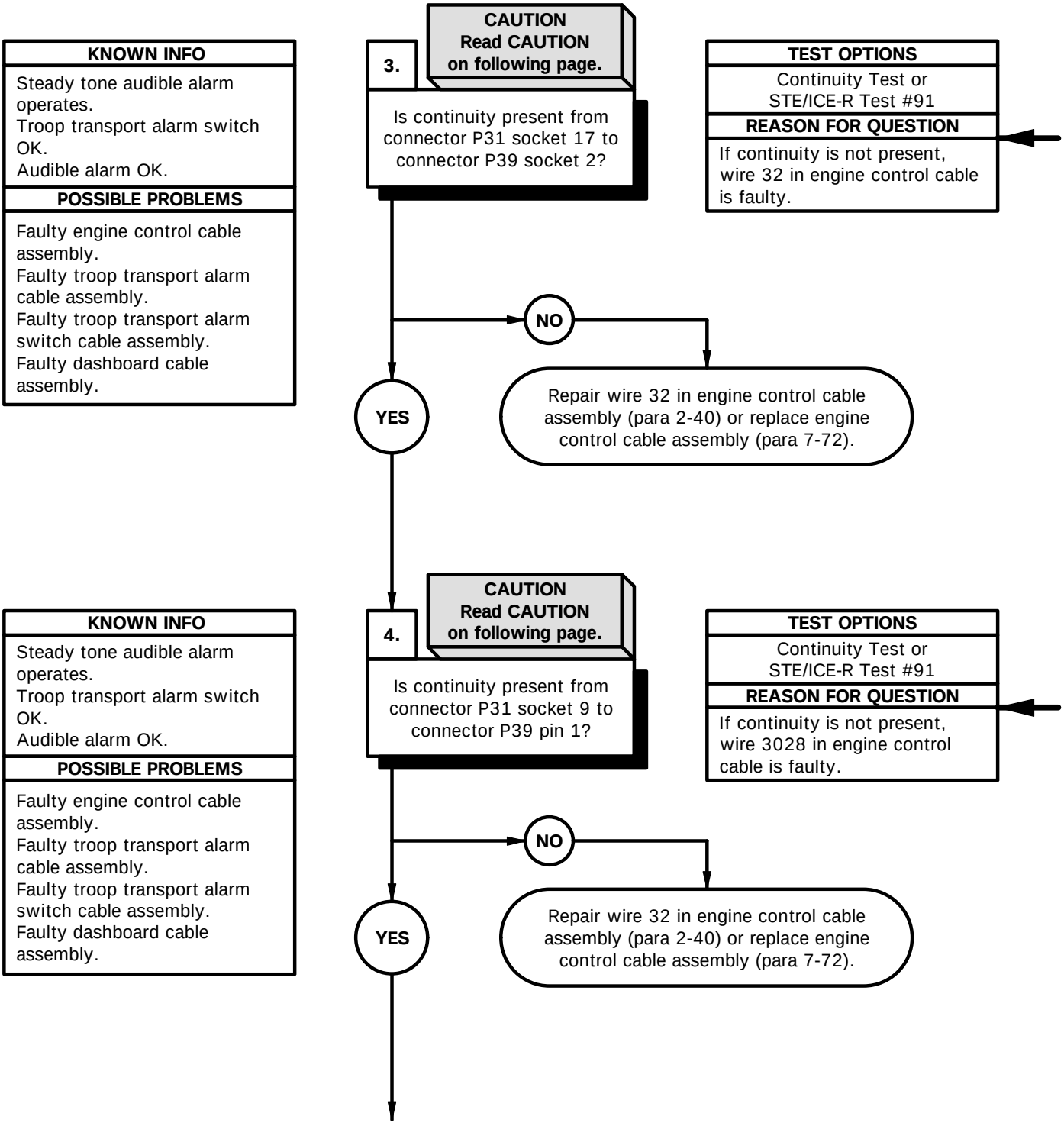
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Start engine (TM 9-2320-365-10) and allow enough pressure to build in air tanks to cause steady tone audible alarm to cease.
(2) Shut down engine (TM 9-2320-365-10).
(3) Remove PDP cover (TM 9-2320-365-10).
(4) Remove circuit breaker CB77 from PDP (para 7-9).
(5) Remove instrument panel assembly for access (para 7-15).
(6) Install circuit breaker CB77 on PDP (para 7-9).
(7) Connect one end of electrical wire to terminal lug TL178.
(8) Connect opposite end of electrical wire to ground.
(9) Position master power switch to on (TM 9-2320-365-10).
(10) If troop transport audible alarm does not operate, replace audible alarm (para 7-35).
(11) Position master power switch to off (TM 9-2320-365-10).
(12) Install PDP cover (TM 9-2320-365-10).



## e16. TROOP TRANSPORT AUDIBLE ALARM DOES NOT OPERATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

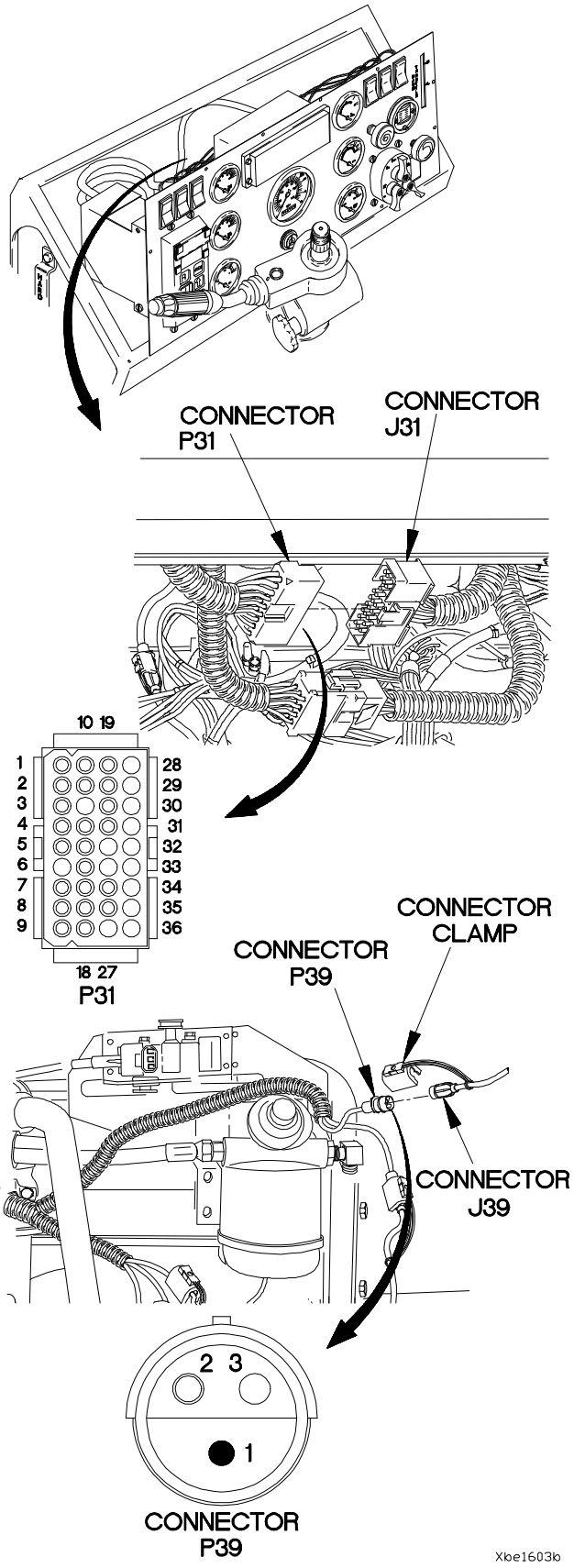
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

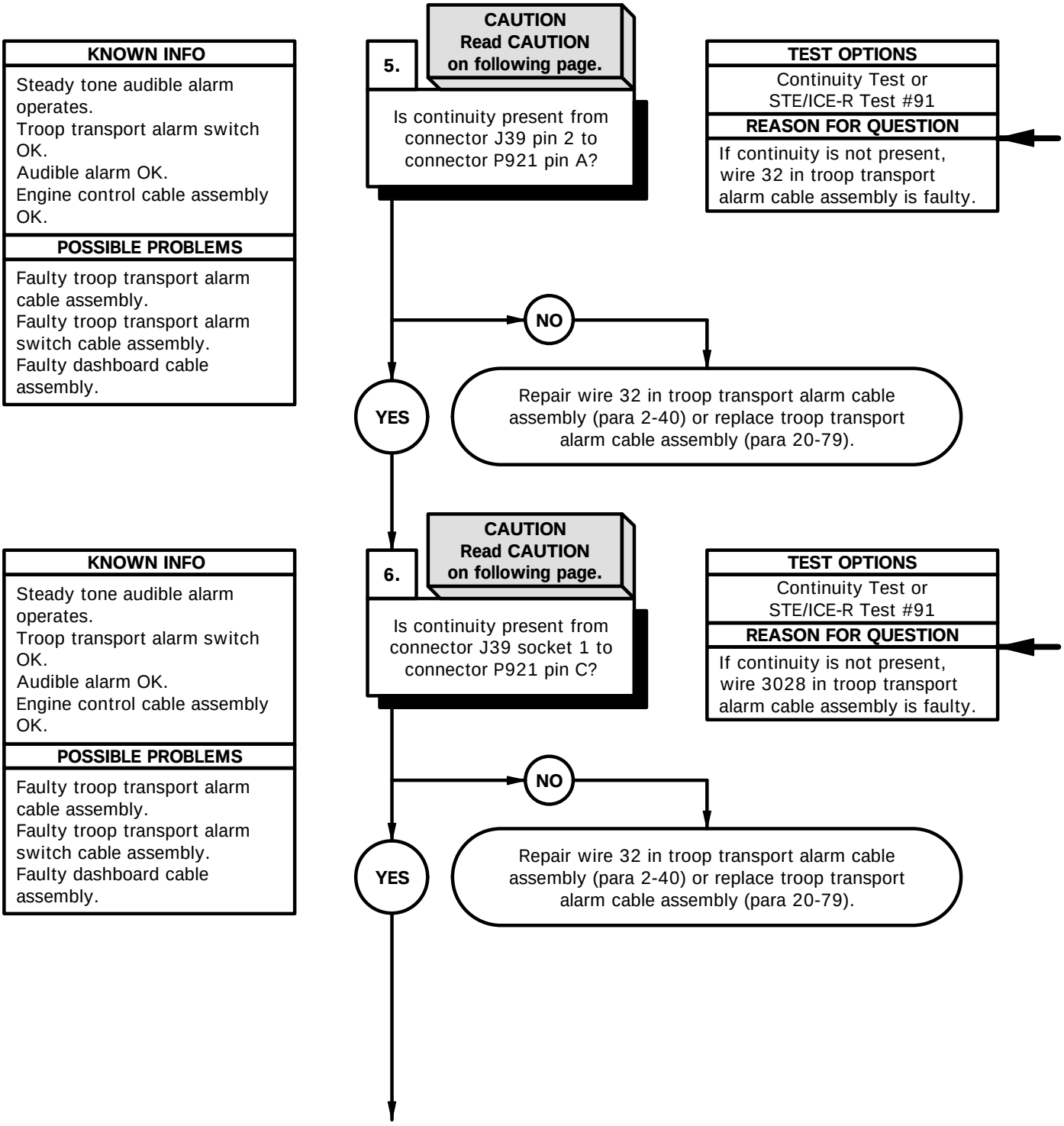
(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector P31 from connector J31.
(3) Raise cab (TM 9-2320-365-10).
(4) Disconnect connector clamp from connector P39.
(5) Disconnect connector P39 from connector J39.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector P39 socket 2.
(8) Connect negative (-) probe of multimeter to connector P31 socket 17 and note reading on multimeter.
(9) If continuity is not present, repair wire 32 in engine control cable (para 2-40) or replace engine control cable assembly (para 7-72).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P39 pin 1.
(3) Connect negative (-) probe of multimeter to connector P31 socket 9 and note reading on multimeter.
(4) If continuity is not present, repair wire 3028 in engine control cable (para 2-40) or replace engine control cable assembly (para 7-72).



## e16. TROOP TRANSPORT AUDIBLE ALARM DOES NOT OPERATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

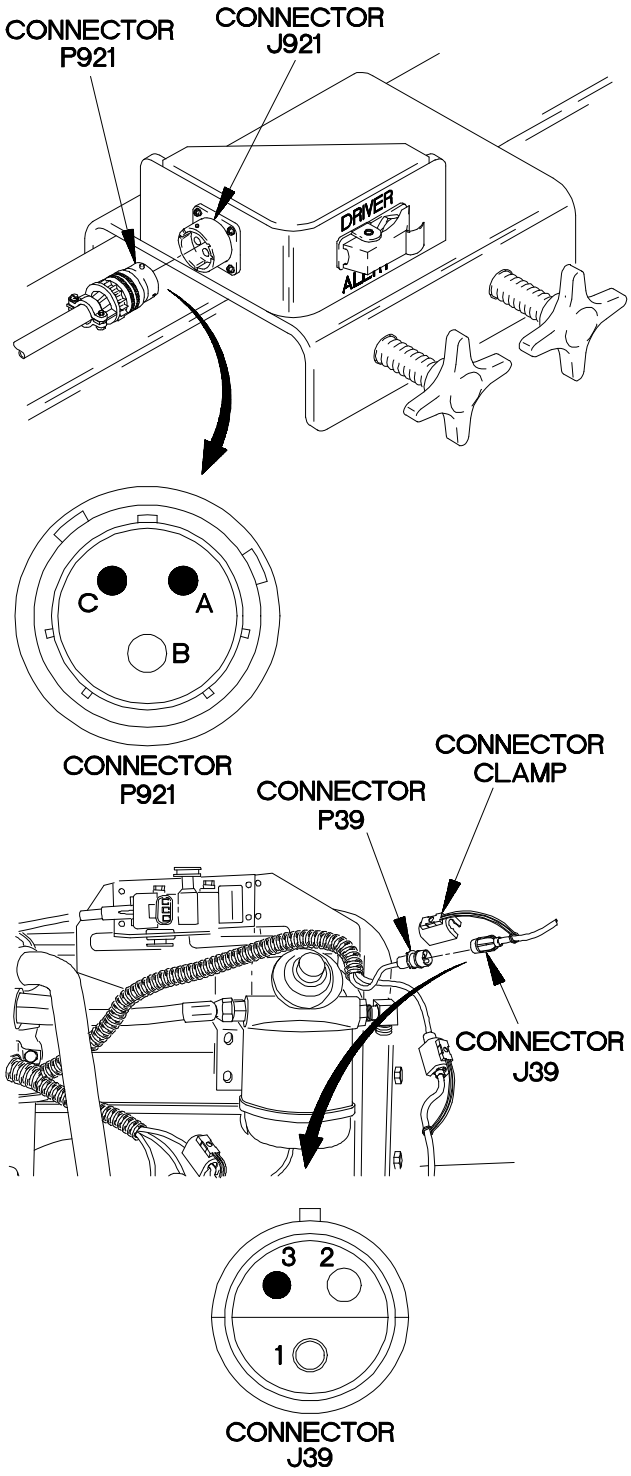
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

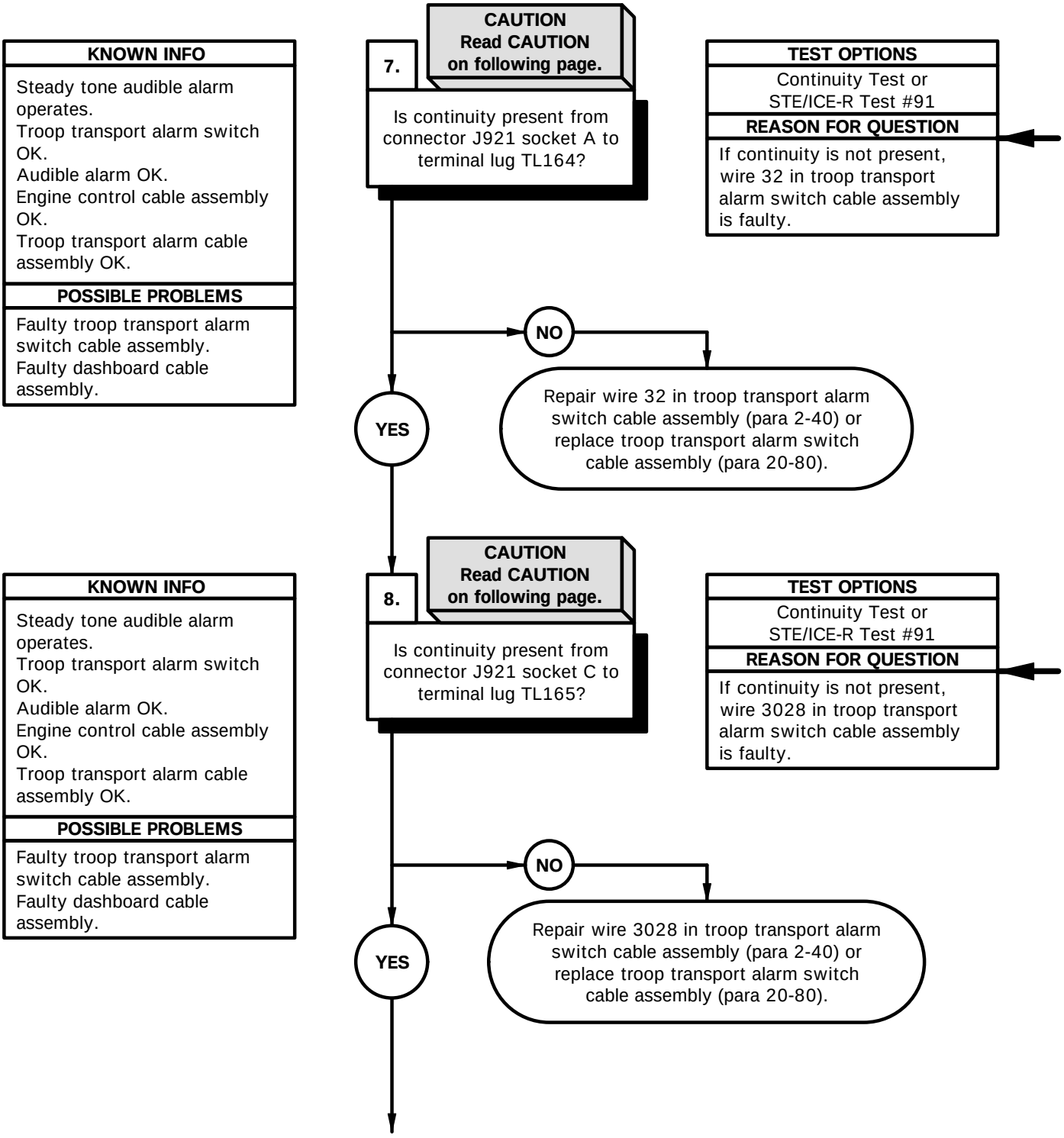
(1) Disconnect connector P921 from connector J921.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P921 pin A.
(4) Connect negative (-) probe of multimeter to connector J39 pin 2 and note reading on multimeter.
(5) If continuity is not present, repair wire 3028 in troop transport alarm cable assembly (para 2-40) or replace troop transport alarm cable assembly (para 20-79).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J39 socket 1.
(3) Connect negative (-) probe of multimeter to connector P921 pin C and note reading on multimeter.
(4) If continuity is not present, repair wire 3028 in troop transport alarm cable assembly (para 2-40) or replace troop transport alarm cable assembly (para 20-79).
(5) Connect connector P39 to connector J39.
(6) Connect connector clamp on connector P39.
(7) Lower cab (TM 9-2320-365-10).



## e16. TROOP TRANSPORT AUDIBLE ALARM DOES NOT OPERATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

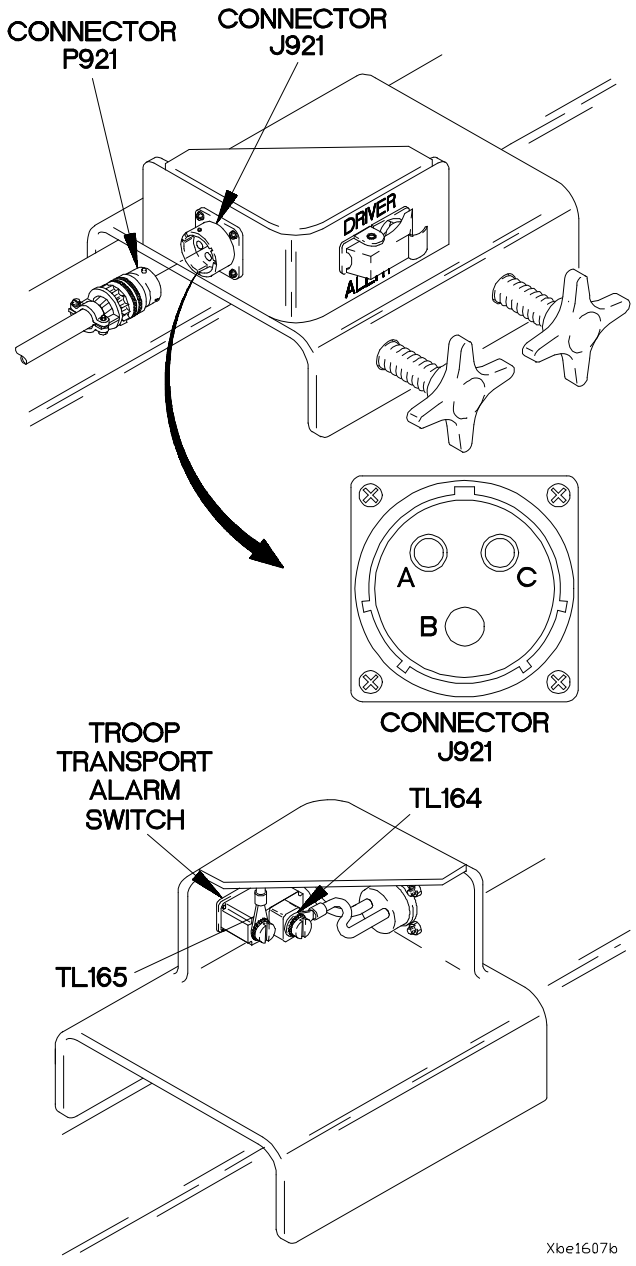
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

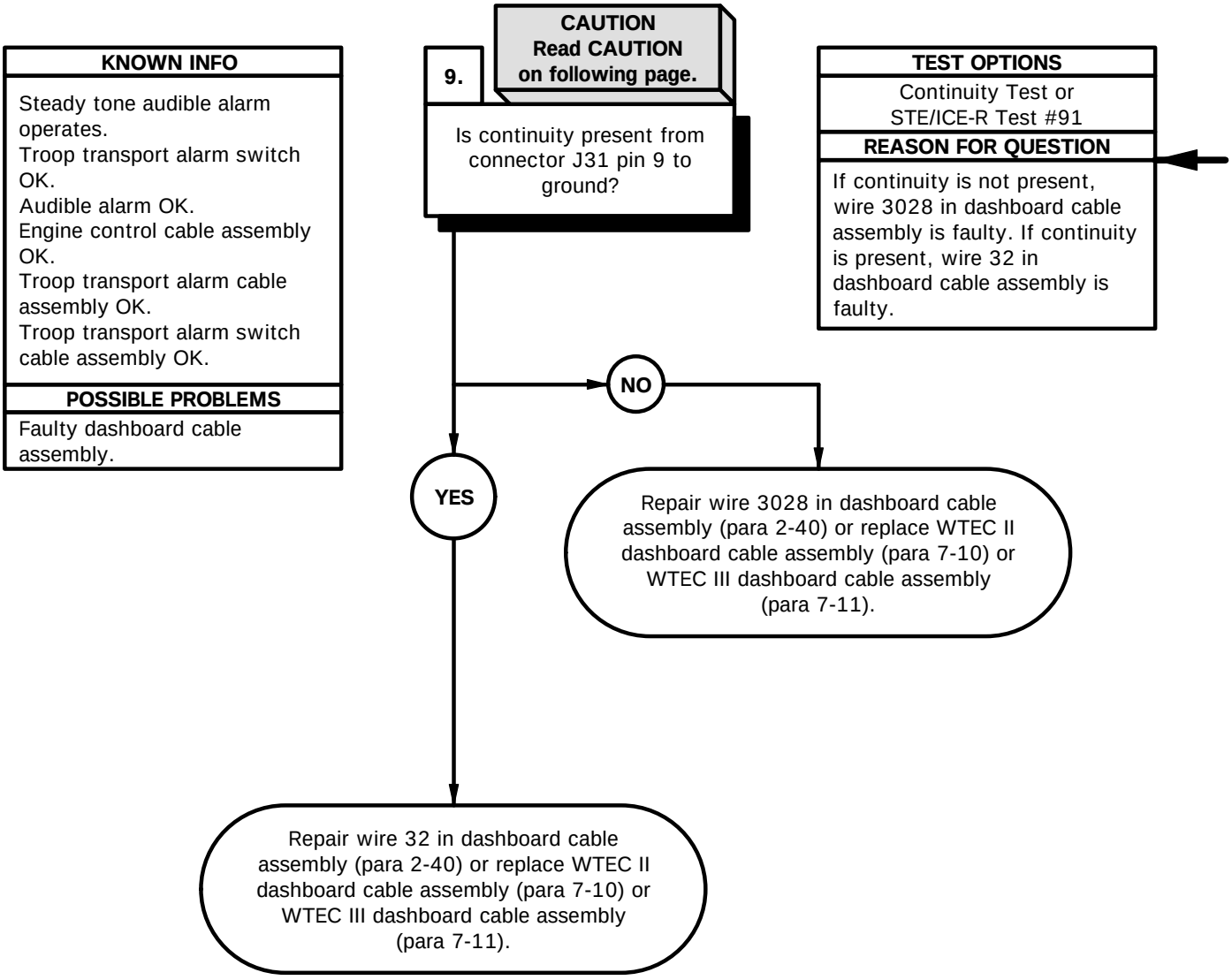
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J921socket A.
(3) Connect negative (-) probe of multimeter to terminal lug TL164 and note reading on multimeter.
(4) If continuity is not present, repair wire 32 in troop transport alarm switch cable assembly (para 2-40) or replace troop transport alarm switch cable assembly (para 20-80).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J921 socket C.
(3) Connect negative (-) probe of multimeter to terminal lug TL165 and note reading on multimeter.
(4) If continuity is not present, repair wire 3028 in troop transport alarm switch cable assembly (para 2-40) or replace troop transport alarm switch cable assembly (para 20-80).
(5) Connect connector P921 to connector J921.



## e16. TROOP TRANSPORT AUDIBLE ALARM DOES NOT OPERATE (CONT)



**CAUTION**

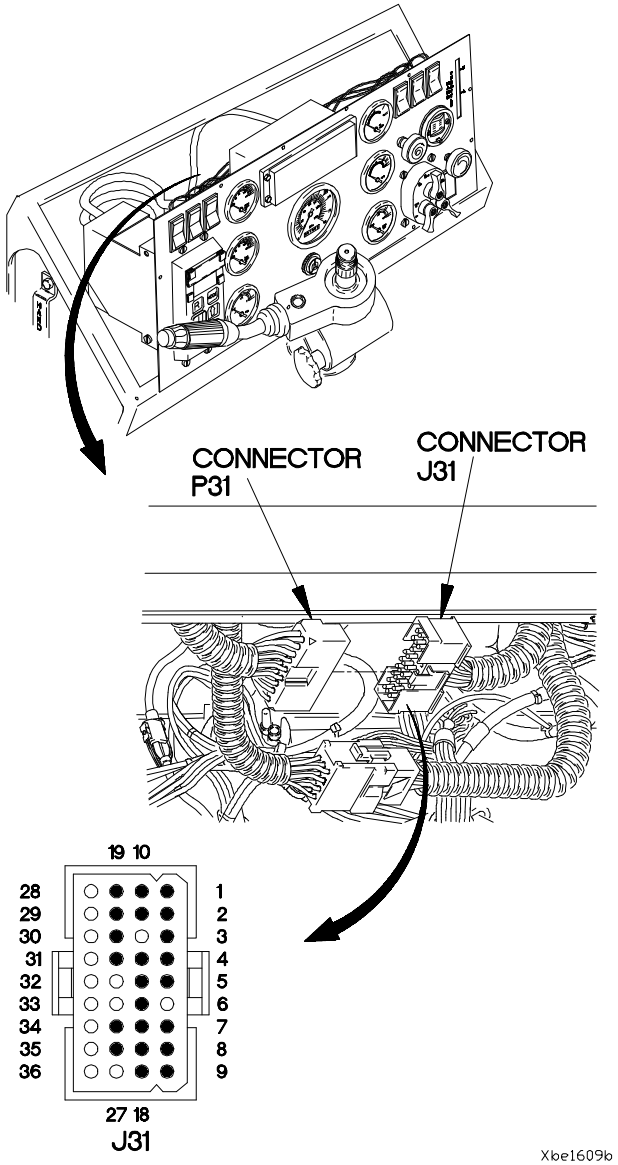
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J31 pin 9.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3028 in dashboard cable assembly (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 32 in dashboard cable assembly (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector P31 to connector J31.
(7) Install instrument panel (para 7-15).



## e16A. MASTER POWER SWITCH DOES NOT SHUT DOWN ENGINE

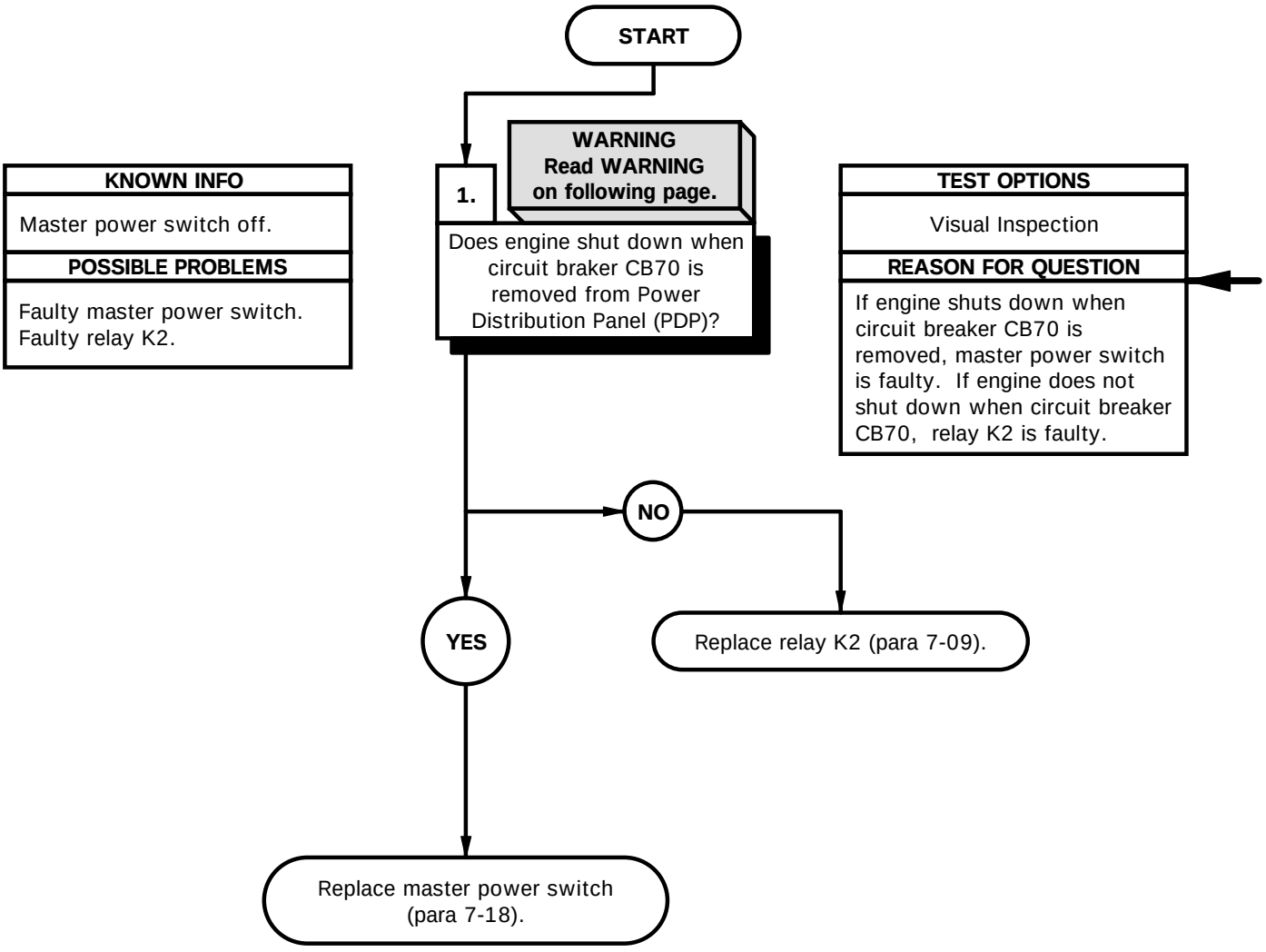
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

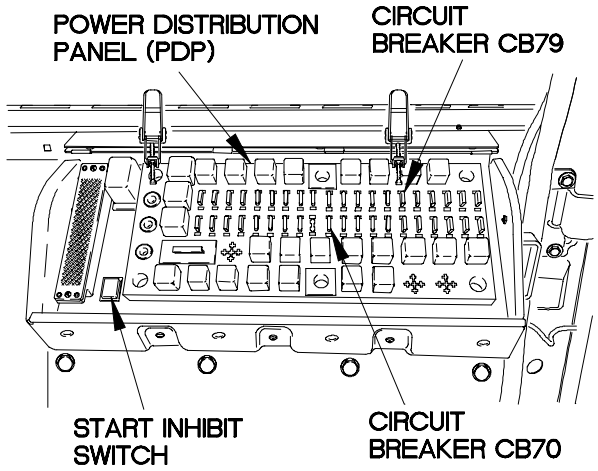
**VISUAL INSPECTION**

(1) Remove Power Distribution Panel (PDP) cover (para 16-2).
(2) Remove circuit breaker CB79 from Power Distribution Panl (PDP).
(3) Install circuit breaker CB79 in Power Distribution Panel (PDP).
(4) Start engine (TM 9-2320-365-10).
(5) Position master power switch to off (TM 9-2320-365-10).
(6) Remove circuit breaker CB70 from Power Distribution Panl (PDP).
(7) If engine does not shut down when circuit breaker CB70 is removed, replace relay K2 (para 7-9).
(8) If engine shuts down when circuit breaker CB70, replace master power switch (para 7-18).

**NOTE**

Perform step (9) if engine does not shut down.

(9) Press start inhibit switch.
(10) Install circuit breaker CB70 in Power Distribution Panel (PDP).
(11) Install Power Distribution Panel (PDP) cover (para 16-2).




**All data on pages 2-370.6 through 2-370.9, including pages 2-370.6 through d 2-370.9 deleted.**

## e16B. LAMP TEST SWITCH DOES NOT ILLUMINATE

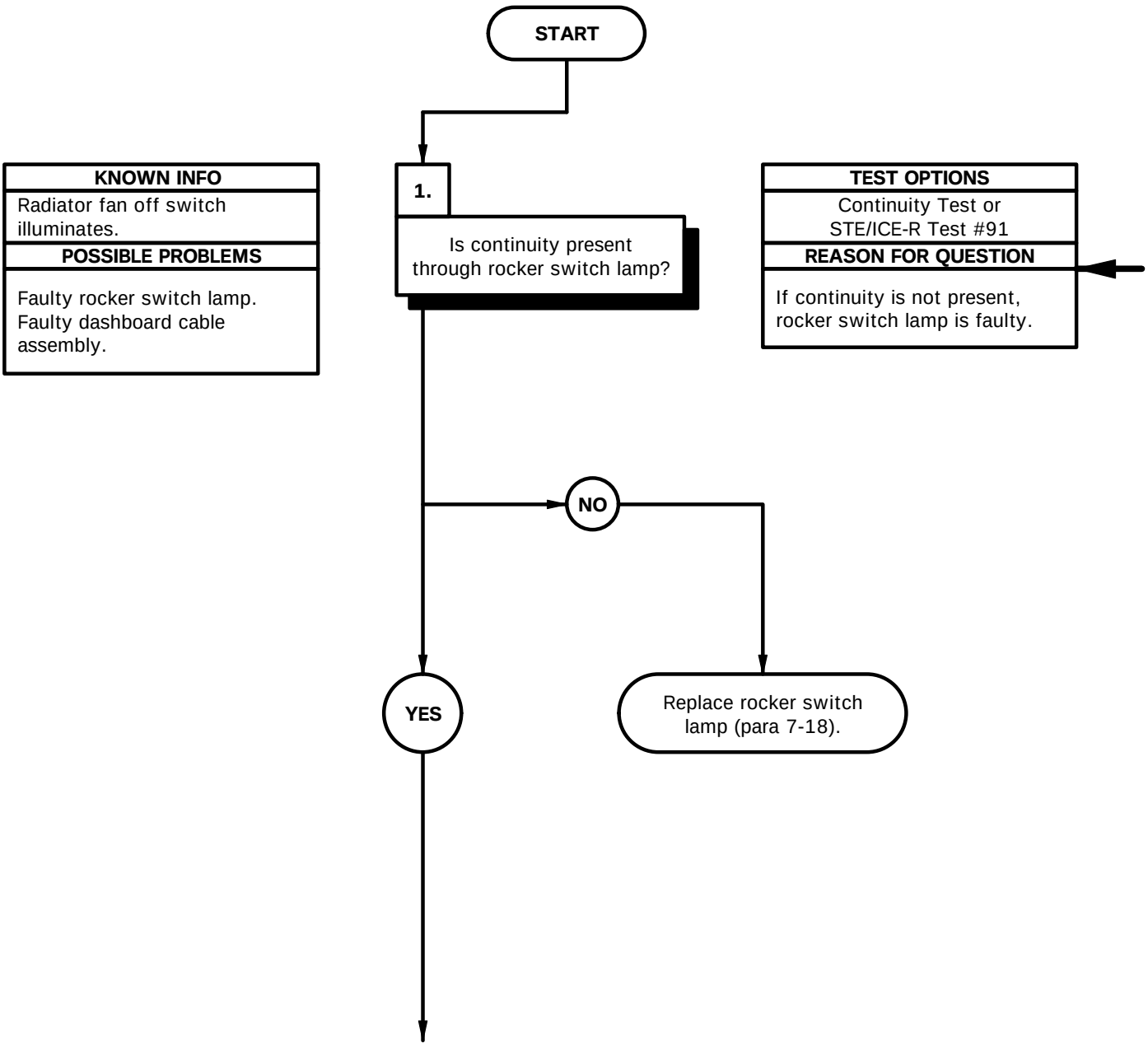
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

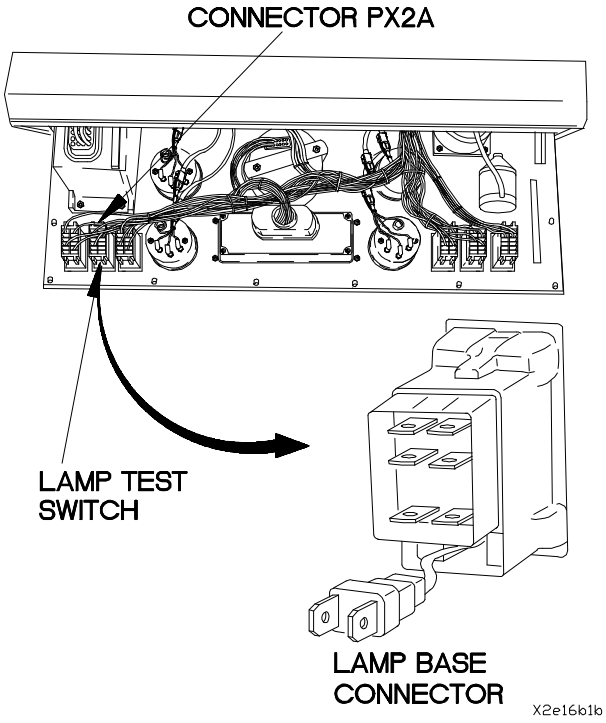


**NOTE**

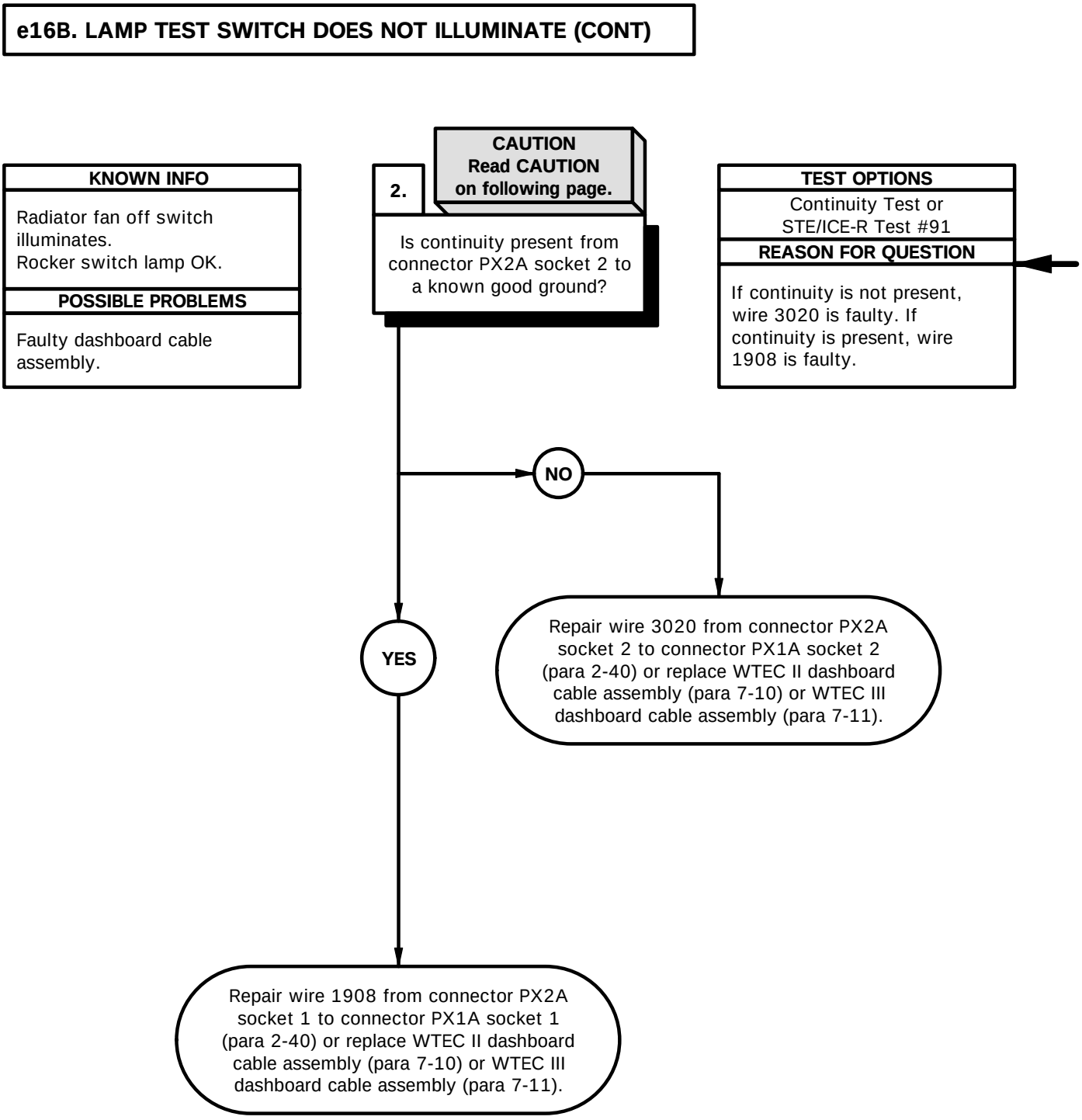
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX2A from lamp test switch lamp base connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of lamp base connector.
(5) Connect negative (-) probe of multimeter to second terminal of lamp base connector and note reading on multimeter.
(6) If continuity is not present, replace rocker switch lamp (para 7-18).



## e16B. LAMP TEST SWITCH DOES NOT ILLUMINATE (CONT)

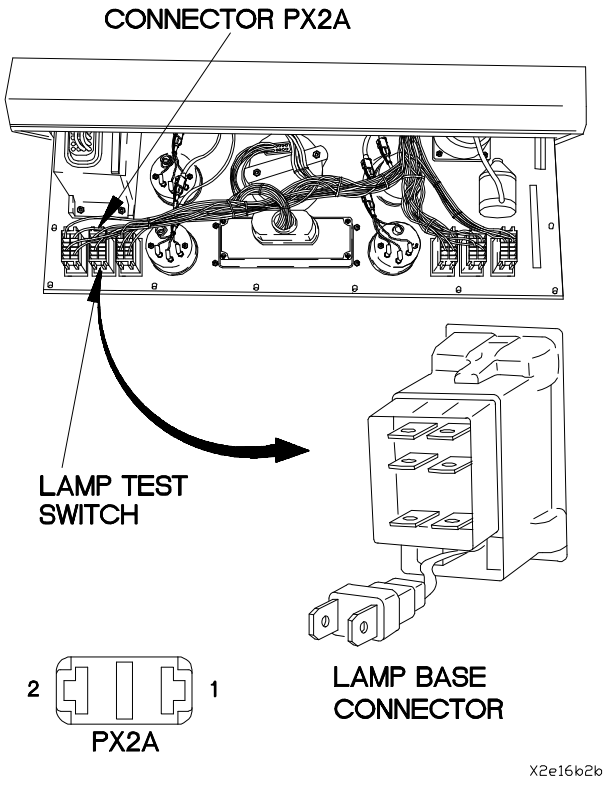


**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX2A socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX2A socket 2 to connector PX1A socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1908 from connector PX2A socket 1 to connector PX1A socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX2A to lamp test switch lamp base connector.
(7) Install instrument panel assembly (para 7-15).



## e17. RADIATOR FAN OFF SWITCH DOES NOT ILLUMINATE

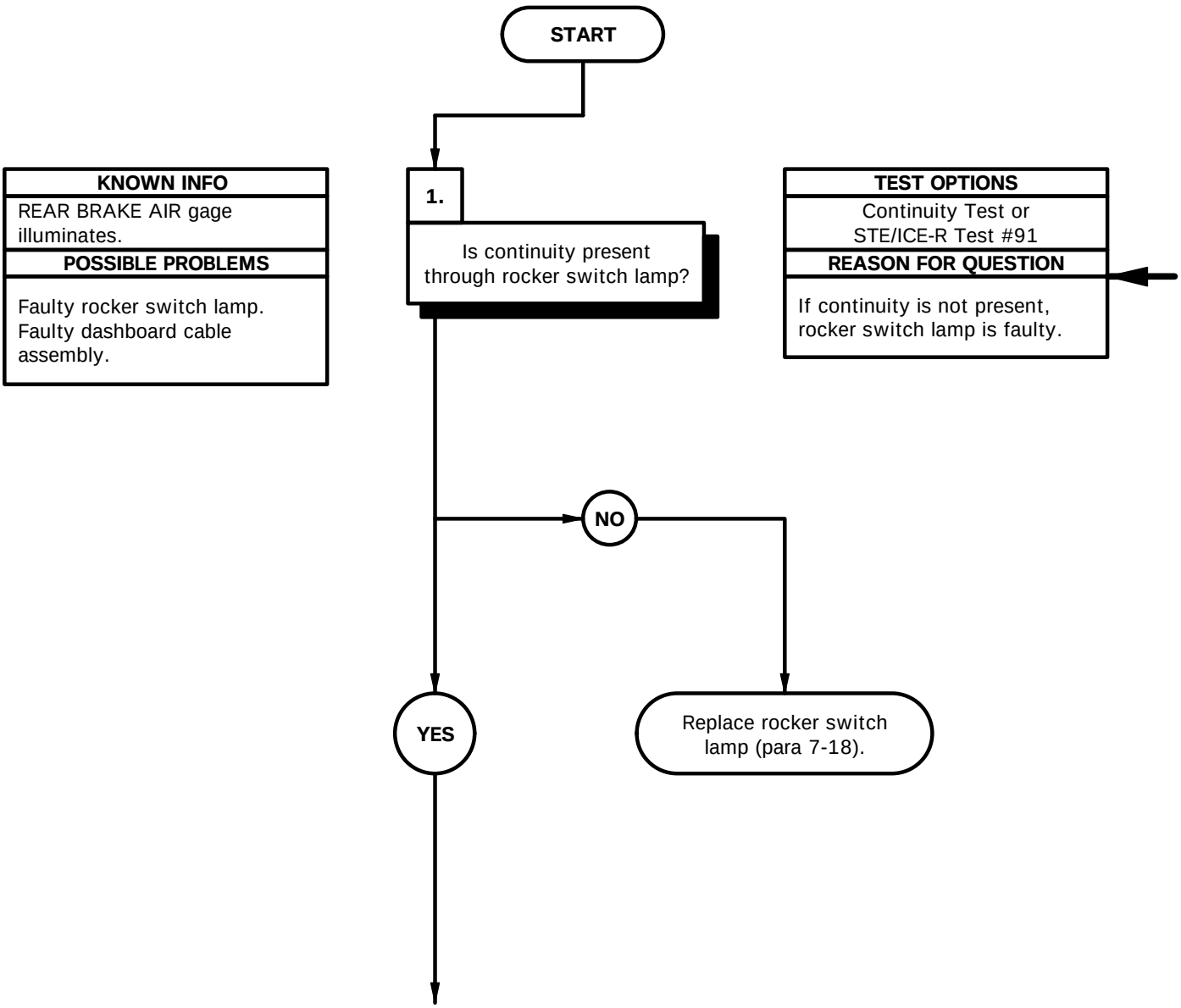
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

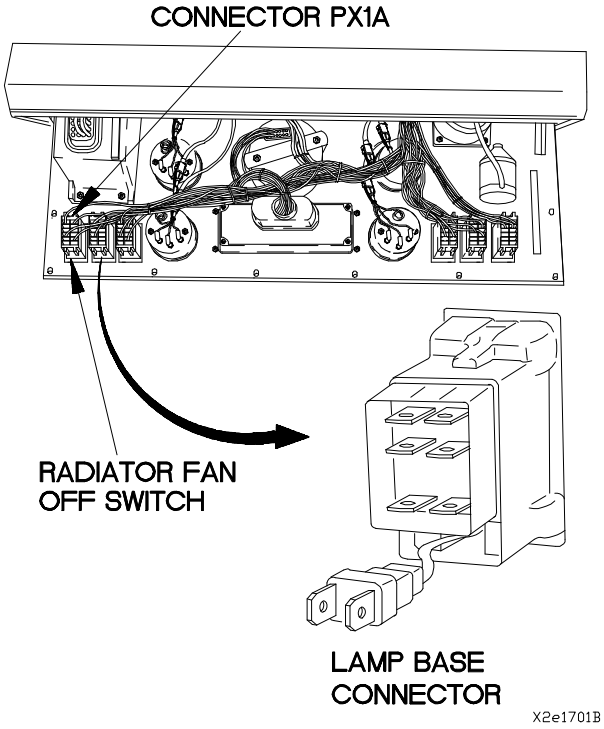


**NOTE**

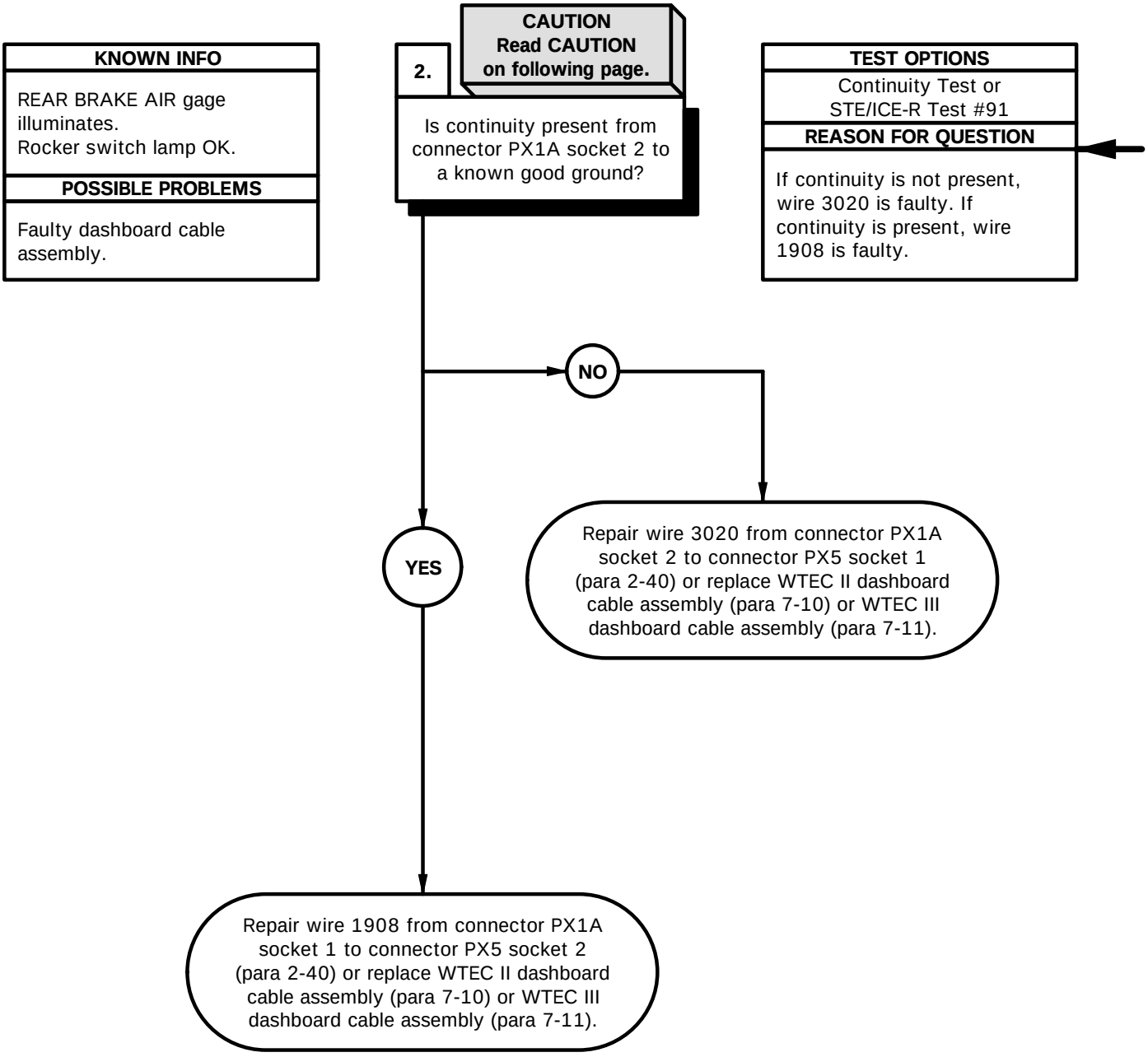
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX1A from radiator fan off switch lamp base connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of lamp base connector.
(5) Connect negative (-) probe of multimeter to second terminal of lamp base connector and note reading on multimeter.
(6) If continuity is not present, replace rocker switch lamp (para 7-18).



## e17. RADIATOR FAN OFF SWITCH DOES NOT ILLUMINATE (CONT)

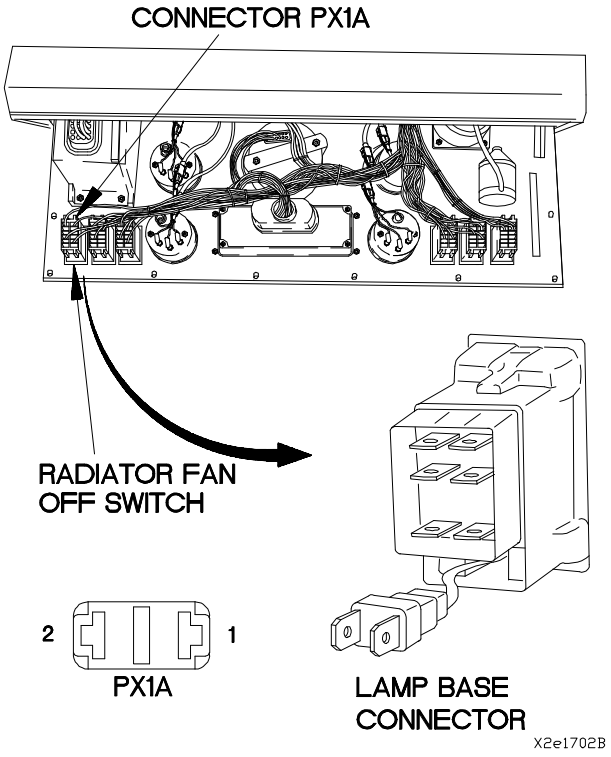


**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX1A socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX1A socket 2 to connector PX5 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1908 from connector PX1A socket 1 to connector PX5 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX1A to radiator fan off switch lamp base connector.
(7) Install instrument panel assembly (para 7-15).



## e17A. ETHER START SWITCH DOES NOT ILLUMINATE

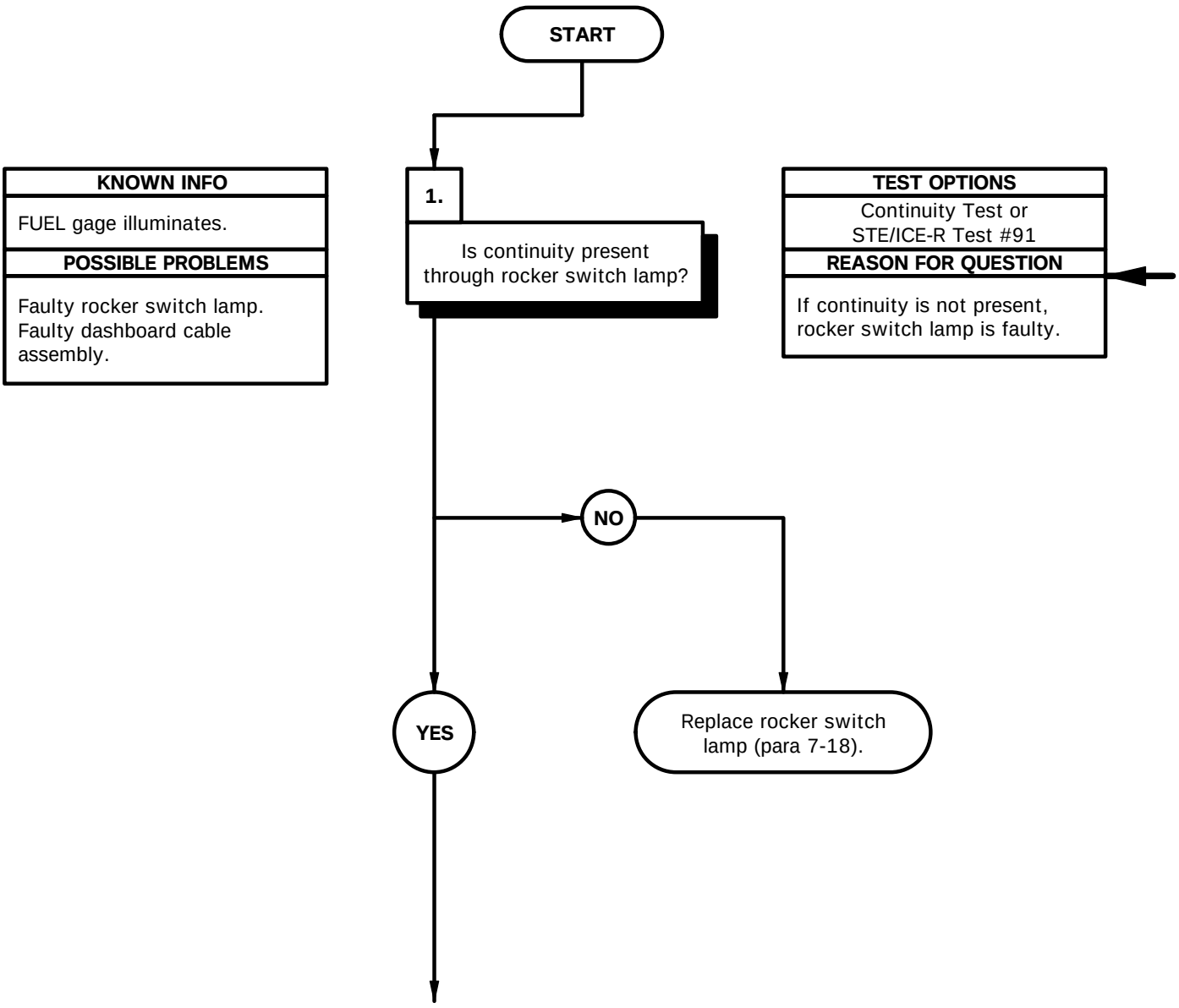
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

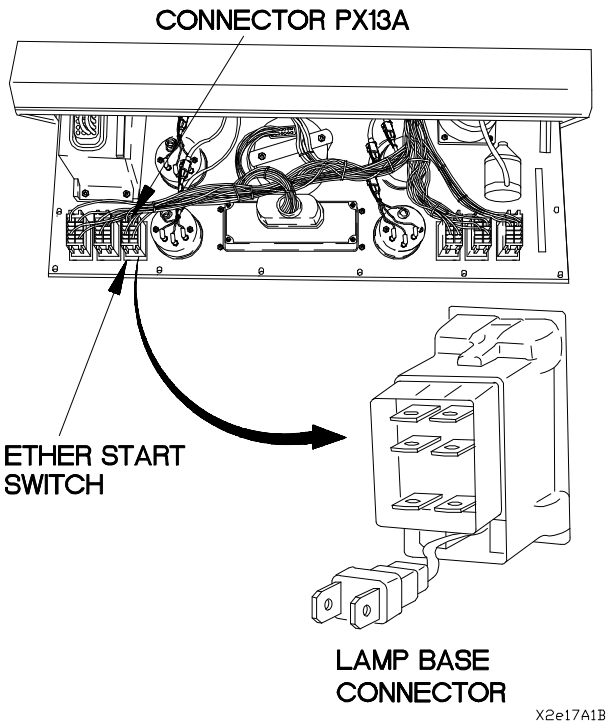


**NOTE**

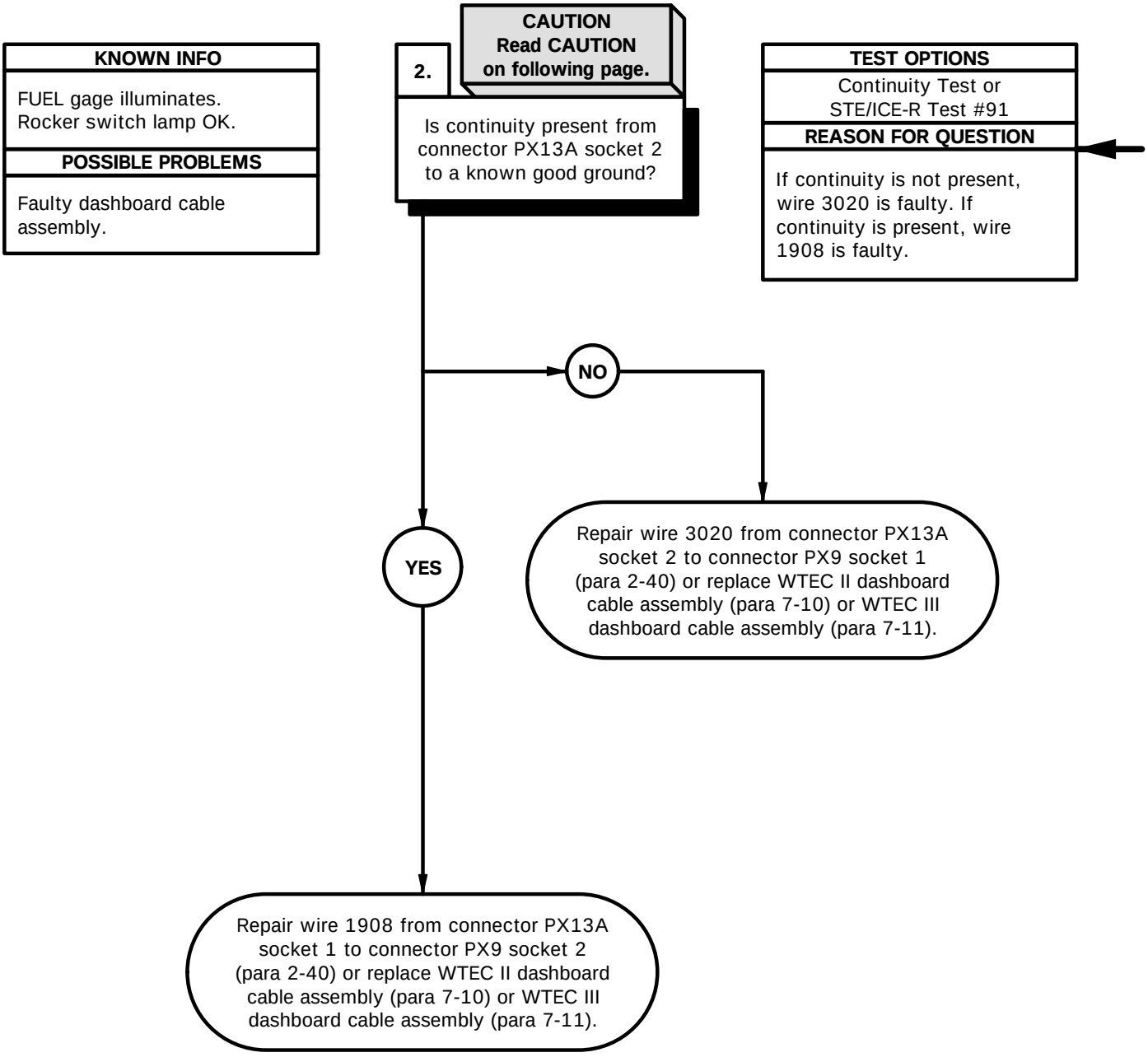
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX13A from ether start switch lamp base connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of lamp base connector.
(5) Connect negative (-) probe of multimeter to second terminal of lamp base connector and note reading on multimeter.
(6) If continuity is not present, replace rocker switch lamp (para 7-18).



## e17A. ETHER START SWITCH DOES NOT ILLUMINATE (CONT)

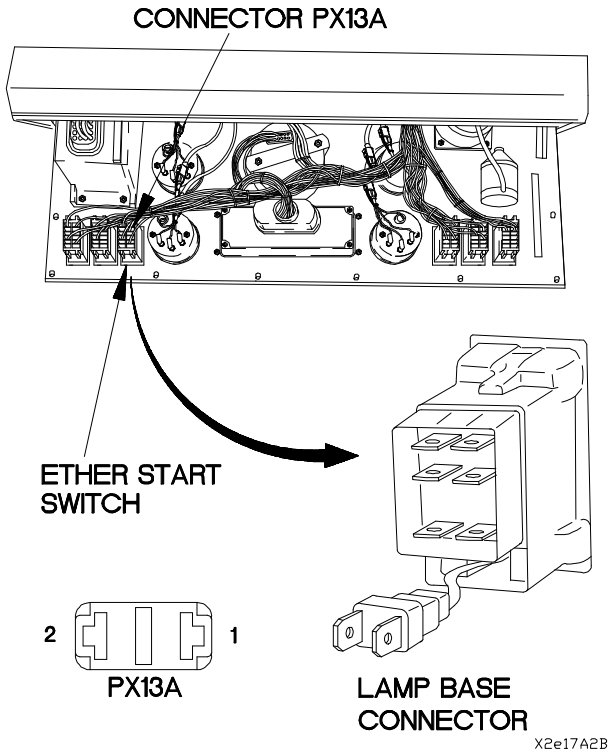


**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX13A socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX13A socket 2 to connector PX9 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1908 from connector PX13A socket 1 to connector PX9 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX13A to ether start switch lamp base connector.
(7) Install instrument panel assembly (para 7-15).



## e17B. HAZARD LIGHTS SWITCH DOES NOT ILLUMINATE

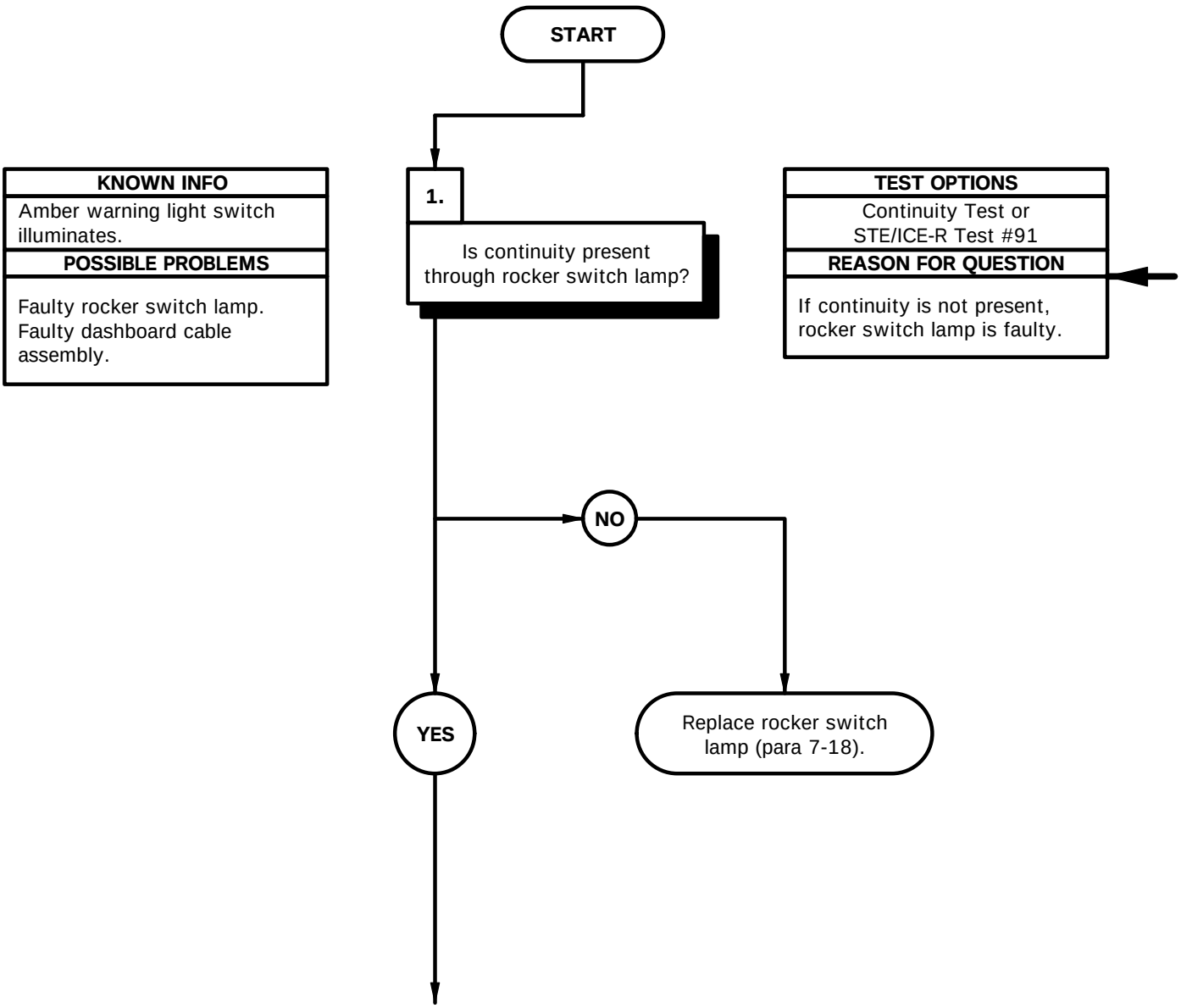
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

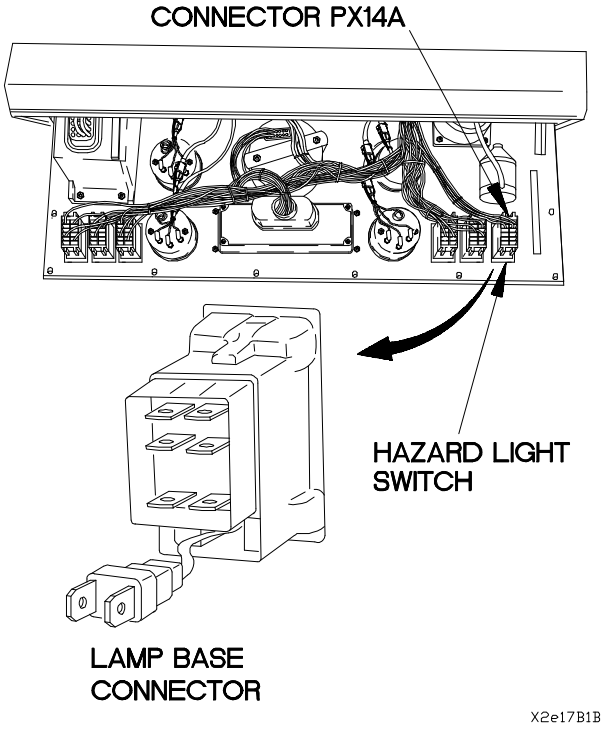


**NOTE**

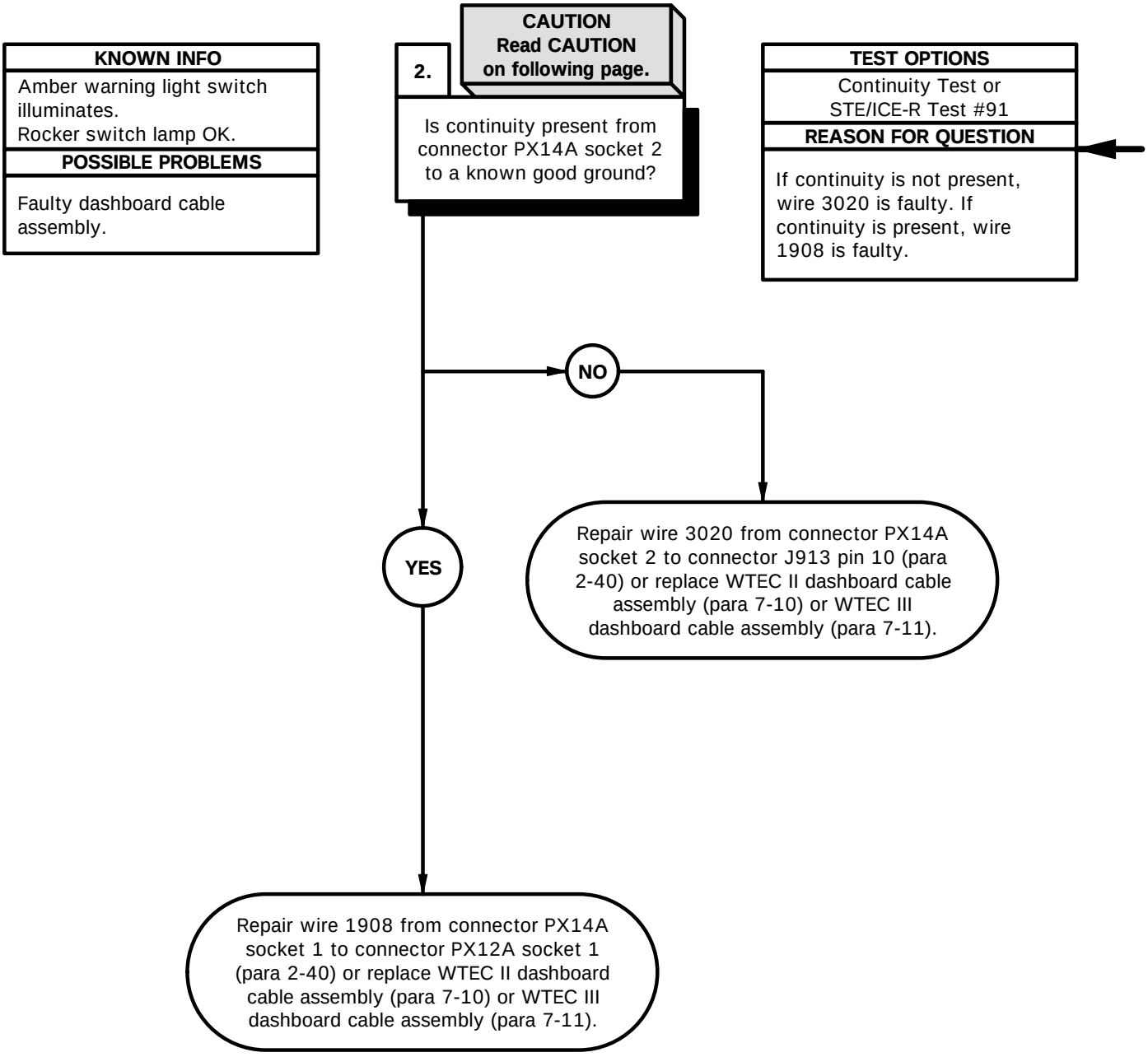
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX14A from hazard lights switch lamp base connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of lamp base connector.
(5) Connect negative (-) probe of multimeter to second terminal of lamp base connector and note reading on multimeter.
(6) If continuity is not present, replace rocker switch lamp (para 7-18).



## e17B. HAZARD LIGHTS SWITCH DOES NOT ILLUMINATE (CONT)

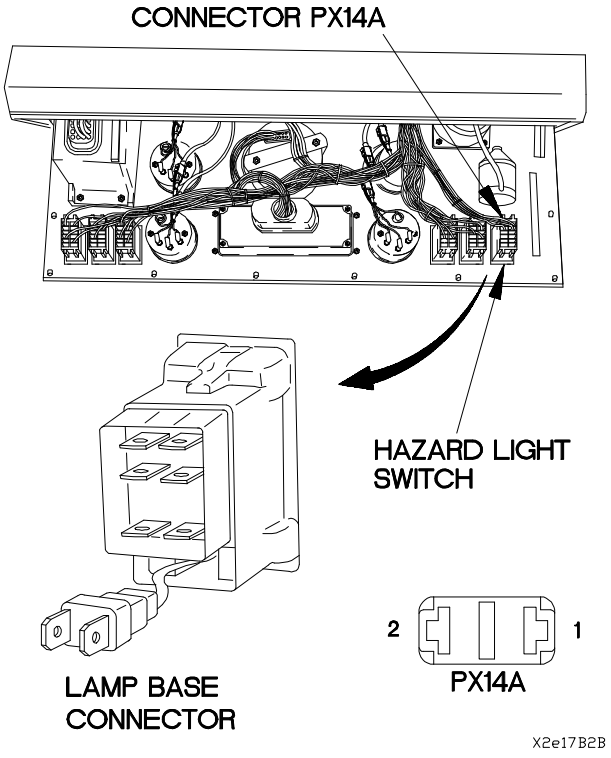


**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX14A socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX14A socket 2 to connector J913 pin 10 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1908 from connector PX14A socket 1 to connector PX12A socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX14A to hazard lights switch lamp base connector.
(7) Install instrument panel assembly (para 7-15).



## e17C. AMBER WARNING LIGHT SWITCH DOES NOT ILLUMINATE

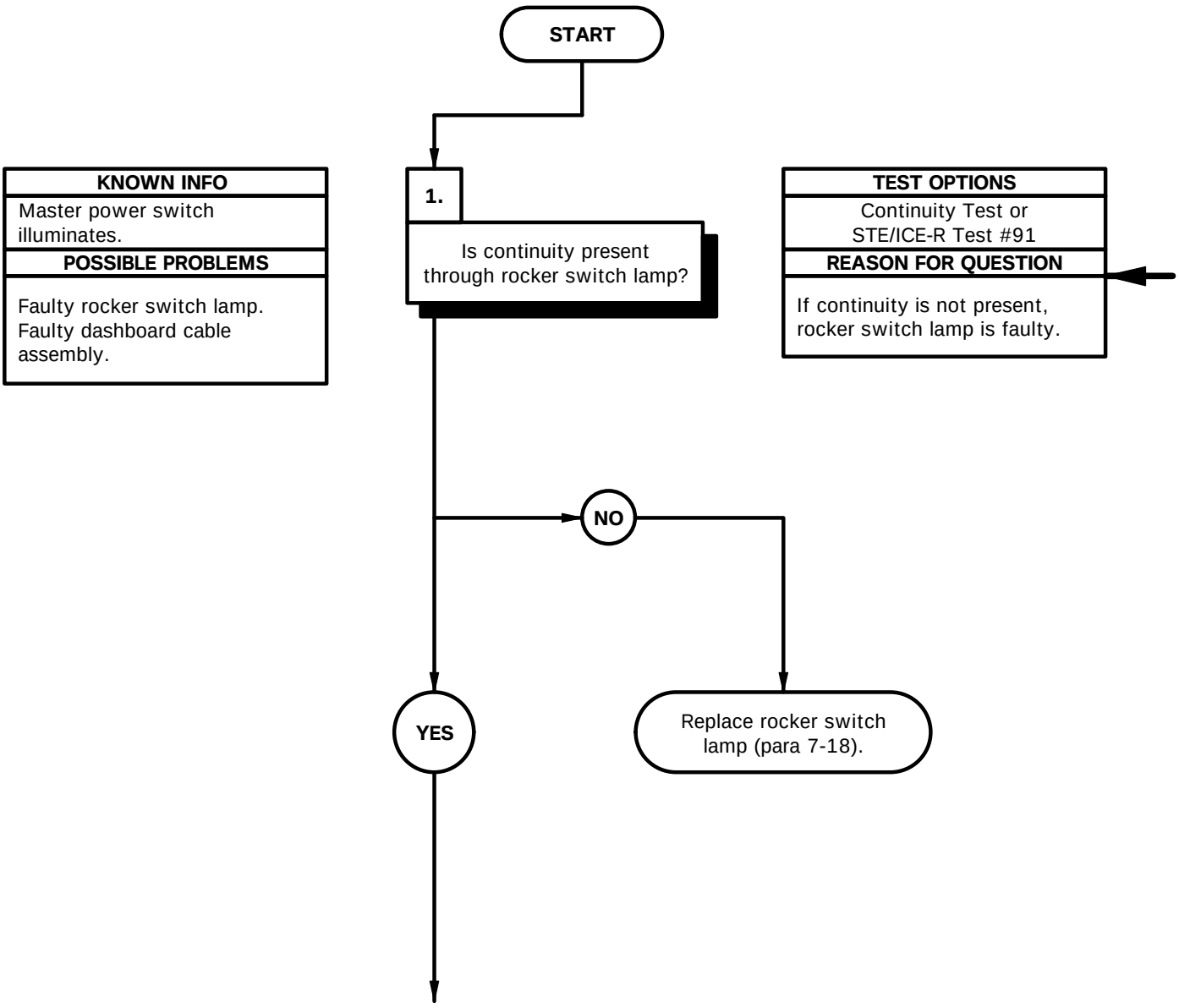
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

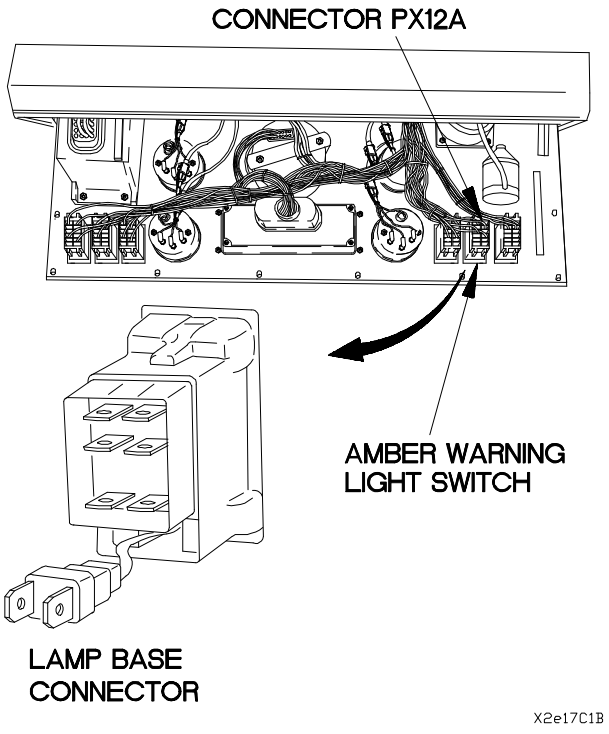


**NOTE**

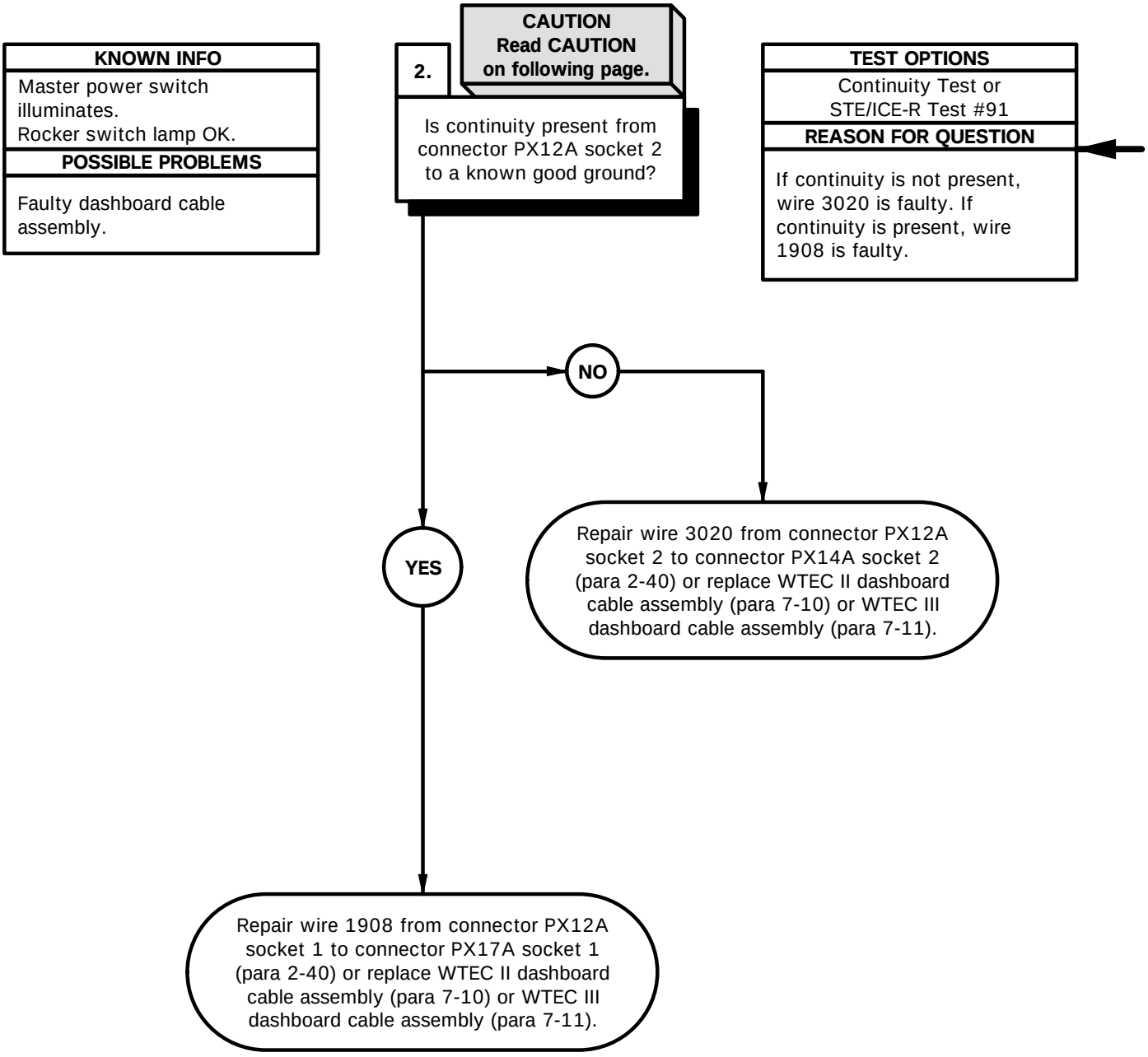
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX12A from amber warning light switch lamp base connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of lamp base connector.
(5) Connect negative (-) probe of multimeter to second terminal of lamp base connector and note reading on multimeter.
(6) If continuity is not present, replace rocker switch lamp (para 7-18).



## e17C. AMBER WARNING LIGHT SWITCH DOES NOT ILLUMINATE (CONT)

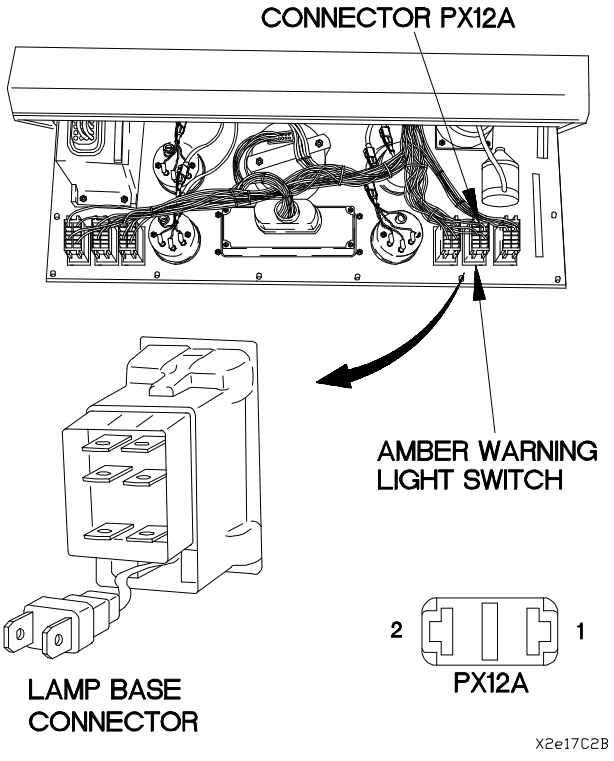


**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX12A socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX12A socket 2 to connector PX14A socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1908 from connector PX12A socket 1 to connector PX17A socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX12A to amber warning light switch lamp base connector.
(7) Install instrument panel assembly (para 7-15).



## e17D. MASTER POWER SWITCH DOES NOT ILLUMINATE

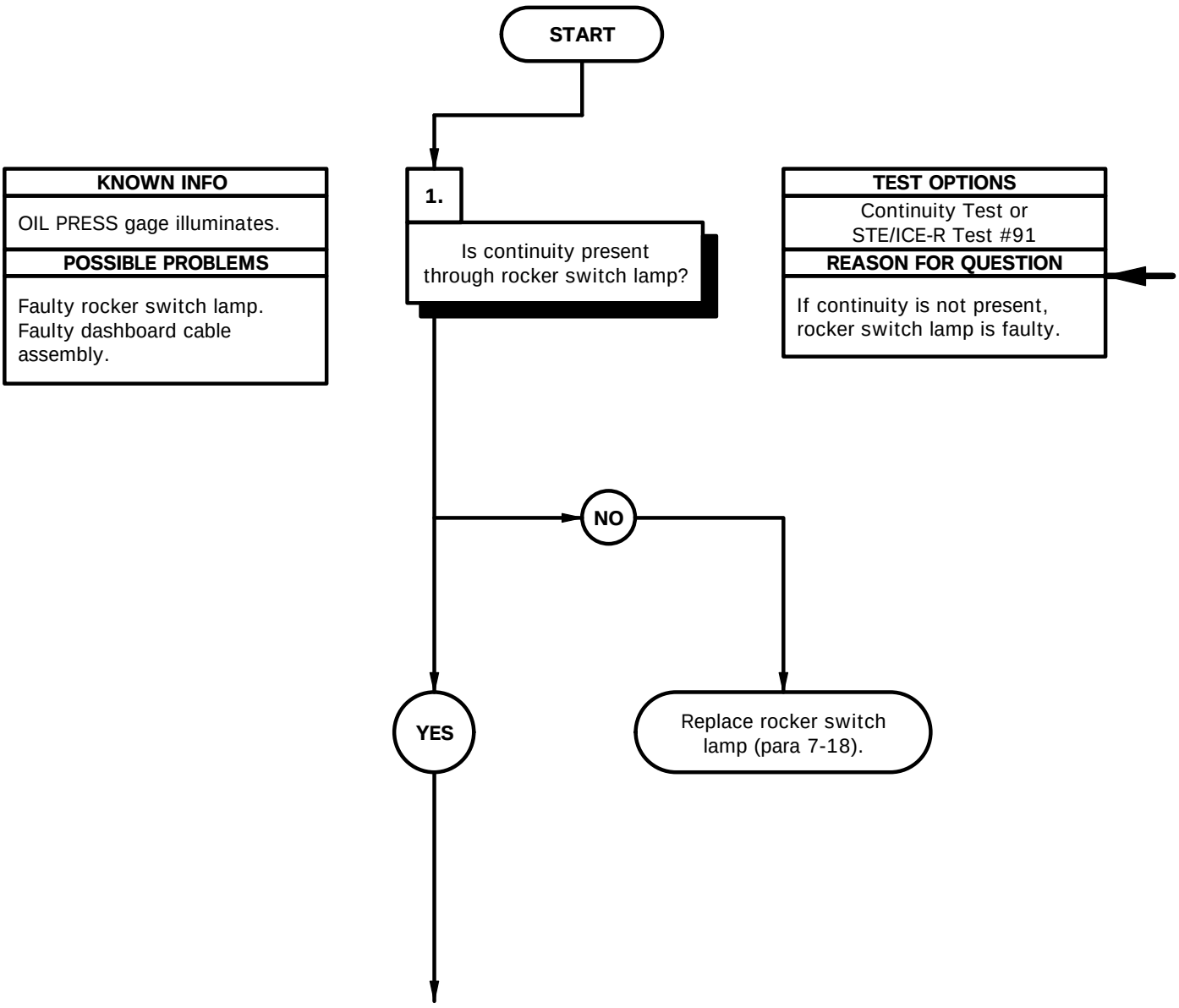
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

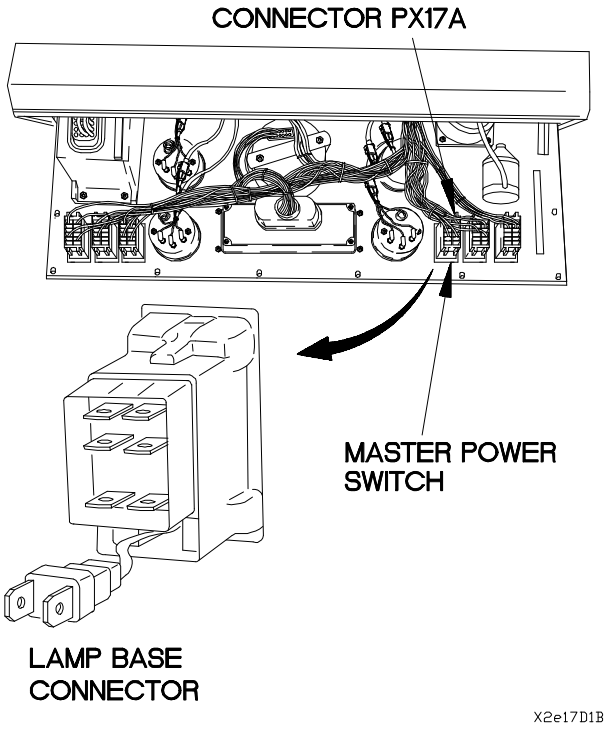


**NOTE**

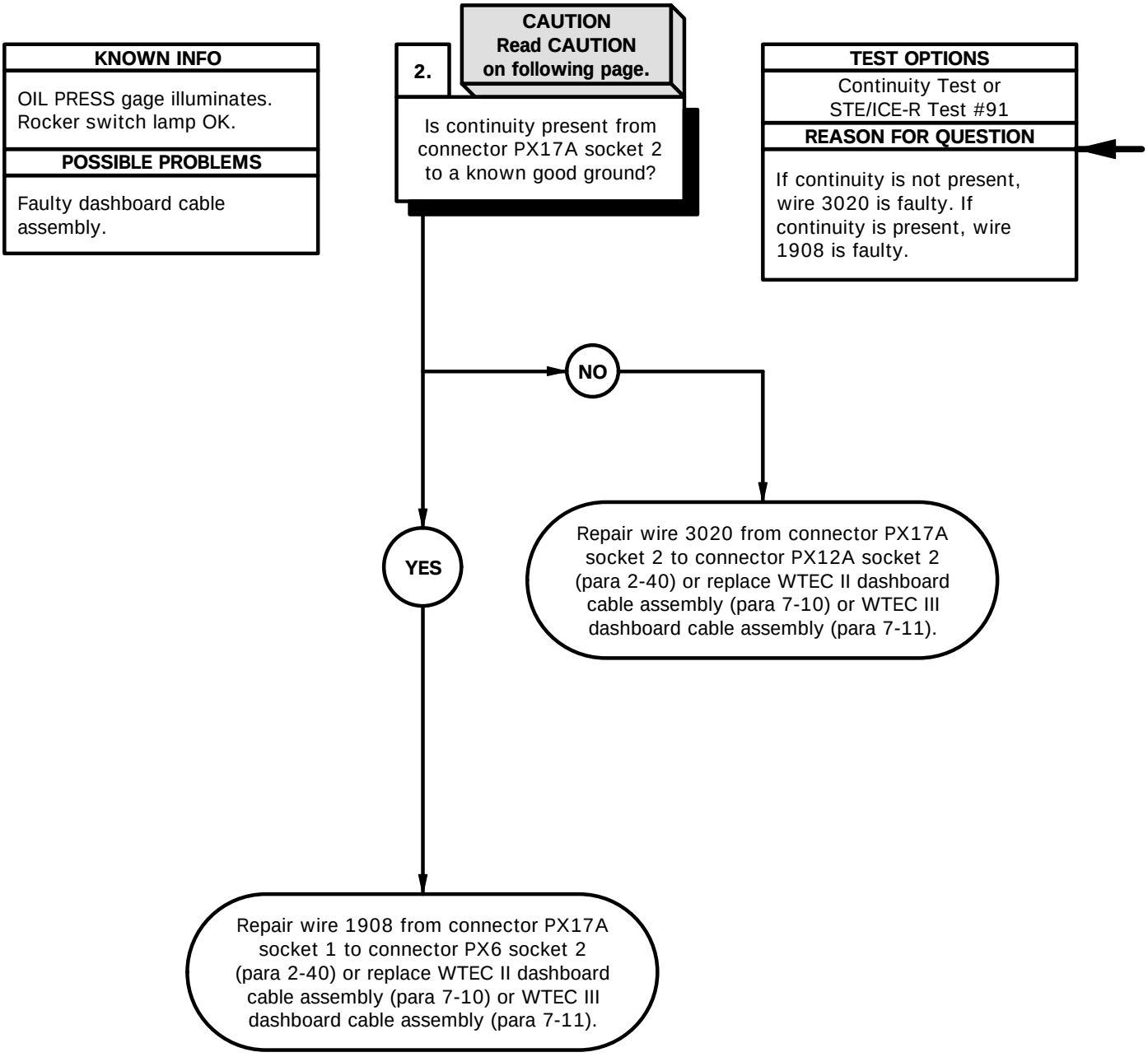
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel for access (para 7-15).
(2) Disconnect connector PX17A from master power switch lamp base connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to one terminal of lamp base connector.
(5) Connect negative (-) probe of multimeter to second terminal of lamp base connector and note reading on multimeter.
(6) If continuity is not present, replace rocker switch lamp (para 7-18).



## e17D. MASTER POWER SWITCH DOES NOT ILLUMINATE (CONT)

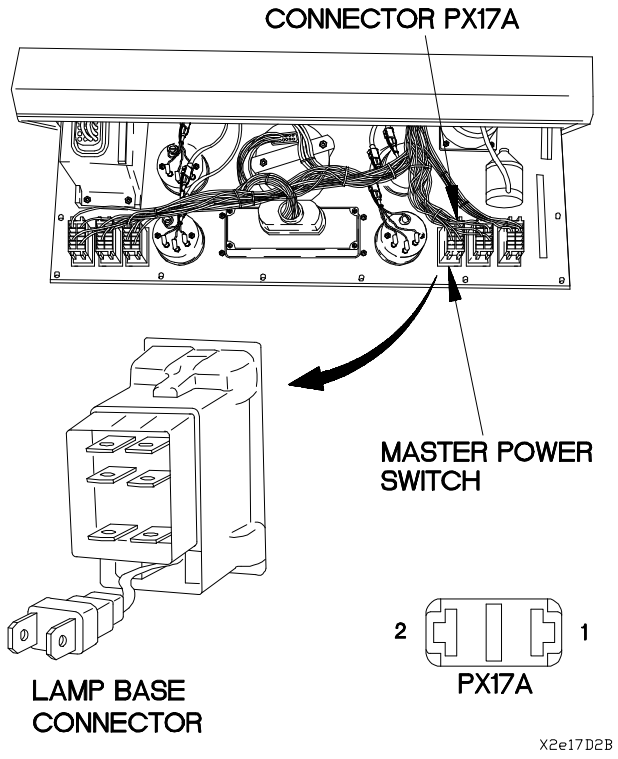


**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX17A socket 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX17A socket 2 to connector PX12A socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1908 from connector PX17A socket 1 to connector PX6 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX17A to master power switch lamp base connector.
(7) Install instrument panel assembly (para 7-15).



## e18. REAR BRAKE AIR GAGE DOES NOT ILLUMINATE

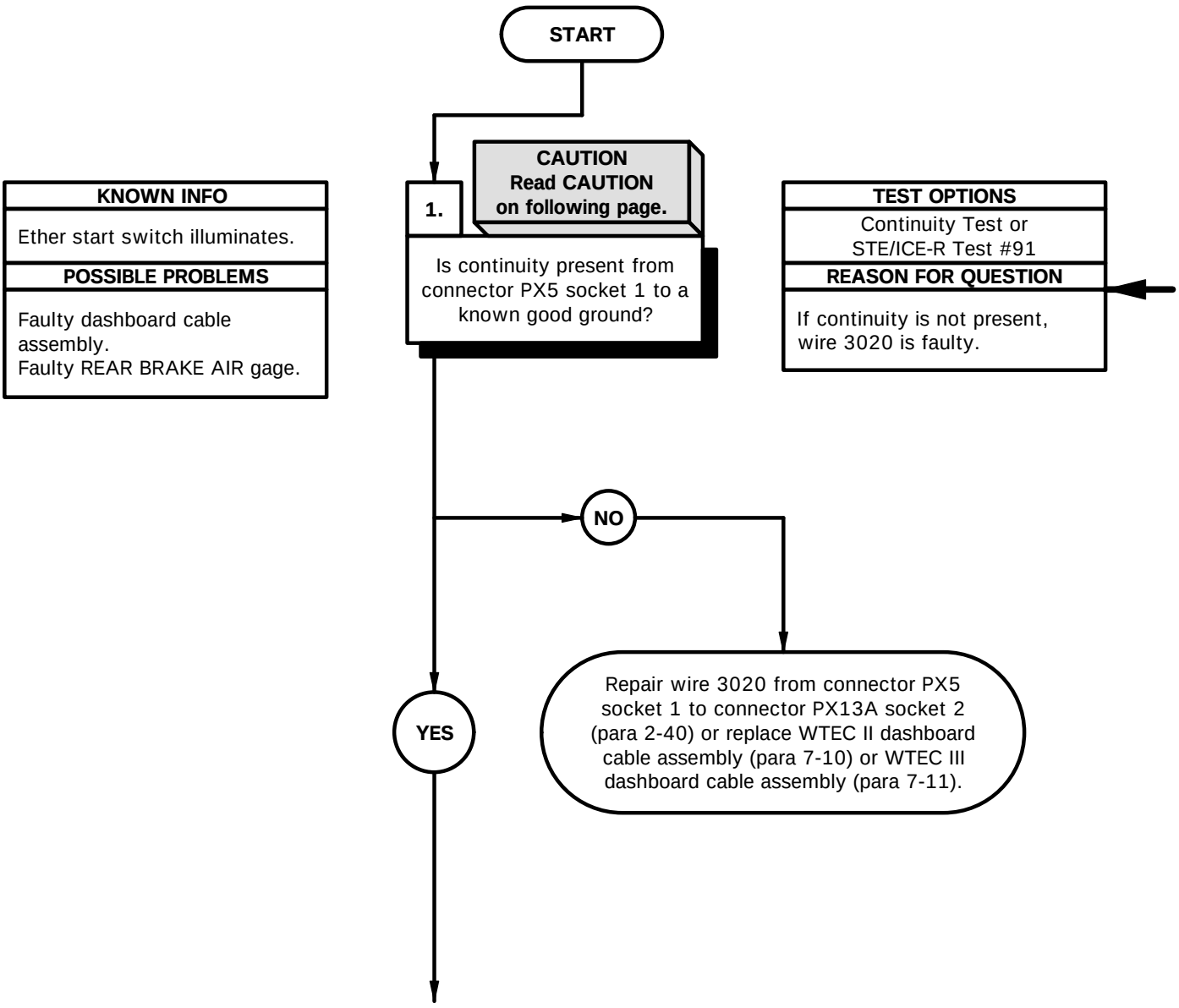
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**CAUTION**

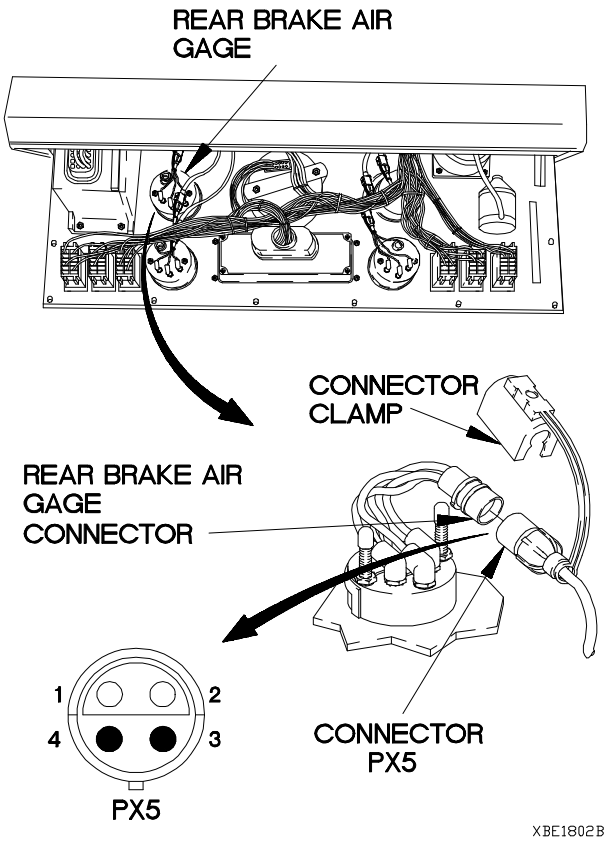
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

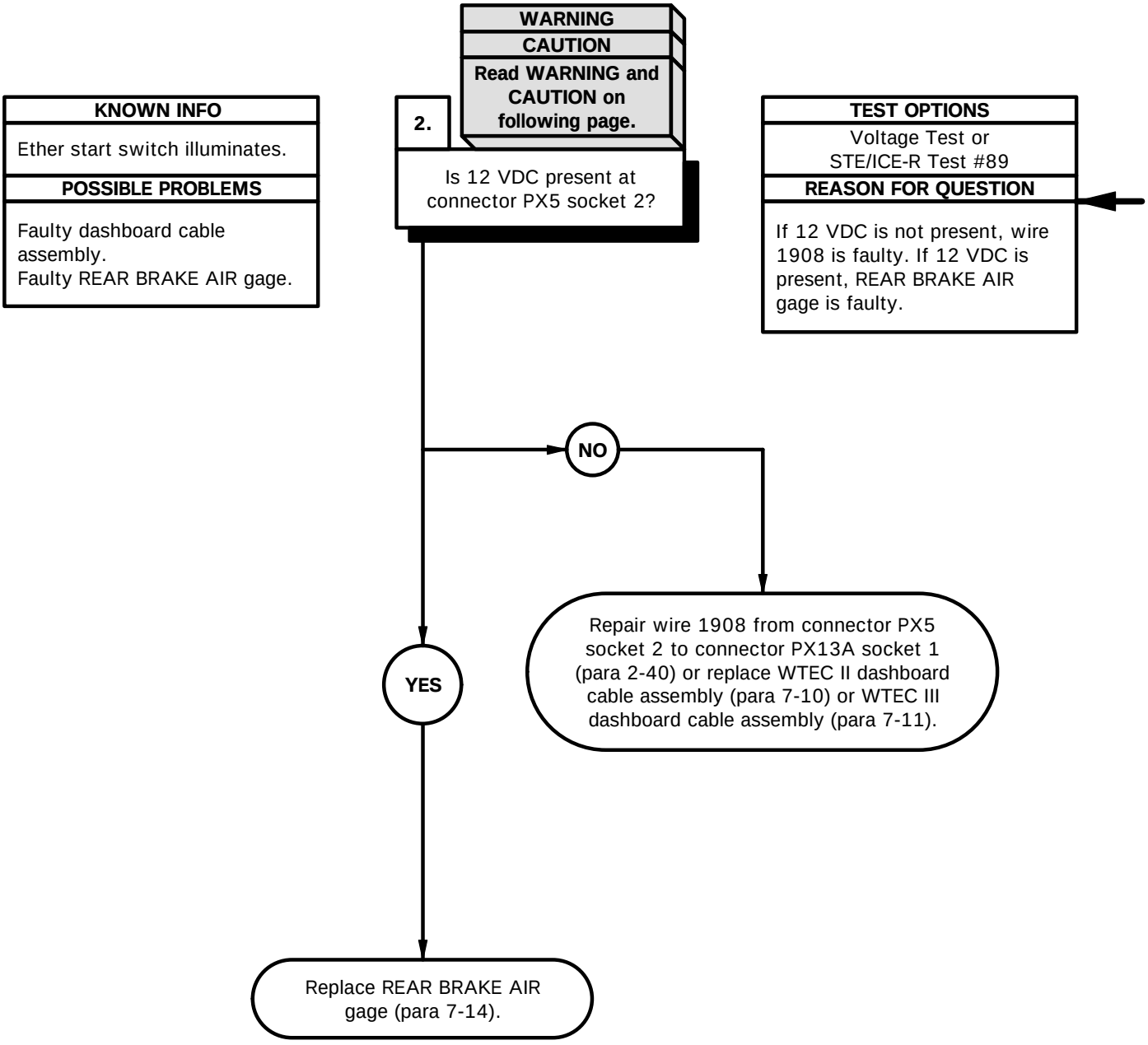
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from REAR BRAKE AIR gage connector.
(3) Disconnect connector PX5 from REAR BRAKE AIR gage connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX5 socket 1.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3020 from connector PX5 socket 1 to connector PX13A socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e18. REAR BRAKE AIR GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

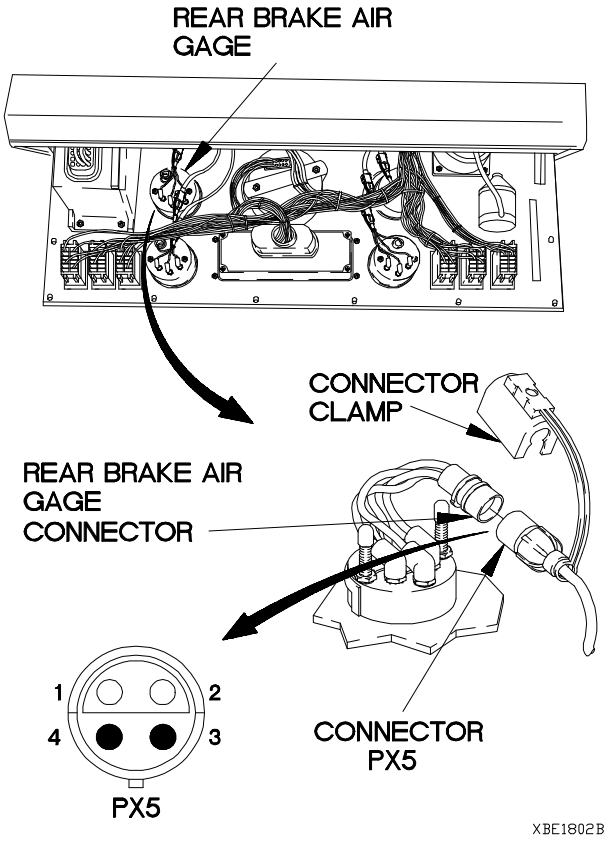
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX5 socket 2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10).
(6) Position dimmer switch for maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1908 from connector PX5 socket 2 to connector PX13A socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 12 VDC is present, replace REAR BRAKE AIR gage (para 7-14).
(9) Position main light switch to auxiliary lever to OFF (TM 9-2320-365-10).
(10) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(11) Connect connector PX5 to REAR BRAKE AIR gage connector.
(12) Connect connector clamp on REAR BRAKE AIR gage connector.
(13) Install instrument panel (para 7-15).



## e18A. FUEL GAGE DOES NOT ILLUMINATE

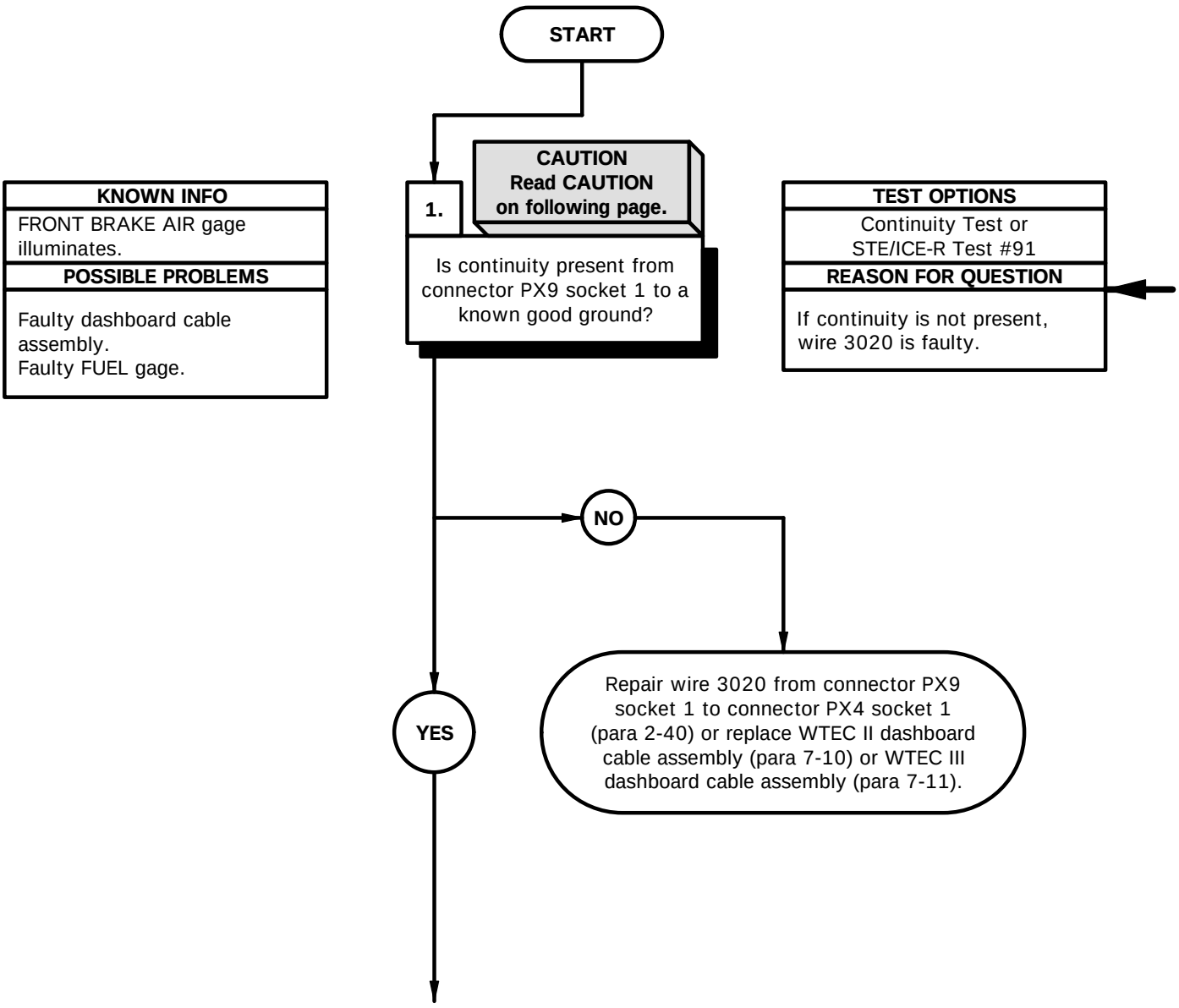
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**CAUTION**

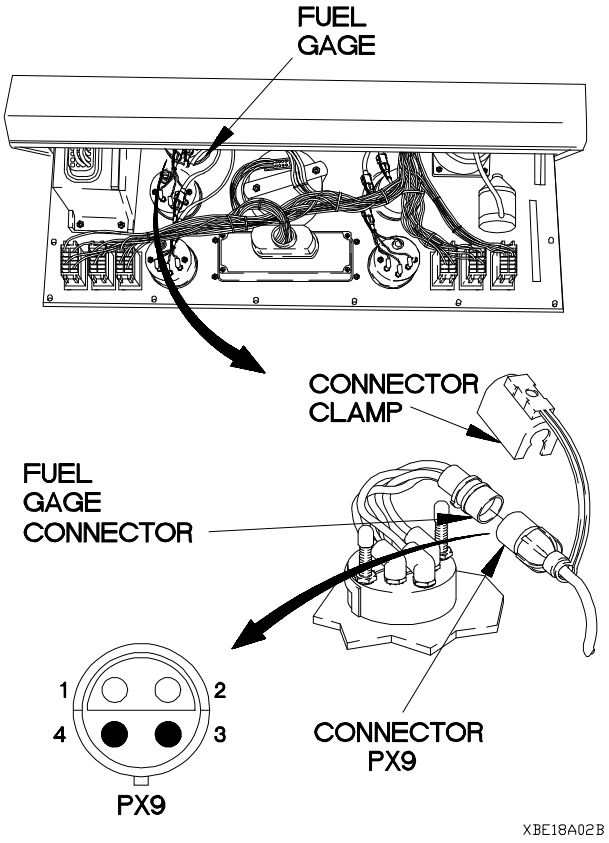
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

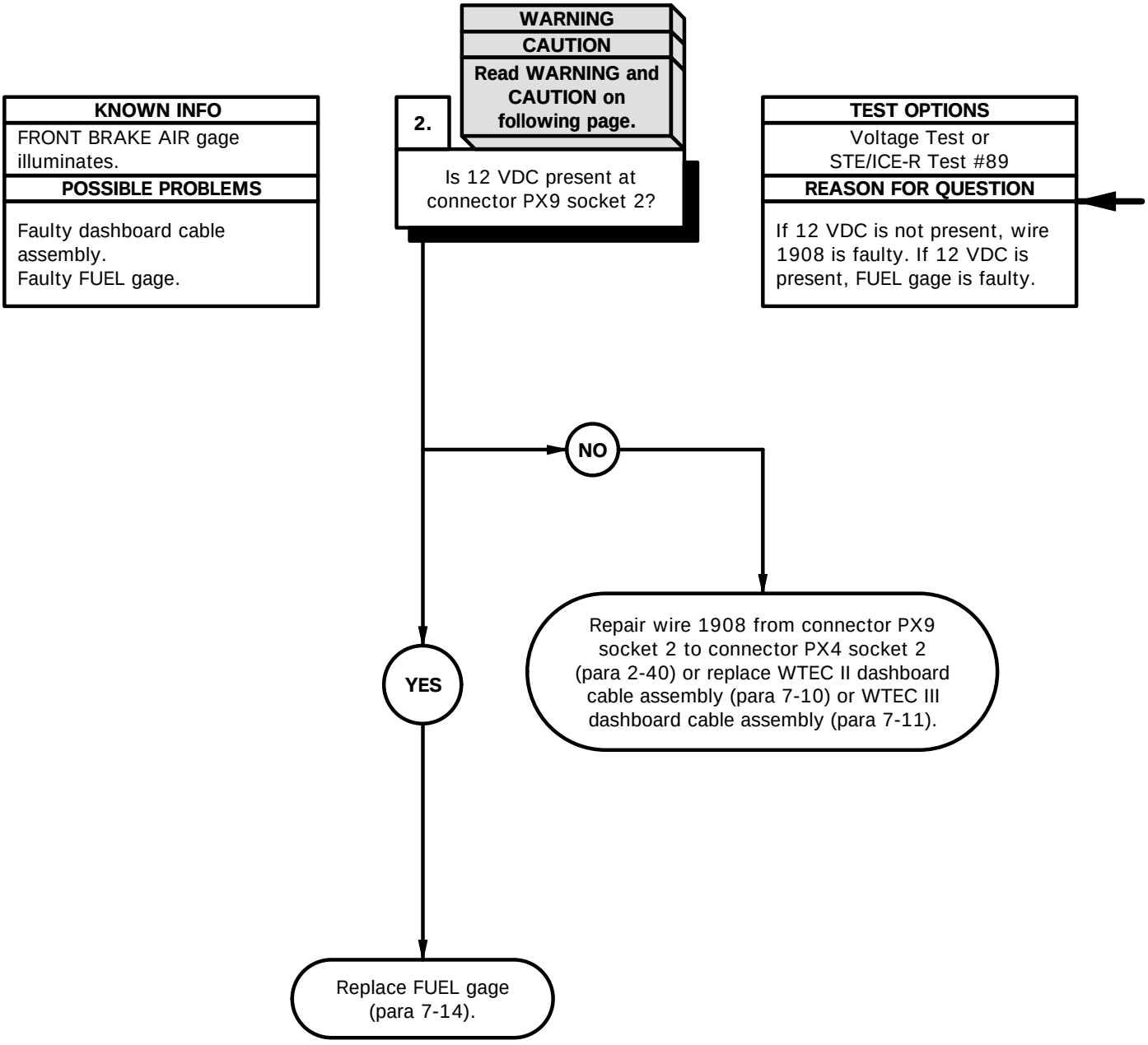
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from FUEL gage connector.
(3) Disconnect connector PX9 from FUEL gage connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX9 socket 1.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3020 from connector PX9 socket 1 to connector PX4 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e18A. FUEL GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

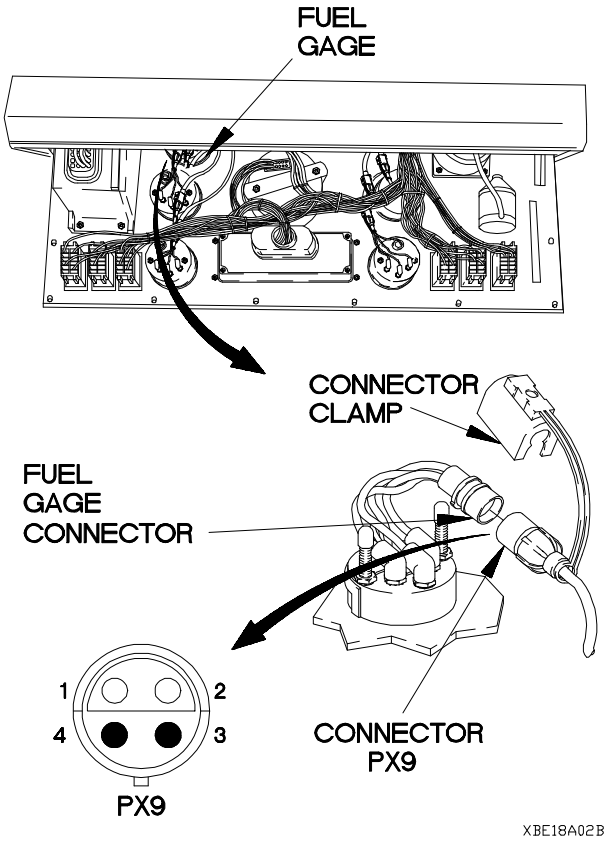
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX9 socket 2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10).
(6) Position dimmer switch for maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1908 from connector PX9 socket 2 to connector PX4 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 12 VDC is present, replace FUEL gage (para 7-14).
(9) Position main light switch to auxiliary lever to OFF (TM 9-2320-365-10).
(10) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(11) Connect connector PX9 to FUEL gage connector.
(12) Connect connector clamp on FUEL gage connector.
(13) Install instrument panel (para 7-15).



## e18B. FRONT BRAKE AIR GAGE DOES NOT ILLUMINATE

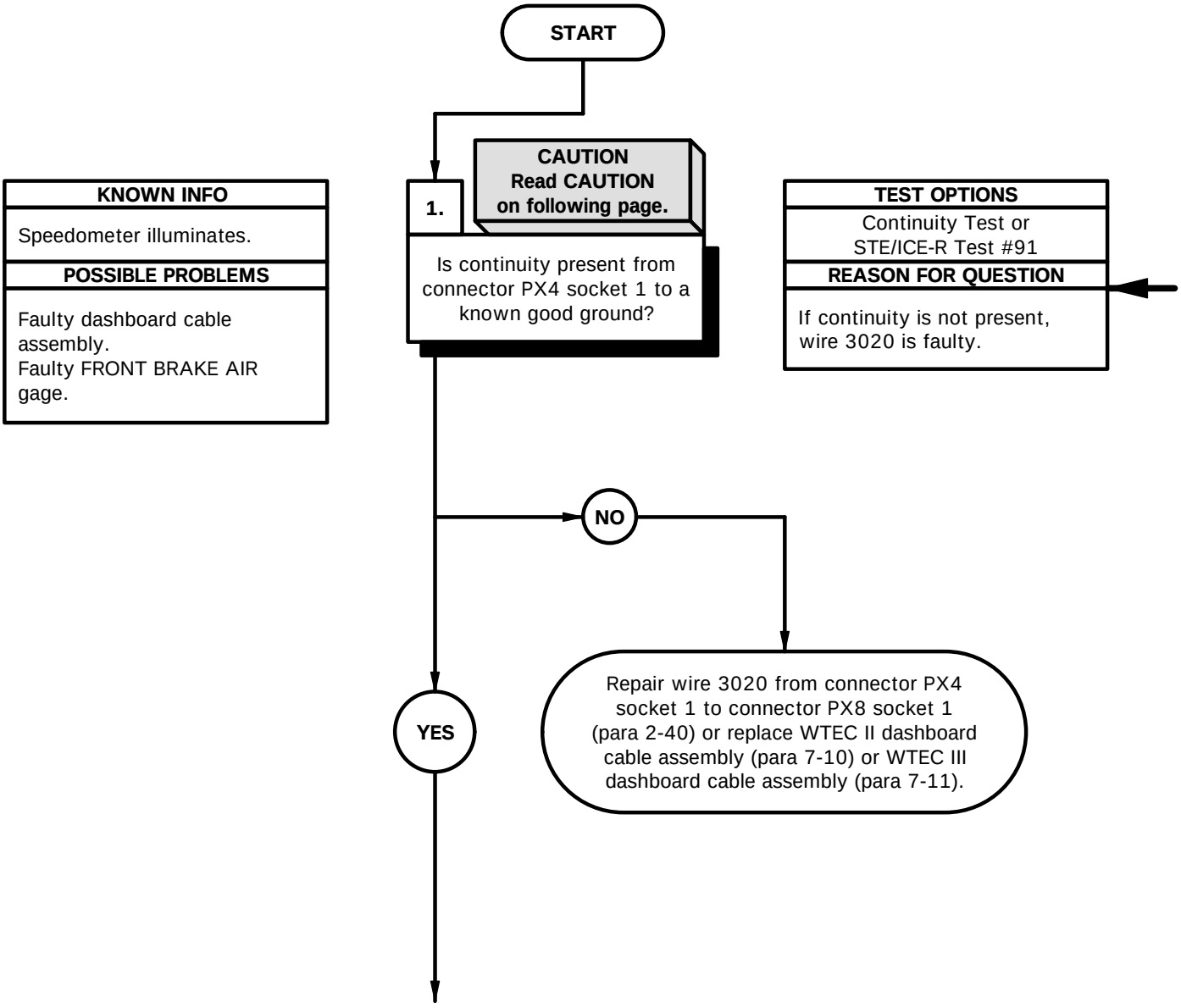
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



**CAUTION**

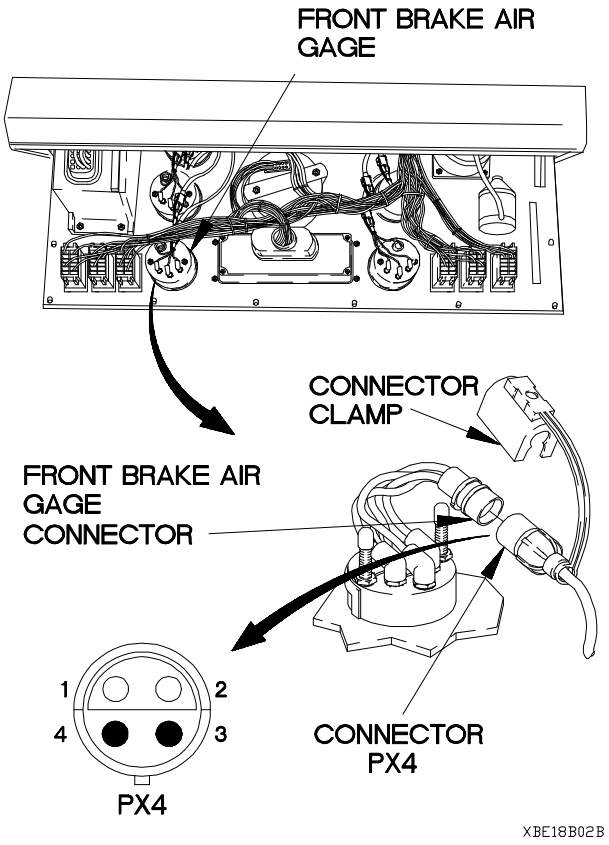
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

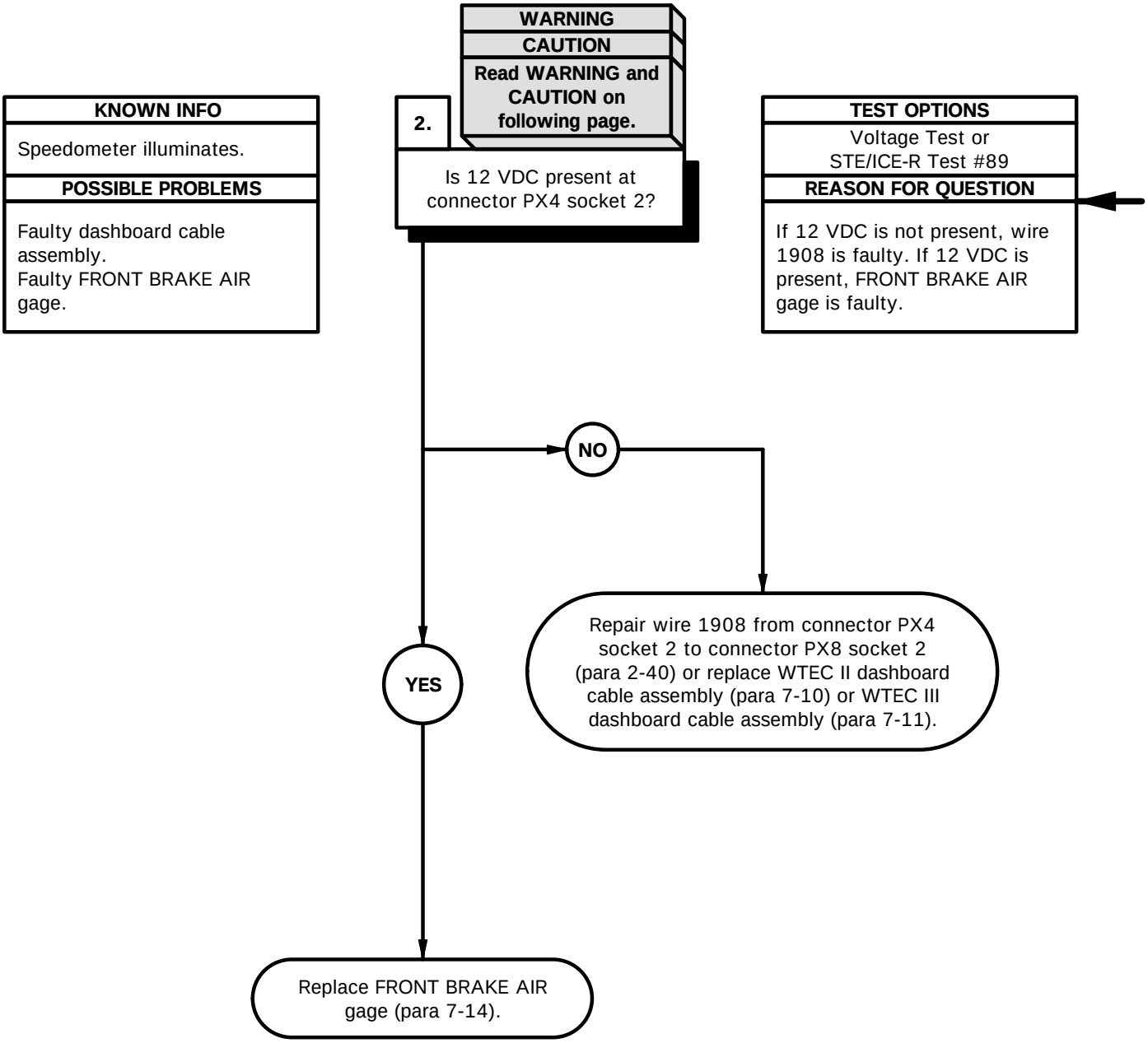
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from FRONT BRAKE AIR gage connector.
(3) Disconnect connector PX4 from FRONT BRAKE AIR gage connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX4 socket 1.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3020 from connector PX4 socket 1 to connector PX8 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e18B. FRONT BRAKE AIR GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

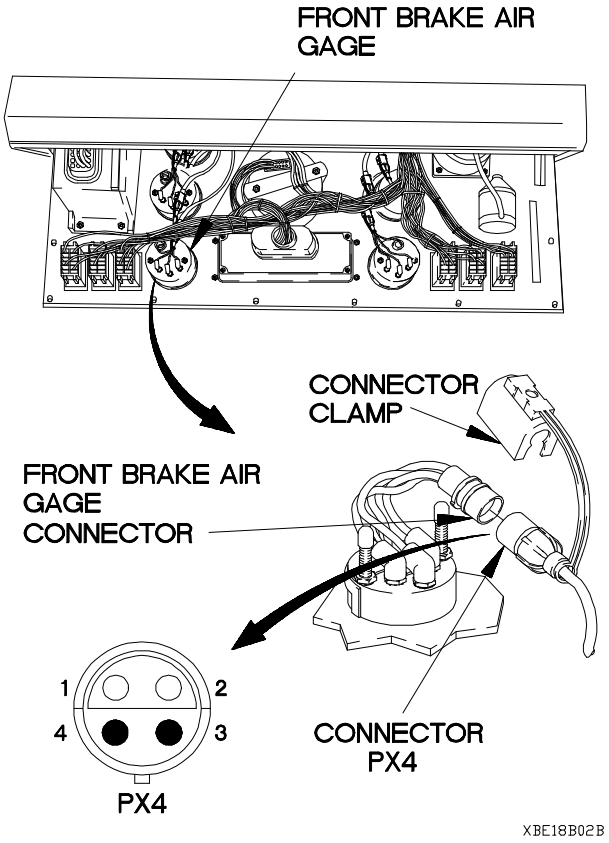
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX4 socket 2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10).
(6) Position dimmer switch for maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1908 from connector PX4 socket 2 to connector PX8 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 12 VDC is present, replace FRONT BRAKE AIR gage (para 7-14).
(9) Position main light switch to auxiliary lever to OFF (TM 9-2320-365-10).
(10) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(11) Connect connector PX4 to FRONT BRAKE AIR gage connector.
(12) Connect connector clamp on FRONT BRAKE AIR gage connector.
(13) Install instrument panel (para 7-15).



## e18C. SPEEDOMETER DOES NOT ILLUMINATE

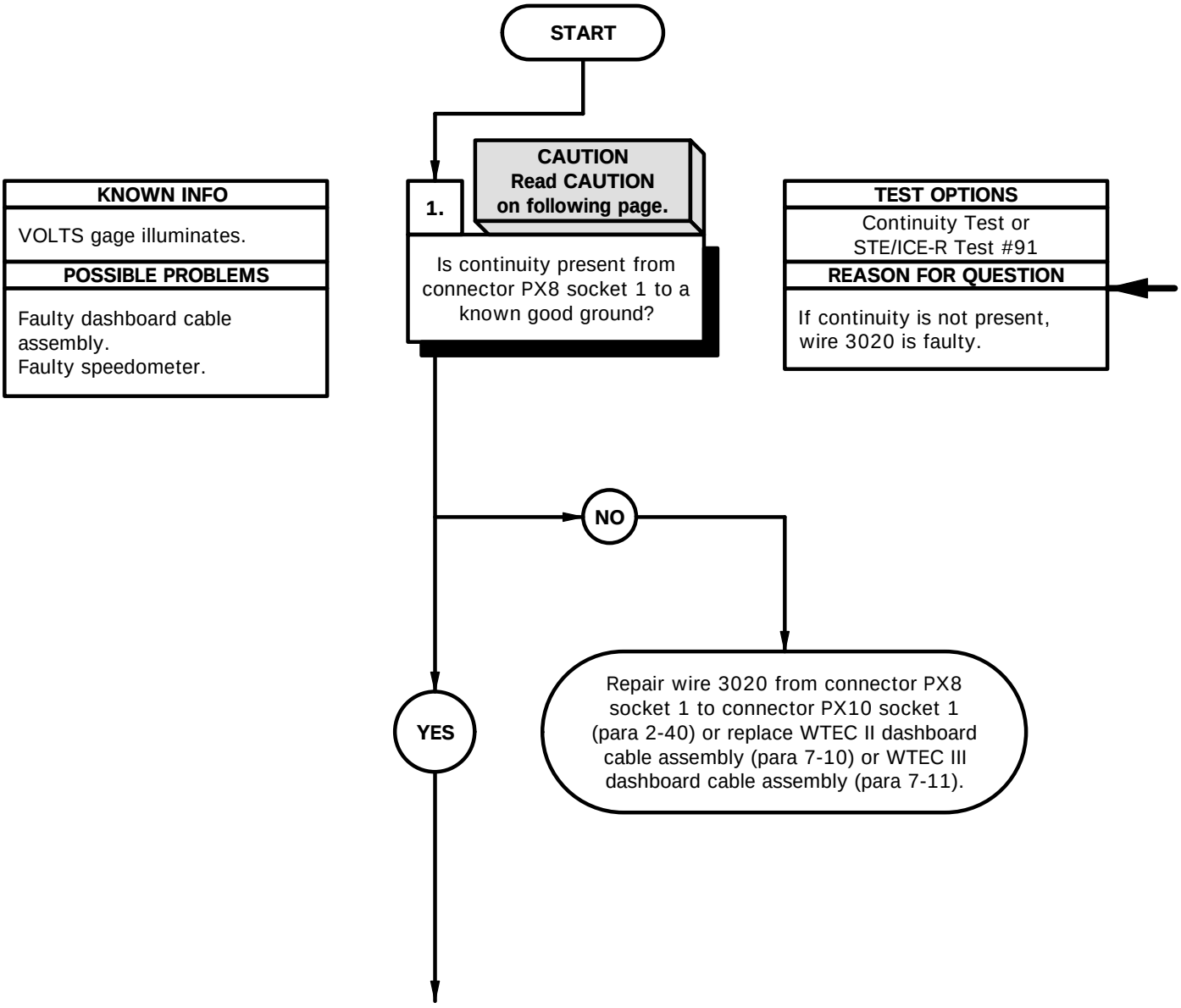
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**CAUTION**

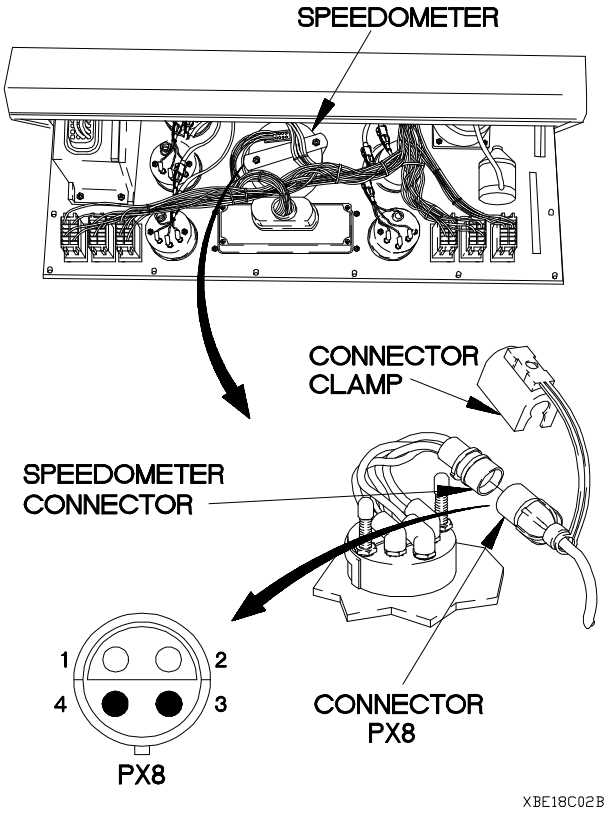
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from speedometer connector.
(3) Disconnect connector PX8 from speedometer connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX8 socket 1.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3020 from connector PX8 socket 1 to connector PX10 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e18C. SPEEDOMETER DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

VOLTS gage illuminates.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty speedometer.

**WARNING**
**CAUTION**
**Read WARNING and CAUTION on following page.**

**2.** Is 12 VDC present at connector PX8 socket 2?

**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

If 12 VDC is not present, wire 1908 is faulty. If 12 VDC is present, speedometer is faulty.

**NO** → Repair wire 1908 from connector PX8 socket 2 to connector PX10 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**YES** → Replace speedometer (para 7-14).

**WARNING**

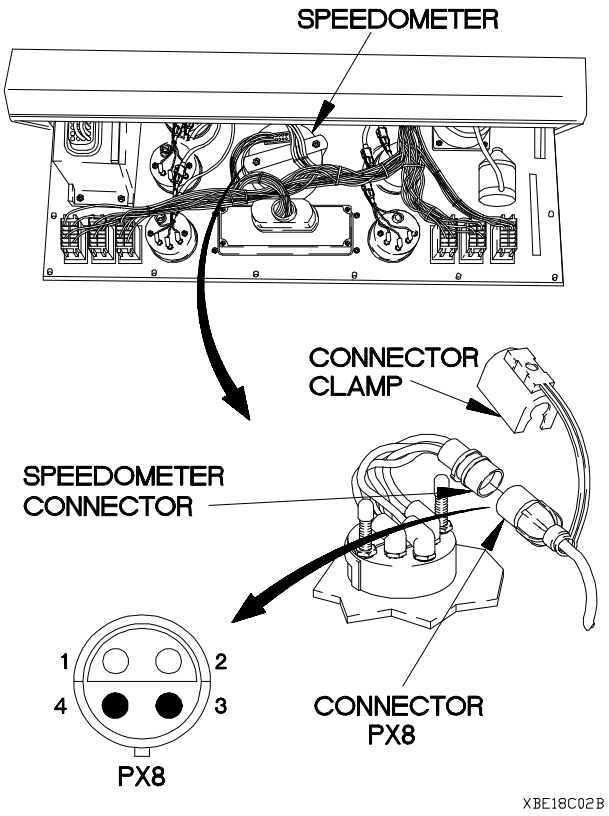
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX8 socket 2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10).
(6) Position dimmer switch for maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1908 from connector PX8 socket 2 to connector PX10 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 12 VDC is present, replace speedometer (para 7-14).
(9) Position main light switch to auxiliary lever to OFF (TM 9-2320-365-10).
(10) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(11) Connect connector PX8 to speedometer connector.
(12) Connect connector clamp on speedometer connector.
(13) Install instrument panel (para 7-15).



## e18D. VOLTS GAGE DOES NOT ILLUMINATE

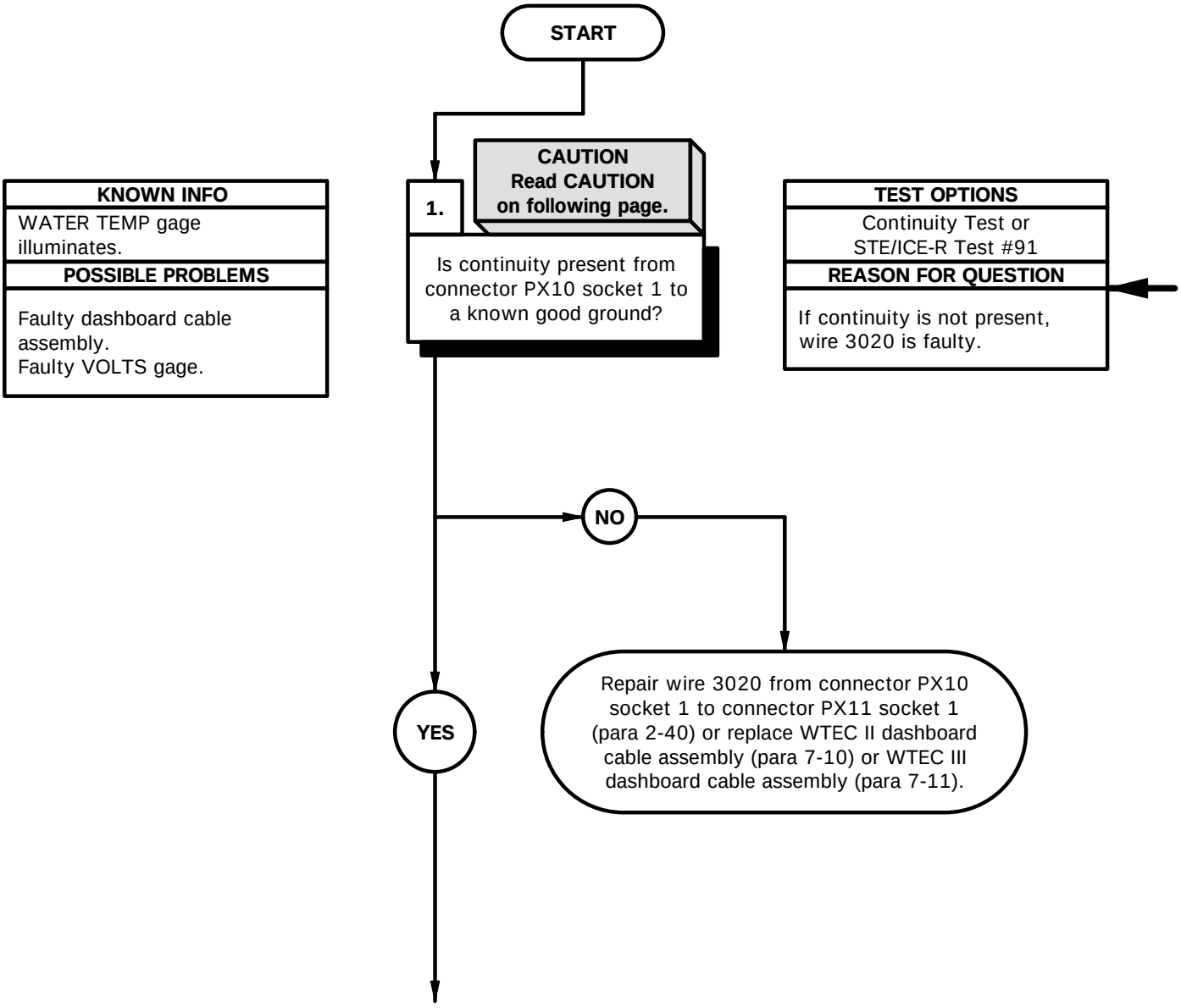
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**CAUTION**

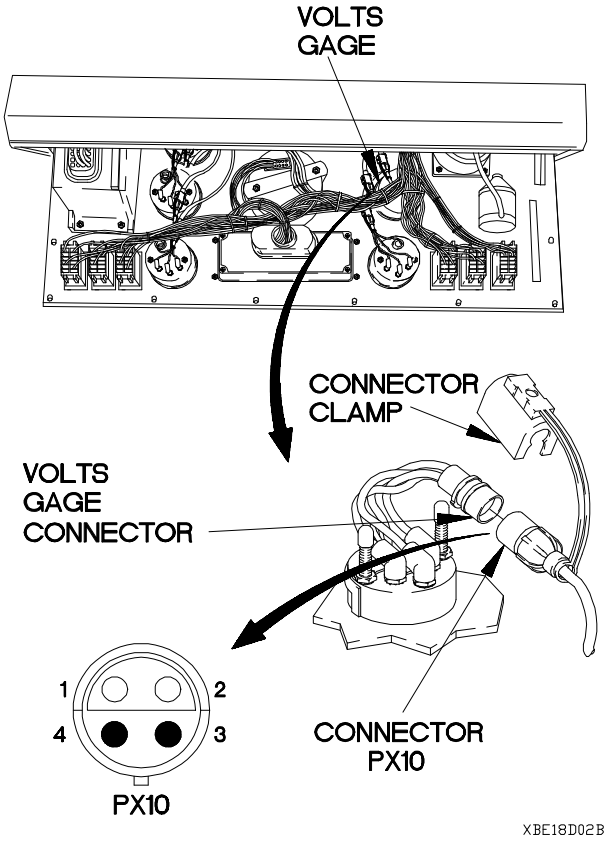
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

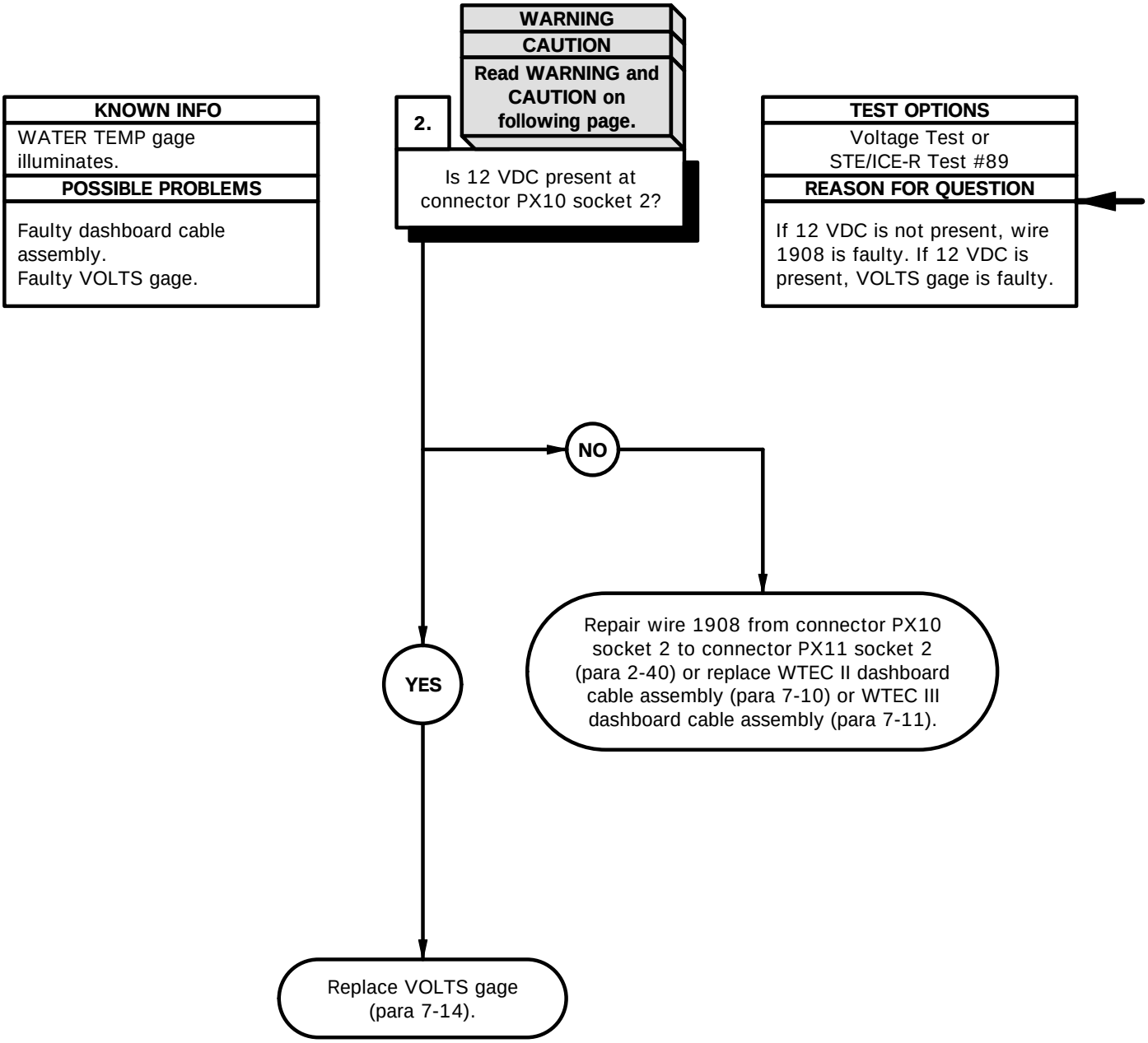
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from VOLTS gage connector.
(3) Disconnect connector PX10 from VOLTS gage connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX10 socket 1.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3020 from connector PX10 socket 1 to connector PX11 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e18D. VOLTS GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

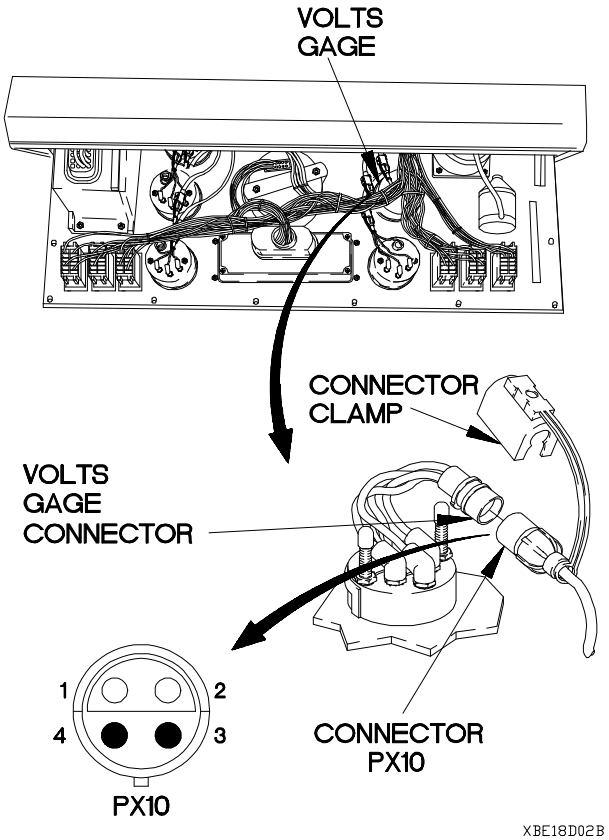
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX10 socket 2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10).
(6) Position dimmer switch for maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1908 from connector PX10 socket 2 to connector PX11 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 12 VDC is present, replace VOLTS gage (para 7-14).
(9) Position main light switch to auxiliary lever to OFF (TM 9-2320-365-10).
(10) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(11) Connect connector PX10 to VOLTS gage connector.
(12) Connect connector clamp on VOLTS gage connector.
(13) Install instrument panel (para 7-15).



## e18E. WATER TEMP GAGE DOES NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

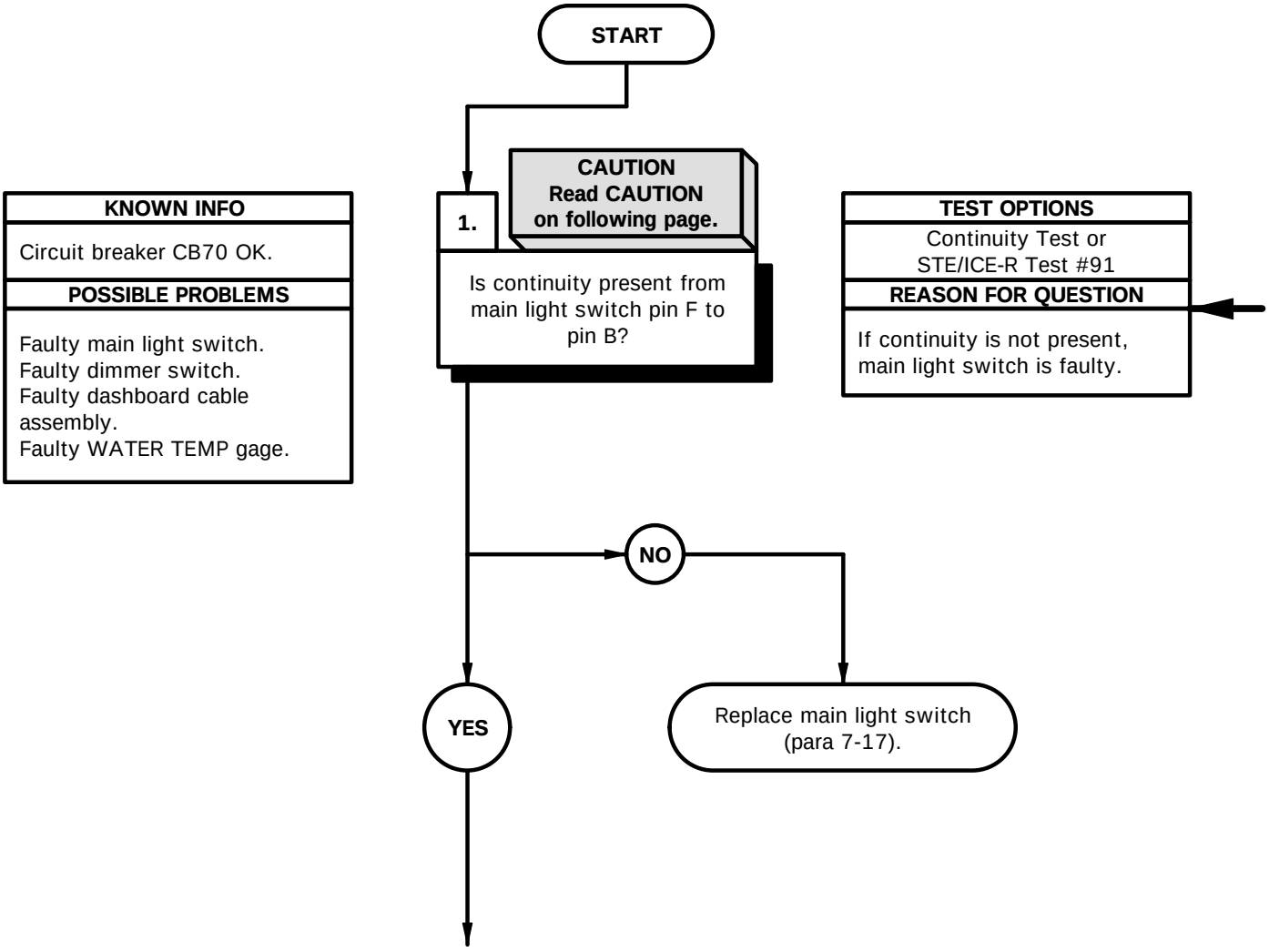
**Materials/Parts**
Dimmer Switch Test Wire (Item 20, Appendix E)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB70 prior to beginning this task.



**CAUTION**

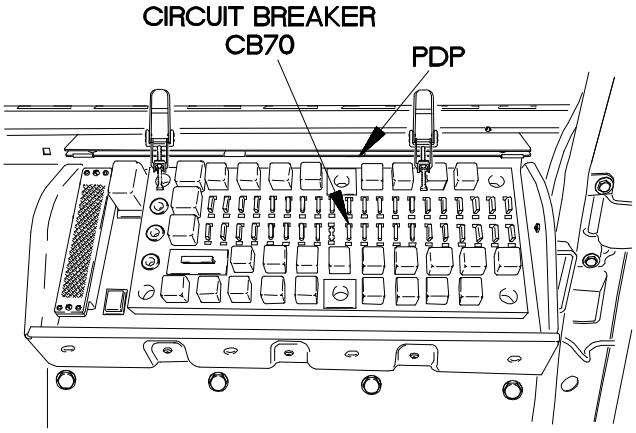
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

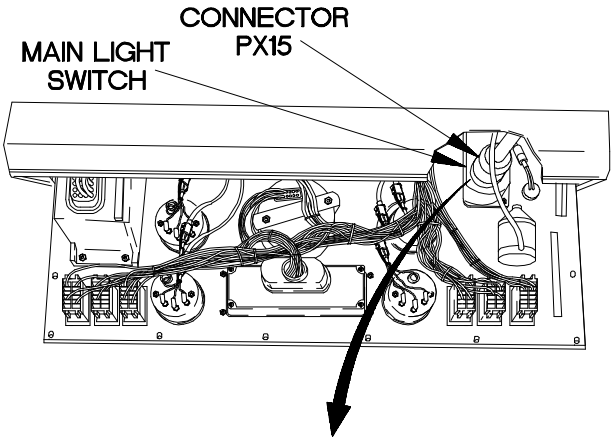
**NOTE**

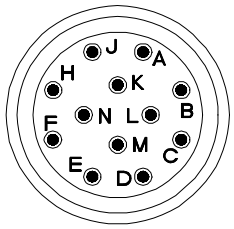
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove PDP cover (TM 9-2320-365-10).
(2) Remove circuit breaker CB70 from PDP.
(3) Remove instrument panel assembly for access (para 7-15).
(4) Disconnect connector PX15 from main light switch connector.
(5) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(6) Position main light switch auxiliary selector lever to PNL BRT (TM 9-2320-365-10).
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to main light switch connector pin F.
(9) Connect negative (-) probe of multimeter to main light switch connector pin B and note reading on multimeter.
(10) If continuity is not present, replace main light switch (para 7-17).
(11) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(12) Position main light switch main selector lever to OFF (TM 9-2320-365-10).




MAIN LIGHT
SWITCH CONNECTOR

XBE18E01B

## e18E. WATER TEMP GAGE DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Main light switch OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty dimmer switch.
Faulty WATER TEMP gage.

**WARNING**
**CAUTION**
**Read WARNING and CAUTION on following page.**

**2.** Is 12 VDC present at connector PX15 socket F?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

If 12 VDC is not present, wire 1586 is faulty.

**NO** → Repair wire 1586 from connector PX15 socket F to circuit breaker CB70 socket 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**YES**

**WARNING**

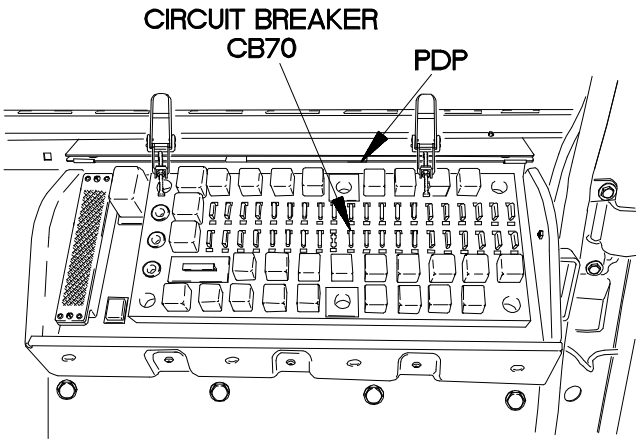
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

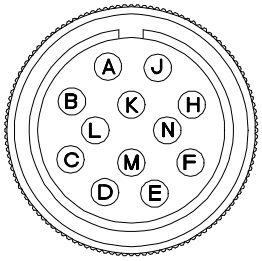
**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Install circuit breaker CB70 on PDP.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector PX15 socket F.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1586 from connector PX15 socket F to circuit breaker CB70 socket 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




PX15

XBE18E02B

## e18E. WATER TEMP GAGE DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Main light switch OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty dimmer switch.
Faulty WATER TEMP gage.

**WARNING**
**CAUTION**
**Read WARNING and CAUTION on following page.**

**3.** Is 12 VDC present at connector PX24 socket 1?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

If 12 VDC is not present, wire 1542 is faulty.

**NO** → Repair wire 1542 from connector PX24 socket 1 to connector PX15 socket B (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**YES**

**WARNING**

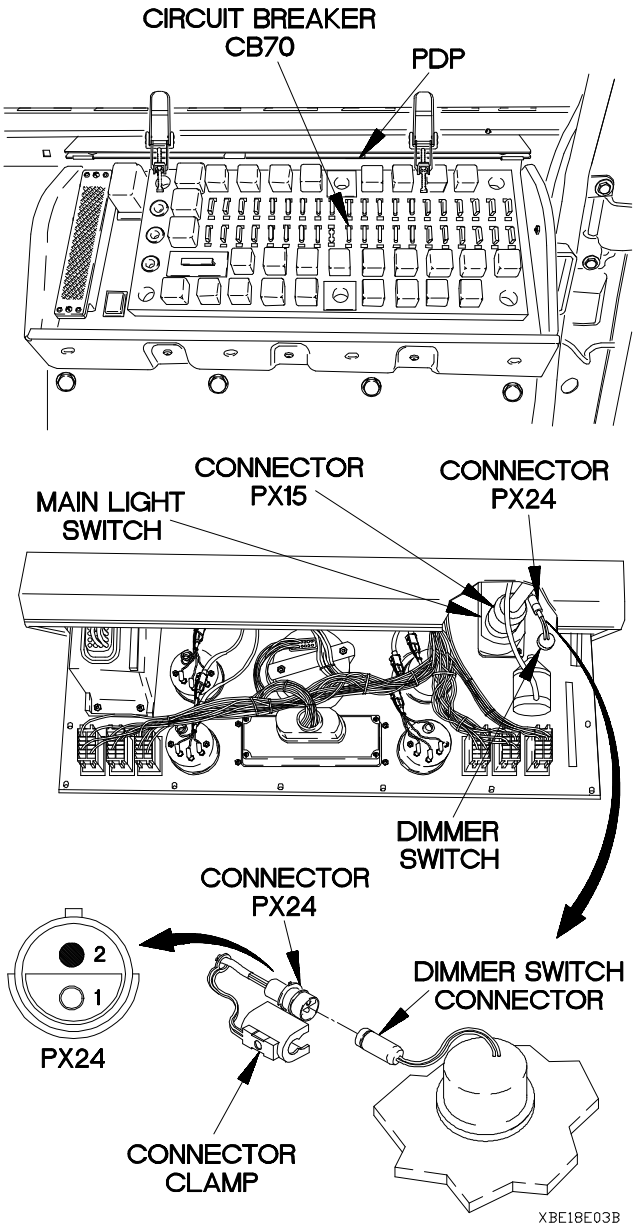
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

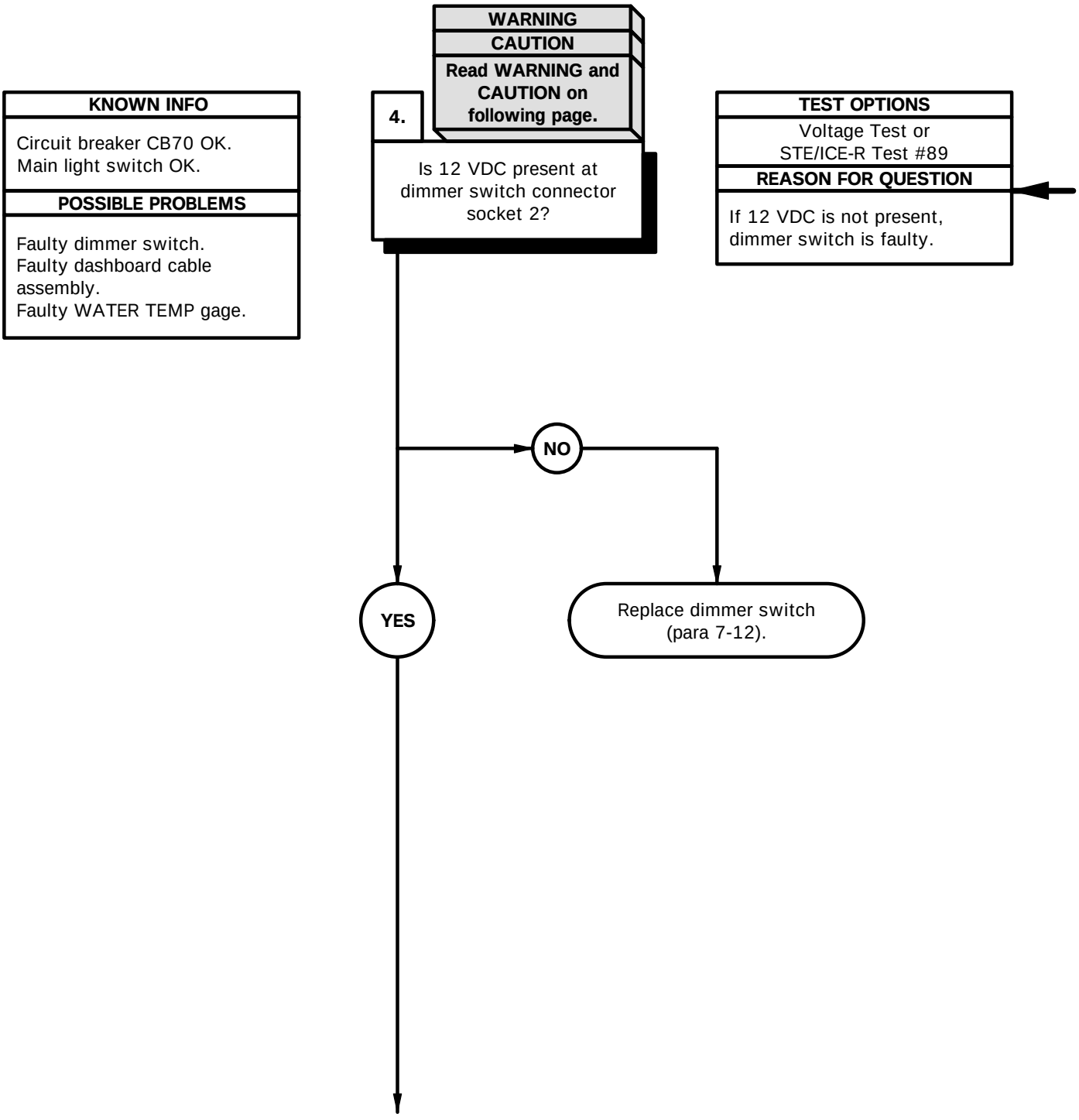
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Remove circuit breaker CB70 from PDP.
(2) Connect connector PX15 to main light switch connector.
(3) Install circuit breaker CB70 on PDP.
(4) Disconnect connector clamp from dimmer switch connector.
(5) Disconnect connector PX24 from dimmer switch connector.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector PX24 socket 1.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(10) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10) and note reading on multimeter.
(11) If 12 VDC is not present, repair wire 1542 from connector PX24 pin 1 to connector PX15 socket B (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(12) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(13) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(14) Install PDP cover (TM 9-2320-365-10).



## e18E. WATER TEMP GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

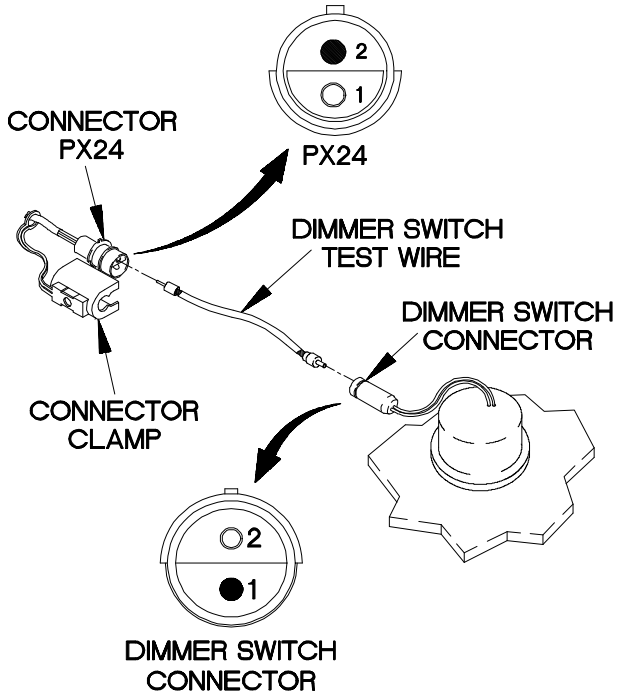
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Position dimmer switch for maximum brightness (TM 9-2320-365-10).
(2) Install dimmer switch test wire pin in connector PX24 socket 1.
(3) Install dimmer switch test wire socket on dimmer switch connector pin 1.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to dimmer switch connector socket 2.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(8) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, replace dimmer switch (para 7-12).
(10) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(11) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(12) Disconnect dimmer switch test wire from dimmer switch connector.
(13) Disconnect dimmer switch test wire from connector PX24.



## e18E. WATER TEMP GAGE DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Main light switch OK.
Dimmer switch OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty WATER TEMP gage.

**CAUTION**
**Read CAUTION on following page.**

**5.** Is continuity present from connector PX11 socket 2 to connector PX24 pin 2?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 1908 is faulty.

**NO** → Repair wire 1908 from connector PX11 socket 2 to connector PX24 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**YES**

**KNOWN INFO**

Circuit breaker CB70 OK.
Main light switch OK.
Dimmer switch OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty WATER TEMP gage.

**CAUTION**
**Read CAUTION on following page.**

**6.** Is continuity present from connector PX11 socket 1 to a known good ground?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 3020 is faulty. If continuity is present, WATER TEMP gage is faulty.

**NO** → Repair wire 3020 from connector PX11 socket 1 to connector PX6 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**YES** → Replace WATER TEMP gage (para 7-14).

**CAUTION**

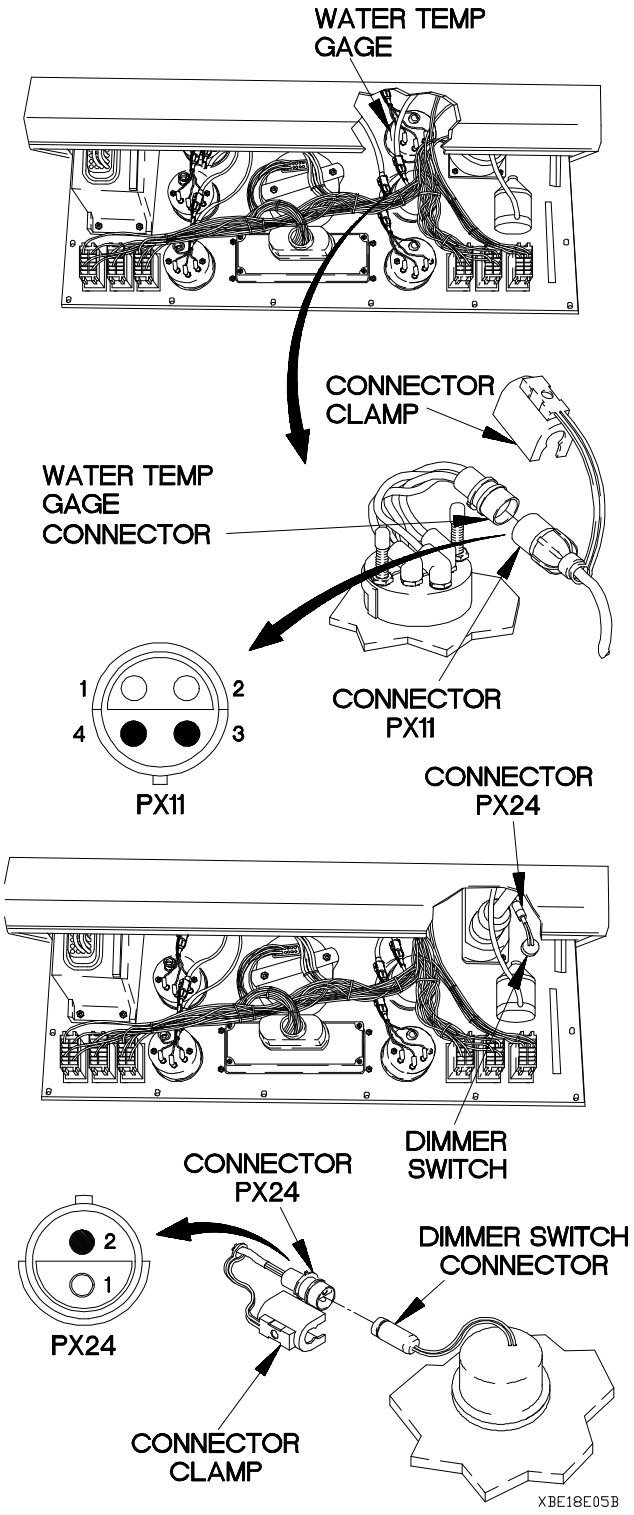
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Disconnect connector clamp from WATER TEMP gage connector.
(2) Disconnect connector PX11 from WATER TEMP gage connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX11 socket 2.
(5) Connect negative (-) probe of multimeter to connector PX24 pin 2 and note reading on multimeter.
(6) If continuity is not present, repair wire 1908 from connector PX11 socket 2 to connector PX24 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX11 socket 1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX11 socket 1 to connector PX6 socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace WATER TEMP gage (para 7-14).
(6) Connect connector PX24 to dimmer switch connector.
(7) Connect connector clamp on dimmer switch connector.
(8) Connect connector PX11 to WATER TEMP gage connector.
(9) Connect connector clamp on WATER TEMP gage connector.
(10) Install instrument panel assembly (para 7-15).



## e19. OIL PRESS GAGE DOES NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Dimmer Switch Test Wire (Item 20, Appendix E)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

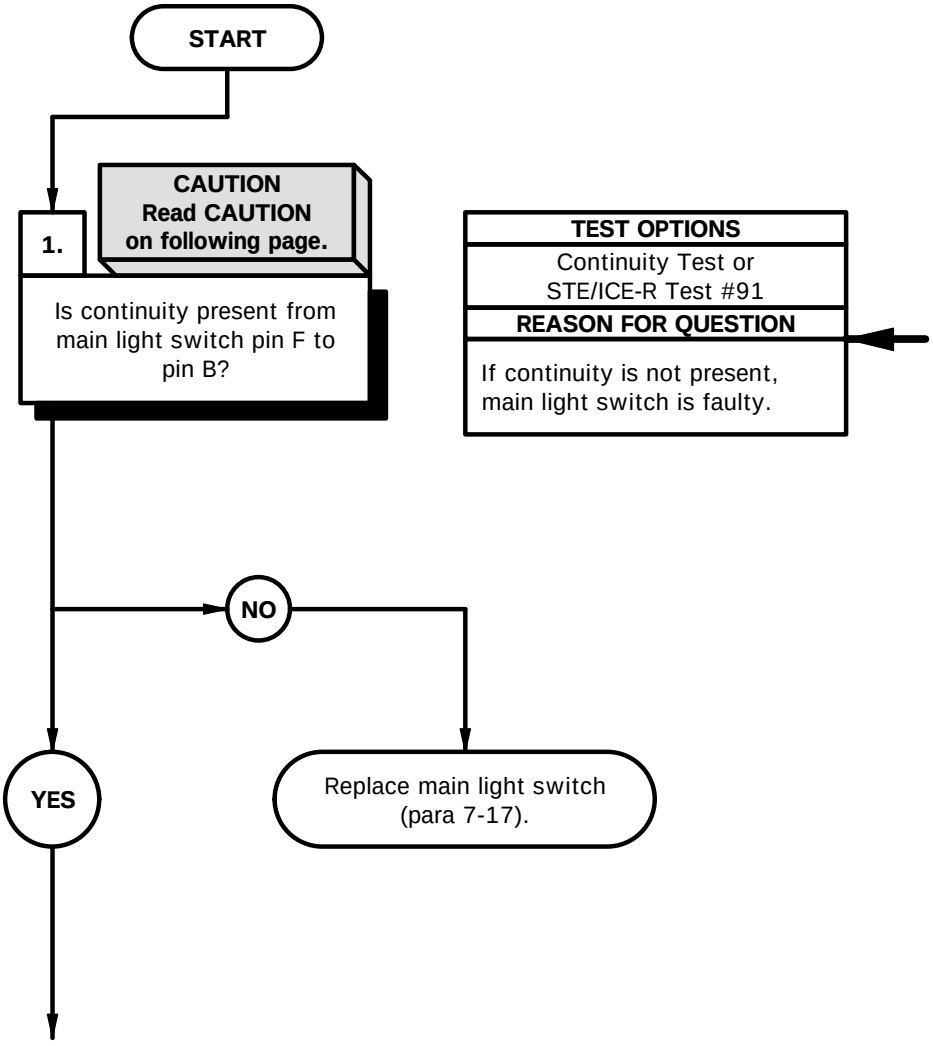
Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB70 prior to beginning this task.

**KNOWN INFO**

Circuit breaker CB70 OK.

**POSSIBLE PROBLEMS**

Faulty main light switch.
Faulty dimmer switch.
Faulty dashboard cable assembly.
Faulty OIL PRESS gage.



**CAUTION**

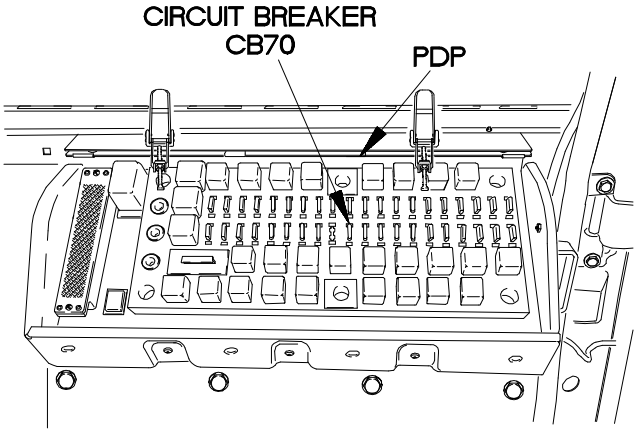
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

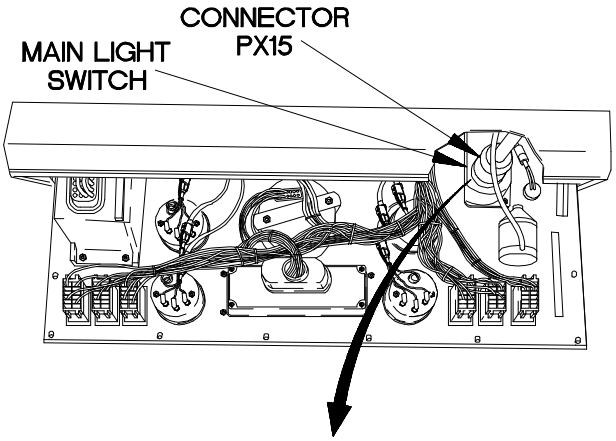
**NOTE**

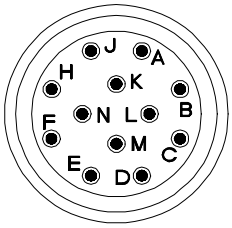
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove PDP cover (TM 9-2320-365-10).
(2) Remove circuit breaker CB70 from PDP.
(3) Remove instrument panel assembly for access (para 7-15).
(4) Disconnect connector PX15 from main light switch connector.
(5) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(6) Position main light switch auxiliary selector lever to PNL BRT (TM 9-2320-365-10).
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to main light switch connector pin F.
(9) Connect negative (-) probe of multimeter to main light switch connector pin B and note reading on multimeter.
(10) If continuity is not present, replace main light switch (para 7-17).
(11) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(12) Position main light switch main selector lever to OFF (TM 9-2320-365-10).



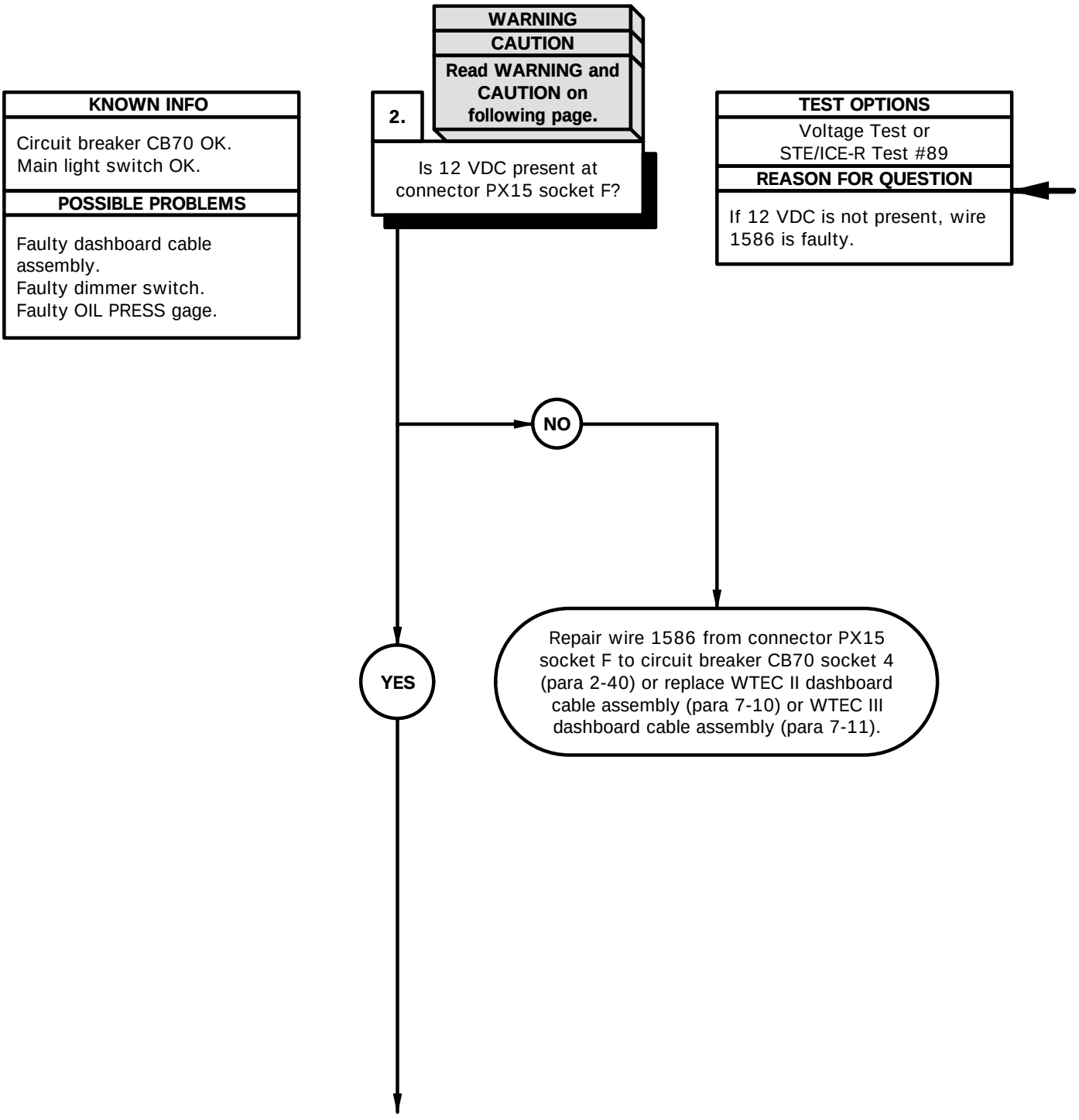




MAIN LIGHT
SWITCH CONNECTOR

XBE1901B

## e19. OIL PRESS GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

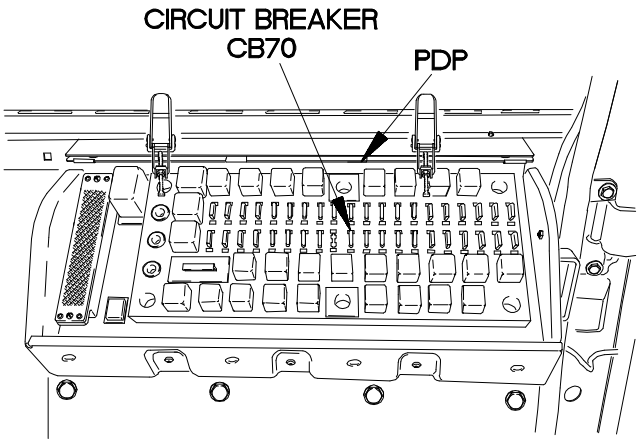
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

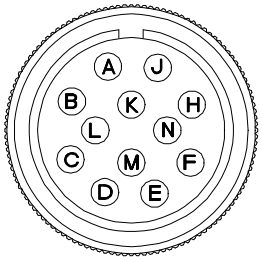
**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Install circuit breaker CB70 on PDP.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector PX15 socket F.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1586 from connector PX15 socket F to circuit breaker CB70 socket 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




PX15

XBE1902B

## e19. OIL PRESS GAGE DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Main light switch OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty dimmer switch.
Faulty OIL PRESS gage.

**WARNING**
**CAUTION**
**Read WARNING and CAUTION on following page.**

**3.** Is 12 VDC present at connector PX24 socket 1?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

If 12 VDC is not present, wire 1542 is faulty.

**NO** → Repair wire 1542 from connector PX24 socket 1 to connector PX15 socket B (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**YES**

**WARNING**

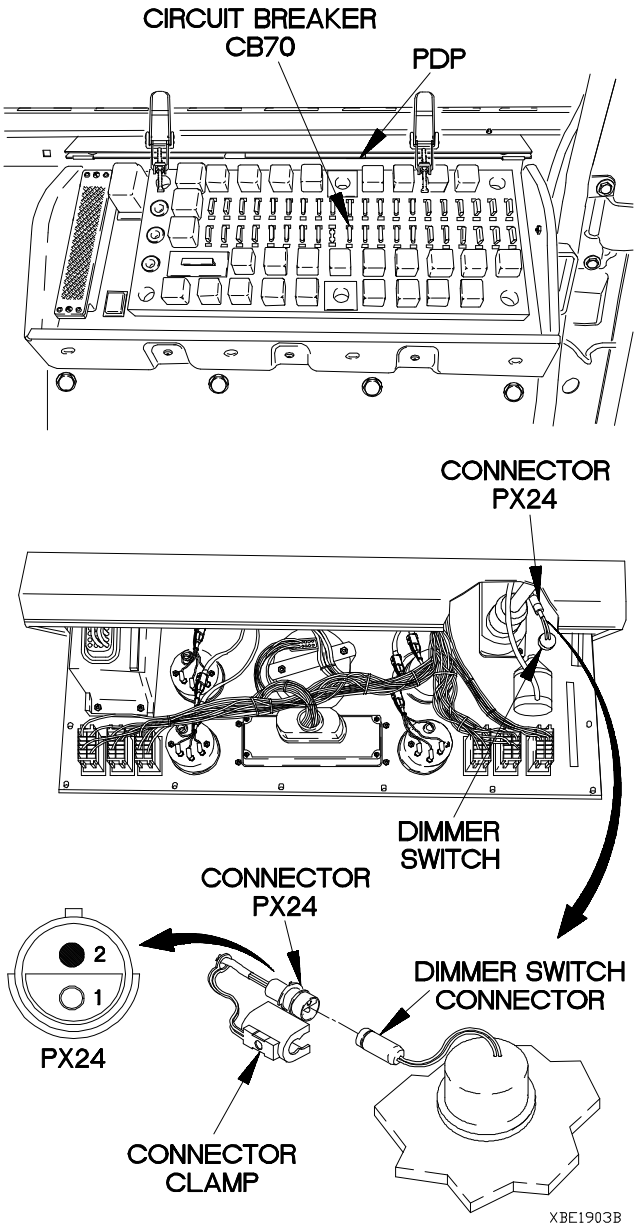
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

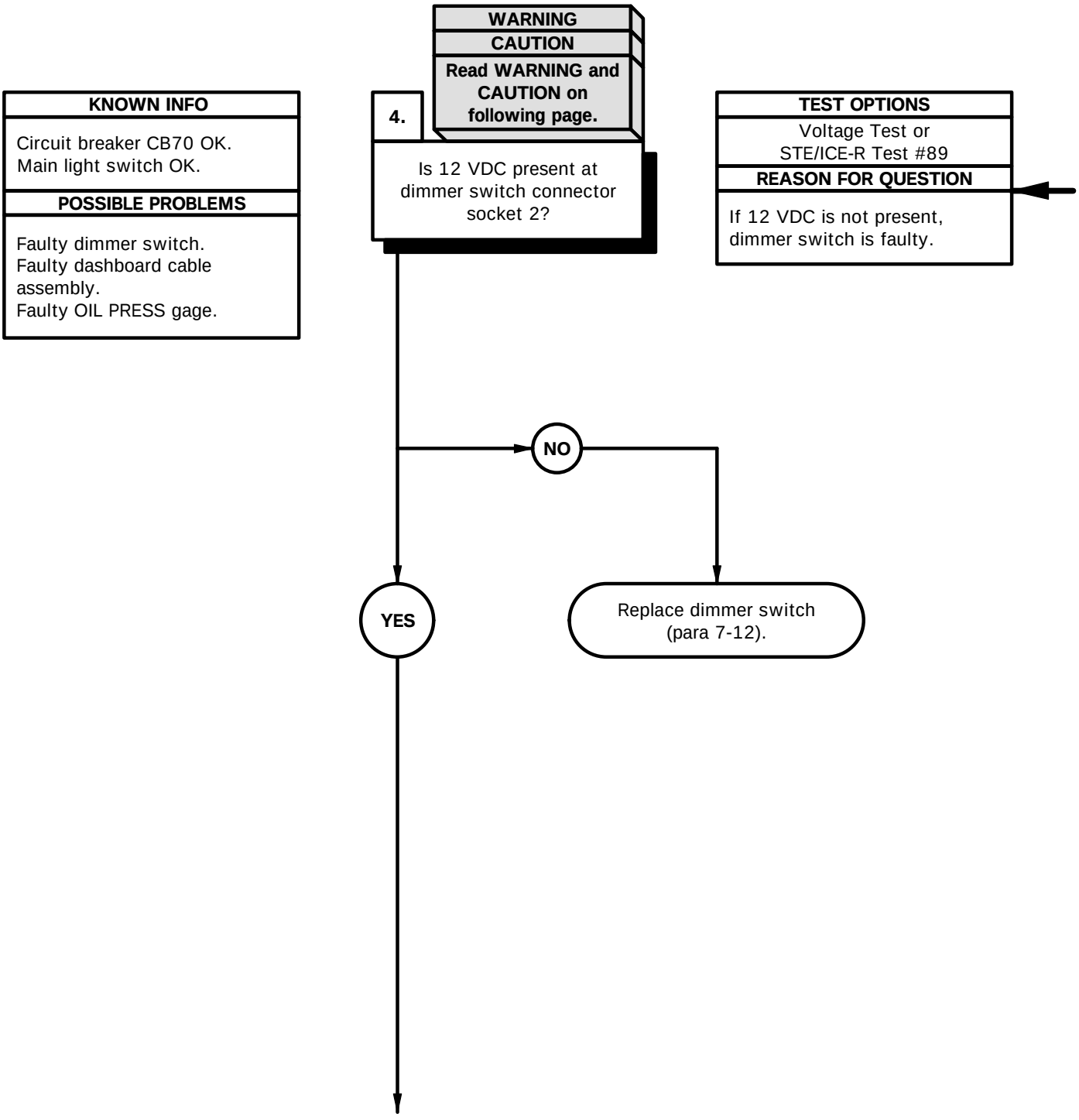
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Remove circuit breaker CB70 from PDP.
(2) Connect connector PX15 to main light switch connector.
(3) Install circuit breaker CB70 on PDP.
(4) Disconnect connector clamp from dimmer switch connector.
(5) Disconnect connector PX24 from dimmer switch connector.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector PX24 socket 1.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(10) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10) and note reading on multimeter.
(11) If 12 VDC is not present, repair wire 1542 from connector PX24 pin 1 to connector PX15 socket B (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(12) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(13) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(14) Install PDP cover (TM 9-2320-365-10).



## e19. OIL PRESS GAGE DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

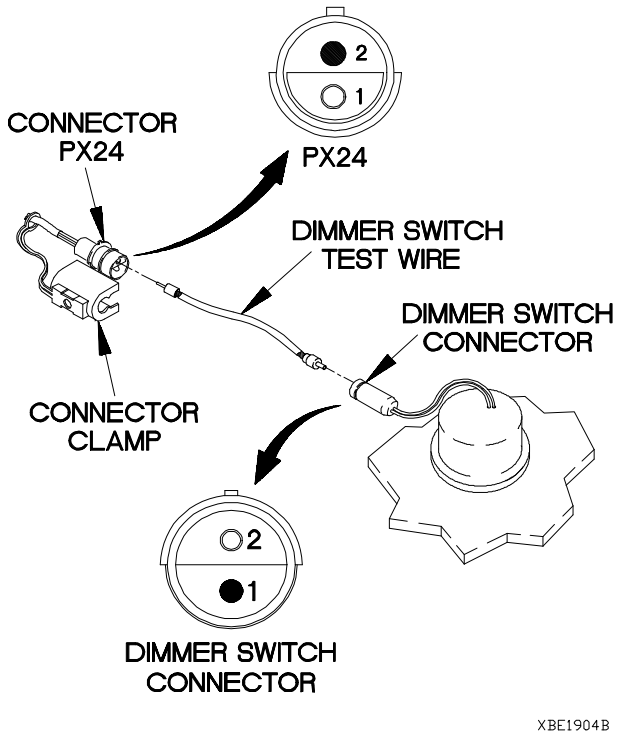
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

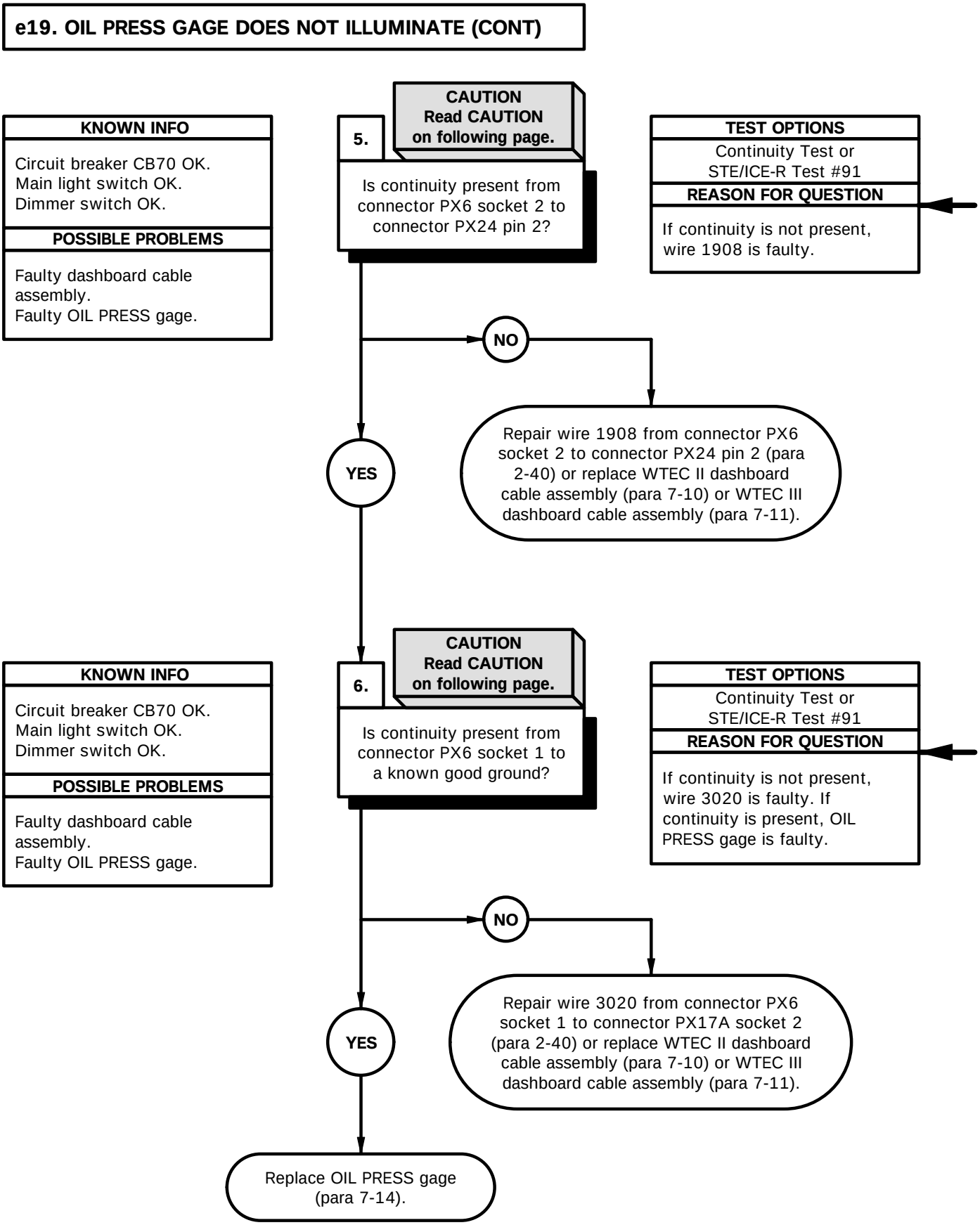
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Position dimmer switch for maximum brightness (TM 9-2320-365-10).
(2) Install dimmer switch test wire pin in connector PX24 socket 1.
(3) Install dimmer switch test wire socket on dimmer switch connector pin 1.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to dimmer switch connector socket 2.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(8) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, replace dimmer switch (para 7-12).
(10) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(11) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(12) Disconnect dimmer switch test wire from dimmer switch connector.
(13) Disconnect dimmer switch test wire from connector PX24.



## e19. OIL PRESS GAGE DOES NOT ILLUMINATE (CONT)



**CAUTION**

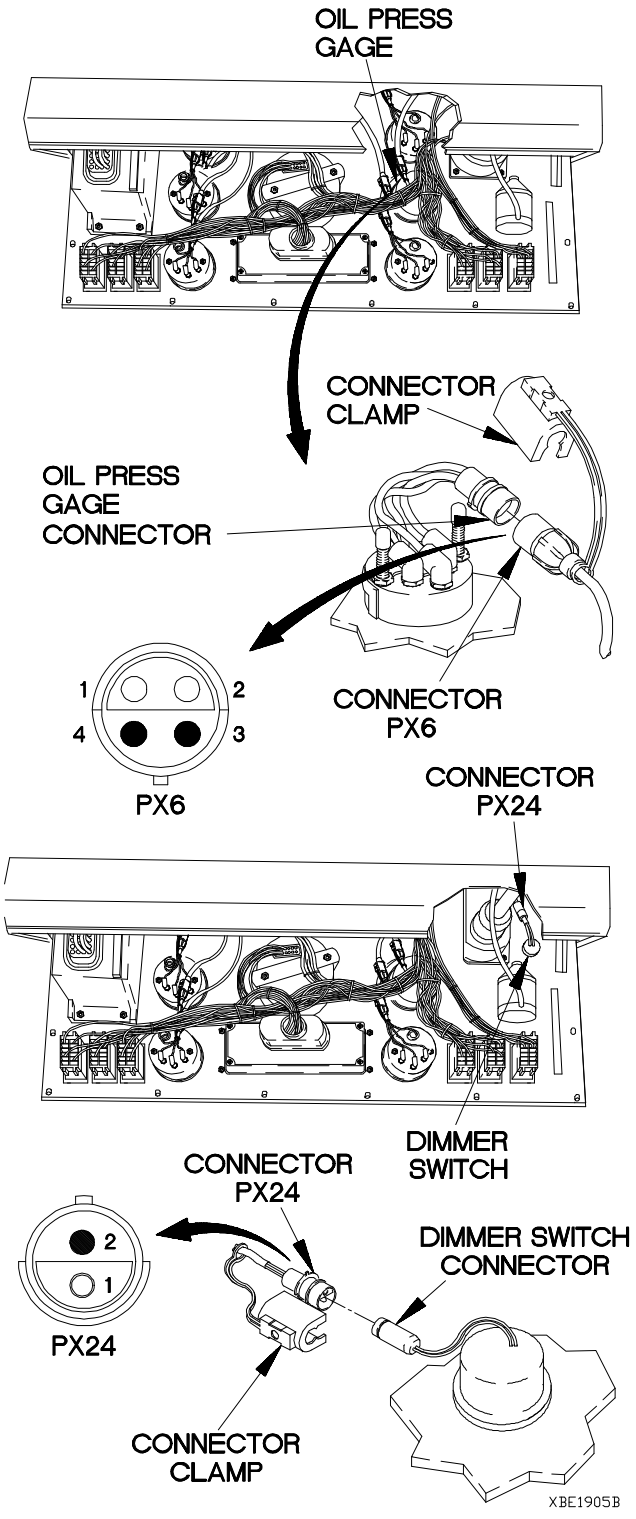
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Disconnect connector clamp from OIL PRESS gage connector.
(2) Disconnect connector PX6 from OIL PRESS gage connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX6 socket 2.
(5) Connect negative (-) probe of multimeter to connector PX24 pin 2 and note reading on multimeter.
(6) If continuity is not present, repair wire 1908 from connector PX6 socket 2 to connector PX24 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX6 socket 1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3020 from connector PX6 socket 1 to connector PX17A socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace OIL PRESS gage (para 7-14).
(6) Connect connector PX24 to dimmer switch connector.
(7) Connect connector clamp on dimmer switch connector.
(8) Connect connector PX6 to OIL PRESS gage connector.
(9) Connect connector clamp on OIL PRESS gage connector.
(10) Install instrument panel assembly (para 7-15).



**e20. AUXILIARY PANEL, PERSONNEL HEATER, AND INSTRUMENT PANEL DO NOT ILLUMINATE**

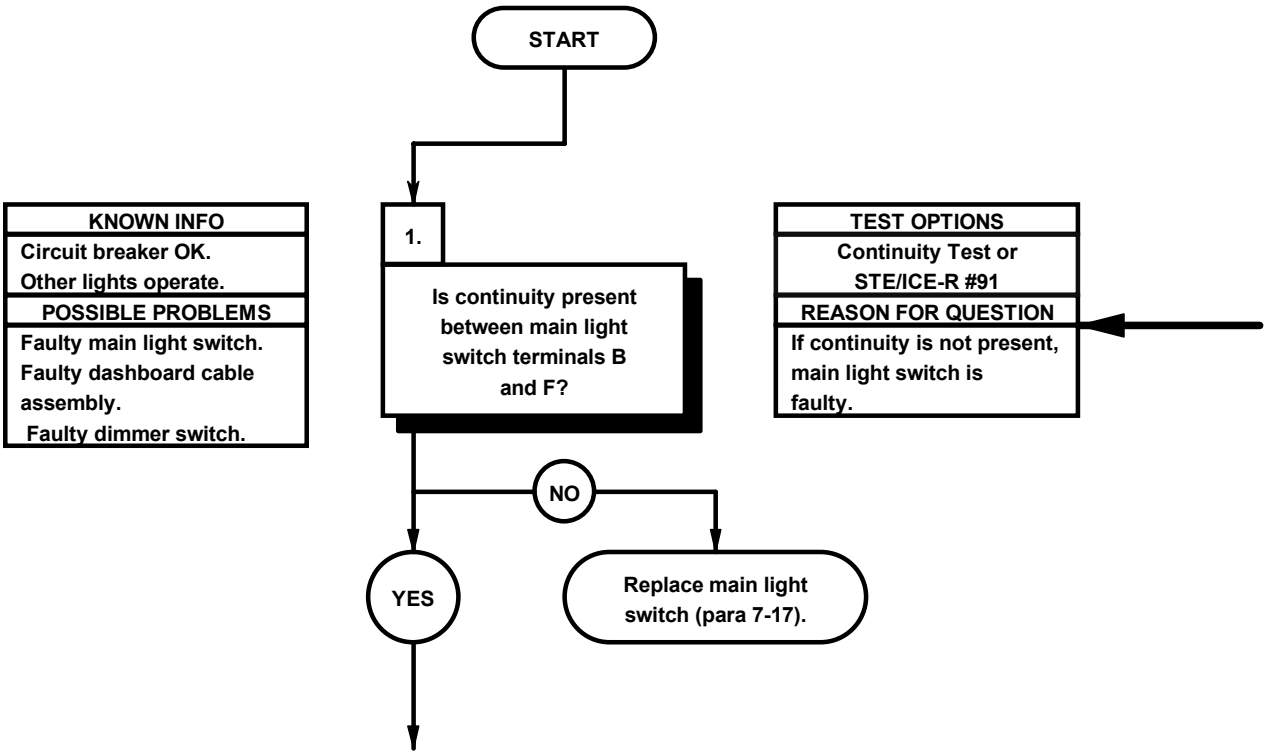
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

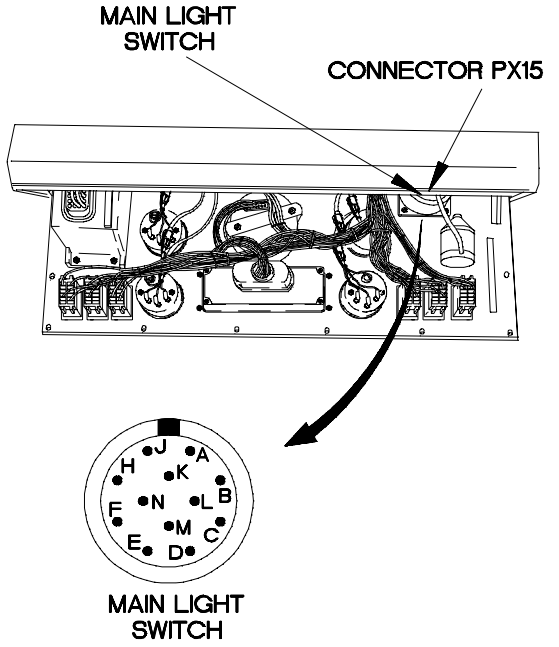
**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

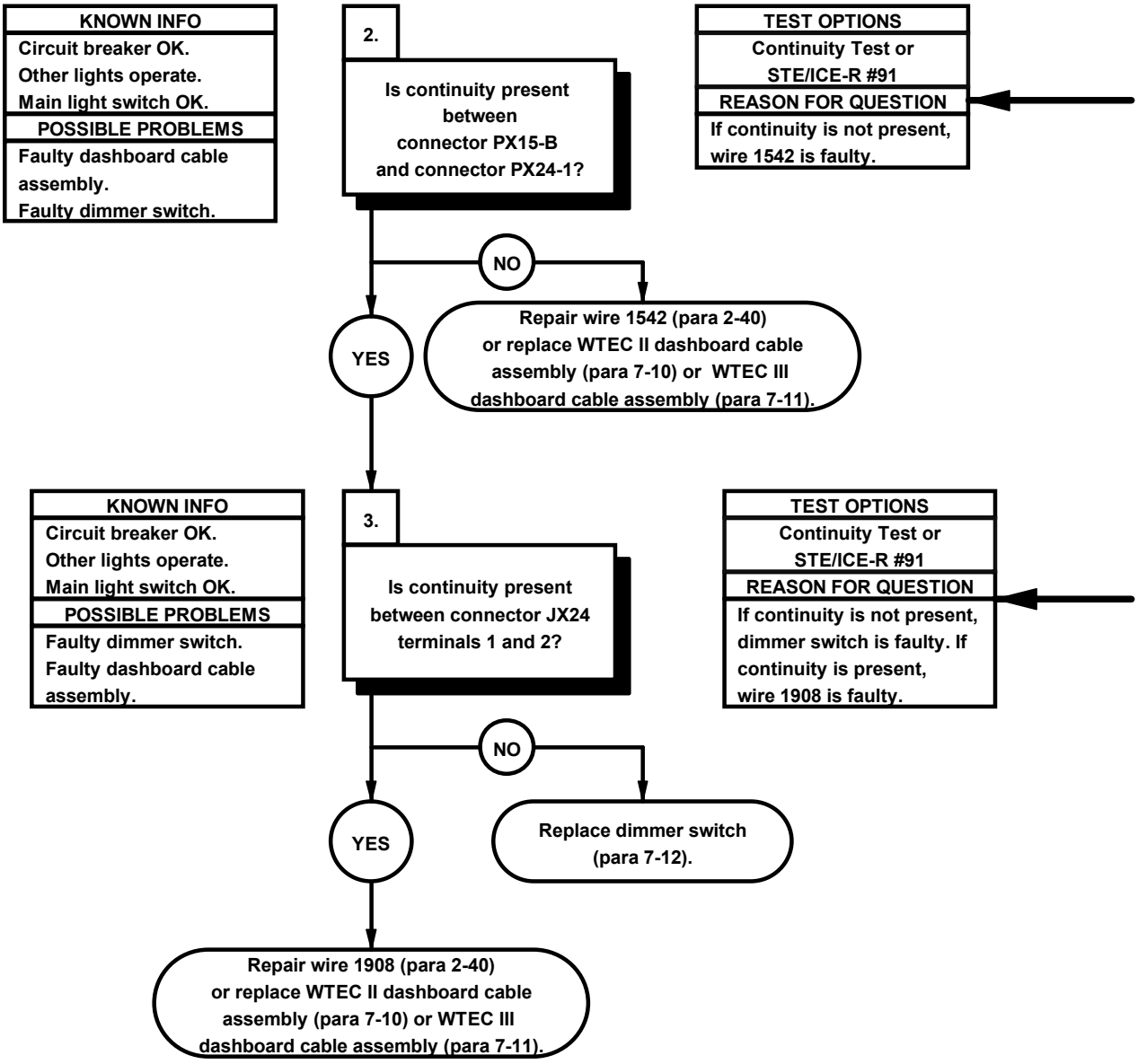
**References**
TM 9-4910-571-12&P



| CONTINUITY TEST |
| --- |
| (1) Remove instrument panel assembly for access (para 7-15). |
| (2) Disconnect connector PX15 from main light switch. |
| (3) Set multimeter to ohms. |
| (4) Position main light switch to SER DRIVE (TM 9-2320-365-10). |
| (5) Position main light switch auxiliary lever to PANEL BRT (TM 9-2320-365-10). |
| (6) Connect positive (+) probe of multimeter to main light switch terminal F. |
| (7) Connect negative (-) probe of multimeter to main light switch terminal B and note reading on multimeter. |
| (8) If continuity is not present, replace main light switch (para 7-17). |
| (9) Position main light switch to OFF (TM 9-2320-365-10). |



## e20. AUXILIARY PANEL, PERSONNEL HEATER, AND INSTRUMENT PANEL DO NOT ILLUMINATE (CONT)

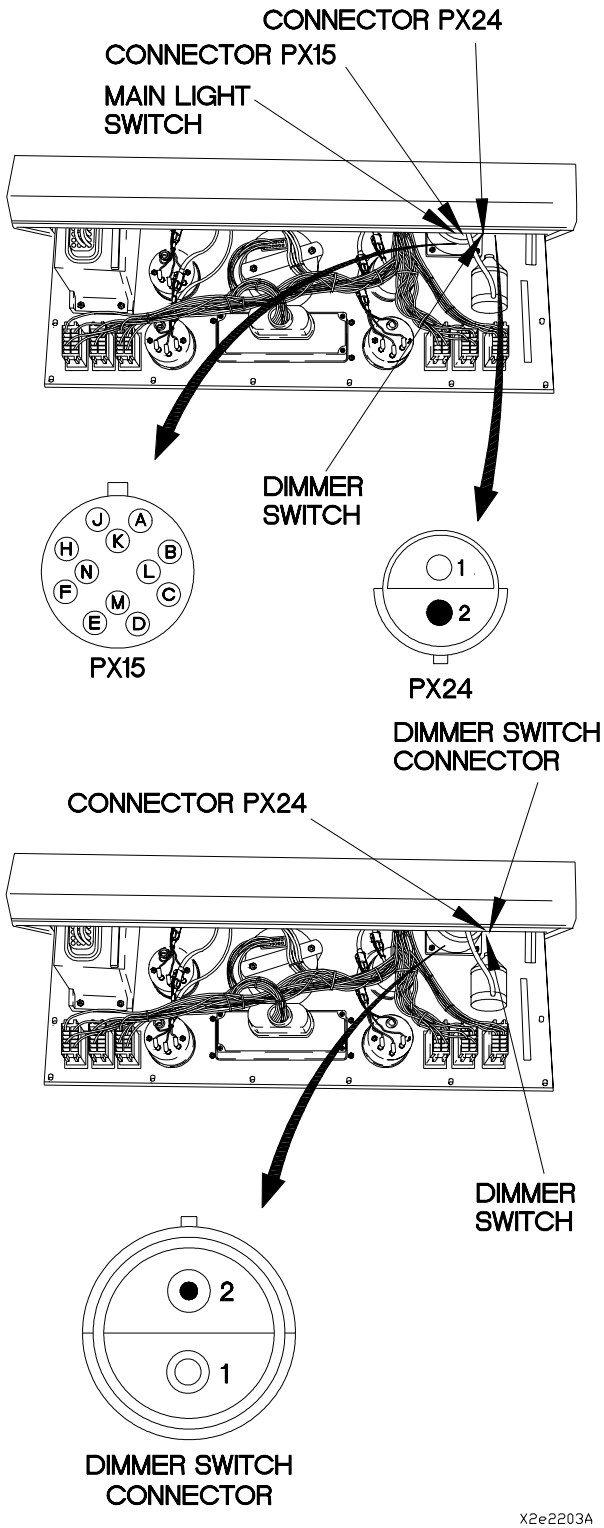


**CONTINUITY TEST**

(1) Disconnect connector PX24 from dimmer switch.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX15-B.
(4) Connect negative (-) probe of multimeter to connector PX24-1 and note reading on multimeter.
(5) If continuity is not present, repair wire 1542 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX15 to main light switch.

**CONTINUITY TEST**

(1) Position dimmer switch to maximum illumination (TM 9-2320-365-10).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to dimmer switch connector terminal 1.
(4) Connect negative (-) probe of multimeter to dimmer switch connector terminal 2 and note reading on multimeter.
(5) If continuity is not present, replace dimmer switch (para 7-12).
(6) If continuity is present, repair wire 1908 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Connect connector PX24 to dimmer switch.
(8) Install instrument panel assembly (para 7-15).



## e21. TACHOMETER DOES NOT ILLUMINATE

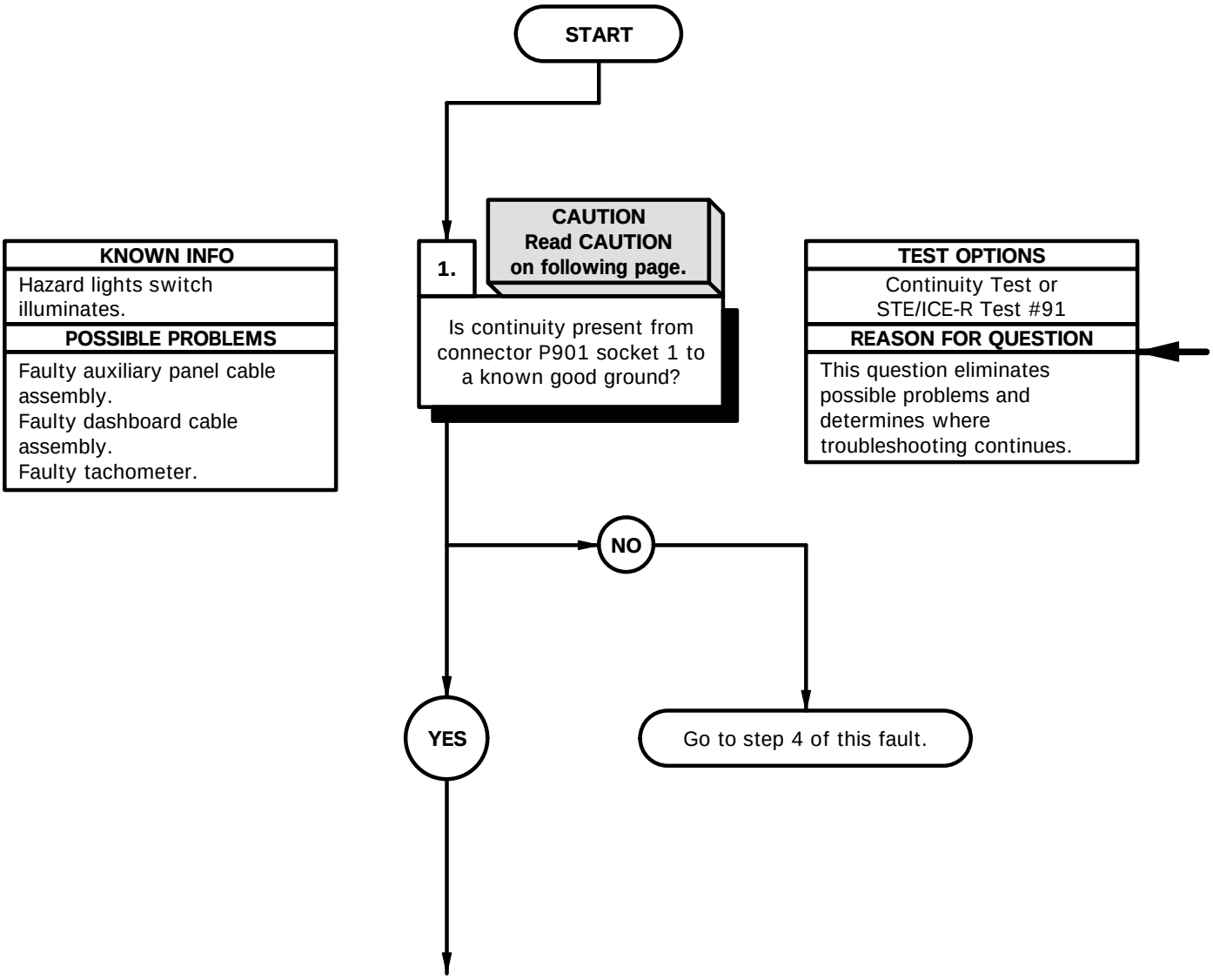
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**CAUTION**

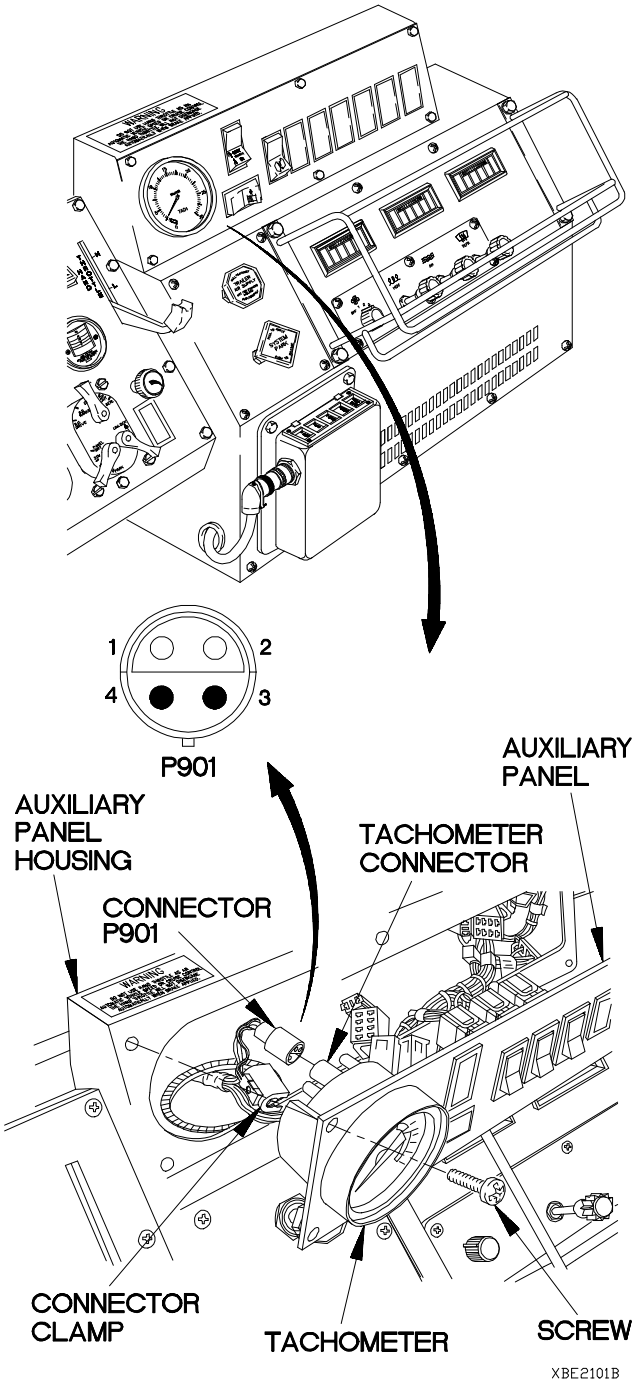
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

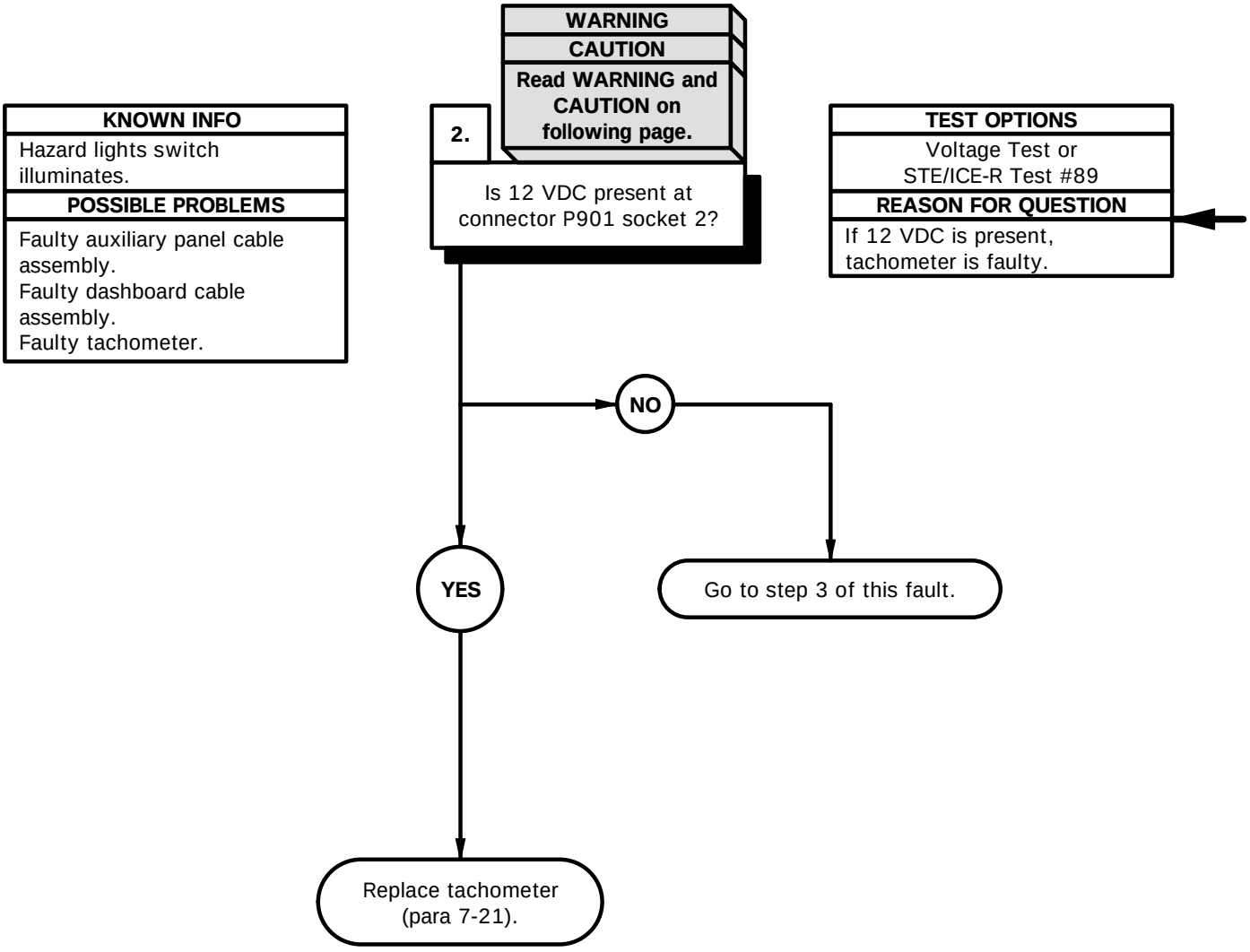
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove six screws from auxiliary panel.
(2) Lift auxiliary panel from auxiliary panel housing to gain access.
(3) Disconnect connector clamp from tachometer connector.
(4) Disconnect connector P901 from tachometer connector.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector P901 socket 1.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If continuity is not present, go to step 4 of this fault.



## e21. TACHOMETER DOES NOT ILLUMINATE (CONT)



**WARNING**

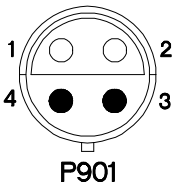
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

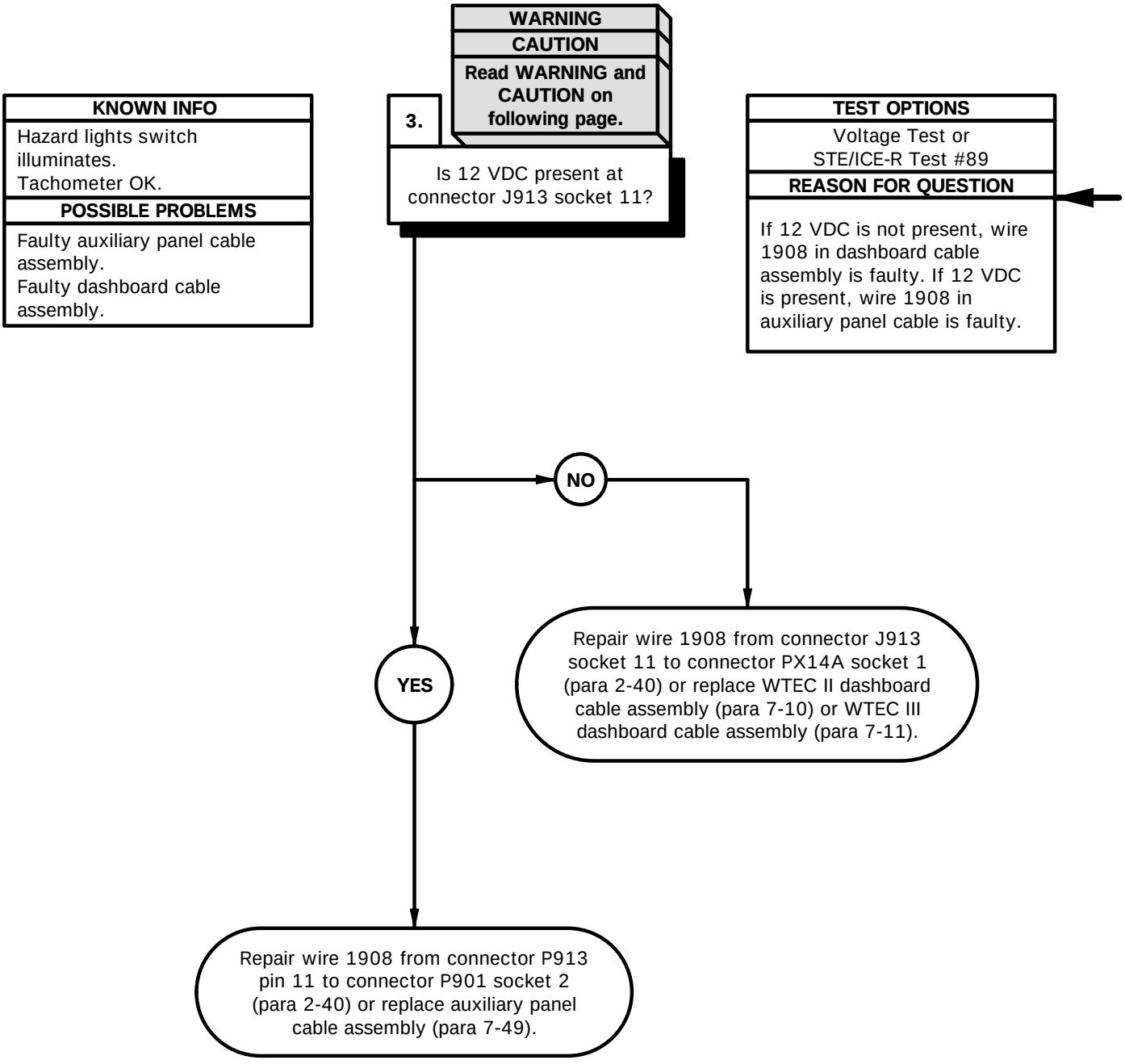
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector P901 socket 2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, go to step 3 of this fault.
(7) If 12 VDC is present, replace tachometer (para 7-21).
(8) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(9) Position main light switch main selector lever to OFF (TM 9-2320-365-10).




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## e21. TACHOMETER DOES NOT ILLUMINATE (CONT)



**WARNING**

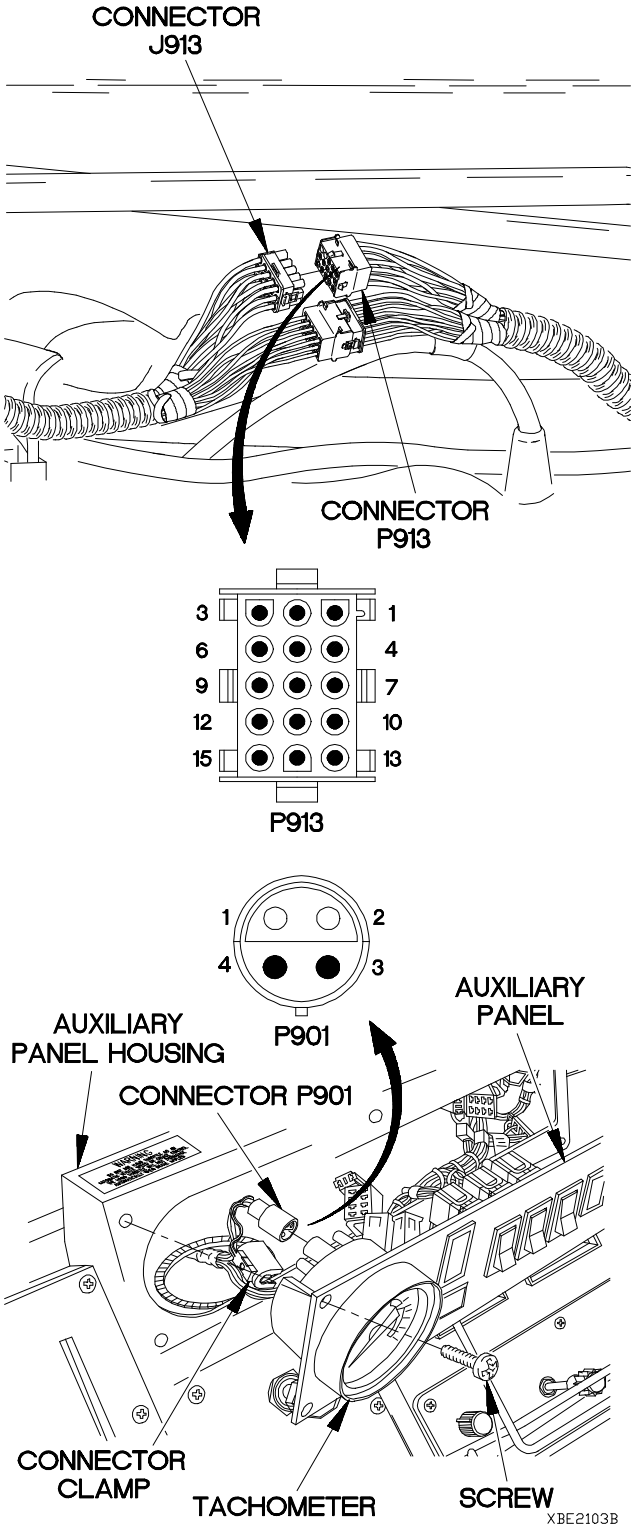
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

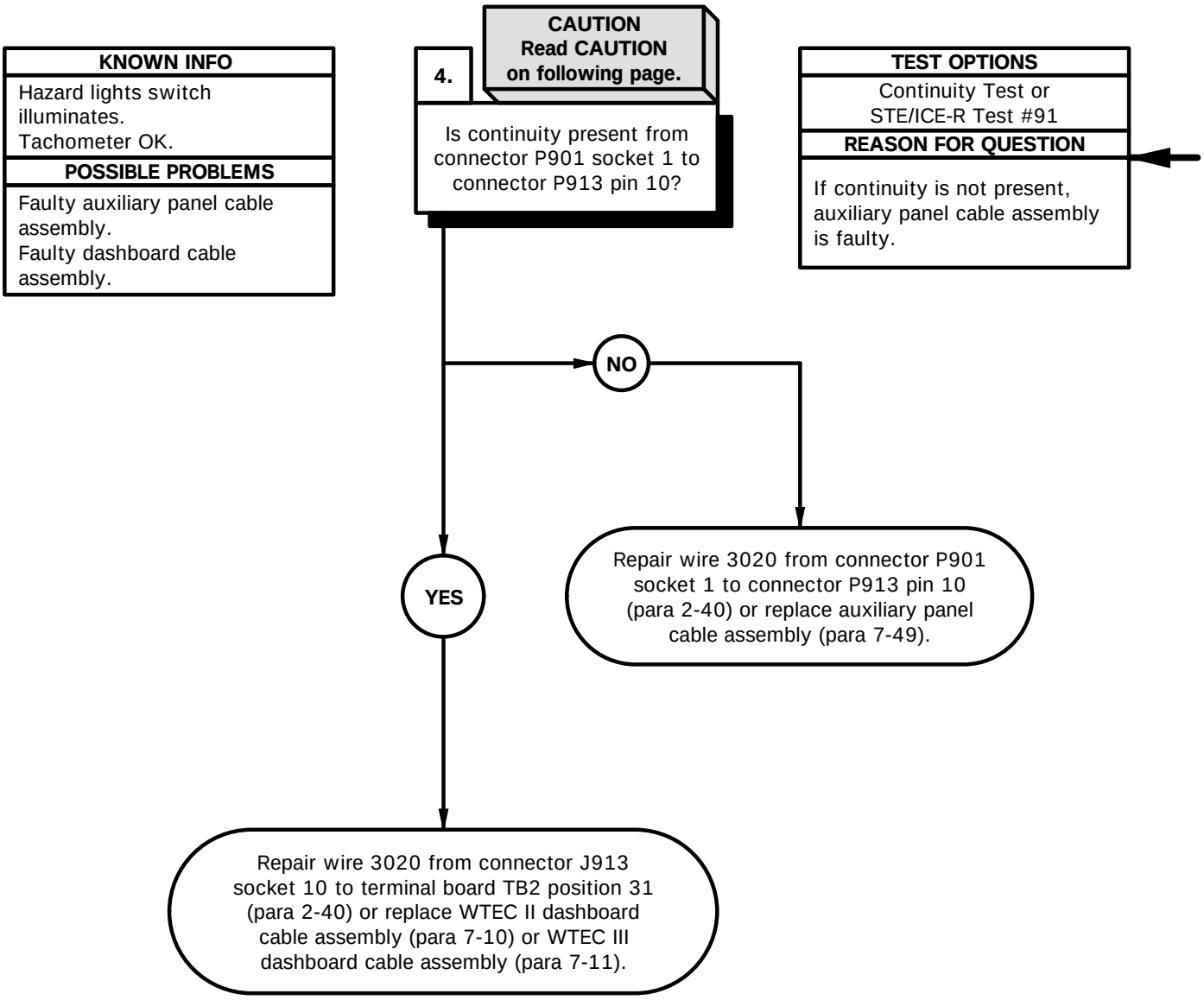
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J913 socket 11.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch main selector lever to SER DRIVE (TM 9-2320-365-10).
(6) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1908 from connector J913 socket 11 to connector PX14A socket 1 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 12 VDC is present, repair wire 1908 from connector P913 pin 11 to connector P901 socket 2 (para 2-40) or replace auxiliary panel cable assembly (para 7-49).
(9) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(10) Position main light switch main selector lever to OFF (TM 9-2320-365-10).
(11) Install personnel heater assembly (para 18-9).



## e21. TACHOMETER DOES NOT ILLUMINATE (CONT)



**CAUTION**

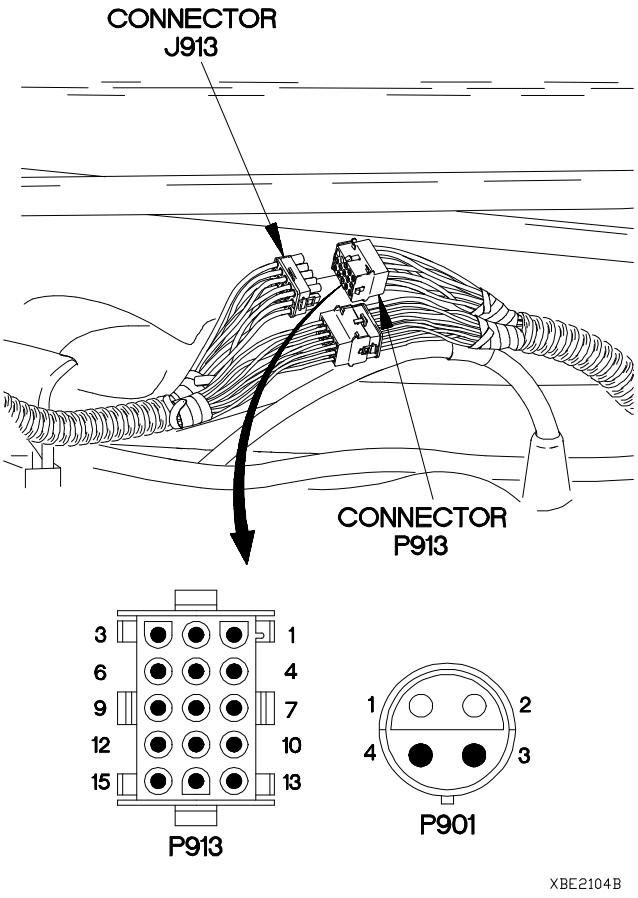
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove personnel heater assembly for access (para 18-9).
(2) Disconnect connector P913 from connector J913.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P901 socket 1.
(5) Connect negative (-) probe of multimeter to connector P913 pin 10 and note reading on multimeter.
(6) If continuity is not present, repair wire 3020 from connector P901 socket 1 to connector P913 pin 10 (para 2-40) or replace auxiliary panel cable assembly (para 7-49).
(7) If continuity is present, repair wire 3020 from connector J913 socket 10 to terminal board TB2 position 31 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Install personnel heater assembly (para 18-9).



**e22. AUXILIARY PANEL SWITCH DOES NOT ILLUMINATE**

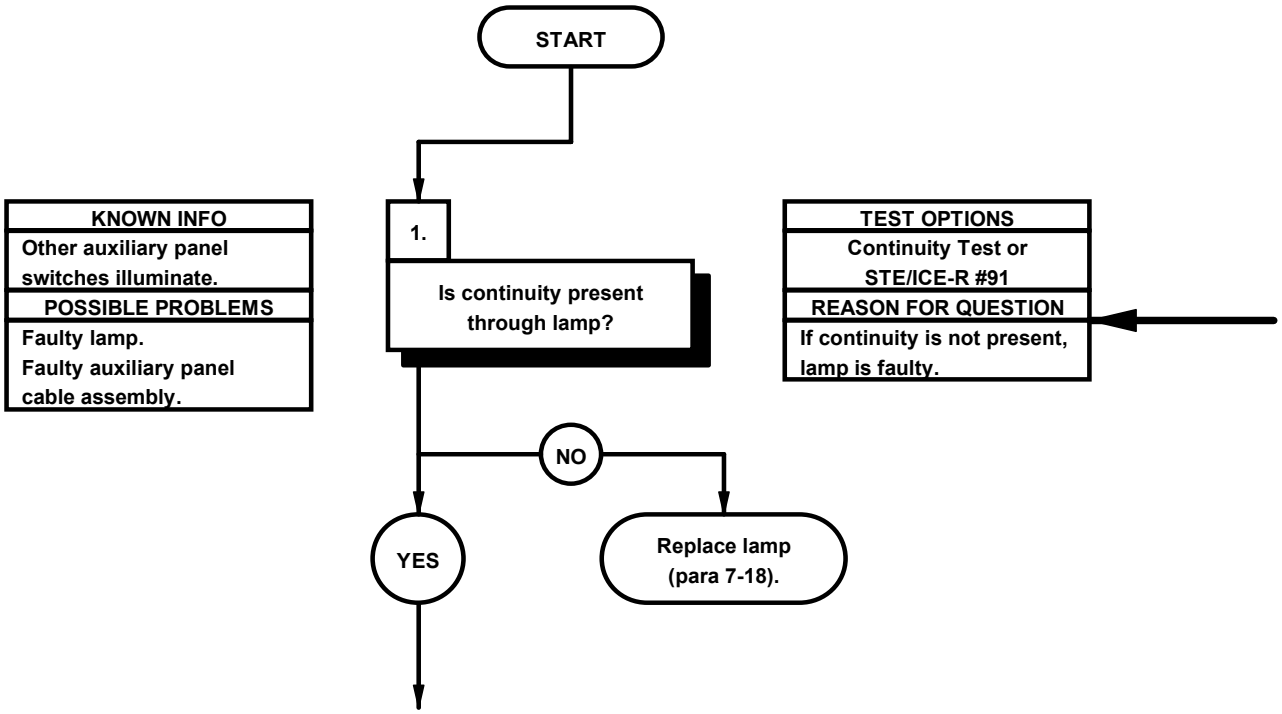
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)



**NOTE**

**All auxiliary panel switch illumination faults are traced the same way. Power Take-Off (PTO) switch shown.**

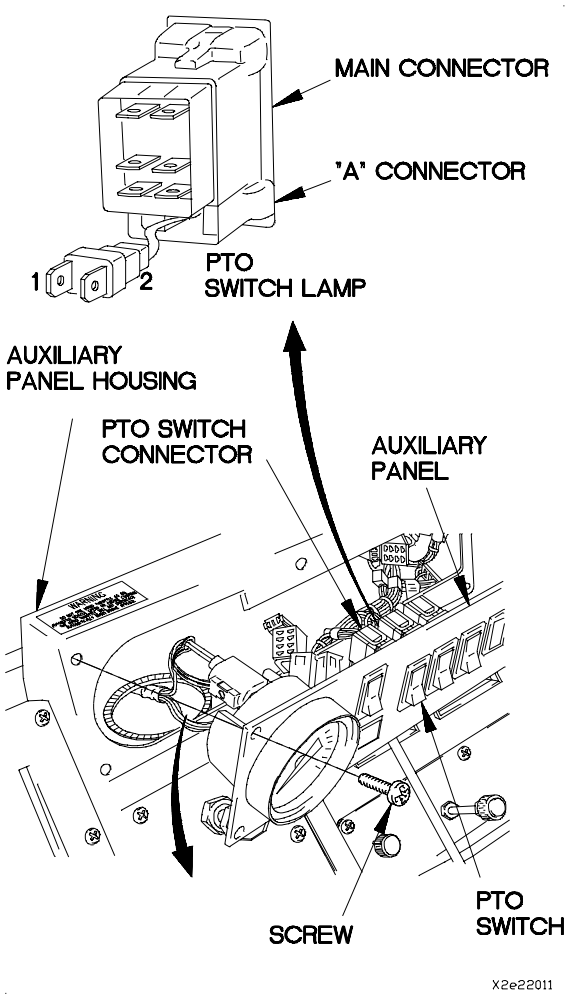
**CONTINUITY TEST**

**(1) Remove six screws from auxiliary panel.**
**(2) Lift auxiliary panel from auxiliary panel housing to gain access.**

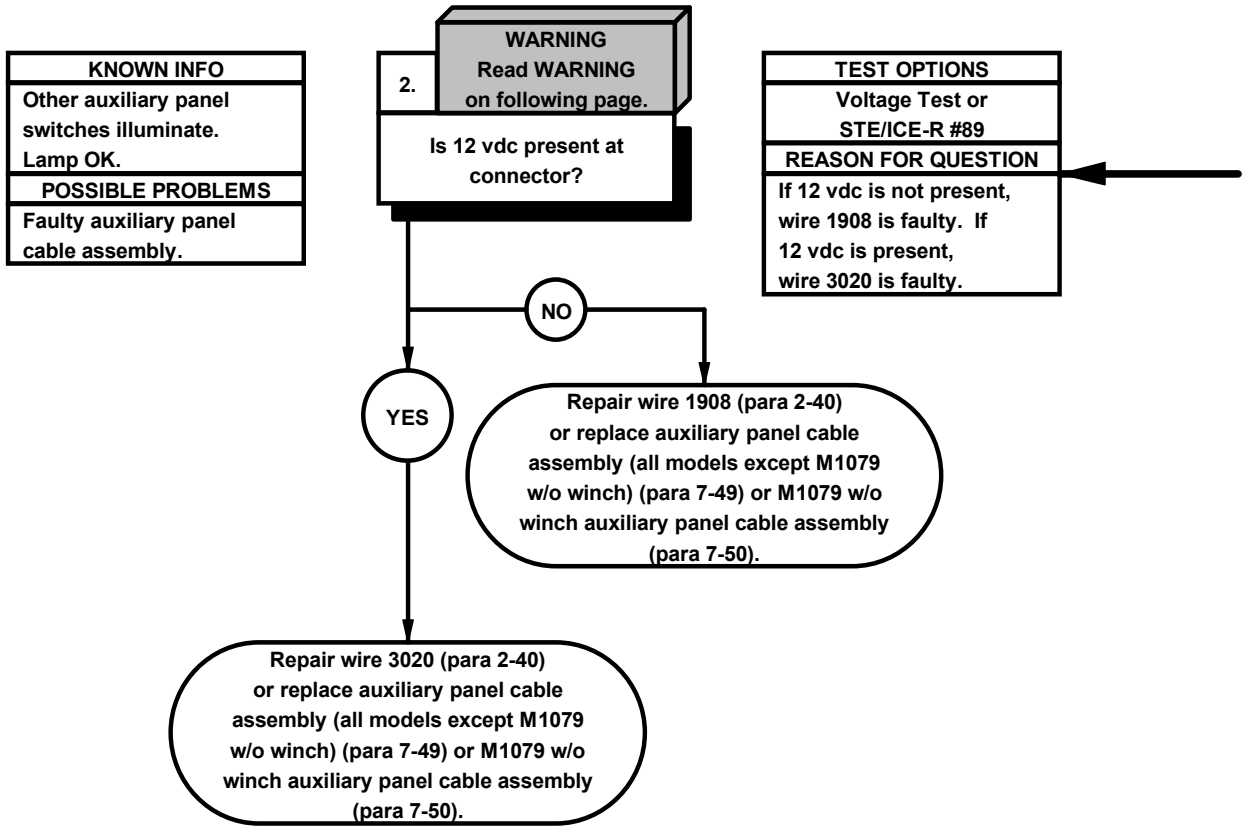
**NOTE**

**Main connector and "A" connector will come off as a unit.**

**(3) Disconnect PTO switch connector from PTO switch.**
**(4) Set multimeter to ohms.**
**(5) Connect positive (+) probe of multimeter to PTO switch lamp terminal 1.**
**(6) Connect negative (-) probe of multimeter to PTO switch lamp terminal 2 and note reading on multimeter.**
**(7) If continuity is not present, replace lamp (para 7-18).**



## e22. AUXILIARY PANEL SWITCH DOES NOT ILLUMINATE (CONT)

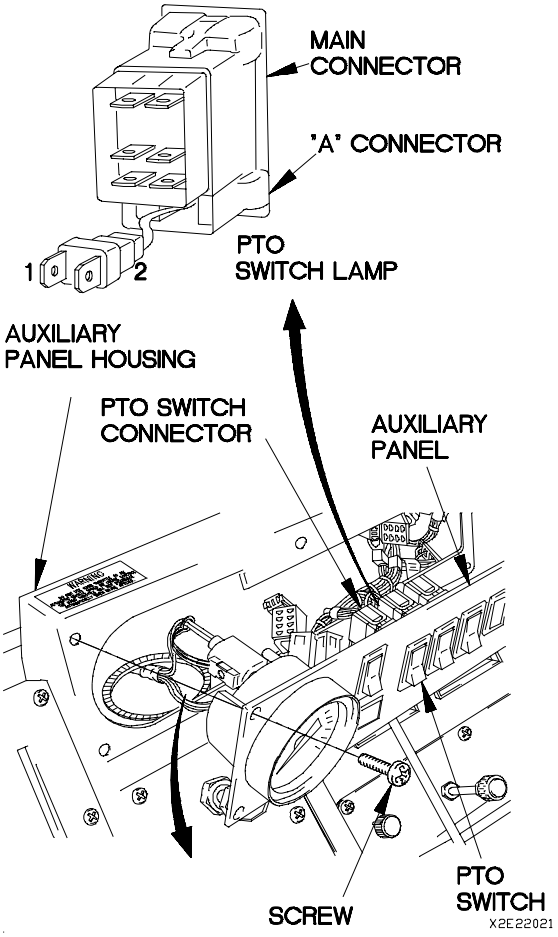


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to "A" switch connector terminal 1.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch auxiliary lever to PANEL BRT (TM 9-2320-365-10).
(5) Position dimmer switch to maximum brightness (TM 9-2320-365-10).
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 vdc is not present, repair wire 1908 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49) or M1079 w/o winch auxiliary panel cable assembly (para 7-50).
(8) If 12 vdc is present, repair wire 3020 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49) or M1079 w/o winch auxiliary panel cable assembly (para 7-50).
(9) Position main light switch to OFF (TM 9-2320-365-10).
(10) Connect PTO switch connector to PTO switch.
(11) Position auxiliary panel on auxiliary panel housing with six screws.
(12) Tighten six screws to 24 lb-in. (3 N·m).



## e23. AUXILIARY PANEL DOES NOT ILLUMINATE

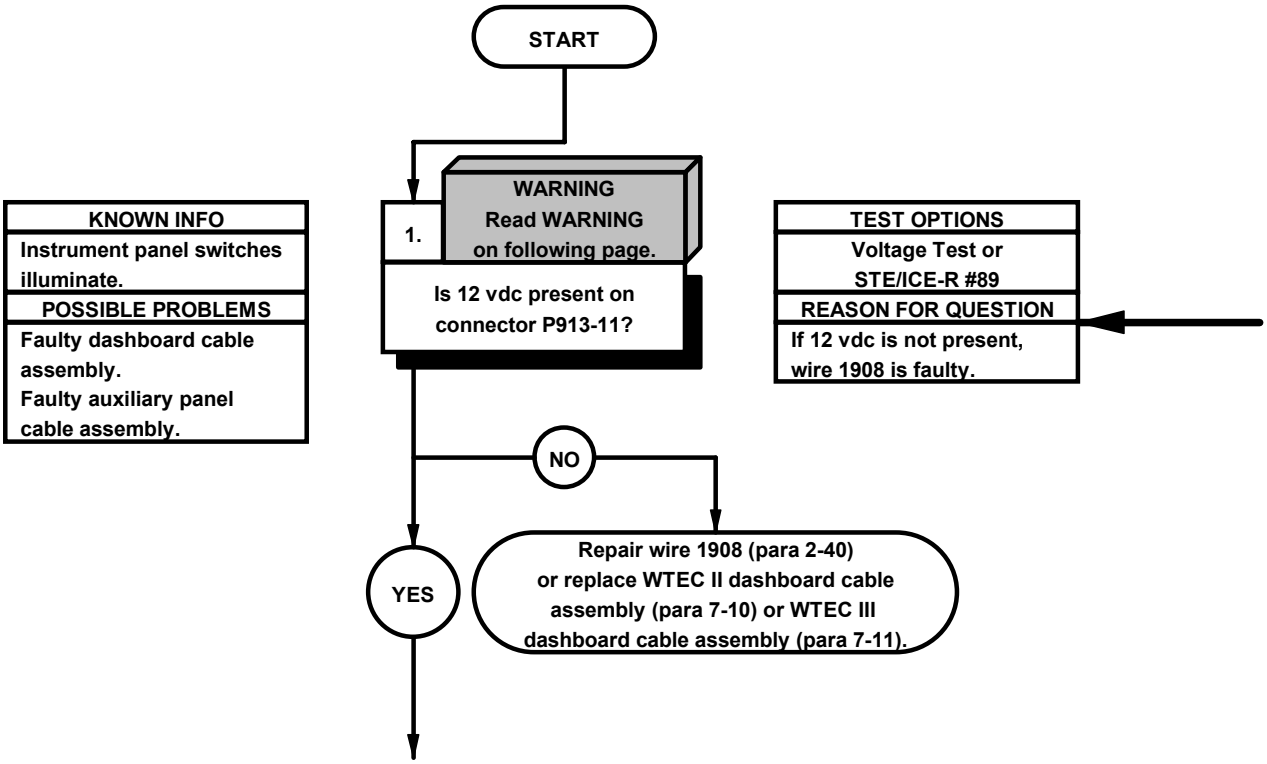
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

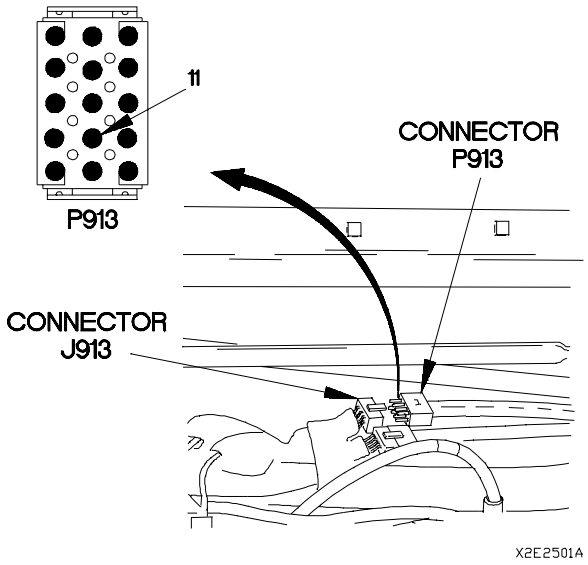


**WARNING**

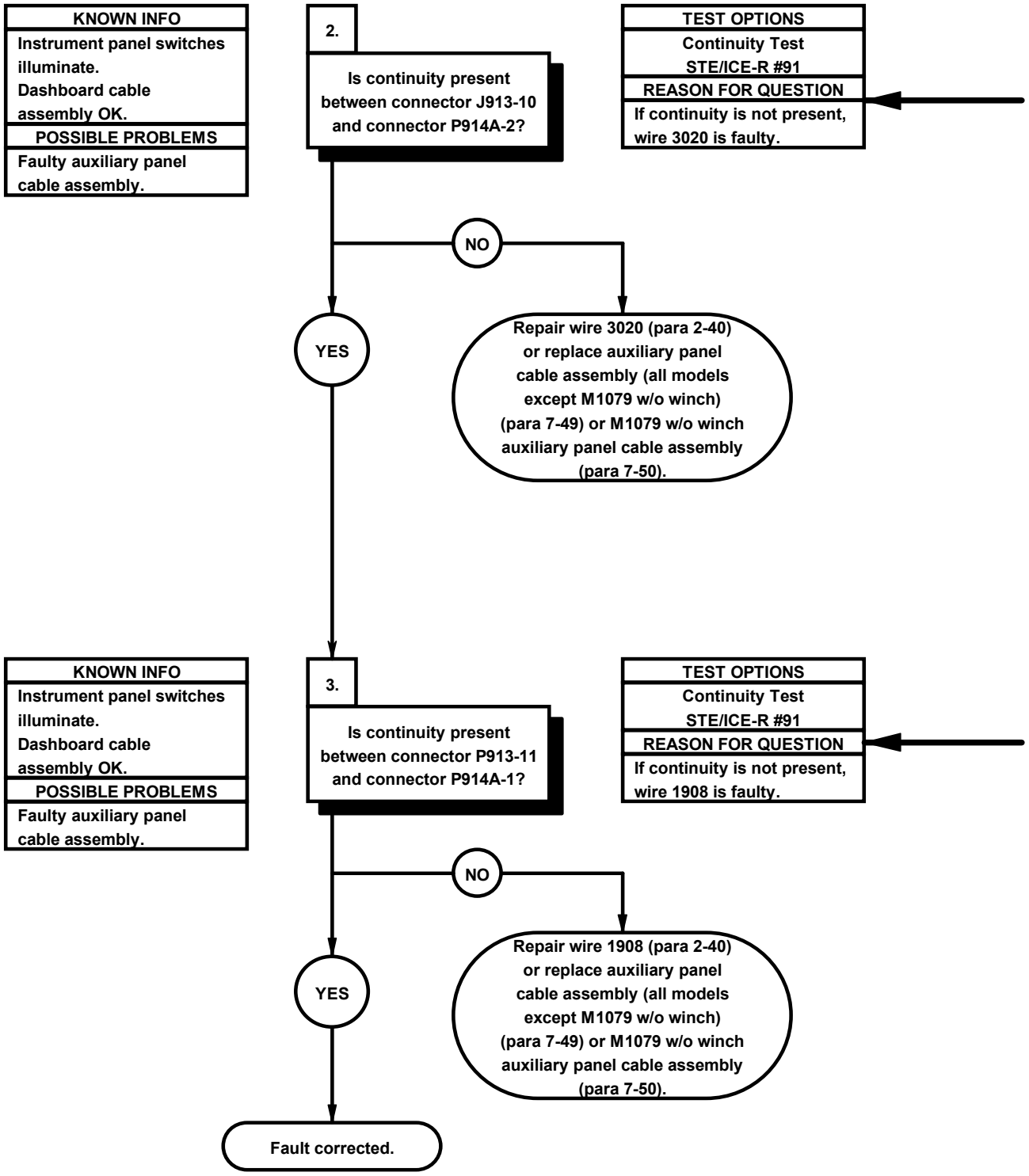
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Remove personnel heater for access (para 18-9).**
**(2) Disconnect connector J913 from connector P913.**
**(3) Set multimeter to volts dc.**
**(4) Connect positive (+) probe of multimeter to connector P913-11.**
**(5) Connect negative (-) probe of multimeter to ground.**
**(6) Position main light switch to STOP LIGHT and PANEL BRIGHT (TM 9-2320-365-10) and note reading on multimeter.**
**(7) If 12 vdc is not present, repair wire 1908 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).**
**(8) Position main light switch to OFF (TM 9-2320-365-10).**



## e23. AUXILIARY PANEL DOES NOT ILLUMINATE (CONT)

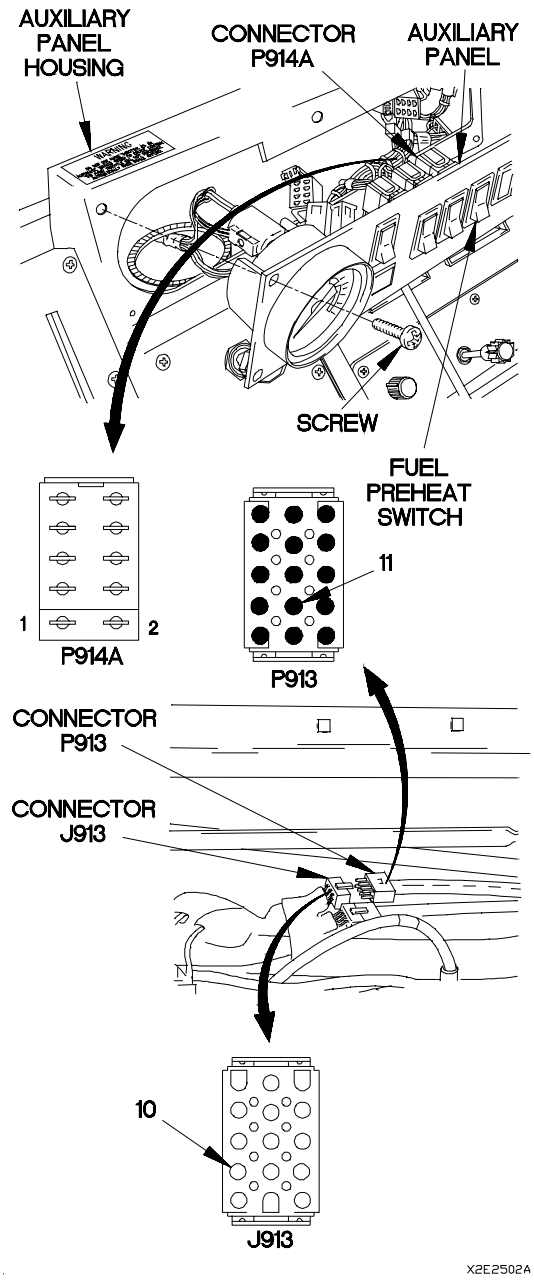


**CONTINUITY TEST**

(1) Remove six screws from auxiliary panel.
(2) Lift auxiliary panel from auxiliary panel housing to gain access.
(3) Disconnect connector P914A from fuel preheat switch, if equipped.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector J913-10.
(6) Connect negative (-) probe of multimeter to connector P914A-2 and note reading on multimeter.
(7) If continuity is not present, repair wire 3020 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49) or M1079 w/o winch auxiliary panel cable assembly (para 7-50).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P913-11.
(3) Connect negative (-) probe of multimeter to connector P914A-1 and note reading on multimeter.
(4) If continuity is not present, repair wire 1908 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49) or M1079 w/o winch auxiliary panel cable assembly (para 7-50).
(5) Connect connector P914A to fuel preheat switch, if equipped.
(6) Position auxiliary panel housing on auxiliary panel with six screws.
(7) Tighten six screws to 24 lb-in. (3 N·m).
(8) Connect connector P913 to connector J913.
(9) Install personnel heater (para 18-9).



**e24. HIGH ENGINE TEMPERATURE INDICATOR DOES NOT OPERATE**

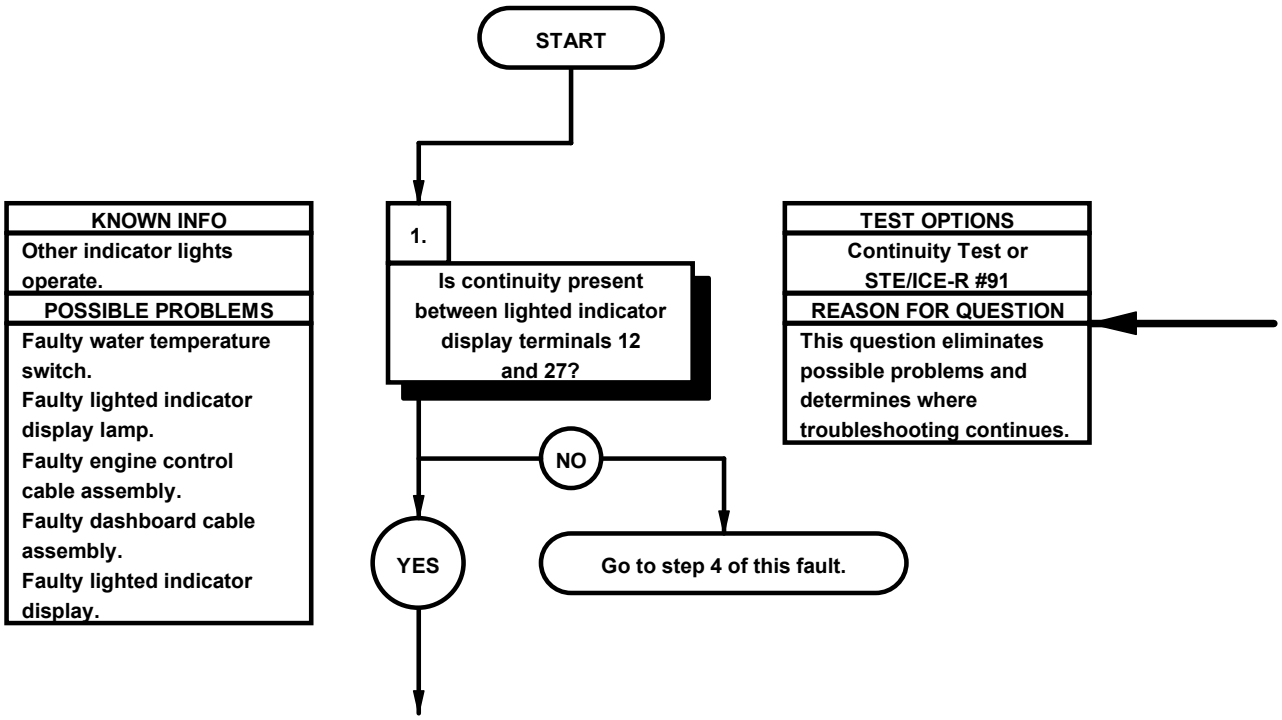
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

**Personnel Required**
(2)

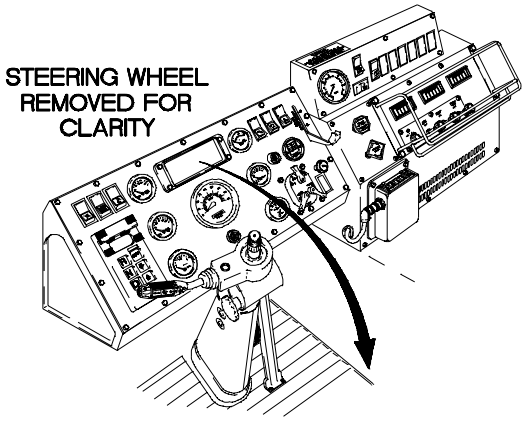
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

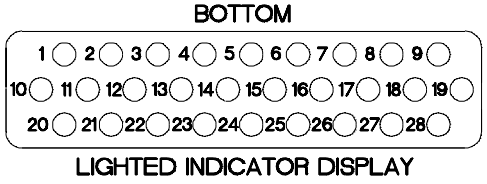
**References**
TM 9-4910-571-12&P

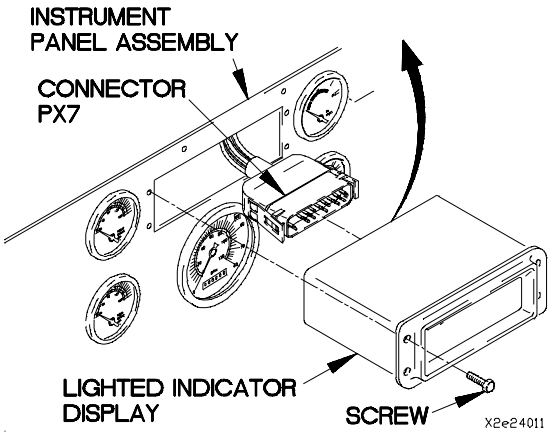


**CONTINUITY TEST**

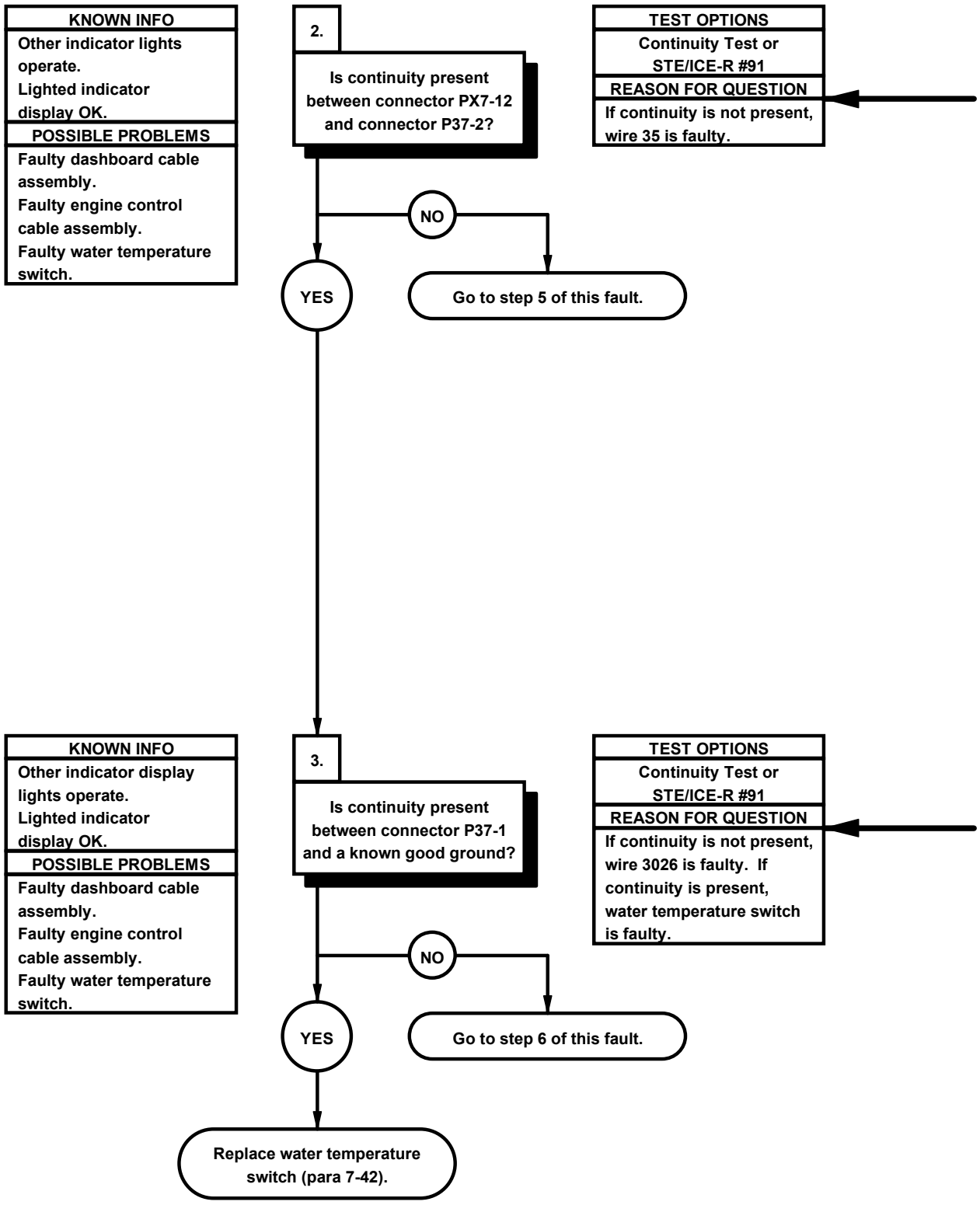
(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to lighted indicator display terminal 27.
(6) Connect negative (-) probe of multimeter to lighted indicator display terminal 12 and note reading on multimeter.
(7) If continuity is not present, go to step 4 of this fault.



## e24. HIGH ENGINE TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)

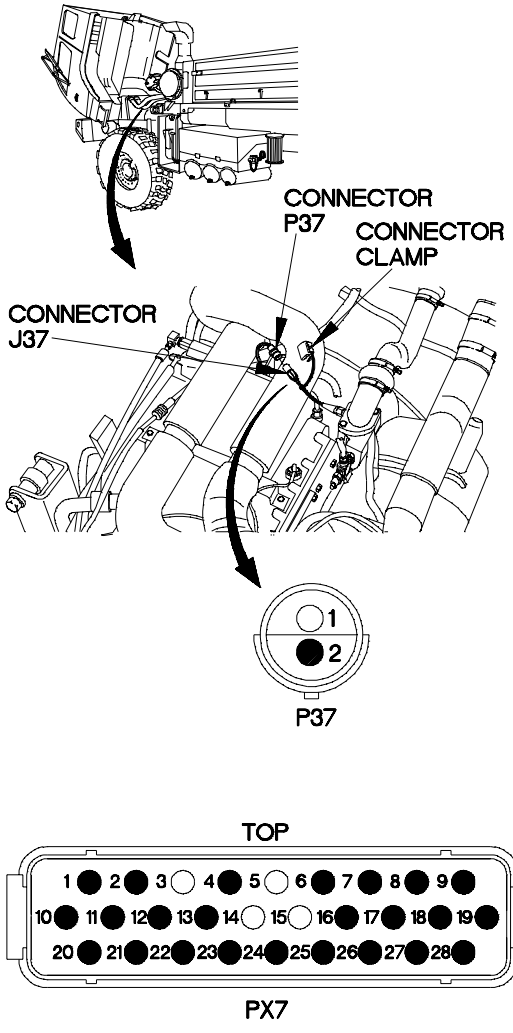


**CONTINUITY TEST**

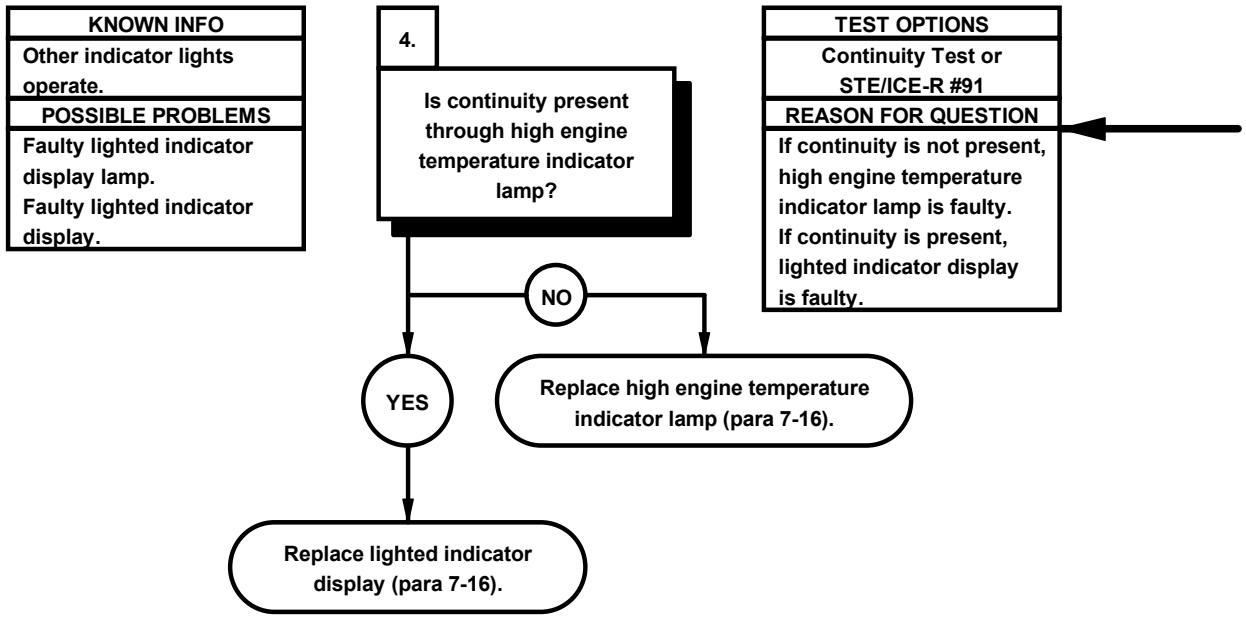
(1) Raise cab (TM 9-2320-365-10).
(2) Set multimeter to ohms.
(3) Disconnect connector clamp from connector J37.
(4) Disconnect connector P37 from connector J37.
(5) Connect positive (+) probe of multimeter to connector P37-2.
(6) Connect negative (-) probe of multimeter to connector PX7-12 and note reading on multimeter.
(7) If continuity is not present, go to step 5 of this fault.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P37-1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, go to step 6 of this fault.
(5) If continuity is present, replace water temperature switch (para 7-42).
(6) Connect connector P37 to connector J37.
(7) Connect connector clamp on connector J37.
(8) Lower cab (TM 9-2320-365-10).

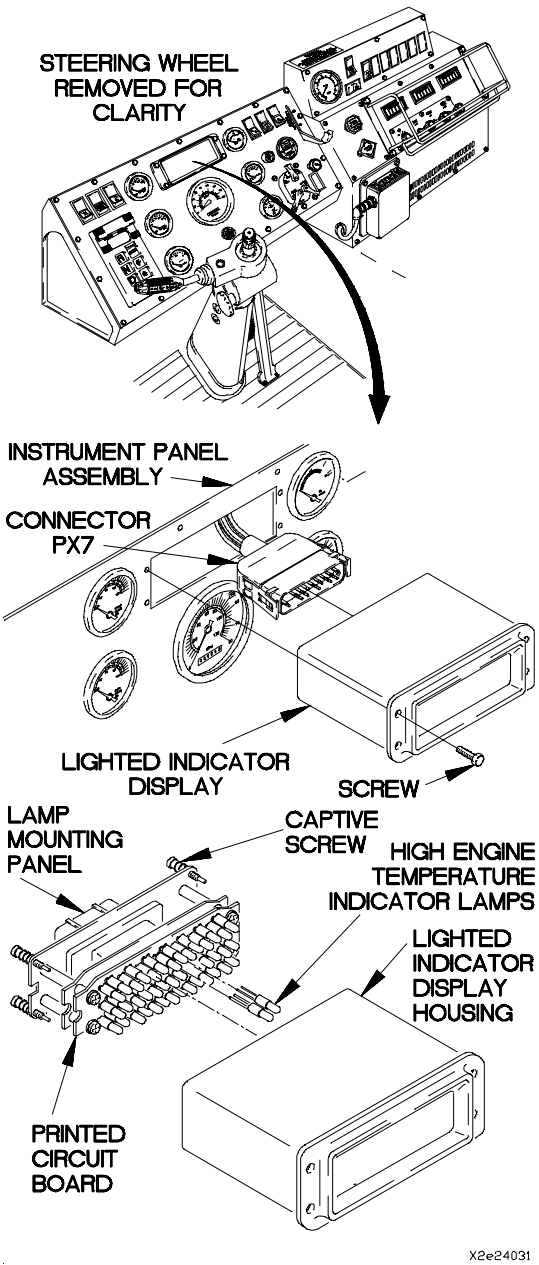


## e24. HIGH ENGINE TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)

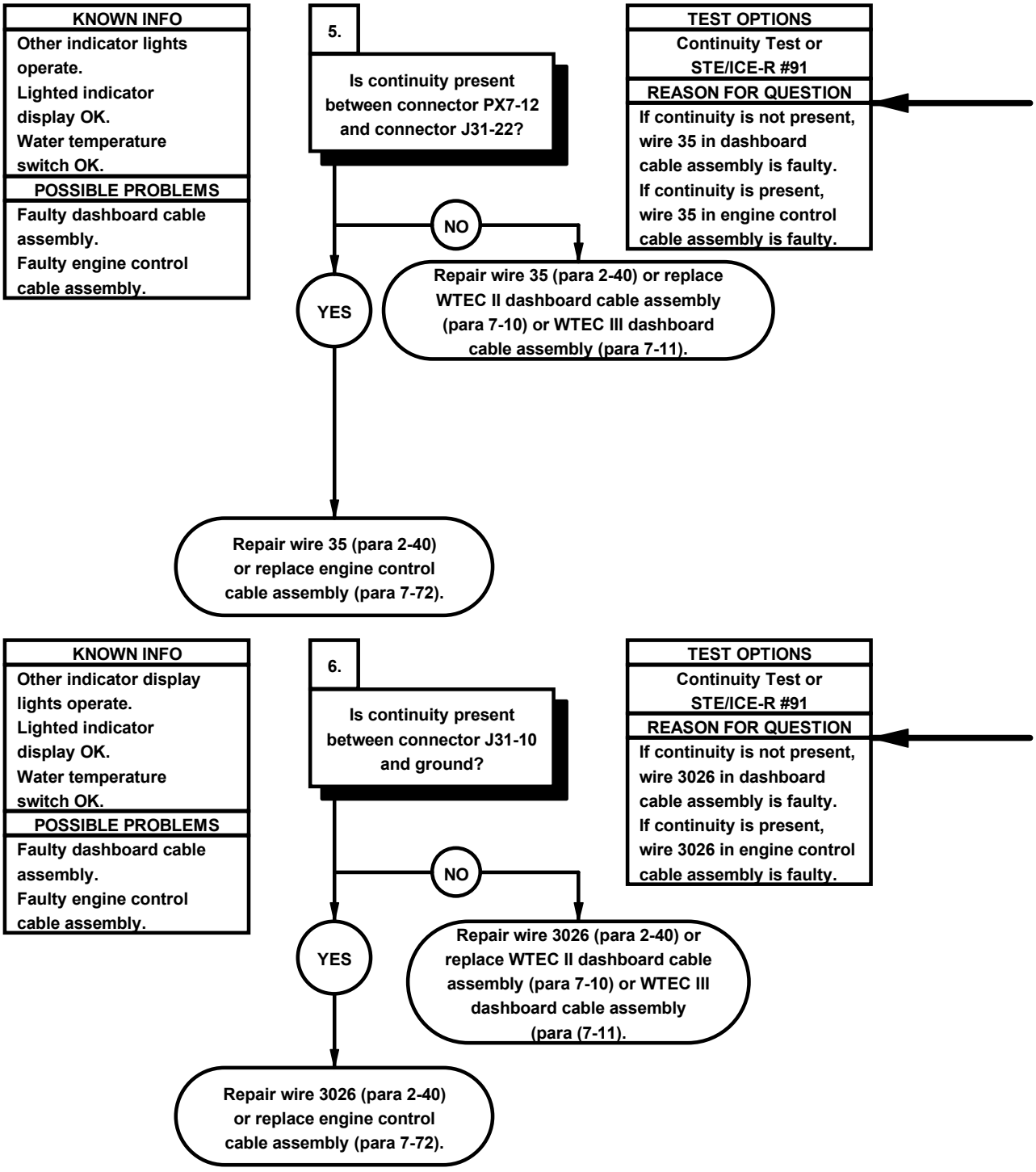


**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove high engine temperature lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each high engine temperature indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace lamp (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install high engine temperature lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



## e24. HIGH ENGINE TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)

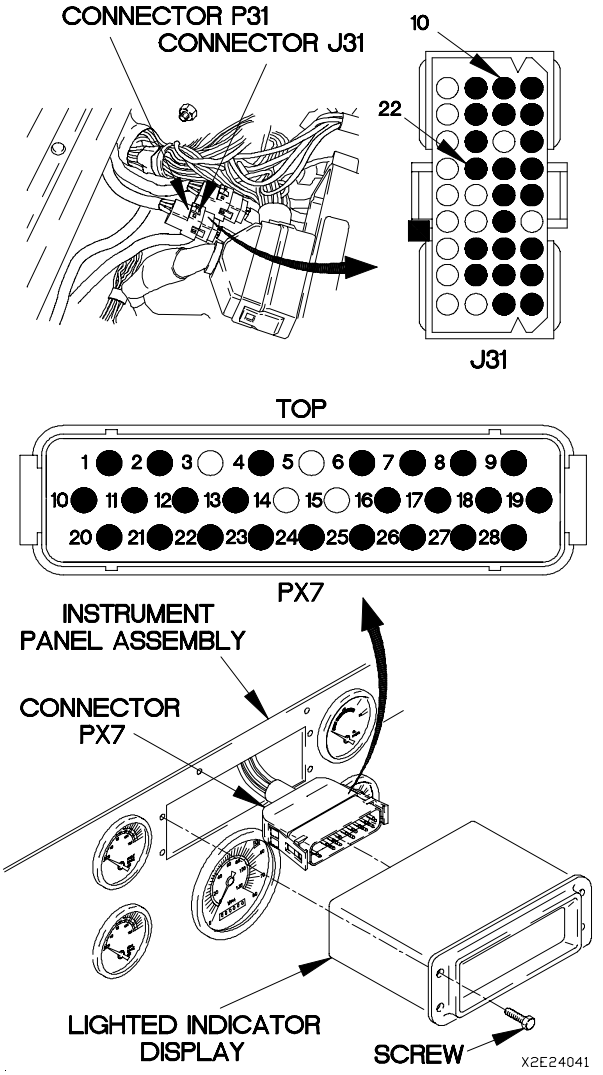


**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Set multimeter to ohms.
(3) Disconnect connector J31 from connector P31.
(4) Connect positive (+) probe of multimeter to connector PX7-12.
(5) Connect negative (-) probe of multimeter to connector J31-22 and note reading on multimeter.
(6) If continuity is not present, repair wire 35 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para (7-11).
(7) If continuity is present, repair wire 35 (para 2-40) or replace engine control cable assembly (para 7-72).
(8) Connect connector J31 to connector P31.
(9) Install instrument panel assembly (para 7-15).
(10) Connect lighted indicator display to connector PX7.
(11) Position lighted indicator display in instrument panel assembly with four screws.
(12) Tighten four screws to 6-10 lb-in. (1 N·m).
(13) Connect batteries (para 7-48).

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Set multimeter to ohms.
(3) Disconnect connector J31 from connector P31.
(4) Connect positive (+) probe of multimeter to connector J31-10.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, repair wire 3026 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, repair wire 3026 (para 2-40) or replace engine control cable assembly (para 7-72).
(8) Connect connector J31 to connector P31.
(9) Install instrument panel assembly (para 7-15).
(10) Connect lighted indicator display to connector PX7.
(11) Position lighted indicator display in instrument panel assembly with four screws.
(12) Tighten four screws to 6-10 lb-in. (1 N·m).
(13) Connect batteries (para 7-48).



## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES

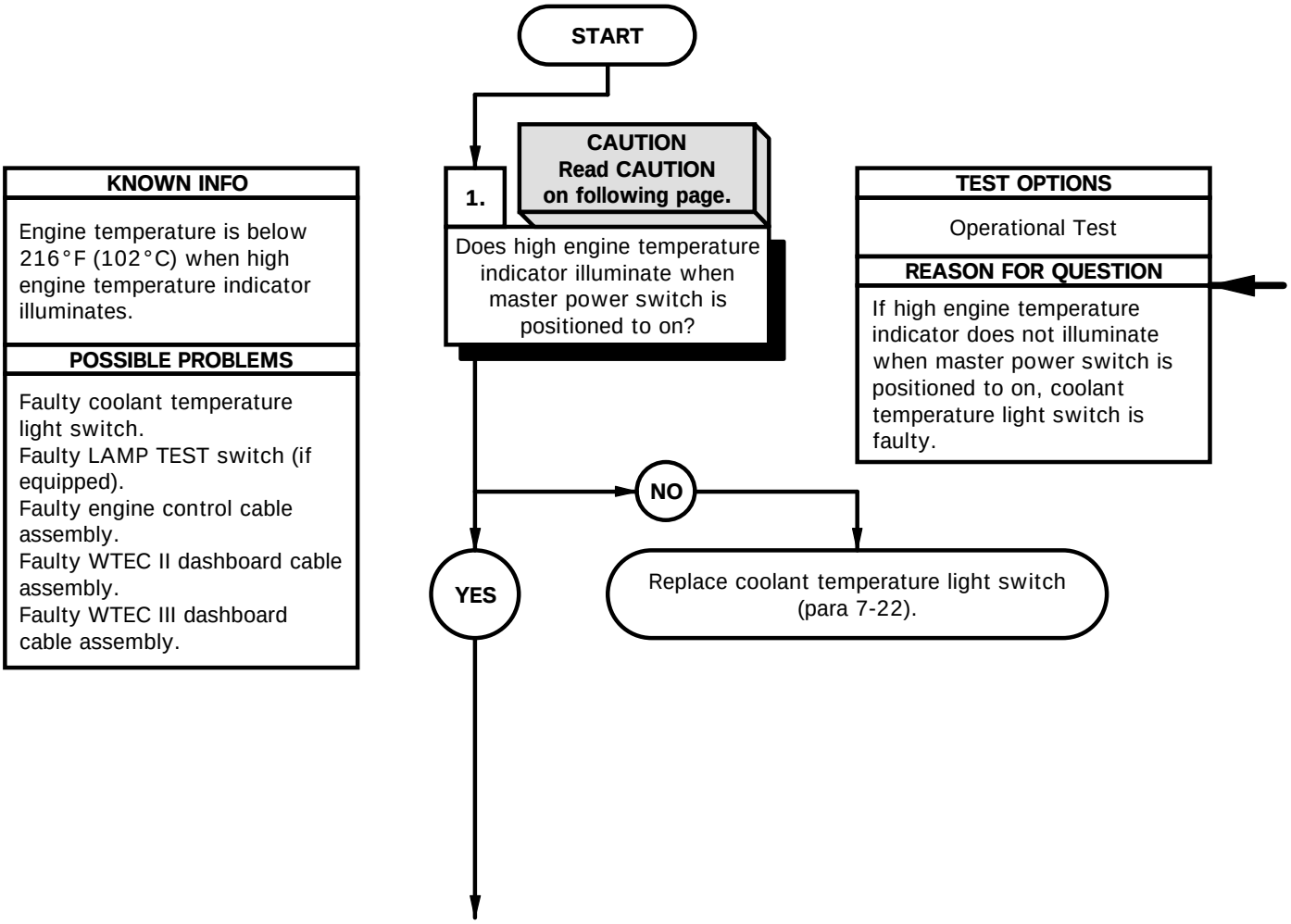
**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



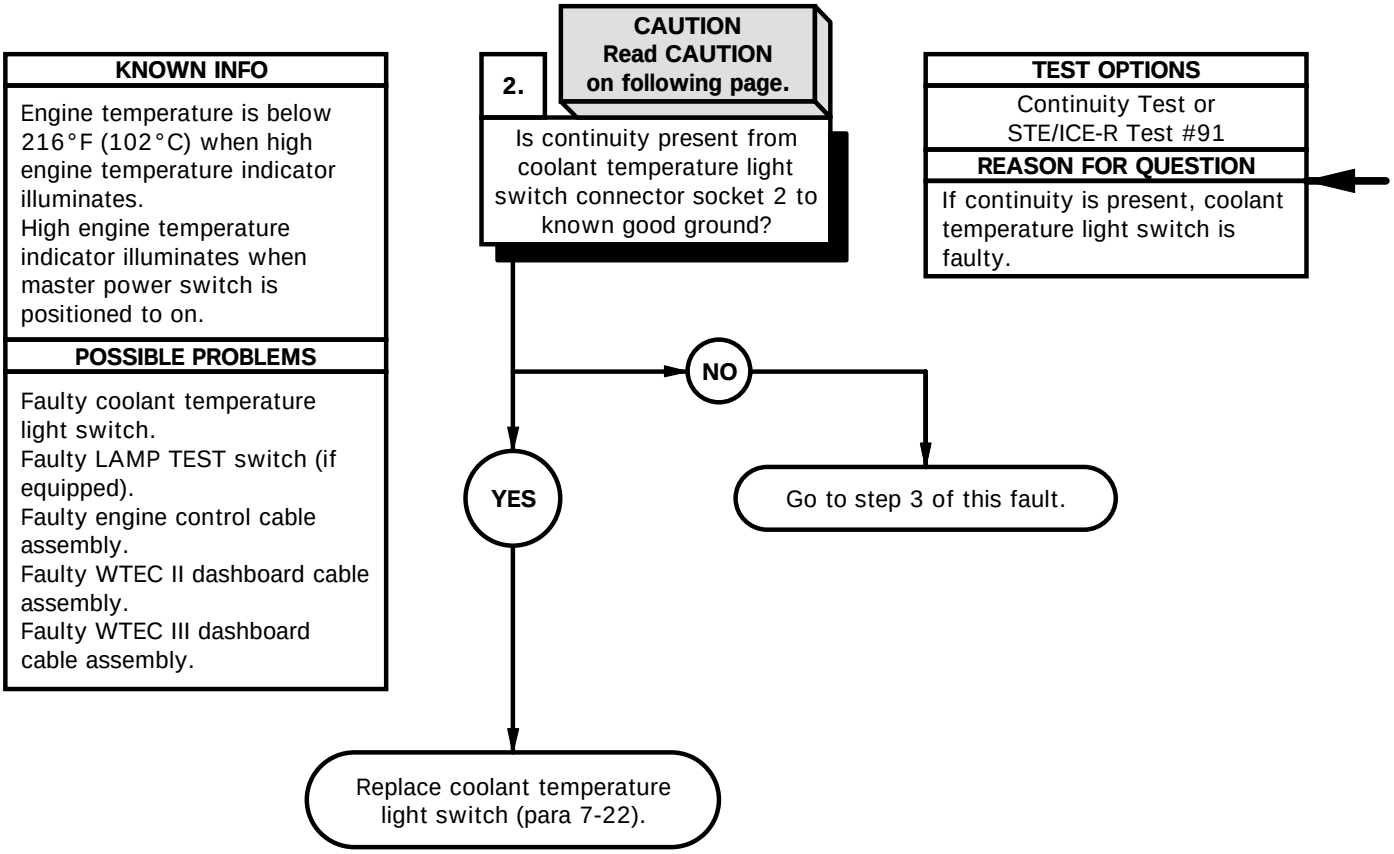
**CAUTION**

Ensure engine has cooled before performing this troubleshooting task. Failure to comply may result in incorrect test results.

**OPERATIONAL TEST**

(1) Position master power switch to on (TM 9-2320-365-10).
(2) Check to see if high engine temperature indicator illuminates (TM 9-2320-365-10).
(3) If high engine temperature indicator illuminates, replace coolant temperature light switch (para 7-22).
(4) Position master power switch to off (TM 9-2320-365-10).

## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)



**CAUTION**

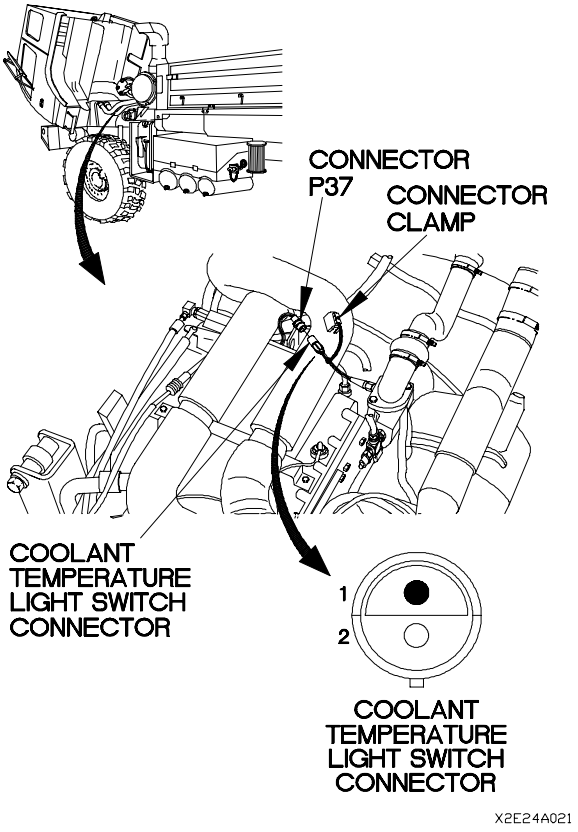
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

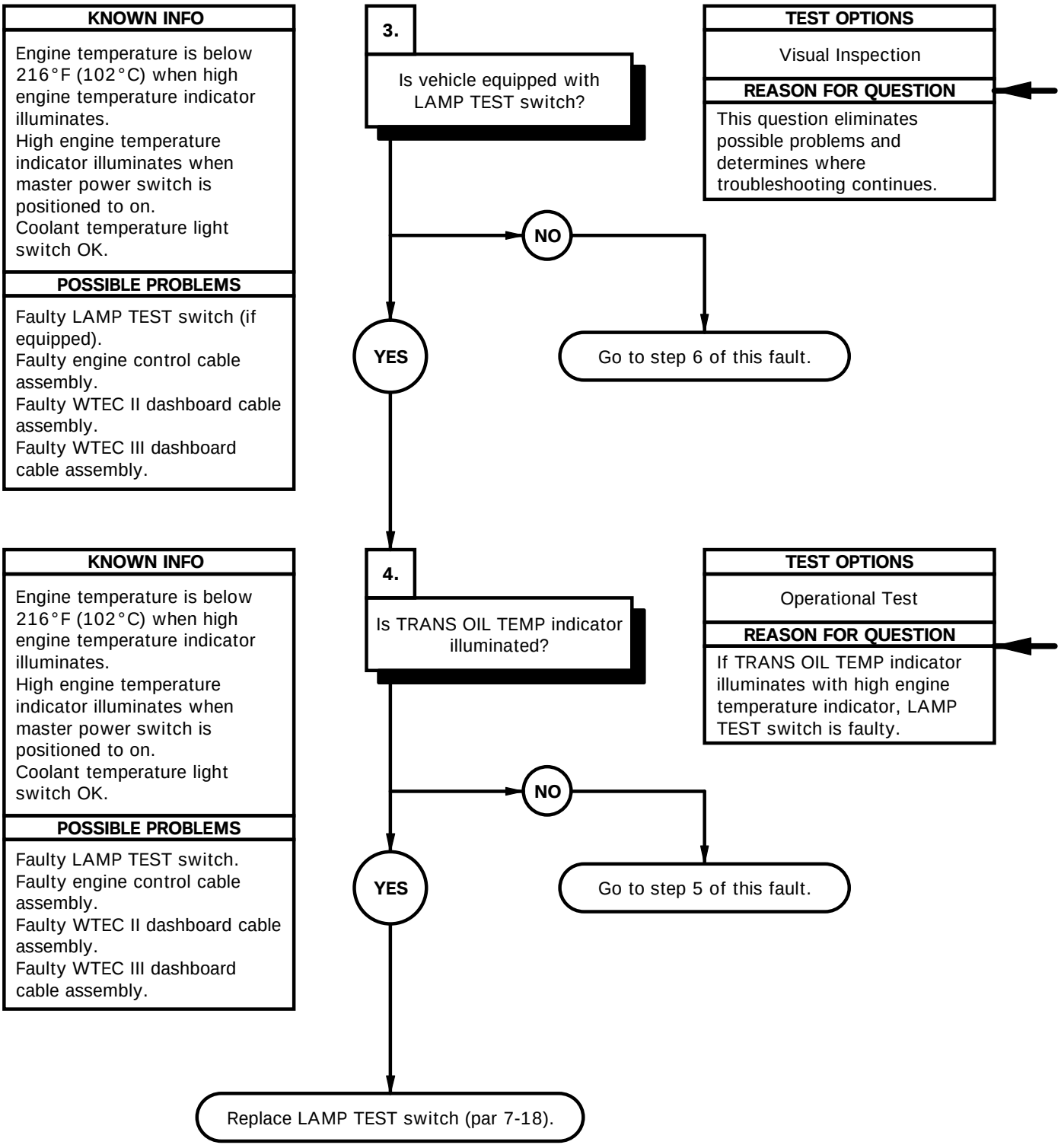
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Disconnect connector clamp from coolant temperature light switch connector,
(3) Disconnect connector P37 from coolant temperature light switch.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to coolant temperature light switch connector socket 2.
(6) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(7) If continuity is not present, go to step 3 of this Fault.
(8) If continuity is present, replace coolant temperature light switch (para 7-22).
(9) Connect connector P37 to coolant temperature light switch.
(10) Connect connector clamp to coolant temperature light switch connector.
(11) Lower cab (TM 9-2320-365-10).



## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)

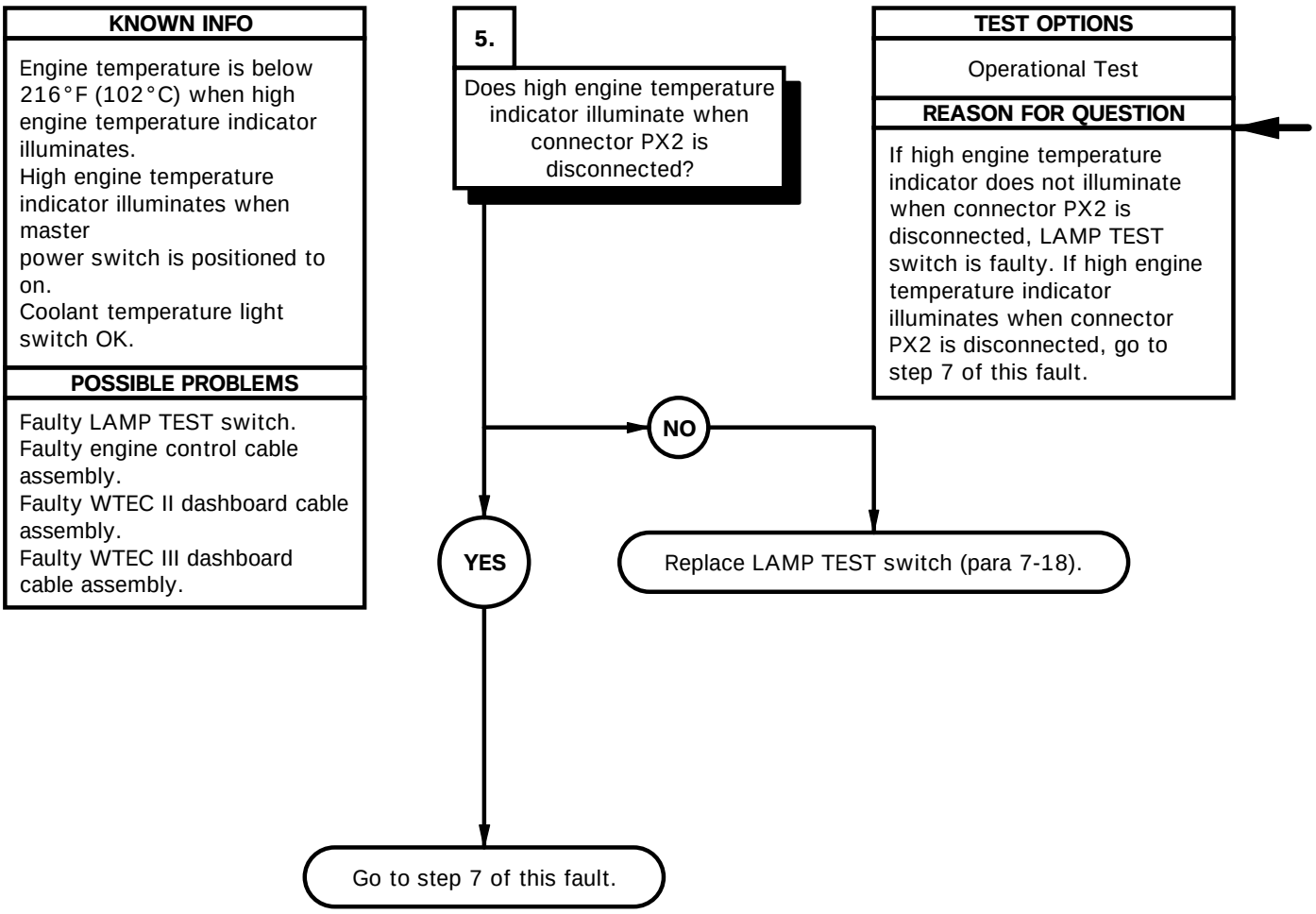


(1) Check to see if vehicle is equipped with LAMP TEST switch (TM 9-2320-365-10).
(2) If vehicle is not equipped with LAMP TEST switch go to step 6 of this fault.

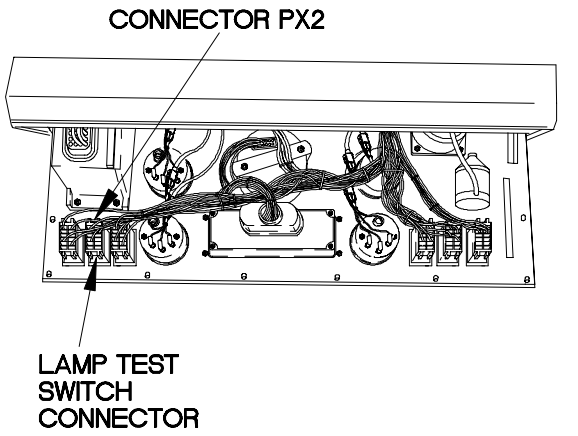
**OPERATIONAL TEST**

(1) Position master power switch to on (TM 9-2320-365-10).
(2) Check to see if TRANS OIL TEMP indicator illuminates (TM 9-2320-365-10).
(3) If TRANS OIL TEMP indicator does not illuminate, go to step 5 of this fault.
(4) If TRANS OIL TEMP indicator illuminates, replace LAMP TEST switch (para 7-18).
(5) Position master power switch to off (TM 9-2320-365-10).

## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)



| OPERATIONAL TEST |
| --- |
| (1) Remove instrument panel for access (para 7-15).<br>(2) Disconnect connector PX2 from LAMP TEST switch connector.<br>(3) Position master power switch to on (TM 9-2320-365-10).<br>(4) Check to see if high engine temperature indicator illuminates (TM 9-2320-365-10).<br>(5) If high engine temperature indicator does not illuminate, replace LAMP TEST switch (para 7-18).<br>(6) If high engine temperature indicator illuminates, go to step 7 of this fault. |



## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)

**KNOWN INFO**

Engine temperature is below 216°F (102°C) when high engine temperature indicator illuminates.
High engine temperature indicator illuminates when master power switch is positioned to on.
Coolant temperature light switch OK.

**POSSIBLE PROBLEMS**

Faulty engine control cable assembly.
Faulty WTEC II dashboard cable assembly.
Faulty WTEC III dashboard cable assembly.

**6.** Is vehicle equipped with connector PX2?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to step 9 of this fault.

YES

**KNOWN INFO**

Engine temperature is below 216°F (102°C) when high engine temperature indicator illuminates.
High engine temperature indicator illuminates when master power switch is positioned to on.
Coolant temperature light switch OK.
LAMP TEST switch OK (if equipped).

**POSSIBLE PROBLEMS**

Faulty engine control cable assembly.
Faulty WTEC II dashboard cable assembly.
Faulty WTEC III dashboard cable assembly.

**WARNING**
**Read WARNING on following page.**

**7.** Is 24 VDC present at connector J31 pin 22?

**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

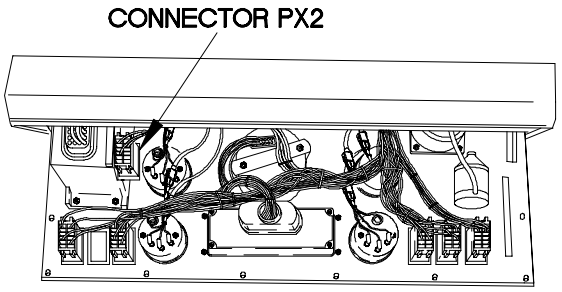
**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

NO → Go to step 10 of this fault.

YES

(1) Remove instrument panel assembly for access (para 7-15).
(2) Check to see if connector PX2 is in dashboard.
(3) If vehicle is not equipped with connector PX2, go step 9 of this fault.



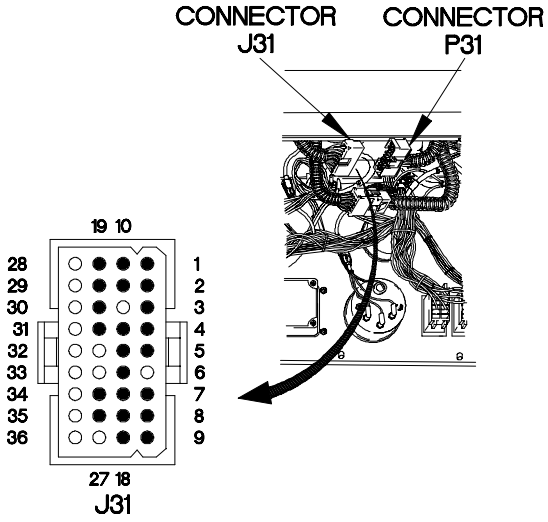

X2E24A061

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

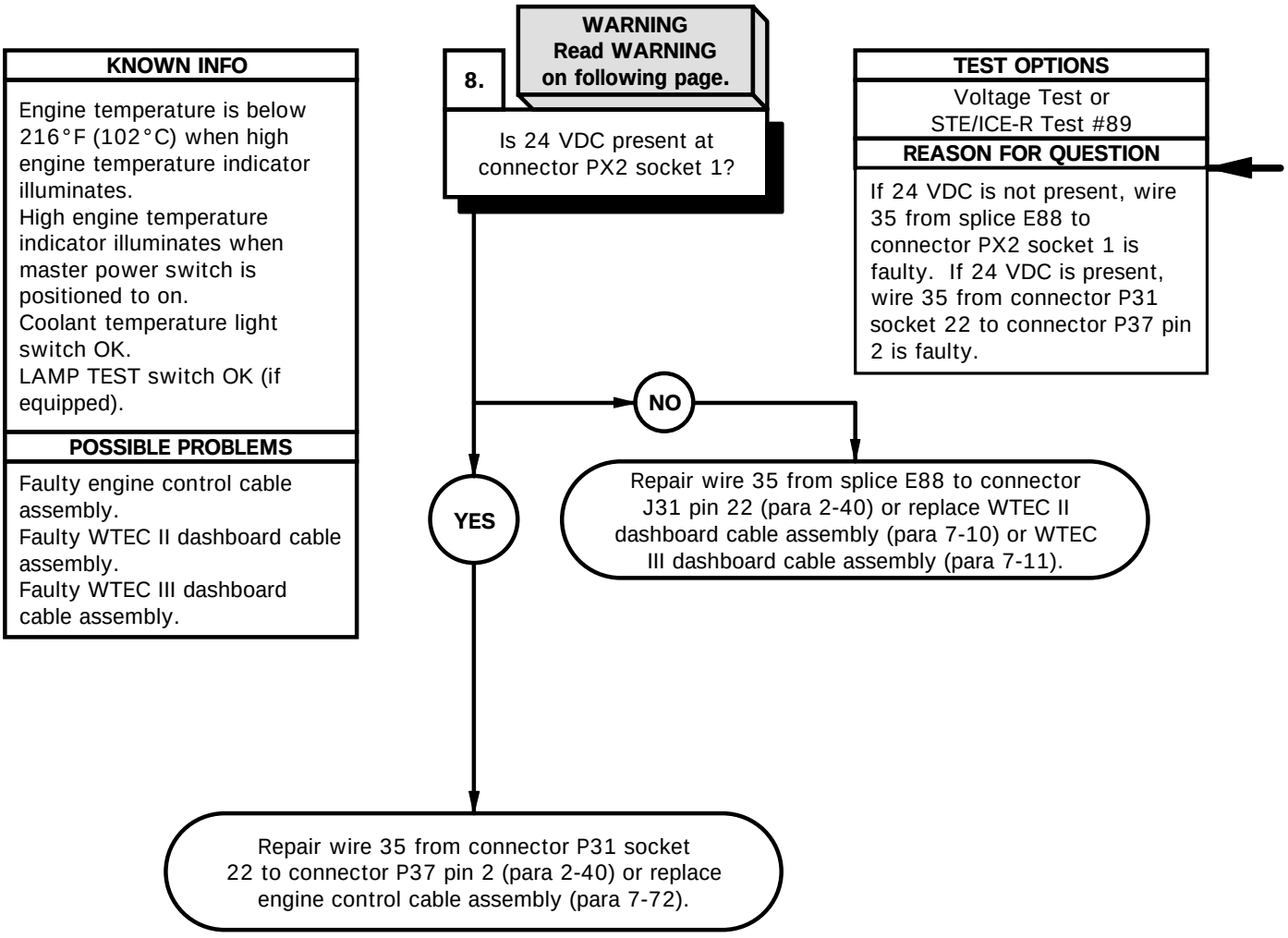
**VOLTAGE TEST**

(1) Disconnect batteries (para 7-48).
(2) Disconnect connector J31 form connector P31.
(3) Connect batteries (para 7-48)
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector J31 pin 22.
(6) Connect negative probe of multimeter to known good ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, go to step 10 of this fault.
(9) Position master power switch to off (TM 9-2320-365-10).




X2E24A071

## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

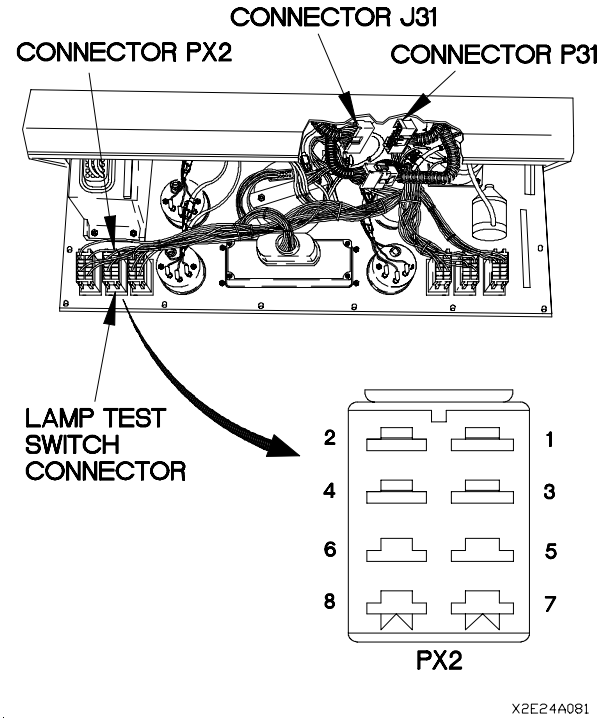
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX2 socket 1.
(3) Connect negative (-) probe of multimeter to known good ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 35 from splice E88 to connector J31 pin 22 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If 24 VDC is present, repair wire 35 from connector P31 socket 22 to connector P37 pin 2 (para 2-40) or replace engine control cable assembly (para 7-72).
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Disconnect batteries (para 7-48)
(9) Connect connector P31 to connector J31.

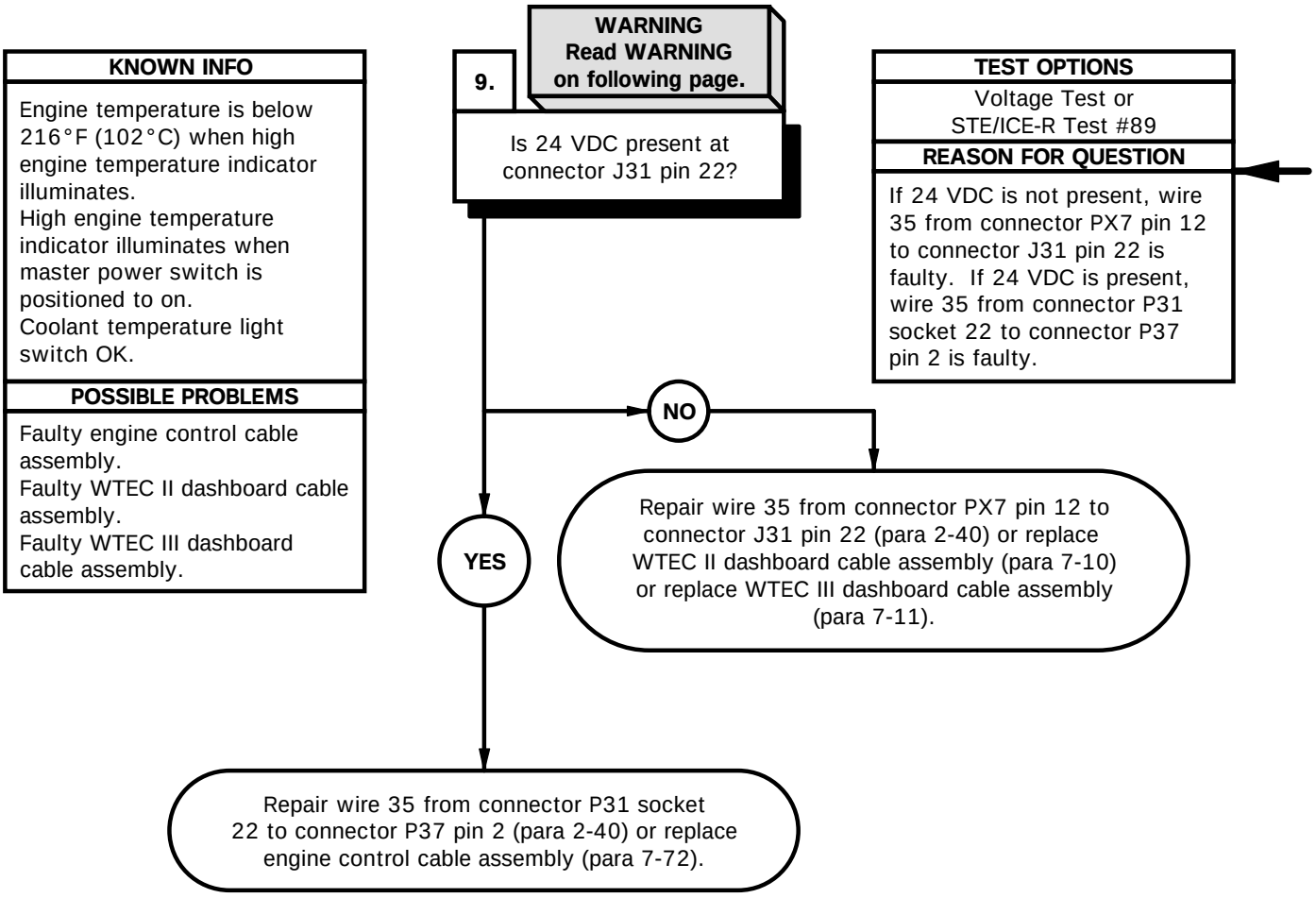
**NOTE**

Perform step (10) if vehicle is equipped with LAMP TEST switch.

(10) Connect connector PX2 to LAMP TEST switch connector.
(11) Install instrument panel assembly (para 7-15).
(12) Connect batteries (para 7-48).



## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)

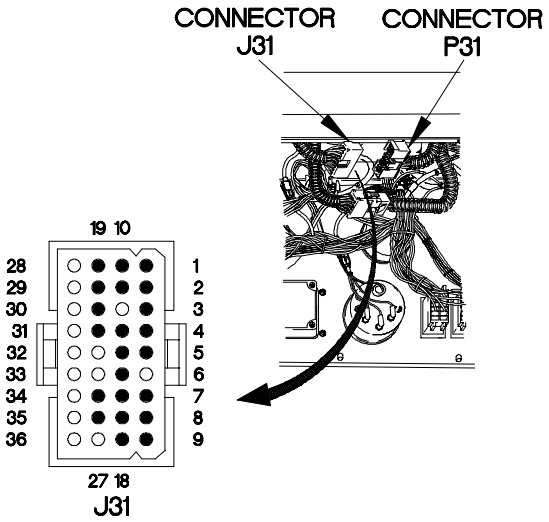


**WARNING**

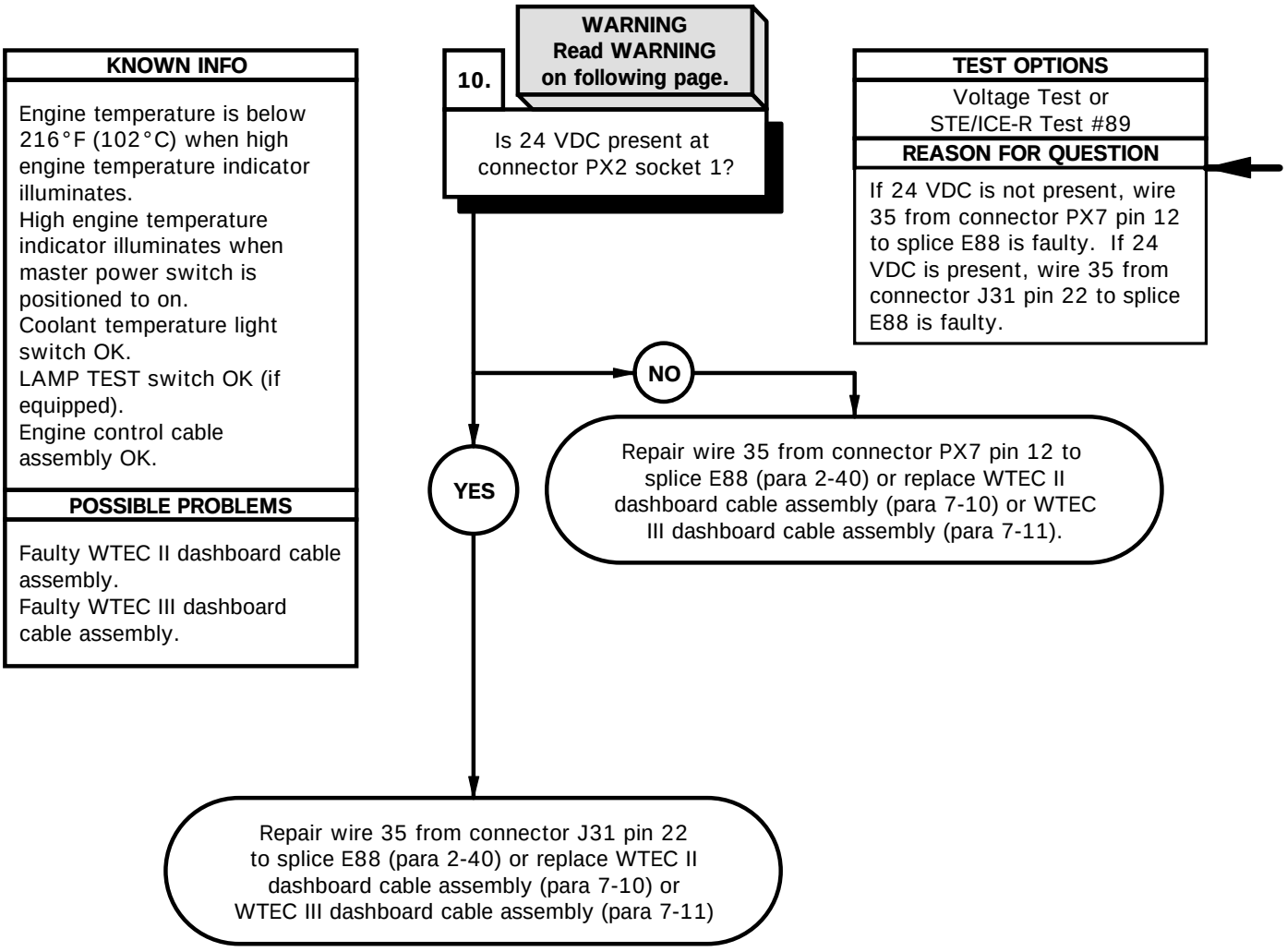
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect batteries (para 7-48).
(2) Disconnect connector J31 from connector P31.
(3) Connect batteries (para 7-48).
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector J31 pin 22.
(6) Connect negative (-) probe of multimeter to known good ground.
(7) Position master power switch to on and note reading on multimeter.
(8) Is 24 VDC is not present, repair wire 35 from connector PX7 pin 12 to connector J31 pin 22 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or replace WTEC III dashboard cable assembly (para 7-11).
(9) If 24 VDC is present, repair wire 35 from connector P31 socket 22 to connector P37 pin 2 (para 2-40) or replace engine control cable assembly (para 7-72).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Disconnect batteries (para 7-48).
(12) Connect connect P31 to connector J31.
(13) Install instrument panel assembly (para 7-15).
(14) Connect batteries (para 7-48).



## e24A. HIGH ENGINE TEMPERATURE INDICATOR ILLUMINATES (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

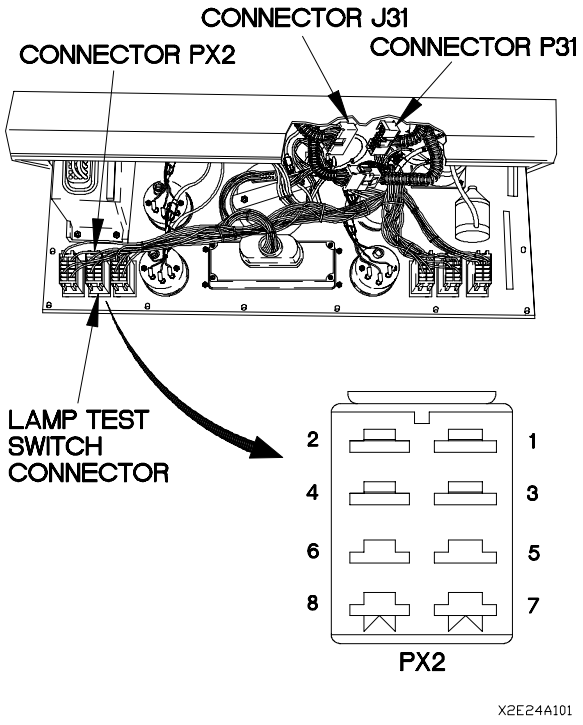
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX2 socket 1.
(3) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 35 from connector PX7 pin 12 to splice E88 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If 24 VDC is present, repair wire 35 from connector J31 pin 22 to splice E88 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11)
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Disconnect batteries (para 7-48)
(9) Connect connector P31 to connector J31.

**NOTE**

Perform step (10) if vehicle is equipped with LAMP TEST switch.

(10) Connect connector PX2 to LAMP TEST switch connector.
(11) Install instrument panel asssembly (para 7-15).
(12) Connect batteries (para 7-48).



**e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE**

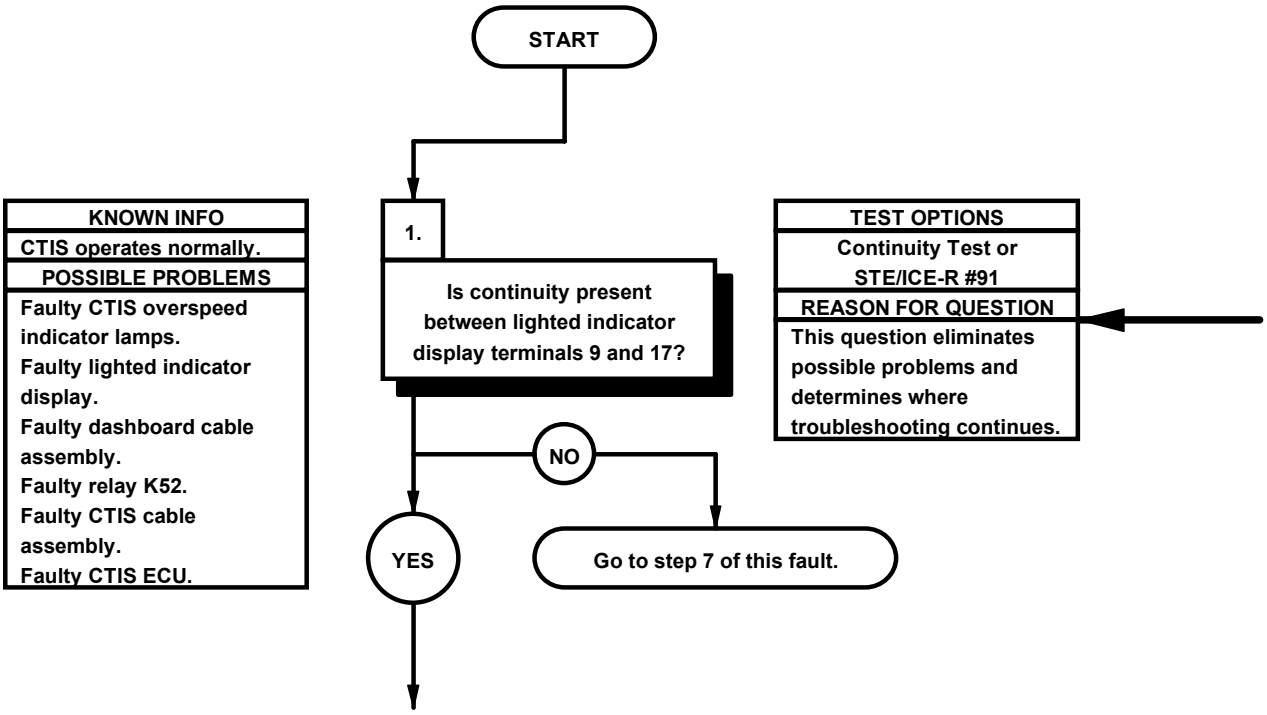
**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

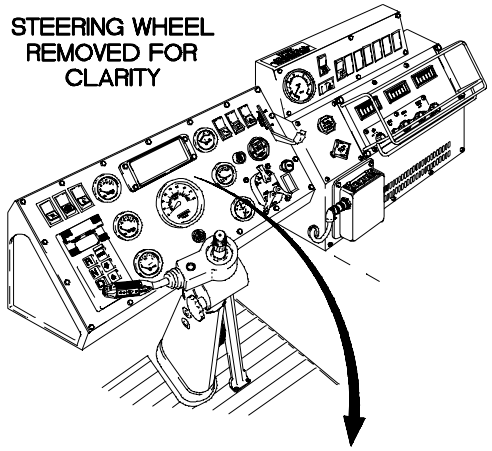
**Personnel Required**
- (2)

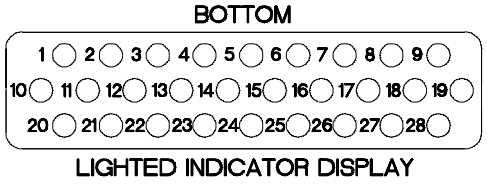
**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

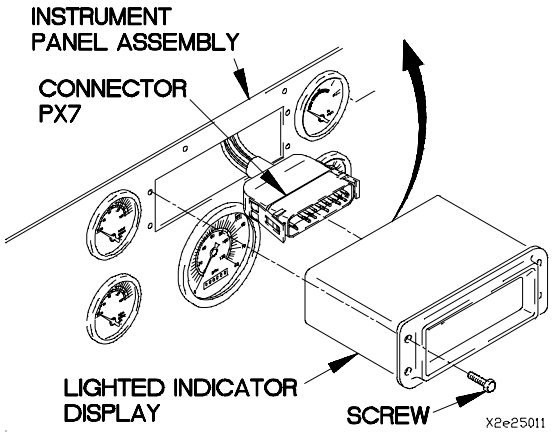
**References**
- TM 9-4910-571-12&P



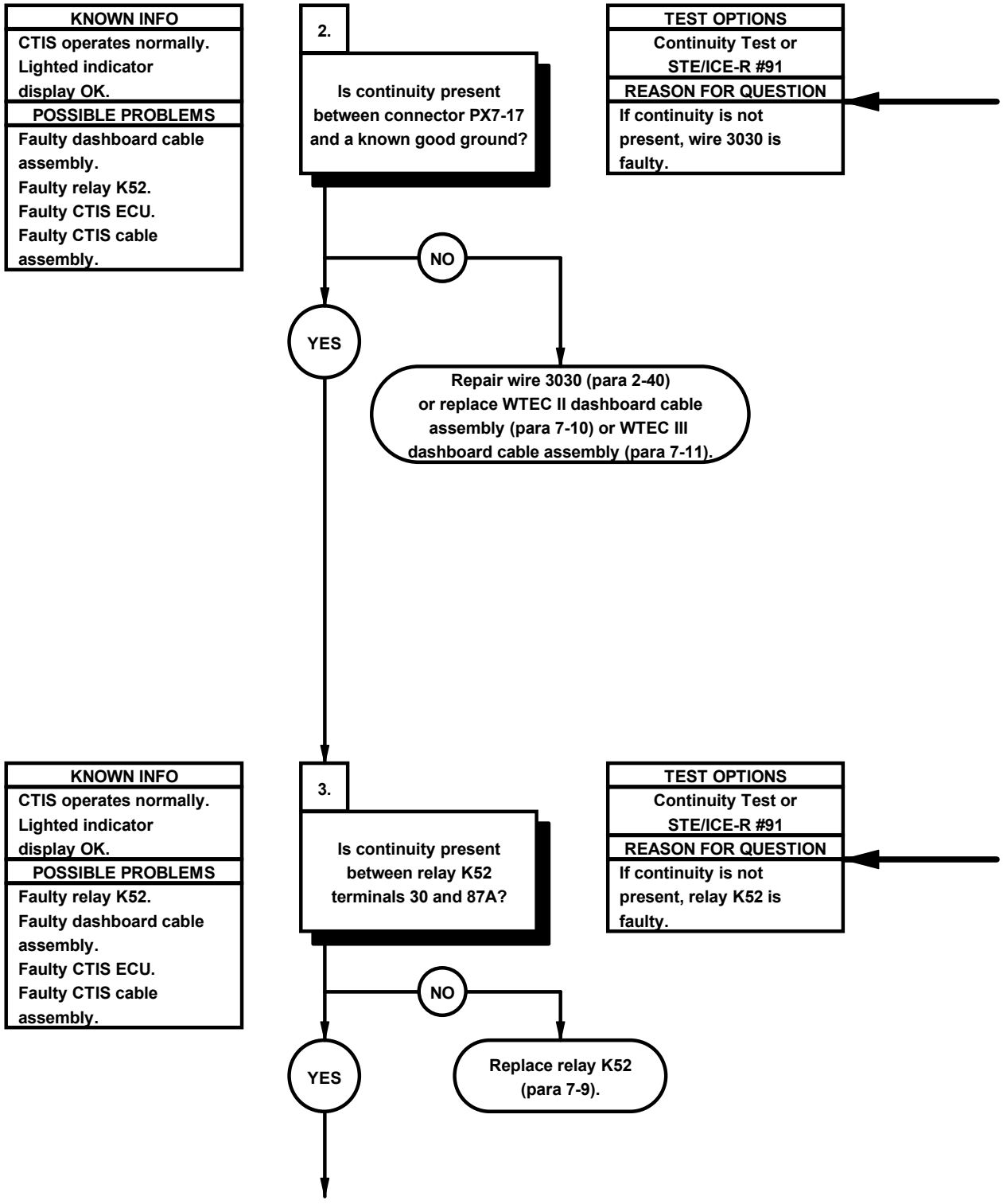
| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 9. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 17 and note reading on multimeter. |
| (7) If continuity is not present, go to step 7 of this fault. |



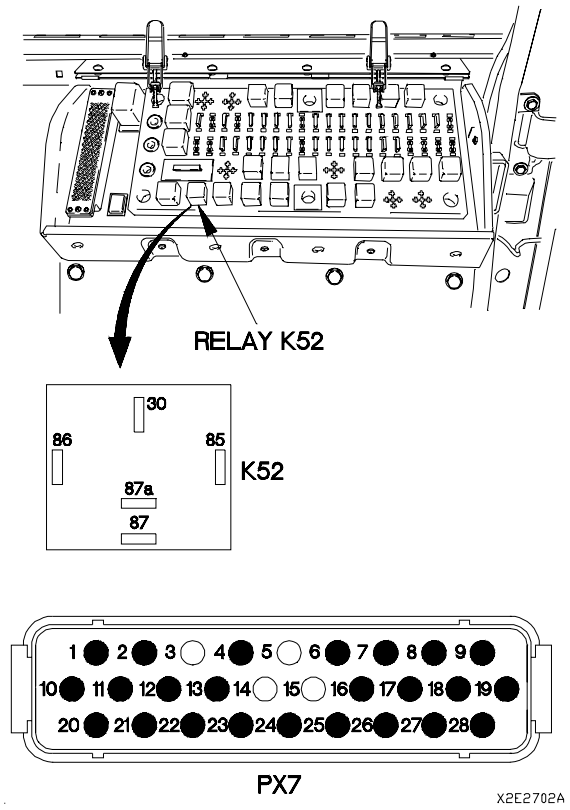



## e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

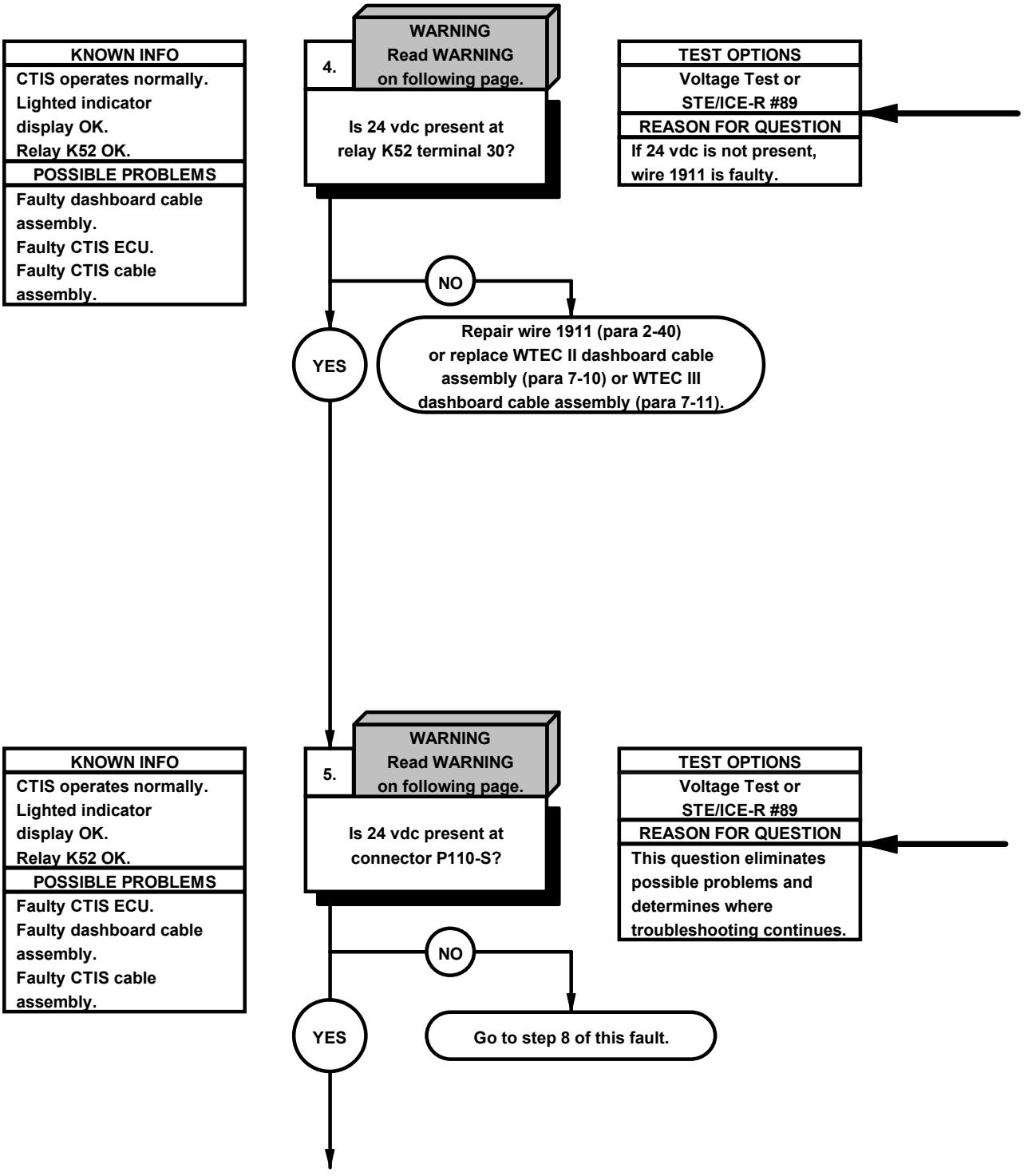
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX7-17.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3030 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove relay K52 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to relay K52 terminal 30.
(5) Connect negative (-) probe of multimeter to relay K52 terminal 87A and note reading on multimeter.
(6) If continuity is not present, replace relay K52 (para 7-9).

## e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE (CONT)

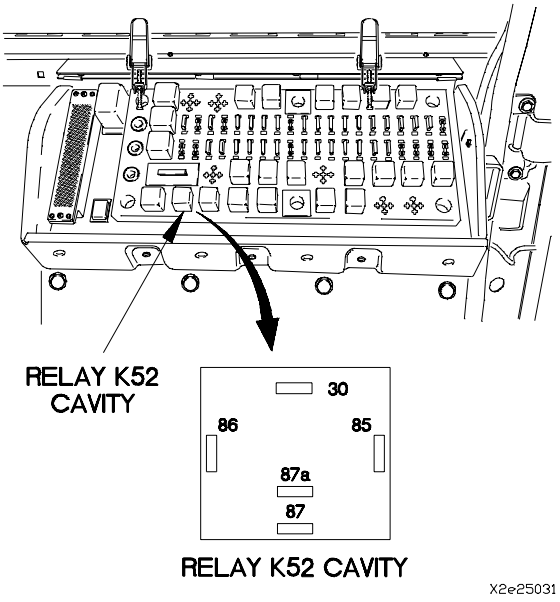


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Connect batteries (para 7-48).
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to PDP, terminal 30, where relay K52 was removed.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 vdc is not present, repair wire 1911 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Install relay K52 in PDP.
(9) Install PDP cover (para 16-2).

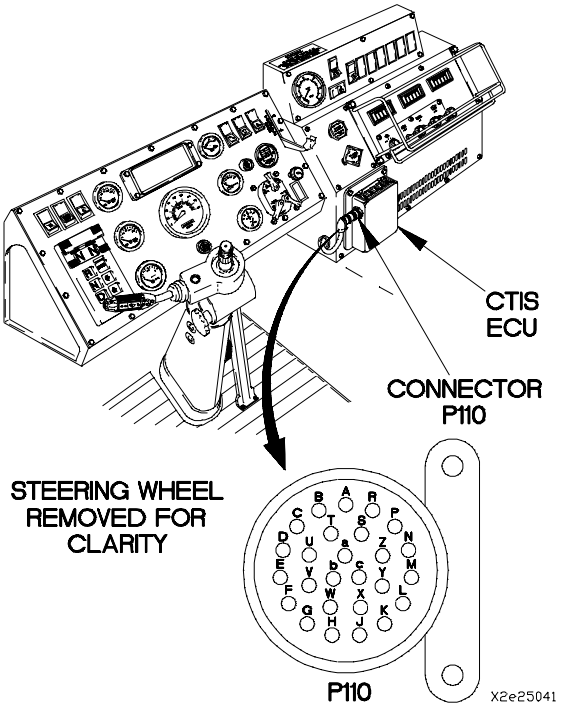



**WARNING**

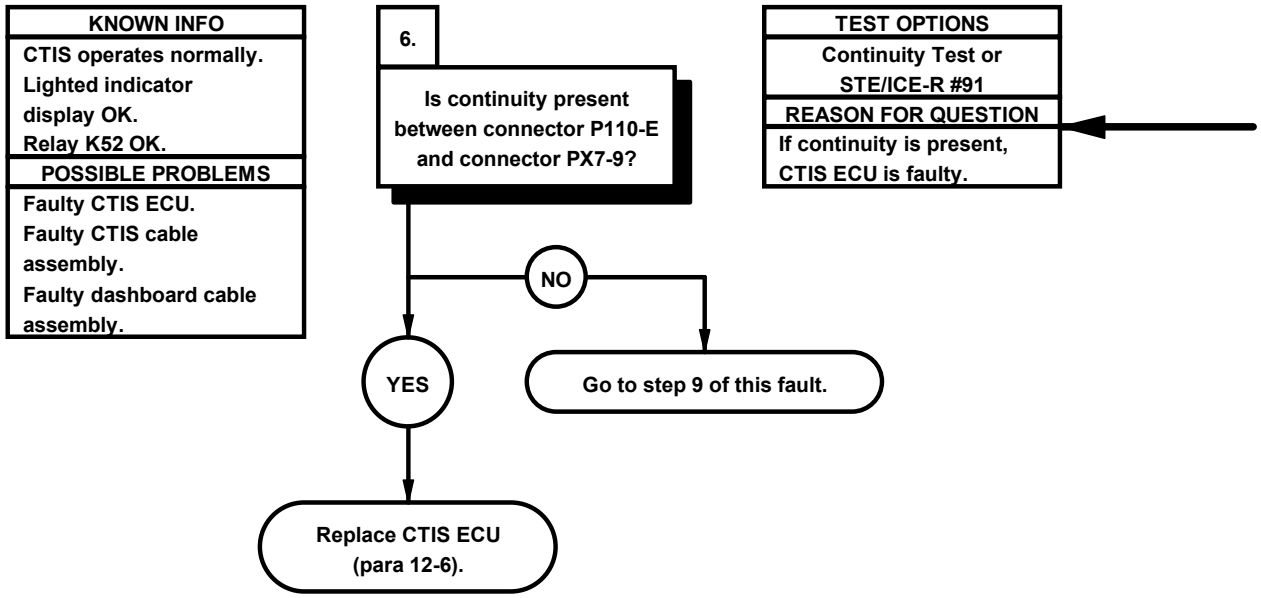
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

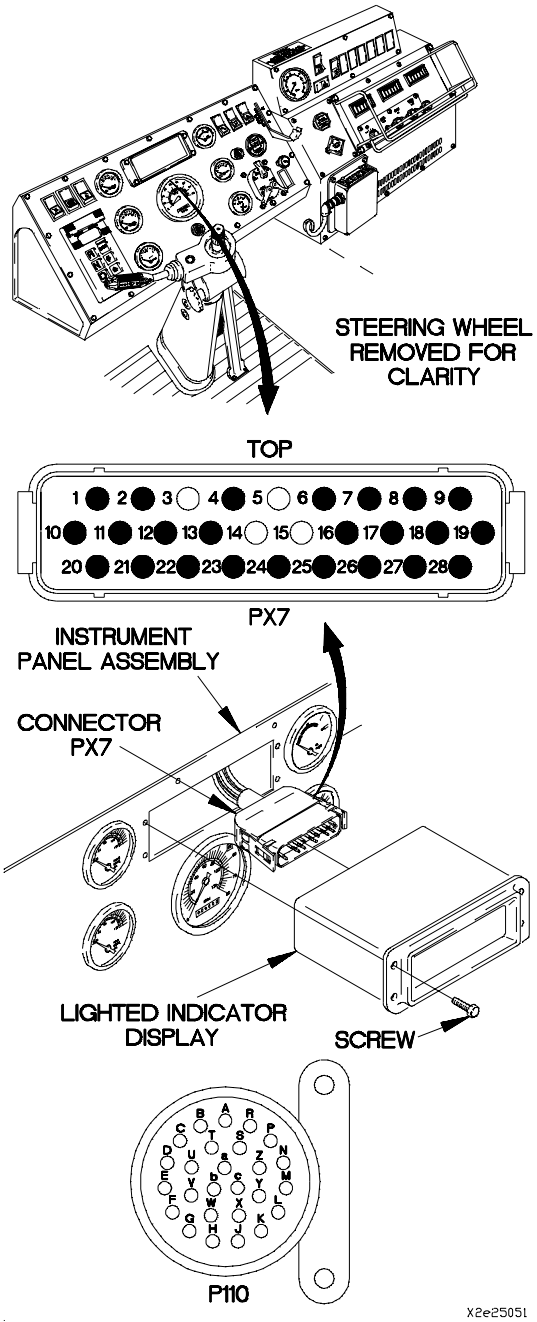
(1) Disconnect connector P110 from CTIS ECU.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector P110-S.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 vdc is not present, go to step 8 of this fault.
(7) Position master power switch to off (TM 9-2320-365-10).



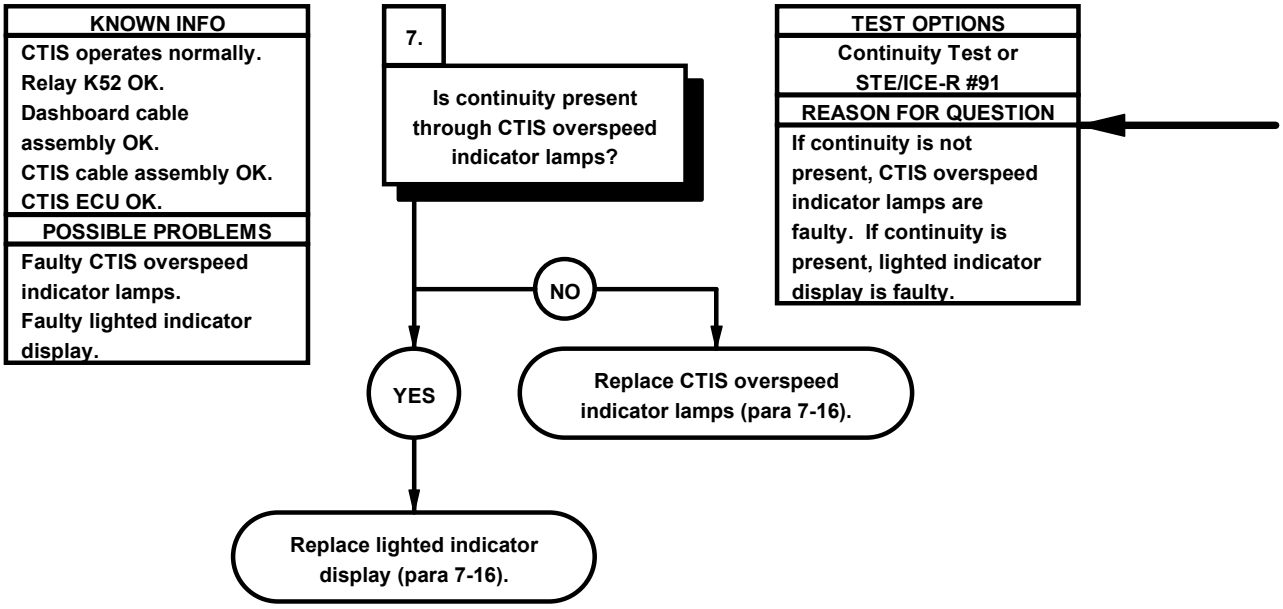
## e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE (CONT)



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-E. |
| (3) Connect negative (-) probe of multimeter to connector PX7-9 and note reading on multimeter. |
| (4) If continuity is not present, go to step 9 of this fault. |
| (5) If continuity is present, replace CTIS ECU (para 12-6). |
| (6) Connect lighted indicator display to connector PX7. |
| (7) Position lighted indicator display in instrument panel assembly with four screws. |
| (8) Tighten four screws to 6-10 lb-in. (1 N·m). |
| (9) Connect batteries (para 7-48). |

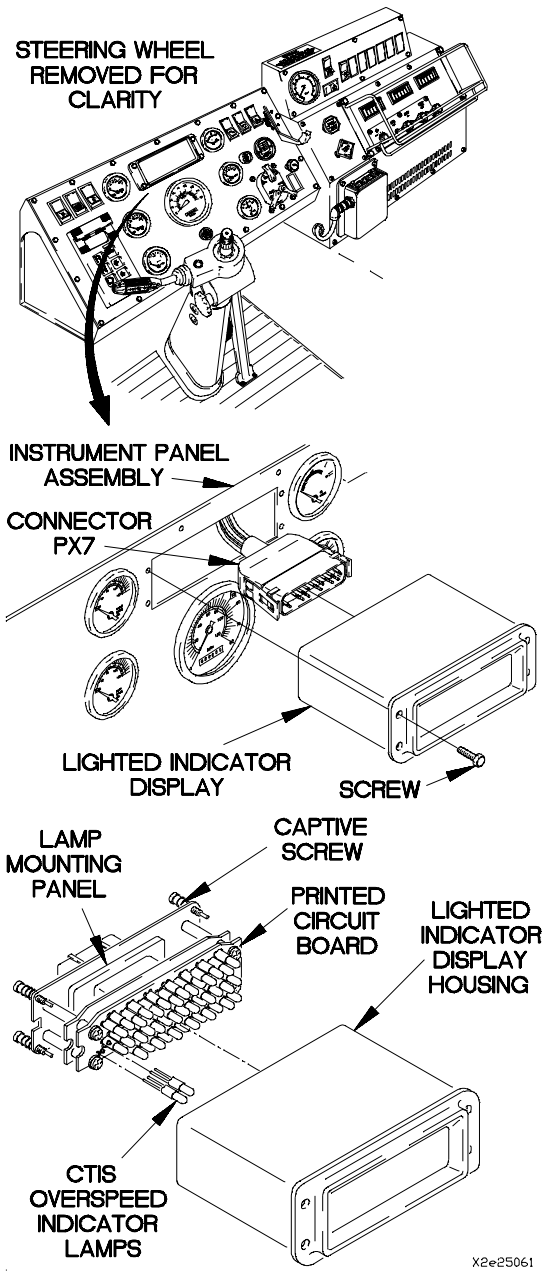


## e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE (CONT)

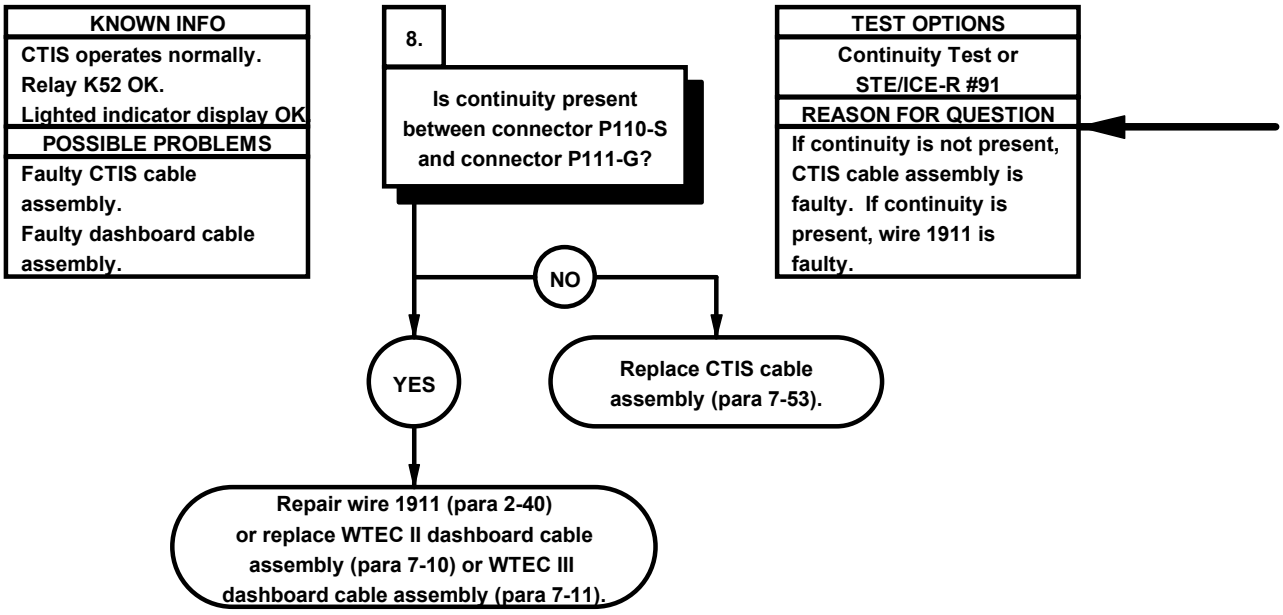


**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove CTIS overspeed indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each CTIS overspeed indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install CTIS overspeed indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).

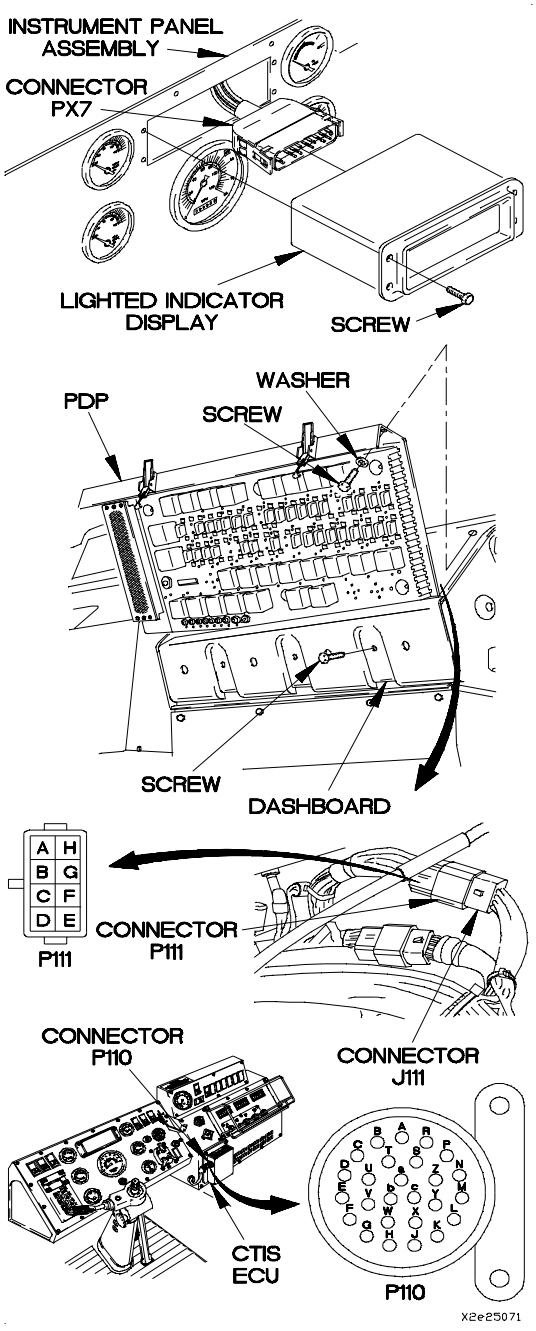


## e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE (CONT)

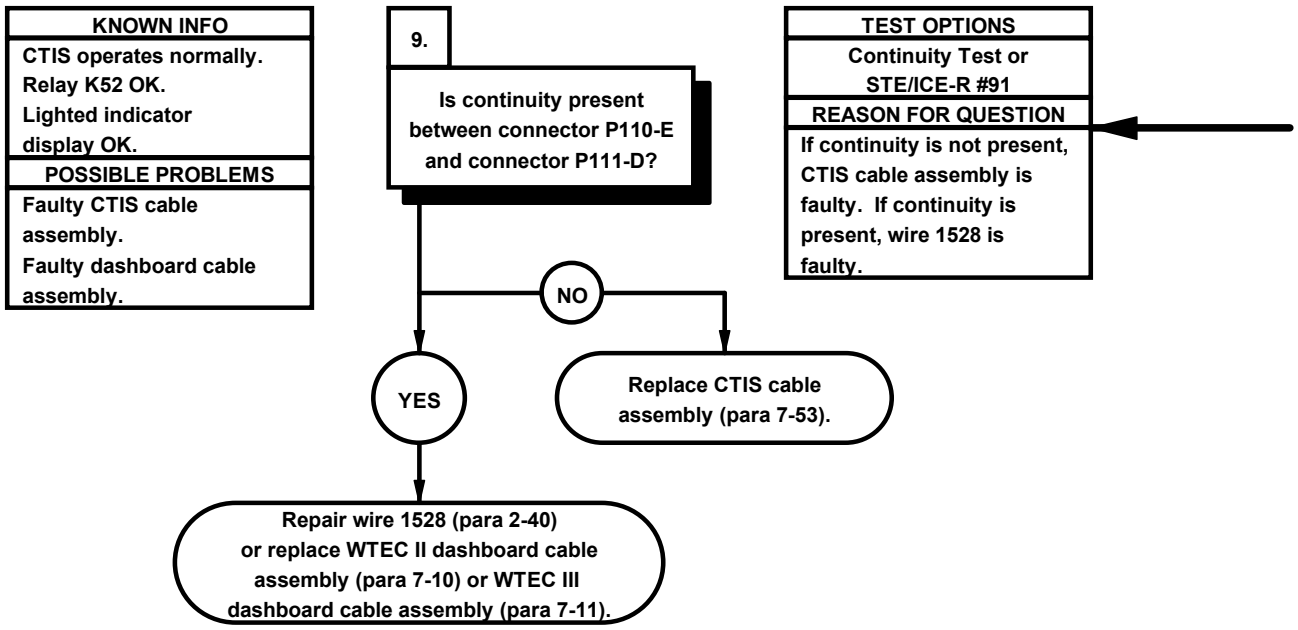


**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector P111 from connector J111.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector P110-S.
(8) Connect negative (-) probe of multimeter to connector P111-G and note reading on multimeter.
(9) If continuity is not present, replace CTIS cable assembly (para 7-53).
(10) If continuity is present, repair wire 1911 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(11) Connect connector P111 to connector J111.
(12) Install PDP on dashboard with three screws.
(13) Install three washers and screws in PDP.
(14) Install PDP cover (para 16-2).
(15) Connect lighted indicator display to connector PX7.
(16) Position lighted indicator display in instrument panel assembly with four screws.
(17) Tighten four screws to 6-10 lb-in. (1 N·m).

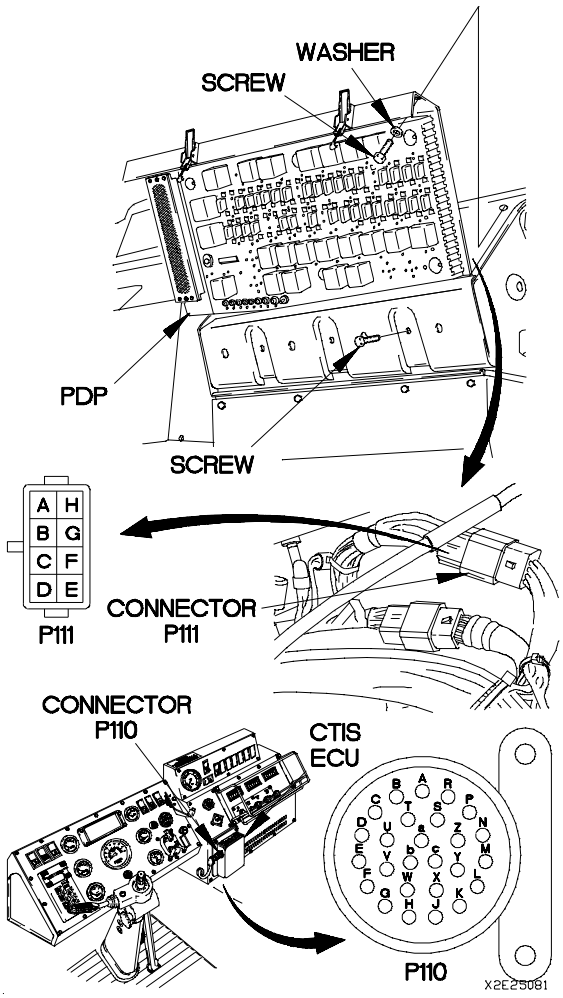


## e25. CTIS OVERSPEED INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector P111 from connector J111.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector P110-E.
(8) Connect negative (-) probe of multimeter to connector P111-D and note reading on multimeter.
(9) If continuity is not present, replace CTIS cable assembly (para 7-53).
(10) If continuity is present, repair wire 1528 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(11) Connect connector P111 to connector J111.
(12) Install PDP on dashboard with three screws.
(13) Install three washers and screws in PDP.
(14) Install PDP cover (para 16-2).
(15) Connect connector P110 to CTIS ECU.



**e26. CHEMICAL DETECTOR INDICATOR DOES NOT OPERATE**

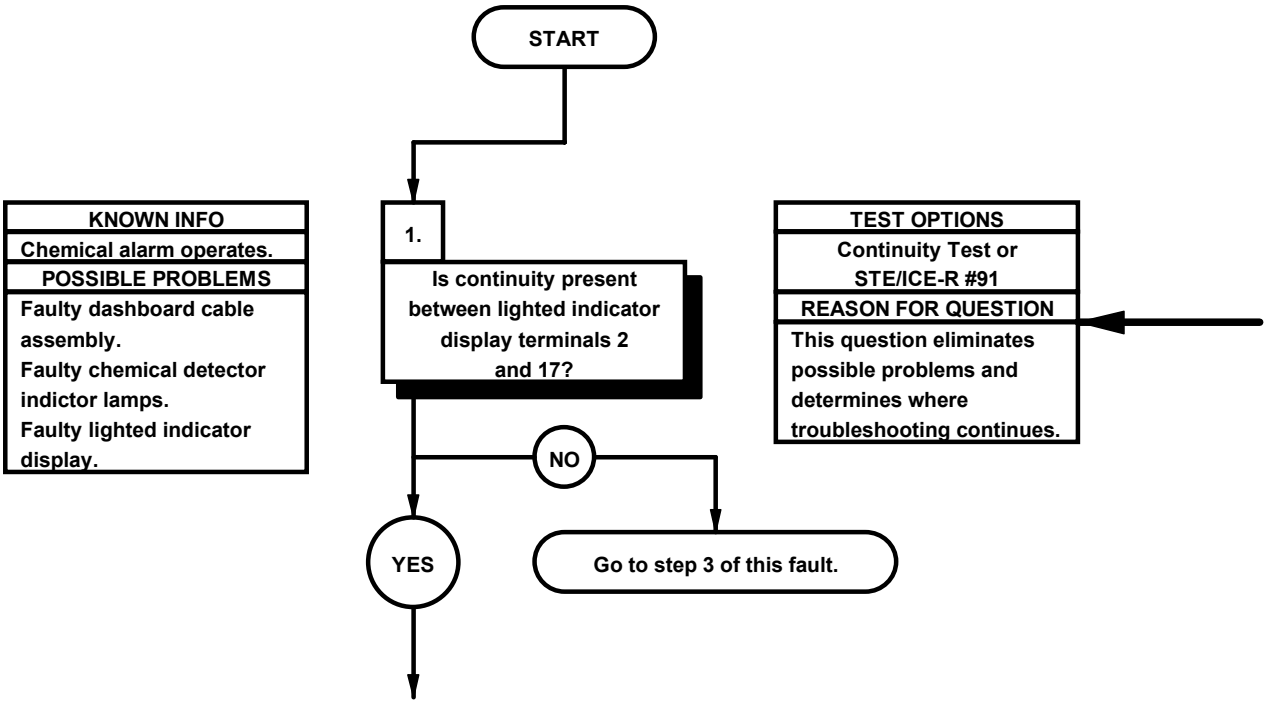
**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

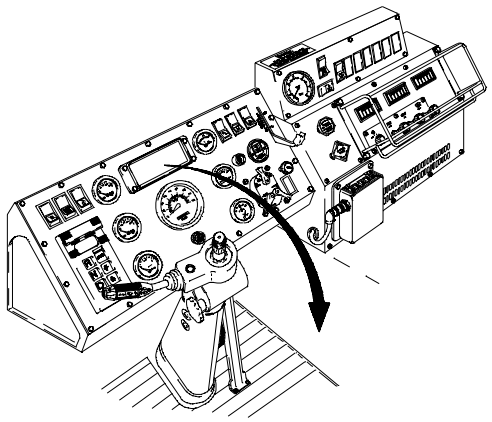
**Personnel Required**
- (2)

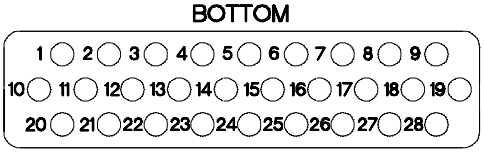
**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

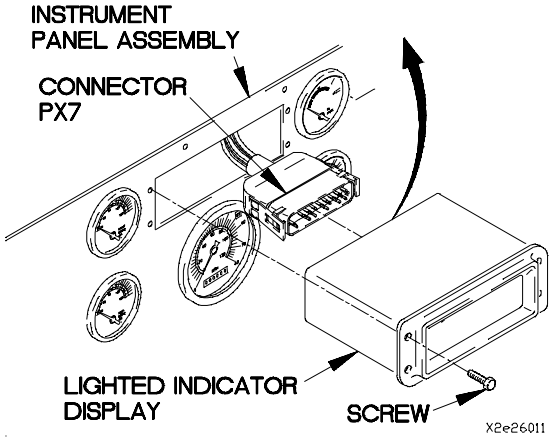
**References**
- TM 9-4910-571-12&P



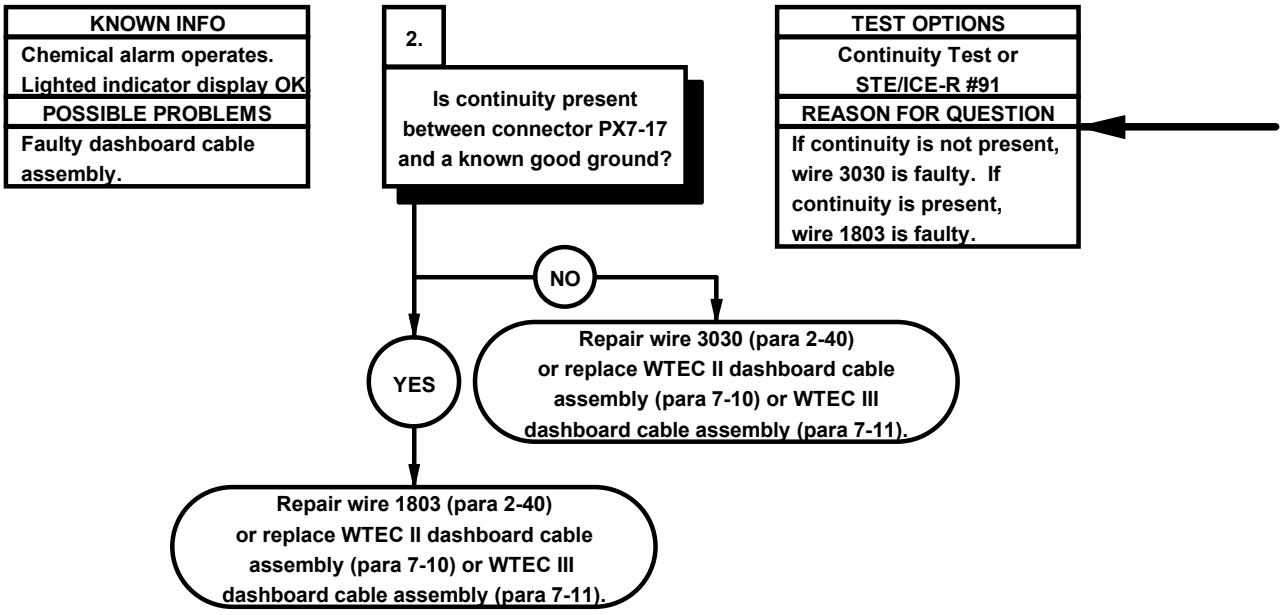
| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 2. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 17 and note reading on multimeter. |
| (7) If continuity is not present, go to step 3 of this fault. |

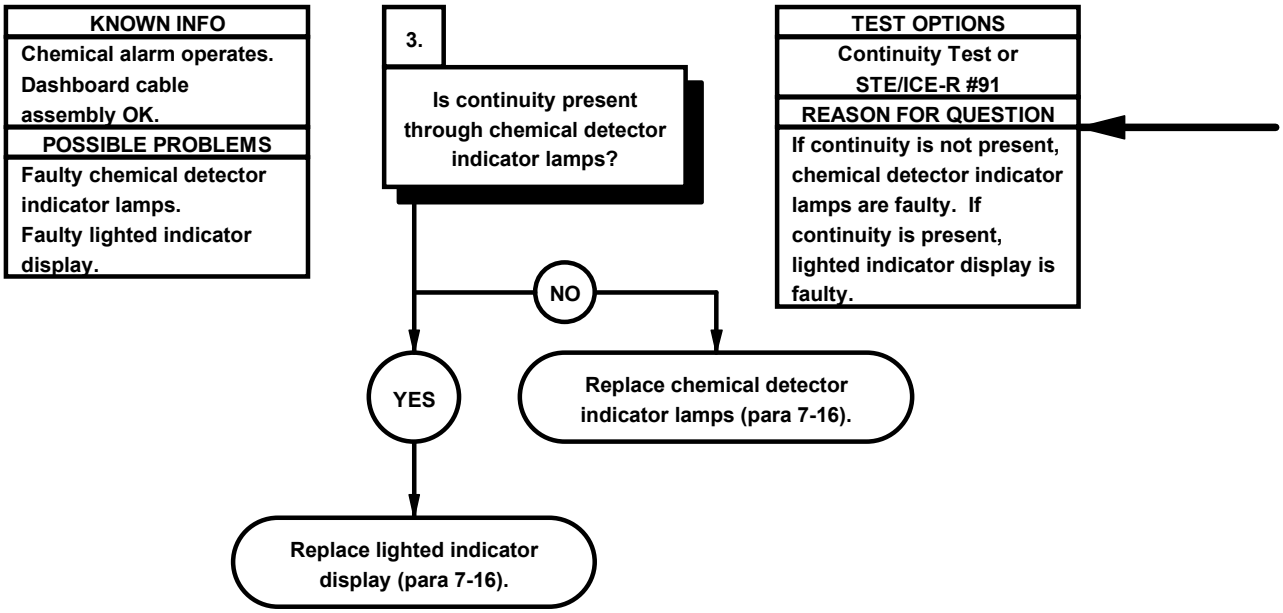




## e26. CHEMICAL DETECTOR INDICATOR DOES NOT OPERATE (CONT)



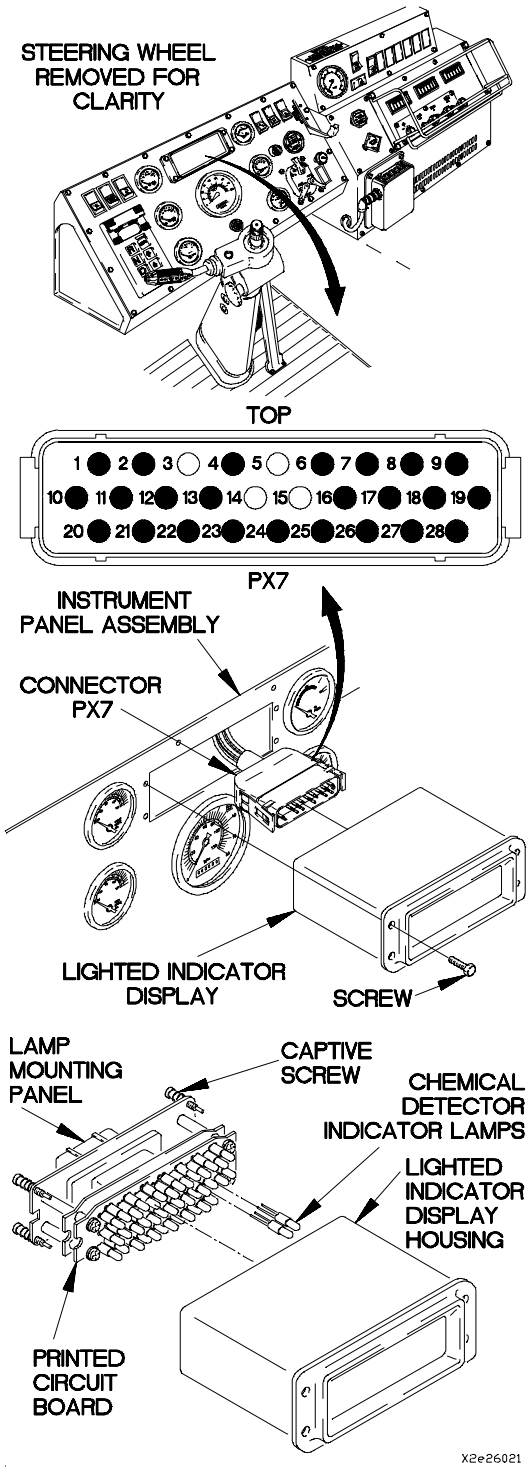



**CONTINUITY TEST**

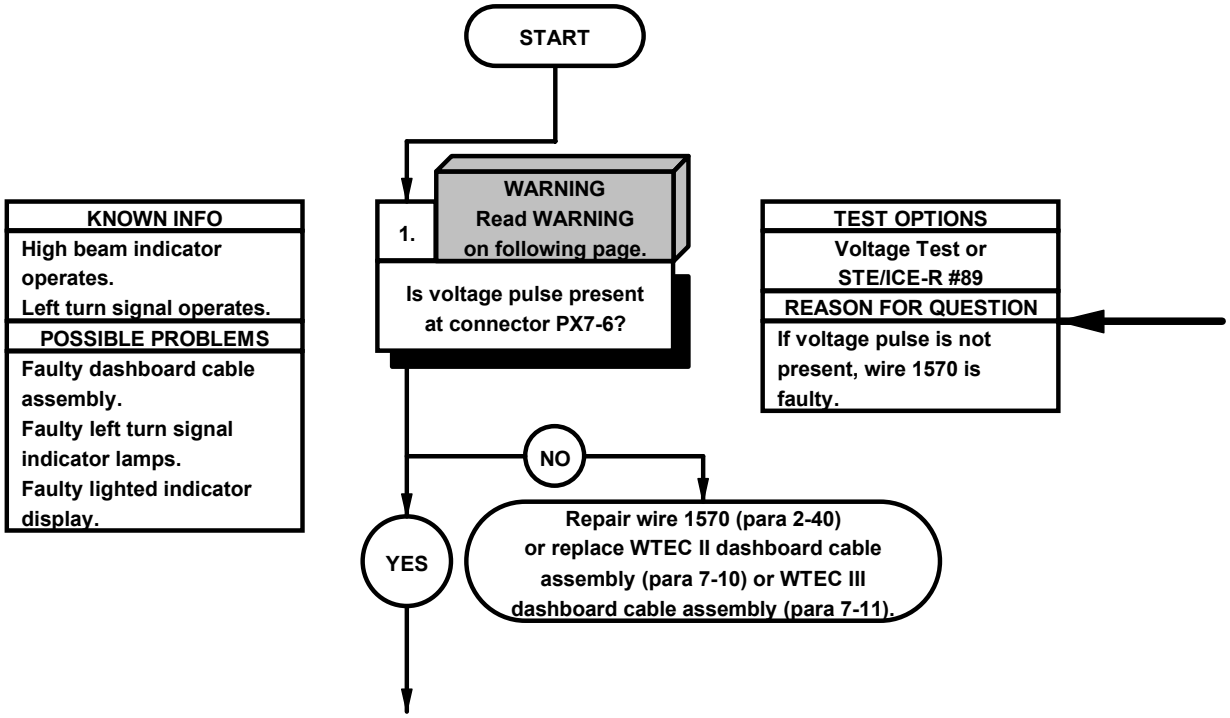
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX7-17.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3030 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, repair wire 1803 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect lighted indicator display to connector PX7.
(7) Position lighted indicator display in instrument panel assembly with four screws.
(8) Tighten four screws to 6-10 lb-in. (1 N·m).
(9) Connect batteries (para 7-48).

**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove chemical detector indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each chemical detector indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install chemical detector indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



| e27. LEFT TURN SIGNAL INDICATOR DOES NOT OPERATE | |
|---|---|
| **INITIAL SETUP** | |
| **Equipment Condition**<br>Engine shut down (TM 9-2320-365-10).<br>Batteries disconnected (para 7-48).<br><br>**Personnel Required**<br>(2) | **Tools and Special Tools**<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C)<br>Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)<br><br>**References**<br>TM 9-4910-571-12&P |

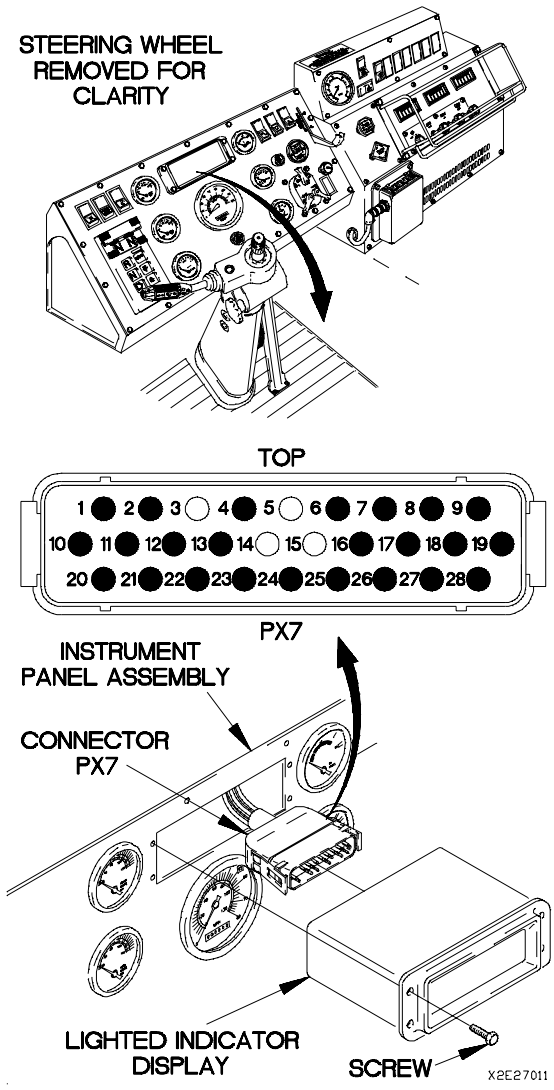


**WARNING**

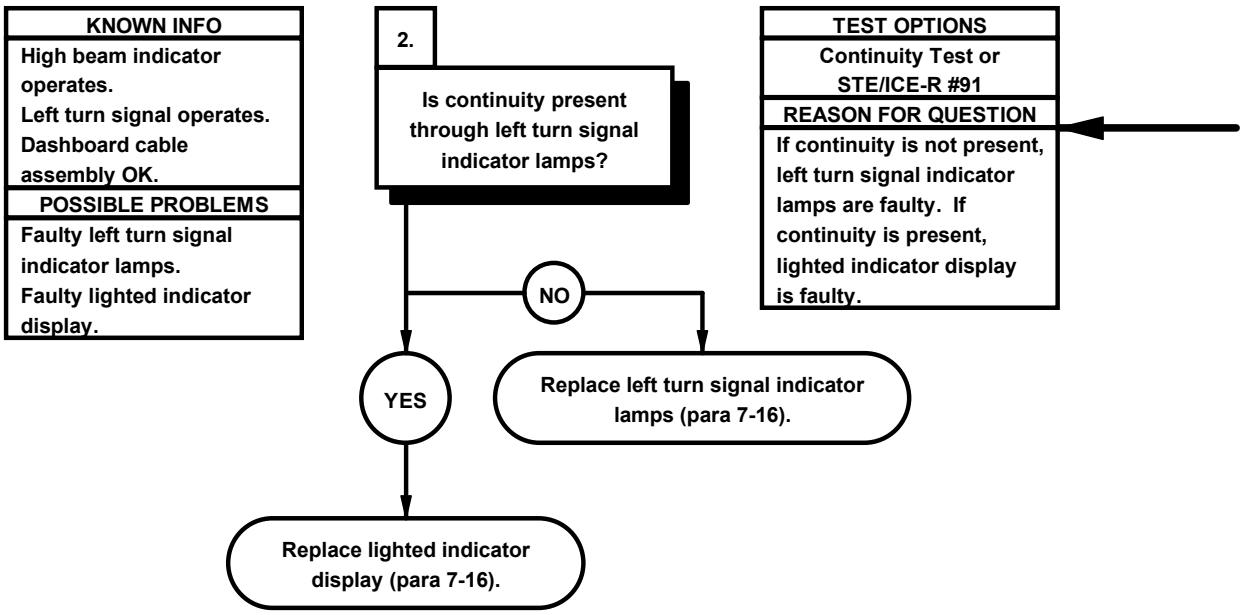
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Connect batteries (para 7-48).
(5) Set multimeter to volts dc.
(6) Connect positive (+) probe of multimeter to connector PX7-6.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(10) Position turn signal to left turn signal position (TM 9-2320-365-10) and note reading on multimeter.
(11) If voltage pulse is not present, repair wire 1570 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(12) Position master power switch to off (TM 9-2320-365-10).
(13) Position main light switch to OFF (TM 9-2320-365-10).
(14) Position turn signal switch to middle position (TM 9-2320-365-10).

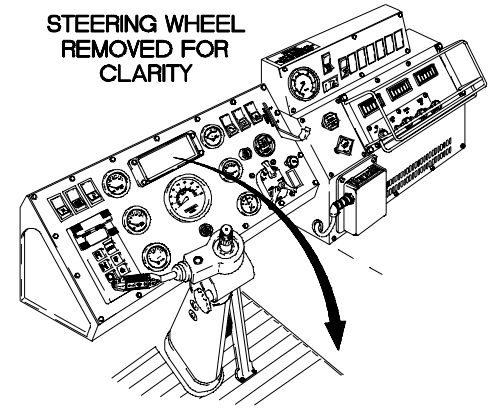


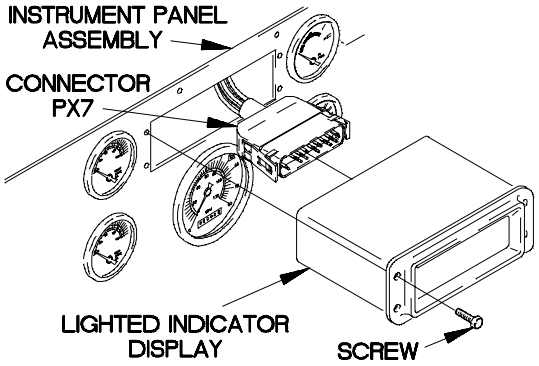
## e27. LEFT TURN SIGNAL INDICATOR DOES NOT OPERATE (CONT)

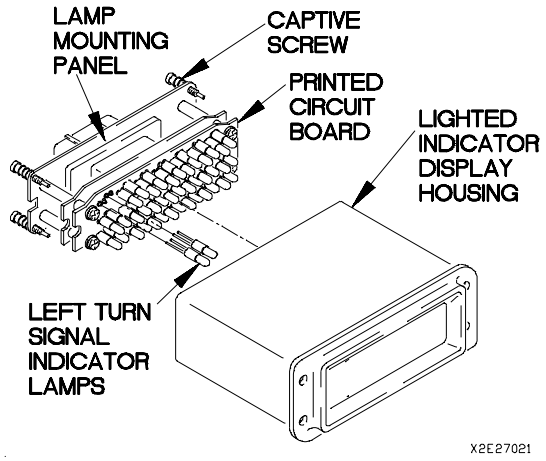


**CONTINUITY TEST**

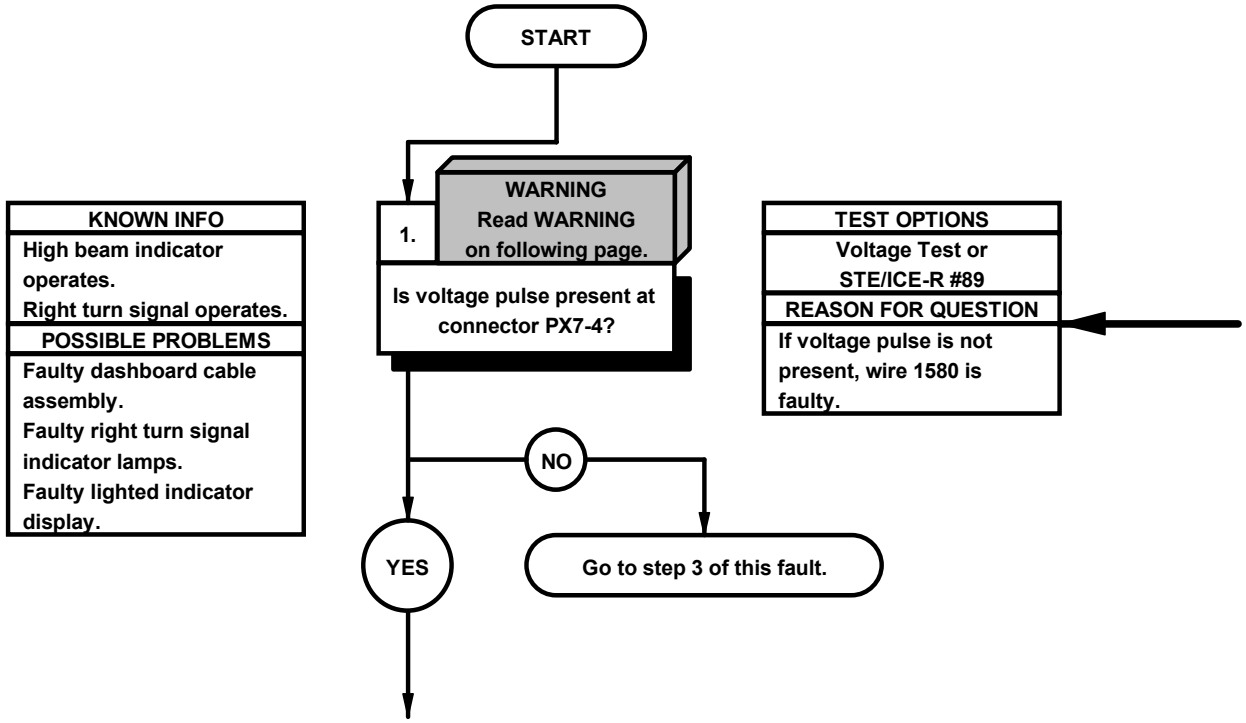
(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove left turn signal indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each left turn signal indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install left turn signal indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Disconnect batteries (para 7-48).
(12) Connect lighted indicator display to connector PX7.
(13) Position lighted indicator display in instrument panel assembly with four screws.
(14) Tighten four screws to 6-10 lb-in. (1 N·m).



| e28. RIGHT TURN SIGNAL INDICATOR DOES NOT OPERATE | |
|---|---|
| **INITIAL SETUP** | |
| **Equipment Condition**<br>Engine shut down (TM 9-2320-365-10).<br>Batteries disconnected (para 7-48).<br><br>**Personnel Required**<br>(2) | **Tools and Special Tools**<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C)<br>Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)<br><br>**References**<br>TM 9-4910-571-12&P |

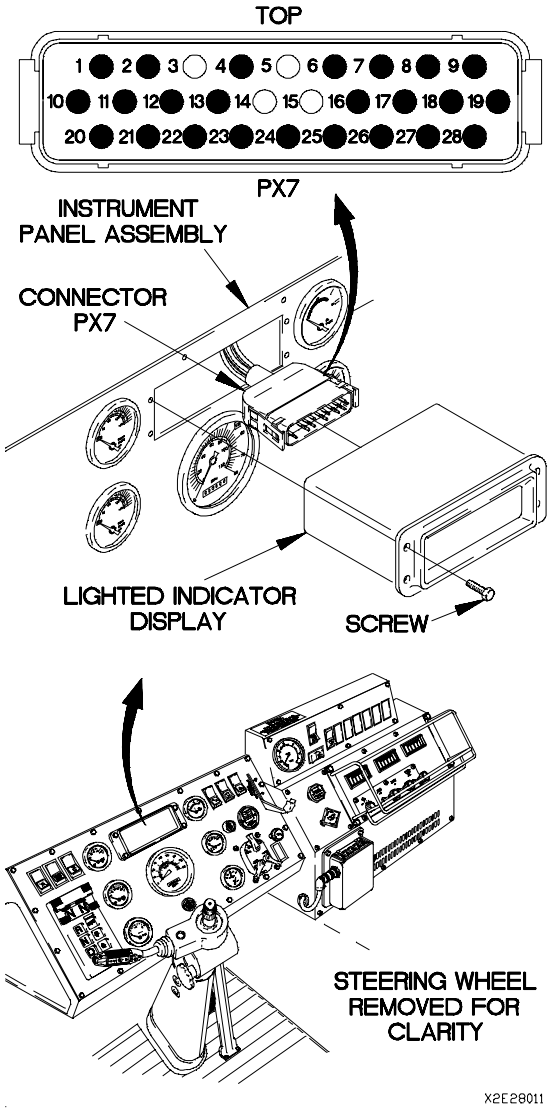


**WARNING**

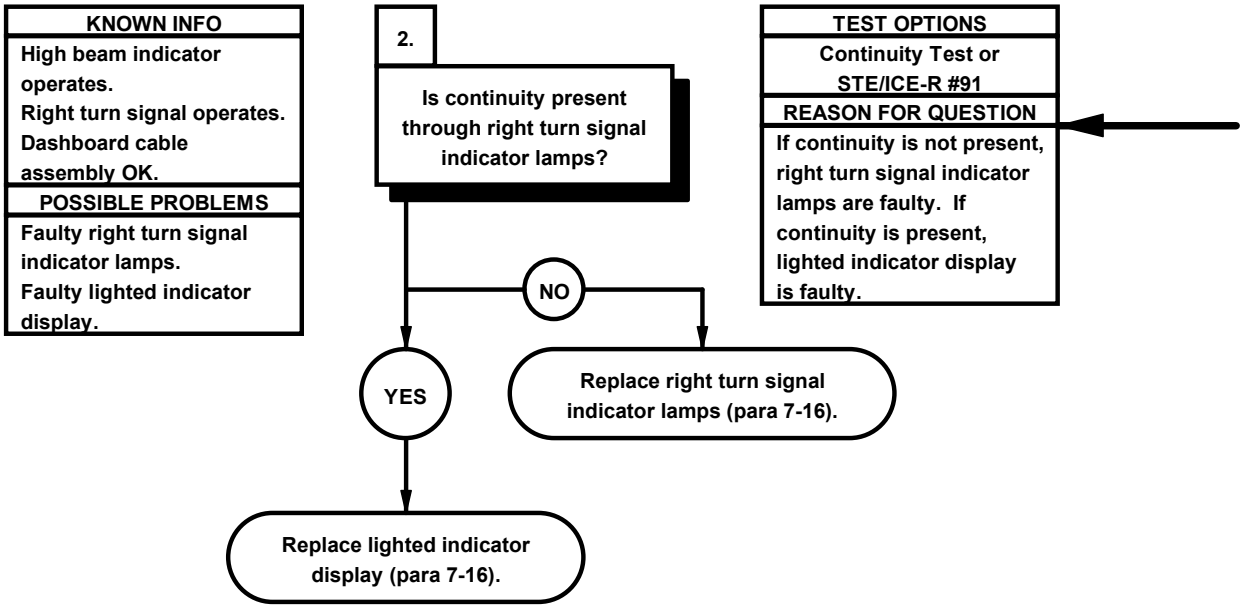
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Connect batteries (para 7-48).
(5) Set multimeter to volts dc.
(6) Connect positive (+) probe of multimeter to connector PX7-4.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(10) Position right signal to right turn signal position (TM 9-2320-365-10) and note reading on multimeter.
(11) If voltage pulse is not present, go to step 3 of this fault.
(12) Position master power switch to off (TM 9-2320-365-10).
(13) Position main light switch to OFF (TM 9-2320-365-10).
(14) Position turn signal control to middle position (TM 9-2320-365-10).

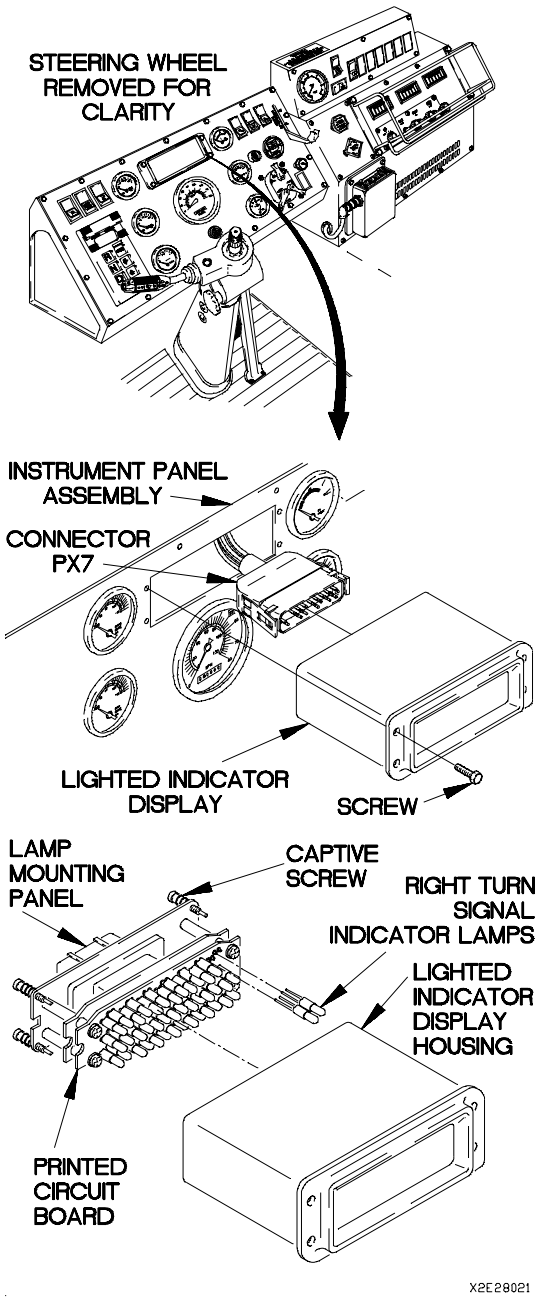


## e28. RIGHT TURN SIGNAL INDICATOR DOES NOT OPERATE (CONT)

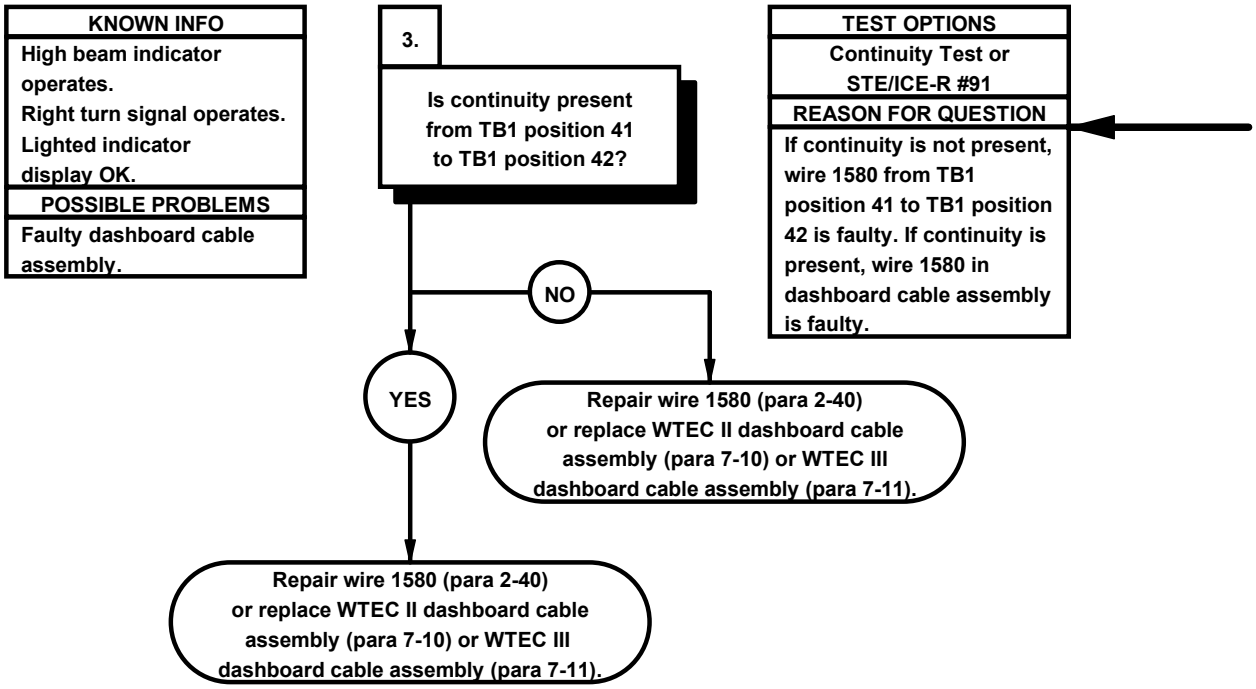


**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove right turn signal indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each right turn signal indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install right turn signal indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Disconnect batteries (para 7-48).
(12) Connect lighted indicator display to connector PX7.
(13) Position lighted indicator display in instrument panel assembly with four screws.
(14) Tighten four screws to 6-10 lb-in. (1 N·m).
(15) Connect batteries (para 7-48).

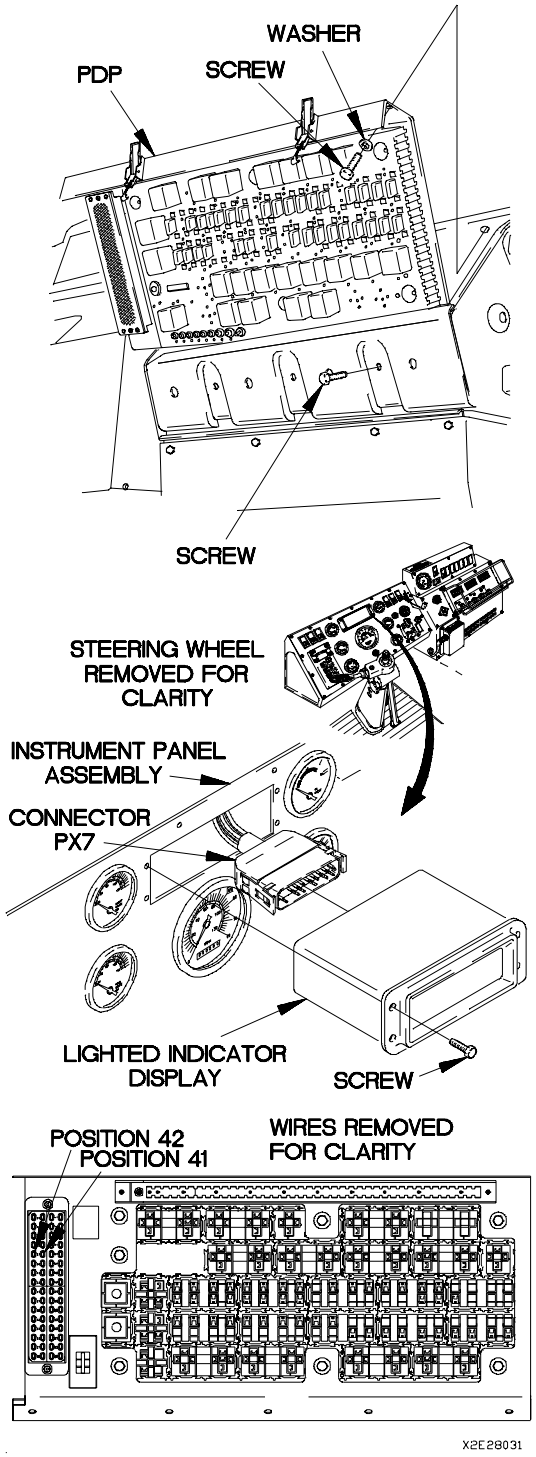


## e28. RIGHT TURN SIGNAL INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove PDP cover (para 16-2).
(3) Remove three screws and washers from PDP.
(4) Remove three screws from PDP.
(5) Lift PDP outward to gain access.
(6) Connect positive (+) probe of multimeter to TB1 position 41.
(7) Connect negative (-) probe of multimeter to TB1 position 42 and note reading on multimeter.
(8) If continuity is not present, repair wire 1580 from TB1 position 41 to TB1 position 42 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, repair wire 1580 in dashboard cable assembly (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) Install PDP on dashboard with three screws.
(11) Install three washers and screws in PDP.
(12) Install PDP cover (para 16-2).
(13) Connect lighted indicator display to connector PX7.
(14) Position lighted indicator display in instrument panel assembly with four screws.
(15) Tighten four screws to 6-10 lb-in. (1 N·m).
(16) Connect batteries (para 7-48).



**e29. TURN SIGNAL INDICATORS AND HIGH BEAMS ON INDICATOR DO NOT OPERATE**

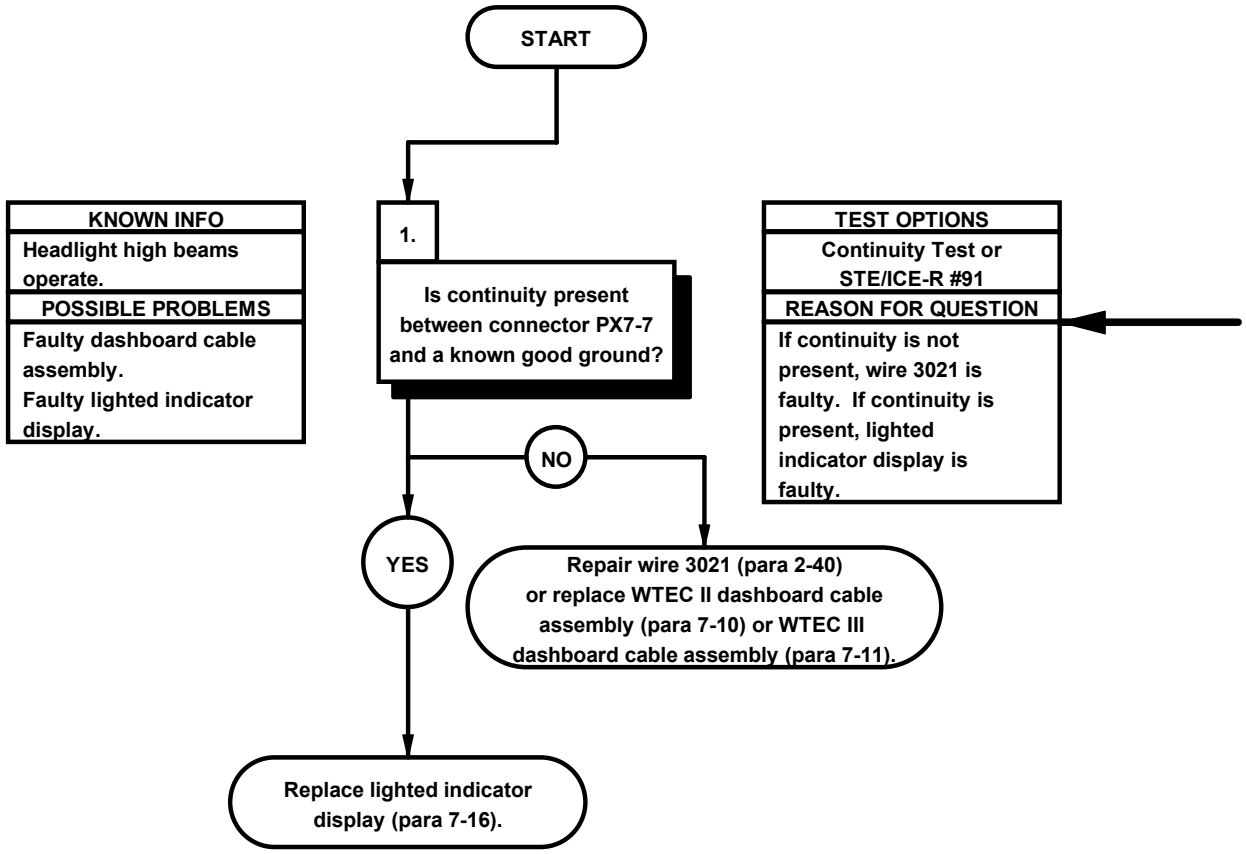
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

**Personnel Required**
(2)

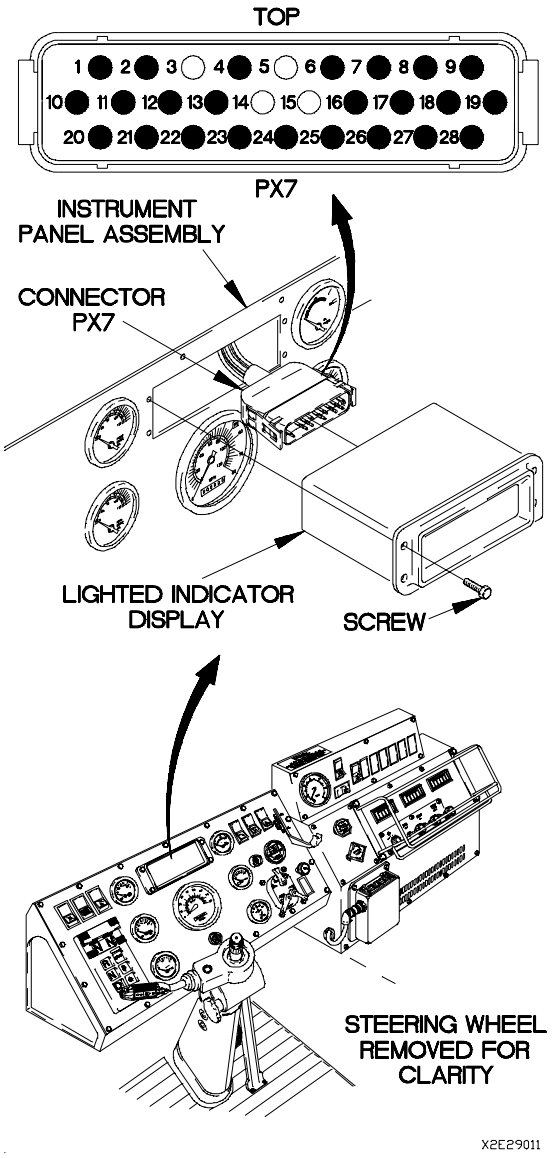
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**References**
TM 9-4910-571-12&P



**CONTINUITY TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX7-7.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair wire 3021 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, replace lighted indicator display (para 7-16).
(9) Connect lighted indicator display to connector PX7.
(10) Position lighted indicator display in instrument panel assembly with four screws.
(11) Tighten four screws to 6-10 lb-in. (1 N·m).
(12) Connect batteries (para 7-48).



**e30. HIGH BEAMS ON INDICATOR DOES NOT OPERATE**

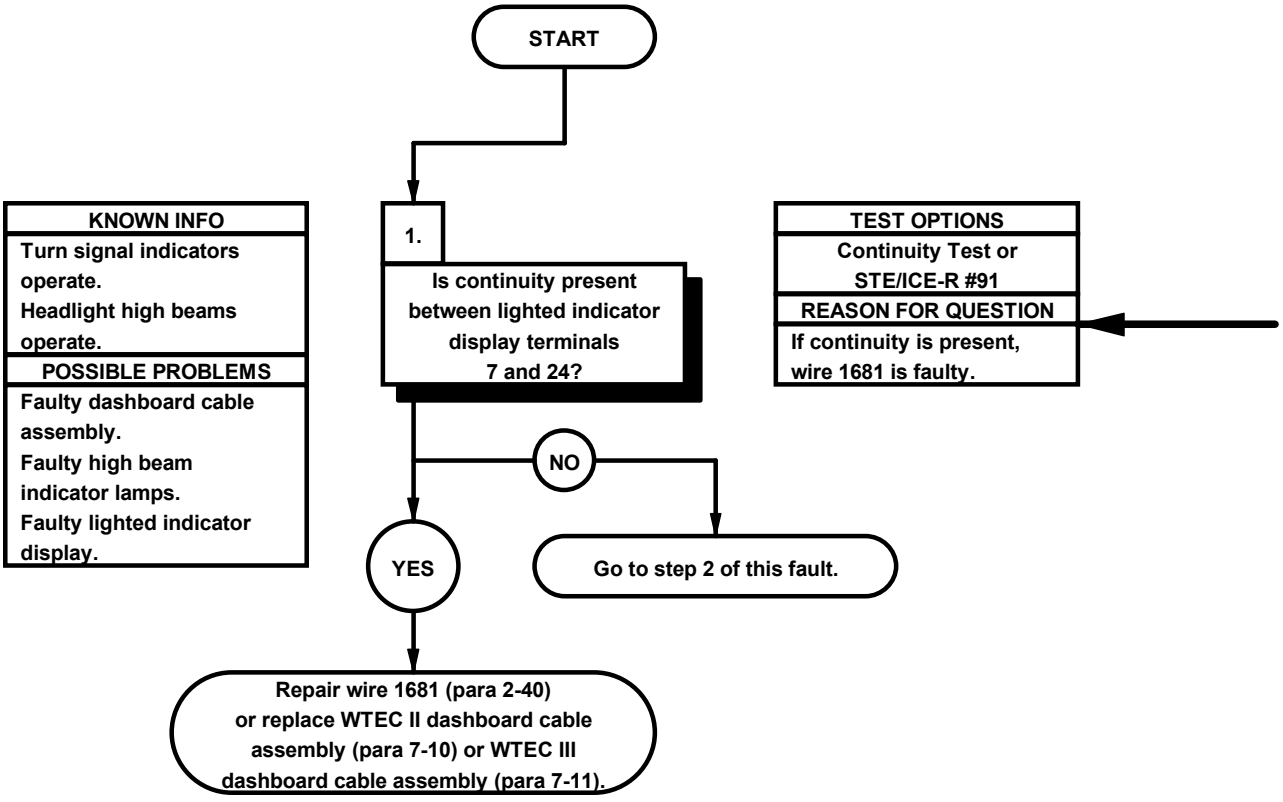
**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

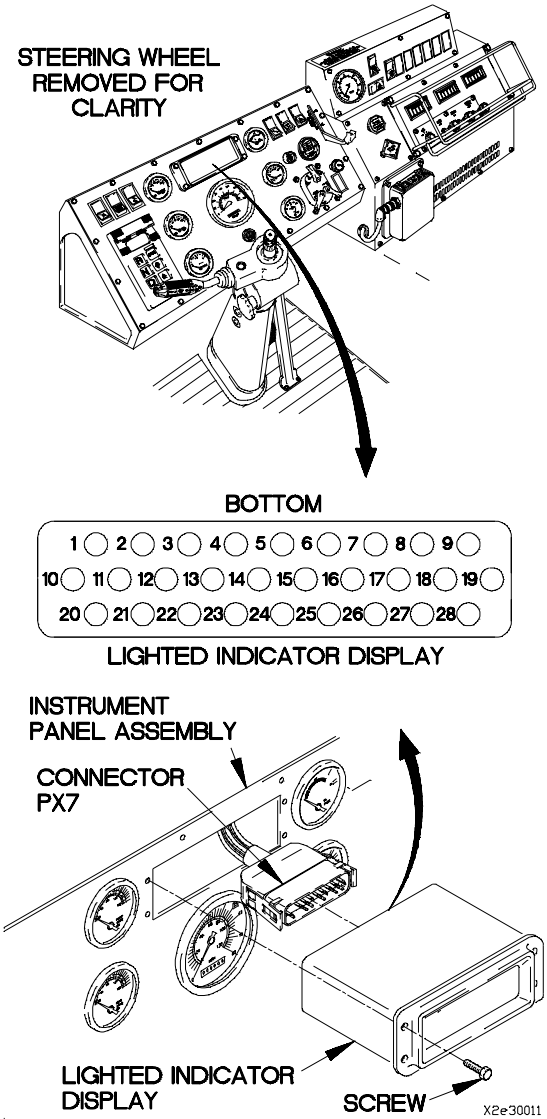
**Personnel Required**
- (2)

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

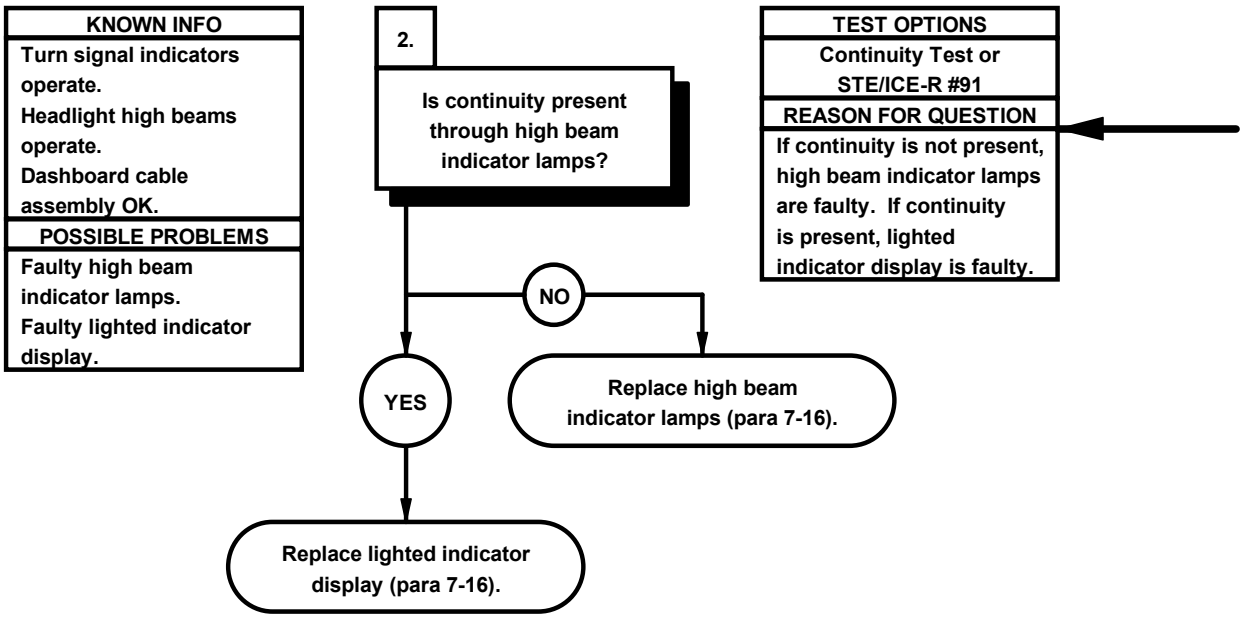
**References**
- TM 9-4910-571-12&P



| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 7. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 24 and note reading on multimeter. |
| (7) If continuity is present, repair wire 1681 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11). |

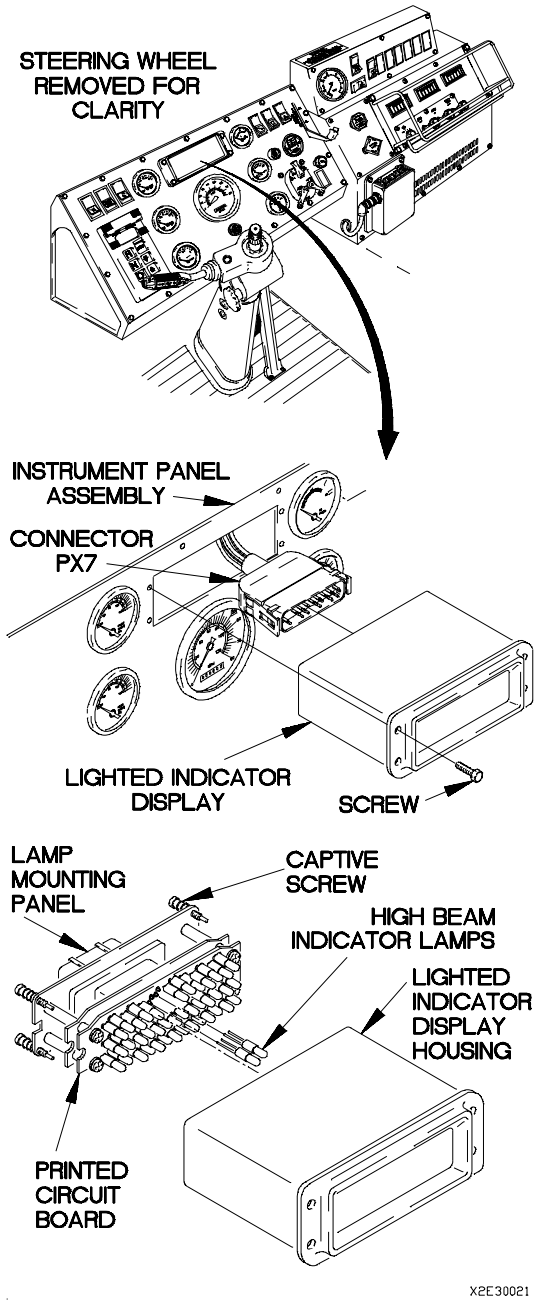


## e30. HIGH BEAMS ON INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove high beam indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each high beam indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install high beam indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICR-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

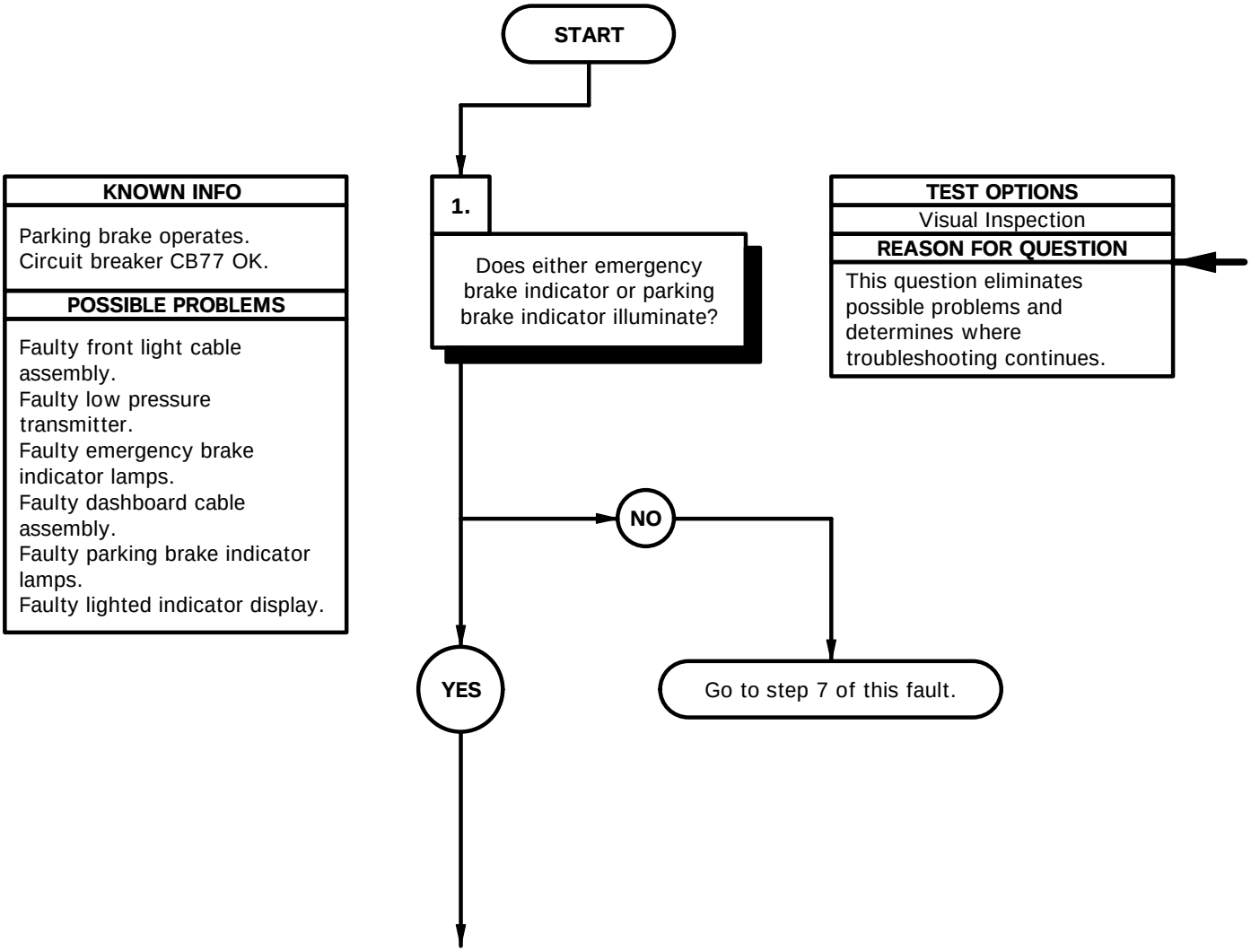
**Materials/Parts**
Wire, Elect., 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

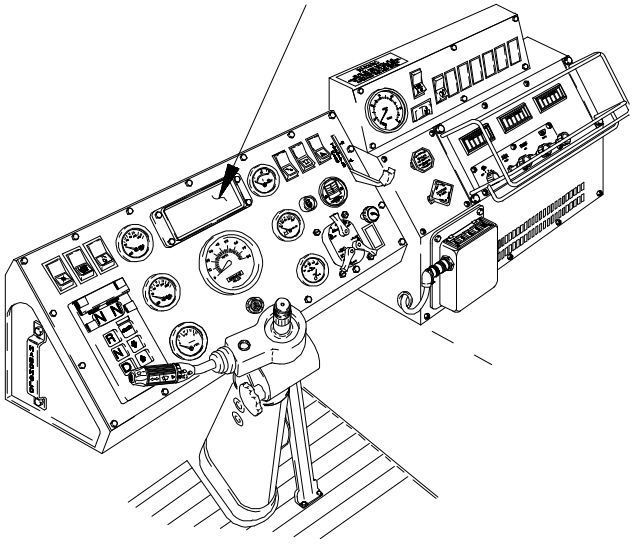
**References**
TM 9-4910-571-12&P

**NOTE**

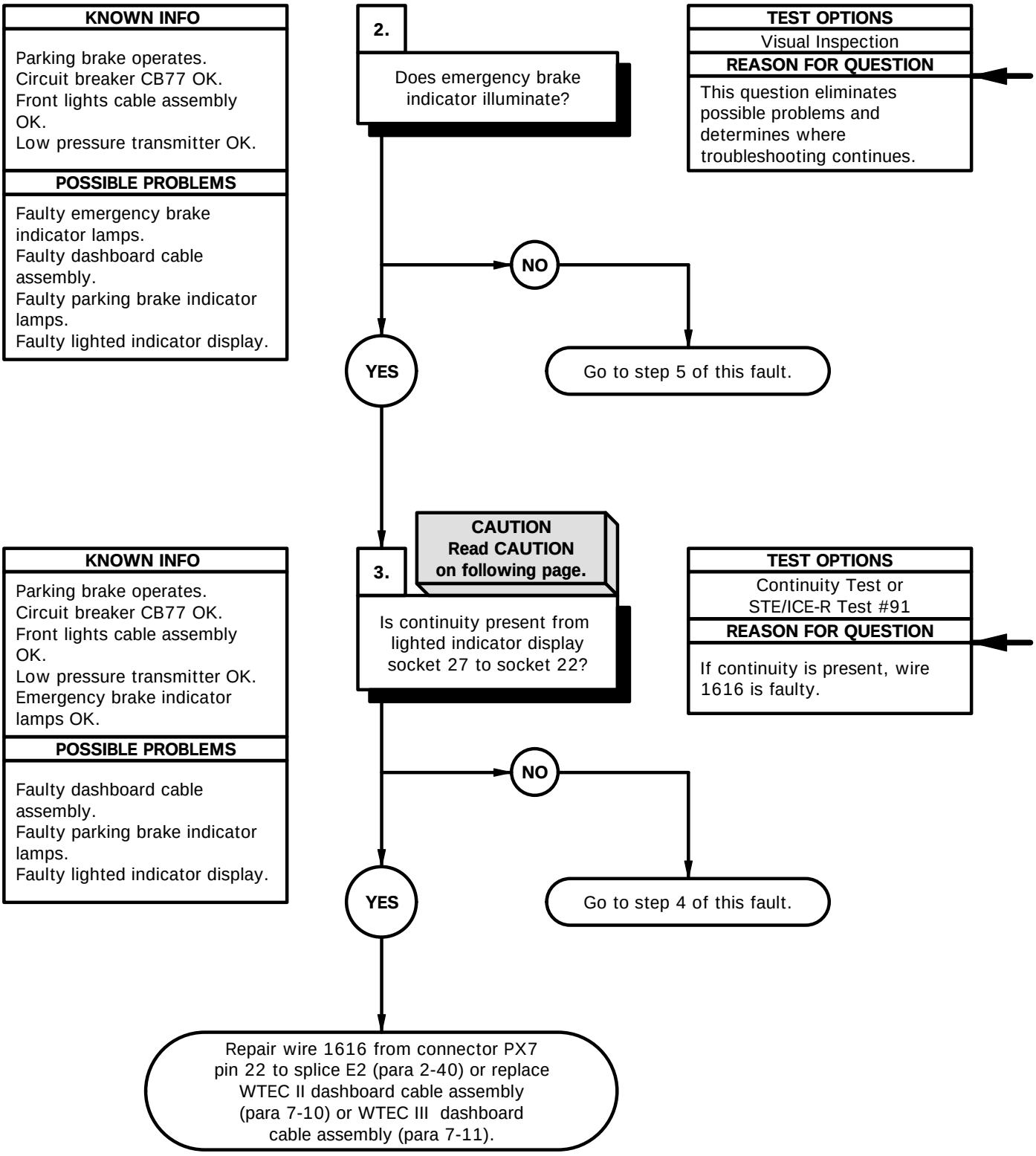
Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB77 prior to beginning this task.



(1) Start engine (TM 9-2320-365-10).
(2) Visually check lighted indicator display.
(3) If emergency brake and parking brake indicator lights both do not illuminate, go to step 7 of this fault.



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)



(1) Visually check lighted indicator display.
(2) If emergency brake indicator does not illuminate, go to step 5 of this fault.
(3) Shut down engine (TM 9-2320-365-10).

**CAUTION**

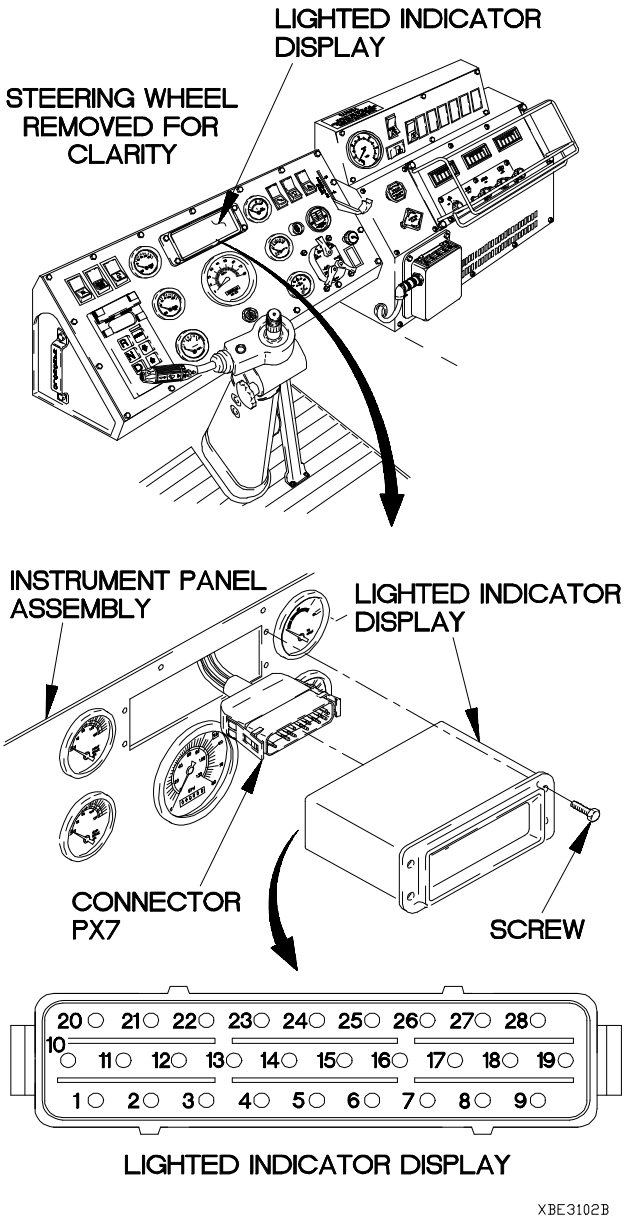
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove four screws from lighted indicator display.
(3) Remove lighted indicator display from instrument panel assembly.
(4) Disconnect connector PX7 from lighted indicator display.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to lighted indicator display socket 27.
(7) Connect negative (-) probe of multimeter to lighted indicator display socket 22 and note reading on multimeter.
(8) If continuity is not present, go to step 4 of this fault.
(9) If continuity is present, repair wire 1616 from connector PX7 pin 22 to splice E2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Parking brake operates.
Circuit breaker CB77 OK.
Front lights cable assembly OK.
Low pressure transmitter OK.
Emergency brake indicator lamps OK.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty parking brake indicator lamps.
Faulty lighted indicator display.

**4.** Is continuity present through both parking brake indicator lamps?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

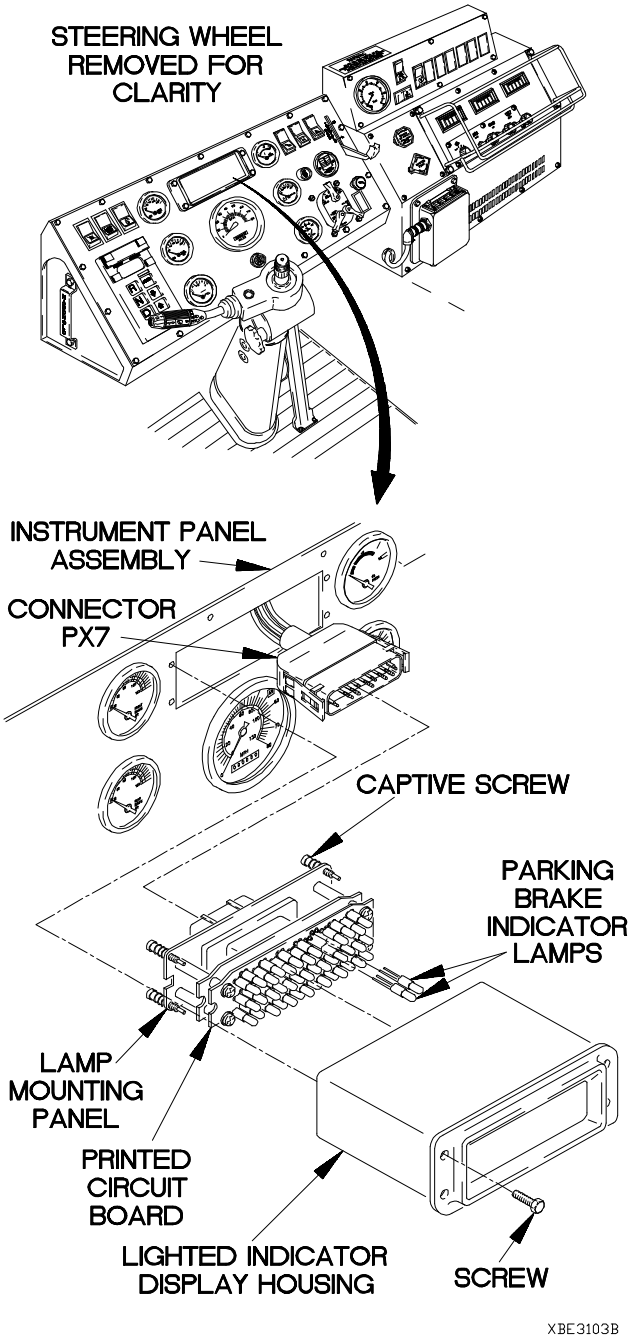
If continuity is not present, parking brake indicator lamps are faulty. If continuity is present, lighted indicator display is faulty.

NO → Replace parking brake indicator lamps (para 7-16).

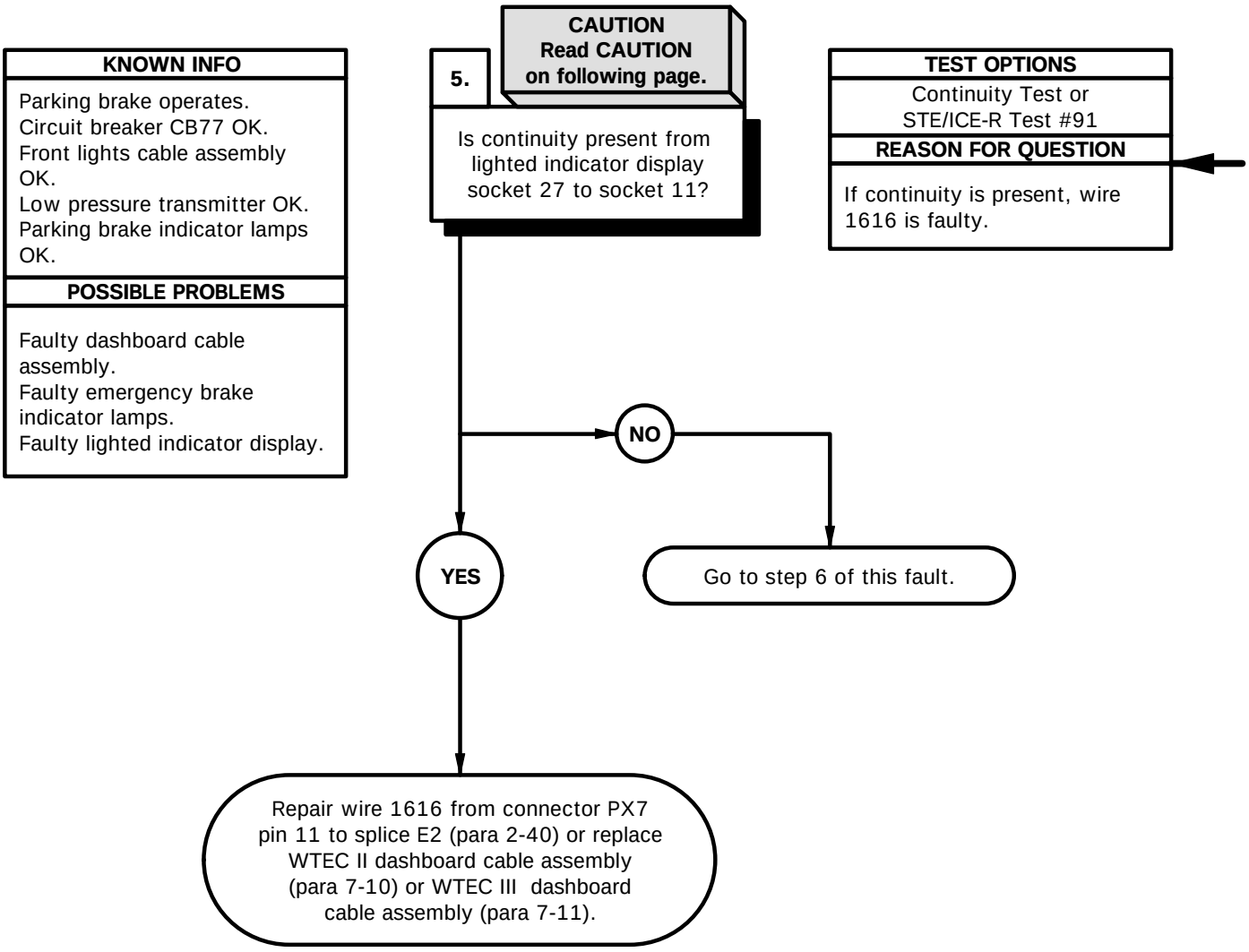
YES → Replace lighted indicator display (para 7-16).

**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove parking brake indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each parking brake indicator lamp and note reading on multimeter.
(6) If continuity is not present in both lamps, replace lamps (para 7-16).
(7) If continuity is present in either lamp, replace lighted indicator display (para 7-16).
(8) Install parking brake indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)



**CAUTION**

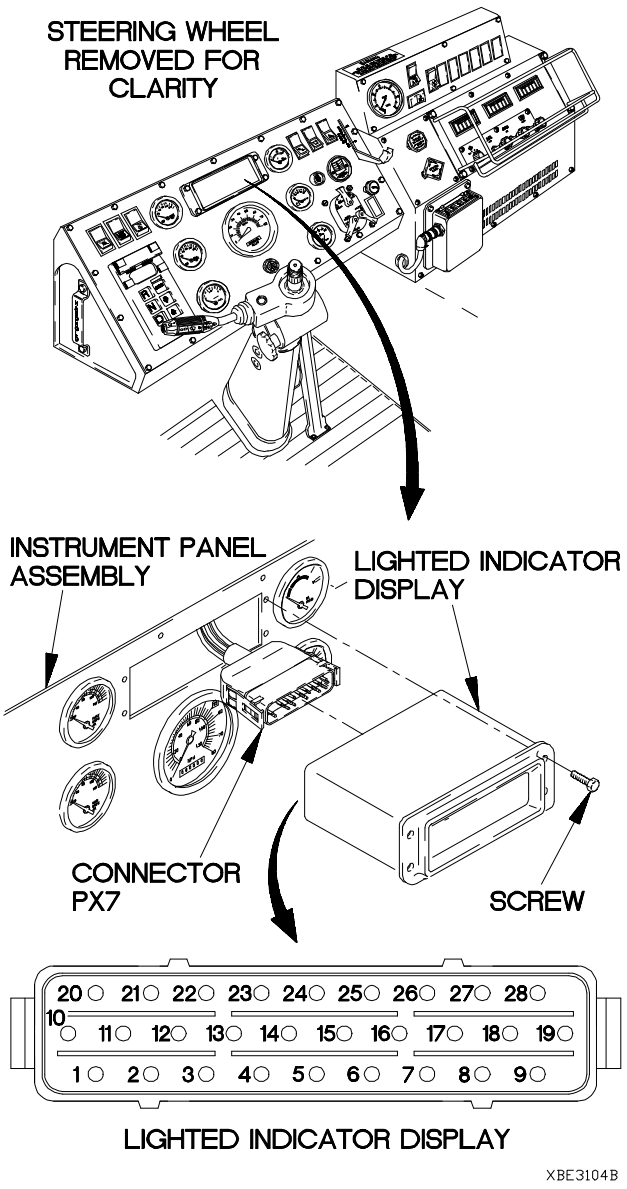
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove four screws from lighted indicator display.
(3) Remove lighted indicator display from instrument panel assembly.
(4) Disconnect connector PX7 from lighted indicator display.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to lighted indicator display socket 27.
(7) Connect negative (-) probe of multimeter to lighted indicator display socket 11 and note reading on multimeter.
(8) If continuity is not present, go to step 6 of this fault.
(9) If continuity is present, repair wire 1616 from connector PX7 pin 11 to splice E2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Parking brake operates.
Circuit breaker CB77 OK.
Front lights cable assembly OK.
Low pressure transmitter OK.
Parking brake indicator lamps OK.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty emergency brake indicator lamps.
Faulty lighted indicator display.

**6.**

Is continuity present through both emergency brake indicator lamps?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

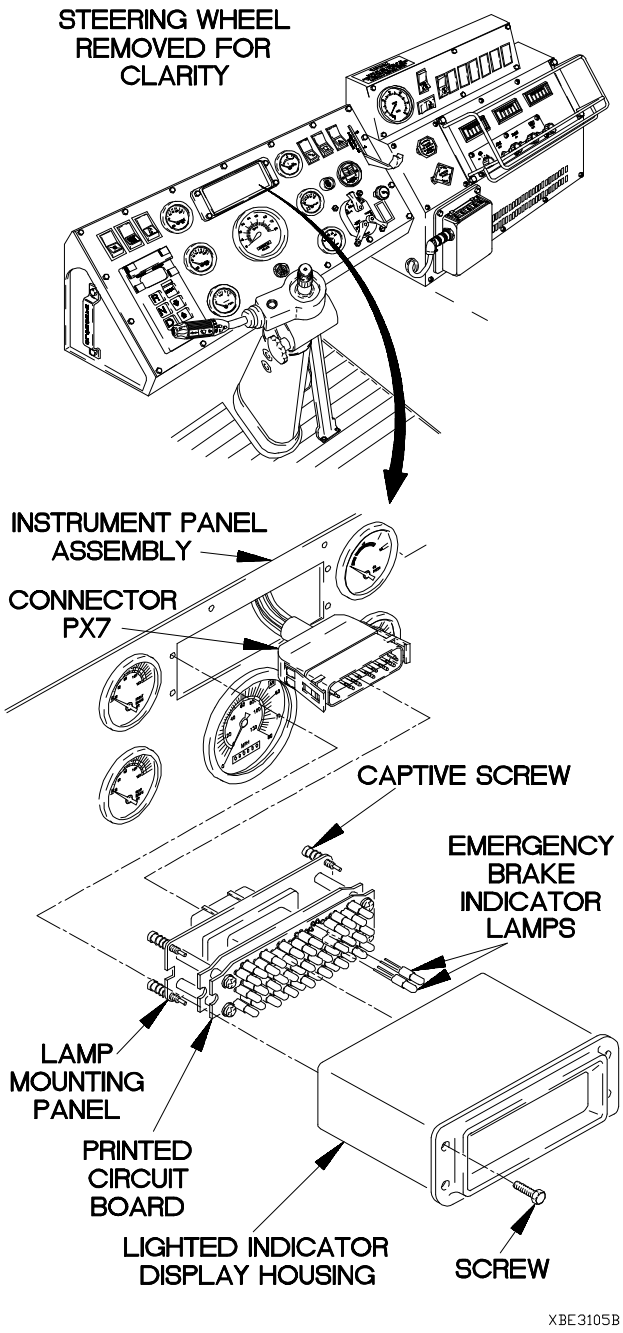
If continuity is not present, emergency brake indicator lamps are faulty. If continuity is present, lighted indicator display is faulty.

**NO** → Replace emergency brake indicator lamps (para 7-16).

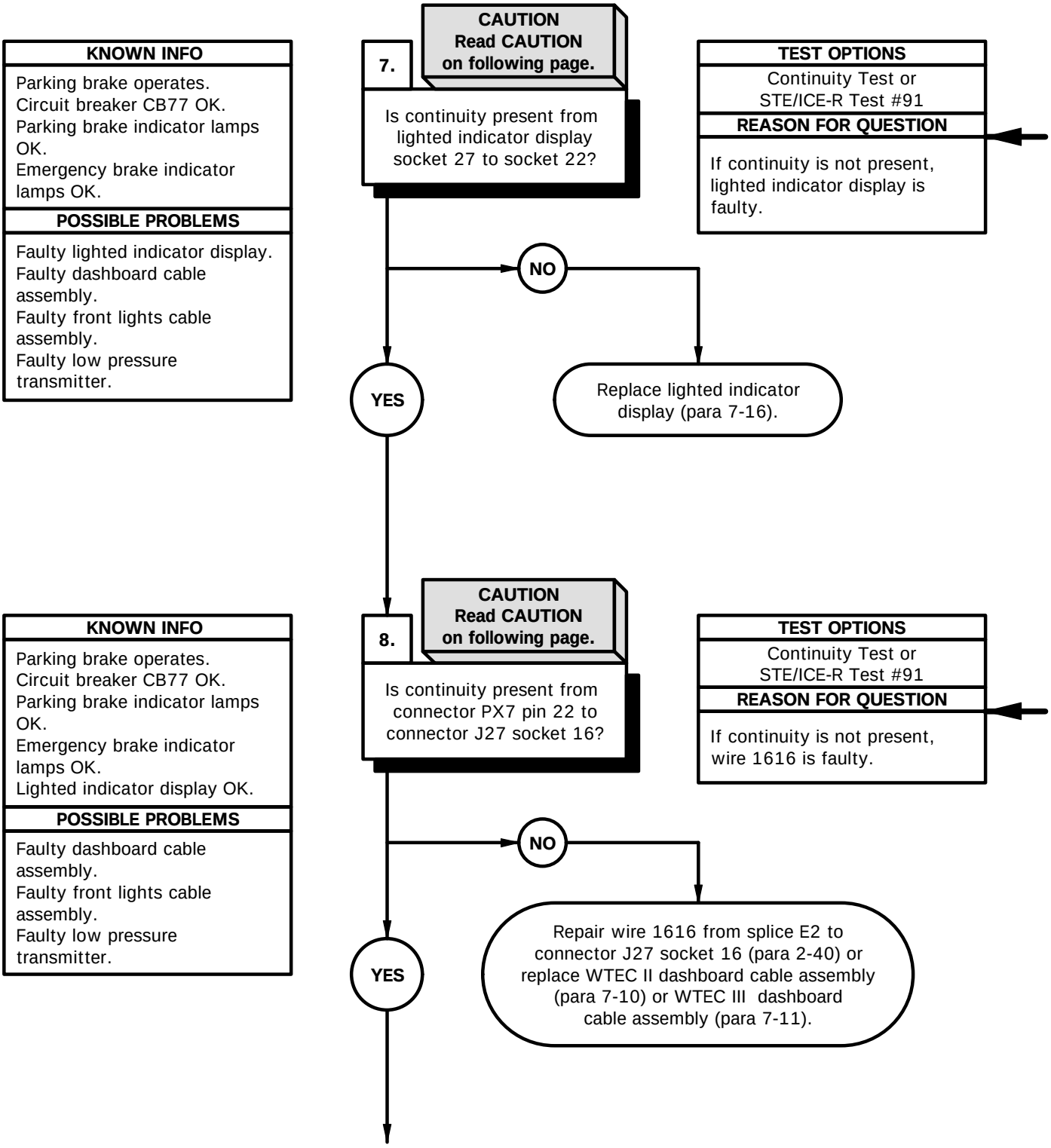
**YES** → Replace lighted indicator display (para 7-16).

**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove emergency brake indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each emergency brake indicator lamp and note reading on multimeter.
(6) If continuity is not present in both lamps, replace lamps (para 7-16).
(7) If continuity is present in either lamp, replace lighted indicator display (para 7-16).
(8) Install emergency brake indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

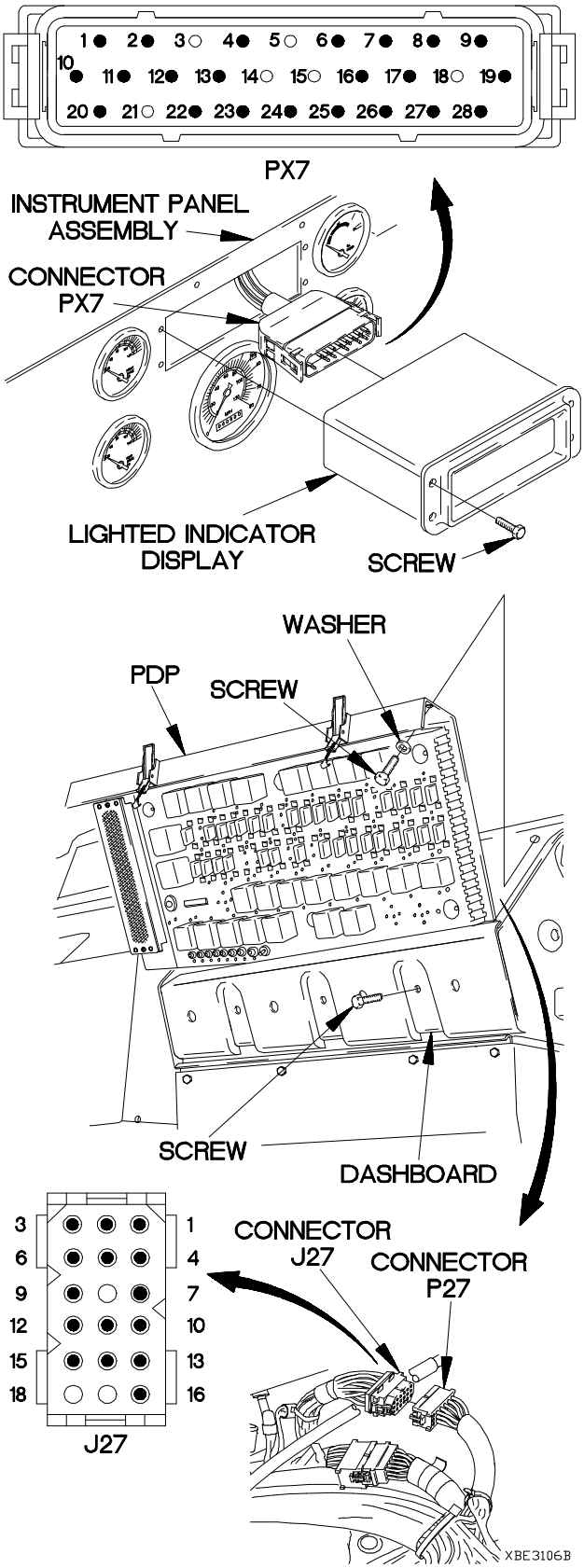
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

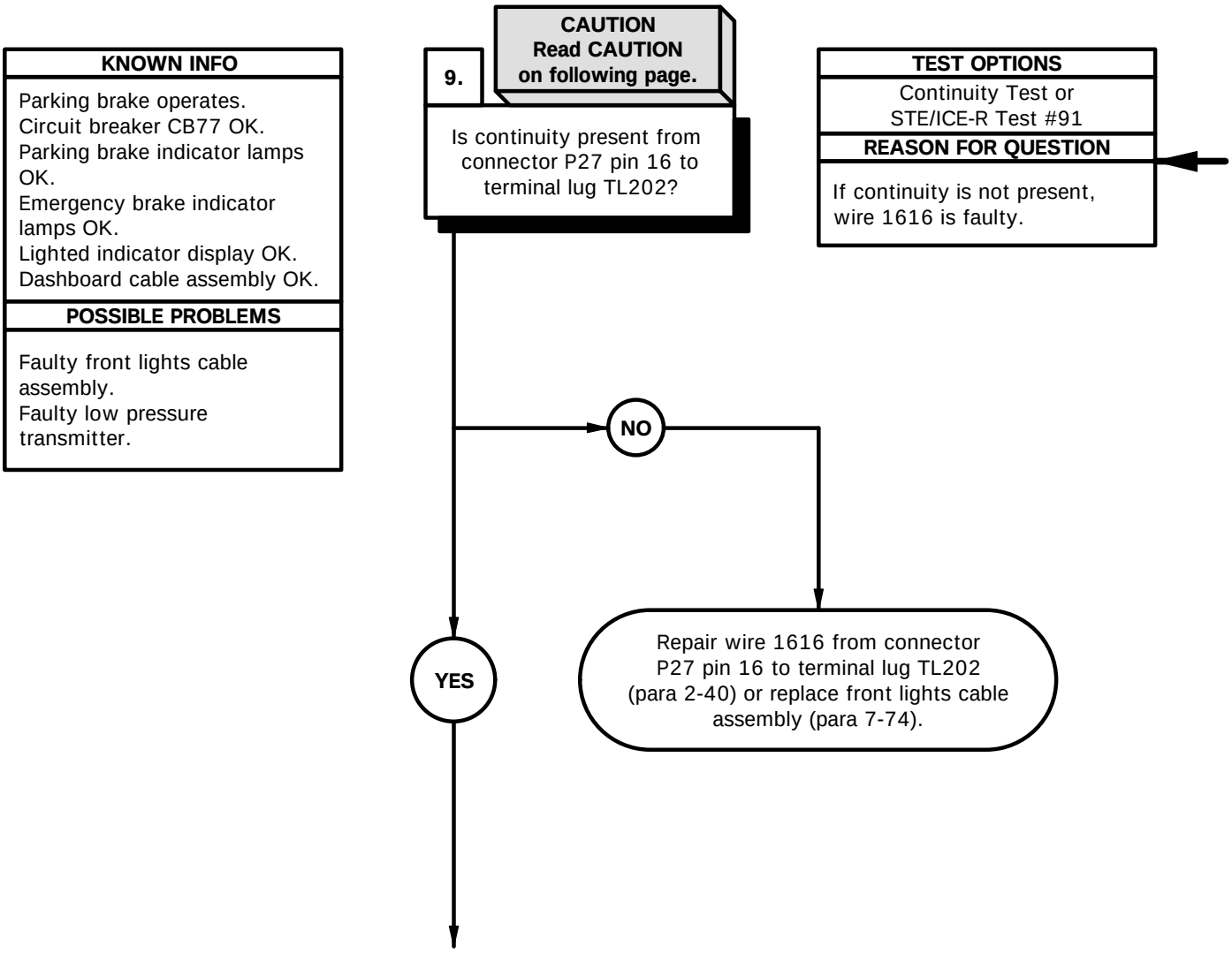
(1) Disconnect batteries (para 7-48).
(2) Remove four screws from lighted indicator display.
(3) Remove lighted indicator display from instrument panel assembly.
(4) Disconnect connector PX7 from lighted indicator display.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to lighted indicator display socket 27.
(7) Connect negative (-) probe of multimeter to lighted indicator display socket 22 and note reading on multimeter.
(8) If continuity is not present, go to step 4 of this faulty.
(9) If continuity is not present, replace lighted indicator display (para 7-16).

**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J27 from connector P27.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector PX7 pin 22.
(8) Connect negative (-) probe of multimeter to connector J27 socket 16 and note reading on multimeter.
(9) If continuity is not present, repair wire 1616 from splice E2 to connector J27 socket 16 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)



**CAUTION**

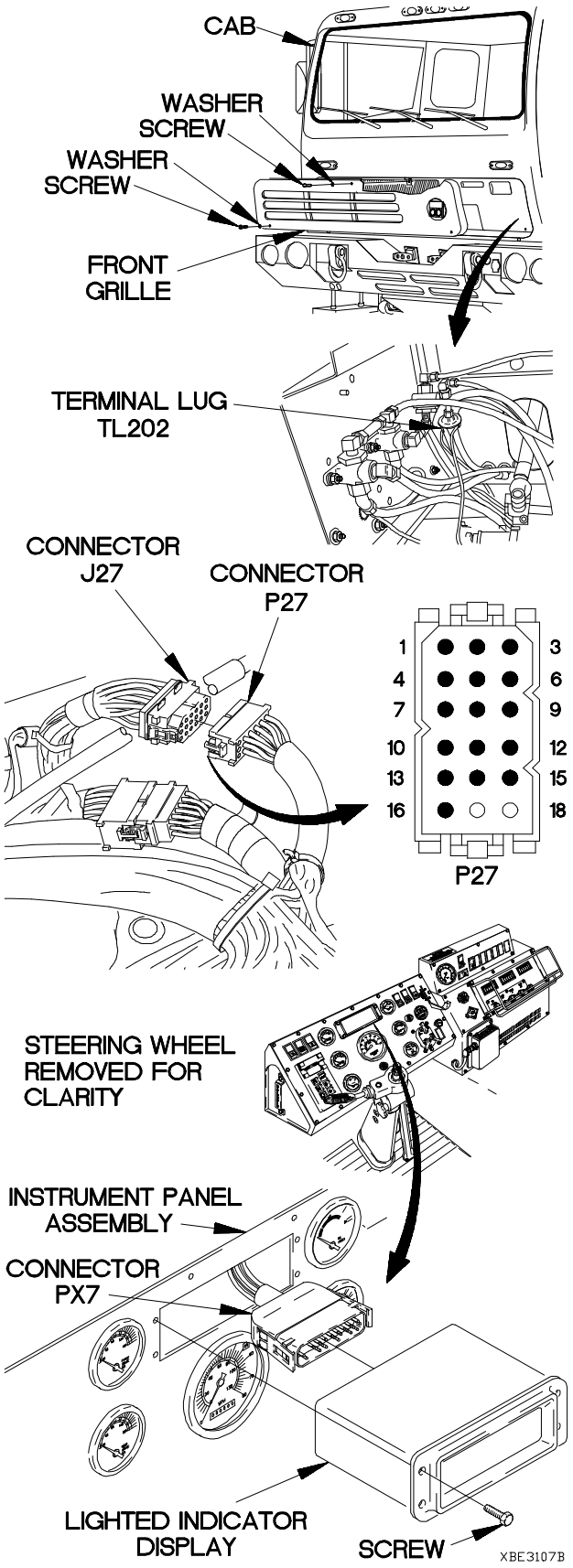
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove two screws and washers from front grille.
(2) Remove screw and washer from front grille.
(3) Remove front grille from cab.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector P27 pin 16.
(6) Connect negative (-) probe of multimeter to terminal lug TL202 and note reading on multimeter.
(7) If continuity is not present, repair wire 1616 from connector P27 pin 16 to terminal lug TL202 (para 2-40) or replace front lights cable assembly (para 7-74).
(8) Connect connector P27 to connector J27.
(9) Connect lighted indicator display to connector PX7.
(10) Position lighted indicator display in instrument panel assembly with four screws.
(11) Tighten four screws to 6-10 lb-in. (1 N·m).
(12) Connect batteries (para 7-48).



## e31. PARKING BRAKE INDICATOR AND/OR EMERGENCY BRAKE INDICATOR DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Parking brake operates.
Circuit breaker CB77 OK.
Parking brake indicator lamps OK.
Emergency brake indicator lamps OK.
Lighted indicator display OK.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty front lights cable assembly.
Faulty low pressure transmitter.

**10.**

Is continuity present from terminal lug TL201 to a known good ground?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 3024 is faulty. If continuity is present, low pressure transmitter is faulty.

NO

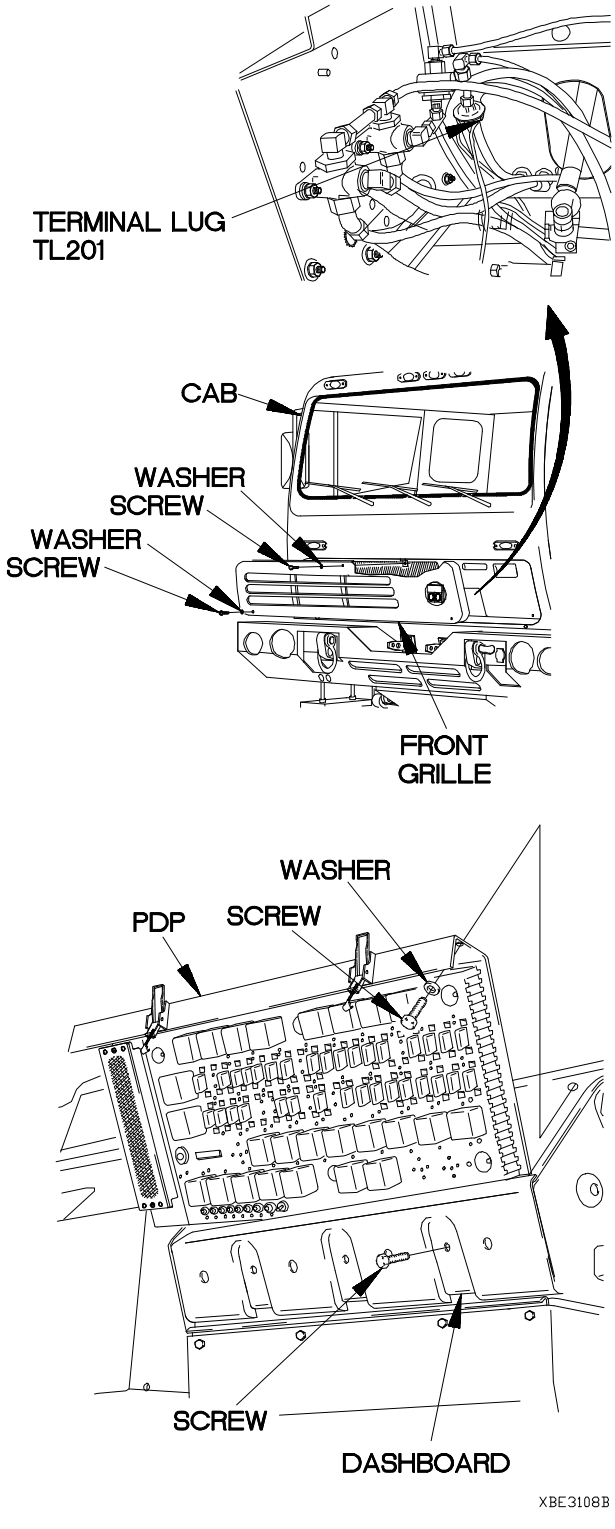
Repair wire 1616 from terminal lug TL201 to terminal lug TL126 (para 2-40) or replace front lights cable assembly (para 7-74).

YES

Replace low pressure transmitter (para 11-28).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL201.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3024 from terminal lug TL201 to terminal lug TL126 (para 2-40) or replace front lights cable assembly (para 7-74).
(5) If continuity is present, replace low pressure transmitter (para 11-28).
(6) Position front grille on cab with washer and screw.
(7) Position two washers and screws in front grille.
(8) Tighten screw to 48-60 lb-in. (5-7 N·m).
(9) Tighten two screws to 24 lb-in. (3 N·m).
(10) Install PDP in dashboard with three screws.
(11) Install three washers and screws in PDP.
(12) Install PDP cover (para 16-2).



**e32. PTO INDICATOR DOES NOT OPERATE**

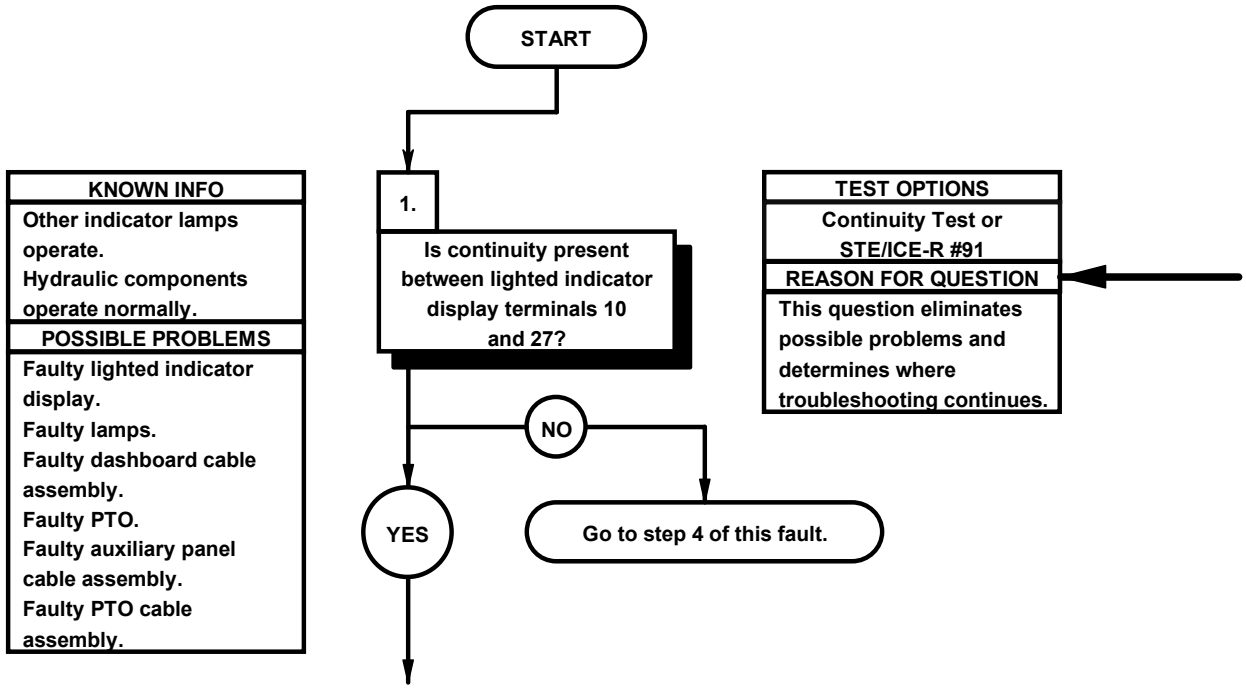
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

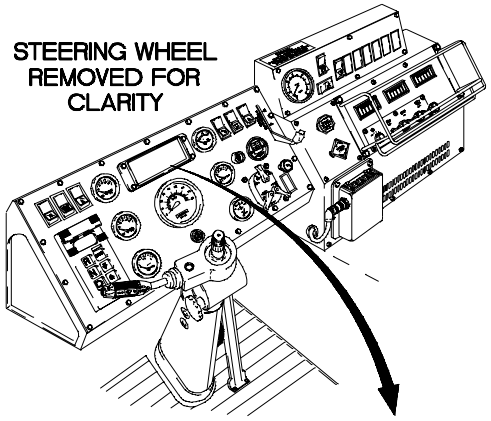
**Personnel Required**
(2)

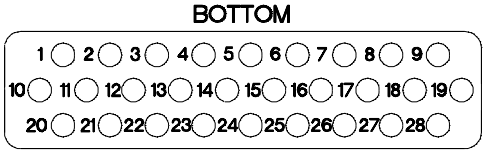
**References**
TM 9-4910-571-12&P

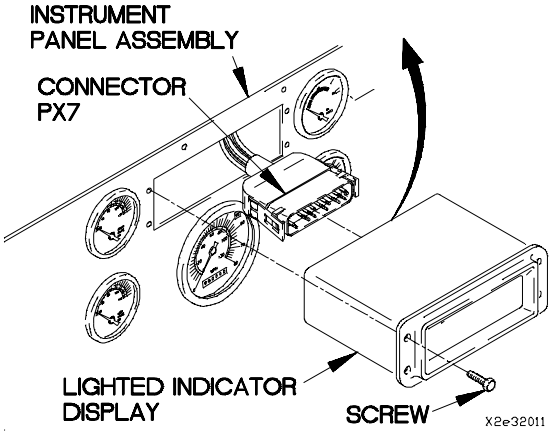
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)



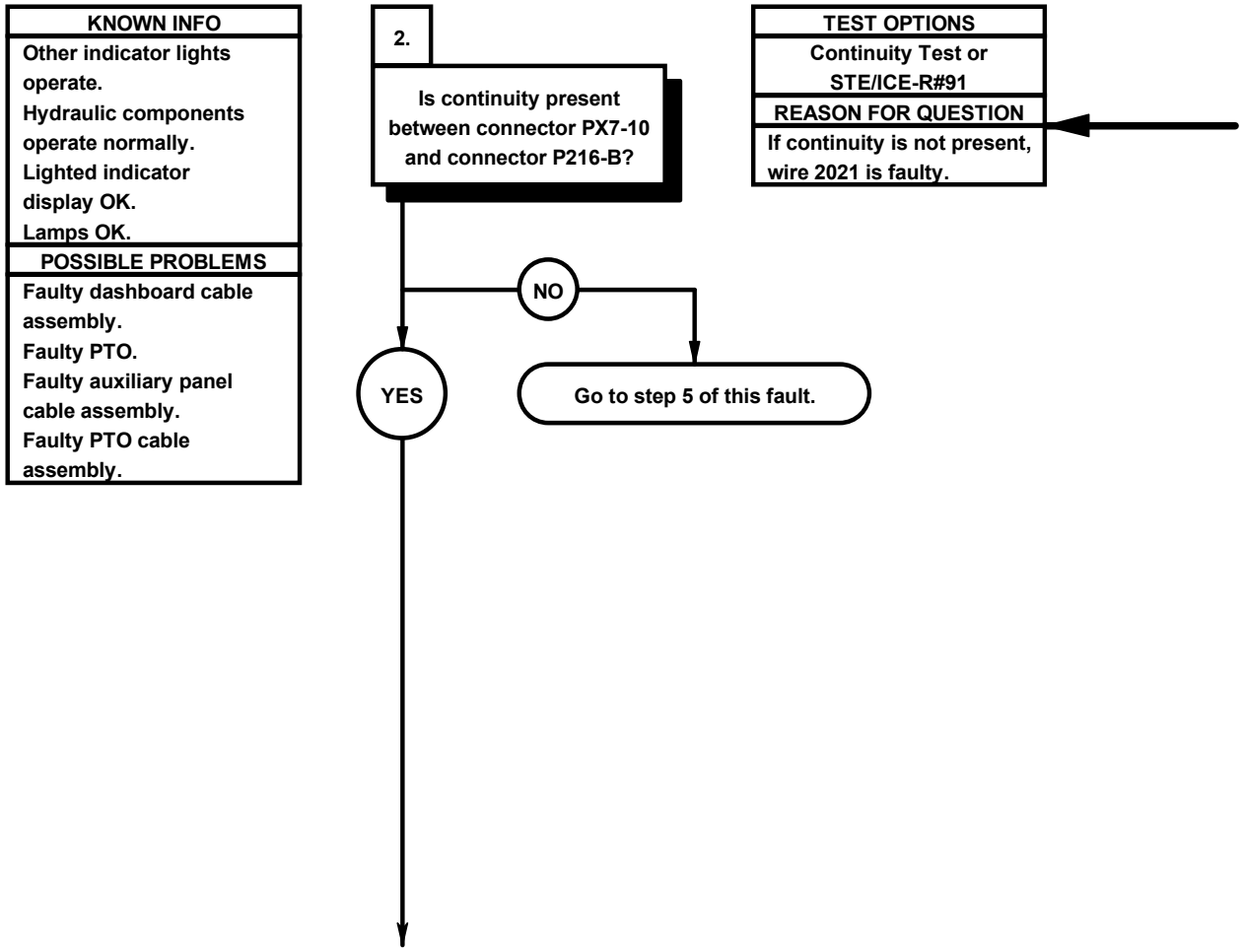
| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 27. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 10 and note reading on multimeter. |
| (7) If continuity is not present, go to step 4 of this fault. |



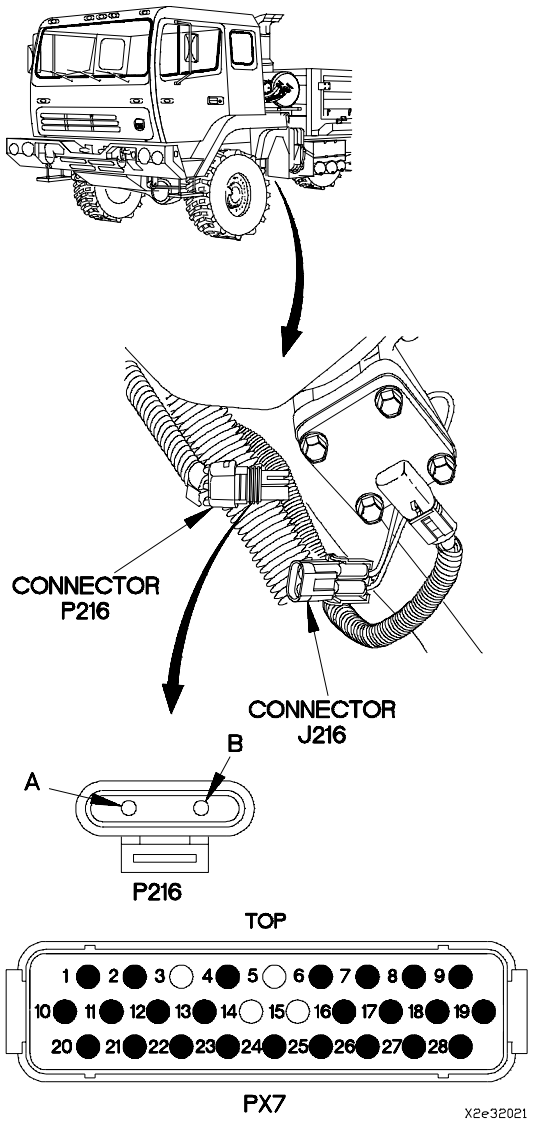



## e32. PTO INDICATOR DOES NOT OPERATE (CONT)

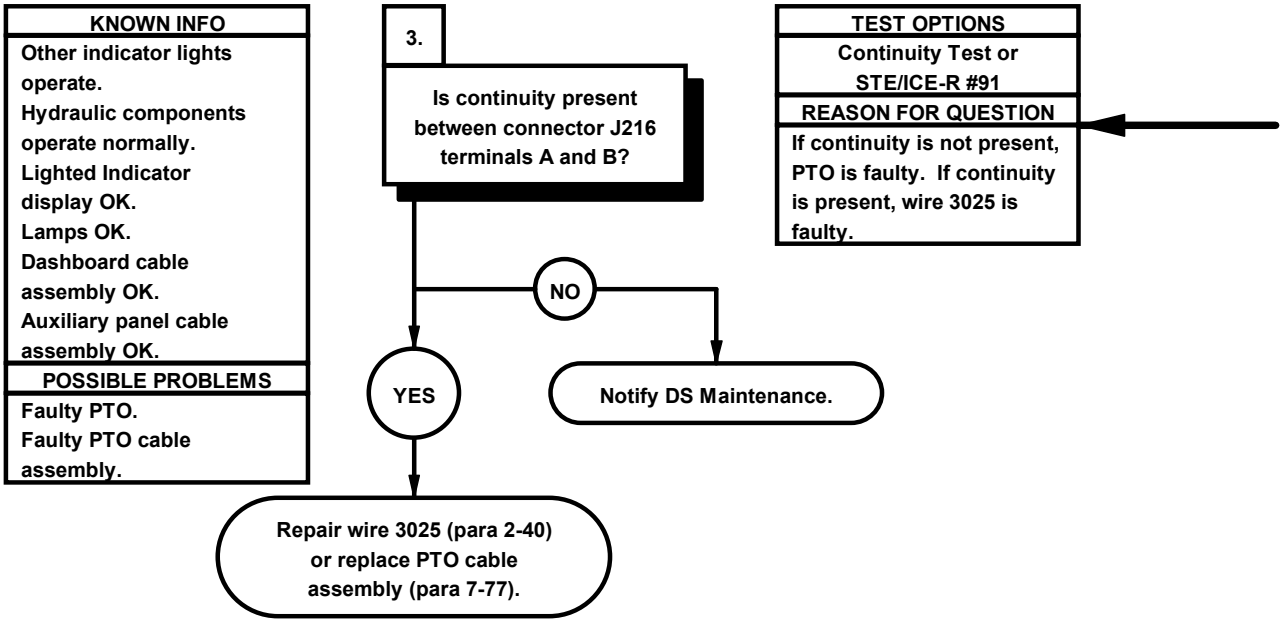


**CONTINUITY TEST**

(1) Disconnect connector P216 from connector J216.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX7-10.
(4) Connect negative (-) probe of multimeter to connector P216-B and note reading on multimeter.
(5) If continuity is not present, go to step 5 of this fault.

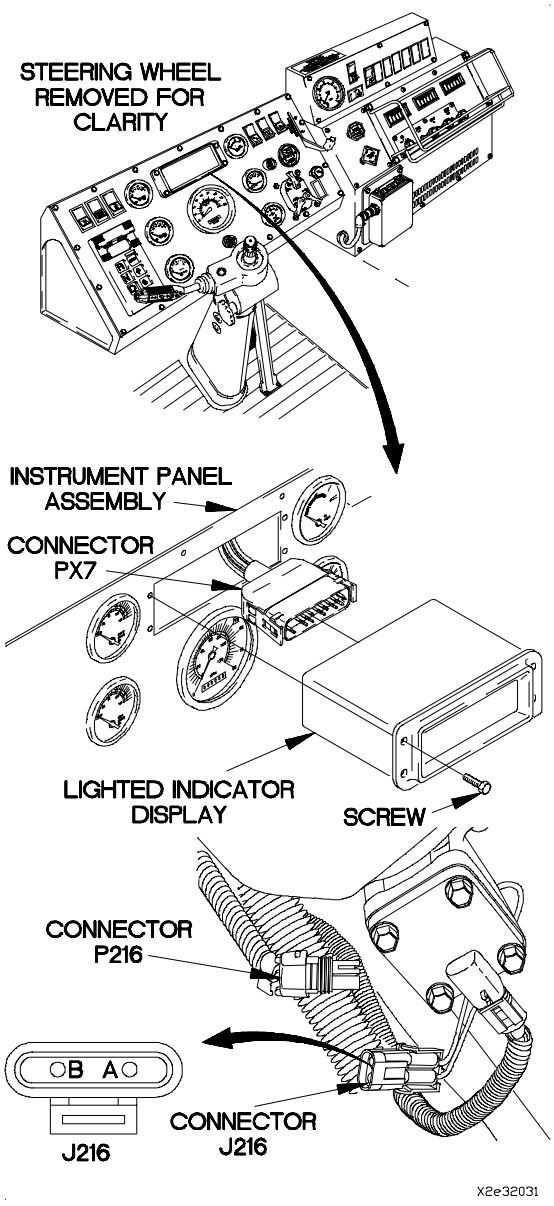


## e32. PTO INDICATOR DOES NOT OPERATE (CONT)

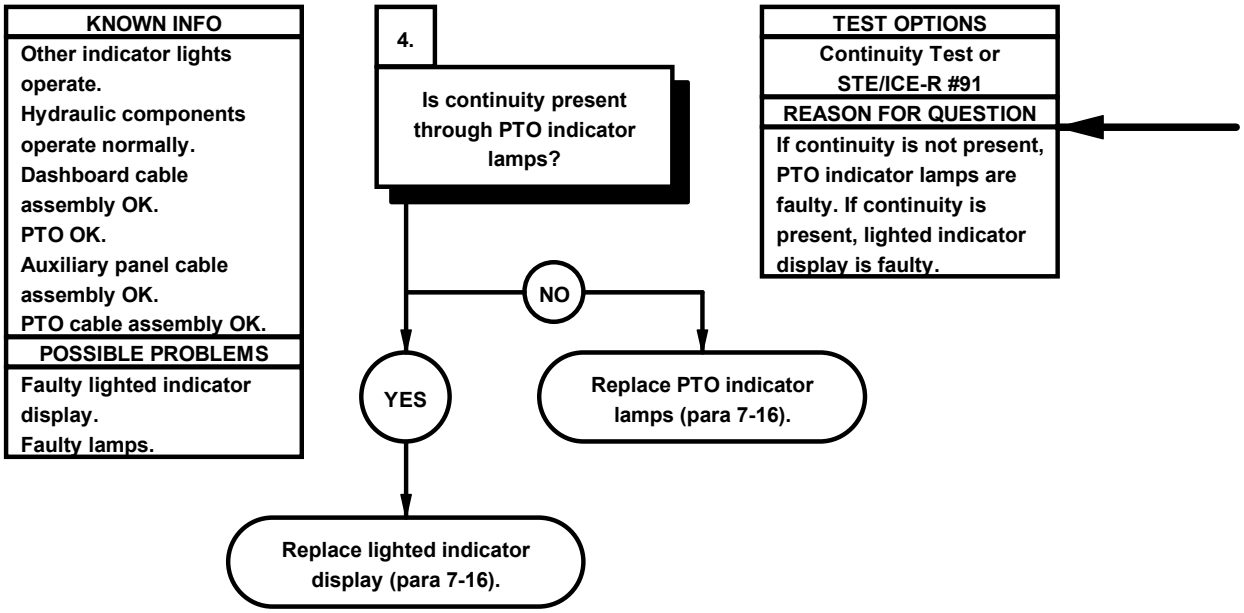


**CONTINUITY TEST**

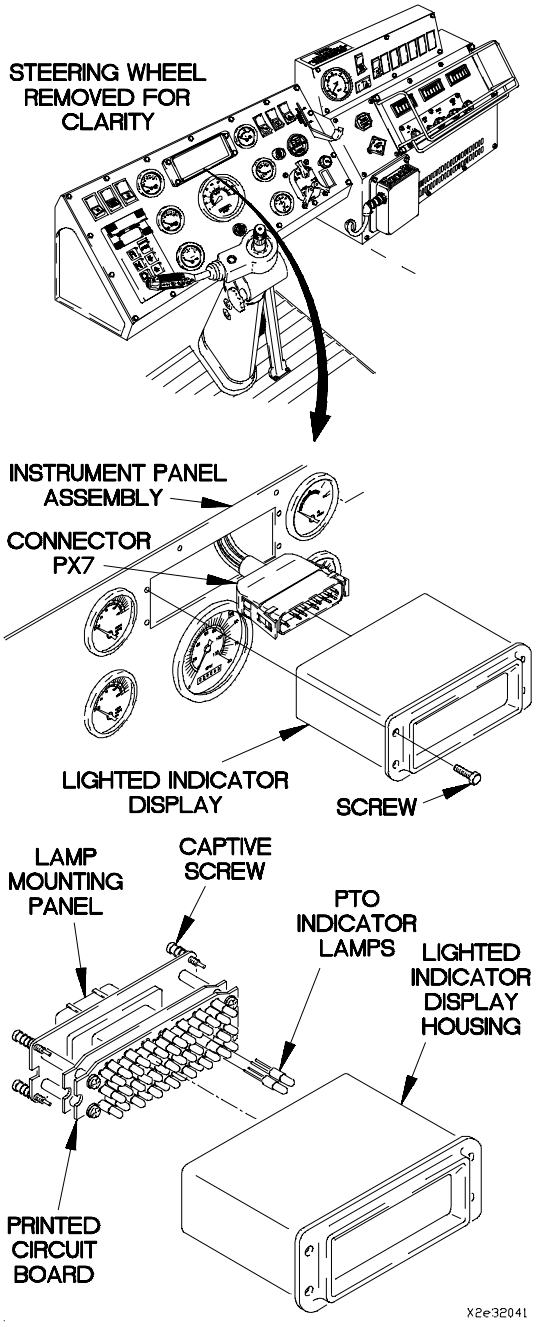
(1) Connect lighted indicator display to connector PX7.
(2) Position lighted indicator display in instrument panel assembly with four screws.
(3) Tighten four screws to 6-10 lb-in. (1 N·m).
(4) Connect batteries (para 7-48).
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector J216-B.
(7) Connect negative (-) probe of multimeter to connector J216-A.
(8) Start engine (TM 9-2320-365-10).
(9) Position PTO switch to on (TM 9-2320-365-10) and note reading on multimeter.
(10) If continuity is not present, notify DS Maintenance.
(11) If continuity is present, repair wire 3025 (para 2-40) or replace PTO cable assembly (para 7-77).
(12) Position PTO switch to off (TM 9-2320-365-10).
(13) Shut down engine (TM 9-2320-365-10).
(14) Connect connector P216 to connector J216.



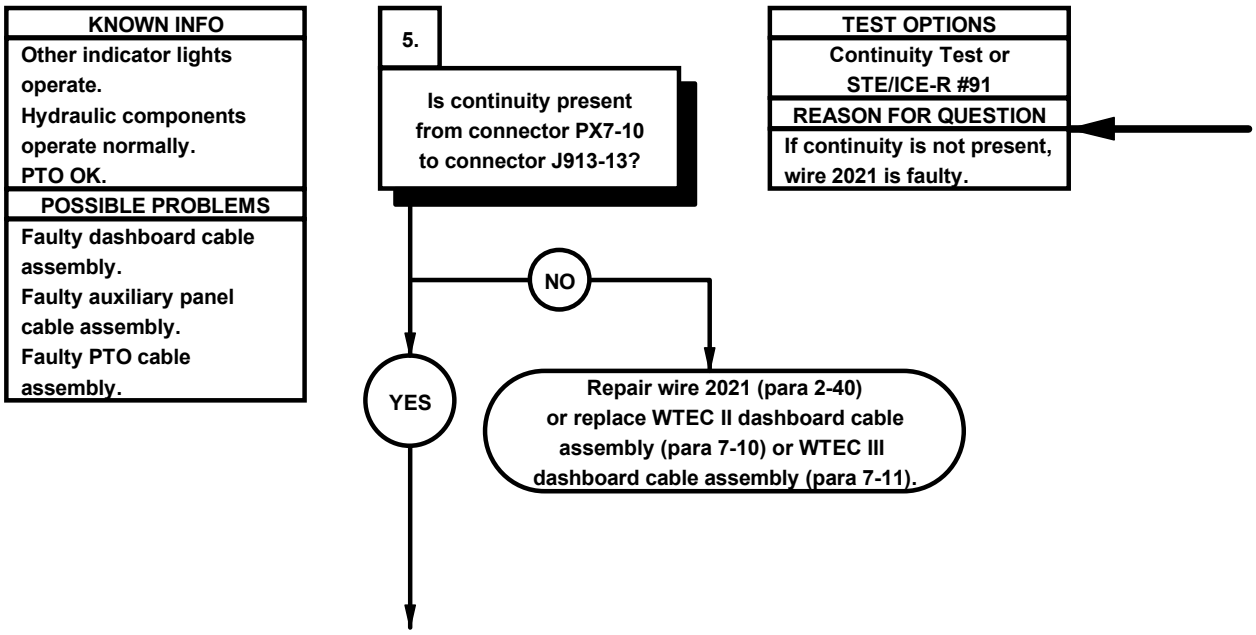
## e32. PTO INDICATOR DOES NOT OPERATE (CONT)



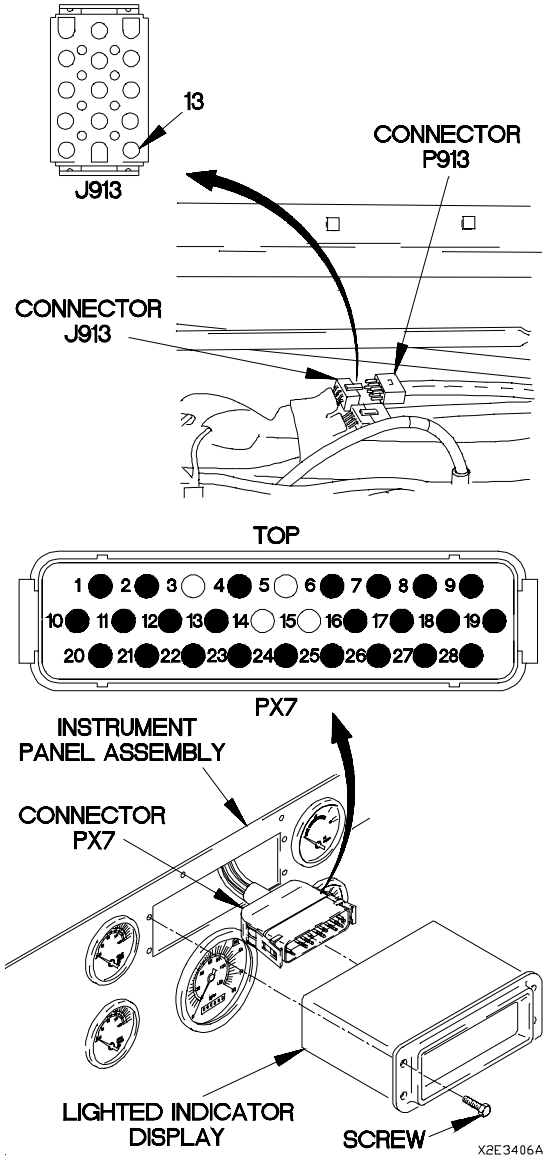
| CONTINUITY TEST |
| --- |
| (1) Loosen four captive screws in lamp mounting panel. |
| (2) Remove lamp mounting panel from lighted indicator display housing. |
| (3) Remove PTO indicator lamps from printed circuit board. |
| (4) Set multimeter to ohms. |
| (5) Check continuity through each indicator lamp and note reading on multimeter. |
| (6) If continuity is not present, replace PTO indicator lamps (para 7-16). |
| (7) If continuity is present, replace lighted indicator display (para 7-16). |
| (8) Install PTO indicator lamps in printed circuit board. |
| (9) Install lamp mounting panel in lighted indicator display housing. |
| (10) Tighten four captive screws in lamp mounting panel. |
| (11) Connect lighted indicator display to connector PX7. |
| (12) Position lighted indicator display in instrument panel assembly with four screws. |
| (13) Tighten four screws to 6-10 lb-in. (1 N·m). |
| (14) Connect batteries (para 7-48). |



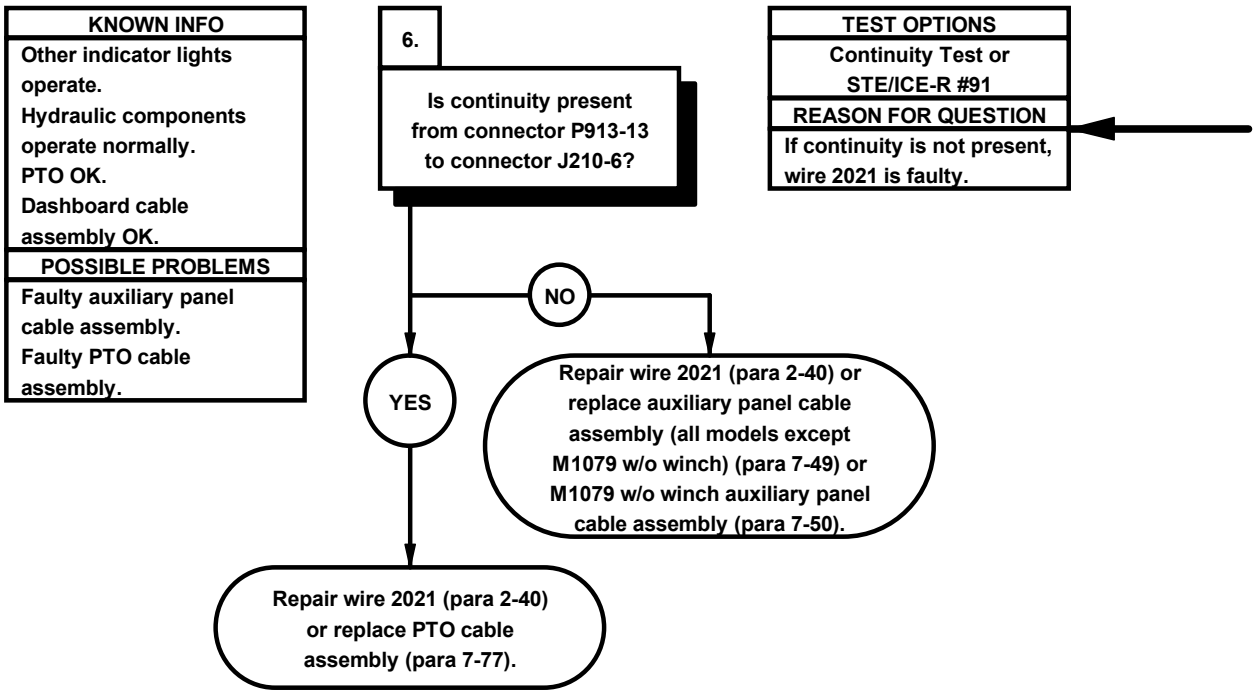
## e32. PTO INDICATOR DOES NOT OPERATE (CONT)



| CONTINUITY TEST |
| --- |
| (1) Remove personnel heater for access (para 18-9). |
| (2) Disconnect connector P913 from connector J913. |
| (3) Set multimeter to ohms. |
| (4) Connect positive (+) probe of multimeter to PX7-10. |
| (5) Connect negative (-) probe of multimeter to J913-13 and note reading on multimeter. |
| (6) If continuity is not present, repair wire 2021 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11). |
| (7) Connect lighted indicator display to connector PX7. |
| (8) Position lighted indicator display in instrument panel assembly with four screws. |
| (9) Tighten four screws to 6-10 lb-in. (1 N·m). |
| (10) Connect batteries (para 7-48). |

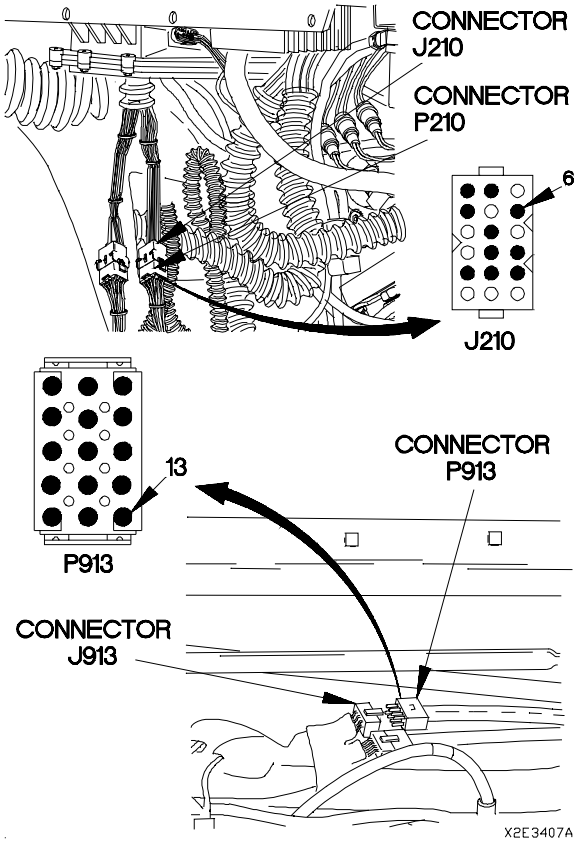


## e32. PTO INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Disconnect connector P210 from connector J210.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to J210-6.
(4) Connect negative (-) probe of multimeter to P913-13 and note reading on multimeter.
(5) If continuity is not present, repair wire 2021 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49) or M1079 w/o winch auxiliary panel cable assembly (para 7-50).
(6) If continuity is present, repair wire 2021 (para 2-40) or replace PTO cable assembly (para 7-77).
(7) Connect connector J210 to connector P210.
(8) Connect connector P913 to connector J913.
(9) Install personnel heater (para 18-9).



**e33. FAN OFF INDICATOR DOES NOT OPERATE**

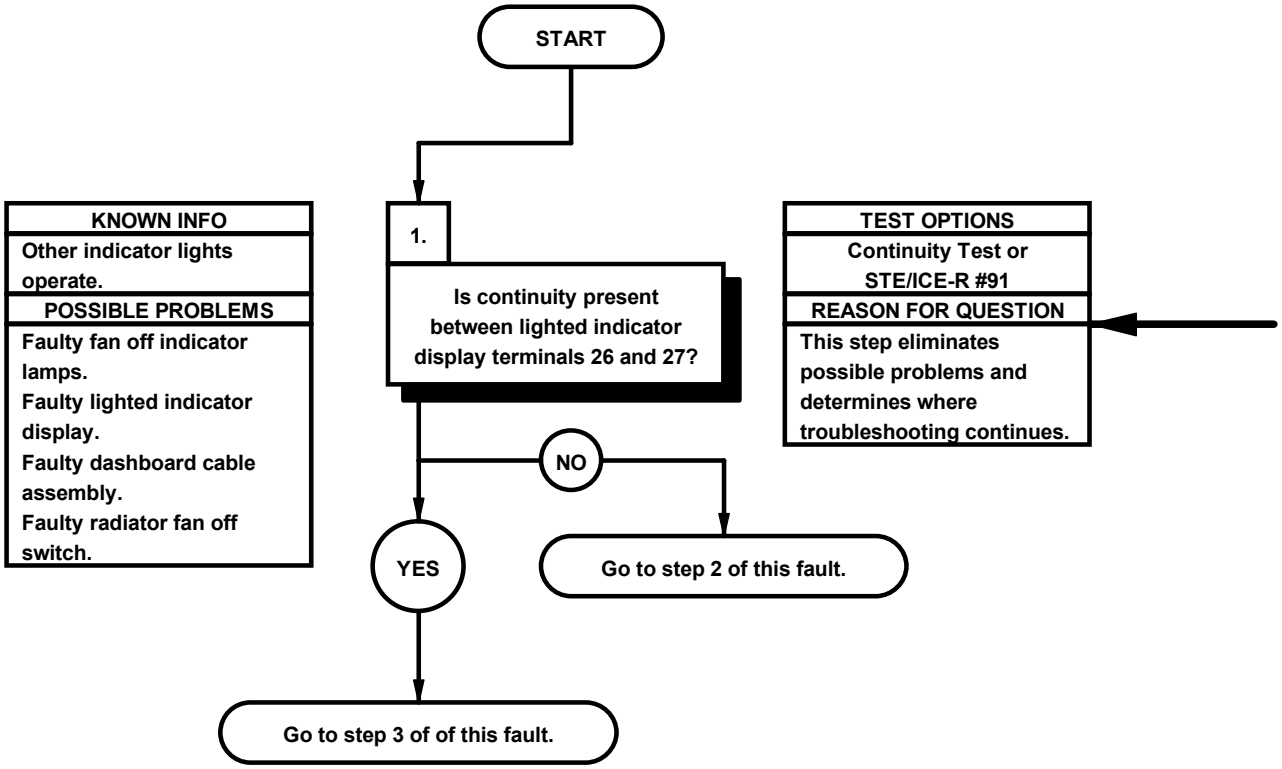
**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

**Personnel Required**
- (2)

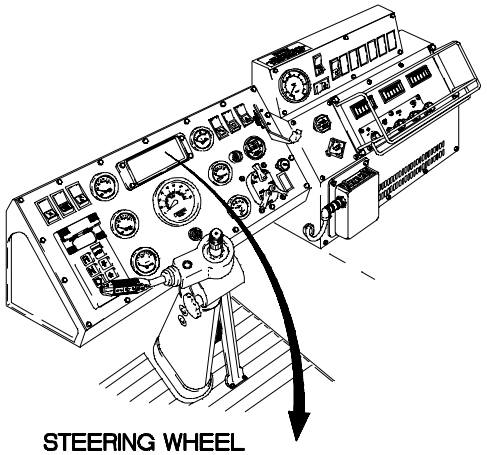
**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

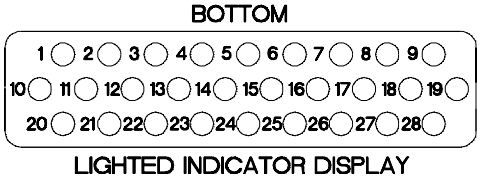
**References**
- TM 9-4910-571-12&P

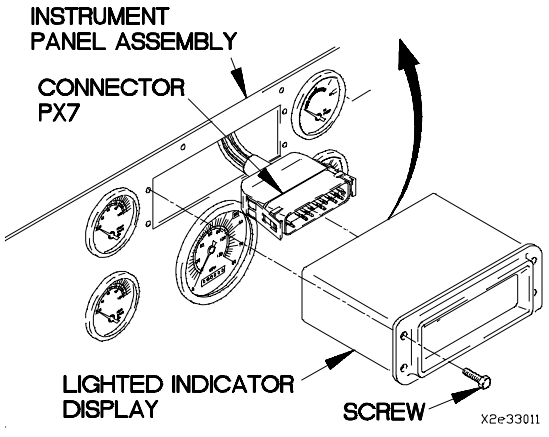


**CONTINUITY TEST**

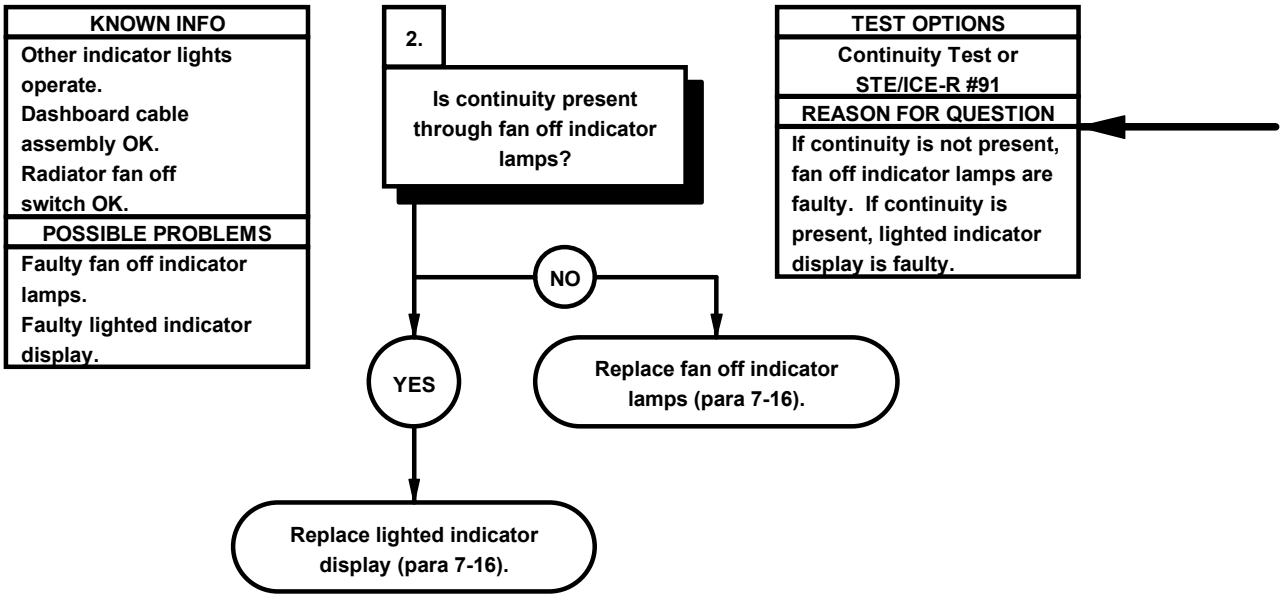
(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to lighted indicator display terminal 27.
(6) Connect negative (-) probe of multimeter to lighted indicator display terminal 26 and note reading on multimeter.
(7) If continuity is not present, go to step 2 of this fault.
(8) If continuity is present, go to step 3 of this fault.



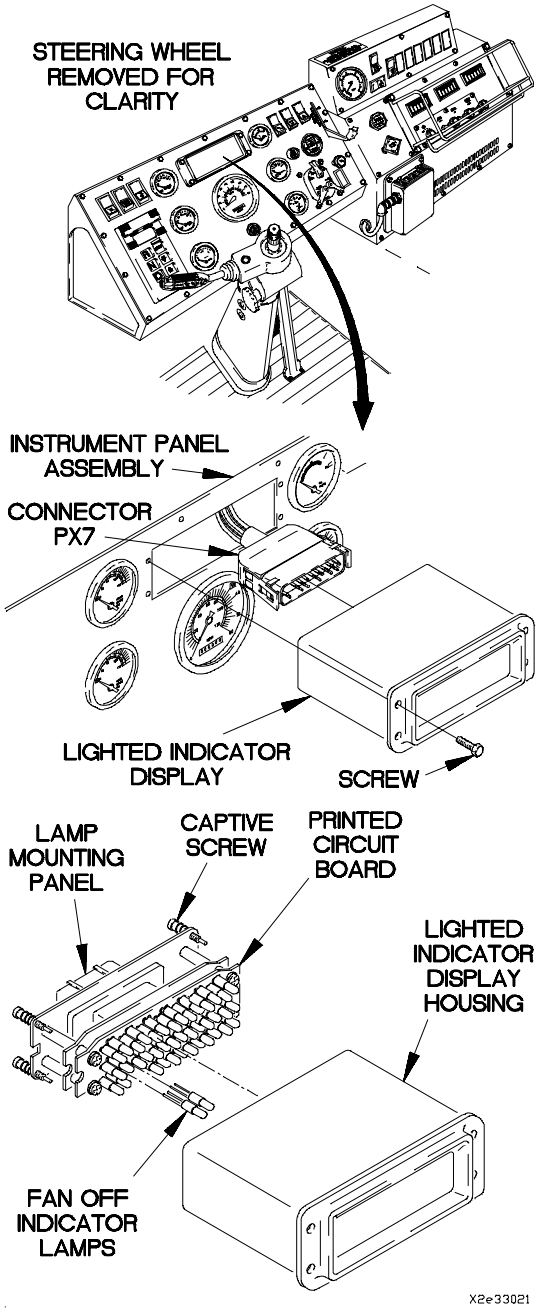



## e33. FAN OFF INDICATOR DOES NOT OPERATE (CONT)

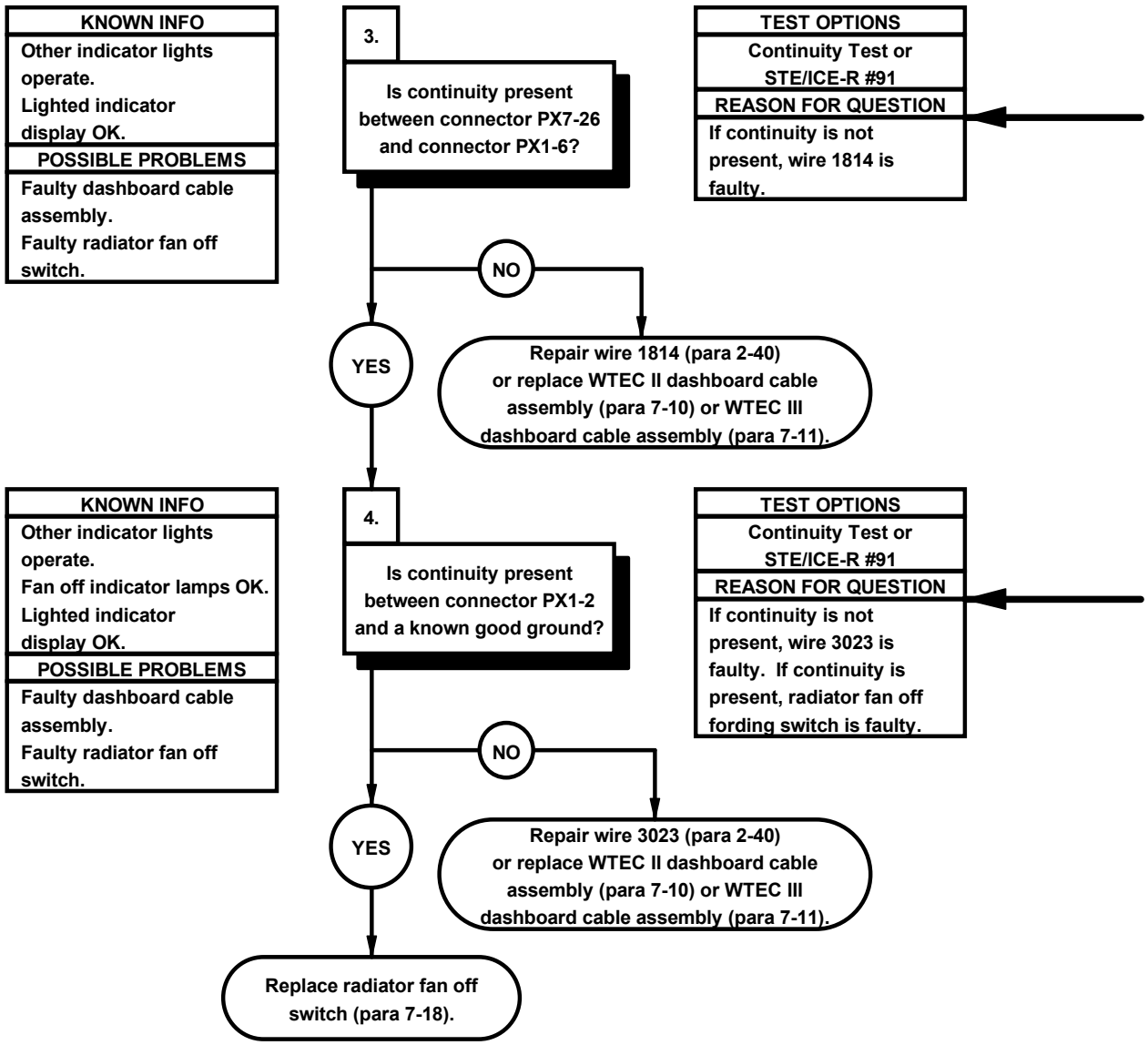


**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove fan off indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each fan off indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace fan off indicator lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install fan off indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



## e33. FAN OFF INDICATOR DOES NOT OPERATE (CONT)

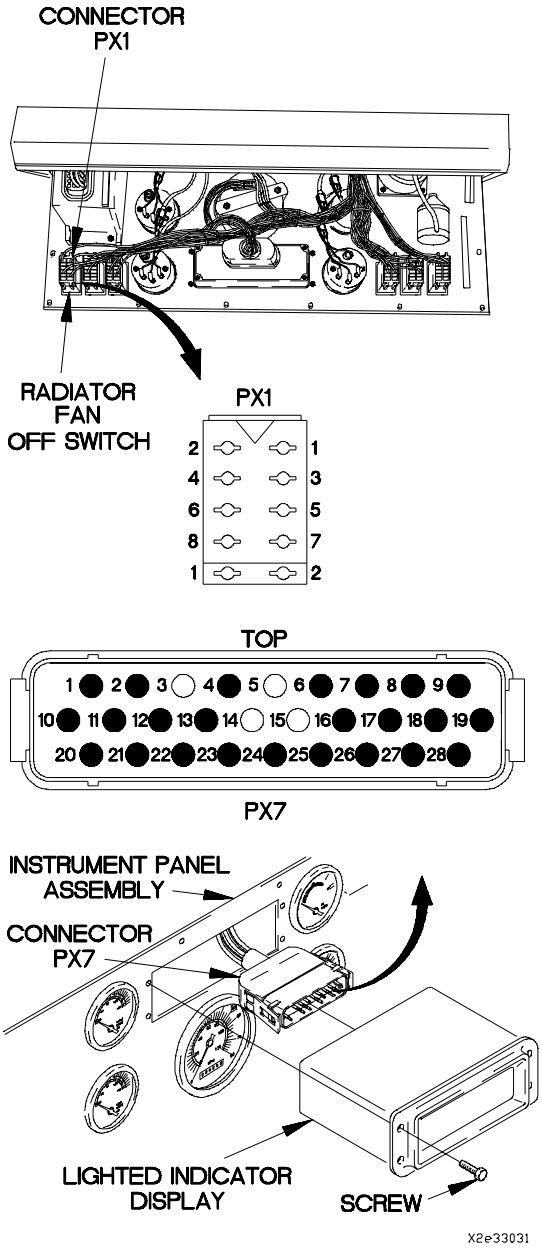


**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX1 from radiator fan off switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX7-26.
(5) Connect negative (-) probe of multimeter to connector PX1-6 and note reading on multimeter.
(6) If continuity is not present, repair wire 1814 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX1-2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3023 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace radiator fan off switch (para 7-18).
(6) Connect connector PX1 to radiator fan off switch.
(7) Install instrument panel assembly (para 7-15).
(8) Connect lighted indicator display to connector PX7.
(9) Position lighted indicator display in instrument panel assembly with four screws.
(10) Tighten four screws to 6-10 lb-in. (1 N·m).
(11) Connect batteries (para 7-48).



**e34. WTEC II TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE**

**INITIAL SETUP**

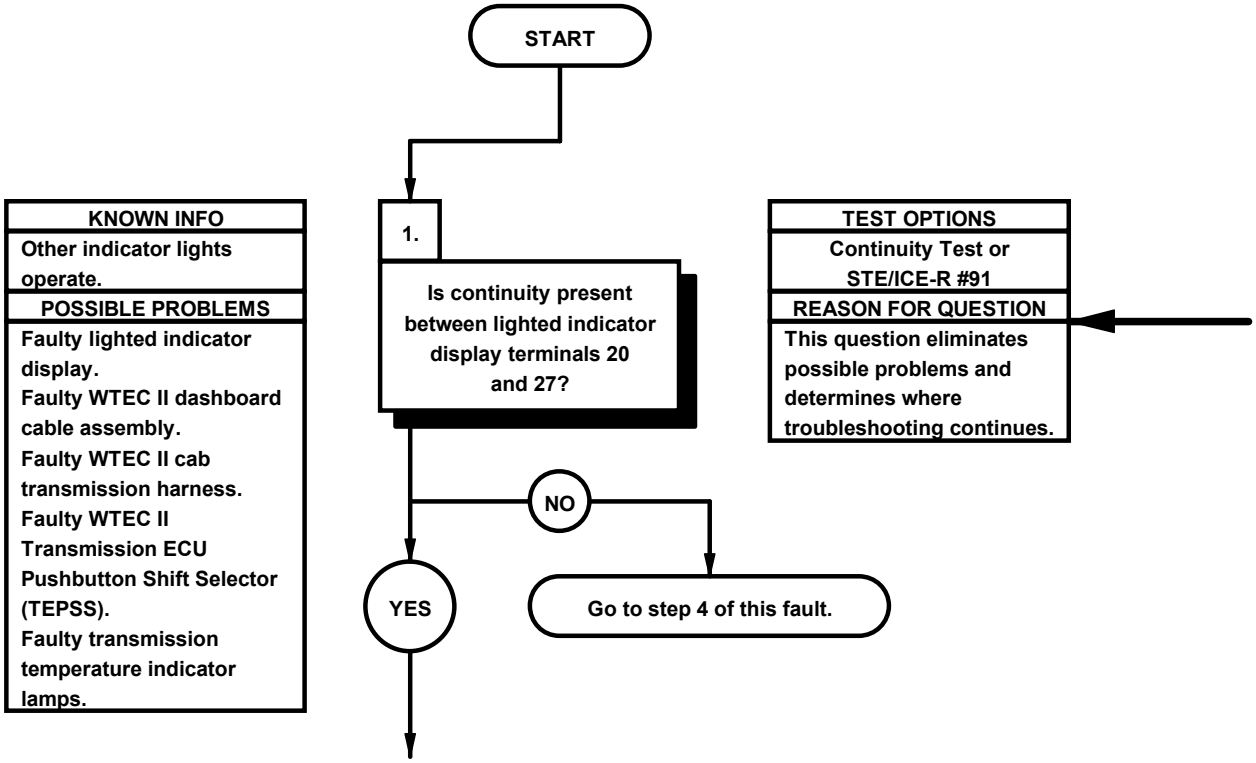
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

**Personnel Required**
(2)

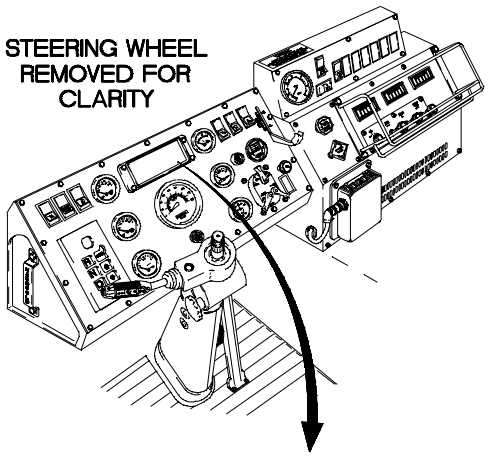
**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

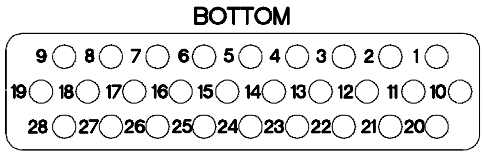
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

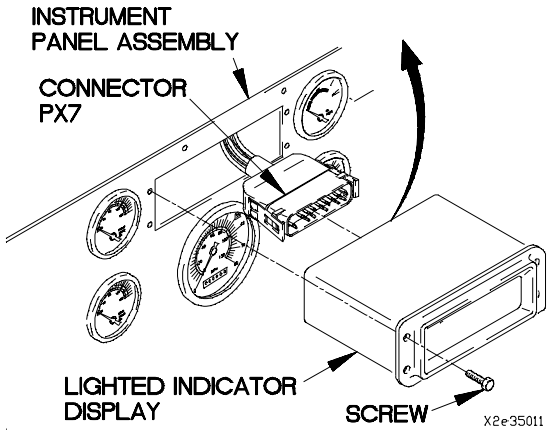
**References**
TM 9-4910-571-12&P



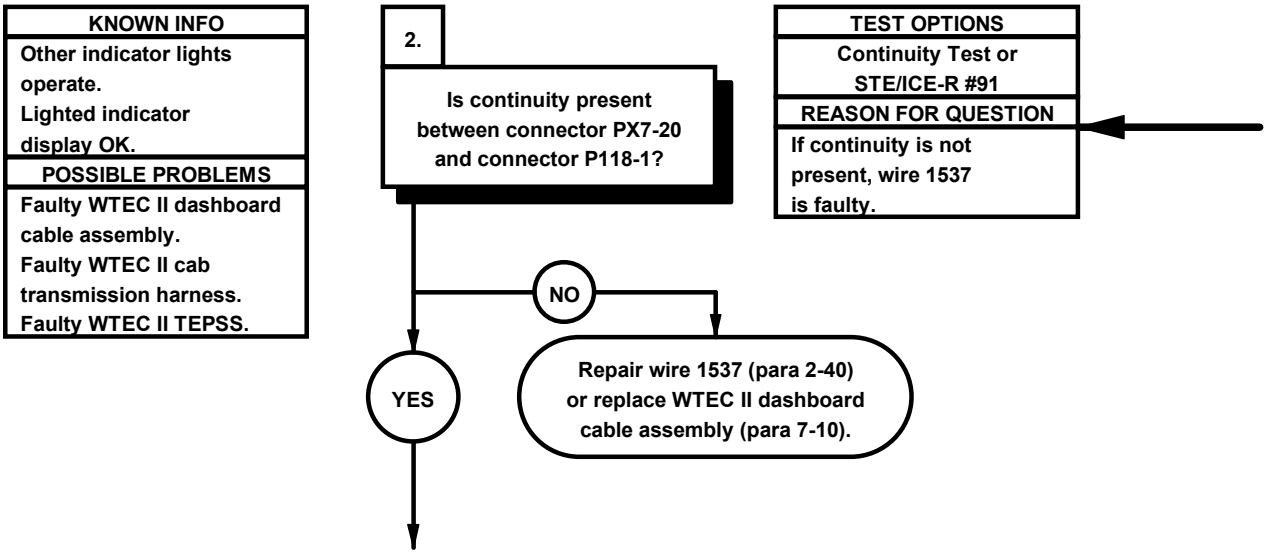
| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 27. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 20 and note reading on multimeter. |
| (7) If continuity is not present, go to step 4 of this fault. |



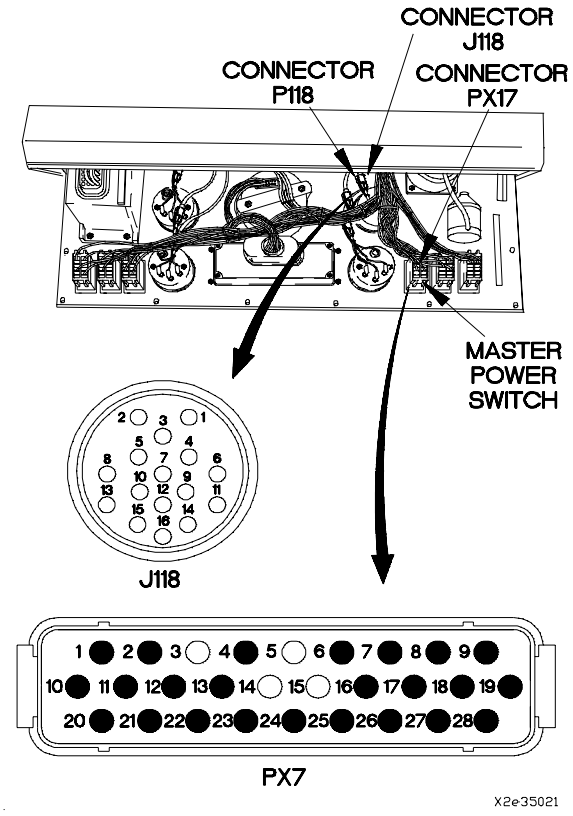



## e34. WTEC II TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)

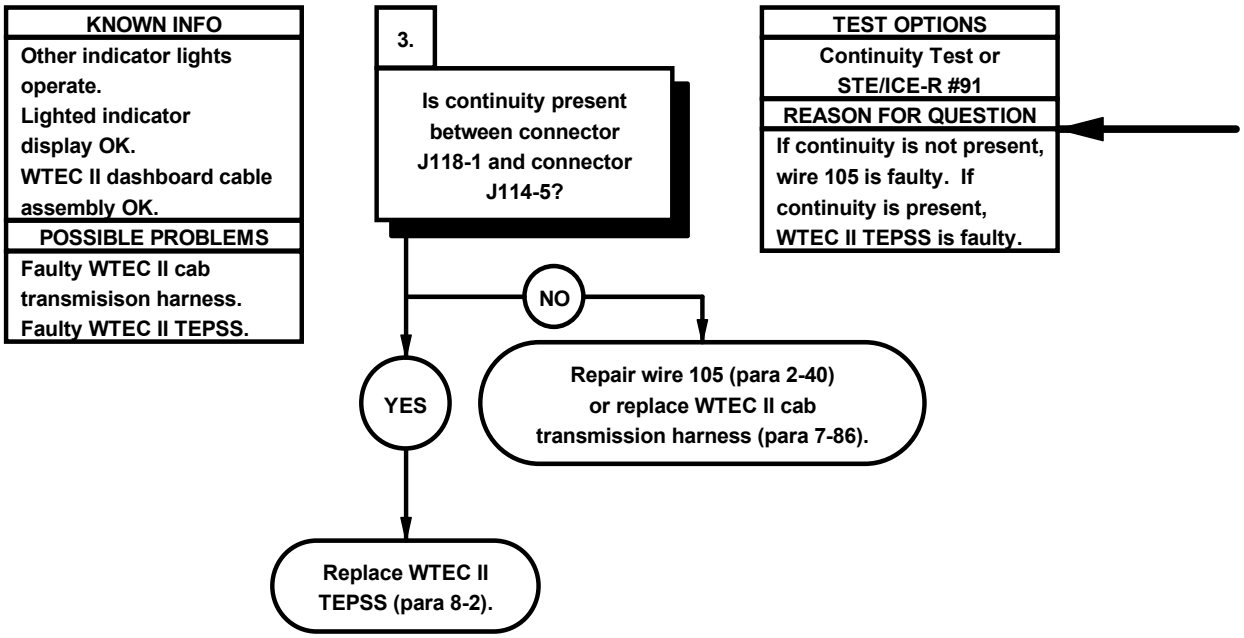


**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX17 from master power switch.
(3) Disconnect connector J118 from connector P118.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX7-20.
(6) Connect negative (-) probe of multimeter to connector P118-1 and note reading on multimeter.
(7) If continuity is not present, repair wire 1537 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

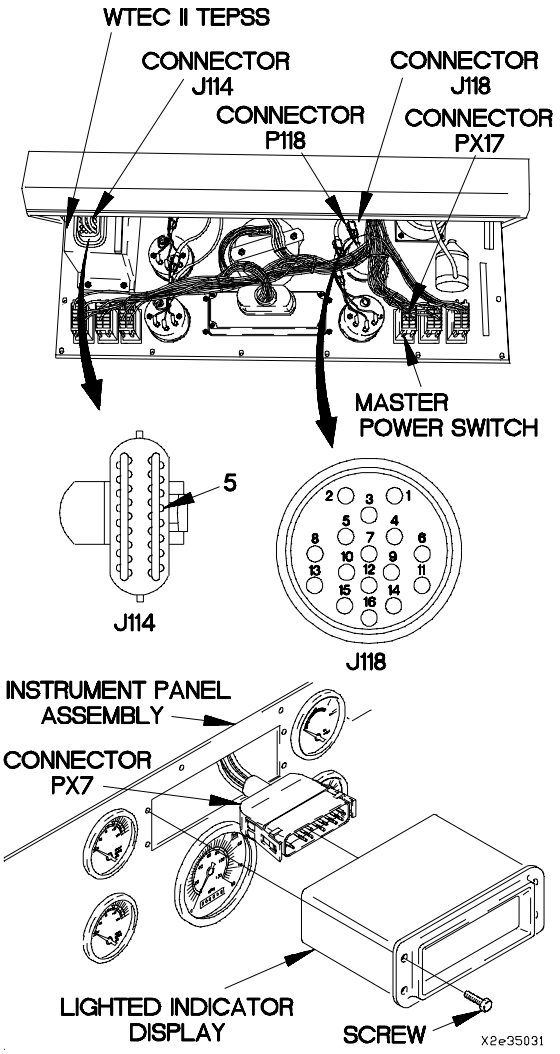


## e34. WTEC II TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)

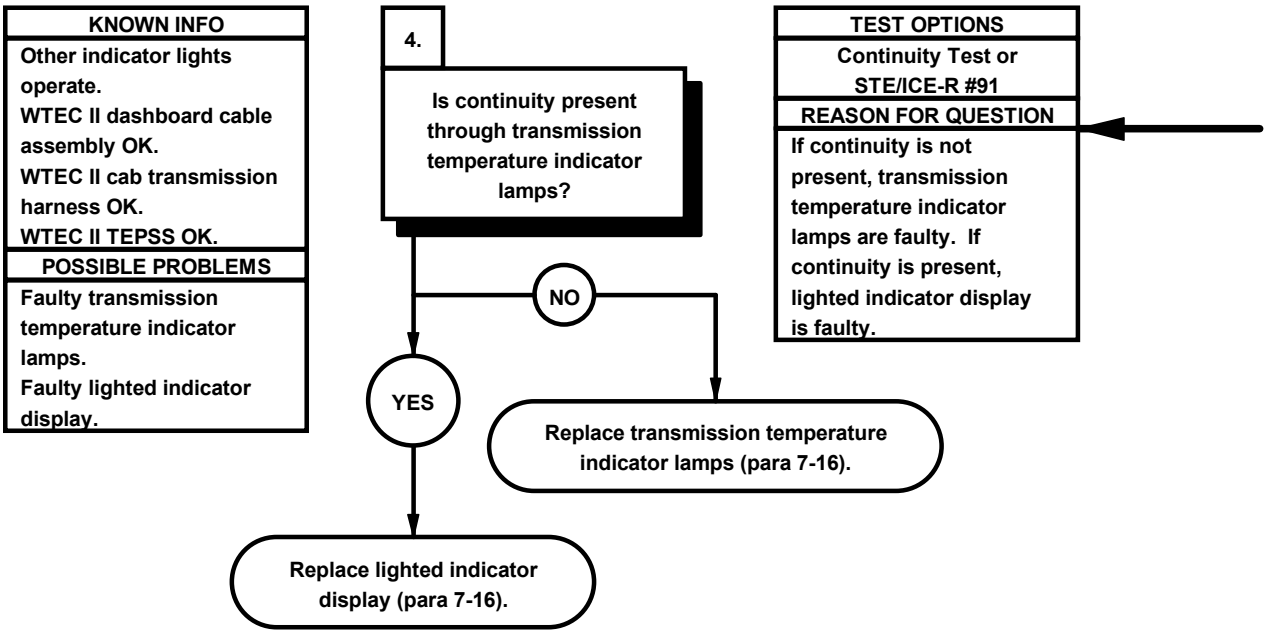


**CONTINUITY TEST**

(1) Disconnect connector J114 (bottom connector) from WTEC II TEPSS.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector J114-5.
(4) Connect negative (-) probe of multimeter to connector J118-1 and note reading on multimeter.
(5) If continuity is not present, repair wire 105 (para 2-40) or replace WTEC II cab transmission harness (para 7-86).
(6) If continuity is present, replace WTEC II TEPSS (para 8-2).
(7) Connect connector J114 to WTEC II TEPSS.
(8) Connect connector J118 to connector P118.
(9) Install instrument panel assembly (para 7-15).
(10) Connect lighted indicator display to connector PX7.
(11) Position lighted indicator display in instrument panel assembly with four screws.
(12) Tighten four screws to 6-10 lb-in. (1 N·m).
(13) Connect batteries (para 7-48).

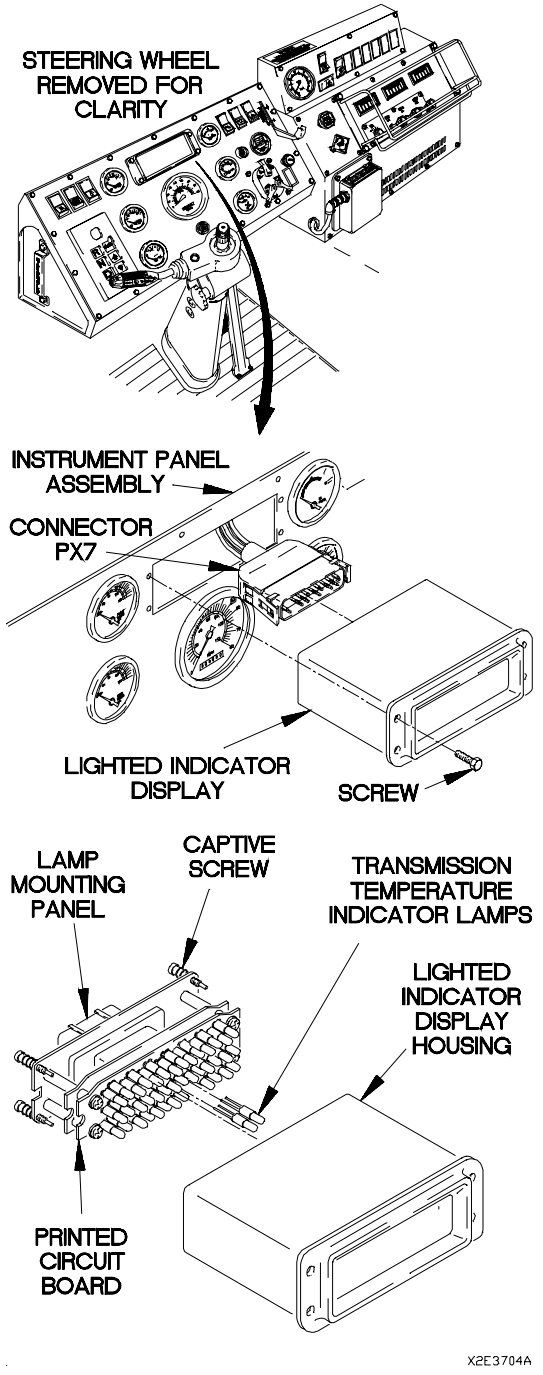


## e34. WTEC II TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove transmission temperature indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each transmission temperature indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace transmission temperature indicator lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install transmission temperature indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



**e35. WTEC III TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE**

**INITIAL SETUP**

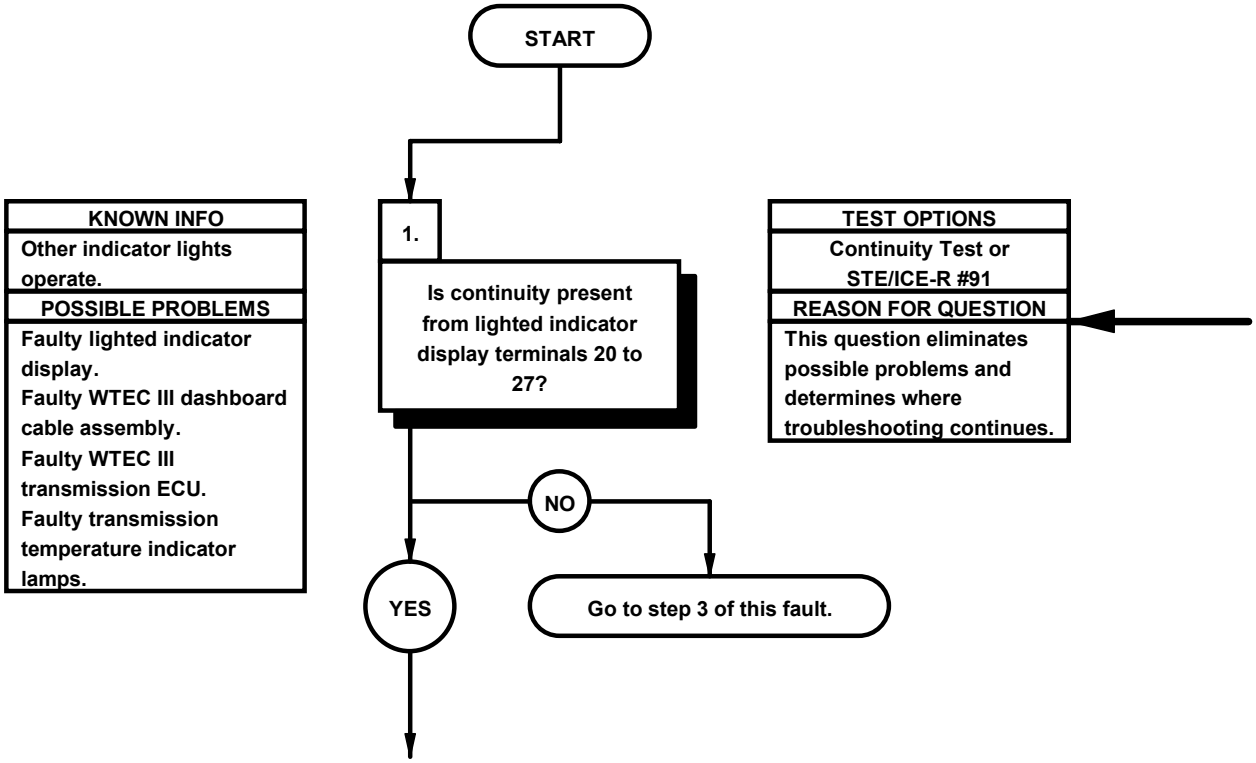
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

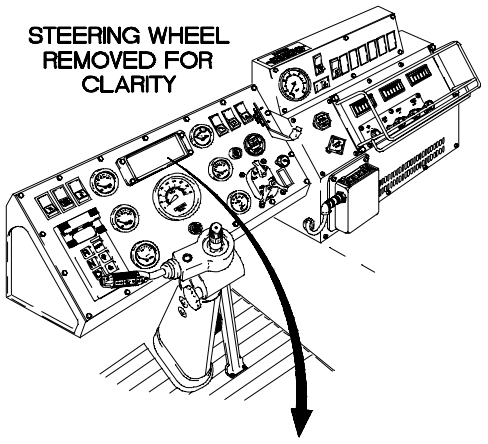
**Personnel Required**
(2)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

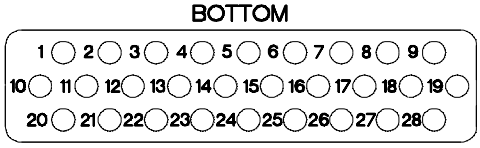
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

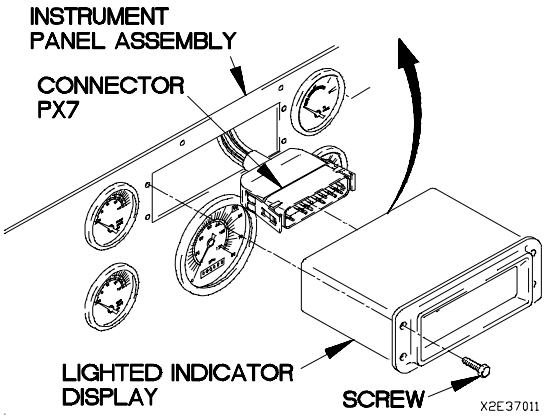
**References**
TM 9-4910-571-12&P



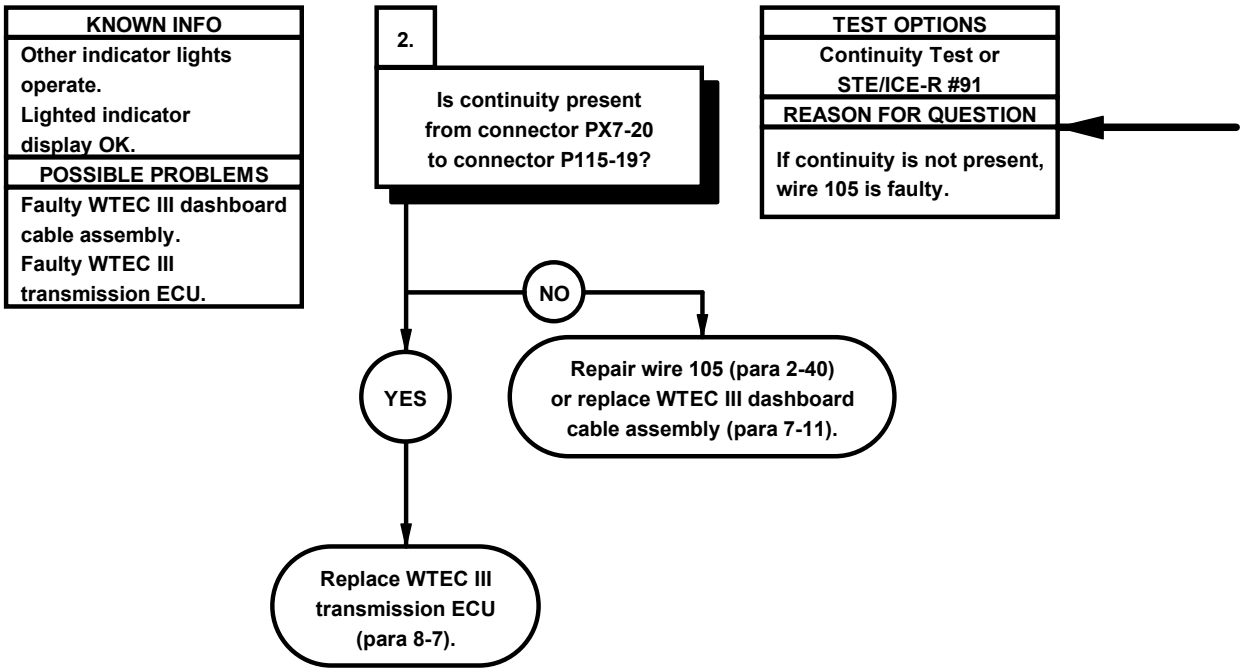



| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 27. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 20 and note reading on multimeter. |
| (7) If continuity is not present, go to step 3 of this fault. |



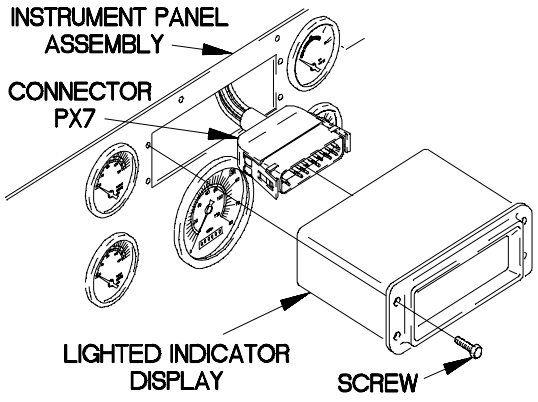



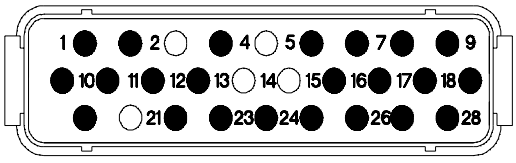
## e35. WTEC III TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)



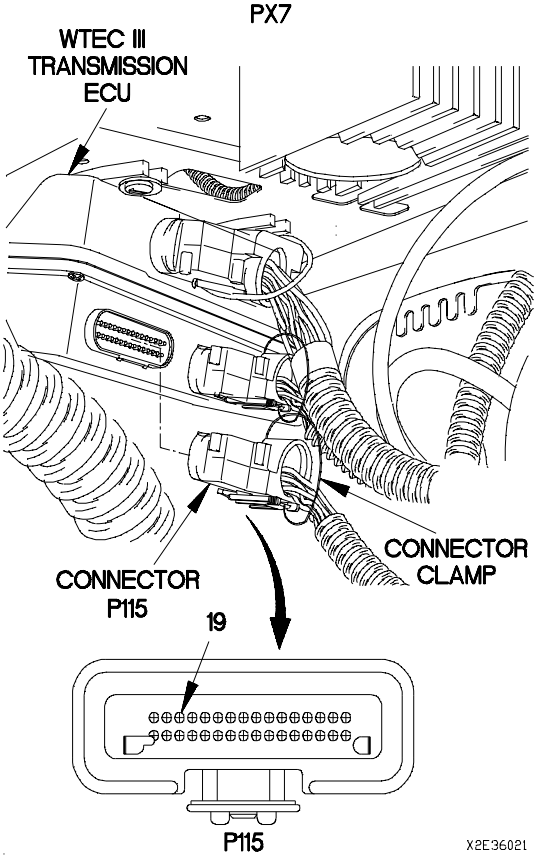
**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector clamp from connector P115.
(3) Disconnect connector P115 from WTEC III transmission ECU.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX7-20.
(6) Connect negative (-) probe of multimeter to connector P115-19 and note reading on multimeter.
(7) If continuity is not present, repair wire 105 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, replace WTEC III transmission ECU (para 8-7).
(9) Connect connector P115 to WTEC III transmission ECU.
(10) Connect connector clamp to connector P115.
(11) Install kick panel (para 16-3).
(12) Connect lighted indicator display to connector PX7.
(13) Position lighted indicator display in instrument panel assembly with four screws.
(14) Tighten four screws to 6-10 lb-in. (1 N·m).
(15) Connect batteries (para 7-48).

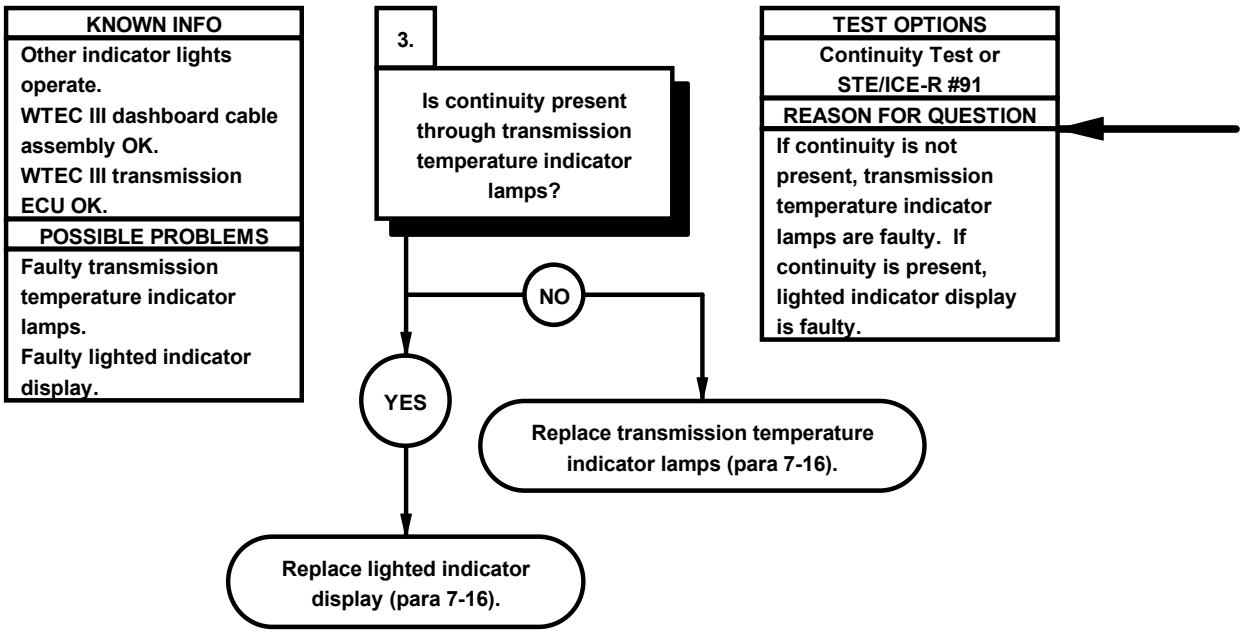



PX7

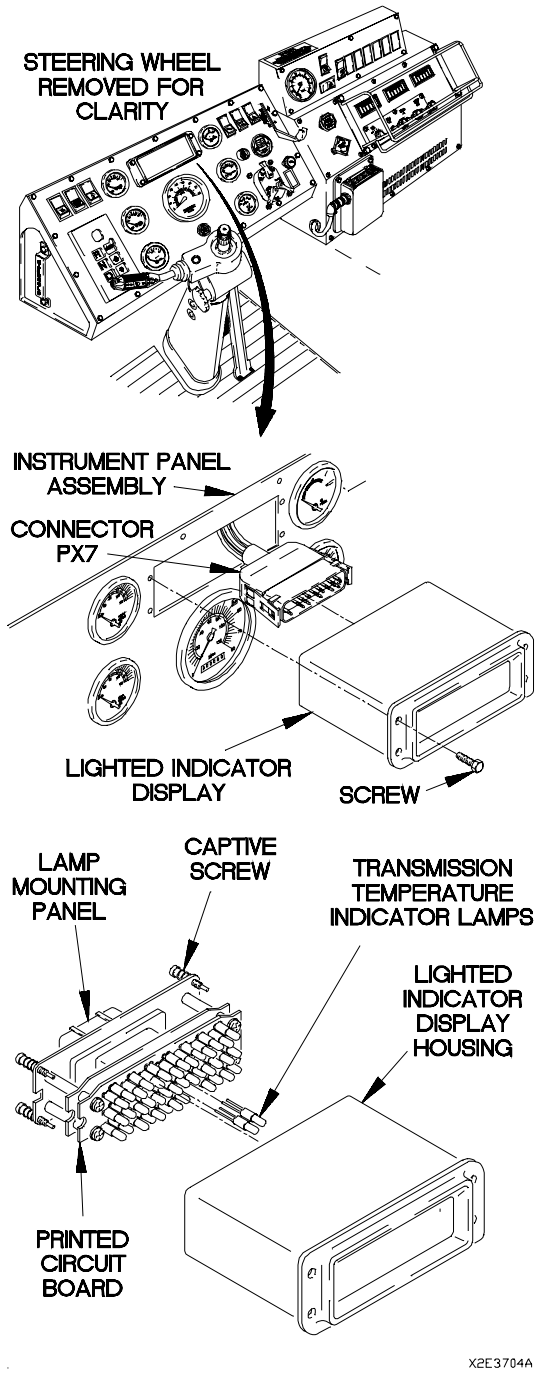


## e35. WTEC III TRANSMISSION TEMPERATURE INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Loosen four captive screws in lamp mounting panel.
(5) Remove lamp mounting panel from lighted indicator display housing.
(6) Remove transmission temperature indicator lamps from printed circuit board.
(7) Set multimeter to ohms.
(8) Check continuity through each transmission temperature indicator lamp and note reading on multimeter.
(9) If continuity is not present, replace transmission temperature indicator lamps (para 7-16).
(10) If continuity is present, replace lighted indicator display (para 7-16).
(11) Install transmission temperature indicator lamps in printed circuit board.
(12) Install lamp mounting panel in lighted indicator display housing.
(13) Tighten four captive screws in lamp mounting panel.
(14) Connect lighted indicator display to connector PX7.
(15) Position lighted indicator display in instrument panel assembly with four screws.
(16) Tighten four screws to 6-10 lb-in. (1 N·m).
(17) Connect batteries (para 7-48).



## e36. FRONT BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI

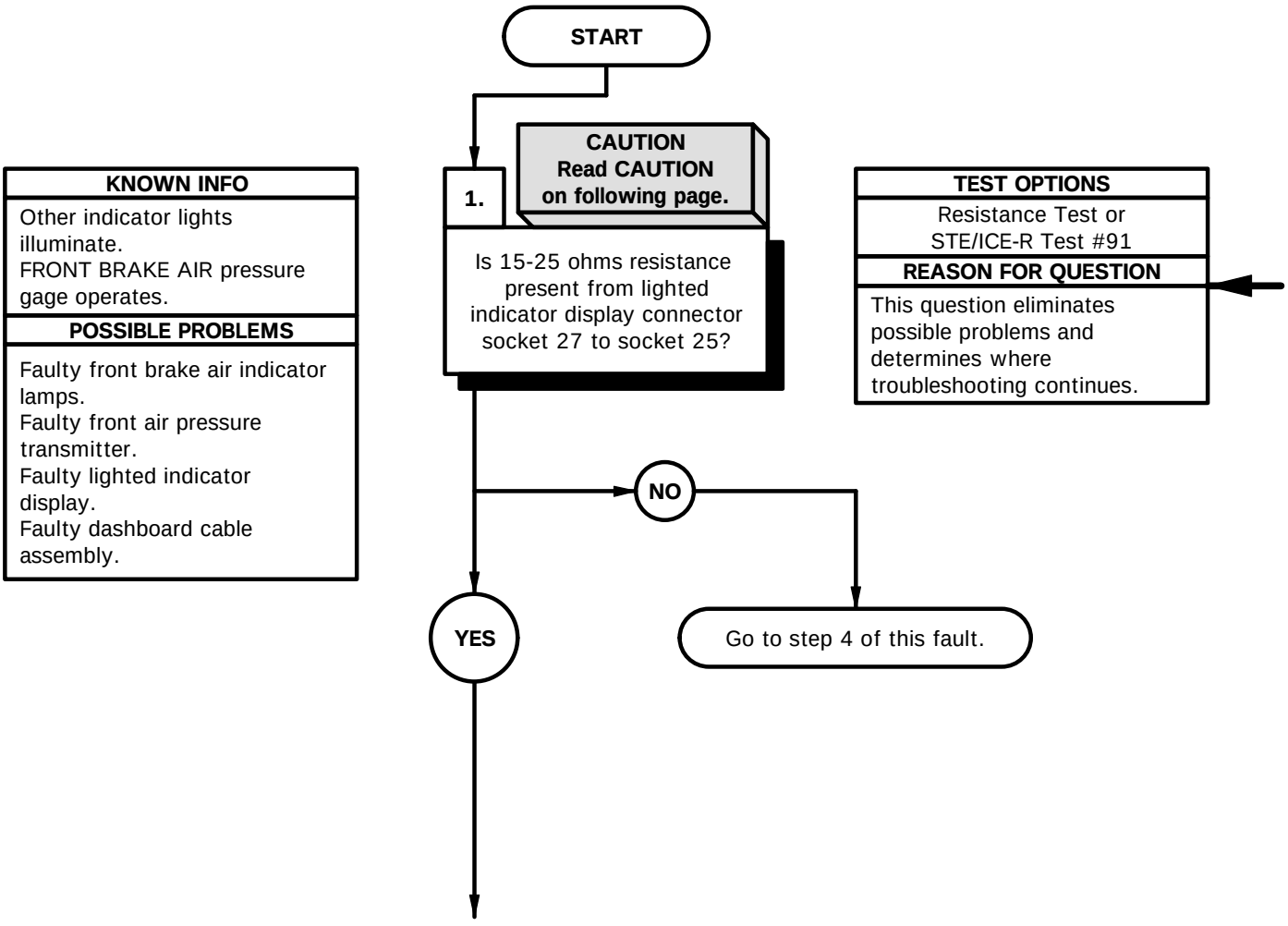
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).
Air tanks drained (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**References**
TM 9-4910-571-12&P



**CAUTION**

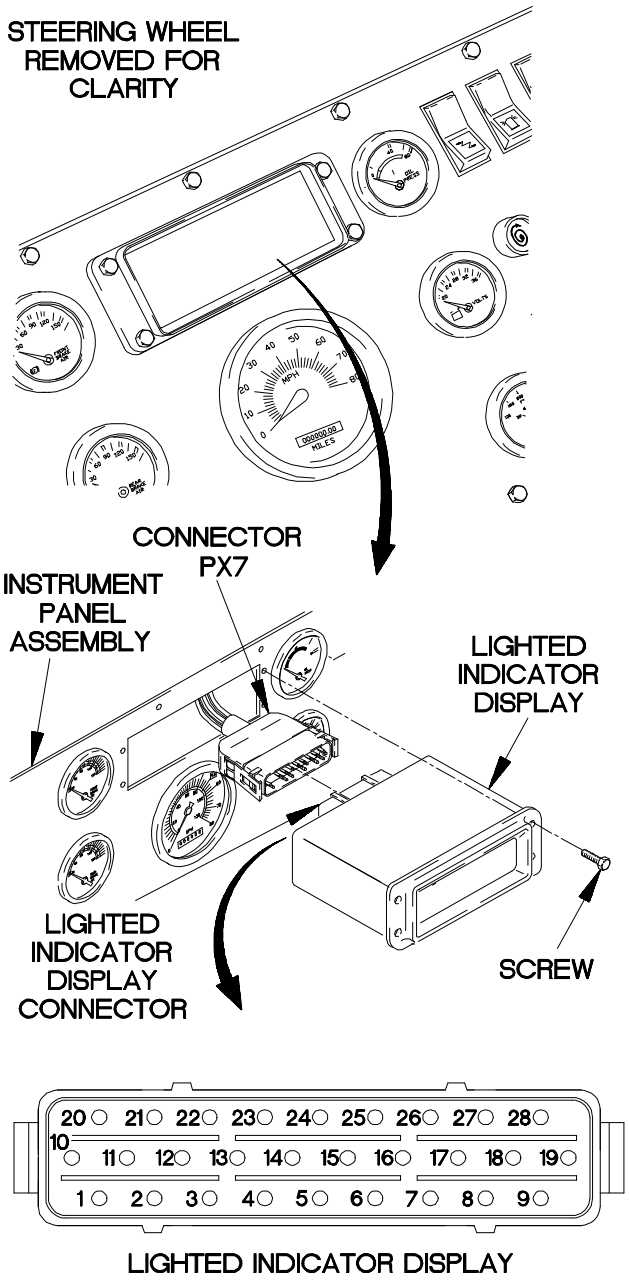
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

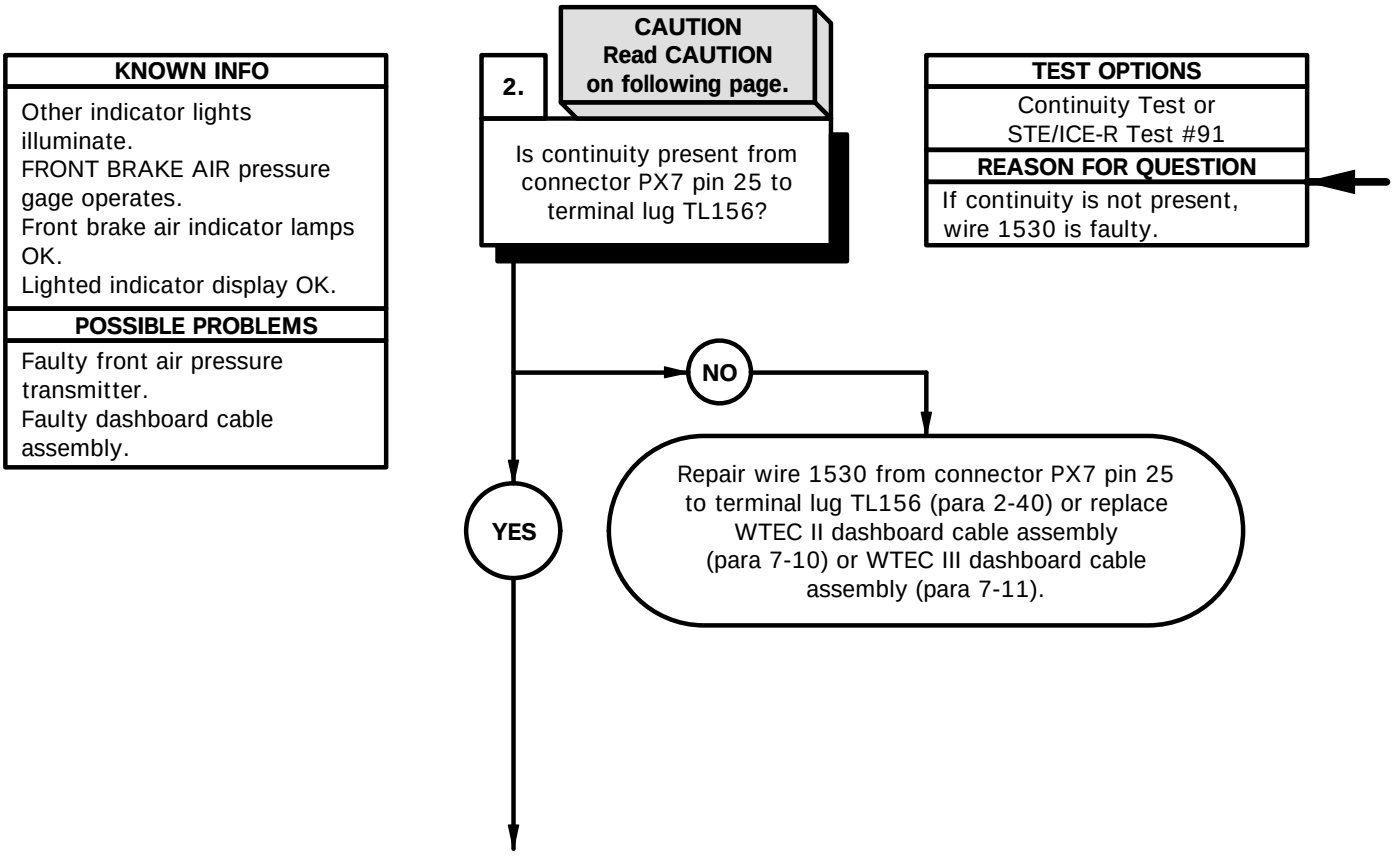
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**RESISTANCE TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to lighted indicator display connector socket 27.
(6) Connect negative (-) probe of multimeter to lighted indicator display connector socket 25 and note reading on multimeter.
(7) If 15-25 ohms resistance is not present, go to step 4 of this fault.



## e36. FRONT BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI (CONT)



**CAUTION**

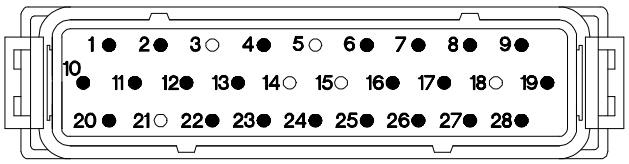
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

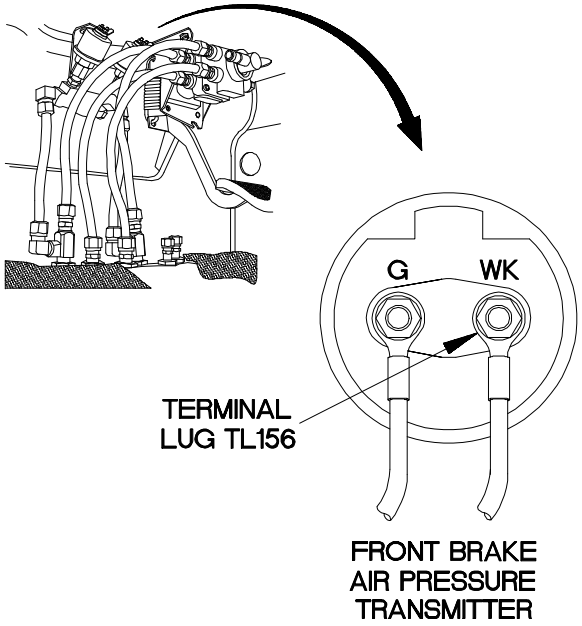
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX7 pin 25.
(3) Connect negative (-) probe of multimeter to terminal lug TL156 and note reading on multimeter.
(4) If continuity is not present, repair wire 1530 from connector PX7 pin 25 to terminal lug TL156 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

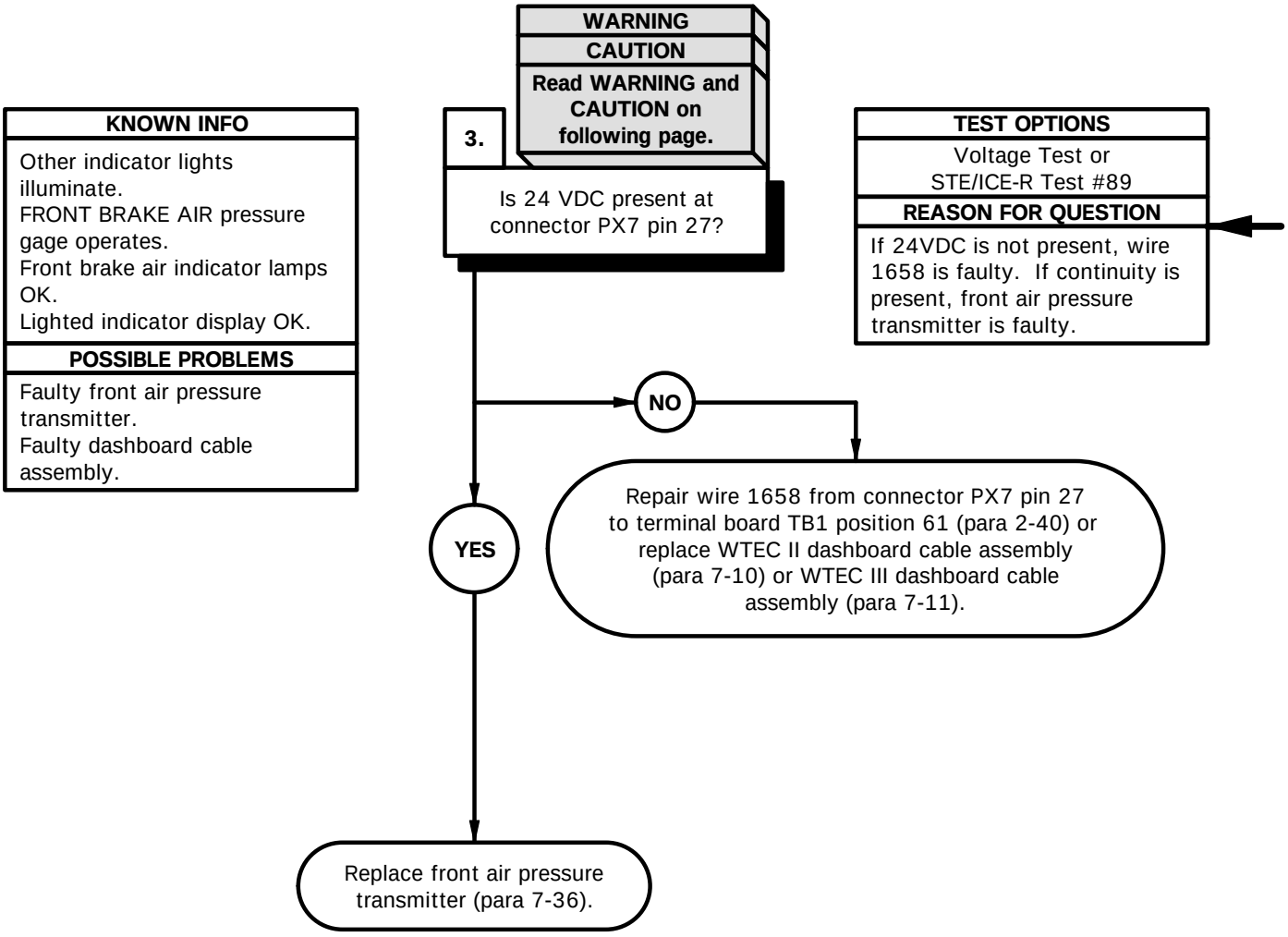



PX7




XBE3702B

## e36. FRONT BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

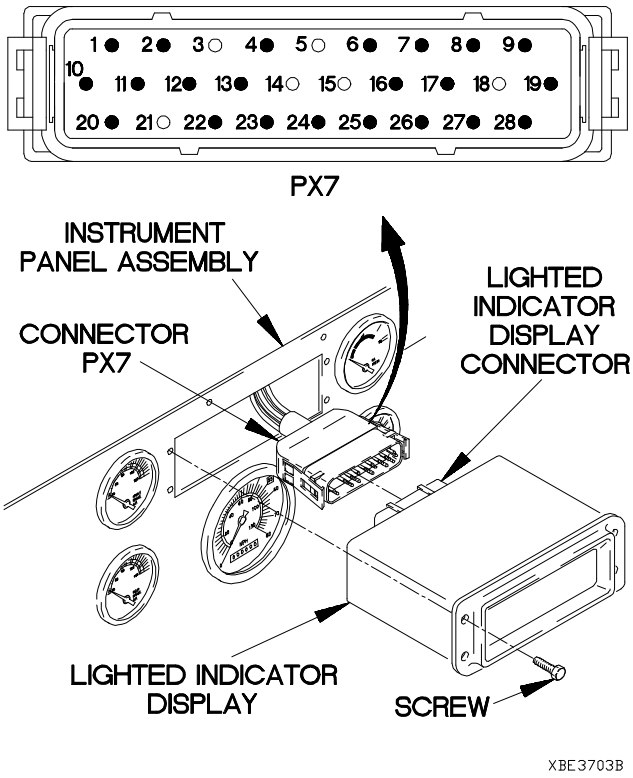
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

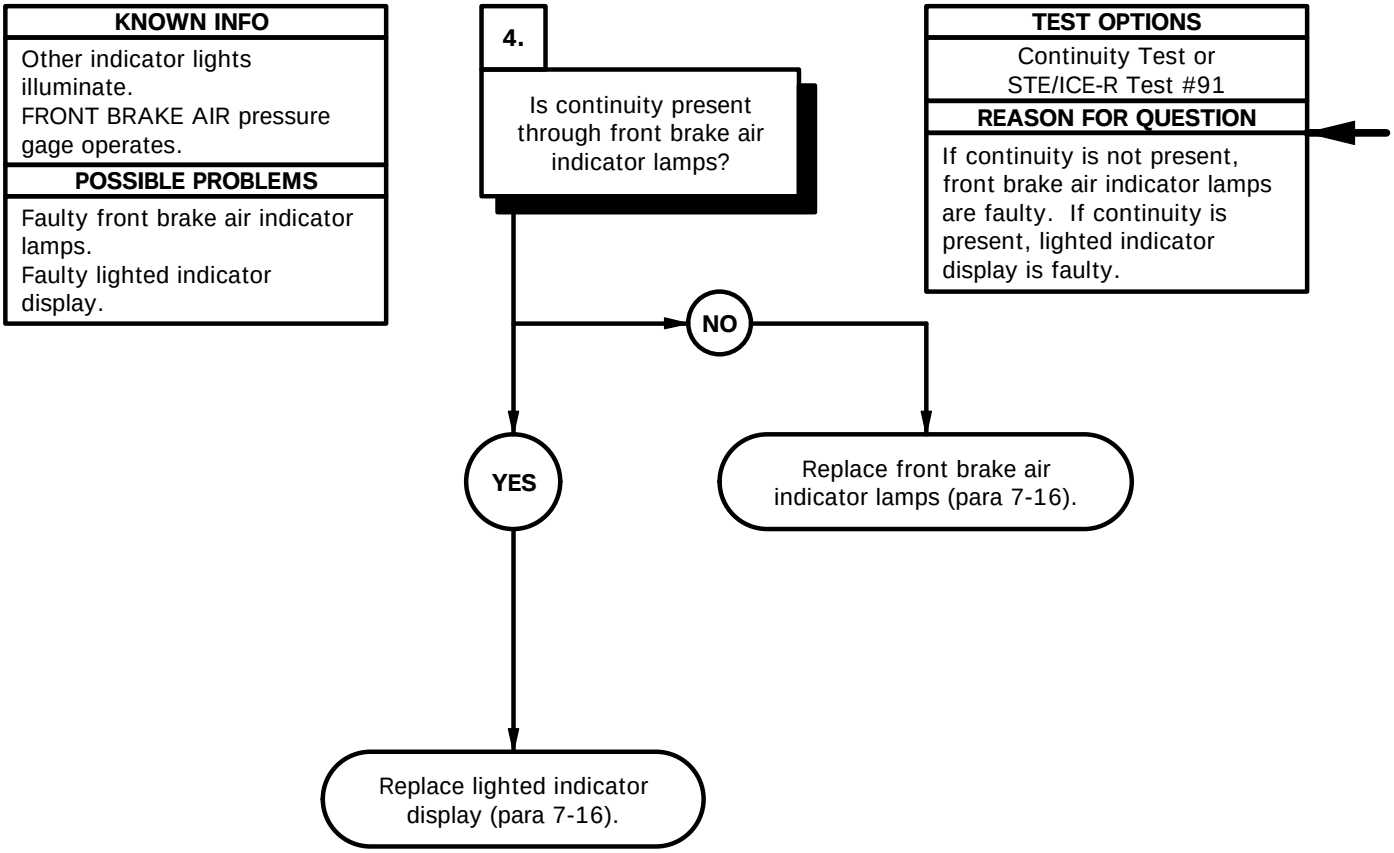
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX7 pin 27.
(3) Connect negative (-) probe of multimeter to ground.
(4) Connect batteries (para 7-48).
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) Position master power switch to off (TM 9-2320-365-10).
(7) Disconnect batteries (para 7-48).
(8) If 24 VDC is not present, repair wire 1658 from connector PX7 pin 27 to terminal board TB1 position 61 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, replace front air pressure transmitter (para 7-36).
(10) Connect lighted indicator display connector to connector PX7.
(11) Position lighted indicator display in instrument panel assembly with four screws.
(12) Tighten four screws to 6-10 lb-in. (1 N·m).
(13) Connect batteries (para 7-48).

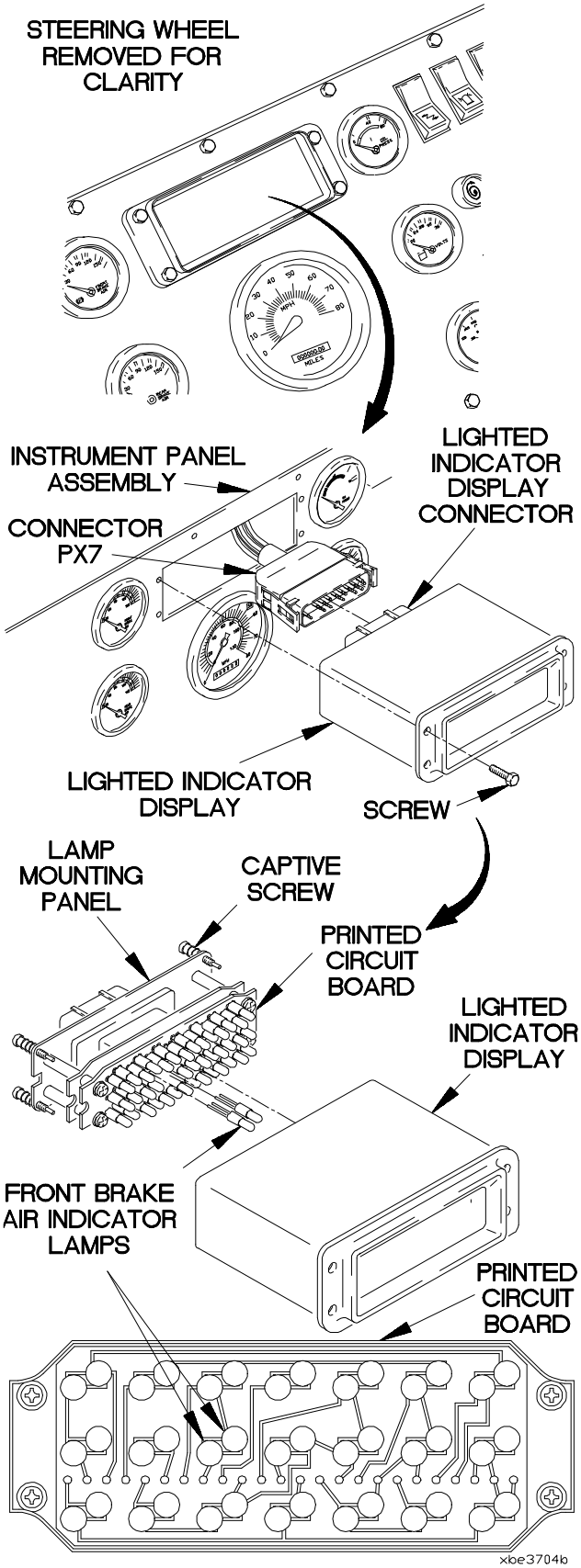


## e36. FRONT BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI (CONT)



**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display.
(3) Remove two front brake air indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each front brake air indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace front brake air indicator lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install two front brake air indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display connector to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



## e37. REAR BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI

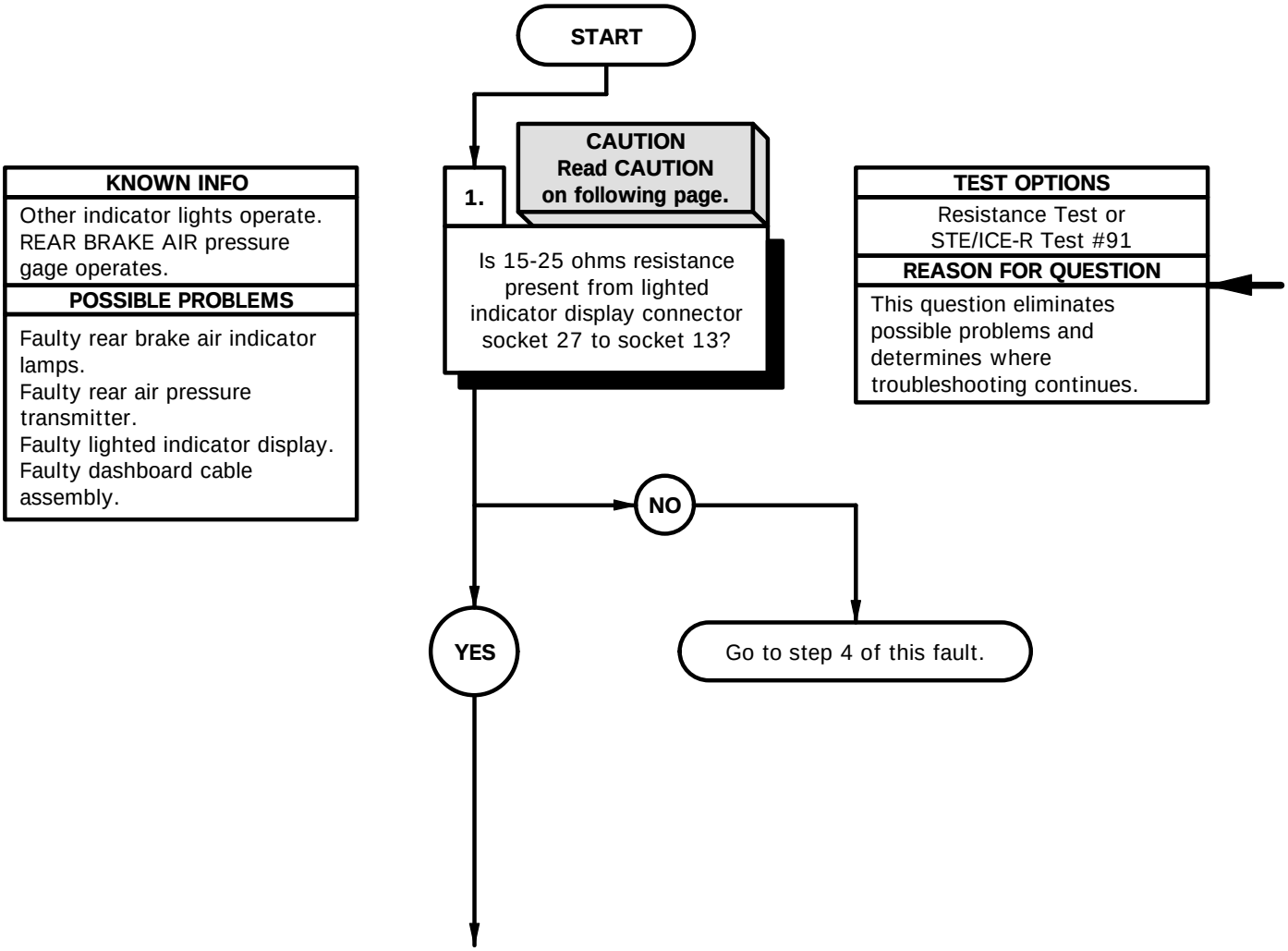
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).
Air tanks drained (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**References**
TM 9-4910-571-12&P



**CAUTION**

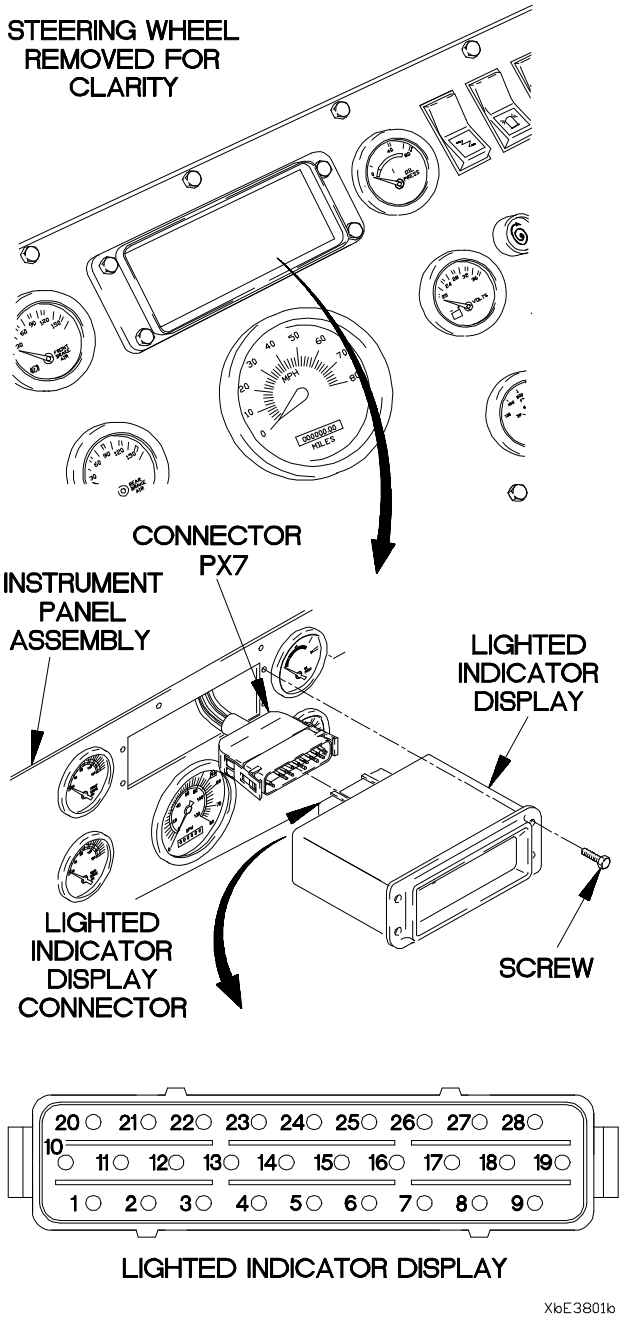
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

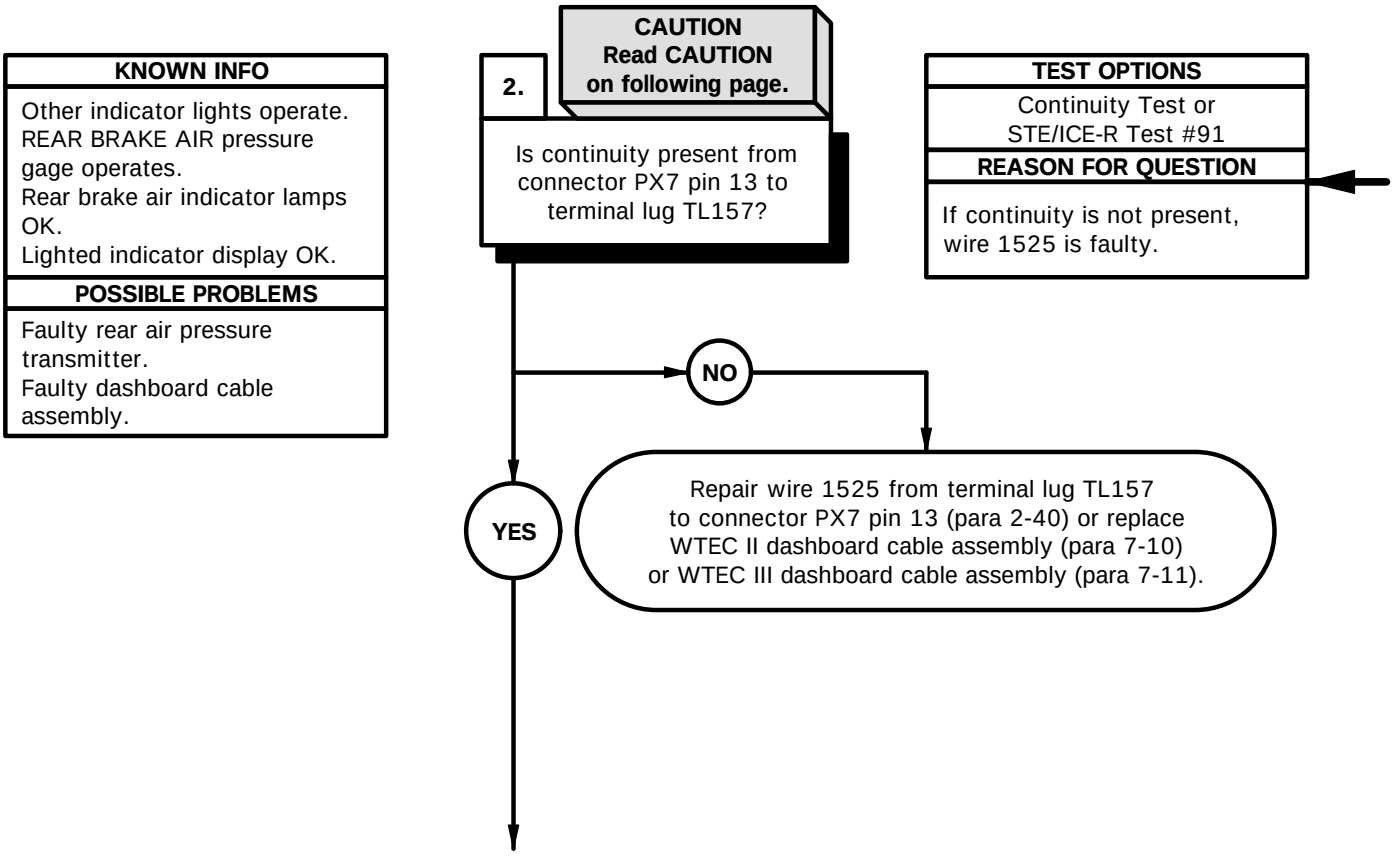
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**RESISTANCE TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to lighted indicator display connector socket 27.
(6) Connect negative (-) probe of multimeter to lighted indicator display connector socket 13 and note reading on multimeter.
(7) If 15-25 ohms resistance is not present, go to step 4 of this fault.



## e37. REAR BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI (CONT)



**CAUTION**

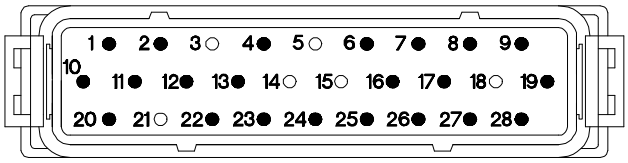
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

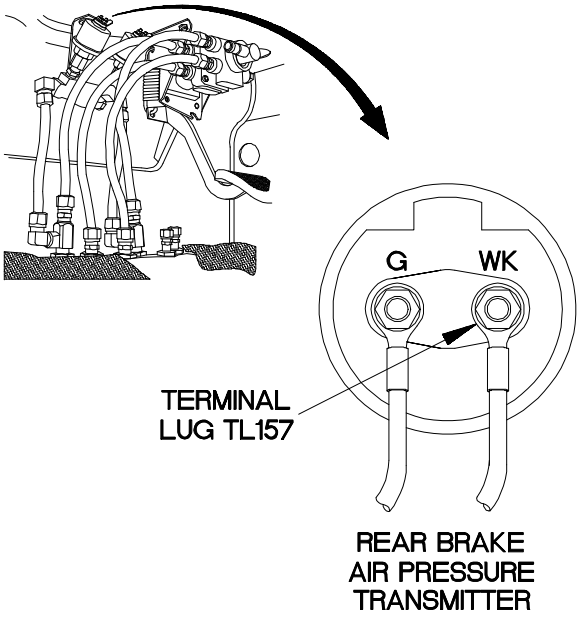
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX7 pin 13.
(3) Connect negative (-) probe of multimeter to terminal lug TL157 and note reading on multimeter.
(4) If continuity is not present, repair wire 1525 from terminal lug TL157 to connector PX7 pin 13 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

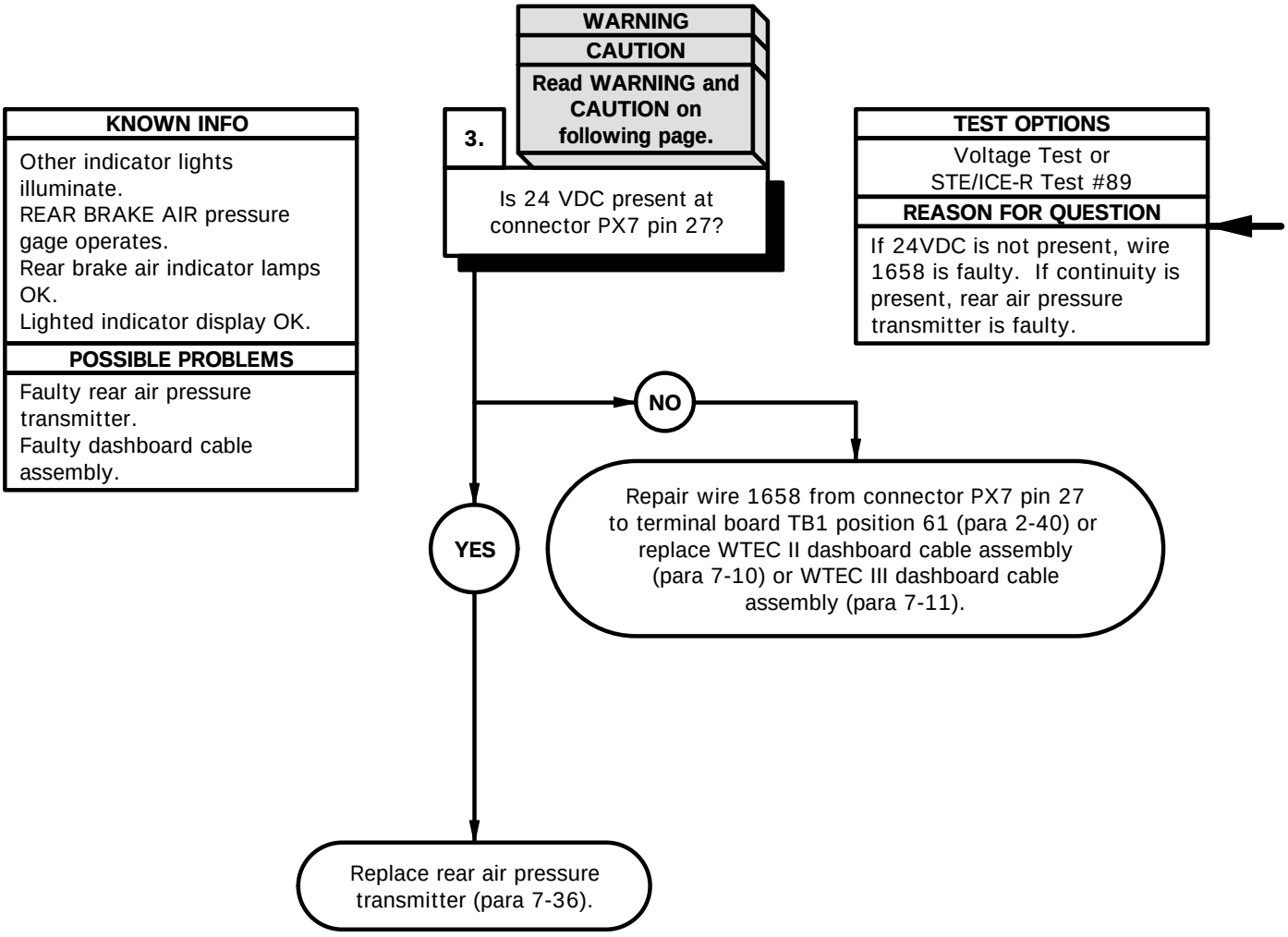



PX7




XbE3802b

## e37. REAR BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

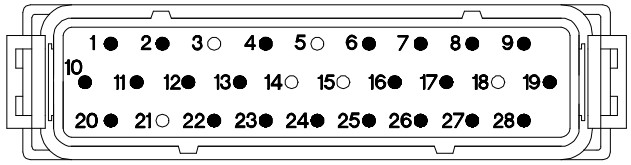
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

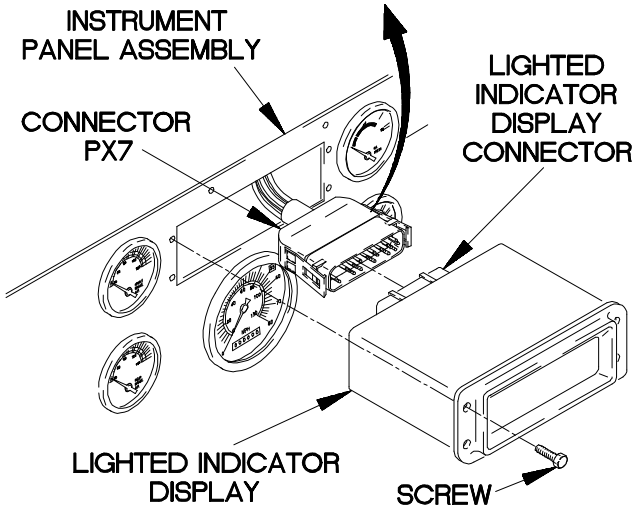
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back or not capable of making good contact.

**VOLTAGE TEST**

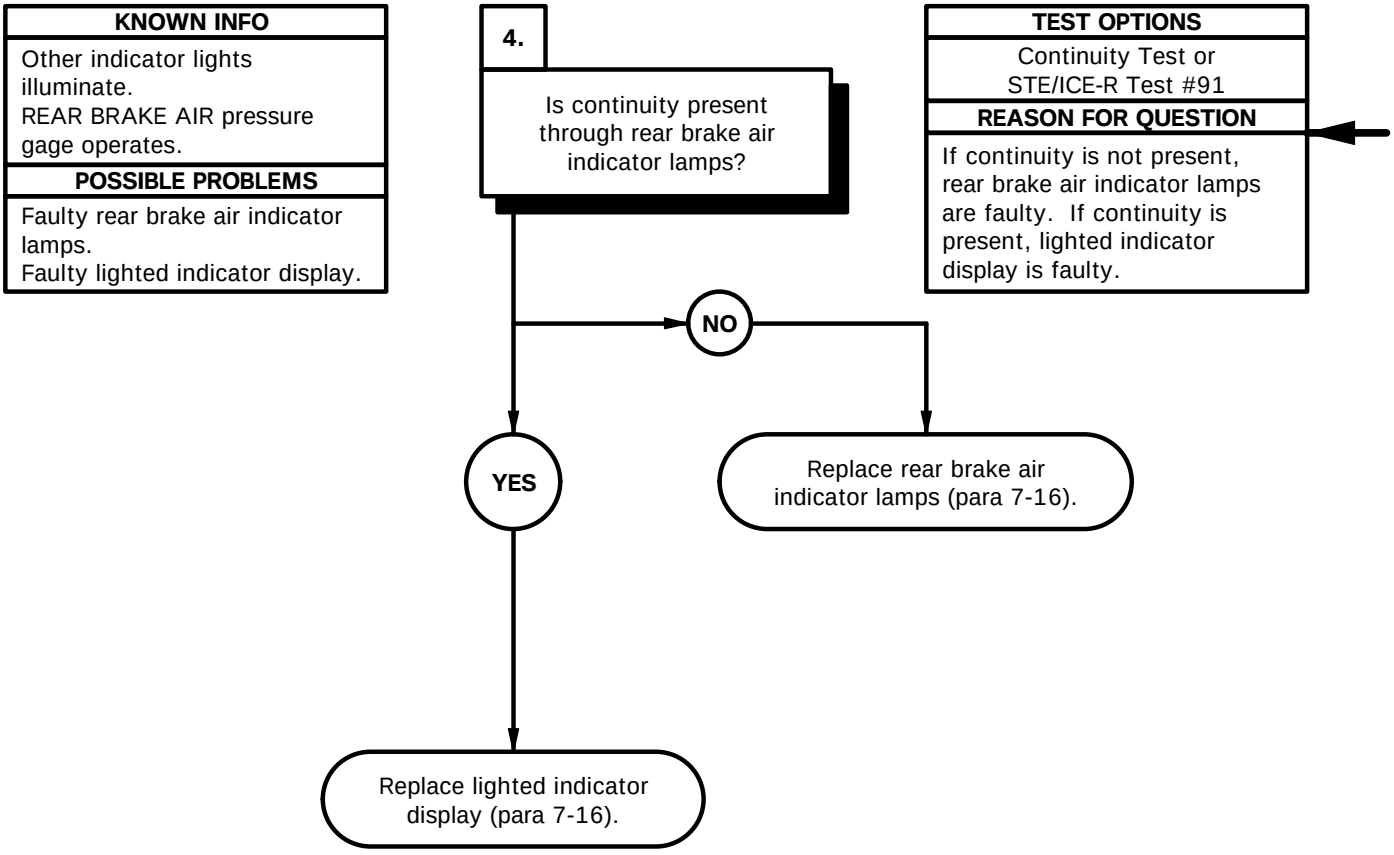
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX7 pin 27.
(3) Connect negative (-) probe of multimeter to ground.
(4) Connect batteries (para 7-48).
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) Position master power switch to off (TM 9-2320-365-10).
(7) Disconnect batteries (para 7-48).
(8) If 24 VDC is not present, repair wire 1658 from connector PX7 pin 27 to terminal board TB1 position 61 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, replace rear air pressure transmitter (para 7-36).
(10) Connect lighted indicator display connector to connector PX7.
(11) Position lighted indicator display in instrument panel assembly with four screws.
(12) Tighten four screws to 6-10 lb-in. (1 N·m).
(13) Connect batteries (para 7-48).




PX7

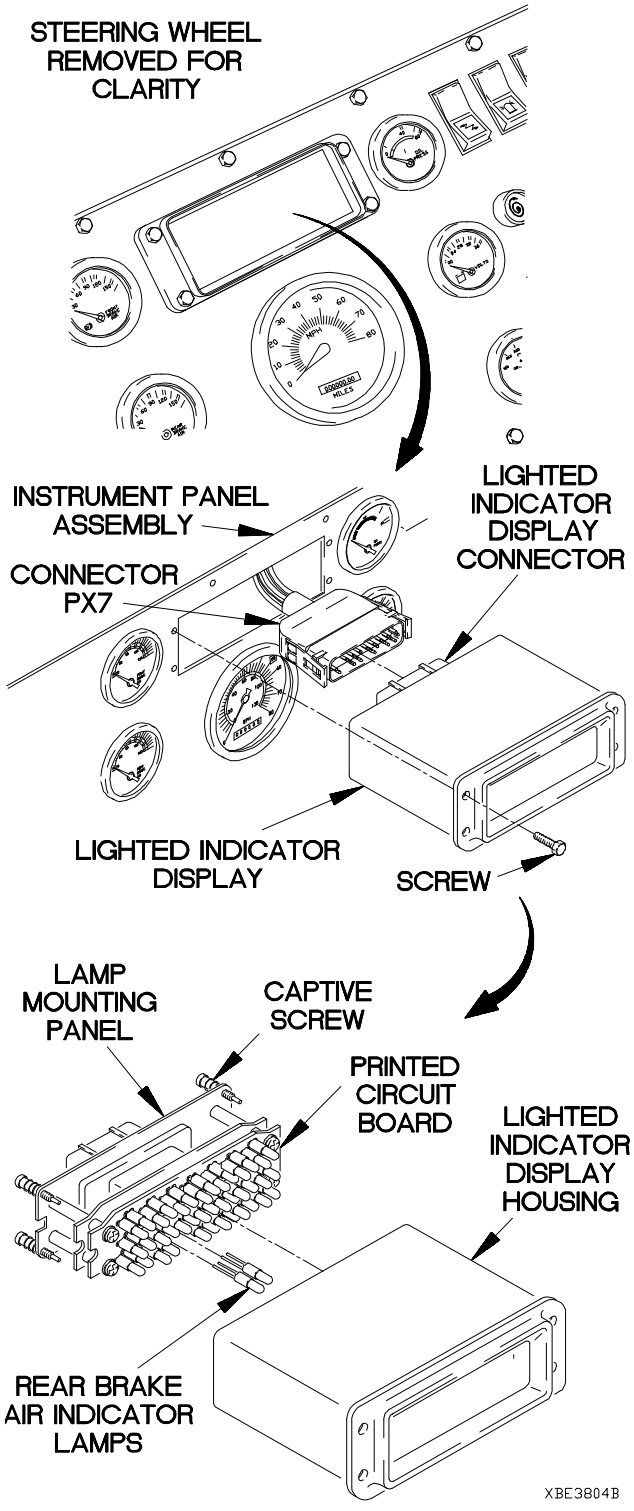


## e37. REAR BRAKE AIR INDICATOR DOES NOT ILLUMINATE WHEN AIR PRESSURE IS BELOW 65 PSI (CONT)



**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove two rear brake air indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each rear brake air indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace rear brake air indicator lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install two rear brake air indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display connector to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



**e38. ENGINE OIL PRESSURE INDICATOR DOES NOT OPERATE**

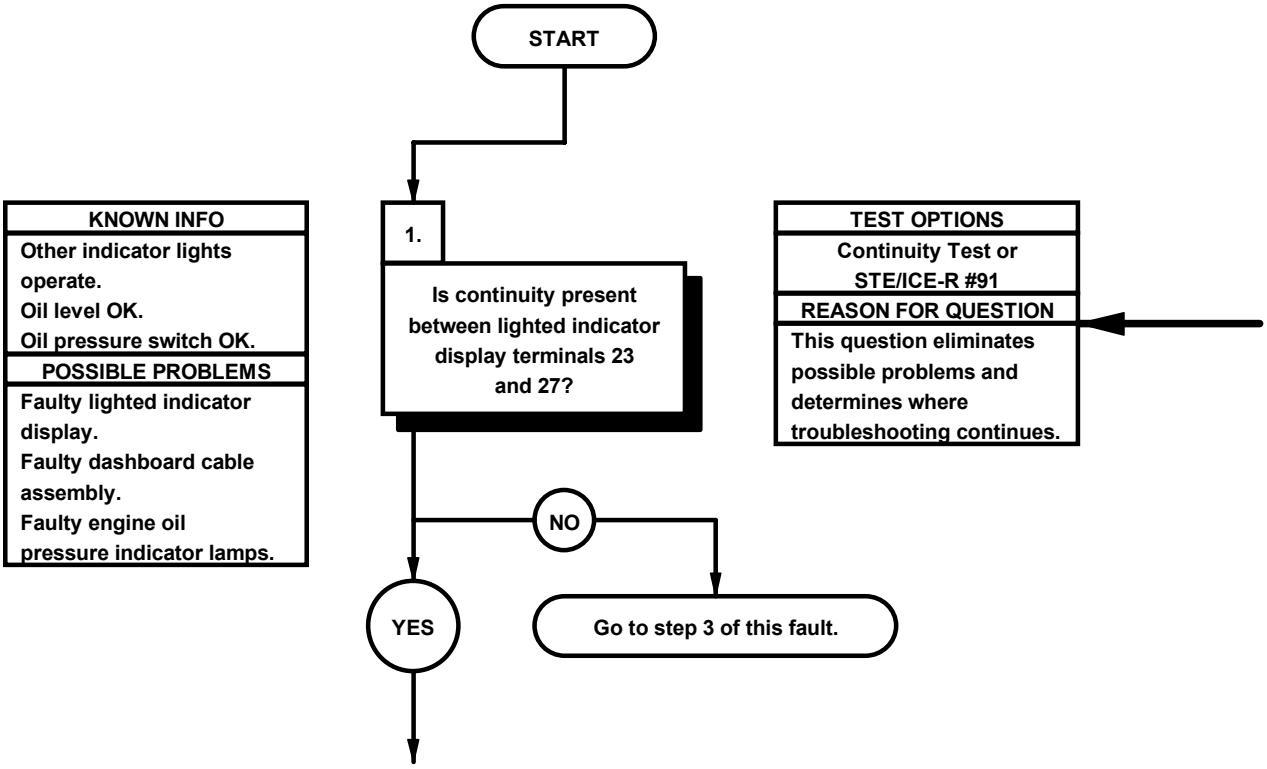
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

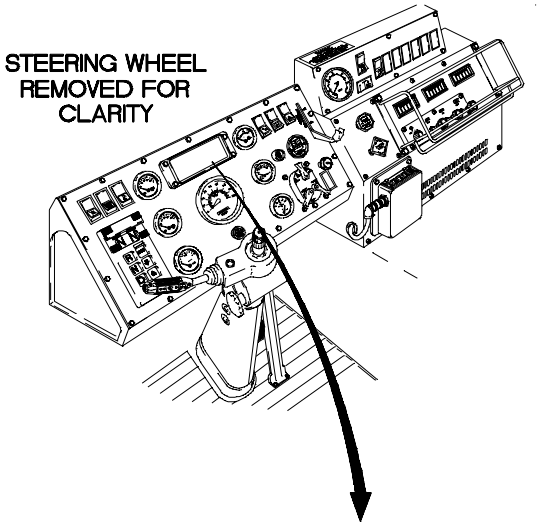
**Personnel Required**
(2)

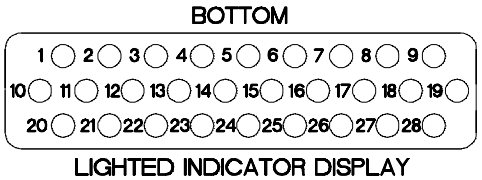
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

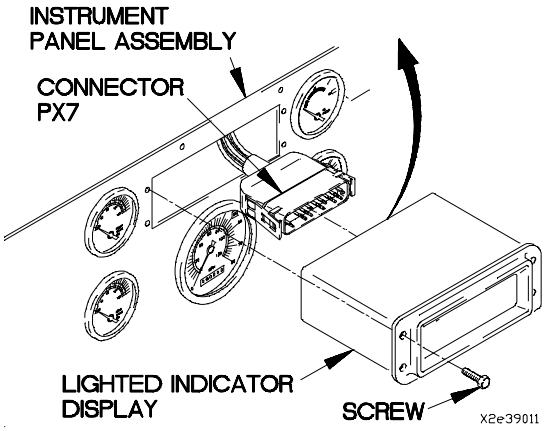
**References**
TM 9-4910-571-12&P



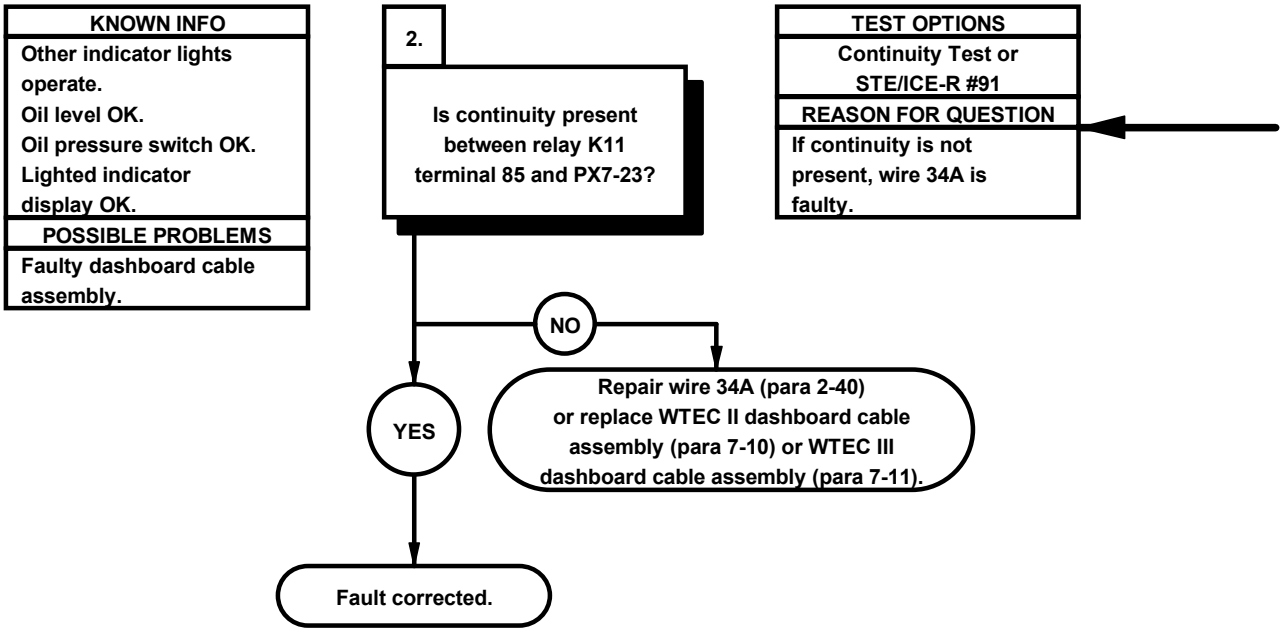
| CONTINUITY TEST |
| --- |
| (1) Remove four screws from lighted indicator display. |
| (2) Remove lighted indicator display from instrument panel assembly. |
| (3) Disconnect connector PX7 from lighted indicator display. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to lighted indicator display terminal 27. |
| (6) Connect negative (-) probe of multimeter to lighted indicator display terminal 23 and note reading on multimeter. |
| (7) If continuity is not present, go to step 3 of this fault. |



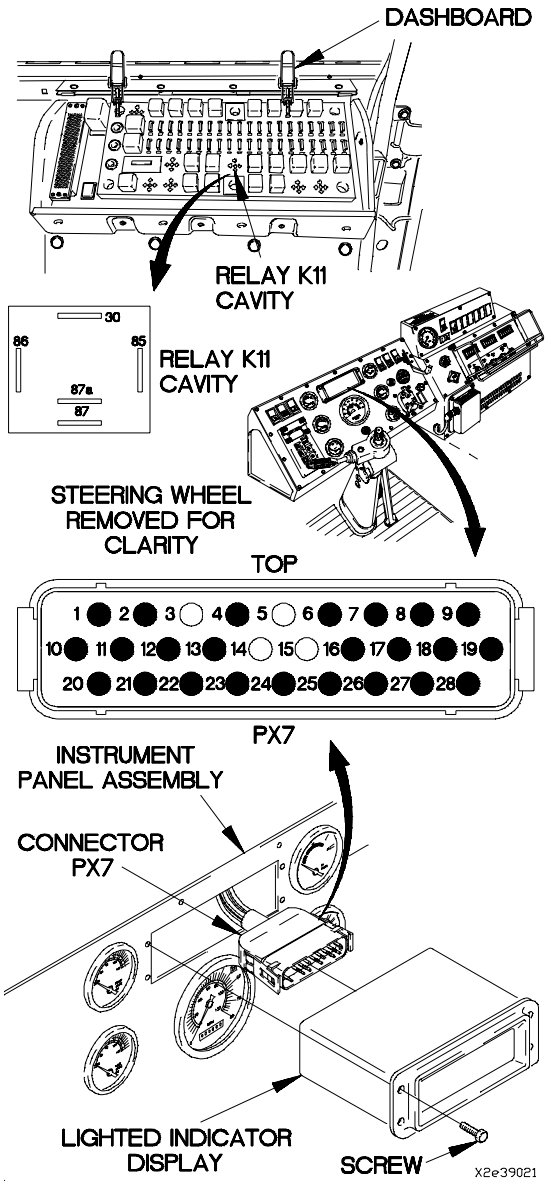



## e38. ENGINE OIL PRESSURE INDICATOR DOES NOT OPERATE (CONT)

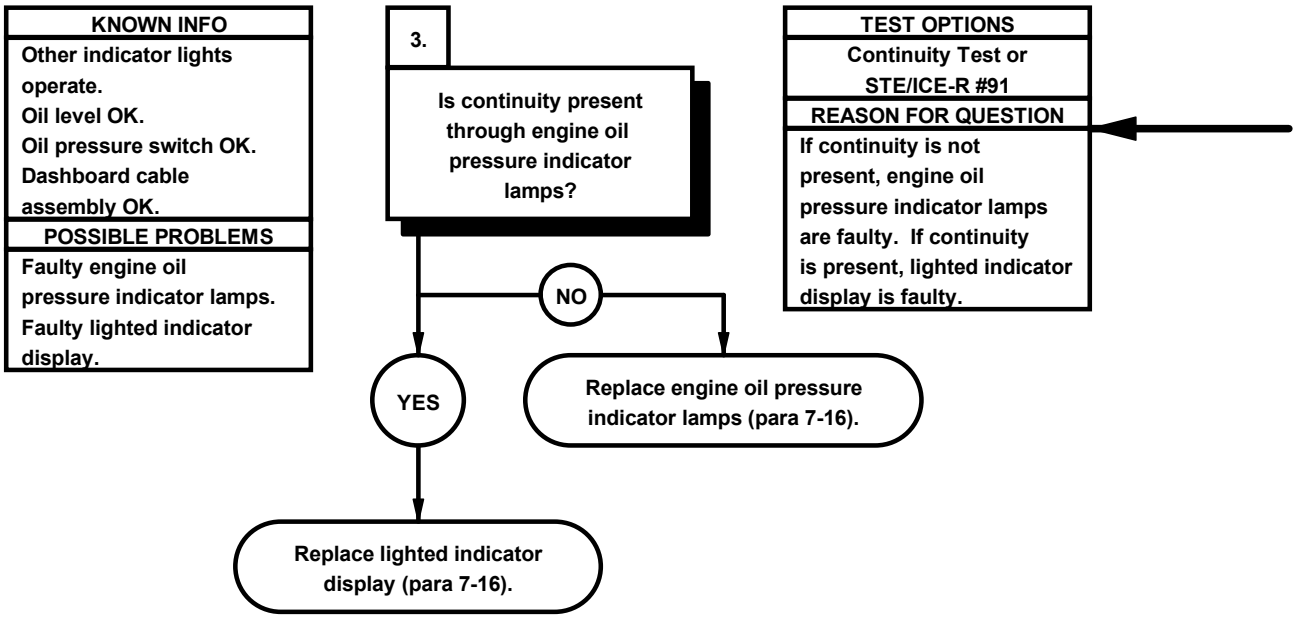


**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove relay K11 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K11 was removed.
(5) Connect negative (-) probe of multimeter to PX7-23 and note reading on multimeter.
(6) If continuity is not present, repair wire 34A (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install relay K11 in PDP.
(8) Install PDP cover (para 16-2).
(9) Connect lighted indicator display to connector PX7.
(10) Position lighted indicator display in instrument panel assembly with four screws.
(11) Tighten four screws to 6-10 lb-in. (1 N·m).
(12) Connect batteries (para 7-48).

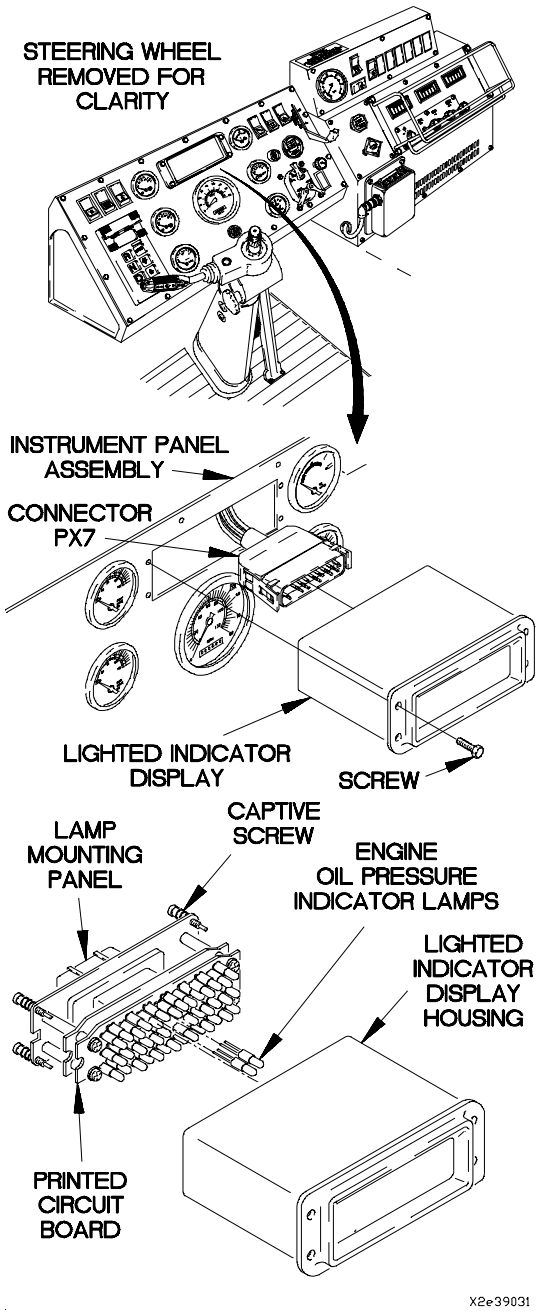


## e38. ENGINE OIL PRESSURE INDICATOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Loosen four captive screws in lamp mounting panel.
(2) Remove lamp mounting panel from lighted indicator display housing.
(3) Remove engine oil pressure indicator lamps from printed circuit board.
(4) Set multimeter to ohms.
(5) Check continuity through each engine oil pressure indicator lamp and note reading on multimeter.
(6) If continuity is not present, replace engine oil pressure indicator lamps (para 7-16).
(7) If continuity is present, replace lighted indicator display (para 7-16).
(8) Install engine oil pressure indicator lamps in printed circuit board.
(9) Install lamp mounting panel in lighted indicator display housing.
(10) Tighten four captive screws in lamp mounting panel.
(11) Connect lighted indicator display to connector PX7.
(12) Position lighted indicator display in instrument panel assembly with four screws.
(13) Tighten four screws to 6-10 lb-in. (1 N·m).
(14) Connect batteries (para 7-48).



**e39. MASTER STOP INDICATOR DOES NOT OPERATE**

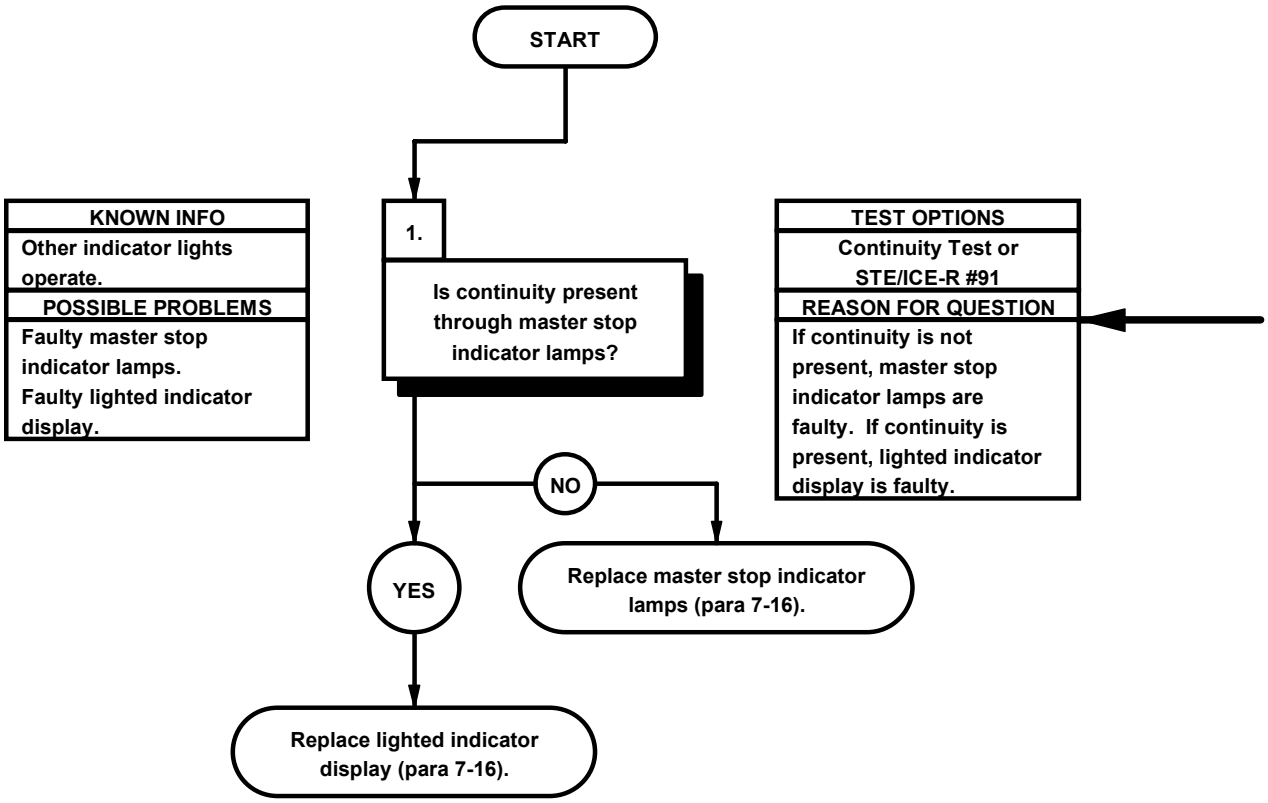
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

**Personnel Required**
(2)

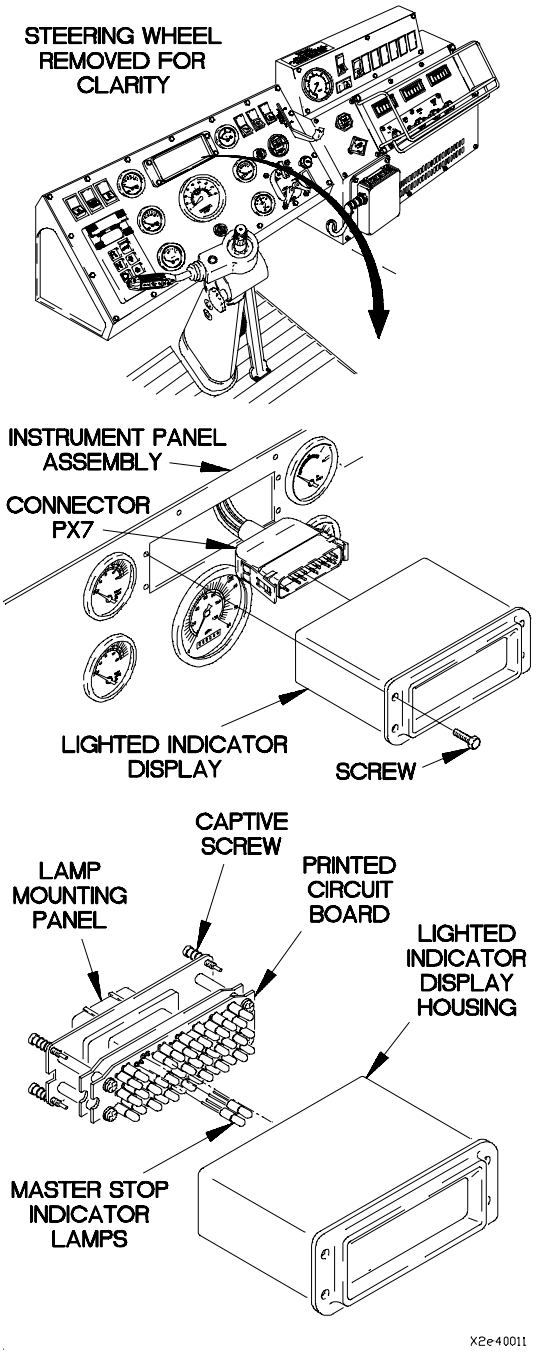
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**References**
TM 9-4910-571-12&P



**CONTINUITY TEST**

(1) Remove four screws from lighted indicator display.
(2) Remove lighted indicator display from instrument panel assembly.
(3) Disconnect connector PX7 from lighted indicator display.
(4) Loosen four captive screws in lamp mounting panel.
(5) Remove lamp mounting panel from lighted indicator display housing.
(6) Remove master stop indicator lamps from printed circuit board.
(7) Set multimeter to ohms.
(8) Check continuity through each master stop indicator lamp and note reading on multimeter.
(9) If continuity is not present, replace master stop indicator lamps (para 7-16).
(10) If continuity is present, replace lighted indicator display (para 7-16).
(11) Install master stop indicator lamps in printed circuit board.
(12) Install lamp mounting panel in lighted indicator display housing.
(13) Tighten four captive screws in lamp mounting panel.
(14) Connect lighted indicator display to connector PX7.
(15) Position lighted indicator display in instrument panel assembly with four screws.
(16) Tighten four screws to 6-10 lb-in. (1 N·m).
(17) Connect batteries (para 7-48).



## e40. ONE OR BOTH HEADLIGHTS (HIGH AND LOW BEAM) DO NOT ILLUMINATE

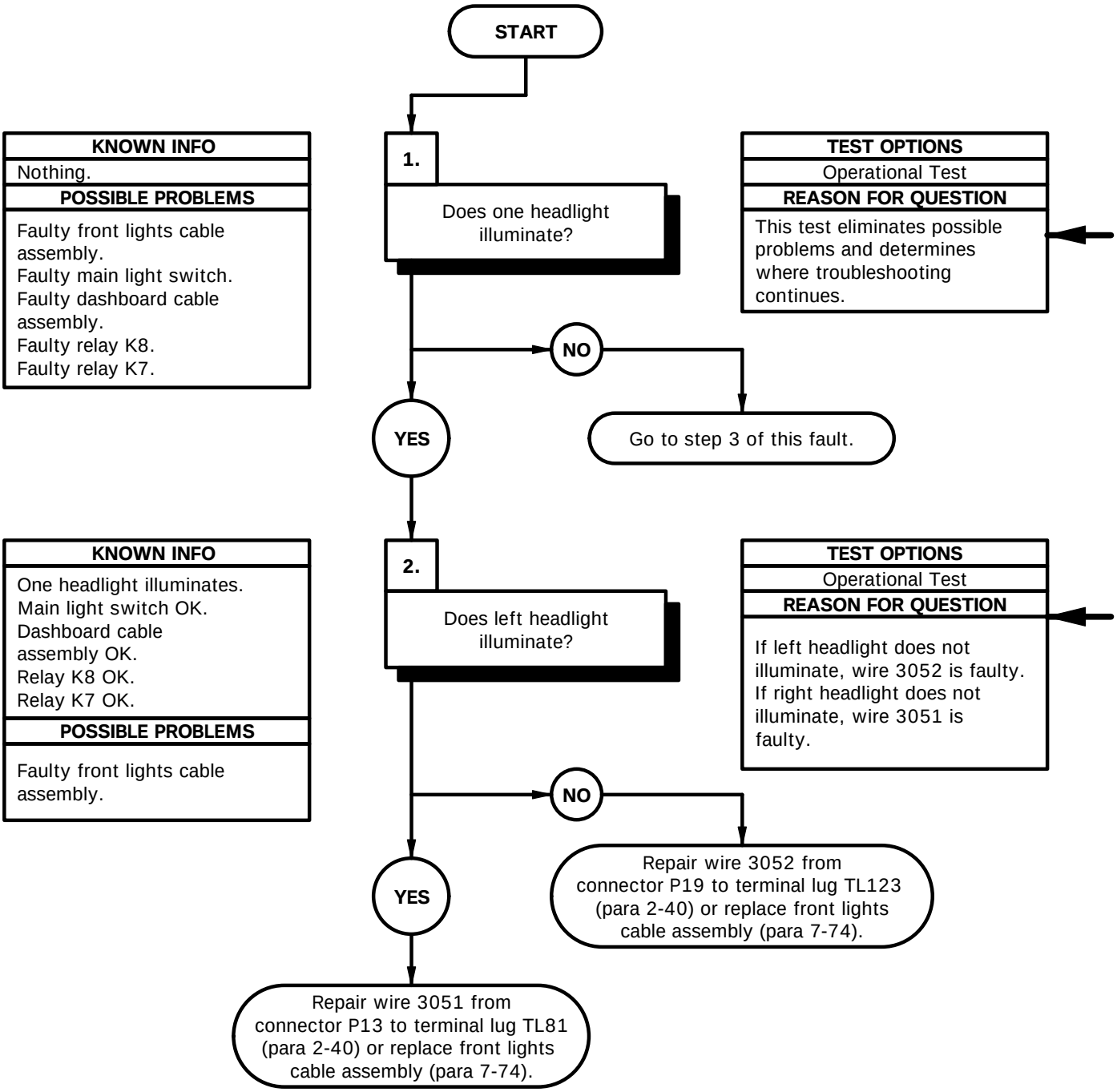
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

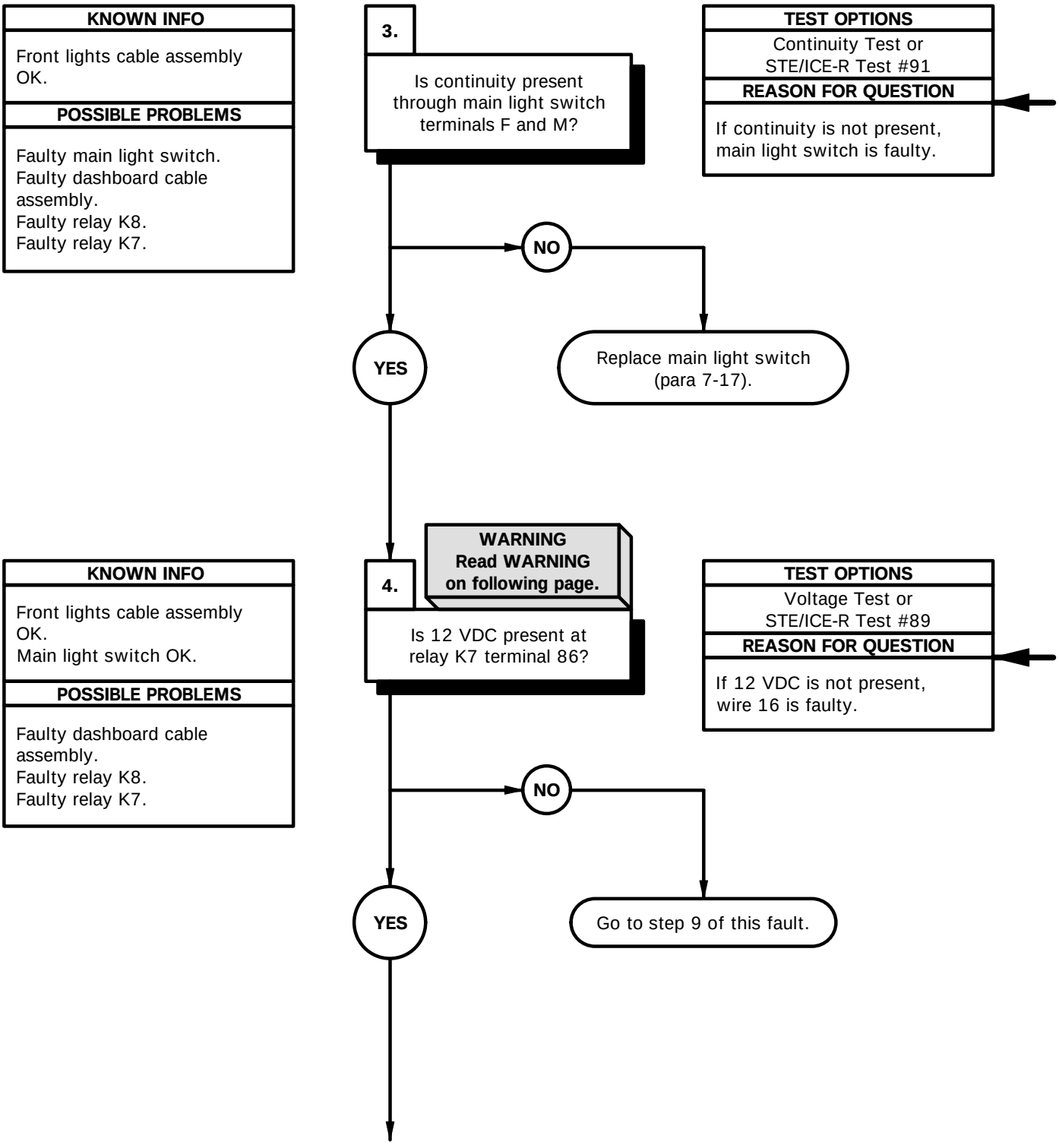
**References**
TM 9-4910-571-12&P



| OPERATIONAL TEST |
| --- |
| (1) Position main light switch to SER DRIVE (TM 9-2320-365-10).<br>(2) If both headlights do not operate, go to step 3 of this fault.<br>(3) Position main light switch to OFF (TM 9-2320-365-10). |

| OPERATIONAL TEST |
| --- |
| (1) Position main light switch to SER DRIVE (TM 9-2320-365-10).<br>(2) Observe which headlight illuminates.<br>(3) If left headlight illuminates, repair wire 3051 from connector P13 to terminal lug TL81 (para 2-40) or replace front lights cable assembly (para 7-74).<br>(4) If RH headlight illuminates, repair wire 3052 from connector P19 to terminal lug TL123 (para 2-40) or replace front lights cable assembly (para 7-74).<br>(5) Position main light switch to OFF (TM 9-2320-365-10). |

## e40. ONE OR BOTH HEADLIGHTS (HIGH AND LOW BEAM) DO NOT ILLUMINATE (CONT)

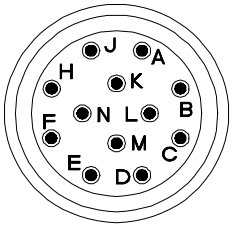


**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove main light switch (para 7-17).
(2) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to main light switch terminal M.
(5) Connect negative (-) probe of multimeter to main light switch terminal F and note reading on multimeter.
(6) If continuity is not present replace main light switch (para 7-17).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Install main light switch (para 7-17).



MAIN LIGHT SWITCH

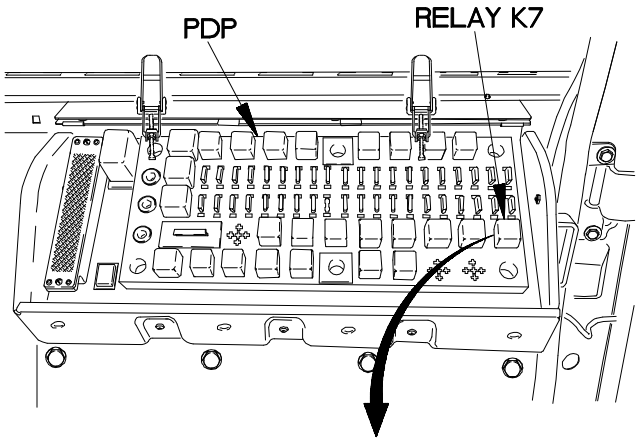
X2e4101B

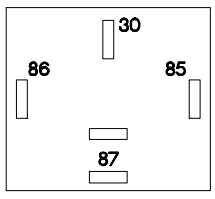
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove relay K7 form PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to PDP terminal 86, where relay K7 was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, go to step 9 of this fault.
(8) Position main light switch to OFF (TM 9-2320-365-10).

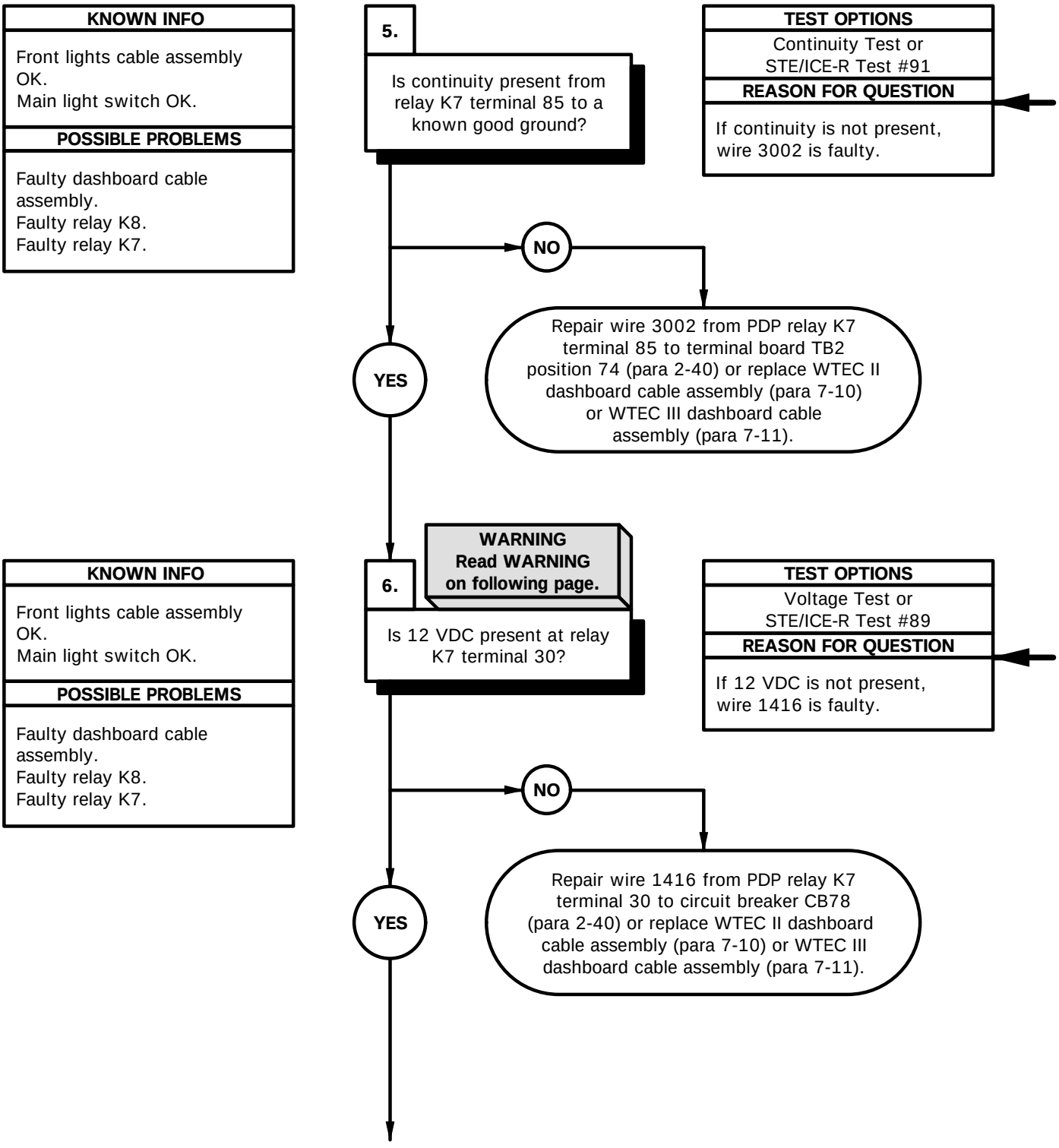


RELAY K7 CAVITY

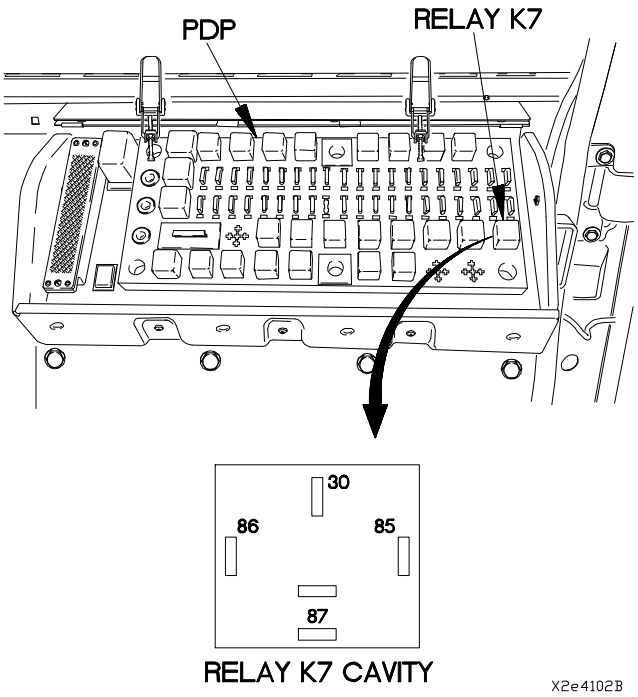
X2e4102B

## e40. ONE OR BOTH HEADLIGHTS (HIGH AND LOW BEAM) DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP terminal 85, where relay K7 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3002 from PDP relay K7 terminal 85 to terminal board TB2 position 74 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



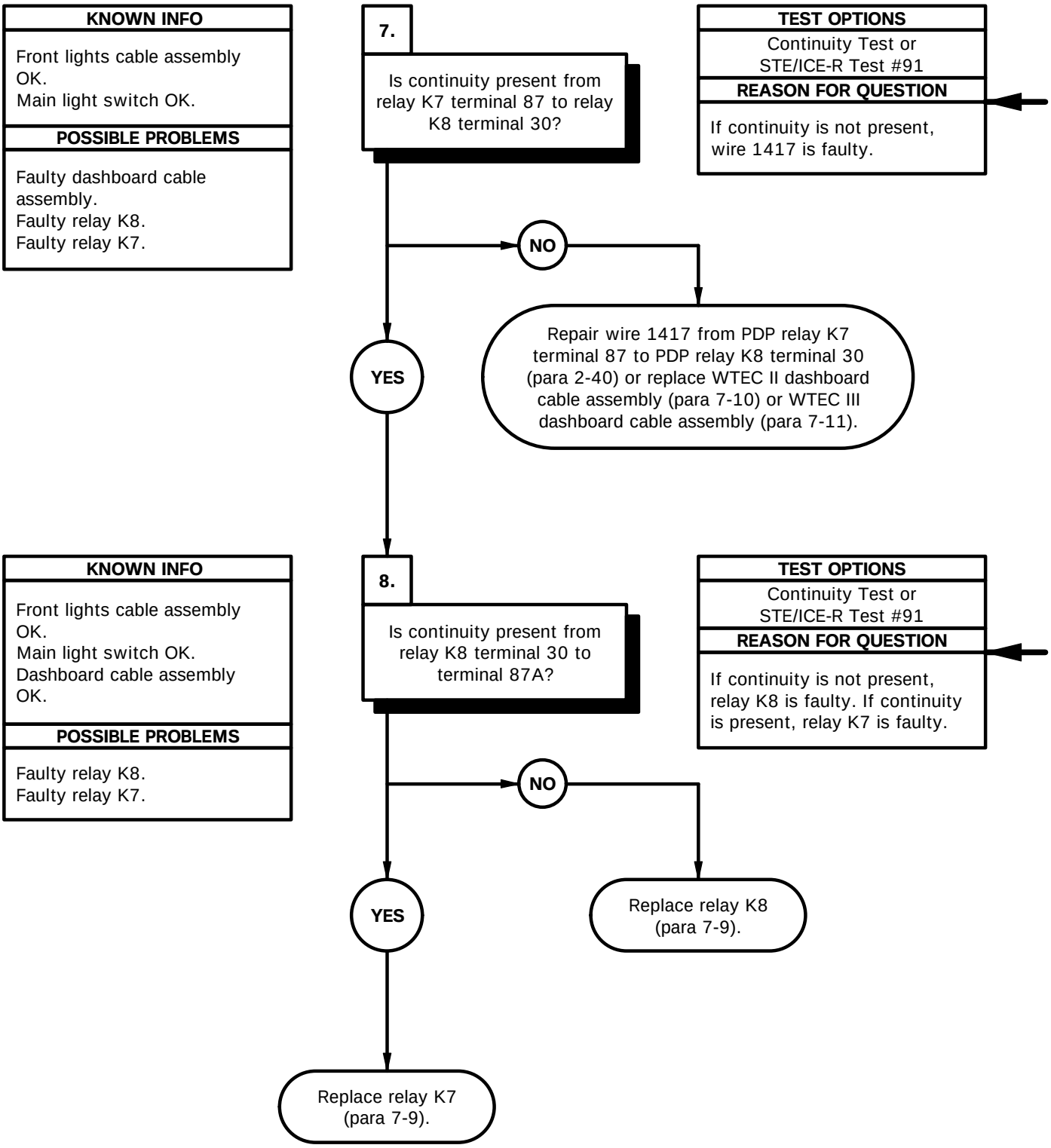

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to PDP terminal 30, where relay K7 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, Repair wire 1416 from PDP relay K7 terminal 30 to circuit breaker CB78 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).

## e40. ONE OR BOTH HEADLIGHTS (HIGH AND LOW BEAM) DO NOT ILLUMINATE (CONT)

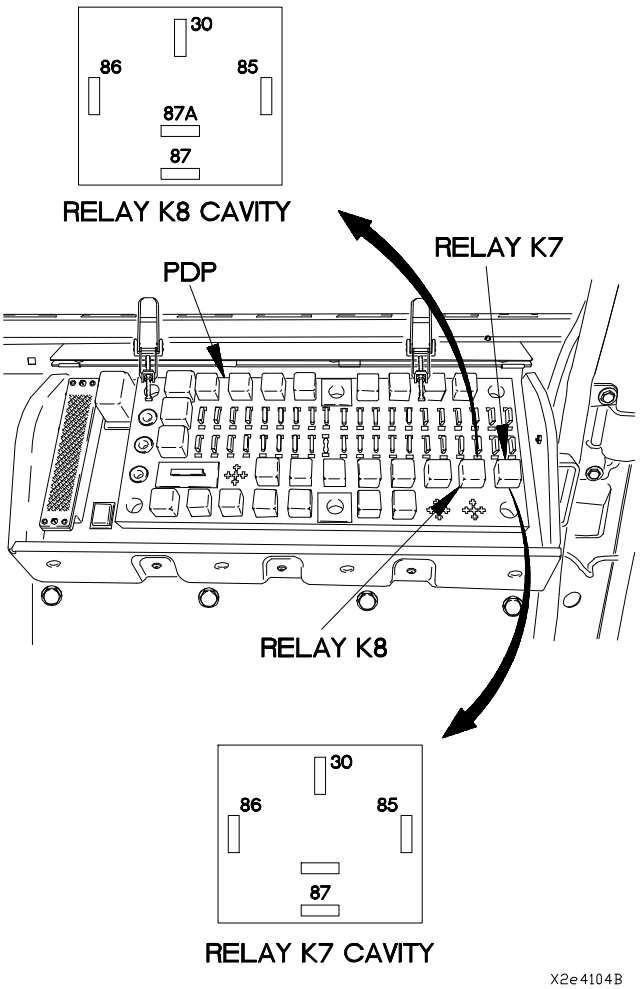


**CONTINUITY TEST**

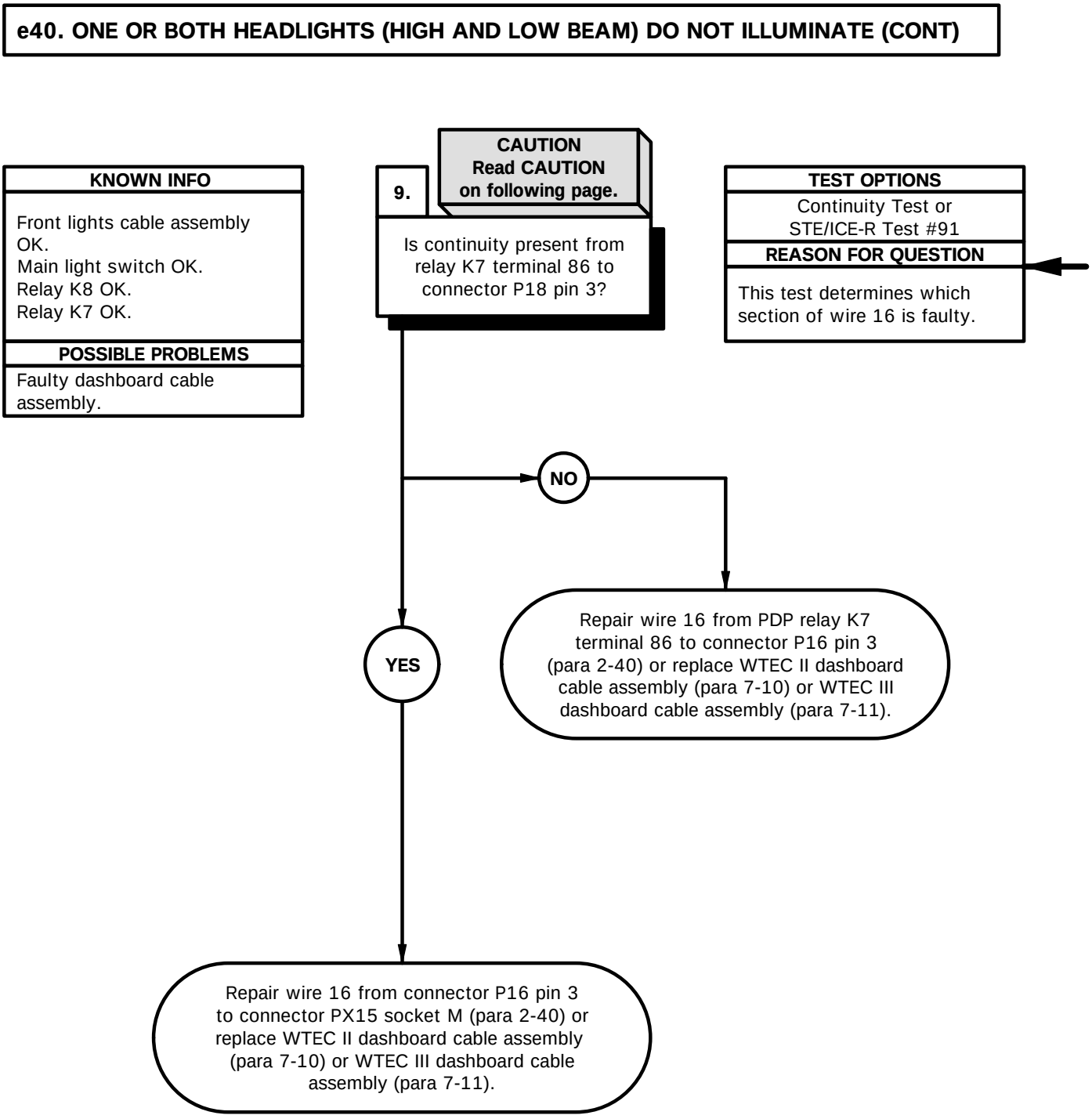
(1) Remove relay K8 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to PDP terminal 87, where relay K7 was removed.
(4) Connect negative (-) probe of multimeter to PDP terminal 30, where relay K8 was removed and note reading on multimeter.
(5) If continuity is not present, repair wire 1417 from PDP relay K7 terminal 87 to PDP relay K8 terminal 30 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Install relay K7 in PDP.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K8 terminal 87A.
(3) Connect negative (-) probe of multimeter to relay K8 terminal 30 and note reading on multimeter.
(4) If continuity is not present, replace relay K8 (para 7-9).
(5) If continuity is present, replace relay K7 (para 7-9).
(6) Install relay K8 in PDP.
(7) Install PDP cover (para 16-2).



## e40. ONE OR BOTH HEADLIGHTS (HIGH AND LOW BEAM) DO NOT ILLUMINATE (CONT)



**CAUTION**

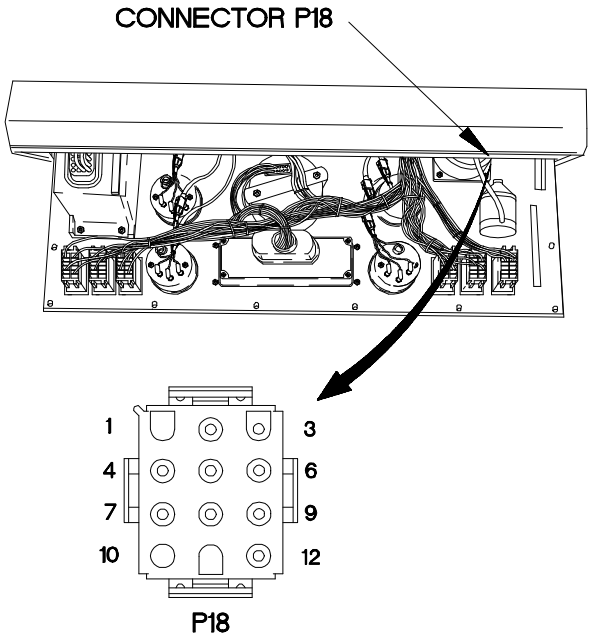
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

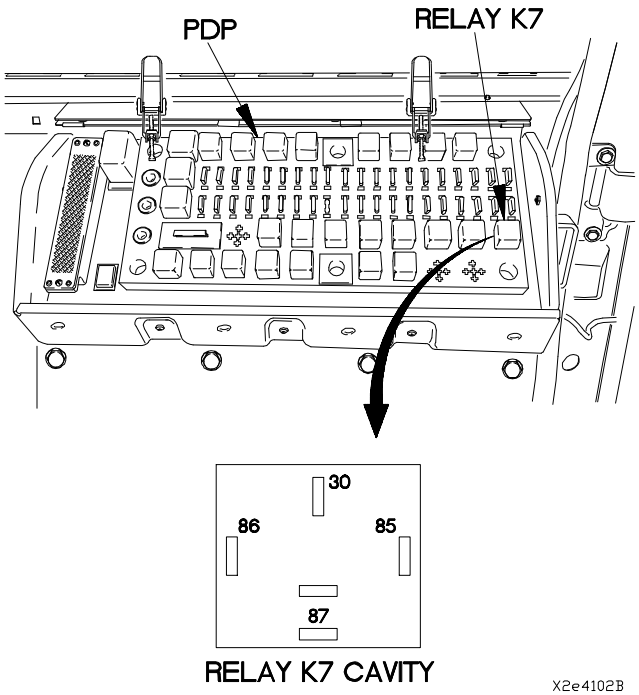
**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector P18 from connector J18.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to PDP terminal 86, where relay K7 was removed.
(5) Connect negative (-) probe of multimeter to connector P18 pin 3 and note reading on multimeter.
(6) If continuity is not present, repair wire 16 from PDP relay K7 terminal 86 to connector P18 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, repair wire 16 from connector P16 pin 3 to connector PX15 socket M (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Install relay K7 in PDP.
(9) Install PDP cover (para 16-2).
(10) Connect connector P18 to connector J18.
(11) Install instrument panel assembly (para 7-15).



**e41. ONE OR BOTH HEADLIGHT LOW BEAMS DO NOT ILLUMINATE**

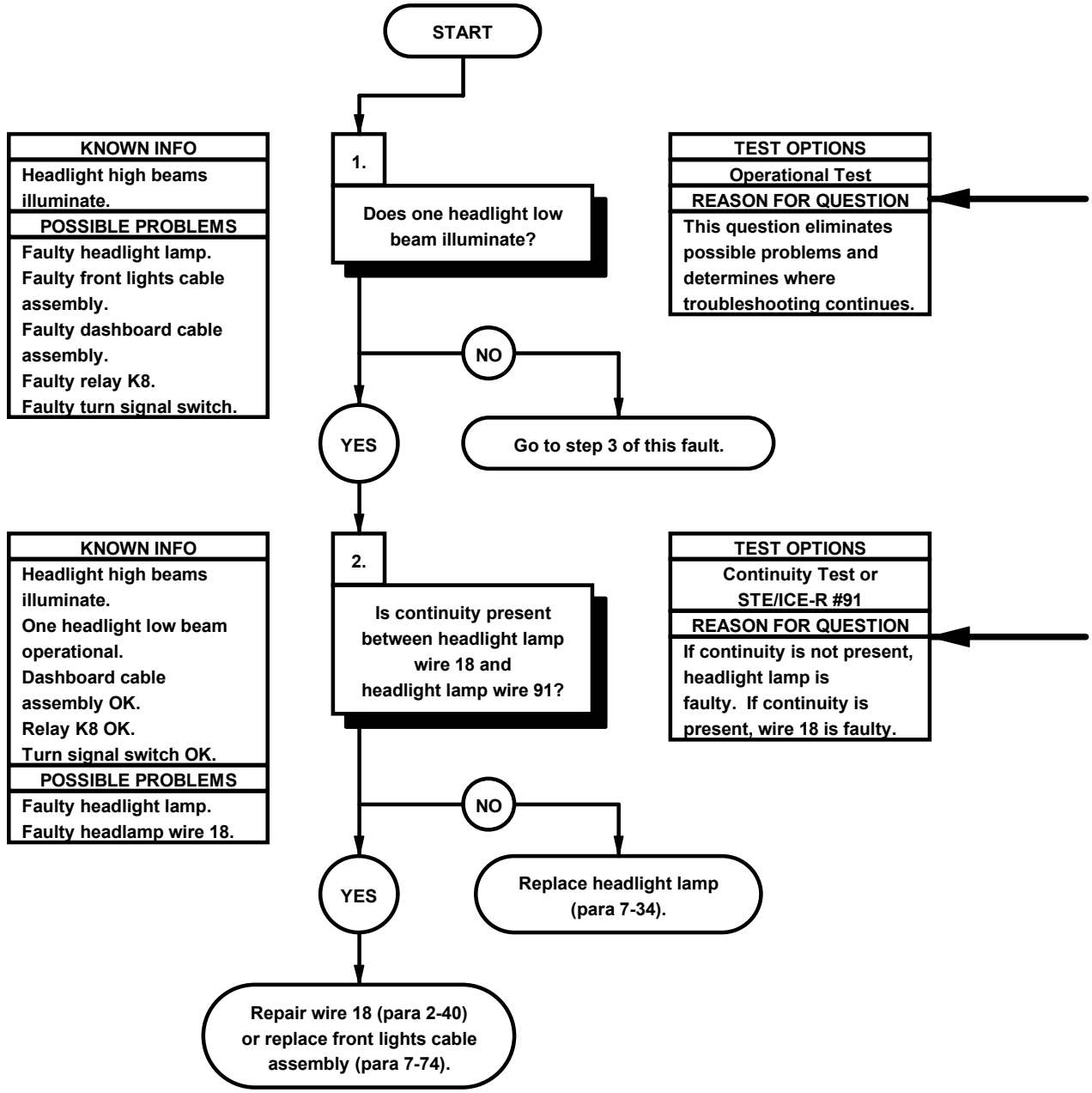
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

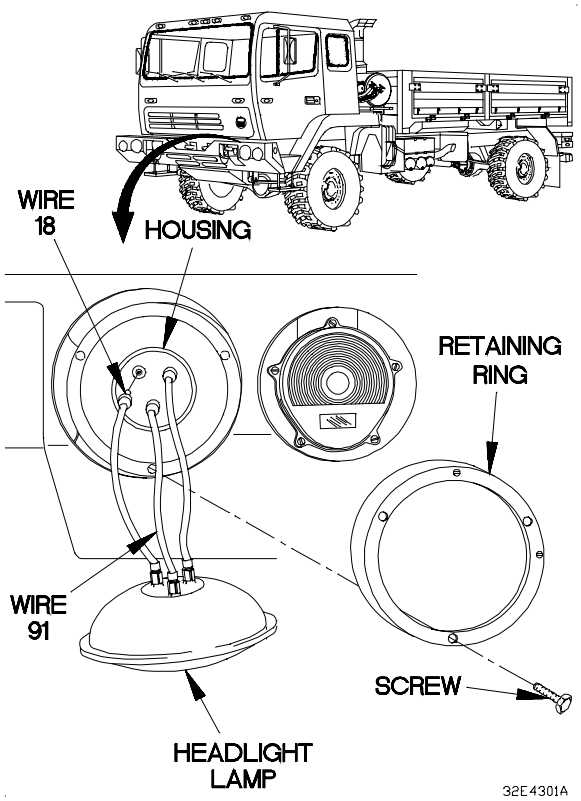


**OPERATIONAL TEST**

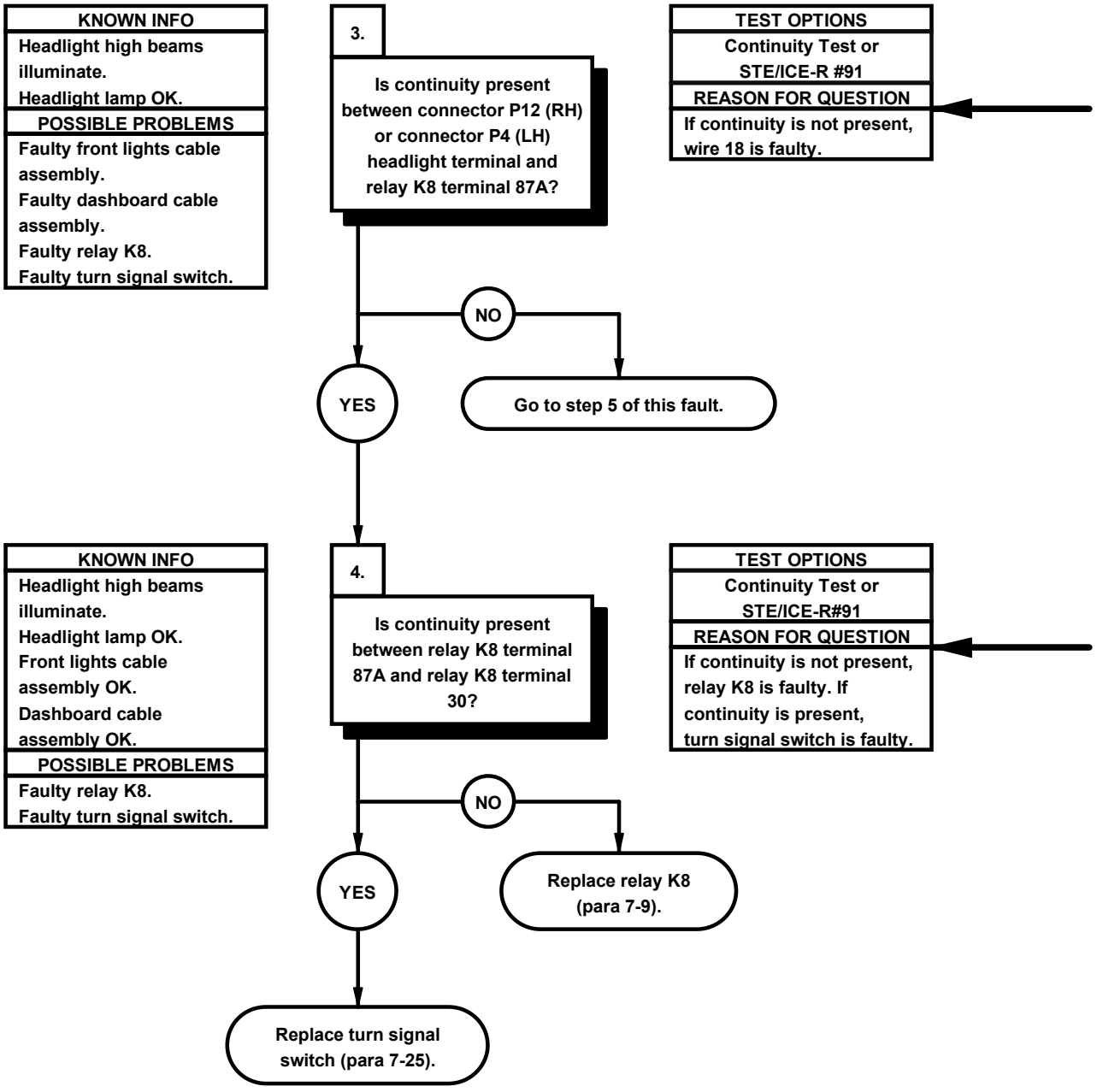
(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) Position headlight low beams to on (TM 9-2320-365-10).
(3) If both headlight low beams do not illuminate, go to step 3 of this fault.
(4) Position main light switch to OFF (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Remove three screws and retaining ring from housing.
(2) Remove lamp from housing.
(3) Disconnect headlight lamp wire 18 from housing.
(4) Disconnect headlight lamp wire 91 from housing.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to headlight lamp wire 18.
(7) Connect negative (-) probe of multimeter to headlight lamp wire 91 and note reading on multimeter.
(8) If continuity is not present, replace headlight lamp (para 7-34).
(9) If continuity is present, repair wire 18 (para 2-40) or replace front lights cable assembly (para 7-74).
(10) Connect headlight lamp wire 18 to housing.
(11) Connect headlight lamp wire 91 to housing.
(12) Install lamp in housing.
(13) Install retaining ring on housing with three screws.

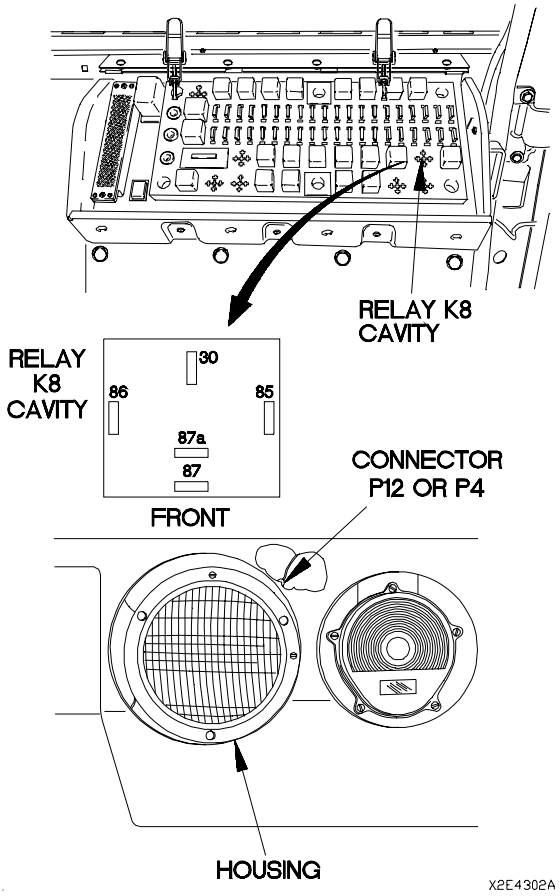


## e41. ONE OR BOTH HEADLIGHT LOW BEAMS DO NOT ILLUMINATE (CONT)

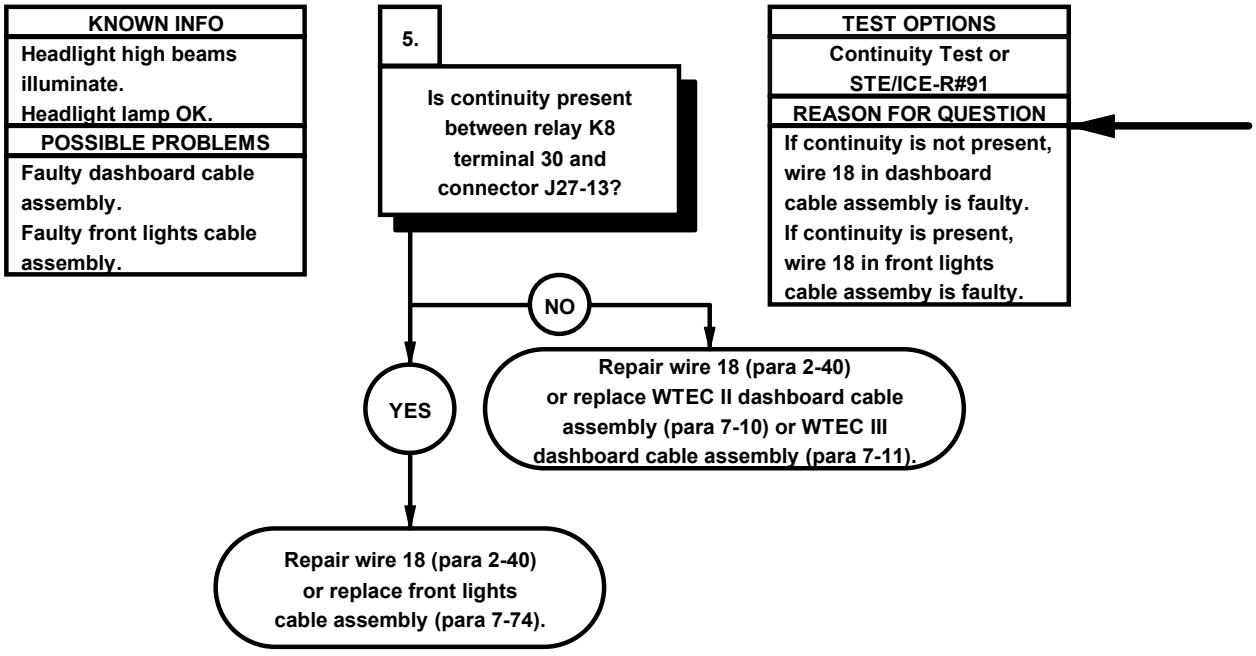


| CONTINUITY TEST |
| --- |
| (1) Remove PDP cover (para 16-2). |
| (2) Remove relay K8 from PDP. |
| (3) Disconnect connector P12 (RH) or connector P4 (LH) from housing. |
| (4) Set multimeter to ohms. |
| (5) Connect positive (+) probe of multimeter to connector P12 (RH) or connector P4 (LH). |
| (6) Connect negative (-) probe of multimeter to PDP, terminal 87A, where relay K8 was removed and note reading on multimeter. |
| (7) If continuity is not present, go to step 5 of this fault. |
| (8) Connect connector P12 (RH) or connector P5 (LH) to housing. |

| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms |
| (2) Connect positive (+) probe of multimeter to relay K8 terminal 87A. |
| (3) Connect negative (-) probe of multimeter to relay K8 terminal 30 and note reading on multimeter. |
| (4) If continuity is not present, replace relay K8 (para 7-9). |
| (5) If continuity is present, replace turn signal switch (para 7-25). |
| (6) Install relay K8 in PDP. |
| (7) Install PDP cover (para 16-2). |

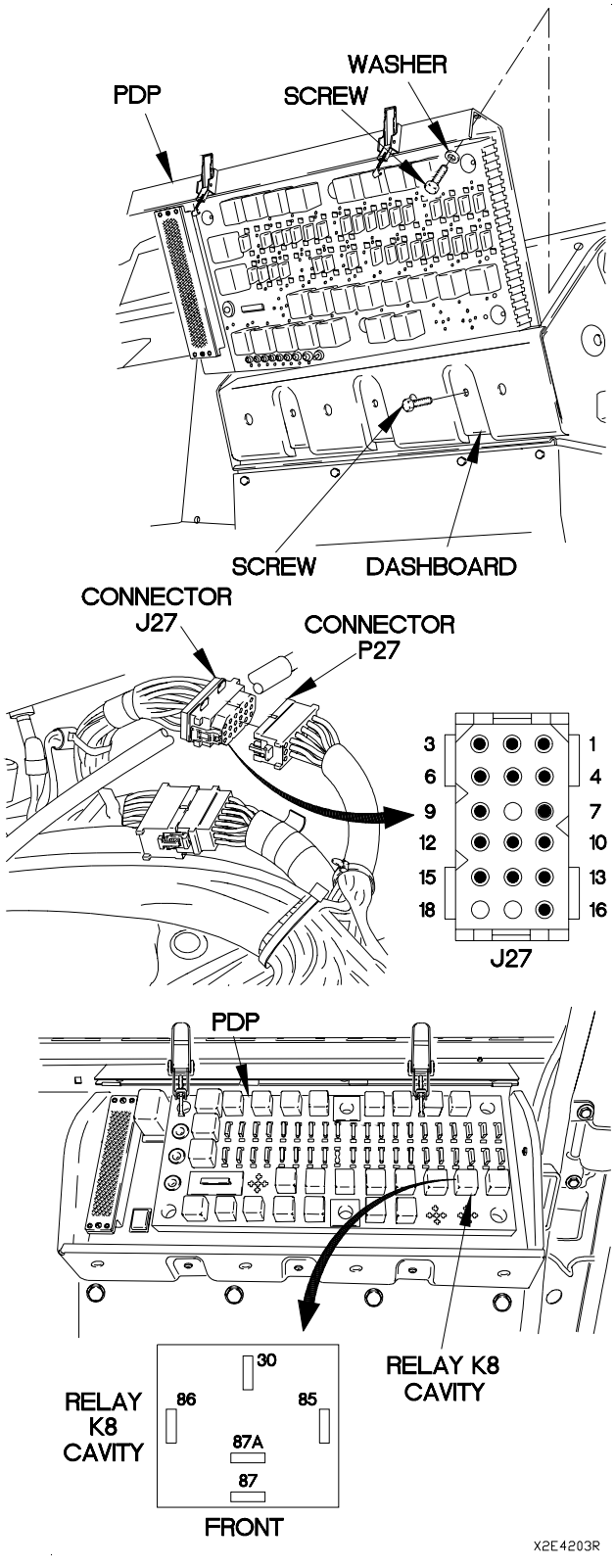


## e41. ONE OR BOTH HEADLIGHT LOW BEAMS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J27 from connector P27.
(5) Set multimeter to ohms
(6) Connect positive (+) probe of multimeter to PDP, relay K8 terminal 87A, where relay K8 was removed.
(7) Connect negative (-) probe of multimeter to connector J27-13 and note reading on multimeter.
(8) If continuity is not present, repair wire 18 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, repair wire 18 (para 2-40) or replace front lights cable assembly (para 7-74).
(10) Connect connector P27 to connector J27.
(11) Install PDP in dashboard with three screws.
(12) Install three washers and screws in PDP.
(13) Install relay K8 in PDP.
(14) Install PDP cover (para 16-2).



## e42. ONE OR BOTH HEADLIGHT HIGH BEAMS DO NOT ILLUMINATE

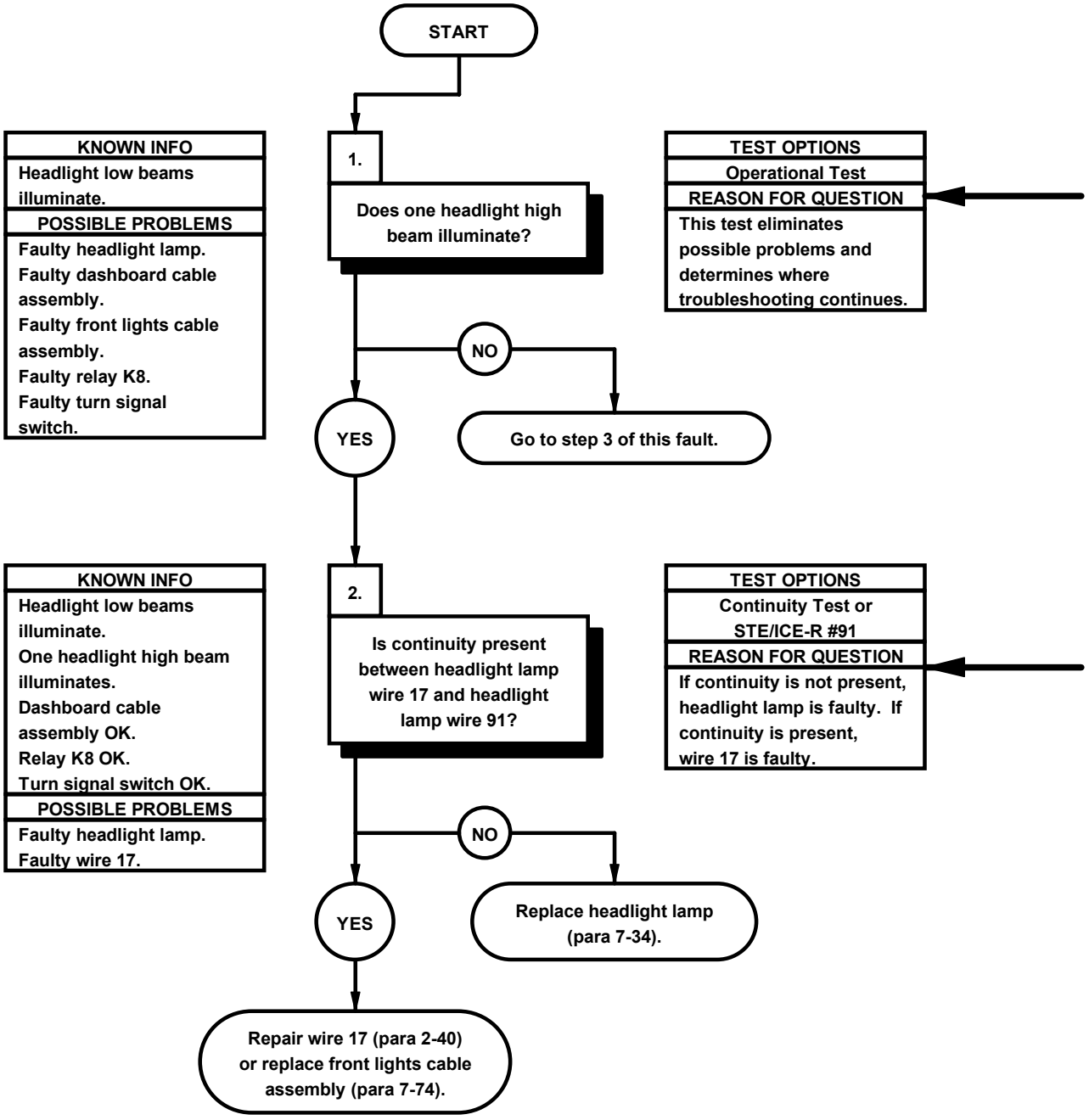
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

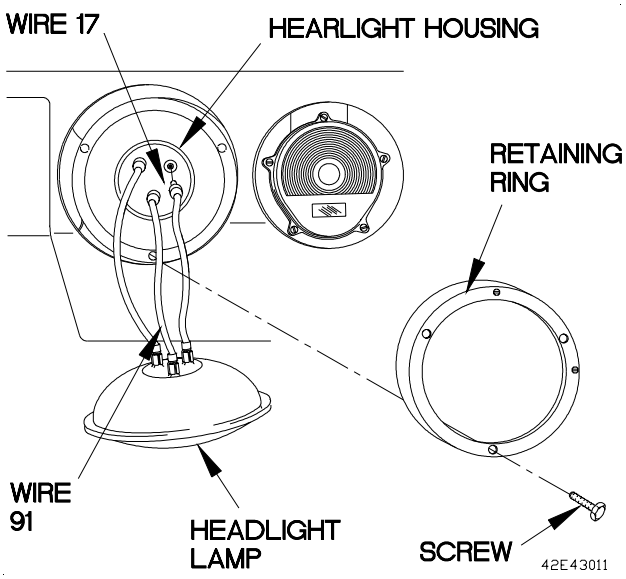


**OPERATIONAL TEST**

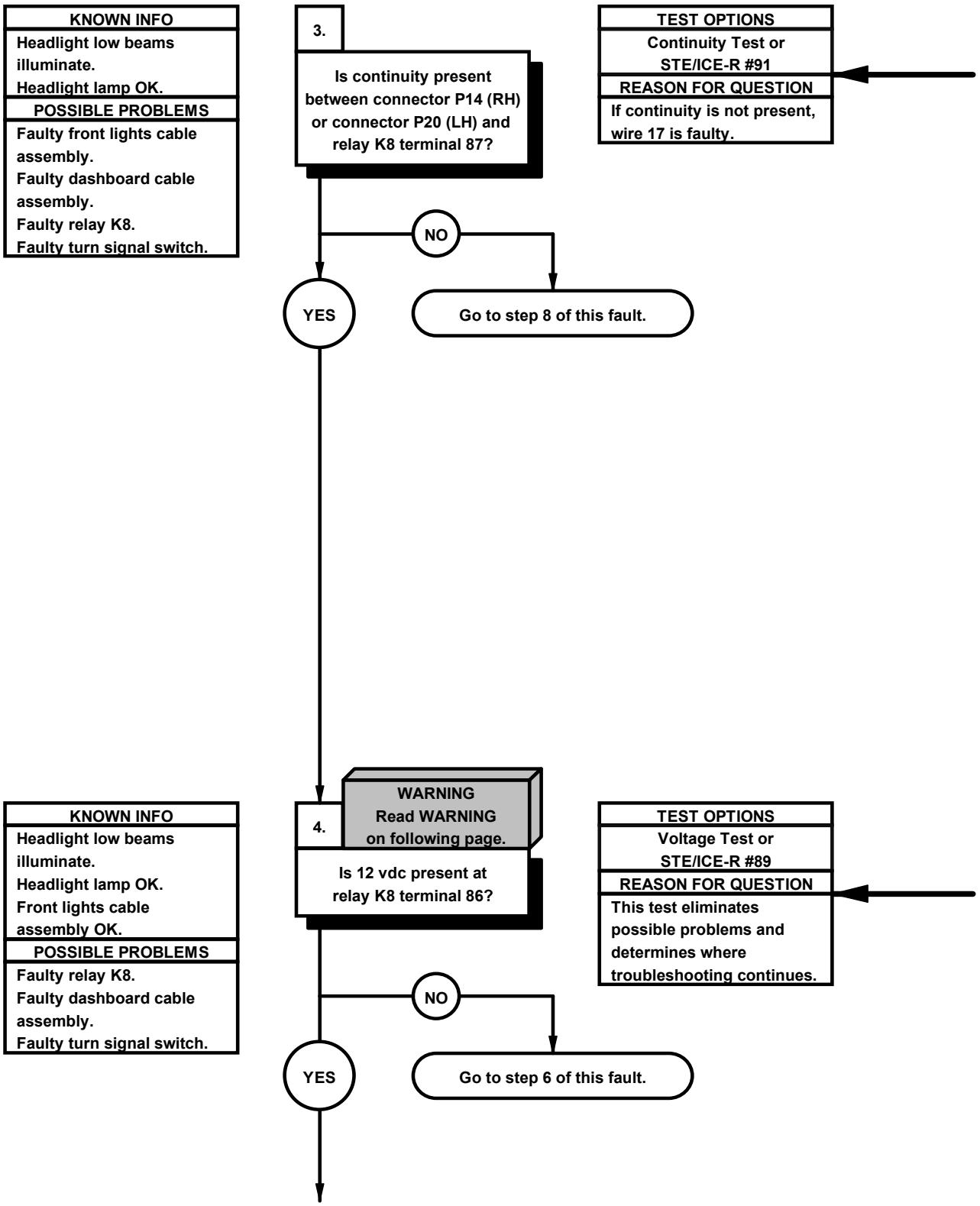
(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) Position headlight high beams on (TM 9-2320-365-10).
(3) If both headlights high beams do not illuminate, and go to step 3 of this fault.
(4) Position main light switch to OFF (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Remove three screws and retaining ring from housing.
(2) Remove headlight lamp from housing.
(3) Disconnect headlight lamp wire 17 from housing.
(4) Disconnect headlight lamp wire 91 from housing.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to headlight lamp wire 17.
(7) Connect negative (-) probe of multimeter to headlight lamp wire 91 and note reading on multimeter.
(8) If continuity is not present, replace headlight lamp (para 7-34).
(9) If continuity is present, repair wire 17 (para 2-40) or replace front lights cable assembly (para 7-74).
(10) Connect headlight lamp wire 17 to housing.
(11) Connect headlight lamp wire 91 to housing.
(12) Install headlight lamp in housing.
(13) Install retaining ring on housing with three screws.



## e42. ONE OR BOTH HEADLIGHT HIGH BEAMS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

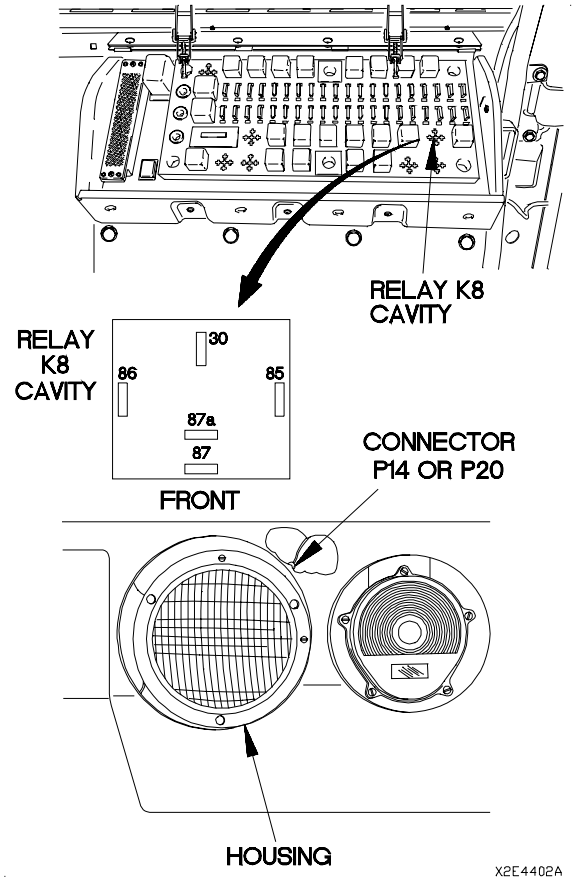
(1) Remove PDP cover (para para 16-2).
(2) Remove relay K8 from PDP.
(3) Disconnect connector P14 (RH) or connector P20 (LH) from housing.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to PDP, terminal 87A, where relay K8 was removed.
(6) Connect negative (-) probe of multimeter to connector P14 (RH) or connector P20 (LH) and note reading on multimeter.
(7) If continuity is not present, go to step 8 of this fault.
(8) Connect connector P14 (RH) or connector P20 (LH) to housing.

**WARNING**

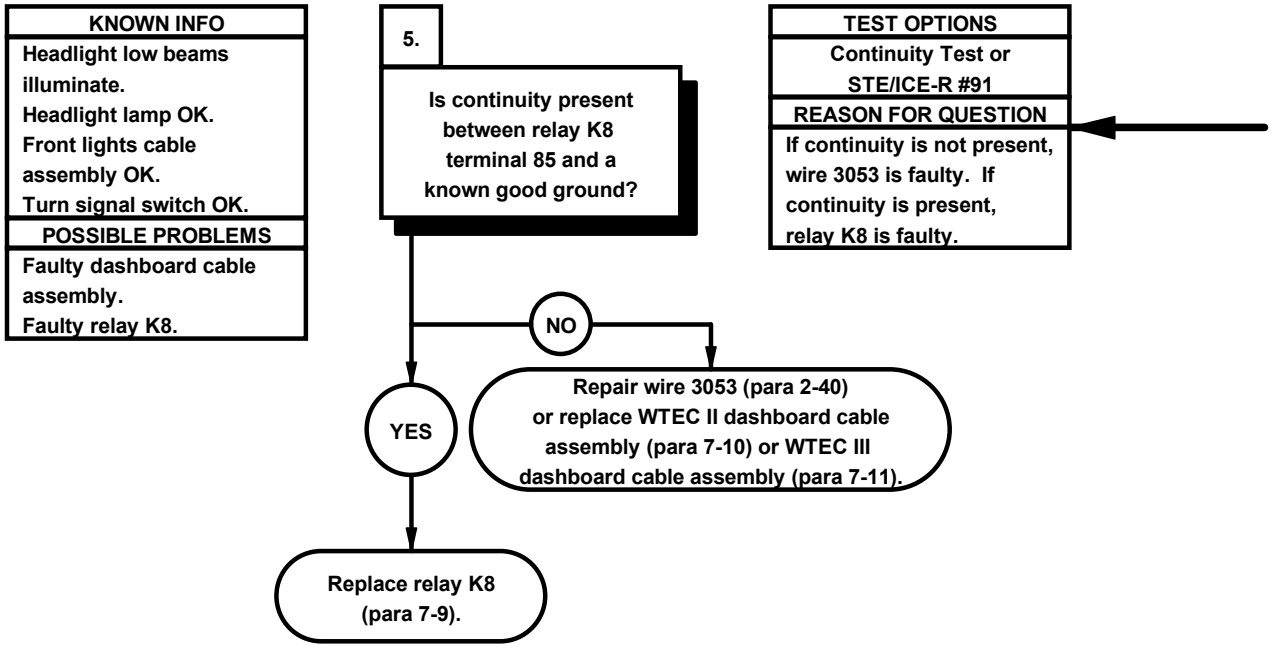
Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

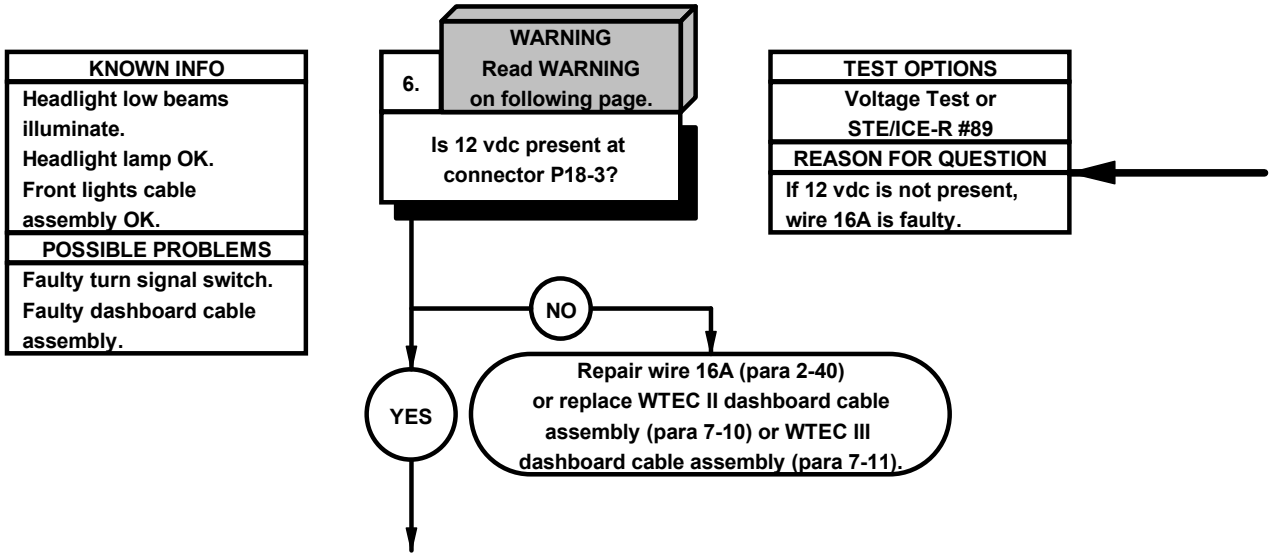
**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to PDP, terminal 86, where relay K8 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(5) Position headlight high beams to on (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 vdc is not present, go to step 6 of this fault.
(7) Position main light switch to OFF (TM 9-2320-365-10).



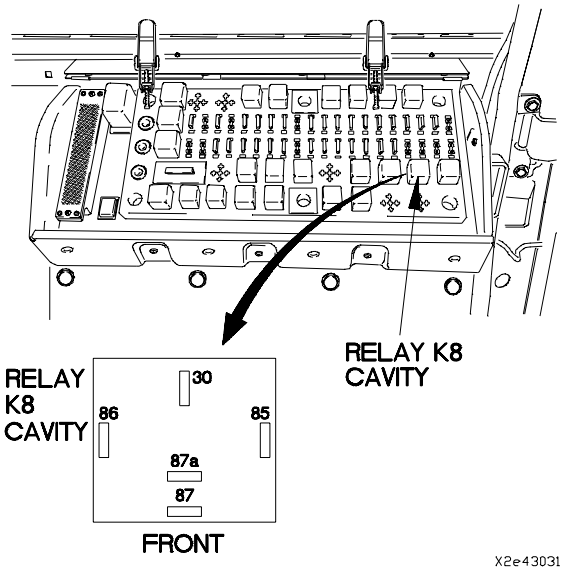
## e42. ONE OR BOTH HEADLIGHT HIGH BEAMS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K8 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3053 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K8 (para 7-9).
(6) Install relay K8 in PDP.
(7) Install PDP cover (para 16-2).

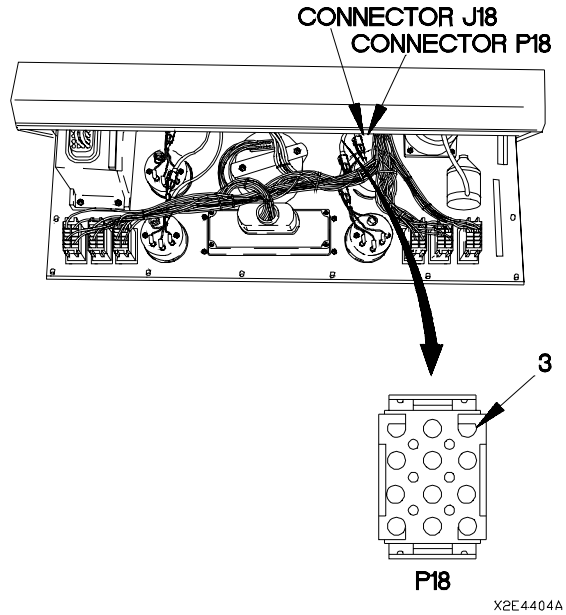



**WARNING**

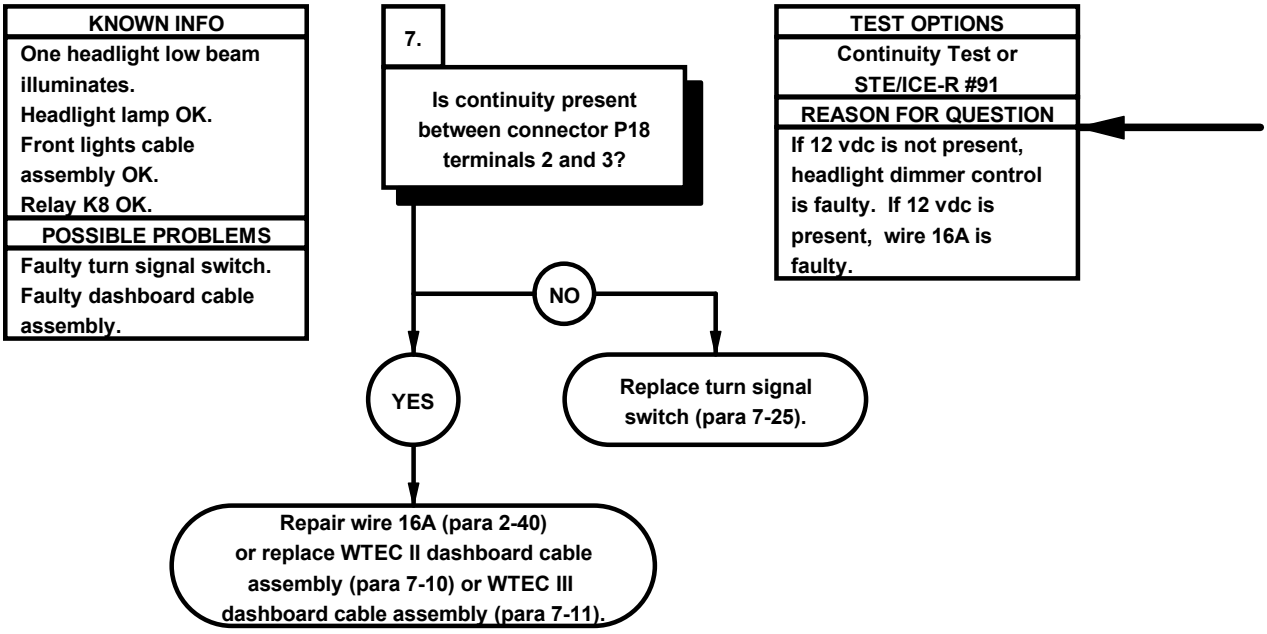
Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

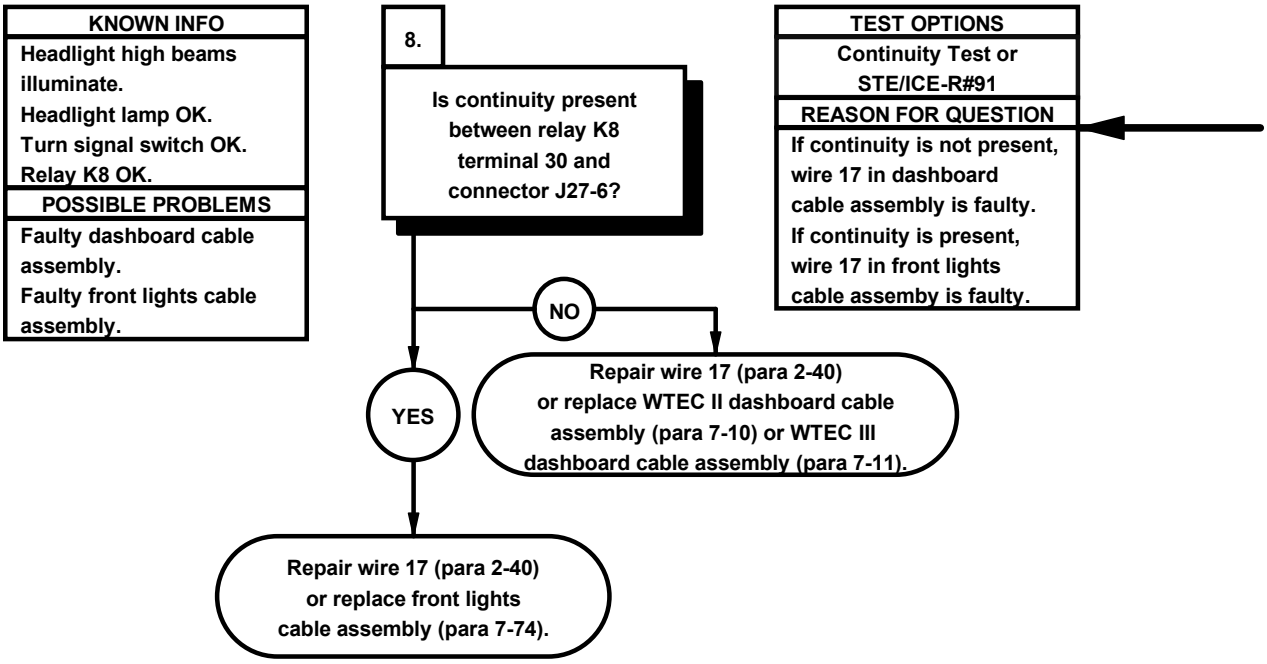
**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector P18 from connector J18.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector P18-3.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 vdc is not present, repair wire 16A (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).



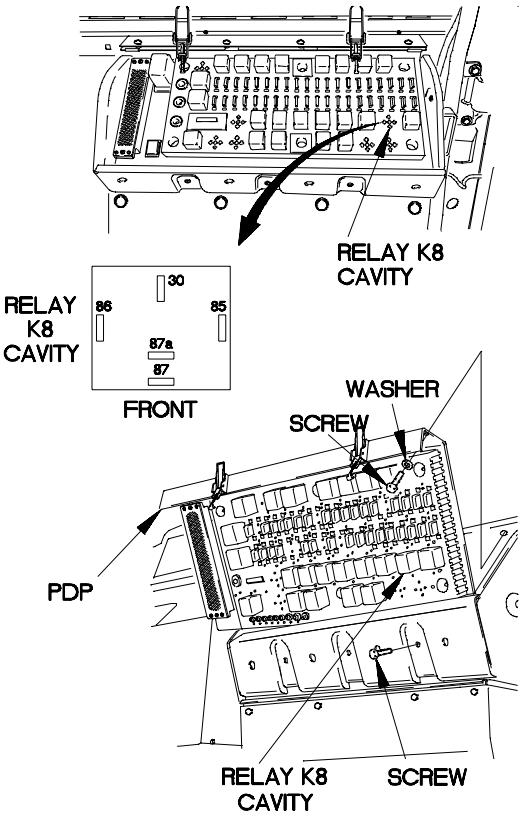
## e42. ONE OR BOTH HEADLIGHT HIGH BEAMS DO NOT ILLUMINATE (CONT)



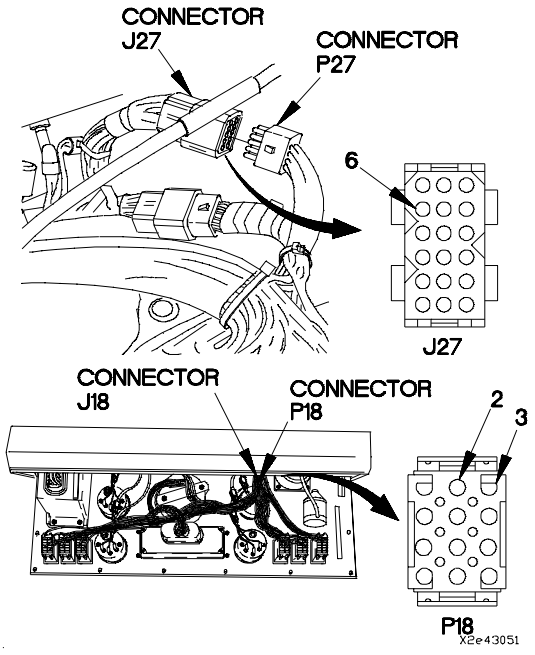
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P18-3.
(3) Connect negative (-) probe of multimeter to connector P18-2.
(4) If continuity is not present, replace turn signal switch (para 7-25).
(5) If continuity is present, repair wire 16A (para 2-40) or replace WETC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector P18 to connector J18.
(7) Install instrument panel assembly (para 7-15).
(8) Install relay K8 in PDP.
(9) Install PDP cover (para 16-2).




**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J27 from connector P27.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to PDP, relay K8 terminal 30, where relay K8 was removed.
(7) Connect negative (-) probe of multimeter to connector J27-6 and note reading on multimeter.
(8) If continuity is not present, repair wire 17 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, repair wire 17 (para 2-40) or replace front lights cable assembly (para 7-74).
(10) Connect connector P27 to connector J27.
(11) Install PDP in dashboard with three screws.
(12) Install three washers and screws in PDP.
(13) Install relay K8 in PDP.
(14) Install PDP cover (para 16-2).



## e43. PARKING LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

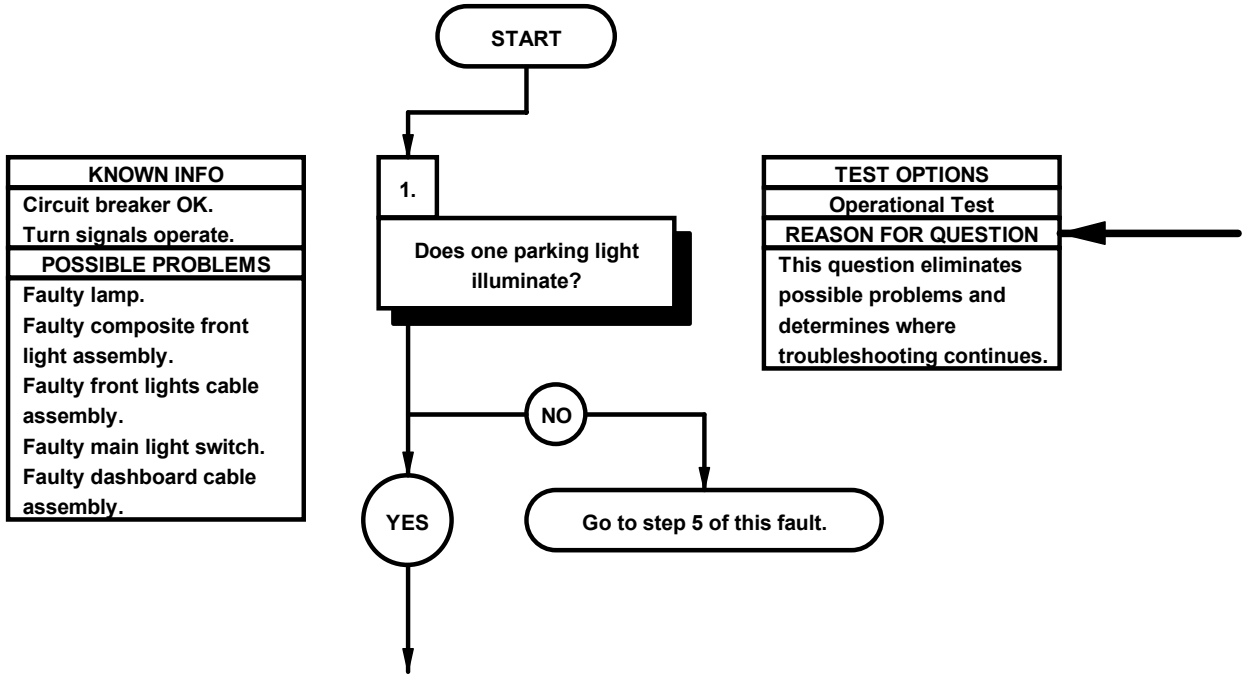
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Packing, Preformed (Item 170, Appendix G)

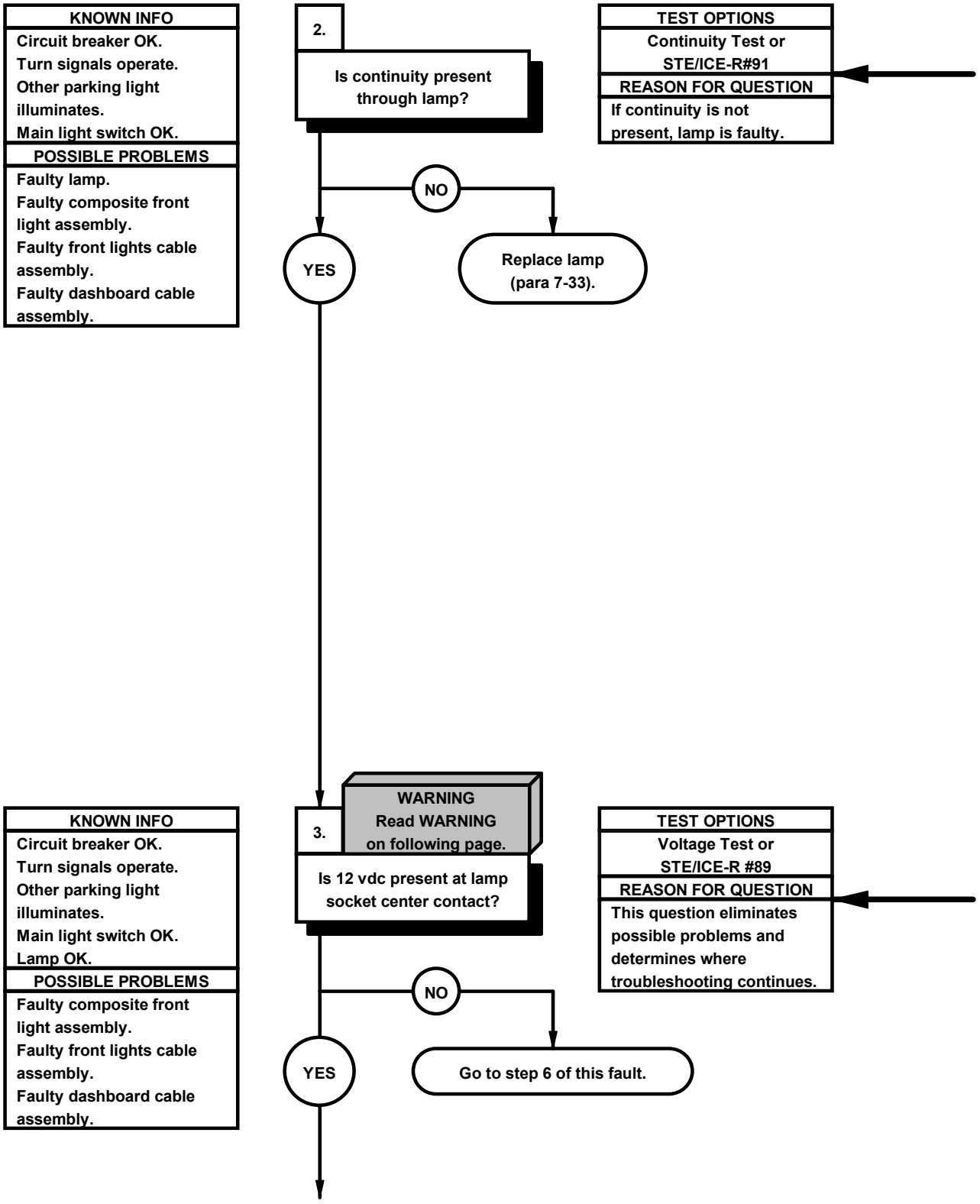
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

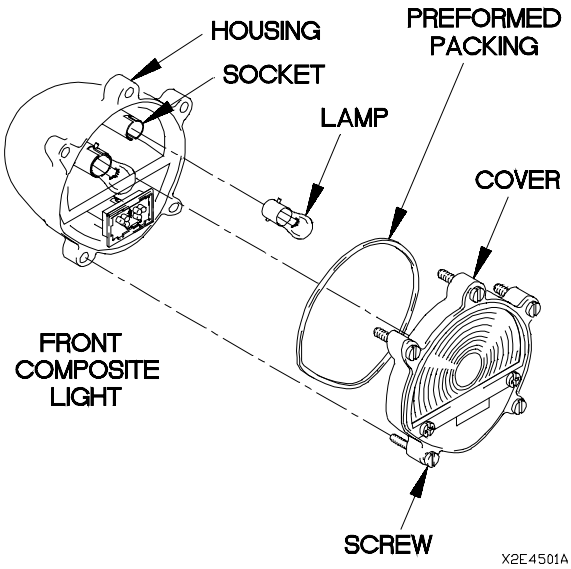
**References**
TM 9-4910-571-12&P



| OPERATIONAL TEST |
| --- |
| (1) Position main light switch to SER DRIVE (TM 9-2320-365-10). |
| (2) Position main light switch auxiliary lever to PARK (TM 9-2320-365-10). |
| (3) If no parking lights illuminate, go to step 5 of this fault. |
| (4) Position main light switch to OFF (TM 9-2320-365-10). |

## e43. PARKING LIGHTS DO NOT ILLUMINATE (CONT)






**CONTINUITY TEST**

(1) Loosen five screws on cover.
(2) Remove cover and preformed packing from housing. Discard preformed packing.
(3) Remove lamp from socket.
(4) Set multimeter to ohms.
(5) Check continuity through lamp and note reading on multimeter.
(6) If continuity is not present, replace lamp (para 7-33).

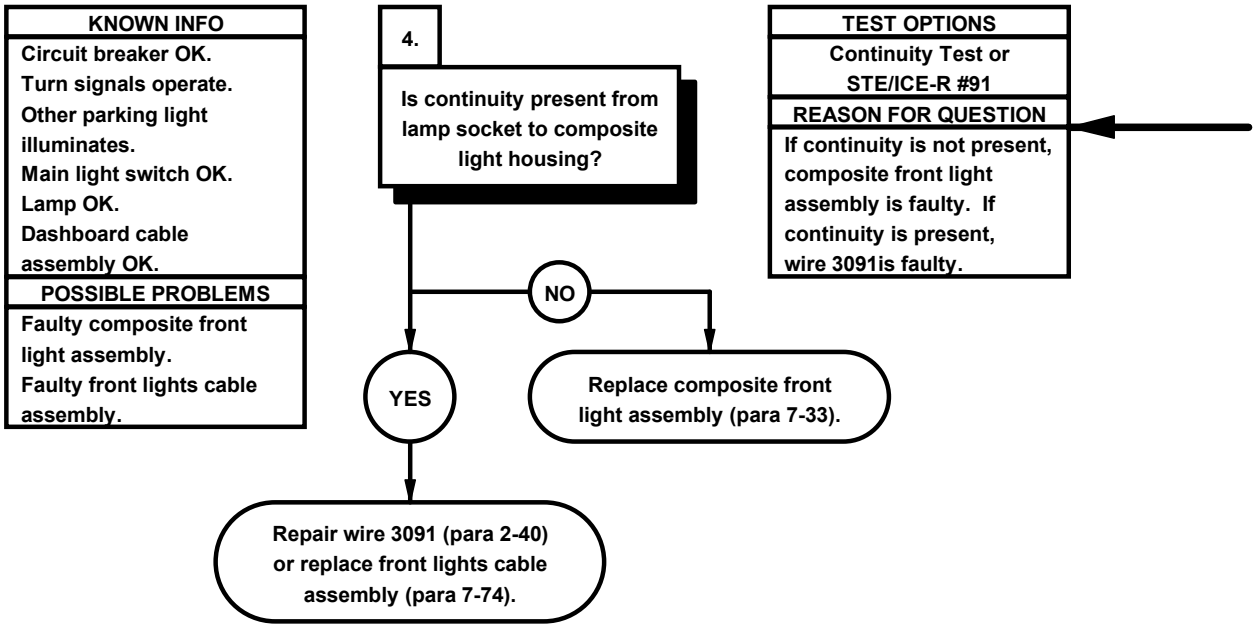
**WARNING**

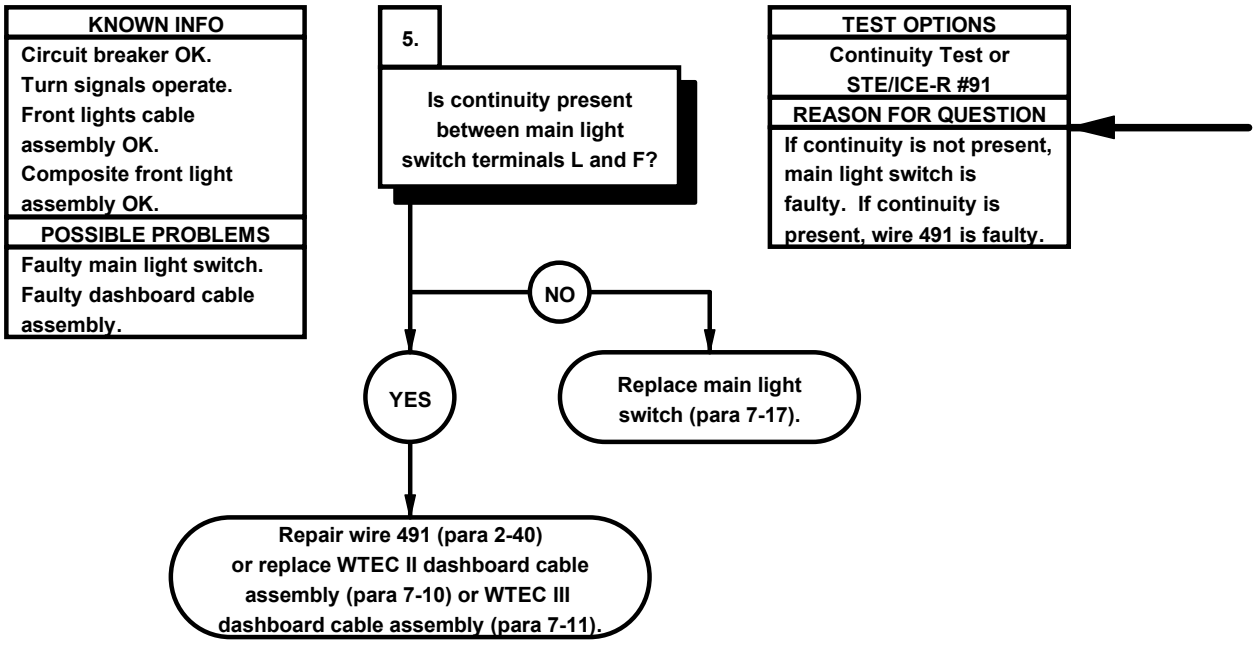
Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to center contact of lamp socket.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PARK (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 vdc is not present, go to step 6 of this fault.
(7) Position main light switch to OFF (TM 9-2320-365-10).

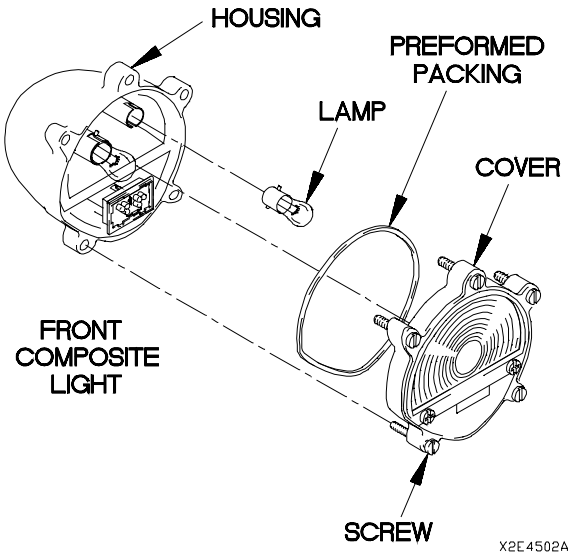
## e43. PARKING LIGHTS DO NOT ILLUMINATE (CONT)



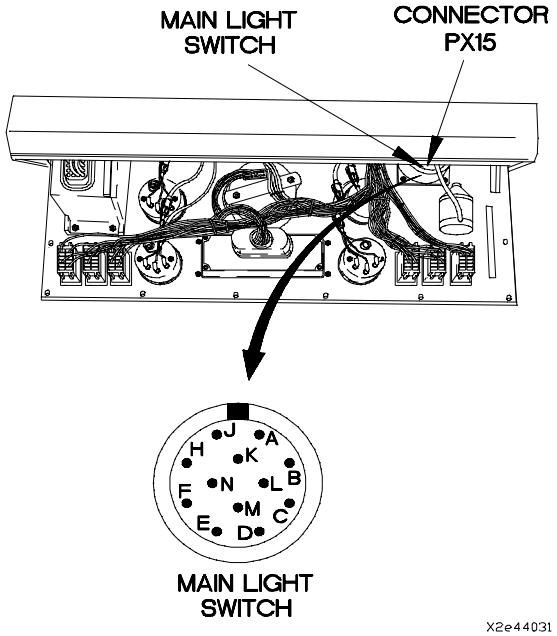
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to lamp socket.
(3) Connect negative (-) probe of multimeter to composite front light housing and note reading on multimeter.
(4) If continuity is not present, replace composite front light assembly (para 7-33).
(5) If continuity is present, repair wire 3091 (para 2-40) or replace front lights cable assembly (para 7-74).
(6) Install lamp in socket.
(7) Install preformed packing and cover on housing with five screws.

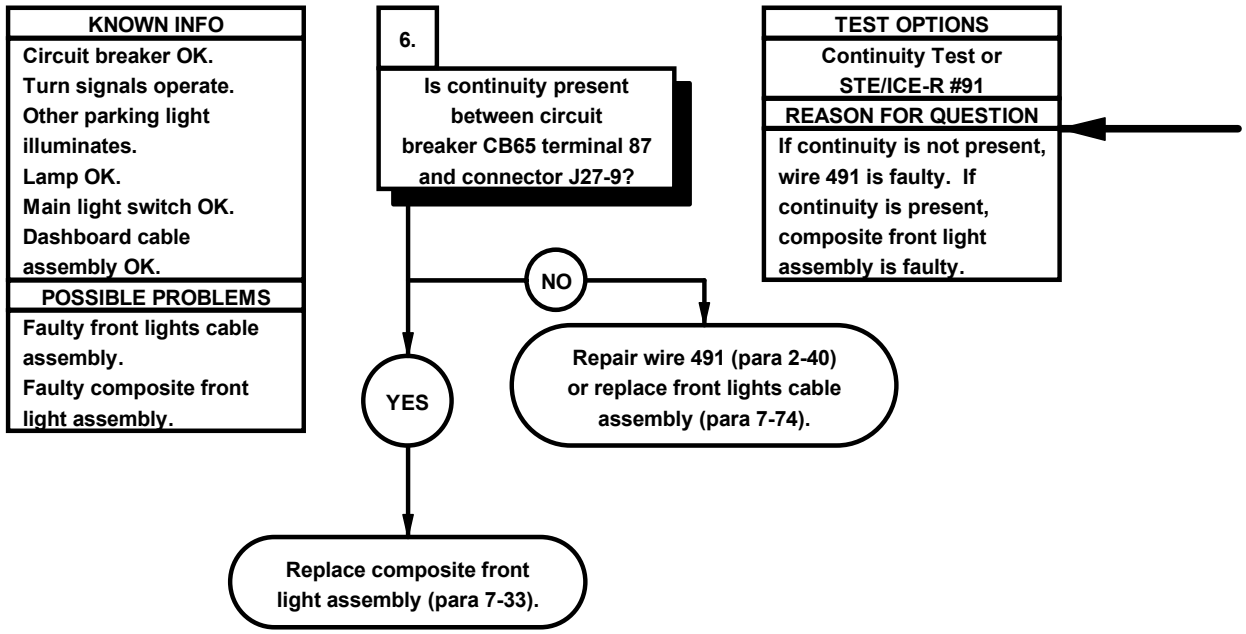



**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX15 from main light switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to main light switch terminal L.
(5) Connect negative (-) probe of multimeter to main light switch terminal F.
(6) Position main light switch auxiliary lever to PARK (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace main light switch (para 7-17).
(8) If continuity is present, repair wire 491 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Connect connector PX15 to main light switch.
(10) Install instrument panel assembly (para 7-15).

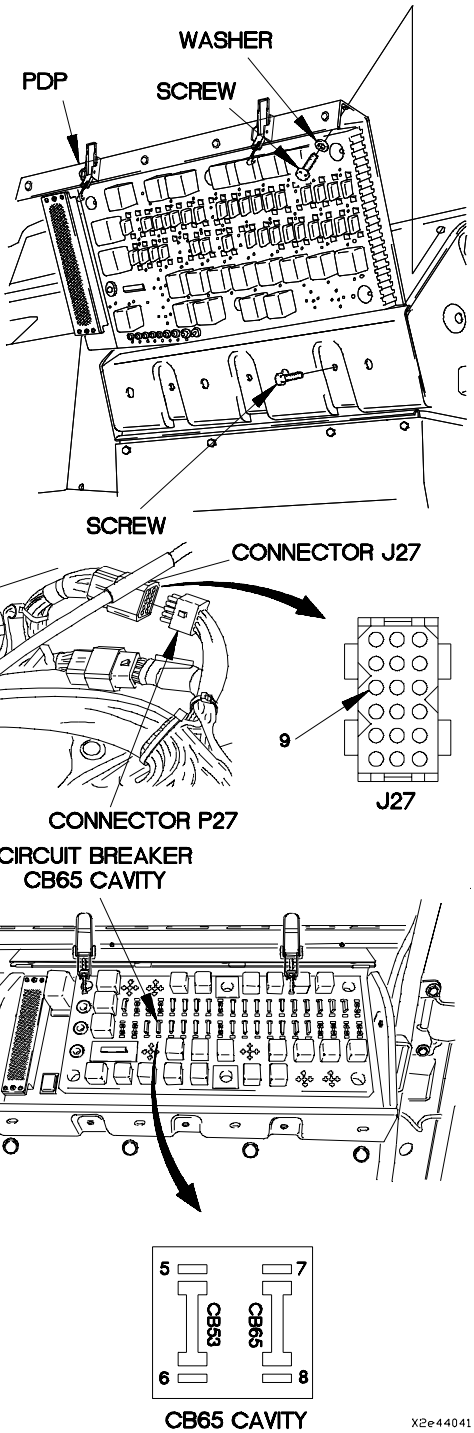


## e43. PARKING LIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J27 from connector P27.
(6) Remove circuit breaker CB65 from PDP.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to PDP, terminal 8, where CB65 was removed.
(9) Connect negative (-) probe of multimeter to connector J27-9 and note reading on multimeter.
(10) If continuity is not present, repair wire 491 (para 2-40) or replace front lights cable assembly (para 7-74).
(11) If continuity is present, replace composite front light assembly (para 7-33).
(12) Install lamp in socket.
(13) Install preformed packing and cover on housing with five screws.
(14) Connect connector J27 to connector P27.
(15) Install PDP on dashboard with three screws.
(16) Install three washers and screws in PDP.
(17) Install circuit breaker CB65 in PDP.
(18) Install PDP cover (para 16-2).



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

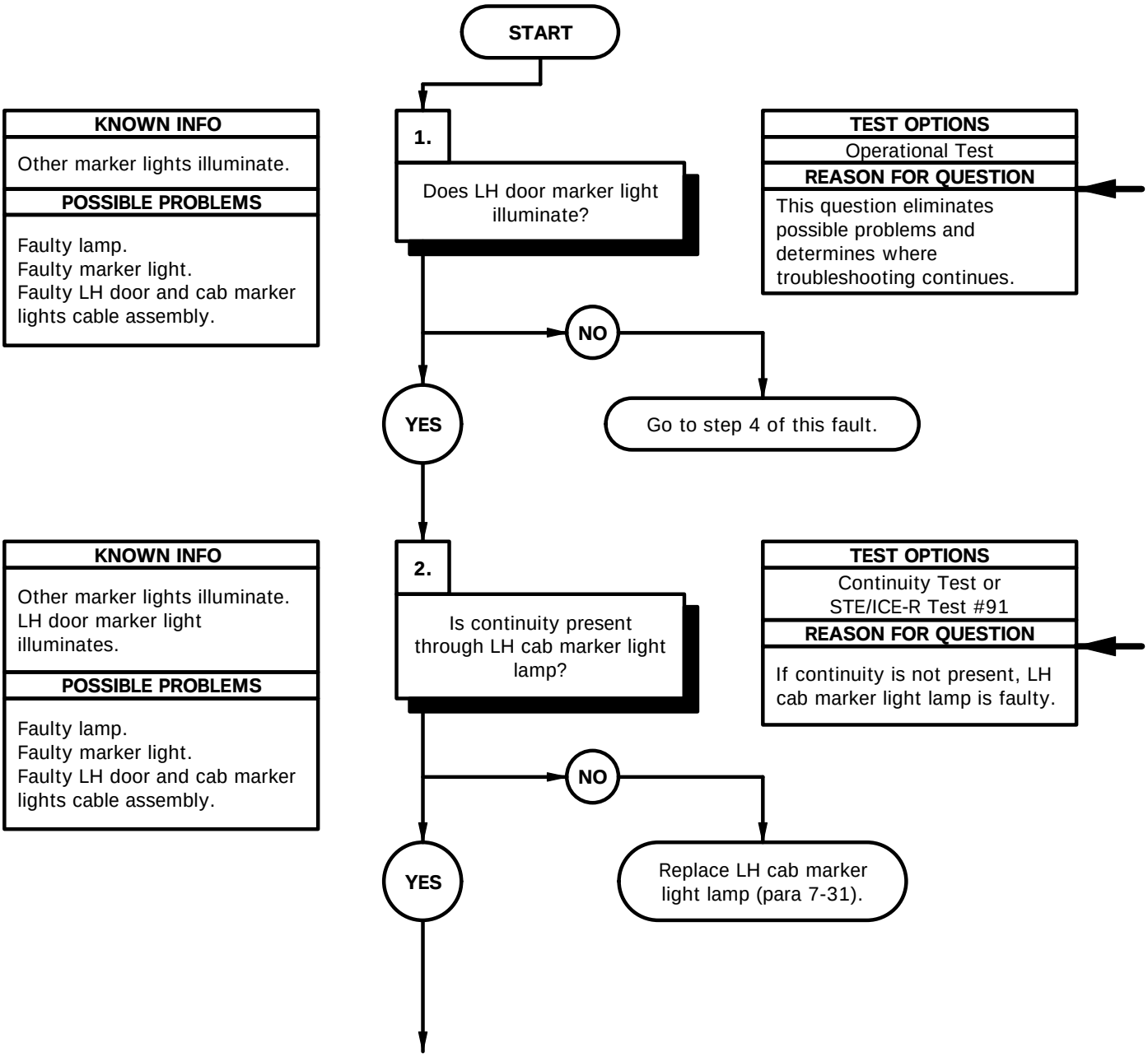
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Lockwasher (4) (Item 71, Appendix G)
Gasket (2) (Item 28, Appendix G)

**Personnel Required**
(2)

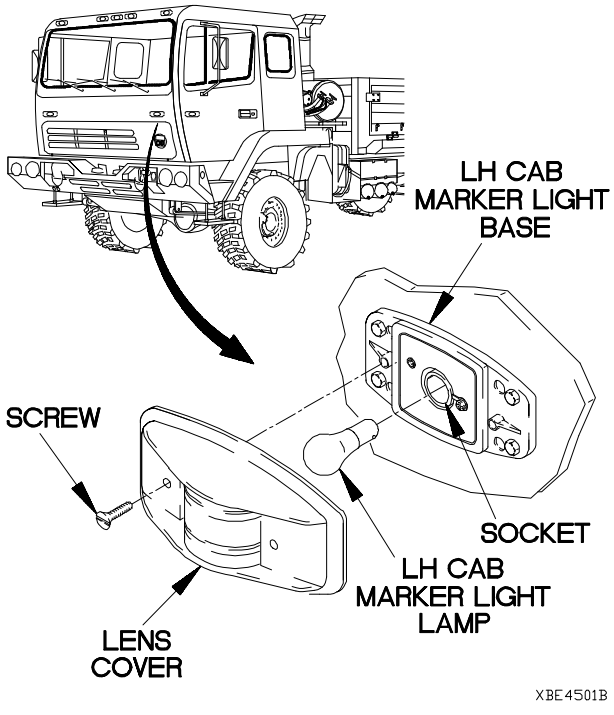
**References**
TM 9-4910-571-12&P



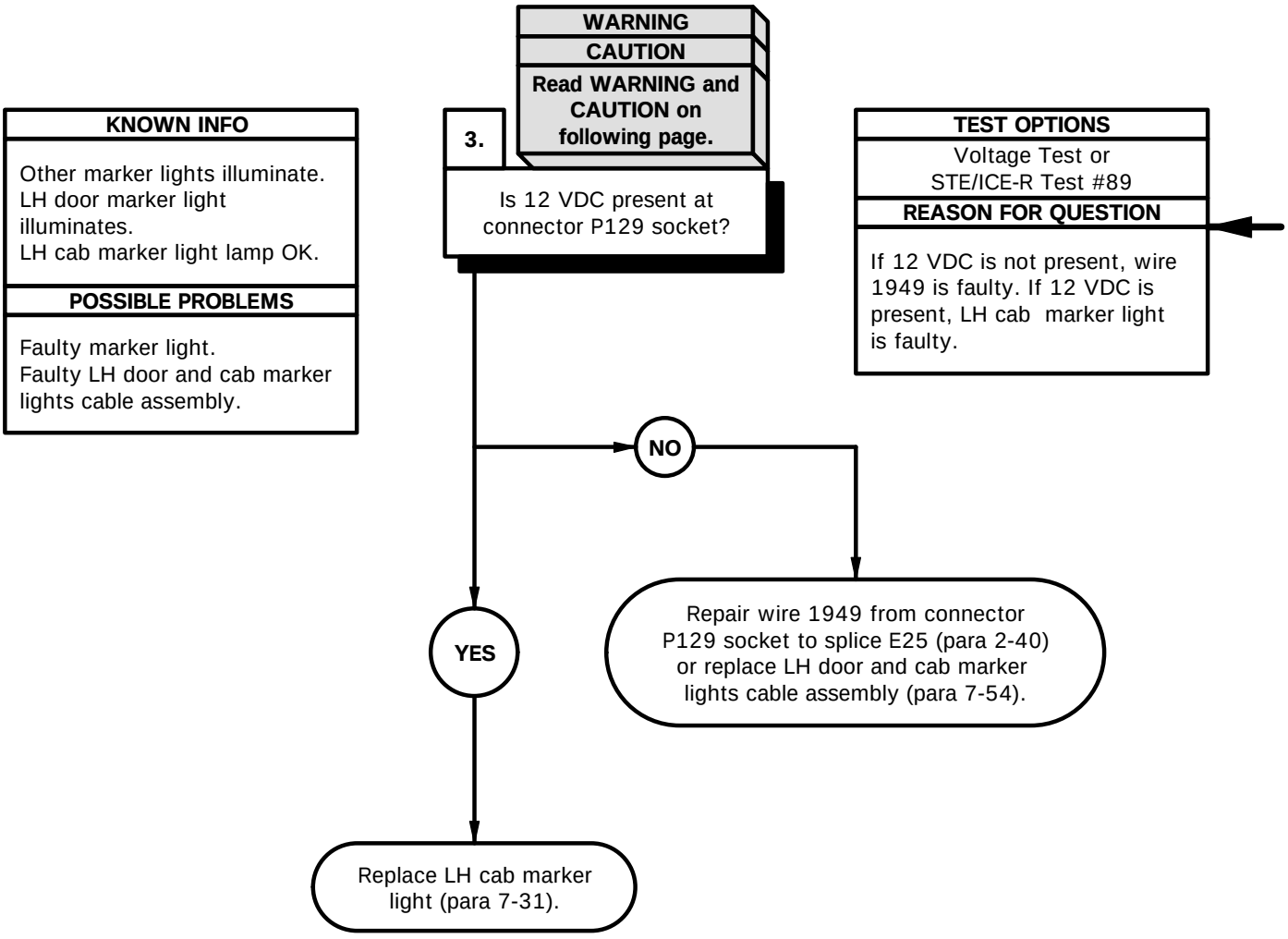
(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) If LH door marker light lamp does not illuminate, go to step 4 of this fault.
(3) Position main light switch to OFF (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH cab marker light base.
(2) Remove LH marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH marker light lamp (para 7-31).



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove four screws from LH cab marker light base.

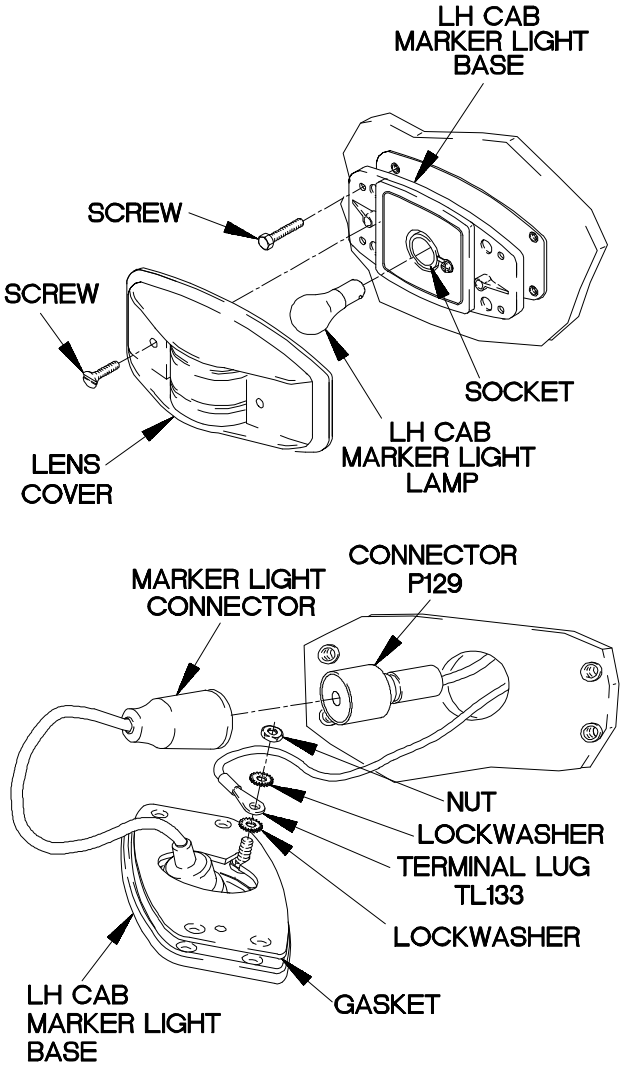
NOTE

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

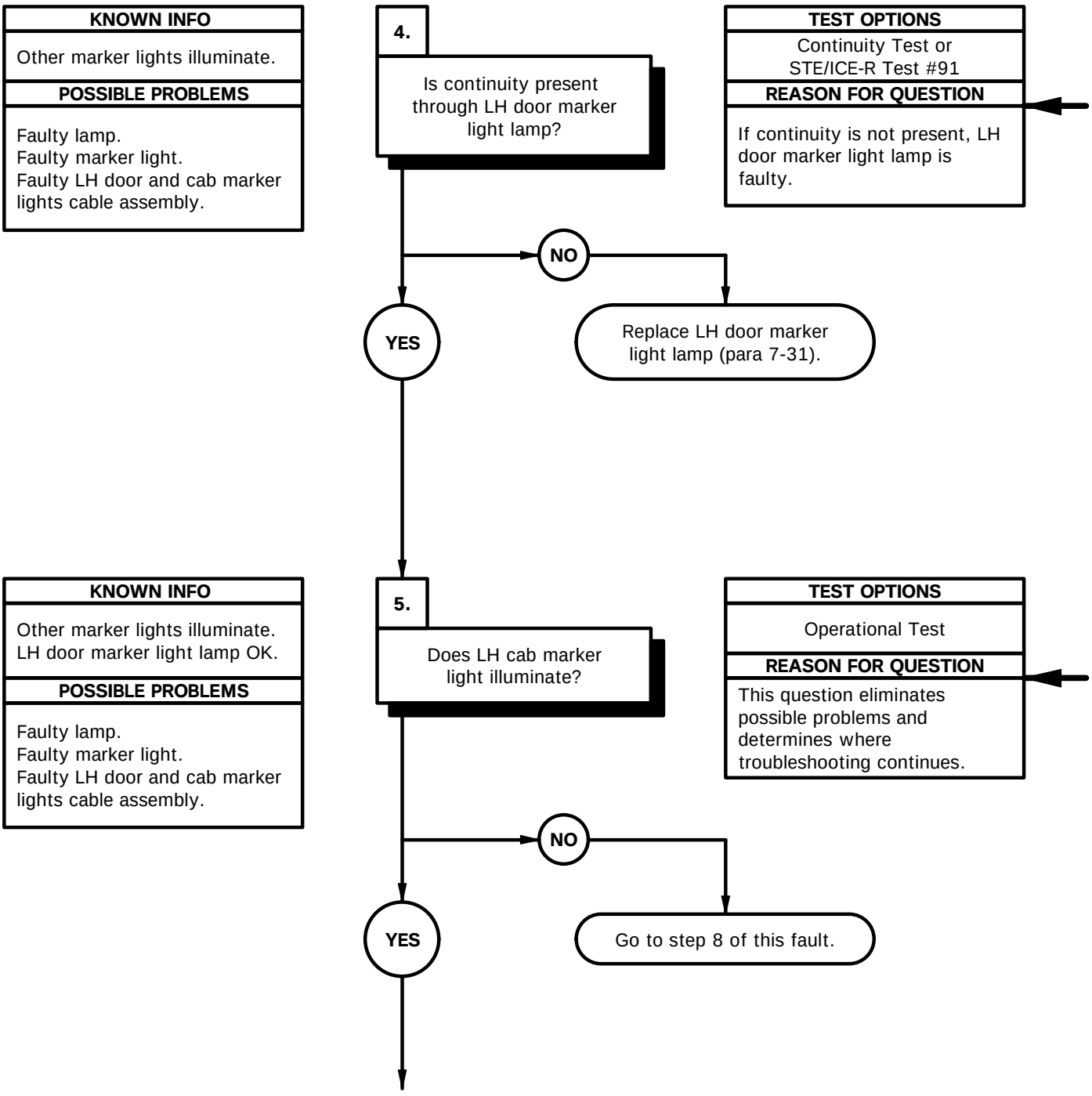
(2) Remove nut, lockwasher, terminal lug TL133, and lockwasher from LH cab marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P129 from marker light connector.
(4) Remove gasket from LH door marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector P129 socket.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 1949 from connector P129 socket to splice E25 (para 2-40) or replace LH door and cab marker lights cable assembly (para 7-54).
(10) If 12 VDC is present, replace LH cab marker light (para 7-31).
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Install gasket on LH cab marker light base.
(13) Connect marker light connector to connector P129.

**VOLTAGE TEST (Cont)**

(14) Install lockwasher, terminal lug TL133, lockwasher, and nut on back of LH cab marker light base.
(15) Install LH cab marker light base on vehicle with four screws.
(16) Install LH cab marker light lamp in socket.
(17) Install lens cover on base with two screws.

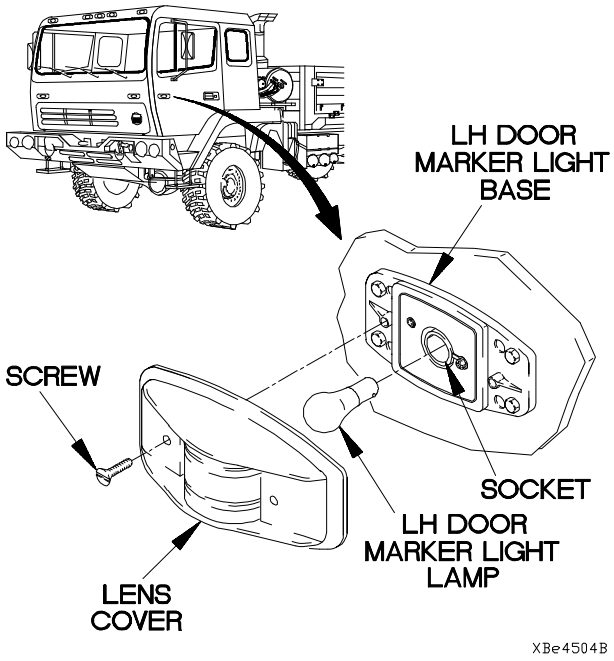


## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



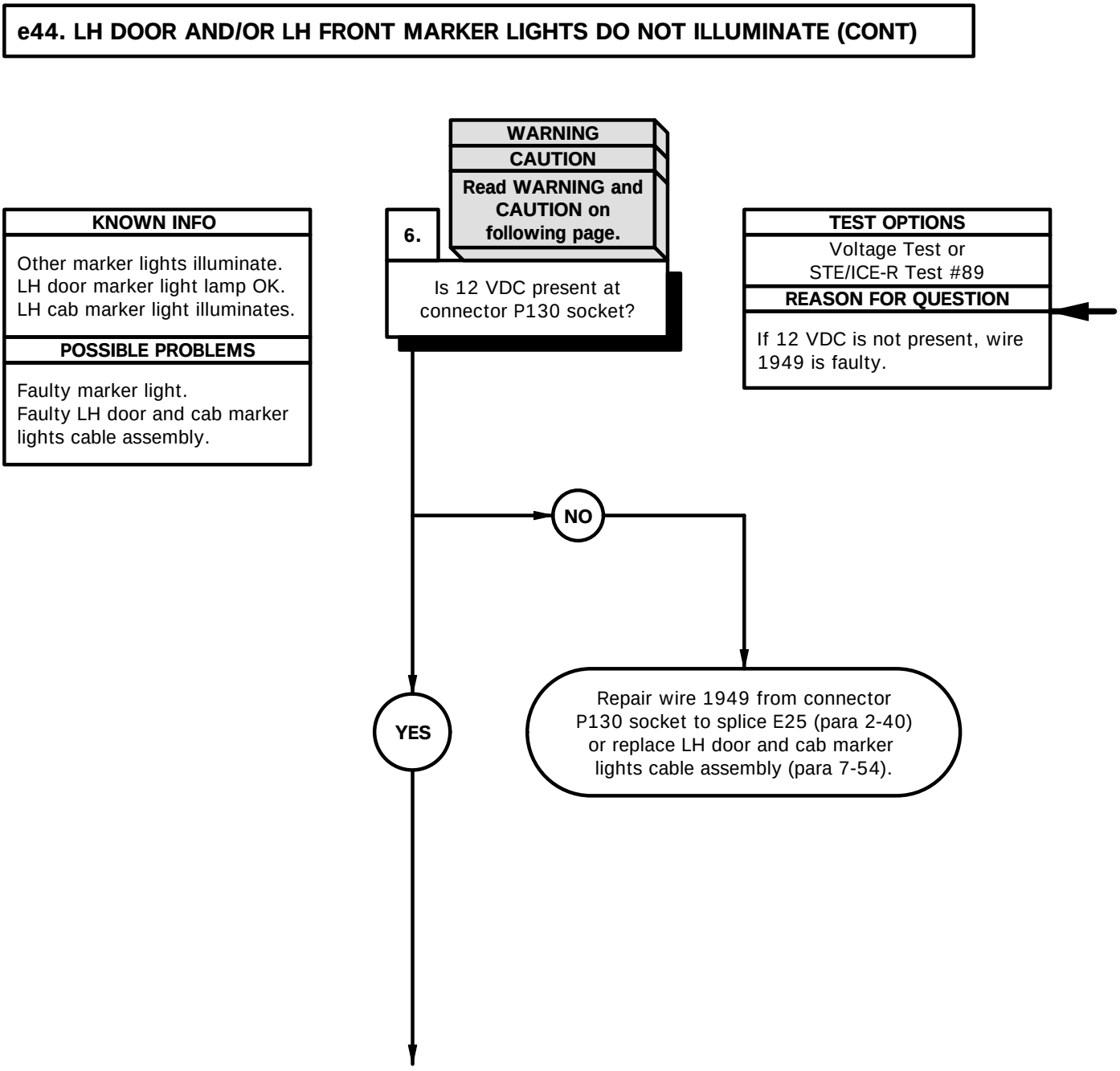
**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH door marker light base.
(2) Remove LH door marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH door marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH door marker light lamp (para 7-31).




(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) If LH cab marker light lamp does not illuminate, go to step 8 of this fault.
(3) Position main light switch to OFF (TM 9-2320-365-10).

## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

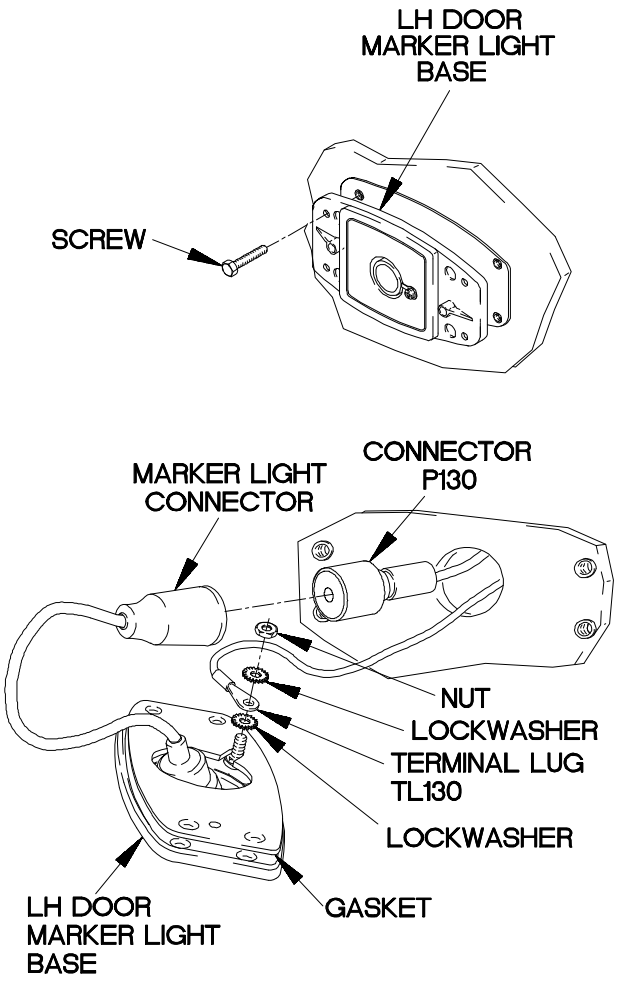
**VOLTAGE TEST**

(1) Remove four screws from LH door marker light base.

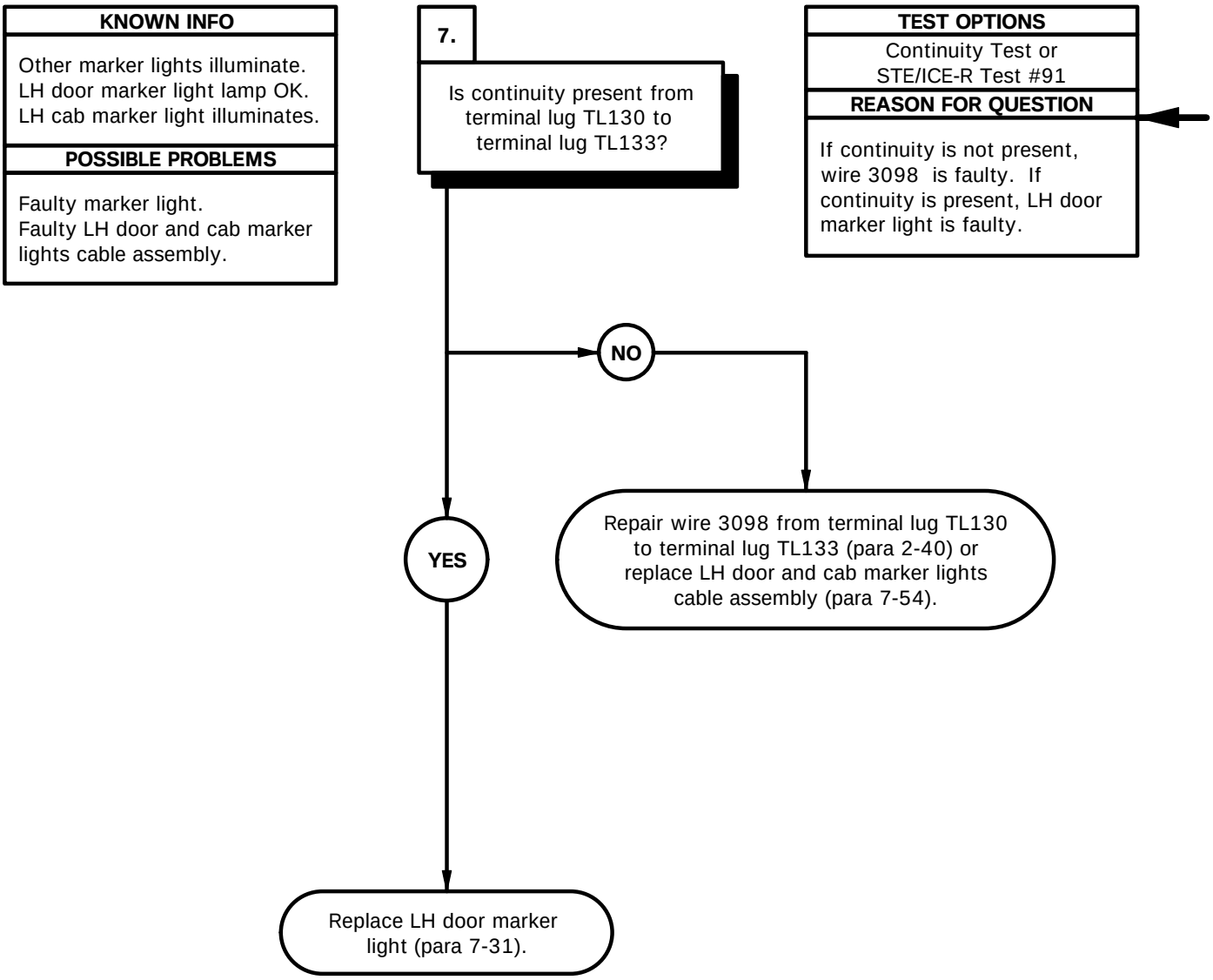
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(2) Remove nut, lockwasher, terminal lug TL130, and lockwasher from LH door marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P130 from marker light connector.
(4) Remove gasket from LH door marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector P130 socket.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 1949 from connector P130 socket to splice E25 (para 2-40) or replace LH door and cab marker lights cable assembly (para 7-54).
(10) Position main light switch to OFF (TM 9-2320-365-10).



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



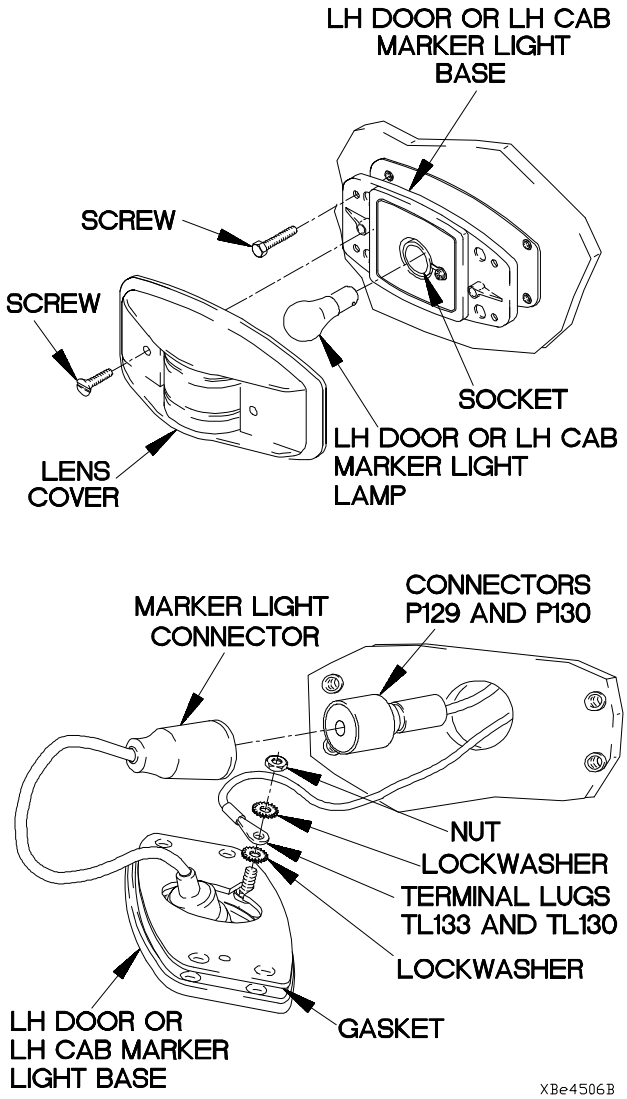
**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH cab marker light base.
(2) Remove LH cab marker light lamp from socket.
(3) Remove four screws from LH cab marker light base.

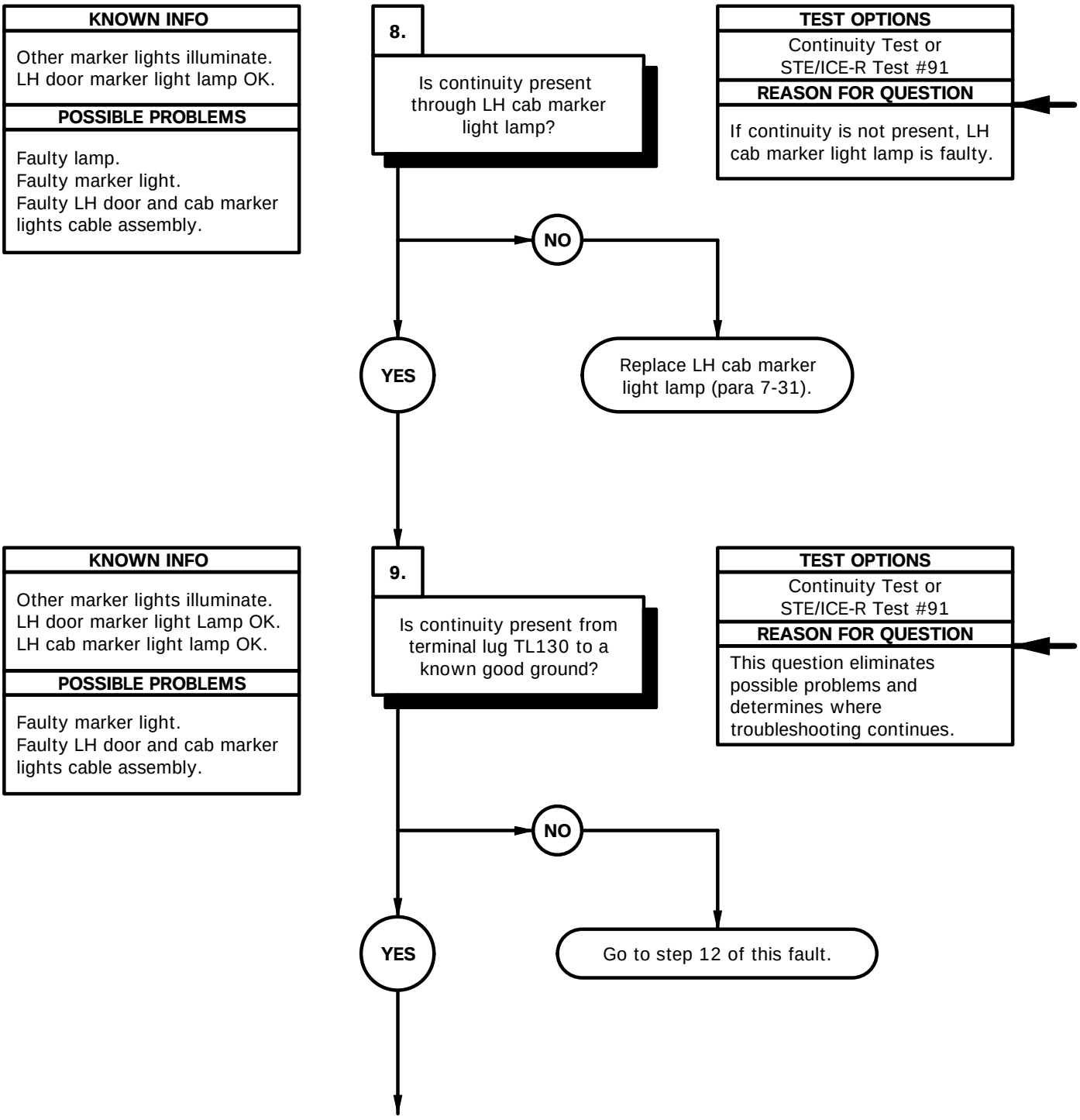
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(4) Remove nut, lockwasher, terminal lug TL133, and lockwasher from LH cab marker light base. Discard lockwashers.
(5) Extend base and disconnect connector P129 from marker light connector.
(6) Remove gasket from LH cab marker light base. Discard gasket.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to terminal lug TL130.
(9) Connect negative (-) probe of multimeter to terminal lug TL133 and note reading on multimeter.
(10) If continuity is not present, repair wire 3098 from terminal lug TL130 to terminal lug TL133 (para 2-40) or replace LH door and cab marker lights cable assembly (para 7-54).
(11) If continuity is present, replace LH door marker light (para 7-31).
(12) Install gasket on LH cab marker light base.
(13) Connect marker light connector to connector P129.
(14) Install lockwasher, terminal lug TL133, lockwasher, and nut on back of LH cab marker light base.
(15) Install LH cab marker light base on vehicle with four screws.
(16) Install LH cab marker light lamp in socket.
(17) Install lens cover on base with two screws.
(18) Install gasket on LH door marker light base.
(19) Connect marker light connector to connector P130.
(20) Install lockwasher, terminal lug TL130, lockwasher, and nut on back of base.
(21) Install LH door marker light base on vehicle with four screws.
(22) Install LH door marker light lamp in socket.
(23) Install lens cover on base with two screws.



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH cab marker light base.
(2) Remove LH cab marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH cab marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH cab marker light lamp (para 7-31).

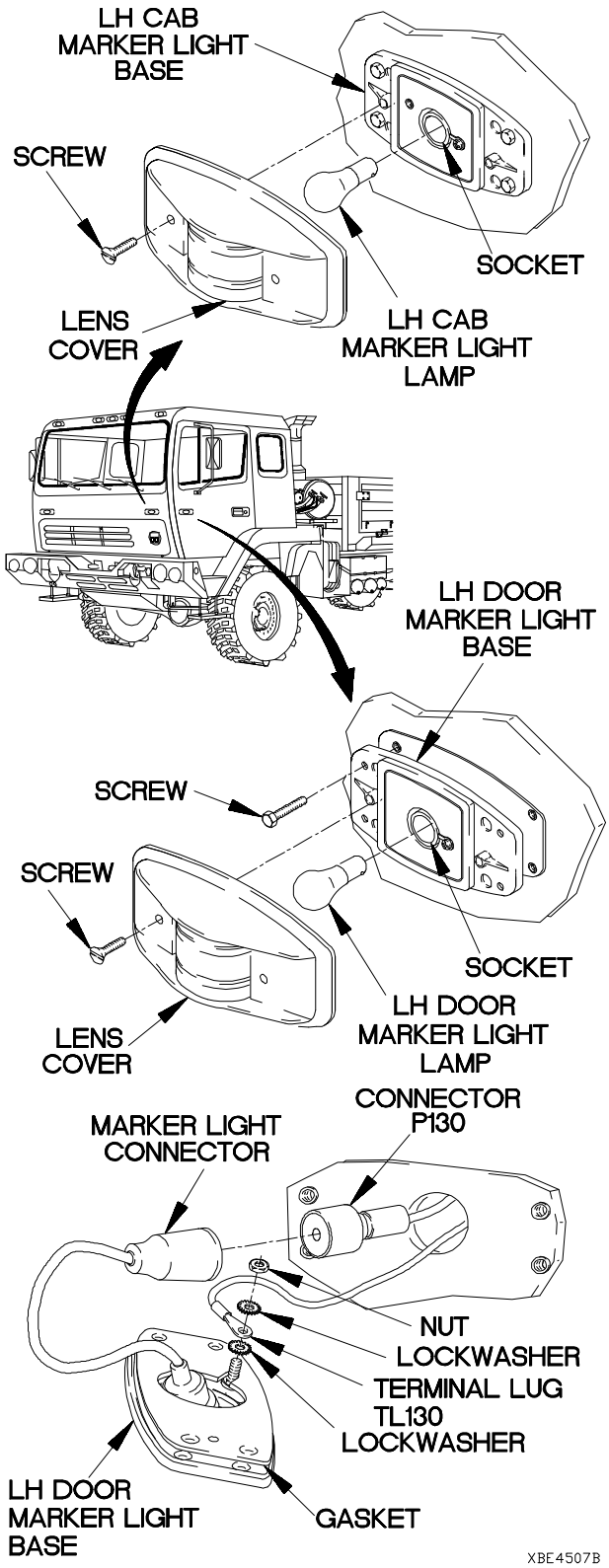
**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH door marker light base.
(2) Remove LH door marker light lamp from socket.
(3) Remove four screws from LH door marker light.

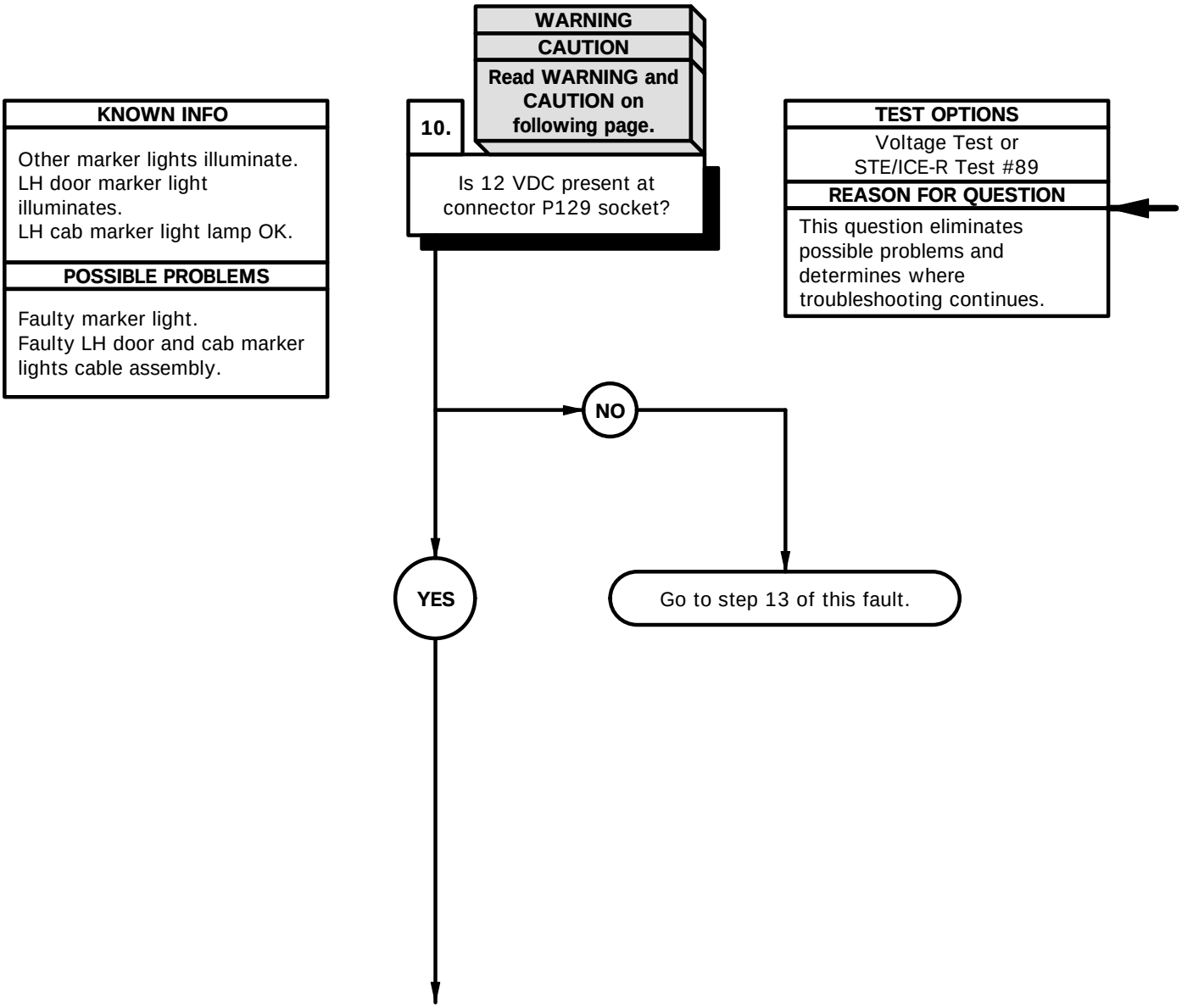
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(4) Remove nut, lockwasher, terminal lug TL130, and lockwasher from LH door marker light base. Discard lockwashers.
(5) Extend base and disconnect connector P130 from marker light connector.
(6) Remove gasket from LH door marker light base. Discard gasket.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to terminal lug TL130.
(9) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(10) If continuity is not present, go to step 12 of this fault.



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove four screws from LH cab marker light base.

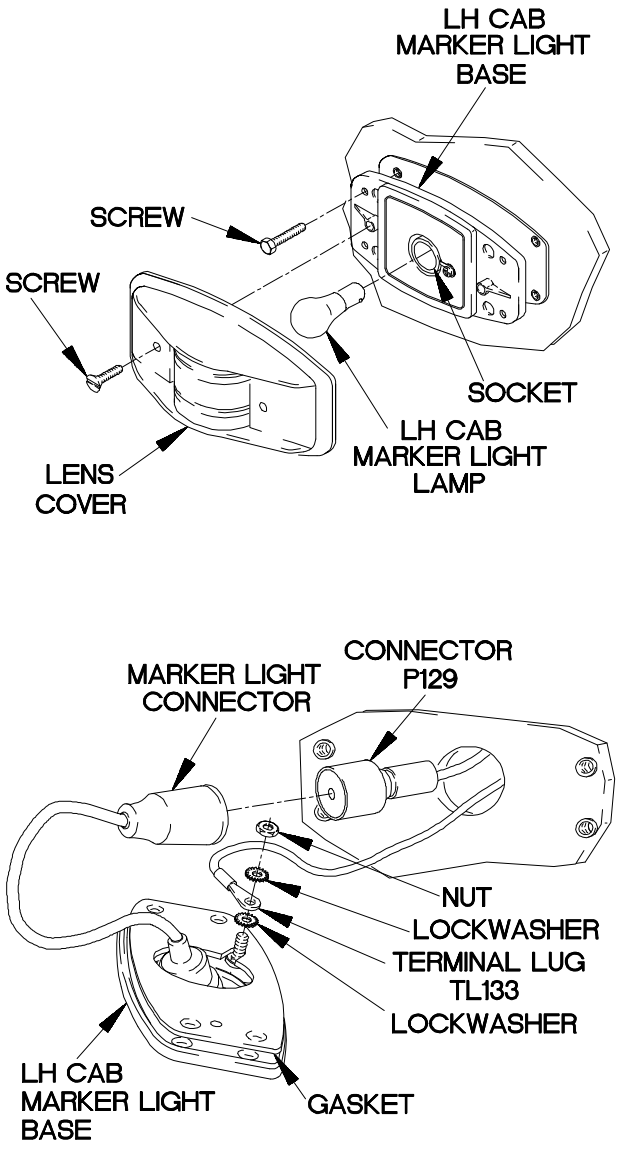
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

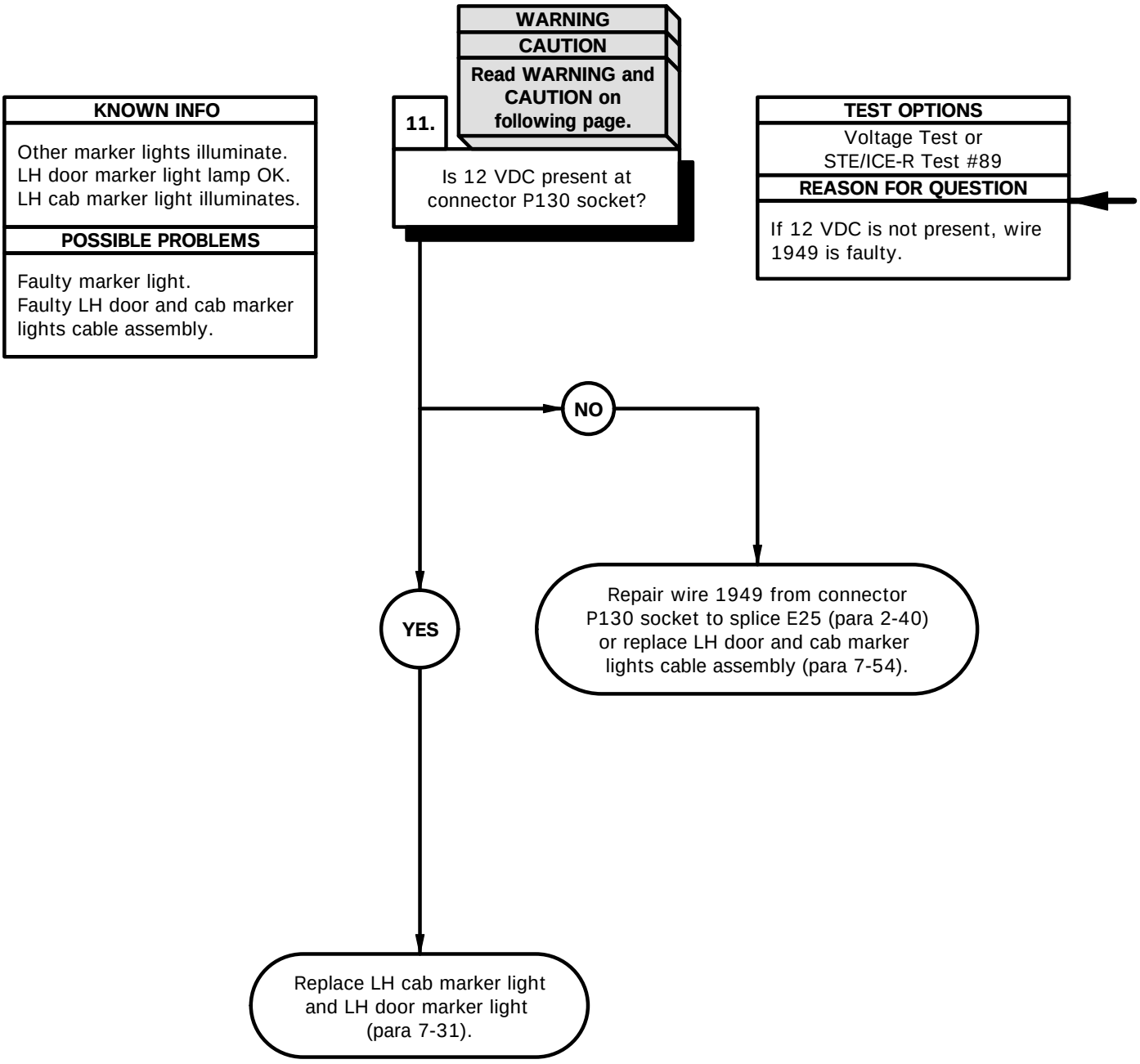
(2) Remove nut, lockwasher, terminal lug TL133, and lockwasher from LH cab marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P129 from marker light connector.
(4) Remove gasket from LH cab marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector P129 socket.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, go to step 13 of this fault.
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Install gasket on LH cab marker light base.
(12) Connect marker light connector to connector P129.
(13) Install lockwasher, terminal lug TL133, lockwasher, and nut on back of LH cab marker light base.

**VOLTAGE TEST (Cont)**

(14) Install LH cab marker light base on vehicle with four screws.
(15) Install LH cab marker light lamp in socket.
(16) Install lens cover on base with two screws.



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

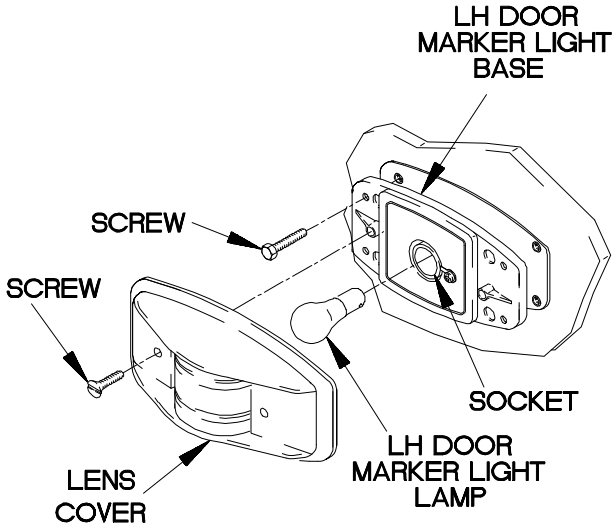
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

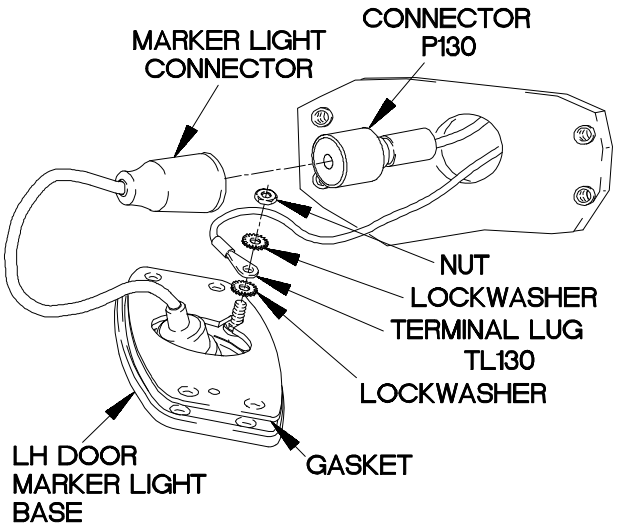
**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

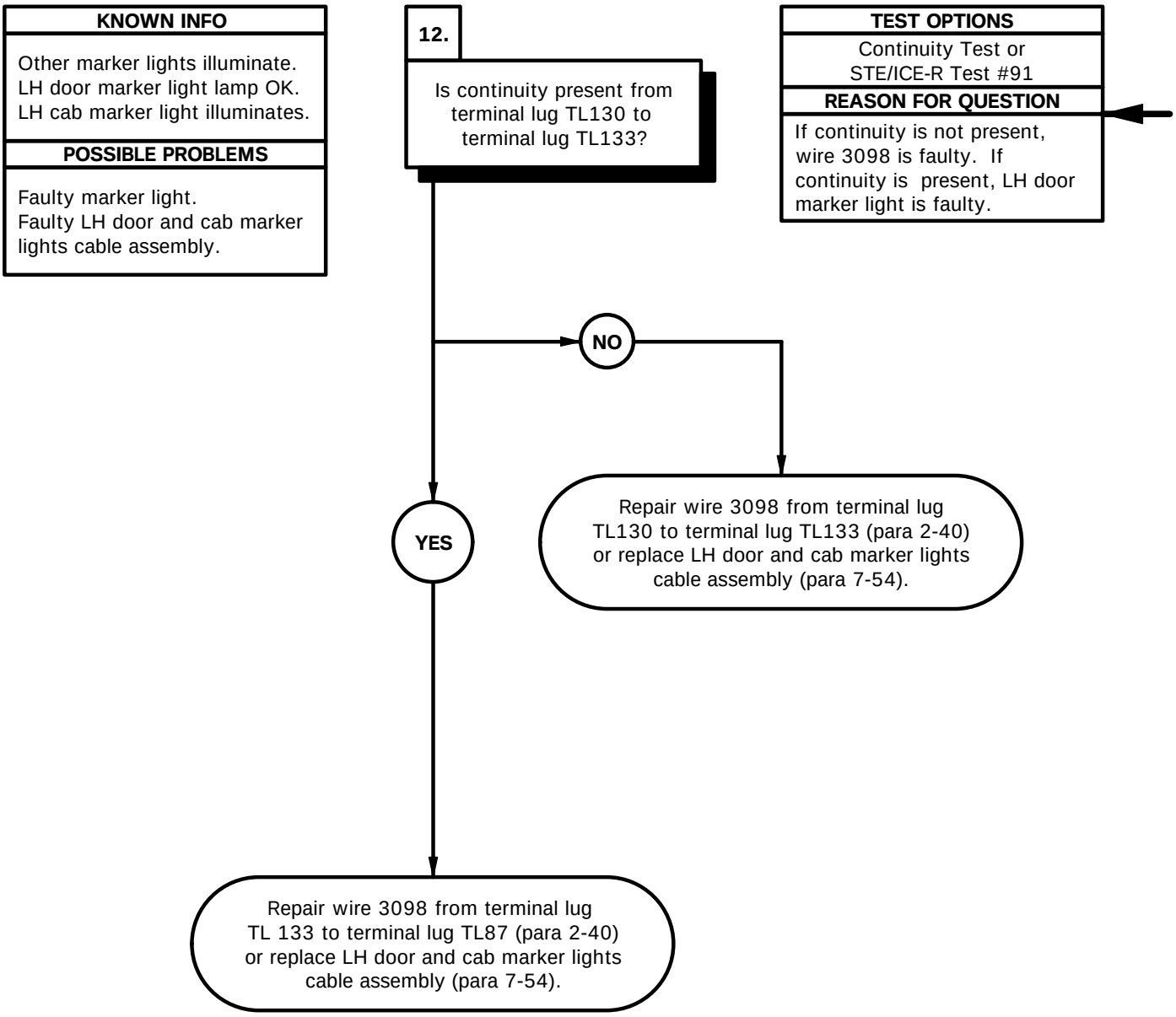
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector P130 socket.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1949 from connector P130 socket to splice E25 (para 2-40) or replace LH door and cab marker lights cable assembly (para 7-54).
(6) If 12 VDC is present, replace LH cab marker light and LH door marker light (para 7-31).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Install gasket on LH door marker light base.
(9) Connect marker light connector to connector P130.
(10) Install lockwasher, terminal lug TL130, lockwasher, and nut on back of LH door marker light base.
(11) Install LH door marker light base on vehicle with four screws.
(12) Install LH door marker light lamp in socket.
(13) Install lens cover on base with two screws.




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## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



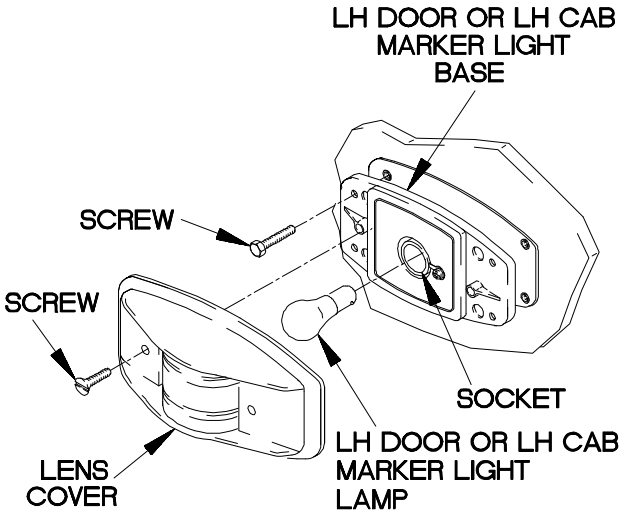
**CONTINUITY TEST**

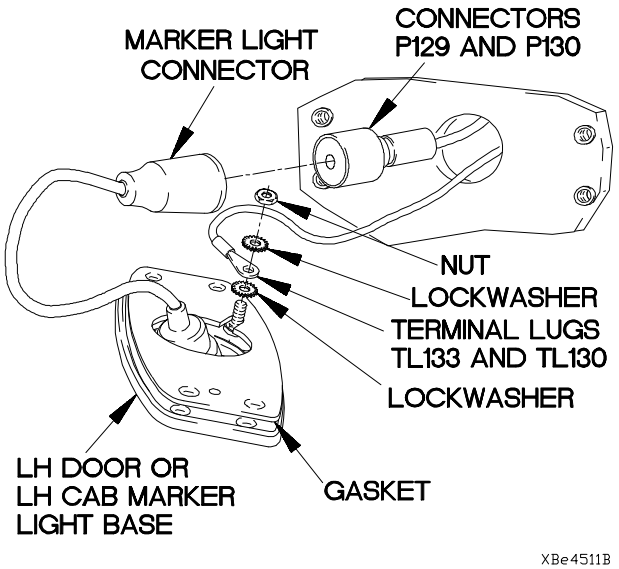
(1) Remove four screws from LH cab marker light base.

**NOTE**

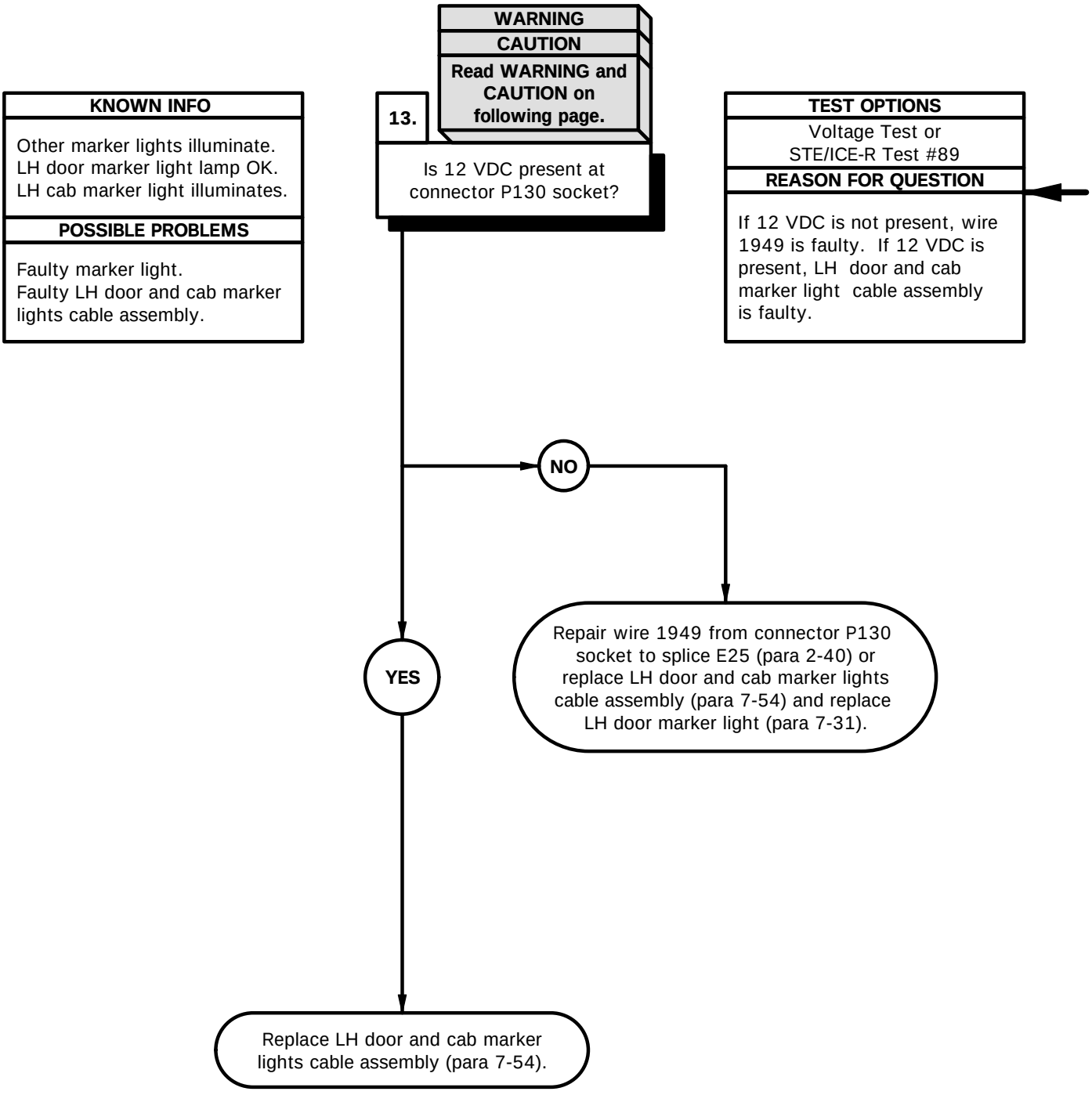
Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(2) Remove nut, lockwasher, terminal lug TL133, and lockwasher from LH cab marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P129 from marker light connector.
(4) Remove gasket from LH cab marker light base. Discard gasket.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to terminal lug TL130.
(7) Connect negative (-) probe of multimeter to terminal lug TL133 and note reading on multimeter.
(8) If continuity is not present, repair wire 3098 from terminal lug TL130 to terminal lug TL133 (para 2-40) or replace LH door and cab marker lights cable assembly (para 7-54).
(9) If continuity is present, replace LH door marker light (para 7-31).
(10) Install gasket on LH cab marker light base.
(11) Connect marker light connector to connector P129.
(12) Install lockwasher, terminal lug TL133, lockwasher, and nut on back of LH cab marker light base.
(13) Install LH cab marker light base on vehicle with four screws.
(14) Install LH cab marker light lamp in socket.
(15) Install lens cover on base with two screws.
(16) Install gasket on LH door marker light base.
(17) Connect marker light connector to connector P130.
(18) Install lockwasher, terminal lug TL130, lockwasher, and nut on back of LH door marker light base.
(19) Install LH door marker light base on vehicle with four screws.
(20) Install LH door marker light lamp in socket.
(21) Install lens cover on base with two screws.



## e44. LH DOOR AND/OR LH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

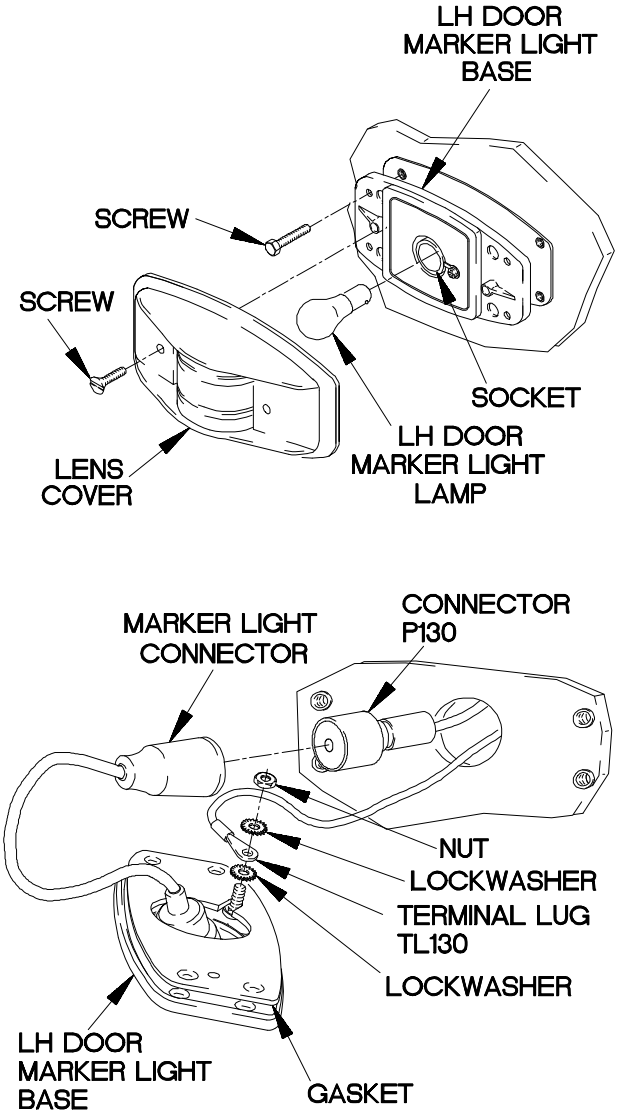
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector P130 socket.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1949 from connector P130 socket to splice E25 (para 2-40) or replace LH door and cab marker lights cable assembly (para 7-54) and replace LH door marker light (para 7-31).
(6) If 12 VDC is present, replace LH door and cab marker light cable assembly (para 7-54).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Install gasket on LH door marker light base.
(9) Connect marker light connector to connector P130.
(10) Install lockwasher, terminal lug TL130, lockwasher, and nut on back of LH door marker light base.
(11) Install LH door marker light base on vehicle with four screws.
(12) Install LH door marker light lamp in socket.
(13) Install lens cover on base with two screws.



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

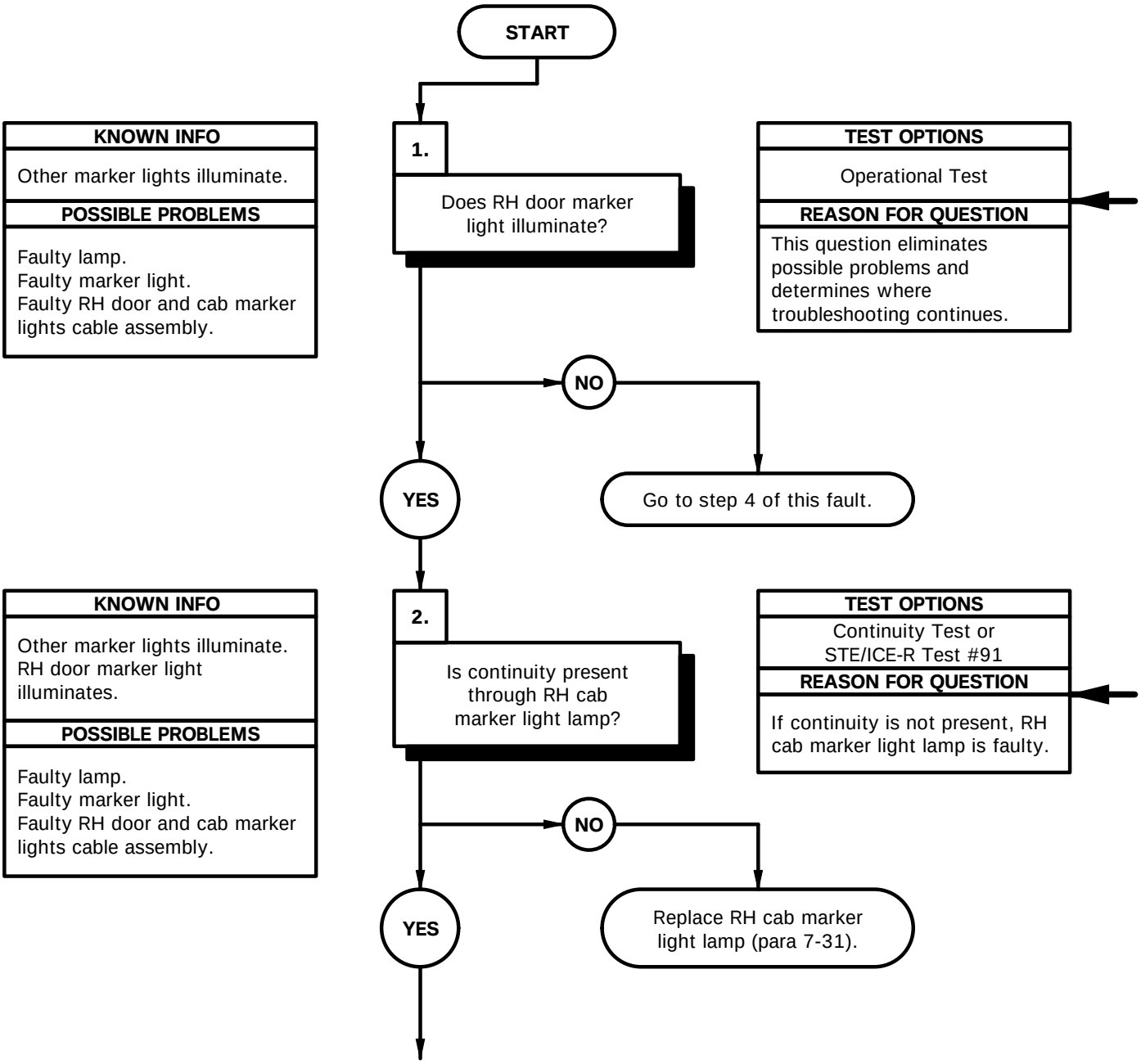
**Equipment Conditions**
Engine shut down (TM 9-23230-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Lockwasher (4) (Item 70, Appendix G)
Gasket (2) (Item 23, Appendix G)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICR-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

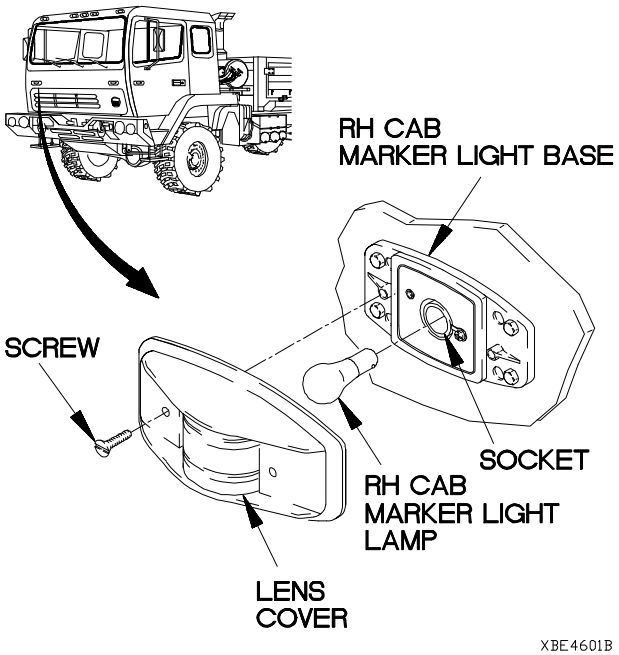
**References**
TM 9-4910-571-12&P



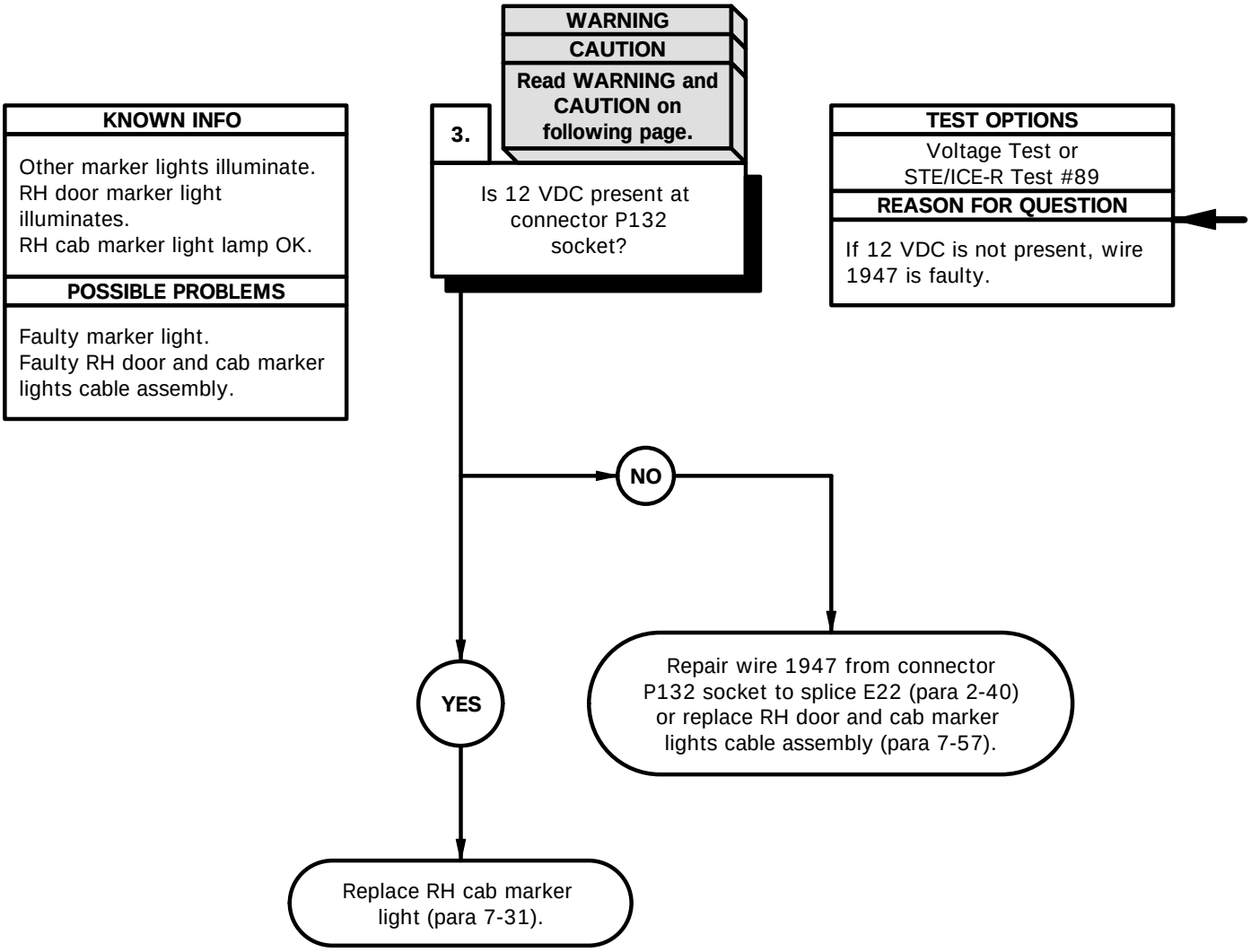
(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) If RH door marker light lamp does not illuminate, go to step 4 of this fault.
(3) Position main light switch to OFF (TM 9-2320-365-10).

CONTINUITY TEST

(1) Remove two screws and lens cover from RH cab marker light base.
(2) Remove RH cab marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace RH cab marker light lamp (para 7-31).



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove four screws from RH cab marker light base.

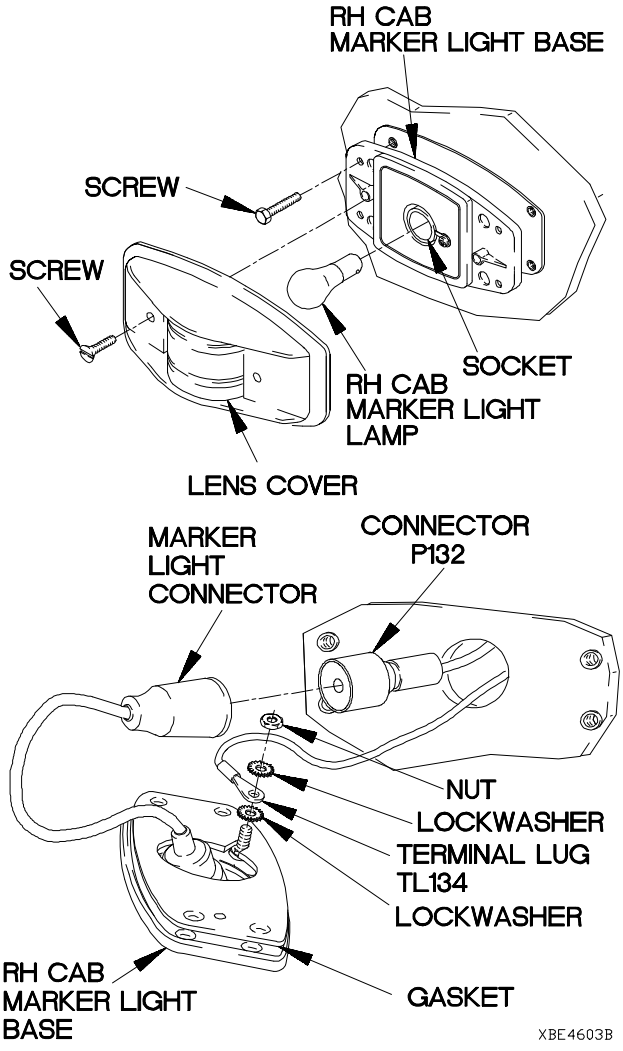
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

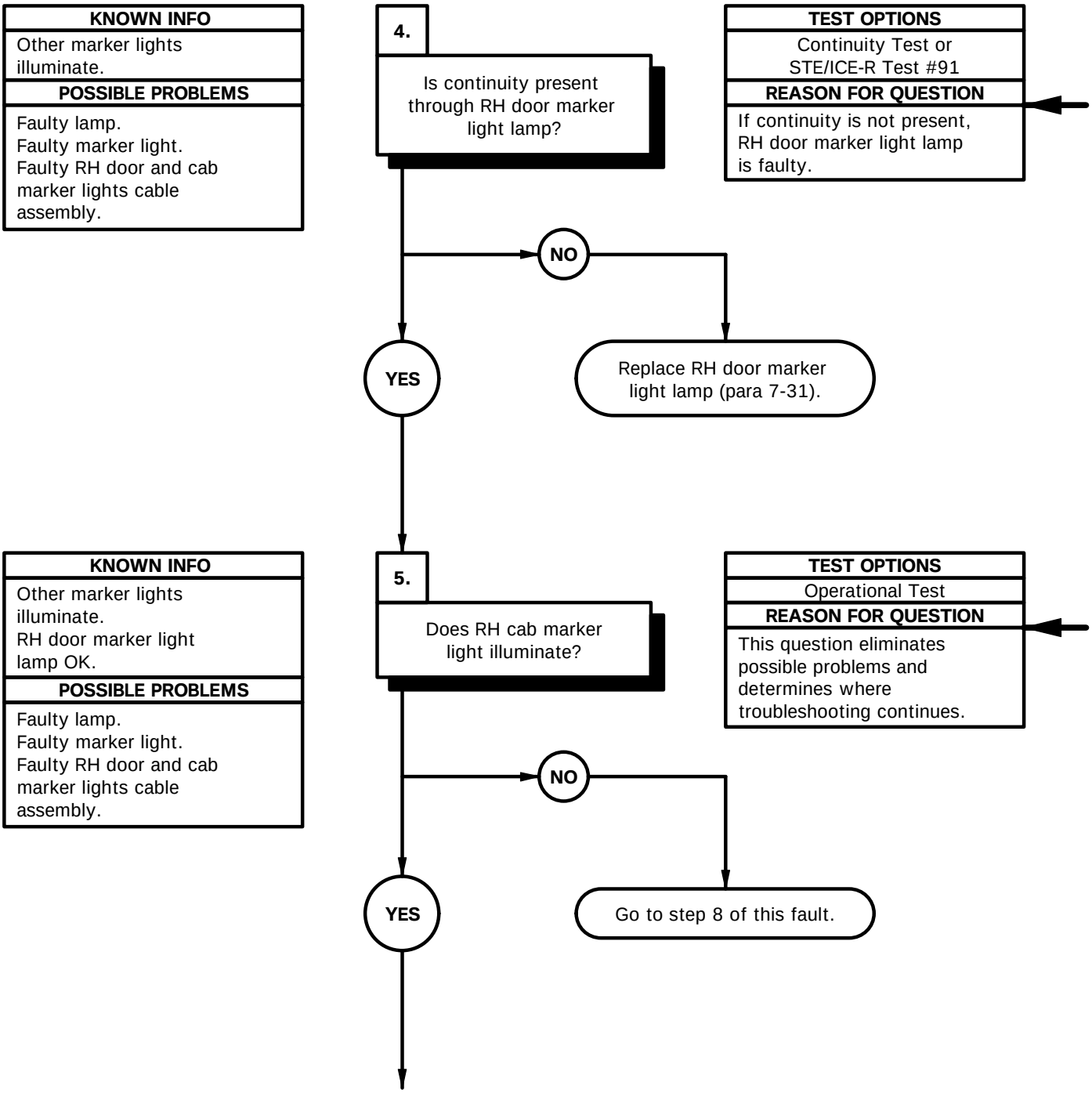
(2) Remove nut, lockwasher, terminal lug TL134, and lockwasher from RH cab marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P132 from marker light connector.
(4) Remove gasket from RH cab marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector P132 socket.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 1947 from connector P132 socket to splice E22 (para 2-40) or replace RH door and cab marker lights cable assembly (para 7-57).
(10) If 12 VDC is present, replace RH cab marker light (para 7-31).
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Install gasket on RH cab marker light base.
(13) Connect marker light connector to connector P132.

**VOLTAGE TEST (Cont)**

(14) Install lockwasher, terminal lug TL134, lockwasher, and nut on back of RH cab marker light base.
(15) Install RH cab marker light base on vehicle with four screws.
(16) Install RH cab marker light lamp in socket.
(17) Install lens cover on base with two screws.

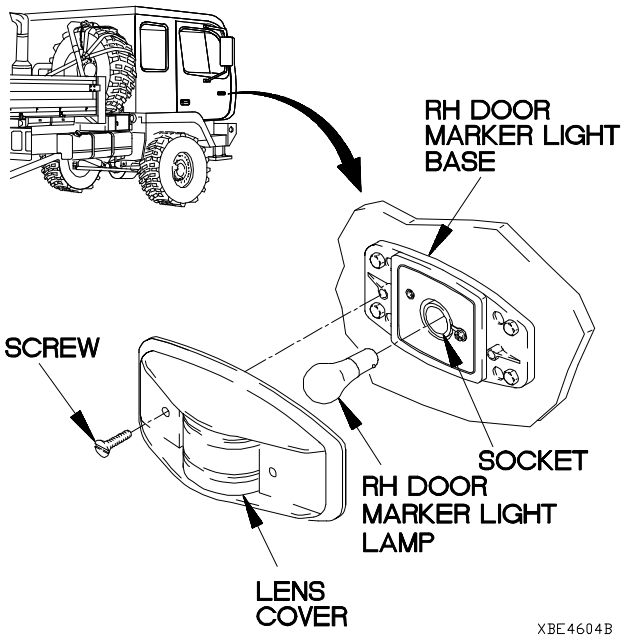


## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



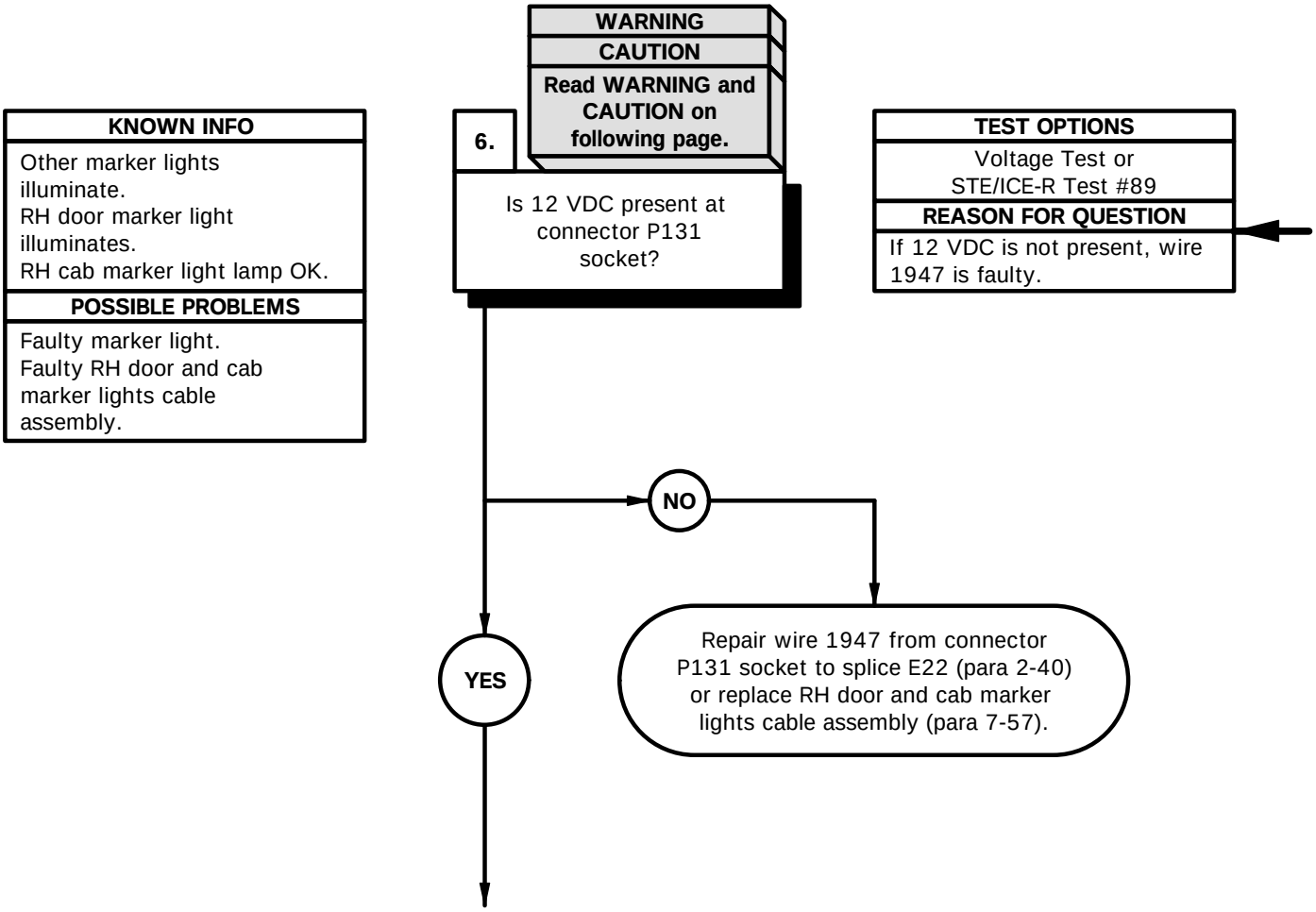
**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH door marker light base.
(2) Remove RH door marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH door marker light lamp and note reading on multimeter.
(5) If continuity is present, replace RH door marker light lamp (para 7-31).




(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) If RH cab marker light lamp does not illuminate, go to step 8 of fault.
(3) Position main light switch to OFF (TM 9-2320-365-10).

## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

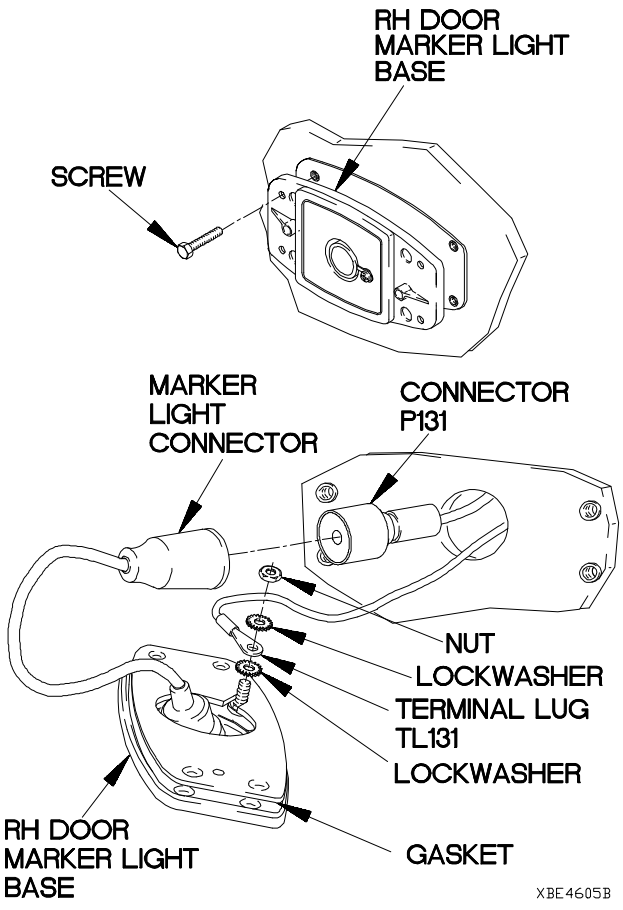
**VOLTAGE TEST**

(1) Remove four screws from RH door marker light base.

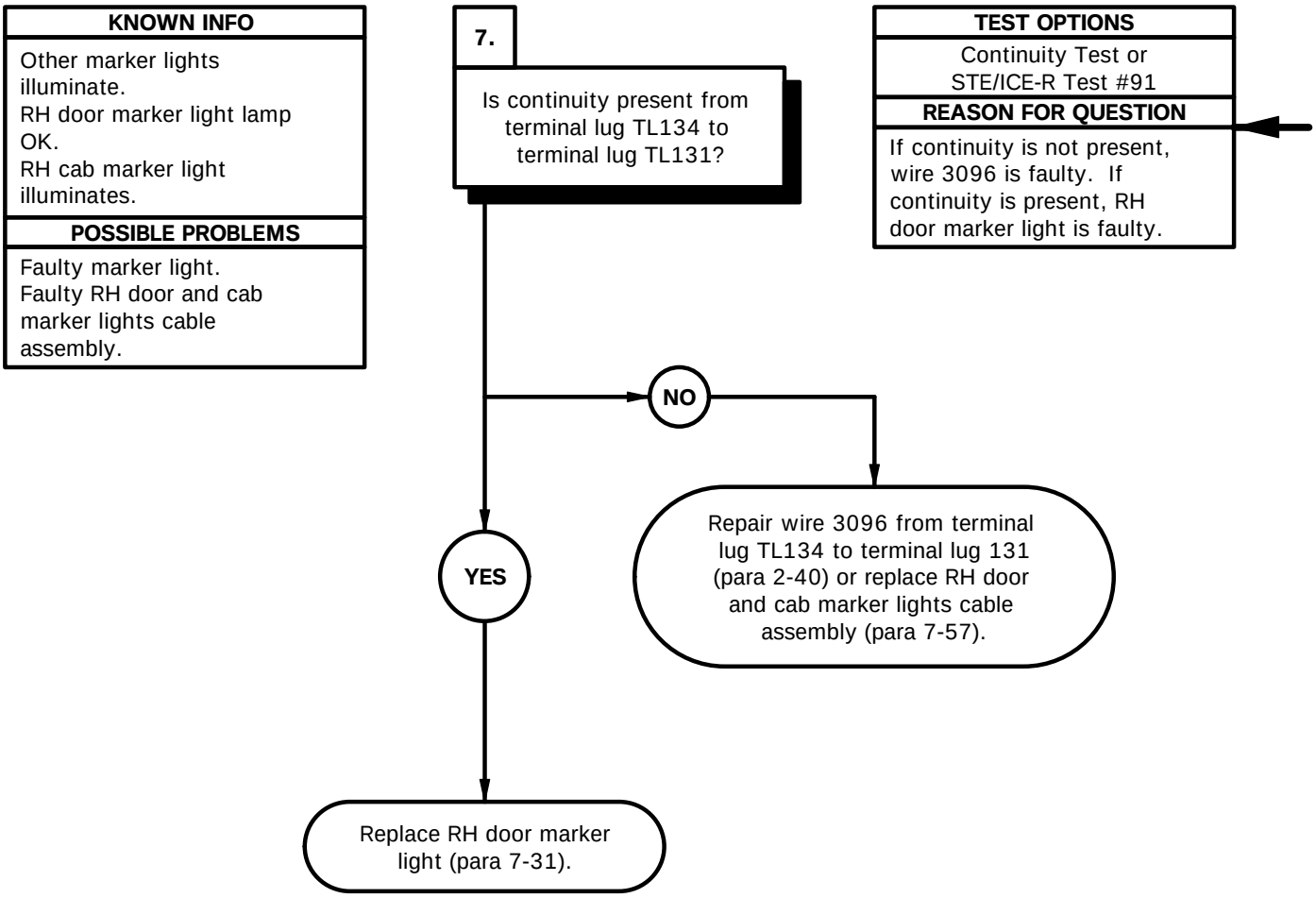
NOTE

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(2) Remove nut, lockwasher, terminal lug TL131, and lockwasher from RH door marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P131 from marker light connector.
(4) Remove gasket from RH door marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector P131 socket.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 1947 from connector P131 socket to splice E22 (para 2-40) or replace RH door and cab marker lights cable assembly (para 7-57).
(10) Position main light switch to OFF (TM 9-2320-365-10).



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



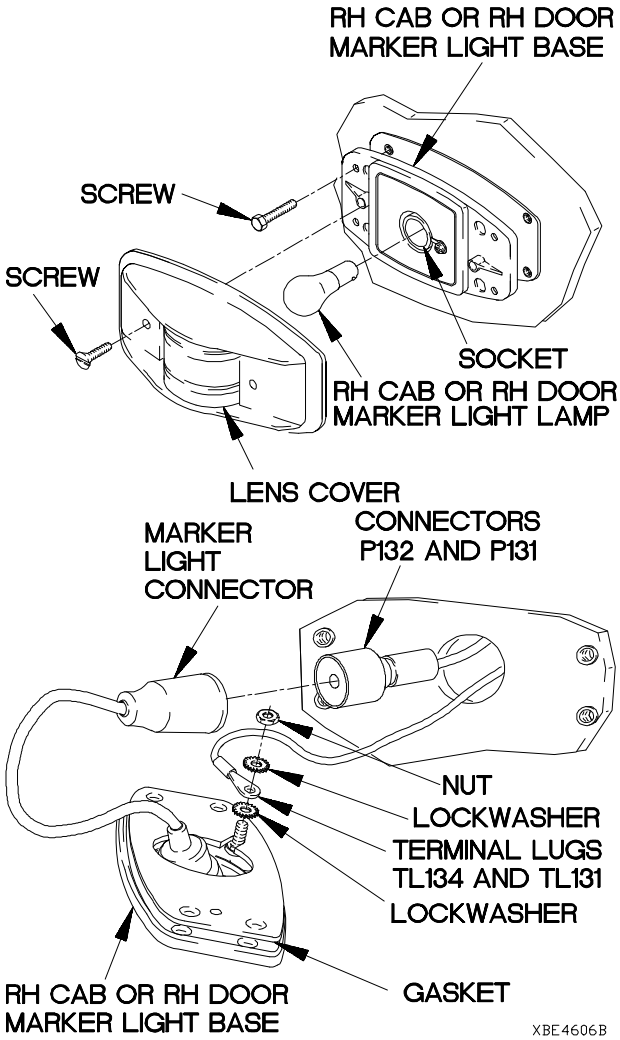
**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH cab marker light base.
(2) Remove RH cab marker light lamp from socket.
(3) Remove four screws from RH cab marker light base.

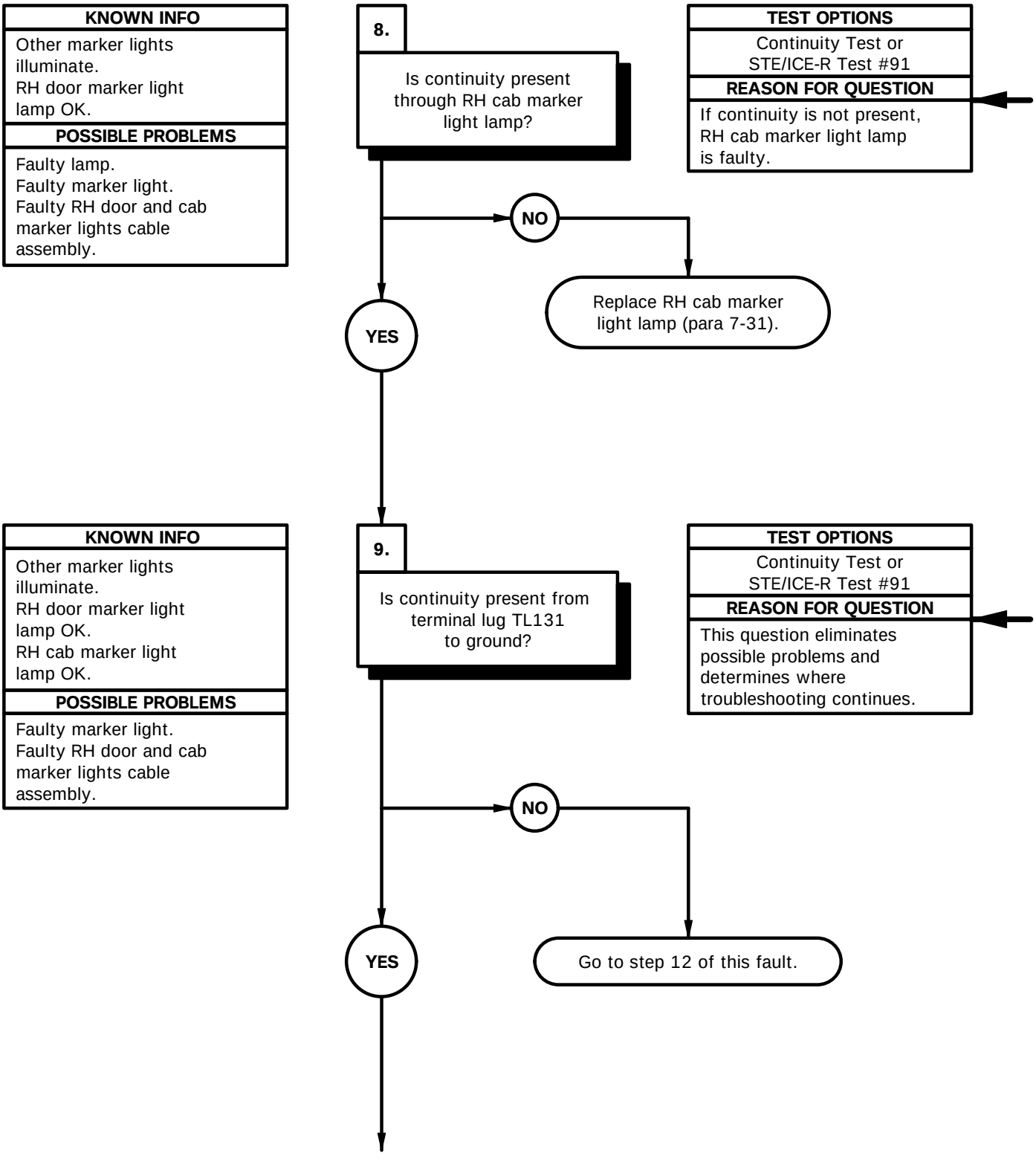
NOTE

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(4) Remove nut, lockwasher, terminal lug TL134, and lockwasher from RH cab marker light base. Discard lockwashers.
(5) Extend base and disconnect connector P132 from marker light connector.
(6) Remove gasket from RH cab marker light base. Discard gasket.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to terminal lug TL131.
(9) Connect negative (-) probe of multimeter to terminal lug TL134 and note reading on multimeter.
(10) If continuity is not present, repair wire 3096 from terminal lug TL131 to terminal lug TL134 (para 2-40) or replace RH door and cab marker lights cable assembly (para 7-57).
(11) If continuity is present, replace RH door marker light (para 7-31).
(12) Install gasket on RH cab marker light base.
(13) Connect marker light connector to connector P132.
(14) Install lockwasher, terminal lug TL134, lockwasher, and nut on back of RH cab marker light base.
(15) Install RH cab marker light base on vehicle with four screws.
(16) Install RH cab marker light lamp in socket.
(17) Install lens cover on base with two screws.
(18) Install gasket on RH cab marker light base.
(19) Connect marker light connector to connector P131.
(20) Install lockwasher, terminal lug TL131, lockwasher, and nut on back of base.
(21) Install RH door marker light base on vehicle with four screws.
(22) Install RH door marker light lamp in socket.
(23) Install lens cover on base with two screws.



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH cab marker light base.
(2) Remove RH cab marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH cab marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace RH cab marker light lamp (para 7-31).

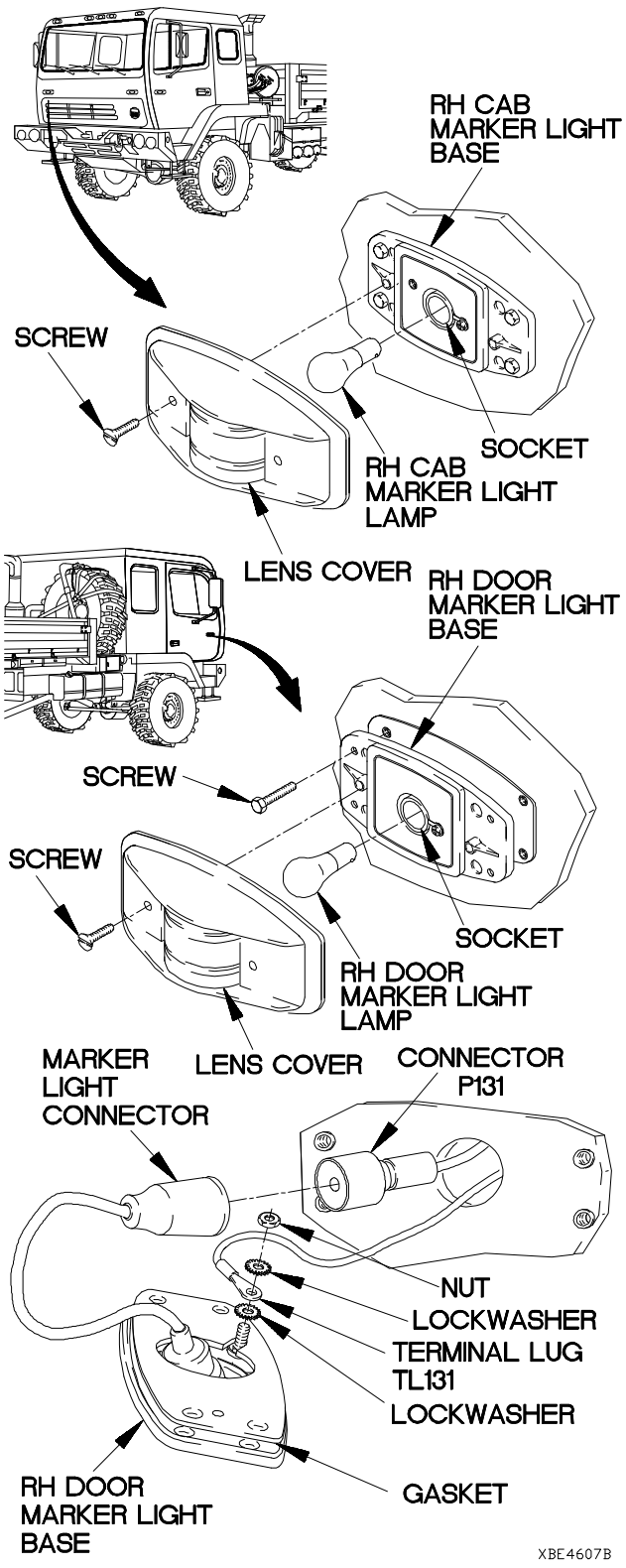
**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH door marker light base.
(2) Remove RH door marker light lamp from socket.
(3) Remove four screws from RH door marker light.

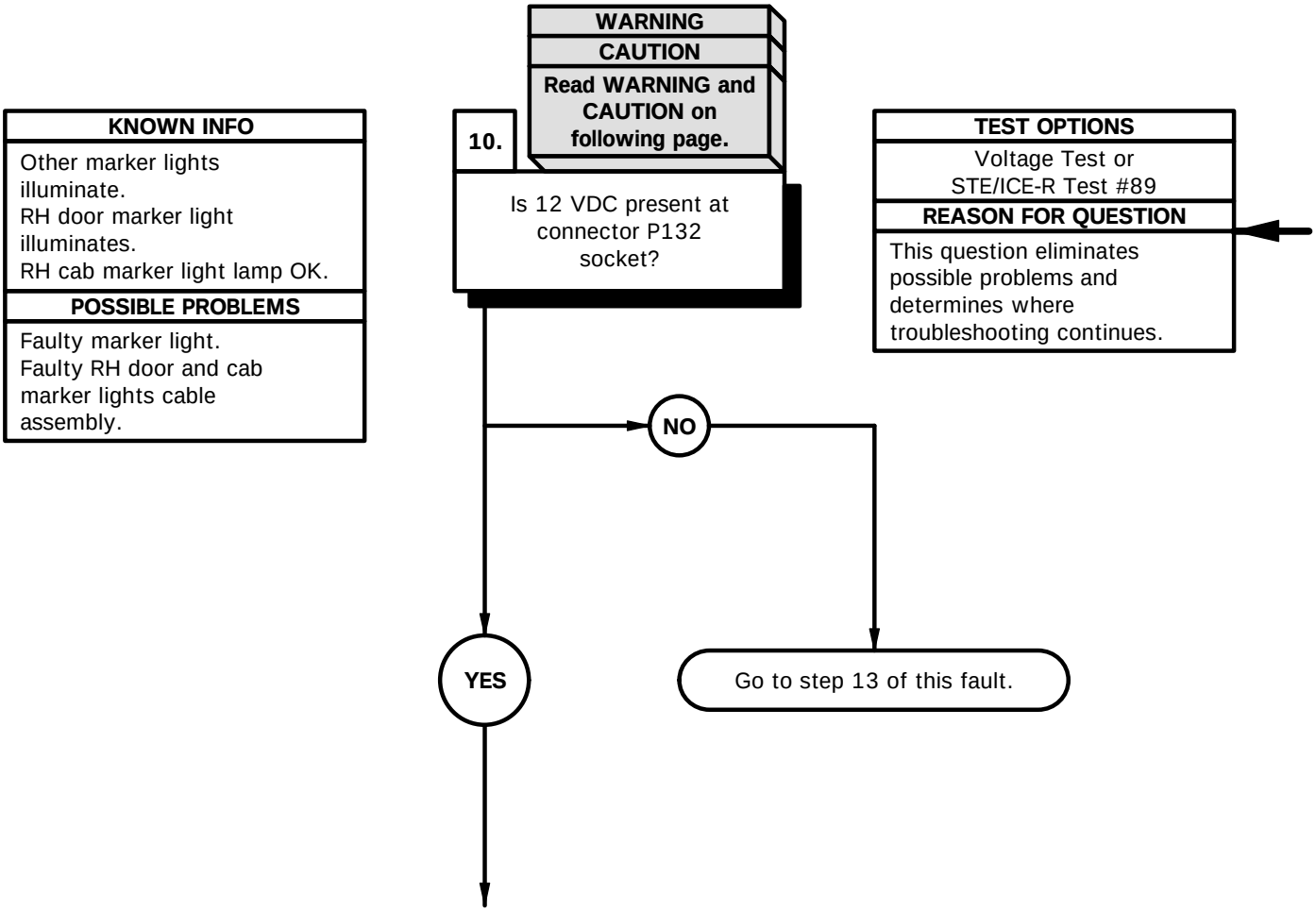
NOTE

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(4) Remove nut, lockwasher, terminal lug TL131, and lockwasher from RH door marker light base. Discard lockwashers.
(5) Extend base and disconnect connector P131 from marker light connector.
(6) Remove gasket from RH door marker light base. Discard gasket.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to terminal lug TL131.
(9) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(10) If continuity is not present from terminal lug TL131 to ground, go to step 12 of this fault.



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove four screws from RH cab marker light base.

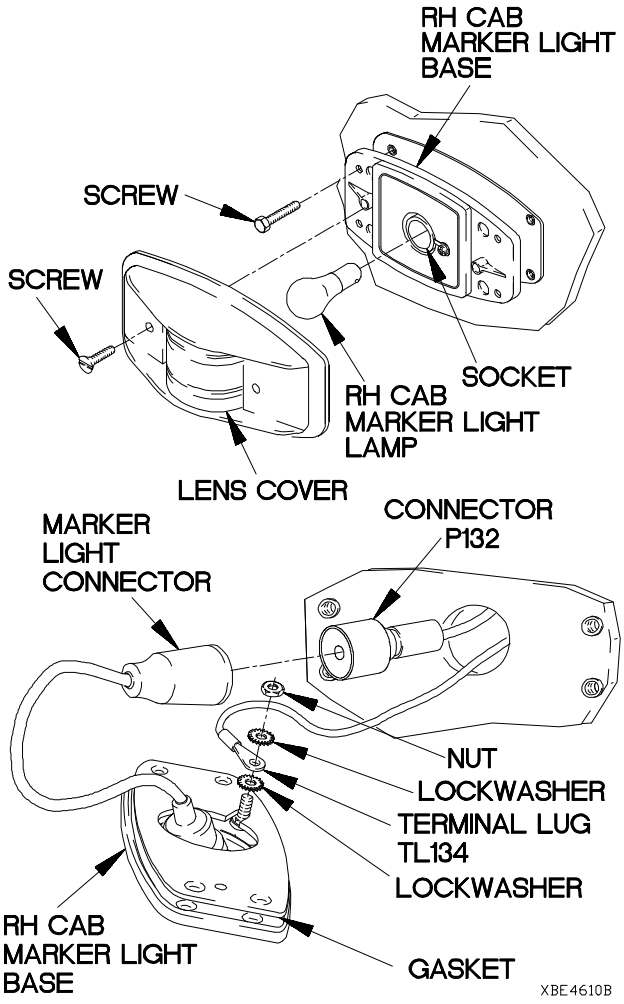
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

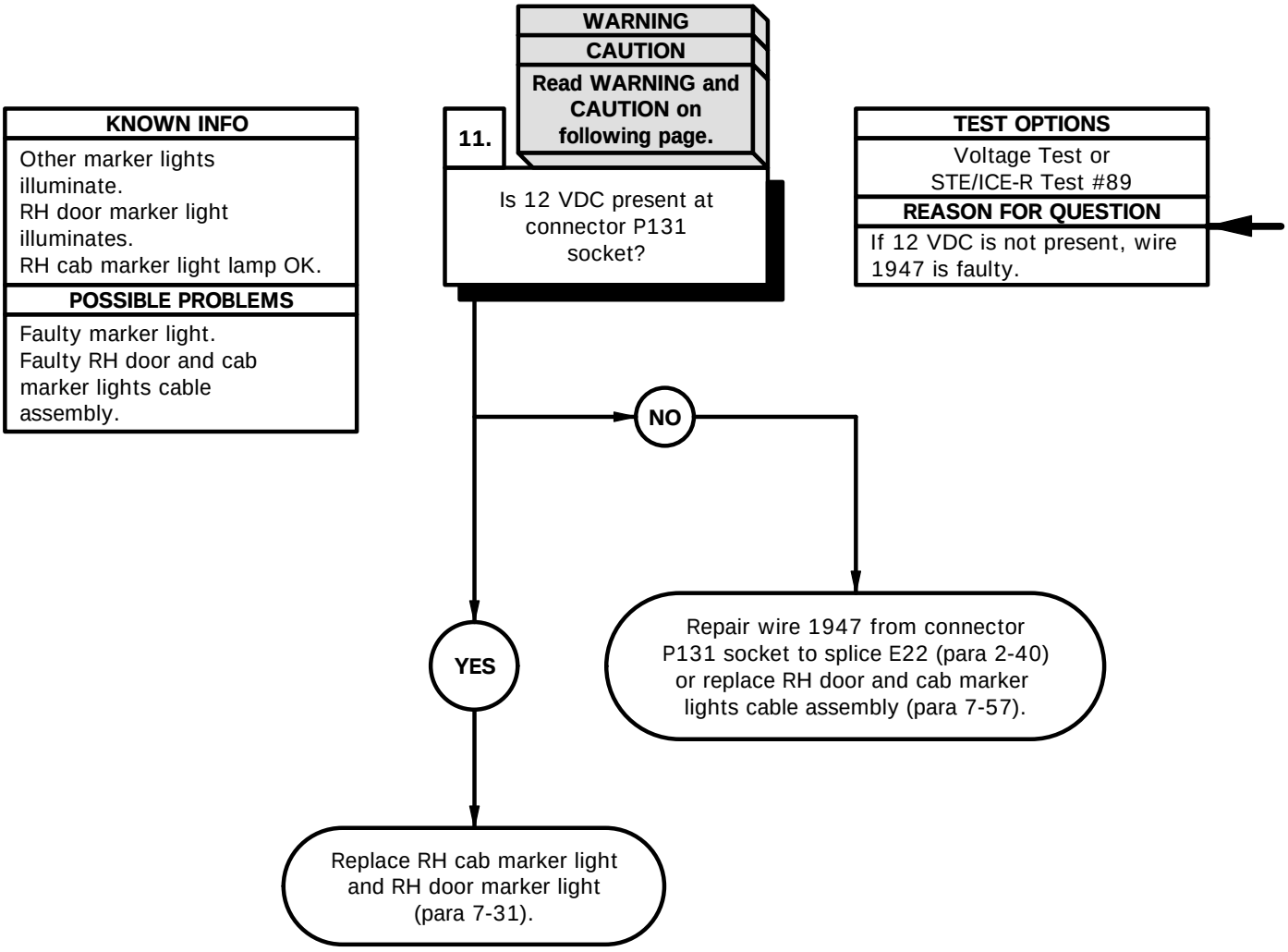
(2) Remove nut, lockwasher, terminal lug TL134, and lockwasher from RH cab marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P132 from marker light connector.
(4) Remove gasket from RH cab marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector P132 socket.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, go to step 13 of this fault.
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Install gasket on RH cab marker light base.
(12) Connect marker light connector to connector P132.
(13) Install lockwasher, terminal lug TL134, lockwasher, and nut on back of RH cab marker light base.

**VOLTAGE TEST (Cont)**

(14) Install RH cab marker light base on vehicle with four screws.
(15) Install RH cab marker light lamp in socket.
(16) Install lens cover on base with two screws.



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

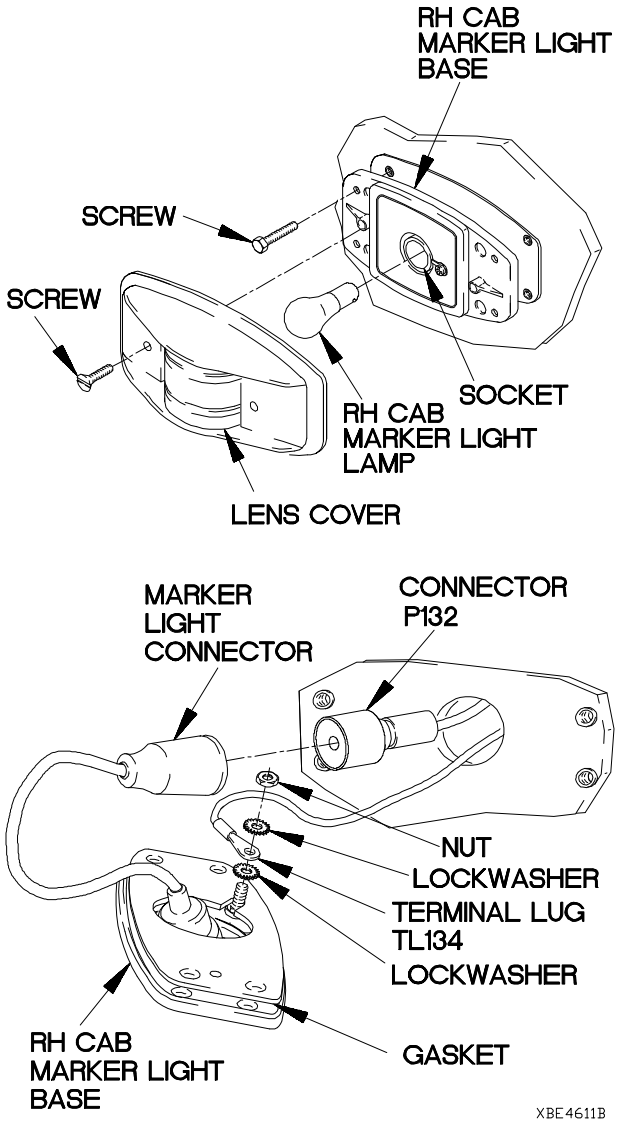
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

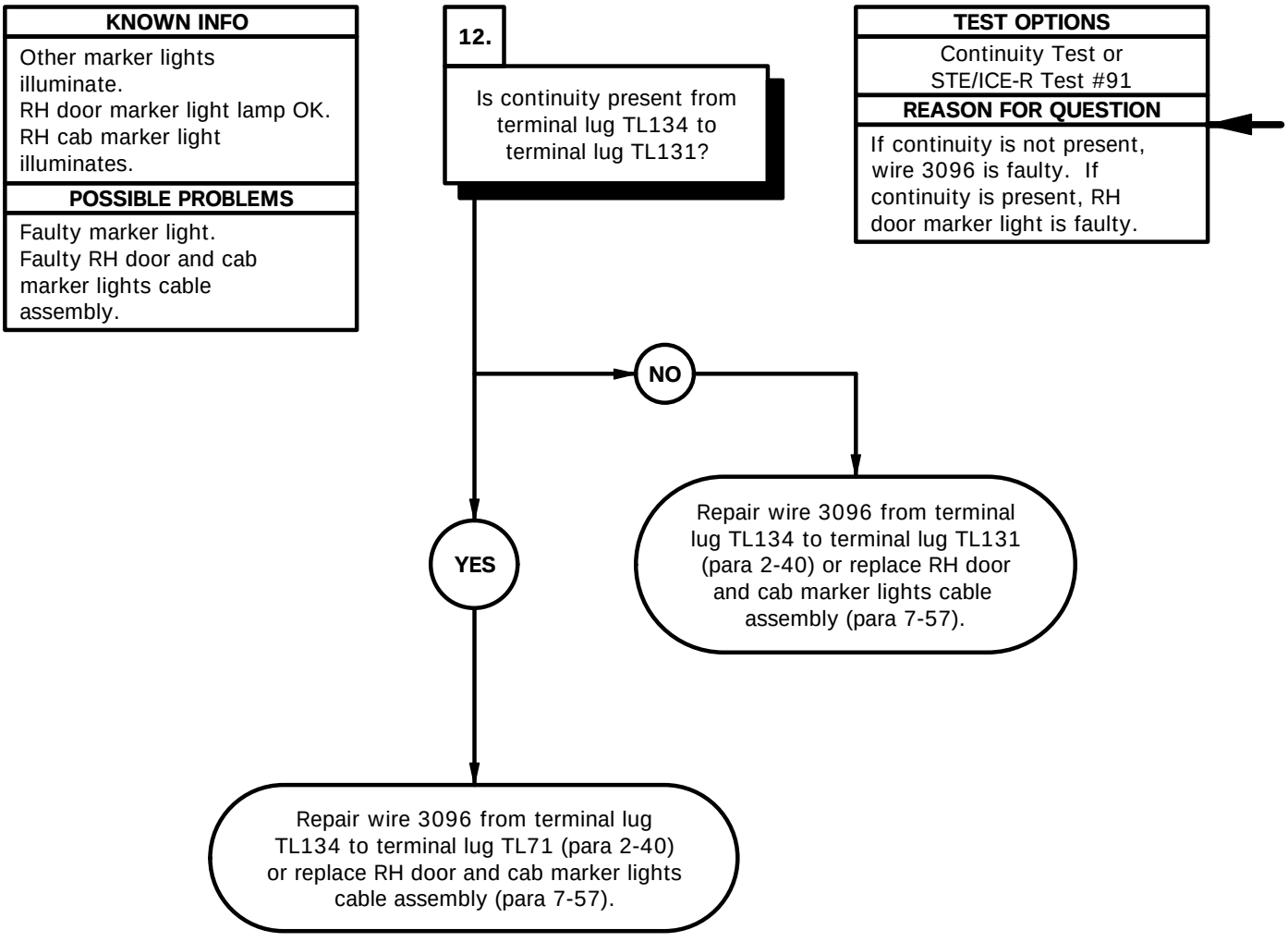
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector P132 socket.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1947 from connector P132 socket to splice E22 (para 2-40) or replace RH door and cab marker lights cable assembly (para 7-57).
(6) If 12 VDC is present, replace RH cab marker light and RH door marker light (para 7-31).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Install gasket on RH door marker light base.
(9) Connect marker light connector to connector P132.
(10) Install lockwasher, terminal lug TL134, lockwasher, and nut on back of RH door marker light base.
(11) Install RH door marker light base on vehicle with four screws.
(12) Install RH door marker light lamp in socket.
(13) Install lens cover on base with two screws.



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



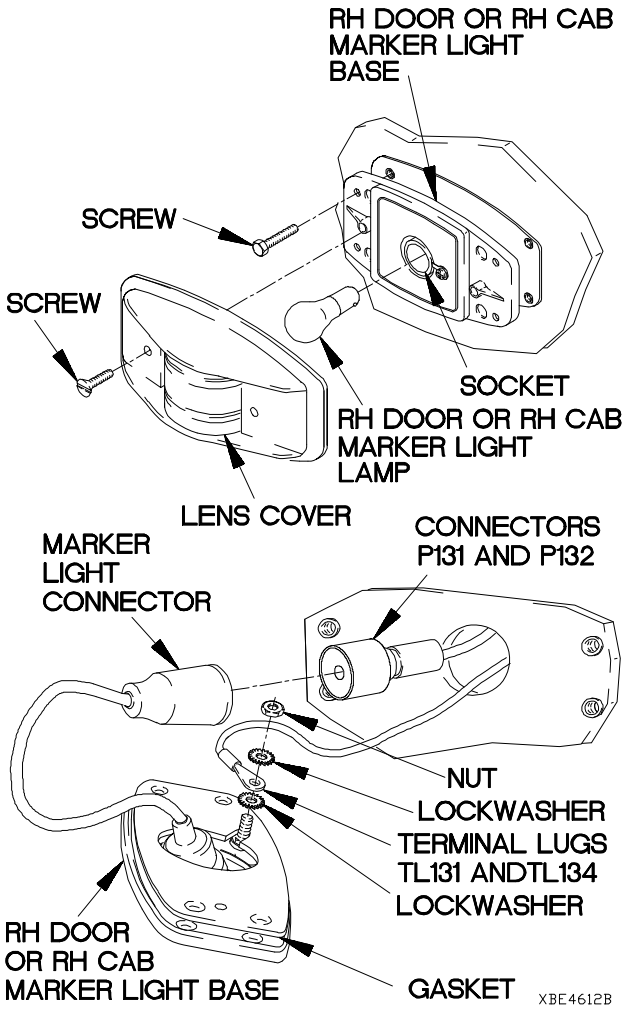
**CONTINUITY TEST**

(1) Remove four screws from RH cab marker light base.

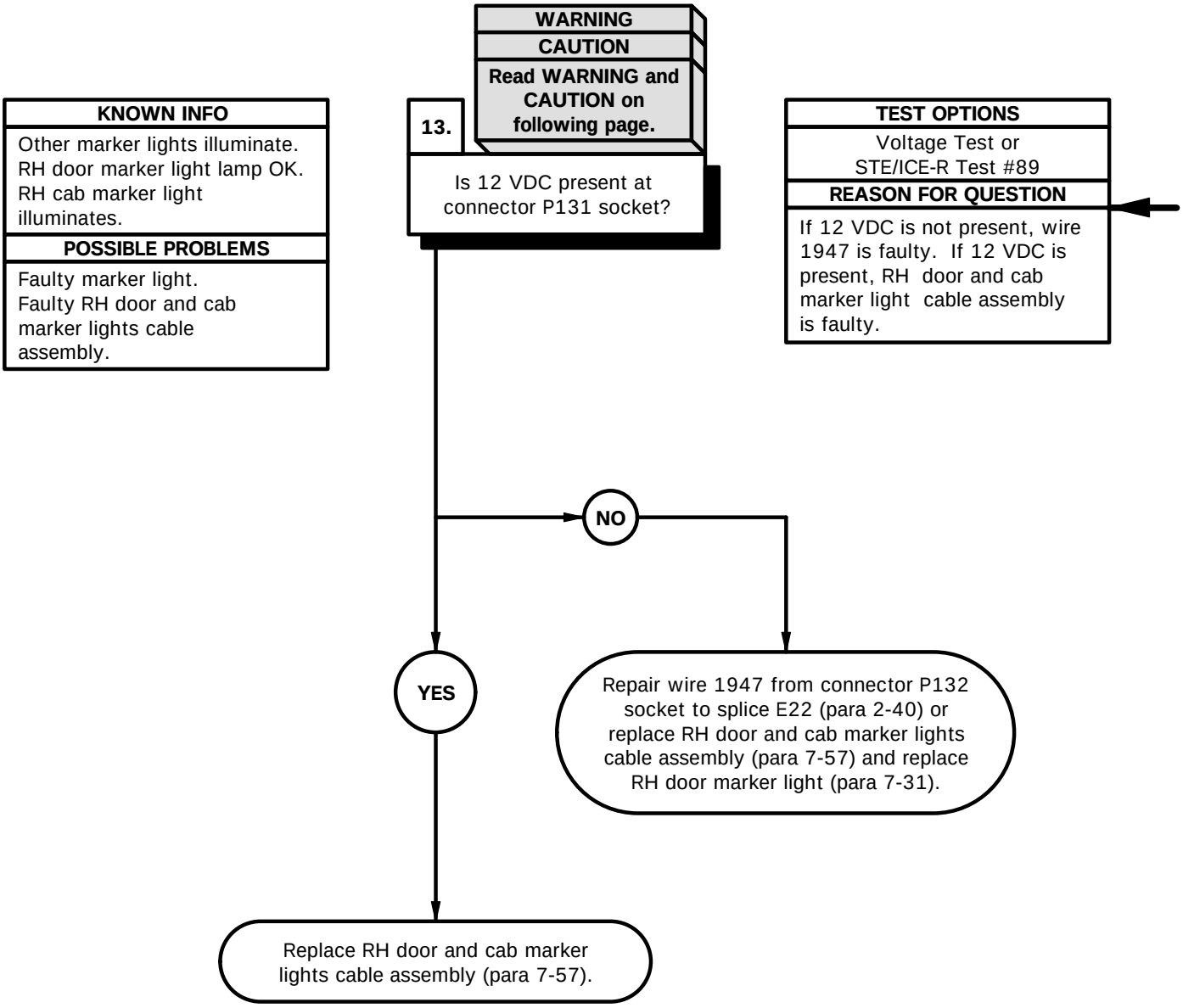
**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(2) Remove nut, lockwasher, terminal lug TL134, and lockwasher from RH cab marker light base. Discard lockwashers.
(3) Extend base and disconnect connector P132 from marker light connector.
(4) Remove gasket from RH cab marker light base. Discard gasket.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to terminal lug TL131.
(7) Connect negative (-) probe of multimeter to terminal lug TL134 and note reading on multimeter.
(8) If continuity is not present, repair wire 3096 from terminal lug TL134 to terminal lug TL131 (para 2-40) or replace RH door and cab marker lights cable assembly (para 7-57).
(9) If continuity is present, replace RH door marker light (para 7-31).
(10) Install gasket on RH cab marker light base.
(11) Connect marker light connector to connector P132.
(12) Install lockwasher, terminal lug TL134, lockwasher, and nut on back of RH cab marker light base.
(13) Install RH cab marker light base on vehicle with four screws.
(14) Install RH cab marker light lamp in socket.
(15) Install lens cover on base with two screws.
(16) Install gasket on RH door marker light base.
(17) Connect marker light connector to connector P131.
(18) Install lockwasher, terminal lug TL131, lockwasher, and nut on back of RH door marker light base.
(19) Install RH door marker light base on vehicle with four screws.
(20) Install RH door marker light lamp in socket.
(21) Install lens cover on base with two screws.



## e45. RH DOOR AND/OR RH FRONT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

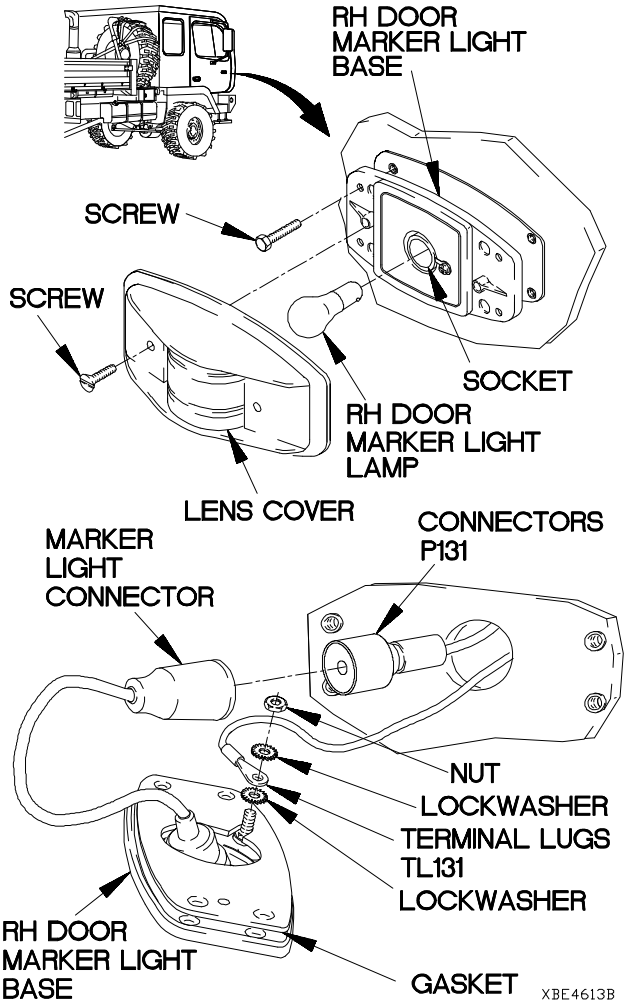
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector P131 socket.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1947 from connector P131 socket to splice E22 (para 2-40) or replace RH door and cab marker lights cable assembly (para 7-57).
(6) If 12 VDC is present, replace RH door and cab marker light cable assembly (para 7-57).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Install gasket on RH door marker light base.
(9) Connect marker light connector to connector P131.
(10) Install lockwasher, terminal lug TL131, lockwasher, and nut on back of RH door marker light base.
(11) Install RH door marker light base on vehicle with four screws.
(12) Install RH door marker light lamp in socket.
(13) Install lens cover on base with two screws.



## e46. ONE OR MORE CAB TOP MARKER LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

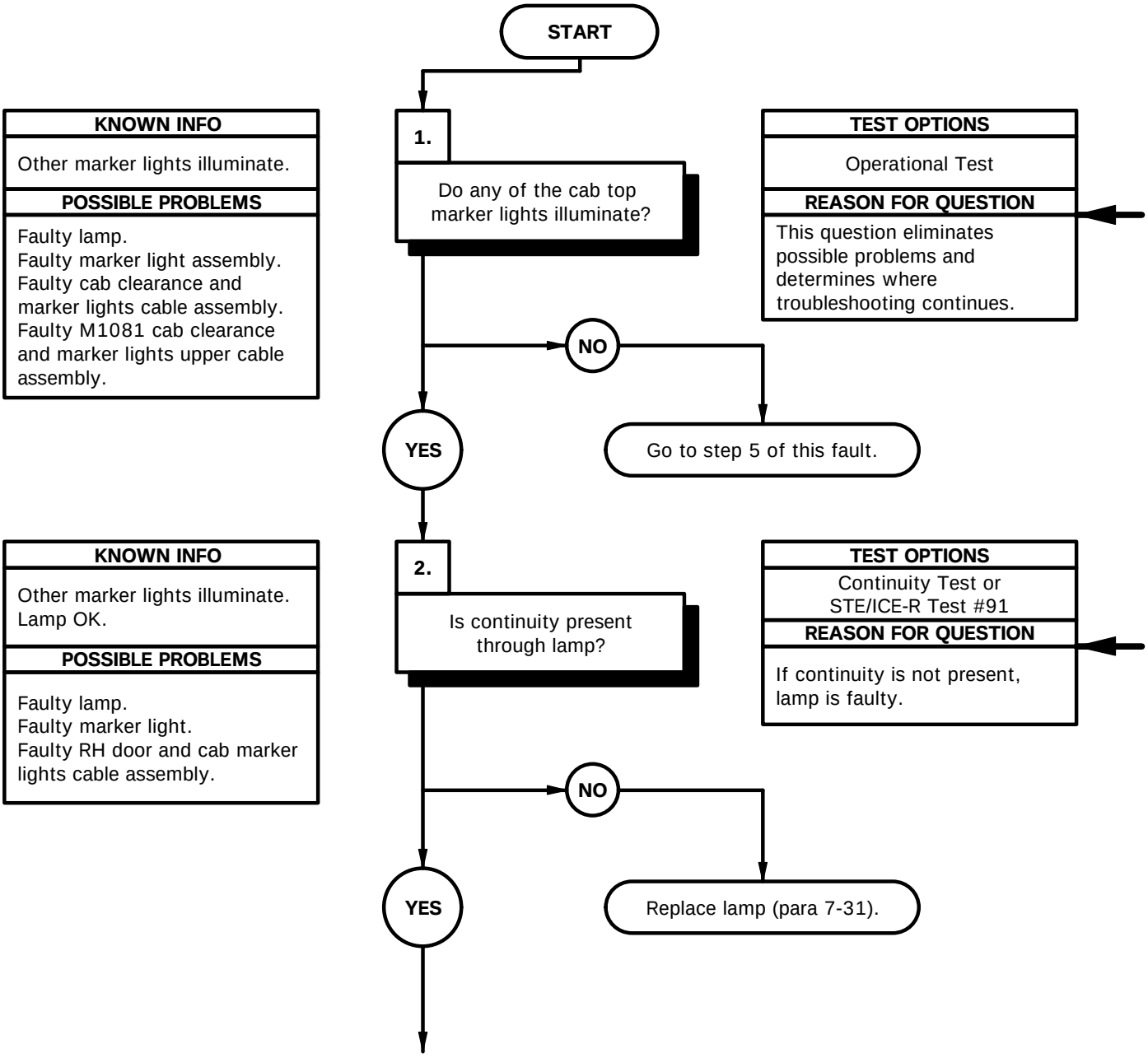
**Equipment Conditions**
Engine shut down (TM 9-23230-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Lockwasher (4) (Item 71, Appendix G)
Gasket (2) (Item 28, Appendix G)
Wire, Elec, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICR-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

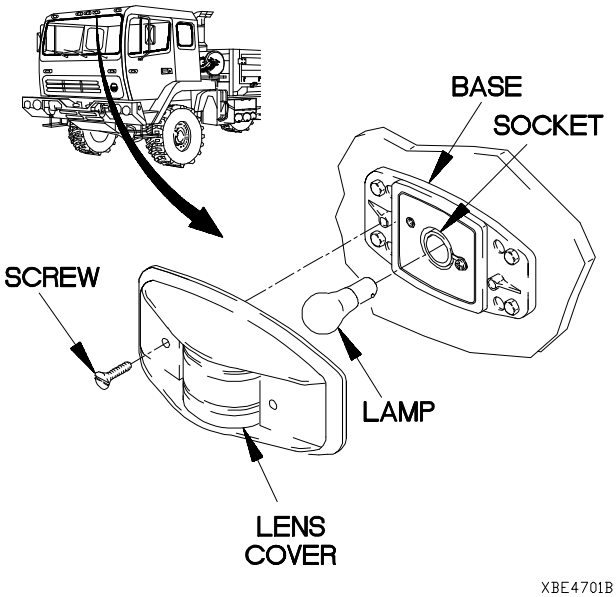
**References**
TM 9-4910-571-12&P



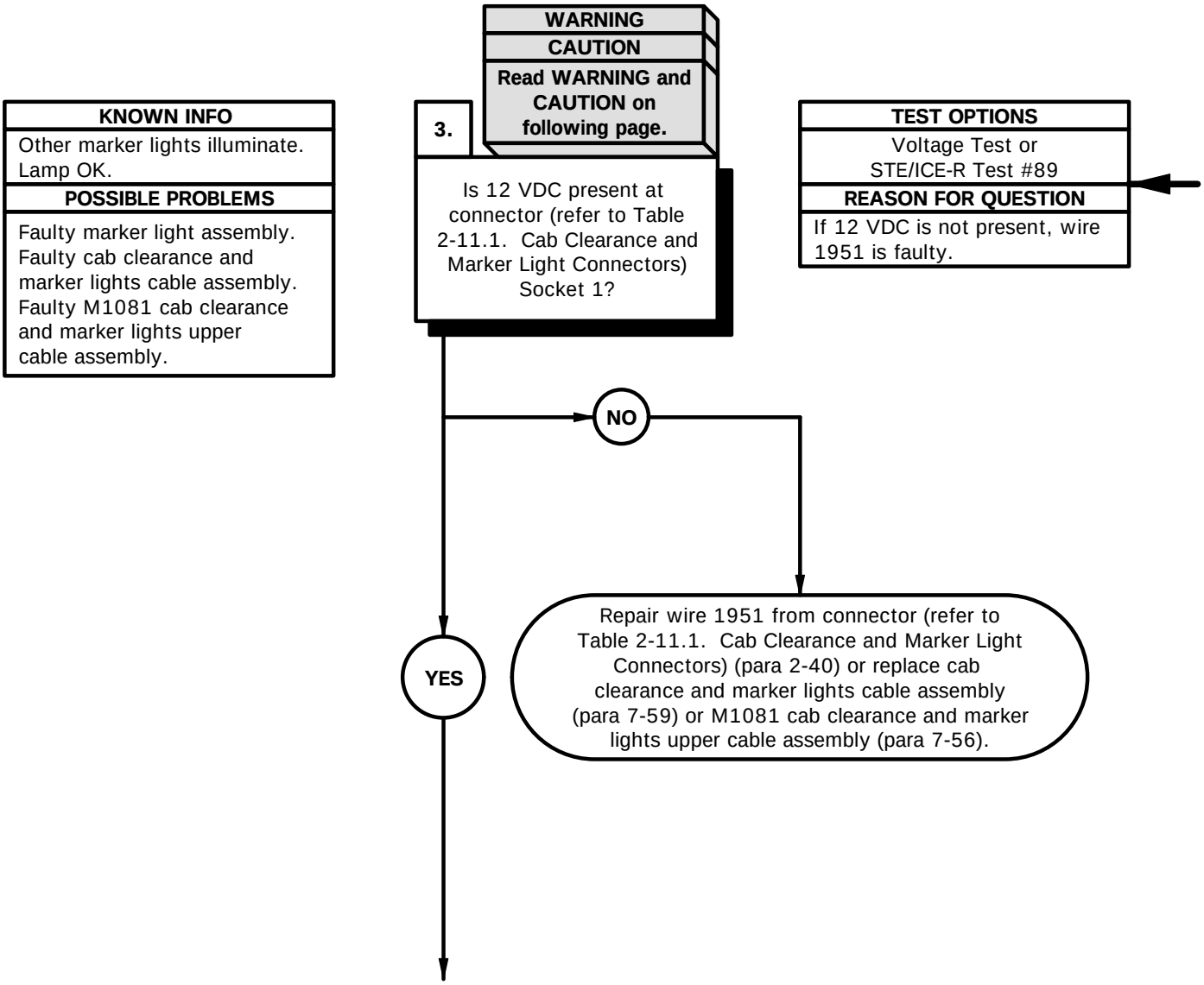
(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) If no cab top marker lights illuminate, go to step 5 of this fault.
(3) Position main light switch to OFF (TM 9-2320-365-10).

CONTINUITY TEST

(1) Remove two screws and lens cover from marker light base.
(2) Remove marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace marker light lamp (para 7-31).



## e46. ONE OR MORE CAB TOP MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

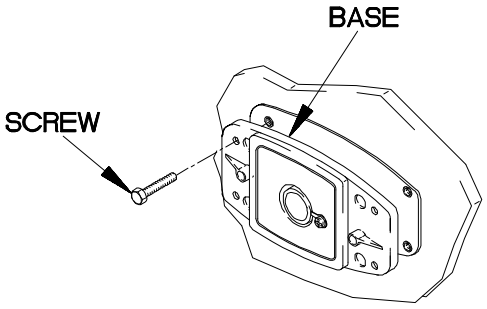
**VOLTAGE TEST**

(1) Remove four screws from marker light base.

**NOTE**

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(2) Remove nut, lockwasher, terminal lug (refer to Table 2-11.1. Cab Clearance and Marker Light Terminal Lugs), and lockwasher from marker light base. Discard lockwashers.
(3) Extend base and disconnect connector (refer to Table 2-11.1. Cab Clearance and Marker Light Connectors) from marker light connector.
(4) Remove gasket from marker light base. Discard gasket.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector (refer to Table 2-11.1. Cab Clearance and Marker Light Connectors).
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 1951b from connector (refer to Table 2-11.1. Cab Clearance and Marker Light Connectors) d (para 2-40) or replace cab clearance and or marker lights cable assembly (para 7-59) or M1081 cab clearance and marker lights upper cable assembly (para 7-56).
(10) Position main light switch to OFF (TM 9-2320-365-10).



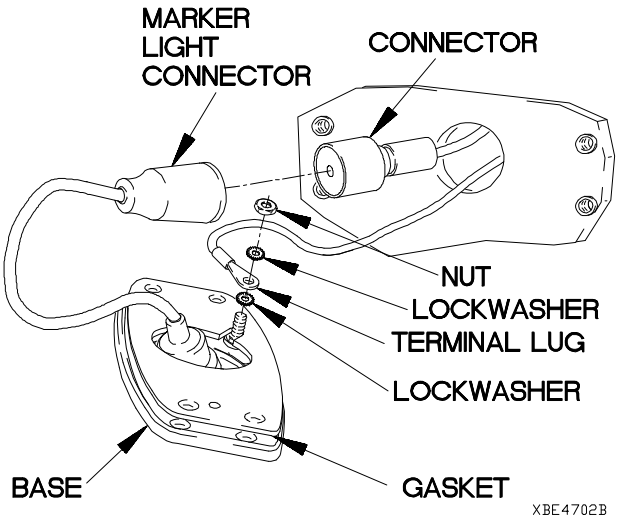
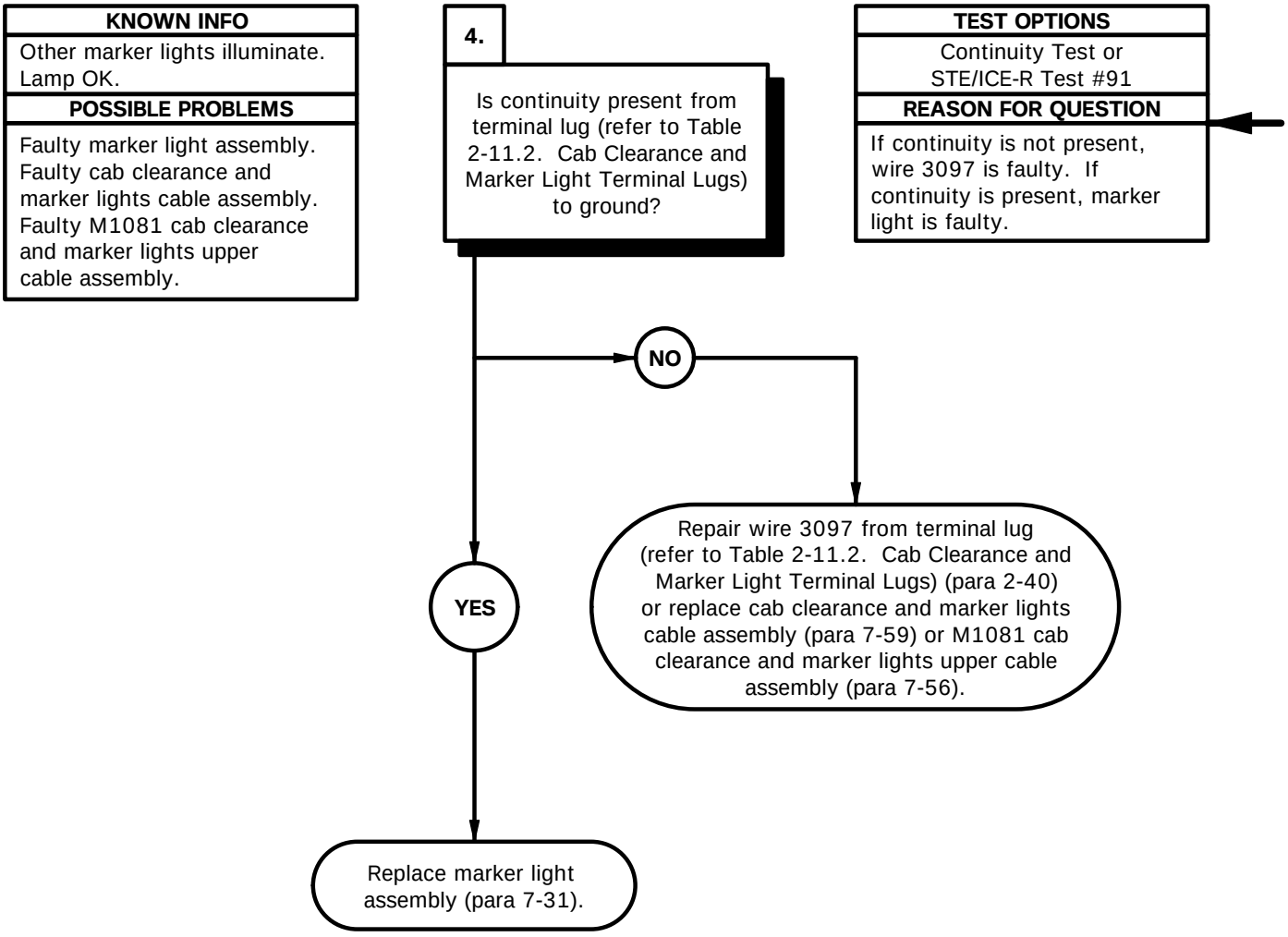




**Table 2-11.1. Cab Clearance and Marker Light Connectors**

| Marker/ID Light | Connector | Wire Segment |
|---|---|---|
| RH Cab Top Marker Light | P55 | P55 to splice E23 |
| RH Cab Top ID Light | P59 | P59 to splice E23 |
| Middle Cab Top ID Light | P60 | P60 to splice E23 |
| LH Cab Top ID Light | P57 | P57 to splice E23 |
| LH Cab Top Marker Light | P50 | P50 to splice E23 |

## e46. ONE OR MORE TOP CAB MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug (refer to Table 2-11.2. Cab Clearance and Marker Light Terminal Lugs).
(3) Connect negative (-) probe of multimeter to to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3097 (para 2-40) or replace cab clearance and marker lights cable assembly (para 7-59) or M1081 cab clearance and marker lights upper cable assembly (para 7-56).
(5) If continuity is present, replace marker light assembly (para 7-31).
(6) Install gasket on marker light base.
(7) Connect connector (refer to Table 2-11.2. Cab Clearance and Marker Light Connectors) to marker light connector.
(8) Install lockwasher, terminal lug (refer to Table 2-11.2. Cab Clearance and Marker Light Terminal Lugs), lockwasher, and nut on back of base.
(9) Install marker light base on vehicle with four screws.
(10) Install marker light lamp in socket.
(11) Install lens cover on base with two screws.

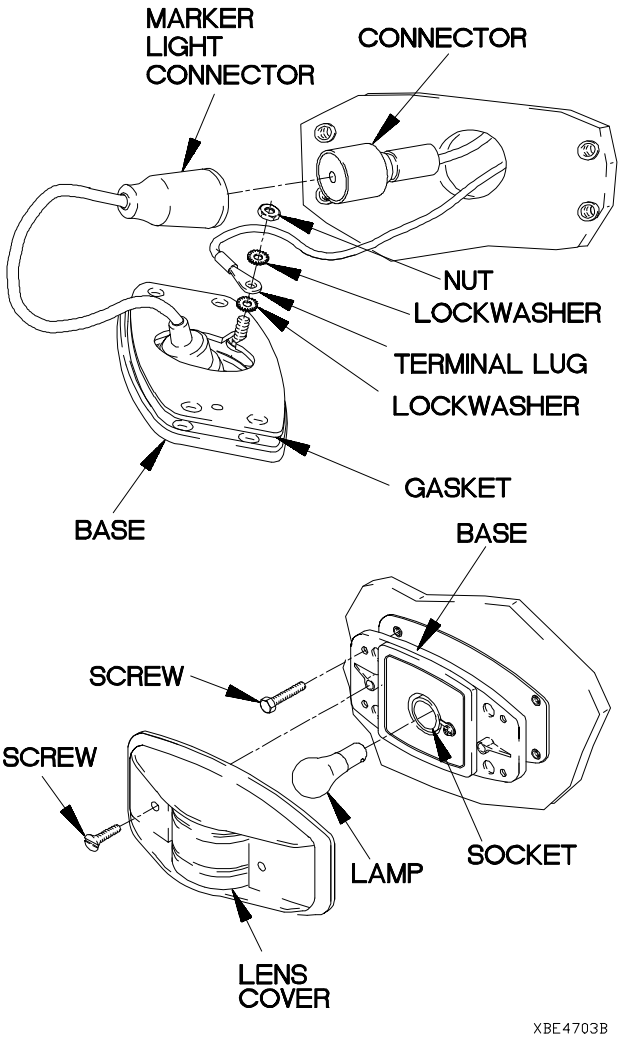



**Table 2-11.2. Cab Clearance and Marker Light Terminal Lugs**

| Light | Terminal Lug | Wire Segment |
|---|---|---|
| RH Cab Top Marker Light | TL3 | TL3 to splice E24 |
| RH Cab Top ID Light | TL4 | TL4 to splice E24 |
| Middle Cab Top ID Light | TL8 | TL8 to splice E24 |
| LH Cab Top ID Light | TL22 | TL22 to splice E24 |
| LH Cab Top Marker Light | TL27 | TL27 to splice E24 |

## e46. ONE OR MORE TOP CAB MARKER LIGHTS DO NOT ILLUMINATE (CONT)

**KNOWN INFO**

No cab top marker lights illuminate.

**POSSIBLE PROBLEMS**

Faulty cab clearance and marker lights cable assembly.
Faulty M1081 cab clearance and marker lights lower cable assembly.
Faulty M1081 cab clearance and marker lights upper cable assembly.

**5.** Is vehicle model M1081?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

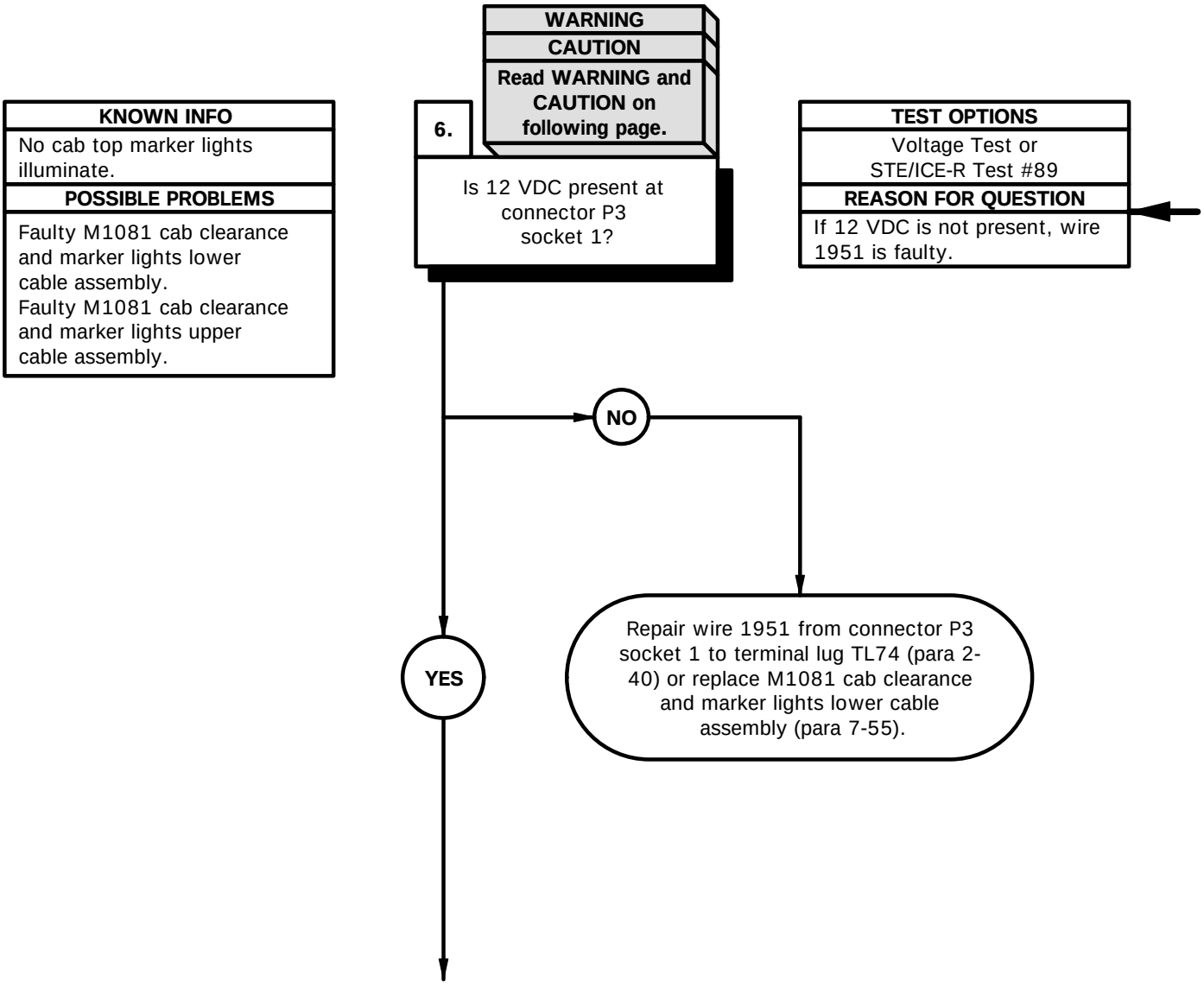
This question eliminates possible problems and determines where troubleshooting continues.

**NO** → Go to step 9 of this fault.

**YES**

(1) Is vehicle model M1081? If vehicle is not model M1081, go to step 9 of this fault.

## e46. ONE OR MORE CAB TOP MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

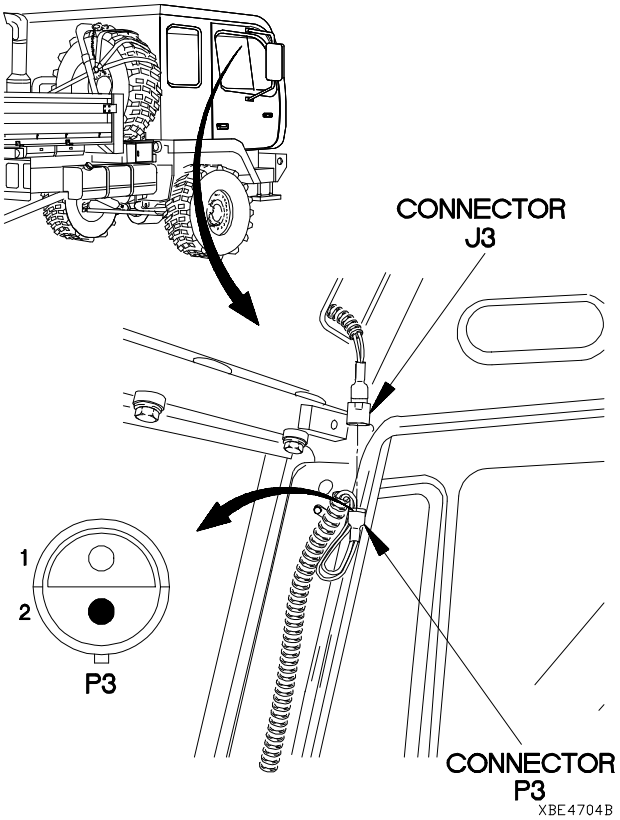
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

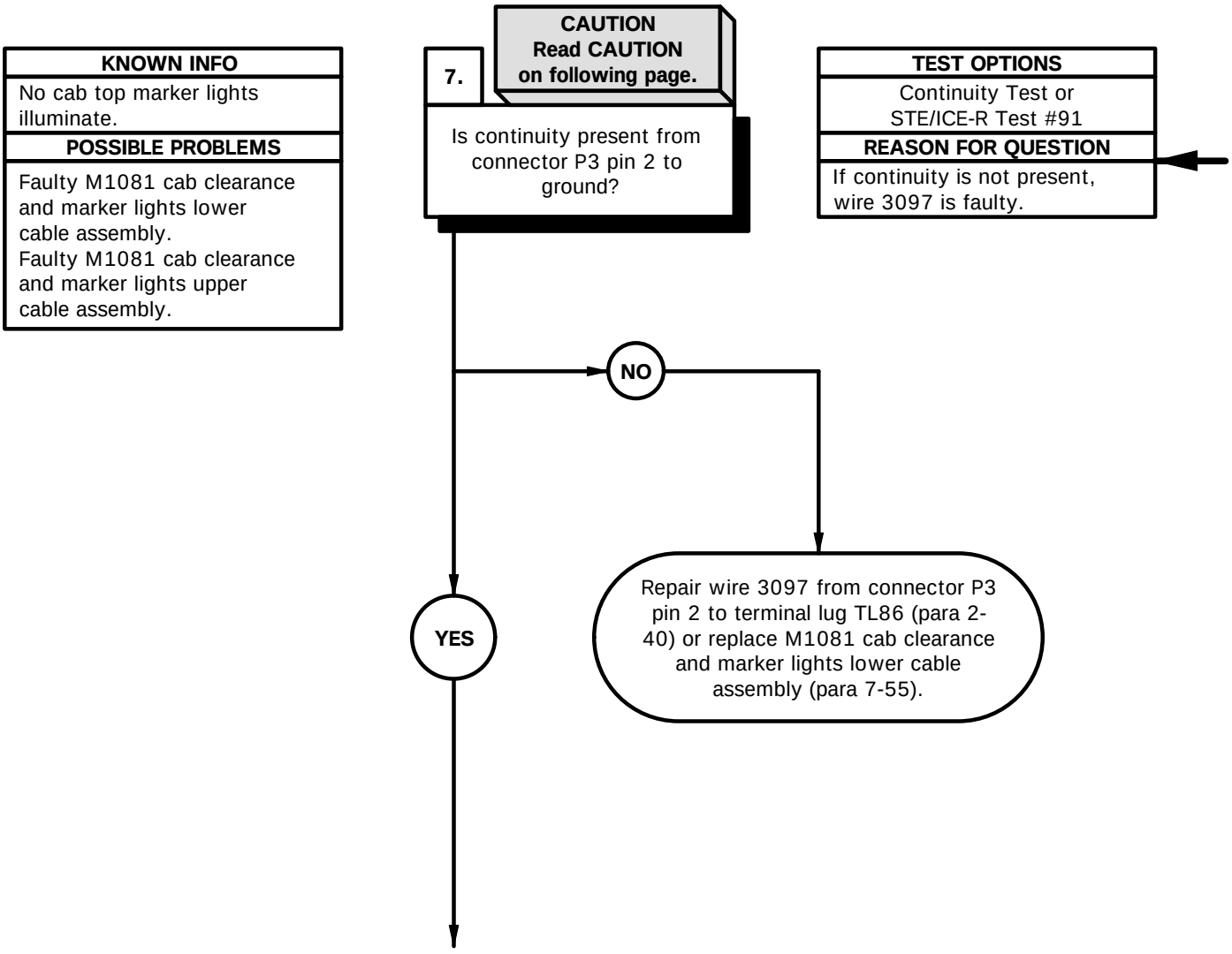
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P3 from connector J3.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P3 socket 1.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 1951 (para 2-40) from connector P3 socket 1 to terminal lug TL74 or replace M1081cab clearance and marker lights lower cable assembly (para 7-55).
(7) Position main light switch to OFF (TM 9-2320-365-10).



## e46. ONE OR MORE CAB TOP MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

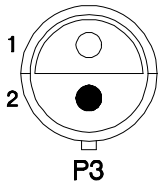
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

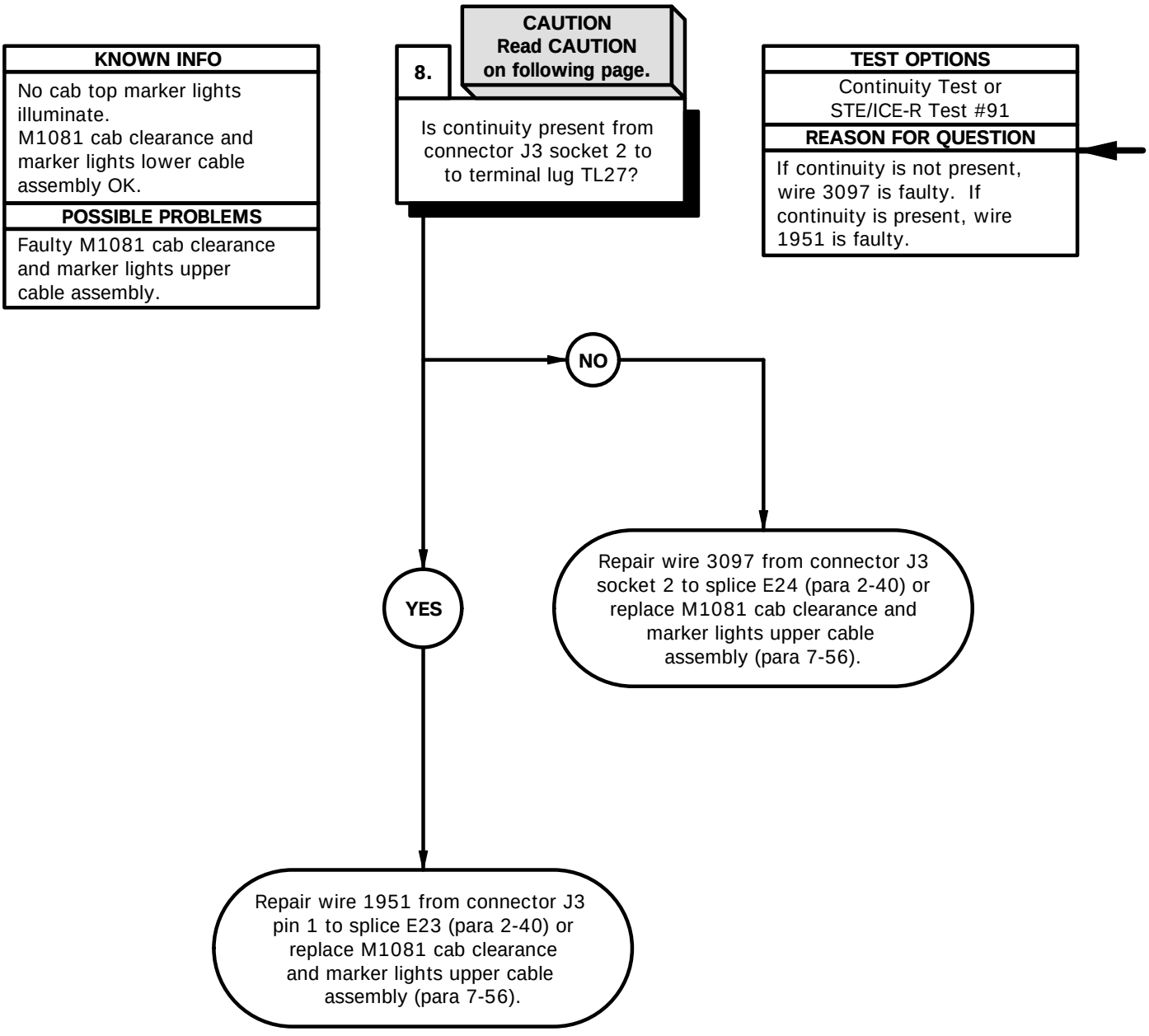
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P3 pin 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3097 (para 2-40) from connector P3 pin 2 to terminal lug TL86 or replace M1081 cab clearance and marker lights lower cable assembly (para 7-55).




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## e46. ONE OR MORE CAB TOP MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH cab top marker light base.
(2) Remove LH cab top marker light lamp from socket.
(3) Remove four screws from LH cab top marker light base.

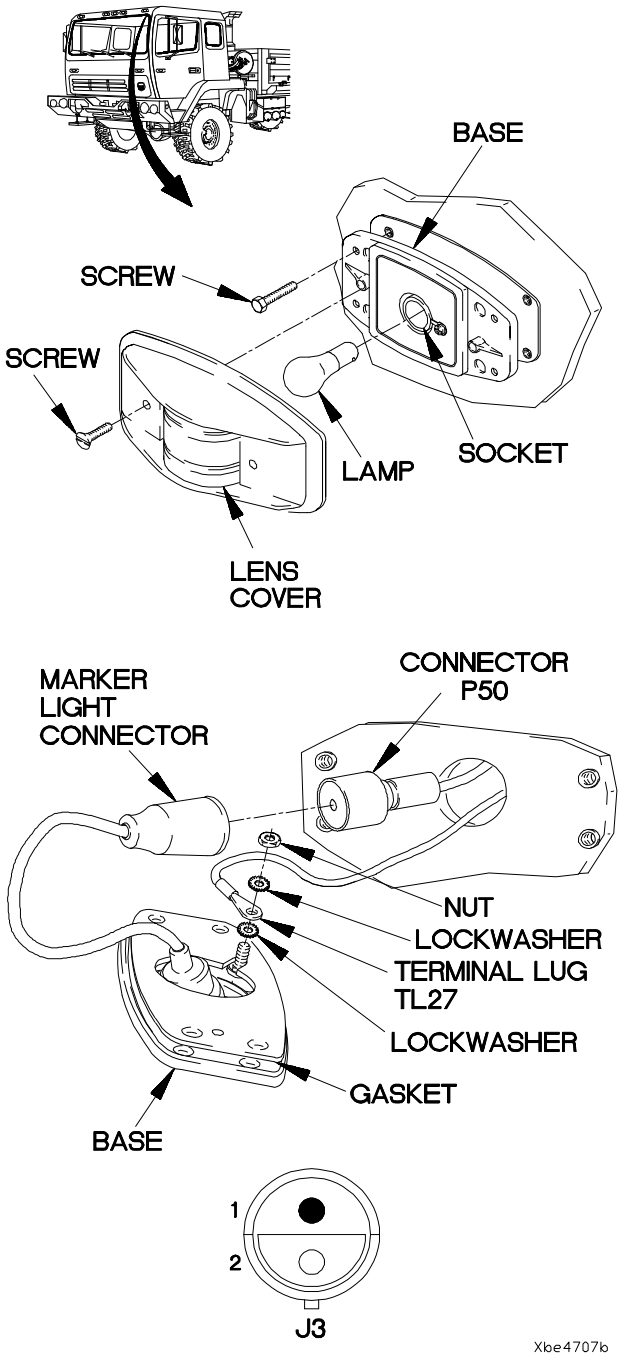
NOTE

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

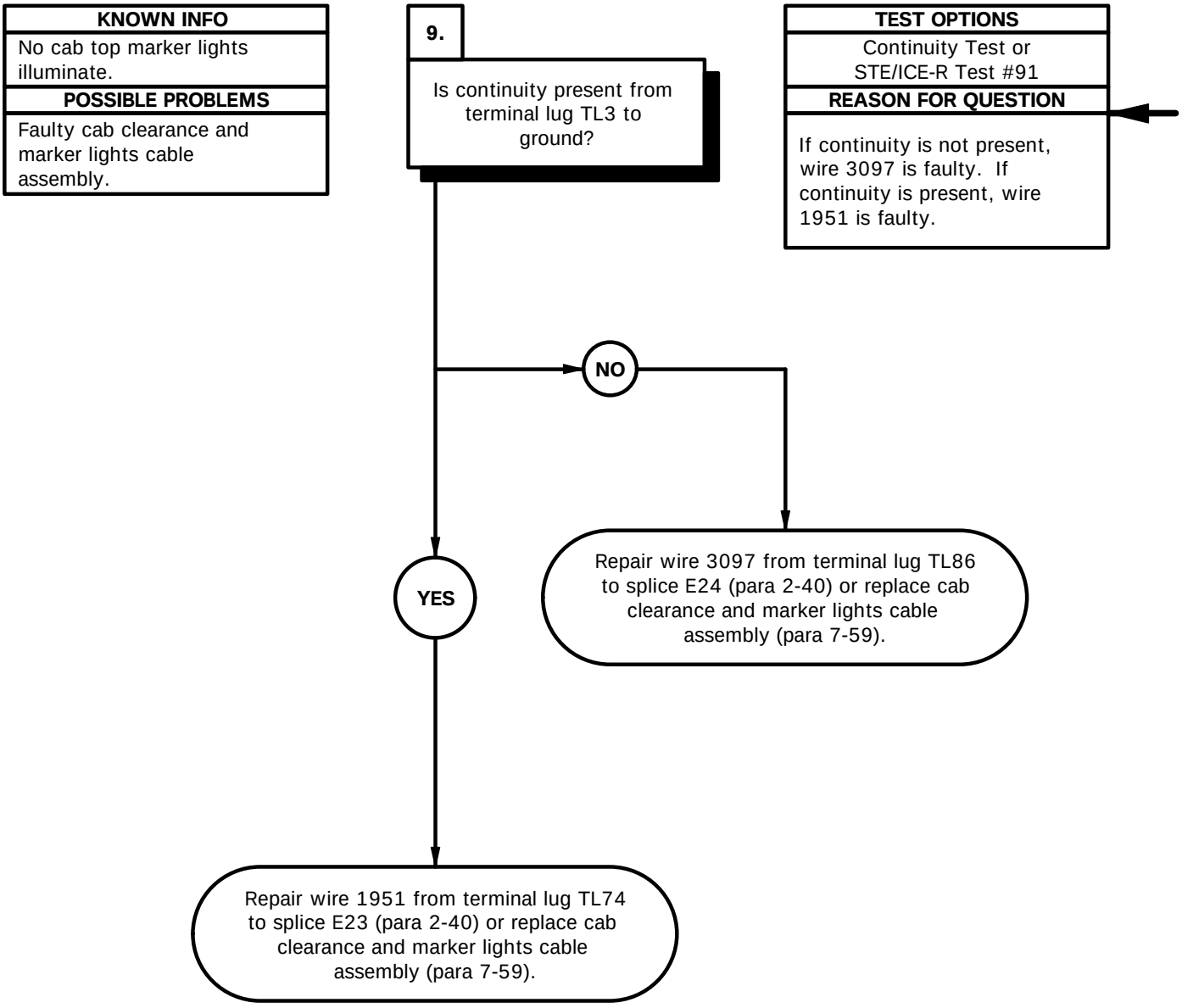
(4) Remove nut, lockwasher, terminal lug TL27, and lockwasher from LH cab top marker light base. Discard lockwashers.
(5) Extend base and disconnect marker light connector from connector P50.
(6) Remove gasket from LH cab top marker light base. Discard gasket.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to connector J3 socket 2.
(9) Connect negative (-) probe of multimeter to terminal lug TL27 and note reading on multimeter.
(10) If continuity is not present, repair wire 3097 from connector J3 socket 2 to splice E24 (para 2-40) or replace M1081 cab clearance and marker lights upper cable assembly (para 7-56).
(11) If continuity is present, repair wire 1951 from connector J3 pin 1 to splice E23 (para 2-40) or replace M1081 cab clearance and marker lights upper cable assembly (para 7-56).
(12) Install gasket on LH cab top marker light base.
(13) Connect marker light connector to connector P50.
(14) Install lockwasher, terminal lug TL27, lockwasher, and nut on back of LH cab top marker light base.

**CONTINUITY TEST (Cont)**

(15) Install LH cab top marker light base on vehicle with four screws.
(16) Install LH cab top marker light lamp in socket.
(17) Install lens cover on base with two screws.
(18) Connect connector P3 to connector J3.



## e46. ONE OR MORE CAB TOP MARKER LIGHTS DO NOT ILLUMINATE (CONT)



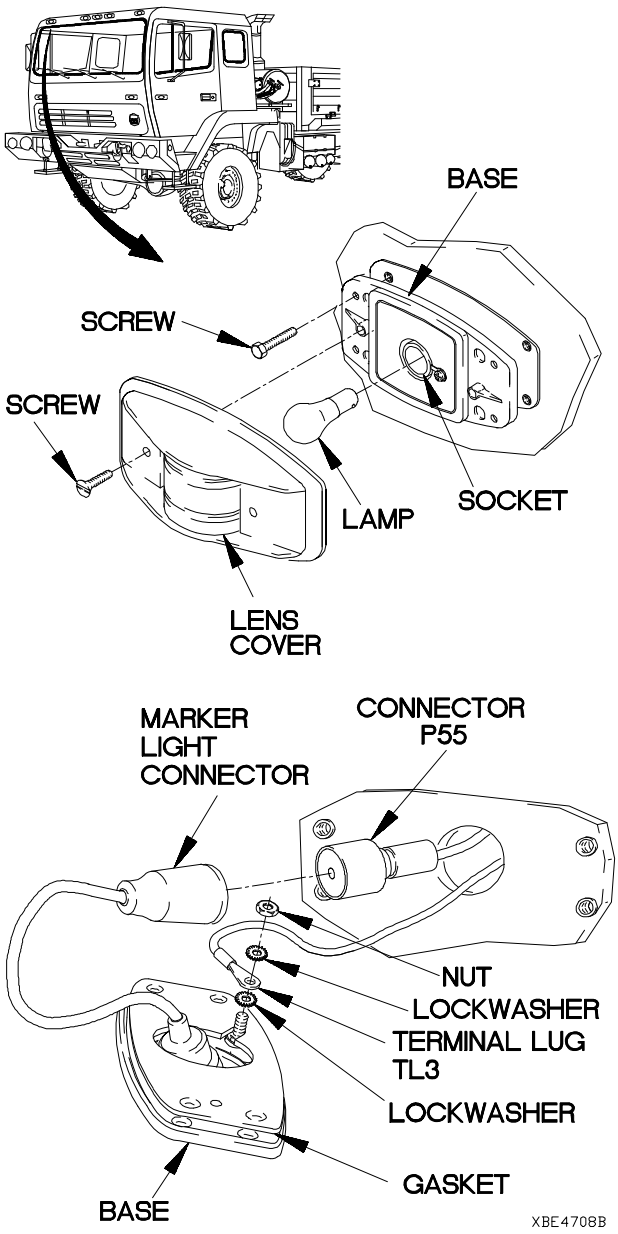
**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH cab top marker light base.
(2) Remove RH cab top marker lamp from socket.
(3) Remove four screws from RH cab top marker light base.

NOTE

Do not let wires slip through hole into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(4) Remove nut, lockwasher, terminal lug TL3, and lockwasher from RH cab top marker light base. Discard lockwashers.
(5) Extend base and disconnect marker light connector from connector P55.
(6) Remove gasket from RH cab top marker light base. Discard gasket.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to terminal lug TL3.
(9) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(10) If continuity is not present, repair wire 3097 from terminal lug TL86 to splice E24 (para 2-40) or replace cab clearance and marker lights cable assembly (para 7-59).
(11) If continuity is present, repair wire 1951 from terminal lug TL74 to splice E23 (para 2-40) or replace cab clearance and marker lights cable assembly (para 7-59).
(12) Install gasket on RH cab top marker light base.
(13) Connect connector P55 to marker light connector.
(14) Install lockwasher, terminal lug TL3, lockwasher, and nut on back of RH cab top marker light base.
(15) Install RH cab top marker light base on vehicle with four screws.
(16) Install RH cab top marker light lamp in socket.
(17) Install lens cover on RH cab top marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE

**INITIAL SETUP**

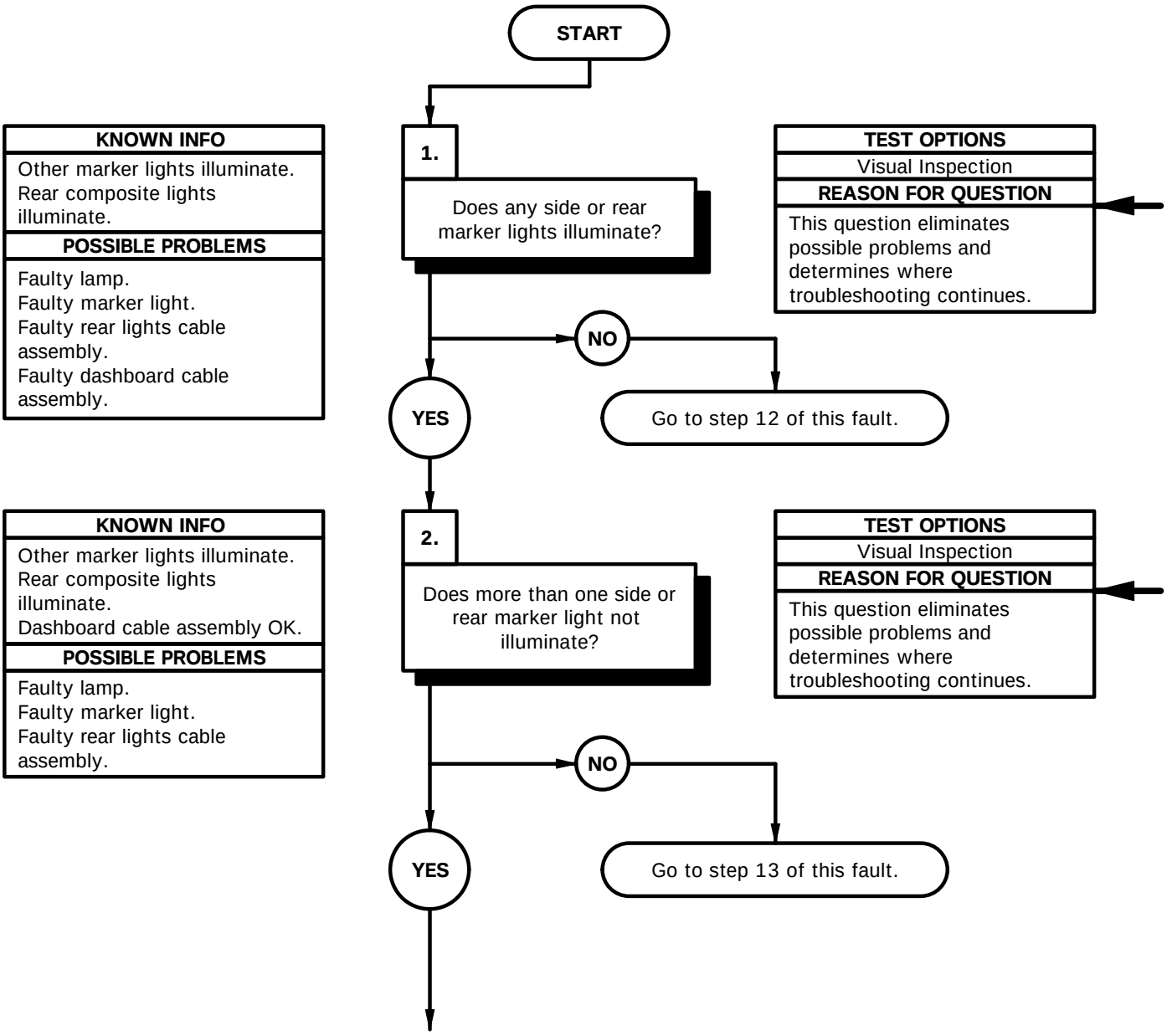
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Lockwasher (6) (Item 71, Appendix G)
Ties, Cable, Plastic (Item 76, Appendix D)

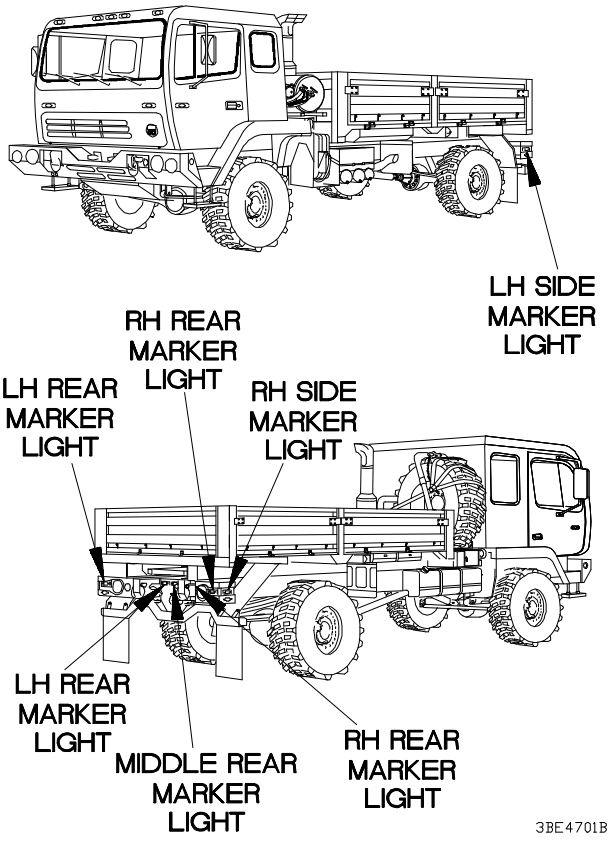
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICR-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

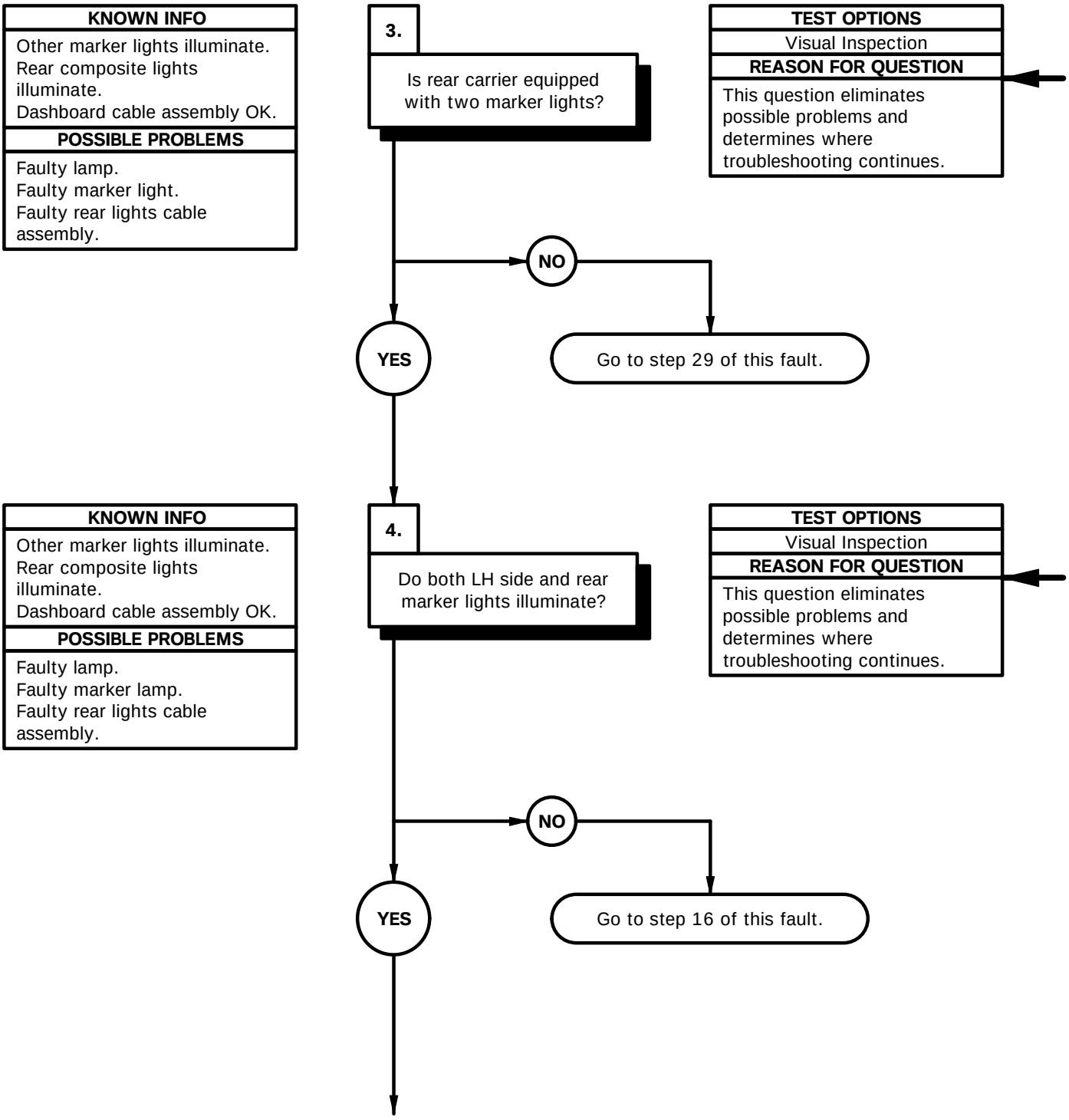


(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) Note side and/or rear marker light(s) that do not illuminate.
(3) If all side and/or rear marker lights do not illuminate, go to step 12 of this fault.
(4) Position main light switch to OFF (TM 9-2320-365-10).

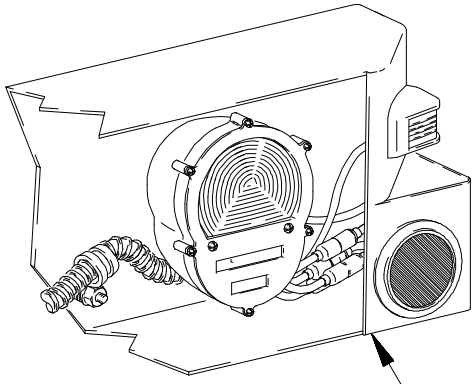
If only one side and/or rear marker light does not illuminate, go to step 13 of this fault.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

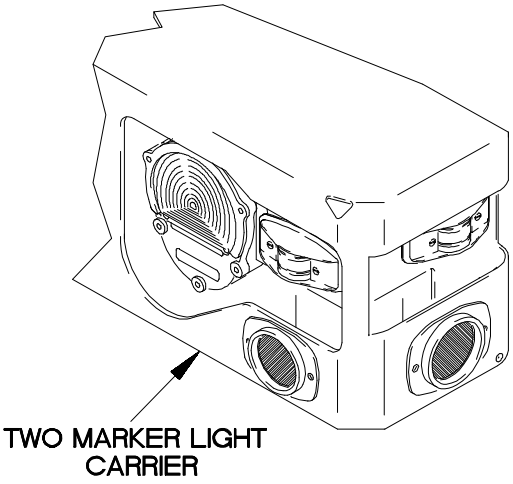


If rear carrier is equipped with one marker light, go to step 29 of this fault.



ONE MARKER LIGHT CARRIER

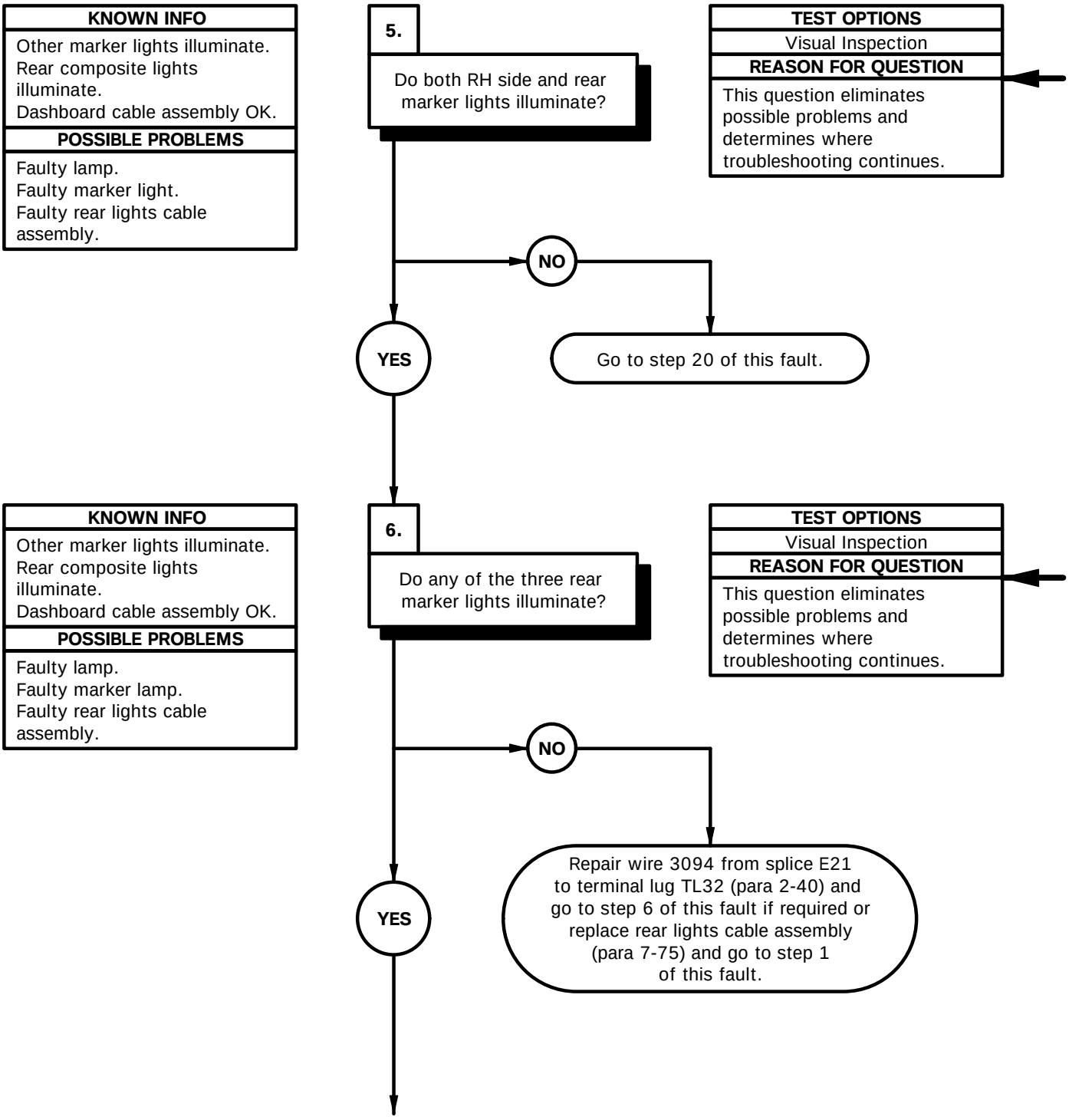
If both LH side and rear marker lights do not illuminate, go to step 16 of this fault.



TWO MARKER LIGHT CARRIER

3BE4704B

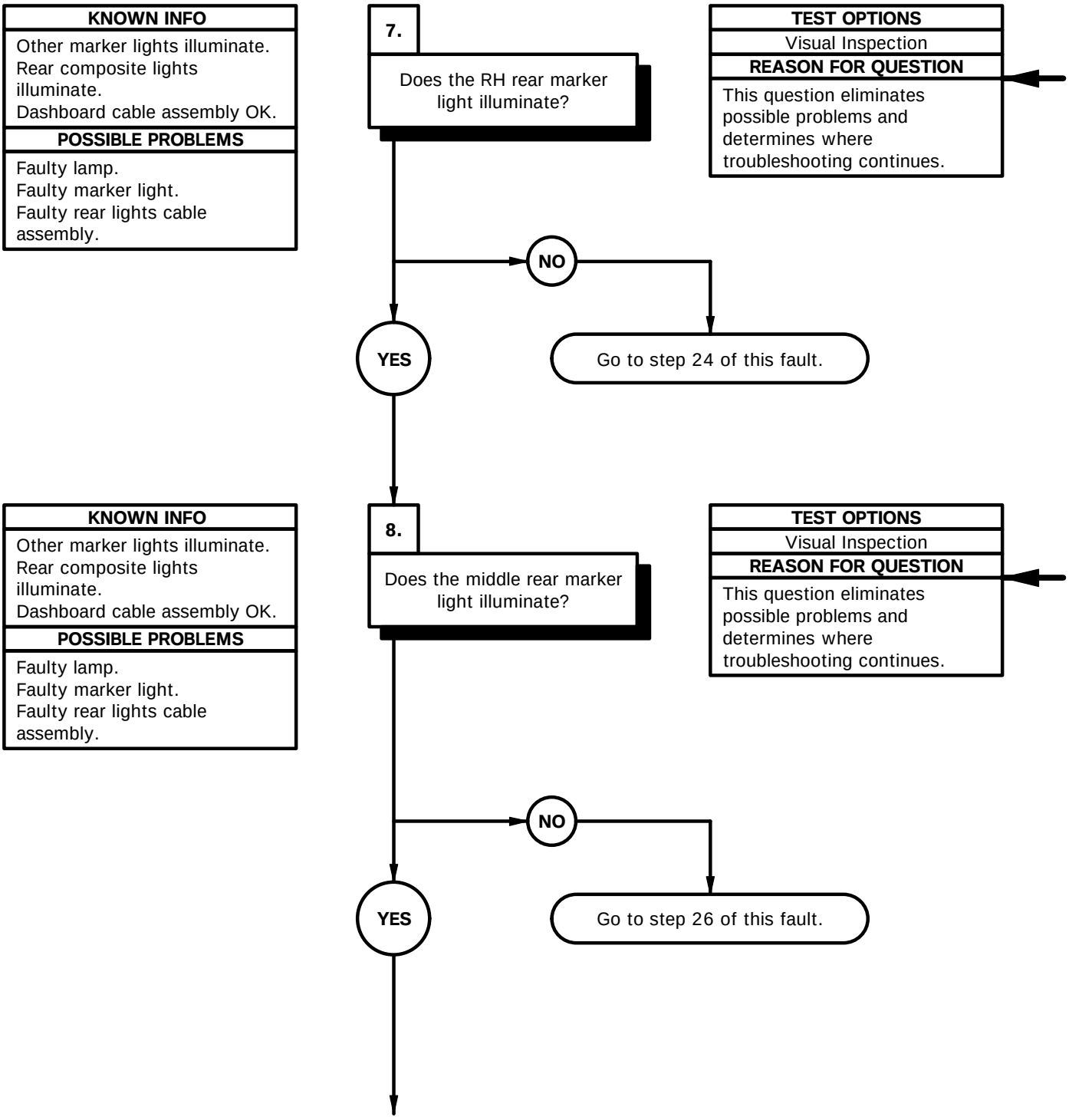
## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



If both RH side and rear marker lights do not illuminate, go to step 20 of this fault.

If all three marker lights do not illuminate, repair wire 3094 from splice E21 to terminal lug TL32 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.

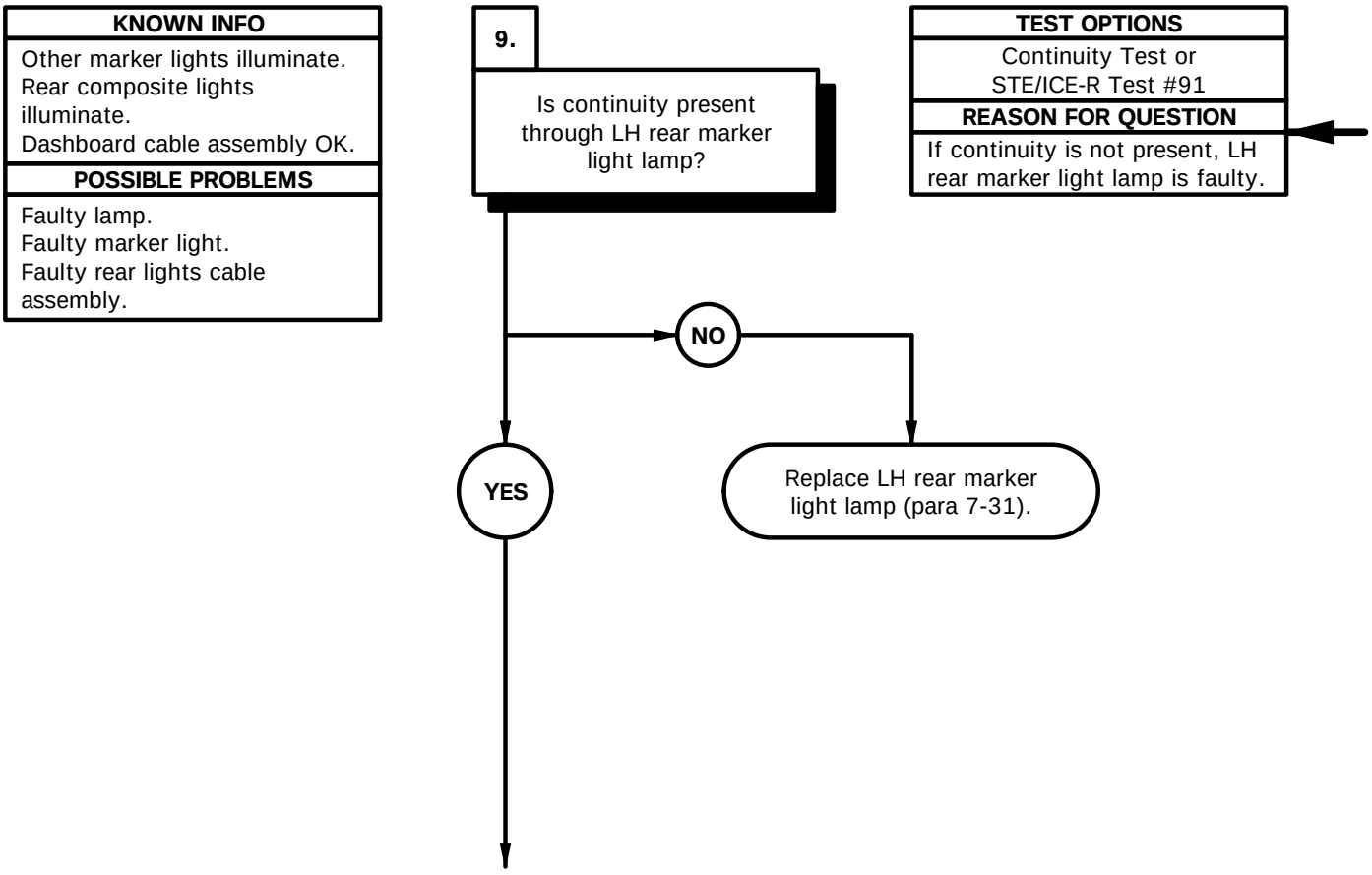
## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



If the RH rear marker light does not illuminate, go to step 24 of this fault.

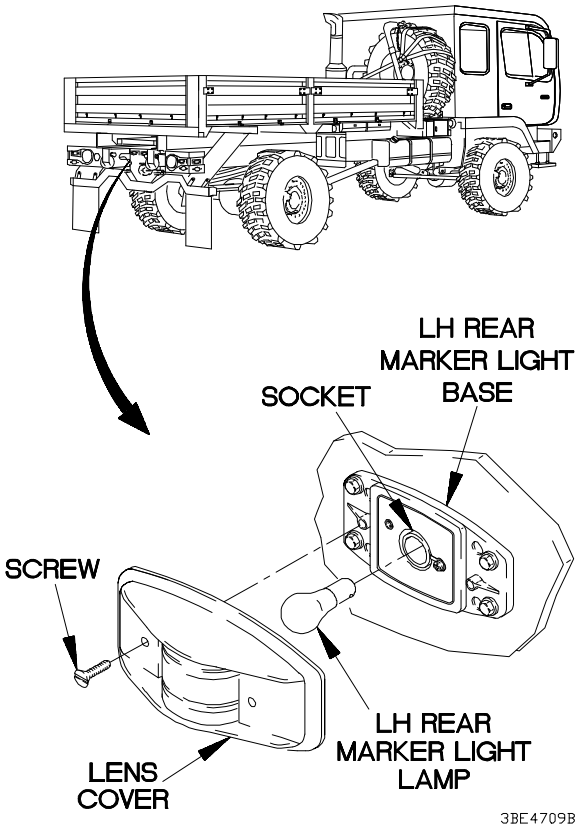
If the middle rear marker light does not illuminate, go to step 26 of this fault.

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

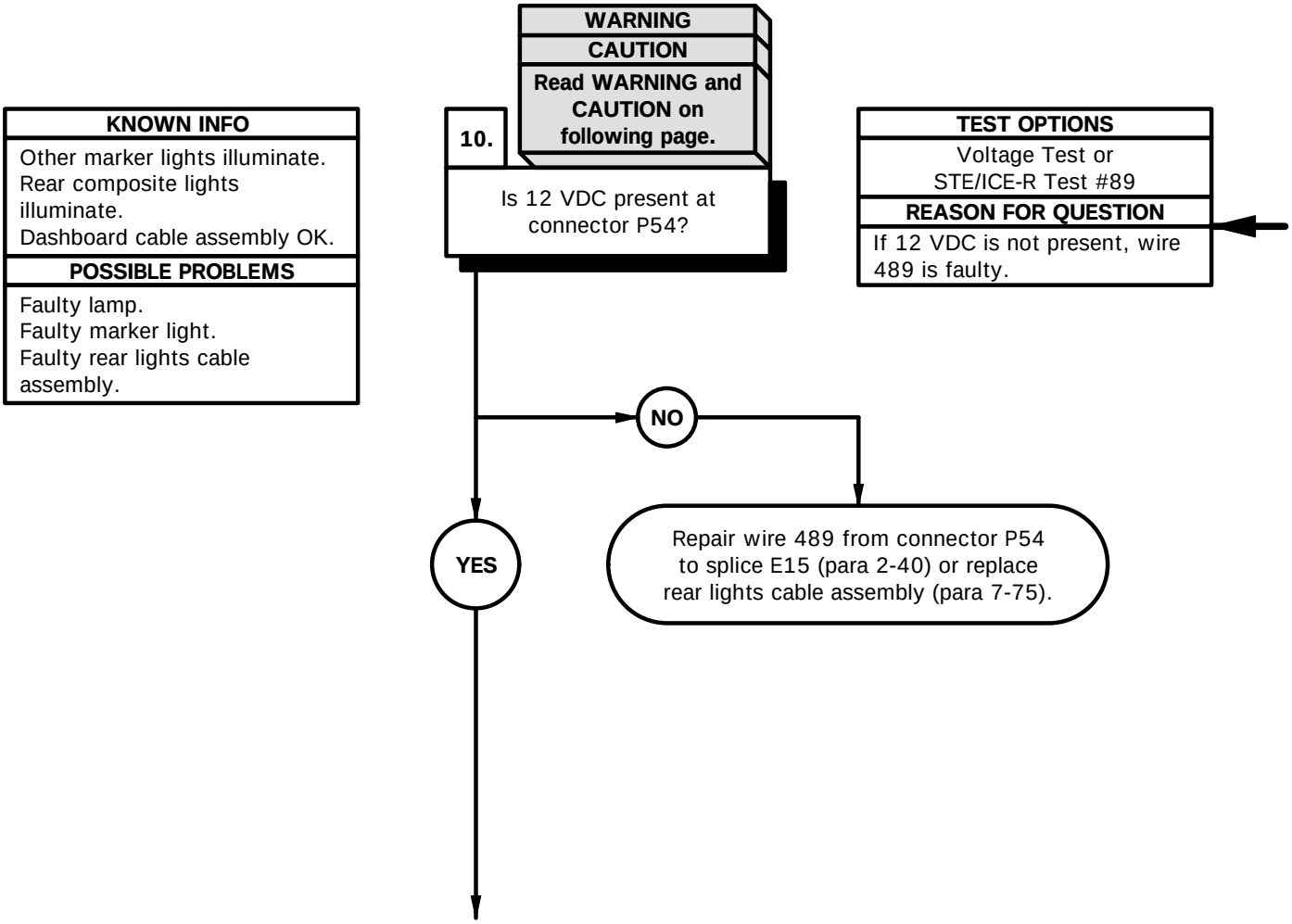


**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH rear marker light base.
(2) Remove LH rear marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH rear marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH rear marker light lamp (para 7-31).
(6) Install LH rear marker light lamp in socket.
(7) Install lens cover on LH rear marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

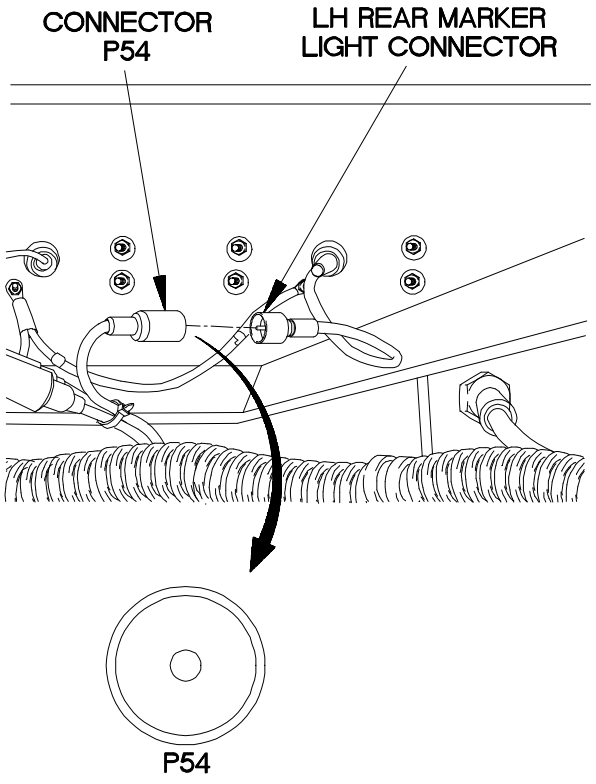
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

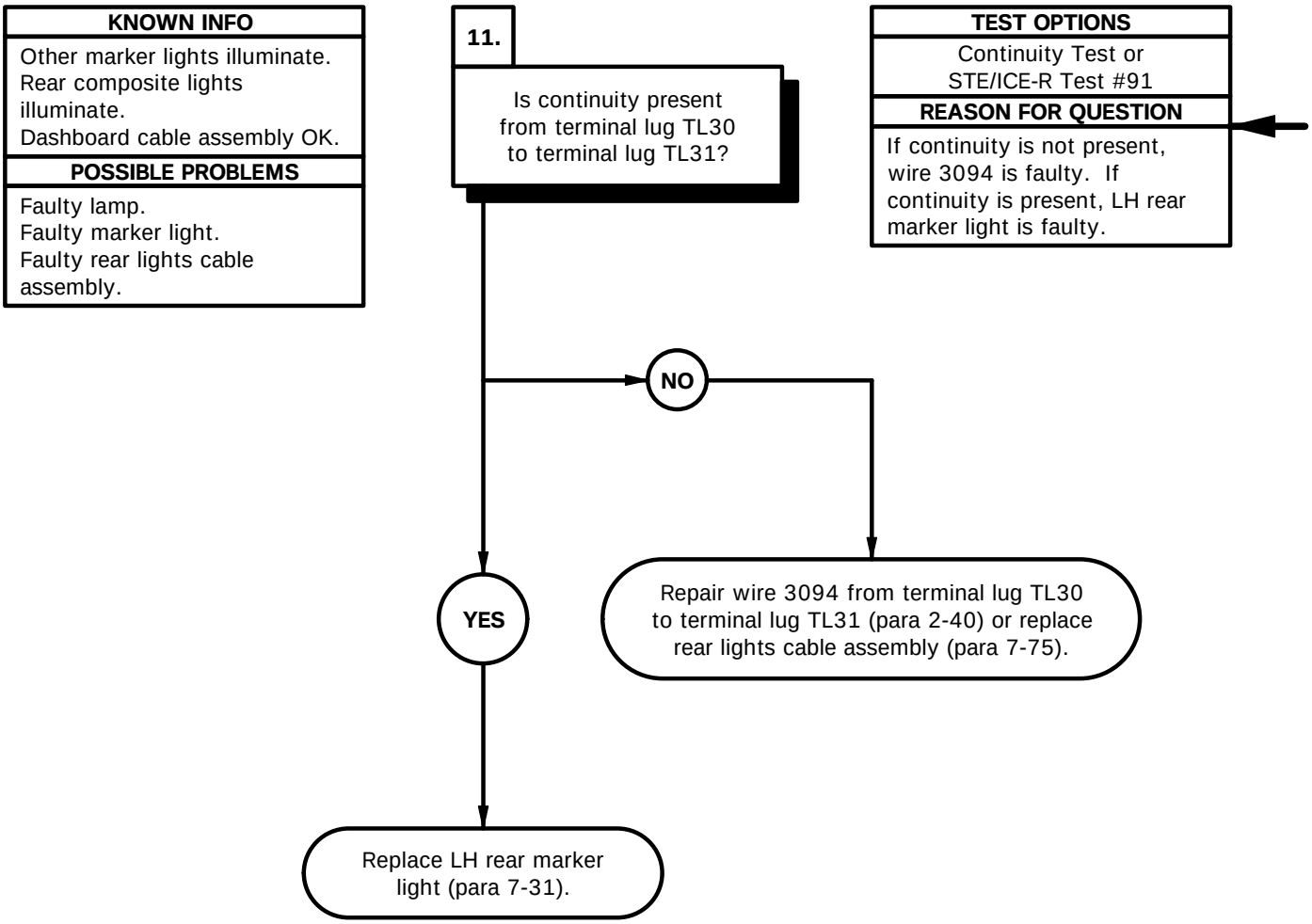
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P54 from LH rear marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P54.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P54 to splice E15 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Connect LH rear marker light connector to connector P54.

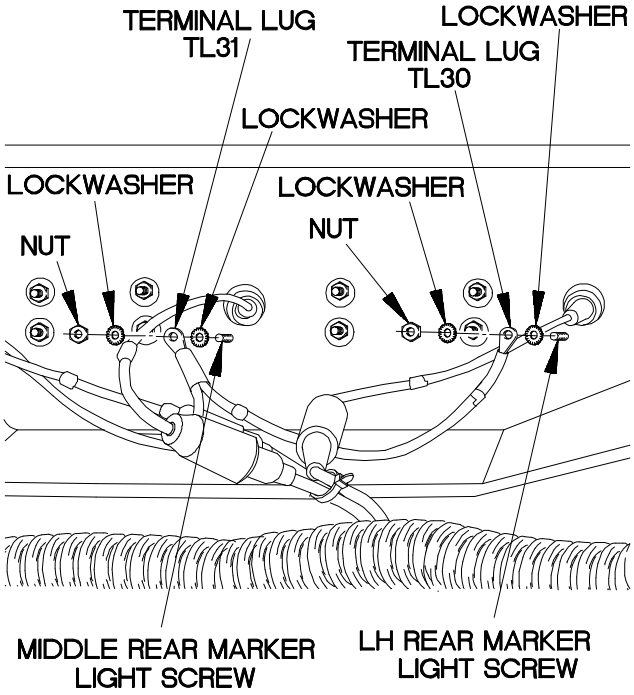


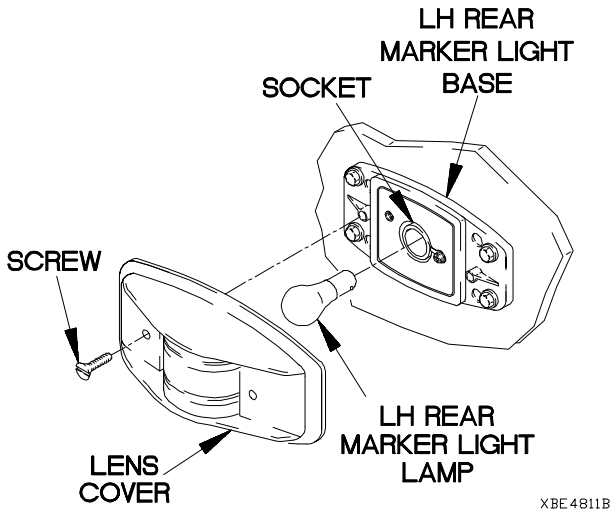
## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



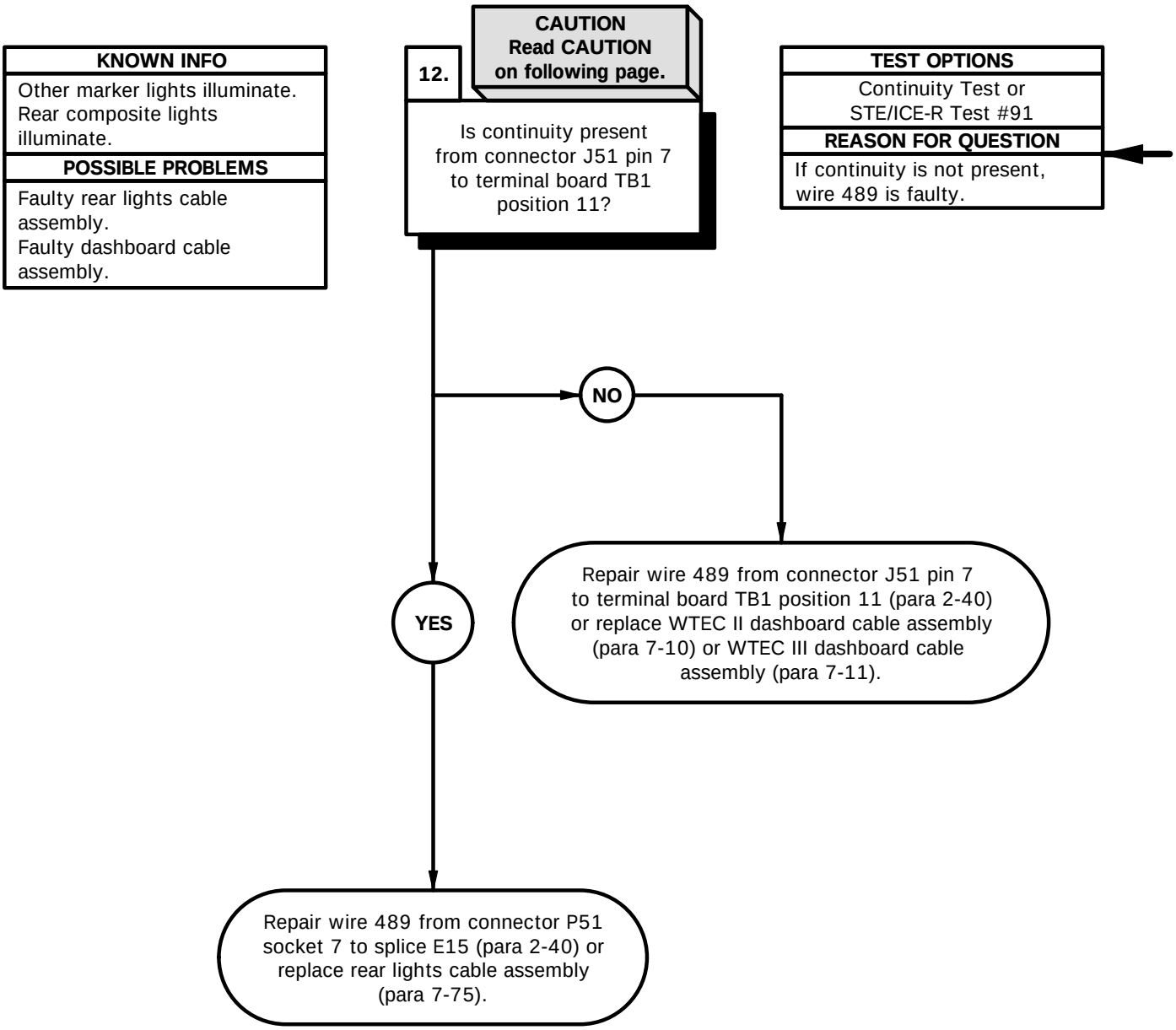
**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL30, and lockwasher from LH rear marker light screw. Discard lockwashers.
(2) Remove nut, lockwasher, terminal lug TL31, and lockwasher from middle rear marker light screw. Discard lockwashers.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL30.
(5) Connect negative (-) probe of multimeter to terminal lug TL31 and note reading on multimeter.
(6) If continuity is not present, repair wire 3094 from terminal lug TL30 to terminal lug TL31 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) If continuity is present, replace LH rear marker light (para 7-31).
(8) Install lockwasher, terminal lug TL31, lockwasher, and nut on middle rear marker light screw.
(9) Install lockwasher, terminal lug TL30, lockwasher, and nut on LH rear marker light screw.
(10) Install LH rear marker light lamp in socket.
(11) Install lens cover on LH rear marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**CAUTION**

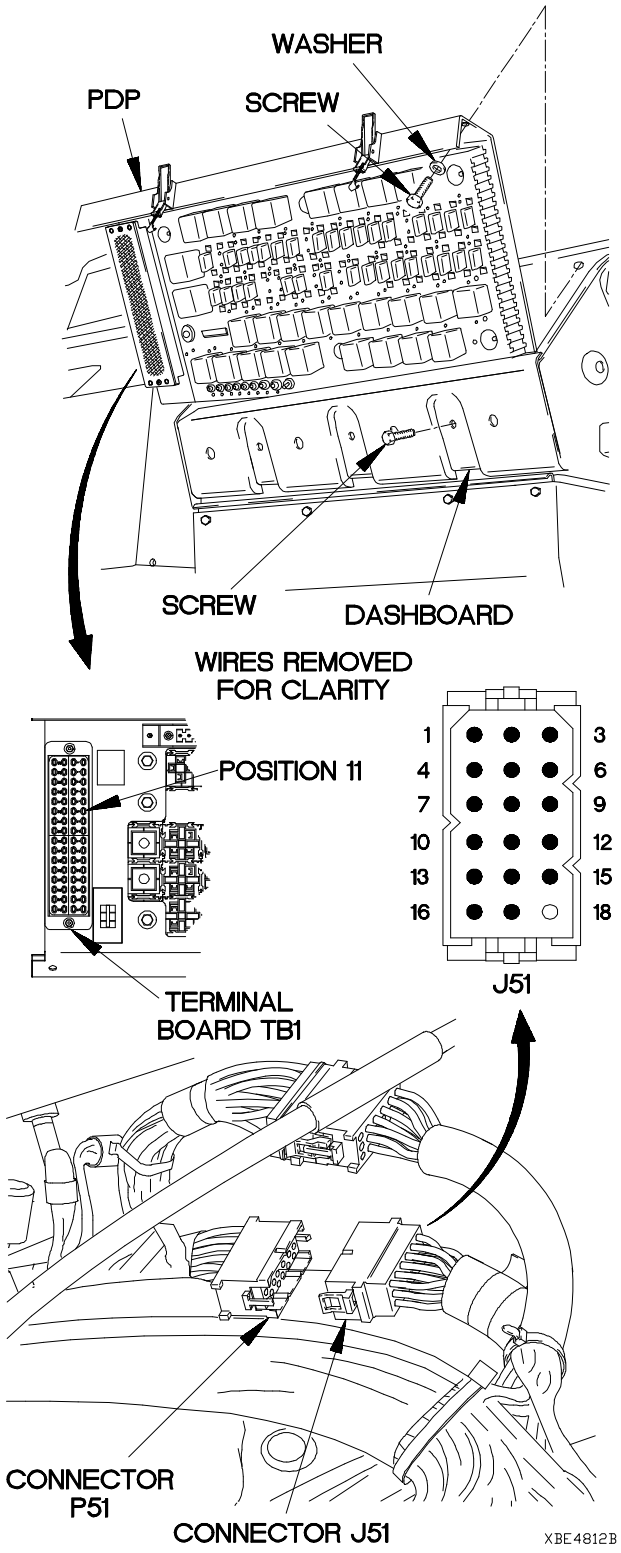
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

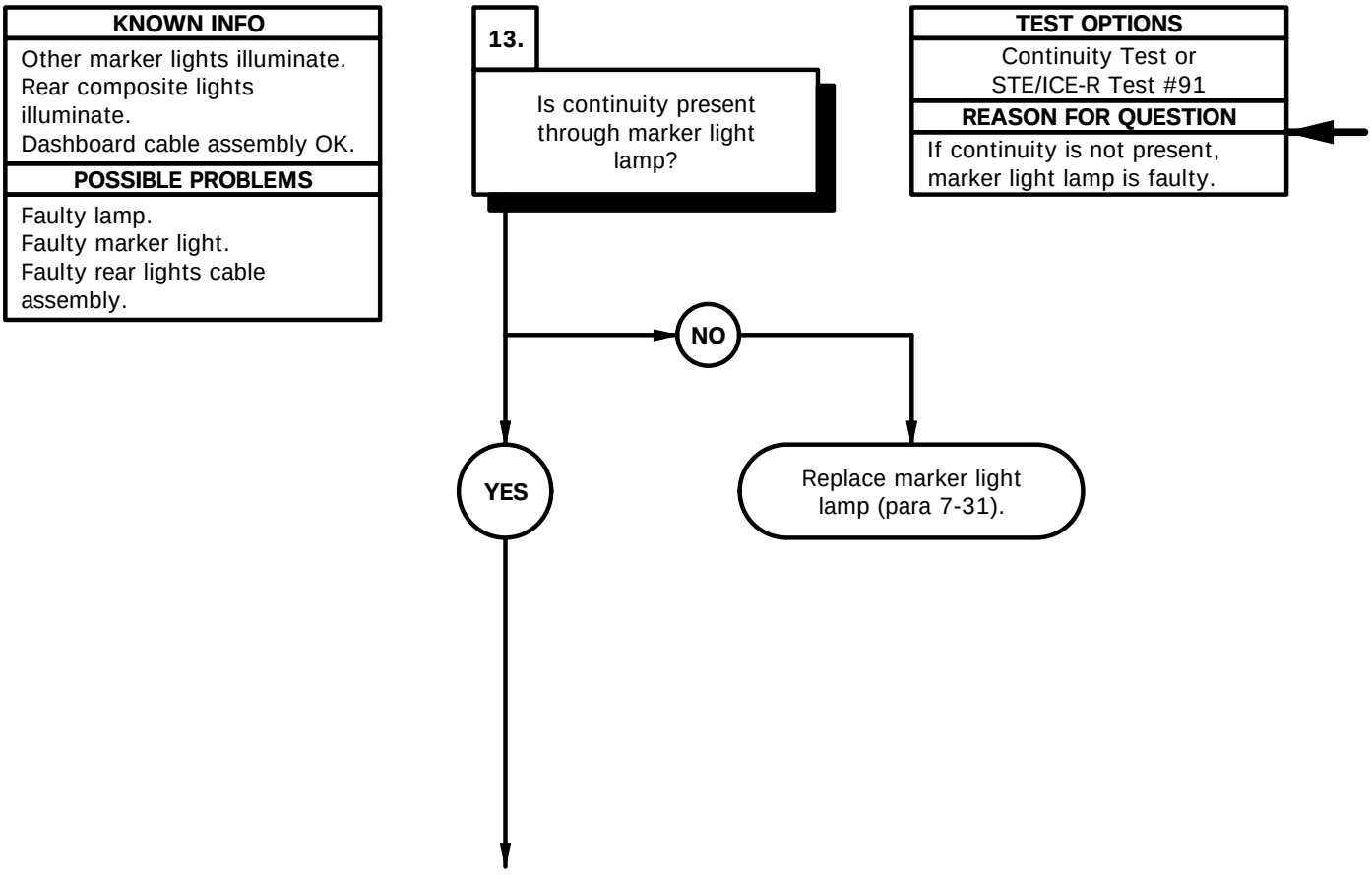
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove PDP cover (para 16-2).
(3) Remove three screws and washers from PDP.
(4) Remove three screws from PDP.
(5) Lift PDP outward to gain access.
(6) Disconnect connector P51 from connector J51.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to connector J51 pin 7.
(9) Connect negative (-) probe of multimeter to terminal board TB1 position 11 and note reading on multimeter.
(10) If continuity is not present, repair wire 489 from connector J51 pin 7 to terminal board TB1 position 11 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(11) If continuity is present, repair wire 489 from connector P51 socket 7 to splice E15 (para 2-40) or replace rear lights cable assembly (para 7-75).
(12) Connect connector J51 to connector P51.
(13) Install PDP on dashboard with three screws.
(14) Install three washers and screws in PDP.
(15) Install PDP cover (para 16-2).
(16) Connect batteries (para 7-48).

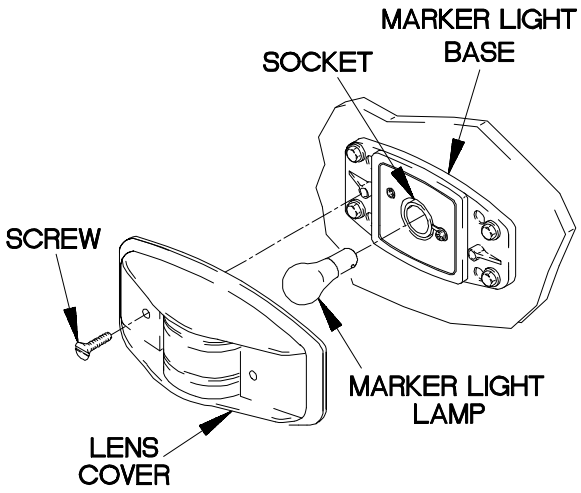


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

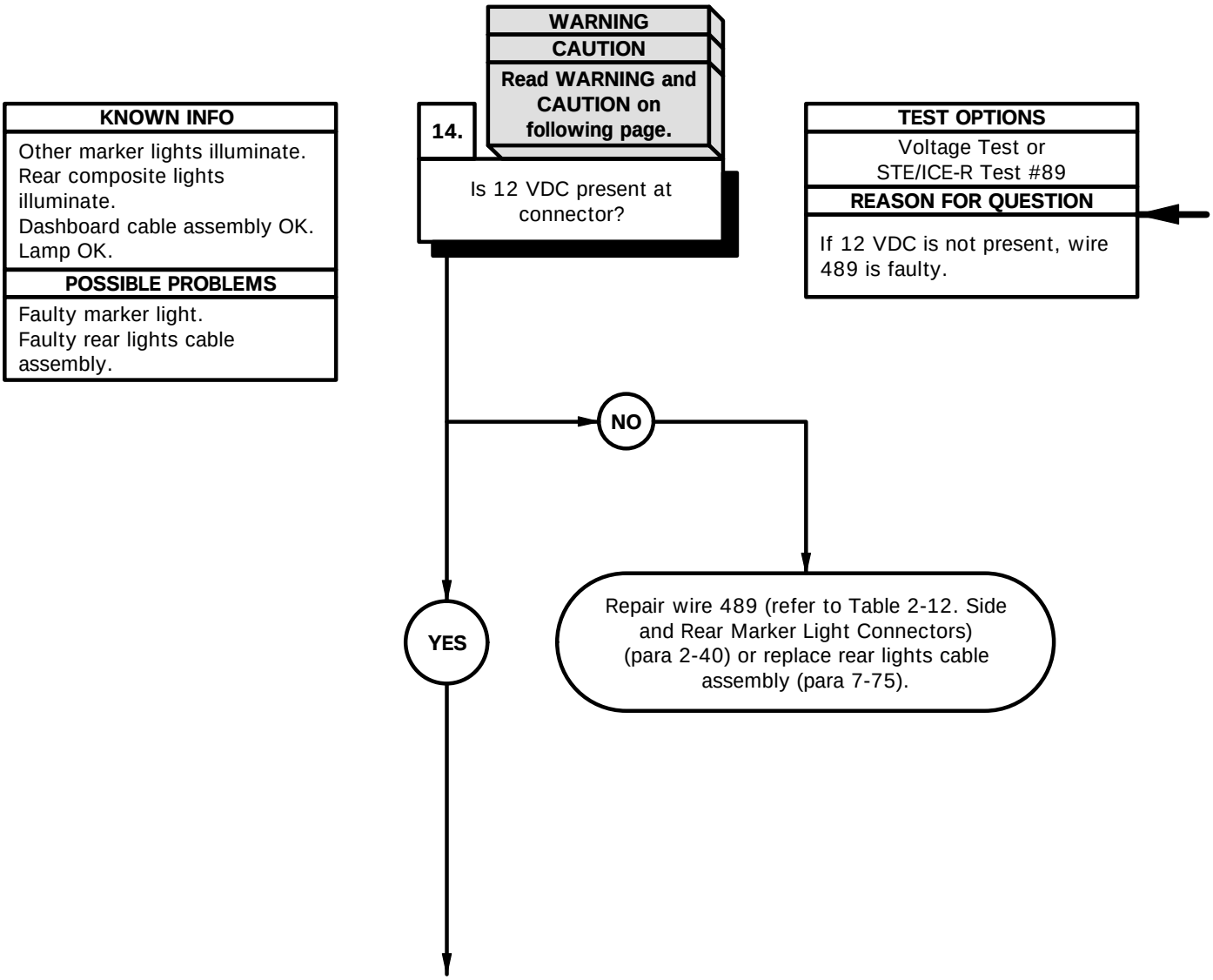


**CONTINUITY TEST**

(1) Remove two screws and lens cover from marker light base.
(2) Remove marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace marker light lamp (para 7-31).
(6) Install marker light lamp in socket.
(7) Install lens cover on marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**VOLTAGE TEST**

(1) Disconnect marker light connector from connector (refer to Table 2-12. Side and Rear Marker Light Connectors).
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector (refer to Table 2-12. Side and Rear Marker Light Connectors).
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) Position main light switch to OFF (TM 9-2320-365-10).
(7) If 12 VDC is not present, repair wire 489 (refer to Table 2-12. Side and Rear Marker Light Connectors) (para 2-40) or replace rear lights cable assembly (para 7-75).

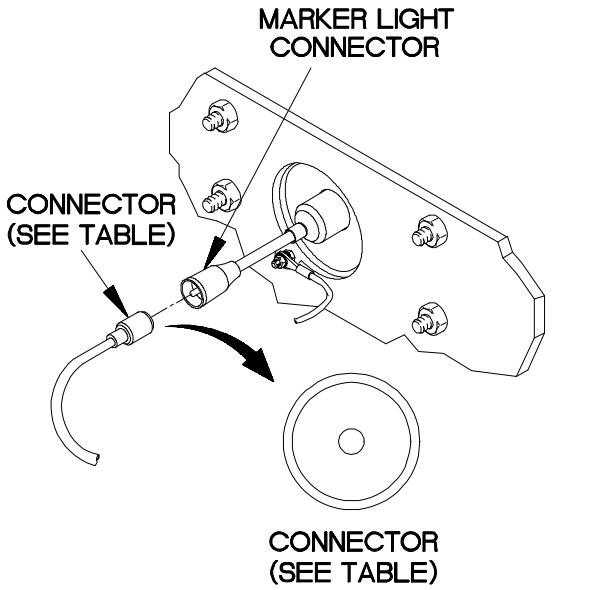
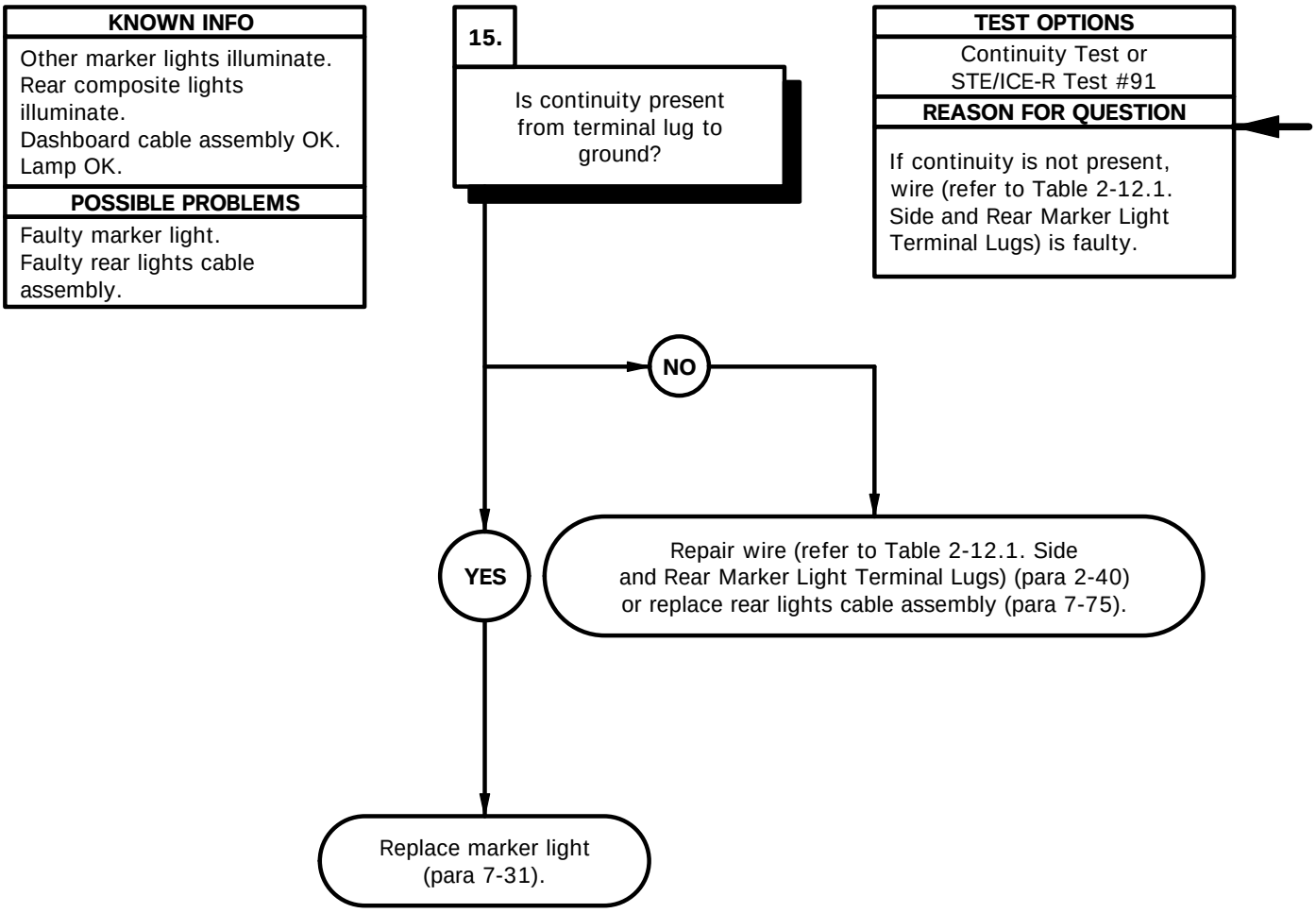



**Table 2-12. Side and Rear Marker Light Connectors**

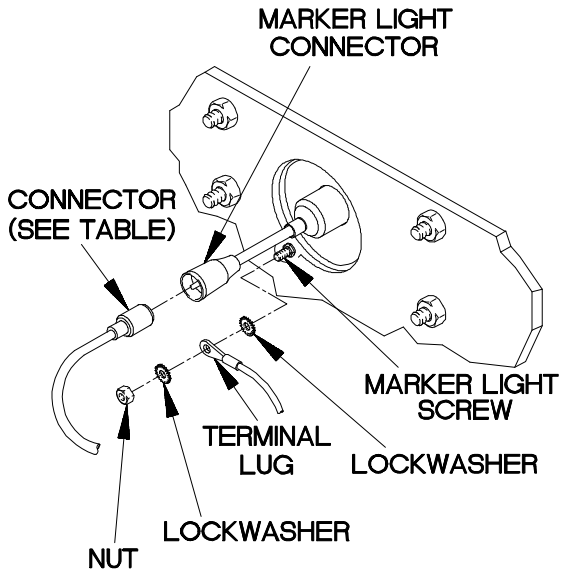
| Marker Light | Connector | Wire 489 Segment |
|---|---|---|
| LH Side | P85 | Connector P85 to Splice E16 |
| LH Rear | P86 | Connector P86 to Splice E15 |
| Left Rear | P54 | Connector P54 to Splice E15 |
| Middle Rear | P56 | Connector P56 to Splice E15 |
| Right Rear | P58 | Connector P58 to Splice E15 |
| RH Rear | P89 | Connector P89 to Splice E17 |
| RH Side | P88 | Connector P88 to Splice E17 |

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug, and lockwasher from marker light screw. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug (refer to Table 2-12.1 Side and Rear Marker Light Terminal Lugs).
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire (refer to Table 2-12.1 Side and Rear Marker Light Terminal Lugs) (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace marker light (para 7-31).
(7) Install lockwasher, terminal lug, lockwasher, and nut on marker light screw.
(8) Connect marker light connector to connector (refer to Table 2-12.1. Side and Rear Marker Light Connectors).

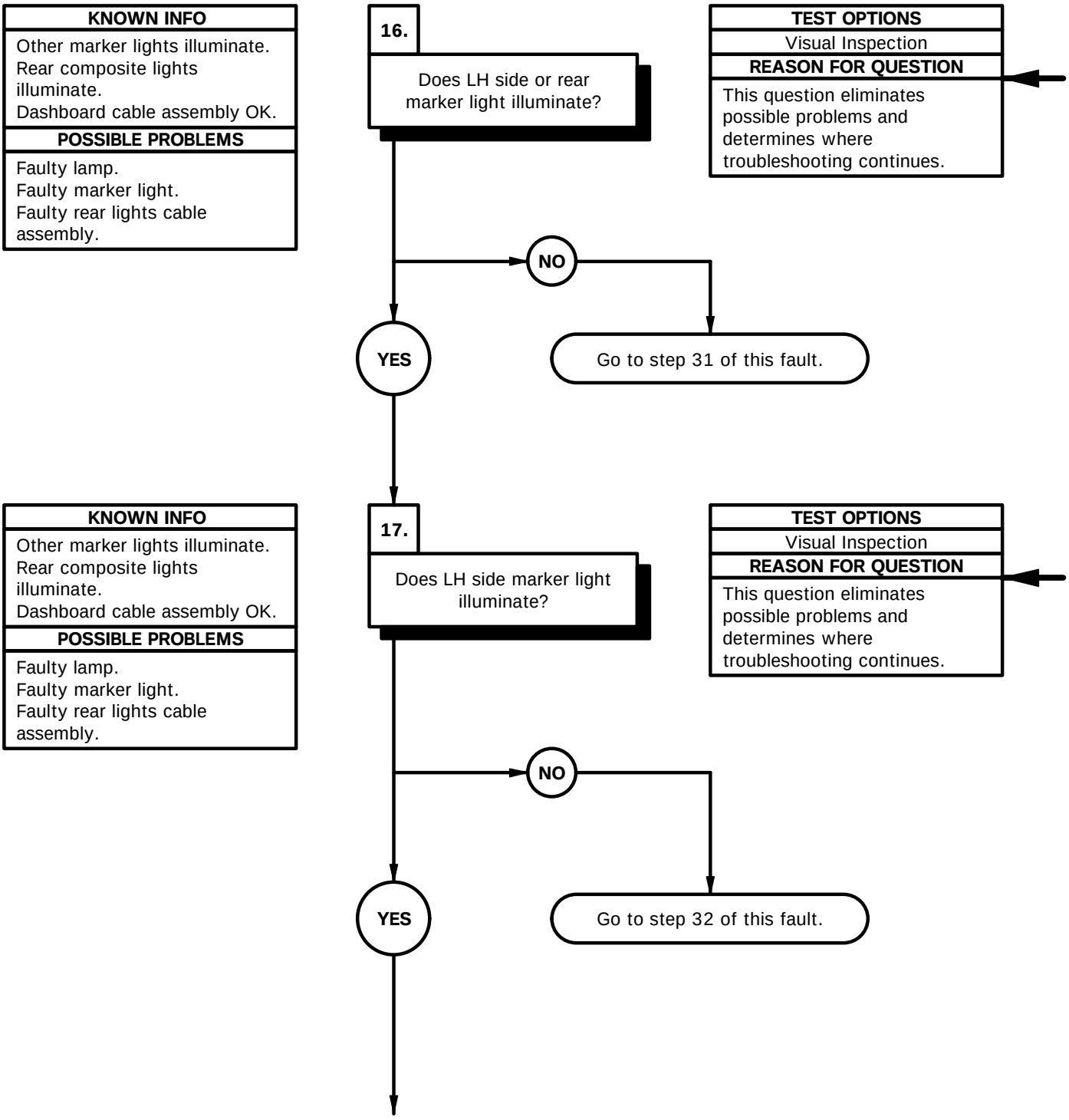



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**Table 2-12.1. Side and Rear Marker Light Terminal Lugs**

| Marker Light | Connector | Wire Segment |
|---|---|---|
| LH Side | TL15 | Wire 3094 from Terminal Lug TL15 to Terminal Lug TL16 |
| LH Rear | TL16 | Replace Marker Light (para 7-38) |
| Left Rear | TL30 | Wire 3094 from Terminal Lug TL31 to Terminal Lug TL30 |
| Middle Rear | TL31 | Replace Marker Light (para 7-38) |
| Right Rear | TL32 | Replace Marker Light (para 7-38) |
| RH Rear | TL20 | Replace Marker Light (para 7-38) |
| RH Side | TL19 | Wire 3095 from Terminal Lug TL19 to Terminal Lug TL20 |

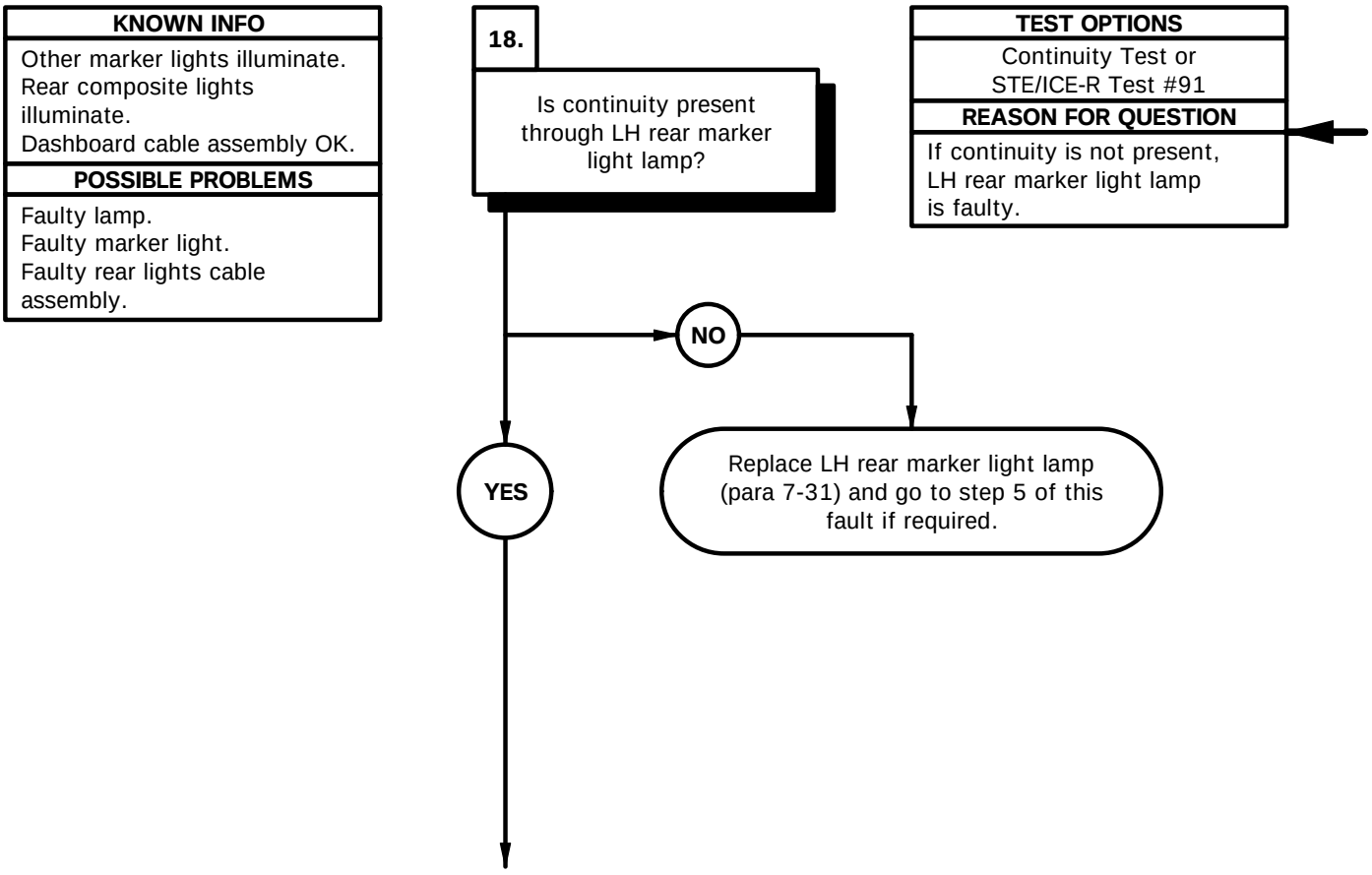
## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



If LH side and rear marker lights do not illuminate, go to step 31 of this fault.

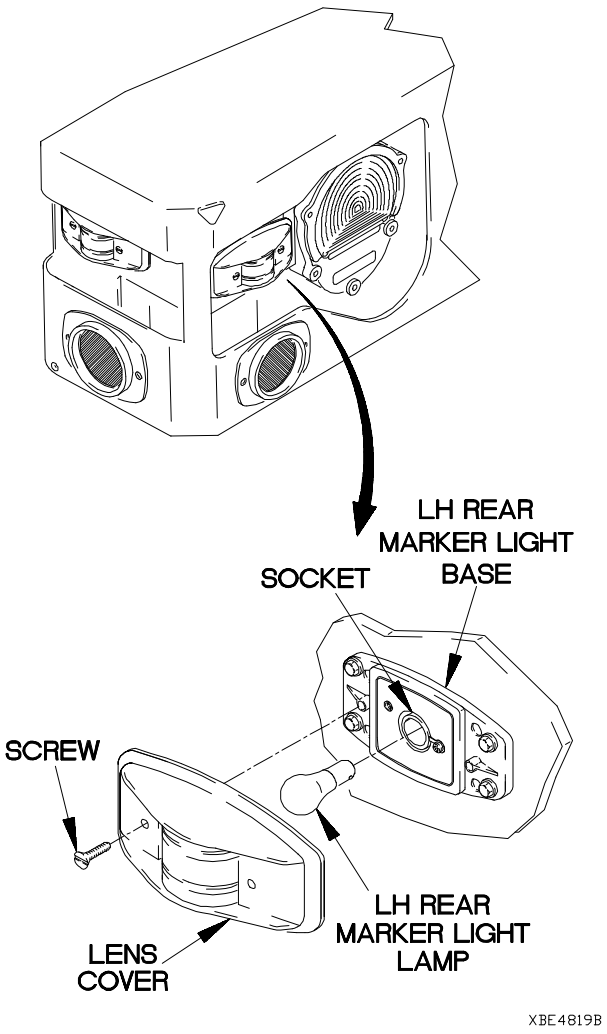
If LH side marker light does not illuminate, go to step 32 of this fault.

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

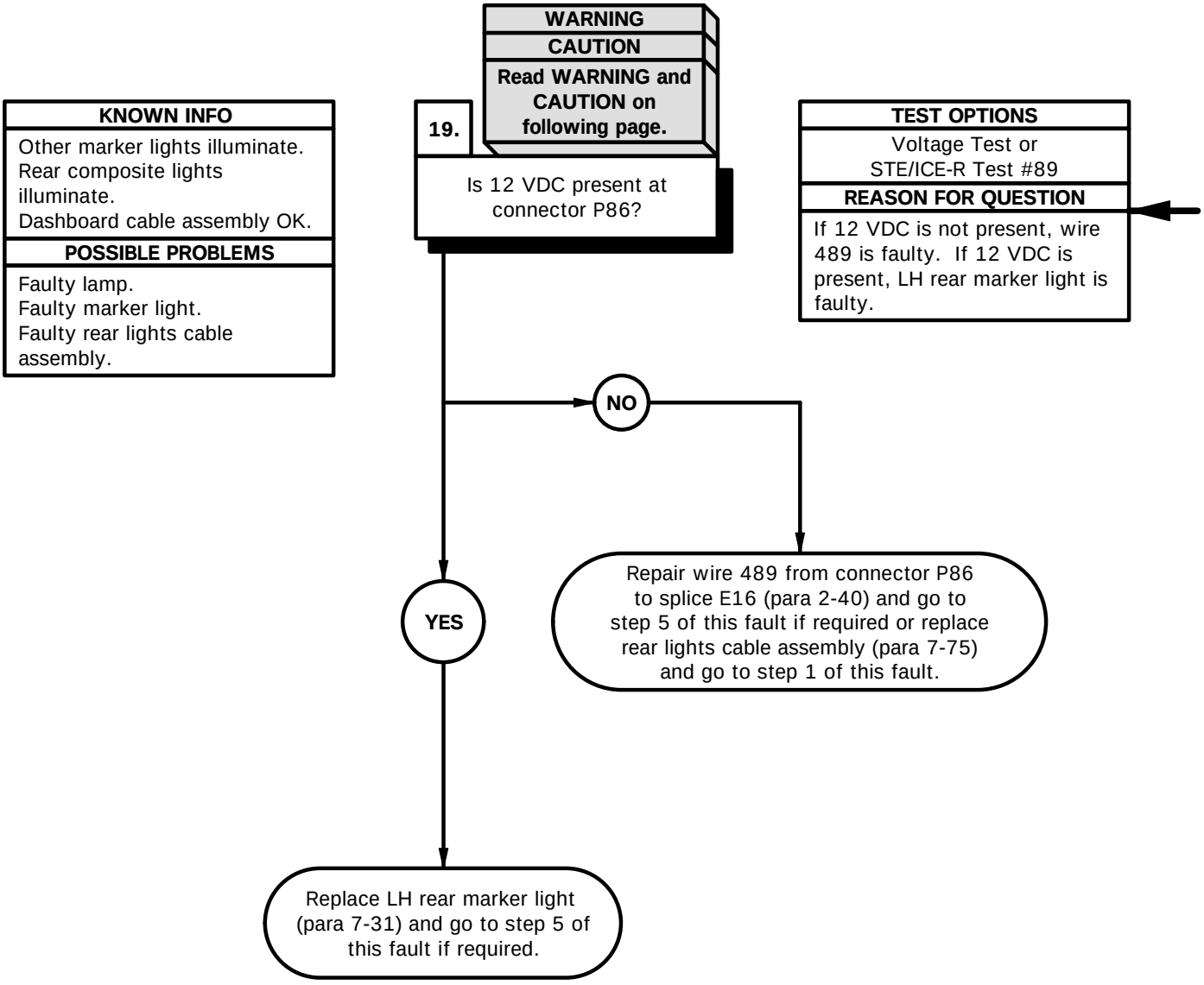


**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH rear marker light base.
(2) Remove LH rear marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH rear marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH rear marker light lamp (para 7-31) and go to step 5 of this fault if required.
(6) Install LH rear marker light lamp in socket.
(7) Install lens cover on LH rear marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

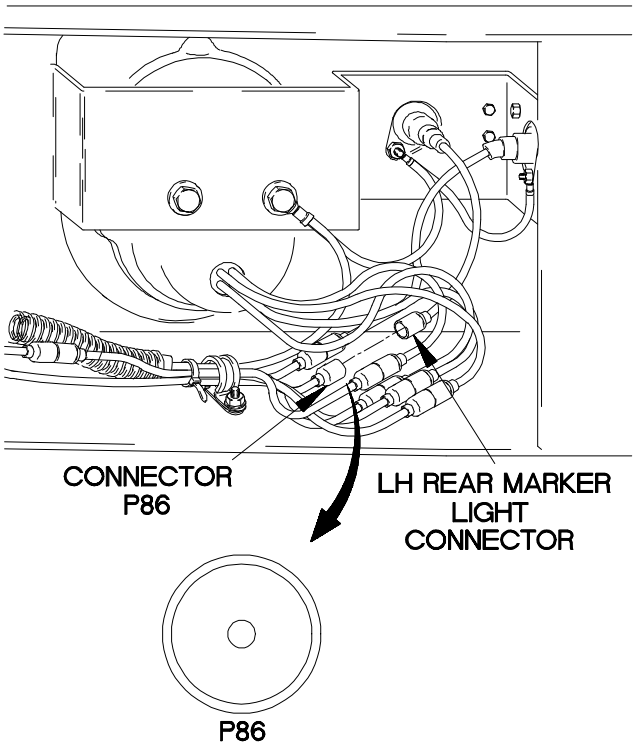
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

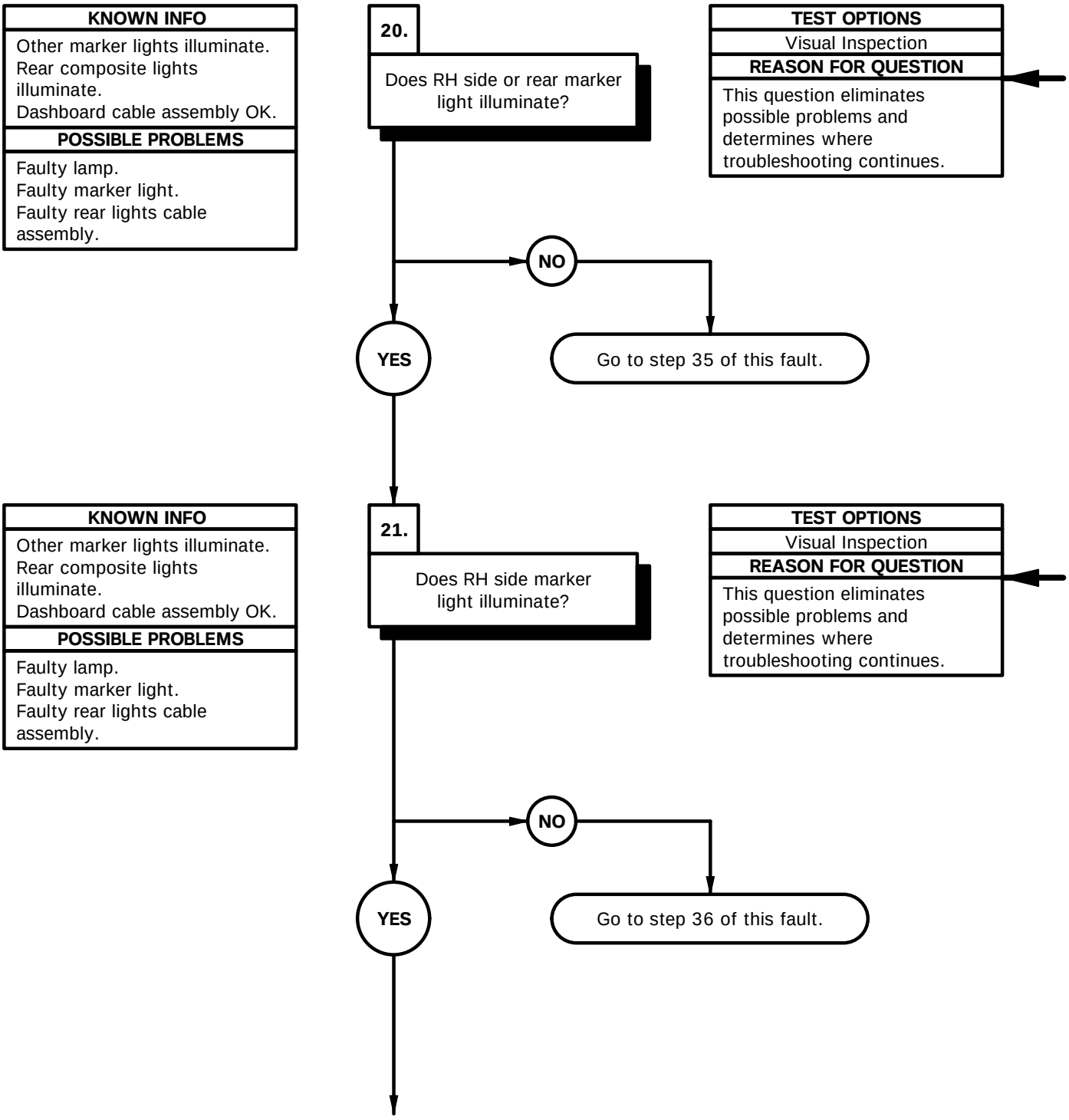
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P86 from LH rear marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P86.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P86 to splice E16 (para 2-40) and go to step 5 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7 If 12 VDC is present, replace LH rear marker light (para 7-31) and go to step 5 of this fault if required.
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Connect LH rear marker light connector to connector P86.



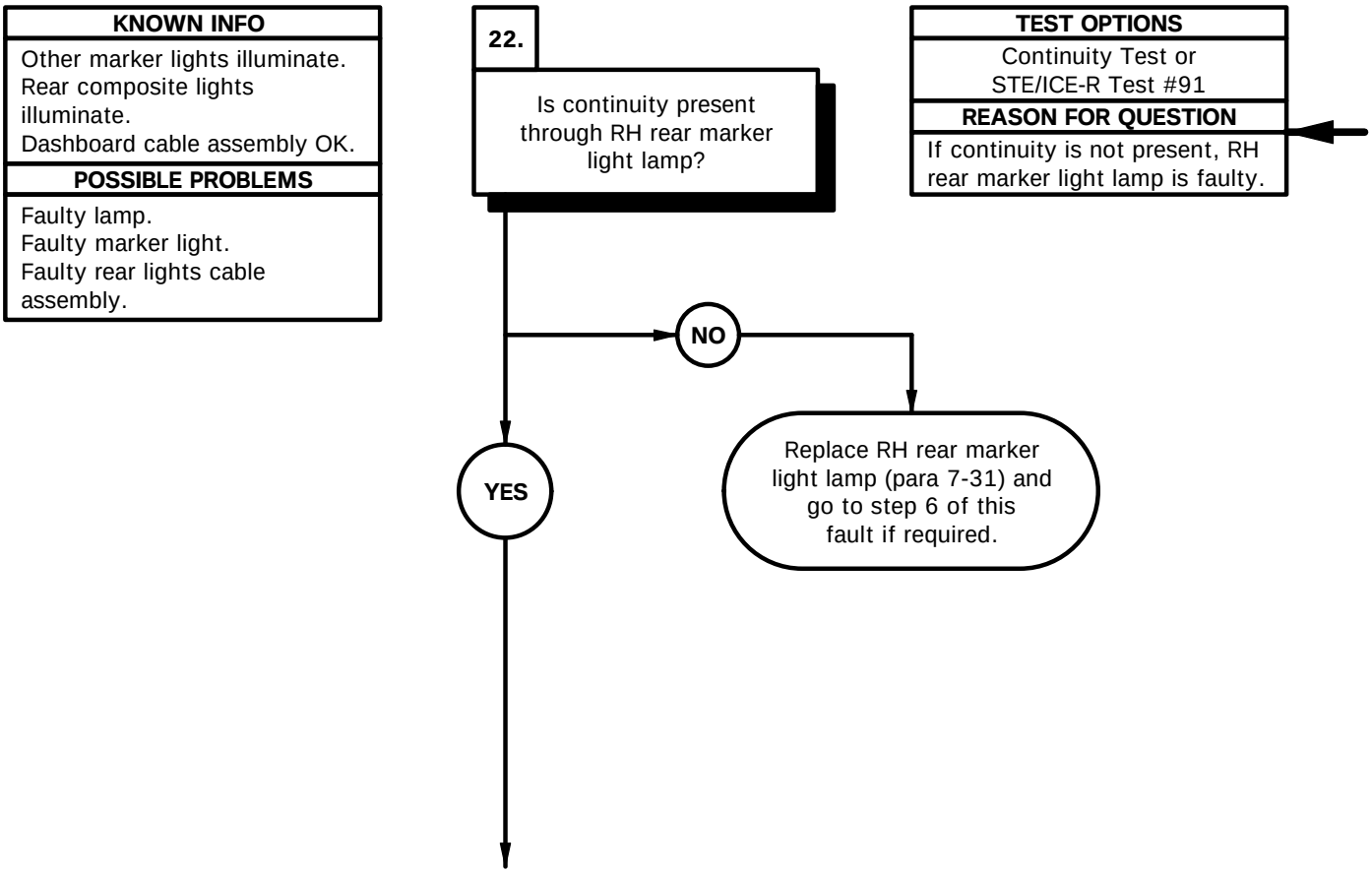
## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



If RH side or rear marker light does not illuminate, go to step 35 of this fault.

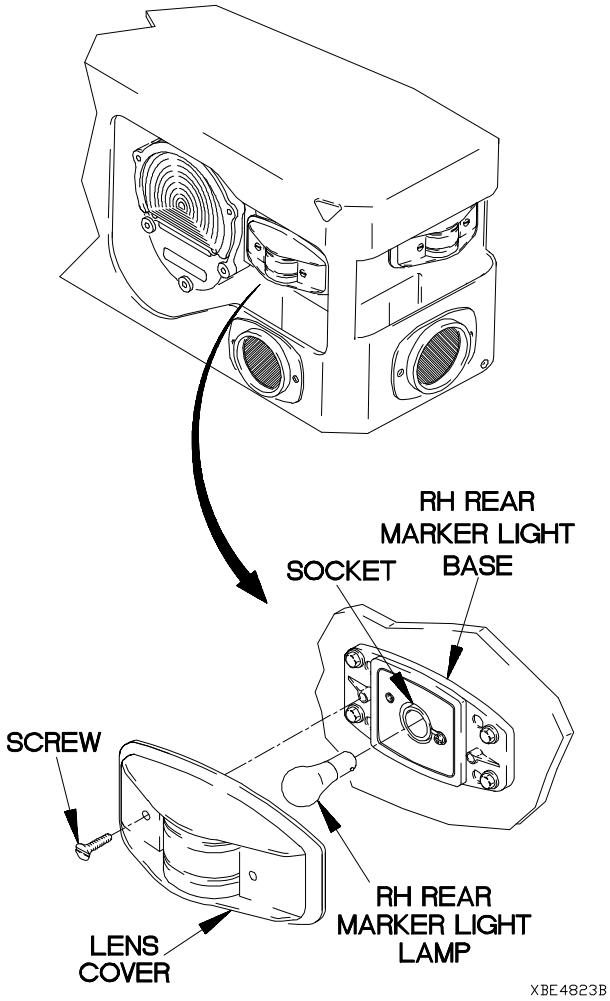
If RH side marker light does not illuminate, go to step 36 of this fault.

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

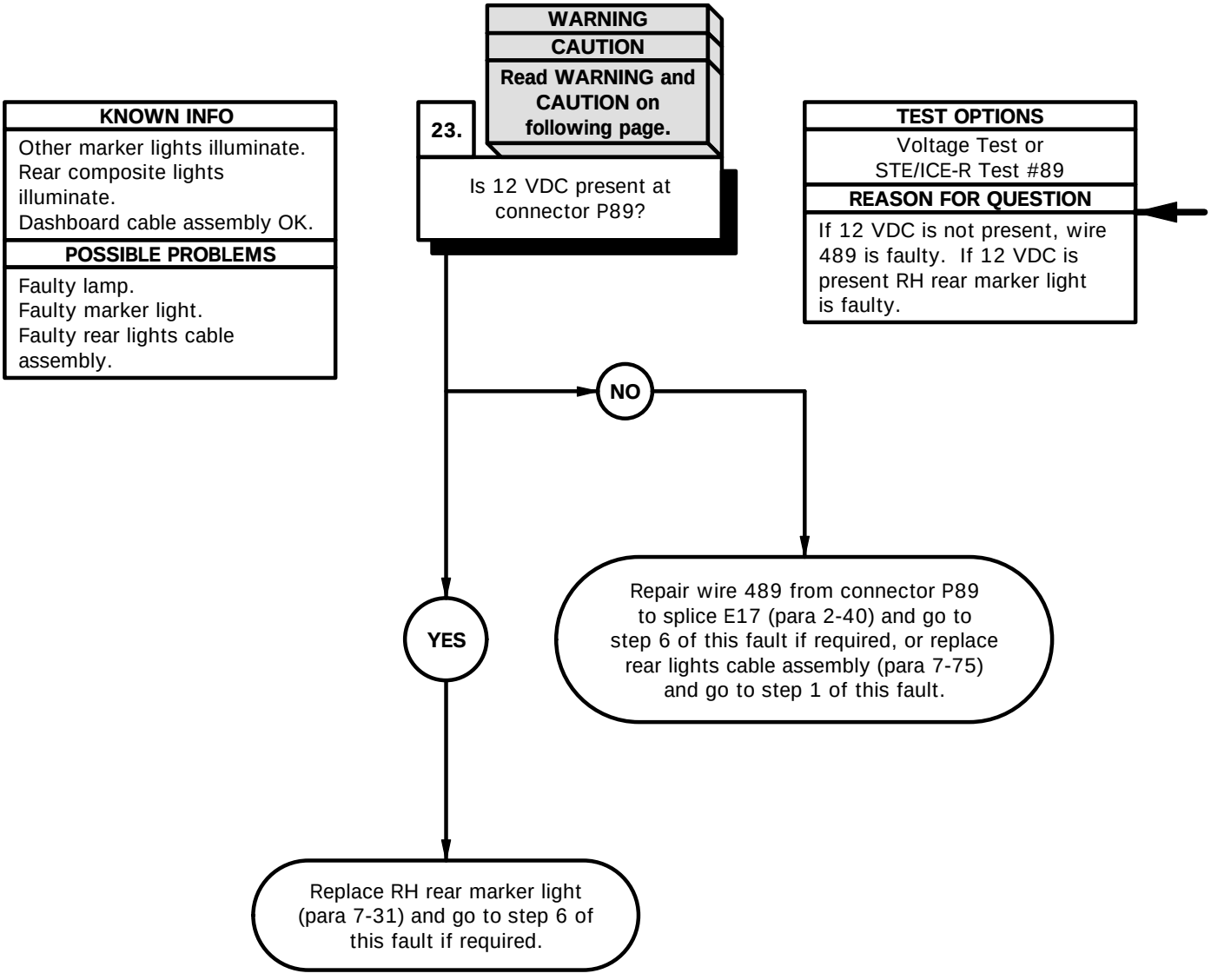


**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH rear marker light base.
(2) Remove RH rear marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH rear marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace RH rear marker light lamp (para 7-31) and go to step 6 of this fault if required.
(6) Install RH rear marker light lamp in socket.
(7) Install lens cover on RH rear marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

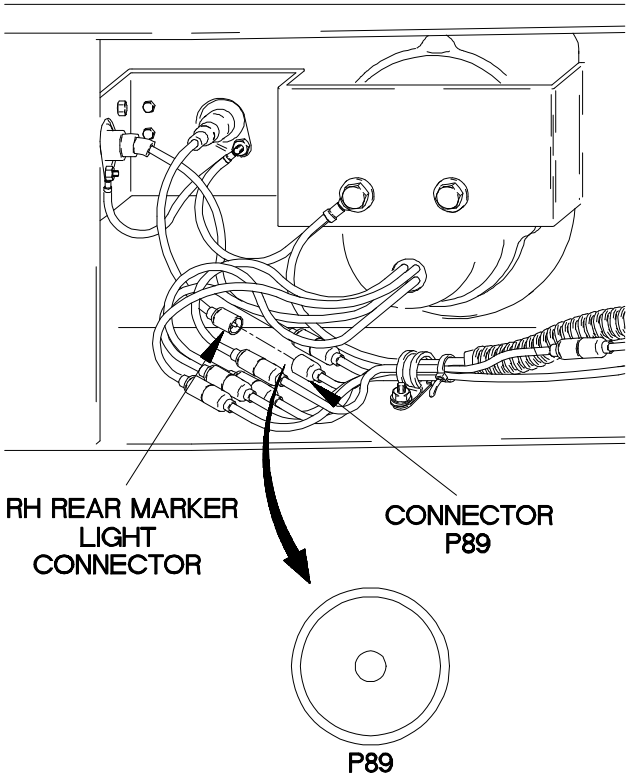
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

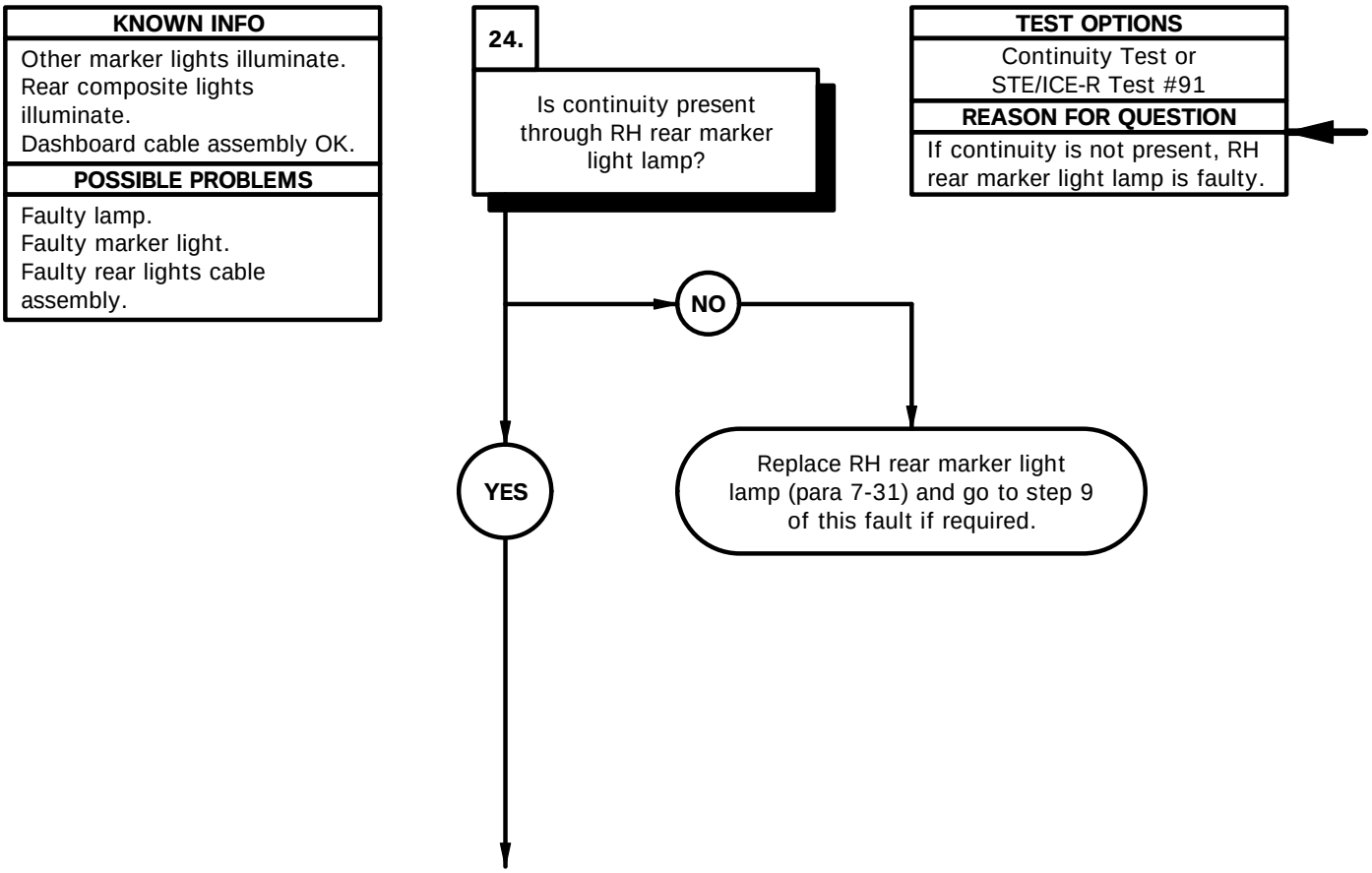
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P89 from RH rear marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P89.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P89 to splice E17 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) If 12 VDC is present, replace RH rear marker light (para 7-31) and go to step 6 of this fault.
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Connect RH rear marker light connector to connector P89.

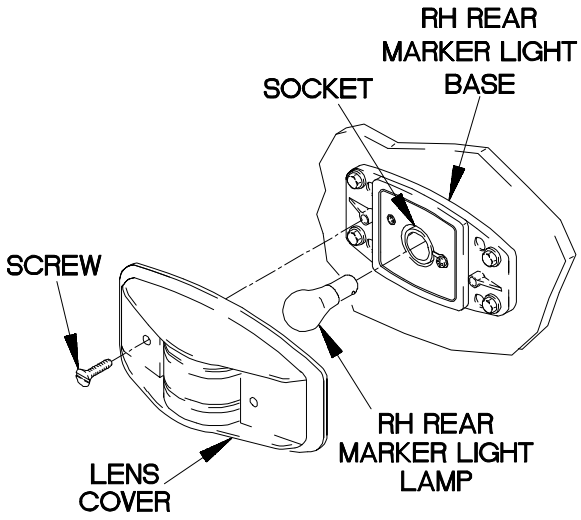


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



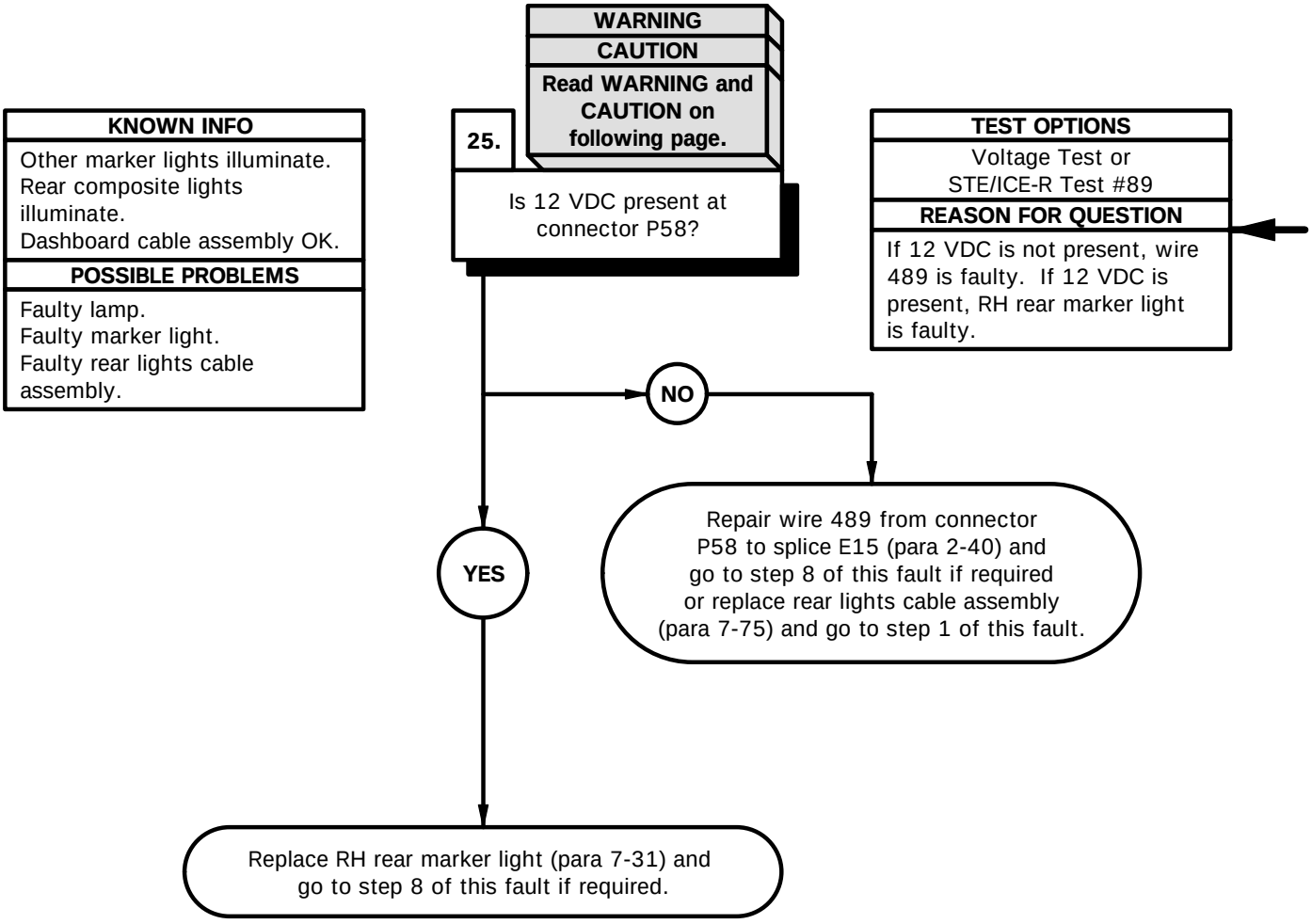
**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH rear marker light base.
(2) Remove RH rear marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH rear marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace RH rear marker light lamp (para 7-31) and go to step 9 of this fault if required.
(6) Install RH rear marker light lamp in socket.
(7) Install lens cover on RH rear marker light base with two screws.




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## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

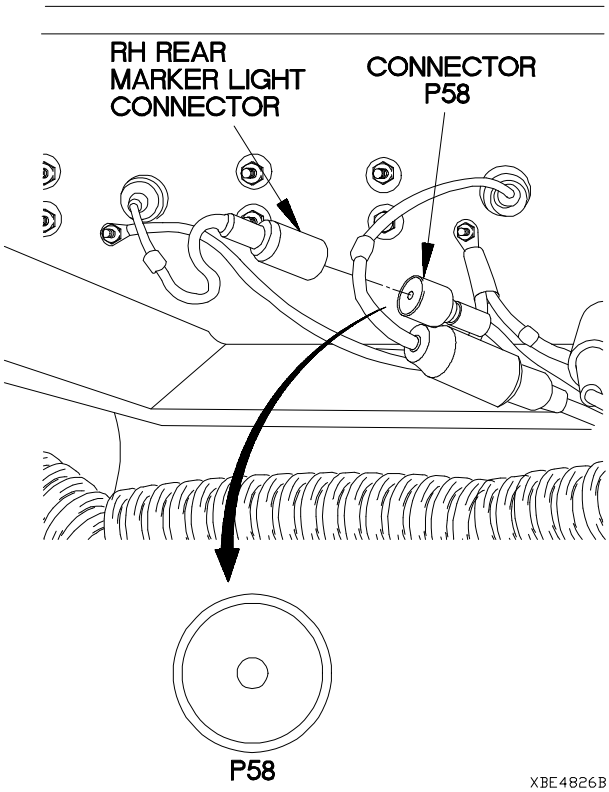
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

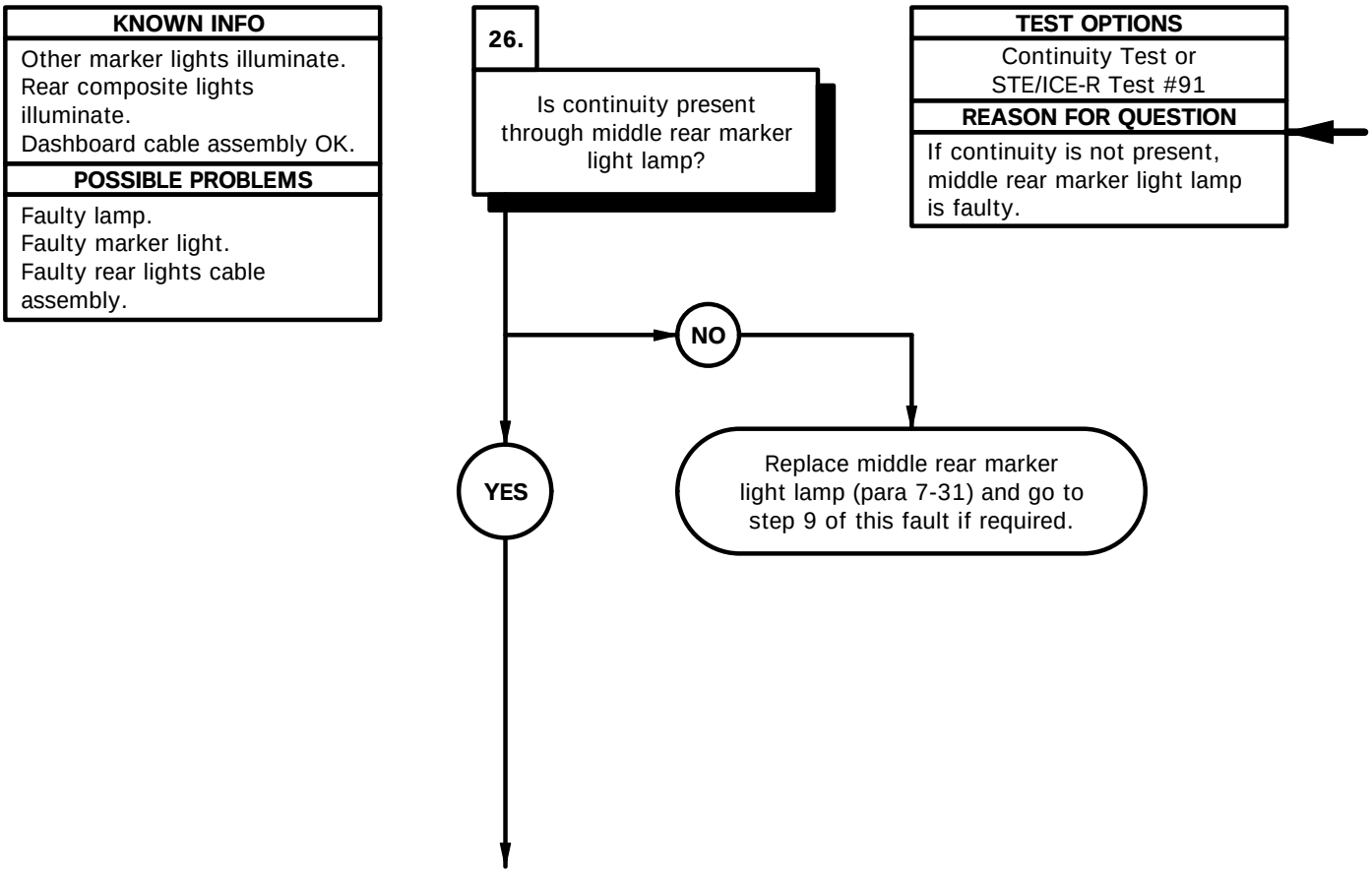
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P58 from RH rear marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P58.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P58 to splice E15 (para 2-40) and go to step 8 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) If 12 VDC is present, replace RH rear marker light (para 7-31) and go to step 8 of this fault if required.
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Connect RH rear marker light connector to connector P58.

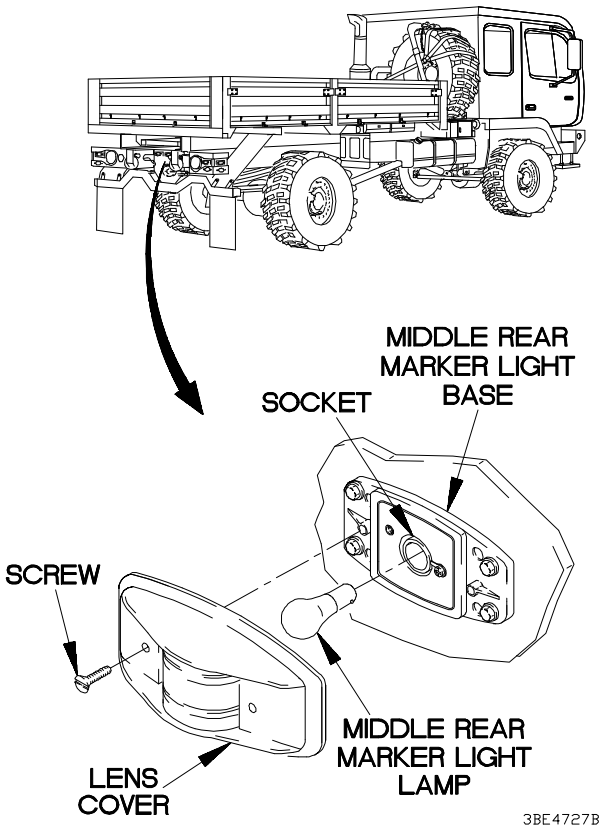


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

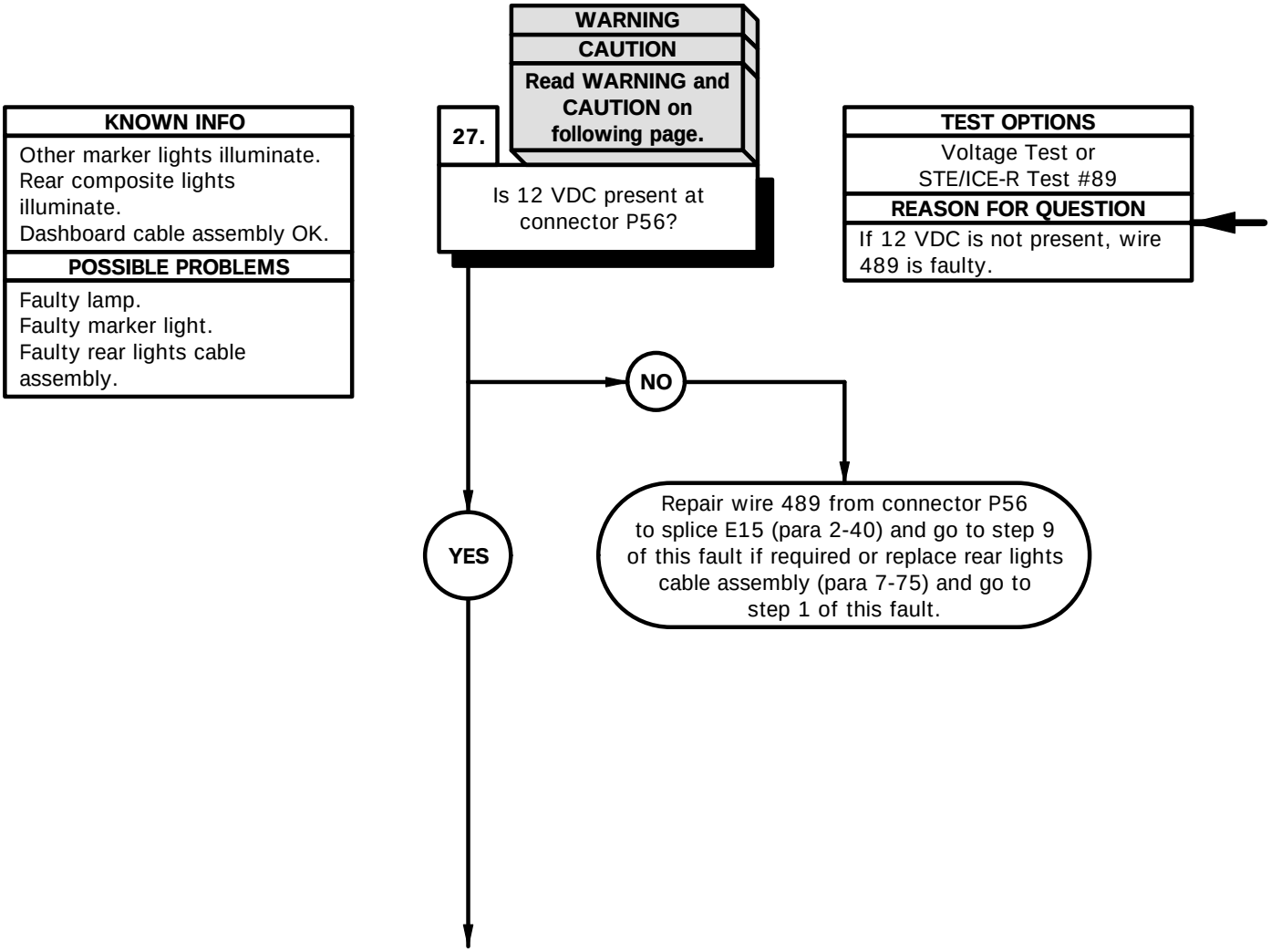


**CONTINUITY TEST**

(1) Remove two screws and lens cover from middle rear marker light base.
(2) Remove middle rear marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through middle rear marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace middle rear marker light lamp (para 7-31) and go to step 9 of this fault if required.
(6) Install middle rear marker light lamp in socket.
(7) Install lens cover on middle rear marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

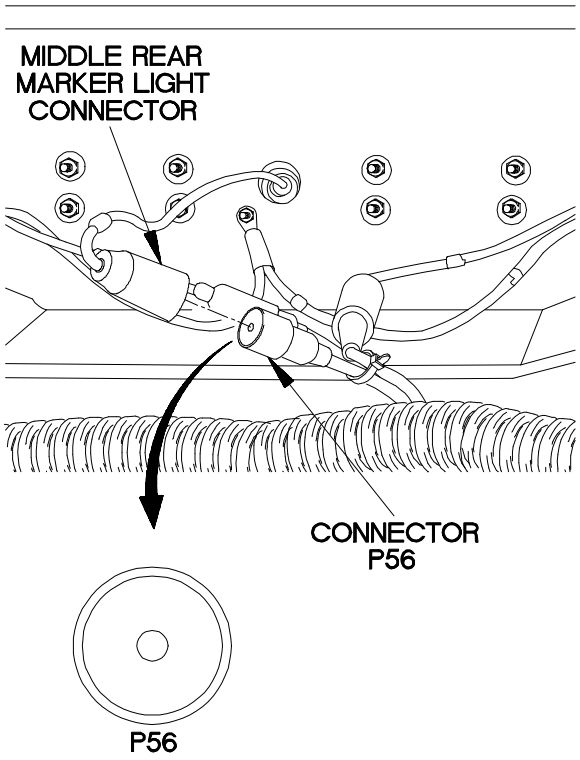
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

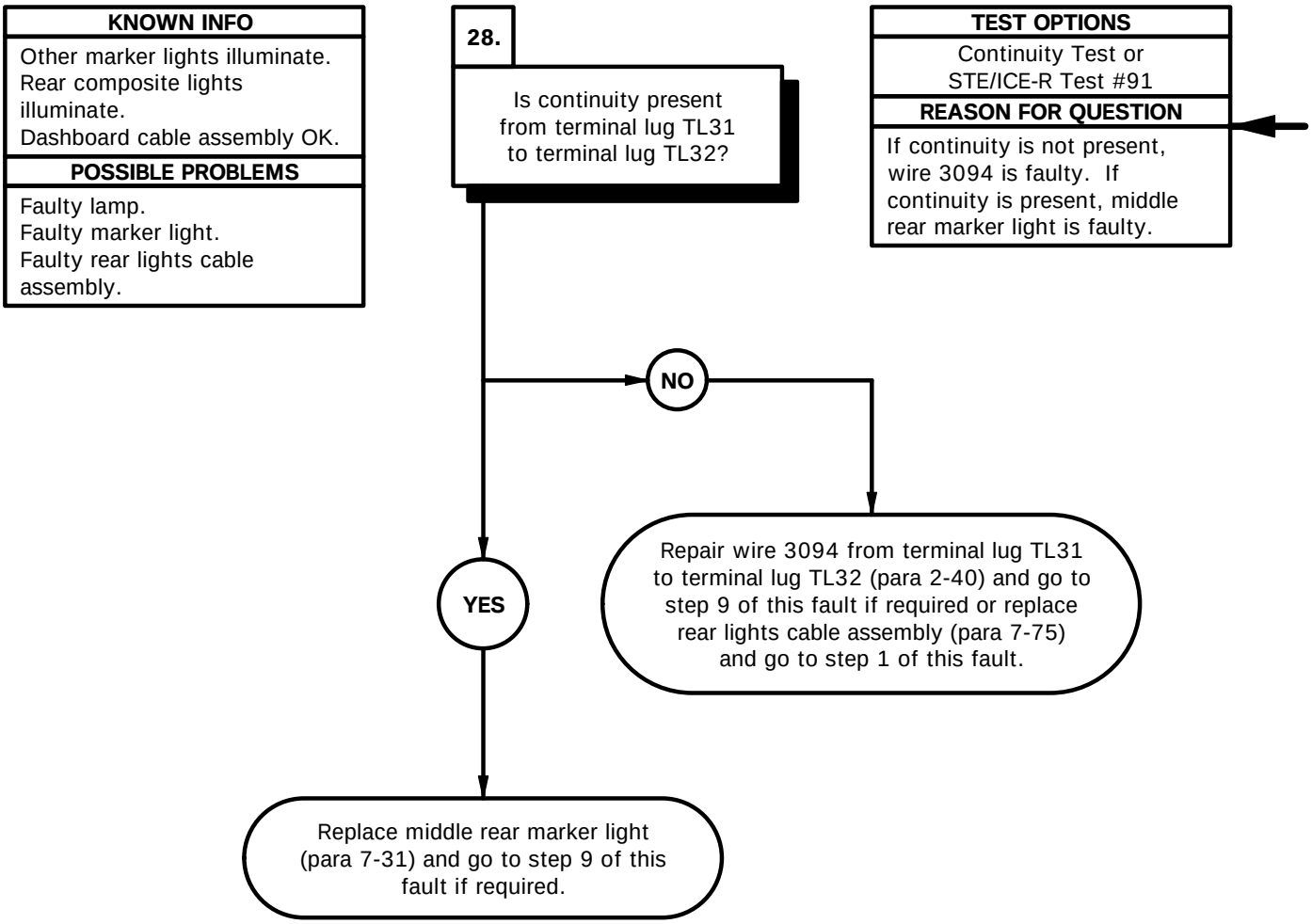
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P56 from middle rear marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P56.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P56 to splice E15 (para 2-40) and go to step 9 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Connect middle rear marker light connector to connector P56.

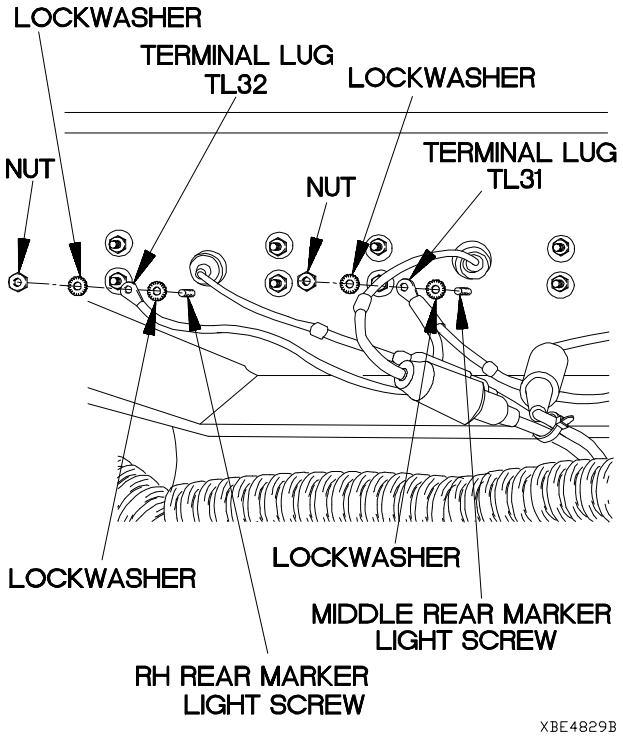


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

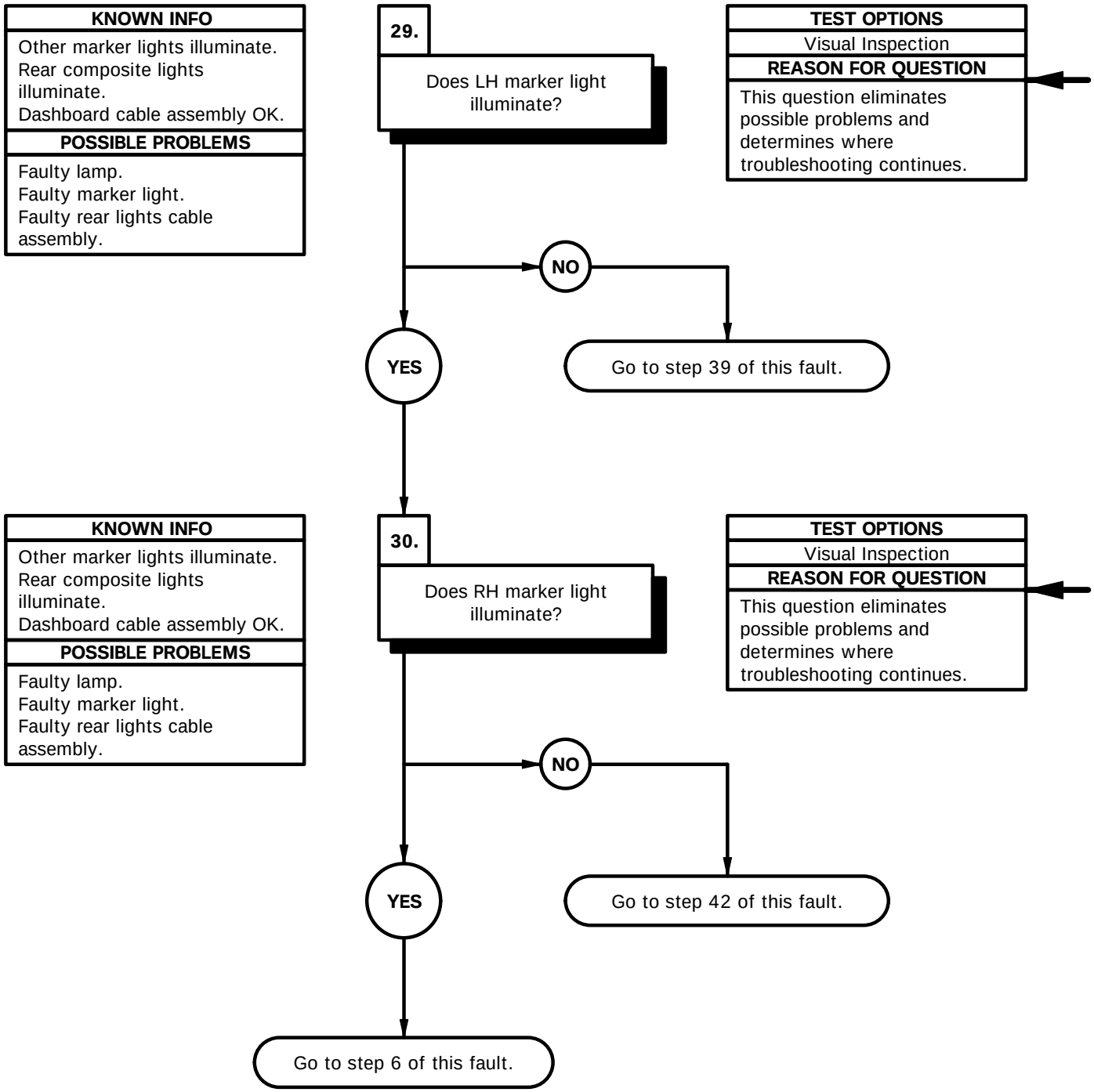


**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL31, and lockwasher from middle rear marker light screw. Discard lockwashers.
(2) Remove nut, lockwasher, terminal lug TL32, and lockwasher from RH rear marker light screw. Discard lockwashers.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to terminal lug TL31.
(5) Connect negative (-) probe of multimeter to terminal lug TL32 and note reading on multimeter.
(6) If continuity is not present, repair wire 3094 from terminal lug TL31 to terminal lug TL32 (para 2-40) and go to step 9 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) If continuity is present, replace middle rear marker light (para 7-31) and go to step 9 of this fault if required.
(8) Install lockwasher, terminal lug TL32, lockwasher, and nut on RH rear marker light screw.
(9) Install lockwasher, terminal lug TL31, lockwasher, and nut on middle rear marker light screw.



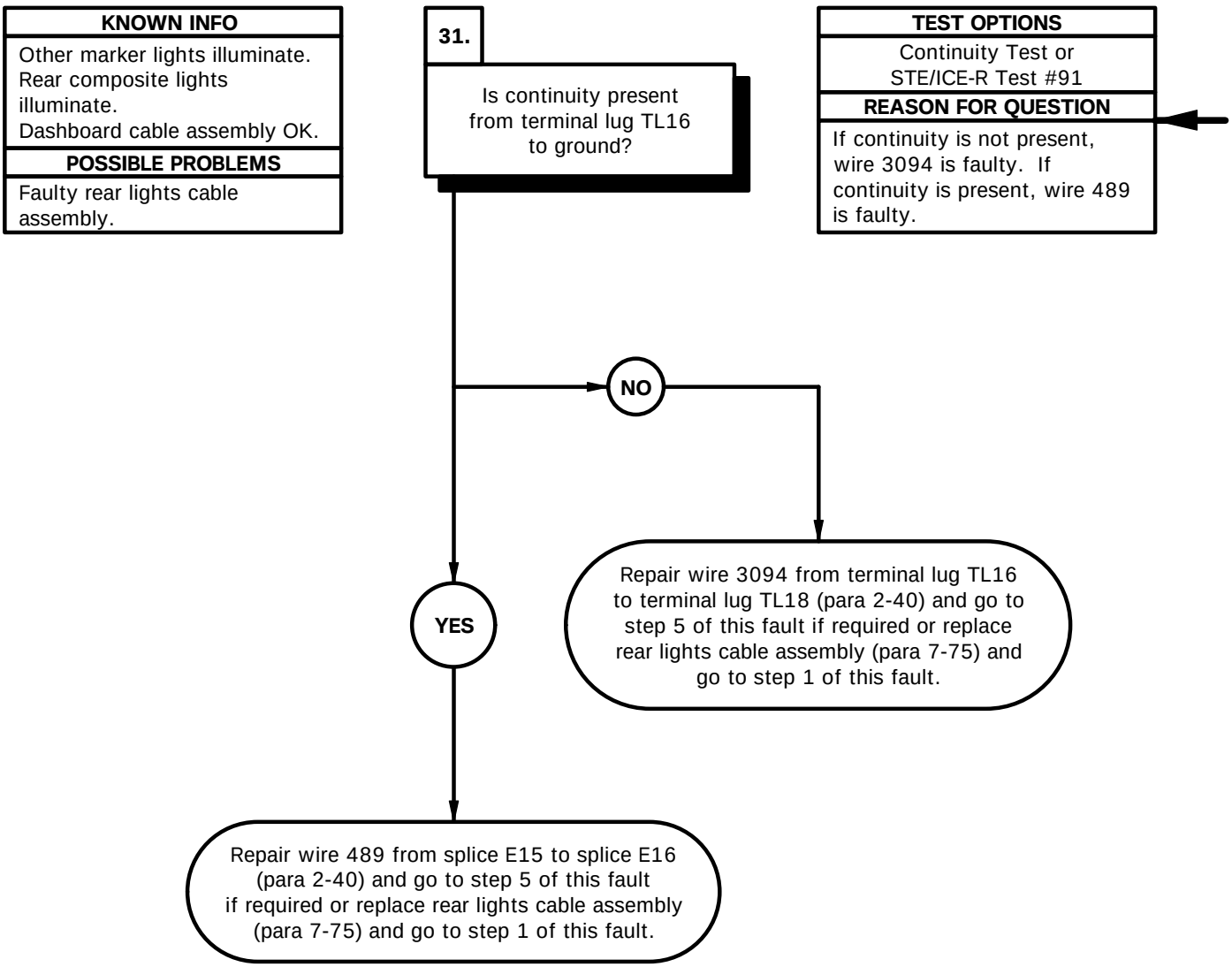
## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



If LH marker light does not illuminate, go to step 39 of this fault.

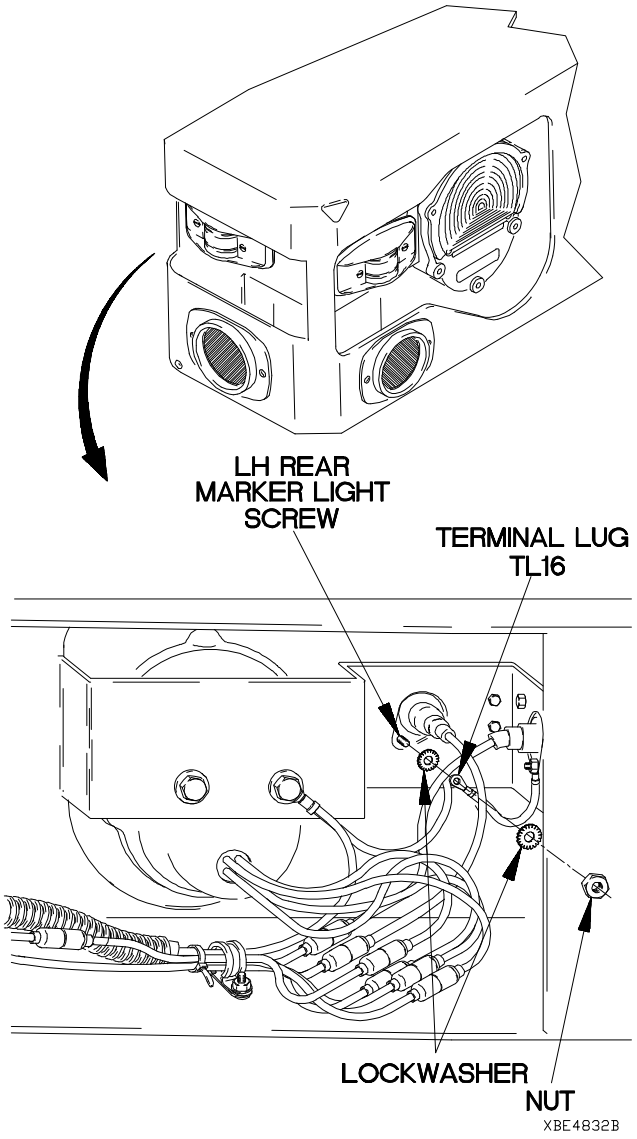
If RH marker light does not illuminate, go to step 42 of this fault.

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

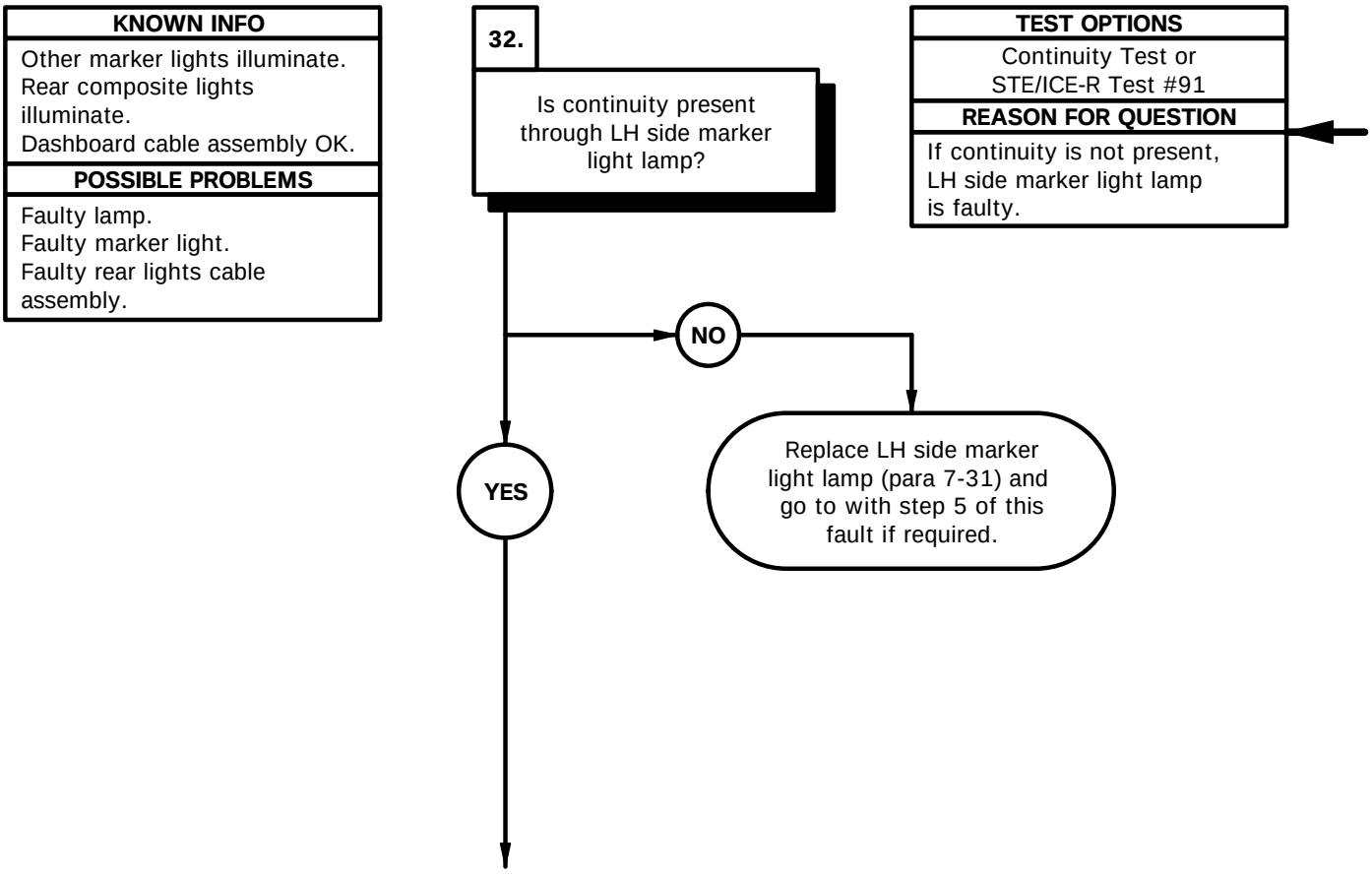


**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL16 and lockwasher from LH rear marker light screw. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL16.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3094 from terminal lug TL16 to ground (para 2-40) and go to step 5 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(6) If continuity is present, repair wire 489 from splice E15 to splice E16 (para 2-40) and go to step 5 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) Install lockwasher, terminal lug TL16, lockwasher, and nut on LH rear marker light screw.

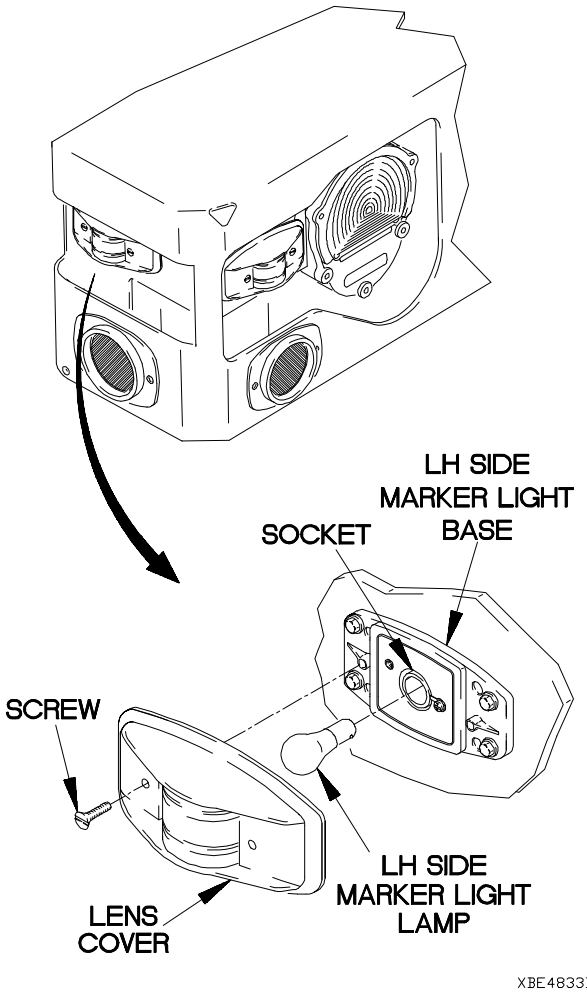


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

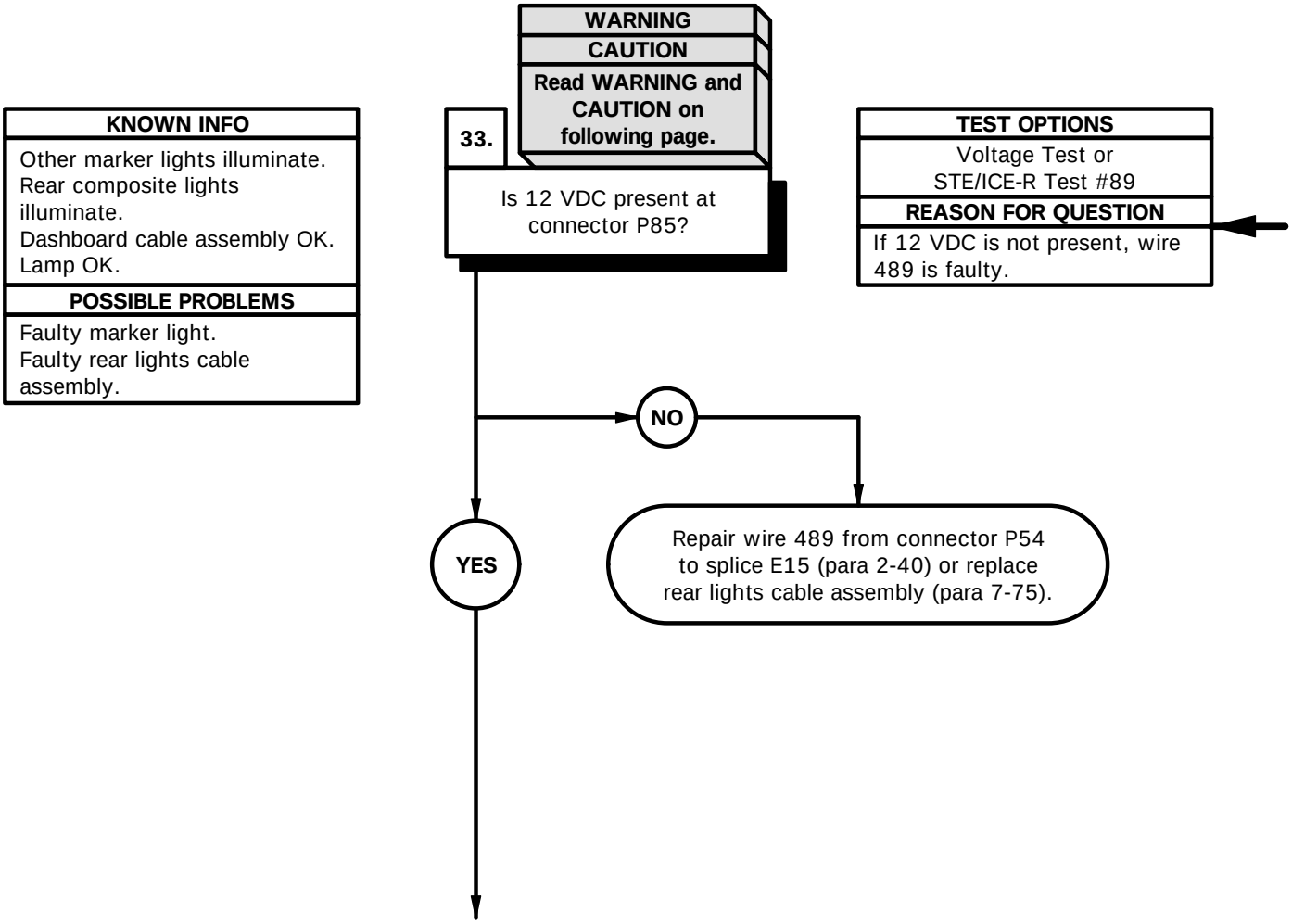


**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH side marker light base.
(2) Remove LH side marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH side marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH side marker light lamp (para 7-31) and go to step 5 of this fault if required.
(6) Install LH side marker lamp in socket.
(7) Install lens cover on LH side marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

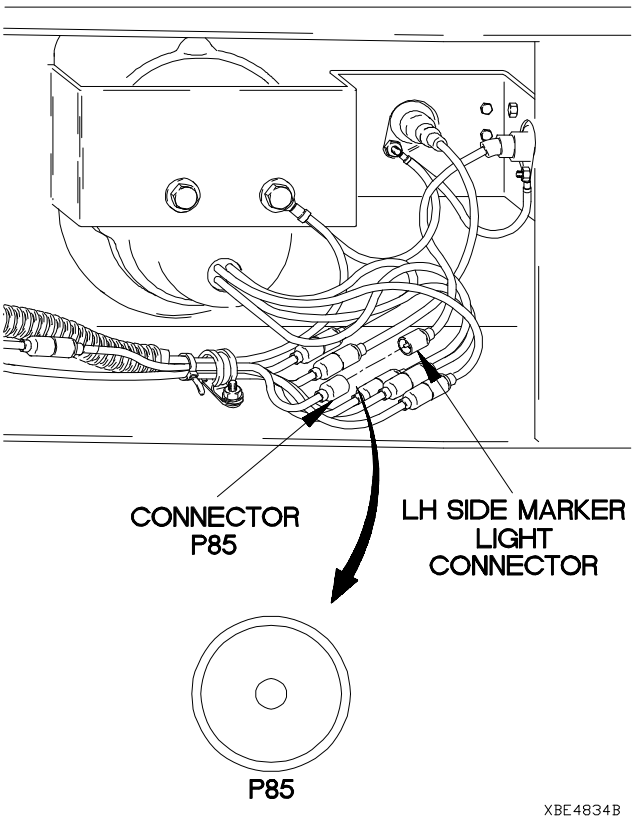
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

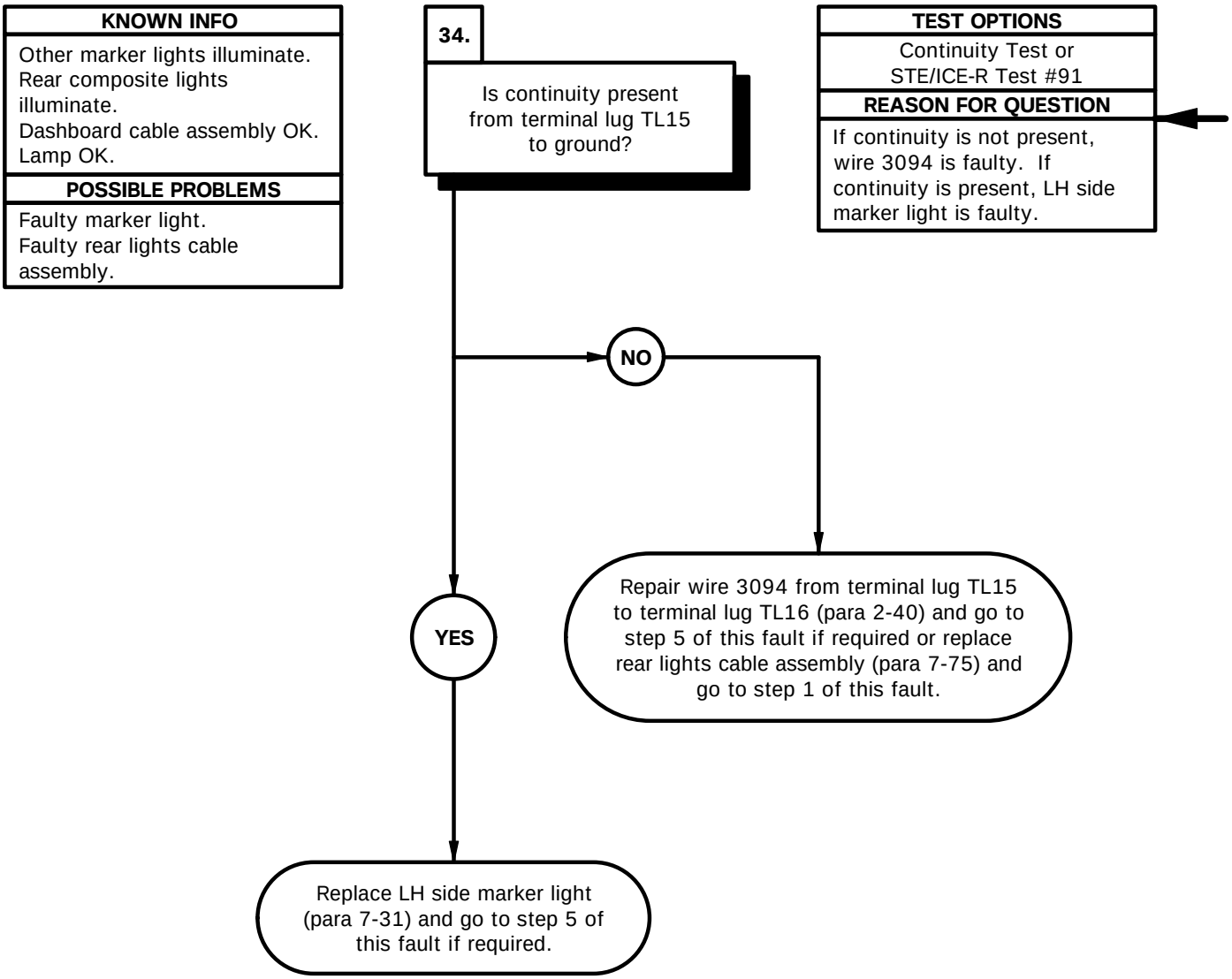
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P85 from LH side marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P85.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P85 to splice E16 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) Position main light switch to OFF (TM 9-2320-365-10).

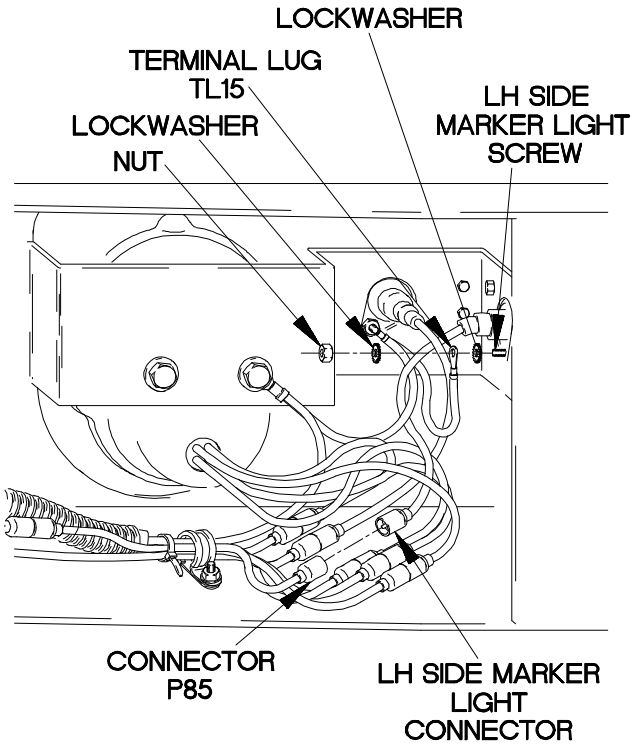


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



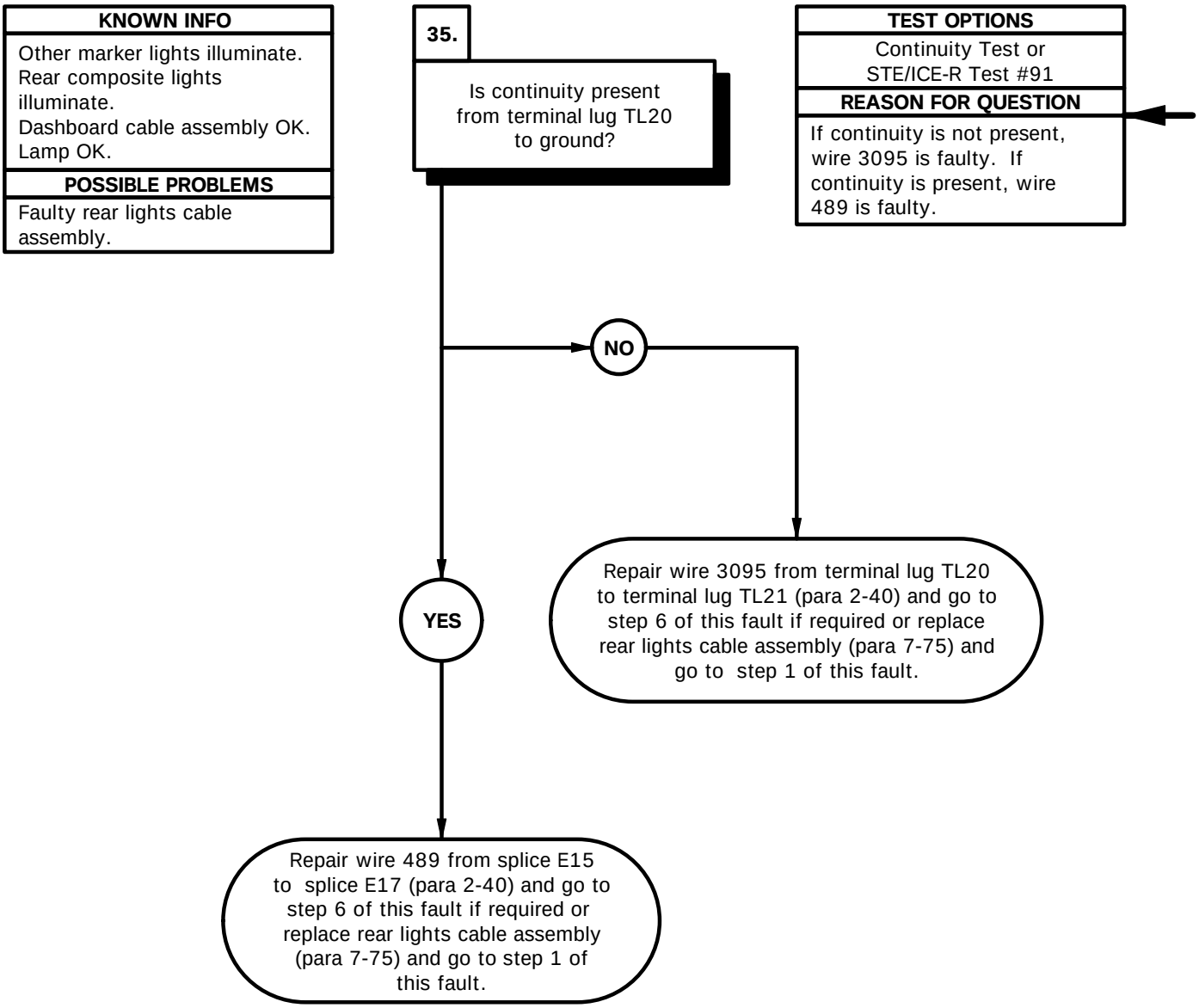
**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL15, and lockwasher from LH side marker light screw. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL15.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3094 from terminal lug TL15 to terminal lug TL16 (para 2-40) and go to step 5 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(6) If continuity is present, replace LH side marker light (para 7-31) and go to step 5 of this fault if required.
(7) Install lockwasher, terminal lug TL15, lockwasher, and nut on LH side marker light screw.
(8) Connect LH side marker light connector to connector P85.



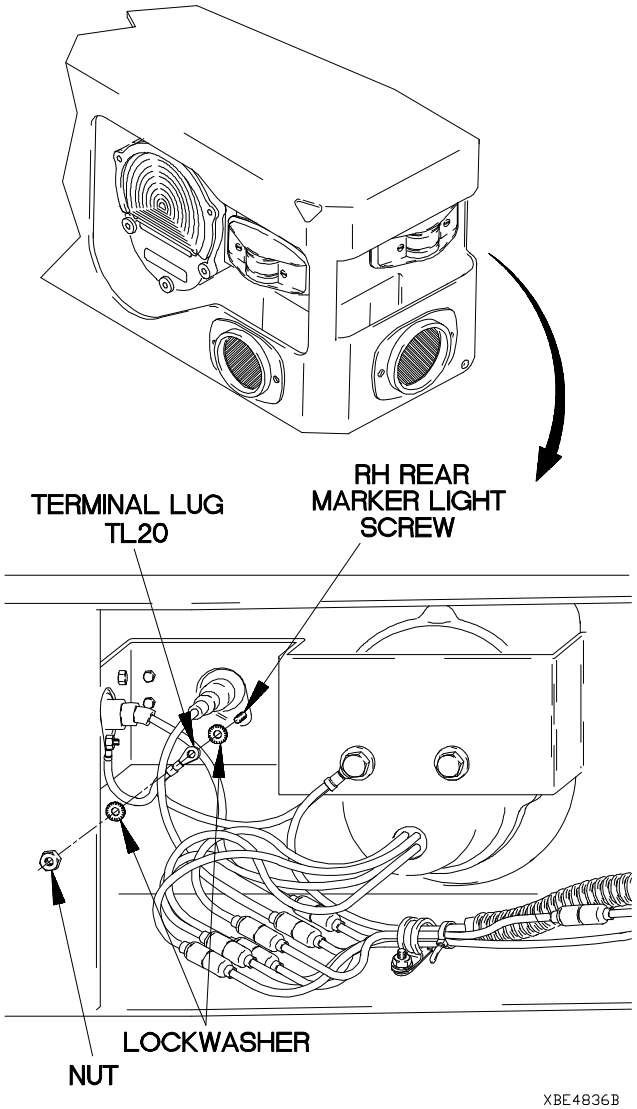

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## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

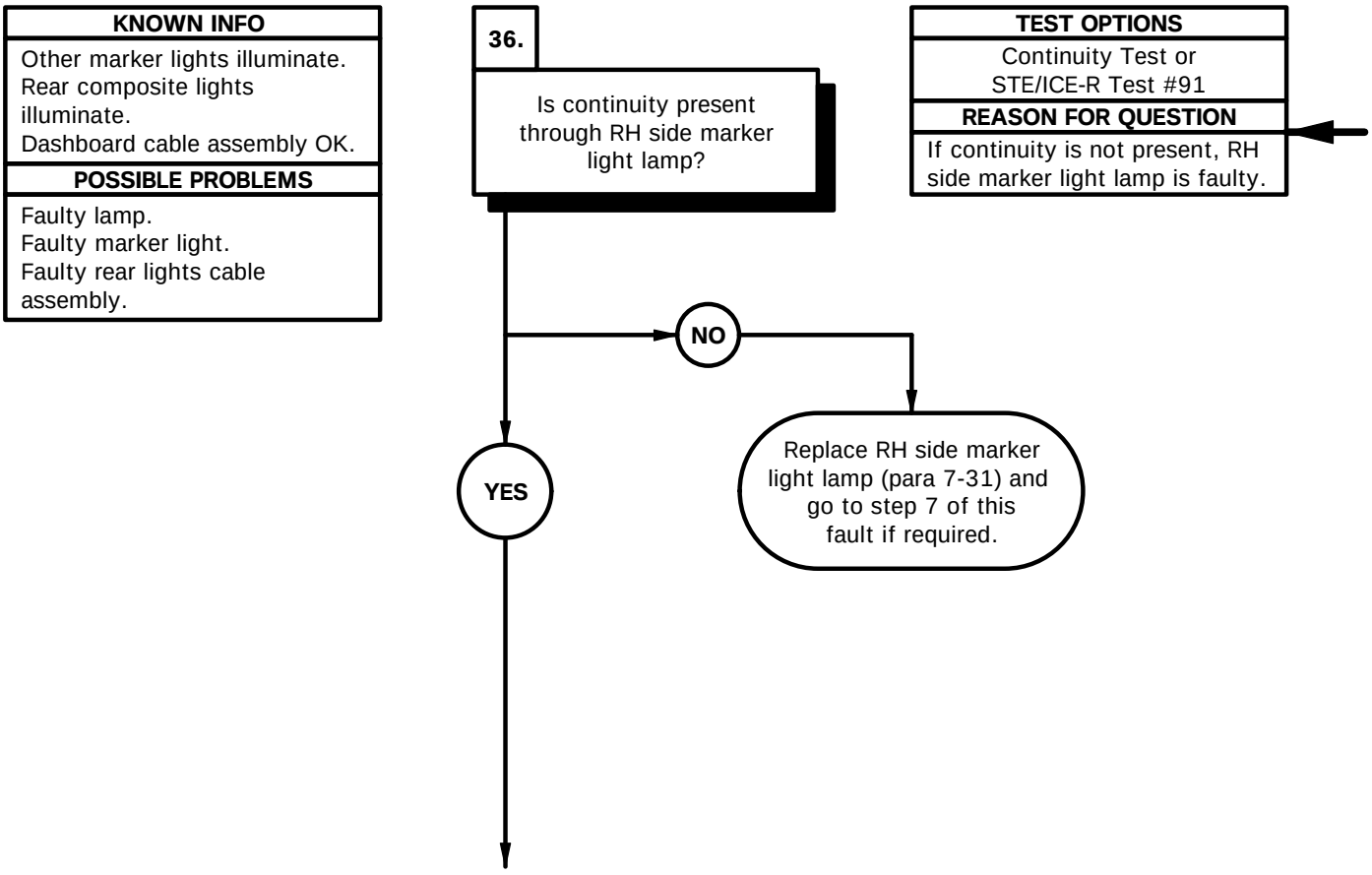


**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL20 and lockwasher from RH rear marker light screw. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL20.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3095 from terminal lug TL20 to terminal lug TL21 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(6) If continuity is present, repair wire 489 from splice E15 to splice E17 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) Install lockwasher, terminal lug TL20, lockwasher, and nut on RH rear marker light screw.

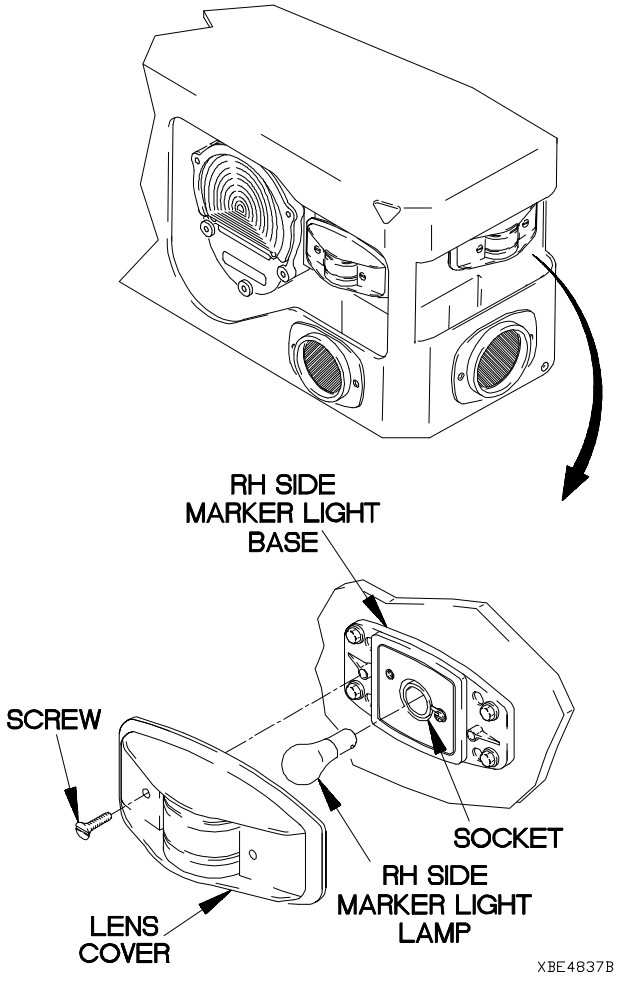


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)

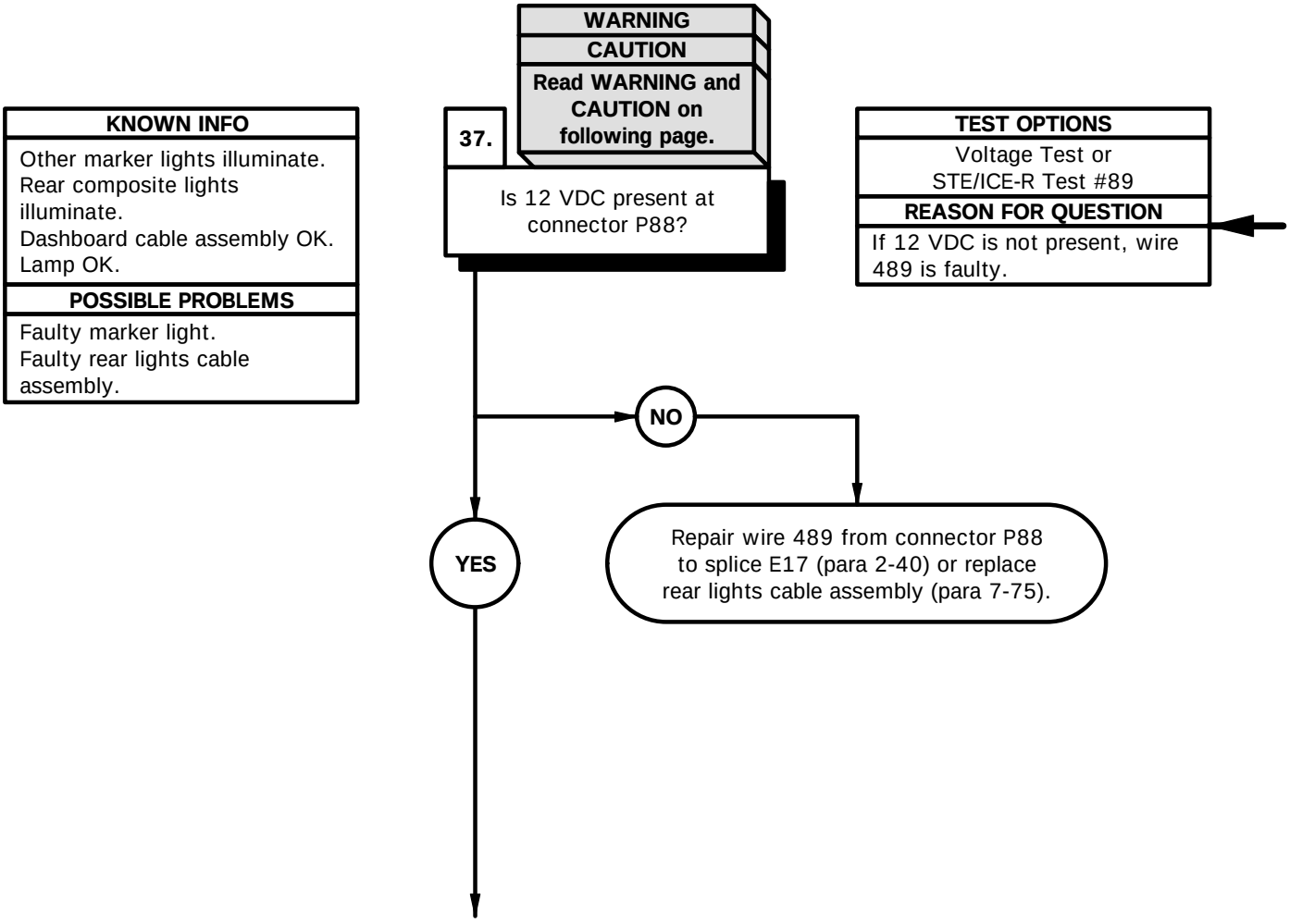


**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH side marker light base.
(2) Remove RH side marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH side marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace RH side marker light lamp (para 7-31) and go to step 7 of this fault if required.
(6) Install RH side marker light lamp in socket.
(7) Install lens cover on RH side marker light base with two screws.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

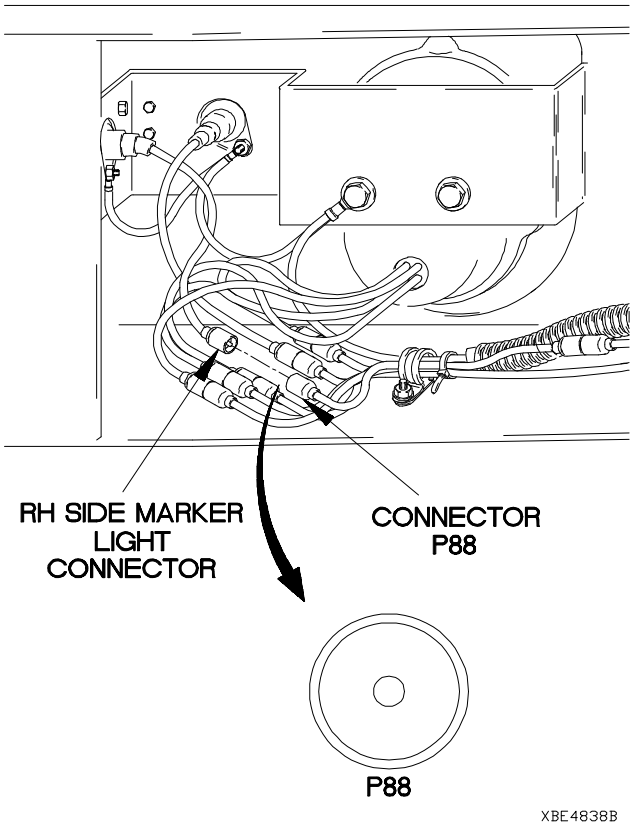
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

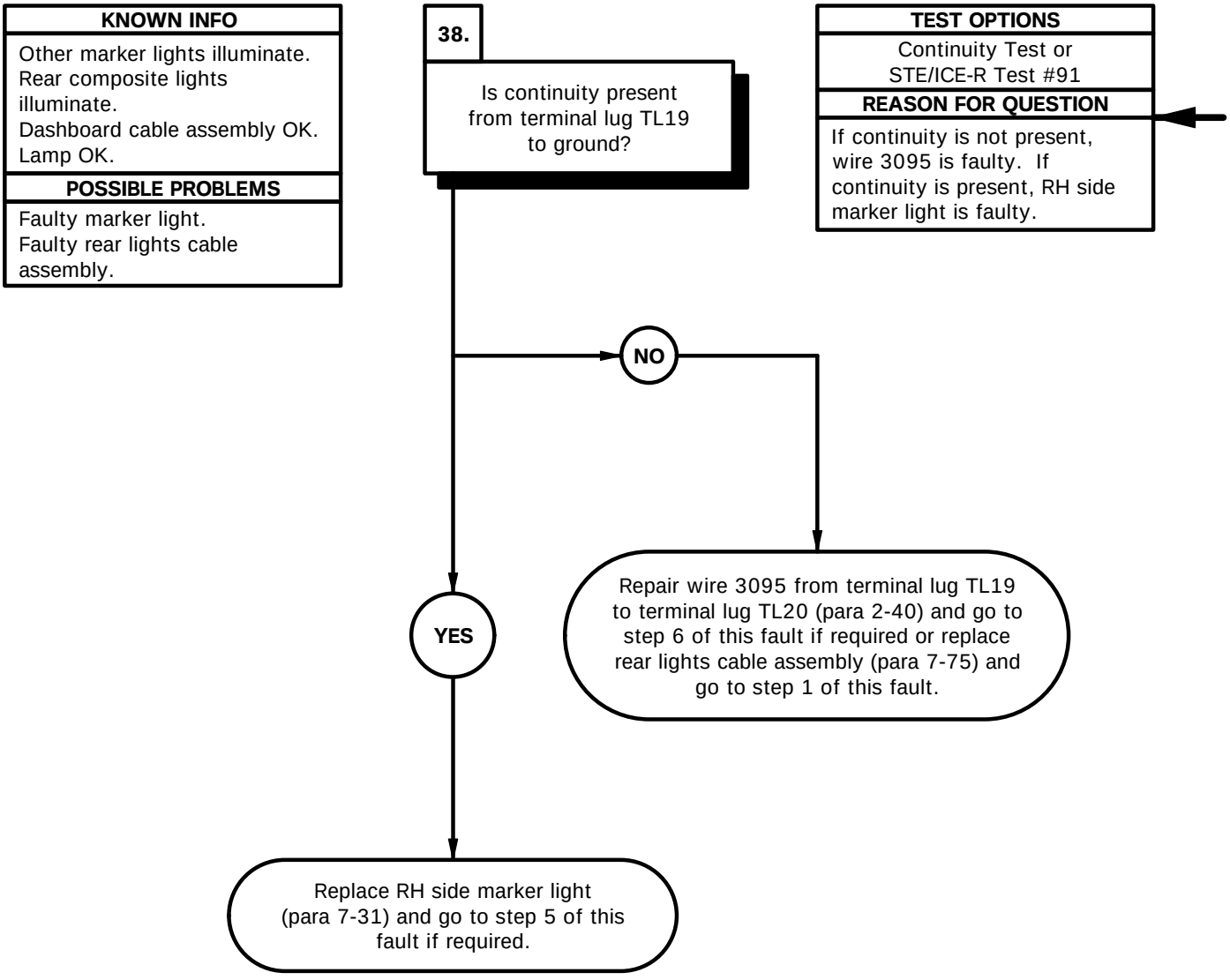
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P88 from RH side marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P88.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P88 to splice E17 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) Position main light switch to OFF (TM 9-2320-365-10).

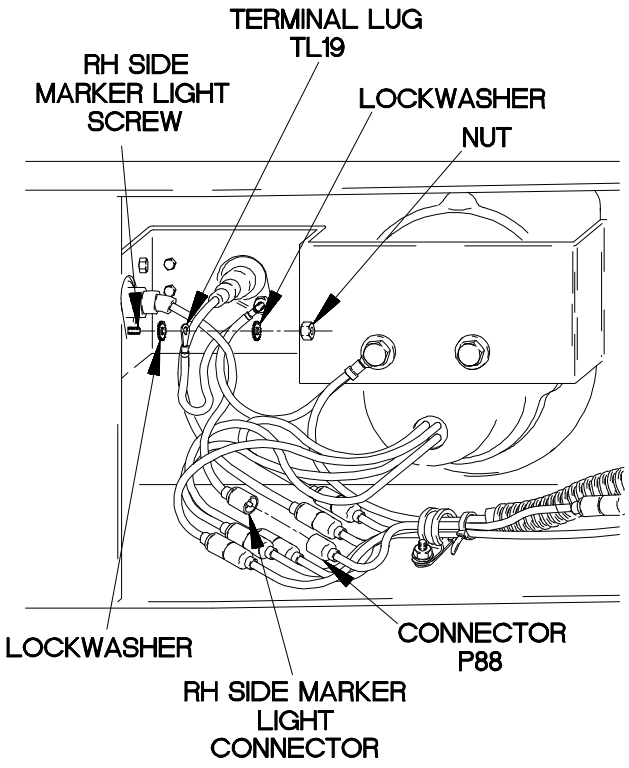


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



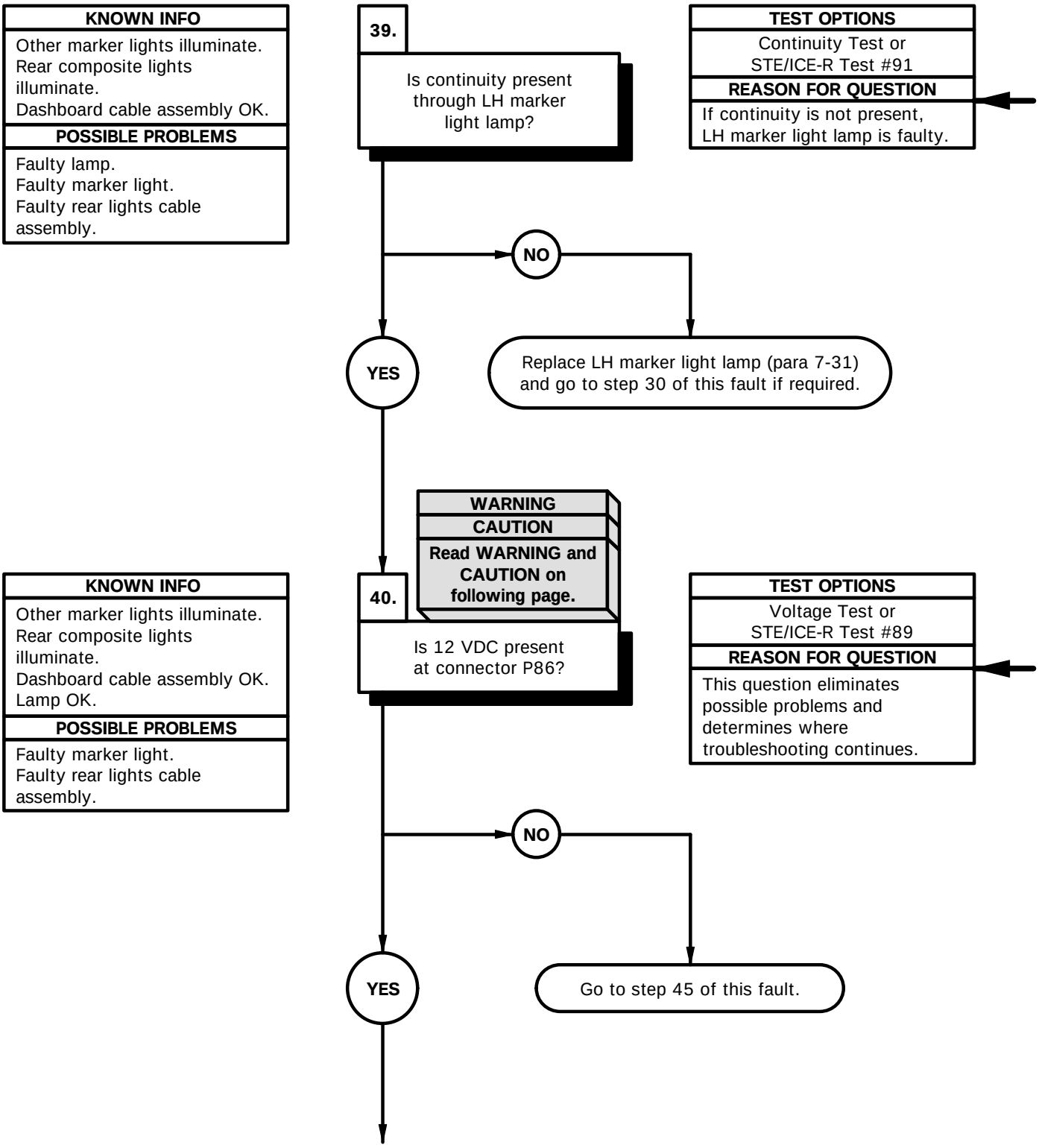
**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL19, and lockwasher from RH side marker light screw. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL19.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3095 from terminal lug TL19 to terminal lug TL20 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(6) If continuity is present, replace RH side marker light (para 7-31) and go to step 5 of this fault if required.
(7) Install lockwasher, terminal lug TL19, lockwasher, and nut on RH side marker light screw.
(8) Connect RH side marker light connector to connector P88.




XBE4839B

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove two screws and lens cover from LH marker light base.
(2) Remove LH marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace LH marker light lamp (para 7-31) and go to step 30 of this fault if required.
(6) Install LH marker light lamp in socket.
(7) Install lens cover on LH marker light base with two screws.

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

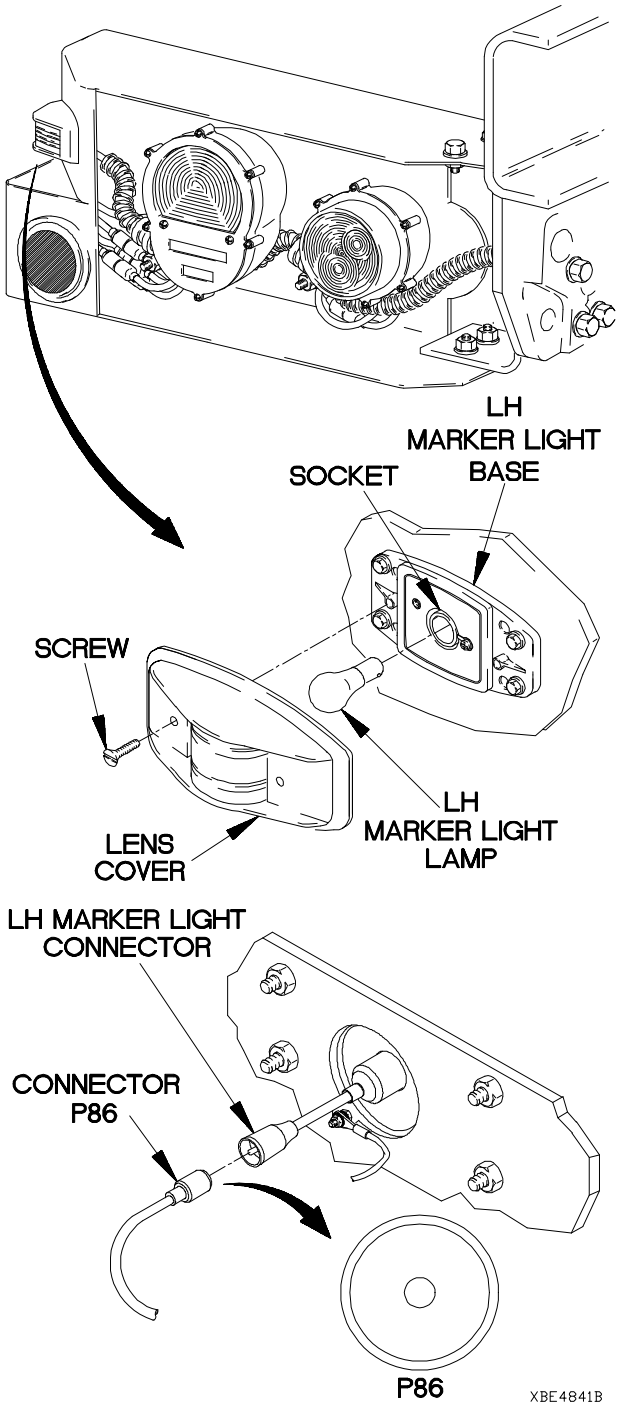
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

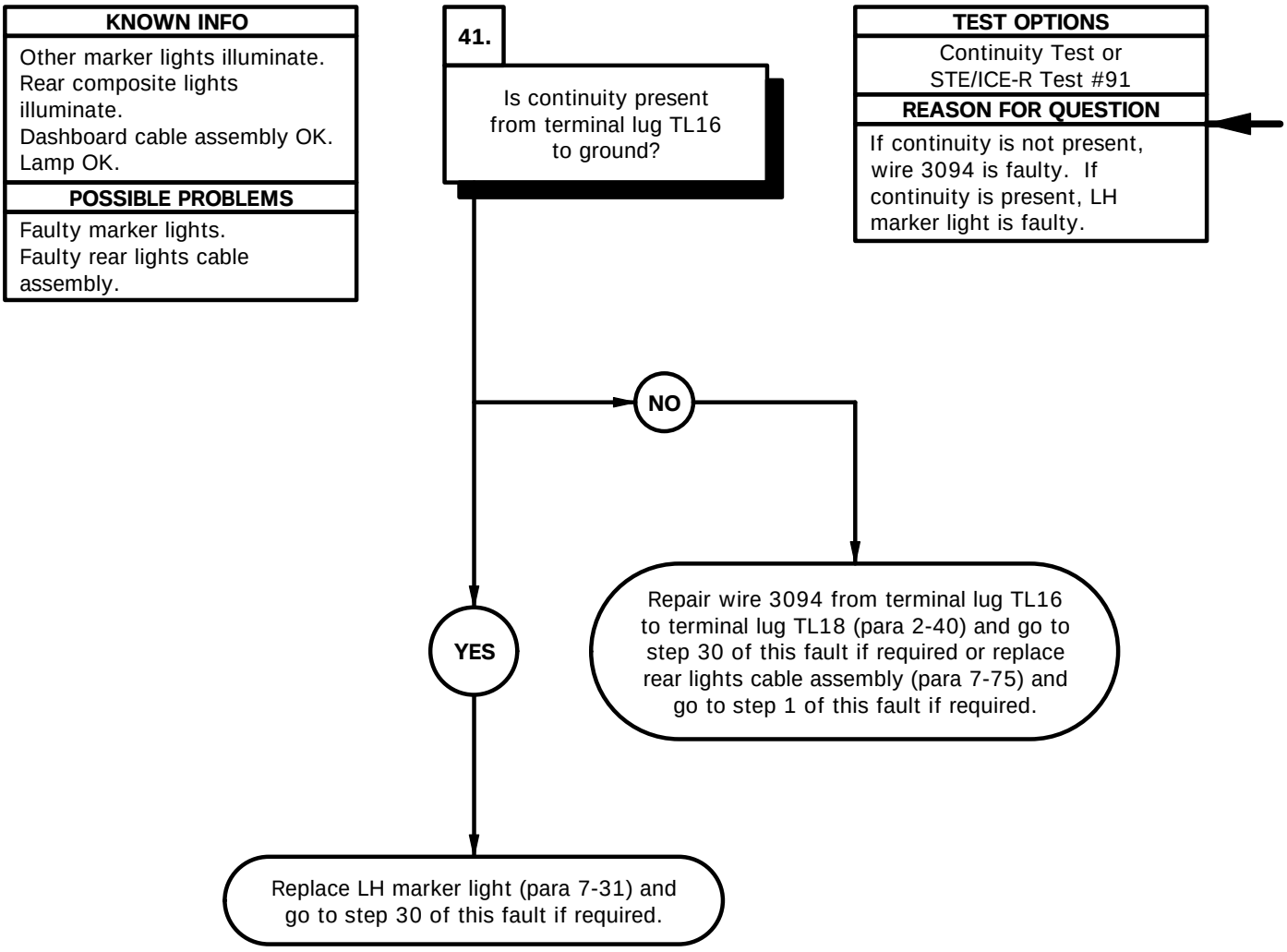
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect LH marker light connector from connector P86.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P86.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) Position main light switch to OFF (TM 9-2320-365-10).
(7) If 12 VDC is not present, go to step 45 of this fault.

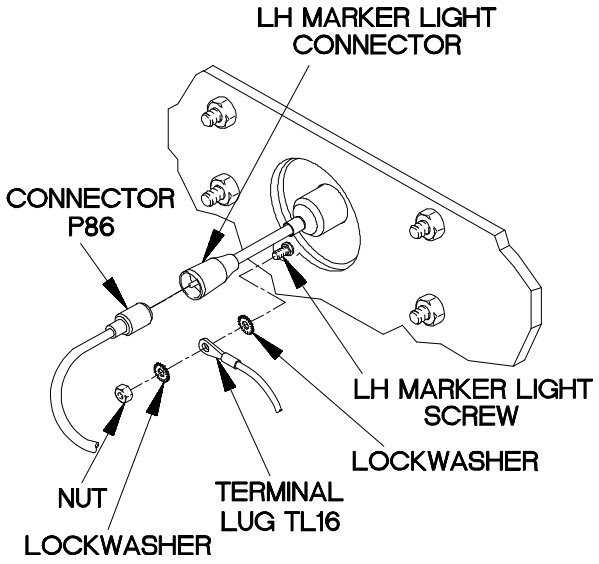


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



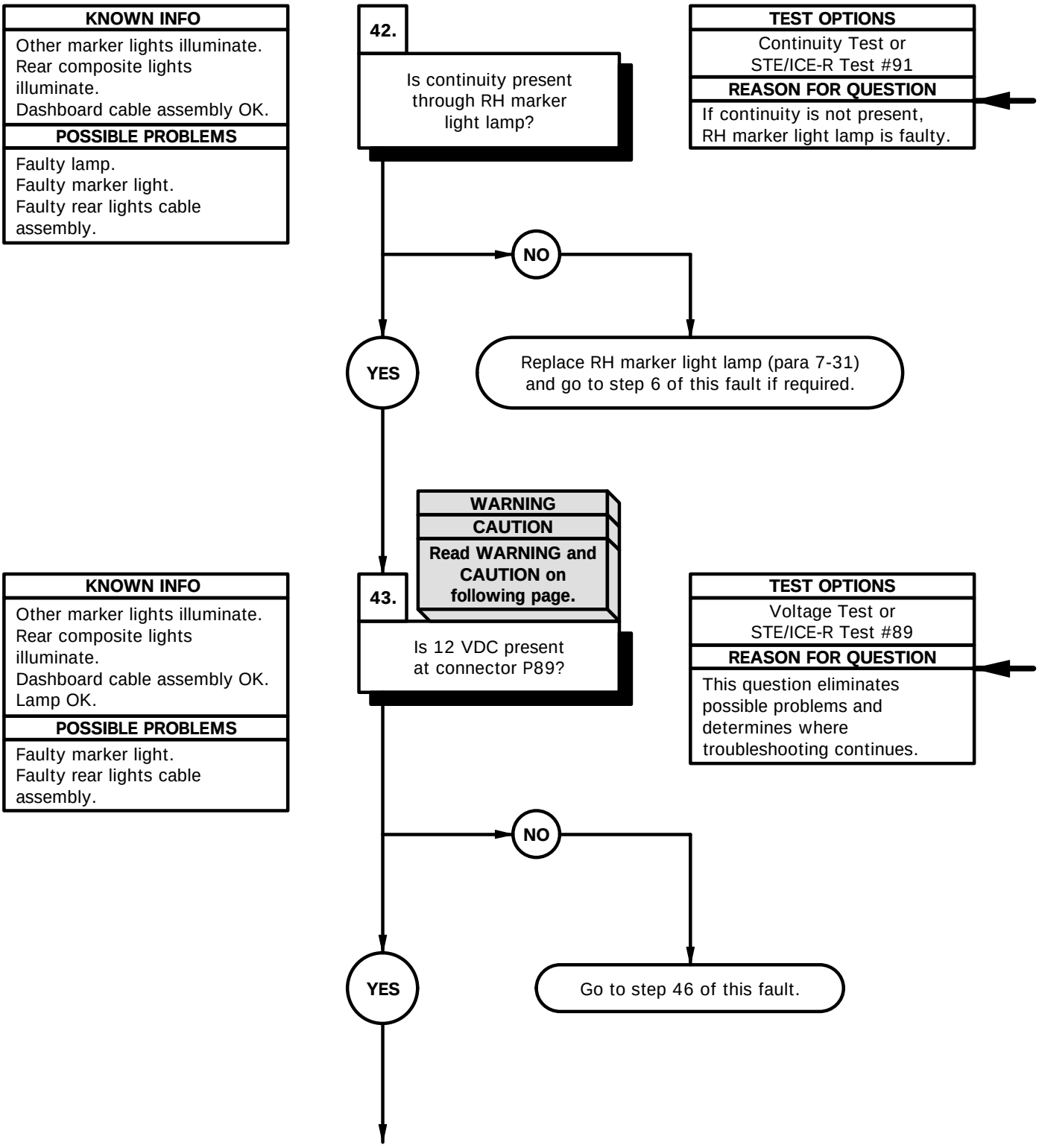
**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL16, and lockwasher from LH marker light screw. Discard lockwashers.
(2) Connect positive (+) probe of multimeter to terminal lug TL16.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3094 from terminal lug TL16 to terminal lug TL18 (para 2-40) and go to step 30 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(5) If continuity is present, replace LH marker light (para 7-38) and go to step 30 of this fault if required.
(6) Install lockwasher, terminal lug TL16, lockwasher, and nut on LH marker light screw.
(7) Connect LH marker light connector to connector P86.




XBE4842B

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove two screws and lens cover from RH marker light base.
(2) Remove RH marker light lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH marker light lamp and note reading on multimeter.
(5) If continuity is not present, replace RH marker light lamp (para 7-31) and go to step 6 of this fault if required.
(6) Install RH marker light lamp in socket.
(7) Install lens cover on RH marker light base with two screws.

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

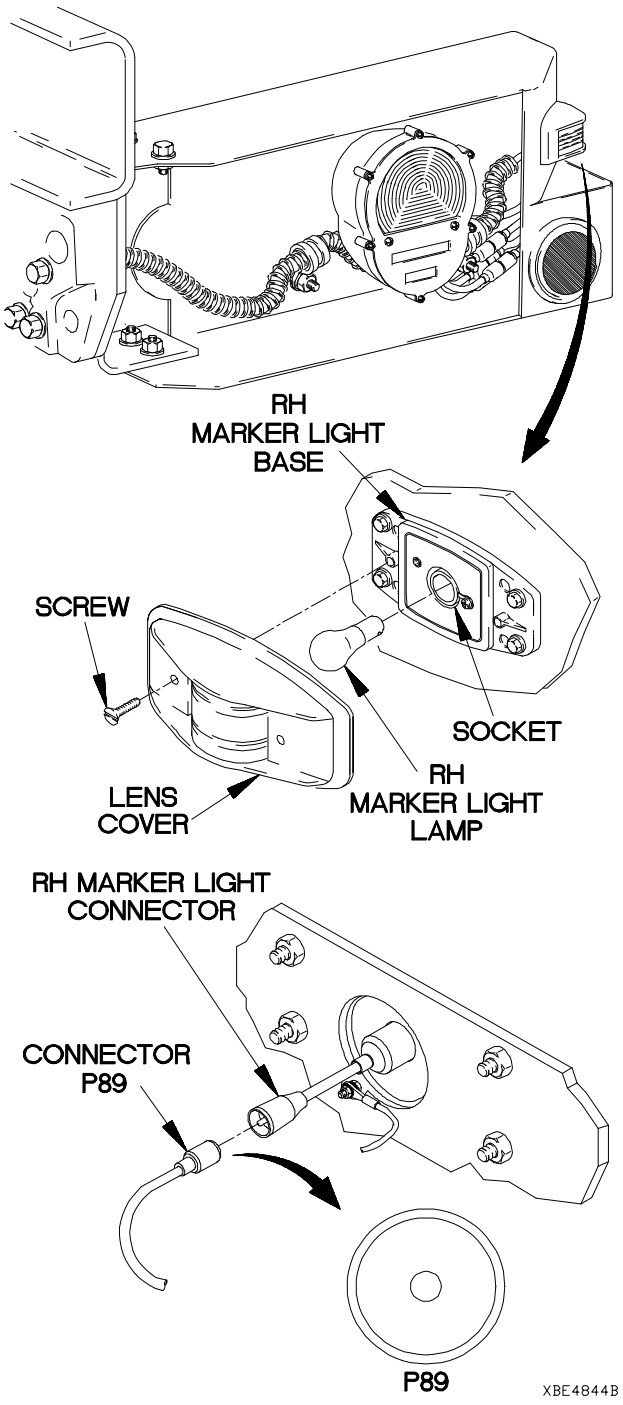
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

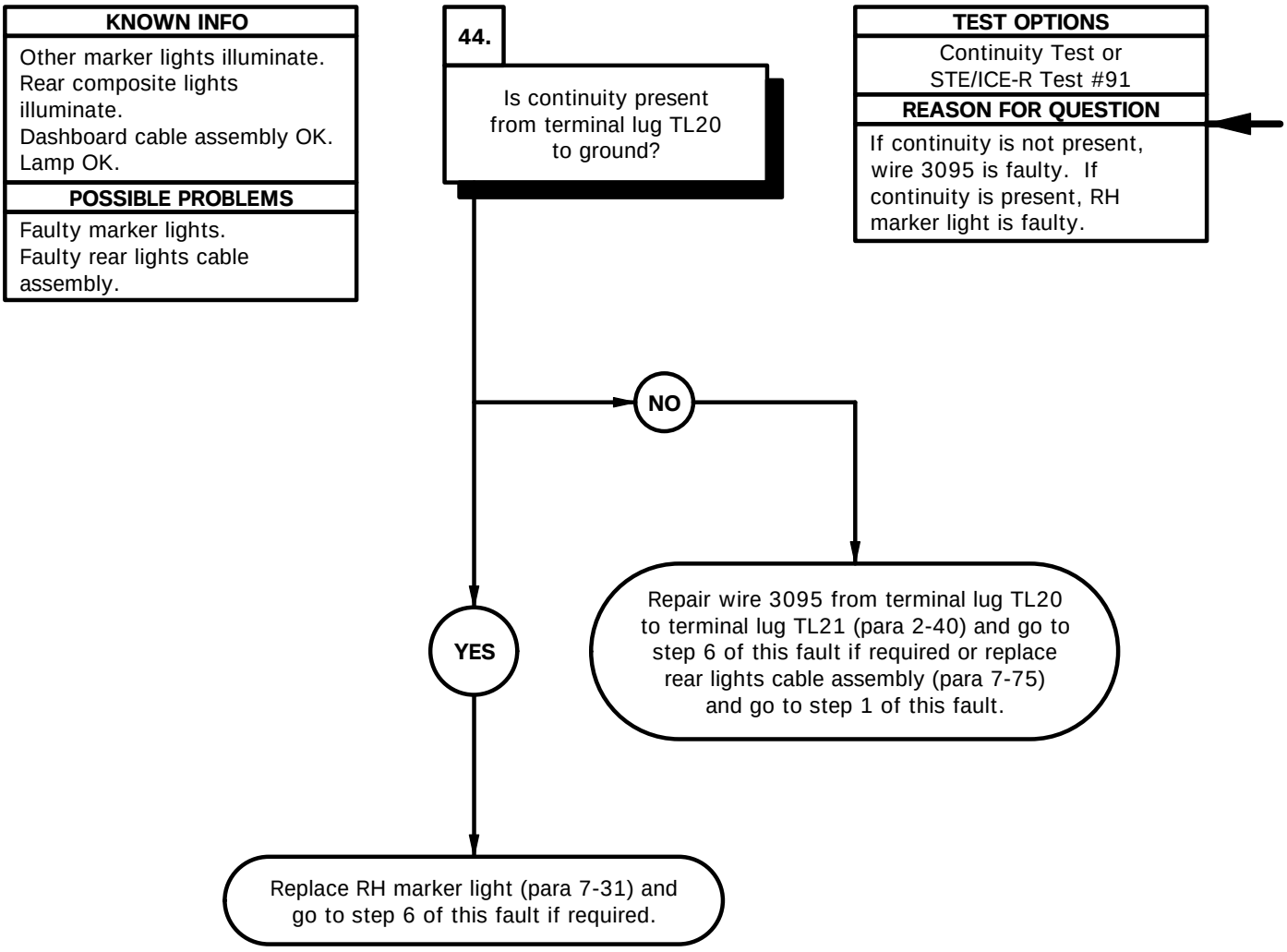
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect RH marker lamp connector from connector P89.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P89.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) Position main light switch to OFF (TM 9-2320-365-10).
(7) If 12 VDC is not present, go to step 46 of this fault.

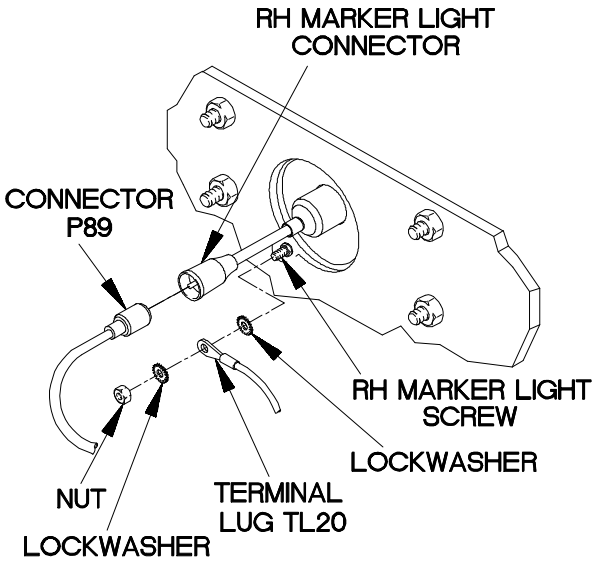


## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



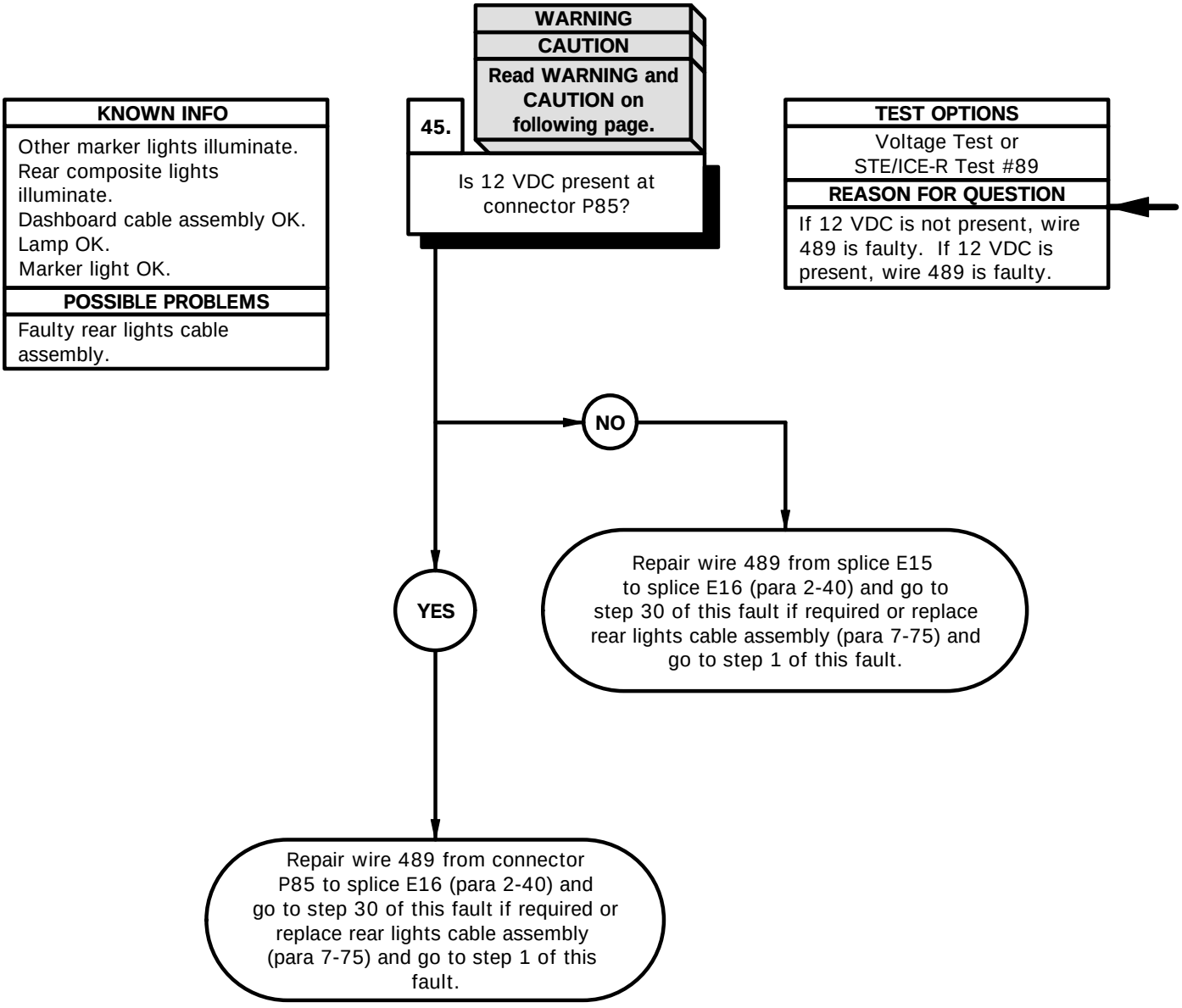
**CONTINUITY TEST**

(1) Remove nut, lockwasher, terminal lug TL20, and lockwasher from RH marker light screw. Discard lockwashers.
(2) Connect positive (+) probe of multimeter to terminal lug TL20.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3095 from terminal lug TL20 to terminal lug TL21 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(5) If continuity is present, replace RH marker light and go to step 6 of this fault if required.
(6) Install lockwasher, terminal lug TL20, lockwasher, and nut on RH marker light screw.
(7) Connect RH marker light connector to connector P89.




XBE4845B

## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

**NOTE**

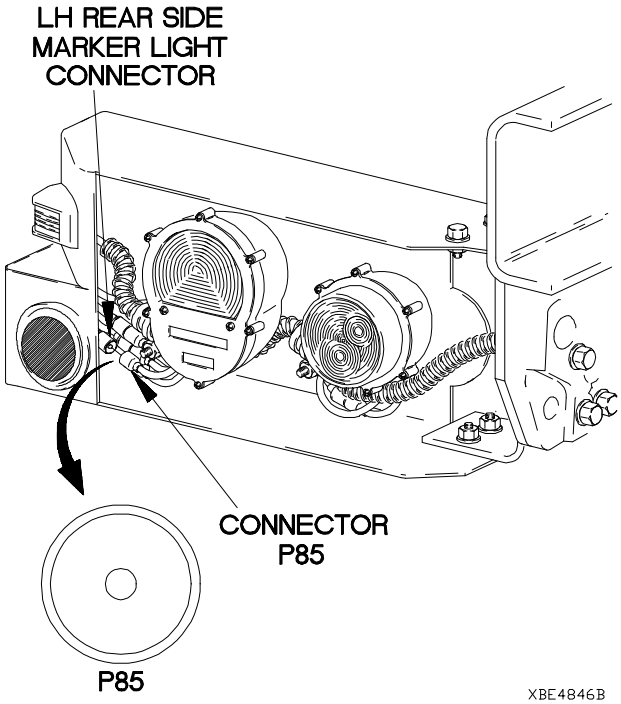
Remove plastic cable ties as required.

(1) Disconnect connector P85 from LH rear side marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P85.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P85 to splice E16 (para 2-40) and go to step 30 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) If 12 VDC is present, repair wire 489 from connector P85 to splice E16 (para 2-40) and go to step 30 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(8) Position main light switch to OFF (TM 9-2320-365-10).

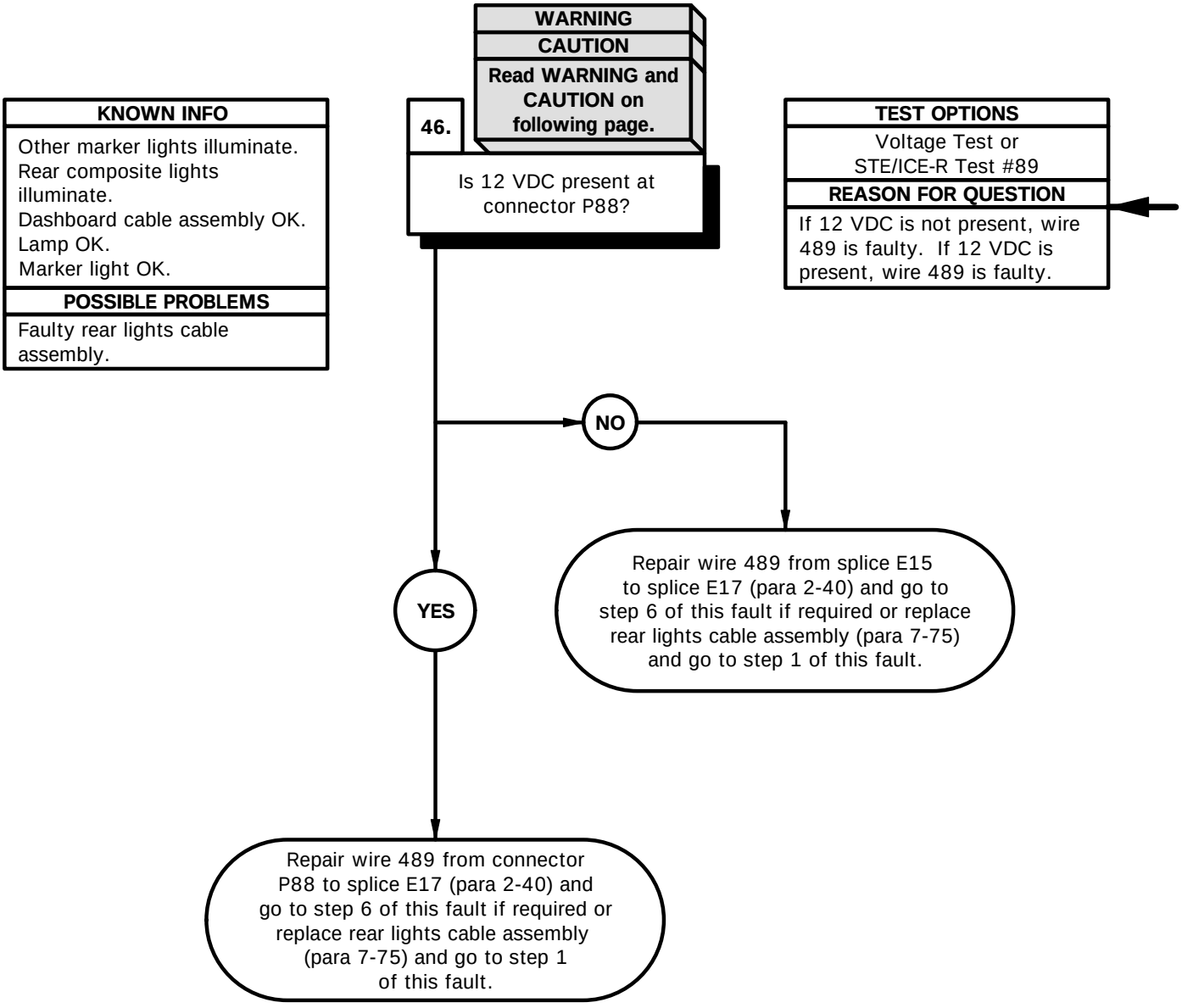
**NOTE**

Install plastic cable ties as required.

(9) Connect connector P85 to LH rear side marker light connector.



## e47. SIDE AND/OR REAR MARKER LIGHT(S) DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

**NOTE**

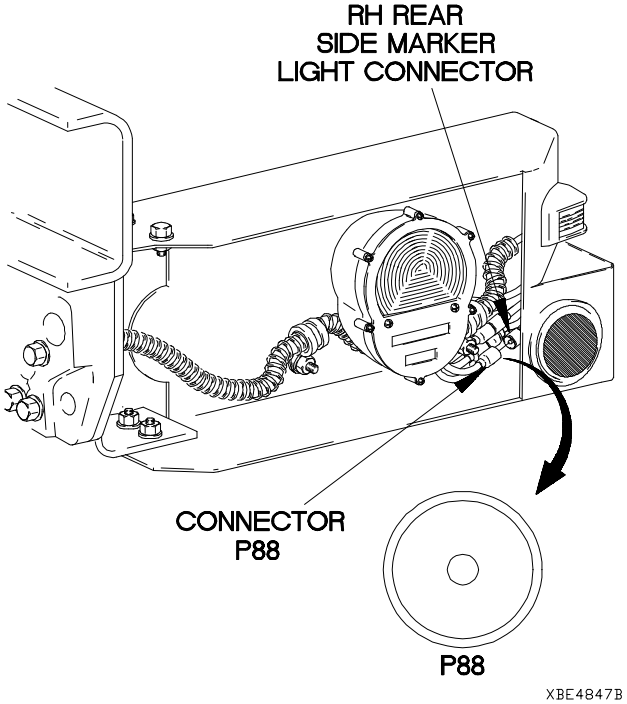
Remove plastic cable ties as required.

(1) Disconnect connector P88 from RH rear side marker light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P88.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 489 from connector P88 to splice E17 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(7) If 12 VDC is present, repair wire 489 from connector P88 to splice E17 (para 2-40) and go to step 6 of this fault if required or replace rear lights cable assembly (para 7-75) and go to step 1 of this fault.
(8) Position main light switch to OFF (TM 9-2320-365-10).

**NOTE**

Install plastic cable ties as required.

(9) Connect connector P88 to RH rear side marker light connector.



## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

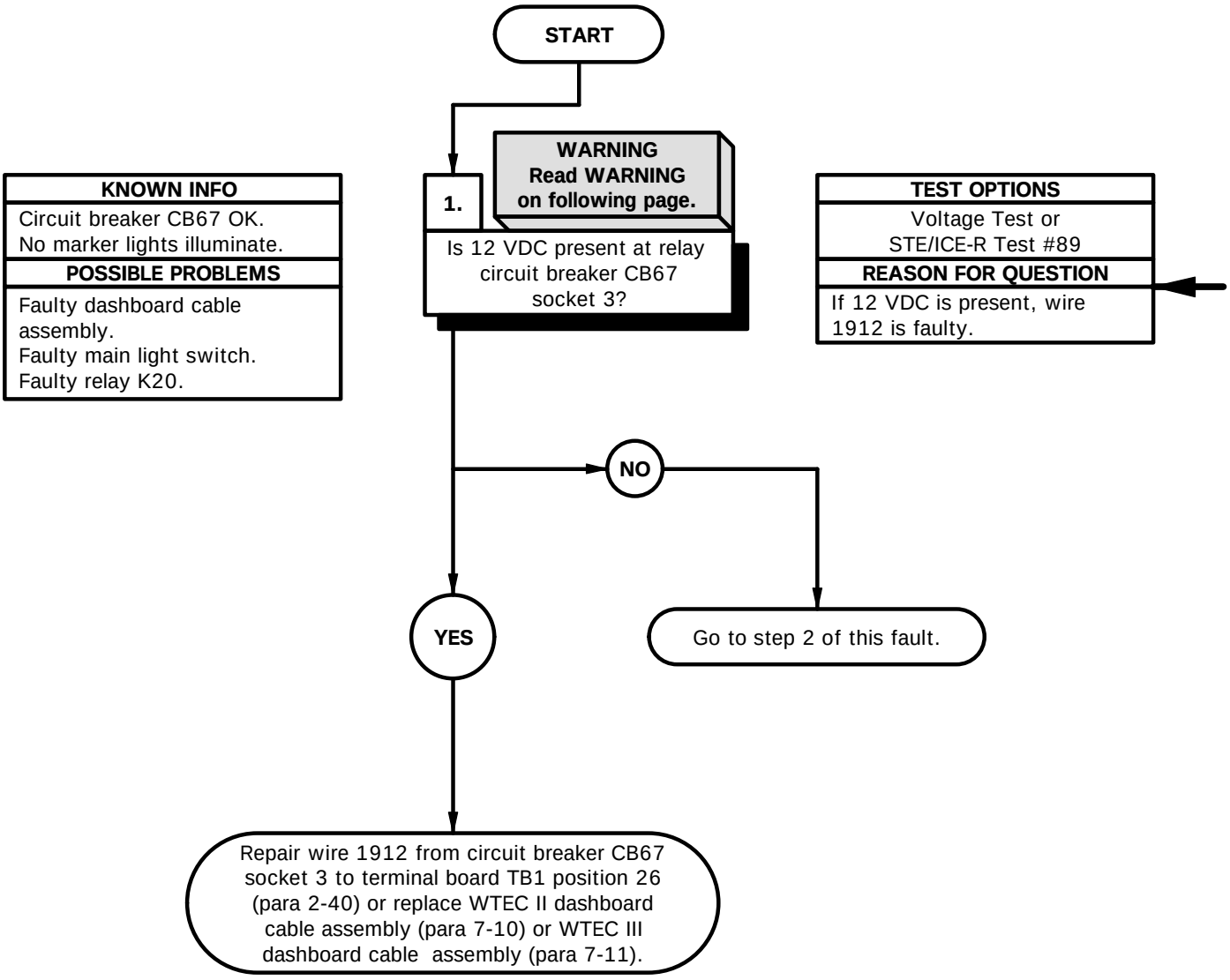
**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICR-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB67 prior to beginning this task.

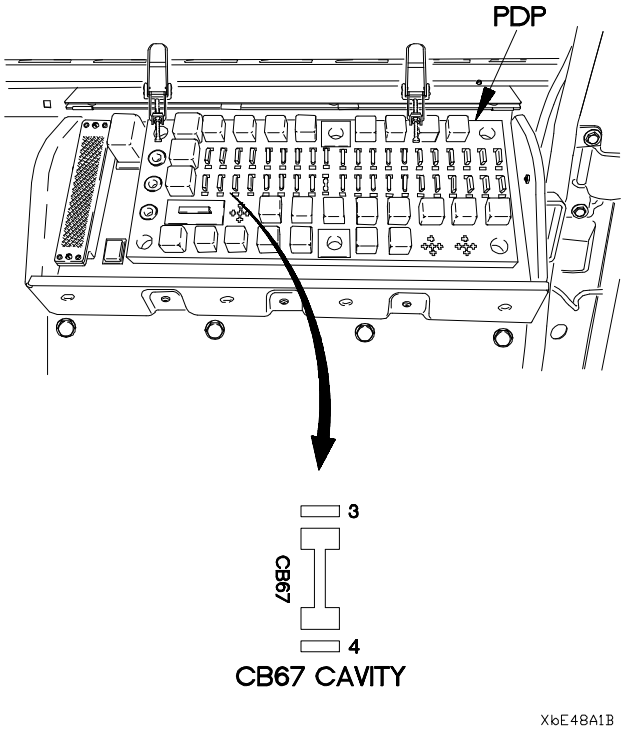


**WARNING**

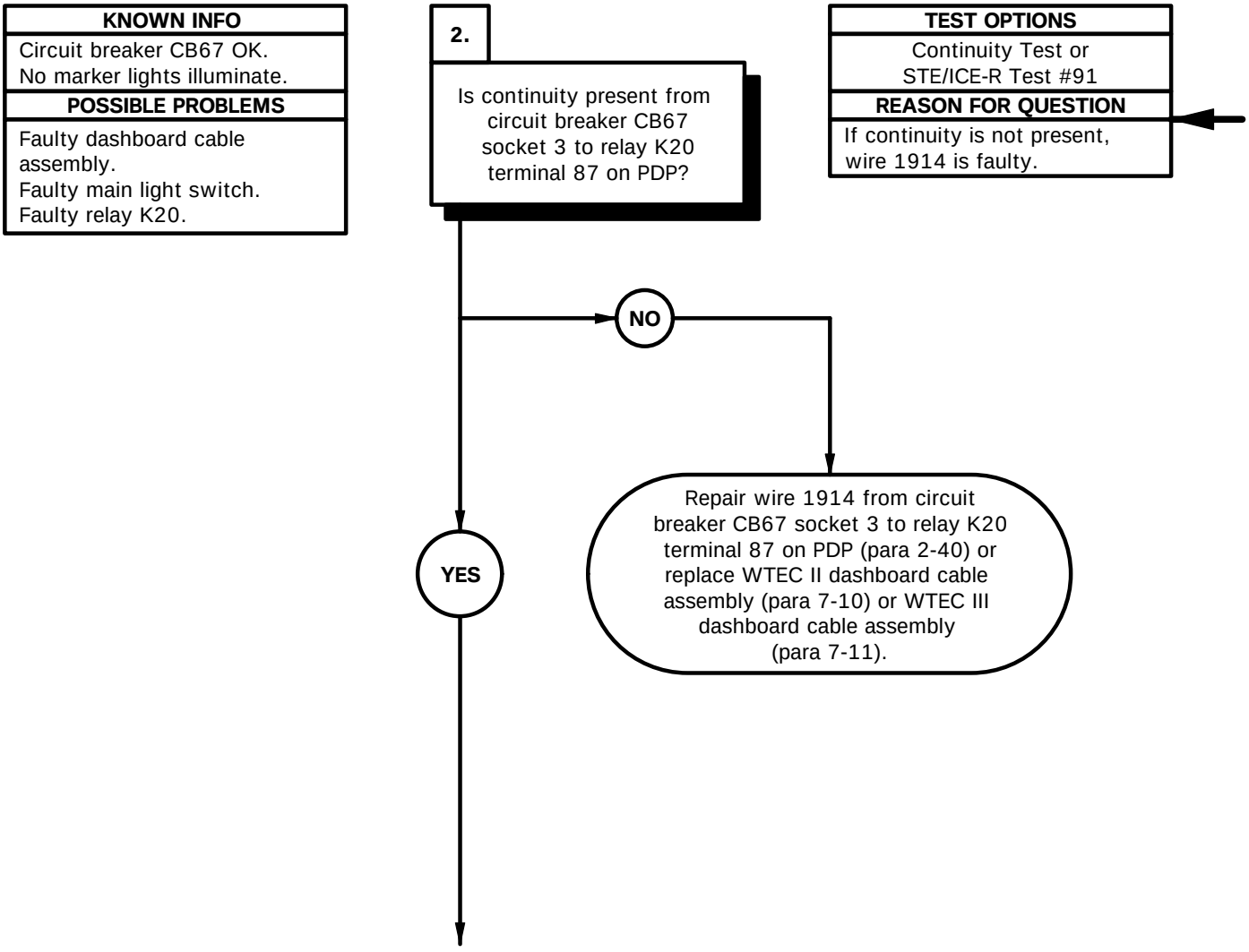
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove circuit breaker CB67 from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to circuit breaker CB67 socket 3 on PDP.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, go to step 2 of this fault.
(8) If 12 VDC is present, repair wire 1912 from circuit breaker CB67 socket 3 to terminal board TB1 position 26 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position main light switch to OFF (TM 9-2320-365-10).

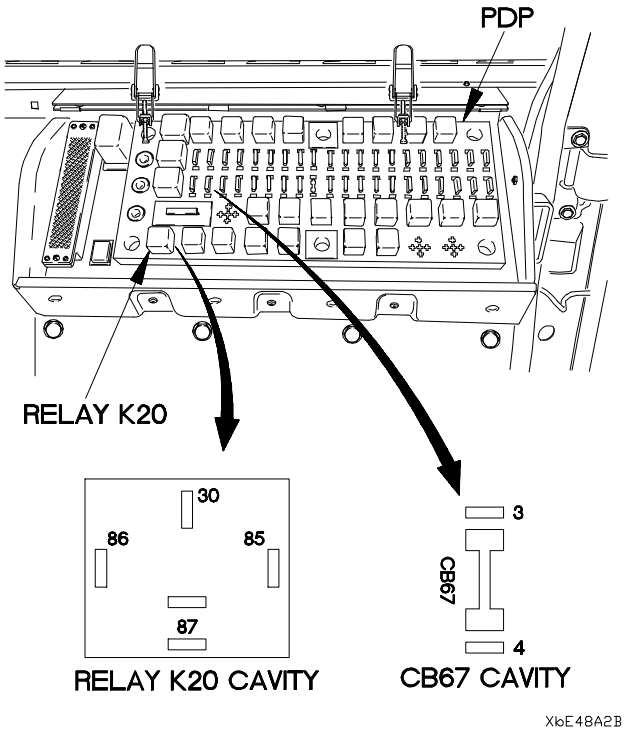


## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE (CONT)

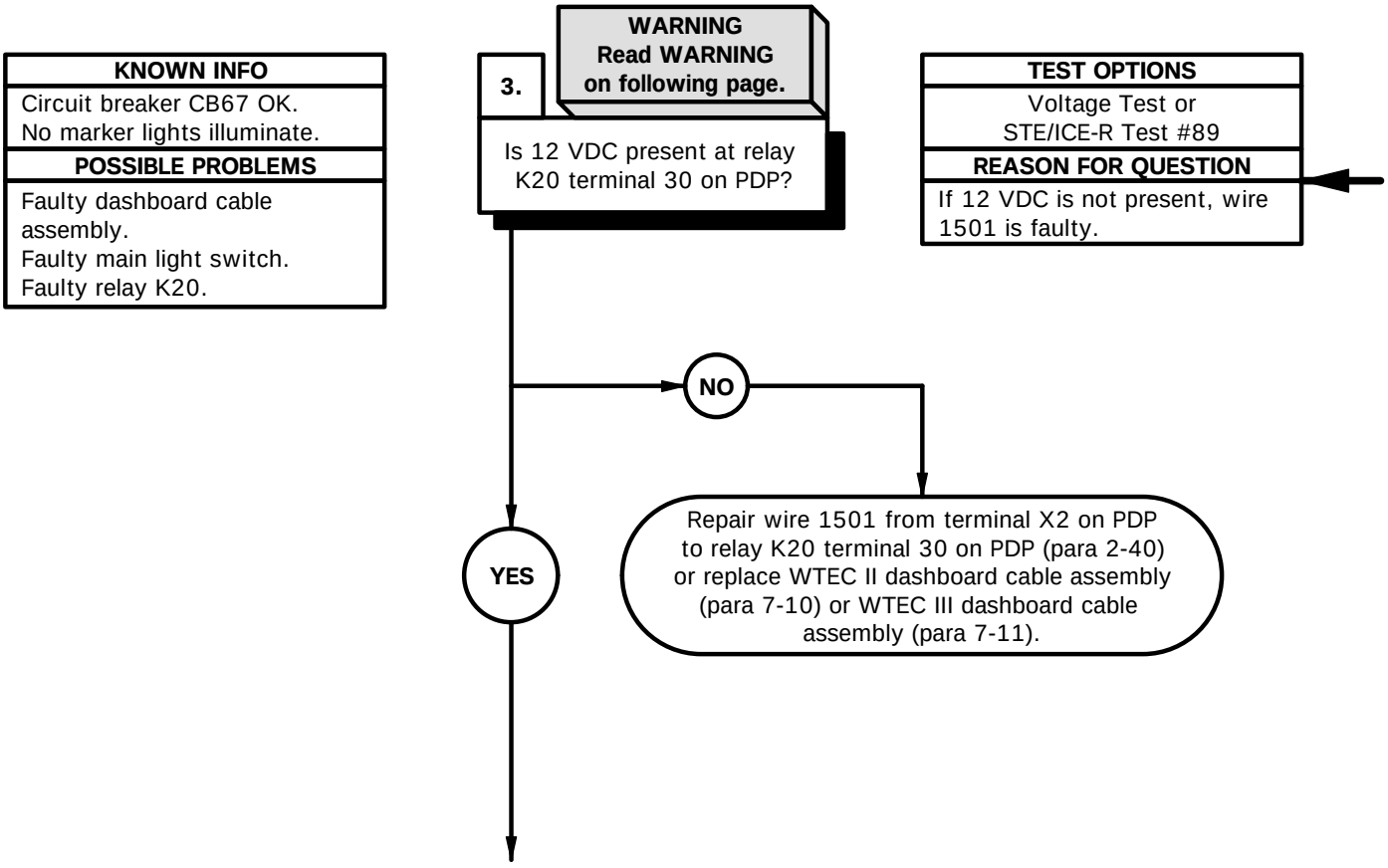


**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove relay K20 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to circuit breaker CB67 socket 3 on PDP.
(5) Connect negative (-) probe of multimeter to relay K20 terminal 87 on PDP and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 1914 from circuit breaker CB67 socket 3 to relay K20 terminal 87 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install circuit breaker CB67 in PDP.
(8) Connect batteries (para 7-48).



## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE (CONT)

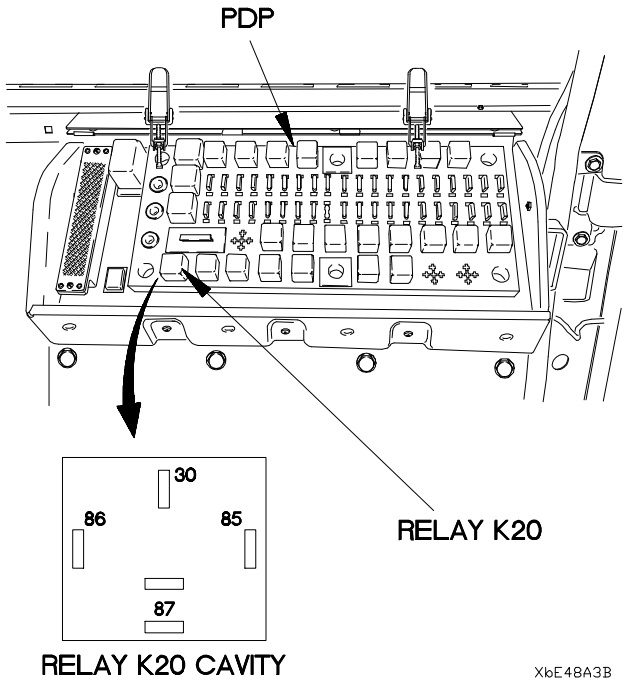


**WARNING**

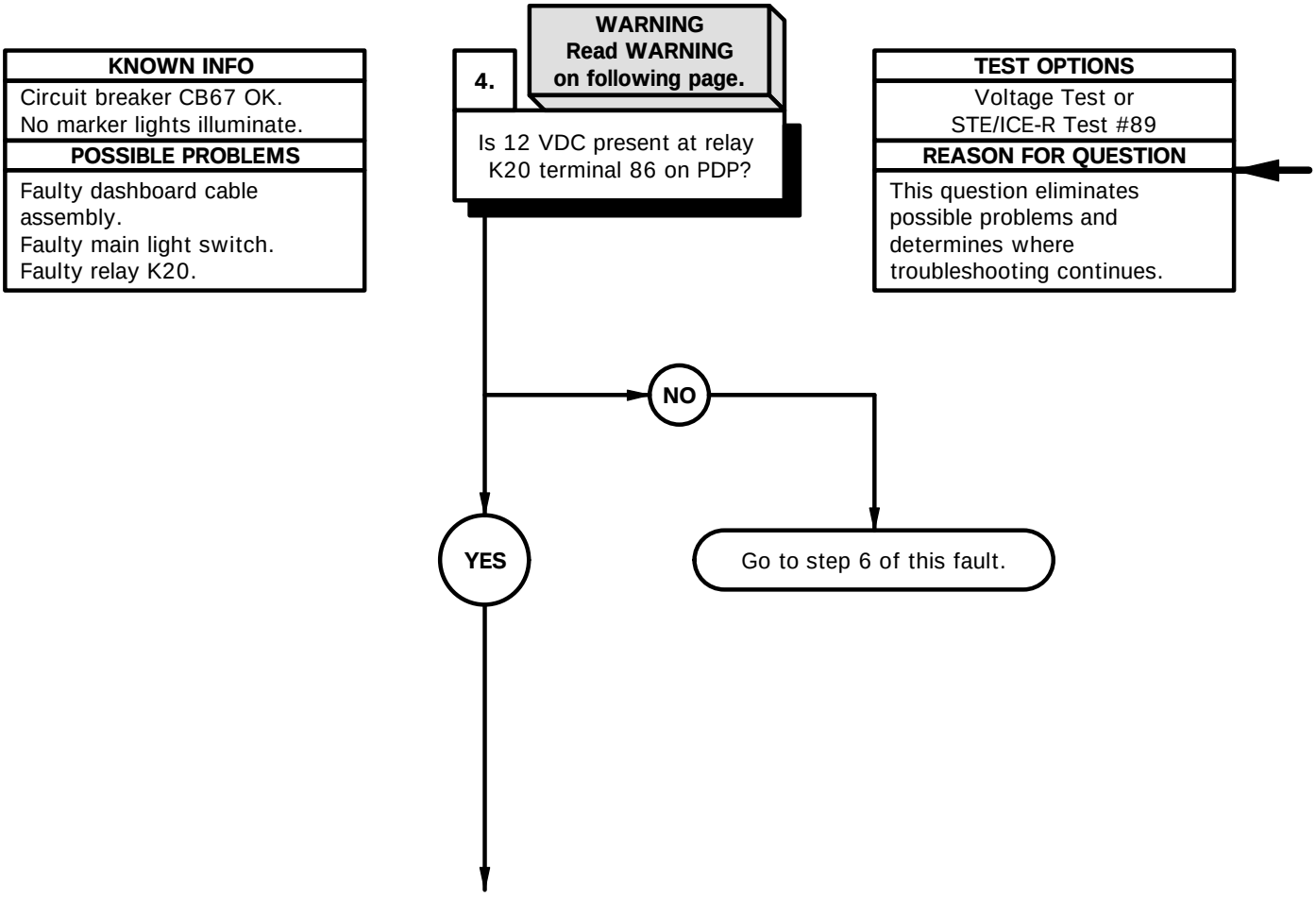
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K20 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 12 VDC is not present, repair wire 1501 from terminal X2 on PDP to relay K20 terminal 30 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE (CONT)

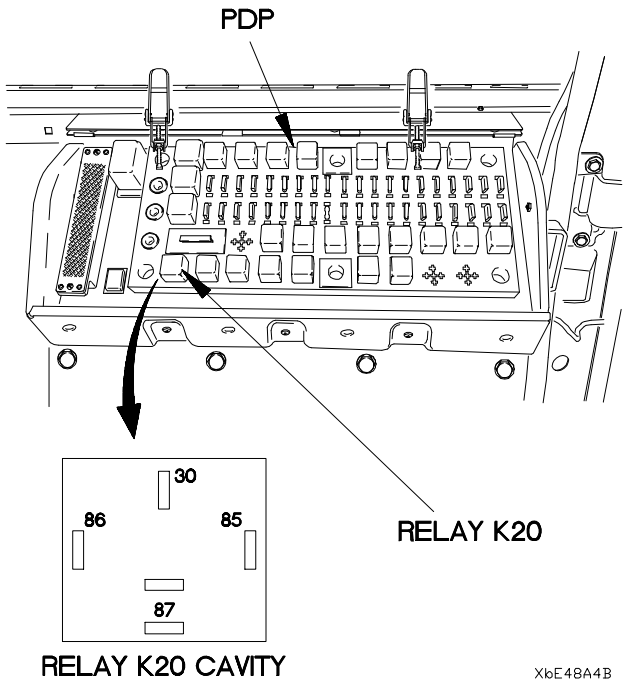


**WARNING**

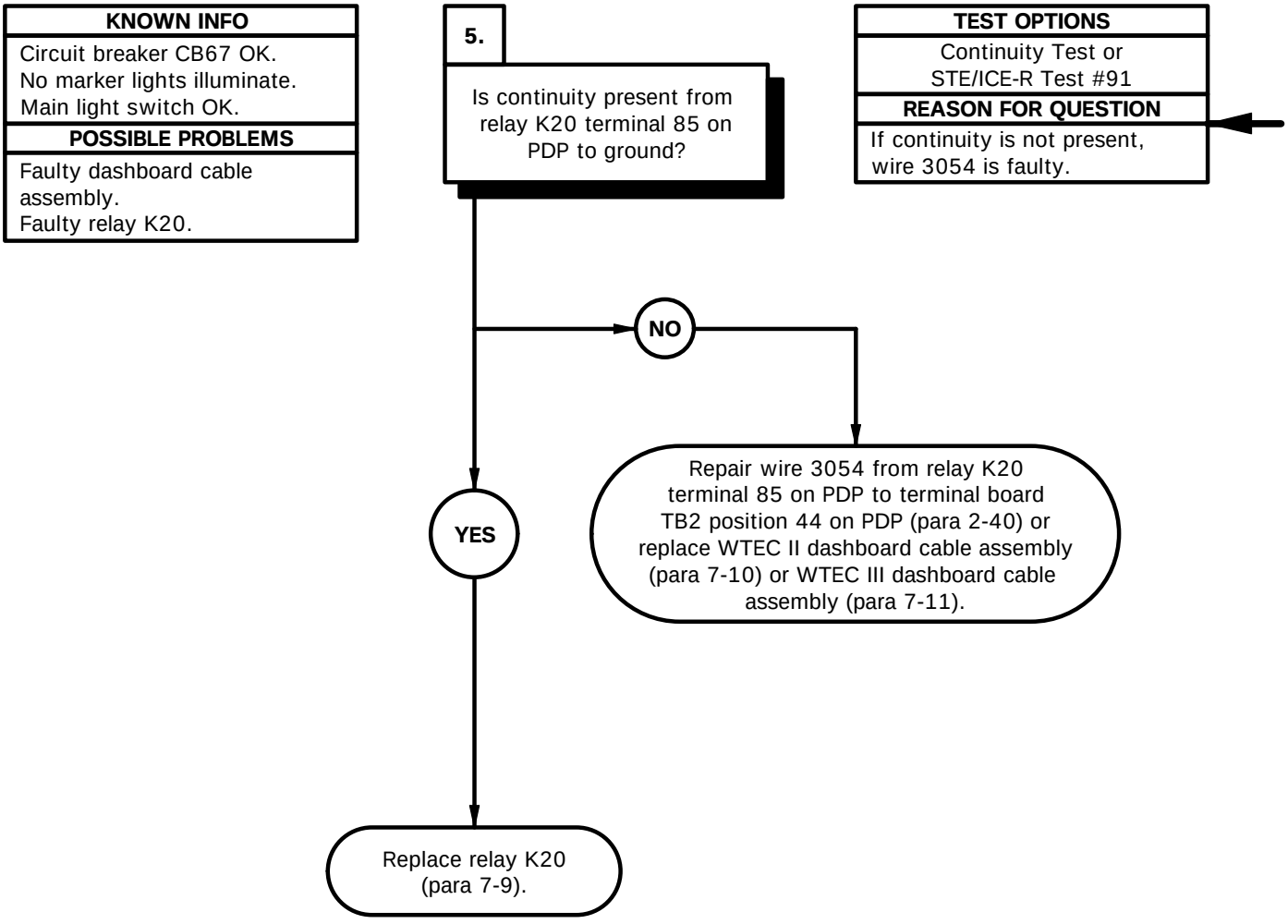
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K20 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, go to step 6 of this fault.
(6) Position main light switch to OFF (TM 9-2320-365-10).

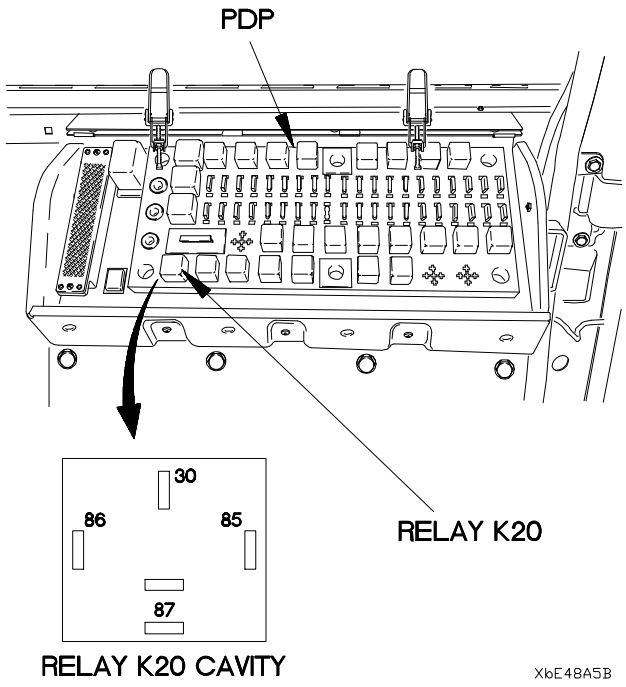


## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE (CONT)

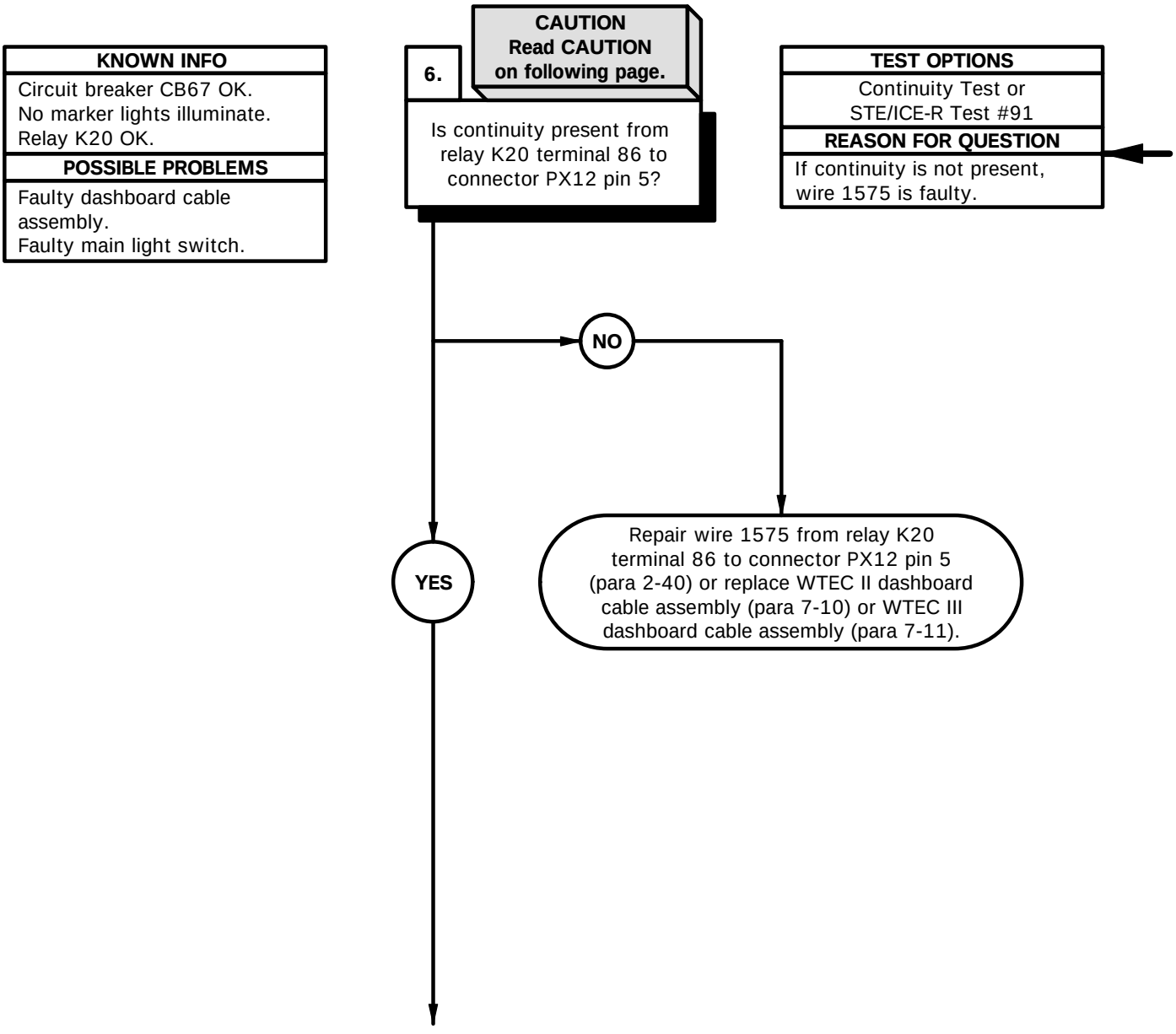


**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to relay K20 terminal 85 on PDP.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3054 from relay K20 terminal 85 on PDP to terminal board TB2 position 44 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace relay K20 (para 7-9).
(7) Install relay K20 in PDP.
(8) Install PDP cover (para 16-2).



## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE (CONT)



**CAUTION**

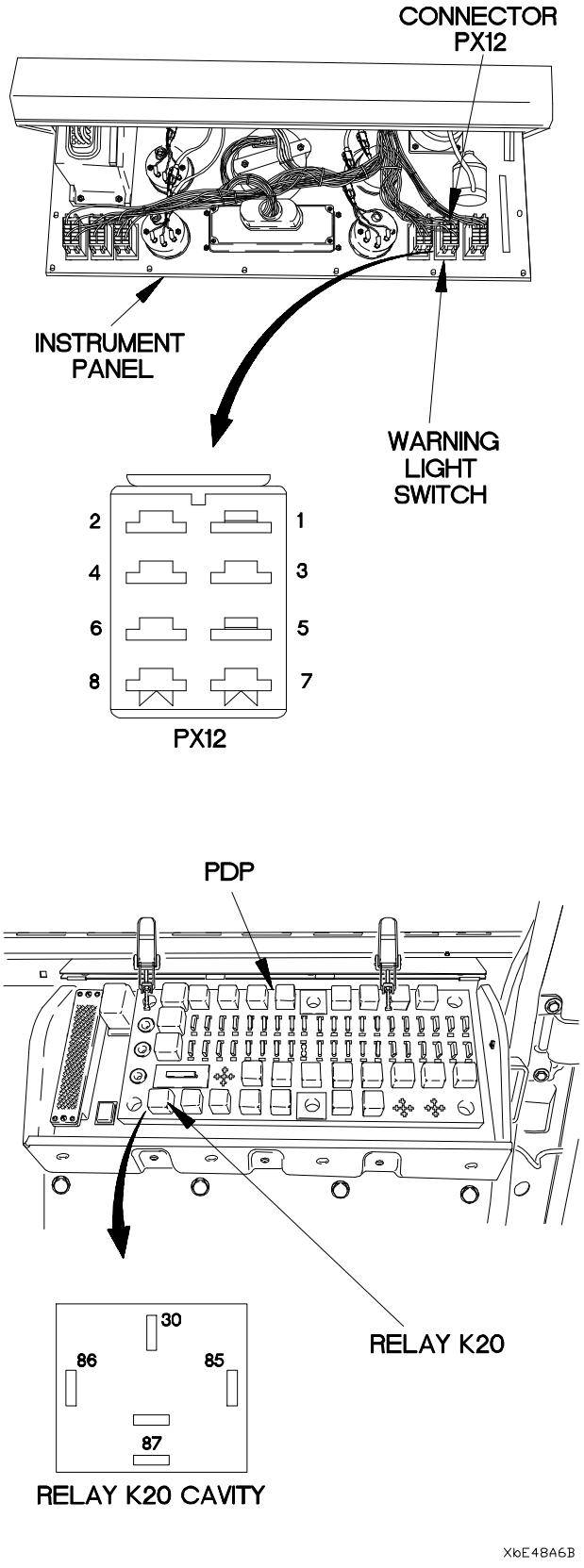
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

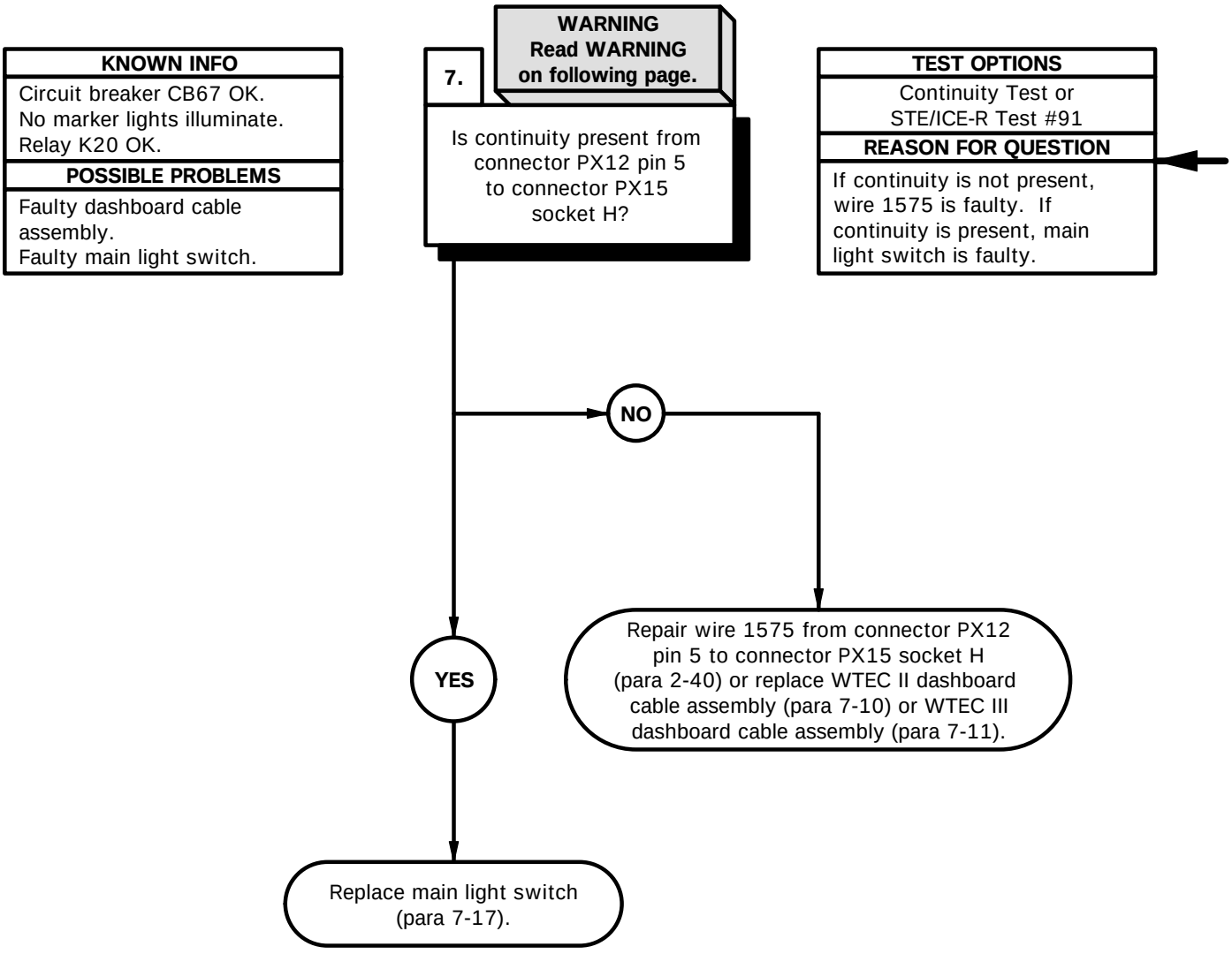
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector PX12 from warning light switch.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX12 pin 5.
(6) Connect negative (-) probe of multimeter to relay K20 terminal 86 on PDP and note reading on multimeter.
(7) If continuity is not present, repair wire 1575 from relay K20 terminal 86 to connector PX12 pin 5 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Install relay K20 in PDP.
(9) Install PDP cover (para 16-2).



## e47A. ALL MARKER LIGHTS DO NOT ILLUMINATE IN NORMAL MODE (CONT)



**CAUTION**

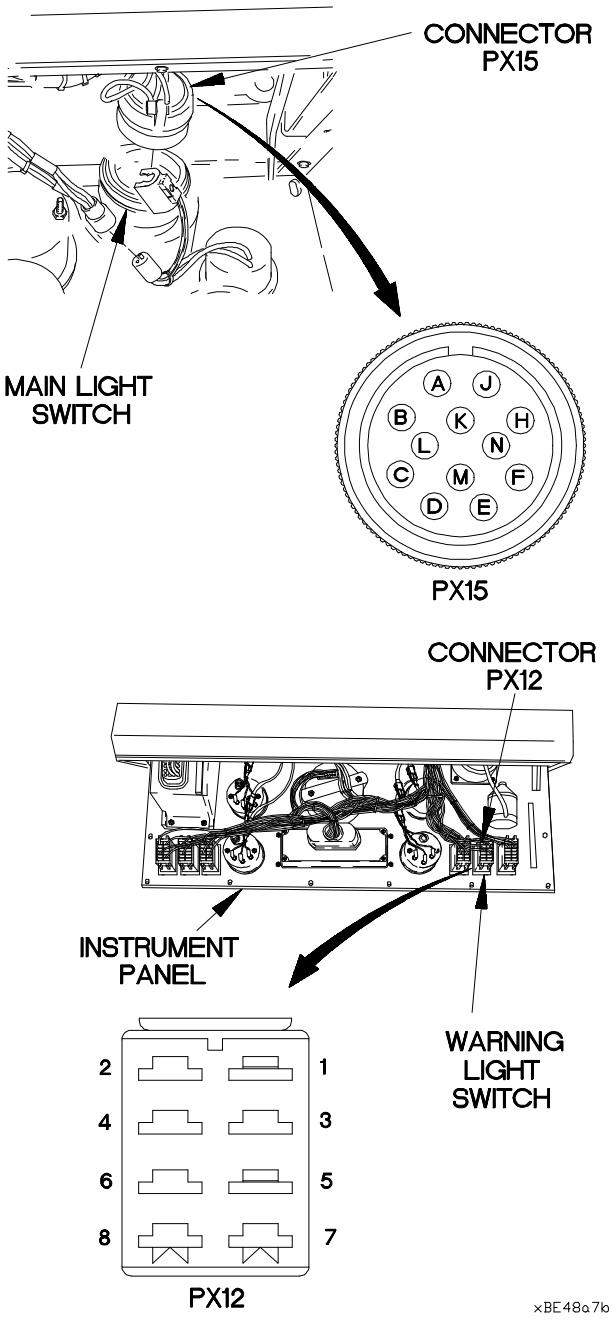
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector PX15 from main light switch.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX12 pin 5.
(4) Connect negative (-) probe of multimeter to connector PX15 socket H and note reading on multimeter.
(5) If continuity is not present, repair wire 1575 from connector PX12 pin 5 to connector PX15 socket H (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace main light switch (para 7-17).
(7) Connect connector PX15 to main light switch.
(8) Connect connector PX12 to warning light switch.
(9) Install instrument panel assembly (para 7-15).
(10) Connect batteries (para 7-48).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

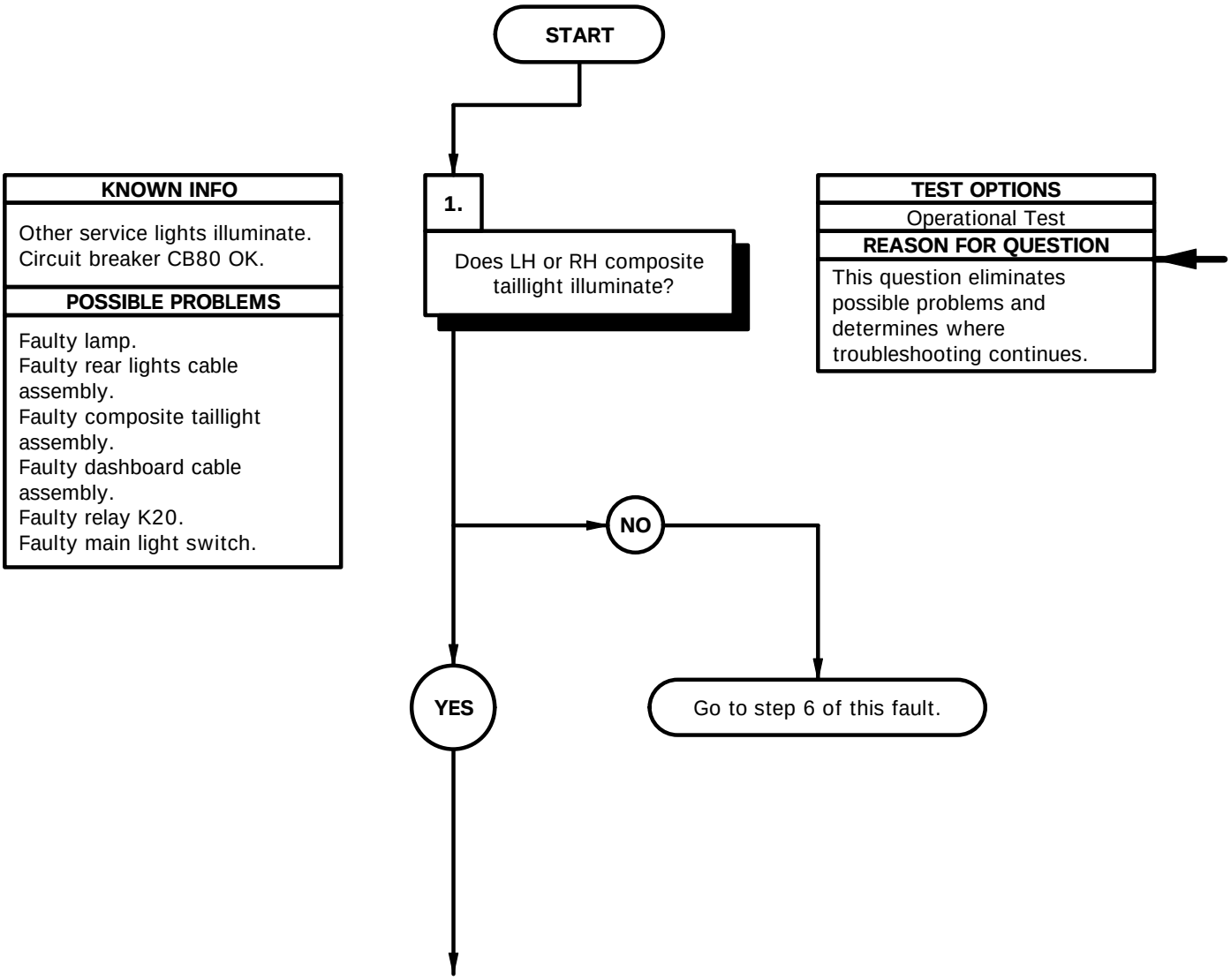
**Material/Parts**
Packing, Preformed (Item 172, Appendix G)
Lockwasher (2) (Item 92, Appendix G)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB80 prior to beginning this task.



(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) If neither composite taillight illuminates, go to step 6 of this fault.
(3) Position main light switch to OFF (TM 9-2320-365-10).

## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

**KNOWN INFO**

Other service light illuminates.
Circuit breaker CB80 OK.
One composite taillight illuminate.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty rear lights cable assembly.
Faulty composite taillight assembly.
Faulty lamp.

**2.** Does LH composite taillight illuminate?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

This question illuminates possible problems and determines where troubleshooting continues.

**NO** → Go to step 7 of this fault.

**YES**

**KNOWN INFO**

Other service light illuminates.
Circuit breaker CB80 OK.
One composite taillight illuminates.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty rear lights cable assembly.
Faulty composite taillight assembly.
Faulty lamp.

**3.** Is continuity present through RH composite taillight lamp?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, RH composite taillight lamp is faulty.

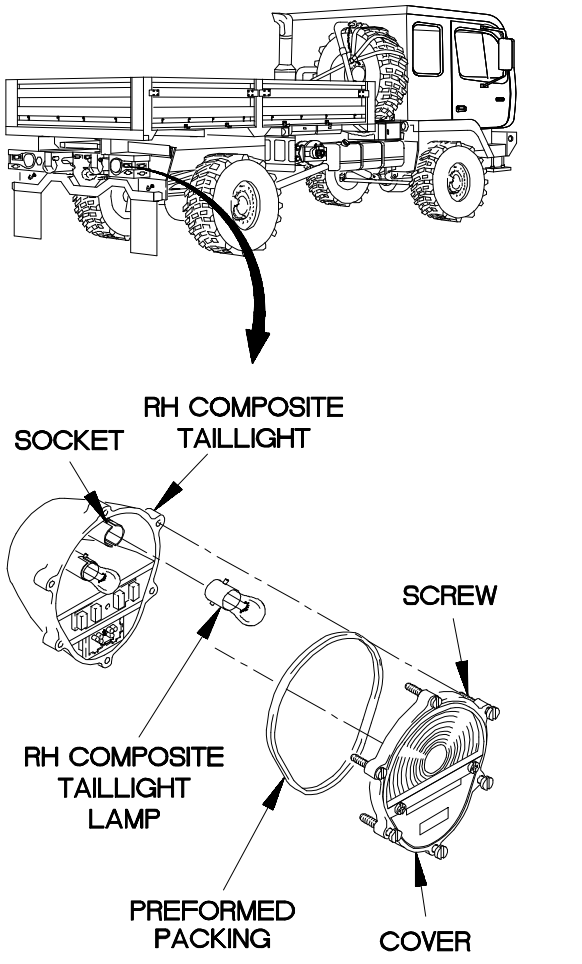
**NO** → Replace RH composite taillight lamp (para 7-32).

**YES**

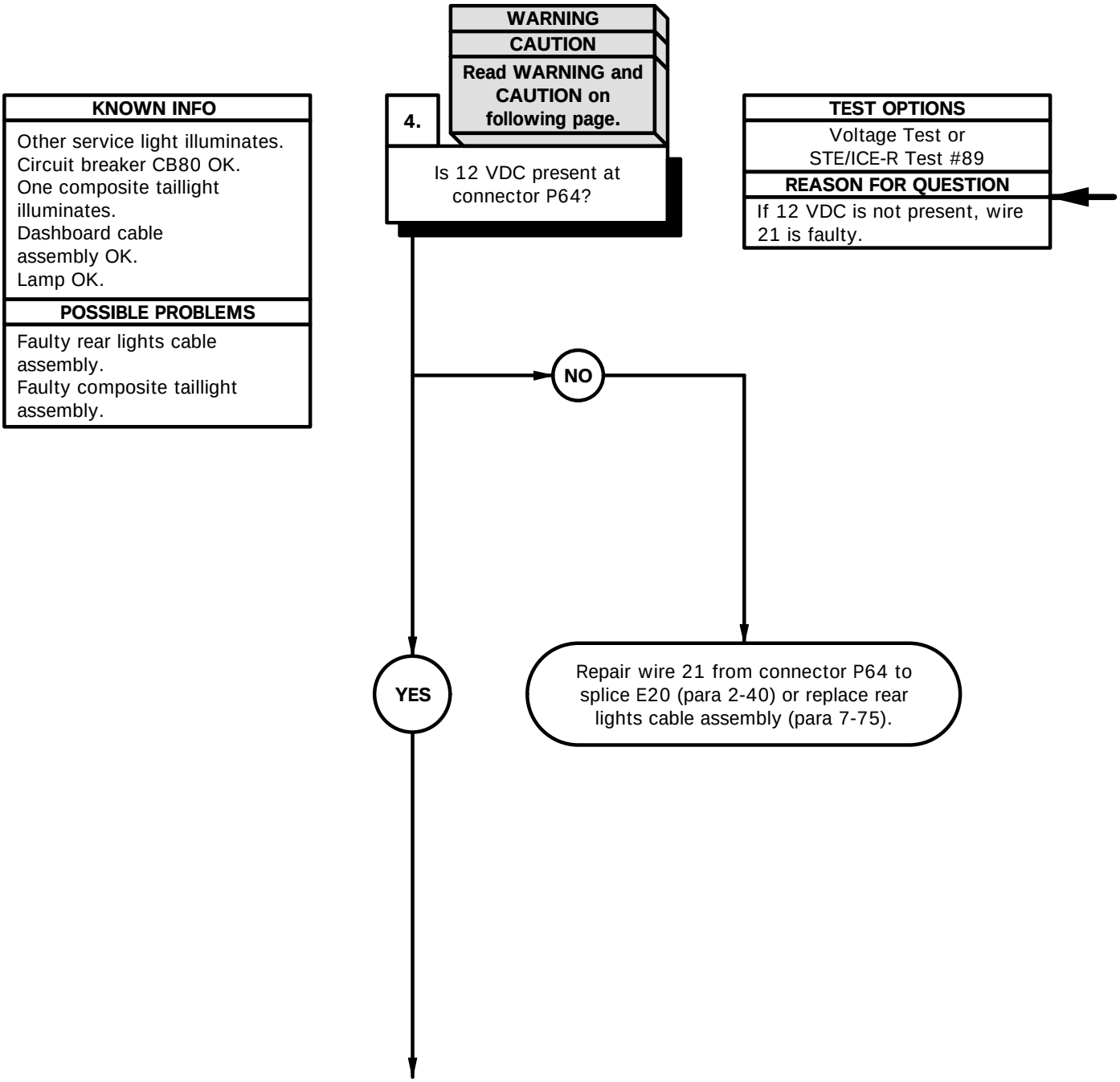
If LH taillight does not illuminate, go to step 7 of this fault.

**CONTINUITY TEST**

(1) Loosen six screws and remove cover and preformed packing from RH composite taillight. Discard preformed packing.
(2) Remove RH composite taillight lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through RH composite taillight lamp and note reading on multimeter.
(5) If continuity is not present, replace RH composite taillight lamp (para 7-32).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits, and cause severe burns or electrical shock.**

**CAUTION**

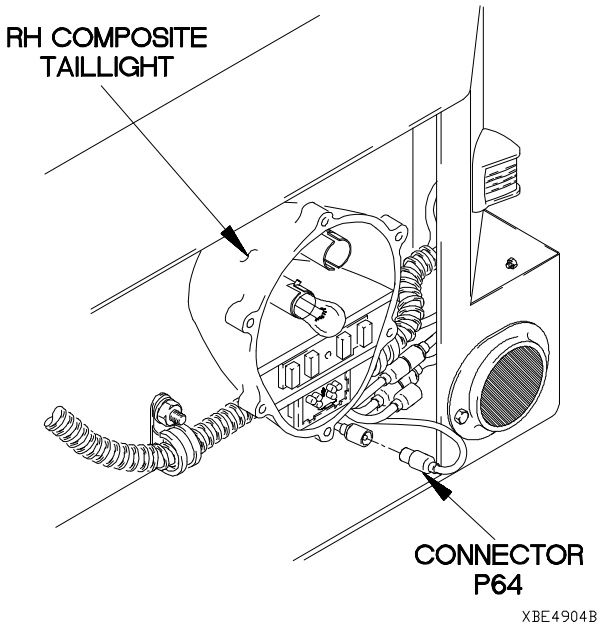
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

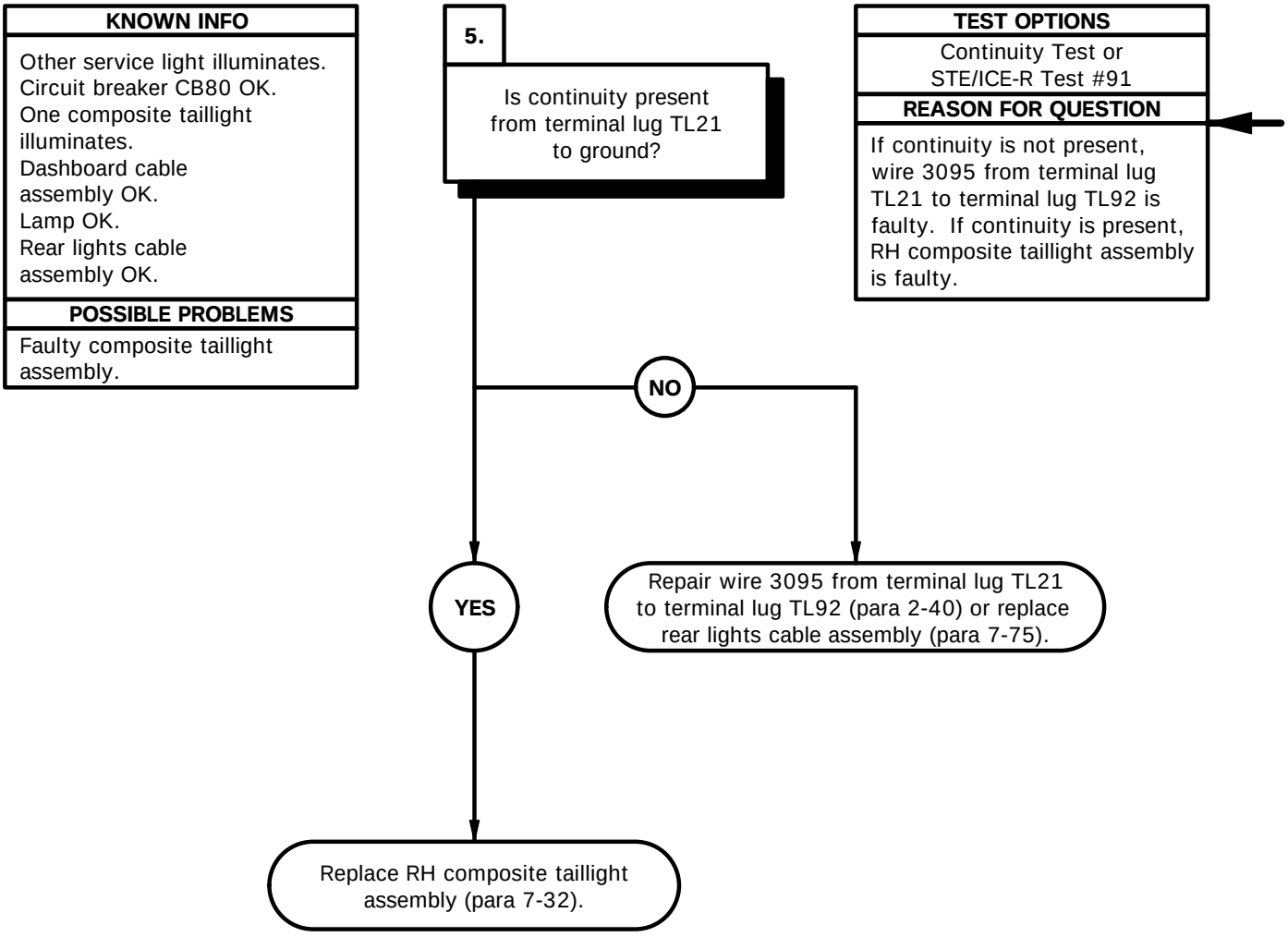
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P64 from RH composite taillight assembly.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P64.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 21 from connector P64 to splice E20 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) Position main light switch to OFF (TM 9-2320-365-10).

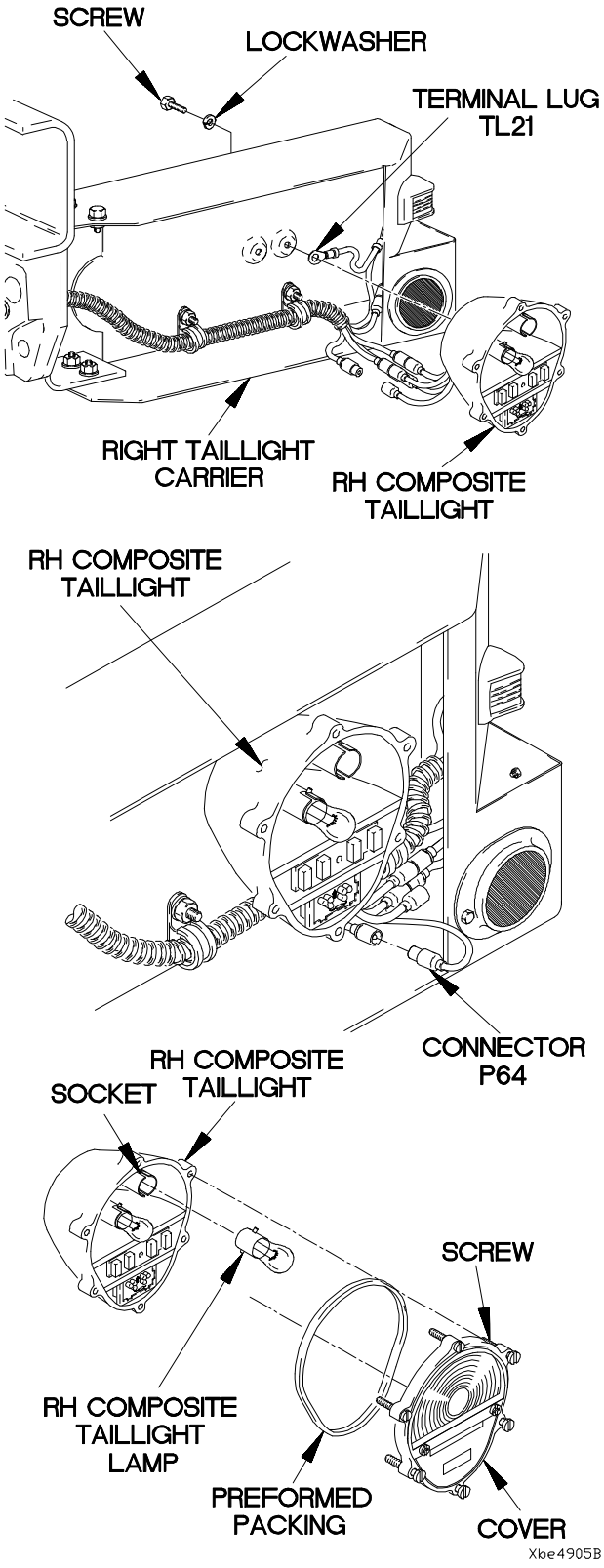


## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

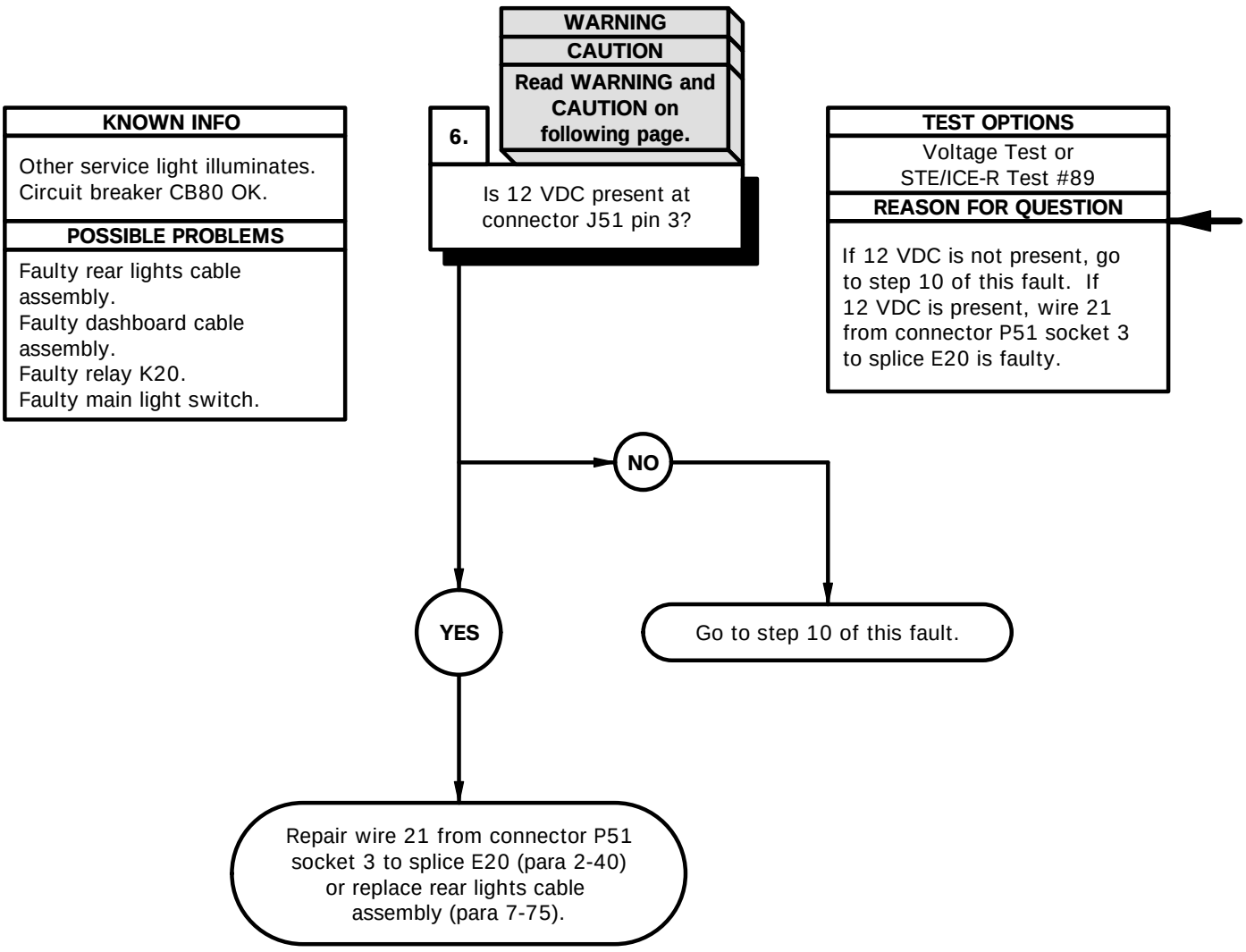


**CONTINUITY TEST**

(1) Remove two screws, lockwashers, RH composite taillight assembly, and terminal lug TL21 from right taillight carrier. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL21.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3095 from terminal lug TL21 to terminal lug TL92 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace RH composite taillight assembly (para 7-32).
(7) Install terminal lug TL21, and RH composite taillight assembly on right taillight carrier with two lockwashers and screws.
(8) Connect connector P64 to RH composite taillight assembly.
(9) Install RH composite taillight lamp in socket.
(10) Install preformed packing and cover on RH composite taillight assembly with six screws.



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

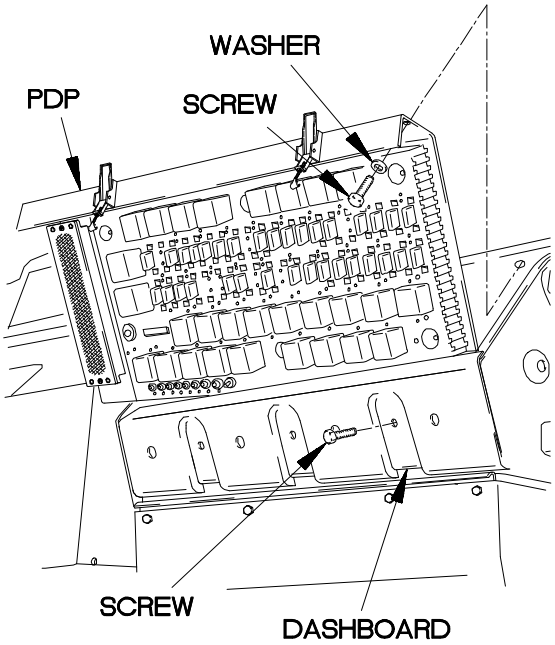
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

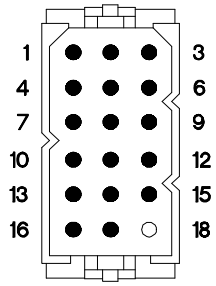
**NOTE**

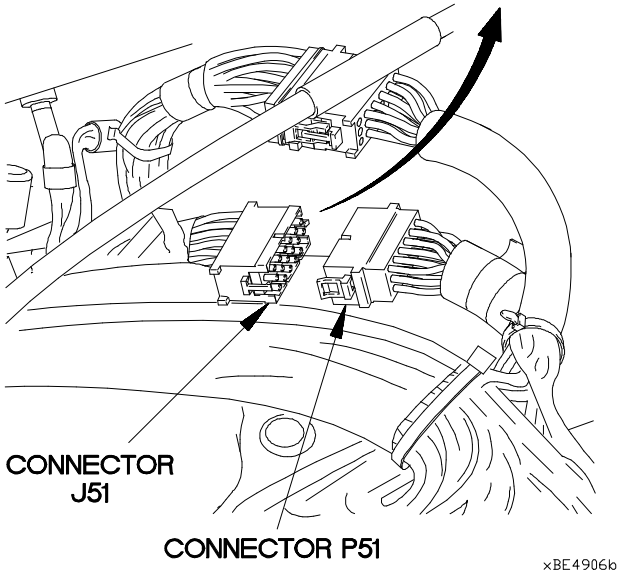
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector P51 from connector J51.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector J51 pin 3.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(10) If 12 VDC is not present, go to step 10 of this fault.
(11) If 12 VDC is present, repair wire 21 from connector P51 socket 3 to splice E20 (para 2-40) or replace rear lights cable assembly (para 7-75).
(12) Position main light switch to OFF TM 9-2320-365-10).
(13) Connect connector J51 to connector P51.
(14) Install PDP on dashboard with three screws.
(15) Install three washers and screws in PDP.



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

**KNOWN INFO**

Other service light illuminates.
Circuit breaker CB80 OK.
One composite taillight illuminates.
Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty rear lights cable assembly.
Faulty composite taillight assembly.
Faulty lamp.

**7.**

Is continuity present through LH composite taillight lamp?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, LH composite taillight lamp is faulty.

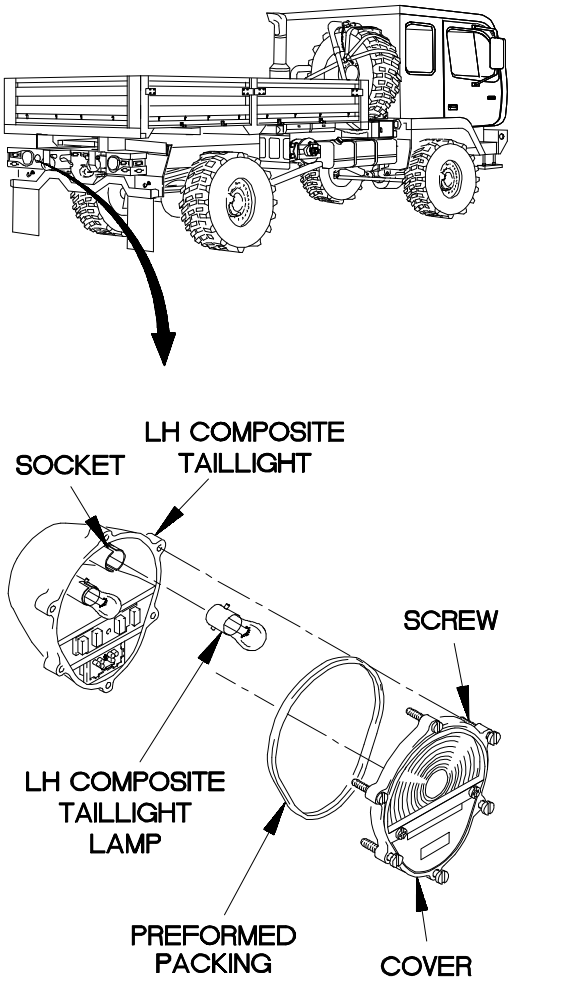
NO

YES

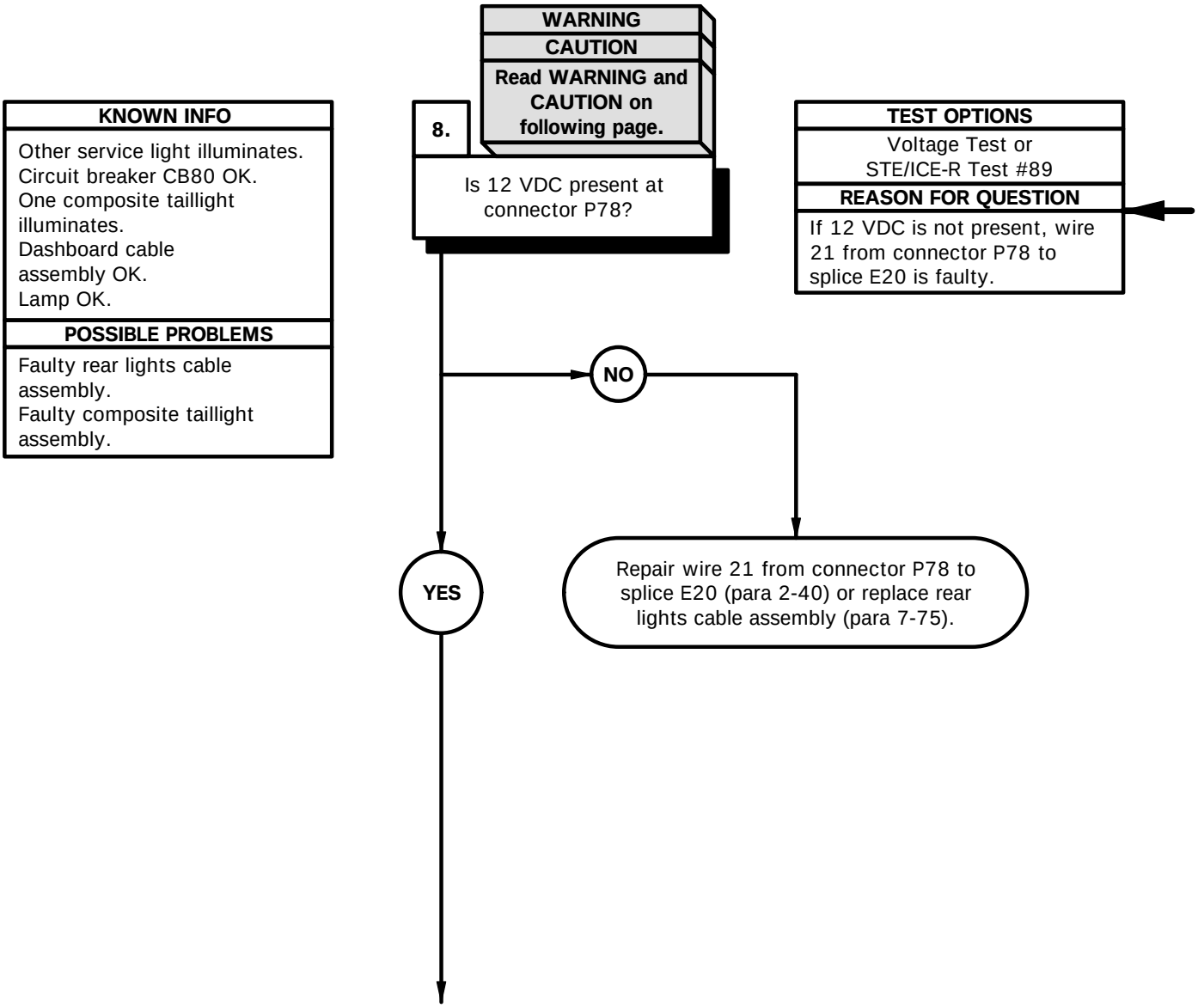
Replace LH composite taillight lamp (para 7-32).

**CONTINUITY TEST**

(1) Loosen six screws and remove cover and preformed packing from LH composite taillight lamp. Discard preformed packing.
(2) Remove LH composite taillight lamp from socket.
(3) Set multimeter to ohms.
(4) Check continuity through LH composite taillight lamp and note reading on multimeter.
(5) If continuity is not present, replace LH composite taillight lamp (para 7-32).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits, or cause severe burns or electrical shock.**

**CAUTION**

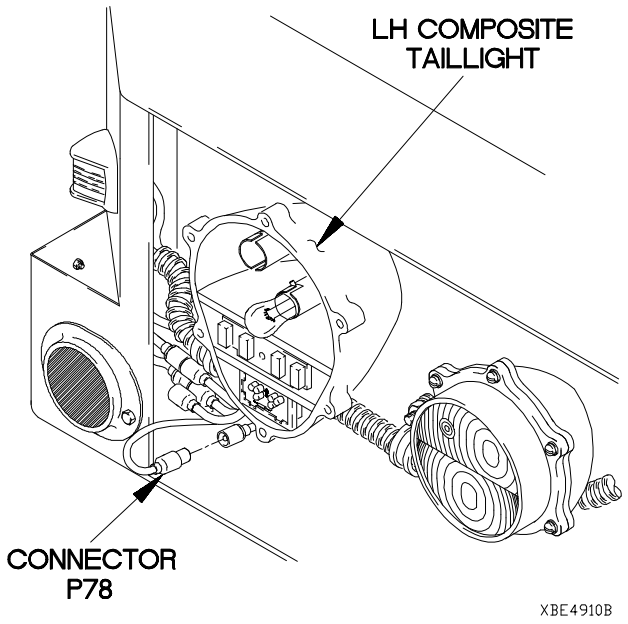
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

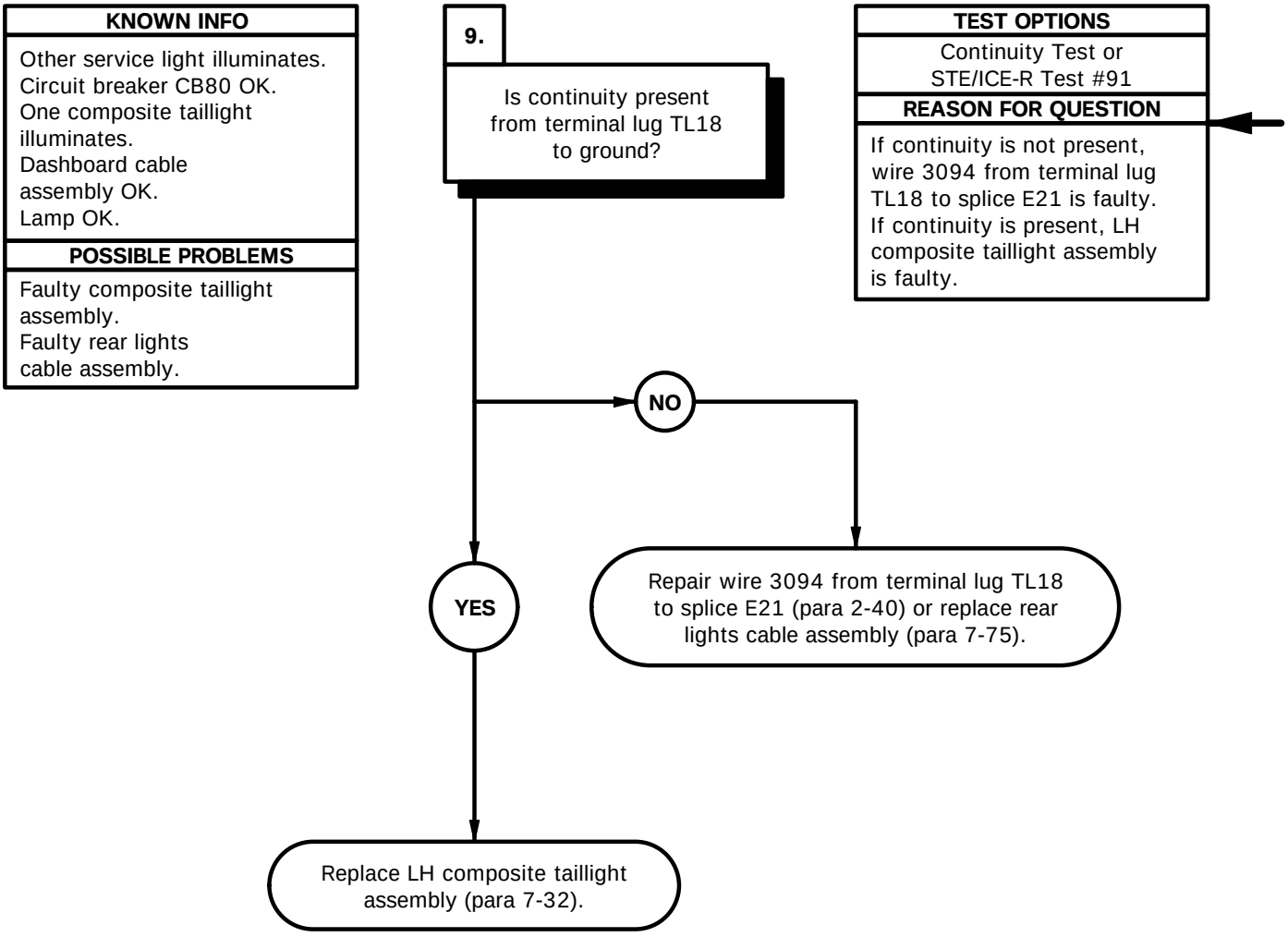
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P78 from LH composite taillight assembly.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P78.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 21 from connector P78 to splice E20 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) Position main light switch to OFF (TM 9-2320-365-10).

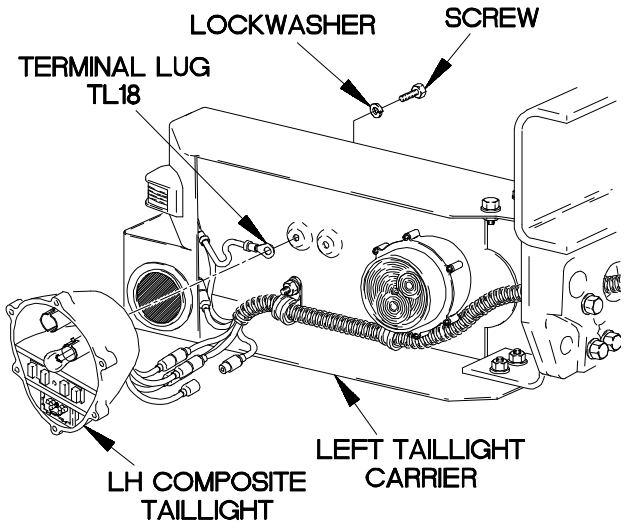


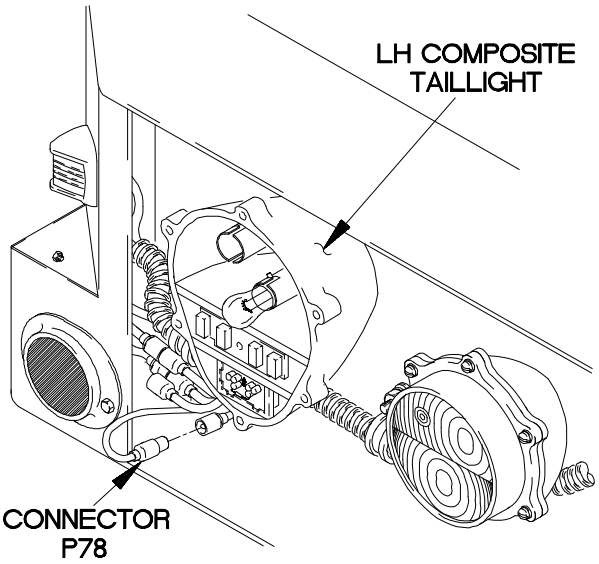
## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

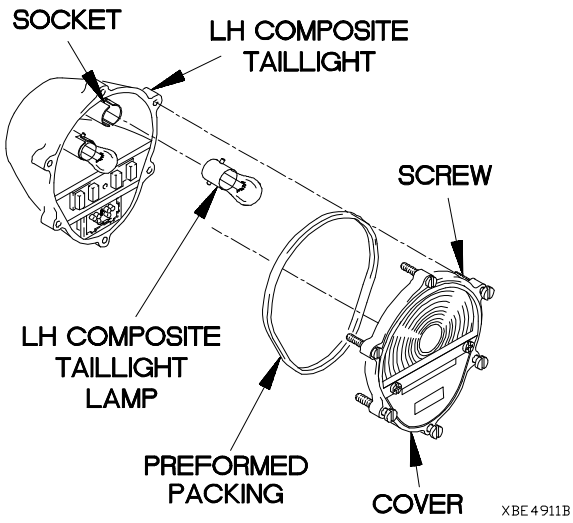


**CONTINUITY TEST**

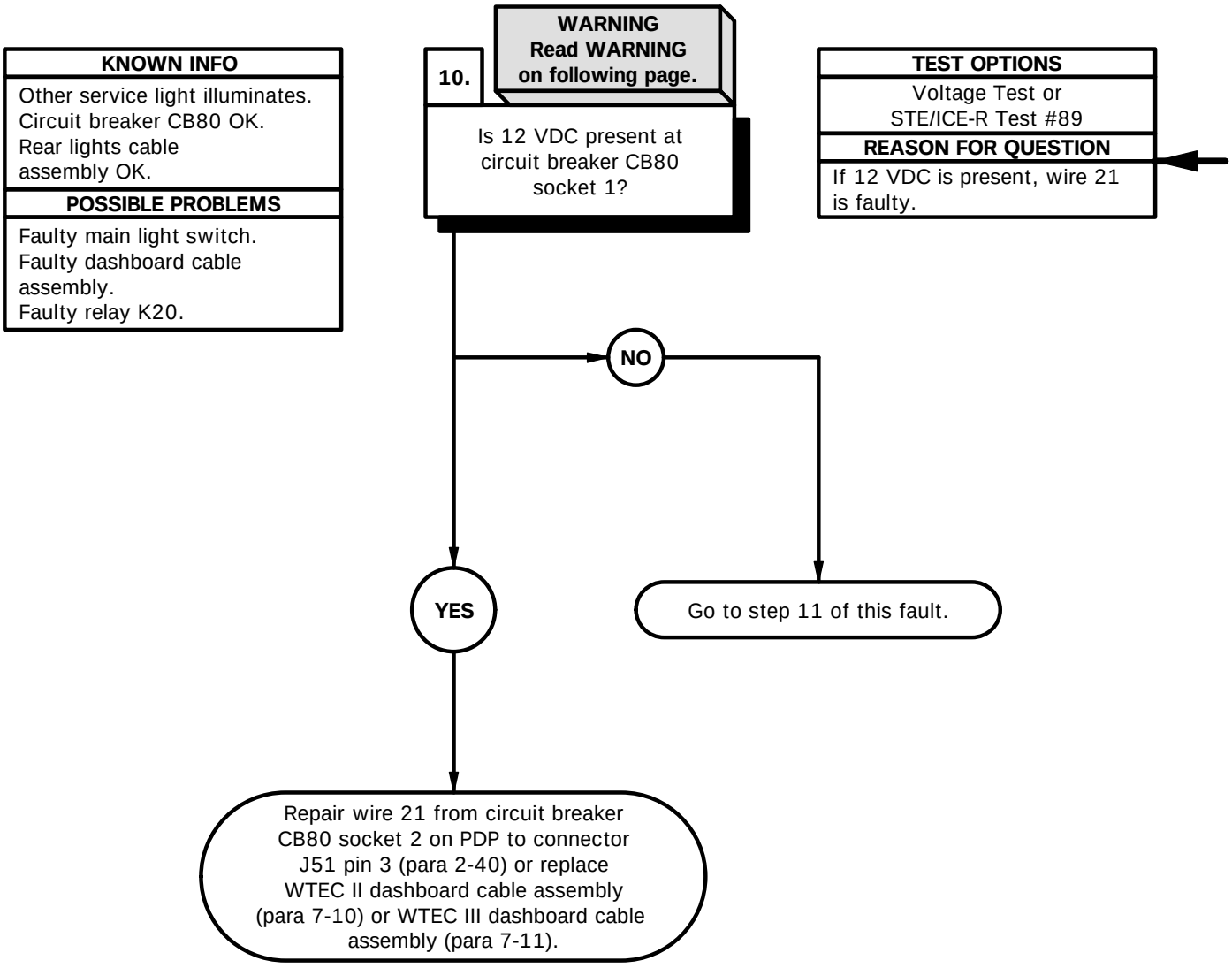
(1) Remove two screws, lockwashers, LH composite taillight assembly, and terminal lug TL18 from right taillight carrier. Discard lockwashers.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL18.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3094 from terminal lug TL18 to splice E21 (para 2-40).
(6) If continuity is present, replace LH composite taillight assembly (para 7-32).
(7) Install terminal lug TL18, and LH composite taillight assembly on left taillight carrier with two lockwashers and screws.
(8) Connect connector P78 to LH composite taillight assembly.
(9) Install LH composite taillight lamp in socket.
(10) Install preformed packing and cover on LH composite taillight assembly with six screws.



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

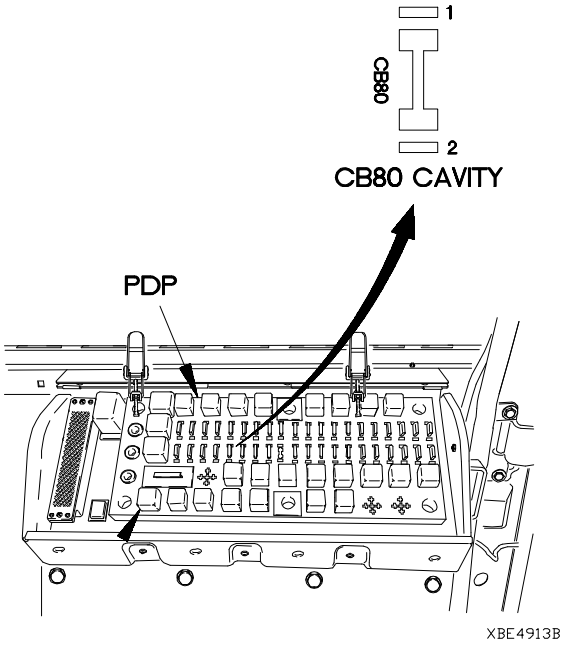


**WARNING**

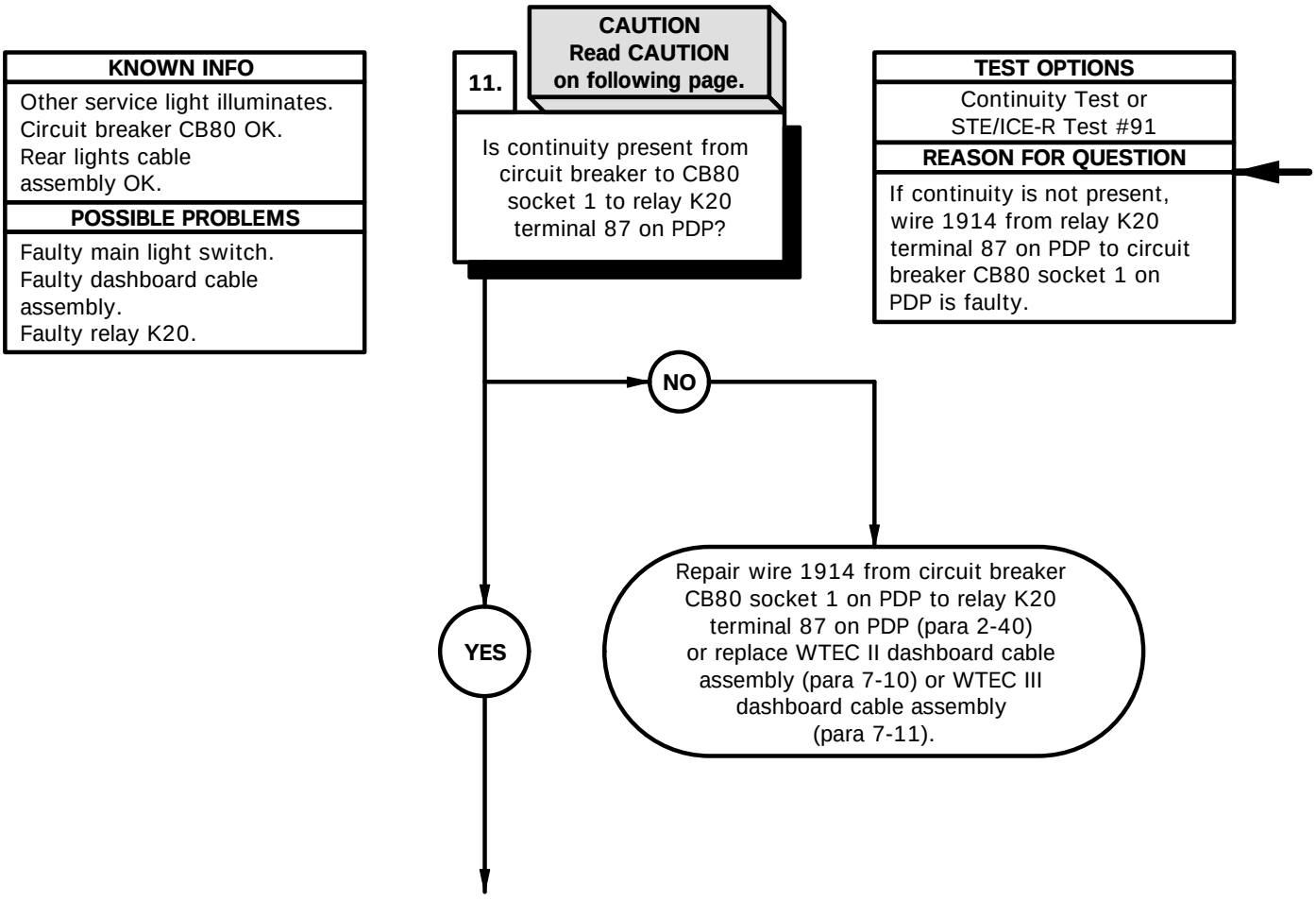
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove circuit breaker CB80 from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to circuit breaker CB80 socket 1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, go to 11 of this fault.
(8) If 12 VDC is present, repair wire 21 from circuit breaker CB80 socket 2 on PDP to connector J51 pin 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position main light switch to OFF (TM 9-2320-365-10).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

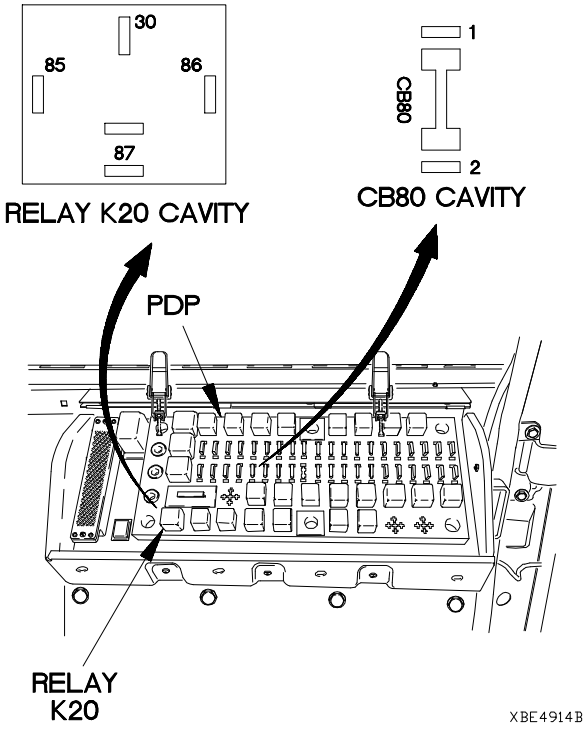
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

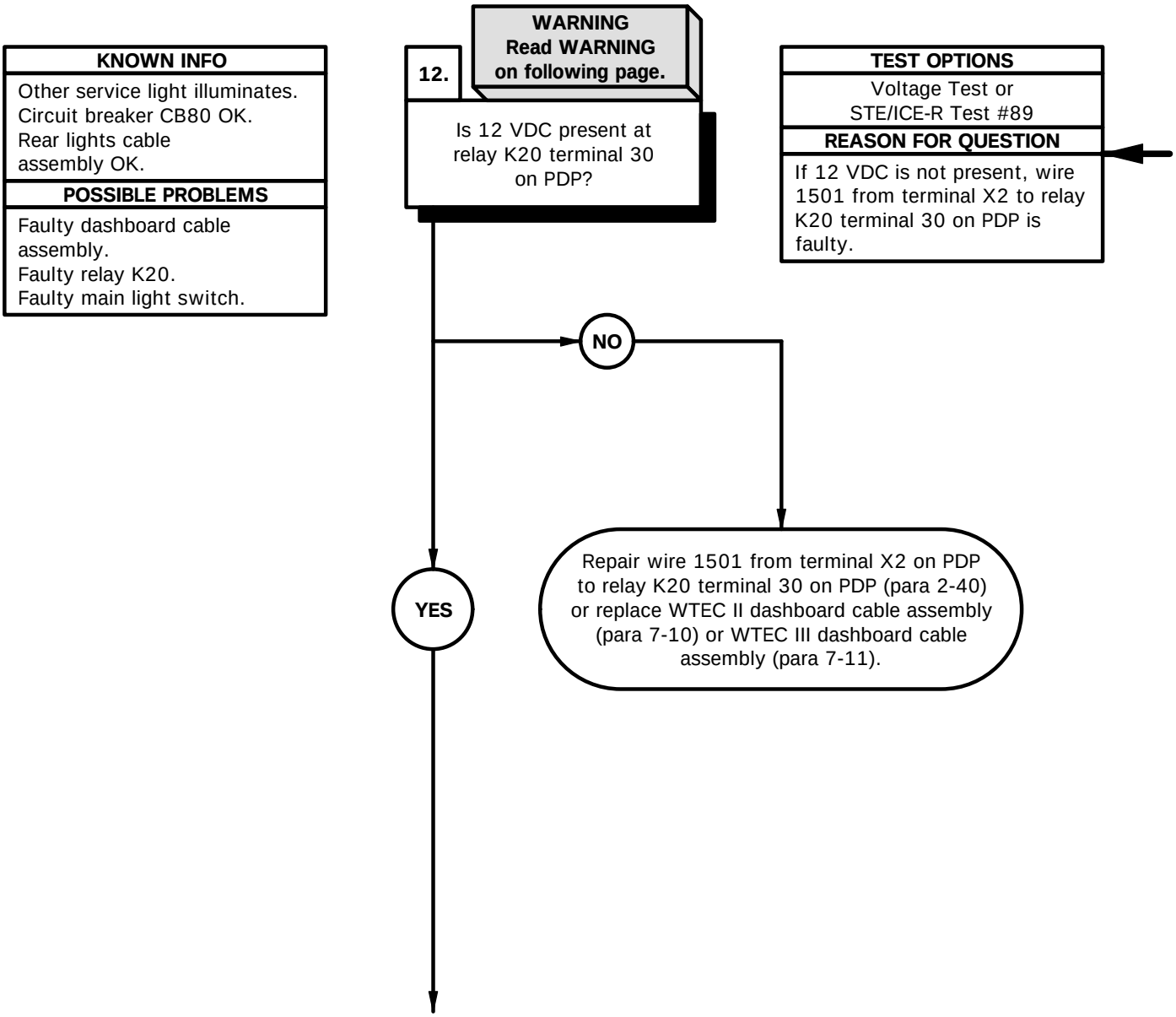
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove relay K20 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to circuit breaker CB80 socket 1 on PDP.
(5) Connect negative (-) probe of multimeter to relay K20 terminal 87 on PDP and note reading on multimeter.
(6) If 12 VDC is not present, repair wire 1914 from circuit breaker CB80 socket 1 on PDP to relay K20 terminal 87 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Install circuit breaker CB80 in PDP.
(8) Connect batteries (para 7-48).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

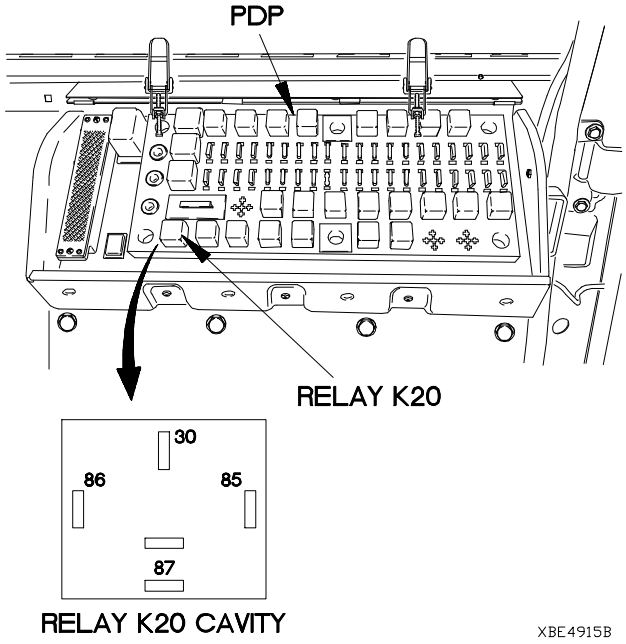


**WARNING**

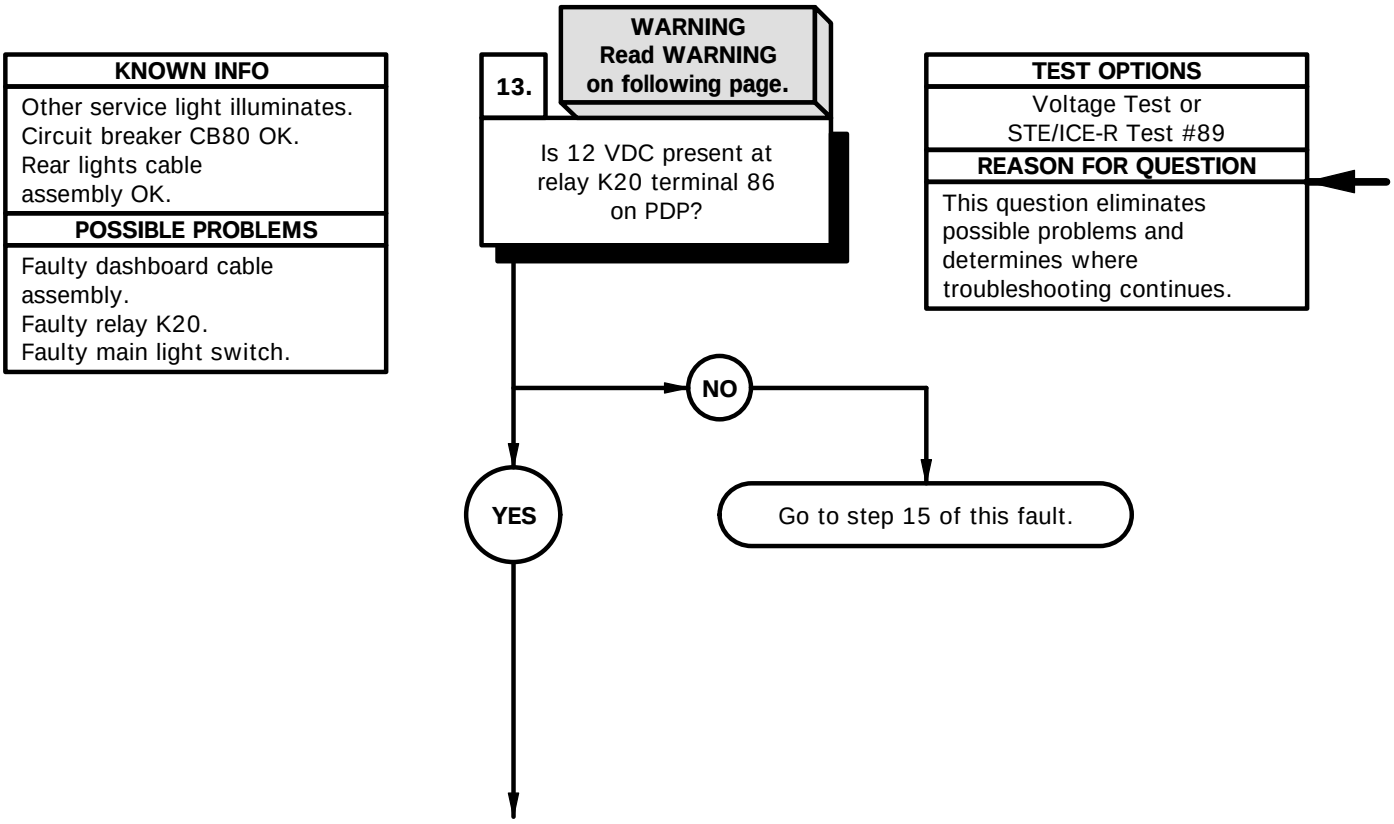
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K20 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1501 from terminal X2 on PDP to relay K20 terminal 30 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

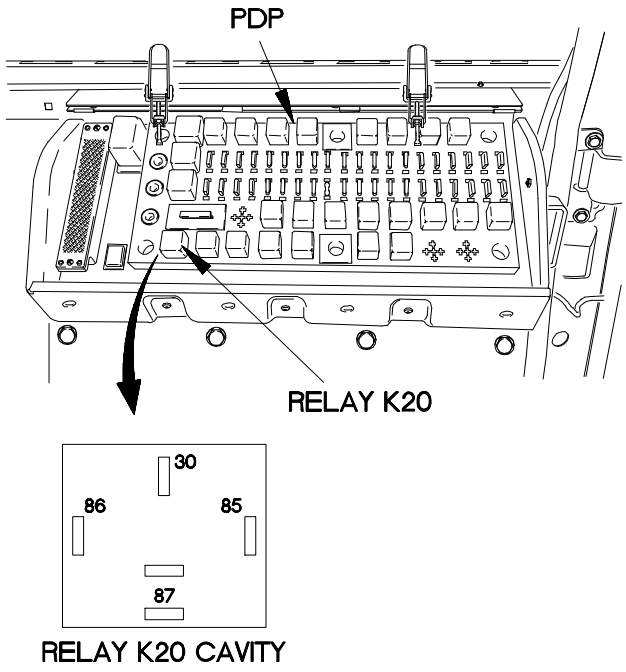


**WARNING**

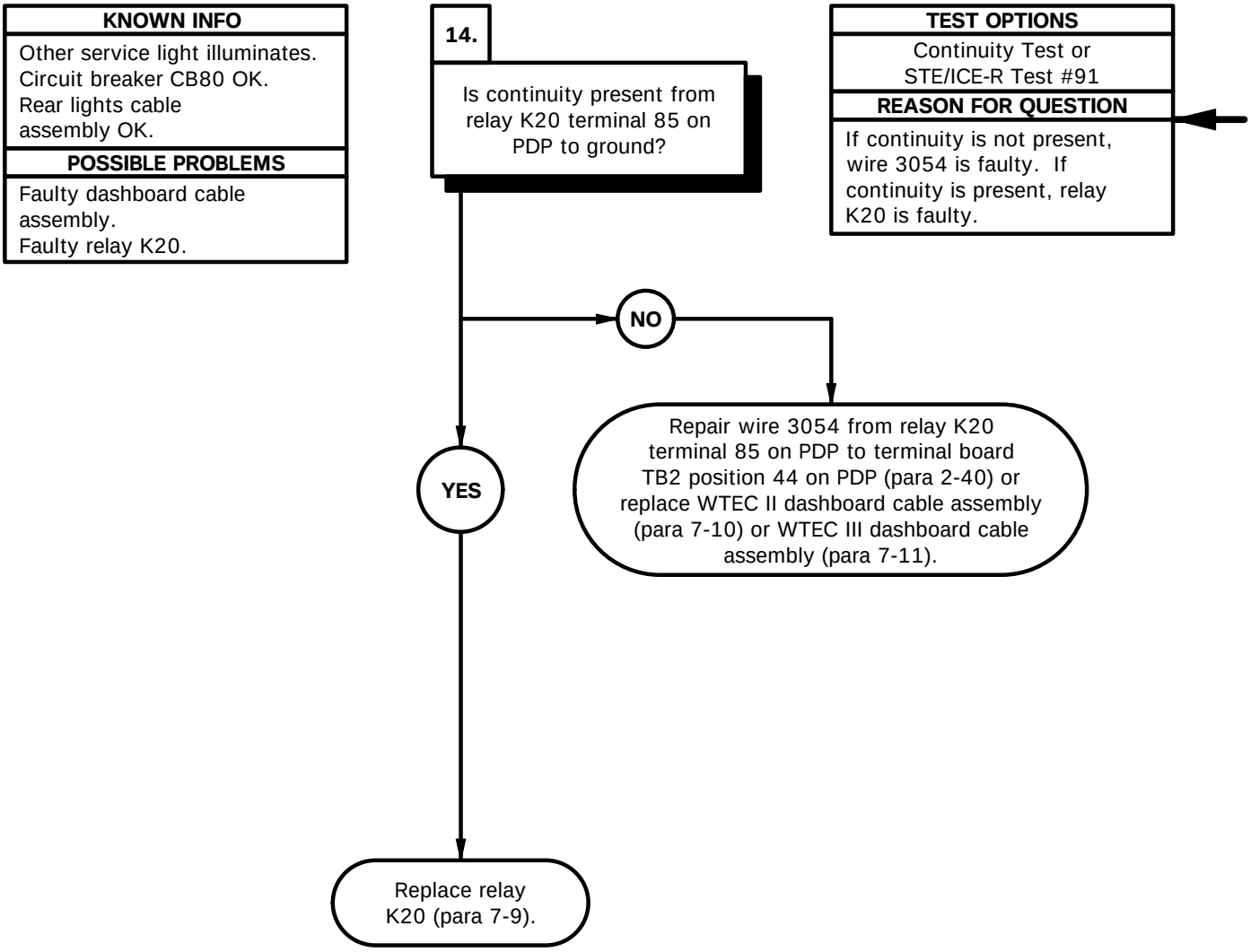
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K20 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 12 VDC is not present, go to step 15 of this fault.

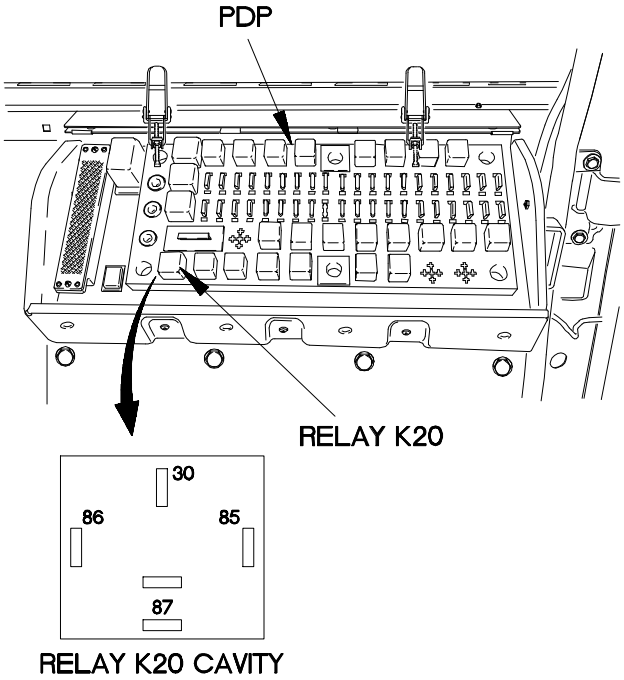


## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)

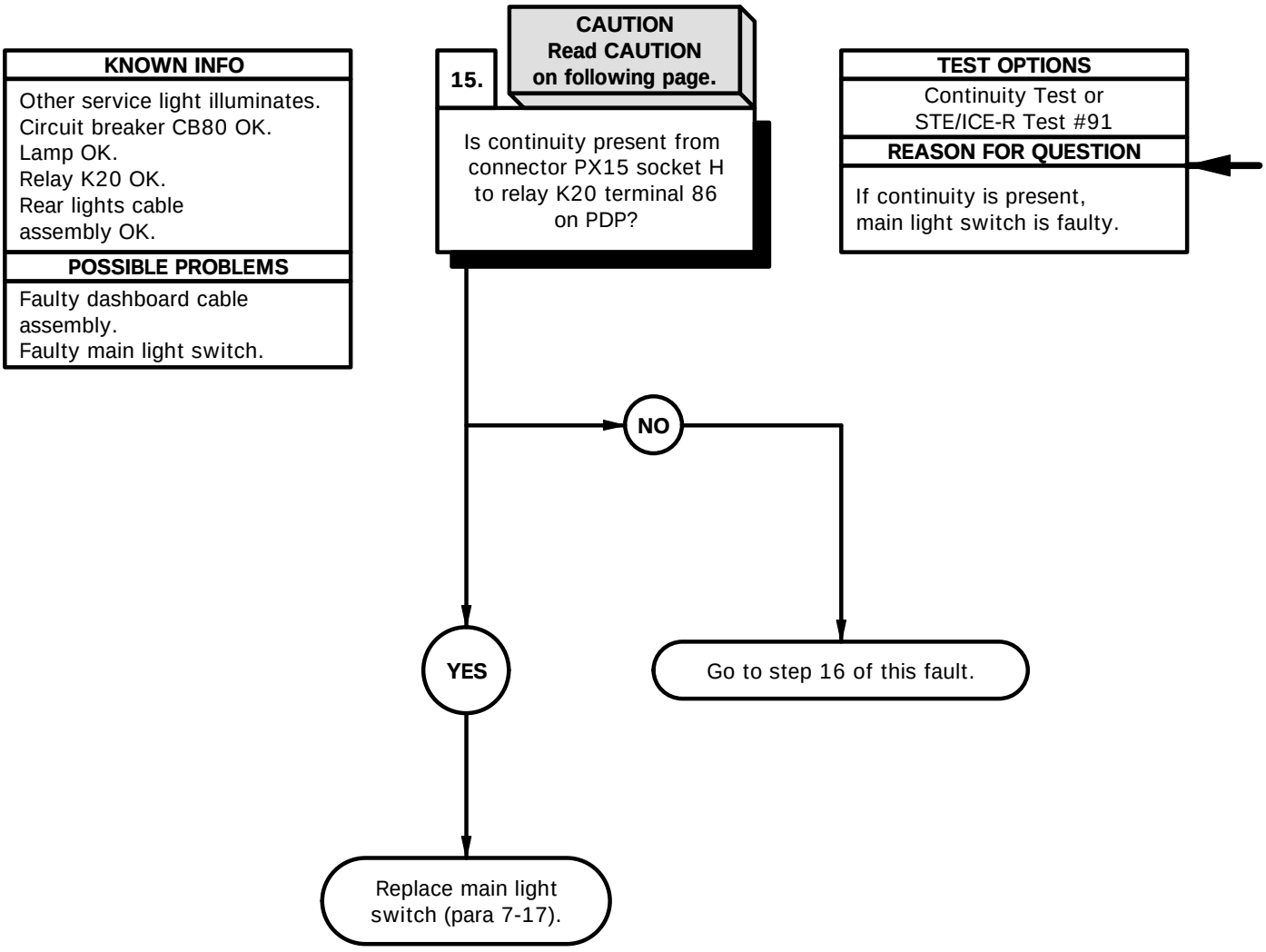


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K20 terminal 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3054 from relay K20 terminal 85 on PDP to terminal board TB2 position 44 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K20 (para 7-9).
(6) Install relay K20 in PDP.
(7) Install PDP cover (para 16-2).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

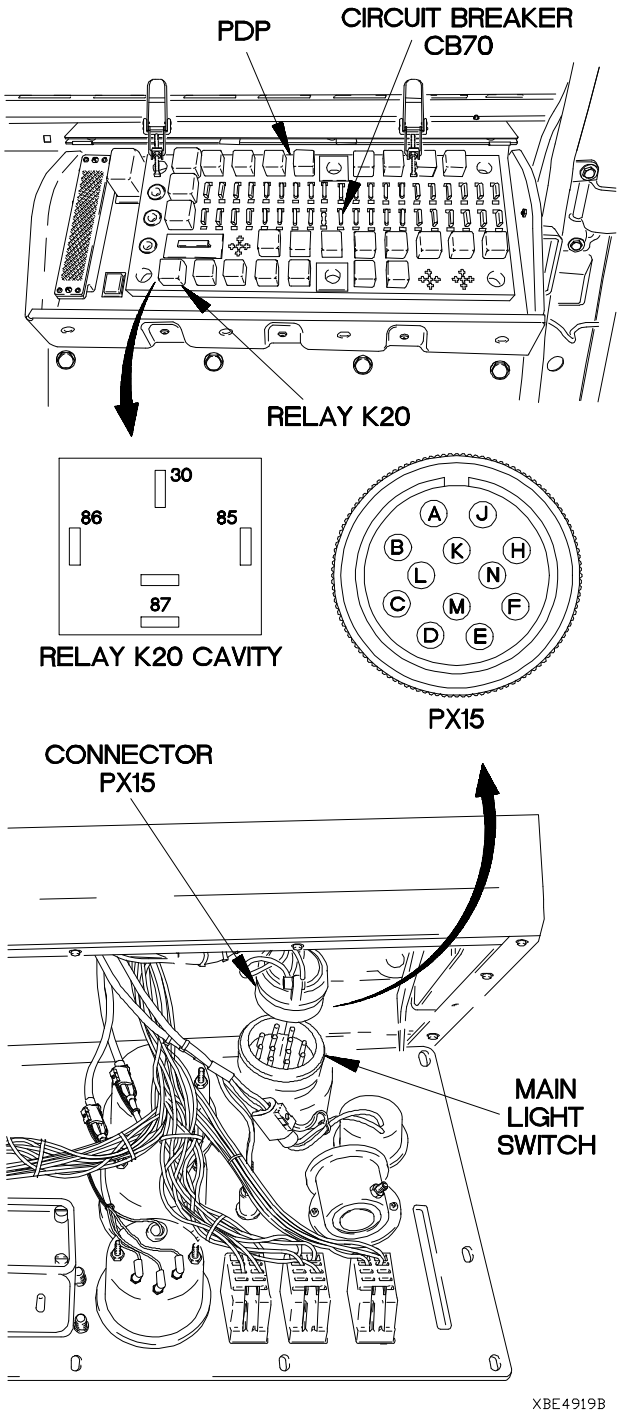
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

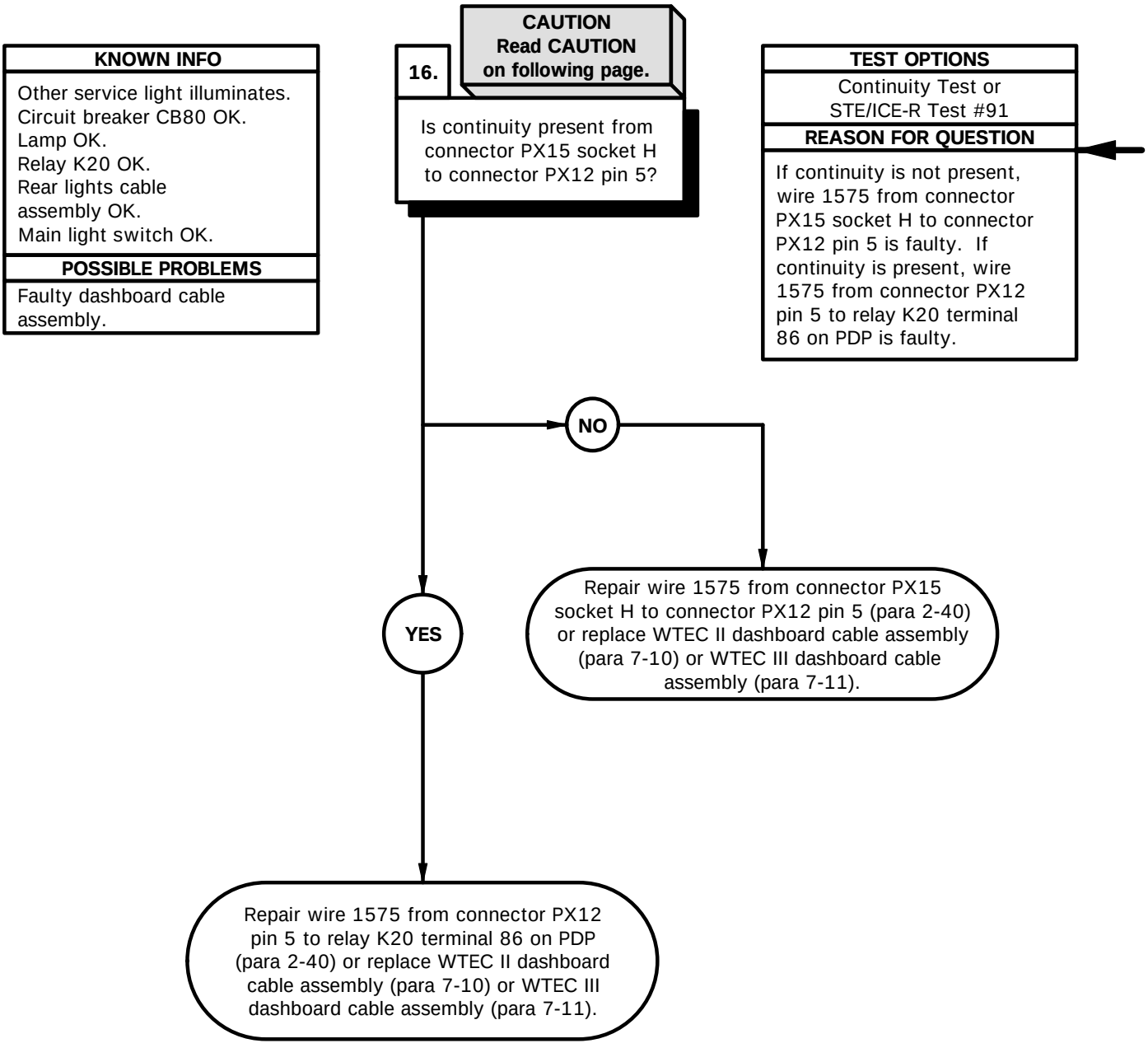
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove circuit breaker CB70 from PDP.
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector PX15 from main light switch.
(4) Install circuit breaker CB70 in PDP.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector PX15 socket H.
(7) Connect negative (-) probe of multimeter to relay K20 terminal 86 on PDP and note reading on multimeter.
(8) If continuity is not present, go to step 16 of this fault.
(9) If continuity is present, replace main light switch (para 7-17).



## e48. ONE OR BOTH COMPOSITE TAILLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

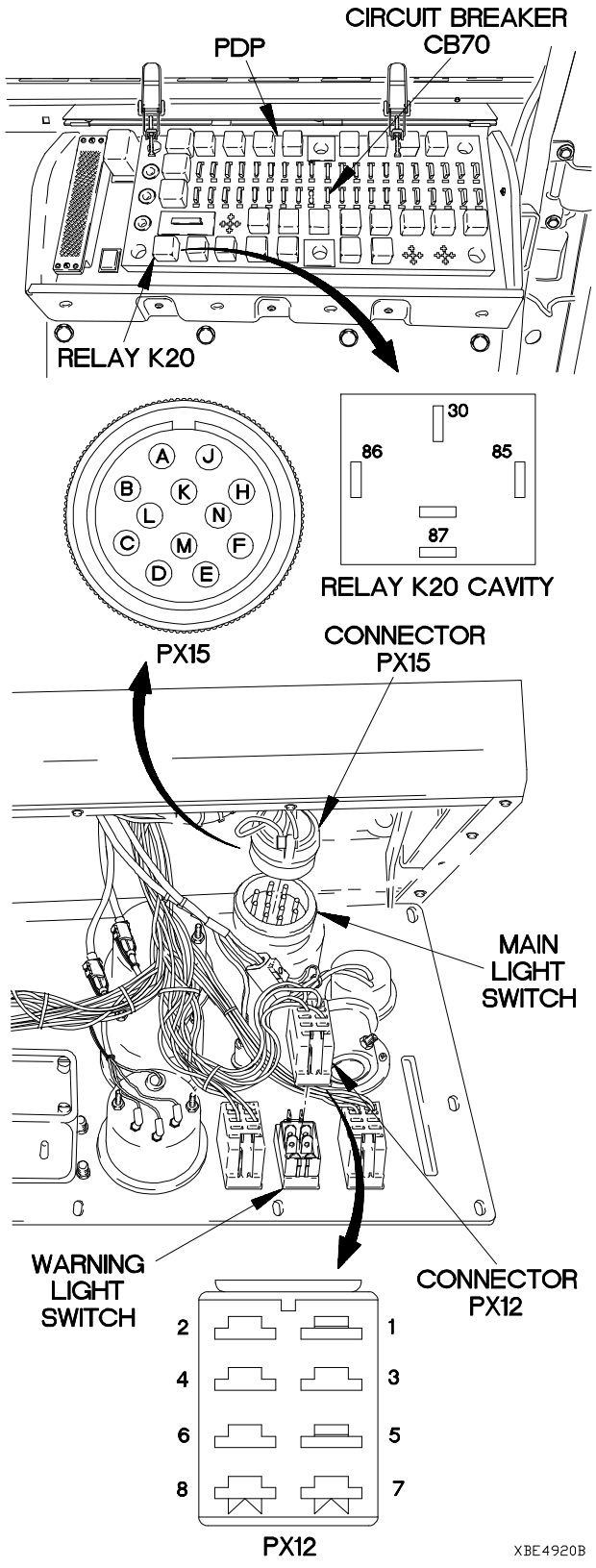
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove circuit breaker CB70 from PDP.
(2) Disconnect connector PX12 from warning light switch.
(3) Install circuit breaker CB70 in PDP.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX15 socket H.
(6) Connect negative (-) probe of multimeter to connector PX12 pin 5 and note reading on multimeter.
(7) If continuity is not present, repair wire 1575 from connector PX15 socket H (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 1575 from connector PX12 pin 5 to relay K20 terminal 86 on PDP (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Remove circuit breaker CB70 from PDP.
(10) Connect connector PX12 to warning light switch.
(11) Connect connector PX15 to main light switch.
(12) Install circuit breaker CB70 in PDP.
(13) Install relay K20 in PDP.
(14) Install PDP cover (16-2).
(15) Install instrument panel assembly (para 7-15).



**e49. ONE OR BOTH FRONT BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE**

**INITIAL SETUP**

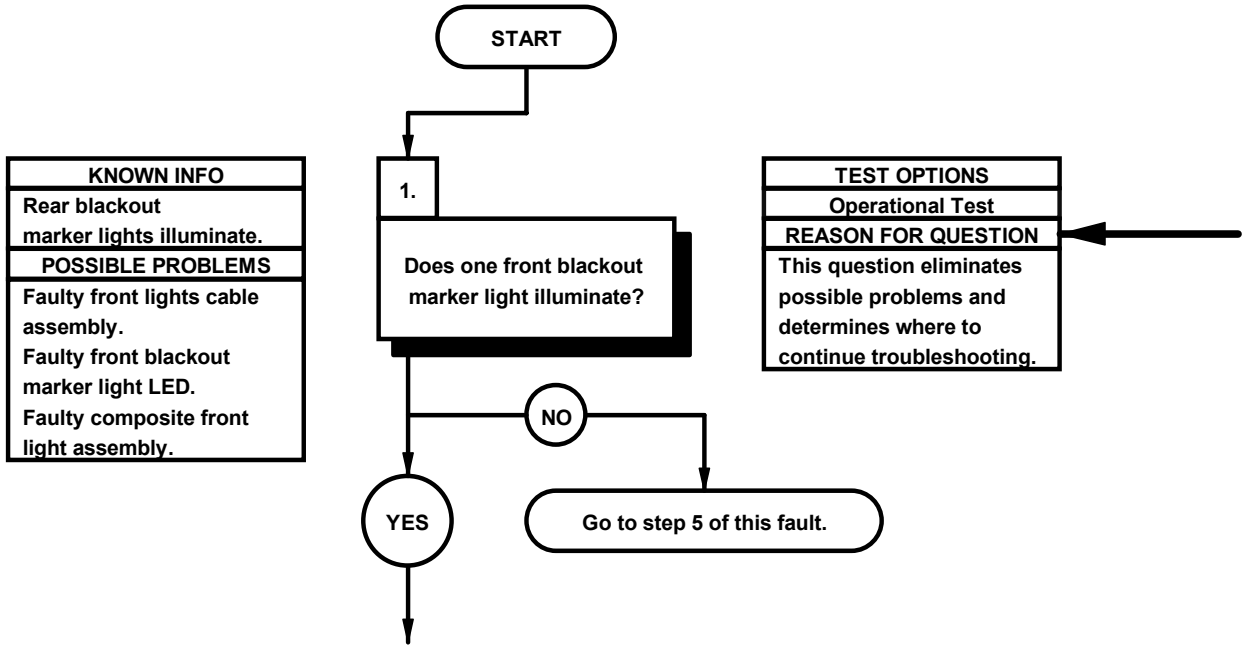
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Packing, Preformed (Item 172, Appendix G)

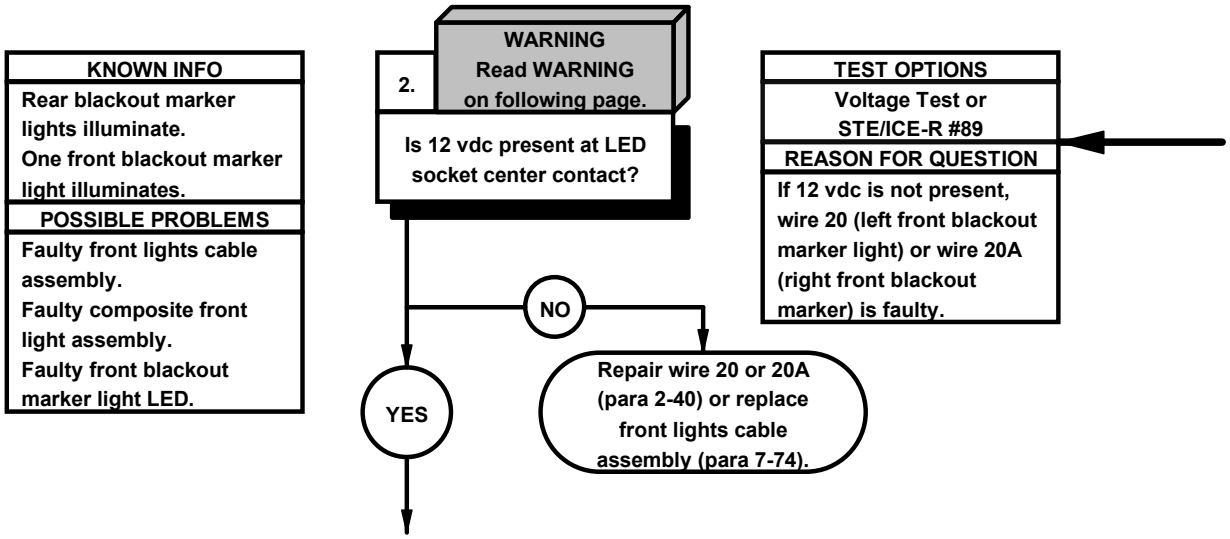
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



| OPERATIONAL TEST |
| --- |
| (1) Position main light switch to BO MARKER (TM 9-2320-365-10). |
| (2) Observe front blackout marker lights and determine how many lights do not illuminate. |
| (3) If both marker lights do not illuminate, go to step 5 of this fault. |
| (4) Position main light switch to OFF (TM 9-2320-365-10). |

## e49. ONE OR BOTH FRONT BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)

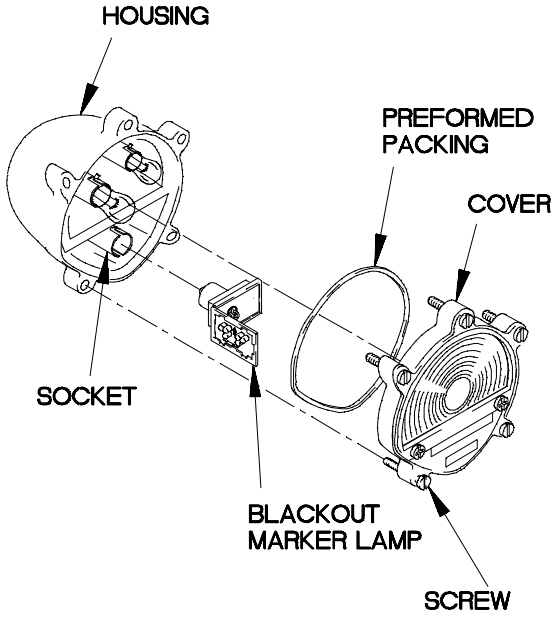


**WARNING**

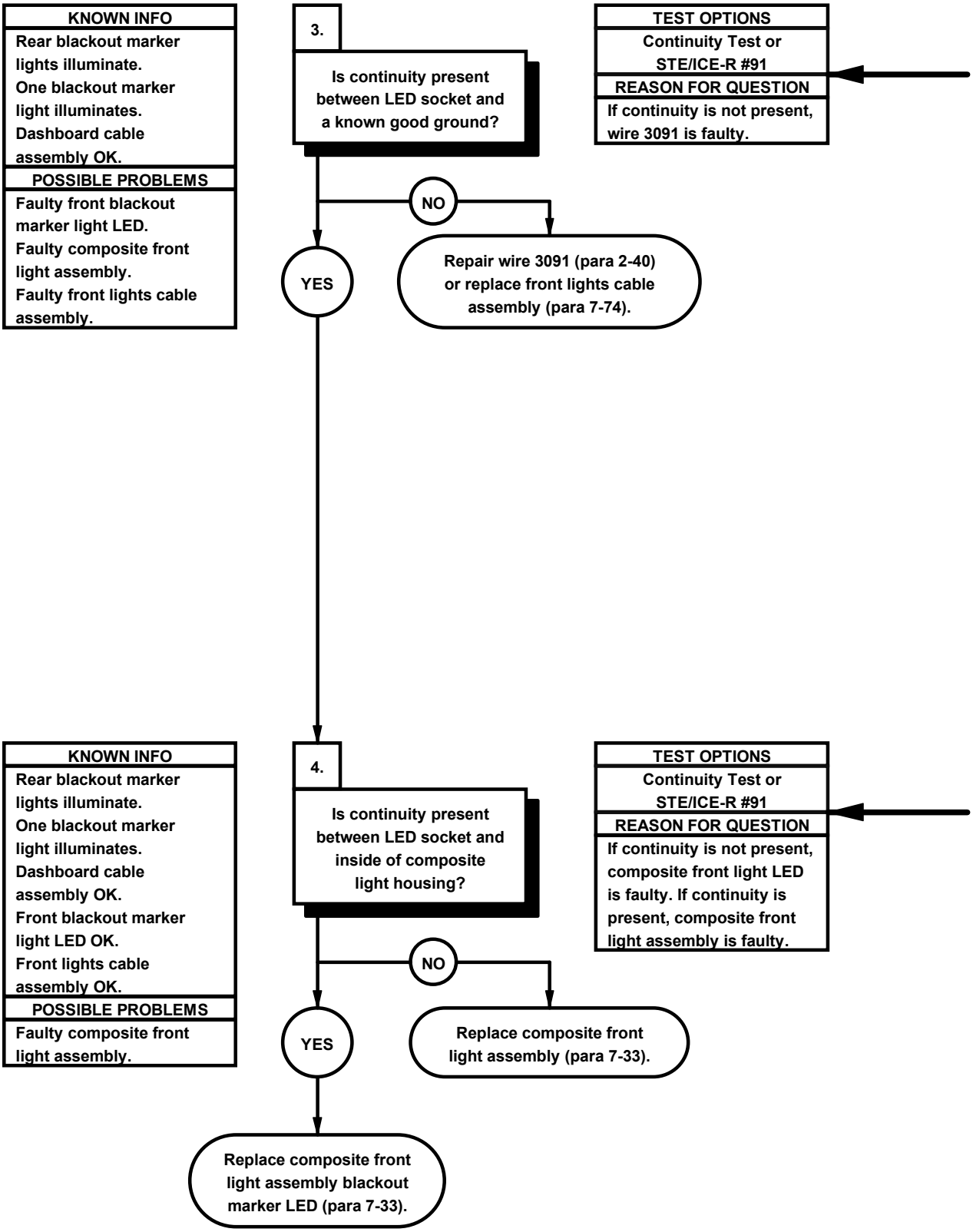
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

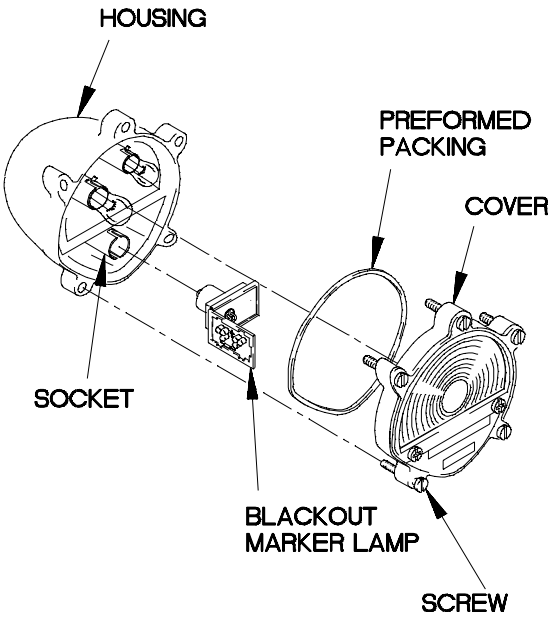
**(1) Loosen five screws on cover.**
**(2) Remove cover and preformed packing from housing. Discard preformed packing.**
**(3) Open blackout marker lamp.**
**(4) Remove blackout marker lamp from socket.**
**(5) Set multimeter to volts dc.**
**(6) Connect positive (+) probe of multimeter to LED socket center contact.**
**(7) Connect negative (-) probe of multimeter to ground.**
**(8) Position main light switch BO MARKER (TM 9-2320-365-10) and note reading on multimeter.**
**(9) If 12 vdc is not present, repair wire 20 (left front blackout marker) or wire 20A (right front blackout marker) (para 2-40) or replace front lights cable assembly (para 7-74).**
**(10) Position main light switch to OFF (TM 9-2320-365-10).**



## e49. ONE OR BOTH FRONT BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



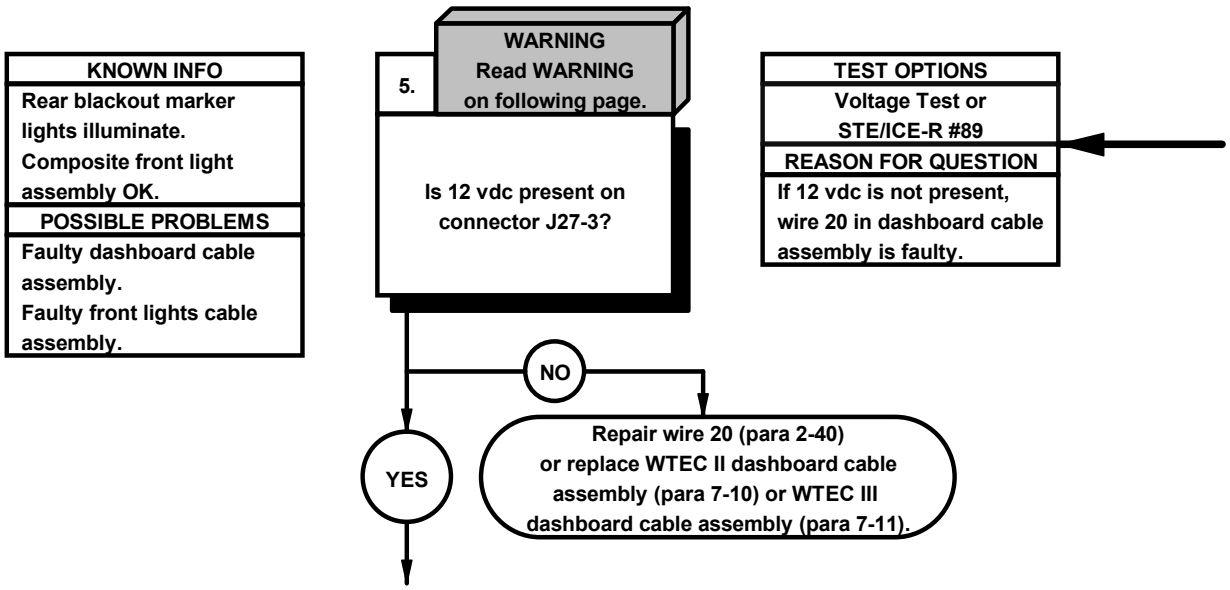
| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to LED socket.<br>(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.<br>(4) If continuity is not present, repair wire 3091 (para 2-40) or replace front lights cable assembly (para 7-74). |




X2E50021

| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to inside of housing.<br>(3) Connect negative (-) probe of multimeter to socket and note reading on multimeter.<br>(4) If continuity is present, replace composite front light assembly blackout marker LED (para 7-33).<br>(5) If continuity is not present, replace composite front light assembly (para 7-33).<br>(6) Open blackout marker lamp.<br>(7) Install blackout marker lamp in socket.<br>(8) Install preformed packing and cover on housing with five screws. |

## e49. ONE OR BOTH FRONT BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)

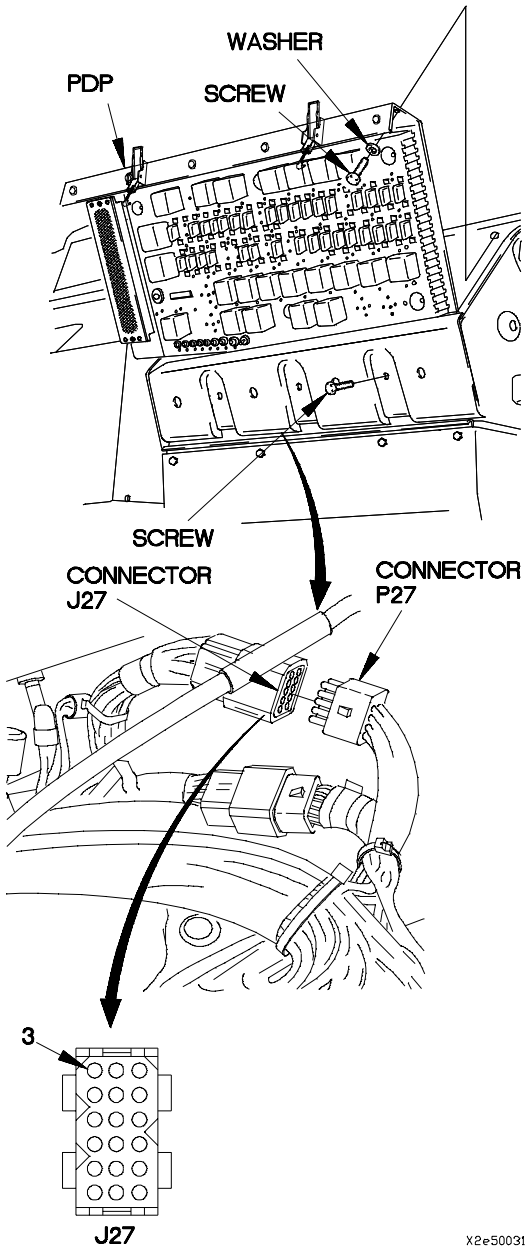


**WARNING**

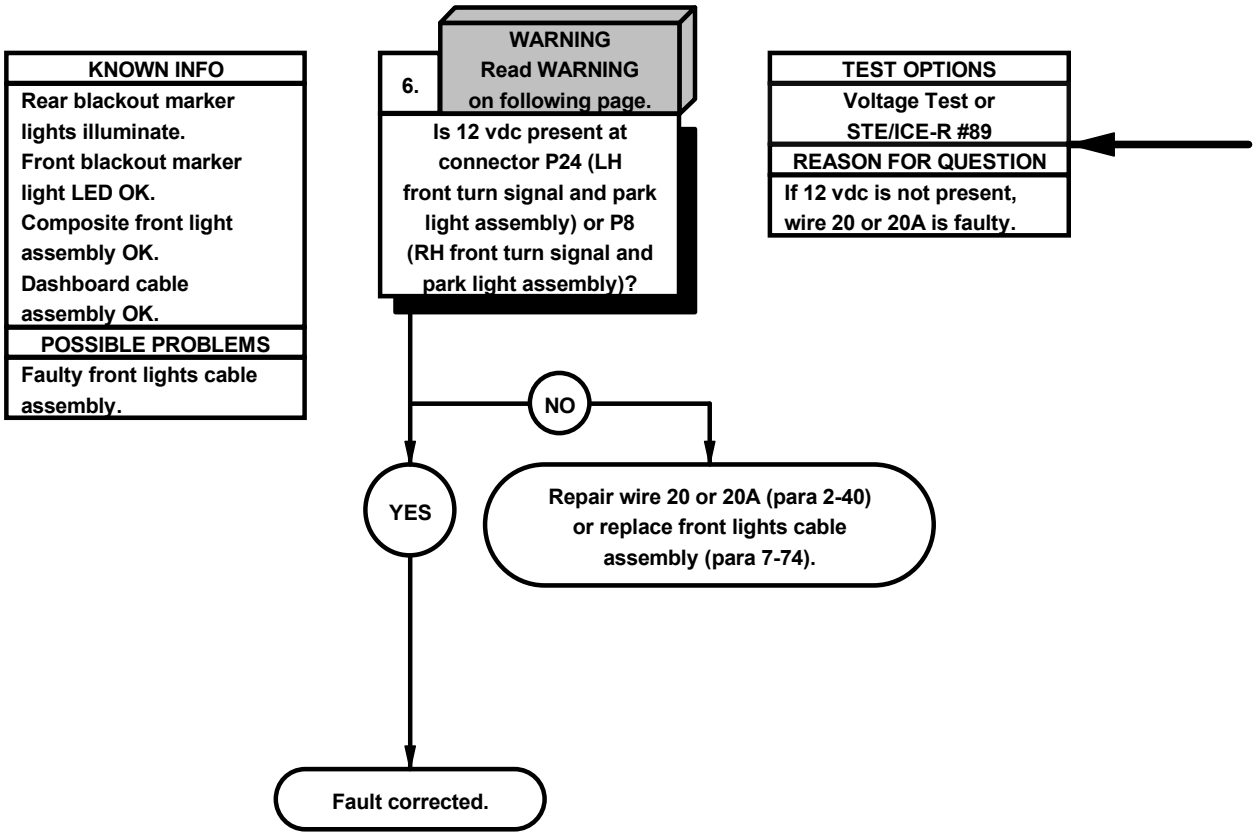
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J27 from connector P27.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to J27-3.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(10) If 12 vdc is not present, repair wire 20 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Connect connector J27 to connector P27.
(13) Install PDP on dashboard with three screws.
(14) Install three washers and screws in PDP.
(15) Install PDP cover (para 16-2).



## e49. ONE OR BOTH FRONT BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)

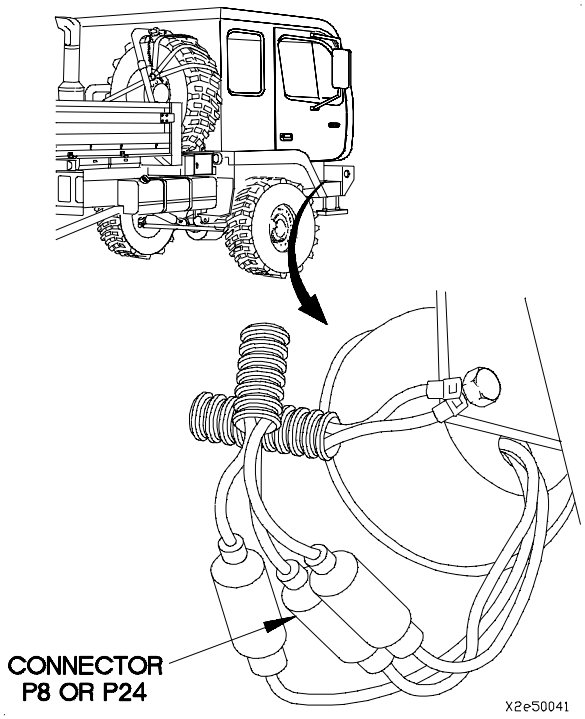


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Disconnect connector P24 (LH composite front light assembly) or connector P8 (RH composite front assembly) from composite front assembly connector.**
**(2) Set multimeter to ohms.**
**(3) Connect positive (+) probe of multimeter to connector P24 or connector P8.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position main light switch to BO MARKER (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If 12 vdc is not present, repair wire 20 or 20A (para 2-40) or replace front lights cable assembly (para 7-74).**
**(7) Position main light switch to OFF (TM 9-2320-365-10).**
**(8) Connect connector P24 or connector P8 to composite front light assembly connector.**



**e50. BLACKOUT DRIVE LIGHT DOES NOT ILLUMINATE**

**INITIAL SETUP**

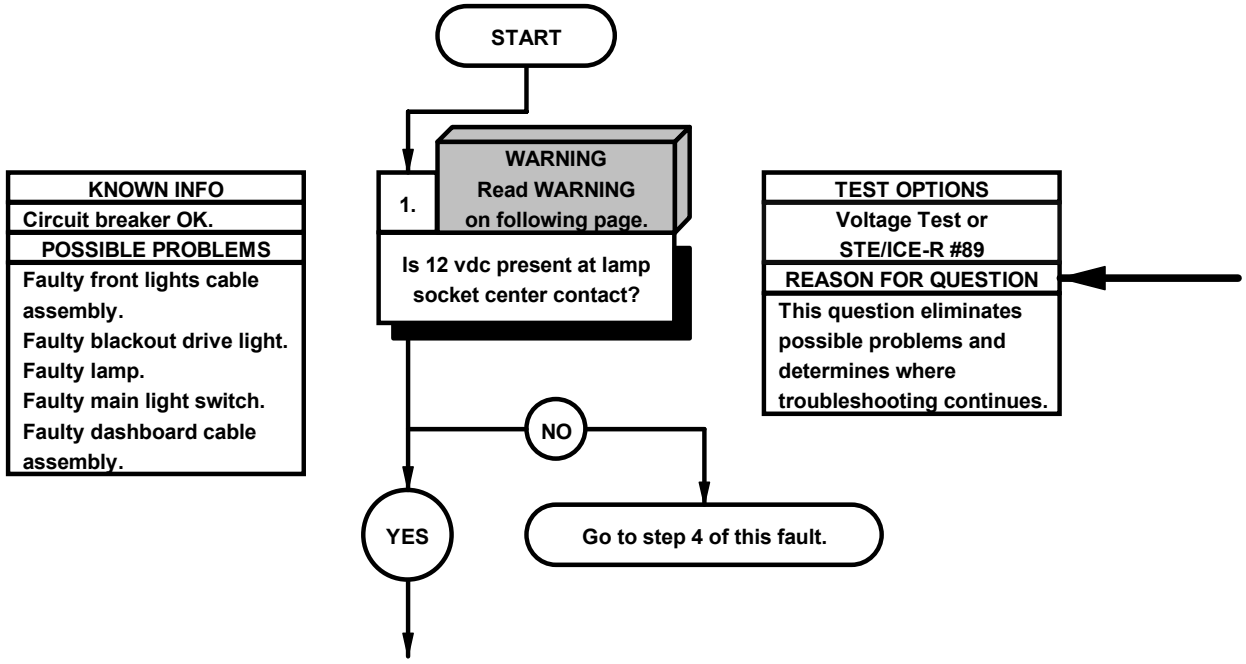
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

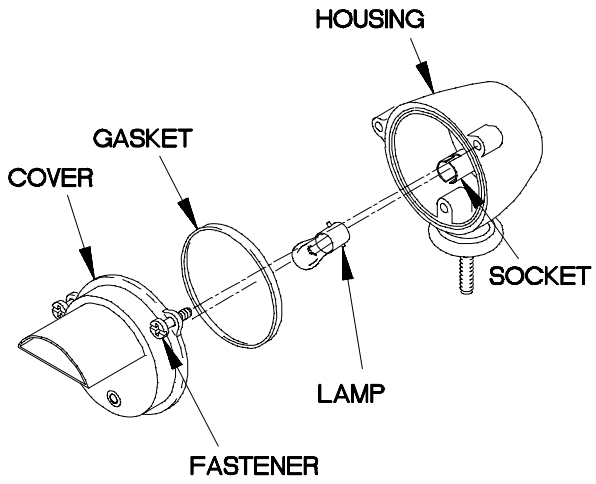
**Personnel Required**
(2)

**Materials/Parts**
Packing, Preformed (Item 168, Appendix G)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



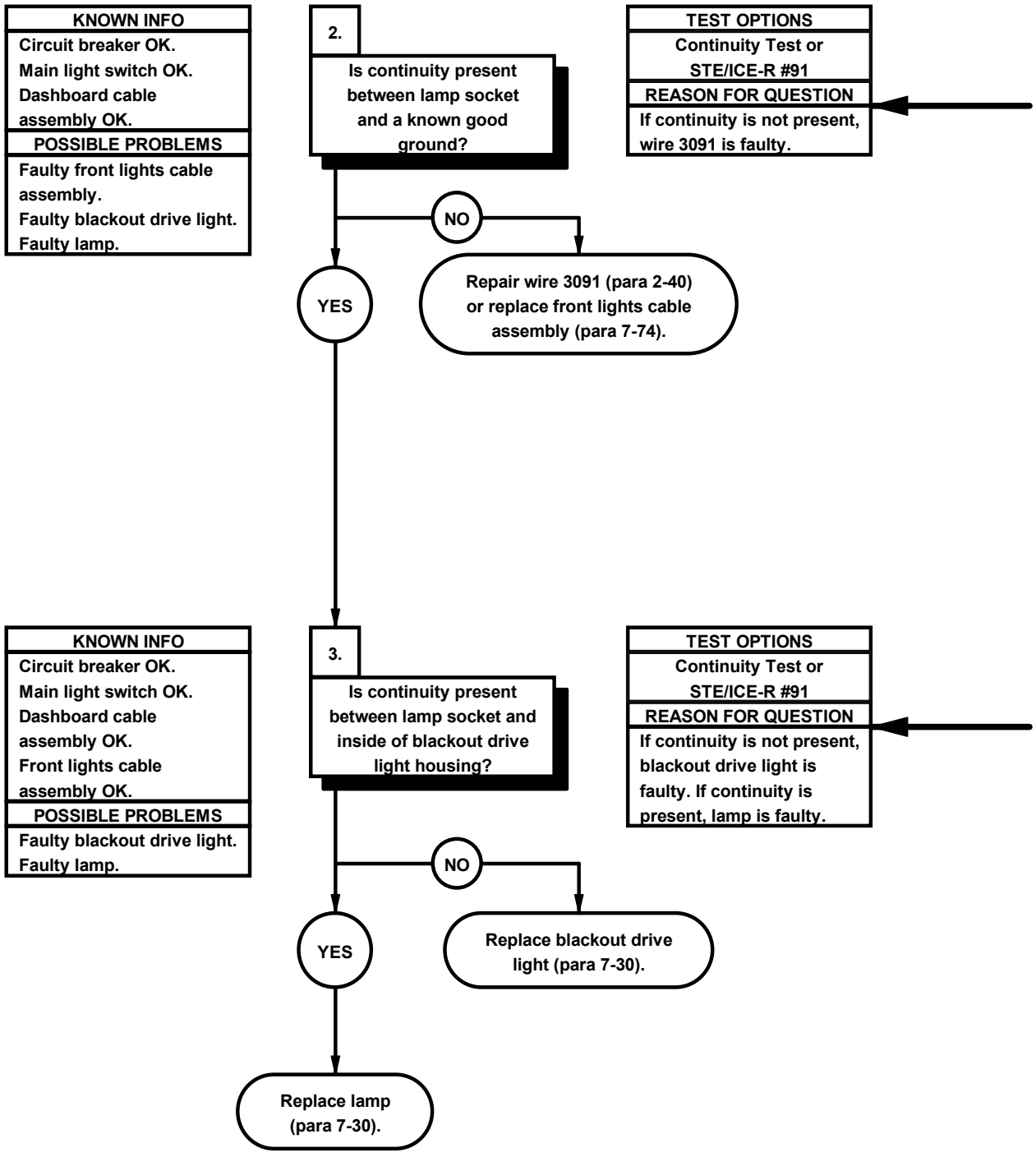



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

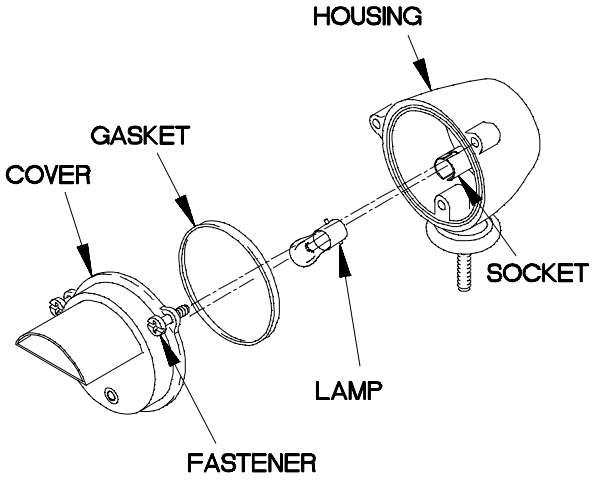
| VOLTAGE TEST |
|---|
| (1) Loosen three screws on cover. |
| (2) Remove cover and gasket from housing. Discard gasket. |
| (3) Remove lamp from socket. |
| (4) Set multimeter to volts dc. |
| (5) Connect positive (+) probe of multimeter to lamp socket center contact. |
| (6) Connect negative (-) probe of multimeter to ground. |
| (7) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter. |
| (8) If 12 vdc is not present, go to step 4 of this fault. |
| (9) Position main light switch to OFF (TM 9-2320-365-10). |

## e50. BLACKOUT DRIVE LIGHT DOES NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

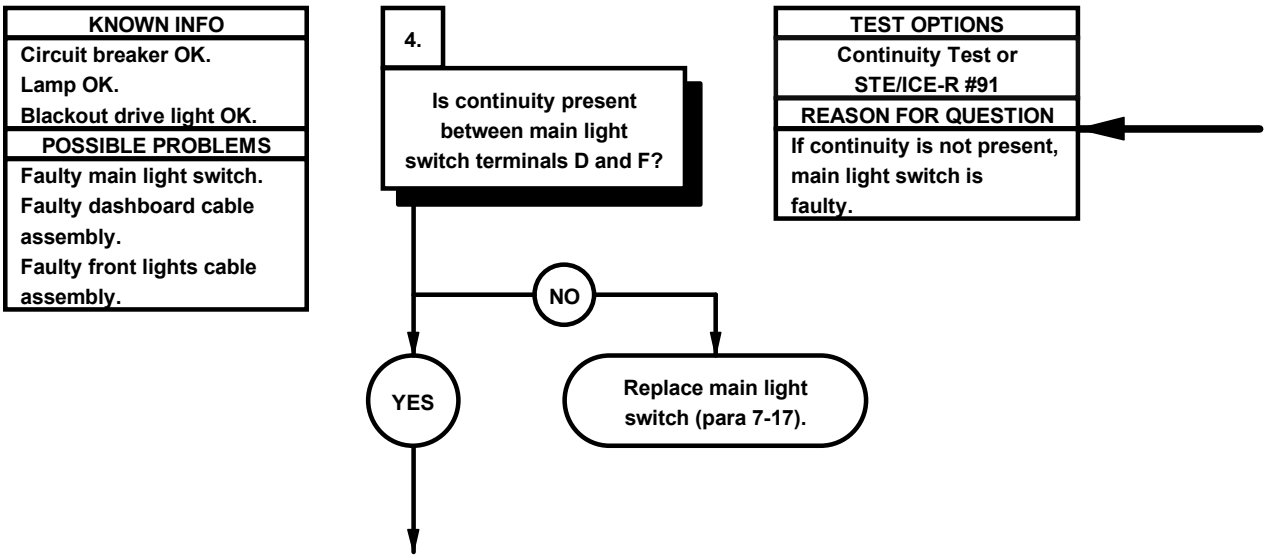
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to lamp socket.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3091 (para 2-40) or replace front lights cable assembly (para 7-74).



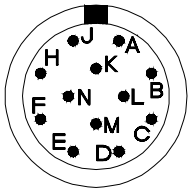

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to inside of blackout drive light housing.
(3) Connect negative (-) probe of multimeter to lamp socket and note reading on multimeter.
(4) If continuity is not present, replace blackout drive light (para 7-30).
(5) If continuity is present, replace lamp (para 7-30).
(6) Install lamp in socket.
(7) Install gasket and cover on housing with three screws.

## e50. BLACKOUT DRIVE LIGHT DOES NOT ILLUMINATE (CONT)



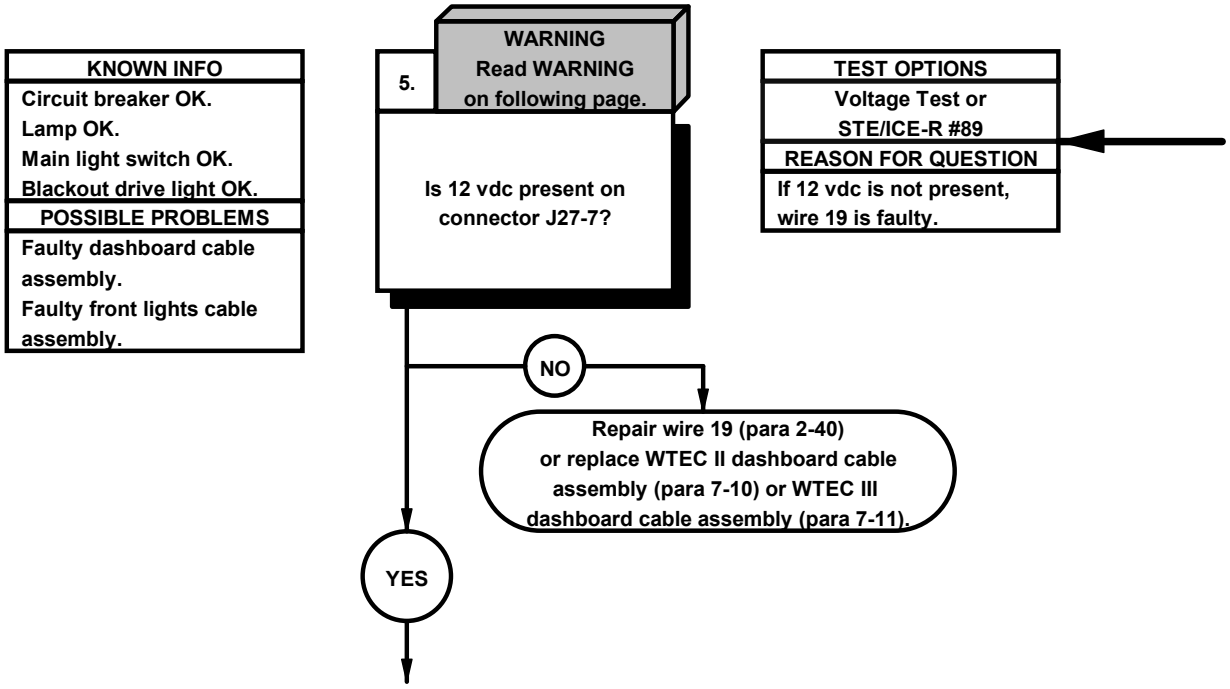
| CONTINUITY TEST |
| --- |
| (1) Remove main light switch (para 7-17). |
| (2) Set multimeter to ohms. |
| (3) Connect positive (+) probe of multimeter to main light switch terminal F. |
| (4) Connect negative (-) probe of multimeter to main light switch terminal D. |
| (5) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter. |
| (6) If continuity is not present, replace main light switch (para 7-17). |
| (7) Position main light switch to OFF (TM 9-2320-365-10). |
| (8) Install main light switch (para 7-17). |




MAIN LIGHT SWITCH

X2E5203A

## e50. BLACKOUT DRIVE LIGHT DOES NOT ILLUMINATE (CONT)

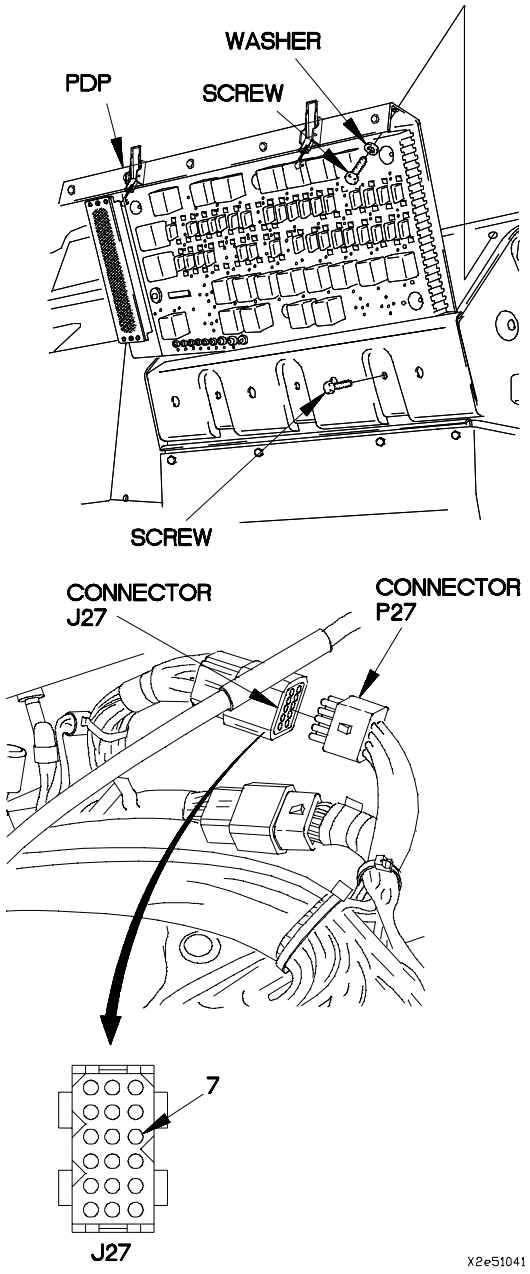


**WARNING**

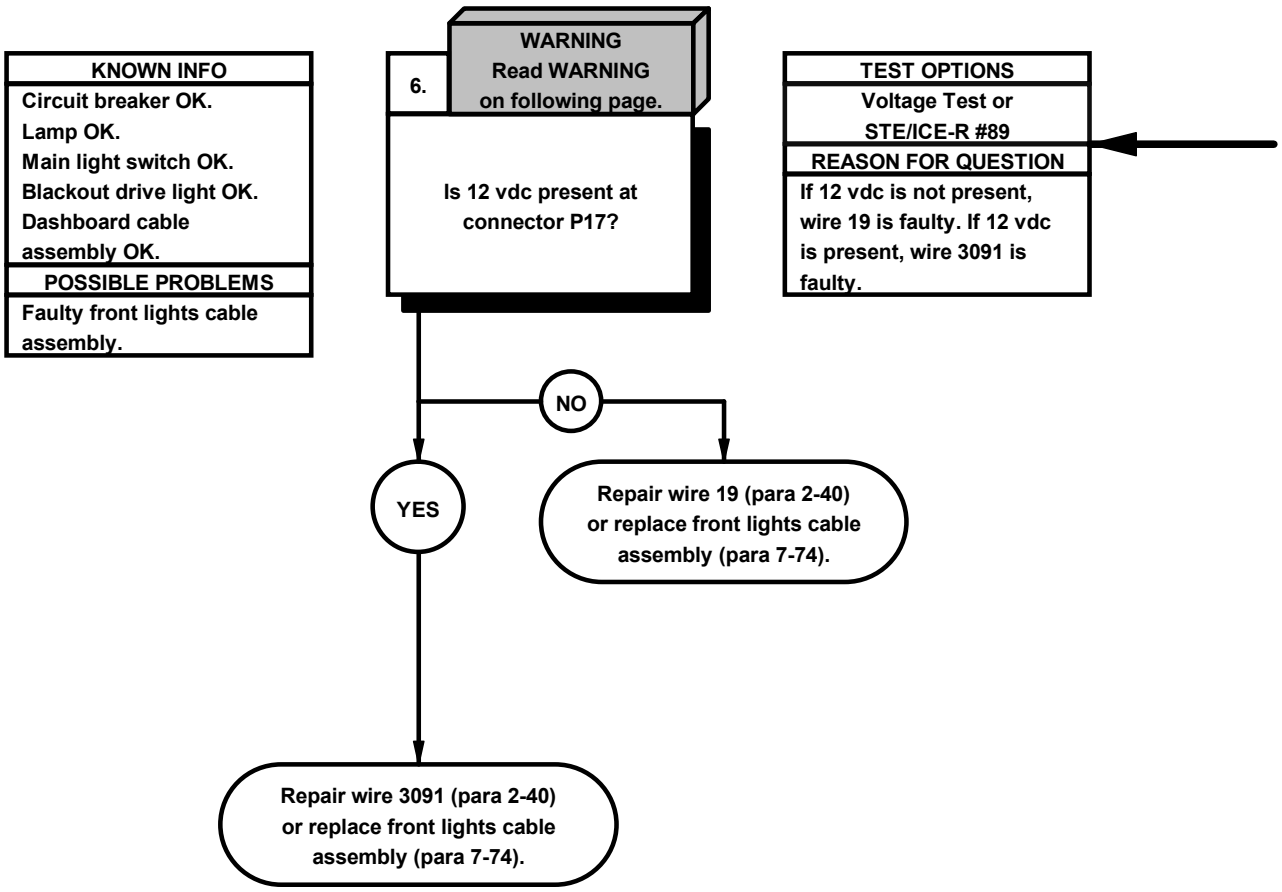
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J27 from connector P27.
(6) Set multimeter to volts dc.
(7) Connect positive (+) probe of multimeter to J27-7.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(10) If 12 vdc is not present, repair wire 19 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Connect connector J27 to connector P27.
(13) Install PDP on dashboard with three screws.
(14) Install three washers and screws in PDP.
(15) Install PDP cover (para 16-2).



## e50. BLACKOUT DRIVE LIGHT DOES NOT ILLUMINATE (CONT)

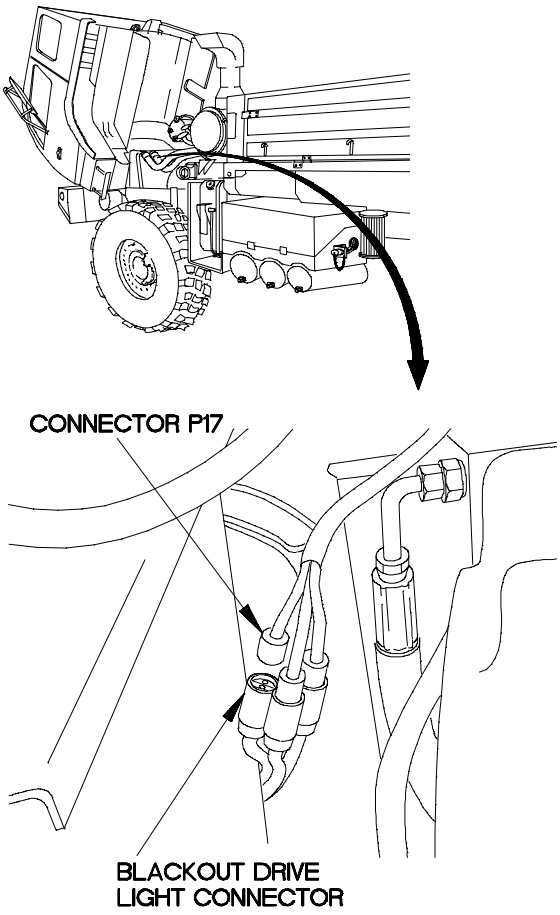


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Disconnect connector P17 from blackout drive light connector.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to connector P17.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If 12 vdc is not present, repair wire 19 (para 2-40) or replace front lights cable assembly (para 7-74).**
**(7) If 12 vdc is present, repair wire 3091 (para 2-40) or replace front lights cable assembly (para 7-74).**
**(8) Position main light switch to OFF (TM 9-2320-365-10).**
**(9) Connect connector P17 to blackout drive light connector.**



## e51. ONE OR BOTH REAR BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

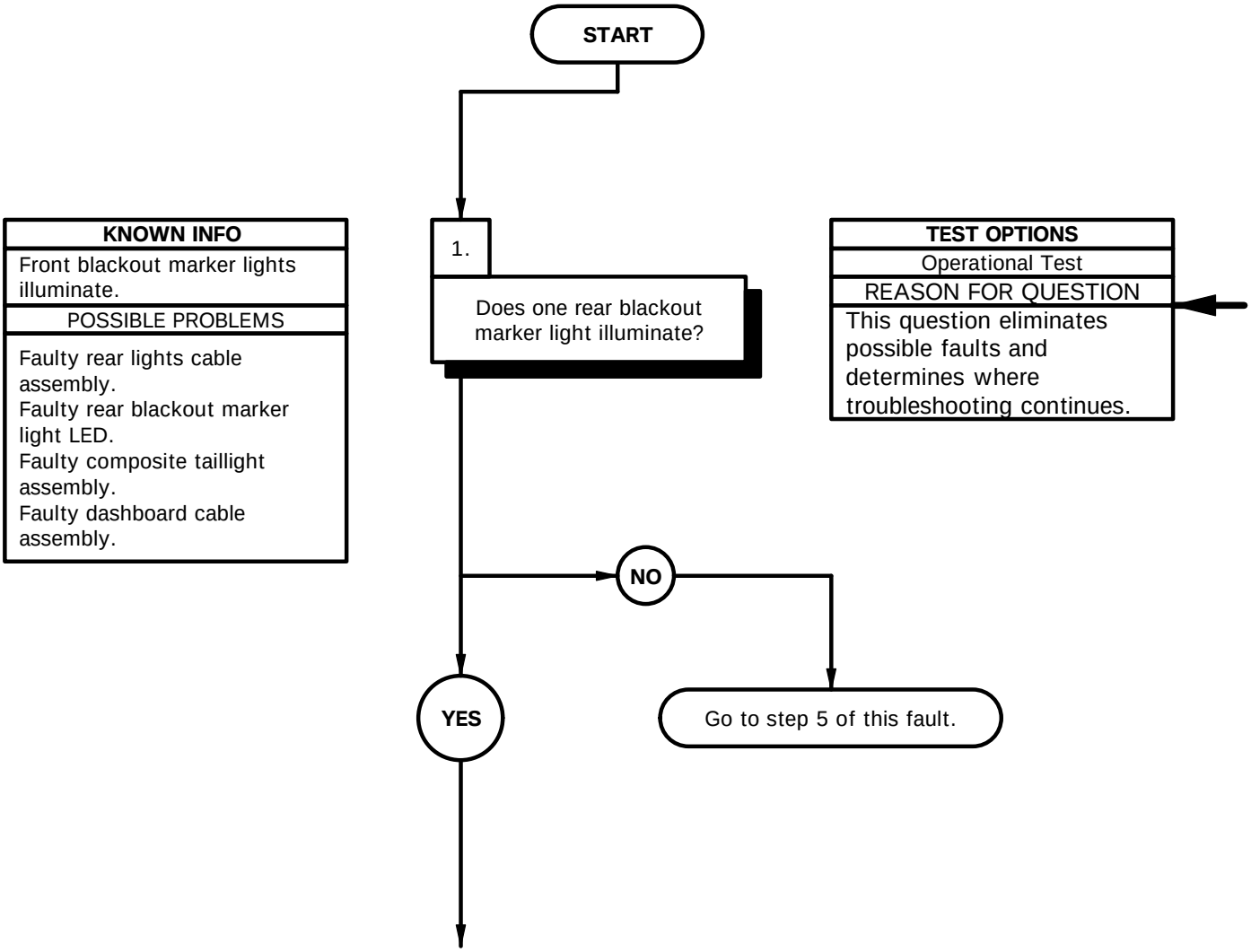
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Material/Parts**
Packing, Preformed (Item 172, Appendix G)
Nut, Self-Locking (Item 137, Appendix G)

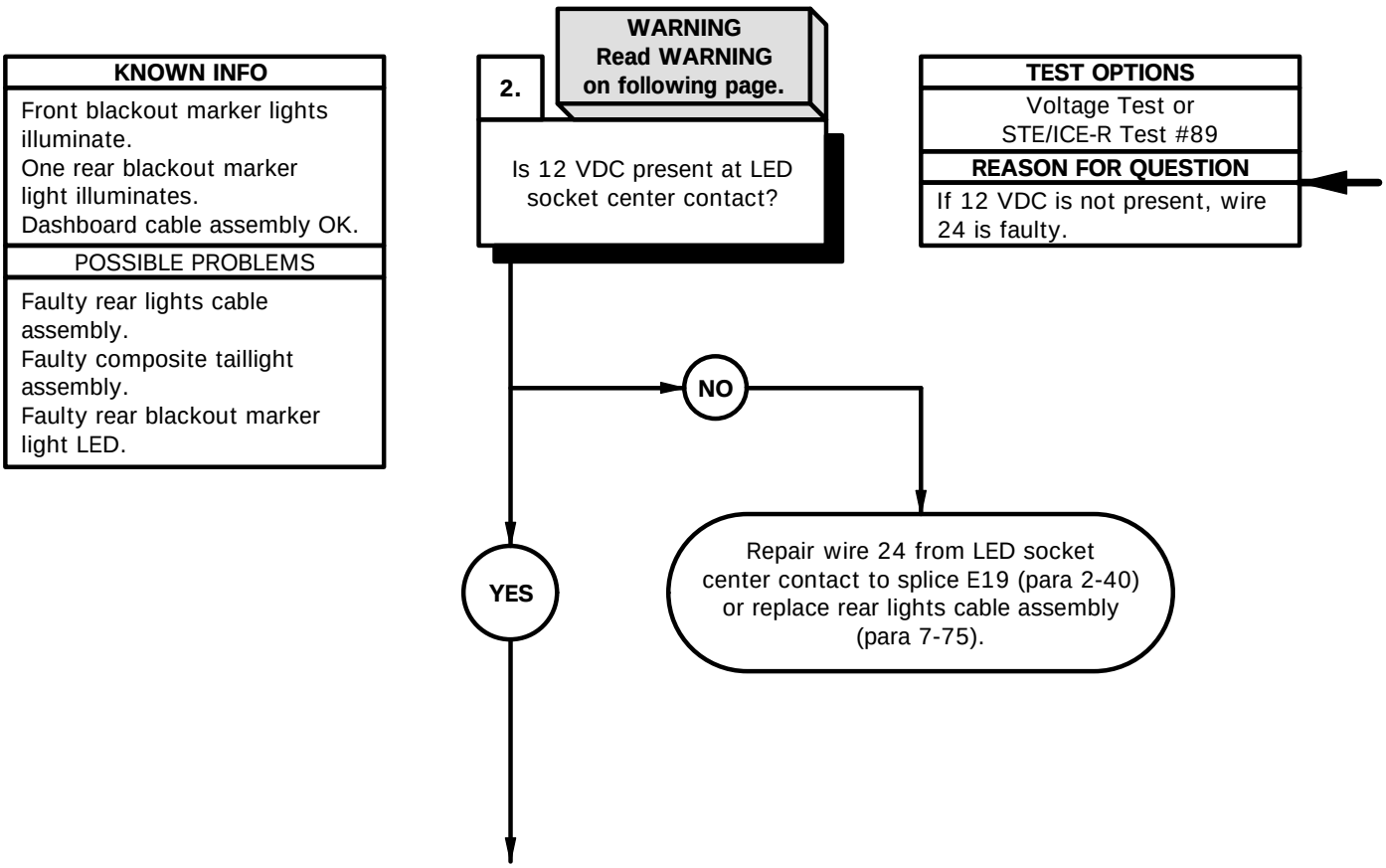
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



(1) Position main light switch to BO MARKER (TM 9-2320-365-10).
(2) Observe operation of rear blackout marker lights.
(3) If neither rear blackout marker light illuminates, go to step 5 of this fault.
(4) Position main light switch to OFF (TM 9-2320-365-10).

## e51. ONE OR BOTH REAR BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)

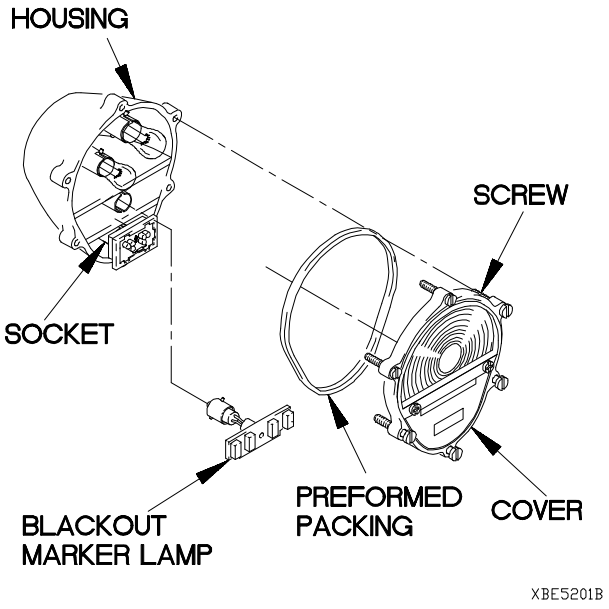


**WARNING**

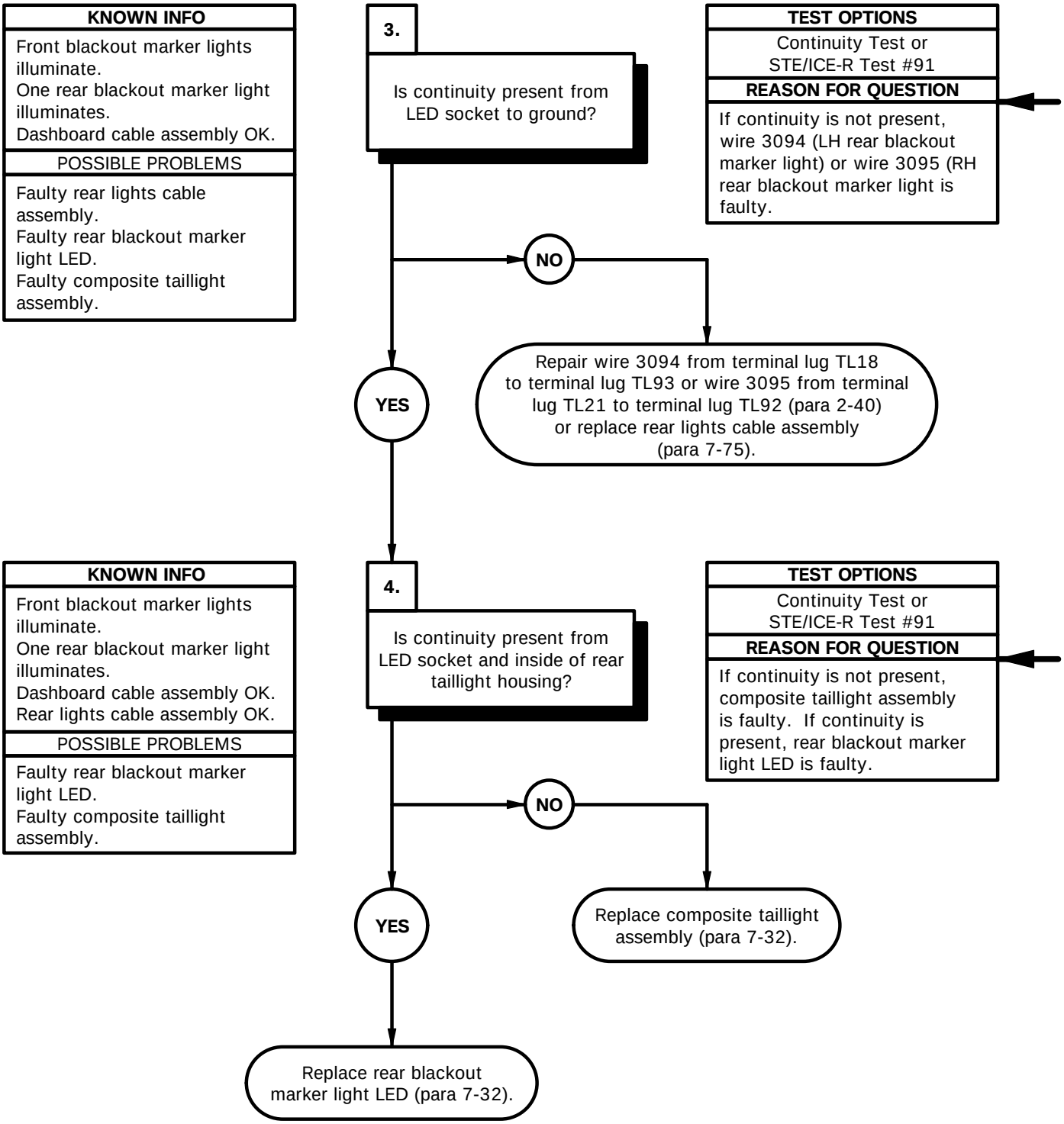
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Loosen six screws and remove cover and preformed packing from housing. Discard preformed packing.
(2) Open blackout marker lamp.
(3) Remove blackout marker lamp from socket.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to LED socket center contact.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position main light switch to BO MARKER (TM 9-2320-365-10) and note reading on multimeter.
(8) If 12 VDC is not present, repair wire 24 from LED socket center contact to splice E19 (para 2-40) or replace rear lights cable assembly (para 7-75).
(9) Position main light switch to OFF (TM 9-2320-365-10).



## e51. ONE OR BOTH REAR BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)

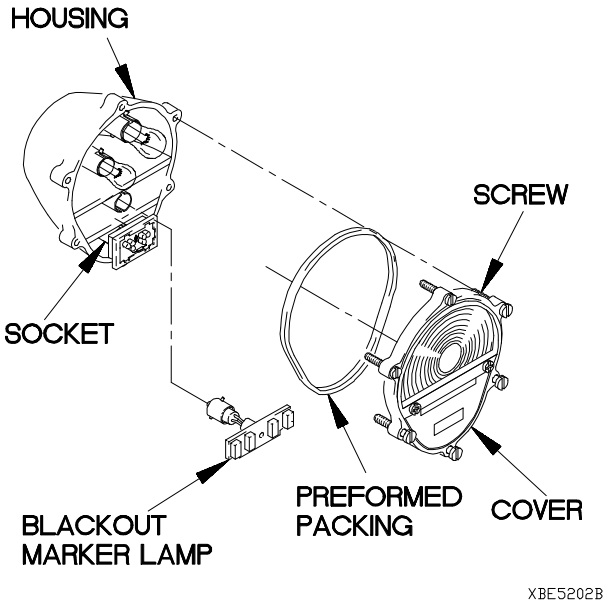


**CONTINUITY TEST**

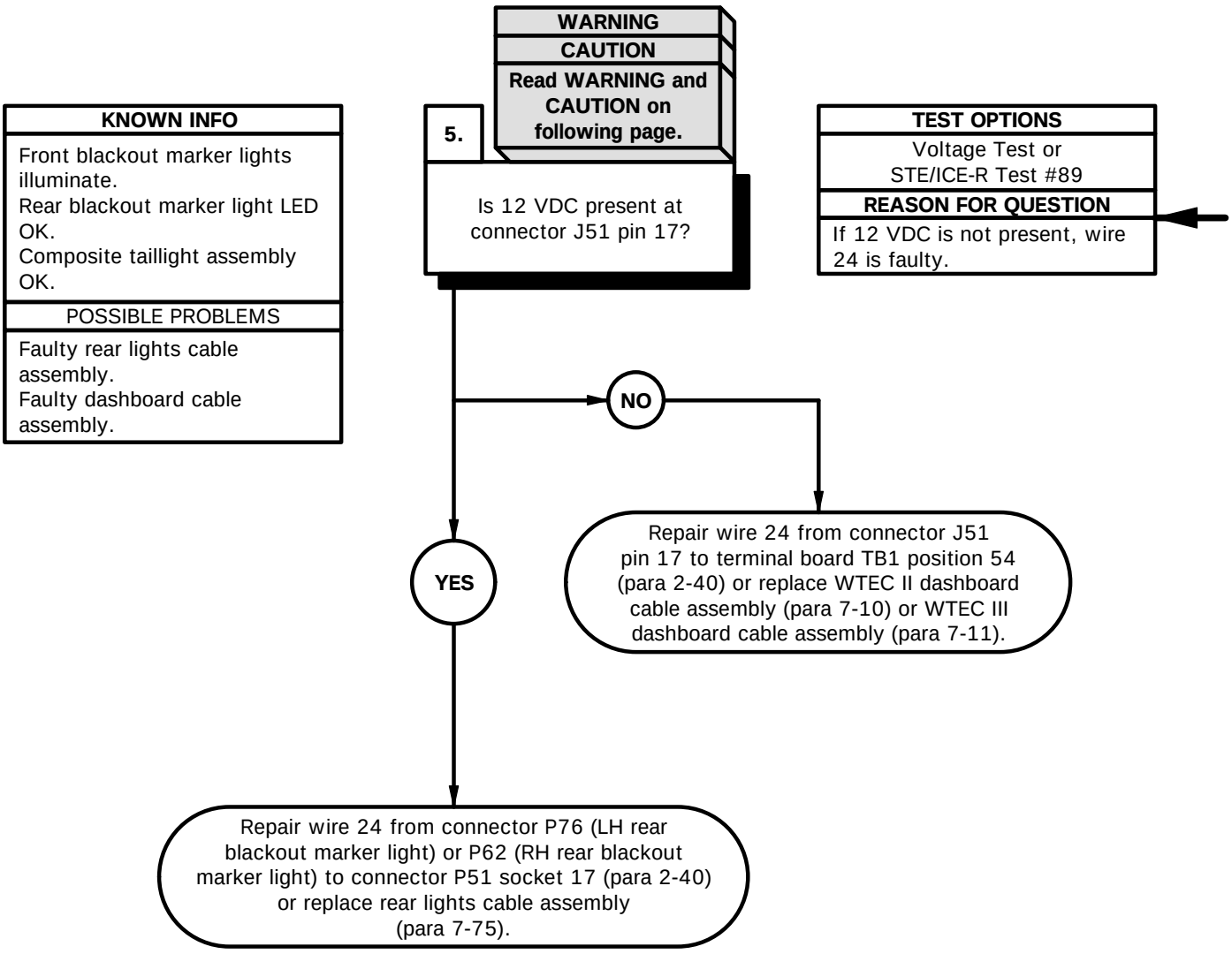
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to LED socket.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3094 from terminal lug TL18 to terminal lug TL93 (LH rear blackout marker light) or wire 3095 from terminal lug TL21 to terminal lug TL92 (RH rear blackout marker light) (para 2-40) or replace rear lights cable assembly (para 7-75).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to inside of housing.
(3) Connect negative (-) probe of multimeter to LED socket and note reading on multimeter.
(4) If continuity is not present, replace composite taillight assembly (para 7-32).
(5) If continuity is present, replace rear blackout marker light LED (para 7-32).
(6) Open blackout marker lamp.
(7) Install blackout marker lamp in socket.
(8) Install preformed packing and cover on housing with six screws.



## e51. ONE OR BOTH REAR BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

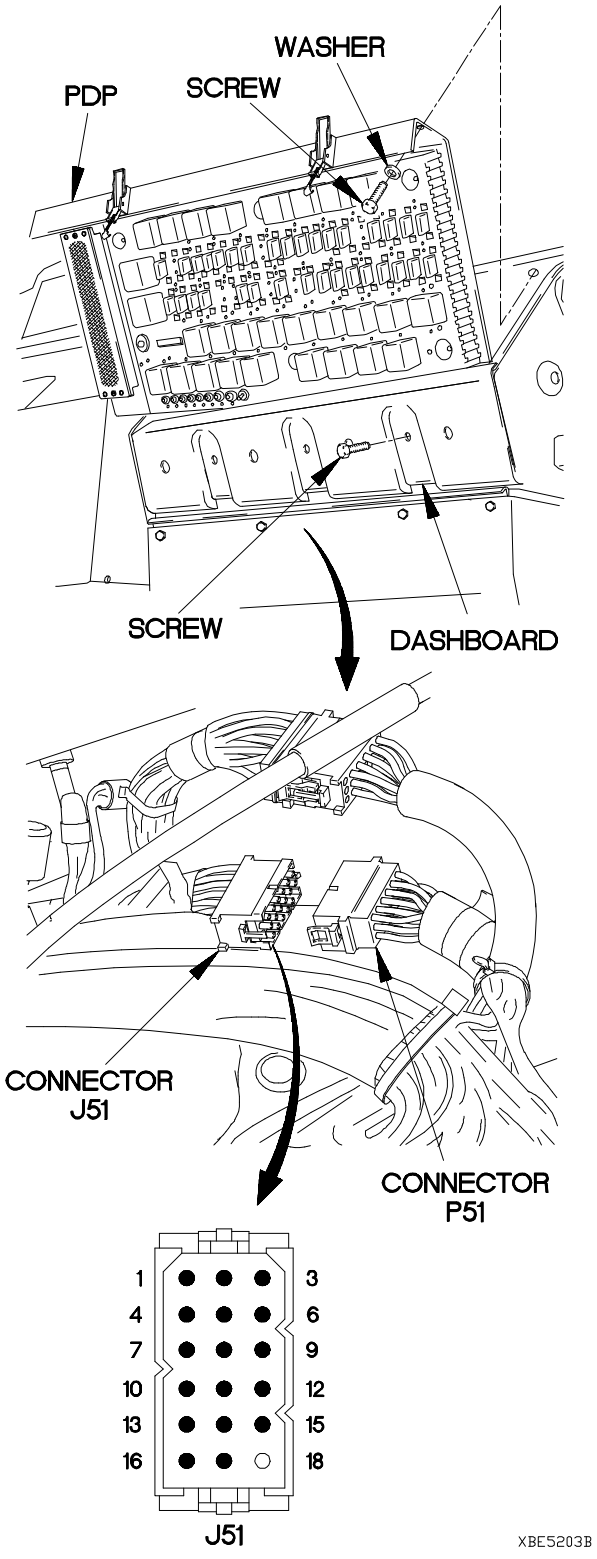
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J51 from connector P51.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector J51 pin 17.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to BO MARKER (TM 9-2320-365-10) and note reading on multimeter.
(10) If 12 VDC is not present, repair wire 24 from connector J51 pin 17 to terminal baord TB1 position 54 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(11) If 12 VDC is present, repair wire 24 from connector P76 (LH rear blackout marker light) or P62 (RH rear blackout marker light) to connector P51 socket 17 (para 2-40) or replace rear lights cable assembly (para 7-75).
(12) Position main light switch to OFF (TM 9-2320-365-10).
(13) Connect connector J51 to connector P51.
(14) Install PDP on dashboard with three screws.
(15) Install three washers and screws in PDP.
(16) Install PDP cover (para 16-2).



## e52. WARNING LIGHT DOES NOT ILLUMINATE

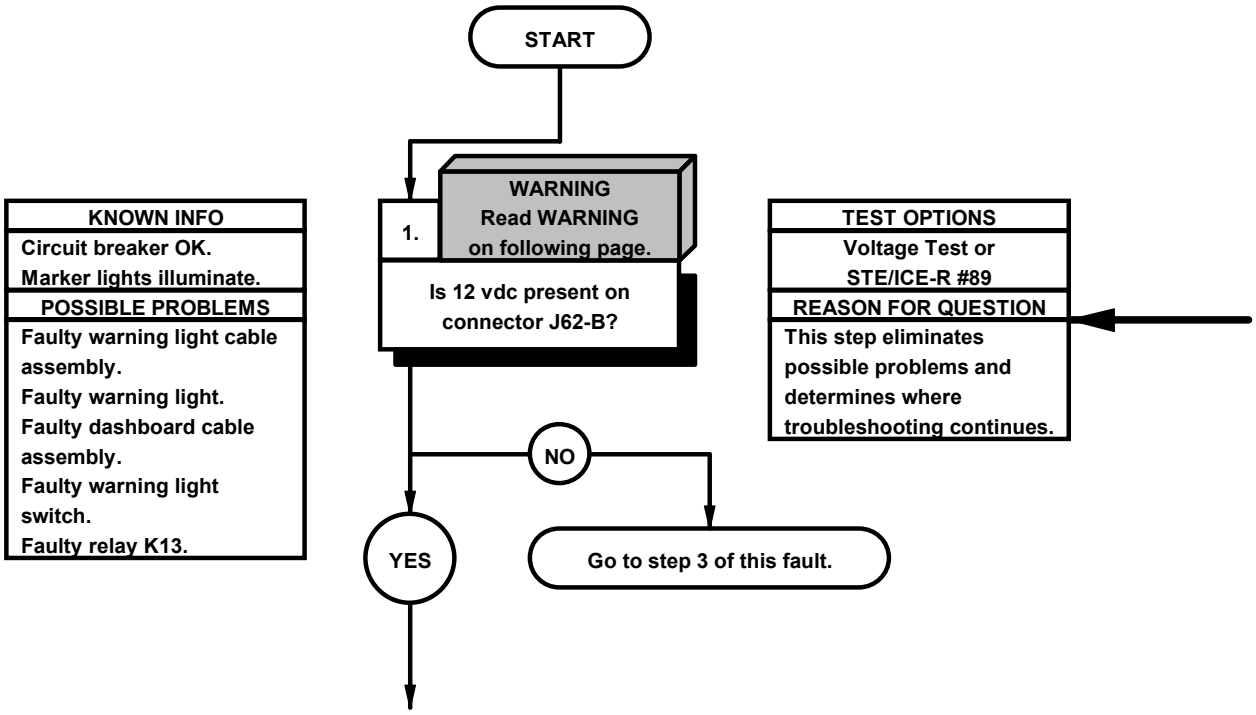
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

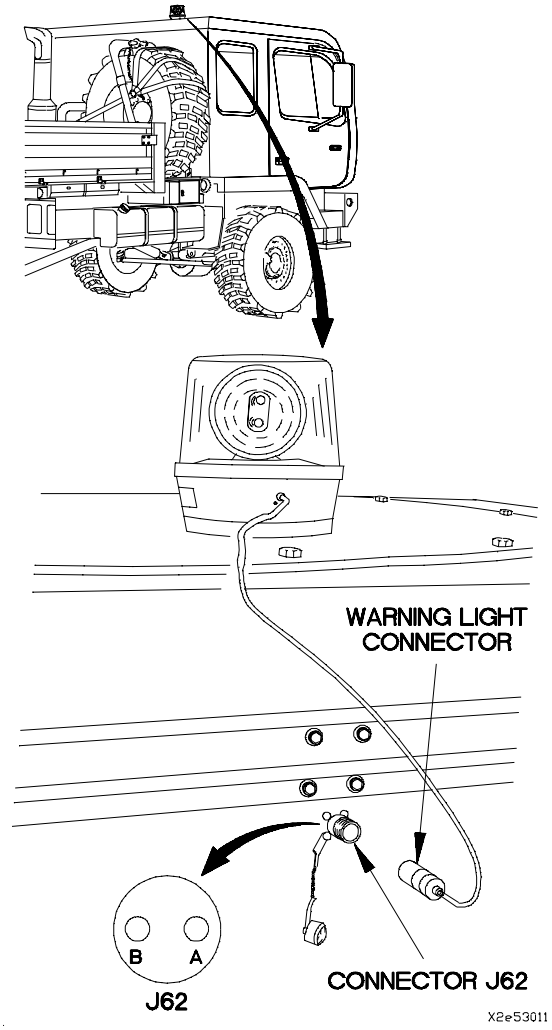


**WARNING**

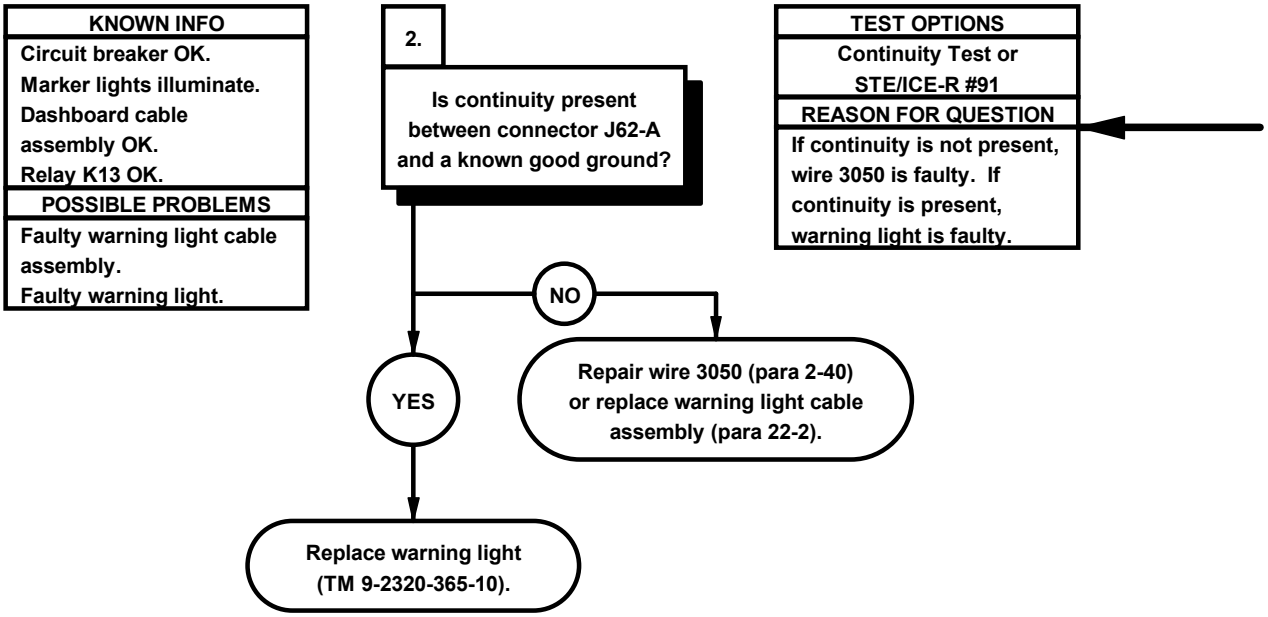
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

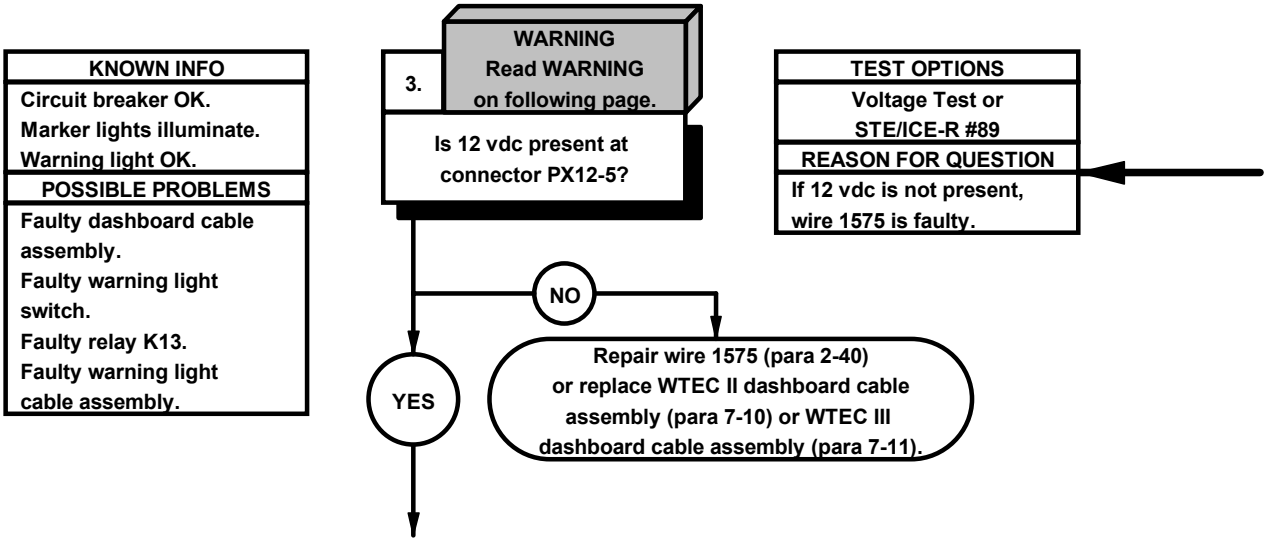
**VOLTAGE TEST**

(1) Disconnect warning light connector from connector J62.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J62-B.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Position warning light switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 vdc is not present, go to step 3 of this fault.
(8) Position warning light switch to off (TM 9-2320-365-10).
(9) Position main light switch to OFF (TM 9-2320-365-10).



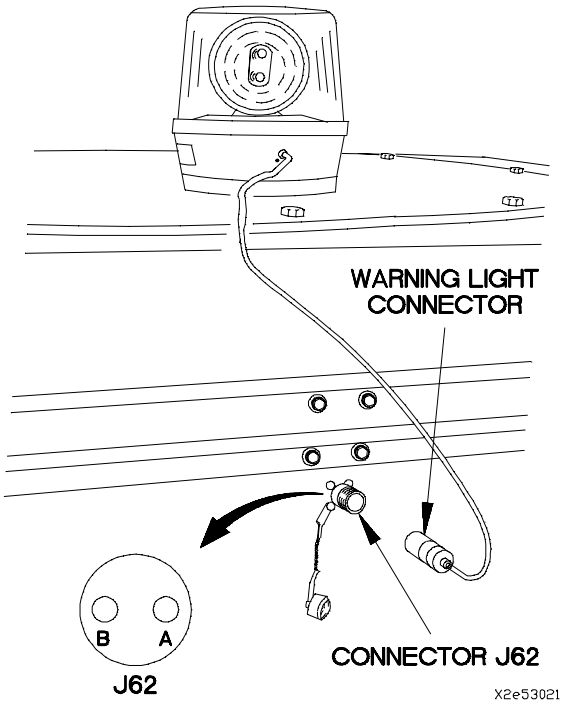
## e52. WARNING LIGHT DOES NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J62-A.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3050 (para 2-40) or replace warning light cable assembly (para 22-2).
(5) If continuity is present, replace warning light (TM 9-2320-365-10).

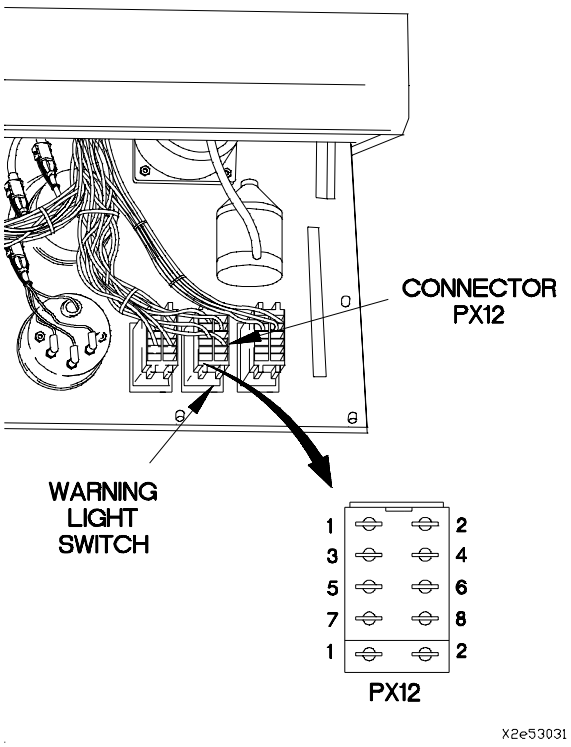



**WARNING**

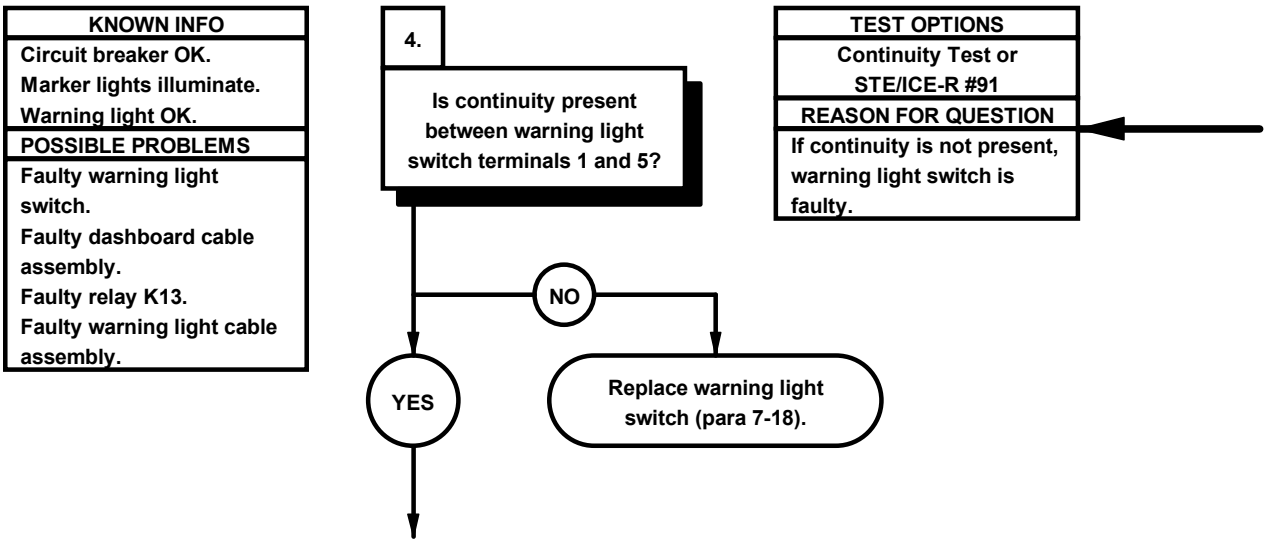
Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Set multimeter to volts dc.
(3) Disconnect connector PX12 from warning light switch.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(5) Connect positive (+) probe of multimeter to connector PX12-5.
(6) Connect negative (-) probe of multimeter to ground.
(7) If 12 vdc is not present, repair wire 1575 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).

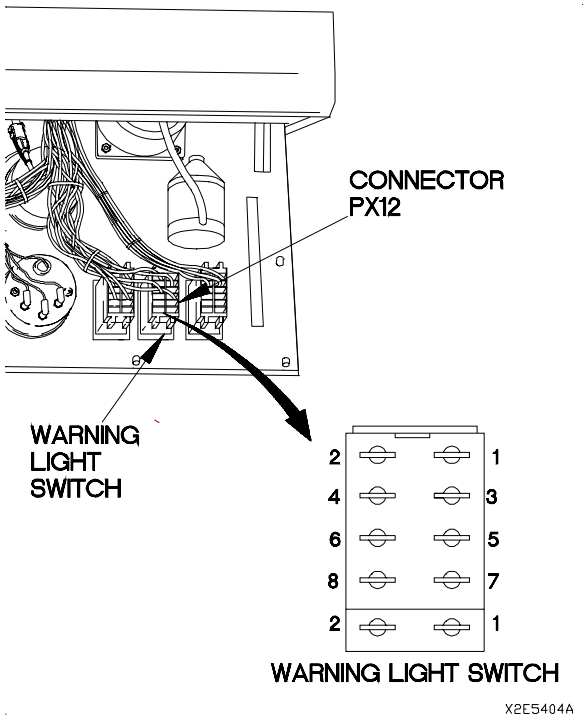


## e52. WARNING LIGHT DOES NOT ILLUMINATE (CONT)

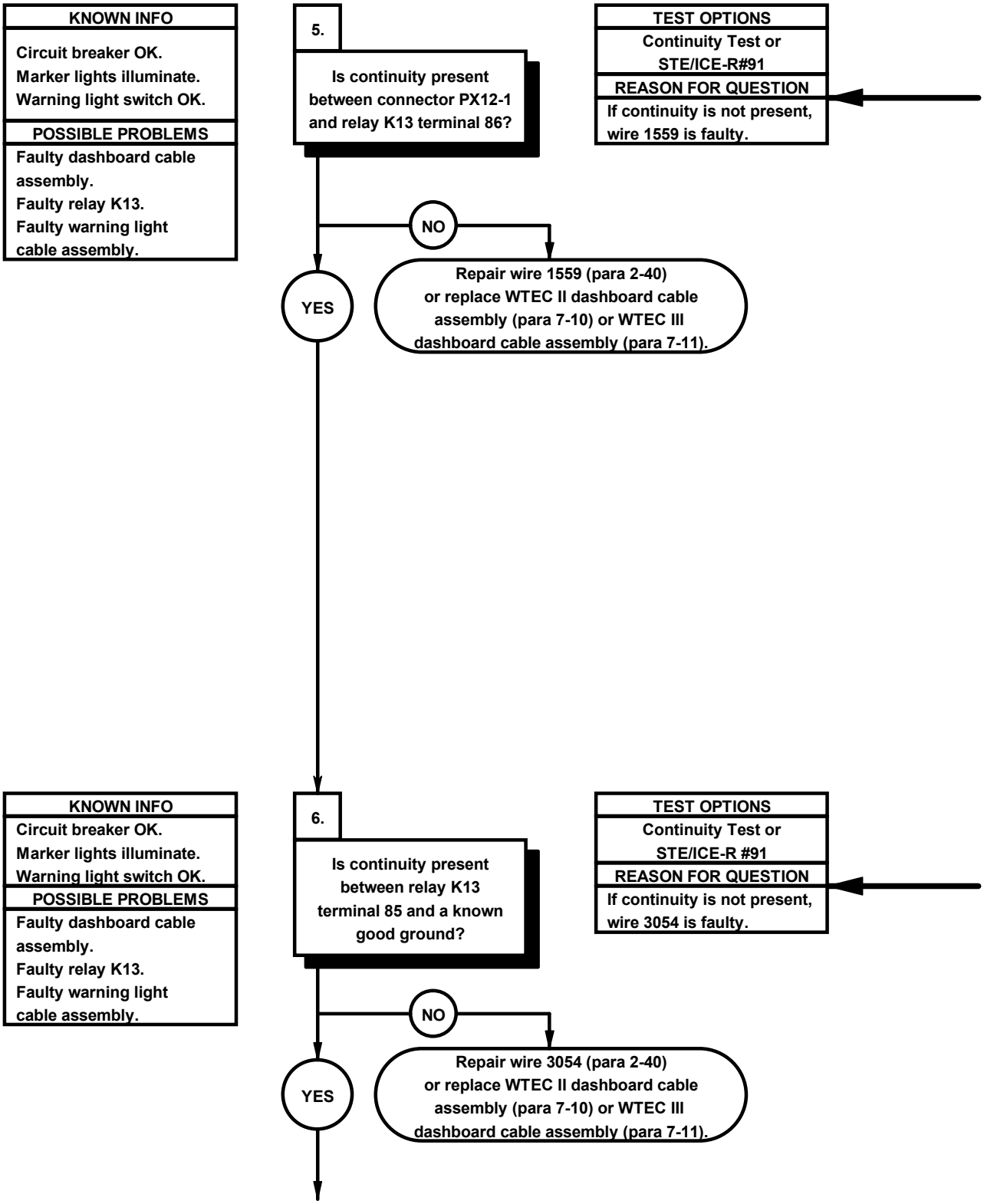


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to warning light switch terminal 1.
(3) Connect negative (-) probe of multimeter to warning light switch terminal 5.
(4) Position warning light switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If continuity is not present, replace warning light switch (para 7-18).

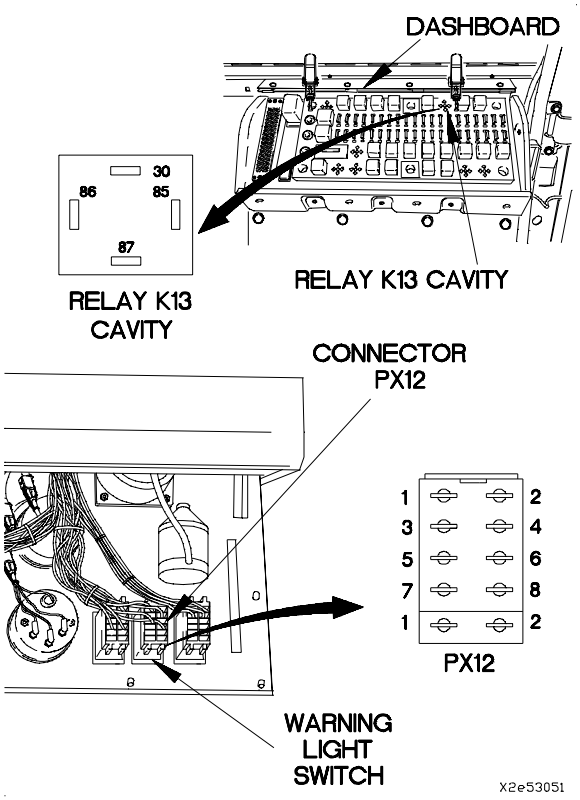


## e52. WARNING LIGHT DOES NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

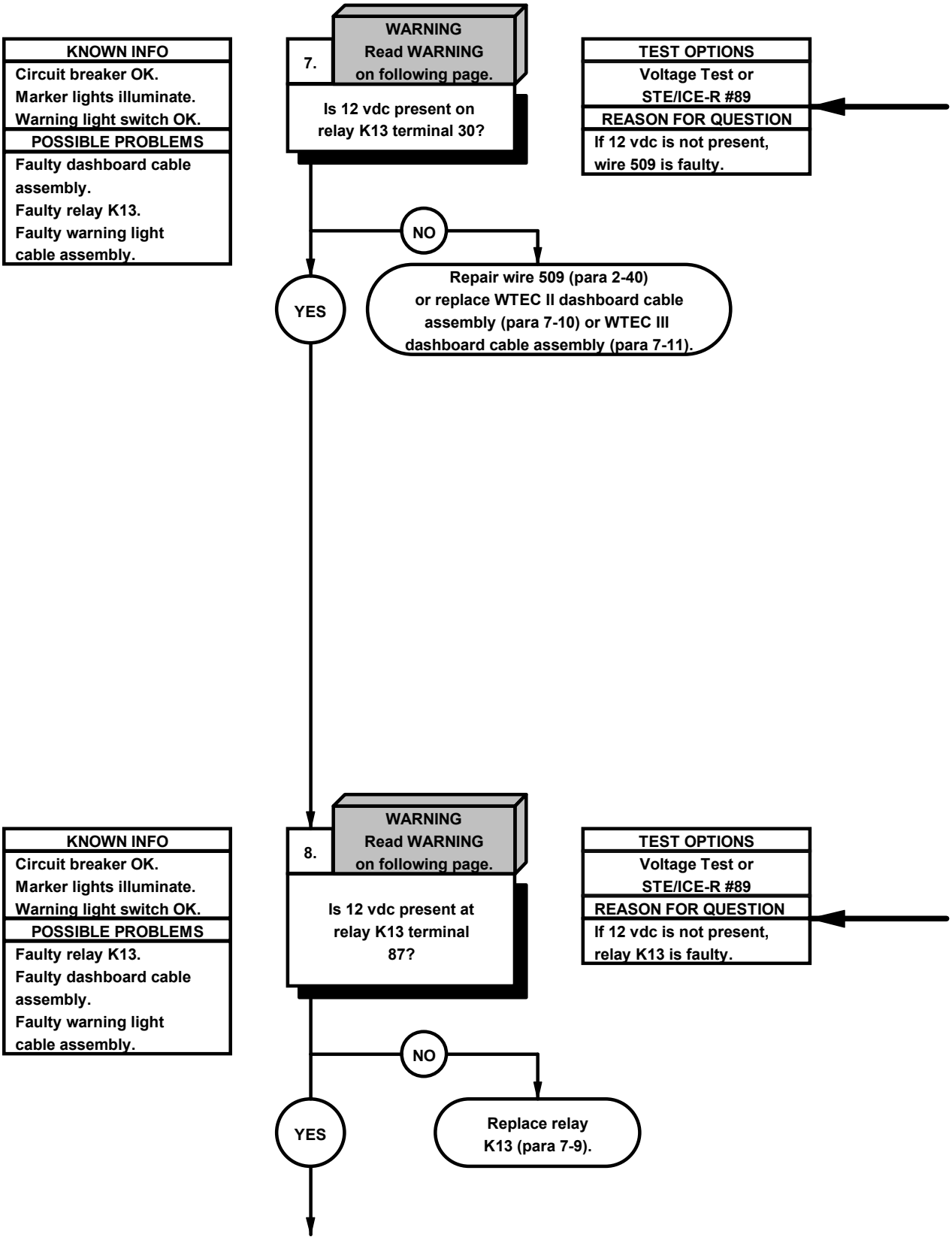
(1) Remove PDP cover (para 16-2).
(2) Remove relay K13 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to PDP, socket 86, where relay K13 was removed.
(5) Connect negative (-) probe of multimeter to connector PX12-1 and note reading on multimeter.
(6) If continuity is not present, repair wire 1559 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Connect connector PX12 to warning light switch.
(8) Install instrument panel assembly (para 7-15).




**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, socket 85, where relay K13 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3054 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

## e52. WARNING LIGHT DOES NOT ILLUMINATE (CONT)



**WARNING**

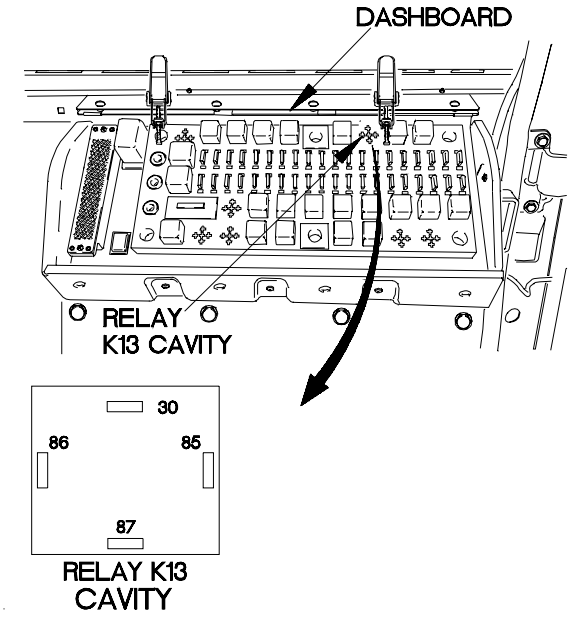
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

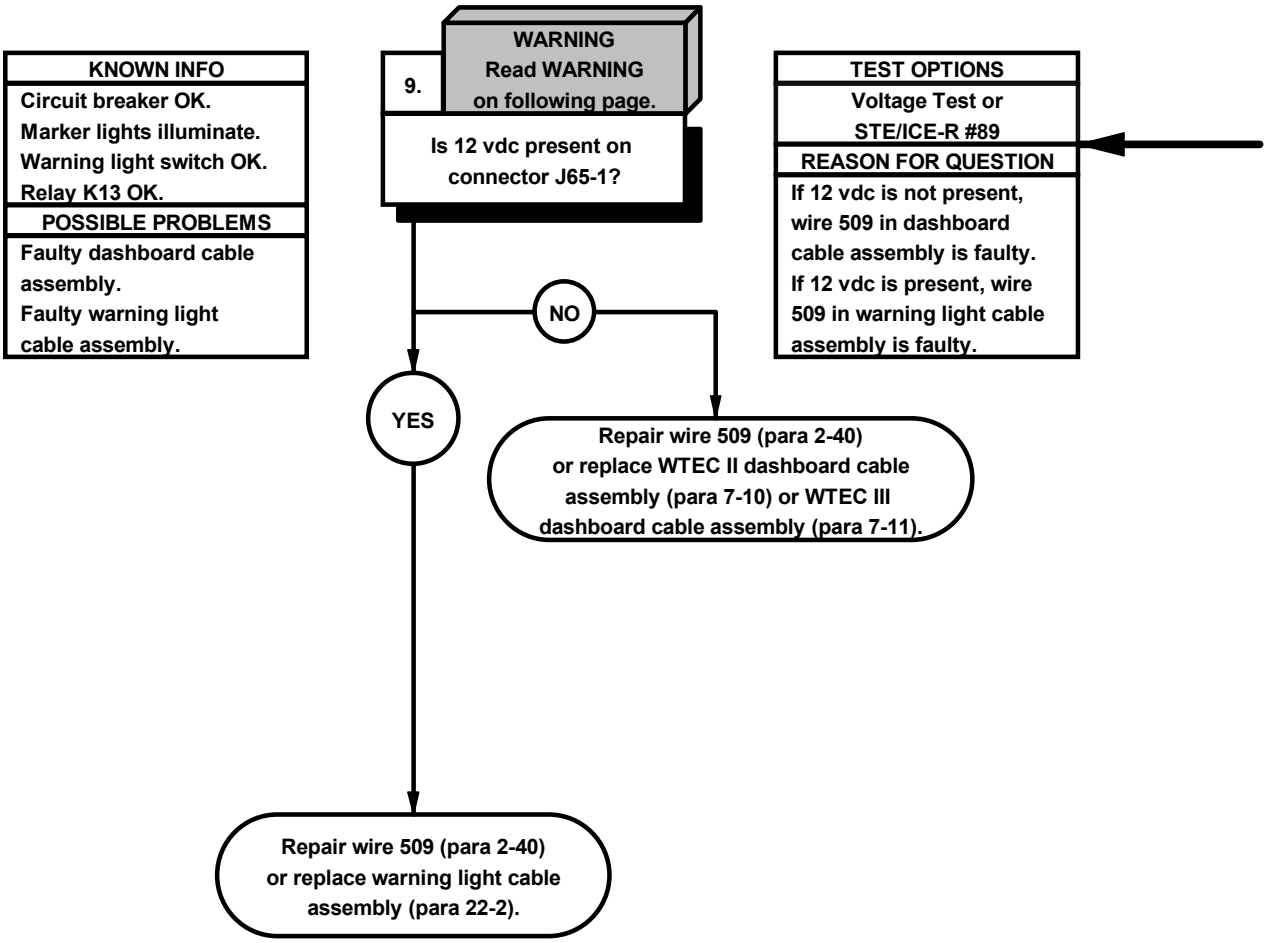
**(1) Set multimeter to volts dc.**
**(2) Connect positive (+) probe of multimeter to PDP, socket 30, where relay K13 was removed.**
**(3) Connect negative (-) probe of multimeter to ground.**
**(4) Position main light switch to SER DRIVE (TM 9-2320-365-10).**
**(5) Position warning light switch to on (TM 9-2320-365-10).**
**(6) If 12 vdc is not present, repair wire 509 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).**
**(7) Position warning light switch to off (TM 9-2320-365-10).**
**(8) Position main light switch to OFF (TM 9-2320-365-10).**

**VOLTAGE TEST**

**(1) Install relay K13 in PDP.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to relay K13 terminal 87.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).**
**(6) Position warning light switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(7) If 12 vdc is not present, replace relay K13 (para 7-9).**
**(8) Position warning light switch to off (TM 9-2320-365-10).**
**(9) Position main light switch to OFF (TM 9-2320-365-10).**



## e52. WARNING LIGHT DOES NOT ILLUMINATE (CONT)

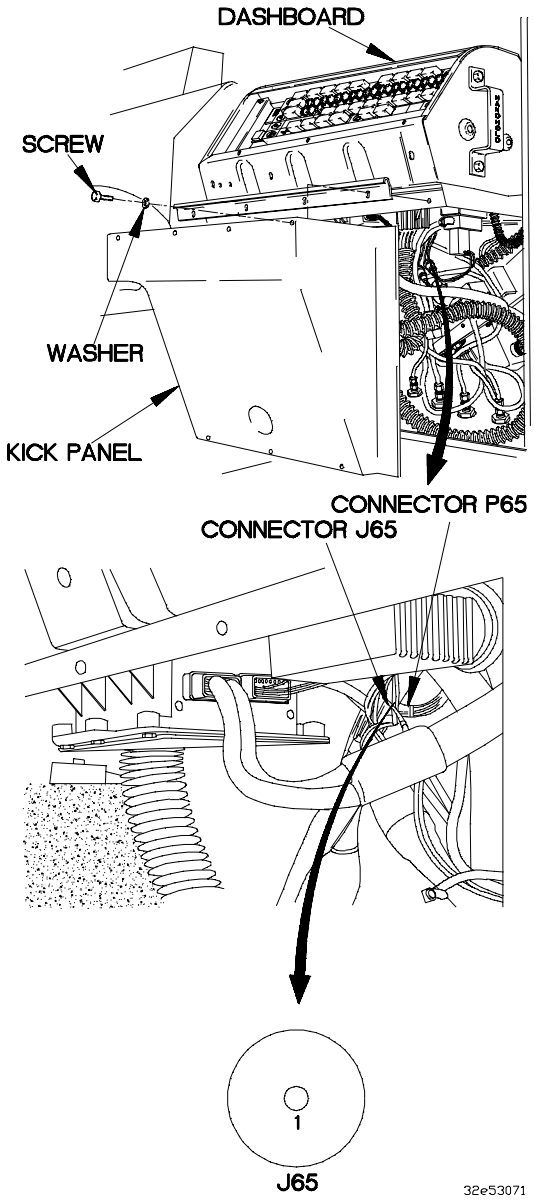


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove seven screws and washers from kick panel.
(2) Remove kick panel and stiffener from dashboard.
(3) Disconnect connector P65 from connector J65.
(4) Set multimeter to volts dc.
(5) Connect positive (+) probe of multimeter to connector J65-1.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(8) Position warning light switch to on (TM 9-2320-365-10).
(9) If 12 vdc is not present, repair wire 509 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) If 12 vdc is present, repair wire 509 (para 2-40) or replace warning light cable assembly (para 22-2).
(11) Position warning light switch to off (TM 9-2320-365-10).
(12) Position main light switch to OFF (TM 9-2320-365-10).
(13) Connect connector P65 to connector J65.
(14) Install kick panel (para 16-3).



## e53. BACKUP LIGHT DOES NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

**Personnel Required**
(2)

**Materials/Parts**
Packing, Preformed (Item 192, Appendix G)
Wire, Electrical, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

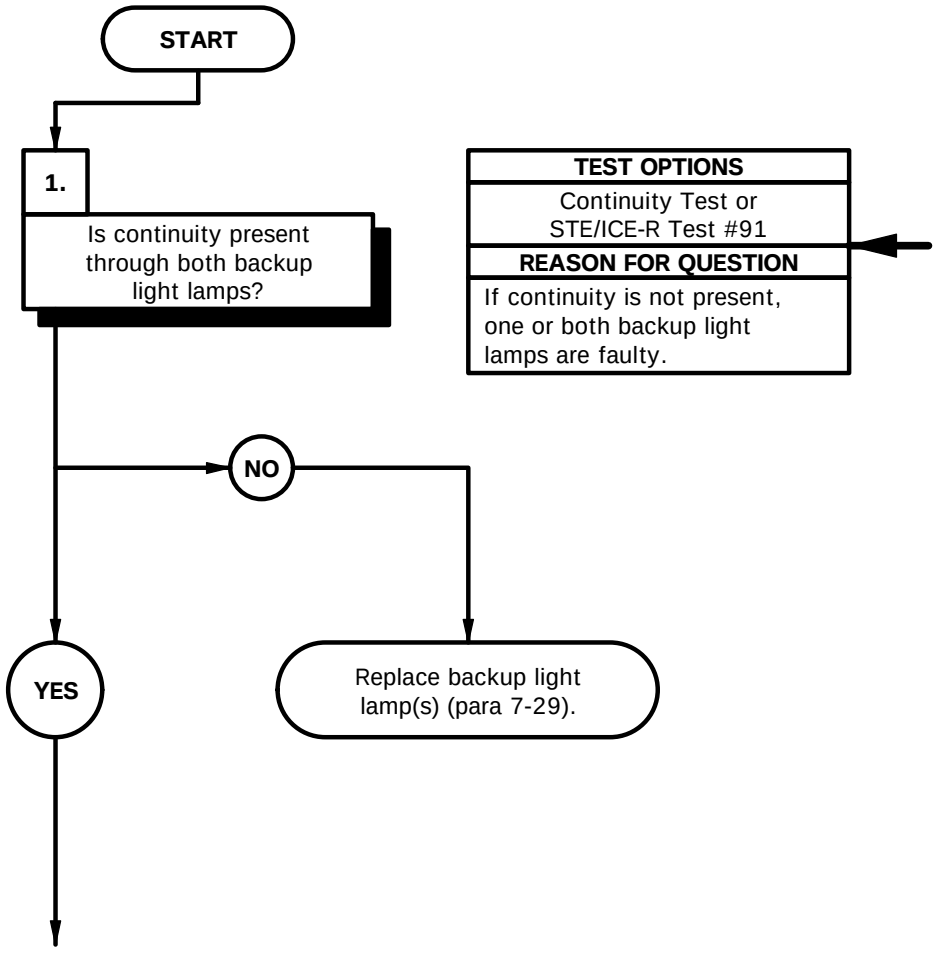
Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breakers CB70 and CB73 prior to beginning this task.

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.

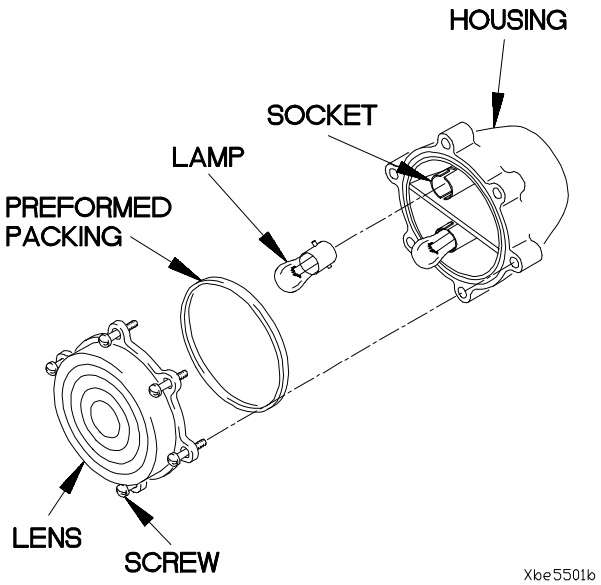
**POSSIBLE PROBLEMS**

Faulty backup light lamps.
Faulty backup light assembly.
Faulty dashboard cable assembly.
Faulty WTEC II cab transmission harness.
Faulty rear lights cable assembly.
Faulty REVERSE WARNING relay in WTEC II VIM.
Faulty WTEC II transmission ECU pushbutton shift selector.
Faulty WTEC III relay K25.
Faulty WTEC III transmission ECU.

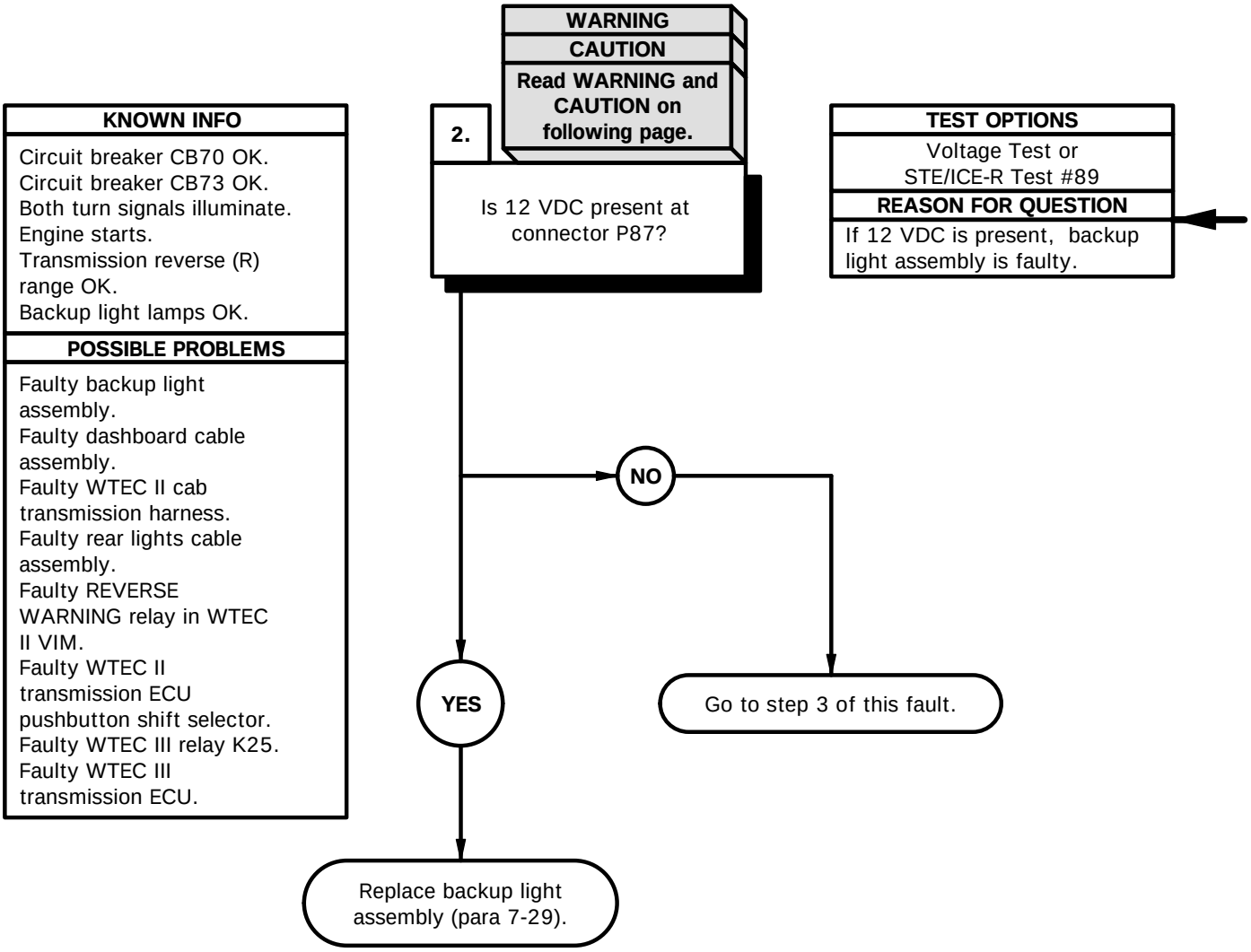


**CONTINUITY TEST**

(1) Loosen six captive screws on lens.
(2) Remove lens from housing.
(3) Remove preformed packing from housing. Discard preformed packing.
(4) Remove two lamps from sockets.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to center contact of lamp.
(7) Connect negative (-) probe of multimeter to lamp base and note reading on multimeter.
(8) If continuity is not present, replace one or both lamps (para 7-29).
(9) Install two lamps in sockets.
(10) Install preformed packing and lens on housing with six captive screws.
(11) Connect batteries (para 7-48).



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

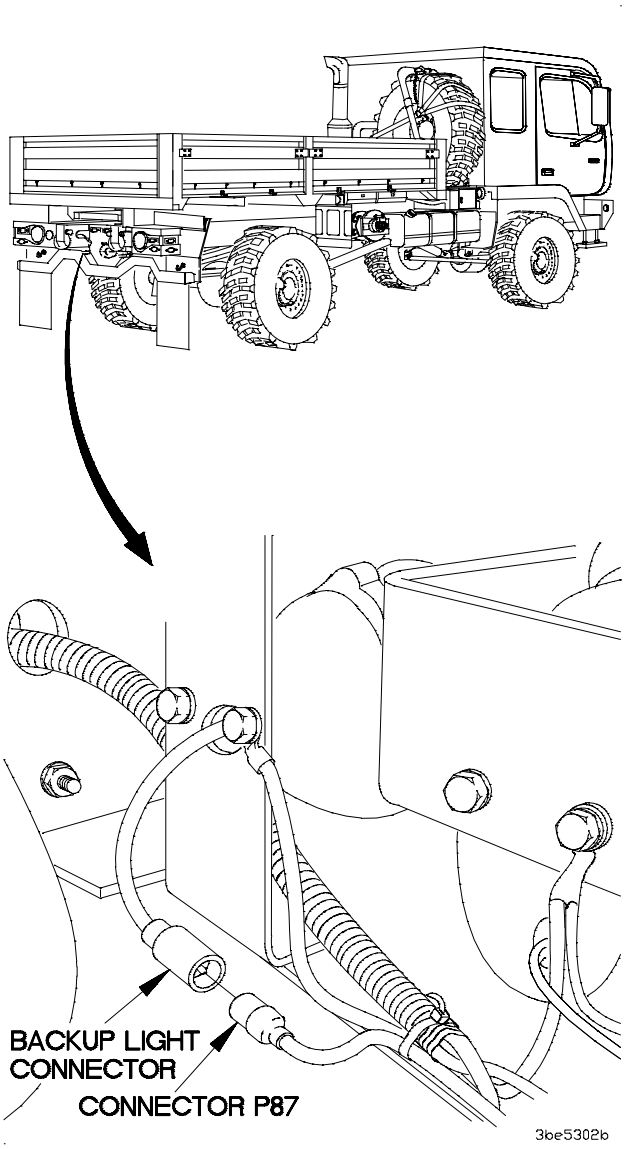
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

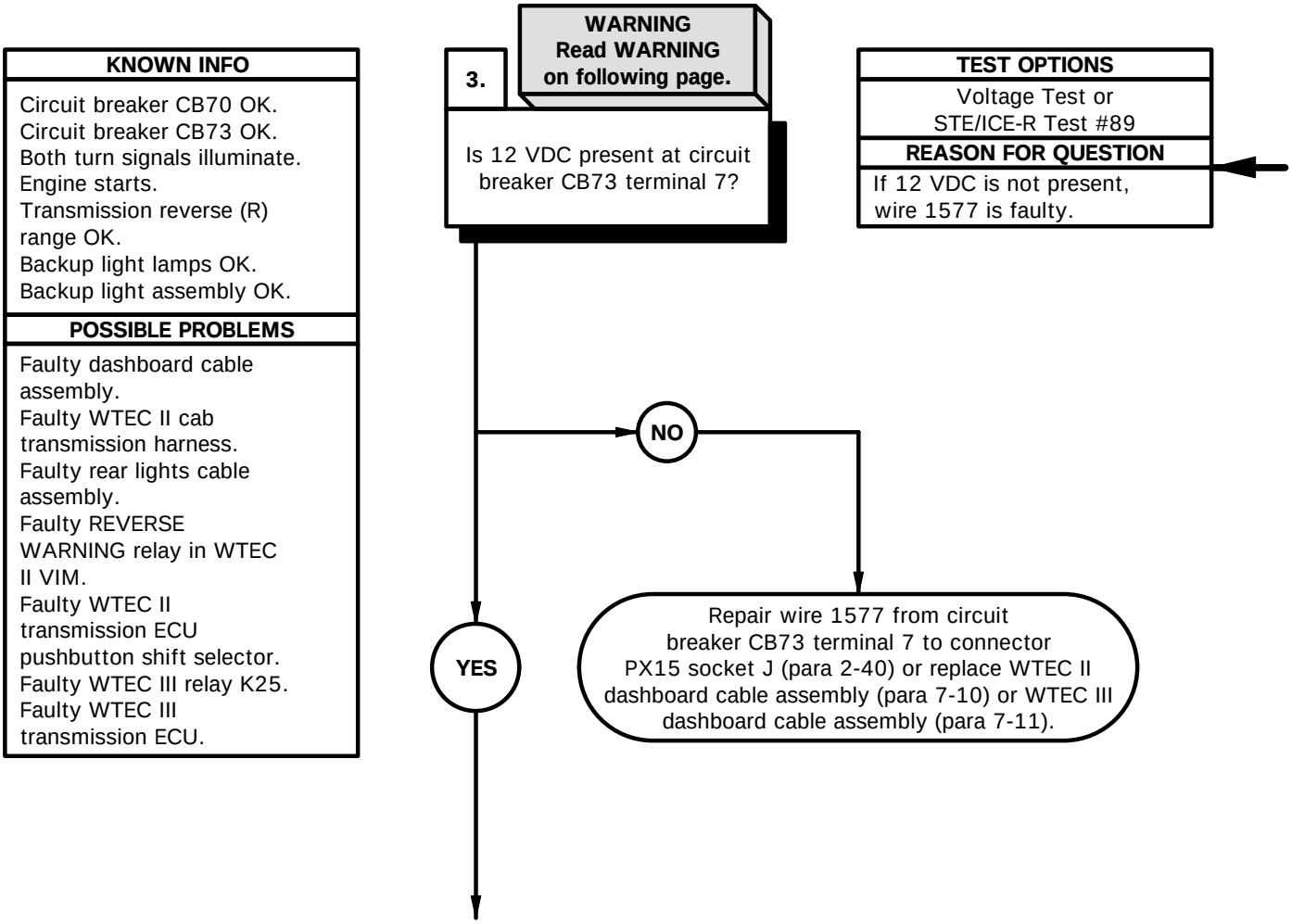
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P87 from backup light connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P87.
(4) Connect negative (-) probe of multimeter to ground.
(5) Start engine (TM 9-2320-365-10).
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Select R (reverse) on pushbutton shift selector (TM 9-2320-365-10) and note reading on multimeter.
(8) If 12 VDC is not present, go to step 3 of this faulty. If 12 VDC is present, replace backup light assembly (para 7-29).
(9) Select N (neutral) on pushbutton shift selector (TM 9-2320-365-10).
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Shut down engine (TM 9-2320-365-10).
(12) Connect connector P87 to backup light connector.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

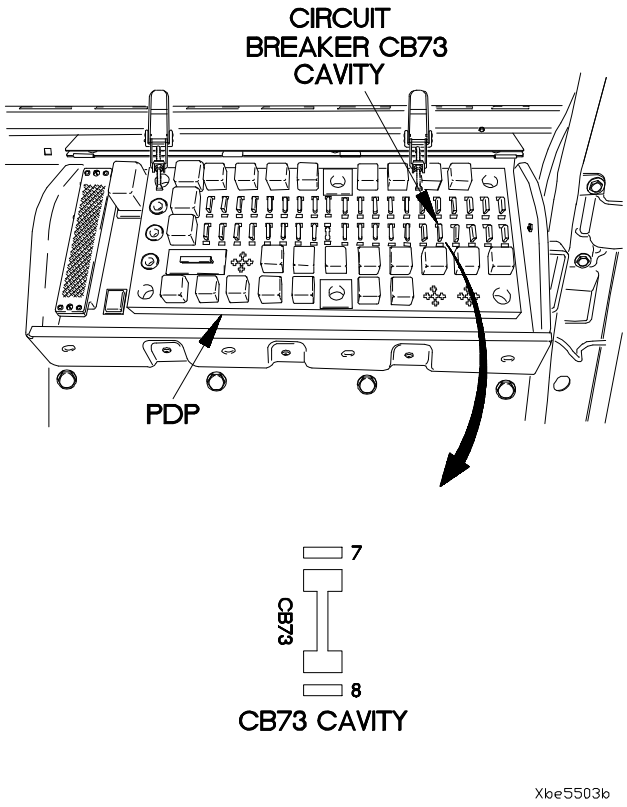


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove circuit breaker CB73 from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to PDP, terminal 7, where circuit breaker CB73 was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1577 from circuit breaker CB73 terminal 7 to connector PX15 socket J (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).



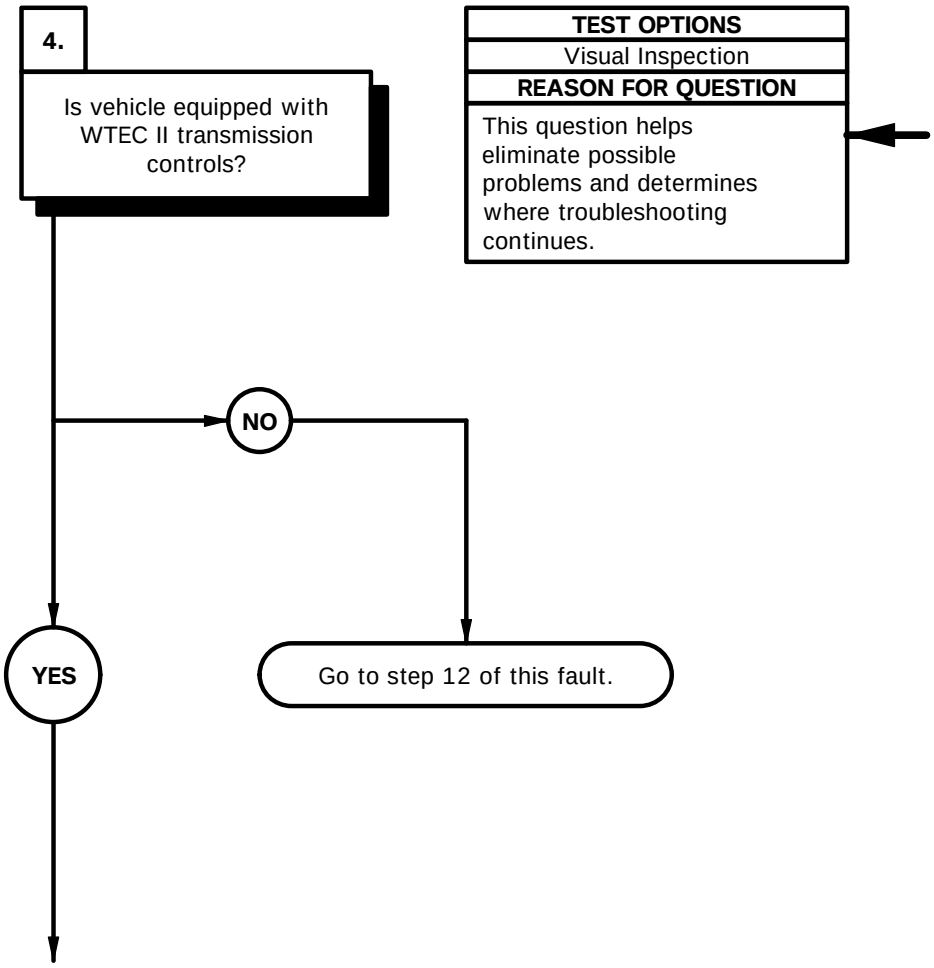
## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty WTEC II cab transmission harness.
Faulty rear lights cable assembly.
Faulty REVERSE WARNING relay in WTEC II VIM.
Faulty WTEC II transmission ECU pushbutton shift selector.
Faulty WTEC III relay K25.
Faulty WTEC III transmission ECU.



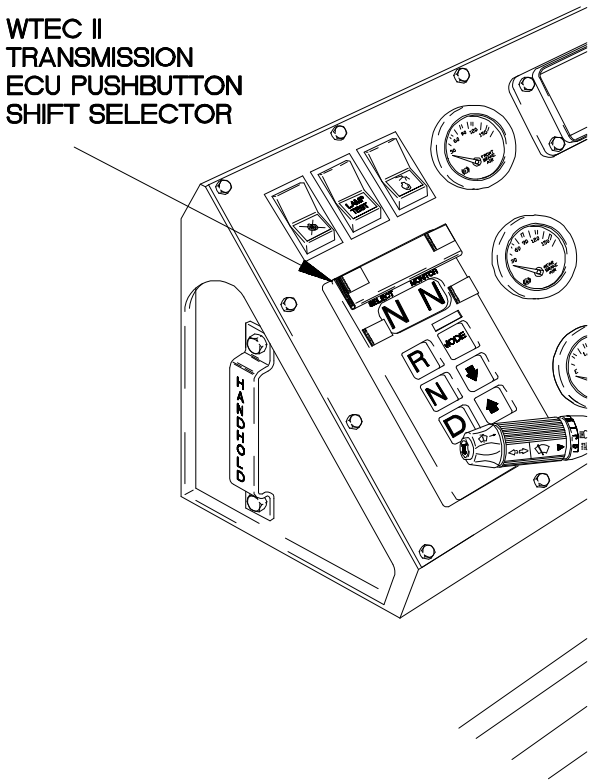

**TEST OPTIONS**

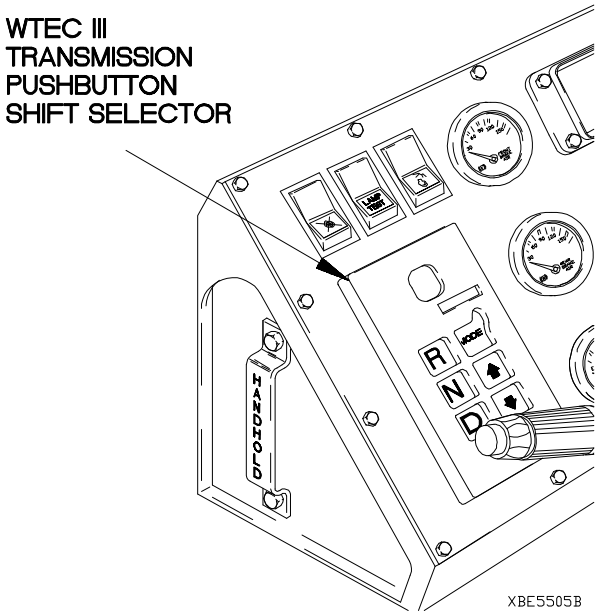
Visual Inspection

**REASON FOR QUESTION**

This question helps eliminate possible problems and determines where troubleshooting continues.

(1) Check if vehicle is equipped with WTEC II TEPSS.
(2) If transmission pushbutton shift selector is not mounted with four screws and does not have a filter cover, go to step 13 of this fault.



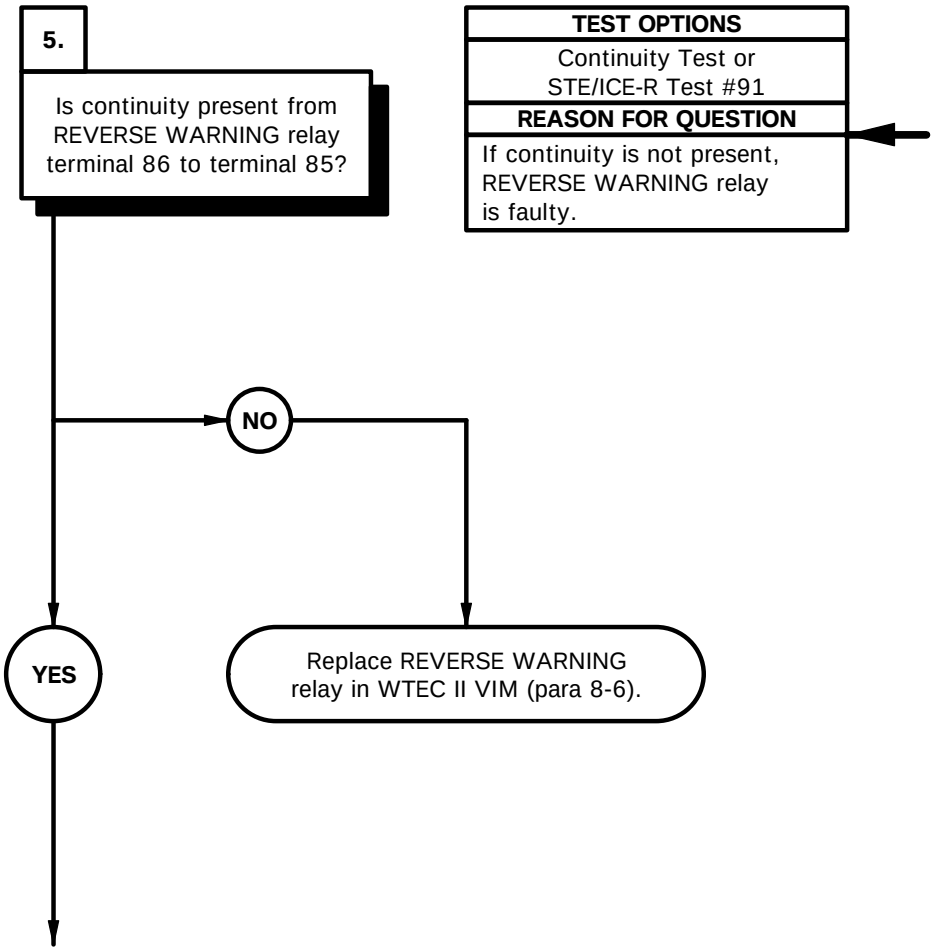
## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.
WTEC II transmission controls.

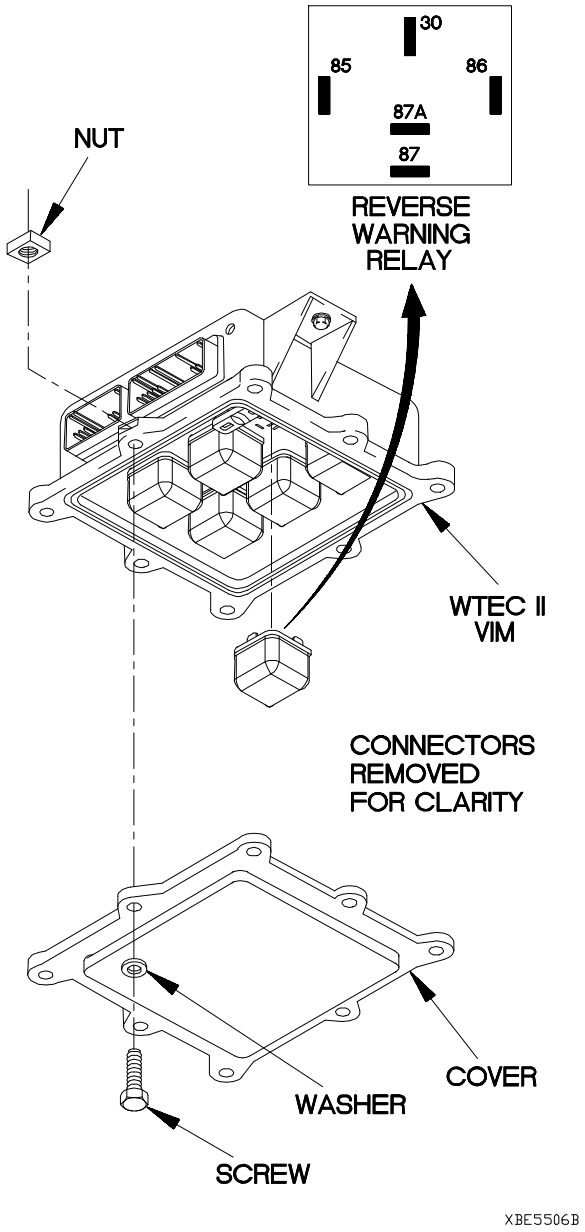
**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty WTEC II cab transmission harness.
Faulty rear lights cable assembly.
Faulty REVERSE WARNING relay in WTEC II VIM.
Faulty WTEC II transmission ECU pushbutton shift selector.

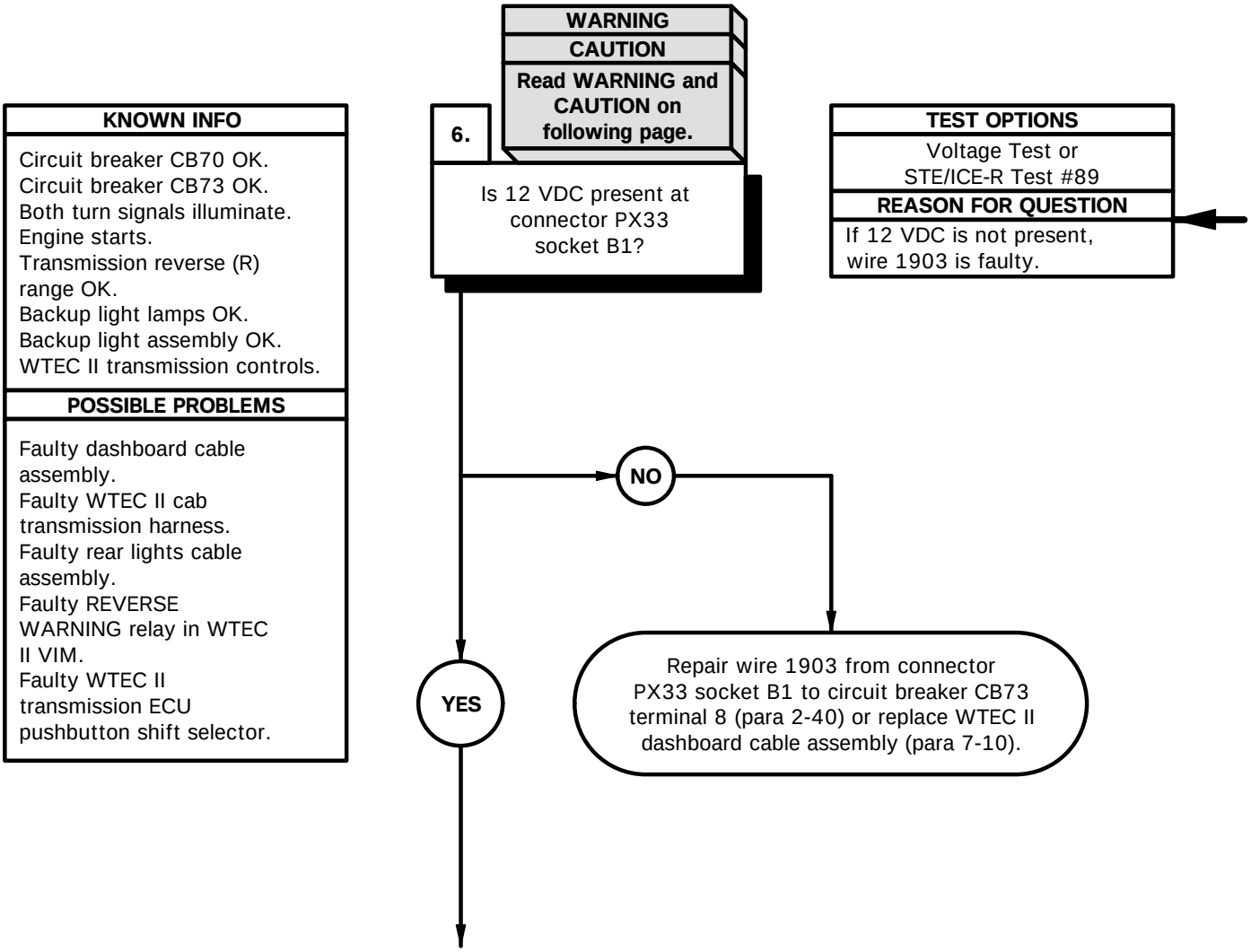


**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Remove seven screws and washers from cover.
(3) Remove screw, washer, cover, and nut from WTEC II VIM.
(4) Remove REVERSE WARNING relay from WTEC II VIM.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to REVERSE WARNING relay terminal 86.
(7) Connect negative (-) probe of multimeter to REVERSE WARNING relay terminal 85 and note reading on multimeter.
(8) If continuity is not present, replace REVERSE WARNING relay in WTEC II VIM (para 8-6).
(9) Install REVERSE WARNING relay in WTEC II VIM.
(10) Install cover on WTEC II VIM with nut, washer, and screw.
(11) Install seven washers and screws in cover.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

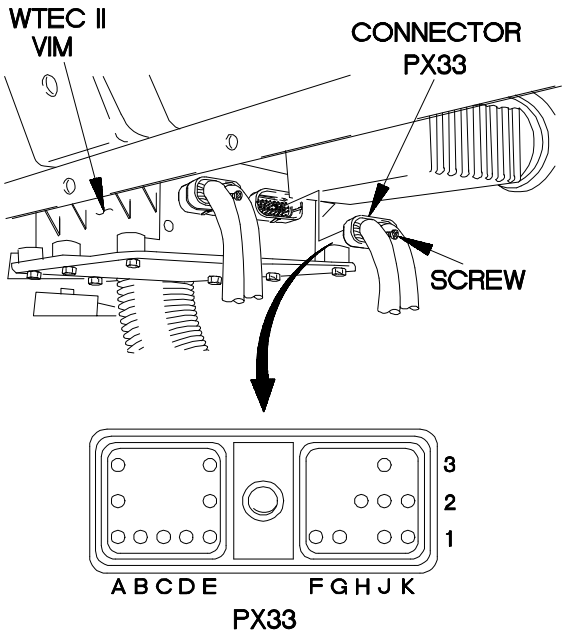
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

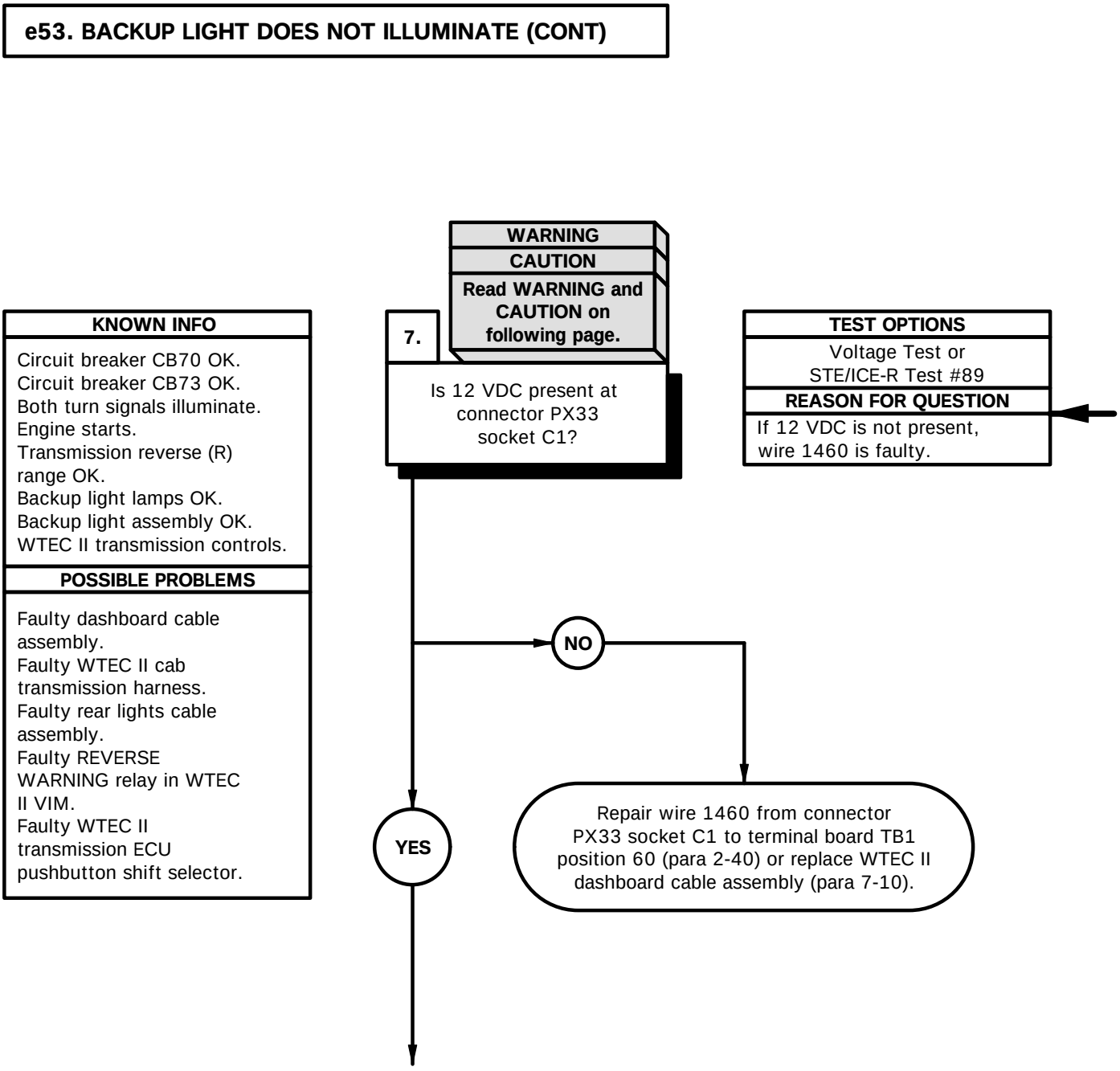
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Loosen screw in connector PX33.
(2) Disconnect connector PX33 from WTEC II VIM.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector PX33 socket B1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1903 from connector PX33 socket B1 to circuit breaker CB73 terminal 8 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(8) Position main light switch to OFF (TM 9-2320-365-10).



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

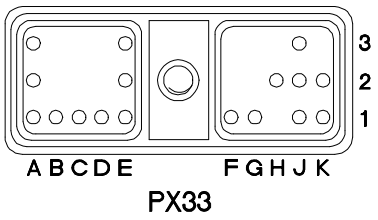
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

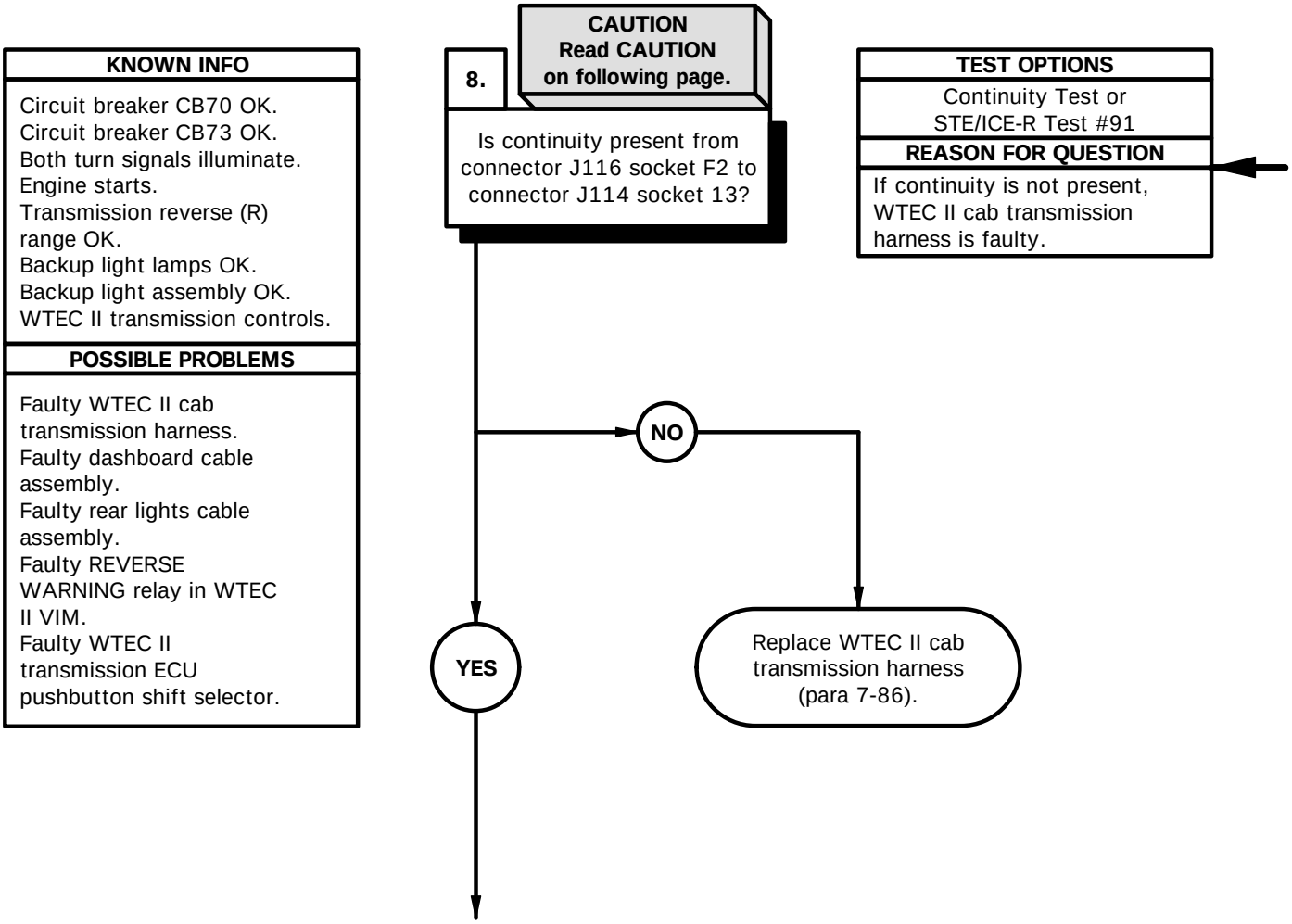
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to connector PX33 socket C1.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1460 from connector PX33 socket C1 to terminal board TB1 position 60 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(6) Position main light switch to OFF (TM 9-2320-365-10).




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## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

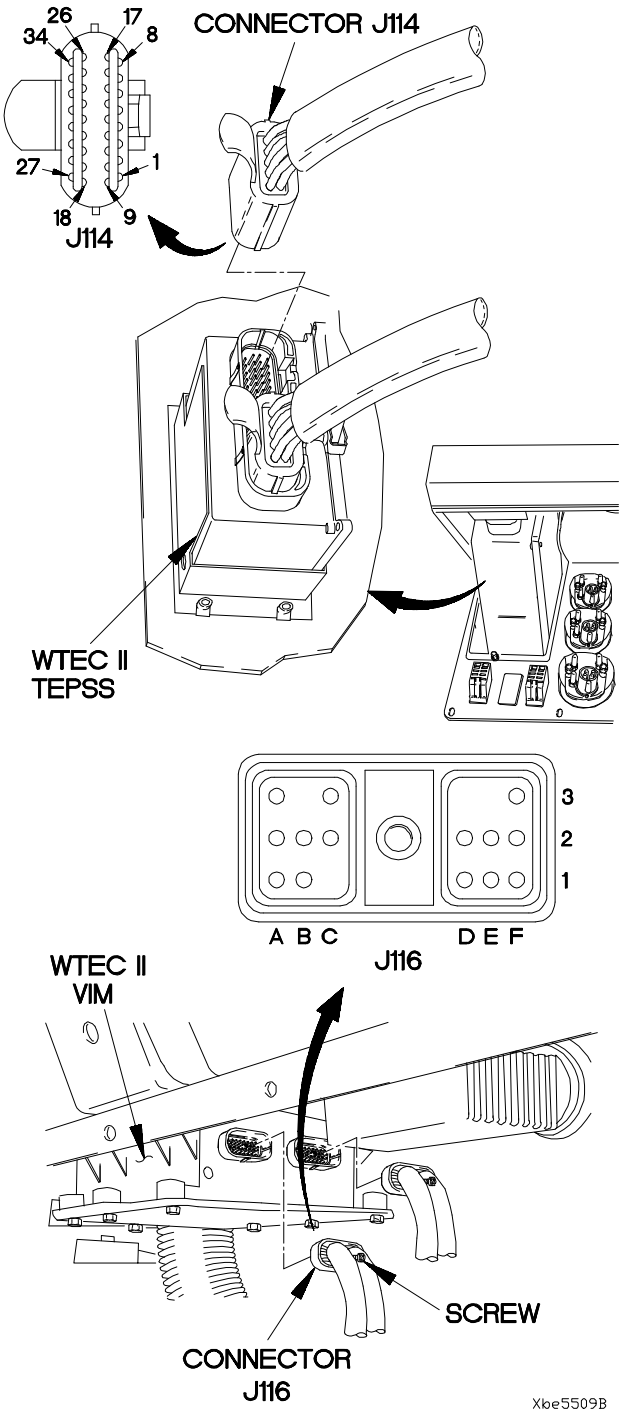
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

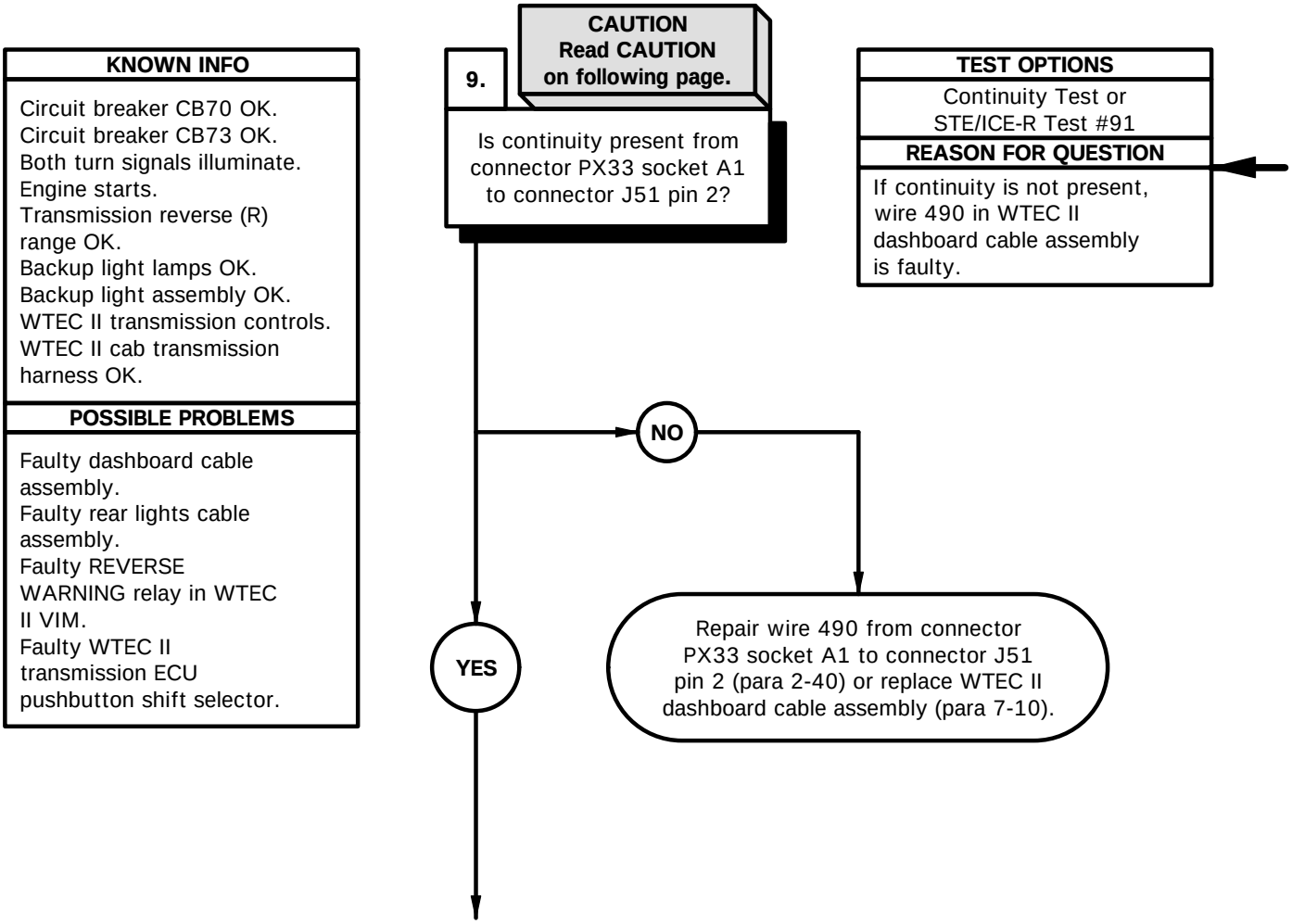
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector J114 from WTEC II TEPSS.
(3) Loosen screw in connector J116.
(4) Disconnect connector J116 from WTEC II VIM.
(5) Connect positive (+) probe of multimeter to connector J116 socket F2.
(6) Connect negative (-) probe of multimeter to connector J114 socket 13 and note reading on multimeter.
(7) If continuity is not present, replace WTEC II cab transmission harness (para 7-86).
(8) Connect connector J114 to WTEC II TEPSS.
(9) Install instrument panel assembly (para 7-15).
(10) Connect connector J116 to WTEC II VIM.
(11) Tighten screw in connector J116.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

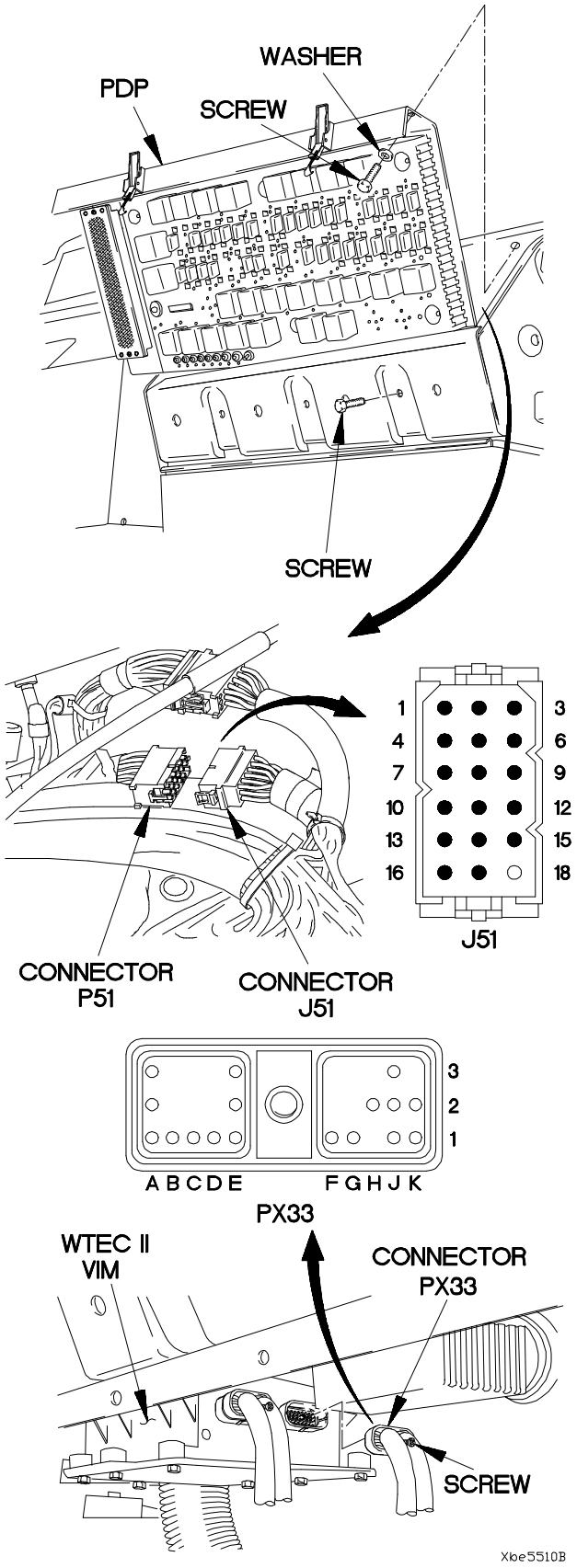
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**NOTE**

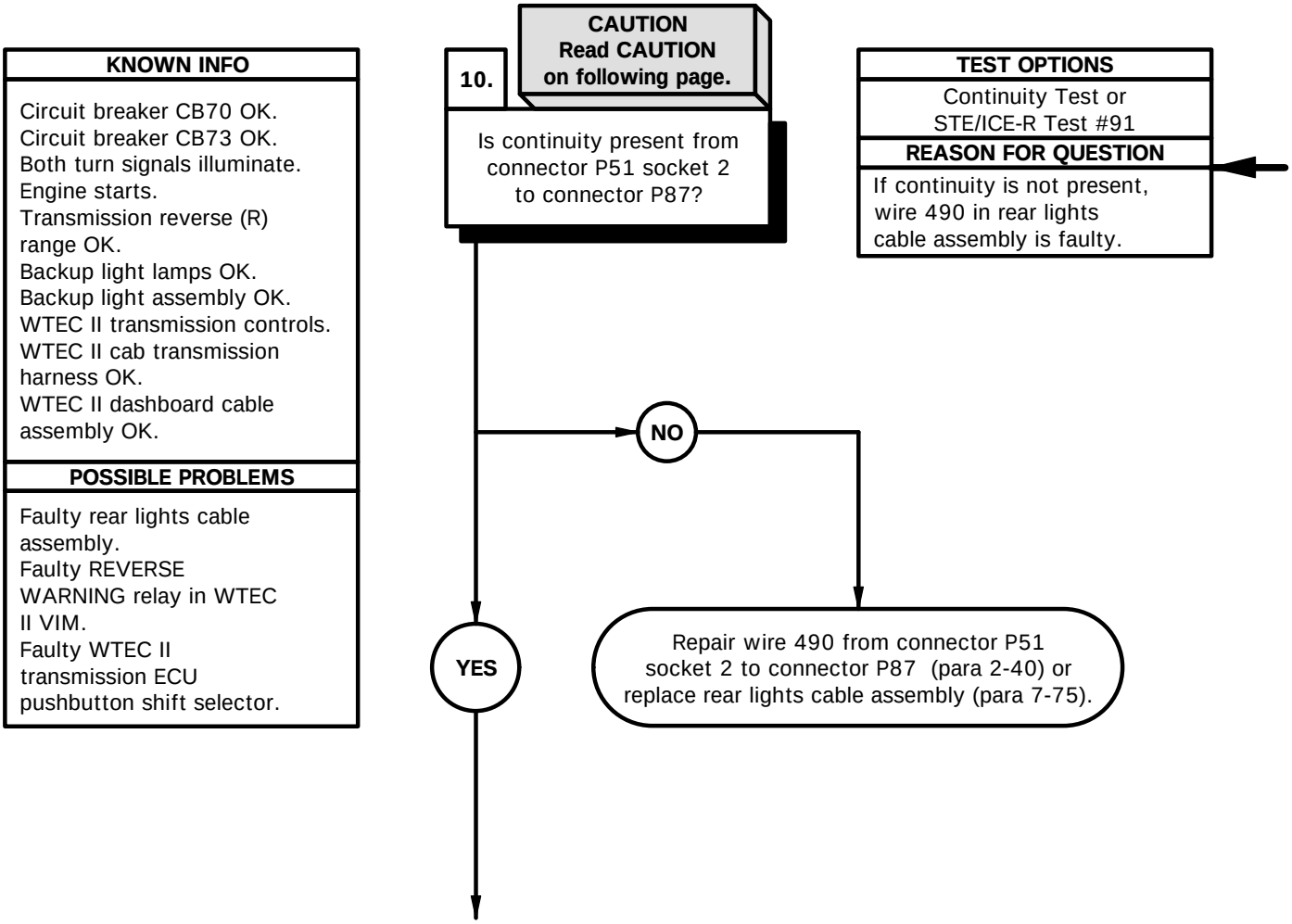
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove three screws from PDP.
(2) Remove three screws and washers from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector P51 from connector J51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector PX33 socket A1.
(7) Connect negative (-) probe of multimeter to connector J51 pin 2 and note reading on multimeter.
(8) If continuity is not present, repair wire 490 from connector PX33 socket A1 to connector J51 pin 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(9) Connect connector PX33 to WTEC II VIM.
(10) Tighten screw in connector PX33.
(11) Install kick panel (para 16-3).



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

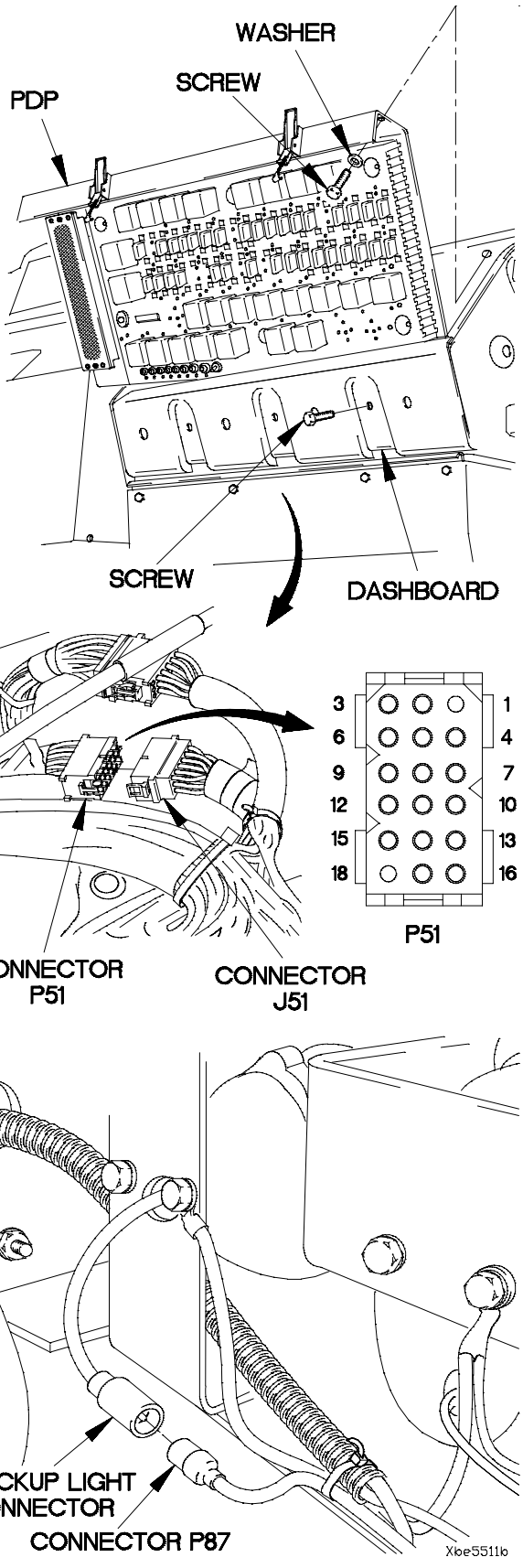
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

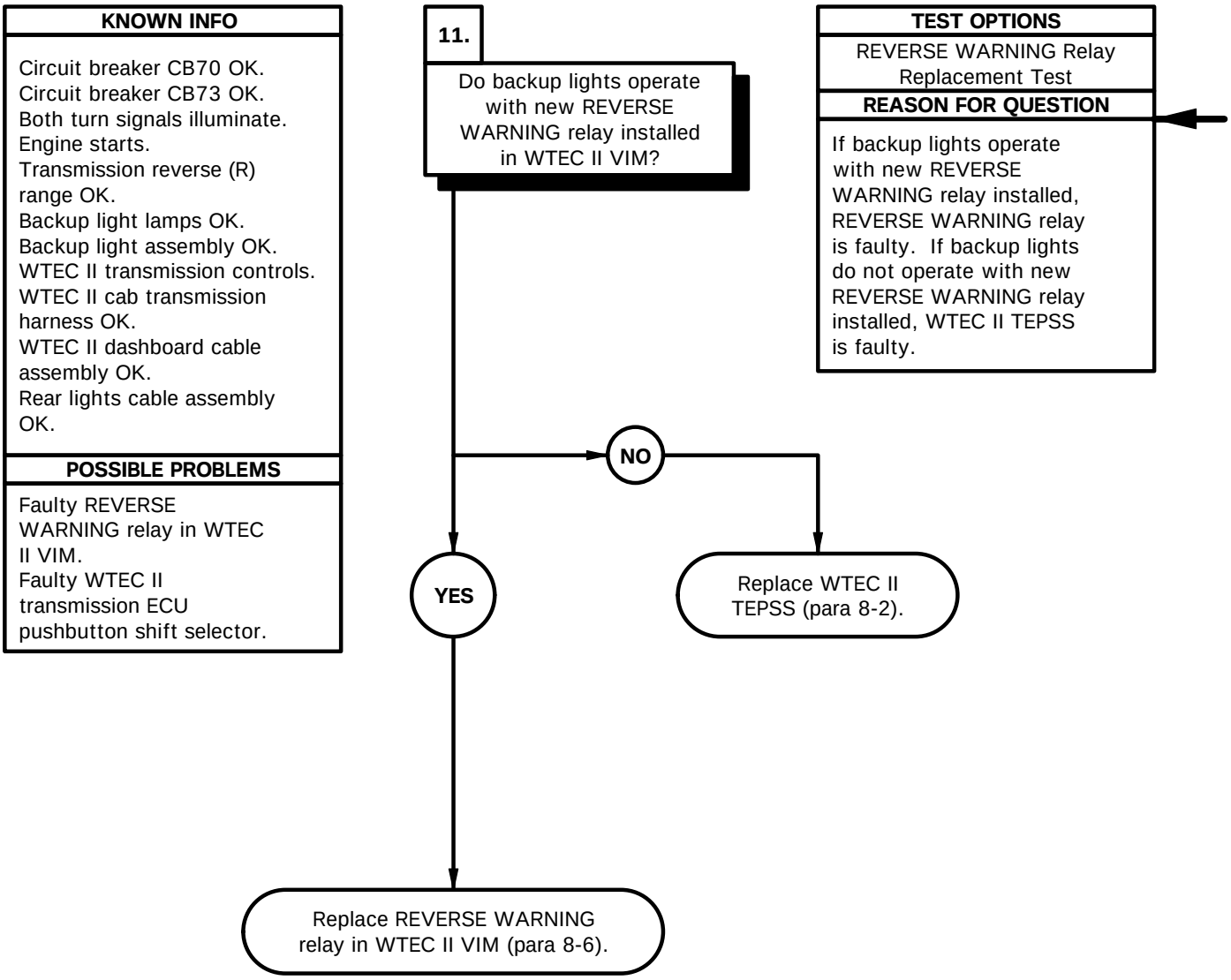
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P87 from backup light connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 2.
(4) Connect negative (-) probe of multimeter to connector P87 and note reading on multimeter.
(5) If continuity is not present, repair wire 490 from connector P51 socket 2 to connector P87 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) Connect connector P87 to backup light connector.
(7) Connect connector P51 to connector J51.
(8) Install PDP on dashboard with three screws.
(9) Install three washers and screws in PDP.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



(1) Replace REVERSE WARNING relay in WTEC II VIM (para 8-6).
(2) Start engine (TM 9-2320-365-10).
(3) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(4) Select R (reverse) on WTEC II TEPSS (TM 9-2320-365-10).
(5) Check to see if backup lights operate.
(6) Select N (neutral) on WTEC II TEPSS (TM 9-2320-365-10).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Shut down engine (TM 9-2320-365-10).
(9) If backup lights do not operate, install old REVERSE WARNING relay WTEC II VIM (para 8-6) and replace WTEC II TEPSS (para 8-2).

## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.
WTEC III transmission controls.

**POSSIBLE PROBLEMS**

Faulty WTEC III relay K25.
Faulty WTEC III dashboard cable assembly.
Faulty rear lights cable assembly.
Faulty WTEC III transmission ECU.

**12.**

Is continuity present from WTEC III relay K25 terminal 86 to terminal 85?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, WTEC III relay K25 if faulty.

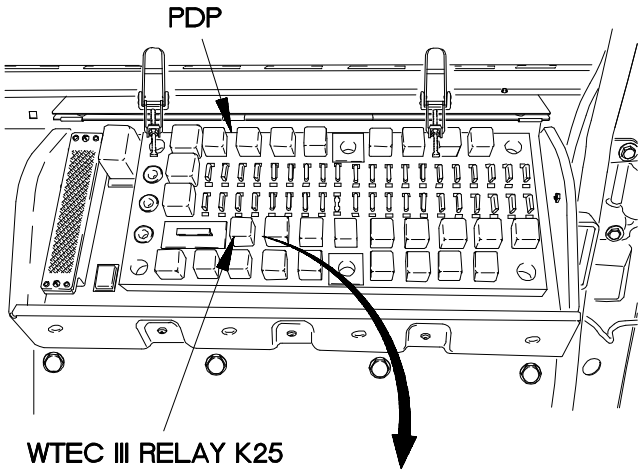
NO

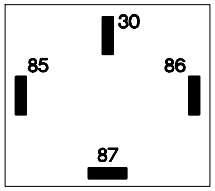
YES

Replace WTEC III relay K25 (para 7-9).

**CONTINUITY TEST**

(1) Remove WTEC III relay K25 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to WTEC III relay K25 terminal 86.
(4) Connect negative (-) probe of multimeter to WTEC III relay K25 terminal 85 and note reading on multimeter.
(5) If continuity is not present, replace WTEC III relay K25 (para 7-9).

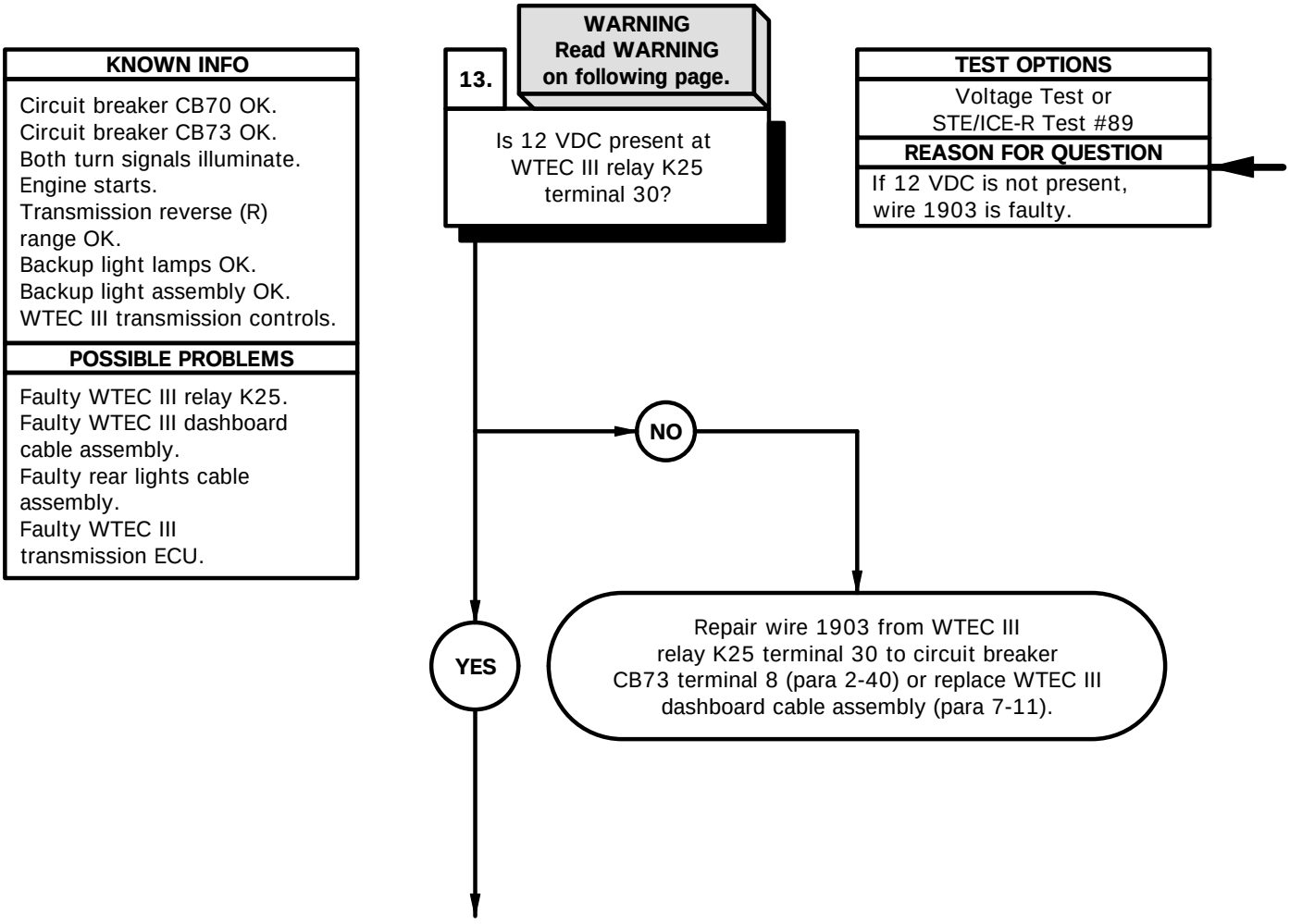



WTEC III
RELAY K25

Xbe5513B

## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

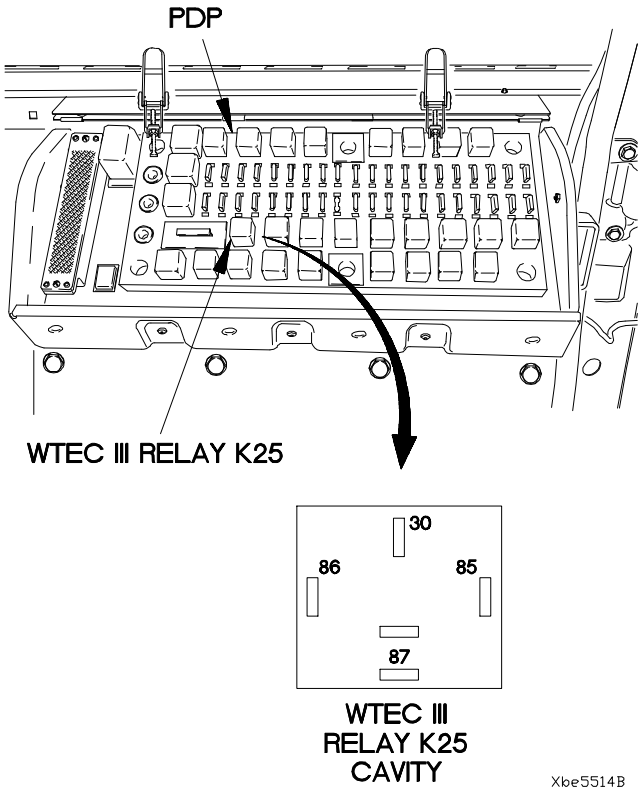


**WARNING**

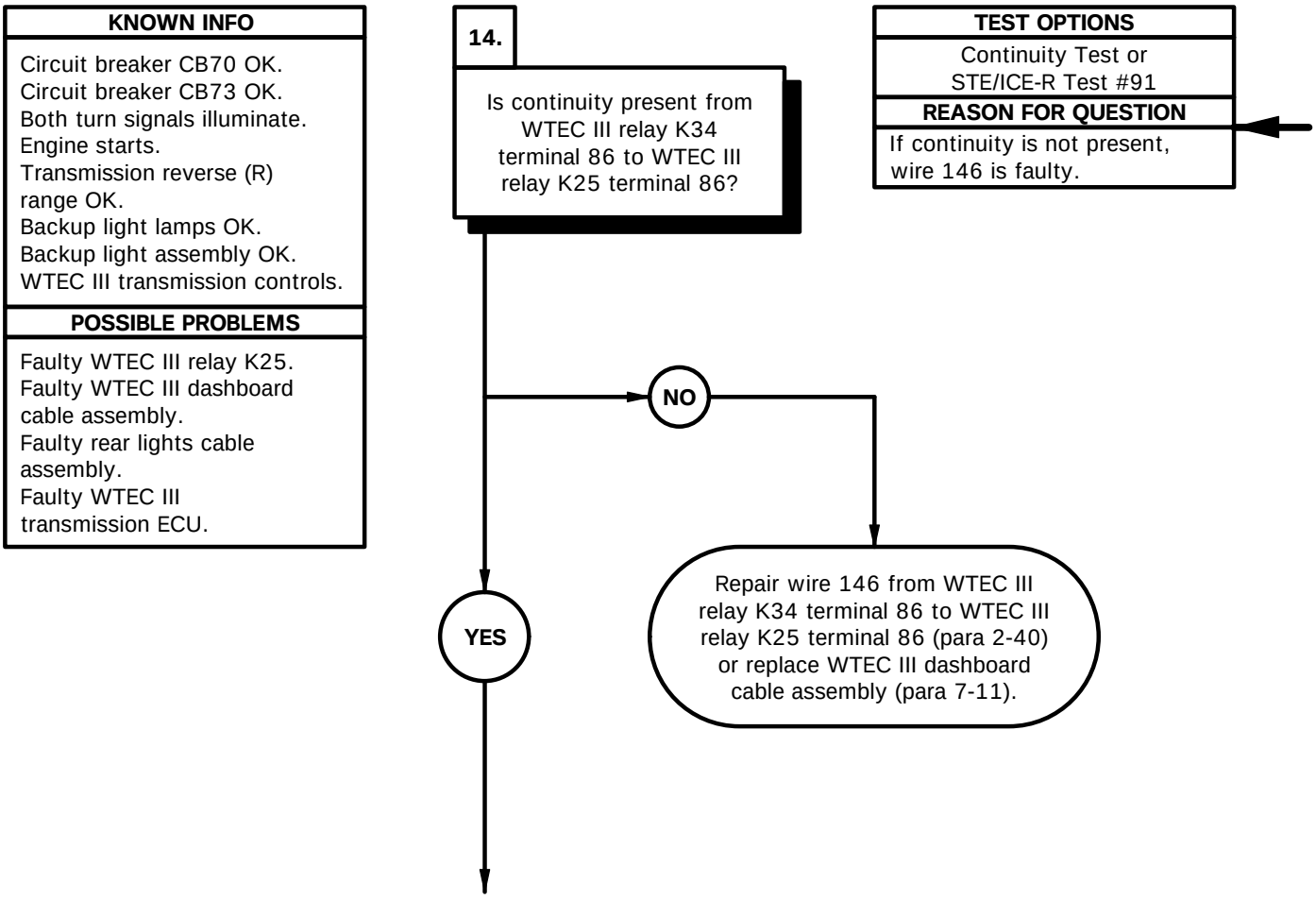
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to PDP, where WTEC III relay K25 terminal 30 was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1903 from WTEC III relay K25 terminal 30 to circuit breaker CB73 terminal 8 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).

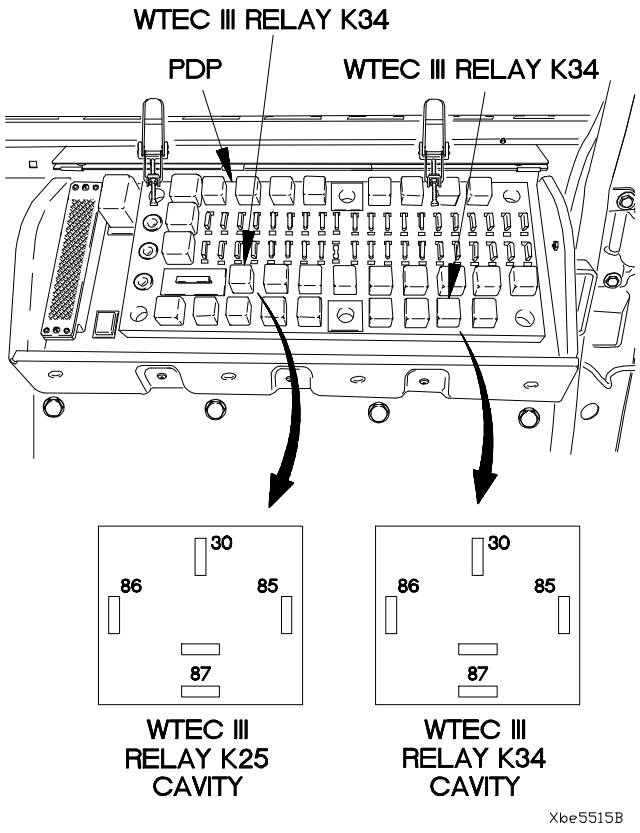


## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove WTEC III relay K34 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to PDP, where WTEC III relay K34 terminal 86 was removed.
(4) Connect negative (-) probe of multimeter to PDP, where WTEC III relay K25 terminal 86 was removed, and note reading on multimeter.
(5) If continuity is not present, repair wire 146 from WTEC III relay K34 terminal 86 to WTEC III relay K25 terminal 86 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(6) Install WTEC III relay K34 on PDP.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.
WTEC III transmission controls.

**POSSIBLE PROBLEMS**

Faulty WTEC III relay K25.
Faulty WTEC III dashboard cable assembly.
Faulty rear lights cable assembly.
Faulty WTEC III transmission ECU.

**CAUTION**
**Read CAUTION on following page.**

**15.** Is continuity present from WTEC III relay K25 terminal 85 to connector P115 socket 4?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 113 is faulty.

**NO** → Repair wire 113 from WTEC III relay K25 terminal 85 to connector P115 socket 4 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

**YES**

**CAUTION**

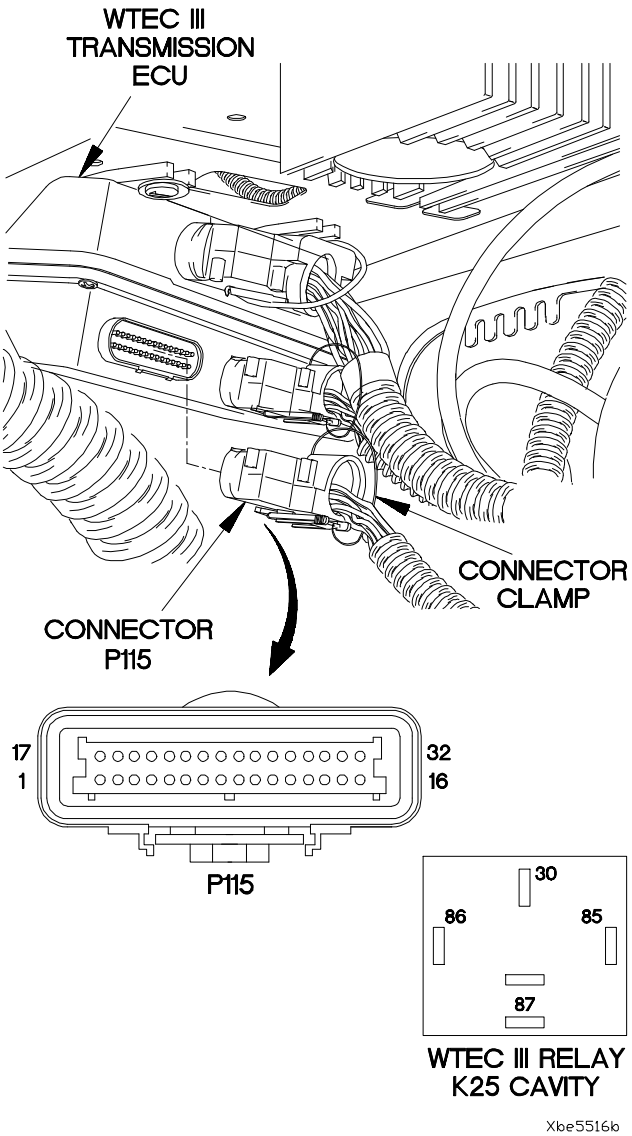
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector clamp from connector P115.
(3) Disconnect connector P115 from WTEC III transmission ECU.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to PDP, where WTEC III relay K25 terminal 85 was removed.
(6) Connect negative (-) probe of multimeter to connector P115 socket 4 and note reading on multimeter.
(7) If continuity is not present, repair wire 113 from WTEC III relay K25 terminal 85 to connector P115 socket 4 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(8) Connect connector P115 to WTEC III transmission ECU.
(9) Connect connector clamp to connector P115.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.
WTEC III transmission controls.

**POSSIBLE PROBLEMS**

Faulty WTEC III relay K25.
Faulty WTEC III dashboard cable assembly.
Faulty rear lights cable assembly.
Faulty WTEC III transmission ECU.

**CAUTION**
**Read CAUTION on following page.**

**16.** Is continuity present from WTEC III relay K25 terminal 87 to connector J51 pin 2?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 490 is faulty.

NO

YES

Repair wire 490 from WTEC III relay K25 terminal 87 to connector J51 pin 2 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

**CAUTION**

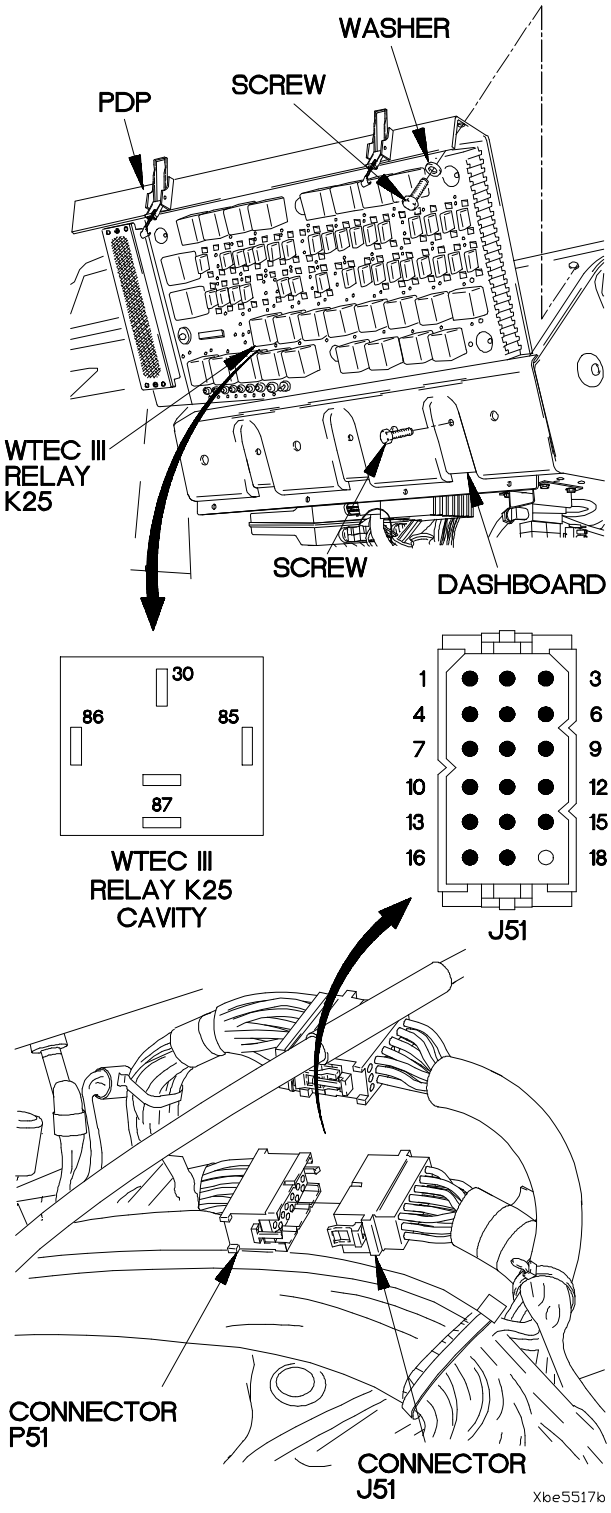
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove three screws from PDP.
(2) Remove three screws and washers from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector P51 from connector J51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to PDP, where WTEC III relay K25 terminal 87 was removed.
(7) Connect negative (-) probe of multimeter to connector J51 pin 2 and note reading on multimeter.
(8) If continuity is not present, repair wire 490 from WTEC III relay K25 terminal 87 to connector J51 pin 2 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.
WTEC III transmission controls.
WTEC III dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty rear lights cable assembly.
Faulty WTEC III relay K25.
Faulty WTEC III transmission ECU.

**CAUTION**
**Read CAUTION on following page.**

**17.** Is continuity present from connector P51 socket 2 to connector P87?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 490 is faulty.

**NO** → Repair wire 490 from connector P51 socket 2 to connector P87 (para 2-40) or replace rear lights cable assembly (para 7-75).

**YES**

**CAUTION**

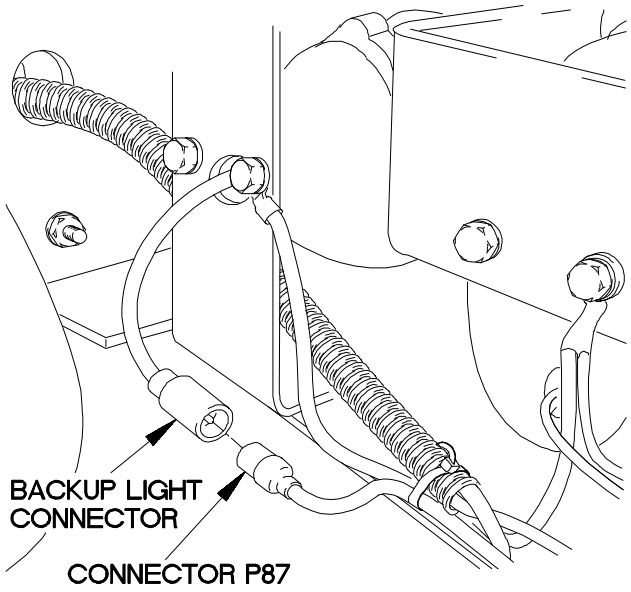
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

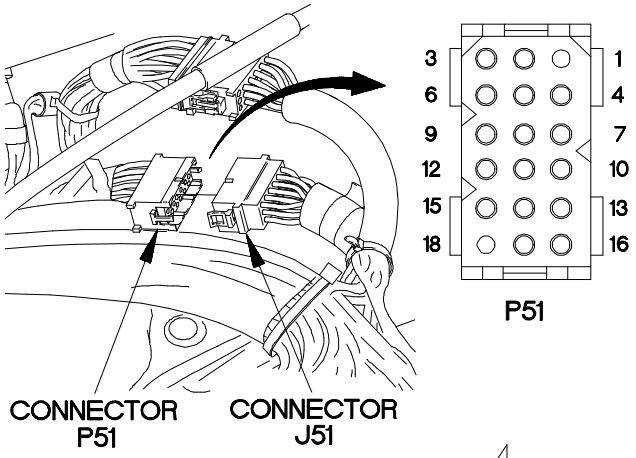
**NOTE**

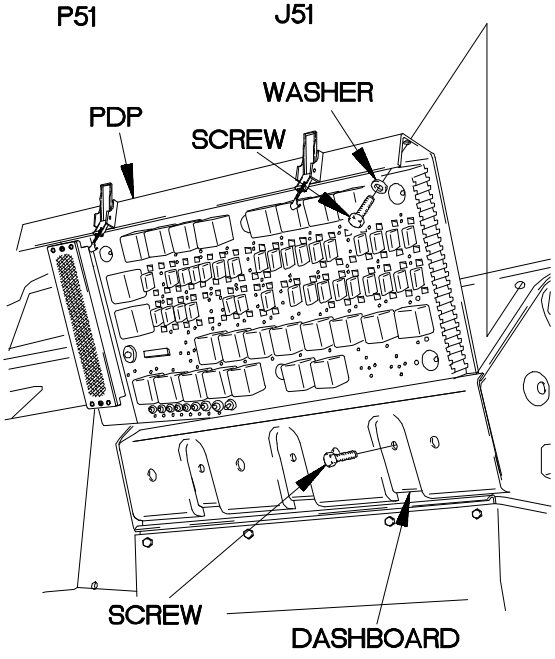
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P87 from backup light connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 2.
(4) Connect negative (-) probe of multimeter to connector P87 and note reading on multimeter.
(5) If continuity is not present, repair wire 490 from connector P51 socket 2 to connector P87 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) Connect connector P87 to backup light connector.
(7) Connect connector P51 to connector J51.
(8) Install PDP on dashboard with three screws.
(9) Install three washers and screws in PDP.



## e53. BACKUP LIGHT DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

Circuit breaker CB70 OK.
Circuit breaker CB73 OK.
Both turn signals illuminate.
Engine starts.
Transmission reverse (R) range OK.
Backup light lamps OK.
Backup light assembly OK.
WTEC III transmission controls.
WTEC III dashboard cable assembly OK.
Rear lights cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III relay K25.
Faulty WTEC III transmission ECU.

**18.**

Do backup lights operate with new WTEC III relay K25 installed?

**TEST OPTIONS**

WTEC III Relay K25 Replacement Test

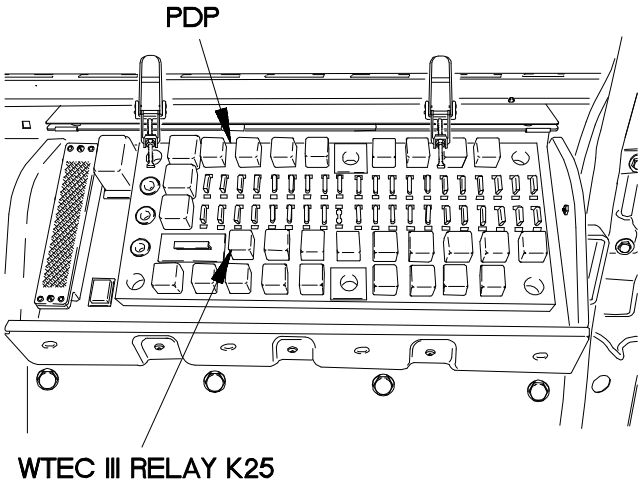
**REASON FOR QUESTION**

If backup lights operate with new WTEC III relay K25 installed, WTEC III relay K25 is faulty. If backup lights do not operate with new WTEC III relay K25 installed, WTEC III transmission ECU is faulty.

NO → Replace WTEC III transmission ECU (para 8-7).

YES → Replace WTEC III relay K25 (para 7-9).

(1) Install new WTEC III relay K25 on PDP.
(2) Start engine (TM 9-2320-365-10).
(3) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(4) Select R (reverse) on WTEC III TPSS (TM 9-2320-365-10).
(5) Check to see if backup lights operate.
(6) Select N (neutral) on WTEC III TPSS (TM 9-2320-365-10).
(7) Position main light switch to OFF (TM 9-2320-365-10).
(8) Shut down engine (TM 9-2320-365-10).
(9) Remove new WTEC III relay K25 from PDP.
(10) Install old WTEC III relay K25 on PDP.
(11) If backup lights operate, replace WTEC III relay K25 (para 7-9).
(12) If backup lights do not operate, replace WTEC III transmission ECU (para 8-7).
(13) Install kick panel (para 16-3).




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## e54. BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

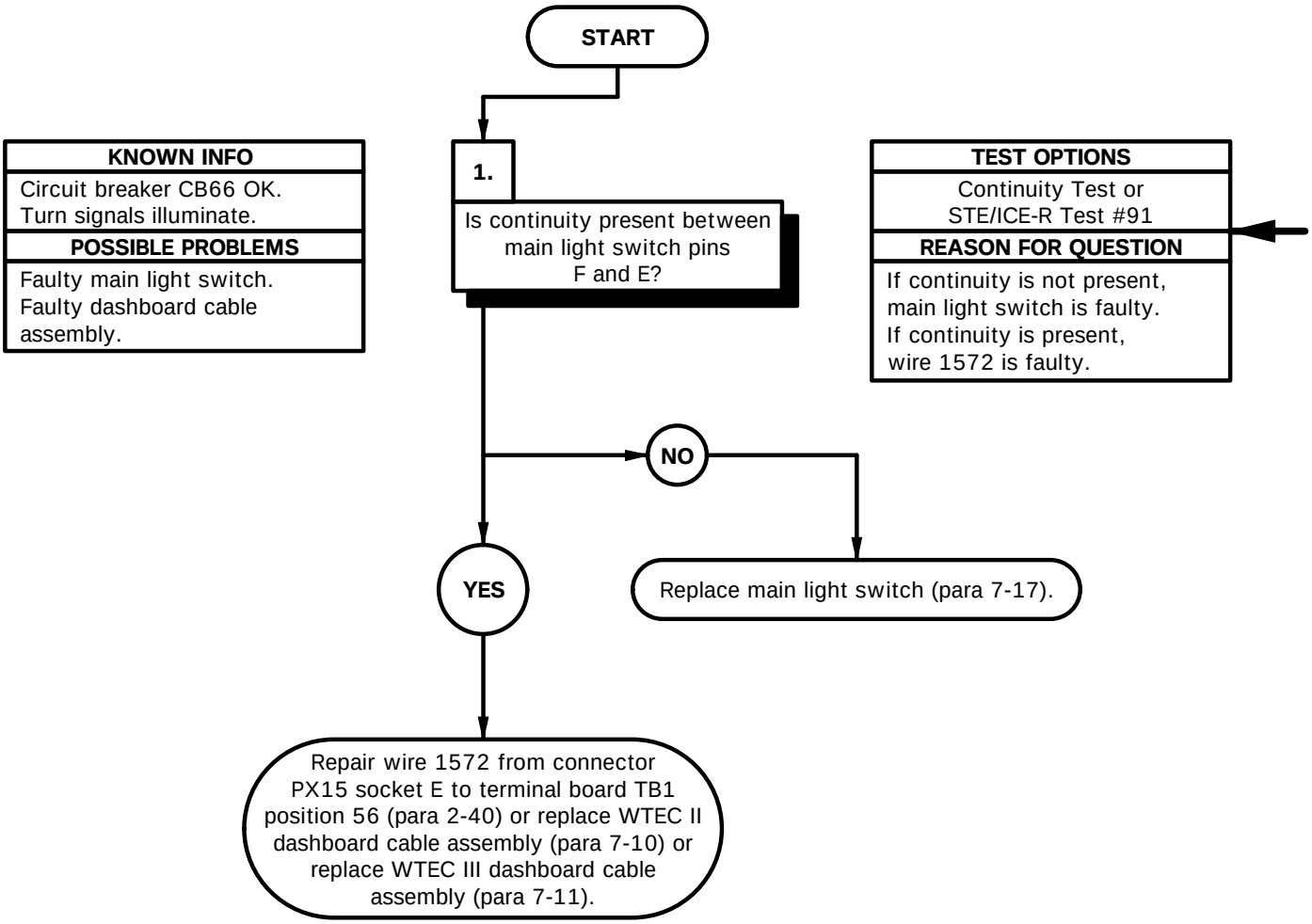
**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB66 prior to beginning this task.

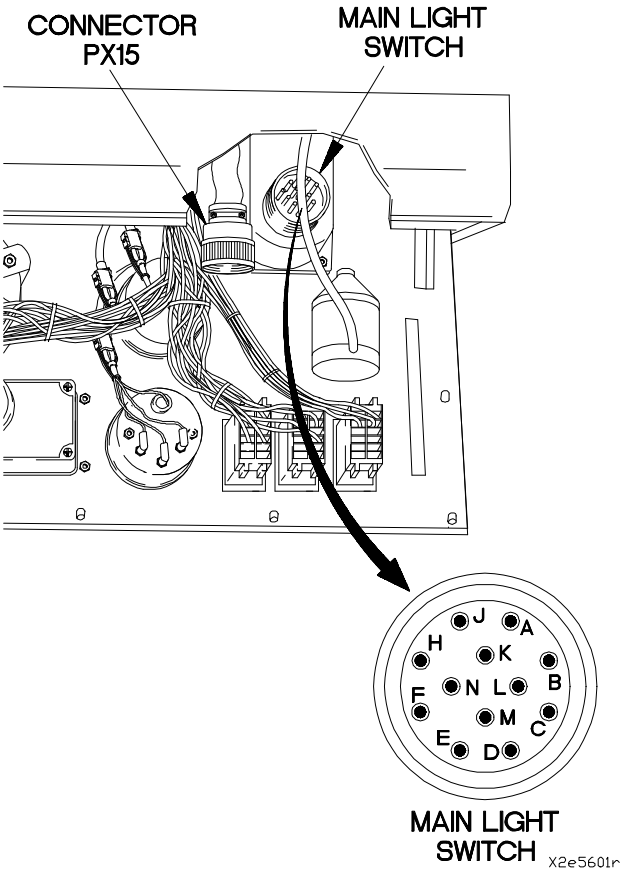


**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access(para 7-15).
(2) Disconnect connector PX15 from main light switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to main light switch pin F.
(5) Connect negative (-) probe of multimeter to main light switch pin E.
(6) Position main light switch to BO MARKER (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace main light switch connector (para 7-17).
(8) If continuity is present, repair wire 1572 from connector PX15 socket E to terminal board TB1 position 56 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or replace WTEC III dashboard cable assembly (para 7-11).
(9) Position main light switch to OFF (TM 9-2320-365-10).
(10) Connect connector PX15 to main light switch.
(11) Install instrument panel assembly (para 7-15).



## e54A. FRONT HAZARD LIGHTS DO NOT ILLUMINATE

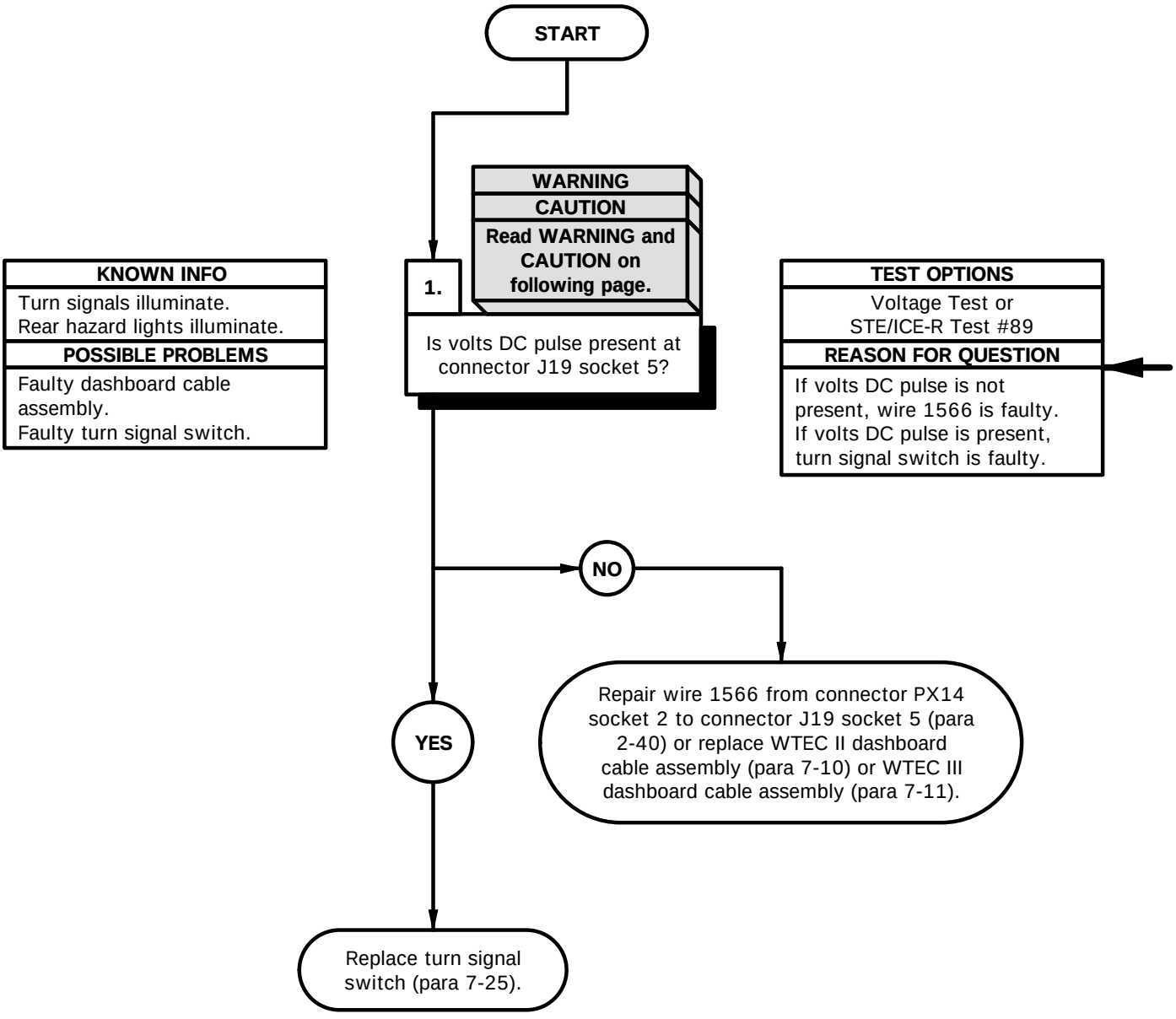
**INITAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

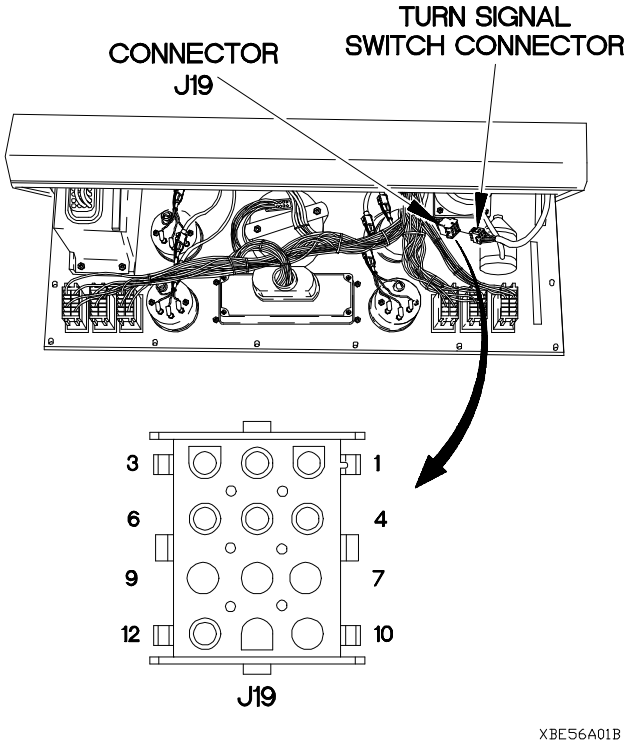
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector J19 from turn signal switch connector.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector J19 socket 5.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Position hazard lights switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If volts DC pulse is not present, Repair wire 1566 from connector PX14 socket 2 to connector J19 socket 5 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If volts DC is present, replace turn signal switch (para 7-25).
(10) Position hazard lights switch to off (TM 9-2320-365-10).
(11) Position main light switch to OFF (TM 9-2320-365-10).



## e55. REAR HAZARD LIGHTS DO NOT ILLUMINATE

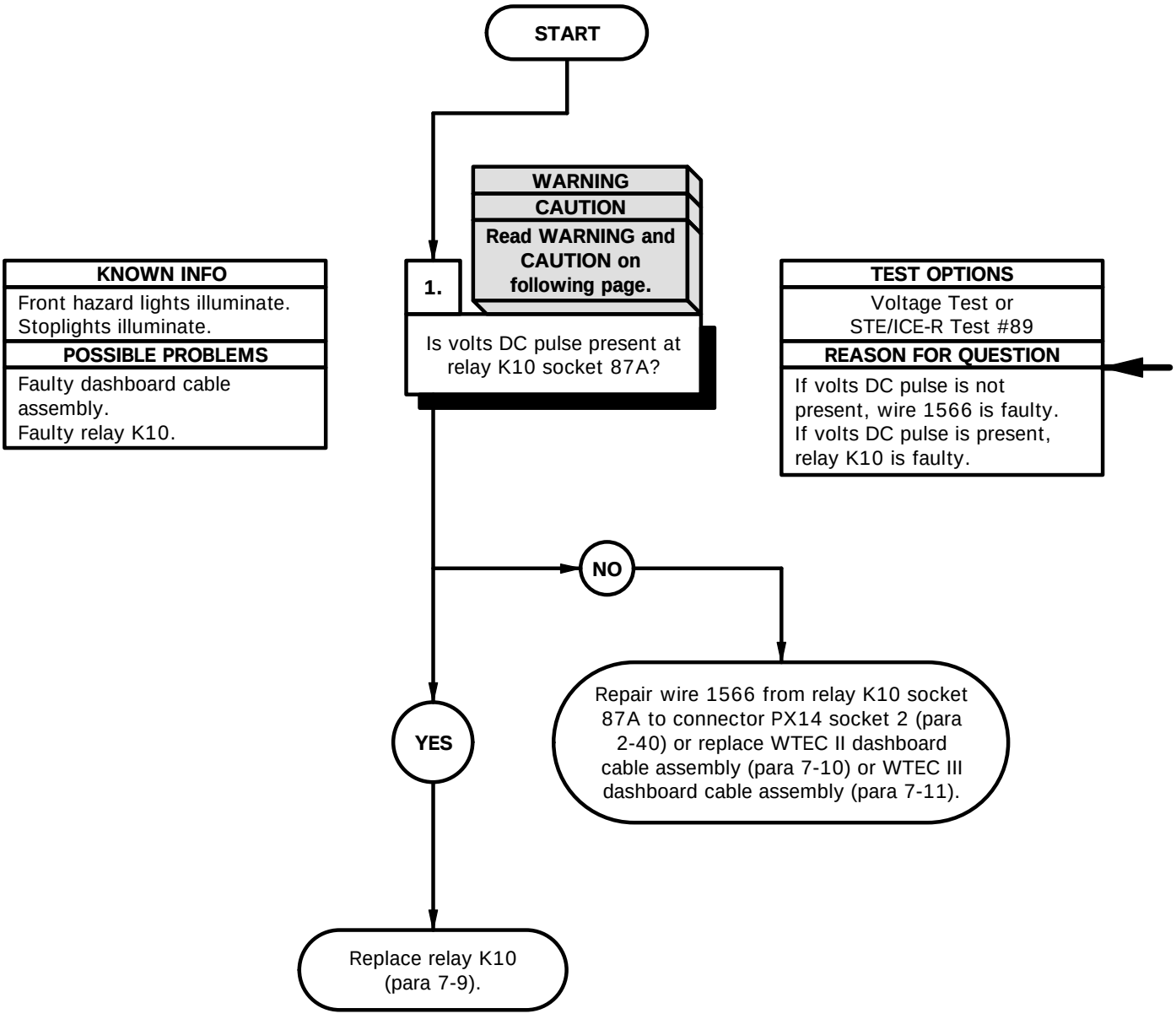
**INITAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

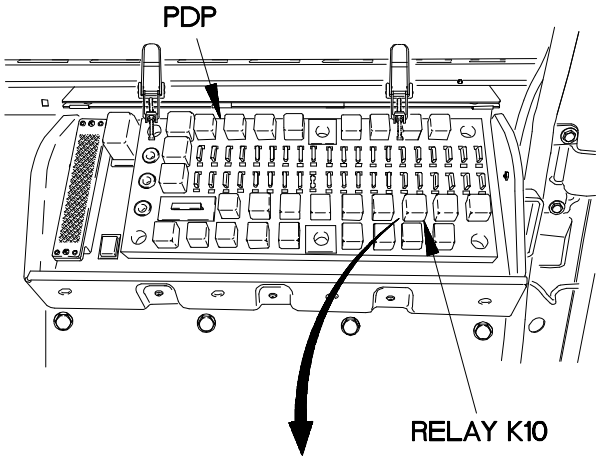
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

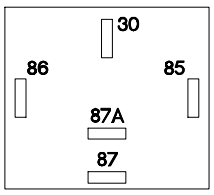
**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove relay K10 from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to PDP, socket 87A, where relay K10 was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Position hazard lights switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If volts DC pulse is not present, Repair wire 1566 from relay K10 socket 87A to connector PX14 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If volts DC is present, replace relay K10 (para 7-9).
(10) Position hazard lights switch to off (TM 9-2320-366-10-1).
(11) Position main light switch to OFF (TM 9-2320-366-10-1).
(12) Install relay K10 in PDP.
(13) Install PDP cover (para 16-2).




RELAY K10 CAVITY

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## e56. FRONT AND REAR HAZARD LIGHTS DO NOT ILLUMINATE

**INITAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

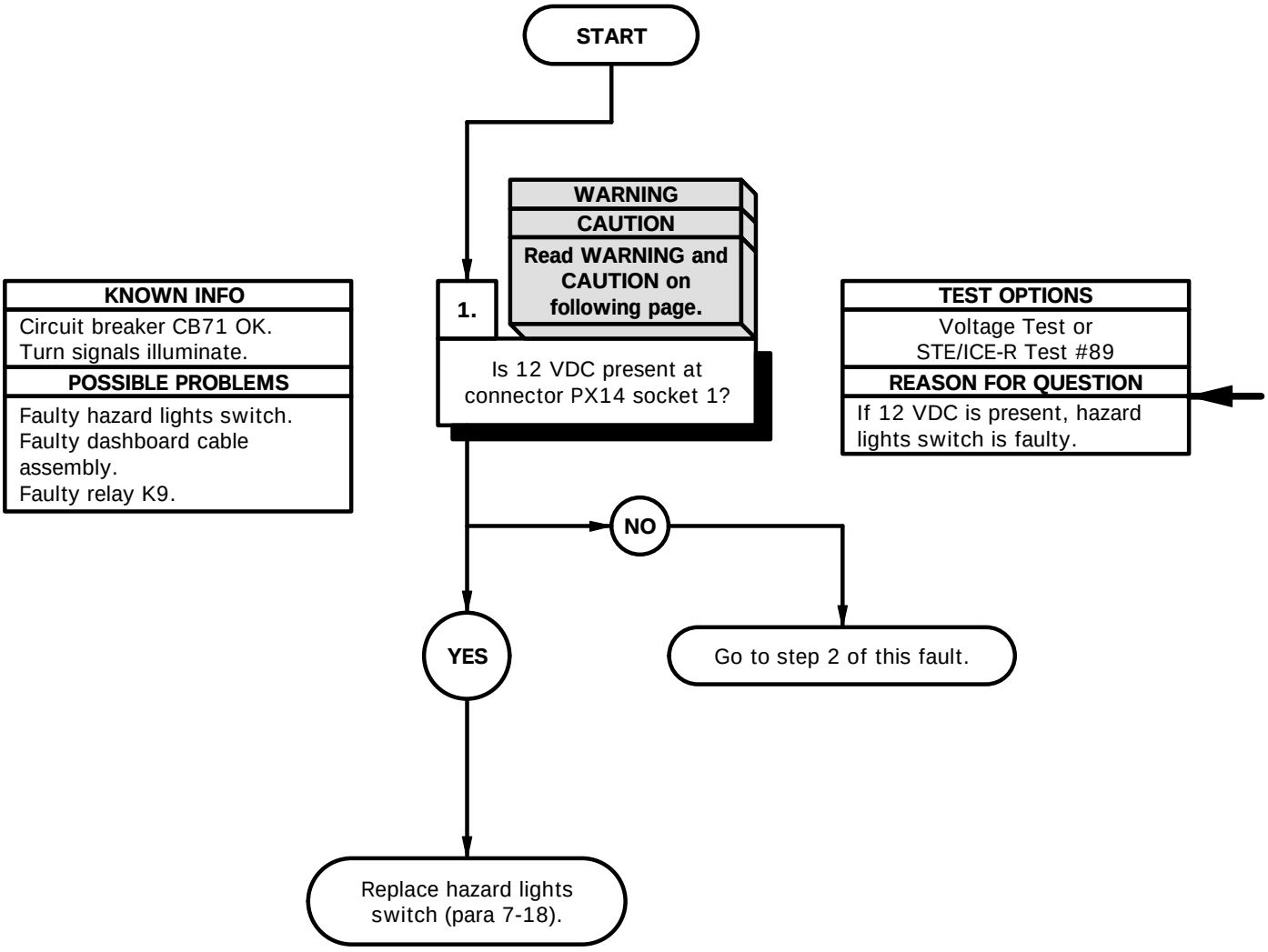
**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB71 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

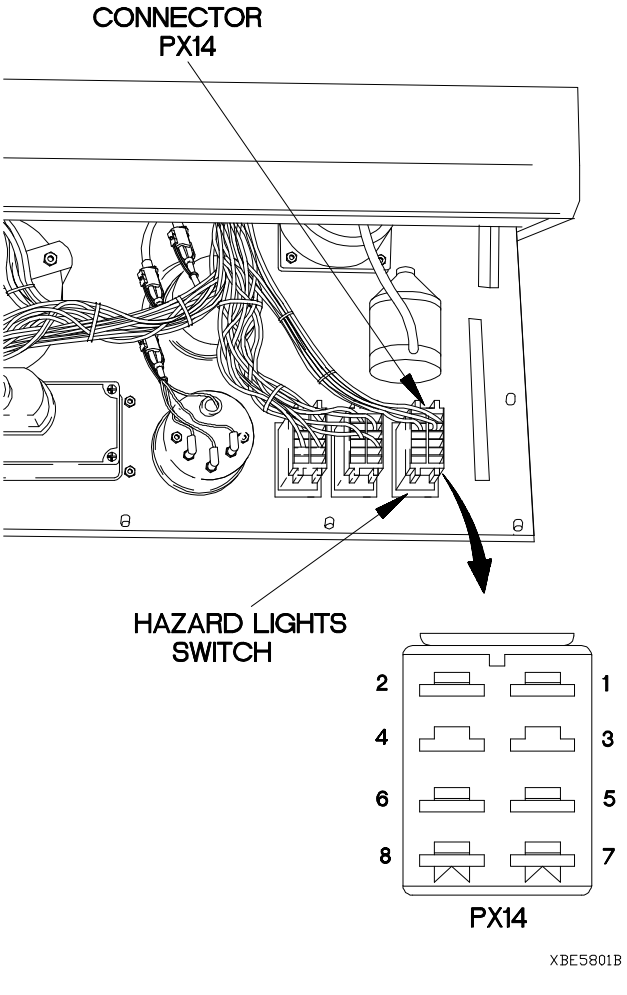
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

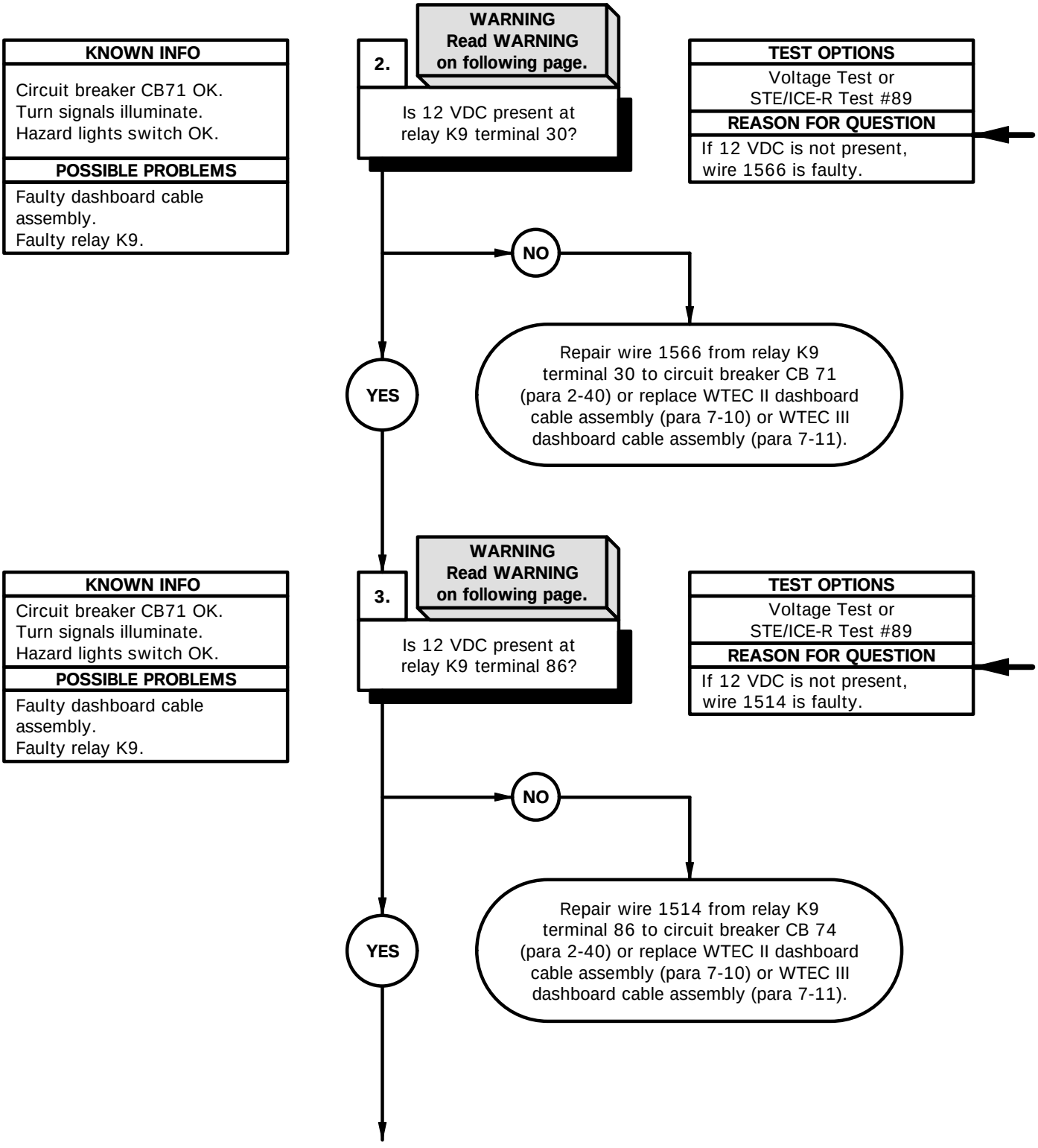
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX14 from hazard lights switch.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector PX14 socket 1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC is not present, go to step 2 of this fault.
(8) If 12 VDC is present, replace hazard lights switch (para 7-18).
(9) Position main light switch to OFF (TM 9-2320-365-10).



## e56. FRONT AND REAR HAZARD LIGHTS DO NOT ILLUMINATE (CONT)

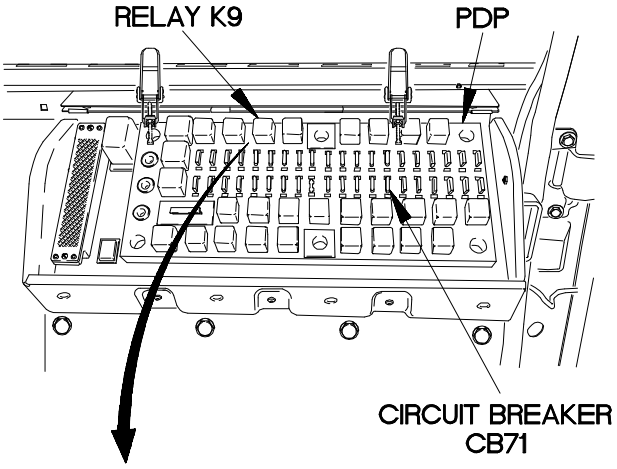


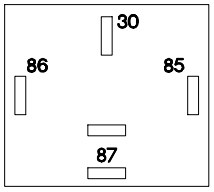
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove circuit breaker CB71 from PDP.
(3) Remove relay K9 from PDP.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to PDP, terminal 30, where relay K9 was removed.
(6) Connect negative (-) probe of multimeter to ground.
(7) Install circuit breaker CB71 in PDP and and note reading on multimeter.
(8) If 12 VDC is not present, repair wire 1566 from relay K9 terminal 30 to circuit breaker CB 71 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




RELAY K9 CAVITY

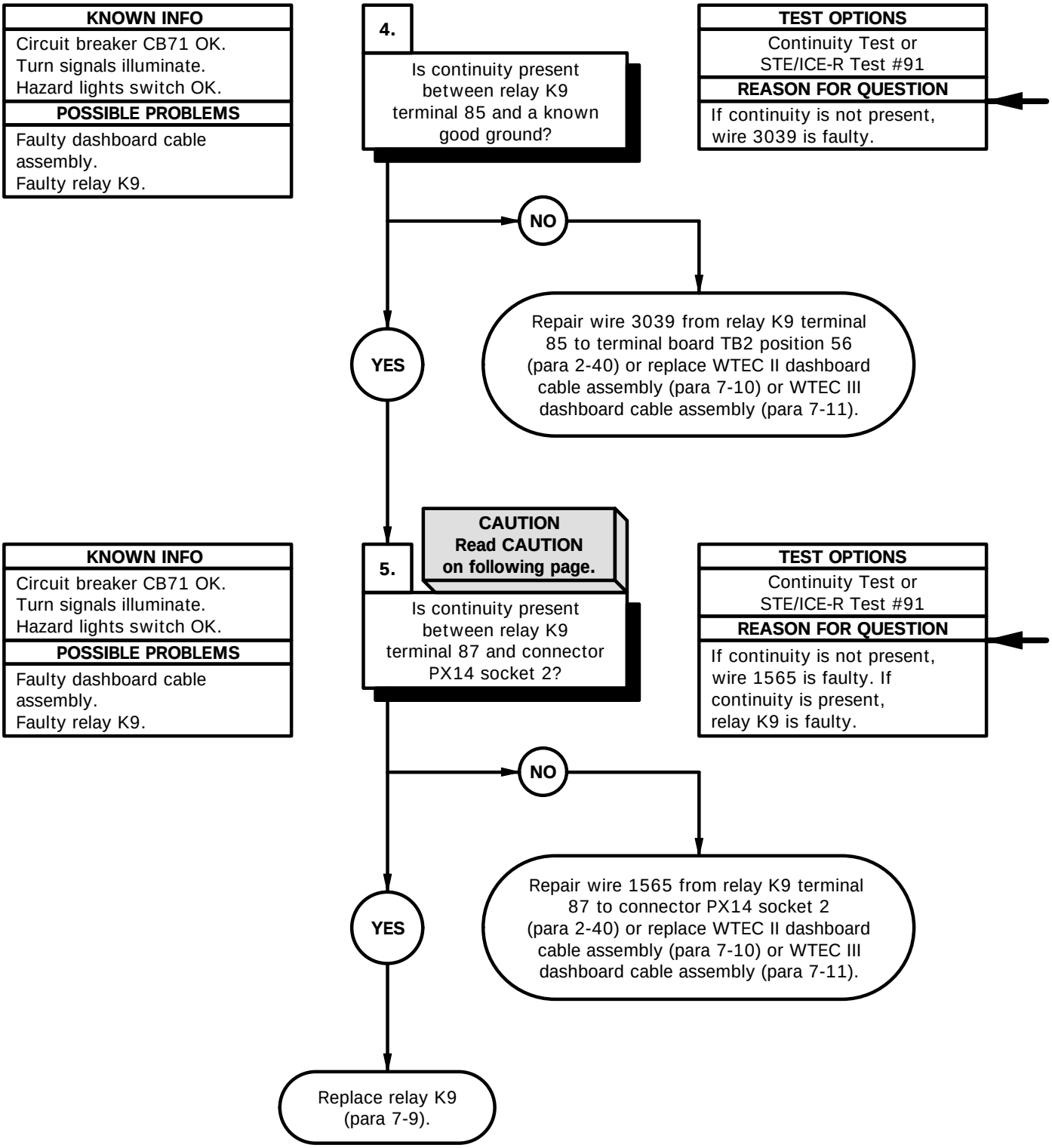
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**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to PDP, terminal 86, where relay K9 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and not reading on multimeter.
(5) If 12 VDC is not present, repair wire 1514 from relay K9 terminal 86 to circuit breaker CB74 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).

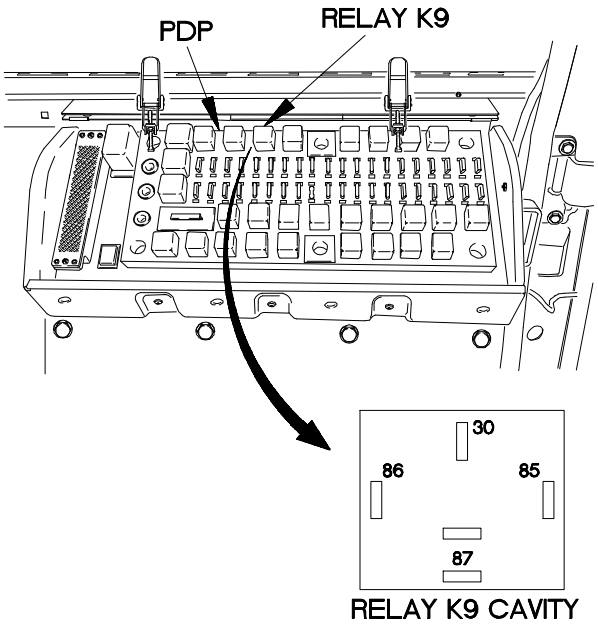
**All data on pages 2-686 and 2-687 deleted.**

## e56. FRONT AND REAR HAZARD LIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K9 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 1565 from relay K9 terminal 85 to terminal board TB2 position 56 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

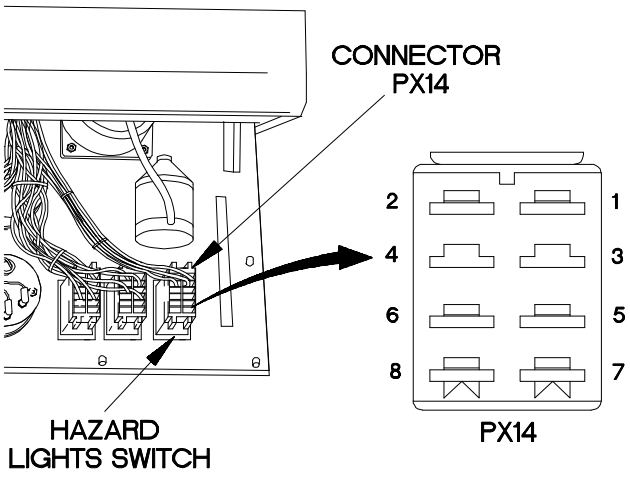



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 87, where relay K9 was removed.
(3) Connect negative (-) probe of multimeter to connector PX14 socket 2.
(4) If continuity is not present, repair wire 1565 from relay K9 terminal 87 to connector PX14 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K9 (para 7-9).
(6) Connect connector PX14 to hazard lights switch.
(7) Install relay K9 in PDP.
(8) Install PDP cover (para 16-2).
(9) Install instrument panel assembly (para 7-15).



**e57. FRONT AND REAR TURN SIGNALS DO NOT OPERATE**

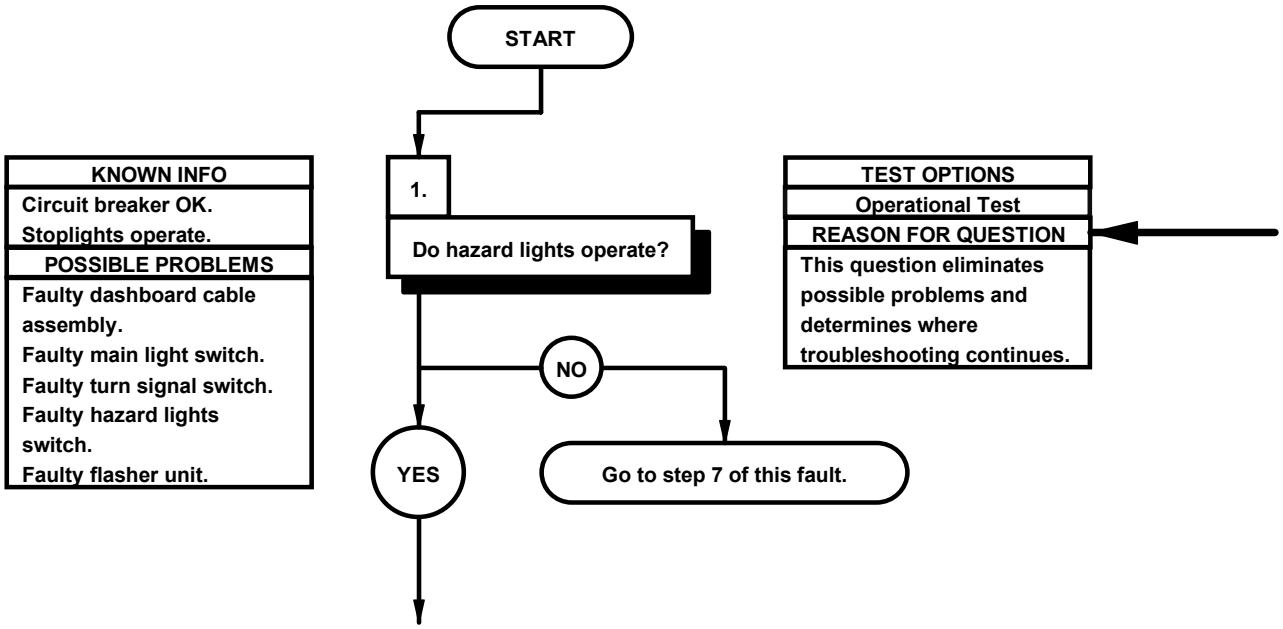
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

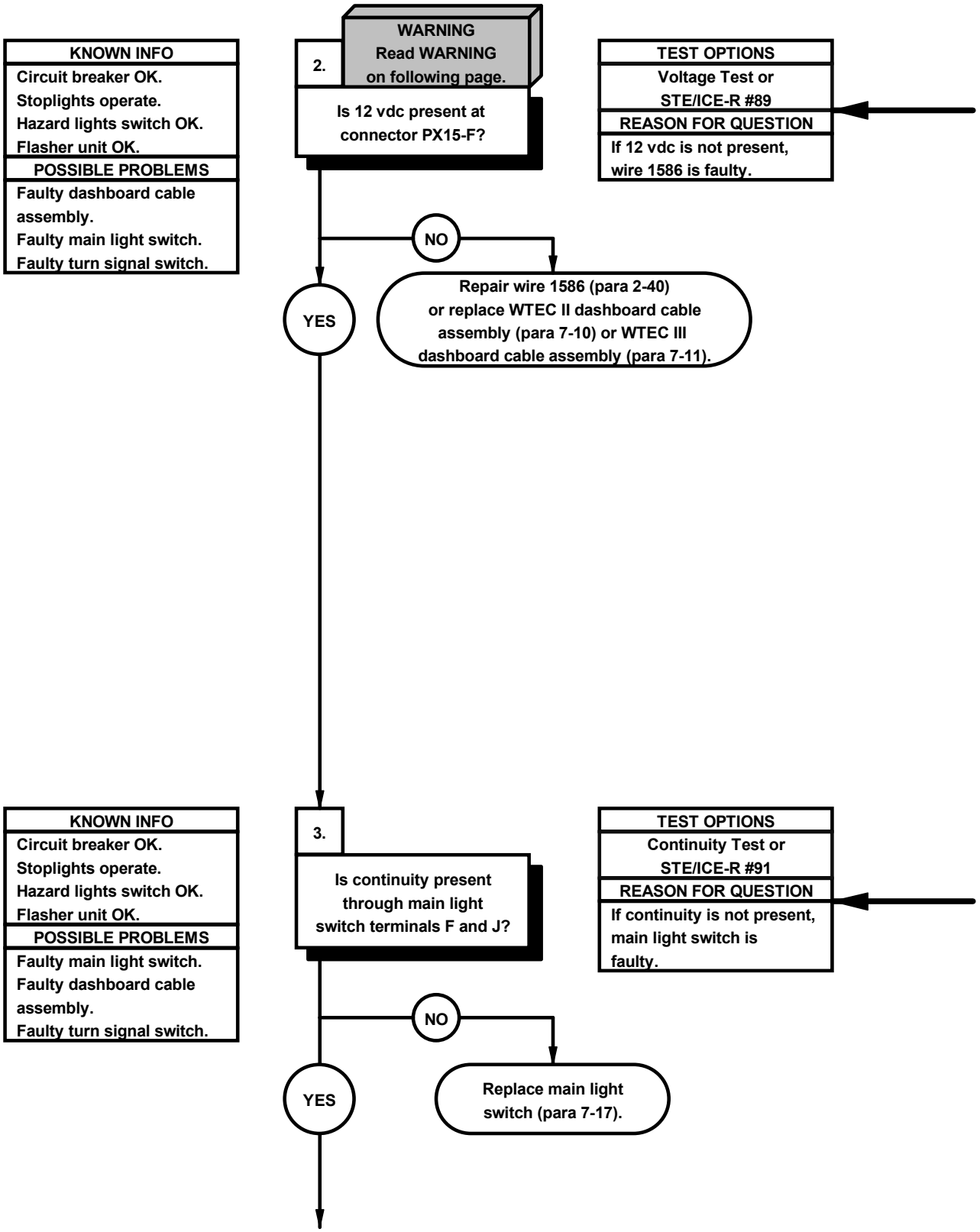
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



| OPERATIONAL TEST |
| --- |
| (1) Position main light switch to STOPLIGHT (TM 9-2320-365-10).<br>(2) Position hazard lights switch to on (TM 9-2320-365-10).<br>(3) Observe hazard lights.<br>(4) If hazard lights do not operate, go to step 7 of this fault.<br>(5) Position hazard lights switch to off (TM 9-2320-365-10).<br>(6) Position main light switch to OFF (TM 9-2320-365-10). |

## e57. FRONT AND REAR TURN SIGNALS DO NOT OPERATE (CONT)

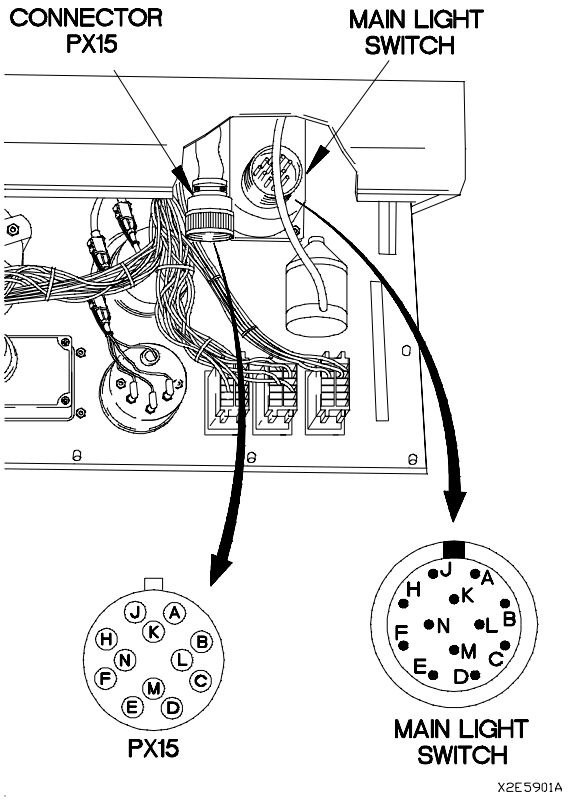


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

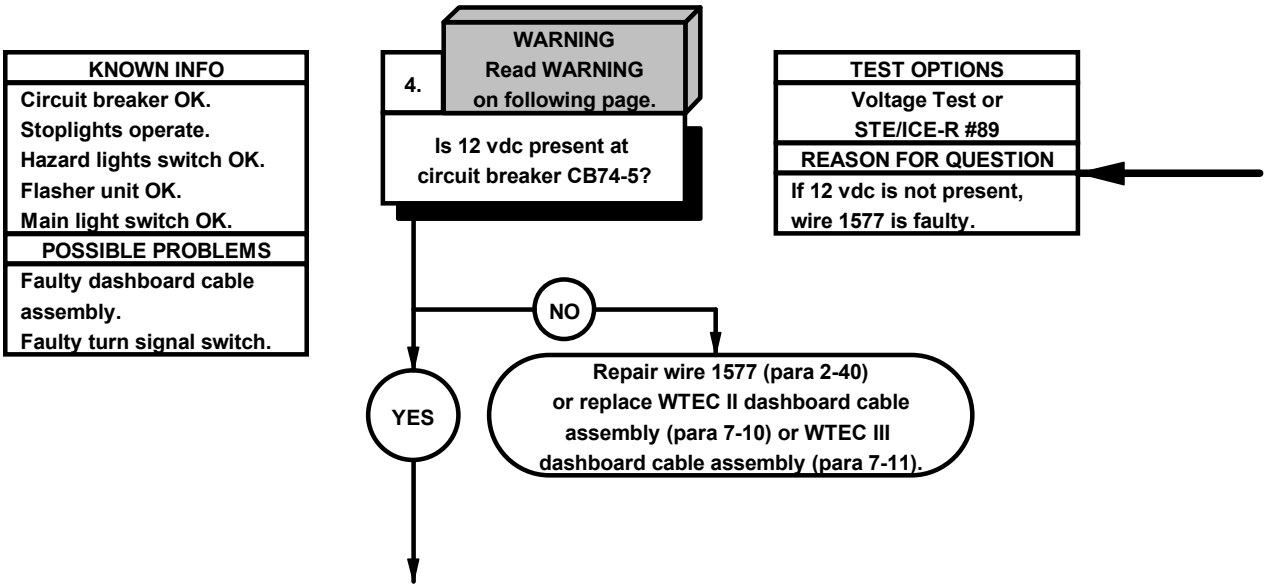
(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX15 from main light switch.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector PX15-F.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If 12 vdc is not present, repair wire 1586 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




**CONTINUITY TEST**

(1) Remove main light switch (para 7-17).
(2) Set multimeter to ohms.
(3) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(4) Connect positive (+) probe of multimeter to main light switch terminal F.
(5) Connect negative (-) probe of multimeter to main light switch terminal J and note reading on multimeter.
(6) If continuity is not present, replace main light switch (para 7-17).
(7) Install main light switch (para 7-17).

## e57. FRONT AND REAR TURN SIGNALS DO NOT OPERATE (CONT)

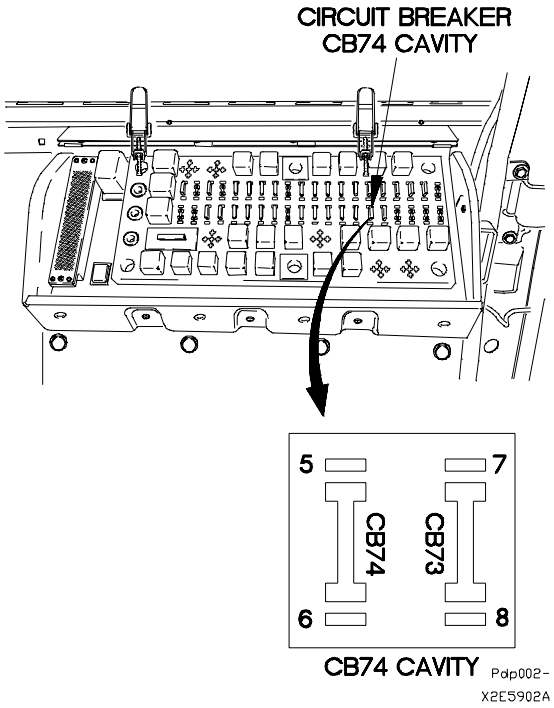


**WARNING**

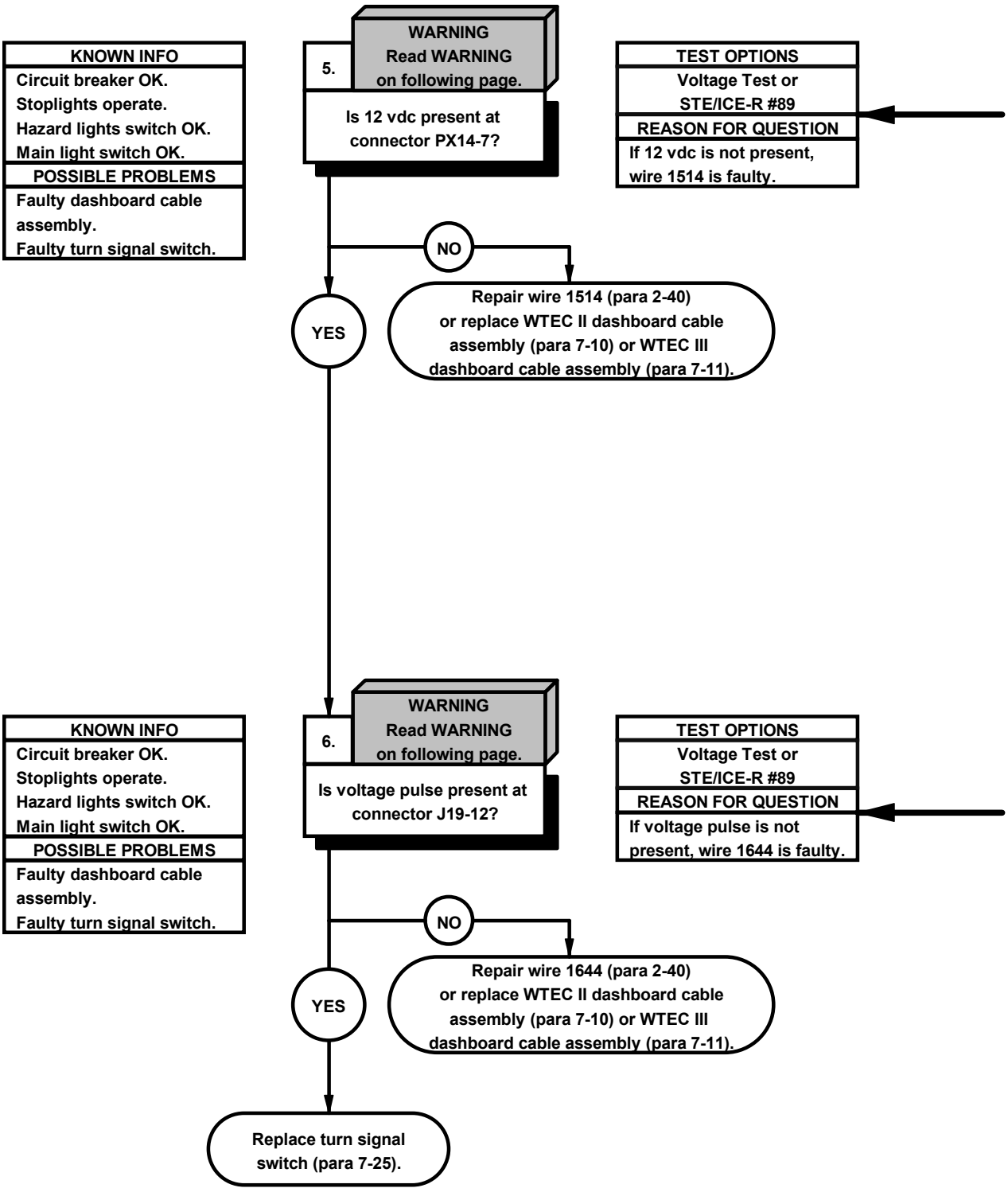
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Remove PDP cover (para 16-2).**
**(2) Remove circuit breaker CB74 from PDP.**
**(3) Set multimeter to volts dc.**
**(4) Connect positive (+) probe of multimeter to PDP, terminal 5, where circuit breaker CB74 was removed.**
**(5) Connect negative (-) probe of multimeter to ground.**
**(6) Position main light switch to STOPLIGHT (TM 9-2320-365-10) and note reading on multimeter.**
**(7) If 12 vdc is not present, repair wire 1577 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).**
**(8) Position main light switch to OFF (TM 9-2320-365-10).**
**(9) Install circuit breaker CB74 in PDP.**
**(10) Install PDP cover (para 16-2).**



## e57. FRONT AND REAR TURN SIGNALS DO NOT OPERATE (CONT)

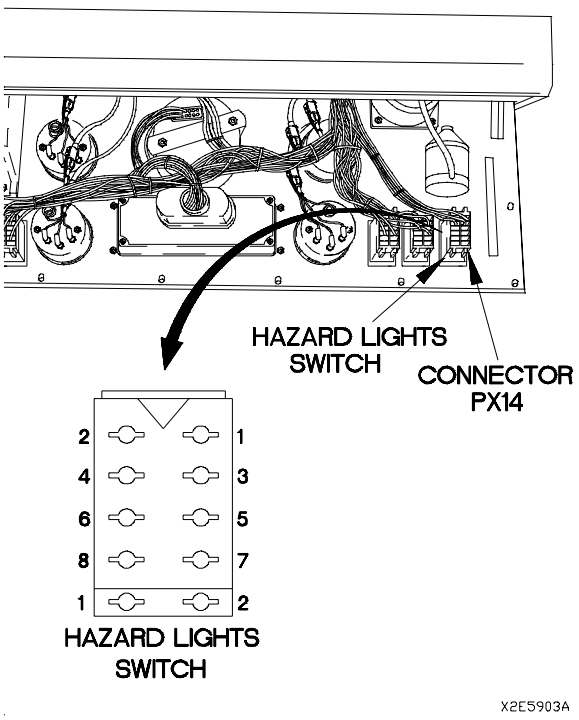


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Disconnect connector PX14 from hazard lights switch.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to connector PX14-7.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position main light switch to STOPLIGHT (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If 12 vdc is not present, repair wire 1514 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).**
**(7) Position main light switch to OFF (TM 9-2320-365-10).**
**(8) Connect connector PX14 to hazard light switch.**



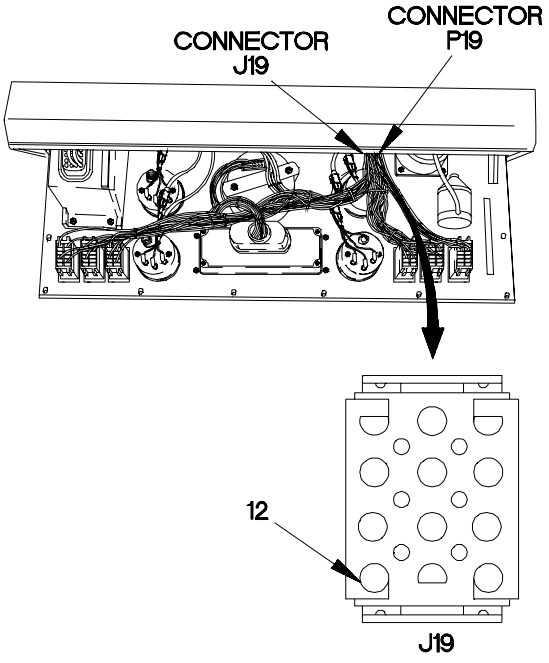

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**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

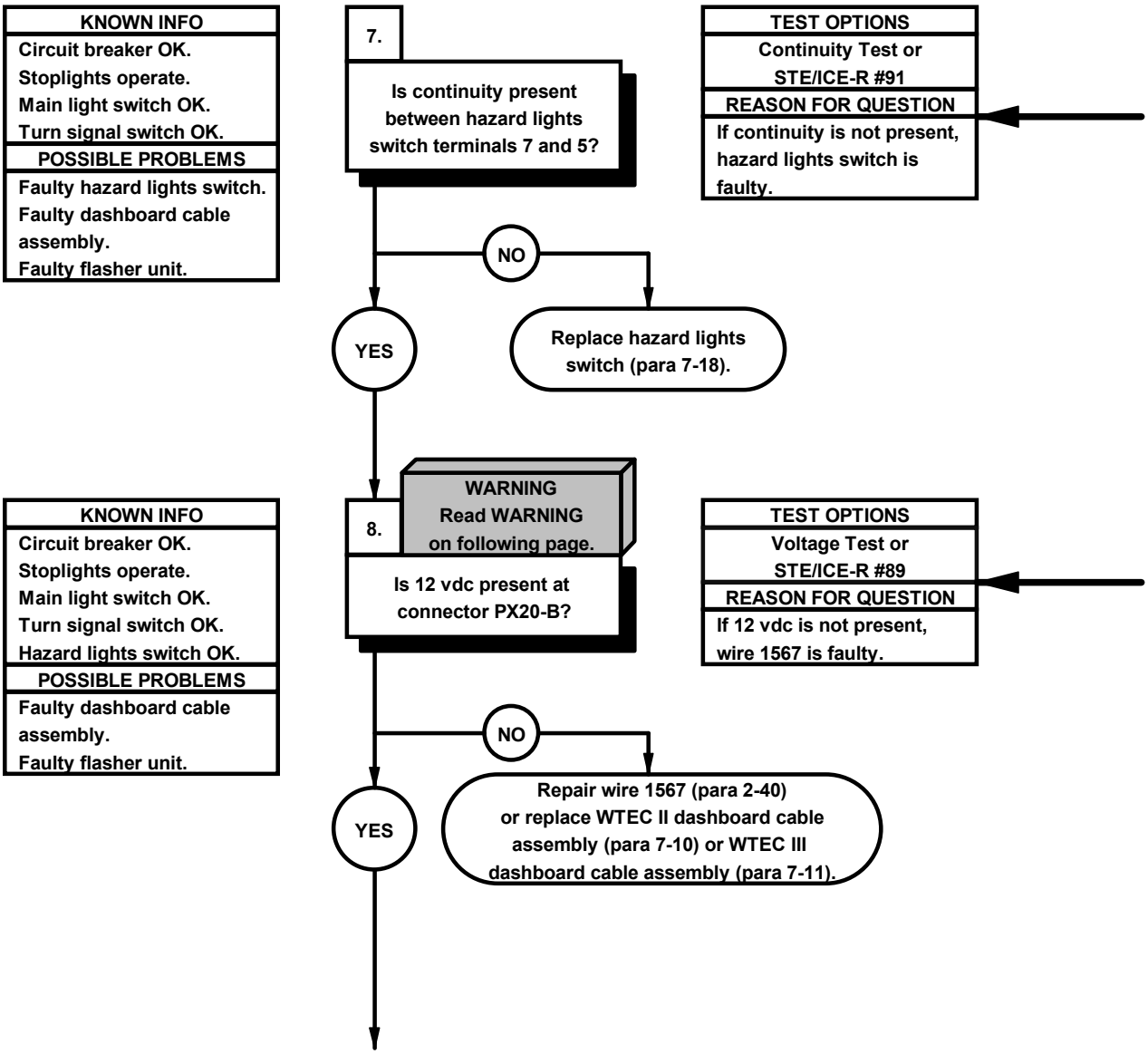
**VOLTAGE TEST**

**(1) Disconnect connector P19 from connector J19.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to connector J19-12.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position main light switch to STOPLIGHT (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If voltage pulse is not present, repair wire 1644 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).**
**(7) If voltage pulse is present, replace turn signal switch (para 7-25).**
**(8) Position main light switch to OFF (TM 9-2320-365-10).**
**(9) Connect connector P19 to connector J19.**
**(10) Install instrument panel assembly (para 7-15).**



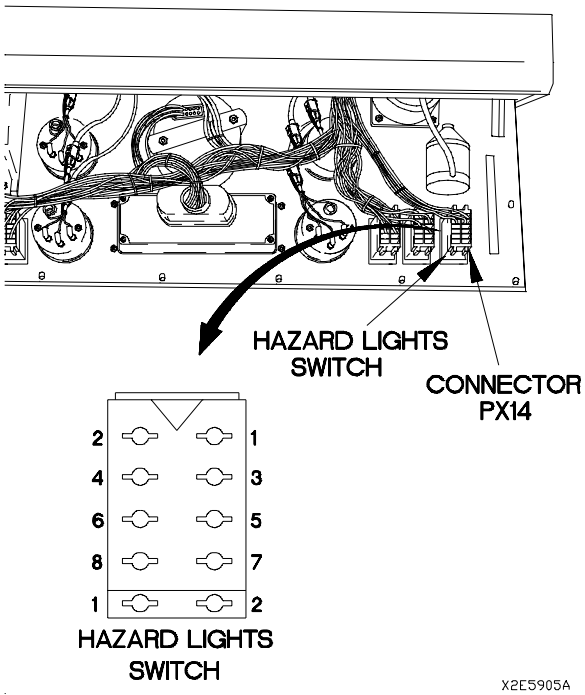

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## e57. FRONT AND REAR TURN SIGNALS DO NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX14 from hazard lights switch.
(3) Set multimeter to volts dc.
(4) Position hazard lights switch to on (TM 9-2320-365-10).
(5) Connect positive (+) probe of multimeter to hazard lights switch terminal 7.
(6) Connect negative (-) probe of multimeter to hazard lights switch terminal 5 and note reading on multimeter.
(7) If continuity is not present, replace hazard lights switch (para 7-18).
(8) Connect connector PX14 to hazard lights switch.

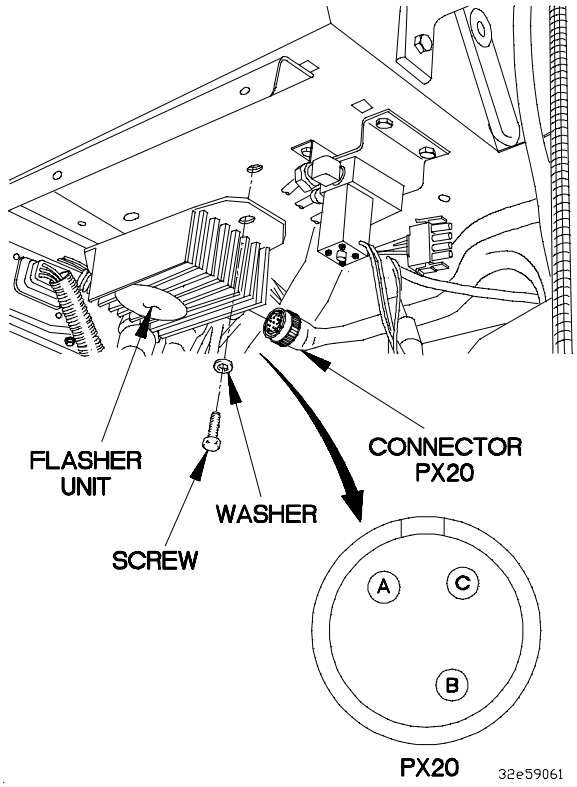



**WARNING**

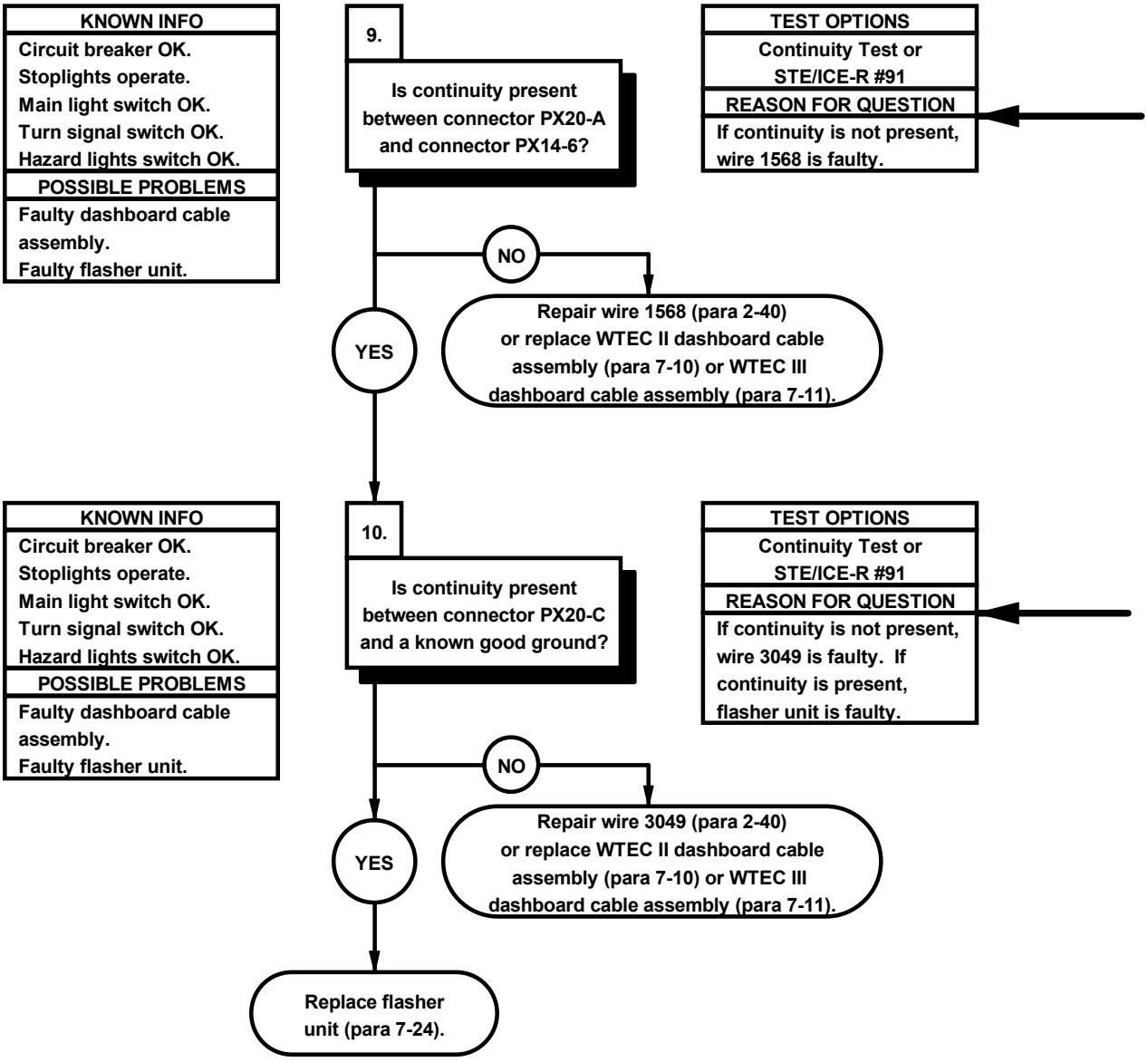
Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Remove kick panel (para 16-3).
(2) Remove two screws, washers, and flasher unit from dashboard.
(3) Disconnect connector PX20 from flasher unit.
(4) Position hazard light switch to off (TM 9-2320-365-10).
(5) Set multimeter to volts dc.
(6) Connect positive (+) probe of multimeter to connector PX20-B.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position main light switch to STOPLIGHT (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 vdc is not present, repair wire 1567 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) Position main light switch to OFF (TM 9-2320-365-10).

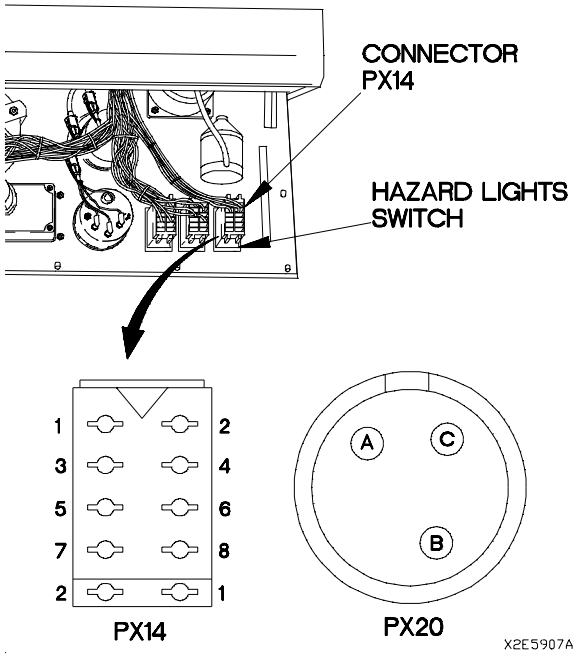


## e57. FRONT AND REAR TURN SIGNALS DO NOT OPERATE (CONT)



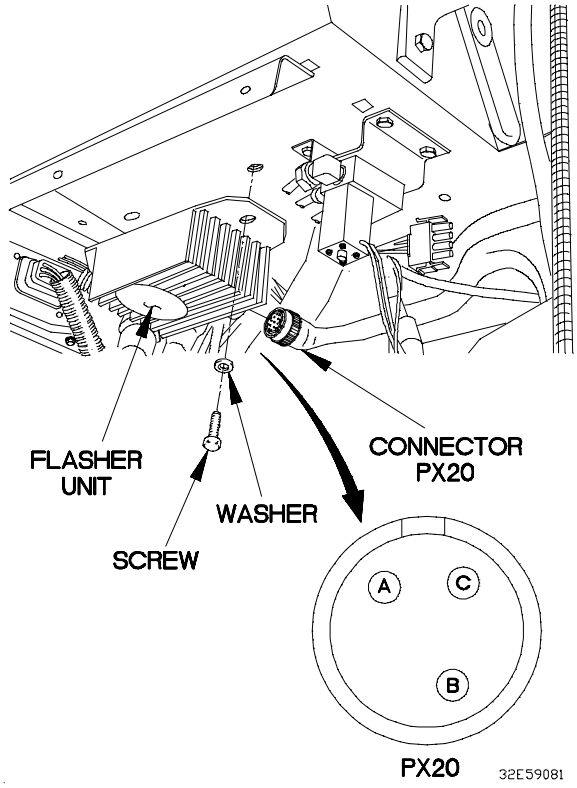
**CONTINUITY TEST**

(1) Disconnect connector PX14 from hazard lights switch.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX20-A.
(4) Connect negative (-) probe of multimeter to connector PX14-6 and note reading on multimeter.
(5) If continuity is not present, repair wire 1568 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect connector PX14 to hazard lights switch.
(7) Install instrument panel assembly (para 7-15).




**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX20-C.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3049 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace flasher unit (para 7-24).
(6) Connect connector PX20 to flasher unit.
(7) Install flasher unit on dashboard with two washers and screws.
(8) Install kick panel (para 16-3).



**e58. LEFT OR RIGHT FRONT TURN SIGNAL DOES NOT OPERATE**

**INITIAL SETUP**

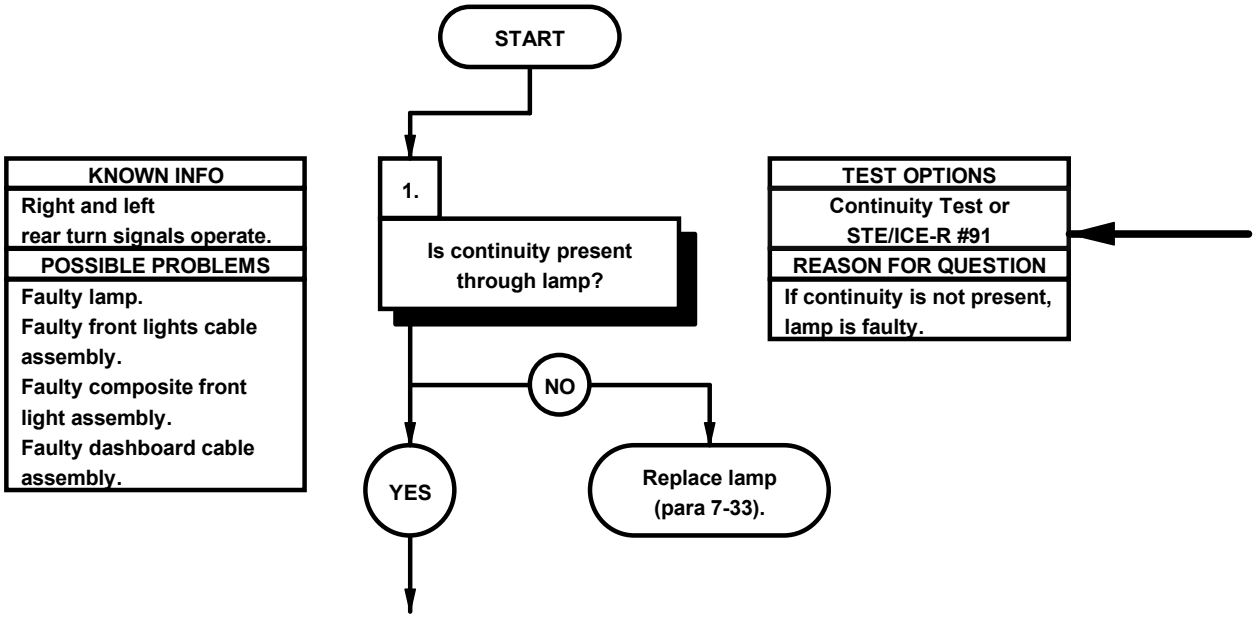
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Packing, Preformed (Item 170, Appendix G)
Lockwasher (Item 92, Appendix G)

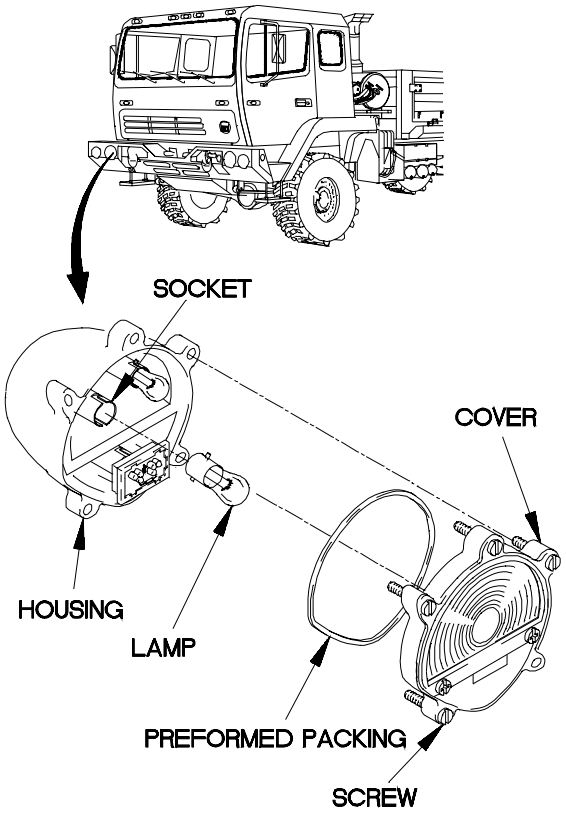
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

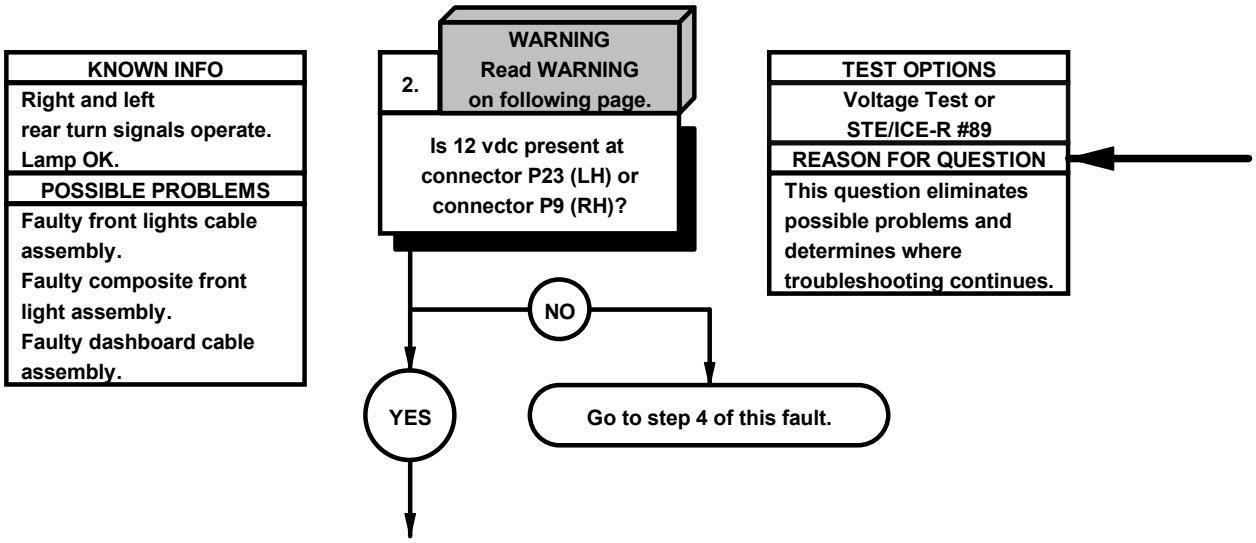


**CONTINUITY TEST**

(1) Loosen five screws on cover.
(2) Remove cover and preformed packing from housing. Discard preformed packing.
(3) Remove lamp from socket.
(4) Set multimeter to ohms.
(5) Check continuity through lamp and note reading on multimeter.
(6) If continuity is not present, replace lamp (para 7-33).
(7) Install turn signal lamp in socket.
(8) Install preformed packing and cover on housing with five screws.



## e58. LEFT OR RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT)

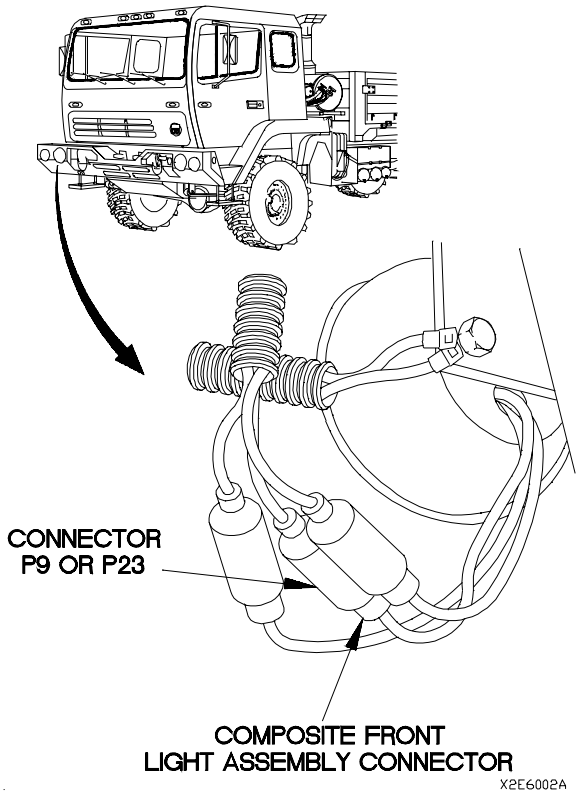


**WARNING**

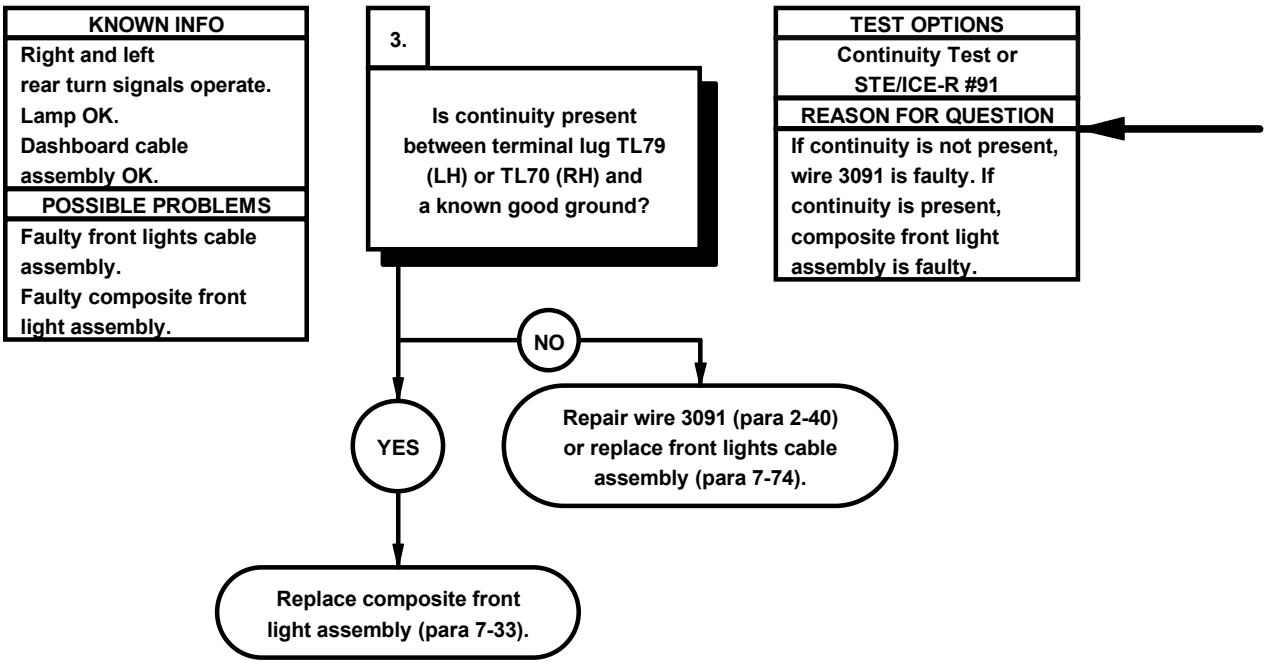
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Raise cab (TM 9-2320-365-10).**
**(2) Disconnect connector P23 (LH composite front light assembly) or P9 (RH composite front light assembly) from composite front light assembly connector.**
**(3) Lower cab (TM 9-2320-365-10).**
**(4) Connect positive (+) probe of multimeter to connector P23 (LH composite front light assembly) or P9 (RH composite front light light assembly).**
**(5) Connect negative (-) probe of multimeter to ground.**
**(6) Position main light switch to STOPLIGHT (TM 9-2320-365-10).**
**(7) Position turn signal switch to left turn or right turn position (TM 9-2320-365-10) and note reading on multimeter.**
**(8) If 12 vdc is not present, go to step 4 of this fault.**
**(9) Position turn signal switch to off (TM 9-2320-365-10).**
**(10) Position main light switch to OFF (TM 9-2320-365-10).**
**(11) Raise cab (TM 9-2320-365-10).**
**(12) Connect connector P23 (LH composite front light assembly) or P9 (RH composite front light assembly) to composite front light assembly connector.**

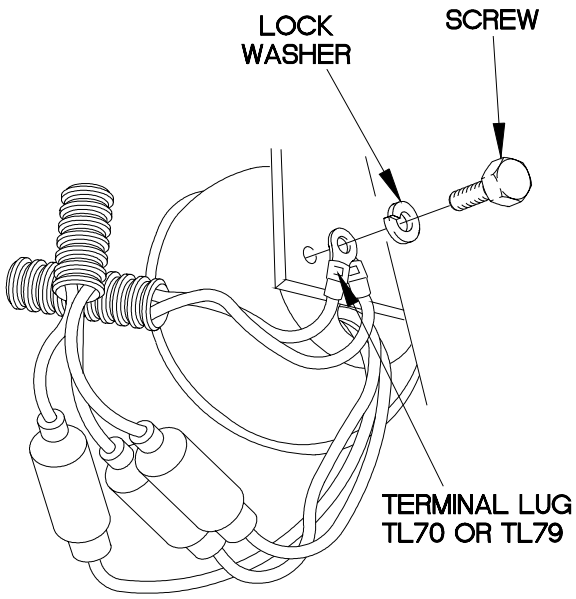


## e58. LEFT OR RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT)



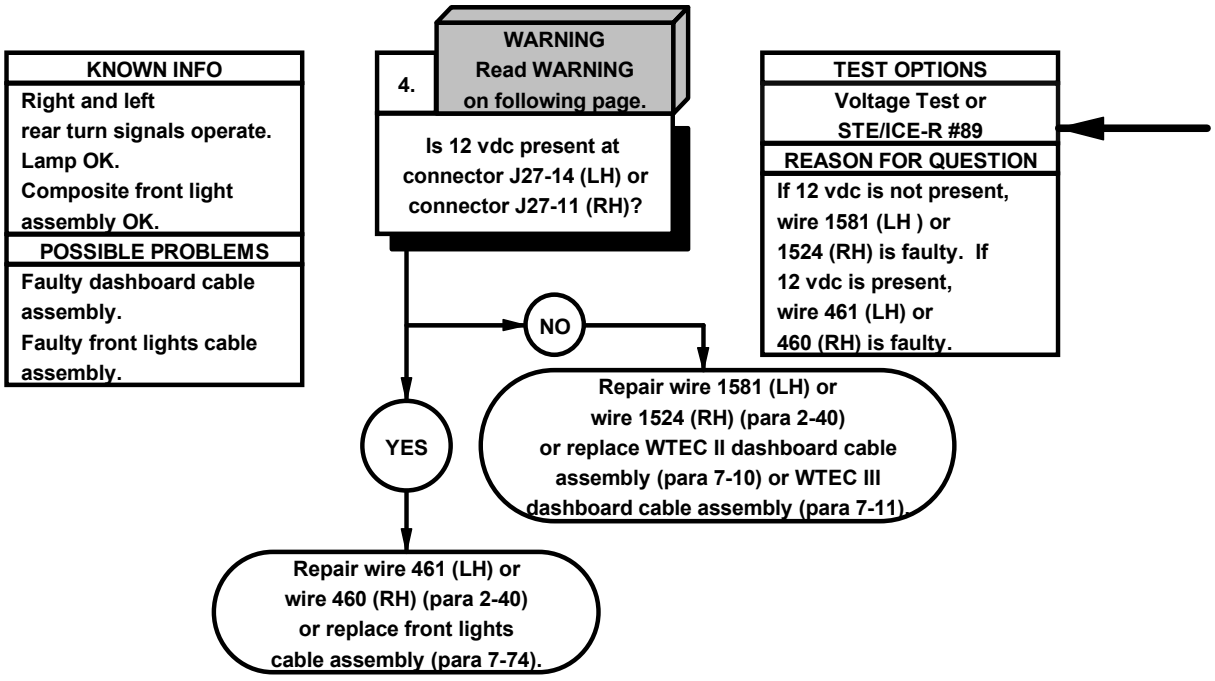
**CONTINUITY TEST**

(1) Remove screw, lockwasher, and terminal lug TL79 (LH) or TL70 (RH) from composite front light light assembly. Discard lockwasher.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL79 (LH) or TL90 (RH).
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3091 (para 2-40) or replace front lights cable assembly (para 7-74).
(6) If continuity is present, replace composite front light assembly (para 7-33).
(7) Install terminal lug TL79 (LH) or TL90 (RH), lockwasher, and screw on composite front light assembly.




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## e58. LEFT OR RIGHT FRONT TURN SIGNAL DOES NOT OPERATE (CONT)

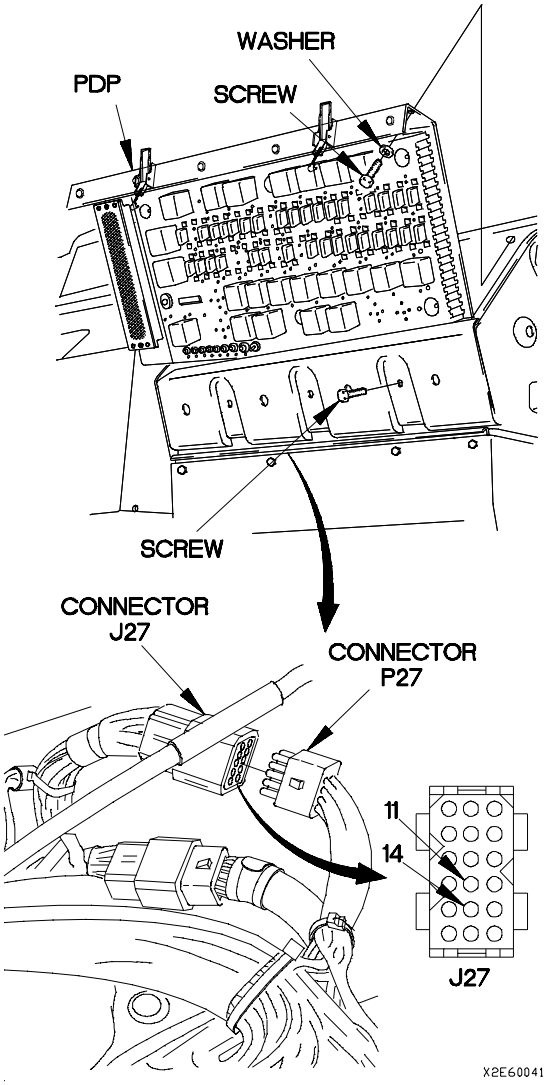


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J27 from connector P27.
(6) Set multimeter to volts dc.
(7) Connect positive (+) probe of multimeter to connector J27-14 (LH) or J27-11 (RH).
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(10) Position turn signal switch to up for right turn signal operation or down for left turn signal operation (TM 9-2320-365-10).
(11) If 12 vdc is not present, repair wire 1581 (LH) or wire 1524 (RH) (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(12) If 12 vdc is present, repair wire 461 (LH) or wire 460 (RH) (para 2-40) or replace front lights cable assembly (para 7-74).
(13) Position main light switch to OFF (TM 9-2320-365-10).
(14) Position turn signal switch to middle (off) (TM 9-2320-365-10).
(15) Connect connector P27 to connector J27.
(16) Install PDP on dashboard with three screws.
(17) Install three washers and screws in PDP.
(18) Install PDP cover (para 16-2).



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

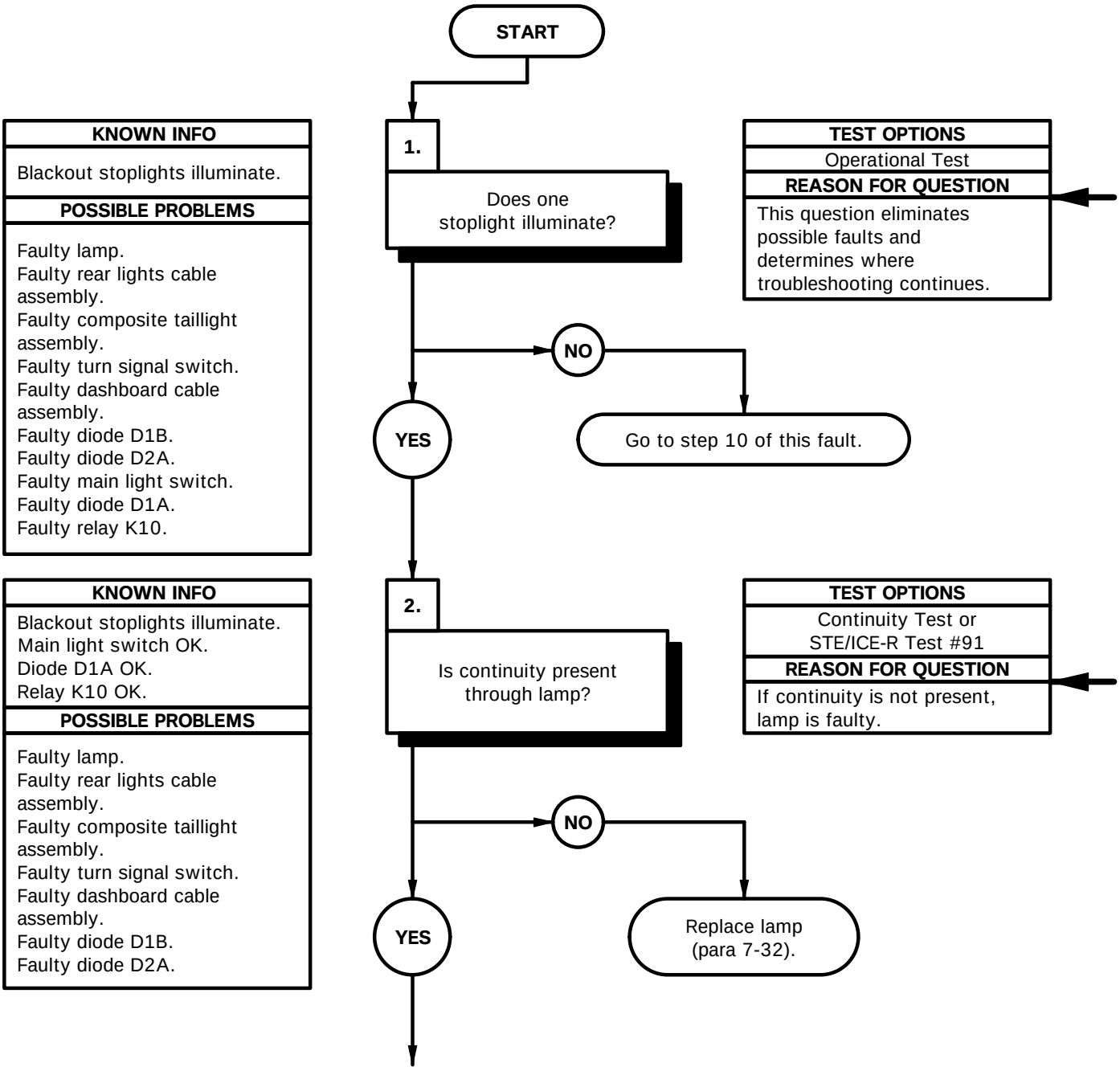
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

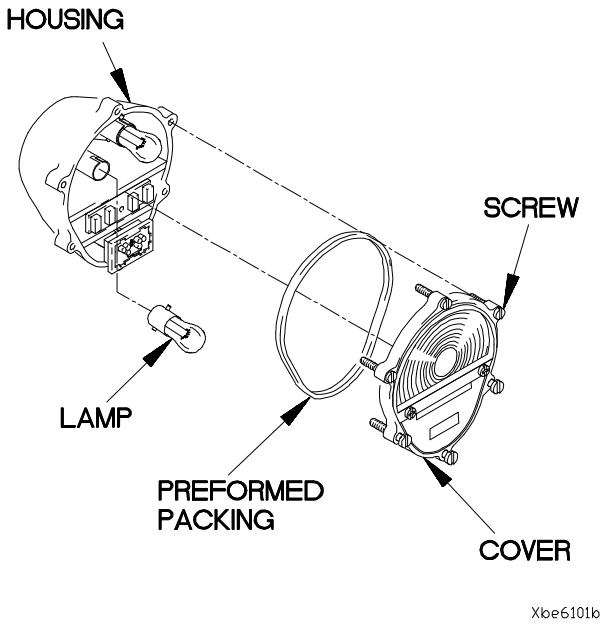
**Material/Parts**
Packing, Preformed (Item 170, Appendix G)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P



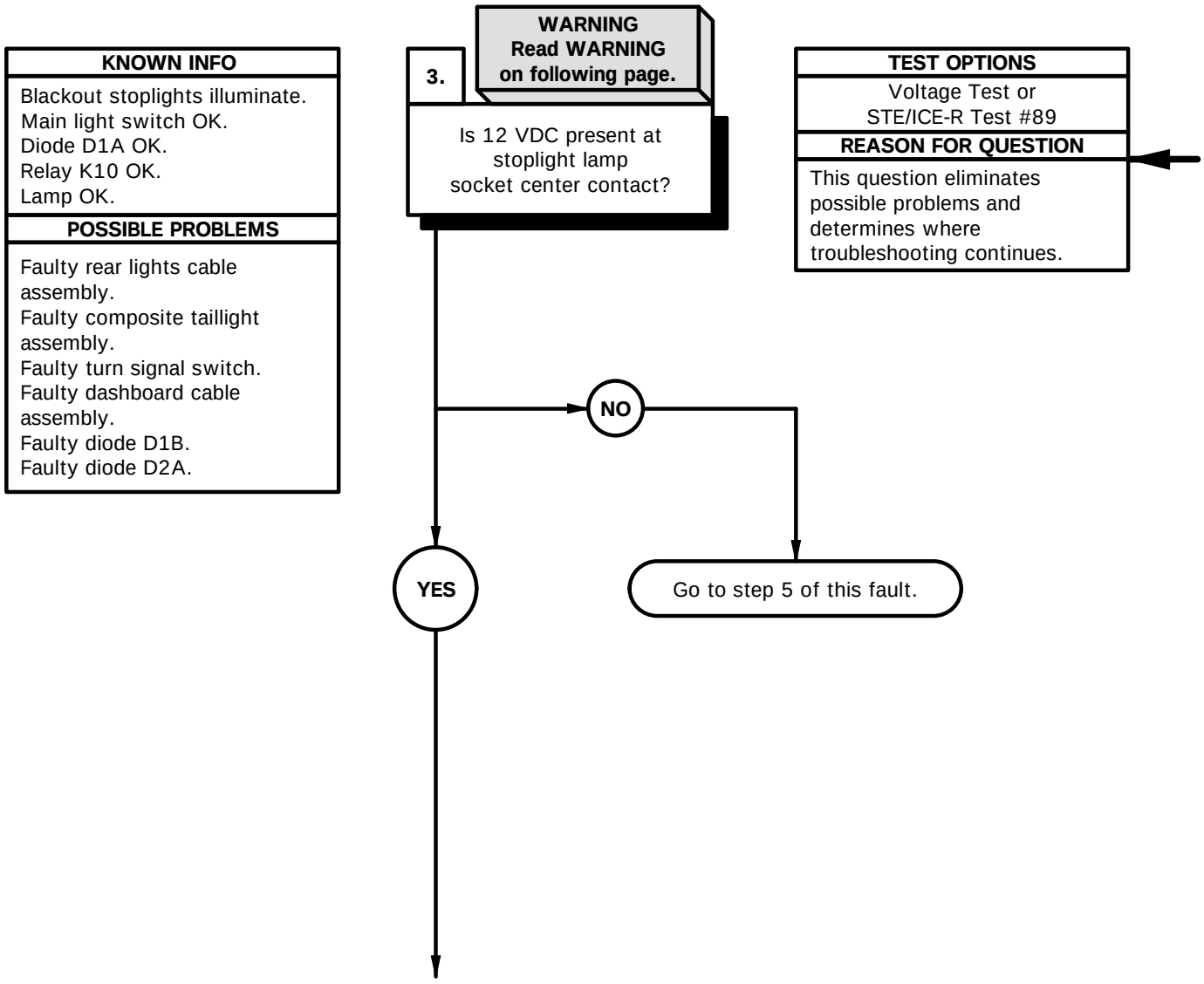
(1) Position master power switch to on (TM 9-2320-365-10).
(2) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(3) Apply brakes and observe stoplights.
(4) If both stoplights do not illuminate, go to step 5 of this fault.
(5) Position main light switch to OFF (TM 9-2320-365-10).
(6) Position master power switch to off (TM 9-2320-365-10).




**CONTINUITY TEST**

(1) Loosen six screws on composite taillight assembly cover.
(2) Remove cover and preformed packing from housing. Discard preformed packing.
(3) Remove lamp from socket.
(4) Set multimeter to ohms.
(5) Check continuity through lamp.
(6) If continuity is not present, replace lamp (para 7-32).

## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)

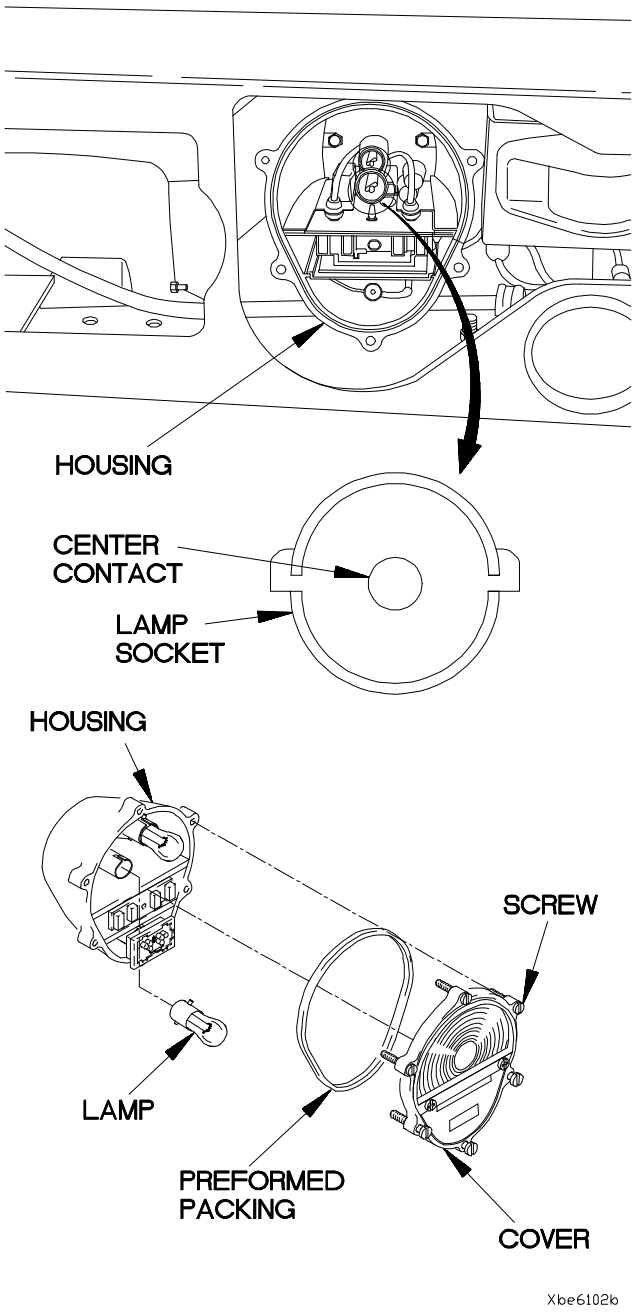


**WARNING**

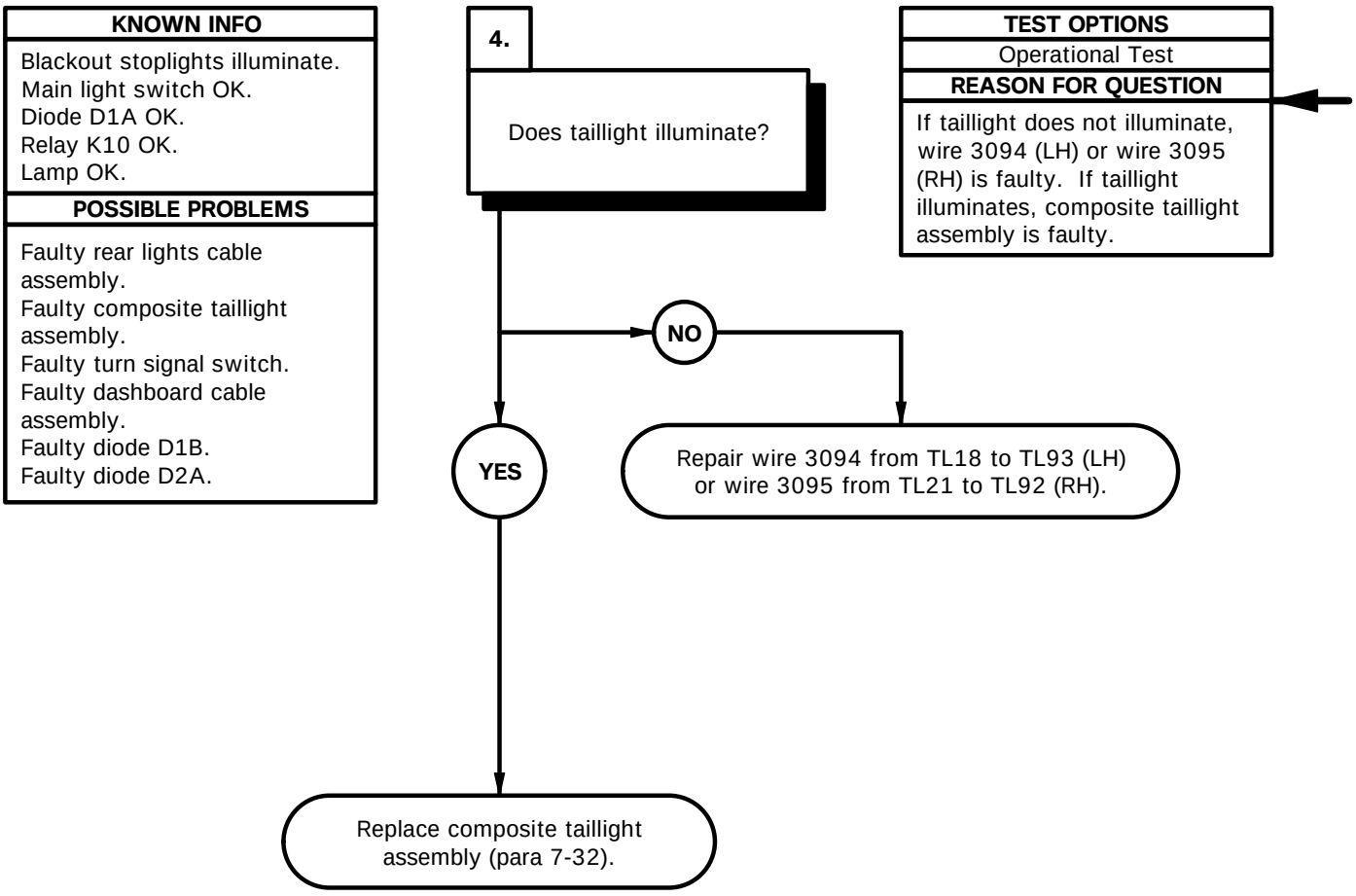
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

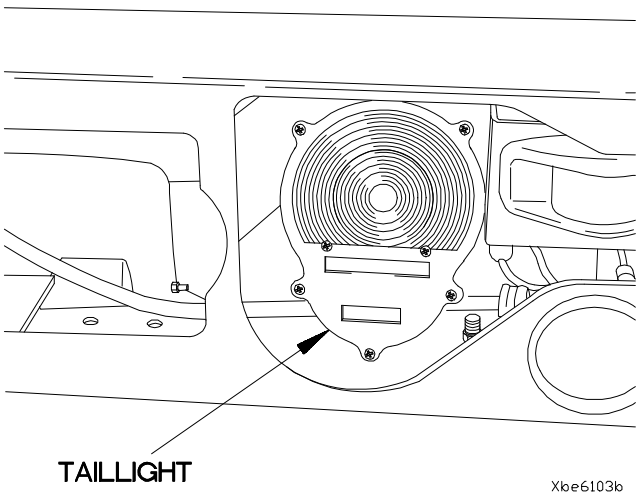
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to stoplight lamp socket center contact.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(6) Apply brakes and note reading on multimeter.
(7) If 12 VDC is not present, go to step 5 of this fault.
(8) Position master power switch to off (TM 9-2320-365-10).
(9) Position main light switch to OFF (TM 9-2320-365-10).
(10) Install lamp in socket.
(11) Install preformed packing and cover on housing with six screws.



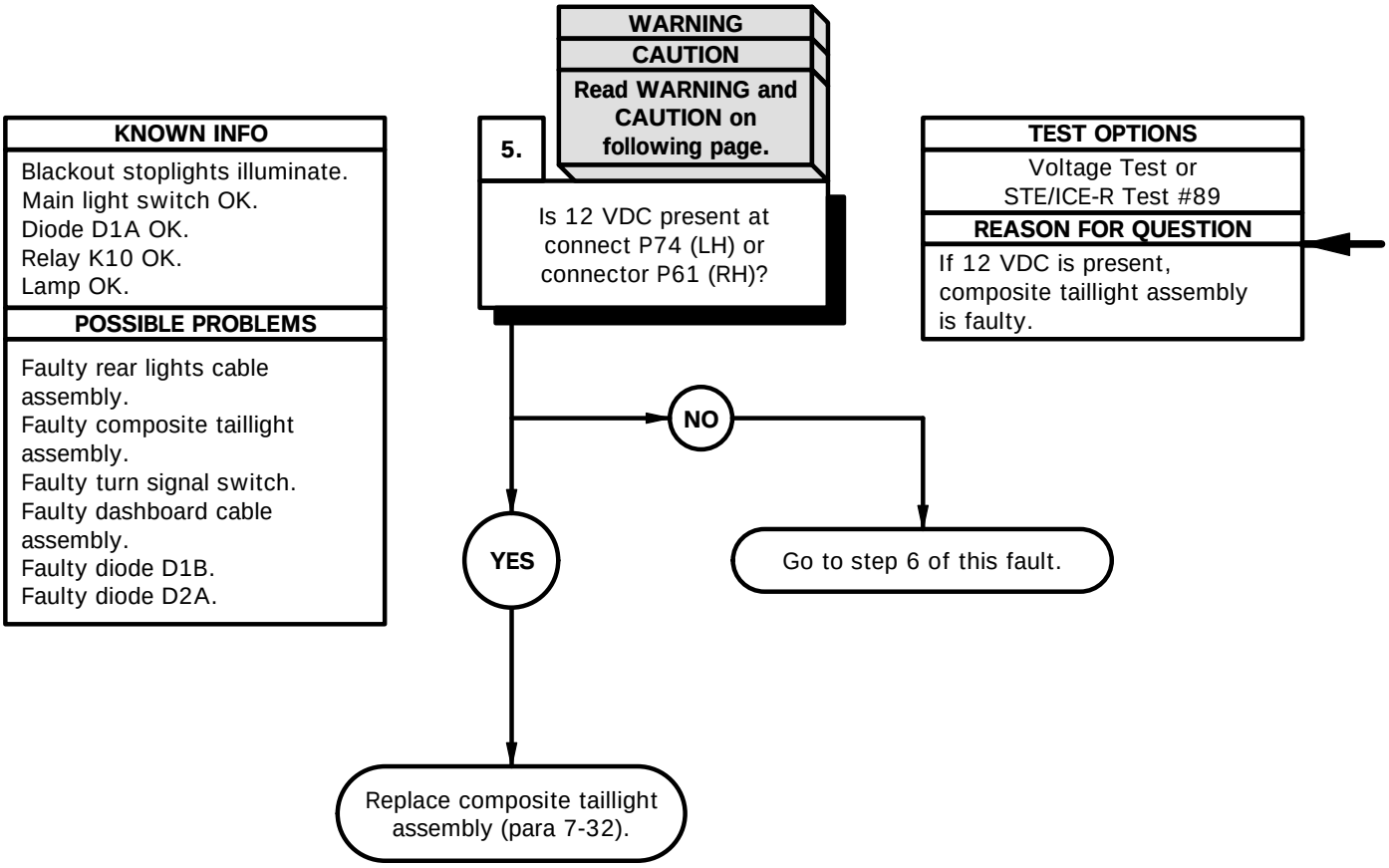
## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



(1) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(2) Observe taillight in housing with non-illuminating stoplight.
(3) If taillight does not illuminate, repair wire 3094 from TL18 to TL93 (LH) or wire 3095 from TL21 to TL92 (RH).
(4) If taillight illuminates, replace composite taillight assembly (para 7-32).
(5) Position main light switch to OFF (TM 9-2320-365-10).



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

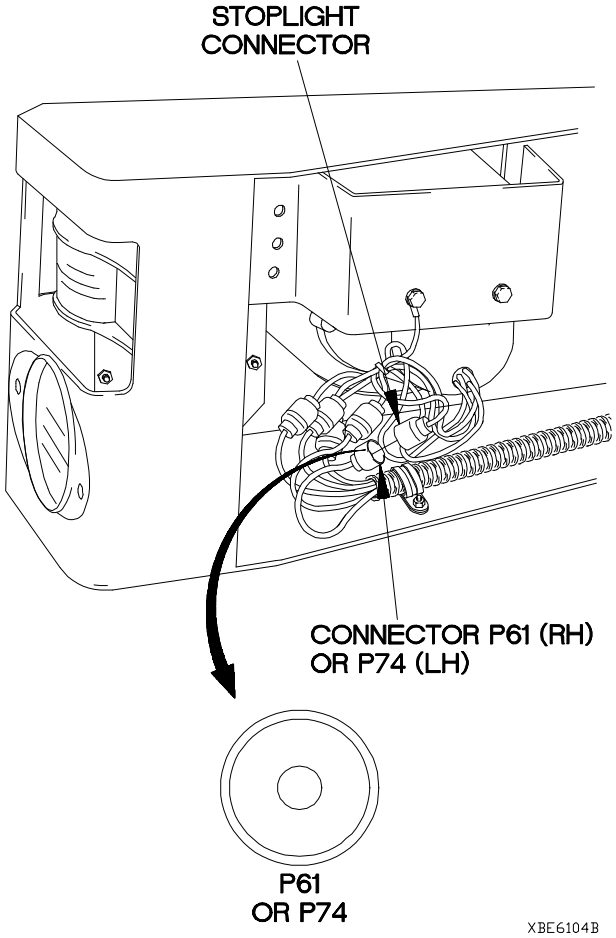
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

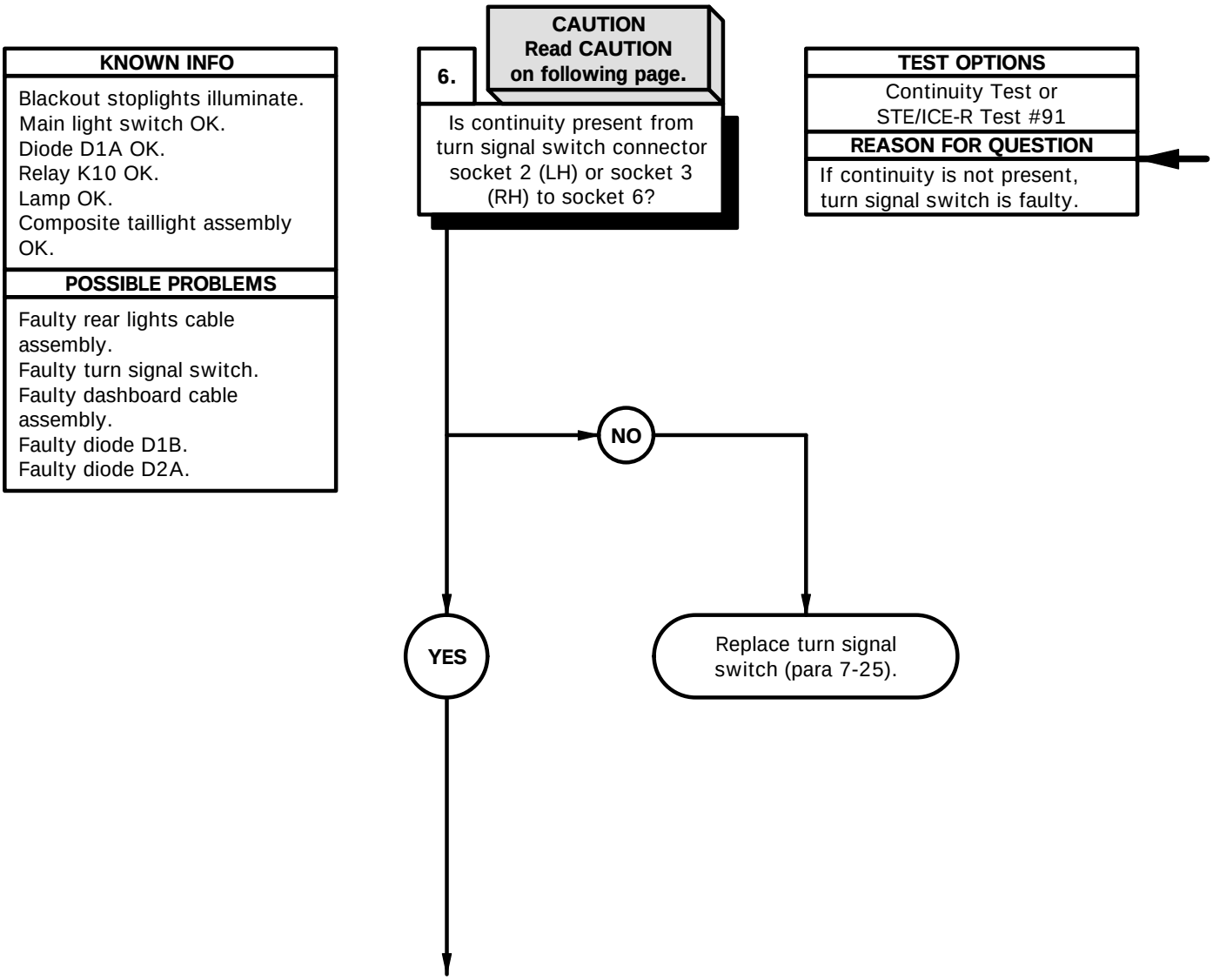
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Disconnect connector P74 (LH) or connector P61 (RH) from stoplight connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P74 or connector P61.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 12 VDC is not present, go to step 6 of this fault.
(9) If 12 VDC is present, replace composite taillight assembly (para 7-32).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Connect connector P74 or connector P61 to stoplight connector.



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

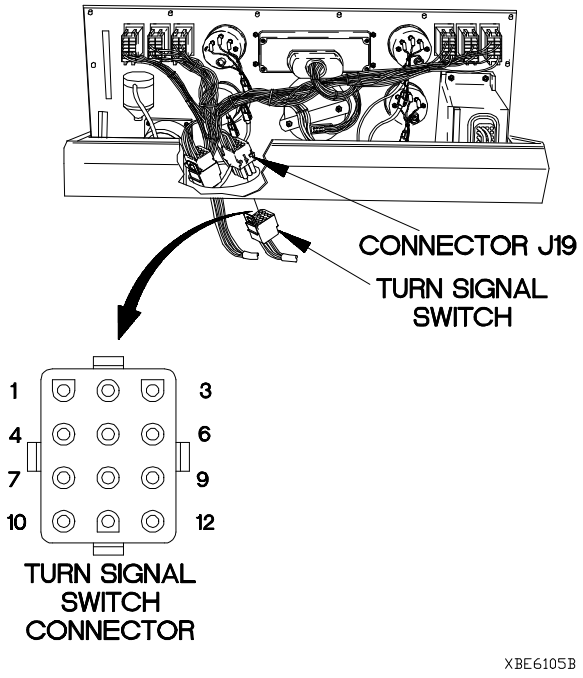
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

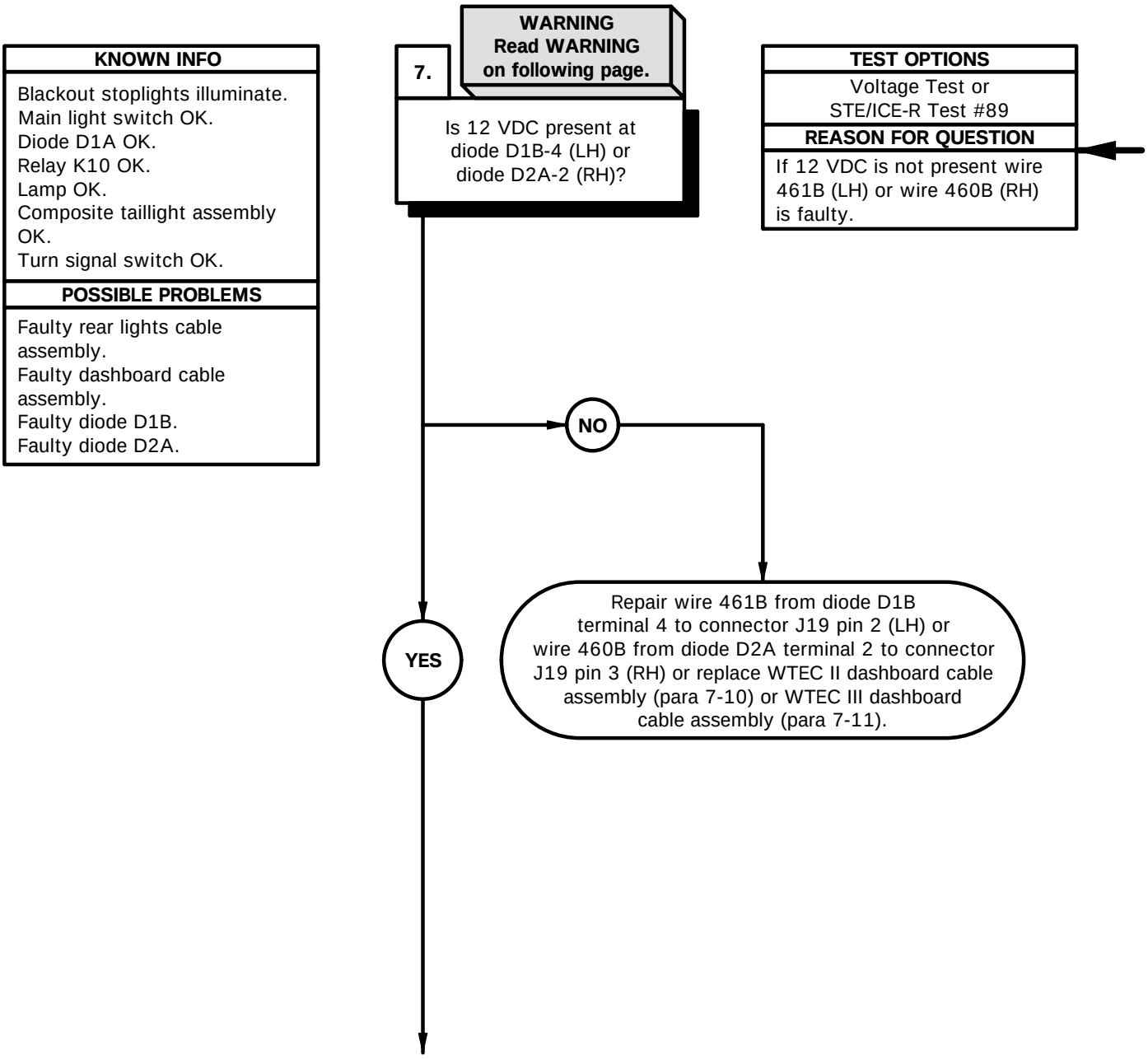
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect turn signal switch connector from connector J19.
(3) Position turn signal switch to center position (TM 9-2320-365-10).
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to turn signal switch connector socket 6.
(6) Connect negative (-) probe of multimeter to turn signal switch connector socket 2 (LH) or socket 3 (RH) and note reading on multimeter.
(7) If continuity is not present, replace turn signal switch (para 7-25).
(8) Connect connector J19 to turn signal switch connector.
(9) Install instrument panel assembly (para 7-15).



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)

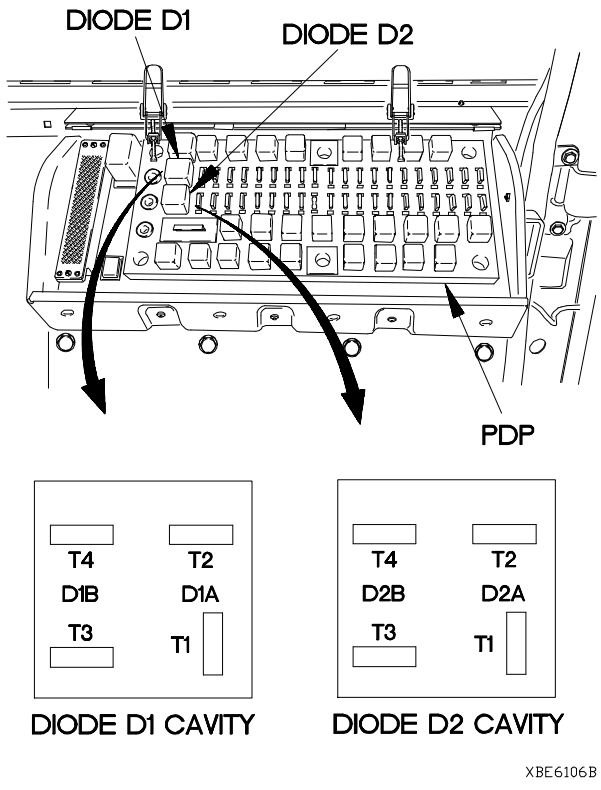


**WARNING**

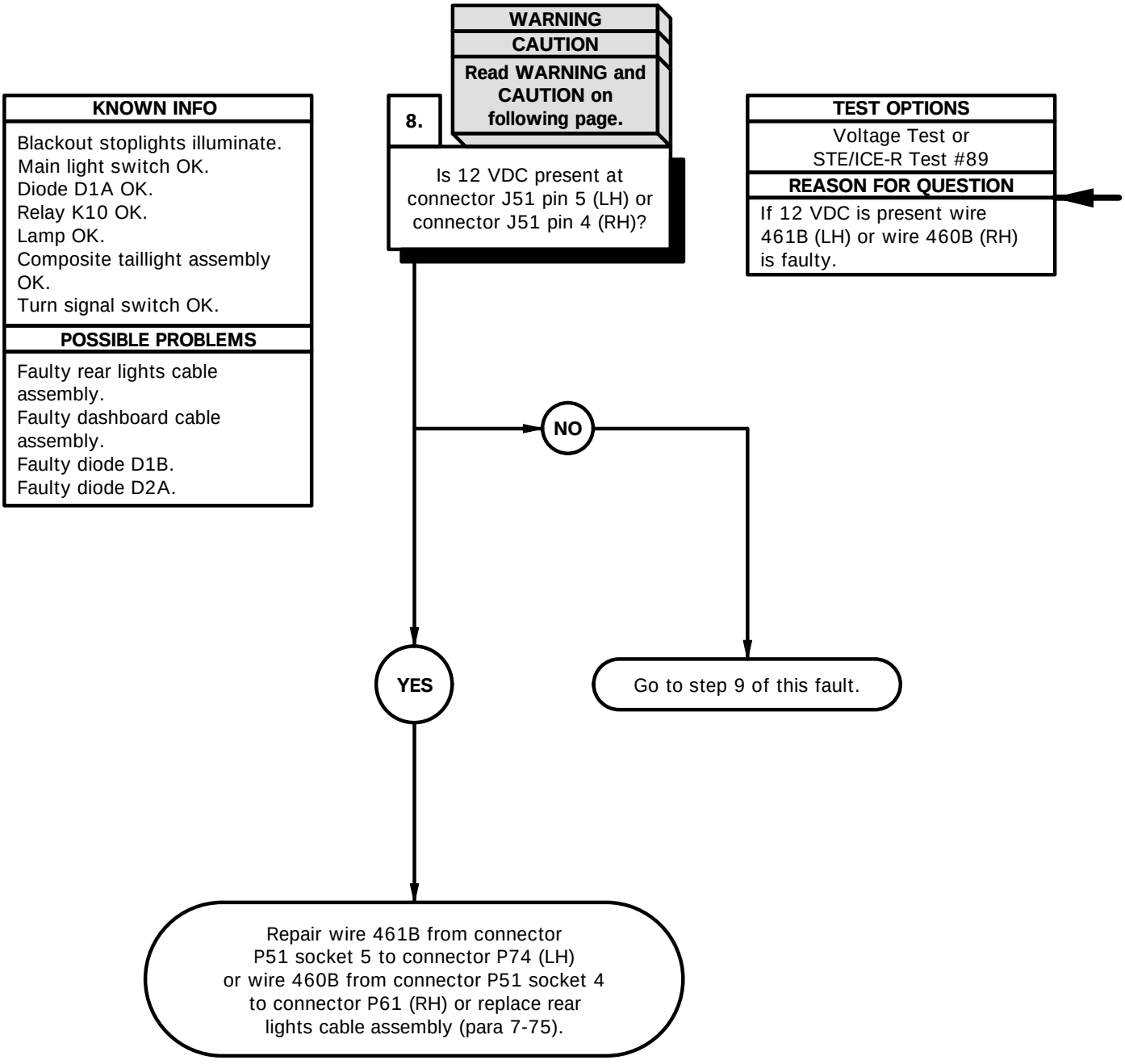
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove diode D1B (LH) or diode D2A (RH) from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to PDP, terminal 4 (LH) or terminal 2 (RH) where diode D1B (LH) or diode D2A (RH) was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(8) Apply brakes and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 461B from diode D1B terminal 4 to connector J19 pin 2 (LH) or wire 460B from diode D2A terminal 2 to connector J19 pin 3 (RH) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Position main light switch to OFF (TM 9-2320-365-10).



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

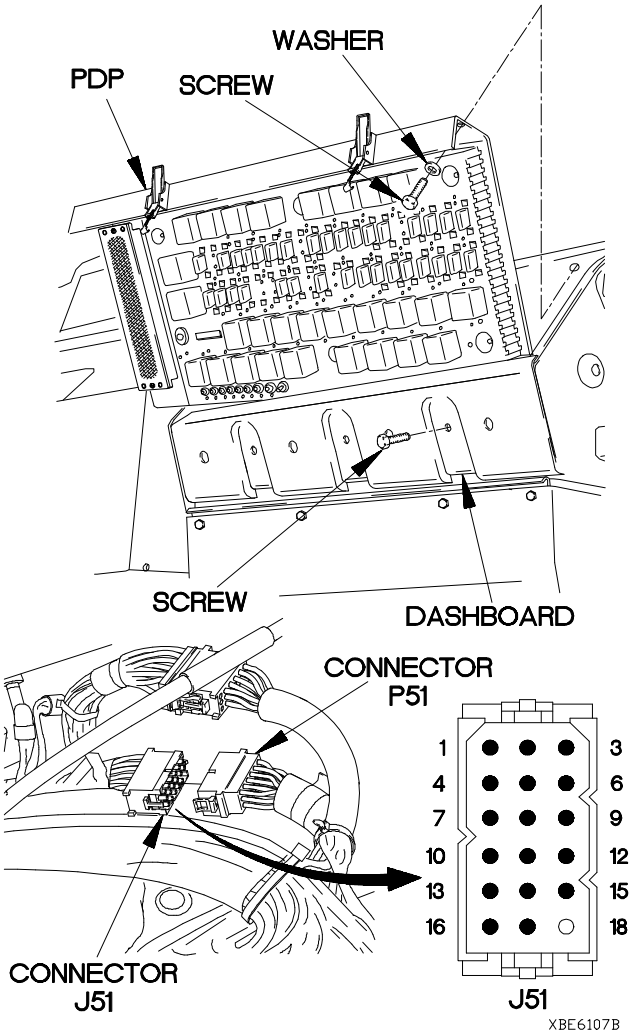
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

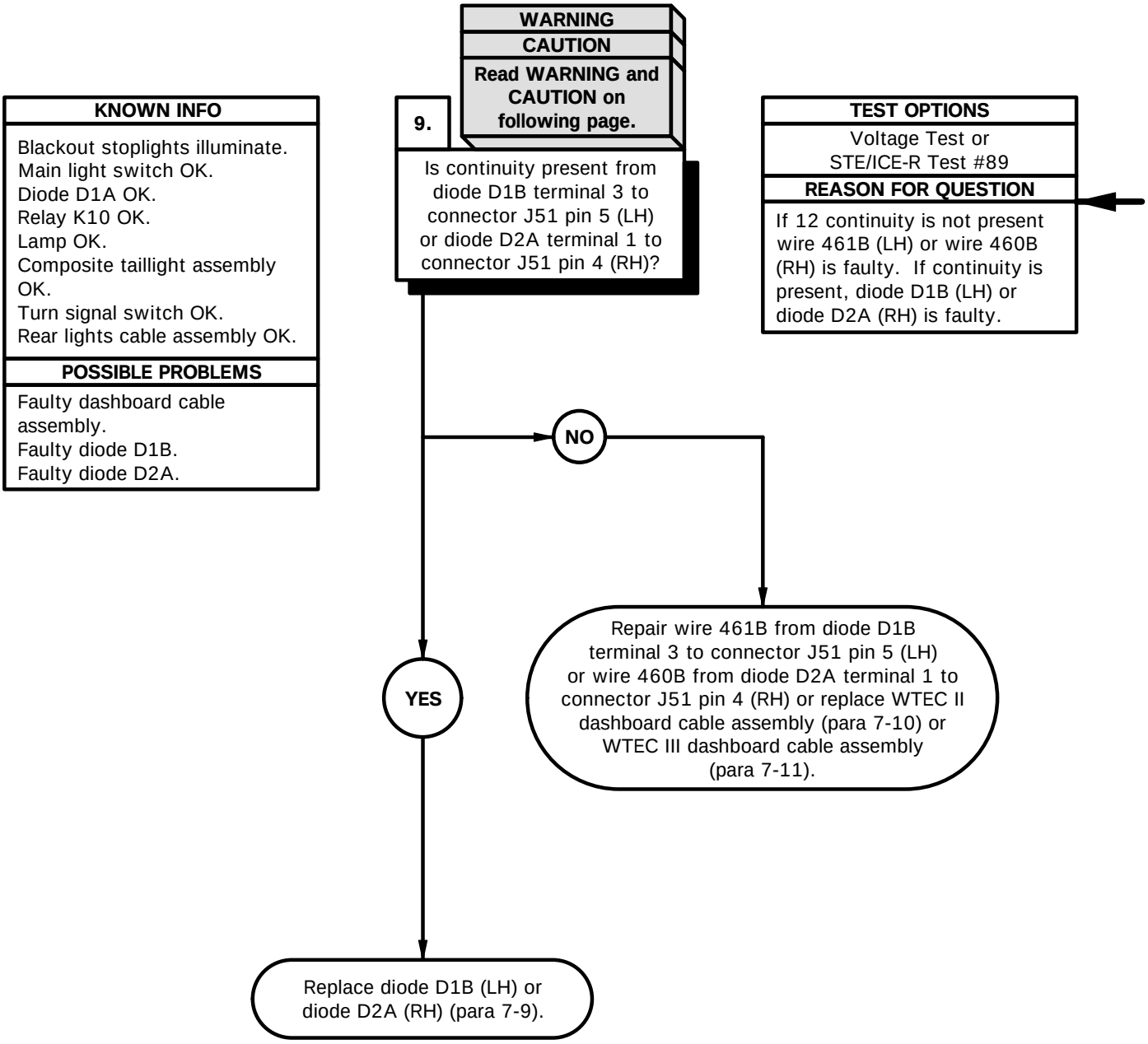
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J51 from connector P51.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to connector J51 pin 5 (LH) or pin 4 (RH).
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(10) Apply brakes and note reading on multimeter.
(11) If 12 VDC is not present, got to step 9 of this faulty.
(12) If 12 VDC is present, repair wire 461B from connector P51 socket 5 to connector P74 (LH) or wire 460B from connector P51 socket 4 to connector P61 (RH) or replace rear lights cable assembly (para 7-75).
(13) Position main light switch to OFF (TM 9-2320-365-10).
(14) Position master power switch to off (TM 9-2320-365-10).



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

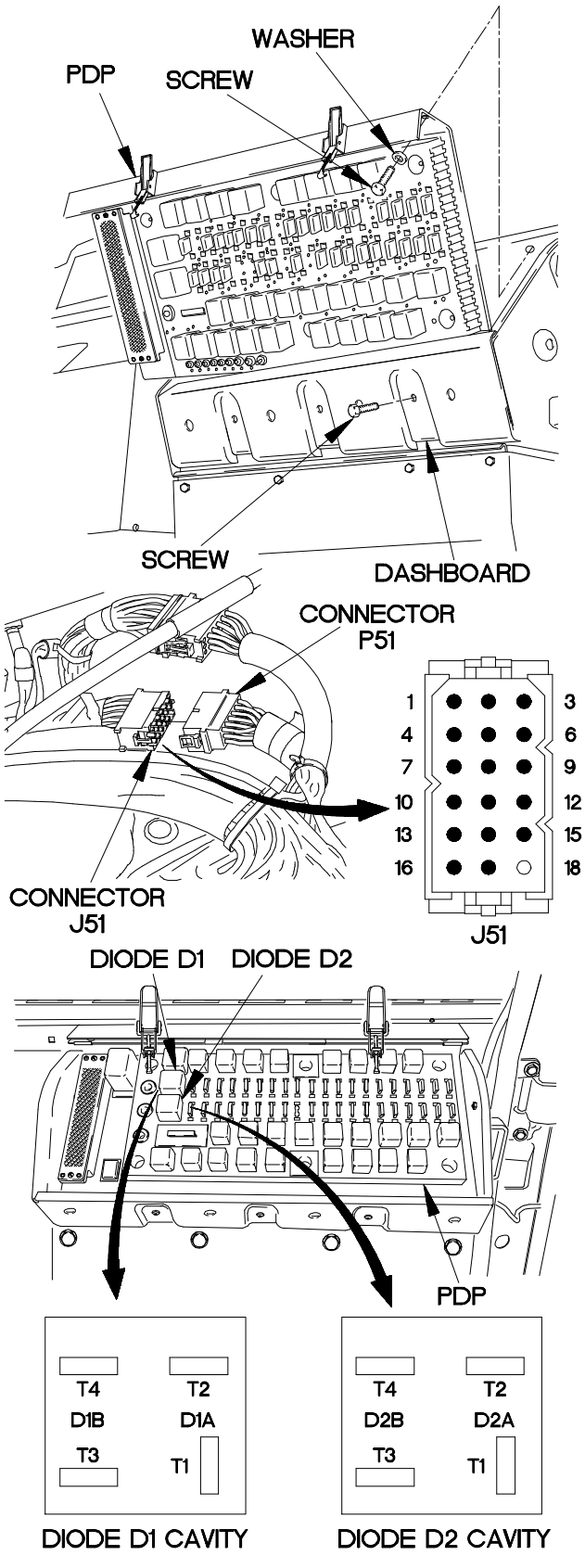
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

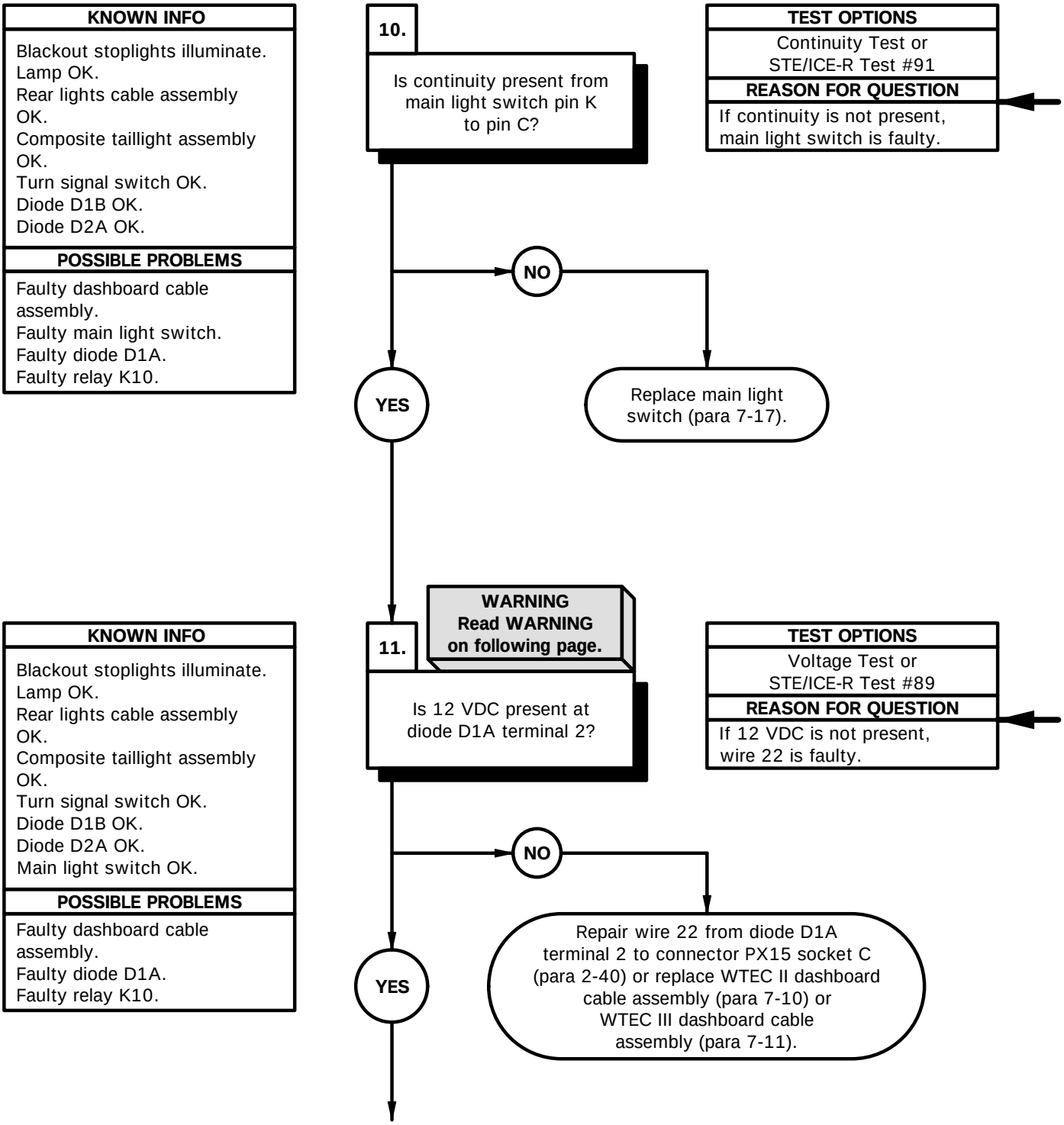
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Set multimeter to volts ohms.
(2) Connect positive (+) probe of multimeter to diode D1B terminal 3 (LH) or diode D2A terminal 1 (RH).
(3) Connect negative (-) probe of multimeter to connector J51 pin 5 (LH) or pin 4 (RH) and note reading on multimeter.
(4) If continuity is not present, repair wire 461B from connector J51 pin 5 to diode D1B terminal 3 (LH) or wire 460B from connector J51 pin 4 to diode D2A terminal 1 (RH) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) Connect connector J51 to connector P51.
(6) Install PDP on dashboard with three screws.
(7) Install three washers and screws in PDP.
(8) Install diode D1B (LH) or diode D2A (RH) in PDP.
(9) Install PDP cover (para 16-2).

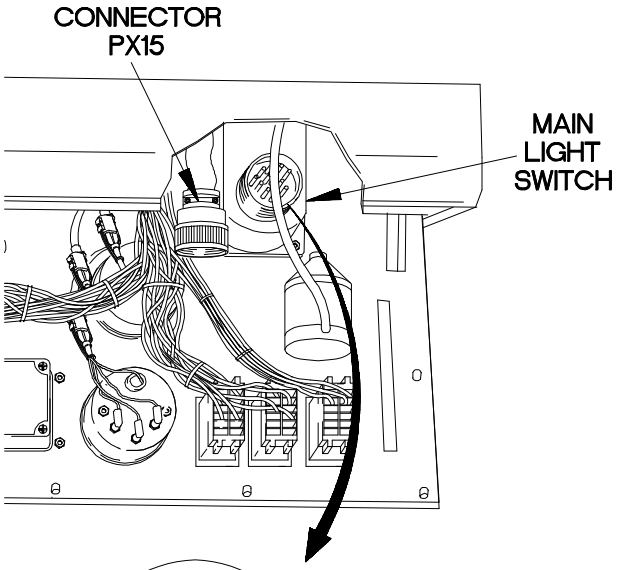


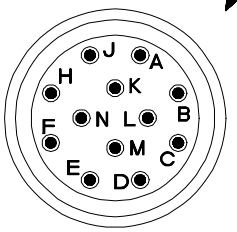
## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX15 from main light switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to main light switch pin K.
(5) Connect negative (-) probe of multimeter to main light switch pin C.
(6) Position main light switch to STOPLIGHT (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace main light switch (para 7-17).
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Connect connector PX15 to main light switch.



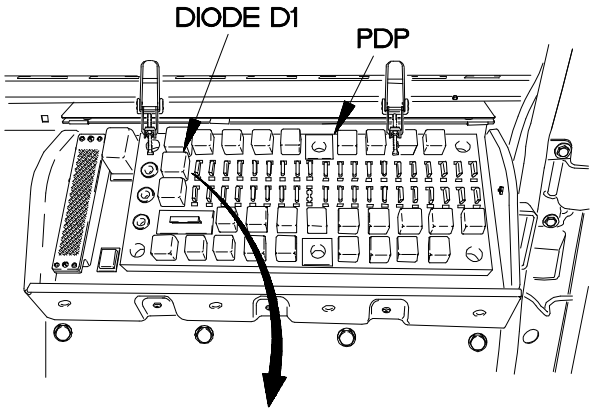

MAIN LIGHT SWITCH CONNECTOR

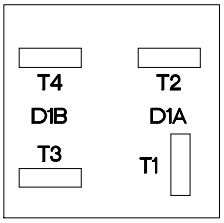
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove diode D1A from PDP.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to PDP, terminal 2, where diode D1A was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(8) Apply brakes and note reading on multimeter.
(9) If 12 VDC is not present, repair wire 22 from diode D1A terminal 2 to connector PX15 socket C (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Position master power switch to off (TM 9-2320-365-10).

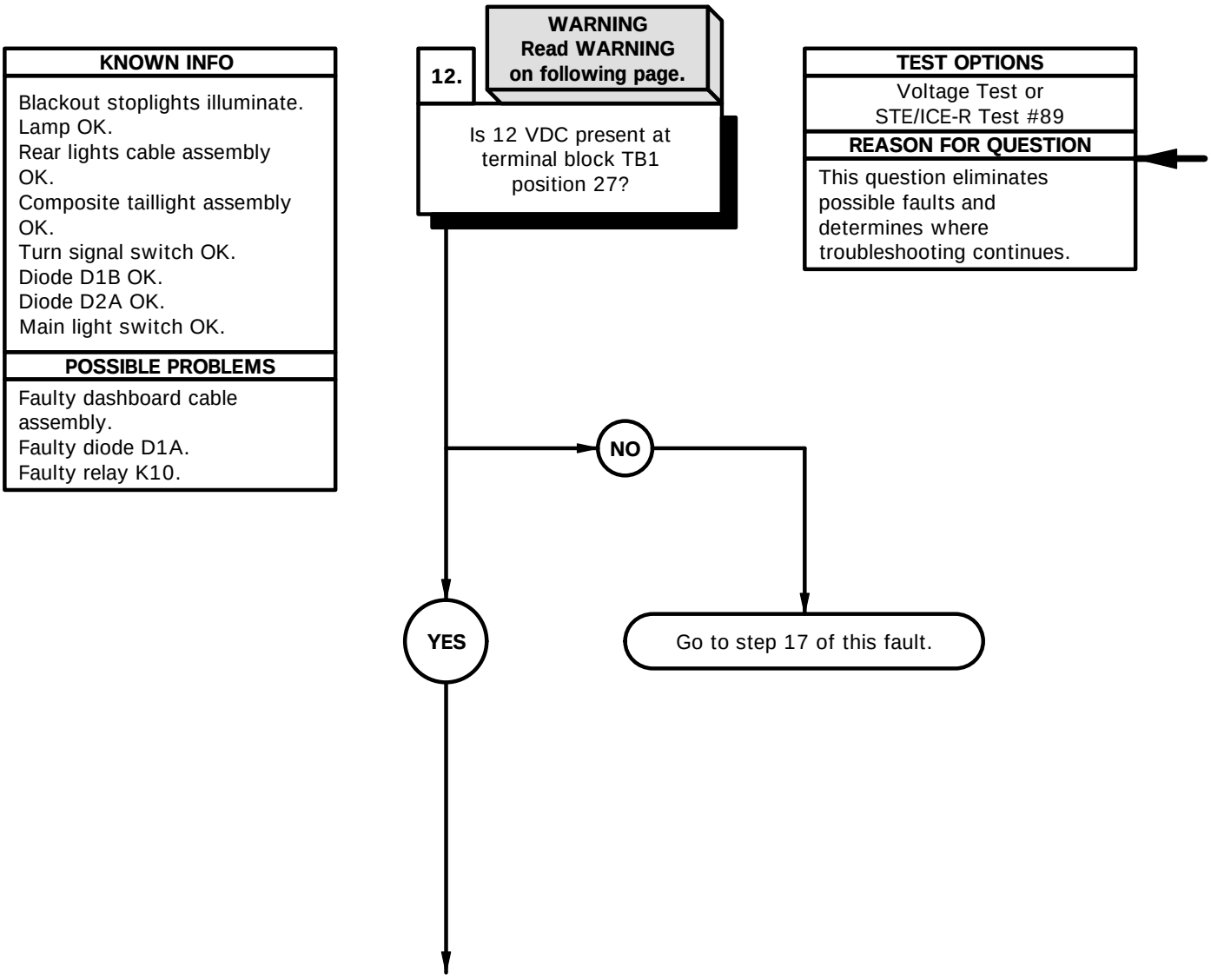



DIODE D1 CAVITY

XBE6109B

## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)

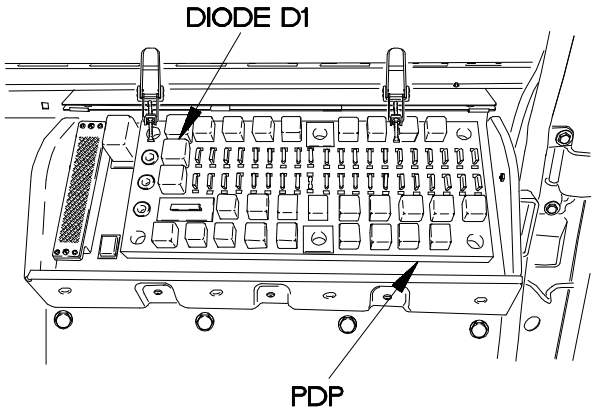


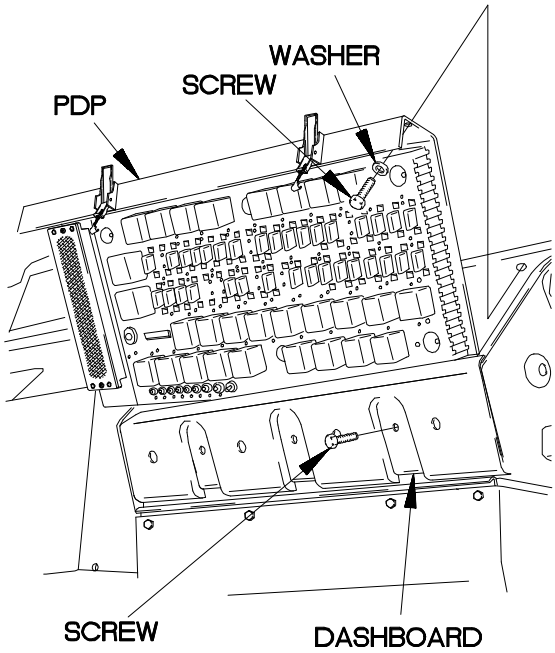
**WARNING**

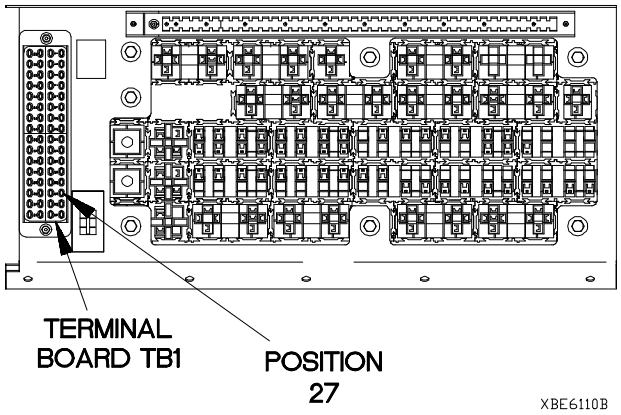
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

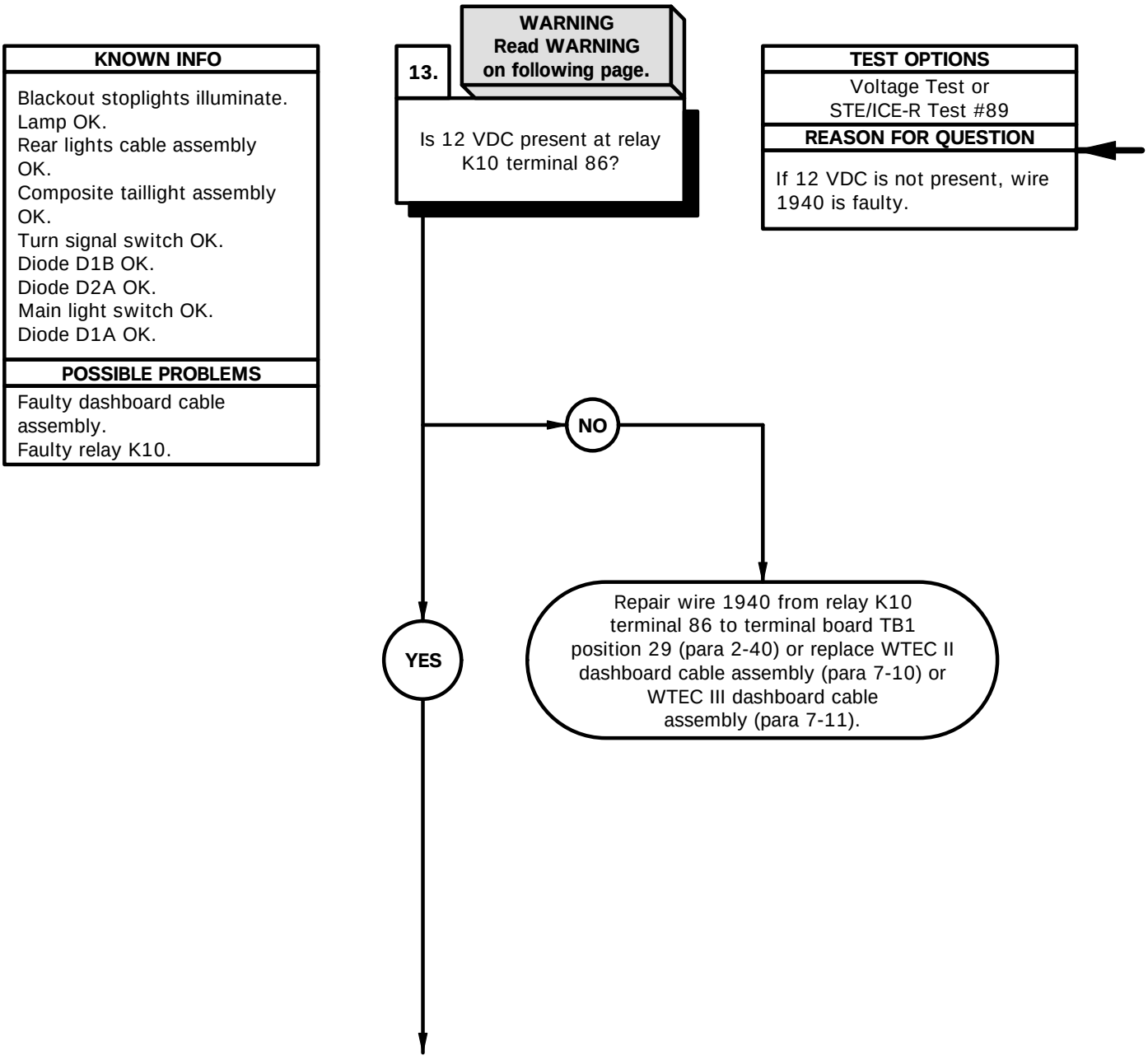
(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to terminal block TB1 position 27.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10).
(8) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(9) Apply brakes and note reading on multimeter.
(10) If 12 VDC is not present, go to step 17 of this fault.
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Position master power switch to off (TM 9-2320-365-10).
(13) Install PDP on dashboard with three screws.
(14) Install three washers and screws in PDP.
(15) Install diode D1A in PDP.



## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)

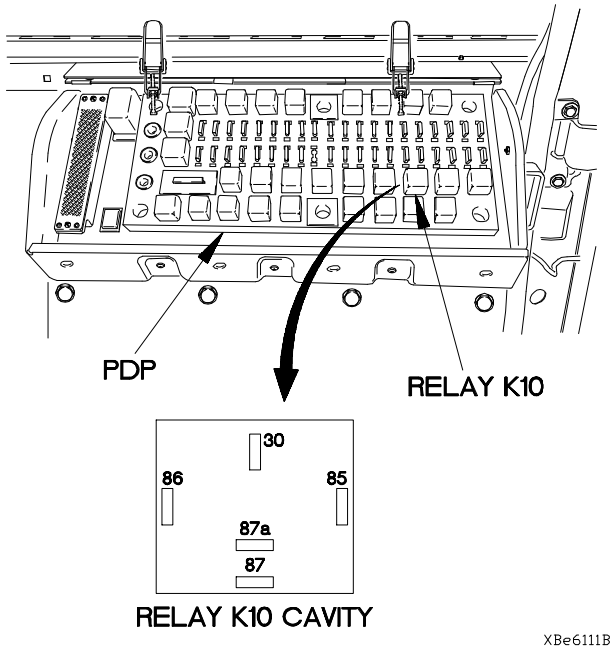


**WARNING**

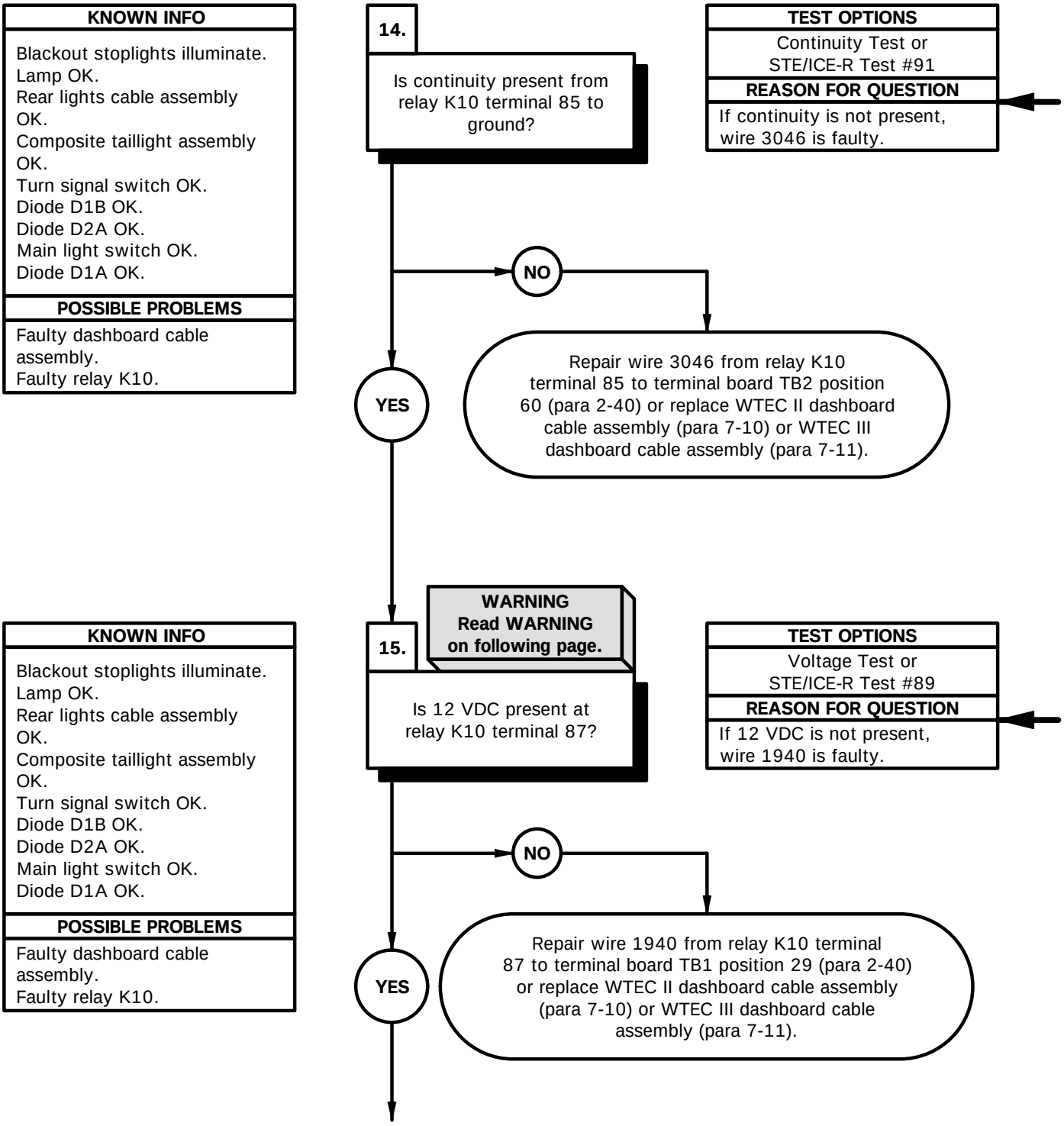
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove relay K10 from PDP.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to PDP, terminal 86, where relay K10 was removed.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 12 VDC is not present, repair wire 1940 from relay K10 terminal 86 to terminal board TB1 position 29 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position main light switch to OFF (TM 9-2320-365-10).
(10) Position master power switch to off (TM 9-2320-365-10).

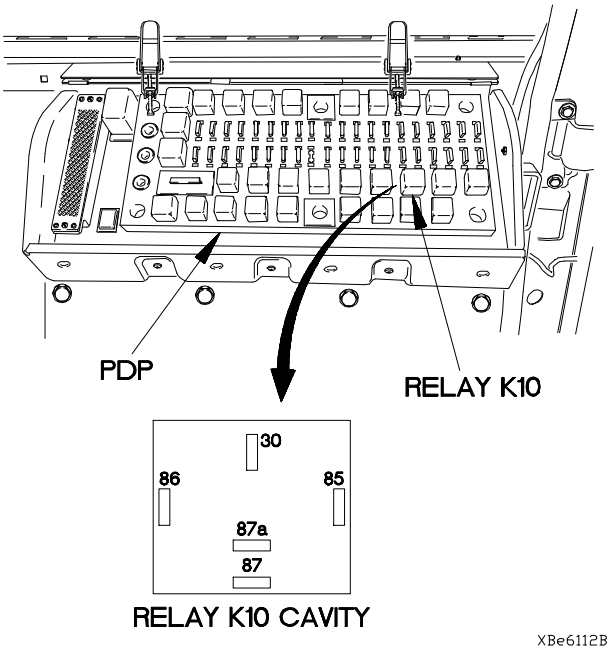


## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K10 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3046 from relay K10 terminal 85 to terminal board TB2 position 60 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



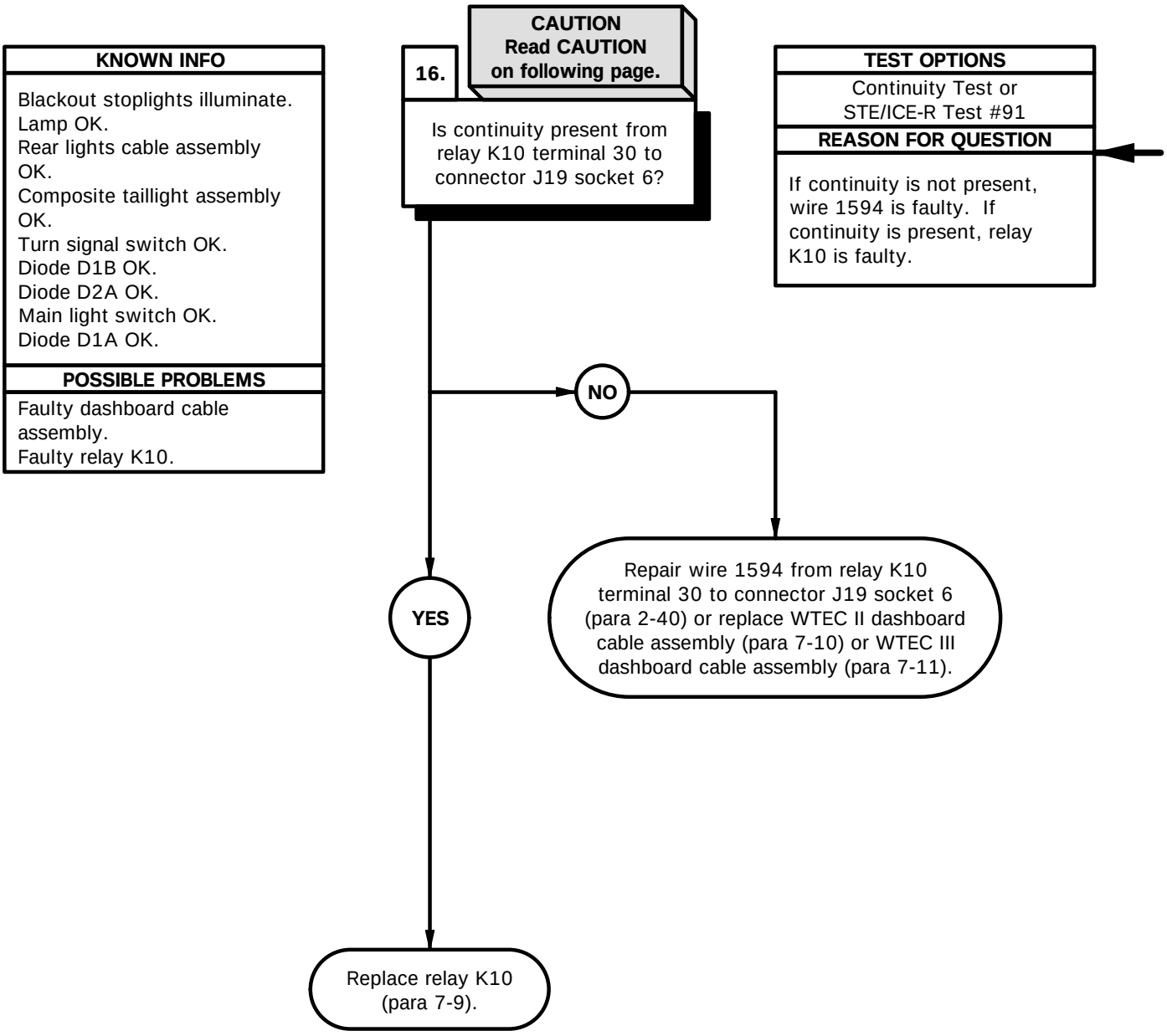

**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to PDP, terminal 87, where relay K10 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Position main light switch to STOPLIGHT (TM 9-2320-365-10).
(6) Apply brakes and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 1940 from relay K10 terminal 87 to terminal board TB1 position 29 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Position master power switch to off (TM 9-2320-365-10).

## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

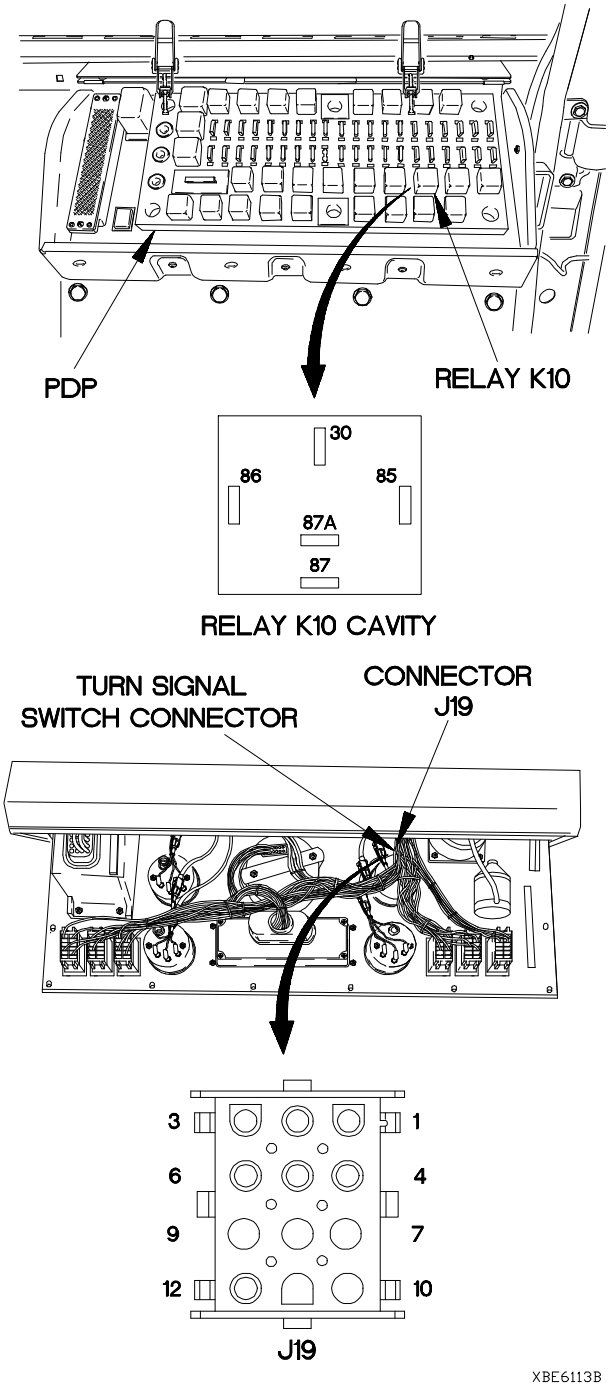
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

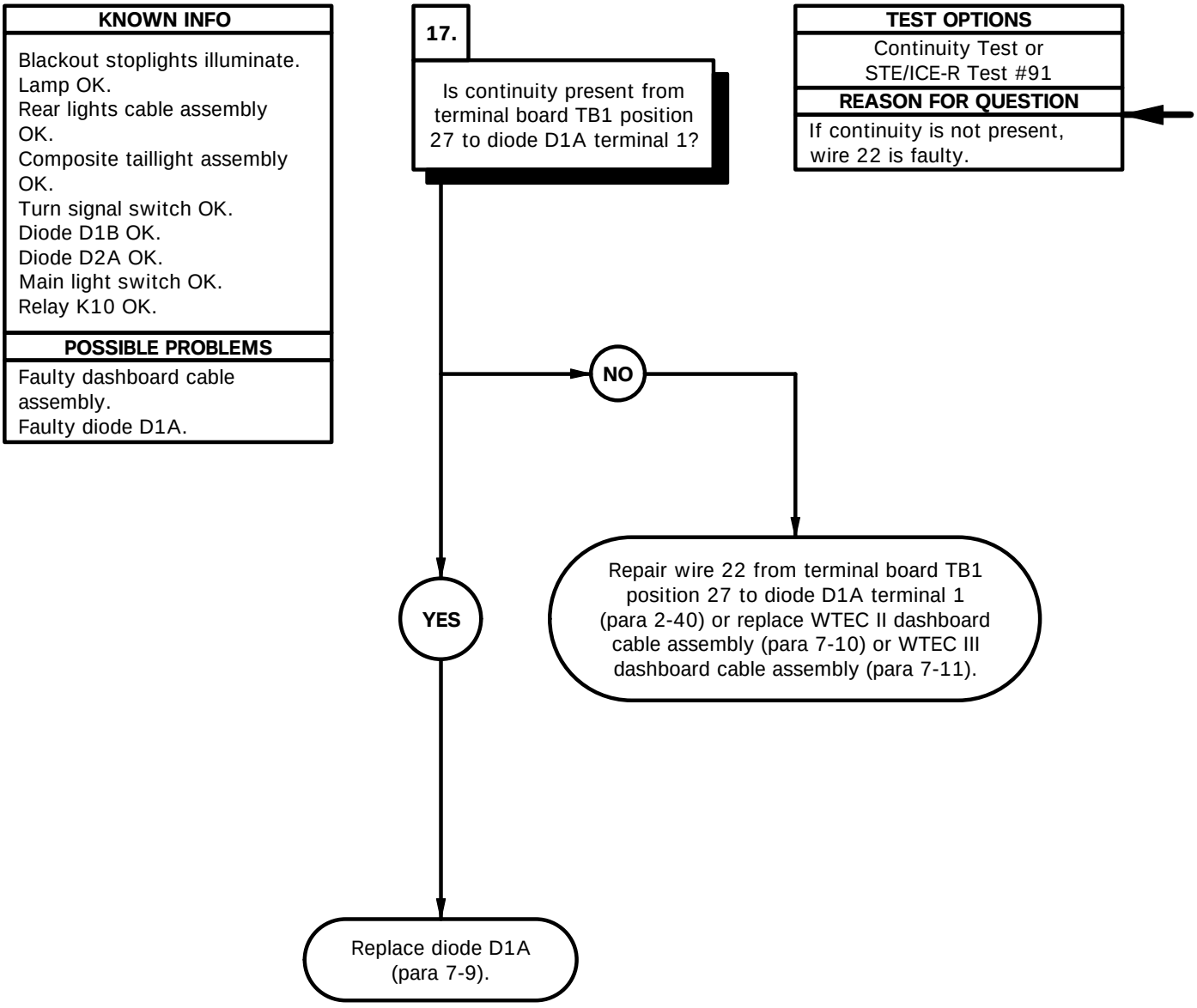
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect turn signal switch connector from connector J19.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to PDP, terminal 30, where relay K10 was removed.
(4) Connect negative (-) probe of multimeter to connector J19 socket 6.
(5) If continuity is not present, repair wire 1594 from relay K10 terminal 30 to connector J19 socket 6 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace relay K10 (para 7-9).
(7) Connect connector J19 to turn signal switch connector.
(8) Install instrument panel assembly (para 7-15).
(9) Install relay K10 in PDP.
(10) Install PDP cover (para 16-2).

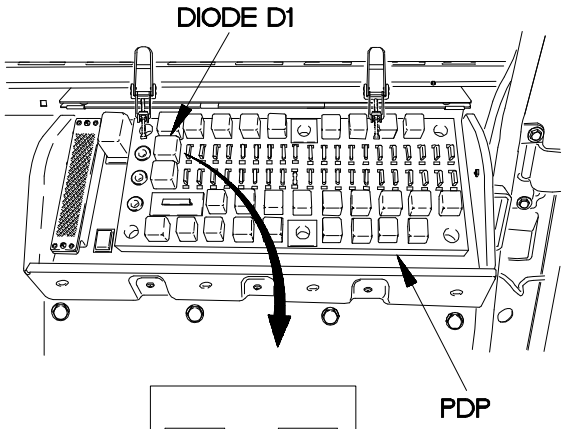


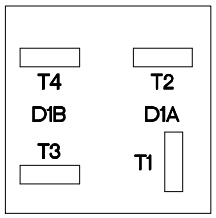
## e59. ONE OR BOTH STOPLIGHTS DO NOT ILLUMINATE (CONT)



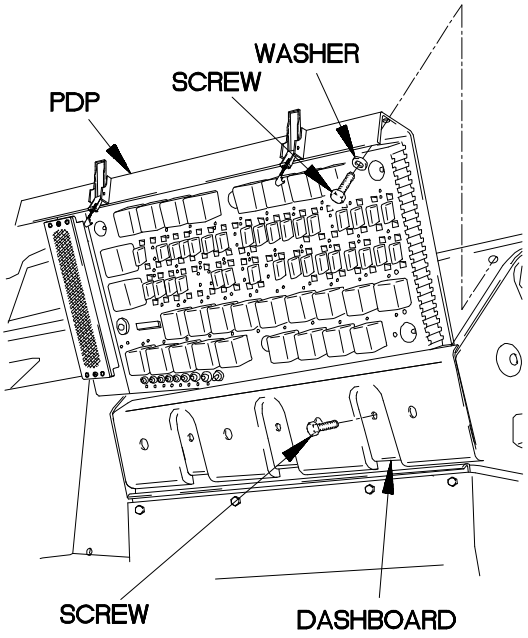
**CONTINUITY TEST**

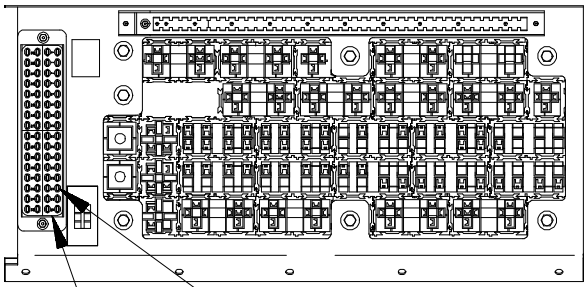
(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to terminal board TB1 position 27.
(6) Connect negative (-) probe of multimeter to diode D1A terminal 1 and note reading on multimeter.
(7) If continuity is not present, repair wire 22 from terminal board TB1 position 27 to diode D1A terminal 1 (para 2-40) 1 or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, replace diode D1A (para 7-9).
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install diode D1A in PDP.
(12) Install PDP cover (para 16-2).




DIODE D1 CAVITY




XBE6114B

## e60. ONE OR BOTH BLACKOUT STOPLIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

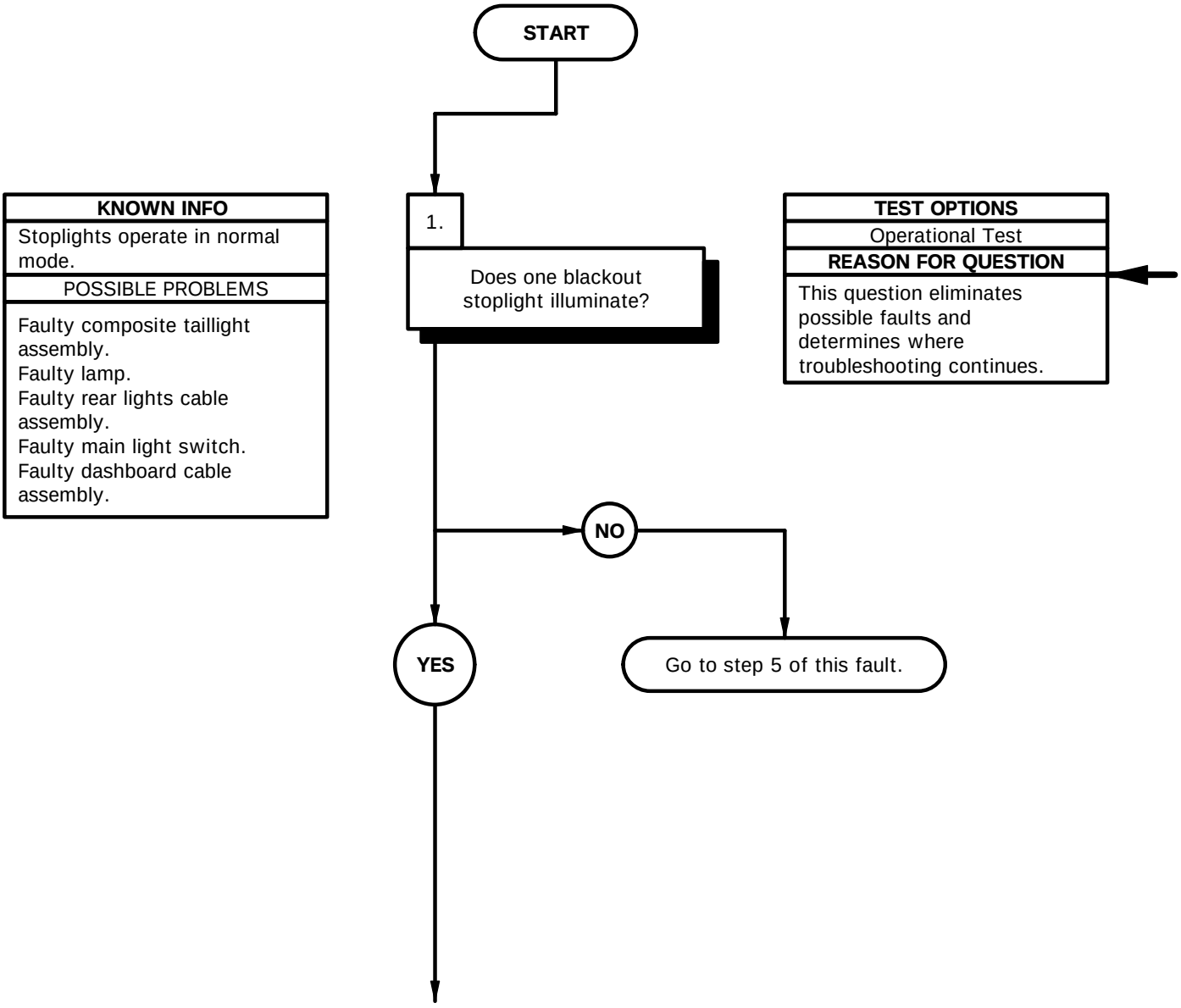
**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Material/Parts**
Packing, Preformed (Item 170, Appendix G)

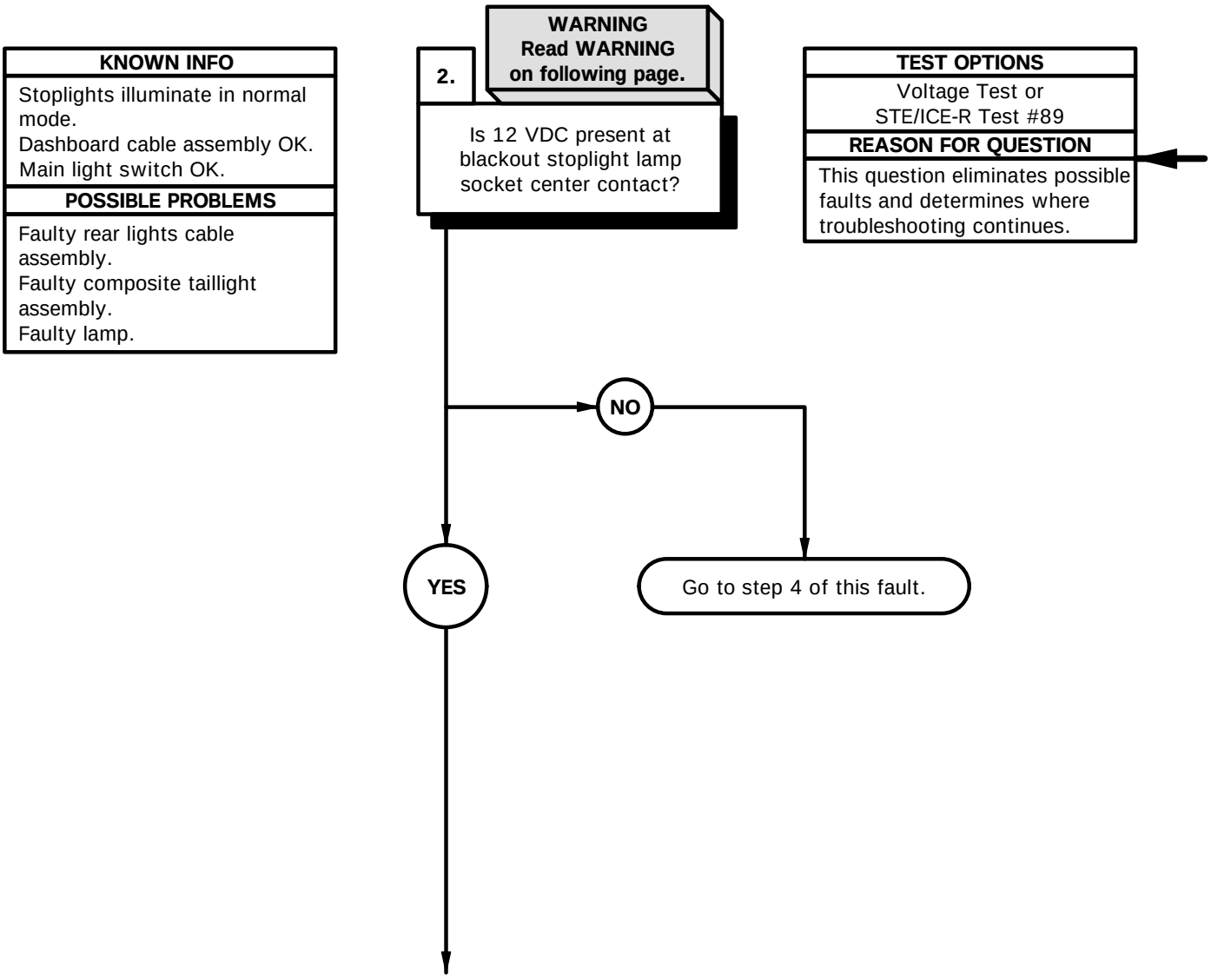
**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



(1) Position master power switch to on (TM 9-2320-365-10).
(2) Position main light switch to BO DRIVE (TM 9-2320-365-10).
(3) Apply brakes and observe blackout stoplights.
(4) If both blackout stoplights do not illuminate, go to step 5 of this fault.
(5) Position main light switch to OFF (TM 9-2320-365-10).
(6) Position master power switch to off (TM 9-2320-365-10).

## e60. ONE OR BOTH BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)

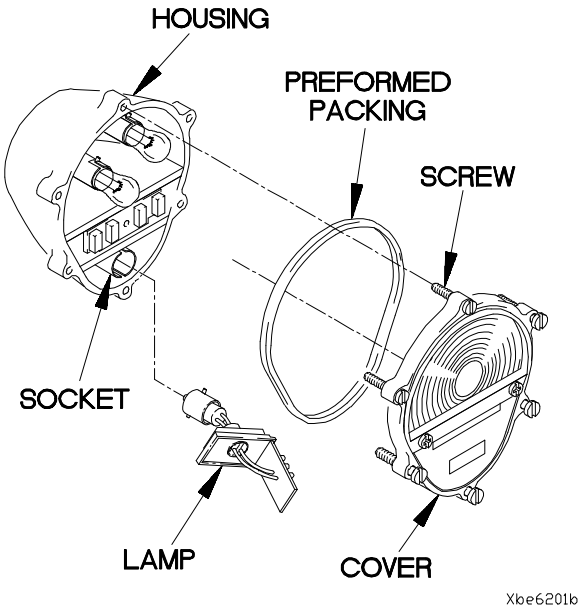


**WARNING**

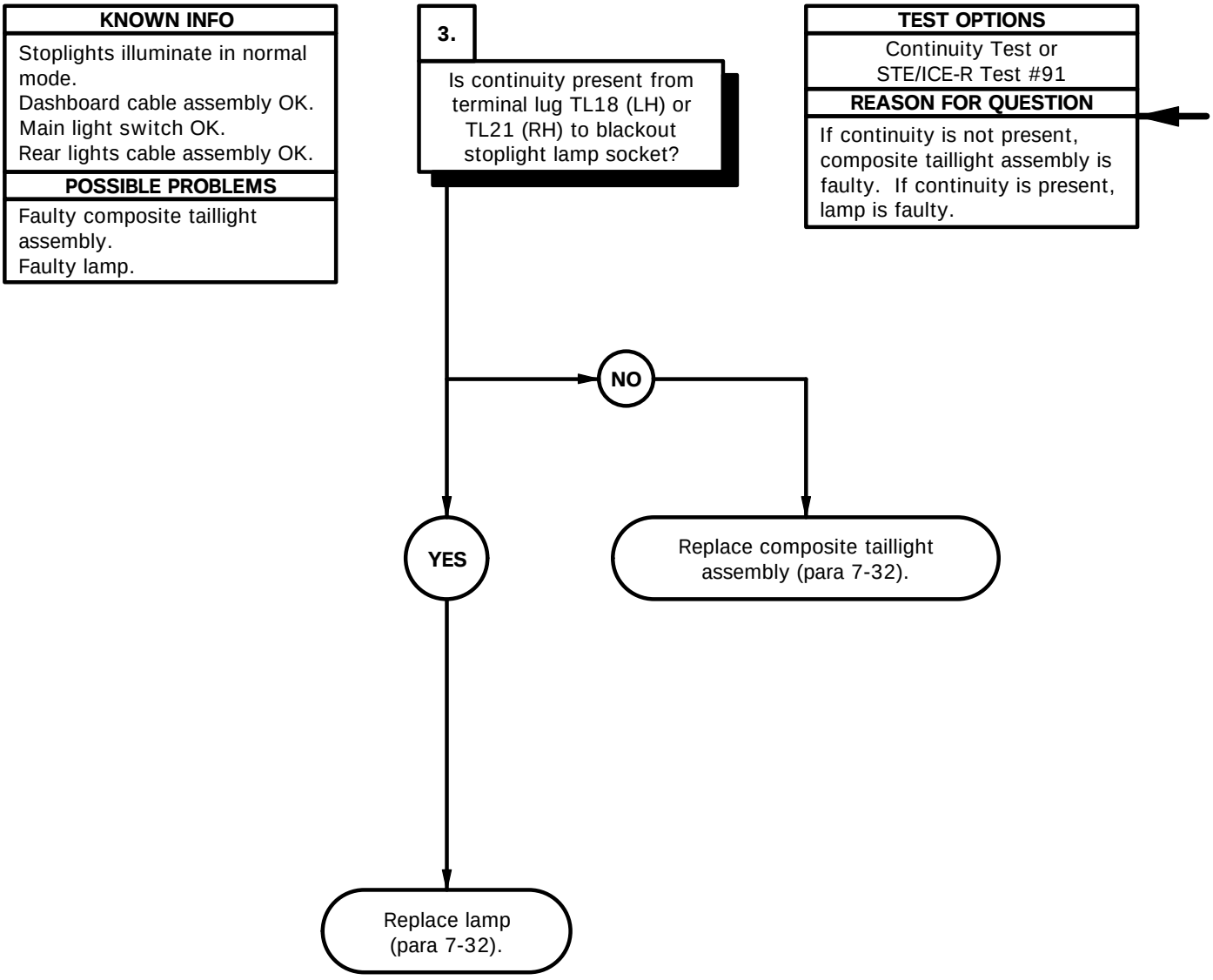
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Loosen six screws and remove cover and preformed packing from composite taillight assembly housing. Discard preformed packing.
(2) Remove lamp from socket.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to blackout stoplight lamp socket center contact.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position main light switch to BO DRIVE (TM 9-2320-365-10).
(8) Apply brakes and note reading on multimeter.
(9) If 12 VDC is not present, go to step 4 of this fault.
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Position main light switch to OFF (TM 9-2320-365-10).

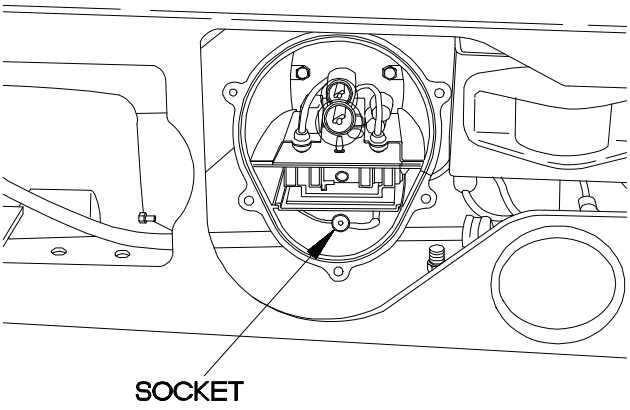


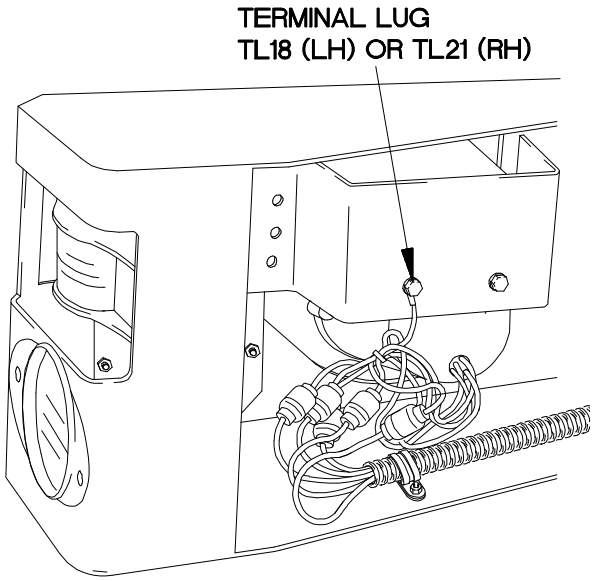
## e60. ONE OR BOTH BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)

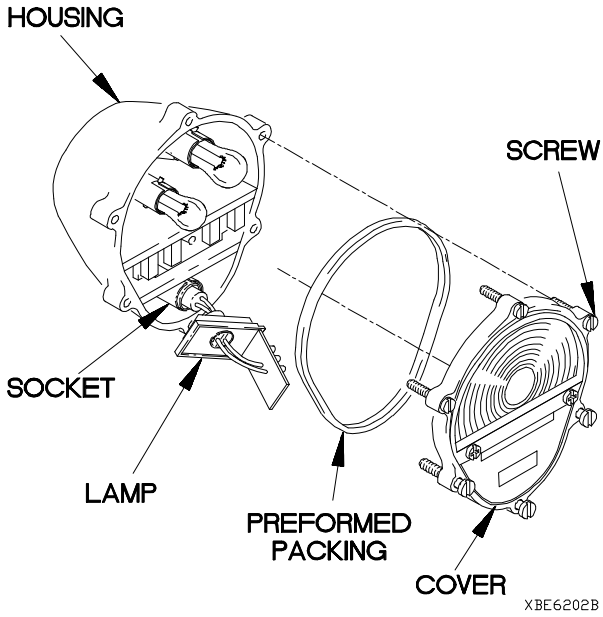


**CONTINUITY TEST**

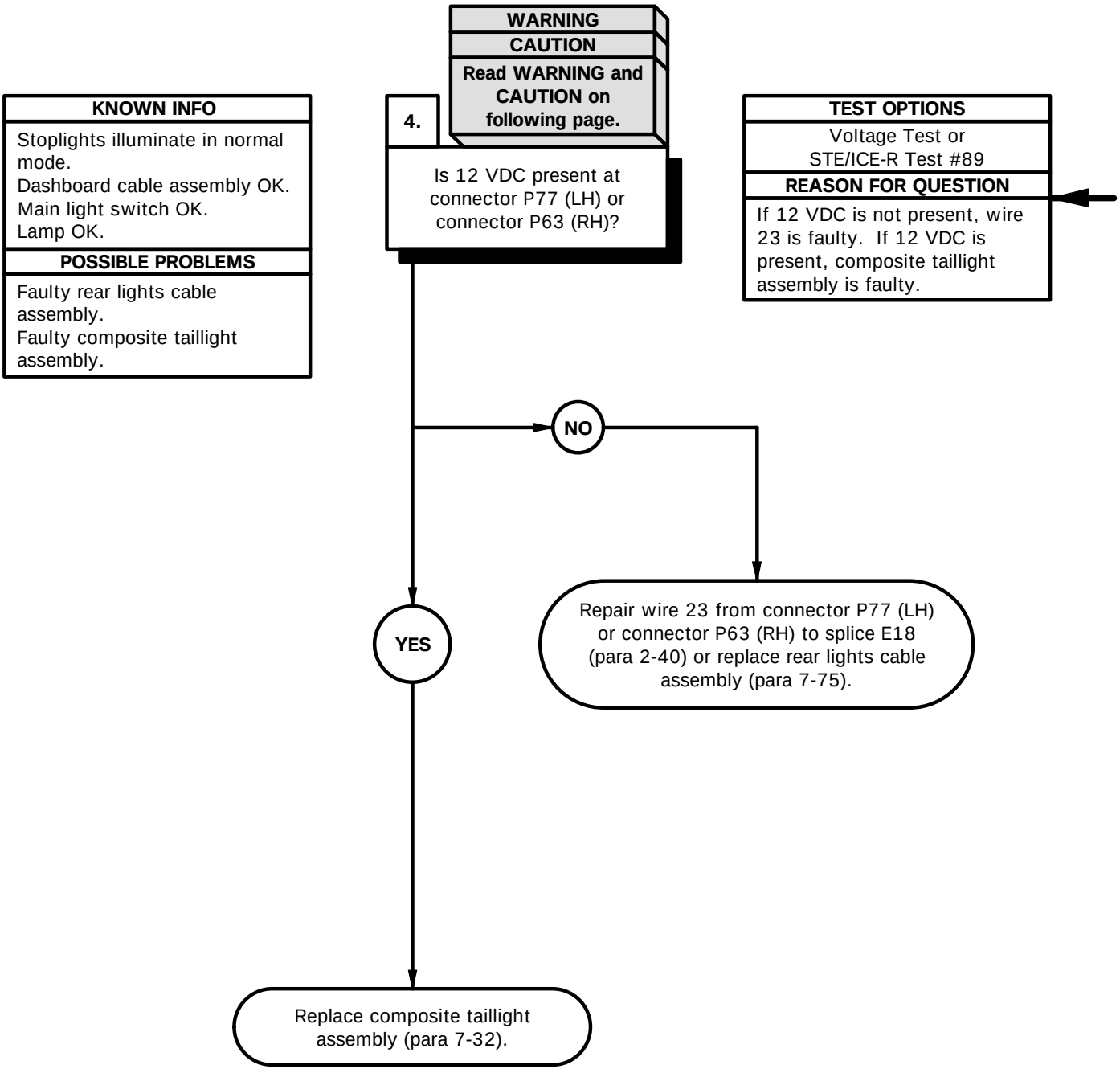
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL18 (LH) or TL21 (RH).
(3) Connect negative (-) probe of multimeter to blackout stoplight lamp socket and note reading on multimeter.
(4) If continuity is not present, replace composite taillight assembly (para 7-32).
(5) If continuity is present, replace lamp (para 7-32).
(6) Install lamp in socket.
(7) Install preformed packing and cover on housing with six screws.



## e60. ONE OR BOTH BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

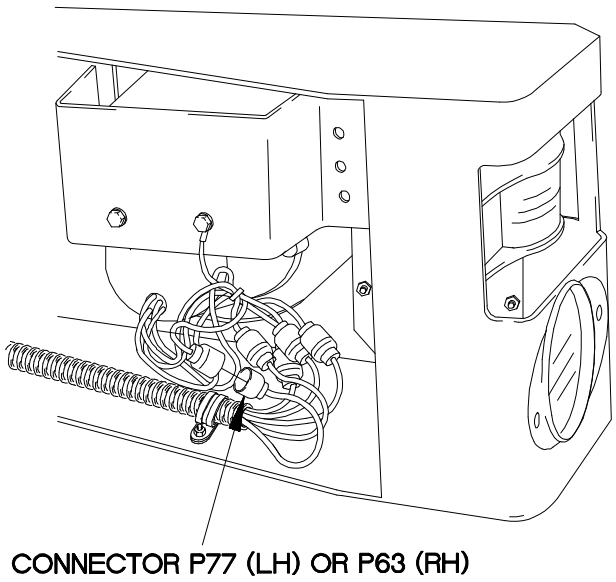
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

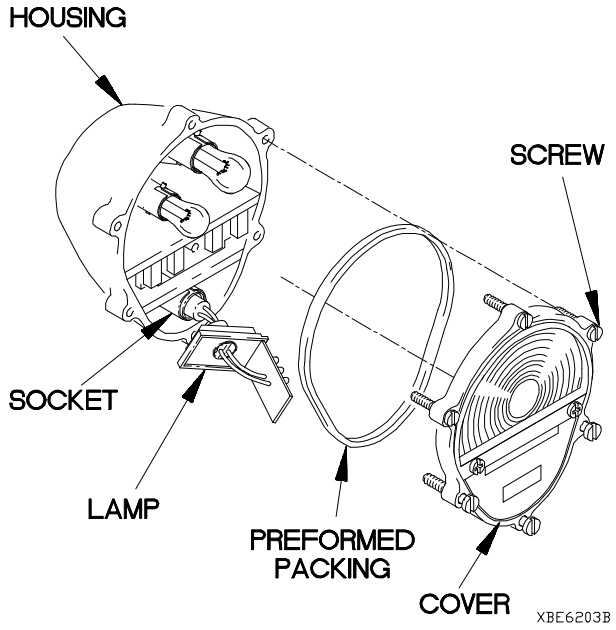
**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

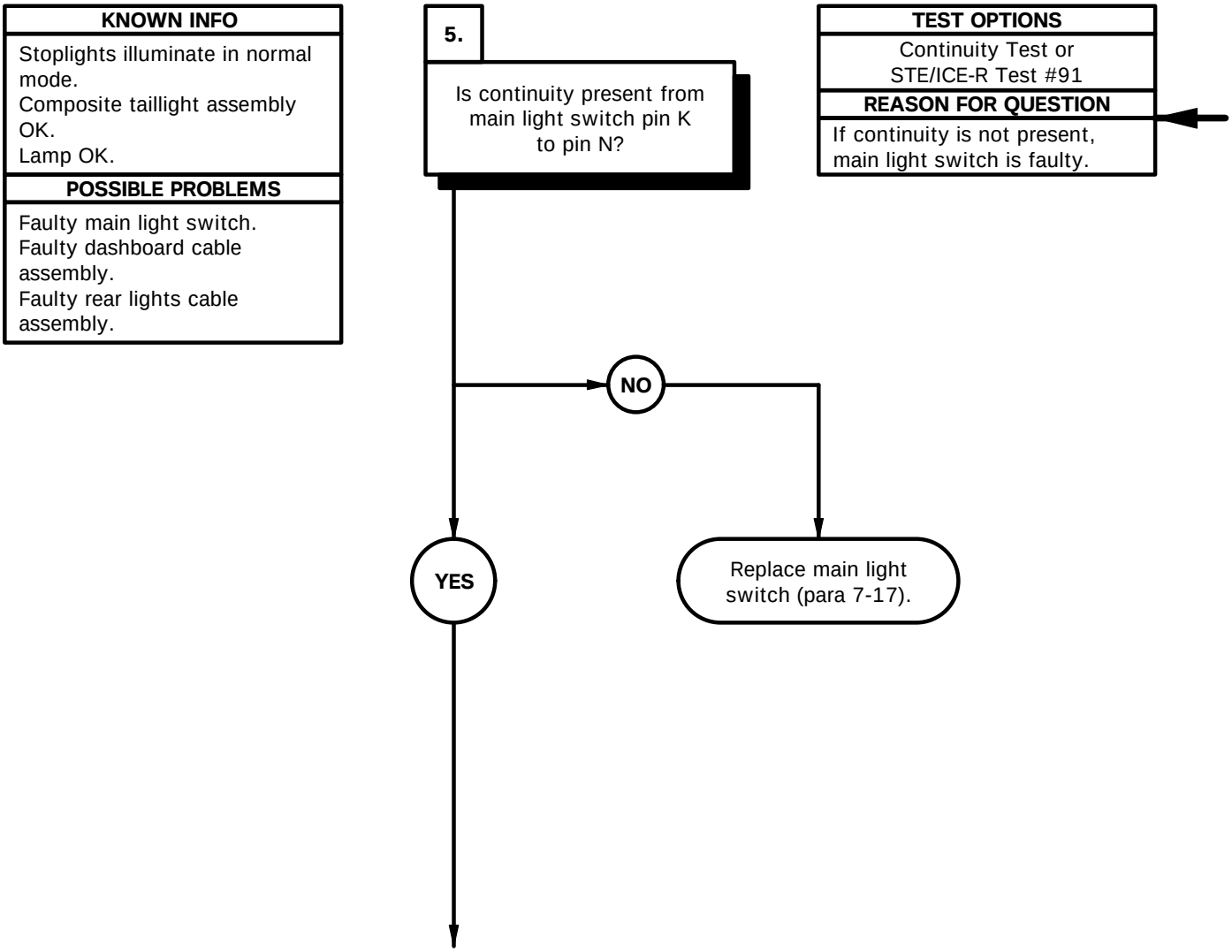
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Disconnect connector P77 (LH) or connector P63 (RH) from blackout stoplight connector.
(3) Connect positive (+) probe of multimeter to connector P77 or connector P63.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to BO DRIVE (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 12 VDC is not present, repair wire 23 from connector P77 (LH) or connector P63 (RH) to splice E18 (para 2-40) or replace rear lights cable assembly (para 7-75).
(9) If 12 VDC is present, replace composite taillight assembly (para 7-32).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Position main light switch to OFF (TM 9-2320-365-10).
(12) Install lamp in socket.
(13) Install preformed packing and cover on housing with six screws.



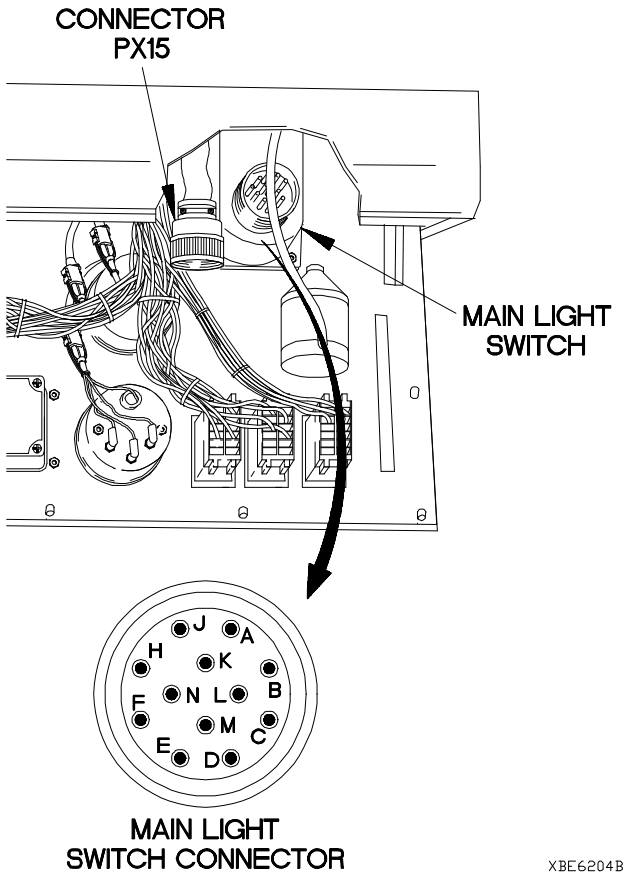



## e60. ONE OR BOTH BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)

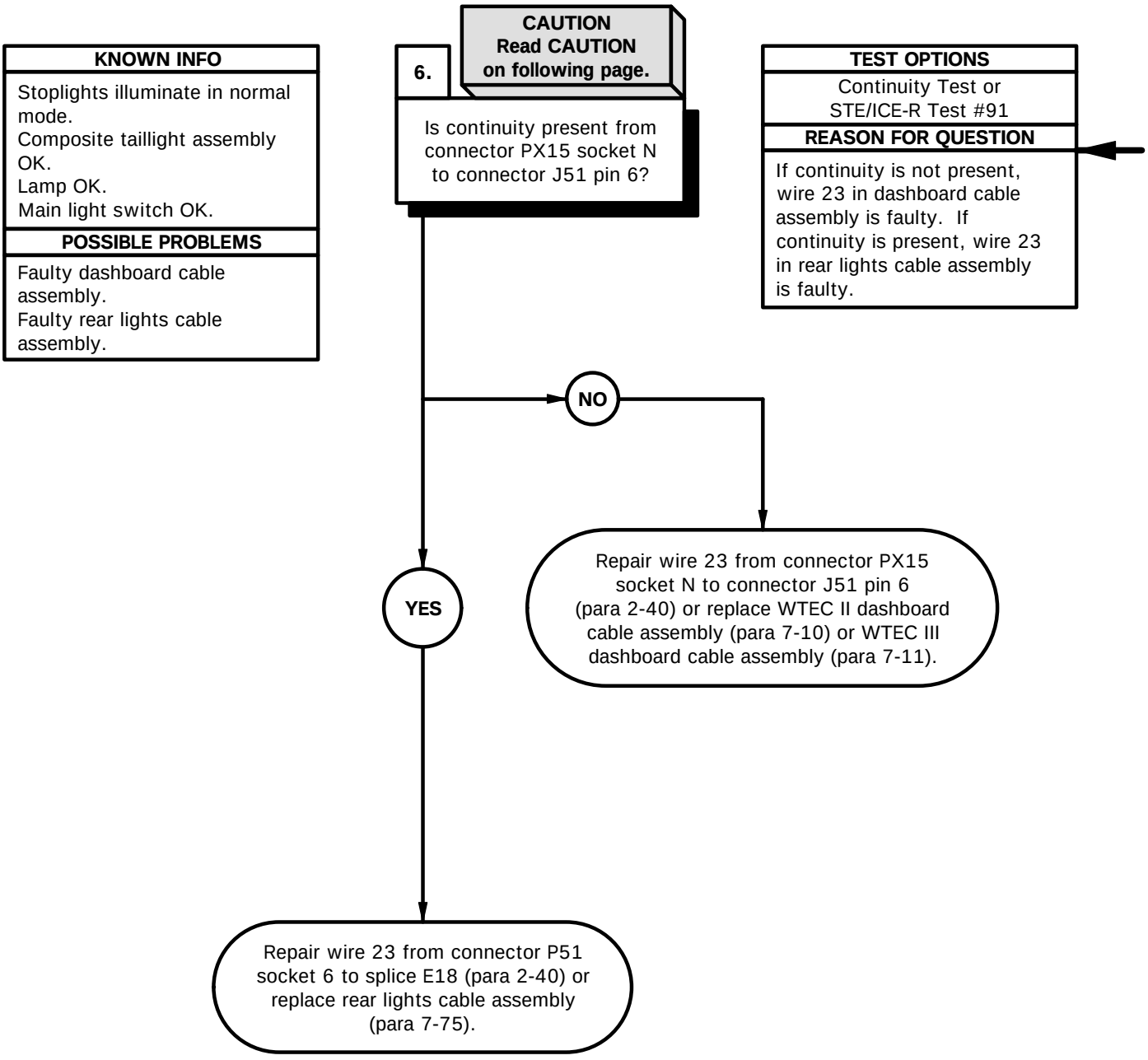


**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX15 from main light switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to main light switch pin K.
(5) Connect negative (-) probe of multimeter to main light switch pin N.
(6) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace main light switch (para 7-17).
(8) Position main light switch to OFF (TM 9-2320-365-10).



## e60. ONE OR BOTH BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

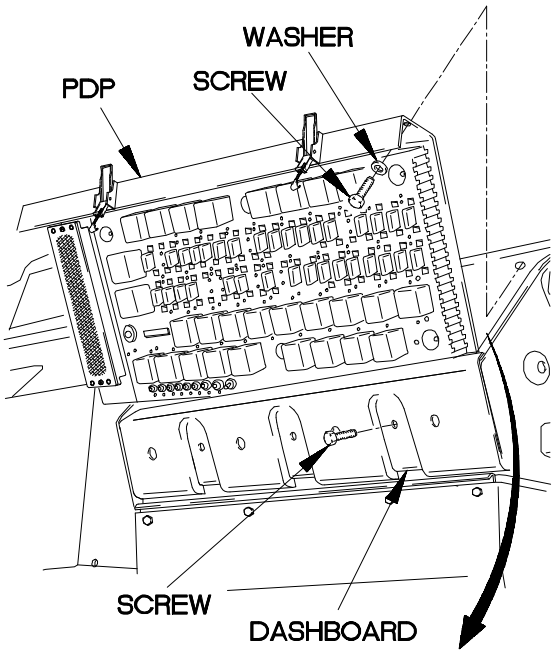
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

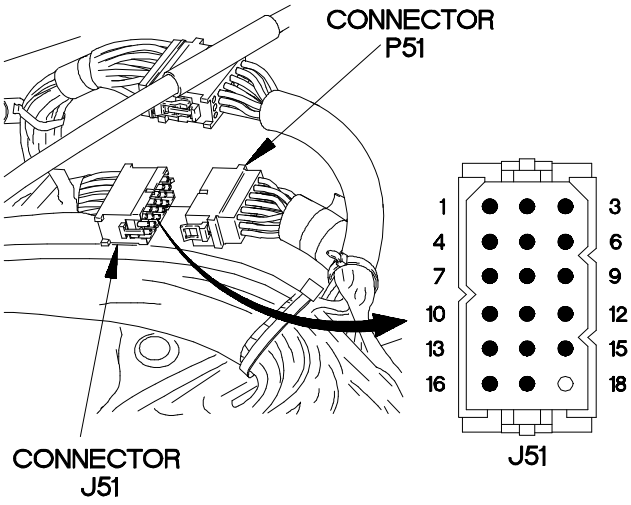
**NOTE**

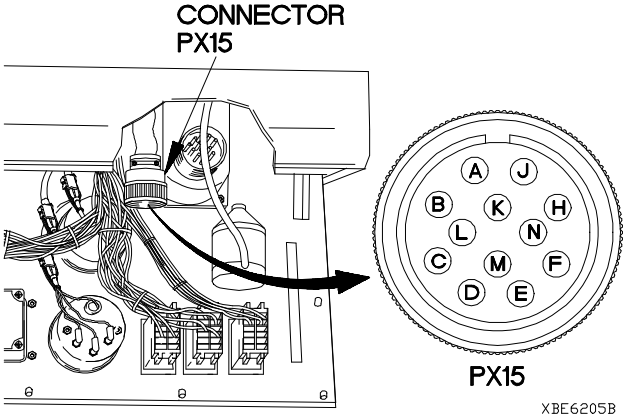
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J51 from connector P51.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to connector PX15 socket N.
(8) Connect negative (-) probe of multimeter to connector J51 pin 6 and note reading on multimeter.
(9) If continuity is not present, repair wire 23 from connector PX15 socket N to connector J51 pin 6 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) If continuity is present, repair wire 23 from connector P51socket 6 to splice E18 (para 2-40) or replace rear lights cable assembly (para 7-75).
(11) Connect connector PX15 to main light switch.
(12) Install instrument panel assembly (para 7-15).
(13) Connect connector J51 to connector P51.
(14) Install PDP on dashboard with three screws.
(15) Install three washers and screws in PDP.
(16) Install PDP cover (para 16-2).



## e61. STOPLIGHTS AND BLACKOUT STOPLIGHTS DO NOT OPERATE

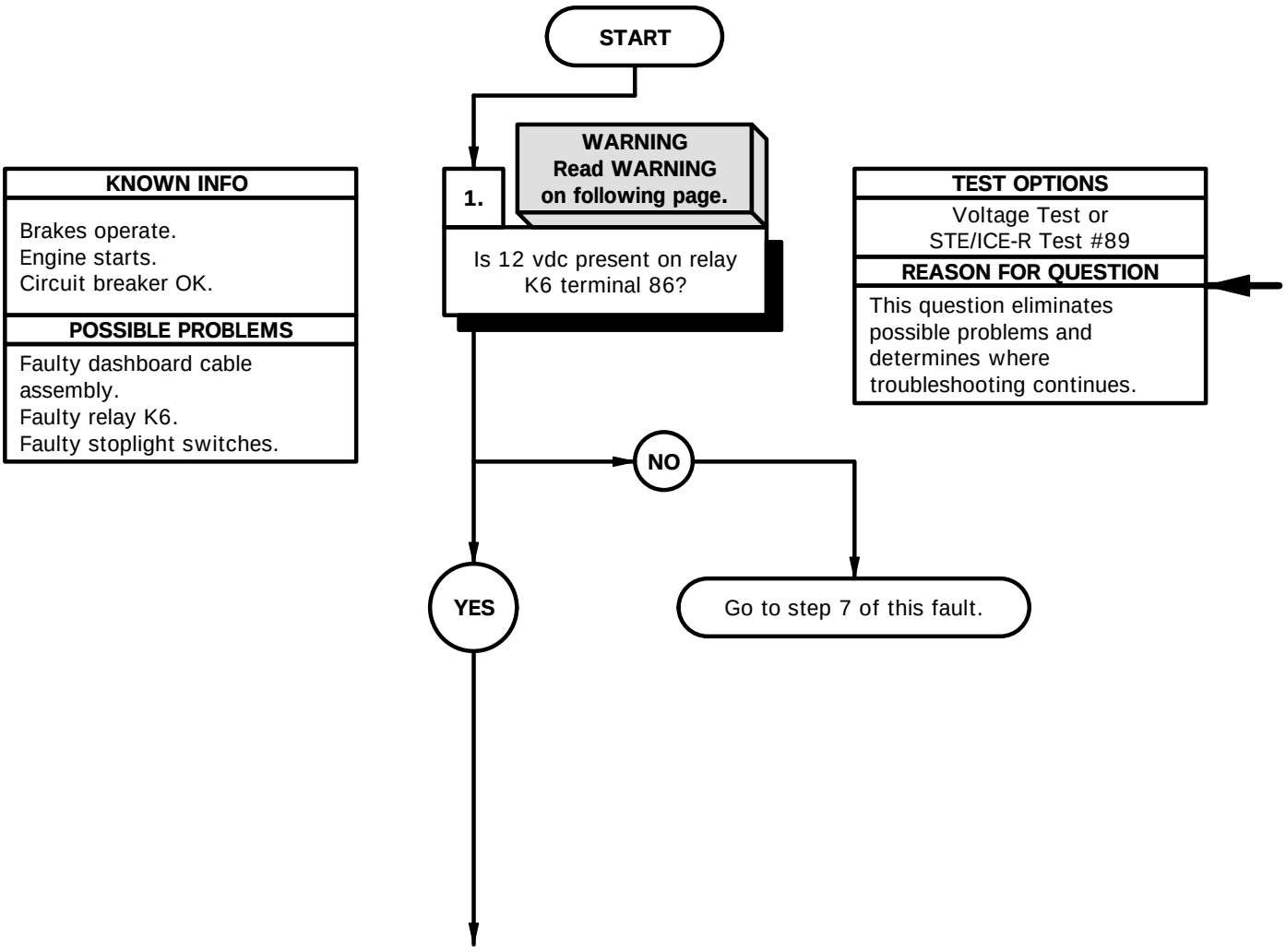
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

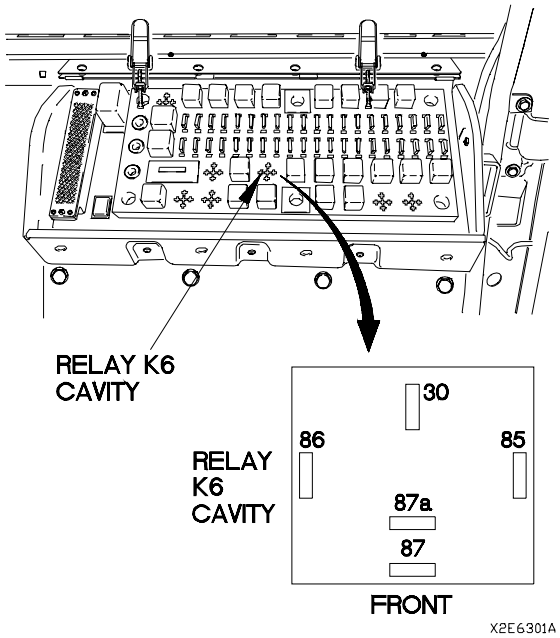


**WARNING**

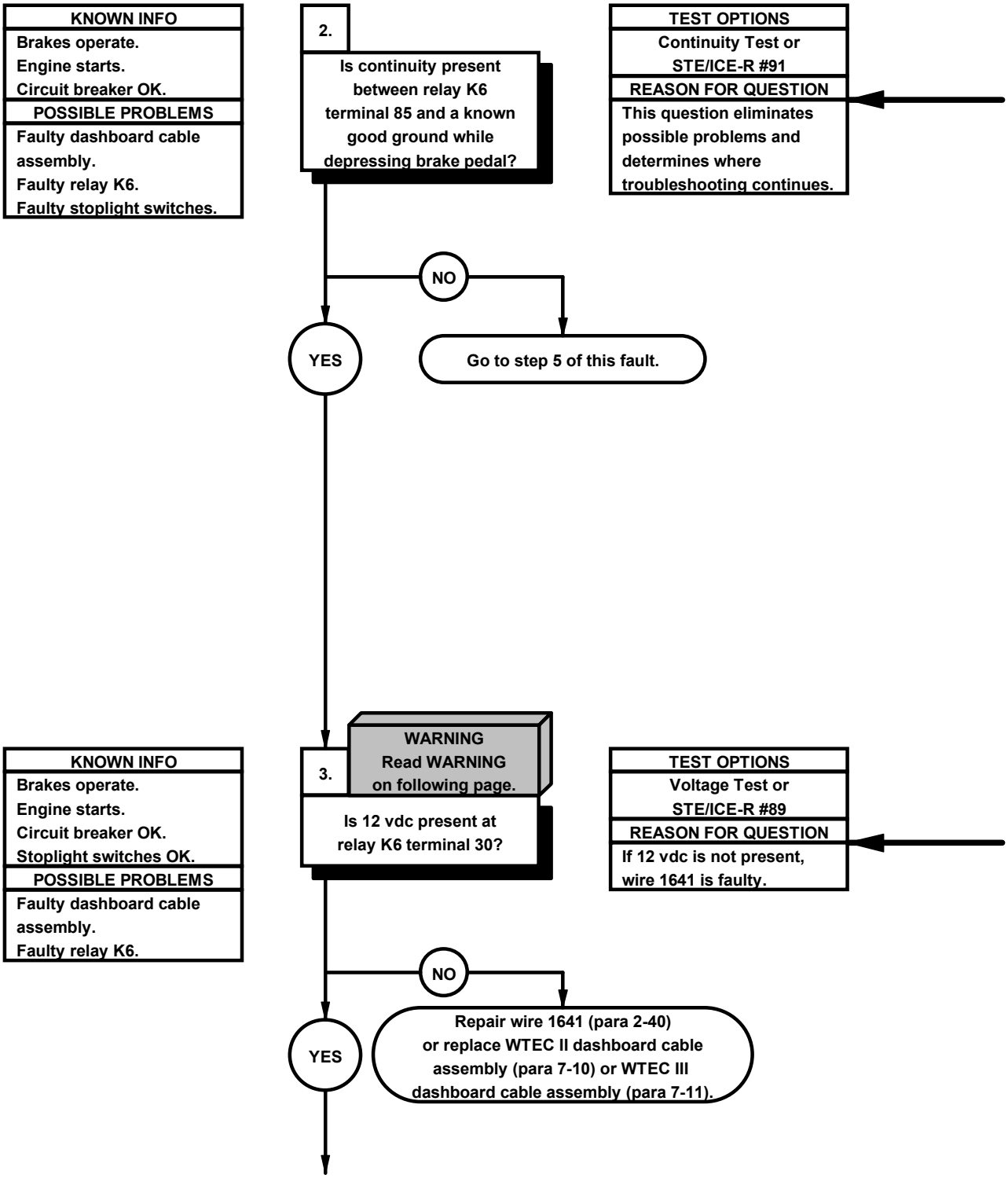
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Remove PDP cover (para 16-2).**
**(2) Remove relay K6 from PDP.**
**(3) Set multimeter to volts dc.**
**(4) Connect positive (+) probe of multimeter to PDP, terminal 86, where relay K6 was removed.**
**(5) Connect negative (-) probe of multimeter to ground.**
**(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(7) If 12 vdc is not present, go to step 7 of this fault.**
**(8) Position master power switch to off (TM 9-2320-365-10).**



## e61. STOPLIGHTS AND BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT)



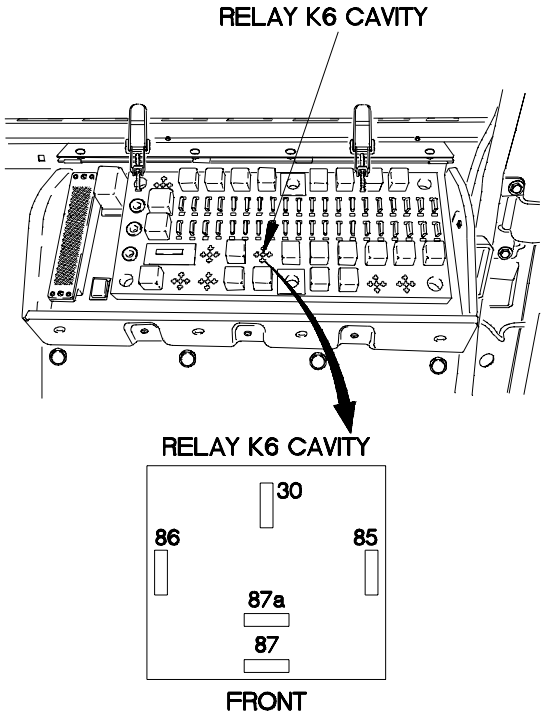
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K6 was removed.
(3) Connect negative (-) probe of multimeter to ground.

**NOTE**

Full system air pressure is required to actuate stoplights.

(4) Apply brakes (TM 9-2320-365-10) and note reading on multimeter.
(5) If continuity is not present, go to step 5 of this fault.



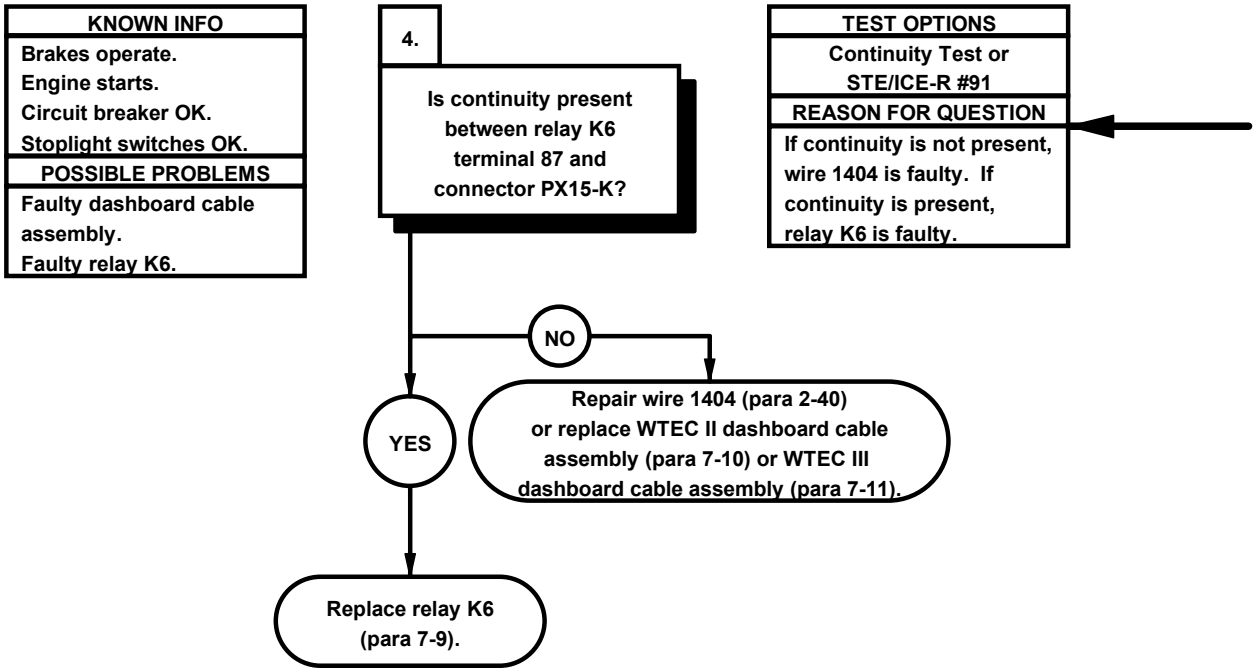

**WARNING**

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

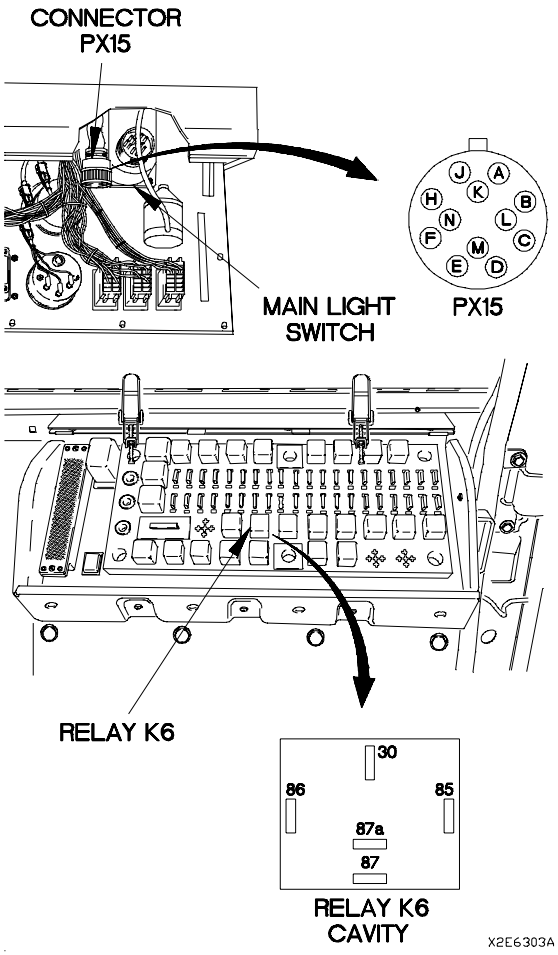
(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to PDP, terminal 30, where relay K6 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 vdc is not present, repair wire 1641 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position master power switch to off (TM 9-2320-365-10).

## e61. STOPLIGHTS AND BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT)

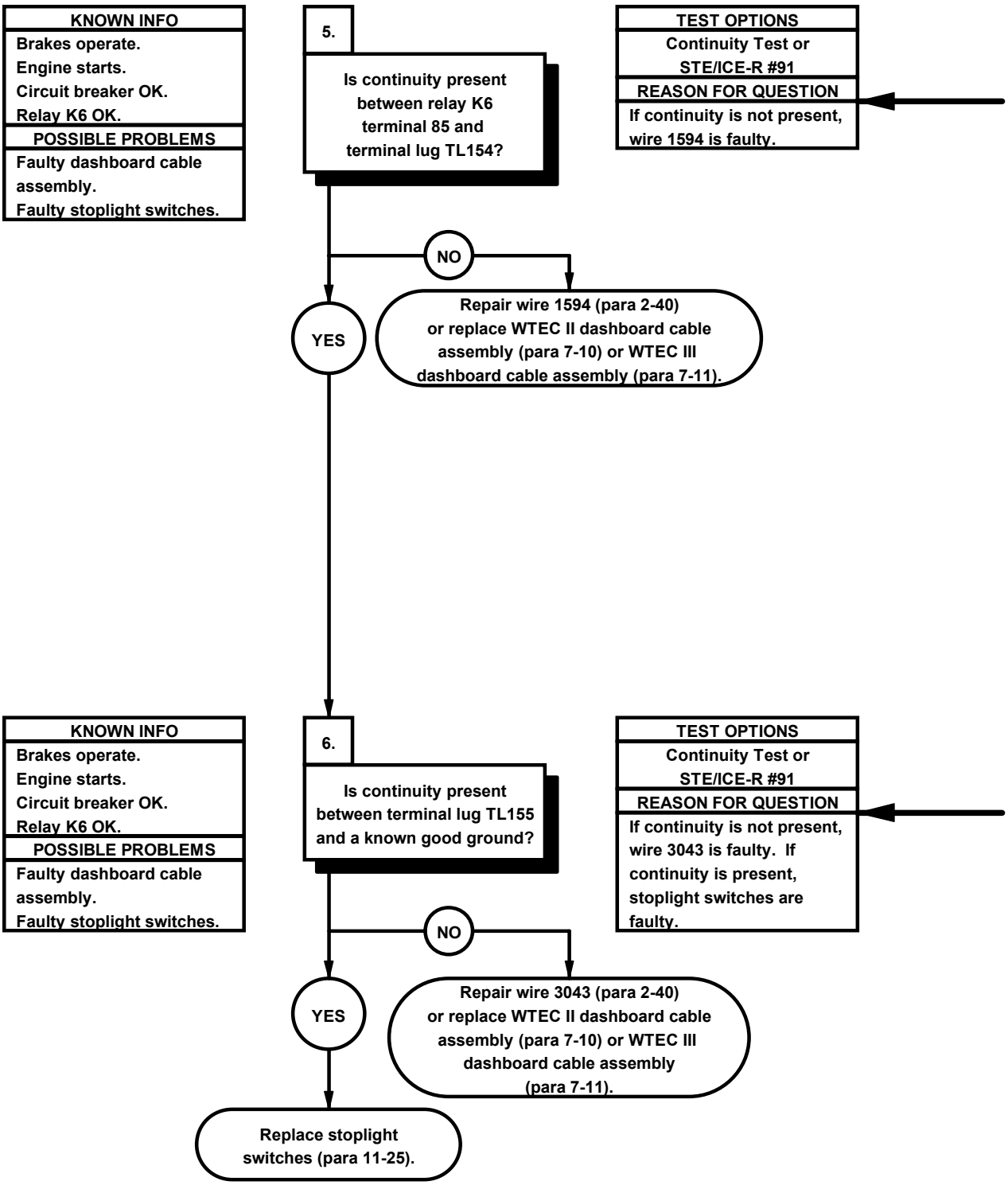


**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX15 from main light switch.
(3) Connect positive (+) probe of multimeter to connector PX15-K.
(4) Connect negative (-) probe of multimeter to PDP, terminal 87, where relay K6 was removed, and note reading on multimeter.
(5) If continuity is not present, repair wire 1404 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace relay K6 (para 7-9).
(7) Install relay K6 in PDP.
(8) Install PDP cover (para 16-2).
(9) Connect connector PX15 to main light switch.
(10) Install instrument panel assembly (para 7-15).

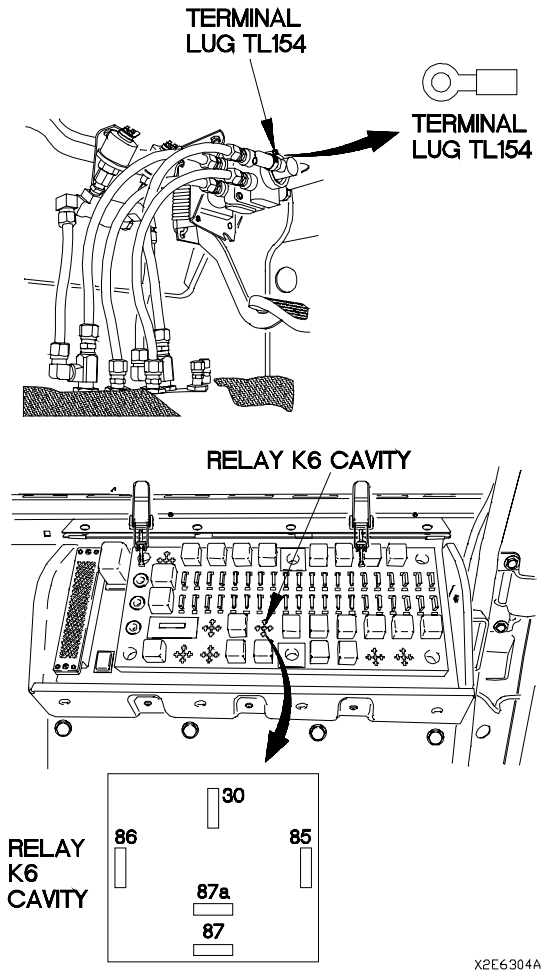


## e61. STOPLIGHTS AND BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT)



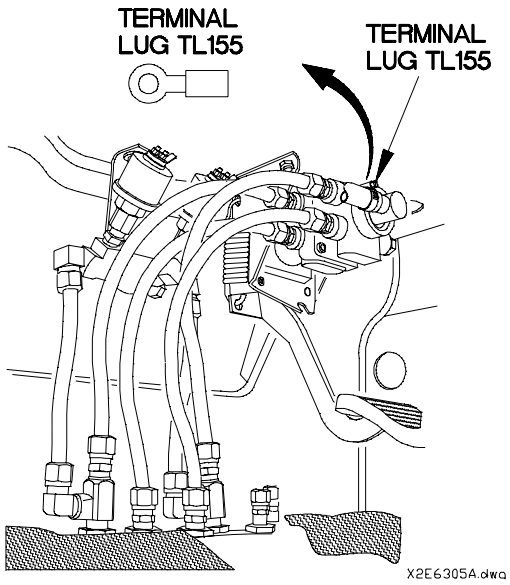
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL154.
(3) Connect negative (-) probe of multimeter to PDP, terminal 85, where relay K6 was removed, and note reading on multimeter.
(4) If continuity is not present, repair wire 1594 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) Install relay K6 in PDP.
(6) Install PDP cover (para 16-2).

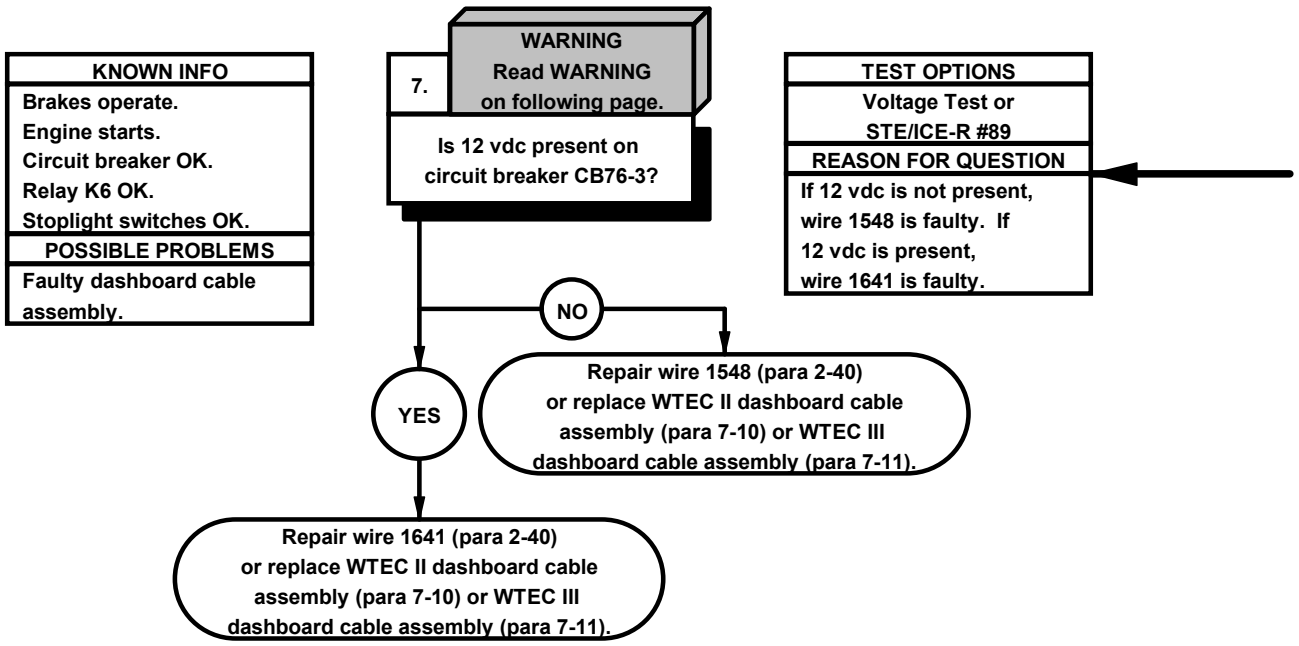



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL155.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3043 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace both stoplight switches (para 11-25).



## e61. STOPLIGHTS AND BLACKOUT STOPLIGHTS DO NOT OPERATE (CONT)

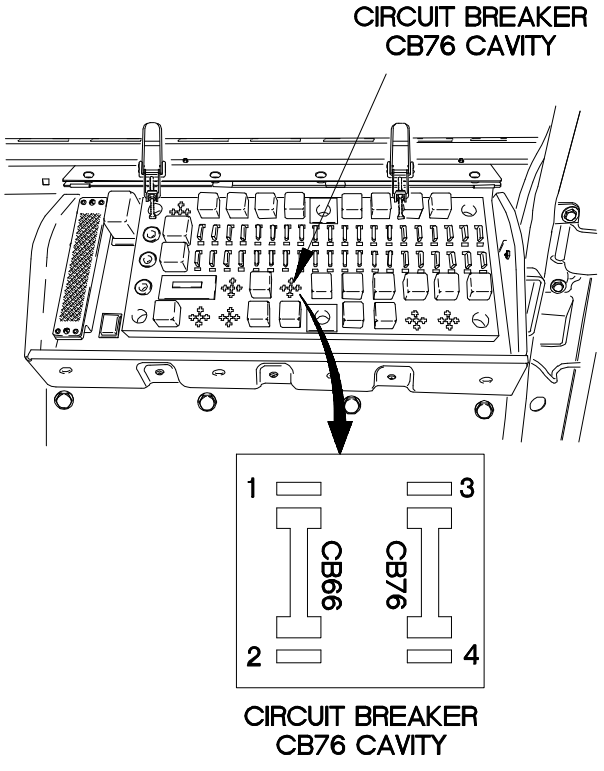


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove circuit breaker CB76 from PDP.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to PDP, terminal 3, where circuit breaker CB76 was removed.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 vdc is not present, repair wire 1548 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If 12 vdc is present, repair wire 1641 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position master power switch to off (TM 9-2320-365-10).
(9) Install circuit breaker CB76 in PDP.
(10) Install relay K6 in PDP.
(11) Install PDP cover (para 16-2).



## e62. TRAILER MARKER/TAILLIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

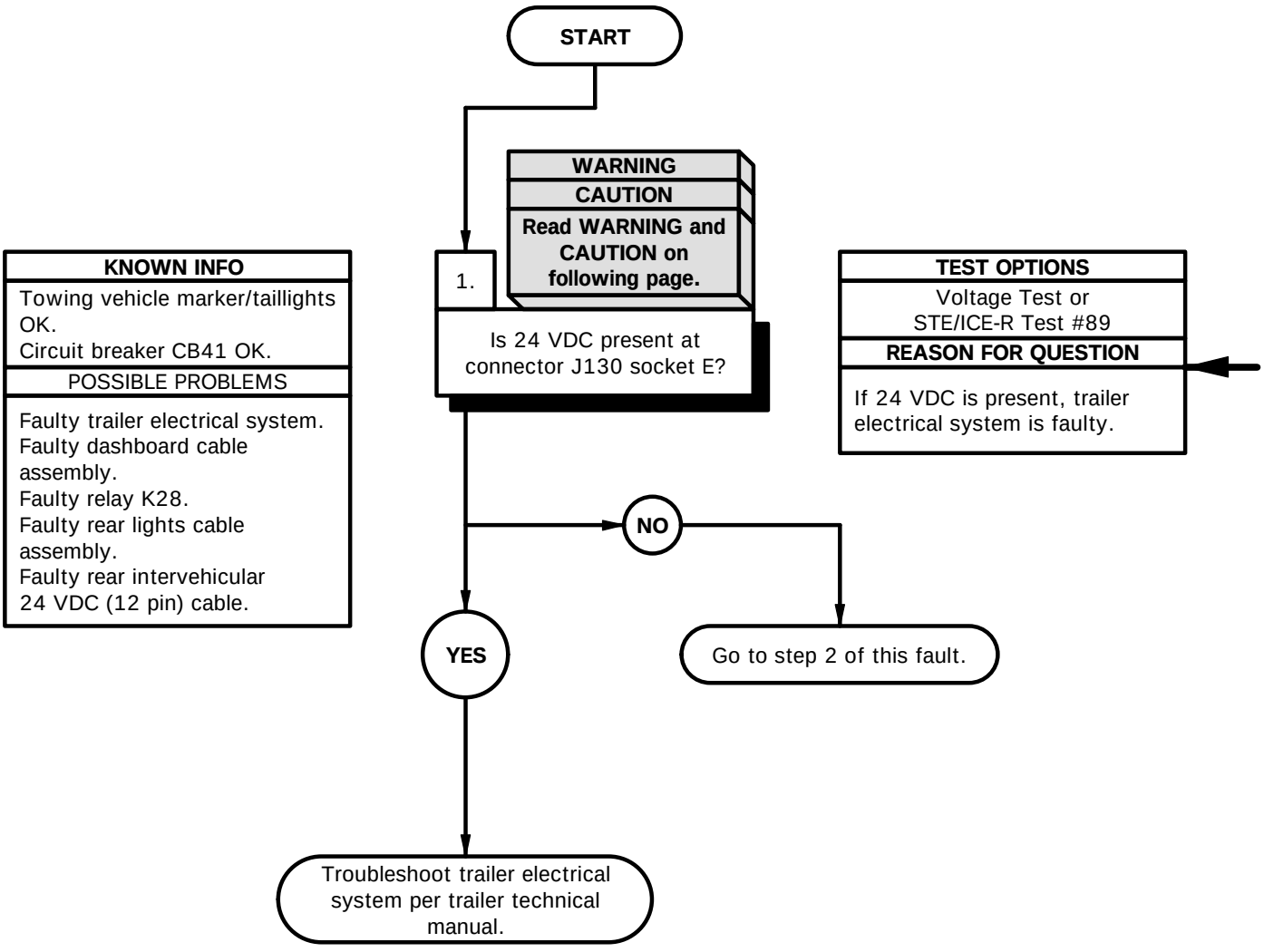
**Material/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB41 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

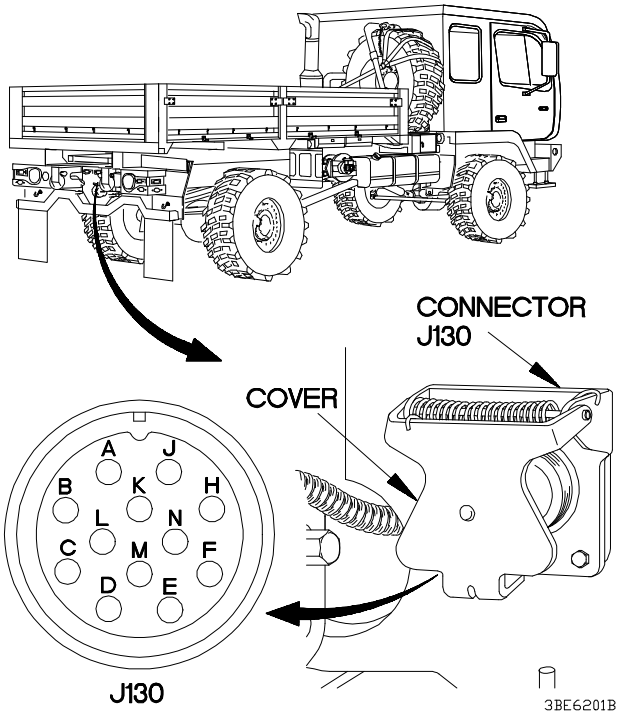
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

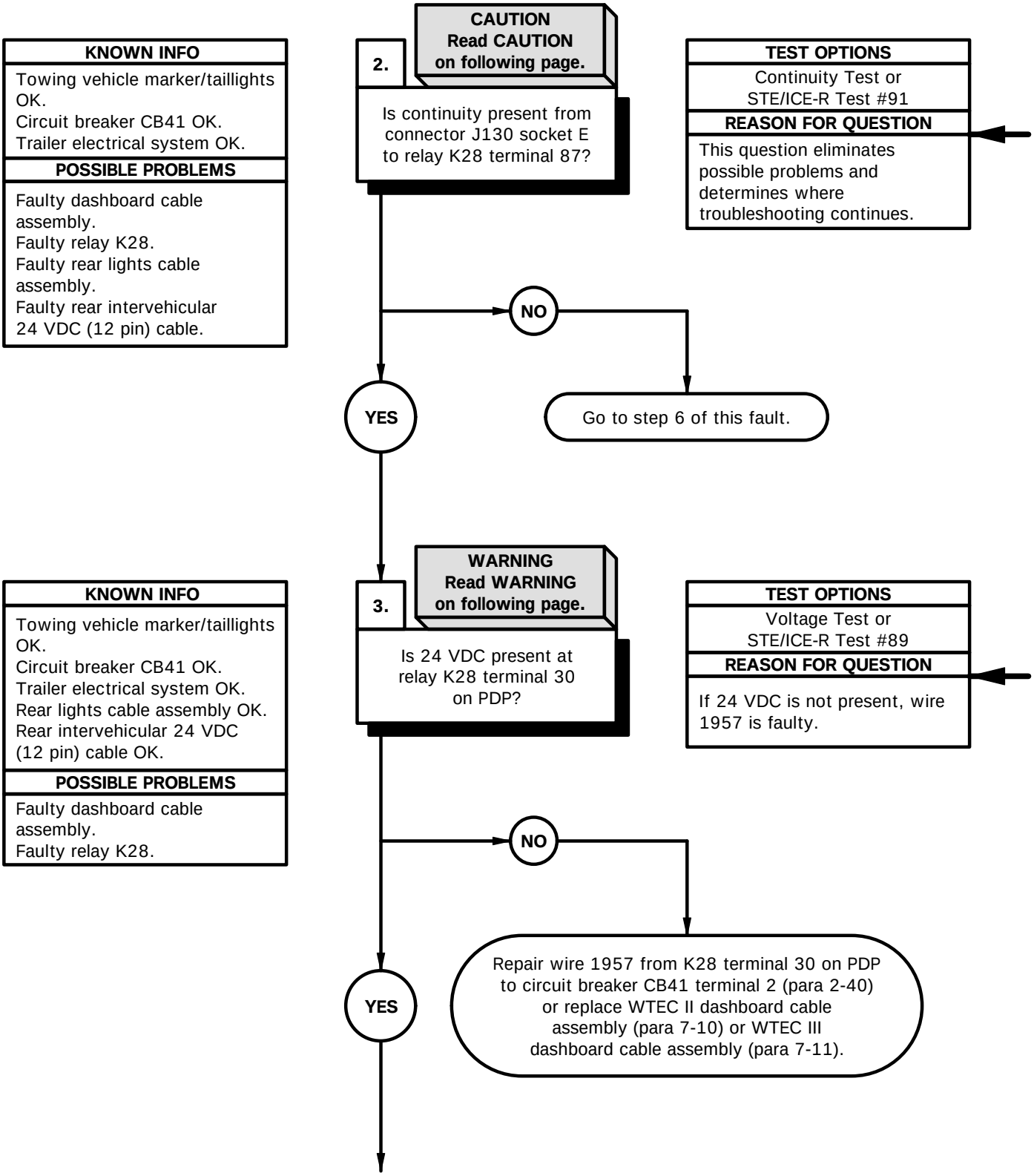
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J130 intervehicular 24 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J130 socket E.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 VDC is not present, go to step 2 of this fault.
(7) If 24 VDC is present, troubleshoot trailer electrical system per trailer technical manual.
(8) Position main light switch to OFF (TM 9-2320-365-10).



## e62. TRAILER MARKER/TAILLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

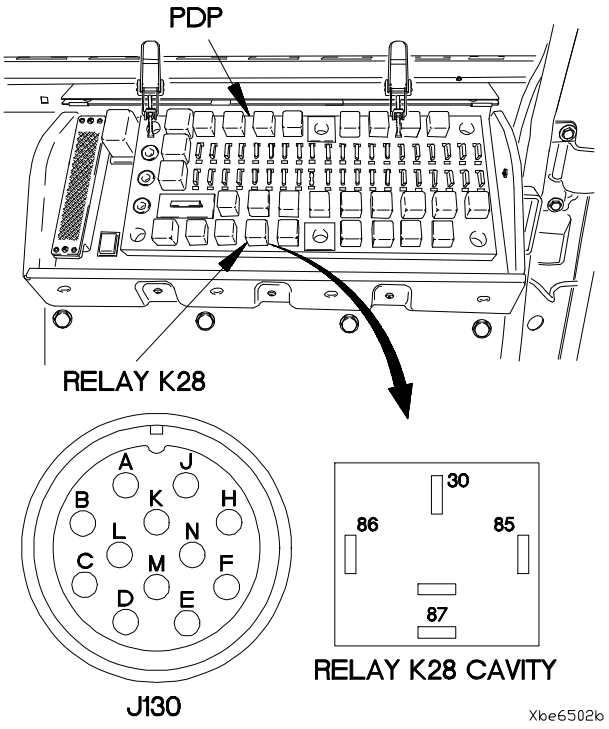
(1) Remove PDP cover (para 16-2).
(2) Remove relay K28 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J130 socket E.
(5) Connect negative (-) probe of multimeter to relay K28 terminal 87 on PDP and note reading on multimeter.
(6) If continuity is not present, go to step 6 of this fault.

**WARNING**

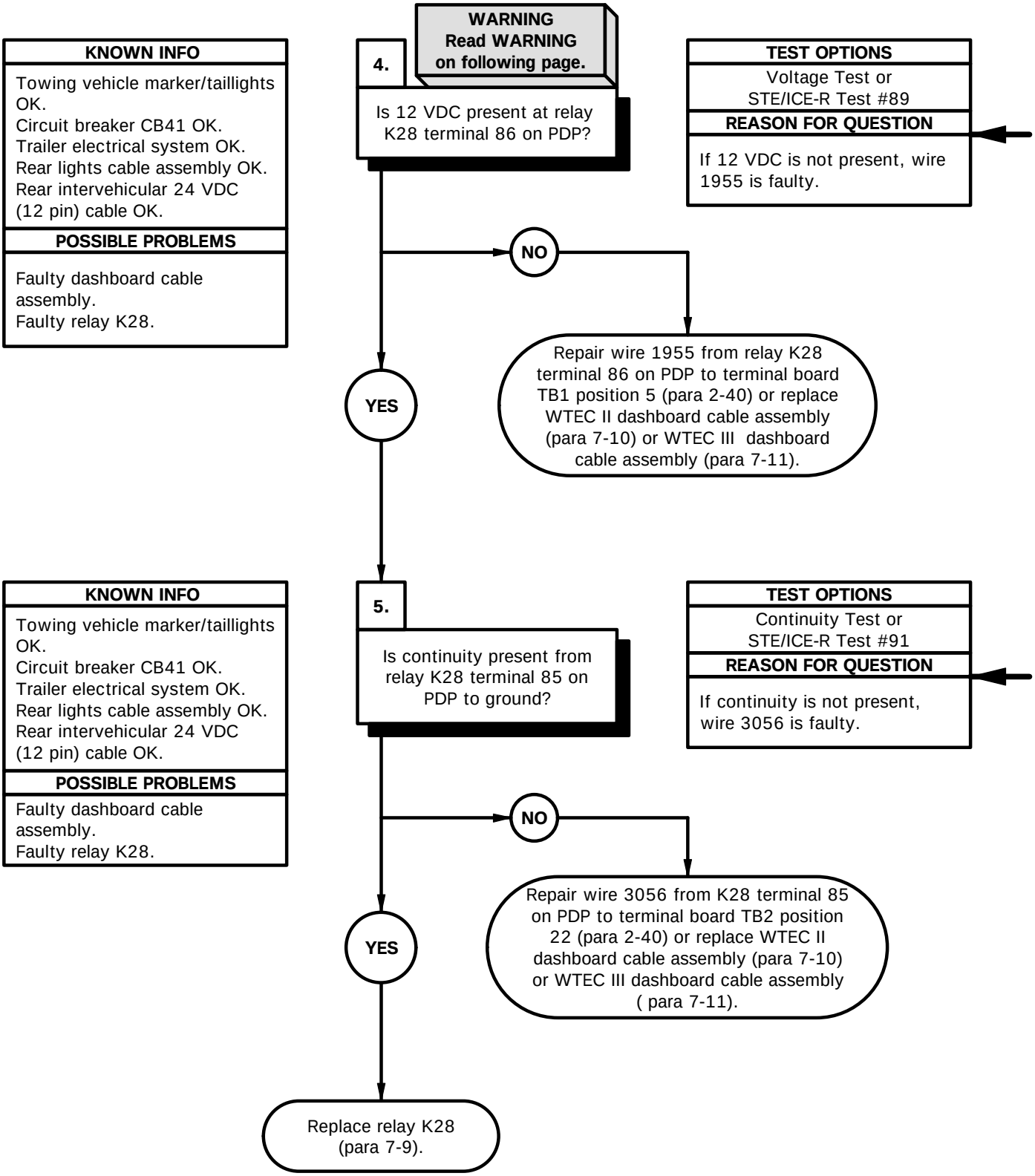
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K28 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 1957 from K28 terminal 30 on PDP to circuit breaker CB41 terminal 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).



## e62. TRAILER MARKER/TAILLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

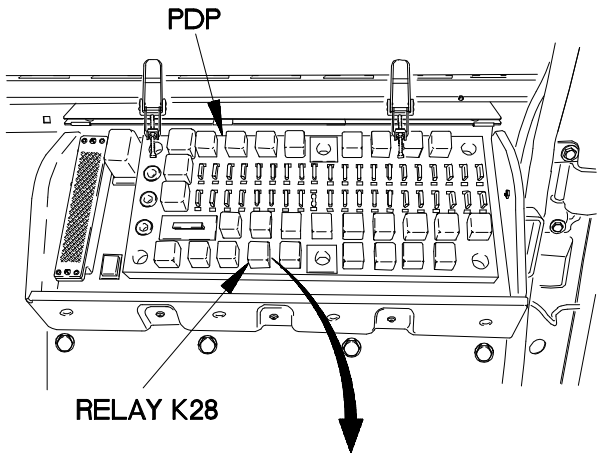
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

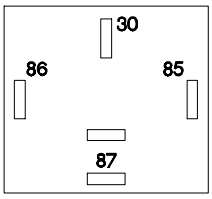
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K28 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1955 from relay K28 terminal 86 on PDP to terminal board TB1 position 5 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K28 terminal 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3056 from K28 terminal 85 on PDP to terminal board TB2 position 22 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K28 (para 7-9).
(6) Install relay K28 in PDP.
(7) Install PDP cover (para 16-2).

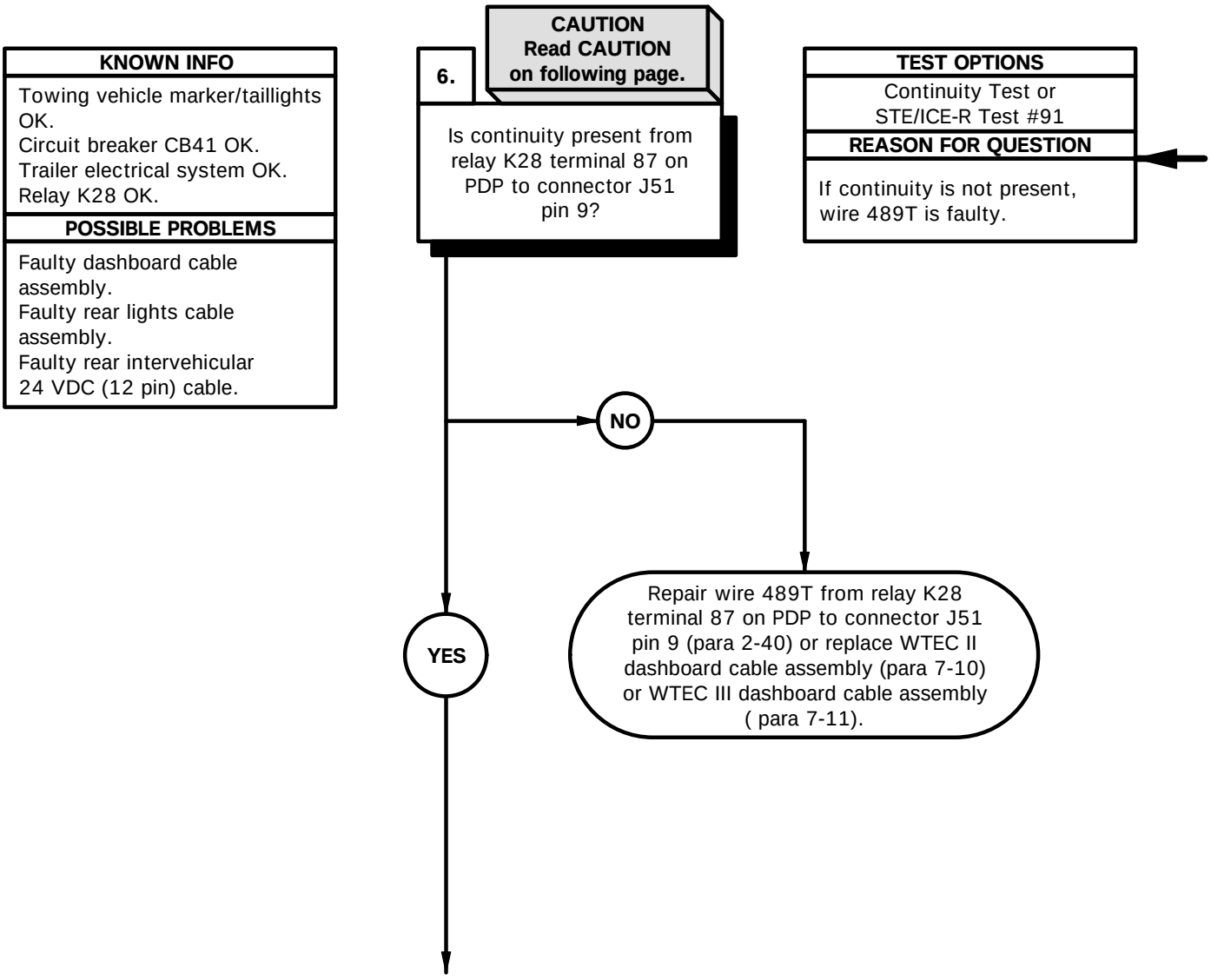



RELAY K28 CAVITY

Xbe6503b

## e62. TRAILER MARKER/TAILLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

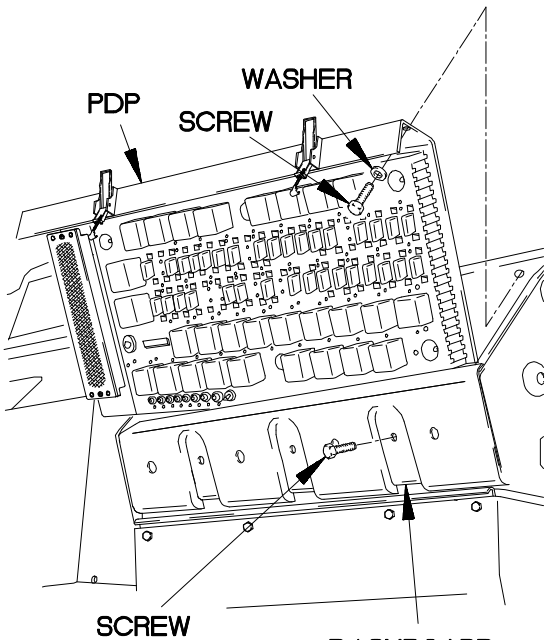
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

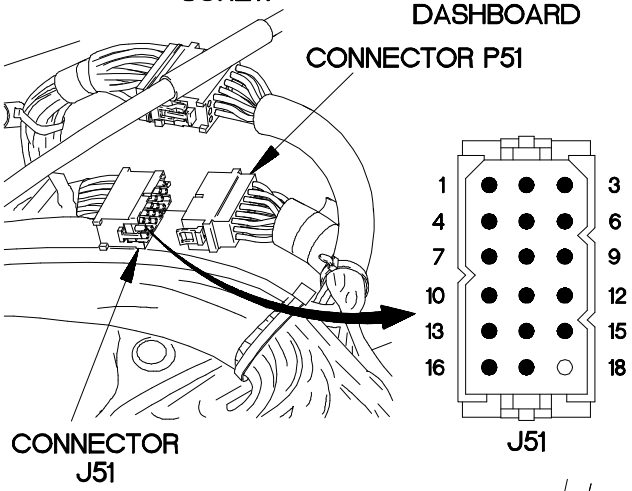
**NOTE**

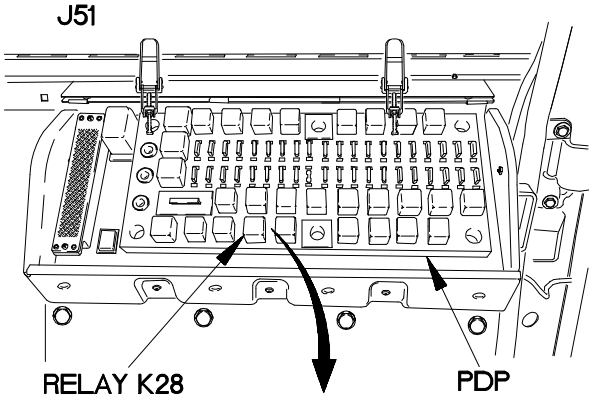
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

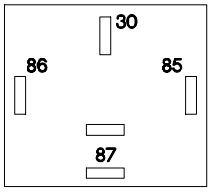
**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J51 from connector P51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to relay K28 terminal 87 on PDP.
(7) Connect negative (-) probe of multimeter to connector J51 pin 9 and note reading on multimeter.
(8) If continuity is not present, repair wire 489T from relay K28 terminal 87 on PDP to connector J51 pin 9 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Install relay K28 in PDP.



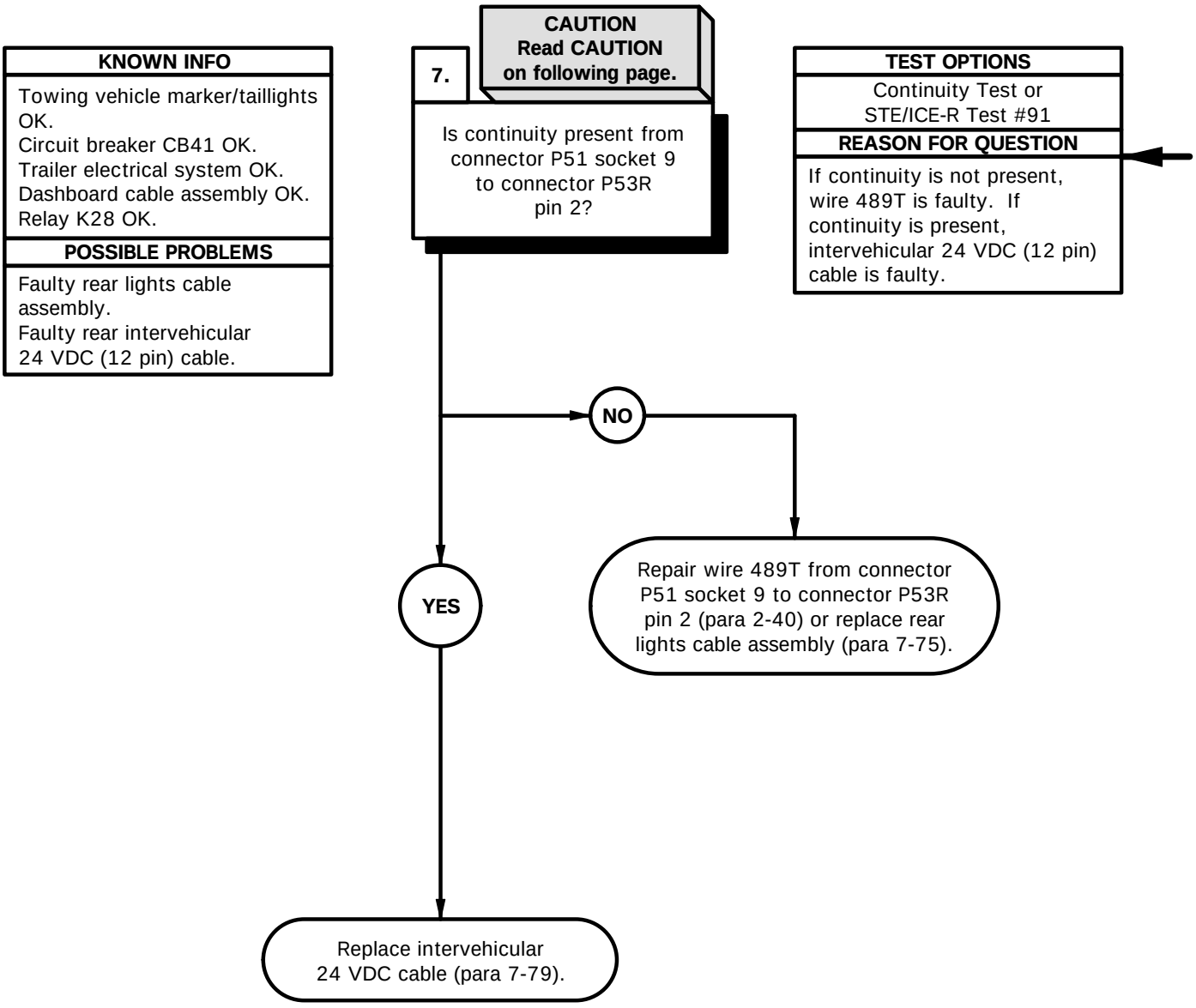




RELAY K28 CAVITY

Xbe6504b

## e62. TRAILER MARKER/TAILLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

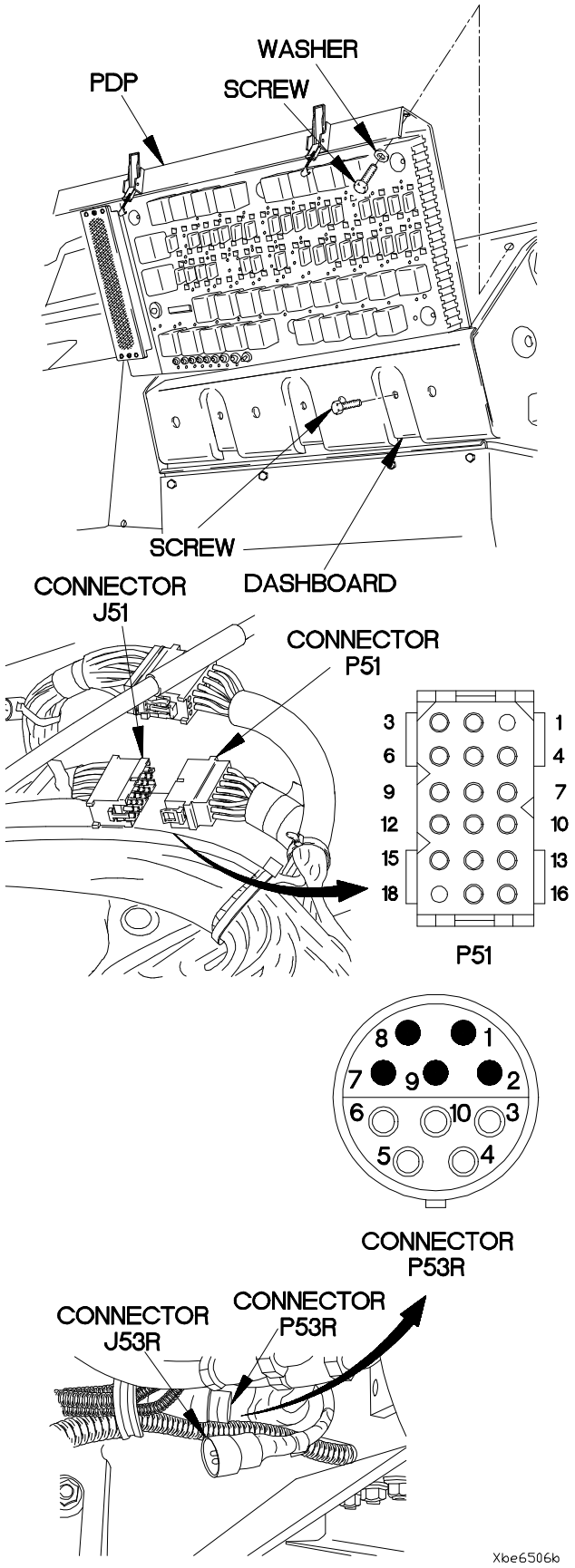
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P53R from connector J53R.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 9.
(4) Connect negative (-) probe of multimeter to connector P53R pin 2 and note reading on multimeter.
(5) If continuity is not present, repair wire 489T from connector P51 socket 9 to connector P53R pin 2 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace intervehicular 24 VDC (12 pin) cable (para 7-79).
(7) Connect connector P53R to connector J53R.
(8) Connect connector P51 to connector J51.
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install PDP cover (para 16-2).



## e63. TRAILER RIGHT STOP/TURN LIGHT DOES NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

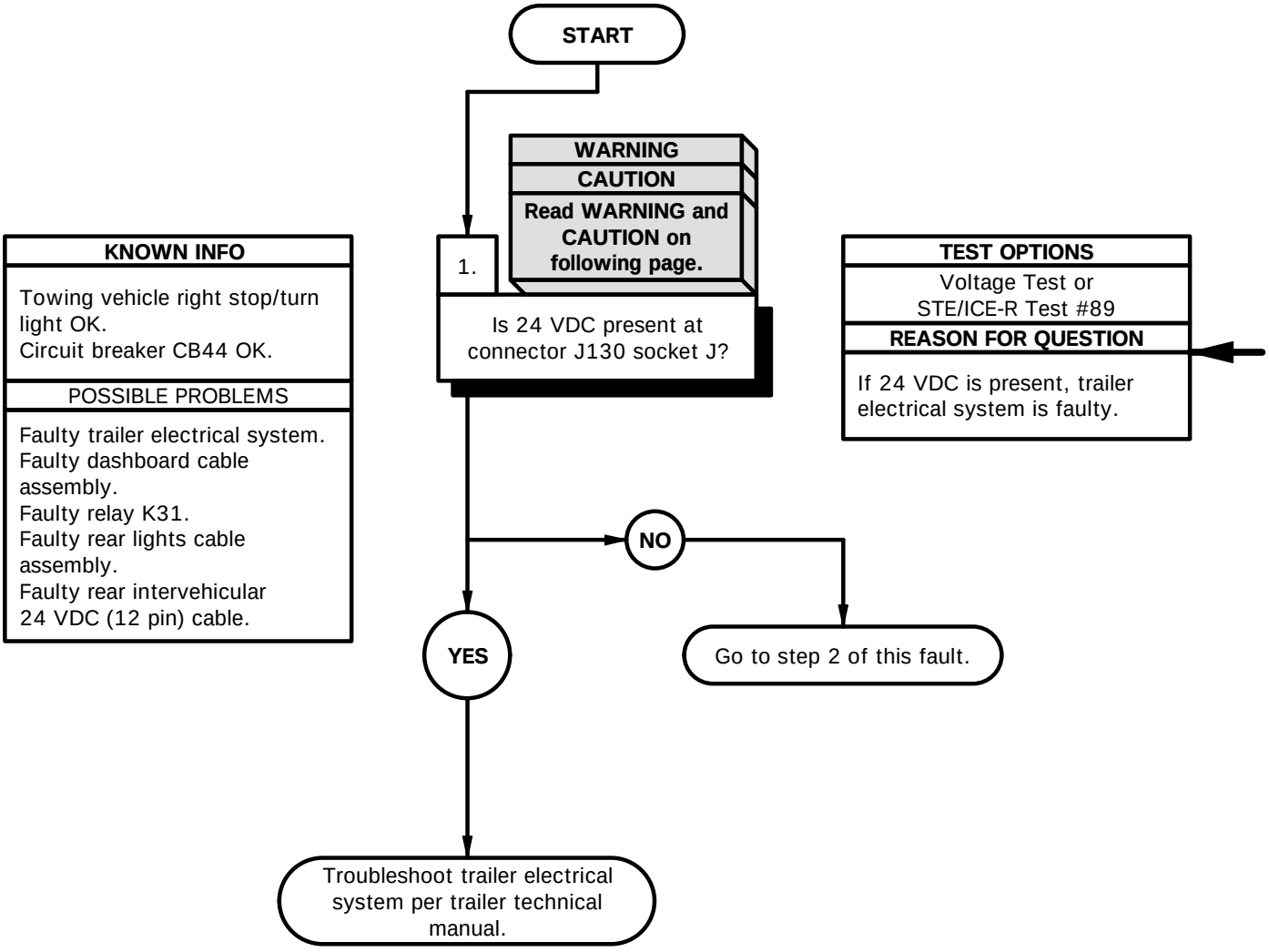
**Material/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB44 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

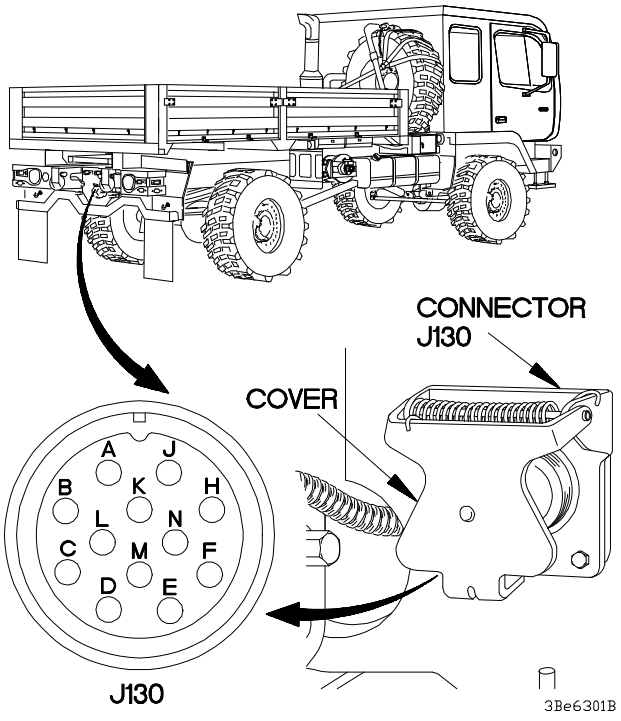
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

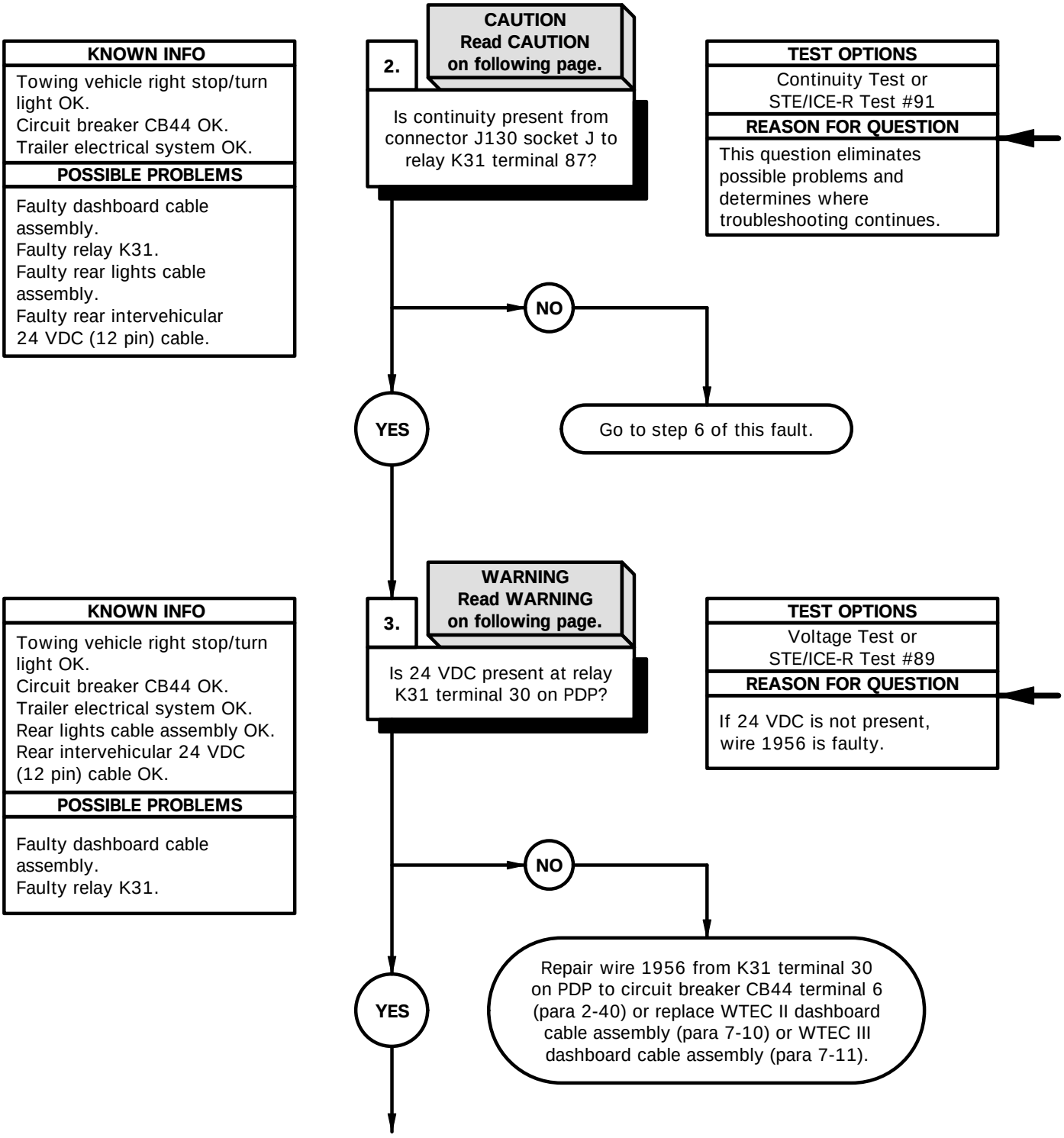
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J130 intervehicular 24 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J130 socket J.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 24 VDC is not present, go to step 2 of this fault.
(9) If 24 VDC is present, troubleshoot trailer electrical system per trailer technical manual.
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Position master power switch to off (TM 9-2320-365-10).



## e63. TRAILER RIGHT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

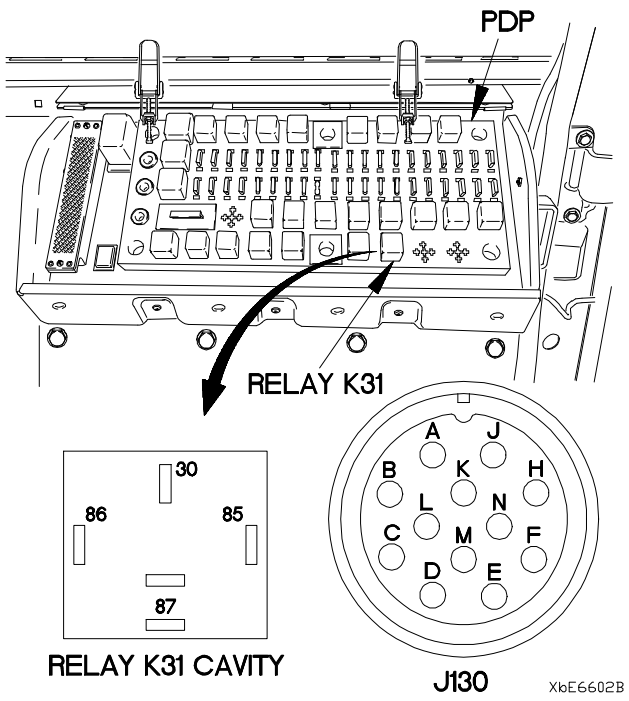
(1) Remove PDP cover (para 16-2).
(2) Remove relay K31 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J130 socket J.
(5) Connect negative (-) probe of multimeter to relay K31 terminal 87 on PDP and note reading on multimeter.
(6) If continuity is not present, go to step 6 of this fault.

**WARNING**

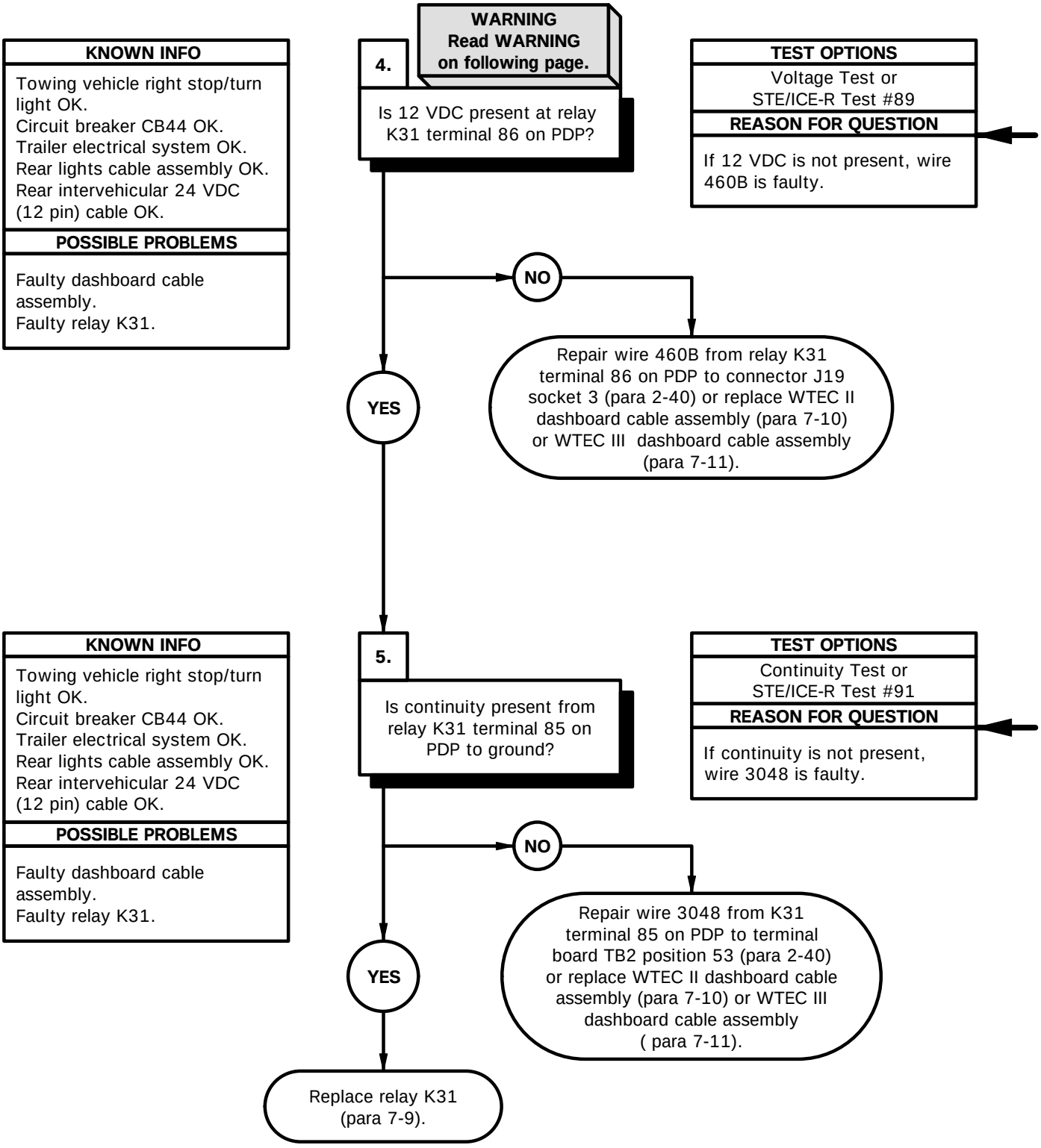
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K31 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 1956 from K31 terminal 30 on PDP to circuit breaker CB44 terminal 6 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).



## e63. TRAILER RIGHT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**WARNING**

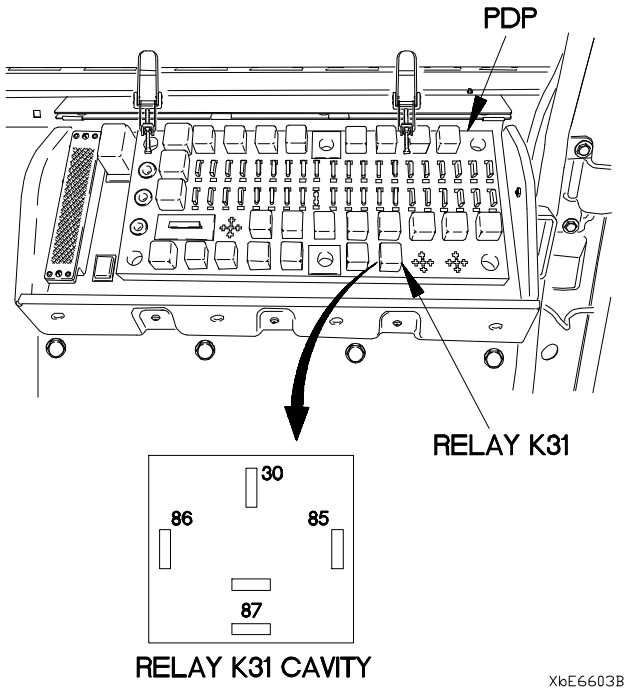
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

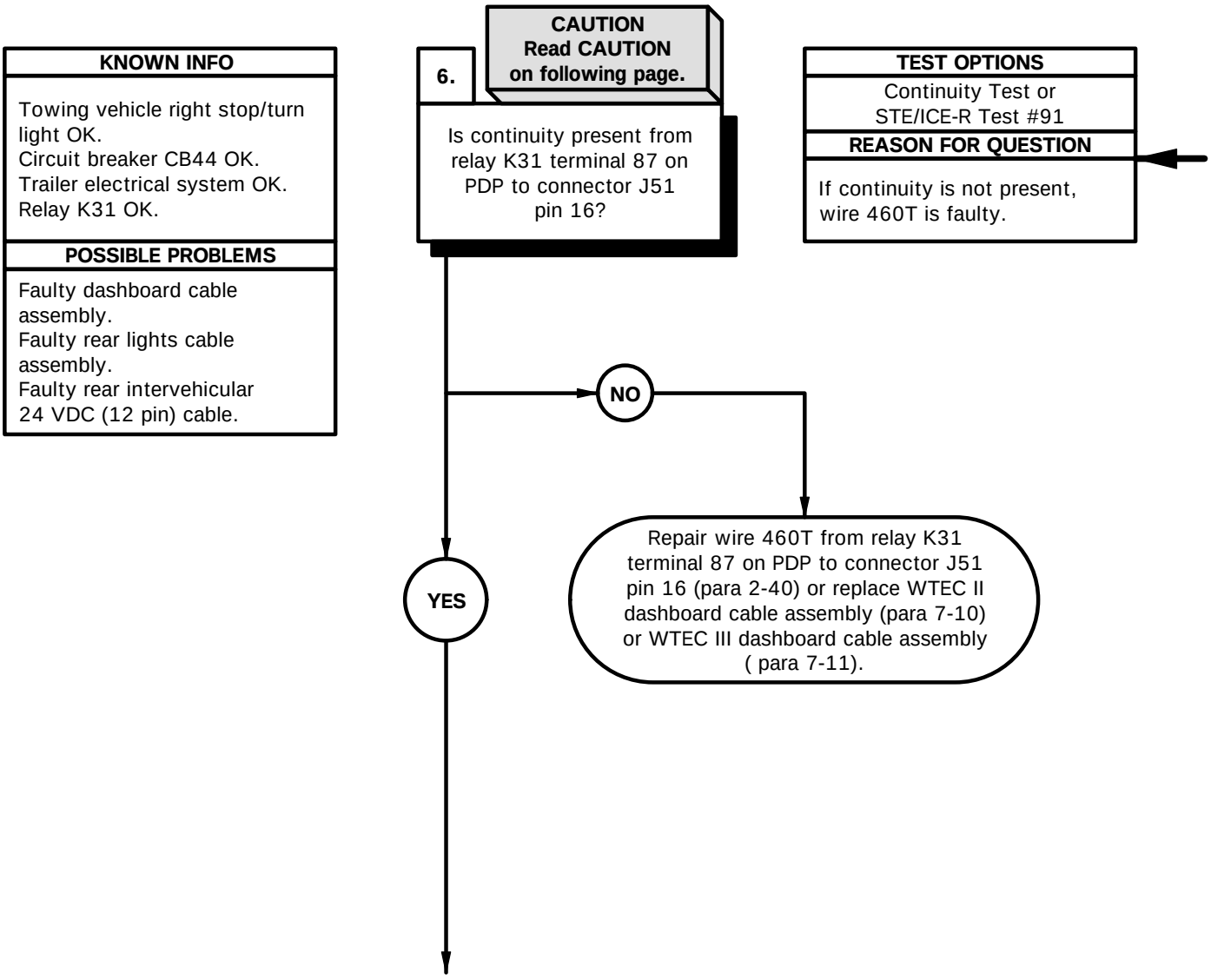
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K31 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Apply brakes and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 460B from relay K31 terminal 86 on PDP to connector J19 socket 3 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Position master power switch to off (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K31 terminal 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3048 from K31 terminal 85 on PDP to terminal board TB2 position 53 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K31 (para 7-9).
(6) Install relay K31 in PDP.
(7) Install PDP cover (para 16-2).



## e63. TRAILER RIGHT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

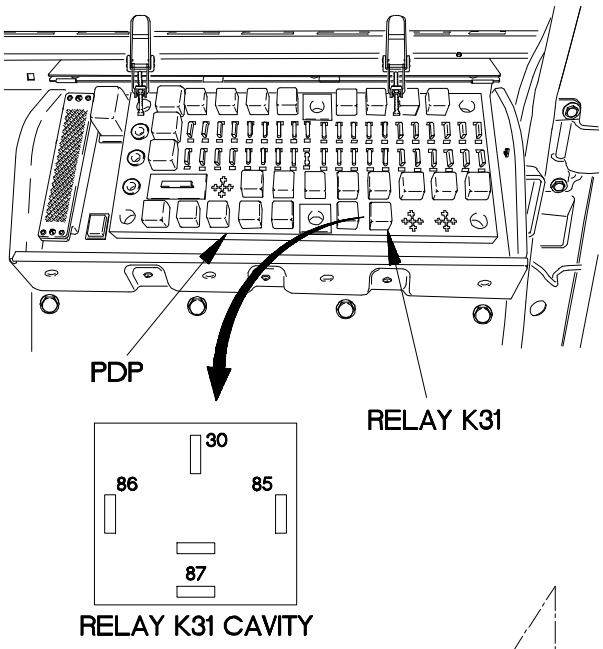
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

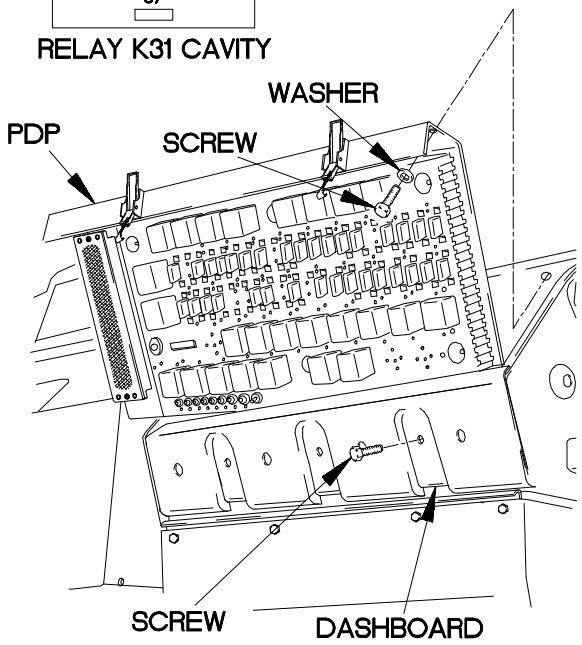
**NOTE**

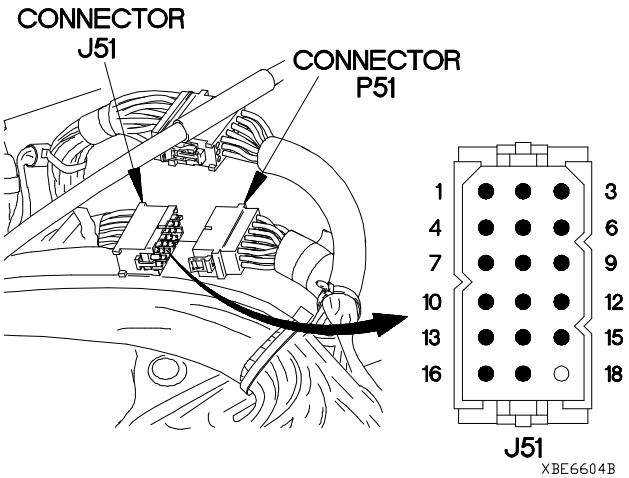
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

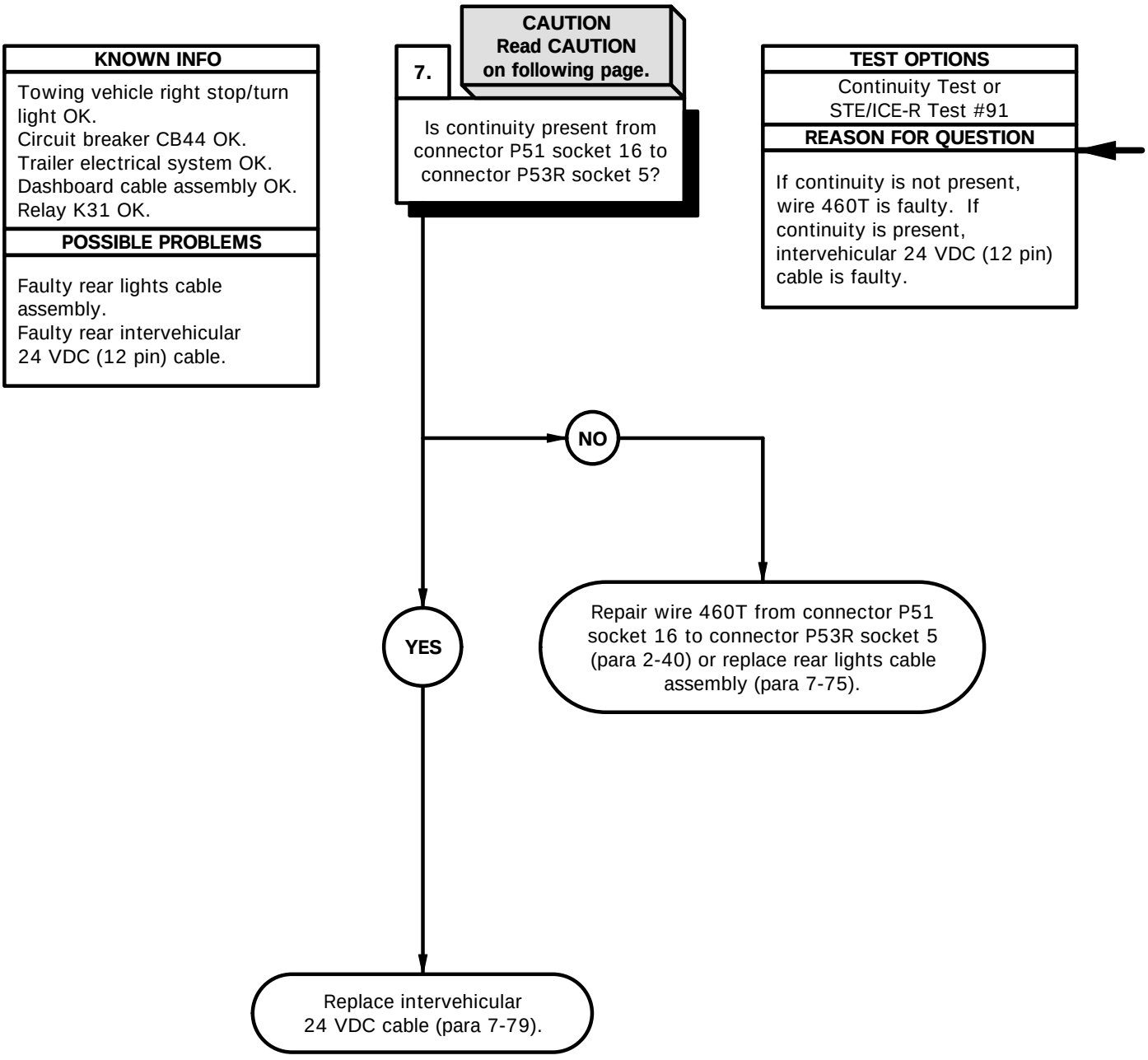
(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J51 from connector P51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to relay K31 terminal 87 on PDP.
(7) Connect negative (-) probe of multimeter to connector J51 pin 16 and note reading on multimeter.
(8) If continuity is not present, repair wire 460T from relay K31 terminal 87 on PDP to connector J51 pin 16 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Install relay K31 in PDP.



## e63. TRAILER RIGHT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

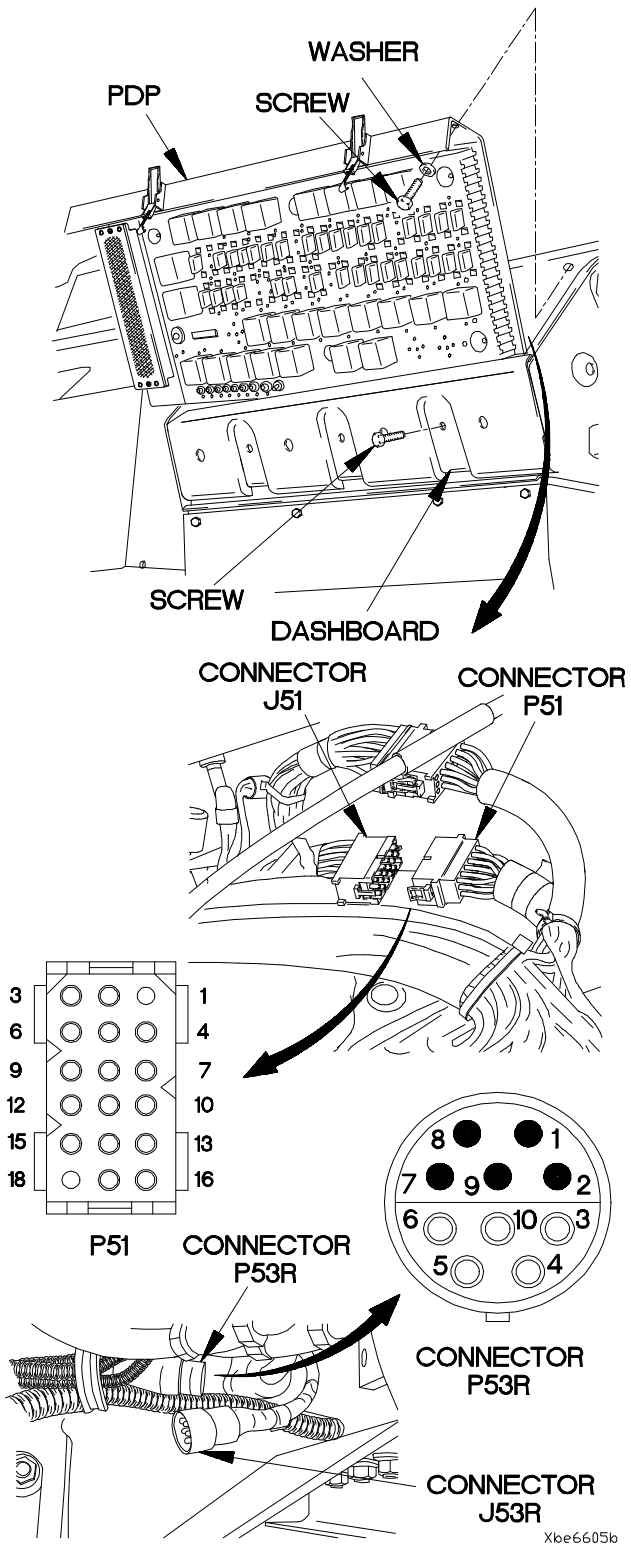
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P53R from connector J53R.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 16.
(4) Connect negative (-) probe of multimeter to connector P53R socket 5 and note reading on multimeter.
(5) If continuity is not present, repair wire 460T from connector P51 socket 16 to connector P53R socket 5 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace intervehicular 24 VDC (12 pin) cable (para 7-79).
(7) Connect connector P53R to connector J53R.
(8) Connect connector P51 to connector J51.
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install PDP cover (para 16-2).



## e64. TRAILER LEFT STOP/TURN LIGHT DOES NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

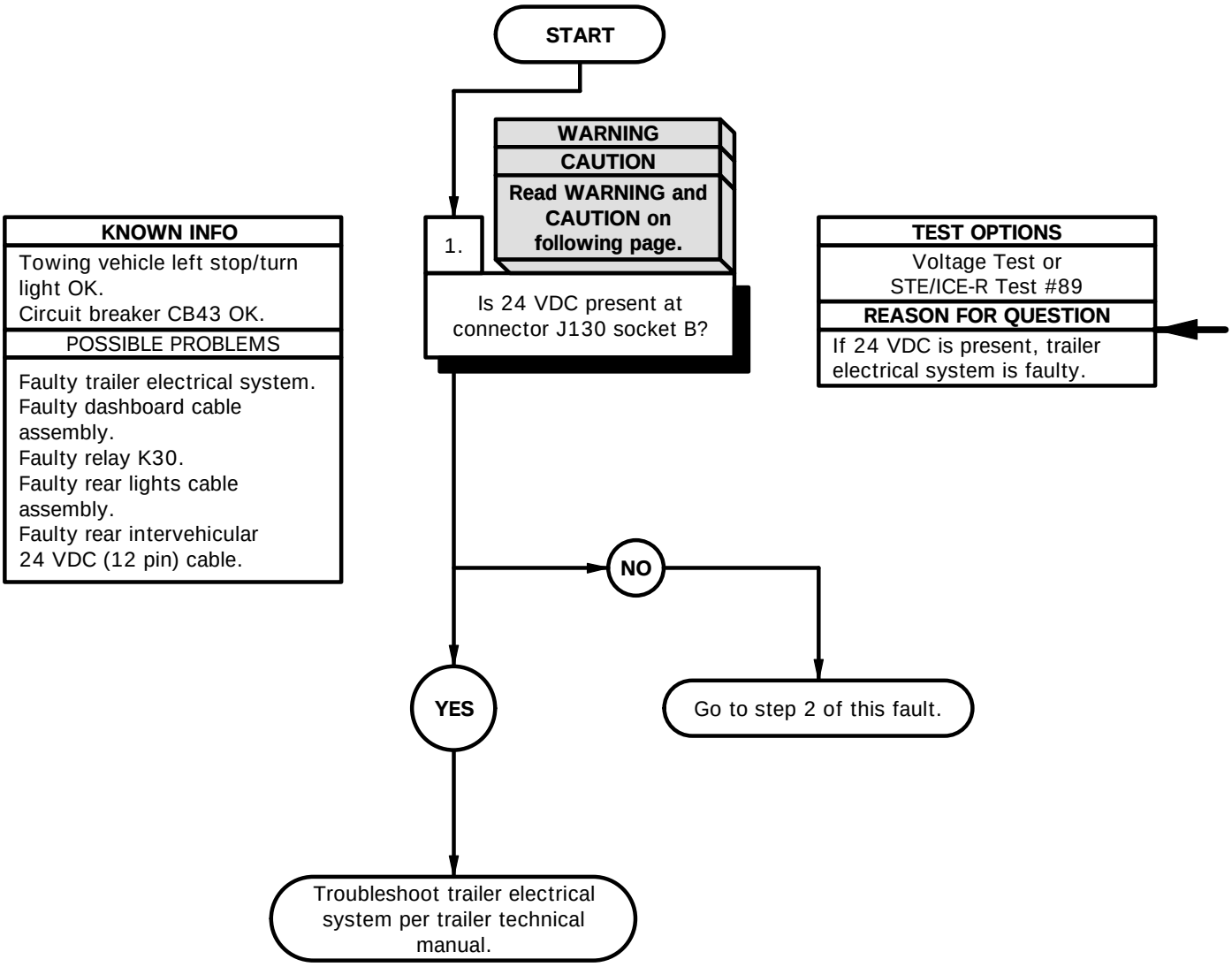
**Material/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB43 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

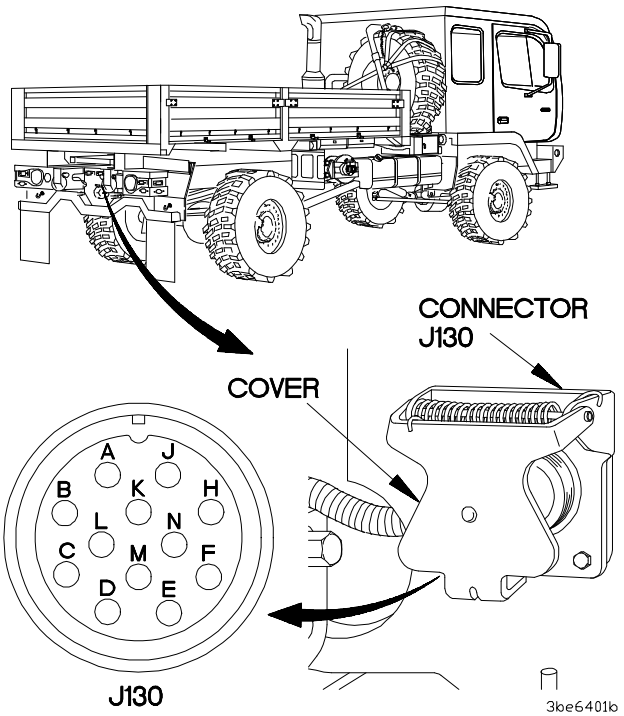
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

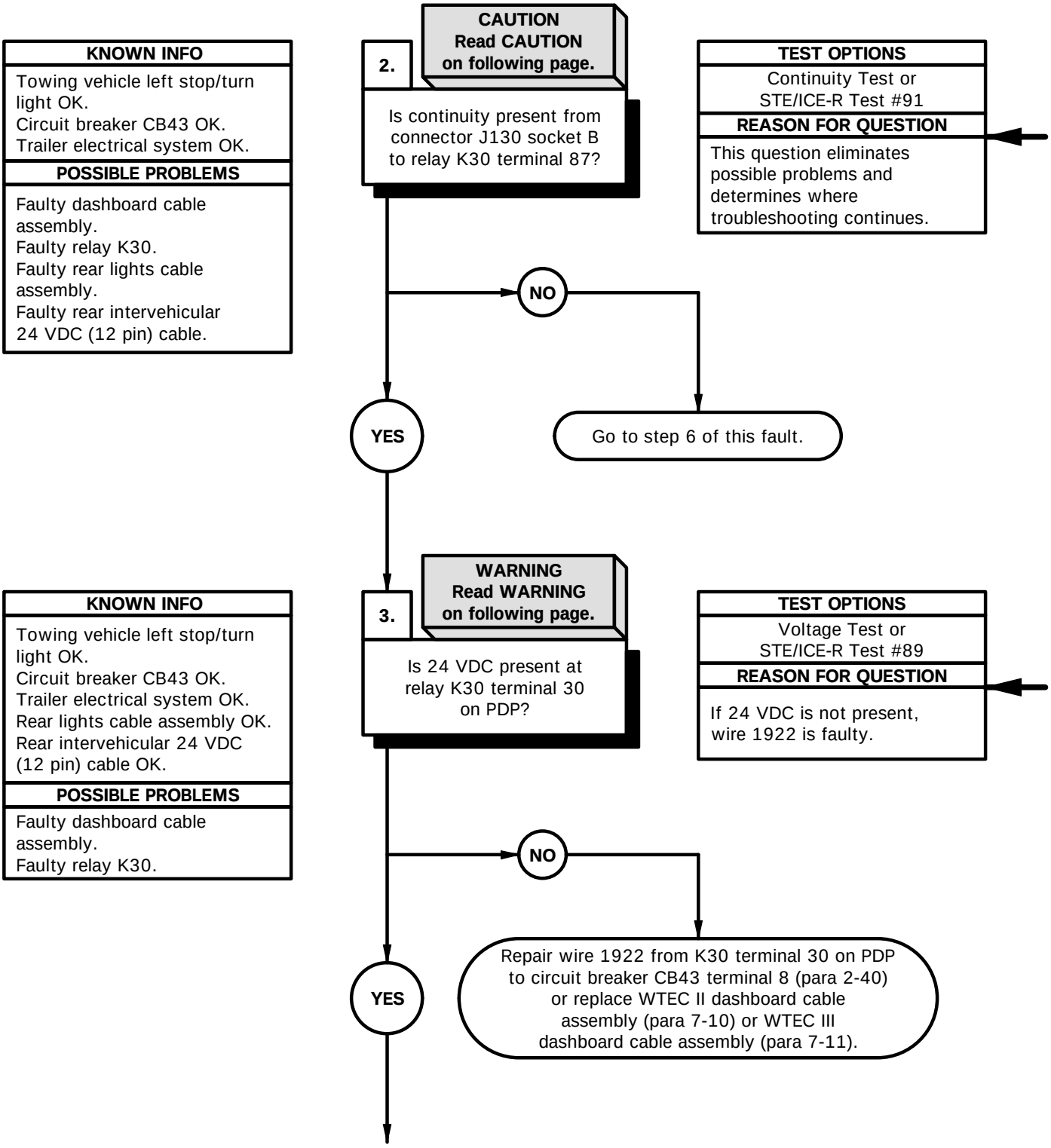
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J130 intervehicular 24 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J130 socket B.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 24 VDC is not present, go to step 2 of this fault.
(9) If 24 VDC is present, troubleshoot trailer electrical system per trailer technical manual.
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Position master power switch to off (TM 9-2320-365-10).



## e64. TRAILER LEFT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

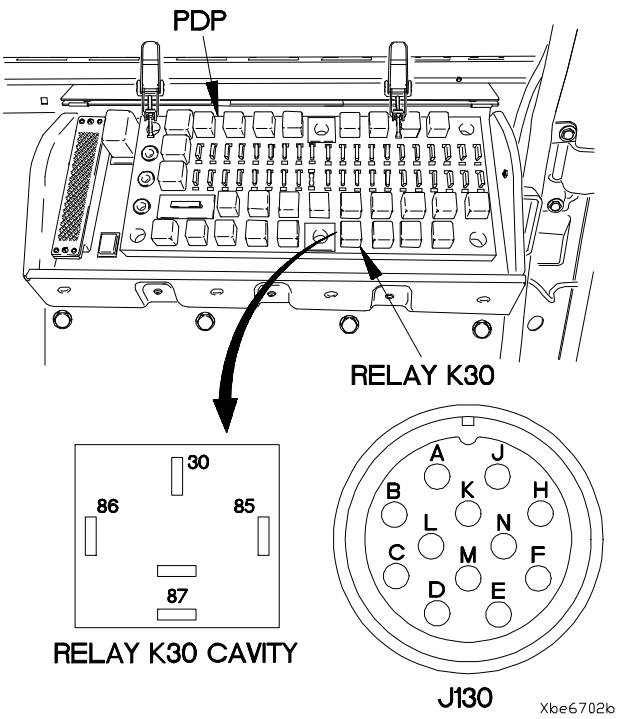
(1) Remove PDP cover (para 16-2).
(2) Remove relay K30 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J130 socket B.
(5) Connect negative (-) probe of multimeter to relay K30 terminal 87 on PDP and note reading on multimeter.
(6) If continuity is not present, go to step 6 of this fault.

**WARNING**

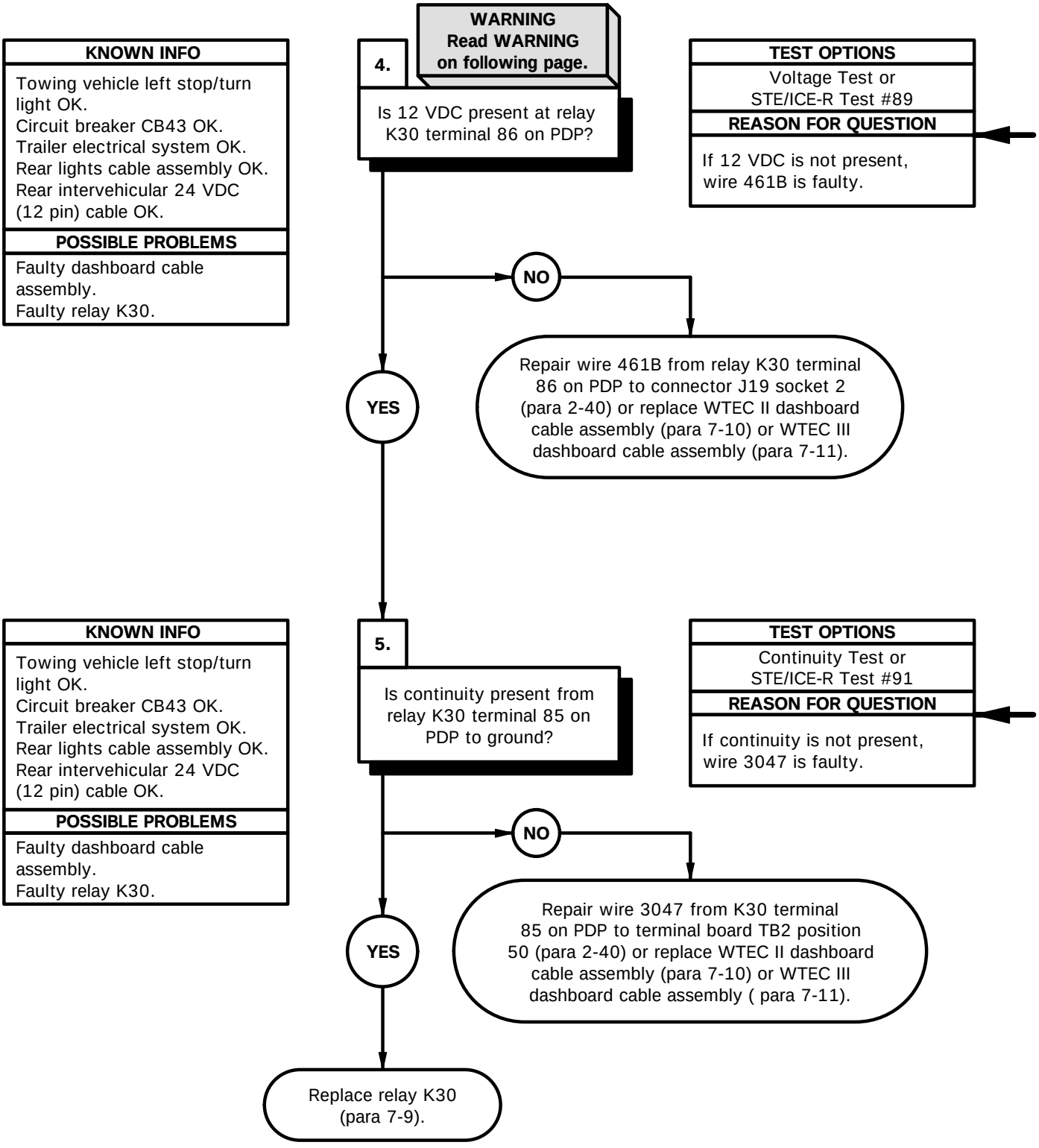
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K30 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 1922 from K30 terminal 30 on PDP to circuit breaker CB43 terminal 8 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).



## e64. TRAILER LEFT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**WARNING**

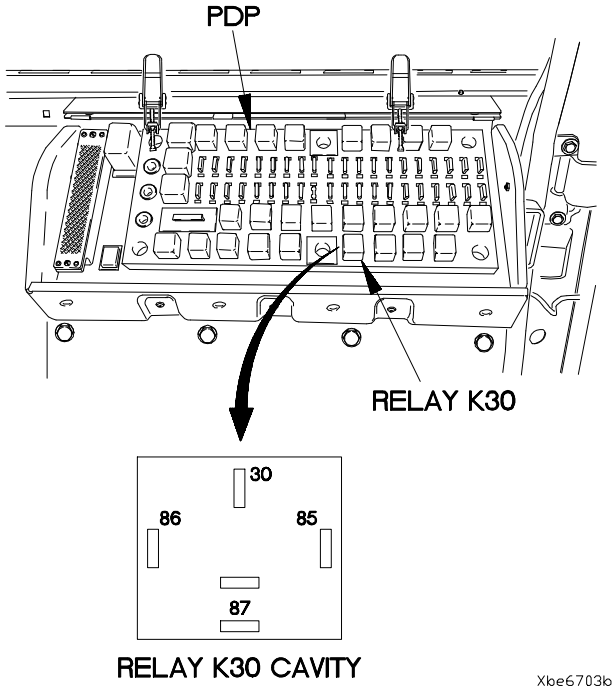
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

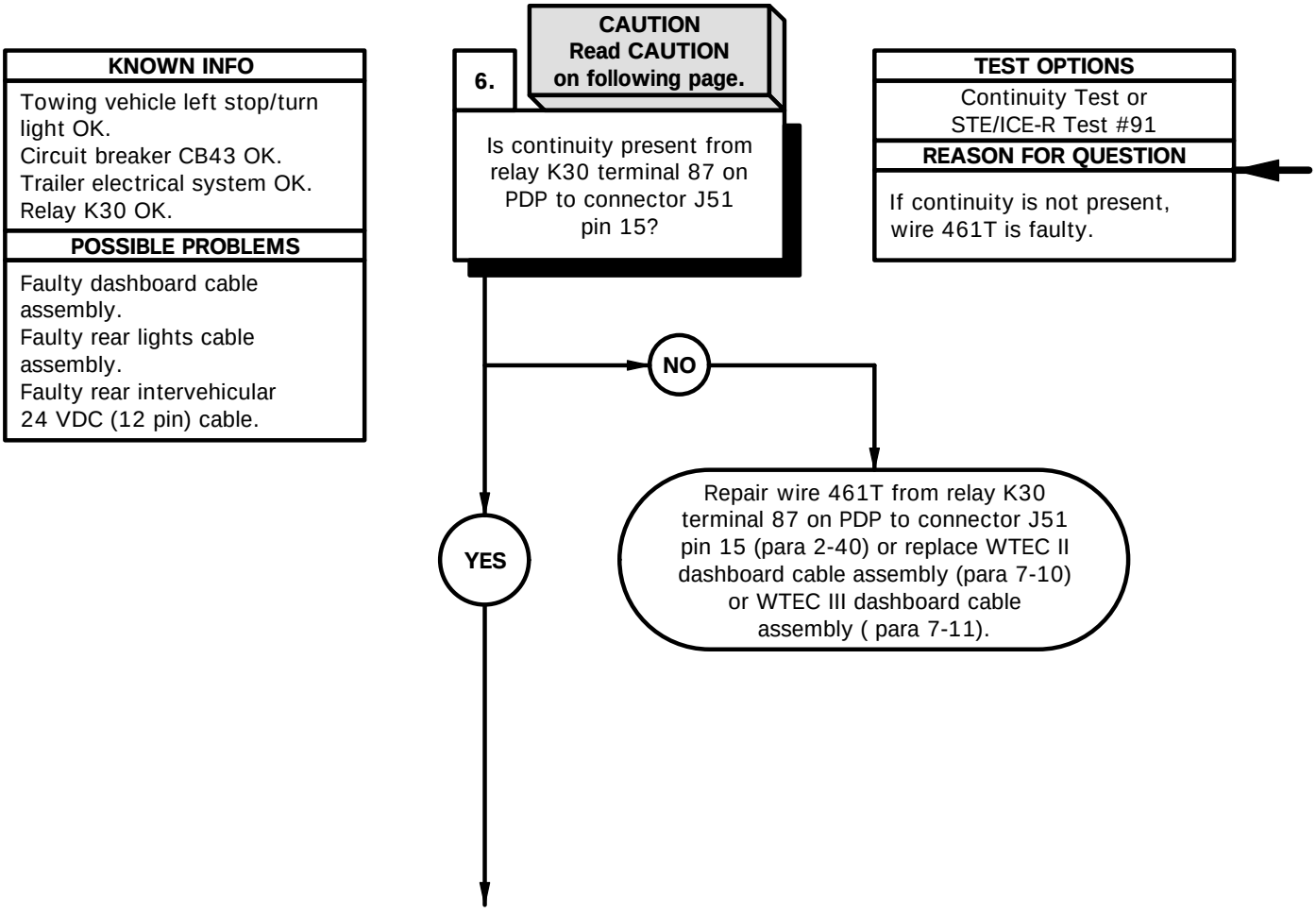
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K30 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Apply brakes and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 461B from relay K30 terminal 86 on PDP to connector J19 socket 2 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Position master power switch to off (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K30 terminal 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3047 from K30 terminal 85 on PDP to terminal board TB2 position 50 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K30 (para 7-9).
(6) Install relay K30 in PDP.
(7) Install PDP cover (para 16-2).



## e64. TRAILER LEFT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

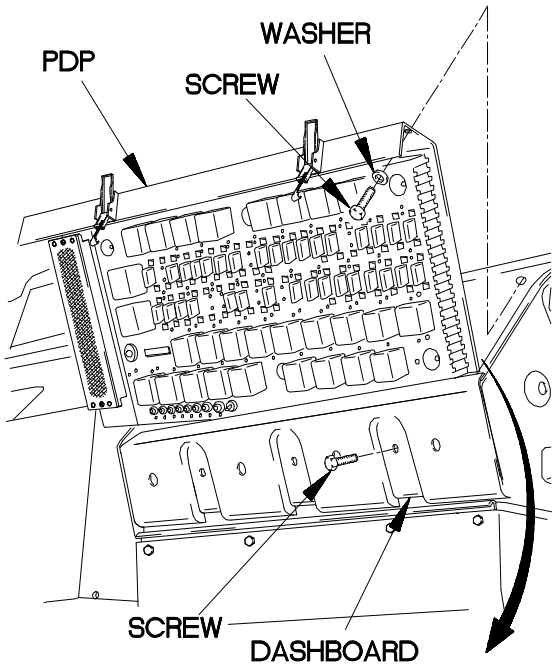
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

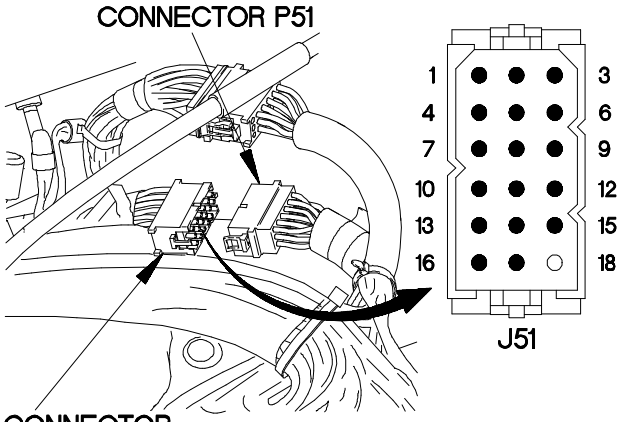
**NOTE**

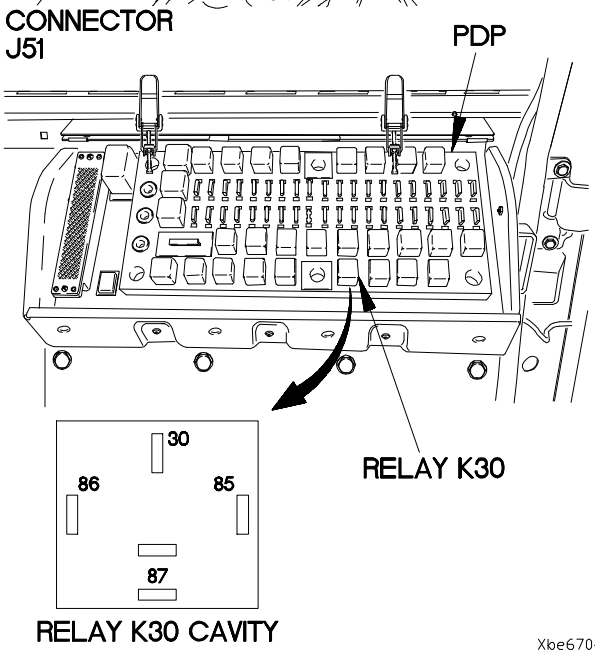
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J51 from connector P51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to relay K30 terminal 87 on PDP.
(7) Connect negative (-) probe of multimeter to connector J51 pin 15 and note reading on multimeter.
(8) If continuity is not present, repair wire 461T from relay K30 terminal 87 on PDP to connector J51 pin 15 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Install relay K30 in PDP.

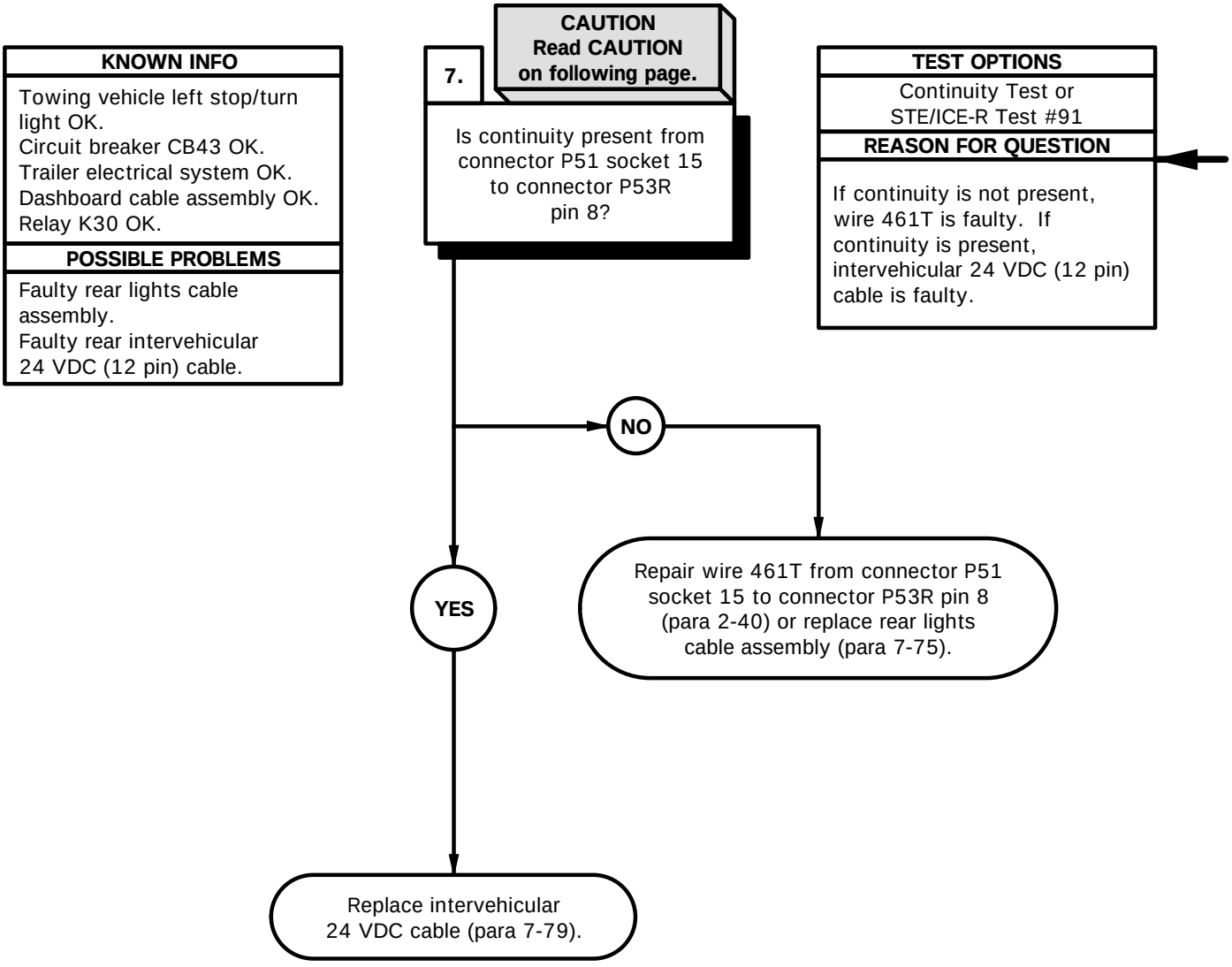



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## e64. TRAILER LEFT STOP/TURN LIGHT DOES NOT ILLUMINATE (CONT)



**CAUTION**

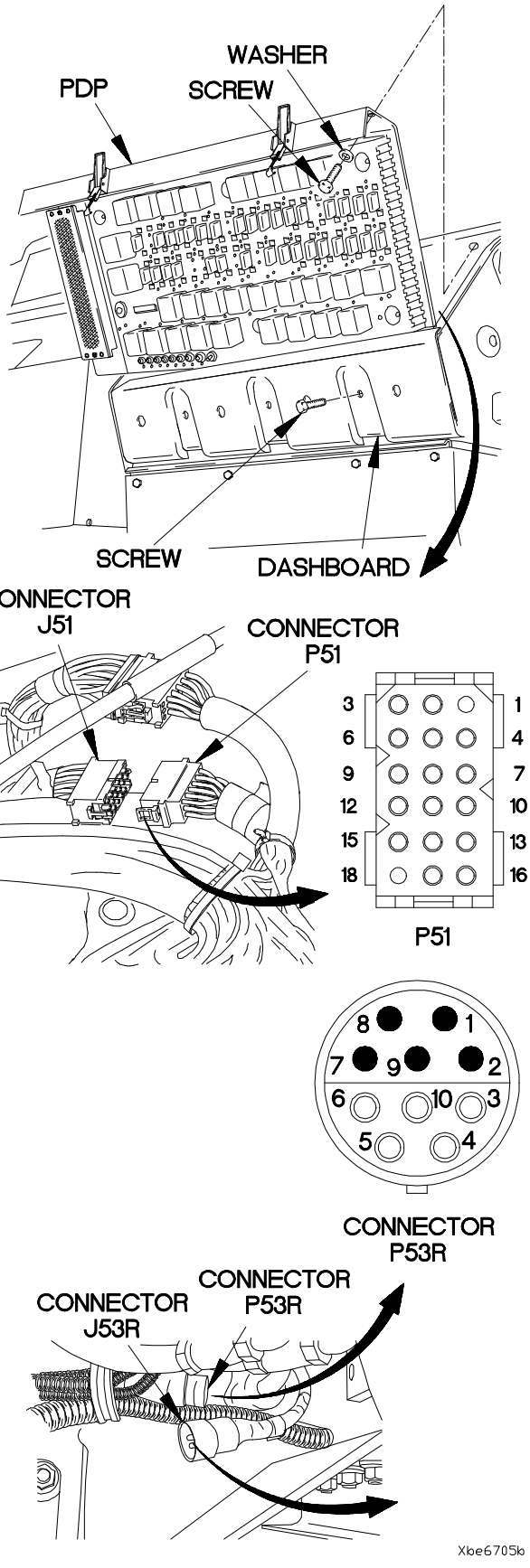
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P53R from connector J53R.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 15.
(4) Connect negative (-) probe of multimeter to connector P53R pin 8 and note reading on multimeter.
(5) If continuity is not present, repair wire 461T from connector P51 socket 15 to connector P53R pin 8 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace intervehicular 24 VDC (12 pin) cable (para 7-79).
(7) Connect connector P53R to connector J53R.
(8) Connect connector P51 to connector J51.
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install PDP cover (para 16-2).



## e65. TRAILER BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

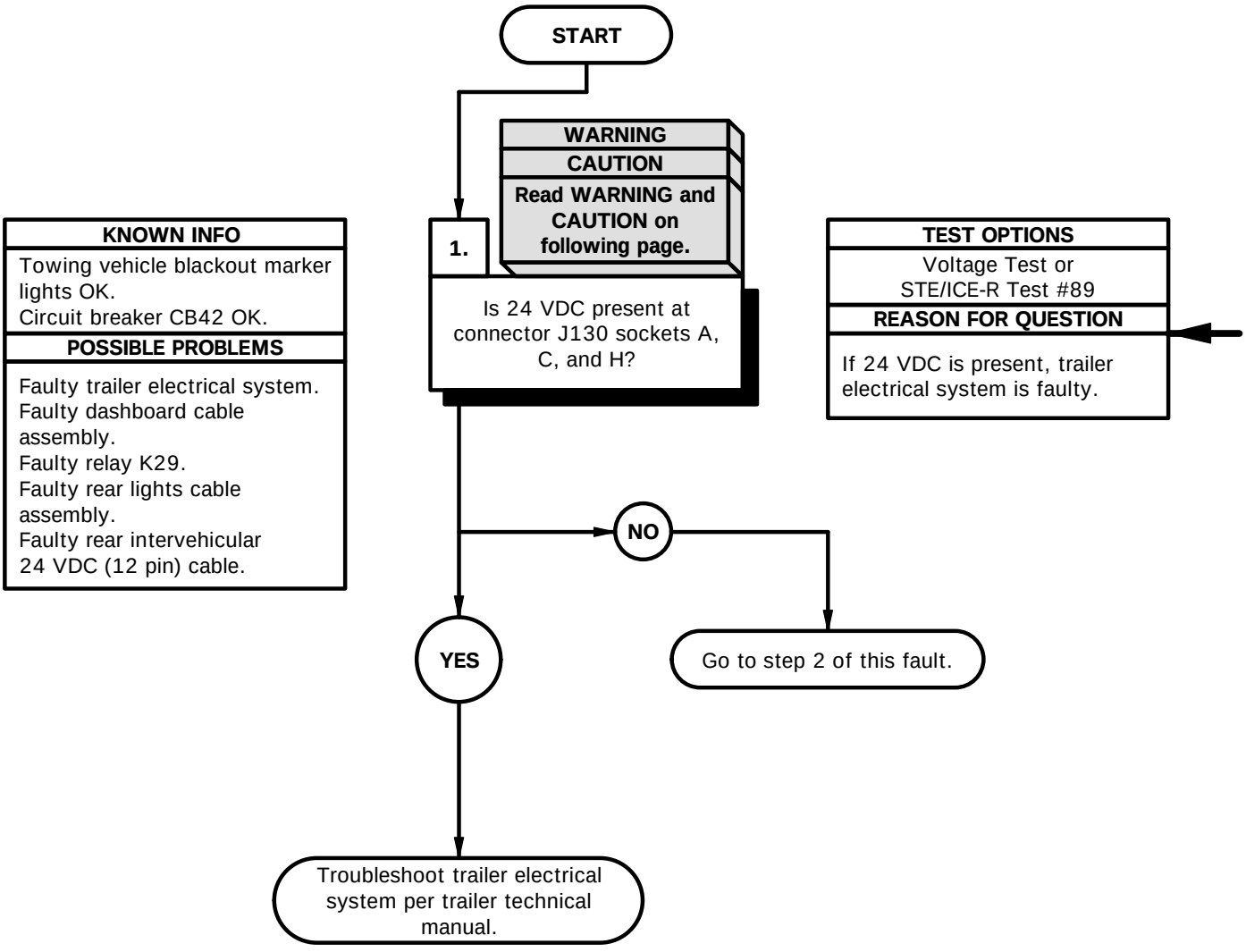
**Material/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB42 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

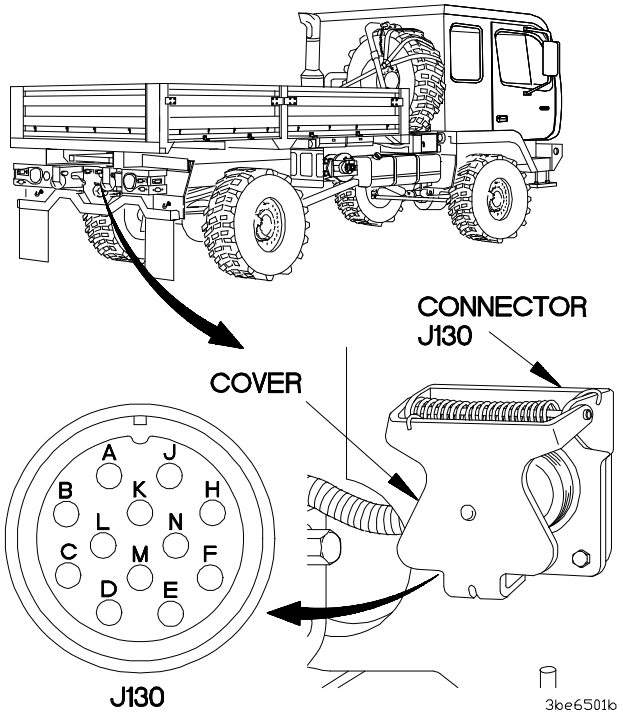
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

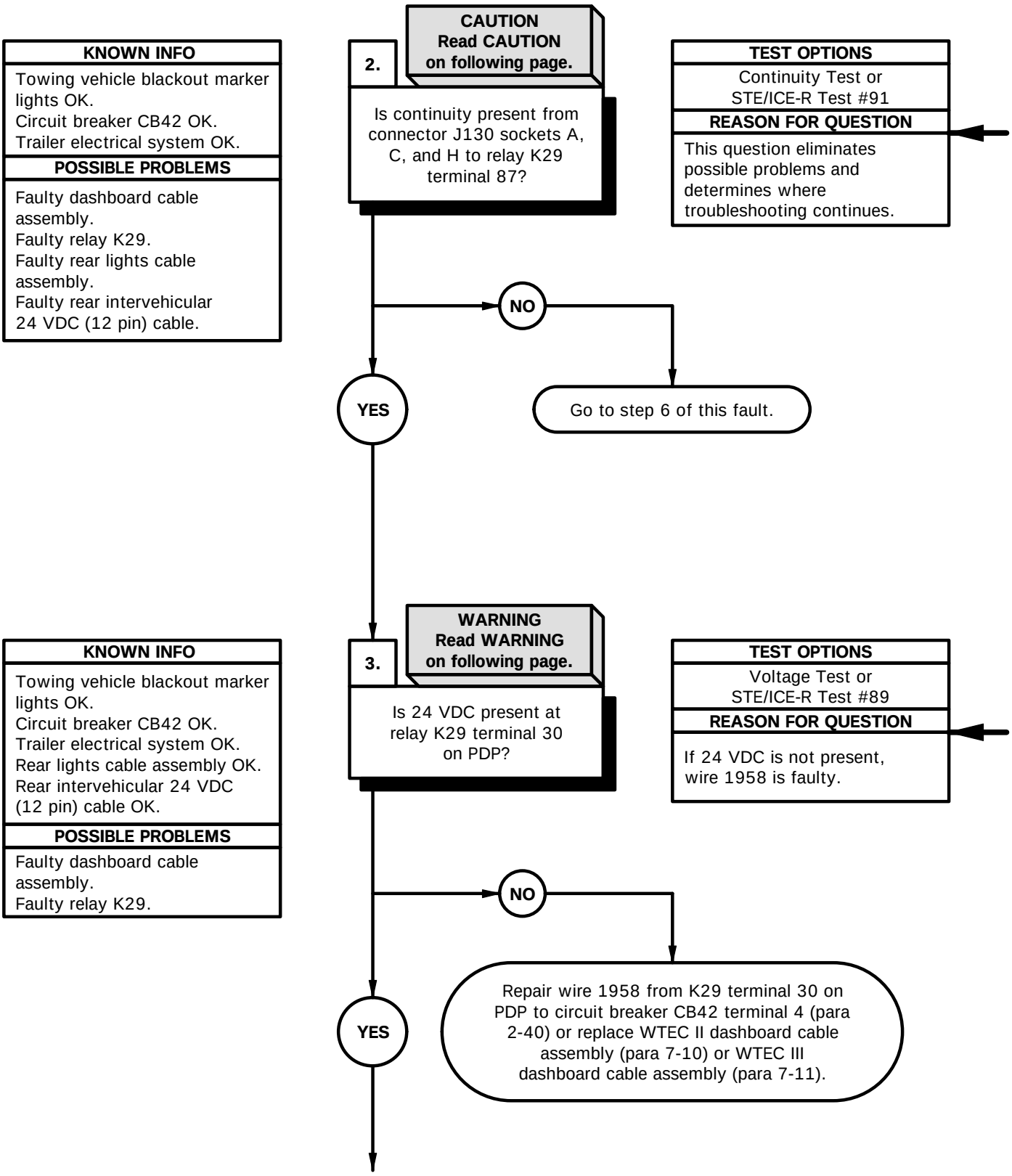
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J130 intervehicular 24 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J130 socket A.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to connector J130 socket C.
(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(9) Connect positive (+) probe of multimeter to connector J130 socket H.
(10) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(11) If 24 VDC is not present, go to step 2 of this fault.
(12) If 24 VDC is present, troubleshoot trailer electrical system per trailer technical manual.
(13) Position main light switch to OFF (TM 9-2320-365-10).



## e65. TRAILER BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

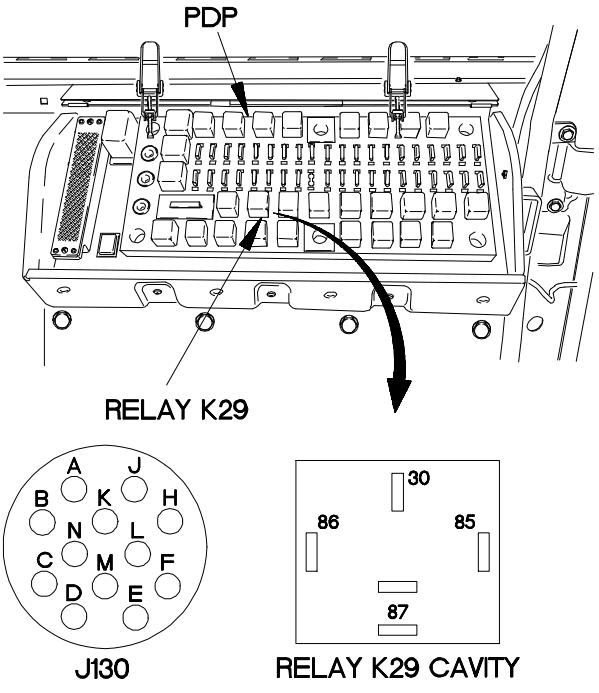
(1) Remove PDP cover (para 16-2).
(2) Remove relay K29 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J130 sockets A, C, and H, one at a time.
(5) Connect negative (-) probe of multimeter to relay K29 terminal 87 on PDP and note reading on multimeter.
(6) If continuity is not present, go to step 6 of this fault.

**WARNING**

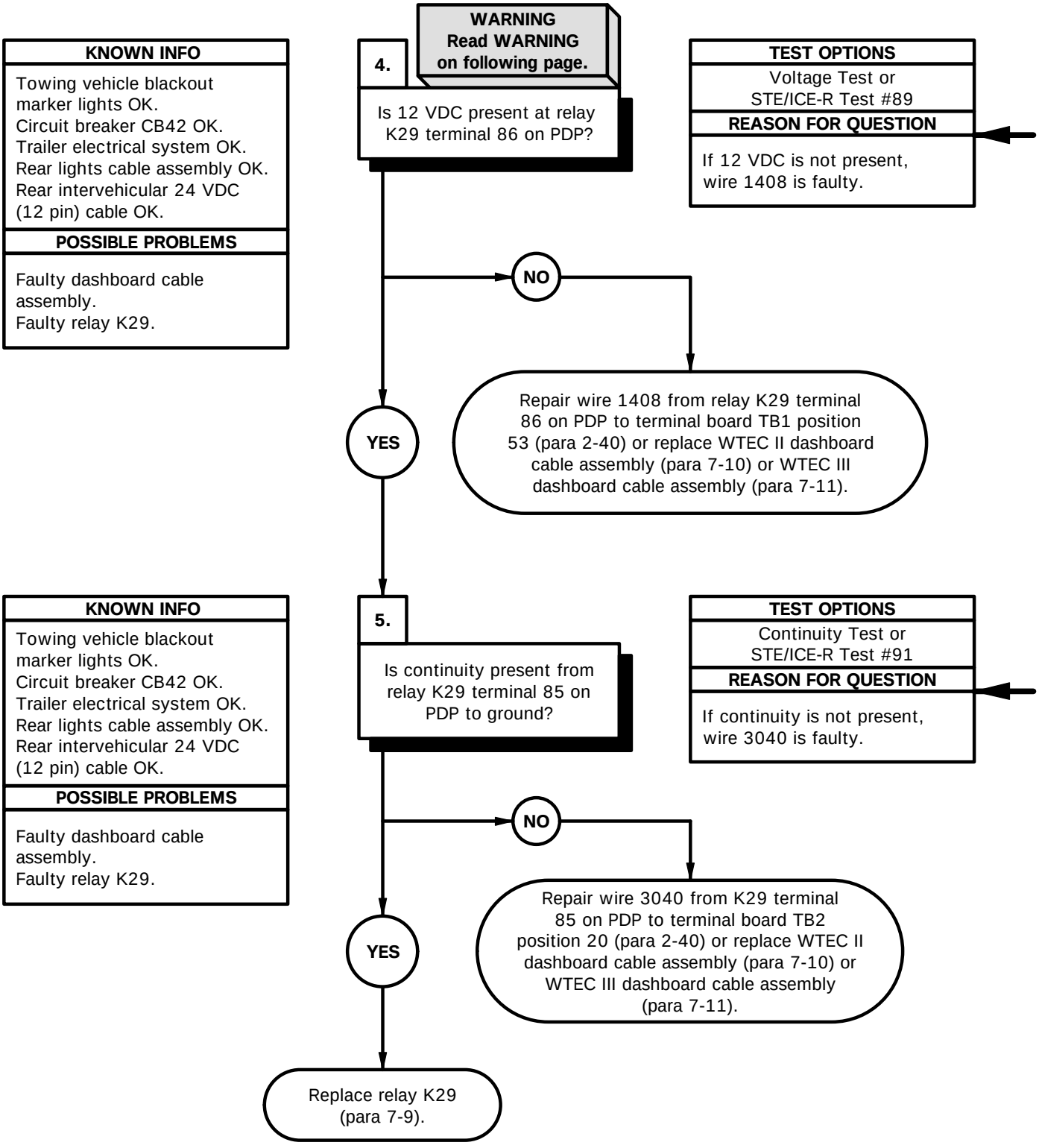
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K29 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 1958 from K29 terminal 30 on PDP to circuit breaker CB42 terminal 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).



## e65. TRAILER BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

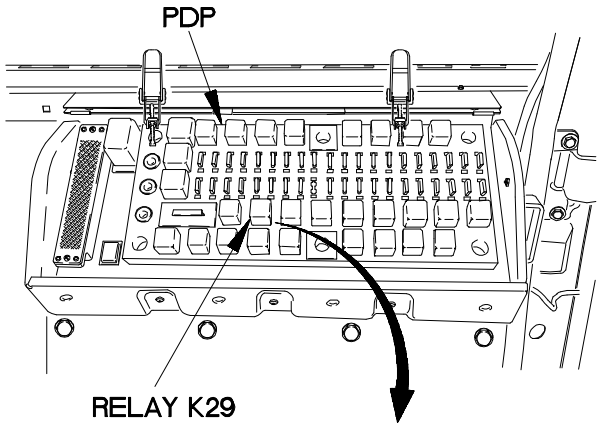
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

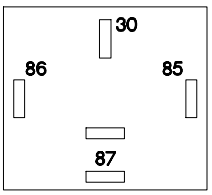
**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K29 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 12 VDC is not present, repair wire 1408 from relay K29 terminal 86 on PDP to terminal board TB1 position 53 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K29 terminal 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3040 from K29 terminal 85 on PDP to terminal board TB2 position 20 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K29 (para 7-9).
(6) Install relay K29 in PDP.
(7) Install PDP cover (para 16-2).

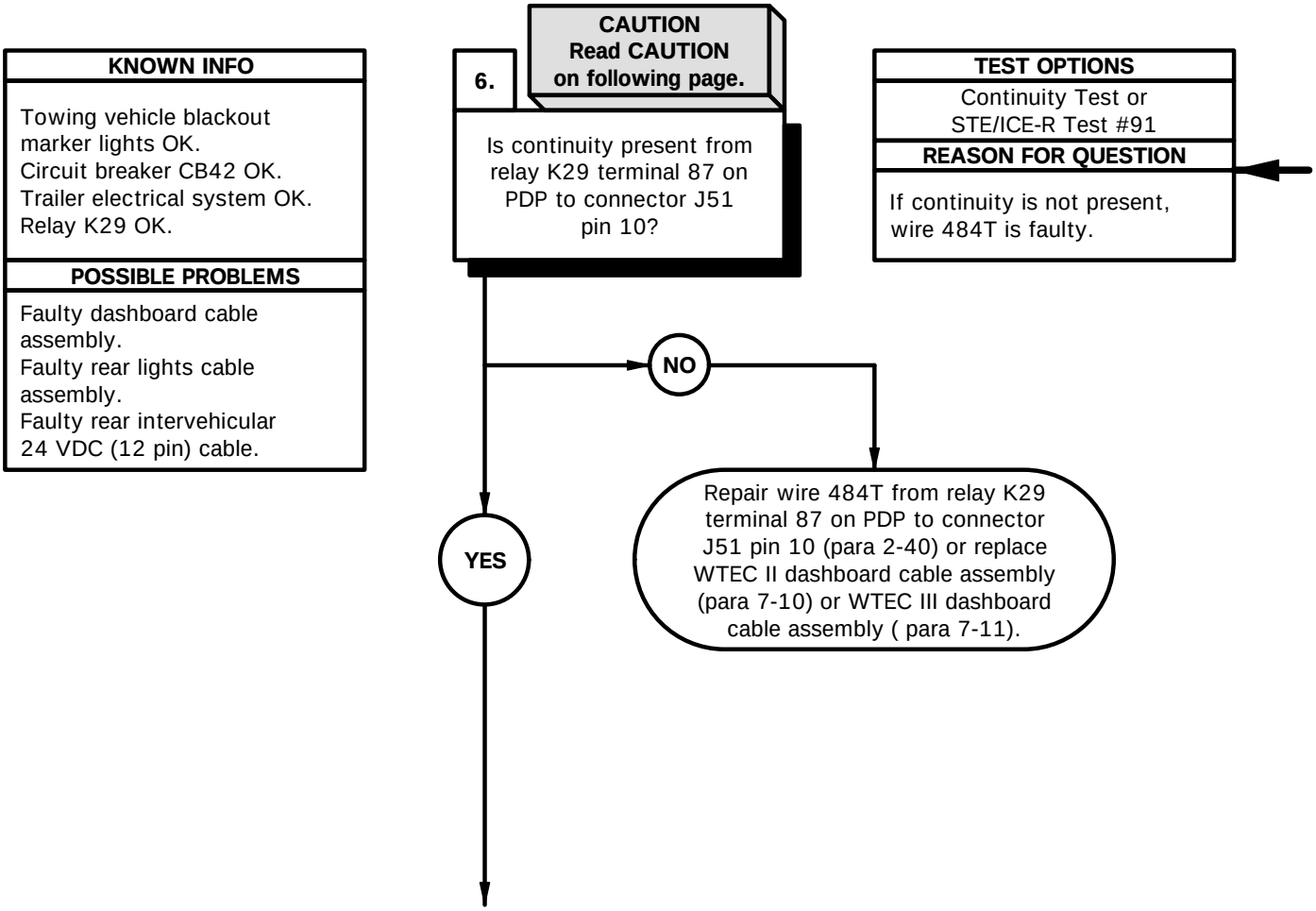



RELAY K29 CAVITY

Xbe68036

## e65. TRAILER BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

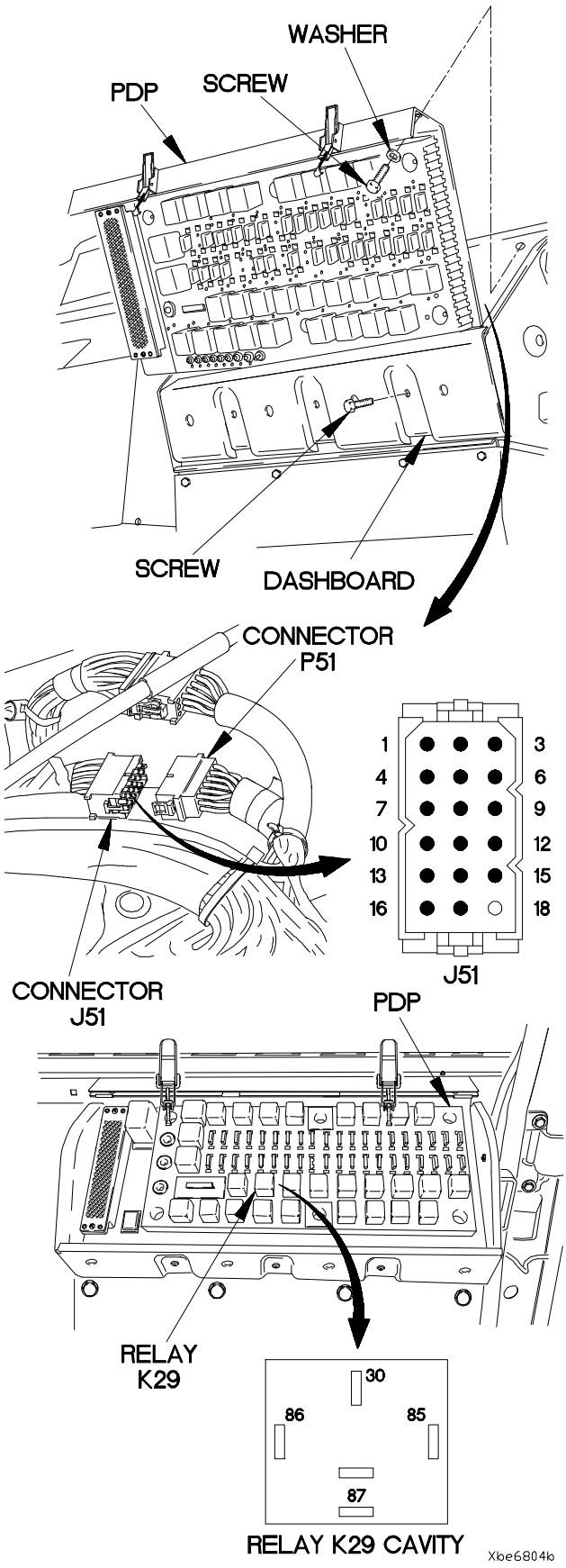
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

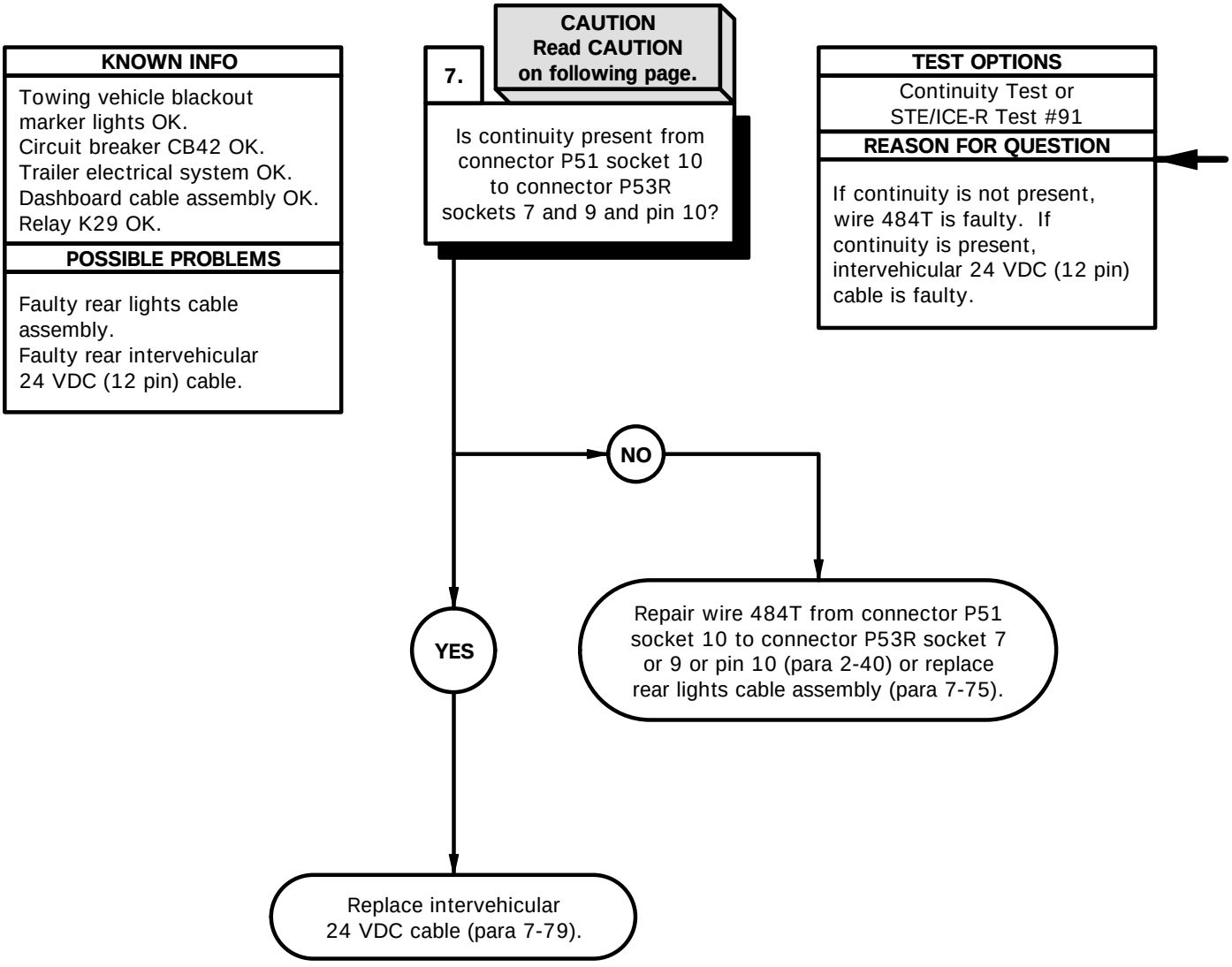
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J51 from connector P51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to relay K29 terminal 87 on PDP.
(7) Connect negative (-) probe of multimeter to connector J51 pin 10 and note reading on multimeter.
(8) If continuity is not present, repair wire 484T from relay K29 terminal 87 on PDP to connector J51 pin 10 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Install relay K29 in PDP.



## e65. TRAILER BLACKOUT MARKER LIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

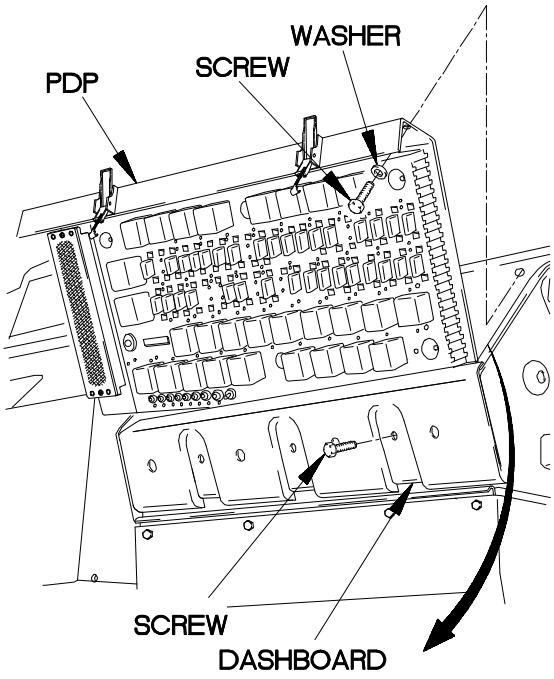
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

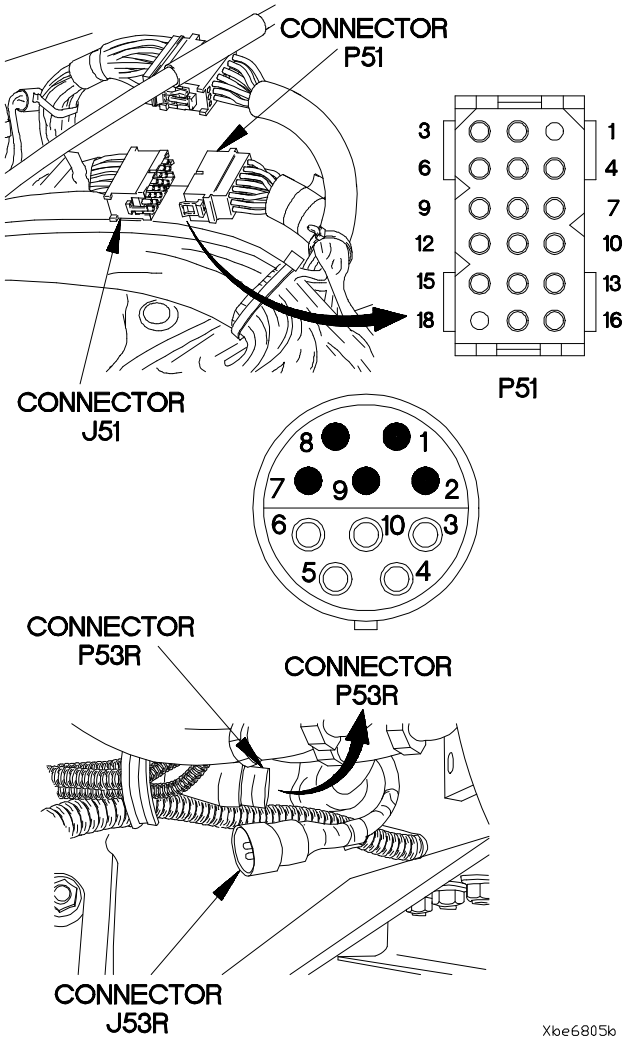
**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P53R from connector J53R.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 10.
(4) Connect negative (-) probe of multimeter to connector P53R sockets 7 and 9 and pin 10, one at a time, and note reading on multimeter.
(5) If continuity is not present, repair wire 484T from connector P51 socket 10 to connector P53R socket 7 or 9 or pin 10 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace intervehicular 24 VDC (12 pin) cable (para 7-79).
(7) Connect connector P53R to connector J53R.
(8) Connect connector P51 to connector J51.
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install PDP cover (para 16-2).



## e66. TRAILER BLACKOUT STOPLIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

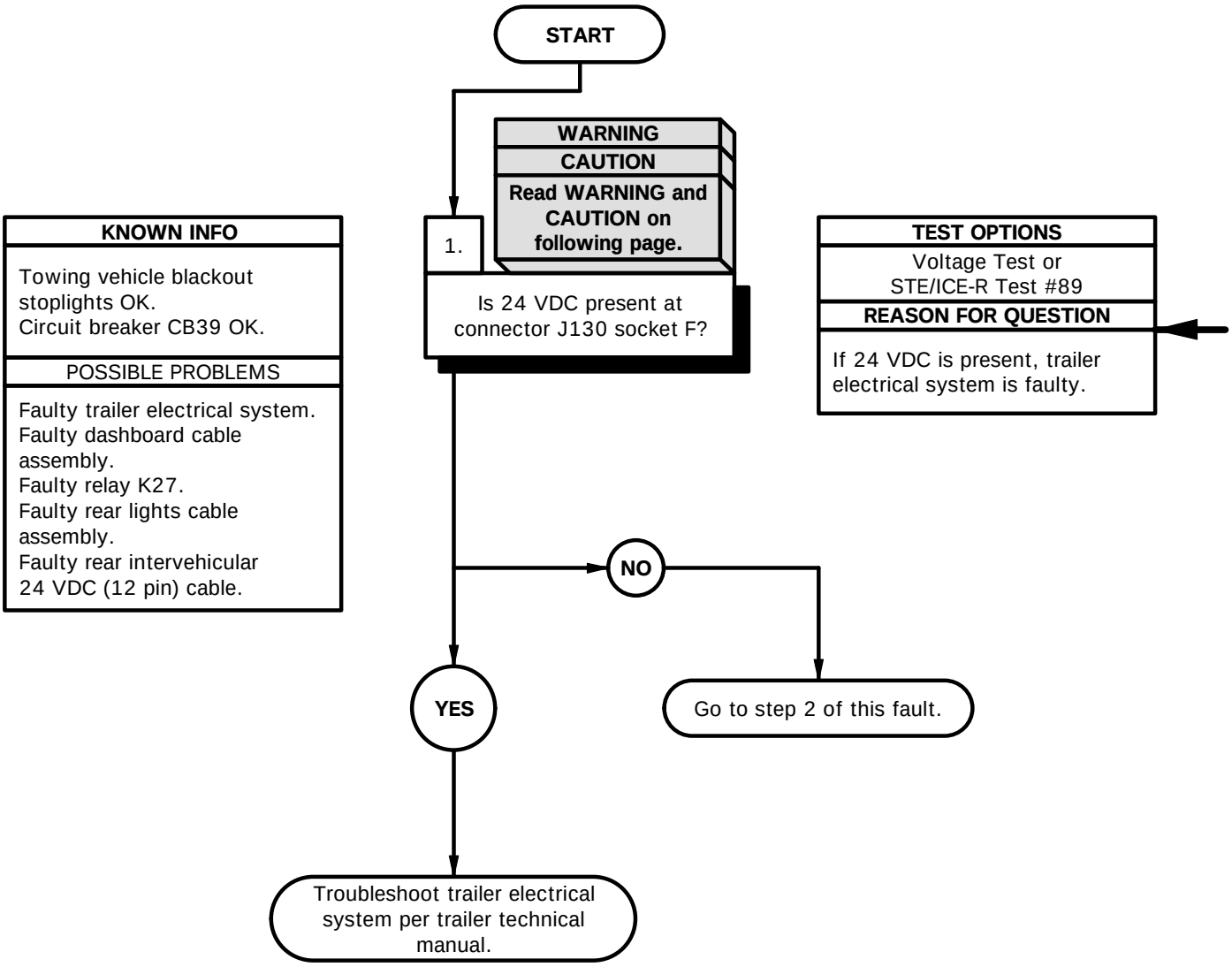
**Material/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB39 prior to beginning this task.



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

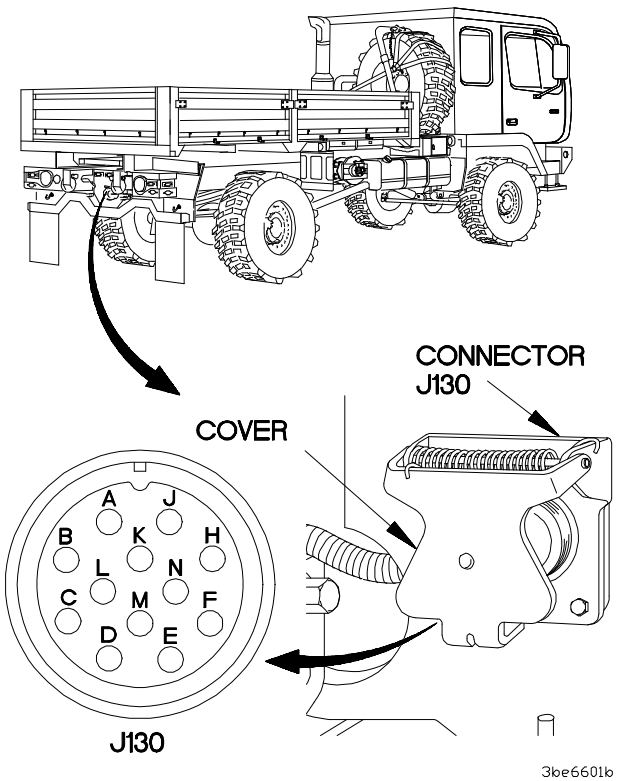
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

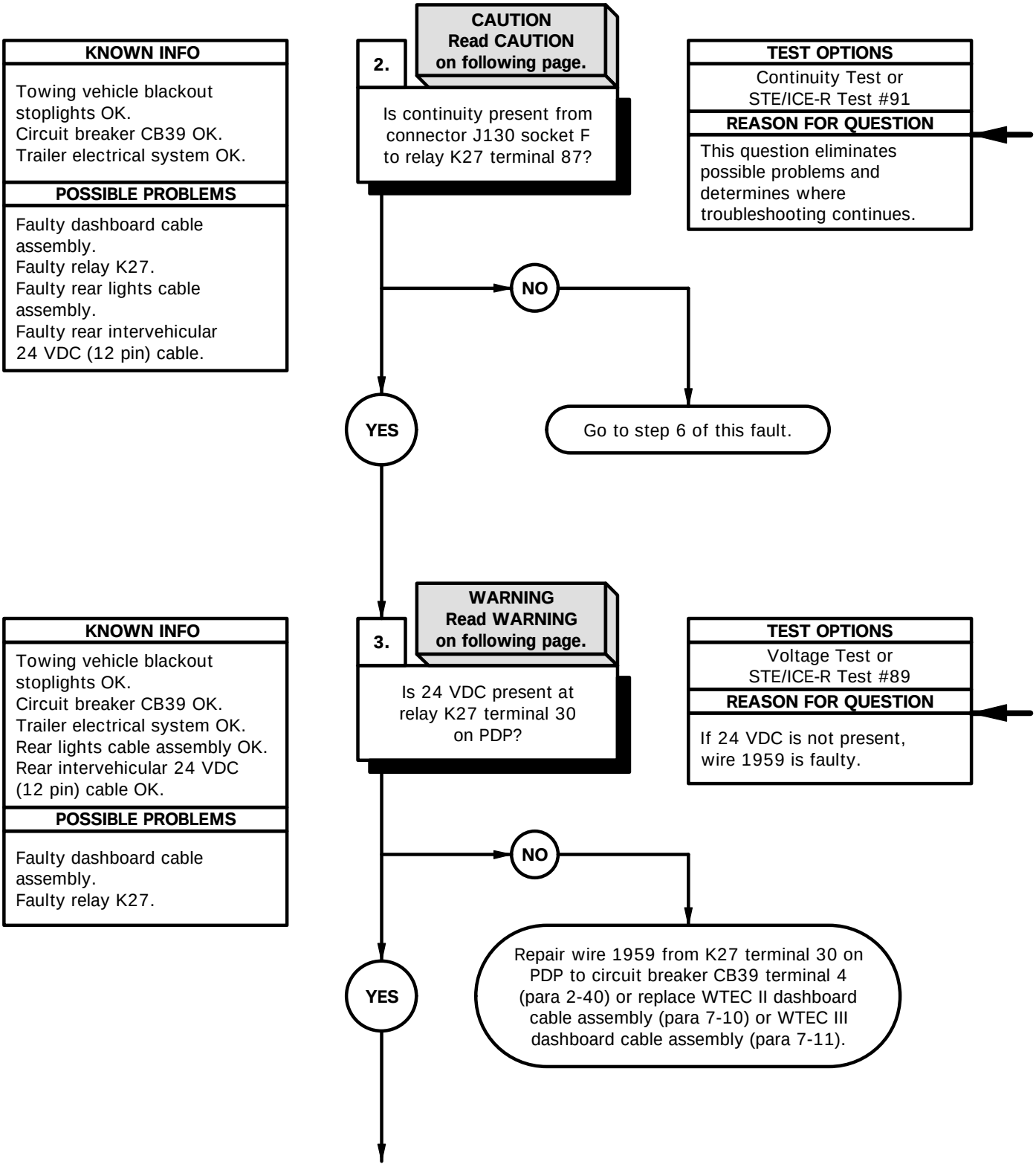
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J130 intervehicular 24 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J130 socket F.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to BO DRIVE (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 24 VDC is not present, go to step 2 of this fault.
(9) If 24 VDC is present, troubleshoot trailer electrical system per trailer technical manual.
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Position master power switch to off (TM 9-2320-365-10).



## e66. TRAILER BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

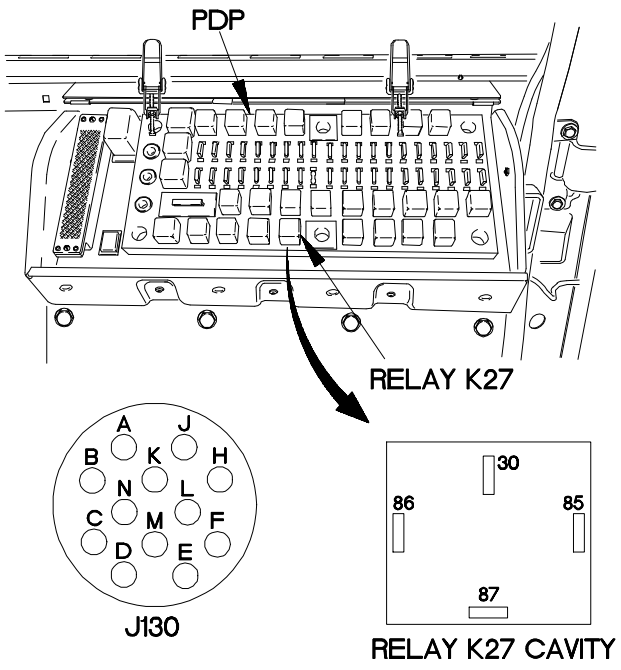
(1) Remove PDP cover (para 16-2).
(2) Remove relay K27 from PDP.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J130 socket F.
(5) Connect negative (-) probe of multimeter to relay K27 terminal 87 on PDP and note reading on multimeter.
(6) If continuity is not present, go to step 6 of this fault.

**WARNING**

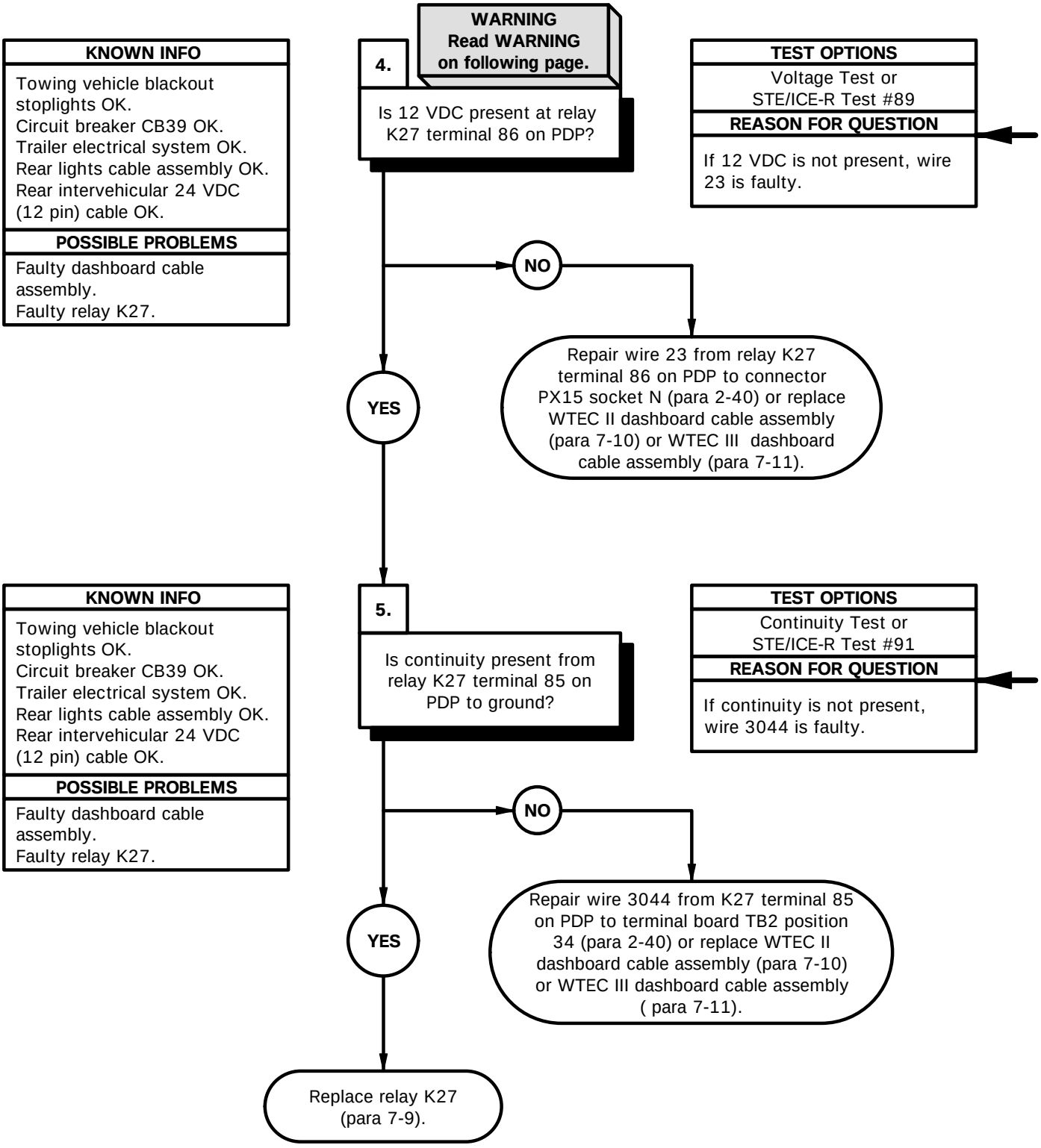
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K27 terminal 30 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to BO DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 VDC is not present, repair wire 1959 from K27 terminal 30 on PDP to circuit breaker CB39 terminal 4 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position main light switch to OFF (TM 9-2320-365-10).



## e66. TRAILER BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

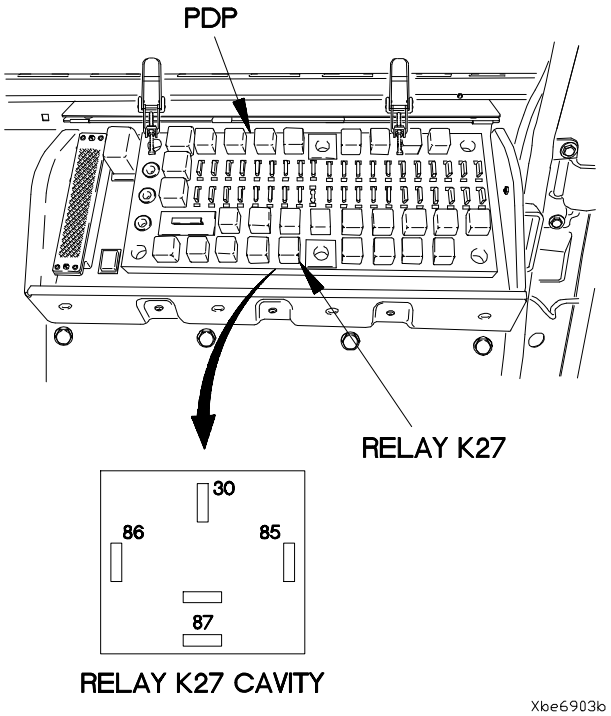
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

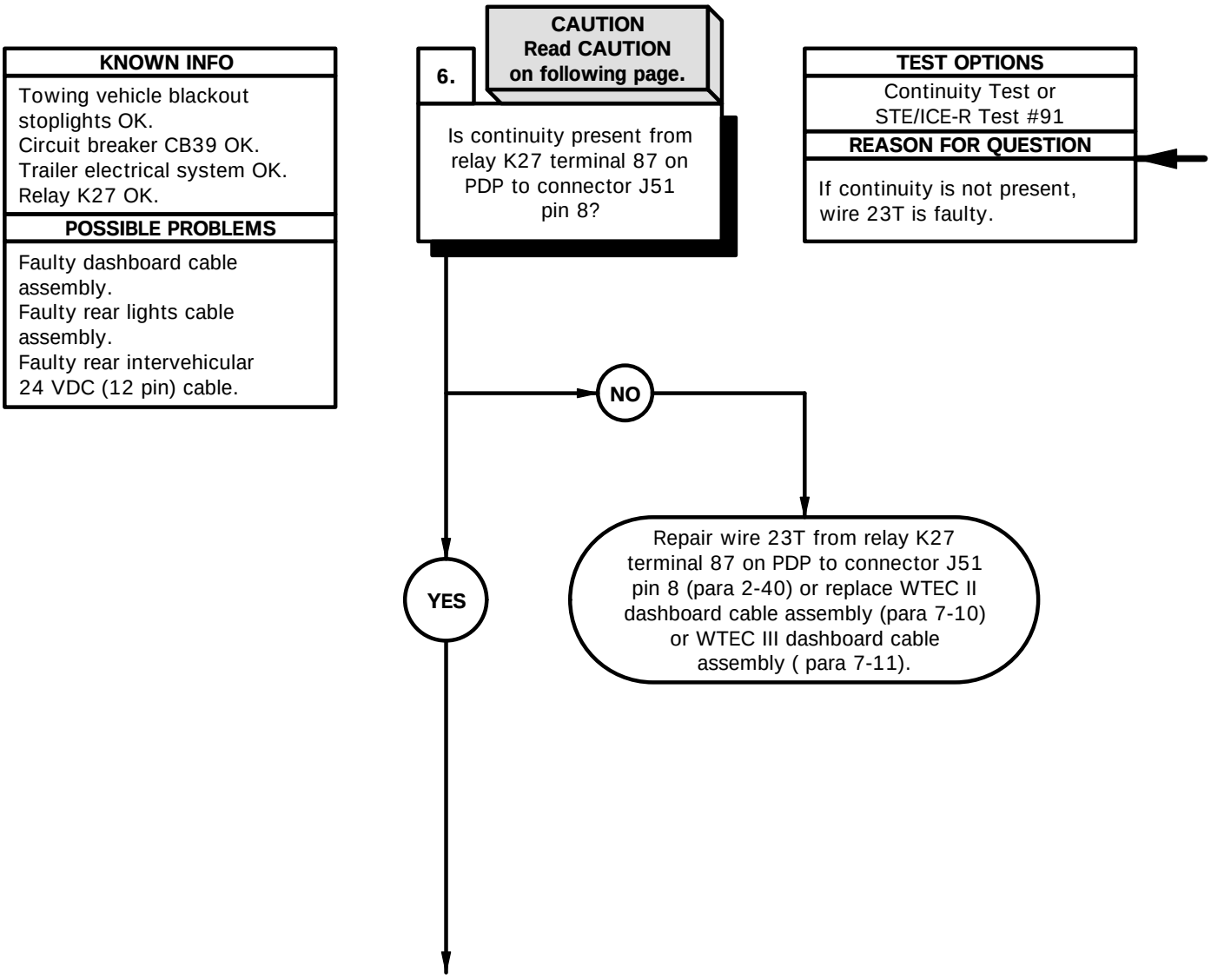
(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to relay K27 terminal 86 on PDP.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Position main light switch to BO DRIVE (TM 9-2320-365-10).
(6) Apply brakes and note reading on multimeter.
(7) If 12 VDC is not present, repair wire 23 from relay K27 terminal 86 on PDP to connector PX15 socket N (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Position master power switch to off (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K27 terminal 85 on PDP.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3044 from K27 terminal 85 on PDP to terminal board TB2 position 34 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K27 (para 7-9).
(6) Install relay K27 in PDP.
(7) Install PDP cover (para 16-2).



## e66. TRAILER BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

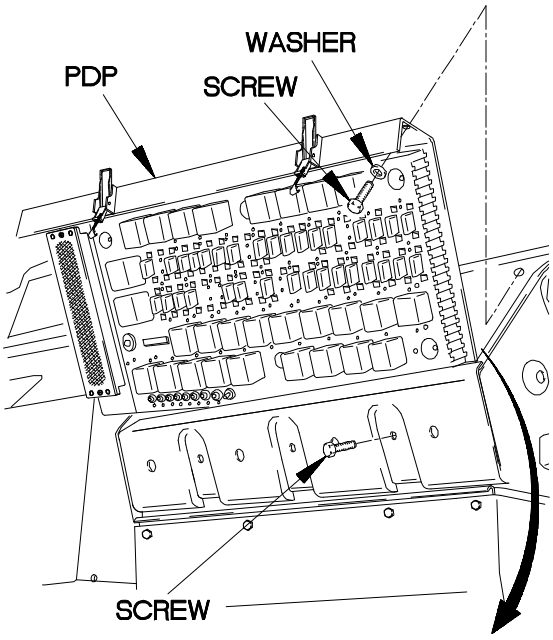
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

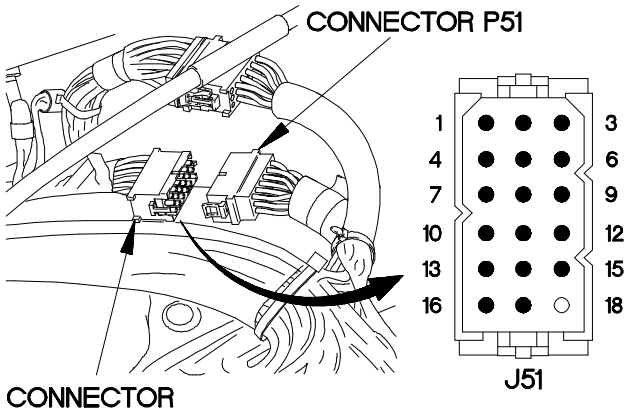
**NOTE**

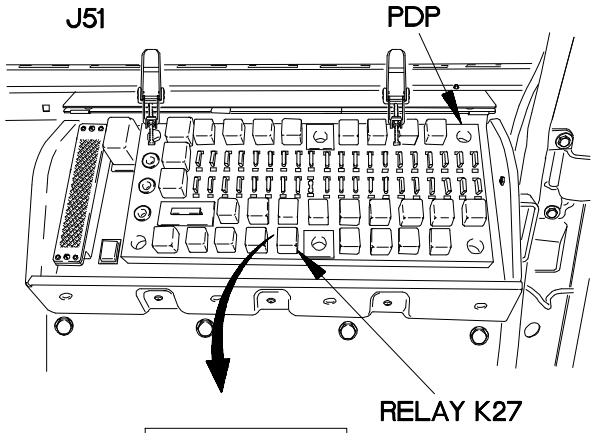
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

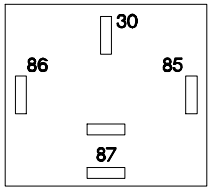
**CONTINUITY TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J51 from connector P51.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to relay K27 terminal 87 on PDP.
(7) Connect negative (-) probe of multimeter to connector J51 pin 8 and note reading on multimeter.
(8) If continuity is not present, repair wire 23T from relay K27 terminal 87 on PDP to connector J51 pin 8 (para 2-40) or replace WTEC II dashboard assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Install relay K27 in PDP.



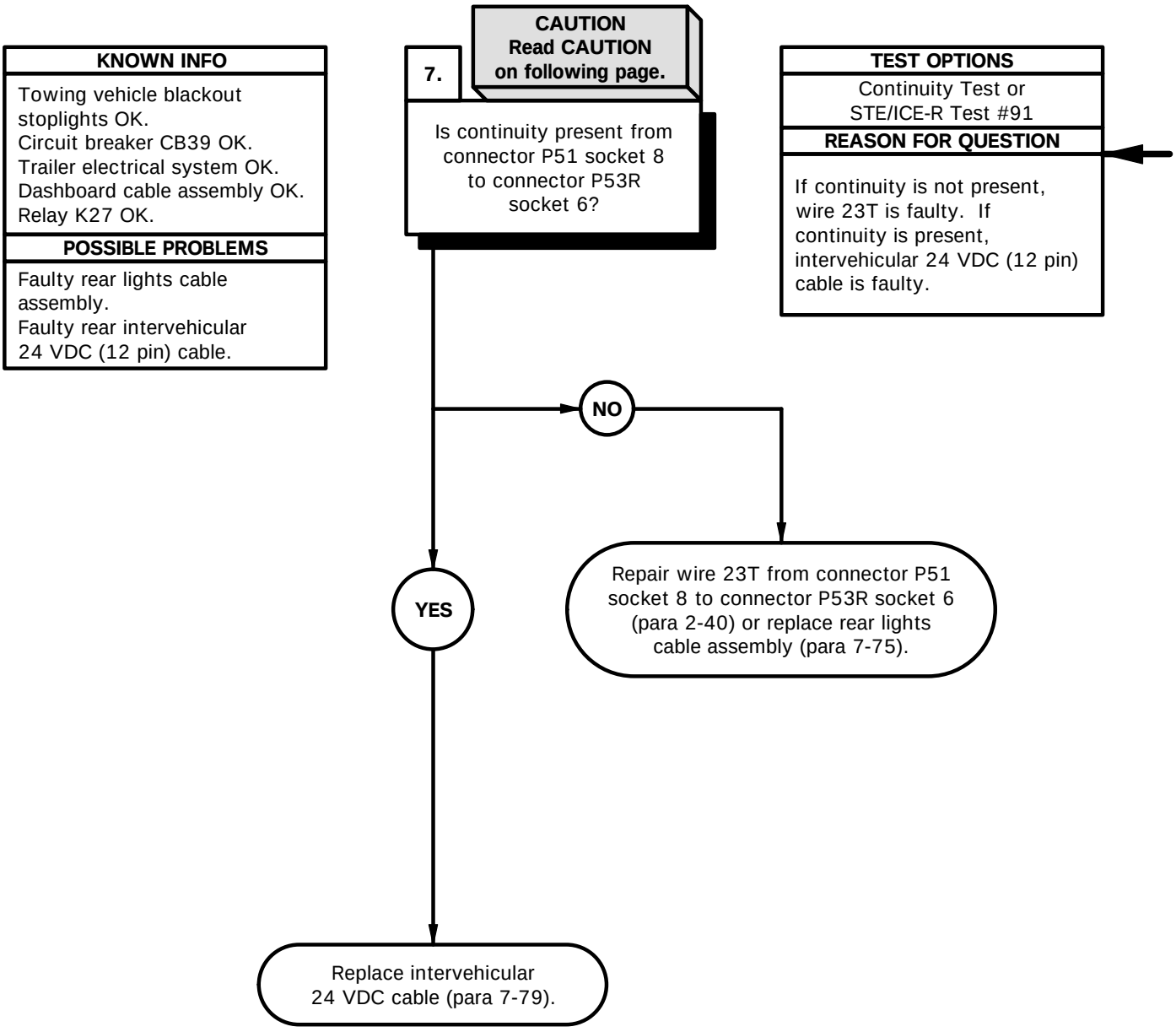




RELAY K27 CAVITY

Xbe6904b

## e66. TRAILER BLACKOUT STOPLIGHTS DO NOT ILLUMINATE (CONT)



**CAUTION**

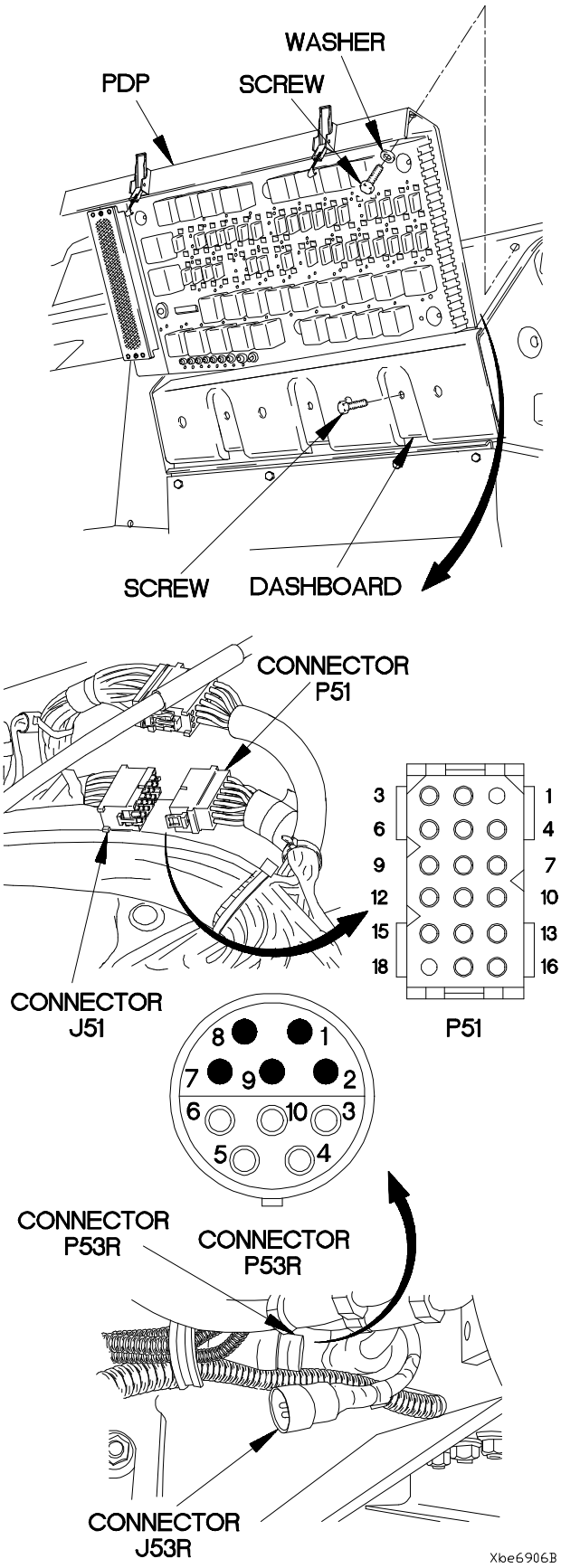
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Disconnect connector P53R from connector J53R.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P51 socket 8.
(4) Connect negative (-) probe of multimeter to connector P53R socket 6 and note reading on multimeter.
(5) If continuity is not present, repair wire 23T from connector P51 socket 8 to connector P53R socket 6 (para 2-40) or replace rear lights cable assembly (para 7-75).
(6) If continuity is present, replace intervehicular 24 VDC (12 pin) cable (para 7-79).
(7) Connect connector P53R to connector J53R.
(8) Connect connector P51 to connector J51.
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install PDP cover (para 16-2).



## e67. INTERVEHICLE CLEARANCE LIGHTS DO NOT OPERATE

**INITIAL SETUP**

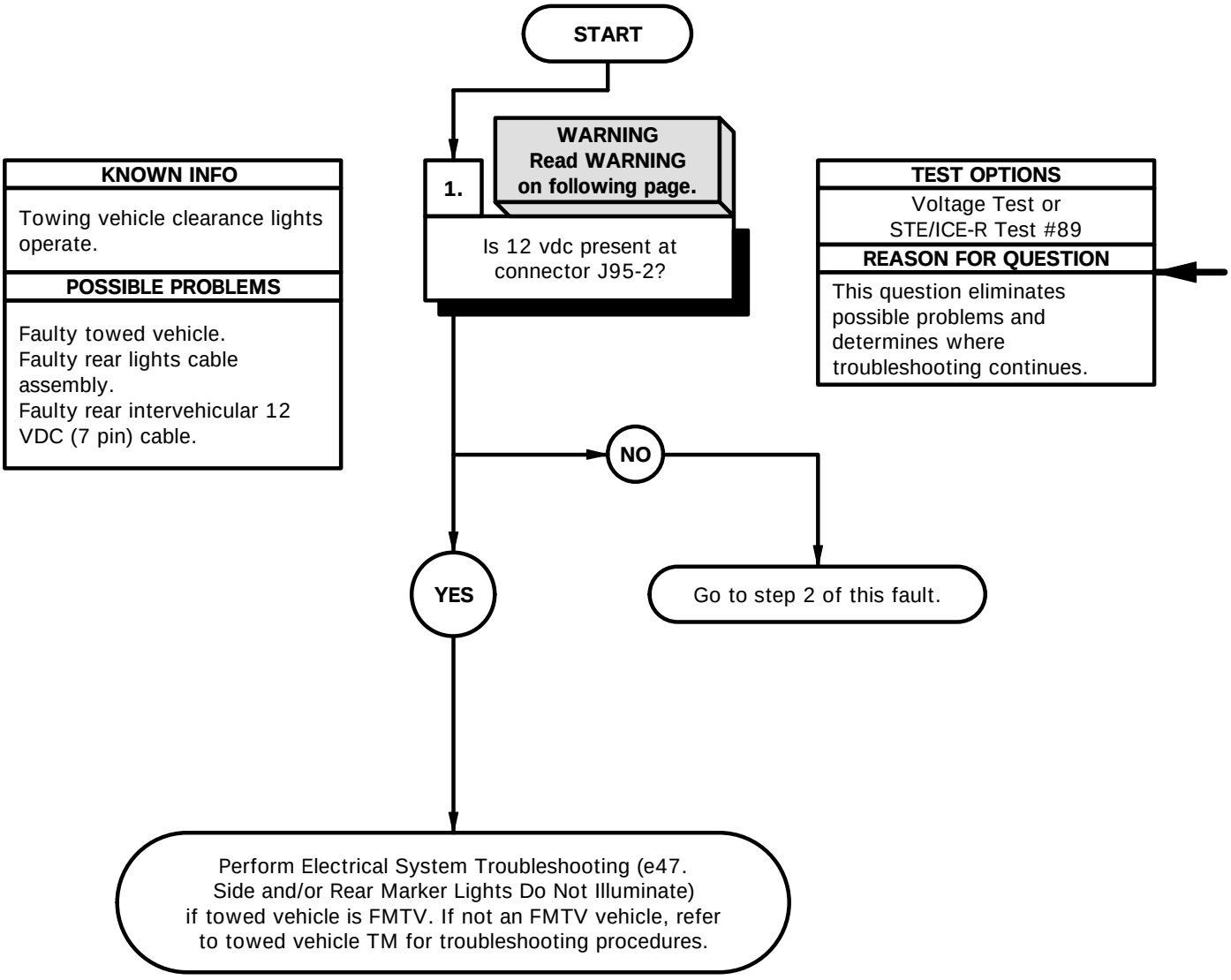
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)

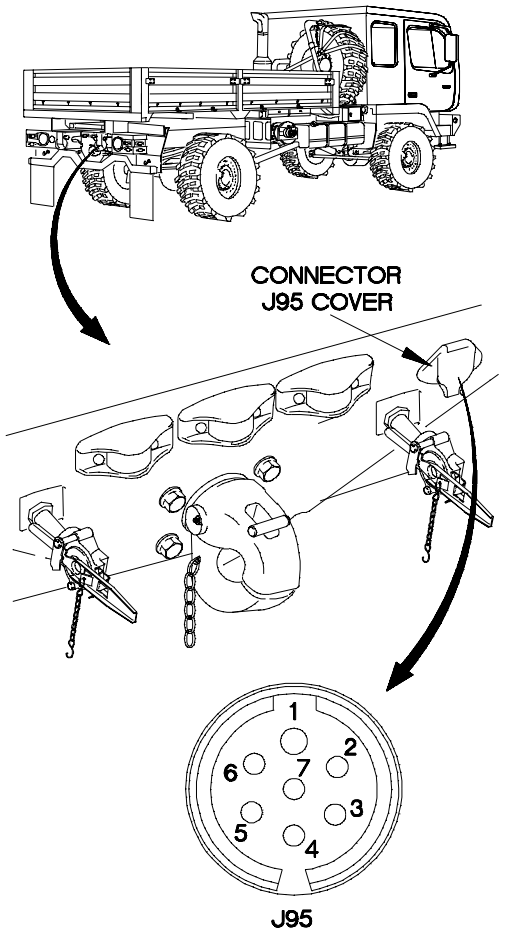


**WARNING**

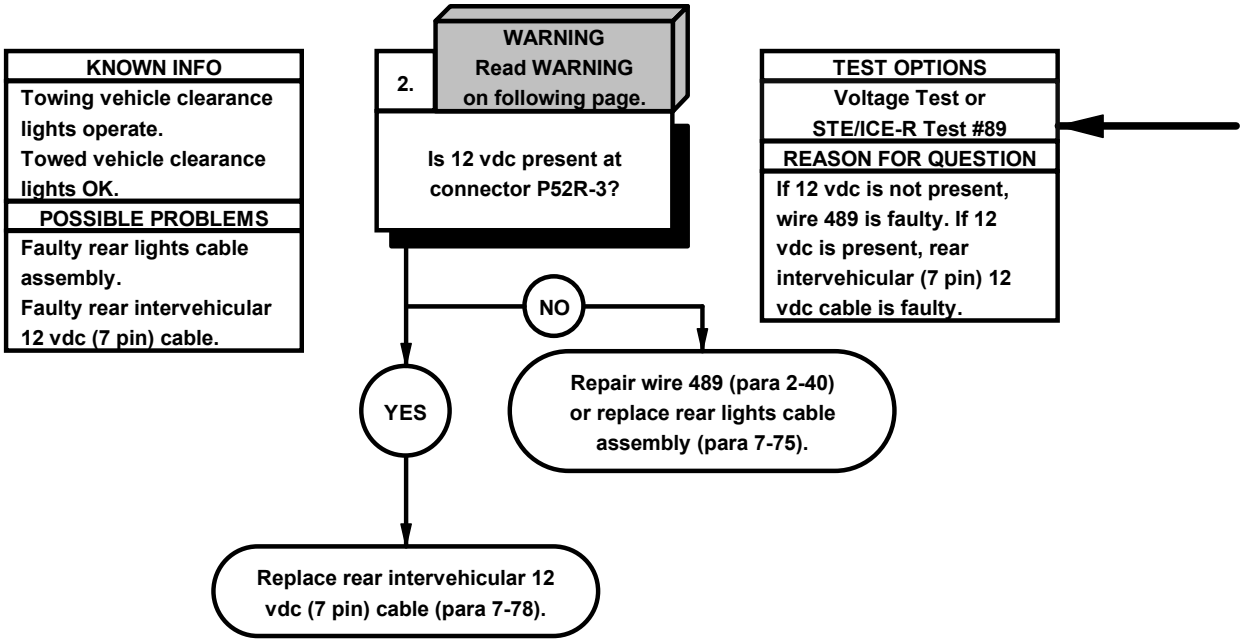
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Raise cover on connector J95 intervehicular 12 vdc connector.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J95-2.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 vdc is not present, go to step 2 of this fault.
(7) If 12 vdc is present, perform Electrical System Troubleshooting (e47. Side and/or Rear Marker Lights Do Not Illuminate) if towed vehicle is FMTV. If towed vehicle is not an FMTV, refer to towed vehicle TM for troubleshooting procedures.
(8) Position main light switch to OFF (TM 9-2320-365-10).



## e67. INTERVEHICLE CLEARANCE LIGHTS DO NOT OPERATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**NOTE**

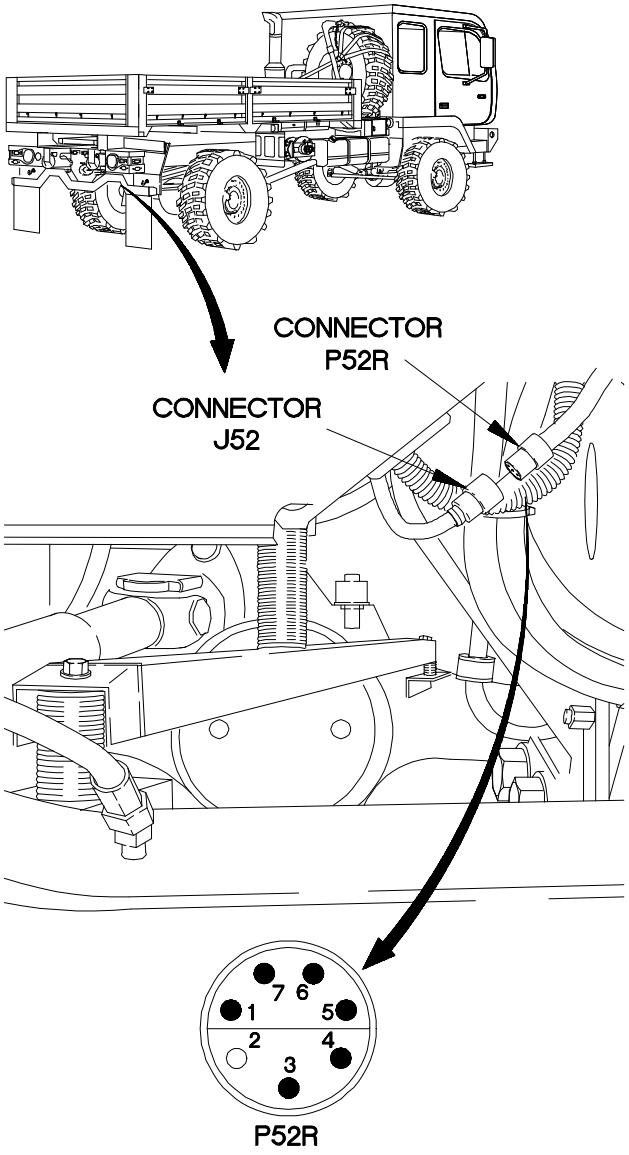
Remove plastic cable ties as required.

(1) Disconnect connector P52R from connector J52.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector P52R-3.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 vdc is not present, repair wire 489 (para 2-40) or replace rear lights cable assembly (para 7-75).
(7) If 12 vdc is present, replace rear intervehicular 12 VDC (7 pin) cable (para 7-78).
(8) Position main light switch to OFF (TM 9-2320-365-10).

**NOTE**

Install plastic cable ties as required.

(9) Connect connector P52R to connector J52.




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## e68. INTERVEHICLE LEFT TURN SIGNAL DOES NOT ILLUMINATE

**INITIAL SETUP**

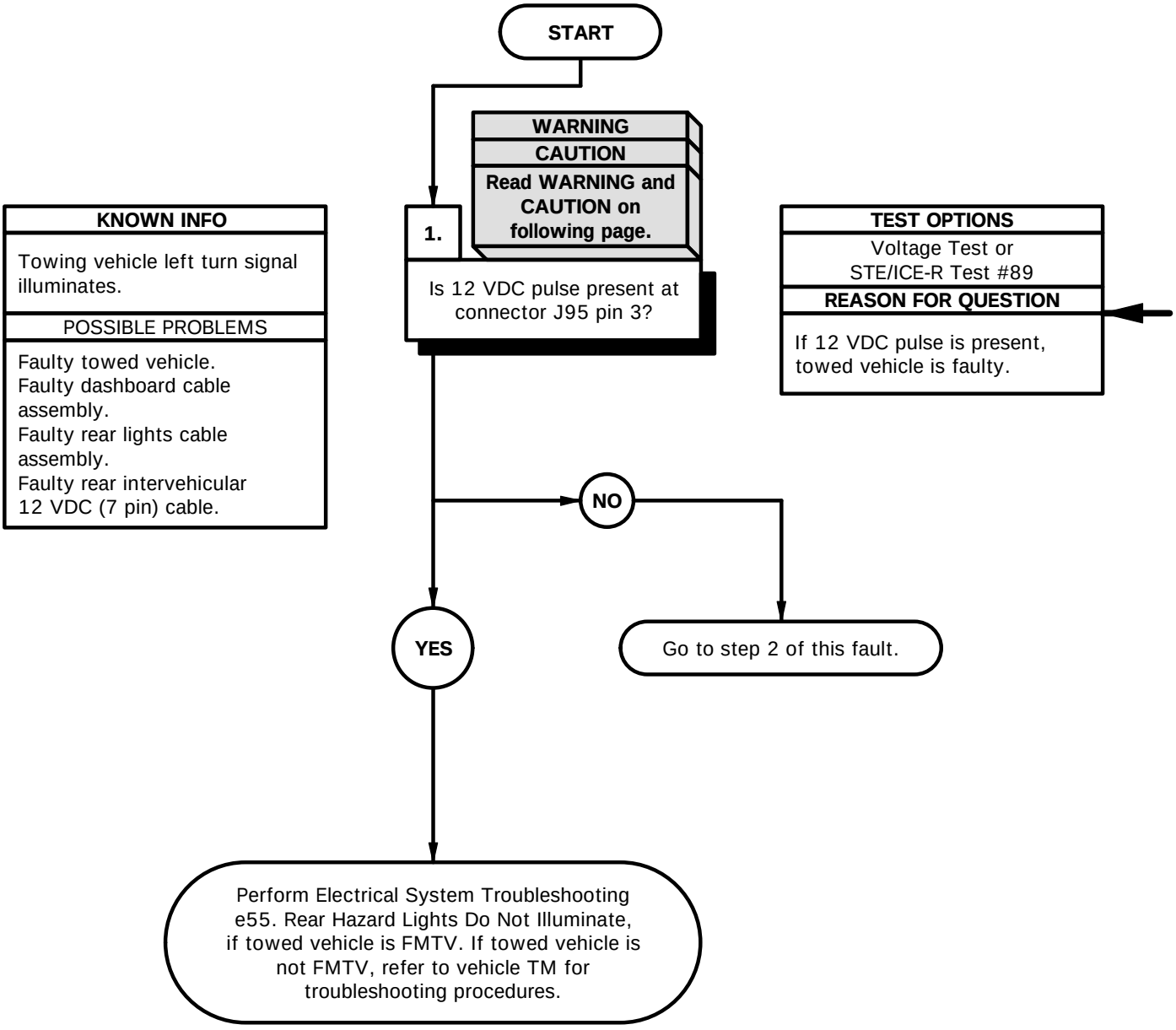
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Material/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

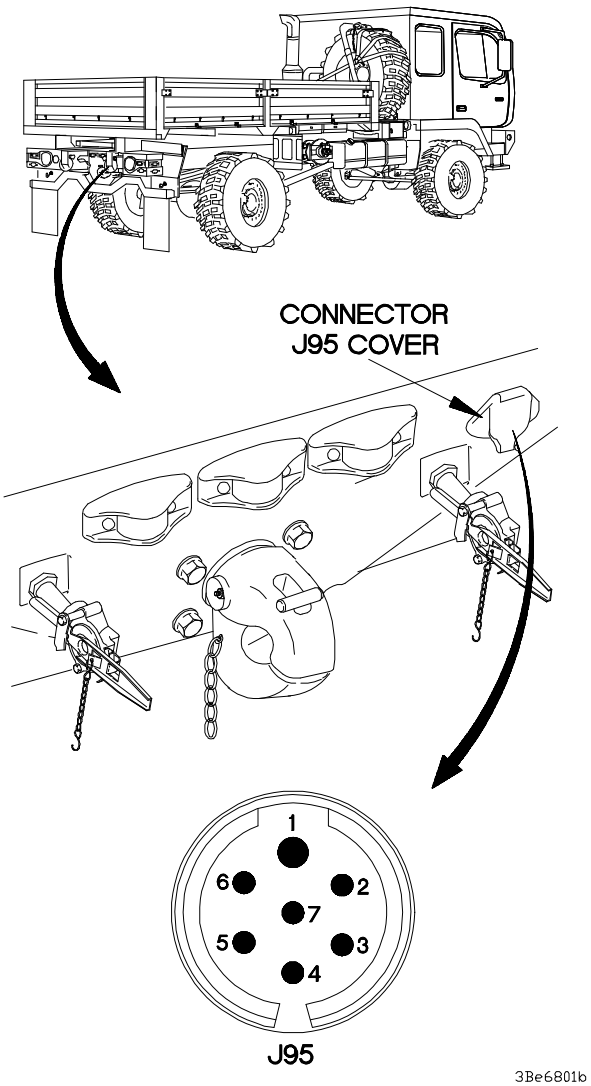
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

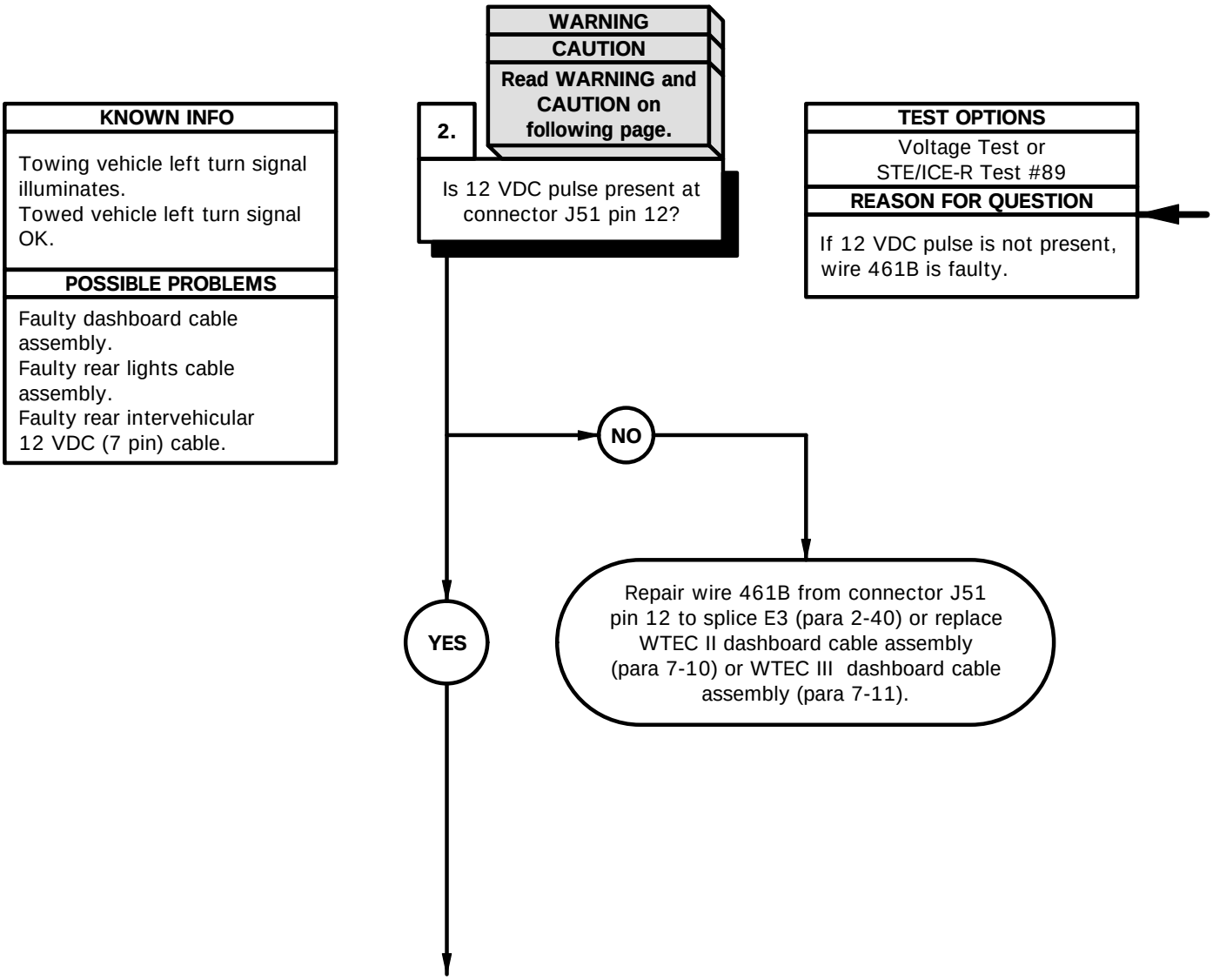
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J95 intervehicular 12 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J95 pin 3.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Position turn signal switch to left turn (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC pulse is not present, go to step 2 of this fault.
(8) If 24 VDC pulse is present, perform Electrical System Troubleshooting e55. Rear Hazard Lights Do Not Illuminate, if towed vehicle is FMTV. If towed vehicle is not FMTV, refer to towed vehicle TM for troubleshooting procedures.
(9) Position turn signal switch to off (TM 9-2320-365-10).
(10) Position main light switch to OFF (TM 9-2320-365-10).



## e68. INTERVEHICLE LEFT TURN SIGNAL DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

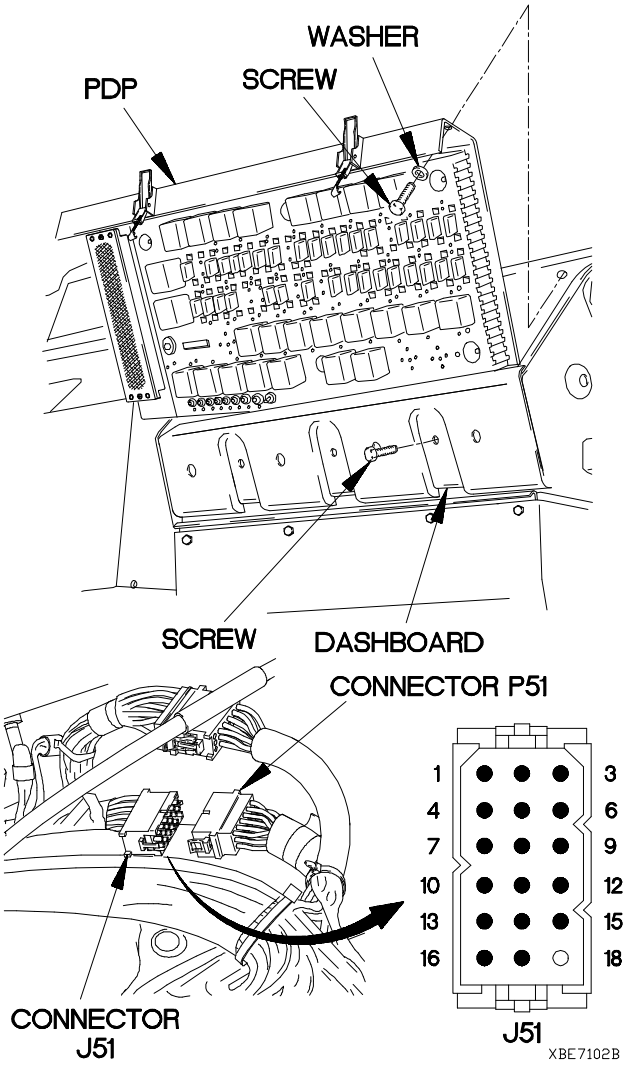
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

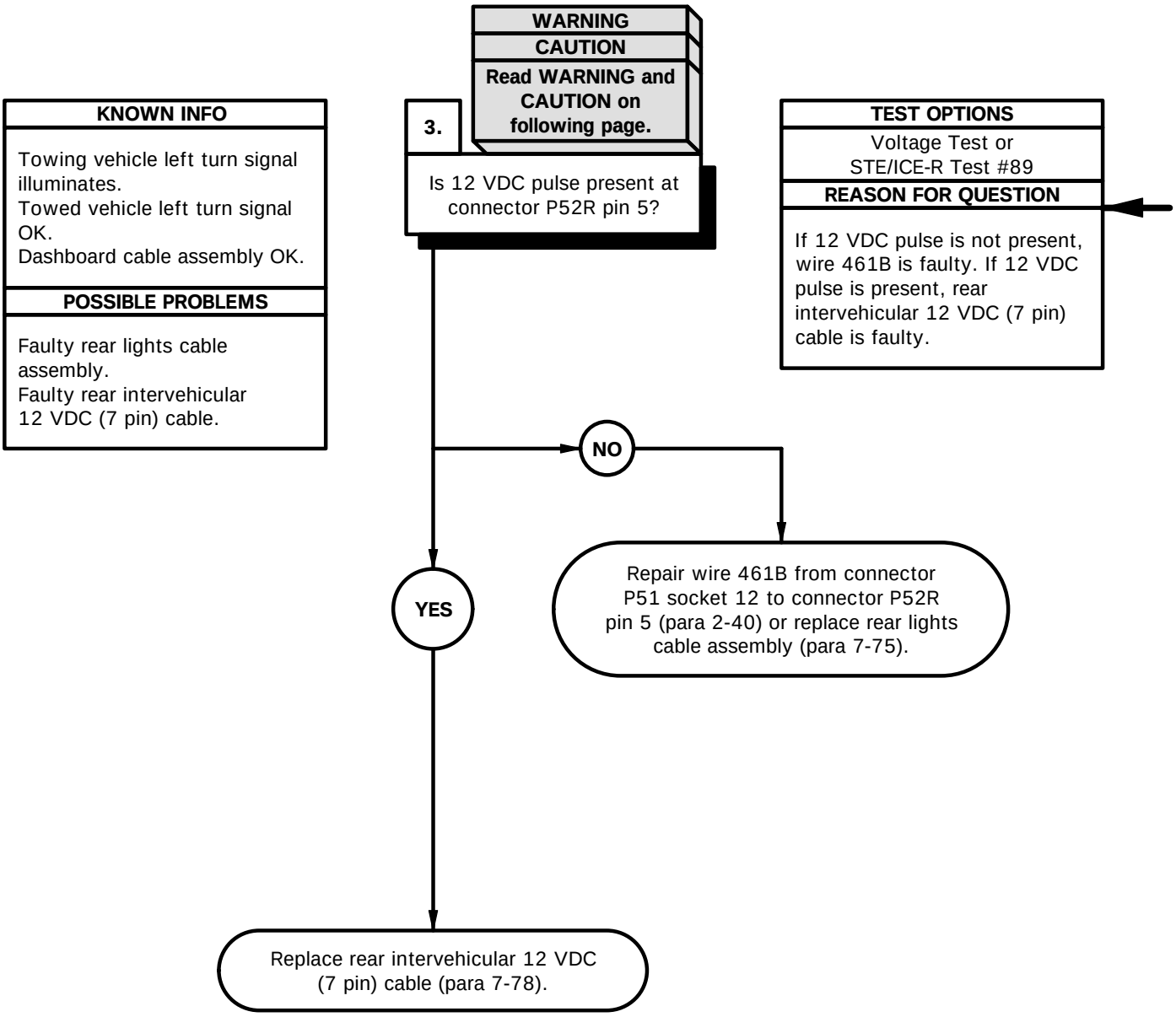
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J51 from connector P51.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector J51 pin 12.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(10) Position turn signal switch to left turn (TM 9-2320-365-10) and note reading on multimeter.
(11) If 12 VDC pulse is not present, repair wire 461B from connector J51 pin 12 to splice E3.
(12) Position main light switch to OFF (TM 9-2320-365-10).
(13) Position turn signal switch to off (TM 9-2320-365-10).
(14) Connect connector J51 to connector P51.
(15) Install PDP on dashboard with three screws.
(16) Install three washers and screws in PDP.
(17) Install PDP cover (para 16-2).



## e68. INTERVEHICLE LEFT TURN SIGNAL DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

**NOTE**

Remove plastic cable ties as required.

(1) Disconnect connector P52R from connector J52.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P52R pin 5.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Position turn signal switch to left turn (TM 9-2320-365-10).
(7) If 12 VDC pulse is not present, repair wire 461B from connector P51 socket 12 to connector P52R pin 5 (para 2-40) or replace rear lights cable assembly (para 7-75).
(8) If 12 VDC pulse is present, replace rear intervehicular 12 VDC (7 pin) cable (para 7-78).
(9) Position turn signal switch to off (TM 9-2320-365-10).

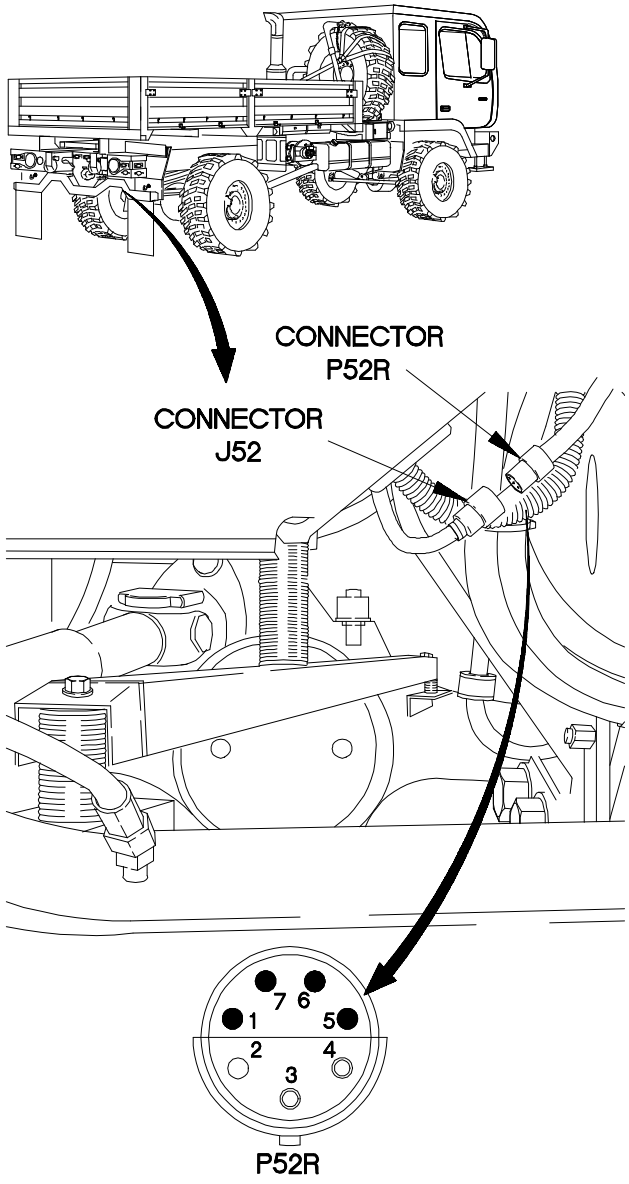
**VOLTAGE TEST (Cont)**

(10) Position main light switch to OFF (TM 9-2320-365-10).

**NOTE**

Install plastic cable ties as required.

(11) Connect connector P52R to connector J52.



## e69. INTERVEHICLE RIGHT TURN SIGNAL DOES NOT ILLUMINATE

**INITIAL SETUP**

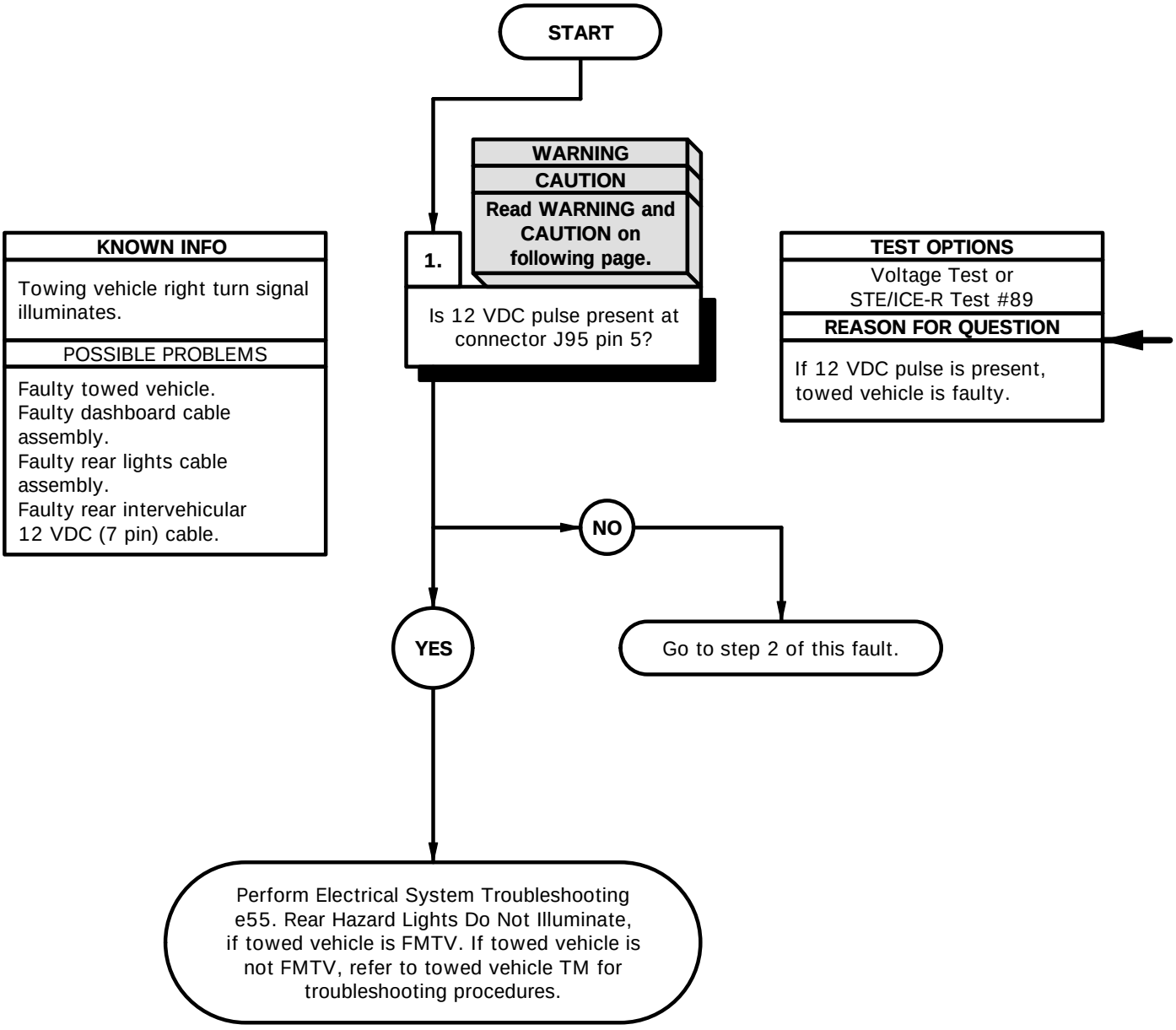
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Material/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

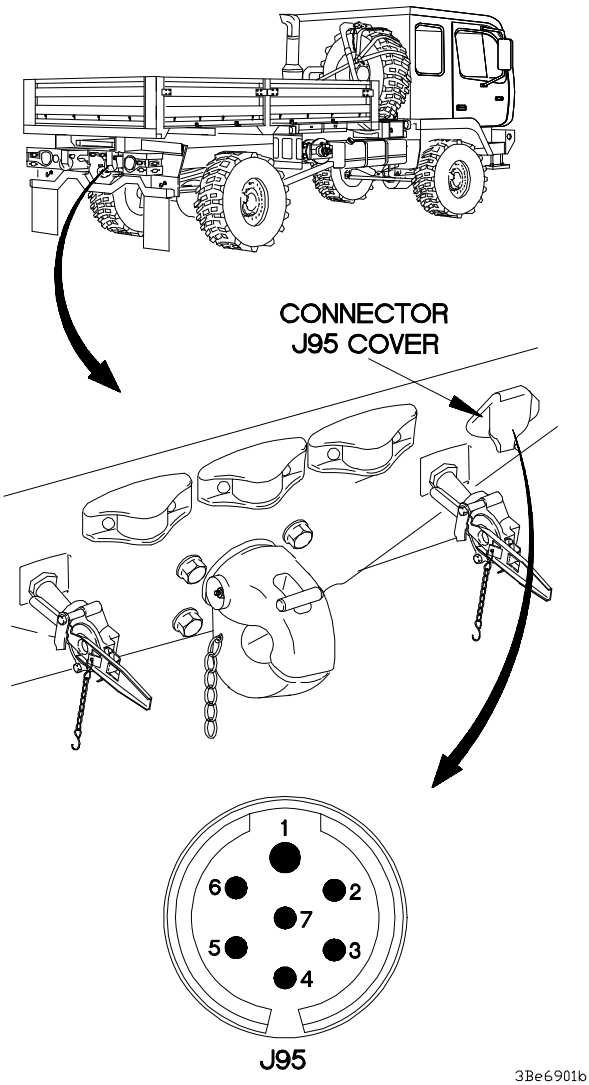
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

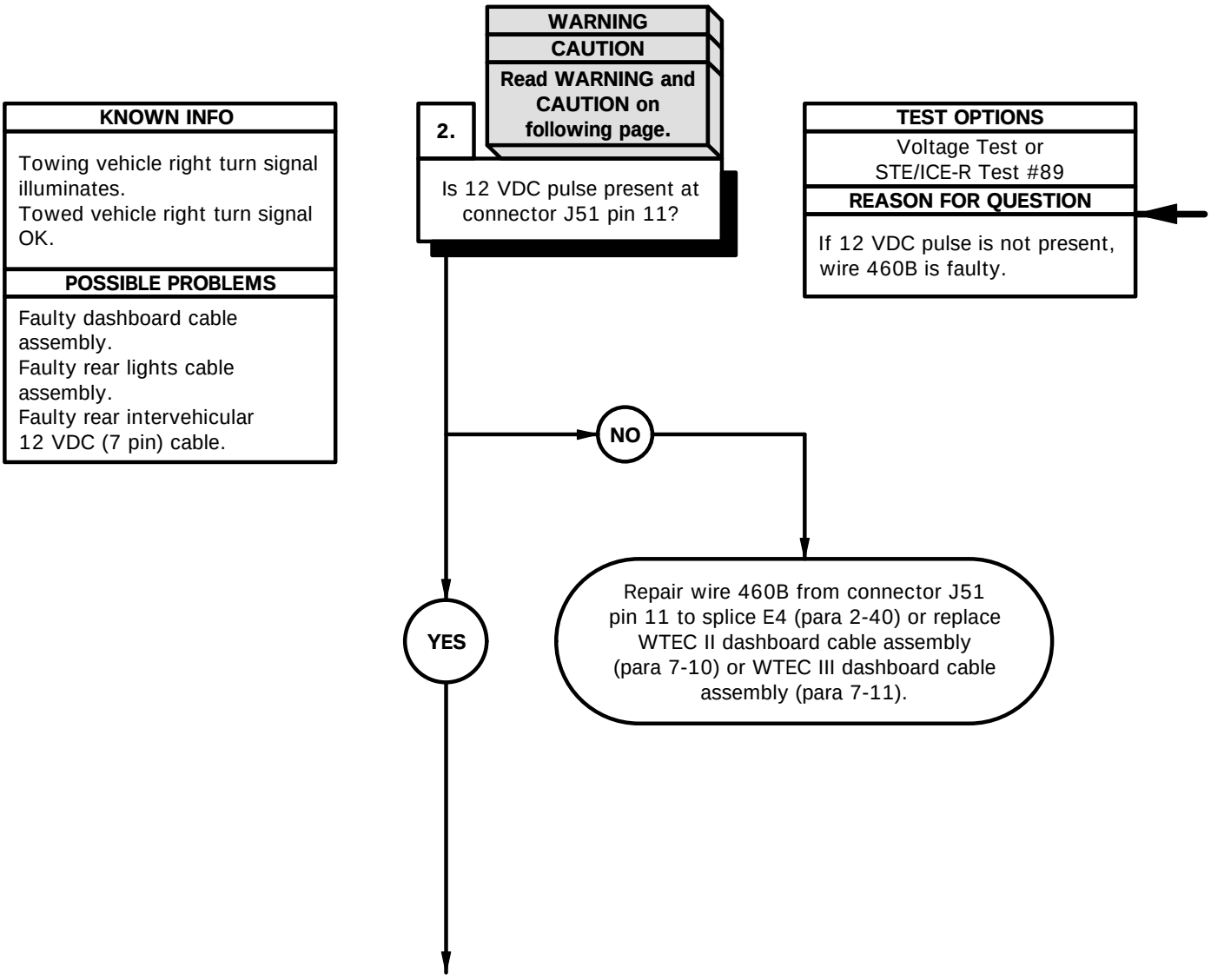
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J95 intervehicular 12 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J95 pin 5.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Position turn signal switch to right turn (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 VDC pulse is not present, go to step 2 of this fault.
(8) If 24 VDC pulse is present, perform Electrical System Troubleshooting e55. Rear Hazard Lights Do Not Illuminate, if towed vehicle is FMTV. If towed vehicle is not FMTV, refer to towed vehicle TM for troubleshooting procedures.
(9) Position turn signal switch to off (TM 9-2320-365-10).
(10) Position main light switch to OFF (TM 9-2320-365-10).



## e69. INTERVEHICLE RIGHT TURN SIGNAL DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

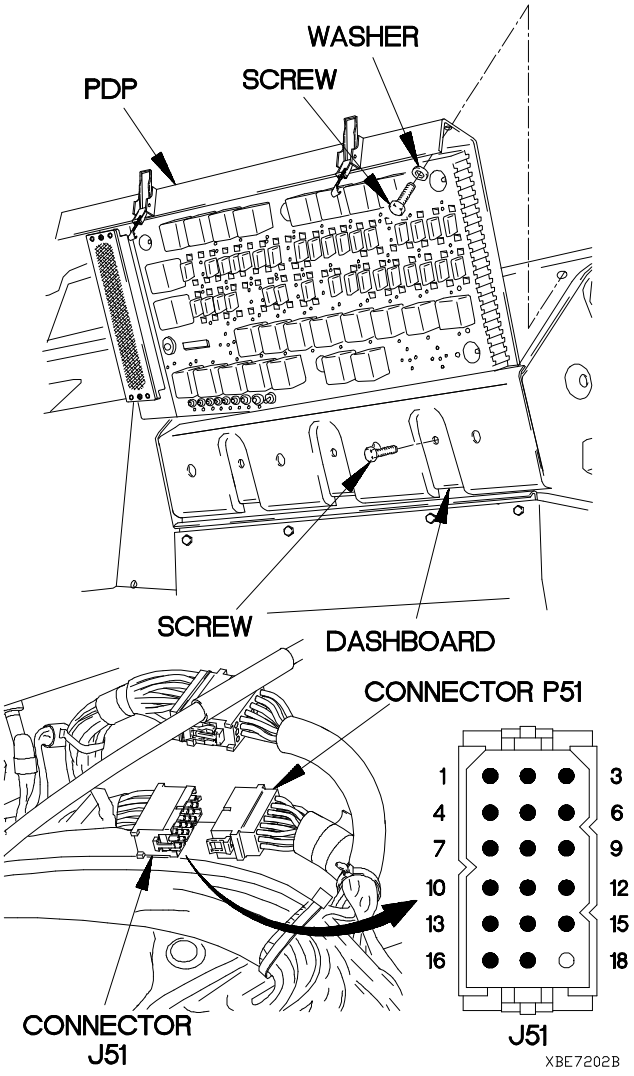
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

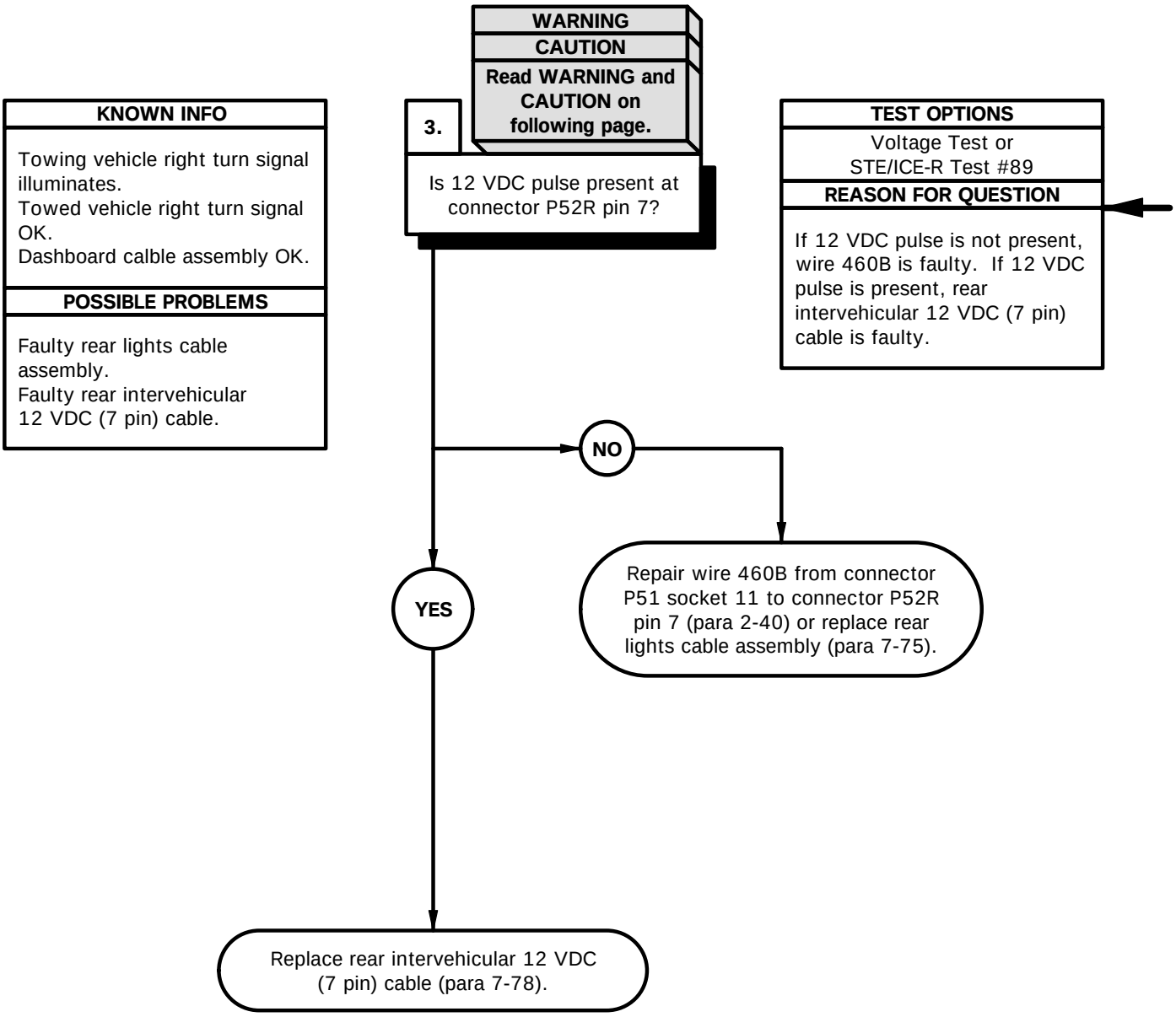
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J51 from connector P51.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector J51 pin 11.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(10) Position turn signal switch to right turn (TM 9-2320-365-10) and note reading on multimeter.
(11) If 12 VDC pulse is not present, repair wire 460B from connector J51 pin 11 to splice E4.
(12) Position main light switch to OFF (TM 9-2320-365-10).
(13) Position turn signal switch to off (TM 9-2320-365-10).
(14) Connect connector J51 to connector P51.
(15) Install PDP on dashboard with three screws.
(16) Install three washers and screws in PDP.
(17) Install PDP cover (para 16-2).



## e69. INTERVEHICLE RIGHT TURN SIGNAL DOES NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

**NOTE**

Remove plastic cable ties as required.

(1) Disconnect connector P52R from connector J52.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P52R pin 7.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(6) Position turn signal switch to right turn (TM 9-2320-365-10).
(7) If 12 VDC pulse is not present, repair wire 460B from connector P51 socket 11 to connector P52R pin 7 (para 2-40) or replace rear lights cable assembly (para 7-75).
(8) If 12 VDC pulse is present, replace rear intervehicular 12 VDC (7 pin) cable (para 7-78).
(9) Position turn signal switch to off (TM 9-2320-365-10).

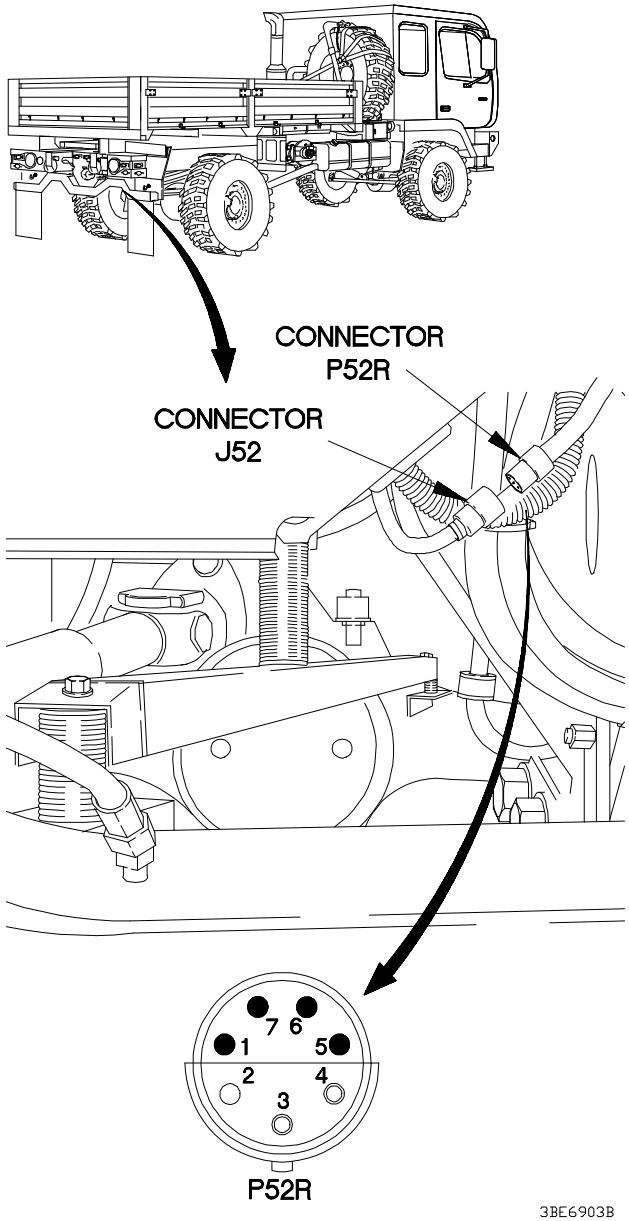
**VOLTAGE TEST (Cont)**

(10) Position main light switch to OFF (TM 9-2320-365-10).

**NOTE**

Install plastic cable ties as required.

(11) Connect connector P52R to connector J52.



## e70. INTERVEHICLE STOPLIGHTS DO NOT ILLUMINATE

**INITIAL SETUP**

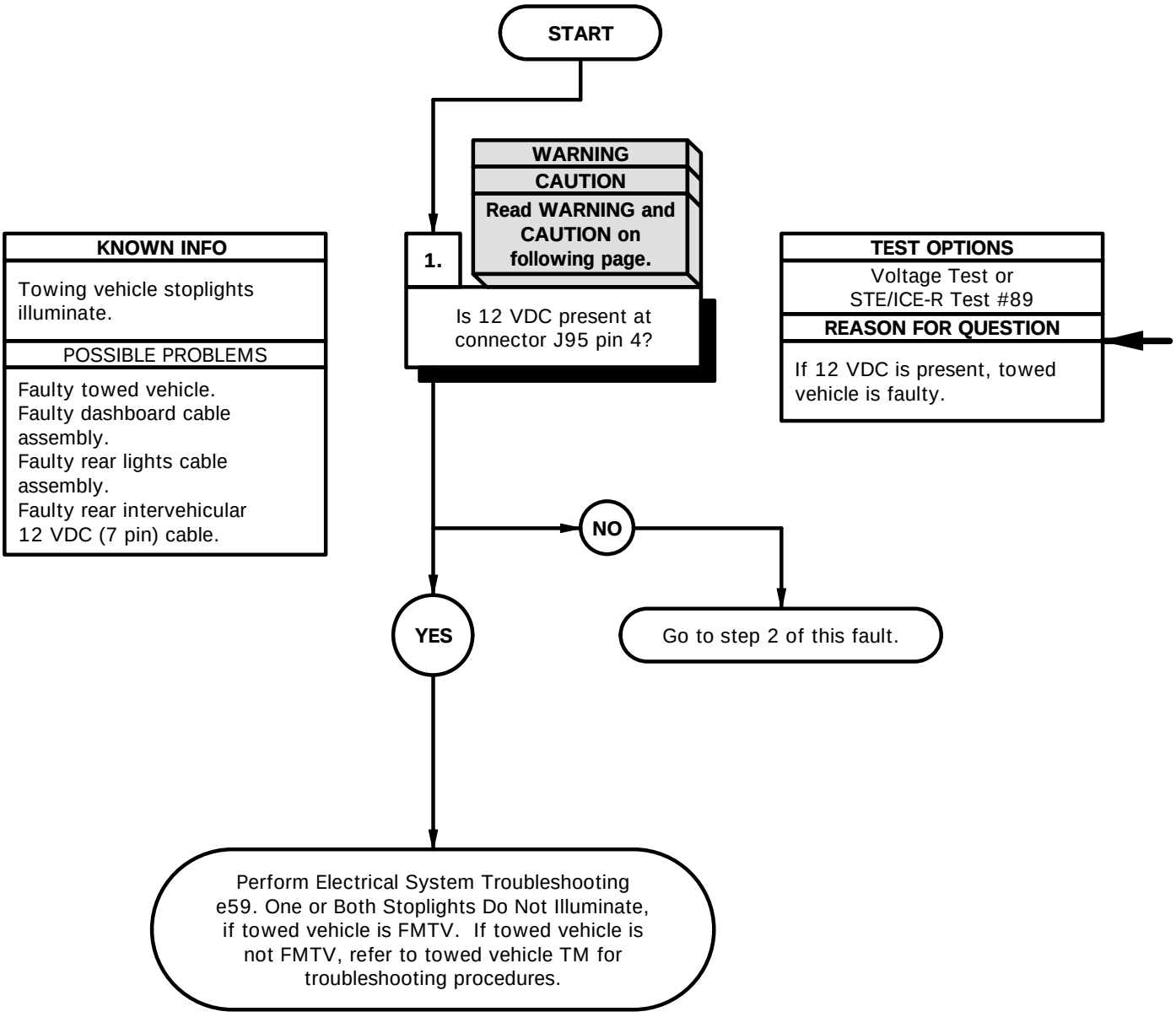
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 46, Appendix C)
STE/ICE-R (Item 41, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Material/Parts**
Ties, Cable, Plastic (Item 69, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

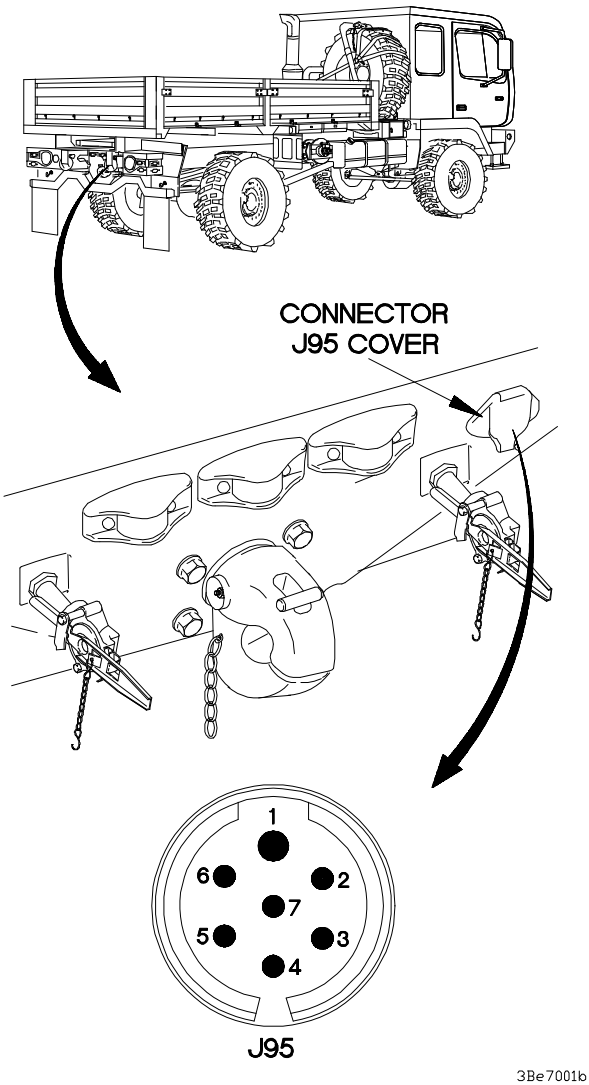
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

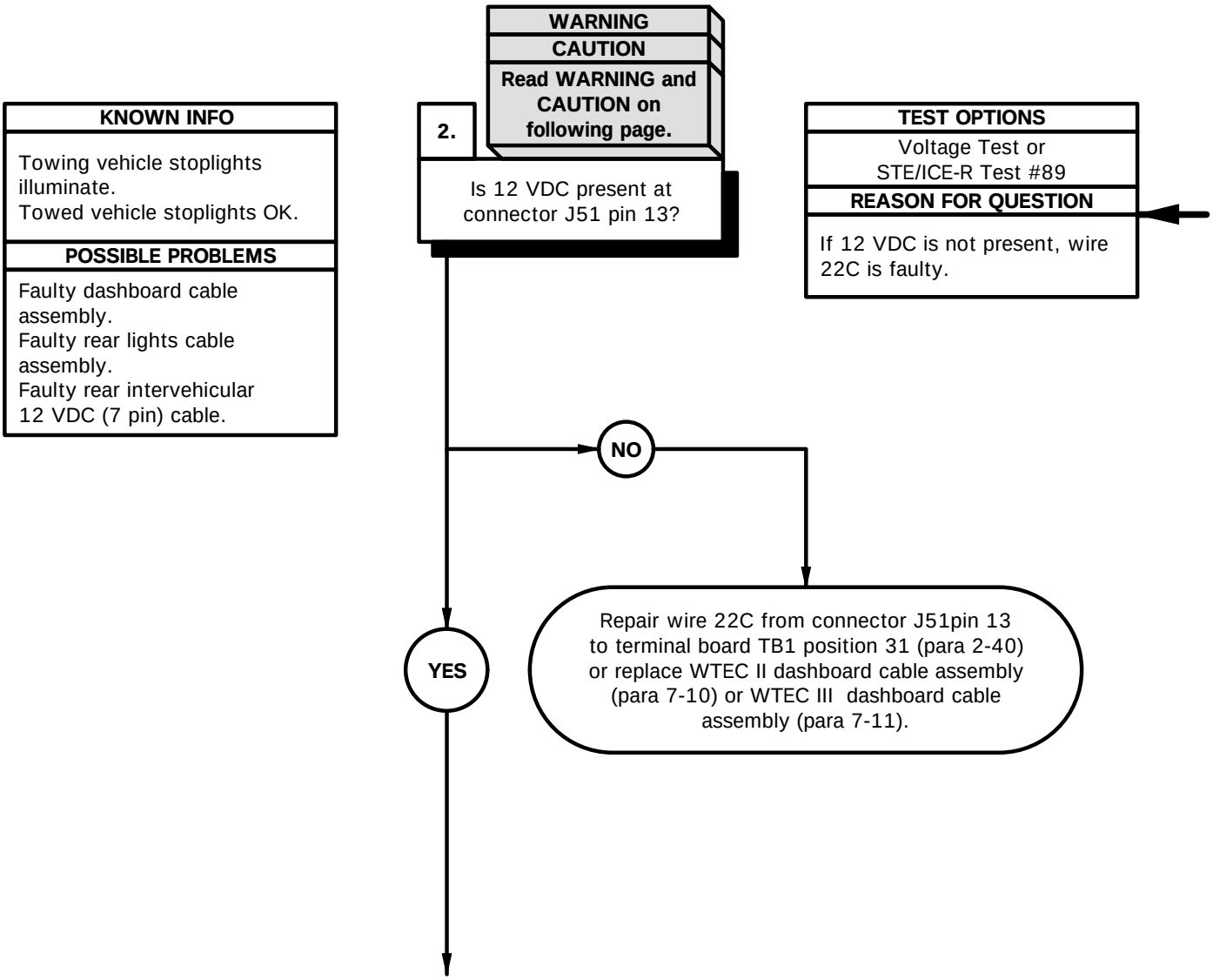
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Lift cover on connector J95 intervehicular 12 VDC connector.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J95 pin 4.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 12 VDC is not present, go to step 2 of this fault.
(9) If 24 VDC is present, perform Electrical System Troubleshooting e59. One or Both Stoplights Do Not Illuminate, if towed vehicle is FMTV. If towed vehicle is not FMTV, refer to towed vehicle TM for troubleshooting procedures.
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Position master power switch to off (TM 9-2320-365-10).



## e70. INTERVEHICLE STOPLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

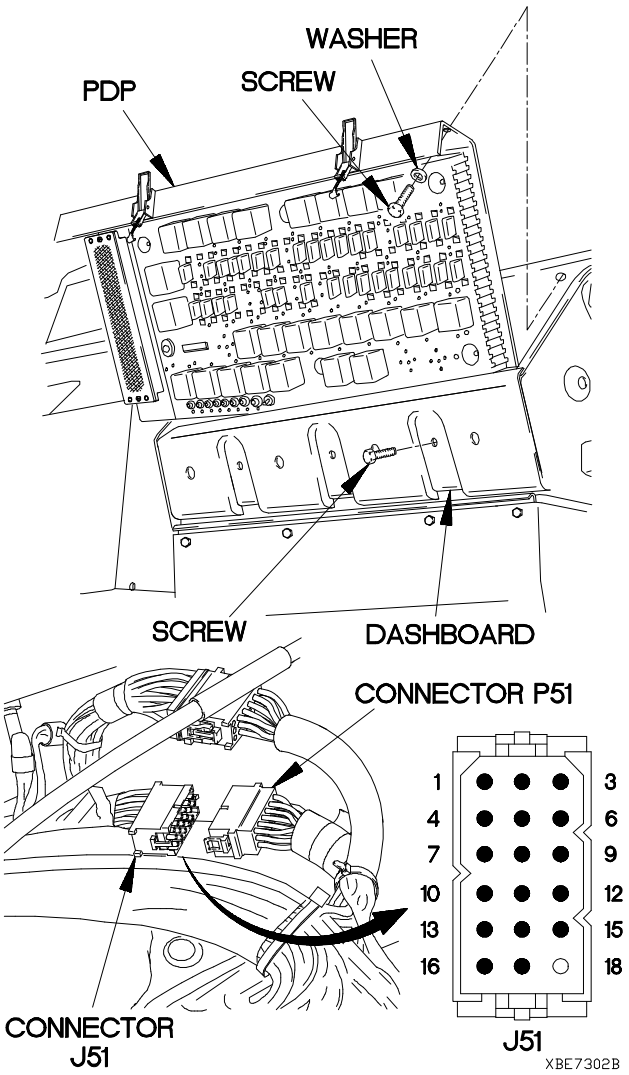
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

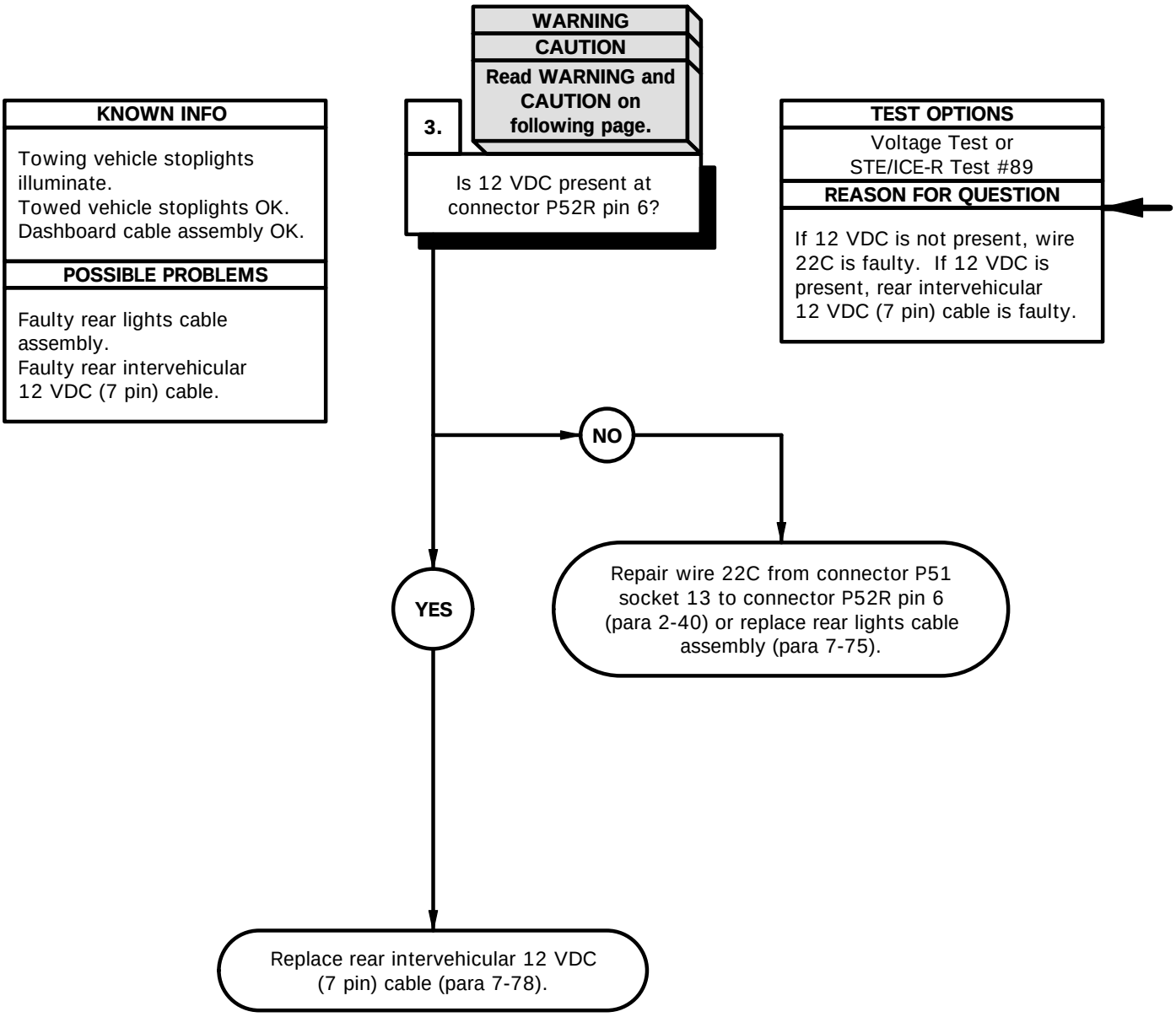
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J51 from connector P51.
(6) Set multimeter to volts DC.
(7) Connect positive (+) probe of multimeter to connector J51 pin 13.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position master power switch to on (TM 9-2320-365-10).
(10) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(11) Apply brakes and note reading on multimeter.
(12) If 12 VDC is not present, repair wire 22C from connector J51 pin 13 to terminal board TB1 position 31.
(13) Position main light switch to OFF (TM 9-2320-365-10).
(14) Position master power switch to off (TM 9-2320-365-10).
(15) Connect connector J51 to connector P51.
(16) Install PDP on dashboard with three screws.
(17) Install three washers and screws in PDP.
(18) Install PDP cover (para 16-2).



## e70. INTERVEHICLE STOPLIGHTS DO NOT ILLUMINATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**CAUTION**

Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**VOLTAGE TEST**

**NOTE**

Remove plastic cable ties as required.

(1) Disconnect connector P52R from connector J52.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P52R pin 6.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(7) Apply brakes and note reading on multimeter.
(8) If 12 VDC is not present, repair wire 22C from connector P51 socket 13 to connector P52R pin 6 (para 2-40) or replace rear lights cable assembly (para 7-75).
(9) If 12 VDC is present, replace rear intervehicular 12 VDC (7 pin) cable (para 7-78).
(10) Position main light switch to OFF (TM 9-2320-365-10).

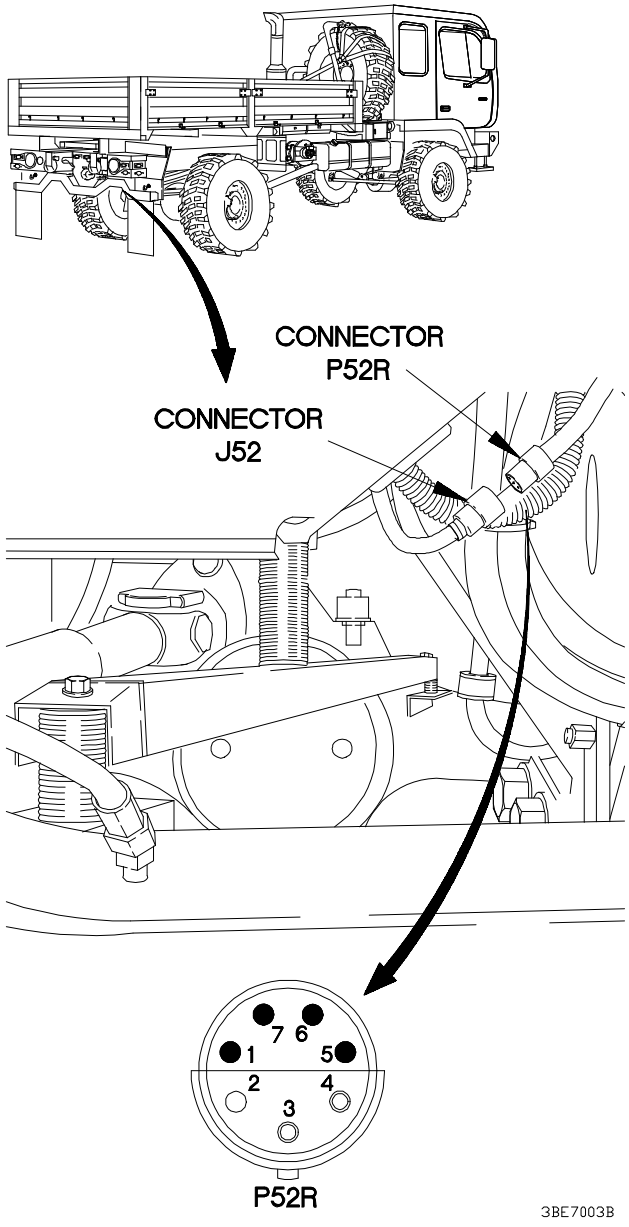
**VOLTAGE TEST (Cont)**

(11) Position master power switch to off (TM 9-2320-365-10).

**NOTE**

Install plastic cable ties as required.

(12) Connect connector P52R to connector J52.



## e71. INTERVEHICLE TAILLIGHTS DO NOT OPERATE

**INITIAL SETUP**

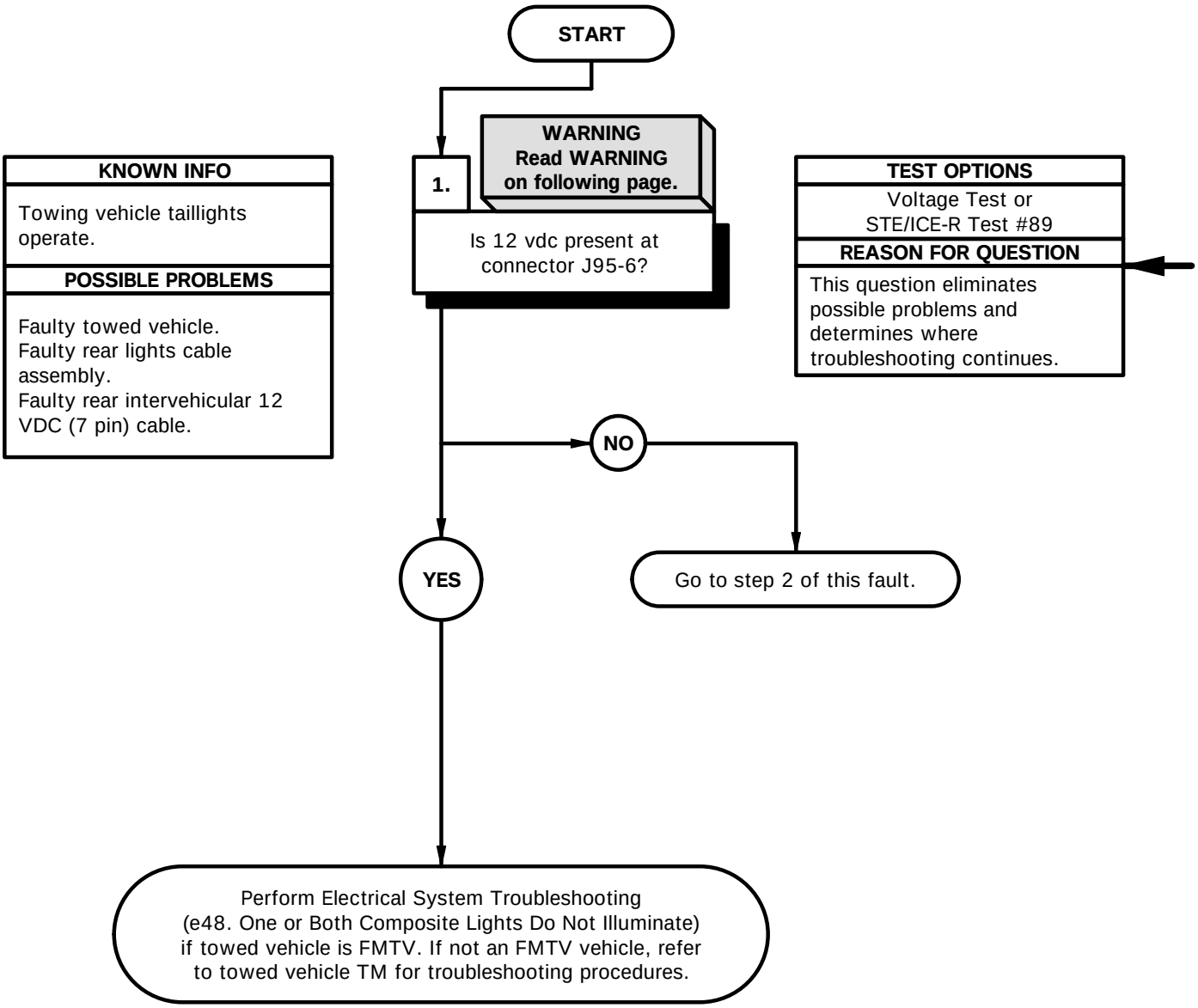
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Ties, Cable, Plastic (Item 76, Appendix D)

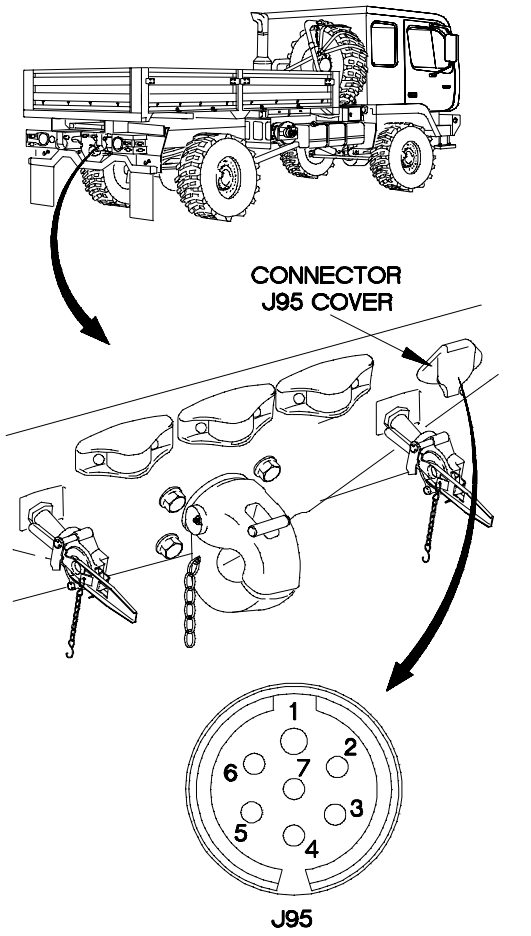


**WARNING**

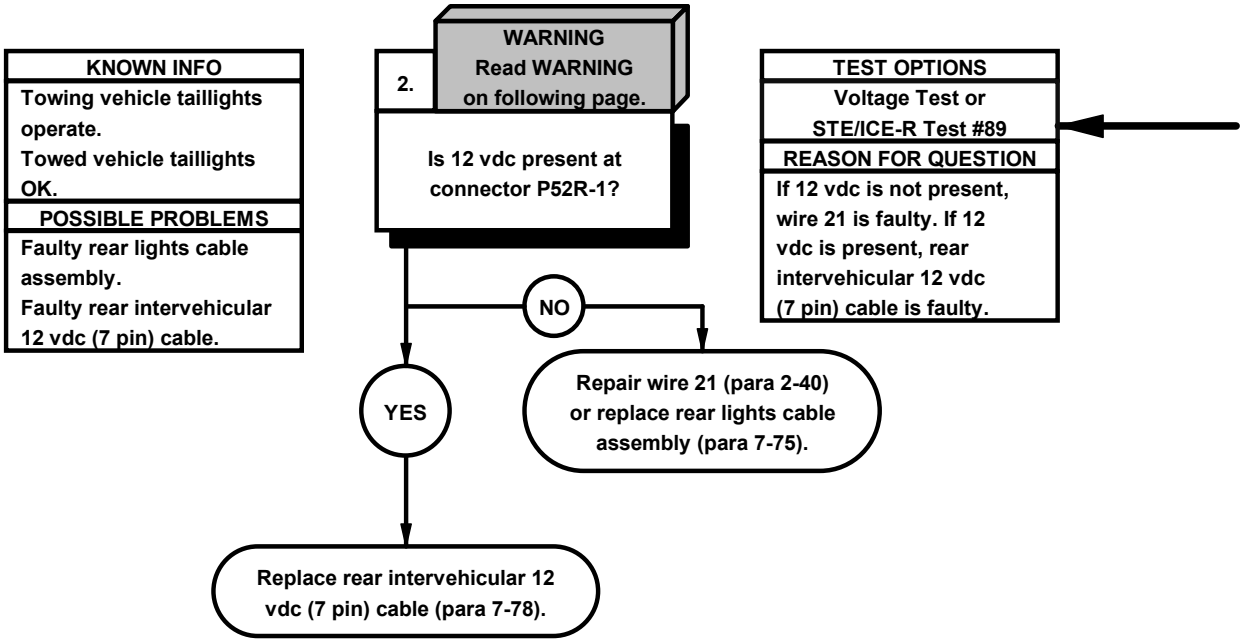
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Raise cover on connector J95 intervehicular 12 vdc connector.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J95-6.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(6) If 12 vdc is not present, go to step 2 of this fault.
(7) If 12 vdc is present, perform Electrical System Troubleshooting (e48. One or Both Composite Lights Do Not Illuminate) if towed vehicle is FMTV. If towed vehicle is not an FMTV, refer to towed vehicle TM for troubleshooting procedures.
(8) Position main light switch to OFF (TM 9-2320-365-10).



## e71. INTERVEHICLE TAILLIGHTS DO NOT OPERATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**NOTE**

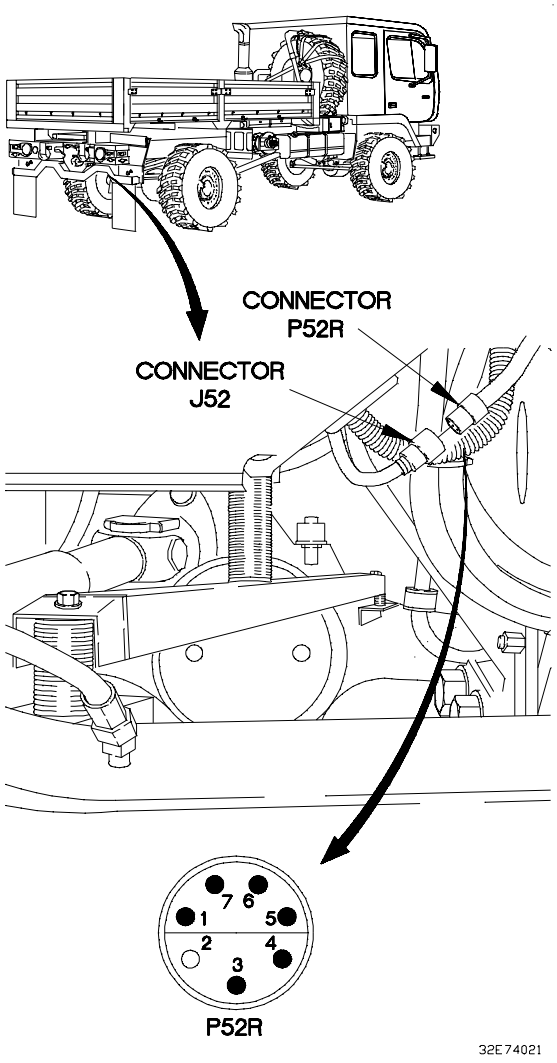
**Remove plastic cable ties as required.**

**(1) Disconnect connector P52R from connector J52.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to connector P52R-1.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If 12 vdc is not present, repair wire 21 (para 2-40) or replace rear lights cable assembly (para 7-75).**
**(7) If 12 vdc is present, replace rear intervehicular 12 vdc (7 pin) cable (para 7-78).**
**(8) Position main light switch to OFF (TM 9-2320-365-10).**

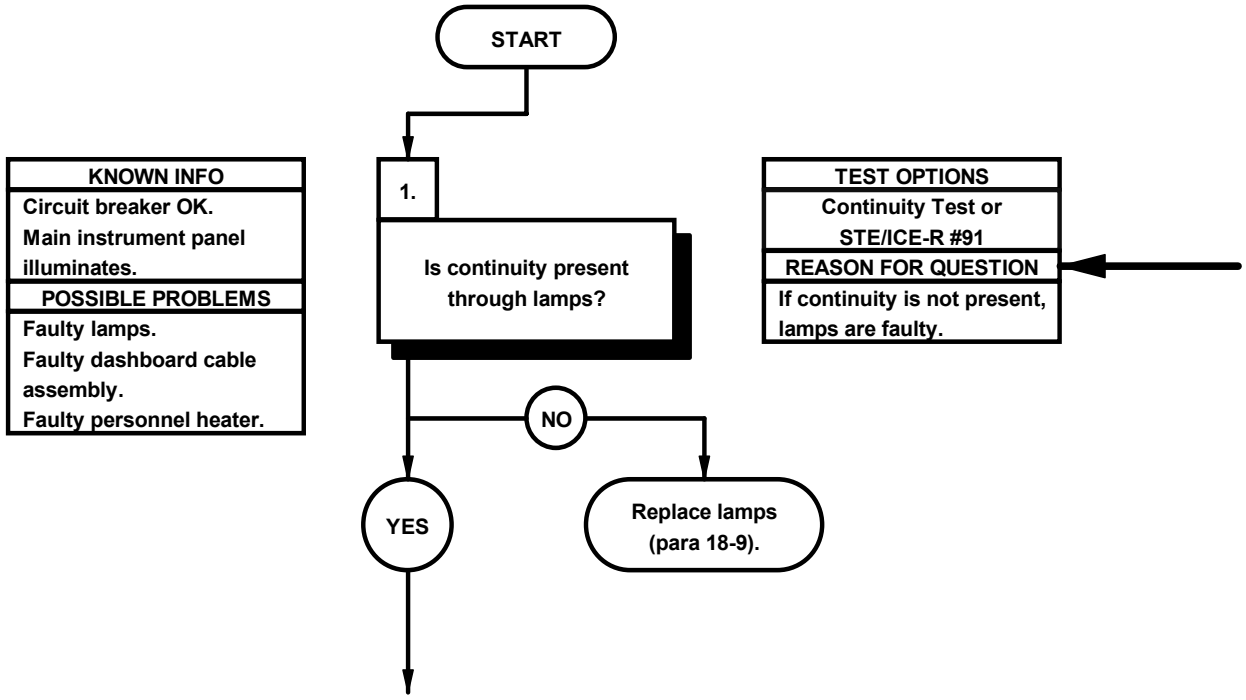
**NOTE**

**Install plastic cable ties as required.**

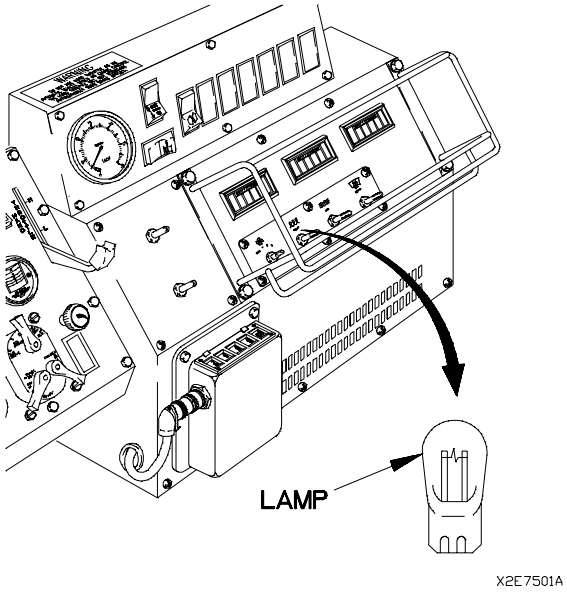
**(9) Connect connector P52R to connector J52.**



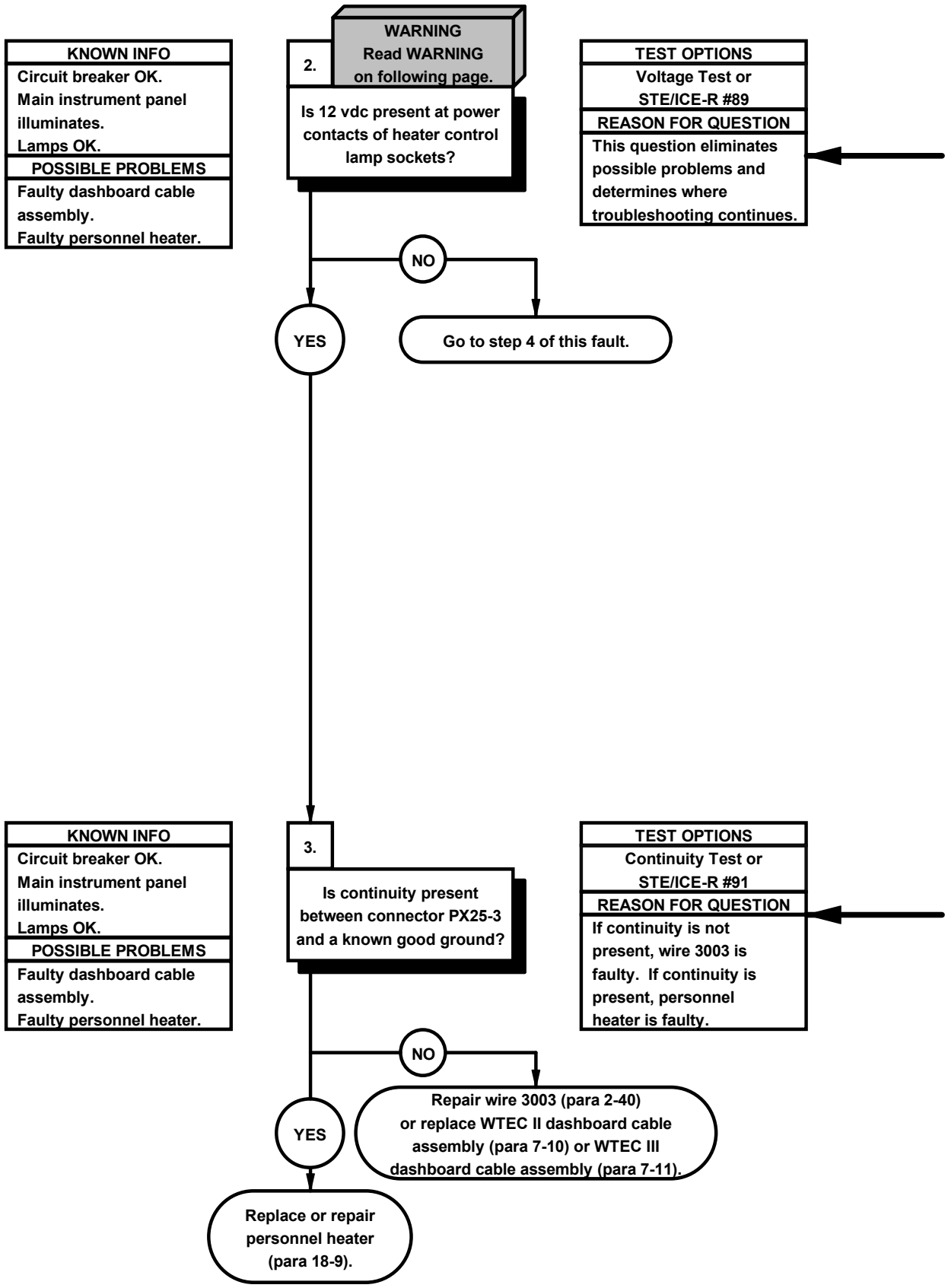
| e72. PERSONNEL HEATER CONTROL ILLUMINATION DOES NOT OPERATE | |
|---|---|
| **INITIAL SETUP** | |
| **Equipment Condition**<br>Engine shut down (TM 9-2320-365-10). | **Tools and Special Tools**<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C) |
| **Personnel Required**<br>(2) | |
| **References**<br>TM 9-4910-571-12&P | |



| CONTINUITY TEST |
| --- |
| (1) Remove lamps from heater (para 18-9). |
| (2) Set multimeter to ohms. |
| (3) Check continuity through each lamp. |
| (4) If continuity is not present, replace lamp(s) (para 18-9). |



## e72. PERSONNEL HEATER ILLUMINATION DOES NOT OPERATE (CONT)

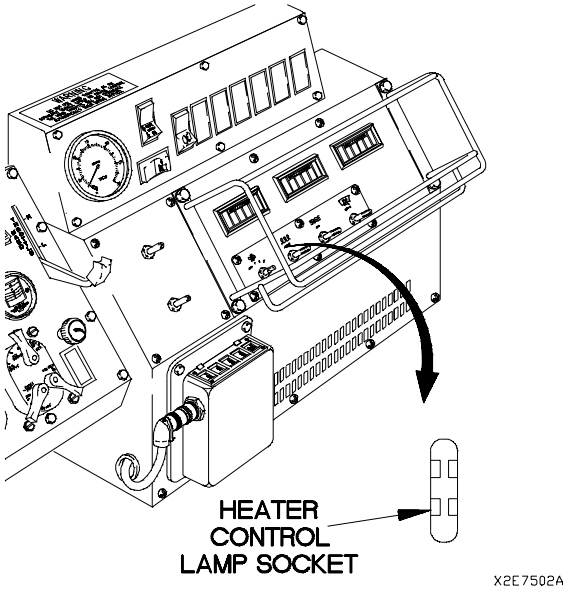


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

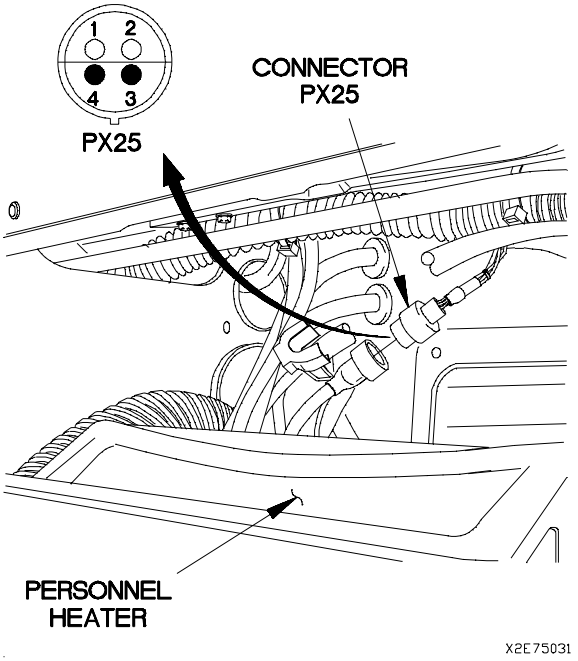
**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to power contact of each heater control lamp socket.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position main light switch to SER DRIVE (TM 9-2320-365-10).
(5) Position main light switch auxiliary lever to PANEL BRT (TM 9-2320-365-10).
(6) Position dimmer switch to maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(7) If 12 vdc is not present, go to step 4 of this fault.
(8) Position main light switch to OFF (TM 9-2320-365-10).
(9) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(10) Install lamps in heater (para 18-9).

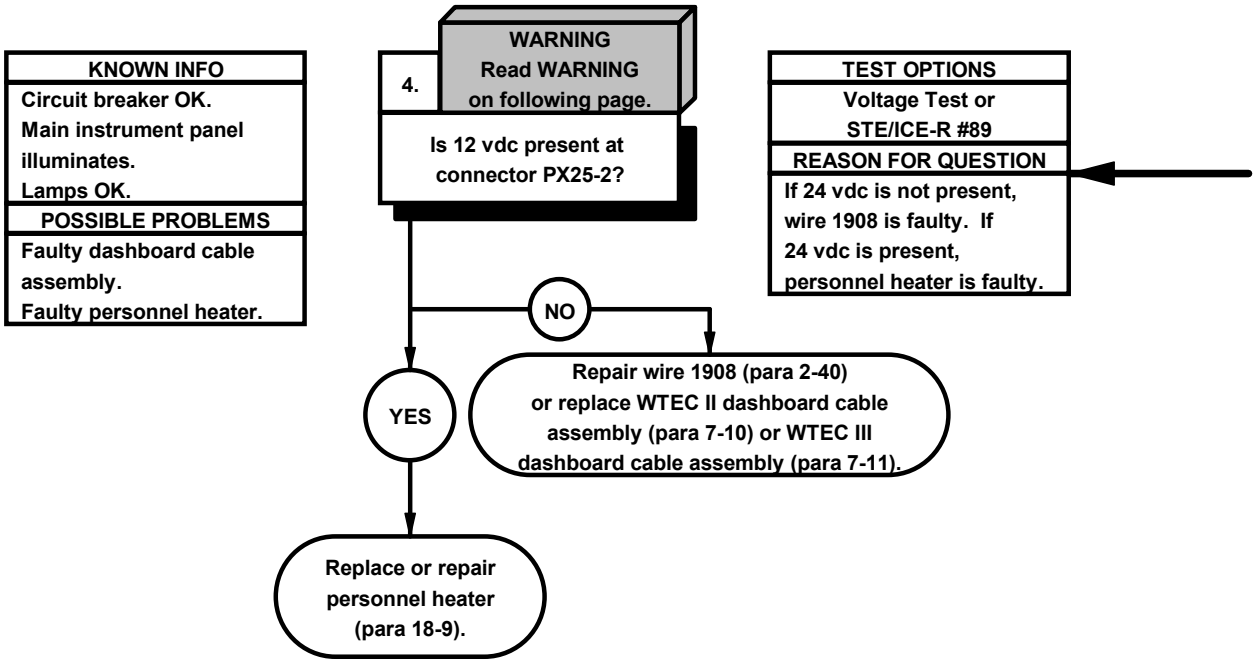



**CONTINUITY TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector PX25 from personnel heater connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX25-3.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, repair wire 3003 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, replace or repair personnel heater (para 18-9).
(8) Connect connector PX25 to personnel heater connector.
(9) Install personnel heater (para 18-9).



## e72. PERSONNEL HEATER ILLUMINATION DOES NOT OPERATE (CONT)

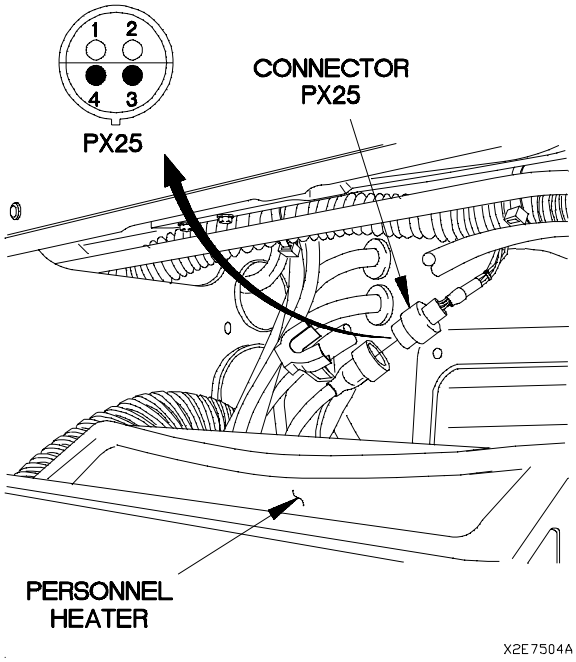


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector PX25 from personnel heater connector.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector PX25-1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position main light switch auxiliary lever to PNL BRT (TM 9-2320-365-10).
(8) Position dimmer switch to maximum brightness (TM 9-2320-365-10) and note reading on multimeter.
(9) If 12 vdc is not present, repair wire 1908 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(10) If 12 vdc is present, replace or repair personnel heater (para 18-9).
(11) Position master power switch to off (TM 9-2320-365-10).
(12) Position main light switch auxiliary lever to OFF (TM 9-2320-365-10).
(13) Connect connector PX25 to personnel heater connector.
(14) Install personnel heater (para 18-9).



## e73. PERSONNEL HEATER FAN DOES NOT OPERATE

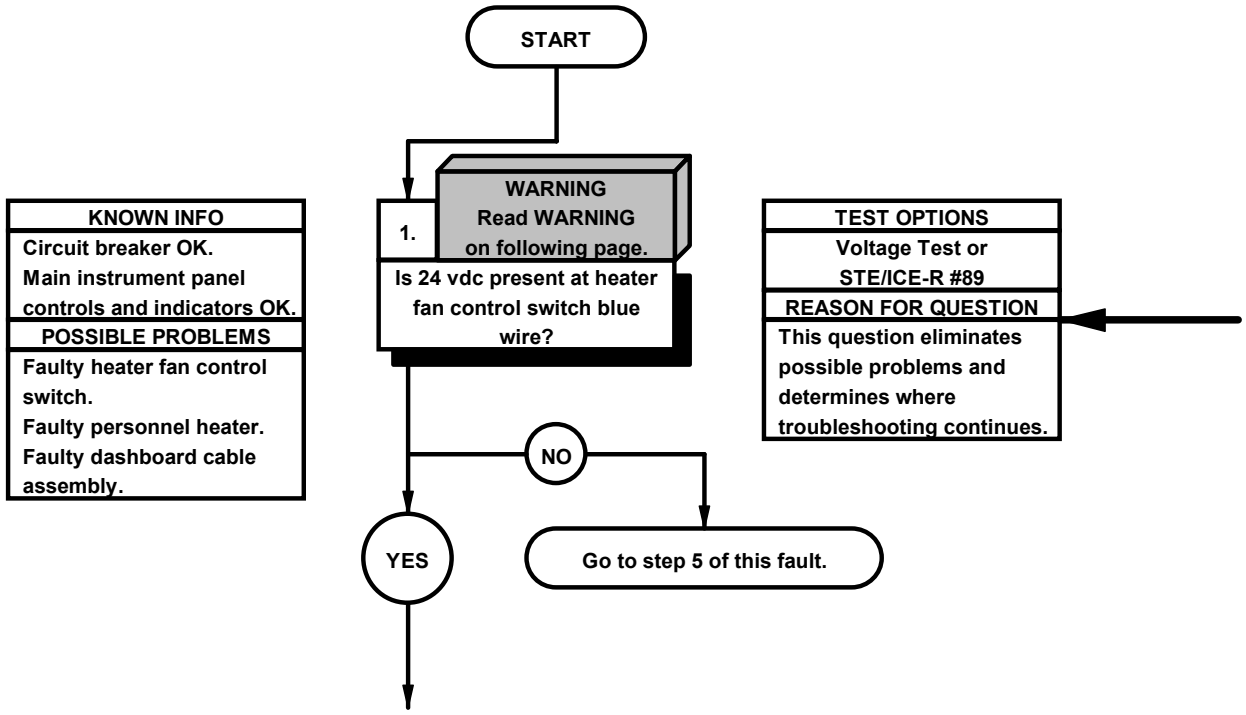
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

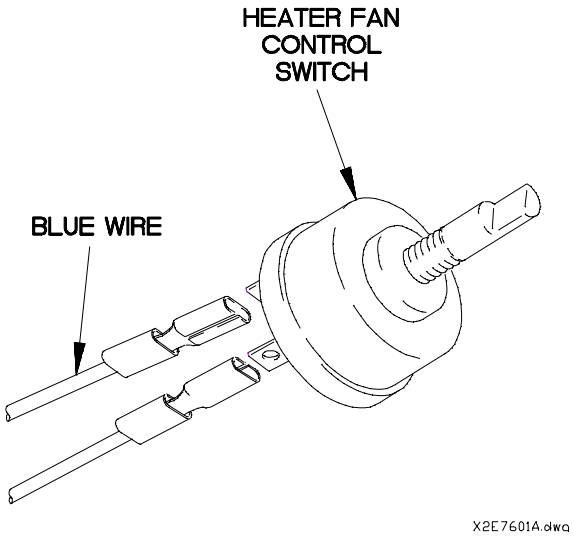


**WARNING**

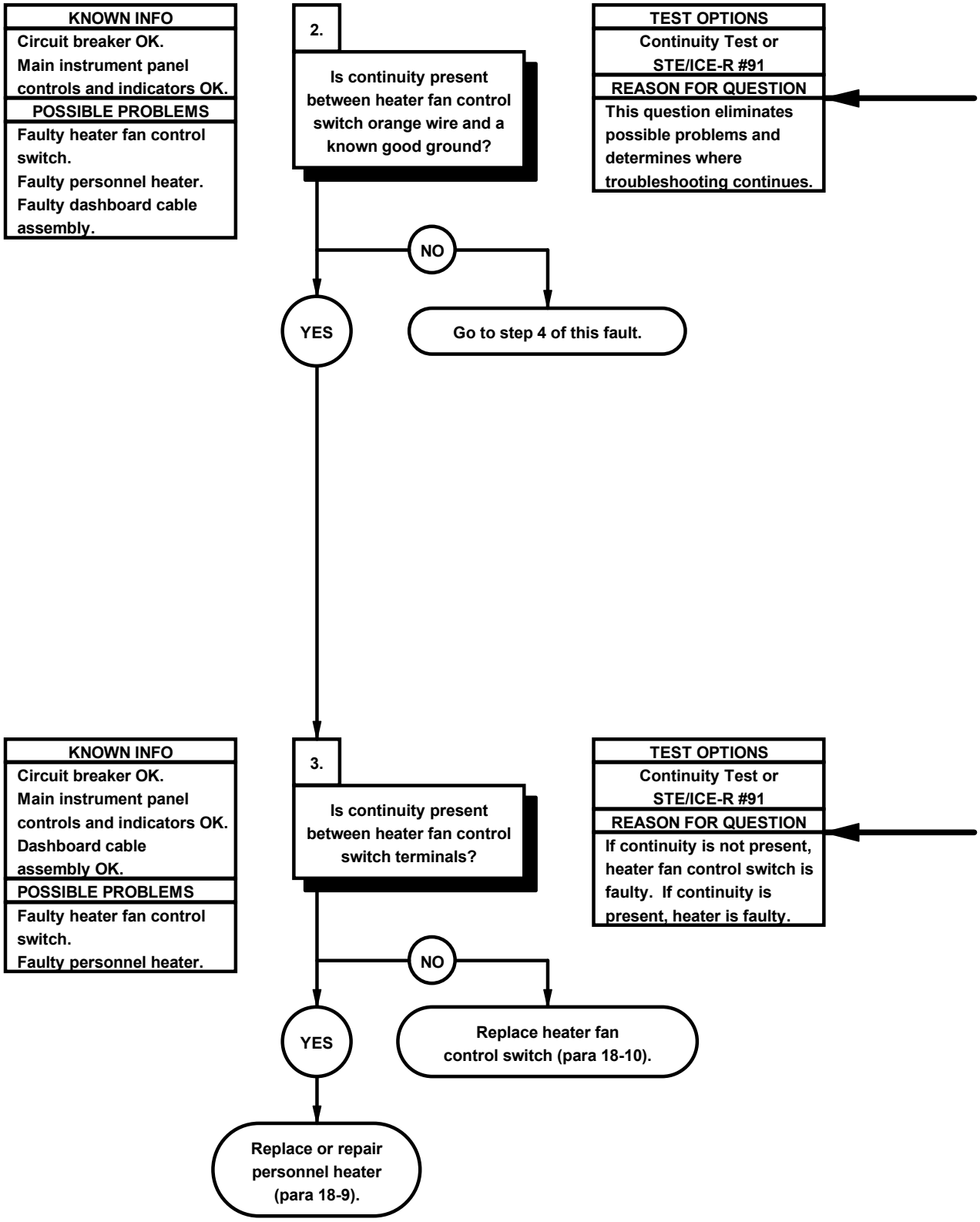
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

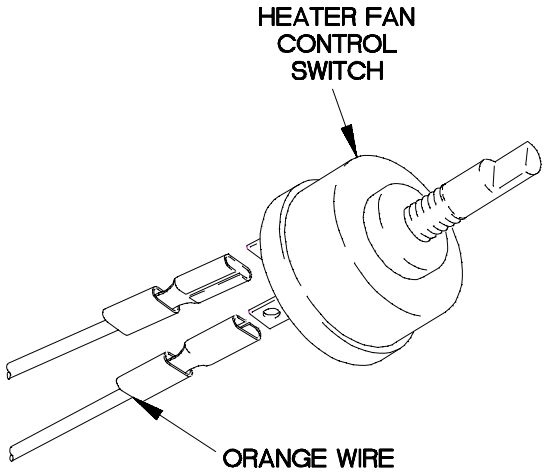
**(1) Remove heater fan control switch (para 18-10).**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to personnel heater fan control switch blue wire.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If 24 vdc is not present, go to step 5 of this fault.**
**(7) Position master power switch to off (TM 9-2320-365-10).**



## e73. PERSONNEL HEATER FAN DOES NOT OPERATE (CONT)



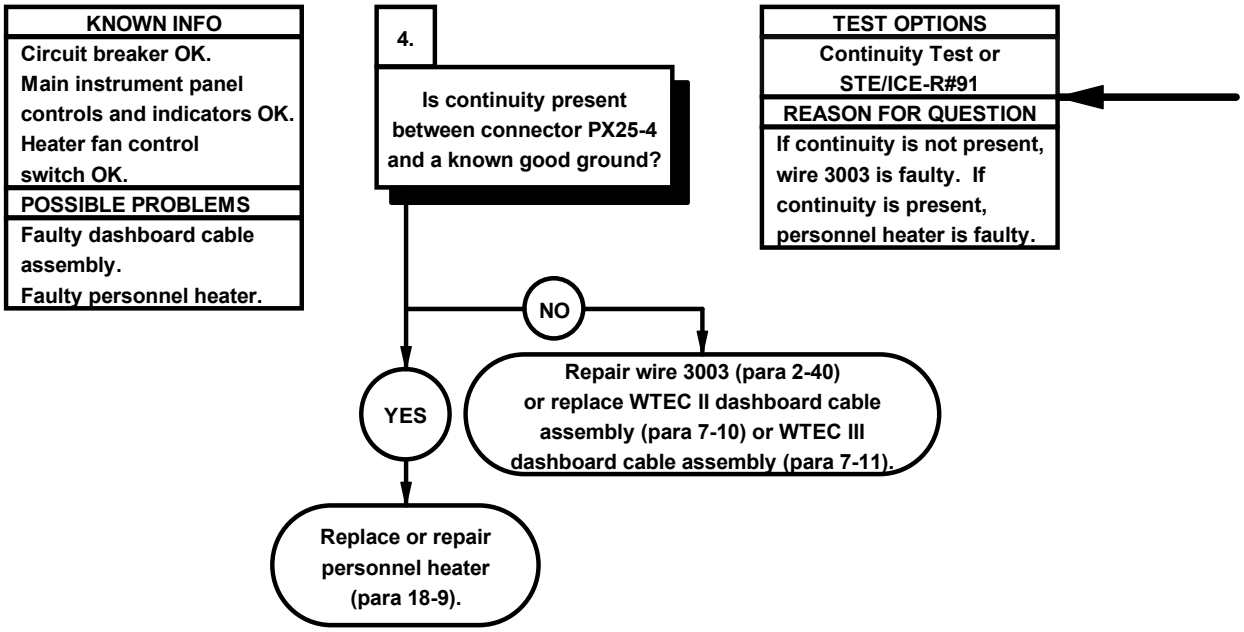
| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to heater fan control switch orange wire. |
| (3) Connect negative (-) probe of multimeter to ground and note reading on multimeter. |
| (4) If continuity is not present, go to step 4 of this fault. |

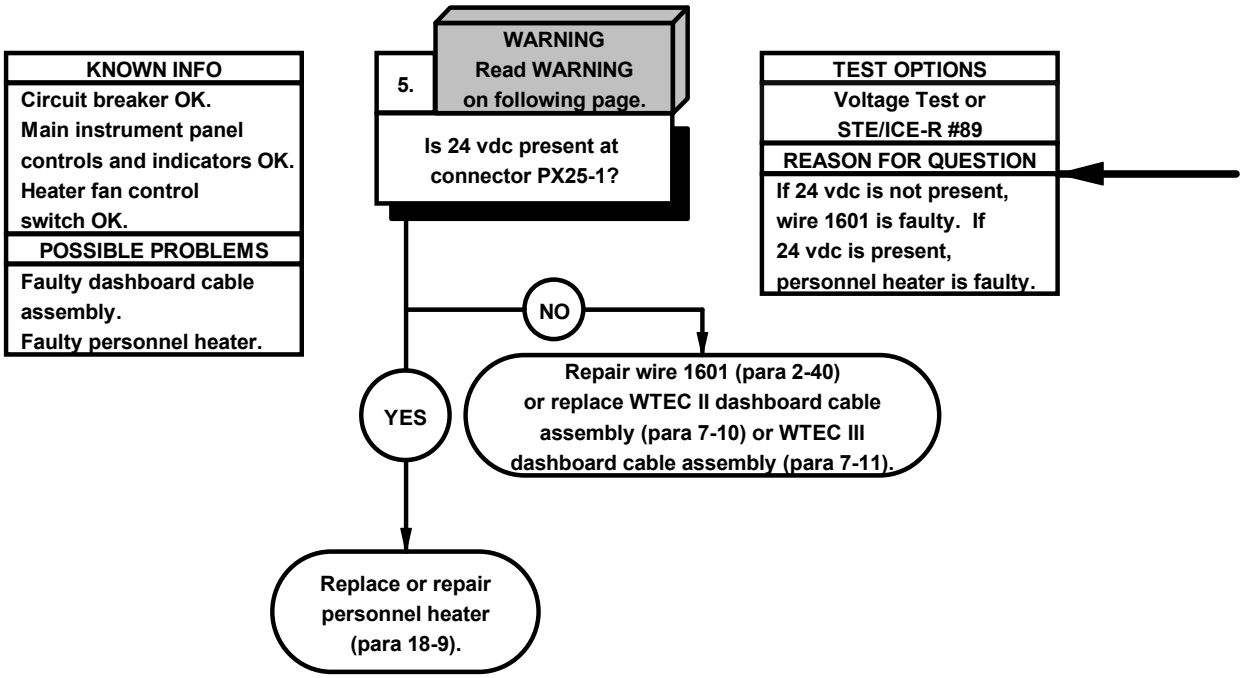



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| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Position heater fan control switch to high speed. |
| (3) Connect positive (+) probe of multimeter to one heater fan control switch terminal. |
| (4) Connect negative (-) probe of multimeter to other heater fan control switch terminal and note reading on multimeter. |
| (5) If continuity is not present, replace heater fan control switch (para 18-10). |
| (6) If continuity is present, replace or repair personnel heater (para 18-9). |
| (7) Install heater fan control switch (para 18-10). |

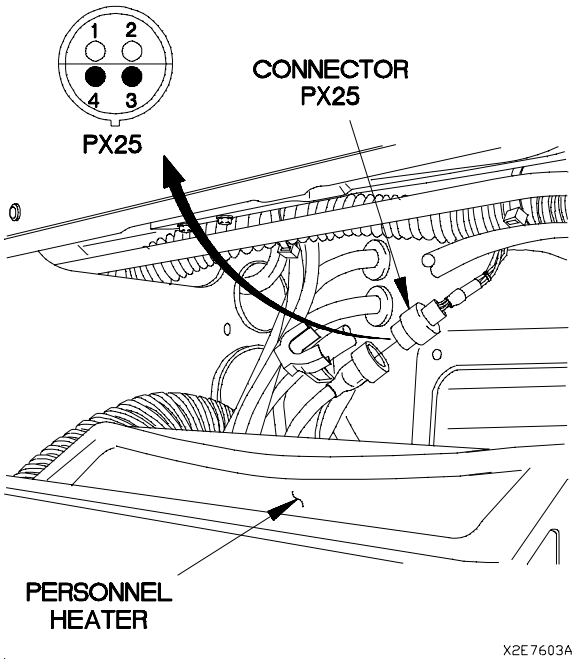
## e73. PERSONNEL HEATER FAN DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector PX25 from personnel heater connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX25-4.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, repair wire 3003 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, replace or repair personnel heater (para 18-9).
(8) Install personnel heater (para 18-9).
(9) Install heater fan control switch (para 18-10).




**WARNING**

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector PX25 from personnel heater connector.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector PX25-2.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 1601 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc is present, replace or repair personnel heater (para 18-9).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Install personnel heater (para 18-9).
(11) Install heater fan control switch (para 18-10).

## e74. WINDSHIELD WASHER DOES NOT OPERATE

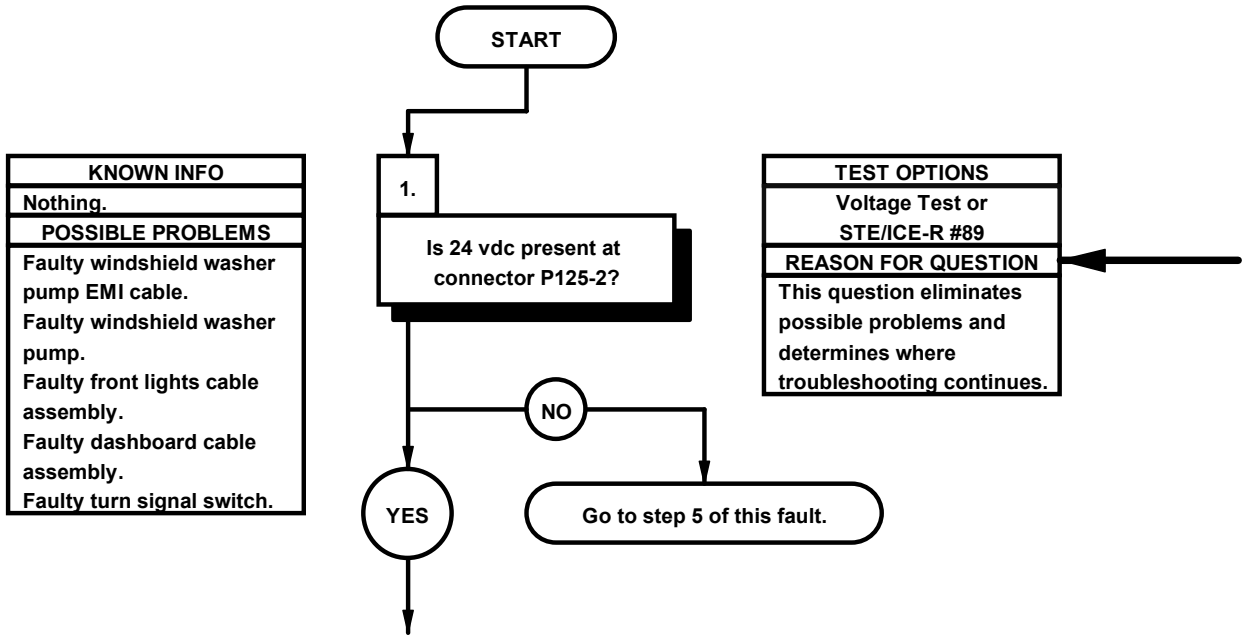
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

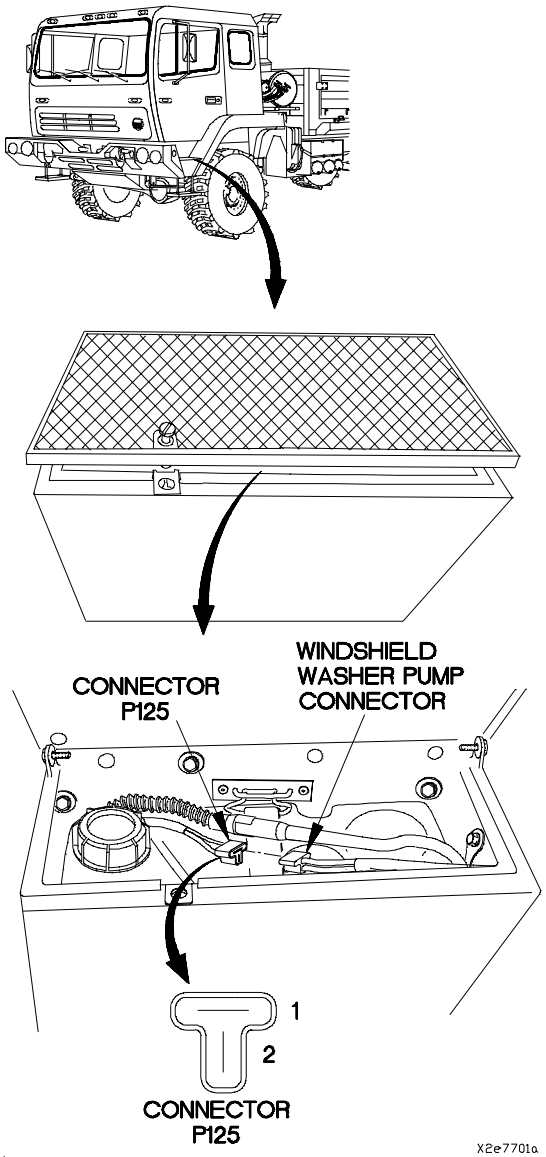
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

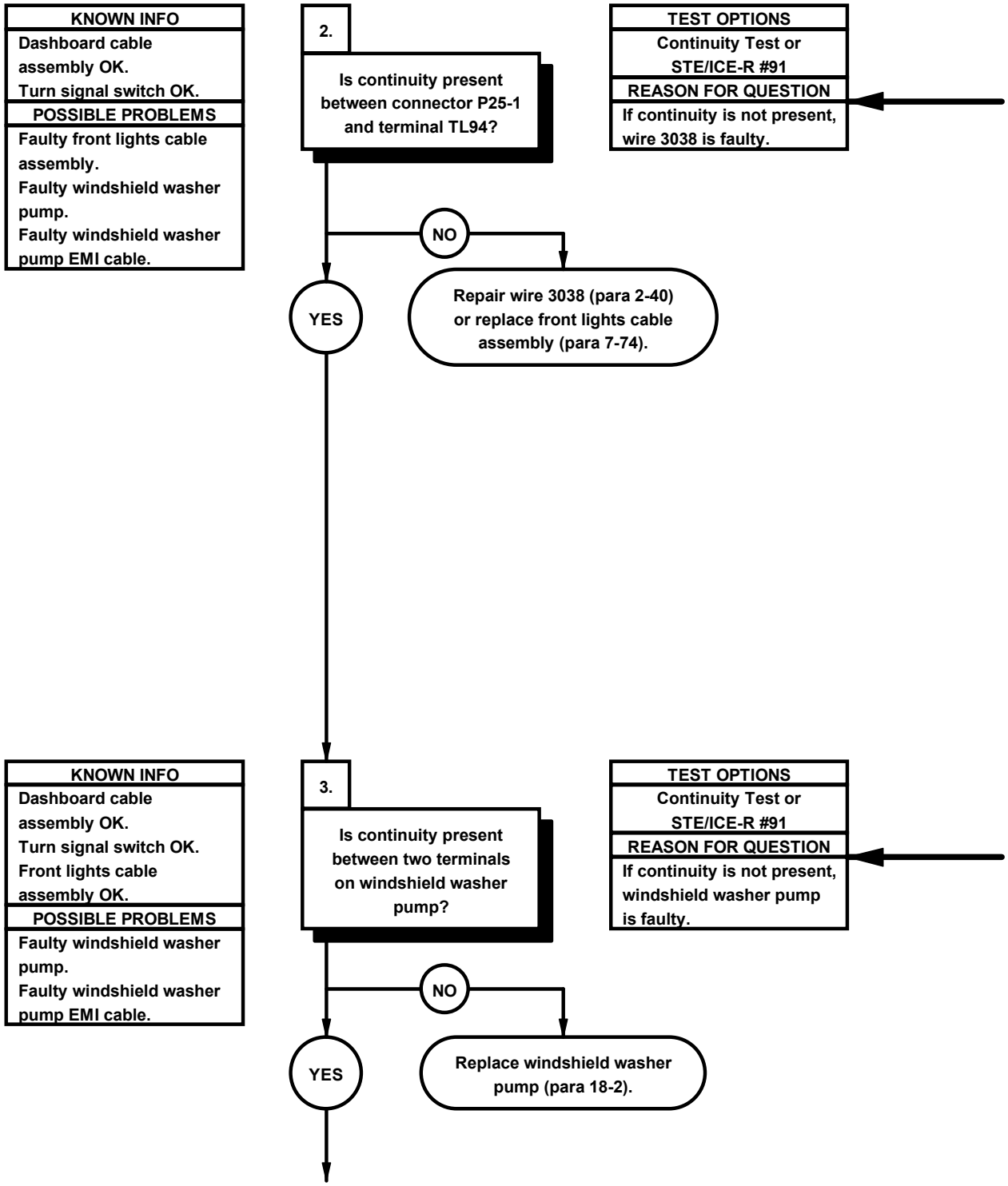


**VOLTAGE TEST**

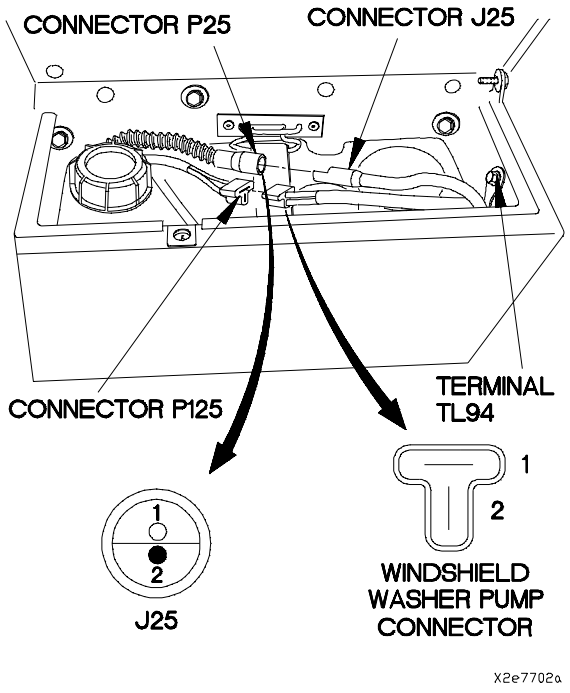
(1) Open left cab step tread (TM 9-2320-365-10).
(2) Disconnect connector P125 from windshield washer pump connector.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector P125-2.
(5) Connect negative (-) probe of multimeter to ground.
(6) Operate windshield washer (TM 9-2320-365-10).
(7) If 24 vdc is not present, go to step 5 of this fault.
(8) Position master power switch to off (TM 9-2320-365-10).
(9) Connect connector P125 to windshield washer pump connector.



## e74. WINDSHIELD WASHER DOES NOT OPERATE (CONT)

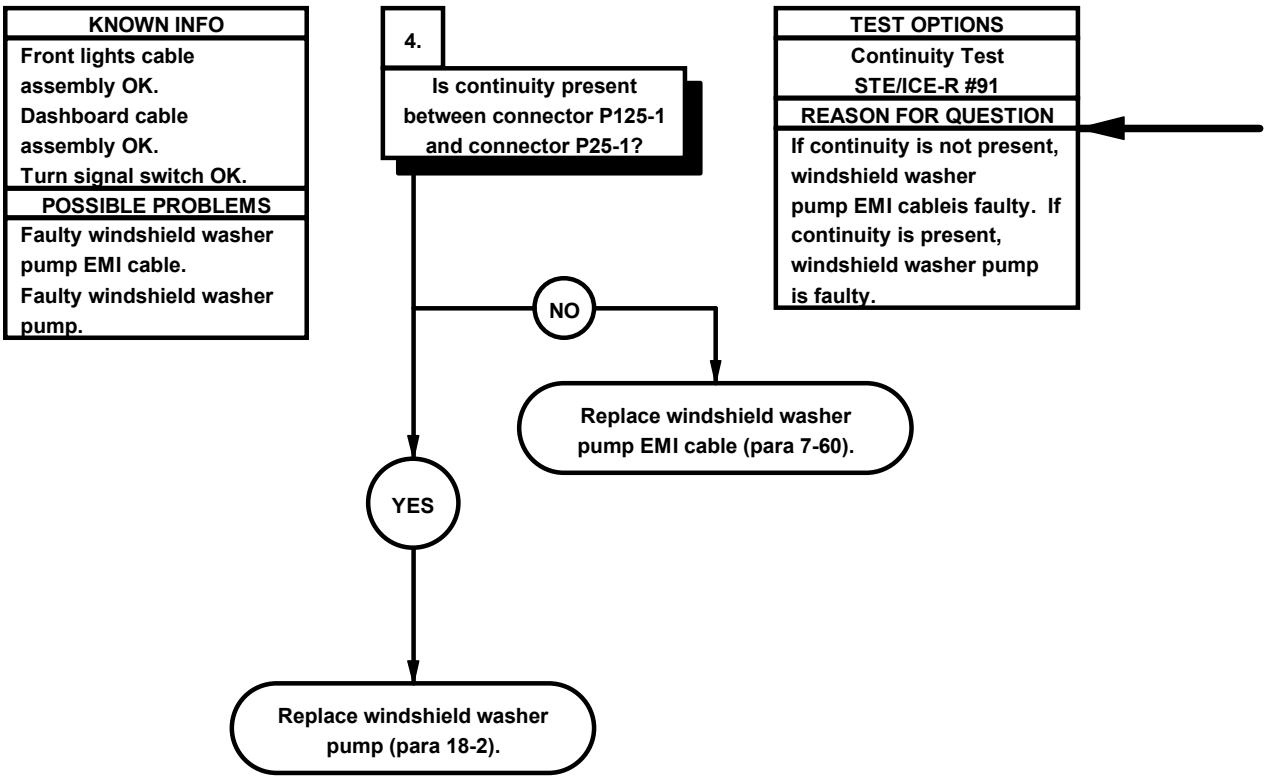


| CONTINUITY TEST |
| --- |
| (1) Disconnect connector P25 from connector J25. |
| (2) Set multimeter to ohms. |
| (3) Connect positive (+) probe of multimeter to connector J25-1. |
| (4) Connect negative (-) probe of multimeter to terminal TL94. |
| (5) If continuity is not present, repair wire 3038 (para 2-40) or replace front lights cable assembly (para 7-74). |
| (6) Connect connector P25 to connector J25. |



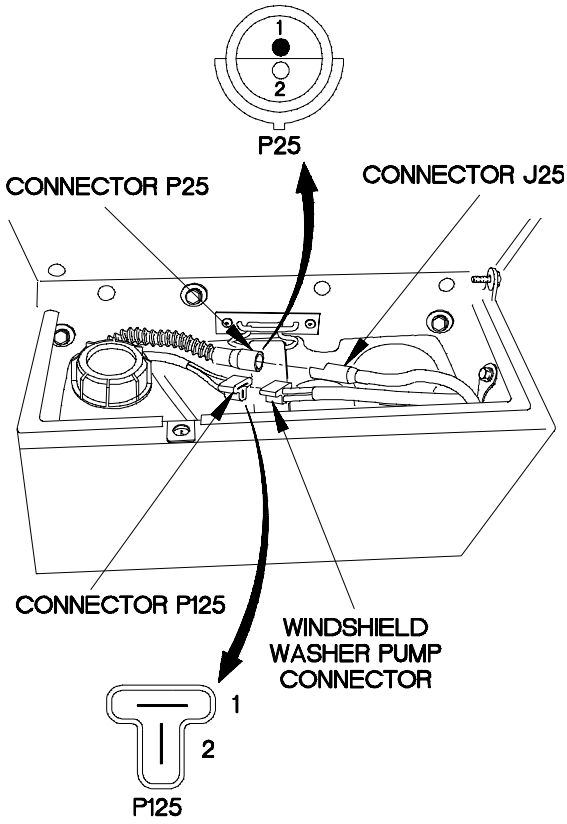

| CONTINUITY TEST |
| --- |
| (1) Disconnect connector P125 from windshield washer pump connector. |
| (2) Set multimeter to ohms. |
| (3) Connect positive (+) probe of multimeter to terminal 1 of windshield washer pump connector. |
| (4) Connect negative (-) probe of multimeter to terminal 2 or windshield washer pump connector. |
| (5) If continuity is not present, replace windshield washer motorpump (para 18-2). |
| (6) Connect connector P125 to windshield washer pump connector. |

## e74. WINDSHIELD WASHER DOES NOT OPERATE (CONT)



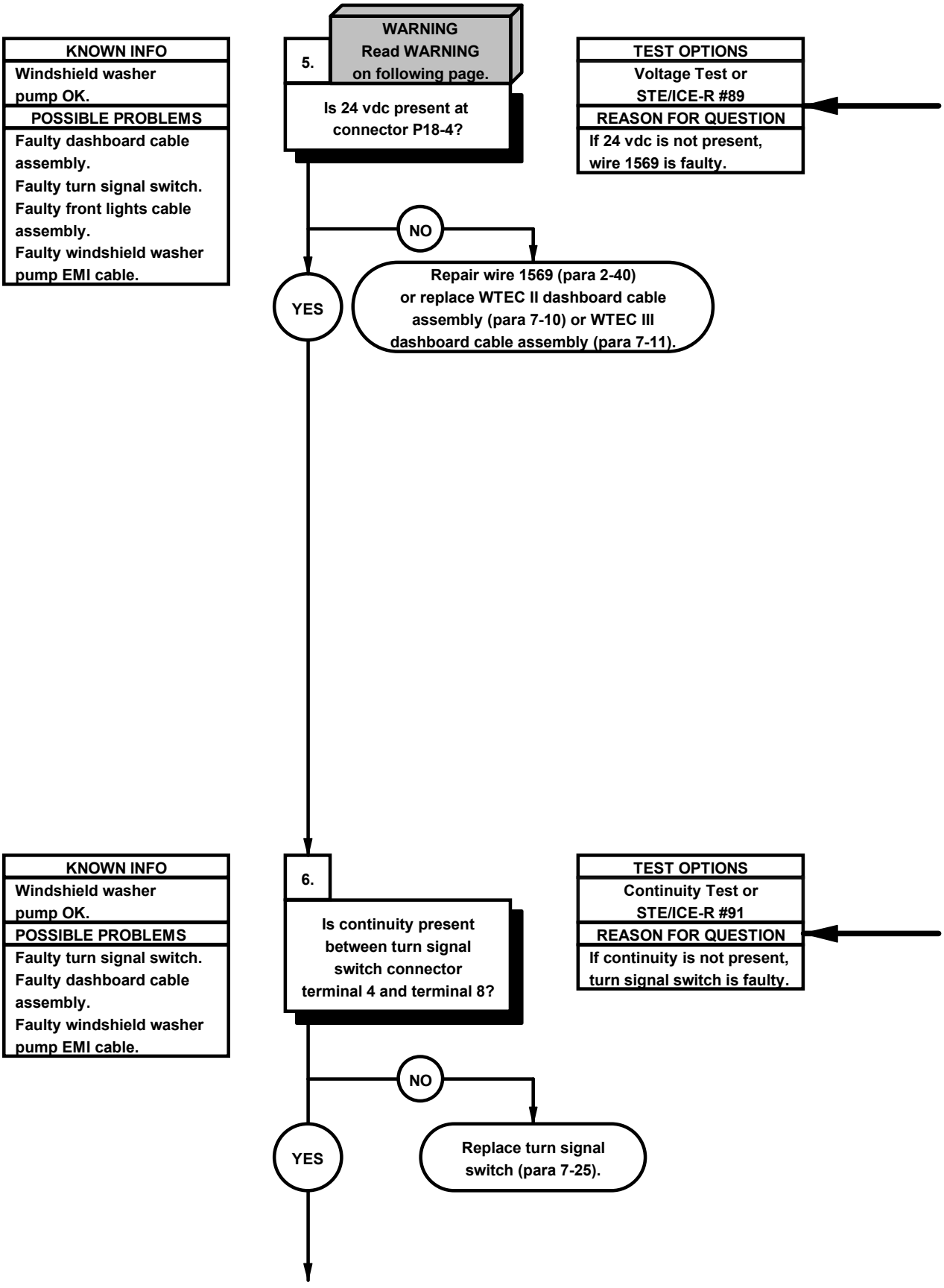
**CONTINUITY TEST**

(1) Disconnect connector P25 from connector J25.
(2) Disconnect connector P125 from windshield washer pump connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P25-1.
(5) Connect negative (-) probe of multimeter to connector P125-1 and note reading on multimeter.
(6) If continuity is not present, replace windshield washer pump EMI cable (para 7-60).
(7) If continuity is present, replace windshield washer pump (para 18-2).
(8) Connect connector P25 to connector J25.
(9) Connect connector P125 to windshield washer pump.
(10) Close left cab step tread (TM 9-2320-365-10).




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## e74. WINDSHIELD WASHER DOES NOT OPERATE (CONT)

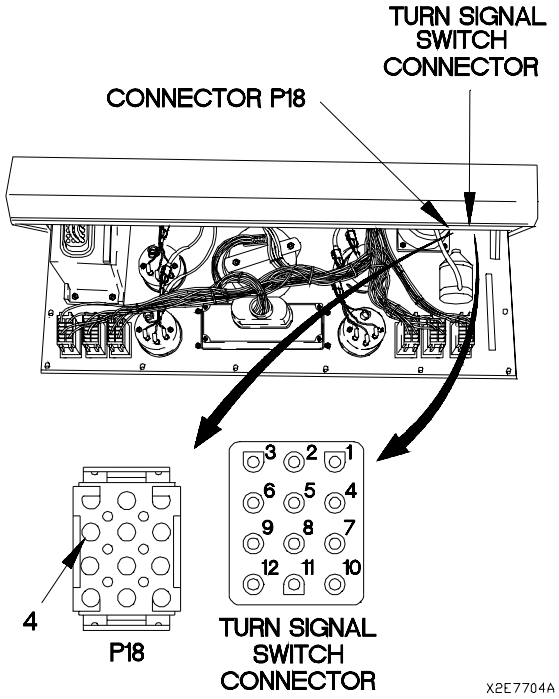


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

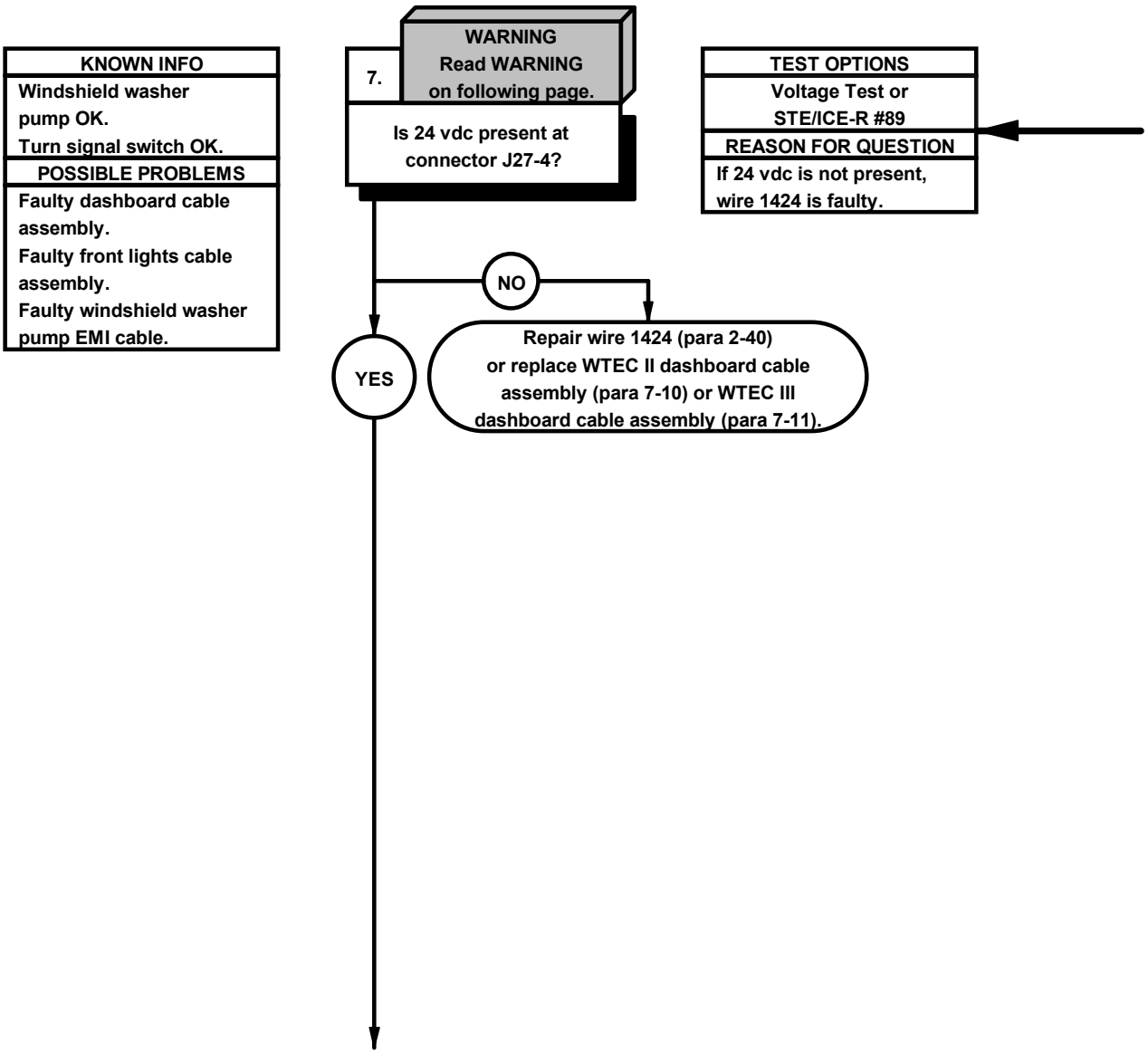
**(1) Remove instrument panel assembly for access (para 7-15).**
**(2) Disconnect connector P18 from turn signal switch connector.**
**(3) Set multimeter to volts dc.**
**(4) Connect positive (+) probe of multimeter to connector P18-4.**
**(5) Connect negative (-) probe of multimeter to ground.**
**(6) Position master power switch to on (TM 9-2320-365-10).**
**(7) Press windshield washer switch (TM 9-2320-365-10) and note reading on multimeter.**
**(8) If 24 vdc is not present, repair wire 1569 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).**
**(9) Position master power switch to off (TM 9-2320-365-10).**




**CONTINUITY TEST**

**(1) Set multimeter to ohms.**
**(2) Connect positive (+) probe of multimeter to turn signal switch connector terminal 4.**
**(3) Connect negative (-) probe of multimeter to turn signal switch connector terminal 8.**
**(4) Press windshield washer switch (TM 9-2320-365-10) and note reading on multimeter.**
**(5) If continuity is not present, replace turn signal switch (para 7-25).**
**(6) Connect connector P18 to turn signal switch connector.**
**(7) Install instrument panel assembly (para 7-15).**

## e74. WINDSHIELD WASHER DOES NOT OPERATE (CONT)

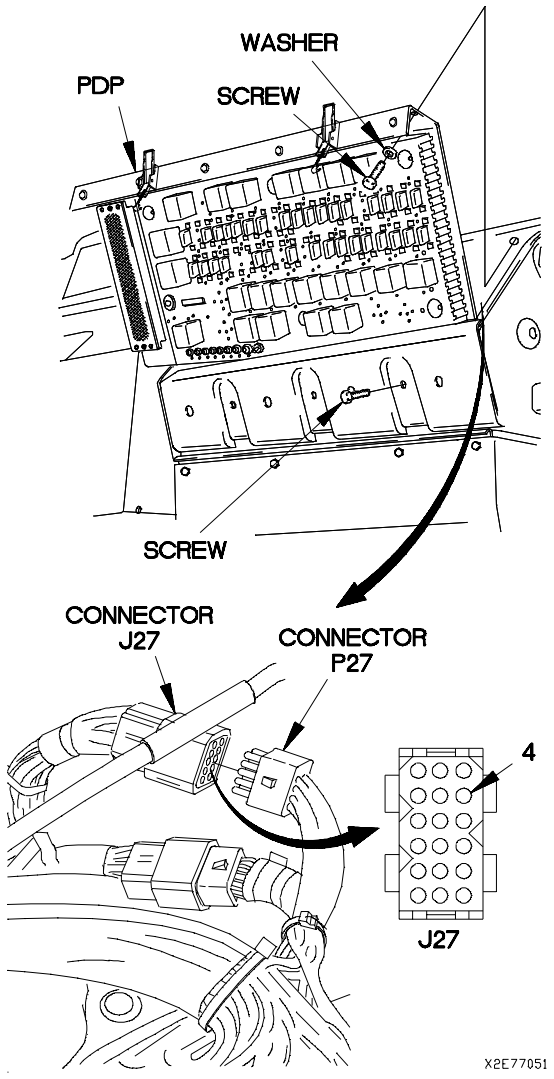


**WARNING**

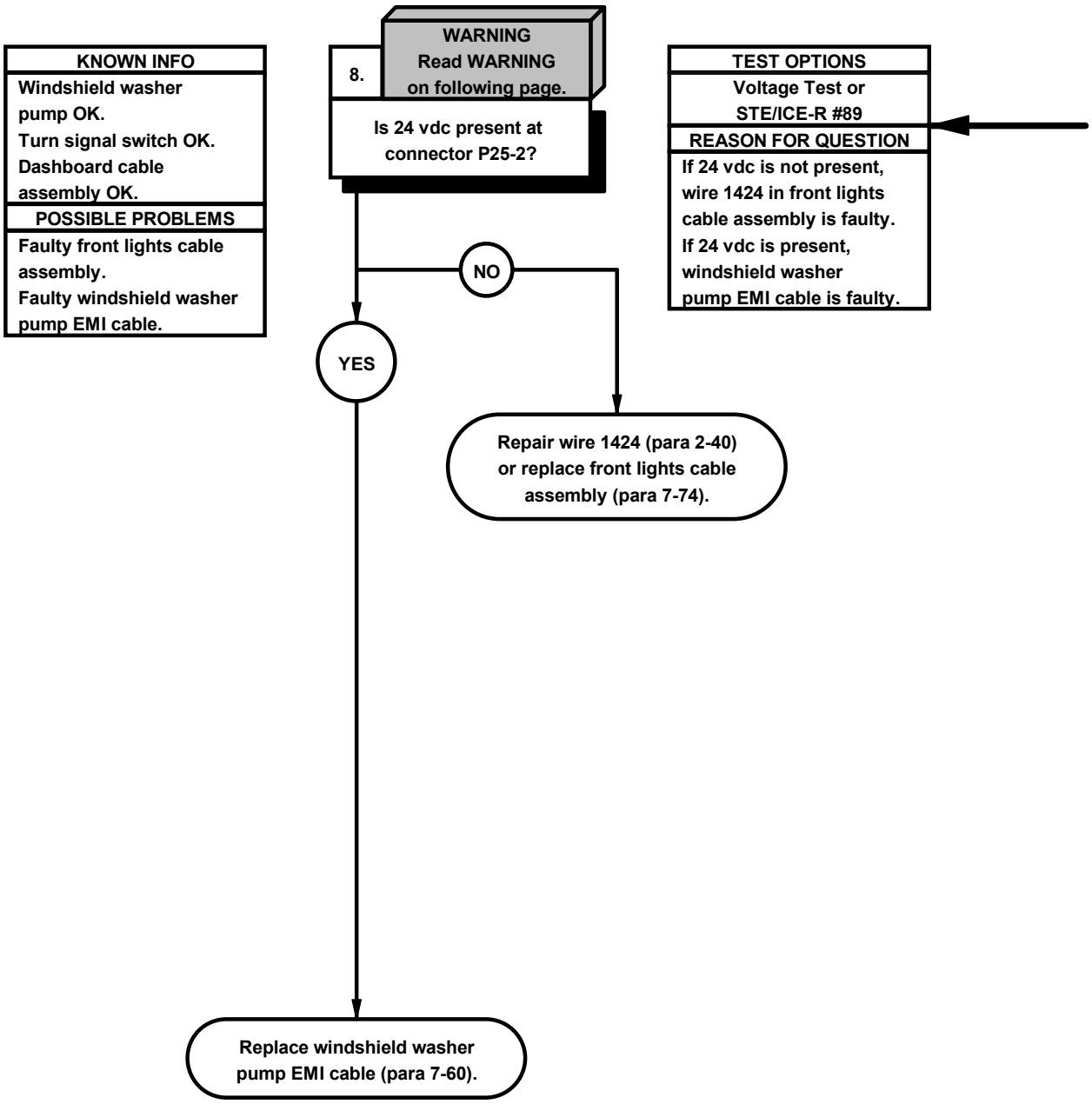
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector J27 from connector P27.
(6) Set multimeter to volts dc.
(7) Connect positive (+) probe of multimeter to connector J27-4.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position master power switch to on (TM 9-2320-365-10).
(10) Press windshield washer switch (TM 9-2320-365-10) and note reading on multimeter.
(11) If 24 vdc is not present, repair wire 1424 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(12) Position master power switch to off (TM 9-2320-365-10).
(13) Connect connector J27 to connector P27.
(14) Install PDP on dashboard with three screws.
(15) Install three washers and screws in PDP.
(16) Install PDP cover (para 16-2).



## e74. WINDSHIELD WASHER DOES NOT OPERATE (CONT)

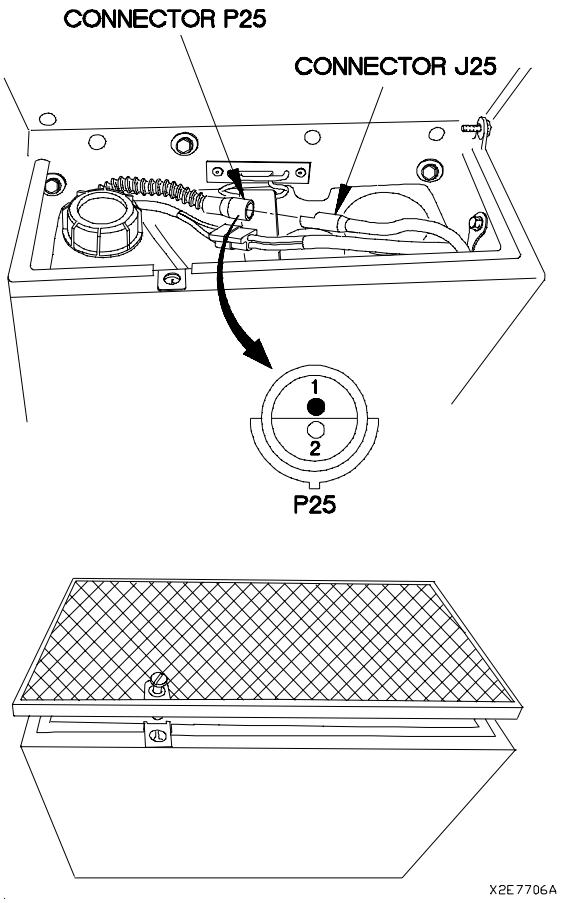


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Disconnect connector P25 from connector J25.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to connector P25-2.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position master power switch to on (TM 9-2320-365-10).**
**(6) Press windshield washer switch (TM 9-2320-365-10) and note reading on multimeter.**
**(7) If 24 vdc is not present, repair wire 1424 (para 2-40) or replace front lights cable assembly (para 7-74).**
**(8) If 24 vdc is present, replace windshield washer pump EMI cable (para 7-60).**
**(9) Position master power switch to off (TM 9-2320-365-10).**
**(10) Connect connector P25 to connector J25.**
**(11) Close left cab step tread (TM 9-2320-365-10).**



## e75. WINDSHIELD WIPER DOES NOT OPERATE ON LOW SPEED

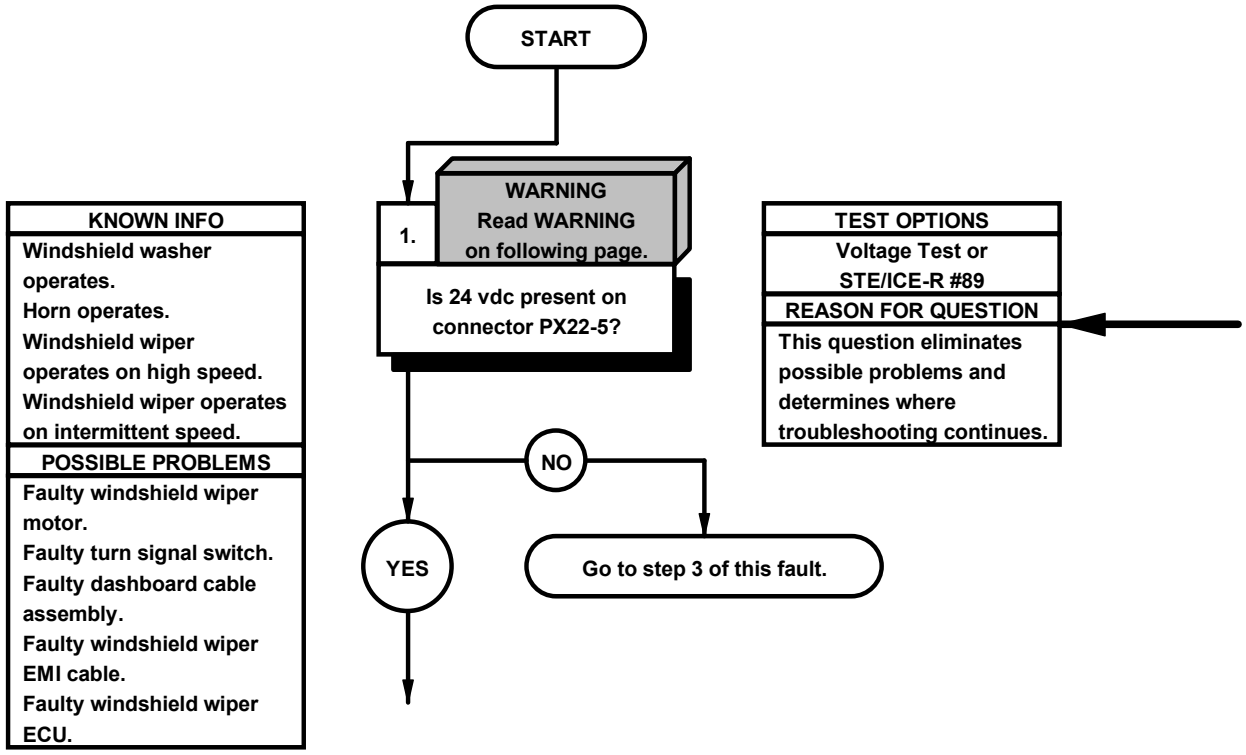
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

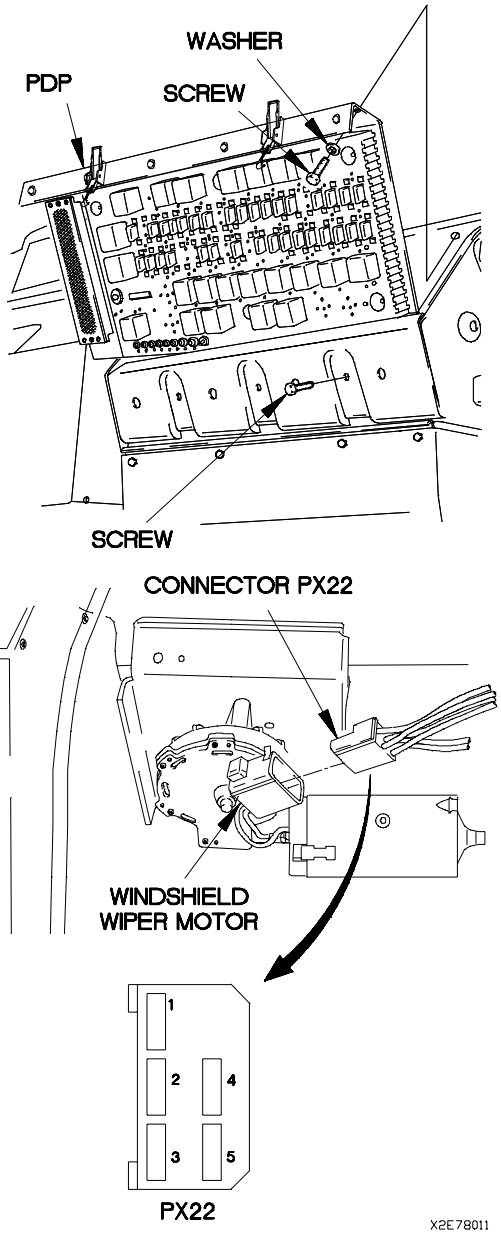


**WARNING**

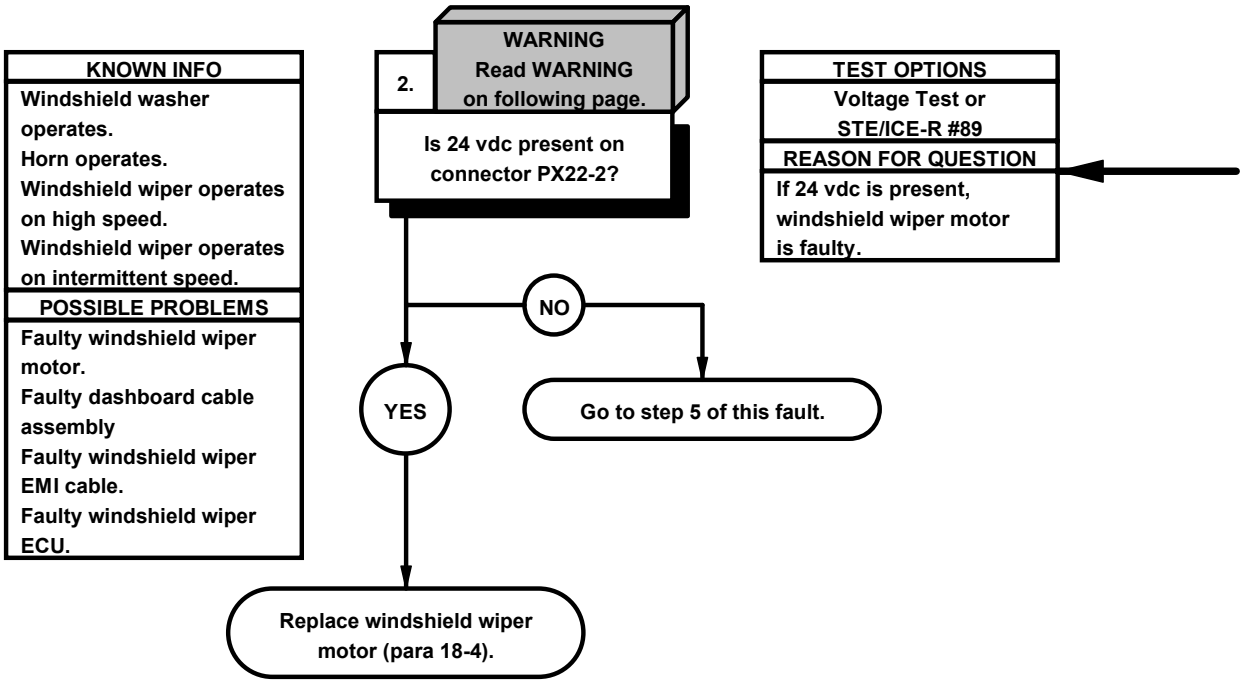
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

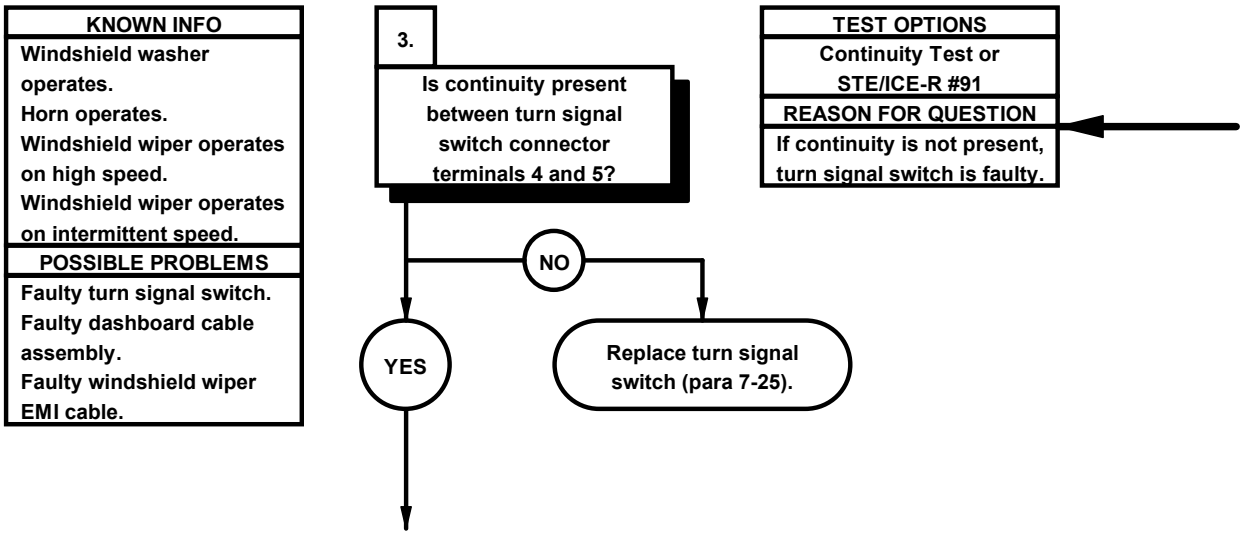
**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector PX22 from windshield wiper motor.
(6) Set multimeter to volts dc.
(7) Connect positive (+) probe of multimeter to connector PX22-5.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position master power switch to on (TM 9-2320-365-10).
(10) Position windshield wiper switch to low (TM 9-2320-365-10) and note reading on multimeter.
(11) If 24 vdc is not present, go to step 3 of this fault.
(12) Position windshield wiper switch to off (TM 9-2320-365-10).
(13) Position master power switch to off (TM 9-2320-365-10).



## e75. WINDSHIELD WIPER DOES NOT OPERATE ON LOW SPEED (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

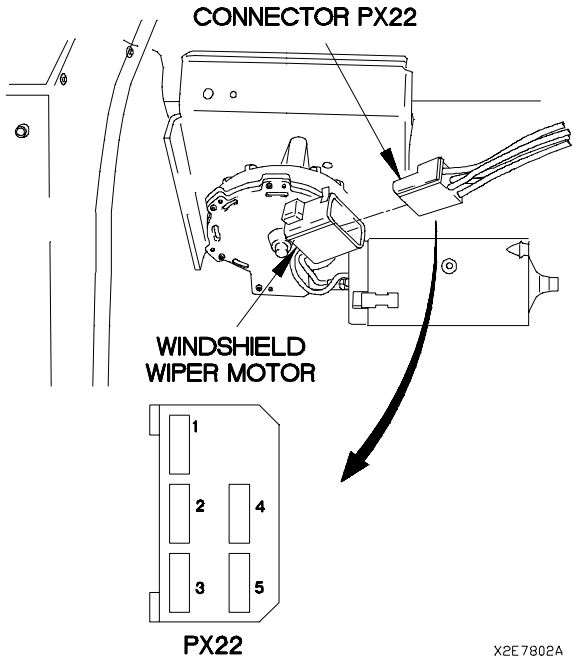
**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to connector PX22-2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).

**NOTE**

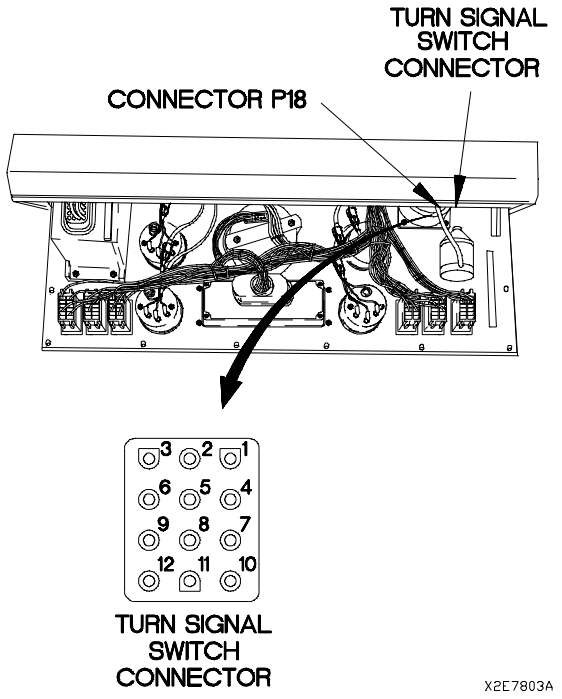
24 vdc is indicated for approximately 1 (one) second.

(5) Position windshield wiper switch to low (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 vdc is not present, go to step 5 of this fault.
(7) Position windshield wiper switch to off (TM 9-2320-365-10).
(8) Position master power switch to off (TM 9-2320-365-10).

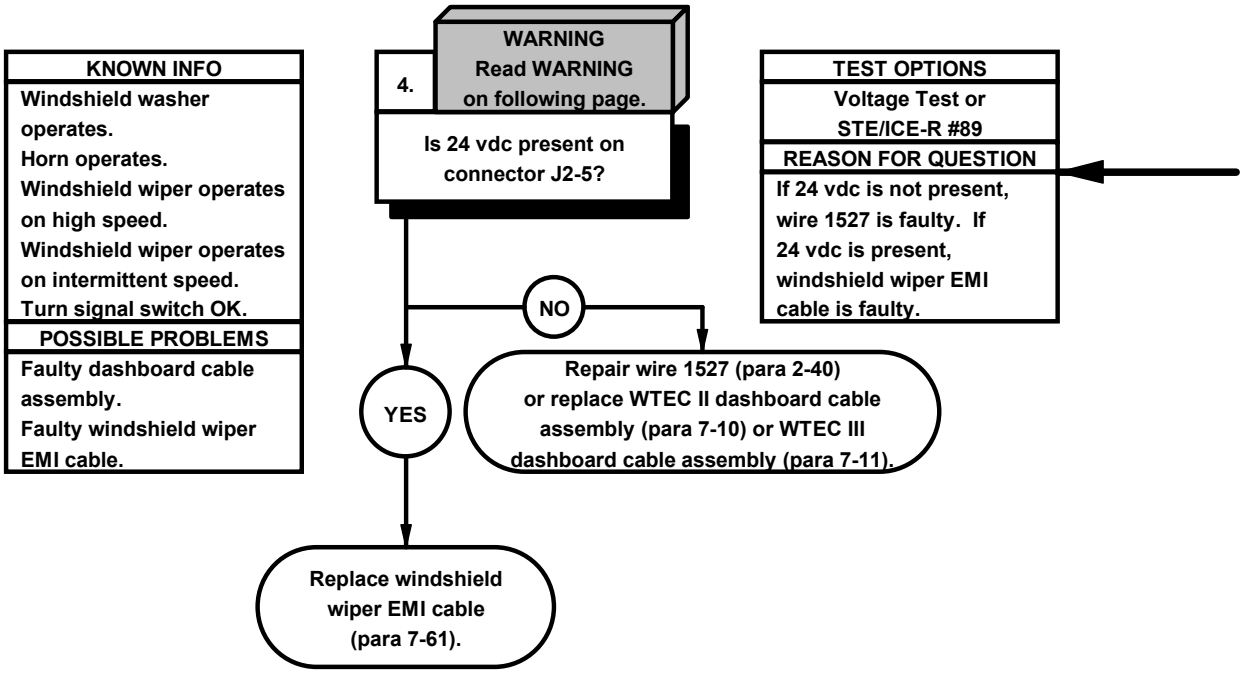


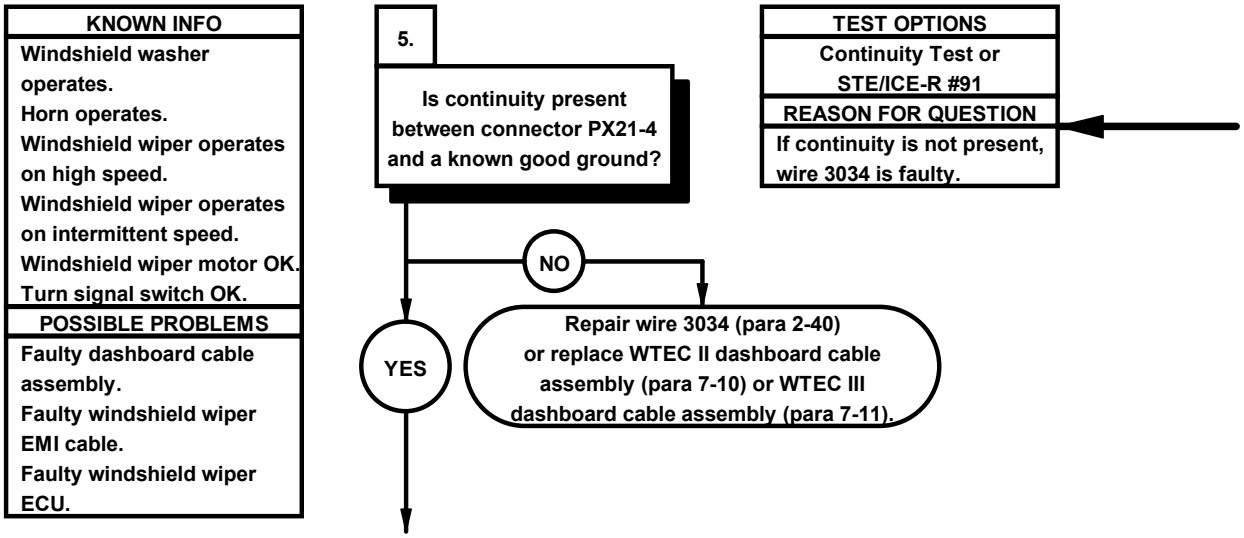

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect turn signal switch connector from connector P18.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to turn signal switch connector terminal 4.
(5) Connect negative (-) probe of multimeter to turn signal switch connector terminal 5.
(6) Position windshield wiper switch to low position (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace turn signal switch (para 7-25).
(8) Position windshield wiper switch to off (TM 9-2320-365-10).
(9) Connect turn signal switch connector to connector P18.
(10) Install instrument panel assembly (para 7-15).



## e75. WINDSHIELD WIPER DOES NOT OPERATE ON LOW SPEED (CONT)



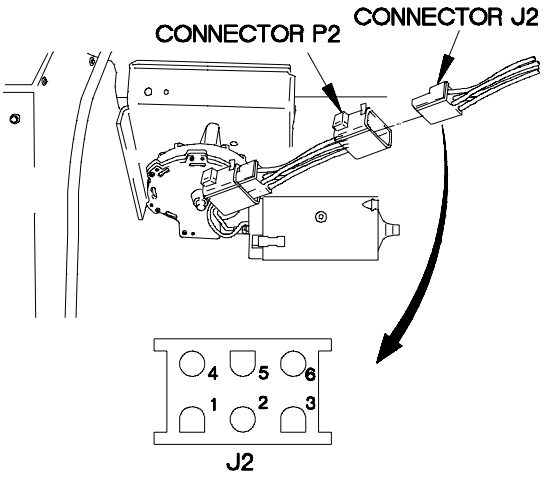



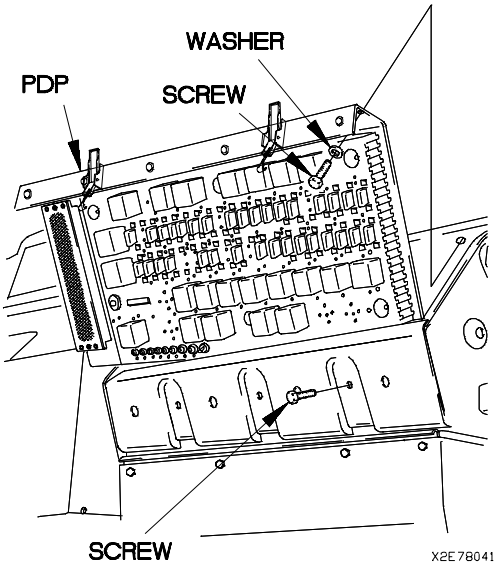
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

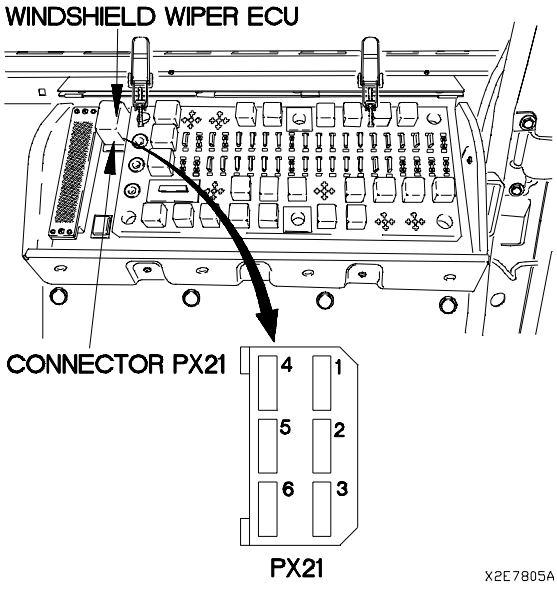
(1) Disconnect connector J2 from connector P2.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J2-5.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position windshield wiper switch to low (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 1527 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc is present, replace windshield wiper EMI cable (para 7-61).
(9) Position windshield wiper switch to off (TM 9-2320-365-10).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Connect connector J2 to connector P2.
(12) Install PDP on dashboard with three screws.
(13) Install three washers and screws in PDP.
(14) Install PDP cover (para 16-2).



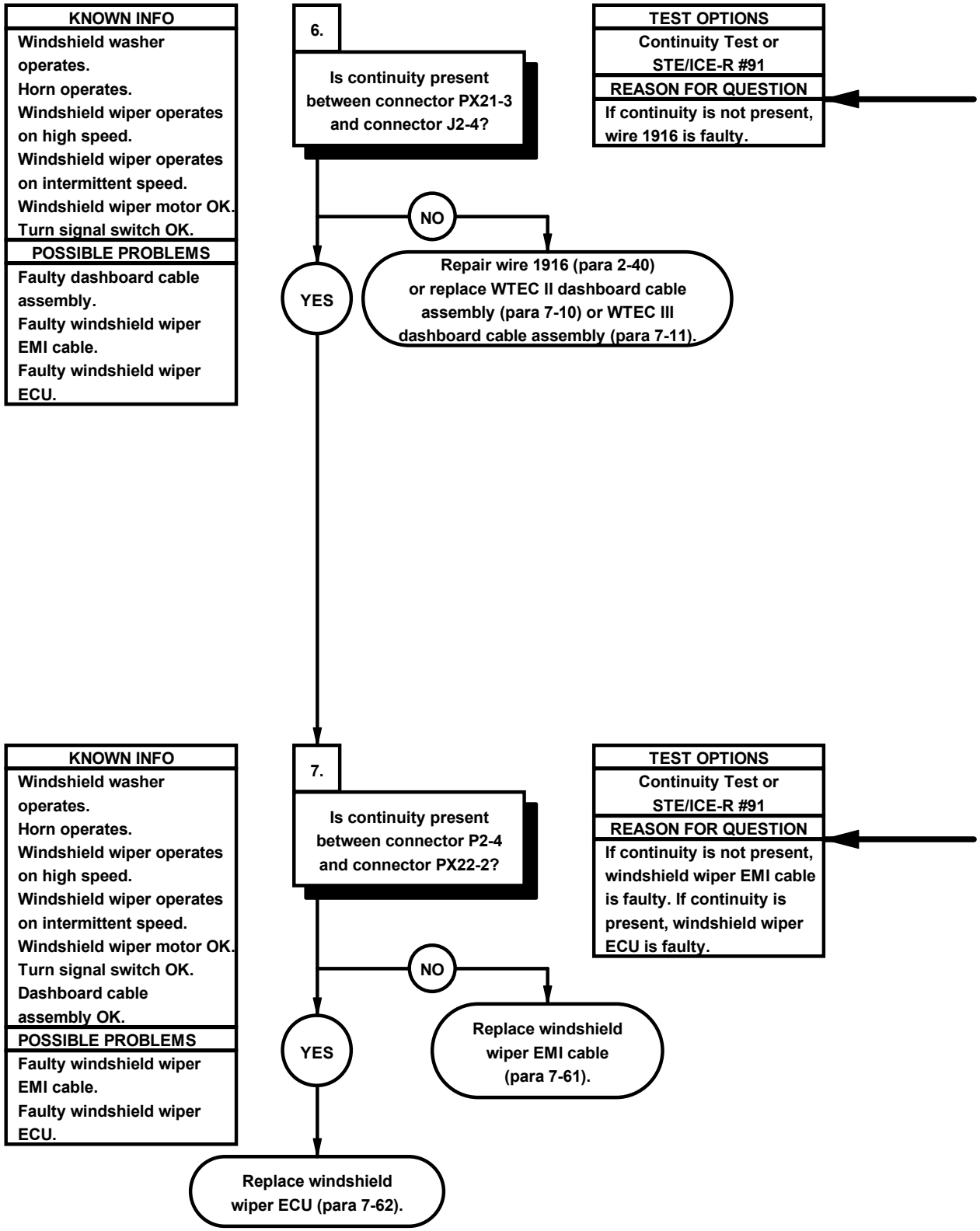




**CONTINUITY TEST**

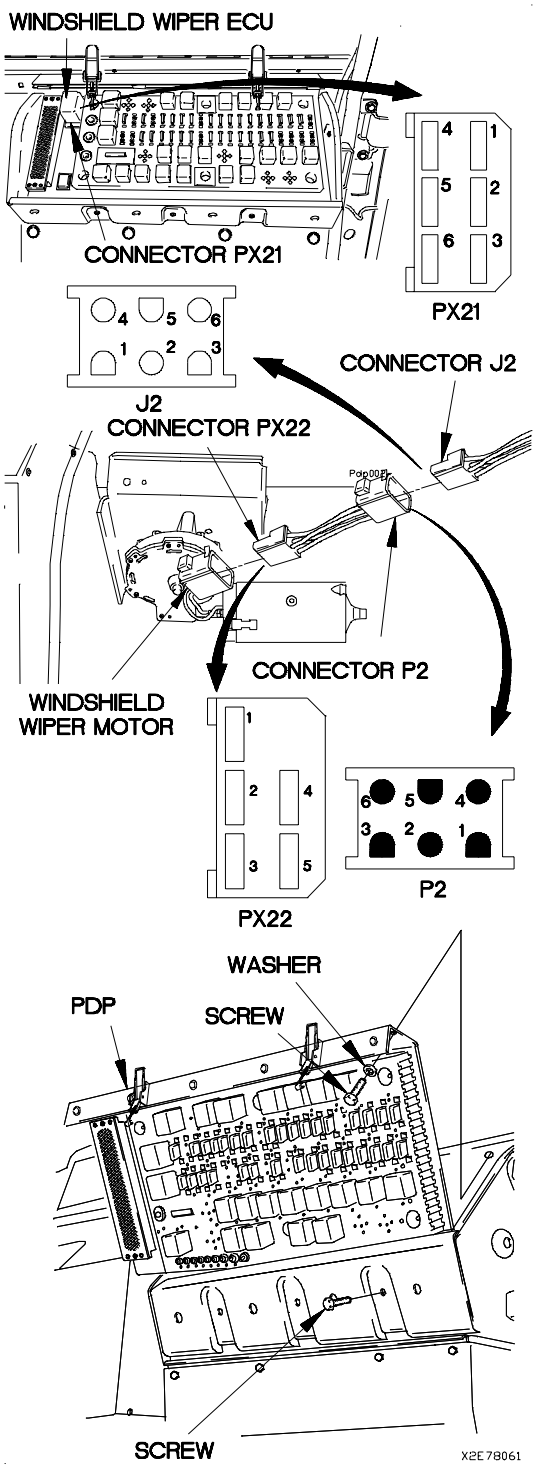
(1) Disconnect windshield wiper ECU from connector PX21.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX21-4.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3034 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



## e75. WINDSHIELD WIPER DOES NOT OPERATE ON LOW SPEED (CONT)



| CONTINUITY TEST |
| --- |
| (1) Disconnect connector J2 from connector P2. |
| (2) Set multimeter to ohms. |
| (3) Connect positive (+) probe of multimeter to connector J2-4. |
| (4) Connect negative (-) probe of multimeter to connector PX21-3 and note reading on multimeter. |
| (5) If continuity is not present, repair wire 1916 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11). |
| (6) Connect windshield wiper ECU to connector PX21. |




| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P2-4. |
| (3) Connect negative (-) probe of multimeter to connector PX22-2 and note reading on multimeter. |
| (4) If continuity is not present, replace windshield wiper EMI cable (para 7-61). |
| (5) If continuity is present, replace windshield wiper ECU (para 7-62). |
| (6) Connect connector P2 to connector J2. |
| (7) Connect connector PX22 to windshield wiper motor. |
| (8) Install PDP on dashboard with three screws. |
| (9) Install three washers and screws in PDP. |
| (10) Install PDP cover (para 16-2). |

**e76. ALL WINDSHIELD WIPER SPEEDS DO NOT OPERATE**

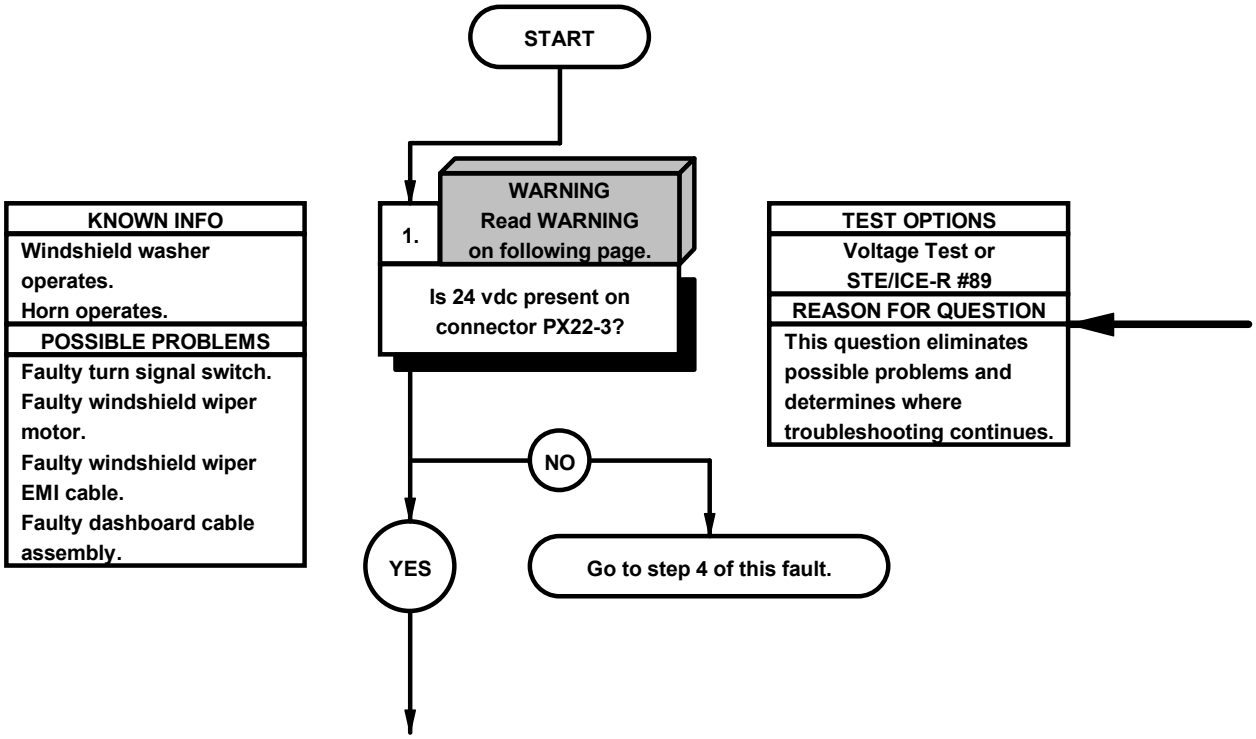
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

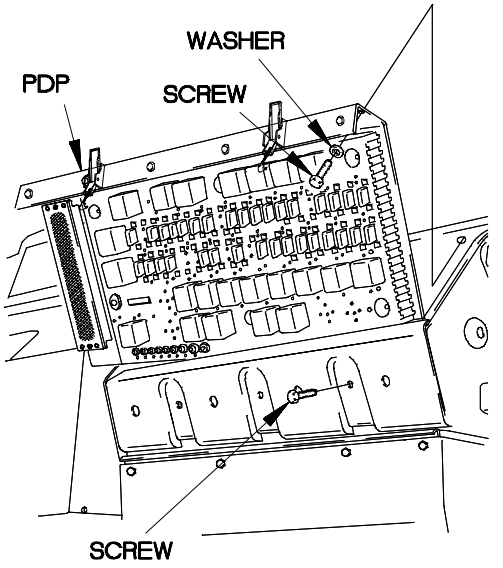


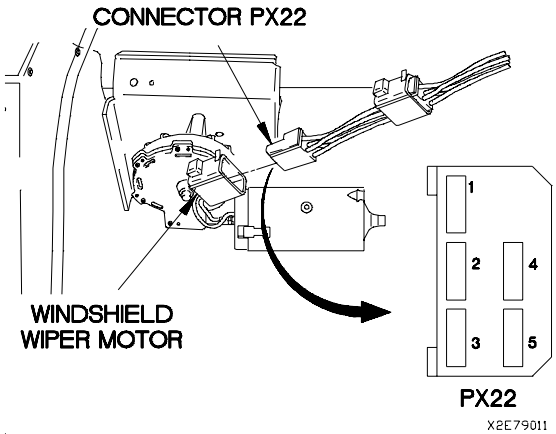
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

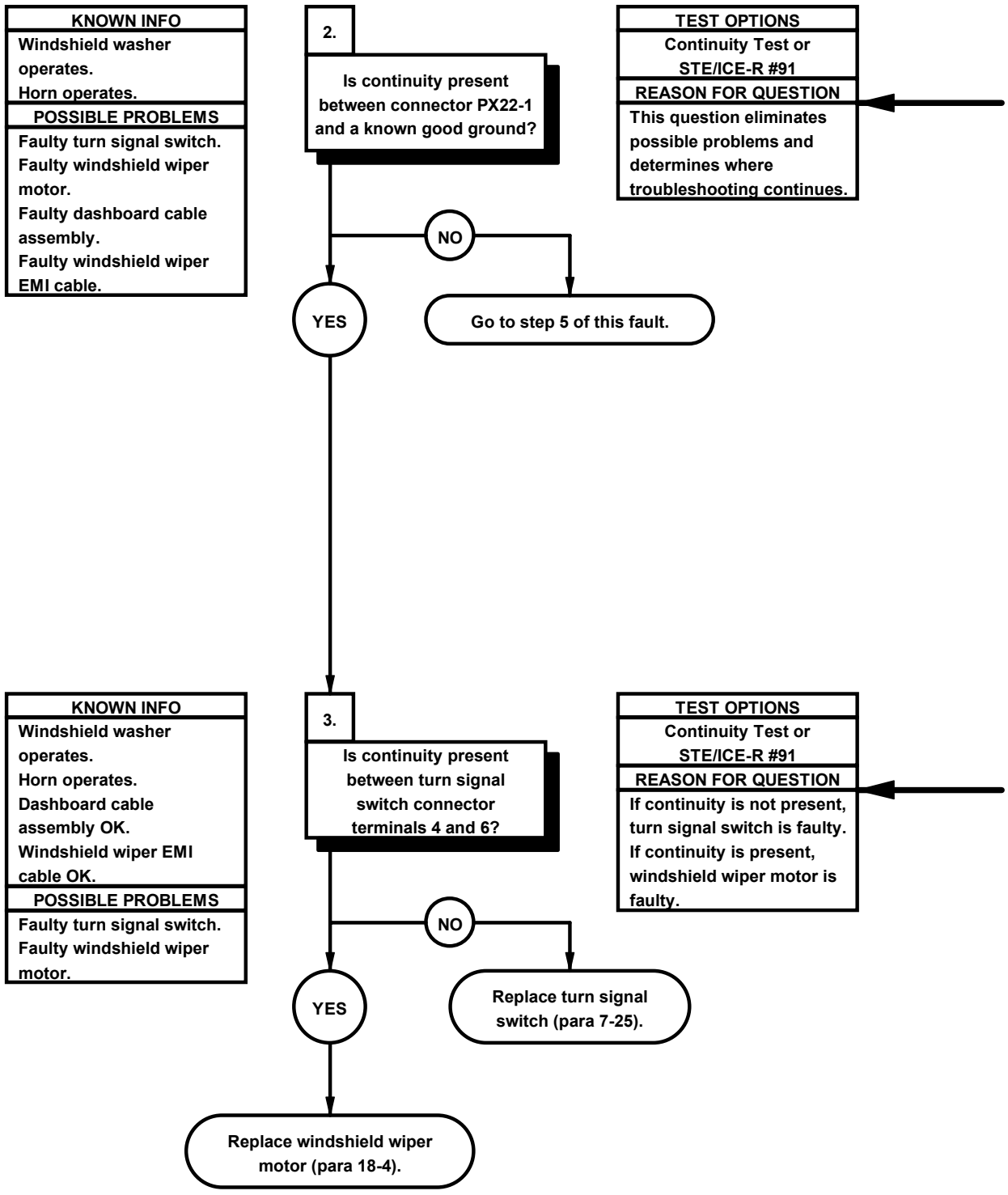
**VOLTAGE TEST**

**(1) Remove PDP cover (para 16-2).**
**(2) Remove three screws and washers from PDP.**
**(3) Remove three screws from PDP.**
**(4) Lift PDP outward to gain access.**
**(5) Disconnect connector PX22 from windshield wiper motor.**
**(6) Set multimeter to volts dc.**
**(7) Connect positive (+) probe of multimeter to connector PX22-3.**
**(8) Connect negative (-) probe of multimeter to ground.**
**(9) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(10) If 24 vdc is not present, go to step 4 of this fault.**
**(11) Position master power switch to off (TM 9-2320-365-10).**



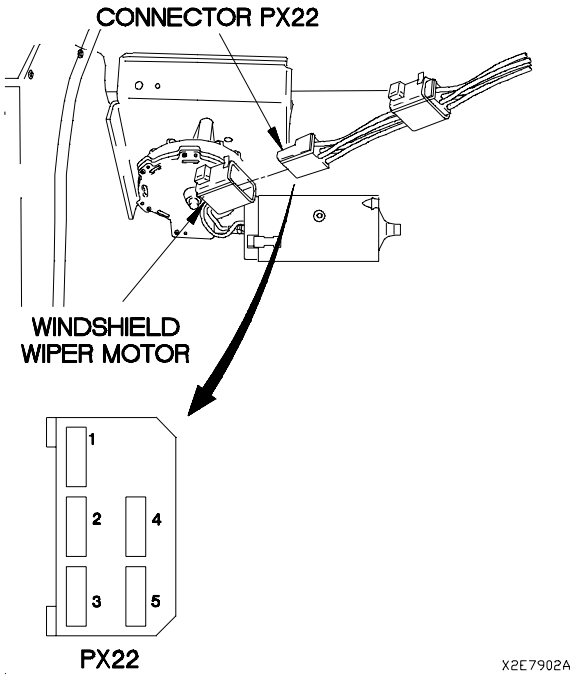



## e76. ALL WINDSHIELD WIPER SPEEDS DO NOT OPERATE (CONT)



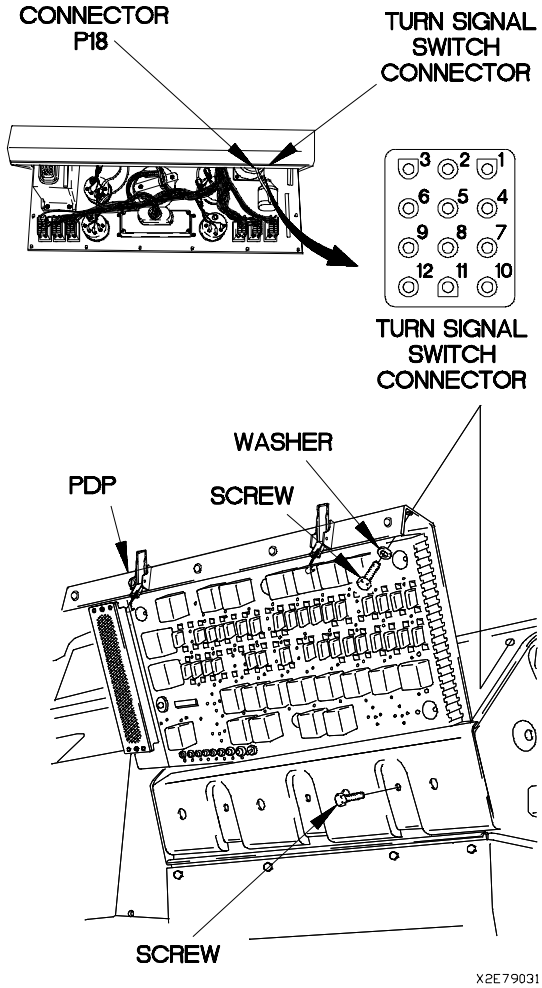
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX22-1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, go to step 5 of this fault.
(5) Connect connector PX22 to windshield wiper motor.

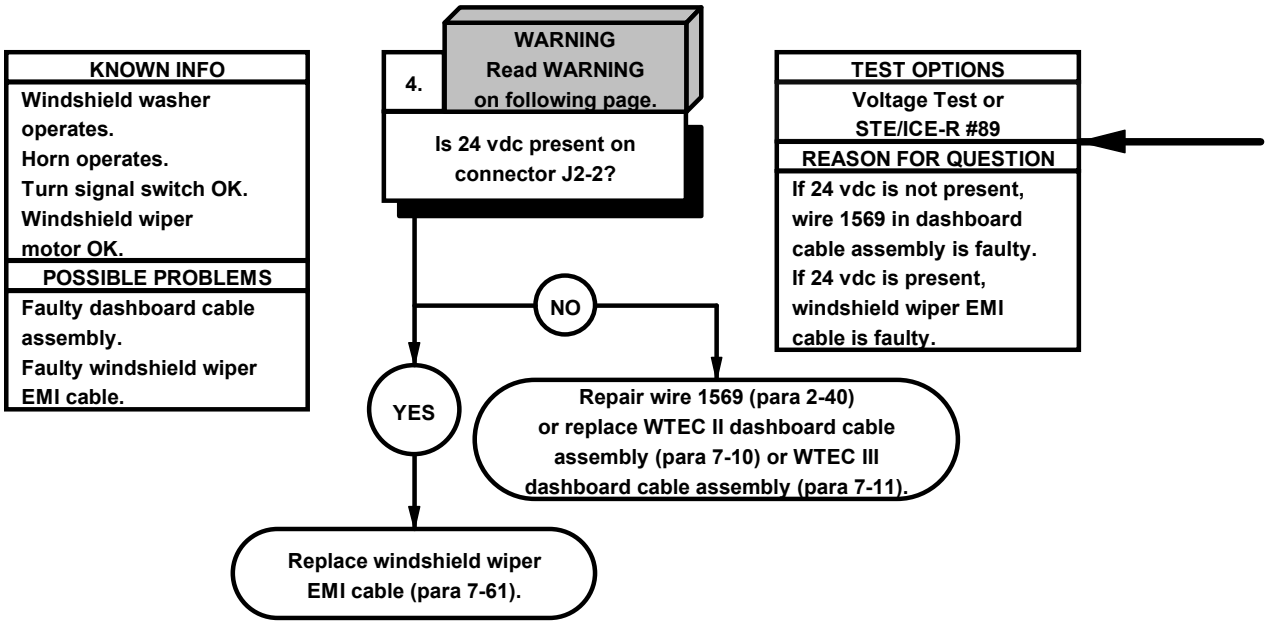


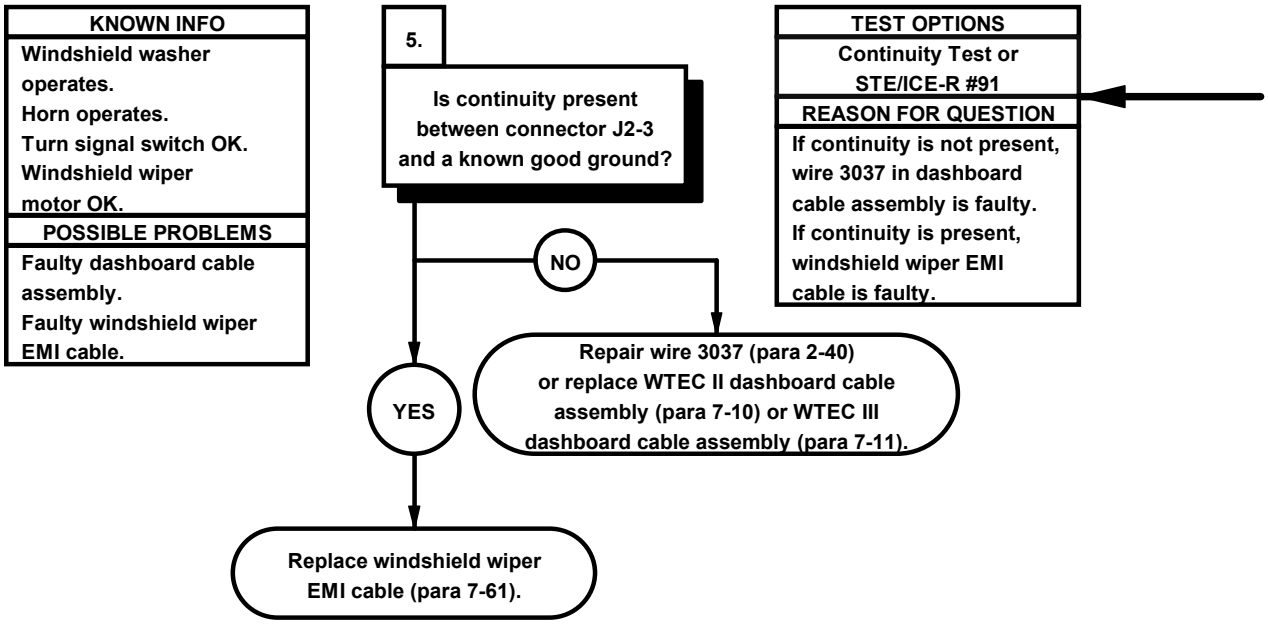

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect turn signal switch connector from connector P18.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to turn signal switch connector terminal 6.
(5) Connect negative (-) probe of multimeter to turn signal switch connector terminal 4.
(6) Position windshield wiper switch to high (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace turn signal switch (para 7-25).
(8) If continuity is present, replace windshield wiper motor (para 18-4).
(9) Position windshield wiper switch to off (TM 9-2320-365-10).
(10) Connect turn signal switch connector to connector P18.
(11) Install instrument panel assembly (para 7-15).
(12) Install PDP on dashboard with three screws.
(13) Install three washers and screws in PDP.
(14) Install PDP cover (para 16-2).



## e76. ALL WINDSHIELD WIPER SPEEDS DO NOT OPERATE (CONT)



**WARNING**

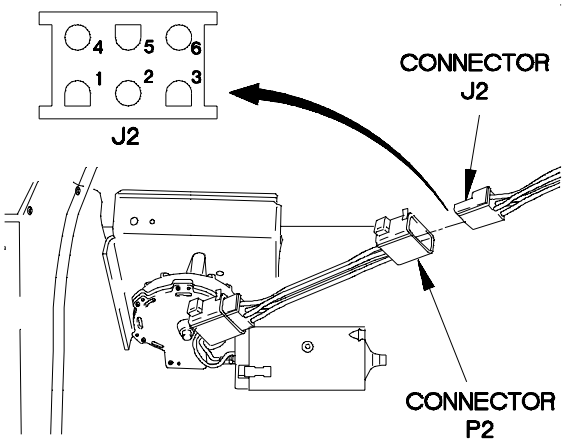
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

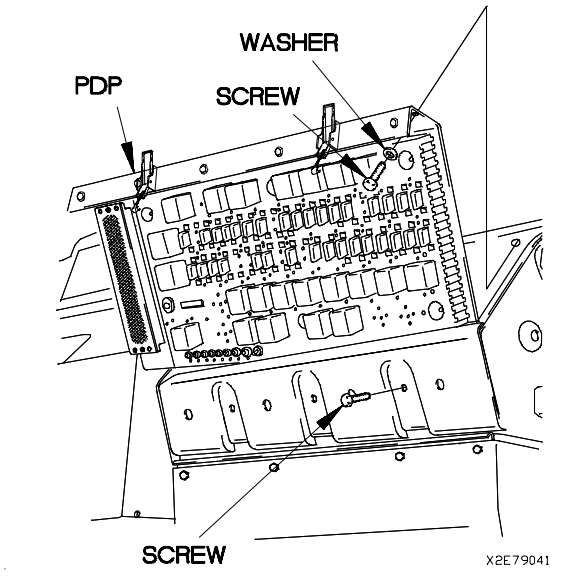
**VOLTAGE TEST**

(1) Disconnect connector J2 from connector P2.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J2-2.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 vdc is not present, repair wire 1569 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If 24 vdc is present, replace windshield wiper EMI cable (para 7-61).
(8) Position master power switch to off (TM 9-2320-365-10).
(9) Connect connector P2 to connector J2.
(10) Install PDP on dashboard with three screws.
(11) Install three washers and screws in PDP.
(12) Install PDP cover (para 16-2).

**CONTINUITY TEST**

(1) Disconnect connector J2 from connector P2.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector J2-3.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3037 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If continuity is present, replace windshield wiper EMI cable (para 7-61).
(7) Connect connector P2 to connector J2.
(8) Install PDP on dashboard with three screws.
(9) Install three washers and screws in PDP.
(10) Install PDP cover (para 16-2).



**e77. WINDSHIELD WIPER DOES NOT OPERATE ON INTERMITTENT SPEED**

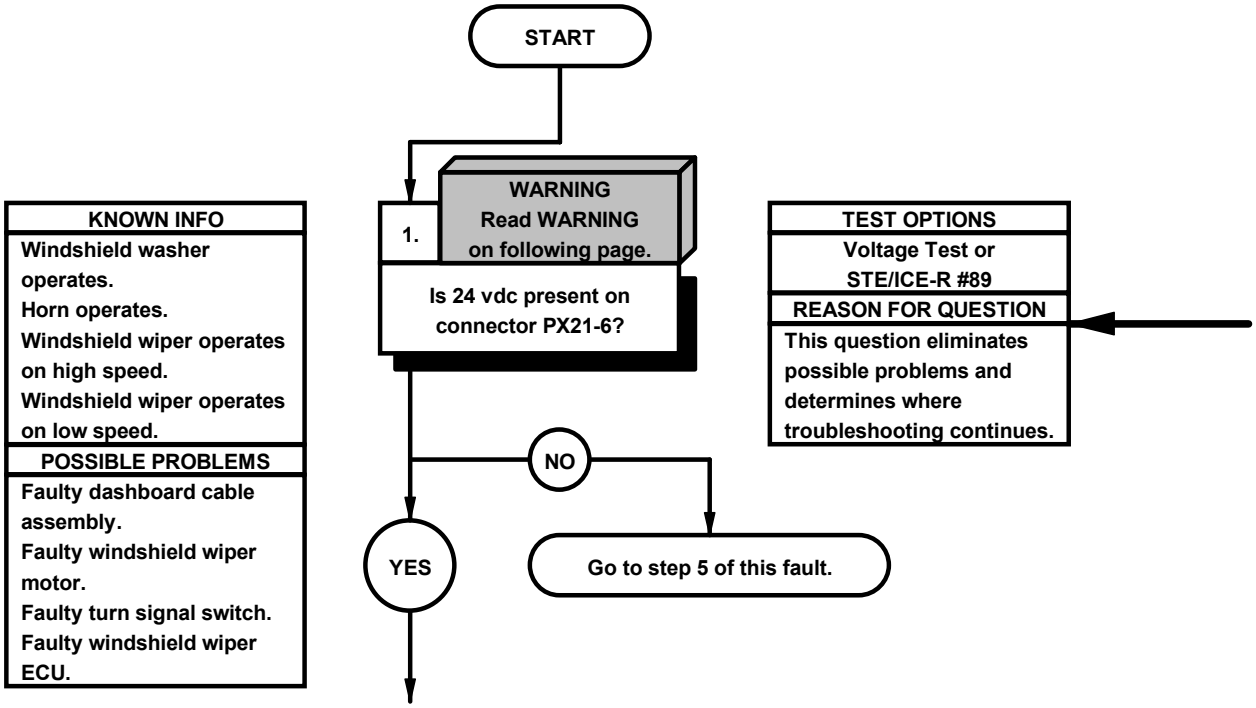
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

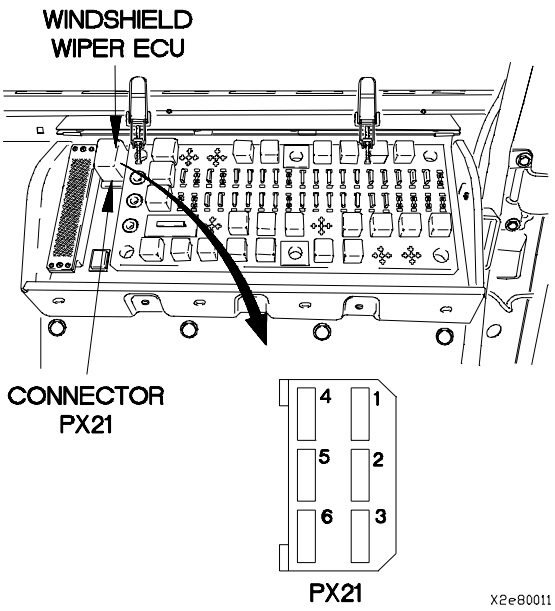


**WARNING**

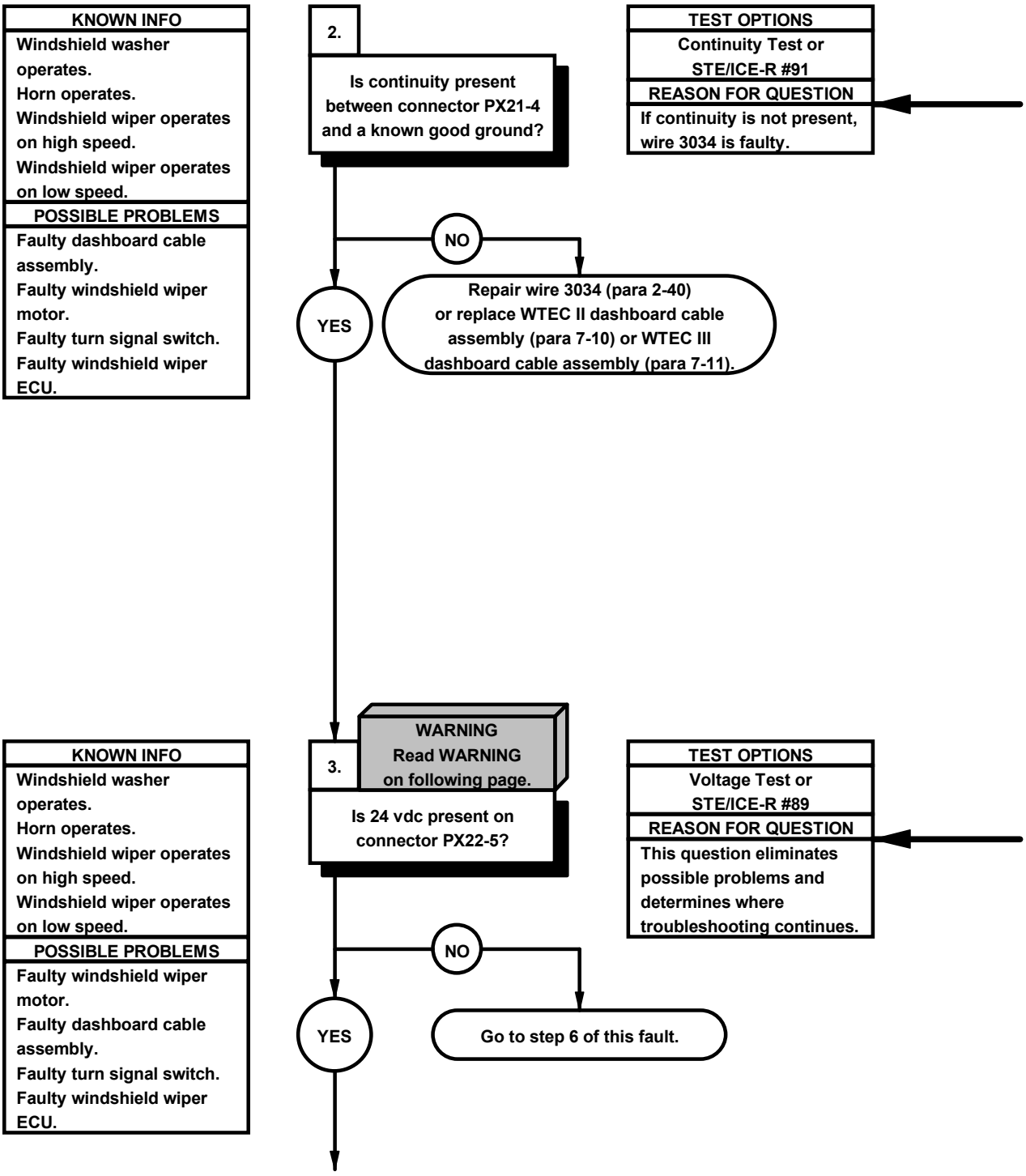
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Disconnect windshield wiper ECU from connector PX21.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector PX21-6.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position windshield wiper switch to intermittent (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, go to step 5 of this fault.
(9) Position windshield wiper switch to off (TM 9-2320-365-10).
(10) Position master power switch to off (TM 9-2320-365-10).

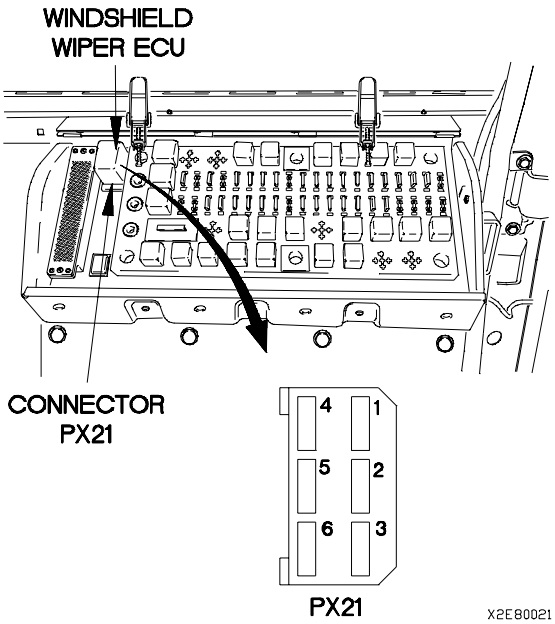


## e77. WINDSHIELD WIPER DOES NOT OPERATE ON INTERMITTENT SPEED (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX21-4.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3034 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) Connect windshield wiper ECU to connector PX21.

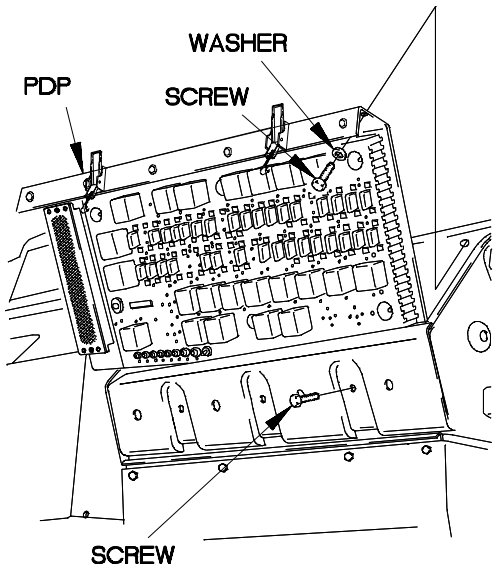


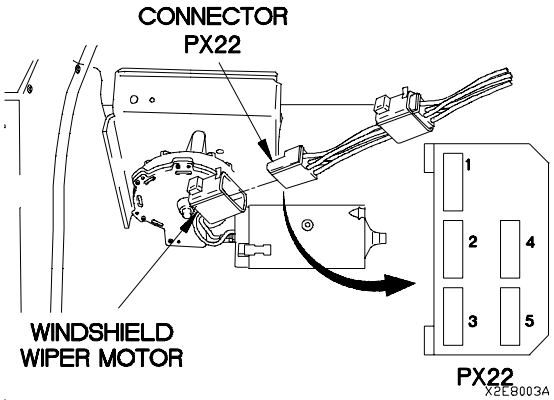

**WARNING**

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

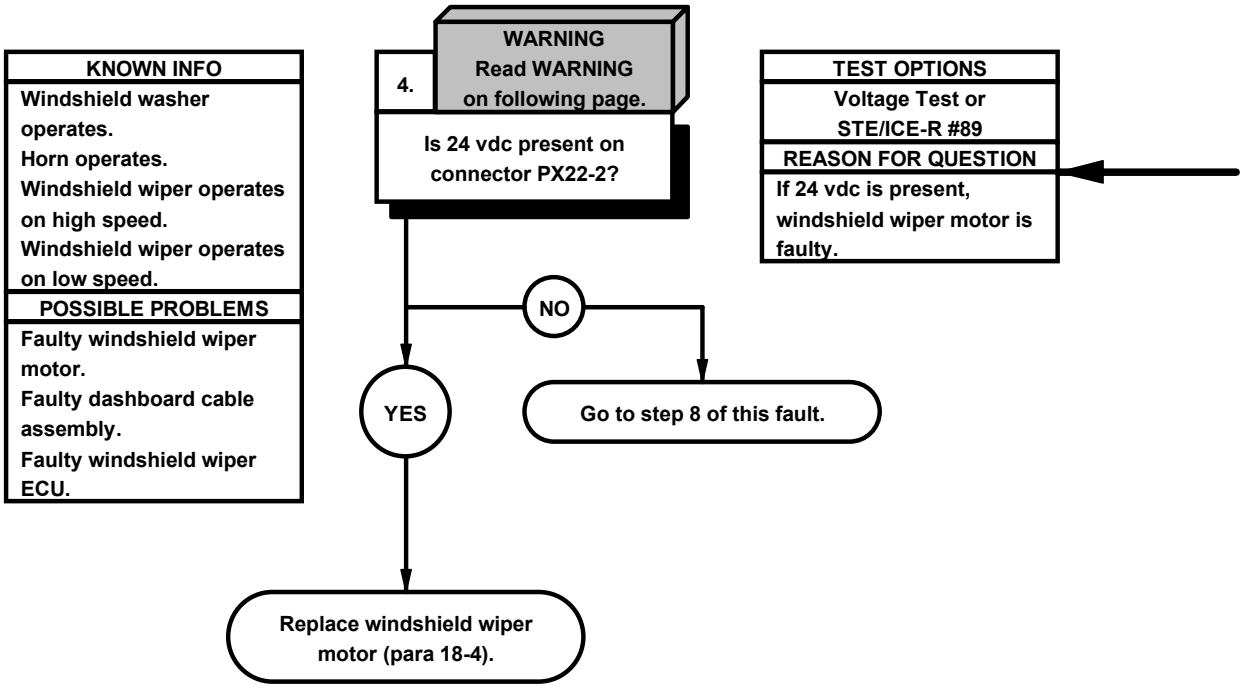
**VOLTAGE TEST**

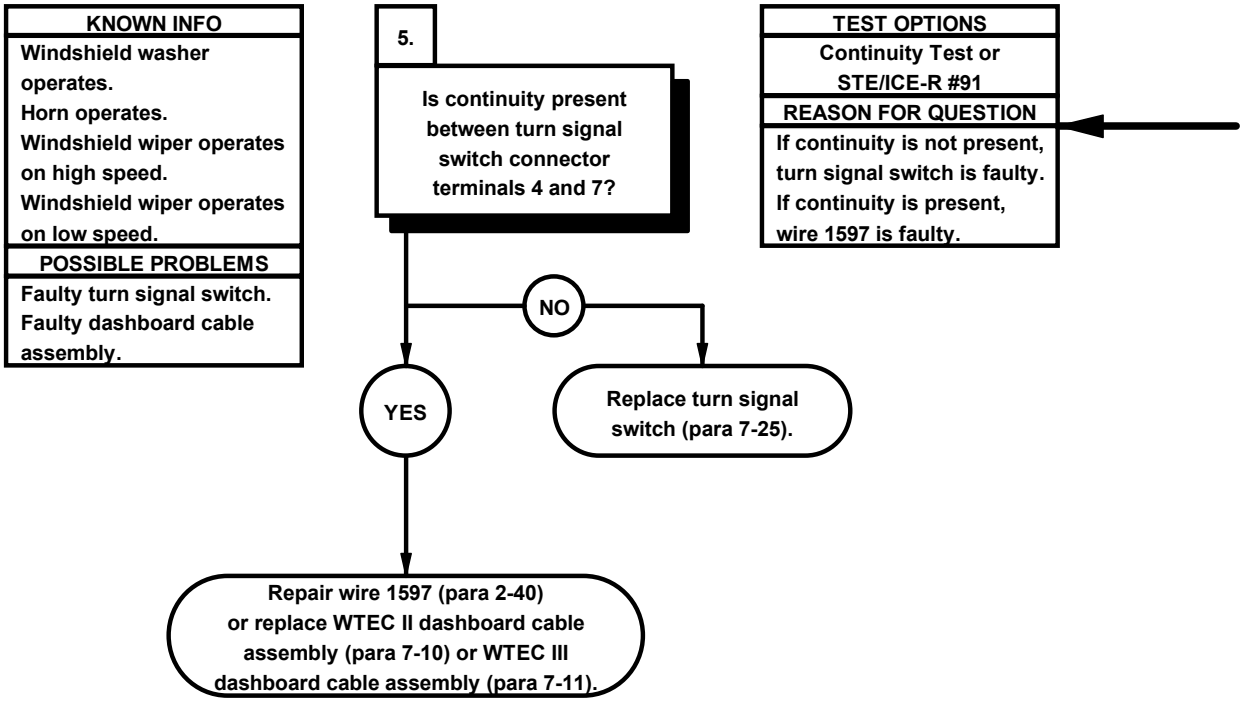
(1) Remove three screws from PDP.
(2) Remove three screws and washers from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector PX22 from windshield wiper motor.
(5) Set multimeter to volts dc.
(6) Connect positive (+) probe of multimeter to connector PX22-5.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Position windshield wiper switch to intermittent (TM 9-2320-365-10) and note reading on multimeter.
(10) If 24 vdc is not present, go to step 6 of this fault.
(11) Position windshield wiper switch to off (TM 9-2320-365-10).
(12) Position master power switch to off (TM 9-2320-365-10).



## e77. WINDSHIELD WIPER DOES NOT OPERATE ON INTERMITTENT SPEED (CONT)



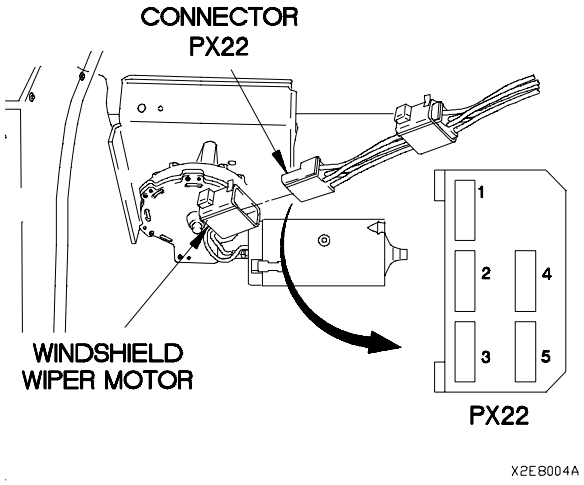



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

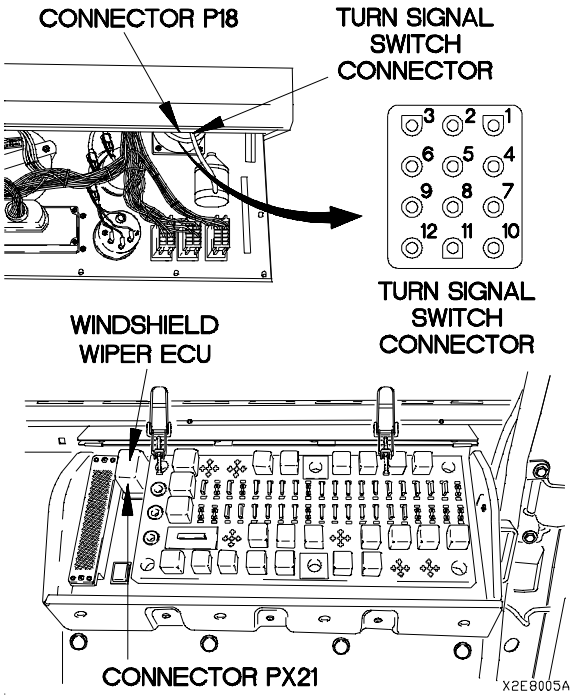
**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to connector PX22-2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10).
(5) Position windshield wiper switch to intermittent (TM 9-2320-365-10) and note reading on multimeter.
(6) If 24 vdc is not present, go to step 8 of this fault.
(7) If 24 vdc is present, replace windshield wiper motor (para 18-4).
(8) Position windshield wiper switch to off (TM 9-2320-365-10).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Connect connector PX22 to windshield wiper motor.

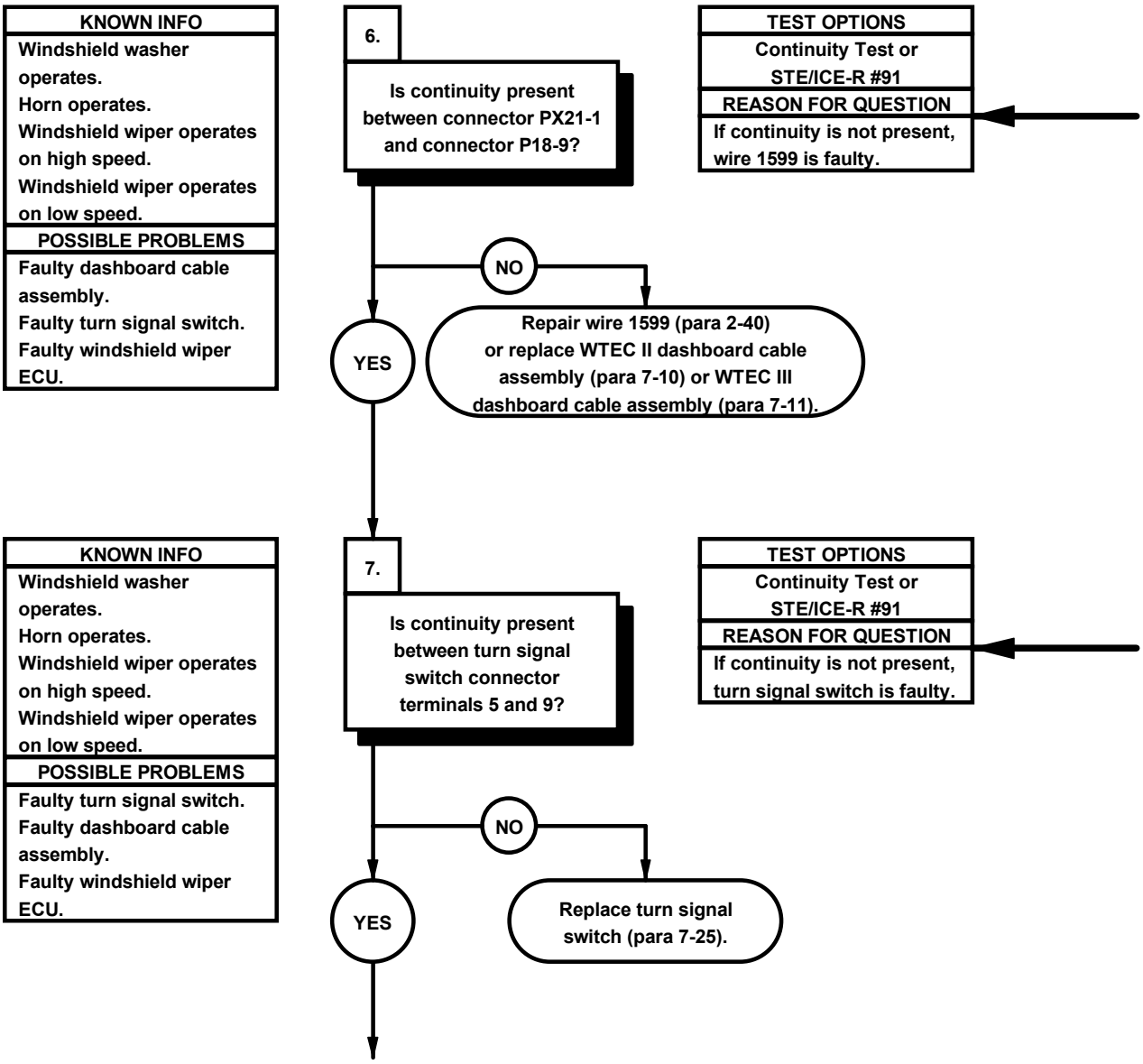



**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect turn signal switch connector from connector P18.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to turn signal switch connector terminal 4.
(5) Connect negative (-) probe of multimeter to turn signal switch connector terminal 7.
(6) Position windshield wiper switch to intermittent (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace turn signal switch (para 7-25).
(8) If continuity is present, repair wire 1597 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position windshield wiper switch to off (TM 9-2320-365-10).
(10) Connect turn signal switch connector to connector P18.
(11) Install instrument panel assembly (para 7-15).
(12) Connect windshield wiper ECU to connector PX21.
(13) Install PDP cover (para 16-2).



## e77. WINDSHIELD WIPER DOES NOT OPERATE ON INTERMITTENT SPEED (CONT)

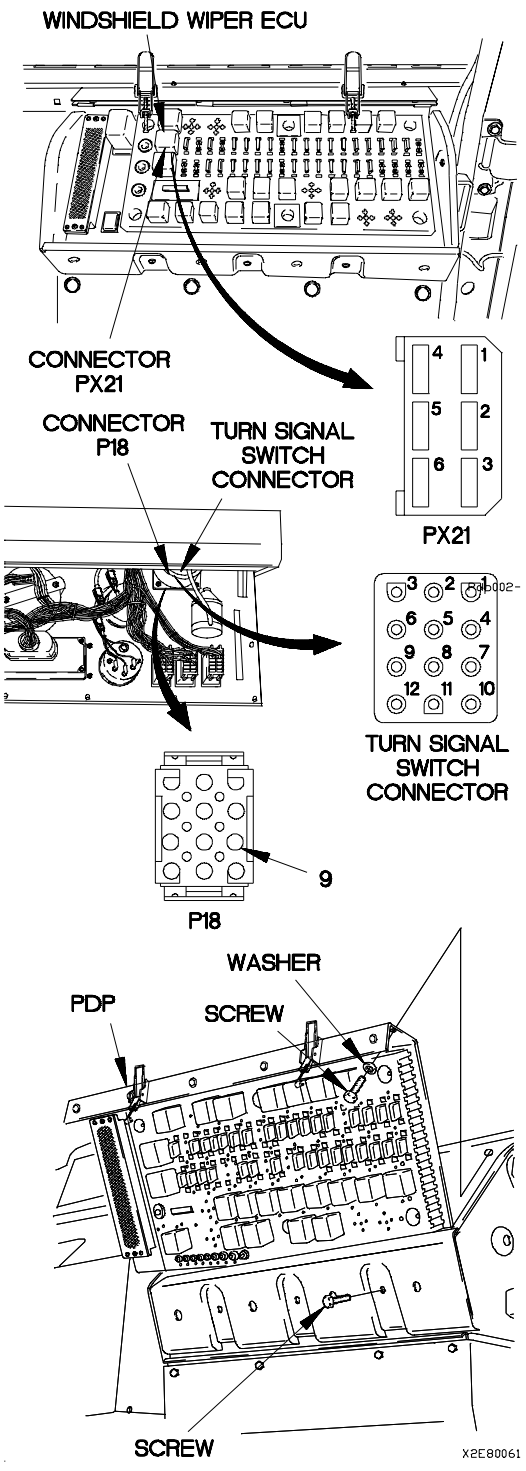


**CONTINUITY TEST**

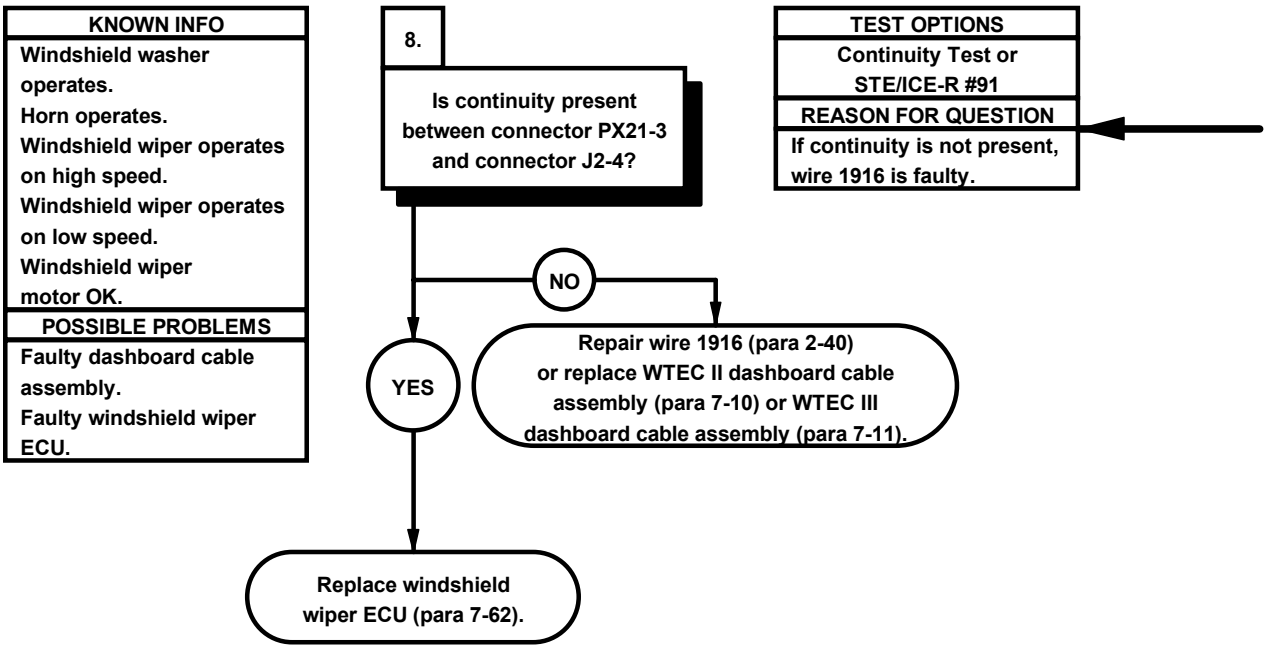
(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect windshield wiper ECU from connector PX21.
(3) Disconnect connector P18 from turn signal switch connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector PX21-1.
(6) Connect negative (-) probe of multimeter to connector P18-9 and note reading on multimeter.
(7) If continuity is not present, repair wire 1599 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to turn signal switch connector terminal 9.
(3) Connect negative (-) probe of multimeter to turn signal switch connector terminal 5.
(4) Position windshield wiper switch to intermittent (TM 9-2320-365-10) and note reading on multimeter.
(5) If continuity is not present, replace turn signal switch (para 7-25).
(6) Position windshield wiper switch to off (TM 9-2320-365-10).
(7) Connect windshield wiper ECU to connector PX21.
(8) Connect connector P18 to turn signal switch connector.
(9) Install instrument panel assembly (para 7-15).
(10) Install PDP on dashboard with three screws.
(11) Install three washers and screws in PDP.
(12) Install PDP cover (para 16-2).

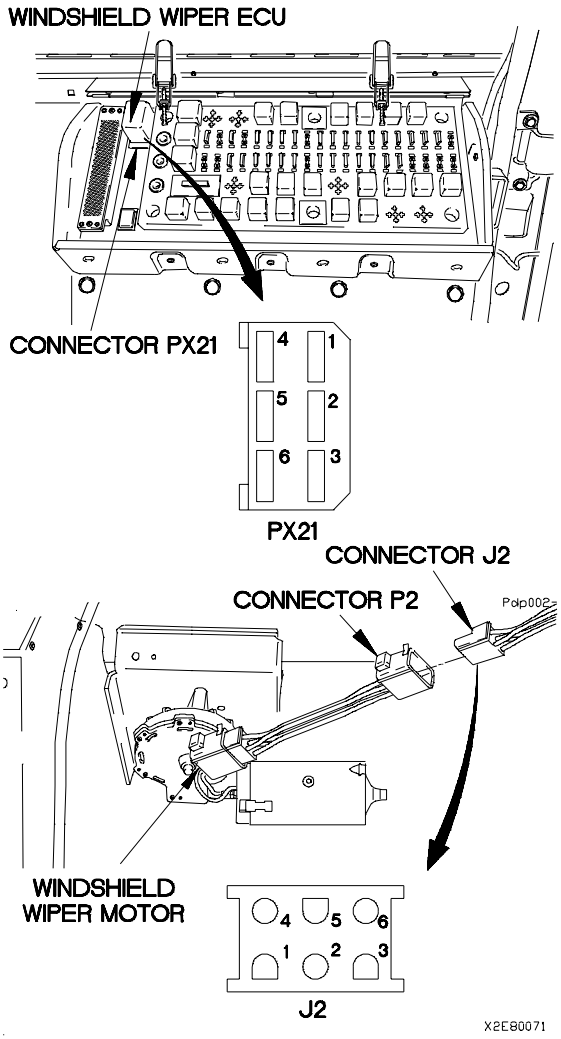


## e77. WINDSHIELD WIPER DOES NOT OPERATE ON INTERMITTENT SPEED (CONT)



**CONTINUITY TEST**

(1) Disconnect connector J2 from connector P2.
(2) Disconnect windshield wiper ECU from connector PX21.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector PX21-3.
(5) Connect negative (-) probe of multimeter to connector J2-4 and note reading on multimeter.
(6) If continuity is not present, repair wire 1916 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, replace windshield wiper ECU (para 7-62).
(8) Connect windshield wiper ECU to connector PX21.
(9) Connect connector P2 to connector J2.
(10) Install PDP on dashboard with three screws.
(11) Install three washers and screws in PDP.
(12) Install PDP cover (para 16-2).



**e78. WINDSHIELD WIPER DOES NOT OPERATE ON HIGH SPEED**

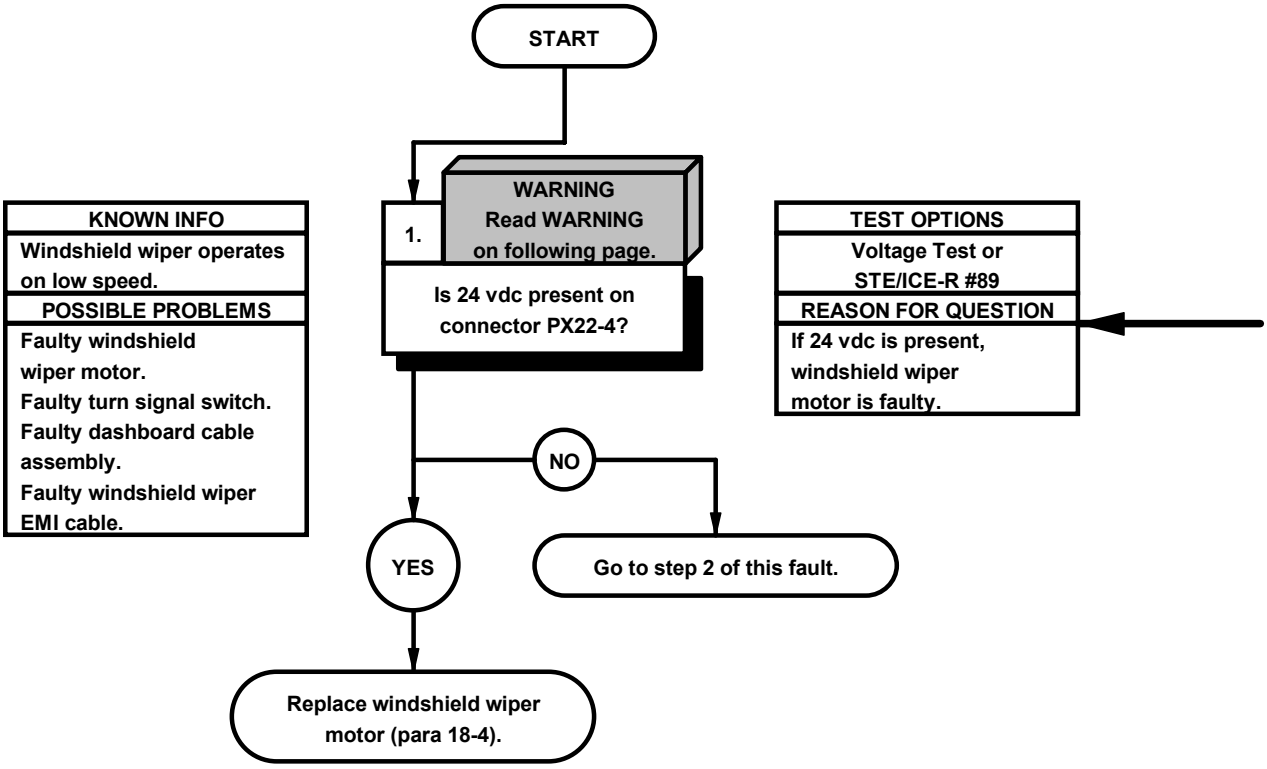
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

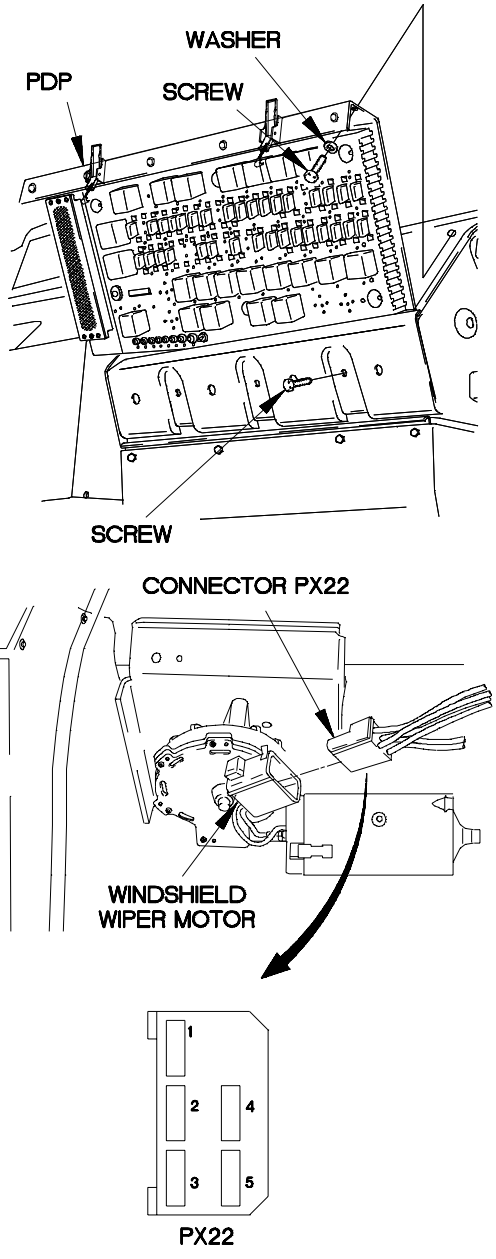


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

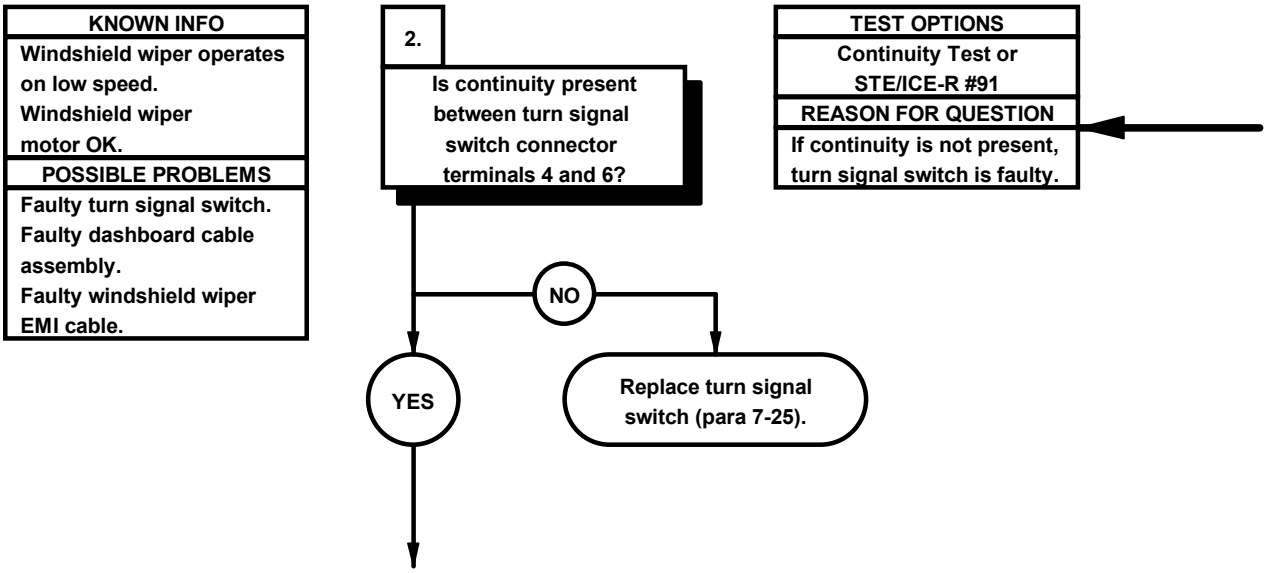
**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect connector PX22 from windshield wiper motor.
(6) Set multimeter to volts dc.
(7) Connect positive (+) probe of multimeter to connector PX22-4.
(8) Connect negative (-) probe of multimeter to ground.
(9) Position master power switch to on (TM 9-2320-365-10).
(10) Position windshield wiper switch to high (TM 9-2320-365-10) and note reading on multimeter.
(11) If 24 vdc is not present, go to step 2 of this fault.
(12) If 24 vdc is present, replace windshield wiper motor (para 18-4).
(13) Position windshield wiper switch to off (TM 9-2320-365-10).
(14) Position master power switch to off (TM 9-2320-365-10).
(15) Connect connector PX22 to windshield wiper motor.

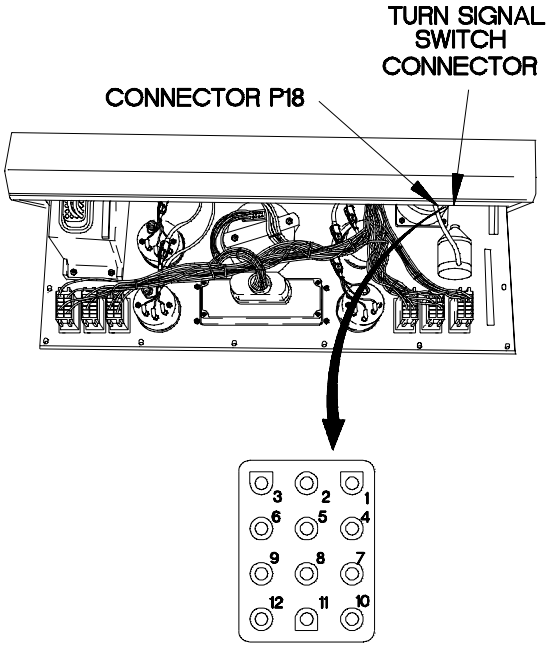



X2E81011

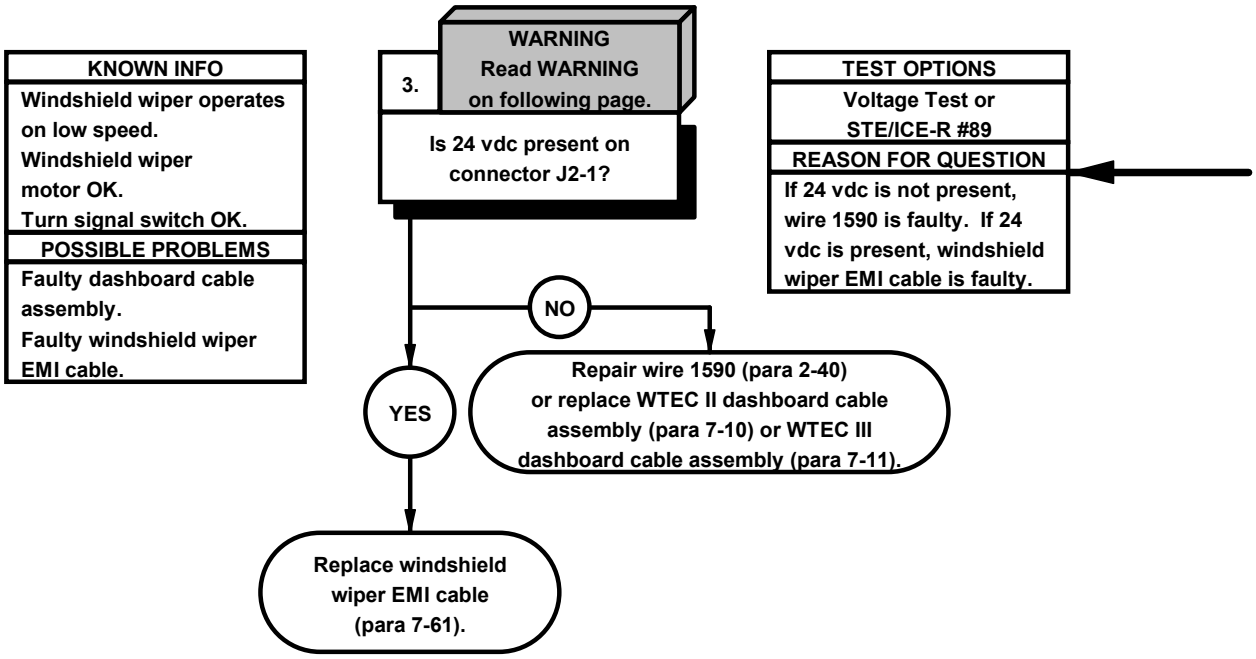
## e78. WINDSHIELD WIPER DOES NOT OPERATE ON HIGH SPEED (CONT)



| CONTINUITY TEST |
| --- |
| (1) Remove instrument panel assembly for access (para 7-15). |
| (2) Disconnect turn signal switch connector from connector P18. |
| (3) Set multimeter to ohms. |
| (4) Connect positive (+) probe of multimeter to turn signal switch connector terminal 4. |
| (5) Connect negative (-) probe of multimeter to turn signal switch connector terminal 6. |
| (6) Position windshield wiper switch to high (TM 9-2320-365-10) and note reading on multimeter. |
| (7) If continuity is not present, replace turn signal switch (para 7-25). |
| (8) Position windshield wiper switch to off (TM 9-2320-365-10). |
| (9) Connect turn signal switch connector to connector P18. |
| (10) Install instrument panel assembly (para 7-15). |



## e78. WINDSHIELD WIPER DOES NOT OPERATE ON HIGH SPEED (CONT)

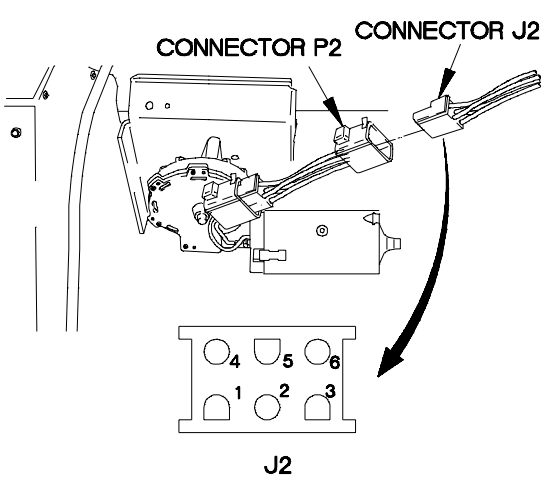


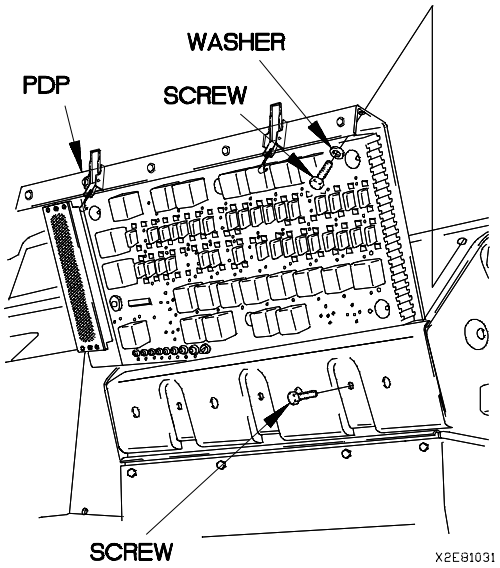
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect connector J2 from connector P2.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J2-1.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position windshield wiper switch to high (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 1590 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc is present, replace windshield wiper EMI cable (para 7-61).
(9) Position windshield wiper switch to off (TM 9-2320-365-10).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Connect connector J2 to connector P2.
(12) Install PDP on dashboard with three screws.
(13) Install three washers and screws in PDP.
(14) Install PDP cover (para 16-2).



## e79. HORN DOES NOT OPERATE

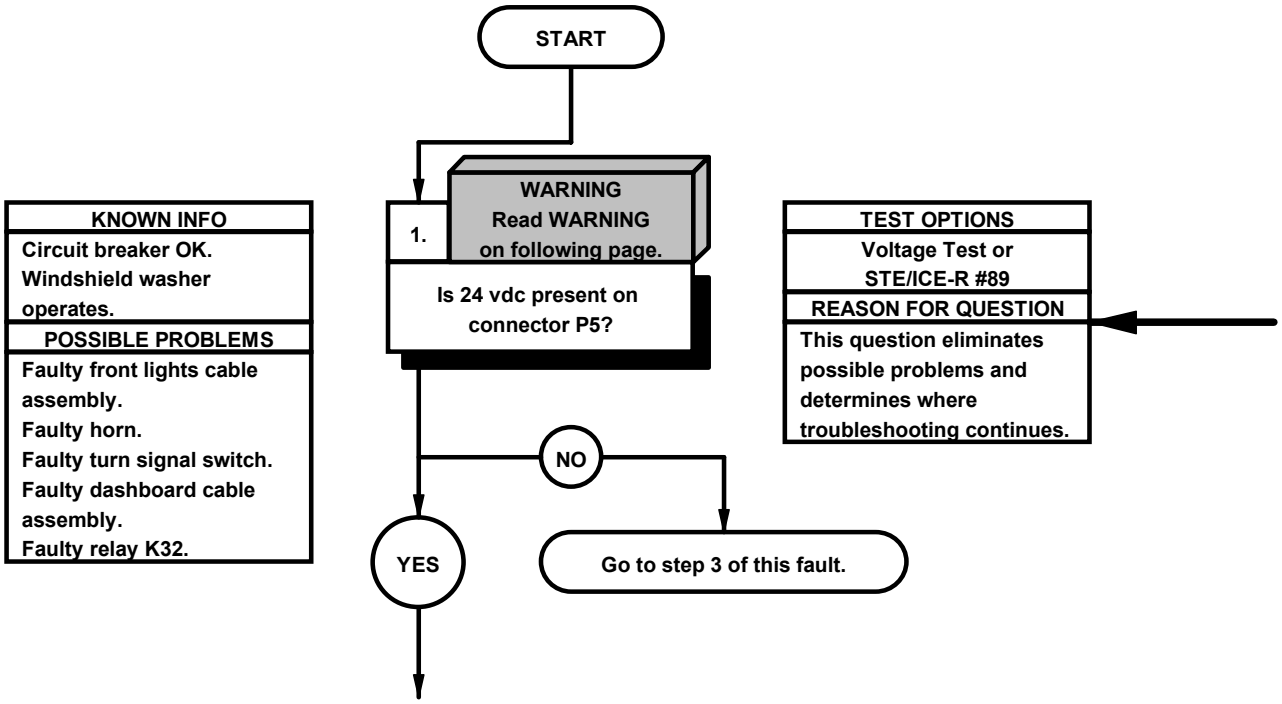
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

**References**
TM 9-4910-571-12&P

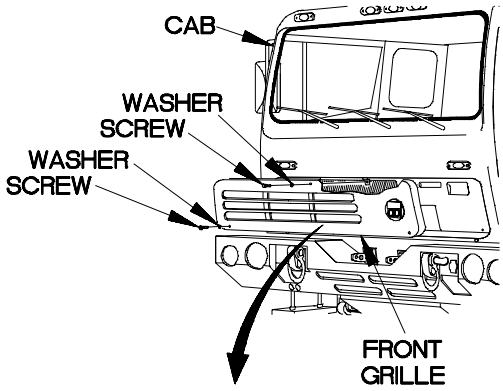


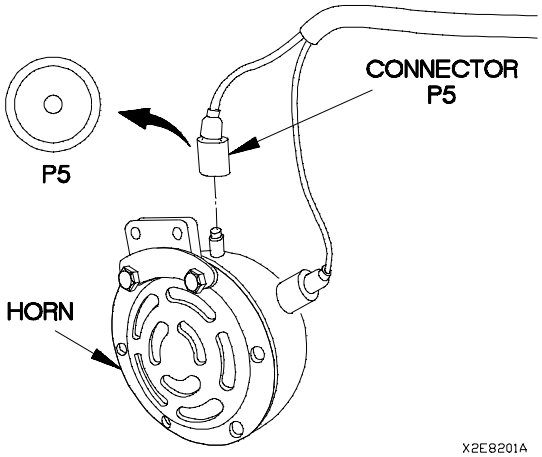
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

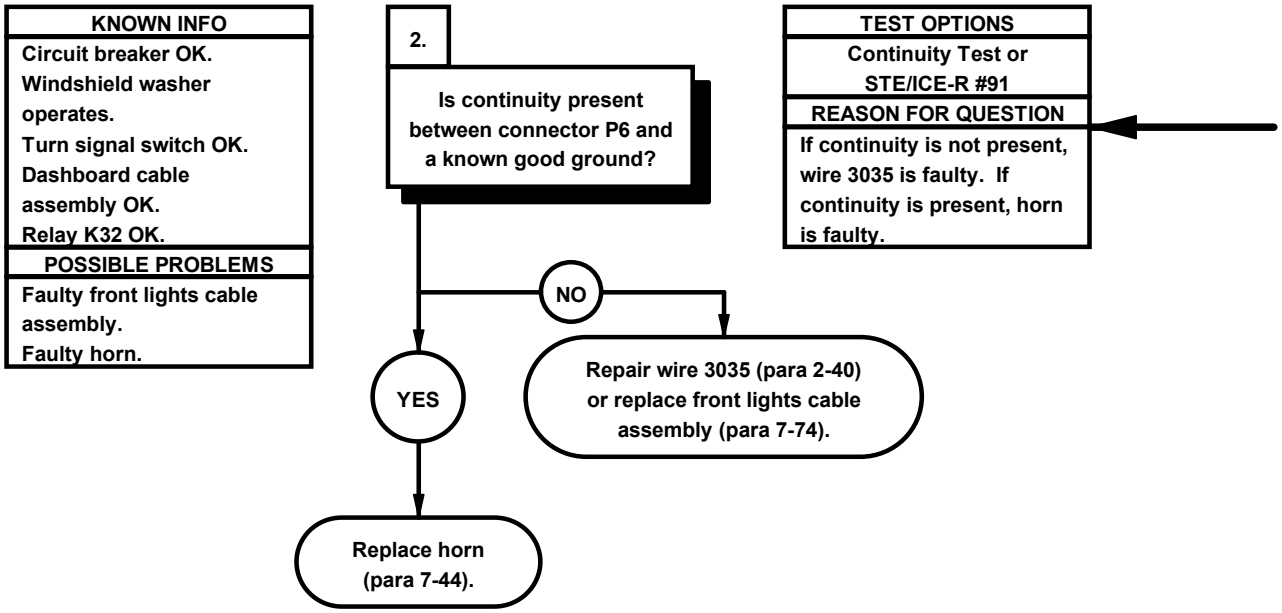
**VOLTAGE TEST**

(1) Remove two screws and washers from front grille.
(2) Remove screw and washer from front grille.
(3) Remove front grille from cab.
(4) Disconnect connector P5 from horn.
(5) Set multimeter to volts dc.
(6) Connect positive (+) probe of multimeter to connector P5.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Press horn button (TM 9-2320-365-10) and note reading of multimeter.
(10) If 24 vdc is not present, go to step 3 of this fault.
(11) Position master power switch to off (TM 9-2320-365-10).
(12) Connect connector P5 to horn.



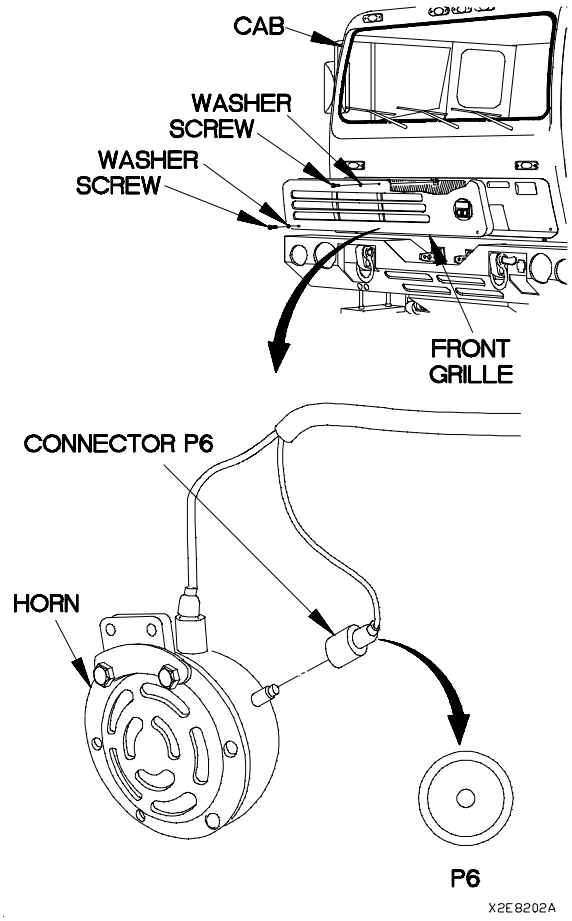



## e79. HORN DOES NOT OPERATE (CONT)

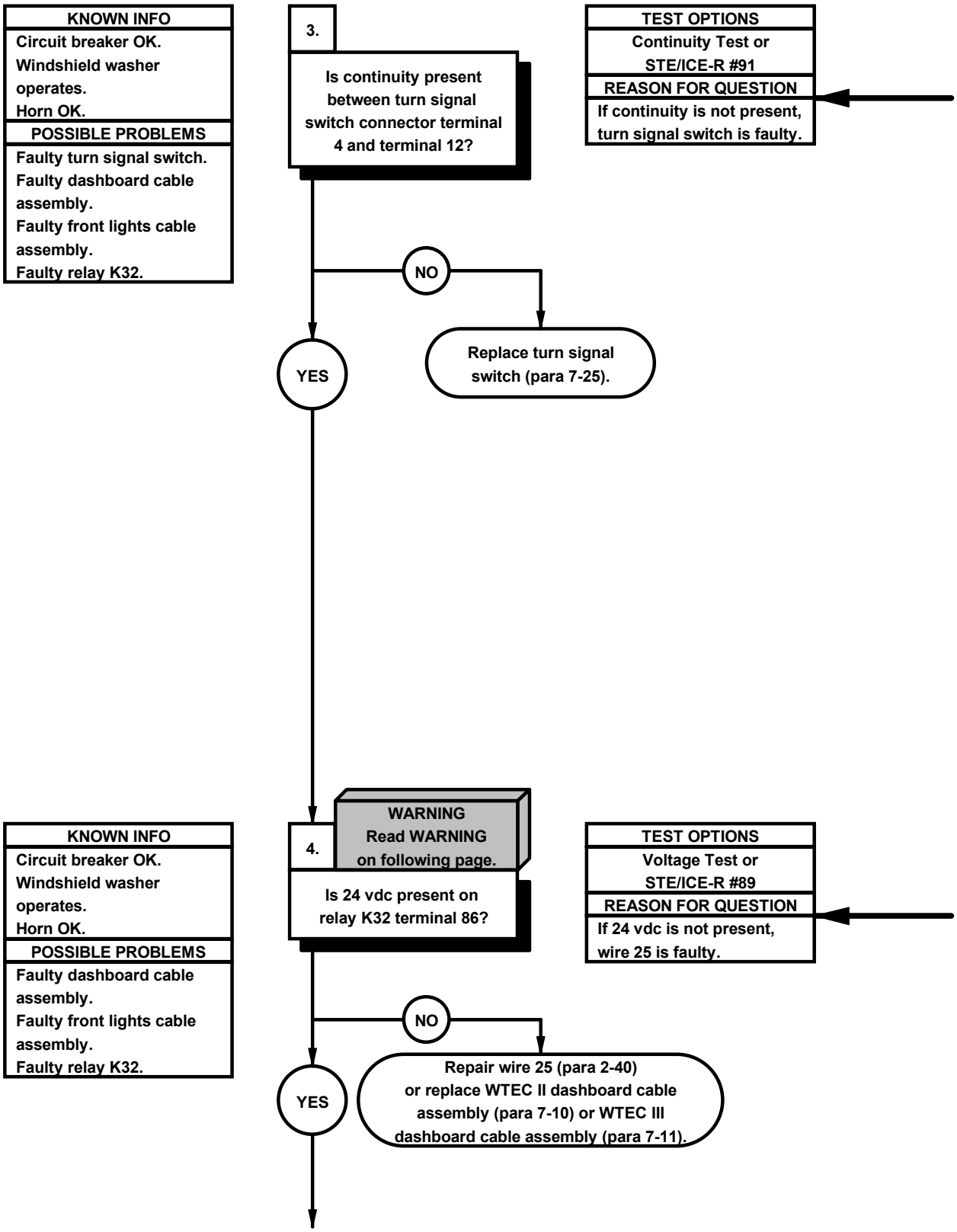


**CONTINUITY TEST**

(1) Disconnect connector P6 from horn.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P6.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3035 (para 2-40) or replace front lights cable assembly (para 7-74).
(6) If continuity is present, replace horn (para 7-44).
(7) Connect connector P6 to horn.
(8) Position front grille on cab with washer and screw.
(9) Position two washers and screws in front grille.
(10) Tighten screw to 48-60 lb-in. (5-7 N·m).
(11) Tighten two screws to 24 lb-in. (3 N·m).

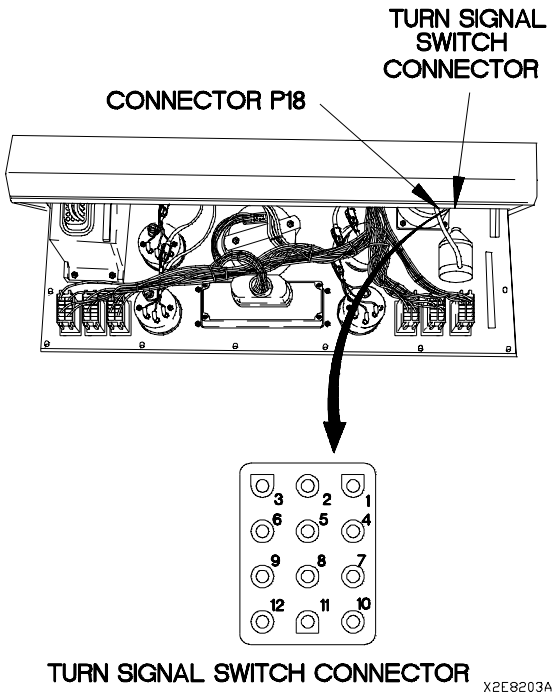


## e79. HORN DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector P18 from turn signal switch connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to turn signal switch connector terminal 4.
(5) Connect negative (-) probe of multimeter to turn signal switch connector terminal 12.
(6) Press horn button (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace turn signal switch (para 7-25).
(8) Connect connector P18 to turn signal switch connector.
(9) Install instrument panel assembly (para 7-15).

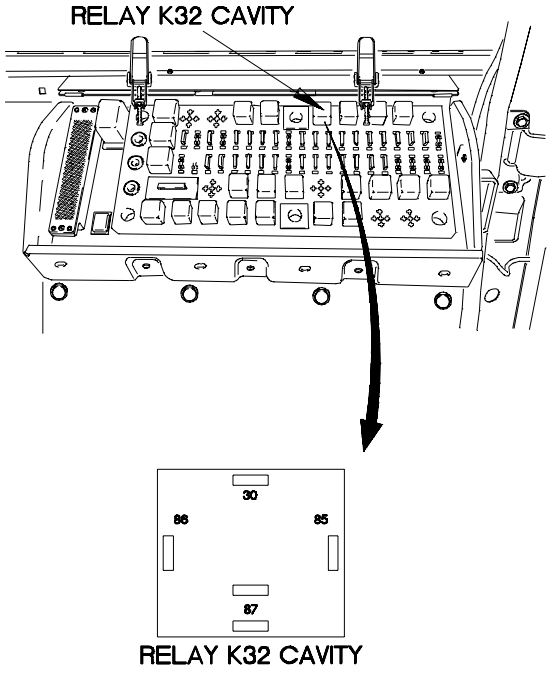



**WARNING**

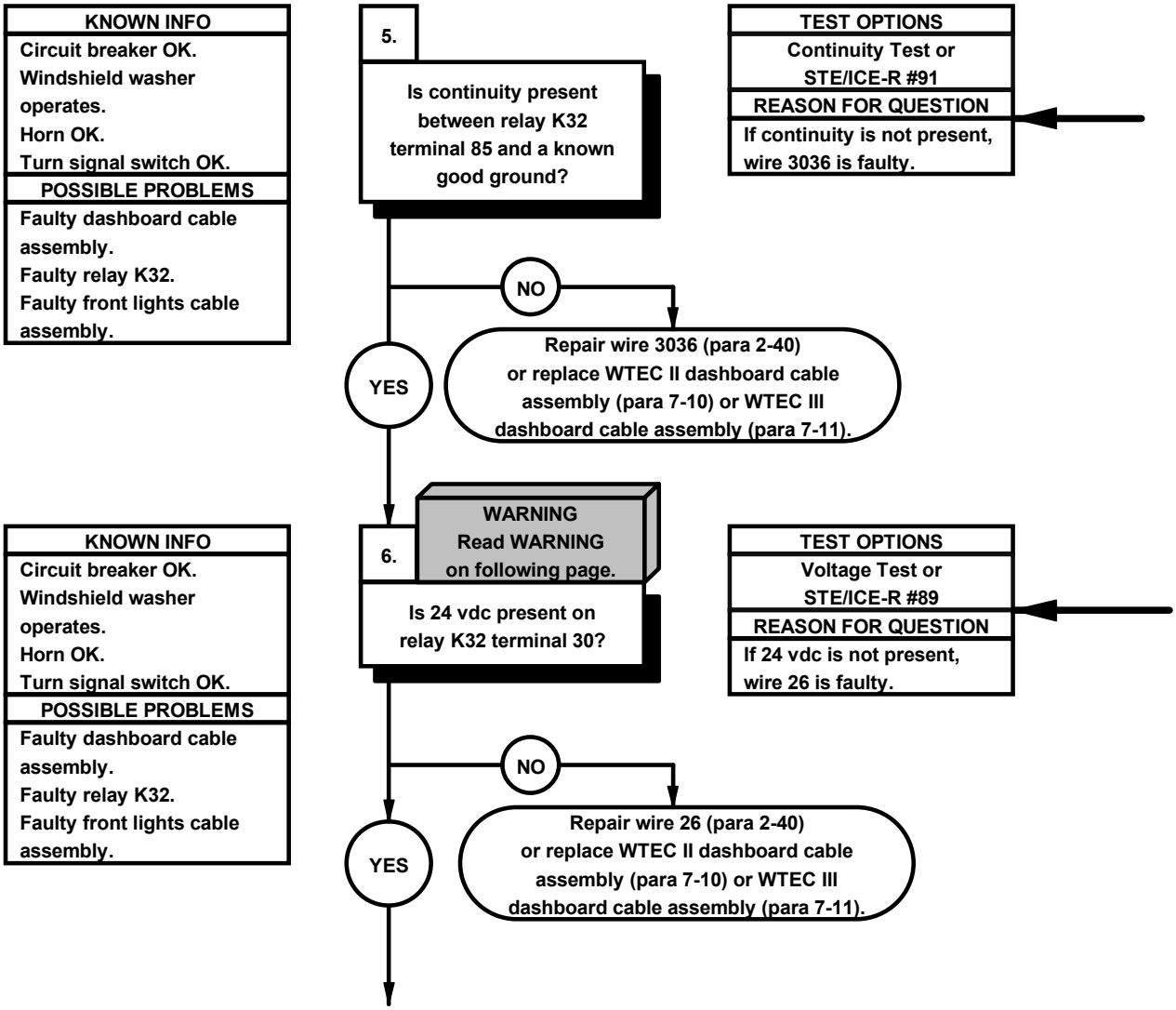
Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove relay K32 from PDP.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to PDP, terminal 86, where relay K32 was removed.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Press horn button (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 25 (para 2-40) or WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) Position master power switch to off (TM 9-2320-365-10).

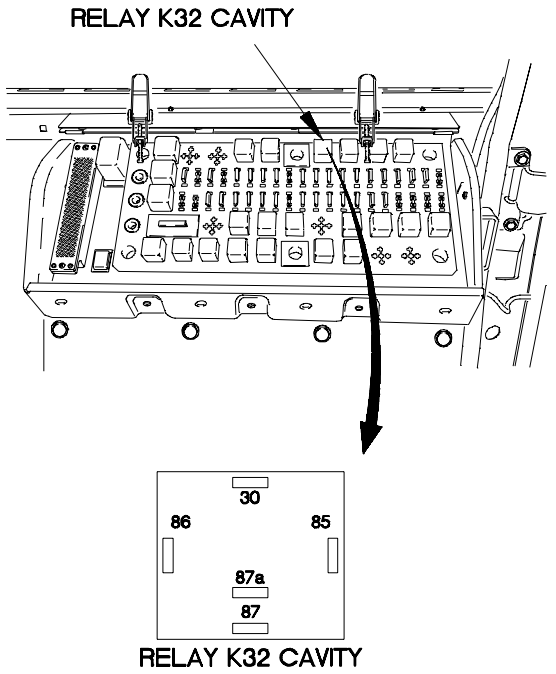


## e79. HORN DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K32 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3036 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).



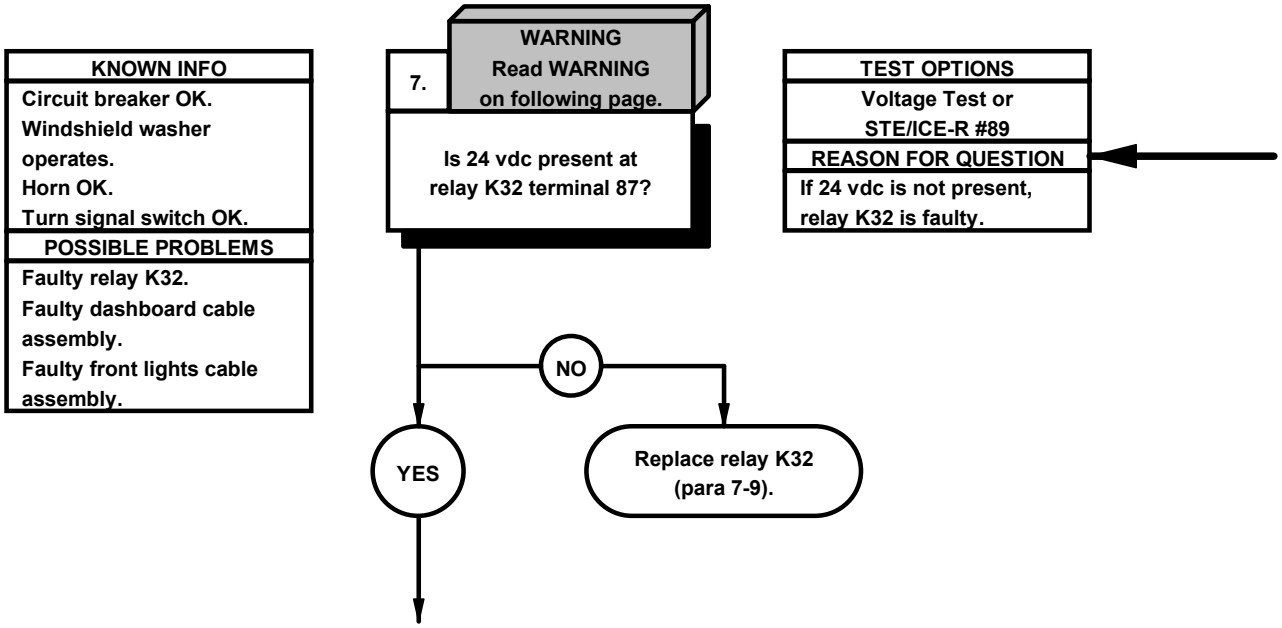

**WARNING**

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to PDP, terminal 30, where relay K32 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, repair wire 26 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position master power switch to off (TM 9-2320-365-10).

## e79. HORN DOES NOT OPERATE (CONT)

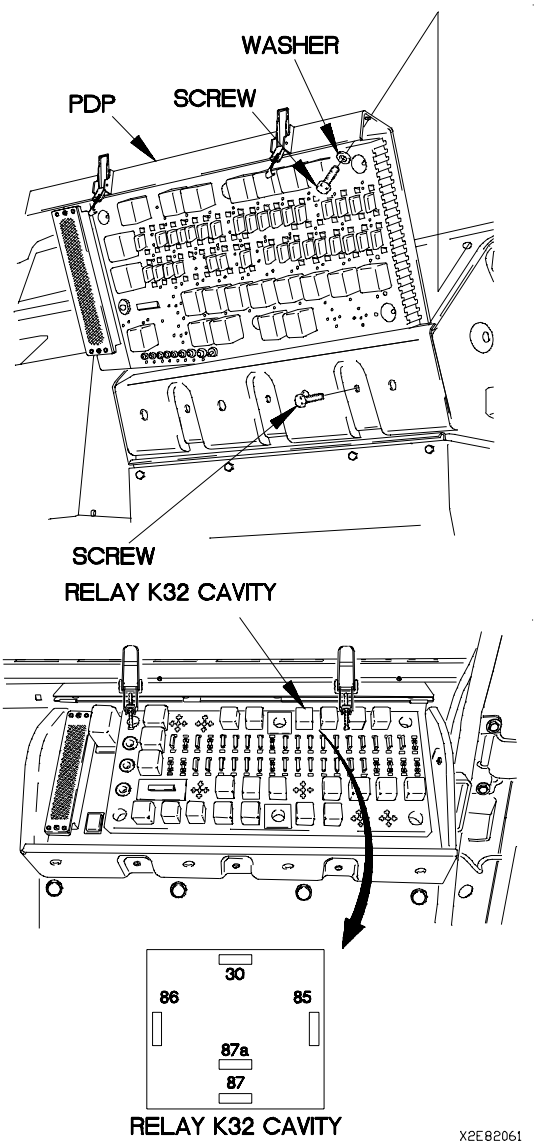


**WARNING**

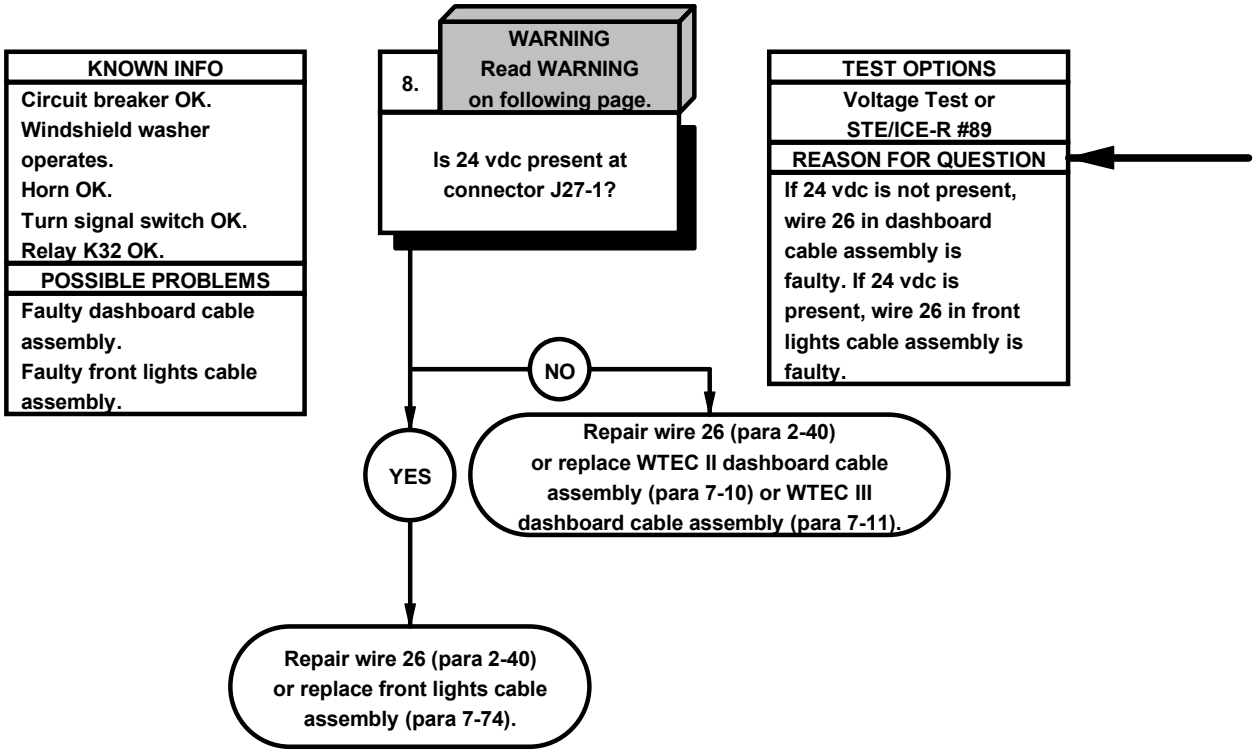
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Install relay K32 in PDP.
(5) Set multimeter to volts dc.
(6) Connect positive (+) probe of multimeter to terminal 87 on relay K32.
(7) Connect negative (-) probe of multimeter to ground.
(8) Position master power switch to on (TM 9-2320-365-10).
(9) Press horn button (TM 9-2320-365-10) and note reading on multimeter.
(10) If 24 vdc is not present, replace relay K32 (para 7-9).
(11) Position master power switch to off (TM 9-2320-365-10).



## e79. HORN DOES NOT OPERATE (CONT)

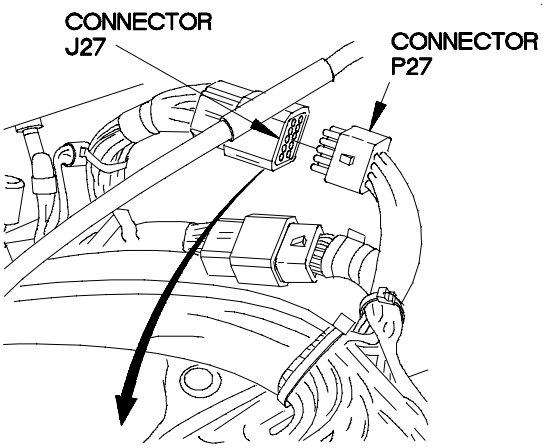


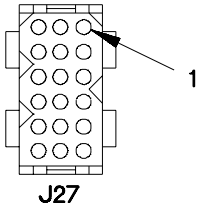
**WARNING**

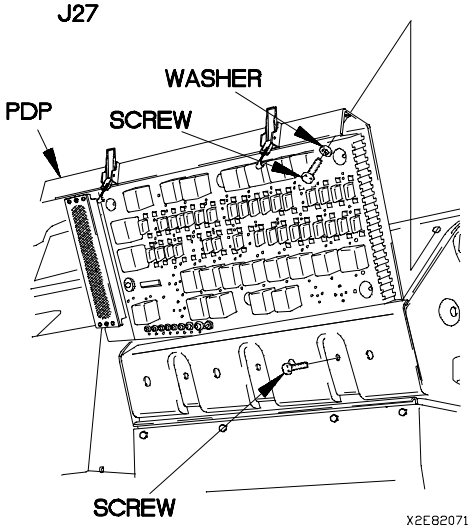
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect connector J27 from connector P27.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector J27-1.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Press horn button (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 26 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc present, repair wire 26 (para 2-40) or replace front lights cable assembly (para 7-74).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Connect connector J27 to connector P27.
(11) Install PDP on dashboard with three screws.
(12) Install three washers and screws in PDP.
(13) Install PDP cover (para 16-2).



## e80. CHEMICAL ALARM DOES NOT OPERATE

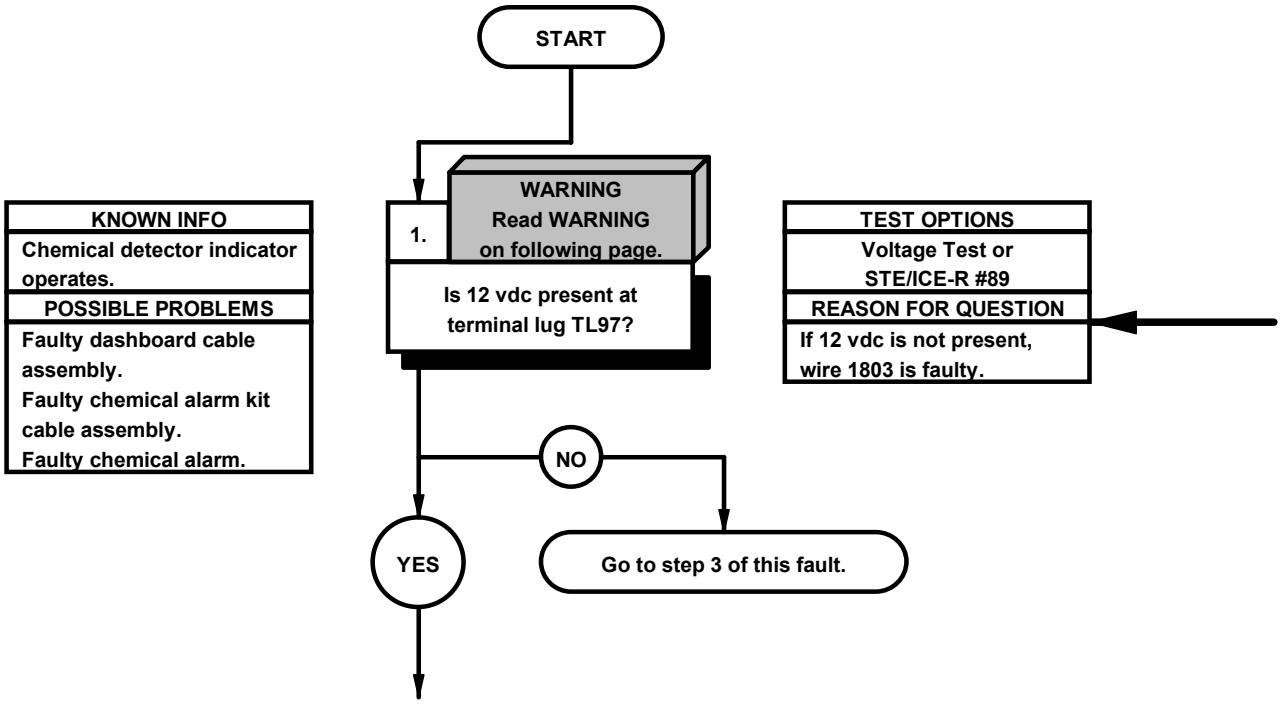
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

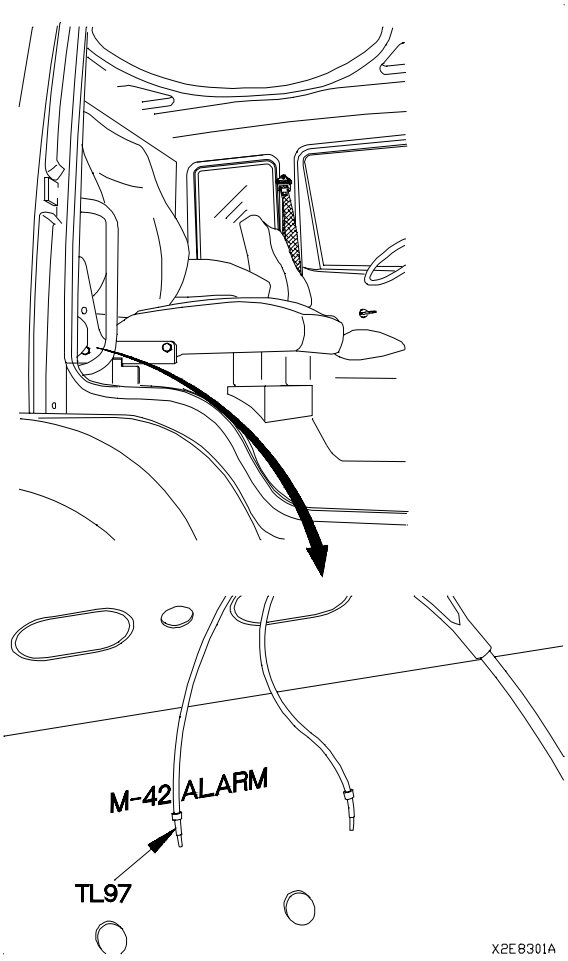


**WARNING**

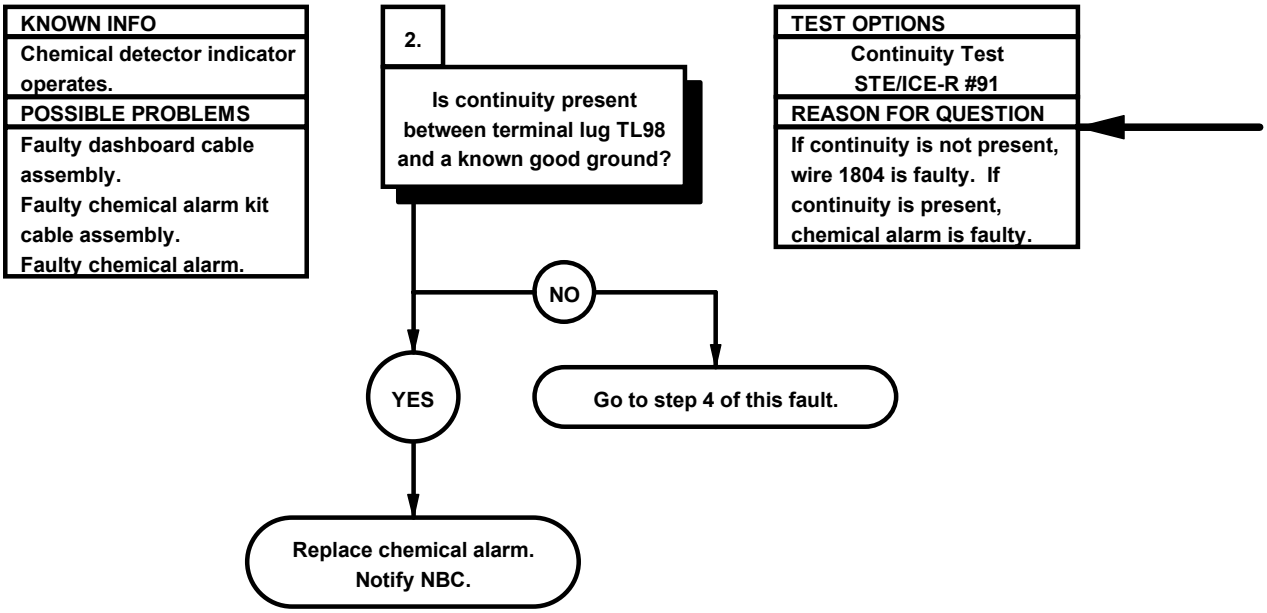
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

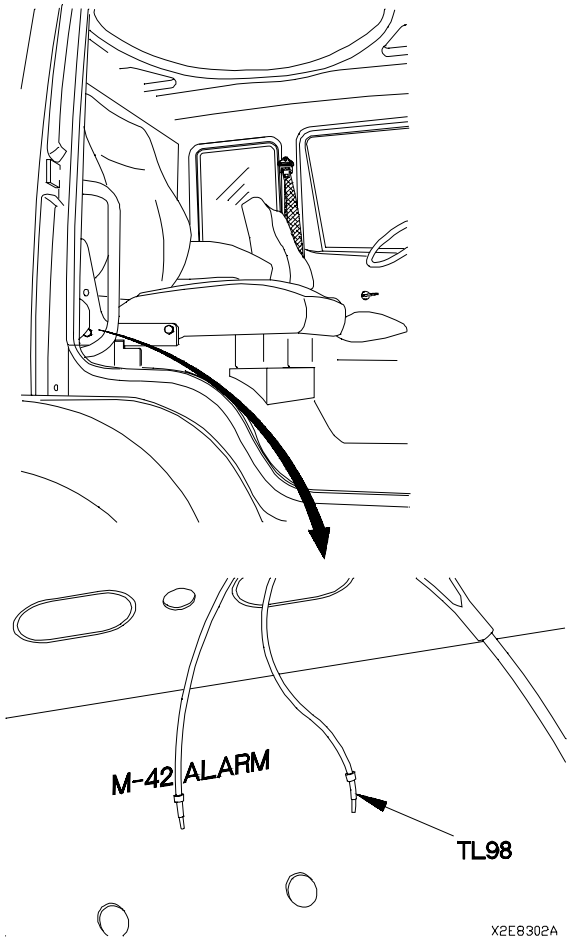
**(1) Set multimeter to volts dc.**
**(2) Connect positive (+) probe of multimeter to terminal lug TL97.**
**(3) Connect negative (-) probe of multimeter to ground.**
**(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(5) If 12 vdc is not present, go to step 3 of this fault.**
**(6) Position master power switch to off (TM 9-2320-365-10).**



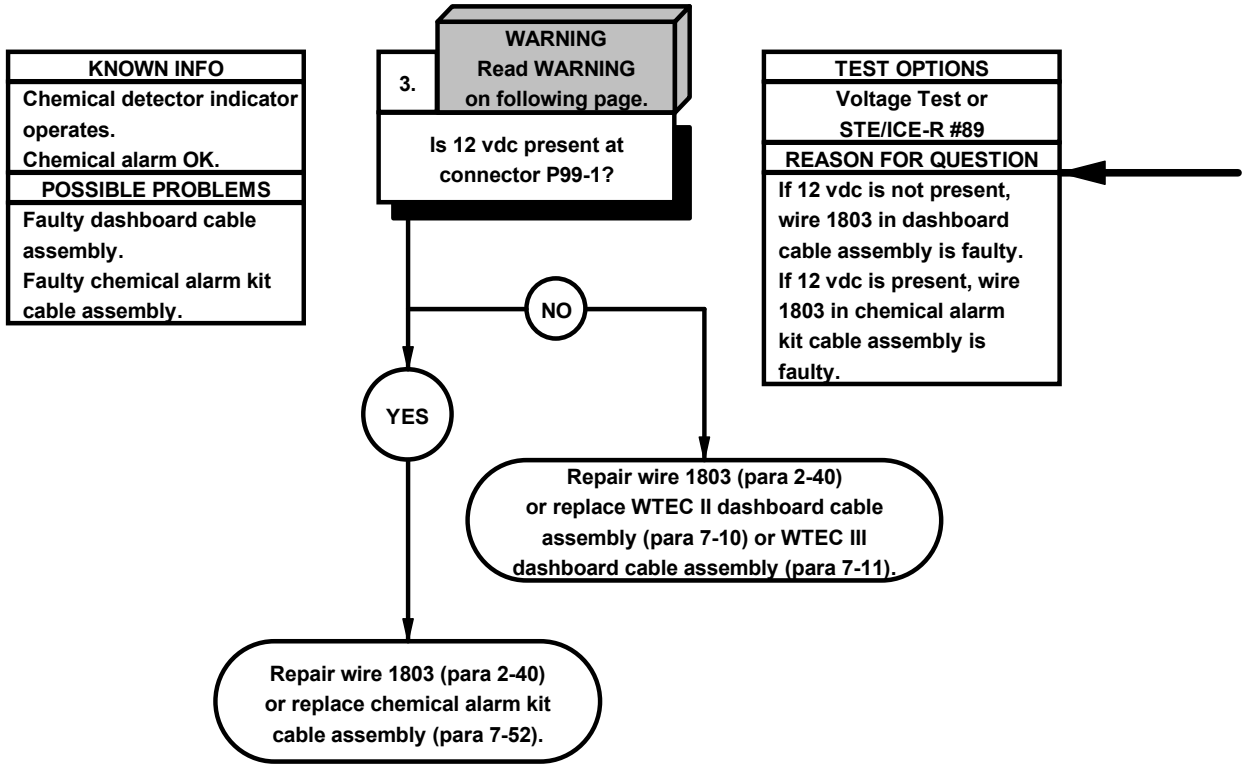
## e80. CHEMICAL ALARM DOES NOT OPERATE (CONT)



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to terminal lug TL98. |
| (3) Connect negative (-) probe of multimeter to ground and note reading on multimeter. |
| (4) If continuity is not present, go to step 4 of this fault. |
| (5) If continuity is present, replace chemical alarm (notify NBC). |



## e80. CHEMICAL ALARM DOES NOT OPERATE (CONT)

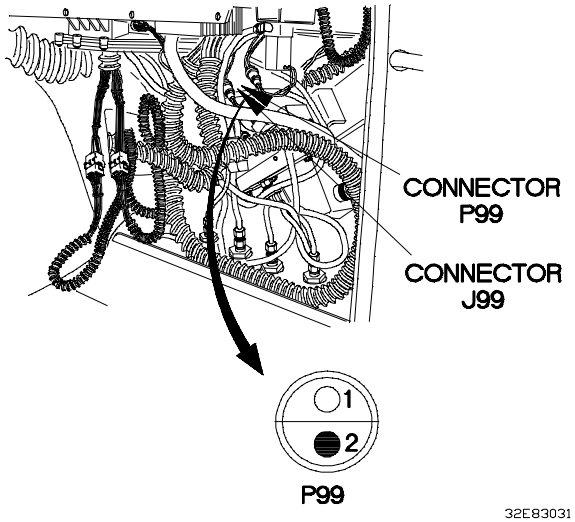


**WARNING**

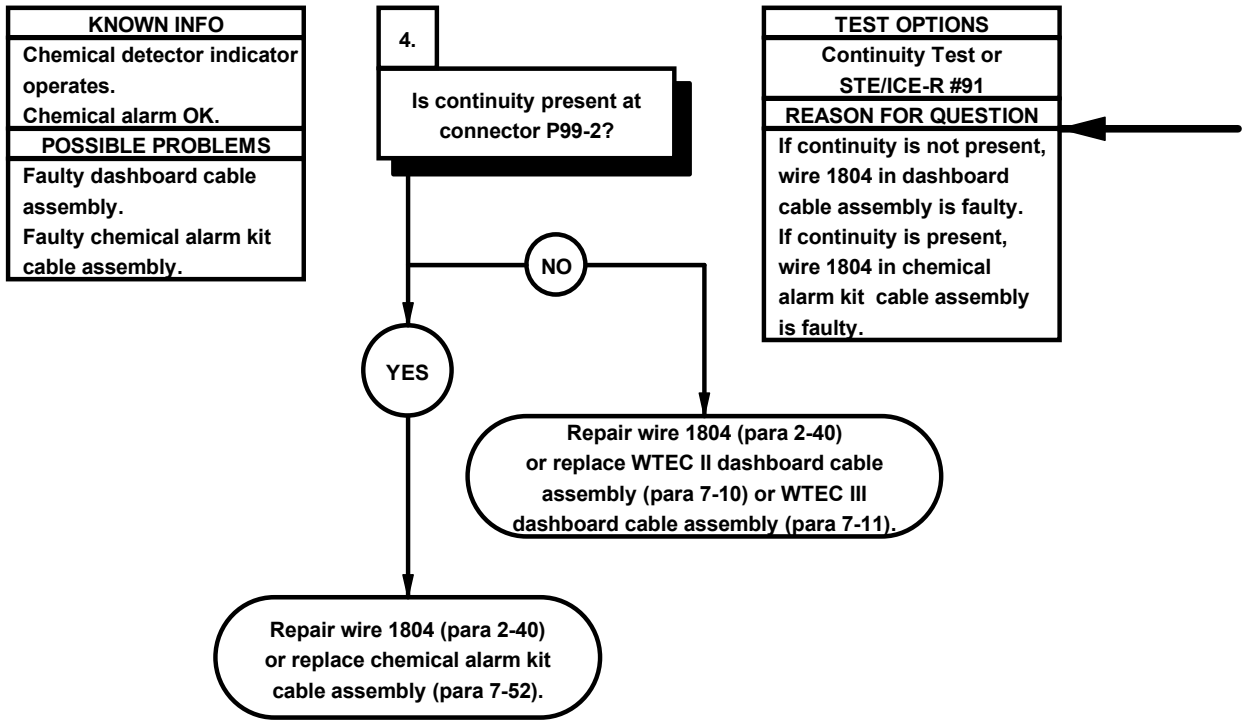
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P99 from connector J99.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector P99-1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 1803 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc is present, repair wire 1803 (para 2-40) or replace chemical alarm kit cable assembly (para 7-52).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Connect connector P99 to connector J99.
(11) Install kick panel (para 16-3).

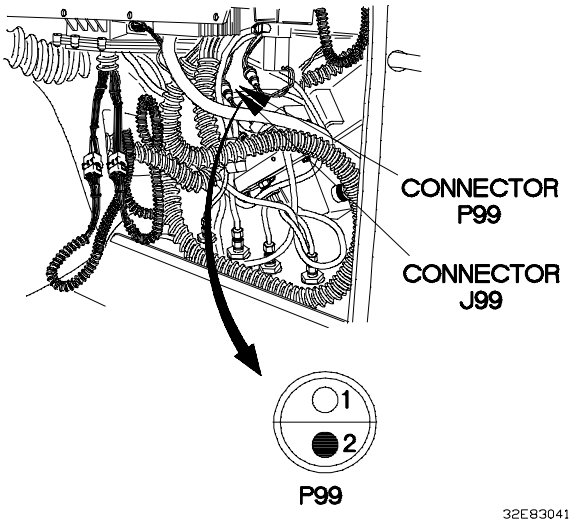


## e80. CHEMICAL ALARM DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P99 from connector J99.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P99-2.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, repair wire 1804 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) If continuity is present, repair wire 1804 (para 2-40) or replace chemical alarm kit cable assembly (para 7-52).
(8) Connect connector P99 to connector J99.
(9) Install kick panel (para 16-3).



## e81. CHEMICAL DETECTOR DOES NOT OPERATE

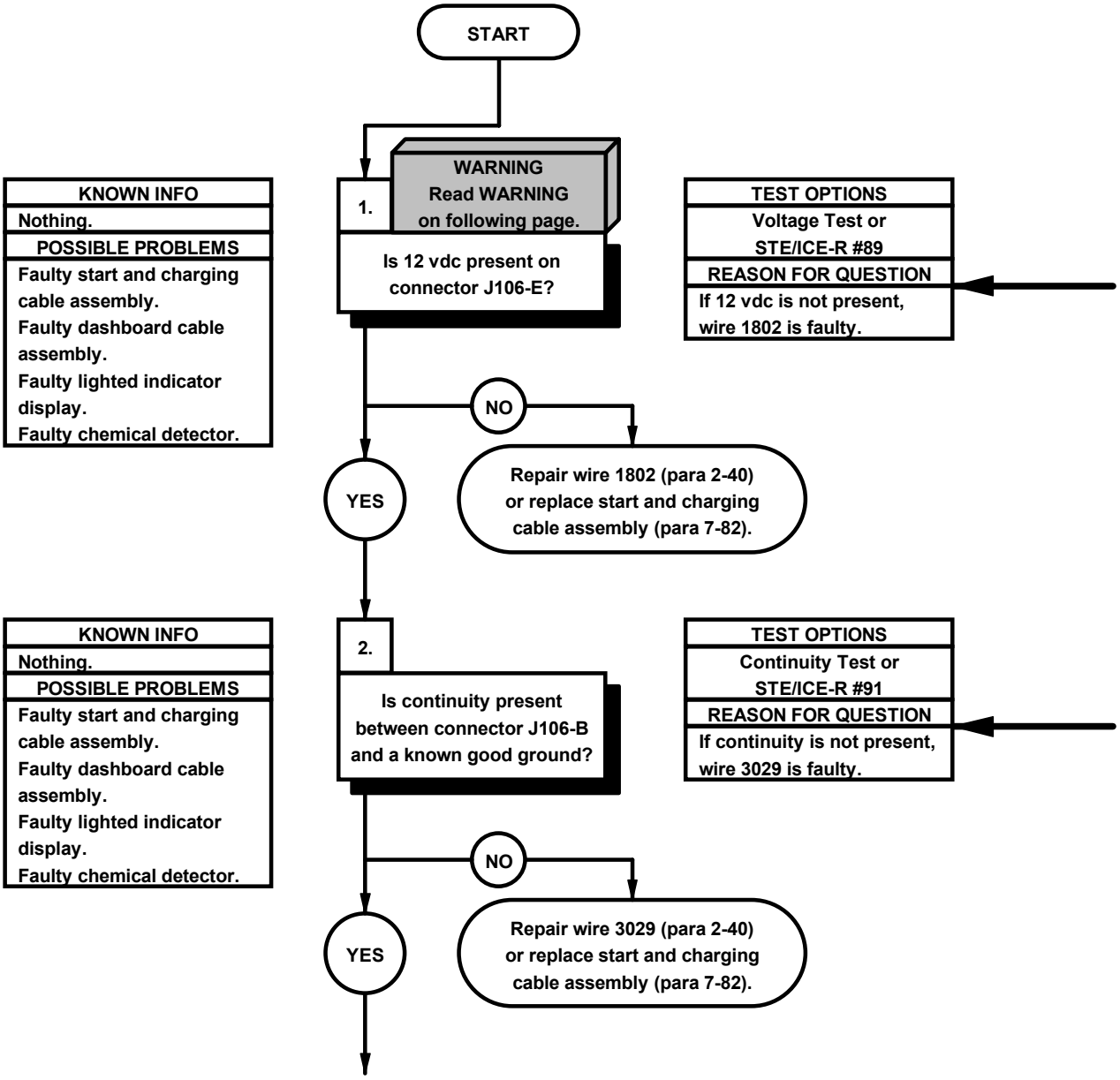
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**References**
TM 9-4910-571-12&P



**WARNING**

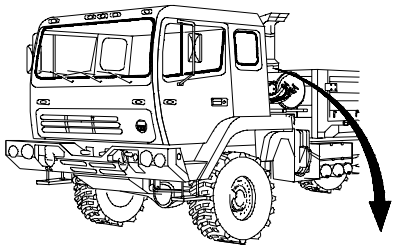
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

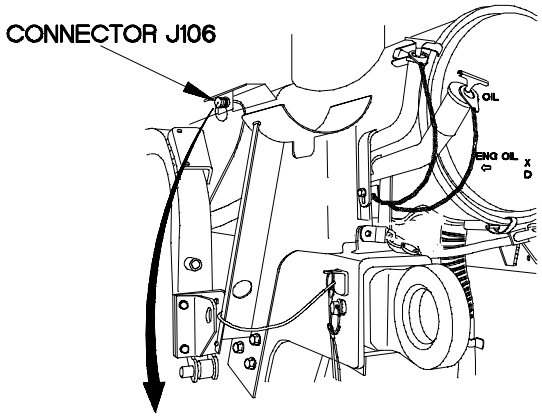
**VOLTAGE TEST**

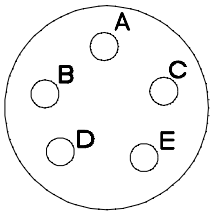
**(1) Set multimeter to volts dc.**
**(2) Connect positive (+) probe of multimeter to connector J106-E.**
**(3) Connect negative (-) probe of multimeter to ground.**
**(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(5) If 12 vdc is not present, repair wire 1802 (para 2-40) or replace start and charging cable assembly (para 7-82).**
**(6) Position master power switch to off (TM 9-2320-365-10).**

**CONTINUITY TEST**

**(1) Set multimeter to ohms.**
**(2) Connect positive (+) probe of multimeter to connector J106-B.**
**(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.**
**(4) If continuity is not present, repair wire 3029 (para 2-40) or replace start and charging cable assembly (para 7-82).**

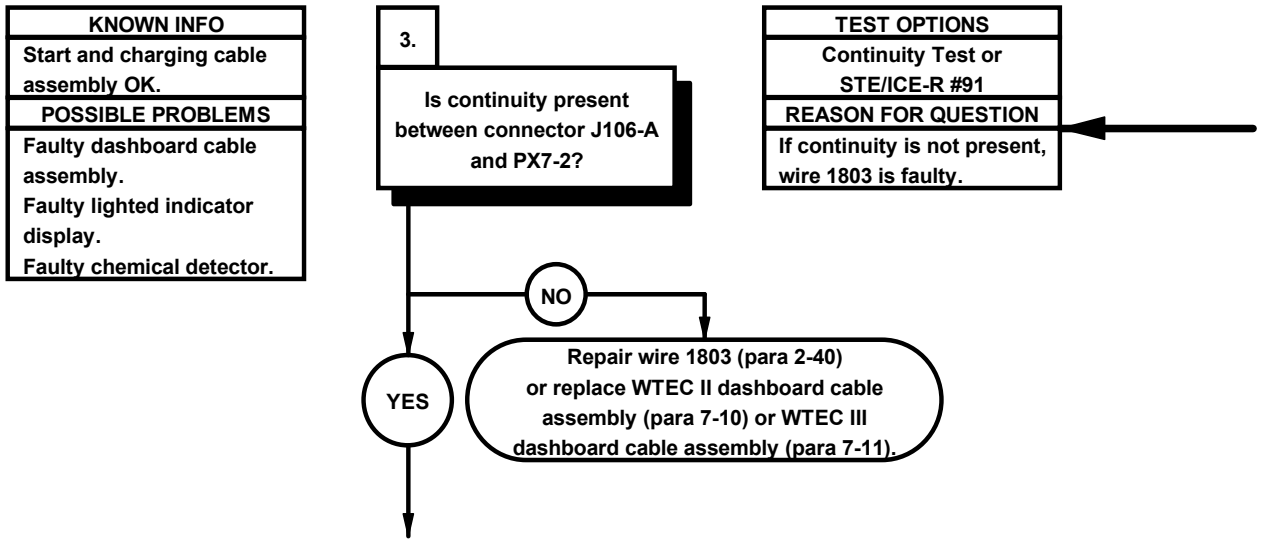




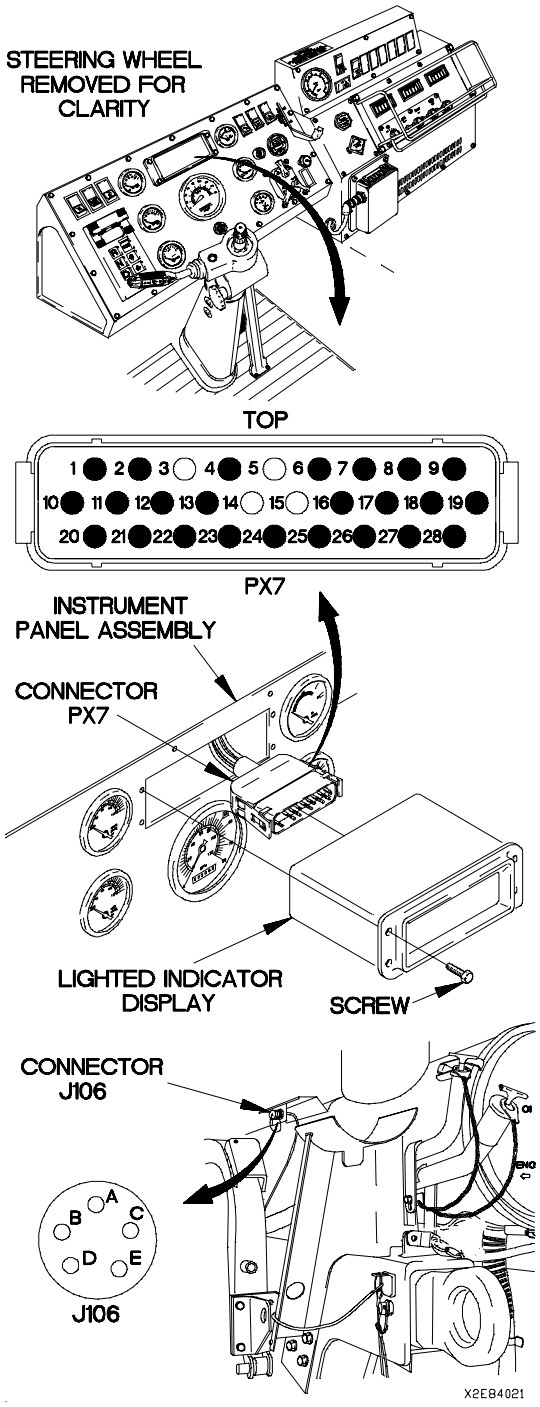




X2E8401A

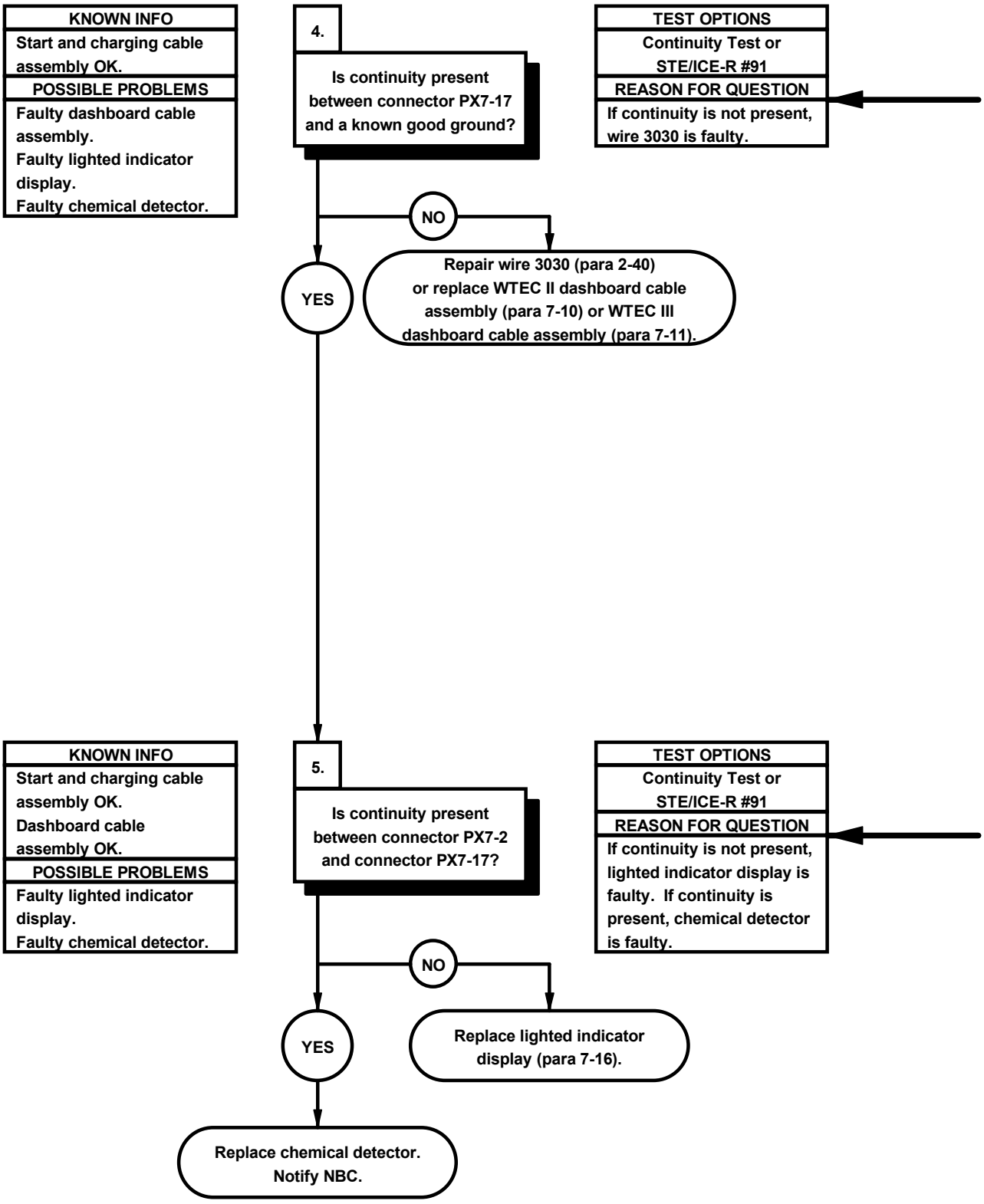
## e81. CHEMICAL DETECTOR DOES NOT OPERATE (CONT)



| CONTINUITY TEST |
| --- |
| (1) Disconnect batteries (para 7-48). |
| (2) Remove four screws from lighted indicator display. |
| (3) Remove lighted indicator display from instrument panel assembly. |
| (4) Disconnect connector PX7 from lighted indicator display. |
| (5) Set multimeter to ohms. |
| (6) Connect positive (+) probe of multimeter to connector J106-A. |
| (7) Connect negative (-) probe of multimeter to connector PX7-2 and note reading on multimeter. |
| (8) If continuity is not present, repair wire 1803 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11). |
| (9) Connect connector J106 to connector P106. |

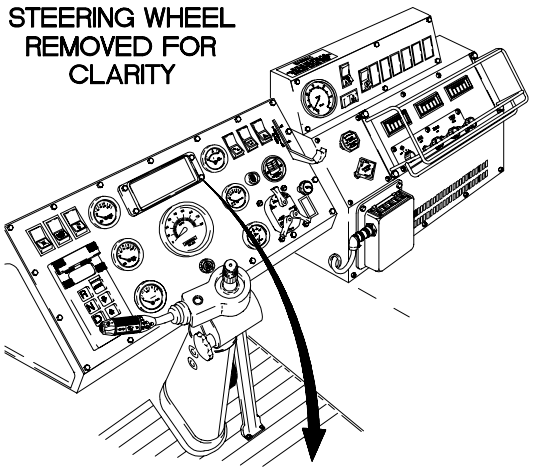


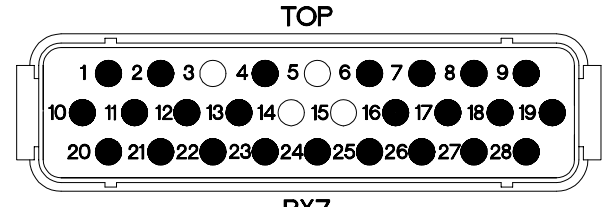
## e81. CHEMICAL DETECTOR DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

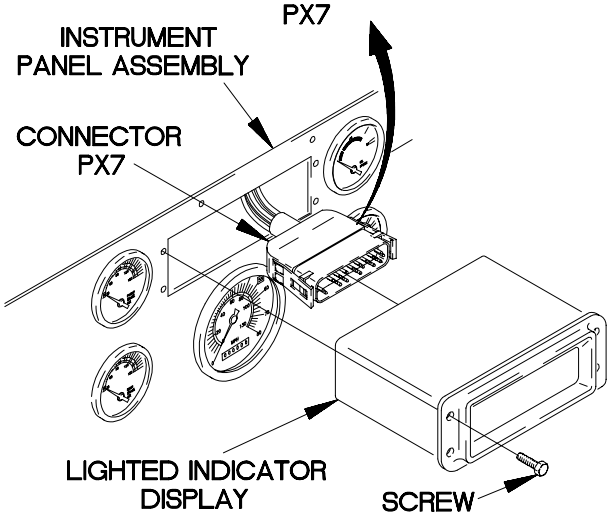
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX7-17.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3030 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX7-2.
(3) Connect negative (-) probe of multimeter to connector PX7-17 and note reading on multimeter.
(4) If continuity is not present, replace lighted indicator display (para 7-16).
(5) If continuity is present, replace chemical detector (notify NBC).
(6) Connect lighted indicator display to connector PX7.
(7) Position lighted indicator display in instrument panel assembly with four screws.
(8) Tighten four screws to 6-10 lb-in. (1 N·m).
(9) Connect batteries (para 7-48).



## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

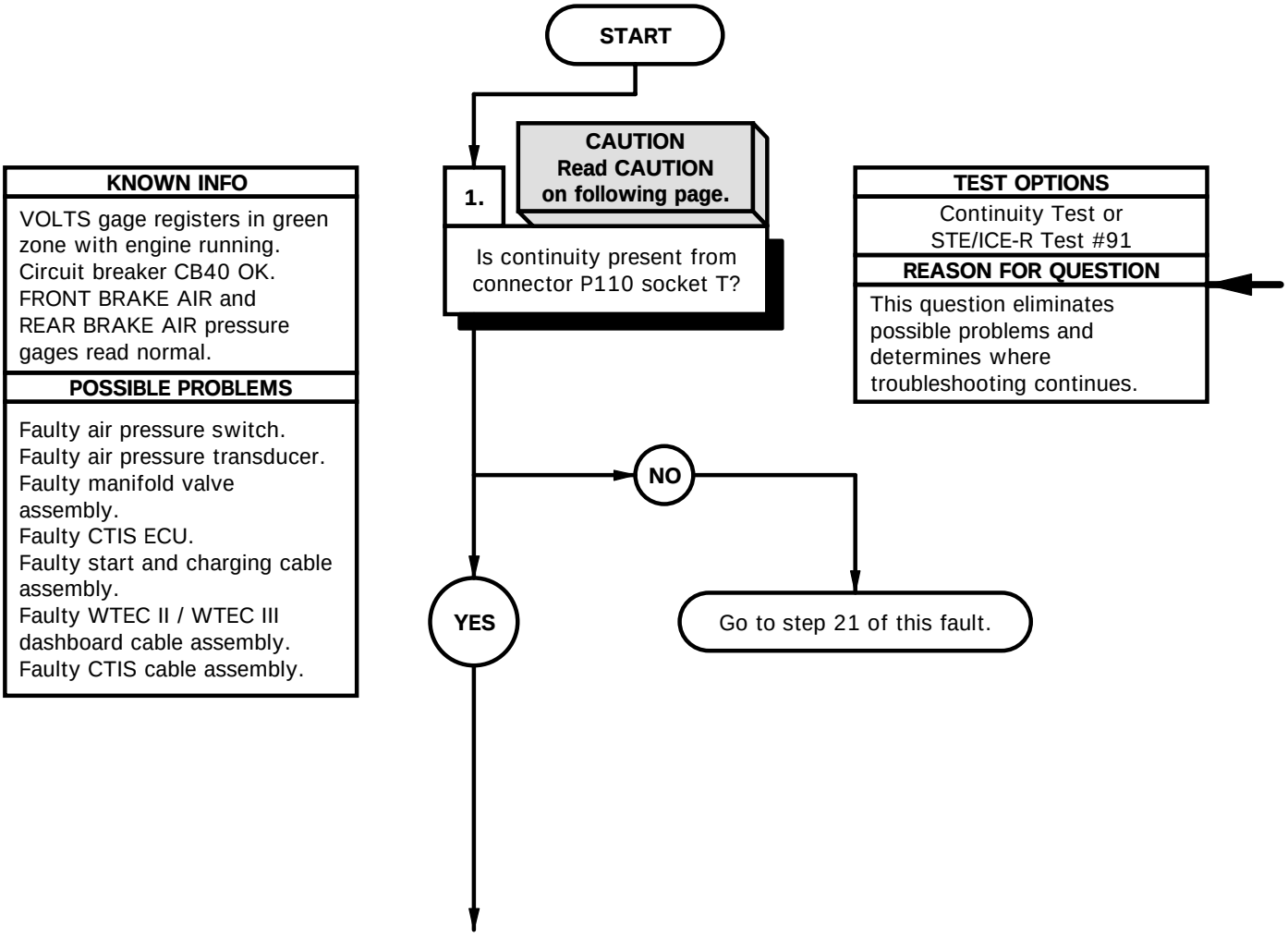
**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**NOTE**

Perform Electrical System Troubleshooting e1. Circuit Breaker Does Not Operate on circuit breaker CB40 prior to beginning this task.



**CAUTION**

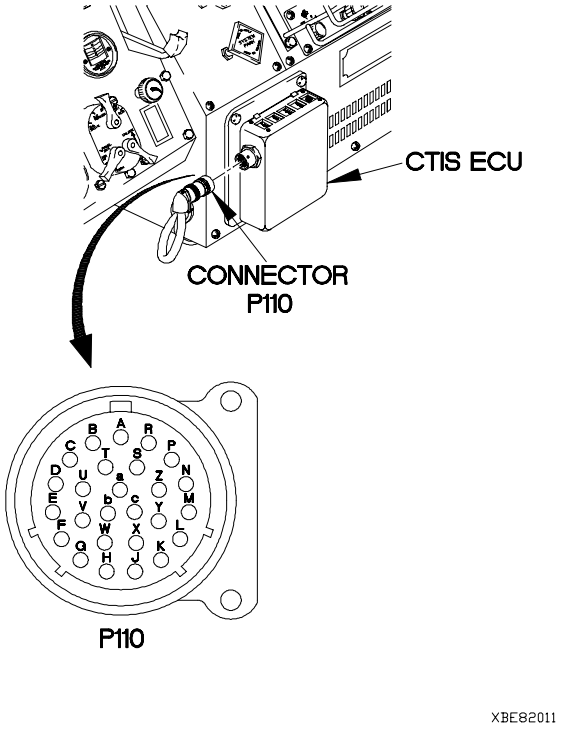
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

**NOTE**

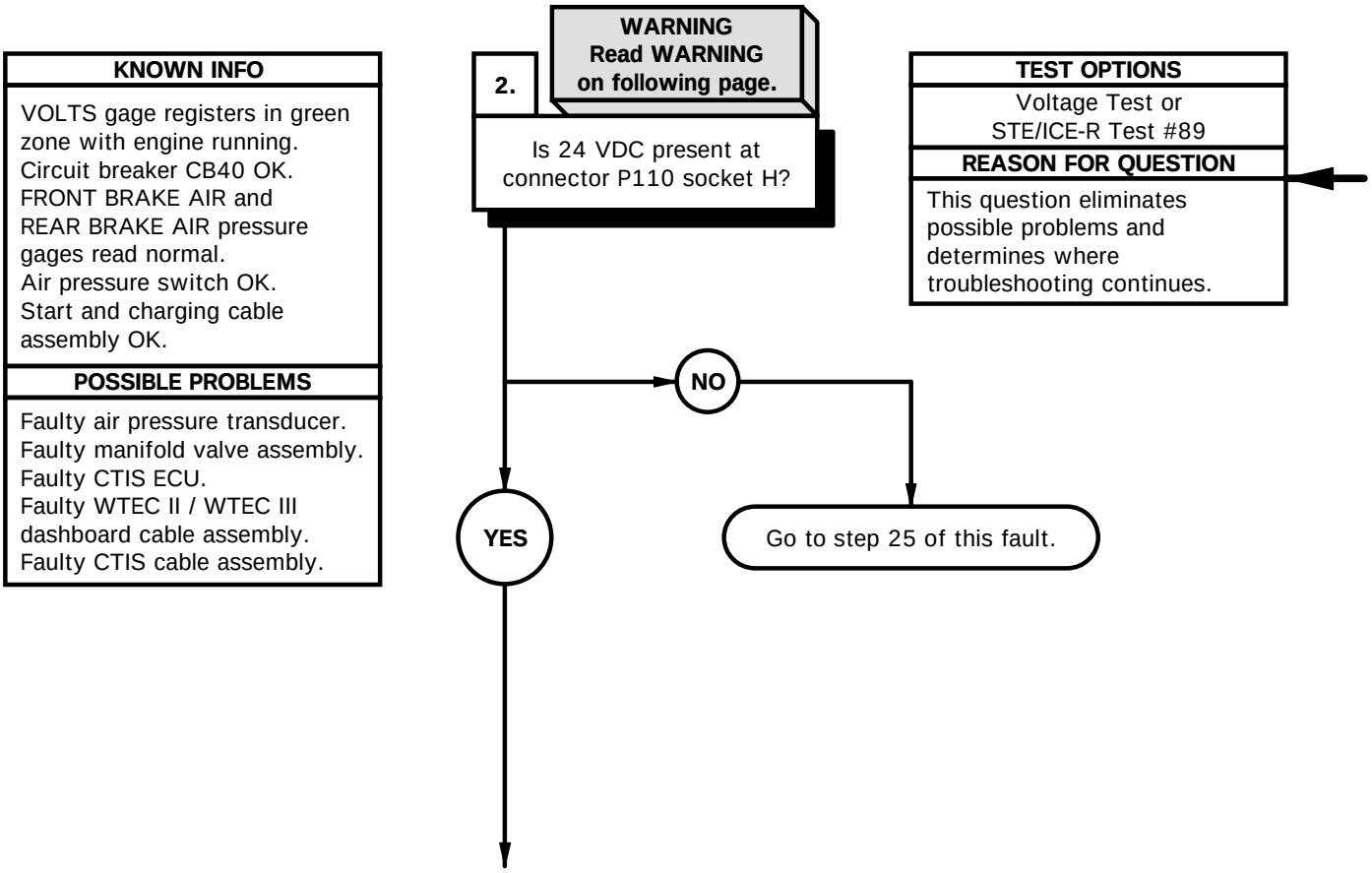
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

**CONTINUITY TEST**

(1) Start engine (TM 9-2320-365-10).
(2) Allow air pressure to build until FRONT BRAKE AIR and REAR BRAKE AIR pressure gages read approximately 120 PSI.
(3) Shut down engine (TM 9-2320-365-10).
(4) Disconnect connector P110 from CTIS ECU.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector P110 socket T.
(7) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(8) If continuity is not present, go to step 21 of this fault.



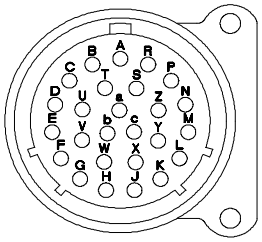
## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

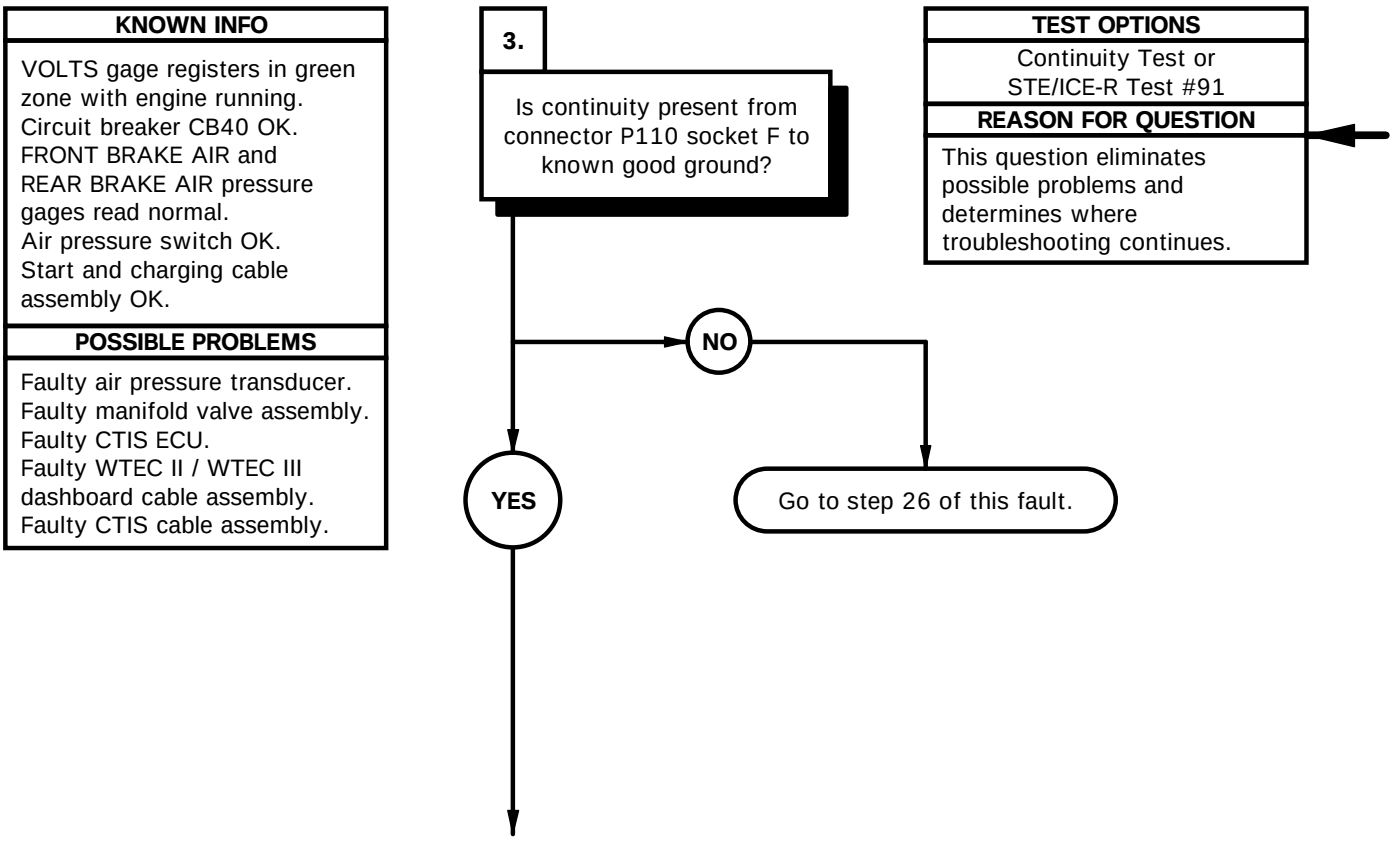
| VOLTAGE TEST |
|---|
| (1) Position master power switch to on (TM 9-2320-365-10). |
| (2) Set multimeter to volts DC. |
| (3) Connect positive (+) probe of multimeter to connector P110 socket H. |
| (4) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter. |
| (5) If 24 VDC is not present, go to step 25 of this fault. |
| (6) Position master power switch to off (TM 9-2320-365-10). |



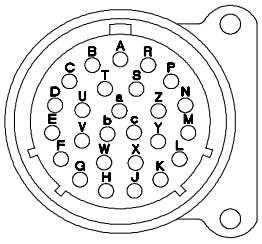

P110

XBE82021

## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



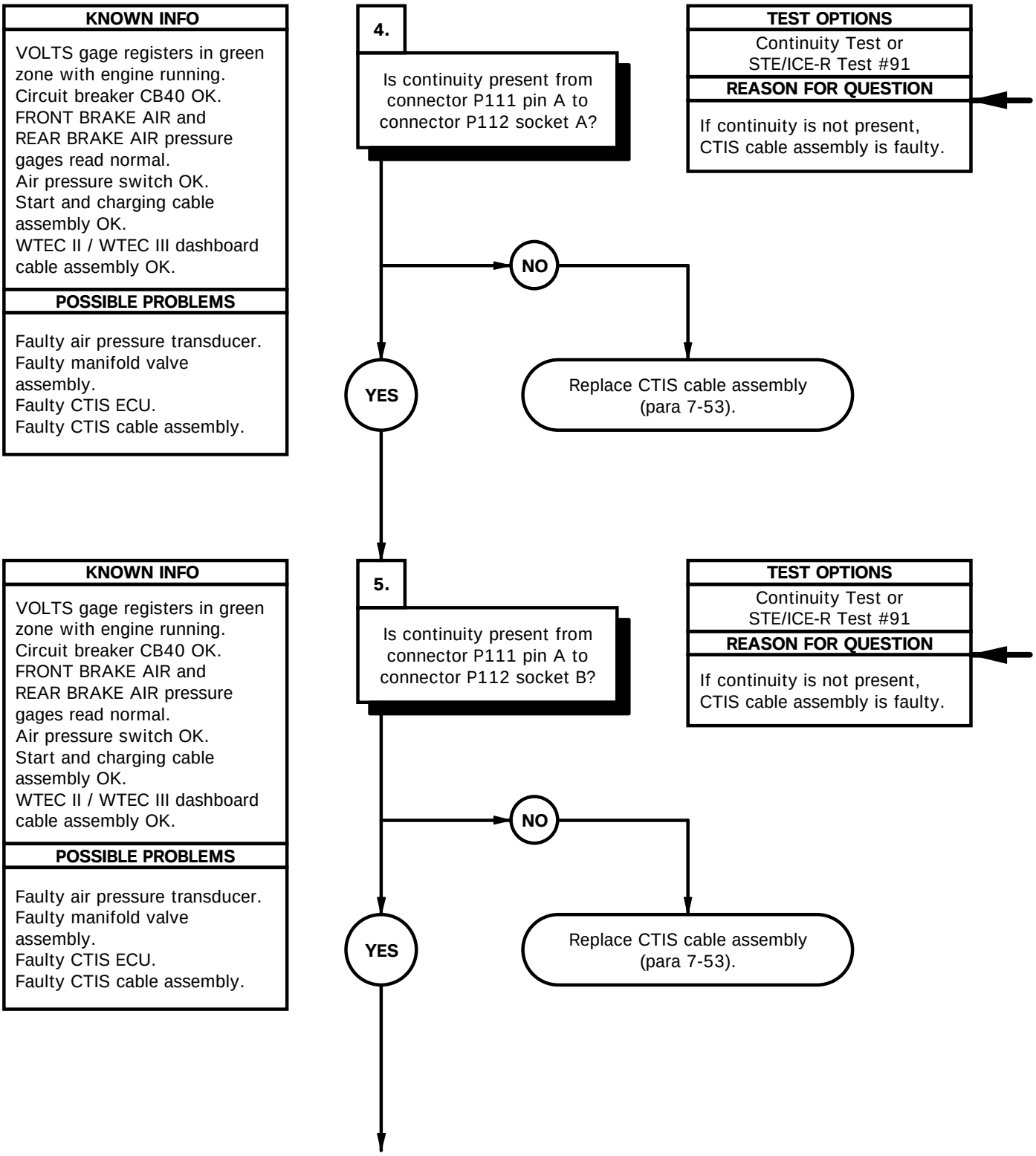
| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to connector P110 socket F.<br>(3) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.<br>(4) If continuity is not present, go to step 26 of this fault. |




P110

XBE82031

## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

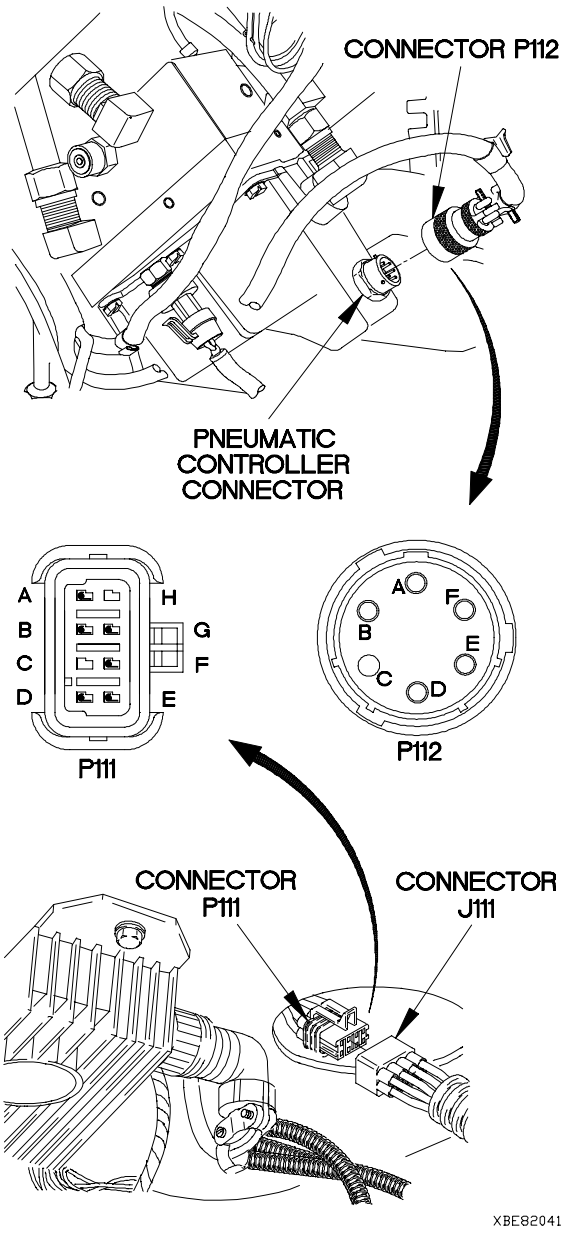


**CONTINUITY TEST**

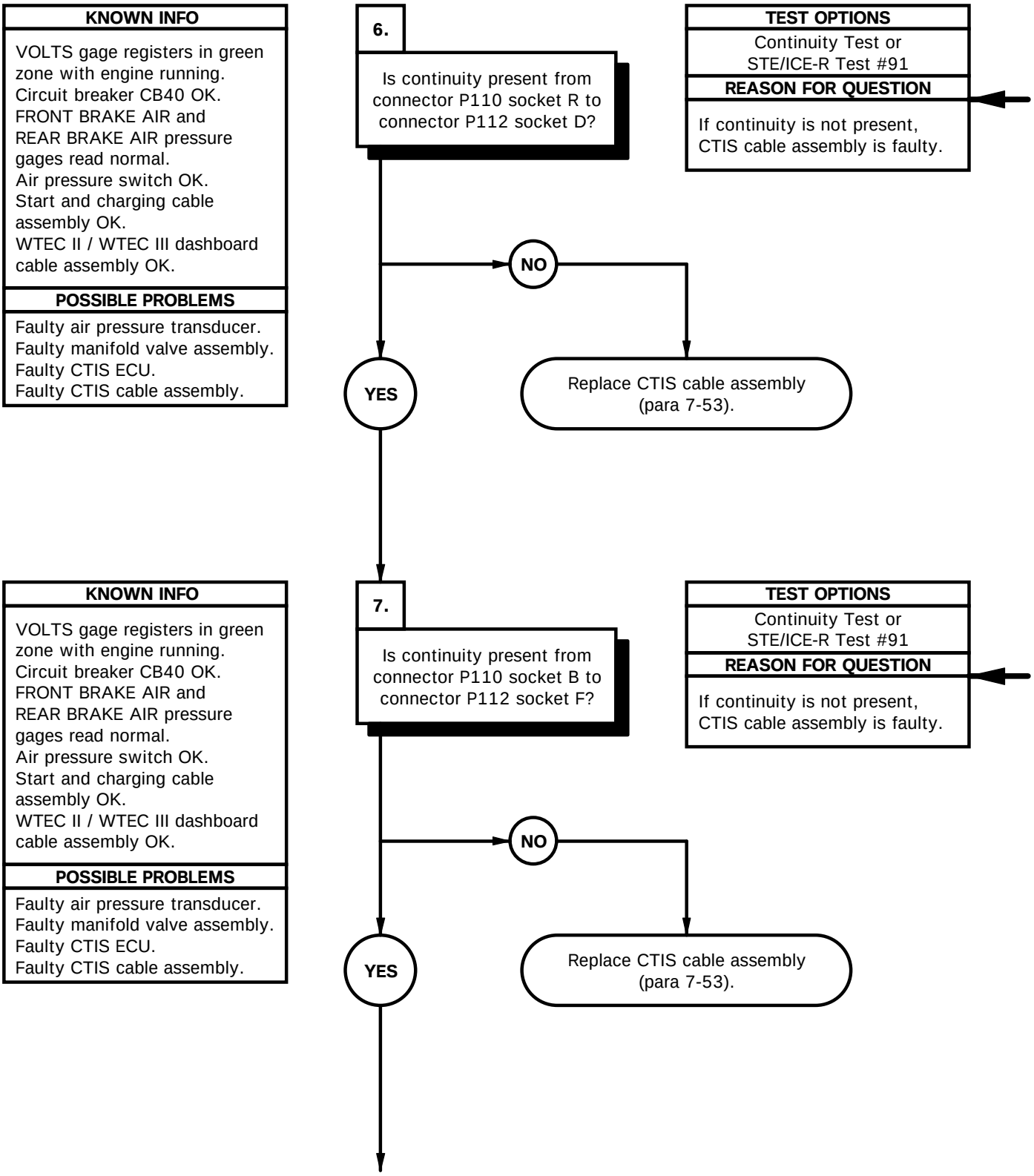
(1) Remove kick panel (para 16-3).
(2) Disconnect connector P112 from pneumatic controller connector.
(3) Disconnect connector J111 from connector P111.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector P111 pin A.
(6) Connect negative (-) probe of multimeter to connector P112 socket A and note reading on multimeter.
(7) If continuity is not present, replace CTIS cable assembly (para 7-53).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P111 pin A.
(3) Connect negative (-) probe of multimeter to connector P112 socket B and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).
(5) Connect connector J111 from connector P111.

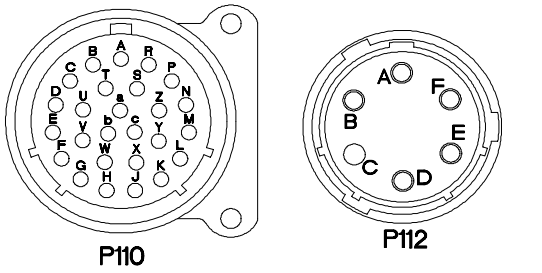


## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110 socket R.
(3) Connect negative (-) probe of multimeter to connector P112 socket D and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).

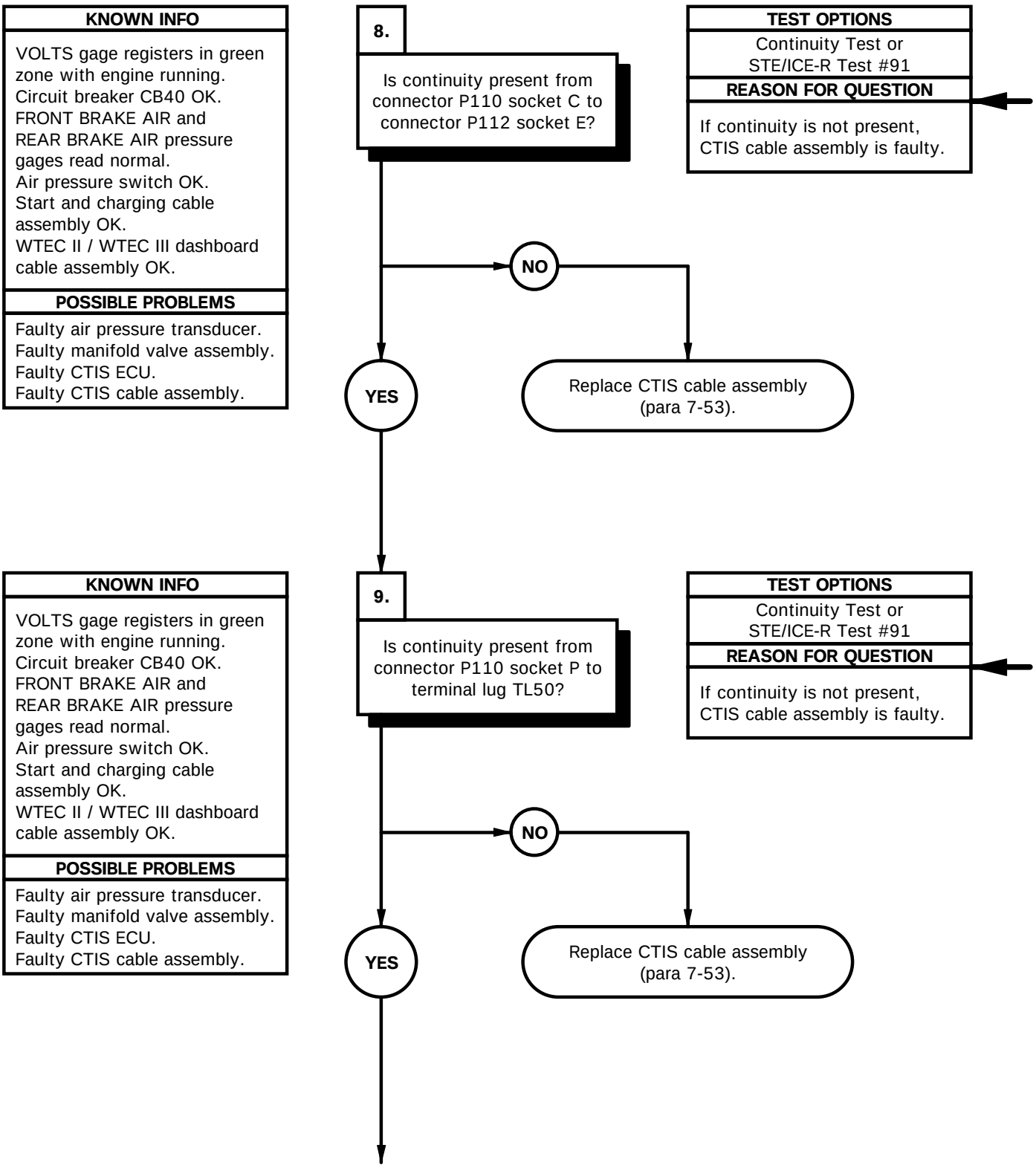



XBE82051

**CONTINUITY TEST**

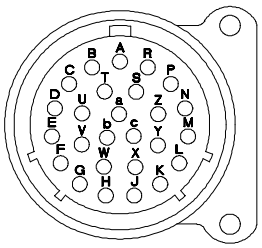
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110 socket B.
(3) Connect negative (-) probe of multimeter to connector P112 socket F and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).

## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

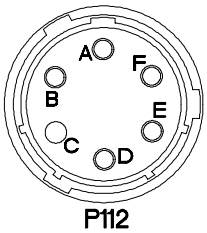


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110 socket C.
(3) Connect negative (-) probe of multimeter to connector P112 socket E and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).



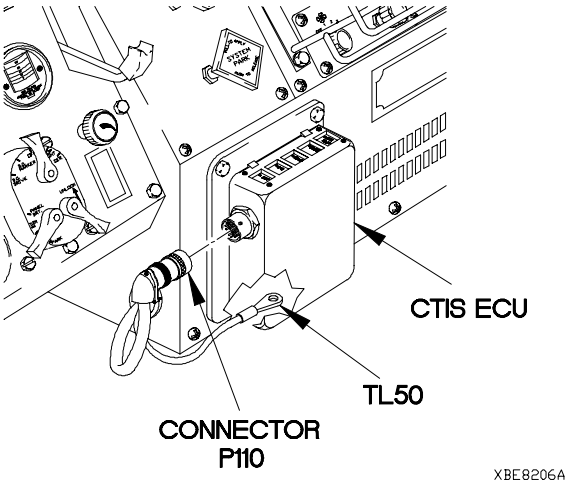
P110



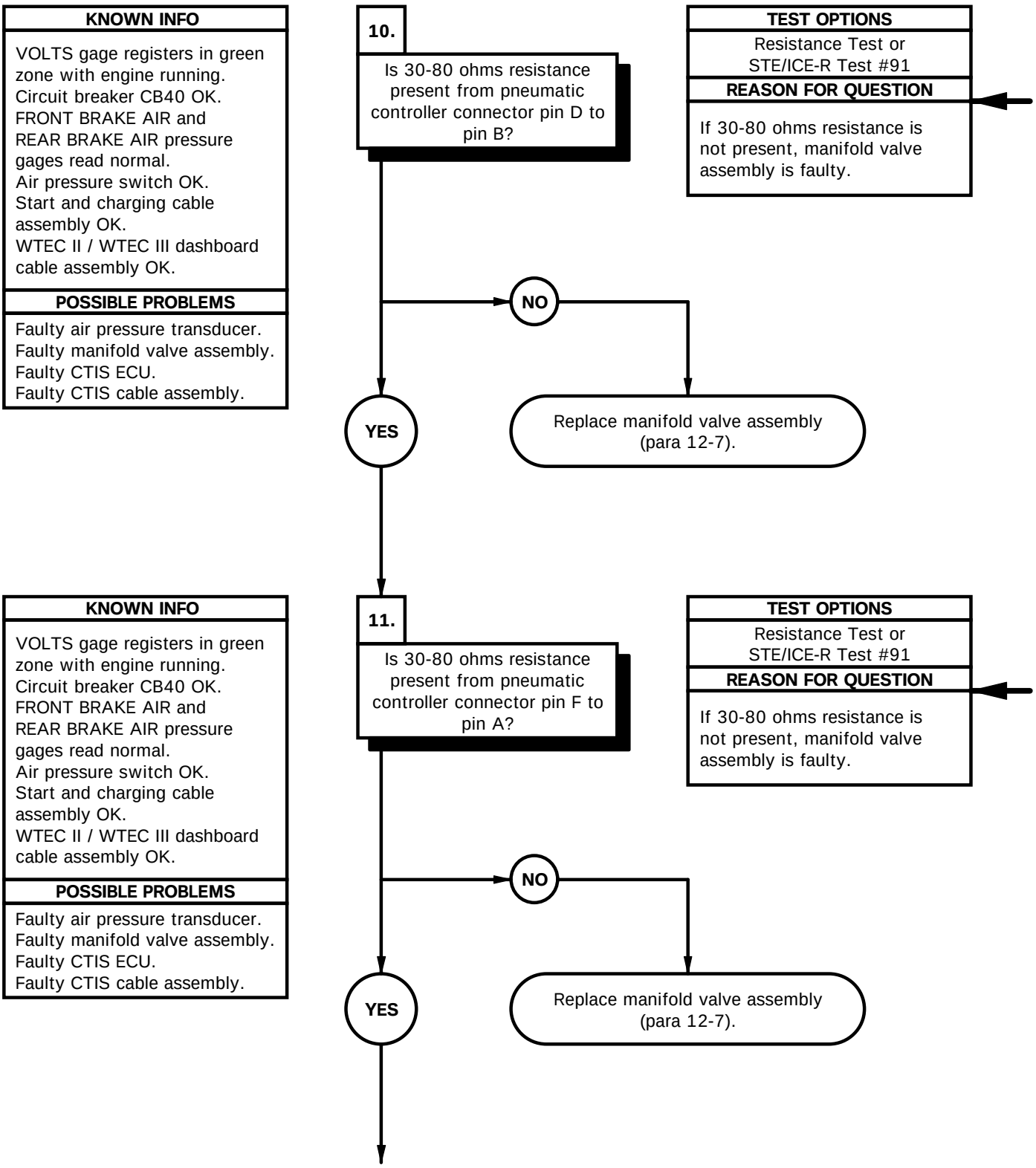
P112

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110 socket P.
(3) Connect negative (-) probe of multimeter to terminal lug TL50 and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).
(5) Connect connector P110 to CTIS ECU.

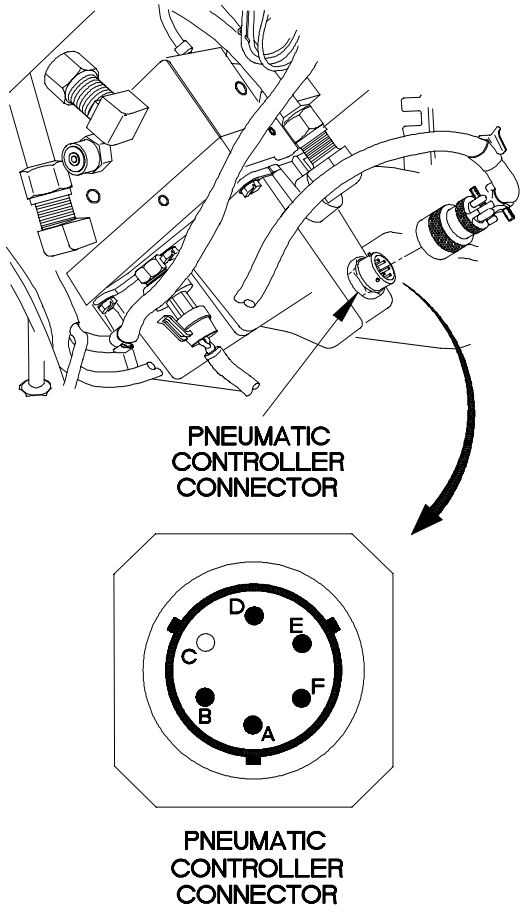


## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to pneumatic controller connector pin D.
(3) Connect negative (-) probe of multimeter to pneumatic controller connector pin B and note reading on multimeter.
(4) If 30-80 ohms resistance is not present, replace manifold valve assembly (para 12-7).




**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to pneumatic controller connector pin F.
(3) Connect negative (-) probe of multimeter to pneumatic controller connector pin A and note reading on multimeter.
(4) If 30-80 ohms resistance is not present, replace manifold valve assembly (para 12-7).

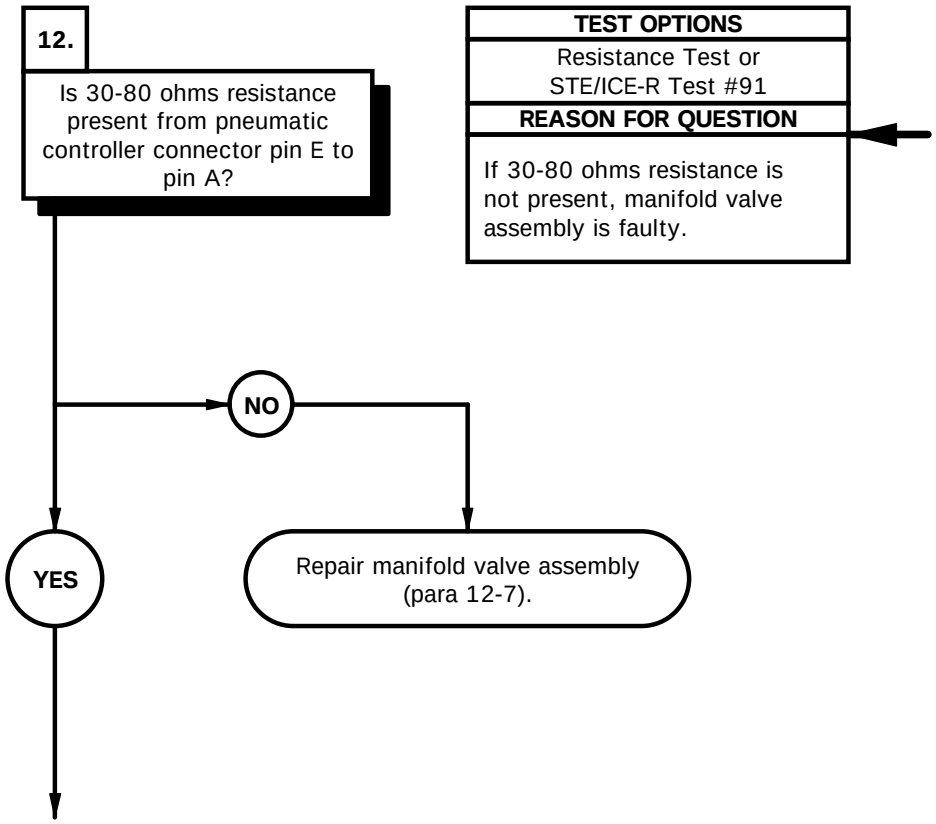
## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

**KNOWN INFO**

VOLTS gage registers in green zone with engine running.
Circuit breaker CB40 OK.
FRONT BRAKE AIR and REAR BRAKE AIR pressure gages read normal.
Air pressure switch OK.
Start and charging cable assembly OK.
WTEC II / WTEC III dashboard cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty air pressure transducer.
Faulty manifold valve assembly.
Faulty CTIS ECU.
Faulty CTIS cable assembly.




**TEST OPTIONS**

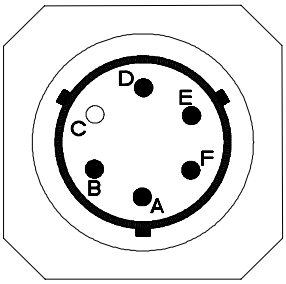
Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

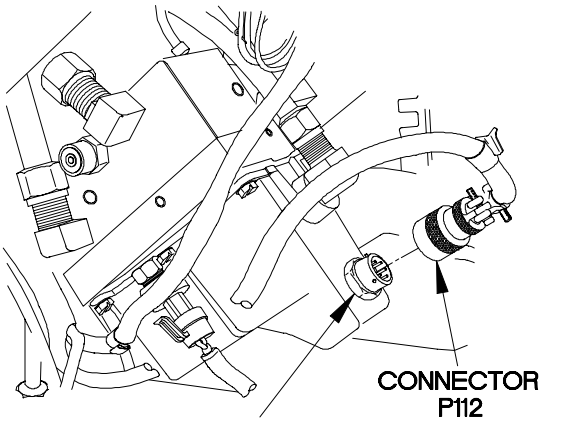
If 30-80 ohms resistance is not present, manifold valve assembly is faulty.

**RESISTANCE TEST**

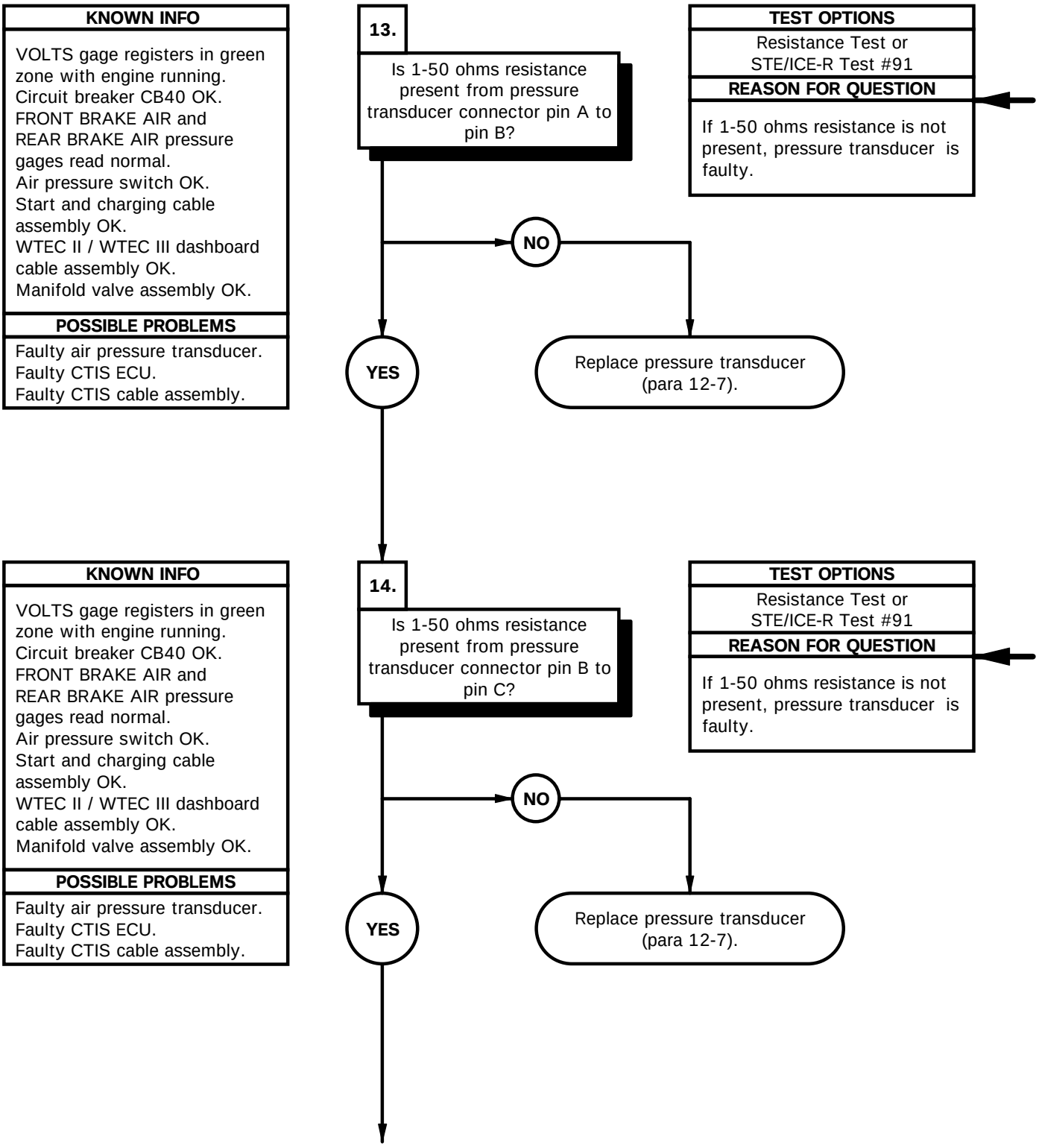
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to pneumatic controller connector pin E.
(3) Connect negative (-) probe of multimeter to pneumatic controller connector pin A and note reading on multimeter.
(4) If 30-80 ohms resistance is not present, repair manifold valve assembly (para 12-7).
(5) Connect connector P112 to pneumatic controller connector.




PNEUMATIC CONTROLLER CONNECTOR



## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

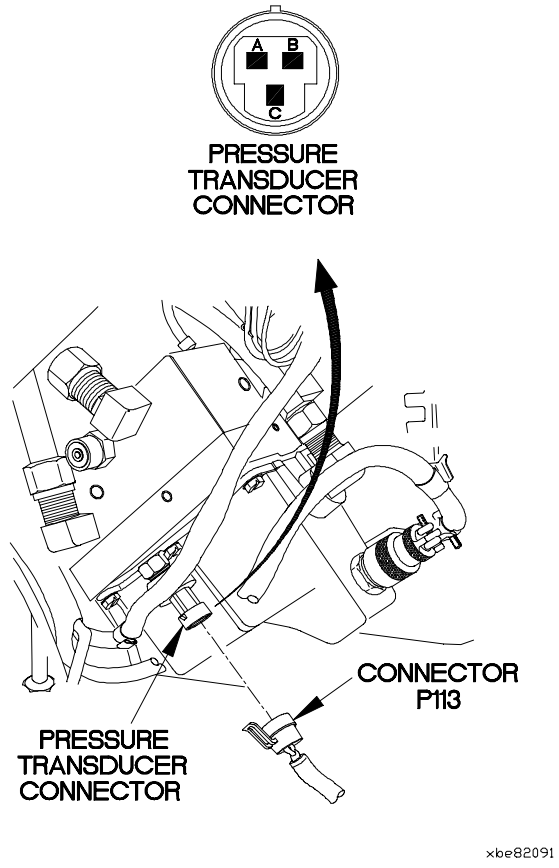


**RESISTANCE TEST**

(1) Disconnect connector P113 from pressure transducer connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to pressure transducer connector pin A.
(4) Connect negative (-) probe of multimeter to pressure transducer connector pin B and note reading on multimeter.
(5) If 1-50 ohms resistance is not present, replace pressure transducer (para 12-7).

**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to pressure transducer connector pin B.
(3) Connect negative (-) probe of multimeter to pressure transducer connector pin C and note reading on multimeter.
(4) If 1-50 ohms resistance is not present, replace pressure transducer (para 12-7).



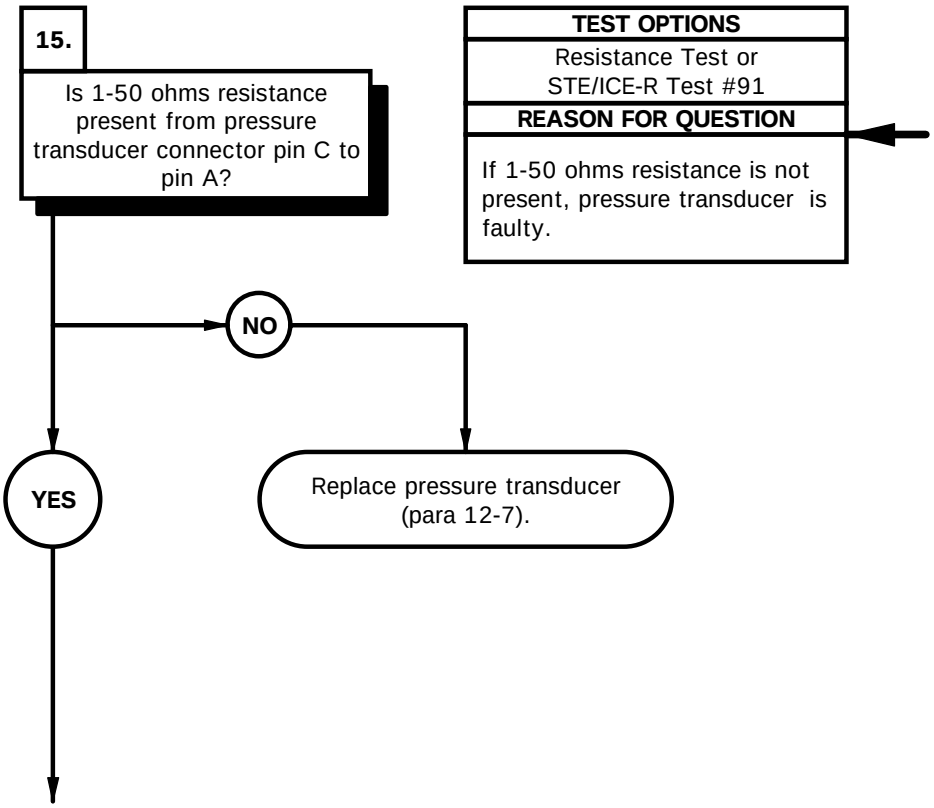
## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

**KNOWN INFO**

VOLTS gage registers in green zone with engine running.
Circuit breaker CB40 OK.
FRONT BRAKE AIR and REAR BRAKE AIR pressure gages read normal.
Air pressure switch OK.
Start and charging cable assembly OK.
WTEC II / WTEC III dashboard cable assembly OK.
Manifold valve assembly OK.

**POSSIBLE PROBLEMS**

Faulty air pressure transducer.
Faulty CTIS ECU.
Faulty CTIS cable assembly.




**TEST OPTIONS**

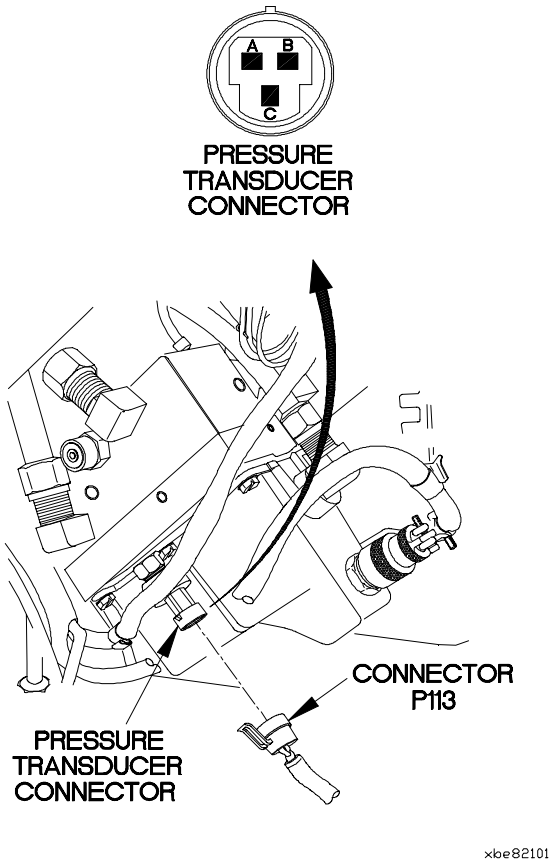
Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

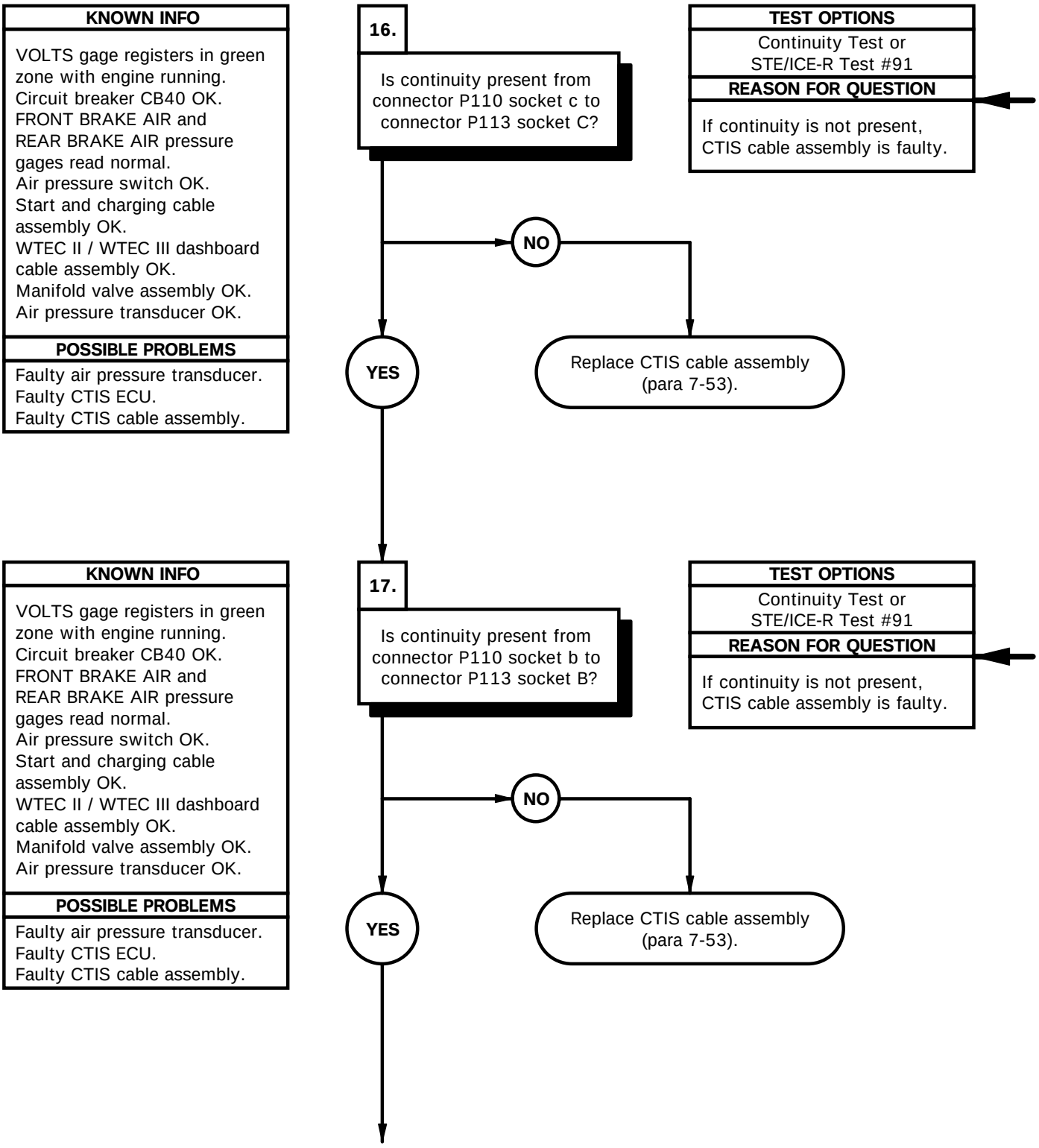
If 1-50 ohms resistance is not present, pressure transducer is faulty.

**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to pressure transducer connector pin C.
(3) Connect negative (-) probe of multimeter to pressure transducer connector pin A and note reading on multimeter.
(4) If 1-50 ohms resistance is not present, replace pressure transducer (para 12-7).

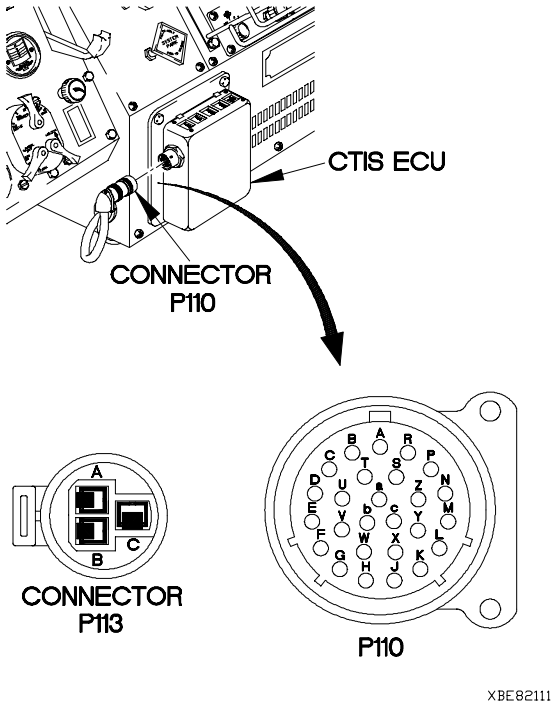


## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

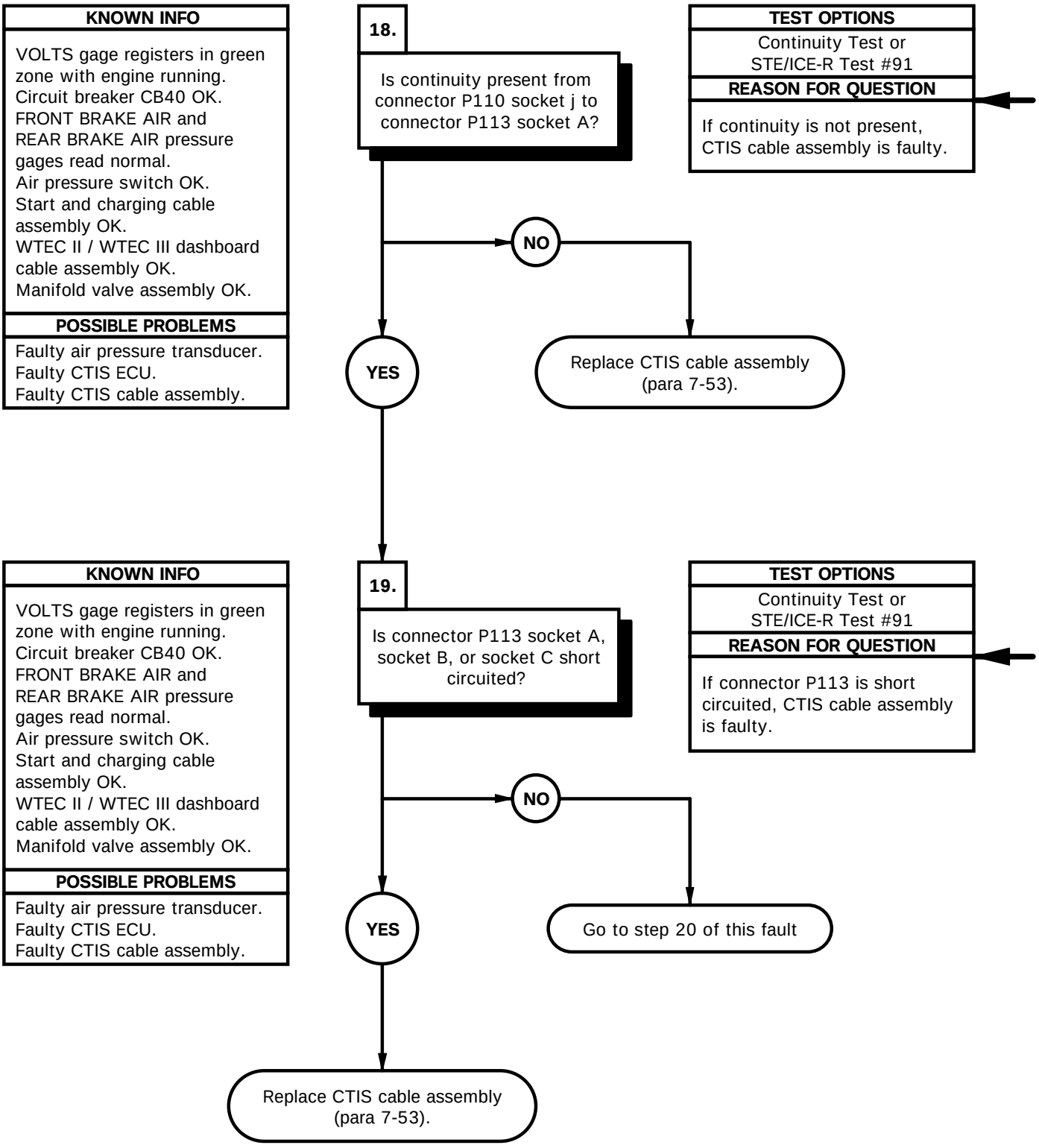
(1) Disconnect connector P110 from CTIS ECU.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P110 socket c.
(4) Connect negative (-) probe of multimeter to connector P113 socket C and note reading on multimeter.
(5) If continuity is not present, replace CTIS cable assembly (para 7-53).




**CONTINUITY TEST**

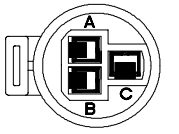
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110 socket b.
(3) Connect negative (-) probe of multimeter to connector P113 socket B and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).

## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

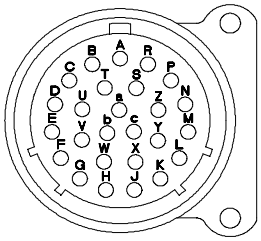


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110 socket j.
(3) Connect negative (-) probe of multimeter to connector P113 socket A and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).



CONNECTOR P113



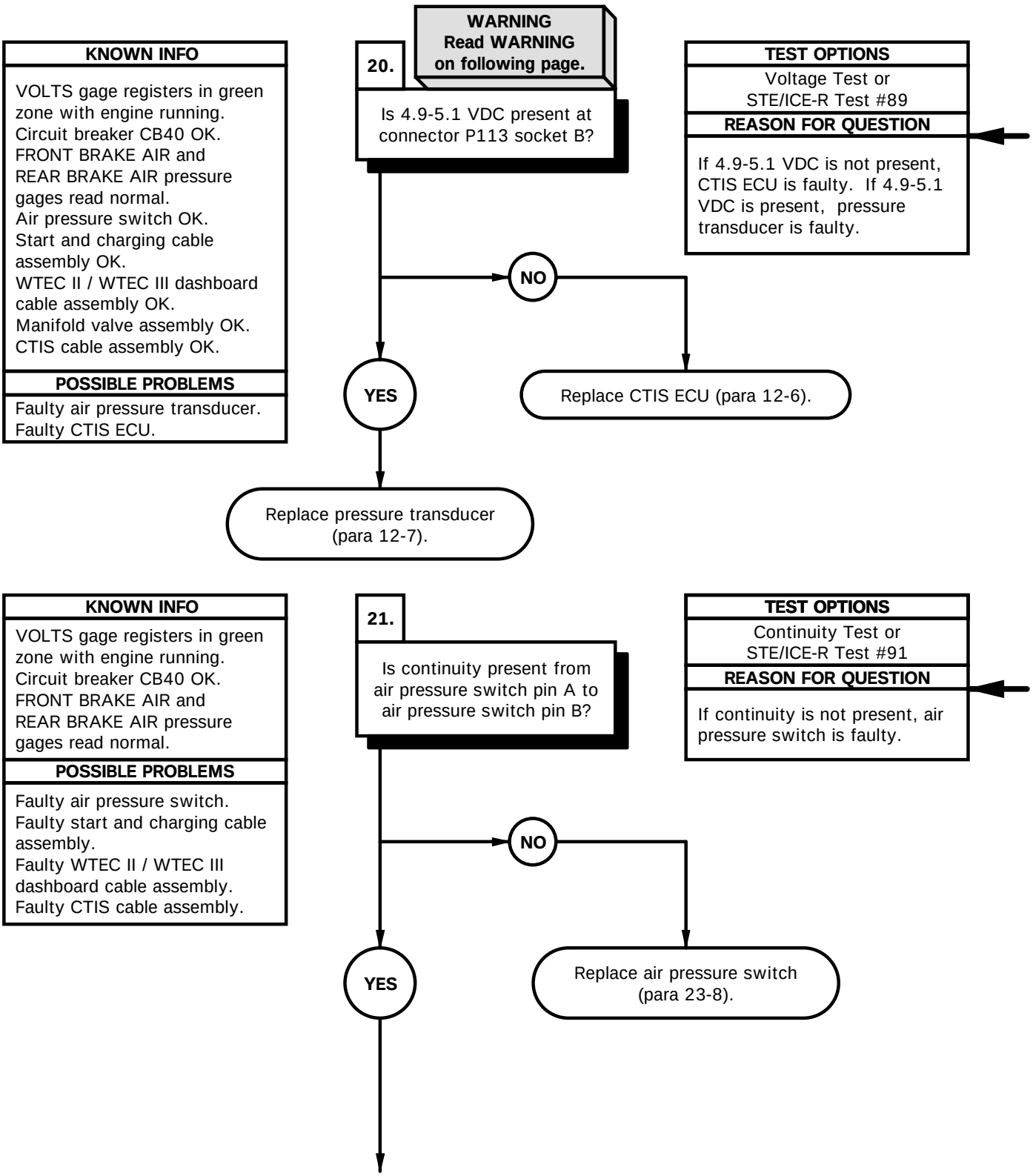
P110

XBE82121

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P113 socket A.
(3) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(4) Connect negative (-) probe of multimeter to all other sockets on connector P113 and note reading on multimeter.
(5) Connect positive (+) probe of multimeter to connector P113 socket B.
(6) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(7) Connect negative (-) probe of multimeter to all other sockets on connector P113 and note reading on multimeter.
(8) Connect positive (+) probe of multimeter to connector P113 socket C.
(9) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(10) Connect negative (-) probe of multimeter to all other sockets on connector P113 and note reading on multimeter
(11) If continuity not present is steps 3, 4, 6, 7, 9, and 10, go to step 20 of this fault.
(12) If continuity present is steps 3, 4, 6, 7, 9, or 10, replace CTIS cable assembly (para 7-53).

## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Connect connector P110 from CTIS ECU.
(2) Position master power switch to on (TM 9-2320-365-10).
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector P113 socket B.
(5) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(6) Position master power switch to off (TM 9-2320-365-10).
(7) If 4.9-5.1 VDC is not present, replace CTIS ECU (para 12-6).
(8) If 4.9-5.1 VDC is present, replace air pressure transducer (para 12-7).

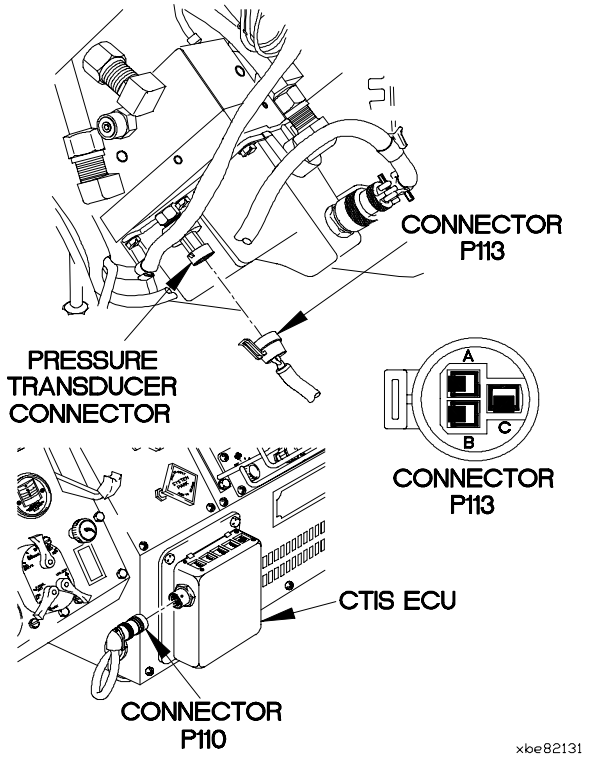
**NOTE**

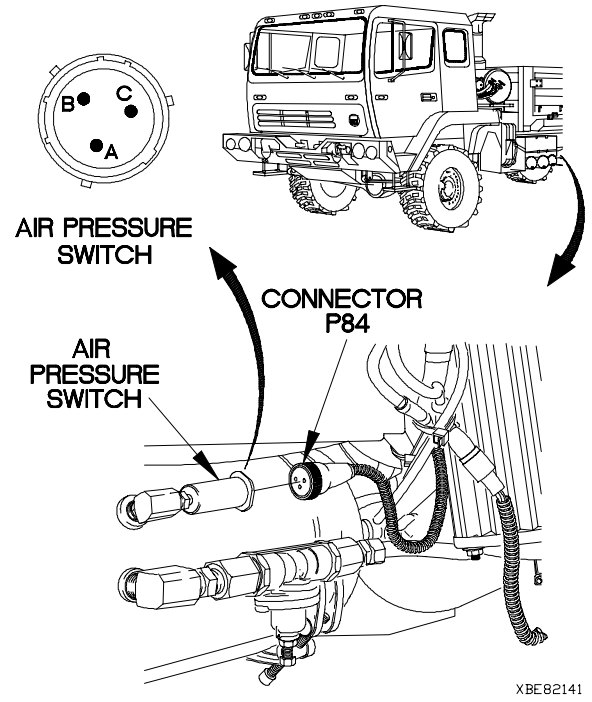
Perform steps (9) and (10) if 4.9-5.1 VDC is not present.

(9) Connect connector P113 to air pressure transducer connector.
(10) Install kick panel (para 16-3).

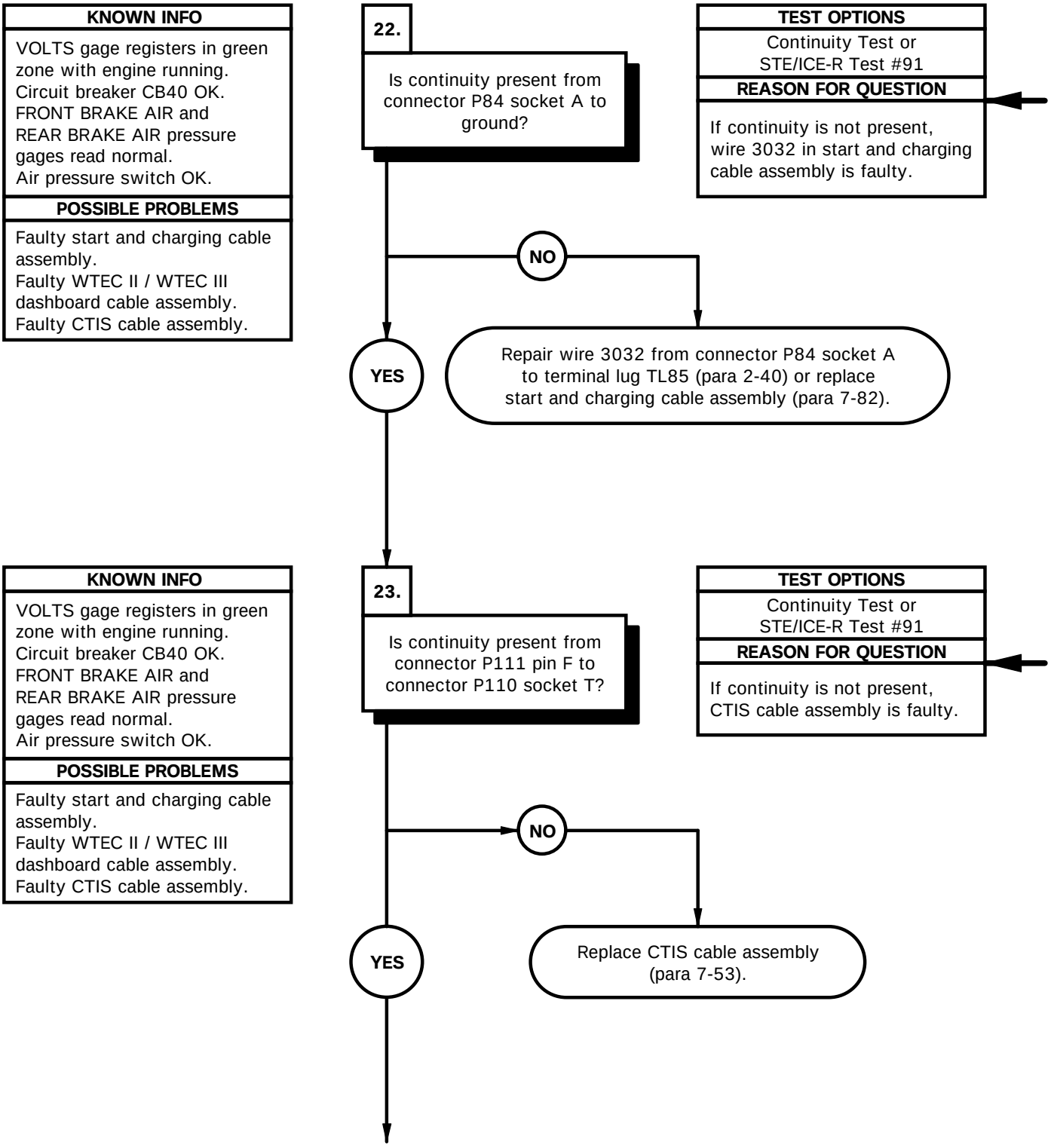
**CONTINUITY TEST**

(1) Connect connector P110 to CTIS ECU.
(2) Disconnect connector P84 from air pressure switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to air pressure switch pin A.
(5) Connect negative (-) probe of multimeter to air pressure switch pin B and note reading on multimeter.
(6) If continuity is not present, replace air pressure switch (para 23-8).



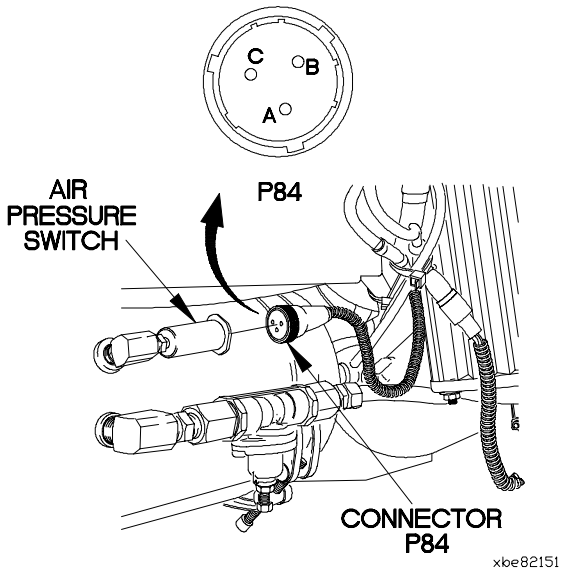



## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



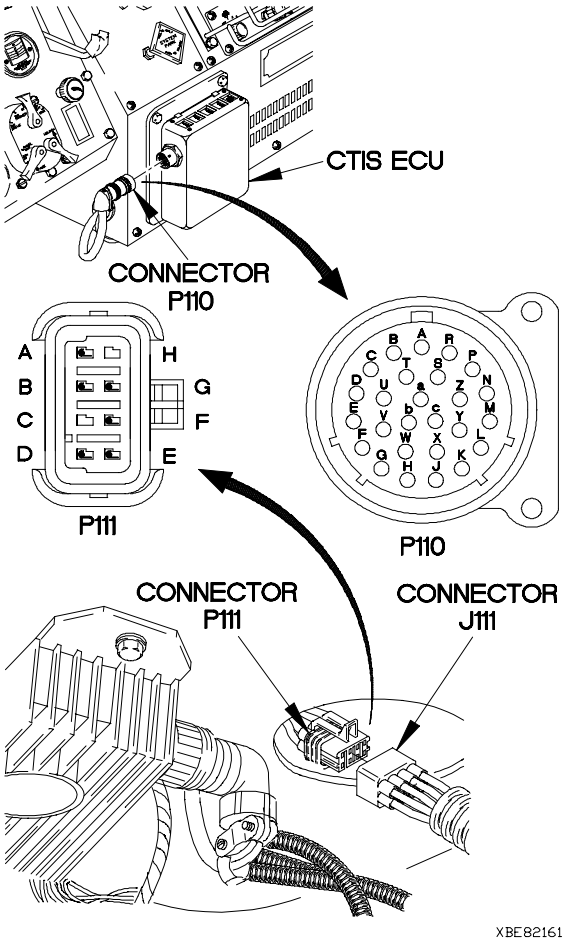
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P84 socket A.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3032 from connector P84 socket A to terminal lug TL85 (para 2-40) or replace start and charging cable assembly (para 7-82).
(5) Connect connector P84 to air pressure switch.

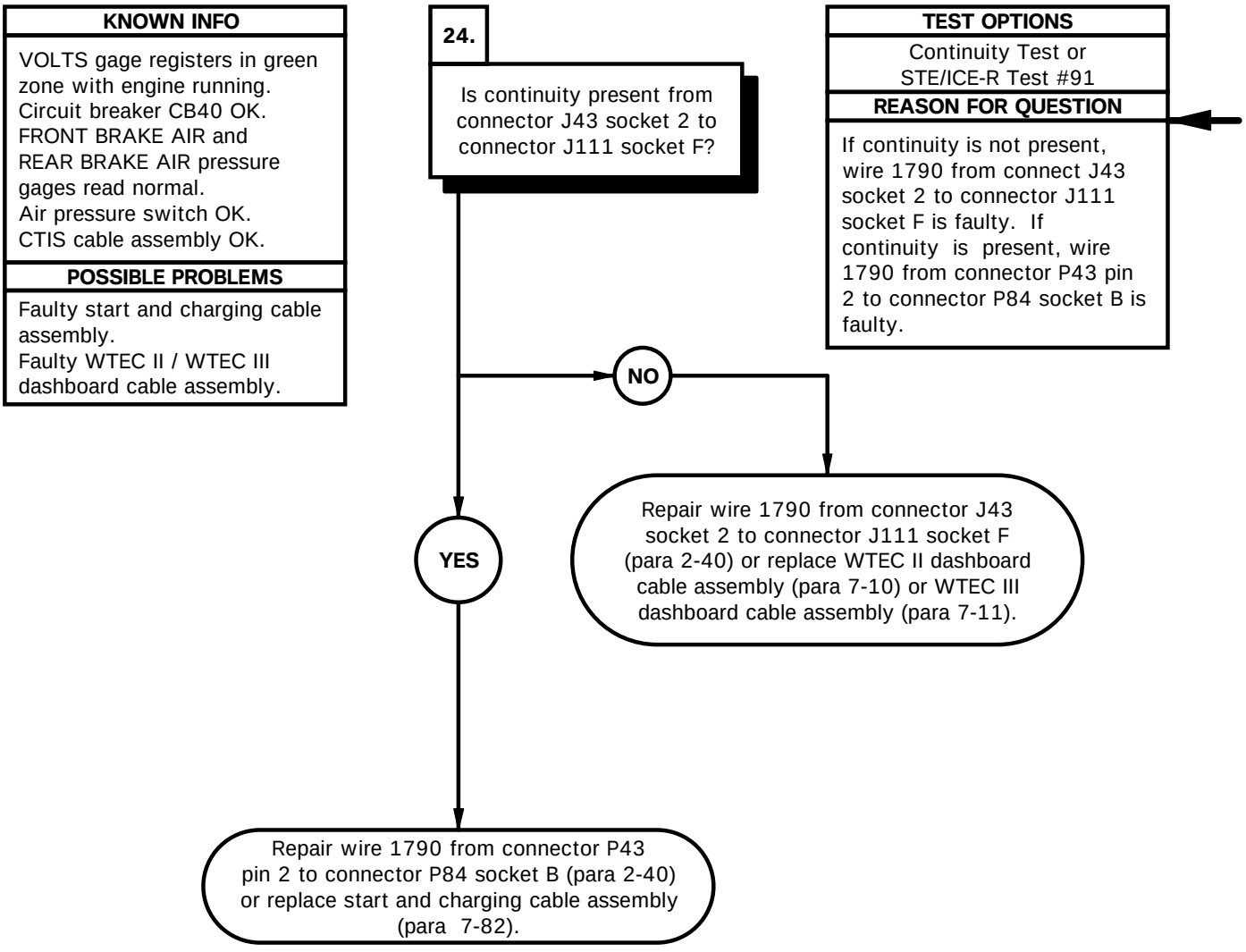



**CONTINUITY TEST**

(1) Disconnect connector P110 from CTIS ECU.
(2) Remove kick panel (para 16-3).
(3) Disconnect connector P111 from connector J111.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector P111 pin F.
(6) Connect negative (-) probe of multimeter to connector P110 socket T and note reading on multimeter.
(7) If continuity is not present, replace CTIS cable assembly (para 7-53).

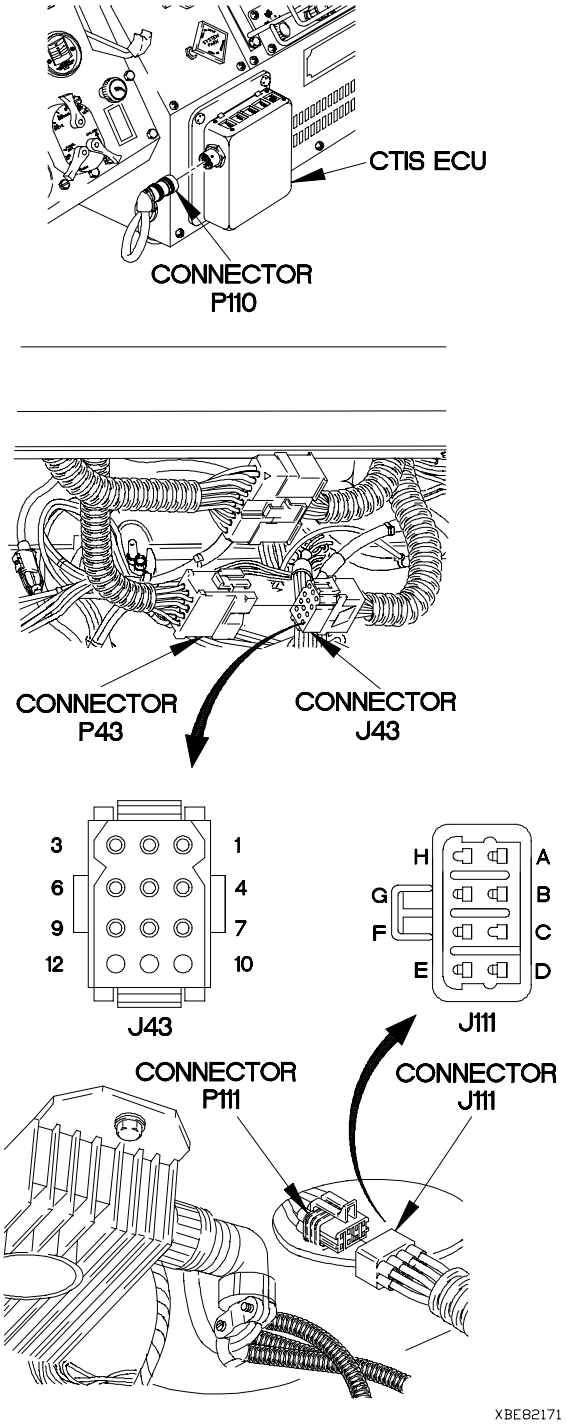


## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

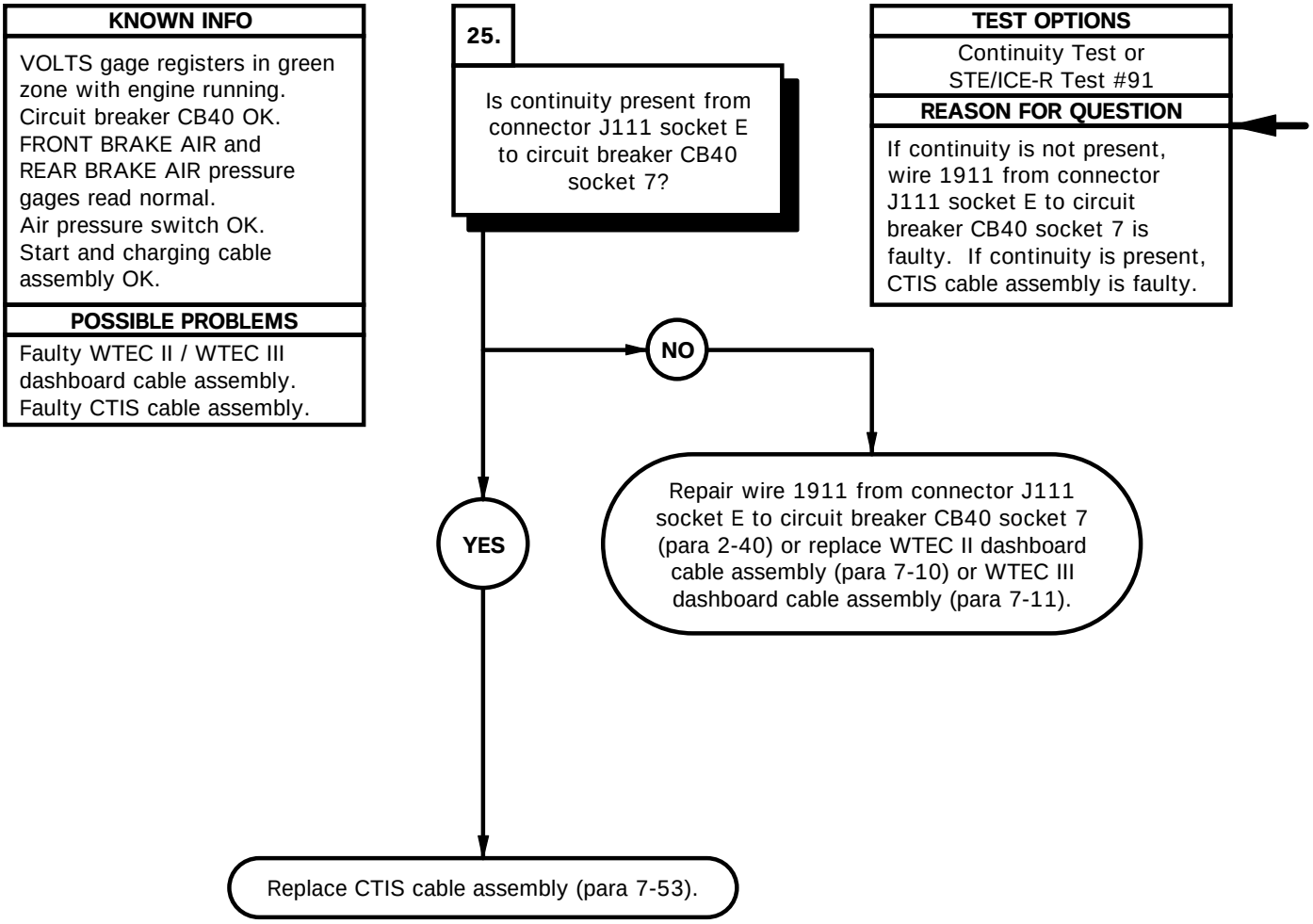


**CONTINUITY TEST**

(1) Connect connector P110 to CTIS ECU.
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector J43 from connector P43.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector J43 socket 2.
(6) Connect negative (-) probe of multimeter to connector J111 socket F and note reading on multimeter.
(7) If continuity is not present, repair wire 1790 from connector J43 socket 2 to connector J111 socket F (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 1790 from connector P43 pin 2 to connector P84 socket B (para 2-40) or replace start and charging cable assembly (para 7-82).
(9) Connect connector P43 to connector J43.
(10) Install instrument panel assembly (para 7-15).
(11) Connect connector J111 to connector P111.
(12) Install kick panel (para 16-3).

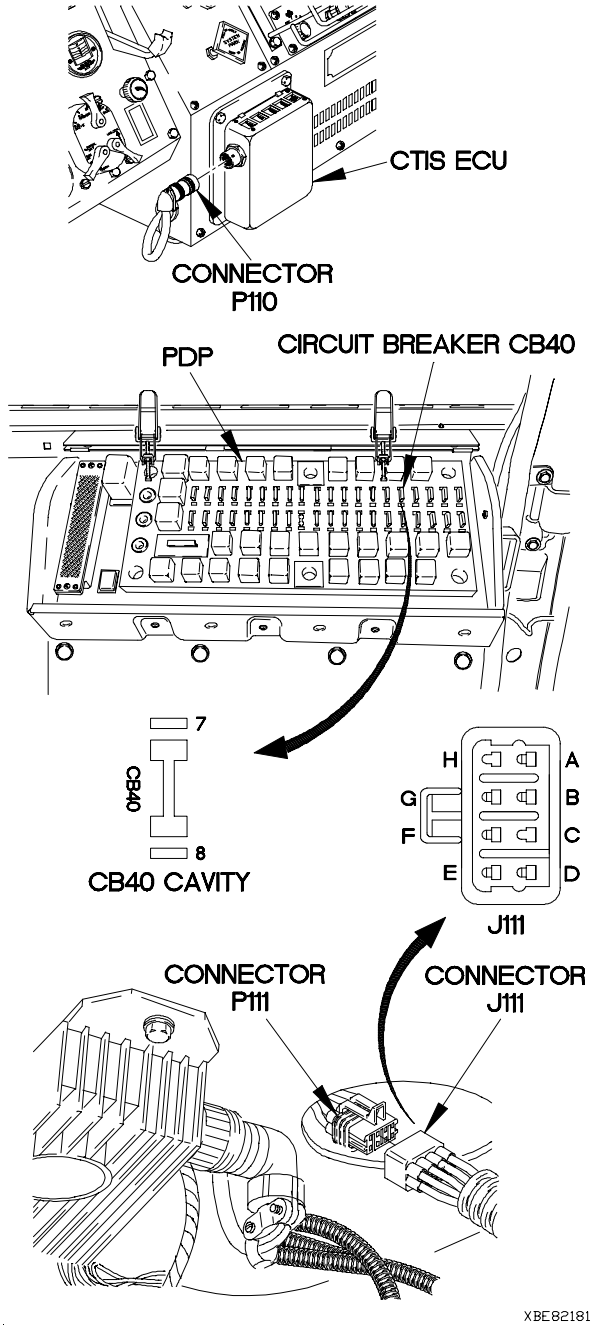


## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)

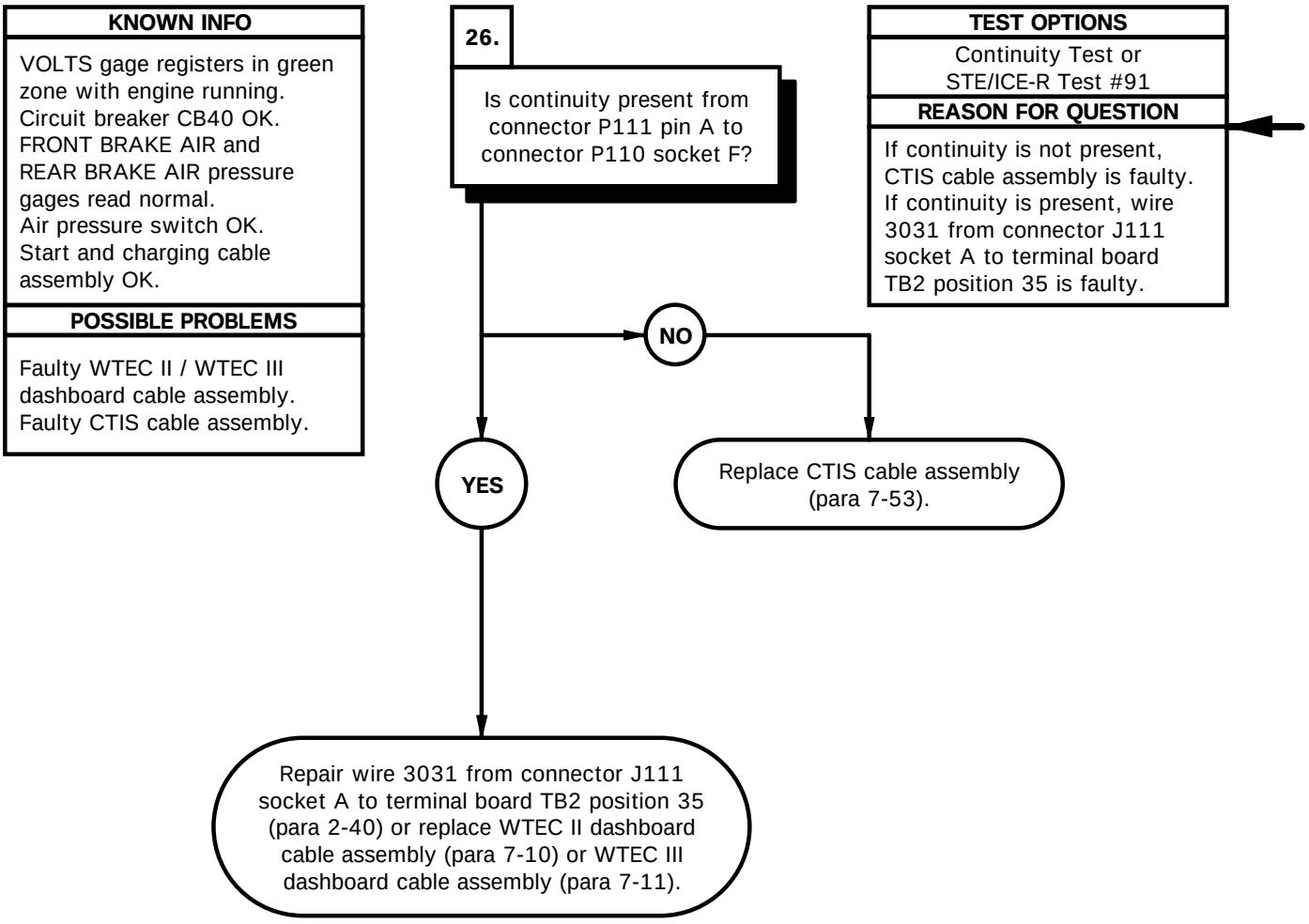


**CONTINUITY TEST**

(1) Connect connector P110 to CTIS ECU.
(2) Remove kick panel (para 16-3).
(3) Remove circuit breaker CB40 from PDP.
(4) Disconnect connector P111 from connector J111.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector J111 socket E.
(7) Connect negative (-) probe of multimeter to circuit breaker CB40 socket 7 and note reading on multimeter.
(8) If continuity is not present, repair wire 1911 from connector J111 socket E to circuit breaker CB40 socket 7 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If continuity is present, replace CTIS cable assembly (para 7-53).
(10) Install circuit breaker CB40 on PDP.
(11) Connect connector J111 to connector P111.
(12) Install kick panel (para 16-3).

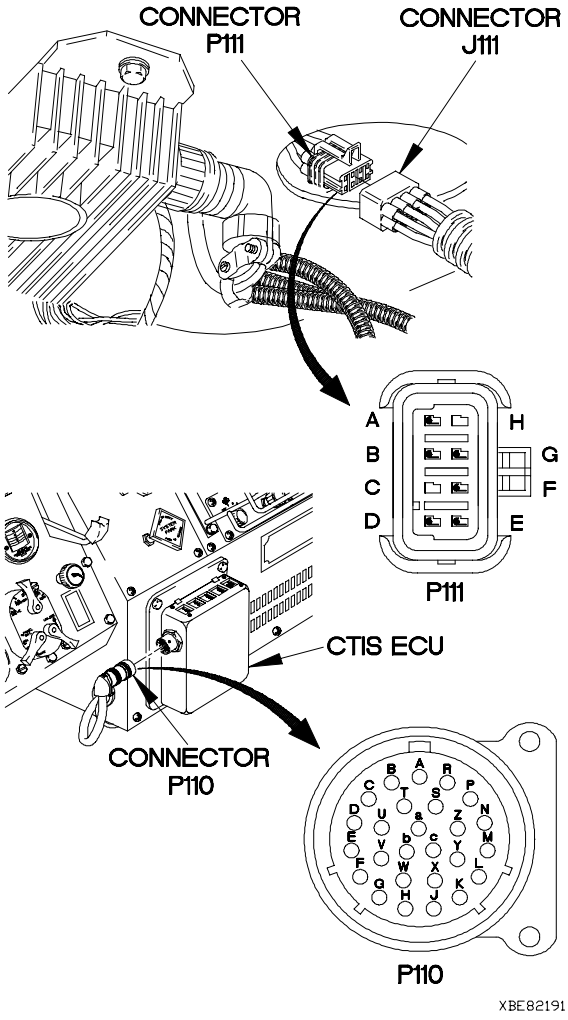


## e82. CENTRAL TIRE INFLATION SYSTEM (CTIS) DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector J111 from connector P111.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P110 socket F.
(5) Connect negative (-) probe of multimeter to connector P111 pin A and note reading on multimeter.
(6) If continuity is not present replace CTIS cable assembly (para 7-53).
(7) If continuity is present, repair wire 3031 from connector J111 socket A to terminal board TB2 position 35 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) Connect connector J111 to connector P111.
(9) Install kick panel (para 16-3).
(10) Connect connector P110 to CTIS ECU.



## e83. CTIS DOES NOT INFLATE TIRES

**INITIAL SETUP**

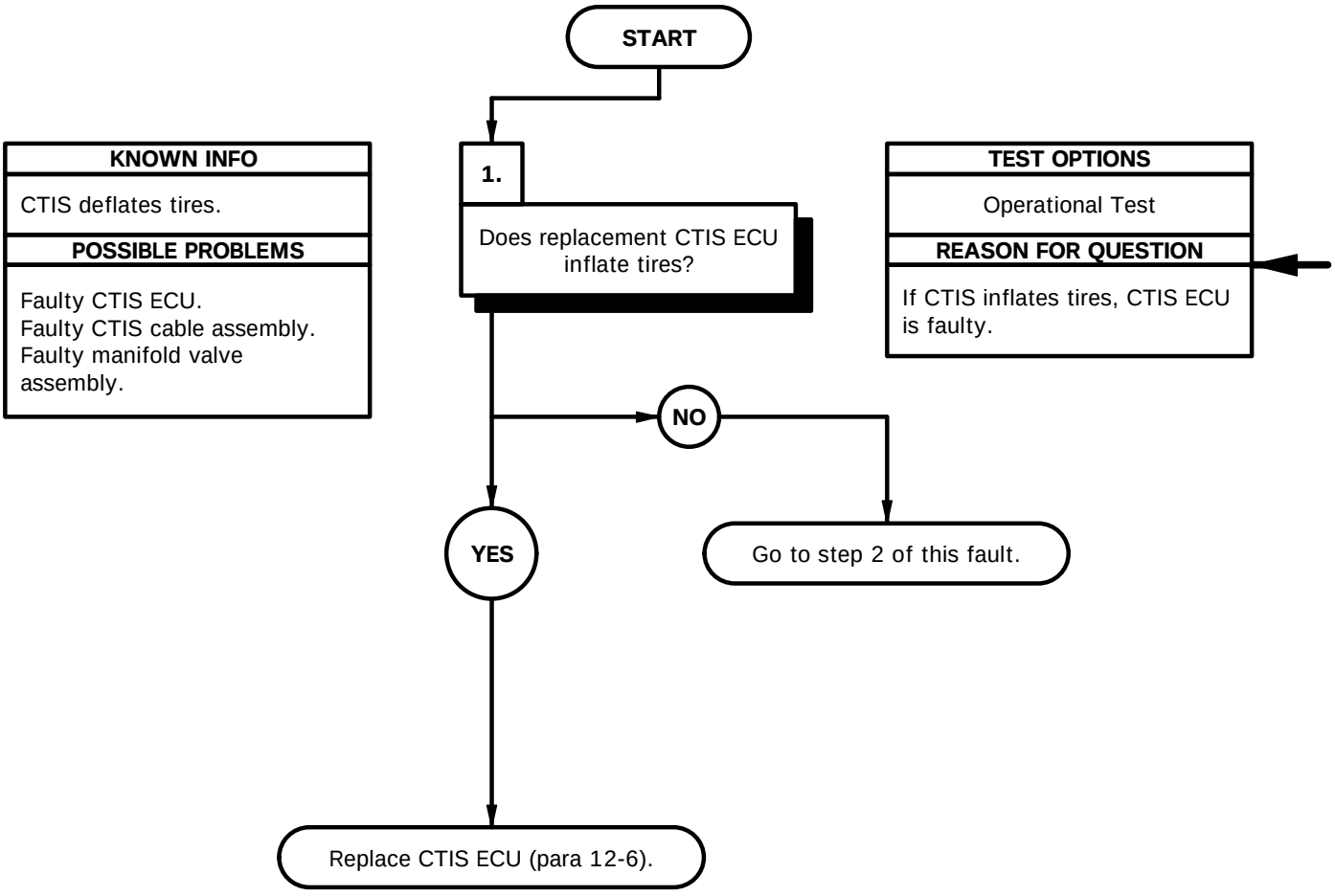
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

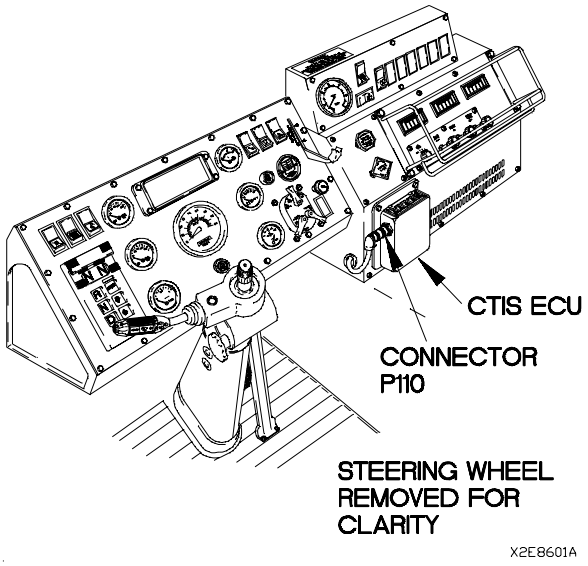
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

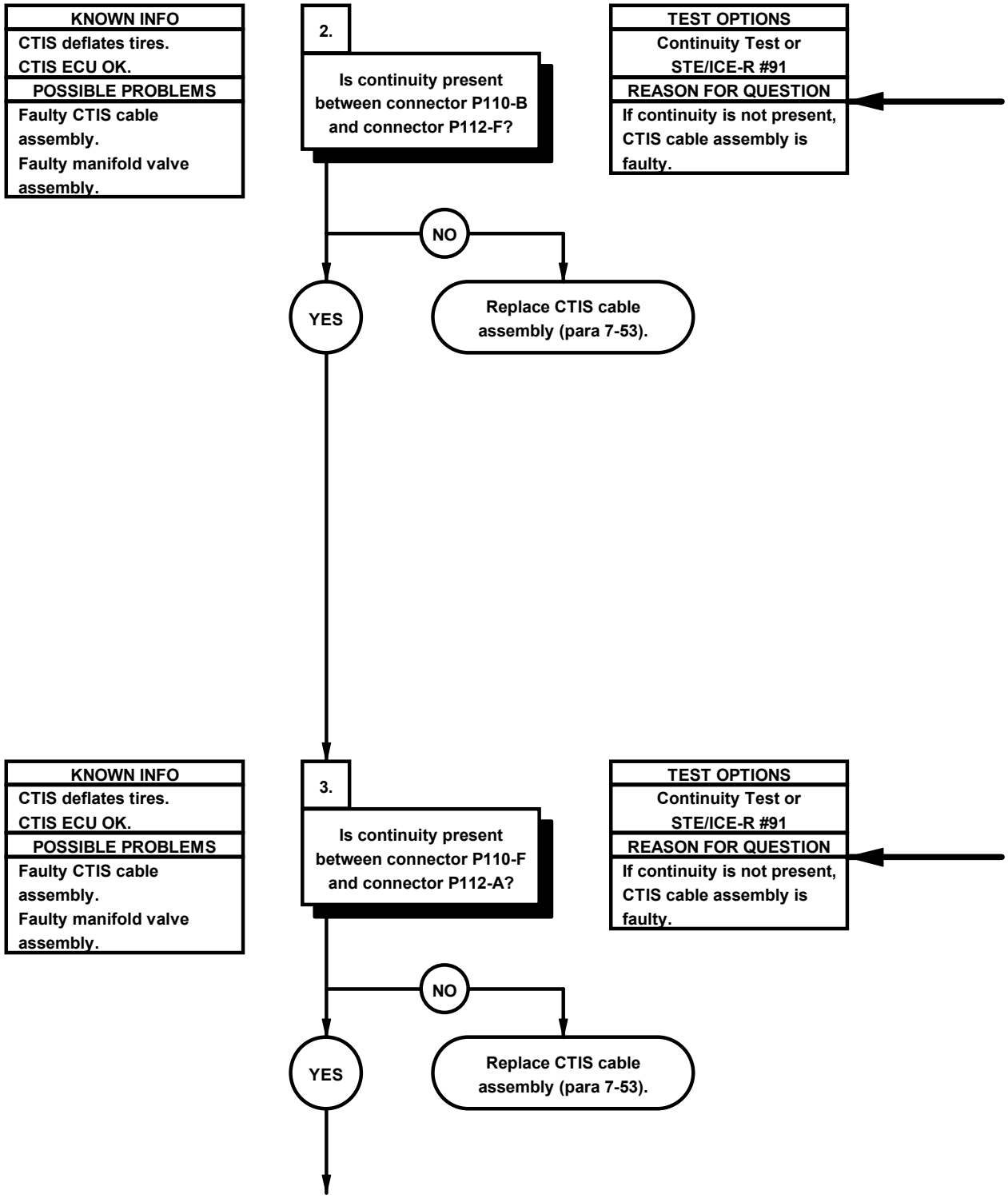


**OPERATIONAL TEST**

(1) Disconnect connector P110 from CTIS ECU.
(2) Connect connector P110 to a known-good CTIS ECU.
(3) Start vehicle (TM 9-2320-365-10).
(4) Allow air pressure to reach 85 psi.
(5) Deflate tires (TM 9-2320-365-10).
(6) If tires do not inflate, go to step 2 of this fault.
(7) If tires inflate, replace CTIS ECU (para 12-6).
(8) Shut down vehicle (TM 9-2320-365-10).
(9) Disconnect connector P110 from known-good CTIS ECU.

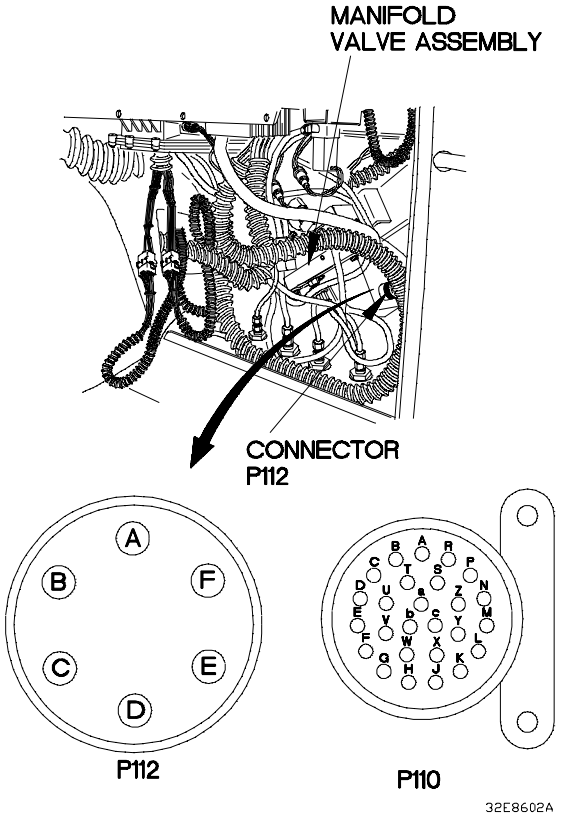


## e83. CTIS DOES NOT INFLATE TIRES (CONT)



**CONTINUITY TEST**

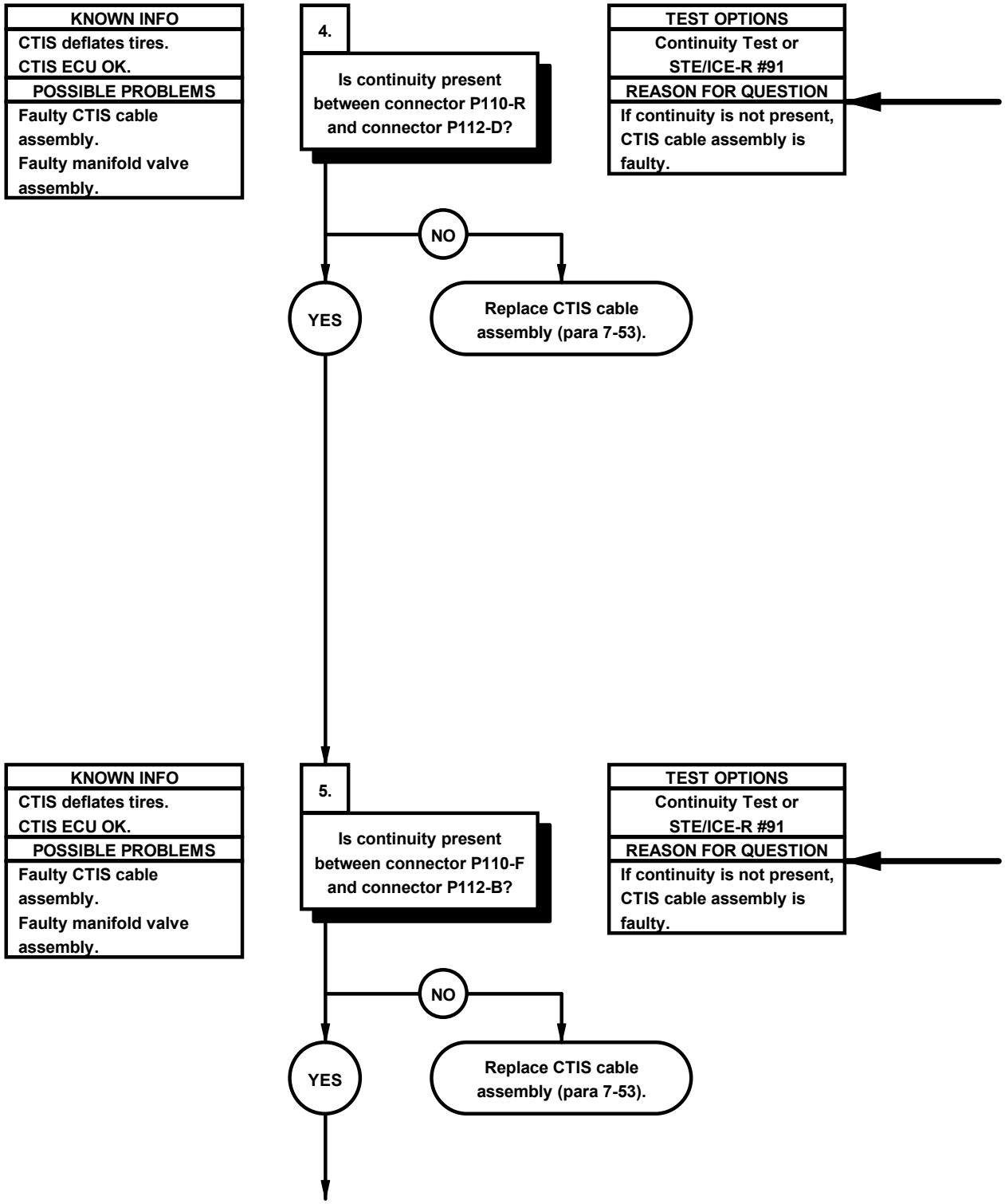
(1) Remove kick panel (para 16-3).
(2) Disconnect connector P112 from manifold valve assembly.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P110-B.
(5) Connect negative (-) probe of multimeter to connector P112-F and note reading on multimeter.
(6) If continuity is not present, replace CTIS cable assembly (para 7-53).



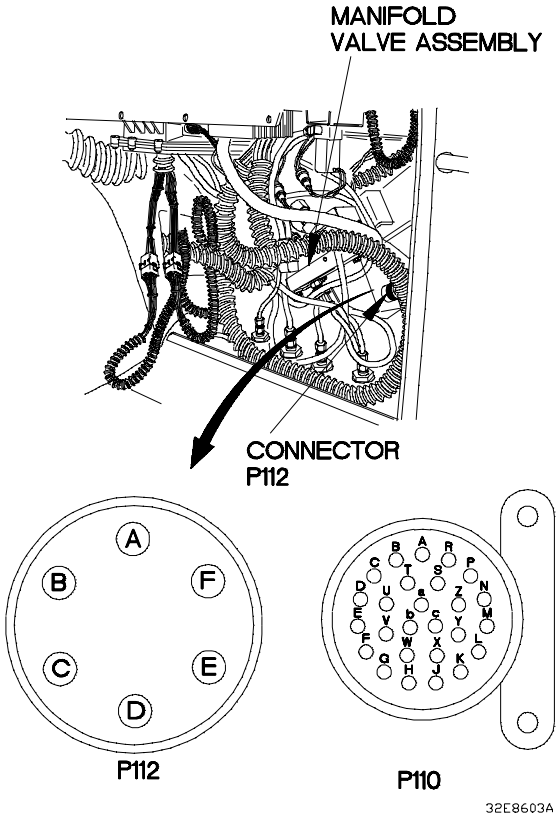

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110-F.
(3) Connect negative (-) probe of multimeter to connector P112-A and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).

## e83. CTIS DOES NOT INFLATE TIRES (CONT)

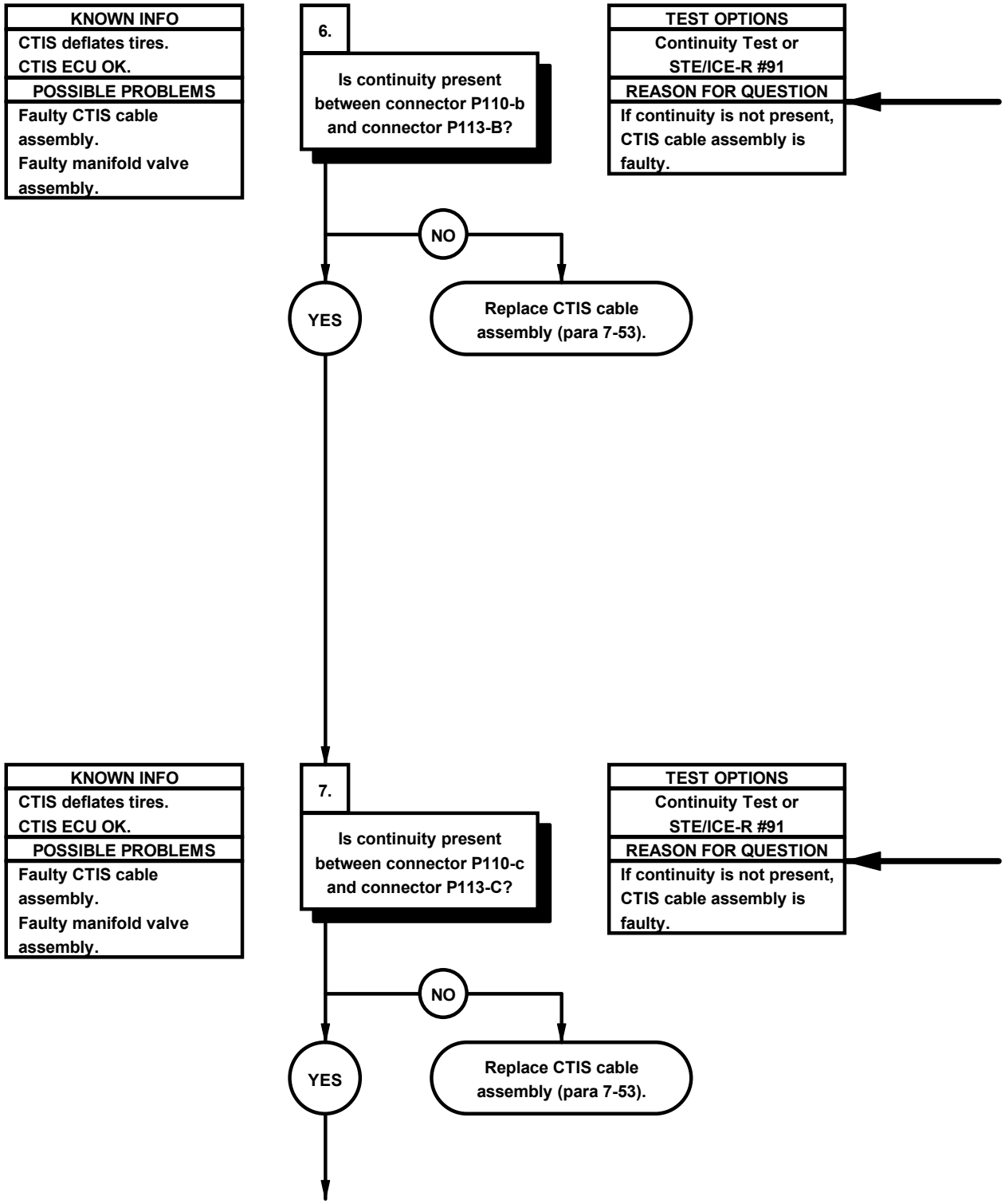


| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-R. |
| (3) Connect negative (-) probe of multimeter to connector P112-D and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |

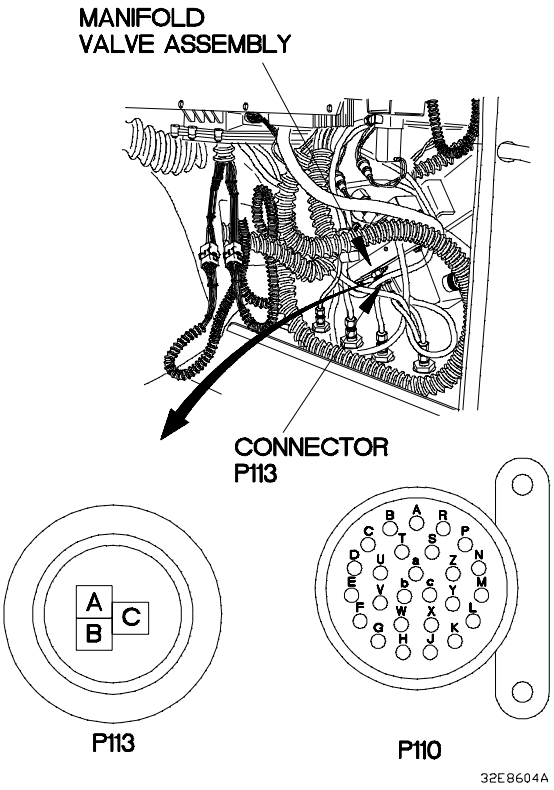



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-F. |
| (3) Connect negative (-) probe of multimeter to connector P112-B and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |
| (5) Connect connector P112 to manifold valve assembly. |

## e83. CTIS DOES NOT INFLATE TIRES (CONT)

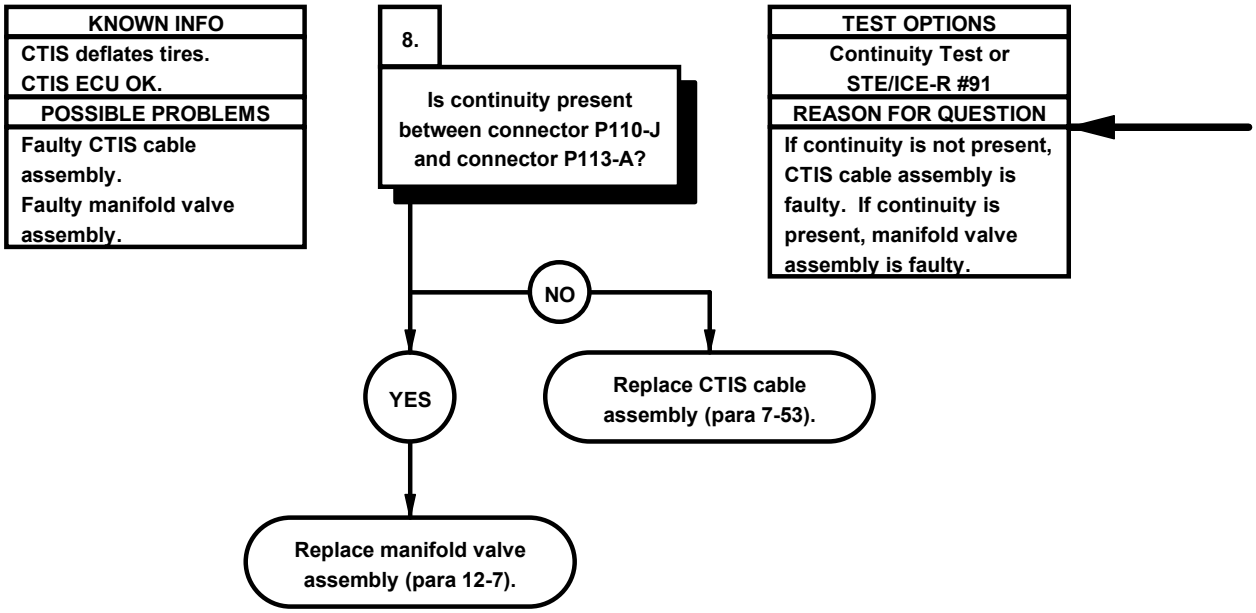


| CONTINUITY TEST |
| --- |
| (1) Disconnect connector P113 from manifold valve assembly. |
| (2) Set multimeter to ohms. |
| (3) Connect positive (+) probe of multimeter to connector P110-b. |
| (4) Connect negative (-) probe of multimeter to connector P113-B and note reading on multimeter. |
| (5) If continuity is not present, replace CTIS cable assembly (para 7-53). |

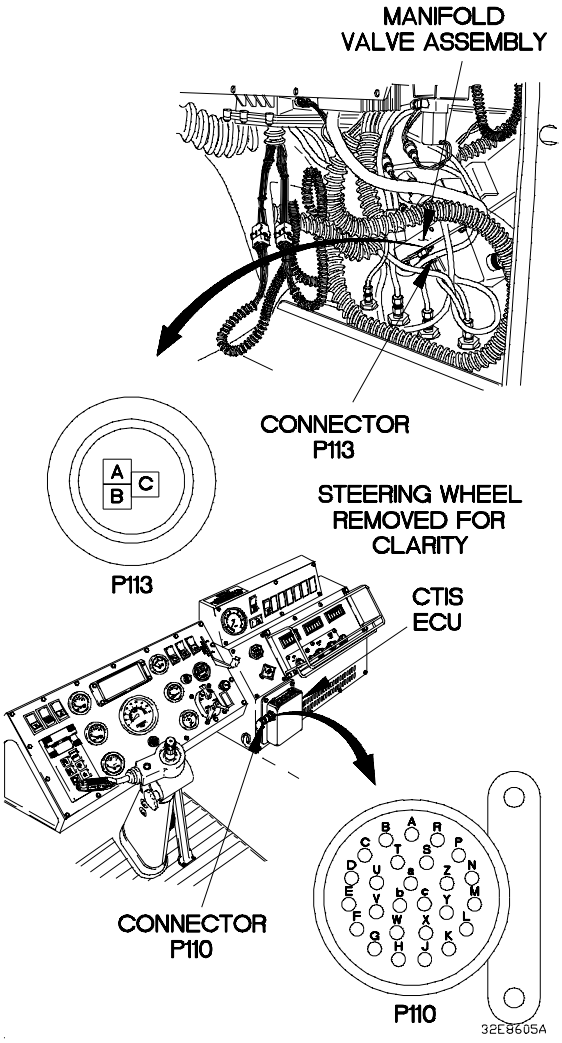



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-c. |
| (3) Connect negative (-) probe of multimeter to connector P113-C and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |

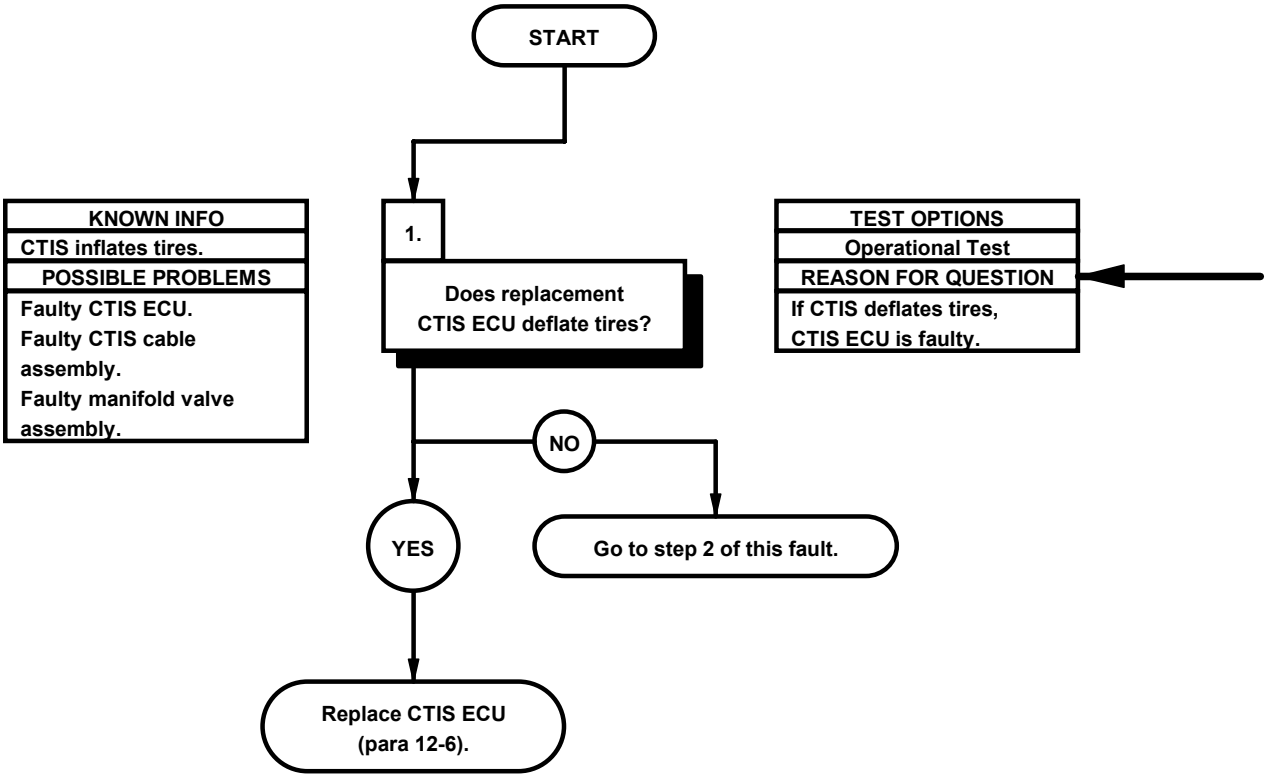
## e83. CTIS DOES NOT INFLATE TIRES (CONT)



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-J. |
| (3) Connect negative (-) probe of multimeter to connector P113-A and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |
| (5) If continuity is present, replace manifold valve assembly (para 12-7). |
| (6) Connect connector P113 to manifold valve assembly. |
| (7) Install kick panel (para 16-3). |
| (8) Connect connector P110 to CTIS ECU. |

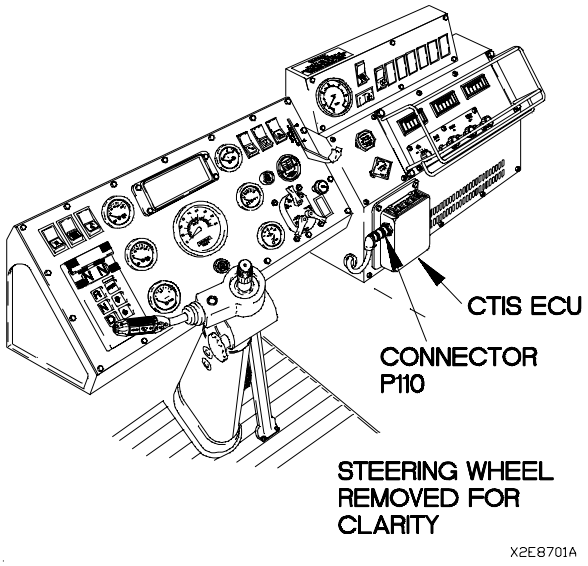


| e84. CTIS DOES NOT DEFLATE TIRES | |
|---|---|
| **INITIAL SETUP** | |
| **Equipment Condition**<br>Engine shut down (TM 9-2320-365-10). | **Tools and Special Tools**<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C) |
| **Personnel Required**<br>(2) | **Materials/Parts**<br>Wire, Elect, 50 ft (Item 77, Appendix D) |
| **References**<br>TM 9-4910-571-12&P | |

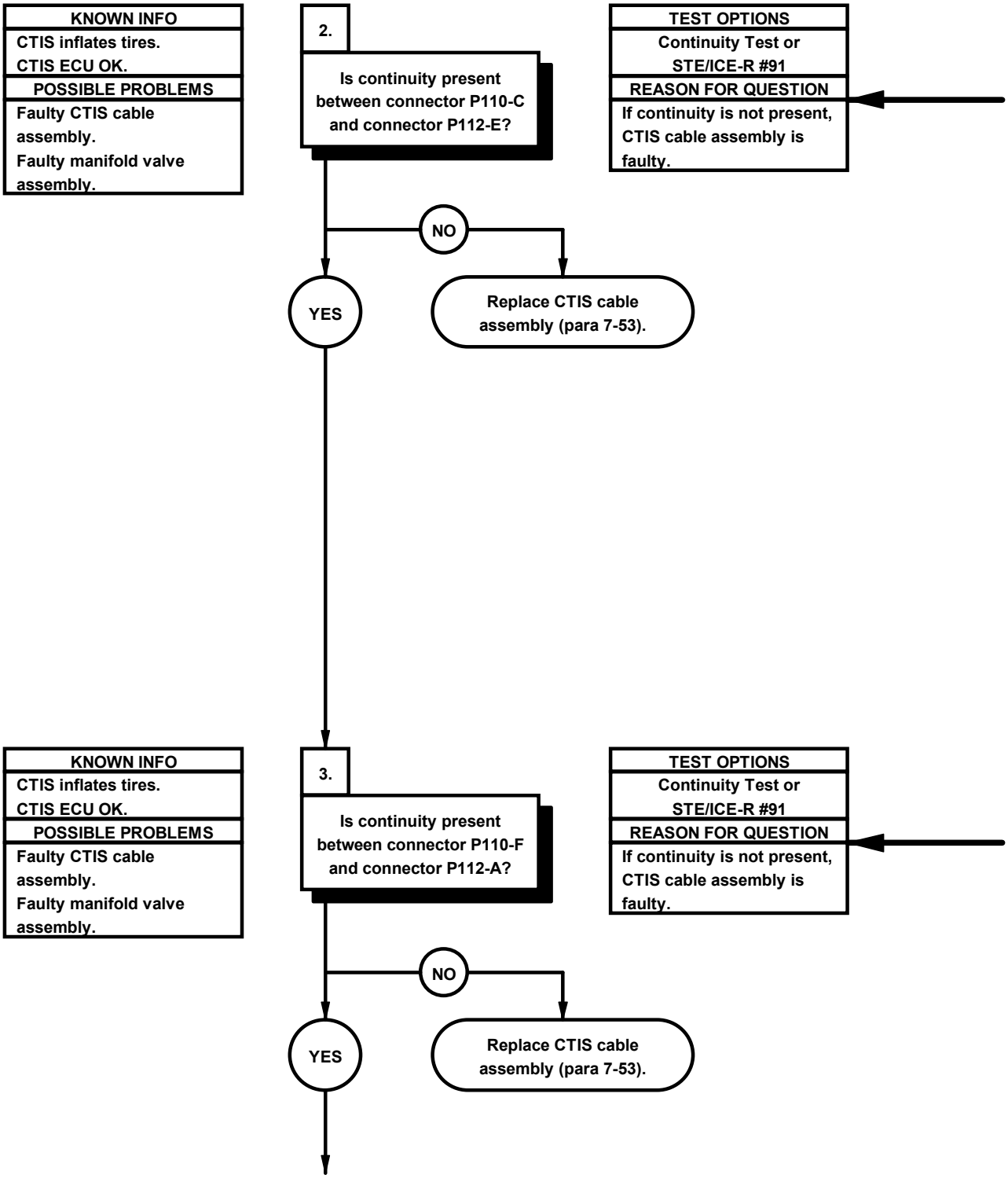


**OPERATIONAL TEST**

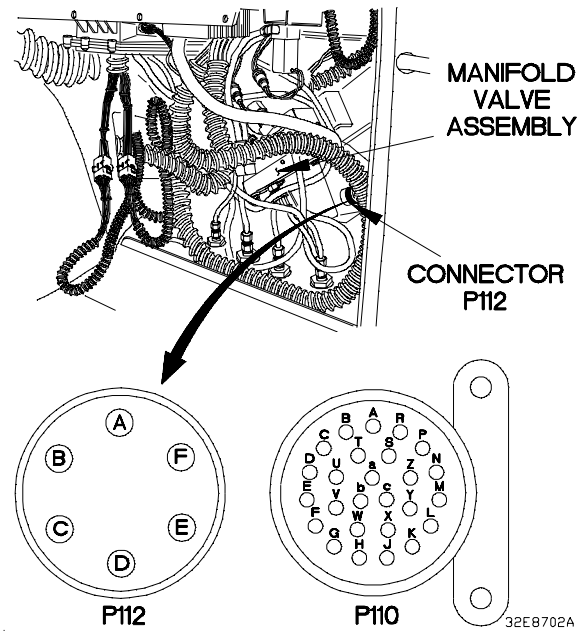
(1) Disconnect connector P110 from CTIS ECU.
(2) Connect connector P110 to a known-good CTIS ECU.
(3) Start vehicle (TM 9-2320-365-10).
(4) Allow air pressure to reach 85 psi.
(5) Deflate tires (TM 9-2320-365-10).
(6) If tires do not deflate, go to step 2 of this fault.
(7) If tires deflate, replace CTIS ECU (para 12-6).
(8) Shut down vehicle (TM 9-2320-365-10).
(9) Disconnect connector P110 from known-good CTIS ECU.



## e84. CTIS DOES NOT DEFLATE TIRES (CONT)

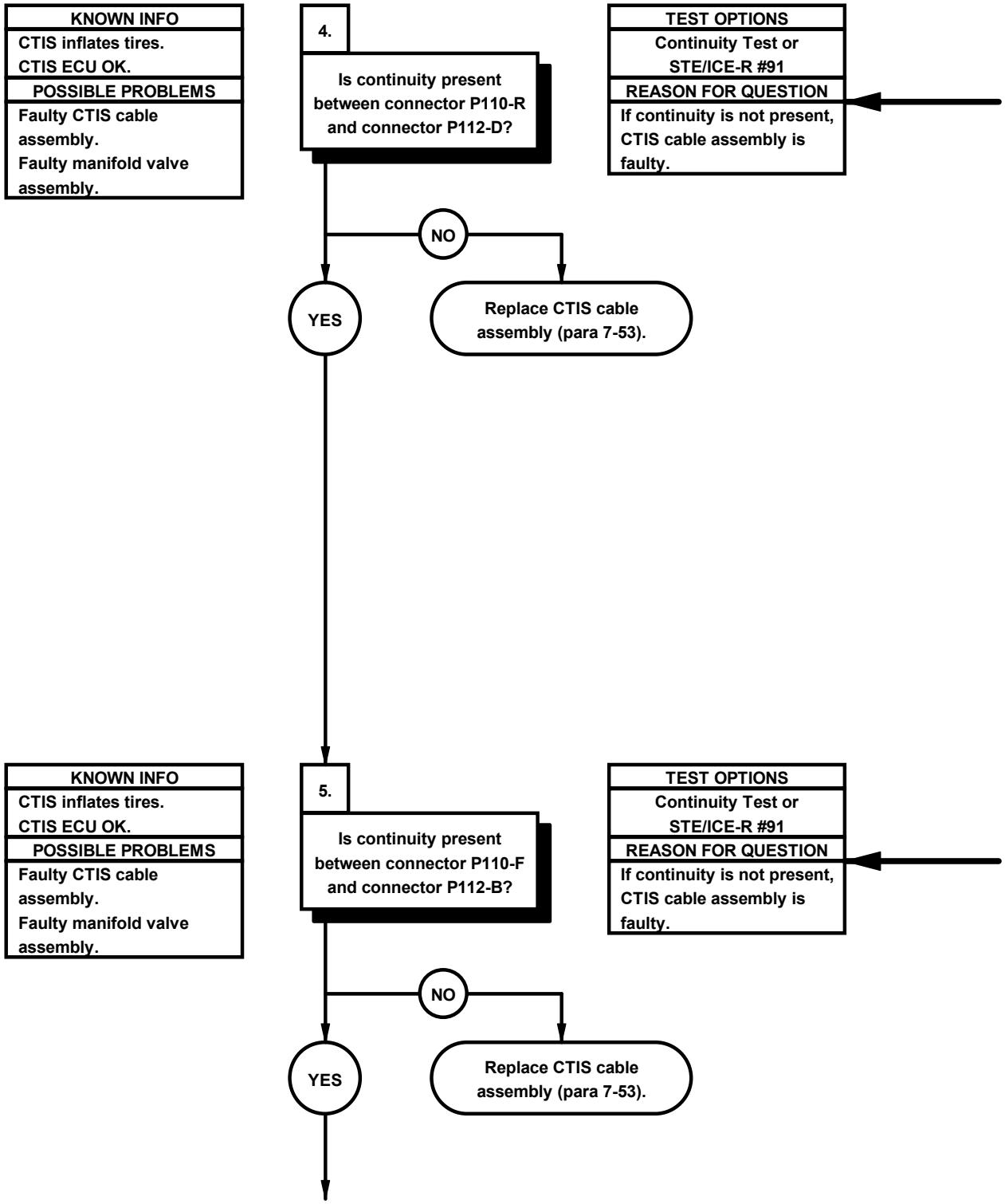


| CONTINUITY TEST |
| --- |
| (1) Remove kick panel (para 16-3). |
| (2) Disconnect connector P112 from manifold valve assembly. |
| (3) Set multimeter to ohms. |
| (4) Connect positive (+) probe of multimeter to connector P110-C. |
| (5) Connect negative (-) probe of multimeter to connector P112-E and note reading on multimeter. |
| (6) If continuity is not present, replace CTIS cable assembly (para 7-53). |

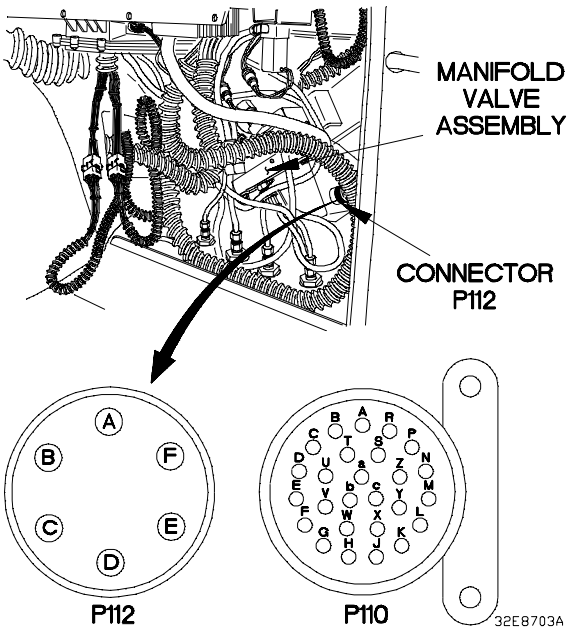



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-F. |
| (3) Connect negative (-) probe of multimeter to connector P112-A and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |

## e84. CTIS DOES NOT DEFLATE TIRES (CONT)

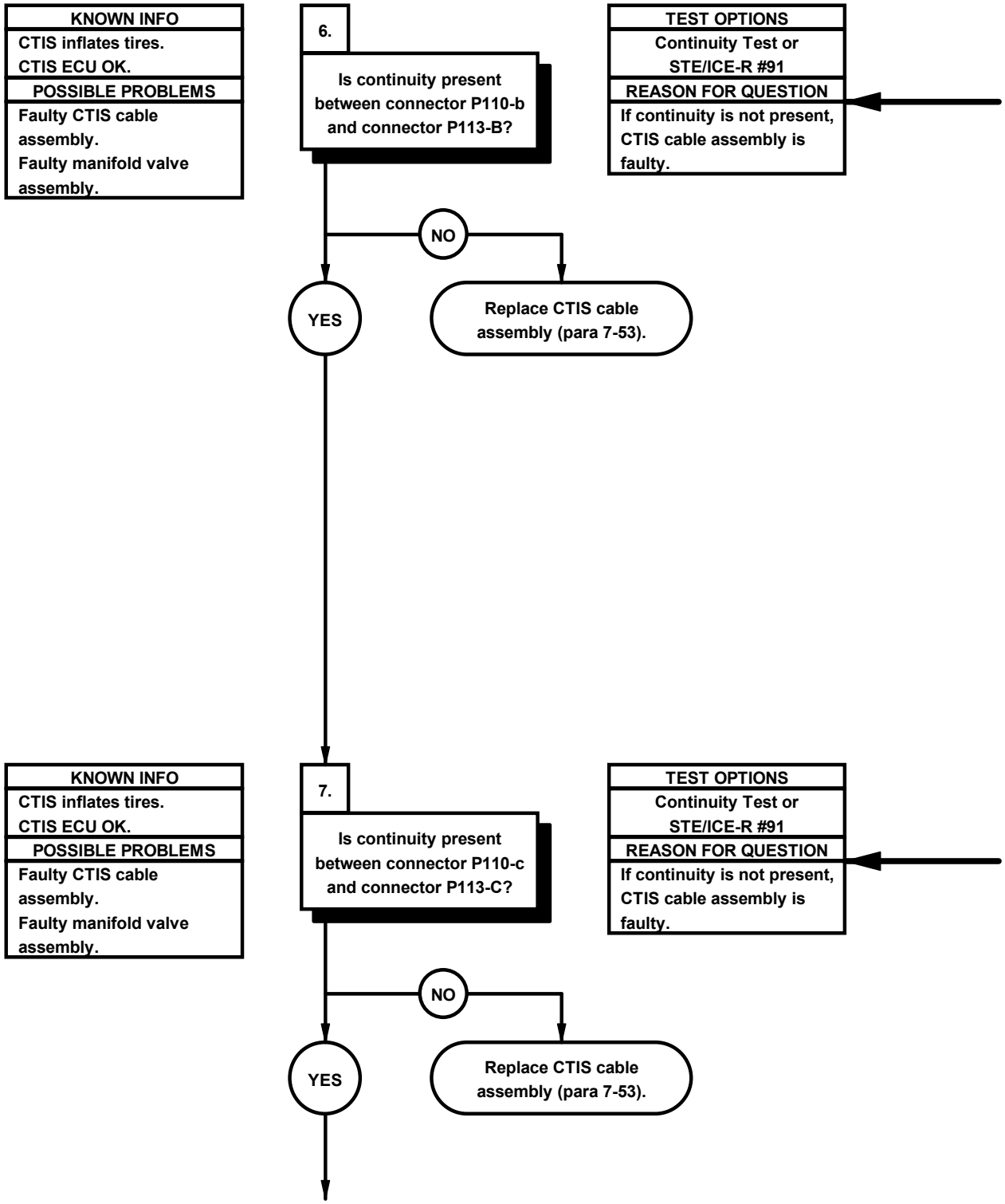


| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-R. |
| (3) Connect negative (-) probe of multimeter to connector P112-D and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |

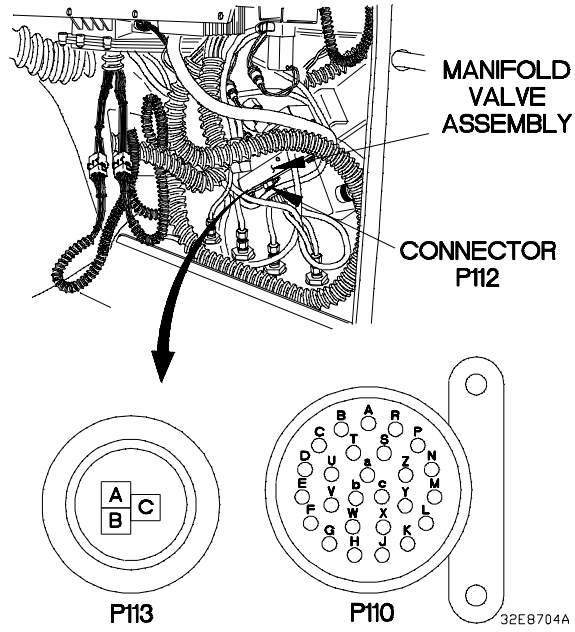



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-F. |
| (3) Connect negative (-) probe of multimeter to connector P112-B and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |
| (5) Connect connector P112 to manifold valve assembly. |

## e84. CTIS DOES NOT DEFLATE TIRES (CONT)

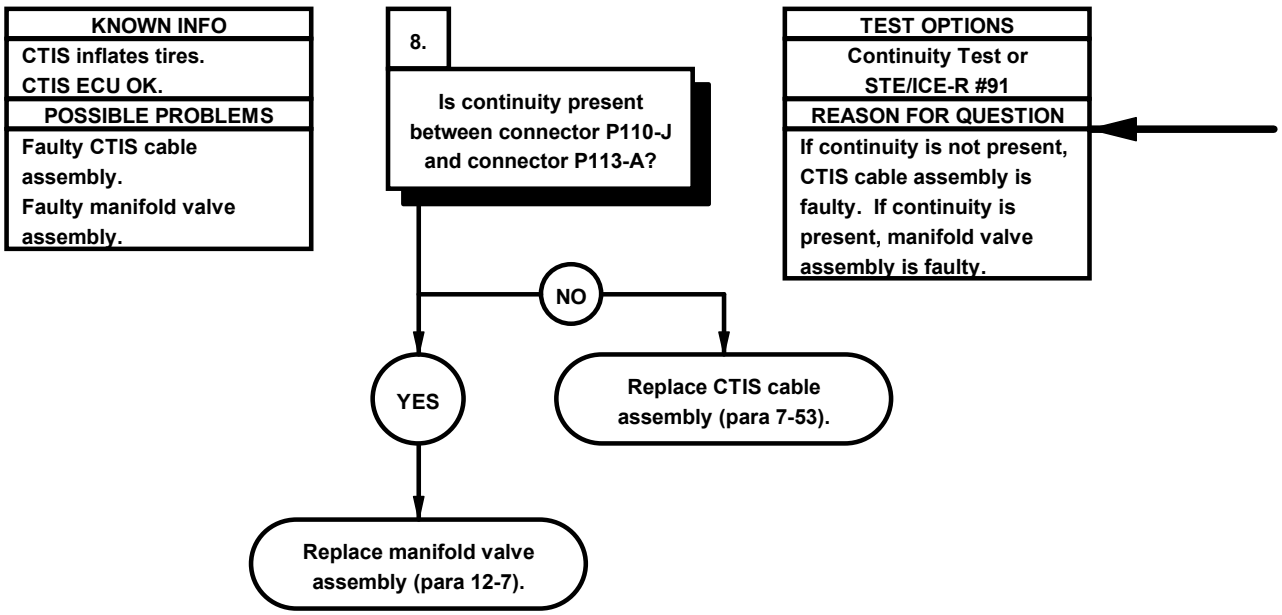


| CONTINUITY TEST |
| --- |
| (1) Disconnect connector P113 from manifold valve assembly.<br>(2) Set multimeter to ohms.<br>(3) Connect positive (+) probe of multimeter to connector P110-b.<br>(4) Connect negative (-) probe of multimeter to connector P113-B and note reading on multimeter.<br>(5) If continuity is not present, replace CTIS cable assembly (para 7-53). |

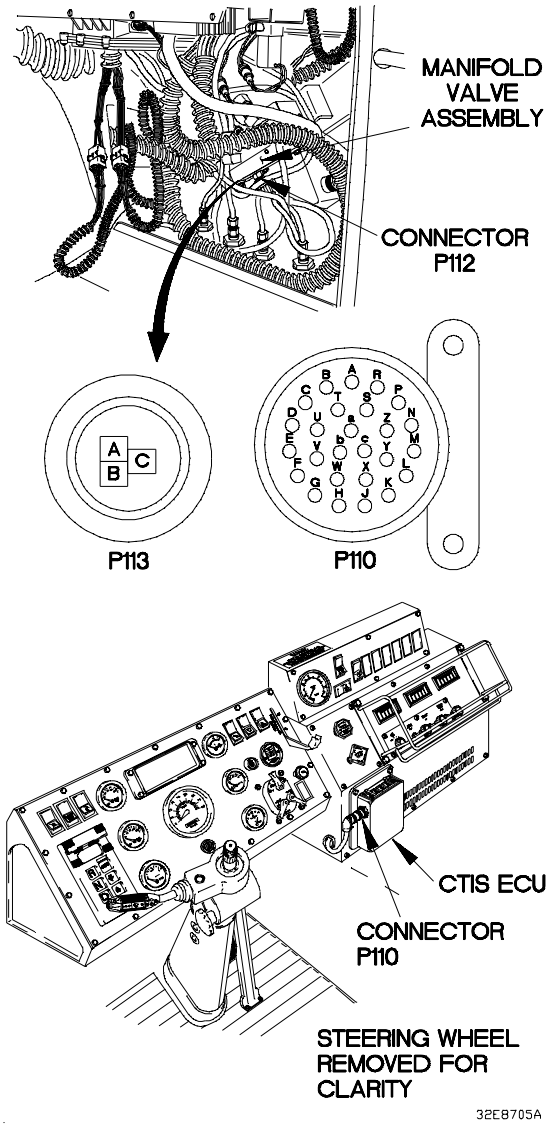



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to connector P110-c.<br>(3) Connect negative (-) probe of multimeter to connector P113-C and note reading on multimeter.<br>(4) If continuity is not present, replace CTIS cable assembly (para 7-53). |

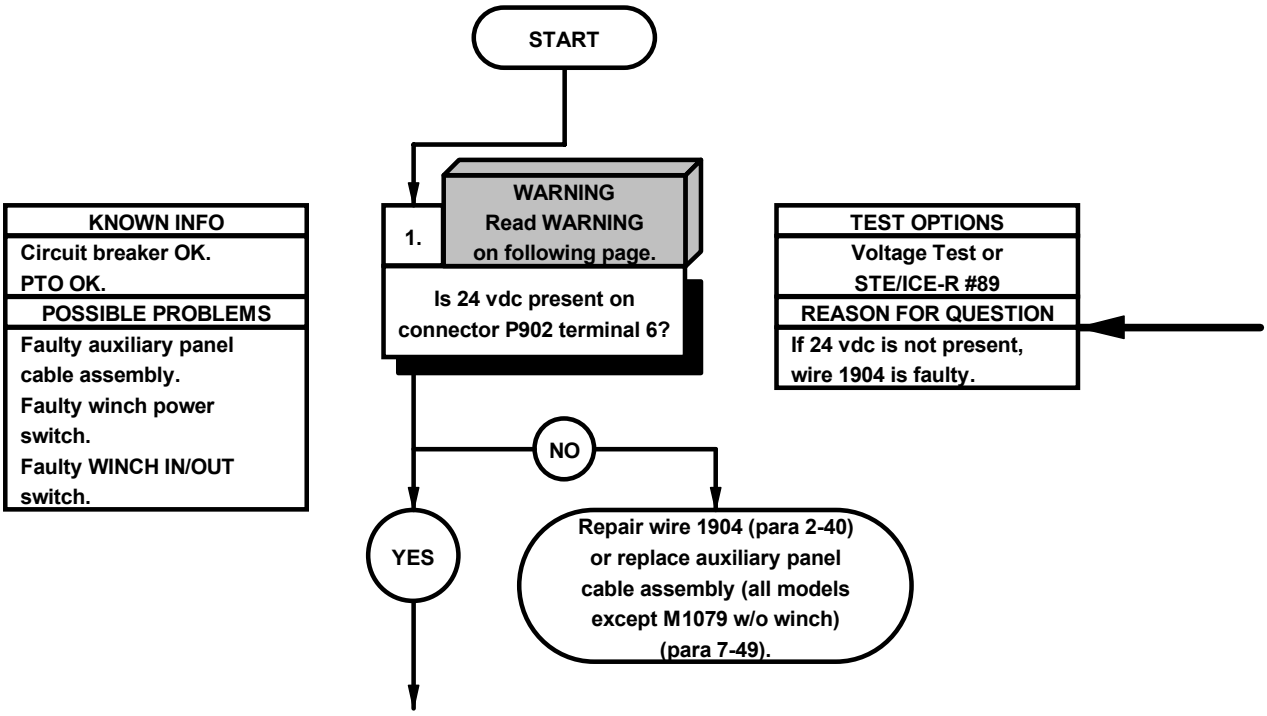
## e84. CTIS DOES NOT DEFLATE TIRES (CONT)



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector P110-J. |
| (3) Connect negative (-) probe of multimeter to connector P113-A and note reading on multimeter. |
| (4) If continuity is not present, replace CTIS cable assembly (para 7-53). |
| (5) If continuity is present, replace manifold valve assembly (para 12-7). |
| (6) Connect connector P113 to manifold valve assembly. |
| (7) Install kick panel (para 16-3). |
| (8) Connect connector P110 to CTIS ECU. |



| e85. 11K SELF-RECOVERY WINCH DOES NOT REEL IN OR PAY OUT | |
|---|---|
| INITIAL SETUP | |
| Equipment Condition<br>Engine shut down (TM 9-2320-365-10).<br><br>Personnel Required<br>(2)<br><br>Materials/Parts<br>Wire, Elect, 50 ft (Item 77, Appendix D) | Tools and Special Tools<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C)<br><br>References<br>TM 9-4910-571-12&P |

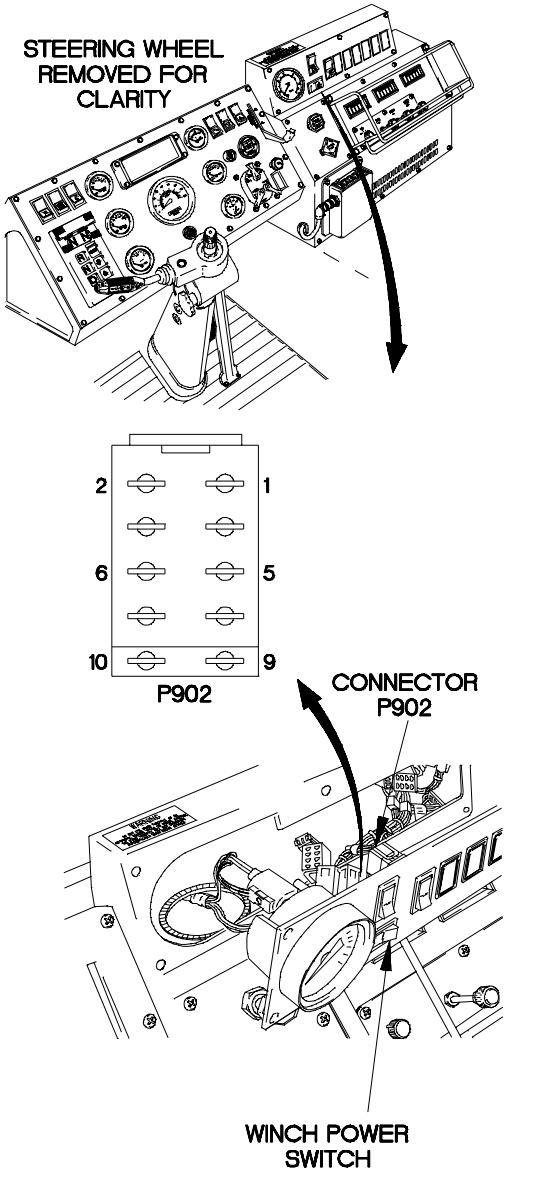


**WARNING**

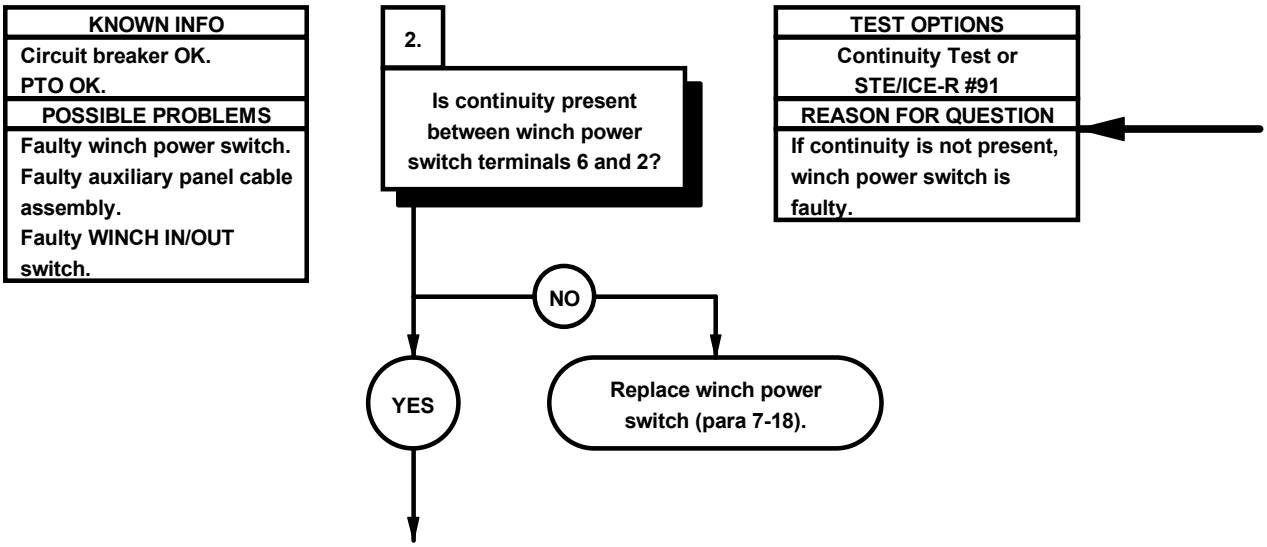
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove auxiliary panel and tilt back. Do not disconnect connectors (para 7-8).
(2) Disconnect connector P902 from winch power switch.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector P902 terminal 6.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position PTO switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1904 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49).
(9) Position PTO switch to off (TM 9-2320-365-10).
(10) Position master power switch to off (TM 9-2320-365-10).

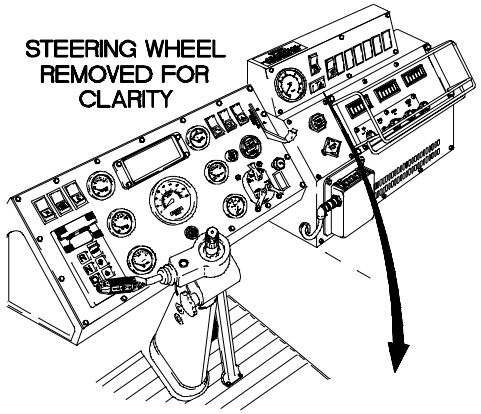


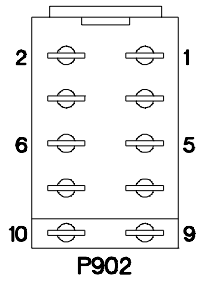
## e85. 11K SELF-RECOVERY WINCH DOES NOT REEL IN OR PAY OUT (CONT)

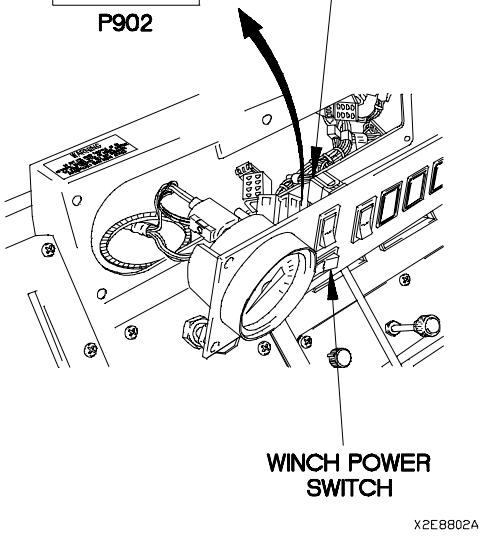


**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P112 from manifold valve assembly.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P110-C.
(5) Connect negative (-) probe of multimeter to connector P112-E and note reading on multimeter.
(6) If continuity is not present, replace CTIS cable assembly (para 7-53).



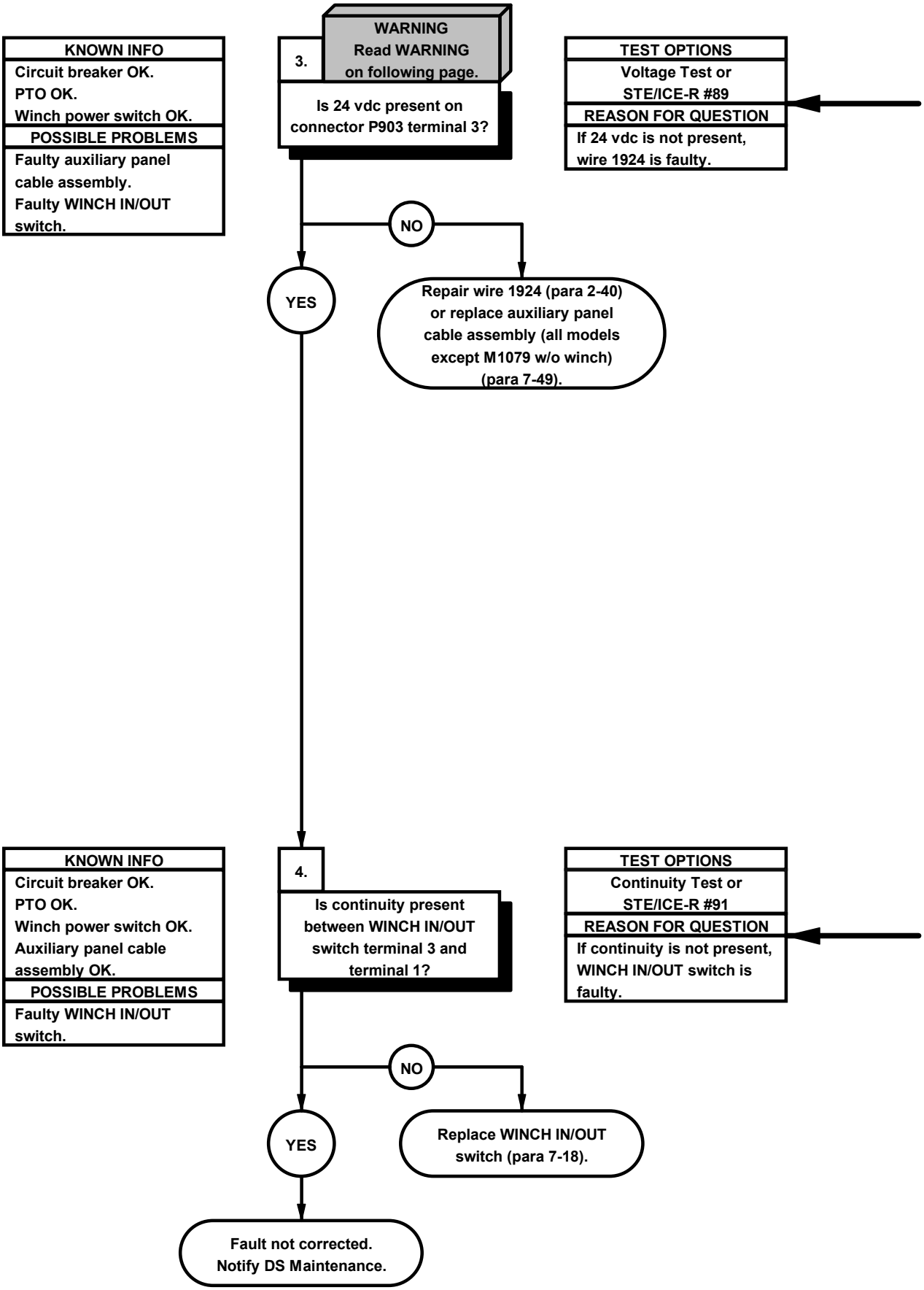




X2E8802A

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P110-F.
(3) Connect negative (-) probe of multimeter to connector P112-A and note reading on multimeter.
(4) If continuity is not present, replace CTIS cable assembly (para 7-53).

## e85. 11K SELF-RECOVERY WINCH DOES NOT REEL IN OR PAY OUT (CONT)



**WARNING**

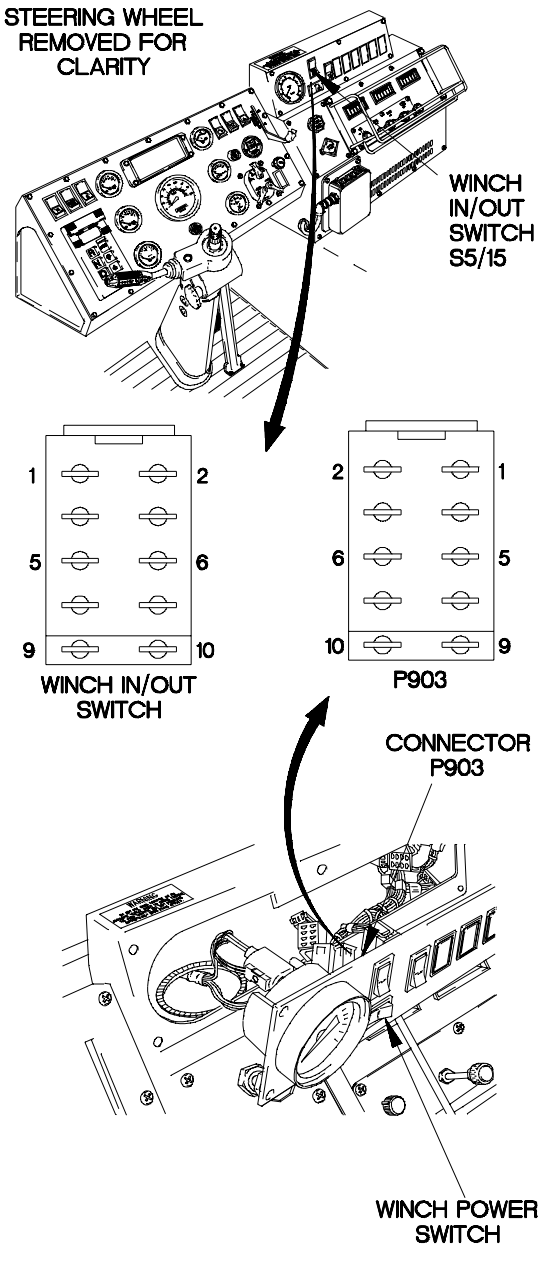
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect connector P903 from WINCH IN/OUT switch.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector P903 terminal 3.
(4) Connect negative (-) probe of multimeter to ground.
(5) Position master power switch to on (TM 9-2320-365-10).
(6) Position PTO switch to on (TM 9-2320-365-10).
(7) Position winch power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1924 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49).
(9) Position winch power switch to off (TM 9-2320-365-10).
(10) Position PTO switch to off (TM 9-2320-365-10).
(11) Position master power switch to off (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to WINCH IN/OUT switch terminal 3.
(3) Connect negative (-) probe of multimeter to WINCH IN/OUT switch terminal 1.
(4) Position WINCH IN/OUT switch to in (TM 9-2320-365-10) and note reading on multimeter.
(5) If continuity is not present, replace WINCH IN/OUT switch (para 7-18).
(6) If continuity is present, fault not corrected. Notify DS Maintenance.
(7) Connect connector P903 to WINCH IN/OUT switch.
(8) Install auxiliary panel (para 7-8).



## e86. 11K SELF-RECOVERY WINCH DOES NOT REEL IN

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

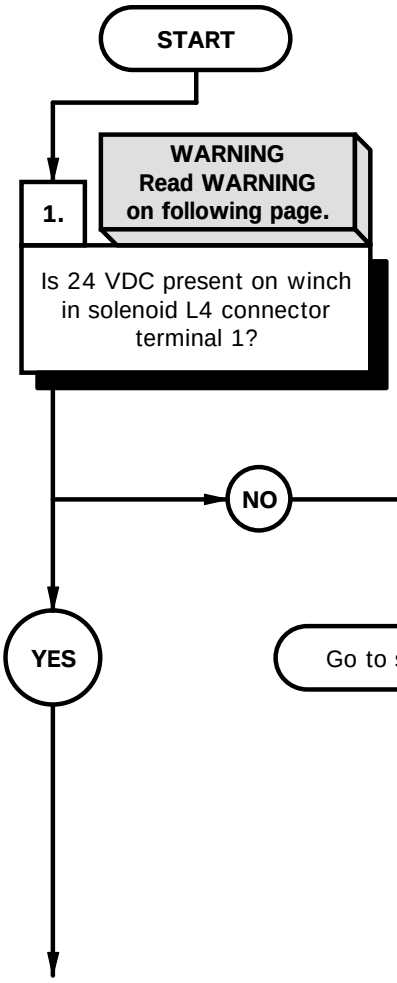
**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**KNOWN INFO**

Circuit breaker OK.
11K self-recovery winch pays out.

**POSSIBLE PROBLEMS**

Faulty winch control valve cable assembly.
Faulty winch control valve assembly.
Faulty WINCH IN/OUT switch.
Faulty PTO cable assembly.
Faulty auxiliary panel cable assembly.




**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

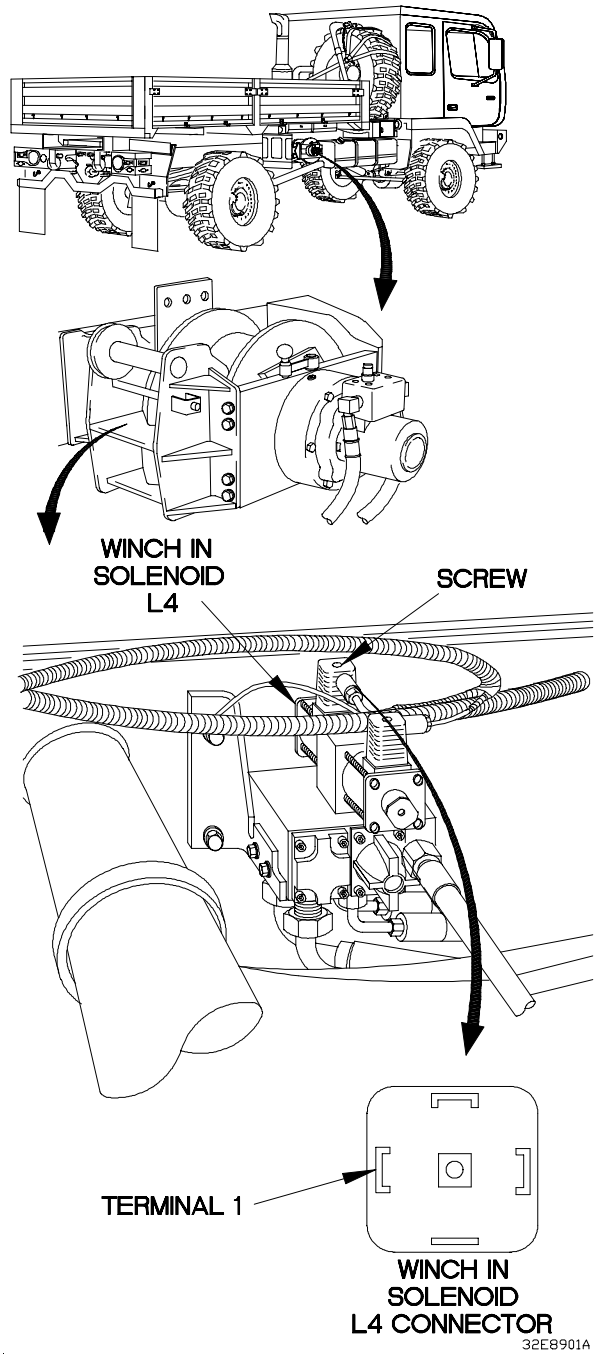
This question eliminates possible problems and determines where troubleshooting continues.

**WARNING**

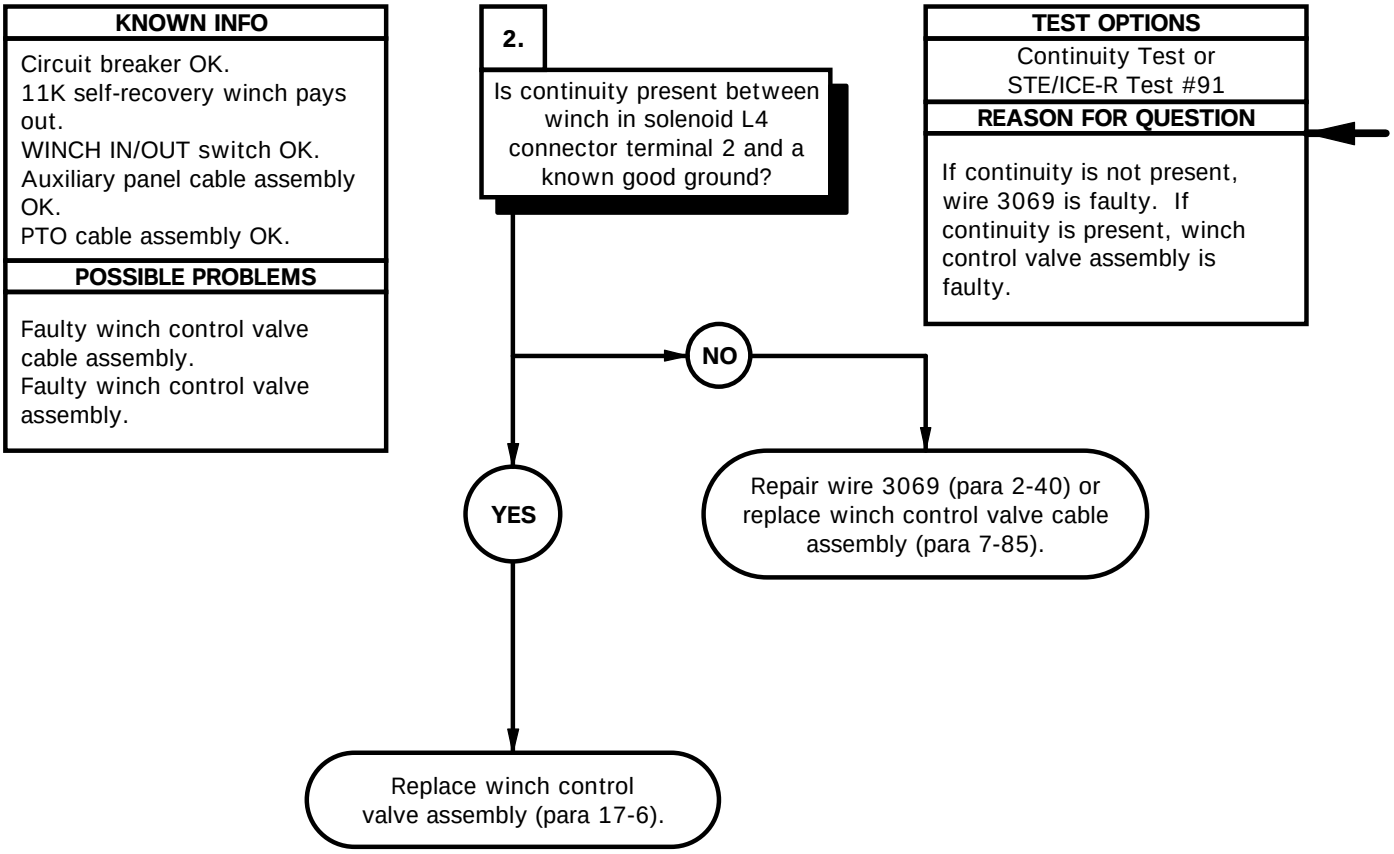
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove four nuts, washers, solenoid bracket, washers, and screws.
(2) Loosen screw and disconnect winch in solenoid L4 connector from solenoid L4.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to winch in solenoid L4 connector terminal 1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position PTO switch to on (TM 9-2320-365-10).
(8) Position winch power switch to on (TM 9-2320-365-10).
(9) Position WINCH IN/OUT switch to IN (TM 9-2320-365-10) and note reading on multimeter.
(10) If 24 VDC is not present, go to step 3 of this fault.
(11) Position winch power switch to off (TM 9-2320-365-10).
(12) Position PTO switch to off (TM 9-2320-365-10).
(13) Position master power switch to off (TM 9-2320-365-10).

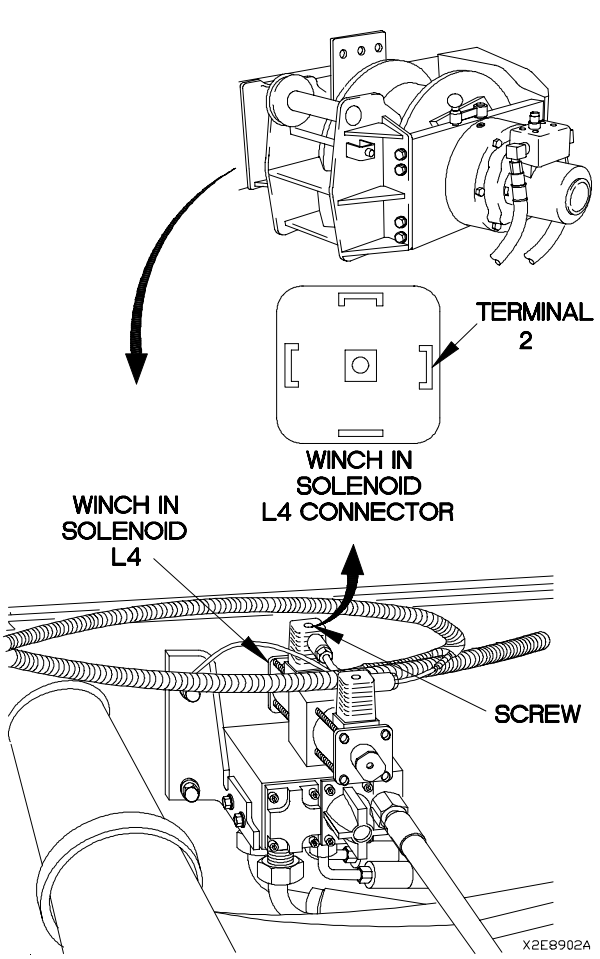


## e86. 11K SELF-RECOVERY WINCH DOES NOT REEL IN (CONT)

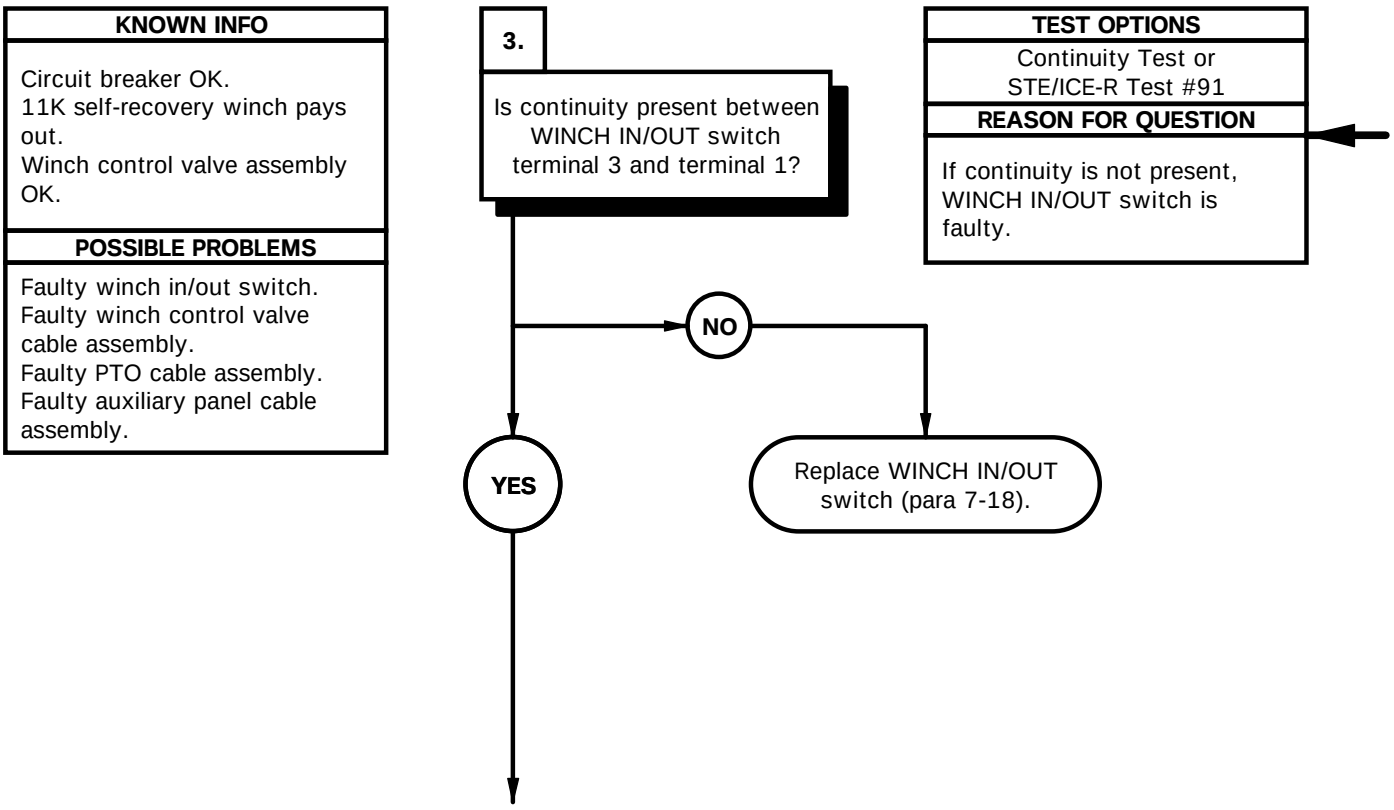


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to winch in solenoid L4 terminal 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3069 (para 2-40) or replace winch control valve cable assembly (para 7-85).
(5) If continuity is present, replace winch control valve assembly (para 17-6).
(6) Connect winch in solenoid L4 connector on solenoid L4 and tighten screw.

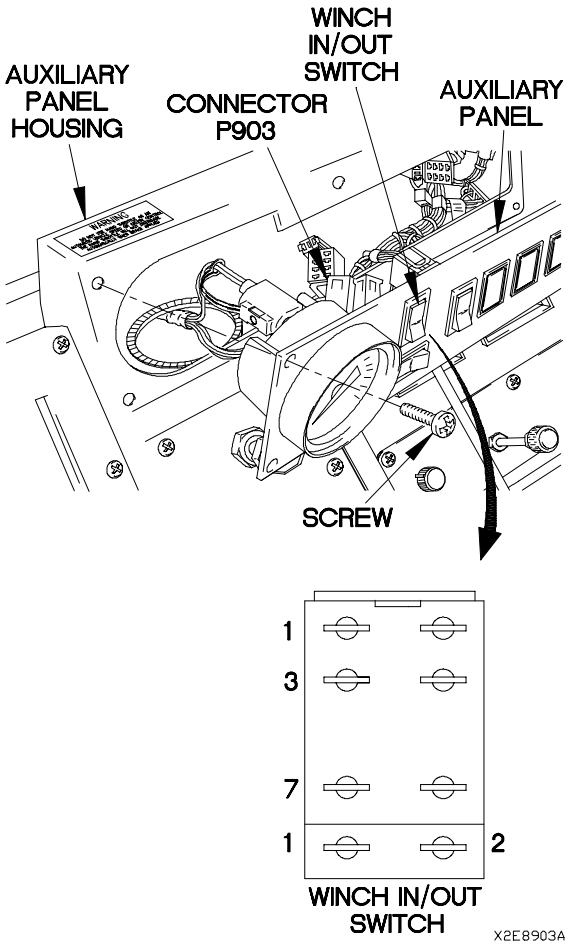


## e86. 11K SELF-RECOVERY WINCH DOES NOT REEL IN (CONT)

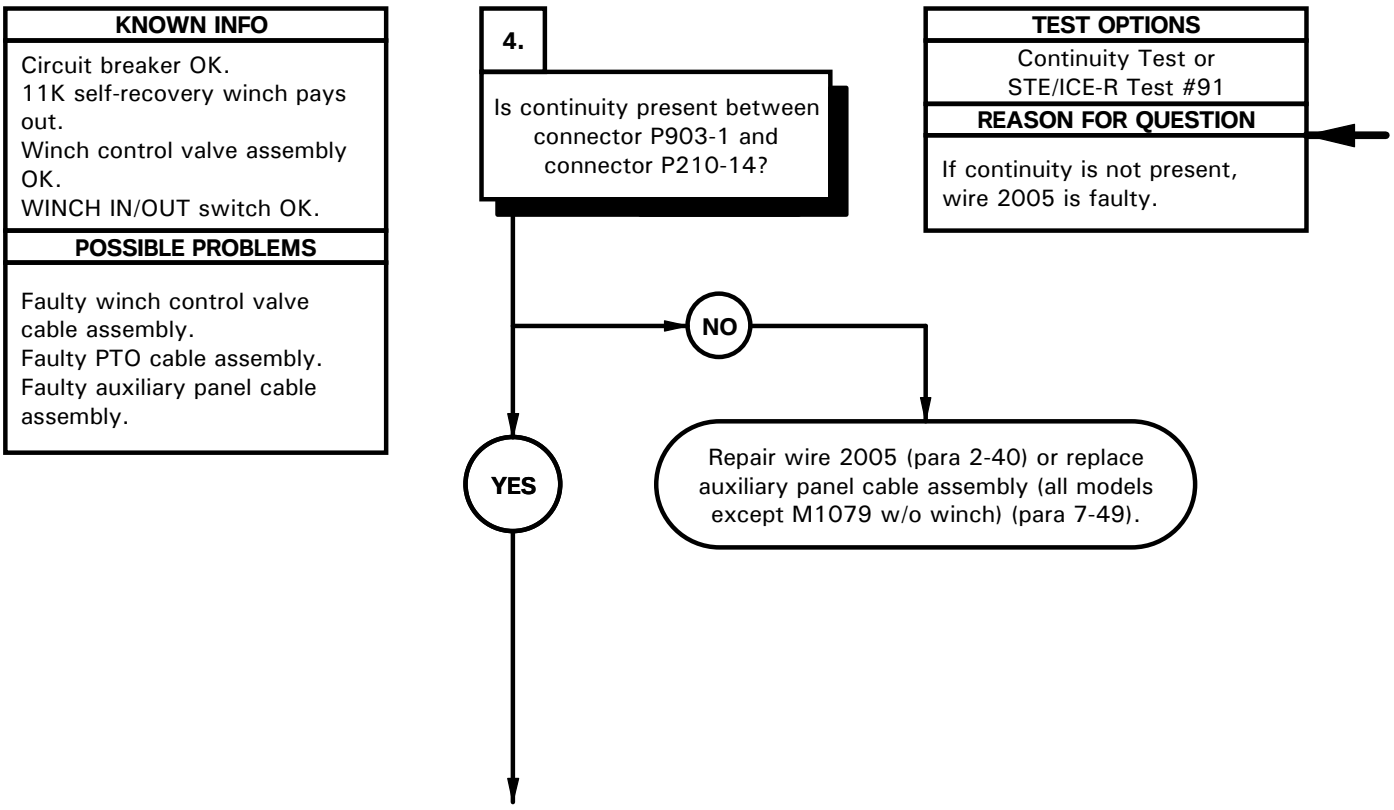


**CONTINUITY TEST**

(1) Remove six screws from auxiliary panel.
(2) Lift auxiliary panel from auxiliary panel housing to gain access.
(3) Disconnect connector P903 from WINCH IN/OUT switch.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to WINCH IN/OUT switch terminal 3.
(6) Connect negative (-) probe of multimeter to WINCH IN/OUT switch terminal 1.
(7) Position WINCH IN/OUT switch to in (TM 9-2320-365-10) and note reading on multimeter.
(8) If continuity is not present, replace WINCH IN/OUT switch (para 7-18).

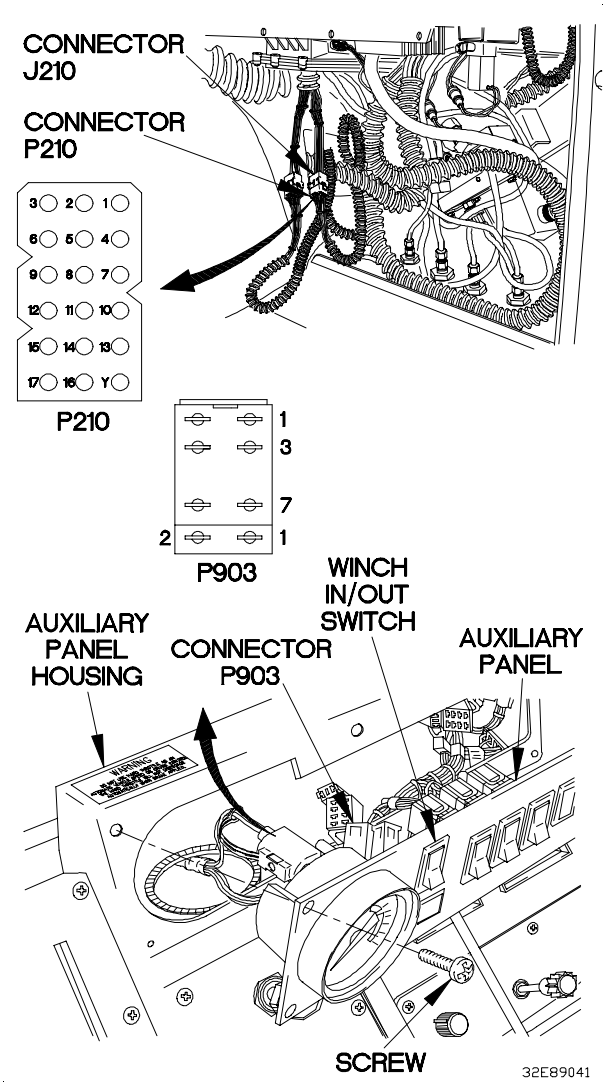


## e86. 11K SELF-RECOVERY WINCH DOES NOT REEL IN (CONT)

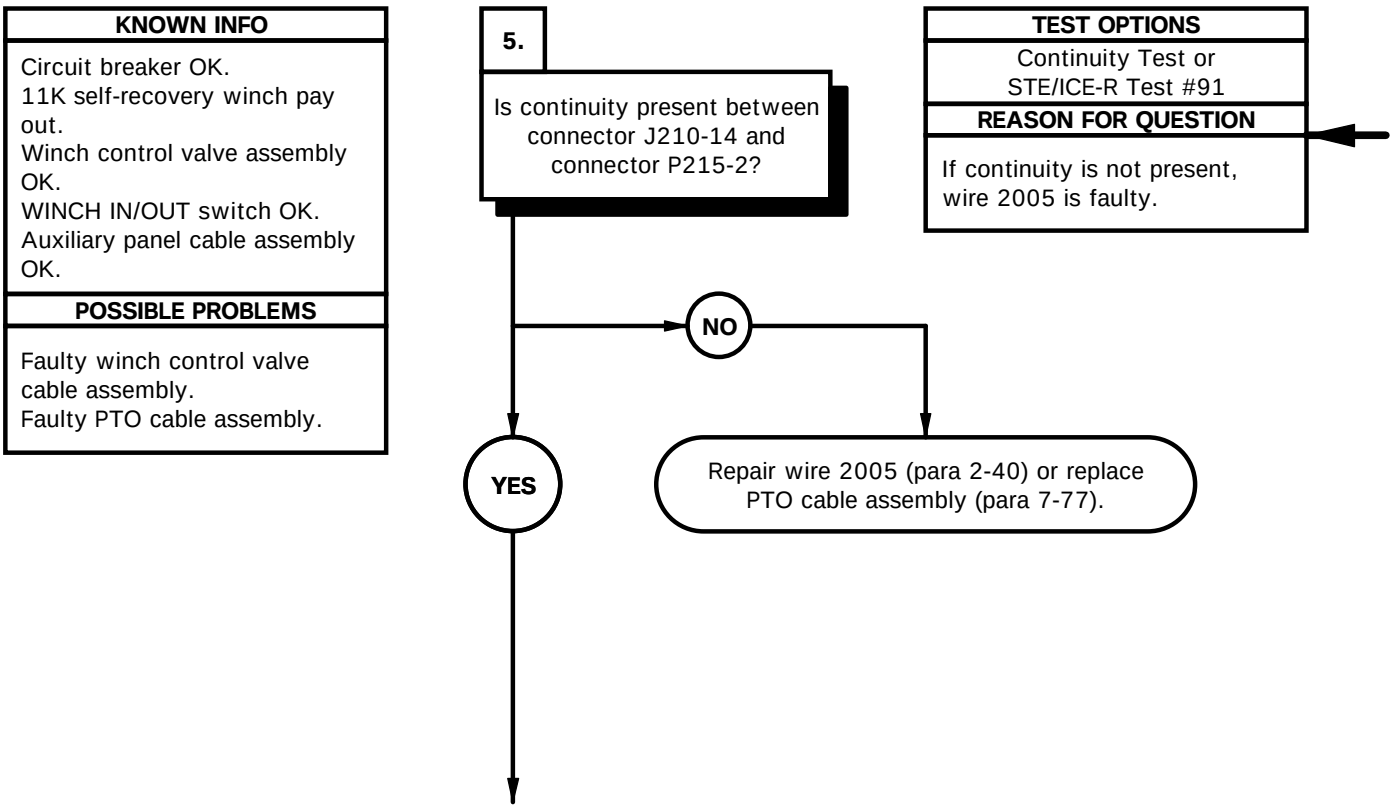


**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P210 from connector J210.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P903-1.
(5) Connect negative (-) probe of multimeter to connector P210-14 and note reading on multimeter.
(6) If continuity is not present, repair wire 2005 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch (para 7-49).
(7) Connect connector P903 to WINCH IN/OUT switch.
(8) Position auxiliary panel on auxiliary panel housing with six screws.
(9) Tighten six screws to 24 lb-in. (3 N·m).

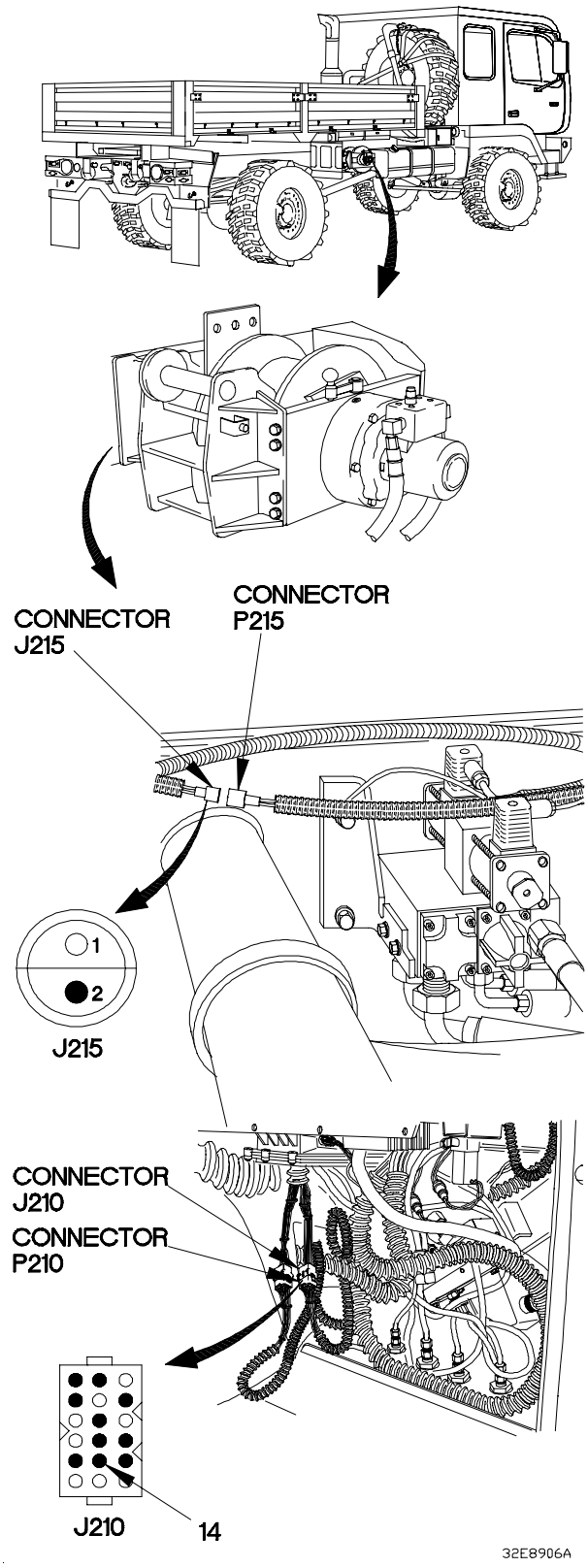


## e86. 11K SELF-RECOVERY WINCH DOES NOT REEL IN (CONT)

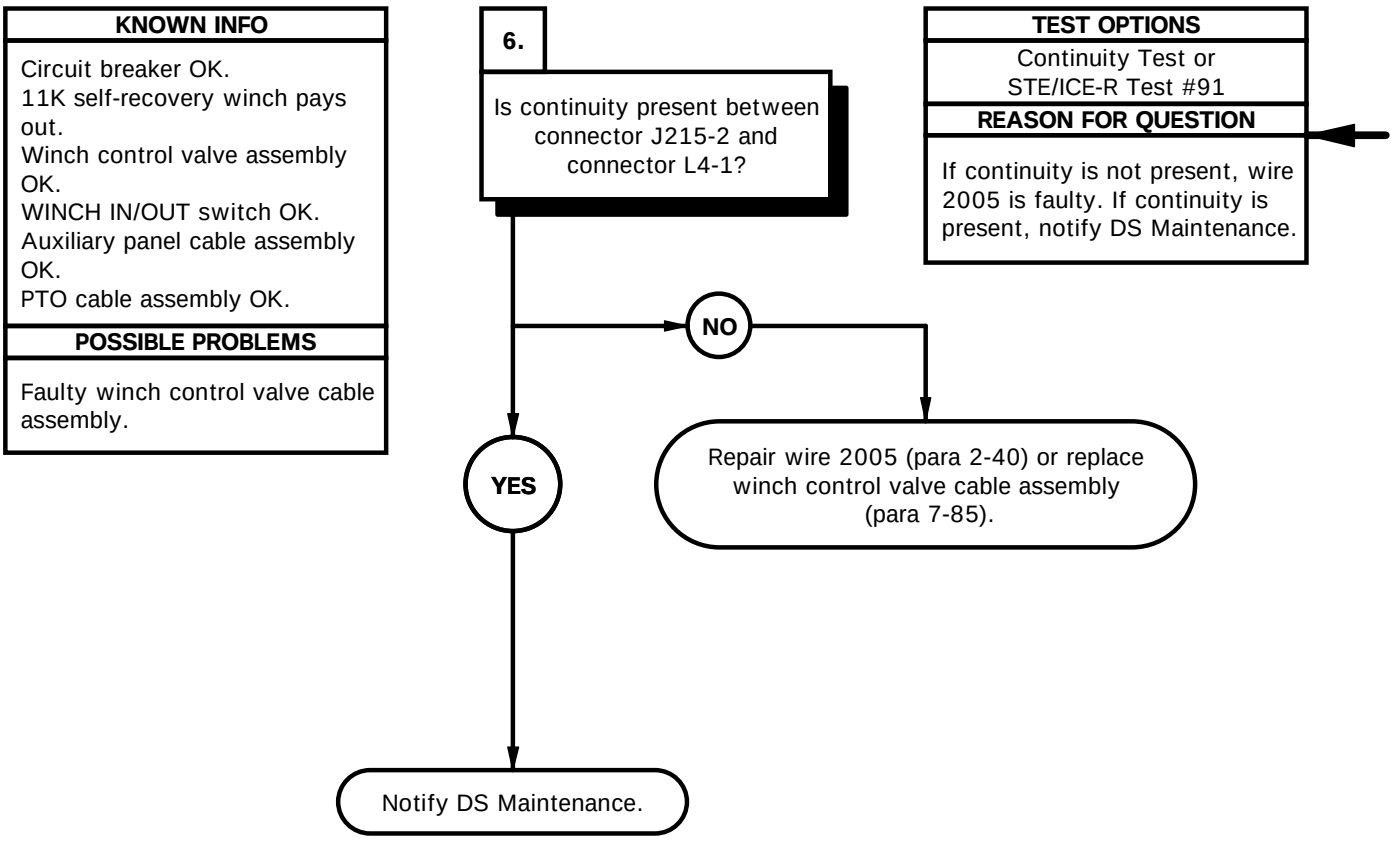


**CONTINUITY TEST**

(1) Disconnect connector P215 from connector J215.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector J210-14.
(4) Connect negative (-) probe of multimeter to connector P215-2 and note reading on multimeter.
(5) If continuity is not present, repair wire 2005 (para 2-40) or replace PTO cable assembly (para 7-77).
(6) Connect connector P210 to connector J210.
(7) Install kick panel (para 16-3).

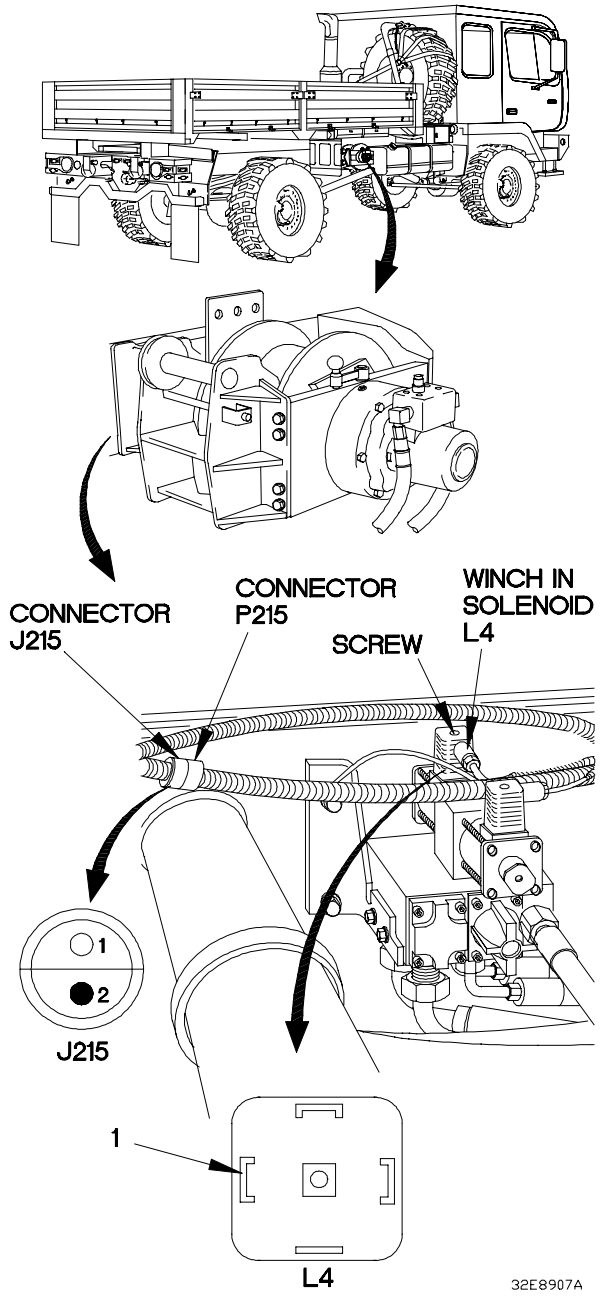


## e86. 11K SELF-RECOVERY WINCH DOES NOT REEL IN (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J215-2.
(3) Connect negative (-) probe of multimeter to winch in solenoid L4 connector terminal 1 and note reading on multimeter.
(4) If continuity is not present, repair wire 2005 (para 2-40) or replace winch control valve cable assembly (para 7-85).
(5) If continuity is present, notify DS Maintenance.
(6) Connect connector P215 to connector J215.
(7) Connect winch in solenoid L4 connector to solenoid L4 and tighten screw.



## e87. 11K SELF-RECOVERY WINCH DOES NOT PAY OUT

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

References
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

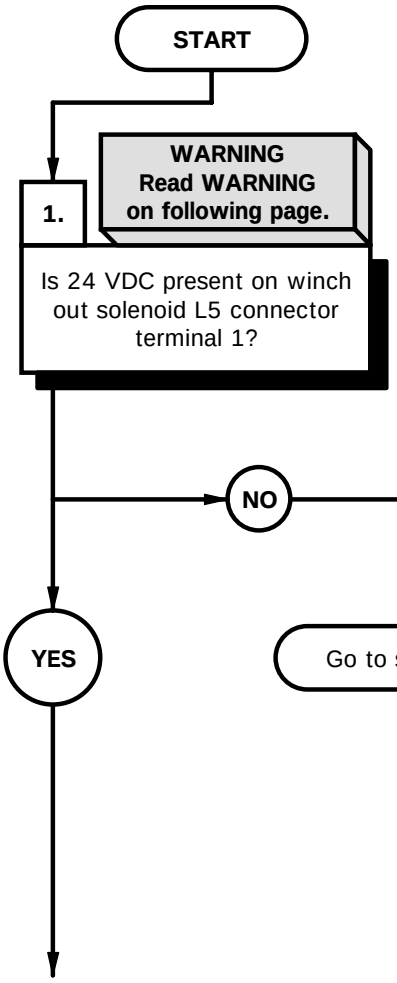
**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

**KNOWN INFO**

Circuit breaker OK.
11K self-recovery winch reels in OK.

**POSSIBLE PROBLEMS**

Faulty winch control valve cable assembly.
Faulty winch control valve assembly.
Faulty WINCH IN/OUT switch.
Faulty PTO cable assembly.
Faulty auxiliary panel cable assembly.




**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

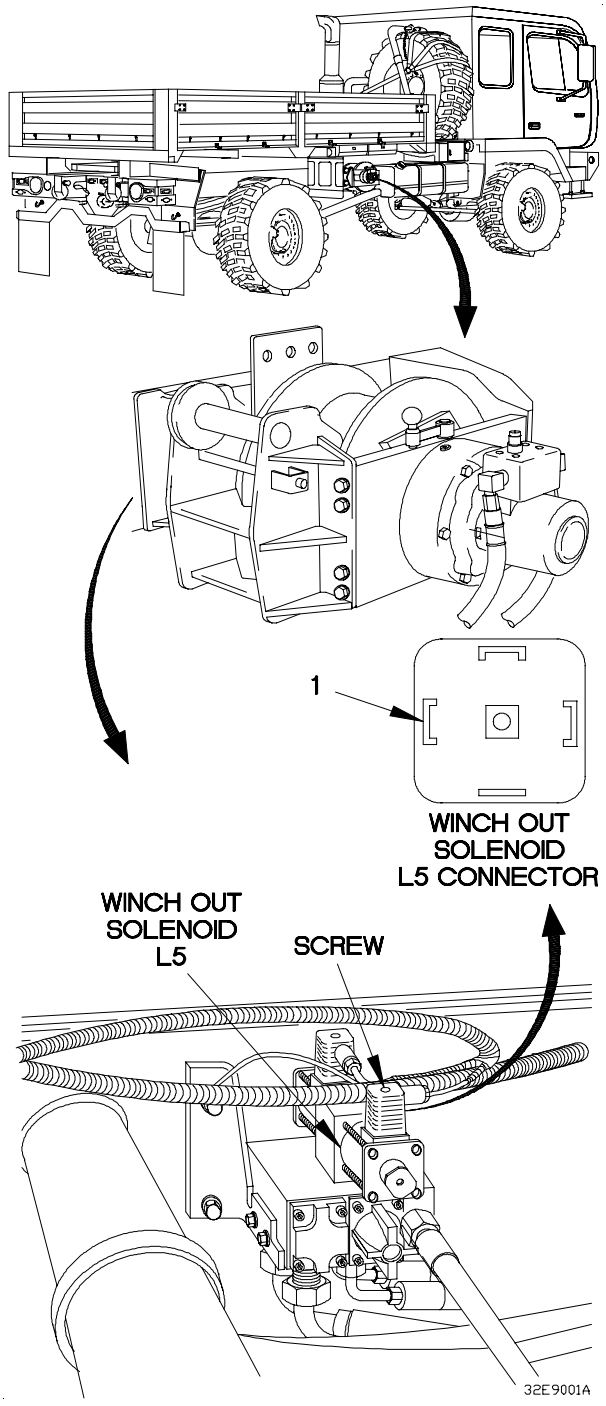
This question eliminates possible problems and determines where troubleshooting continues.

**WARNING**

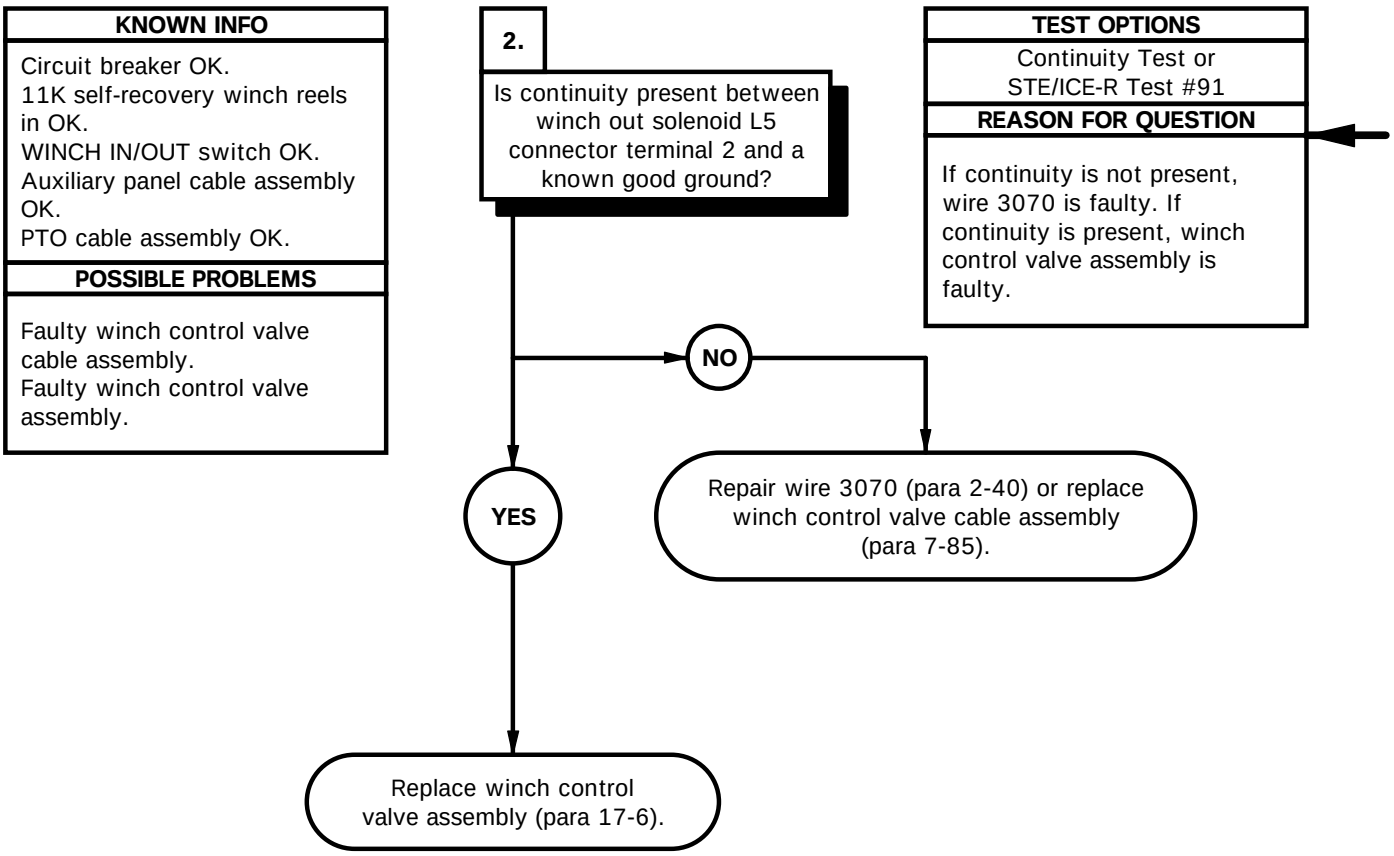
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove four nuts, washers, solenoid bracket, washers, and screws.
(2) Loosen screw and disconnect winch out solenoid L5 connector from solenoid L5.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to winch out solenoid L5 connector terminal 1.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position PTO switch to on (TM 9-2320-365-10).
(8) Position winch power switch to on (TM 9-2320-365-10).
(9) Position WINCH IN/OUT switch to OUT (TM 9-2320-365-10) and note reading on multimeter.
(10) If 24 VDC is not present, go to step 3 of this fault.
(11) Position winch power switch to off (TM 9-2320-365-10).
(12) Position PTO switch to off (TM 9-2320-365-10).
(13) Position master power switch to off (TM 9-2320-365-10).

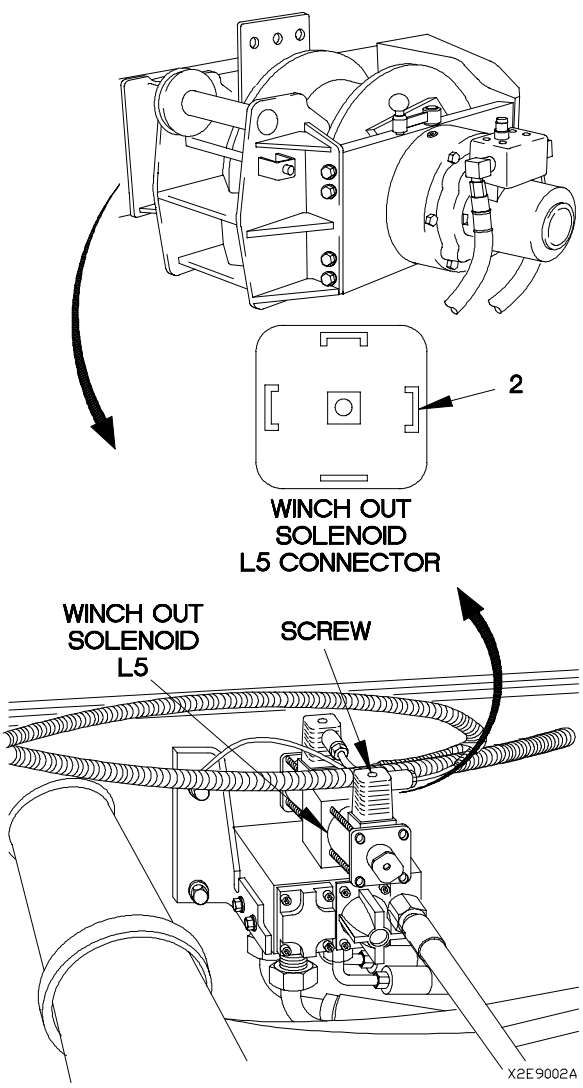


## e87. 11K SELF-RECOVERY WINCH DOES NOT PAY OUT (CONT)

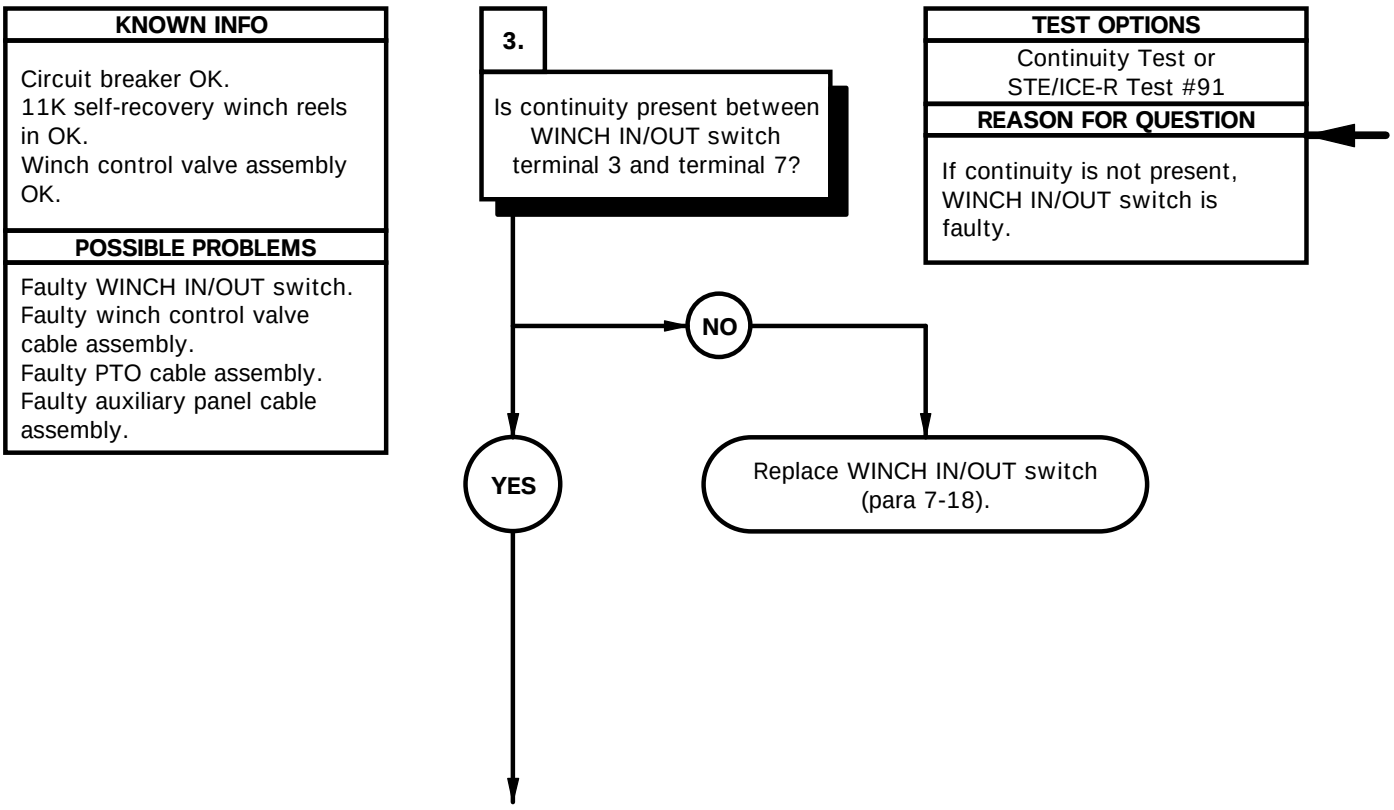


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to winch out solenoid L5 terminal 2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3070 (para 2-40) or replace winch control valve cable cable assembly (para 7-85).
(5) If continuity is present, replace winch control valve assembly (para 17-6).
(6) Connect winch out solenoid L5 connector on solenoid L5 and tighten screw.

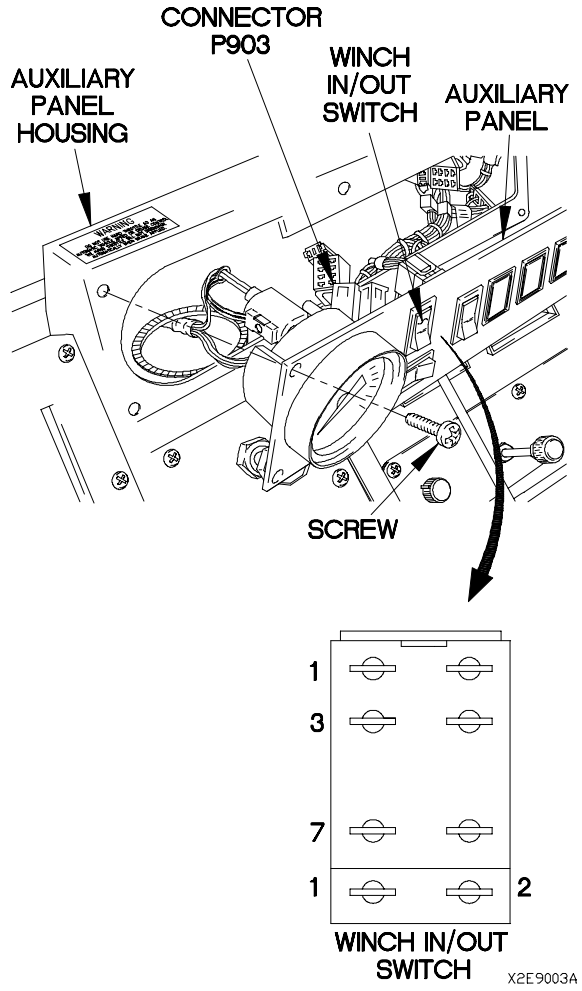


## e87. 11K SELF-RECOVERY WINCH DOES NOT PAY OUT (CONT)

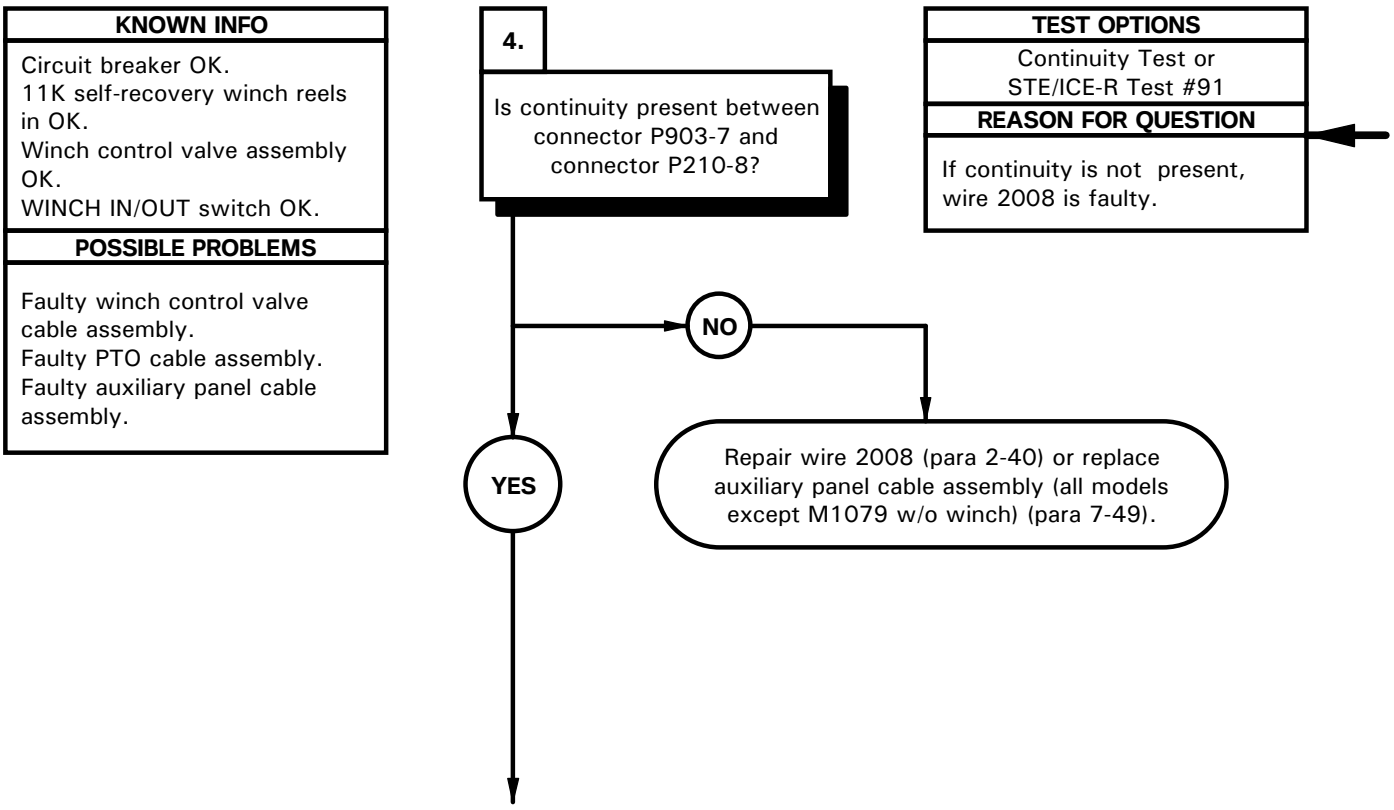


**CONTINUITY TEST**

(1) Remove six screws from auxiliary panel.
(2) Lift auxiliary panel from auxiliary panel housing to gain access.
(3) Disconnect connector P903 from WINCH IN/OUT switch.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to WINCH IN/OUT switch terminal 3.
(6) Connect negative (-) probe of multimeter to WINCH IN/OUT switch terminal 7.
(7) Position WINCH IN/OUT switch to out (TM 9-2320-365-10) and note reading on multimeter.
(8) If continuity is not present, replace WINCH IN/OUT switch (para 7-18).

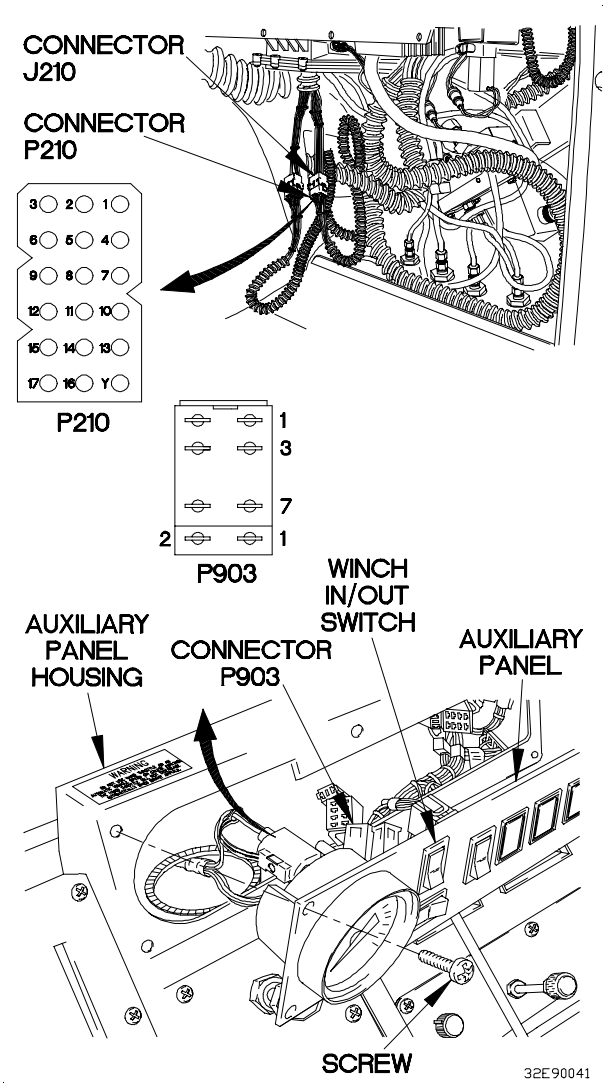


## e87. 11K SELF-RECOVERY WINCH DOES NOT PAY OUT (CONT)

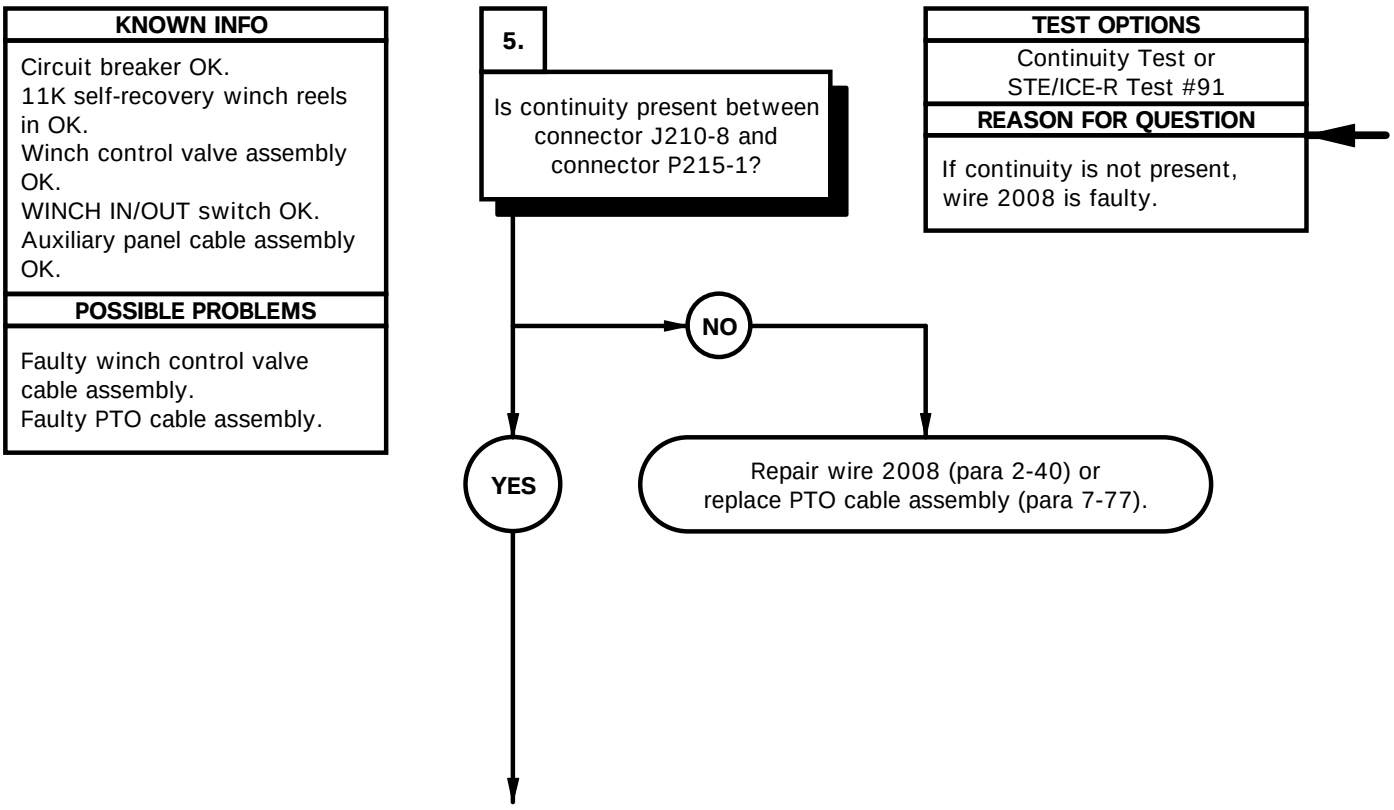


**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P210 from connector J210.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P903-7.
(5) Connect negative (-) probe of multimeter to connector P210-8 and note reading on multimeter.
(6) If continuity is not present, repair wire 2008 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch (para 7-49).
(7) Connect connector P903 to WINCH IN/OUT switch.
(8) Position auxiliary panel on auxiliary panel housing with six screws.
(9) Tighten six screws to 24 lb-in. (3 N·m).

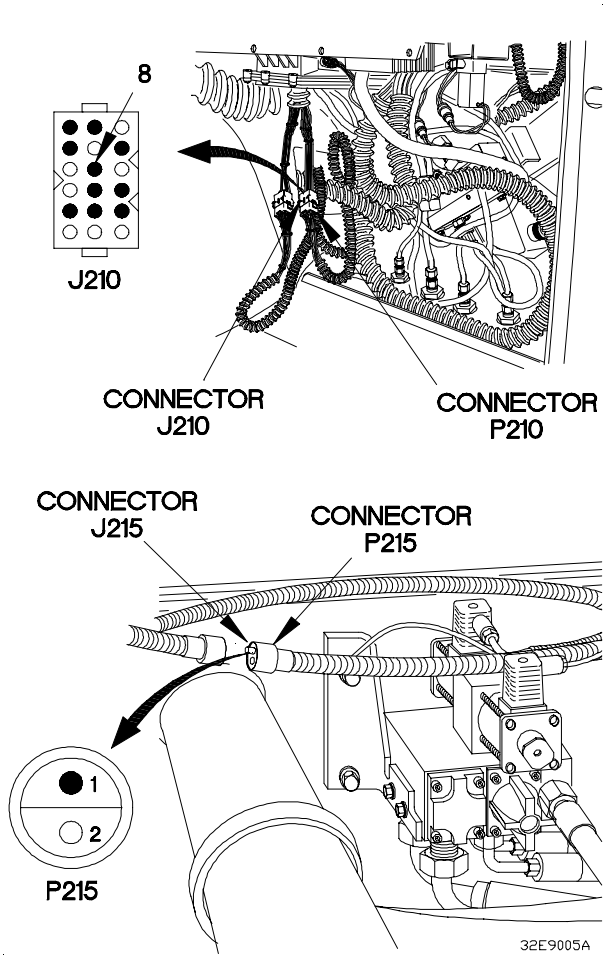


## e87. 11K SELF-RECOVERY WINCH DOES NOT PAY OUT (CONT)

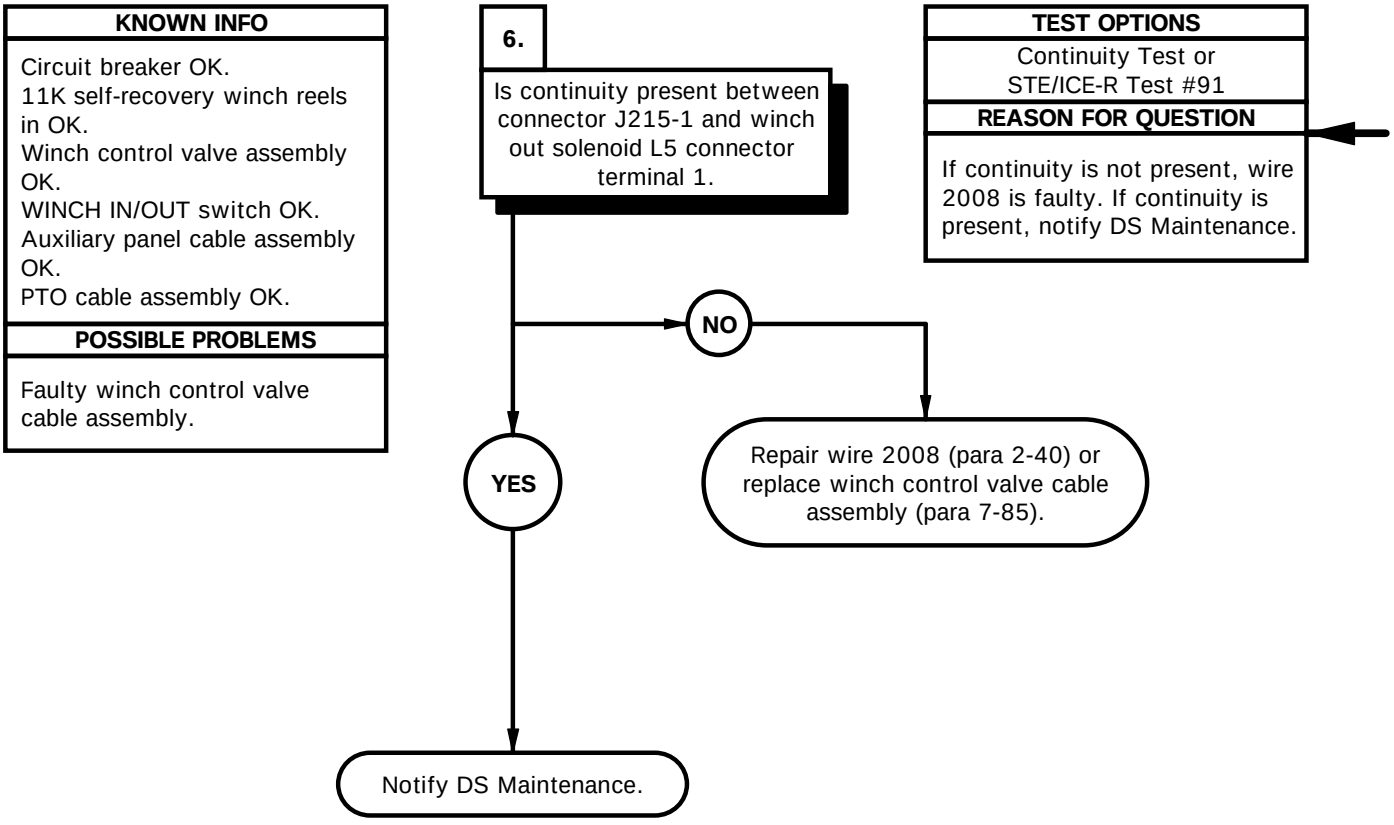


**CONTINUITY TEST**

(1) Disconnect connector P215 from connector J215.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector J210-8.
(4) Connect negative (-) probe of multimeter to connector P215-1 and note reading on multimeter.
(5) If continuity is not present, repair wire 2008 (para 2-40) or replace PTO cable assembly (para 7-77.
(6) Connect connector P210 to connector J210.
(7) Install kick panel (para 16-3).

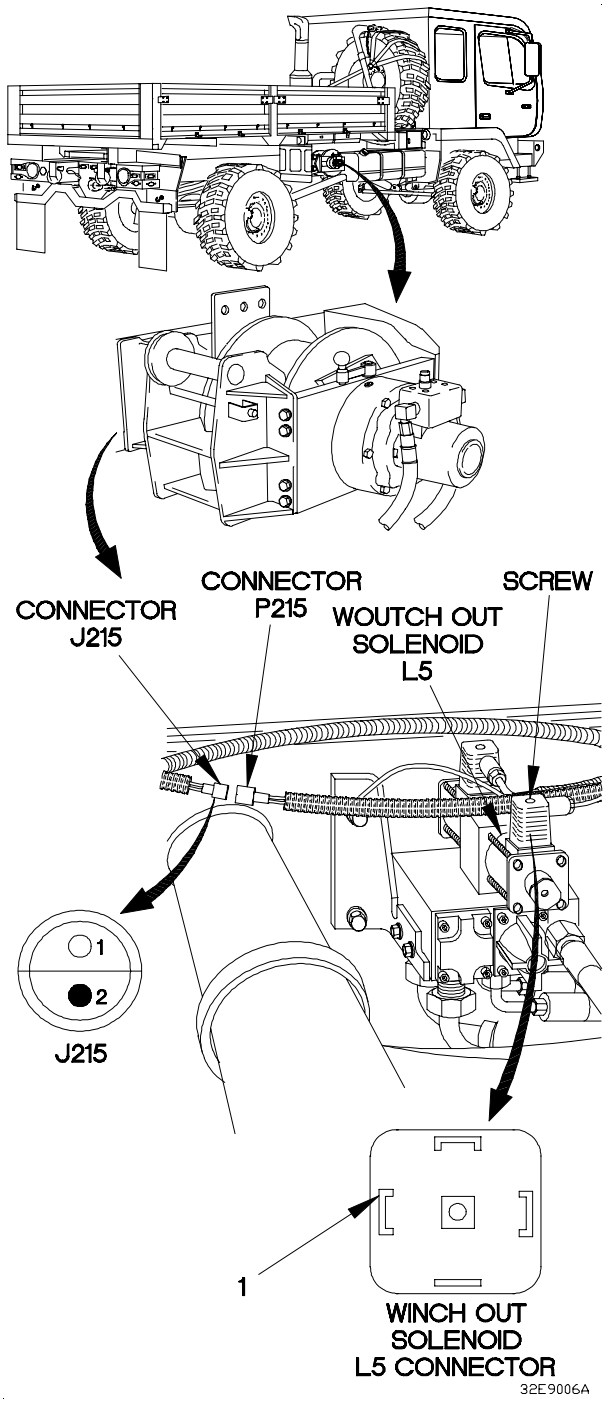


## e87. 11K SELF-RECOVERY WINCH DOES NOT PAY OUT (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J215-1.
(3) Connect negative (-) probe of multimeter to winch out solenoid L5 connector terminal 1 and note reading on multimeter.
(4) If continuity is not present, repair wire 2008 (para 2-40) or replace winch control valve cable assembly (para 7-85).
(5) If continuity is present, notify DS Maintenance.
(6) Connect connector P215 to connector J215.
(7) Connect winch out solenoid L5 connector to solenoid L5 and tighten screw.



## e88. PTO DOES NOT OPERATE

**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 78, Appendix C)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)
Wire, Relay Test (Item E-9, Appendix E)

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.

**POSSIBLE PROBLEMS**

Faulty PTO cable assembly.
Faulty PTO.
Faulty dashboard cable assembly.
Faulty auxiliary panel cable assembly.
Faulty PTO switch.
Faulty WTEC II VIM.
Faulty WTEC II relay SF02.
Faulty WTEC III relay K37.
Faulty WTEC III transmission ECU.

**WARNING**
**Read WARNING on following page.**

**1.** Is 24 VDC present at connector P217-B?

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

**NO** → Go to step 3 of this fault.

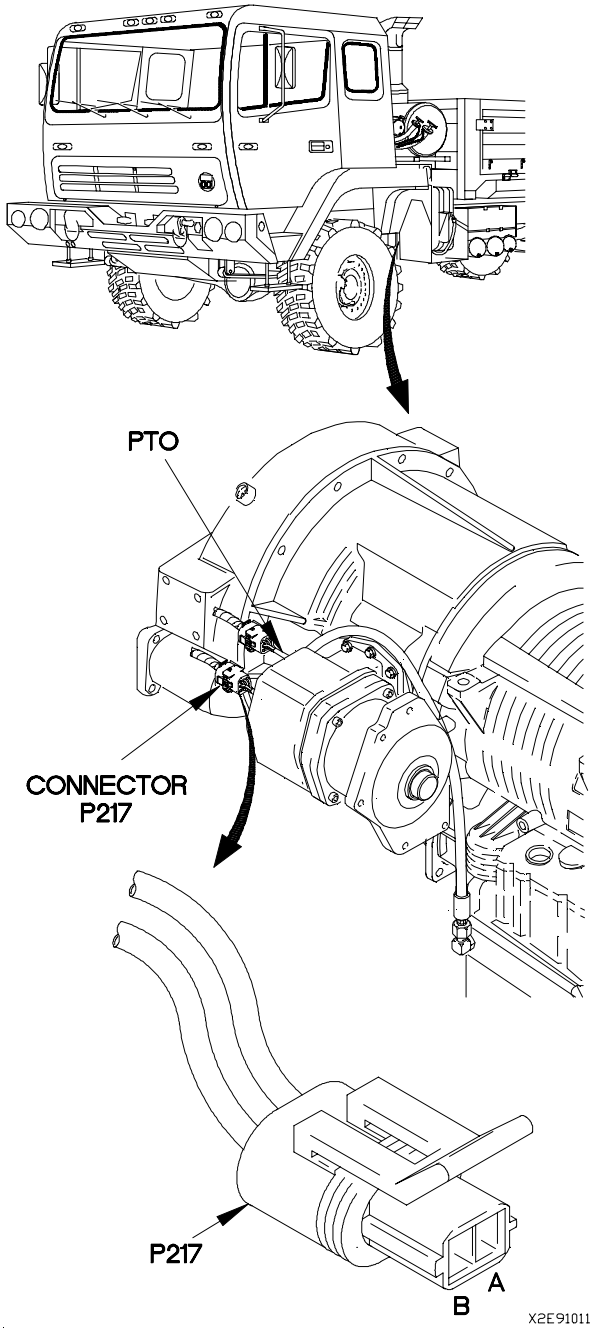
**YES**

**WARNING**

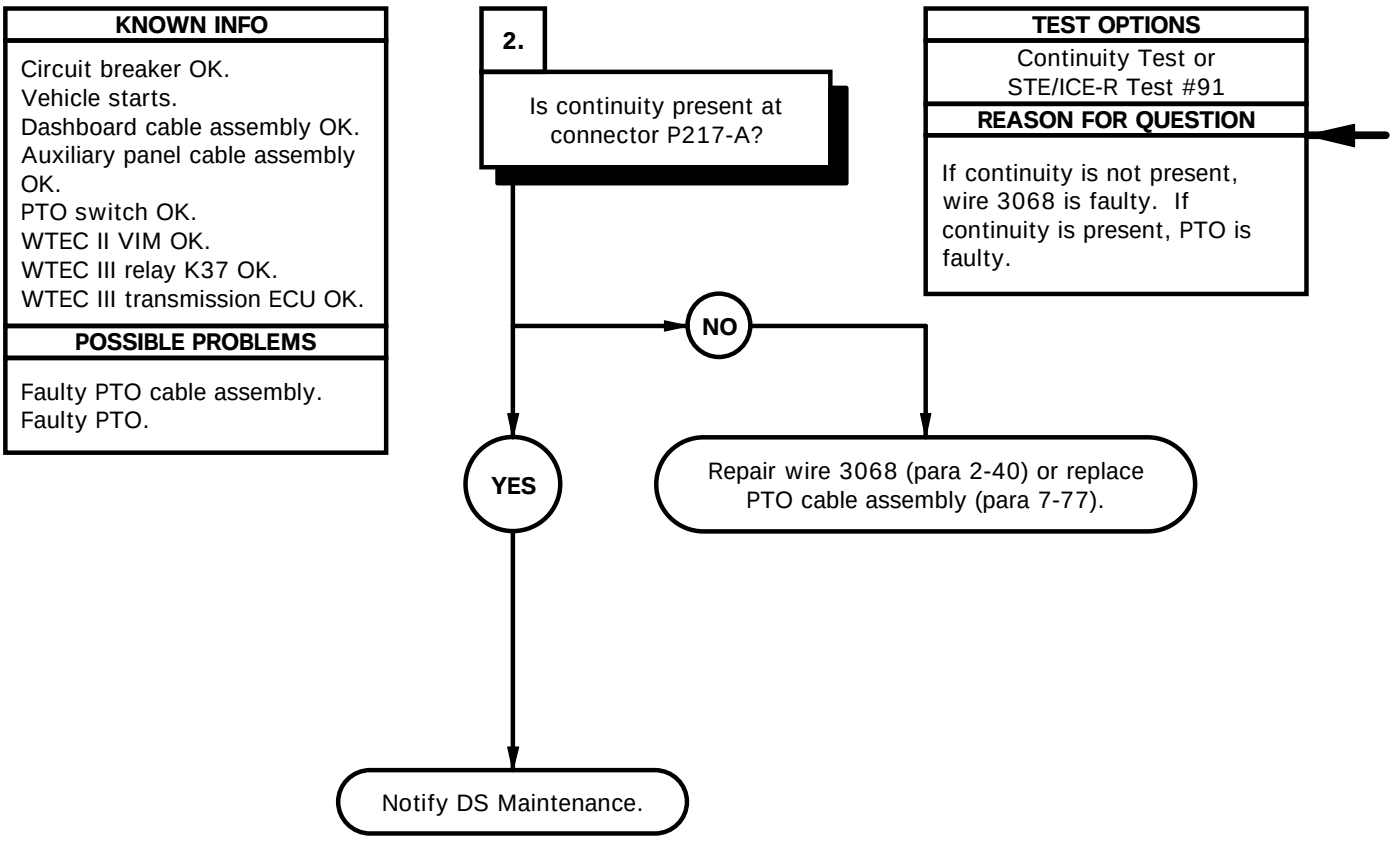
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect connector P217 from PTO.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector P217-B.
(4) Connect negative (-) probe of multimeter to ground.
(5) Start engine (TM 9-2320-365-10).
(6) Position PTO switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, go to step 3 of this fault.
(8) Position PTO switch to off (TM 9-2320-365-10).
(9) Shut down engine (TM 9-2320-365-10).

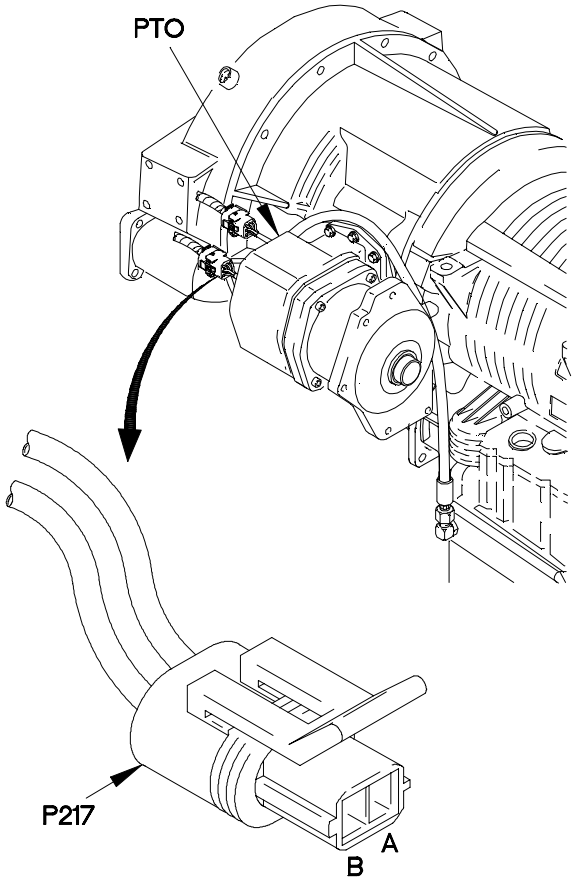


## e88. PTO DOES NOT OPERATE (CONT)

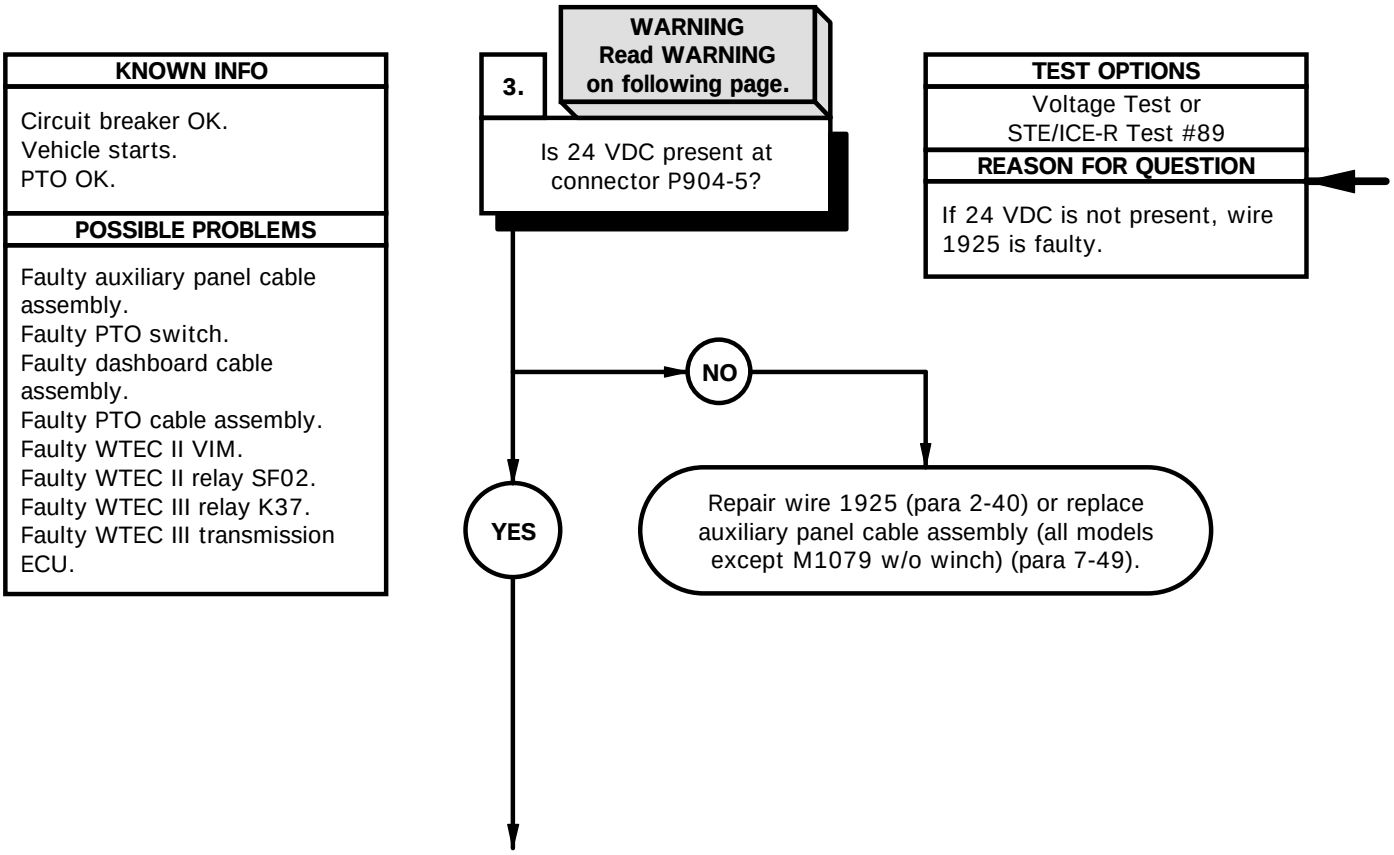


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P217-A.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3068 (para 2-40) or replace PTO cable assembly (para 7-77).
(5) If continuity is present, notify DS Maintenance.
(6) Connect connector P217 to PTO.



## e88. PTO DOES NOT OPERATE (CONT)

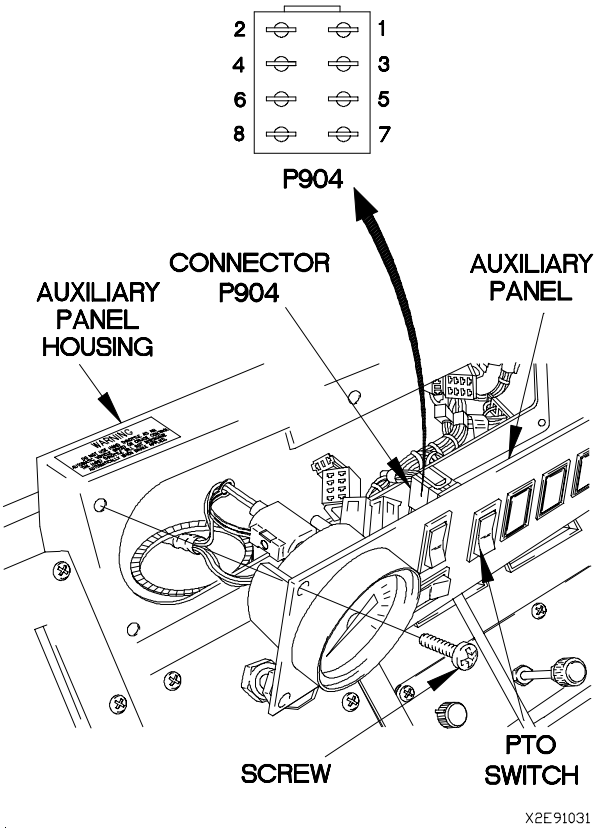


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove six screws from auxiliary panel.
(2) Lift auxiliary panel from auxiliary panel housing to gain access.
(3) Disconnect connector P904 from PTO switch.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector P904-5.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, repair wire 1925 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49).
(9) Position master power switch to off (TM 9-2320-365-10).



## e88. PTO DOES NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.
PTO OK.

**POSSIBLE PROBLEMS**

Faulty PTO switch.
Faulty auxiliary panel cable assembly.
Faulty dashboard cable assembly.
Faulty PTO cable assembly.
Faulty WTEC II VIM.
Faulty WTEC II relay SF02.
Faulty WTEC III relay K37.
Faulty WTEC III transmission ECU.

**4.**

Is continuity present from PTO switch terminal 5 to terminal 1?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, PTO switch is faulty.

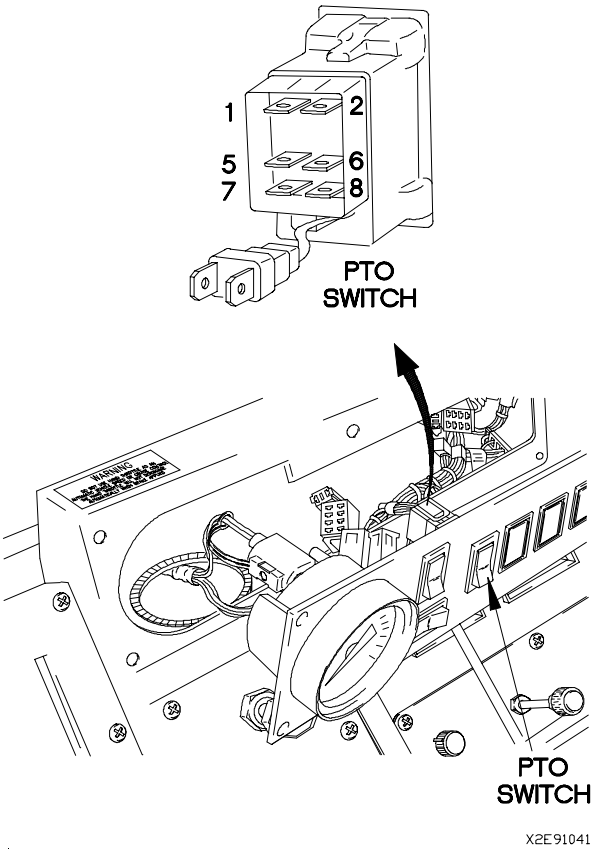
NO

Replace PTO switch (para 7-18).

YES

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PTO switch terminal 5.
(3) Connect negative (-) probe of multimeter to PTO switch terminal 1.
(4) Position PTO switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If continuity is not present, replace PTO switch (para 7-18).
(6) Position PTO switch to off (TM 9-2320-365-10).



## e88. PTO DOES NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.
PTO OK.
PTO switch OK.

**POSSIBLE PROBLEMS**

Faulty PTO cable assembly.
Faulty WTEC II VIM.
Faulty dashboard cable assembly.
Faulty auxiliary panel cable assembly.
Faulty WTEC II relay SF02.
Faulty WTEC III relay K37.
Faulty WTEC III transmission ECU.

**5.**

Is continuity present from connector P210-4 to connector P217-B?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 2019 is faulty.

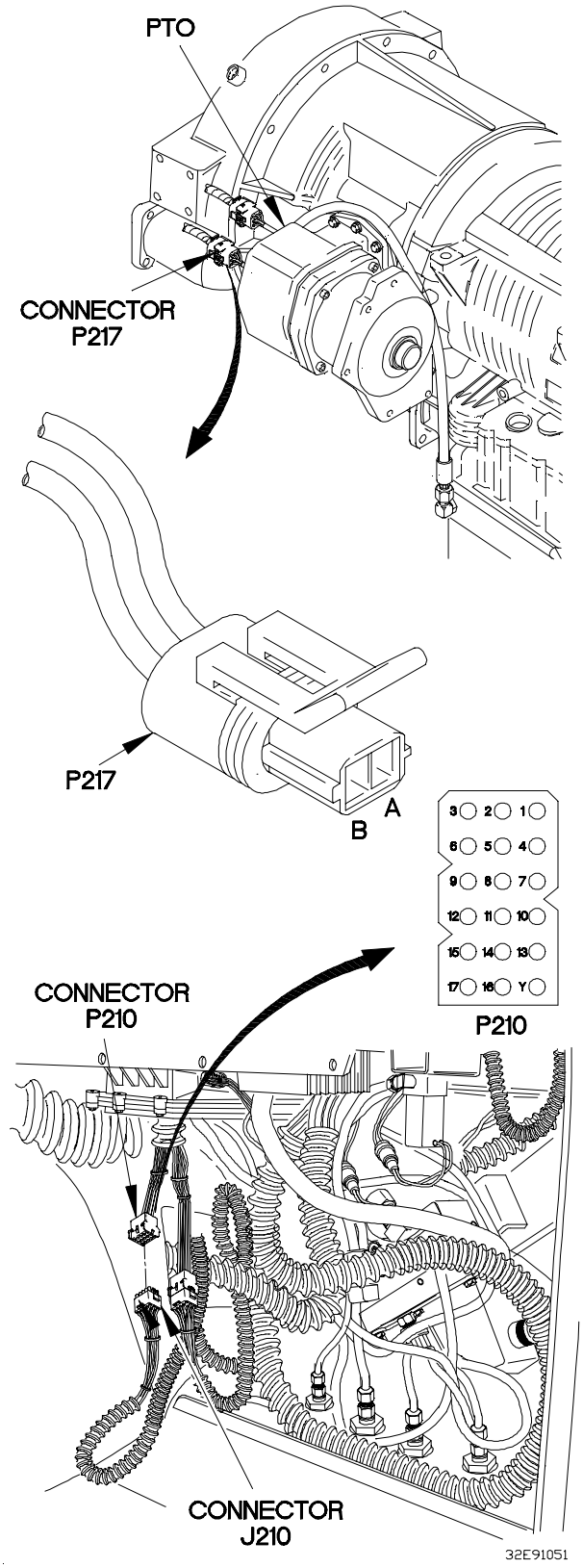
NO

Repair wire 2019 (para 2-40) or replace PTO cable assembly (para 7-77).

YES

**CONTINUITY TEST**

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P210 from connector J210.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P210-4.
(5) Disconnect connector P217 from PTO.
(6) Connect negative (-) probe of multimeter to connector P217-B and note reading on multimeter.
(7) If continuity is not present, repair wire 2019 (para 2-40) or replace PTO cable assembly (para 7-77).
(8) Connect connector P217 to PTO.
(9) Connect connector P210 to connector J210.



## e88. PTO DOES NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.
PTO OK.
PTO switch OK.
PTO cable assembly OK.

**POSSIBLE PROBLEMS**

Faulty WTEC II VIM.
Faulty dashboard cable assembly.
Faulty auxiliary panel cable assembly.
Faulty WTEC II relay SF02.
Faulty WTEC III relay K37.
Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.

**6.**

Is vehicle equipped with WTEC II transmission controls?

**NO**

Go to step 13 of this fault.

**YES**

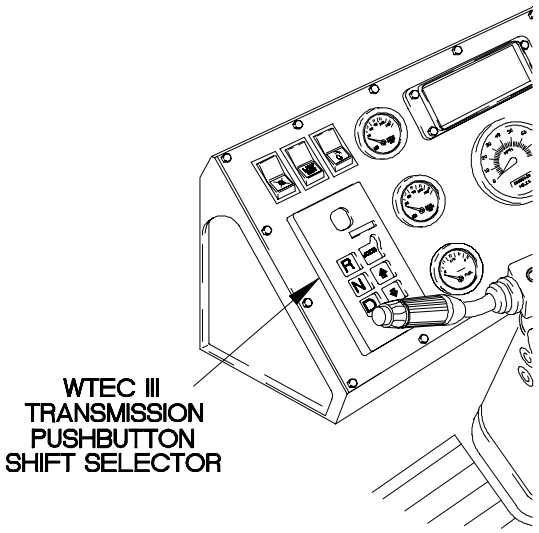
**TEST OPTIONS**

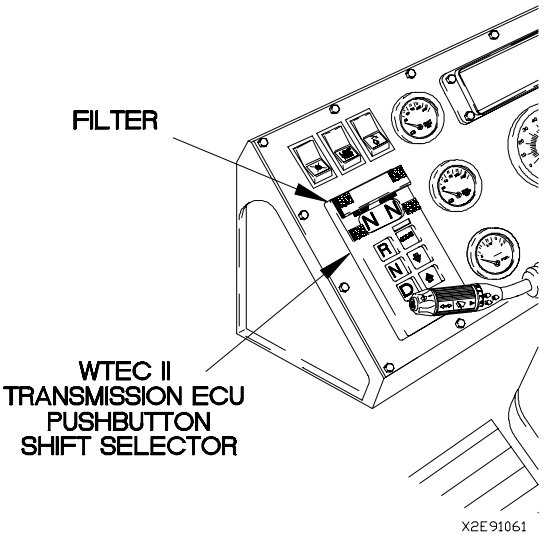
Visual inspection

**REASON FOR QUESTION**

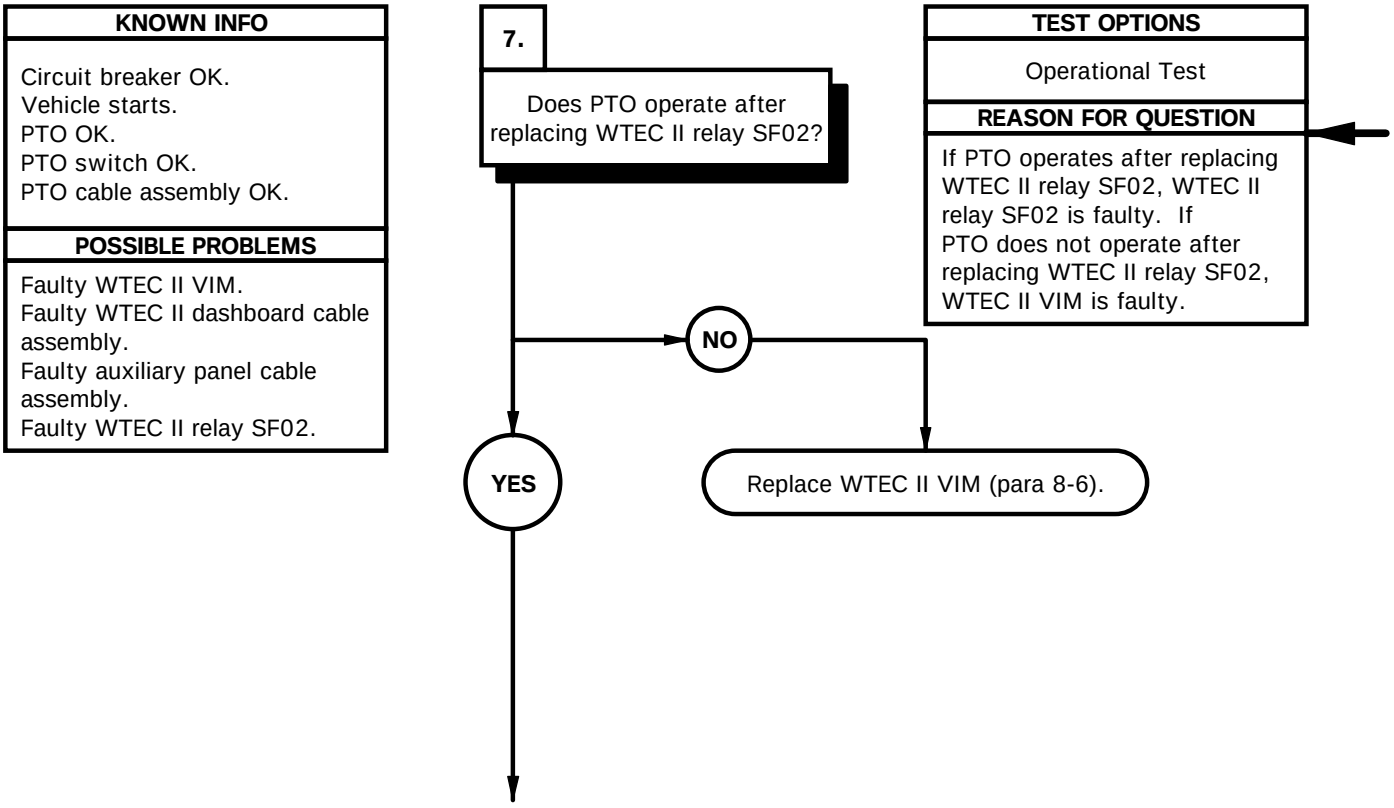
This question eliminates possible problems and determines where troubleshooting continues.

(1) Check if vehicle is equipped with WTEC II transmission ECU pushbutton shift selector.
(2) If transmission pushbutton shift selector is not mounted with four screws and does not have a filter cover, go to step 13.



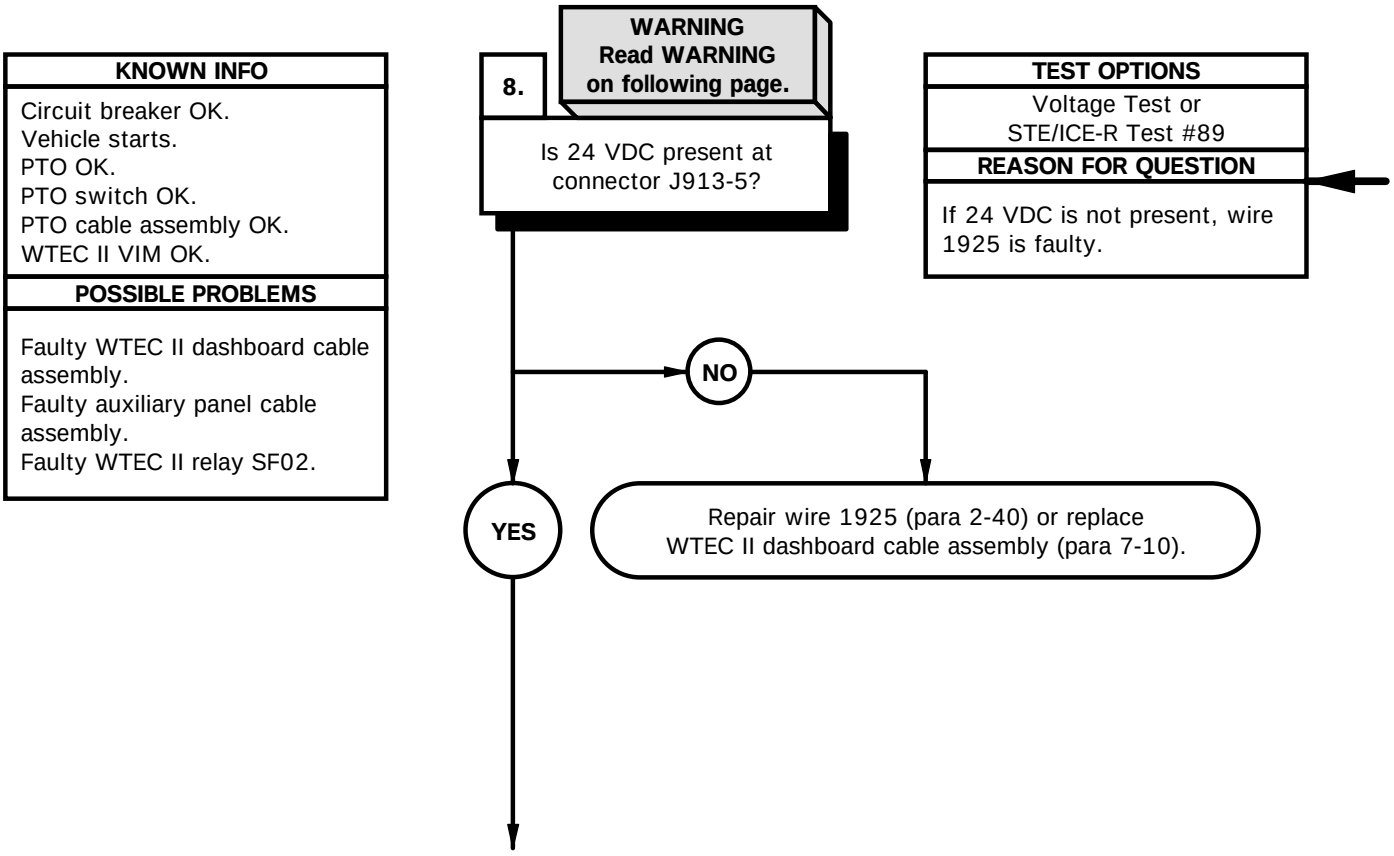



## e88. PTO DOES NOT OPERATE (CONT)



| OPERATIONAL TEST |
| --- |
| (1) Remove WTEC II relay SF02 (para 8-6).<br>(2) Install new WTEC II relay SF02 (para 8-6).<br>(3) Start engine (TM 9-2320-365-10).<br>(4) Position PTO switch to on (TM 9-2320-365-10-1).<br>(5) If PTO operates, replace WTEC II relay SF02 (para 8-6).<br>(6) If PTO does not operate, replace WTEC II VIM (para 8-6). |

## e88. PTO DOES NOT OPERATE (CONT)

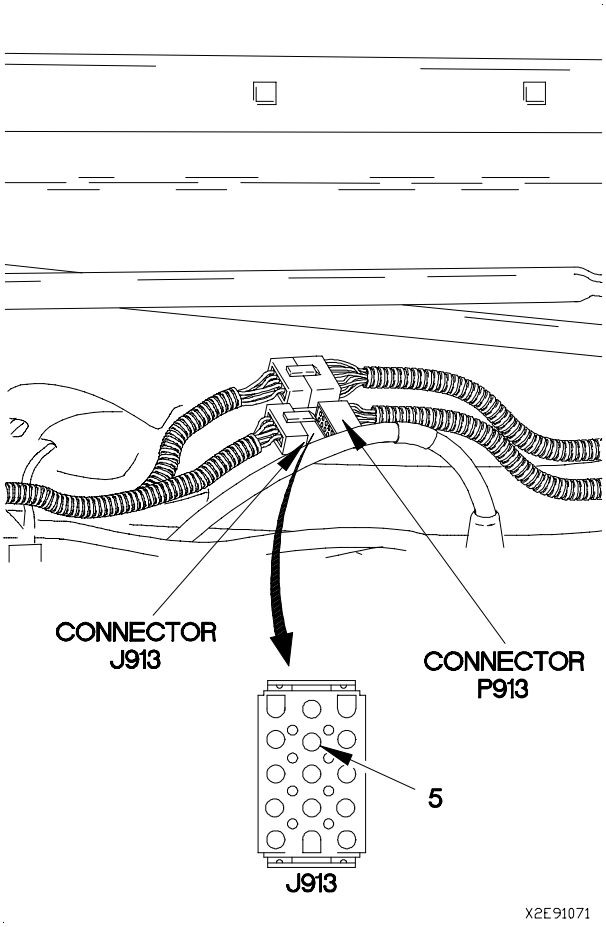


**WARNING**

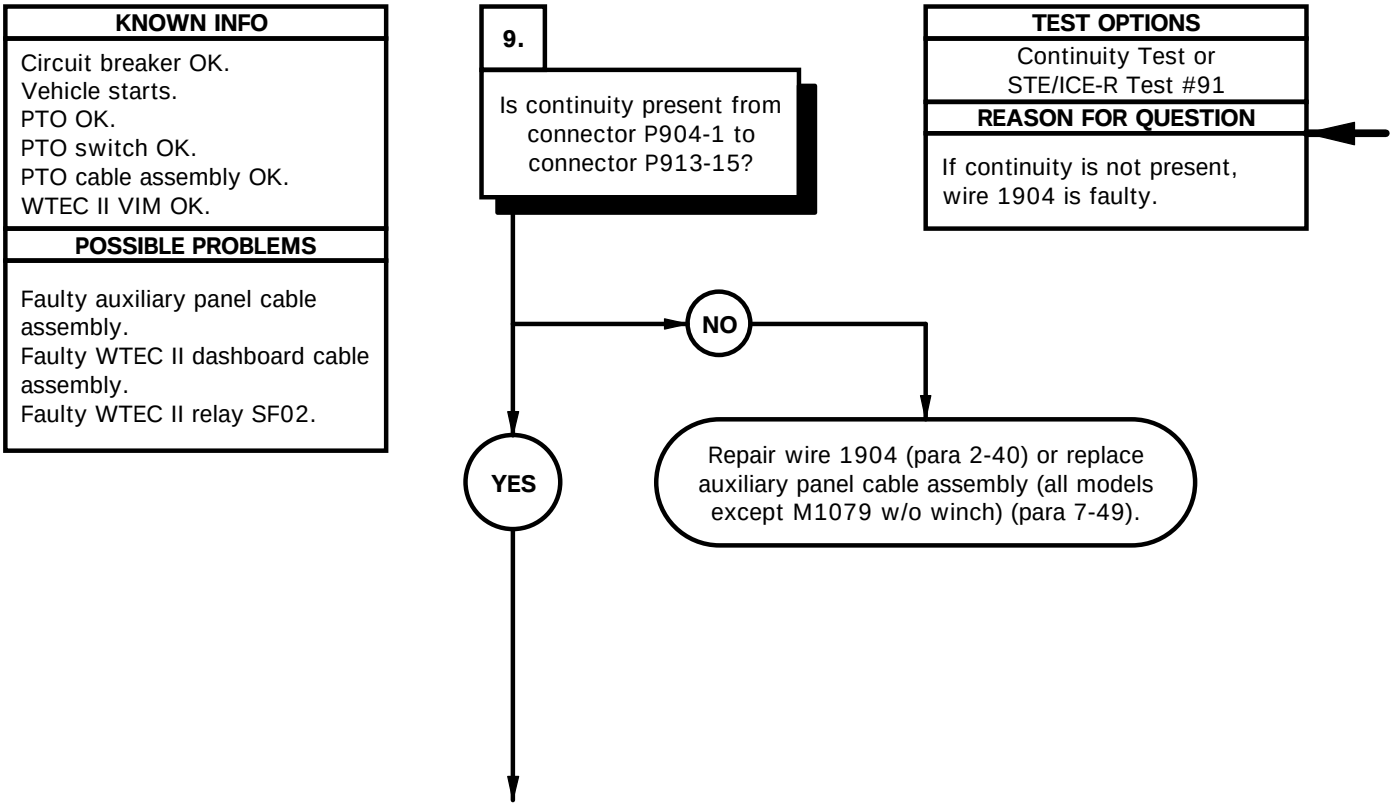
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector J913 from connector P913.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector J913-5.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, repair wire 1925 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(8) Position master power switch to off (TM 9-2320-365-10).

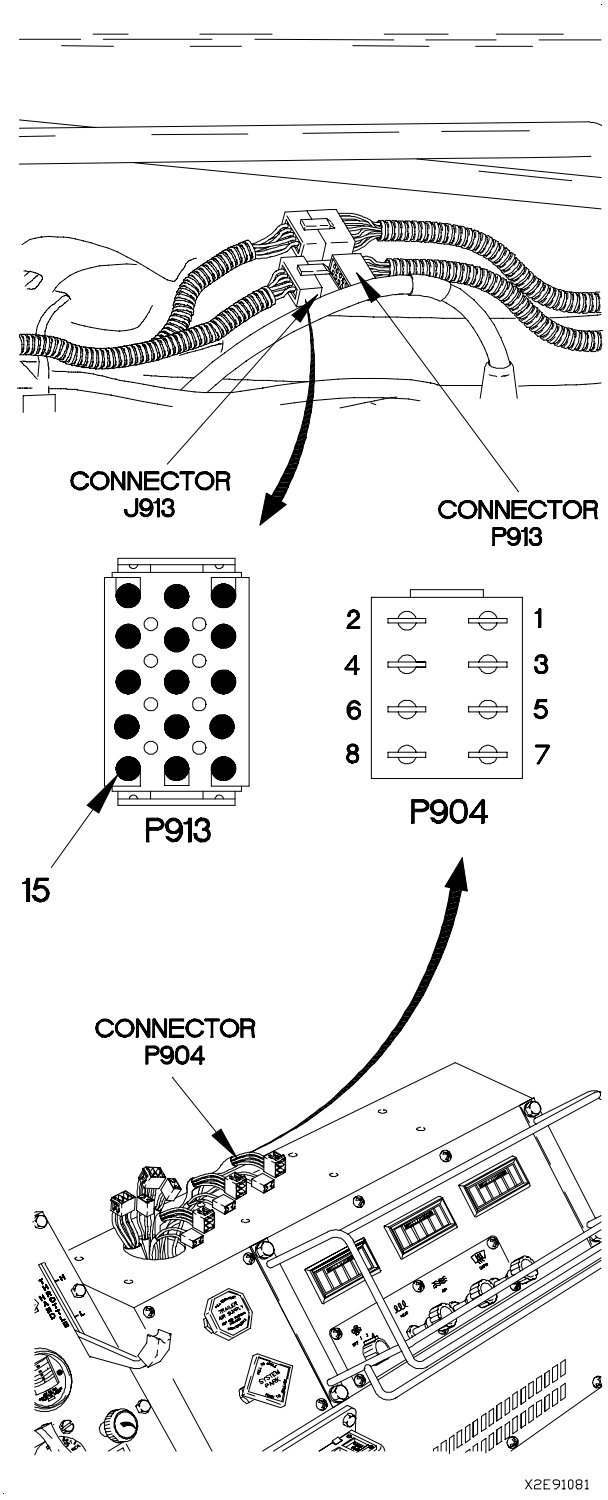


## e88. PTO DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P904-1.
(3) Connect negative (-) probe of multimeter to connector P913-15 and note reading on multimeter.
(4) If continuity is not present, repair wire 1904 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch (para 7-49).



## e88. PTO DOES NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.
PTO OK.
PTO switch OK.
PTO cable assembly OK.
WTEC II VIM OK.

**POSSIBLE PROBLEMS**

Faulty WTEC II dashboard cable assembly.
Faulty auxiliary panel cable assembly.
Faulty WTEC II relay SF02.

**10.** Is continuity present from connector J913-15 to connector PX33-E3?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 1904 is faulty.

**NO** → Repair wire 1904 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

**YES**

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.
PTO OK.
PTO switch OK.
PTO cable assembly OK.
WTEC II VIM OK.

**POSSIBLE PROBLEMS**

Faulty WTEC II dashboard cable assembly.
Faulty auxiliary panel cable assembly.
Faulty WTEC II relay SF02.

**11.** Is continuity present from connector PX33-E2 to connector J913-14?

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 2019 is faulty.

**NO** → Repair wire 2019 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

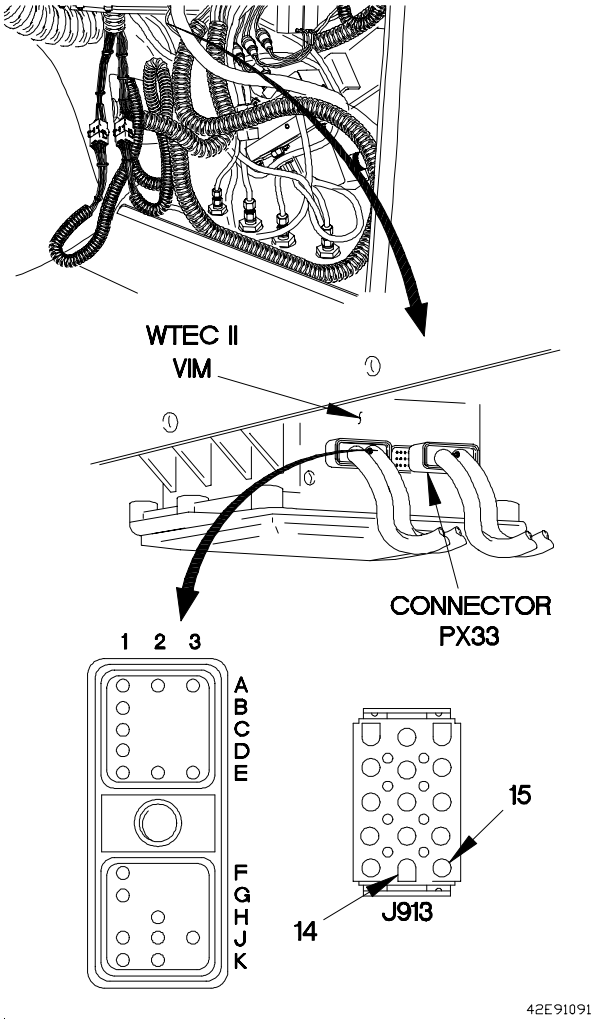
**YES**

**CONTINUITY TEST**

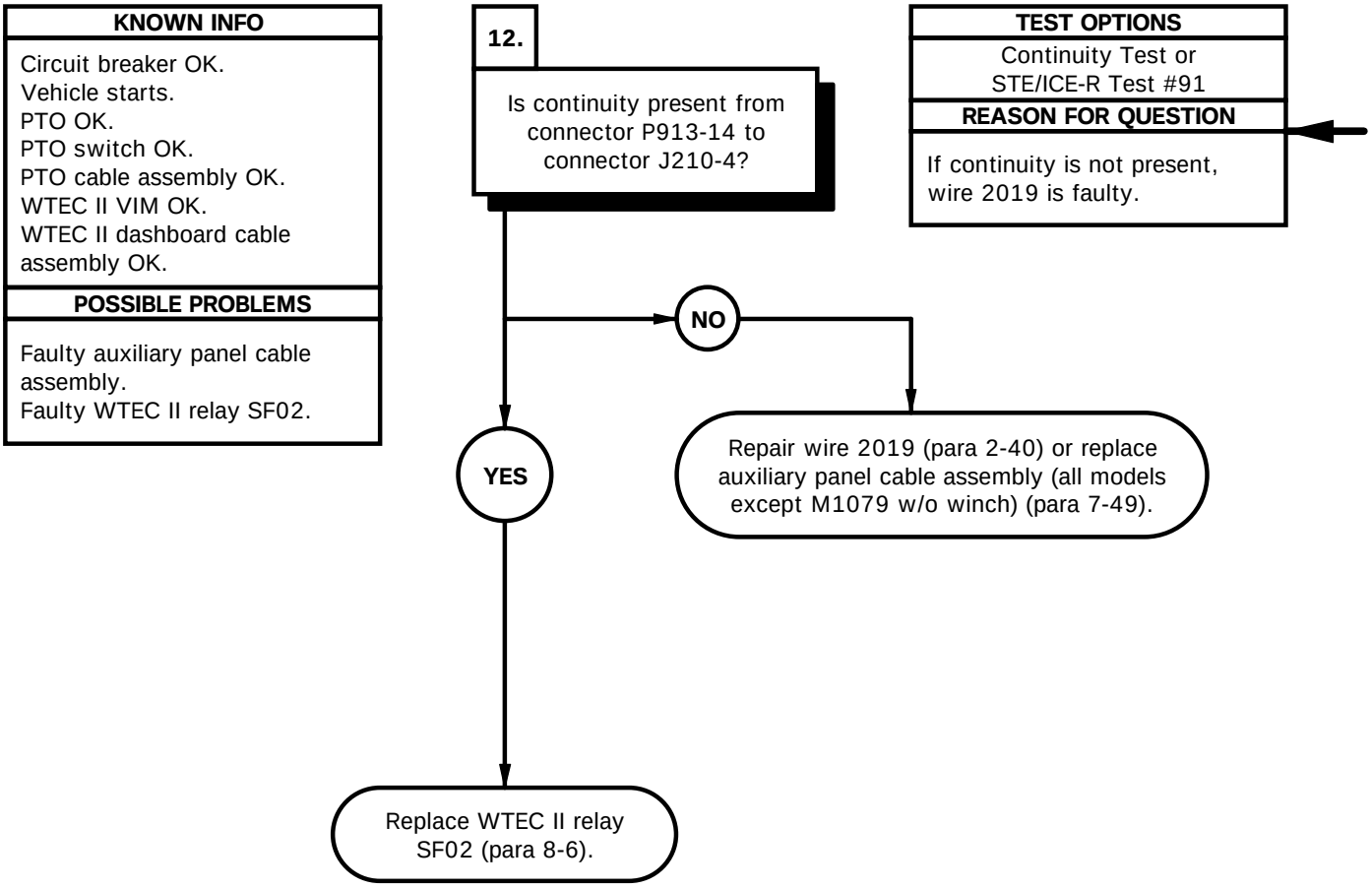
(1) Loosen screw in connector PX33.
(2) Disconnect connector PX33 from WTEC II VIM.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J913-15.
(5) Connect negative (-) probe of multimeter to connector PX33-E3 and note reading on multimeter.
(6) If continuity is not present, repair wire 1904 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX33-E2.
(3) Connect negative (-) probe of multimeter to connector J913-14 and note reading on multimeter.
(4) If continuity is not present, repair wire 2019 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(5) Connect connector PX33 to WTEC II VIM.
(6) Tighten screw in connector PX33.

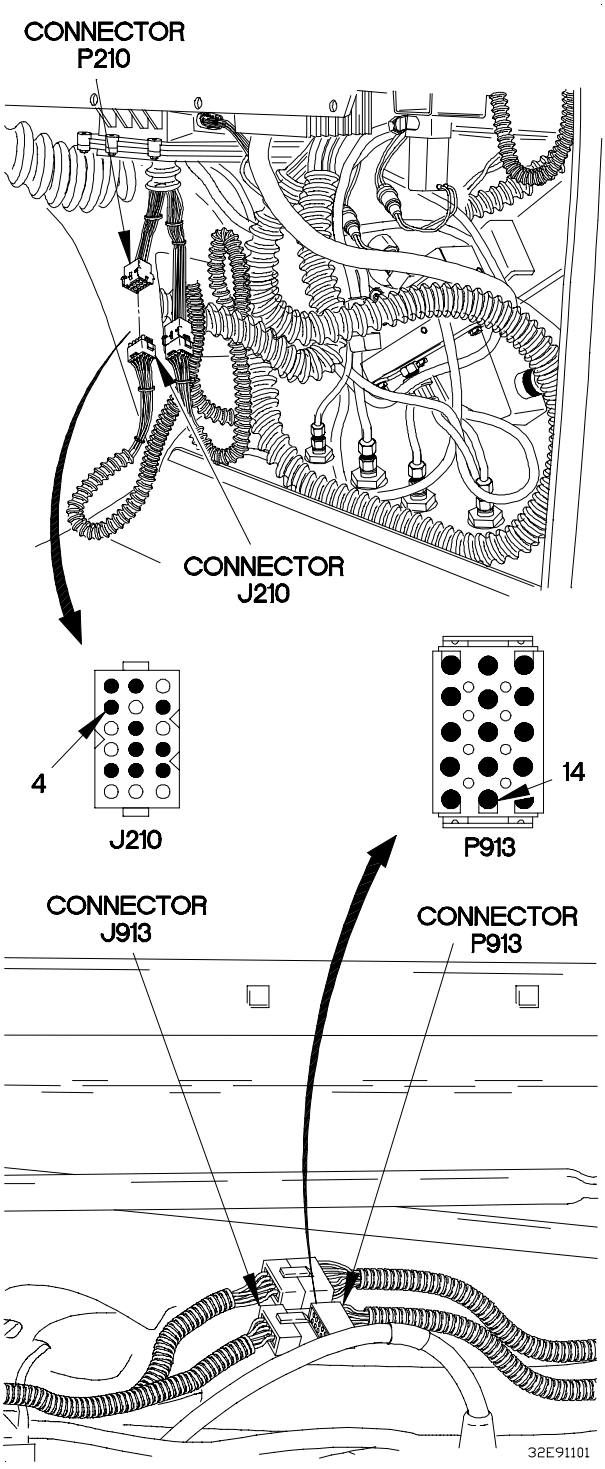


## e88. PTO DOES NOT OPERATE (CONT)

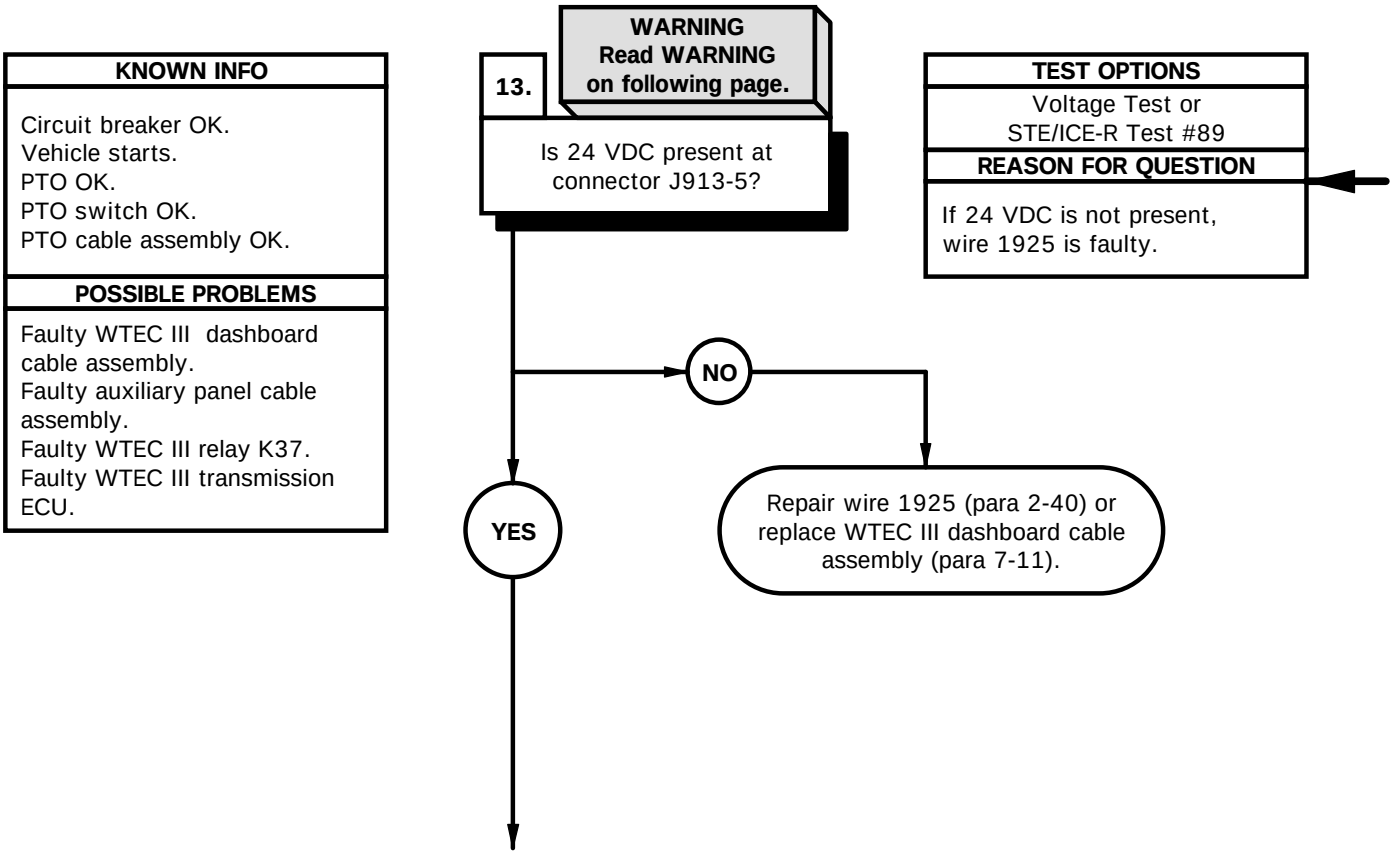


**CONTINUITY TEST**

(1) Disconnect connector P210 from connector J210.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P913-14.
(4) Connect negative (-) probe of multimeter to connector J210-4 and note reading on multimeter.
(5) If continuity is not present, repair wire 2019 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49).
(6) If continuity is present, replace WTEC II relay SF02 (para 8-6).
(7) Connect connector P913 to connector J913.
(8) Connect connector J210 to connector P210.
(9) Install personnel heater (para 18-9).



## e88. PTO DOES NOT OPERATE (CONT)

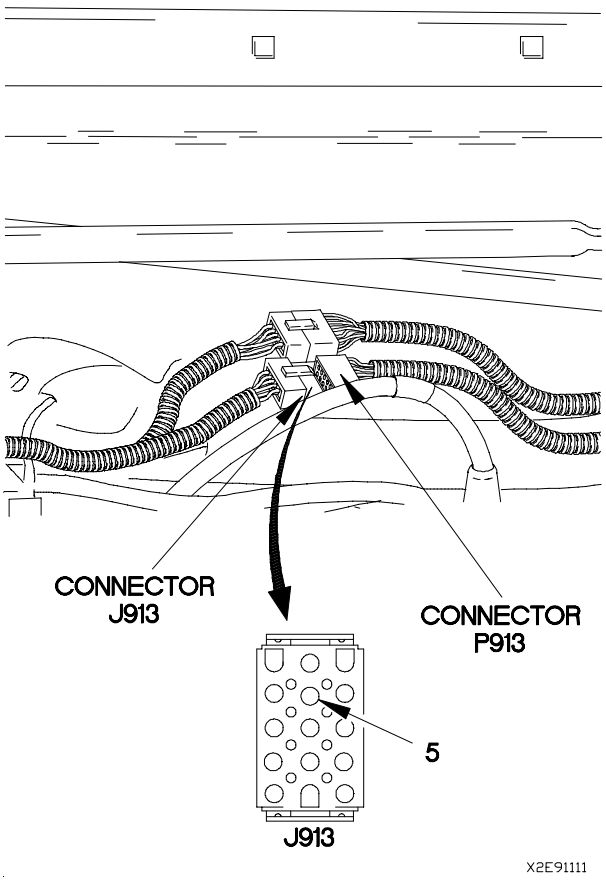


**WARNING**

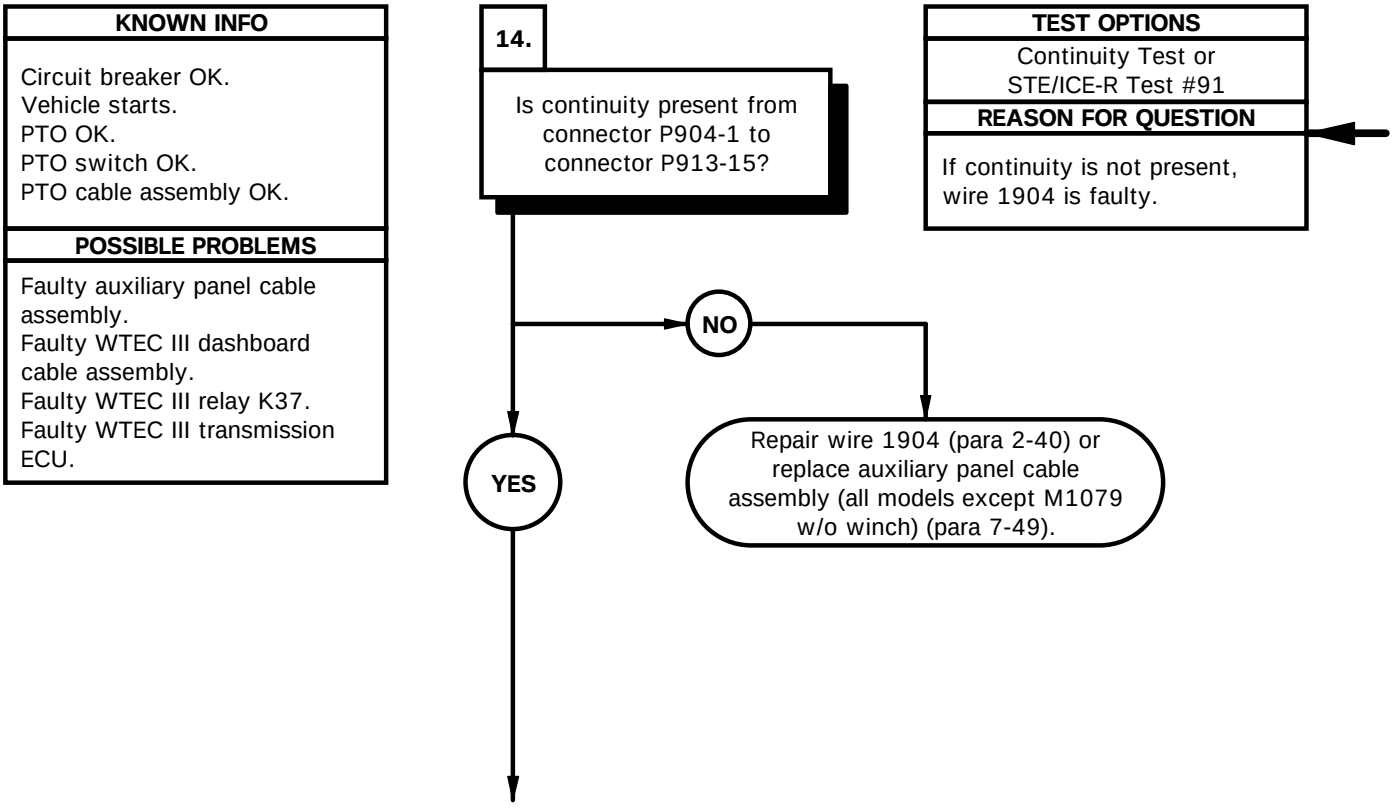
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove personnel heater for access (para 18-9).
(2) Disconnect connector J913 from connector P913.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector J913-5.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 VDC is not present, repair wire 1925 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(8) Position master power switch to off (TM 9-2320-365-10).

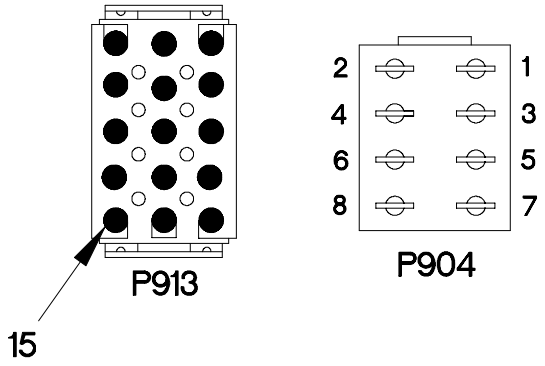


## e88. PTO DOES NOT OPERATE (CONT)



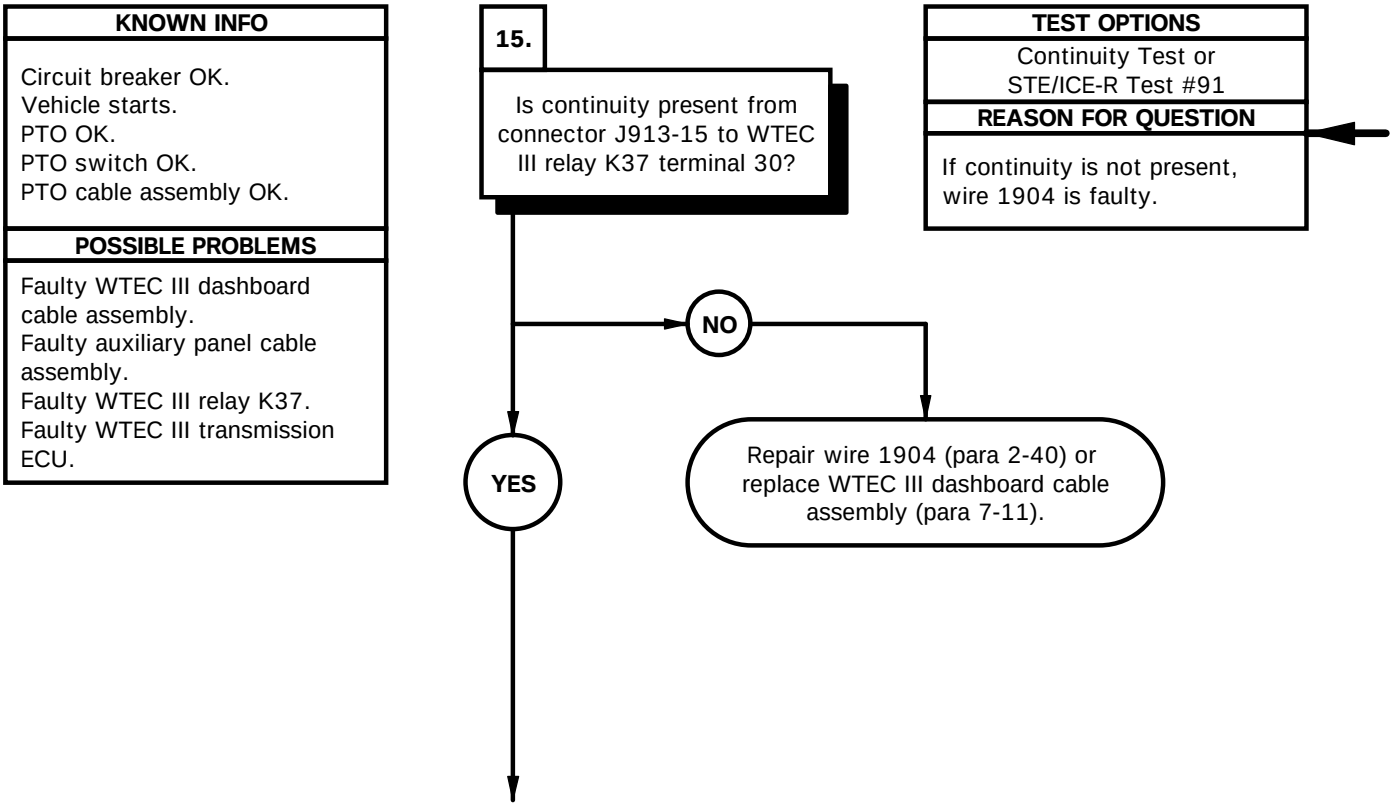
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P904-1.
(3) Connect negative (-) probe of multimeter to connector P913-15 and note reading on multimeter.
(4) If continuity is not present, repair wire 1904 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49).



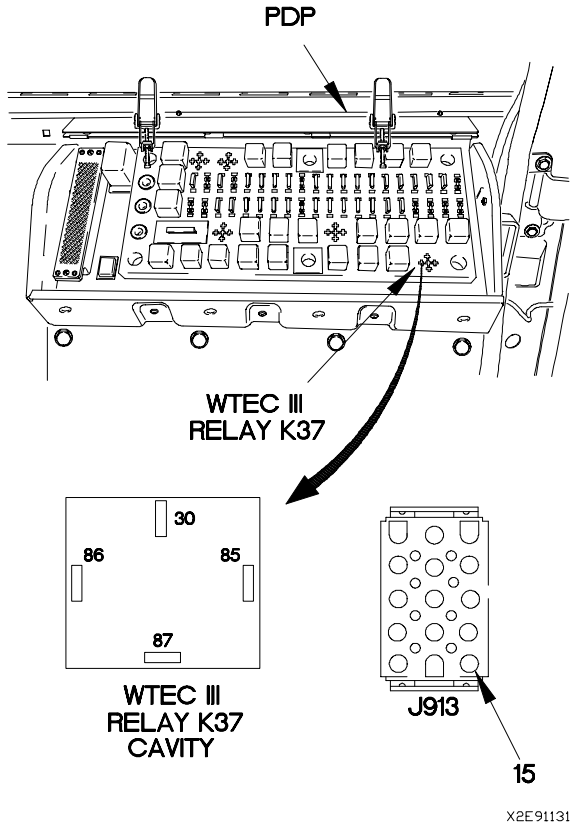

X2E91121

## e88. PTO DOES NOT OPERATE (CONT)

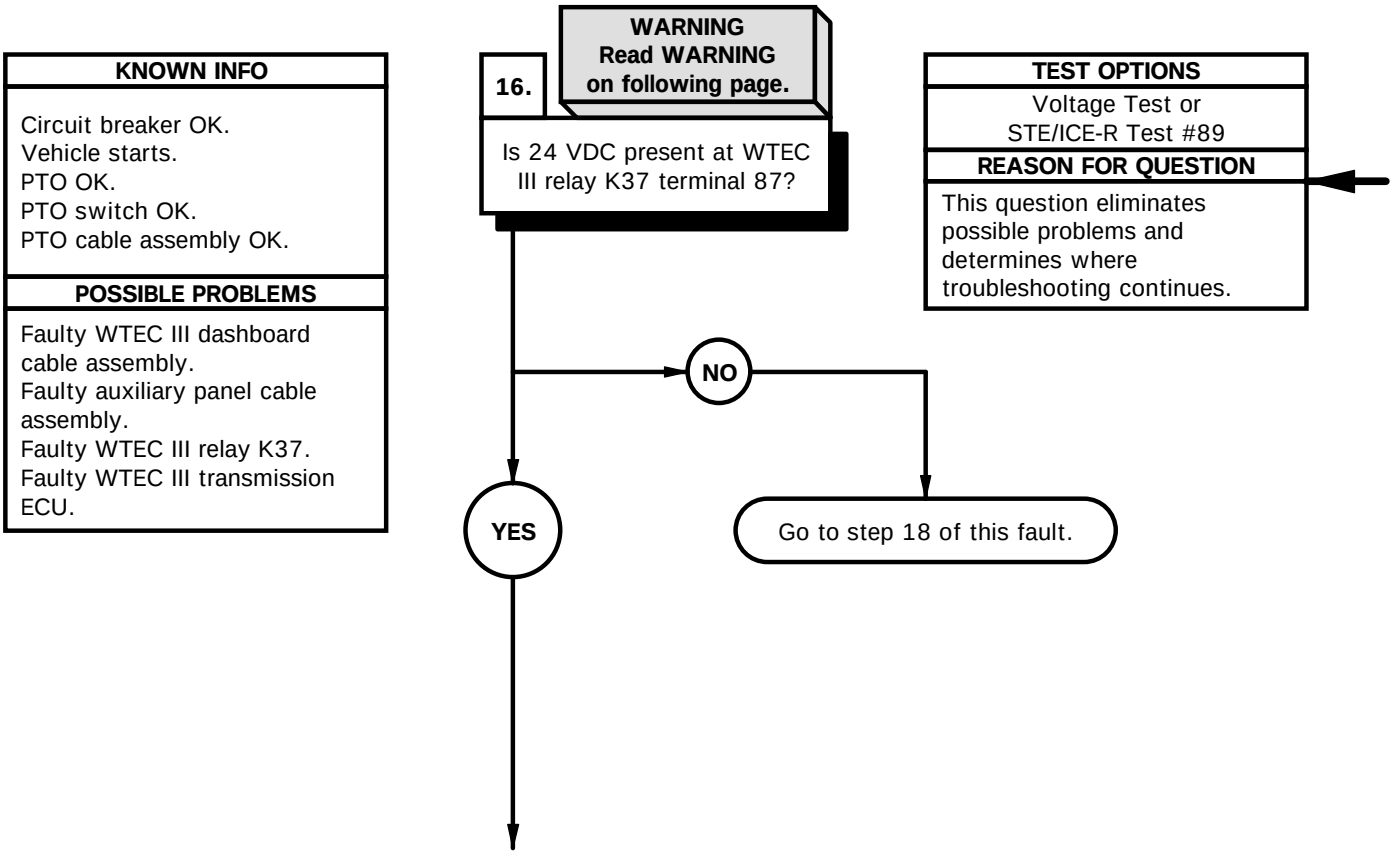


**CONTINUITY TEST**

(1) Remove WTEC III relay K37 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector J913-15.
(4) Connect negative (-) probe of multimeter to PDP, terminal 30, where WTEC III relay K37 was removed, and note reading on multimeter.
(5) If continuity is not present, repair wire 1904 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(6) Install WTEC III relay K37 in PDP.



## e88. PTO DOES NOT OPERATE (CONT)

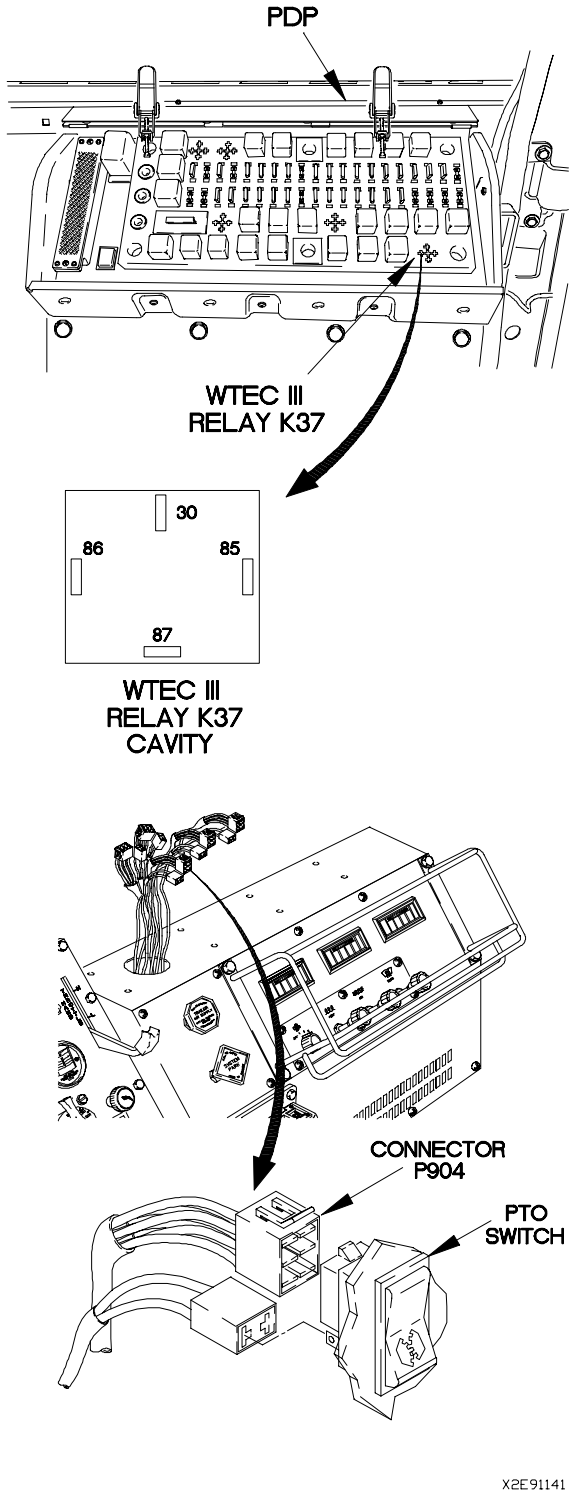


**WARNING**

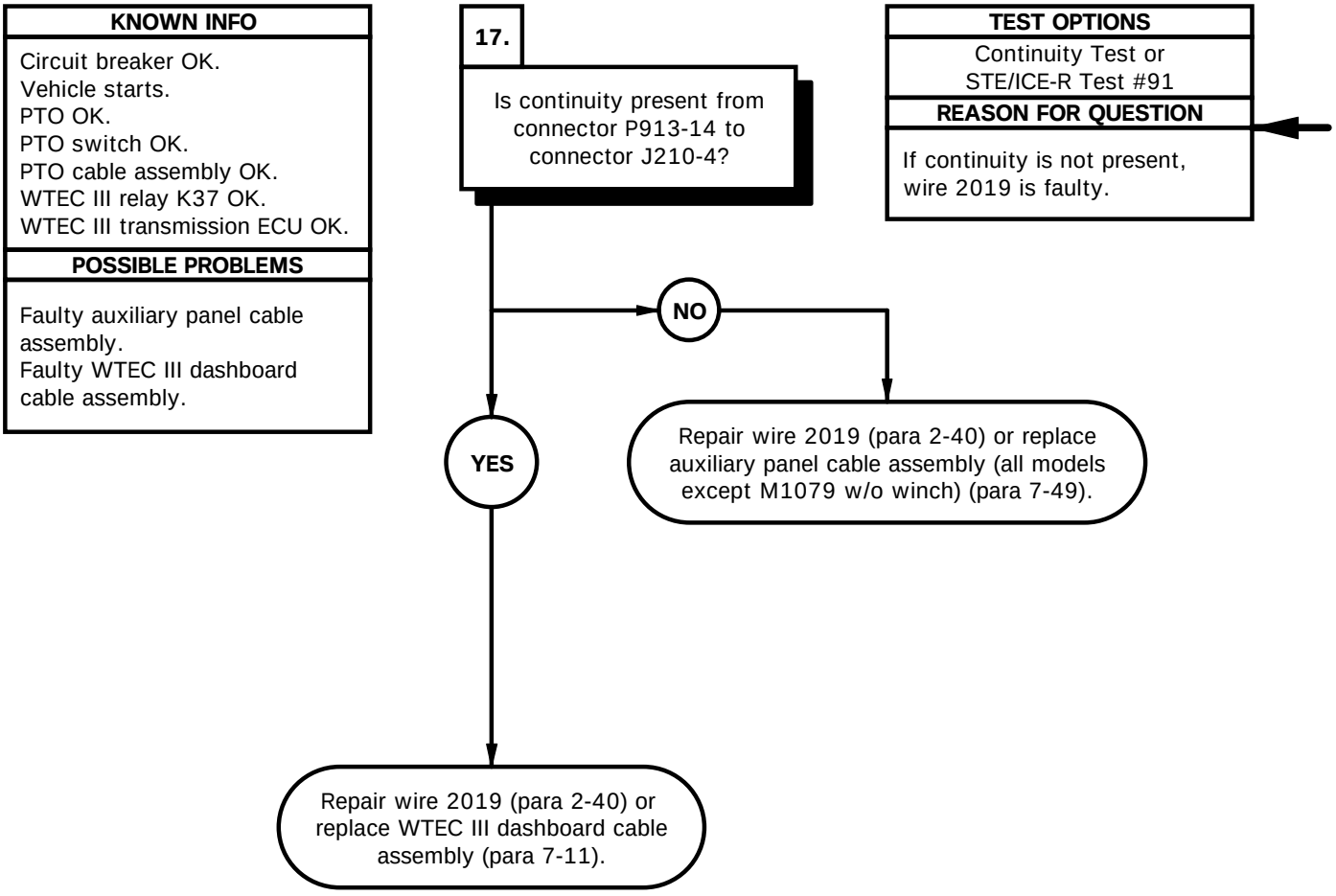
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Install personnel heater hoses (para 18-9).
(2) Remove PTO switch from auxiliary panel.
(3) Install PTO switch on connector P904.
(4) Remove WTEC III relay K37 from PDP.
(5) Insert relay test wire in PDP, terminal 87, where WTEC III relay K37 was removed.
(6) Install WTEC III relay K37 in PDP.
(7) Set multimeter to volts dc.
(8) Connect positive (+) probe of multimeter to relay test wire.
(9) Connect negative (-) probe of multimeter to ground.
(10) Start engine (TM 9-2320-365-10).
(11) Position PTO switch to on (TM 9-2320-365-10) and note reading on multimeter.
(12) If 24 vdc is not present, go to step 18 of this faulty.
(13) Position PTO switch to off (TM 9-2320-365-10).
(14) Shut down engine (TM 9-2320-365-10).
(15) Remove WTEC III relay relay K37 from PDP.
(16) Remove relay test wire from PDP.
(17) Install WTEC III relay K37 in PDP.

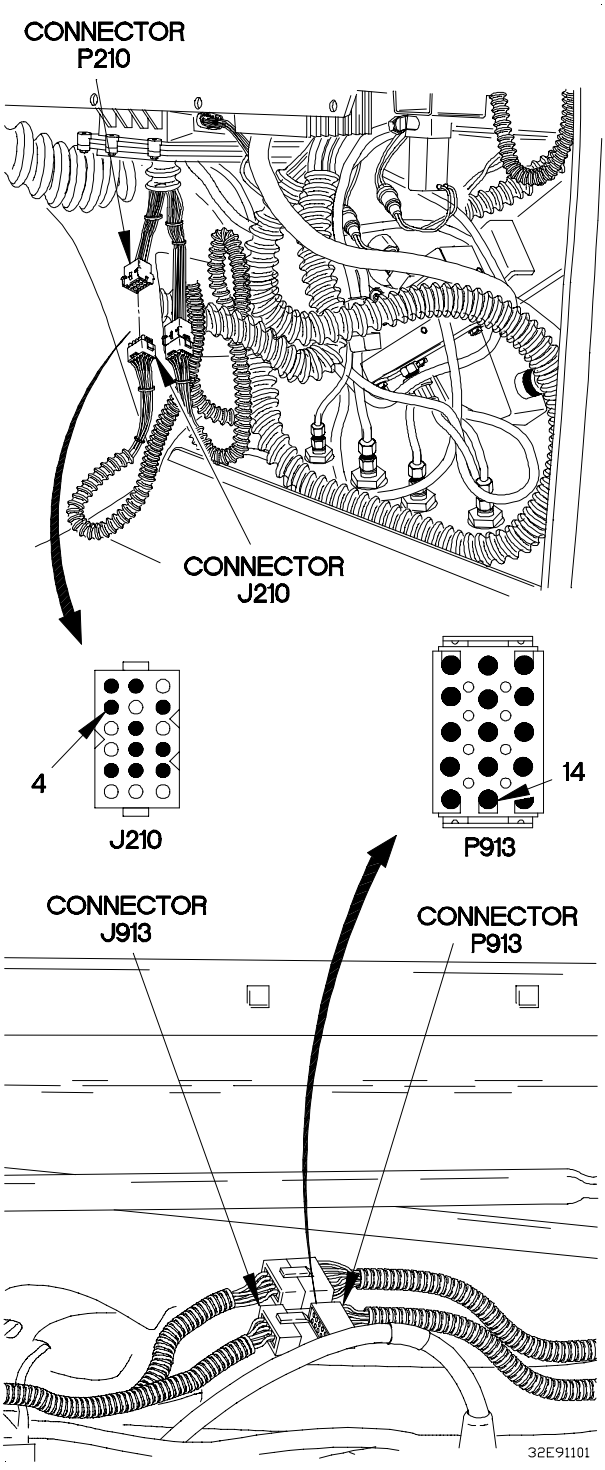


## e88. PTO DOES NOT OPERATE (CONT)

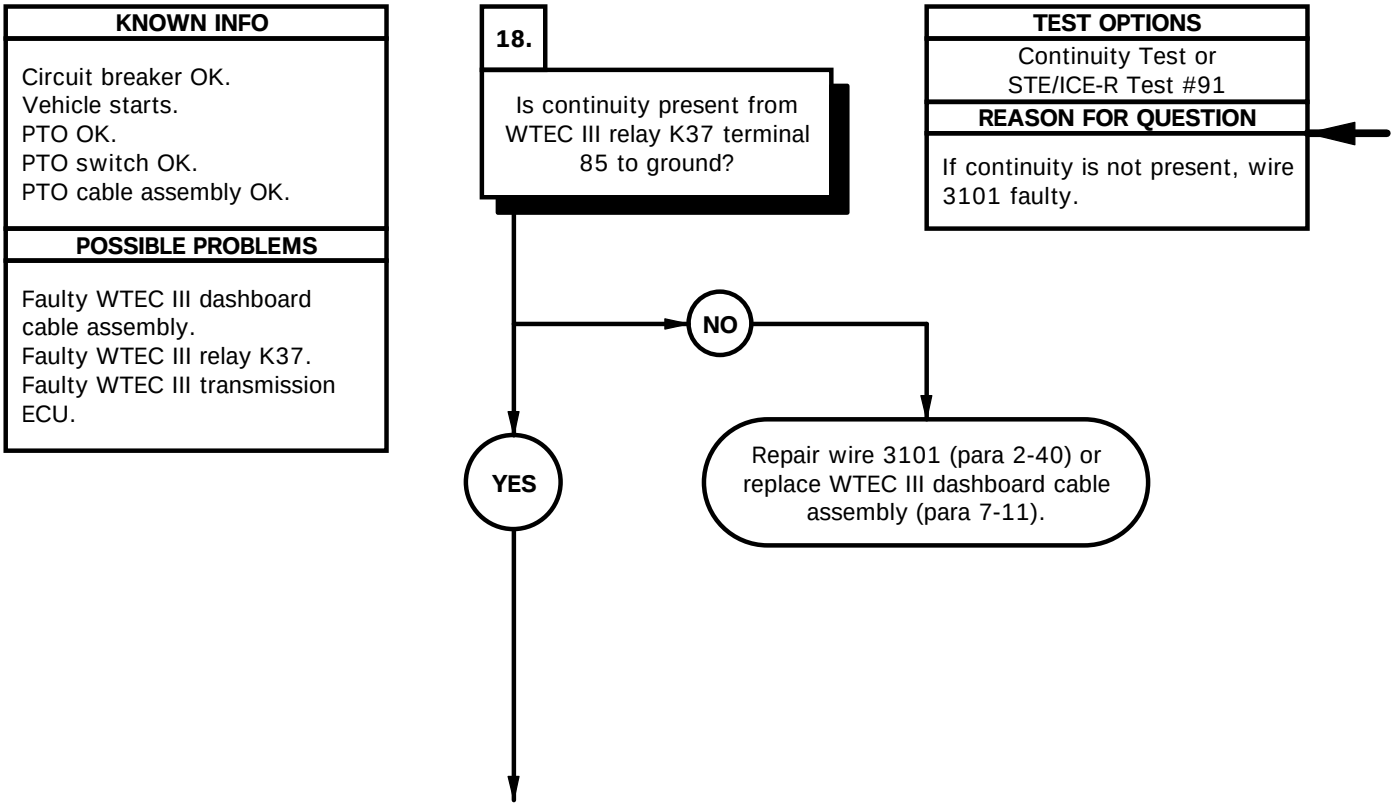


**CONTINUITY TEST**

(1) Disconnect connector P210 from connector J210.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P913-14.
(4) Connect negative (-) probe of multimeter to connector J210-4 and note reading on multimeter.
(5) If continuity is not present, repair wire 2019 (para 2-40) or replace auxiliary panel cable assembly (all models except M1079 w/o winch) (para 7-49).
(6) If continuity is present, repair wire 2019 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(7) Connect connector P913 to connector J913.
(8) Remove PTO switch from connector P904.
(9) Install personnel heater (para 18-9).

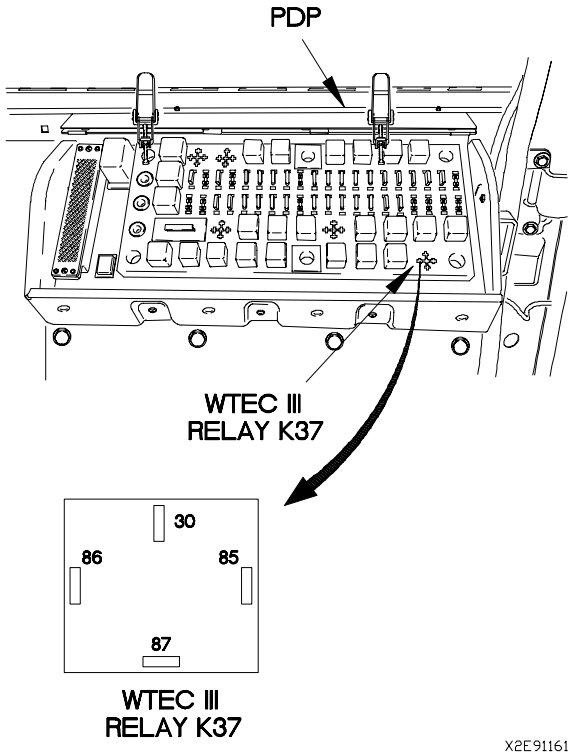


## e88. PTO DOES NOT OPERATE (CONT)

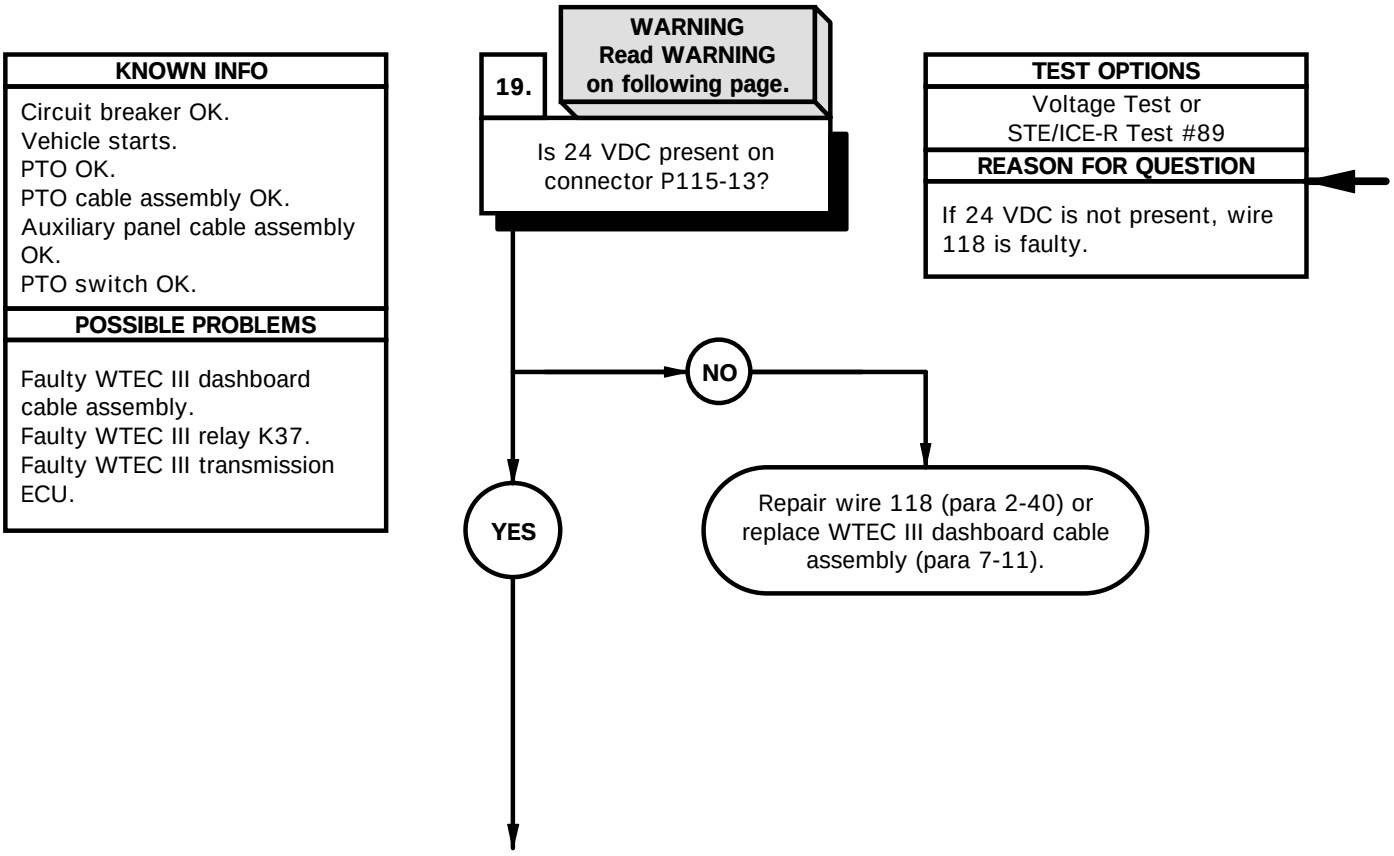


**CONTINUITY TEST**

(1) Remove WTEC III relay K37 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive ( + ) probe of multimeter to PDP, terminal 85, where WTEC III relay K37 was removed.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If continuity is not present, repair wire 3101 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).



## e88. PTO DOES NOT OPERATE (CONT)

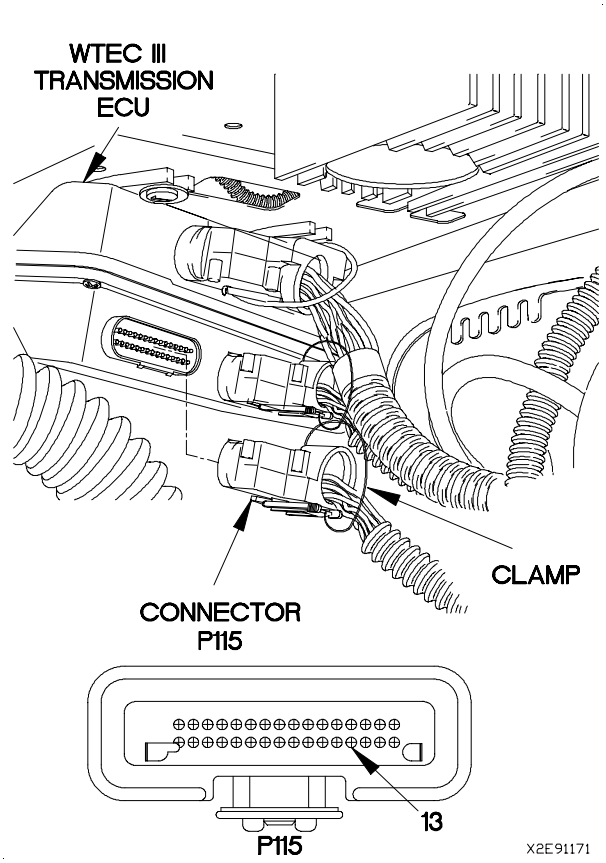


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Disconnect connector clamp from connector P115.
(2) Disconnect connector P115 from WTEC III transmission ECU.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector P115-13.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10).
(7) Position PTO switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 VDC is not present, repair wire 118 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(9) Position PTO switch to off (TM 9-2320-365-10).
(10) Position master power switch to off (TM 9-2320-365-10).



## e88. PTO DOES NOT OPERATE (CONT)

**KNOWN INFO**

Circuit breaker OK.
Vehicle starts.
PTO OK.
PTO cable assembly OK.
Auxiliary panel cable assembly OK.
PTO switch OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III dashboard cable assembly.
Faulty WTEC III relay K37.
Faulty WTEC III transmission ECU.

**20.**

Is continuity present from connector P115-22 to WTEC III relay K37 terminal 86?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 112 is faulty.

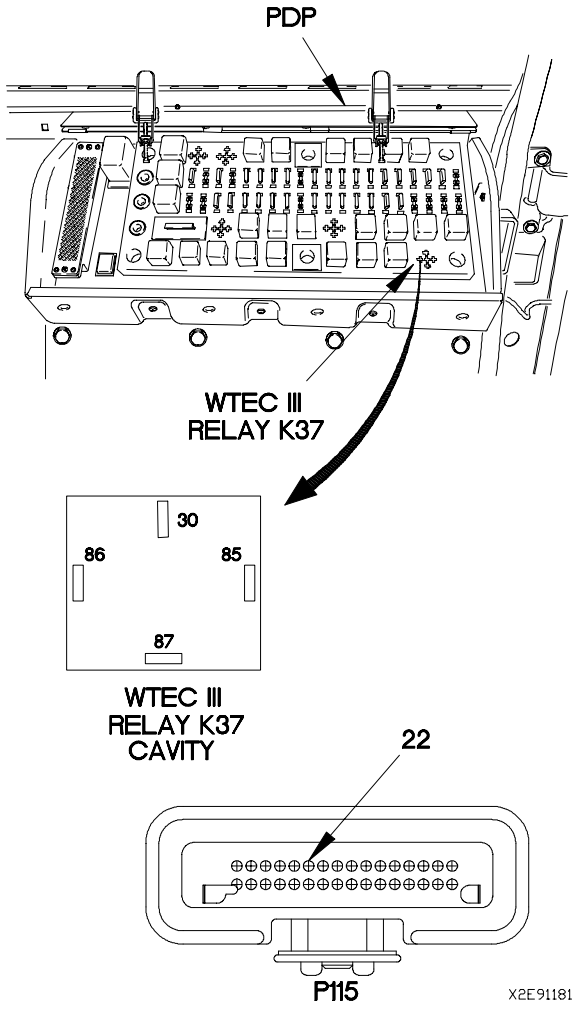
NO

Repair wire 112 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

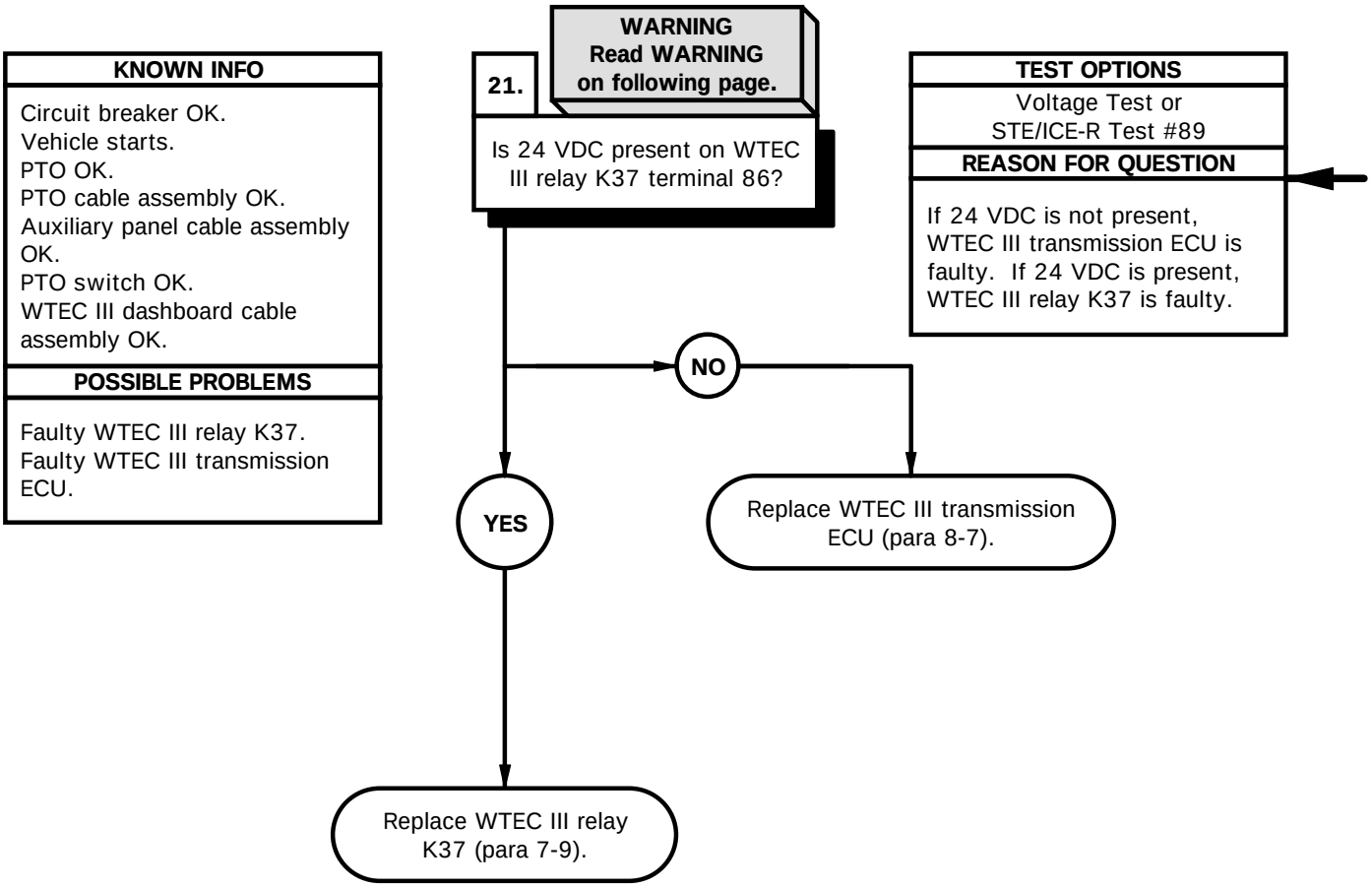
YES

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positve (+) probe of multimeter to connector P115-22.
(3) Connect negative (-) probe of multimeter to PDP, terminal 86, where WTEC III relay K37 was removed, and note reading on multimeter.
(4) If continuity is not present, repair wire 112 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(5) Connect connector P115 to WTEC III transmission ECU.
(6) Connect connector clamp on connector P115.



## e88. PTO DOES NOT OPERATE (CONT)

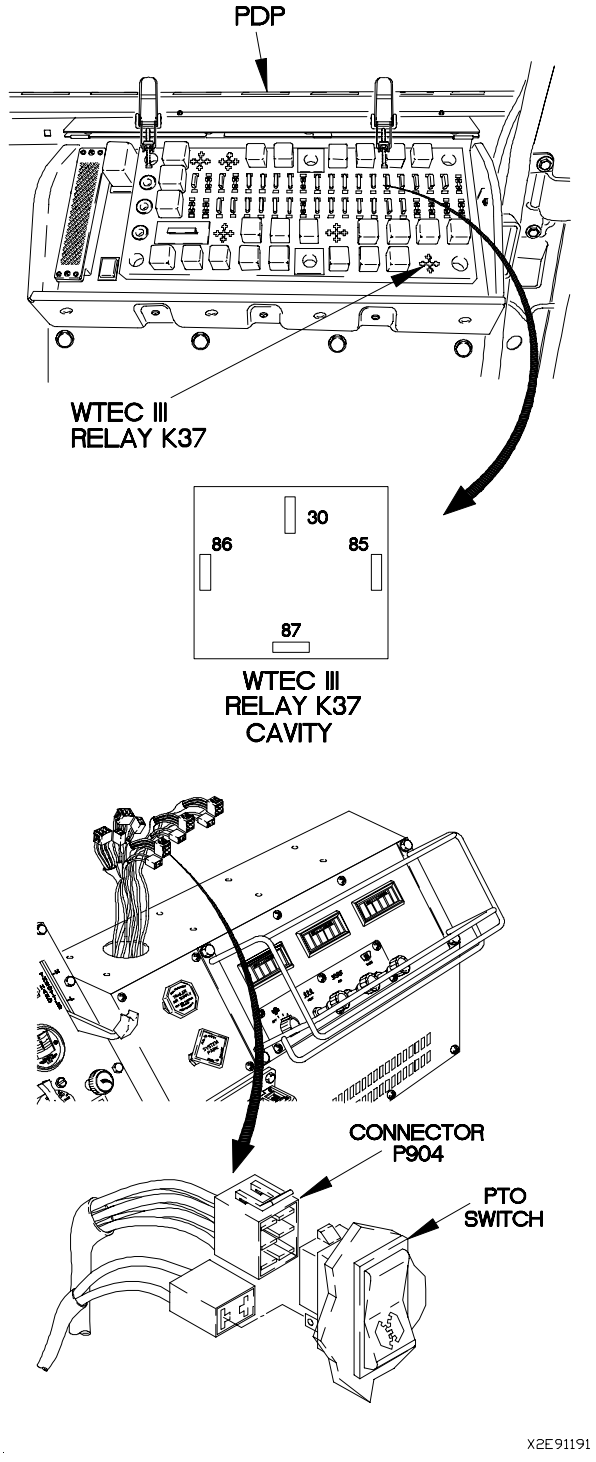


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Set multimeter to volts DC.
(2) Connect positive (+) probe of multimeter to PDP, terminal 86, where WTEC III relay K37 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 24 VDC is not present, replace WTEC III transmission ECU (para 8-7).
(5) If 24 VDC is present, replace WTEC III relay K37 (para 7-9).
(6) Install WTEC III relay K37 on PDP.
(7) Remove PTO switch from connector P904.
(8) Install personnel heater (para 18-9).



## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-365-10).

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)
Wire, Relay Test (Item 9, Appendix E)
Nut, Self-Locking (Item 131.1, Appendix G) (100 AMP)
Nut, Self-Locking (Item 130.1, Appendix G) (200 AMP)

**References**
TM 9-6140-200-14
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Apron, Rubber (Item 3, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Tester, Antifreeze and Battery (Item 41, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

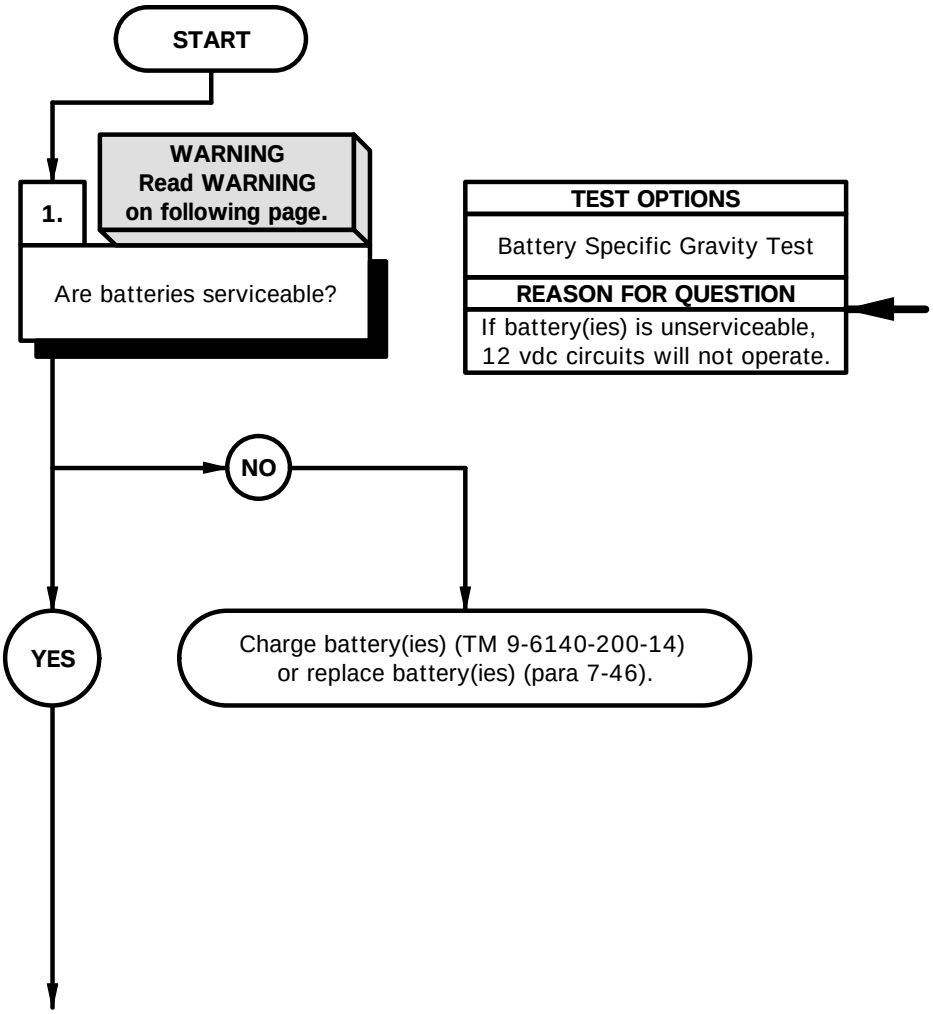
**Personnel Required**
(2)

**KNOWN INFO**

Engine oil pressure indicator light illuminates.
OIL PRESS gage operates.
Engine starts.
Alternator belts OK.

**POSSIBLE PROBLEMS**

Faulty battery(ies).
Faulty engine oil pressure switch.
Faulty relay K11.
Faulty dashboard cable assembly.
Faulty engine control cable assembly.
Faulty alternator ground strap.
Faulty alternator.
Faulty voltage regulator.
Faulty 100 AMP alternator to reverse polarity relay 12 vdc cable.
Faulty 200 AMP alternator to terminal block 12 VDC cable.
Faulty 100 AMP alternator to reverse polarity relay 24 VDC cable.
Faulty 200 AMP alternator to terminal block 24 VDC cable.



**WARNING**

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

**BATTERY SPECIFIC GRAVITY TEST**

(1) Remove battery box cover from battery box (TM 9-2320-365-10).
(2) Remove four batteries from battery box (para 7-46).
(3) Test batteries for serviceability (TM 9-6140-200-14).
(4) Replace battery(ies) if unserviceable (TM 9-6140-200-14).
(5) Install four batteries in battery box (para 7-46).
(6) Install battery box cover on battery box (TM 9-2320-365-10).

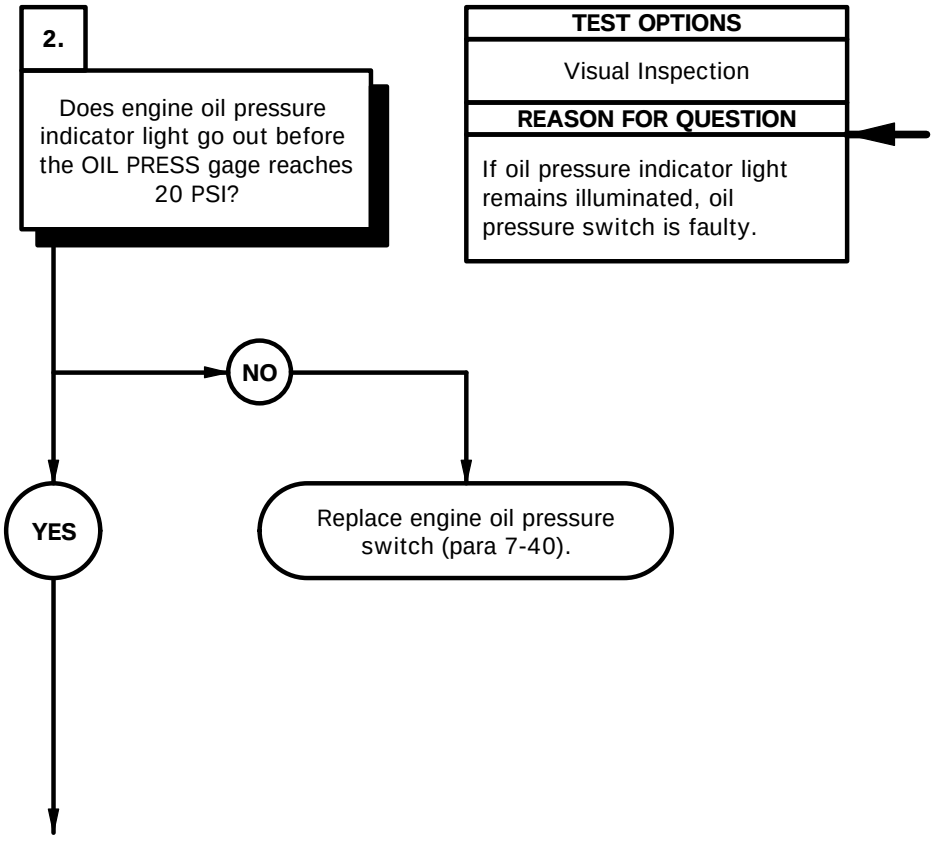
## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

**KNOWN INFO**

Engine oil pressure indicator light illuminates.
OIL PRESS gage operates.
Engine starts.
Alternator belts OK.
Battery(ies) OK.

**POSSIBLE PROBLEMS**

Faulty engine oil pressure switch.
Faulty relay K11.
Faulty dashboard cable assembly.
Faulty engine control cable assembly.
Faulty alternator ground strap.
Faulty alternator.
Faulty voltage regulator.
Faulty 100 AMP alternator to reverse polarity relay 12 vdc cable.
Faulty 200 AMP alternator to terminal block 12 VDC cable.
Faulty 100 AMP alternator to reverse polarity relay 24 VDC cable.
Faulty 200 AMP alternator to terminal block 24 VDC cable.



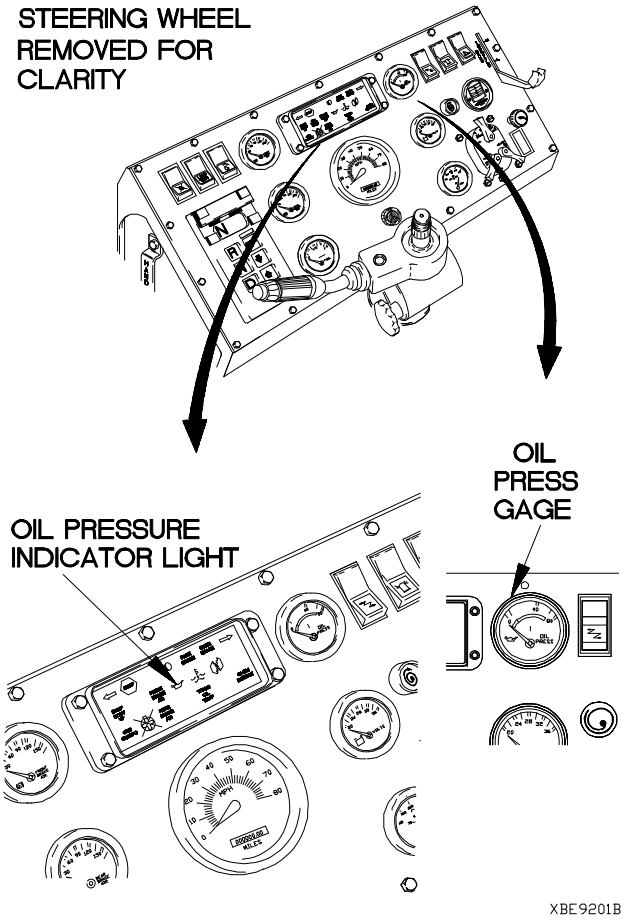

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

If oil pressure indicator light remains illuminated, oil pressure switch is faulty.

(1) Start engine (TM 9-2320-365-10).
(2) If engine oil pressure indicator light remains on after OIL PRESS gage reaches 20 PSI, replace engine oil pressure switch (para 7-40).
(3) Shut down engine (TM 9-2320-365-10).



## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

**KNOWN INFO**

Engine oil pressure indicator light illuminates.
OIL PRESS gage operates.
Engine starts.
Alternator belts OK.
Battery(ies) OK.
Engine oil pressure switch OK.

**POSSIBLE PROBLEMS**

Faulty relay K11.
Faulty dashboard cable assembly.
Faulty engine control cable assembly.
Faulty alternator ground strap.
Faulty alternator.
Faulty voltage regulator.
Faulty 100 AMP alternator to reverse polarity relay 12 vdc cable.
Faulty 200 AMP alternator to terminal block 12 VDC cable.
Faulty 100 AMP alternator to reverse polarity relay 24 VDC cable.
Faulty 200 AMP alternator to terminal block 24 VDC cable.

**3.**

Is continuity present from relay K11 terminal 30 to terminal 87A?

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, relay K11 is faulty.

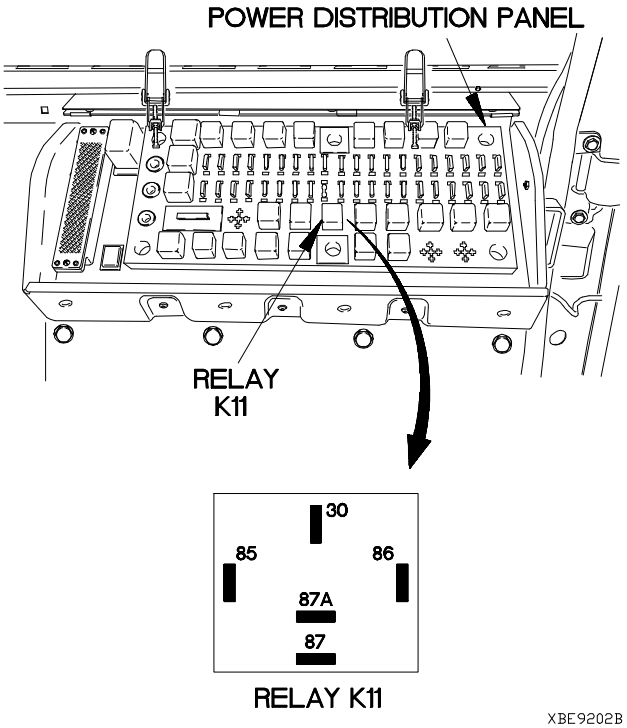
NO

YES

Replace relay K11 (para 7-9).

**CONTINUITY TEST**

(1) Disconnect batteries (para 7-48).
(2) Remove power distribution panel (PDP) cover (para 16-2).
(3) Remove relay K11 from power distribution panel (PDP).
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to relay K11 terminal 30.
(6) Connect negative (-) probe of multimeter to relay K11 terminal 87A and note reading on multimeter.
(7) If continuity is not present, replace relay K11 (para 7-9).



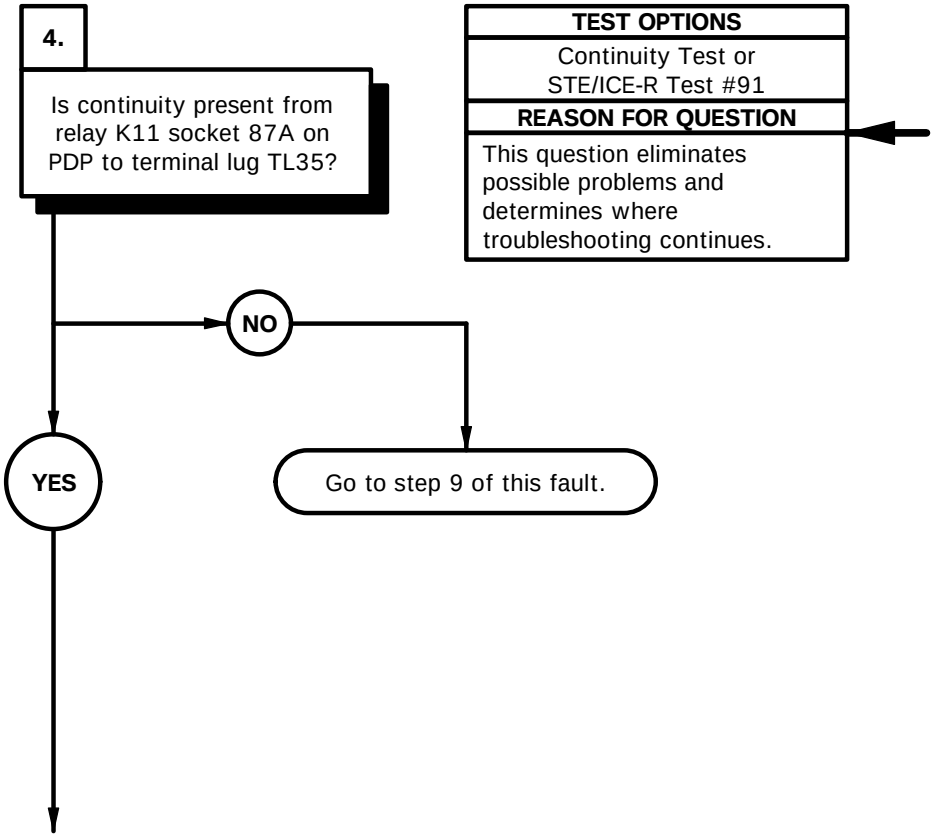
## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

**KNOWN INFO**

Engine oil pressure indicator light illuminates.
OIL PRESS gage operates.
Engine starts.
Alternator belts OK.
Battery(ies) OK.
Engine oil pressure switch OK.
Relay K11 OK.

**POSSIBLE PROBLEMS**

Faulty dashboard cable assembly.
Faulty engine control cable assembly.
Faulty alternator ground strap.
Faulty alternator.
Faulty voltage regulator.
Faulty 100 AMP alternator to reverse polarity relay 12 vdc cable.
Faulty 200 AMP alternator to terminal block 12 VDC cable.
Faulty 100 AMP alternator to reverse polarity relay 24 VDC cable.
Faulty 200 AMP alternator to terminal block 24 VDC cable.




**TEST OPTIONS**

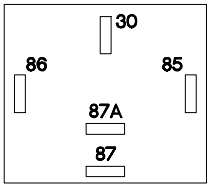
Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

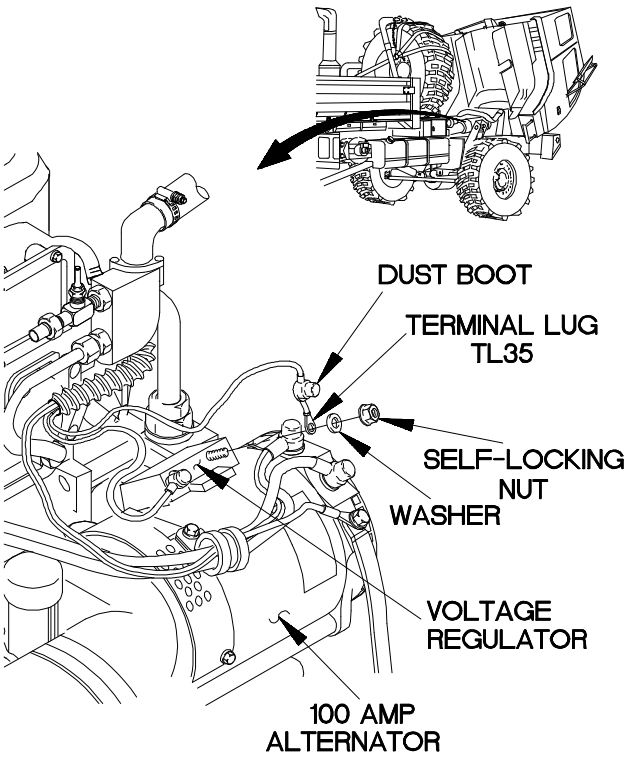
This question eliminates possible problems and determines where troubleshooting continues.

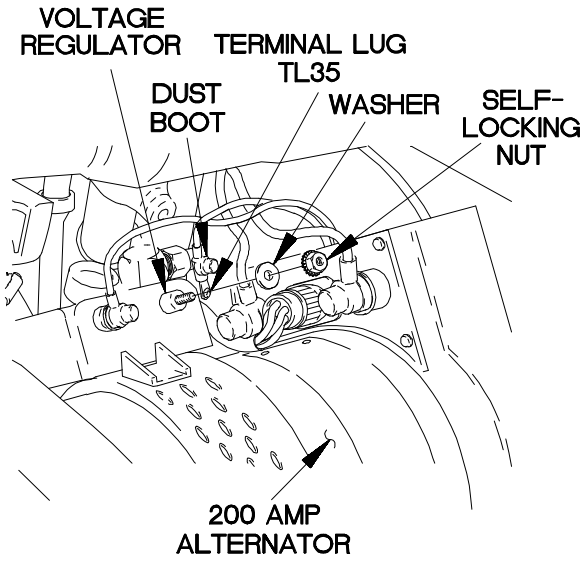
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to relay K11 socket 87A on PDP.
(3) Raise cab (TM 9-2320-365-10).
(4) Lift dust boot on terminal lug TL35.
(5) Remove self-locking nut, washer, and terminal lug TL35 from voltage regulator. Discard self-locking nut.
(6) Connect negative (-) probe of multimeter to terminal lug TL35 and note reading on multimeter.
(7) If continuity is not present, go to step 9 of this fault.
(8) Position terminal lug TL35 on voltage regulator with washer and self-locking nut.
(9) Tighten self-locking nut to 23-27 lb-in. (3 N.m).
(10) Position dust boot on terminal lug TL35.




RELAY K11 CAVITY




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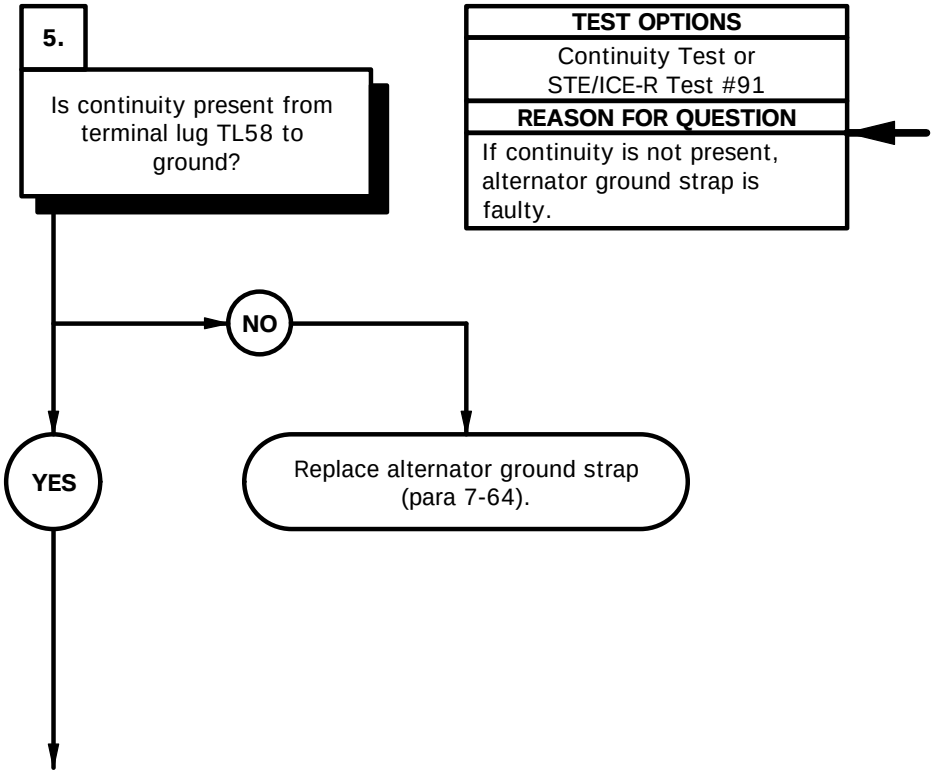
## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

**KNOWN INFO**

Engine oil pressure indicator light illuminates.
OIL PRESS gage operates.
Engine starts.
Alternator belts OK.
Battery(ies) OK.
Engine oil pressure switch OK.
Relay K11 OK.
Dashboard cable assembly OK.
Engine control cable assembly OK.

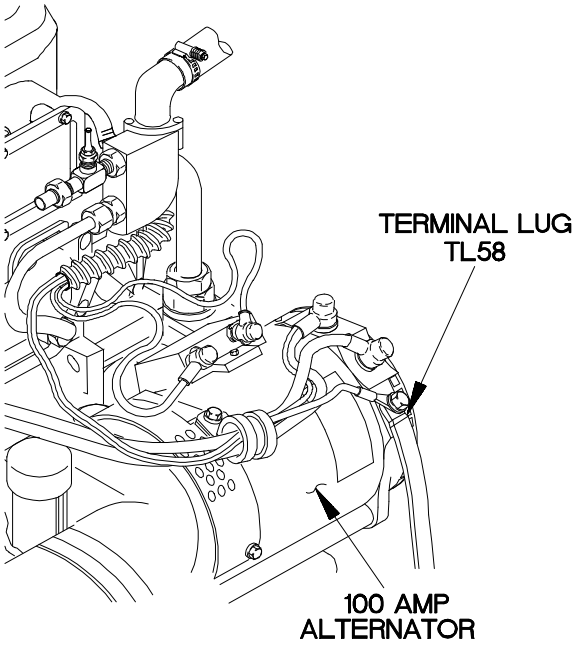
**POSSIBLE PROBLEMS**

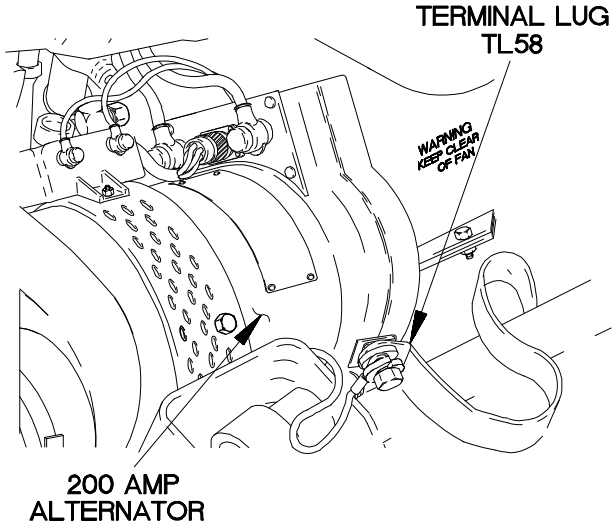
Faulty alternator ground strap.
Faulty alternator.
Faulty voltage regulator.
Faulty 100 AMP alternator to reverse polarity relay 12 vdc cable.
Faulty 200 AMP alternator to terminal block 12 VDC cable.
Faulty 100 AMP alternator to reverse polarity relay 24 VDC cable.
Faulty 200 AMP alternator to terminal block 24 VDC cable.



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal lug TL58.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, replace alternator ground strap (para 7-64).
(5) Connect batteries (para 7-48).




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## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

**KNOWN INFO**

Engine oil pressure indicator light illuminates.
OIL PRESS gage operates.
Engine starts.
Alternator belts OK.
Battery(ies) OK.
Engine oil pressure switch OK.
Relay K11 OK.
Dashboard cable assembly OK.
Engine control cable assembly OK.
Alternator ground strap OK.

**POSSIBLE PROBLEMS**

Faulty alternator.
Faulty voltage regulator.
Faulty 100 AMP alternator to reverse polarity relay 12 vdc cable.
Faulty 200 AMP alternator to terminal block 12 VDC cable.
Faulty 100 AMP alternator to reverse polarity relay 24 VDC cable.
Faulty 200 AMP alternator to terminal block 24 VDC cable.

**WARNING**
**Read WARNING on following page.**

**6.** Is 12 VDC present at terminal lug TL60?

**NO**

Replace 100 AMP alternator to reverse polarity relay 12 VDC cable (para 7-65) or replace 200 AMP alternator to terminal block 12 VDC cable (para 20-59).

**YES**

**TEST OPTIONS**

Voltage Test or
STE/ICE-R Test #89

**REASON FOR QUESTION**

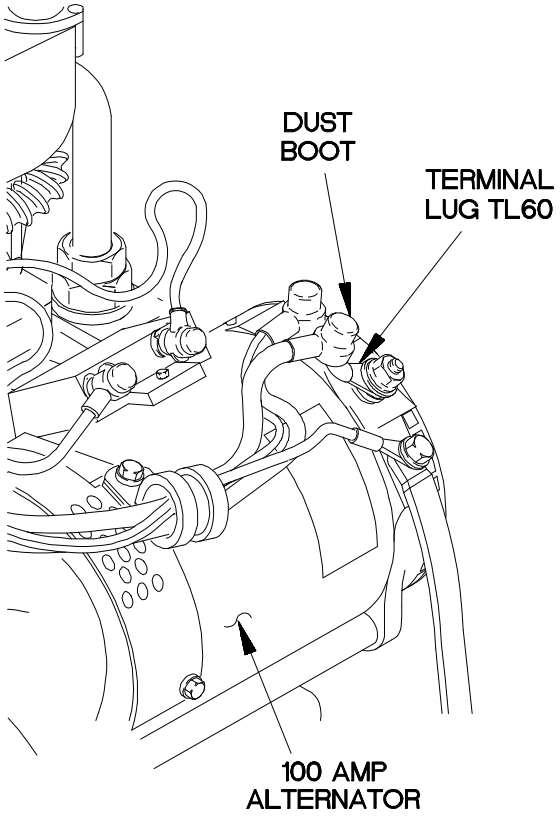
If 12 VDC is not present, 100 AMP alternator to reverse polarity relay 12 VDC cable or 200 AMP alternator to terminal block 12 VDC cable is faulty.

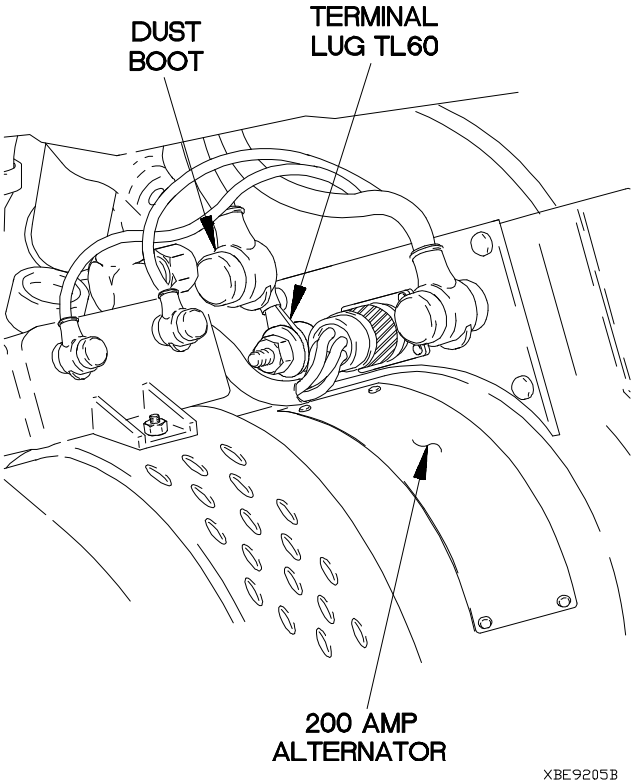
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

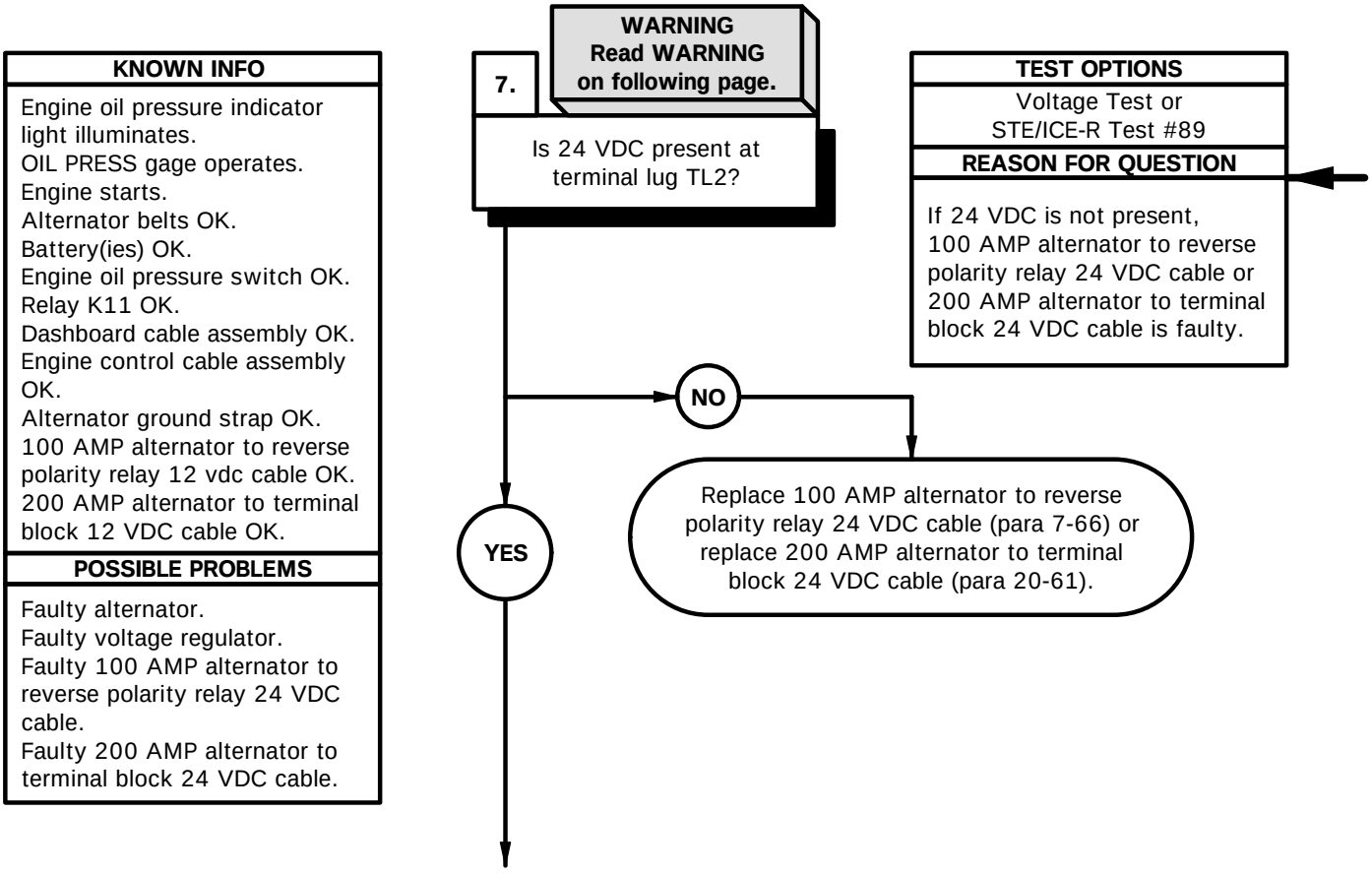
**VOLTAGE TEST**

(1) Raise cab (TM 9-2320-365-10).
(2) Lift dust boot from terminal lug TL60.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to terminal lug TL60.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If 12 VDC is not present, replace 100 AMP alternator to reverse polarity relay 12 VDC cable (para 7-65) or replace 200 AMP alternator to terminal block 12 VDC cable (para 20-59).
(7) Position dust boot on terminal lug TL60.



## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

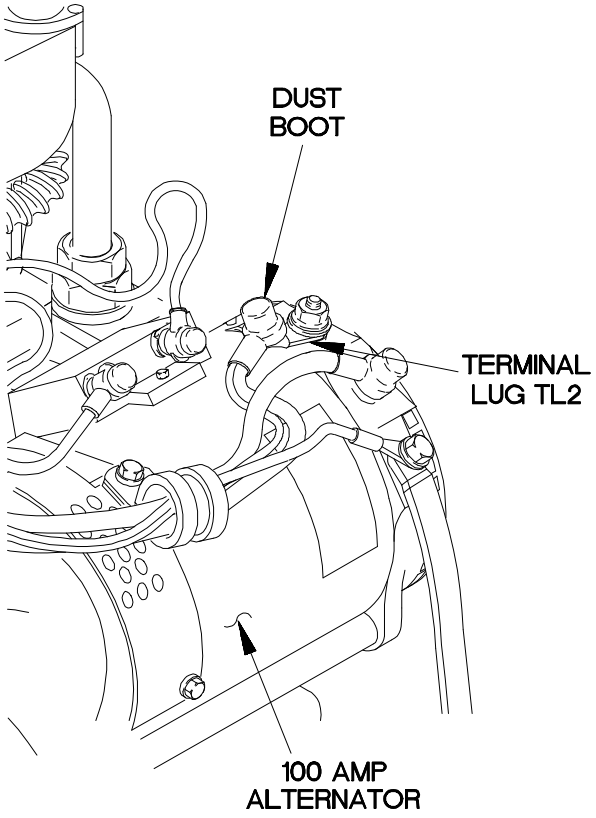


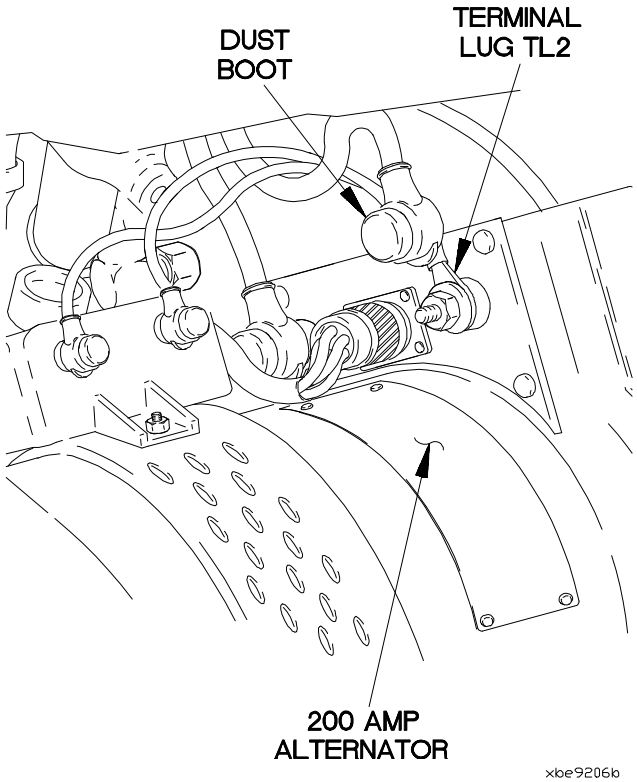
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

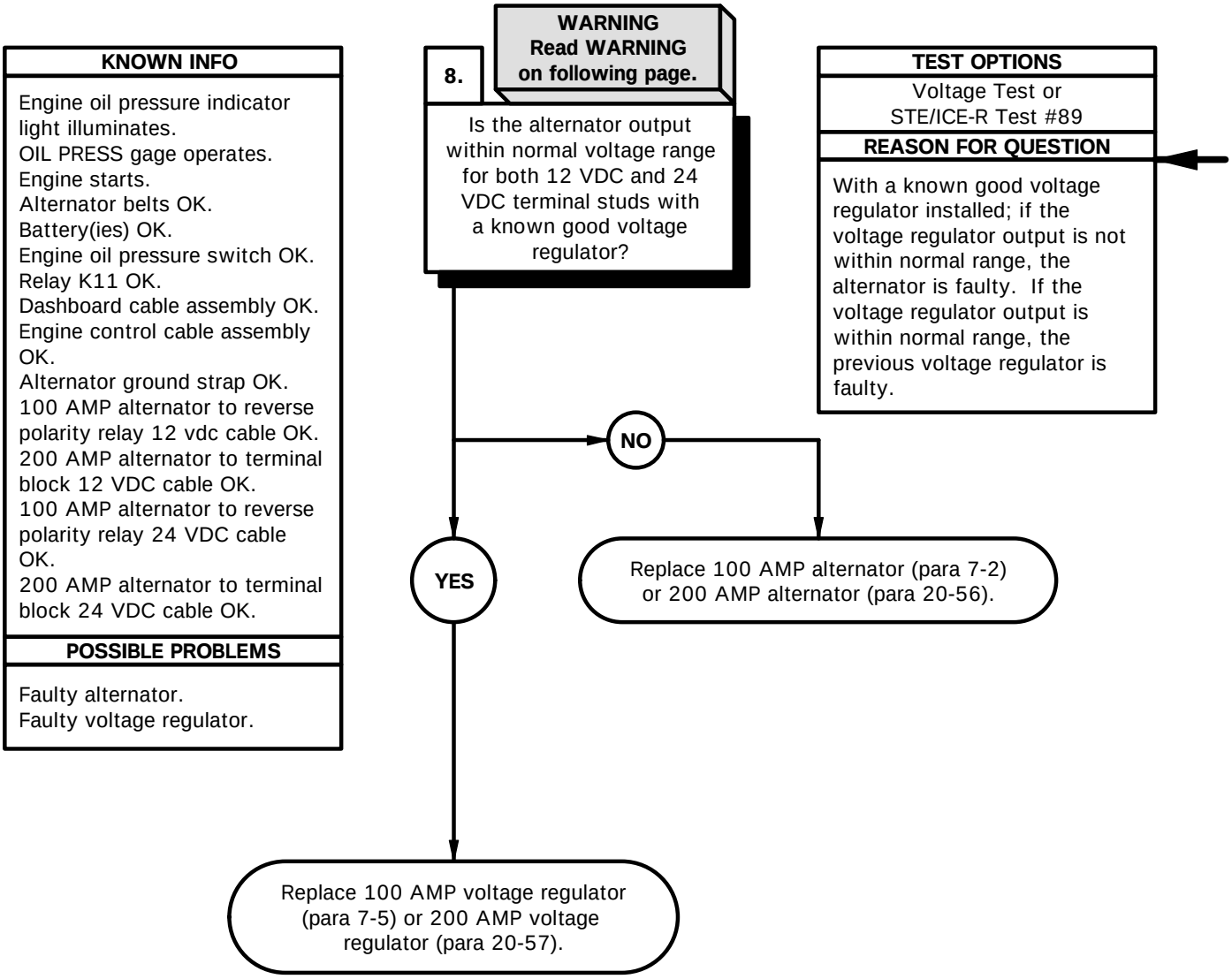
**VOLTAGE TEST**

(1) Lift dust boot from terminal lug TL2.
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to terminal lug TL2.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) If 24 VDC is not present, replace 100 AMP alternator to reverse polarity relay 24 VDC cable (para 7-66) or replace 200 AMP alternator to terminal block 12 VDC cable (para 20-61).
(6) Position dust boot on terminal lug TL2.
(7) Disconnect batteries (para 7-48).
(8) Lower cab (TM9-2320-365-10).
(9) Install relay K11 in PDP.
(10) Install PDP cover (para 16-2).
(11) Connect batteries (para 7-48).



## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)

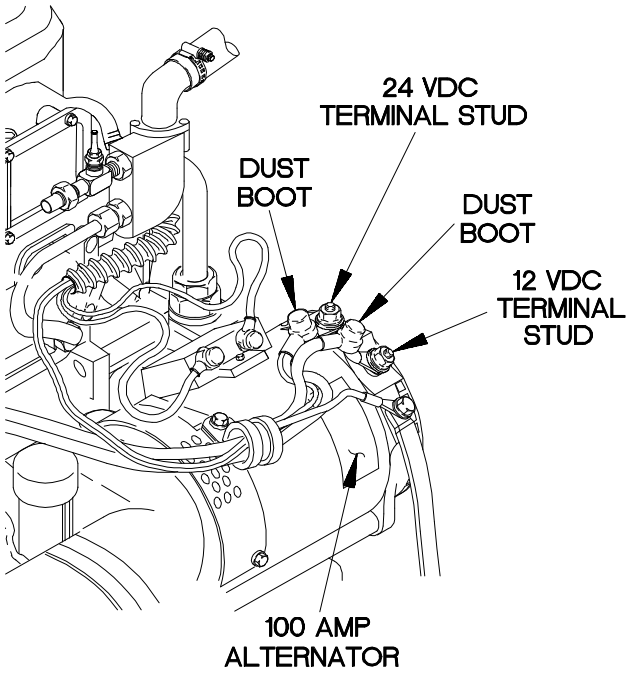


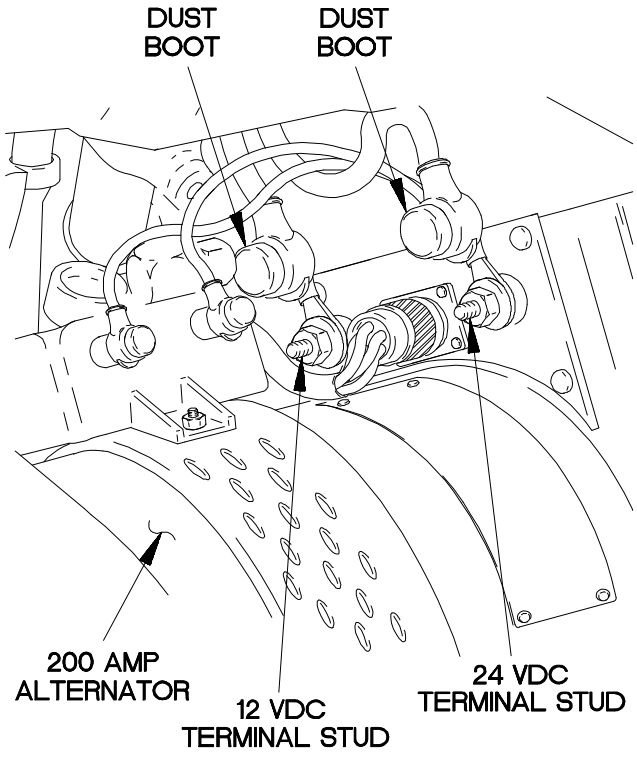
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuits and cause severe burns or electrical shock.**

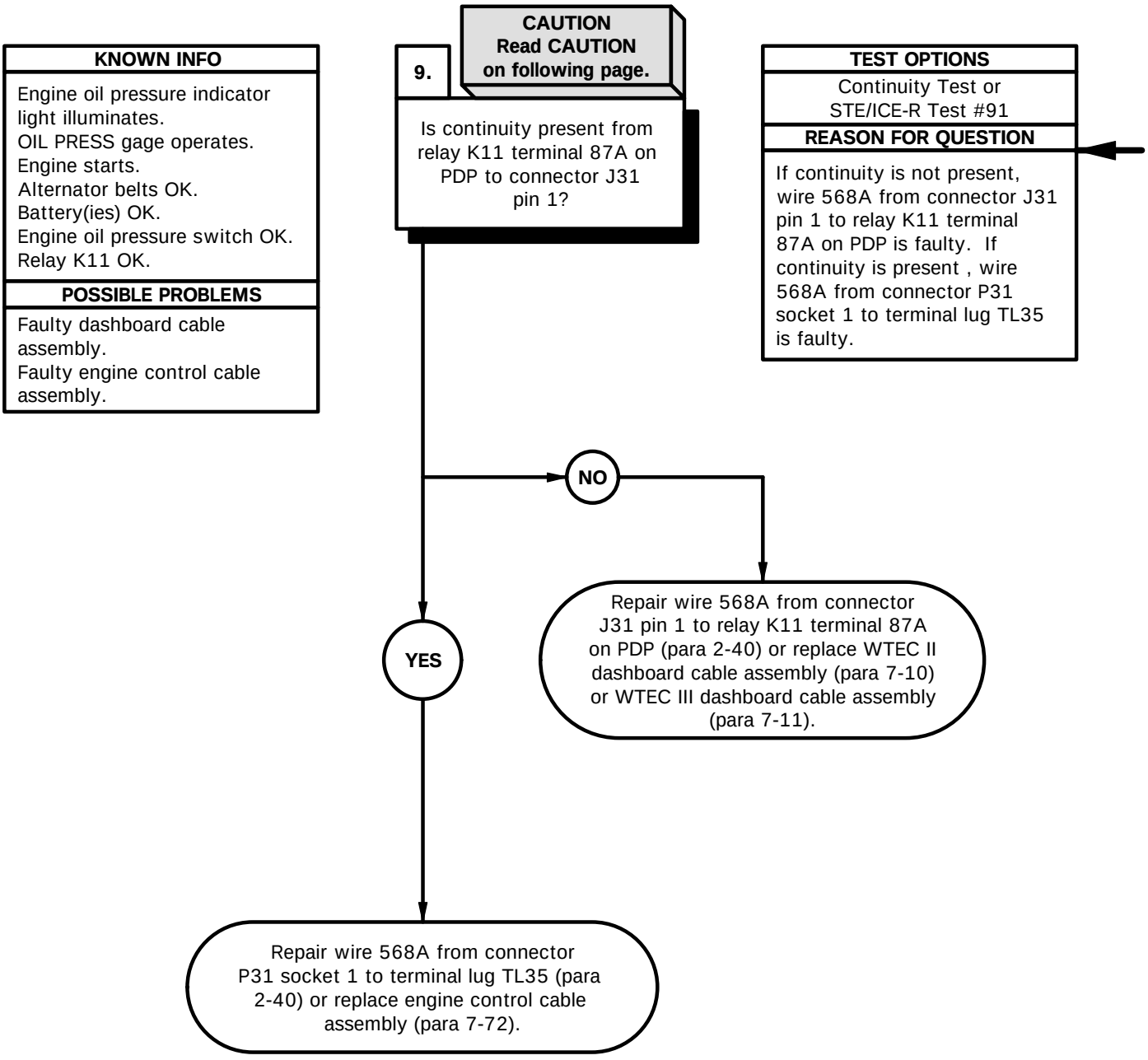
**VOLTAGE TEST**

(1) Replace 100 AMP voltage regulator (para 7-5) or 200 AMP voltage regulator (para 20-57) with a known good voltage regulator.
(2) Start engine (TM 9-2320-365-10).
(3) Raise cab (TM 9-2320-365-10).
(4) Lift dust boot from alternator 12 VDC terminal stud.
(5) Set multimeter to volts DC.
(6) Connect positive (+) probe of multimeter to alternator 12 VDC terminal stud.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If 13.25 -14.75V is not present, replace 100 AMP alternator (para 7-2) or 200 AMP alternator (para 20-56).
(9) If 13.25-14.75V is present, replace 100 AMP voltage regulator (para 7-5) or 200 AMP voltage regulator (para 20-57).
(10) Position dust boot on alternator 12 VDC terminal stud.
(11) Lift dust boot from alternator 24 VDC terminal stud.
(12) Connect positive (+) probe of multimeter to alternator 24 VDC terminal stud.
(13) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(14) If 27.25 -28.75V is not present, replace 100 AMP alternator (para 7-2) or 200 AMP alternator (para 20-56).
(15) If 27.25-28.75V is present, replace 100 AMP voltage regulator (para 7-5) or 200 AMP voltage regulator (para 20-57).
(16) Position dust boot on alternator 24 VDC terminal stud.
(17) Lower cab (TM 9-2320-365-10).
(18) Shut down engine (TM 9-2320-365-10).



## e89. ELECTRICAL SYSTEM DOES NOT MAINTAIN A CHARGE (CONT)



**CAUTION**

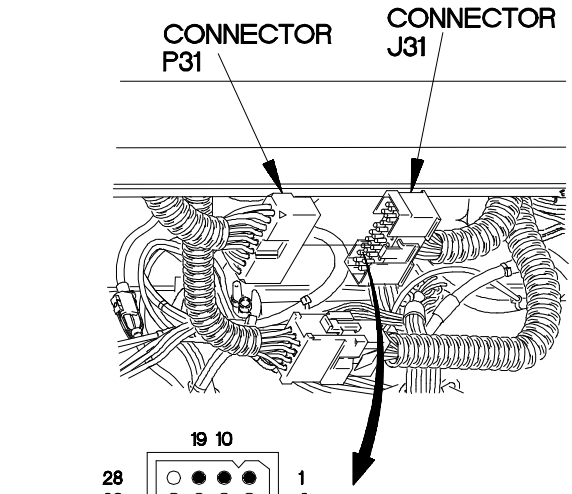
Use care when testing electrical connectors. Do not damage connector pins or sockets with multimeter probes. Failure to comply may result in damage to equipment.

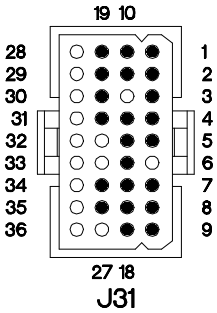
**NOTE**

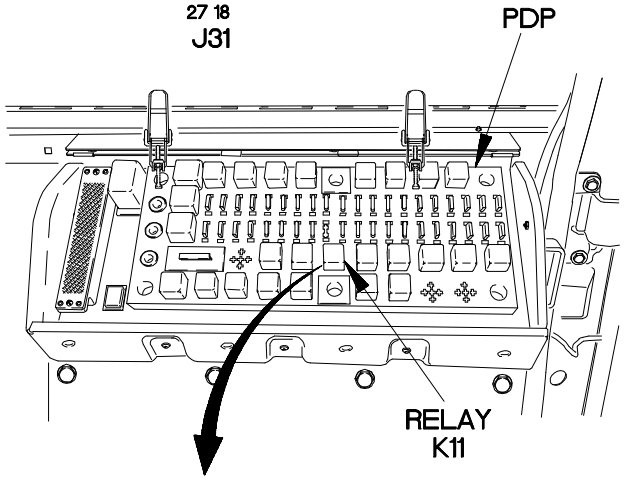
Inspect connector pins/sockets for damage, corrosion, and serviceability. Check that connector pins are not pushed back and are capable of making good contact.

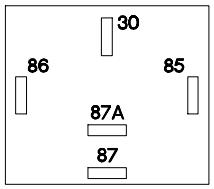
**CONTINUITY TEST**

(1) Lower cab (TM 9-2320-365-10).
(2) Remove instrument panel for access (para 7-15).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to relay K11 terminal 87A on PDP.
(6) Connect negative (-) probe of multimeter to connector J31 pin 1 and note reading on multimeter.
(7) If continuity is not present, repair wire 568A from connector J31 pin 1 to relay K11 terminal 87A (para 2-40) on PDP or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If continuity is present, repair wire 568A from connector P31 socket 1 to terminal lug TL35 (para 2-40) or replace engine control cable assembly (para 7-72).
(9) Connect connector J31 to connector P31.
(10) Install instrument panel (para 7-15).
(11) Install relay K11 in PDP.
(12) Install PDP cover (para 16-2).
(13) Connect batteries (para 7-48).




RELAY K11 CAVITY

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**e90. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) ILLUMINATION DOES NOT DIM**

**INITIAL SETUP**

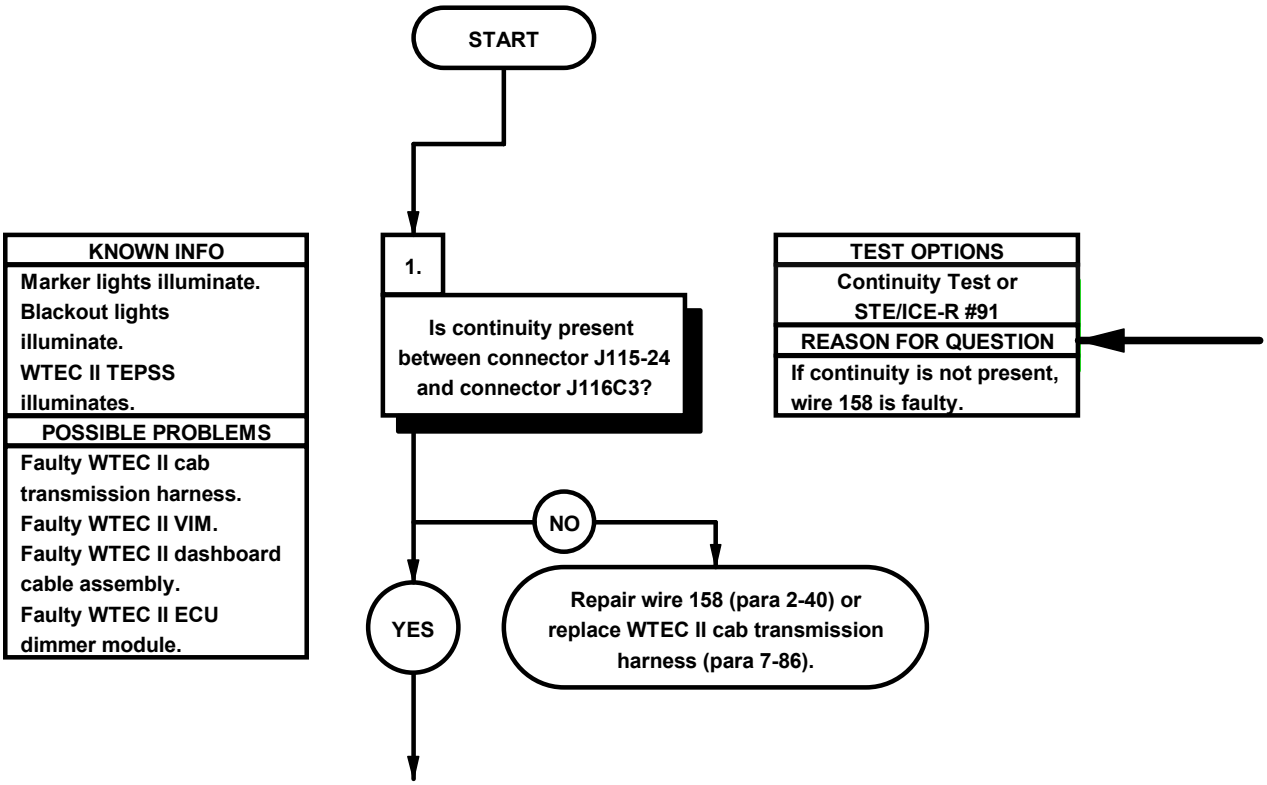
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

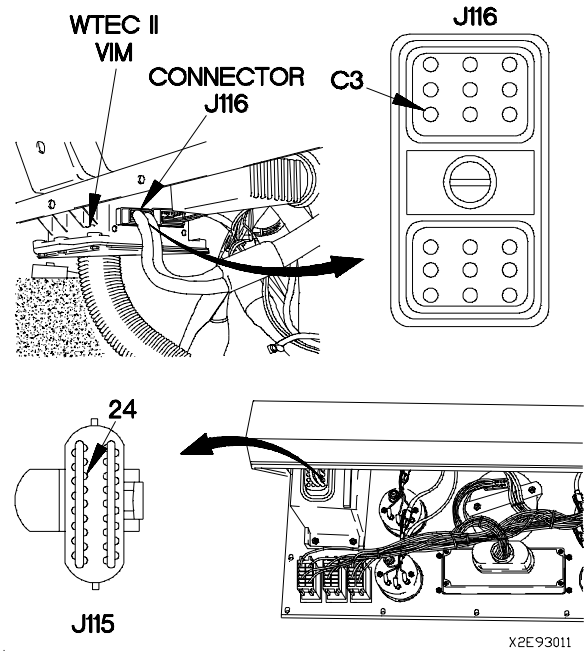
**References**
TM 9-4910-571-12&P

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

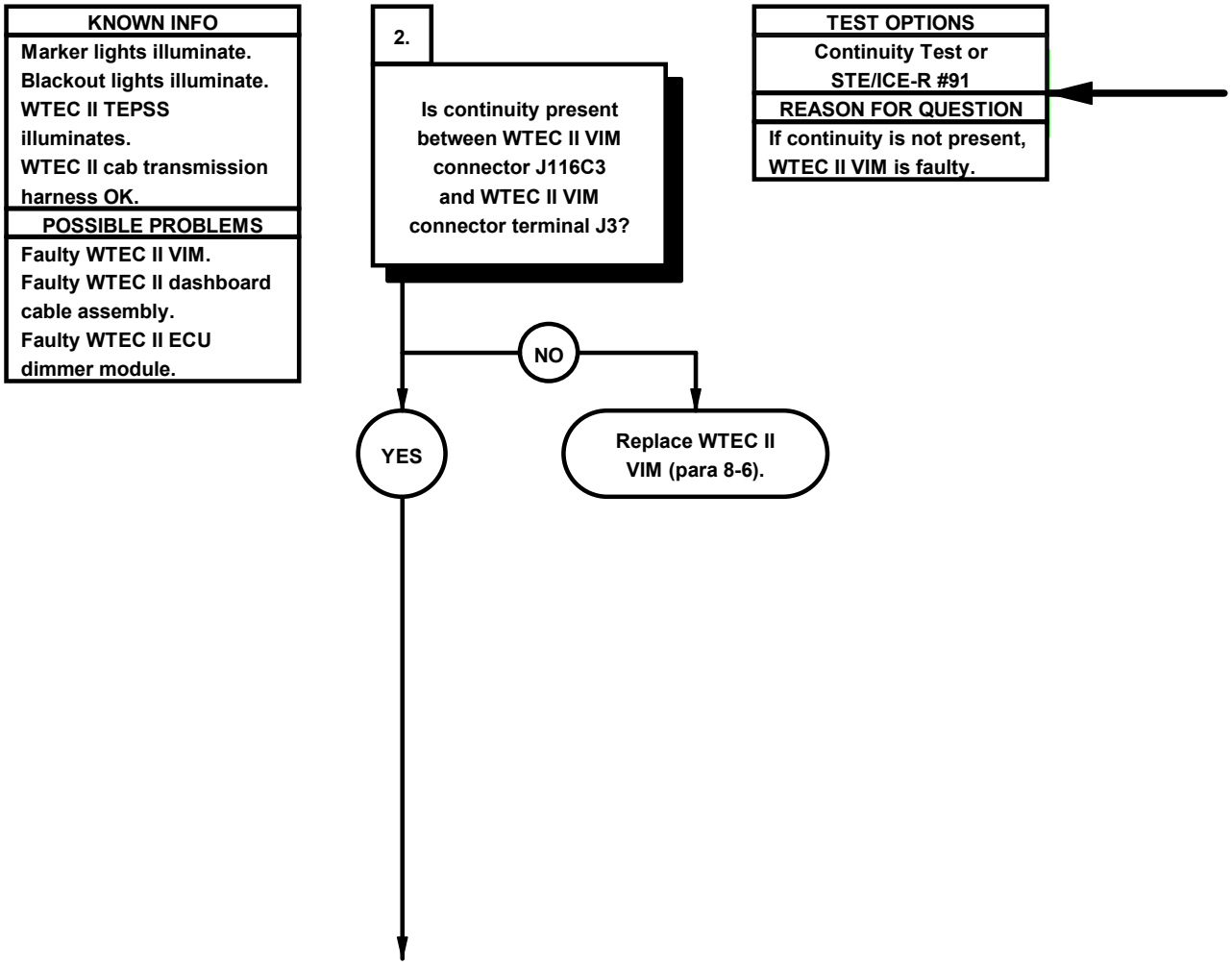
**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)



| CONTINUITY TEST |
| --- |
| (1) Remove kick panel (para 16-3). |
| (2) Disconnect connector J116 from WTEC II VIM. |
| (3) Remove instrument panel assembly for access (para 7-15). |
| (4) Disconnect connector J115 (top connector) from WTEC II TEPSS. |
| (5) Set multimeter to ohms. |
| (6) Connect positive (+) probe of multimeter to connector J115-24. |
| (7) Connect negative (-) probe of multimeter to connector J116C3. |
| (8) If continuity is not present, repair wire 158 (para 2-40) or replace WTEC II cab transmission harness (para 7-86). |
| (9) Connect connector J115 to WTEC II TEPSS. |
| (10) Install instrument panel assembly (para 7-15). |

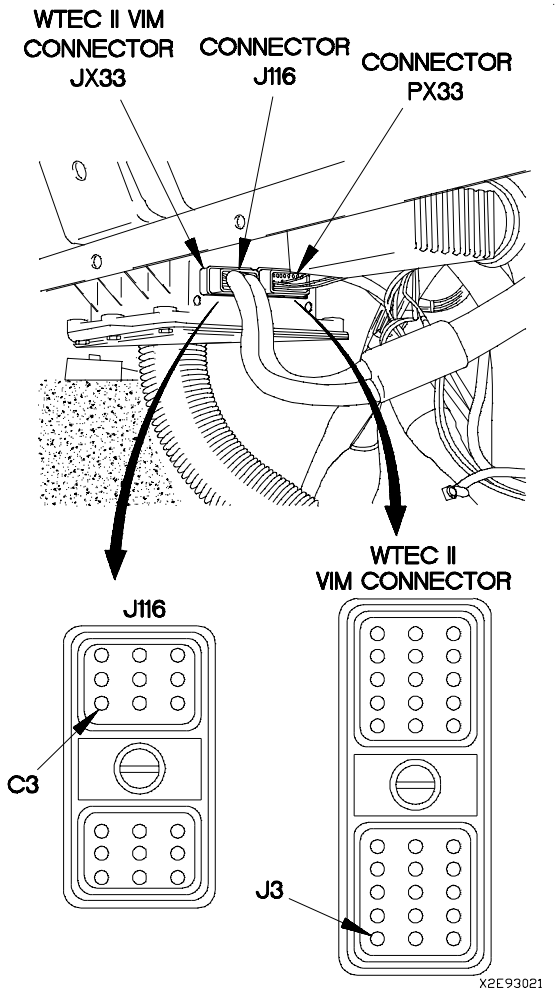


## e90. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) ILLUMINATION DOES NOT DIM (CONT)

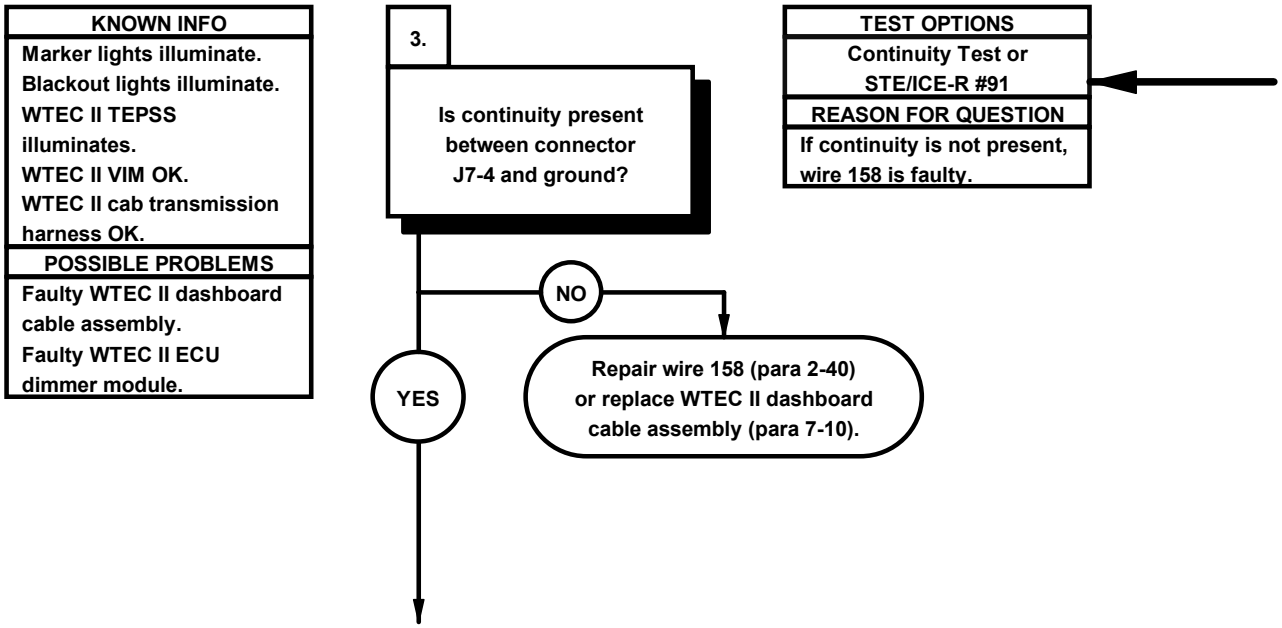


**CONTINUITY TEST**

(1) Loosen screw and disconnect connector PX33 from WTEC II VIM.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to WTEC II VIM connector J116C3.
(4) Connect negative (-) probe of multimeter to WTEC II VIM connector terminal J3 and note reading on multimeter.
(5) If continuity is not present, replace WTEC II VIM (para 8-6).
(6) Connect connector J116 to WTEC II VIM.
(7) Connect connector PX33 to WTEC II VIM and tighten screw.

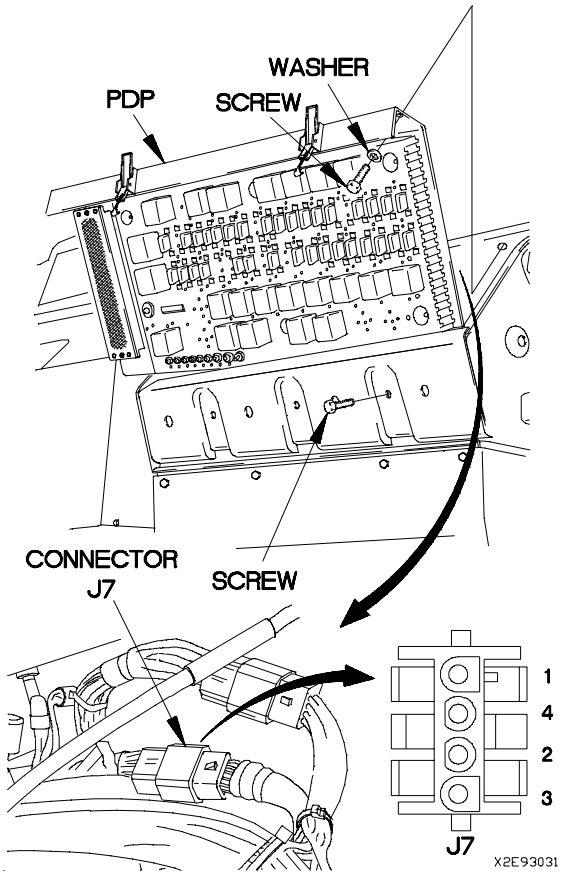


## e90. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) ILLUMINATION DOES NOT DIM (CONT)

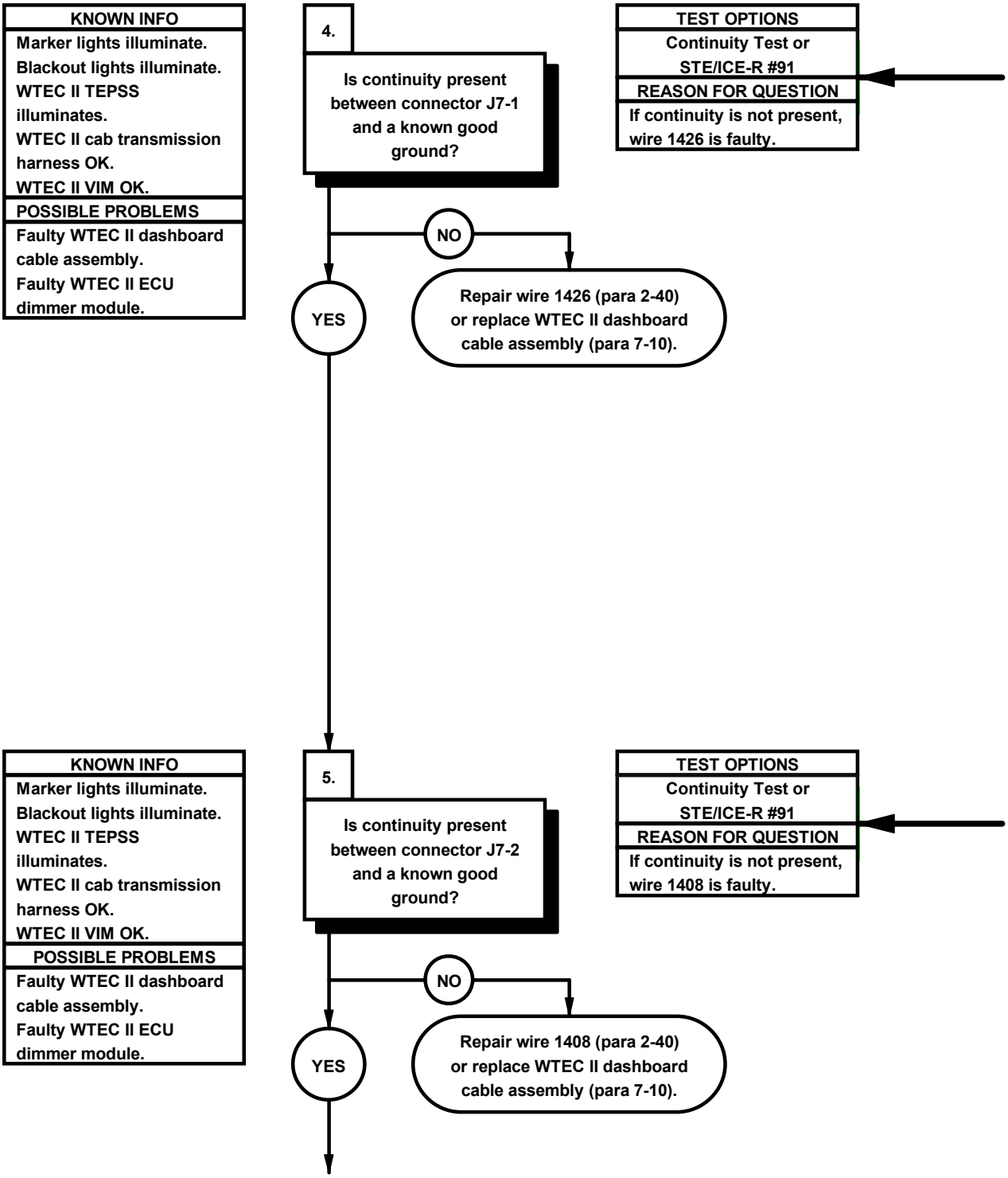


**CONTINUITY TEST**

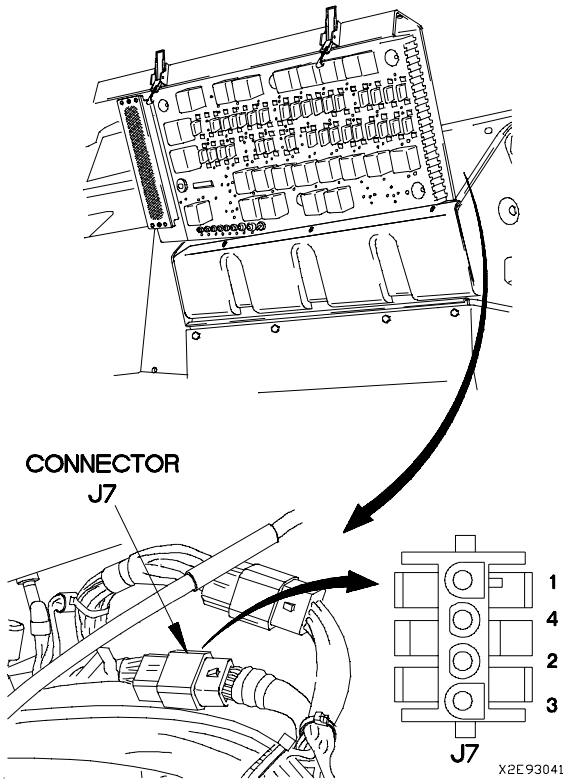
(1) Remove three screws and washers from PDP.
(2) Remove three screws from PDP.
(3) Lift PDP outward to gain access.
(4) Disconnect connector J7 from WTEC II ECU dimmer module.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector J7-4.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If continuity is not present, repair wire 158 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).



## e90. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) ILLUMINATION DOES NOT DIM (CONT)

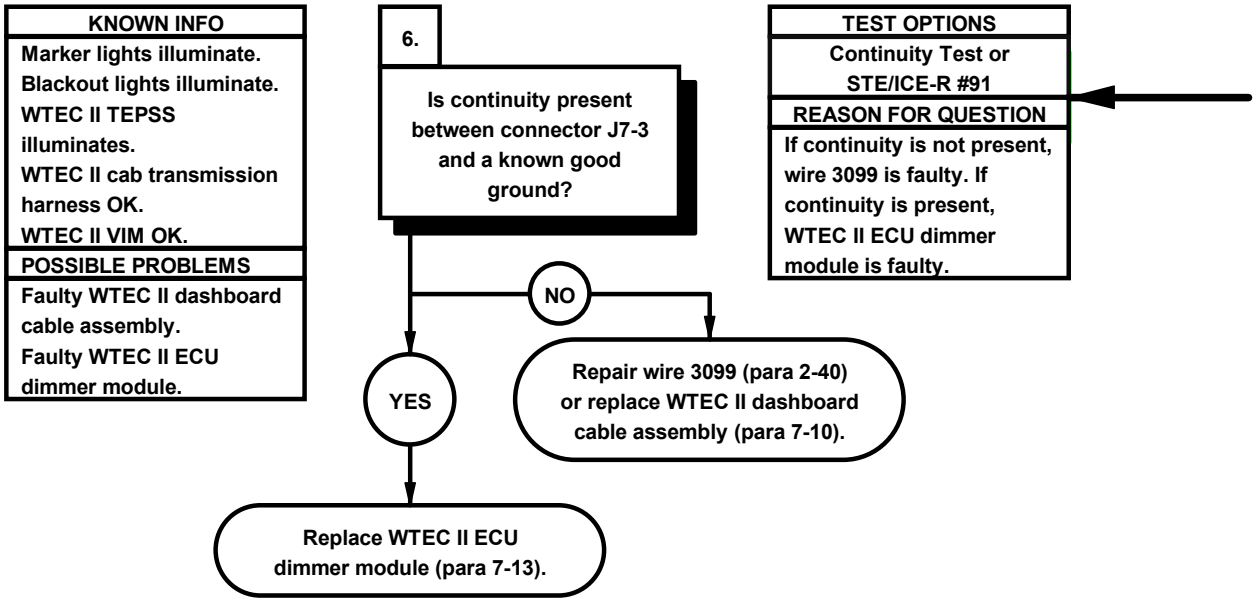


| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to connector J7-1.<br>(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.<br>(4) If continuity is not present, repair wire 1426 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10). |



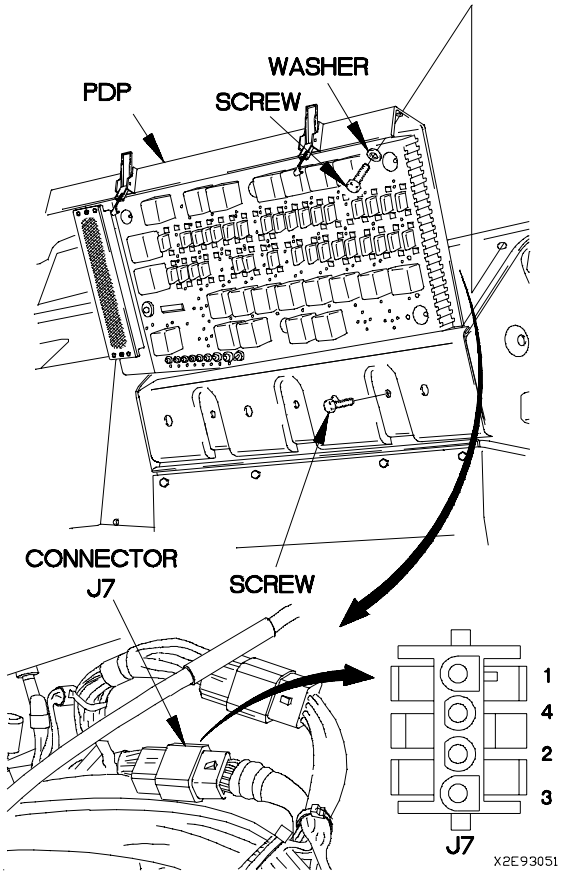

| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms.<br>(2) Connect positive (+) probe of multimeter to connector J7-2.<br>(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.<br>(4) If continuity is not present, repair wire 1408 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10). |

## e90. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) ILLUMINATION DOES NOT DIM (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J7-3.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3099 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(5) If continuity is present, replace WTEC II ECU dimmer module (para 7-13).
(6) Connect connector J7 to WTEC II ECU dimmer module.
(7) Install PDP on dashboard with three screws.
(8) Install three washers and screws in PDP.
(9) Install kick panel (para 16-3).



**e91. ENGINE FAN RUNS CONSTANTLY**

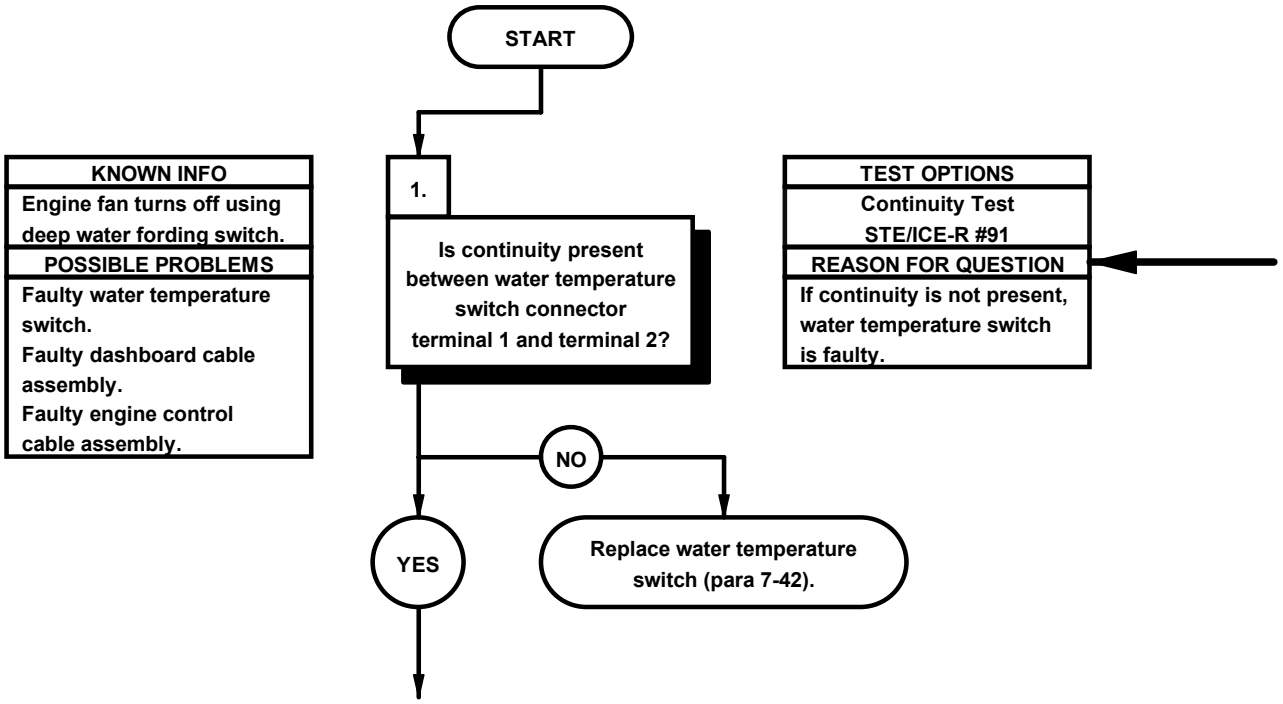
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

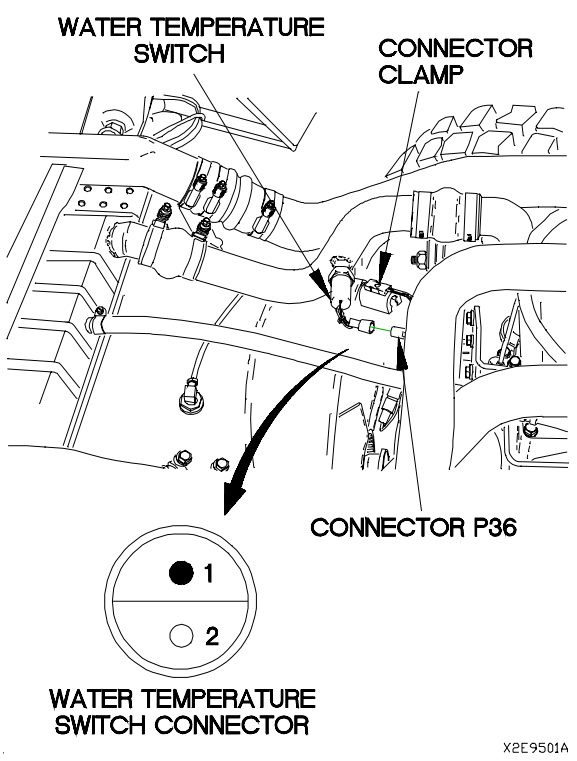
**References**
TM 9-4910-571-12&P



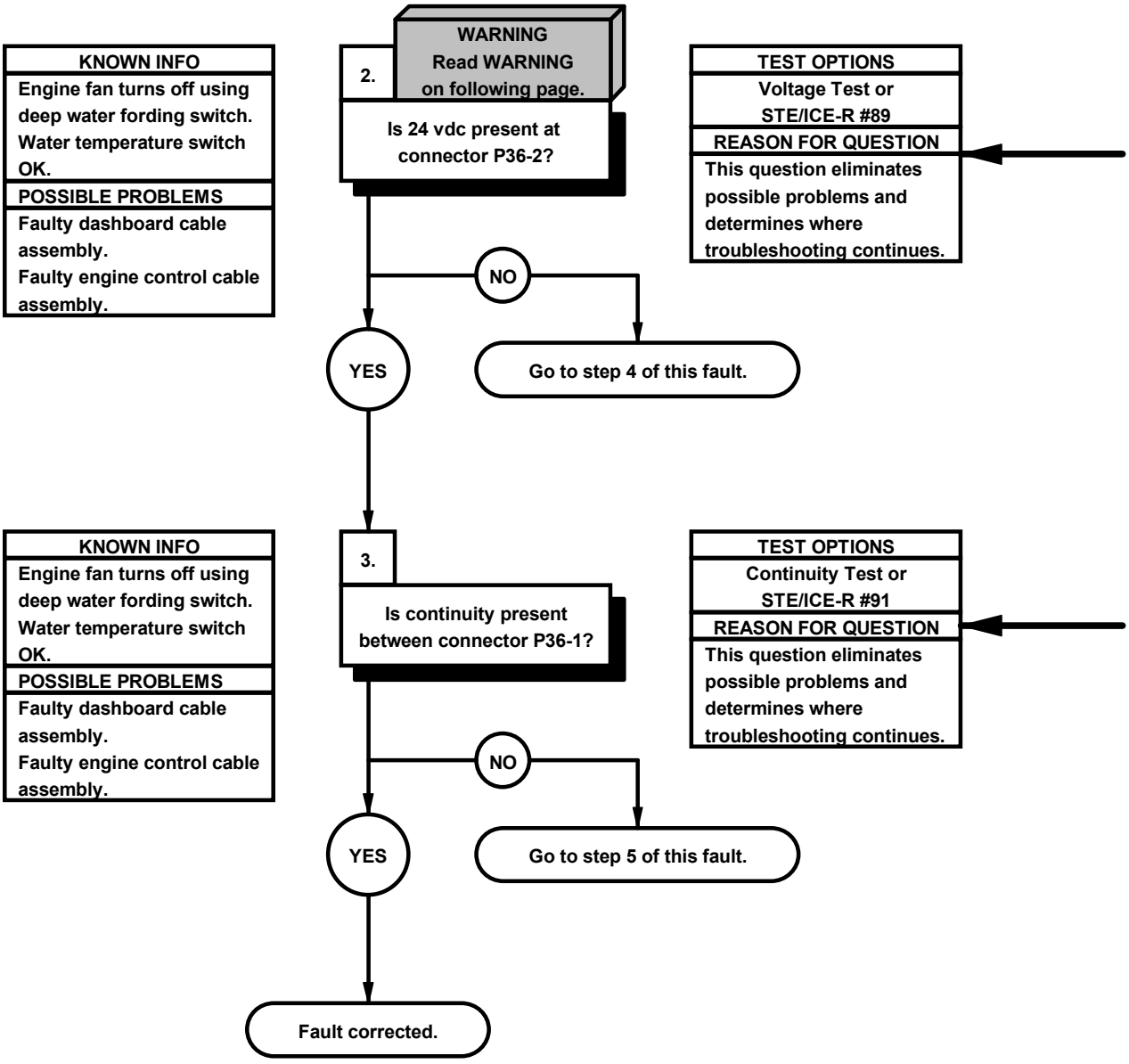
**CONTINUITY TEST**

**NOTE**
**Engine must be cool during test.**

**(1) Raise cab (TM 9-2320-365-10).**
**(2) Disconnect connector clamp from water temperature switch connector.**
**(3) Disconnect connector P36 from water temperature switch connector.**
**(4) Set multimeter to ohms.**
**(5) Connect positive (+) probe of multimeter to water temperature switch connector terminal 1.**
**(6) Connect negative (-) probe of multimeter to water temperature switch connector terminal 2 and note reading on multimeter.**
**(7) If continuity is not present, replace water temperature switch (para 7-42).**



## e91. ENGINE FAN RUNS CONSTANTLY (CONT)



**WARNING**

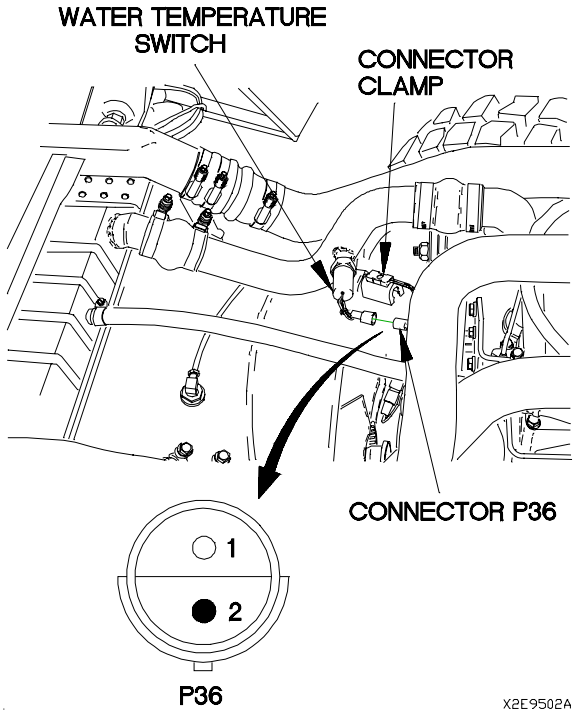
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

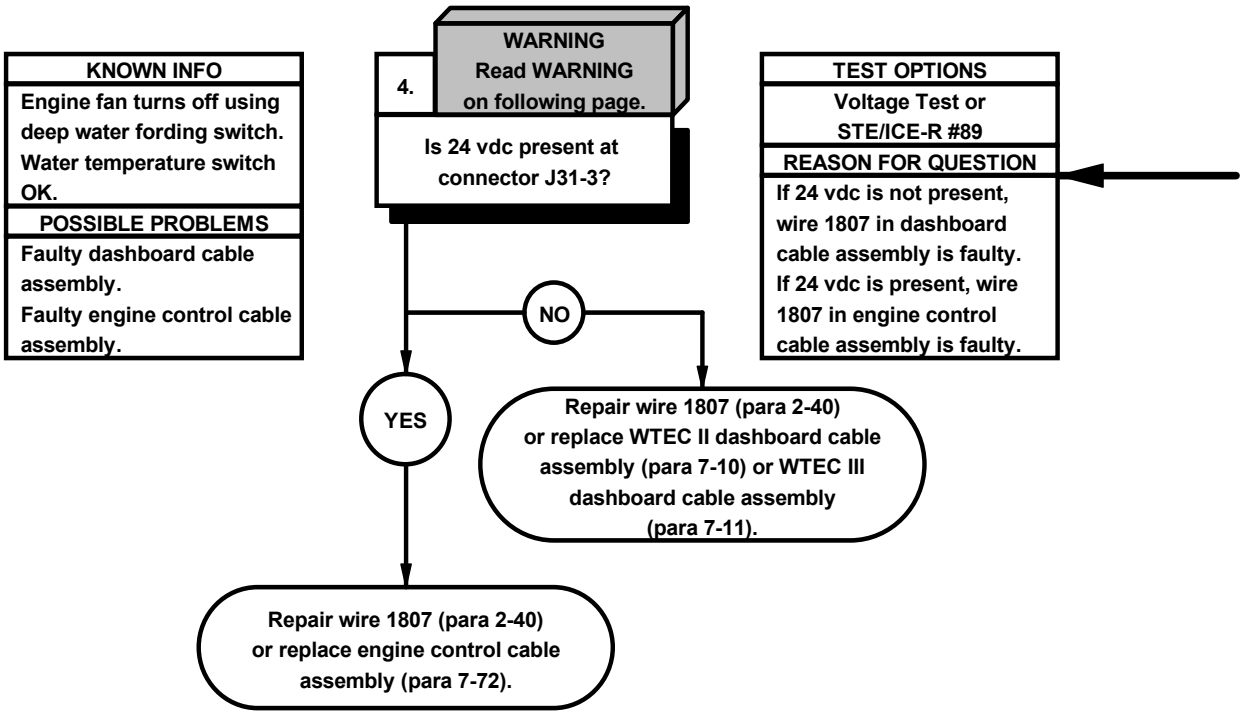
(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to connector P36-2.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, go to step 4 of this fault.
(6) Position master power switch to off (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P36-1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, go to step 5 of this fault.
(5) If continuity is present, fault corrected.
(6) Connect connector P36 to water temperature switch connector.
(7) Connect connector clamp on water temperature switch connector.



## e91. ENGINE FAN RUNS CONSTANTLY (CONT)

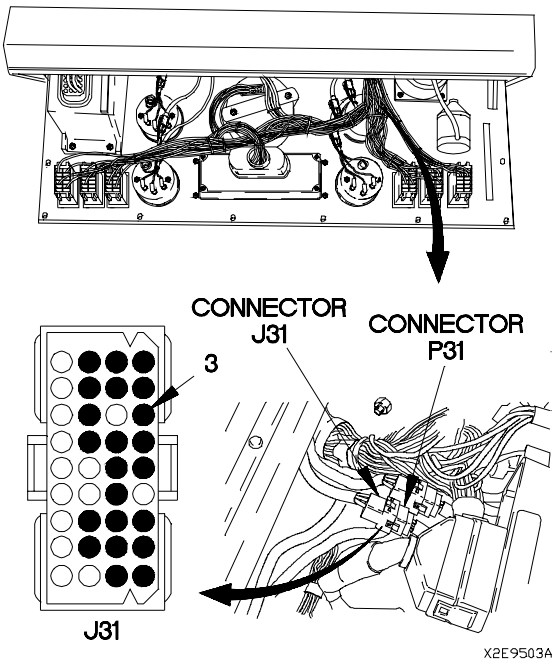


**WARNING**

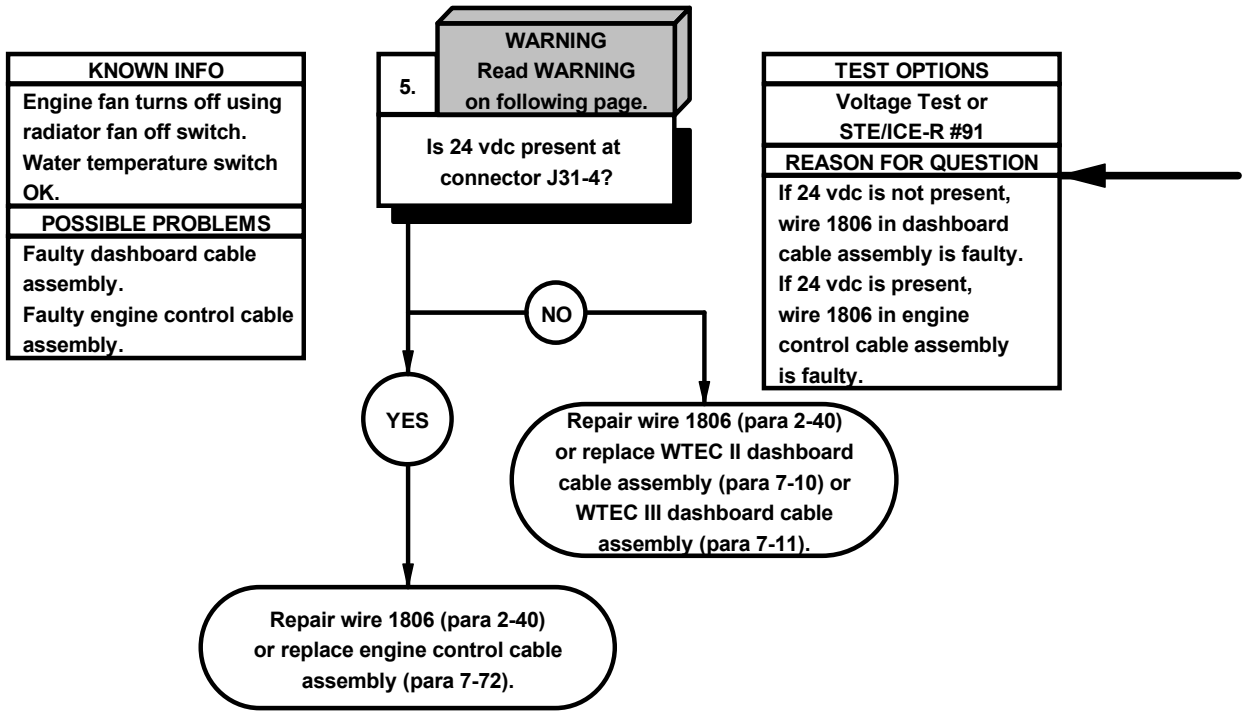
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Lower cab (TM 9-2320-365-10).
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to volts dc.
(5) Connect positive (+) probe of multimeter to connector J31-3.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1807 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If 24 vdc is present, repair wire 1807 (para 2-40) or replace engine control cable assembly (para 7-72).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Connect connector J31 to connector P31.
(12) Install instrument panel assembly (para 7-15).



## e91. ENGINE FAN RUNS CONSTANTLY (CONT)

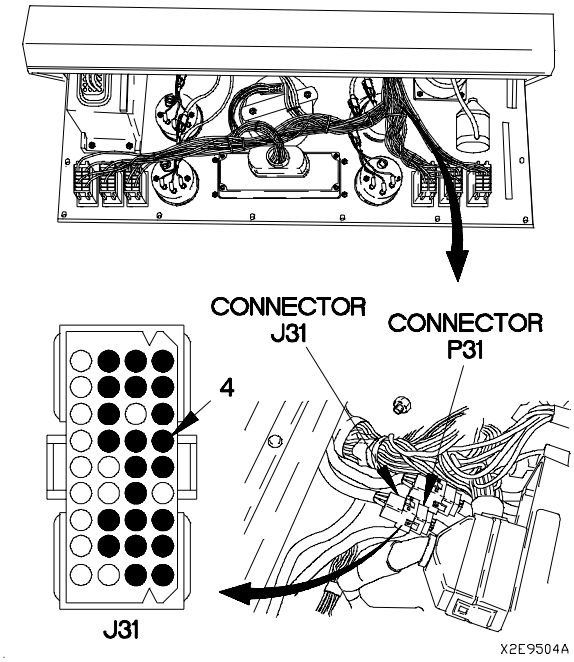


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Lower cab (TM 9-2320-365-10).
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to volts dc.
(5) Connect positive (+) probe of multimeter to connector J31-4.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1806 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If 24 vdc is present, repair wire 1806 (para 2-40) or replace engine control cable assembly (para 7-72).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Connect connector J31 to connector P31.
(12) Install instrument panel assembly (para 7-15).



**e92. ENGINE FAN DOES NOT TURN OFF USING RADIATOR FAN OFF SWITCH**

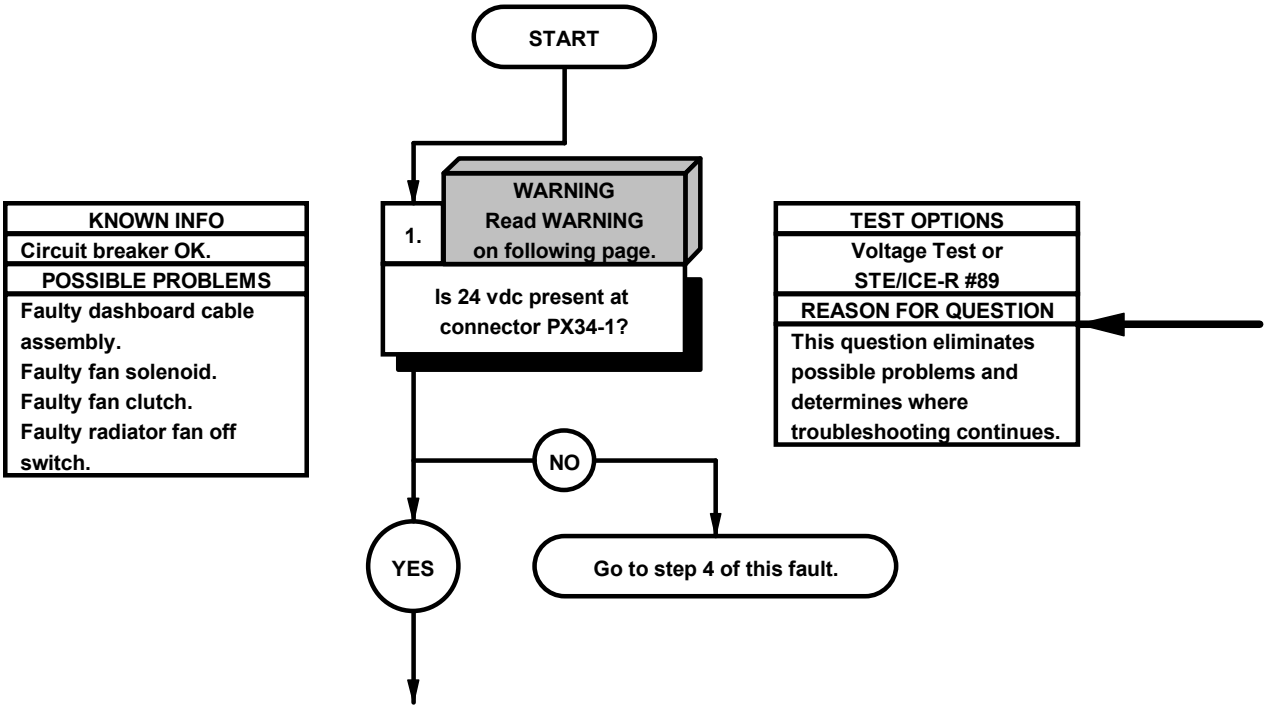
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

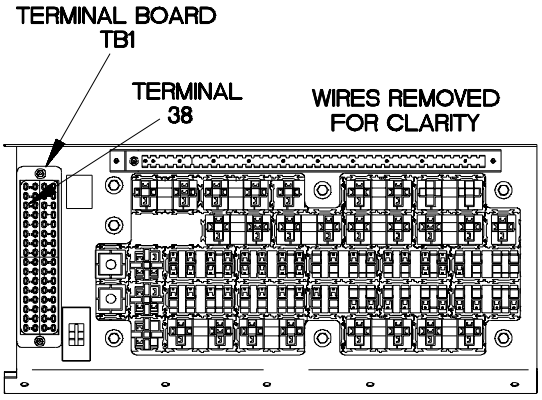


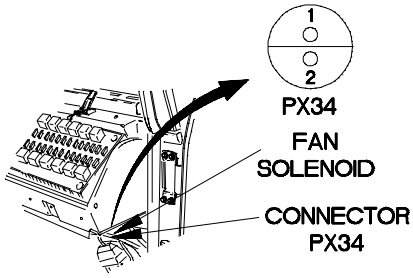
**WARNING**

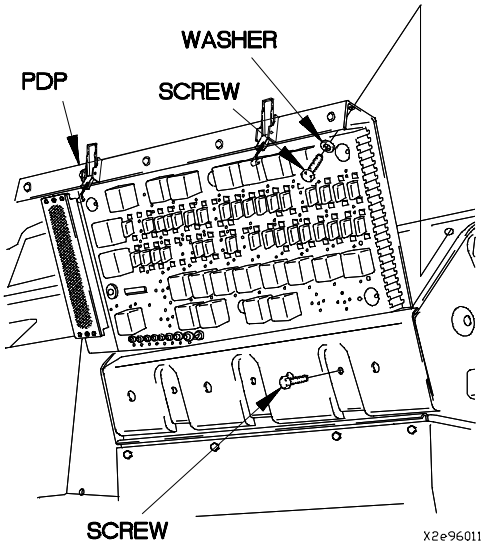
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

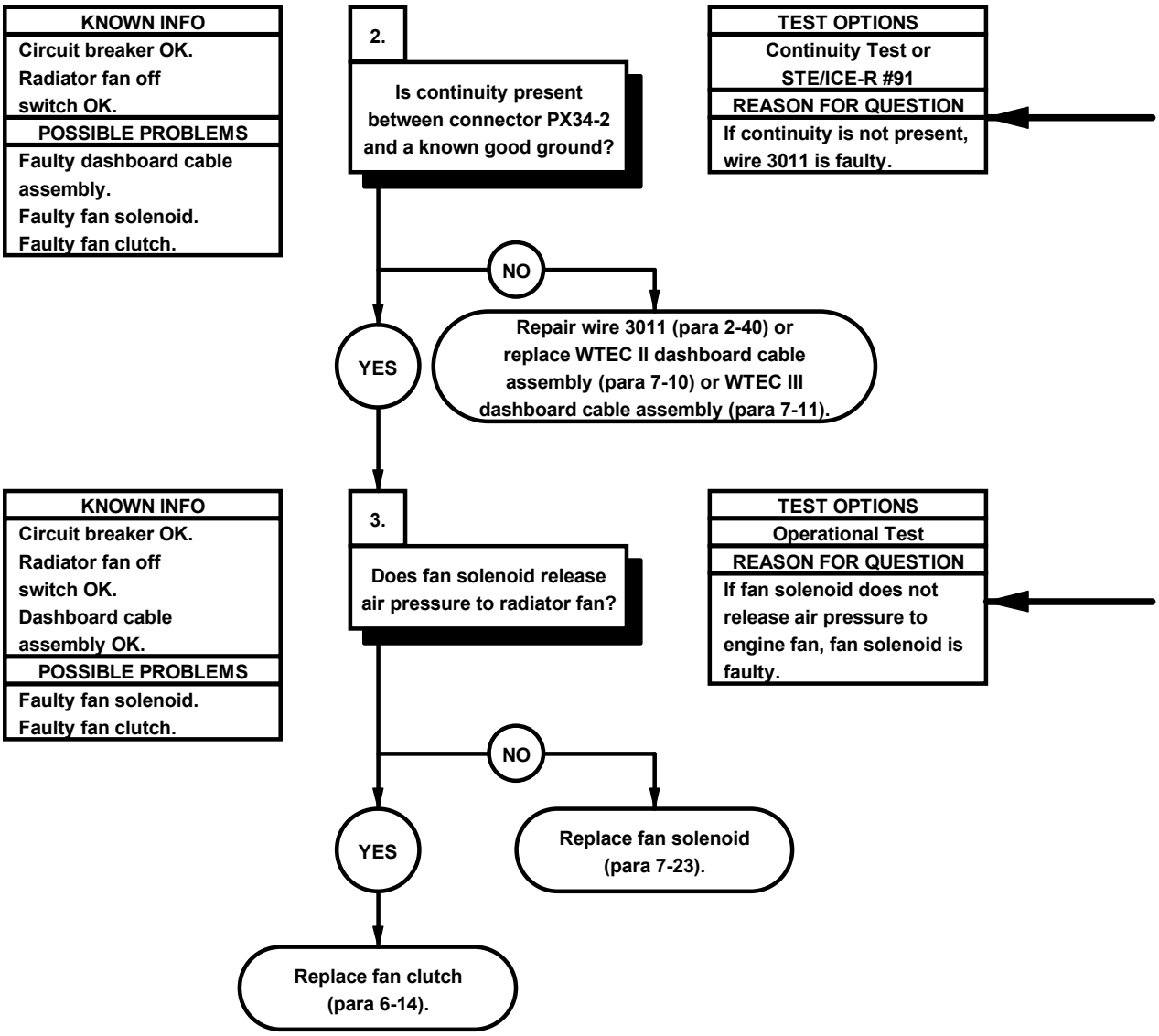
**(1) Remove kick panel (para 16-3).**
**(2) Remove three screws and washers from PDP.**
**(3) Remove three screws from PDP.**
**(4) Lift PDP outward to gain access.**
**(5) Disconnect wire 1807 from terminal board TB1 terminal 38.**
**(6) Disconnect connector PX34 from fan solenoid JX34.**
**(7) Set multimeter to volts dc.**
**(8) Connect positive (+) probe of multimeter to connector PX34-1.**
**(9) Connect negative (-) probe of multimeter to ground.**
**(10) Position master power switch to on (TM 9-2320-365-10).**
**(11) Position radiator fan off switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(12) If 24 vdc is not present, go to step 4 of this fault.**
**(13) Position radiator fan off switch to off (TM 9-2320-365-10).**
**(14) Position master power switch to off (TM 9-2320-365-10).**
**(15) Connect wire 1807 to terminal board TB1 terminal 38.**



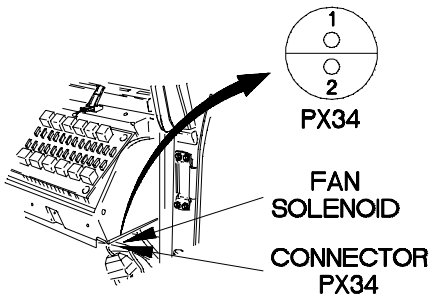



## e92. ENGINE FAN DOES NOT TURN OFF USING RADIATOR FAN OFF SWITCH (CONT)



**CONTINUITY TEST**

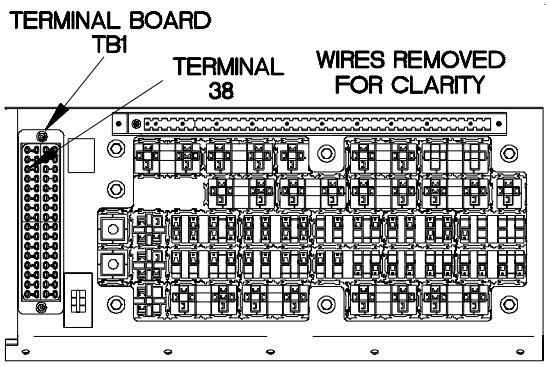
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX34-2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3011 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) Connect connector PX34 to fan solenoid.

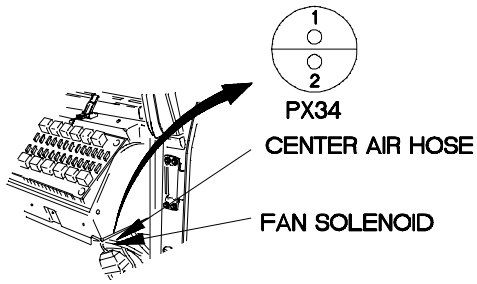


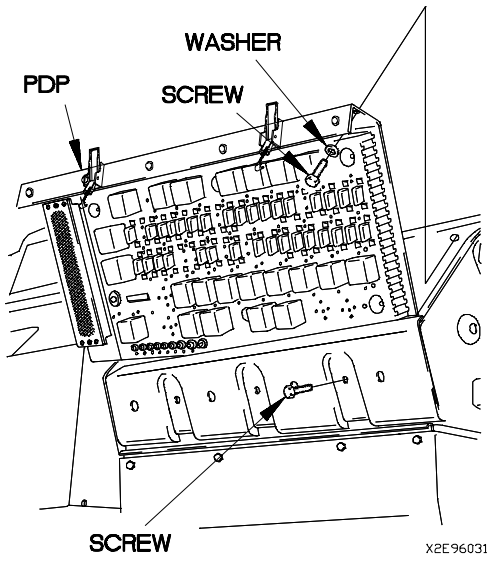

X2E96021

**OPERATIONAL TEST**

(1) Remove air hose from fan solenoid.
(2) Start engine (TM 9-2320-365-10) and allow air pressure to build up to normal level.
(3) Position radiator fan off switch to on (TM 9-2320-365-10).
(4) If air pressure is not present, replace fan solenoid (para 7-23).
(5) If air pressure is present, replace fan clutch (para 6-14).
(6) Position radiator fan off switch to off (TM 9-2320-365-10).
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Connect wire 1807 to terminal board TB1 terminal 38.
(9) Install PDP on dashboard with three screws.
(10) Install three washers and screws in PDP.
(11) Install air hose on fan solenoid.
(12) Install kick panel (para 16-3).

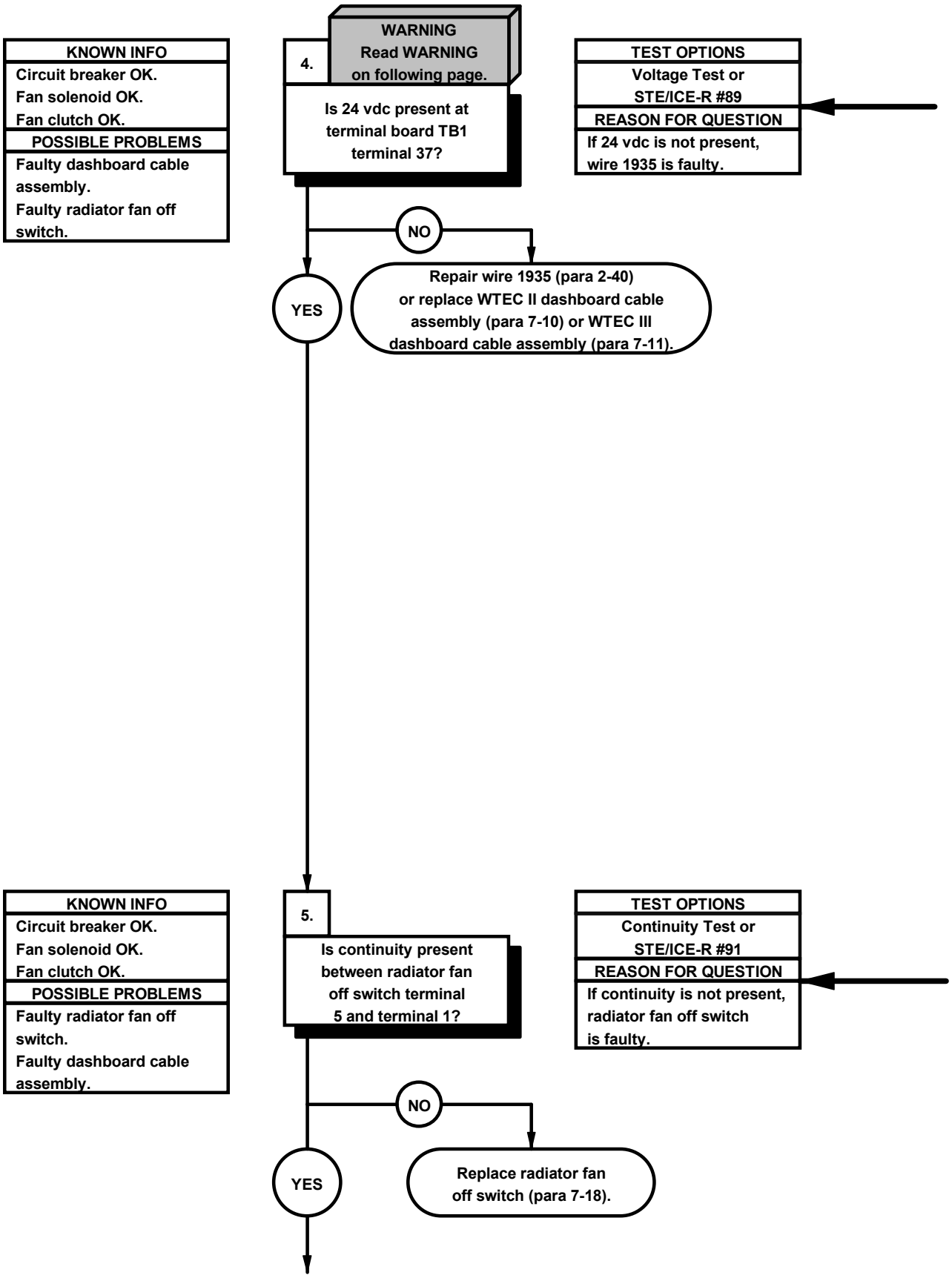



X2E96031

## e92. ENGINE FAN DOES NOT TURN OFF USING RADIATOR FAN OFF SWITCH (CONT)



**WARNING**

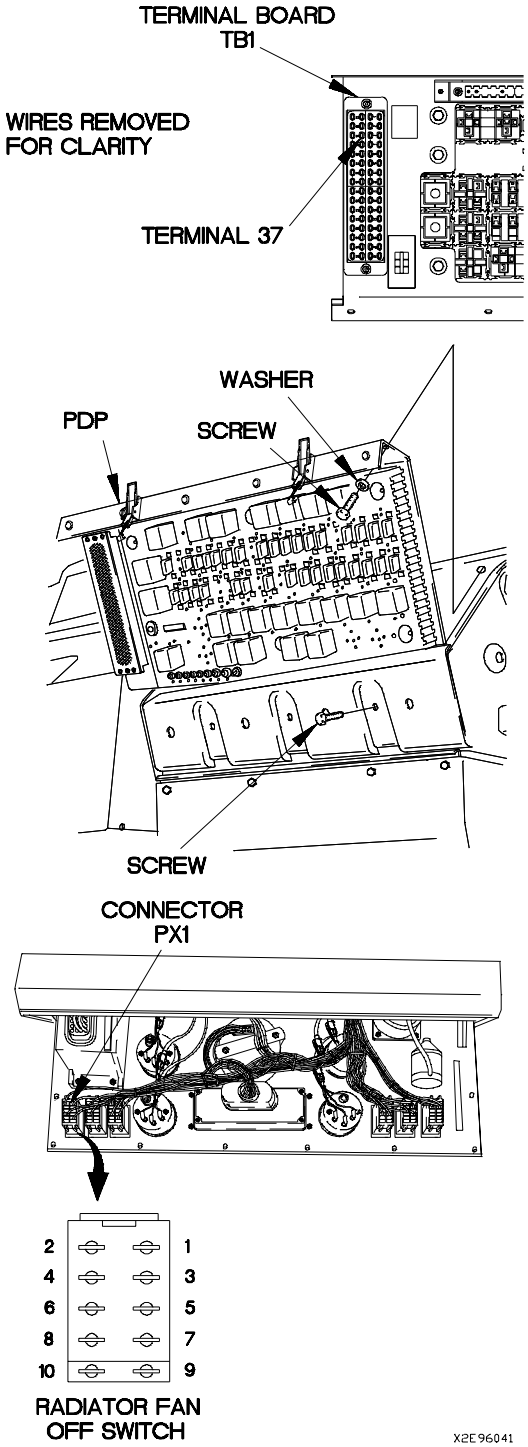
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

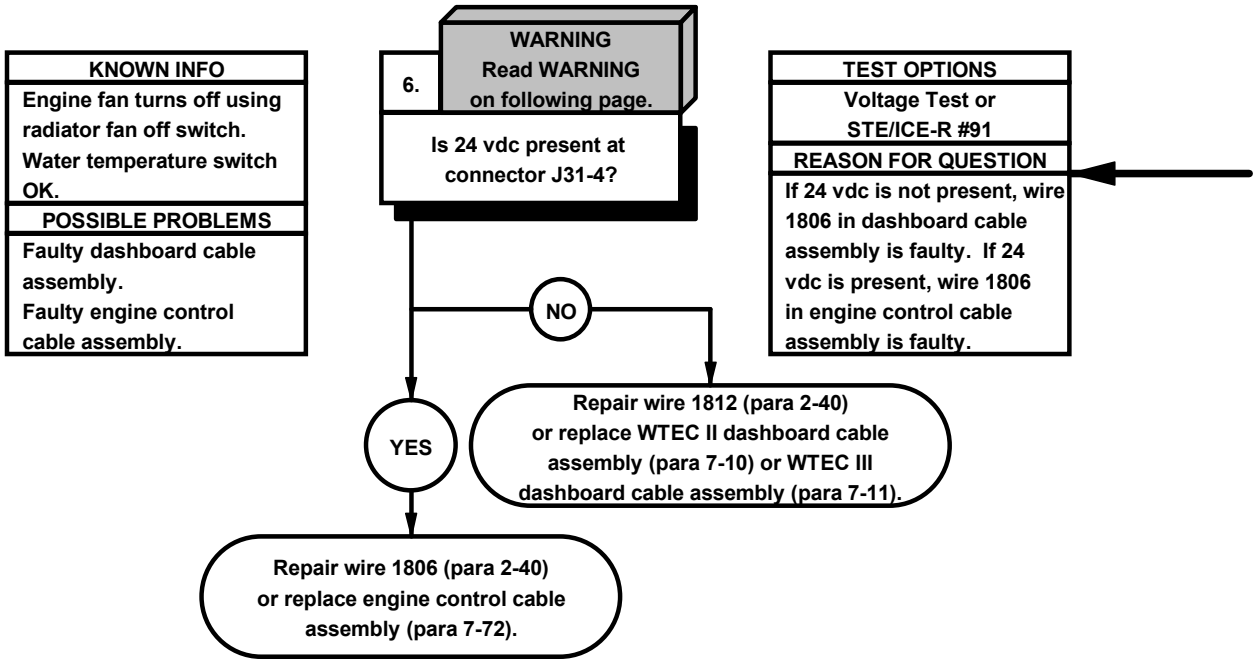
(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to terminal board TB1 terminal 37.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, repair wire 1935 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position master power switch to off (TM 9-2320-365-10).
(7) Install PDP on dashboard with three screws.
(8) Install three washers and screws in PDP.
(9) Install kick panel (para 16-3).

**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX1 from radiator fan off switch.
(3) Position radiator fan off switch to on (TM 9-2320-365-10).
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to radiator fan off switch terminal 5.
(6) Connect negative (-) probe of multimeter to radiator fan off switch terminal 1.
(7) If continuity is not present, replace radiator fan off switch (para 7-18).
(8) Position radiator fan off switch to off (TM 9-2320-365-10).



## e92. ENGINE FAN DOES NOT TURN OFF USING RADIATOR FAN OFF SWITCH (CONT)

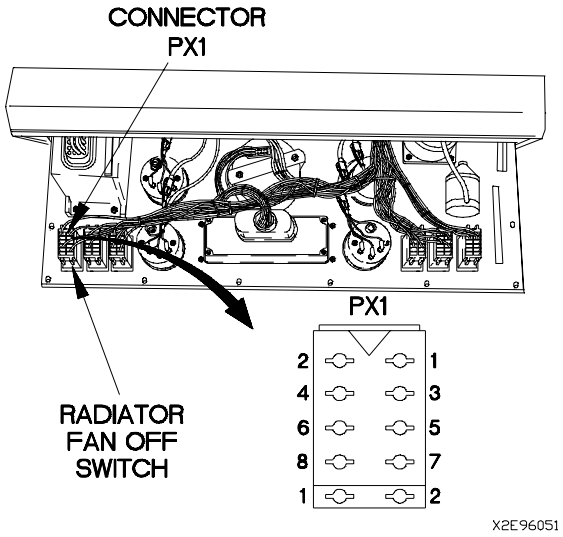


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Lower cab (TM 9-2320-365-10).
(2) Remove instrument panel assembly for access (para 7-15).
(3) Disconnect connector J31 from connector P31.
(4) Set multimeter to volts dc.
(5) Connect positive (+) probe of multimeter to connector J31-4.
(6) Connect negative (-) probe of multimeter to ground.
(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(8) If 24 vdc is not present, repair wire 1806 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(9) If 24 vdc is present, repair wire 1806 (para 2-40) or replace engine control cable assembly (para 7-72).
(10) Position master power switch to off (TM 9-2320-365-10).
(11) Connect connector J31 to connector P31.
(12) Install instrument panel assembly (para 7-15).



## e93. ETHER START DOES NOT OPERATE

**INITIAL SETUP**

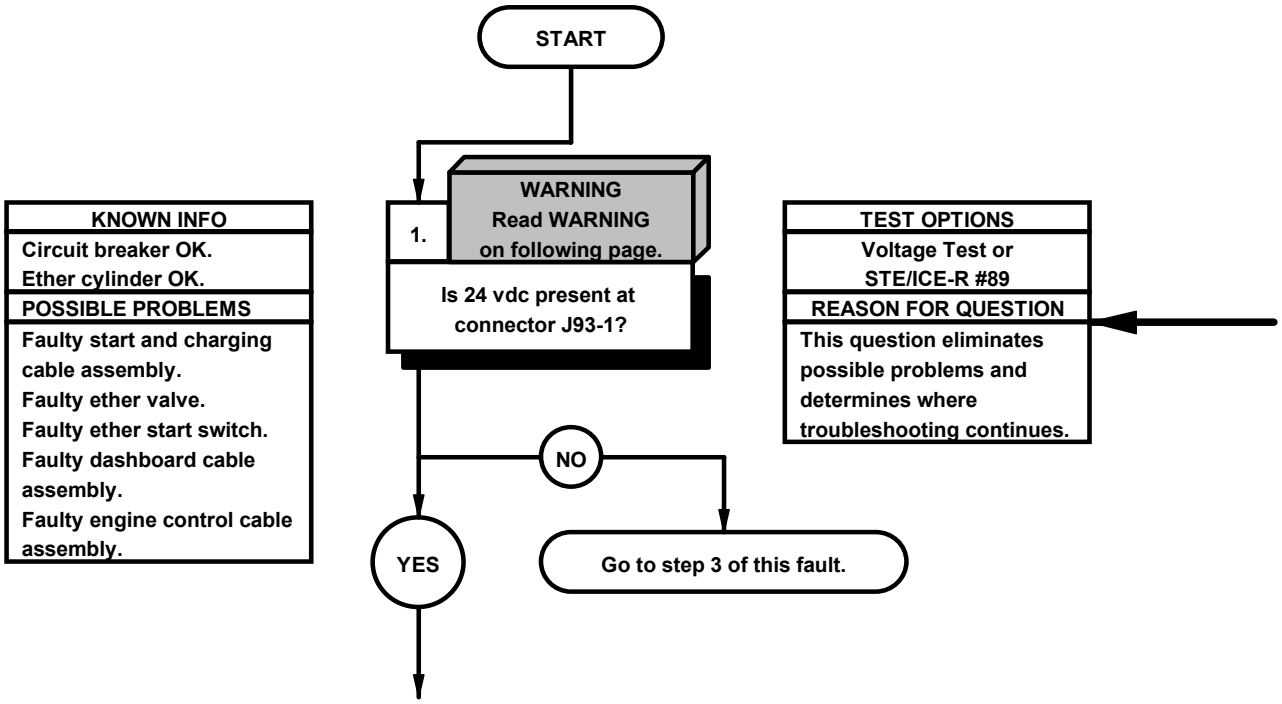
**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Spare tire lowered (TM 9-2320-365-10).

**Personnel Required**
- (2)

**Materials/Parts**
- Wire, Elect, 50 ft (Item 77, Appendix D)

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)

**References**
- TM 9-4910-571-12&P

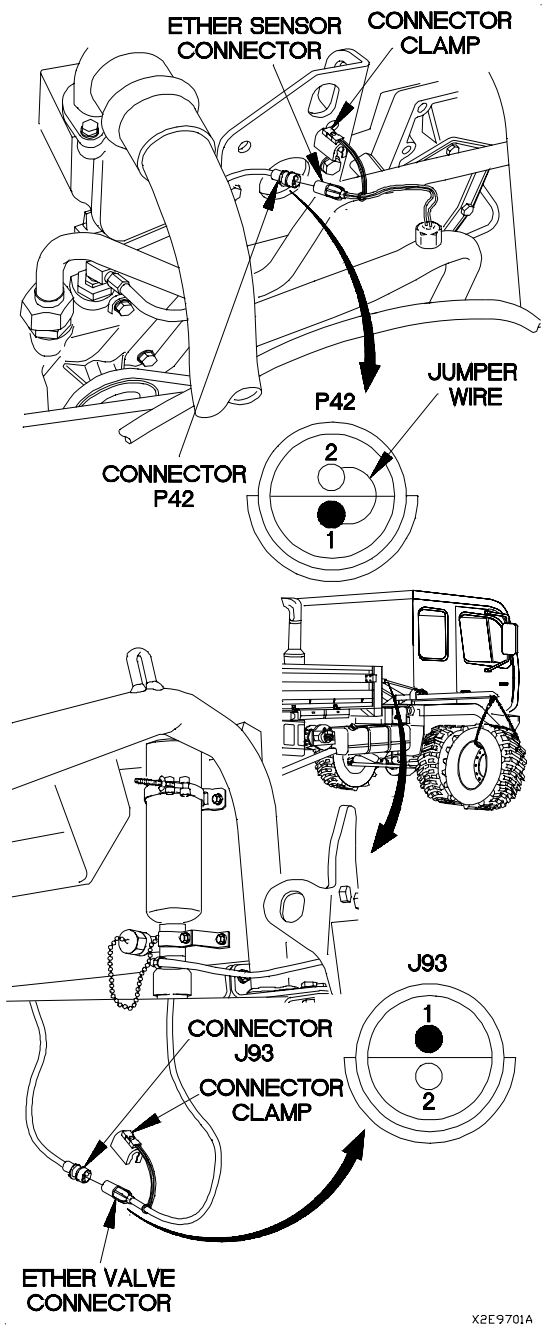


**WARNING**

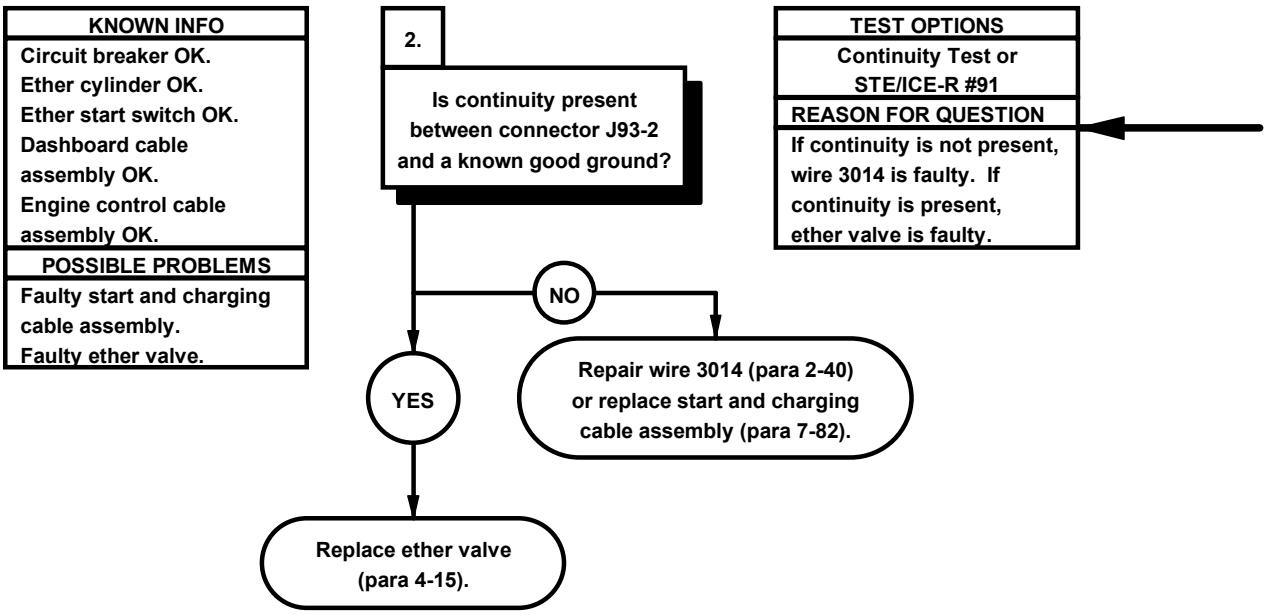
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

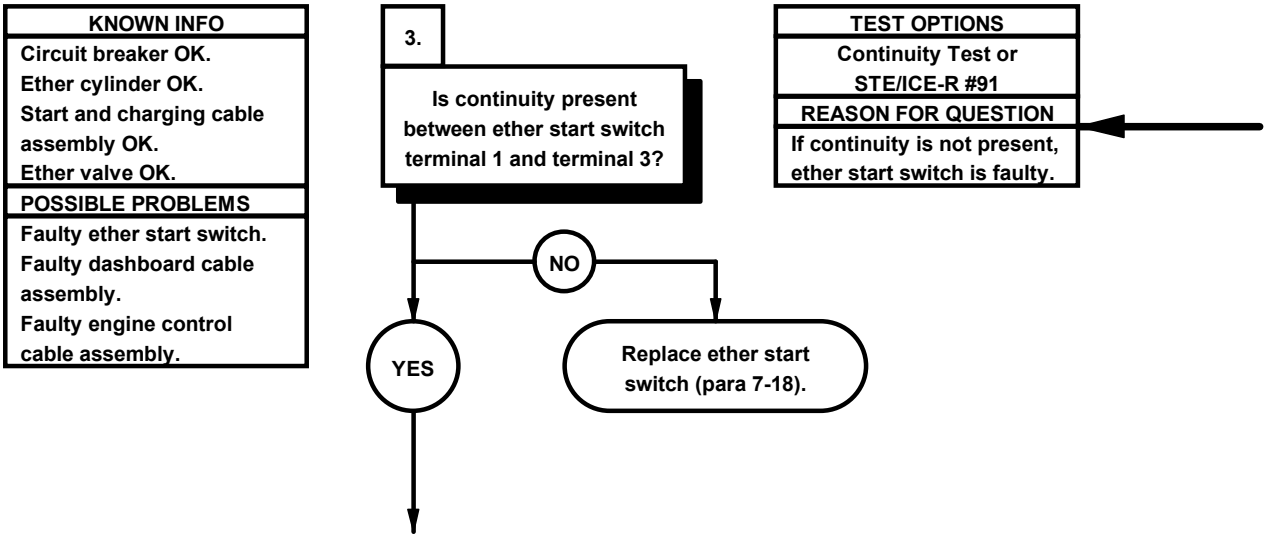
**VOLTAGE TEST**

**(1) Disconnect connector clamp from ether valve connector.**
**(2) Disconnect ether valve connector from connector J93.**
**(3) Disconnect connector clamp from ether sensor connector.**
**(4) Disconnect connector P42 from ether sensor connector.**
**(5) Install jumper wire from connector P42-1 to connector P42-2.**
**(6) Set multimeter to volts dc.**
**(7) Connect positive (+) probe of multimeter to connector J93-1.**
**(8) Connect negative (-) probe of multimeter to ground.**
**(9) Position master power switch to on (TM 9-2320-365-10).**
**(10) Press ether start switch (TM 9-2320-365-10) and note reading on multimeter.**
**(11) If 24 vdc is not present, go to step 3 of this fault.**
**(12) Release ether start switch (TM 9-2320-365-10).**
**(13) Position master power switch to off (TM 9-2320-365-10).**
**(14) Remove jumper wire from connector P42-1 and connector P42-2.**
**(15) Connect connector P42 to ether sensor connector.**
**(16) Lower cab (TM 9-2320-365-10).**



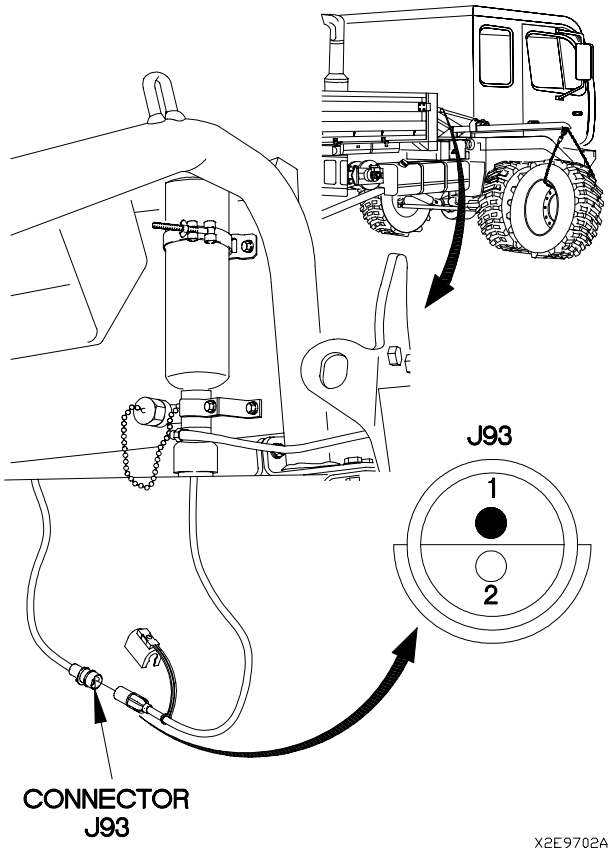
## e93. ETHER START DOES NOT OPERATE (CONT)



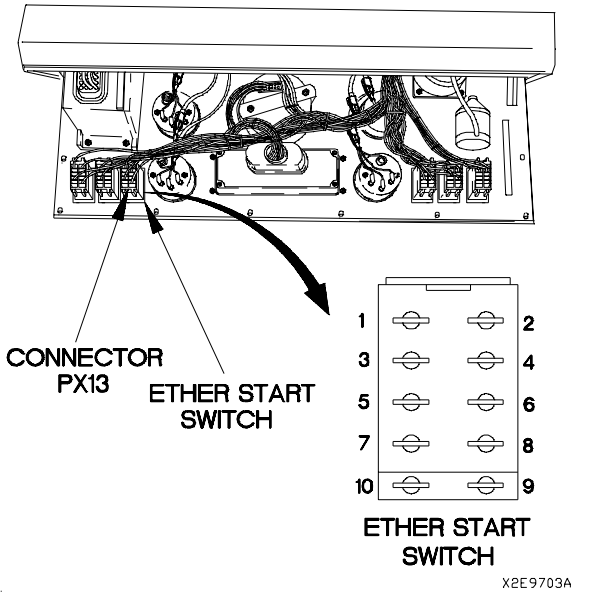
**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J93-2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3014 (para 2-40) or replace start and charging cable assembly (para 7-82).
(5) If continuity is present, replace ether valve (para 4-15).
(6) Raise spare tire (TM 9-2320-365-10).

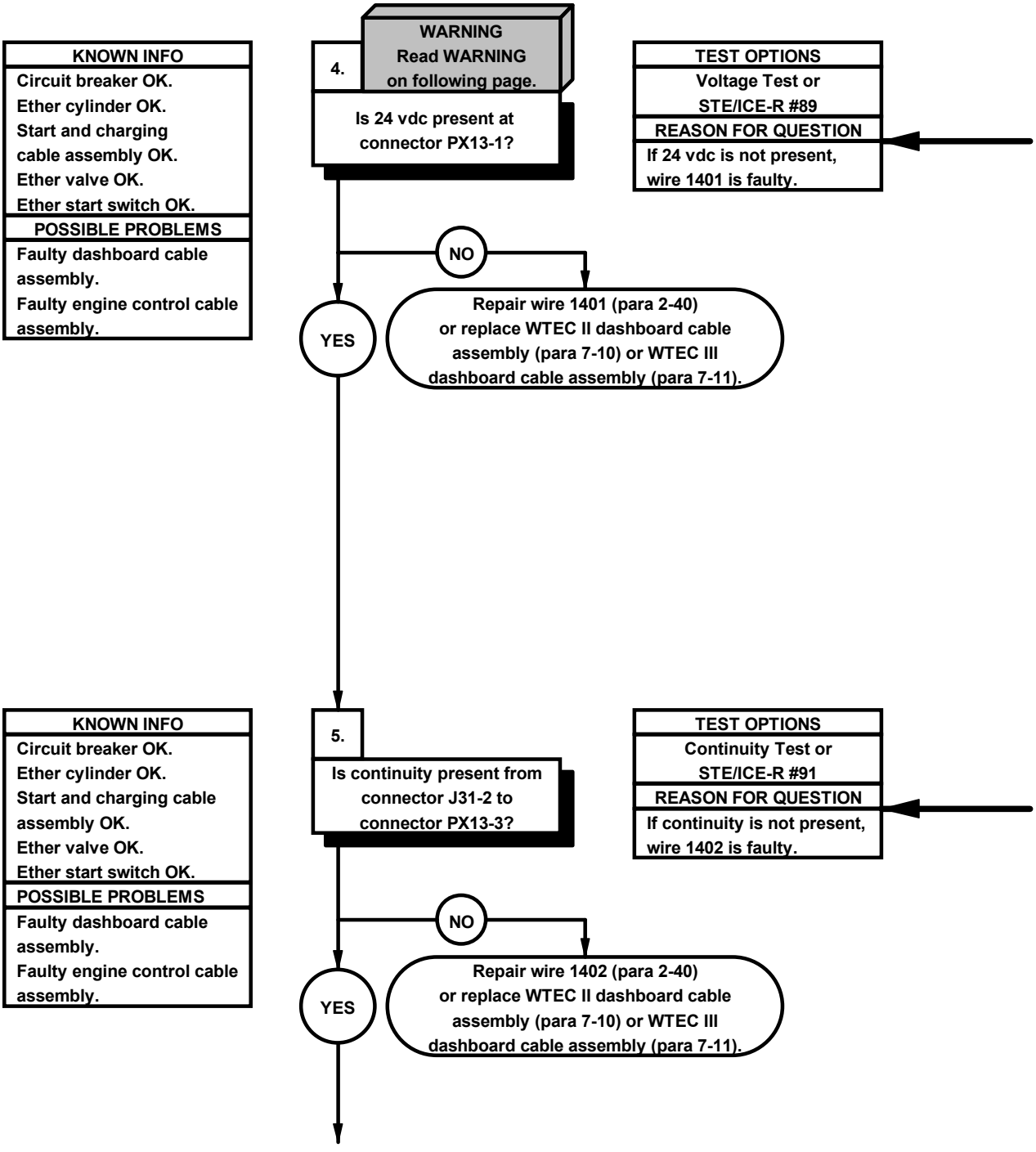



**CONTINUITY TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector PX13 from ether start switch.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to ether start switch terminal 1.
(5) Connect negative (-) probe of multimeter to ether start switch terminal 3.
(6) Position ether start switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If continuity is not present, replace ether start switch (para 7-18).



## e93. ETHER START DOES NOT OPERATE (CONT)

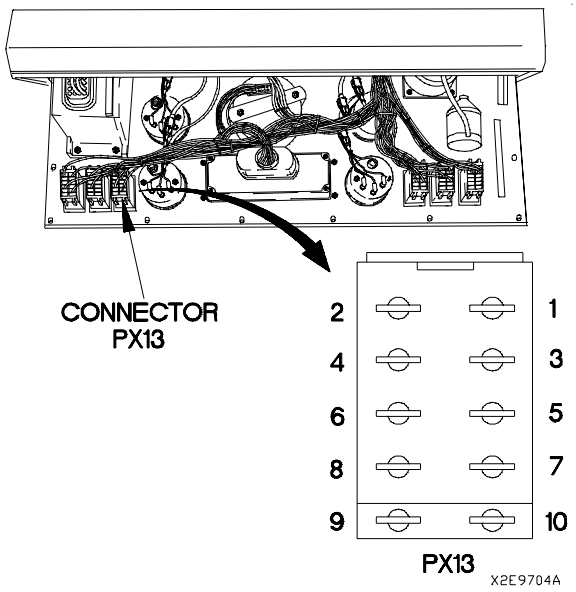


**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

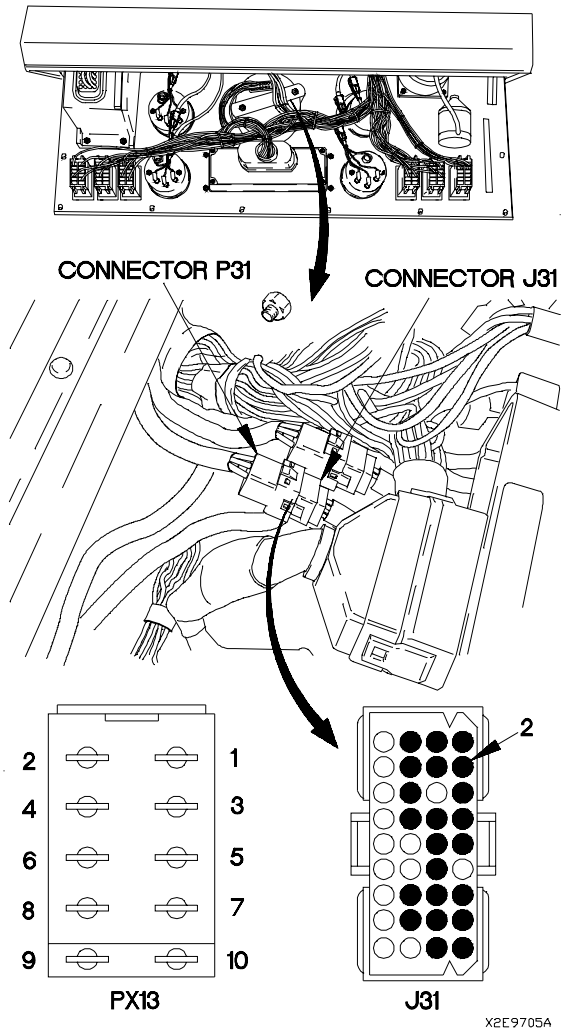
**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to connector PX13-1.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, repair wire 1401 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position master power switch to off (TM 9-2320-365-10).

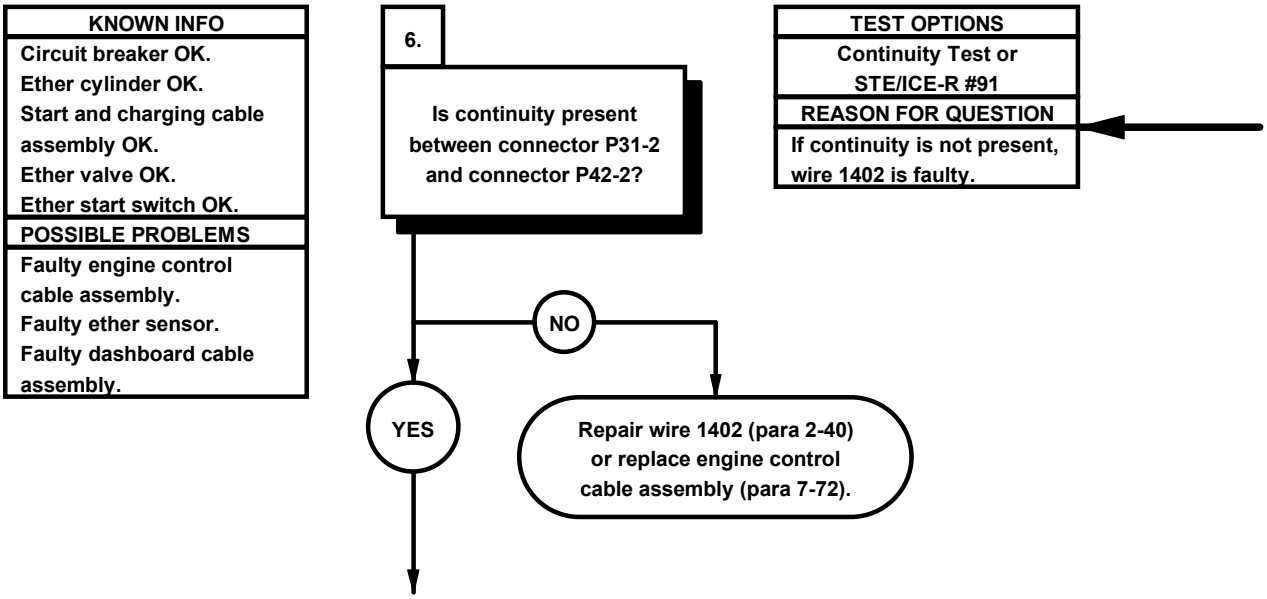



**CONTINUITY TEST**

(1) Disconnect connector P31 from connector J31.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX13-3.
(4) Connect negative (-) probe of multimeter to connector J31-2 and note reading on multimeter.
(5) If continuity is not present, repair wire 1402 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

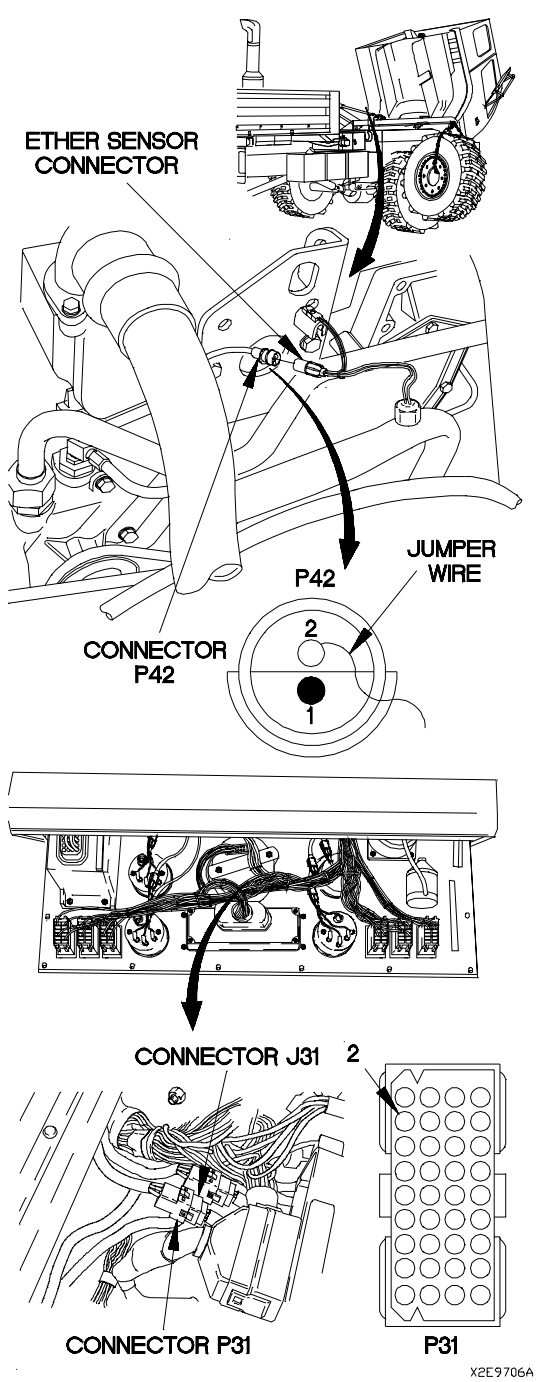


## e93. ETHER START DOES NOT OPERATE (CONT)

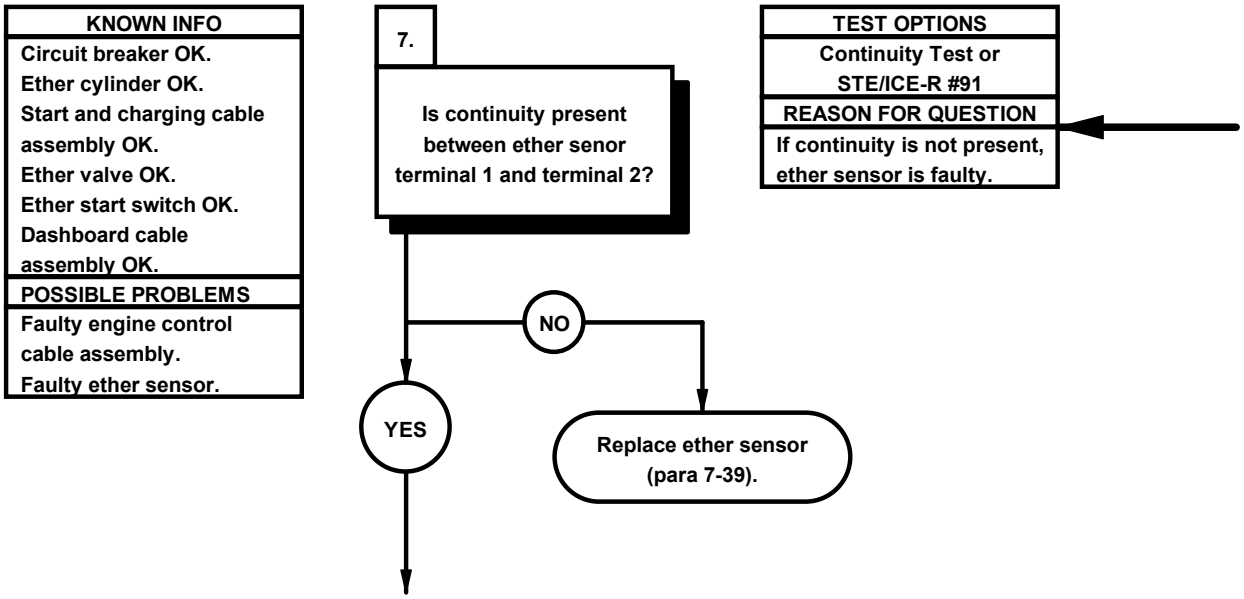


**CONTINUITY TEST**

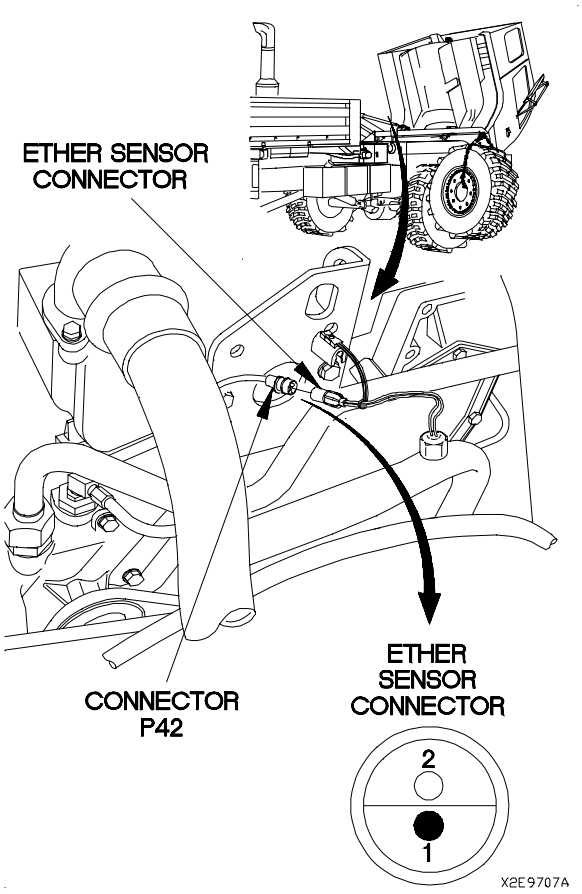
(1) Raise cab (TM 9-2320-365-10).
(2) Disconnect connector P42 from ether sensor connector.
(3) Connect jumper wire to connector P42-2.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to connector P31-2.
(6) Connect negative (-) probe of multimeter to jumper wire and note reading on multimeter.
(7) If continuity is not present, repair wire 1402 (para 2-40) or replace engine control cable assembly (para 7-72).



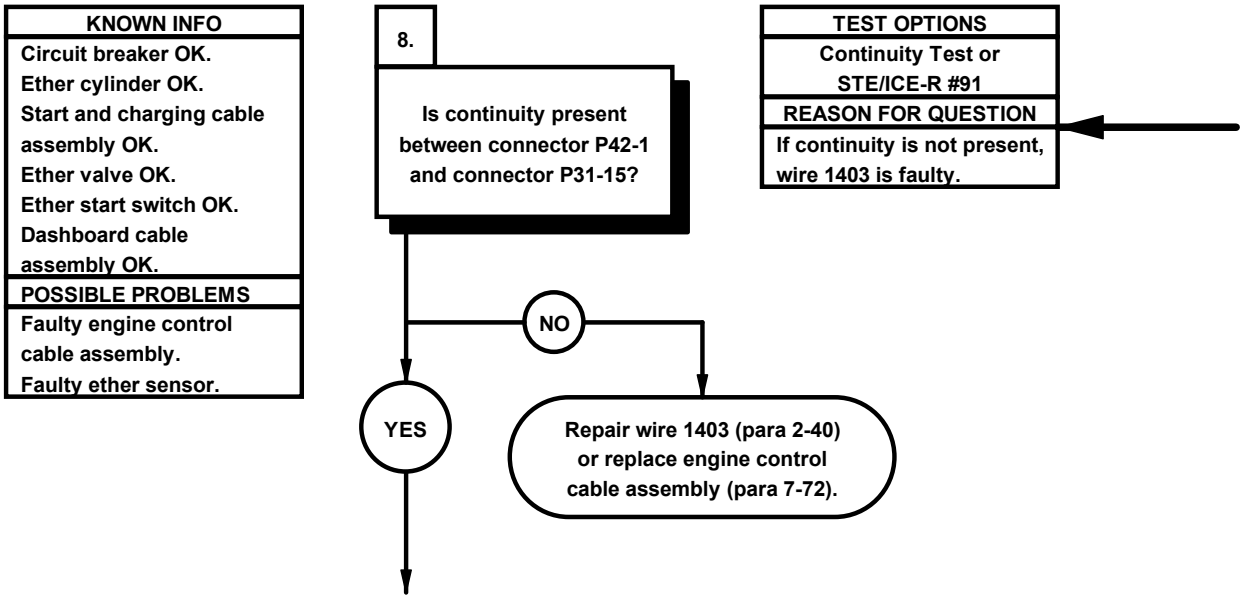
## e93. ETHER START DOES NOT OPERATE (CONT)



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to ether sensor terminal 1. |
| (3) Connect negative (-) probe of multimeter to ether sensor terminal 2 and note reading on multimeter. |
| (4) If continuity is not present, replace ether sensor (para 7-39). |

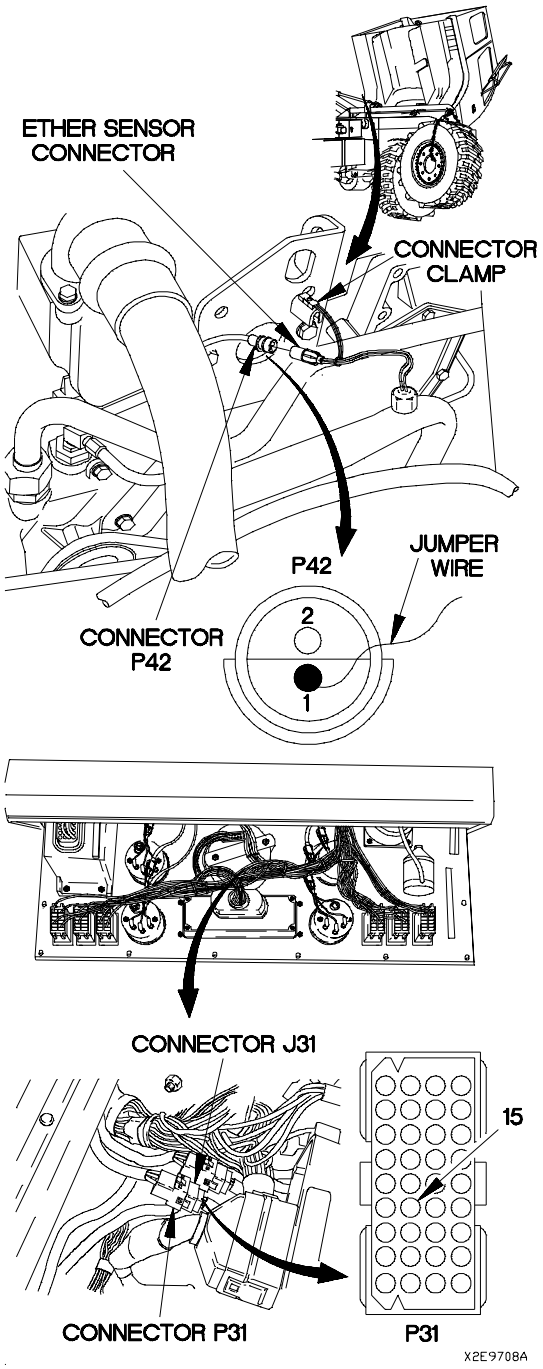


## e93. ETHER START DOES NOT OPERATE (CONT)

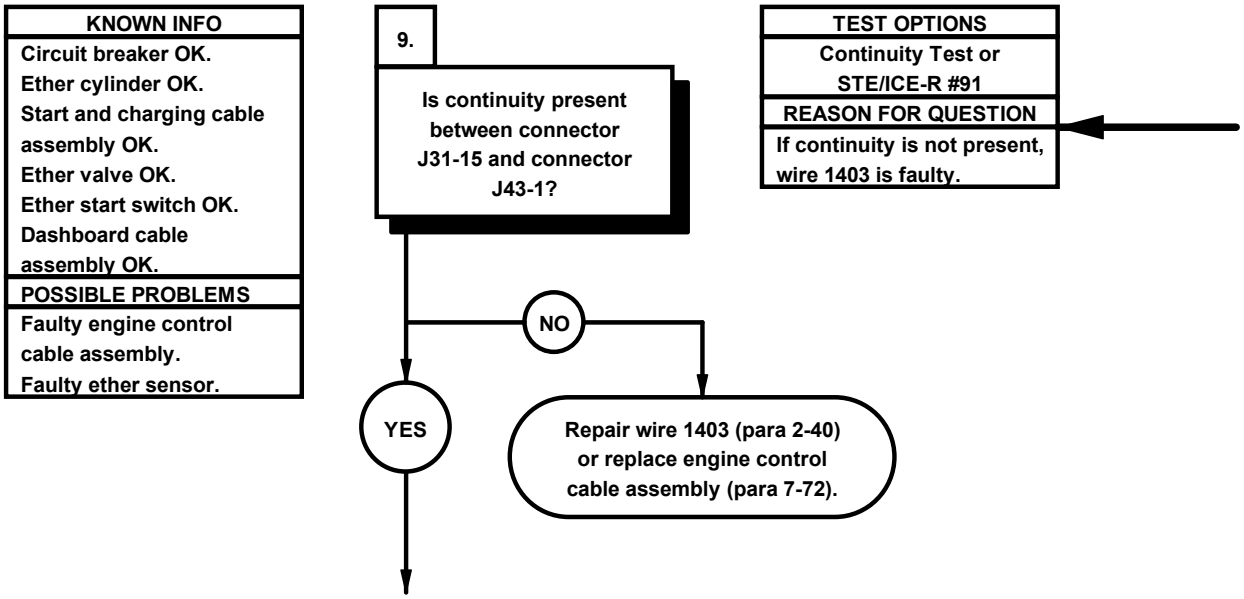


**CONTINUITY TEST**

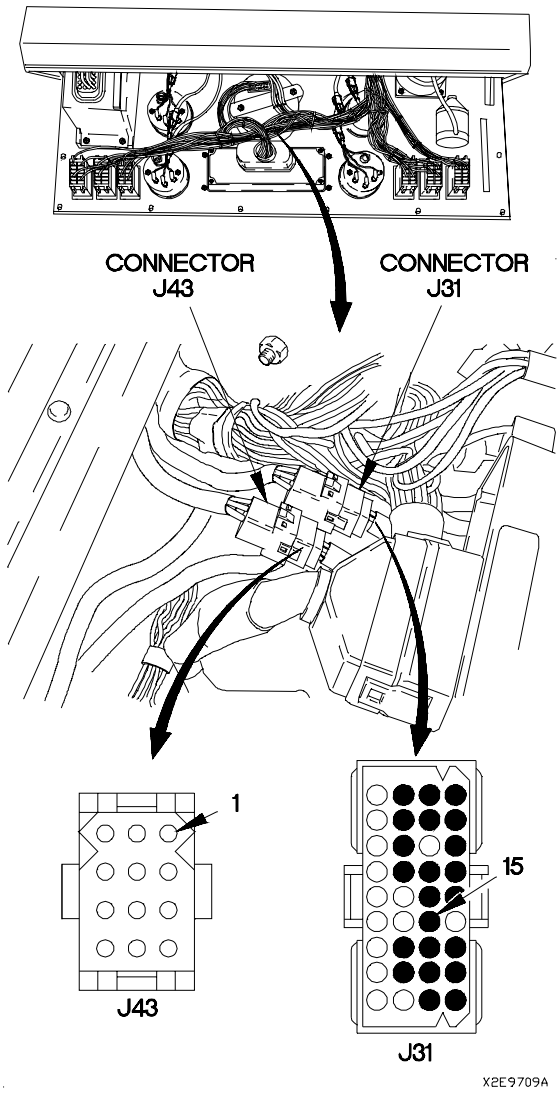
(1) Set multimeter to ohms.
(2) Connect jumper wire to connector P42-1.
(3) Lower cab (TM 9-2320-365-10).
(4) Connect positive (+) probe of multimeter to connector P31-15.
(5) Connect negative (-) probe of multimeter to jumper wire and note reading on multimeter.
(6) If continuity is not present, repair wire 1403 (para 2-40) or replace engine control cable assembly (para 7-72).
(7) Raise cab (TM 9-2320-365-10).
(8) Remove jumper wire from connector P42.
(9) Connect connector P42 to ether sensor connector.
(10) Connect connector clamp on ether sensor connector.
(11) Lower cab (TM 9-2320-365-10).



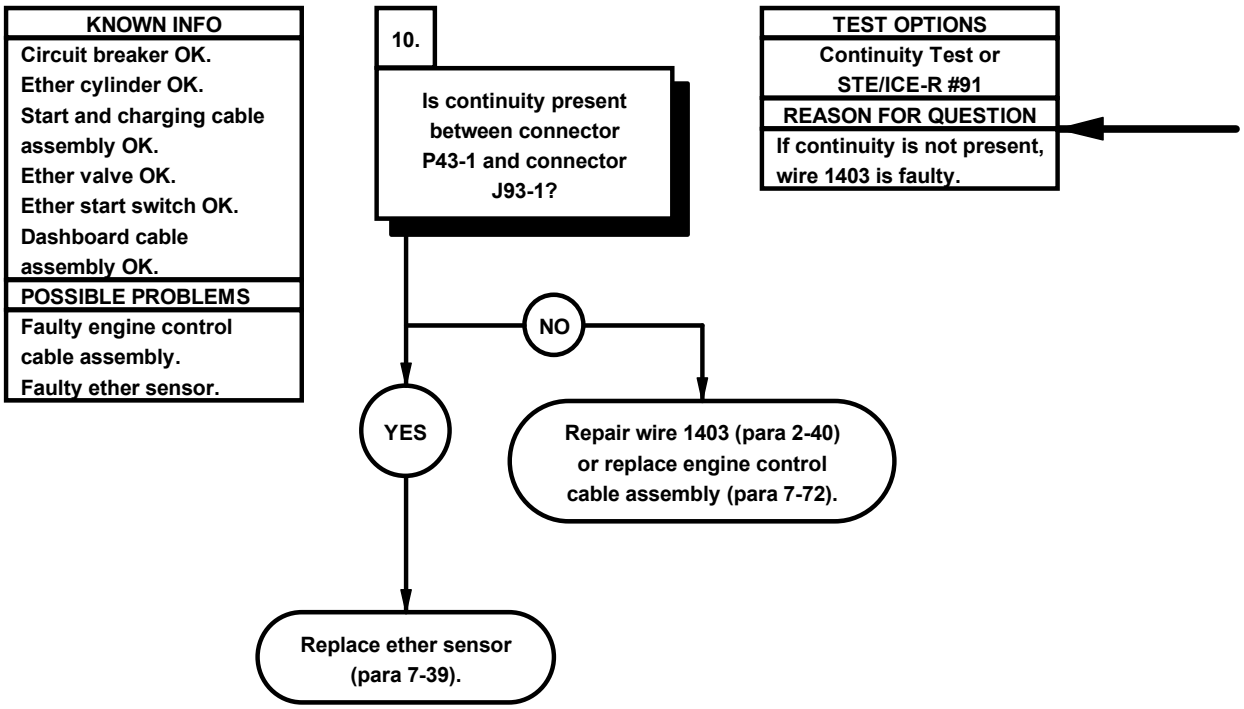
## e93. ETHER START DOES NOT OPERATE (CONT)



| CONTINUITY TEST |
| --- |
| (1) Set multimeter to ohms. |
| (2) Connect positive (+) probe of multimeter to connector J31-15. |
| (3) Connect negative (-) probe of multimeter to connector J43-1 and note reading on multimeter. |
| (4) If continuity is not present, repair wire 1403 (para 2-40) or replace engine control cable assembly (para 7-72). |

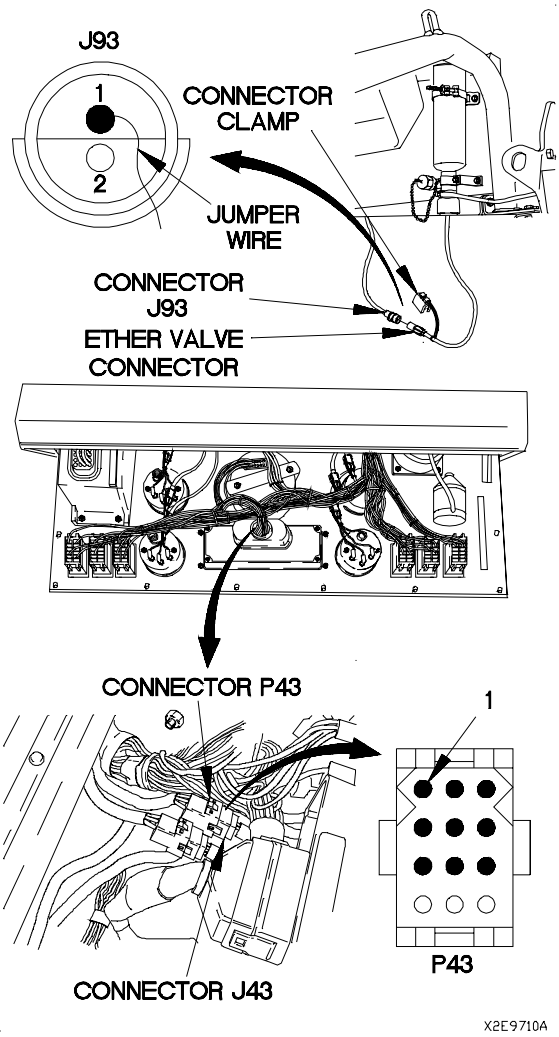


## e93. ETHER START DOES NOT OPERATE (CONT)

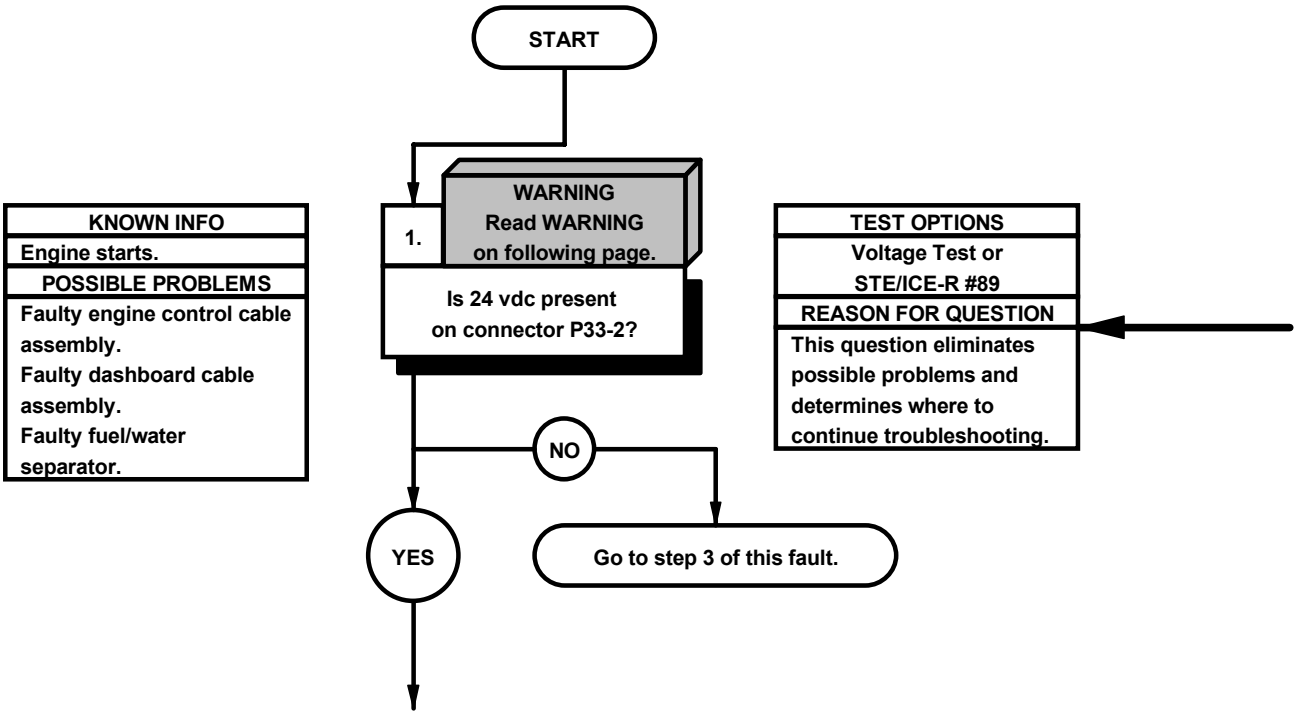


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect jumper wire to connector J93-1.
(3) Connect positive (+) probe of multimeter to connector P43-1.
(4) Connect negative (-) probe of multimeter to jumper wire and note reading on multimeter.
(5) If continuity is not present, repair wire 1403 (para 2-40) or replace engine control cable assembly (para 7-72).
(6) If continuity is present, replace ether sensor (para 7-39).
(7) Remove jumper wire from connector J93.
(8) Connect connector J93 to ether valve connector.
(9) Connect connector clamp to ether valve connector.
(10) Connect connector J43 to connector P43.
(11) Install instrument panel assembly (para 7-15).



| e94. EXCESSIVE CONDENSATION IN FUEL | |
|---|---|
| **INITIAL SETUP** | |
| **Equipment Condition**<br>Engine shut down (TM 9-2320-365-10).<br><br>**Personnel Required**<br>(2)<br><br>**References**<br>TM 9-4910-571-12&P | **Tools and Special Tools**<br>Tool Kit, Genl Mech (Item 44, Appendix C)<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C)<br><br>**Materials/Parts**<br>Wire, Elect, 50 ft (Item 77, Appendix D) |

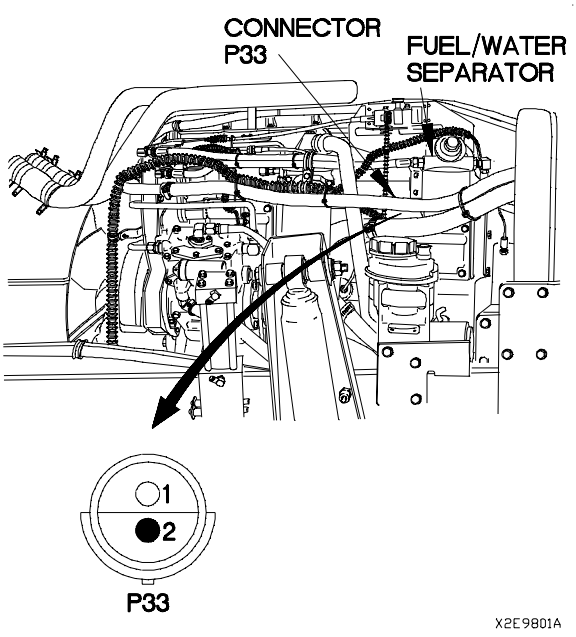


**WARNING**

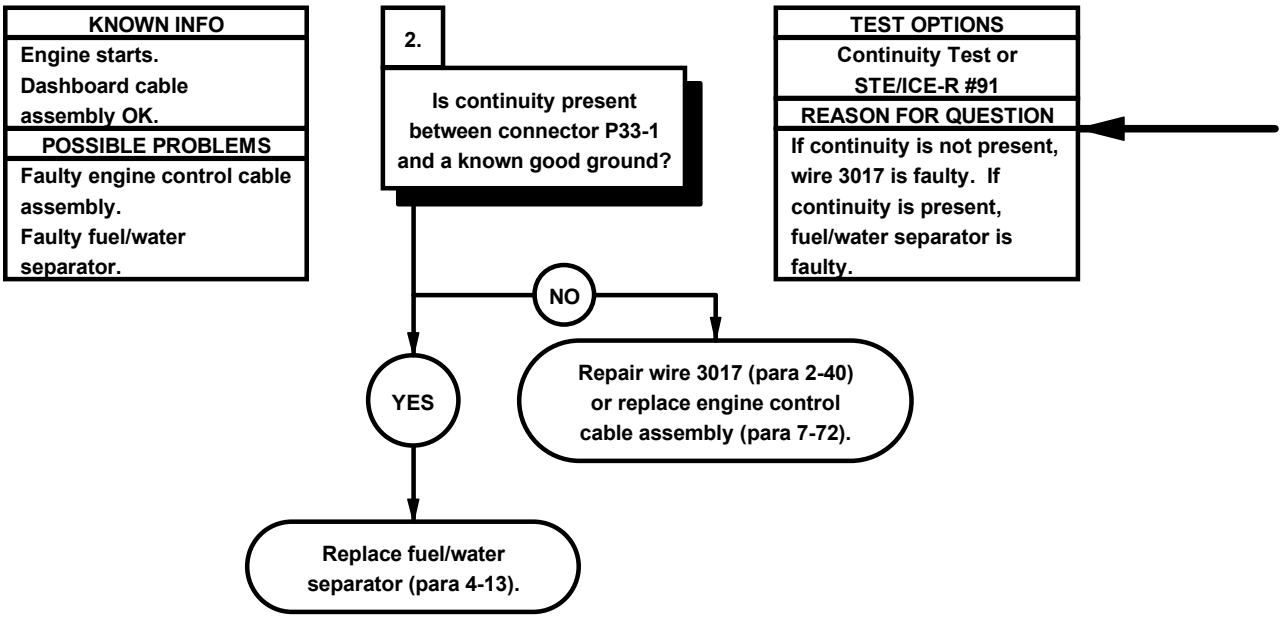
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

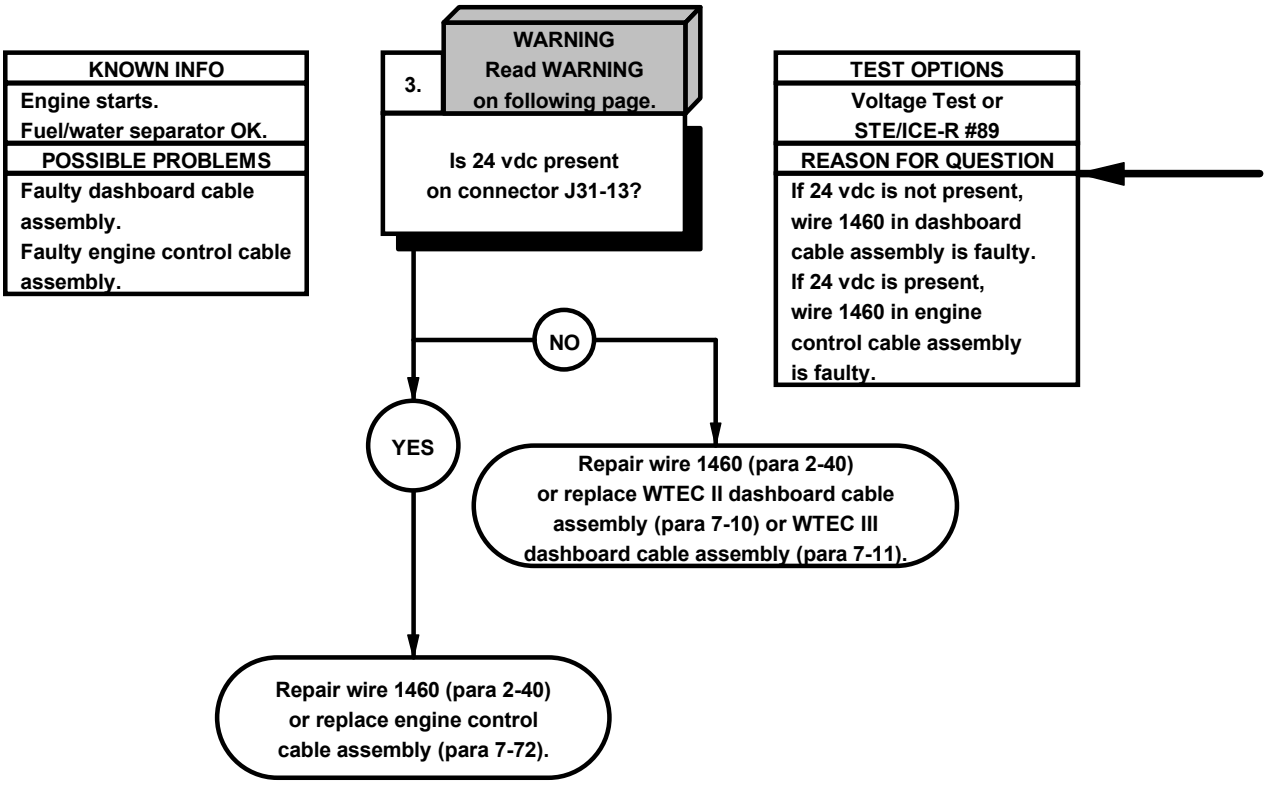
**VOLTAGE TEST**

**(1) Raise cab (TM 9-2320-365-10).**
**(2) Disconnect connector clamp from fuel/water separator.**
**(3) Disconnect connector P33 from fuel/water separator.**
**(4) Set multimeter to volts dc.**
**(5) Connect positive (+) probe of multimeter to connector P33-2.**
**(6) Connect negative (-) probe of multimeter to ground.**
**(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(8) If 24 vdc is not present, go to step 3 of this fault.**
**(9) Position master power switch to off (TM 9-2320-365-10).**



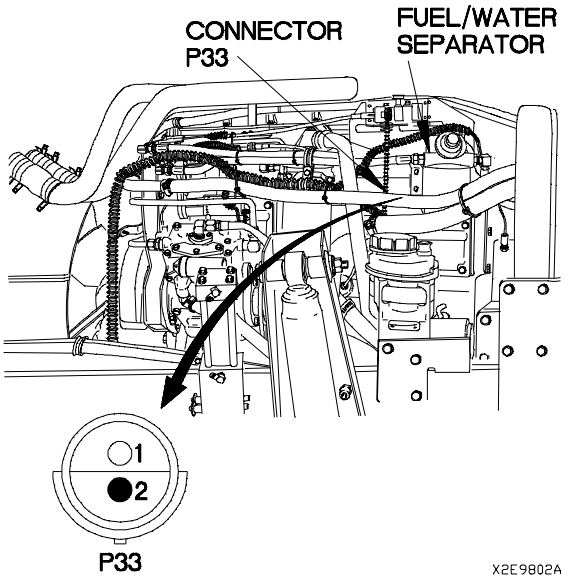
## e94. EXCESSIVE CONDENSATION IN FUEL (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P33-1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3017 (para 2-40) or replace engine control cable assembly (para 7-72).
(5) If continuity is present, replace fuel/water separator (para 4-13).
(6) Connect connector P33 to fuel/water separator.
(7) Connect connector clamp on fuel/water separator.
(8) Lower cab (TM 9-2320-365-10).

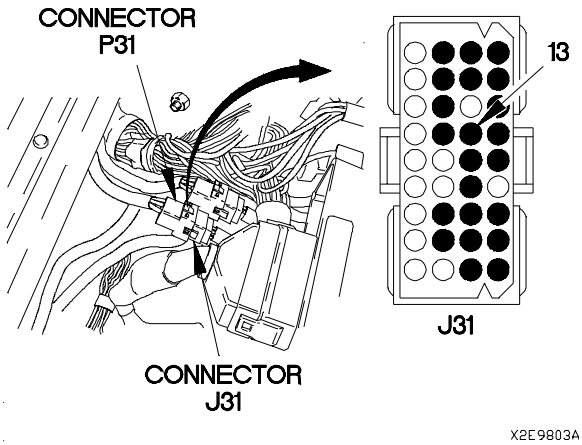



**WARNING**

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector P31 from connector J31.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector J31-13.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 1460 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc is present, repair wire 1460 (para 2-40) or replace engine control cable assembly (para 7-72).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Connect connector P31 to connector J31.
(11) Install instrument panel assembly on (para 7-15).



**e95. RADIO DOES NOT OPERATE**

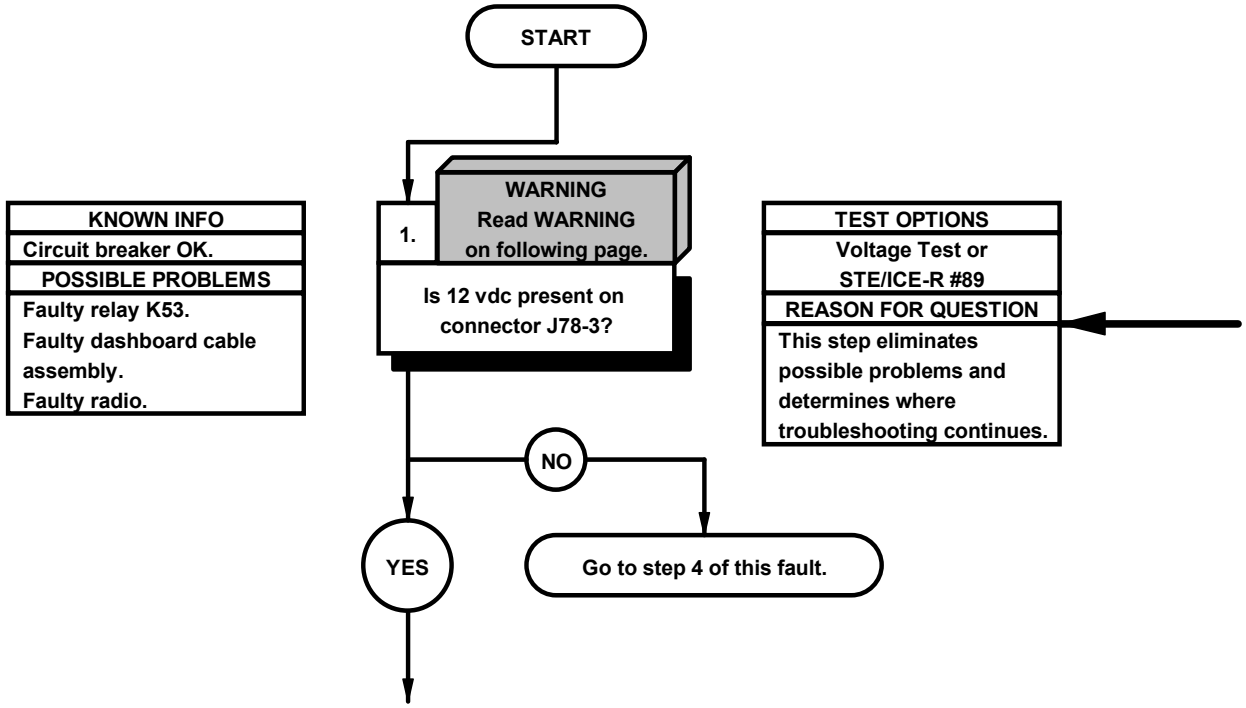
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

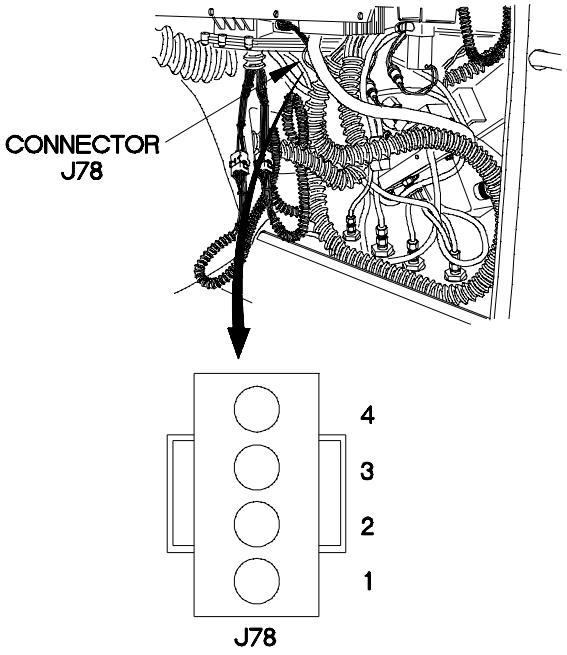
**References**
TM 9-4910-571-12&P



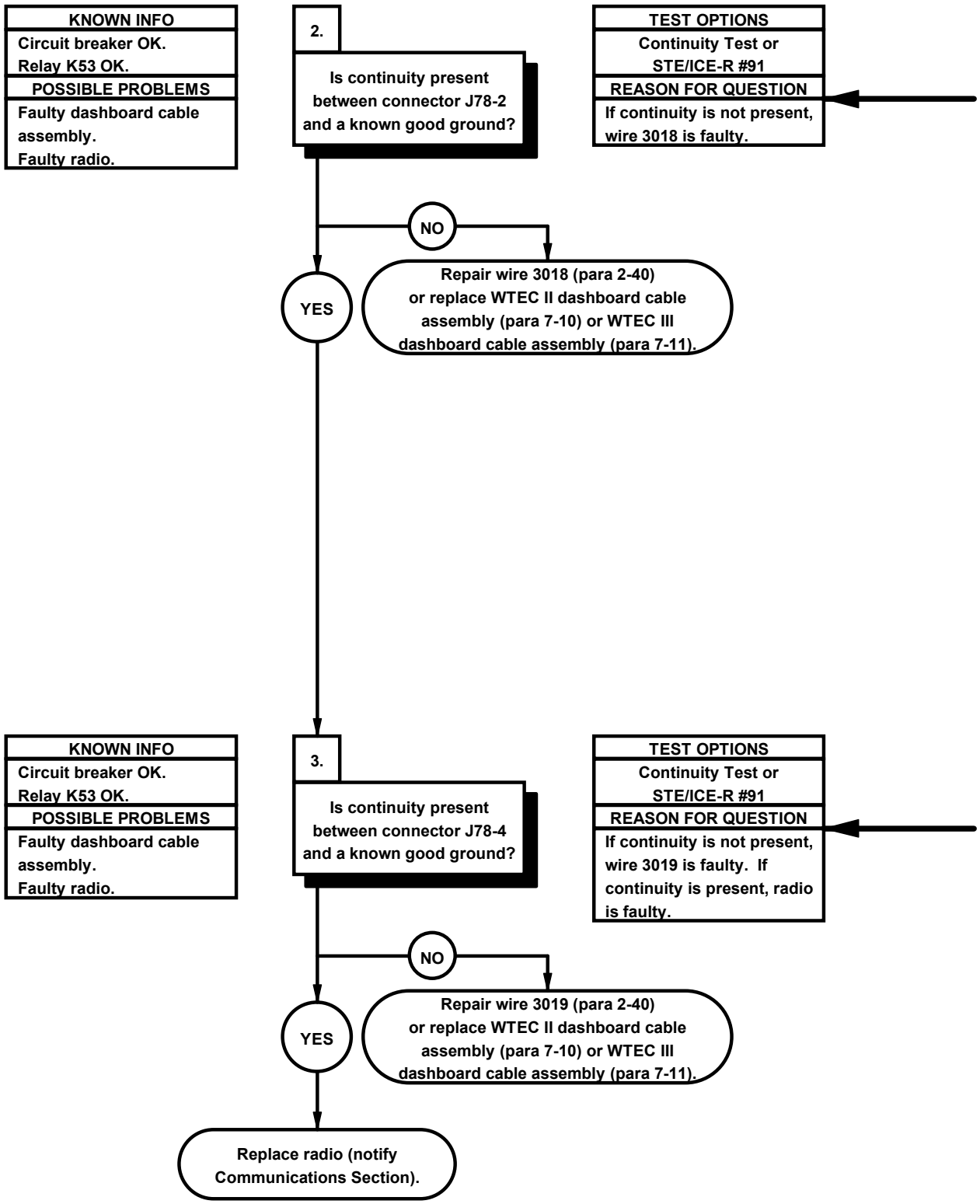
**WARNING**

**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

| VOLTAGE TEST |
| --- |
| (1) Remove kick panel (para 16-3). |
| (2) Disconnect connector J78 from radio. |
| (3) Set multimeter to volts dc. |
| (4) Connect positive (+) probe of multimeter to connector J78-3. |
| (5) Connect negative (-) probe of multimeter to ground. |
| (6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter. |
| (7) If 12 vdc is not present, go to step 4 of this fault. |
| (8) Position master power switch to off (TM 9-2320-365-10). |

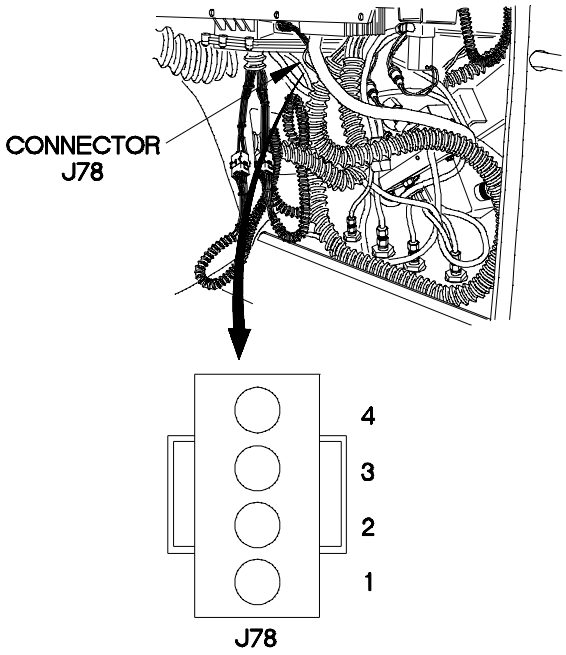


## e95. RADIO DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

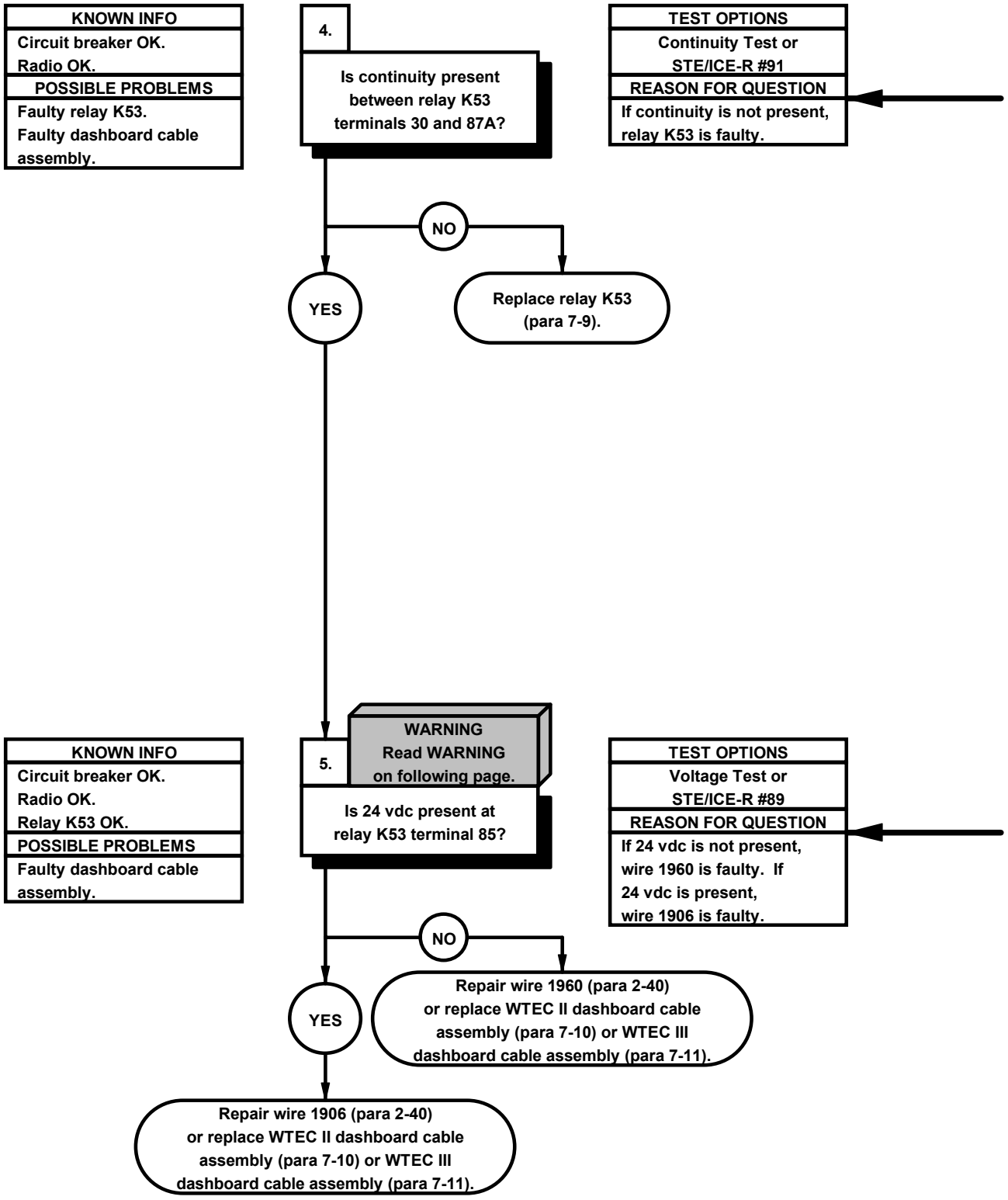
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J78-2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3018 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).




**CONTINUITY TEST**

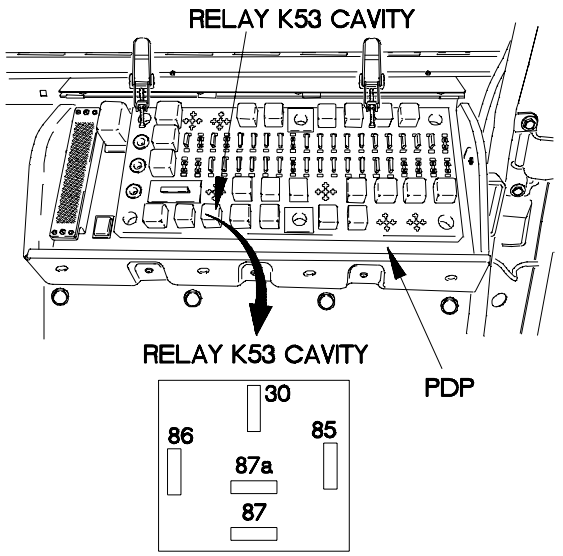
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J78-4.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3019 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace radio (notify Communications Section).
(6) Connect connector J78 to radio.
(7) Install kick panel (para 16-3).

## e95. RADIO DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Remove relay K53 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to relay K53 terminal 30.
(4) Connect negative (-) probe of multimeter to relay K53 terminal 87A and note reading on multimeter.
(5) If continuity is not present, replace relay K53 (para 7-9).




**WARNING**

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.

**VOLTAGE TEST**

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K53 was removed.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, repair wire 1960 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) If 24 vdc is present, repair wire 1906 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(7) Position master power switch to off (TM 9-2320-365-10).
(8) Install relay K53 in PDP.
(9) Connect connector J78 to radio.
(10) Install kick panel (para 16-3).

**e96. START INHIBIT PUSHBUTTON DOES NOT OPERATE**

**INITIAL SETUP**

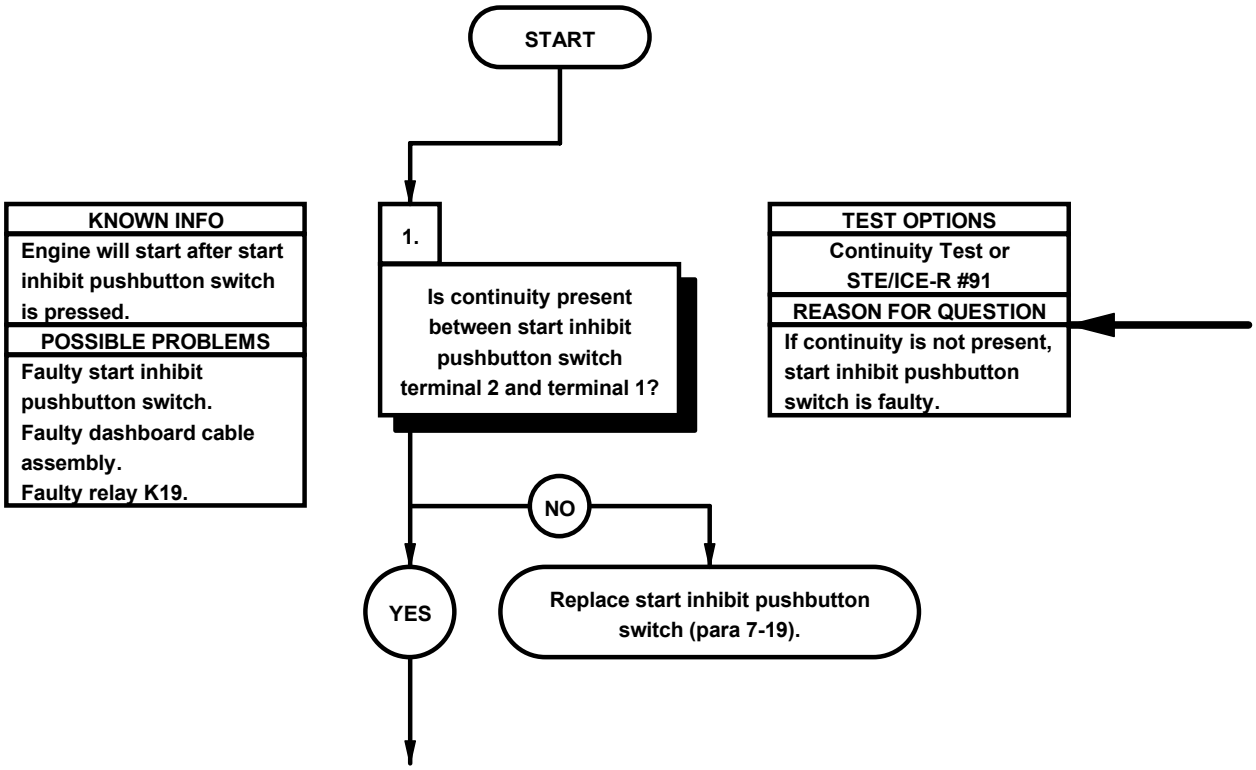
**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Materials/Parts**
Wire, Elect, 50 ft (Item 77, Appendix D)

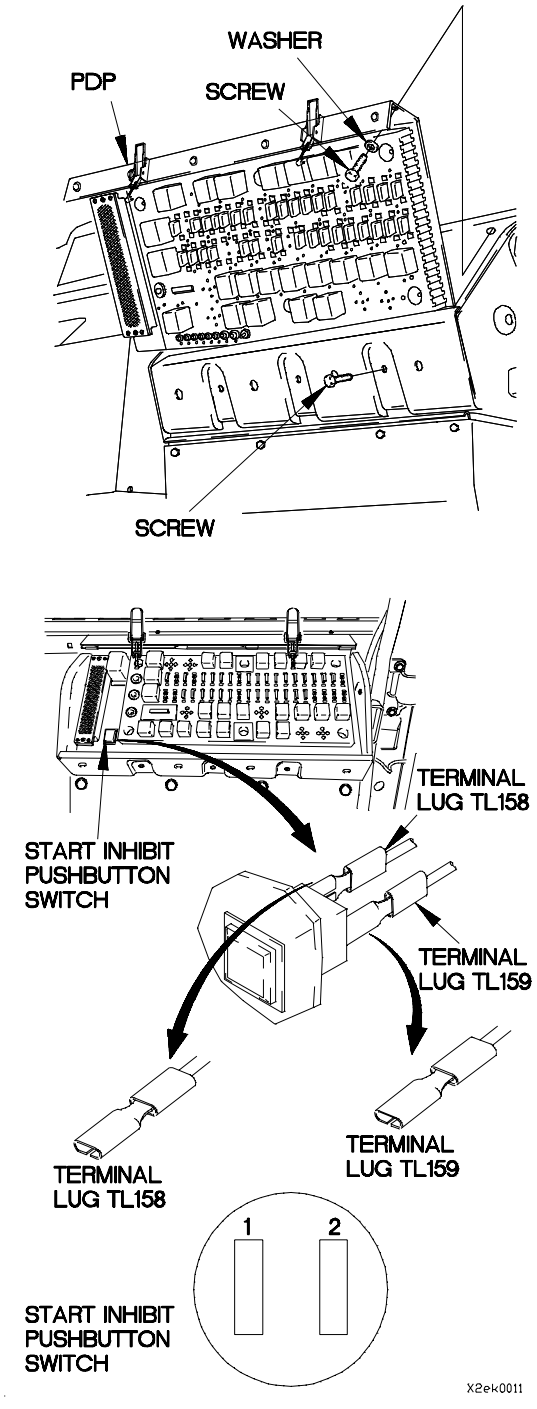
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

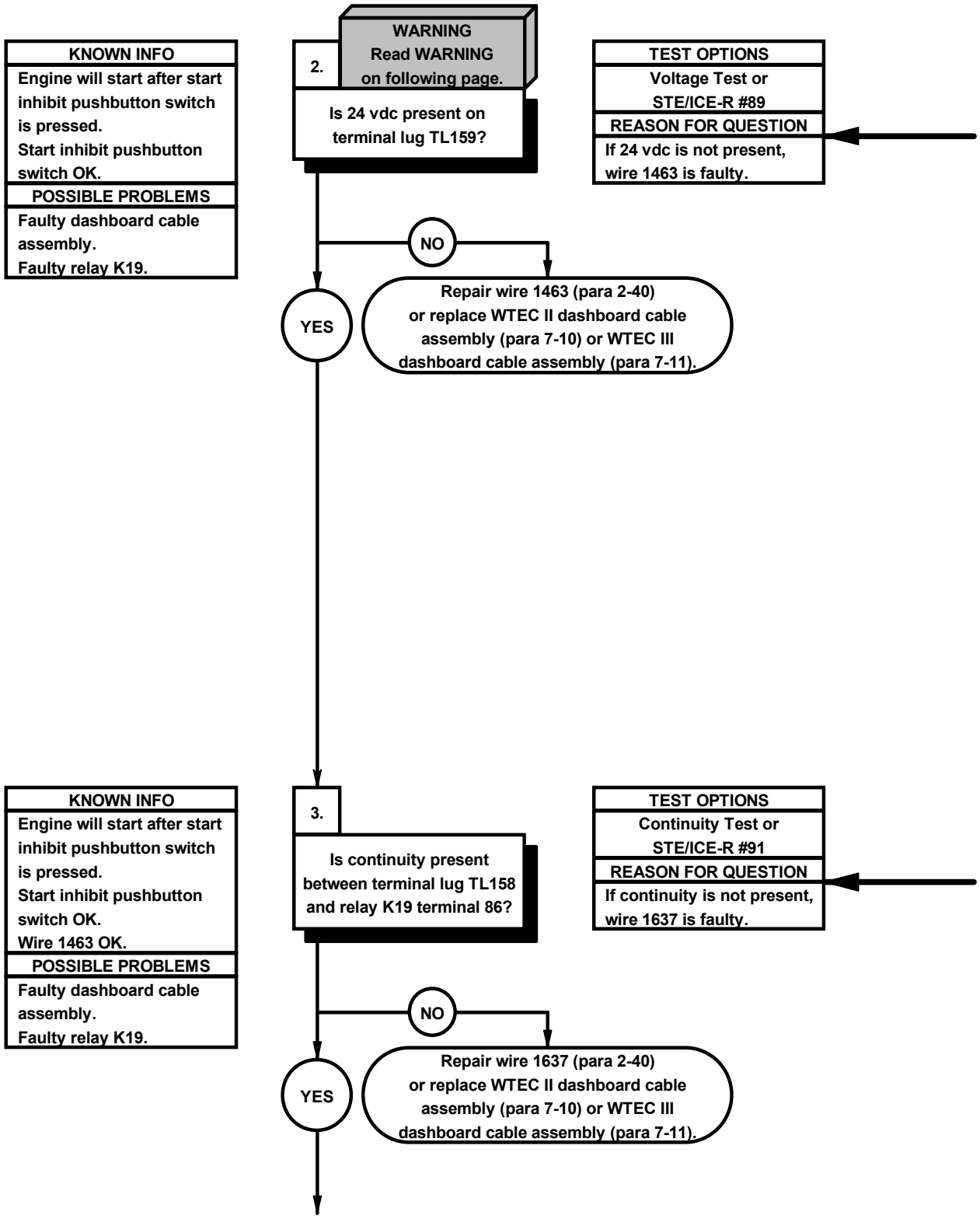


**CONTINUITY TEST**

(1) Remove PDP cover (para 16-2).
(2) Remove three screws and washers from PDP.
(3) Remove three screws from PDP.
(4) Lift PDP outward to gain access.
(5) Disconnect terminal lugs TL158 and TL159 from start inhibit pushbutton switch.
(6) Set multimeter to ohms.
(7) Connect positive (+) probe of multimeter to start inhibit pushbutton switch terminal 1.
(8) Connect negative (-) probe of multimeter to start inhibit pushbutton switch terminal 2.
(9) Press start inhibit pushbutton switch and hold (TM 9-2320-365-10) and note reading on multimeter.
(10) If continuity is not present, replace start inhibit pushbutton switch (para 7-19).
(11) Install PDP on dashboard with three screws.
(12) Install three washers and screws in PDP.



## e96. START INHIBIT PUSHBUTTON DOES NOT OPERATE (CONT)



**WARNING**

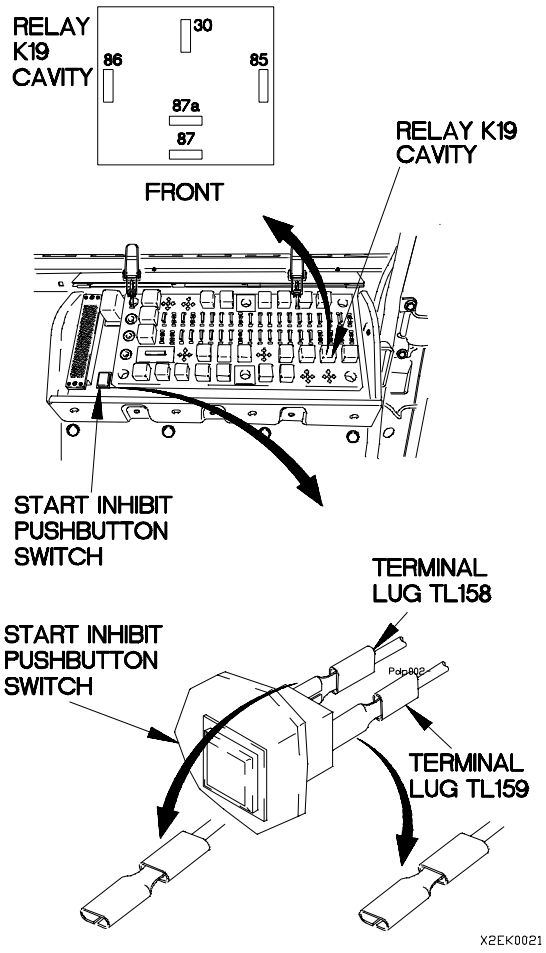
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

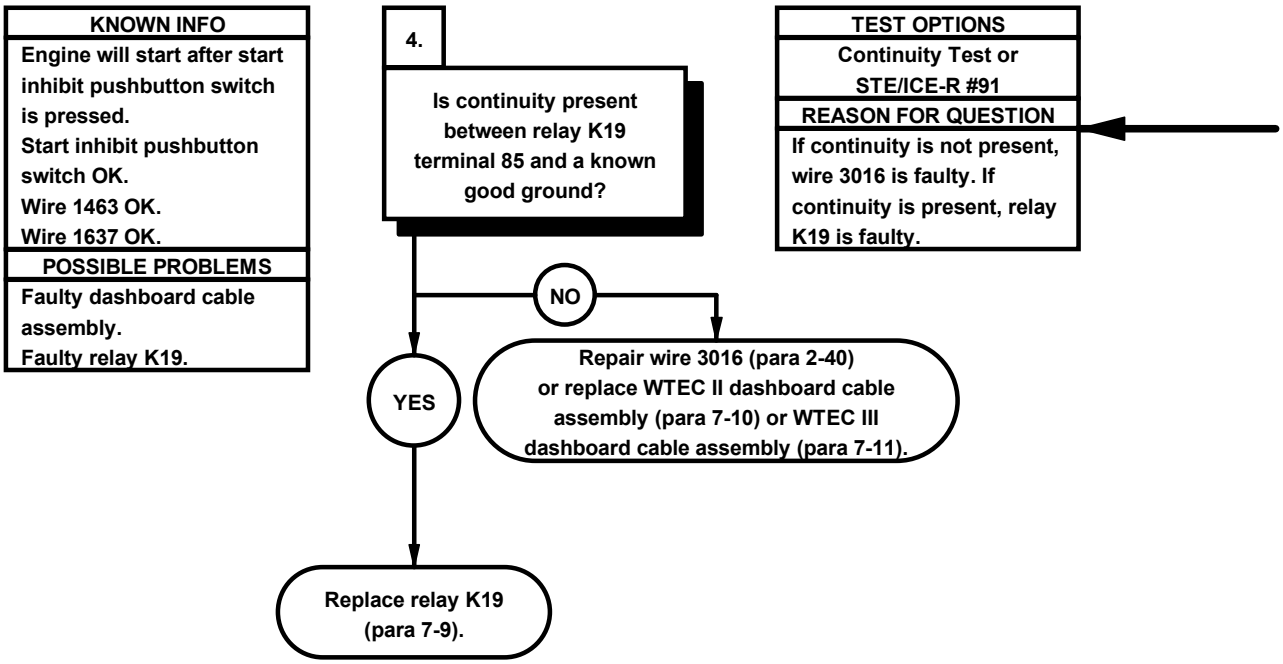
(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to terminal lug TL159.
(3) Connect negative (-) probe of multimeter to ground.
(4) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(5) If 24 vdc is not present, repair wire 1463 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Position master power switch to off (TM 9-2320-365-10).

**CONTINUITY TEST**

(1) Remove relay K19 from PDP.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal lug TL158.
(4) Connect negative (-) probe of multimeter to PDP, terminal 86, where relay K19 was removed, and note reading on multimeter.
(5) If continuity is not present, repair wire 1637 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(6) Connect terminal lugs TL158 and TL159 to start inhibit pushbutton switch.

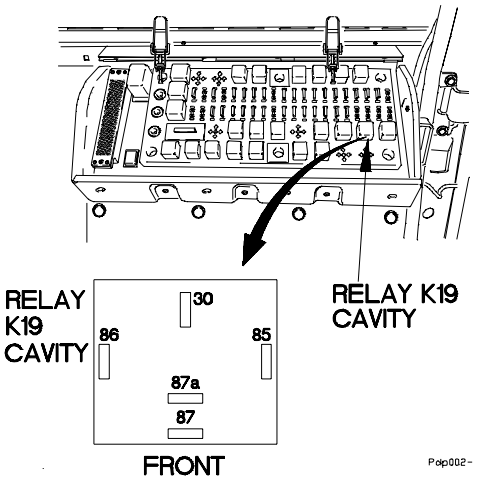


## e96. START INHIBIT PUSHBUTTON DOES NOT OPERATE (CONT)



**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PDP, terminal 85, where relay K19 was removed.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3016 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(5) If continuity is present, replace relay K19 (para 7-9).
(6) Install relay K19 in PDP.
(7) Install PDP cover (para 16-2).




X2EK0031

## e97. AIR DRYER DOES NOT OPERATE

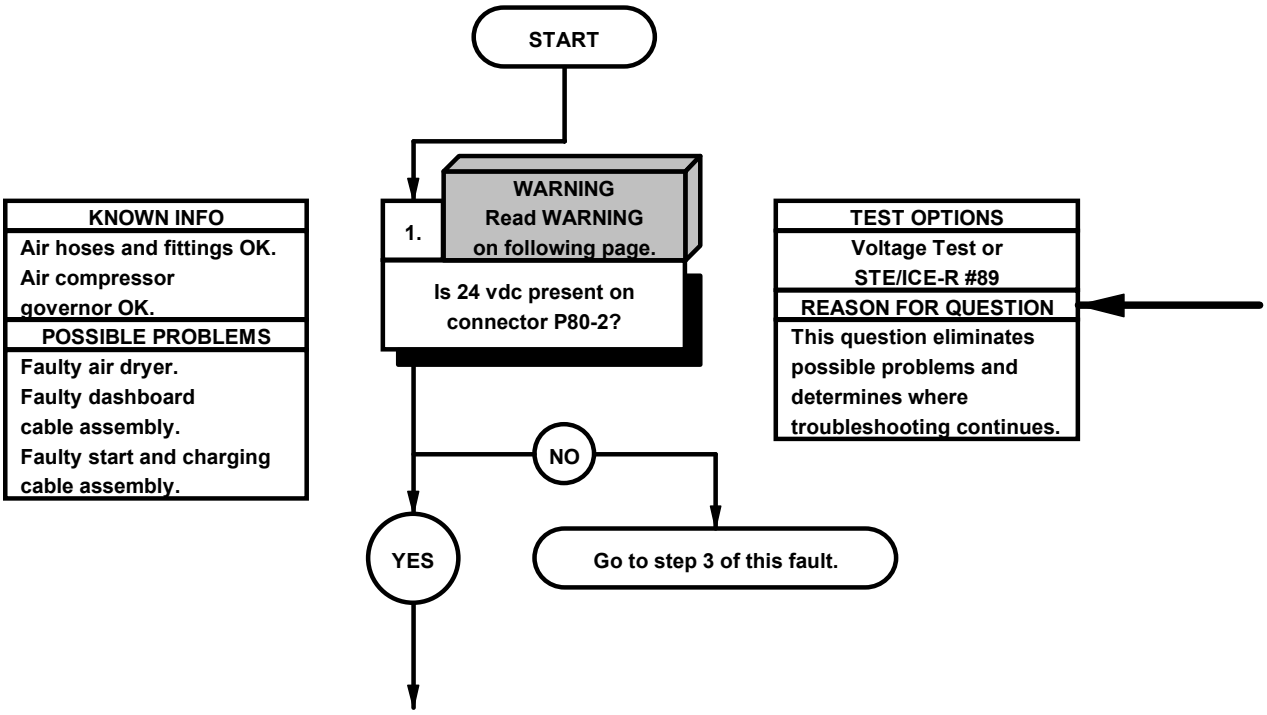
**INITIAL SETUP**

**Equipment Condition**
Engine shut down (TM 9-2320-365-10).

**Personnel Required**
(2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

**References**
TM 9-4910-571-12&P

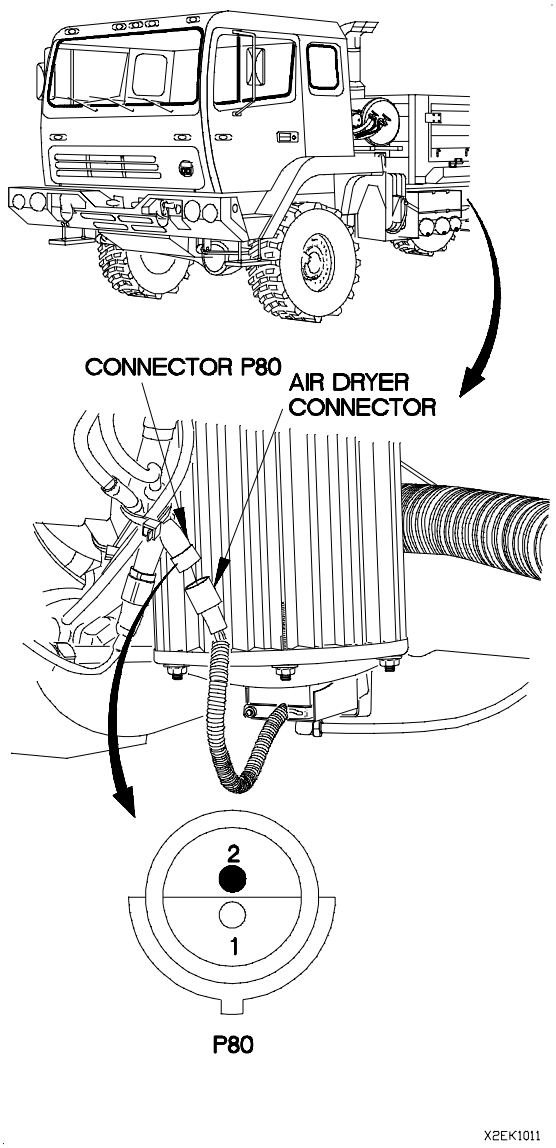


**WARNING**

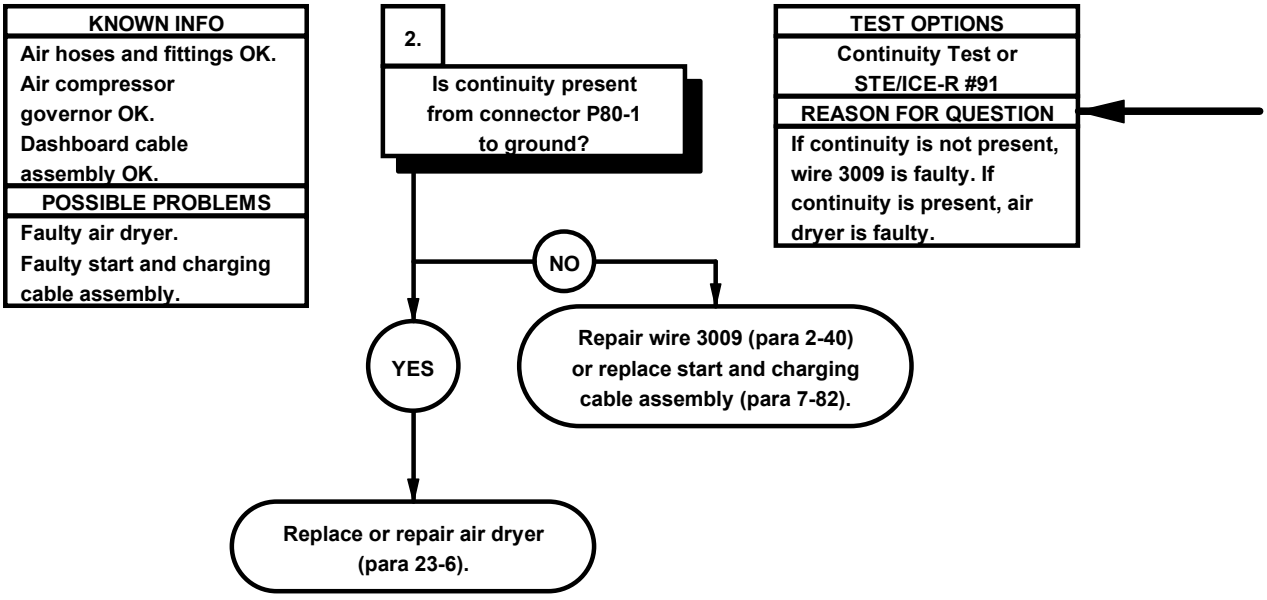
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

**(1) Disconnect connector P80 from air dryer connector.**
**(2) Set multimeter to volts dc.**
**(3) Connect positive (+) probe of multimeter to connector P80-2.**
**(4) Connect negative (-) probe of multimeter to ground.**
**(5) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.**
**(6) If 24 vdc is not present, go to step 3 of this fault.**
**(7) Position master power switch to off (TM 9-2320-365-10).**

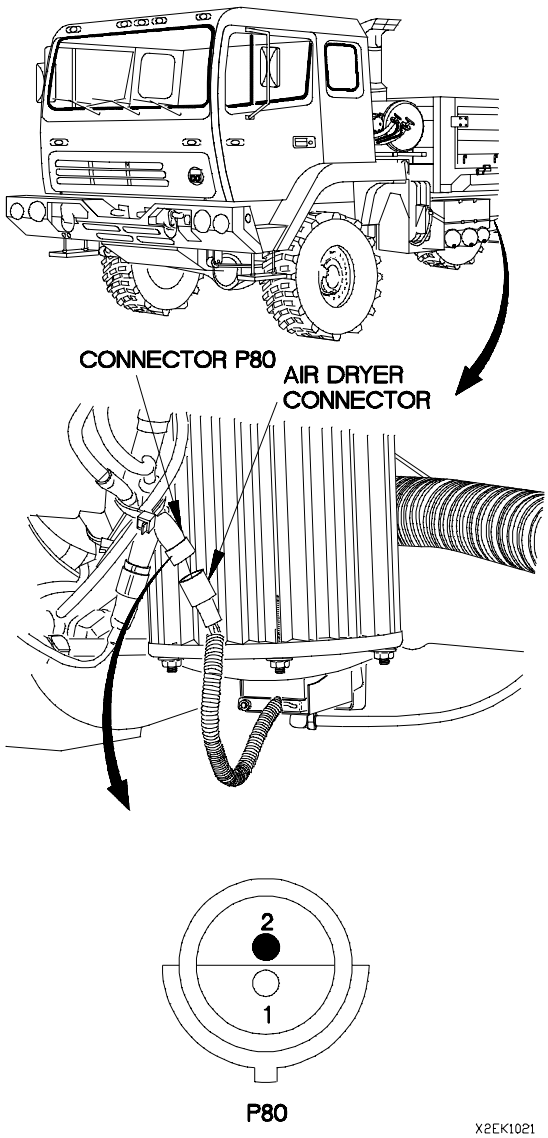


## e97. AIR DRYER DOES NOT OPERATE (CONT)

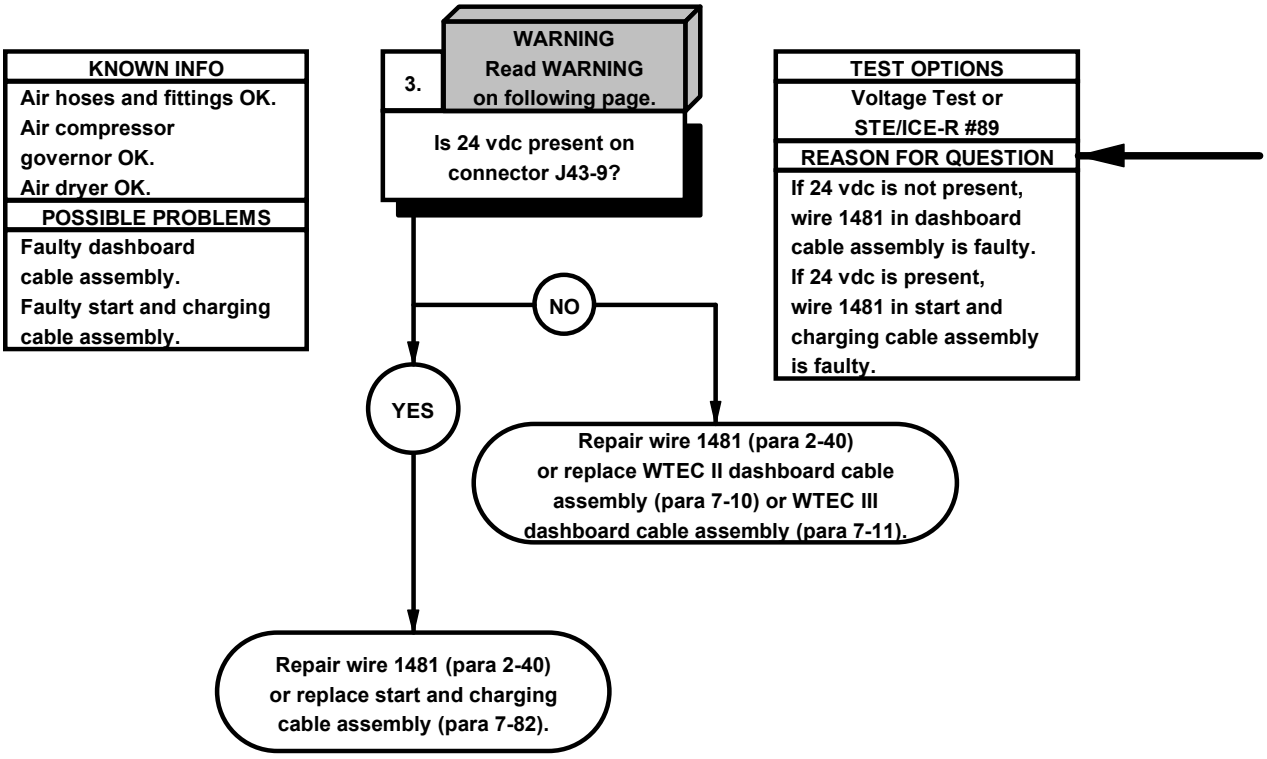


**CONTINUITY TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P80-1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3009 (para 2-40) or replace start and charging cable assembly (para 7-82).
(5) If continuity is present, replace or repair air dryer (para 23-6).
(6) Connect connector P80 to air dryer connector.



## e97. AIR DRYER DOES NOT OPERATE (CONT)

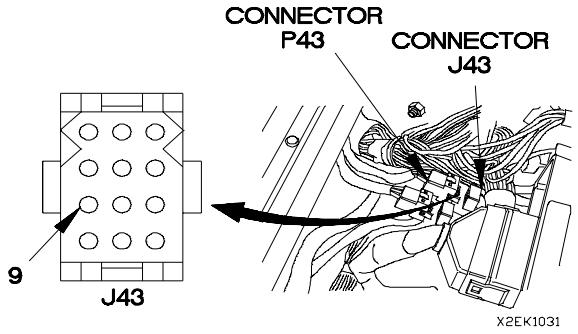


**WARNING**

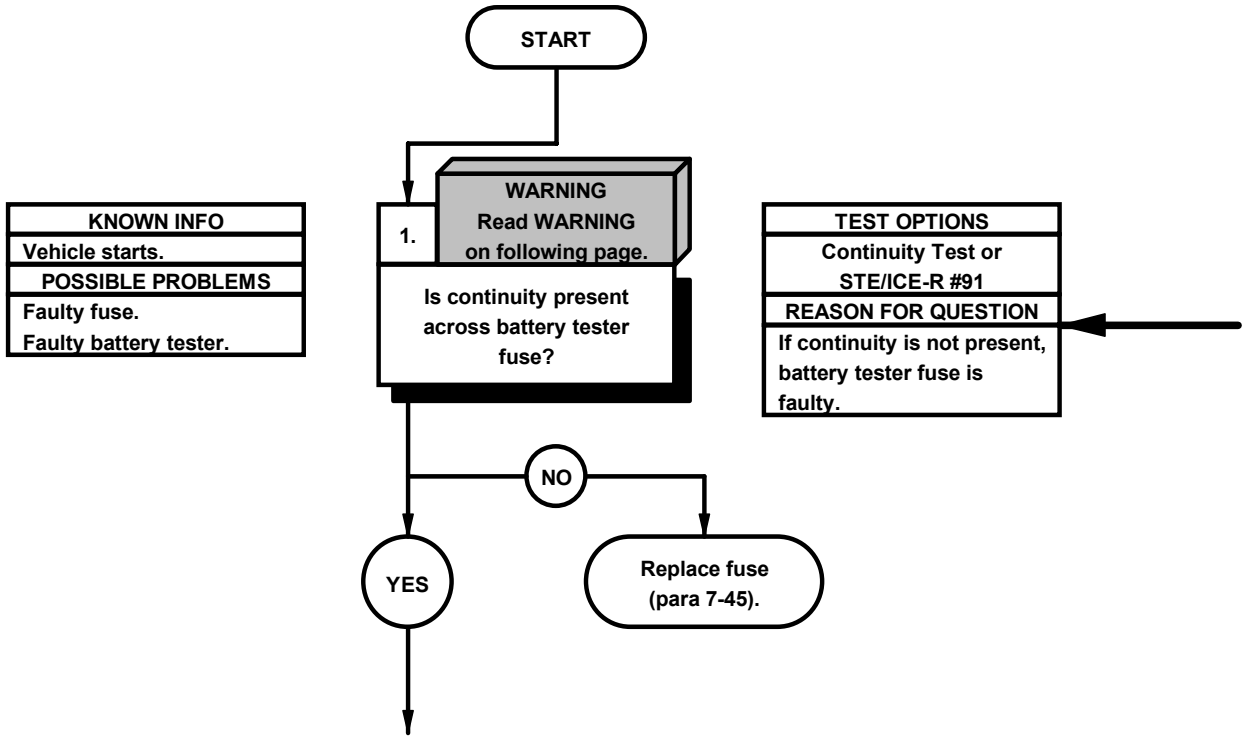
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock.**

**VOLTAGE TEST**

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector J43 from connector P43.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to connector J43-9.
(5) Connect negative (-) probe of multimeter to ground.
(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.
(7) If 24 vdc is not present, repair wire 1481 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
(8) If 24 vdc is present, repair wire 1481 (para 2-40) or replace start and charging cable assembly (para 7-82).
(9) Position master power switch to off (TM 9-2320-365-10).
(10) Connect connector J43 to connector P43.
(11) Install instrument panel assembly (para 7-15).



| e98. BATTERY TESTER DOES NOT OPERATE | |
|---|---|
| **INITIAL SETUP** | |
| **Equipment Condition**<br>Engine shut down (TM 9-2320-365-10).<br><br>**Personnel Required**<br>(2)<br><br>**References**<br>TM 9-4910-571-12&P | **Tools and Special Tools**<br>STE/ICE-R (Item 39, Appendix C)<br>Multimeter, Digital (Item 22, Appendix C)<br>Goggles, Industrial (Item 15, Appendix C)<br>Gloves, Rubber (Item 13, Appendix C)<br>Apron, Rubber (Item 3, Appendix C) |

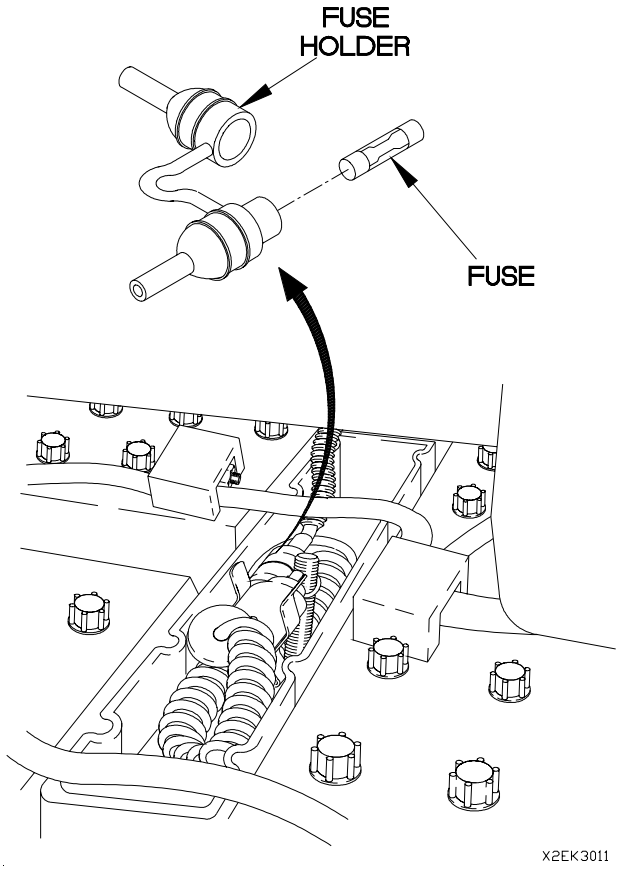


**WARNING**

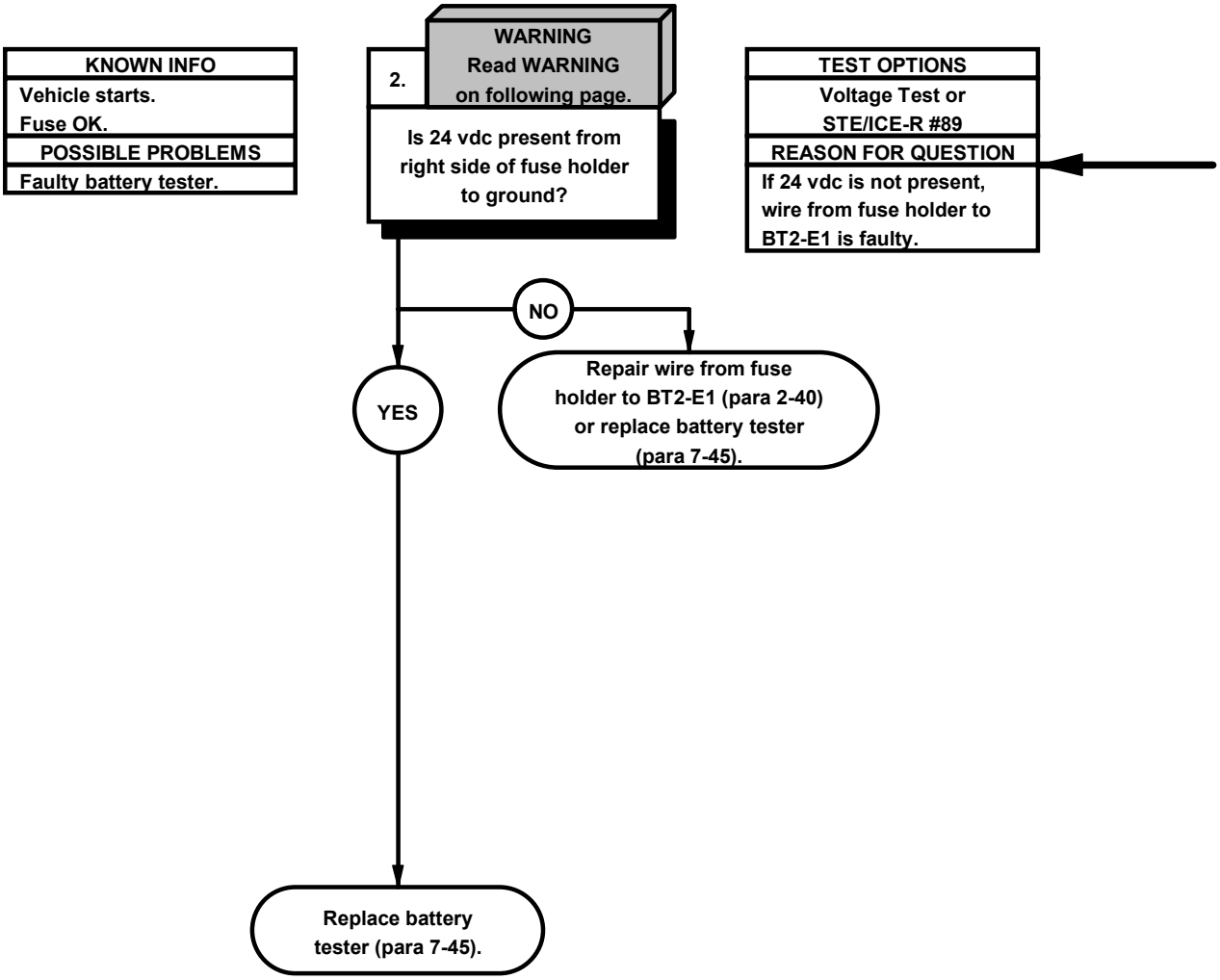
**Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock. Batteries can explode from a spark. Battery acid is harmful to skin and eyes.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

**CONTINUITY TEST**

**(1) Remove battery box cover (TM 9-2320-365-10).**
**(2) Open fuse holder on battery tester.**
**(3) Remove fuse from fuse holder.**
**(4) Set multimeter to ohms.**
**(5) Connect positive (+) probe of multimeter to one end of fuse.**
**(6) Connect negative (-) probe of multimeter to other end of fuse and note reading on multimeter.**
**(7) If continuity is not present, replace battery tester 3 milliamp fuse (para 7-45).**



## e98. BATTERY TESTER DOES NOT OPERATE (CONT)

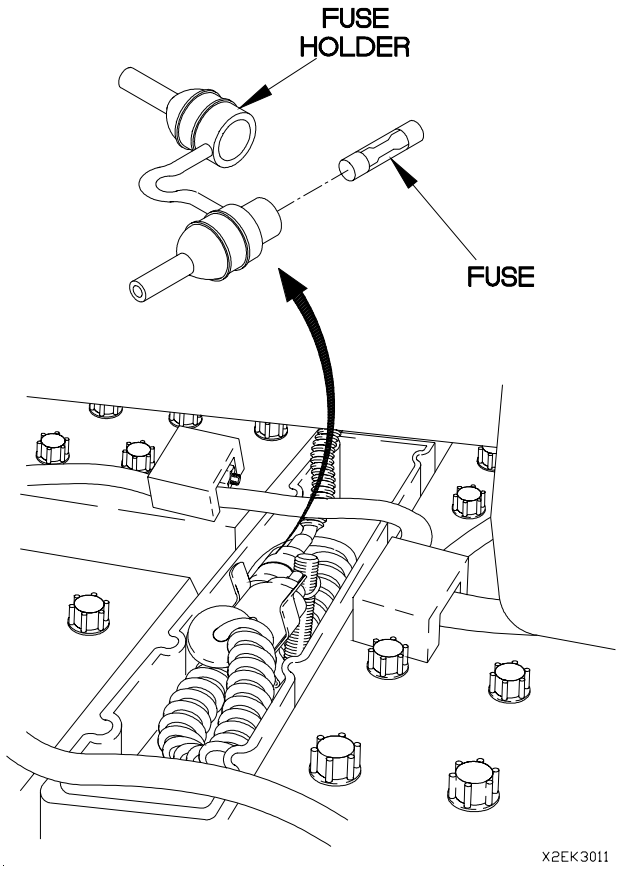


**WARNING**

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

**VOLTAGE TEST**

**(1) Set multimeter to volts dc.**
**(2) Connect positive (+) probe of multimeter to terminal in right side of fuse holder.**
**(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.**
**(4) If 24 vdc is not present, repair wire from right side of fuse holder to BT2-E1 (para 2-40) or replace battery tester (para 7-45).**
**(5) If 24 vdc is present, replace battery tester (para 7-45).**
**(6) Install fuse in battery tester fuse holder.**
**(7) Close battery tester fuse holder.**
**(8) Install battery box cover (TM 9-2320-365-10).**



# APPENDIX A
# REFERENCES

## A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual. Those publications that should be consulted for additional information about vehicle operations are also listed.

## A-2. PUBLICATIONS INDEX

The following index should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Consolidated Index of Army Publications and Blank Forms . . . . . DA Pam 25-30

## A-3. FORMS

The following forms pertain to this manual. See DA Pam 25-30 for index of blank forms. See DA Pam 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to this material.

Equipment Control Record . . . . . DA Form 2408-9
Equipment Inspection and Maintenance Worksheet . . . . . DA Form 2404
Maintenance Request . . . . . DA Form 2407
Packaging Improvement Report . . . . . DD Form 6
Processing and Deprocessing Record of Shipping, Storage, and Issue of Vehicles and Spare Engines . . . . . DD Form 1397
Product Quality Deficiency Report . . . . . SF 368
Recommended Changes to DA Publications and Blank Forms . . . . . DA Form 2028-2
Report of Item Discrepancy (ROID) . . . . . SF 364

## A-4. OTHER PUBLICATIONS

The following publications contain information pertinent to the LMTV and associated equipment.

**a. Safety.**

First Aid for Soldiers . . . . . FM 21-11
Security of Tactical Wheeled Vehicles . . . . . TB 9-2300-422-20
Safety Inspection and Testing of Lifting Devices . . . . . TB 43-0142

## A-4. OTHER PUBLICATIONS (CONT)

**b. LMTV.**

Direct Support and General Support Maintenance Manual for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-34
Hand Receipt Covering Contents of Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL), for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicles (LMTV) . . . . . TM 9-2320-365-10-HR
Operator's Manual for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-10
Unit, Direct Support, and General Support Repair Parts and Special Tools List for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-24P
Warranty Program for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TB 9-2300-365-15

**c. General Vehicle Operation.**

Army Motor Transport Units and Operations . . . . . FM 55-30
Deleted
Manual for the Wheeled Vehicle Driver . . . . . FM 21-305
Safety Prevention of Motor Vehicle Accidents . . . . . AR 385-55
Vehicle Recovery Operations . . . . . FM 20-22

**d. General Maintenance and Repair.**

Army Oil Analysis Program . . . . . TB 43-0211
Camouflage Pattern Painting . . . . . FM 5-20
Charging System Troubleshooting . . . . . DA Pam 750-33
Color, Marking, and Camouflage Painting of Military Vehicles . . . . . TB 43-0209
Cooling Systems: Tactical Vehicles . . . . . TM 750-254
Corrosion Prevention and Control Including Rustproofing Procedures for Tactical Vehicles and Trailers . . . . . TB 43-0213
Description, Use, Bonding Techniques, and Properties of Adhesives . . . . . TB ORD 1032
Equipment Improvement Report and Maintenance Digest: TACOM Equipment . . . . . TB 43-0001-39-1
Equipment Improvement Report and Maintenance Summary . . . . . TM 43-0143
Installation Instructions for Installation Kit, Electronic Equipment, MK-2700/VRC (NSN 5895-01-421-0814) (EIC: N/A) to Permit Installation of Radio Set AN/VRC-87/88/90 Series into M1078, M1080, M1081, M1083-M1086, M1088-M1094 and M1096 Family of Medium Tactical Vehicles . . . . . TB 11-5820-890-20-101
Installation Instructions for Installation Kit, Electronic Equipment, MK-2715/VRC (NSN 5895-01-421-0812) (EIC: N/A) to Permit Installation of Radio Set AN/VRC-89/91/92 Series into M1078, M1080, M1081, M1083-M1086, M1088-M1094 and M1096 Family of Medium Tactical Vehicles . . . . . TB 11-5820-890-20-92
Metal Body Repair and Related Operations . . . . . FM 43-2
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals . . . . . TM 9-247
Operator's and Organizational Maintenance Manual for Radio Sets . . . . . TM 11-5820-498-12
Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List Simplified Test Equipment for Internal Combustion Engines Reprogrammable (STE/ICE-R) (NSN 4910-01-222-6589) . . . . . TM 9-4910-571-12&P
Operator's Manual, Radio Set, AN/VRC-46 . . . . . TM 11-5820-401-10-1

Operator's Manual, Radio Set, AN/VRC-90A . . . . . TM 11-5820-890-10-1
Operator's, Unit, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14
Ordnance Tracked and Wheeled Vehicle Hull and Chassis Wiring, Repair of . . . . . TB ORD 650
Organizational Care, Maintenance, and Repair of Pneumatic Tires and Inner Tubes . . . . . TM 9-2610-200-14
Painting Instructions for Field Use . . . . . TM 43-0139
Purging, Cleaning, and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks . . . . . TB 43-0212
Repair of Tents, Canvas, and Webbing . . . . . FM 10-16
Rigging Techniques, Procedures, and Applications . . . . . FM 5-125
Use and Care of Hand Tools and Measuring Tools . . . . . TM 9-243
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems . . . . . TB 750-651
Welding Theory and Application . . . . . TM 9-237

**e. Cold Weather Operation.**

Basic Cold Weather Manual . . . . . FM 31-70
Northern Operations . . . . . FM 31-71
Operation and Maintenance of Ordnance Materiel in Cold Weather (0° to -65°F) . . . . . FM 9-207

**f. Decontamination.**

Decontamination Operations Facilities & Equipment . . . . . TB 700-4
NBC Protection . . . . . FM 3-4
NBC Decontamination . . . . . FM 3-5

**g. Maintenance of Special Purpose Kits.**

Operator and Organizational Maintenance Manual for Chemical Alarm . . . . . TM 3-6665-225-12
Operator's and Unit Maintenance Manual Including Repair Parts and Special Tools List for Decontaminating Apparatus: M13 . . . . . TM 3-4230-214-12&P
Operator's, Organizational, Direct Support, and General Support Maintenance Manual Including Repair Parts and Special Tools List for Various Machine Gun Mounts . . . . . TM 9-1005-245-14
Operator's, Organizational, Direct Support, and General Support Maintenance Manual, Air Conditioner, Horizontal Compact, 18,000 BTU/HR, 208 Volt, 3 Phase, 50/60 Hertz, Model F18H-3S . . . . . TM 5-4120-384-14
Unit and Direct Support Maintenance, Repair Parts and Special Tools List for Heater, Space, Multifuel with Blower, 60,000 BTU/HR, 120V, Model UH-68G, NSN 4520-01-203-4410, and Model UH-68GI, NSN 4520-01-297-6803 . . . . . TM 5-4520-253-23P

**h. General.**

Operator's Manual (M998 Series) . . . . . TM 9-2320-280-10
Operator's Manual (M1008 Series) . . . . . TM 9-2320-289-10
Operator's Manual (M35 Series) . . . . . TM 9-2320-361-10
Operator's Manual (M939 Series) . . . . . TM 9-2320-272-10
Principles of Automotive Vehicles . . . . . TM 9-8000
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use (US Army Tank-automotive and Armaments Command) . . . . . TM 750-244-6
Route Reconnaissance and Classification . . . . . FM 5-36
Soldier's Manual MOS 88M Motor Transport Operator, Skill Levels 1/2 . . . . . STP 55-88-M12-SM

## A-4. OTHER PUBLICATIONS (CONT)

**i. Land, Sea, and Air Shipment.**

Airdrop of Supplies and Equipment: Rigging 2 1/2-Ton Trucks . . . . . FM 10-520
Containerization of Military Vehicles . . . . . MTMCTEA Ref 95-55-23
Lifting and Tiedown of U.S. Military Helicopters . . . . . MTMCTEA Ref 95-55-21
Marine Lifting and Lashing Handbook . . . . . MTMCTEA Ref 95-55-22
Marine Terminal Lifting Guidance . . . . . MTMCTEA Pam 56-1
Multiservice Helicopter External Air Transport: Basic Operations and Equipment . . . . . FM 55-450-3
Multiservice Helicopter External Air Transport: Dual-Point Load Rigging Procedures . . . . . FM 55-450-5
Multiservice Helicopter External Air Transport: Single-Point Load Rigging Procedures . . . . . FM 55-450-4
Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment (in TOE Line Sequence) . . . . . TB 55-46-1
Tiedown Handbook for Rail Movements . . . . . MTMCTEA Pam 55-19
Tiedown Handbook for Truck Movements . . . . . MTMCTEA Ref 92-55-20

# APPENDIX B
# MAINTENANCE ALLOCATION CHART (MAC)

## SECTION I

## INTRODUCTION

**B-1. The Army Maintenance System MAC.**

a. This introduction (Section I) provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

b. The Maintenance Allocation Chart (MAC) in Section II 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 will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

**Unit** - includes two subcolumns, C (Operator/Crew) and O (Unit) maintenance.

**Direct Support** - includes an F subcolumn.

**General Support** - includes an H subcolumn.

**Depot** - includes a D subcolumn.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

**B-2. Maintenance Functions.** Maintenance functions are limited to and defined as follows:

a. **Inspect**. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g. by sight, sound, or feel).

b. **Test**. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service**. Operations required periodically to keep an item in proper operating condition; e.g. to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemicals fluids, or gases.

d. **Adjust**. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

e. **Align**. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. **Calibrate**. To determine and cause corrections to be made or to be adjusted on instruments or Test, Measurement, and Diagnostic Equipment (TMDE) used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. **Remove/Install**. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. **Replace**. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace " is authorized by the MAC and assigned maintenance level is shown as the 3d position code of the SMR code.

i. **Repair**. The application of maintenance services[1] including fault location/troubleshooting[2], removal/installation, and disassembly/assembly[3] procedures, and maintenance actions[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. **Overhaul**. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. **Rebuild**. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

**B-3. Explanation of Columns in the MAC, Section II.**

a. **Column 1, Group Number.** Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. **Column 2, Component/Assembly.** Column 2 contains the item names of components , assemblies, subassemblies, and modules for which maintenance is authorized.

c. **Column 3, Maintenance Function.** Column 3 lists the functions to be performed on the items listed in Column 2. (For detailed explanation of these functions, see Paragraph B-2.)

d. **Column 4, Maintenance Level.** Column 4 specifies each level of maintenance authorized to perform each function listed in Column 3, by indicating work time required (expressed in man-hours 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 vary 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.

---

[1]Services - Inspect, test, service, adjust, align calibrate, and/or replace.

[2]Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunction; the act of isolating a fault within a system or Unit Under Test (UUT).

[3]Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item, to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

[4]Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

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 maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C . . . . . Operator or crew maintenance
O . . . . . Unit maintenance
F . . . . . Direct Support maintenance
L . . . . . Specialized Repair Activity (SRA)[5]
H . . . . . General Support maintenance
D . . . . . Depot maintenance

e. **Column 5, Tools and Test Equipment Reference Code.** Column 5 specifies, by code, those common tools sets (not individual tools), common TMDE, and special tools, special TMDE, and special support equipment required to perform the designated functions. Codes are keyed to tools and test equipment in Section III.

f. **Column 6, Remarks.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks contained in Section IV.

**B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III.**

a. **Column 1, Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, Section II column 5.

b. **Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

c. **Column 3, Nomenclature.** Name or identification of the tool or test equipment.

d. **Column 4, National Stock Number.** The National Stock Number of tool or test equipment.

e. **Column 5, Tool Number.** The manufacturer's part number, model number, or type number.

**B-5. Explanation of Columns in Remarks, Section IV.**

a. **Column 1, Remarks Code.** The code recorded in column 6, Section II.

b. **Column 2, Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

[5]This maintenance level is not included in Section II, Column (4) of the Maintenance Allocation Chart. Functions to this level of maintenance are identified by a work-time figure in the "H" column of Section II, Column (4), and an associated reference code is used in the Remarks column (6). This code is keyed to Section IV, Remarks, and the SRA complete repair application is explained there.

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Tools and Equipment Ref Code | Remarks Code |
| 0100 | ENGINE ASSEMBLY | Inspect | | 0.1 | | | | 78 | |
| | | Test | | 1.5 | 0.3 | | | 78,79 | |
| | | Adjust | | | 3.0 | | | 56,60,78, 80 | |
| | | Service | | 0.8 | | | | 57,59,78 | |
| | | Replace | | | 7.0 | | | 16,56,59, 61,78,79 | |
| | | Repair | | 0.4 | 1.6 | 3.3 | | 16,31,32, 44,56,59,60, 61,78,79 | |
| 0101 | CYLINDER HEAD ASSEMBLY | Inspect | | | 0.1 | | | 78 | |
| | | Replace | | | 2.0 | | | 44,56,59, 60,78 | |
| | | Repair | | | | 2.5 | | 56,59,60, 61,62,78,81 | |
| 0102 | CRANKSHAFT | Replace | | | | 16.0 | | 56,57,60, 71,78 | |
| | | Repair | | | 3.8 | 16.0 | | 16,31,32, 56,59,60,61, 78 | |
| 0103 | FLEXPLATE, ENGINE | Replace | | | 6.5 | | | 56,59,78 | |
| | | Repair | | | 1.0 | | | 56,49,78 | |
| 0104 | PISTON ASSEMBLY | Replace | | | | 9.0 | | 56,57,59, 60,62,78,79 | |
| | | Repair | | | | 0.6 | | 78 | |
| 0105 | CAMSHAFT ASSEMBLY | Replace | | | | 3.1 | | 14,56,57, 49,60,78 | |
| | | Repair | | | | 1.2 | | 56,78 | |
| 0105 | ROCKER ARM AND PUSH RODS | Replace | | | 2.0 | | | 44,59,60, 61,78 | |
| | | Repair | | | 0.3 | | | 44,78 | |
| 0106 | COOLER, ENGINE OIL | Replace | | | 1.3 | | | 56,78 | |
| | | Repair | | | 0.3 | | | 56,78 | |
| 0108 | MANIFOLDS, INLET AND EXHAUST | Replace | | | 1.5 | | | 56,60,61, 78,79 | |
| 0301 | INJECTOR ASSEMBLY, FUEL | Replace | | | 2.1 | | | 44,57,78, 80 | |
| | | Adjust | | | 1.6 | | | 56,78,79, 80 | |
| 0304 | AIR INTAKE SYSTEM | Service | | 0.3 | | | | | |
| | | Repair | | 0.3 | | | | 46,57 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| 0304 | INTAKE AIR CLEANER | Service | | 0.2 | | | | | |
| | | Replace | | 0.8 | | | | 6,46,57, 78 | |
| | | Repair | | 0.4 | | | | 57,78 | |
| 0305 | TURBOCHARGER | Replace | | | 0.8 | | | 56,61,78,79 | |
| 0306 | FUEL TANK | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.5 | | | | 57,59,78 | |
| 0308 | GOVERNOR, ENGINE SPEED | Replace | | | 1.0 | | | 57,60,76,78,79 | |
| | | Repair | | 0.5 | 0.7 | | | 57,78 | |
| 0309 | FILTER, FUEL/WATER SEPARATOR | Inspect | 0.2 | | | | | | |
| | | Service | 0.2 | 0.3 | | | | 78 | |
| | | Replace | | 0.5 | | | | 57,78 | |
| 0311 | ETHER STARTING AID | Replace | | 0.6 | | | | 57,59,78 | |
| 0312 | ACCELERATOR/HAND THROTTLE | Replace | | 0.5 | | | | 57,78 | |
| | | Adjust | | 0.2 | | | | 57,78 | |
| 0401 | EXHAUST MUFFLER/PIPES | Inspect | 0.1 | 0.2 | | | | | |
| | | Replace | | 0.9 | | | | 57,59,78 | |
| 0501 | RADIATOR/CHARGE AIR COOLER | Inspect | 0.1 | | | | | | |
| | | Replace | | 2.5 | | | | 2,27,53, 59,78 | |
| | | Service | | 1.5 | | | | 59,79 | |
| | | Repair | | 0.6 | 2.0 | | | 2,27,53, 59,78 | |
| 0501 | RADIATOR OVERFLOW TANK | Replace | | 0.5 | | | | 46,57,78 | |
| | | Repair | | 0.3 | | | | 78 | |
| 0502 | SHROUD, FAN | Replace | | 1.0 | | | | 57,59,78,86 | |
| 0503 | HOSES, WATER | Replace | | 0.5 | | | | 57,59,78,86 | |
| 0504 | PUMP, WATER | Replace | | 0.8 | | | | 15,57,59,78,86 | |
| 0505 | CLUTCH, ENGINE FAN | Inspect | | 1.0 | | | | 57 | |
| | | Replace | | 1.5 | | | | 2,53,57, 78 | |
| | | Repair | | | 1.2 | | | 56,59,60,61,78,79 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment Ref Code | Remarks Code |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | | |
| 0601 | ALTERNATOR, 100 AMP | Inspect | | 0.2 | | | | | |
| | | Test | | 0.5 | 1.5 | | | 59,63,78 | |
| | | Replace | | 1.0 | | | | 59,78 | |
| | | Repair | | 0.2 | 0.5 | | | 38,56,57, 59,63,78,79 | |
| 0603 | STARTING MOTOR, ENGINE | Inspect | | 0.1 | | | | | |
| | | Test | | 0.5 | 0.5 | | | 57,63 | |
| | | Replace | | 1.5 | | | | 2,9,57, 59,78 | |
| | | Repair | | | 2.1 | | | 52,56,59, 60,76,78 | |
| 0606 | SOLENOID, FUEL SHUTOFF | Replace | | | 1.0 | | | 60,78,80 | |
| 0607 | CABLE ASSEMBLY, DASHBOARD | Test | | 0.5 | | | | 56 | |
| | | Replace | | 2.9 | | | | 57,59,76, 78 | |
| | | Repair | | 1.0 | 0.6 | | | 56,57,61, 78 | |
| 0607 | DISPLAY, LIGHTED INDICATOR | Test | | 0.3 | | | | | |
| | | Replace | | 0.5 | | | | 78,86 | |
| | | Repair | | 0.3 | | | | 78 | |
| 0609 | LIGHT ASSEMBLY, BACKUP | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.8 | | | | 57,78 | |
| | | Repair | | 0.3 | | | | 78 | |
| 0609 | LIGHT, BLACKOUT DRIVE | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.8 | | | | 57,59,78 | |
| | | Repair | | 0.5 | | | | 78 | |
| 0609 | TAILLIGHT ASSEMBLY, COMPOSITE | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.8 | | | | 57,59,78 | |
| | | Repair | | 0.5 | | | | 78 | |
| 0609 | LIGHT ASSEMBLY, FRONT TURN SIGNAL AND PARK | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.8 | | | | 57,59,78 | |
| | | Repair | | 0.5 | | | | 78 | |
| 0609 | HEADLIGHT | Inspect | 0.1 | | | | | | |
| | | Adjust | | 0.4 | | | | 78 | |
| | | Replace | | 1.0 | | | | 57,59,78 | |
| 0610 | AUDIBLE ALARM | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.6 | | | | 78 | |
| 0611 | HORN, CAB | Inspect | 0.1 | | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment Ref Code | Remarks Code |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | | |
| | | Replace | | 0.4 | | | | 57,78 | |
| 0612 | BOX ASSEMBLY, BATTERY | Inspect | 0.1 | | | | | | |
| | | Test | | 0.5 | | | | 57,78 | |
| | | Service | | 0.3 | | | | 57 | A |
| | | Replace | | 1.0 | | | | 57,59,78 | |
| | | Repair | | 0.2 | | | | 63 | |
| 0613 | CABLE ASSEMBLY, LH/RH CAB AND DOOR MARKER LIGHTS | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.8 | | | | 78 | |
| | | Repair | | 0.7 | | | | 63 | |
| 0613 | CABLE ASSEMBLY, LOWER, CAB MARKER LIGHTS, M1081 | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.6 | | | | 78,86 | |
| | | Repair | | 0.5 | | | | 63 | |
| 0613 | CABLE ASSEMBLY, UPPER, CAB CLEARANCE AND MARKER LIGHTS, M1081 | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.8 | | | | 78,86 | |
| | | Repair | | 0.5 | | | | 63 | |
| 0613 | CABLE ASSEMBLY, STE/ICE-R | Replace | | 1.0 | | | | 78 | |
| | | Repair | | 0.5 | 0.8 | | | 63 | |
| 0613 | CABLE ASSEMBLY, CAB CLEARANCE AND MARKER LIGHTS | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.2 | | | | 57,78 | |
| | | Repair | | 0.5 | 0.8 | | | 63 | |
| 0613 | CABLE ASSEMBLY, WARNING LIGHT | Replace | | 0.5 | | | | 48,78,86 | |
| | | Repair | | 0.3 | 0.5 | | | 63 | |
| 0613 | CABLE ASSEMBLY, WINDSHIELD WASHER PUMP/EMI | Replace | | 0.5 | | | | 78 | |
| | | Repair | | 0.3 | | | | 63 | |
| 0613 | CABLE ASSEMBLY, ENGINE CONTROL | Inspect | 0.1 | | | | | | |
| | | Replace | | 2.3 | | | | 57,78 | |
| | | Repair | | 0.5 | 0.5 | | | 63 | |
| 0613 | CABLE ASSEMBLY, FRONT INTERVEHICULAR, 12 VDC | Replace | | 0.8 | | | | 59,78 | |
| | | Repair | | 0.2 | 1.3 | | | 63 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| 0613 | CABLE ASSEMBLY, FRONT LIGHTS | Replace | | 2.0 | | | | 57,59,78,86 | |
| | | Repair | | 0.5 | 0.5 | | | 63 | |
| 0613 | CABLE ASSEMBLY, REAR LIGHTS | Replace | | 2.8 | | | | 57,59,78 | |
| | | Repair | | 0.5 | 0.5 | | | 63 | |
| 0613 | CABLE ASSEMBLY, PTO | Replace | | 1.6 | | | | 57,59,78 | |
| | | Repair | | 0.5 | 0.8 | | | 63 | |
| 0613 | CABLE ASSEMBLY, REAR INTERVEHICULAR, 24 VDC | Replace | | 0.6 | | | | 59,78 | |
| | | Repair | | 0.5 | 0.8 | | | 63 | |
| 0613 | CABLE ASSEMBLY, START AND CHARGING | Replace | | 2.0 | | | | 57,78 | |
| | | Repair | | 0.5 | 0.8 | | | 63 | |
| 0613 | CABLE ASSEMBLY, WINCH CONTROL VALVE | Replace | | 1.8 | | | | 57,59,78 | |
| | | Repair | | 0.5 | 0.8 | | | 63 | |
| 0705 | WTEC II VEHICLE INTERFACE MODULE (VIM) | Replace | | 0.6 | | | | 78 | |
| | | Repair | | 0.8 | | | | 78 | |
| 0708 | TORQUE CONVERTER | Adjust | | | 0.9 | | | 18,59,60,78 | |
| | | Remove/ Install | | | 0.8 | | | 56,59,60,61, 78 | |
| | | Repair | | | 1.3 | | | 30,56,59,60, 62,78 | |
| 0710 | TRANSMISSION | Inspect | | 0.4 | | | | 78 | |
| | | Service | | 1.5 | | | | 57,59,78 | |
| | | Replace | | | 7.0 | | | 56,59,60,61, 78,79,84 | |
| | | Repair | | 0.4 | 2.7 | 1.9 | | 3,18,19, 24,25,27,41, 56,57,59,60, 61,78,79,84 | |
| 0710 | MODULE, FRONT SUPPORT | Remove/ Install | | | | 2.0 | | 56,57,59,60, 61,78 | |
| | | Repair | | | | 0.7 | | 30,56,57,59, 60,61,78 | |
| 0710 | MODULE, PLANETARY GEAR (P1) | Remove/ Install | | | | 2.0 | | 59,60,71,78 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Tools and Equipment Ref Code | Remarks Code |
| | | Repair | | | | 1.5 | | 59,60,71,78 | |
| 0710 | MODULE, PLANETARY (P2) | Remove/ Install | | | | 2.0 | | 3,56,59, 60,61,78 | |
| | | Repair | | | | 1.9 | | 3,19,56, 59,60,61,71, 78 | |
| 0710 | PLANETARY CARRIER (P3) | Remove/ Install | | | | 2.0 | | 3,56,60, 78 | |
| | | Repair | | | | 1.9 | | 3,27,56, 60,78 | |
| 0710 | MODULE, MAIN SHAFT | Remove/ Install | | | | 2.0 | | 59,60,78 | |
| | | Repair | | | | 0.4 | | 59,60,78 | |
| 0710 | MODULE, CONVERTER HOUSING | Remove/ Install | | | | 4.3 | | 3,56,57, 59,60,78 | |
| | | Repair | | | | 2.0 | | 3,19,25, 56,57,59,60, 78 | |
| 0713 | CLUTCH ASSEMBLY, C3/C4/C5, TRANSMISSION | Remove/ Install | | | | 2.0 | | 56,57,59,60, 78 | |
| | | Repair | | | | 1.0 | | 41,56,57,59, 60,78 | |
| 0713 | MODULE, ROTATING CLUTCH | Remove/ Install | | | | 2.0 | | 3,56,59, 60,78 | |
| | | Repair | | | | 2.4 | | 3,19,24, 56,59,60,78 | |
| 0714 | VALVE ASSEMBLY, CONTROL MODULE | Remove/ Install | | | 2.0 | | | 56,59,60,61, 78,79 | |
| | | Repair | | 1.0 | 2.5 | | | 59,61,78,79 | |
| 0714 | BODY ASSEMBLY, MAIN VALVE | Service | | 1.5 | | | | 57,59,78 | |
| | | Remove/ Install | | | 2.0 | | | 56,59,60,61, 78,79 | |
| | | Repair | | 1.5 | 2.5 | | | 56,59,60,61, 78,79 | |
| 0801 | MODULE, TRANSFER CASE | Adjust | | | | 1.0 | | | |
| | | Remove/ Install | | | | 2.0 | | 21,56,57,59, 60,61,71,74, 78,79 | |
| | | Repair | | | | 1.1 | | 23,27,33,50, 56,57,60,78 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| 0802 | HOUSING ASSEMBLY, C6 AND C7 CLUTCH | Remove/ Install | | | | 2.0 | | 56,59,60,61, 78 | |
| | | Repair | | | | 0.8 | | 19,23,26,27, 28,29,56,59, 60,61,62,71, 78 | |
| 0802 | CONTROL VALVE ASSEMBLY | Remove/ Install | | | | 2.0 | | 56,59,61,78, 79 | |
| | | Repair | | | | 1.0 | | 56,59,61,78, 79 | |
| 0804 | PUMP ASSEMBLY, OIL | Replace | | | | 1.0 | | 79 | |
| | | Repair | | | | 0.8 | | 79 | |
| 0900 | PROPELLER SHAFT | Inspect | | 0.1 | | | | | |
| | | Service | | 0.5 | | | | 59 | |
| | | Repair | | 0.6 | | | | 57,59,78 | |
| | | Replace | | 0.5 | | | | 57,59,78 | |
| 1000 | AXLE ASSEMBLY, FRONT | Inspect | 0.1 | 0.3 | 0.7 | | | 78 | |
| | | Adjust | | | 1.0 | | | 57,79 | |
| | | Service | | 0.5 | | | | 59,78 | |
| | | Replace | | | 4.5 | | | 56,57,59,60, 61,70,78 | |
| | | Repair | | 2.3 | 2.2 | 6.0 | | 56,57,59,60, 61,78 | |
| 1002 | CARRIER ASSEMBLY, DIFFERENTIAL | Inspect | | 0.1 | 0.1 | 0.1 | | 78,79 | |
| | | Service | | | 0.3 | | | 78 | |
| | | Replace | | | | 4.6 | | 21,56,57,59, 60,78,79 | |
| | | Repair | | | | 2.7 | | 56,57,59,60, 78,79 | |
| 1004 | STEERING KNUCKLE, AXLE | Inspect | | | 0.2 | | | | |
| | | Adjust | | | 2.5 | | | 79 | |
| | | Service | | | 0.3 | | | 79 | |
| | | Replace | | | 5.1 | | | 56,57,59,60, 71,78 | |
| 1100 | AXLE ASSEMBLY, REAR | Inspect | 0.1 | 0.4 | 0.7 | | | | |
| | | Service | | 0.8 | | | | 57,59,78 | |
| | | Replace | | | 4.5 | | | 34,56,57,59, 60,78,84 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| | | Repair | | | 0.9 | 6.0 | | 21,56,57,59, 60,78,84,85 | |
| 1102 | CARRIER ASSEMBLY, DIFFERENTIAL | Inspect | | 0.1 | 0.1 | 1.0 | | 78,79 | |
| | | Service | | | 0.3 | | | 78 | |
| | | Replace | | | | 4.6 | | 21,56,57,59, 60,78,79,85 | |
| | | Repair | | | | 2.7 | | 21,37,56,57, 59,60,71,73, 78 | |
| 1202 | BRAKE ASSEMBLY, FRONT AXLE | Inspect | | 0.1 | 1.0 | | | 59,78,79 | |
| | | Adjust | | 0.4 | | | | 57,59,78 | |
| | | Repair | | 1.5 | 0.5 | | | 57,59,78,83 | |
| 1202 | BRAKE ASSEMBLY, REAR AXLE | Inspect | | 0.1 | 1.0 | | | 59,78,79 | |
| | | Adjust | | 0.4 | | | | 57,59,78 | |
| | | Repair | | 1.5 | 0.5 | | | 57,59,78,83 | |
| 1208 | BRAKE AIR CHAMBER | Inspect | | 0.1 | | | | | |
| | | Replace | | 0.5 | | | | 57,59,78 | |
| 1209 | AIR COMPRESSOR | Adjust | | 0.6 | | | | 59,78 | |
| | | Replace | | | 1.2 | | | 56,60,61,78, 79 | |
| 1311 | WHEEL ASSEMBLY, PNEUMATIC TIRE | Inspect | 0.1 | | | | | 57 | B |
| | | Replace | 1.0 | 1.2 | | | | 57,59 | |
| | | Repair | | 2.0 | | | | 57,59 | |
| 1313 | TIRE, PNEUMATIC | Replace | | 2.0 | | | | 57,59 | |
| 1401 | STEERING SYSTEM | Inspect | | 0.2 | | | | | |
| | | Adjust | | | 1.0 | | | 56,60,78 | |
| | | Repair | | 1.0 | 1.5 | | | 54,56,57,59, 60,61,78,79 | |
| 1407 | STEERING GEAR ASSEMBLY | Replace | | | 4.0 | | | 56,60,78 | |
| 1410 | PUMP, POWER STEERING | Replace | | | 1.5 | | | 47,56,59,60, 78 | |
| 1411 | HOSES, POWER STEERING | Replace | | 0.3 | | | | 57,59,78,88 | |
| 1413 | HYDRAULIC RESERVOIR, POWER STEERING | Service | 0.1 | 0.5 | | | | 78 | |
| | | Replace | | 0.8 | | | | 59,78,86 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| 1501 | FRAME ASSEMBLY | Inspect | 0.1 | 0.3 | | | | | |
| | | Repair | | 0.8 | 14.0 | | | 56,57,59,60, 61,78,79 | |
| 1504 | RETAINER, SPARE TIRE | Inspect | 0.1 | 0.1 | | | | | |
| | | Replace | | 3.0 | | | | 57,59,78 | |
| | | Repair | | 0.6 | | | | 57,59,78 | |
| 1601 | LEAF SPRING ASSEMBLIES | Inspect | 0.1 | 0.2 | | | | | |
| | | Service | | 0.3 | | | | 57 | |
| | | Replace | | | 2.7 | | | 56,57,59,60, 78,79 | |
| 1604 | SHOCK ABSORBERS | Inspect | 0.1 | 0.3 | | | | | |
| | | Replace | | 0.5 | | | | 57,59,78 | |
| 1605 | STABILIZER BAR, REAR | Inspect | | 0.2 | | | | | |
| | | Replace | | 2.0 | | | | 57,59,68,78 | |
| | | Repair | | 1.5 | | | | 57,78 | |
| 1801 | CAB BODY, STANDARD | Inspect | 0.1 | | | | | | |
| | | Replace | | | 60.0 | | | 56,57,60,61, 78,79 | |
| | | Repair | | 0.6 | | | | 57,59,78 | |
| 1801 | CAB BODY, AIR DROP | Inspect | 0.1 | | | | | | |
| | | Replace | | | 60.0 | | | 56,57,60,61, 78,79 | |
| | | Repair | | 0.6 | | | | 57,59,78 | |
| 1801 | CAB DOORS, STANDARD | Inspect | 0.1 | | | | | | |
| | | Replace | | | 1.0 | | | 55,59,78 | |
| | | Repair | | 2.7 | | | | 49,57,78 | |
| 1801 | CAB DOORS, AIR DROP | Inspect | 0.1 | | | | | | |
| | | Replace | | | 1.0 | | | 55,59,78 | |
| | | Repair | | 2.7 | | | | 49,57,78 | |
| 1801 | SUPPORT ASSEMBLY, CAB FRONT | Inspect | 0.1 | | | | | | |
| | | Repair | | 1.1 | | | | 57,59,78 | |
| | | Replace | | | 3.0 | | | 8,13,57, 59,60,78, 79 | |
| 1801 | SUPPORT ASSEMBLY, CAB REAR | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.0 | | | | 57,59,78 | |
| | | Repair | | 0.8 | | | | 57,78 | |
| 1802 | WINDSHIELD | Replace | | | 0.6 | | | 55,59,78 | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| 1802 | FENDER, VEHICULAR, FRONT | Inspect | 0.1 | | | | | | |
| | | Replace | | 2.0 | | | | 57,59,78 | |
| | | Repair | | 0.5 | | | | 57,78 | |
| 1803 | ROOF, CAB, M1081 | Replace | | 1.0 | | | | 45,50,57,59, 78 | |
| 1805 | FLOOR COVERING, CAB | Replace | | 1.0 | | | | 57,78 | |
| 1806 | SEATS | Replace | | | | | | | |
| 1808 | TOOL BOX ASSEMBLY | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.5 | | | | 47,57,59,78 | |
| | | Repair | | 0.5 | | | | 57,59,78 | |
| 1808 | STOWAGE BOX, CAB | Replace | | 0.8 | | | | 57,78 | |
| | | Repair | | 0.5 | | | | 57,78 | |
| 1810 | BODY, CARGO | Inspect | 0.1 | | | | | | |
| | | Replace | | | 4.0 | | | 56,57,59,60, 78 | |
| | | Repair | | 0.5 | | | | 57,59,78 | |
| 1812 | BODY ASSEMBLY, VAN | Inspect | 0.1 | 0.1 | | | | | |
| | | Repair | | 0.5 | | | | 20,35,36,42, 43,47,57,59, 64,72,76,78 | |
| | | Replace | | 1.9 | | | | 36,64,78 | |
| 1812 | DOOR, ACCESS, LEFT | Inspect | 0.1 | | | | | | |
| | | Replace | | 2.3 | | | | 78 | |
| | | Repair | | 0.1 | | | | 57,59,78 | |
| 1812 | DOOR, ACCESS, RIGHT | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.4 | | | | 78 | |
| | | Repair | | 0.4 | | | | 57,59,78 | |
| 1812 | WINDOW SASH ASSEMBLY | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.2 | | | | 78 | |
| | | Repair | | 0.4 | | | | 57,59,78 | |
| 1812 | BOX ASSEMBLY, RELAY | Inspect | 0.1 | 0.1 | | | | | |
| | | Replace | | 0.6 | | | | 78 | |
| | | Repair | | 0.1 | | | | 78 | |
| | | Test | 0.1 | 0.5 | | | | 59,78 | |
| 1812 | FAN ASSEMBLY | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.8 | | | | 20,76,78 | |
| | | Repair | | 0.5 | | | | 78 | |
| 2001 | WINCH, 11K SELF-RECOVERY (SRW) | Inspect | 0.1 | 4.0 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Tools and Equipment Ref Code | Remarks Code |
| | | Service | | 0.2 | | | | 59 | |
| | | Replace | | | 1.0 | | | 59,60,78 | |
| | | Repair | | | 0.9 | | | 59,60,78 | |
| 2004 | POWER TAKEOFF ASSEMBLY (PTO) | Inspect | 0.1 | | | | | | |
| | | Replace | | | 1.0 | | | 56,57,59,60, 78 | |
| | | Repair | | | 0.8 | | | 56,57,59,60, 78 | |
| 2202 | MOTOR, WIPER, WINDSHIELD | Test | | 0.5 | | | | | |
| | | Replace | | 1.0 | | | | 78 | |
| 2207 | HEATER ASSEMBLY, PERSONNEL | Replace | | 2.0 | | | | 57,59,78 | |
| | | Repair | | 1.0 | | | | 57,59,78 | |
| 2210 | DECALS | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.0 | | | | 78 | |
| 2401 | POWER UNIT, AIR/HYDRAULIC | Inspect | 0.1 | | | | | | |
| | | Test | | 0.2 | | | | | |
| | | Service | | 1.0 | | | | | |
| | | Replace | | 3.0 | | | | 57,59,78 | |
| | | Repair | | | 2.0 | | | 57,59,60,69, 78,79 | |
| 2402 | MANIFOLD, HYDRAULIC | Inspect | 0.1 | | | | | | |
| | | Test | | 0.2 | | | | | |
| | | Replace | | 1.5 | | | | 51,57,59,78 | |
| | | Repair | | 1.0 | | | | 51,57,59,78 | |
| 2402 | LATCH, HYDRAULIC, CAB | Inspect | 0.1 | | | | | | |
| | | Adjust | | 0.5 | | | | 57,59,78 | |
| | | Replace | | 0.5 | | | | 57,59,78 | |
| 2404 | SUSPENSION CYLINDER | Inspect | | | | | | | |
| | | Replace | | | | | | | |
| 2406 | FILTER, HYDRAULIC | Service | | 0.3 | | | | 59,78 | |
| | | Replace | | 0.2 | | | | 59,78 | |
| 2408 | RESERVOIR, HYDRAULIC | Replace | | 1.0 | | | | 57,59,78 | |
| | | Repair | | 0.5 | | | | 57,59,78 | |
| 3303 | HEATER KIT, M1079 | Inspect | 0.1 | | | | | | |
| | | Remove/ Install | | 2.5 | | | | 78 | |
| 3307 | ALTERNATOR KIT, 200 AMP | Inspect | 0.1 | 0.2 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| | | Test | | 0.5 | | | | 59 | |
| | | Remove/ Install | | 2.0 | | | | 57,59,78 | |
| | | Replace | | 1.0 | | | | 57,59,78 | |
| | | Repair | | | 0.5 | | | 56,57,60,62,78 | |
| 3307 | ALTERNATOR, 200 AMP | Inspect | | 0.2 | | | | | |
| | | Test | | 0.5 | 1.5 | | | 59,63,78 | |
| | | Replace | | 1.0 | | | | 57,59,78 | |
| | | Repair | | 0.2 | 0.5 | | | 56,57,60,61,63,78 | |
| 3307 | CRANE (LMHC), MATERIAL HANDLING, LIGHT | Inspect | 0.1 | 0.1 | | | | | |
| | | Repair | | 0.5 | | | | 59,76,78 | |
| | | Replace | | 0.5 | | | | | |
| | | Test | | 0.5 | | | | | |
| 3307 | WEIGHT BLOCK AND WIRE ROPE, LMHC | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.1 | | | | 59,78 | |
| | | Repair | | 0.5 | | | | 59,78 | |
| | | Test | | | 0.5 | | | | |
| 3307 | WINCH, LMHC | Inspect | 0.1 | | | | | | |
| | | Replace | | | 0.5 | | | 59,78 | |
| | | Repair | | | 1.0 | | | 59,78 | |
| | | Test | | 0.5 | | | | | |
| 3307 | MAST/SWING ASSEMBLY, LMHC | Inspect | 0.1 | | | | | | |
| | | Repair | | 1.0 | | | | 59,78 | |
| | | Test | | 0.5 | | | | | |
| 3307 | CONTROL BOX, LMHC | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.1 | | | | | |
| | | Repair | | 0.5 | | | | 76,78 | |
| | | Test | 0.1 | 0.5 | | | | | |
| 3307 | TROOPSEAT KIT | Remove/ Install | 1.0 | | | | | | |
| | | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.0 | | | | | |
| | | Repair | | 0.5 | | | | 78 | |
| 3307 | COVER KIT, CARGO SOFT TOP | Remove/ Install | 1.5 | | | | | | |
| | | Inspect | 0.1 | | | | | | |
| | | Replace | | 2.0 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART FOR THE LMTV VEHICLE (CONT)

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | Direct Support | General Support | Depot | Tools and Equipment | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Ref Code | Remarks Code |
| | | Repair | | 0.5 | | | | | |
| 3307 | AIR CONDITIONER KIT, M1079 | Inspect | 0.1 | | | | | | |
| | | Remove/ Install | | 1.5 | | | | 59,78 | |
| 3307 | WARNING LIGHT ASSEMBLY, AMBER | Inspect | 0.1 | | | | | | |
| | | Repair | | 0.4 | | | | 78 | |
| | | Test | | 0.2 | | | | | |
| 3401 | MACHINE GUN RING KIT | Inspect | 0.1 | | | | | | |
| | | Remove/ Install | | | 4.0 | | | 56,57,60,78,79,84 | |
| | | Repair | | 1.1 | | | | 10,57,78 | |
| 3402 | MOUNT, SMALL ARMS | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.3 | | | | 78 | |
| 3909 | CABLE ASSEMBLY, WARNING LIGHT | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.5 | | | | 78 | |
| 4316 | AIR HOSE, CTIS | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.4 | | | | 59,78 | |
| 4317 | VALVE, INVERSION | Replace | | 0.5 | | | | 59,78 | |
| 4321 | AIR DRYER | Inspect | 0.1 | 0.1 | | | | | |
| | | Replace | | 1.0 | | | | 57,59,78 | |
| | | Repair | | 0.6 | | | | 57,59,78 | |
| 4702 | GAUGE, AIR FILTER RESTRICTION | Replace | | 0.5 | | | | 78 | |

## Section III. TOOLS AND TEST EQUIPMENT FOR LMTV VEHICLES

| Tool or Test Equipment REF Code | Maintenance Level | Nomenclature | National Stock Number | Tool Number |
|---|---|---|---|---|
| 1 | O,F | ADAPTER, RADIATOR | 4910-01-170-4928 | J29003-A |
| 2 | O | ADAPTER, SOCKET WRENCH | 5120-00-240-8702 | 11655788-2 |
| 2.1 | O | BASE, MAGNETIC | | P5646 |
| 3 | H | BUSHING DRIVER SET | 5120-01-391-3541 | J35922 |
| 4 | O | CRIMPING TOOL, TERMINAL, HAND | 5120-00-165-3912 | M22520/1-01 |
| 5 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-00-078-3809 | 10935497 |
| 6 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-00-293-1010 | 5120-293-1282 |

## Section III. TOOLS AND TEST EQUIPMENT FOR LMTV VEHICLES (CONT)

| Tool or Test Equipment REF Code | Maintenance Level | Nomenclature | National Stock Number | Tool Number |
|---|---|---|---|---|
| 7 | F | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-00-181-6754 | GGG-C-1507 |
| 8 | F | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-074-7557 | FCOM19 |
| 9 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-236-9996 | FCOM15 |
| 10 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-335-1091 | FCO32 |
| 11 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-335-1119 | SCO34 |
| 12 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-335-1122 | SCO40 |
| 12.1 | O | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-335-1126 | SCO48 |
| 13 | F | CROWFOOT ATTACHMENT, SOCKET WRENCH | 5120-01-348-9473 | AN8508-19A |
| 13.1 | O | DISPENSER, SEALANT | 5120-00-061-1283 | 45RCT |
| 13.2 | F | DRILL SET, STOPCOLLAR | 5133-01-383-7665 | 1955 |
| 14 | H | DRIVER KIT, BEARING | 4910-01-032-3128 | 8S0602 |
| 14.1 | O | FRAME, HAND HACKSAW | 5110-00-289-9657 | 163-20 |
| 15 | | DELETED | | |
| 16 | O,F | GAGE, BELT TENSION | 6635-01-143-2237 | GA-424 |
| 17 | O,F | GAGE, PRESSURE, 0-150 psi | 6685-00-474-5721 | 111T1D05A01 |
| 18 | F,H | GAGE, PROFILE | 5220-01-388-1460 | J-38548-1 |
| 19 | H | HANDLE, DRIVE | 5120-00-377-2259 | J8092 |
| 20 | O | HEATER, GUN TYPE, ELECTRIC | 4940-00-561-1002 | 500A |
| 21 | F,H | HOLDING BAR, PINION | 5120-01-166-0573 | J3453 |
| 21.1 | O | INDICATOR, DIAL | | P36491 |
| 22 | O | INSERTER AND REMOVER, ELECTRICAL CONTACT | 5120-00-915-4588 | MS3447-16 |
| 23 | H | INSERTER AND REMOVER, SPRING | 5120-01-388-3660 | J38573 |
| 24 | H | INSERTER AND REMOVER, SPRING | 5120-01-388-4436 | J35923 |
| 25 | H | INSERTER, BEARING AND BUSHING | 5120-01-388-7841 | J-38565 |
| 26 | H | INSERTER, BEARING AND BUSHING | 5120-01-389-0658 | J35921-1 |
| 27 | H | INSERTER, BEARING AND BUSHING | 5120-01-390-1104 | J 38569 |
| 28 | H | INSERTER, BEARING AND BUSHING | 5120-01-390-1105 | J 38568-3 |
| 29 | H | INSERTER, BEARING AND BUSHING | 5120-01-391-5133 | J 38579 |
| 30 | F,H | INSERTER, BEARING AND BUSHING | 5120-01-414-7398 | J38566 |
| 31 | F | INSERTER, SEAL | 5120-01-362-2026 | 1U7430 |
| 32 | F | INSERTER, SEAL | 5120-01-362-2027 | 1U7598 |
| 33 | F | INSTALLER, SEAL | N/A | J38574 |
| 33.1 | F | JACK, DOLLY TYPE HYDRAULIC | 4910-01-396-5044 | TTJ3 |
| 34 | F | JACK, LEVELING SUPPORT, VEHICLE | 2590-00-231-7418 | 10876244 |
| 35 | O | KEY, SOCKET HEAD SCREW | 5120-00-984-0247 | 58010 |

## Section III. TOOLS AND TEST EQUIPMENT FOR LMTV VEHICLES

| Tool or Test Equipment REF Code | Maintenance Level | Nomenclature | National Stock Number | Tool Number |
|---|---|---|---|---|
| 35.1 | O | KEY, SOCKET HEAD SCREW | 5120-01-355-1670 | AWML2.5 |
| 35.2 | F | LIFTING SADDLE ASSEMBLY | | TTJ-ZIFA |
| 36 | O | LINK, CHAIN, END | 4010-00-932-5013 | NAS1049-16 |
| 36.1 | F | NOSE ASSEMBLY | | 99-3307 |
| 36.2 | O | PLIERS, HOG RING STAPLE | 5120-01-413-8837 | 0012 |
| 37 | H | PULLER KIT, UNIVERSAL | 5180-00-089-3660 | A57QB |
| 38 | F | PULLER KIT, UNIVERSAL | 5180-01-124-1903 | 1P3075 |
| 39 | O | REMOVER, ELECTRICAL CONTACT | 5120-00-148-9844 | MS3448-001B |
| 40 | F | RIVETER, BLIND, HAND | 5120-01-289-4310 | HP-2 |
| 40.1 | F | RIVETER, BLIND, PNEUMATIC | 5130-01-232-4042 | 245 |
| 41 | H | RIVETER, YOKE, HAND | 5120-01-415-3558 | J-39354 |
| 42 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-00-180-0881 | 5120-00-180-0881 |
| 43 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-053-4158 | FAM5A |
| 44 | O,F,H | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-055-1308 | ANSIB18.3.2M |
| 45 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-079-8032 | SAM8A |
| 46 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-160-8862 | S 6 HBS |
| 47 | O,F | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3462 | SA10A |
| 47.1 | O,F | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3483 | FA5LE |
| 48 | O,F | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3497 | TMP12A |
| 49 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3519 | F23D |
| 50 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3526 | FP24 |
| 51 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3527 | FP32A |
| 52 | F,H | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3536 | FTX40A |
| 53 | O | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-367-3574 | GFA8A |
| 53.1 | F | SCREWDRIVER ATTACHMENT, SOCKET WRENCH | 5120-01-430-5715 | SZ-21 |
| 54 | O | SEPARATOR, BALL JOINT | 5120-01-255-8238 | 2287 |
| 55 | F | SETTING TOOL, WINDSHIELD | 5120-01-316-4995 | CRL216 |
| 56 | O,F | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-348-7696 | SC4910-95CLA02 |
| 57 | O,F,H | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-754-0650 | SC4910-95CLA72 |
| 58 | O | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-754-0653 | SC4910-95CLA73 |

## Section III. TOOLS AND TEST EQUIPMENT FOR LMTV VEHICLES

| Tool or Test Equipment REF Code | Maintenance Level | Nomenclature | National Stock Number | Tool Number |
|---|---|---|---|---|
| 59 | O,F,H | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-754-0654 | SC4910-95CLA74 |
| 60 | F,H | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-754-0705 | SC4910-95CLA31 |
| 61 | F,H | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-754-0706 | SC4910-95CLA62 |
| 62 | O,F,H | SHOP EQUIPMENT, AUTOMOTIVE VEHICLE | 4910-00-754-0707 | SC4910-95CLA63 |
| 63 | O,F | SHOP EQUIPMENT, FUEL AND ELECTRICAL | 4910-00-754-0714 | SC4910-95CLA01 |
| 64 | O | SLING, EYE | 3940-01-334-0749 | EE1-202 |
| 65 | F | SLING, MULTIPLE LEG | 3940-00-777-5744 | A170 |
| 66 | H | SOCKET SET, SOCKET WRENCH | 5120-01-195-0640 | 208FA |
| 67 | F,H | SOCKET, SOCKET WRENCH | 5120-01-068-5643 | 5555M |
| 68 | O | SOCKET, SOCKET WRENCH | 5120-01-161-5907 | GLDH382 |
| 69 | F | SOCKET, SOCKET WRENCH | 5120-01-335-0784 | TW321 |
| 70 | O | SOCKET, SOCKET WRENCH | 5120-01-144-5324 | ANS 1913A |
| 71 | F | SOLDERING AND BRAZING OUTFIT, RESISTANCE HEATING | 3439-00-460-7198 | SC4940-95-CLB20 |
| 72 | O | SOLDERING IRON, ELECTRIC | 3439-01-036-3308 | 3112-S3-40W |
| 73 | H | STAND, DIFFERENTIAL CARRIER REPAIR | 4910-01-085-7729 | J3409-D |
| 74 | H | STAND, MAINTENANCE, AUTOMOTIVE ENGINE | 4910-00-808-3372 | J29109 |
| 75 | F | TOOL, DISTORTER | 5120-01-119-1748 | 5P-7312 |
| 76 | O,F | TOOL KIT, AUTO FUEL AND ELECTRICAL SYSTEM REPAIR | 5180-00-754-0655 | SC4910-95CLA50 |
| 77 | F | TOOL KIT, BODY AND FENDER | 5180-00-754-0643 | SC5180-90-N34 |
| 78 | O,F,H | TOOL KIT, GENERAL MECHANIC'S | 5180-00-177-7033 | SC5180-90-CL-N26 |
| 79 | F,H | TOOL KIT, GENERAL MECHANIC'S | 5180-00-699-5273 | SC5180-90-CL-N05 |
| 80 | F | TOOL KIT, INTERNAL COMBUSTION ENGINE | 5180-01-356-8155 | 1U6680 |
| 81 | H | TOOL KIT, DIESEL INJECTOR | 5180-01-466-3966 | 143-2099 |
| 82 | F | TOOL OUTFIT, HYDRAULIC | 4940-01-036-5784 | SC4940-95-CL-B07 |
| 83 | O | TOOL, SPRING REMOVAL | 5120-01-360-1918 | TV940010 |
| 84 | F | WRENCH SET, CROWFOOT, RATCHETING | 5120-00-293-0013 | GGG-W-646 |
| 85 | F | WRENCH SET, SOCKET | 5120-00-148-3706 | ANSI-B107.5 |
| 86 | O | WRENCH, TORQUE, 0-75 LB-IN. | 5120-01-112-9532 | TQSC6A |

## Section IV. REMARKS FOR THE LMTV VEHICLE

| Remarks Code | Remarks |
|---|---|
| A | Battery service will be in accordance with TM 9-6140-200-14. |
| B | Repair of tires will be in accordance with TM 9-2610-200-14. |

# APPENDIX C
# TOOLS IDENTIFICATION LIST

## Section I. INTRODUCTION

### C-1. INTRODUCTION

This appendix lists common tools, supplements, and special tools/fixtures that are suggested for maintenance tasks performed at the Unit Maintenance level.

### C-2. EXPLANATION OF COLUMNS

**a. Column (1) - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item, e.g., "Bar, Pry (Item 1, Appendix C)."

**b. Column (2) - Item Name.** This column contains the nomenclature for the item.

**c. Column (3) - National Stock Number.** This is the national stock number assigned to the item which you can use to requisition it.

**d. Column (4) - Part Number.** This provides the Government, manufacturer, or vendor part number for the item.

**e. Column (5) - Reference.** This column contains the shop catalog (SC), technical manual, or other publication which provides an illustration and description of the item, or lists whether the item is fabricated.

## APPENDIX C
## Section II. TOOLS IDENTIFICATION LIST

| (1) ITEM NUMBER | (2) ITEM NAME | (3) NATIONAL STOCK NUMBER | (4) PART NUMBER | (5) REFERENCE |
|---|---|---|---|---|
| 1 | ADAPTER, SOCKET WRENCH | 5120-00-227-8088 | A-A-2172 | SC 4910-95-CL-A74 |
| 2 | ADJUSTING TOOL, BRAKE SHOE | 5120-00-154-3029 | J34061 | SC 4910-95-CL-A74 |
| 3 | APRON, RUBBER | 8145-00-082-6108 | MIL-A-41829 | SC 4910-95-CL-A74 |
| 4 | CAPS, VISE JAW | 5120-00-221-1506 | GGG-C-137 | SC 4910-95-CL-A74 |
| 5 | DISPENSING PUMP, HAND DRIVEN | 4930-00-263-9886 | 43D15069 | SC 4910-95-CL-A74 |
| 6 | DRILL SET, TWIST | 5130-00-293-0983 | 58 | SC 4910-95-CL-A74 |
| 7 | DRILL, PORTABLE, ELECTRIC | 5130-00-293-1849 | W-D-661 | SC 4910-95-CL-A74 |
| 8 | DRILL, TWIST | 5133-01-120-3519 | | SC 4910-95-CL-A74 |

## Section II. TOOLS IDENTIFICATION LIST (CONT)

| (1) ITEM NUMBER | (2) ITEM NAME | (3) NATIONAL STOCK NUMBER | (4) PART NUMBER | (5) REFERENCE |
|---|---|---|---|---|
| 9 | FISHING TOOL, PNEUMATIC TIRE VALVE | 5120-00-516-4220 | 991 | SC 4910-95-CL-A74 |
| 10 | GAGE, DEPTH, MICROMETER | 5210-00-619-4045 | 445BZ-6RL | CTA 50-909 |
| 11 | GAGE, TIRE PRESSURE | 4910-01-117-2994 | 955 | SC 4910-95-CL-A72 |
| 12 | GAGE, WHEEL ALIGNMENT | 5210-01-223-3701 | WA361 | SC 4910-95-CL-A72 |
| 13 | GLOVES, RUBBER | 8415-00-641-4601 | ZZ-G-381 | SC 4910-95-CL-A74 |
| 14 | GLOVES, WELDER'S | 8415-00-268-7859 | A-A-50022 | SC 4910-95-CL-A72 |
| 15 | GOGGLES, INDUSTRIAL | 4240-00-052-3776 | A-A-1110 | SC 4910-95-CL-A74 |
| 16 | GUN, LUBRICATING | 4930-00-253-2478 | 1142 | SC 4910-95-CL-A74 |
| 17 | HAMMER, HAND | 5120-00-224-4130 | A-A-1292 | SC 4910-95-CL-A74 |
| 18 | HAMMER, HAND | 5120-01-065-9037 | 57-533 | SC 4910-95-CL-A72 |
| 19 | HOSE ASSEMBLY, NONMETALLIC | 4720-00-356-8557 | ZZ-H-461 | SC 4910-95-CL-A74 |
| 20 | IRON, TIRE | 5120-00-765-8536 | T48A | SC 4910-95-CL-A74 |
| 21 | JACK, HYDRAULIC, HAND | 5120-00-224-7330 | D120 | SC 4910-95-CL-A74 |
| 22 | MULTIMETER, DIGITAL | 6625-01-139-2512 | T00377 | SC 4910-95-CL-A74 |
| 23 | MULTIPLIER, TORQUE WRENCH | 5120-00-574-9318 | 292 | SC 4910-95-CL-A72 |
| 24 | PAN, DRAIN | 4910-00-387-9592 | 450 | SC 4910-95-CL-A72 |
| 25 | PAN, WASH | 4940-00-617-9859 | 5582281 | SC 4910-95-CL-A72 |
| 26 | PRESSURE TESTER, RADIATOR | 4910-01-170-4929 | J24460-01 | SC 4910-95-CL-A74 |
| 27 | PULLER KIT, MECHANICAL | 5120-00-313-9496 | 1178 | SC 4910-95-CL-A74 |
| 28 | PULLER, BATTERY TERMINAL | 5120-00-944-4268 | 21 | SC 4910-95-CL-A74 |
| 29 | RESPIRATOR, AIR FILTER | 4240-00-022-2524 | GGG-M-125/6 | SC 4910-95-CL-A72 |
| 30 | SCALE, WEIGHING | 6670-00-254-4634 | AAA-5-133 | SC 4910-95-CL-A72 |
| 31 | SLING, CARGO | 1670-00-823-5043 | 63J4261-13 | CTA 50-970 |
| 32 | SLING, ENDLESS | 3940-00-675-5003 | PD101-96 | CTA 50-970 |
| 33 | SOCKET SET, IMPACT | 5120-01-117-0466 | 4151MMY | SC 4910-95-CL-A74 |
| 34 | SOCKET SET, SOCKET WRENCH | 5120-01-073-2821 | 217FMY | SC 4910-95-CL-A72 |

## Section II. TOOLS IDENTIFICATION LIST (CONT)

| (1) ITEM NUMBER | (2) ITEM NAME | (3) NATIONAL STOCK NUMBER | (4) PART NUMBER | (5) REFERENCE |
|---|---|---|---|---|
| 35 | SOCKET SET, SOCKET WRENCH | 5120-01-117-3876 | 221FSMY | SC 4910-95-CL-A02 |
| 36 | SOCKET, SOCKET WRENCH | 5120-00-181-6813 | 5530 | SC 4910-95-CL-A74 |
| 37 | SOCKET, SOCKET WRENCH | 5120-00-232-5681 | 1242 | SC 4910-95-CL-A74 |
| 38 | SOCKET, SOCKET WRENCH | 5120-01-112-0581 | SIMM190 | SC 4910-95-CL-A74 |
| 39 | STE/ICE-R | 4910-01-222-6589 | 12259266 | SC 4910-95-CL-A74 |
| 40 | TAPE, MEASURING | 5210-00-081-4719 | GA508A | CTA 50-970 |
| 40.1 | TEST KIT, RADIATOR | 4910-00-728-8227 | | SC 4910-95-CL-A74 |
| 40.2 | TAP AND DIE SET | 5136-01-119-0005 | TDM99117 | SC 4910-95-CL-A72 |
| 40.3 | TAP, THREAD, CUTTING | 5136-00-729-5692 | B94.9 ½13 UNCHSGH3 | SC 4910-95-CL-A72 |
| 41 | TESTER, ANTIFREEZE AND BATTERY | 6630-00-105-1418 | 10425 | SC 4910-95-CL-A74 |
| 42 | TOOL KIT, AUTO FUEL | 5780-00-754-0655 | | SC 5180-95-CL-A50 |
| 43 | TOOL KIT, BLIND RIVET | 5180-01-201-4978 | D-100-MIL-1 | SC 4910-95-CL-A72 |
| 44 | TOOL KIT, GENERAL MECHANIC'S | 5180-00-177-7033 | | SC 5180-90-N26 |
| 44.1 | TOOL KIT, ELECTRICAL CONTACT REPAIR | 5780-00-876-9336 | 7550526 | SC 4940-95-B09 |
| 45 | TRESTLE, MOTOR VEHICLE MAINTENANCE | 4910-00-251-8013 | 306 | SC 4910-95-CL-A72 |
| 46 | VISE, MACHINIST | 5120-00-293-1439 | 504M2 | SC 4910-95-CL-A74 |
| 47 | WRENCH SET, SOCKET | 5120-00-081-2305 | GGG-W-641 | SC 4910-95-CL-A74 |
| 48 | WRENCH SET, SOCKET | 5120-00-204-1999 | GGG-W-641 | SC 4910-95-CL-A74 |
| 49 | WRENCH SET, SOCKET | 5120-00-322-6231 | 51200017510 | SC 4910-95-CL-A74 |
| 50 | WRENCH, ADJUSTABLE | 5120-00-264-3793 | 2117080 | SC 4910-95-CL-A72 |
| 51 | WRENCH, ADJUSTABLE, AUTOMOTIVE | 5120-00-449-8083 | 1B7536 | SC 4910-95-CL-A74 |
| 51.1 | WRENCH, BOX AND OPEN END | 5120-00-228-9518 | 1174 | SC 4910-95-CL-A74 |
| 52 | WRENCH, BOX AND OPEN END | 5120-00-277-8833 | 1244 | SC 4910-95-CL-A74 |
| 53 | WRENCH, BOX AND OPEN END | 5120-00-277-8834 | GGG-W-636 | SC 4910-95-CL-A74 |
| 54 | WRENCH, PIPE | 5120-00-277-1461 | | SC 4910-95-CL-A74 |

## Section II. TOOLS IDENTIFICATION LIST (CONT)

| (1) ITEM NUMBER | (2) ITEM NAME | (3) NATIONAL STOCK NUMBER | (4) PART NUMBER | (5) REFERENCE |
|---|---|---|---|---|
| 55 | WRENCH, PIPE | 5120-00-277-1485 | | SC 4910-95-CL-A74 |
| 56 | WRENCH, STRAP, ADJUSTABLE | 5120-00-020-2947 | A91C | SC 4910-95-CL-A74 |
| 57 | WRENCH, TORQUE, 0-175 lb-ft | 5120-00-640-6364 | 1753LDF | SC 4910-95-CL-A72 |
| 58 | WRENCH, TORQUE, 0-200 lb-in. | 5120-00-853-4538 | F2001 | SC 4910-95-CL-A72 |
| 58.1 | WRENCH, TORQUE, 0-300 lb-in. | 5120-00-776-1841 | 2163993 | SC 4910-95-CL-A74 |
| 59 | WRENCH, TORQUE, 0-600 lb-ft | 5120-00-221-7983 | SW130-301 | SC 4910-95-CL-A72 |

# APPENDIX D
# EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

## Section I. INTRODUCTION

### D-1. SCOPE

This appendix lists expendable and durable items that you will need to operate and maintain the LMTV vehicle. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except medical, class V repair parts, and heraldic items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

### D-2. EXPLANATION OF COLUMNS

**a. Column (1) - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item, e.g., "Oil, Lubricating (Item 25, Appendix D).

**b. Column (2) - Level.** This column identifies the lowest level of maintenance that requires the item.

**c. Column (3) - National Stock Number.** This is the national stock number assigned to the item which you can use to requisition it.

**d. Column (4) - Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number.** This provides the other information you need to identify the item.

**e. Column (5) - Unit of Measure.** This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

## Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 1 | O | 4730-00-248-9340 | Adapter, Pipe to Tube (81343) 4-4 010103B | ea |
| 1.1 | O | 4730-01-453-9651 | Adapter, Straight, Pipe to Boss (19207) 12421890-001 | ea |
| 1.2 | O | 4730-01-457-4025 | Adapter, Straight, Pipe to Tube (96906) MS51503B4-4 | ea |
| 1.3 | O | 4730-00-760-3525 | Adapter, Straight, Tube to Boss (81361) C116-3-71 | ea |
| 2 | O | 8040-00-273-8717 | Adhesive (81348) MMM-A-121 | pt |
| 3 | O | 8040-00-152-0063 | Adhesive (81348) MMM-A-1617 TY 3 | bt |
| 4 | O | 8040-01-250-3969 | Adhesive (05972) 242 | ea |
| 5 | O | 8040-01-117-7872 | Adhesive (04963) 08031 | tu |
| 6 | O | 8040-00-117-8510 | Adhesive (71984) 3145 RTV Clear | tu |
| 7 | O | 8040-00-776-9602 | Adhesive (73168) 80055-31 | kt |
| 8 | O | 8040-00-118-2695 | Adhesive (72799) RTV162 | kt |

## Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 9 | O | 8040-01-446-7842 | Adhesive (01139) RTV123 | ca |
| 10 | O | 8040-01-331-7473 | Adhesive (81349) (MIL-A-46106 GP3TY1) | tu |
| 11 | O | 8040-01-331-7470 | Adhesive (81349) (MIL-A-46106 GP1TY1) | tu |
| 11.1 | O | 8040-00-728-3088 | Adhesive (78500) 1199-T-3842<br>6 oz | kt |
| 12 | C | 6850-00-174-1806 | Antifreeze, Arctic Type (81349) (MIL-A-11755)<br>55 gl drum | dr |
| 13 | C | | Antifreeze, Multi-Engine Type (58536) (A-A-52624A) | dr |
| | | 6850-01-441-3218 | Type I (Green) – 1 gal | gal |
| | | 6850-01-441-3221 | Type I (Green) - 5 gal | co |
| | | 6850-01-441-3257 | Type II (Purple) - 5 gal | co |
| 14 | O | 8030-00-597-5367 | Antiseize Compound (81349) (MIL-A-907) | lb |
| 14.1 | O | 5110-00-277-4588 | Blade, Hand Hacksaw (54940) 31-51024 | ea |
| 14.2 | O | 5340-01-454-4336 | Bracket, Angle (0FW39) 12421859-001 | ea |
| 15 | O | 5340-00-450-5718 | Cap and Plug Set 10935405 | ea |
| 15.1 | O | 5340-01-423-0972 | Clamp, Loop (18076) S630H-20 | ea |
| 16 | O | 6850-00-926-2275 | Cleaning Compound, Windshield (81349) O-C-1901<br>16 oz bottle | bt |
| 17 | O | 7920-00-044-9281 | Cloth, Cleaning (81349) (MIL-C-85043) | bx |
| 18 | O | | Corrosion Preventive Compound (81349) (MIL-C-16173) | |
| | | 8030-00-062-6950 | Grade 1 - 1 qt can | qt |
| | | 8030-01-149-1731 | Grade 2 - 1 qt can | qt |
| | | 8030-00-837-6557 | Grade 3 - 1 pt can | pt |
| | | 8030-00-903-0931 | Grade 4 - 1 pt can | pt |
| 19 | O | 8030-00-033-4291 | Corrosion Preventive Compound (MIL-C-82594)<br>8 oz can | bt |
| 19.1 | O | 2540-01-460-8048 | Cover, Seat, Vehicular (27797) WM1059 | ea |
| 19.2 | O | 2540-01-463-8394 | Cover, Seat, Vehicular (0FW39) WM1058 | ea |
| 20 | C | 9150-00-664-0047 | Damping Fluid (81348) VV-D-1078<br>1 lb can | lb |
| 21 | O | 7520-01-209-1152 | Dispenser, Pressure Sensitive Adhesive Tape (75037) STD-0-9 | ea |
| 21.1 | O | 4730-01-454-1233 | Elbow, Pipe to Boss (19207) 12421891-001 | ea |
| 21.2 | O | 4730-00-863-9098 | Elbow, Pipe to Tube (30780) 4VBTXB | ea |
| 22 | O | 5330-01-325-6993 | Gasket Forming Compound (05972) 515 | ea |
| 22.1 | O | | Gasket Maker, RTV Silicone (05972) 5699 | ea |

## Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 23 | C | | Grease, Automotive and Artillery (GAA) (81349) (MIL-G-10924) | |
| | | 9150-01-197-7688 | 2-1/4 oz tube | tu |
| | | 9150-01-197-7690 | 1.75 lb can | cn |
| | | 9150-01-197-7689 | 6.5 lb can | cn |
| | | 9150-01-197-7692 | 35 lb can | cn |
| 24 | O | 9150-00-530-6814 | Grease, Wire Rope-Exposed Gear (81349) (MIL-G-18458) 35 lb can | cn |
| 25 | O | 9150-00-935-4018 | Grease, Molybenum Disulfide (81349) (MIL-G-21164) 14 oz cartridge | ca |
| 25.1 | O | 4720-00-988-3842 | Hose Assembly, Nonmetallic (50599) R25679-1 | ea |
| 25.2 | O | 4720-01-384-0995 | Hose Assembly, Nonmetallic (19207) 12421858-006 | ea |
| 25.3 | O | 4720-01-453-9530 | Hose Assembly, Nonmetallic (0FW39) 12421857 | ea |
| 25.4 | O | 4720-01-469-9208 | Hose Assembly, Nonmetallic (19207) 12418004-002 | ea |
| 26 | C | | Hydraulic Fluid A (MIL-H-5606) | |
| | | 9150-00-252-6383 | 1 qt can | cn |
| | | 9150-00-223-4134 | 1 gl can | cn |
| 27 | O | 7510-00-145-0559 | Ink, Marking Stencil (MIL-l-43553) | oz |
| 28 | O | 7510-01-386-0787 | Inking Pad, Rubber Stamp | ea |
| 29 | O | 9150-01-360-1905 | Insulating Compound, Electrical | tu |
| 30 | O | 5970-00-838-5951 | Insulation Sleeving, Electrical (06090) CRN3-16BLACK | ft |
| 30.1 | O | 5970-01-378-3018 | Insulation Sleeving, Electrical (06090) ATUM-1/4-0-4FT | lg |
| 31 | O | 5970-01-422-3579 | Insulation Sleeving, Electrical (06090) ATUM 1/2 4 ft length | lg |
| 32 | O | 1650-00-166-4834 | Lockwire (90166) 68A32 | ea |
| 33 | O | 9150-01-360-1905 | Lubricant, Solid Film (MIL-L-46147) 16 oz can | cn |
| 34 | O | 4730-00-019-0608 | Nipple, Pipe | ea |
| 35 | O | 4730-00-825-7304 | Nipple, Tube MS51501B4 | ea |
| 36 | O | 5310-00-059-4265 | Nut, Plain, Hex | ea |

## Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 36.1 | C | | Oil, Commercial Burner Fuel, Grade FO-1 (ASTM D396) | |
| 36.2 | C | | Oil, Commercial Burner Fuel, Grade FO-2 (ASTM D396) | |
| 37 | C | | Oil, Fuel Diesel, DF-A, Arctic (VV-F-800) (81348) | |
| | | 9140-00-286-5282 | 5 gl can | cn |
| | | 9140-00-286-5283 | Bulk | gl |
| | | 9140-00-286-5284 | 55 gl drum, 16 gauge | dr |
| | | 9140-00-286-5285 | 55 gl drum, 18 gauge | dr |
| 38 | C | | Oil, Fuel, Diesel, DF-1, Winter (VV-F-800) (81348) | |
| | | 9140-00-286-5286 | Bulk | gl |
| | | 9140-00-286-5287 | 5 gl can | cn |
| | | 9140-00-286-5288 | 55 gl drum, 16 gauge | dr |
| | | 9140-00-286-5289 | 55 gl drum, 18 gauge | dr |
| 39 | C | | Oil, Fuel, Diesel, DF-2, Regular (VV-F-800) (81348) | |
| | | 9140-00-286-5294 | Bulk | gl |
| | | 9140-00-286-5295 | Can | cn |
| | | 9140-00-286-5296 | 55 gl drum, 16 gauge | dr |
| | | 9140-00-286-5297 | 55 gl drum, 18 gauge | dr |
| 40 | C | | Oil, Lubricating, Arctic (MIL-L-46167) | |
| | | 9150-00-402-2372 | 5 gl can | cn |
| | | 9150-00-491-7197 | 55 gl drum | dr |
| 41 | C | | Oil, Lubricating, Gear, GO 75W (MIL-L-2105C) | |
| | | 9150-00-035-5390 | 1 qt can | cn |
| | | 9150-00-035-5391 | 5 gl can | cn |
| 42 | C | | Oil, Lubricating, Gear, 80W-90 (MIL-L-2105C) | |
| | | 9150-01-035-5392 | 1 qt can | qt |
| | | 9150-01-035-5393 | 5 gl can | cn |
| | | 9150-01-035-5394 | 55 gl drum, 16 gauge | dr |
| 43 | C | | Oil, Lubricating, OE/HDO 10 (MIL-L-2104) | |
| | | 9150-00-183-7807 | Bulk | gl |
| | | 9150-00-186-6668 | 5 gl can | cn |
| | | 9150-00-191-2772 | 55 gl drum | dr |
| 44 | C | 9150-00-189-6727 | Oil, Lubricating, OE/HDO 10W (MIL-L-2104) 1 qt can | cn |
| 45 | C | | Oil, Lubricating, OE/HDO 15W-40 (MIL-L-2104) | |
| | | 9150-01-152-4117 | 1 qt can | cn |
| | | 9150-01-152-4118 | 5 gl can | cn |
| | | 9150-01-152-4119 | 55 gl drum | dr |

## Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 46 | C | | Oil, Lubricating, OE/HDO 30 (SAE 30) (MIL-L-2104) | |
| | | 9150-00-183-7808 | Bulk | gl |
| | | 9150-00-186-6681 | 1 qt can | cn |
| | | 9150-00-188-9858 | 5 gl can | cn |
| | | 9150-00-189-6729 | 55 gl drum, 18 gauge | dr |
| 47 | C | | Oil, Lubricating, OE/HDO 40 (MIL-L-2104) | |
| | | 9150-00-405-2987 | Bulk | gl |
| | | 9150-00-189-6730 | 1 qt can | cn |
| | | 9150-00-188-9862 | 5 gl can | cn |
| 48 | O | 5350-00-067-7639 | Paper, Abrasive (28124) 02347<br>pg contains 100 sheets | pg |
| 49 | O | 8010-01-146-2650 | Polyurethane Coating (MIL-C-46168) | kt |
| 50 | O | 8030-00-181-8372 | Primer, Sealing Compound (05972) 747-56 | cn |
| 51 | C | 7920-00-205-1711 | Rag, Wiping A-A-531 | be |
| 52 | | DELETED | | |
| 53 | O | 4020-00-855-2767 | Rope, Fibrous (MIL-R-17343)<br>75 ft | cl |
| 54 | O | 7520-00-634-2442 | Rubber Stamp Set, Fixed Type | ea |
| 55 | O | 5330-01-337-1108 | Rubber Strip (12624) V4062 | ft |
| 56 | O | 5330-01-181-6482 | Rubber Strip (19207) 12328583-3 | ft |
| 56.1 | O | 5305-00-021-3740 | Screw, Cap, Hex Hd (97942) 645A560H43 | ea |
| 56.2 | O | 5305-01-299-4602 | Screw, Cap, Hex Hd (64678) 000933 006058 | ea |
| 56.3 | O | 5305-01-454-5938 | Screw, Cap, Hex Hd (19207) 12419954-093 | ea |
| 57 | O | 5305-01-296-0019 | Screw, Cap, Socket Head (06888) SHCM75275<br>50 ct box | bx |
| 58 | O | 1015-01-255-4144 | Sealant, Pipe, Teflon (19207) 12297953<br>50 ml tube | tu |
| 59 | O | 8030-00-081-2327 | Sealing Compound (05972) 079-21 | bx |
| 60 | O | 8030-00-111-2762 | Sealing Compound (05972) 290-31 | bt |
| 61 | O | 8030-00-133-3164 | Sealing Compound (05972) 571-31 | bt |
| 62 | O | 8030-00-148-9833 | Sealing Compound (05972) 271-21 | bx |
| 63 | O | 8030-00-204-9149 | Sealing Compound (05972) 592-41 | tu |
| 64 | O | 8030-00-656-1426 | Sealing Compound (81349) (MIL-S-45180) | pt |
| 65 | O | 8030-01-025-1692 | Sealing Compound (05972) 242-41 (MIL-S-46163) | bt |
| 66 | O | 8030-01-088-8140 | Sealing Compound (52571) 9001512-0011 | bt |

## Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 67 | O | | Sealing Compound (81349) (MIL-S-8802TY2CLB-2) | |
| | | 8030-00-753-5006 | 2 oz cartridge | ca |
| | | 8030-00-753-4599 | 6 oz can | kt |
| | | 8030-00-723-2746 | 12 oz can | kt |
| | | 8030-00-685-0915 | 24 oz can | kt |
| 68 | O | 8030-01-155-3238 | Sealing Compound (11083) 6V6640 | ml |
| 68.1 | O | 8030-01-371-8405 | Sealing Compound (83574) PR-1422 B-1/2 6 oz | ca |
| 68.2 | O | 8030-01-255-4144 | Sealant (19207) 12297953 | tb |
| 68.3 | O | 8030-00-956-2397 | Sealing Compound 104 | tb |
| 69 | C | 7930-00-634-3935 | Soap, Laundry (81348) P-S-1792 | lb |
| 70 | O | 3439-00-006-7764 | Solder, Tin Alloy (81348) SN63WRAP3 | sl |
| 71 | C | | Solvent, Dry Cleaning SD (P-D-680) | |
| | | 6850-00-281-1985 | 1 gl can | cn |
| | | 6850-00-664-5685 | 1 qt can | cn |
| 71.1 | O | | Strap, Tiedown, Electrical Components (06383) PLP2S | ea |
| 72 | O | | Tape, Adhesive (0SHR6) 70P00002 | ea |
| 72.1 | O | 9320-01-244-0046 | Tape, Adhesive, Rubber (18876) MIS-41157-08 180 ft | ro |
| 73 | O | 8030-00-889-3534 | Tape, Antiseizing (81349) (MIL-T-27730) | ea |
| 74 | O | 5640-00-103-2254 | Tape, Duct (39428) 1791K70 | ea |
| 75 | O | 5970-00-644-3167 | Tape, Insulation, Electrical (80063) TL83 | ro |
| 75.1 | O | 4730-00-138-8050 | Tee, Pipe (81343) 8-8-8 140424C | ea |
| 76 | O | 5975-01-379-4997 | Ties, Cable, Plastic (06383) PLT 35-C-O | hd |
| | C | | Turbine Fuel, Aviation, Kerosene Type (MIL-T-83133), Grade JP-8 | |
| | C | | Turbine Fuel, (MIL-F-16884), (NATO Code No. F75 or F-72) | |
| | | 9140-00-255-7764 | 5 gl can | cn |
| | | 9140-00-273-2378 | 55 gl drum | dr |
| | | 9140-00-273-2377 | 1 gl can | cn |
| | C | | Turbine Fuel, (MIL-F-5624), Grade JP-4 (NATO Code No. F40) | |
| | | 9130-00-273-2380 | Drum, 16 gage | dr |
| | C | | Turbine Fuel, (MIL-T-5624), Grade JP-5 (NATO Code No. F-44) | |
| | | 9130-01-305-5596 | Bulk | gl |
| | | 9130-01-250-6353 | Drum, 16 gage | dr |
| 77 | O | 6145-01-148-2263 | Wire, Electrical (80009) 175-0825-00 50 ft | ft |

# APPENDIX E
# ILLUSTRATED LIST OF MANUFACTURED ITEMS

## Section I. INTRODUCTION

### E-1. INTRODUCTION

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. Figures are provided as needed. See standards and specifications DoD-Std-00100D(AR) and ANSI Y14.5M1982 for required details.

## Section II. MANUFACTURED ITEMS INDEX


| ITEM NAME/PART NUMBER | ITEM DESCRIPTION | PARA NO. |
|---|---|---|
| Brake Adjusting Tool Support | | E-2 |
| Brake Plunger Seal Driver | | E-3 |
| Cab Support Tool | | E-4 |
| Headlight Adjustment Screen | | E-5 |
| M1079 Blackout Shield Seals | | E-6 |
| M1079 Door Gaskets | | E-7 |
| M1079 Window Sash Glazing Seals | | E-8 |
| Relay Test Wire | | E-9 |
| Wheel Bearing Shim Tool Rest | | E-10 |
| 12414690-001 | Pneumatic Tube | E-11 |
| 12414690-002 | Pneumatic Tube | E-11 |
| 12414690-004 | Pneumatic Tube | E-11 |
| 12414690-005 | Pneumatic Tube | E-11 |
| 12414690-010 | Pneumatic Tube | E-11 |
| 12414690-101 | Pneumatic Tube | E-11 |
| 12414690-102 | Pneumatic Tube | E-11 |
| 12414690-103 | Pneumatic Tube | E-11 |
| 12414690-104 | Pneumatic Tube | E-11 |
| 12414690-105 | Pneumatic Tube | E-11 |
| 12414690-106 | Pneumatic Tube | E-11 |
| 12414690-107 | Pneumatic Tube | E-11 |
| 12414690-108 | Pneumatic Tube | E-11 |
| 12414690-109 | Pneumatic Tube | E-11 |
| 12414690-112 | Pneumatic Tube | E-11 |
| 12414690-113 | Pneumatic Tube | E-11 |
| 12414690-115 | Pneumatic Tube | E-11 |
| 12414690-117 | Pneumatic Tube | E-11 |
| 12414690-118 | Pneumatic Tube | E-11 |
| 12414690-119 | Pneumatic Tube | E-11 |
| 12414690-120 | Pneumatic Tube | E-11 |
| 12414690-121 | Pneumatic Tube | E-11 |
| 12414690-122 | Pneumatic Tube | E-11 |
| 12414690-123 | Pneumatic Tube | E-11 |
| 12414690-124 | Pneumatic Tube | E-11 |
| 12414690-125 | Pneumatic Tube | E-11 |
| 12414690-126 | Pneumatic Tube | E-11 |
| 12414690-127 | Pneumatic Tube | E-11 |
| 12414690-201 | Pneumatic Tube | E-11 |
| 12414690-202 | Pneumatic Tube | E-11 |

## Section II. MANUFACTURED ITEMS INDEX (CONT)

| ITEM NAME/PART NUMBER | ITEM DESCRIPTION | PARA NO. |
|---|---|---|
| 12414690-203 | Pneumatic Tube | E-11 |
| 12414690-205 | Pneumatic Tube | E-11 |
| 12414690-206 | Pneumatic Tube | E-11 |
| 12414690-207 | Pneumatic Tube | E-11 |
| 12414690-208 | Pneumatic Tube | E-11 |
| 12414690-209 | Pneumatic Tube | E-11 |
| 12414690-210 | Pneumatic Tube | E-11 |
| 12414690-211 | Pneumatic Tube | E-11 |
| 12414690-212 | Pneumatic Tube | E-11 |
| 12414690-213 | Pneumatic Tube | E-11 |
| 12414690-214 | Pneumatic Tube | E-11 |
| 12414690-215 | Pneumatic Tube | E-11 |
| 12414690-216 | Pneumatic Tube | E-11 |
| 12414690-217 | Pneumatic Tube | E-11 |
| 12414690-218 | Pneumatic Tube | E-11 |
| 12414690-219 | Pneumatic Tube | E-11 |
| 12414690-220 | Pneumatic Tube | E-11 |
| 12414690-221 | Pneumatic Tube | E-11 |
| 12414690-222 | Pneumatic Tube | E-11 |
| 12414690-223 | Pneumatic Tube | E-11 |
| 12414690-224 | Pneumatic Tube | E-11 |
| 12414690-225 | Pneumatic Tube | E-11 |
| 12414690-226 | Pneumatic Tube | E-11 |
| 12414690-227 | Pneumatic Tube | E-11 |
| 12414690-228 | Pneumatic Tube | E-11 |
| 12414690-229 | Pneumatic Tube | E-11 |
| 12414690-230 | Pneumatic Tube | E-11 |
| 12414690-231 | Pneumatic Tube | E-11 |
| 12414690-301 | Pneumatic Tube | E-11 |
| 12414690-302 | Pneumatic Tube | E-11 |
| 12414690-303 | Pneumatic Tube | E-11 |
| 12416381P1 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P10 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P11 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P12 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P13 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P14 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P15 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P16 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P17 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P2 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P20 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P21 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P22 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P23 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P26 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P3 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P30 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P32 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P34 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P35 | Non-Metallic Electrical Cable Conduit | E-12 |

| ITEM NAME/PART NUMBER | ITEM DESCRIPTION | PARA NO. |
|---|---|---|
| 12416381P36 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P37 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P38 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P4 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P5 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P6 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P7 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P8 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12416381P9 | Non-Metallic Electrical Cable Conduit | E-12 |
| 12418037 | Steering Gear Return Hose | E-13 |
| 12418460-001 | Transmission Oil Cooler Hose | E-13 |
| 12418460-002 | Transmission Oil Cooler Hose | E-13 |
| 12418763 | Lanyard Assembly | E-14 |
| 12420196 | Lanyard Assembly | E-14 |
| 12420197-001 | Non-Metallic Vent Air Hose | E-15 |
| 12420197-002 | Non-Metallic Vent Air Hose | E-15 |
| 12420197-003 | Non-Metallic Vent Air Hose | E-15 |
| 12420197-004 | Non-Metallic Vent Air Hose | E-15 |
| 12420197-005 | Non-Metallic Vent Air Hose | E-15 |
| 12420197-006 | Non-Metallic Vent Air Hose | E-15 |
| 12420198-001 | Non-Metallic Vent Air Hose | E-15 |
| 12420198-002 | Non-Metallic Vent Air Hose | E-15 |
| 12420308-457 | Personnel Heater Air Duct Hose | E-16 |
| 12420308-760 | Personnel Heater Air Duct Hose | E-16 |
| 12420489 | Block Seal | E-17 |
| 3256-H-1048 | CTIS Seal Driver | E-18 |
| 3256-K-1051 | Wheel Hub Grease Seal Driver | E-19 |
| Dimmer Switch Test Wire | | E-20 |
| Purge Valve Tool | | E-21 |

## Section III. MANUFACTURED ITEMS

### E-2. BRAKE ADJUSTING TOOL SUPPORT

Make the brake adjusting tool support from 0.134 in. (3.4 mm) flat steel stock according to the following instructions. Refer to the parts list and **Figure E-1. Brake Adjusting Tool Support** for details.

| Item | Part Number | Material Description | Size | Qty |
|---|---|---|---|---|
| 1 | N/A | Steel, ASTM A569 Sheet, Hot Rolled | 6.0 in. (152.4 mm) x 6.0 in. (152.4 mm) x 0.134 in. (3.4 cm) | 2 |

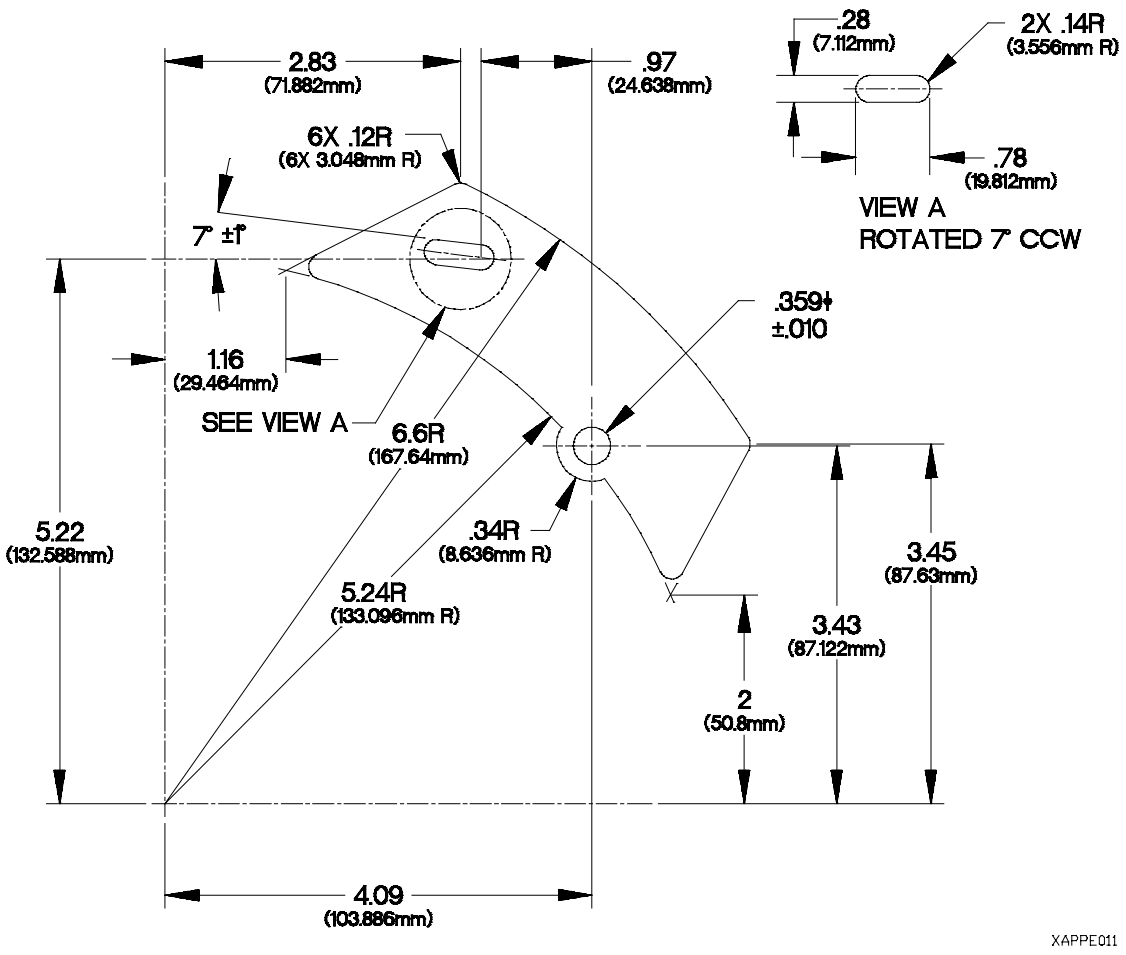



**Figure E-1. Brake Adjusting Tool Support**

a. All dimensions are in inches (millimeters).
b. Cut steel sheet as shown by dimensions on **Figure E-1. Brake Adjusting Tool Support**.
c. De-burr and remove sharp edges.

## E-3. BRAKE PLUNGER SEAL DRIVER

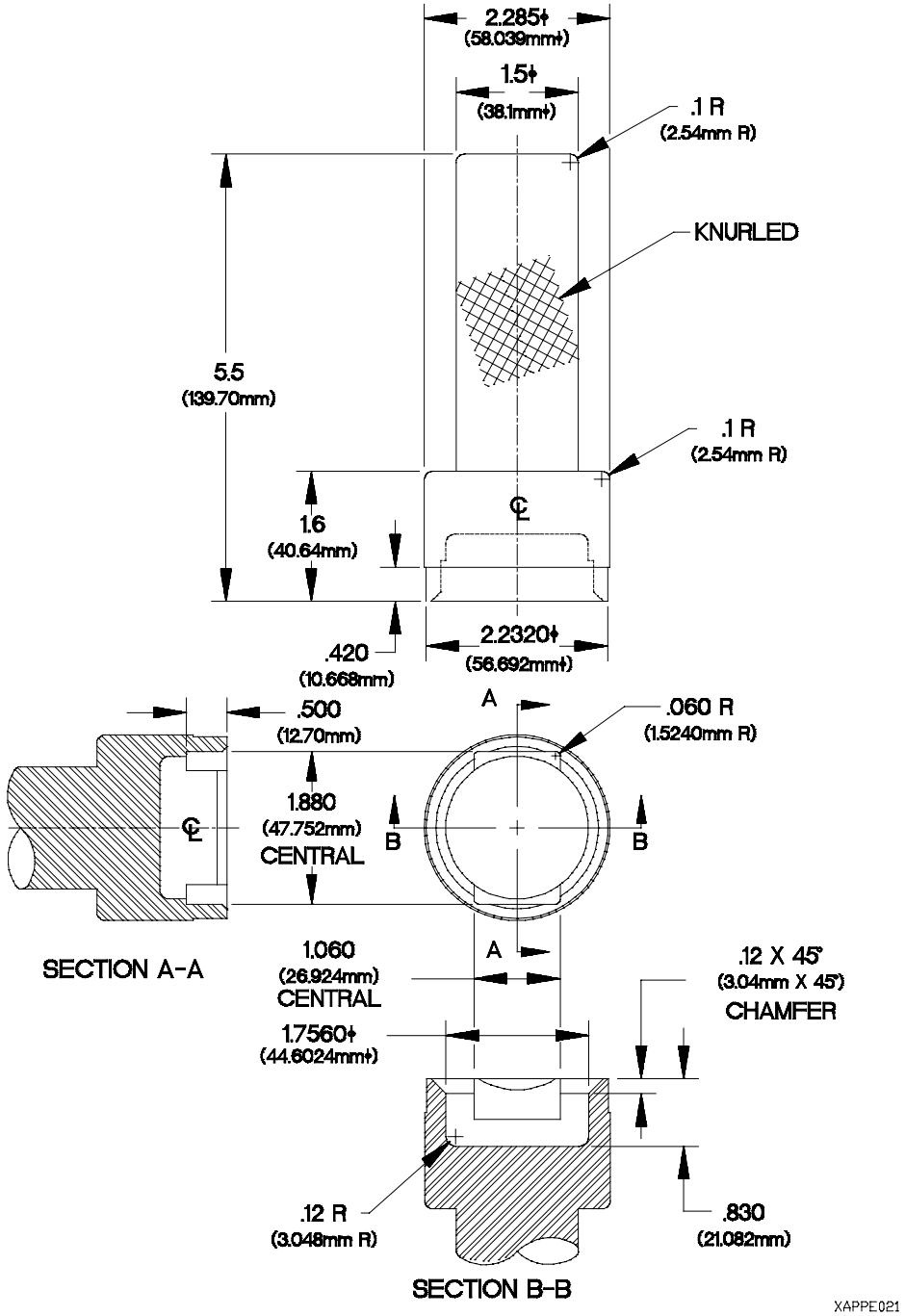



**Figure E-2. Brake Plunger Seal Driver**

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.

## E-4. CAB SUPPORT TOOL

Make the cab support tool from .38 inch (.96 cm) flat steel stock and angle iron stock according to the following instructions. Refer to the parts list and **Figure E-3. Cab Support Tool Strut and Cab Rest** for details.

| Item | Part Number | Material Description | Size | Qty |
|---|---|---|---|---|
| 1 | N/A | Steel, Flat Bar | 4.0 in. (10.2 cm) X 33.38 in. X (84.8 cm) X 0.38 in. (0.96 cm) | 1 |
| 2 | N/A | Steel, Flat Bar | 4.0 in. (10.2 cm) X 12.0 in. (30.5 cm) X 0.38 in. (0.96 cm) | 1 |
| 3 | N/A | Angle Iron | 2.0 in. (5.1 cm) X 2.0 in. (5.1 cm) X 3.5 in. (8.9 cm) | 2 |
| 4 | H.S.105VW-1 | Insulgrip, CSA 105 C | | |

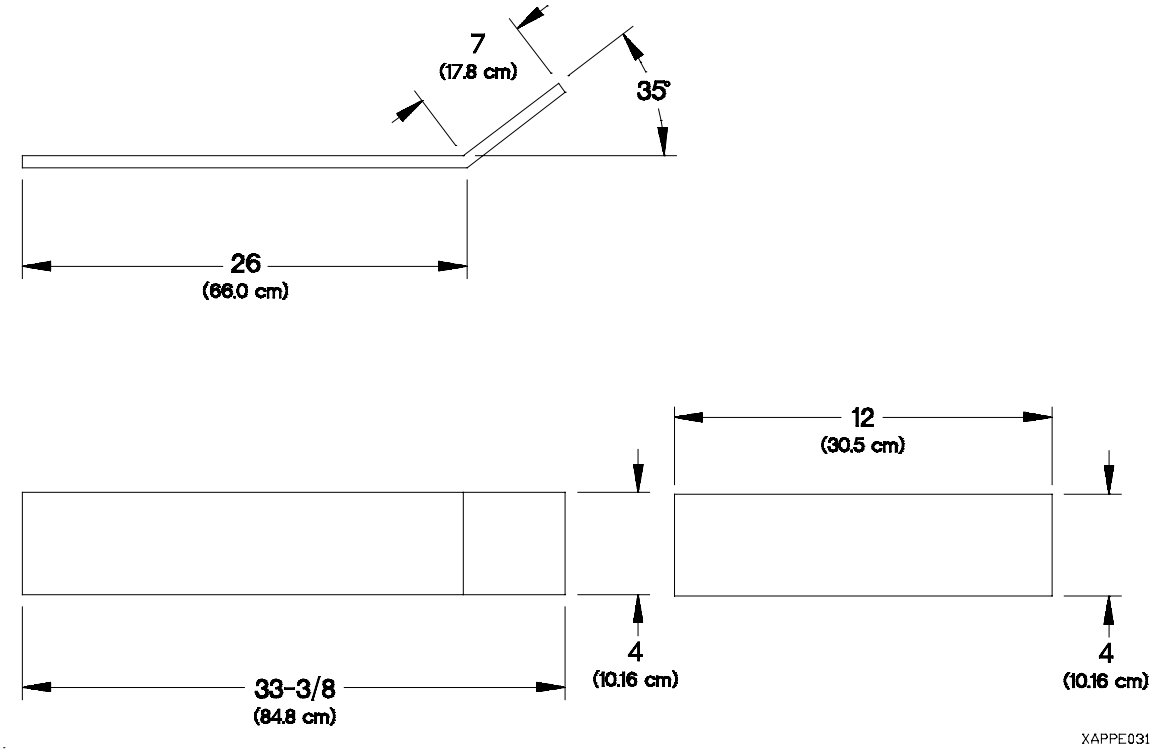



**Figure E-3. Cab Support Tool Strut and Cab Rest**

a. All dimensions are in inches (centimeters).
b. Cut cab support tool strut (1) from steel flat bar and bend to shape as shown in **Figure E-3. Cab Support Tool Strut and Cab Rest**.
c. Cut cab support tool cab rest (2) from steel flat bar.
d. De-burr and remove sharp edges.

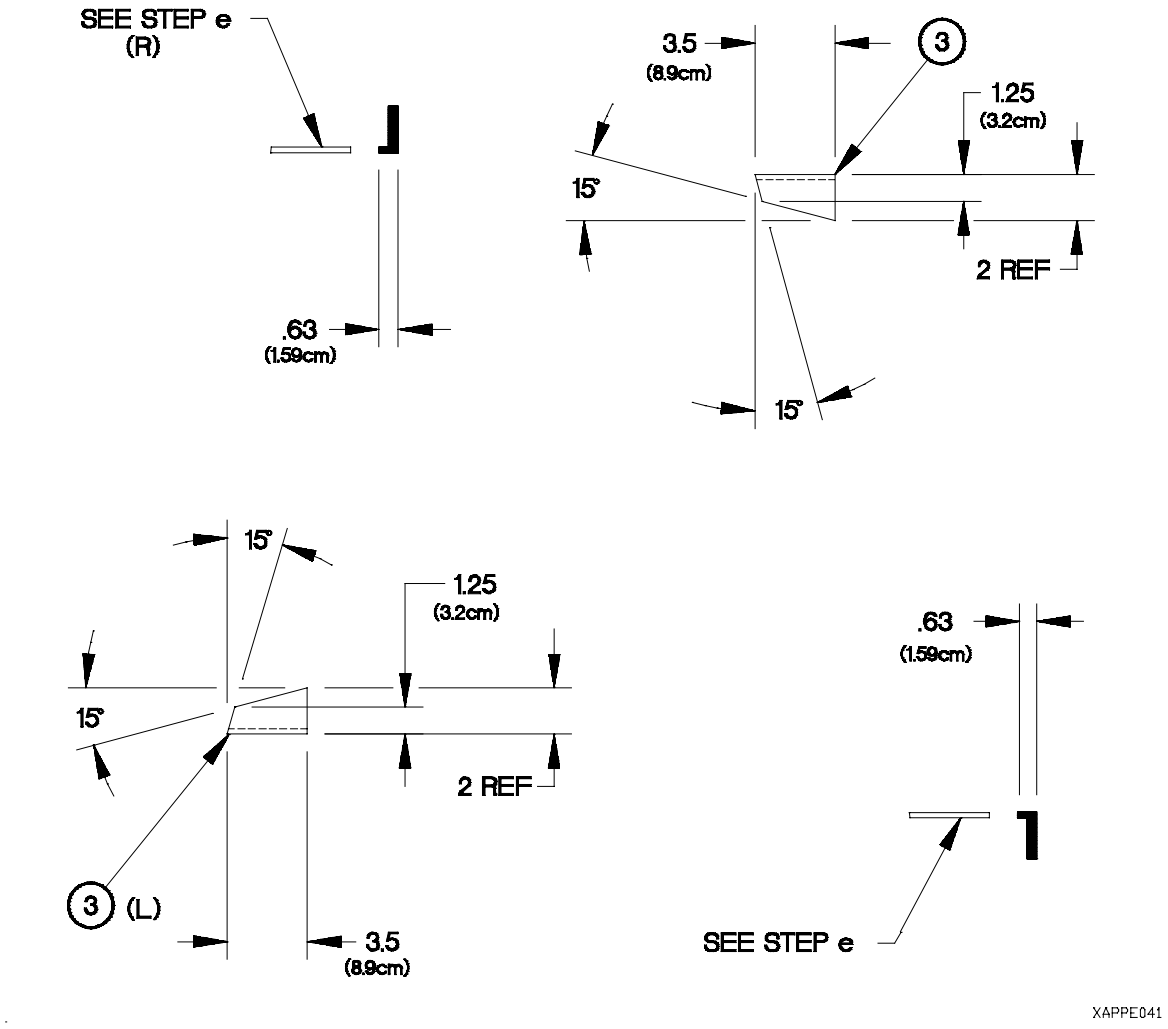



**Figure E-4. Cab Support Tool Seat**

e. Remove flange side of cab support tool seats (3) as shown in **Figure E-4. Cab Support Tool Seat**.
f. Cut cab support tool seats (3) L and (3) R according to dimensions and left\right orientation shown on **Figure E-4. Cab Support Tool Seat**.
g. De-burr and remove sharp edges.

## E-4. CAB SUPPORT TOOL (CONT)

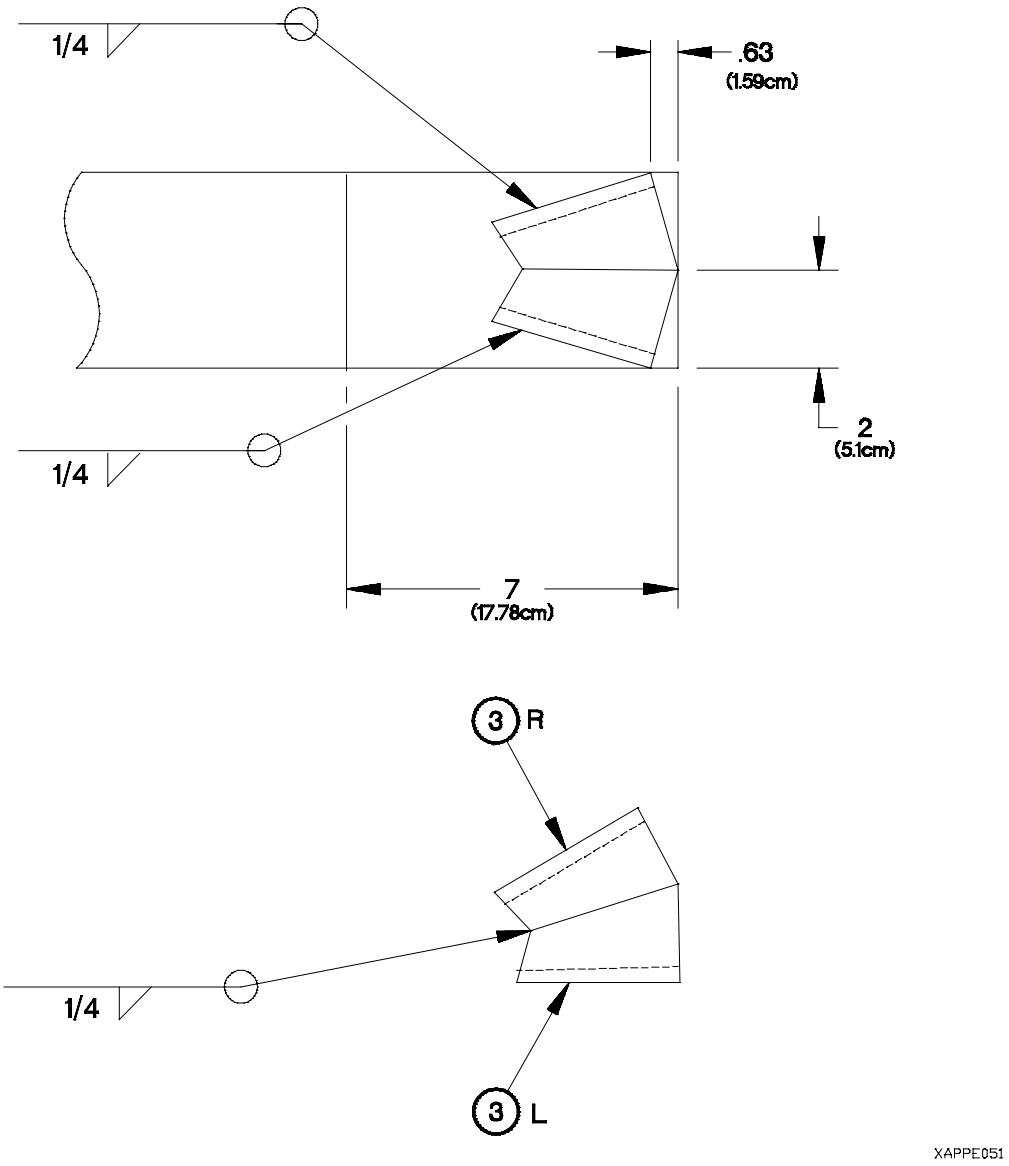



**Figure E-5. Cab Support Tool Seat Layout**

h. Position and clamp cab support tool seats (3) L and (3) R together as shown by dimensions on **Figure E-5. Cab Support Tool Seat Layout**.
i. Weld cab support tool seat (3) L to cab support tool seat (3) R as identified on assembly table and **Figure E-5. Cab Support Tool Seat Layout**.
j. Position and clamp cab support tool seats (3) L and (3) R to cab support tool strut (1) as shown by dimensions on **Figure E-5. Cab Support Tool Seat Layout**.
k. Weld items clamped in step (f) as shown in **Figure E-5. Cab Support Tool Seat Layout**.
l. De-burr and remove sharp edges.

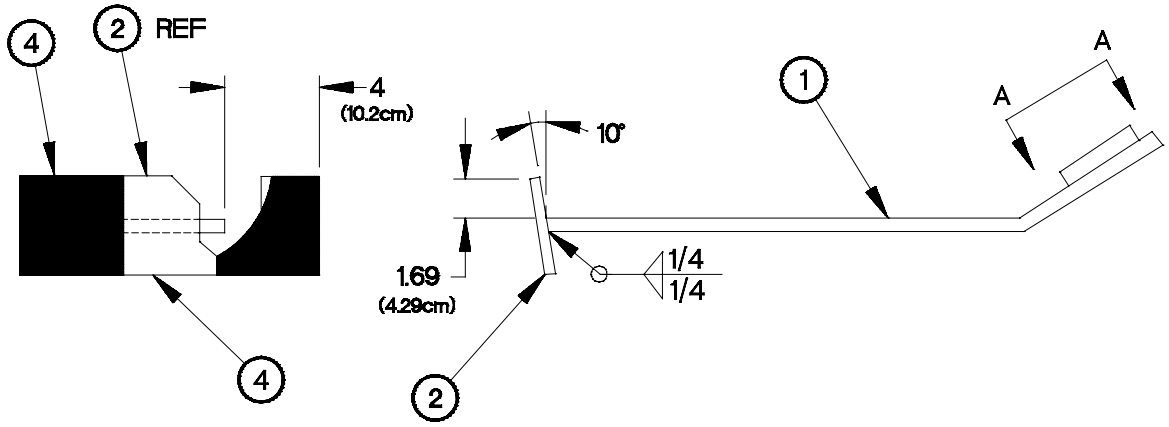



**Figure E-6. Cab Support Tool Assembly**

m. Position and clamp cab support tool strut (1) to cab support tool cab rest (2) as shown by dimensions on **Figure E-6. Cab Support Tool Assembly**, before insulgrip (4) is applied.
n. Weld cab support tool strut (1) to cab support tool cab rest (2).
o. Apply Insulgrip (4) to cab support tool cab rest (2) as described on material container.

## E-5. HEADLIGHT ADJUSTMENT SCREEN

The headlight adjustment screen may be drawn on any vertical surface at least 50 in. (127 cm) high and 100 in. (254 cm) wide.

a. Draw two vertical lines (1) 50 in. (127 cm) high and 90.6 in. (230 cm) apart (centered on headlight adjustment screen).

b. Locate two points 40 in. (101.6 cm) from floor and 13 in. (33 cm) toward the center from each vertical line (1).

c. Draw vertical line (2) about 3-5 in. (8-13 cm) centered on each of the two points.

d. Draw horizontal line (3) about 3-5 in. (8-13 cm) centered on each of the two points.

e. Measure out 4 in. (10 cm) along each vertical line (2) and horizontal line (3) from each of the two points to make 8 in. (20 cm) squares (4).

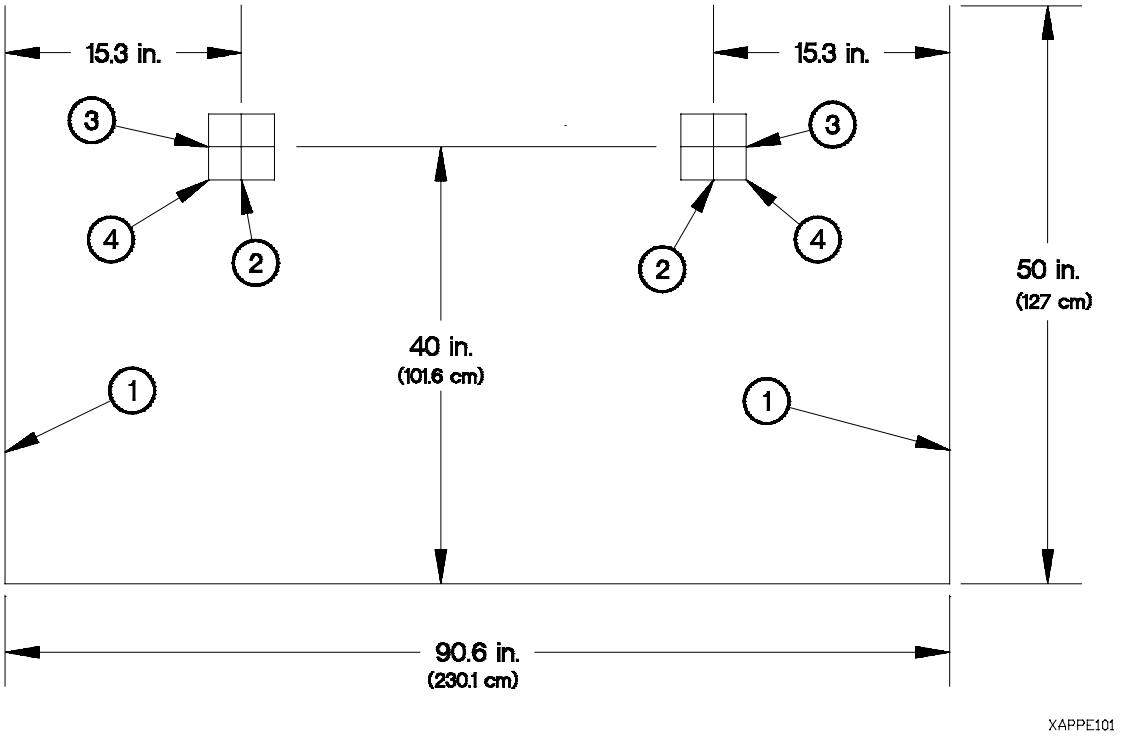



**Figure E-7. Headlight Adjustment Screen**

## E-6. M1079 BLACKOUT SHIELD SEALS

Fabricate the M1079 blackout shield seals according to the following steps. Refer to the following parts list for materials.

| Description | Material Part Number | CAGE Code | Cut Length |
|---|---|---|---|
| Blackout Shield Header Seal | 942P00001 | 0SHR6 | 28-3/4 in. (730 mm) |
| Blackout Shield Jamb Seal (van body serial numbers 001 through 190) | 942P00001 | 0SHR6 | 63-3/8 in. (1610 mm) |
| Blackout Shield Jamb Seal (van body serial number 191 and higher) | 942P00001 | 0SHR6 | 33 in. (838 mm) |

a. Dimensions are in inches (millimeters).
b. Cut seal material to the specified length using a fine-toothed hacksaw or other suitable cutting tool.

## E-7. M1079 DOOR GASKETS

Fabricate the M1079 door gaskets according to the following steps. Refer to the following parts list for materials.

| Description | Material Part Number | CAGE Code | Cut Length |
|---|---|---|---|
| LH Door Gasket | 12416417 | 19207 | 214 in. (5435 mm) |
| RH Door Gasket | 12416417 | 19207 | 197 in. (5004 mm) |

a. Dimensions are in inches (millimeters).
b. Cut seal material to the specified length using a fine-toothed hacksaw or other suitable cutting tool.
c. Glue ends of gasket to each other using adhesive MIL-A-46106 GP1TY1 (Item 11, Appendix D).

## E-8. M1079 WINDOW SASH GLAZING SEALS

Fabricate the M1079 window sash glazing seals according to the following steps. Refer to the following parts list for materials.

| Description | Material Part Number | CAGE Code | Cut Length |
|---|---|---|---|
| Window Sash Top/Bottom Seal | 941P00001 | 0SHR6 | 26-13/16 in. (681 mm) |
| Window Sash Side Seal (van body serial numbers 001 through 190) | 941P00001 | 0SHR6 | 28-1/2 in. (724 mm) |
| Window Sash Side Seal (van body serial number 191 and higher) | 941P00001 | 0SHR6 | 12-11/16 in. (322 mm) |

a. Dimensions are in inches (millimeters).
b. Cut seal material to the specified length using a fine-toothed hacksaw or other suitable cutting tool.

**NOTE**

Cut miters so that short side of seal faces toward glass.

c. Cut 45-degree miters on ends of window sash seals.

## E-9. RELAY TEST WIRE

Fabricate the relay test wire according to the following steps. Refer to the following parts list for materials.

| Material Description | National Stock Number | Cut Length |
|---|---|---|
| Wire, Electrical (MIL-W-16878) | 6145-00-330-3318 | 6 in. (152 mm) |

a. Dimensions are in inches (millimeters).
b. Cut a length of wire six inches (152 mm) long.
c. Remove approximately 3/4 in. (19 mm) of electrical insulation from each end of wire.

## E-10. WHEEL BEARING SHIM TOOL REST

Fabricate the wheel bearing shim tool rest according to the following steps. Refer to the following parts list for materials.

| Part Number | National Stock Number | Description |
|---|---|---|
| QQ-T-570 | 9510-00-866-1037 | Bar, Metal |

a. Dimensions are in inches (millimeters).
b. Cut metal bar to 9.0 inches (228.6 mm) long.
c. De-burr and remove sharp edges from ends of metal bar.

## E-11. PNEUMATIC TUBES FABRICATION

Cut pneumatic tubes from bulk tubing stock listed **Table E-1. Pneumatic Tube Lengths**. Use a fine-toothed hacksaw or suitable cutting device and cut tubing to required length.

**Table E-1. Pneumatic Tube Lengths**

| Tube Part Number | Bulk Tubing Part Number | Cut Length | |
|---|---|---|---|
| | | inches | cm |
| 12414690-001 | NT-100-4 (79470) | 18.1 | 46.0 |
| 12414690-002 | NT-100-4 (79470) | 16.0 | 40.6 |
| 12414690-004 | NT-100-4 (79470) | 74.8 | 190.0 |
| 12414690-005 | NT-100-4 (79470) | 69.7 | 177.0 |
| 12414690-010 | NT-100-4 (79470) | 180.0 | 457.2 |
| 12414690-101 | J844TYBSIZE 3/8 (81343) | 18.0 | 45.7 |
| 12414690-102 | J844TYBSIZE 3/8 (81343) | 35.4 | 90.0 |
| 12414690-103 | J844TYBSIZE 3/8 (81343) | 20.9 | 53.0 |
| 12414690-104 | J844TYBSIZE 3/8 (81343) | 13.8 | 35.0 |
| 12414690-105 | J844TYBSIZE 3/8 (81343) | 11.8 | 30.0 |
| 12414690-106 | J844TYBSIZE 3/8 (81343) | 20.5 | 52.0 |
| 12414690-107 | J844TYBSIZE 3/8 (81343) | 39.0 | 99.0 |
| 12414690-108 | J844TYBSIZE 3/8 (81343) | 15.4 | 39.0 |
| 12414690-109 | J844TYBSIZE 3/8 (81343) | 23.0 | 58.4 |
| 12414690-112 | J844TYBSIZE 3/8 (81343) | 80.0 | 198.0 |
| 12414690-113 | J844TYBSIZE 3/8 (81343) | 11.4 | 29.0 |
| 12414690-115 | J844TYBSIZE 3/8 (81343) | 82.8 | 210.2 |
| 12414690-117 | J844TYBSIZE 3/8 (81343) | 156.5 | 397.5 |
| 12414690-118 | J844TYBSIZE 3/8 (81343) | 11.8 | 30.0 |
| 12414690-119 | J844TYBSIZE 3/8 (81343) | 269.5 | 684.5 |
| 12414690-120 | J844TYBSIZE 3/8 (81343) | 11.9 | 30.2 |
| 12414690-121 | J844TYBSIZE 3/8 (81343) | 43.0 | 109.2 |
| 12414690-122 | J844TYBSIZE 3/8 (81343) | 44.1 | 112.0 |
| 12414690-123 | J844TYBSIZE 3/8 (81343) | 259.4 | 659.0 |
| 12414690-124 | J844TYBSIZE 3/8 (81343) | 288.2 | 732.0 |
| 12414690-125 | J844TYBSIZE 3/8 (81343) | 10.8 | 27.3 |
| 12414690-126 | J844TYBSIZE 3/8 (81343) | 17.0 | 43.2 |
| 12414690-127 | J844TYBSIZE 3/8 (81343) | 17.0 | 43.2 |

## E-11. PNEUMATIC TUBES FABRICATION (CONT)

**Table E-1. Pneumatic Tube Lengths (Cont)**

| Tube Part Number | Bulk Tubing Part Number | Cut Length | |
|---|---|---|---|
| | | inches | cm |
| 12414690-201 | C608-100BLK (13174) | 14.8 | 37.5 |
| 12414690-202 | C608-100BLK (13174) | 14.0 | 35.7 |
| 12414690-203 | C608-100BLK (13174) | 6.5 | 16.5 |
| 12414690-205 | C608-100BLK (13174) | 14.5 | 36.8 |
| 12414690-206 | C608-100BLK (13174) | 14.9 | 37.7 |
| 12414690-207 | C608-100BLK (13174) | 15.5 | 39.5 |
| 12414690-208 | C608-100BLK (13174) | 6.7 | 17.0 |
| 12414690-209 | C608-100BLK (13174) | 19.5 | 49.5 |
| 12414690-210 | C608-100BLK (13174) | 15.5 | 39.3 |
| 12414690-211 | C608-100BLK (13174) | 8.0 | 20.3 |
| 12414690-212 | C608-100BLK (13174) | 16.9 | 43.0 |
| 12414690-213 | C608-100BLK (13174) | 118.5 | 301.0 |
| 12414690-214 | C608-100BLK (13174) | 124.0 | 315.0 |
| 12414690-215 | C608-100BLK (13174) | 163.0 | 414.0 |
| 12414690-216 | C608-100BLK (13174) | 160.0 | 406.4 |
| 12414690-217 | C608-100BLK (13174) | 62.6 | 159.0 |
| 12414690-218 | C608-100BLK (13174) | 119.8 | 304.2 |
| 12414690-219 | C608-100BLK (13174) | 69.0 | 175.3 |
| 12414690-220 | C608-100BLK (13174) | 45.5 | 115.6 |
| 12414690-221 | C608-100BLK (13174) | 12.6 | 32.0 |
| 12414690-222 | C608-100BLK (13174) | 5.5 | 14.0 |
| 12414690-223 | C608-100BLK (13174) | 14.6 | 37.1 |
| 12414690-224 | C608-100BLK (13174) | 170.0 | 431.8 |
| 12414690-225 | C608-100BLK (13174) | 174.0 | 442.0 |
| 12414690-226 | C608-100BLK (13174) | 103.5 | 263.0 |
| 12414690-227 | C608-100BLK (13174) | 32.8 | 83.2 |
| 12414690-228 | C608-100BLK (13174) | 3.5 | 8.9 |
| 12414690-229 | C608-100BLK (13174) | 62.2 | 158.1 |
| 12414690-230 | C608-100BLK (13174) | 14.6 | 37.0 |
| 12414690-231 | C608-100BLK (13174) | 60.5 | 153.7 |
| 12414690-301 | PFT-10B-BLK-100 (61424) | 19.0 | 48.3 |
| 12414690-302 | PFT-10B-BLK-100 (61424) | 56.0 | 142.2 |
| 12414690-303 | PFT-10B-BLK-100 (61424) | 118.1 | 300.0 |

## E-12. NON-METALLIC ELECTRICAL CABLE CONDUIT FABRICATION

Make conduit to cover electrical cables described on 1241638 from bulk tube stock listed in **Table E-2. Non-Metallic Electrical Cable Conduit Lengths**. Use a fine-toothed hacksaw or suitable cutting device and cut hose/tube to required length.

**Table E-2. Non-Metallic Electrical Cable Conduit Lengths**

| Tube Part Number | Bulk Tube Part Number | Cut Length | |
|---|---|---|---|
| | | inch | cm |
| 12416381P1 | 49008 | 8.9 | 22.6 |
| 12416381P10 | 49008 | 17.8 | 45.2 |
| 12416381P11 | 49008 | 29.9 | 75.9 |
| 12416381P12 | 49008 | 33.0 | 83.8 |
| 12416381P13 | 49008 | 13.9 | 35.3 |
| 12416381P14 | 49008 | 4.0 | 10.2 |
| 12416381P15 | 49008 | 17.4 | 44.2 |
| 12416381P16 | 49008 | 3.2 | 8.1 |
| 12416381P17 | 49008 | 4.5 | 11.4 |
| 12416381P2 | 49008 | 16.2 | 41.1 |
| 12416381P20 | 27413 | 32.8 | 83.3 |
| 12416381P21 | 27413 | 9.2 | 23.4 |
| 12416381P22 | 27413 | 8.0 | 20.3 |
| 12416381P23 | 27413 | 23.3 | 59.2 |
| 12416381P26 | 49008 | 2.5 | 6.4 |
| 12416381P3 | 27413 | 7.3 | 18.5 |
| 12416381P30 | 49007 | 17.0 | 43.2 |
| 12416381P32 | 49005 | 1.7 | 4.3 |
| 12416381P34 | 49005 | 20.7 | 52.6 |
| 12416381P35 | 49005 | 21.8 | 55.4 |
| 12416381P36 | 49005 | 5.5 | 14.0 |
| 12416381P37 | 49005 | 8.0 | 20.3 |
| 12416381P38 | 49008 | 3.7 | 9.4 |
| 12416381P4 | 49008 | 12.0 | 30.5 |
| 12416381P5 | 49008 | 26.0 | 66.0 |
| 12416381P6 | 49008 | 7.7 | 19.6 |
| 12416381P7 | 49008 | 26.7 | 67.8 |
| 12416381P8 | 49008 | 5.2 | 13.2 |
| 12416381P9 | 49008 | 16.8 | 42.7 |

## E-13. STEERING GEAR RETURN HOSE AND TRANSMISSION OIL COOLER HOSES FABRICATION

Cut the following hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

| Hose Part Number | Bulk Hose Part Number | Cut Length | |
|---|---|---|---|
| | | inches | cm |
| 12418037 | A110 (30327) | 75.5 | 191.7 |
| 12418460-001 | MS521302B110360 (96906) | 17.5 | 44.4 |
| 12418460-002 | MS521301A206R (96906) | 16.0 | 40.6 |

## E-14. LANYARD ASSEMBLIES P/N 12418763 AND 12420196 FABRICATION

Make the following lanyard assemblies from bulk cable material, sleeves, and tab material and assemble according to **Figure E-8. Lanyard Assembly**. The following parts list identifies part numbers and lengths of cut pieces.

| Item | Part Number | Material Description | Size | Qty |
|---|---|---|---|---|
| 1 | MIL-W-83420 Type 1, Comp B | 1/16 in. stranded wire cable | 4 in. (102 mm) | 1 |
| 2 | MS51844-22 | Sleeve | | 2 |
| 3 | N/A | Tab, Stainless Steel ASTM A617 | .06 in. (16 cm) X .37 in. (9.5 mm) X 1.25 in. (32 mm) | 1 |

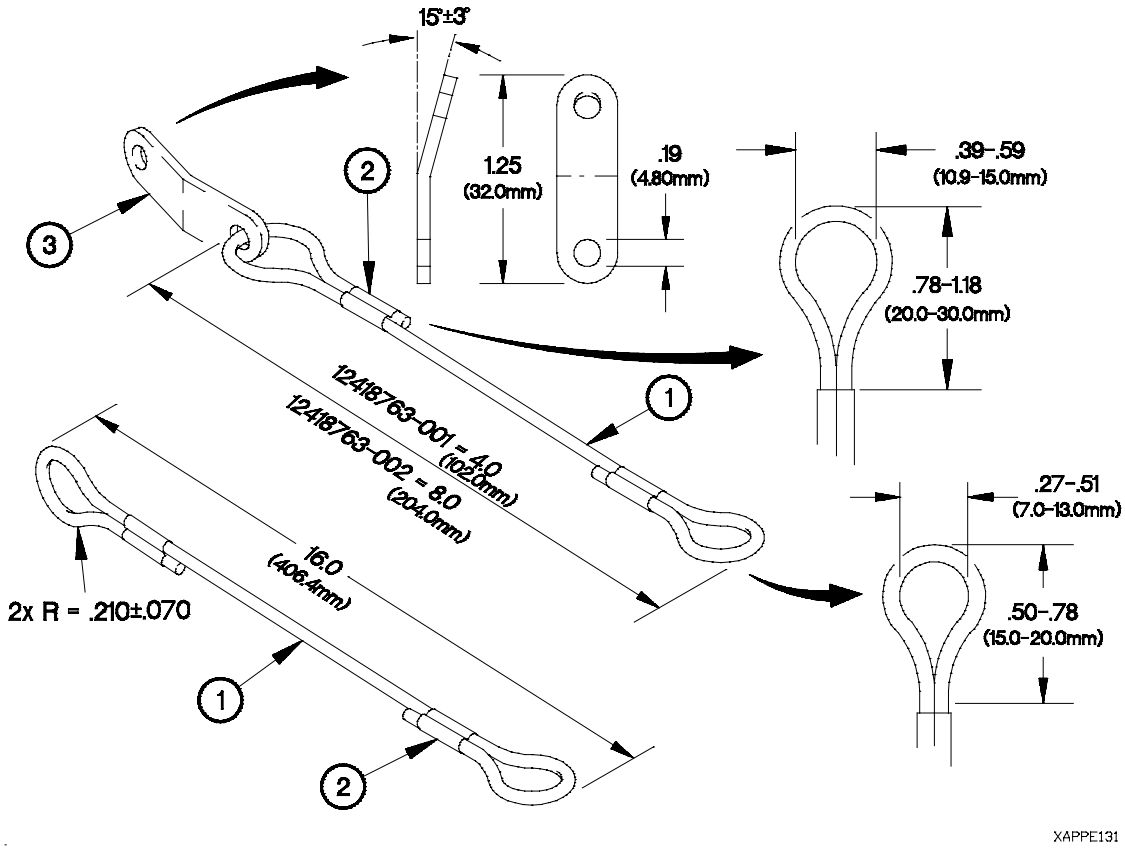



**Figure E-8. Lanyard Assembly**

a. All dimensions are in inches (millimeters).
b. Make from bulk cable and flat steel material as identified in parts list.
c. Drill two 0.19 in. (4.8 mm) diameter holes through tab material as shown on **Figure E-14. Lanyard Assembly**.
d. De-burr and remove sharp edges.
e. Bend tab as shown on **Figure E-14. Lanyard Assembly**.
f. Form loops on cable ends and insert sleeve material over cable on one end of cable and over cable and through sleeve at other end of cable as shown in **Figure E-14. Lanyard Assembly**.
g. Crimp two sleeves over cable ends.

## E-15. NON-METALLIC VENT AIR HOSES FABRICATION

Cut the following vent air hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

| Hose Part Number | Bulk Hose Part Number | Cut Length | |
|---|---|---|---|
| | | inches | cm |
| 12420197-001 | 483666 (02280) | 180.0 | 457.2 |
| 12420197-002 | 483666 (02280) | 120.0 | 304.8 |
| 12420197-003 | 483666 (02280) | 96.0 | 243.8 |
| 12420197-004 | 483666 (02280) | 36.0 | 91.4 |
| 12420197-005 | 483666 (02280) | 156.0 | 396.2 |
| 12420197-006 | 483666 (02280) | 72.0 | 182.9 |
| 12420198-001 | 881-16 (98441) | 120.0 | 304.8 |
| 12420198-002 | 11657469 | 36.0 | 91.4 |

## E-16. PERSONNEL HEATER AIR DUCT HOSE FABRICATION

Cut the following hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

| Hose Part Number | Bulk Hose Part Number | Cut Length | |
|---|---|---|---|
| | | inches | cm |
| 12420308-457 | 8711054 (19207) | 18.3 | 46.4 |
| 12420308-760 | 8711054 (19207) | 30.4 | 77.2 |

## E-17. BLOCK SEAL 12420489 FABRICATION

Make block seal from P/N (0VXY8) STN2.38X.5. Use a suitable cutting tool to cut seal to 0.52 inch (1.3 cm) long.

## E-18. CTIS SEAL DRIVER 3256-H-1048

Used on Front and Rear Axle CTIS Seals.

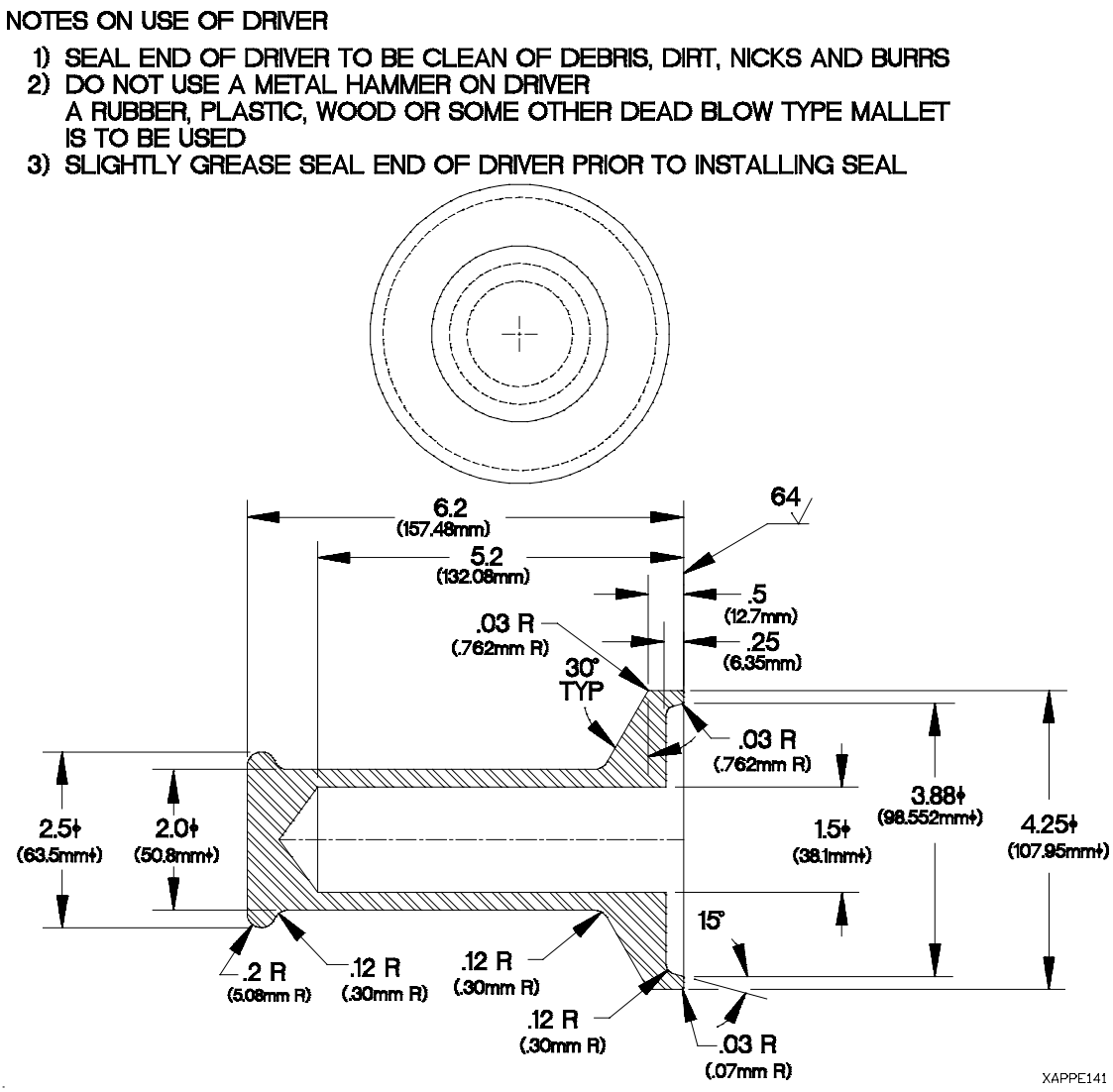



**Figure E-9. CTIS Seal Driver**

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.

## E-19. WHEEL HUB GREASE SEAL DRIVER 3256-K-1051

NOTES ON USE OF DRIVER

1) SEAL END OF DRIVER TO BE CLEAN OF DEBRIS, DIRT, NICKS AND BURRS
2) DO NOT USE A METAL HAMMER ON DRIVER
   A RUBBER, PLASTIC, WOOD OR SOME OTHER DEAD BLOW TYPE MALLET
   IS TO BE USED
3) SLIGHTLY GREASE SEAL END OF DRIVER PRIOR TO INSTALLING SEAL

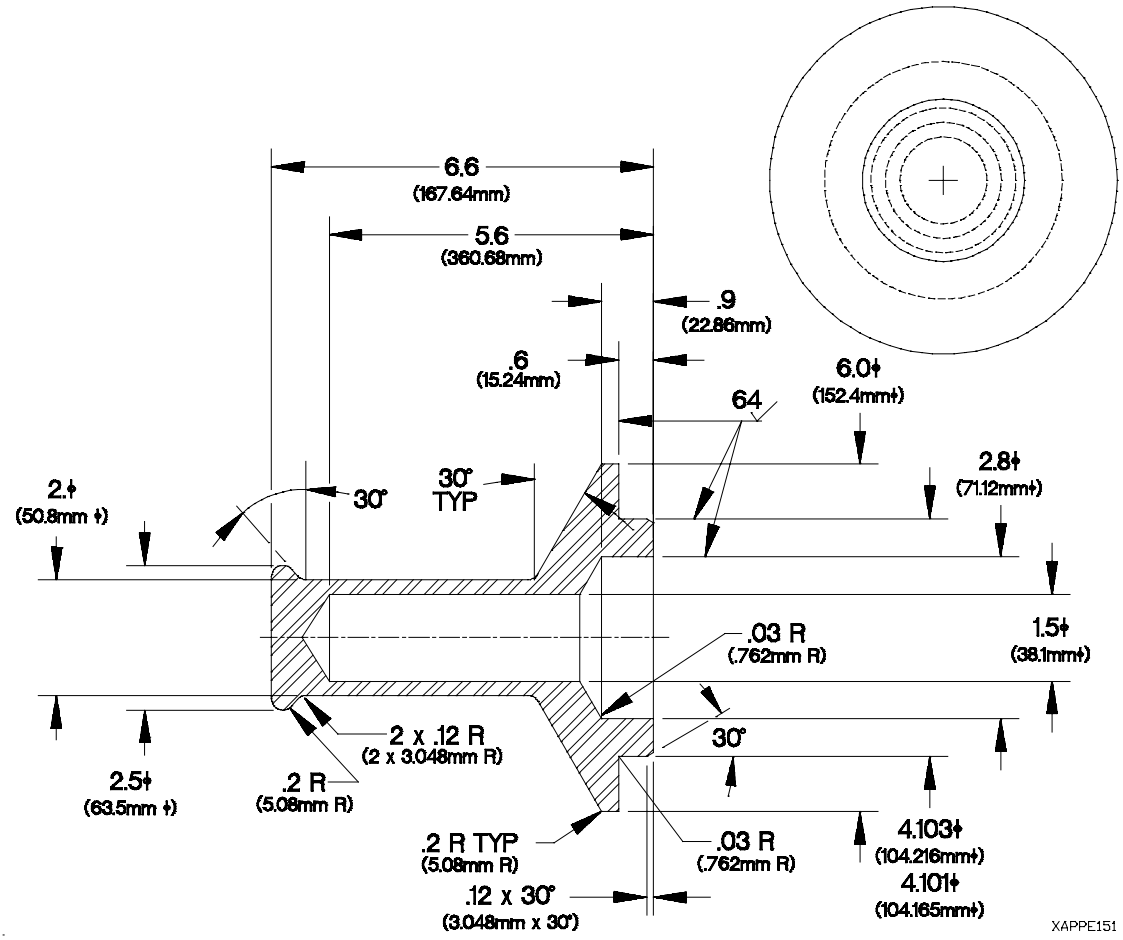



**Figure E-10. Wheel Hub Grease Seal Driver**

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.

## E-20. DIMMER SWITCH TEST WIRE

Fabricate the dimmer switch test wire according to the following steps. Refer to the following parts list for materials.

| Material Description | National Stock Number | Quantity | Cut Length |
|---|---|---|---|
| Wire, Electrical (M168678/14BKE9) | 6145-01-229-4134 | 1 | 12 in (305 mm) |
| Pin, Grooved, Headless (12258939-1) | 5315-01-156-6314 | 1 | |
| Contact, Electrical (12258939-2) | 5999-01-150-8808 | 1 | |

a. Dimensions are in inches (millimeters).
b. Cut a length of electrical wire approximately 12 in. (305 mm) long.
c. Remove approximately 1/4 in. (6 mm) of insulation from each end of electrical wire.
d. Crimp headless grooved pin on one end of electrical wire.
e. Crimp electrical contact on opposite end of electrical wire.

## E-21. PURGE VALVE TOOL

Fabricate Purge Valve Tool according to the following instructions. Refer to Figure E-11. Purge Valve Tool for details.

| Item | Part Number | Material Description | Size | Qty |
|---|---|---|---|---|
| 1 | N/A | Steel, ASTM A 108 or A576 Grade 1015-1025, BAR (Ref UNS G10150-G10250). Finish Black Oxide Coat, Class I, IAW MIL-C-13924. | 14.0 in. (356 mm) | 1 |

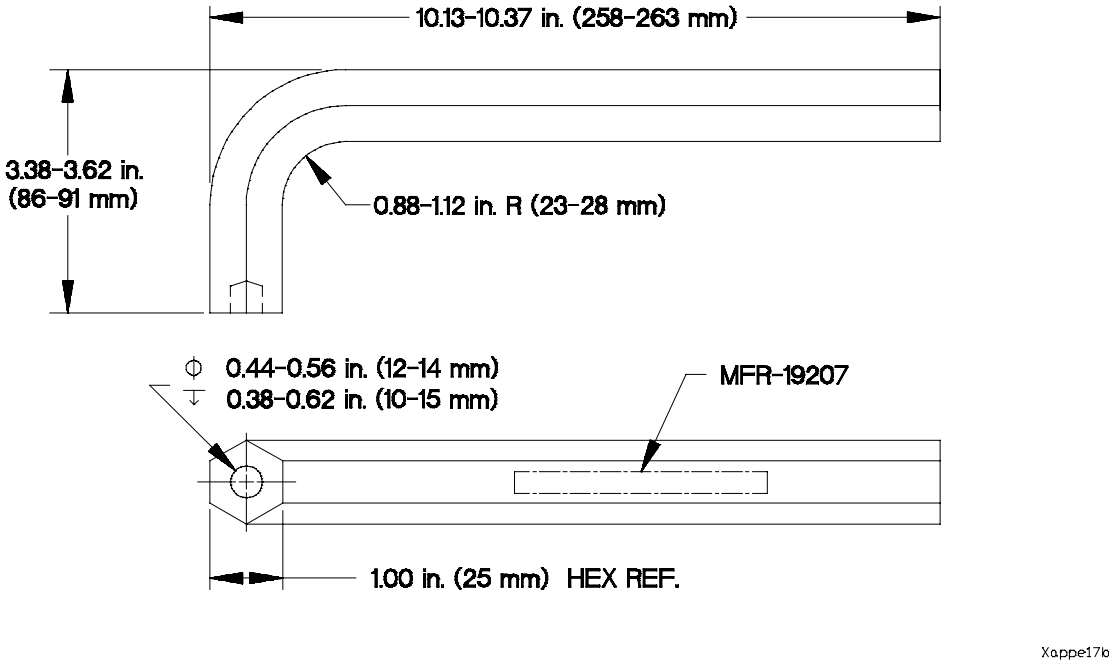



**Figure E-11. Purge Valve Tool**

a. All dimensions are in inches (cm).
b. Cut steel bar (1) and bend to shape as shown in Figure E-11.
c. Dimensional limits apply after coating.
d. All edges shall be broken and free from burrs.
e. Metal Stamp, electro etch, or engrave with the following marking IAW MIL-STD-130: 19207-12379968 MFR-19207.

# APPENDIX F
# TORQUE LIMITS

## F-1. GENERAL

This appendix provides general torque limits for screws and nuts used on the vehicle. Special torque limits are shown in the maintenance procedures for applicable components. Use the general torque limit given in this appendix when specific torque limits are not given in the maintenance procedure. These general torque limits can not 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 for a fastener which retains a rubber component, tighten the screw or nut until it touches metal, then tighten one more turn. Whenever possible, the tightening force (torque) should be applied to the nut side of the fastener group.

## F-2. TORQUE LIMITS

Refer to **Table F-1. Torque Limits for SAE and ANSI Fasteners** for torque limits on standard (SAE and ANSI) screws and free spinning nuts. Refer to **Table F-2. Torque Limits for SAE and ANSI Prevailing Torque Nuts** for torque limits on standard (SAE and ANSI) self-locking nuts. Refer to **Table F-3. Torque Limits for Metric Screws and Free Spinning Nuts** for torque limits on metric screws and free spinning nuts. Refer to **Table F-4. Torque Limits for Metric Prevailing Torque Nuts** for torque limits on metric self-locking nuts.

## F-3. USE OF TORQUE TABLES

(1) Measure the diameter of the screw to be installed.

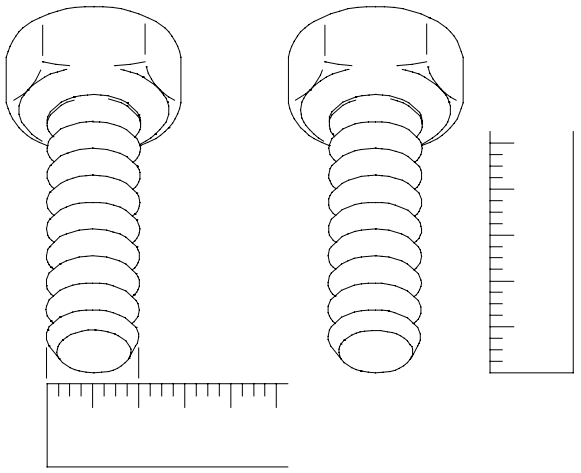
(2) Count the number of threads per inch.

(3) Under the heading DIAMETER look down the column until the diameter of the screw is found. (There are usually two lines beginning with the same diameter.)

(4) Under the heading THREADS PER INCH (SAE and ANSI) or THREAD PITCH (metric), find the number of threads per inch that matches the number counted in step (2).

(5) To find the grade of the screw, match the markings on the head to the correct picture under CAPSCREW HEAD MARKINGS on the torque table.

(6) Look down the column under the picture found in step (5) until the torque limit (lb-ft or N·m) for the diameter and threads per inch (or thread pitch, in the case of metric fasteners) of the screw are located.



XAPPF01A

# APPENDIX F
# TORQUE LIMITS

**Table F-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts**

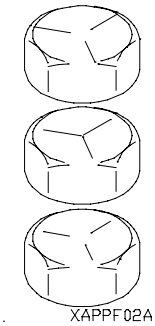
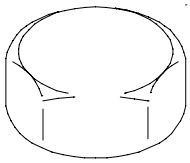
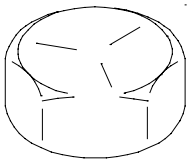
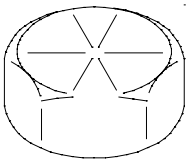
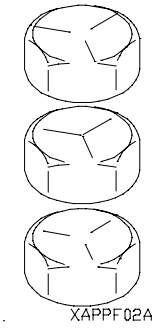
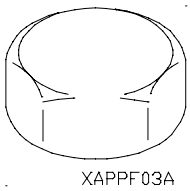
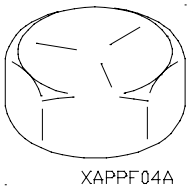
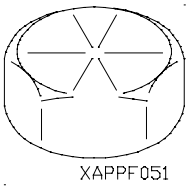
|  XAPPF02A **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.** | | Material Grade Markings | | | | | |
|---|---|---|---|---|---|---|---|
| | |  XAPPF03A **SAE Grade 2** | |  XAPPF04A **SAE Grade 5** | |  XAPPF051 **SAE Grade 8** | |
| **Diameter** | **Threads per inch** | **Torque** | | | | | |
| **inch** | | **lb-ft** | **N·m** | **lb-ft** | **N·m** | **lb-ft** | **N·m** |
| 1/4 | 20 | 3-5 | 5-7 | 5-7 | 8-10 | 8-10 | 10-14 |
| 1/4 | 28 | 4-6 | 5-7 | 6-8 | 9-11 | 8-12 | 12-16 |
| 1/4 | 32 | 4-6 | 5-7 | 7-9 | 9-11 | 9-13 | 12-16 |
| 5/16 | 18 | 7-9 | 9-13 | 11-15 | 15-21 | 15-21 | 21-29 |
| 5/16 | 24 | 8-10 | 11-15 | 12-16 | 17-23 | 17-23 | 24-32 |
| 5/16 | 32 | 9-11 | 12-16 | 14-18 | 18-24 | 19-25 | 27-34 |
| 3/8 | 16 | 13-17 | 17-23 | 20-26 | 27-35 | 28-38 | 38-50 |
| 3/8 | 24 | 15-19 | 20-26 | 22-30 | 31-41 | 32-42 | 43-57 |
| 3/8 | 32 | 15-21 | 21-27 | 24-32 | 33-43 | 33-45 | 55-61 |
| 7/16 | 14 | 20-28 | 28-38 | 32-42 | 43-57 | 44-60 | 61-81 |
| 7/16 | 20 | 23-31 | 31-41 | 35-47 | 48-64 | 49-67 | 68-90 |
| 7/16 | 28 | 25-33 | 33-45 | 37-51 | 51-69 | 54-72 | 73-97 |
| 1/2 | 13 | 32-42 | 43-57 | 49-65 | 66-88 | 68-92 | 93-123 |
| 1/2 | 20 | 35-47 | 48-64 | 55-73 | 74-98 | 77-103 | 105-139 |
| 1/2 | 28 | 38-50 | 51-67 | 58-78 | 79-105 | 82-110 | 111-149 |
| 9/16 | 12 | 55-61 | 62-82 | 70-94 | 95-127 | 98-132 | 134-178 |
| 9/16 | 18 | 50-68 | 69-91 | 78-104 | 105-141 | 109-147 | 149-199 |
| 9/16 | 24 | 53-71 | 72-96 | 82-110 | 111-149 | 115-155 | 158-210 |
| 5/8 | 11 | 62-84 | 85-113 | 95-129 | 131-175 | 136-182 | 184-246 |
| 5/8 | 18 | 70-94 | 96-128 | 108-146 | 148-198 | 154-206 | 209-279 |
| 5/8 | 24 | 73-99 | 100-134 | 114-154 | 155-207 | 161-217 | 219-293 |

**Table F-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)**

|  XAPPF02A<br>Manufacturer's marks may vary. These are all SAE Grade 5 | | Material Grade Markings | | | | | |
|---|---|---|---|---|---|---|---|
| | |  XAPPF03A<br>SAE Grade 2 | |  XAPPF04A<br>SAE Grade 5 | |  XAPPF051<br>SAE Grade 8 | |
| Diameter | Threads per inch | Torque | | | | | |
| inch | | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m |
| 11/16 | 24 | 99-133 | 135-181 | 153-207 | 209-279 | 217-291 | 296-394 |
| 3/4 | 10 | 110-148 | 150-200 | 171-229 | 232-310 | 240-324 | 328-438 |
| 3/4 | 16 | 123-165 | 168-224 | 190-256 | 259-345 | 269-361 | 366-488 |
| 3/4 | 20 | 127-171 | 174-232 | 197-265 | 268-358 | 278-374 | 379-505 |
| 13/16 | 20 | | | 252-340 | 345-459 | 357-481 | 487-649 |
| 7/8 | 9 | | | 275-369 | 374-498 | 387-521 | 528-704 |
| 7/8 | 14 | | | 303-407 | 413-551 | 427-575 | 583-777 |
| 7/8 | 20 | | | 319-429 | 435-579 | 450-606 | 614-818 |
| 15/16 | 20 | | | 395-531 | 538-718 | 558-750 | 760-1014 |
| 1 | 8 | | | 411-553 | 560-748 | 581-781 | 792-1056 |
| 1 | 12 | | | 450-606 | 614-818 | 636-856 | 867-1155 |
| 1 | 20 | | | 483-649 | 658-878 | 681-917 | 929-1239 |
| 1-1/16 | 18 | | | 576-776 | 782-1044 | 813-1095 | 1109-1479 |
| 1-1/8 | 7 | | | 507-683 | 693-923 | 824-1108 | 1123-1497 |
| 1-1/8 | 12 | | | 570-766 | 776-1034 | 923-1241 | 1258-1678 |
| 1-1/8 | 18 | | | 600-806 | 817-1089 | 971-1307 | 1324-1766 |
| 1-3/16 | 18 | | | 709-953 | 966-1288 | 1149-1545 | 1566-2088 |
| 1-1/4 | 7 | | | 716-964 | 976-1302 | 1161-1563 | 1584-2112 |
| 1-1/4 | 12 | | | 793-1067 | 1081-1441 | 1286-1730 | 1754-2338 |
| 1-1/4 | 18 | | | 831-1117 | 1132-1510 | 1346-1812 | 1835-2447 |
| 1-5/16 | 18 | | | 965-1299 | 1316-1754 | 1565-2105 | 2134-2846 |
| 1-3/8 | 6 | | | 939-1263 | 1281-1707 | 1523-2049 | 2076-2768 |

# APPENDIX F
# TORQUE LIMITS

**Table F-2. Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts**

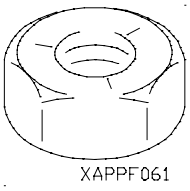
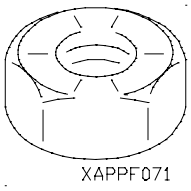
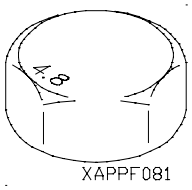
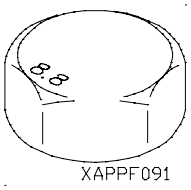
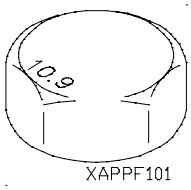
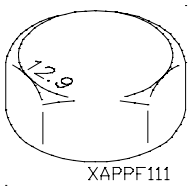
| | | Material Grade Markings | | | |
|---|---|---|---|---|---|
| | |  XAPPF061 | |  XAPPF071 | |
| | | SAE Grade 5 | | SAE Grade 8 | |
| Hole Diameter | Threads per inch | Torque | | | |
| inch | | lb-ft | N·m | lb-ft | N·m |
| 1/4 | 20 | 10-12 | 14-16 | 15-17 | 20-24 |
| 1/4 | 28 | 12-14 | 16-18 | 14-18 | 21-25 |
| 5/16 | 18 | 20-24 | 27-33 | 26-32 | 36-44 |
| 5/16 | 24 | 22-26 | 30-36 | 29-35 | 40-48 |
| 3/8 | 16 | 35-41 | 47-55 | 48-58 | 65-77 |
| 3/8 | 24 | 38-46 | 53-63 | 53-63 | 72-86 |
| 7/16 | 14 | 55-65 | 74-88 | 75-91 | 103-123 |
| 7/16 | 20 | 60-70 | 81-97 | 80-98 | 110-132 |
| 1/2 | 13 | 86-102 | 116-138 | 113-137 | 154-184 |
| 1/2 | 20 | 92-110 | 125-149 | 127-153 | 177-207 |
| 9/16 | 12 | 120-144 | 162-194 | 168-202 | 229-273 |
| 9/16 | 18 | 135-161 | 183-219 | 179-217 | 244-294 |
| 5/8 | 11 | 165-199 | 226-270 | 226-272 | 306-368 |
| 5/8 | 18 | 181-219 | 246-296 | 244-296 | 331-401 |
| 3/4 | 10 | 296-354 | 402-480 | 395-479 | 538-648 |
| 3/4 | 16 | 310-376 | 422-508 | 424-516 | 576-698 |
| 7/8 | 9 | 460-554 | 625-749 | 612-746 | 833-1009 |
| 7/8 | 14 | 503-607 | 684-822 | 652-800 | 888-1082 |
| 1 | 8 | 686-828 | 933-1121 | 941-1141 | 1280-1544 |

**Table F-3. Dry Torque Limits for Metric Screws and Free Spinning Nuts**

| | | Material Grade Markings | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  Metric Grade 4.8 | |  Metric Grade 8.8 | |  Metric Grade 10.9 | |  Metric Grade 12.9 | |
| Diameter | Thread Pitch | Torque | | | | | | | |
| mm | | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m |
| 6 | 1 | 3 | 4-5 | 5-7 | 7-9 | 7-9 | 10-13 | 8-11 | 11-15 |
| 8 | 1.25 | 7-9 | 9-11 | 13-17 | 17-23 | 17-23 | 23-31 | 21-27 | 27-37 |
| 8 | 1 | 7-9 | 9-13 | 14-18 | 18-24 | 19-25 | 25-33 | 21-29 | 29-39 |
| 10 | 1.5 | 13-17 | 17-23 | 25-33 | 33-45 | 34-46 | 46-62 | 40-54 | 54-72 |
| 10 | 1.25 | 14-18 | 18-24 | 26-34 | 35-47 | 36-48 | 49-65 | 42-56 | 57-77 |
| 10 | 0.75 | 15-19 | 21-27 | 29-39 | 39-53 | 40-54 | 54-72 | 47-63 | 63-85 |
| 12 | 1.75 | 22-30 | 30-40 | 43-57 | 58-78 | 60-80 | 81-107 | 69-93 | 94-126 |
| 12 | 1.5 | 23-31 | 32-42 | 46-60 | 61-81 | 63-83 | 85-113 | 73-97 | 99-131 |
| 12 | 1.25 | 24-32 | 33-45 | 47-63 | 65-85 | 65-87 | 88-118 | 76-102 | 104-138 |
| 12 | 1 | 26-34 | 34-46 | 49-65 | 67-89 | 68-90 | 93-123 | 80-106 | 108-144 |
| 14 | 2 | 36-48 | 48-74 | 69-91 | 93-125 | 95-127 | 129-173 | 112-148 | 151-201 |
| 14 | 1.5 | 39-51 | 52-70 | 75-99 | 99-135 | 103-137 | 140-186 | 120-160 | 163-217 |
| 15 | 1 | 51-69 | 69-93 | 100-132 | 135-179 | 137-183 | 187-249 | 160-214 | 218-290 |
| 16 | 2 | 55-73 | 75-99 | 107-143 | 145-193 | 148-198 | 201-267 | 173-231 | 235-313 |
| 16 | 1.5 | 59-79 | 80-106 | 114-152 | 155-207 | 158-210 | 214-286 | 184-246 | 250-334 |
| 18 | 1.5 | | | 166-222 | 225-301 | 230-306 | 311-415 | 268-358 | 364-486 |
| 20 | 2.5 | | | 209-279 | 283-377 | 289-385 | 392-522 | 338-450 | 458-610 |
| 20 | 1.5 | | | 232-308 | 315-419 | 321-427 | 435-579 | 375-499 | 508-678 |
| 20 | 1 | | | 244-324 | 330-440 | 337-449 | 457-609 | 394-524 | 534-712 |
| 22 | 2.5 | | | 285-379 | 387-515 | 394-524 | 534-712 | 461-613 | 624-832 |
| 22 | 1.5 | | | 313-417 | 424-566 | 432-576 | 586-782 | 664-884 | 900-1200 |
| 24 | 3 | | | 361-481 | 489-653 | 499-665 | 677-903 | 584-778 | 791-1055 |
| 24 | 2 | | | 394-524 | 534-712 | 545-725 | 738-984 | 725-965 | 982-1310 |
| 25 | 1.5 | | | 467-621 | 633-843 | 645-859 | 875-1167 | 754-1004 | 1023-1363 |

# APPENDIX F
# TORQUE LIMITS

**Table F-4. Dry Torque Limits for Metric Prevailing Torque Nuts**

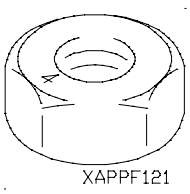
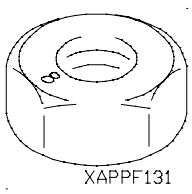
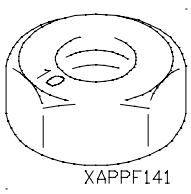
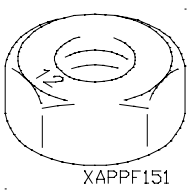
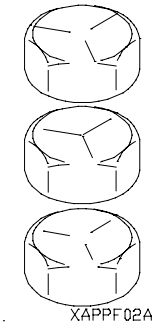
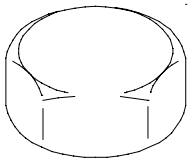
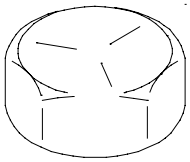
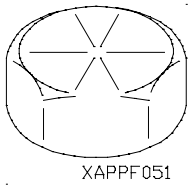
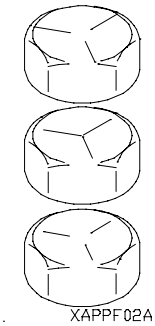
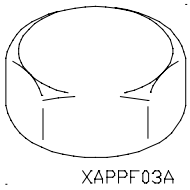
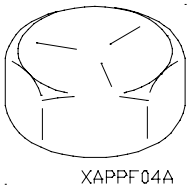
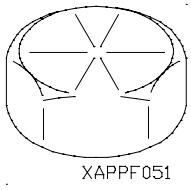
| | | Material Grade Markings | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  | |  | |  | |  | |
| | | Metric Grade 4.8 | | Metric Grade 8.8 | | Metric Grade 10.9 | | Metric Grade 12.9 | |
| Diameter | Thread Pitch | Torque | | | | | | | |
| mm | | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m |
| 6 | 1 | 5-6 | 7-8 | 7-9 | 10-12 | 10-12 | 14-17 | 11-14 | 15-19 |
| 8 | 1.25 | 12-14 | 16-18 | 18-22 | 24-30 | 24-30 | 32-40 | 27-33 | 36-46 |
| 8 | 1 | 12-14 | 16-20 | 19-23 | 25-31 | 25-31 | 34-42 | 28-36 | 38-48 |
| 10 | 1.5 | 21-25 | 28-34 | 33-41 | 44-56 | 44-56 | 60-76 | 50-64 | 68-86 |
| 10 | 1.25 | 21-25 | 29-35 | 34-42 | 46-58 | 46-58 | 63-79 | 53-67 | 71-91 |
| 10 | 0.75 | 23-27 | 31-37 | 37-47 | 49-63 | 50-64 | 68-86 | 57-73 | 77-99 |
| 12 | 1.75 | 33-41 | 46-56 | 55-69 | 74-94 | 75-95 | 102-128 | 85-109 | 115-147 |
| 12 | 1.5 | 35-43 | 47-57 | 56-72 | 77-97 | 78-98 | 106-134 | 89-113 | 120-152 |
| 12 | 1.25 | 36-44 | 48-60 | 58-74 | 79-101 | 81-103 | 109-139 | 91-117 | 125-159 |
| 12 | 1 | 37-45 | 50-62 | 61-77 | 82-104 | 84-106 | 114-144 | 95-121 | 129-165 |
| 14 | 2 | 53-65 | 72-88 | 87-109 | 117-149 | 118-150 | 160-204 | 134-172 | 182-232 |
| 14 | 1.5 | 57-69 | 76-94 | 92-116 | 125-159 | 126-160 | 171-217 | 143-183 | 194-248 |
| 16 | 2 | 79-97 | 107-131 | 130-166 | 177-225 | 178-228 | 243-309 | 204-262 | 277-355 |
| 16 | 1.5 | 82-102 | 112-138 | 138-176 | 187-239 | 189-241 | 256-328 | 215-277 | 292-376 |
| 18 | 1.5 | | | 197-253 | 267-343 | 271-347 | 367-471 | 309-399 | 420-542 |
| 20 | 2.5 | | | 248-318 | 337-431 | 342-438 | 464-594 | 391-503 | 530-682 |
| 20 | 1.5 | | | 271-349 | 369-473 | 374-480 | 507-651 | 428-552 | 580-750 |
| 20 | 1 | | | 283-365 | 384-494 | 390-502 | 529-681 | 447-577 | 606-784 |
| 22 | 2.5 | | | 335-429 | 455-583 | 460-592 | 624-802 | 526-680 | 714-922 |
| 22 | 1.5 | | | 363-467 | 492-634 | 499-643 | 676-872 | 730-950 | 990-1290 |
| 24 | 3 | | | 420-540 | 569-733 | 577-743 | 783-1009 | 662-856 | 897-1161 |
| 24 | 2 | | | 453-583 | 614-792 | 622-804 | 844-1090 | 803-1043 | 1088-1416 |

**Table F-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts**

|  XAPPF02A **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.** | | Material Grade Markings | | | | | |
|---|---|---|---|---|---|---|---|
| | |  XAPPF03A **SAE Grade 2** | |  XAPPF04A **SAE Grade 5** | |  XAPPF051 **SAE Grade 8** | |
| **Diameter** | **Threads per inch** | **Torque** | | | | | |
| **inch** | | **lb-ft** | **N·m** | **lb-ft** | **N·m** | **lb-ft** | **N·m** |
| 1/4 | 20 | 4 | 6 | 6 | 8 | 9 | 12 |
| 1/4 | 28 | 5 | 7 | 7 | 9 | 10 | 14 |
| 5/16 | 18 | 8 | 11 | 13 | 18 | 18 | 24 |
| 5/16 | 24 | 9 | 12 | 14 | 19 | 20 | 27 |
| 3/8 | 16 | 15 | 20 | 23 | 31 | 35 | 47 |
| 3/8 | 24 | 17 | 23 | 25 | 34 | 35 | 47 |
| 7/16 | 14 | 24 | 33 | 35 | 47 | 55 | 75 |
| 7/16 | 20 | 25 | 34 | 40 | 54 | 60 | 81 |
| 1/2 | 13 | 35 | 47 | 55 | 75 | 80 | 108 |
| 1/2 | 20 | 40 | 54 | 65 | 88 | 90 | 122 |
| 9/16 | 12 | 50 | 68 | 80 | 108 | 110 | 149 |
| 9/16 | 18 | 55 | 75 | 90 | 122 | 130 | 176 |
| 5/8 | 11 | 70 | 95 | 110 | 149 | 170 | 231 |
| 5/8 | 18 | 80 | 108 | 130 | 176 | 180 | 244 |
| 3/4 | 10 | 120 | 163 | 200 | 271 | 280 | 380 |
| 3/4 | 16 | 140 | 190 | 220 | 298 | 320 | 434 |
| 7/8 | 9 | 110 | 149 | 300 | 407 | 460 | 624 |
| 7/8 | 14 | 120 | 163 | 320 | 434 | 500 | 678 |
| 1 | 8 | 160 | 217 | 440 | 597 | 680 | 922 |
| 1 | 12 | 170 | 231 | 480 | 651 | 740 | 1003 |
| 1-1/8 | 7 | 220 | 298 | 600 | 814 | 960 | 1302 |
| 1-1/8 | 12 | 260 | 353 | 660 | 895 | 1080 | 1464 |

# APPENDIX F
# TORQUE LIMITS

**Table F-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)**

|  XAPPF02A **Manufacturer's marks may vary. These are all SAE Grade 5** | | **Material Grade Markings** | | | | | |
|---|---|---|---|---|---|---|---|
| | |  XAPPF03A **SAE Grade 2** | |  XAPPF04A **SAE Grade 5** | |  XAPPF051 **SAE Grade 8** | |
| **Diameter** | **Threads per inch** | **Torque** | | | | | |
| **inch** | | **lb-ft** | **N·m** | **lb-ft** | **N·m** | **lb-ft** | **N·m** |
| 1-1/4 | 7 | 320 | 434 | 840 | 1139 | 1360 | 1844 |
| 1-1/4 | 12 | 360 | 488 | 920 | 1248 | 1500 | 2034 |
| 1-3/8 | 6 | 420 | 570 | 1100 | 1492 | 1780 | 2414 |
| 1-3/8 | 12 | 460 | 624 | 1260 | 1709 | 2040 | 2766 |

# APPENDIX G
# MANDATORY REPLACEMENT PARTS

## Section I. INTRODUCTION

### G-1. SCOPE

This appendix lists mandatory replacement parts you will need to maintain the LMTV vehicle.

### G-2. EXPLANATION OF COLUMNS

**a.Column (1) - Item Number.** This number is assigned to each entry in the listing and is referenced in the Initial Setup of the applicable task under Materials/Parts.

**b.Column (2) - Nomenclature.** Name or identification of the part.

**c.Column (3) - Part Number.** The manufacturer's part number.

**d.Column (4) - National Stock Number.** The National stock number of the part.

## Section II. MANDATORY REPLACEMENT PARTS LIST

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 1 | BLADE, WINDSHIELD WIPER | 105.384 | 2540-01-364-1621 |
| 2 | BOLT, MACHINE | 12414307-065 | 5306-01-382-5054 |
| 3 | BOOT KIT, EXHAUST | DQ6025 | 4730-01-417-3197 |
| 4 | BUMPER, RUBBER | 12419182 | 5340-01-410-8397 |
| 5 | BUSHING, SLEEVE | 7-199-002668 | 3120-01-367-6894 |
| 6 | CHANNEL, RUBBER | ZZR765/2-001A7 | 9390-01-420-4560 |
| 7 | CLAMP | 12421183-005 | 4730-01-447-4312 |
| 8 | CLAMP | 12421183-006 | 4730-01-447-4313 |
| 9 | DECAL | 12340917 | 7690-01-256-4909 |
| 10 | FASTENER TAPE | MIL-F-21840 | 8315-00-006-9855 |
| 11 | FASTENER TAPE | 50-534718-19 | 8315-00-935-6762 |
| 12 | FILTER ASSEMBLY | 75223-11 | 2940-01-417-9333 |
| 13 | FILTER ELEMENT | 1048011 | 2940-01-385-8931 |
| 14 | FILTER ELEMENT, FLUID | R22146 | 2910-01-360-6366 |
| 14.1 | FILTER ELEMENT, FLUID | ST117073098-000 | 2910-01-467-4594 |
| 15 | FILTER ELEMENT, FLUID | 29507750 | 2940-01-361-2406 |
| 16 | FILTER ELEMENT, FLUID | 599791 | 4460-01-284-2344 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 17 | FILTER ELEMENT, FLUID | 931558 | 2940-01-363-4377 |
| 18 | FILTER ELEMENT, INTAKE AIR CLEANER | P52-7750 | 2940-01-361-2407 |
| 19 | FILTER, AIR | 12416539 | |
| 20 | FILTER, AIR | 12416563 | 4730-01-398-5654 |
| 21 | FILTER, FUEL | 7E9763 | 2940-01-363-3089 |
| 22 | FILTER, OIL | 1R0739 | 2940-00-029-0388 |
| 23 | GASKET | F337576M6 | |
| 24 | GASKET | M28840/24HA | 5935-01-421-9754 |
| 25 | GASKET | QS-1181 | 5330-01-058-3788 |
| 26 | GASKET | 10-36675-18 | 5330-00-298-0190 |
| 26.1 | GASKET | 11446 | 5330-00-247-4174 |
| 27 | GASKET | 119-2940 | 5330-01-424-7905 |
| 28 | GASKET | 12421469 | 5330-01-453-2980 |
| 29 | GASKET | 12422254 | |
| 30 | GASKET | 13848 | 5330-01-211-0717 |
| 31 | GASKET | 350700 | 5330-01-295-3053 |
| 32 | GASKET | 350903 | 5330-00-576-4626 |
| 33 | GASKET | 352200 | 5330-01-421-6105 |
| 34 | GASKET | 352302 | 5330-01-421-6107 |
| 35 | GASKET | 353400 | 5330-01-421-6102 |
| 36 | GASKET | 353806 | 5330-01-421-6103 |
| 37 | GASKET | 353810 | 5330-01-450-6666 |
| 38 | GASKET | 355148 | 5330-01-423-0596 |
| 39 | GASKET | 355175 | 5330-01-423-0623 |
| 40 | GASKET | 3K3257 | 5330-01-305-6550 |
| 40.1 | GASKET | 3N4087 | 5330-01-061-8003 |
| 41 | GASKET | 4P1624 | 5330-01-360-5934 |
| 42 | GASKET | 9Y8103 | 5330-01-360-5931 |
| 42.1 | GASKET AND PREFORMED PACKING SET | 9X8318 | 5330-01-360-9098 |
| 43 | GASKET, FUEL FILTER | 7C1159 | 5330-01-360-5941 |
| 44 | NOT USED | | |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 45 | GASKET, THERMOSTAT | 2W7212 | 5330-01-347-3206 |
| 46 | GROMMET, NONMETALLIC | MS35489-6 | 5325-00-263-6632 |
| 47 | GROMMET, NONMETALLIC | 12417598 | 5325-01-375-1299 |
| 48 | GROMMET, NONMETALLIC | 12421402 | 5325-01-440-2178 |
| 49 | GROMMET, NONMETALLIC | 4082-37634-01 | 5325-01-194-3076 |
| 50 | GROMMET, NONMETALLIC | 50S12-1-1AA | 5325-01-145-0105 |
| 51 | GROMMET, NONMETALLIC | 8741442 | 5325-00-088-6147 |
| 51.1 | HEAD, FLUID FILTER | 7632-002-144 | 2940-01-387-4397 |
| 52 | INSULATOR, TANK | A1394J | 5970-01-385-7317 |
| 53 | INSULATOR, TANK | A1394K | 5970-01-385-7262 |
| 54 | KIT, FILTER | 29503829 | |
| 55 | KIT, FILTER | 29526899 | 5330-01-453-0770 |
| 56 | NOT USED | | |
| 57 | LAMP, INCANDESCENT | CM7-7373 | 6240-00-270-6824 |
| 58 | LAMP, INCANDESCENT | CM7376 | 6240-00-499-6278 |
| 59 | LATCH, BAIL HEAD | 68-20-101-10 | 2540-01-232-2470 |
| 60 | LOCKNUT | 0770-023-003 | 5310-01-423-3725 |
| 61 | LOCKWASHER | ABCH207-LW-1/2 | |
| 62 | LOCKWASHER | ABCH207-LW-3/8 | |
| 63 | LOCKWASHER | B7949000161 | |
| 64 | LOCKWASHER | D70336/1-20 | 5310-01-110-7933 |
| 65 | LOCKWASHER | D70336/3-50 | 5310-01-439-2542 |
| 66 | LOCKWASHER | D70336/3-52 | 5310-01-439-2543 |
| 66.1 | LOCKWASHER | MS35333-78 | 5310-01-110-7953 |
| 66.2 | LOCKWASHER | ERNA245 | 5310-00-584-5272 |
| 67 | LOCKWASHER | MS35335-30 | 5310-00-209-0788 |
| 68 | LOCKWASHER | MS35335-31 | 5310-00-596-7693 |
| 69 | LOCKWASHER | MS35335-33 | 5310-00-209-0786 |
| 70 | LOCKWASHER | MS35335-36 | 5310-00-550-3503 |
| 71 | LOCKWASHER | MS35335-38 | 5310-00-616-6354 |
| 72 | LOCKWASHER | MS35335-58 | 5310-00-209-1366 |
| 73 | LOCKWASHER | MS35335-61 | 5310-00-527-3634 |
| 74 | LOCKWASHER | MS35335-62 | 5310-00-184-9562 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 75 | LOCKWASHER | MS35337-25 | 5310-00-013-8502 |
| 76 | LOCKWASHER | MS35338-100 | 5310-00-261-8278 |
| 77 | LOCKWASHER | MS35338-102 | 5310-00-167-0671 |
| 78 | LOCKWASHER | MS35338-103 | 5310-00-184-8971 |
| 79 | LOCKWASHER | MS35338-135 | 5310-00-933-8118 |
| 80 | LOCKWASHER | MS35338-136 | 5310-00-929-6395 |
| 81 | LOCKWASHER | MS35338-137 | 5310-00-933-8119 |
| 82 | LOCKWASHER | MS35338-138 | 5310-00-933-8120 |
| 83 | LOCKWASHER | MS35338-139 | 5310-00-933-8121 |
| 84 | LOCKWASHER | MS35338-140 | 5310-00-974-6623 |
| 85 | LOCKWASHER | MS35338-141 | 5310-00-984-7042 |
| 86 | LOCKWASHER | MS35338-143 | 5310-00-933-8778 |
| 87 | LOCKWASHER | MS35338-158 | 5310-00-883-9417 |
| 88 | LOCKWASHER | MS35338-171 | 5310-01-130-9066 |
| 89 | LOCKWASHER | MS35338-42 | 5310-00-045-3299 |
| 90 | LOCKWASHER | MS35338-43 | 5310-00-045-3296 |
| 91 | LOCKWASHER | MS35338-45 | 5310-00-407-9566 |
| 92 | LOCKWASHER | MS35338-46 | 5310-01-334-4710 |
| 93 | LOCKWASHER | MS35338-51 | 5310-00-584-7888 |
| 94 | LOCKWASHER | MS35340-44 | 5310-00-682-5930 |
| 95 | LOCKWASHER | MS51414-1 | 5310-01-235-2057 |
| 96 | LOCKWASHER | MS51414-2 | 5310-01-310-1098 |
| 97 | LOCKWASHER | MS51848-50 | 5310-01-033-8615 |
| 98 | LOCKWASHER | N9015 | 5310-01-369-6073 |
| 99 | LOCKWASHER | N9018 | 5310-01-032-4827 |
| 100 | LOCKWASHER | N9459 | 5310-01-348-8393 |
| 101 | LOCKWASHER | N9461 | 5310-01-348-8392 |
| 101.1 | LOCKWASHER | XP1113 | 5310-01-460-5991 |
| 101.2 | LOCKWASHER | 10241 | 5310-01-416-3010 |
| 101.3 | LOCKWASHER | 10030 | |
| 102 | LOCKWASHER | 1229-S-513C | 5310-01-062-3384 |
| 102.1 | LOCKWASHER | 12414570-011 | 5310-01-374-3292 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 102.2 | LOCKWASHER | 12414570-013 | 5310-01-374-4515 |
| 103 | LOCKWASHER | 12414570-015 | 5310-01-388-2043 |
| 103.1 | LOCKWASHER | 12414570-019 | 5310-01-470-2362 |
| 104 | LOCKWASHER | 12414570-021 | 5310-01-374-4516 |
| 105 | LOCKWASHER | MS35338-40 | 5310-00-543-2410 |
| 106 | LOCKWASHER | MS35338-47 | 5310-00-550-3741 |
| 107 | NOT USED | | |
| 108 | LOCKWASHER | 1729B262 | 5310-00-964-7811 |
| 109 | NOT USED | | |
| 110 | NUT, BLIND RIVET | MS27130-S136 | 5310-01-409-4435 |
| 111 | NUT, BLIND RIVET | MS27130-S148 | 5310-01-370-5548 |
| 112 | NUT, BLIND RIVET | 12421403-060 | |
| 113 | NUT, BLIND RIVET | 12421403-065 | |
| 114 | NUT, BLIND RIVET | 12421634-017 | |
| 115 | NUT, BLIND RIVET | 12442158-5 | |
| 115.1 | NUT, PLAIN, ROUND | 1727N40 | 5310-00-123-2572 |
| 116 | NUT, SELF-LOCKING | DIN-934STM6 | 5310-01-342-2739 |
| 117 | NUT, SELF-LOCKING | MS16228-10C | 5310-00-245-8826 |
| 118 | NUT, SELF-LOCKING | MS16228-5C | 5310-00-584-7992 |
| 119 | NUT, SELF-LOCKING | MS20500-524 | 5310-00-208-4023 |
| 120 | NUT, SELF-LOCKING | MS21042-04 | 5310-00-811-6419 |
| 121 | NUT, SELF-LOCKING | MS21042-5 | 5310-00-807-1469 |
| 122 | NUT, SELF-LOCKING | MS21044C08 | 5310-00-982-6814 |
| 122.1 | NUT, SELF-LOCKING | MS21045L5 | 5310-00-857-5559 |
| 123 | NUT, SELF-LOCKING | MS21083N08 | 5310-00-941-6019 |
| 124 | NUT, SELF-LOCKING | MS21083N6 | 5310-00-926-1852 |
| 125 | NUT, SELF-LOCKING | MS51922-1 | 5310-00-088-1251 |
| 126 | NUT, SELF-LOCKING | MS51922-2 | 5310-00-929-1807 |
| 127 | NUT, SELF-LOCKING | MS51922-33 | 5310-00-225-6993 |
| 128 | NUT, SELF-LOCKING | MS51922-5 | 5310-00-959-7600 |
| 129 | NUT, SELF-LOCKING | N9406 | 5310-01-362-6171 |
| 130 | NUT, SELF-LOCKING | N9410 | 5310-01-348-8398 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 130.1 | NUT, SELF-LOCKING | N9453 | 5310-01-348-8314 |
| 131 | NUT, SELF-LOCKING | N9467 | 5310-01-350-4257 |
| 131.1 | NUT, SELF-LOCKING | N9556 | 5310-01-423-0880 |
| 132 | NUT, SELF-LOCKING | 12301125 | 5310-01-210-0199 |
| 132.1 | NUT, SELF-LOCKING | 12411174-008 | |
| 133 | NUT, SELF-LOCKING | 12412476-04 | 5310-01-466-0565 |
| 134 | NUT, SELF-LOCKING | 12414308-002 | 5310-01-381-2819 |
| 135 | NUT, SELF-LOCKING | 12414308-003 | 5310-01-377-1549 |
| 136 | NUT, SELF-LOCKING | 12414308-004 | 5310-01-369-5703 |
| 137 | NUT, SELF-LOCKING | 12414308-007 | 5310-01-046-0186 |
| 138 | NUT, SELF-LOCKING | 12414308-017 | 5310-01-381-9830 |
| 139 | NUT, SELF-LOCKING | 12414308-018 | 5310-01-369-3337 |
| 140 | NUT, SELF-LOCKING | 12414308-019 | 5310-01-369-9522 |
| 141 | NUT, SELF-LOCKING | 12414308-020 | 5310-01-381-9849 |
| 142 | NUT, SELF-LOCKING | 12414308-021 | 5310-01-369-3338 |
| 143 | NUT, SELF-LOCKING | 12414308-022 | 5310-01-417-1262 |
| 144 | NUT, SELF-LOCKING | 12414308-025 | 5310-01-367-6706 |
| 145 | NUT, SELF-LOCKING | 12414308-027 | 5310-01-369-3339 |
| 146 | NUT, SELF-LOCKING | 12414315-003 | 5310-01-374-1382 |
| 147 | NUT, SELF-LOCKING | 12414315-005 | 5310-01-372-3023 |
| 148 | NUT, SELF-LOCKING | 12414315-006 | 5310-01-369-3332 |
| 149 | NUT, SELF-LOCKING | 12414315-009 | 5310-01-365-7236 |
| 150 | NUT, SELF-LOCKING | 12414315-012 | 5310-01-369-3331 |
| 151 | NUT, SELF-LOCKING | 12414315-017 | 5310-01-368-8065 |
| 152 | NUT, SELF-LOCKING | 12414420-004 | 5310-01-370-0010 |
| 152.1 | NUT, SELF-LOCKING | 12417642-002 | 5310-01-374-3288 |
| 153 | NUT, SELF-LOCKING | 12419003 | 5310-01-376-0773 |
| 154 | NUT, SELF-LOCKING | 270W10000 | |
| 155 | NUT, SELF-LOCKING | 29514660 | |
| 156 | NUT, SELF-LOCKING | 7951286 | 5310-00-789-0398 |
| 157 | PACKING, PREFORMED | A82777 | 5330-00-579-6495 |
| 158 | PACKING, PREFORMED | F4001-16 | 5331-01-466-0354 |
| 158.1 | PACKING, PREFORMED | J515-16-3 | 5331-01-465-3634 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 158.2 | PACKING, PREFORMED | J515-4-1 | 5331-01-387-9490 |
| 159 | PACKING, PREFORMED | J515-8-1 | 5330-00-292-8171 |
| 160 | PACKING, PREFORMED | 5999807 | 5331-01-456-9156 |
| 161 | PACKING, PREFORMED | MS28775-011 | 5330-00-582-2133 |
| 162 | PACKING, PREFORMED | MS28775-227 | 5330-00-576-9731 |
| 162.1 | PACKING, PREFORMED | MS28775-910 | 5331-00-448-6753 |
| 163 | PACKING, PREFORMED | MS28778-10 | 5330-00-285-9842 |
| 164 | PACKING, PREFORMED | MS28778-12 | 5330-00-251-8839 |
| 165 | PACKING, PREFORMED | MS28778-16 | 5330-00-816-3546 |
| 166 | PACKING, PREFORMED | MS28778-4 | 5330-00-805-2966 |
| 166.1 | PACKING, PREFORMED | MS28778-6 | 5331-00-804-5695 |
| 167 | PACKING, PREFORMED | MS9955-113 | 5330-01-374-2325 |
| 168 | PACKING, PREFORMED | M25988/1-246 | 5330-01-189-6351 |
| 168.1 | PACKING, PREFORMED | M83461/1-442 | 5330-01-183-0987 |
| 169 | PACKING, PREFORMED | OR42OA | 5330-01-389-6028 |
| 170 | PACKING, PREFORMED | 11639519-1 | 5330-00-463-0200 |
| 170.1 | PACKING, PREFORMED | 12422548-004 | 5331-01-059-1141 |
| 171 | PACKING, PREFORMED | 1509 | 5330-00-172-1919 |
| 171.1 | PACKING, PREFORMED | 195045 | 5331-00-618-5361 |
| 171.2 | PACKING, PREFORMED | 19755 | 5331-01-415-9632 |
| 171.3 | PACKING, PREFORMED | 198336 | 5331-00-584-1840 |
| 172 | PACKING, PREFORMED | 2M4453 | 5330-00-074-3768 |
| 173 | PACKING, PREFORMED | 22617-16 | 5330-01-168-0885 |
| 174 | PACKING, PREFORMED | 23043446 | 5330-01-424-6629 |
| 174.1 | PACKING, PREFORMED | 250192 | 5331-01-417-5105 |
| 174.2 | PACKING, PREFORMED | 251216 | 5330-01-417-5107 |
| 175 | PACKING, PREFORMED | 29500969 | 5330-01-360-7852 |
| 176 | PACKING, PREFORMED | 29503383 | 5330-01-360-6017 |
| 177 | PACKING, PREFORMED | 3-906N522-90 | 5330-01-104-1093 |
| 178 | PACKING, PREFORMED | 3-908N522-90 | 5330-00-929-8171 |
| 179 | PACKING, PREFORMED | 3D2824 | 5330-00-944-8281 |
| 180 | PACKING, PREFORMED | 3J1907 | 5330-01-333-6444 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 181 | PACKING, PREFORMED | 3J7354 | 5330-00-954-8008 |
| 182 | PACKING, PREFORMED | 3K0360 | 5330-00-948-6482 |
| 183 | PACKING, PREFORMED | 4J5477 | 5330-00-855-8059 |
| 184 | PACKING, PREFORMED | 4L9564 | 5330-00-828-8639 |
| 184.1 | PACKING, PREFORMED | 420828 | 5340-01-417-3788 |
| 185 | PACKING, PREFORMED | 5-X-1155 | 5330-01-392-1637 |
| 186 | PACKING, PREFORMED | 5F7054 | 5330-00-339-6224 |
| 187 | PACKING, PREFORMED | 5P7813 | 5330-01-335-0042 |
| 188 | PACKING, PREFORMED | 6V8397 | 5330-00-579-6495 |
| 189 | PACKING, PREFORMED | 673268 | |
| 190 | PACKING, PREFORMED | 673269 | 5330-01-395-1252 |
| 191 | PACKING, PREFORMED | 7F8267 | 5330-01-291-7353 |
| 192 | PACKING, PREFORMED | 7320658 | 5330-00-297-7106 |
| 193 | PACKING, PREFORMED | 9604792-001 | 5330-01-429-3089 |
| 194 | PAD, CUSHIONING | 12416479-001 | 2590-01-397-7844 |
| 195 | PAD, CUSHIONING | 12416479-002 | 2590-01-412-2663 |
| 196 | PARTS KIT, DEHYDRATOR | RN-60-A | 4440-01-337-7324 |
| 197 | PARTS KIT, SEAL REPLACEMENT | SK10-2 | 5330-01-350-4474 |
| 198 | PARTS KIT, SEAL REPLACEMENT | SK10-3 | 5330-01-350-4472 |
| 199 | PARTS KIT, SEAL REPLACEMENT | SK10-4 | 5330-01-343-2745 |
| 200 | PIN, COTTER | K-2412-Z | 5315-01-179-9882 |
| 201 | PIN, COTTER | MS171659 | 5315-00-846-8337 |
| 202 | PIN, COTTER | MS24665-151 | 5315-00-815-1405 |
| 203 | PIN, COTTER | MS24665-298 | 5315-00-234-1861 |
| 204 | PIN, COTTER | MS24665-385 | 5315-00-187-9382 |
| 205 | PIN, COTTER | MS24665-423 | 5315-00-013-7228 |
| 206 | PIN, COTTER | MS24665-457 | 5315-00-187-9393 |
| 207 | PIN, COTTER | MS24665-459 | 5315-00-187-9394 |
| 208 | PIN, COTTER | MS24665-69 | 5315-00-828-8190 |
| 208.1 | PIN, COTTER | XB-781-1 | 5315-01-369-1346 |
| 209 | NOT USED | | |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 210 | PIN, SPRING | MS16562-142 | 5315-00-058-6115 |
| 211 | PIN, SPRING | MS16552-146 | 5315-00-853-3814 |
| 212 | PLASTIC STRIP | 352700 | 5330-01-296-2109 |
| 213 | RECEPTACLE | 50R4-1-1AA | 5325-01-049-2049 |
| 213.1 | REPAIR KIT, GOVERNOR | RN32W | |
| 213.2 | RETAINER, PACKING | 11863-012 | 5330-01-417-7795 |
| 213.3 | RETAINER, PACKING | 202624 | 5330-01-417-7794 |
| 214 | RETAINER | A-1205-D-2344 | 5330-01-360-5253 |
| 215 | RIVET, BLIND | AK42H | 5320-00-874-4477 |
| 216 | RIVET, BLIND | AK43H | 5320-00-143-6149 |
| 217 | RIVET, BLIND | MS20600AD5W12 | 5320-01-047-0467 |
| 217.1 | RIVET, BLIND | MS20601B4W2 | 5320-00-616-5274 |
| 218 | RIVET, BLIND | MS20604B3W2 | 5320-00-721-9075 |
| 219 | RIVET, BLIND | M24243/1-A806 | 5320-00-850-3256 |
| 220 | RIVET, BLIND | M24243/1-B302 | 5320-00-999-0397 |
| 221 | RIVET, BLIND | M24243/1-D502 | 5320-00-850-3248 |
| 222 | RIVET, BLIND | M24243/1-D608 | 5320-00-850-3246 |
| 223 | RIVET, BLIND | M24243/1-F402 | 5320-00-129-9706 |
| 223.1 | RIVET, BLIND | M24243/1-F608 | 5320-01-392-0699 |
| 223.2 | RIVET, BLIND | M24243/1-F610 | |
| 224 | RIVET, BLIND | M24243/6-A403H | 5320-00-882-8388 |
| 225 | RIVET, BLIND | M24243/6-A405H | 5320-01-291-9121 |
| 226 | RIVET, BLIND | M24243/6-A406H | 5320-01-421-0484 |
| 227 | RIVET, BLIND | M24243/6-A602H | 5320-00-956-7362 |
| 228 | RIVET, BLIND | M24243/6-A604H | 5320-00-956-7355 |
| 229 | RIVET, BLIND | M24243/6-A606H | 5320-00-882-8385 |
| 230 | RIVET, BLIND | M24243/6-A608H | 5320-01-032-6534 |
| 231 | RIVET, BLIND | M24243/7-A402H | 5320-00-874-4477 |
| 232 | RIVET, BLIND | M24243/7-A403H | 5320-00-143-6149 |
| 233 | RIVET, BLIND | M24243/7-A604H | 5320-00-420-2165 |
| 234 | RIVET, BLIND | M24243/7-A606H | 5320-00-490-5523 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 235 | RIVET, BLIND | SD64BSLF | 5320-01-397-3347 |
| 236 | RIVET, BLIND | 206057 | 5320-01-411-0081 |
| 237 | RIVET, COMPRESSION | 12418469 | 5320-01-376-0699 |
| 237.1 | SCREW, CAP | CSH5-24-39 | 5305-01-479-7857 |
| 238 | SCREW, CAP | 12414475-131 | 5303-01-363-0703 |
| 239 | SCREW, CAP | 6V-2315 | 5306-01-433-4753 |
| 240 | SCREW, MACHINE | MS24693-144 | |
| 241 | SCREW, MACHINE | MS51958-83 | 5305-00-071-2095 |
| 242 | SCREW, SELF-LOCKING | MS16998-61L | 5305-01-211-3097 |
| 243 | SEAL | VC08G1R0B | 5330-01-389-6109 |
| 244 | SEAL | 12421431 | 9320-01-398-6317 |
| 245 | SEAL | 125128-5 | |
| 246 | SEAL | 125128-6 | |
| 247 | SEAL | 355150 | 5330-01-423-0689 |
| 247.1 | SEAL | 12422401-001 | 5999-01-478-5940 |
| 247.2 | SEAL | 12422401-002 | 5999-01-478-5932 |
| 247.3 | SEAL | 12422401-003 | 5999-01-478-5937 |
| 248 | SEAL ASSEMBLY, CTIS | A1205-Q-2435 | 5330-01-360-7753 |
| 249 | SEAL ASSEMBLY, HUB | A1205-R-2254 | 5330-01-360-5252 |
| 250 | SEAL, DOOR | 12416467 | 5330-01-385-3769 |
| 251 | SEAL RING, METAL | 29505809 | 5330-01-360-5329 |
| 252 | SEAL, NONMETALLIC | CC3550 | 5330-01-431-7575 |
| 253 | SEAL, NONMETALLIC | 12417725 | 5330-01-375-2908 |
| 254 | SEAL, NONMETALLIC | 2418974-1 | 5330-01-257-1709 |
| 255 | SEAL, NONMETALLIC | 673999 | 5310-01-454-5553 |
| 255.1 | SEAL, PLAIN | N72143 | 5330-01-453-4462 |
| 255.2 | SEAL, SHAFT | SERUR25-2 | 5330-01-135-3376 |
| 256 | SEAL, URETHANE FOAM | 12420420-001 | 5680-01-453-8912 |
| 257 | SEAL, URETHANE FOAM | 12420420-002 | 5680-01-453-8485 |
| 258 | SEAL, URETHANE FOAM | 12420420-003 | 5680-01-453-8486 |
| 259 | SEAL, WEATHER | 147P00039 | |
| 259.1 | SPACER | 12422545 | 5365-01-490-6790 |

## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

| (1) ITEM NO. | (2) NOMENCLATURE | (3) PART NUMBER | (4) NATIONAL STOCK NUMBER |
|---|---|---|---|
| 260 | SPACER, RING | 4P2987 | 5365-01-433-8407 |
| 260.1 | SPIDER, UNIVERSAL JOINT, VEHICULAR | R279X | |
| 261 | SPLICE, CONDUCTOR | 12420927-001 | 5940-01-456-1319 |
| 262 | SPLICE, CONDUCTOR | 12420927-002 | 5940-01-421-6955 |
| 263 | STRAIN RELIEF | 10280870-3 | 5975-00-376-1585 |
| 263.1 | STRIP, RUBBER | 12412581 | 9320-01-399-4888 |
| 264 | TERMINAL, LUG | MS20659-163 | 5940-00-113-3145 |
| 265 | TERMINAL, LUG | MS20659-164 | 5940-00-113-3148 |
| 266 | TERMINAL, LUG | MS25036-108 | 5940-00-143-4780 |
| 267 | TERMINAL, LUG | MS25036-122 | 5940-00-113-8190 |
| 268 | TERMINAL, LUG | 12414275-001 | |
| 269 | TERMINAL, LUG | 12416409-006 | |
| 269.1 | TERMINAL, LUG | 12420344 | 5940-01-082-3321 |
| 270 | WASHER, FLAT | MS27183-10 | 5310-00-809-4058 |
| 270.1 | WASHER, FLAT | 12414473-010 | 5310-01-374-6990 |
| 271 | WASHER, FLAT | 12417948-004 | 5365-01-436-8308 |
| 271.1 | WASHER, FLAT | 251391 | 5310-01-417-1041 |
| 272 | WASHER, FLAT RUBBER | 900.032 | 5330-01-378-7541 |
| 273 | WASHER, NYLON | MS51859-16 | 5310-00-964-7811 |
| 274 | WASHER, SPRING | D63474/1-30 | 5310-01-413-8475 |
| 275 | WASHER, SPRING | WW579S18 | |
| 276 | WASHER, SPRING | 110 7289 | 5310-01-246-1387 |
| 277 | WASHER, SPRING | 12414559-021 | 5310-01-374-4517 |
| 278 | WASHER, SPRING | 12414560-017 | 5310-01-395-0820 |
| 279 | WASHER, SPRING | 12414560-018 | 5310-01-381-3281 |
| 280 | WASHER, SPRING | 12414560-019 | 5310-01-369-6074 |
| 281 | WASHER, SPRING | 12417503 | 5310-01-406-6326 |
| 282 | WASHER, SPRING | 12418220 | 5310-01-372-3495 |
| 283 | WASHER, SPRING | 12414560-009 | 5310-01-333-5517 |

# APPENDIX H
# LUBRICATION ORDER AND SERVICES

## SECTION I. INTRODUCTION

### H-1. GENERAL

The information contained in this appendix provides the lubrication/services requirements for the LMTV vehicle.

**a. Adherence.** Intervals (on-condition or hardtime) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals will be applied unless changed by the Army Oil Analysis Program (AOAP) laboratory. Change the hardtime interval if the lubricants are contaminated or if operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hardtime intervals will be applied in the event AOAP laboratory support is not available. Hardtime intervals must be applied during the warranty period.

Intervals shown in this lubrication order and services are based on mileage/calendar, and in some cases mileage alone. An example of a mileage/calendar interval is: **Q**, which means every 3,000 miles (4,827 km) or quarterly (every three months). The lubrication is to be performed at whichever interval occurs first for the vehicle. An example of a mileage alone interval is: **6K**, which stands for every 6,000 miles (9,654 km). The lubrication/services is to be performed at the mileage indicated regardless of the calendar interval.

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38 C) and for Type II is 138 F (50 C). Failure to comply may result in serious 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 medical attention. Failure to comply may result in injury to personnel.**

**b. Cleaning fittings before lubricating.** Clean parts with dry cleaning solvent (SD P-D-680) (Item 71, Appendix D) or equivalent. Dry before lubricating. Dashed arrows indicate lubrication on both sides of the equipment.

**c. Lubricating after fording.** If fording occurs, lubricate all fittings below fording depth and check submerged gearboxes for presence of water.

**d. Lubricating after high-pressure washing.** After a thorough washing, lubricate all grease fittings and oil can points outside and underneath vehicle.

**e. Level of Maintenance.** The lowest level of maintenance authorized to lubricate a point is Operator/Unit Maintenance (O). Operator/crew (C) may lubricate points authorized for Unit Maintenance (O) when authorized by Unit Maintenance (O).

**f. Localized views.** A reference to the appropriate localized view is given after most lubrication entries. Localized views begin on page H-9.

## H-1. GENERAL (CONT)

**g. Interval Symbols.** The lubrication/service interval symbols will be used as applicable:

Q-quarterly/3,000 mi (4,827 km) (whichever occurs first)
S-semiannually/6,000 mi (9,654 km) (whichever occurs first)
A-annually/12,000 mi (19,308 km) (whichever occurs first)
B-biennially/24,000 mi (38,616 km) (whichever occurs first)
3K-every 3,000 mi (4,827 km) (no calendar interval)
6K-every 6,000 mi (9,654 km) (no calendar interval)
12K-every 12,000 mi (19,308 km) (no calendar interval)
24K-every 24,000 mi (38,616 km) (no calendar interval)

## H-2. OIL FILTERS

Oil filters shall be serviced/changed as applicable, when:

a. They are known to be contaminated, or clogged;

b. Service is recommended by AOAP laboratory analysis; or

c. At prescribed hardtime intervals while vehicle is under warranty, or if AOAP is not available/used as required.

## H-3. AOAP SAMPLING INTERVAL

**WARNING**

- **Engine oil is hot and under pressure. The oil sampling valve releases oil proportionally to the amount of pressure applied to valve. Activate oil sampling valve by pressing in slowly to prevent injury to personnel. Failure to comply may result in injury to personnel.**
- **Wear safety goggles when taking oil sample. Oil is under pressure and could cause injury to personnel. Failure to comply may result in injury to personnel.**

Units participating in AOAP will sample engine oil every 3,000 miles (4,827 km) or 6 months, whichever occurs first and change engine oil as directed by AOAP. Units participating in AOAP will sample transmission oil every 6,000 miles (9,654 km) or 12 months, whichever occurs first and change transmission oil as directed by AOAP. Units participating in AOAP will sample hydraulic system oil initially after 6 weeks or 10 hours of operation, whichever occurs first. After initial oil change samples should be taken every 12 months or 50 hours of operation, whichever occurs first and change hydraulic oil as directed by AOAP.

## H-4. WARRANTY HARDTIME STATEMENT

"For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer than usual operating hours, extended idling periods, extreme dust)."

# SECTION II. LUBRICATION/SERVICE CHART

## H-5. LUBRICATION/SERVICE KEY

| LUBRICANTS | |
|---|---|
| **Specification** | **Type** |
| MIL-L-2104 (OE/HDO) | Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service |
| MIL-L-46167 (OEA) | Lubricating Oil, Internal Combustion Engine, Arctic |
| MIL-L-2105 (GO) | Lubricating Oil, Gear, Multipurpose |
| MIL-G-10924 (GAA) | Grease, Automotive and Artillery |
| MIL-G-18458 (GW) | Grease, Wire-Rope and Exposed Gear |
| MIL-H-5606 (OHA) | Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance |

| DESCRIPTION | CAPACITY | EXPECTED TEMPERATURES | | |
|---|---|---|---|---|
| | | Above +40 F (Above +4 C) | +40 F to -15 F (+4 C to -26 C) | -15 F to -50 F (-26 C to -46 C) |
| Engine crankcase | 25 qt (24 L) | OE/HDO-15/40 | OE/HDO-15/40 | OEA |
| Transmission (total system) | 43.3 qt (41 L) | OE/HDO-15/40 | OE/HDO-10 | OEA |
| Transmission (at oil change) | 31.8 qt (30.0 L) | OE/HDO-15/40 | OE/HDO-10 | OEA |
| Transmission (after overhaul) | 39.0 qt (37.0 L) | OE/HDO-15/40 | OE/HDO-10 | OEA |
| Steering system | 5 qt (4.8 L) | OE/HDO-10 | OE/HDO-10 | OEA |
| Hydraulic reservoir | 27 gal (102.2 L) | OE/HDO-10 | OE/HDO-10 | OEA |
| Front axle differential (maximum capacity) | 9.5 qt (9.0 L) | GO-80/90 | GO-80/90 | SAE 75W90 OR GO-75 |
| Rear axle differential (maximum capacity) | 18.05 qt (17.1 L) | GO-80/90 | GO-80/90 | SAE 75W90 OR GO-75 |
| Front axle planetary hubs | 11-13 oz (0.33-0.38 L) | GO-80/90 | GO-80/90 | SAE 75W90 OR GO-75 |
| 11K Self-Recovery Winch (SRW) | As Required | GO-85/140 | GO-80/90 | GO-75 |
| Propeller shaft universal and slip joints | As Required | GAA | GAA | GAA |
| Tie rod ends | As Required | GAA | GAA | GAA |
| Towing pintle assembly | As Required | GAA | GAA | GAA |
| Spring bolts and spring shackles | As Required | GAA | GAA | GAA |
| Front axle shaft U-joints and steering knuckles | As Required | GAA | GAA | GAA |

## H-5. LUBRICATION/SERVICE KEY (CONT)

| DESCRIPTION | CAPACITY | EXPECTED TEMPERATURES | | |
|---|---|---|---|---|
| | | Above +40 F (Above +4 C) | +40 F to -15 F (+4 C to -26 C) | -15 F to -50 F (-26 C to -46 C) |
| Front axle inner wheel bearing | As Required | GAA | GAA | GAA |
| Rear axle inner wheel bearing | As Required | GAA | GAA | GAA |
| Front lifting beam | As Required | GAA | GAA | GAA |
| 11K Self-Recovery Winch (SRW) cable | As Required | GW | GW | GW |
| Air/hydraulic power unit | 3 pt (1.4 L) | OHA | OHA | OHA |
| Backup hydraulic pump | 19 oz (562 ml) | OHA | OHA | OHA |

| COOLANT | |
|---|---|
| **Specification** | **Type** |
| A-A-52624A | Antifreeze, Multi-Engine Type |
| MIL-A-11755 | Antifreeze, Arctic-Type |

| DESCRIPTION | CAPACITY | EXPECTED TEMPERATURES | | |
|---|---|---|---|---|
| | | Above +40 F (Above +4 C) | +40 F to -15 F (+4 C to -26 C) | -15 F to -50 F (-26 C to -46 C) |
| Cooling system (engine only) | 14 qt (13 L) | A-A-52624A | A-A-52624A | N/A |
| Cooling system (total system) | 43.8 qt (41.5 L) | A-A-52624A | A-A-52624A | N/A |
| Cooling system, Arctic (total system) | 58.3 qt (55.2 L) | N/A | N/A | MIL-A-11755 |

| CLEANING AGENT | |
|---|---|
| **Specification** | **Type** |
| P-D-680 | Dry Cleaning Solvent, SD-II |
| O-C-1901 | Cleaning Compound, Windshield |

| DESCRIPTION | CAPACITY | EXPECTED TEMPERATURES | | |
|---|---|---|---|---|
| | | Above +15 F (Above -9 C) | +15 F to -15 F (-9 C to -26 C) | -15 F to -50 F (-26 C to -46 C) |
| All metal parts as required | N/A | SD-II (all temperatures) | | |
| Windshield washer reservoir | 7.5 qt (7.1 L) | 2/3 water to 1/3 O-C-1901 | 1/2 water to 1/2 O-C-1901 | 1/3 water to 2/3 O-C-1901 |

For arctic operation refer to FM 9-207.

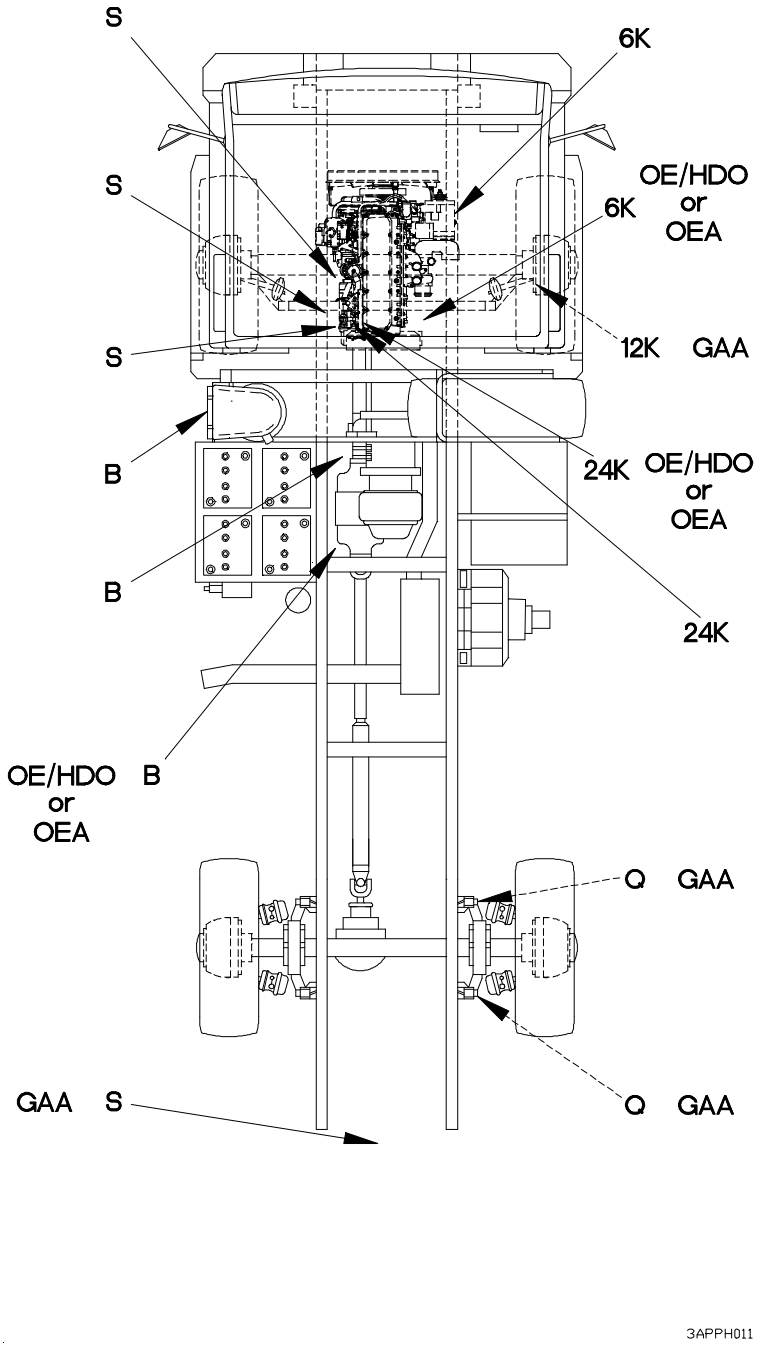
## H-6. LUBRICATION/SERVICE INTERVALS

| Intervals | | Total Man-Hours |
|---|---|---|
| Quarterly (Q) | Lubrication performed once every three months or 3,000 mi (4,827 km).* | 2.0 |
| Semi-annually (S) | Lubrication performed once every six months or 6,000 mi (9,654 km).* | 2.5 |
| Annually (A) | Lubrication performed once every year or every 12,000 mi (19,308 km).* | 1.5 |
| Biennially (B) | Lubrication performed once every two years or every 24,000 mi (38,616 km).* | 3.5 |
| 3K | Lubrication performed once every 3,000 mi (4,827 km).** | 1.0 |
| 6K | Lubrication performed once every 6,000 mi (9,654 km).** | 1.0 |
| 12K | Lubrication performed once every 12,000 mi (19,308 km).** | 4.0 |
| 24K | Lubrication performed once every 24,000 mi (38,616 km).** | 0.5 |

* Whichever occurs first.
** No calendar interval.

## H-7. LOCATOR VIEWS

**LUBRICANT INTERVAL** **INTERVAL LUBRICANT**




**Engine Crankcase Breather (O)**
(See note 17 and view A)

**Fuel Filter (O)**
(See note 6 and view A)

**Fuel/Water Separator (O)**
(See note 5 and view B)

**Cooling System (O)**
(See note 7)

**Transmission Filter (O)**
(See note 3 and view F)

**Transmission Drain and Fill (O)**
(See note 3 and views D, E, and F)

**Towing Pintle Fill (O)**
(See note 16 and views J and K)

**Engine Oil Filter (O)**
(See note 2 and view C)

**Crankcase Drain and Fill (O)**
(See note 1 and views C and D)

**Front Axle Inner Wheel Bearing Repack (O)**
(See note 22)

**Power Steering Reservoir Drain and Fill (O)**
(See note 4 and view G)

**Power Steering Filter (O)**
(See note 4 and view G)

**Spring Bolt Fill (O)**
(See note 18 and view H)

**Spring Shackle Fill (O)**
(See note 18 and view AE)

**CHASSIS**

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.

| LUBRICANT | INTERVAL | INTERVAL | LUBRICANT |
|---|---|---|---|

**Spring Bolt**
**Fill (O)**
(See note 18 and view H)

**Spring Shackle**
**Fill (O)**
(See note 18 and view I)

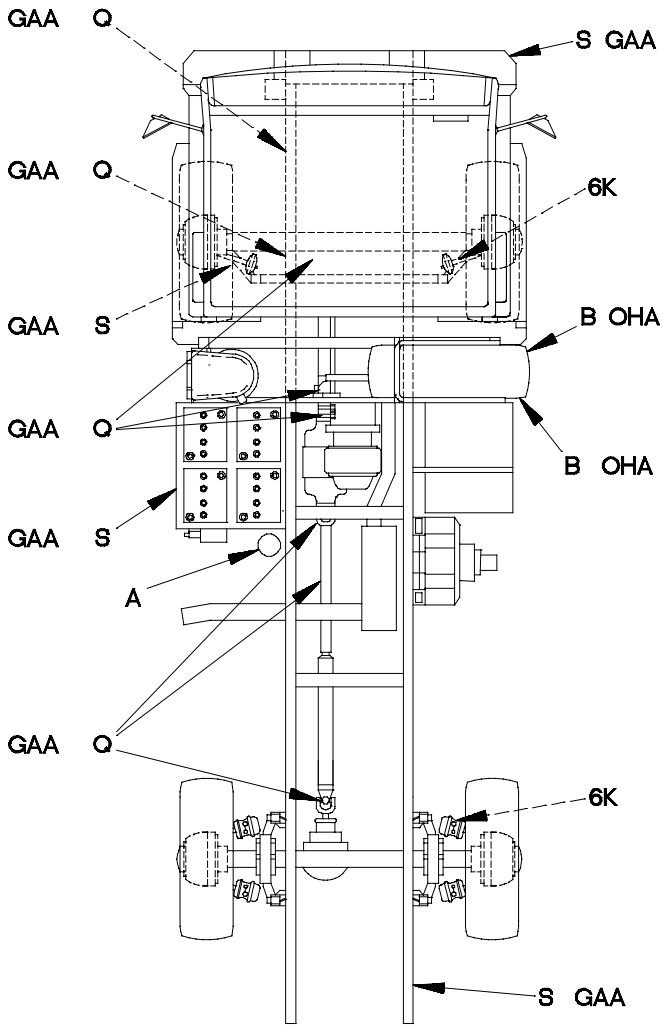
**Tie Rod Ends**
**Fill (O)**
(See note 13 and view N)

**Universal and Slip Joints**
**Fill (O)**
(See note 9 and view P)

**Battery Posts (O)**
(See note 19 and view Q)

**Air Dryer (O)**
(See note 25 and view AF)

**Universal and Slip Joints**
**Fill (O)**
(See note 9 and view P)




**11K Self-Recovery Winch (SRW) Cable Front Roller Fairlead**
**Fill (O)**
(See note 23 and views Z and AA)

**Brake Wedge and Air Chamber (O)**
(See note 21 and view L)

**Backup Hydraulic Pump**
**Drain and Fill (O)**
(See note 10 and view R)

**Air/Hydraulic Power Unit**
**Drain and Fill (O)**
(See note 10 and view S)

**Brake Wedge and Air Chamber (O)**
(See note 21 and view M)

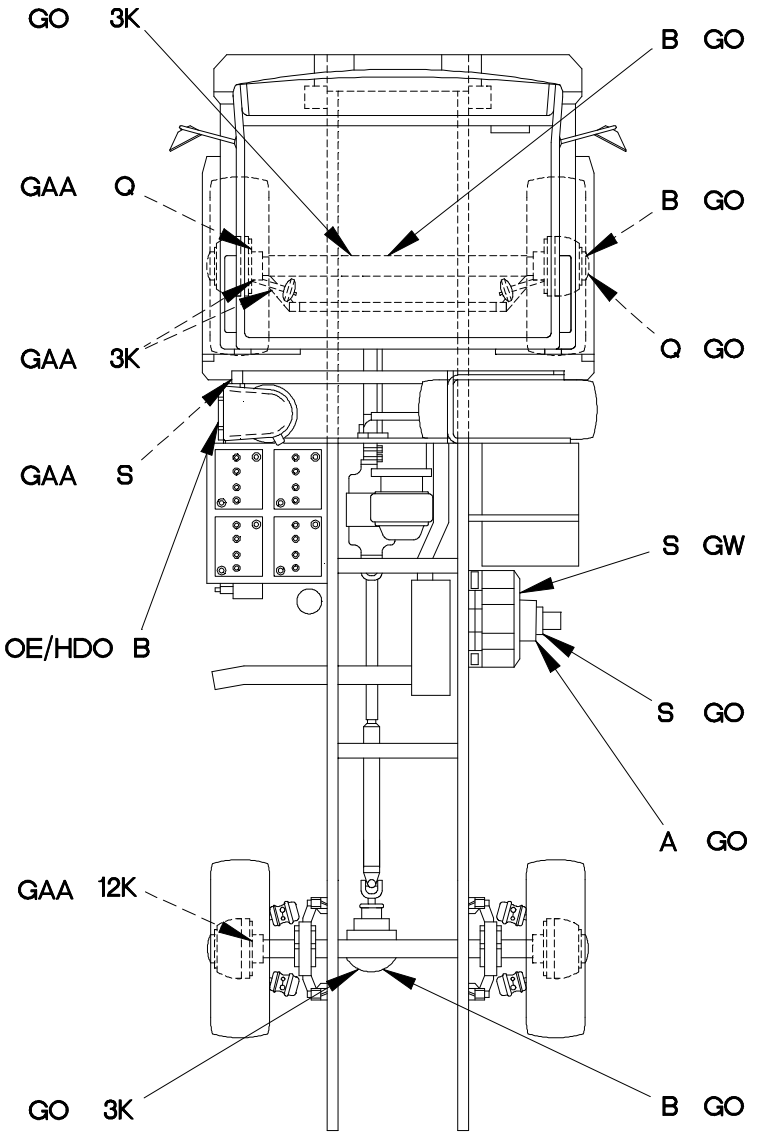
**11K Self-Recovery Winch (SRW) Cable Rear Roller Fairlead**
**Fill (O)**
(See note 23 and views AB and AC)

**CHASSIS**

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.

## H-7. LOCATOR VIEWS (CONT)

**LUBRICANT INTERVAL** **INTERVAL LUBRICANT**




**Front Axle**
**Check and Fill (O)**
(See note 11 and view T)

**Axle Shaft U-Joints**
**Fill (O)**
(See note 20 and view U)

**Steering Knuckles**
**Fill (O)**
(See note 20 and view U)

**Front Lifting Beam**
**Clean and Grease (O)**
(See note 24 and view AD)

**Hydraulic Reservoir and Filter**
**Drain and Fill (O)**
(See note 8 and view X)

**Rear Axle Inner Wheel Bearing Repack (O)**
(See note 22)

**Rear Axle**
**Check and Fill (O)**
(See note 11 and view T)

**Front Axle**
**Drain and Fill (O)**
(See note 11 and view T)

**Wheel End Planetary Hubs**
**Drain and Fill (O)**
(See note 12 and view V)

**Wheel End Planetary Hubs**
**Check and Fill (O)**
(See note 12 and view V)

**11K Self-Recovery Winch (SRW) Cable**
**Fill (O)**
(See note 14 and view W)

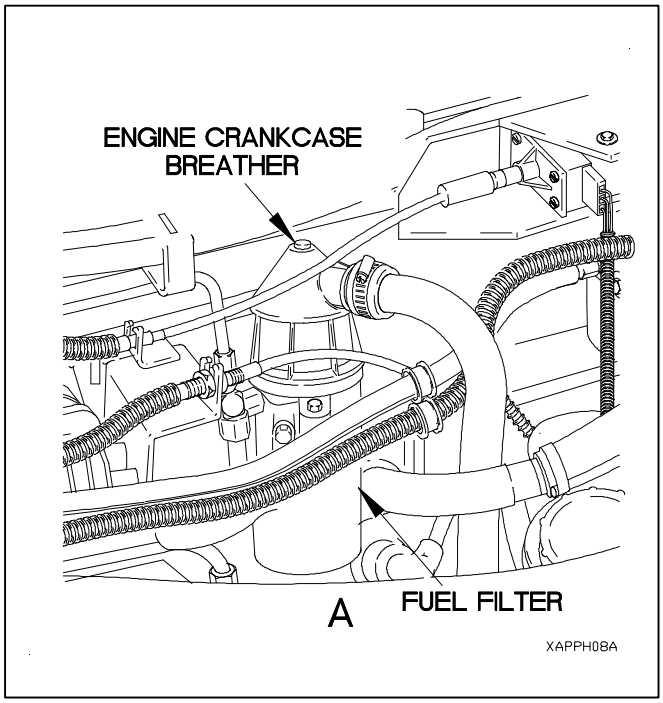
**11K Self-Recovery Winch (SRW)**
**Check and Fill (O)**
(See note 15 and view Y)

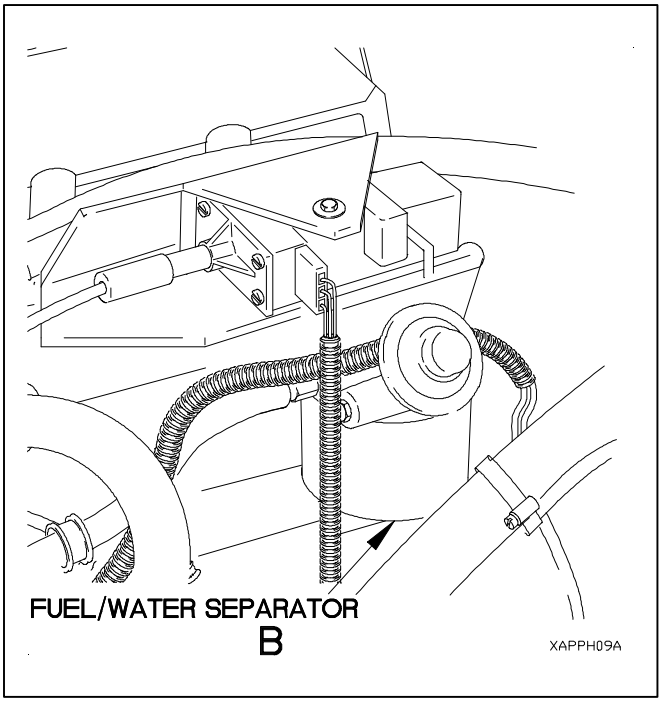
**11K Self-Recovery Winch (SRW)**
**Drain and Fill (O)**
(See note 15 and view Y)

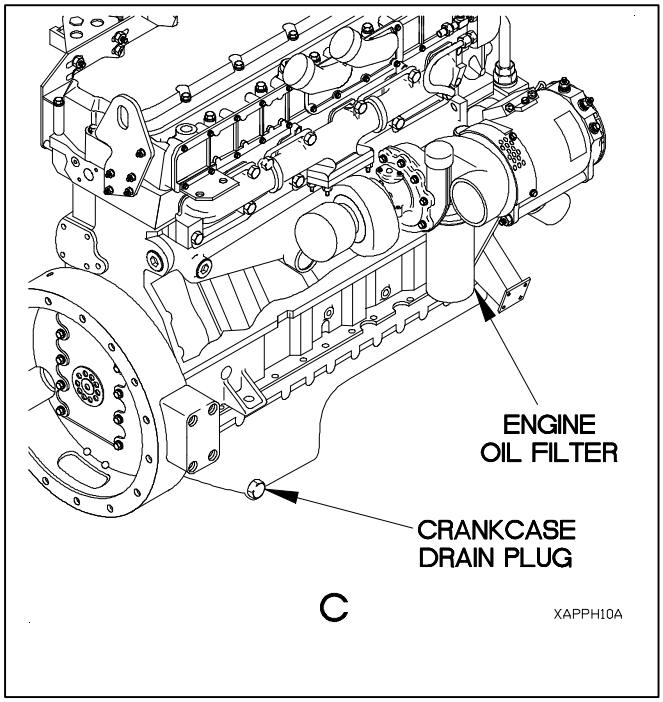
**Rear Axle**
**Drain and Fill (O)**
(See note 11 and view T)

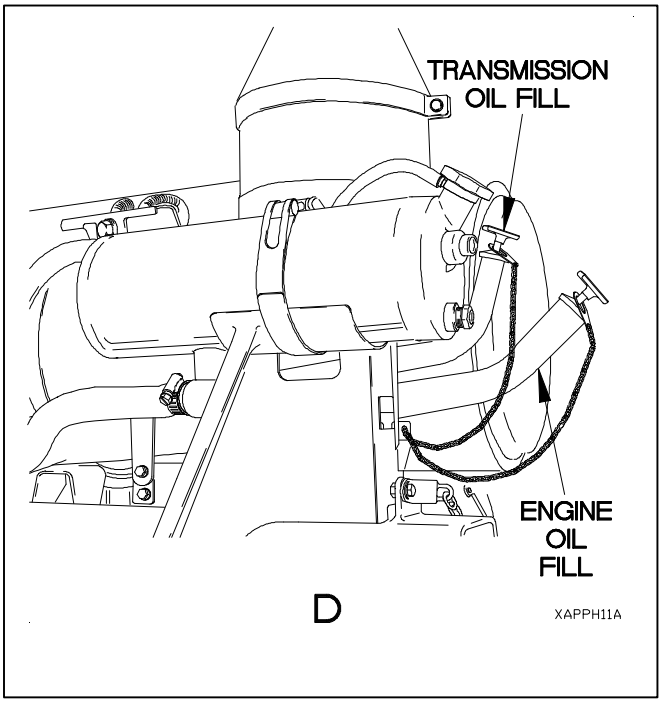
**CHASSIS**

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.

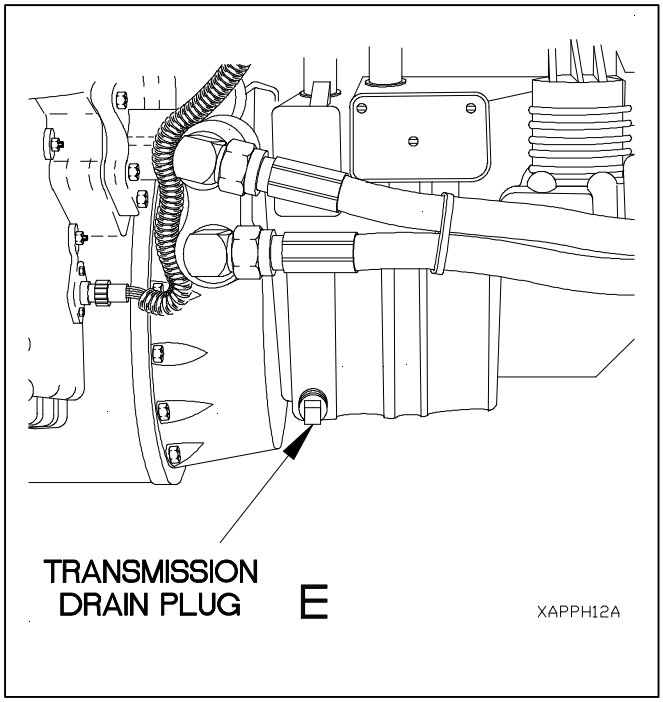

ENGINE CRANKCASE
BREATHER
FUEL FILTER
A
XAPPH08A

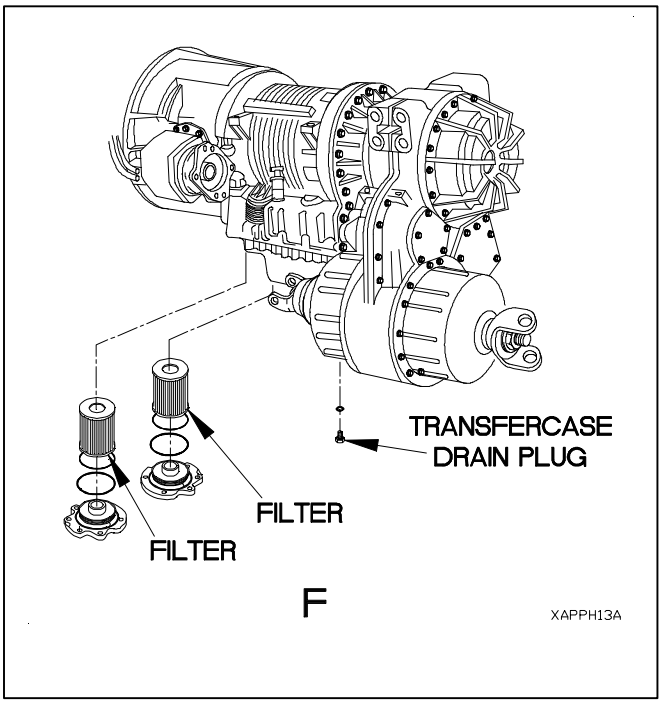

FUEL/WATER SEPARATOR
B
XAPPH09A

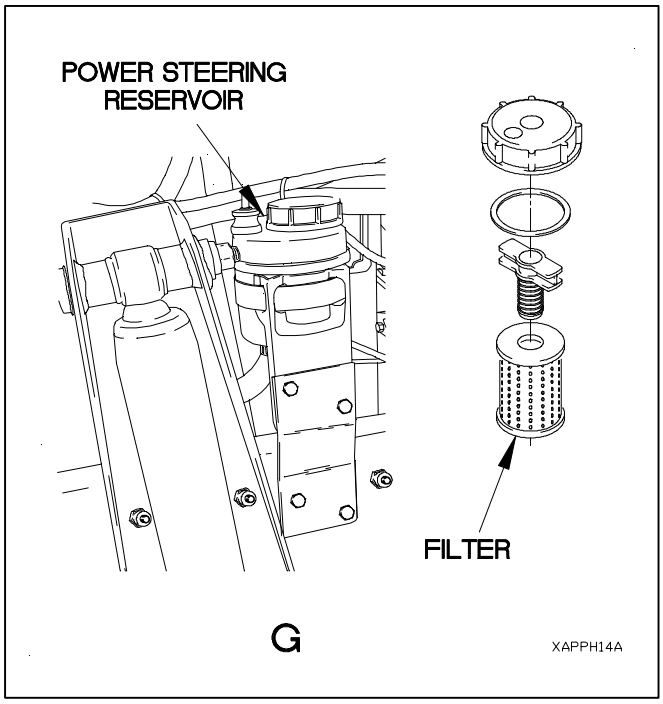

ENGINE
OIL FILTER
CRANKCASE
DRAIN PLUG
C
XAPPH10A

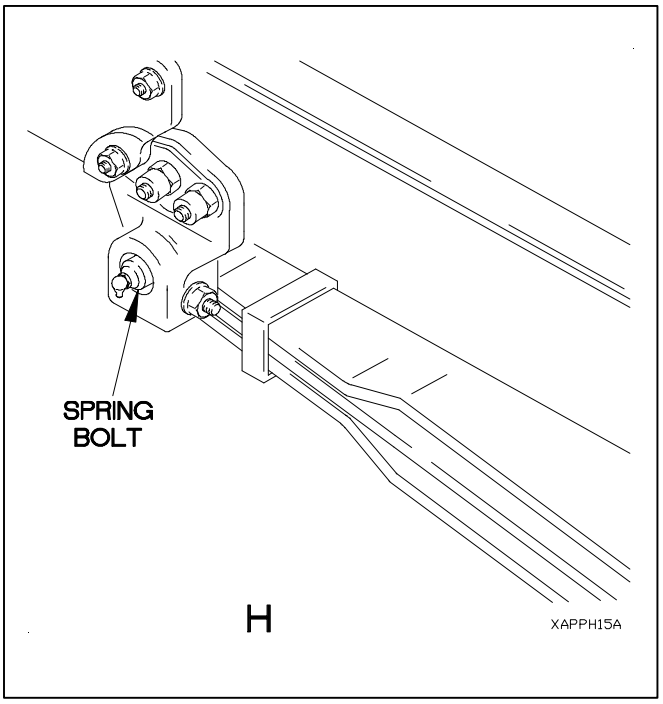

TRANSMISSION
OIL FILL
ENGINE
OIL
FILL
D
XAPPH11A

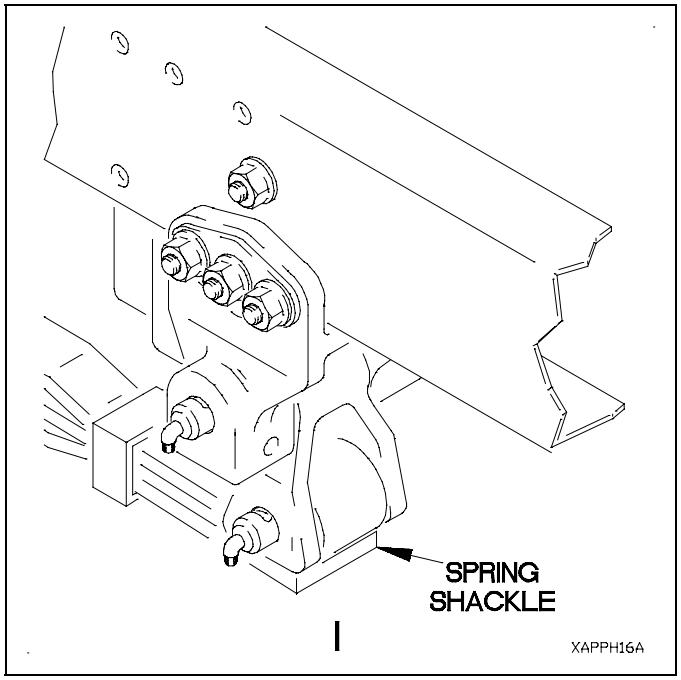
## H-8. LOCAL VIEWS (CONT)

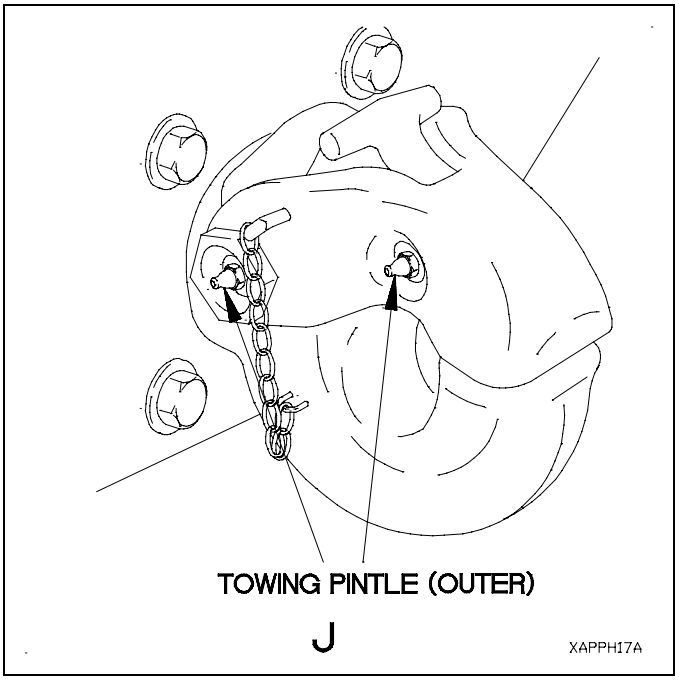


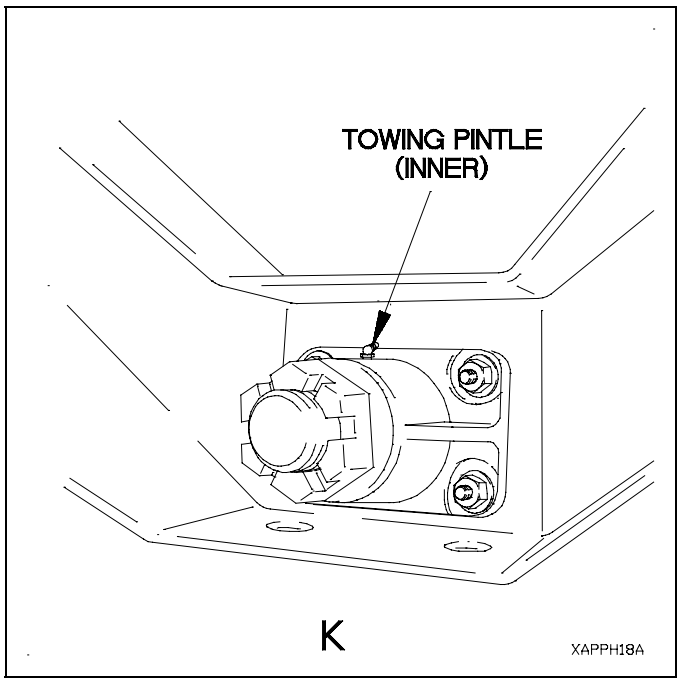



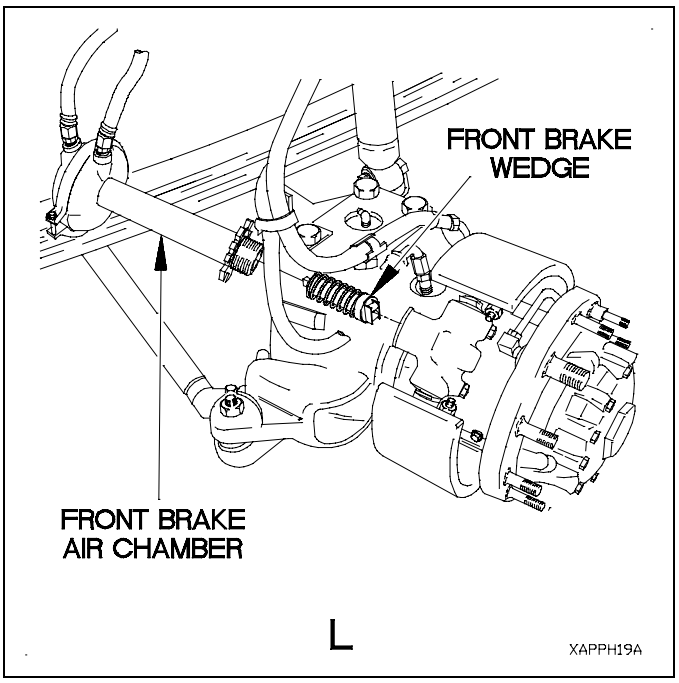



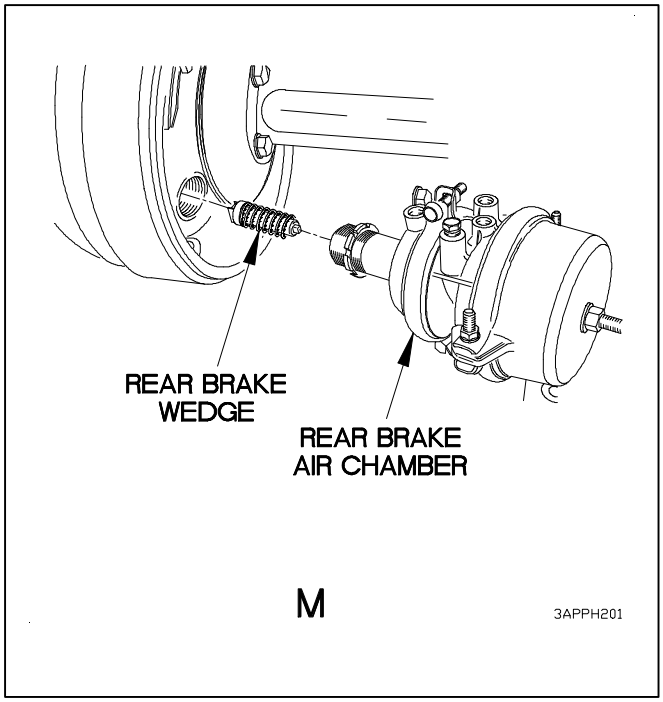

SPRING
SHACKLE
I
XAPPH16A

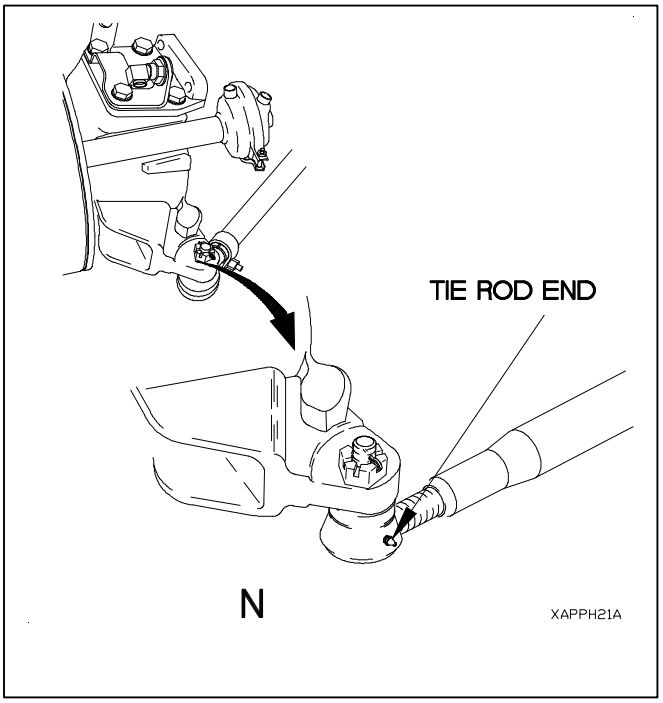

TOWING PINTLE (OUTER)
J
XAPPH17A

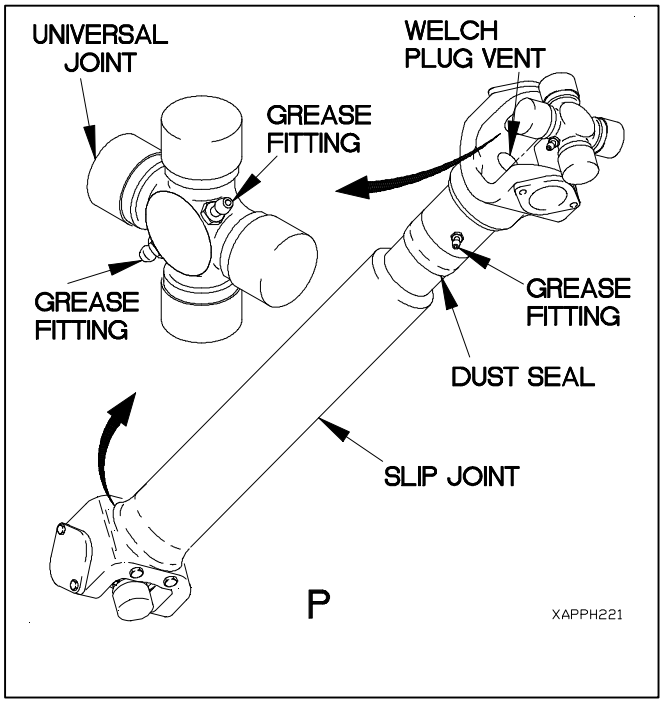

TOWING PINTLE
(INNER)
K
XAPPH18A

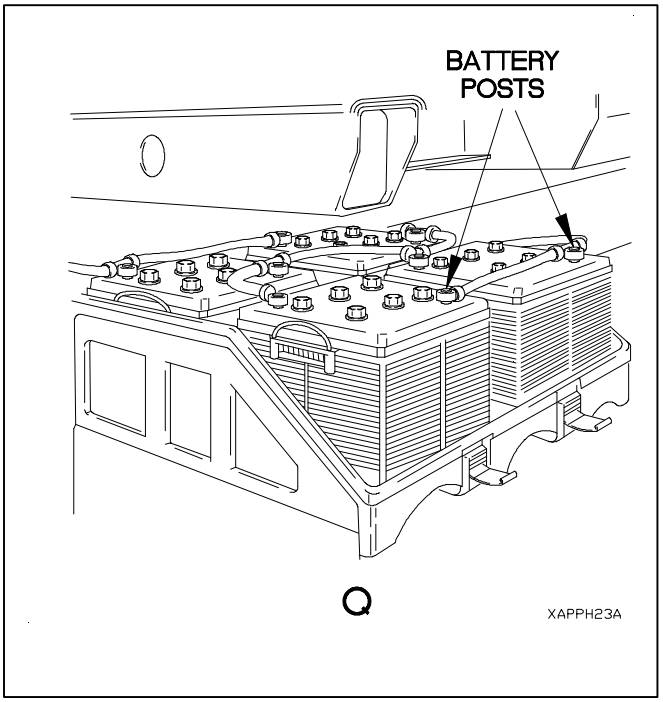

FRONT BRAKE
WEDGE
FRONT BRAKE
AIR CHAMBER
L
XAPPH19A

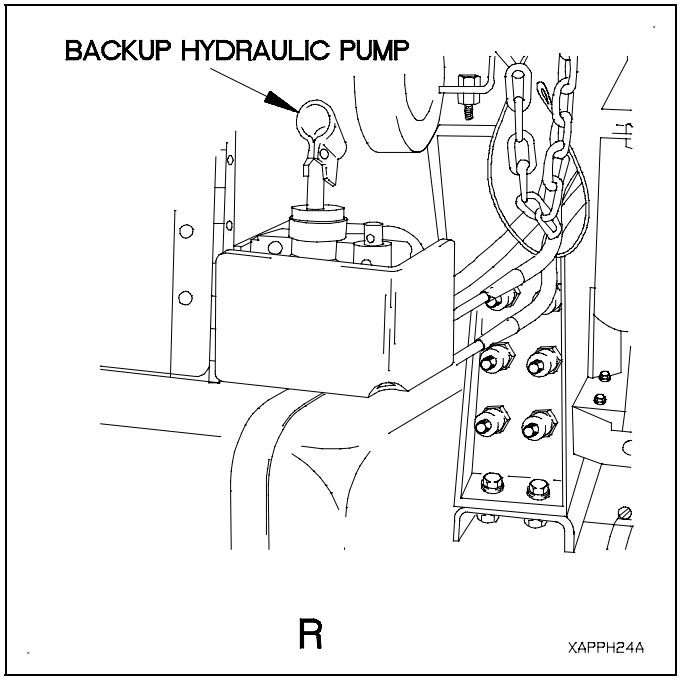
## H-8. LOCAL VIEWS (CONT)

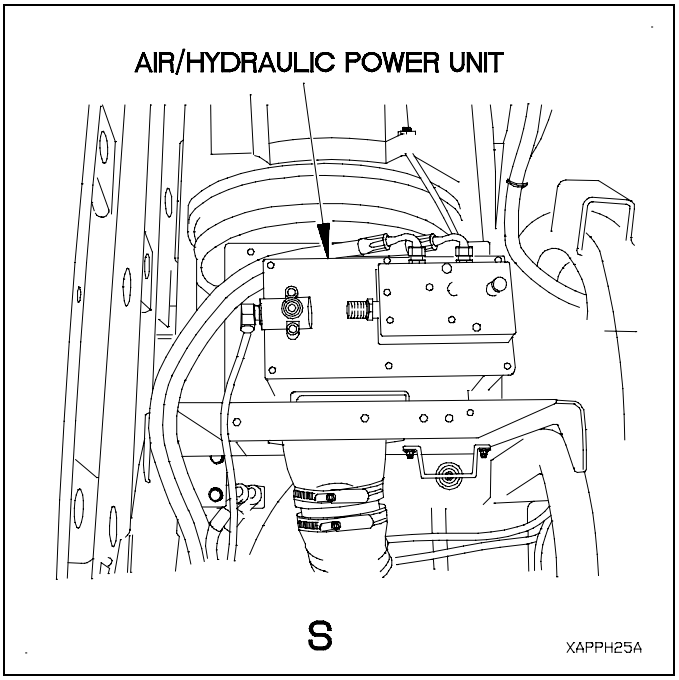


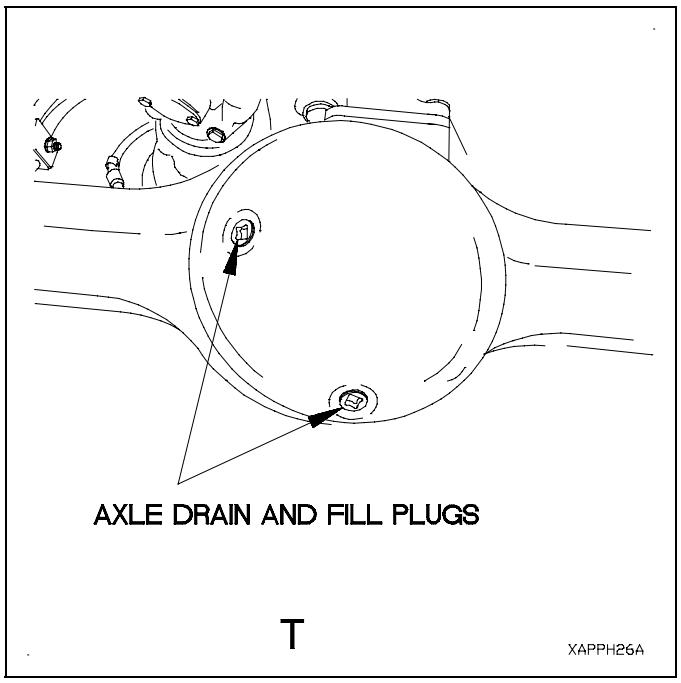



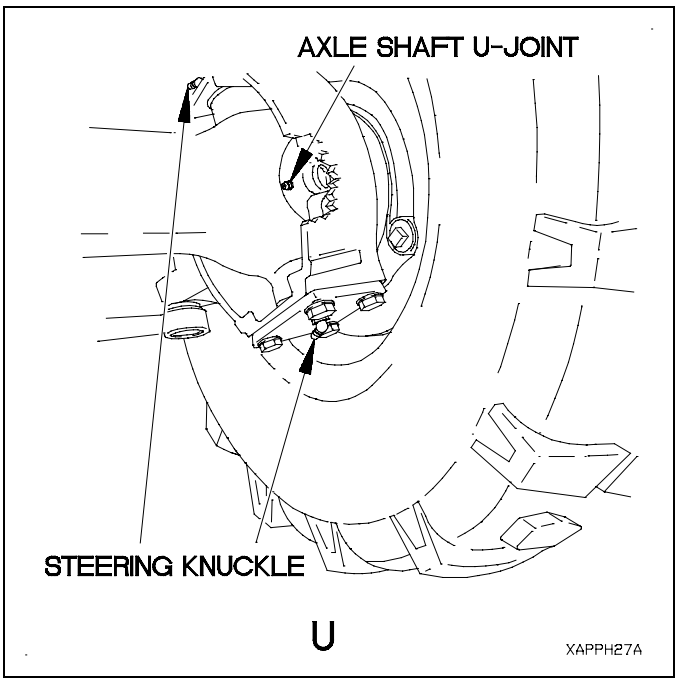



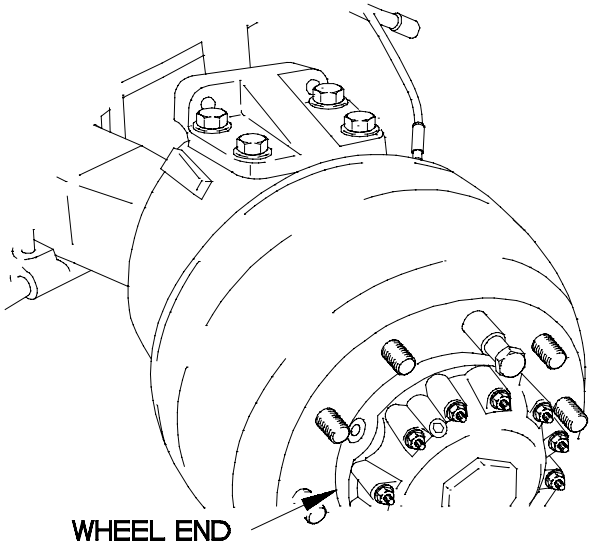

BACKUP HYDRAULIC PUMP
R
XAPPH24A


AIR/HYDRAULIC POWER UNIT
S
XAPPH25A

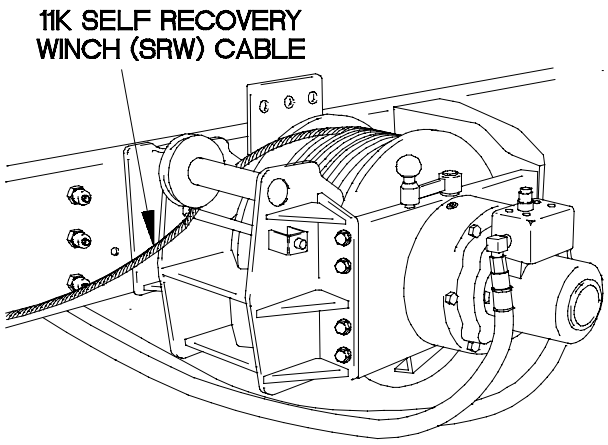

AXLE DRAIN AND FILL PLUGS
T
XAPPH26A


AXLE SHAFT U-JOINT
STEERING KNUCKLE
U
XAPPH27A

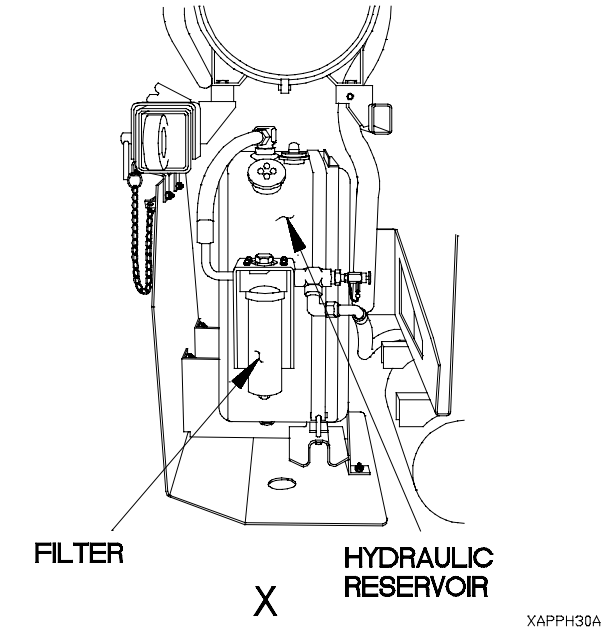
## H-8. LUBRICATION LOCAL VIEWS (CONT)



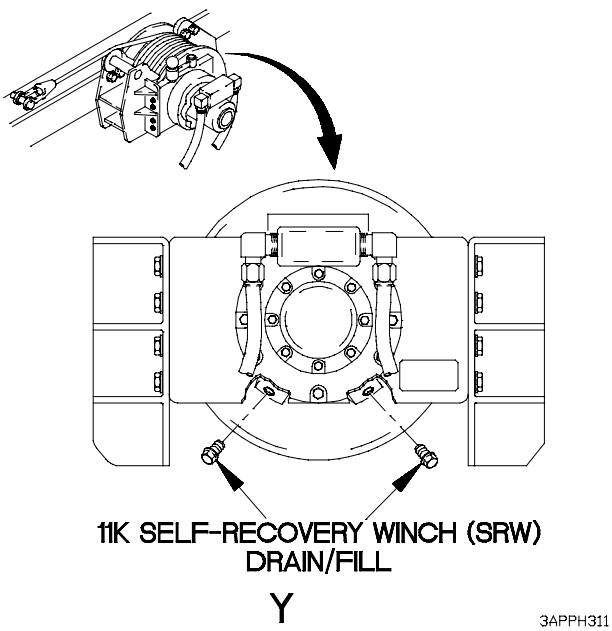

V



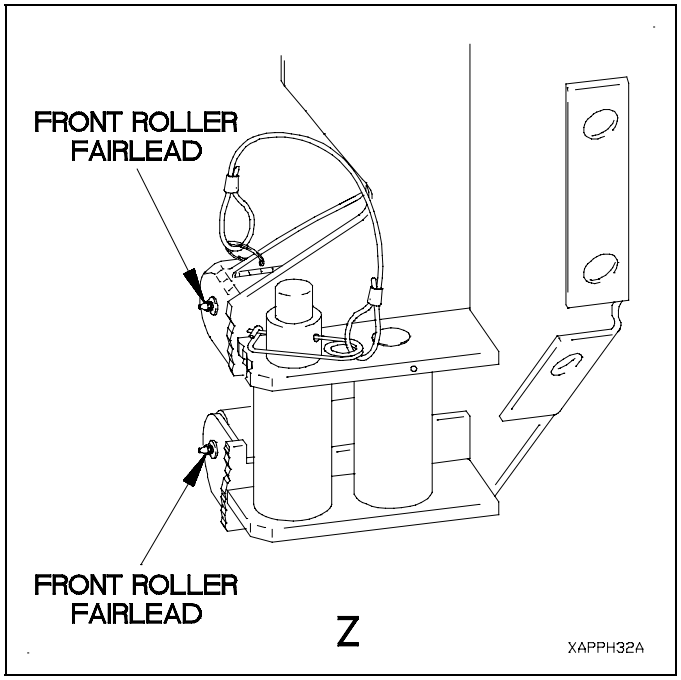

W

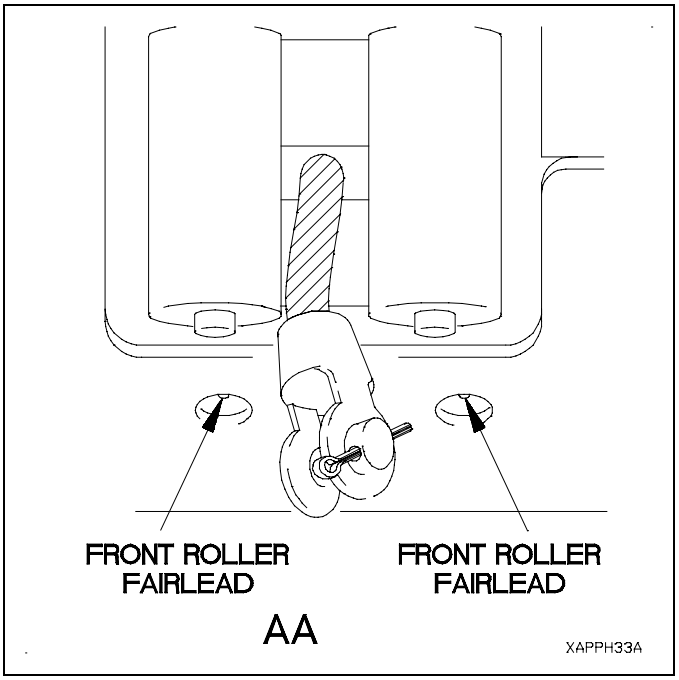


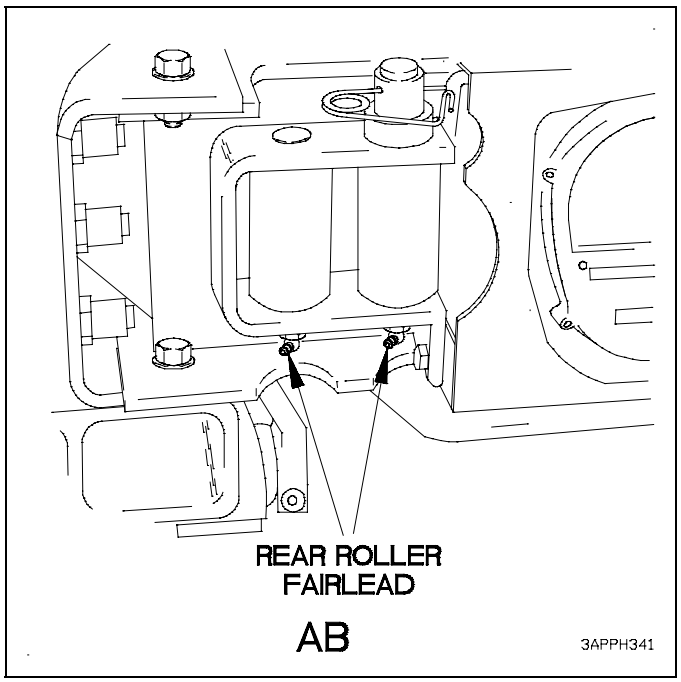

X

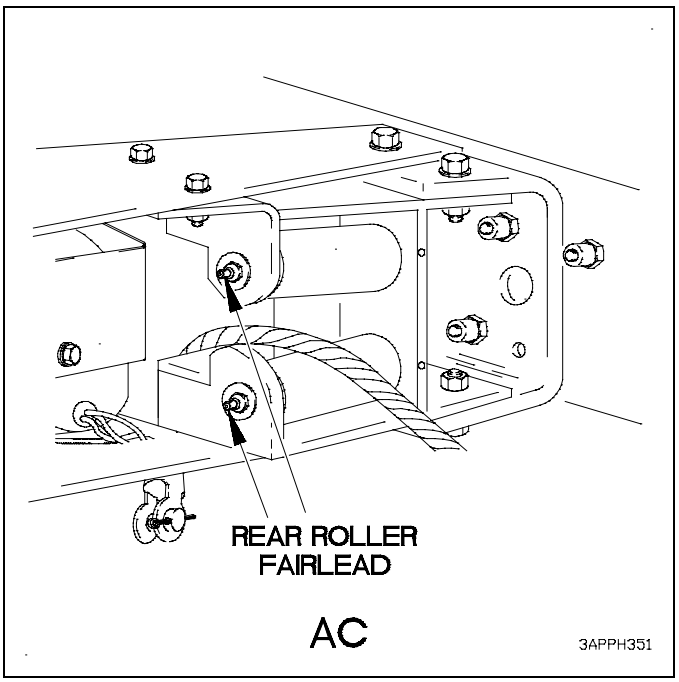



Y

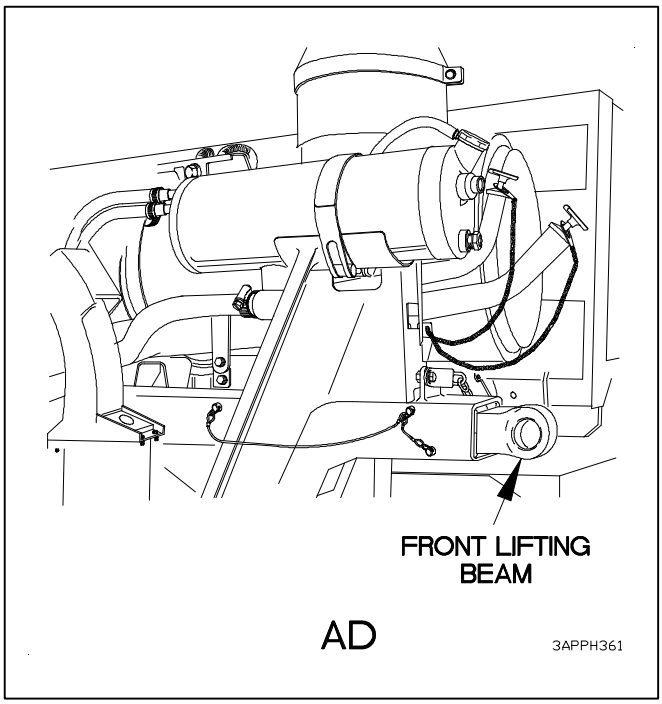

FRONT ROLLER
FAIRLEAD
FRONT ROLLER
FAIRLEAD
Z
XAPPH32A

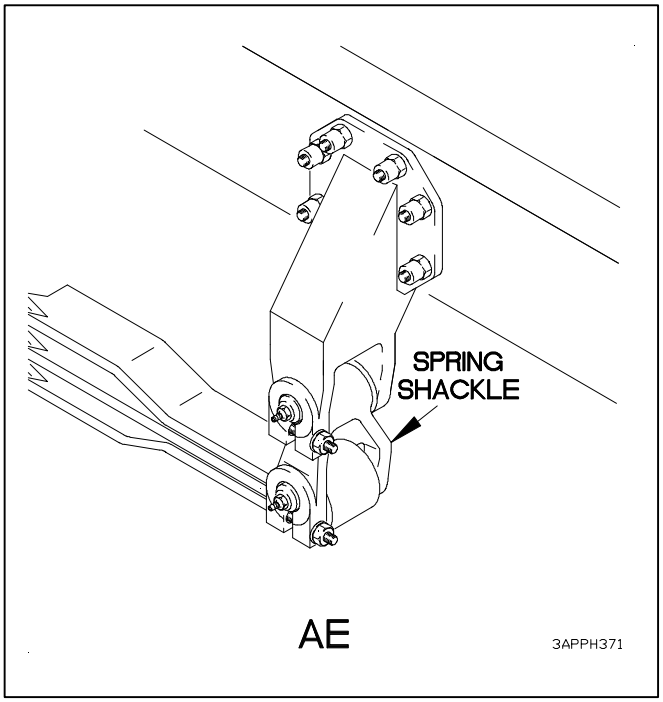

FRONT ROLLER
FAIRLEAD
FRONT ROLLER
FAIRLEAD
AA
XAPPH33A

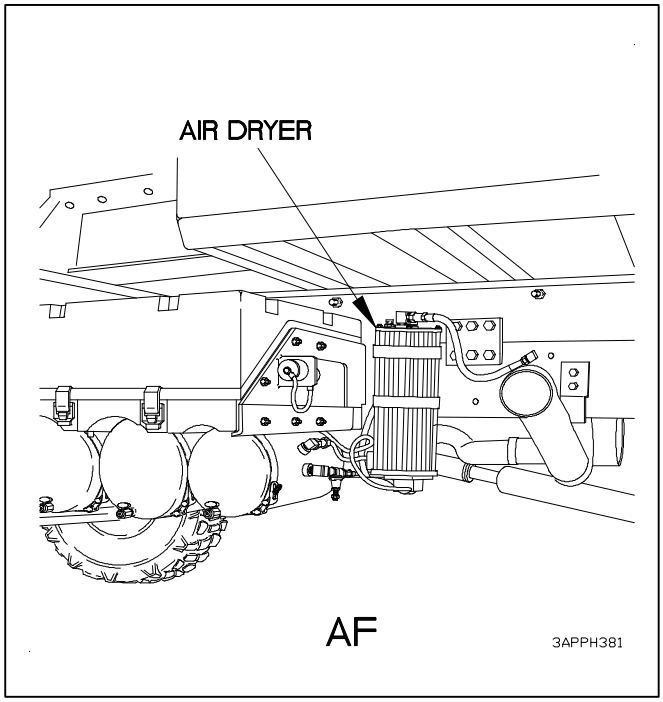

REAR ROLLER
FAIRLEAD
AB
3APPH341


REAR ROLLER
FAIRLEAD
AC
3APPH351

**H-8. LOCAL VIEWS (CONT)**



## H-9. LUBRICATION/SERVICES NOTES

**1. ENGINE CRANKCASE.** Check engine oil level daily. Change engine oil at initial 5,000 miles (8,045 km). During the remainder of the 12,000 mile (19,308 km)/18 month warranty period, Units participating in AOAP will sample engine oil every 3,000 miles (4,827 km) or 6 months, whichever occurs first and change engine oil as directed by AOAP. Units not participating in AOAP, will change engine oil every 6,000 miles (9,654 km) or every six months, whichever occurs first. After expiration of engine warranty period, Units participating in AOAP will perform engine oil change as directed by AOAP. Units not participating in AOAP will change engine oil every 6,000 miles (9,654 km) or every six months, whichever occurs first, or when operating in dusty areas or under severe operating conditions, change the oil every 3,000 miles (4,827 km) or every three months, whichever occurs first. Drain engine oil when engine is warm. Refill engine crankcase with OE/HDO specified for the ambient temperature. Engine oil is full when level is within crosshatch marks on the dipstick. Do not overfill.

**2. ENGINE OIL FILTER.** Filter is replaced each time the crankcase is drained. If water or metal particles are detected during oil filter replacement, notify Direct Support Maintenance personnel before refilling crankcase (para 3-4).

**3. TRANSMISSION.** Check transmission oil level daily. Change transmission oil at initial 5,000 miles (8,045 km). During the remainder of the 24 month/unlimited mileage warranty, Units participating in AOAP will sample transmission oil every 6,000 miles (9,654 km) or 12 months, whichever occurs first and change transmission oil as directed by AOAP. Units not participating in AOAP will perform transmission oil change every 24,000 miles (38,616 km) or once every two years, whichever occurs first. Drain transmission oil when engine is warm. Refill with OE/HDO specified for ambient temperature. Add oil until the proper level is reached (TM 9-2320-365-10). Do not overfill. Replace oil filters each time transmission oil is changed (para 8-9).

**4. POWER STEERING.** Check power steering oil level weekly. Change the oil every 24,000 miles (38,616 km). Disconnect upper and lower hoses from steering gear and drain oil. Refill power steering pump reservoir with OE/HDO specified for the ambient temperature. Reservoir is full when oil is between the two marks on the dipstick. Do not overfill. Remove dipstick, wipe clean and install dipstick fully into reservoir. Remove dipstick and read oil level. Replace oil filter each time power steering oil is changed (para 13-8).

**5. FUEL/WATER SEPARATOR.** Replace filter element every 6,000 miles (9,654 km) or once every six months, whichever occurs first (para 4-13).

**6. FUEL FILTER.** The fuel particle filter is replaced when a new fuel/water separator filter element is installed. The normal replacement interval is every 6,000 miles (9,654 km) or once every six months, whichever occurs first (para 4-14).

**7. ENGINE COOLANT.** Check engine coolant level daily. Change the coolant and flush the cooling system every 24,000 miles (38,616 km) or once every two years, whichever occurs first. Fill radiator overflow tank with an Ethylene Glycol/water mixture as specified in 0-A-548D. Service the cooling system before the specified interval if:

- Coolant is heavily contaminated.
- Engine overheats.
- Oil cooler has failed allowing oil and coolant to mix.

**8. HYDRAULIC RESERVOIR and FILTER.** Check oil level weekly and make sure oil level gage reads **F (full)**. Units participating in AOAP will sample oil annually and change oil and filter as directed by AOAP. Units not participating in AOAP will change oil and filter every two years. Drain oil and refill hydraulic reservoir with OE/HDO specified for ambient operating temperature. Fill hydraulic reservoir until oil level gage reads **F (full).** Do not overfill. Replace oil filter each time oil is changed (para 9-12).

## H-9. LUBRICATION/SERVICE NOTES (CONT)

**9. DRIVE SHAFT UNIVERSAL and SLIP YOKE.**
Lubricate drive shafts with GAA every 3,000 miles (4,827 km) or once every three months, whichever occurs first, using a low pressure lubrication gun. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first. Perform drive shaft hinging inspection every time drive shafts are serviced (para 9-3).

- UNIVERSAL JOINT:
  - A. Apply grease to both grease fittings until new grease purges from all four bearing caps.
  - B. If grease does not purge from all four bearing caps, perform the following steps:
  - (1) Loosen two screws on bearing cap that does not purge, approximately 1/4 in.
  - (2) Apply grease to grease fitting for bearing cap that does not purge until bearing cap purges.
  - (3) Remove and discard the two screws loosened in step (1).
  - (4) Position two replacement screws in bearing cap and tighten down evenly.
  - (5) Tighten two screws to 26-35 lb-ft (35-47 N•m).

- SLIP JOINT:
  - A. Apply grease until grease appears at the vent in the welch plug.
  - B. Place your finger over the welch plug vent and add grease until grease purges from the dust seal.
  - C. If grease does not purge from the dust seal, inspect drive shaft slip yoke (para 9-2).

**10. AIR/HYDRAULIC POWER UNIT and BACKUP HYDRAULIC PUMP.** Change OHA oil every 24,000 miles (38,616 km) or once every two years, whichever occurs first. To service air/hydraulic power unit and backup hydraulic pump refer to vehicle para 19-7, Air Transportability Hydraulic System Service.

**11. ALL AXLE DIFFERENTIALS.** Check oil level in differentials every 3,000 miles (4,827 km). Check oil level with vehicle parked on level surface and axle differential at ambient temperature, allowing at least one hour to cool down after vehicle operation. If oil is checked when axle differential is hot, it is normal for oil to spill out of the port due to expansion from the heat. Oil level is considered full if it is within one inch of the bottom of the fill port. If oil spills from the fill port when the axle differential is cool, it is overfull. Allow oil to drain until no more drains out. If the oil level is more than one inch below the bottom of the fill port, refill axle differential with GO specified for the ambient temperature until level with bottom of fill port. Change the oil every 24,000 miles (38,616 km) or once every two years, whichever occurs first. Drain oil when hot after operation.

**12. FRONT AXLE WHEEL END PLANETARY HUBS.** There are two lube intervals for the front axle wheel end planetary hubs.

a. Check and fill front axle wheel end planetary hubs every 3,000 miles (4,827 km) or once every three months, whichever occurs first, as follows:

(1) Position vehicle on a level surface. Allow 15 minutes for vehicle to cool before checking oil levels.
(2) Position fill port at 4 o'clock position. If oil flows from fill port when plug is loosened, let oil drain to correct level. If oil level is below fill port, fill hub with GO specified for the ambient temperature until oil is level with fill port.

b. Drain and fill front axle wheel end planetary hubs every 24,000 miles (38,616 km) or once every two years, whichever occurs first, following the repacking of the inner wheel bearings or whenever wheel end assemblies are taken apart for other maintenance as follows:

(1) Position vehicle on a level surface.
(2) Position fill port at the 6 o'clock (down) position.
(3) Drain hub oil (allow a minimum of 15 minutes for oil to drain down from vent tubes).
(4) Refill hubs with 11-13 ounces of GO specified for the ambient temperature.

**13. TIE ROD ENDS.** Lubricate tie rod ends with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun, until new grease is seen purging from the boot area. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

**14. 11K SELF-RECOVERY WINCH (SRW) CABLE:**

**CAUTION**

Do not use dry cleaning solvent to clean 11K Self-Recovery Winch (SRW) cables. Use of dry cleaning solvent will remove lubricant from inner strands of 11K SRW cables. Failure to comply may result in damage to equipment.

a. After winch operation:

Refer to FM 5-125.

b. Care of wire rope:

Refer to FM 5-125.

c. Inspection of wire rope:

Refer to FM 5-125.

d. Every six months:

(1) Unwind entire length of 11K SRW cable (TM 9-2320-365-10).
(2) Soak and clean 11K SRW cable with new OE/HDO 30.
(3) Wipe off excess OE/HDO 30.
(4) Coat 11K SRW cable with GW.
(5) Rewind 11K SRW cable (TM 9-2320-365-10).

**15. 11K SRW.** Check 11K SRW gear oil level every 6,000 miles (9,654 km) or once every six months, whichever occurs first. Refill 11K SRW with GO specified for ambient temperature. Change oil every 12,000 miles (19,308 km) or once every year, whichever occurs first. Use procedure (a) to check and fill oil level; use procedure (b) to change oil.

a. Check and fill oil level as follows:

(1) Shift the freespool mechanism to the disengage position so the drum can be freely rotated.
(2) Rotate the drum to where either plug is near the top of the 11K SRW. Remove the plug.
(3) Rotate the drum 90 degrees in the direction that allows the other plug to be near the top of the 11K SRW. Remove the plug.

**NOTE**

Oil level is full if a small amount of oil runs out of lower plug.

(4) Add oil until a small amount of oil runs out of lower plug hole.
(5) Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
(6) Rotate drum until open hole is at top.
(7) Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
(8) Tighten plugs to 13-15 lb-ft (18-20 N·m).

## H-9. LUBRICATION/SERVICE NOTES (CONT)

b. Change oil as follows:

(1) Shift the freespool mechanism to the disengage position so the drum can be freely rotated.
(2) Rotate the drum to where either plug is near the top of the 11K SRW. Remove the plug.
(3) Rotate the drum 90 degrees in the direction that allows the other plug to be near the top of the 11K SRW. Remove the plug.
(4) Position drain pan (Item 17, Appendix C) under 11K SRW.
(5) Rotate the drum until either hole is straight down to the bottom of the 11K SRW. Allow the oil to drain completely.
(6) Rotate the drum until either hole is at top.

NOTE

Oil level is full if a small amount of oil runs out of lower plug.

(7) Add oil until a small amount of oil runs out of lower plug hole.
(8) Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
(9) Rotate drum until open hole is at top.
(10) Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
(11) Tighten plugs to 13-15 lb-ft (18-20 N•m).

**16. TOWING PINTLE.** Lubricate towing pintle with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun until new grease is seen purging.

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 F (38 C) and for Type II is 138 F (50 C). Failure to comply may result in serious 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 medical attention. Failure to comply may result in injury to personnel.**

**17. ENGINE CRANKCASE BREATHER.** Remove crankcase breather and clean with Dry Cleaning Solvent (SD P-D-680) (Item 71, Appendix D) or equivalent, and replace o-ring seal every 6,000 miles (9,654 km) or once every six months, whichever occurs first (para 3-5).

**18. FRONT and REAR AXLE SPRING BOLT and SPRING SHACKLE.** Lubricate front and rear axle spring bolts and spring shackles with GAA every 3,000 miles (4,827 km) or once every three months, whichever occurs first, using a low pressure lubrication gun until grease appears between pins and bushings at both ends of spring bolt and spring shackle. If pins do not accept grease, notify Direct Support to remove pins. Clean and inspect pins and bushings, replace if necessary. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

**19. BATTERY POSTS.** Service batteries in accordance with TM 9-6140-200-14, every 6,000 miles (9,654 km) or once every six months, whichever occurs first.

**20. FRONT AXLE SHAFT UNIVERSAL JOINTS and STEERING KNUCKLES.** Lubricate universal joints every 3,000 miles (4,827 km) or once every three months, whichever occurs first. Lubricate steering knuckles with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

**21. BRAKE WEDGE and AIR CHAMBER: BRAKE SPIDER, SELF-ADJUSTER MECHANISM, AND WEDGE ASSEMBLY.** Clean and lubricate (with GAA) areas of spider and hardware that contact the brake shoes. Disassemble, clean and lubricate the self-adjuster mechanism. Clean and lubricate the wedge head, rollers and ramps in the plungers. Clean and lubricate every 6,000 miles (9,654 km). If operating conditions are severe or abnormal, service at 3,000 miles (4,827 km) or once every three months, whichever occurs first, or when any of the following occur: Refer to para 11-4 and 11-5.

- Seals are replaced
- Plungers are removed
- Brakes are relined
- Grease becomes contaminated or hardened

**22. FRONT and REAR AXLE INNER WHEEL BEARINGS.** Repack inner wheel bearings with GAA every 12,000 miles (19,308 km), when semiannual PMCS inspection of service brakes reveals oil leak from inner hub, or whenever wheel end assemblies are taken apart for other maintenance (para 10-2).

**23. 11K SRW CABLE ROLLER FAIRLEADS.** Lubricate with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 F (38 C) and for Type II is 138 F (50 C). Failure to comply may result in serious 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 medical attention. Failure to comply may result in injury to personnel.**

**24. FRONT LIFTING BEAM.** Remove left and right lifting beams and clean with Dry Cleaning Solvent (SD P-D-680) (Item 71, Appendix D) or equivalent, every 6,000 miles (9,654 km) or once every six months, whichever occurs first. Apply a light coat of GAA to lifting beams. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

**25. AIR DRYER.** Service air dryer (para 23-6) every 12,000 miles (19,308 km) or annually, whichever occurs first.

**26. FRONT AND REAR LEAF SPRING.** At initial 1000 miles (1609 km) of vehicle operation, tighten U-bolts to 390-510 lb-ft (529-692 N•m).

# APPENDIX J
# ADDITIONAL AUTHORIZATION LIST (AAL)

## Section I. INTRODUCTION

### J-1. SCOPE

This appendix lists additional items you are authorized for the support of the LMTV.

### J-2. GENERAL

This list identifies items that do not have to accompany the LMTV and that do not have to be turned in with it. These items are all authorized to you by Common Tables of Allowance (CTA), Modification Table of Organization and Equipment (MTOE), Tables of Distribution and Allowances (TDA), or Joint Table of Allowance (JTA).

### J-3. EXPLANATION OF LISTING

National Stock Numbers, description, and quantities are provided to help you identify and request the additional items you require to support this equipment.

## Section II. ADDITIONAL AUTHORIZATION LIST

| (1)<br>National Stock<br>Number | (2)<br>Description<br>(CAGE) Part Number | (3)<br><br>U/M | (4)<br>Qty<br>Auth |
|---|---|---|---|
| 6685-01-193-1733 | 10,000 PSI Transducer:<br>(19207) 12258956 | EA | 1 |

# APPENDIX K
# TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART

## Section I. INTRODUCTION

### K-1. INTRODUCTION

This appendix lists the various transmission controls and configuration modifications that may be required to permit the transmission to function correctly. This appendix will guide the mechanic through the hardware selection process by identifying compatibility issues between the transmission controls (WTEC II/WTEC III) and the numerous revisions of the Allison MD3070PT transmission (PRE-ID w/ 24-pin connector, PRE-ID w/ 31-pin connector, TID 1, TID 2, and TID 3). Refer to Figure 1. After replacing any component of the transmission controls or the transmission assembly, perform calibration procedures in TM 9-2320-365-20-3 paragraph 8-2 or 8-3.

### K-2. EXPLANATION OF COLUMNS

**a. Column (1) - Installed Controls or Controls Being Installed.** This column lists all of the variables concerning which version of transmission controls are installed in the vehicle, or may need to be installed, to communicate correctly with the transmission.

**b. Column (2) - Installed Transmission or Transmission Being Installed.** This column lists all of the various revisions of the Allison MD3070PT transmissions that may be installed in the vehicle.

**c. Column (3) - Required Modification.** This column lists the various electrical interface (hardware) modifications that may be required to allow the transmission controls to communicate with the transmission.

### K-3. HOW TO USE THIS CHART

**a.** Determine which controls and transmission are installed in the vehicle.

**b.** Determine which component requires replacement.

**c.** Read across the row to column (3) to determine the required modification.

## Section II.

## TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART

| (1)<br>Installed Controls or<br>Controls Being Installed | (2)<br>Installed Transmission or<br>Transmission Being Installed | (3)<br>Required Modification<br>(Refer to Section III) |
|---|---|---|
| WTEC II<br>(with 24-pin connector) | PRE-ID w/ 24-pin connector<br>(transmission serial number prior to 6510032369) | No modification required. |
| WTEC II<br>(with 24-pin connector) | PRE-ID w/ 31-pin connector<br>(transmission serial number 6510032369 to 6510090785) | Install 31-pin connector. |
| WTEC II<br>(with 24-pin connector) | TID 1<br>(transmission serial number 6510090786 to 6510142171) | Install 31-pin connector. |
| WTEC II<br>(with 24-pin connector) | TID 2<br>(transmission serial number 6510142172 to 6510262116) | Install 31-pin connector and replace transmission internal wiring harness. |

## TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART (CONT)

| (1) Installed Controls or Controls Being Installed | (2) Installed Transmission or Transmission Being Installed | (3) Required Modification (Refer to Section III) |
|---|---|---|
| WTEC II (with 24-pin connector) | TID 3 (transmission serial number 6510262117 and subsequent) | Install 31-pin connector, replace transmission internal wiring harness, and reprogram WTEC II TEPSS. [1] |
| WTEC II (with 31-pin connector) | PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369) | Install adapter cable assembly. |
| WTEC II (with 31-pin connector) | PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785) | No modification required. |
| WTEC II (with 31-pin connector) | TID 1 (transmission serial number 6510090786 to 6510142171) | No modification required. |
| WTEC II (with 31-pin connector) | TID 2 (transmission serial number 6510142172 to 6510262116) | Replace transmission internal wiring harness. |
| WTEC II (with 31-pin connector) | TID 3 (transmission serial number 6510262117 and subsequent) | Replace transmission internal wiring harness and reprogram WTEC II TEPSS. [1] |
| WTEC III (with ECU manufactured prior to October 1999) [2] | PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369) | Install adapter cable assembly and ID harness. |
| WTEC III (with ECU manufactured prior to October 1999) [2] | PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785) | Install ID harness. |
| WTEC III (with ECU manufactured prior to October 1999) [2] | TID 1 (transmission serial number 6510090786 to 6510142171) | No modification required. |
| WTEC III (with ECU manufactured prior to October 1999) [2] | TID 2 (transmission serial number 6510142172 to 6510262116) | No modification required. |
| WTEC III (with ECU manufactured prior to October 1999) [2] | TID 3 (transmission serial number 6510262117 and subsequent) | Reprogram WTEC III ECU [1] or install new WTEC III ECU (P/N 12421787-002). |
| WTEC III (with ECU manufactured after October 1999) [3] | PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369) | Install adapter cable assembly and ID harness. |
| WTEC III (with ECU manufactured after October 1999) [3] | PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785) | Install ID harness. |
| WTEC III (with ECU manufactured after October 1999) [3] | TID 1 (transmission serial number 6510090786 to 6510142171) | No modification required. |

[1] Reprogramming can only be accomplished by an authorized Allison Transmission distributor. You must provide the transmission serial number of the transmission being installed to ensure correct reprogramming. If at a later time, an earlier version transmission is installed in a WTEC II equipped vehicle, WTEC II TEPSS will require reprogramming again.
[2] Vehicle serial number 012477 and lower. Refer to Figure 1.
[3] Vehicle serial number 012478 and higher. Refer to Figure 1.

| (1) Installed Controls or Controls Being Installed | (2) Installed Transmission or Transmission Being Installed | (3) Required Modification (Refer to Section III) |
|---|---|---|
| WTEC III (with ECU manufactured after October 1999) [3] | TID 2 (transmission serial number 6510142172 to 6510262116) | No modification required. |
| WTEC III (with ECU manufactured after October 1999) [3] | TID 3 (transmission serial number 6510262117 and subsequent) | No modification required. |

## Section III.

## MODIFICATION PARTS IDENTIFICATION

| Identification | Part Number/NSN | Description |
|---|---|---|
| 31-pin connector | 300130<br>5935-21-921-1813 | Converts a transmission external wiring harness from a 24-pin ("D" type) connector to a 31-pin (round type) connector. |
| Transmission internal wiring harness | 29529474<br>6150-01-481-8088 | Converts a TID 2 transmission to a TID 1 configuration to allow WTEC II controls to communicate with the transmission. |
| Gasket | 29503283<br>5330-01-360-9035 | Required when replacing transmission internal wiring harness. |
| ID harness | 200100<br>6150-21-921-1191 | Allows WTEC III controls to communicate with a PRE-ID transmission. |
| Adapter cable assembly | 29519210<br>6150-01-420-5987 | Adapts a PRE-ID transmission with 24-pin ("D" type) connector to a transmission external wiring harness with a 31-pin (round) connector. |

## MODIFICATION PARTS IDENTIFICATION (CONT)

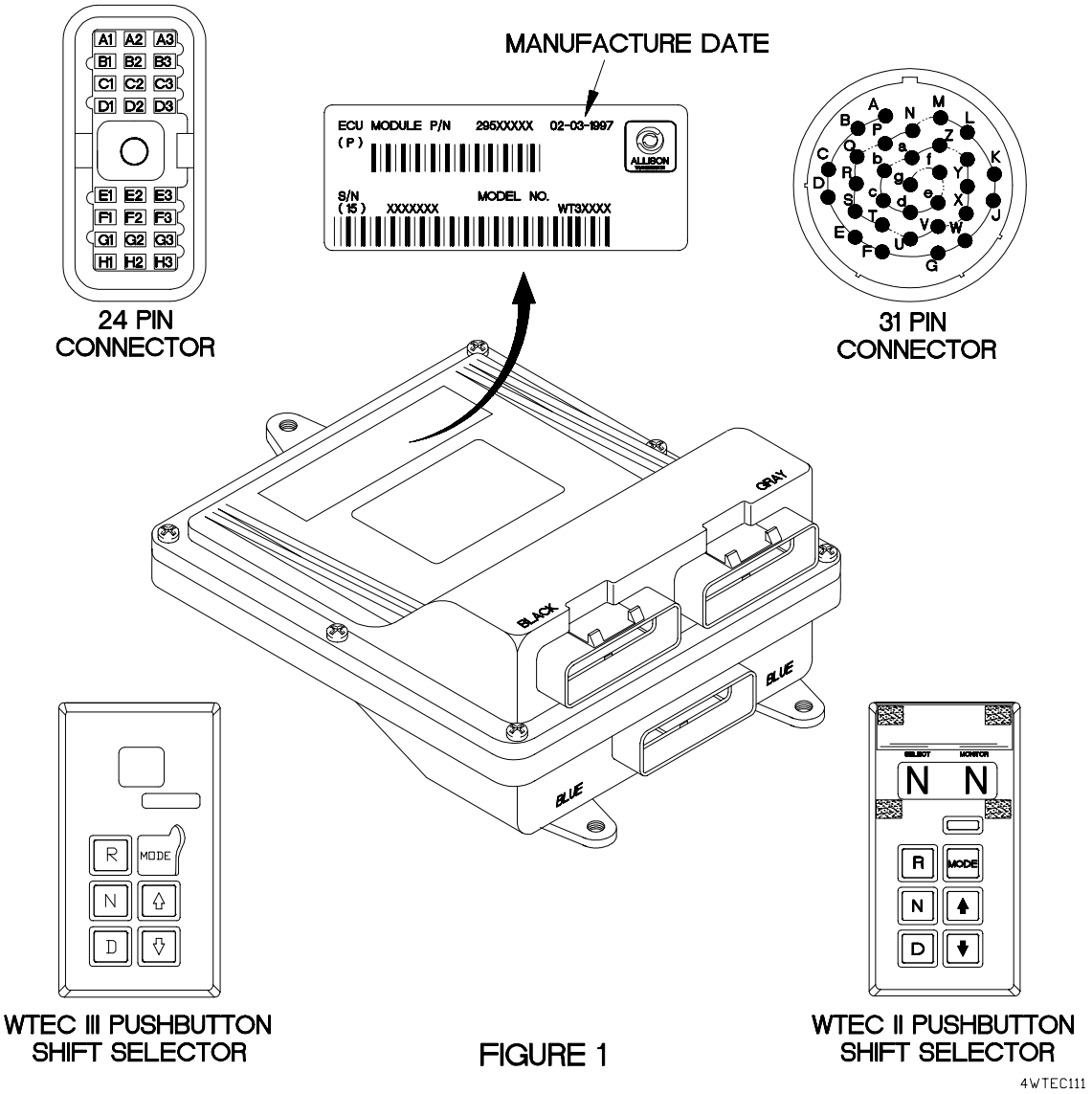



FIGURE 1

# SUBJECT INDEX


Subject Para

## A

Absorber
Rear Axle Shock Absorber Replacement . . . . . 15-4
Accessory
Introduction, Body, Chassis, and Accessory Items Maintenance . . . . . 18-1
M1079 Van Body Interior Accessory Mounting Locations . . . . . 16-44
Accelerator Pedal Replacement . . . . . 4-21
Air
Brake Air Hoses Replacement . . . . . 11-19
Brake Protecting Valve Replacement . . . . . 11-16
Brake System Loses Air When Brakes Are Applied . . . . . 2-20
Cab Leveling Air Springs Will Not Operate . . . . . 2-30
Charge Air Cooler to Air Inlet Elbow Tubes and Hoses Replacement . . . . . 4-5
Compressor Governor Adjustment . . . . . 11-29
Compressor Inlet and Outlet Coolant Tubes Replacement . . . . . 6-11
Dryer Does Not Operate . . . . . 2-16
Dryer Purges Constantly . . . . . 2-21
Dryer Replacement/Repair . . . . . 21-14
Engine Air Intake System . . . . . 1-11
Filter Restriction Gauge Replacement . . . . . 24-2
Front Brake Air Chamber Replacement . . . . . 11-7
Front Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI . . . . . 2-16
FRONT BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
Front Brake Air Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
/Hydraulic Power Unit and Bracket Replacement/Repair . . . . . 19-3
Intake Air Cleaner Filter Element, Air Cleaner Assembly, and Particle Extraction Tube Replacement . . . . . 4-2
Introduction, Air System Maintenance . . . . . 23-1
Large Quantity of Moisture Expelled From Air Reservoirs . . . . . 2-21
M1079 Air Conditioner Does Not Operate . . . . . 2-16

Subject Para

## A (Cont)

Air (Cont)
M1079 Air Conditioner ECU Connector Replacement . . . . . 16-47
M1079 Air Conditioner Kit Installation/ Removal . . . . . 20-81
M1079 Air Conditioner Power Cable Replacement . . . . . 20-82
M1079 Air Filter Replacement . . . . . 16-33
M1079 Heater and Air Conditioner Cover Replacement . . . . . 16-31
M1079 Van Preparation For Air Transport . . . . . 16-73
No Air Pressure Present At Rear Gladhands . . . . . 2-21
Noisy Air Compressor Operation . . . . . 2-21
Pressure Transmitter Replacement . . . . . 7-36
Primary and Central Tire Inflation System (CTIS) Air Hoses Replacement . . . . . 23-2
Radiator/Charge Air Cooler Replacement . . . . . 6-2
REAR BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
REAR BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
Rear Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI . . . . . 2-16
Rear Brake Air Chamber Replacement . . . . . 11-8
Secondary and Primary Air Tanks Replacement . . . . . 11-20
Spring and Bracket Replacement . . . . . 16-9
System . . . . . 1-19
System Loses Pressure During Operation/ Slow, No, or Incorrect Air Pressure Buildup . . . . . 2-21
System Park and Trailer Air Supply Valves Replacement . . . . . 11-18
System Pressure Builds Up to More Than 120 psi (827 kPa) (Compressor Fails to Unload) . . . . . 2-21
System Troubleshooting . . . . . 2-21
Transport Troubleshooting . . . . . 2-30
Transportability Air Hoses Replacement . . . . . 23-3

# SUBJECT INDEX (CONT)


Subject Para

## A (Cont)

Air (Cont)
Transportability Hydraulic Hose Replacement . . . . . 19-11
Transportability Hydraulic System . . . . . 1-18
Transportability Hydraulic System Service . . . . . 19-7
Alarm
Audible Alarm Does Not Operate . . . . . 2-16
Audible Alarm Replacement . . . . . 7-35
Chemical Alarm Does Not Operate . . . . . 2-16
Chemical Alarm Kit Cable Assembly Replacement . . . . . 7-52
M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate . . . . . 2-16
Troop Transport Alarm Cable Replacement . . . . . 20-79
Troop Transport Alarm Does Not Operate . . . . . 2-31
Troop Transport Audible Alarm Does Not Operate . . . . . 2-16
Troop Transport Alarm Switch, Connector, and Bracket Replacement . . . . 20-80
All Marker Lights Do Not Illuminate In Normal Mode . . . . . 2-16
Alternator
Belts Replacement . . . . . 7-3
Brackets Replacement . . . . . 7-4
Ground Strap Replacement . . . . . 7-64
100 Amp Alternator Replacement . . . . . 7-2
100 Amp Alternator to Reverse Polarity Relay 12 VDC Cable Replacement . . . . . 7-65
100 Amp Alternator to Reverse Polarity Relay 24 VDC Cable Replacement . . . . . 7-66
24 VDC Circuits Do Not Operate . . . . . 2-16
200 Amp Alternator Kit Installation . . . . . 20-54
200 Amp Alternator Kit Removal . . . . . 20-55
200 Amp Alternator to Terminal Block 12 VDC Cable Replacement . . . . . 20-59
200 Amp Alternator to Terminal Block 24 VDC Cable Replacement . . . . . 20-61
200 Amp Alternator Replacement . . . . . 20-56
Amber Warning Light Switch Does Not Illuminate . . . . . 2-16

Subject Para

## A (Cont)

Amp
100 Amp Alternator Replacement . . . . . 7-2
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement . . . . . 7-80
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement . . . . . 7-81
100 Amp Reverse Polarity Relay Replacement . . . . . 7-27
100 Amp Voltage Regulator Replacement . . . . . 7-5
24 VDC Circuits Do Not Operate . . . . . 2-16
12 VDC and/or 24 VDC Circuits Do Not Operate . . . . . 2-16
200 Amp Alternator Kit Installation . . . . . 20-54
200 Amp Alternator Kit Removal . . . . . 20-55
200 Amp Alternator Replacement . . . . . 20-56
200 Amp Alternator to Terminal Block 12 VDC Cable Replacement . . . . . 20-59
200 Amp Alternator to Terminal Block 24 VDC Cable Replacement . . . . . 20-61
200 Amp Reverse Polarity Relay Replacement . . . . . 20-58
200 Amp Terminal Block Replacement . . . . 20-69
200 Amp Terminal Block to Power Distribution Panel (PDP) 12 VDC Cable Replacement . . . . . 20-65
200 Amp Terminal Block to Power Distribution Panel (PDP) 24 VDC Cable Replacement . . . . . 20-68
200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Load Cable Replacement . . . . . 20-60
200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Load Cable Replacement . . . . . 20-62
200 Amp Voltage Regulator Replacement . . . . . 20-57
Anchor
Latch and Cab Anchor Brackets Replacement . . . . . 16-74
Anti-Compounding Relay Valve Replacement . . . . . 11-11
Armament
Introduction, Armament/Sighting and Fire Control Materiel Maintenance . . . . . 21-1

Subject Para

## A (Cont)


Assembly
General Assembly Instructions . . . . . 2-41
Audible
Alarm Does Not Operate . . . . . 2-16
Alarm Replacement . . . . . 7-35
Troop Transport Audible Alarm Does Not Operate . . . . . 2-16
Auxiliary
M1079 W/O Winch Auxiliary Panel Cable Assembly Replacement . . . . . 7-50
Panel Cable Assembly Replacement (All Models Except M1079 W/O Winch) . . . . . 7-49
Panel Does Not Illuminate . . . . . 2-16
Panel, Instrument Panel, and Personnel Heater Do Not Illuminate . . . . . 2-16
Panel Replacement . . . . . 7-8
Panel Switch Does Not Illuminate . . . . . 2-16
Starter Solenoid Replacement . . . . . 7-6
Axle
Differential(s) Noisy . . . . . 2-25
Introduction, Front and Rear Axle Maintenance . . . . . 10-1
Front Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement . . . . . 12-8
Rear Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement . . . . . 12-9
Rear Axle Shaft Replacement . . . . . 10-4
Rear Axle Shock Absorber Replacement . . . . . 15-4
Troubleshooting . . . . . 2-25


## B


Backup
Light Assembly Replacement/Repair . . . . . 7-29
Light Does Not Illuminate . . . . . 2-16
Back-Up
Hydraulic Pump Replacement . . . . . 19-2
Batteries
Disconnecting/Connecting Batteries . . . . . 7-48
Battery
Box Replacement . . . . . 7-47
/Battery Cables Replacement . . . . . 7-46
Tester Does Not Operate . . . . . 2-16
Tester Replacement . . . . . 7-45
to Shunt Cable Assembly Replacement . . . . . 7-69
to Starter Cable Assembly Replacement . . . . . 7-70


Subject Para

## B (Cont)


Battery (Cont)
to 100 Amp Reverse Polarity Relay 12 VDC Cable Replacement . . . . . 7-67
to 100 Amp Reverse Polarity Relay 24 VDC Cable Replacement . . . . . 7-68
to 200 Amp Terminal Block 12 VDC Cable Assembly Replacement . . . . . 20-63
to 200 Amp Terminal Block 24 VDC Cable Assembly Replacement . . . . . 20-64
Beams
One or Both Headlights (High and Low Beams) Do Not Illuminate . . . . . 2-16
One or Both Headlight High Beams Do Not Illuminate . . . . . 2-16
One or Both Headlight Low Beams Do Not Illuminate . . . . . 2-16
Turn Signal Indicators and High Beams on Indicator Do Not Operate . . . . . 2-16
Belt
Drive Belt and Tension Pulley Replacement . . . . . 6-13
Seat Belt Replacement . . . . . 16-15
Belts
Alternator Belts Replacement . . . . . 7-3
Binding
M1079 Field Telephone Binding Post/ Box and Conduit Replacement . . . . . 16-51
M1079 24 VDC Binding Post/Box and Conduit Replacement . . . . . 16-52
Blackout
Drive Light Does Not Illuminate . . . . . 2-16
Drive Light Replacement/Repair . . . . . 7-30
Marker Lights Do Not Illuminate . . . . . 2-16
M1079 Blackout Light(s) Does Not Operate . . . . . 2-16
M1079 Blackout Override Switch Replacement . . . . . 16-56
M1079 Blackout Shield and Frame Replacement/Repair . . . . . 16-37
M1079 Blackout Switch Replacement . . . . . 16-57
M1079 Blackout/Emergency Light Replacement . . . . . 16-58
M1079 Fluorescent Lights Do Not Operate In Blackout Override Mode . . . . . 2-16
M1079 110 VAC Outlet J232 and J233 Do Not Operate In Blackout Override Mode . . . . . 2-16
One or Both Blackout Stoplights Do Not Illuminate . . . . . 2-16
Boarding Handles Replacement . . . . . 16-76

# SUBJECT INDEX (CONT)


Subject Para

## B (Cont)

Body
All M1079 Van Body Marker Lights Do Not Operate . . . . . 2-16
Introduction, Body and Cab Maintenance . . . . . 16-1
Introduction, Body, Chassis, and Accessory Items Maintenance . . . . . 18-1
M1079 Van Body Floor Tapping Plate Initial Installation (Serial Numbers 001 through 190) . . . . . 16-43
M1079 Van Body Interior Mounting Locations . . . . . 16-44
M1079 Van Body Clearance Marker Light Does Not Illuminate . . . . . 2-16
M1079 Van Body Replacement . . . . . 16-19
Boom
Light Material Handling Crane (LMHC) Boom Replacement . . . . . 20-74
Light Material Handling Crane (LMHC) Boom Sheave Replacement . . . . . 20-75
Brackets
Alternator Brackets Replacement . . . . . 7-4
Brake
Air Brake Protecting Valve Replacement . . . . . 11-16
Air Hoses Replacement . . . . . 11-19
Foot Control Valve and Brake Foot Pedal Replacement . . . . . 11-9
Front Brake Air Chamber Replacement . . . . . 11-7
FRONT BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
Front Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI . . . . . 2-16
FRONT BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
Front Brake Plunger Assembly Replacement/Repair . . . . . 11-4
Front Brake Shoes Replacement/ Adjustment . . . . . 11-2
Introduction, Brake System Maintenance . . . . . 11-1
Parking Brake Indicator and/or Emergency Brake Indicator Does Not Operate . . . . . 2-16
Parking Brake Does Not Release . . . . . 2-20
REAR BRAKE AIR Gage Does Not Illuminate . . . . . 2-16

Subject Para

## B (Cont)

Brake (Cont)
REAR BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
Rear Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI . . . . . 2-16
Rear Brake Air Chamber Replacement . . . . . 11-8
Rear Brake Plunger Assembly Replacement/Repair . . . . . 11-5
Rear Brake Shoes Replacement/ Adjustment . . . . . 11-3
Rear Spring Brake Caging . . . . . 11-6
System . . . . . 1-15
System Loses Air When Brakes Are Applied . . . . . 2-20
System Troubleshooting . . . . . 2-20
Braking
Excessive Braking Distance . . . . . 2-20
Brakes
Brake System Loses Air When Brakes Are Applied . . . . . 2-20
Front Brakes Do Not Apply . . . . . 2-20
Front Brakes Overheat and/or Do Not Release . . . . . 2-20
Parking Brakes Does Not Apply . . . . . 2-20
Rear Brakes Do Not Apply . . . . . 2-20
Rear Brakes Overheat . . . . . 2-20
Vehicle Brakes Unevenly, Brakes Pull to One Side or Grab . . . . . 2-20
Breather
Crankcase Breather Replacement . . . . . 3-5
Bumper
Front Bumper Replacement . . . . . 14-2
M1079 Rubber Bumper and Tee Latch Replacement . . . . . 16-29

## C

Cab
Clearance Marker Lights Cable Assembly Replacement . . . . . 7-59
Does Not Raise . . . . . 2-32
Does Not Lower . . . . . 2-32
Emergency Cab Lift Procedure . . . . . 19-8
Exhaust Fumes in Cab . . . . . 2-14

Subject Para

## C (Cont)


Cab (Cont)
Floor Covering Replacement 16-12
Hydraulic Cylinder Replacement 19-10
Hydraulic Latch Replacement/ Adjustment 19-6
Introduction, Body and Cab Maintenance 16-1
Latch and Cab Anchor Brackets Replacement 16-74
Left-Hand Door and Cab Marker Lights Cable Assembly Replacement 7-54
Leveling Air Springs Will Not Operate 2-30
Leveling Valve and linkage Replacement/ Adjustment 16-8
Panel Liners Replacement 16-13
M1081 Cab Clearance and Marker Lights Lower Cable Assembly Replacement 7-55
M1081 Cab Clearance and Marker Lights Upper Cable Assembly Replacement 7-56
M1081 Cab Roof Replacement 16-4
Mirror Replacement 18-7
Convex Mirror
Initial Installation 20-3
RH Convex Mirror Initial Installation 20-2
RH Convex Mirror Replacement 18-13
One or More Cab Top Marker Lights Do Not Illuminate 2-16
Power Distribution Panel (PDP) to Cab Ground Cable Replacement 7-76
Rear Cab Support Assembly Replacement 16-7
Right-Hand Door and Cab Marker Lights Cable Assembly Replacement 7-57
Step Replacement 16-11
Storage Box Replacement/Repair 16-17
Tilt and Spare Tire Retainer Troubleshooting 2-32
Tilt, Spare Tire Retainer, and Suspension Compression Will Not Work 2-30
to Chassis Ground Strap Replacement 7-71
Will Not Raise or Lower Properly 2-32
WTEC II Cab Transmission Harness Replacement 7-86
WTEC III Cab Transmission Harness Replacement 7-87
Cable
Auxiliary Panel Cable Assembly Replacement (All Models Except M1079 W/O winch) 7-49
Battery/Battery Cables Replacement 7-46
Battery to Shunt Cable Assembly Replacement 7-69
Battery to Starter Cable Assembly Replacement 7-70


Subject Para

## C (Cont)


Cable (Cont)
Central Tire Inflation System (CTIS) Cable Assembly Replacement 7-53
Engine Control Cable Assembly Replacement 7-72
Front Intervehicular 12 VDC (7 Pin) Cable Replacement 7-73
Front Lights Cable Assembly Replacement 7-74
Left-Hand Door and Cab Marker Lights Cable Assembly Replacement 7-54
Load Sensing Valve and Control Cable Replacement/Adjustment 11-10
Rear Lights Cable Assembly Replacement 7-75
M1079 Air Conditioner Power Cable Replacement 20-82
M1079 Heater Control Cable Replacement 20-43
M1079 Heater Fuel Pump Power Cable Replacement 20-49
M1079 Heater Power Cable Replacement 20-42
M1079 Heater Thermostat Cable Replacement 20-45
M1079 W/O Winch Auxiliary Panel Cable Assembly Replacement 7-50
M1079 110/208 VAC Power In/Out Cable Replacement 16-68
M1079 12/24 VDC Power Cable Replacement 7-51
M1081 Cab Clearance and Marker Lights Lower Cable Assembly Replacement 7-55
M1081 Cab Clearance and Marker Lights Upper Cable Assembly Replacement 7-56
NATO Power Cable Replacement 7-63
Power Distribution Panel (PDP) to Cab Ground Cable Replacement 7-76
Power Take-Off (PTO) Cable Assembly Replacement 7-77
Rear Intervehicular 12 VDC (7 Pin) Cable Replacement 7-78
Rear Intervehicular 24 VDC (12 Pin) Cable Replacement 7-79
Right-Hand Door and Cab Marker Lights Cable Assembly Replacement 7-57
Start and Charging Cable Assembly Replacement 7-82

# SUBJECT INDEX (CONT)


Subject Para

## C (Cont)

Cable (Cont)
- Starter to Chassis Ground Cable Replacement . . . . . 7-83
- Starter to Shunt 24 VDC Cable Replacement . . . . . 7-84
- STE/ICE-R Cable Assembly Replacement . . . . . 7-58
- Throttle Control Cable Replacement/ Adjustment . . . . . 4-18
- Throttle Position Sensor (TPS) Cable Assembly Replacement . . . . . 4-16
- Troop Transport Alarm Cable Assembly Replacement . . . . . 20-79
- Warning Light Cable Assembly Replacement . . . . . 22-2
- Winch Control Valve Cable Assembly Replacement . . . . . 7-85
- Windshield Washer Pump Electromagnetic Interference (EMI) Cable Assembly Replacement . . . . . 7-60
- Windshield Wiper Electromagnetic Interference (EMI) Cable Replacement . . . . . 7-61
- WTEC II Dashboard Cable Assembly Replacement/Repair . . . . . 7-10
- WTEC III Dashboard Cable Assembly Replacement/Repair . . . . . 7-11
- 100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement . . . . . 7-80
- 100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement . . . . . 7-81
- 11K Self-Recovery Winch (SRW) Cable Replacement . . . . . 17-5
- 200 Amp Alternator to Terminal Block 12 VDC Cable Replacement . . . . . 20-59
- 200 Amp Alternator to Terminal Block 24 VDC Cable Replacement . . . . . 20-61
- 200 Amp Terminal Block to Power Distribution Panel (PDP) 12 VDC Cable Replacement . . . . . 20-65
- 200 Amp Terminal Block to Power Distribution Panel (PDP) 24 VDC Cable Replacement . . . . . 20-68
- 200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Battery Cable Replacement . . . . . 20-66

Subject Para

## C (Cont)

Cable (Cont)
- 200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Battery Cable Replacement . . . . . 20-67
- 200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Load Cable Replacement . . . . . 20-60
- 200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Load Cable Replacement . . . . . 20-62

Caging
- Rear Spring Brake Caging . . . . . 11-6

Central
- Tire Inflation System (CTIS) Cable Assembly Replacement . . . . . 7-53
- Tire Inflation System (CTIS) Does Not Deflate Tires . . . . . 2-16
- Tire Inflation System (CTIS) Does Not Inflate Tires . . . . . 2-16
- Tire Inflation System (CTIS) Does Not Operate . . . . . 2-16
- Tire Inflation System (CTIS) ECU Indicates No Fault Code But Fails to Inflate or Deflate . . . . . 2-24
- Tire Inflation System (CTIS) ECU Replacement . . . . . 12-6
- Tire Inflation System (CTIS) Hose Assemblies, Manifold Valve, Kneeling Valve and Bracket Replacement . . . . . 12-5
- Tire Inflation System (CTIS) Overspeed Indicator Does Not Operate . . . . . 2-16
- Tire Inflation System (CTIS) Repeatedly Resumes Cycling 30 Seconds After Indicator Lights Stop Flashing . . . . . 2-24
- Tire Inflation System (CTIS) Troubleshooting . . . . . 2-24

Charge
- Radiator/Charge Air Cooler Replacement . . . . 6-2
- Turbocharger to Charge Air Cooler Tube and Hoses Replacement . . . . . 4-4

Charging
- Start and Charging Cable Assembly Replacement . . . . . 7-82

Chassis
- Introduction, Body, Chassis, and Accessory Items Maintenance . . . . . 18-1
- M1079 Chassis Ground Lug Replacement . . . . . 16-69

Subject Para

## C (Cont)


Checking and Stenciling High/Low Hand Throttle Positions ..... 4-22
Chemical
Alarm Does Not Operate ..... 2-16
Alarm Kit Cable Assembly Replacement ..... 7-52
Detector Does Not Operate ..... 2-16
Detector Indicator Does Not Operate ..... 2-16
Circuit
Breaker, Diode, and Relay Replacement ..... 7-9
Breaker Does Not Operate ..... 2-16
M1079 15/20/30 and 50 Amp AC Circuit Breaker Replacement ..... 16-64
M1079 200 Amp AC Circuit Breaker Replacement ..... 16-65
M1079 5/20 Amp DC Circuit Breaker Replacement ..... 16-61
Circuits
24 VDC Circuits Do Not Operate ..... 2-16
12 VDC and/or 24 VDC Circuits Do Not Operate ..... 2-16
Cleaning
General Cleaning Instructions ..... 2-38
Clearance
And Marker Light Assemblies Replacement ..... 7-31
Intervehicle Clearance Lights Do Not Operate ..... 2-16
M1079 Clearance and Marker Lights Replacement ..... 16-60
Code
WTEC II Code Reading and Code Clearing Procedures ..... 8-4
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Emits Eight Seconds of Beeps and/or Transmission Does Not Shift Gears ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 14 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 24 and/or 33 and Any Sub Code ..... 2-17


Subject Para

## C (Cont)


Code (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 41, 42, 44, 45, 66, and/or 69 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 43 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 52 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 57 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 21 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 51 Sub Code 10, 12, 21, 43, 45, or 65 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 25 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 53 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 54 Sub Code 01, 07, 10, 12, 17, 21, 23, 27, 32, 34, 43, 45, 54, 56, 65, 70, 71, 72, 80, 81, 82, 83, 85, 86, 92, 93, 95, 96, or 97 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 55 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 56 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 13 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 23 and Any Sub Code ..... 2-17

# SUBJECT INDEX (CONT)


Subject Para

## C (Cont)

Code (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Does Not Illuminate 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 14 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 24 and/or 33 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 32 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 42, 44, 45, 46, 66, and/or 69 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 52 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 57 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 21 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 51 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 25 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 53 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 54 and Any Sub Code 2-17

Subject Para

## C (Cont)

Code (Cont)
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 55 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 56 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 13 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Indicator Displays "--" and/or Transmission Does Not Shift Gears 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 23 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Does Not Illuminate 2-17
Column
Steering Column Replacement 13-6
Common Tools and Equipment, Vehicle
Compressor
Air Compressor Governor Adjustment 11-29
Air Compressor Inlet and Outlet Coolant Tubes Replacement 6-11
Noisy Air Compressor Operation 2-21
Conduit
M1079 Door Ajar Switch/Box and Conduit Replacement 16-55
M1079 Fan Switch/Box and Conduit Replacement 16-54
M1079 Field Telephone Binding Post/ Box and Conduit Replacement 16-51
M1079 Interior Lights Switch/Box and Conduit Replacement 16-50
M1079 Lighting Fixture and Conduit Replacement 16-59
M1079 110 VAC Outlet/Box and Conduit Replacement 16-53
M1079 110/208 VAC Power Entry Panel and Conduit Replacement 16-70
M1079 12/24 VDC Power Entry Panel and Conduit Replacement 16-72
M1079 24 VDC Binding Post/Box and Conduit Replacement 16-52

Subject Para

## C (Cont)


Coolant
Bypass Tube Replacement 6-7
In Engine Lubrication Oil 2-12
Loss of Coolant 2-15
Lower Coolant Hose Replacement 6-10
Temperature Gage Sensor Replacement 7-37
Temperature Light Switch Replacement 7-22
Upper Coolant Tube and Hoses Replacement 6-9
Cooler
Radiator/Charge Air Cooler Replacement 6-2
Transmission Oil Cooler Hoses Initial Installation 8-14
Transmission Oil Cooler Hoses Replacement 8-15
Transmission Oil Cooler Hose Bracket Replacement 8-16
Transmission Oil Cooler Replacement 8-10
Transmission Oil Cooler Tubes Replacement 8-11
Cooling
Introduction, Cooling System Maintenance 6-1
Oil In Cooling System 2-15
System 1-13
System Troubleshooting 2-15
Cover
Cold Weather Radiator Cover Installation/Removal 18-12
Defrost Cover Replacement 18-8
M1079 Heater and Air Conditioner Cover Replacement 16-31
M1079 Raceway Cover Replacement 16-45
M1079 Vent Cover Replacement 16-32
M1079 Window Cover Replacement 16-41
Rim Cover Initial Installation 20-4
Rim Cover Replacement 12-10
Crane
Light Material Handling Crane (LMHC) Assembly/Disassembly 20-70
Light Material Handling Crane (LMHC) Boom Replacement 20-74
Light Material Handling Crane (LMHC) Boom Sheave Replacement 20-75
Light Material Handling Crane (LMHC) Control Box Repair 20-77
Light Material Handling Crane (LMHC) Does Not Operate 2-31
Light Material Handling Crane (LMHC) Hoist IN Does Not Operate 2-31


## C (Cont)


Crane (Cont)
Light Material Handling Crane (LMHC) Hoist OUT Does Not Operate 2-31
Light Material Handling Crane (LMHC) Mast and Swing Assembly Repair 20-78
Light Material Handling Crane (LMHC) Replacement 20-71
Light Material Handling Crane (LMHC) Turret Replacement 20-76
Light Material Handling Crane (LMHC) Weight Block and Wire Rope Replacement/Repair 20-72
Light Material Handling Crane (LMHC) Winch Replacement/Repair 20-73
Crankcase Breather Replacement 3-5
Cranks
Engine Cranks But Does Not Start 2-12
Engine Cranks But Does Not Start 2-16
Engine Cranks But Does Not Start or Engine Stalls After Starting 2-13
Engine Does Not Crank 2-12
Engine Does Not Crank 2-16
CTIS
Central Tire Inflation System (CTIS) Cable Assembly Replacement 7-53
Central Tire Inflation System (CTIS) Does Not Operate 2-16
Central Tire Inflation System (CTIS) ECU Replacement 12-6
Central Tire Inflation System (CTIS) Hose Assemblies, Manifold Valve, Kneeling Valve and Bracket Replacement 12-5
Central Tire Inflation System (CTIS) ECU Indicates No Fault Code But Fails to Inflate or Deflate 2-24
Central Tire Inflation System (CTIS) Troubleshooting 2-24
Does Not Deflate Tires 2-16
Does Not Inflate Tires 2-16
Does Not Operate 2-16
Five Central Tire Inflation System (CTIS) ECU Indicator Lights Flashing 2-24
Four CTIS ECU Indicator Lights Flashing 2-24
Front Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement 12-8
Rear Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement 12-9

# SUBJECT INDEX (CONT)


Subject Para

## C (Cont)

CTIS (Cont)
Overspeed Indicator Does Not Operate 2-16
Primary and Central Tire Inflation System (CTIS) Air Hoses Replacement 23-2
Repeatedly Resumes Cycling 30 Seconds After Indicator Lights Stop Flashing 2-24
Wheel Bearing/Central Tire Inflation System (CTIS) Seal Replacement 10-2

## D

Dashboard
WTEC II Dashboard Cable Assembly Replacement/Repair 7-10
WTEC III Dashboard Cable Assembly Replacement/Repair 7-11
Defrost Cover Replacement 18-8
Deprocessing
Unpacking and Deprocessing 2-4
Destruction of Army Materiel to Prevent Enemy Use 1-3
Detector
Chemical Detector Does Not Operate 2-16
Chemical Detector Indicator Does Not Operate 2-16
Differences Between Models 1-9
Differential
Axle Differential(s) Noisy 2-25
Spider Assembly Replacement 10-3
Digitization Kit
Aft Storage Box Replacement 20-90
Circuit Breaker Replacement 20-87
Co-Drivers Seat Replacement 20-92
Drivers Storage Box Replacement 20-91
Installation 20-86
No Power to Digitization Rack 2-31
No Power to Driver Visual Enhancement (DVE) 2-31
No Power to Enhanced Position Location Reporting System (EPLRS) 2-31
No Power to Mobile Tracking system (MTS) 2-31
No Power to Mobile Tracking System (MTS) Sense 2-31
No Power to Precision Lightweight Global Positioning System Receiver (PLGR) 2-31
No Power to SINCGAR/Force XXI Battle Command Brigade and Below (FBCB) 2-31
Power Cable Replacement 20-88
Radio Rack Replacement 20-89
Removal 20-86

Subject Para

## D (Cont)

Dimmer
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Dimmer Module Replacement 7-13
Switch Replacement 7-12
Disassembly
General Disassembly Instructions 2-37
Door
Left-Hand Door and Cab Marker lights Cable Assembly Replacement 7-54
LH Door and/or LH Front Marker Lights Do Not Illuminate 2-16
M1079 Door Ajar Switch and Conduit Replacement 16-55
Door (Cont)
M1079 Door Seal, Retainer, and Latch Striker Replacement 16-30
M1079 Pod Door and Panel Replacement 16-22
M1079 LH Door Assembly Replacement/Repair 16-36
M1079 RH Door Assembly Replacement/Repair 16-35
M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate 2-16
M1081 Door Repair/Adjustment 16-6
Panel Stowage Door Assembly Repair 16-18
Repair/Adjustment (All Models Except M1081) 16-5
Drag Link Replacement/Repair 13-3
Drive
Belt and Tension Pulley Replacement 6-13
Shaft and Universal Joint Replacement 9-2
Shaft Hinging Inspection 9-3
Shaft or Universal Joint
Unusually Noisy When Operating 2-18
Dryer
Air Dryer Does Not Operate 2-16
Air Dryer Purges Constantly 2-21
Air Dryer Replacement/Repair 23-6

## E

ECU
Central Tire Inflation System (CTIS) ECU Indicates No Fault Code But Fails to Inflate or Deflate 2-24
Central Tire Inflation System (CTIS) ECU Replacement 12-6
Five Central Tire Inflation System (CTIS) ECU Indicator Lights Flashing 2-24

Subject Para

## E (Cont)


ECU (Cont)
Four CTIS ECU Indicator Lights Flashing 2-24
Frequency ECU Replacement 7-28
M1079 Air Conditioner ECU Connector Replacement 16-47
Windshield Wiper ECU Replacement 7-62
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) and Bracket Replacement and Calibration 8-2
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Dimmer Module Replacement 7-13
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Illumination Does Not Dim 2-16
WTEC III Transmission ECU Replacement 8-7
Electrical
Gages Replacement 7-14
Introduction, Electrical System Maintenance 7-1
System 1-14
System Does Not Maintain a Charge 2-16
System Troubleshooting 2-16
Emergency
Cab Lift Procedure 19-8
Gladhand Two-Way Check Valve Replacement 11-24
M1079 Blackout/Emergency Light Replacement 16-58
M1079 Emergency Light(s) Does Not Operate 2-16
EMI
Windshield Washer Pump Electromagnetic Interference (EMI) Cable Assembly Replacement 7-60
Windshield Wiper Electromagnetic Interference (EMI) Cable Replacement 7-61
Engine
Air Intake System 1-11
And Transmission Oil Sampling Valves Replacement 3-6
Control Cable Assembly Replacement 7-72
Coolant In Engine Lubrication Oil 2-12
Cranks But Does Not Start 2-12
Cranks But Does Not Start 2-16
Cranks But Does Not Start or Engine Stalls After Starting 2-13
Does Not Crank 2-12
Does Not Crank 2-16
Excessive Black or Gray Exhaust Smoke 2-12
Excessive Engine Oil Consumption 2-12


Subject Para

## E (Cont)


Engine (Cont)
Exhaust System Unusually Noisy or Vibrates Excessively During Engine Operation 2-14
Fan and Fan Clutch Assembly Replacement 6-14
Fan Does Not Turn Off Using Radiator Fan Off Switch 2-16
Fan Runs Constantly 2-16
High Engine Temperature Indicator Does Not Operate 2-16
High Engine Temperature Indicator Illuminates 2-16
Introduction, Engine Maintenance 3-1
Low Engine Oil Pressure 2-12
Low Engine Power 2-12
Master Power Switch Does Not Shut Down Engine 2-16
Oil Pressure Gage Does Not Operate or Is Inaccurate 2-16
Oil Pressure Indicator Does Not Operate 2-16
Overheats 2-12
Overheats 2-15
Overspeeds on Start 2-12
Speed Sensor Replacement/ Adjustment 7-38
Stalls at Low RPM 2-12
System Troubleshooting 2-12
Too Much Engine Vibration 2-12
Transmission Engine Speed Sensor Replacement 7-43
Equipment Characteristics, Capabilities, and Features 1-7
Ether
Sensor Replacement 7-39
Start Switch Does Not Illuminate 2-16
Start Does Not Operate 2-16
Starting Aid Does Not Operate 2-13
Starting Aid Replacement 4-15
Excessive
Black or Gray Exhaust Smoke 2-12
Braking Distance 2-20
Condensation in Fuel 2-16
Engine Oil Consumption 2-12
Play When Turning Steering Wheel 2-26
Exhaust
Excessive Black or Gray Exhaust Smoke 2-12
Fumes in Cab 2-14
Introduction, Exhaust System Maintenance 5-1
Muffler and Exhaust Heat Shields Replacement 5-2
Pipe Replacement 5-3
System Troubleshooting 2-14

# SUBJECT INDEX (CONT)


Subject Para

## E (Cont)

Exhaust (Cont)
System Unusually Noisy or Vibrates Excessively During Engine Operation . . . . . 2-14
White Exhaust Smoke . . . . . 2-12

## F

Fan
Engine Fan and Fan Clutch Assembly Replacement . . . . . 6-14
Engine Fan Does Not Turn Off Using Radiator Fan Off Switch . . . . . 2-16
Engine Fan Runs Constantly . . . . . 2-16
M1079 Fan Assembly Replacement/ Repair . . . . . 16-67
M1079 Fan Does Not Operate . . . . . 2-16
M1079 Fan Switch/Box and Conduit Replacement . . . . . 16-54
Off Indicator Does Not Operate . . . . . 2-16
Personnel Heater Fan Does Not Operate . . . 2-16
Radiator Fan Off Switch Does Not Illuminate . . . . . 2-16
Radiator Fan Shrouds Replacement . . . . . 6-4
Solenoid Replacement . . . . . 7-23
Fender and Splash Guard Replacement . . . . . 16-10
Filter
Air Filter Restriction Gauge Replacement . . . . . 24-2
Fuel Filter and Filter Base Replacement . . . . . 4-14
Fuel Filter Tubes Replacement . . . . . 4-10
Intake Air Cleaner Filter Element, Air Cleaner Assembly, and Particle Extraction Tube Replacement . . . . . 4-2
M1079 Air Filter Replacement . . . . . 16-33
Oil Filter Replacement . . . . . 3-4
Transmission Oil Filter Replacement . . . . . 8-9
Five Central Tire Inflation System (CTIS)
ECU Indicator Lights Flashing . . . . . 2-24
Flasher Unit Replacement . . . . . 7-24
Floor
Cab Floor Covering Replacement . . . . . 16-12
M1079 Van Body Floor Tapping Plate Initial Installation (Serial Numbers 001 through 190) . . . . . 16-43

Subject Para

## F (Cont)

Fluorescent
All M1079 Fluorescent Lights Do Not Operate . . . . . 2-16
M1079 Fluorescent Lights Do Not Operate In Blackout Override Mode . . . . . 2-16
Folding
M1079 Folding Step Replacement . . . . . 16-28
Foot Control Valve and Brake Foot Pedal Replacement . . . . . 11-9
Forms
Maintenance Forms, Records, and Reports . . . . . 1-2
Four CTIS ECU Indicator Lights Flashing . . . . . 2-24
Frame
Introduction, Frame, Towing Attachments, and Drawbars Maintenance . . . . . 14-1
M1079 Blackout Shield and Frame Replacement/Repair . . . . . 16-37
M1079 Pod Frame Replacement/ Repair . . . . . 16-23
M1079 Window Main Frame Replacement . . . . . 16-40
Troubleshooting . . . . . 2-33
Frequency ECU Replacement . . . . . 7-28
Front
And Rear Hazard Lights Do Not Illuminate . . . . . 2-16
And Rear Turn Signals Do Not Operate . . . . . 2-16
Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement . . . . . 12-8
Axle Quick Release Valve Replacement . . . . . 11-15
Axle Shock Absorber Replacement . . . . . 15-3
Brake Air Chamber Replacement . . . . . 11-7
BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI . . . . . 2-16
Brake Air Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
Brake Plunger Assembly Replacement/ Repair . . . . . 11-4

Subject Para

## F (Cont)


Front (Cont)
- Brake Shoes Replacement/Adjustment . . . . . 11-2
- Brakes Do Not Apply . . . . . 2-20
- Brakes Overheat and/or Do Not Release . . . . 2-20
- Bumper Replacement . . . . . 14-2
- Composite Front Light Assembly Replacement/Repair . . . . . 7-33
- Gladhand Replacement . . . . . 11-21
- Hazard Lights Do Not Illuminate . . . . . 2-16
- Intervehicular 12 VDC (7 Pin) Cable Replacement . . . . . 7-73
- Left or Right Front Turn Signals Do Not Operate . . . . . 2-16
- Lights Cable Assembly Replacement . . . . . 7-74
- One or Both Front Blackout Marker Lights Do Not Illuminate . . . . . 2-16
- RH Door and/or RH Front Marker Lights Do Not Illuminate . . . . . 2-16
- Wheel Toe-In Alignment/Adjustment . . . . . 13-5

Fuel
- Consumption Too High . . . . . 2-13
- Excessive Condensation in Fuel . . . . . 2-16
- Filter and Filter Base Replacement . . . . . 4-14
- Filter Tubes Replacement . . . . . 4-10
- Gage Does Not Illuminate . . . . . 2-16
- Gage Does Not Operate or Is Inaccurate . . . . . 2-16
- Hoses Replacement . . . . . 4-9
- Introduction, Fuel System Maintenance . . . . . 4-1
- M1079 Heater Fuel Pump Power Cable Replacement . . . . . 20-49
- M1079 Heater Fuel Pump Replacement . . . . . 20-48
- M1079 Heater Fuel Regulator Replacement . . . . . 20-47
- M1079 Heater Fuel Tubes/Hoses Replacement . . . . . 20-46
- Pressure Regulating Valve Replacement . . . . . 4-3
- Ratio Control Tube Replacement . . . . . 4-6
- System . . . . . 1-12
- System Bleeding . . . . . 4-11
- System Troubleshooting . . . . . 2-13
- Tank and Brackets Replacement . . . . . 4-8
- /Water Separator and Filter Replacement . . . . . 4-13


## G


Gage
- Engine Oil Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16


Subject Para

## G (Cont)


Gage (Cont)
- FRONT BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
- Front Brake Air Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
- FUEL Gage Does Not Illuminate . . . . . 2-16
- FUEL Gage Does Not Operate or Is Inaccurate . . . . . 2-16
- OIL PRESS Gage Does Not Illuminate . . . . . 2-16
- REAR BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
- REAR BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
- VOLTS Gage Does Not Illuminate . . . . . 2-16
- VOLTS Gage Does Not Operate or Is Inaccurate . . . . . 2-16
- WATER TEMP Gage Does Not Illuminate . . . 2-16
- WATER TEMP Gage Does Not Operate or Is Inaccurate . . . . . 2-16

Gages
- Electrical Gages Replacement . . . . . 7-14
- Introduction, Gages (Non-Electrical) Maintenance . . . . . 24-1

General
- Assembly Instructions . . . . . 2-41
- Cleaning Instructions . . . . . 2-38
- Disassembly Instructions . . . . . 2-37
- Inspection Instructions . . . . . 2-39
- Installation Instructions . . . . . 2-42
- Maintenance Procedures . . . . . 2-8
- Removal Instructions . . . . . 2-36
- Repair Instructions . . . . . 2-40

Gladhand
- Emergency Gladhand Two-Way Check Valve Replacement . . . . . 11-24
- Front Gladhand Replacement . . . . . 11-21
- Rear Gladhand Replacement . . . . . 11-22
- Service Gladhand Two-Way Check Valve Replacement . . . . . 11-23

Gladhands
- No Air Pressure Present At Rear Gladhands . . . . . 2-21

Governor Linkage Replacement . . . . . 4-12

Gravel
- Gravel Deflector and Gravel Deflector Extension Replacement . . . . . 14-2

Ground
- Alternator Ground Strap Replacement . . . . . 7-64
- Cab to Chassis Ground Strap Replacement . . . . . 7-71
- Handling . . . . . 2-35

# SUBJECT INDEX (CONT)


Subject Para

## G (Cont)

Ground (Cont)
M1079 Chassis Ground Lug Replacement ..... 16-69
Power Distribution Panel (PDP) to Cab Ground Cable Replacement ..... 7-76
Starter to Chassis Ground Cable Replacement ..... 7-83
Guides
M1079 Sling Spreader and Guides Replacement ..... 16-24

## H

Hand
Checking and Stenciling High/Low Hand Throttle Positions ..... 4-22
Receipt Manual and Inventory of Equipment ..... 2-5
Right-Hand Door and Cab Marker Lights Cable Assembly Replacement ..... 7-57
Throttle Lever Replacement/ Adjustment ..... 4-17
Handle(s)
Boarding Handles Replacement ..... 16-76
M1079 Roof Bail Handle Replacement ..... 16-27
Hard to Steer ..... 2-26
Hatch
Roof Hatch Replacement (All Models Except M1081) ..... 16-75
Hazard
Front Hazard Lights Do Not Illuminate ..... 2-16
Lights Switch Does Not Illuminate ..... 2-16
Rear Hazard Lights Do Not Illuminate ..... 2-16
Headlight
One or Both Headlight High Beams Do Not Illuminate ..... 2-16
One or Both Headlight Low Beams Do Not Illuminate ..... 2-16
and Housing Replacement/Repair/ Adjustment ..... 7-34
Headlights
One or Both Headlights (High and Low Beams) Do Not Illuminate ..... 2-16
Heater
Fan Control Switch Replacement ..... 18-10
M1079 Heater and Air Conditioner Cover Replacement ..... 16-31

Subject Para

## H (Cont)

Heater (Cont)
M1079 Heater Deflector/Duct Replacement ..... 20-50
M1079 Heater Does Not Operate ..... 2-16
M1079 Heater Fuel Pump Power Cable Replacement ..... 20-49
M1079 Heater Fuel Pump Replacement ..... 20-48
M1079 Heater Fuel Regulator Replacement ..... 20-47
M1079 Heater Fuel Tubes/Hoses Replacement ..... 20-46
M1079 Heater Connector Replacement ..... 16-49
M1079 Heater Control Cable Replacement ..... 20-43
M1079 Heater Kit Installation /Removal ..... 20-41
M1079 Heater Power Cable Replacement ..... 20-42
M1079 Heater Replacement ..... 20-51
M1079 Heater Thermostat Cable Replacement ..... 20-45
M1079 Heater Thermostat Connector Replacement ..... 16-48
M1079 Heater Thermostat Replacement ..... 20-44
Personnel Heater Fan Does Not Operate ..... 2-16
Personnel Heater Hoses Replacement ..... 6-8
Personnel Heater Illumination Does Not Operate ..... 2-16
Personnel Heater Replacement/Repair ..... 18-9
High
Beams Indicator Does Not Operate ..... 2-16
Engine Temperature Indicator Does Not Operate ..... 2-16
Engine Temperature Indicator Illuminates ..... 2-16
Hinging
Drive Shaft Hinging Inspection ..... 9-3
Hoist
Light Material Handling Crane (LMHC) Hoist IN Does Not Operate ..... 2-31
Light Material Handling Crane (LMHC) Hoist OUT Does Not Operate ..... 2-31
Horn
And Bracket Replacement ..... 7-44
Does Not Operate ..... 2-16

Subject Para

## H (Cont)


Hose
Lower Coolant Hose Replacement 6-10
Transmission Oil Cooler Hose Bracket Replacement 8-16
Transmission Scavenge Pump Hose Replacement 8-12
Hoses
Brake Air Hoses Replacement 11-19
Fuel Hoses Replacement 4-9
M1079 Heater Tubes/Hoses Replacement 20-46
Personnel Heater Hoses Replacement 6-8
Power Steering Hoses and Tube Replacement 13-7
Primary and Central Tire Inflation System (CTIS) Air Hoses Replacement 23-2
Transmission Oil Cooler Hoses Initial Installation 8-14
Transmission Oil Cooler Hoses Replacement 8-15
Upper Coolant Tube and Hoses Replacement 6-9
Windshield Washer Hoses and Connector Replacement 18-6
11K Self-Recovery Winch (SRW) Hoses Replacement 17-7
Hubs
Introduction, Wheels, Tires, and Hubs Maintenance 12-1
Hydraulic
Air/Hydraulic Power Unit and Bracket Replacement/Repair 19-3
Back-Up Hydraulic Pump Replacement 19-2
Cab Hydraulic Cylinder Replacement 19-10
Cab Hydraulic Latch Replacement/ Adjustment 19-6
Introduction, Hydraulic System Maintenance 19-1
Loss of Hydraulic Pressure (Single Stage Pump) 2-23
Manifold Filter Replacement 19-5
Manifold Replacement/Repair 19-4
Oil Filter Assembly Service/ Replacement 19-12
Reservoir and Bracket Replacement 19-13
System Troubleshooting 2-23
Steering Hydraulic System Troubleshooting 2-29


Subject Para

## I


Illumination
Personnel Heater Illumination Does Not Operate 2-16
Inclinometer Replacement 16-77
Indicator
CTIS Overspeed Indicator Does Not Operate 2-16
CTIS Repeatedly Resumes Cycling 30 Seconds After Indicator Lights Stop Flashing 2-24
Engine Oil Pressure Indicator Does Not Operate 2-16
Fan Off Indicator Does Not Operate 2-16
Five Central Tire Inflation System (CTIS) ECU Indicator Lights Flashing 2-24
Four CTIS ECU Indicator Lights Flashing 2-24
Front Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI 2-16
High Beams Indicator Does Not Operate 2-16
High Engine Temperature Indicator Does Not Operate 2-16
High Engine Temperature Indicator Illuminates 2-16
Left Turn Signal Indicator Does Not Operate 2-16
Lighted Indicator Display Replacement/ Repair 7-16
Master Stop Indicator Does Not Operate 2-16
Parking Brake Indicator and/or Emergency Brake Indicator Does Not Operate 2-16
PTO Indicator Does Not Operate 2-16
Rear Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI 2-16
Right Turn Signal Indicator Does Not Operate 2-16
Transmission Temperature Indicator Does Not Operate 2-16
Turn Signal Indicators and High Beams on Indicator Do Not Operate 2-16
Indicators
Turn Signal Indicators and High Beams on Indicator Do Not Operate 2-16
Inflation
Central Tire Inflation System (CTIS) Cable Assembly Replacement 7-53
Central Tire Inflation System (CTIS) Does Not Operate 2-16
Central Tire Inflation System (CTIS) ECU Replacement 12-6

# SUBJECT INDEX (CONT)


Subject Para

## I (Cont)

Inflation (Cont)
Central Tire Inflation System (CTIS)
Hose Assemblies, Manifold Valve, Kneeling Valve and Bracket Replacement 12-5
Central Tire Inflation System (CTIS) Troubleshooting 2-24
Front Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement 12-8
Primary and Central Tire Inflation System (CTIS) Air Hoses Replacement 23-2
Rear Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement 12-9
Wheel Bearing/Central Tire Inflation System (CTIS) Seal Replacement 10-2
Initial Installation
Convex Mirror Initial Installation 20-3
RH Convex Mirror Initial Installation 20-2
Rim Cover Initial Installation 20-4
Transmission Oil Cooler Hoses Initial Installation 8-14
Inspection
Drive Shaft Hinging Inspection 9-3
General Inspection Instructions 2-39
Installation
General Installation Instructions 2-42
Instructions
General Assembly Instructions 2-41
General Cleaning Instructions 2-38
General Disassembly Instructions 2-37
General Inspection Instructions 2-39
General Installation Instructions 2-42
General Removal Instructions 2-36
General Repair Instructions 2-40
Instrument Panel Assembly Replacement/Repair 7-15
Intake Air Cleaner Filter Element, Air Cleaner Assembly, and Particle Extraction Tube Replacement 4-2
Intervehicle
Clearance Lights Do Not Operate 2-16
Left Turn Signal Does Not Illuminate 2-16
Right Turn Signal Does Not Illuminate 2-16
Stoplights Do Not Illuminate 2-16
Taillights Do Not Operate 2-16

Subject Para

## I (Cont)

Intervehicular
Front Intervehicular 12 VDC (7 Pin) Cable Replacement 7-73
Rear Intervehicular 12 VDC (7 Pin) Cable Replacement 7-78
Rear Intervehicular 24 VDC (12 Pin) Cable Replacement 7-79
Introduction
Air System Maintenance 23-1
Armament/Sighting and Fire Control Materiel Maintenance 21-1
Body and Cab Maintenance 16-1
Body, Chassis, and Accessory Items Maintenance 18-1
Brake System Maintenance 11-1
Cooling System Maintenance 6-1
Electrical Illuminating Equipment Maintenance 22-1
Electrical System Maintenance 7-1
Engine Maintenance 3-1
Exhaust System Maintenance 5-1
Frame, Towing Attachments, and Drawbars Maintenance 14-1
Front and Rear Axle Maintenance 10-1
Fuel System Maintenance 4-1
Gages (Non-Electrical) Maintenance 24-1
Hydraulic System Maintenance 19-1
Propeller Shaft Maintenance 9-1
Special Purpose Kits Maintenance 20-1
Steering System Maintenance 13-1
Suspension System Maintenance 15-1
To Logic Tree Troubleshooting 2-10
Transmission Maintenance 8-1
Wheels, Tires, and Hubs Maintenance 12-1
11K Self-Recovery Winch (SRW) Maintenance 17-1
Inversion
Valve Replacement 11-12
Valve Replacement 23-4

## J

Joint
Drive Shaft or Universal Joint Unusually Noisy When Operating 2-18

Subject Para

## K


Kick Panel Replacement . . . . . 16-3
Kit
  M1078/M1081 S-280 Shelter Tiedown Kit Installation/Removal . . . . . 20-84
  M1079 Air Conditioner Kit Installation/ Removal . . . . . 20-81
  M1079 Heater Kit Installation/Removal . . . . 20-41
  200 Amp Alternator Kit Installation . . . . . 20-54
  200 Amp Alternator Kit Removal . . . . . 20-55


## L


Ladder
  M1079 Ladder, Mounting Bracket, and Stowage Bracket Replacement/Repair . . . . 16-34
Lamp
  Test Switch Does Not Illuminate . . . . . 2-16
Large Quantity of Moisture Expelled From Air Reservoirs . . . . . 2-21
Latch
  and Cab Anchor Brackets Replacement . . . 16-74
  Cab Hydraulic Latch Replacement/ Adjustment . . . . . 19-6
  M1079 Door Seal, Retainer, and Latch Striker Replacement . . . . . 16-30
  M1079 Rubber Bumper and Tee Latch Replacement . . . . . 16-29
  M1079 Window Latch and Prop Replacement . . . . . 16-38
  Power Distribution Panel (PDP) Cover and Latch Replacement/Adjustment . . . . . 16-2
Leans to One Side or Rear Of Vehicle Sags . . . . . 2-27
Left
  Hand Door and Cab Marker Lights Cable Assembly Replacement . . . . . 7-54
  Intervehicle Left Turn Signal Does Not Illuminate . . . . . 2-16
LH
  Door and/or LH Front Marker Lights Do Not Illuminate . . . . . 2-16
  M1079 LH Door Assembly Replacement/ Repair . . . . . 16-36
Lift
  M1079 Lift Casting Replacement . . . . . 16-25
Lifting Plate Replacement . . . . . 3-2
Light
  Amber Warning Light Assembly Repair . . . . 20-83
  Amber Warning Light Switch Does Not Illuminate . . . . . 2-16


Subject Para

## L (Cont)


Light (Cont)
  Backup Light Assembly Replacement/ Repair . . . . . 7-29
  Backup Light Does Not Illuminate . . . . . 2-16
  Blackout Drive Light Does Not Illuminate . . . . . 2-16
  Blackout Drive Light Replacement/ Repair . . . . . 7-30
  Clearance and Marker Light Assemblies Replacement . . . . . 7-31
  Composite Front Light Assembly Replacement/Repair . . . . . 7-33
  Main Light Switch Replacement . . . . . 7-17
  Material Handling Crane (LMHC) Assembly/Disassembly . . . . . 20-70
  Material Handling Crane (LMHC) Boom Replacement . . . . . 20-74
  Material Handling Crane (LMHC) Boom Sheave Replacement . . . . . 20-75
  Material Handling Crane (LMHC) Control Box Repair . . . . . 20-77
  Material Handling Crane (LMHC) Does Not Operate . . . . . 2-31
  Material Handling Crane (LMHC) Hoist IN Does Not Operate . . . . . 2-31
  Material Handling Crane (LMHC) Hoist OUT Does Not Operate . . . . . 2-31
  Material Handling Crane (LMHC) Mast and Swing Assembly Repair . . . . . 20-78
  Material Handling Crane (LMHC) Replacement . . . . . 20-71
  Material Handling Crane (LMHC) Turret Replacement . . . . . 20-76
  Material Handling Crane (LMHC) Weight Block and Wire Rope Replacement/ Repair . . . . . 20-72
  Material Handling Crane (LMHC) Winch Replacement/Repair . . . . . 20-73
  M1079 Van Body Clearance Marker Light Does Not Illuminate . . . . . 2-16
  M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate . . . . . 2-16
  No Overspeed Warning Light and/or Overspeed Pressure Change . . . . . 2-24
  Trailer Left Stop/Turn Light Does Not Illuminate . . . . . 2-16
  Trailer Right Stop/Turn Light Does Not Illuminate . . . . . 2-16
  Warning Light Cable Assembly Replacement . . . . . 22-2
  Warning Light Does Not Illuminate . . . . . 2-16

# SUBJECT INDEX (CONT)


Subject Para

## L (Cont)

Lighted Indicator Display Replacement/ Repair . . . . . 7-16
Lighting
M1079 Lighting Fixture and Conduit Replacement . . . . . 16-59
M1079 Lighting Fixture(s) DS80 and/ or DS81 Do Not Operate . . . . . 2-16
M1079 Lighting Fixture(s) DS82 and/ or DS83 Do Not Operate . . . . . 2-16
Lights
All M1079 Van Body Fluorescent Lights Do Not Operate . . . . . 2-16
All M1079 Van Body Marker Lights Do Not Operate . . . . . 2-16
All Marker Lights Do Not Illuminate In Normal Mode . . . . . 2-16
Cab Clearance Marker Lights Cable Assembly Replacement . . . . . 7-59
Blackout Marker Lights Do Not Illuminate . . . . . 2-16
Five Central Tire Inflation System (CTIS) ECU Indicator Lights Flashing . . . . . 2-24
Four CTIS ECU Indicator Lights Flashing . . . . . 2-24
Front and Rear Hazard Lights Do Not Illuminate . . . . . 2-16
Front Hazard Lights Do Not Illuminate . . . . . 2-16
Front Lights Cable Assembly Replacement . . . . . 7-74
Hazard Lights Switch Does Not Illuminate . . . . . 2-16
Intervehicle Clearance Lights Do Not Operate . . . . . 2-16
Left Door and/or LH Front Marker Lights Do Not Illuminate . . . . . 2-16
Left-Hand Door and Cab Marker Lights Cable Assembly Replacement . . . . . 7-54
M1079 Blackout Light(s) Does Not Operate . . . . . 2-16
M1079 Emergency Light(s) Does Not Operate . . . . . 2-16
M1079 Clearance and Marker Lights Replacement . . . . . 16-60
M1079 Fluorescent Lights Do Not Operate In Blackout Override Mode . . . . . 2-16
M1079 Interior Lights Switch/Box and Conduit Replacement . . . . . 16-50

Subject Para

## L (Cont)

Lights (Cont)
M1081 Cab Clearance and Marker Lights Lower Cable Replacement . . . . . 7-55
M1081 Cab Clearance and Marker Lights Upper Cable Replacement . . . . . 7-56
One or Both Composite Lights Do Not Illuminate . . . . . 2-16
One or Both Front Blackout Marker Lights Do Not Illuminate . . . . . 2-16
One or Both Rear Blackout Marker Lights Do Not Illuminate . . . . . 2-16
One or More Cab Top Marker Lights Do Not Illuminate . . . . . 2-16
Parking Lights Do Not Illuminate . . . . . 2-16
Rear Hazard Lights Do Not Illuminate . . . . . 2-16
Rear Lights Cable Assembly Replacement . . . . . 7-75
RH Door and/or RH Front Marker Lights Do Not Illuminate . . . . . 2-16
Right-Hand Door and Cab Marker Lights Cable Assembly Replacement . . . . . 7-57
Side and/or Rear Marker Lights Do Not Illuminate . . . . . 2-16
Two Steady Mode Lights Illuminate on Central Tire Inflation System (CTIS) ECU . . . . . 2-24
LMHC
Light Material Handling Crane (LMHC) Assembly/Disassembly . . . . . 20-70
Light Material Handling Crane (LMHC) Boom Replacement . . . . . 20-74
Light Material Handling Crane (LMHC) Boom Sheave Replacement . . . . . 20-75
Light Material Handling Crane (LMHC) Control Box Repair . . . . . 20-77
Light Material Handling Crane (LMHC) Does Not Operate . . . . . 2-31
Light Material Handling Crane (LMHC) Hoist IN Does Not Operate . . . . . 2-31
Light Material Handling Crane (LMHC) Hoist OUT Does Not Operate . . . . . 2-31
Light Material Handling Crane (LMHC) Mast and Swing Assembly Repair . . . . . 20-78
Light Material Handling Crane (LMHC) Replacement . . . . . 20-71
Light Material Handling Crane (LMHC) Turret Replacement . . . . . 20-76

Subject Para

## L (Cont)


LMHC (Cont)
Light Material Handling Crane (LMHC)
Weight Block and Wire Rope
Replacement/Repair ..... 20-72
Light Material Handling Crane (LMHC)
Winch Replacement/Repair ..... 20-73
Load Sensing Valve and Control Cable
Replacement/Adjustment ..... 11-10
Location and Description of Major
Components ..... 1-8
Loss
of Coolant ..... 2-15
of Hydraulic Pressure (Single Stage
Pump) ..... 2-23
Low
Engine Oil Pressure ..... 2-12
Engine Power ..... 2-12
Pressure Transmitter Replacement ..... 7-88
Pressure Transmitter Two-Way Check
Valve Replacement ..... 11-28
Windshield Wiper Does Not Operate
On Low Speed ..... 2-16
Lower
Cab Does Not Lower ..... 2-32
Coolant Hose Replacement ..... 6-10
M1079 Lower Spreader Bar
Replacement ..... 16-21
Lubrication
AOAP Sampling Intervals ..... H-3
General ..... H-1
Intervals ..... H-6
Key ..... H-5
Local Views ..... H-8
Locator Views ..... H-7
Notes ..... H-9
Oil Filters ..... H-2
Warranty Hardtime Statement ..... H-4


## M


Machine Gun
Ring Center Seat Replacement ..... 21-5
Ring Lower Platform Replacement ..... 21-3
Ring Replacement ..... 21-2
Ring Roof Support Replacement ..... 21-6
Ring Top Platform Replacement ..... 21-4
Main Light Switch Replacement ..... 7-17
Maintenance
Common Tools and Equipment, Vehicle
Maintenance ..... 2-1
Forms, Records, and Reports ..... 1-2


Subject Para

## M (Cont)


Maintenance (Cont)
General Maintenance Procedures ..... 2-8
Introduction ..... 2-34
Manifold
Hydraulic Manifold Filter Replacement ..... 19-5
Hydraulic Manifold Replacement/
Repair ..... 19-4
Valve Assembly Replacement ..... 12-7
Marker
All Marker Lights Do Not Illuminate
In Normal Mode ..... 2-16
Left Door and/or LH Front Marker Lights
Do Not Illuminate ..... 2-16
Left-Hand Door and Cab Marker Lights
Cable Assembly Replacement ..... 7-54
M1079 Clearance and Marker Lights
Replacement ..... 16-60
Trailer Marker/Taillights Do Not
Illuminate ..... 2-16
Mast
Light Material Handling Crane (LMHC)
Mast and Swing Assembly Repair ..... 20-78
Master
Power Switch Does Not Shut Down Engine ..... 2-16
Power Switch Does Not Operate ..... 2-16
Master Stop Indicator Does Not Operate ..... 2-16
Mechanical
Resilient Mount and Mechanical Stop
Replacement ..... 15-2
Mirror
Cab Mirror Replacement ..... 18-7
Convex Mirror Initial Installation ..... 20-3
RH Convex Mirror Initial Installation ..... 20-2
RH Convex Mirror Replacement ..... 18-13
Module
WTEC II Transmission ECU Pushbutton
Shift Selector (TEPSS) Dimmer Module
Replacement ..... 7-13
WTEC II Vehicle Interface Module (VIM)
Replacement/Repair ..... 8-6
Motor
Windshield Wiper Motor Replacement ..... 18-4
Muffler and Exhaust Heat Shields
Replacement ..... 5-2
M1079
Air Conditioner Does Not Operate ..... 2-16
Air Conditioner ECU Connector
Replacement ..... 16-47
Air Filter Replacement ..... 16-33
All M1079 Fluorescent Lights Do Not
Operate ..... 2-16
All M1079 Van Body Marker Lights Do
Not Operate ..... 2-16
Blackout Light(s) Does Not Operate ..... 2-16

# SUBJECT INDEX (CONT)


Subject Para

## M (Cont)

M1079 (Cont)
- Blackout Override Switch Replacement . . . . 16-56
- Blackout Switch Replacement . . . . . 16-57
- Blackout Shield and Frame Replacement/ Repair . . . . . 16-37
- Blackout/Emergency Light Replacement . . . . . 16-58
- Chassis Ground Lug Replacement . . . . . 16-69
- Clearance and Marker Lights Replacement . . . . . 16-60
- Door Ajar Switch and Conduit Replacement . . . . . 16-55
- Door Seal, Retainer, and Latch Striker Replacement . . . . . 16-30
- Emergency Light(s) Does Not Operate . . . . . 2-16
- Fan Assembly Replacement/Repair . . . . . 16-67
- Fan Does Not Operate . . . . . 2-16
- Fan Switch/Box and Conduit Replacement . . . . . 16-54
- Field Phone 1 and/or 2 Binding Post Does Not Operate . . . . . 2-16
- Field Telephone Binding Post/Box and Conduit Replacement . . . . . 16-51
- Fluorescent Lights Do Not Operate In Blackout Override Mode . . . . . 2-16
- Folding Step Replacement . . . . . 16-28
- Heater and Air Conditioner Cover Replacement . . . . . 16-31
- Heater Connector Replacement . . . . . 16-49
- Heater Control Cable Replacement . . . . . 20-43
- Heater Deflector/Duct Replacement . . . . . 20-50
- Heater Does Not Operate . . . . . 2-16
- Heater Fuel Pump Power Cable Replacement . . . . . 20-49
- Heater Fuel Pump Replacement . . . . . 20-48
- Heater Fuel Regulator Replacement . . . . . 20-47
- Heater Fuel Tubes/Hoses Replacement . . . 20-46
- Heater Kit Installation/Removal . . . . . 20-41
- Heater Power Cable Replacement . . . . . 20-42
- Heater Replacement . . . . . 20-51
- Heater Thermostat Cable Replacement . . . . 20-45
- Heater Thermostat Connector Replacement . . . . . 16-48
- Heater Thermostat Replacement . . . . . 20-44
- Interior Lights Switch/Box and Conduit Replacement . . . . . 16-50
- Ladder, Mounting Bracket, and Stowage Bracket Replacement/Repair . . . . . 16-34

Subject Para

## M (Cont)

M1079 (Cont)
- Lift Casting Replacement . . . . . 16-25
- Lighting Fixture and Conduit Replacement . . . . . 16-59
- Lighting Fixture(s) DS80 and/or DS81 Do Not Operate . . . . . 2-16
- Lighting Fixture(s) DS82 and/or DS83 Do Not Operate . . . . . 2-16
- LH Door Assembly Replacement/ Repair . . . . . 16-36
- Lower Spreader Bar Replacement . . . . . 16-21
- Pod Door and Panel Replacement . . . . . 16-22
- Pod Frame Replacement/Repair . . . . . 16-23
- Raceway Replacement . . . . . 16-46
- Raceway Cover Replacement . . . . . 16-45
- Relay Box Assembly Replacement/ Repair . . . . . 16-63
- RH Door Assembly Replacement/ Repair . . . . . 16-35
- Roof Bail Handle Replacement . . . . . 16-27
- Rubber Bumper and Tee Latch Replacement . . . . . 16-28
- Sling Bearing Angle Replacement . . . . . 16-26
- Sling Spreader and Guides Replacement . . . . . 16-24
- Tapping Plate Replacement . . . . . 16-42
- Upper Sub-Frame Replacement . . . . . 16-20
- Van Body Floor Tapping Plate Initial Installation (Serial Numbers 001 through 190) . . . . . 16-43
- Van Body Interior Accessory Mounting Locations . . . . . 16-44
- Van Body Clearance Marker Light Does Not Illuminate . . . . . 2-16
- Van Body Replacement . . . . . 16-19
- Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate . . . . . 2-16
- Van Preparation for Air Transport . . . . . 16-73
- Vent Cover Replacement . . . . . 16-32
- Window Cover Replacement . . . . . 16-41
- Window Latch and Prop Replacement . . . . . 16-38
- Window Main Frame Replacement . . . . . 16-40
- Window Sash Assembly Replacement/ Repair . . . . . 16-39
- 110 VAC and 24 VDC Relay Replacement . . . . . 16-62

Subject Para

## M (Cont)


M1079 (Cont)
110 VAC Outlet J230 Does Not Operate 2-16
110 VAC Outlet J231 Does Not Operate 2-16
110 VAC Outlet J232 and J233 Do Not Operate In Blackout Override Mode 2-16
110 VAC Outlet J232 Does Not Operate 2-16
110 VAC Outlet J232 Does Not Operate In Normal Mode 2-16
110 VAC Outlet J233 Does Not Operate 2-16
110 VAC Outlet J234 Does Not Operate 2-16
110 VAC Outlet J235 Does Not Operate 2-16
110 VAC Outlet/Box and Conduit Replacement 16-53
110 VAC Power Does Not Operate 2-16
110/208 VAC Power Distribution Panel Replacement 16-66
110/208 VAC Power Entry Panel and Conduit Replacement 16-70
110/208 VAC Power In/Out Cable Replacement 16-68
12/24 VDC Power Entry Connector Replacement 16-71
12/24 VDC Power Entry Panel Replacement 16-72
15/20/30 and 50 Amp AC Circuit Breaker Replacement 16-64
200 Amp AC Circuit Breaker Replacement 16-65
24 VDC Binding Post Does Not Operate 2-16
24 VDC Binding Post/Box and Conduit Replacement 16-52
5/20 Amp DC Circuit Breaker Replacement 16-61
M1081
Cab Clearance and Marker Lights Lower Cable Assembly Replacement 7-55
Cab Clearance and Marker Lights Upper Cable Assembly Replacement 7-56
Cab Roof Replacement 16-4
Door Repair/Adjustment 16-6
Parachute Suspension Slides Replacement 14-3


## N


NATO Power Cable Replacement 7-63
No
Air Pressure Present At Rear Gladhands 2-21


Subject Para

## N (Cont)


No (Cont)
Overspeed Warning Light and/or Overspeed Pressure Change 2-24
Response When Turning Steering Wheel 2-26
Power to Digitization Rack 2-31
Power to Driver Visual Enhancement (DVE) 2-31
Power to Enhanced Position Location Reporting System (EPLRS) 2-31
Power to Mobile Tracking system (MTS) 2-31
Power to Mobile Tracking System (MTS) Sense 2-31
Power to Precision Lightweight Global Positioning System Receiver (PLGR) 2-31
Power to SINCGAR/Force XXI Battle Command Brigade and Below (FBCB) 2-31
Noisy Air Compressor Operation 2-21
Nozzle
Windshield Wiper and Nozzle Replacement 18-3


## O


Official Nomenclature, Names and Designations 1-4
Oil
Engine Oil Filter Replacement 3-4
Engine Oil Pressure Gage Does Not Operate or Is Inaccurate 2-16
Engine Oil Pressure Indicator Does Not Operate 2-16
Hydraulic Oil Filter Assembly Service/ Replacement 19-12
In Cooling System 2-15
Low Engine Oil Pressure 2-12
PRESS Gage Does Not Illuminate 2-16
Pressure Switch Replacement 7-40
Pressure Transmitter Replacement 7-41
Transmission Oil Cooler Hoses Initial Installation 8-14
Transmission Oil Cooler Hoses Replacement 8-15
Transmission Oil Cooler Hose Bracket Replacement 8-16
Transmission Oil Cooler Replacement 8-10
Transmission Oil Cooler Tubes Replacement 8-11
Transmission Oil Fill Tube Replacement 8-13
Transmission Oil Filter Replacement 8-9
One
Or Both Blackout Stoplights Do Not Illuminate 2-16

# SUBJECT INDEX (CONT)


Subject Para

## O (Cont)

One (Cont)
Or Both Composite Lights Do Not Illuminate 2-16
Or Both Front Blackout Marker Lights Do Not Illuminate 2-16
Or Both Headlight High Beams Do Not Illuminate 2-16
Or Both Headlight Low Beams Do Not Illuminate 2-16
Or Both Headlights (High and Low Beams) Do Not Illuminate 2-16
Or Both Rear Blackout Marker Lights Do Not Illuminate 2-16
Or Both Stoplights Do Not Illuminate 2-16
Or More Cab Top Marker Lights Do Not Illuminate 2-16
Orifice Tube Assembly Replacement 4-7
Overflow
Radiator Overflow Tank and Bracket Replacement/Repair 6-3
Overheat
Front Brakes Overheat and/or Do Not Release 2-20
Rear Brakes Overheat 2-20
Overheats
Engine Overheats 2-12
Engine Overheats 2-15
Overspeed
No Overspeed Warning Light and/or Overspeed Pressure Change 2-24

## P

Panel
Auxiliary Panel Cable Assembly Replacement (All Models Except M1079 W/O Winch) 7-49
Auxiliary Panel Does Not Illuminate 2-16
Auxiliary Panel, Instrument Panel, and Personnel Heater Do Not Illuminate 2-16
Auxiliary Panel Replacement 7-8
Auxiliary Panel Switch Does Not Illuminate 2-16
Instrument Panel Assembly Replacement/Repair 7-15
Kick Panel Replacement 16-3
M1079 Pod Door and Panel Replacement 16-22
M1079 W/O Winch Auxiliary Panel Cable Assembly Replacement 7-50
M1079 110/208 VAC Power Distribution Panel Replacement 16-66

Subject Para

## P (Cont)

Panel (Cont)
M1079 110/208 VAC Power Entry Panel and Conduit Replacement 16-70
M1079 12/24 VDC Power Entry Panel and Conduit Replacement 16-72
Power Distribution Panel (PDP) Cover and Latch Replacement/Adjustment 16-2
Power Distribution Panel (PDP) to Cab Ground Cable Replacement 7-76
Stowage Door Assembly Repair 16-18
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement 7-80
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement 7-81
200 Amp Terminal Block to Power Distribution Panel (PDP) 12 VDC Cable Replacement 20-65
200 Amp Terminal Block to Power Distribution Panel (PDP) 24 VDC Cable Replacement 20-68
Parachute
M1081 Parachute Suspension Slides Replacement 14-3
Park Control Two-Way Check Valve Replacement 11-17
Parking
Brake Indicator and/or Emergency Brake Indicator Does Not Operate 2-16
Brake Does Not Release 2-20
Brake Does Not Apply 2-20
Lights Do Not Illuminate 2-16
PDP
Power Distribution Panel (PDP) Cover and Latch Replacement/Adjustment 16-2
Power Distribution Panel (PDP) to Cab Ground Cable Replacement 7-76
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement 7-80
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement 7-81

Subject Para

## P (Cont)

PDP (Cont)
200 Amp Terminal Block to Power Distribution Panel (PDP) 12 VDC Cable Replacement 20-65
200 Amp Terminal Block to Power Distribution Panel (PDP) 24 VDC Cable Replacement 20-68
Personnel
Heater Fan Does Not Operate 2-16
Heater Hoses Replacement 6-8
Heater Illumination Does Not Operate 2-16
Heater Replacement/Repair 18-9
Pipe
Exhaust Pipe Replacement 5-3
Platform
Machine Gun Ring Lower Platform Replacement 21-3
Machine Gun Ring Top Platform Replacement 21-4
Plunger
Front Brake Plunger Assembly Replacement/Repair 11-4
Rear Brake Plunger Assembly Replacement/Repair 11-5
PMCS
Preventive Maintenance Checks and Services (PMCS) Introduction 2-7
Preventive Maintenance Checks and Services (PMCS) Table 2-9
Pod
M1079 Pod Door and Panel Replacement 16-22
M1079 Pod Frame Replacement/Repair 16-23
Power
Distribution Panel (PDP) Cover and Latch Replacement/Adjustment 16-2
Distribution Panel (PDP) to Cab Ground Cable Replacement 7-76
Low Engine Power 2-12
M1079 Air Conditioner Power Cable Replacement 20-82
M1079 Heater Fuel Pump Power Cable Replacement 20-49
M1079 Heater Power Cable Replacement 20-42
M1079 110/208 VAC Power Distribution Panel Replacement 16-66
M1079 110/208 VAC Power Does Not Operate 2-16
M1079 101/208 VAC Power Entry Panel and Conduit Replacement 16-70

Subject Para

## P (Cont)

Power (Cont)
M1079 110/208 VAC Power In/Out Cable Replacement 16-68
M1079 12/24 VDC Power Entry Connector Replacement 16-71
M1079 12/24 VDC Power Entry Panel and Conduit Replacement 16-72
Master Power Switch Does Not Shut Down Engine 2-16
No Power to Digitization Rack 2-31
No Power to Driver Visual Enhancement (DVE) 2-31
No Power to Enhanced Position Location Reporting System (EPLRS) 2-31
No Power to Mobile Tracking system (MTS) 2-31
No Power to Mobile Tracking System (MTS) Sense 2-31
No Power to Precision Lightweight Global Positioning System Receiver (PLGR) 2-31
No Power to SINCGAR/Force XXI Battle Command Brigade and Below (FBCB) 2-31
Steering Hoses and Tube Replacement 13-7
Steering Pump Replacement 13-9
Steering Pump Reservoir and Bracket Replacement 13-8
Take-Off (PTO) Cable Assembly Replacement 7-77
Take Off (PTO) Troubleshooting 2-19
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement 7-80
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement 7-81
200 Amp Terminal Block to Power Distribution Panel (PDP) 12 VDC Cable Replacement 20-65
200 Amp Terminal Block to Power Distribution Panel (PDP) 24 VDC Cable Replacement 20-68
Powertrain 1-10
Preparation
for Storage or Shipment 2-44
for Storage or Shipment Introduction 2-43
M1079 Van Preparation For Air Transport 16-73
Pressure
Air Pressure Transmitter Replacement 7-36
Engine Oil Pressure Gage Does Not Operate or Is Inaccurate 2-16
Engine Oil Pressure Indicator Does Not Operate 2-16

# SUBJECT INDEX (CONT)


Subject Para

## P (Cont)

Pressure (Cont)
Low Pressure Transmitter Replacement 7-88
Oil Pressure Switch Replacement 7-40
Oil Pressure Transmitter Replacement 7-41
Protection Valve Replacement 11-27
Switch Replacement 23-8
Preventive
Maintenance Checks and Services (PMCS) Introduction 2-7
Maintenance Checks and Services (PMCS) Table 2-9
Primary and Central Tire Inflation System (CTIS) Air Hoses Replacement 23-2
Procedures
General Maintenance Procedures 2-8
Propeller
Introduction, Propeller Shaft Maintenance 9-1
Shaft Troubleshooting 2-18
PTO
Power Take-Off (PTO) Cable Assembly Replacement 7-77
Does Not Engage 2-19
Does Not Operate 2-16
Indicator Does Not Operate 2-16
Power Take Off (PTO) Troubleshooting 2-19
Pulls
Wanders, Pulls to One Side, or Shimmies 2-26
Wanders, Pulls to One Side, or Shimmies 2-27
Pump
Loss of Hydraulic Pressure (Single Stage Pump) 2-23
M1079 Heater Fuel Pump Power Cable Replacement 20-49
M1079 Heater Fuel Pump Replacement 20-48
Power Steering Pump Replacement 13-9
Power Steering Pump Reservoir and Bracket Replacement 13-8
Power Steering Pump Reservoir Filter Replacement 13-10
Transmission Scavenge Pump Hose Replacement 8-12
Water Pump and Fittings Replacement 6-12
Windshield Washer Pump
Electromagnetic Interference (EMI) Cable Assembly Replacement 7-60
Pushbutton
Start Inhibit Pushbutton Does Not Operate 2-16

Subject Para

## P (Cont)

Pushbutton (Cont)
Start Inhibit Pushbutton Switch Replacement 7-19
Starter Pushbutton Switch Replacement 7-20
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) and Bracket Replacement and Calibration 8-2
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Dimmer Module Replacement 7-13
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Emits Eight Seconds of Beeps and/or Transmission Does Not Shift Gears 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 14 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 24 and/or 33 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 41, 42, 44, 45, 66, and/or 69 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 43 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 52 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 57 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 21 and Any Sub Code 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 51 Sub Code 10, 12, 21, 43, 45, or 65 2-17

Subject Para

## P (Cont)


Pushbutton (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 25 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 53 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 54 Sub Code 01, 07, 10, 12, 17, 21, 23, 27, 32, 34, 43, 45, 54, 56, 65, 70, 71, 72, 80, 81, 82, 83, 85, 86, 92, 93, 95, 96, or 97 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 55 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 56 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 13 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 23 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Does Not Illuminate ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 14 ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16 ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 24 and/or 33 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 32 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 42, 44, 45, 46, 66, and/or 69 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 52 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 57 and Any Sub Code ..... 2-17


Subject Para

## P (Cont)


Pushbutton (Cont)
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 21 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 51 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 25 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 53 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 54 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 55 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 56 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 13 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Indicator Displays "--" and/or Transmission Does Not Shift Gears ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 23 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Does Not Illuminate ..... 2-17


## R


Raceway
M1079 Raceway Replacement ..... 16-46
M1079 Raceway Cover Replacement ..... 16-45
Radiator
Cold Weather Radiator Cover Installation/ Removal ..... 18-12
/Charge Air Cooler Replacement ..... 6-2
Radiator Fan Off Switch Does Not Illuminate ..... 2-16
Fan Shrouds Replacement ..... 6-4
Overflow Tank and Bracket Replacement/ Repair ..... 6-3
Radio Does Not Operate ..... 2-16

# SUBJECT INDEX (CONT)

Subject Para

## R (Cont)


Rear
  Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement . . . . . 12-9
  Axle Shaft Replacement . . . . . 10-4
  Axle Shock Absorber Replacement . . . . . 15-4
  BRAKE AIR Gage Does Not Illuminate . . . . . 2-16
  BRAKE AIR Pressure Gage Does Not Operate or Is Inaccurate . . . . . 2-16
  Brake Air Indicator Does Not Illuminate When Air Pressure Is Below 65 PSI . . . . . 2-16
  Brake Air Chamber Replacement . . . . . 11-8
  Brake Plunger Assembly Replacement/ Repair . . . . . 11-5
  Brake Shoes Replacement/Adjustment . . . . . 11-3
  Brakes Do Not Apply . . . . . 2-20
  Brakes Overheat . . . . . 2-20
  Cab Support Assembly Replacement . . . . . 16-7
  Front and Rear Hazard Lights Do Not Illuminate . . . . . 2-16
  Front and Rear Turn Signals Do Not Operate . . . . . 2-16
  Gladhand Replacement . . . . . 11-22
  Hazard Lights Do Not Illuminate . . . . . 2-16
  Intervehicular 12 VDC (7 Pin) Cable Replacement . . . . . 7-78
  Intervehicular 24 VDC (12 Pin) Cable Replacement . . . . . 7-79
  Leans to One Side or Rear Of Vehicle Sags . . . . . 2-27
  Rear Lights Cable Assembly Replacement . . . . . 7-75
  No Air Pressure Present At Rear Gladhands . . . . . 2-21
  One or Both Rear Blackout Marker Lights Do Not Illuminate . . . . . 2-16
  Side and/or Rear Marker Lights Do Not Illuminate . . . . . 2-16
  Spring Brake Caging . . . . . 11-6
  Stabilizer Bar Replacement/Repair . . . . . 15-5
  11K Self-Recovery Winch (SRW) Rear Roller Fairlead Replacement . . . . . 17-3
Records
  Maintenance Forms, Records, and Reports . . . . . 1-2
Regulator
  M1079 Heater Fuel Regulator Replacement . . . . . 20-47


Subject Para

## R (Cont)


Relay
  Anti-Compounding Relay Valve Replacement . . . . . 11-11
  Circuit Breaker, Diode, and Relay Replacement . . . . . 7-9
  M1079 Relay Box Assembly Replacement/Repair . . . . . 16-63
  M1079 110 VAC and 24 VDC Relay Replacement . . . . . 16-62
  Relay Valve Replacement . . . . . 11-13
  100 Amp Alternator to Reverse Polarity Relay 12 VDC Cable Replacement . . . . . 7-65
  100 Amp Alternator to Reverse Polarity Relay 24 VDC Cable Replacement . . . . . 7-66
  100 Amp Reverse Polarity Relay Replacement . . . . . 7-27
  100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement . . . . . 7-80
  100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement . . . . . 7-81
  200 Amp Reverse Polarity Relay Replacement . . . . . 20-58
  200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Battery Cable Replacement . . . . . 20-66
  200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Load Cable Replacement . . . . . 20-60
  200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Battery Cable Replacement . . . . . 20-67
  200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Load Cable Replacement . . . . . 20-62
Removal
  General Removal Instructions . . . . . 2-36
Repair
  General Repair Instructions . . . . . 2-40
Repair Parts . . . . . 2-3
Reporting Equipment Improvement Recommendations (EIR) . . . . . 1-5
Reports
  Maintenance Forms, Records, and Reports . . . . . 1-2

Subject Para

## R (Cont)


Reservoir
Hydraulic Reservoir and Bracket Replacement 19-13
Power Steering Pump Reservoir and Bracket Replacement 13-8
Reservoirs
Large Quantity of Moisture Expelled From Air Reservoirs 2-21
Resilient Mount and Mechanical Stop Replacement 15-2
Restriction
Air Filter Restriction Gauge Replacement 24-2
Reverse
100 Amp Alternator to Reverse Polarity Relay 12 VDC Cable Replacement 7-65
100 Amp Alternator to Reverse Polarity Relay 24 VDC Cable Replacement 7-66
100 Amp Reverse Polarity Relay Replacement 7-27
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 12 VDC Cable Replacement 7-80
100 Amp Reverse Polarity Relay to Power Distribution Panel (PDP) 24 VDC Cable Replacement 7-81
200 Amp Reverse Polarity Relay Replacement 20-58
200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Battery Cable Replacement 20-66
200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Load Cable Replacement 20-60
200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Battery Cable Replacement 20-67
200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Load Cable Replacement 20-62
RH
Door and/or RH Front Marker Lights Do Not Illuminate 2-16
M1079 RH Door Assembly Replacement/ Repair 16-35
Right
Door and/or RH Front Marker Lights Do Not Illuminate 2-16
Hand Door and Cab Marker Lights Cable Assembly Replacement 7-57
Intervehicle Right Turn Signal Does Not Illuminate 2-16


Subject Para

## R (Cont)


Right (Cont)
Left or Right Front Turn Signals Do Not Operate 2-16
Turn Signal Indicator Does Not Operate 2-16
Rim
Cover Initial Installation 20-4
Cover Replacement 12-10
Ring
Machine Gun Ring Center Seat Replacement 21-5
Machine Gun Ring Lower Platform Replacement 21-3
Machine Gun Ring Replacement 21-2
Machine Gun Ring Roof Support Replacement 21-6
Machine Gun Ring Top Platform Replacement 21-4
Rocker Switches Replacement 7-18
Roller
11K Self-Recovery Winch (SRW) Front Roller Fairlead Replacement 17-2
11K Self-Recovery Winch (SRW) Rear Roller Fairlead Replacement 17-3
Roof
Hatch Replacement (All Models Except M1081) 16-74
M1079 Roof Bail Handle Replacement 16-27
M1081 Cab Roof Replacement 16-4
Machine Gun Ring Roof Support Replacement 21-6


## S


Scope, Introduction 1-1
Seat
Machine Gun Ring Center Seat Replacement 21-5
Seat Belt Replacement 16-15
Seats Replacement/Repair 16-14
Secondary and Primary Air Tanks Replacement 11-20
Self-Recovery
Introduction, 11K Self-Recovery Winch (SRW) Maintenance 17-1
11K Self-Recovery Winch (SRW) 1-17
11K Self-Recovery Winch (SRW) Cable Replacement 17-5
11K Self-Recovery Winch (SRW) Cable Pulleys Replacement 17-4
11K Self-Recovery Winch (SRW) Does Not Pay Out 2-16
11K Self-Recovery Winch (SRW) Does Not Reel In 2-16

# SUBJECT INDEX (CONT)


Subject Para

## S (Cont)

Self-Recovery (Cont)
11K Self-Recovery Winch (SRW) Does Not Reel In or Pay Out ..... 2-16
11K Self-Recovery Winch (SRW) Does Not Work ..... 2-28
11K Self-Recovery Winch (SRW) Front Roller Fairlead Replacement ..... 17-2
11K Self-Recovery Winch (SRW) Hoses Replacement ..... 17-7
11k Self-Recovery Winch (SRW) Rear Roller Fairlead Replacement ..... 17-3
11K Self-Recovery Winch (SRW) System Troubleshooting ..... 2-28
Sensor
Coolant Temperature Gage Sensor Replacement ..... 7-37
Ether Sensor Replacement ..... 7-39
Transmission Engine Speed Sensor Replacement ..... 7-43
Throttle Position Sensor (TPS) Cable Assembly Replacement ..... 4-16
Service
Before Operation ..... 2-6
Gladhand Two-Way Check Valve Replacement ..... 11-23
Shaft
Drive Shaft and Universal Joint Replacement ..... 9-2
Drive Shaft or Universal Joint Unusually Noisy When Operating ..... 2-18
Rear Axle Shaft Replacement ..... 10-4
Propeller Shaft Troubleshooting ..... 2-18
Shelter
M1078/M1081 S-280 Shelter Tiedown Kit Installation/Removal ..... 20-84
Shield
Muffler and Exhaust Heat Shields Replacement ..... 5-2
M1079 Blackout Shield and Frame Replacement/Repair ..... 16-37
Shift
Transmission Does Not Shift or Is Slow to Shift When Cold ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) and Bracket Replacement and Calibration ..... 8-2

Subject Para

## S (Cont)

Shift (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Dimmer Module Replacement ..... 7-13
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Emits Eight Seconds of Beeps and/or Transmission Does Not Shift Gears ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 14 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 24 and/or 33 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 41, 42, 44, 45, 66, and/or 69 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 43 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 52 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 57 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 21 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 51 Sub Code 10, 12, 21, 43, 45, or 65 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 25 and Any Sub Code ..... 2-17

Subject Para

## S (Cont)


Shift (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 53 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 54 Sub Code 01, 07, 10, 12, 17, 21, 23, 27, 32, 34, 43, 45, 54, 56, 65, 70, 71, 72, 80, 81, 82, 83, 85, 86, 92, 93, 95, 96, or 97 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 55 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 56 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 13 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 23 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Does Not Illuminate ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 14 ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16 ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 24 and/or 33 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 32 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 42, 44, 45, 46, 66, and/or 69 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 52 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 57 and Any Sub Code ..... 2-17


Subject Para

## S (Cont)


Shift (Cont)
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 21 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 51 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 25 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 53 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 54 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 55 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 56 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 13 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Indicator Displays "--" and/or Transmission Does Not Shift Gears ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 23 and Any Sub Code ..... 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Does Not Illuminate ..... 2-17
Shimmies
Wanders, Pulls to One Side, or Shimmies ..... 2-26
Wanders, Pulls to One Side, or Shimmies ..... 2-27
Shipment
Preparation for Storage or Shipment ..... 2-44
Preparation for Storage or Shipment Introduction ..... 2-43
Shock
Front Axle Shock Absorber Replacement ..... 15-3
Rear Axle Shock Absorber Replacement ..... 15-4
Shoes
Front Brake Shoes Replacement/ Adjustment ..... 11-2

# SUBJECT INDEX (CONT)

Subject Para

## S (Cont)


Shoes (Cont)
Rear Brake Shoes Replacement/ Adjustment ..... 11-3
Shrouds
Radiator Fan Shrouds Replacement ..... 6-4
Shunt
Replacement ..... 7-26
Starter to Shunt 24 VDC Cable Replacement ..... 7-84
Shuttle Valve Replacement ..... 23-5
Side and/or Rear Marker Lights Do Not Illuminate ..... 2-16
Slides
M1081 Parachute Suspension Slides Replacement ..... 14-3
Sling
M1079 Sling Bearing Angle Replacement ..... 16-26
M1079 Sling Spreader and Guides Replacement ..... 16-24
Small Arms Mount Replacement ..... 21-7
Spare
Tire Retainer Replacement/Repair ..... 14-4
Tire Retainer Does Not Lower ..... 2-32
Tire Retainer Does Not Raise ..... 2-32
Special
Introduction, Special Purpose Kits Maintenance ..... 20-1
Purpose Kit Troubleshooting ..... 2-31
Tools, TMDE, and Support Equipment ..... 2-2
Speed
Engine Speed Sensor Replacement/ Adjustment ..... 7-38
Speedometer
Does Not Illuminate ..... 2-16
Does Not Operate or Is Inaccurate ..... 2-16
Spider
Differential Spider Assembly Replacement ..... 10-3
Spindle Replacement ..... 10-5
Spreader
M1079 Lower Spreader Bar Replacement ..... 16-21
M1079 Sling Spreader and Guides Replacement ..... 16-24
Spring
Air Spring and Bracket Replacement ..... 16-9
Rear Spring Brake Caging ..... 11-6


## S (Cont)


SRW
Introduction, 11K Self-Recovery Winch (SRW) Maintenance ..... 17-1
11K Self-Recovery Winch (SRW) ..... 1-17
11K Self-Recovery Winch (SRW) Cable Replacement ..... 17-5
11K Self-Recovery Winch (SRW) Does Not Pay Out ..... 2-16
11K Self-Recovery Winch (SRW) Does Not Reel In ..... 2-16
11K Self-Recovery Winch (SRW) Does Not Reel In or Pay Out ..... 2-16
11K Self-Recovery Winch (SRW) Does Not Work ..... 2-28
11K Self-Recovery Winch (SRW) Front Roller Fairlead Replacement ..... 17-2
11K Self-Recovery Winch (SRW) Hoses Replacement ..... 17-7
11K Self-Recovery Winch (SRW) Maintenance ..... 17-1
11K Self-Recovery Winch (SRW) Cable Pulleys Replacement ..... 17-4
11K Self-Recovery Winch (SRW) Rear Roller Fairlead Replacement ..... 17-3
11K Self-Recovery Winch (SRW) System Troubleshooting ..... 2-28
Stabilizer
Rear Stabilizer Bar Replacement/Repair ..... 15-5
Stalls
Engine Stalls at Low RPM ..... 2-12
Start
and Charging Cable Assembly Replacement ..... 7-82
Engine Overspeeds on Start ..... 2-12
Ether Start Does Not Operate ..... 2-16
Ether Start Switch Does Not Illuminate ..... 2-16
Hazard Lights Switch Does Not Illuminate ..... 2-16
Inhibit Pushbutton Does Not Operate ..... 2-16
Inhibit Pushbutton Switch Replacement ..... 7-19
Starter
Auxiliary Starter Solenoid Replacement ..... 7-6
Battery to Starter Cable Assembly Replacement ..... 7-70
Pushbutton Switch Replacement ..... 7-20
to Chassis Ground Cable Replacement ..... 7-83
to Shunt 24 VDC Cable Replacement ..... 7-84

Subject Para

## S (Cont)


Starting
Ether Starting Aid Does Not Operate 2-13
Ether Starting Aid Replacement 4-15
Motor Replacement 7-7
STE/ICE-R Cable Assembly Replacement 7-58
Steering
Column Replacement 13-6
Excessive Play When Turning Steering Wheel 2-26
Hard or Does Not Work 2-29
Hydraulic System Troubleshooting 2-29
Introduction, Steering System Maintenance 13-1
No Response When Turning Steering Wheel 2-26
Power Steering Hoses and Tube Replacement 13-7
Power Steering Pump Replacement 13-9
Power Steering Pump Reservoir and Bracket Replacement 13-8
System 1-16
Troubleshooting 2-26
Wheel Replacement 13-2
Step
Cab Step Replacement 16-11
M1079 Folding Step Replacement 16-28
Stop
Master Stop Indicator Does Not Operate 2-16
Trailer Left Stop/Turn Light Does Not Illuminate 2-16
Trailer Right Stop/Turn Light Does Not Illuminate 2-16
Stoplights
and Blackout Stoplights Do Not Operate 2-16
Intervehicle Stoplights Do Not Illuminate 2-16
One or Both Blackout Stoplights Do Not Illuminate 2-16
One or Both Stoplights Do Not Illuminate 2-16
Stoplight Switch Replacement 11-25
Storage
Cab Storage Box Replacement/Repair 16-17
Preparation for Storage or Shipment 2-44
Preparation for Storage or Shipment Introduction 2-43
Storage Maintenance Procedures 2-45
Stowage
Panel Stowage Door Assembly Repair 16-18


Subject Para

## S (Cont)


Stud
Wheel Stud Replacement 12-3
Wheel Stud Tightening Sequence 12-4
Sub-Frame
M1079 Upper Sub-Frame Replacement 16-20
Suspension
Introduction, Suspension System Maintenance 15-1
M1081 Parachute Suspension Slides Replacement 14-3
System Troubleshooting 2-27
Will Not Compress or Return to Normal 2-30
Swing
Light Material Handling Crane (LMHC) Mast and Swing Assembly Repair 20-78
Switch
Amber Warning Light Switch Does Not Illuminate 2-16
Dimmer Switch Replacement 7-12
Heater Fan Control Switch Replacement 18-10
Lamp Test Switch Does Not Illuminate 2-16
Main Light Switch Replacement 7-17
Master Power Switch Does Not Illuminate 2-16
Master Power Switch Does Not Shut Down Engine 2-16
M1079 Blackout Override Switch Replacement 16-56
M1079 Blackout Switch Replacement 16-57
M1079 Door Ajar Switch and Conduit Replacement 16-55
M1079 Fan Switch/Box and Conduit Replacement 16-54
M1079 Interior Lights Switch/Box and Conduit Replacement 16-50
Oil Pressure Switch Replacement 7-40
Pressure Switch Replacement 23-8
Radiator Fan Off Switch Does Not Illuminate 2-16
Start Inhibit Pushbutton Switch Replacement 7-19
Starter Pushbutton Switch Replacement 7-20
Stoplight Switch Replacement 11-25
Troop Transport Alarm Switch, Connector, and Bracket Replacement 20-80
Turn Signal Switch Replacement 7-25
Water Temperature Switch Replacement 7-42

# SUBJECT INDEX (CONT)


Subject Para

## S (Cont)

Switches
Rocker Switches Replacement 7-18
System
11K Self-Recovery Winch (SRW) System
Troubleshooting 2-28
Air System 1-19
Air System Loses Pressure During
Operation/Slow, No, or Incorrect
Air Pressure Buildup 2-21
Air System Troubleshooting 2-21
Brake System 1-15
Brake System Loses Air When Brakes
Are Applied 2-20
Brake System Troubleshooting 2-20
Cooling System 1-13
Cooling System Troubleshooting 2-15
Electrical System 1-14
Electrical System Does Not Maintain A
Charge 2-16
Electrical System Troubleshooting 2-16
Engine System Troubleshooting 2-12
Exhaust System Troubleshooting 2-14
Exhaust System Unusually Noisy or
Vibrates Excessively During Engine
Operation 2-14
Fuel System 1-12
Fuel System Bleeding 4-11
Fuel System Troubleshooting 2-13
Hydraulic System Troubleshooting 2-23
Introduction, Air System Maintenance 23-1
Introduction, Brake System
Maintenance 11-1
Introduction, Cooling System
Maintenance 6-1
Introduction, Electrical System
Maintenance 7-1
Introduction, Exhaust System
Maintenance 5-1
Introduction, Fuel System Maintenance 4-1
Introduction, Hydraulic System
Maintenance 19-1
Introduction, Steering System
Maintenance 13-1
Introduction, Suspension System
Maintenance 15-1
Oil In Cooling System 2-15

Subject Para

## S (Cont)

System (Cont)
Park and Trailer Air Supply Valves
Replacement 11-18
Steering Hydraulic System
Troubleshooting 2-29
Steering System 1-16
Suspension System Troubleshooting 2-27
Transmission System Troubleshooting 2-17

## T

Tachometer
Does Not Illuminate 2-16
Does Not Operate or Is Inaccurate 2-16
Replacement 7-21
Taillight
Composite Taillight Assembly
Replacement/Repair 7-32
Trailer Marker/Taillights Do Not
Illuminate 2-16
Taillights
Intervehicle Taillights Do Not Illuminate 2-16
Tailpipe Replacement 5-4
Tank
Fuel Tank and Brackets Replacement 4-8
Radiator Overflow Tank and
Bracket Replacement/Repair 6-3
Wet Tank Replacement 23-7
Tanks
Secondary and Primary Air Tanks
Replacement 11-20
Tapping
M1079 Tapping Plate Replacement 16-42
M1079 Van Body Floor Tapping Plate
Initial Installation (Serial Numbers 001
through 190) 16-43
Temperature
Coolant Temperature Gage Sensor
Replacement 7-37
Coolant Temperature Light Switch
Replacement 7-22
High Engine Temperature Indicator
Illuminates 2-16
Terminal Block
Battery to 200 Amp Terminal Block
12 VDC Cable Assembly
Replacement 20-63

Subject Para

## T (Cont)


Terminal Block (Cont)
Battery to 200 Amp Terminal Block 24 VDC Cable Assembly Replacement ..... 20-64
200 Amp Alternator to Terminal Block 12 VDC Cable Replacement ..... 20-59
200 Amp Alternator to Terminal Block 24 VDC Cable Replacement ..... 20-61
200 Amp Terminal Block Replacement ..... 20-69
200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Battery Cable Replacement ..... 20-66
200 Amp Terminal Block to Reverse Polarity Relay 12 VDC Load Cable Replacement ..... 20-60
200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Battery Cable Replacement ..... 20-67
200 Amp Terminal Block to Reverse Polarity Relay 24 VDC Load Cable Replacement ..... 20-62
200 Amp Terminal Block to Power Distribution Panel (PDP) 12 VDC Cable Replacement ..... 20-65
200 Amp Terminal Block to Power Distribution Panel (PDP) 24 VDC Cable Replacement ..... 20-68
Test
Lamp Test Switch Does Not Illuminate ..... 2-16
Tester
Battery Tester Does Not Operate ..... 2-16
Battery Tester Replacement ..... 7-45
Thermostat
Housing Replacement ..... 6-6
M1079 Heater Thermostat Connector Replacement ..... 16-48
Replacement ..... 6-5
Throttle
Checking and Stenciling High/Low Hand Throttle Positions ..... 4-22
Hand Throttle Lever Replacement/ Adjustment ..... 4-17
Control Cable Replacement/ Adjustment ..... 4-18
Control Lever Replacement ..... 4-20
Control Threaded Rod Replacement ..... 4-19
Position Sensor (TPS) Cable Assembly Replacement ..... 4-16
Tiedown
M1078/M1081 S-280 Shelter Tiedown Kit Installation/Removal ..... 20-84
Tie-Rod Replacement/Repair 13-4


Subject Para

## T (Cont)


Tilt
Cab Tilt and Spare Tire Retainer Troubleshooting ..... 2-32
Cab Tilt, Spare Tire Retainer, and Suspension Compression Will Not Work ..... 2-30
Tire
Central Tire Inflation System (CTIS) Cable Assembly Replacement ..... 7-53
Central Tire Inflation System (CTIS) Does Not Operate ..... 2-16
Central Tire Inflation System (CTIS) ECU Replacement ..... 12-6
Central Tire Inflation System (CTIS) Hose Assemblies, Manifold Valve, Kneeling Valve and Bracket Replacement ..... 12-5
Central Tire Inflation System (CTIS) Troubleshooting ..... 2-24
Front Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement ..... 12-8
Primary and Central Tire Inflation System (CTIS) Air Hoses Replacement ..... 23-2
Rear Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement ..... 12-9
Spare Tire Retainer Replacement/ Repair ..... 14-5
Spare Tire Retainer Does Not Lower ..... 2-32
Spare Tire Retainer Does Not Raise ..... 2-32
Wheel Bearing/Central Tire Inflation System (CTIS) Seal Replacement ..... 10-2
Tires
CTIS Does Not Deflate Tires ..... 2-16
CTIS Does Not Inflate Tires ..... 2-16
Introduction, Wheels, Tires, and Hubs Maintenance ..... 12-1
Wear Unevenly or Excessively ..... 2-22
Too Much Engine Vibration ..... 2-12
Tool Box Replacement/Repair ..... 16-16
Trailer
Left Stop/Turn Light Does Not Illuminate ..... 2-16
Marker/Taillights Do Not Illuminate ..... 2-16
Right Stop/Turn Light Does Not Illuminate ..... 2-16

# SUBJECT INDEX (CONT)


Subject Para

## T (Cont)

Transmission
Does Not Shift or Is Slow to Shift When Cold ..... 2-17
Engine and Transmission Oil Sampling Valves Replacement ..... 3-6
Engine Speed Sensor Replacement ..... 7-43
Introduction, Transmission Maintenance ..... 8-1
Metal Particles Found During Transmission Oil Change ..... 2-17
Oil Cooler Hoses Initial Installation ..... 8-14
Oil Cooler Hoses Replacement ..... 8-15
Oil Cooler Hose Bracket Replacement ..... 8-16
Oil Cooler Replacement ..... 8-10
Oil Cooler Tubes Replacement ..... 8-11
Oil Filter Replacement ..... 8-9
Scavenge Pump Hose Replacement ..... 8-12
System Troubleshooting ..... 2-17
Temperature Indicator Does Not Operate ..... 2-16
Unusually Noisy When Operating ..... 2-17
WTEC II Cab Transmission Harness Replacement ..... 7-86
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) and Bracket Replacement and Calibration ..... 8-2
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Dimmer Module Replacement ..... 7-13
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Emits Eight Seconds of Beeps and/or Transmission Does Not Shift Gears ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 14 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 24 and/or 33 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code ..... 2-17

Subject Para

## T (Cont)

Transmission (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 41, 42, 44, 45, 66, and/or 69 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 43 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 52 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 57 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 21 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 51 Sub Code 10, 12, 21, 43, 45, or 65 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 25 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 53 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 54 Sub Code 01, 07, 10, 12, 17, 21, 23, 27, 32, 34, 43, 45, 54, 56, 65, 70, 71, 72, 80, 81, 82, 83, 85, 86, 92, 93, 95, 96, or 97 ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 55 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 56 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 13 and Any Sub Code ..... 2-17
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 23 and Any Sub Code ..... 2-17

Subject Para

## T (Cont)

Transmission (Cont)
WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Does Not Illuminate 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 14 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 24 and/or 33 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 32 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 42, 44, 45, 46, 66, and/or 69 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 52 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 57 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 21 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 51 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 25 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 53 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 54 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 55 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 56 and Any Sub Code 2-17

Subject Para

## T (Cont)

Transmission (Cont)
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 13 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Indicator Displays "--" and/or Transmission Does Not Shift Gears 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 23 and Any Sub Code 2-17
WTEC III Transmission Pushbutton Shift Selector (TPSS) Does Not Illuminate 2-17
Transmitter
Low Pressure Transmitter Replacement 7-88
Oil Pressure Transmitter Replacement 7-41
Transport/Transportability
Air Transport Troubleshooting 2-30
Air Transportability Air Hoses Replacement 23-3
Air Transportability Hydraulic Hose Replacement 19-11
Air Transportability Hydraulic System 1-18
Air Transportability Hydraulic System Service 19-7
M1079 Van Preparation for Air Transport 16-73
Troop Transport Alarm Cable Assembly Replacement 20-79
Troop Transport Alarm Does Not Operate 2-31
Troop Transport Audible Alarm Does Not Operate 2-16
Troop Transport Alarm Switch, Connector, and Bracket Replacement 2-80
Troop Transport Audible Alarm Does Not Operate 2-16
Troubleshooting
Axle Troubleshooting 2-25
Electrical System Troubleshooting 2-16
Engine System Troubleshooting 2-12
Exhaust System Troubleshooting 2-14
Fuel System Troubleshooting 2-13
Hydraulic System Troubleshooting 2-23
Introduction to Logic Tree Troubleshooting 2-10
Power Take Off (PTO) Troubleshooting 2-19
Special Purpose Kit Troubleshooting 2-31
Steering Hydraulic System Troubleshooting 2-29
Steering Troubleshooting 2-26
Suspension System Troubleshooting 2-27

# SUBJECT INDEX (CONT)


Subject Para

## T (Cont)

Troubleshooting (Cont)
Transmission System Troubleshooting . . . . . 2-17
Wheel Troubleshooting . . . . . 2-22
11K Self-Recovery Winch (SRW) System Troubleshooting . . . . . 2-28
Tube
Coolant Bypass Tube Replacement . . . . . 6-7
Engine Oil Fill Tube Replacement . . . . . 3-7
Fuel Ratio Control Tube Replacement . . . . . 4-6
Intake Air Cleaner Filter Element, Air Cleaner Assembly, and Particle Extraction Tube Replacement . . . . . 4-2
Orifice Tube Assembly Replacement . . . . . 4-7
Power Steering Hoses and Tube Replacement . . . . . 13-7
Transmission Oil Fill Tube Replacement . . . . . 8-13
Turbocharger to Charge Air Cooler Tube and Hoses Replacement . . . . . 4-4
Upper Coolant Tube and Hoses Replacement . . . . . 6-9
Tubes
Air Compressor Inlet and Outlet Coolant Tubes Replacement . . . . . 6-11
Charge Air Cooler to Air Inlet Elbow Tubes and Hoses Replacement . . . . . 4-5
Fuel Filter Tubes Replacement . . . . . 4-10
M1079 Heater Fuel Tubes/Hoses Replacement . . . . . 20-46
Transmission Oil Cooler Tubes Replacement . . . . . 8-11
Turn
Intervehicle Left Turn Signal Does Not Illuminate . . . . . 2-16
Intervehicle Right Turn Signal Does Not Illuminate . . . . . 2-16
Front and Rear Turn Signals Do Not Operate . . . . . 2-16
Left or Right Front Turn Signals Do Not Operate . . . . . 2-16
Left Turn Signal Indicator Does Not Operate . . . . . 2-16
Right Turn Signal Indicator Does Not Operate . . . . . 2-16
Signal Indicators and High Beams on Indicator Do Not Operate . . . . . 2-16

Subject Para

## T (Cont)

Turn (Cont)
Signal Switch Replacement . . . . . 7-25
Trailer Left Stop/Turn Light Does Not Illuminate . . . . . 2-16
Trailer Right Stop/Turn Light Does Not Illuminate . . . . . 2-16
Turret
Light Material Handling Crane (LMHC) Turret Replacement . . . . . 20-76
Two
Steady Mode Lights Illuminate on Central Tire Inflation System (CTIS) ECU . . . . . 2-24
Way Check Valve Replacement . . . . . 11-14

## U

Universal
Drive Shaft or Universal Joint Unusually Noisy When Operating . . . . . 2-18
Universal Joint
Drive Shaft and Universal Joint Replacement . . . . . 9-2
Unpacking and Deprocessing . . . . . 2-4
Upper
Coolant Tube and Hoses Replacement . . . . . 6-9
M1079 Upper Sub-Frame Replacement . . . . . 16-20

## V

Valve
Cab Leveling Valve and Linkage Replacement/Adjustment . . . . . 16-8
Cover and Gasket Replacement . . . . . 3-3
Emergency Gladhand Two-Way Check Valve Replacement . . . . . 11-24
Front Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement . . . . . 12-8
Front Axle Quick Release Valve Replacement . . . . . 11-15
Front Gladhand One-Way Check Valve Replacement . . . . . 11-26
Fuel Pressure Regulating Valve Replacement . . . . . 4-3

Subject Para

## V (Cont)


Valve (Cont)
Rear Axle Central Tire Inflation System (CTIS) Quick Release Valve Replacement . . . . . 12-9
Inversion Valve Replacement . . . . . 11-12
Inversion Valve Replacement . . . . . 23-4
Load Sensing Valve and Control Cable Replacement/Adjustment . . . . . 11-10
Low Pressure Transmitter Two-Way Check Valve Replacement . . . . . 11-28
Manifold Valve Assembly Replacement . . . . . 12-7
Park Control Two-Way Check Valve Replacement . . . . . 11-17
Pressure Protection Valve Replacement . . . . . 11-27
Relay Valve Replacement . . . . . 11-13
Service Gladhand Two-Way Check Valve Replacement . . . . . 11-23
Shuttle Valve Replacement . . . . . 23-5
Two-Way Check Valve Replacement . . . . . 11-14
Winch Control Valve Assembly and Bracket Replacement . . . . . 17-6
Winch Control Valve Cable Assembly Replacement . . . . . 7-85
Valves
System Park and Trailer Air Supply Valves Replacement . . . . . 11-18
Van
All M1079 Van Body Marker Lights Do Not Operate . . . . . 2-16
M1079 Van Body Floor Tapping Plate Initial Installation (Serial Numbers 001 through 190) . . . . . 16-43
M1079 Van Body Interior Accessory Mounting Locations . . . . . 16-44
M1079 Van Body Clearance Marker Light Does Not Illuminate . . . . . 2-16
M1079 Van Body Replacement . . . . . 16-19
M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate . . . . . 2-16
M1079 Van Preparation for Air Transport . . . . . 16-73
Vehicle
Brakes Unevenly, Brakes Pull to One Side or Grab . . . . . 2-20
WTEC II Vehicle Interface Module (VIM) Replacement/Repair . . . . . 8-6
Vent
M1079 Vent Cover Replacement . . . . . 16-32


Subject Para

## V (Cont)


Voltage Regulator
100 Amp Voltage Regulator Replacement . . . . . 7-5
200 Amp Voltage Regulator Replacement . . . . . 20-57
VOLTS
Gage Does Not Illuminate . . . . . 2-16
Gage Does Not Operate or Is Inaccurate . . . . . 2-16


## W


Wanders
Pulls to One Side, or Shimmies . . . . . 2-26
Pulls to One Side, or Shimmies . . . . . 2-27
Warning
Amber Warning Light Assembly Repair . . . . . 20-83
Amber Warning Light Switch Does Not Illuminate . . . . . 2-16
Light Cable Assembly Replacement . . . . . 22-2
Light Does Not Illuminate . . . . . 2-16
No Overspeed Warning Light and/or Overspeed Pressure Change . . . . . 2-24
Warranty Information . . . . . 1-6
Washer
Windshield Washer Does Not Operate . . . . . 2-16
Windshield Washer Does Not Operate on Low Speed . . . . . 2-16
Windshield Washer Hoses and Connector Replacement . . . . . 18-6
Windshield Washer Pump Electromagnetic Interference (EMI) Cable Replacement . . . . . 7-60
Windshield Washer Reservoir and Pump Replacement . . . . . 18-2
Water
Fuel/Water Separator and Filter Replacement . . . . . 4-13
Pump and Fittings Replacement . . . . . 6-12
TEMP Gage Does Not Illuminate . . . . . 2-16
TEMP Gage Does Not Operate or Is Inaccurate . . . . . 2-16
Temperature Switch Replacement . . . . . 7-42
Wet Tank Replacement . . . . . 23-7
Wheel
Bearing/Central Tire Inflation System (CTIS) Seal Replacement . . . . . 10-2
Front Wheel Toe-In Alignment/ Adjustment . . . . . 13-5
No Response When Turning Steering Wheel . . . . . 2-26

# SUBJECT INDEX (CONT)


Subject Para

## W (Cont)

Wheel (Cont)
Repair . . . . . 12-2
Steering Wheel Replacement . . . . . 13-2
Stud Replacement . . . . . 12-3
Stud Tightening Sequence . . . . . 12-4
Troubleshooting . . . . . 2-22
Wheels
Introduction, Wheels, Tires, and Hubs Maintenance . . . . . 12-1
Wobbles or Shimmies . . . . . 2-22
White Exhaust Smoke . . . . . 2-12
Winch
Control Valve Assembly and Bracket Replacement . . . . . 17-6
Control Valve Cable Assembly Replacement . . . . . 7-85
Light Material Handling Crane (LMHC) Winch Replacement/Repair . . . . . 20-73
11K Self-Recovery Winch (SRW) . . . . . 1-17
11K Self-Recovery Winch (SRW) Cable Replacement . . . . . 17-5
11K Self-Recovery Winch (SRW) Does Not Pay Out . . . . . 2-16
11K Self-Recovery Winch (SRW) Does Not Reel In . . . . . 2-16
11K Self-Recovery Winch (SRW) Does Not Reel In or Pay Out . . . . . 2-16
11K Self-Recovery Winch (SRW) Does Not Work . . . . . 2-28
11K Self-Recovery Winch (SRW) Front Roller Fairlead Replacement . . . . . 17-2
11K Self-Recovery Winch (SRW) Hoses Replacement . . . . . 17-7
11K Self-Recovery Winch (SRW) Cable Pulleys Replacement . . . . . 17-4
11K Self-Recovery Winch (SRW) Rear Roller Fairlead Replacement . . . . . 17-3
11K Self-Recovery Winch (SRW) System Troubleshooting . . . . . 2-28
Window
M1079 Window Latch and Prop Replacement . . . . . 16-38
M1079 Window Main Frame Replacement . . . . . 16-40
M1079 Window Sash Assembly Replacement/Repair . . . . . 16-39
M1079 Window Cover Replacement . . . . . 16-41

Subject Para

## W (Cont)

Windshield
All Windshield Wiper Speeds Do Not Operate . . . . . 2-16
Washer Does Not Operate . . . . . 2-16
Washer Does Not Operate on Low Speed . . . . . 2-16
Washer Hoses and Connector Replacement . . . . . 18-6
Washer Pump Electromagnetic Interference (EMI) Cable Assembly Replacement . . . . . 7-60
Washer Reservoir and Pump Replacement . . . . . 18-2
Wiper and Nozzle Replacement . . . . . 18-3
Wiper Does Not Operate on High Speed . . . . . 2-16
Wiper Does Not Operate on Intermittent Speed . . . . . 2-16
Wiper ECU Replacement . . . . . 7-62
Wiper Electromagnetic Interference (EMI) Cable Replacement . . . . . 7-61
Wiper Linkage Replacement . . . . . 18-5
Wiper Motor Replacement . . . . . 18-4
Wiper Speed Does Not Operate On Low Speed . . . . . 2-16
Wiper
All Windshield Wiper Speeds Do Not Operate . . . . . 2-16
Windshield Wiper and Nozzle Replacement . . . . . 18-3
Windshield Wiper Does Not Operate on High Speed . . . . . 2-16
Windshield Wiper Does Not Operate on Intermittent Speed . . . . . 2-16
Windshield Wiper Does Not Operate on Low Speed . . . . . 2-16
Windshield Wiper ECU Replacement . . . . . 7-62
Windshield Wiper Electromagnetic Interference (EMI) Cable Replacement . . . . . 7-61
Windshield Wiper Linkage Replacement . . . . . 18-5
Windshield Wiper Motor Replacement . . . . . 18-4
Wire
Light Material Handling Crane (LMHC) Weight Block and Wire Rope Replacement/Repair . . . . . 20-72




All data on page INDEX-39, including pages INDEX-39 and INDEX-40 Blank, deleted

# GLOSSARY
# ABBREVIATIONS

| | |
|---|---|
| A/C | Air Conditioner |
| ANSI | American National Standards Institute |
| CCW | Counterclockwise |
| CTIS | Central Tire Inflation System |
| CW | Clockwise |
| ECU | Electronic Control Unit |
| EMI | Electromagnetic Interference |
| LED | Light Emitting Diode |
| LH | Left Hand |
| LMHC | Light Material Handling Crane |
| MAC | Maintenance Allocation Chart |
| NATO | North Atlantic Treaty Organization |
| NBC | Nuclear, Biological, or Chemical |
| NO/NC | Normally Open/Normally Closed |
| PDP | Power Distribution Panel |
| PMCS | Preventive Maintenance Checks and Services |
| PTO | Power Takeoff |
| RH | Right Hand |
| SAE | Society of Automotive Engineers |
| SRW | Self-Recovery Winch |
| STE/ICE-R | Simplified Test Equipment/Internal Combustion Engine-Reprogrammable |
| TEPSS | Transmission ECU Pushbutton Shift Selector |
| TPS | Throttle Position Sensor |
| VDC | Volts Direct Current |
| VIM | Vehicle Interface Module |

WTEC II . . . . . World Transmission Electronic Controls (version 2)

WTEC III . . . . . World Transmission Electronic Controls (version 3)

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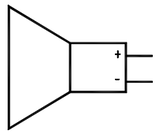
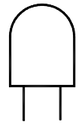
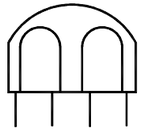
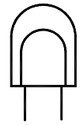
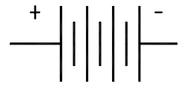
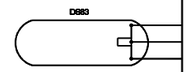
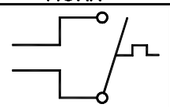
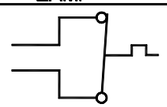
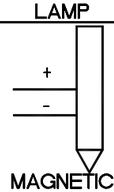
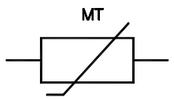
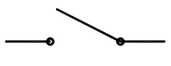
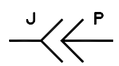
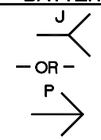
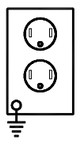
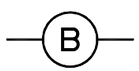
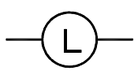
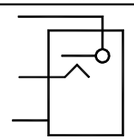
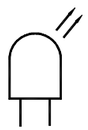
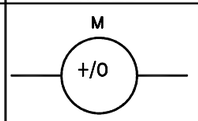
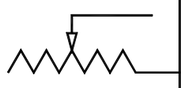
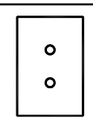
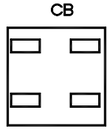
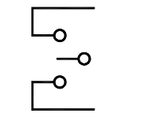
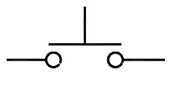
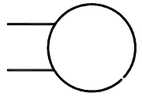
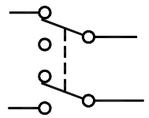
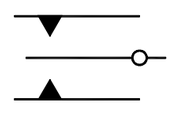
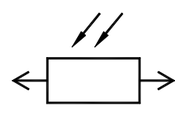
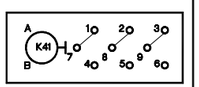
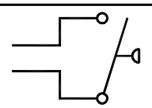
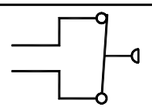
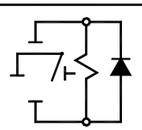
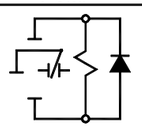
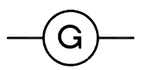
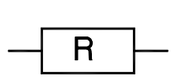
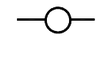
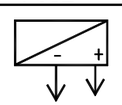
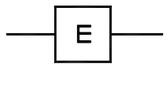
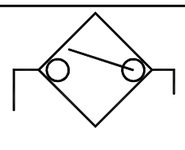
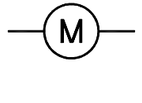
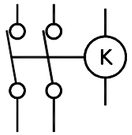
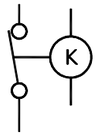
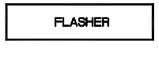
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|---|---|---|---|---|---|---|---|---|
|  HORN |  BLACKOUT LAMP |  LAMP |  DUALBEAM LAMP |  GROUND |  POWER LAMP |  OPEN CONTACT |  BATTERY |  FLUORESCENT LIGHT |
|  TEMPERATURE SWITCH OPEN |  TEMPERATURE SWITCH CLOSED |  MAGNETIC PICKUP |  SENSOR |  NORMALLY OPEN |  NORMALLY CLOSED |  CONNECTOR |  RECEPTACLE |  ELECTRICAL OUTLET |
|  MOTOR |  SOLENOID |  LEVEL SENSOR |  FILTER |  LED |  METER OR GAGE |  CLOSED CONTACT |  DIMMER MODULE |  TELEPHONE RECEPTACLE |
|  CIRCUIT BREAKER |  TWO-WAY SWITCH |  PUSHBUTTON |  CIRCULATING PUMP |  DPDT SWITCH |  DPST SWITCH |  PHOTOCELL |  FUSE |  RELAY |
|  PRESSURE SWITCH OPEN |  PRESSURE SWITCH CLOSED |  NORMALLY OPEN |  NORMALLY CLOSED |  ALTERNATOR |  RESISTOR |  TERMINAL LUG |  ELECTRONIC IGNITION UNIT | |
|  DIODE |  SPLICE |  SENSING SWITCH |  MOTOR |  GROUND RELAY |  RELAY |  CIRCUIT BREAKER |  FLASHER | |

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 1 OF 34

| SIZE | ILL NO. | |
|---|---|---|
| B | 5WD01L1B | FP-1/ (FP-2 BLANK) |

| CONNECTORS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| A13 | A66 | 8 | WTEC II TRANSMISSION CONNECTOR A |
| A13 | A70 | 8 | WTEC II TRANSMISSION CONNECTOR B |
| A13 | A74 | 9 | WTEC II TRANSMISSION CONNECTOR C |
| J1 | D285 | 32 | VAN 110 VAC POWER ENTRY |
| J2 | A185 | 21 | EMI FILTER |
| J2 | E285 | 32 | VAN 110 VAC POWER ENTRY |
| J3 | D205 | 23 | AIRDROP ONLY |
| J5 | A38 | 5 | VEHICLE HORN |
| J6 | A38 | 5 | VEHICLE HORN |
| J7 | A188 | 21 | WTEC II TRANSMISSION DIMMER MODULE |
| J8 | B38 | 5 | BLACKOUT MARKER RIGHT FRONT |
| J9 | C38 | 5 | FRONT RIGHT TURN SIGNAL |
| J10 | B38 | 5 | PARKING LIGHT FRONT RIGHT |
| J12 | D38 | 5 | RIGHT HEADLIGHT |
| J13 | C38 | 5 | RIGHT HEADLIGHT |
| J14 | C38 | 5 | RIGHT HEADLIGHT |
| J17 | H38 | 5 | BLACKOUT DRIVE LIGHT |
| J18 | D38 | 5 | LEFT HEADLIGHT |
| J19 | E38 | 5 | LEFT HEADLIGHT |
| J19 | C177 | 20 | CAB - DASH - LEFT - UNDERDASH |
| J20 | D38 | 5 | LEFT HEADLIGHT |
| J22 | G38 | 5 | PARKING LIGHT FRONT LEFT |
| J23 | F38 | 5 | FRONT LEFT TURN SIGNAL |
| J24 | H38 | 5 | BLACKOUT MARKER LEFT FRONT |
| J25 | G85 | 10 | WINDSHIELD WASHER ROTARY PUMP (B3) |
| J27 | A43 | 5 | CHASSIS - FRONT |
| J31 | E55 | 7 | ENGINE |
| J31X | F175 | 20 | CAB - DASH - LEFT - UNDERDASH |
| J39 | G61 | 7 | ENGINE |
| J43 | G42 | 5 | CHASSIS - FRONT |
| J43X | F42 | 5 | CHASSIS - FRONT |
| J43X | G175 | 20 | CAB - DASH - LEFT - UNDERDASH |
| J50 | E85 | 10 | CAB MARKER LIGHT FRONT UPPER LEFT |
| J51 | D42 | 5 | CHASSIS - FRONT |
| J52 | E38 | 5 | CHASSIS - FRONT BUMPER |
| J52 | B203 | 23 | CHASSIS - FRONT |
| J53 | F200 | 23 | AIRDROP ONLY |
| J55 | C85 | 10 | CAB MARKER LIGHT FRONT UPPER RIGHT |
| J57 | D85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT |
| J59 | C85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT |
| J60 | D85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE |
| J62 | E88 | 10 | ROTARY WARNING LIGHT CONNECTOR |
| J65 | E186 | 21 | ROTARY WARNING LIGHT CONNECTOR |
| J78 | F185 | 21 | CAB RADIO CONNECTOR |
| J80 | D78 | 9 | AIR DRYER (EXCEPT DUMP) |
| J93 | B50 | 6 | CHASSIS - SPARE TIRE |
| J95 | E38 | 5 | 12V INTERVEHICULAR |
| J95 | B206 | 23 | ENGINE |
| J99 | E187 | 21 | CHEMICAL ALARM CONNECTOR |
| J106 | F50 | 6 | CHEMICAL DETECTOR RECEPTACLE |
| J108 | B222 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| J111 | E122 | 14 | CTIS ELECTRONIC CONTROL UNIT |
| J113 | G186 | 21 | CTIS PRESSURE TRANSDUCER |
| J114 | B165 | 21 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| J114 | D298 | 34 | WTEC III TRANSMISSION HARNESS (TID1) |
| J114 | D303 | 34 | WTEC III TRANSMISSION HARNESS (TID2) |
| J115 | C154 | 18 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| J116 | C159 | 18 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| J117 | F161 | 18 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| J117 | B289 | 33 | WTEC III DIAGNOSTIC CONNECTOR |
| J118 | D161 | 18 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| J119 | B169 | 19 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| J119 | D301 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID1) |
| J119 | D305 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID2) |
| J129 | F85 | 10 | CAB MARKER LIGHT FRONT LOWER LEFT |
| J130 | F85 | 10 | CAB MARKER LIGHT LEFT DOOR |
| J130 | F202 | 23 | 12 PIN CONNECTOR |
| J131 | B85 | 10 | CAB MARKER LIGHT RIGHT DOOR |
| J132 | B85 | 10 | CAB MARKER LIGHT FRONT LOWER RIGHT |
| J150 | B271 | 31 | VAN FRONT MARKER LIGHT |
| J151 | B271 | 31 | VAN FRONT MARKER LIGHT |
| J152 | B271 | 31 | VAN FRONT MARKER LIGHT |
| J153 | A271 | 31 | VAN FRONT MARKER LIGHT |

| CONNECTORS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| J154 | A271 | 31 | VAN FRONT MARKER LIGHT |
| J155 | B287 | 32 | VAN CURBSIDE MARKER LIGHT |
| J156 | B287 | 32 | VAN CURBSIDE MARKER LIGHT |
| J157 | C287 | 32 | VAN ROADSIDE MARKER LIGHT |
| J158 | C287 | 32 | VAN ROADSIDE MARKER LIGHT |
| J159 | D287 | 32 | VAN REAR CENTER MARKER LIGHT |
| J160 | E287 | 32 | VAN REAR CENTER MARKER LIGHT |
| J161 | E287 | 32 | VAN REAR CENTER MARKER LIGHT |
| J162 | B273 | 31 | VAN CURBSIDE BLACKOUT LIGHT |
| J163 | B274 | 31 | VAN CURBSIDE EMERGENCY LIGHT |
| J164 | H274 | 31 | VAN ROADSIDE BLACKOUT LIGHT |
| J165 | H275 | 31 | VAN ROADSIDE EMERGENCY LIGHT |
| J166 | C271 | 31 | VAN FRONT EMERGENCY LIGHT |
| J167 | D287 | 32 | VAN REAR EMERGENCY LIGHT |
| J173 | G272 | 31 | VAN 12/24 VDC POWER RECEPTACLE |
| J209A | C230 | 26 | PTO EQUIPPED |
| J209B | D230 | 26 | PTO EQUIPPED |
| J210 | F222 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| J215 | E230 | 26 | PTO EQUIPPED |
| J230 | A282 | 32 | VAN CURBSIDE 110 VAC OUTLET |
| J231 | A283 | 32 | VAN CURBSIDE 110 VAC OUTLET |
| J232 | A284 | 32 | VAN CURBSIDE 110 VAC OUTLET |
| J233 | H282 | 32 | VAN ROADSIDE 110 VAC OUTLET |
| J234 | H283 | 32 | VAN ROADSIDE 110 VAC OUTLET |
| J235 | H284 | 32 | VAN ROADSIDE 110 VAC OUTLET |
| J236 | H275 | 31 | VAN ROADSIDE 24 VDC OUTLET |
| J237 | 275 | 31 | VAN CURBSIDE 24 VDC OUTLET |
| J242 | D271 | 31 | VAN A/C |
| J244 | E271 | 31 | VAN THERMOSTAT |
| J245 | F271 | 31 | VAN HEATER |
| J912 | B124 | 14 | CAB - DASH - CENTER - HEATER / CTIS ECU |
| J912 | D209 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| J913 | B122 | 14 | CAB - DASH - CENTER - HEATER / CTIS ECU |
| J921 | G62 | 7 | TROOP TRANSPORT ALARM |
| P2 | A185 | 21 | EMI FILTER |
| P3 | D204 | 23 | AIRDROP ONLY |
| P5 | A38 | 5 | VEHICLE HORN |
| P6 | A38 | 5 | VEHICLE HORN |
| P8 | B38 | 5 | BLACKOUT MARKER RIGHT FRONT |
| P9 | C38 | 5 | FRONT RIGHT TURN SIGNAL |
| P10 | B38 | 5 | PARKING LIGHT FRONT RIGHT |
| P12 | D38 | 5 | RIGHT HEADLIGHT |
| P13 | C38 | 5 | RIGHT HEADLIGHT |
| P14 | C38 | 5 | RIGHT HEADLIGHT |
| P17 | H38 | 5 | BLACKOUT DRIVE LIGHT |
| P18 | D38 | 5 | LEFT HEADLIGHT |
| P18 | A177 | 20 | CAB - DASH - LEFT - UNDERDASH |
| P19 | E38 | 5 | LEFT HEADLIGHT |
| P20 | D38 | 5 | LEFT HEADLIGHT |
| P22 | G38 | 5 | PARKING LIGHT FRONT LEFT |
| P23 | F38 | 5 | FRONT LEFT TURN SIGNAL |
| P24 | H38 | 5 | BLACKOUT MARKER LEFT FRONT |
| P25 | G85 | 10 | WINDSHIELD WASHER ROTARY PUMP (B3) |
| P27 | A43 | 5 | CHASSIS - FRONT |
| P31 | E56 | 7 | ENGINE |
| P31X | D56 | 7 | ENGINE |
| P32 | F59 | 7 | ENGINE OIL PRESSURE SENSOR |
| P33 | H59 | 7 | FUEL/WATER SEPARATOR |
| P34 | E59 | 7 | OIL PRESSURE WARNING LIGHT SWITCH |
| P36 | A57 | 7 | WATER COOLER TEMPERATURE |
| P37 | C57 | 7 | WATER TEMPERATURE SWITCH |
| P38 | F61 | 7 | ENGINE SPEED MAGNETIC PICKUP |
| P39 | G61 | 7 | ENGINE |
| P41 | B57 | 7 | WATER TEMPERATURE SENSOR |
| P410 | E240 | 27 | ARCTIC KIT W/PTO EQUIPPED |
| P42 | F57 | 7 | ETHER SENSOR SWITCH |
| P43 | G42 | 5 | CHASSIS - FRONT |
| P43X | F42 | 5 | CHASSIS - FRONT |
| P50 | E85 | 10 | CAB MARKER LIGHT FRONT UPPER LEFT |
| P50 | F206 | 23 | LH FRONT TOP CAB MARKER LIGHT |
| P51 | D190 | 22 | CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL |
| P52F | E38 | 5 | CHASSIS - FRONT |
| P52R | E196 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |

| CONNECTORS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| P53R | D196 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| P54 | D197 | 22 | LEFT REAR MARKER |
| P55 | C85 | 10 | CAB MARKER LIGHT FRONT UPPER RIGHT |
| P55 | D206 | 23 | RH FRONT TOP CAB MARKER LIGHT |
| P56 | E197 | 22 | MIDDLE REAR MARKER |
| P57 | D85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT |
| P57 | F206 | 23 | LH FRONT TOP CAB CLEARANCE LIGHT |
| P58 | E197 | 22 | RIGHT REAR MARKER |
| P59 | C85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT |
| P59 | D206 | 23 | RH FRONT TOP CAB CLEARANCE LIGHT |
| P60 | D85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE |
| P60 | E206 | 23 | MIDDLE FRONT TOP CLEARANCE LIGHT |
| P61 | F197 | 22 | RH COMPOSITE LIGHT |
| P62 | F197 | 22 | RH COMPOSITE LIGHT |
| P63 | G197 | 22 | RH COMPOSITE LIGHT |
| P64 | F197 | 22 | RH COMPOSITE LIGHT |
| P65 | E186 | 21 | ROTARY WARNING LIGHT CONNECTOR |
| P67 | A74 | 9 | PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION EXTERNAL |
| P67 | B69 | 8 | WIRING HARNESS TO TRANSMISSION CONNECTOR TID1, TID2, AND TID3 TRANSMISSION EXTERNAL WIRING |
| | | | HARNESS TO TRANSMISSION CONNECTOR |
| P69 | D59 | 7 | ENGINE |
| P71 | E66 | 8 | PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR |
| P71 | E70 | 8 | CONNECTOR TID1, TID2, AND TID3 TRANSMISSION OUTPUT SPEED |
| P71 | E75 | 9 | SENSOR CONNECTOR PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION OUTPUT |
| P72 | F66 | 8 | SPEED SENSOR CONNECTOR PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED |
| P72 | F70 | 8 | SENSOR CONNECTOR TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED |
| P72 | E75 | 9 | SENSOR CONNECTOR PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION ENGINE |
| P73 | F66 | 8 | SPEED SENSOR CONNECTOR PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION |
| P73 | F70 | 8 | SENSOR CONNECTOR TID1, TID2, AND TID3 TRANSMISSION THROTTLE POSITION |
| P73 | F75 | 9 | SENSOR CONNECTOR PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION THROTTLE |
| | | | POSITION SENSOR CONNECTOR |
| P74 | B197 | 22 | LH COMPOSITE LIGHT |
| P76 | C197 | 22 | LH COMPOSITE LIGHT |
| P77 | C197 | 22 | LH COMPOSITE LIGHT |
| P78 | B197 | 22 | LH COMPOSITE LIGHT |
| P80 | G51 | 6 | CHASSIS - REAR |
| P81 | C47 | 6 | CHASSIS - FRONT |
| P81 | D62 | 7 | STARTER THERMO SWITCH |
| P82 | B51 | 6 | FUEL TANK LEVEL SENSOR |
| P83 | B172 | 20 | CAB - DASH - LEFT - UNDERDASH |
| P84 | F51 | 6 | CHASSIS - REAR |
| P85 | A197 | 22 | LH SIDE MARKER LIGHT |
| P86 | A197 | 22 | LH REAR MARKER LIGHT |
| P87 | C197 | 22 | BACKUP LIGHT |
| P88 | H197 | 22 | RH SIDE MARKER LIGHT |
| P89 | G197 | 22 | RH REAR MARKER LIGHT |
| P99 | F186 | 21 | CHEMICAL ALARM CONNECTOR |
| P10 | B38 | 5 | PARKING LIGHT FRONT RIGHT |
| P110 | E119 | 14 | CTIS ELECTRONIC CONTROL UNIT |
| P111 | E122 | 14 | CTIS ELECTRONIC CONTROL UNIT |
| P112 | G123 | 14 | CAB - DASH - CENTER - HEATER / CTIS ECU |
| P113 | F123 | 14 | CTIS ELECTRONIC CONTROL UNIT |
| P115 | C290 | 33 | WTEC III - CAB - DASH - RIGHT - KICK PANEL |
| P116 | C185 | 21 | CAB - DASH - RIGHT - UNDERDASH |
| P118 | D161 | 18 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| P116 | E291 | 33 | WTEC III - CAB - DASH - RIGHT - KICK PANEL |
| P119 | A64 | 8 | PRE-BLOCK SEVEN TRANSMISSION CONNECTOR |
| P119 | A69 | 8 | TID1, TID2, AND TID3 TRANSMISSION CONNECTOR |
| P119 | A73 | 9 | PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION CONNECTOR |
| P119 | B169 | 19 | CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS |
| P125 | G84 | 10 | WINDSHIELD WASHER ROTARY PUMP (B3) |
| P129 | F85 | 10 | CAB MARKER LIGHT FRONT LOWER LEFT |
| P130 | F85 | 10 | CAB MARKER LIGHT LEFT DOOR |
| P131 | A85 | 10 | CAB MARKER LIGHT RIGHT DOOR |

| CONNECTORS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| P132 | B85 | 10 | CAB MARKER LIGHT FRONT LOWER RIGHT |
| P150 | B272 | 31 | VAN FRONT MARKER LIGHT |
| P151 | B272 | 31 | VAN FRONT MARKER LIGHT |
| P152 | B272 | 31 | VAN FRONT MARKER LIGHT |
| P153 | A272 | 31 | VAN FRONT MARKER LIGHT |
| P154 | A272 | 31 | VAN FRONT MARKER LIGHT |
| P155 | B287 | 32 | VAN CURBSIDE MARKER LIGHT |
| P156 | B287 | 32 | VAN CURBSIDE MARKER LIGHT |
| P157 | C287 | 32 | VAN ROADSIDE MARKER LIGHT |
| P158 | C287 | 32 | VAN ROADSIDE MARKER LIGHT |
| P159 | D287 | 32 | VAN REAR CENTER MARKER LIGHT |
| P160 | E287 | 32 | VAN REAR CENTER MARKER LIGHT |
| P161 | D287 | 32 | VAN REAR CENTER MARKER LIGHT |
| P162 | B273 | 31 | VAN CURBSIDE BLACKOUT LIGHT |
| P163 | B274 | 31 | VAN CURBSIDE EMERGENCY LIGHT |
| P164 | G274 | 31 | VAN ROADSIDE BLACKOUT LIGHT |
| P165 | G275 | 31 | VAN ROADSIDE EMERGENCY LIGHT |
| P166 | C272 | 32 | VAN FRONT EMERGENCY LIGHT |
| P167 | D287 | 31 | VAN REAR EMERGENCY LIGHT |
| P172 | E264 | 30 | DUMP BODY CONNECTOR |
| P173 | G271 | 31 | VAN 12/24 VDC POWER |
| P201 | G61 | 7 | ENGINE |
| P210 | F222 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| P210 | C227 | 26 | PTO EQUIPPED |
| P215 | E230 | 26 | PTO EQUIPPED |
| P216 | E229 | 26 | PTO EQUIPPED |
| P217 | C229 | 26 | PTO EQUIPPED |
| P217 | B268 | 30 | PTO EQUIPPED |
| P901 | A209 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P902A | D214 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P903 | C212 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P903A | D212 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P904 | C211 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P904A | D211 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P905 | A211 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P905A | B211 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P906 | A212 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P906A | B212 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P908 | A215 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P908A | B215 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P909 | A220 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| P909A | B220 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| P910 | C215 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P910A | D215 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P911 | C220 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| P911A | D220 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| P912 | B124 | 14 | CAB - DASH - CENTER - HEATER / CTIS ECU |
| P913 | B122 | 14 | CAB - DASH - CENTER - HEATER / CTIS ECU |
| P913 | F209 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P914 | A214 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P914A | B214 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| P921 | G62 | 7 | TROOP TRANSPORT ALARM |
| PBSS | C93 | 11 | WTEC II PUSHBUTTON SHIFT SELECTOR |
| PX1 | A92 | 11 | ENGINE FAN OFF SWITCH |
| PX10 | D107 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX11 | G107 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX12 | C112 | 13 | ROTATING WARNING LIGHT SWITCH |
| PX12A | E112 | 13 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX13 | F92 | 11 | ETHER STARTER SWITCH |
| PX13A | G92 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX14 | F112 | 13 | FULL HAZARD WARNING SWITCH |
| PX14A | H112 | 13 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX15 | C115 | 13 | MAIN LIGHT SWITCH |
| PX17 | A112 | 13 | IGNITION SWITCH |
| PX17A | C112 | 13 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX1A | B92 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX2 | D92 | 11 | LAMP TEST SWITCH |
| PX20 | C188 | 21 | TURN SIGNAL FLASHER |
| PX21 | A134 | 15 | WIPER DELAY MODULE |

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 2 OF 34

SIZE B | ILL. NO. 5WD01L2B | FP-3/ (FP-4 BLANK)

| CONNECTORS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| PX22 | A184 | 21 | EMI FILTER |
| PX24 | G115 | 13 | INSTRUMENT PANEL LIGHTS DIMMER MODULE |
| PX25 | C119 | 14 | CAB DASH CENTER HEATER / CTIS ECU |
| PX26 | B179 | 20 | CAB - DASH - LEFT - UNDERDASH |
| PX2A | E92 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX33 | B182 | 21 | CAB - DASH - RIGHT - UNDERDASH |
| PX33 | G292 | 33 | WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR |
| PX34 | E188 | 21 | FRONT AIR PRESSURE METER |
| PX4 | F97 | 11 | FAN SOLENOID |
| PX5 | B97 | 11 | REAR AIR PRESSURE METER |
| PX6 | B107 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX7 | A104 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX8 | G102 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| PX9 | D97 | 11 | FUEL LEVEL METER |

| LIGHTS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| D51 | B257 | 29 | POWER LAMP |
| D52 | B257 | 29 | POWER LAMP |
| DS1 | D96 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS2 | G106 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS3 | F96 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS4 | B96 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS5 | B106 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS6 | G101 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS7 | D106 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS8 | C91 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS9 | B101 | 12 | DUMP BODY UP |
| DS10 | E111 | 13 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS11 | G91 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS12 | H111 | 13 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS13 | C111 | 13 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| DS14 | B101 | 12 | LEFT TURN SIGNAL |
| DS15 | B101 | 12 | RIGHT TURN SIGNAL |
| DS16 | E101 | 12 | HIGH BEAM |
| DS17 | D119 | 14 | HEATER CONTROL PANEL ILLUMINATION |
| DS18 | A208 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS19 | E101 | 12 | RADIATOR FAN OFF |
| DS21 | C101 | 12 | EMERGENCY BRAKE |
| DS22 | D101 | 12 | PARKING BRAKE |
| DS23 | C101 | 12 | PTO ON |
| DS24 | D101 | 12 | OIL PRESSURE |
| DS25 | C101 | 12 | WATER TEMPERATURE |
| DS27 | C101 | 12 | REAR BRAKE AIR |
| DS28 | E101 | 12 | FRONT AIR BRAKE |
| DS29 | D101 | 12 | ENGINE OIL LEVEL |
| DS30 | F101 | 12 | MASTER STOP |
| DS31 | D213 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS32 | B101 | 12 | CHEMICAL DETECT |
| DS34 | C101 | 12 | CTIS OVERSPEED |
| DS35 | C198 | 22 | REAR LH COMPOSITE LIGHT |
| DS36 | G198 | 22 | REAR RH COMPOSITE LIGHT |
| DS37 | B198 | 22 | REAR LH COMPOSITE LIGHT |
| DS38 | F198 | 22 | REAR RH COMPOSITE LIGHT |
| DS39 | F37 | 5 | FRONT LEFT TURN SIGNAL |
| DS41 | D101 | 12 | TRANSMISSION OIL TEMPERATURE |
| DS42 | C38 | 5 | FRONT RIGHT TURN SIGNAL |
| DS43 | D212 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS44 | D37 | 5 | RIGHT HEADLIGHT |
| DS45 | C198 | 22 | BACKUP LIGHT |
| DS46 | D210 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS47 | G37 | 5 | PARKING LIGHT FRONT LEFT |
| DS48 | B38 | 5 | PARKING LIGHT FRONT RIGHT |
| DS49 | G37 | 5 | BLACKOUT MARKER LEFT FRONT |
| DS50 | B38 | 5 | BLACKOUT MARKER RIGHT FRONT |
| DS51 | C198 | 22 | REAR LH COMPOSITE LIGHT |
| DS52 | F198 | 22 | REAR RH COMPOSITE LIGHT |
| DS53 | H37 | 5 | BLACKOUT DRIVE LIGHT |
| DS54 | D84 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT |
| DS54 | F206 | 23 | LH FRONT TOP CAB CLEARANCE LIGHT |
| DS55 | D84 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE |
| DS55 | E206 | 23 | MIDDLE FRONT TOP CLEARANCE LIGHT |

| LIGHTS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| DS56 | C84 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT |
| DS56 | D206 | 23 | RH FRONT TOP CAB CLEARANCE LIGHT |
| DS57 | C84 | 10 | CAB MARKER LIGHT FRONT UPPER RIGHT |
| DS57 | D206 | 23 | RH FRONT TOP CAB MARKER LIGHT |
| DS58 | E84 | 10 | CAB MARKER LIGHT FRONT UPPER LEFT |
| DS58 | F206 | 23 | LH FRONT TOP CAB MARKER LIGHT |
| DS59 | B84 | 10 | CAB MARKER LIGHT RIGHT DOOR |
| DS60 | F84 | 10 | CAB MARKER LIGHT FRONT LOWER LEFT |
| DS61 | A84 | 10 | CAB MARKER LIGHT RIGHT DOOR |
| DS62 | F84 | 10 | CAB MARKER LIGHT LEFT DOOR |
| DS63 | B210 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS64 | B212 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS65 | A198 | 22 | LH SIDE MARKER LIGHT |
| DS66 | A198 | 22 | LH REAR MARKER LIGHT |
| DS67 | H198 | 22 | RH SIDE MARKER LIGHT |
| DS68 | G198 | 22 | RH REAR MARKER LIGHT |
| DS69 | D198 | 22 | LEFT REAR MARKER |
| DS70 | E198 | 22 | MIDDLE REAR MARKER |
| DS71 | E198 | 22 | RIGHT REAR MARKER |
| DS72 | B198 | 22 | REAR LH COMPOSITE LIGHT |
| DS73 | F198 | 22 | REAR RH COMPOSITE LIGHT |
| DS74 | D37 | 5 | LEFT HEADLIGHT |
| DS75 | A273 | 31 | VAN CURBSIDE BLACKOUT LIGHT |
| DS76 | H274 | 31 | VAN ROADSIDE BLACKOUT LIGHT |
| DS78 | A274 | 31 | VAN CURBSIDE EMERGENCY LIGHT |
| DS79 | H275 | 31 | VAN ROADSIDE EMERGENCY LIGHT |
| DS80 | H284 | 32 | VAN ROADSIDE FLUORESCENT LIGHT |
| DS81 | H286 | 32 | VAN ROADSIDE FLUORESCENT LIGHT |
| DS82 | A286 | 32 | VAN CURBSIDE FLUORESCENT LIGHT |
| DS83 | A284 | 32 | VAN CURBSIDE FLUORESCENT LIGHT |
| DS84 | B271 | 31 | VAN FRONT MARKER LIGHT |
| DS85 | B271 | 31 | VAN FRONT MARKER LIGHT |
| DS86 | B271 | 31 | VAN FRONT MARKER LIGHT |
| DS87 | A271 | 31 | VAN FRONT MARKER LIGHT |
| DS88 | A271 | 31 | VAN FRONT MARKER LIGHT |
| DS89 | B288 | 32 | VAN CURBSIDE MARKER LIGHT |
| DS90 | B288 | 32 | VAN CURBSIDE MARKER LIGHT |
| DS91 | C288 | 32 | VAN ROADSIDE MARKER LIGHT |
| DS92 | C288 | 32 | VAN ROADSIDE MARKER LIGHT |
| DS93 | D288 | 32 | VAN REAR CENTER MARKER LIGHT |
| DS94 | E288 | 32 | VAN REAR CENTER MARKER LIGHT |
| DS95 | E288 | 32 | VAN REAR CENTER MARKER LIGHT |
| DS96 | B215 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS96 | C271 | 31 | VAN FRONT EMERGENCY LIGHT |
| DS97 | B219 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS97 | C271 | 32 | VAN REAR EMERGENCY LIGHT |
| DS100 | B213 | 24 | CAB - DASH - CENTER - OPTIONS PANEL |
| DS101 | D119 | 14 | HEATER CONTROL PANEL ILLUMINATION |
| DS108 | E91 | 11 | CAB - DASH - LEFT - INSTRUMENT PANEL |

| CIRCUIT BREAKERS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| CB1 | C285 | 32 | VAN 110 VAC MAIN CIRCUIT BREAKER |
| CB2 | C284 | 32 | VAN A/C |
| CB3 | D284 | 32 | VAN 110 VAC POWER OUT |
| CB4 | D284 | 32 | VAN NOT USED |
| CB5 | E284 | 32 | VAN BLACKOUT OVERRIDE |
| CB6 | E284 | 32 | VAN LIGHTS |
| CB7 | E284 | 32 | VAN 110 VAC OUTLETS |
| CB8 | E284 | 32 | VAN THERMOSTAT/FAN |
| CB9 | E284 | 32 | VAN 110 VAC OUTLETS |
| CB10 | D277 | 31 | VAN BLACKOUT LIGHTS |
| CB11 | D277 | 31 | VAN EMERGENCY/BLACKOUT LIGHTS |
| CB20 | C140 | 16 | CAB RADIO |
| CB21 | C149 | 17 | WTEC II VIM STE/ICE |
| CB22 | C149 | 17 | FAN/ETHER |
| CB23 | C147 | 17 | HEATER BLOWER |
| CB30 | C139 | 16 | CHEMICAL ALARM |
| CB35 | D149 | 17 | WTEC II VIM POWER |
| CB36 | C147 | 17 | HORN POWER |
| CB37 | C151 | 17 | WINDSHIELD WIPER/WASHER |
| CB38 | D147 | 17 | ROTATING BEACON |
| CB39 | C146 | 17 | TRAILER BLACKOUT STOP |

| CIRCUIT BREAKERS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| CB40 | C150 | 17 | CTIS COOLER |
| CB41 | C142 | 16 | TRAILER REAR LIGHTS POWER |
| CB42 | C142 | 16 | BLACKOUT MARKER LIGHTS POWER |
| CB43 | C143 | 16 | REAR COMPOSITE LIGHTS/WTEC III ECU |
| CB44 | C143 | 16 | REAR COMPOSITE LIGHTS |
| CB45 | C139 | 16 | FUEL PREHEAT |
| CB48 | C140 | 16 | ARCTIC CAB/ENGINE KILL |
| CB49 | C151 | 17 | PTO POWER |
| CB50 | F256 | 29 | MAIN POWER CIRCUIT BREAKER SWITCH |
| CB53 | D140 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB54 | D142 | 16 | BLACKOUT HEADLIGHT |
| CB61 | D153 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB62 | D153 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB63 | D151 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB64 | D151 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB65 | D140 | 16 | PARKING LIGHTS |
| CB66 | D143 | 16 | BLACKOUT MARKER POWER |
| CB67 | D139 | 16 | MARKER LIGHTS |
| CB68 | C152 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB70 | D146 | 17 | IGNITION/MAIN LIGHT SWITCH |
| CB71 | D149 | 17 | HAZARD/FLASHER WORKLIGHTS |
| CB72 | D139 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB73 | D150 | 17 | BACK-UP LIGHT POWER |
| CB74 | D150 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| CB76 | D143 | 16 | BLACKOUT STOP RELAY POWER |
| CB77 | C152 | 17 | ENGINE INSTR POWER |
| CB78 | D147 | 17 | HEADLIGHTS |
| CB79 | C150 | 17 | WTEC II VIM POWER/WTEC III REVERSE WARNING RELAY |
| CB80 | D142 | 16 | TAILLIGHTS |

| TERMINAL LUGS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| TL1 | B54 | 6 | POLARITY PROTECTION |
| TL1 | E60 | 7 | ALTERNATOR |
| TL2 | B53 | 6 | POLARITY PROTECTION |
| TL2 | D60 | 7 | ALTERNATOR |
| TL2 | D53 | 6 | POLARITY PROTECTION (P/P) |
| TL3 | C85 | 10 | CAB MARKER LIGHT FRONT UPPER RIGHT |
| TL3 | D206 | 23 | RH FRONT TOP CAB MARKER LIGHT |
| TL4 | C85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT |
| TL4 | D206 | 23 | RH FRONT TOP CAB CLEARANCE LIGHT |
| TL5 | D60 | 7 | ALTERNATOR |
| TL6 | D60 | 7 | ALTERNATOR |
| TL8 | D85 | 10 | CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE |
| TL8 | E206 | 23 | MIDDLE FRONT TOP CLEARANCE LIGHT |
| TL9 | D47 | 6 | 24V AUXILIARY STARTER SOLENOID |
| TL10 | C52 | 6 | CHASSIS - REAR (REF E1) |
| TL12 | C49 | 6 | BATTERIES |
| TL12 | C62 | 7 | STARTER/STARTER SOLENOID |
| TL14 | E88 | 10 | ROTARY WARNING LIGHT CONNECTOR |
| TL15 | A198 | 22 | LH SIDE MARKER LIGHT |
| TL16 | A198 | 22 | LH REAR MARKER LIGHT |
| TL17 | C198 | 22 | BACKUP LIGHT |
| TL18 | C198 | 22 | LONG WHEEL BASE |
| TL19 | H198 | 22 | RH SIDE MARKER LIGHT |
| TL20 | G198 | 22 | RH REAR MARKER LIGHT |
| TL21 | G198 | 22 | RH COMPOSITE LIGHT |
| TL22 | D85 | 10 | CAB MARKER LIGHTS |
| TL22 | E206 | 23 | LH FRONT TOP CAB CLEARANCE LIGHT |
| TL23 | D47 | 6 | 24V AUXILIARY STARTER SOLENOID |
| TL24 | D47 | 6 | 24V AUXILIARY STARTER SOLENOID |
| TL25 | C47 | 6 | CHASSIS - FRONT |
| TL25 | C62 | 7 | STARTER/STARTER SOLENOID |
| TL26 | C47 | 6 | CHASSIS - FRONT |
| TL26 | C62 | 7 | STARTER/STARTER SOLENOID |
| TL27 | E85 | 10 | CAB MARKER LIGHT FRONT UPPER RIGHT |
| TL27 | F206 | 23 | CAB MARKER LIGHTS FRONT UPPER RIGHT |
| TL28 | G57 | 7 | FUEL SOLENOID |
| TL29 | H57 | 7 | FUEL SOLENOID |
| TL30 | D198 | 22 | LEFT REAR MARKER |

| TERMINAL LUGS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| TL31 | E198 | 22 | MIDDLE REAR MARKER |
| TL32 | E198 | 22 | RIGHT REAR MARKER |
| TL33 | E47 | 6 | 24V AUXILIARY STARTER SOLENOID |
| TL35 | D61 | 7 | ALTERNATOR |
| TL36 | B54 | 6 | POLARITY PROTECTION |
| TL37 | F54 | 6 | POLARITY PROTECTION |
| TL37 | C54 | 6 | POLARITY PROTECTION |
| TL38 | E50 | 6 | SHUNT |
| TL39 | C52 | 6 | CHASSIS - REAR (REF E1) |
| TL41 | C53 | 6 | POLARITY PROTECTION |
| TL42 | B54 | 6 | POLARITY PROTECTION |
| TL44 | B54 | 6 | POLARITY PROTECTION |
| TL44 | E54 | 6 | POLARITY PROTECTION |
| TL45 | D50 | 6 | SHUNT |
| TL46 | D49 | 6 | SHUNT |
| TL46 | D62 | 7 | STARTER/STARTER SOLENOID |
| TL47 | C54 | 6 | POLARITY PROTECTION |
| TL48 | E52 | 6 | CHASSIS - REAR (REF E2) |
| TL49A | D52 | 6 | CHASSIS - REAR (REF E1) |
| TL49A | F52 | 6 | NATO SLAVE RECEPTACLE |
| TL50 | G121 | 14 | CHASSIS GROUND |
| TL50A | F52 | 6 | NATO SLAVE RECEPTACLE |
| TL51 | E50 | 6 | SHUNT |
| TL52 | E50 | 6 | SHUNT |
| TL53 | B47 | 6 | CHASSIS - FRONT |
| TL53 | B62 | 7 | STARTER/STARTER SOLENOID |
| TL55 | B47 | 6 | CHASSIS - FRONT |
| TL55 | C62 | 7 | STARTER/STARTER SOLENOID |
| TL56 | F136 | 16 | X3 GROUND |
| TL57 | F136 | 16 | CAB GROUND |
| TL58 | D60 | 7 | ALTERNATOR |
| TL59 | C61 | 7 | ALTERNATOR |
| TL60 | C53 | 6 | POLARITY PROTECTION |
| TL60 | D60 | 7 | ALTERNATOR |
| TL61 | C54 | 6 | POLARITY PROTECTION |
| TL61 | E60 | 7 | ALTERNATOR |
| TL62 | C47 | 6 | CHASSIS - FRONT |
| TL63 | C47 | 6 | CHASSIS - FRONT |
| TL63 | B62 | 7 | STARTER/STARTER SOLENOID |
| TL66 | H61 | 7 | ENGINE (REF P201) |
| TL68 | D224 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| TL69 | E224 | 25 | CAB - DASH - CENTER - OPTIONS PANEL |
| TL70 | B38 | 5 | FRONT RH COMPOSITE LIGHT |
| TL71 | A85 | 10 | CAB MARKER LIGHT RIGHT DOOR |
| TL72 | H38 | 5 | BLACKOUT DRIVE LIGHT |
| TL73 | B86 | 10 | CAB - MARKER LIGHTS |
| TL74 | D86 | 10 | CAB - MARKER LIGHTS |
| TL74 | E204 | 23 | AIRDROP ONLY |
| TL75 | F87 | 10 | CAB - MARKER LIGHTS |
| TL76 | D229 | 26 | PTO EQUIPPED |
| TL79 | F38 | 5 | FRONT LH COMPOSITE LIGHT |
| TL80 | C54 | 6 | POLARITY PROTECTION |
| TL80 | F54 | 6 | 200 AMP |
| TL81 | C39 | 5 | CHASSIS GROUND |
| TL82 | F38 | 5 | CHASSIS GROUND |
| TL83 | B52 | 6 | FUEL TANK LEVEL SENSOR |
| TL84 | B49 | 6 | CHASSIS - SPARE TIRE (REF J93) |
| TL85 | G52 | 6 | CHASSIS - REAR |
| TL86 | C86 | 10 | CAB - MARKER LIGHTS |
| TL86 | D204 | 23 | AIRDROP ONLY |
| TL87 | F86 | 10 | CAB - MARKER LIGHTS |
| TL92 | F195 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| TL93 | G194 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| TL94 | G85 | 10 | WINDSHIELD WASHER ROTARY PUMP (B3) |
| TL96 | H271 | 31 | VAN BODY GROUND |
| TL97 | B88 | 10 | CHEMICAL ALARM CONNECTOR |
| TL98 | B88 | 10 | CHEMICAL ALARM CONNECTOR |

| TERMINAL LUGS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| TL99 | D52 | 6 | CHASSIS - REAR (REF E2) |
| TL100 | E54 | 6 | POLARITY PROTECTION |
| TL110 | D61 | 7 | ALTERNATOR |
| TL111 | D230 | 26 | PTO EQUIPPED |
| TL123 | E38 | 5 | CHASSIS - FRONT (REF J19) |
| TL126 | E126 | 14 | CHASSIS GROUND |
| TL130 | F85 | 10 | CAB - MARKER LIGHTS |
| TL131 | A85 | 10 | CAB - MARKER LIGHTS |
| TL133 | F85 | 10 | CAB - MARKER LIGHTS |
| TL134 | B85 | 10 | CAB - MARKER LIGHTS |
| TL150 | F177 | 20 | SENSOR/FRONT AIR PRESSURE TRANSMITTER |
| TL151 | G177 | 20 | SENSOR/REAR AIR PRESSURE TRANSMITTER |
| TL152 | C179 | 20 | STOPLIGHT SWITCH |
| TL153 | C179 | 20 | STOPLIGHT SWITCH |
| TL154 | D179 | 20 | STOPLIGHT SWITCH |
| TL154 | D179 | 20 | STOPLIGHT SWITCH |
| TL155 | D179 | 20 | STOPLIGHT SWITCH |
| TL156 | F177 | 20 | SWITCH/FRONT AIR PRESSURE TRANSMITTER |
| TL157 | G177 | 20 | SWITCH/REAR AIR PRESSURE TRANSMITTER |
| TL158 | E137 | 16 | START INHIBIT PUSHBUTTON |
| TL159 | E136 | 16 | START INHIBIT PUSHBUTTON |
| TL160 | H102 | 12 | AUDIBLE ALARM |
| TL161 | H102 | 12 | AUDIBLE ALARM |
| TL162 | B114 | 13 | STARTER PUSHBUTTON |
| TL163 | B114 | 13 | STARTER PUSHBUTTON |
| TL164 | G62 | 7 | ENGINE (REF J921) |
| TL165 | G62 | 7 | ENGINE (REF J921) |
| TL166 | F54 | 6 | TERMINAL BLOCK |
| TL167 | E54 | 6 | TERMINAL BLOCK |
| TL169 | D53 | 6 | POLARITY PROTECTION (P/P) |
| TL171 | F54 | 6 | TERMINAL BLOCK |
| TL172 | F54 | 6 | TERMINAL BLOCK |
| TL173 | E54 | 6 | POLARITY PROTECTION (P/P) |
| TL174 | D54 | 6 | POLARITY PROTECTION (P/P) |
| TL190 | D290 | 33 | WTEC III PRESSURE SWITCH GROUND |
| TL201 | E125 | 14 | PARKING BRAKE SWITCH |
| TL202 | E125 | 14 | PARKING BRAKE SWITCH |
| TL320 | E232 | 26 | PTO EQUIPPED |
| TL320 | C241 | 27 | ARCTIC KIT W/PTO EQUIPPED |

| SWITCHES | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| S3 | A177 | 20 | COLUMN SWITCH |
| S3 | C177 | 20 | COLUMN SWITCH |
| S4 | D114 | 13 | MAIN LIGHT SWITCH |
| S5/1 | B111 | 13 | IGNITION SWITCH |
| S5/11 | A91 | 11 | ENGINE FAN OFF SWITCH |
| S5/14 | C213 | 24 | WINCH ON OFF |
| S5/15 | B212 | 24 | WINCH IN-OUT |
| S5/16 | F91 | 11 | ETHER STARTER SWITCH |
| S5/2 | D91 | 11 | LAMP TEST SWITCH |
| S5/2 | D111 | 13 | ROTATING WARNING LIGHT SWITCH |
| S5/22 | G111 | 13 | FULL HAZARD WARNING SWITCH |
| S5/25 | A219 | 25 | SWINGFIRE PUMP SWITCH |
| S5/6 | B210 | 24 | PTO ON/OFF SWITCH |
| S5/8 | A213 | 24 | BLACKOUT OVERRIDE SWITCH |
| S5/9 | A214 | 24 | FUEL PRE-HEAT SWITCH |
| S6 | A114 | 13 | STARTER PUSHBUTTON |
| S7 | F137 | 16 | START INHIBIT PUSHBUTTON |
| S10A | C179 | 20 | STOPLIGHT SWITCH |
| S10B | D179 | 20 | STOPLIGHT SWITCH |
| S11 | A287 | 32 | VAN CURBSIDE WINDOW BLACKOUT SWITCH |
| S12 | A287 | 32 | VAN CURBSIDE WINDOW BLACKOUT SWITCH |
| S13 | G288 | 32 | VAN ROADSIDE WINDOW BLACKOUT SWITCH |
| S14 | G288 | 32 | VAN ROADSIDE WINDOW BLACKOUT SWITCH |
| S15 | G288 | 32 | VAN ROADSIDE WINDOW BLACKOUT SWITCH |
| S17 | G288 | 32 | VAN DOOR WINDOW BLACKOUT SWITCH (S/N 191 AND HIGHER) |

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 3 OF 34

SIZE B | ILL. NO. 5WD01L3B | FP-5/ (FP-6 BLANK)

28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36

| SWITCHES (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| S17 | G288 | 32 | VAN CURBSIDE WINDOW BLACKOUT SWITCH (S/N 001 THROUGH 190) |
| S18 | D269 | 30 | PTO PRESSURE SWITCH |
| S20 | E177 | 20 | SWITCH/FRONT AIR PRESSURE TRANSMITTER |
| S23 | F52 | 6 | AIR PRESSURE SWITCH FOR CTIS |
| S24 | E125 | 14 | PARKING BRAKE SWITCH |
| S26 | C57 | 7 | WATER TEMPERATURE SENSOR |
| S27 | E59 | 7 | OIL PRESSURE WARNING LIGHT SWITCH |
| S29 | G177 | 20 | SWITCH/REAR AIR PRESSURE TRANSMITTER |
| S31 | A216 | 24 | ARCTIC TROOP HEATER SWITCH |
| S32 | F288 | 32 | VAN LIGHTS ON/OFF SWITCH |
| S33 | E277 | 31 | VAN BLACKOUT SWITCH |
| S34 | D278 | 31 | VAN BLACKOUT SWITCH |
| S35 | H273 | 31 | VAN BLACKOUT OVERRIDE SWITCH |
| S40 | F58 | 7 | ETHER SENSOR SWITCH |
| S45 | E62 | 7 | TROOP ALARM SWITCH |
| S45 | G62 | 31 | VAN FAN ON/OFF SWITCH |
| S56 | A57 | 7 | WATER TEMPERATURE SWITCH |
| S57 | G77 | 9 | LMHC IN/OUT SWITCH |

| GAGES | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| M2 | D106 | 12 | VOLTMETER |
| M3 | B106 | 12 | ENGINE OIL PRESSURE METER |
| M4 | F96 | 11 | FRONT AIR PRESSURE METER |
| M5 | B96 | 11 | REAR AIR PRESSURE METER |
| M6 | G107 | 12 | WATER TEMPERATURE METER |
| M7 | D96 | 11 | FUEL LEVEL METER |
| M8 | G102 | 12 | SPEEDOMETER |
| M9 | A210 | 24 | TACHOMETER |

| RELAYS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| K1 | F149 | 17 | STARTER RELAY |
| K2 | B143 | 16 | CONTROL PANEL RELAY |
| K6 | F144 | 16 | STOPLIGHT RELAY |
| K7 | G153 | 17 | HEADLIGHT RELAY |
| K8 | G151 | 17 | HEADLIGHT LO/HI-BEAM RELAY |
| K9 | A142 | 16 | HAZARD FLASHER BLACKOUT OVERRIDE |
| K10 | F150 | 17 | STOP HAZARD FLASHER RELAY |
| K11 | F146 | 17 | ALTERNATOR EXCITATION RELAY |
| K12 | B139 | 16 | WORKLIGHT RELAY |
| K13 | B149 | 17 | ROTATING BEACON BLACKOUT OVERRIDE RELAY |
| K15 | B140 | 16 | AUXILIARY COOLER RELAY |
| K19 | B150 | 17 | START INHIBIT RELAY |
| K20 | H138 | 16 | MARKER LIGHTS RELAY |
| K24 | B151 | 17 | CRANKING LOCKOUT RELAY |
| K25 | B292 | 33 | WTEC III REVERSE WARNING RELAY |
| K26 | B290 | 33 | WTEC III NEUTRAL START RELAY |
| K27 | H143 | 16 | BLACKOUT STOP RELAY |
| K28 | H142 | 16 | TRAILER REAR LIGHTS RELAY |
| K29 | F142 | 16 | BLACKOUT MARKER RELAY/WTEC III BLACKOUT DRIVE RELAY |
| K30 | H147 | 17 | REAR LEFT COMPOSITE LAMP RELAY |
| K31 | H149 | 17 | REAR RIGHT COMPOSITE LAMP RELAY |
| K32 | B147 | 17 | HORN RELAY |
| K35 | E277 | 31 | VAN 110 VAC OUTLETS |
| K36 | F277 | 31 | VAN FLUORESCENT LIGHTS |
| K37 | B294 | 33 | WTEC III PTO ENABLE OUTPUT RELAY |
| K52 | H139 | 16 | CTIS OVERSPEED INDICATION RELAY |
| K53 | H140 | 16 | RADIO POWER RELAY |

| RESISTORS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| R2 | E172 | 20 | CAB - DASH - LEFT - UNDERDASH |
| R4 | D175 | 20 | CAB - DASH - LEFT - UNDERDASH |
| R5 | C175 | 20 | CAB - DASH - LEFT - UNDERDASH |
| R6 | F172 | 20 | CAB - DASH - LEFT - UNDERDASH |

| SOLENOIDS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| KS | D47 | 6 | 24V AUXILIARY STARTER SOLENOID |
| L1 | E189 | 21 | FAN SOLENOID |
| L2 | H57 | 7 | FUEL SOLENOID |
| L3 | D269 | 30 | PTO SOLENOID |
| L4 | E233 | 26 | WINCH IN SOLENOID |
| L5 | D233 | 26 | SOLENOID |
| L15 | B51 | 6 | CHASSIS - SPARE TIRE |
| | E80 | 9 | LMHC IN SOLENOID |
| | F80 | 9 | LMHC OUT SOLENOID |

| HORNS AND ALARMS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| LS1 | A37 | 5 | VEHICLE HORN |
| LS2 | H101 | 12 | AUDIBLE ALARM |

| MOTORS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| B2 | A183 | 21 | WINDSHIELD WIPER MOTOR |
| B4 | C118 | 14 | FAN MOTOR |
| | F81 | 9 | LMHC HOIST MOTOR |

| BATTERIES | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| BT1 | C52 | 6 | BATTERY |
| BT2 | D52 | 6 | BATTERY |
| BT3 | D52 | 6 | BATTERY |
| BT4 | E52 | 6 | BATTERY |

| MISCELLANEOUS | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| 10A | C183 | 21 | WTECII VEHICLE INTERFACE MODULE |
| 10A | E183 | 21 | WTECII VEHICLE INTERFACE MODULE |
| A2 | F118 | 14 | CTIS ELECTRONIC CONTROL UNIT |
| A3 | G114 | 13 | INSTRUMENT PANEL LIGHTS DIMMER MODULE |
| A5 | A135 | 15 | WIPER DELAY MODULE |
| A7 | B179 | 20 | FREQUENCY DIVIDER |
| A18 | A103 | 12 | LIGHTED INDICATOR DISPLAY |
| A20 | H59 | 7 | FUEL/WATER SEPARATOR |
| B1 | C63 | 7 | STARTER/STARTER SOLENOID |
| B3 | G83 | 10 | WINDSHIELD WASHER ROTARY PUMP |
| B10 | E67 | 8 | WTEC II TRANSFER CASE (SERIAL # 29513233) |
| B10 | E70 | 8 | WTEC II TRANSFER CASE (SERIAL # 29513233) |
| B10 | E66 | 8 | WTEC II TRANSMISSION (SERIAL # 29513233) |
| B10 | E71 | 8 | WTEC II TRANSFER CASE (SERIAL # 29517497) |
| B10 | E70 | 8 | WTEC II TRANSMISSION (SERIAL # 29517497) |
| B10 | E76 | 9 | WTEC II TRANSFER CASE (SERIAL # 29513233) |
| B10 | E74 | 9 | WTEC II TRANSMISSION (SERIAL # 29513233) |
| BJ1 | A175 | 20 | JUNCTION BOX |
| BL1 | F257 | 29 | FURNACE CONTROL UNIT |
| BL2 | F256 | 29 | FURNACE CONTROL UNIT |
| BL3 | F256 | 29 | FURNACE CONTROL UNIT |
| D1A | C138 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| D1B | C138 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| D2A | D138 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| D2B | D138 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| D3A | B138 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| D3B | B138 | 16 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| E1 | C52 | 6 | BATTERY |
| E1 | D52 | 6 | BATTERY |
| E1 | D52 | 6 | BATTERY |
| E1 | E52 | 6 | BATTERY |
| E2 | C43 | 5 | CHASSIS FRONT BUMPER (REF J27) |
| E2 | C52 | 6 | BATTERY |
| E2 | D52 | 6 | BATTERY |
| E2 | E52 | 6 | BATTERY |
| E2 | E52 | 6 | BATTERY |
| E3 | H148 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| E4 | H150 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| E5 | B151 | 17 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| E14 | E194 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |

| MISCELLANEOUS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| E15 | E197 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E16 | A197 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E17 | G195 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E18 | G194 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E19 | F194 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E20 | E194 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E21 | D195 | 22 | ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE |
| E22 | B86 | 10 | CAB - MARKER LIGHTS |
| E23 | D86 | 10 | CAB - MARKER LIGHTS |
| E23 | D205 | 23 | AIRDROP ONLY |
| E24 | C85 | 10 | CAB - MARKER LIGHTS |
| E24 | D205 | 23 | AIRDROP ONLY |
| E25 | F86 | 10 | CAB - MARKER LIGHTS |
| E60 | B41 | 31 | 24 VDC VAN POWER |
| E65 | B41 | 5 | CHASSIS - FRONT |
| E66 | C41 | 5 | CHASSIS - FRONT |
| E66 | D300 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID1) |
| E66 | D305 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID2) |
| E67 | D38 | 5 | CHASSIS - FRONT |
| E68 | D40 | 5 | CHASSIS - FRONT |
| E70 | C229 | 26 | PTO EQUIPPED |
| E71 | F173 | 20 | CAB - DASH - LEFT - UNDERDASH |
| E88 | B106 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| E89 | C106 | 12 | CAB - DASH - LEFT - INSTRUMENT PANEL |
| E90 | D300 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID1) |
| E90 | D305 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID2) |
| E91 | C300 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID1) |
| E91 | C305 | 34 | WTEC III CAB TRANSMISSION HARNESS (TID2) |
| E501 | B275 | 31 | VAN EMERGENCY/BLACKOUT LIGHT/24 VDC OUTLET |
| E502 | G274 | 31 | VAN EMERGENCY/BLACKOUT LIGHT |
| E503 | B273 | 31 | VAN MARKER LIGHT |
| E504 | B272 | 31 | VAN MARKER LIGHT |
| E505 | B287 | 32 | VAN REAR MARKER LIGHTS |
| E506 | C287 | 32 | VAN REAR MARKER LIGHTS |
| E514 | C274 | 31 | VAN EMERGENCY LIGHT |
| E516 | H272 | 31 | VAN 24 VDC |
| F2 | H271 | 31 | VAN 24 VDC POWER |
| FL | E183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| FL1 | G85 | 10 | EMI FILTER |
| FL2 | A184 | 21 | EMI FILTER |
| FL3 | C118 | 14 | FAN MOTOR |
| G1 | D60 | 7 | ALTERNATOR |
| MPU1 | F61 | 7 | ENGINE SPEED MAGNETIC PICKUP |
| MT3 | F60 | 7 | ENGINE OIL PRESSURE SENSOR |
| MT4 | E177 | 20 | SENSOR/FRONT AIR PRESSURE TRANSMITTER |
| MT5 | G177 | 20 | SENSOR/REAR AIR PRESSURE TRANSMITTER |
| MT6 | B57 | 7 | WATER COOLER TEMPERATURE |
| MT7 | B52 | 6 | FUEL TANK LEVEL SENSOR |
| NS | E183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| P/P | B54 | 6 | POLARITY PROTECTION |
| P/P | D54 | 6 | POLARITY PROTECTION |
| R11 | D50 | 6 | SHUNT |
| R1 | D79 | 9 | AIR DRYER |
| TB1 | C128 | 15 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| TB2 | F130 | 15 | CAB - DASH - RIGHT - POWER DISTRIBUTION PNL |
| X1 | C137 | 16 | 24 VDC |
| X11 | F52 | 6 | NATO SLAVE RECEPTACLE |
| X2 | D137 | 16 | 24 VDC |
| X3 | F137 | 16 | GROUND |
| X5 | D137 | 16 | 24 VDC |
| X7 | D137 | 16 | 24 VDC |
| PHONE 1 | A285 | 32 | VAN PHONE 1 |
| PHONE 2 | H287 | 32 | VAN PHONE 2 |

| MISCELLANEOUS (CONTINUED) | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| | E77 | 9 | LIGHT MATERIAL HANDLING CRANE (LMHC) |
| | E77 | 9 | LMHC REMOTE CONTROL BOX |
| | E77 | 9 | LMHC POWER CABLE |
| | G78 | 9 | LMHC REMOTE CONTROL IN/OUT |
| | G302 | 34 | WTEC III TRANSMISSION PRESSURE SWITCH |
| | B304 | 34 | WTEC III OUTPUT SPEED SENSOR |
| | C304 | 34 | WTEC III ENGINE SPEED SENSOR |
| | E304 | 34 | WTEC III SUMP TEMP SENSOR |

| TRANSMISSION | | | |
|---|---|---|---|
| NUMBER | ZONE | SH | DESCRIPTION |
| A10 | B183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| A13 | B67 | 8 | WTEC II TRANSMISSION A13 (SERIAL # 29513233) |
| A13 | A72 | 8 | WTEC II TRANSMISSION A13 (SERIAL # 29517497) |
| A13 | A76 | 9 | WTEC II TRANSMISSION A13 (SERIAL # 29513233) |
| B10 | E67 | 8 | PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR |
| B10 | E72 | 8 | TID1, TID2, AND TID3 TRANSMISSION OUTPUT SPEED SENSOR |
| B10 | E76 | 9 | PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION OUTPUT SPEED SENSOR |
| MT9 | F67 | 8 | PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED SENSOR |
| MT9 | F72 | 8 | TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED SENSOR |
| MT9 | F76 | 9 | PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION ENGINE SPEED SENSOR |
| MT11 | F67 | 8 | PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION SENSOR |
| MT11 | F72 | 8 | TID1, TID2, AND TID3 TRANSMISSION THROTTLE POSITION SENSOR |
| MT11 | F76 | 9 | PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION THROTTLE POSITION SENSOR |
| REV | C183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| RW | D183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| S02 | F183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| S03 | F183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF01 | D183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF01 | D183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF02 | C183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF02 | D183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF04 | C183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF3 | F183 | 21 | WTEC II VEHICLE INTERFACE MODULE |
| SF4 | D183 | 21 | WTEC II VEHICLE INTERFACE MODULE |

A | B | C | D | E | F | G | H

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 4 OF 34

SIZE B | ILL. NO. 5WD01L4B | FP-7/ (FP-8 BLANK)

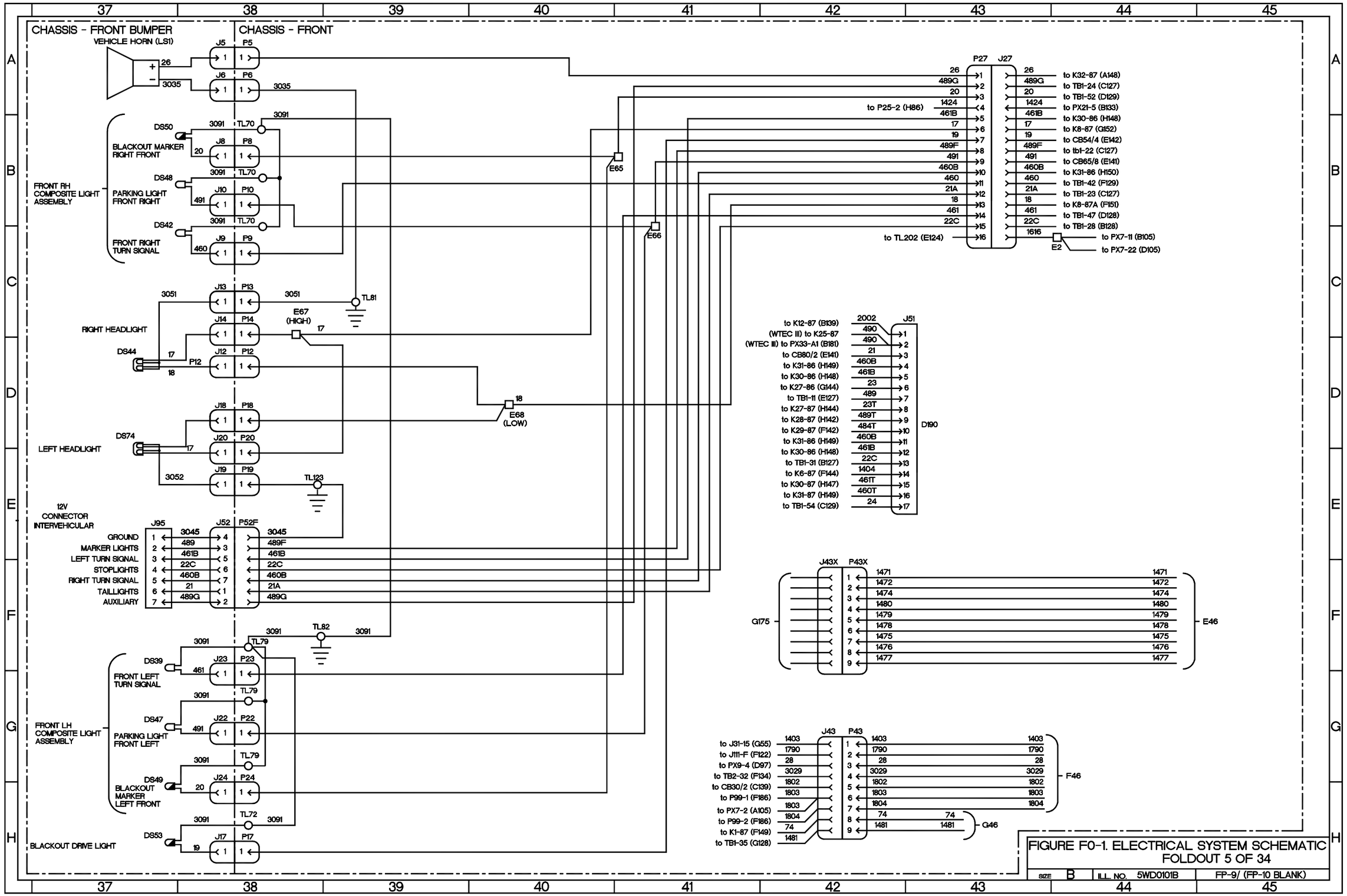



FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 34

SIZE B | ILL. NO. 5WD0101B | FP-9/ (FP-10 BLANK)

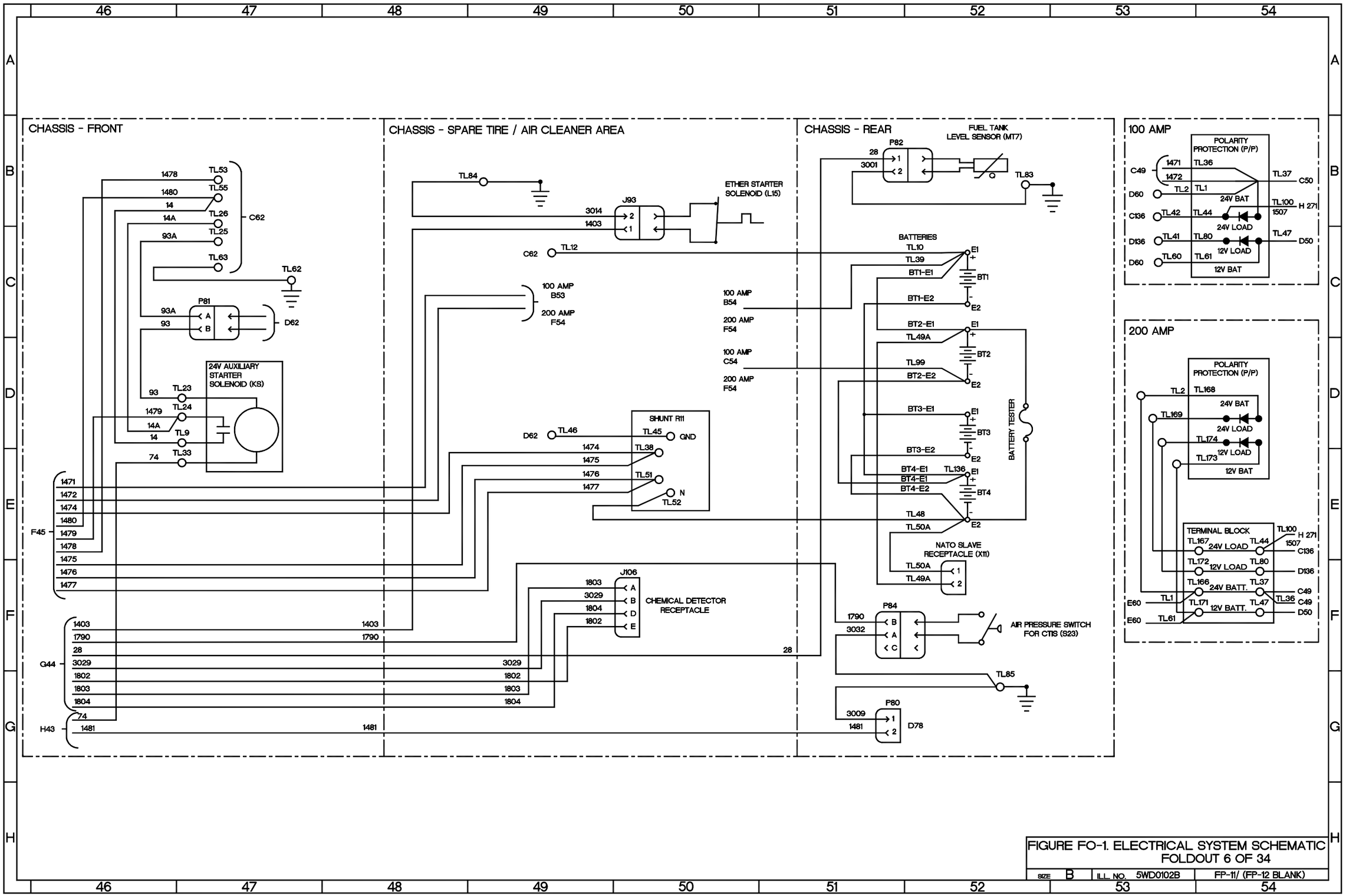



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 6 OF 34

SIZE B | ILL. NO. 5WD0102B | FP-11/ (FP-12 BLANK)

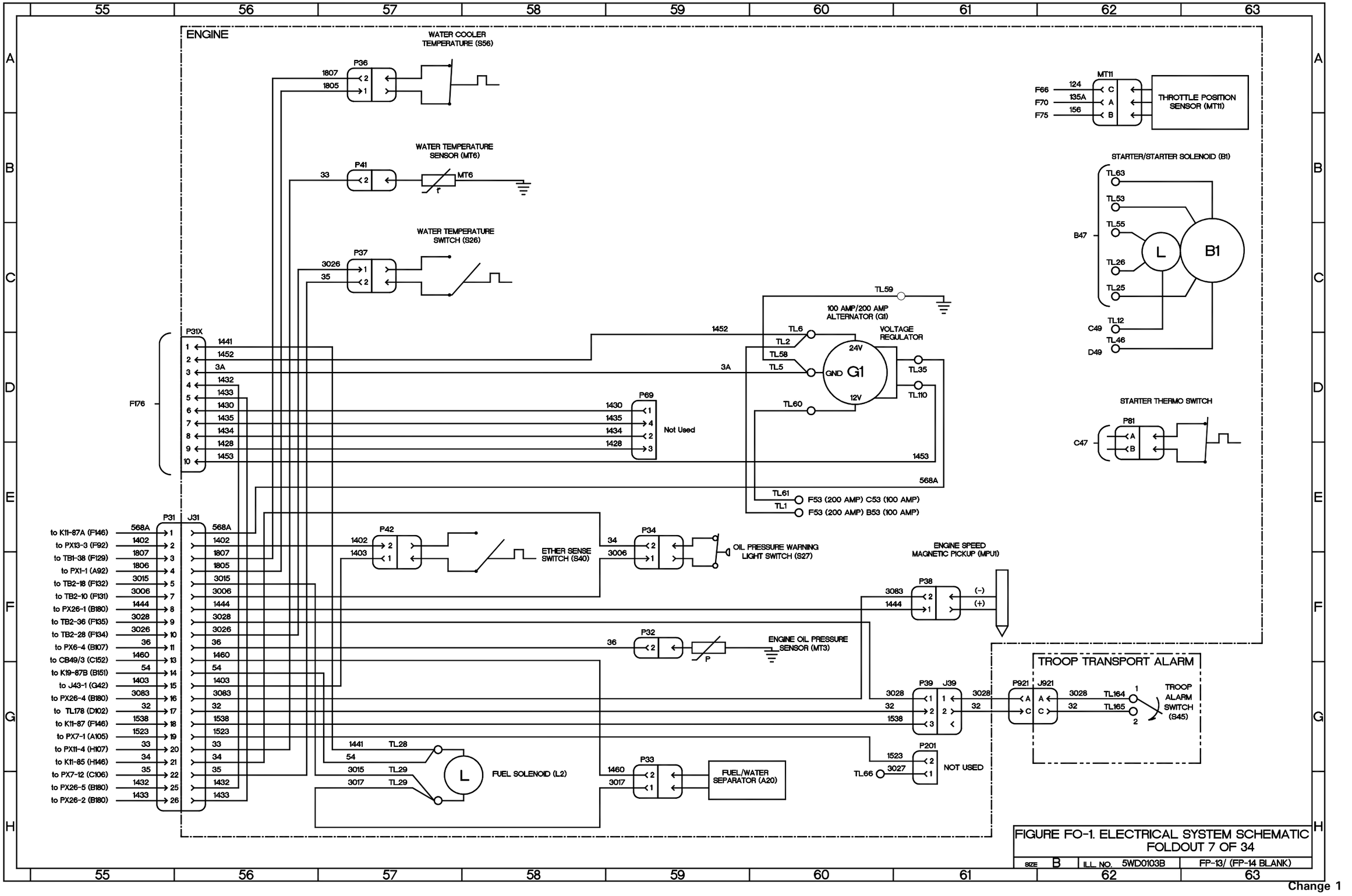


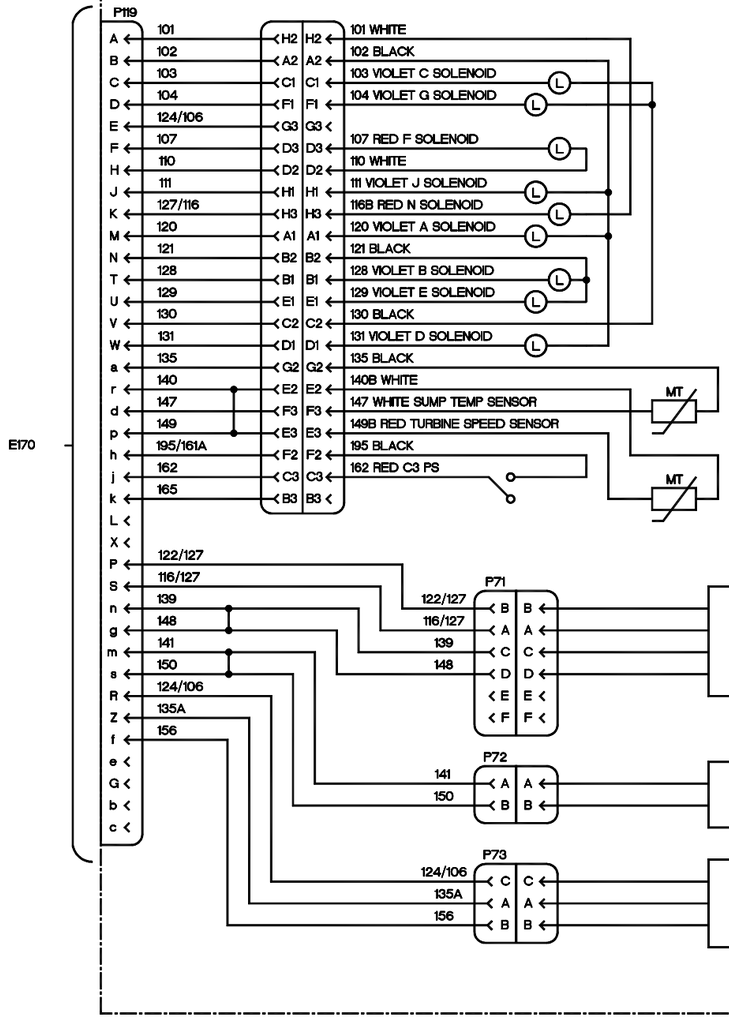

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 34

SIZE B | ILL. NO. 5WD0103B | FP-13/ (FP-14 BLANK)

PRIOR TO SERIAL NUMBER 6510032369

PRE-BLOCK SEVEN TRANSMISSION

EXTERNAL WIRING HARNESS TO TRANSMISSION CONNECTOR




SERIAL NUMBER 6510032369 AND HIGHER

TID1, TID2, AND TID3 TRANSMISSIONS

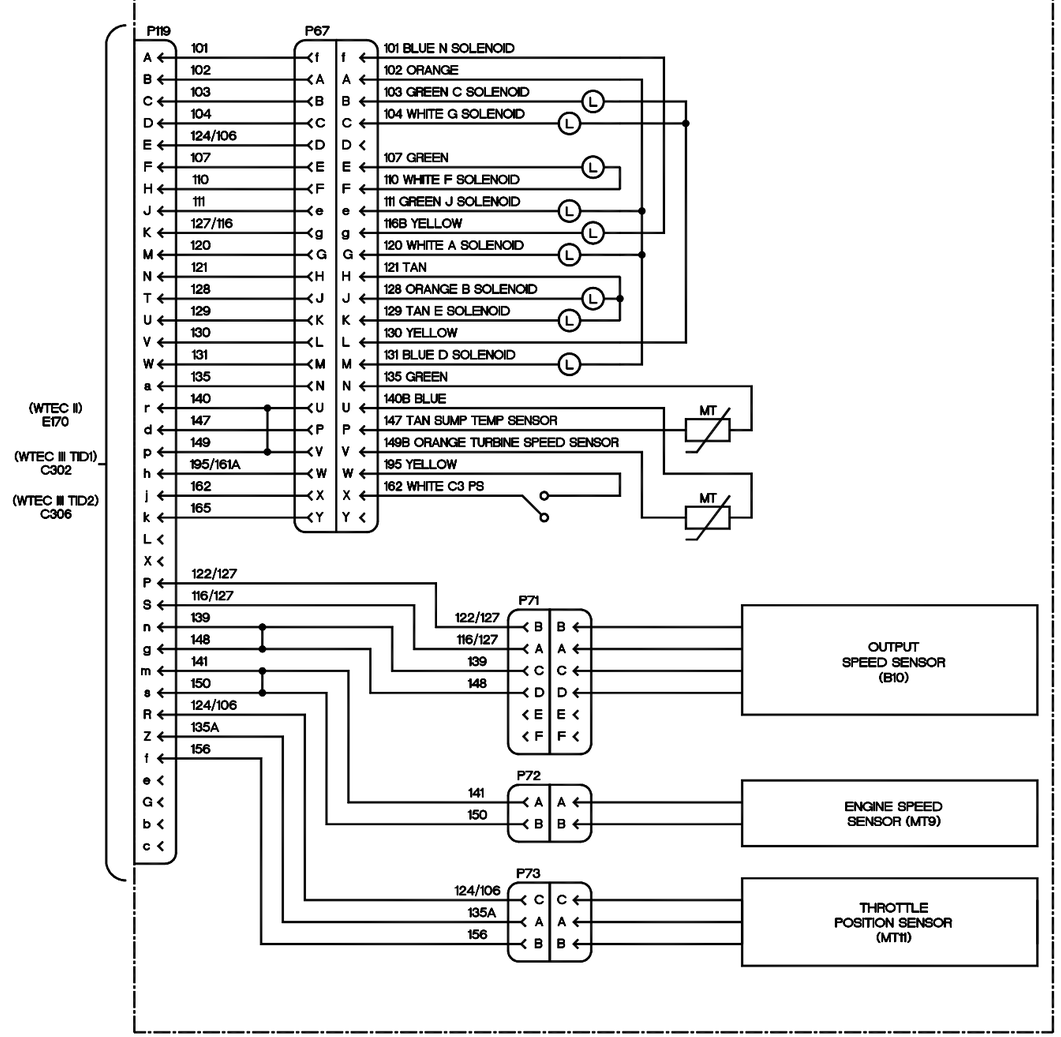
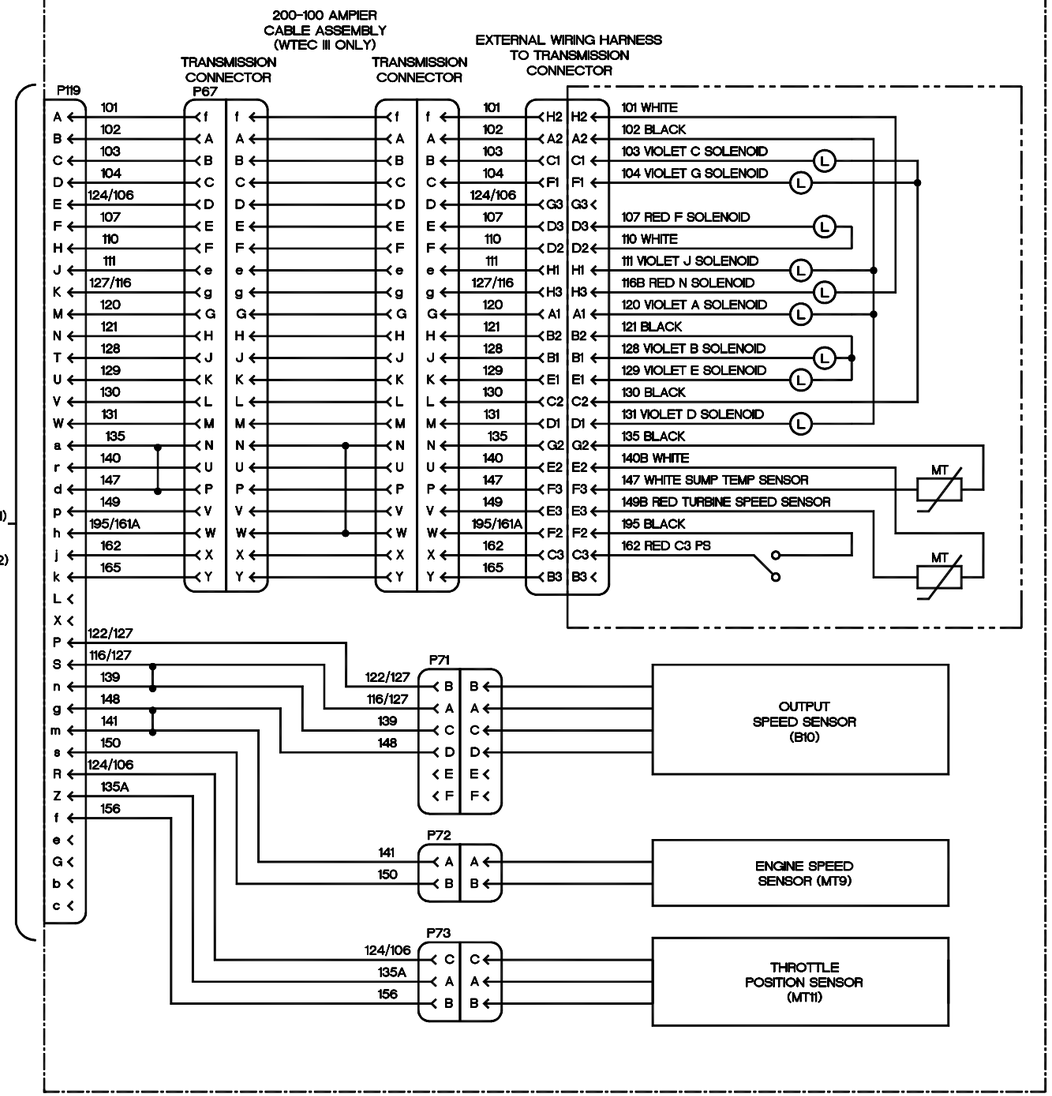


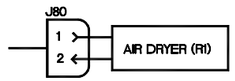

FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 8 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0104B | FP-15/ (FP-16 BLANK) |

PRIOR TO SERIAL NUMBER 6510032369 WITH ADAPTER CABLE ASSEMBLY

PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION




LIGHT MATERIAL HANDLING CRANE (LMHC)

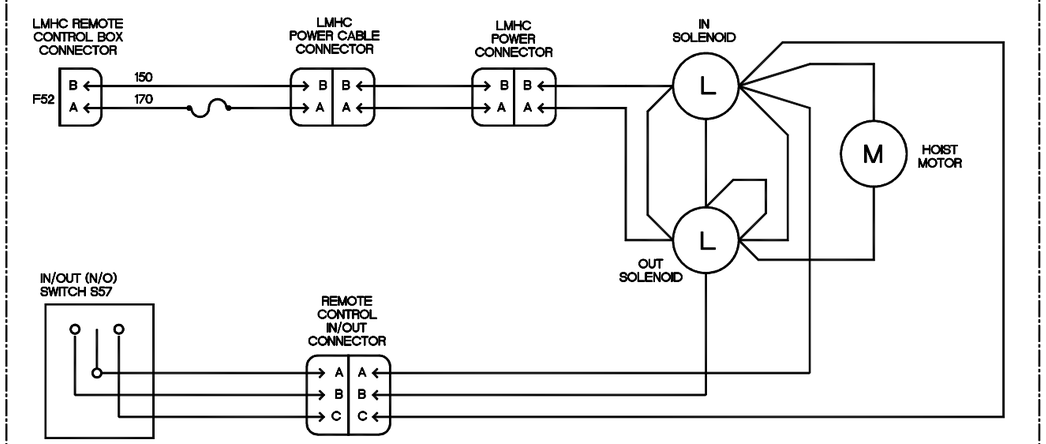



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0105B | FP-17/ (FP-18 BLANK) |

## CAB - MARKER LIGHTS

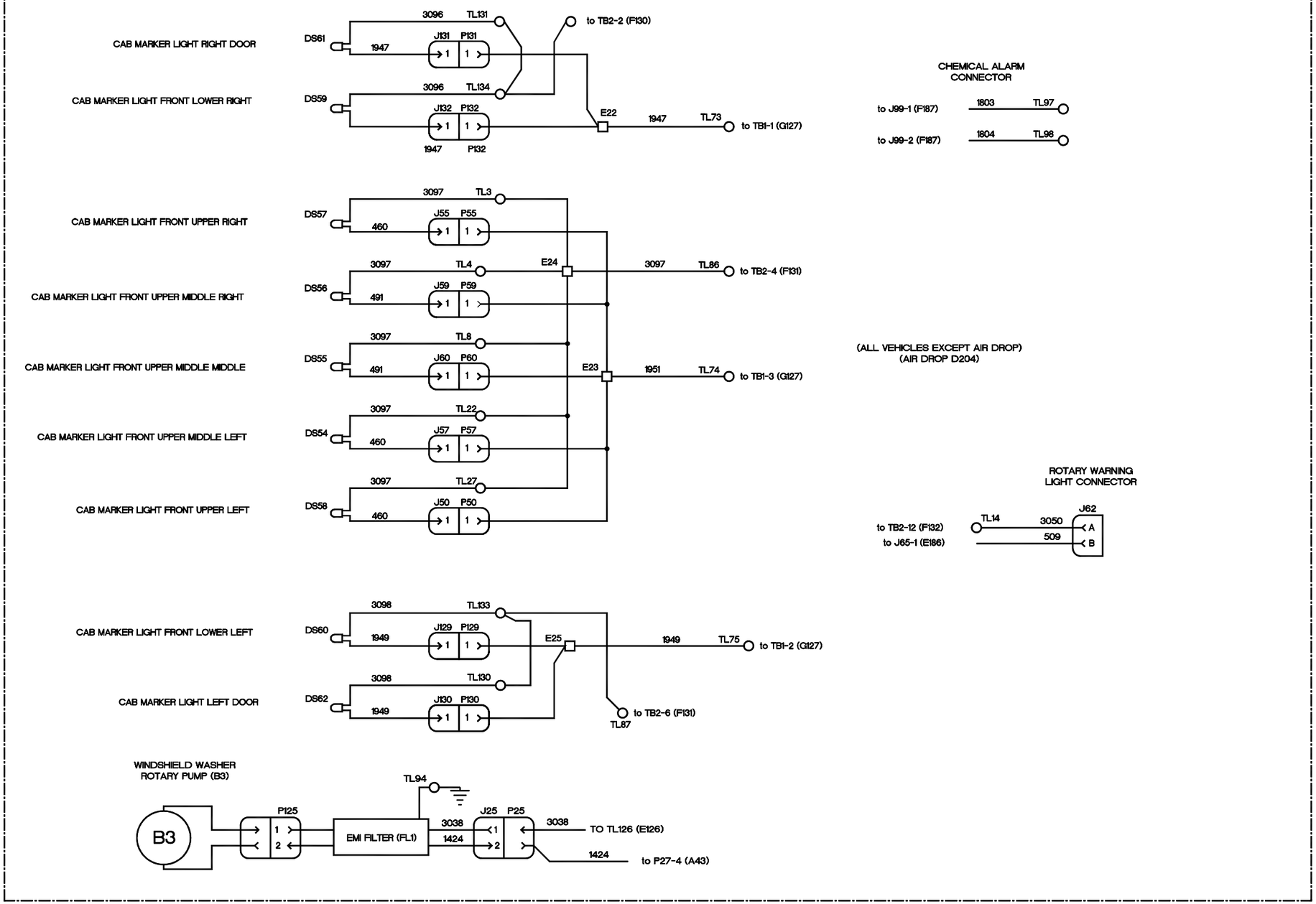



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 10 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0106B | FP-19/ (FP-20 BLANK) |

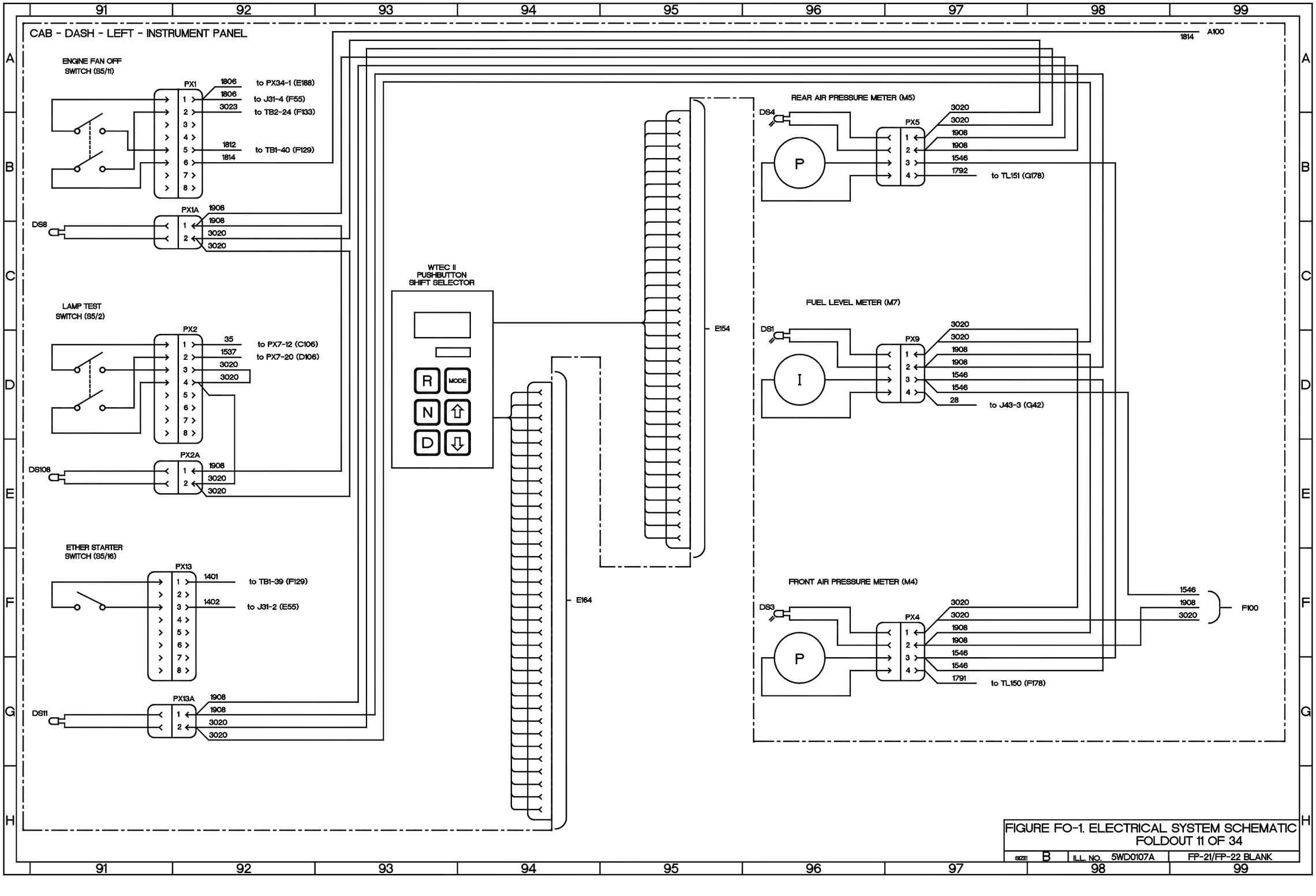



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0107A | FP-21/FP-22 BLANK |

CAB - DASH - LEFT - INSTRUMENT PANEL

A99 — 1814

LIGHTED INDICATOR DISPLAY (A18)

| | | PX7 | |
|---|---|---|---|
| CHEM DETECT | DS32 | 1 | 1523 to J31-19 (G55) |
| RIGHT TURN SIGNAL | DS15 | 2 | 1803 to J43-6 (H42) |
| LEFT TURN SIGNAL | DS14 | 4 | 1580 to TB1-41 (E129) |
| | DS9 | 6 | 1570 to TB1-47 (E129) |
| CTIS OVRSPD | DS34 | 7 | 3021 to TB2-25 (G133) |
| PTO ON | DS23 | 8 | 2034 to P912-9 (C124) |
| EMER BRAKE | DS21 | 9 | 1528 to J111-D (F122) |
| WATER TEMPERATURE | DS25 | 10 | 2021 to J913-13 (C121) |
| REAR BRAKE AIR | DS27 | 11 | 1616 to J27-16 (C43) |
| TRANS OIL TEMP | DS41 | 12 | 35 |
| ENGINE OIL LEVEL | DS29 | 13 | 1525 to TL157 (H178) |
| PARK BRAKE | DS22 | 16 | 1532 |
| OIL PRESSURE | DS24 | 17 | 3030 to TB2-33 (G134) |
| HIGH BEAM | DS16 | 19 | 1536 |
| FRONT AIR BRAKE | DS28 | 20 | 1537 |
| RADIATOR FAN OFF | DS19 | 22 | 1616 to J27-16 (C43) |
| MASTER STOP | DS30 | 23 | 34A to D3B-4 (A138) |
| | | 24 | 1681 to K8-87 (F152) |
| | | 25 | 1530 to TL156 (F178) |
| | | 26 | 1814 |
| | | 27 | 1658 to TB1-61 (B129) |
| | | 28 | 2010 to P912-7 (B124) |

ENGINE OIL PRESSURE METER (M3)

DS5 — OP — PX6

| | | |
|---|---|---|
| 1 | 3020 | |
| 2 | 3020 | |
| 3 | 1908 | |
| 4 | 1908 | B109 |
| | 1546 | |
| | 1546 | |
| | 36 | to J31-11 (F55) |

E88: 35 to PX2-1 (D92); 35 to J31-22 (H55)

E89: 1537 to PX2-2 (D92); 1537 to J118-1 (D162); 105 to P115-19

VOLTMETER (M2)

DS7 — V — PX10

| | | |
|---|---|---|
| 1 | 3020 | |
| 2 | 3020 | |
| 3 | 1908 | D109 |
| 4 | 1908 | |
| | 1546 | |
| | 1546 | to J913-9 (C121) E109 |
| | 3004 | to TB2-9 (G131) |

F99: 1546, 1908, 3020 — 3020, 1908 — F109

SPEEDOMETER (M8)

DS6 — KM — PX8

| | | |
|---|---|---|
| 1 | 3020 | |
| 2 | 3020 | |
| 3 | 1908 | |
| 4 | 1908 | |
| | 1546 | |
| | 1546 | |
| | 1793 | to PX33-H2 (E181) (WTEC II) |
| | 1793 | to J111-B (F122) (WTEC II) |
| | 157 | to J111-B (F122) (WTEC III) |
| | 157 | to P116-30 (F291) (WTEC III) |

AUDIBLE ALARM (LS2)

| | | | |
|---|---|---|---|
| | 32 | TL178 | 32 to J31-17 (G55) |
| − | 1536 | TL160 | |
| + | 1532 | TL161 | |

WATER TEMPERATURE METER (M6)

DS2 — t° — PX11

| | | |
|---|---|---|
| 1 | 3020 | |
| 2 | 3020 | |
| 3 | 1908 | |
| 4 | 1908 | G109 |
| | 1546 | |
| | 1546 | |
| | 33 | to J31-20 (G55) |

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0108B | FP-23/ (FP-24 BLANK) |

CAB - DASH - LEFT - INSTRUMENT PANEL

IGNITION SWITCH (S5/1)

PX17

B108: 3020, 3020, 1908, 1908, 1546, 1546

1548 to K2-86 (A143)

1586 to CB70/4 (E146)

DS13 — PX17A: 1908, 1908, 3020, 3020

STARTER PUSHBUTTON (S6)

TL163 — TL162 — 1405 to K24-87 (A152); 3007 to TB2-11 (G131)

ROTATING WARNING LIGHT SWITCH (S5/2)

PX12

D108: 3020, 3020, 1908, 1908, 1546

E108: 1546

1559 to K13-86 (A149)

1575, 1575 to K20-86 (G138)

DS10 — PX12A: 1908, 1908, 3020, 3020

MAIN LIGHT SWITCH (S4)

PX15

| | | |
|---|---|---|
| B | 1542 | |
| C | 22 | to D1A-2 (C138) |
| D | 19 | to CB54/3 (D142) |
| E | 1572 | to CB66/1 (D143) |
| F | 1586 | to CB70/4 (D146) |
| H | 1575 | |
| J | 1577 | to CB74/5 (D150) |
| K | 1404 | to K6-87 (F143) |
| L | 491 | to CB65/7 (D141) |
| M | 16 | to P18-3 (B178) |
| N | 23 | to K27-86 (G143) |

F108: 3020, 1908

G108: 3020, 3020, 1908, 1908, 1546

FULL HAZARD WARNING SWITCH (S5/22)

PX14

1565 to K9-87 (B142)

1566 to J19-5 (D177)

1566 to K10-87A (F150)

1567 to PX20-B (C188)

1568 to J19-12 (E177)

1568 to PX20-A (C188)

1514 to CB74/6 (E150)

DS12 — PX14A: 1908, 1908 to J913-11 (C121); 3020, 3020 to J913-10 (C121)

INSTRUMENT PANEL LIGHTS DIMMER MODULE (A3)

PX24: 1908, 1908, 1542

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 34

SIZE B | ILL. NO. 5WD0109A | FP-25/FP-26 BLANK

CAB - DASH - CENTER - HEATER / CTIS ECU

PERSONNEL HEATER

FAN MOTOR
B4
FL3
3 HIGH
2 MED
1 LOW
OFF

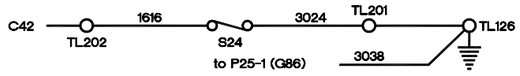
PX25
1 1601 to CB23/7 (C147)
2 1908
3 3003
4 3003 to TB2-8 (F131)

HEATER CONTROL PANEL ILLUMINATION
DS17
DS101

J913 P913
to K12-86 (A139) 1673 — 1 1673
to CB72/2 (D139) 1674 — 2 1674
to D2B-3 (D138) 1672 — 3 1672
to CB45/4 (C139) 1670 — 4 1670
to CB49/3 (C152) 1925 — 5 1925
to J118-9 (E162) 1954 — 6 1954
(WTEC II) to PX33-A3 (C181) 161 — 7 161
(WTEC II) to J118-13 (E162) 161 — 8 153
(WTEC III) to P115-31 (D291) 161/1952 — 9 1546
(WTEC II) to J118-8 (D162) 153 — 10 3020
(WTEC III) to P115-12 (D291) 153 — 11 1908
to TB1-61 (B129) 1546 — 12 1550
to PX10-3 (E107) 1546 — 13 2021
to TB2-31 (G134) 3020 — 14 2019
to PX14A-2 (H112) 3020 — 15 1904
to PX14A-1 (H112) 1908
to PX26-1 (B179) 1908
to PX7-10 (B105) 1550
(WTEC II) to PX33-E2 (D181) 2021
(WTEC III) to K37-87 (B294) 2019
(WTEC II) to PX33-E3 (D181) 2019
(WTEC III) to K37-30 (B294) 1904
1904
G208

P912 J912
to CB50/2 (C145) 2006 — 1 1 — 2006
to CB48/8 (C141) 2069 — 2 2 — 2006
3 3 — 2069
to K12-87 (B139) 2004 — 4 4 — 2069
to CB63/1 (D151) 1328 — 5 5 — 2012
6 6 — 2004
to PX7-28 (D105) 2010 — 7 7 — 1328
to CB53/6 (E140) 2033 — 8 8 — 2010
to PX7-8 (B105) 2034 — 9 9 — 2033
to TB1-20 (D127) 2040 — 10 10 — 2034
to TB1-50 (D129) 2041 — 11 11 — 2040
to X1 (C136) 1650 — 12 12 — 2041
to X1 (C136) 1653 — 13 13 — 1650
to K19-87 (B150) 2037 — 14 14 — 1653
to K15-87A (A140) 1811 — 15 15 — 2037
1811
E208

PARKING BRAKE SWITCH




CTIS ELECTRONIC CONTROL UNIT (A2)

P110
H 01
F 02
Z
M 01
U 03
S 04
E 05
T 06
P 07
b 08
c 09
j 10
R 11
B 12
C 13

P111 J111
01 E E 1911 — to CB40/7 (C150)
02 A A 3031 — to TB2-35 (G135)
03 B B 1793 — to PX8-4 (G103) (WTEC II)
04 G G 157 — to PX8-4 (G103) (WTEC III)
05 D D 1911 — to K52-87A (G139)
06 F F 1528 — to PX7-9 (B105)
1790 — to J43-2 (G42)

P113
B
C
A

P112
D
F
E
A
B
G186

TL50
CHASSIS GROUND

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 14 OF 34

SIZE B | ILL. NO. 5WD0110B | FP-27/ (FP-28 BLANK)

CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL

PX21

to P18-9 (B178) 1599
to CB37/1 (C152) 1569
to J2-4 (B185) 1916
to TB2-37 (G135) 3034
to P18-8 (B178) 1424
to J27-4 (A43) 1424
to P18-7 (B178) 1597

WIPER DELAY MODULE (A5)

22C J51-13 (E42)
1940 K10-87 (F150)
1940 K10-86 (F150)
22 D1A-1 (C138)
22C J27-15 (C43)
1912 CB67-4 (E139)
21A J27-12 (B43)
489G J27-2 (A43)
489F J27-8 (B43)
2040 P912-10 (C124)
489 J51-7 (D42)
1426 J7-1 (A188)
1955 K28-86 (H142)
1951 TL74 (D86)
1951 TL74 (E205)
1947 TL73 (B86)
1949 TL75 (F86)

1930 K11-86 (F146)
1929 CB77/5 (C152)
1658 K11-30 (F146)
1546 J913-9 (C122)
1658 PX7-27 (D105)
1690 CB79/5 (C150)
1462 K19-30 (A150)
1460 PX33-C1 (C181) (WTEC II)
146 K25-86 (B292) (WTEC III)
1463 TL159 (E136)
146 J117-C (C289) (WTEC III)
1572 CB66/2 (E143)
1408 K29-86 (F142)
24 J51-17 (E42)
1329 K52-86 (H139)
20 J27-3 (A43)
2041 P912-11 (C124)
461 J27-14 (B43)
1570 PX7-6 (B105)
1581 J19-1 (C177)
1524 J19-4 (D178)
1580 PX7-4 (B105)
460 J27-11 (B43)
1401 PX13-1 (F92)
1812 PX1-5 (B92)
1935 CB22/3 (C149)
1807 J31-3 (F55)
1481 J43-9 (H42)
1692 CB21/1 (C149)
1692 PX26-3 (B179)
(WTEC II) 1692 PX33-E1 (D181)
(WTEC III) 1692 K34-30 (B293)
1692 PX33-F1 (D181) (WTEC II)
1692 K26-30 (B290) (WTEC III)

TB1

3101 K37-85 (B294) (WTEC III)
3054 K20-85 (H138)
3036 K32-85 (A147)
3047 K30-85 (H147)
3039 K9-85 (A142)
3099 J7-3 (B188)
3046 K10-85 (F150)
3016 K19-85 (A150)
3053 K8-85 (F151)
3002 K7-85 (F152)
3041 K2-85 (A143)
3043 TL153 (C180)
3048 K31-85 (G149)
3049 PX20-C (C189)
3012 K15-85 (A141)
3011 PX34-2 (E188)

1603 TB2-1 — F136

1603 X3

TB2

3096 TL71 (A86)
3097 TL86 (C86)
3098 TL87 (F86)
3003 PX25-3 (C120)
3006 J31-7 (F55)
3050 TL14 (E88)
3008 PX50-1 (D188)
3101 PX33-K1 (F181) (WTEC II)
143 P115-32 (D291) (WTEC III)
3015 J31-5 (F55)
3040 K29-85 (F142)
3056 K28-85 (G142)
3023 PX1-2 (B92)
3083 PX26-6 (B179)
3026 J31-10 (F55)
3067 K12-85 (A139)
3029 J43-4 (H42)
3044 K27-85 (H143)
3028 J31-9 (F55)
3045 K52-85 (H139)
3004 PX10-4 (E108)
3007 TL163 (B115)
(WTEC III) 188 TB2-13 (H292)
(WTEC III) 188 TB2-15 (H292)
(WTEC II) 3102 PX33-K2 (F181)
(WTEC III) 3102 K26-85 (B290)
3018 J78-2 (F185)
3019 J78-4 (F185)
3021 PX7-7 (B105)
(WTEC III) 143 P115-17 (D291)
(WTEC III) 143 J117-E (C289)
3020 J913-10 (C121)
3030 PX7-17 (C105)
3031 J117-A (F122)
3034 PX21-4 (A183)
3037 J2-3 (A185)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0111B | FP-29/ (FP-30 BLANK) |

CAB - DASH - RIGHT
POWER DISTRIBUTION PANEL

34 K24-85 (A151)
34A PX7-23 (D105)
74 K24-30 (A151)
D3B
D3A
1674 CB72/2
3067 TB2-30 (F134)
2004 P912-4 (B124)
K12
WORKLIGHT RELAY
2002 J51-1 (D42)
1673 J913-1 (B121)
1808 CB68/7
1806 PX34-1 (E187)
1811 P912-15 (C134)
3039 TB2-56 (B132)
3012 TB2-77 (C135)
K15
AUX. COOLER RELAY
1566 CB71/4
1514 CB74/6
1565 D2B-4
1565 PX14-1 (F112)
K9
HAZARD FLASHER BO OVERIDE
1602 X1
1548 PX17-1 (A112)
3041 TB2-43 (C130)
K2
CONTROL PANEL RELAY
1548 CB76/3
1637
A145
B145
3054
1566
to CB43 (C289)
to CB79 (B289)
to P912-12 (C124)
1650
to P912-13 (C124)
1653
to TL44 (E54)
to TL44 (B53)
TL42
X1
+24 VDC
X4 1602 K2-30
1602 K1-30
461B J19-2 (C178)
22 PX15-C (D115)
D1B
D1A
461B K30-86
22 TB1-27 (B127)
+24V
CHEMICAL ALARM
CB30
CB45
FUEL PREHEAT
1670 J913-4 (B121)
1802 J43-5 (H42)
CAB RADIO
CB20
CB48
ARCTIC CAB/ ENGINE KILL
1906 K53-30
2069 P912-2 (B124)
TRAILER REAR LIGHTS POWER
CB41
CB42
BO MARKER LIGHTS POWER
1957 K28-30
1958 K29-30
REAR COMPOSITE LIGHTS
CB44
CB43
REAR COMPOSITE LIGHTS WTEC III ECU
136 P115-1 (C289)(WTEC III)
136 P115-1 (D289)(WTEC III)
1922 K30-30 (WTEC II)
1956 K31-30
1956
C145
X7 1601
X5 1601
1601
D145
+12V
19 PX15-D (D115)
1914A K20-87
TAIL LIGHTS
CB80
CB54
BO HEADLIGHT
21 J51-3 (D42)
19 J27-7 (B43)
1572 PX15-E (D115)
1548 K2-86
BO MARKER POWER
CB66
CB76
BO STOP RELAY POWER
1572 TB1-56 (C129)
1641 K6-30
TL41
X2
+12 VDC
1501
1565 K9-87
460B J19-3 (D178)
D2B
D2A
460B K31-86
1672 J913-3 (B121)
1674 K12-30
1914 K20-87
CB72
CB67
MARKER LIGHTS
1674 J913-2 (B121)
1912 TB1-26 (C128)
2033 P912-8 (C124)
491 PX15-L (E116)
CB53
CB65
PARKING LIGHTS
491 J27-9 (B43)
1514
1808
1911
E145
TL159
TL158
to TB1-57 (C129)
1463
1637 K19-86
START INHIBIT PUSHBUTTON (S7)
1958 CB42/4
178 P115-28 (D291)(WTEC III)
1408 J7-2 (B188)
1408 TB1-53 (C129)
3040 TB2-20 (F133)
484T J51-10 (D42)
K29
BO MARKER RELAY WTEC III BLACKOUT DRIVE RELAY
1641 CB76-4
1404 PX15-K (D115)
1404 J51-14 (E42)
1594 TL152 (C180)
K6
STOP LIGHT RELAY
D135
1603 TB2-1
TL57
TL56
CAB GND
X3
GROUND
1602
461B D1B-3
460B
1691
74
G145
1691 K1-86
1501
3054 K13-85
1575 PX12-5 (D113)
3054 TB2-44 (B131)
1914 CB67/3
1914A CB80/1
K20
MARKER LIGHTS RELAY
1911 CB40/7
1329 TB1-51 (D129)
1911 J111-G (F123)
3045 TB2-3 (G130)
K52
CTIS OVERSPEED INDICATION RELAY
1906 CB20/6
74 K1-85
1906 J78-3 (F185)
K53
RADIO POWER RELAY
1957 CB41/2
3056 TB2-22 (F133)
1955 TB1-5 (F127)
489T J51-9 (D42)
K28
TRAILER REAR LIGHTS RELAY
3044 TB2-34 (F135)
1959 CB39/4
23 PX15-N (E115)
23 J51-6 (D42)
23T J51-8 (D42)
BO STOP RELAY
K27

FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 16 OF 34

SIZE B | ILL. NO. 5WD0112B | FP-31/ (FP-32 BLANK)

CAB - DASH - RIGHT
POWER DISTRIBUTION PANEL

A144 1637
B144 1604 X6
3054
1566
C144
D144 1601
E144 1514 1808 1911
G145 1602 461B D1B-3 460B 1691 74 1959

1637 TL158
1658 K11-30
74 D3B-3(B137)
74 K1-85
34 K11-85
1405 TL162 (B115)
1462 TB1-59 (B129)
3016 TB2-62 (B133)
1569 J2-2 (A185)
1569 P18-4 (B177)
1569 PX21-2 (A133)
1925 J913-5 (B121)
1460 J31-13 (F55)
1929 TB1-64 (B129)
1808 K15-30
1690 TB1-62 (B129)
1911 J111-E (E123)
1911 K52-30
1328 P912-5 (B124)
1577 PX15-J (D115)
1514 PX14-7 (G113)
1903 PX33-B1 (C181)(WTEC II)
1903 K25-30 (B292)(WTEC III)
1514 K9-86
1416 K7-30
1416
1911
1691 K26-87 (B290)(WTEC III)
1602 X1
1691 PX33-G1 (E181)(WTEC II)
1691 K53-86
74 K24-30
74 K53-85
74 J43-8 (H42)
1594 J19-6 (D178)
1940 TB1-30 (B128)
1922 CB43/8
1956 CB44/6
3048 TB2-53 (C132)
460B D2A-1
460B J51-4 (D42)
460B J51-11 (E42)
460B J27-10 (B43)
461B J51-12 (E42)
461B J27-5 (B43)
461B J51-5 (D42)
461B D1B-3
460T J51-16 (E42)
3047 TB2-50 (B131)
461T J51-15 (E42)
34 K24-85
1658 K24-86
1658 TB1-64 (B129)
1930 TB1-63 (B129)
568A J31-1 (E55)
1538 J31-18 (G55)
26 CB36/5
25 P18-12 (C178)
26 J27-1 (A43)
509 CB38/8
509 K13-30
26 K32-30
1601 PX25-1 (C120)
2006 P912-1 (B124)
1959 K27-30
1922
1956
+24V
+12V
SWING FIRE PUMP POWER
TRAILER BO STOP LIGHTS
HORN POWER
HEATER BLOWER
WTEC II VIM STE/ICE
FAN/ ETHER
WTEC II VIM POWER
CTIS COOLER
WINDSHIELD WIPER/WASHER
PTO POWER
ENGINE INSTR POWER
IGNITION/MAIN LIGHT SWITCH
HEAD LIGHTS
ROTATING BEACON
VIM POWER
HAZARD/ FLASHER WORKLIGHTS
BACK-UP LIGHT POWER
CB50 CB39 CB36 CB23 CB21 CB22 CB79 CB40 CB37 CB49 CB77 CB68 CB70 CB78 CB38 CB35 CB71 CB74 CB73 CB63 CB64 CB61 CB62
1586 PX15-F (D115)
1586 PX17-5 (B112)
1900 PX33-J1 (E182)
1900 PX33-J2 (E182)
1566 K9-30
1692 TB1-36 (G129)
1935 TB1-37 (F129)
3054 K20-85
509 P65-1 (E186)
509 PX12-1 (D113)
1559 PX12-1 (D113)
3036 TB2-46 (B131)
2037 P912-14 (C124)
54 J31-14 (G55)
34 J31-21 (G55)
3046 TB2-60 (B133)
1940 TB1-29 (B127)
1566 PX14-2 (GH13)
18 J27-13 (B43)
3053 TB2-70 (B134)
17 J27-6 (B43)
1681 PX7-24 (D105)
3002 TB2-74 (B135)
1416 CB78/6
16 P18-3 (B178)
1417 K8-30
1417 K7-87
16A P18-2 (B178)
E5 E4 E3
HORN RELAY
ROTATING BEACON BO OVRD RELAY
START INHIBIT RELAY
CRANKING LOCKOUT RELAY
ALTERNATOR EXCITATION RELAY
STARTER RELAY
STOP/HAZARD FLASHER RELAY
HEADLIGHT LO/HI-BEAM RELAY
HEADLIGHT RELAY
REAR LEFT COMPOSITE LAMP RELAY
REAR RIGHT COMPOSITE LAMP RELAY
K32 K13 K19 K24 K11 K1 K10 K8 K7 K30 K31

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 34

SIZE B | ILL. NO. 5WD0113B | FP-33/ (FP-34 BLANK)

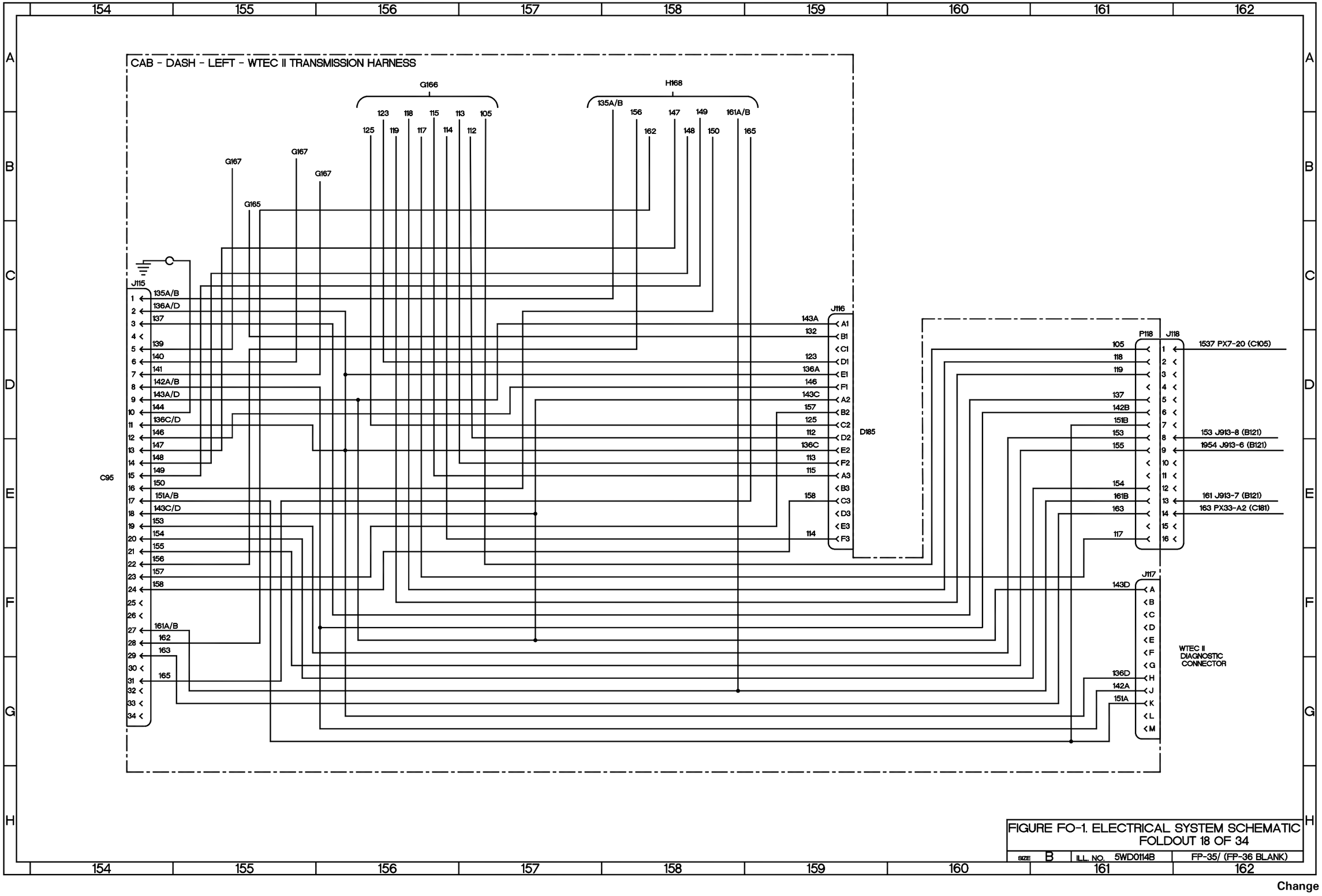



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 34

SIZE B | ILL. NO. 5WD0114B | FP-35/ (FP-36 BLANK)

CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS

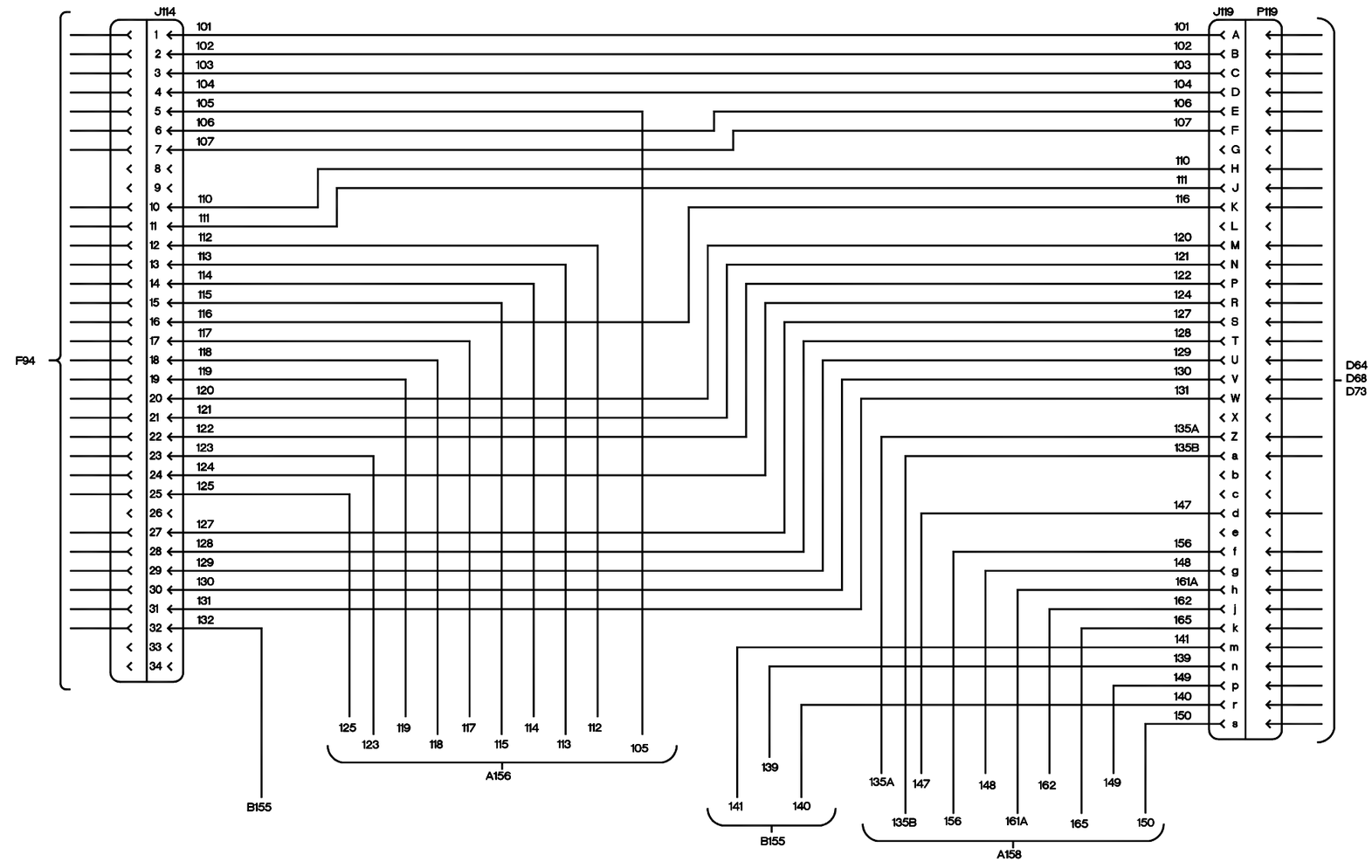



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0115B | FP-37/ (FP-38 BLANK) |

CAB - DASH - LEFT - UNDERDASH

JUNCTION BOX (BJ1)

P83

STE / ICE RECEPTACLE

| | | |
|---|---|---|
| f | 1610 | 1610 |
| AB | 1437 | 1430 |
| AD | 1431 | |
| z | 1446 | |
| x | 1427 | |
| p | 1423 | |
| m | 1438 | |
| AA | 1436 | |
| g | 1612 | 1437 |
| k | 1439 | 1431 |
| n | 1421 | 1446 |
| w | 1425 | 1427 |
| y | 1447 | 1423 |
| AC | 1429 | 1438 |
| R | 1441 | |
| N | 1452 | 1436 |
| P | 3A | 1612 |
| d | 1432 | 1434 |
| c | 1433 | |
| v | 1435 | 1439 |
| u | 1428 | 1421 |
| O | 1453 | 1425 |
| E | 1471 | 1447 |
| V | 1472 | 1429 |
| Y | 1474 | |
| T | 1480 | |
| S | 1479 | |
| M | 1478 | |
| F | 1475 | |
| X | 1476 | |
| W | 1477 | |
| h | R2 | |
| j | | |
| s | R6 | |
| U | 1482 | |
| Z | 1482 | E71 |
| a | 1482 | |
| b | 1482 | |

BLUE
BROWN
GREEN
RED
YELLOW
BLACK
WHITE

R5
R4

J31X

| | |
|---|---|
| 1441 | 1 |
| 1452 | 2 |
| 3A | 3 |
| 1432 | 4 |
| 1433 | 5 |
| 1430 | 6 |
| 1435 | 7 |
| 1434 | 8 |
| 1428 | 9 |
| 1453 | 10 |

D55

J43X

| | |
|---|---|
| 1471 | 1 |
| 1472 | 2 |
| 1474 | 3 |
| 1480 | 4 |
| 1479 | 5 |
| 1478 | 6 |
| 1475 | 7 |
| 1476 | 8 |
| 1477 | 9 |

F42

COLUMN SWITCH (S3)

P18

HORN PUSHBUTTON SWITCH

| | | |
|---|---|---|
| 1 | 16A | to K8-86 (F152) |
| 2 | 16 | to K7-86 (F153) |
| 3 | 16 | to PX15-M (E116) |
| 4 | 1569 | to CB37/1 (B152) |
| 5 | 1527 | to J2-5 (B186) |
| 6 | 1590 | to J2-1 (A186) |
| 7 | 1597 | to PX21-6 (B133) |
| 8 | 1424 | to PX21-5 (B133) |
| 9 | 1599 | to PX21-1 (A133) |
| 10 | | |
| 11 | | |
| 12 | 25 | to K32-86 (A147) |

COLUMN SWITCH (S3)

J19

| | | |
|---|---|---|
| 1 | 1581 | to TB1-46 (E129) |
| 2 | 461B | to D1B-4 (C138) |
| 3 | 460B | to D2A-2 (D138) |
| 4 | 1524 | to TB1-43 (E129) |
| 5 | 1566 | to PX14-2 (G113) |
| 6 | 1594 | to K10-30 (F150) |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | 1568 | to PX14-6 (G113) |

FREQUENCY DIVIDER (A7)

PX26

| | | |
|---|---|---|
| INPUT (+) | 1 | 1550 to J913-12 (C121) |
| OUTPUT (+) | 2 | 1444 to J31-8 (F55) |
| +24V POWER | 3 | 1433 to J31-26 (H55) |
| INPUT (-) | 4 | 1692 to TB1-36 (G129) |
| OUTPUT (-) | 5 | 3083 to J31-16 (G55) |
| GROUND | 6 | 1432 to J31-25 (H55) |
| | | 3083 to TB2-26 (F133) |

STOP LIGHT SWITCH (S10A)

TL152 — TL153 — 3043 — 3043 to TB2/47 (C131)
1594 — 1594 to K6-85 (F143)

STOP LIGHT SWITCH (S10B)

TL154 — TL155 — 3043
1594

FRONT AIR PRESSURE TRANSMITTER

SENSOR (MT4) / SWITCH (S20)

TL150 — 1791 — to PX4-4 (G97)
P
N/C
TL156 — 1530 — to PX7-25 (D105)

REAR AIR PRESSURE TRANSMITTER

SENSOR (MT5) / SWITCH (S29)

TL151 — 1792 — to PX5-4 (B97)
P
N/C
TL157 — 1525 — to PX7-13 (C105)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 34

SIZE B | ILL. NO. 5WD0116B | FP-39/ (FP-40 BLANK)

CAB - DASH - RIGHT - UNDERDASH

WINDSHIELD WIPER MOTOR (B2)

B2

PX22

EMI FILTER (FL2)

P2 J2

1590 to P18-6 (B178)
1569 to CB37/1 (B152)
3037 to TB2-39 (G135)
1916 to PX21-3 (A133)
1527 to P18-5 (B178)

TRANSMISSION DIMMER MODULE

J7

1426 to TB1-9 (F127)
1408 to K29-86 (F142)
3099 to TB2-58 (B132)
158

WTEC II VEHICLE INTERFACE MODULE (A10)

PX33

to J51-2 (D42) 490
to J118-14 (E162) 163
to J913-7 (B121) 161
to CB73/8 (E150) 1903
to TB1-60 (B129) 1460
1697
to TB1-33 (G129) 1692
to J913-14 (D121) 2019
to J913-15 (D121) 1904
to TB1-34 (G129) 1692
to K1-86 (F149) 1691
to PX8-4 (G103) 1793
to CB35/2 (E149) 1900
to CB35/2 (E149) 1900
158
to TB2-16 (F132) 3101
to TB2-17 (G132) 3102

REV
SF02
SF04
10A
RW
SF01
SF4
SF02
NS
FL
10A
NS
SF3
S02
S03

132
125
146
113
114
157
136A
136C
158
143A
143C
123
112
115

P116

143A 132 123 136A 146 143C 157 125 112 136C 113 115 158 114

D159

TURN SIGNAL FLASHER (A1)

OUTPUT
INPUT
GROUND

PX20

1568 to PX14-6 (G113)
1567 to PX14-5 (G113)
3049 to TB2-55 (C132)

PX50

to TB2-14 (F132) 3008
(WTEC II) 1697
(WTEC III) K34-87A (B293) 1697

ROTARY WARNING LIGHTS CONNECTION

P65 J65

to K13-87 (B149) 509
509 to J62-B (E88)

CHEMICAL ALARM CONNECTION

P99 J99

to J43-6 (H42) 1803
to J43-7 (H42) 1804
1803 to TL88 (B88)
1804 to TL98 (B88)

FAN SOLENOID (L1)

to K15-86 (A141) 1806
to PX1-1 (A92) 1806
to TB2-79 (C135) 3011

PX34

L

CAB RADIO CONNECTION

J78

to TB2-21 (G133) 3018
to K53-87A (H141) 1906
to TB2-23 (G133) 3019

J113

G123

CTIS PRESSURE TRANSDUCER

CTIS PNEUMATIC CONTROLLER

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 34

SIZE B | ILL. NO. 5WD0117B | FP-41/ (FP-42 BLANK)

REAR LIGHTS

CAB-DASH-RIGHT-POWER DISTRIBUTION PANEL

D43 — P51

| | |
|---|---|
| 1 | 490 |
| 2 | 21 |
| 3 | 460B |
| 4 | 461B |
| 5 | 23 |
| 6 | 489 |
| 7 | 23T |
| 8 | 489T |
| 9 | 484T |
| 10 | 460B |
| 11 | 461B |
| 12 | 22C |
| 13 | 1404 |
| 14 | 461T |
| 15 | 460T |
| 16 | 24 |
| 17 | |

E21 — P53R — F200

| | |
|---|---|
| 3094 | 1 |
| 489T | 2 |
| 3094 | 3 |
| 1404 | 4 |
| 460T | 5 |
| 23T | 6 |
| 484T | 7 |
| 461T | 8 |
| 484T | 9 |
| 484T | 10 |

E14 — E20 — P52R — B203

| | |
|---|---|
| 21 | 1 |
| | 2 |
| 489 | 3 |
| 3045 | 4 |
| 461B | 5 |
| 22C | 6 |
| 460B | 7 |

3045 / 3095 — TL92

E19

E18

TL93

E17

E16 — LH REAR COMPOSITE LIGHT

| | | | |
|---|---|---|---|
| P85 | 489 | DS65 | LH SIDE MARKER LIGHT |
| | 3094 | TL15 | |
| P86 | 489 | DS66 | LH REAR MARKER LIGHT |
| | 3094 | TL16 | |
| P74 | 461B | DS37 | LH TURN AND STOPLIGHT |
| P78 | 21 | DS72 | LH TAILLIGHT |
| P76 | 24 | DS51 | BLACKOUT MARKER LH REAR |
| P77 | 23 | DS35 | BLACKOUT STOP LH REAR |
| | 3094 | TL18 | |
| | 3094 | | |
| P87 | 490 | DS45 | BACKUP LIGHT |
| | 3094 | TL17 | |

E15 — RH REAR COMPOSITE LIGHT

| | | | |
|---|---|---|---|
| P54 | 489 | DS69 | LEFT REAR MARKER |
| | 3094 | TL30 | |
| P56 | 489 | DS70 | MIDDLE REAR MARKER |
| | 3094 | TL31 | |
| P58 | 489 | DS71 | RIGHT REAR MARKER |
| | 3094 | TL32 | |
| P61 | 460B | DS38 | RH TURN AND STOPLIGHT |
| P64 | 21 | DS73 | RH TAILLIGHT |
| P62 | 24 | DS52 | BLACKOUT MARKER RH REAR |
| P63 | 23 | DS36 | BLACKOUT STOP RH REAR |
| | 3095 | TL21 | |
| | 3095 | | |
| P89 | 489 | DS68 | RH REAR MARKER LIGHT |
| | 3095 | TL20 | |
| P88 | 489 | DS67 | RH SIDE MARKER LIGHT |
| | 3095 | TL19 | |

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 22 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0118B | FP-43/ (FP-44 BLANK) |

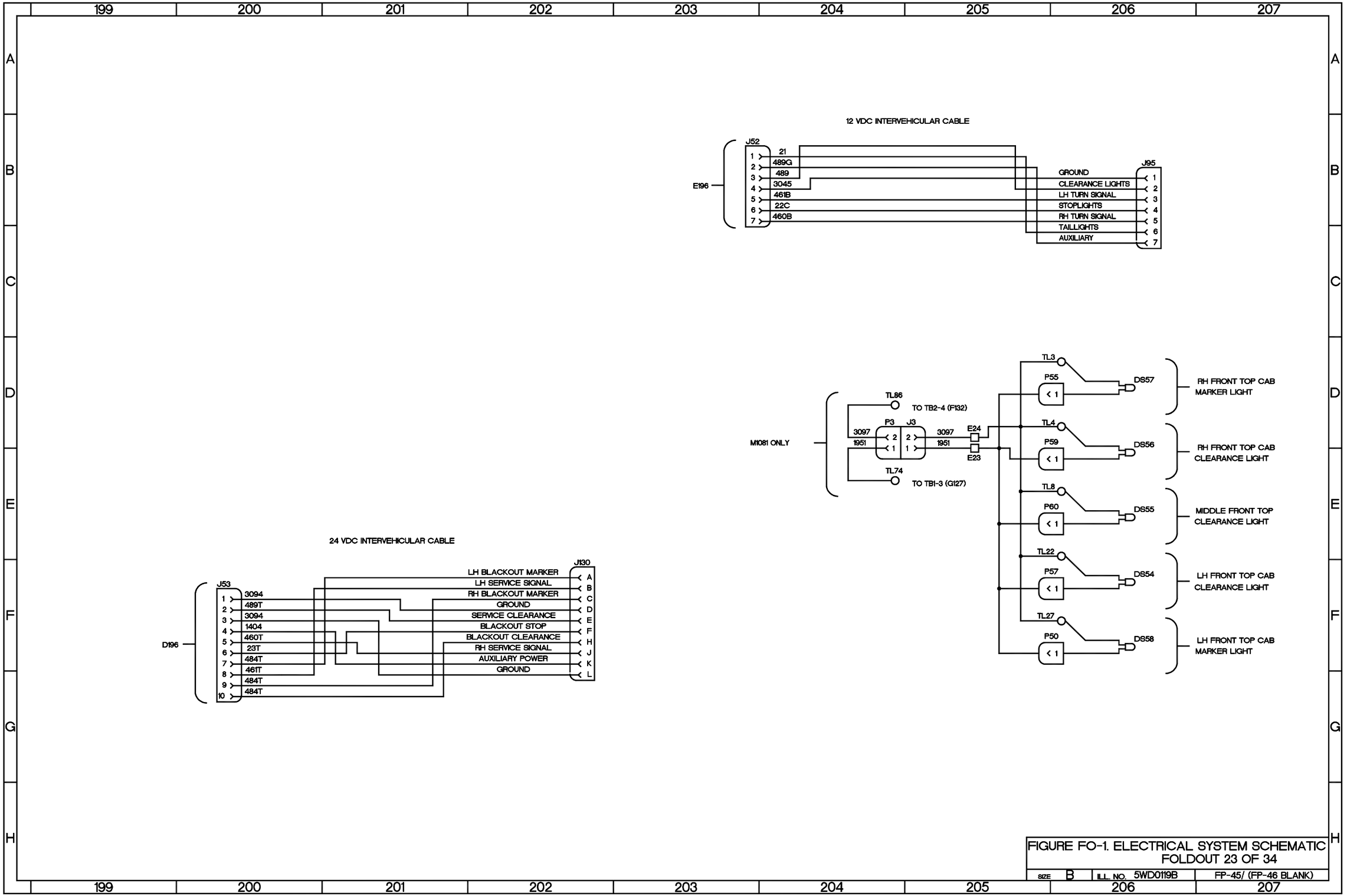



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 23 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0119B | FP-45/ (FP-46 BLANK) |

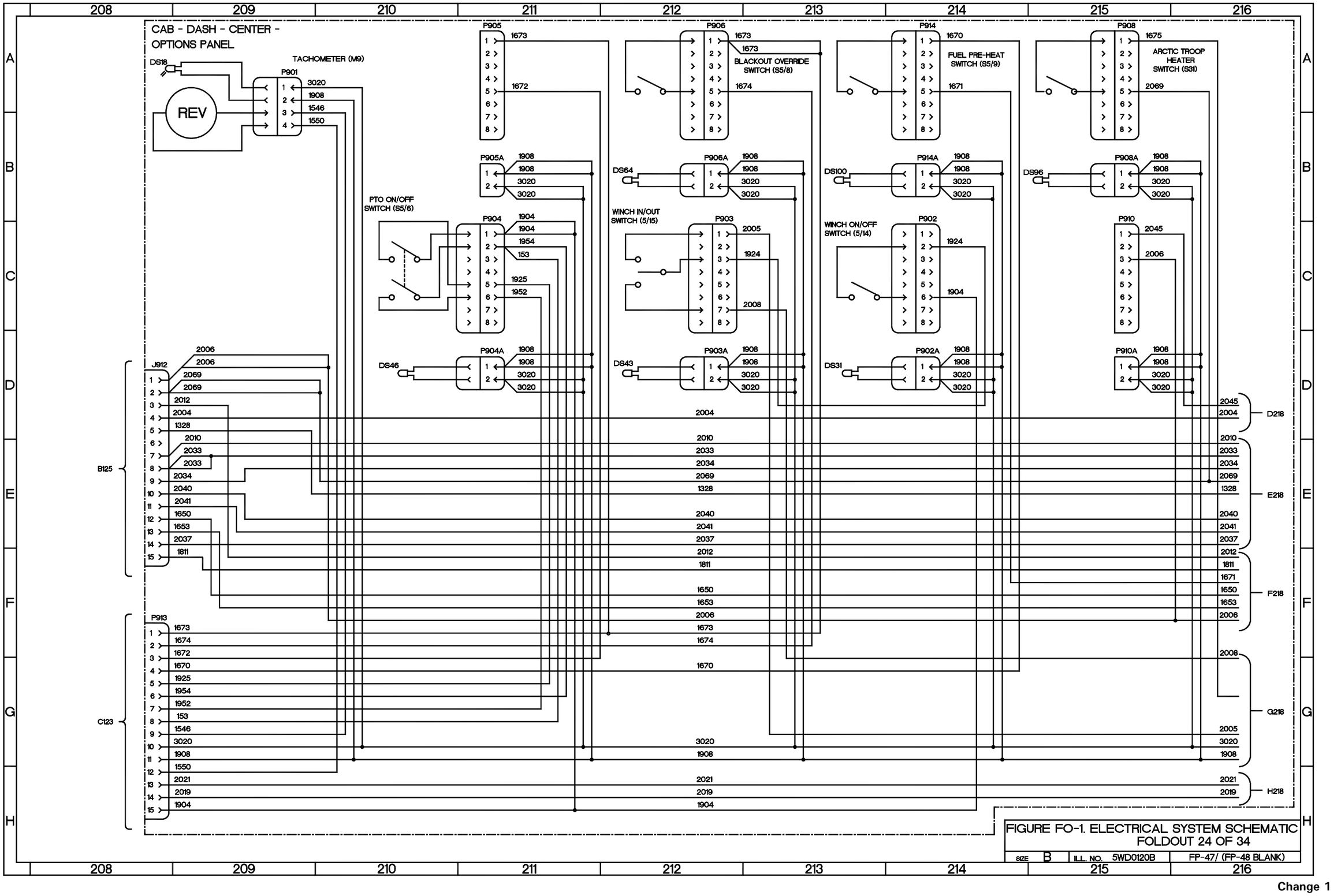



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 24 OF 34

SIZE B | ILL. NO. 5WD0120B | FP-47/ (FP-48 BLANK)

CAB - DASH - CENTER - OPTIONS PANEL

SWING FIRE PUMP SWITCH (S5/25)

P909
2007
2006
2006

DS97

P909A
1908
1908
3020
3020

P911
2044
2006
2006
2043

P911A
1908
1908
3020
3020

D216
2045
2004

E216
2010
2033
2034
2069
1328
2040
2041
2037

F216
2012
1811
1671
1650
1653
2006

G216
2008
1675
2005
3020
1908

H216
2021
2019

J108 P108

1328 1
2040 4 ← 2040 ← H 271
2041 5 ← 2041 ← H 271
2043 6
2044 7
2045 8
2033 9
2010 12 ← 2010 ← H 271
2037 13
2033 14
2069 15
2006 16 ← 2006 ← H 271
2034 18
2004 19

J210 P210

1811 1
1671 2
1650 3
2019 4
2021 6
2008 8 — C226
1675 11
2012 12
1653 13
2005 14
2007 15

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD0121B | FP-49/ (FP-50 BLANK) |

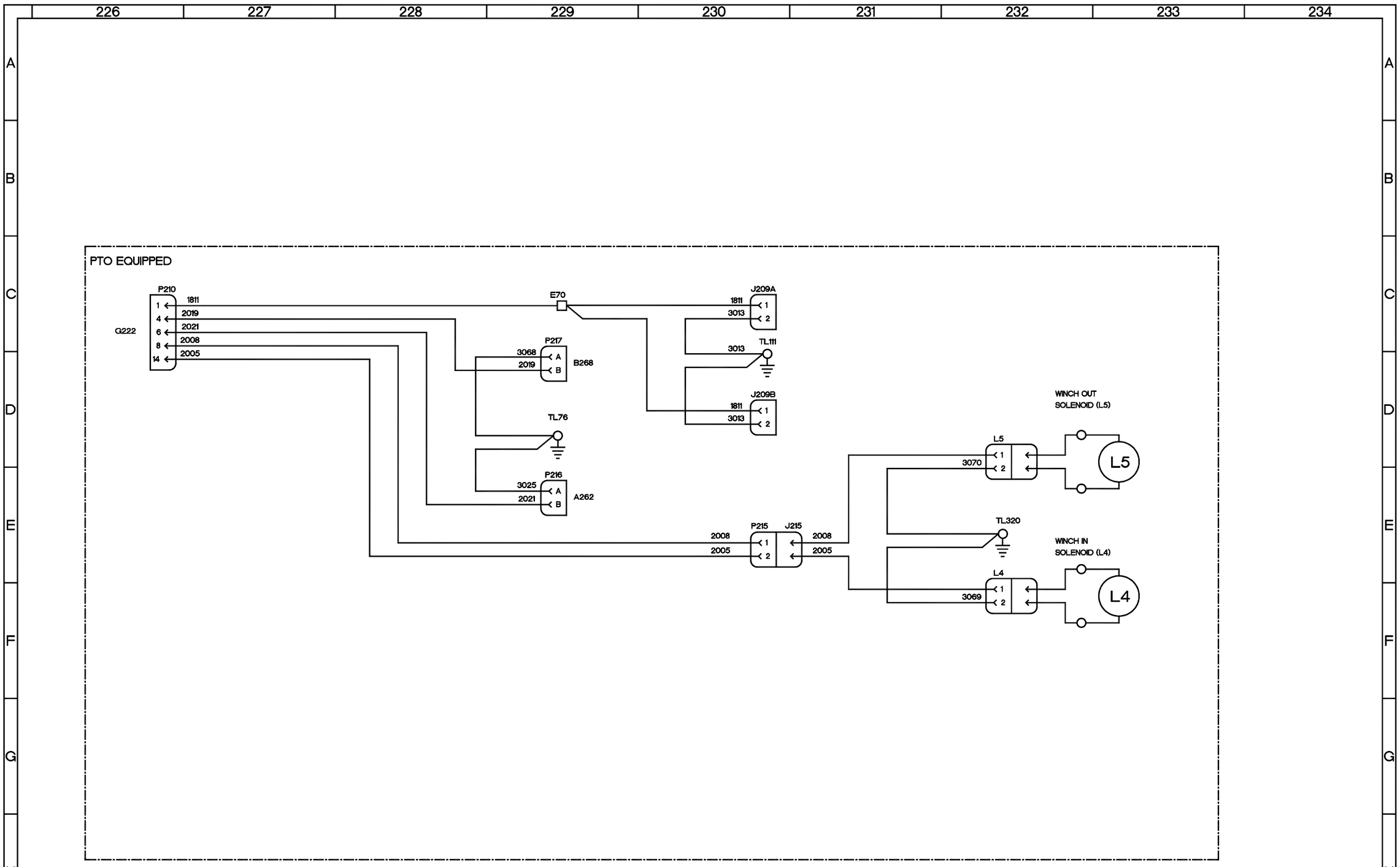



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 26 OF 34

| SIZE | ILL NO. | |
|---|---|---|
| B | 5WD0122B | FP-51/ (FP-52 BLANK) |

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 27 OF 34

SIZE B | ILL. NO. 5WD0123B | FP-53/ (FP-54 BLANK)

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 28 OF 34

SIZE B | ILL. NO. 5WD0124B | FP-55/ (FP-56 BLANK)

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 29 OF 34

SIZE B | ILL. NO. 5WD0125B | FP-57/ (FP-58 BLANK)

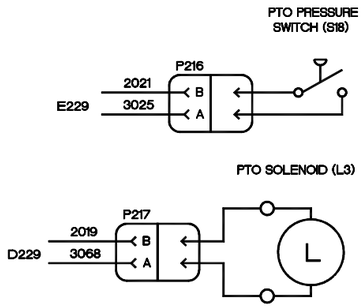



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 30 OF 34

SIZE B | ILL. NO. 5WD0126B | FP-59/ (FP-60 BLANK)

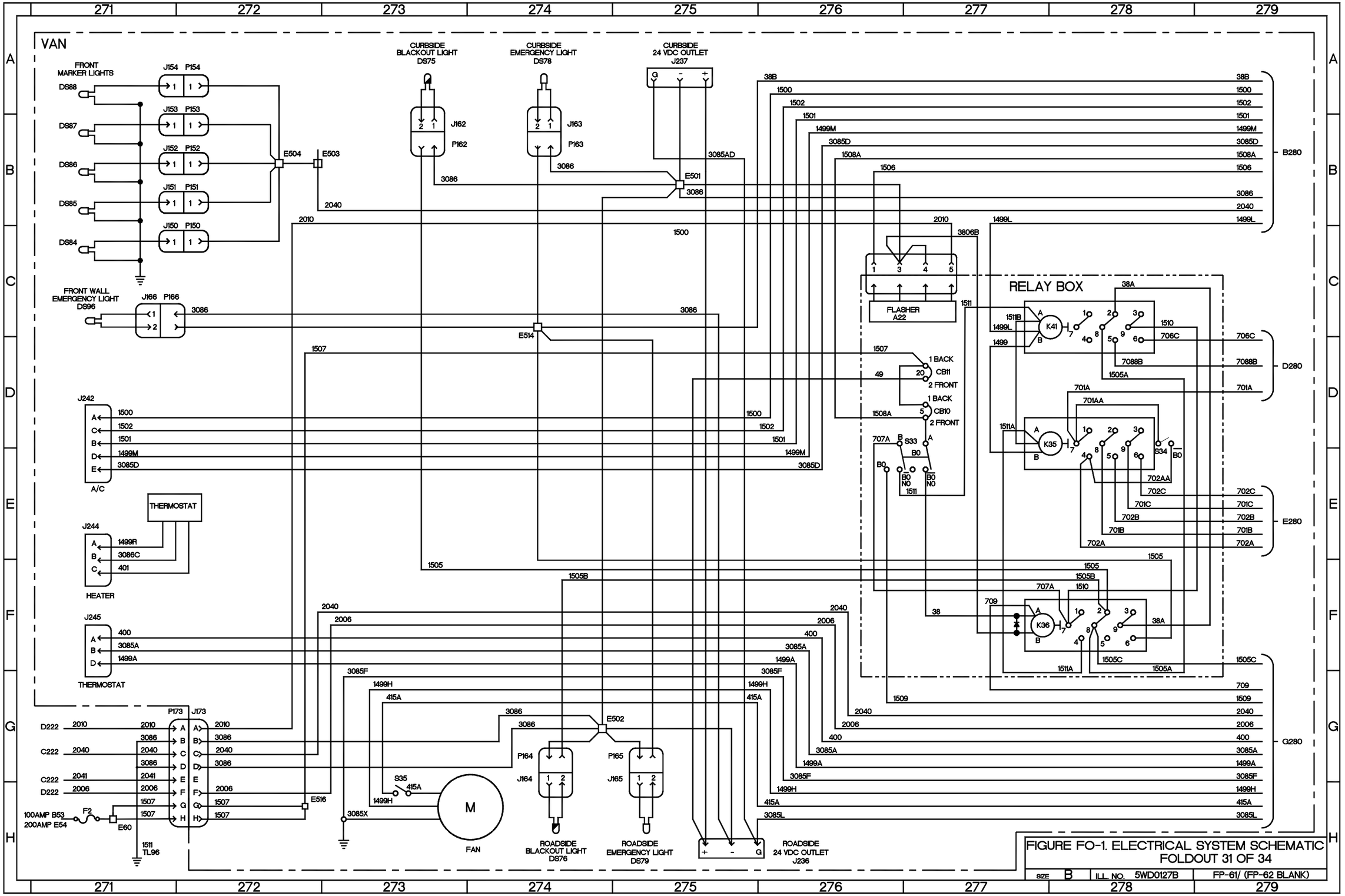



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 31 OF 34

| SIZE | ILL NO. | |
|---|---|---|
| B | 5WD0127B | FP-61/ (FP-62 BLANK) |

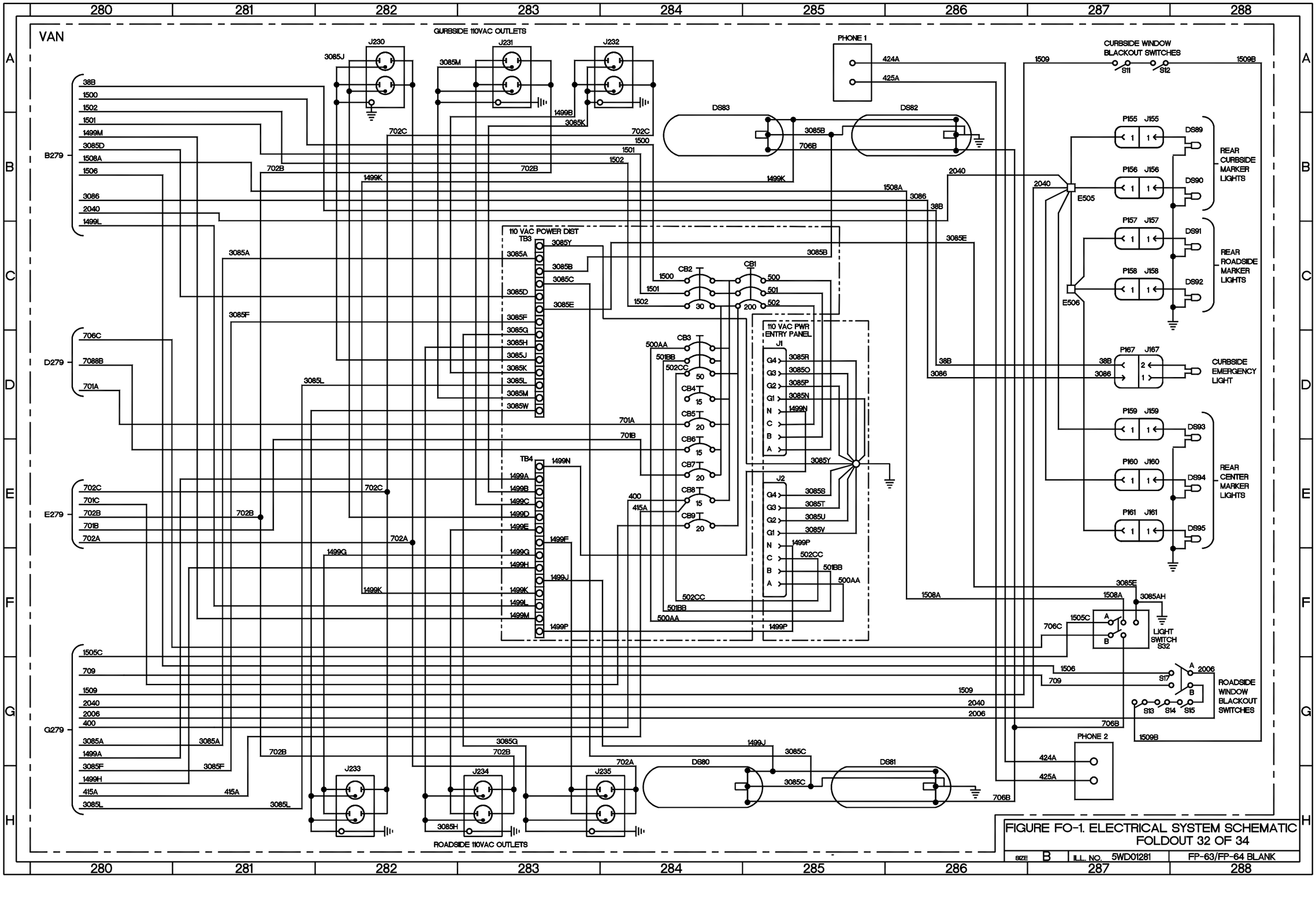



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 32 OF 34

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5WD01281 | FP-63/FP-64 BLANK |

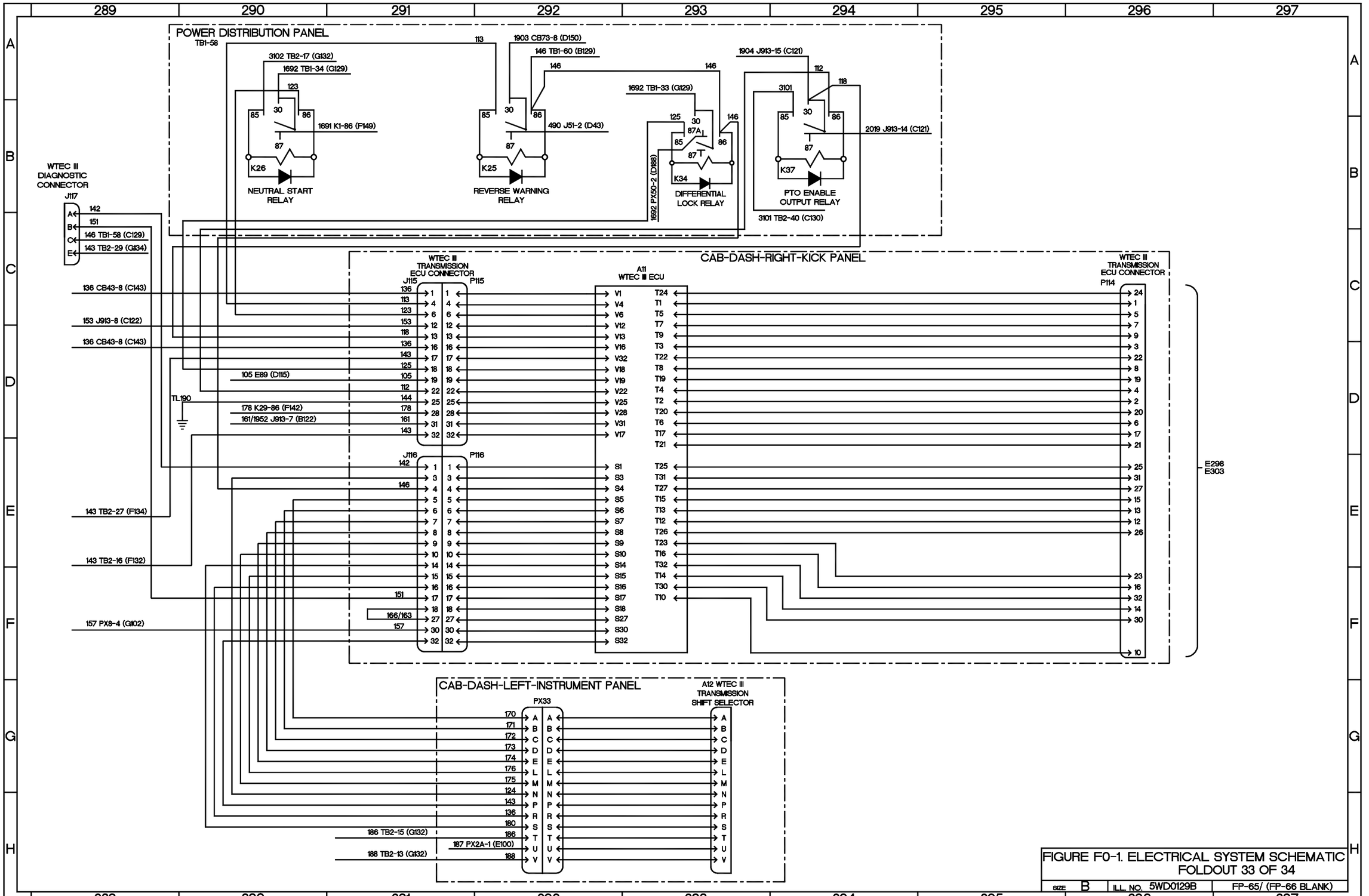


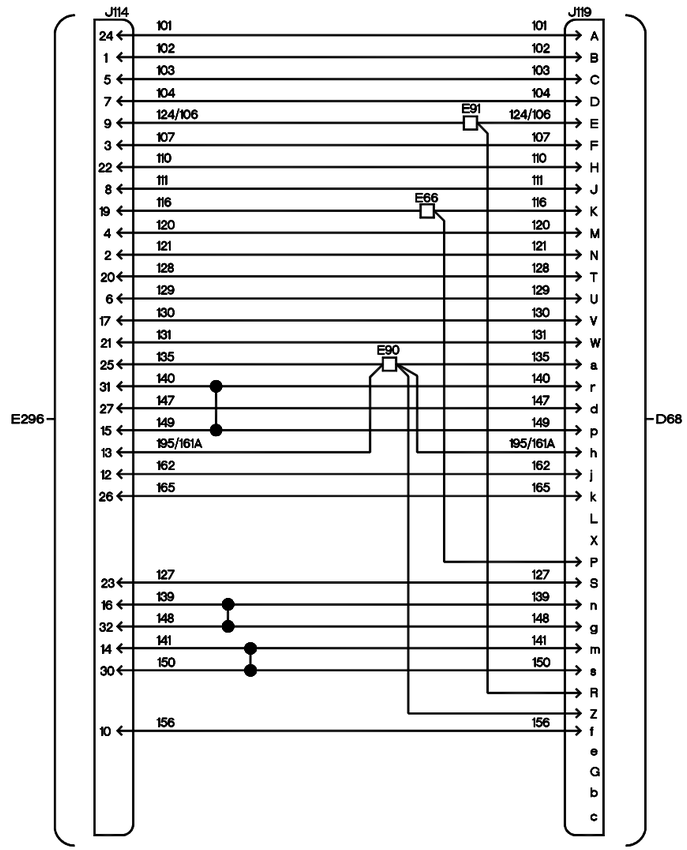

FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 33 OF 34

SIZE B | ILL. NO. 5WD0129B | FP-65/ (FP-66 BLANK)

298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306

TRANSMISSION SERIAL #: 6510090785 AND LOWER

WTEC III CAB TRANSMISSION HARNESS (TID1)




TRANSMISSION SERIAL #: 6510090786 AND HIGHER

WTEC III CAB TRANSMISSION HARNESS (TID2)

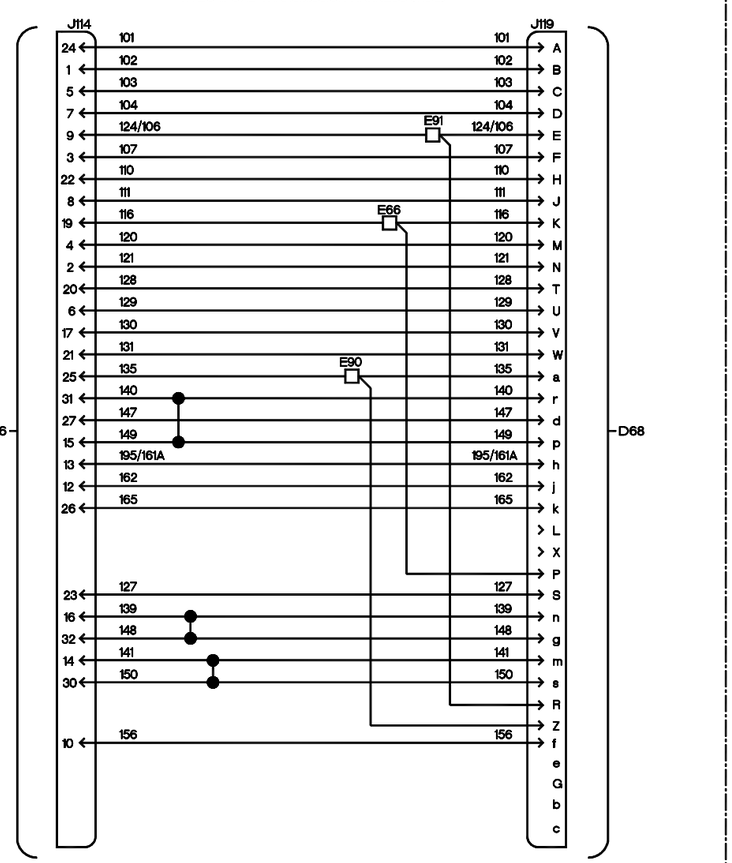



FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 34 OF 34

SIZE B | ILL. NO. 5WD0130B | FP-67/ (FP-68 BLANK)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| REAR AXLE BRAKE CHAMBER | FRONT AXLE BRAKE CHAMBER | COUPLER AIR BRAKE | AIR DRYER | AIR CLEANER INTAKE | AIR COMPRESSOR WITH GOVERNOR | AIR TANKS | DASH GAUGE |
| MANUAL VALVE | ONE WAY CHECK VALVE | FAN CLUTCH | MODULATED CONTROL VALVE | QUICK RELEASE VAVLE | TWO WAY CHECK VALVE | TIRE | PRESSURE SWITCH |
| PRESSURE RELIEF VALVE | FOOT CONTROL VALVE | PARK CONTROL VALVE (HAND OPERATED) | TRAILER AIR SUPPLY VALVE (HAND OPERATED) | LOAD SENSING VALVE (MECHANICALLY CONTROLLED) | DIRECTIONAL RELAY VALVE | CONTROL VALVE WITH TWO WAY CHECK VALVE | STOPLIGHT SWITCH |
| CONNECTION | SUPPLY AIR HOSE | NO CONNECTION | DELIVERY AIR HOSE | PARK/EMERGENCY AIR HOSE | AIR BRAKE PROTECTING VALVE | CTIS MANIFOLD VALVE | AIR BR AKE PRESSURE TRANSMITTER |
| EXH KNEELING VALVE | AIR/HYDRAULIC INVERSION VALVE | DELIVERY AIR HOSE NO CONNECTION | WHEEL VALVE | EXH BLEED VALVE | | | |

FIGURE F0-2 PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 1 OF 4

SIZE B | ILL. NO. 5PD01AL1 | FP-1/FP-2 BLANK

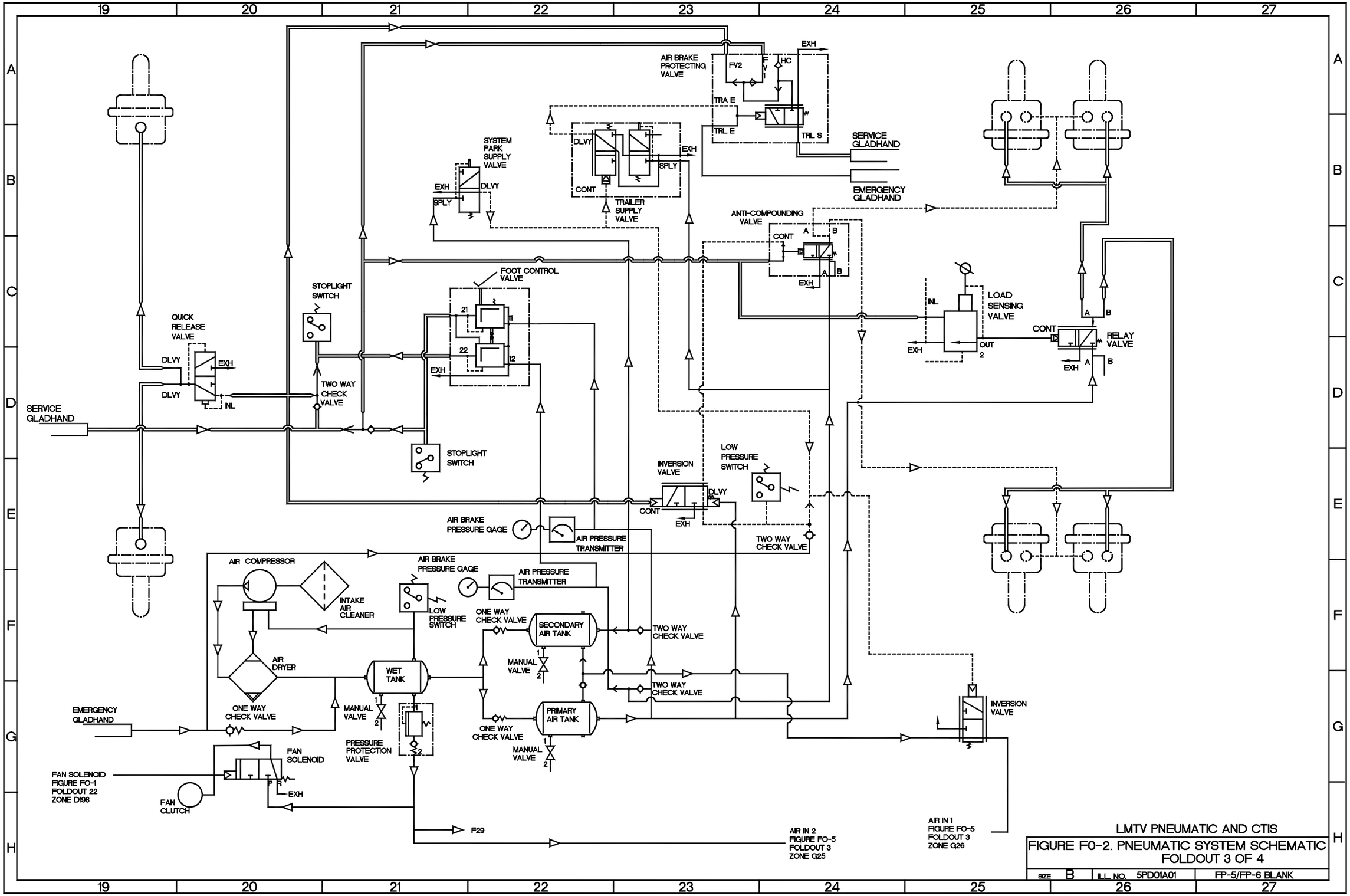
| SH | ZONE | DESCRIPTION |
|---|---|---|
| 3 | E22 | AIR BRAKE PRESSURE GAGE |
| 3 | F22 | AIR BRAKE PRESSURE GAGE |
| 3 | A23 | AIR BRAKE PROTECTING VALVE |
| 3 | F20 | AIR COMPRESSOR |
| 3 | F20 | AIR DRYER |
| 3 | E22 | AIR PRESSURE TRANSMITTER |
| 3 | E22 | AIR PRESSURE TRANSMITTER |
| 3 | C24 | ANTI-COMPOUNDING VALVE |
| 4 | E31 | CONTROL VALVE |
| 4 | E31 | CTIS MANIFOLD VALVE |
| 4 | E32 | DEFLATE VALVE |
| 3 | G19 | EMERGENCY GLADHAND |
| 3 | B24 | EMERGENCY GLADHAND |
| 3 | H20 | FAN CLUTCH |
| 3 | G20 | FAN SOLENOID |
| 3 | C22 | FOOT CONTROL VALVE |
| 3 | F20 | INTAKE AIR CLEANER |
| 3 | G25 | INVERSION VALVE |
| 3 | E23 | INVERSION VALVE |
| 4 | C28 | KNEELING VALVE |
| 4 | E28 | KNEELING VALVE |
| 3 | C25 | LOAD SENSING VALVE |
| 3 | E23 | LOW PRESSURE SWITCH |
| 3 | F21 | LOW PRESSURE SWITCH |
| 3 | F22 | MANUAL VALVE |
| 3 | G22 | MANUAL VALVE |
| 3 | G21 | MANUAL VALVE |
| 3 | F22 | ONE WAY CHECK VALVE |
| 3 | G22 | ONE WAY CHECK VALVE |
| 3 | G20 | ONE WAY CHECK VALVE |
| 3 | G21 | PRESSURE PROTECTION VALVE |
| 3 | G22 | PRIMARY AIR TANK |
| 3 | C20 | QUICK RELEASE VALVE |
| 4 | C34 | QUICK RELEASE VALVE |
| 4 | D30 | QUICK RELEASE VALVE |
| 3 | D26 | RELAY VALVE |
| 3 | F22 | SECONDARY AIR TANK |

| SH | ZONE | DESCRIPTION |
|---|---|---|
| 3 | D19 | SERVICE GLADHAND |
| 3 | B24 | SERVICE GLADHAND |
| 3 | C20 | STOPLIGHT SWITCH |
| 3 | E21 | STOPLIGHT SWITCH |
| 4 | F32 | SUPPLY VALVE |
| 3 | B21 | SYSTEM PARK SUPPLY VALVE |
| 3 | B22 | TRAILER SUPPLY VALVE |
| 3 | D21 | TWO WAY CHECK VALVE |
| 3 | E24 | TWO WAY CHECK VALVE |
| 3 | F23 | TWO WAY CHECK VALVE |
| 3 | G23 | TWO WAY CHECK VALVE |
| 3 | F21 | WET TANK |
| 4 | C29 | WHEEL VALVE |
| 4 | C33 | WHEEL VALVE |
| 4 | E29 | WHEEL VALVE |
| 4 | E33 | WHEEL VALVE |

LMTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 4

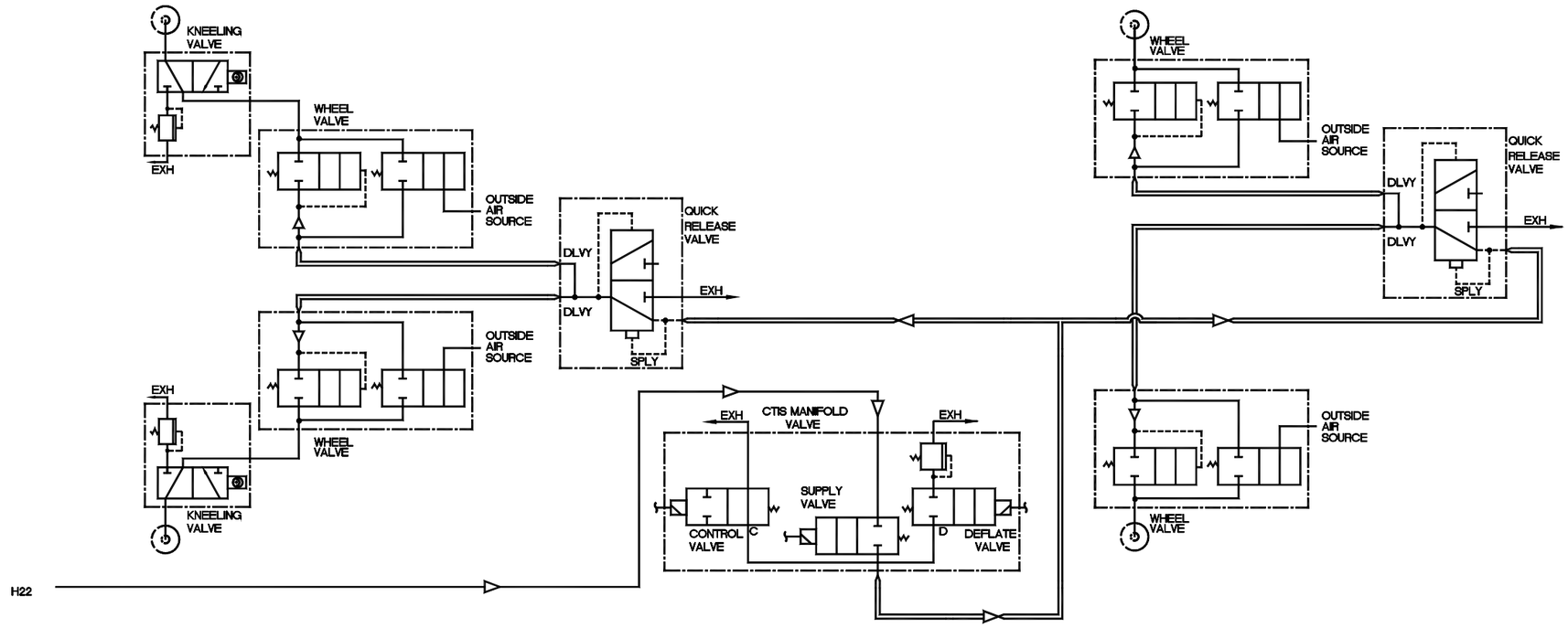
SIZE B | ILL. NO. 5PD01AL2 | FP-3/FP-4 BLANK




LMTV PNEUMATIC AND CTIS

FIGURE FO-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 3 OF 4

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5PD01A01 | FP-5/FP-6 BLANK |




LMTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 4 OF 4

| SIZE | ILL. NO. | |
|---|---|---|
| B | 5PD01A02 | FP-7/FP-8 BLANK |

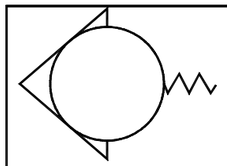
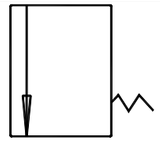
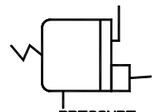
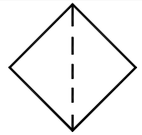
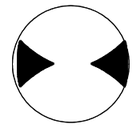
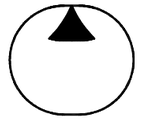
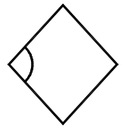
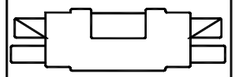
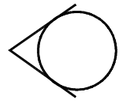
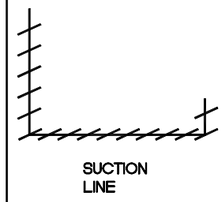
| | | | | | | |
|---|---|---|---|---|---|---|
|  CHECK VALVE |  BYPASS VALVE |  PRESSURE CONTROL VALVE |  AIR OR OIL FILTER |  MOTOR |  PUMP |  PTO |
|  AIR LINE LUBRICATOR |  CYLINDER |  CHECK VALVE |  FLOW CONTROL VALVE |  SUCTION LINE |  RESERVOIR | |

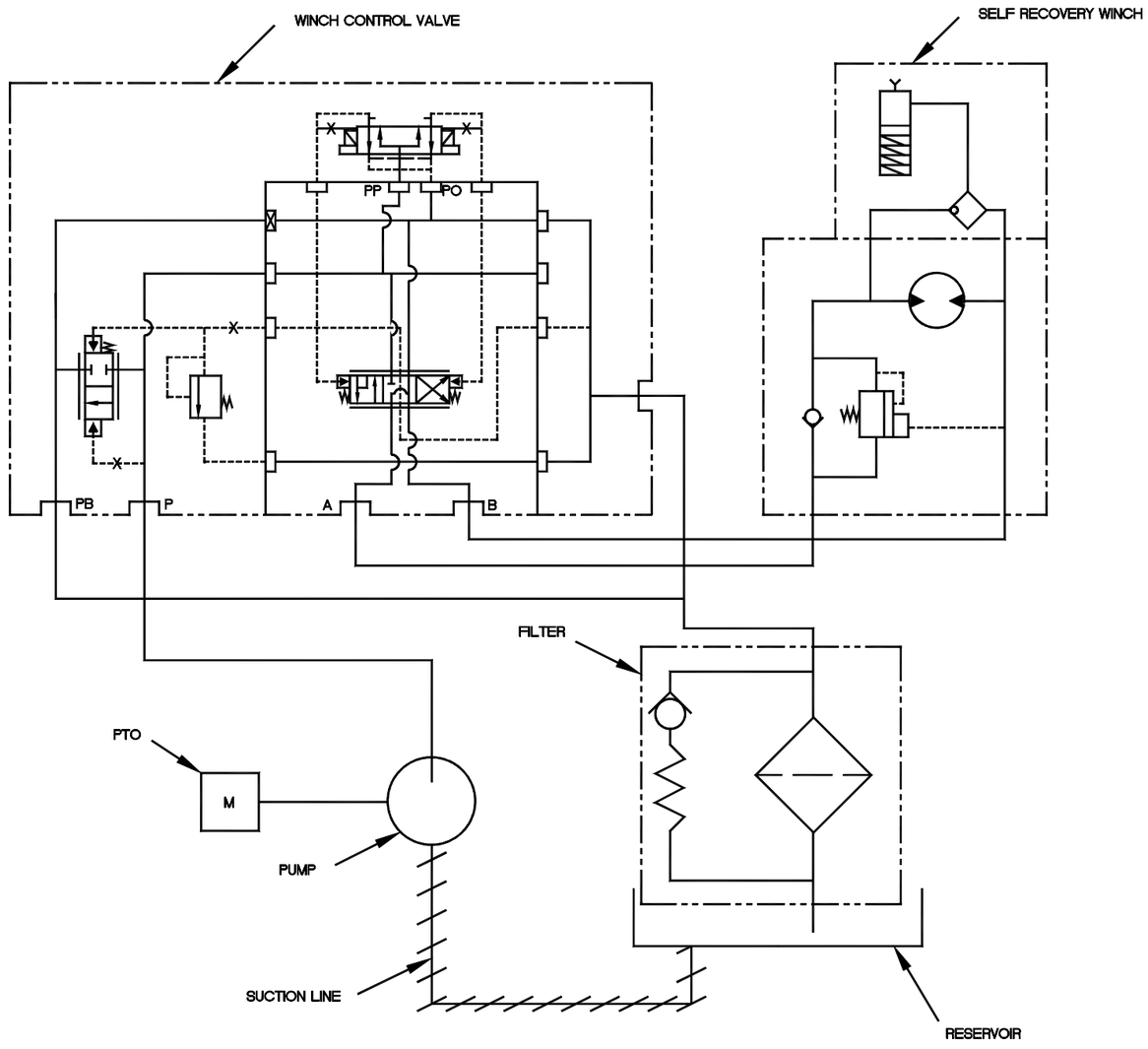
FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 1 OF 3

SIZE B | ILL. NO. 5HD01AL1 | FP-1/FP-2 BLANK

| SHEET | ZONE | DESCRIPTION |
|---|---|---|
| 3 | B21 | WINCH CONTROL VALVE |
| 3 | B24 | SELF RECOVERY WINCH |
| 3 | F21 | PTO |
| 3 | F22 | PUMP |
| 3 | E23 | FILTER |
| 3 | G23 | RESERVOIR |
| 3 | G22 | SUCTION LINE |

FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 3

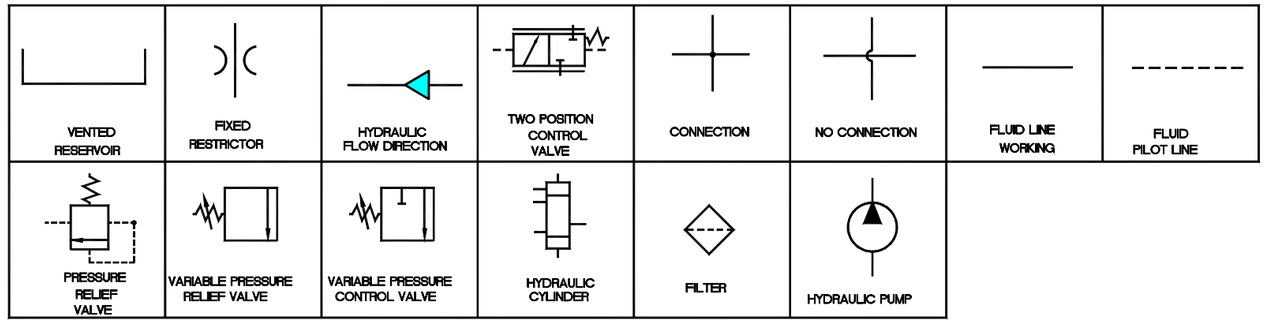
SIZE B | ILL NO. 5HD01-L2 | FP-3/FP-4 BLANK




LMTV TRUCK W/WINCH

FIGURE F0-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

SIZE B | ILL. NO. 5HD01-01 | FP-5/FP-6 BLANK




| SH | ZONE | DESCRIPTION |
|---|---|---|
| 2 | D11 | FILTER |
| 2 | D14 | FIXED RESTRICTOR |
| 2 | E17 | HYDRAULIC CYLINDER |
| 2 | E13 | HYDRAULIC PUMP |
| 2 | C13 | PRESSURE RELIEF VALVE |
| 2 | D13 | TWO POSITION CONTROL VALVE |
| 2 | E16 | VARIABLE PRESSURE CONTROL VALVE |
| 2 | E16 | VARIABLE PRESSURE RELIEF VALVE |
| 2 | C11 | VENTED RESERVOIR |

FIGURE FO-4 HYDRAULIC STEERING SYSTEM

FOLDOUT 1 OF 2

SIZE B | ILL NO. YSD01AL1 | FP-1/FP-2 BLANK

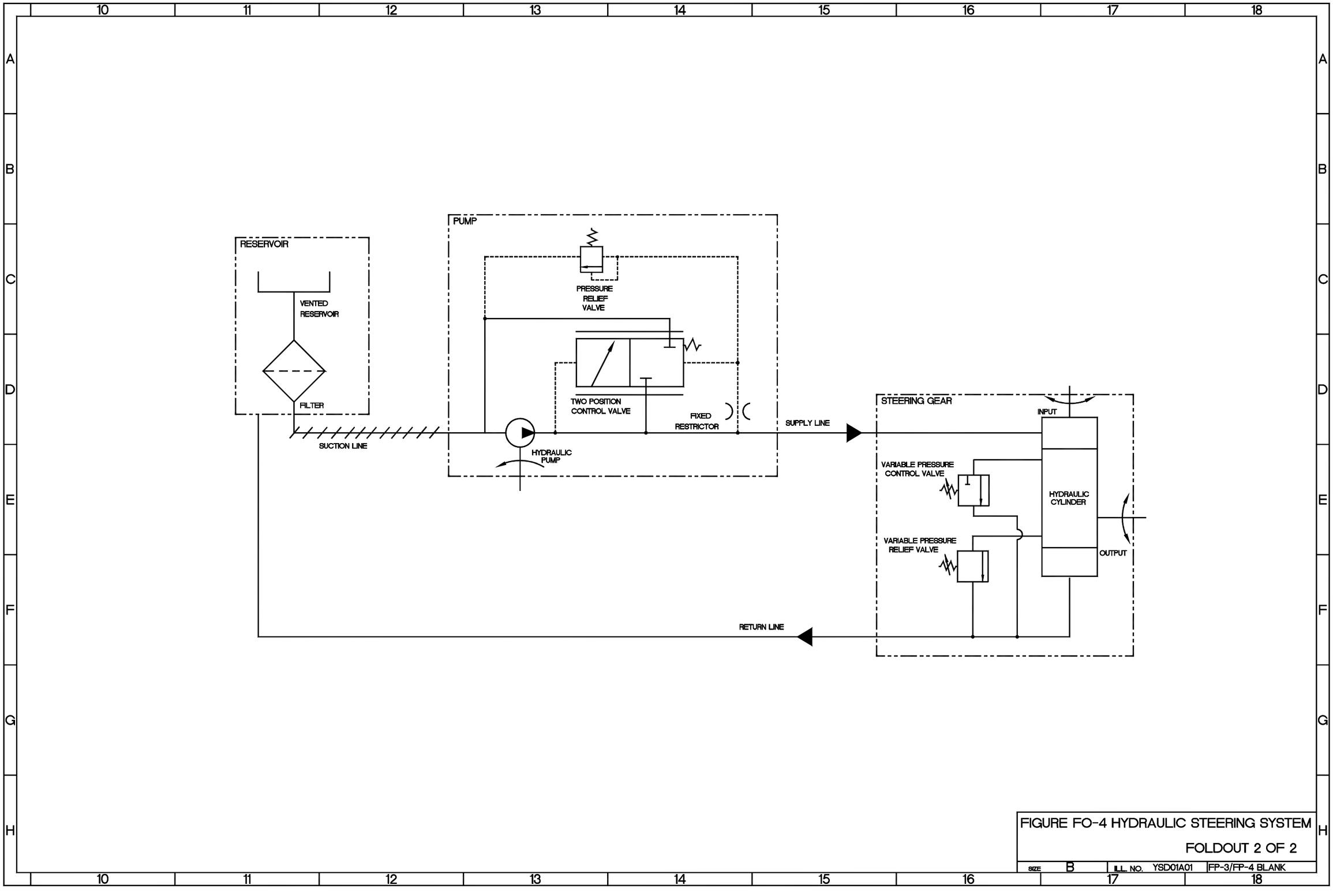



FIGURE FO-4 HYDRAULIC STEERING SYSTEM

FOLDOUT 2 OF 2

| SIZE | ILL. NO. | |
|---|---|---|
| B | YSD01A01 | FP-3/FP-4 BLANK |

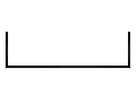
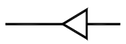
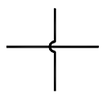
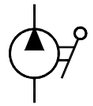
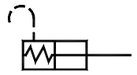
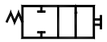
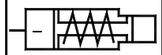
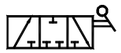
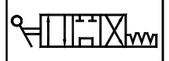
| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  VENTED RESERVOIR |  ABOVE FLUID LEVEL RESERVOIR |  HYDRAULIC FLOW DIRECTION |  PNEUMATIC FLOW DIRECTION |  CONNECTION |  NO CONNECTION |  FLUID LINE WORKING |  FLUID PILOT LINE |
|  FIXED RESTRICTOR |  CHECK VALVE |  VARIABLE CONTROL CHECK VALVE |  CHECK PILOT |  PRESSURE RELIEF VALVE |  FILTER |  HAND PUMP |  DETENT |
|  TWO POSITION CAB SUSPENSION VALVE |  MUFFLER |  HYDRAULIC CYLINDER |  CAB AIR SUSPENSION W/DAMPER |  REAR CAB LATCH |  TWO POSITION AIR PUMP VALVE |  PRESSURE INTENSIFIER |  HEIGHT CONTROL VALVE |
|  TWO POSITION CAB TILT VALVE |  TWO POSITION SUSPENSION VALVE |  TWO POSITION SPARE TIRE VALVE |  THREE POSITION SELECTION VALVE | | | | |

FIGURE F0-5 AIR TRANSPORTABILITY
HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC

FOLDOUT 1 OF 3

SIZE B | ILL NO. YAD01AL1 | FP-1/FP-2 BLANK

| SH | ZONE | DESCRIPTION |
|---|---|---|
| 3 | A25 | CAB AIR SUSPENSION W/DAMPER |
| 3 | F21 | CHECK PILOT |
| 3 | A22 | CHECK VALVE |
| 3 | A23 | CHECK VALVE |
| 3 | B22 | CHECK VALVE |
| 3 | B23 | CHECK VALVE |
| 3 | B25 | CHECK VALVE |
| 3 | C20 | CHECK VALVE |
| 3 | C21 | CHECK VALVE |
| 3 | E19 | CHECK VALVE |
| 3 | E24 | CHECK VALVE |
| 3 | E25 | CHECK VALVE |
| 3 | F19 | CHECK VALVE |
| 3 | F21 | CHECK VALVE |
| 3 | G21 | CHECK VALVE |
| 3 | A22 | FILTER |
| 3 | B22 | FILTER |
| 3 | A24 | FILTER |
| 3 | B24 | FILTER |
| 3 | D19 | FILTER |
| 3 | D20 | FILTER |
| 3 | D21 | FILTER |
| 3 | E19 | FILTER |
| 3 | G19 | FILTER |
| 3 | G21 | FILTER |
| 3 | A22 | FIXED RESTRICTOR |
| 3 | B22 | FIXED RESTRICTOR |
| 3 | A23 | FIXED RESTRICTOR |
| 3 | B23 | FIXED RESTRICTOR |
| 3 | F19 | HAND PUMP |
| 3 | B25 | HEIGHT CONTROL VALVE |
| 3 | B22 | HYDRAULIC CYLINDER |
| 3 | B23 | HYDRAULIC CYLINDER |
| 3 | C21 | HYDRAULIC CYLINDER |
| 3 | F20 | MUFFLER |
| 3 | F21 | PRESSURE INTENSIFIER |
| 3 | F19 | PRESSURE RELIEF VALVE |
| 3 | A24 | REAR CAB LATCH |
| 3 | E21 | THREE POSITION SELECTION VALVE |
| 3 | D26 | TWO POSITION AIR PUMP VALVE |
| 3 | D25 | TWO POSITION CAB SUSPENSION VALVE |
| 3 | C24 | TWO POSITION CAB TILT VALVE |
| 3 | C23 | TWO POSITION SPARE TIRE VALVE |
| 3 | D21 | TWO POSITION SUSPENSION VALVE |
| 3 | G22 | VARIABLE CONTROL CHECK VALVE |
| 3 | G22 | VENTED RESERVOIR |

FIGURE F0-5 AIR TRANSPORTABILITY
HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 3

SIZE B | ILL NO. YAD01AL2 | FP-3/FP-4 BLANK

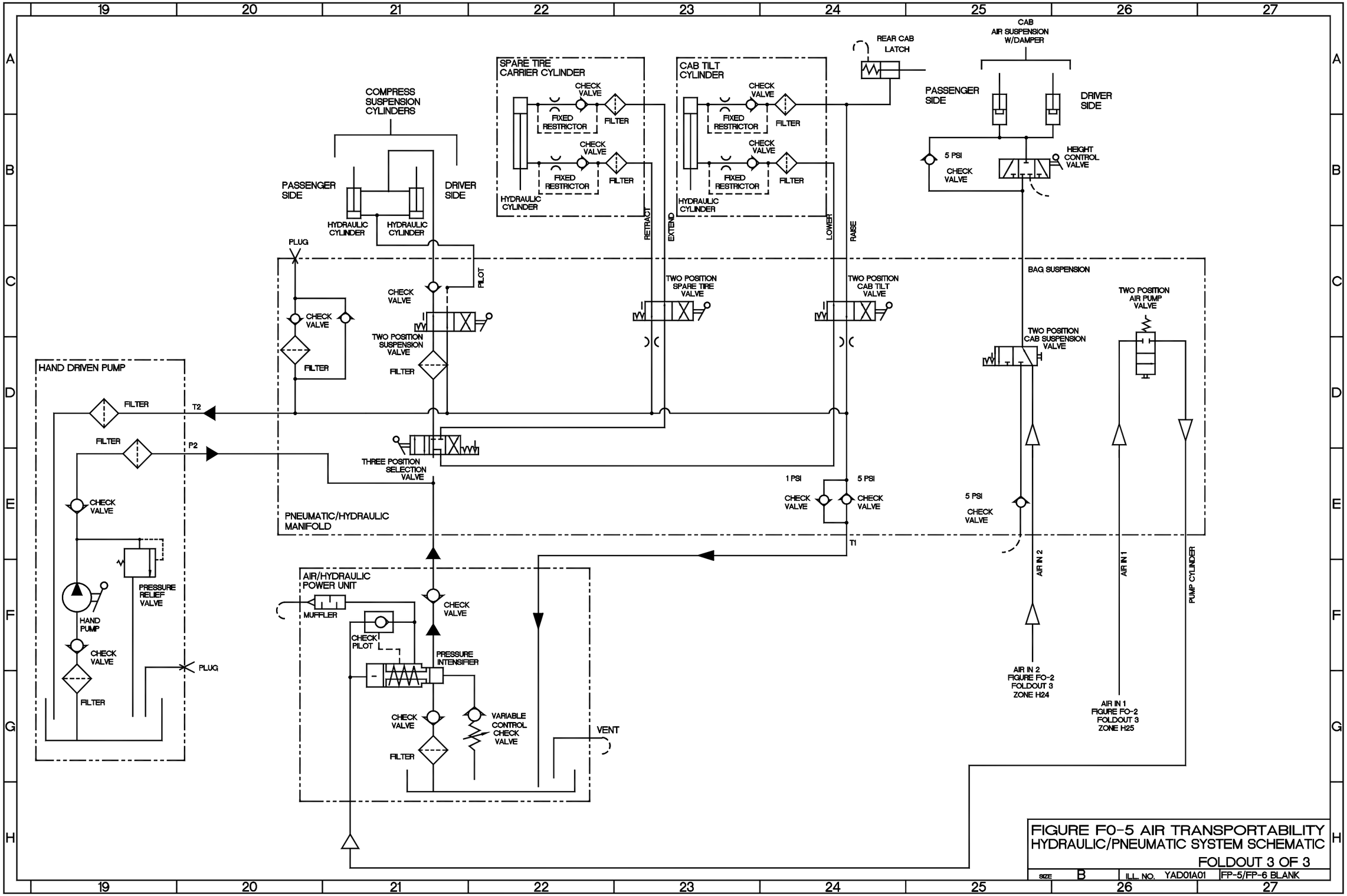



FIGURE FO-5 AIR TRANSPORTABILITY HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

SIZE B | ILL NO. YAD01A01 | FP-5/FP-6 BLANK

## 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

### 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

### 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

### CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

### LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

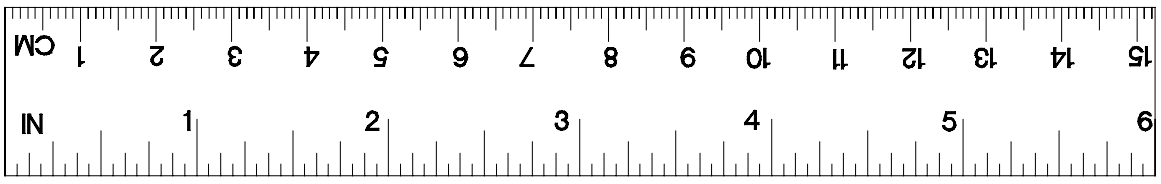
### TEMPERATURE

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 |
| Inches | Millimeters | 25.4 |
| 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 | 29.57 |
| Pints | Liters | 0.473 |
| Quarts | Liters | 0.946 |
| Gallons | Liters | 3.785 |
| Ounces | Grams | 28.35 |
| Pounds | Kilograms | 0.454 |
| Pounds (force) | Newtons | 4.448 |
| 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 |
| Millimeters | Inches | 0.0394 |
| 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 |
| Newtons | Pounds (force) | 0.2248 |
| 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 |




YMET001A

PIN: 074407-000