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

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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.
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.

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.

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.

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.

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

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

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

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

VOLUME NO. 2 OF 5

TM 9-2320-365-20-2, 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.
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Official:

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Administrative Assistant to the
Secretary of the Army
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HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington, D.C., 20 AUGUST 2005

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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.
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Place this change sheet in the front of the publication for reference purposes.
By Order of the Secretary of the Army:

JOHN M. KEANE
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0110103

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Dates of issue for original and changed pages are:
Original .............................. 0...... 17 June 1998
Change ................................. 1........ 1 July 2003
Change ................................. 2........ 20 August 2005
Change ................................. 3........ 10 February 2006

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NO. 9-2320-365-20-2

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

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

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

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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. 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.** This chapter contains the continuation of the troubleshooting tables.
- **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.

• 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 2 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, PMCS. 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 22. 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.
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VEHICLE MAINTENANCE (CONT)

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e99. M1079 FAN DOES NOT OPERATE

INITIAL SETUP

Equipment Condition
Engine shut down (TM 9-2320-365-10).
AC power disconnected (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)

KNOWLED INFO
Fluorescent lights OK.

POSSIBLE PROBLEMS
Faulty circuit breaker CB8.
Faulty fan switch S35.
Faulty fan.
Faulty wire 415.
Faulty wire 415A.
Faulty wire 1499H.
Faulty wire 3085X.
Faulty wire 3085F.
Faulty wire 3085Z.

START

1. Is continuity present across circuit breaker CB8?

YES

NO

Replace circuit breaker CB8 (para 16-64).

TEST OPTIONS
Continuity Test or STE/ICE-R #91

REASON FOR QUESTION
If continuity is not present, circuit breaker CB8 is faulty.
CONTINUITY TEST

(1) Remove six screws and 110/208 VAC POWER DISTRIBUTION PANEL cover from power distribution panel.
(2) Remove circuit breaker CB8 from power distribution panel.
(3) Position circuit breaker CB8 to ON.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to output terminal of circuit breaker CB8.
(6) Connect negative (-) probe of multimeter to input terminal of circuit breaker CB8 and note reading on multimeter.
(7) If continuity is not present, replace circuit breaker CB8 (para 16-64).
(8) Install circuit breaker CB8 in power distribution panel.
2. Is continuity present across fan switch S35?
   - **YES**: Replace fan switch S35 (para 16-54).
   - **NO**: If continuity is not present, fan switch S35 is faulty.

3. Is 30-40 ohms resistance present from fan connector terminal 2 to fan connector terminal 4?
   - **YES**: Replace fan (para 16-67).
   - **NO**: If resistance is too high or too low, fan is faulty.
CONTINUITY TEST

1. Remove two screws and cover from outlet box.
2. Remove two screws and fan switch S35 from outlet box.
3. Position fan switch S35 to ON.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to lower terminal of fan switch S35.
6. Connect negative (-) probe of multimeter to upper terminal of fan switch S35 and note reading on multimeter.
7. If continuity is not present, replace fan switch S35 (para 16-54).

RESISTANCE TEST

1. Remove fan assembly (para 16-67).
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to fan connector terminal 4 screw.
4. Connect negative (-) probe of multimeter to fan connector terminal 2 screw and note reading on multimeter.
5. If 30-40 ohms resistance is not present, replace fan (para 16-67).
4. **Is continuity present on wire 415 from circuit breaker CB8 to fan switch S35 outlet box?**

   **YES**
   - Repair or replace wire 415 (para 2-40).

   **NO**
   - Test Options: Continuity Test or STE/ICE-R #91
     - Reason for Question: If continuity is not present, wire 415 is faulty.

---

5. **Is continuity present on wire 415A from one end to the other?**

   **YES**
   - Repair or replace wire 415A (para 2-40).

   **NO**
   - Test Options: Continuity Test or STE/ICE-R #91
     - Reason for Question: If continuity is not present, wire 415A is faulty.

---

**Known Info**
- Fluorescent lights OK.
- Circuit breaker CB8 OK.
- Fan switch S35 OK.
- Fan OK.

**Possible Problems**
- Faulty wire 415.
- Faulty wire 415A.
- Faulty wire 1499H.
- Faulty wire 3085X.
- Faulty wire 3085F.
- Faulty wire 3085Z.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to output terminal of circuit breaker CB8.
(3) Connect negative (-) probe of multimeter to wire 415 terminal lug in fan switch S35 outlet box and note reading on multimeter.
(4) If continuity is not present, repair or replace 415 (para 2-40).

CONTINUITY TEST

(1) Loosen terminal 4 screw on fan terminal board.
(2) Remove wire 415A from fan terminal board.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 415A terminal lug.
(5) Connect negative (-) probe of multimeter to other end of wire 415A and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 415A (para 2-40).
(7) Position wire 415A in fan terminal board.
(8) Tighten terminal 4 screw on fan terminal board.
6. Is continuity present on wire 1499H from one end to the other?

**KNOWN INFO**
- Fluorescent lights OK.
- Circuit breaker CB8 OK.
- Fan switch S35 OK.
- Fan OK.
- Wire 415 OK.
- Wire 415A OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1499H.
- Faulty wire 3085X.
- Faulty wire 3085F.
- Faulty wire 3085Z.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- REASON FOR QUESTION
  - If continuity is not present, wire 1499H is faulty.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- REASON FOR QUESTION
  - If continuity is not present, wire 1499H is faulty.

7. Is continuity present on wire 1499H from power distribution panel to fan switch S35 outlet box?

**KNOWN INFO**
- Fluorescent lights OK.
- Circuit breaker CB8 OK.
- Fan switch S35 OK.
- Fan OK.
- Wire 415 OK.
- Wire 415A OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1499H.
- Faulty wire 3085X.
- Faulty wire 3085F.
- Faulty wire 3085Z.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- REASON FOR QUESTION
  - If continuity is not present, wire 1499H is faulty.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- REASON FOR QUESTION
  - If continuity is not present, wire 1499H is faulty.
CONTINUITY TEST

(1) Loosen screw in terminal board TB4.
(2) Remove wire 1499H from terminal board TB4.
(3) Set multimeter to ohms.
(4) Connect positive (+) multimeter to wire 1499H.
(5) Connect negative (-) probe of multimeter to wire 1499H and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 1499H (para 2-40).
(7) Position wire 1499H in terminal board.
(8) Tighten screw in terminal board TB4.

CONTINUITY TEST

(1) Loosen screw on fan terminal board.
(2) Remove wire 1499H from fan terminal board.
(3) Set multimeter to ohms.
(4) Connect positive (+) multimeter to wire 1499H.
(5) Connect negative (-) probe of multimeter to wire 1499H and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 1499H (para 2-40).
(7) Position wire 1499H in fan terminal board.
(8) Tighten screw on fan terminal board.
8. Is continuity present on wire 3085X from one end to the other?

- **YES**: Repair or replace wire 3085X (para 2-40).
- **NO**: If continuity is not present, wire 3085X is faulty.

**KNOWN INFO**
- Fluorescent lights OK.
- Circuit breaker CB8 OK.
- Fan switch S35 OK.
- Fan OK.
- Wire 415 OK.
- Wire 415A OK.
- Wires 1499H OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085X.
- Faulty wire 3085F.
- Faulty wire 3085Z.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085X is faulty.
CONTINUITY TEST

(1) Loosen terminal 1 screw on fan terminal board.
(2) Remove wire 3085X from fan terminal board.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085X terminal lug.
(5) Connect negative (-) probe of multimeter to other end of wire 3085X and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 3085X.
(7) Position wire 3085X in fan terminal board.
(8) Tighten terminal 1 screw on fan terminal board.
9. Is continuity present on wire 3085F from power distribution panel to fan switch S35 outlet box?

**KNOWN INFO**
- Fluorescent lights OK.
- Circuit breaker CB8 OK.
- Fan switch S35 OK.
- Fan OK.
- Wire 415 OK.
- Wire 415A OK.
- Wires 1499H OK.
- Wire 3085X OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085F.
- Faulty wire 3085Z.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085F is faulty. If continuity is present, wire 3085Z is faulty.

**YES**
- Repair or replace wire 3085F (para 2-40).

**NO**
- Repair or replace wire 3085Z (para 2-40).
CONTINUITY TEST

(1) Loosen screw in terminal board TB3.
(2) Remove wire 3085F from terminal board TB3.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085F in power distribution panel.
(5) Connect negative (-) probe of multimeter to wire 3085F terminal lug in fan switch S35 outlet box and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 3085F (para 2-40).
(7) If continuity is present, repair or replace wire 3085Z (para 2-40).
(8) Position wire 3085F in terminal board TB3.
(9) Tighten screw in terminal board TB3.
(10) Position wire 1499H in terminal board TB4.
(11) Tighten screw in terminal board TB4.
(12) Install 110/208 VAC POWER DISTRIBUTION PANEL cover on power distribution panel with six screws.
(13) Install fan assembly (para 16-67).
**INITIAL SETUP**

<table>
<thead>
<tr>
<th>Equipment Condition</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required (2)</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
</tbody>
</table>

**REFERENCES**

- TM 9-4910-571-12&P

---

**KNOWN INFO**

- Cab clearance and marker lights OK.
- **POSSIBLE PROBLEMS**
  - Faulty wire 2040.
  - Faulty M1079 12/24 vdc power cable.
  - Faulty auxiliary panel cable assembly.
  - Faulty dashboard cable assembly.

**TEST OPTIONS**

- Voltage Test or STE/ICE-R #89

**REASON FOR QUESTION**

- If 12 vdc is present, wire 2040 between connector J173C and connector splice is faulty.

---

**START**

**WARNING**

1. Read WARNING on following page.

**Is 12 vdc present on connector P173C?**

**NO**

**YES**

- Go to step 2 of this fault.

- Repair or replace wire 2040 (para 2-40).
WARNING

Remove 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 P173 from connector J173.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector P173C.
(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 or replace wire 2040 between connector J173 and connector splice (para 2-40).
(7) Position main light switch to OFF (TM 9-2320-365-10).
2. Is continuity present from connector P173C to connector P108-4?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cab clearance and marker lights OK. Wire 2040 OK.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
</tr>
<tr>
<td>Faulty M1079 12/24 vdc power cable. Faulty auxiliary panel cable assembly. Faulty dashboard cable assembly.</td>
</tr>
</tbody>
</table>

If continuity is not present, wire 2040 is faulty.

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 2040 is faulty.</td>
</tr>
</tbody>
</table>

YES

Repair wire 2040 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).

NO

3. Is continuity present from connector J108-4 to connector J912-10?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cab clearance and marker lights OK. Wire 2040 OK. M1079 12/24 vdc power cable OK.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
</tr>
<tr>
<td>Faulty auxiliary panel cable assembly. Faulty dashboard cable assembly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 2040 in auxiliary panel cable assembly is faulty. If continuity is present, wire 2040 in dashboard cable assembly is faulty.</td>
</tr>
</tbody>
</table>

YES

Repair wire 2040 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).

NO

Repair wire 2040 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly or 7-11).
CONTINUITY TEST

(1) Remove kick panel (para 16-3).
(2) Disconnect connector P108 from connector J108.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P173C.
(5) Connect negative (-) probe of multimeter to connector P108-4 and note reading on multimeter.
(6) If continuity is not present, repair wire 2040 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
(7) Connect connector P173 to connector J173.

CONTINUITY TEST

(1) Remove personnel heater (para 18-9).
(2) Disconnect connector J912 from connector P912.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector J108-4.
(5) Connect negative (-) probe of multimeter to connector J912-10 and note reading on multimeter.
(6) If continuity is not present, repair wire 2040 (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).
(7) If continuity is present, repair wire 2040 (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 J912 to connector P912.
(9) Connect connector P108 to connector J108.
(10) Install personnel heater (para 18-9).
e101. M1079 VAN BODY CLEARANCE/MARKER LIGHT 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
Lockwasher (4) (Item 77, Appendix G)
Gasket (2) (Item 28, Appendix G)

Personnel Required
(2)

References
TM 9-4910-571-12&P

**KNOWN INFO**

Other clearance and marker lights illuminate.

**POSSIBLE PROBLEMS**

Faulty marker light lamp.
Faulty clearance/marker light.
Faulty wire 2040.

**TEST OPTIONS**

Continuity Test or
STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, marker light lamp is faulty.

1. Is continuity present through marker light lamp?

   **START**

   **NO**

   Replace marker light lamp (para 16-60).

   **YES**
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 16-60).
(6) Install marker light lamp in socket.
e101. M1079 VAN BODY CLEARANCE/MARKER LIGHT DOES NOT ILLUMINATE (CONT)

**WARNING**

**CAUTION**

Read WARNING and CAUTION on following page.

2. Is 12 VDC present at connector "P"?

**REASON FOR QUESTION**

If 12 VDC is not present, wire 2040 is faulty. If 12 VDC is present, M1079 clearance/marker light is faulty.

**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**KNOWN INFO**

Other clearance and marker lights illuminate.
Cab marker light lamp OK.

**POSSIBLE PROBLEMS**

Faulty clearance/marker light.
Faulty wire 2040.

**YES**

Replace M1079 clearance/marker light (para 16-60).

**NO**

Repair or replace wire 2040 from connector "P" to splice (refer to Table 2-13. Van Body Clearance/Marker Light Location, Connector Number, and Splice) (para 2-40).
WARNING

Remove 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, lockwashers, and marker light base from van body. Discard lockwashers.
(2) Disconnect connector "P" from connector 489.
(3) Remove gasket from marker light base. Discard gasket.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector "P" (refer to Table 2-13. Van Body Clearance/Marker Light Location, Connector Number, and Splice).
(6) Connect negative (-) probe of multimeter to ground.
(7) Position main light switch to SER DRIVE (TM 9-2320-365-10) and note reading on multimeter.
(8) If 12 VDC is not present, repair or replace wire 2040 from connector "P" to splice (refer to Table 2-13. Van Body Clearance/Marker Light Location, Connector Number, and Splice) (para 2-40).
(9) If 12 VDC is present, replace M1079 clearance/marker light (para 16-60).
(10) Position main light switch to OFF (TM 9-2320-365-10).
(11) Install gasket on marker light base.
(12) Connect connector "P" (refer to Table 2-13. Van Body Clearance/Marker Light Location, Connector Number, and Splice) to connector 489.

Table 2-13. Van Body Clearance/Marker Light Location, Connector Number, and Splice

<table>
<thead>
<tr>
<th>Location</th>
<th>Connector Number</th>
<th>Splice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Front</td>
<td>P150</td>
<td>E504</td>
</tr>
<tr>
<td>Left Front Center</td>
<td>P151</td>
<td>E504</td>
</tr>
<tr>
<td>Front Center</td>
<td>P152</td>
<td>E504</td>
</tr>
<tr>
<td>Right Front Center</td>
<td>P153</td>
<td>E504</td>
</tr>
<tr>
<td>Right Front</td>
<td>P154</td>
<td>E504</td>
</tr>
<tr>
<td>Left Side Rear</td>
<td>P155</td>
<td>E505</td>
</tr>
<tr>
<td>Left Rear</td>
<td>P156</td>
<td>E505</td>
</tr>
<tr>
<td>Left Rear Center</td>
<td>P157</td>
<td>E506</td>
</tr>
<tr>
<td>Rear Center</td>
<td>P158</td>
<td>E506</td>
</tr>
<tr>
<td>Right Rear Center</td>
<td>P159</td>
<td>E505</td>
</tr>
<tr>
<td>Right Rear</td>
<td>P160</td>
<td>E505</td>
</tr>
<tr>
<td>Right Side Rear</td>
<td>P161</td>
<td>E506</td>
</tr>
</tbody>
</table>
INITIAL Setup

Equipment Condition
Engine shut down (TM 9-2320-365-10).
AC power disconnected (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)

References
TM 9-4910-571-12&P

Known Info

110 vac outlets OK.

Possible Problems
Faulty circuit breaker CB6.
Faulty wire 708BB.
Faulty wire 706C.
Faulty INTERIOR LIGHTS switch S32.
Faulty wire 706B.
Faulty relay K41.

Test Options
Continuity Test or STE/ICE-R #91

Reason for Question
If continuity is not present, circuit breaker CB6 is faulty.

Flowchart:

1. Is continuity present across circuit breaker CB6?

   Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
   
   Start → Yes → Replace circuit breaker CB6 (para 16-64).

   No → Check continuity again.
### CONTINUITY TEST

1. Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
2. Remove circuit breaker CB6 from 110/208 VAC POWER DISTRIBUTION PANEL.
3. Position circuit breaker CB6 to ON.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to output terminal of circuit breaker CB6.
6. Connect negative (-) probe of multimeter to input terminal of circuit breaker CB6 and note reading on multimeter.
7. If continuity is not present, replace circuit breaker CB6 (para 16-64).
8. Install circuit breaker CB6 on 110/208 VAC POWER DISTRIBUTION PANEL.
2. Is continuity present on wire 708BB from circuit breaker CB6 to K41 relay base terminal 9?

- **YES**
  - Repair or replace wire 708BB (para 2-40).

- **NO**
  - If continuity is not present, wire 708BB is faulty.

### KNOWN INFO
- 110 vac outlets OK.
- Circuit breaker CB6 OK.

### POSSIBLE PROBLEMS
- Faulty wire 708BB.
- Faulty wire 706C.
- Faulty INTERIOR LIGHTS switch S32.
- Faulty wire 706B.
- Faulty relay K41.

### TEST OPTIONS
- Continuity Test or STE/ICE-R #91

### REASON FOR QUESTION
- If continuity is not present, wire 708BB is faulty.
CONTINUITY TEST

(1) Loosen screw in cover.
(2) Open cover on relay box assembly.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to output terminal of circuit breaker CB6.
(5) Connect negative (-) probe of multimeter to K41 relay base terminal 9 and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 708BB (para 2-40).
(7) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
e102. ALL M1079 FLOURESCENT LIGHTS DO NOT OPERATE (CONT)

**KNOWN INFO**
- 110 vac outlets OK.
- Circuit breaker CB6 OK.
- Wire 708BB OK.

**POSSIBLE PROBLEMS**
- Faulty wire 706C.
- Faulty INTERIOR LIGHTS switch S32.
- Faulty wire 706B.
- Faulty relay K41.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- **REASON FOR QUESTION**
  - If continuity is not present, wire 706C is faulty.

3. **Is continuity present on wire 706C from K41 relay base terminal 6 to bottom left pole of INTERIOR LIGHTS switch S32?**

   - **NO**
   - **YES**
     - Repair or replace wire 706C (para 2-40).
CONTINUITY TEST

(1) Remove two screws and cover from INTERIOR LIGHTS switch S32 outlet box.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to K41 relay base terminal 6.
(4) Connect negative (-) probe of multimeter to top left pole of INTERIOR LIGHTS switch S32 and note reading on multimeter.
(5) If continuity is not present, repair or replace wire 706C (para 2-40).
(6) Close cover on relay box assembly.
(7) Tighten screw in cover.
**102. ALL M1079 FLOURESCENT LIGHTS DO NOT OPERATE (CONT)**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 vac outlets OK.</td>
<td>Faulty INTERIOR LIGHTS switch S32.</td>
</tr>
<tr>
<td>Circuit breaker CB6 OK.</td>
<td>Faulty wire 706B.</td>
</tr>
<tr>
<td>Wire 708BB OK.</td>
<td>Faulty relay K41.</td>
</tr>
<tr>
<td>Wire 706C OK.</td>
<td></td>
</tr>
</tbody>
</table>

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
If continuity is not present, INTERIOR LIGHTS switch S32 is faulty.

4. Is continuity present across INTERIOR LIGHTS switch S32?

- **NO**
  - Replace INTERIOR LIGHTS switch S32 (para 16-50).
- **YES**
<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Set multimeter to ohms.</td>
</tr>
<tr>
<td>2. Connect positive (+) probe of multimeter to bottom left pole of INTERIOR LIGHTS switch S32.</td>
</tr>
<tr>
<td>3. Connect negative (-) probe of multimeter to top left pole of INTERIOR LIGHTS switch S32.</td>
</tr>
<tr>
<td>4. Position INTERIOR LIGHTS switch S32 to ON and note reading on multimeter.</td>
</tr>
<tr>
<td>5. If continuity is not present, replace INTERIOR LIGHTS switch S32 (para 16-50).</td>
</tr>
<tr>
<td>6. Position INTERIOR LIGHTS switch S32 to OFF.</td>
</tr>
</tbody>
</table>
5. Is continuity present on wire 706B from INTERIOR LIGHTS switch S32 to fluorescent light DS80 wire 706B splice?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 vac outlets OK.</td>
<td>Continuity Test or STE/ICE-R #91</td>
<td>If continuity is not present, wire 706B is faulty. If</td>
</tr>
<tr>
<td>Circuit breaker CB6 OK.</td>
<td></td>
<td>continuity is present, relay K41 is faulty.</td>
</tr>
<tr>
<td>Wire 708BB OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire 706C OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTERIOR LIGHTS switch S32 OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty wire 706B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty relay K41.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If continuity is present, relay K41 is faulty.

YES: Repair or replace wire 706B (para 2-40).

NO: Replace relay K41 (para 16-62).
### CONTINUITY TEST

1. Remove diffuser from light fixture DS80.
2. Remove tube lock holder from each end of two fluorescent lamps.
3. Remove two fluorescent lamps from light fixture DS80.
4. Remove ballast cover from light fixture DS80.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to bottom left pole of INTERIOR LIGHTS switch S32.
7. Connect negative (-) probe of multimeter to fluorescent light DS80 wire 706B splice and note reading on multimeter.
8. If continuity is not present, repair or replace wire 706B (para 2-40).
9. If continuity is present, replace relay K41 (para 16-62).
10. Install ballast cover on light fixture DS80.
11. Install two fluorescent lights in light fixture DS80.
12. Install tube lock holder at each end of two fluorescent lamps.
13. Install diffuser on light fixture DS80.
14. Install cover on INTERIOR LIGHTS switch S32 box with two screws.
**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- AC power connected (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

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**POSSIBLE PROBLEMS**
- Faulty fluorescent lamps.
- Faulty wire 706B.
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture.
- Faulty wire 3085C.

---

**START**

1. **Does lighting fixture DS80 or DS81 operate?**

   **NO**

   **YES** Go to step 8 of this fault.

---

**TEST OPTIONS**

- Visual inspection

**REASON FOR QUESTION**

This question helps eliminate possible problems and determines where troubleshooting continues.
(1) Turn on interior lights (TM 9-2320-365-10).
(2) Check to see if lighting fixture DS80 or DS81 operates.
(3) If lighting fixtures DS80 and DS81 do not operate, go to step 8 of this fault.
(4) Turn off interior lights (TM 9-2320-365-10).
**e103. M1079 LIGHTING FIXTURE(S) DS80 AND/OR DS81 DO NOT OPERATE (CONT)**

**KNOWN INFO**
- Lighting fixtures DS82 and DS83 OK.
- Faulty fluorescent lamps.
- Faulty wire 706B.
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture.
- Faulty wire 3085C.

**POSSIBLE PROBLEMS**
- Faulty fluorescent lamps.
- Faulty wire 706B.
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture.
- Faulty wire 3085C.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- This question helps eliminate possible problems and determines where troubleshooting continues.

**Diagram**
- **Does lighting fixture DS80 operate?**
  - **NO**
    - **Go to step 7 of this fault.**
  - **YES**

---

**Lighting fixtures DS82 and DS83 OK.**

**Faulty fluorescent lamps.**

**Faulty wire 706B.**

**Faulty wire 1499J.**

**Faulty wire 3085AK.**

**Faulty lighting fixture.**

**Faulty wire 3085C.**

**Go to step 7 of this fault.**

---

**TM 9-2320-365-20-2**

---

**2-1120**
(1) Turn on interior lights (TM 9-2320-365-10).
(2) Check to see if lighting fixture DS80 operates.
(3) If lighting fixture DS80 does not operate, go to step 7 of this fault.
(4) Turn off interior lights (TM 9-2320-365-10).
e103. M1079 LIGHTING FIXTURE(S) DS80 AND/OR DS81 DO NOT OPERATE

**KNOWN INFO**
- Lighting fixtures DS82 and DS83 OK.
- Lighting fixture DS80 OK.

**POSSIBLE PROBLEMS**
- Faulty fluorescent lamps.
- Faulty wire 706B.
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture DS81.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, fluorescent lamps are faulty.

---

3. **Is continuity present across pins at each end of fluorescent lamps in lighting fixture DS81?**

- **YES**
  - Replace fluorescent lamps (para 16-59).

- **NO**
## CONTINUITY TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove diffuser from lighting fixture DS81.</td>
</tr>
<tr>
<td>2</td>
<td>Remove tube lock holder from each end of two fluorescent lamps.</td>
</tr>
<tr>
<td>3</td>
<td>Remove two fluorescent lamps from lighting fixture DS81.</td>
</tr>
<tr>
<td>4</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>5</td>
<td>Connect positive (+) probe of multimeter to one pin on end of fluorescent lamp.</td>
</tr>
<tr>
<td>6</td>
<td>Connect negative (-) probe of multimeter to other pin on same end of fluorescent lamp and note reading on multimeter.</td>
</tr>
<tr>
<td>7</td>
<td>Perform steps (5) and (6) on opposite end of fluorescent lamp.</td>
</tr>
<tr>
<td>8</td>
<td>If continuity is not present at either end of fluorescent lamp, replace fluorescent lamp (para 16-59).</td>
</tr>
<tr>
<td>9</td>
<td>Perform steps (5) through (8) on second fluorescent lamp.</td>
</tr>
</tbody>
</table>
Is continuity present on wire 706B from top left pole of INTERIOR LIGHTS switch S32 to lighting fixture DS81?

**TEST OPTIONS**
Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
If continuity is not present, wire 706B is faulty.

**KNOWN INFO**
- Lighting fixtures DS82 and DS83 OK.
- Fluorescent light DS80 OK.
- Fluorescent lamps OK.

**POSSIBLE PROBLEMS**
- Faulty wire 706B.
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture DS81.

**Yes**
Repair or replace wire 706B between lighting fixtures DS80 and DS81 (para 2-40).

**No**
- Faulty wire 706B.
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture DS81.

If continuity is not present, wire 706B is faulty.
CONTINUITY TEST

1. Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
2. Position circuit breaker CB1 to OFF (TM 9-2320-365-10).
3. Remove two screws and cover from outlet box.
4. Remove ballast cover from lighting fixture DS81.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to top left pole of INTERIOR LIGHTS switch S32.
7. Connect negative (-) probe of multimeter to wire 706B in lighting fixture DS81 and note reading on multimeter.
8. If continuity is not present, repair or replace wire 706B between lighting fixtures DS80 and DS81 (para 2-40).
9. Install cover on outlet box with two screws.
Is continuity present from wire 1499J in 110/208 VAC POWER DISTRIBUTION PANEL to wire 1499J in lighting fixture DS81?

5.

- **YES**
  - Repair or replace wire 1499J between lighting fixtures DS80 and DS81 (para 2-40).

- **NO**
  - Test options: Continuity Test or STE/ICE-R #91
  - Reason for question: If continuity is not present, wire 1499J is faulty.

**Known Info**
- Lighting fixtures DS82 and DS83 OK.
- Lighting fixture DS80 OK.
- Fluorescent lamps OK.
- Wire 706B OK.

**Possible Problems**
- Faulty wire 1499J.
- Faulty wire 3085AK.
- Faulty lighting fixture DS81.
**CONTINUITY TEST**

1. Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
2. Loosen screw in terminal board TB4.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to wire 1499J in 110/208 VAC POWER DISTRIBUTION PANEL.
6. Connect negative (-) probe of multimeter to wire 1499J in lighting fixture DS81 and note reading on multimeter.
7. If continuity is not present, repair or replace wire 1499J between lighting fixtures DS80 and DS81 (para 2-40).
8. Install wire 1499J on terminal board TB4.
M1079 LIGHTING FIXTURE(S) DS80 AND/OR DS81 DO NOT OPERATE (CONT)

**KNOWN INFO**
- Lighting fixtures DS82 and DS83 OK.
- Lighting fixture DS80 OK.
- Fluorescent lamps OK.
- Wire 706B OK.
- Wire 1499J OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085AK.
- Faulty lighting fixture DS81.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085C is faulty. If continuity is present, lighting fixture DS81 is faulty.

6. Is continuity present from wire 3085C in 110/208 VAC POWER DISTRIBUTION PANEL to wire 3085AK in lighting fixture DS81?

- **NO**
  - Repair or replace wire 3085AK between lighting fixtures DS80 and DS81 (para 2-40).

- **YES**
  - Replace lighting fixture DS81 (para 16-59).
CONTINUITY TEST

(1) Loosen screw in terminal board TB3.
(2) Remove wire 3085C from terminal board TB3.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085C.
(5) Connect negative (-) probe of multimeter to wire 3085AK and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 3085AK between lighting fixtures DS80 and DS81 (para 2-40).
(7) If continuity is present, replace lighting fixture DS81 (para 16-59).
(8) Install ballast cover on lighting fixture DS81.
(9) Install two fluorescent lamps in lighting fixture DS81.
(10) Install tube lock holder at each end of two fluorescent lamps.
(11) Install diffuser on lighting fixture DS81.
(12) Install wire 3085C on terminal board TB3.
(13) Tighten screw in terminal board TB3.
(14) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
103. M1079 LIGHTING FIXTURE(S) DS80 AND/OR DS81 DO NOT OPERATE (CONT)

**Known Info**
- Lighting fixtures DS82 and DS83 OK.
- Lighting fixture DS81 OK.
- Wire 706B OK.
- Wire 1499J OK.
- Wire 3085C OK.

**Possible Problems**
- Faulty fluorescent lamps.
- Faulty lighting fixture DS80.

**Test Options**
- Continuity Test or STE/ICE-R #91

**Reason for Question**
- If continuity is not present, fluorescent lamps are faulty. If continuity is present, lighting fixture DS80 is faulty.

**Diagrams**
- Diagram showing the flow of the test process.
  - **7.** Is continuity present across pins at each end of fluorescent lamps in lighting fixture DS80?
  - **NO**
    - Replace fluorescent lamps (para 16-59).
  - **YES**
    - Replace lighting fixture DS80 (para 16-59).
**CONTINUITY TEST**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove diffuser from lighting fixture DS80.</td>
</tr>
<tr>
<td>2</td>
<td>Remove tube lock holder from each end of two fluorescent lamps.</td>
</tr>
<tr>
<td>3</td>
<td>Remove two fluorescent lamps from lighting fixture DS80.</td>
</tr>
<tr>
<td>4</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>5</td>
<td>Connect positive (+) probe of multimeter to one pin on end of fluorescent lamp.</td>
</tr>
<tr>
<td>6</td>
<td>Connect negative (-) probe of multimeter to other pin on same end of fluorescent lamp and note reading on multimeter.</td>
</tr>
<tr>
<td>7</td>
<td>Perform steps (5) and (6) on opposite end of fluorescent lamp.</td>
</tr>
<tr>
<td>8</td>
<td>If continuity is not present at either end of fluorescent lamp, replace fluorescent lamp (para 16-59).</td>
</tr>
<tr>
<td>9</td>
<td>Perform steps (5) through (8) on second fluorescent lamp.</td>
</tr>
<tr>
<td>10</td>
<td>If continuity is present at both ends of two fluorescent lamps, replace lighting fixture DS80 (para 16-59).</td>
</tr>
<tr>
<td>11</td>
<td>Install two fluorescent lamps in lighting fixture DS80.</td>
</tr>
<tr>
<td>12</td>
<td>Install tube lock holder at each end of two fluorescent lamps.</td>
</tr>
<tr>
<td>13</td>
<td>Install diffuser on lighting fixture DS80.</td>
</tr>
</tbody>
</table>
103. M1079 LIGHTING FIXTURE(S) DS80 AND/OR DS81 DO NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting fixtures DS82 and DS83 OK.</td>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
<tr>
<td>Faulty wire 1499J. Faulty wire 3085C.</td>
<td>REASON FOR QUESTION</td>
</tr>
</tbody>
</table>

8. Is continuity present from wire 1499J in 110/208 VAC POWER DISTRIBUTION PANEL to wire 1499J in lighting fixture DS80?

- **NO**
  - Repair or replace wire 1499J between 110/208 VAC POWER DISTRIBUTION PANEL and lighting fixture DS80 (para 2-40).

- **YES**
  - Repair or replace wire 3085C between 110/208 VAC POWER DISTRIBUTION PANEL and lighting fixture DS80 (para 2-40).

If continuity is not present, wire 1499J is faulty. If continuity is present, wire 3085C is faulty.
CONTINUITY TEST

(1) Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
(2) Position circuit breaker CB1 to OFF (TM 9-2320-365-10).
(3) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(4) Loosen screw in terminal board TB4.
(5) Remove wire 1499J from terminal board TB4.
(6) Remove diffuser from lighting fixture DS80.
(7) Remove tube lock holder from each end of two fluorescent lamps.
(8) Remove two fluorescent lamps from lighting fixture DS80.
(9) Remove ballast cover from lighting fixture DS80.
(10) Set multimeter to ohms.
(11) Connect positive (+) probe of multimeter to wire 1499J in 110/208 VAC POWER DISTRIBUTION PANEL.
(12) Connect negative (-) probe of multimeter to wire 1499J in lighting fixture DS80 and note reading on multimeter.
(13) If continuity is not present, repair or replace wire 1499J (para 2-40).
(14) If continuity is present, repair or replace wire 3085C (para 2-40).
(15) Install ballast cover on lighting fixture DS80.
(16) Install two fluorescent lamps in lighting fixture DS80.
(17) Install tube lock holder at each end of two fluorescent lamps.
(18) Install diffuser on lighting fixture DS80.
(19) Install wire 1499J on terminal board TB4.
(20) Tighten screw in terminal board TB4.
(21) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
(22) Close door on 110/208 VAC POWER DISTRIBUTION PANEL.
e104. M1079 LIGHTING FIXTURE(S) DS82 AND/OR DS83 DO NOT OPERATE

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Condition</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>AC power connected (TM 9-2320-365-10).</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personnel Required</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>TM 9-4910-571-12&amp;P</td>
</tr>
</tbody>
</table>

KNOWLEDGE INFO

<table>
<thead>
<tr>
<th>Lighting fixtures DS80 and DS81 OK.</th>
</tr>
</thead>
</table>

POSSIBLE PROBLEMS

<table>
<thead>
<tr>
<th>Faulty fluorescent lamps.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 706B.</td>
</tr>
<tr>
<td>Faulty wire 1499K.</td>
</tr>
<tr>
<td>Faulty wire 3085AJ.</td>
</tr>
<tr>
<td>Faulty lighting fixture.</td>
</tr>
<tr>
<td>Faulty wire 3085B.</td>
</tr>
</tbody>
</table>

TEST OPTIONS

<table>
<thead>
<tr>
<th>Visual inspection</th>
</tr>
</thead>
</table>

REASON FOR QUESTION

This question helps eliminate possible problems and determines where troubleshooting continues.

1. Does lighting fixture DS83 or DS82 operate?

   NO

   YES

   Go to step 8 of this fault.
(1) Turn on interior lights (TM 9-2320-365-10).
(2) Check to see if lighting fixture DS82 or DS83 operates.
(3) If lighting fixtures DS82 and DS83 do not operate, go to step 8 of this fault.
(4) Turn off interior lights (TM 9-2320-365-10).
### TEST OPTIONS

**Visual inspection**

**REASON FOR QUESTION**

This question helps eliminate possible problems and determines where troubleshooting continues.

---

### KNOWN INFO

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lighting fixtures DS80 and DS81 OK.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>POSSIBLE PROBLEMS</strong></td>
<td></td>
</tr>
<tr>
<td>Faulty fluorescent lamps.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 706B.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 1499K.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 3085AJ.</td>
<td></td>
</tr>
<tr>
<td>Faulty lighting fixture.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 3085B.</td>
<td></td>
</tr>
</tbody>
</table>

---

### TEST OPTIONS

**Visual inspection**

**REASON FOR QUESTION**

This question helps eliminate possible problems and determines where troubleshooting continues.

### Diagram

1. **Does lighting fixture DS83 operate?**
   - **YES**:
     - Go to step 7 of this fault.
   - **NO**:
     - Go to step 7 of this fault.
(1) Turn on interior lights (TM 9-2320-365-10).
(2) Check to see if lighting fixture DS83 operates.
(3) If lighting fixture DS83 does not operate, go to step 7 of this fault.
(4) Turn off interior lights (TM 9-2320-365-10).
3. Is continuity present across pins at each end of fluorescent lamps in lighting fixture DS82?

- **YES**
  - Replace fluorescent lamps (para 16-59).
- **NO**
  - Continuity Test or STE/ICE-R #91
    - Reason for Question
      - If continuity is not present, fluorescent lamps are faulty.

**Known Info**
- Lighting fixtures DS80 and DS81 OK.
- Lighting fixture DS83 OK.

**Possible Problems**
- Faulty fluorescent lamps.
- Faulty wire 706B.
- Faulty wire 1499K.
- Faulty wire 3085AJ.
- Faulty lighting fixture DS82.
CONTINUITY TEST

(1) Remove diffuser from lighting fixture DS82.
(2) Remove tube lock holder from each end of two fluorescent lamps.
(3) Remove two fluorescent lamps from lighting fixture DS82.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to one pin on end of fluorescent lamp.
(6) Connect negative (-) probe of multimeter to other pin on same end of fluorescent lamp and note reading on multimeter.
(7) Perform steps (5) and (6) on opposite end of fluorescent lamp.
(8) If continuity is not present at either end of fluorescent lamp, replace fluorescent lamp (para 16-59).
(9) Perform steps (5) through (8) on second fluorescent lamp.
4. Is continuity present on wire 706B from bottom left pole of INTERIOR LIGHTS switch S32 to lighting fixture DS82.

TEST OPTIONS
Continuity Test or STE/ICE-R #91

REASON FOR QUESTION
If continuity is not present, wire 706B is faulty.

YES

NO

- Repair or replace wire 706B from lighting fixture DS83 to DS82 (para 2-40).

KNOWN INFO
- Lighting fixtures DS80 and DS81 OK.
- Lighting fixture DS83 OK.

POSSIBLE PROBLEMS
- Faulty wire 706B.
- Faulty wire 1499K.
- Faulty wire 3085AJ.
- Faulty lighting fixture DS82.
CONTINUITY TEST

1. Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
2. Position circuit breaker CB1 to OFF (TM 9-2320-365-10).
3. Remove two screws and cover from INTERIOR LIGHTS switch outlet box.
4. Remove ballast cover from lighting fixture DS82.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to bottom left pole of switch S32.
7. Connect negative (-) probe of multimeter to wire 706B in lighting fixture DS82 and note reading on multimeter.
8. If continuity is not present, repair or replace wire 706B from lighting fixture DS83 to DS82 (para 2-40).
9. Install cover on INTERIOR LIGHTS switch outlet box with two screws.
5. Is continuity present on wire 1499K from 110/208 VAC POWER DISTRIBUTION PANEL to lighting fixture DS82?

- **TEST OPTIONS**
  - Continuity Test or STE/ICE-R #91

- **REASON FOR QUESTION**
  - If continuity is not present, wire 1499K is faulty.

- **KNOWN INFO**
  - Lighting fixtures DS80 and DS81 OK.
  - Lighting fixture DS83 OK.
  - Wire 706B OK.

- **POSSIBLE PROBLEMS**
  - Faulty wire 1499K.
  - Faulty wire 3085AJ.
  - Faulty lighting fixture DS82.

- **YES**
  - Repair or replace wire 1499K from lighting fixture DS83 to DS82 (para 2-40).

- **NO**
CONTINUITY TEST

1. Disconnect AC power (TM 9-2320-365-10).
2. Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
4. Remove wire 1499K from terminal board TB4.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to wire 1499K in 110/208 VAC POWER DISTRIBUTION PANEL.
7. Connect negative (-) probe of multimeter to wire 1499K in lighting fixture DS82 and note reading on multimeter.
8. If continuity is not present, repair or replace wire 1499K from lighting fixture DS83 to DS82 (para 2-40).
6. Is continuity present on wire 3085B from 110/208 VAC POWER DISTRIBUTION PANEL to wire 3085AJ in lighting fixture DS82?

**NO**

- Repair or replace wire 3085AJ from lighting fixture DS83 to DS82 (para 2-40).

**YES**

- Replace lighting fixture DS82 (para 16-59).

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085AJ is faulty. If continuity is present, lighting fixture DS82 is faulty.

**KNOWN INFO**
- Lighting fixtures DS80 and DS81 OK.
- Lighting fixture DS83 OK.
- Wire 706B OK.
- Wire 1499K OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085AJ.
- Faulty lighting fixture DS82.
CONTINUITY TEST

1. Loosen screw in terminal board TB3.
2. Remove wire 3085B from terminal board TB3.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to wire 3085B.
5. Connect negative (-) probe of multimeter to wire 3085AJ and note reading on multimeter.
6. If continuity is not present, repair or replace wire 3085AJ from lighting fixture DS83 to DS82 (para 2-40).
7. If continuity is present, replace lighting fixture DS82 (para 16-59).
8. Install ballast cover on lighting fixture DS82.
9. Install two fluorescent lamps in lighting fixture DS82.
10. Install tube lock holder at each end of two fluorescent lamps.
11. Install diffuser on lighting fixture DS82.
12. Install wire 3085B on terminal board TB3.
13. Tighten screw in terminal board TB3.
15. Tighten screw in terminal board TB4.
16. Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
17. Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
18. Position circuit breaker CB1 to ON (TM 9-2320-365-10).
7. Is continuity present across pins at each end of fluorescent lamps in lighting fixture DS83?

**KNOWN INFO**
- Lighting fixtures DS80 and DS81 OK.
- Lighting fixture DS82 OK.
- Faulty fluorescent lamps.
- Faulty lighting fixture DS83.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- **REASON FOR QUESTION**
  - If continuity is not present, fluorescent lamps are faulty. If continuity is present, lighting fixture DS83 is faulty.

If continuity is present, replace fluorescent lamps (para 16-59).

If continuity is not present, replace fluorescent lamps (para 16-59) and replace lighting fixture DS83 (para 16-59).
CONTINUITY TEST

(1) Remove diffuser from lighting fixture DS83.
(2) Remove tube lock holder from each end of two fluorescent lamps.
(3) Remove two fluorescent lamps from lighting fixture DS83.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to one pin on end of fluorescent lamp.
(6) Connect negative (-) probe of multimeter to other pin on same end of fluorescent lamp and note reading on multimeter.
(7) Perform steps (5) and (6) on opposite end of fluorescent lamp.
(8) If continuity is not present at either end of fluorescent lamp, replace fluorescent lamp (para 16-59).
(9) Perform steps (5) through (8) on second fluorescent lamp.
(10) If continuity is present at both ends of two fluorescent lamps, replace lighting fixture DS83 (para 16-59).
(11) Install two fluorescent lamps in lighting fixture DS83.
(12) Install tube lock holder at each end of two fluorescent lamps.
(13) Install diffuser on lighting fixture DS83.
8. Is continuity present on wire 706B from bottom left pole of INTERIOR LIGHTS switch S32 to lighting fixture DS83?

- **Yes**: Repair or replace wire 706B from lighting fixture DS83 to DS82 (para 2-40).
- **No**: If continuity is not present, wire 706B is faulty.

**KNOWN INFO**
- Lighting fixtures DS80 and DS81 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 706B.
- Faulty wire 1499K.
- Faulty wire 3085B.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 706B is faulty.
CONTINUITY TEST

(1) Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
(2) Position circuit breaker CB1 to OFF (TM 9-2320-365-10).
(3) Remove two screws and cover from INTERIOR LIGHTS switch outlet box.
(4) Remove diffuser from lighting fixture DS83.
(5) Remove tube lock holder from each end of two fluorescent lamps.
(6) Remove two fluorescent lamps from lighting fixture DS83.
(7) Remove ballast cover from lighting fixture DS83.
(8) Set multimeter to ohms.
(9) Connect positive (+) probe of multimeter to bottom left pole of INTERIOR LIGHTS switch S32.
(10) Connect negative (-) probe of multimeter to wire 706B in lighting fixture DS83 and note reading on multimeter.
(11) If continuity is not present, repair or replace wire 706B from lighting fixture DS83 to DS82 (para 2-40).
(12) Install cover on INTERIOR LIGHTS switch outlet box S32 with two screws.
9. Is continuity present on wire 1499K from 110/208 VAC POWER DISTRIBUTION PANEL to lighting fixture DS83?

- **NO**
  - Repair or replace wire 1499K (para 2-40).

- **YES**
  - Repair or replace wire 3085B (para 2-40).
CONTINUITY TEST

(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Loosen screw in terminal board TB4.
(4) Remove wire 1499K from terminal board TB4.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to wire 1499K in 110/208 VAC POWER DISTRIBUTION PANEL.
(7) Connect negative (-) probe of multimeter to wire 1499K in lighting fixture DS83 and note reading on multimeter.
(8) If continuity is not present, repair or replace wire 1499K (para 2-40).
(9) If continuity is present, repair or replace wire 3085B (para 2-40).
(10) Install ballast cover on lighting fixture DS83.
(11) Install two fluorescent lamps in lighting fixture DS83.
(12) Install tube lock holder at each end of two fluorescent lamps.
(13) Install diffuser on lighting fixture DS83.
(14) Install wire 1499K on terminal board TB4.
(15) Tighten screw in terminal board TB4.
(16) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
(17) Position circuit breaker CB1 to ON (TM 9-2320-365-10).
(18) Close door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
(19) Connect AC power (TM 9-2320-365-10).
**E105. M1079 110 VAC OUTLET J233 DOES NOT OPERATE**

**INITIAL SETUP**

- **Equipment Condition**
  - Engine shut down (TM 9-2320-365-10).
  - AC power disconnected (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

---

**START**

1. Is continuity present across 110 vac receptacle J233?

**KNOWN INFO**
- 110 vac outlet J232 OK.
- **POSSIBLE PROBLEMS**
  - Faulty 110 vac receptacle J233.
  - Faulty wire 702D.
  - Faulty wire 1499G.
  - Faulty wire 3085W.
  - Faulty wire 3085AF.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, 110 vac receptacle J233 is faulty.

**YES**
- Replace 110 vac receptacle J233 (para 16-53).

**NO**
CONTINUITY TEST

(1) Remove screw and cover from 110 vac outlet J233.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to supply pole of 110 vac receptacle J233.
(4) Connect negative (-) probe of multimeter to supply socket of 110 vac receptacle J233 and note reading on multimeter.
(5) Connect positive (+) probe of multimeter to neutral pole of 110 vac receptacle J233.
(6) Connect negative (-) probe of multimeter to neutral socket of 110 vac receptacle J233 and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to ground pole of 110 vac receptacle J233.
(8) Connect negative (-) probe of multimeter to ground socket of 110 vac receptacle J233 and note reading on multimeter.
(9) If continuity is not present in steps (4), (6), and (8), replace 110 vac receptacle J233 (para 16-53).
2. Is continuity present on wire 702D from 110 vac receptacle J232 to 110 vac receptacle J233?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 vac outlet J232 OK.</td>
</tr>
<tr>
<td>110 vac outlet J233 OK.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 702D.</td>
</tr>
<tr>
<td>Faulty wire 1499G.</td>
</tr>
<tr>
<td>Faulty wire 3085W.</td>
</tr>
<tr>
<td>Faulty wire 3085AF.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
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</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 702D is faulty.</td>
</tr>
</tbody>
</table>

If NO, repair or replace wire 702D (para 2-40).
CONTINUITY TEST

(1) Remove screw and cover from 110 vac outlet J232.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to supply pole of 110 vac receptacle J232.
(4) Connect negative (-) probe of multimeter to supply pole of 110 vac receptacle J233 and note reading on multimeter.
(5) If continuity is not present, repair or replace wire 702D (para 2-40).
(6) Install cover on 110 vac outlet J232 with screw.
3. Is continuity present on wire 1499G from 110 vac receptacle J233 to terminal board TB4?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 1499G is faulty.

**KNOWN INFO**
- 110 vac outlet J232 OK.
- 110 vac receptacle J233 OK.
- Wire 702D OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1499G.
- Faulty wire 3085W.
- Faulty wire 3085AF.

**YES**
- Repair or replace wire 1499G (para 2-40).

**NO**
CONTINUITY TEST

1. Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
2. Loosen screw in terminal board TB4.
3. Remove wire 1499G from terminal board TB4.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to wire 1499G.
6. Connect negative (-) probe of multimeter to neutral socket of 110 vac receptacle J233 and note reading on multimeter.
7. If continuity is not present, repair or replace wire 1499G (para 2-40).
4.

Is continuity present on wire 3085W from 110 vac receptacle J233 to terminal board TB3?

**KNOWN INFO**

<table>
<thead>
<tr>
<th>Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 vac outlet J232 OK.</td>
</tr>
<tr>
<td>110 vac receptacle J233 OK.</td>
</tr>
<tr>
<td>Wire 702D OK.</td>
</tr>
<tr>
<td>Wire 1499G OK.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

<table>
<thead>
<tr>
<th>Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 3085W.</td>
</tr>
<tr>
<td>Faulty wire 3085AF.</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**

<table>
<thead>
<tr>
<th>Test Description</th>
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</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R #91</td>
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</tbody>
</table>

**REASON FOR QUESTION**

<table>
<thead>
<tr>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 3085W is faulty. If continuity is present, wire 3085AF is faulty.</td>
</tr>
</tbody>
</table>

**YES**

- Repair or replace wire 3085W (para 2-40).

**NO**

- Repair or replace wire 3085AF (para 2-40).
CONTINUITY TEST

1. Loosen screw in terminal board TB3.
2. Remove wire 3085W from terminal board TB3.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to wire 3085W.
5. Connect negative (-) probe of multimeter to ground socket of 110 vac receptacle J233 and note multimeter.
6. If continuity is not present, repair or replace wire 3085W (para 2-40).
7. If continuity is present, repair or replace wire 3085AF (para 2-40).
8. Install wire 3085W on terminal board TB3.
10. Install wire 1499G on terminal board TB4.
12. Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
13. Install cover on 110 vac outlet J233 with screw.
**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- AC power disconnected (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

---

**KNOWING INFO**

- 110 vac outlet J231 OK.

**POSSIBLE PROBLEMS**

- Faulty 110 vac receptacle J234.
- Faulty wire 702E.
- Faulty wire 1499E.
- Faulty wire 3085H.
- Faulty wire 3085AE.

---

**TEST OPTIONS**

- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**

If continuity is not present, 110 vac receptacle J234 is faulty.

---

**START**

1. **Is continuity present across 110 vac receptacle J234?**

**YES**

- Replace 110 vac receptacle J234 (para 16-53).

**NO**

- Replace 110 vac receptacle J234 (para 16-53).
CONTINUITY TEST

(1) Remove screw and cover from 110 vac outlet J234.

(2) Set multimeter to ohms.

(3) Connect positive (+) probe of multimeter to supply pole of 110 vac receptacle J234.

(4) Connect negative (-) probe of multimeter to supply socket of 110 vac receptacle J234 and note reading on multimeter.

(5) Connect positive (+) probe of multimeter to neutral pole of 110 vac receptacle J234.

(6) Connect negative (-) probe of multimeter to neutral socket of 110 vac receptacle J234 and note reading on multimeter.

(7) Connect positive (+) probe of multimeter to ground pole of 110 vac receptacle J234.

(8) Connect negative (-) probe of multimeter to ground socket of 110 vac receptacle J234 and note reading on multimeter.

(9) If continuity is not present in steps (4), (6), and (8), replace 110 vac receptacle J234 (para 16-53).
106. M1079 110 VAC OULET J234 DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 vac outlet J231 OK.</td>
</tr>
<tr>
<td>110 vac receptacle J234 OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 702E.</td>
</tr>
<tr>
<td>Faulty wire 1499E.</td>
</tr>
<tr>
<td>Faulty wire 3085H.</td>
</tr>
<tr>
<td>Faulty wire 3085AE.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 702E is faulty.</td>
</tr>
</tbody>
</table>

2. Is continuity present on wire 702E from 110 vac receptacle J231 to 110 vac receptacle J234?

- **NO**: Repair or replace wire 702E (para 2-40).
- **YES**: Continue with testing.
CONTINUITY TEST

(1) Remove screw and cover from 110 vac outlet J231.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to supply pole of 110 vac receptacle J231.
(4) Connect negative (-) probe of multimeter to supply pole of 110 vac receptacle J234 and note reading on multimeter.
(5) If continuity is not present, repair or replace wire 702E (para 2-40).
(6) Install cover on 110 vac outlet J231 with screw.
3. Is continuity present on wire 1499E from 110 vac receptacle J234 to terminal board TB4?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 vac outlet J231 OK.</td>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
<tr>
<td>110 vac receptacle J234 OK.</td>
<td></td>
</tr>
<tr>
<td>Wire 702E OK.</td>
<td>REASON FOR QUESTION</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 1499E.</td>
<td>If continuity is not present, wire 1499E is faulty.</td>
</tr>
<tr>
<td>Faulty wire 3085H.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 3085AE.</td>
<td></td>
</tr>
</tbody>
</table>

NO

YES

Repair or replace wire 1499E (para 2-40).
CONTINUITY TEST

(1) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(2) Loosen screw in terminal board TB4.
(3) Remove wire 1499E from terminal board TB4.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to wire 1499E.
(6) Connect negative (-) probe of multimeter to neutral socket of 110 vac receptacle J234 and note reading on multimeter.
(7) If continuity is not present, repair or replace wire 1499E (para 2-40).
A106. M1079 110 VAC Outlet J234 Does Not Operate (Cont)

**Known Info**
- 110 vac outlet J231 OK.
- 110 vac receptacle J234 OK.
- Wire 702E OK.
- Wire 1499E OK.

**Possible Problems**
- Faulty wire 3085H.
- Faulty wire 3085AE.

**Test Options**
- Continuity Test or STE/CE-R #91

**Reason for Question**
- If continuity is not present, wire 3085H is faulty. If continuity is present, wire 3085AE is faulty.

**4.** Is continuity present on wire 3085H from 110 vac receptacle J234 to terminal board TB3?

- **No**
  - Repair or replace wire 3085H (para 2-40).

- **Yes**
  - Repair or replace wire 3085AE (para 2-40).
CONTINUITY TEST

1. Loosen screw in terminal board TB3.
2. Remove wire 3085H from terminal board TB3.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to wire 3085H.
5. Connect negative (-) probe of multimeter to ground socket of 110 vac receptacle J234 and note multimeter.
6. If continuity is not present, repair or replace wire 3085H (para 2-40).
7. If continuity is present, repair or replace wire 3085AE (para 2-40).
8. Install wire 3085H on terminal board TB3.
10. Install wire 1499E on terminal board TB4.
12. Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
13. Install cover on 110 vac outlet J234 with screw.
**INITIAL SETUP**

<table>
<thead>
<tr>
<th>Equipment Condition</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>AC power disconnected (TM 9-2320-365-10).</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td>References</td>
</tr>
<tr>
<td></td>
<td>TM 9-4910-571-12&amp;P</td>
</tr>
</tbody>
</table>

**KNOWLEDGE INFO**

110 vac outlet J230 OK.

**POSSIBLE PROBLEMS**

- Faulty 110 vac receptacle J235.
- Faulty wire 702F.
- Faulty wire 1499F.
- Faulty wire 3085G.
- Faulty wire 3085AG.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**

If continuity is not present, 110 vac receptacle J235 is faulty.

1. Is continuity present across 110 vac receptacle J235?

   - **NO**
     - Replace 110 vac receptacle J235 (para 16-53).
   - **YES**
CONTINUITY TEST

1. Remove screw and cover from 110 vac outlet J235.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to supply pole of 110 vac receptacle J235.
4. Connect negative (-) probe of multimeter to supply socket of 110 vac receptacle J235 and note reading on multimeter.
5. Connect positive (+) probe of multimeter to neutral pole of 110 vac receptacle J235.
6. Connect negative (-) probe of multimeter to neutral socket of 110 vac receptacle J235 and note reading on multimeter.
7. Connect positive (+) probe of multimeter to ground pole of 110 vac receptacle J235.
8. Connect negative (-) probe of multimeter to ground socket of 110 vac receptacle J235 and note reading on multimeter.
9. If continuity is not present in steps (4), (6), and (8), replace 110 vac receptacle J235 (para 16-53).
2-1170  M1079 110 VAC OULET J235 DOES NOT OPERATE (CONT)

**KNOWN INFO**
- 110 vac outlet J230 OK.
- 110 vac receptacle J235 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 702F.
- Faulty wire 1499F.
- Faulty wire 3085G.
- Faulty wire 3085AG.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 702F is faulty.

**FLOWCHART**
2. Is continuity present on wire 702F from 110 vac receptacle J230 to 110 vac receptacle J235?
   - **NO**
     - Repair or replace wire 702F (para 2-40).
   - **YES**

---

e107.  M1079 110 VAC OULET J235 DOES NOT OPERATE (CONT)
CONTINUITY TEST

(1) Remove screw and cover from 110 vac outlet J230.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to supply pole of 110 vac receptacle J230.
(4) Connect negative (-) probe of multimeter to supply pole of 110 vac receptacle J235 and note reading on multimeter.
(5) If continuity is not present, repair or replace wire 702F (para 2-40).
(6) Install cover on 110 vac outlet J230 with screw.
3. Is continuity present on wire 1499F from 110 vac receptacle J235 to terminal board TB4?

- **NO**
  - If continuity is not present, wire 1499F is faulty.

- **YES**
  - Repair or replace wire 1499F (para 2-40).

**KNOWN INFO**
- 110 vac outlet J230 OK.
- 110 vac receptacle J235 OK.
- Wire 702F OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1499F.
- Faulty wire 3085G.
- Faulty wire 3085AG.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 1499F is faulty.
CONTINUITY TEST
(1) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(2) Loosen screw in terminal board TB4.
(3) Remove wire 1499F from terminal board TB4.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to wire 1499F.
(6) Connect negative (-) probe of multimeter to neutral socket of 110 vac receptacle J235 and note reading on multimeter.
(7) If continuity is not present, repair or replace wire 1499F (para 2-40).
107. M1079 110 VAC OUTLET J235 DOES NOT OPERATE (CONT)

**KNOWN INFO**
- 110 vac outlet J230 OK.
- 110 vac receptacle J235 OK.
- Wire 702F OK.
- Wire 1499F OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085G.
- Faulty wire 3085AG.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085G is faulty. If continuity is present, wire 3085AG is faulty.

**Flowchart**

**Question:** Is continuity present on wire 3085G from 110 vac receptacle J235 to terminal board TB3?

- **NO**
  - Repair or replace wire 3085G (para 2-40).

- **YES**
  - Repair or replace wire 3085G (para 2-40).
  - Repair or replace wire 3085AG (para 2-40).
CONTINUITY TEST

(1) Loosen screw in terminal board TB3.
(2) Remove wire 3085G from terminal board TB3.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085G.
(5) Connect negative (-) probe of multimeter to ground socket of 110 vac receptacle J235 and note multimeter.
(6) If continuity is not present, repair or replace wire 3085G (para 2-40).
(7) If continuity is present, repair or replace wire 3085AG (para 2-40).
(8) Position wire 3085G on terminal board TB3.
(9) Tighten screw in terminal board TB3.
(10) Position wire 1499F on terminal board TB4.
(11) Tighten screw in terminal board TB4.
(12) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
(13) Install cover on 110 vac outlet J235 with screw.
**e108. M1079 110 VDC OUTLET J232 DOES NOT OPERATE IN NORMAL MODE**

### 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

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<table>
<thead>
<tr>
<th><strong>Test Options</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Test</td>
</tr>
</tbody>
</table>

**Reason For Question**
This question eliminates possible problems and determines where troubleshooting continues.

---

**Known Info**
Fluorescent lights OK.

**Possible Problems**
- Faulty 110 VAC receptacle J 232.
- Faulty wire 1499B.
- Faulty wire 3085K.
- Faulty wire 3085AA.
- Faulty circuit breaker CB5.
- Faulty wire 701A.
- Faulty wire 702A.
- Faulty relay K35.

---

1. **Does 110 VAC outlet J 233 operate?**

   **START**

   - **NO**
   - **YES**

   **Go to step 5 of this fault.**
OPERATIONAL TEST

(1) Connect any 110 VAC appliance to 110 VAC outlet J233 and check for operation.
(2) If 110 VAC outlet J233 does not operate, go to step 5 of this fault.
(3) Disconnect 110 VAC appliance from 110 VAC outlet J233.
2. Is continuity present across 110 VAC receptacle J232?

**KNOWN INFO**
- Fluorescent lights OK.
- 110 VAC outlet J233 OK.

**POSSIBLE PROBLEMS**
- Faulty 110 VAC receptacle J232.
- Faulty wire 1499B.
- Faulty wire 3085K.
- Faulty wire 3085AA.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, 110 VAC receptacle J232 is faulty.

**YES**
Replace 110 VAC receptacle J232 (para 16-53).

**NO**
CONTINUITY TEST

(1) Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
(2) Position circuit breaker CB1 to OFF (TM 9-2320-365-10).
(3) Remove screw and cover from 110 VAC outlet J232.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to supply pole of 110 VAC receptacle J232.
(6) Connect negative (-) probe of multimeter to supply socket of 110 VAC receptacle J232 and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to neutral pole of 110 VAC receptacle J232.
(8) Connect negative (-) probe of multimeter to neutral socket of 110 VAC receptacle J232 and note reading on multimeter.
(9) Connect positive (+) probe of multimeter to ground pole of 110 VAC receptacle J232.
(10) Connect negative (-) probe of multimeter to ground socket of 110 VAC receptacle J232 and note reading on multimeter.
(11) If continuity is not present in steps (6), (8), and (10), replace 110 VAC receptacle J232 (para 16-53).
e108. M1079 110 VAC OUTLET J232 DOES NOT OPERATE IN NORMAL MODE (CONT)

3. Is continuity present on wire 1499B from 110/208 VAC POWER DISTRIBUTION PANEL to 110 VAC receptacle J232?

If continuity is not present, wire 1499B is faulty.

TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, wire 1499B is faulty.

YES
- Repair or replace wire 1499B (para 2-40).

NO
CONTINUITY TEST

(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Loosen screw in terminal board TB4.
(4) Remove wire 1499B from terminal board TB4.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to wire 1499B.
(7) Connect negative (-) probe of multimeter to neutral pole of 110 VAC receptacle J232 and note reading on multimeter.
(8) If continuity is not present, repair or replace wire 1499B (para 2-40).
E108. M1079 110 VAC OUTLET J232 DOES NOT OPERATE IN NORMAL MODE (CONT)

4. Is continuity present on wire 3085K from 110/208 VAC POWER DISTRIBUTION PANEL to 110 VAC receptacle J232.

- **YES**
  - Repair or replace wire 3085K (para 2-40).
  - Repair or replace wire 3085AA (para 2-40).

- **NO**
  - If continuity is not present, wire 3085K is faulty. If continuity is present, wire 3085AA is faulty.

**KNOWN INFO**
- Fluorescent lights OK.
- 110 VAC outlet J233 OK.
- 110 VAC receptacle J232 OK.
- Wire 1499B OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085K.
- Faulty wire 3085AA.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085K is faulty. If continuity is present, wire 3085AA is faulty.
**CONTINUITY TEST**

1. Loosen screw in terminal board TB3.
2. Remove wire 3085K from terminal board TB3.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to wire 3085K.
5. Connect negative (-) probe of multimeter to ground pole of 110 VAC receptacle J232 and note reading on multimeter.
6. If continuity is not present, repair or replace wire 3085K (para 2-40).
7. If continuity is present, repair or replace wire 3085AA (para 2-40).
12. Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
13. Install cover on 110 VAC outlet J232 with screw.
15. Position circuit breaker CB1 to ON (TM 9-2320-365-10).
5. Is continuity present across circuit breaker CB5?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, circuit breaker CB5 is faulty.

---

**KNOWN INFO**
Fluorescent lights OK.

**POSSIBLE PROBLEMS**
- Faulty circuit breaker CB5.
- Faulty wire 701A.
- Faulty wire 702A.
- Faulty relay K35.

---

**YES**
Replace circuit breaker CB5 (para 16-64).

**NO**
CONTINUITY TEST

(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Remove circuit breaker CB5 from 110/208 VAC POWER DISTRIBUTION PANEL.
(4) Position circuit breaker CB5 to ON (TM 9-2320-365-10).
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to output terminal of circuit breaker CB5.
(7) Connect negative (-) probe of multimeter to input terminal of circuit breaker CB5 and note reading on multimeter.
(8) If continuity is not present, replace circuit breaker CB5 (para 16-64).
(9) Install circuit breaker CB5 on 110/208 VAC POWER DISTRIBUTION PANEL.
6. Is continuity present on wire 701A from circuit breaker CB5 to K35 relay base terminal 7? 

- **Possessible Problems**
  - Faulty wire 701A.
  - Faulty wire 702A.
  - Faulty relay K35.

- **Test Options**
  - Continuity Test or STE/ICE-R Test #91

- **Reason for Question**
  - If continuity is not present, wire 701A is faulty.

- **Known Info**
  - Fluorescent lights OK.
  - Circuit breaker CB5 OK.

- **Yes**
  - Repair or replace wire 701A (para 2-40). 

- **No**
CONTINUITY TEST

(1) Loosen screw in circuit breaker CB5.
(2) Remove wire 701A from circuit breaker CB5.
(3) Loosen screw in cover.
(4) Open cover on relay box assembly.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to wire 701A.
(7) Connect negative (-) probe of multimeter to K35 relay base terminal 7 and note reading on multimeter.
(8) If continuity is not present, repair or replace wire 701A (para 2-40).
(9) Position wire 701A in circuit breaker CB5.
(10) Tighten screw in circuit breaker CB5.
(11) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
7. Is continuity present on wire 702A from K35 relay base terminal 4 to supply pole of 110 VAC receptacle J232?

If continuity is not present, wire 702A is faulty. If continuity is present, relay K35 is faulty.

**KNOWN INFO**
- Fluorescent lights OK.
- Circuit breaker CB5 OK.
- Wire 701A OK.

**POSSIBLE PROBLEMS**
- Faulty wire 702A.
- Faulty relay K35.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 702A is faulty. If continuity is present, relay K35 is faulty.

**YES**
- Repair or replace wire 702A (para 2-40).

**NO**
- Replace relay K35 (para 16-62).
CONTINUITY TEST

1. Remove screw and cover from 110 VAC outlet J232.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to K35 relay base terminal 4.
4. Connect negative (-) probe of multimeter to supply pole of 110 VAC receptacle J232 and note reading on multimeter.
5. If continuity is not present, repair or replace wire 702A (para 2-40).
6. If continuity is present, replace relay K35 (para 16-62).
7. Install cover on 110 VAC outlet J232 with screw.
8. Close cover on relay box assembly.
9. Tighten screw in cover.
e109. M1079 110 VAC OUTLETS J232 AND J233 DO NOT OPERATE IN BLACKOUT OVERRIDE MODE

**INITIAL SETUP**

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

**POSSIBLE PROBLEMS**
Faulty FORWARD RECEPTACLE OVERRIDE switch S34.
Faulty wire 701AA.
Faulty wire 702AA.

**KNOWN INFO**
110 VAC outlets J232 and J233 OK in normal mode.

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, FORWARD RECEPTACLE OVERRIDE switch S34 is faulty.

1. Is continuity present across FORWARD RECEPTACLE OVERRIDE switch S34?
   - **YES**
     - Replace FORWARD RECEPTACLE OVERRIDE switch S34 (para 16-56).
   - **NO**

**2-1190          Change 1**
CONTINUITY TEST

(1) Loosen screw in cover.
(2) Open cover on relay box assembly.
(3) Position FORWARD RECEPTACLE OVERRIDE switch S34 to BLACKOUT OVERRIDE.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to wire 702AA terminal lug on FORWARD RECEPTACLE OVERRIDE switch S34.
(6) Connect negative (-) probe of multimeter to wire 701AA terminal lug on FORWARD RECEPTACLE OVERRIDE switch S34 and note reading on multimeter.
(7) If continuity is not present, replace FORWARD RECEPTACLE OVERRIDE switch S34 (para 16-56).
2. **KNOWN INFO**

| 110 VAC outlets J232 and J233 OK in normal mode. FORWARD RECEPTACLE OVERRIDE switch S34 OK. |

**POSSIBLE PROBLEMS**

Faulty wire 701AA.
Faulty wire 702AA.

---

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 701AA is faulty. If continuity is present, wire 702AA is faulty.

---

If continuity is present on wire 701AA from K35 relay base terminal 7 to FORWARD RECEPTACLE OVERRIDE switch S34?

**YES**

Repair or replace wire 701AA (para 2-40).

---

**NO**

Repair or replace wire 702AA (para 2-40).
CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to K35 relay base terminal 7.
3. Connect negative (-) probe of multimeter to wire 701AA terminal lug on FORWARD RECEPTACLE OVERRIDE switch S34 and note reading on multimeter.
4. If continuity is not present, repair or replace wire 701AA (para 2-40).
5. If continuity is present, repair or replace wire 702AA (para 2-40).
6. Position FORWARD RECEPTACLE OVERRIDE switch S34 to BLACKOUT (TM 9-2320-365-10).
7. Close cover on relay box assembly.
8. Tighten screw in cover.
e110. M1079 110 VAC OUTLET J231 DOES NOT OPERATE

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- AC power connected (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

This question eliminates possible problems and determines where troubleshooting continues.

1. Does 110 VAC outlet J234 operate?

   NO

   YES

   Go to step 5 of this fault.

   Test options
   - Operational Test

   Reason for question
   - This question eliminates possible problems and determines where troubleshooting continues.

Known Info
- 110 VAC outlets J230, J232, J233, and J235 OK.

Possible Problems
- Faulty circuit breaker CB7.
- Faulty wire 701B.
- Faulty wire 702B.
- Faulty relay K35.
- Faulty 110 VAC receptacle J231.
- Faulty wire 1499C.
- Faulty wire 3085M.
- Faulty wire 3085AB.
OPERATIONAL TEST

(1) Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
(2) Position circuit breaker CB7 to ON (TM 9-2320-365-10).
(3) Plug any 110 vac appliance in 110 VAC receptacle J234.
(4) Check to see if 110 VAC appliance operates.
(5) If 110 VAC appliance does not operate, go to step 5 of this fault.
2. Is continuity present across 110 VAC receptacle J231?

**YES**
Replace 110 VAC receptacle J231 (para 16-53).

**NO**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
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<tbody>
<tr>
<td>110 VAC outlets J230, J232, J233, and J235 OK.</td>
</tr>
<tr>
<td>110 VAC outlet J234 OK.</td>
</tr>
<tr>
<td>Circuit breaker CB7 OK.</td>
</tr>
<tr>
<td>Wire 701B OK.</td>
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<tr>
<td>Wire 702B OK.</td>
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<tr>
<td>Relay K35 OK.</td>
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<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
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</thead>
<tbody>
<tr>
<td>Faulty 110 VAC receptacle J231.</td>
</tr>
<tr>
<td>Faulty wire 1499C.</td>
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<tr>
<td>Faulty wire 3085M.</td>
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<tr>
<td>Faulty wire 3085AB.</td>
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<th>TEST OPTIONS</th>
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<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
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<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
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<tbody>
<tr>
<td>If continuity is not present, 110 VAC receptacle J231 is faulty.</td>
</tr>
</tbody>
</table>
**CONTINUITY TEST**

(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove screw and cover from 110 VAC outlet J231.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to supply pole of 110 VAC receptacle J231.
(5) Connect negative (-) probe of multimeter to supply socket of 110 VAC receptacle J231 and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to neutral pole of 110 VAC receptacle J231.
(7) Connect negative (-) probe of multimeter to neutral socket of 110 VAC receptacle J231 and note reading on multimeter.
(8) Connect positive (+) probe of multimeter to ground pole of 110 VAC receptacle J231.
(9) Connect negative (-) probe of multimeter to ground socket of 110 VAC receptacle J231 and note reading on multimeter.
(10) If continuity is not present in steps (5), (7), and (9), replace 110 VAC receptacle J231 (para 16-53).
KNOWLEDGE INFO
110 VAC outlets J230, J232, J233, and J235 OK.
110 VAC outlet J234 OK.
Circuit breaker CB7 OK.
Wire 701B OK.
Wire 702B OK.
Relay K35 OK.
110 VAC receptacle J231 OK.

POSSIBLE PROBLEMS
Faulty wire 1499C.
Faulty wire 3085M.
Faulty wire 3085AB.

3. Is continuity present on wire 1499C from 110 VAC receptacle J231 to terminal board TB4?

TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, wire 1499C is faulty.

YES: Repair or replace wire 1499C (para 2-40).

NO
## CONTINUITY TEST

1. Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
2. Loosen screw in terminal board TB4.
3. Remove wire 1499C from terminal board TB4.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to wire 1499C.
6. Connect negative (-) probe of multimeter to neutral socket of 110 VAC receptacle J231 and note reading on multimeter.
7. If continuity is not present, repair or replace wire 1499C (para 2-40).
4. **TEST OPTIONS**
   - Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, wire 3085M is faulty. If continuity is present, wire 3085AB is faulty.

---

**KNOWN INFO**
- 110 VAC outlets J230, J232, J233, and J235 OK.
- 110 VAC outlet J234 OK.
- Circuit breaker CB7 OK.
- Wire 701B OK.
- Wire 702B OK.
- Relay K35 OK.
- 110 VAC receptacle J231 OK.
- Wire 1499C OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085M.
- Faulty wire 3085AB.

---

**Diagram**

- **YES**
  - Repair or replace wire 3085M (para 2-40).

- **NO**
  - Repair or replace wire 3085M from 110 VAC receptacle J231 to terminal board TB3?

- **YES**
  - Repair or replace wire 3085AB (para 2-40).
CONTINUITY TEST

(1) Loosen screw in terminal board TB3.
(2) Remove wire 3085M from terminal board TB3.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085M.
(5) Connect negative (-) probe of multimeter to ground socket of 110 VAC receptacle J231 and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 3085M (para 2-40).
(7) If continuity is present, repair or replace wire 3085AB (para 2-40).
(8) Position wire 3085M on terminal board TB3.
(9) Tighten screw in terminal board TB3.
(10) Position wire 1499C on terminal board TB4.
(11) Tighten screw in terminal board TB4.
(12) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
(13) Install cover on 110 VAC outlet J231 with screw.
e110. M1079 110 VAC OUTLET J231 DOES NOT OPERATE (CONT)

5. Is continuity present across circuit breaker CB7?

- **YES**
  - Replace circuit breaker CB7 (para 16-64).

- **NO**
  - If continuity is not present, circuit breaker CB7 is faulty.

**KNOWN INFO**

- 110 VAC outlets J230, J232, J233, and J235 OK.
- 110 VAC outlet J234 does not operate.

**POSSIBLE PROBLEMS**

- Faulty circuit breaker CB7.
- Faulty wire 701B.
- Faulty wire 702B.
- Faulty relay K35.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

- If continuity is not present, circuit breaker CB7 is faulty.
CONTINUITY TEST

(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Remove circuit breaker CB7 from 110/208 VAC POWER DISTRIBUTION PANEL.
(4) Position circuit breaker CB7 to ON (TM 9-2320-365-10).
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to output terminal of circuit breaker CB7.
(7) Connect negative (-) probe of multimeter to input terminal of circuit breaker CB7 and note reading on multimeter.
(8) If continuity is not present, replace circuit breaker CB7 (para 16-64).
(9) Install circuit breaker CB7 on 110/208 VAC POWER DISTRIBUTION PANEL.
e110. M1079 110 VAC OUTLET J231 DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
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<tbody>
<tr>
<td>110 VAC outlets J230, J232, J233, and J235 OK. 110 VAC outlet J234 does not operate. Circuit breaker CB7 OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 701B. Faulty wire 702B. Faulty relay K35.</td>
</tr>
</tbody>
</table>

6. Is continuity present on wire 701B from circuit breaker CB7 to K35 relay base terminal 8?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
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<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
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<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 701B is faulty.</td>
</tr>
</tbody>
</table>

If NO, repair or replace wire 701B (para 2-40).
CONTINUITY TEST

(1) Loosen screw in cover.
(2) Open cover on relay box assembly.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to K35 relay base terminal 8.
(5) Connect negative (-) probe of multimeter to output terminal on circuit breaker CB7 and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 701B (para 2-40).
(7) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
e110. M1079 110 VAC OUTLET J231 DOES NOT OPERATE (CONT)

**KNOWN INFO**
- 110 VAC outlets J230, J232, J233, and J235 OK.
- 110 VAC outlet J234 does not operate.
- Circuit breaker CB7 OK.
- Wire 701B OK.

**POSSIBLE PROBLEMS**
- Faulty wire 702B.
- Faulty relay K35.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 702B is faulty. If continuity is present, relay K35 is faulty.

7. Is continuity present on wire 702B from K35 relay base terminal 5 to 110 VAC receptacle J231 supply pole? 

- **YES**
  - Repair or replace wire 702B (para 2-40).
  - Replace relay K35 (para 16-62).

- **NO**
CONTINUITY TEST

1. Remove screw and cover from 110 VAC outlet J231.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to K35 relay base terminal 5.
4. Connect negative (-) probe of multimeter to supply pole on 110 VAC receptacle J231 and note reading on multimeter.
5. If continuity is not present, repair or replace wire 702B (para 2-40).
6. If continuity is present, replace relay K35 (para 16-62).
7. Install cover on 110 VAC outlet J231 with screw.
8. Close cover on relay box assembly.
9. Tighten screw in cover.
e111. M1079 110 VAC OUTLET J230 DOES NOT OPERATE

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
AC power connected (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

START

1. Does 110 VAC outlet J235 operate?

POSSIBLE PROBLEMS
Faulty circuit breaker CB9.
Faulty wire 701C.
Faulty wire 702C.
Faulty relay K35.
Faulty 110 VAC receptacle J230.
Faulty wire 1499D.
Faulty wire 3085J.
Faulty wire 3085AC.

TEST OPTIONS
Operational Test

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

NO

YES

Go to step 5 of this fault.
OPERATIONAL TEST

(1) Open door on 110/208 VAC POWER DISTRIBUTION PANEL (TM 9-2320-365-10).
(2) Position circuit breaker CB9 to ON (TM 9-2320-365-10).
(3) Plug any 110 VAC appliance in 110 VAC receptacle J235.
(4) Check to see if 110 VAC appliance operates.
(5) If 110 VAC appliance does not operate, go to step 5 of this fault.
e111. M1079 110 VAC OUTLET J230 DOES NOT OPERATE (CONT)

2. Is continuity present across 110 VAC receptacle J230?

YES Replace 110 VAC receptacle J230 (para 16-53).

NO

Known Info

| 110 VAC outlets J231, J232, J233, and J234 OK. |
| 110 VAC outlet J235 OK. |
| Circuit breaker CB9 OK. |
| Wire 701C OK. |
| Wire 702C OK. |
| Relay K35 OK. |

Possible Problems

- Faulty 110 VAC receptacle J230.
- Faulty wire 1499D.
- Faulty wire 3085J.
- Faulty wire 3085AC.

Test Options

| Continuity Test or STE/ICE-R Test #91 |

Reason for Question

If continuity is not present, 110 VAC receptacle J230 is faulty.
(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove screw and cover from 110 VAC outlet J230.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to supply pole of 110 VAC receptacle J230.
(5) Connect negative (-) probe of multimeter to supply socket of 110 VAC receptacle J230 and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to neutral pole of 110 VAC receptacle J230.
(7) Connect negative (-) probe of multimeter to neutral socket of 110 VAC receptacle J230 and note reading on multimeter.
(8) Connect positive (+) probe of multimeter to ground pole of 110 VAC receptacle J230.
(9) Connect negative (-) probe of multimeter to ground socket of 110 VAC receptacle J230 and note reading on multimeter.
(10) If continuity is not present in steps (5), (7), and (9), replace 110 VAC receptacle J230 (para 16-53).
e111. M1079 110 VAC OUTLET J 230 DOES NOT OPERATE (CONT)

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<td>110 VAC outlets J 231, J 232, J 233, and J 234 OK.</td>
</tr>
<tr>
<td>110 VAC outlet J 235 OK.</td>
</tr>
<tr>
<td>Circuit breaker CB9 OK.</td>
</tr>
<tr>
<td>Wire 701C OK.</td>
</tr>
<tr>
<td>Wire 702C OK.</td>
</tr>
<tr>
<td>Relay K35 OK.</td>
</tr>
<tr>
<td>110 VAC receptacle J 230 OK.</td>
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</table>

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<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
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<tbody>
<tr>
<td>Faulty wire 1499D.</td>
</tr>
<tr>
<td>Faulty wire 3085J.</td>
</tr>
<tr>
<td>Faulty wire 3085AC.</td>
</tr>
</tbody>
</table>

3. Is continuity present on wire 1499D from 110 VAC receptacle J 230 to terminal board TB4?

- **NO**
  - REASON FOR QUESTION
    - If continuity is not present, wire 1499D is faulty.

- **YES**
  - Repair or replace wire 1499D (para 2-40).
CONTINUITY TEST

1. Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
2. Loosen screw in terminal board TB4.
3. Remove wire 1499D from terminal board TB4.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to wire 1499D.
6. Connect negative (-) probe of multimeter to neutral socket of 110 VAC receptacle J230 and note reading on multimeter.
7. If continuity is not present, repair or replace wire 1499D (para 2-40).
e111. M1079 110 VAC OUTLET J230 DOES NOT OPERATE (CONT)

**KNOWN INFO**
- 110 VAC outlets J231, J232, J233, and J234 OK.
- 110 VAC outlet J235 OK.
- Circuit breaker CB9 OK.
- Wire 701C OK.
- Wire 702C OK.
- Relay K35 OK.
- 110 VAC receptacle J230 OK.
- Wire 1499D OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085J.
- Faulty wire 3085AC.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, wire 3085J is faulty. If continuity is present, wire 3085AC is faulty.

4. Is continuity present on wire 3085J from 110 VAC receptacle J230 to terminal board TB3?

- **NO**
  - Repair or replace wire 3085J (para 2-40).

- **YES**
  - Repair or replace wire 3085AC (para 2-40).
CONTINUITY TEST

(1) Loosen screw in terminal board TB3.
(2) Remove wire 3085J from terminal board TB3.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085J.
(5) Connect negative (-) probe of multimeter to ground socket of 110 VAC receptacle J230 and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 3085J (para 2-40).
(7) If continuity is present, repair or replace wire 3085AC (para 2-40).
(8) Position wire 3085J on terminal board TB3.
(9) Tighten screw in terminal board TB3.
(10) Position wire 1499D on terminal board TB4.
(11) Tighten screw in terminal board TB4.
(12) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
(13) Install cover on 110 VAC outlet J230 with screw.
e111. M1079 110 VAC OUTLET J230 DOES NOT OPERATE (CONT)

**KNOWN INFO**

| 110 VAC outlets J231, J232, J233, and J234 OK. |
| 110 VAC outlet J235 does not operate. |

**POSSIBLE PROBLEMS**

- Faulty circuit breaker CB9.
- Faulty wire 701C.
- Faulty wire 702C.
- Faulty relay K35.

5. **Is continuity present across circuit breaker CB9?**

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, circuit breaker CB9 is faulty.

**Diagrams:**

- **NO**
  - Replace circuit breaker CB9 (para 16-64).
- **YES**
CONTINUITY TEST

(1) Disconnect AC power (TM 9-2320-365-10).
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Remove circuit breaker CB9 from 110/208 VAC POWER DISTRIBUTION PANEL.
(4) Position circuit breaker CB9 to ON (TM 9-2320-365-10).
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to output terminal of circuit breaker CB9.
(7) Connect negative (-) probe of multimeter to input terminal of circuit breaker CB9 and note reading on multimeter.
(8) If continuity is not present, replace circuit breaker CB9 (para 16-64).
(9) Install circuit breaker CB9 on 110/208 VAC POWER DISTRIBUTION PANEL.
6. Is continuity present on wire 701C from circuit breaker CB9 to K35 relay base terminal 9?

**NO**

**YES**

- Repair or replace wire 701C (para 2-40).

**KNOWN INFO**

- 110 VAC outlets J231, J232, J233, and J234 OK.
- 110 VAC outlet J235 does not operate.
- Circuit breaker CB9 OK.

**POSSIBLE PROBLEMS**

- Faulty wire 701C.
- Faulty wire 702C.
- Faulty relay K35.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, wire 701C is faulty.
### CONTINUITY TEST

1. Loosen screw in cover.
2. Open cover on relay box assembly.
3. Set multimeter to ohms.
5. Connect negative (-) probe of multimeter to output terminal on circuit breaker CB9 and note reading on multimeter.
6. If continuity is not present, repair or replace wire 701C (para 2-40).
7. Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
e111. M1079 110 VAC OUTLET J230 DOES NOT OPERATE (CONT)

KNOWN INFO
110 VAC outlets J231, J232, J233, and J234 OK.
110 VAC outlet J235 does not operate.
Circuit breaker CB9 OK.
Wire 701C OK.

POSSIBLE PROBLEMS
Faulty wire 702C.
Faulty relay K35.

7. Is continuity present on wire 702C from K35 relay base terminal 6 to 110 VAC receptacle J230 supply pole?

TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, wire 702C is faulty. If continuity is present, relay K35 is faulty.

YES
- Repair or replace wire 702C (para 2-40).

NO
- Replace relay K35 (para 16-62).
**CONTINUITY TEST**

1. Remove screw and cover from 110 VAC outlet J230.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to K35 relay base terminal 6.
4. Connect negative (-) probe of multimeter to supply pole on 110 VAC receptacle J230 and note reading on multimeter.
5. If continuity is not present, repair or replace wire 702C (para 2-40).
6. If continuity is present, replace relay K35 (para 16-62).
7. Install cover on 110 VAC outlet J230 with screw.
8. Close cover on relay box assembly.
9. Tighten screw in cover.
1. Does either blackout light operate?

   - **NO**
     - Replace relay K36 (para 16-62).

   - **YES**

   **KNOW**
   - Emergency lights OK.
   - Faulty relay K36.
   - Faulty lamp.
   - Faulty blackout light.
   - Faulty wire 1505.
   - Faulty wire 1505B.
   - Faulty wire 3086.

   **POSSIBLE PROBLEMS**

   **TEST OPTIONS**
   - Visual Inspection
     - If neither blackout light operates, relay K36 is faulty.

---

**INITIAL SETUP**

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

**Materials/Parts**
- Lockwasher (12) (Item 81, 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)

**Personnel Required**
- (2)

**References**
- TM 9-4910-571-12&P
(1) Push in circuit breaker CB11 (TM 9-2320-365-10).
(2) Push in circuit breaker CB10 (TM 9-2320-365-10).
(3) Position INTERIOR LIGHTS switch S32 to ON (TM 9-2320-365-10).
(4) Position LIGHTS/BLACKOUT OVERRIDE switch S33 to BLACKOUT (TM 9-2320-365-10).
(5) Open any blackout shield or RH door (TM 9-2320-365-10).
(6) Check to see if either blackout light operates.
(7) If neither blackout light operates, replace relay K36 (para 16-62).
(8) Position INTERIOR LIGHTS switch S32 to OFF (TM 9-2320-365-10).
(9) Pull out circuit breaker CB10 (TM 9-2320-365-10).
(10) Pull out circuit breaker CB11 (TM 9-2320-365-10).
2. M1079 BLACKOUT LIGHT(S) DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency lights OK.</td>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
<tr>
<td>Relay K36 OK.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty lamp.</td>
<td>If continuity is not present, lamp is faulty.</td>
</tr>
<tr>
<td>Faulty blackout light.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 1505.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 1505B.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 3086.</td>
<td></td>
</tr>
</tbody>
</table>

Is continuity present across lamp?

- **YES**: Replace lamp (para 16-58).
- **NO**: If continuity is not present, lamp is faulty.
CONTINUITY TEST

NOTE
Both blackout light lamps
are tested the same way.
Refer to Table 2-14, M1079
Blackout Light Locations
and Connector Numbers for
details. Blackout light DS75
shown.

(1) Remove four screws and lens from base.
(2) Remove gasket from base.
(3) Remove lamp from base.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to
center contact of lamp base.
(6) Connect negative (-) probe of multimeter to
lamp base and note reading on multimeter.
(7) If continuity is not present, replace lamp
(para 16-58).
(8) Install lamp in base.
(9) Install gasket on base.
(10) Install lens on base with four screws.

Table 2-14. M1079 Blackout Light Locations
and Connector Numbers

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>NUMBER</th>
<th>CONNECTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH side</td>
<td>DS75</td>
<td>J162, P162</td>
</tr>
<tr>
<td>LH side</td>
<td>DS76</td>
<td>J164, P164</td>
</tr>
</tbody>
</table>

LOCATION

RH side

LH side

SCREW

GASKET

LENS

BASE

LAMP

BASE

CENTER CONTACT

Table 2-14. M1079 Blackout Light Locations
and Connector Numbers
112. M1079 BLACKOUT LIGHT(S) DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Emergency lights OK.
- Relay K36 OK.
- Lamp OK.

**POSSIBLE PROBLEMS**
- Faulty blackout light.
- Faulty wire 1505.
- Faulty wire 1505B.
- Faulty wire 3086.

3. **Is continuity present from socket 1 to pin 2 of blackout light connector?**

**TEST OPTIONS**
- Continuity Test or
- STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, blackout light is faulty.

**YES**
- Replace blackout light (para 16-58).

**NO**
CONTINUITY TEST

(1) Remove 12 screws, lockwashers, and washers from raceway cover. Discard lockwashers.
(2) Remove raceway cover from raceway.
   NOTE
   Both blackout lights are tested the same way. Refer to Table 2-14. M1079 Blackout Light
   Locations and Connector Numbers for details. Blackout Light DS75 shown.
(3) Disconnect J connector from P connector.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to socket 1 of J connector.
(6) Connect negative (-) probe of multimeter to pin 2 of J connector and note reading on multimeter.
(7) If continuity is not present, replace blackout light (para 16-58).
e112. M1079 BLACKOUT LIGHT(S) DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency lights OK.</td>
</tr>
<tr>
<td>Relay K36 OK.</td>
</tr>
<tr>
<td>Lamp OK.</td>
</tr>
<tr>
<td>Blackout light OK.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
</tr>
<tr>
<td>Faulty wire 1505.</td>
</tr>
<tr>
<td>Faulty wire 1505B.</td>
</tr>
<tr>
<td>Faulty wire 3086.</td>
</tr>
</tbody>
</table>

**WARNING**
Read WARNING on following page.

4. Is 24 vdc present on pin 1 of P connector?

- **YES**
  - Repair or replace wire 1505(B) (para 2-40).

- **NO**
  - If 24 vdc is not present, wire 1505(B) is faulty. If 24 vdc is present, wire 3086 is faulty.
  - Repair or replace wire 3086 (para 2-40).

**TEST OPTIONS**
Voltage Test or STE/ICE-R #89

**REASON FOR QUESTION**
If 24 vdc is not present, wire 1505(B) is faulty. If 24 vdc is present, wire 3086 is faulty.
WARNING

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

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Push in circuit breaker CB11 (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(2) Push in circuit breaker CB10 (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(3) Position INTERIOR LIGHTS switch S32 to ON (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(4) Set multimeter to volts dc.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to pin 1 of P connector. Refer to Table 2-14. M1079 Blackout Light Locations and Connector Numbers.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) If 24 vdc is not present, repair or replace wire 1505(B) (para 2-40).</td>
</tr>
<tr>
<td>(8) If 24 vdc is present, repair or replace wire 3086 (para 2-40).</td>
</tr>
<tr>
<td>(9) Position INTERIOR LIGHTS switch S32 to OFF (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(10) Pull out circuit breaker CB10 (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(11) Pull out circuit breaker CB11 (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(12) Install blackout light (para 16-58).</td>
</tr>
</tbody>
</table>
e113. M1079 EMERGENCY LIGHTS(S) 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 (12) (emergency lights DS78, DS79, and DS97) (Item 81, Appendix G)
Lockwasher (16) (emergency light DS96) (Item 81, Appendix G)

Personnel Required
(2)

References
TM 9-4910-571-12&P

START

TEST OPTIONS
Visual Inspection

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

TABLE

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
<td>Faulty wire 1505A.</td>
</tr>
<tr>
<td></td>
<td>Faulty relay K41.</td>
</tr>
<tr>
<td></td>
<td>Faulty wire 38A.</td>
</tr>
<tr>
<td></td>
<td>Faulty relay K36.</td>
</tr>
<tr>
<td></td>
<td>Faulty lamp.</td>
</tr>
<tr>
<td></td>
<td>Faulty emergency light.</td>
</tr>
<tr>
<td></td>
<td>Faulty wire 38B.</td>
</tr>
<tr>
<td></td>
<td>Faulty wire 3086.</td>
</tr>
</tbody>
</table>

1. Does any emergency light operate?

NO

YES

Go to step 5 of this fault.
(1) Disconnect AC power (TM 9-2320-365-10).
(2) Push in circuit breaker CB11 (TM 9-2320-365-10).
(3) Push in circuit breaker CB10 (TM 9-2320-365-10).
(4) Position INTERIOR LIGHTS switch S32 to ON (TM 9-2320-365-10).
(5) Position LIGHTS/BLACKOUT OVERRIDE switch S33 to BLACKOUT OVERRIDE (TM 9-2320-365-10).
(6) Check to see if any emergency light illuminates.
(7) If all emergency lights do not illuminate, go to step 5 of this fault.
(8) Position LIGHTS/BLACKOUT OVERRIDE switch S33 to BLACKOUT (TM 9-2320-365-10).
(9) Position INTERIOR LIGHTS switch S32 to OFF (TM 9-2320-365-10).
(10) Pull out circuit breaker CB10 (TM 9-2320-365-10).
(11) Pull out circuit breaker CB11 (TM 9-2320-365-10).
2. Is continuity present across lamp?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Relay K36 OK.</td>
</tr>
<tr>
<td>Relay K41 OK.</td>
</tr>
<tr>
<td>Wire 38A OK.</td>
</tr>
<tr>
<td>Wire 1505A OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty lamp.</td>
</tr>
<tr>
<td>Faulty emergency light.</td>
</tr>
<tr>
<td>Faulty wire 38B.</td>
</tr>
<tr>
<td>Faulty wire 3086.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, lamp is faulty.</td>
</tr>
</tbody>
</table>

YES: Replace lamp (para 16-58).
NO:
NOTE
All emergency light lamps are tested the same way. Refer to Table 2-15. M1079 Emergency Light Locations and Connector Numbers for details. Emergency light DS78 shown.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove four screws and lens from base.</td>
</tr>
<tr>
<td>(2) Remove gasket from base.</td>
</tr>
<tr>
<td>(3) Remove lamp from base.</td>
</tr>
<tr>
<td>(4) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to center contact of lamp.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to lamp base and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) If continuity is not present, replace lamp (16-58).</td>
</tr>
<tr>
<td>(8) Install lamp in base.</td>
</tr>
</tbody>
</table>

Table 2-15. M1079 Emergency Light Locations and Connector Numbers

<table>
<thead>
<tr>
<th>Location</th>
<th>Number</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH Side</td>
<td>DS78</td>
<td>J163, P163</td>
</tr>
<tr>
<td>LH Side</td>
<td>DS79</td>
<td>J165, P165</td>
</tr>
<tr>
<td>Front</td>
<td>DS96</td>
<td>J166, P166</td>
</tr>
<tr>
<td>Rear</td>
<td>DS97</td>
<td>J167, P167</td>
</tr>
</tbody>
</table>
e113. M1079 EMERGENCY LIGHT(S) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**
Blackout lights OK.
Relay K36 OK.
Relay K41 OK.
Wire 38A OK.
Wire 1505A OK.
Lamp OK.

**POSSIBLE PROBLEMS**
Faulty emergency light.
Faulty wire 38B.
Faulty wire 3086.

3. Is continuity present from socket 1 to pin 2 of emergency light connector?

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, emergency light is faulty.

**CAUTION**
Read CAUTION on following page.

**YES**
Replace M1079 emergency light (para 16-58).

**NO**
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

All emergency lights are tested the same way. Refer to Table 2-15. M1079 Emergency Light Locations and Connector Numbers for details. Emergency light DS78 shown.

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 12 screws, lockwashers, and washers from raceway cover. Discard lockwashers.

**NOTE**

Perform step (2) on front raceway cover.

(2) Remove two screws, lockwashers, and washers from each end of raceway cover. Discard lockwashers.

(3) Remove raceway cover from raceway.

(4) Disconnect J connector from P connector.

(5) Set multimeter to ohms.

(6) Connect positive (+) probe of multimeter to socket 1 of J connector.

(7) Connect negative (-) probe of multimeter to pin 2 of J connector and note reading on multimeter.

(8) If continuity is not present, replace M1079 emergency light (para 16-58).
WARNING

CAUTION

Read WARNING and CAUTION on following page.

4.

Is 24 VDC present on socket 2 of connector P?

YES

Repair or replace wire 3086 (para 2-40).

NO

Repair or replace wire 38B (para 2-40).

KNOWN INFO
Blackout lights OK.
Relay K36 OK.
Relay K41 OK.
Wire 38A OK.
Wire 1505A OK.
Lamp OK.
Emergency light OK.

POSSIBLE PROBLEMS
Faulty wire 38B.
Faulty wire 3086.

TEST OPTIONS
Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION
If 24 VDC is not present, wire 38B is faulty. If 24 VDC is present, wire 3086 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.

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

3. Position INTERIOR LIGHTS switch S32 to ON (TM 9-2320-365-10).
5. Set multimeter to volts DC.
6. Connect positive (+) probe of multimeter to socket 2 of P connector. Refer to Table 2-15. M1079 Emergency Light Locations and Connector Numbers.
7. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
8. If 24 VDC is not present, repair or replace wire 38B (para 2-40).
9. If 24 VDC is present, repair or replace wire 3086 (para 2-40).
11. Position INTERIOR LIGHTS switch to OFF (TM 9-2320-365-10).
e113. M1079 EMERGENCY LIGHT(S) DOES NOT ILLUMINATE (CONT)

KNOWN INFO

- Blackout lights OK.
- All emergency lights do not operate.

POSSIBLE PROBLEMS

- Faulty wire 1505A.
- Faulty relay K41.
- Faulty wire 38A.
- Faulty relay K36.

TEST OPTIONS

- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION

- If continuity is not present, wire 1505A is faulty.

5. Is continuity present on wire 1505A from K36 relay base terminal 8 to K41 relay base terminal 8?

- NO
  - Repair or replace wire 1505A (para 2-40).
- YES
CONTINUITY TEST

(1) Loosen screw in cover.
(2) Open cover on relay box assembly.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to K36 relay base terminal 8.
(5) Connect negative (-) probe of multimeter to K41 relay base terminal 8 and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 1505A (para 2-40).
e113. M1079 EMERGENCY LIGHT(S) DOES NOT ILLUMINATE (CONT)

6.
Is continuity present from K41 relay base terminal 8 to terminal 2?

**KNOWLEDGE INFO**
- Blackout lights OK.
- All emergency lights do not operate.
- Wire 1505A OK.

**POSSIBLE PROBLEMS**
- Faulty relay K41.
- Faulty wire 38A.
- Faulty relay K36.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, relay K41 is faulty.

**IF NO**
- Replace relay K41 (para 16-62).

**IF YES**
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to K4 relay base terminal 8.
(3) Connect negative (-) probe of multimeter to K41 relay base terminal 2 and note reading on multimeter.
(4) If continuity is not present, replace relay K41 (para 16-62).
7. Is continuity present on wire 38A from K41 relay base terminal 2 to K36 relay base terminal 9? 

**KNOWN INFO**

Blackout lights OK.  
All emergency lights do not operate.  
Wire 1505A OK.  
Relay K41 OK. 

**POSSIBLE PROBLEMS**

Faulty wire 38A.  
Faulty relay K36. 

**TEST OPTIONS**

Continuity Test or STE/ICE-R Test #91 

**REASON FOR QUESTION**

If continuity is not present, wire 38A is faulty. If continuity is present, relay K36 is faulty. 

**YES**

Repair or replace wire 38A (para 2-40).

**NO**

Replace relay K36 (para 16-62).
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to K4 relay base terminal 2.
3. Connect negative (-) probe of multimeter to K36 relay base terminal 9 and note reading on multimeter.
4. If continuity is not present, repair or replace wire 38A (para 2-40).
5. If continuity is present, replace relay K36 (para 16-62).
6. Close cover on relay box assembly.
7. Tighten screw in cover.
KNOWLEDGE OR PERSONNEL

Potential Problems

Faulty positive field telephone binding post.
Faulty negative field telephone binding post.
Faulty external positive field telephone binding post.
Faulty external negative field telephone binding post.
Faulty wire 424.
Faulty wire 425.
Faulty wire 424A.
Faulty wire 425A.

TEST OPTIONS

Visual inspection

REASON FOR QUESTION

This question helps eliminate possible problems and determines where troubleshooting continues.

GO TO:

YES: Go to step 5 of this fault.

NO: Does field telephone operate on PHONE 1 field telephone binding posts?

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
(1) Install field telephone on PHONE 1 field telephone binding posts.
(2) Operate field telephone.
(3) If field telephone does not operate, go to step 5 of this fault.
(4) Remove field telephone from PHONE 1 field telephone binding posts.
e114. M1079 PHONE 1 AND/OR 2 BINDING POST DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field telephone operates on PHONE 1 field telephone binding posts.</td>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty PHONE 2 positive field telephone binding post.</td>
<td>If continuity is not present, PHONE 2 positive field telephone binding post is faulty.</td>
</tr>
<tr>
<td>Faulty PHONE 2 negative field telephone binding post.</td>
<td></td>
</tr>
<tr>
<td>Faulty external positive field telephone binding post.</td>
<td></td>
</tr>
<tr>
<td>Faulty external negative field telephone binding post.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 424A.</td>
<td></td>
</tr>
<tr>
<td>Faulty wire 425A.</td>
<td></td>
</tr>
</tbody>
</table>

2. Is continuity present across PHONE 2 positive field telephone binding post?

- **NO**
  - Replace PHONE 2 positive field telephone binding post (para 16-51).

- **YES**
  - Continue with troubleshooting.
CONTINUITY TEST

(1) Remove two screws and cover from PHONE 2 outlet box.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to one side of PHONE 2 positive field telephone binding post.
(4) Connect negative (-) probe of multimeter to other side of PHONE 2 positive field telephone binding post and note reading on multimeter.
(5) If continuity is not present, replace PHONE 2 positive field telephone binding post (para 16-51).
3. Is continuity present across PHONE 2 negative field telephone binding post?

- **YES**
  - Replace PHONE 2 negative field telephone binding post (para 16-51).

- **NO**
  - If continuity is not present, PHONE 2 negative field telephone binding post is faulty.

**KNOWN INFO**
- Field telephone operates on PHONE 1 field telephone binding posts.
- PHONE 2 positive field telephone binding post OK.

**POSSIBLE PROBLEMS**
- Faulty PHONE 2 negative field telephone binding post.
- Faulty external positive field telephone binding post.
- Faulty external negative field telephone binding post.
- Faulty wire 424A.
- Faulty wire 425A.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91
- If continuity is not present, PHONE 2 negative field telephone binding post is faulty.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to one side of PHONE 2 negative field telephone binding post.
(3) Connect negative (-) probe of multimeter to other side of PHONE 2 negative field telephone binding post and note reading on multimeter.
(4) If continuity is not present, replace PHONE 2 negative field telephone binding post (para 16-51).
(5) Install cover on PHONE 2 outlet box with two screws.
4. Is continuity present on wire 424A from PHONE 1 positive field telephone binding post to PHONE 2 positive field telephone binding post?

**Known Info**
- Field telephone operates on PHONE 1 field telephone binding posts.
- PHONE 2 field telephone binding posts OK.
- Possible Problems:
  - Faulty wire 424A.
  - Faulty wire 425A.

**Test Options**
- Continuity Test or STE/ICE-R Test #91

**Reason for Question**
- If continuity is not present, wire 424A is faulty. If continuity is present, wire 425A is faulty.

**Flowchart**
- If NO, Repair or replace wire 425A (para 2-40).
- If YES, Repair or replace wire 424A (para 2-40).
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to PHONE 1 positive field telephone binding post.
3. Connect negative (-) probe of multimeter to PHONE 2 positive field telephone binding post and note reading on multimeter.
4. If continuity is not present, repair or replace wire 424A (para 2-40).
5. If continuity is present, repair or replace wire 425A (para 2-40).
5. Is continuity present across PHONE 1 positive field telephone binding post?

- **YES**
  - Replace PHONE 1 positive field telephone binding post (para 16-51).

- **NO**
  - If continuity is not present, PHONE 1 positive field telephone binding post is faulty.

### KNOWN INFO

<table>
<thead>
<tr>
<th>Nothing</th>
</tr>
</thead>
</table>

### POSSIBLE PROBLEMS

- Faulty PHONE 1 positive field telephone binding post.
- Faulty PHONE 1 negative field telephone binding post.
- Faulty external positive field telephone binding post.
- Faulty external negative field telephone binding post.
- Faulty wire 424.
- Faulty wire 425.
- Faulty field telephone.

### TEST OPTIONS

- Continuity Test or STE/ICE-R Test #91

### REASON FOR QUESTION

- If continuity is not present, PHONE 1 positive field telephone binding post is faulty.
CONTINUITY TEST

(1) Remove two screws and cover from PHONE 1 outlet box.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to one side of PHONE 1 positive field telephone binding post.
(4) Connect negative (-) probe of multimeter to other side of PHONE 1 positive field telephone binding post and note reading on multimeter.
(5) If continuity is not present, replace PHONE 1 positive field telephone binding post (para 16-51).
e114. M1079 PHONE 1 AND/OR 2 BINDING POST DOES NOT OPERATE (CONT)

**KNOWN INFO**
- PHONE 1 Positive field telephone binding post OK.
- POSSIBLE PROBLEMS
  - Faulty PHONE 1 negative field telephone binding post.
  - Faulty external positive field telephone binding post.
  - Faulty external negative field telephone binding post.
  - Faulty wire 424.
  - Faulty wire 425.
  - Faulty field telephone.

6. Is continuity present across PHONE 1 negative field telephone binding post?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, PHONE 1 negative field telephone binding post is faulty.

YES

NO

Replace PHONE 1 negative field telephone binding post (para 16-51).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to one side of PHONE 1 negative field telephone binding post.
(3) Connect negative (-) probe of multimeter to other side of PHONE 1 negative field telephone binding post and note reading on multimeter.
(4) If continuity is not present, replace PHONE 1 negative field telephone binding post (para 16-51).
(5) Install cover on PHONE 1 outlet box with two screws.
7. Is continuity present across external positive field telephone binding post?

- **YES**
  - Replace external positive field telephone binding post (para 16-51).

- **NO**
  - If continuity is not present, external positive field telephone binding post is faulty.

**KNOWLEDGE**
- PHONE 1 field telephone binding posts OK.

**POSSIBLE PROBLEMS**
- Faulty external positive field telephone binding post.
- Faulty external negative field telephone binding post.
- Faulty wire 424.
- Faulty wire 425.
- Faulty field telephone.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, external positive field telephone binding post is faulty.
**CONTINUITY TEST**

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform step (1) on van body serial numbers 001 through 190.</td>
</tr>
</tbody>
</table>

(1) Remove 28 screws, lockwashers, washers, and cover from 110/208 vac power entry panel. Discard lockwashers.

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform step (2) on van bodies serial number 191 and higher.</td>
</tr>
</tbody>
</table>

(2) Remove 16 screws, lockwashers, washers, and cover from 110/208 vac power entry panel. Discard lockwashers.

(3) Set multimeter to ohms.

(4) Connect positive (+) probe of multimeter to one end of external positive field telephone binding post.

(5) Connect negative (-) probe of multimeter to other end of external positive field telephone binding post and note reading on multimeter.

(6) If continuity is not present, replace external positive field telephone binding post (para 16-51).
e114. M1079 PHONE 1 AND/OR 2 BINDING POST DOES NOT OPERATE (CONT)

**KNOWN INFO**
- PHONE 1 field telephone binding posts OK.
- External positive field telephone binding post OK.

**POSSIBLE PROBLEMS**
- Faulty external negative field telephone binding post.
- Faulty wire 424.
- Faulty wire 425.
- Faulty field telephone.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, external negative field telephone binding post is faulty.

**FLOWCHART**
- **8.** Is continuity present across external negative field telephone binding post?
  - **NO**
  - **YES**
    - Replace external negative field telephone binding post (para 16-51).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to one end of external negative field telephone binding post.
(3) Connect negative (-) probe of multimeter to other end of external negative field telephone binding post and note reading on multimeter.
(4) If continuity is not present, replace external negative field telephone binding post (para 16-51).

NOTE
Perform step (5) on van bodies serial number 191 and higher.

(5) Install cover on 110/208 vac power entry panel with 16 washers, lockwashers, and screws.

NOTE
Perform step (6) on van body serial numbers 001 through 190.

(6) Install cover on 110/208 vac power entry panel with 28 washers, lockwashers, and screws.
9. Is continuity present on wire 424 from external positive field telephone binding post to PHONE 1 positive field telephone binding post?

- YES
  - Repair or replace wire 424 (para 2-40).

- NO
  - Faulty wire 424.
  - Faulty wire 425.
  - Faulty field telephone.

**KNOWN INFO**
- PHONE 1 field telephone binding posts OK.
- External field telephone binding posts OK.

**POSSIBLE PROBLEMS**
- Faulty wire 424.
- Faulty wire 425.
- Faulty field telephone.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 424 is faulty.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PHONE 1 positive field telephone binding post.
(3) Connect negative (-) probe of multimeter to external positive field telephone binding post and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 424 (para 2-40).
114. M1079 PHONE 1 AND/OR 2 BINDING POST DOES NOT OPERATE (CONT)

**KNOWN INFO**
- PHONE 1 field telephone binding posts OK.
- External field telephone binding posts OK.
- Wire 424 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 425.
- Faulty field telephone.

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 425 is faulty. If continuity is present, notify Communications Section.</td>
</tr>
</tbody>
</table>

10. Is continuity present on wire 425 from external negative field telephone binding post to PHONE 1 negative field telephone binding post?

- **NO**
  - Notify Communications Section.

- **YES**
  - Repair or replace wire 425 (para 2-40).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to PHONE 1 negative field telephone binding post.
(3) Connect negative (-) probe of multimeter to external negative field telephone binding post and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 425 (para 2-40).
(5) If continuity is present, notify communications section.

POSITIVE FIELD TELEPHONE BINDING POST

PHONE 1

110/208 VAC POWER ENTRY PANEL

EXTERNAL POSITIVE FIELD TELEPHONE BINDING POST
START

1. Is continuity present across circuit breaker CB2?

- **YES**
  - Replace circuit breaker CB2 (para 16-64).

- **NO**
  - If continuity is not present, circuit breaker CB2 is faulty.

**KNOWN INFO**
- Fluorescent lights OK.
- 110 vac outlets OK.

**POSSIBLE PROBLEMS**
- Faulty circuit breaker CB2.
- Faulty wire 1500.
- Faulty wire 1501.
- Faulty wire 1505.
- Faulty wire 1499.
- Faulty M1079 A/C power cable.
- Faulty air conditioner.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, circuit breaker CB2 is faulty.

**INITIAL SETUP**

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- AC power disconnected (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
- TM 5-4120-384-14
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.</td>
</tr>
<tr>
<td>(2)</td>
<td>Remove circuit breaker CB2 from 110/208 VAC POWER DISTRIBUTION PANEL.</td>
</tr>
<tr>
<td>(3)</td>
<td>Position circuit breaker CB2 to ON (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(4)</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>(5)</td>
<td>Connect positive (+) probe of multimeter to top output terminal on circuit breaker CB2.</td>
</tr>
<tr>
<td>(6)</td>
<td>Connect negative (-) probe of multimeter to top input terminal on circuit breaker CB2 and note reading on multimeter.</td>
</tr>
<tr>
<td>(7)</td>
<td>Connect positive (+) probe of multimeter to middle output terminal on circuit breaker CB2.</td>
</tr>
<tr>
<td>(8)</td>
<td>Connect negative (-) probe of multimeter to middle input terminal on circuit breaker CB2 and note reading on multimeter.</td>
</tr>
<tr>
<td>(9)</td>
<td>Connect positive (+) probe of multimeter to bottom output terminal on circuit breaker CB2.</td>
</tr>
<tr>
<td>(10)</td>
<td>Connect negative (-) probe of multimeter to bottom input terminal on circuit breaker CB2 and note reading on multimeter.</td>
</tr>
<tr>
<td>(11)</td>
<td>If continuity is not present in steps (6), (8), and (10), replace circuit breaker CB2 (para 16-64).</td>
</tr>
<tr>
<td>(12)</td>
<td>Install circuit breaker CB2 on 110/208 VAC POWER DISTRIBUTION PANEL.</td>
</tr>
</tbody>
</table>
2. Is continuity present on wire 1500 from circuit breaker CB2 to air conditioner connector J242 socket A?

**YES**
- Repair or replace wire 1500 (para 2-40).

**NO**
- Test options: Continuity Test or STE/ICE-R #91
- Reason for question: If continuity is not present, wire 1500 is faulty.

**Known Info**
- Fluorescent lights OK.
- 110 vac outlets OK.
- Circuit breaker CB2 OK.

**Possible Problems**
- Faulty wire 1500.
- Faulty wire 1501.
- Faulty wire 1502.
- Faulty wire 1499M.
- Faulty M1079 A/C power cable.
- Faulty air conditioner.
## CONTINUITY TEST

1. Disconnect connector P242 from air conditioner connector J242.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to top output terminal on circuit breaker CB2.
4. Connect negative (-) probe of multimeter to air conditioner connector J242 socket A and note reading on multimeter.
5. If continuity is not present, repair or replace wire 1500 (para 2-40).
e115. M1079 AIR CONDITIONER DOES NOT OPERATE (CONT)

3. Is continuity present on wire 1501 from circuit breaker CB2 to air conditioner connector J242 socket B?

- **YES**
  - Repair or replace wire 1501 (para 2-40).

- **NO**
  - Faulty wire 1501.
  - Faulty wire 1502.
  - Faulty wire 1499M.
  - Faulty M1079 A/C power cable.
  - Faulty air conditioner.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 1501 is faulty.

**KNOWN INFO**
- Fluorescent lights OK.
- 110 vac outlets OK.
- Circuit breaker CB2 OK.
- Wire 1500 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1501.
- Faulty wire 1502.
- Faulty wire 1499M.
- Faulty M1079 A/C power cable.
- Faulty air conditioner.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to middle output terminal on circuit breaker CB2.
(3) Connect negative (-) probe of multimeter to air conditioner connector J242 socket B and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 1501 (para 2-40).
115. M1079 AIR CONDITIONER DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Fluorescent lights OK.
- 110 vac outlets OK.
- Circuit breaker CB2 OK.
- Wire 1500 OK.
- Wire 1501 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1502.
- Faulty wire 1499M.
- Faulty M1079 A/C power cable.
- Faulty air conditioner.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 1502 is faulty.

4. Is continuity present on wire 1502 from circuit breaker CB2 to air conditioner connector J242 socket C?

**YES**
- Repair or replace wire 1502 (para 2-40).

**NO**
CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to bottom output terminal on circuit breaker CB2.
3. Connect negative (-) probe of multimeter to air conditioner connector J242 socket C and note reading on multimeter.
4. If continuity is not present, repair or replace wire 1502 (para 2-40).
e115. M1079 AIR CONDITIONER DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Fluorescent lights OK.
- 110 vac outlets OK.
- Circuit breaker CB2 OK.
- Wire 1500 OK.
- Wire 1501 OK.
- Wire 1502 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 1499M.
- Faulty M1079 A/C power cable.
- Faulty air conditioner.

5. **TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
If continuity is not present, wire 1499M is faulty.

**YES**
- Repair or replace wire 1499M (para 2-40).

**NO**
- Is continuity present on wire 1499M from terminal board TB4 to air conditioner connector J242 socket D?

---

2-1272
CONTINUITY TEST

(1) Loosen screw in terminal board TB4.
(2) Remove wire 1499M from terminal board TB4.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 1499M.
(5) Connect negative (-) probe of multimeter to air conditioner connector J242 socket D and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 1499M (para 2-40).
(7) Install wire 1499M on terminal board TB4.
(8) Tighten screw in terminal board TB4.
(9) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
115. M1079 AIR CONDITIONER DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Fluorescent lights OK.
- 110 vac outlets OK.
- Circuit breaker CB2 OK.
- Wire 1500 OK.
- Wire 1501 OK.
- Wire 1502 OK.
- Wire 1499M OK.

**POSSIBLE PROBLEMS**
- Faulty M1079 A/C power cable.
- Faulty air conditioner.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, M1079 A/C power cable is faulty.

**6.**
Is continuity present on M1079 A/C power cable?

- **NO**
  - Replace M1079 A/C power cable (para 20-82).

- **YES**
  - Replace M1079 A/C power cable (para 20-82).

- Troubleshoot air conditioner (TM 5-4120-384-14).
(1) Disconnect connector J242A from air conditioner POWER INPUT connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P242 socket A.
(4) Connect negative (-) probe of multimeter to connector J242A pin A and note reading on multimeter.
(5) Connect positive (+) probe of multimeter to connector P242 socket B.
(6) Connect negative (-) probe of multimeter to connector J242A pin B and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to connector P242 socket C.
(8) Connect negative (-) probe of multimeter to connector J242A pin C and note reading on multimeter.
(9) Connect positive (+) probe of multimeter to connector P242 socket D.
(10) Connect negative (-) probe of multimeter to connector J242A pin D and note reading on multimeter.
(11) If continuity is not present in steps (4), (6), (8), and (10), replace M1079 A/C power cable (para 20-82).
(12) If continuity is present, troubleshoot air conditioner (TM 5-4120-384-14).
(13) Connect connector J242A to air conditioner POWER INPUT connector.
(14) Connect connector P242 to air conditioner connector J242.
e116. M1079 HEATER DOES NOT OPERATE

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Condition</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>AC power disconnected (TM 9-2320-365-10).</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personnel Required</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>TM 9-4910-571-12&amp;P</td>
</tr>
<tr>
<td></td>
<td>TM 5-4520-253-13</td>
</tr>
</tbody>
</table>

KNOWN INFO

Fan OK.

POSSIBLE PROBLEMS

Faulty wire 400.
Faulty wire 1499A.
Faulty wire 3085A.
Faulty M1079 heater power cable.
Faulty wire 401.
Faulty wire 1499R.
Faulty wire 3086C.
Faulty M1079 heater thermostat cable.
Faulty M1079 heater thermostat.
Faulty M1079 heater control cable.
Faulty M1079 heater.

TEST OPTIONS

Continuity Test or STE/ICE-R #91

REASON FOR QUESTION

If continuity is not present, wire 400 is faulty.

START

1. Is continuity present on wire 400 from circuit breaker CB8 to HEATER connector J244 socket A?

NO

YES

Repair or replace wire 400 (para 2-40).
CONTINUITY TEST

(1) Disconnect connector P244 from HEATER connector J244.
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to output terminal on circuit breaker CB8.
(5) Connect negative (-) probe of multimeter to HEATER connector J244 socket A and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 400 (para 2-40).
**116. M1079 HEATER DOES NOT OPERATE (CONT)**

### KNOWN INFO
- Fan OK.
- Wire 400 OK.

### POSSIBLE PROBLEMS
- Faulty wire 1499A.
- Faulty wire 3085A.
- Faulty M1079 heater power cable.
- Faulty wire 401.
- Faulty wire 1499R.
- Faulty wire 3086C.
- Faulty M1079 heater thermostat cable.
- Faulty M1079 heater thermostat.
- Faulty M1079 heater control cable.
- Faulty M1079 heater.

### TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

### REASON FOR QUESTION
- If continuity is not present, wire 1499A is faulty.

2. Is continuity present on wire 1499A from terminal board TB4 to HEATER connector J244 socket C.

- **NO**
  - Faulty wire 1499A.
  - Faulty wire 3085A.
  - Faulty M1079 heater power cable.
  - Faulty wire 401.
  - Faulty wire 1499R.
  - Faulty wire 3086C.
  - Faulty M1079 heater thermostat cable.
  - Faulty M1079 heater thermostat.
  - Faulty M1079 heater control cable.
  - Faulty M1079 heater.

- **YES**
  - Repair or replace wire 1499A (para 2-40).
CONTINUITY TEST

1. Loosen screw in terminal board TB4.
2. Remove wire 1499A from terminal board TB4.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to wire 1499A.
5. Connect negative (-) probe of multimeter to HEATER connector J244 socket C and note reading on multimeter.
6. If continuity is not present, repair or replace wire 1499A (para 2-40).
3. Is continuity present on wire 3085A from terminal board TB3 to HEATER connector J244 socket D?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085A is faulty.

**KNOWN INFO**
- Fan OK.
- Wire 400 OK.
- Wire 1499A OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085A.
- Faulty M1079 heater power cable.
- Faulty wire 401.
- Faulty wire 1499R.
- Faulty wire 3086C.
- Faulty M1079 heater thermostat cable.
- Faulty M1079 heater thermostat.
- Faulty M1079 heater control cable.
- Faulty M1079 heater.

**YES**
- Repair or replace wire 3085A (para 2-40).

**NO**
CONTINUITY TEST

(1) Loosen screw in terminal board TB3.
(2) Remove wire 3085A from terminal board TB3.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to wire 3085A.
(5) Connect negative (-) probe of multimeter to HEATER connector J244 socket D and note reading on multimeter.
(6) If continuity is not present, repair or replace wire 3085A (para 2-40).
(7) Install wire 3085A on terminal board TB3.
(8) Tighten screw in terminal board TB3.
(9) Install wire 1499A on terminal board TB4.
(10) Tighten screw in terminal board TB4.
(11) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
116. M1079 HEATER DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan OK.</td>
</tr>
<tr>
<td>Wire 400 OK.</td>
</tr>
<tr>
<td>Wire 1499A OK.</td>
</tr>
<tr>
<td>Wire 3085A OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty M1079 heater power cable.</td>
</tr>
<tr>
<td>Faulty wire 401.</td>
</tr>
<tr>
<td>Faulty wire 1499R.</td>
</tr>
<tr>
<td>Faulty wire 3086C.</td>
</tr>
<tr>
<td>Faulty M1079 heater thermostat cable.</td>
</tr>
<tr>
<td>Faulty M1079 heater thermostat.</td>
</tr>
<tr>
<td>Faulty M1079 heater control cable.</td>
</tr>
<tr>
<td>Faulty M1079 heater.</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, M1079 heater power cable is faulty.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, M1079 heater power cable is faulty.

4. Is continuity present on M1079 heater power cable?

- **NO**
  - Replace M1079 heater power cable (para 20-42).

- **YES**
(1) Remove heater deflector/duct and hood (para 20-50).
(2) Disconnect connector J244A from heater POWER RECEPTACLE connector.
(3) Set multimeter to ohms.
(4) Connect positive (+) probe of multimeter to connector P244 pin A.
(5) Connect negative (-) probe of multimeter to connector J244A socket A and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to connector P244 pin C.
(7) Connect negative (-) probe of multimeter to connector J244A socket C and note reading on multimeter.
(8) Connect positive (+) probe of multimeter to connector P244 pin D.
(9) Connect negative (-) probe of multimeter to connector J244A socket D and note reading on multimeter.
(10) If continuity is not present in step 5, 7, or 9, replace M1079 heater power cable (para 20-50).
(11) Connect connector J244A to heater POWER RECEPTACLE connector.
**116. M1079 HEATER DOES NOT OPERATE (CONT)**

**KNOWN INFO**
- Fan OK.
- Wire 400 OK.
- Wire 1499A OK.
- Wire 3085A OK.
- M1079 heater power cable OK.

**POSSIBLE PROBLEMS**
- Faulty wire 401.
- Faulty wire 1499R.
- Faulty wire 3086C.
- Faulty M1079 heater thermostat cable.
- Faulty M1079 heater thermostat.
- Faulty M1079 heater control cable.
- Faulty M1079 heater.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 401 is faulty.

**5.**
Is continuity present on wire 401 from THERMOSTAT connector P245 pin C to thermostat terminal 3?

- **NO**
  - Repair or replace wire 401 (para 2-40).

- **YES**
CONTINUITY TEST

1. Loosen screw in thermostat cover.
2. Remove thermostat cover from thermostat.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to thermostat terminal 3.
5. Connect negative (-) probe of multimeter to THERMOSTAT connector P245 pin C and note reading on multimeter.
6. If continuity is not present, repair or replace wire 401 (para 2-40).
6. Is continuity present on wire 1499R from THERMOSTAT connector P245 pin A to thermostat terminal 1?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan OK.</td>
</tr>
<tr>
<td>Wire 400 OK.</td>
</tr>
<tr>
<td>Wire 1499A OK.</td>
</tr>
<tr>
<td>Wire 3085A OK.</td>
</tr>
<tr>
<td>M1079 heater power cable OK.</td>
</tr>
<tr>
<td>Wire 401 OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 1499R.</td>
</tr>
<tr>
<td>Faulty wire 3086C.</td>
</tr>
<tr>
<td>Faulty M1079 heater thermostat cable.</td>
</tr>
<tr>
<td>Faulty M1079 heater thermostat.</td>
</tr>
<tr>
<td>Faulty M1079 heater control cable.</td>
</tr>
<tr>
<td>Faulty M1079 heater.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

If continuity is not present, wire 1499R is faulty.

If continuity is present, wire 1499R is OK.

Repair or replace wire 1499R (para 2-40).
## CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to thermostat terminal 1.
3. Connect negative (-) probe of multimeter to THERMOSTAT connector P245 pin A and note reading on multimeter.
4. If continuity is not present, repair or replace wire 1499R (para 2-40).
M1079 HEATER DOES NOT OPERATE (CONT)

7. Is continuity present on wire 3086C from THERMOSTAT connector P245 pin B to thermostat ground terminal?

**KNOWN INFO**

- Fan OK.
- Wire 400 OK.
- Wire 1499A OK.
- Wire 3085A OK.
- M1079 heater power cable OK.
- Wire 401 OK.
- Wire 1499R OK.

**POSSIBLE PROBLEMS**

- Faulty wire 3086C.
- Faulty M1079 heater thermostat cable.
- Faulty M1079 heater thermostat.
- Faulty M1079 heater control cable.
- Faulty M1079 heater.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91
- If continuity is not present, wire 3086C is faulty.

**REASON FOR QUESTION**

- Repair or replace wire 3086C (para 2-40).
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to thermostat ground terminal.
3. Connect negative (-) probe of multimeter to THERMOSTAT connector P245 pin B and note reading on multimeter.
4. If continuity is not present, repair or replace wire 3086C (para 2-40).
8. Is continuity present on M1079 heater thermostat cable?

- **YES**
  - Replace M1079 heater thermostat cable (para 20-45).

- **NO**
  - If continuity is not present, M1079 heater thermostat cable is faulty.
CONTINUITY TEST

(1) Disconnect connector P245A from ROOM THERMO connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P245A pin A.
(4) Connect negative (-) probe of multimeter to connector J245 socket A and note reading on multimeter.
(5) Connect positive (+) probe of multimeter to connector P245A pin B.
(6) Connect negative (-) probe of multimeter to connector J245 socket B and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to connector P245A pin C.
(8) Connect negative (-) probe of multimeter to connector J245 socket C and note reading on multimeter.
(9) If continuity is not present in step 4, 6, or 8, replace M1079 heater thermostat cable (para 20-45).
(10) Connect connector P245A to ROOM THERMO connector.
e116. M1079 HEATER DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan OK.</td>
<td>Continuity Test or</td>
</tr>
<tr>
<td>Wire 400 OK.</td>
<td>STE/ICE-R Test #91</td>
</tr>
<tr>
<td>Wire 1499A OK.</td>
<td>REASON FOR QUESTION</td>
</tr>
<tr>
<td>Wire 3085A OK.</td>
<td>If continuity is not present,</td>
</tr>
<tr>
<td>M1079 heater power</td>
<td>M1079 heater thermostat is faulty.</td>
</tr>
<tr>
<td>cable OK.</td>
<td></td>
</tr>
<tr>
<td>Wire 401 OK.</td>
<td></td>
</tr>
<tr>
<td>Wire 1499R OK.</td>
<td></td>
</tr>
<tr>
<td>Wire 3086C OK.</td>
<td></td>
</tr>
<tr>
<td>M1079 heater thermostat</td>
<td></td>
</tr>
<tr>
<td>cable OK.</td>
<td></td>
</tr>
</tbody>
</table>

9. Is continuity present across M1079 heater thermostat?

   YES

   NO

   Replace M1079 heater thermostat (para 20-44).

POSSIBLE PROBLEMS

Faulty M1079 heater thermostat.
Faulty M1079 heater control cable.
Faulty M1079 heater.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Set M1079 heater thermostat to highest setting (TM 9-2320-365-10).
(3) Connect positive (+) probe of multimeter to thermostat terminal 3.
(4) Connect negative (-) probe of multimeter to thermostat terminal 1 and note reading on multimeter.
(5) If continuity is not present, replace M1079 heater thermostat (para 20-44).
(6) Install thermostat cover on thermostat.
(7) Tighten screw in thermostat cover.
116. M1079 HEATER DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan OK.</td>
</tr>
<tr>
<td>Wire 400 OK.</td>
</tr>
<tr>
<td>Wire 1499A OK.</td>
</tr>
<tr>
<td>Wire 3085A OK.</td>
</tr>
<tr>
<td>M1079 heater power cable OK.</td>
</tr>
<tr>
<td>Wire 401 OK.</td>
</tr>
<tr>
<td>Wire 1499R OK.</td>
</tr>
<tr>
<td>Wire 3086C OK.</td>
</tr>
<tr>
<td>M1079 heater thermostat cable OK.</td>
</tr>
<tr>
<td>M1079 heater thermostat OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty M1079 heater control cable.</td>
</tr>
<tr>
<td>Faulty M1079 heater.</td>
</tr>
</tbody>
</table>

10. Is continuity present on M1079 heater control cable?

- **YES**
  - Replace M1079 heater control cable (para 20-43).

- **NO**
  - **TEST OPTIONS**
    - Continuity Test or STE/ICE-R Test #91

  - **REASON FOR QUESTION**
    - If continuity is not present, M1079 heater control cable is faulty. If continuity is present, M1079 heater is faulty.

Troubleshoot M1079 heater (TM 5-4520-253-13).
## CONTINUITY TEST

1. Disconnect connector P4A from heater connector.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to connector P4A pin 1.
4. Connect negative (−) probe of multimeter to connector J4A socket 1 and note reading on multimeter.
5. Connect positive (+) probe of multimeter to connector P4A pin 2.
6. Connect negative (−) probe of multimeter to connector J4A socket 2 and note reading on multimeter.
7. Connect positive (+) probe of multimeter to connector P4A pin 3.
8. Connect negative (−) probe of multimeter to connector J4A socket 3 and note reading on multimeter.
9. Connect positive (+) probe of multimeter to connector P4A pin 4.
10. Connect negative (−) probe of multimeter to connector J4A socket 4 and note reading on multimeter.
11. Connect positive (+) probe of multimeter to connector P4A pin 5.
12. Connect negative (−) probe of multimeter to connector J4A socket 5 and note reading on multimeter.
13. Connect positive (+) probe of multimeter to connector P4A pin 6.
14. Connect negative (−) probe of multimeter to connector J4A socket 6 and note reading on multimeter.
15. Connect positive (+) probe of multimeter to connector P4A pin 7.
16. Connect negative (−) probe of multimeter to connector J4A socket 7 and note reading on multimeter.
17. Connect positive (+) probe of multimeter to connector P4A pin 8.
18. Connect negative (−) probe of multimeter to connector J4A socket 8 and note reading on multimeter.
19. If continuity is not present in step 4, 6, 8, 10, 12, 14, 16, or 18, replace M1079 heater control cable (para 20-53).
20. If continuity is present, troubleshoot M1079 heater (TM 5-4520-253-13).
21. Connect connector P127 to heater connector.
22. Install M1079 heater deflector/duct (para 20-50).
e117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE

**INITIAL SETUP**

<table>
<thead>
<tr>
<th>Equipment Condition</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>AC power disconnected (TM 9-2320-365-10).</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personnel Required</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>TM 9-4910-571-12&amp;P</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Emergency lights OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 49A.</td>
</tr>
<tr>
<td>Faulty positive 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty wire 3085AD.</td>
</tr>
<tr>
<td>Faulty ground 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty fuse.</td>
</tr>
<tr>
<td>Faulty M1079 12/24 vdc power cable.</td>
</tr>
<tr>
<td>Faulty circuit breaker CB11.</td>
</tr>
<tr>
<td>Faulty wire 49.</td>
</tr>
<tr>
<td>Faulty positive 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty wire 3085L.</td>
</tr>
<tr>
<td>Faulty negative 24 vdc binding post.</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**

<table>
<thead>
<tr>
<th>Visual inspection</th>
</tr>
</thead>
</table>

**REASON FOR QUESTION**

This question helps eliminate possible problems and determines where troubleshooting continues.

---

**FLOW CHART**

1. Does 24 vdc binding post J237 operate?

   - **YES**
     - Go to step 5 of this fault.

   - **NO**
     - **START**
(1) Install a known good 24 vdc appliance to J237 binding posts.
(2) Operate 24 vdc appliance.
(3) If 24 vdc appliance does not operate, go to step 5 of this fault.
(4) Remove 24 vdc appliance from J237 binding posts.
117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Blackout lights OK.
- Emergency lights OK.
- J237 24 vdc binding posts OK.

**POSSIBLE PROBLEMS**
- Faulty wire 49A.
- Faulty positive 24 vdc binding post.
- Faulty wire 3085AD.
- Faulty ground 24 vdc binding post.

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 49A is faulty.</td>
</tr>
</tbody>
</table>

2. Is continuity present from J237 positive (+) binding post to J236 positive (+) binding post?

- **YES**
  - Repair or replace wire 49A (para 2-40).

- **NO**
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to J237 positive (+) binding post.
3. Connect negative (-) probe of multimeter to J236 positive (+) binding post and note reading on multimeter.
4. If continuity is not present, repair or replace wire 49A (para 2-40).
117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Emergency lights OK.</td>
</tr>
<tr>
<td>J237 24 vdc binding</td>
</tr>
<tr>
<td>post OK.</td>
</tr>
<tr>
<td>Wire 49A OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty positive 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty wire 3085AD.</td>
</tr>
<tr>
<td>Faulty ground 24 vdc binding post.</td>
</tr>
</tbody>
</table>

3. Is continuity present across J236 positive (+) binding post?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, J236 positive (+) binding post is faulty.</td>
</tr>
</tbody>
</table>

NO  
Replace positive binding post (para 16-52).
**CONTINUITY TEST**

1. Disconnect M1079 12/24 vdc power cable from van body (TM 9-2320-365-10).
2. Remove two screws and cover from J236 24 vdc outlet box.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to inside of J236 positive (+) binding post.
5. Connect negative (-) probe of multimeter to front side of J236 positive (+) binding post and note reading on multimeter.
6. If continuity is not present, replace J236 24 vdc positive binding post (para 16-52).
7. Install cover on J236 24 vdc outlet box with two screws.
e117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Emergency lights OK.</td>
</tr>
<tr>
<td>J237 24 vdc binding post OK.</td>
</tr>
<tr>
<td>Wire 49A OK.</td>
</tr>
<tr>
<td>J236 24 vdc positive binding post OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty wire 3085AD.</td>
</tr>
<tr>
<td>Faulty ground 24 vdc binding post.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>TEST OPTIONS</th>
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<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 3085AD is faulty. If continuity is present, J236 ground (G) binding post is faulty.</td>
</tr>
</tbody>
</table>

4. Is continuity present from J237 ground (G) binding post to J236 ground (G) binding post?

- **NO**
  - Replace ground binding post (para 16-52).  
  - Repair or replace wire 3085AD (para 2-40).

- **YES**
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to J237 ground (G) binding post.
(3) Connect negative (-) probe of multimeter to J236 ground (G) binding post and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 3085AD (para 2-40).
(5) If continuity is present, replace J236 24 vdc ground binding post (para 16-52).
M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Blackout lights OK.
- Emergency lights OK.

**POSSIBLE PROBLEMS**
- Faulty fuse.
- Faulty M1079 12/24 vdc power cable.
- Faulty circuit breaker CB11.
- Faulty wire 49.
- Faulty positive 24 vdc binding post.
- Faulty wire 3085L.
- Faulty negative 24 vdc binding post.

5. Is continuity present across fuse?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, fuse is faulty.

- **YES** Replace fuse (para 7-51).
- **NO**
CONTINUITY TEST

1. Disconnect M1079 12/24 vdc power cable from van body (TM 9-2320-365-10).
2. Open fuse holder on M1079 12/24 vdc power cable.
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 fuse (para 7-51).
e117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Emergency lights OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty M1079 12/24 vdc power cable.</td>
</tr>
<tr>
<td>Faulty circuit breaker CB11.</td>
</tr>
<tr>
<td>Faulty wire 49.</td>
</tr>
<tr>
<td>Faulty positive 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty wire 3085L.</td>
</tr>
<tr>
<td>Faulty negative 24 vdc binding post.</td>
</tr>
</tbody>
</table>

6. Is continuity present from left end of fuse holder to terminal lug TL100?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, wire 1507 is faulty.</td>
</tr>
</tbody>
</table>

   NO |

   YES |

   Repair wire 1507 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
CONTINUITY TEST

1. Lower spare tire (TM 9-2320-365-10).
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to left end of fuse holder.
4. Connect negative (-) probe of multimeter to terminal lug TL100 and note reading on multimeter.
5. If continuity is not present, repair wire 1507 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
e117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

KNOWN INFO
Blackout lights OK.
Emergency lights OK.
Fuse OK.

POSSIBLE PROBLEMS
Faulty M1079 12/24 vdc power cable.
Faulty circuit breaker CB11.
Faulty wire 49.
Faulty positive 24 vdc binding post.
Faulty wire 3085L.
Faulty negative 24 vdc binding post.

7. Is continuity present from right end of fuse holder to connector P173 pin G and H?
   NO
   YES

TEST OPTIONS
Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, wire 1507 is faulty.

Repair wire 1507 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to right end of fuse holder.
3. Connect negative (-) probe of multimeter to connector P173-G and note reading on multimeter.
4. Connect negative (-) probe of multimeter to connector P173-H and note reading on multimeter.
5. If continuity is not present at connector P173-G and/or P173-H, repair wire 1507 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
6. Install fuse in fuse holder on M1079 12/24 vdc power cable.
7. Close fuse holder.
e117.  M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

### KNOWN INFO
- Blackout lights OK.
- Emergency lights OK.
- Fuse OK.
- M1079 12/24 vdc power cable OK.

### POSSIBLE PROBLEMS
- Faulty wire 1507.
- Faulty circuit breaker CB11.
- Faulty wire 49.
- Faulty positive 24 vdc binding post.
- Faulty wire 3085L.
- Faulty negative 24 vdc binding post.

### TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

### REASON FOR QUESTION
- If continuity is not present, wire 1507 is faulty.

8. Is continuity present from connector J173 pin G and H to circuit breaker CB11 wire 1507?

- **YES**
  - Repair or replace wire 1507 (para 2-40).

- **NO**
CONTINUITY TEST

1. Loosen screw in cover.
2. Open cover on relay box assembly.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to connector J173-G.
5. Connect negative (-) probe of multimeter to circuit breaker CB11 wire 1507 and note reading on multimeter.
6. Connect positive (+) probe of multimeter to connector J173-H and note reading on multimeter.
7. If continuity is not present at connector J173-G and/or J173-H, repair wire 1507 (para 2-40).
e117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Emergency lights OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>M1079 12/24 vdc power cable OK.</td>
</tr>
<tr>
<td>Wire 1507 OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty circuit breaker CB11.</td>
</tr>
<tr>
<td>Faulty wire 49.</td>
</tr>
<tr>
<td>Faulty positive 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty wire 3085L.</td>
</tr>
<tr>
<td>Faulty negative 24 vdc binding post.</td>
</tr>
</tbody>
</table>

9. Is continuity present across circuit breaker CB11?

- **NO**
  
  If continuity is not present, circuit breaker CB11 is faulty.

- **YES**
  
  Replace circuit breaker CB11 (para 16-61).

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, circuit breaker CB11 is faulty.</td>
</tr>
</tbody>
</table>
### CONTINUITY TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Push in circuit breaker CB11.</td>
</tr>
<tr>
<td>(2)</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>(3)</td>
<td>Connect positive (+) probe of multimeter to one end of circuit breaker CB11.</td>
</tr>
<tr>
<td>(4)</td>
<td>Connect negative (-) probe of multimeter to other end of circuit breaker CB11 and note reading on multimeter.</td>
</tr>
<tr>
<td>(5)</td>
<td>If continuity is not present, replace circuit breaker CB11 (para 16-61).</td>
</tr>
</tbody>
</table>
117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Blackout lights OK.
- Emergency lights OK.
- Fuse OK.
- M1079 12/24 vdc power cable OK.
- Wire 1507 OK.
- Circuit breaker CB11 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 49.
- Faulty positive 24 vdc binding post.
- Faulty wire 3085L.
- Faulty negative 24 vdc binding post.

---

10. Is continuity present from circuit breaker CB11 wire 49 to J237 24 vdc positive (+) binding post?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 49 is faulty.

**FLOWCHART**

- **YES** → Repair or replace wire 49 (para 2-40).
- **NO** → Is continuity present from circuit breaker CB11 wire 49 to J237 24 vdc positive (+) binding post?
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to circuit breaker CB11 wire 49.
(3) Connect negative (-) probe of multimeter to J237 24 vdc positive (+) binding post and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 49 (para 2-40).
(5) Close cover on relay box assembly.
(6) Tighten screw in cover.
11. If continuity is not present, 
J237 positive binding post 
is faulty.

**POSSIBLE PROBLEMS**
- Faulty positive 24 vdc binding post.
- Faulty wire 3085L.
- Faulty negative 24 vdc binding post.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, J237 positive binding post is faulty.

**KNOWN INFO**
- Blackout lights OK.
- Emergency lights OK.
- Fuse OK.
- M1079 12/24 vdc power cable OK.
- Wire 1507 OK.
- Circuit breaker CB11 OK.
- Wire 49 OK.

Is continuity present across 24 vdc positive (+) binding post?

- **YES**: Replace positive binding post (para 16-52).
- **NO**: Replace positive binding post (para 16-52).
## CONTINUITY TEST

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Remove two screws and cover from J237 24 vdc outlet box.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Connect positive (+) probe of multimeter to one side of J237 positive (+) binding post.</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Connect negative (-) probe of multimeter to other side of J237 positive (+) binding post and note reading on multimeter.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>If continuity is not present, replace J237 24 vdc positive binding post (para 16-52).</td>
</tr>
</tbody>
</table>

![Diagram showing J237, Cover, Screw, Positive Binding Post connections]
117. M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)

KNOWN INFO
- Blackout lights OK.
- Emergency lights OK.
- Fuse OK.
- M1079 12/24 vdc power cable OK.
- Wire 1507 OK.
- Circuit breaker CB11 OK.
- Wire 49 OK.
- Positive binding post OK.

POSSIBLE PROBLEMS
- Faulty wire 3085L.
- Faulty negative 24 vdc binding post.
- Faulty wire 3086.

12. Is continuity present from J237 24 vdc ground (G) binding post to terminal board TB3 wire 3085L?

TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, wire 3085L is faulty.

YES

NO

Repair or replace wire 3085L (para 2-40).
CONTINUITY TEST

(1) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(2) Loosen screw in terminal board TB3.
(3) Remove wire 3085L from terminal board TB3.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to J237 24 vdc ground (G) binding post.
(6) Connect negative (-) probe of multimeter to terminal board TB3 wire 3085L and note reading on multimeter.
(7) If continuity is not present, repair or replace wire 3085L (para 2-40).
(8) Position wire 3085L in terminal board TB3.
(9) Tighten screw in terminal board TB3.
(10) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
117. **M1079 24 VDC BINDING POST(S) DOES NOT OPERATE (CONT)**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout lights OK.</td>
</tr>
<tr>
<td>Emergency lights OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>M1079 12/24 vac power cable OK.</td>
</tr>
<tr>
<td>Wire 1507 OK.</td>
</tr>
<tr>
<td>Circuit breaker CB11 OK.</td>
</tr>
<tr>
<td>Wire 49 OK.</td>
</tr>
<tr>
<td>Positive binding post OK.</td>
</tr>
<tr>
<td>Wire 3085L OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty ground 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty negative 24 vdc binding post.</td>
</tr>
<tr>
<td>Faulty wire 3086.</td>
</tr>
</tbody>
</table>

13. **Is continuity present across J237 24 vdc ground (G) binding post?**

   - **YES**
     - Replace ground binding post (para 16-52).
   - **NO**
     - **Reason for Question**
     - Continuity Test or STE/ICE-R Test #91
     - If continuity is not present, J237 ground binding post is faulty.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to inside of J237 ground (G) binding post.
(3) Connect negative (-) probe of multimeter to front side of J237 ground (G) binding post and note reading on multimeter.
(4) If continuity is not present, replace J237 24 vdc ground binding post (para 16-52).
Is continuity present across J237 24 vdc negative (-) binding post?

NO

Replace negative binding post (para 16-52).

YES

Replace negative binding post (para 16-52).

TEST OPTIONS

Continuity Test or
STE/ICE-R Test #91

REASON FOR QUESTION

If continuity is not present, J237 negative binding post is faulty. If continuity is present, wire 3086 is faulty.

POSSIBLE PROBLEMS

Faulty negative 24 vdc binding post.
Faulty wire 3086.

KNOWN INFO

Blackout lights OK.
Emergency lights OK.
Fuse OK.
M1079 12/24 vdc power cable OK.
Wire 1507 OK.
Circuit breaker CB11 OK.
Wire 49 OK.
Positive binding post OK.
Wire 3085L OK.
Ground binding post OK.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to inside of J237 negative (-) binding post.
(3) Connect negative (-) probe of multimeter to front side of J237 negative (-) binding post and note reading on multimeter.
(4) If continuity is not present, replace J237 24 vdc negative binding post (para 16-52).
(5) If continuity is present, repair or replace wire 3086 (para 2-40).
(6) Install cover on J237 24 vdc outlet box with two screws.
(7) Connect M1079 12/24 vdc power cable to van body (TM 9-2320-365-10).
START

Is continuity present from connector P 7-28 to connector P912-7?

YES

Repair wire 2010 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

NO

REASON FOR QUESTION

Is continuity is not present, wire 2010 is faulty.

Equipment Condition
- Engine shut down (TM 9-2320-365-10).
- AC power disconnected (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)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

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

Known Info
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.

Possible Problems
- Faulty dashboard cable assembly.
- Faulty lighted indicator display.
- Faulty auxiliary panel cable assembly.
- Faulty M1079 12/24 vdc power cable.
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.
CONTINUITY TEST

1. Open van body RH door (TM 9-2320-365-10).
2. Remove four screws from lighted indicator display.
3. Remove lighted indicator display from instrument panel assembly.
4. Disconnect connector P 7 from lighted indicator display.
5. Remove personnel heater for access (para 18-9).
6. Disconnect connector P912 from connector J912.
7. Set multimeter to ohms.
8. Connect positive (+) probe of multimeter to connector P 7-28.
9. Connect negative (-) probe of multimeter to connector P912-7 and note reading on multimeter.
10. If continuity is not present, repair wire 2010 (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 P 7 to lighted indicator display.
12. Position lighted indicator display in instrument panel assembly with four screws.
13. Tighten four screws to 6-10 lb-in. (1 N m).
e118. M1079 VAN DOOR OPEN INDICATOR DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other indicator lights illuminate.</td>
<td>Voltage Test or STE/ICE-R #89</td>
<td>If 24 vdc is not present, lighted indicator display is faulty.</td>
</tr>
<tr>
<td>Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit breaker CB50 OK.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### POSSIBLE PROBLEMS
- Faulty lighted indicator display.
- Faulty dashboard cable assembly.
- Faulty auxiliary panel cable assembly.
- Faulty M1079 12/24 vdc power cable.
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

#### WARNING
Read WARNING on following page.

2. Is 24 vdc present at connector P912-7?

- **NO**
  - Replace lighted indicator display (para 7-16).
- **YES**
  - Replace lighted indicator display (para 7-16).

#### WARNING
Read WARNING on following page.

3. Is 24 vdc present at connector P912-1?

- **NO**
  - Repair wire 2006 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10 or WTEC II dashboard cable assembly (para 7-11).
- **YES**
  - Repair wire 2006 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10 or WTEC II dashboard cable assembly (para 7-11).

**WARNING**
Read WARNING on following page.

**Is 24 vdc present at connector P912-7?**

**NO**
- Replace lighted indicator display (para 7-16).

**YES**
- Replace lighted indicator display (para 7-16).

**Is 24 vdc present at connector P912-1?**

**NO**
- Repair wire 2006 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10 or WTEC II dashboard cable assembly (para 7-11).

**YES**
- Repair wire 2006 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10 or WTEC II dashboard cable assembly (para 7-11).

**WARNING**
Read WARNING on following page.

## Known Info:
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.

### Possible Problems:
- Faulty lighted indicator display.
- Faulty dashboard cable assembly.
- Faulty auxiliary panel cable assembly.
- Faulty M1079 12/24 vdc power cable.
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.
WARNING

Remove 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 P912-7.
(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, replace lighted indicator display (para 7-16).
(6) Position master power switch to off (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) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to connector P912-1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 24 vdc is not present, repair wire 2006 (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 P912 to connector J912.
(6) Install personnel heater (para 18-9).
4. Other indicator lights illuminate. Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi. Circuit breaker CB50 OK. Lighted indicator display OK. Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty auxiliary panel cable assembly.
- Faulty M1079 12/24 vdc power cable.
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

**KNOWN INFO**
- Is 24 vdc present at connector J108-12?
- **TEST OPTIONS**
  - Voltage Test or STE/ICE-R #89
  - **REASON FOR QUESTION**
    - If 24 vdc is not present, wire 2010 is faulty.

4. **WARNING**
   - Read WARNING on following page.
   - Is 24 vdc present at connector J108-12?
   - **TEST OPTIONS**
     - Voltage Test or STE/ICE-R #89
     - **REASON FOR QUESTION**
       - If 24 vdc is not present, wire 2010 is faulty.

5. Other indicator lights illuminate. Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi. Circuit breaker CB50 OK. Lighted indicator display OK. Dashboard cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty auxiliary panel cable assembly.
- Faulty M1079 12/24 vdc power cable.
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

**KNOWN INFO**
- Is 24 vdc present at connector J108-16?
- **TEST OPTIONS**
  - Voltage Test or STE/ICE-R #89
  - **REASON FOR QUESTION**
    - If 24 vdc is not present, wire 2006 is faulty.

5. **WARNING**
   - Read WARNING on following page.
   - Is 24 vdc present at connector J108-16?
   - **TEST OPTIONS**
     - Voltage Test or STE/ICE-R #89
     - **REASON FOR QUESTION**
       - If 24 vdc is not present, wire 2006 is faulty.

5. **WARNING**
   - Read WARNING on following page.
   - Is 24 vdc present at connector J108-16?
   - **TEST OPTIONS**
     - Voltage Test or STE/ICE-R #89
     - **REASON FOR QUESTION**
       - If 24 vdc is not present, wire 2006 is faulty.

5. **WARNING**
   - Read WARNING on following page.
   - Is 24 vdc present at connector J108-16?
   - **TEST OPTIONS**
     - Voltage Test or STE/ICE-R #89
     - **REASON FOR QUESTION**
       - If 24 vdc is not present, wire 2006 is faulty.
**WARNING**

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

### VOLTAGE TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>2</td>
<td>Disconnect connector P108 from connector J108.</td>
</tr>
<tr>
<td>3</td>
<td>Set multimeter to volts dc.</td>
</tr>
<tr>
<td>4</td>
<td>Connect positive (+) probe of multimeter to connector J108-12.</td>
</tr>
<tr>
<td>5</td>
<td>Connect negative (-) probe of multimeter to ground.</td>
</tr>
<tr>
<td>6</td>
<td>Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.</td>
</tr>
<tr>
<td>7</td>
<td>If 24 vdc is not present, repair wire 2010 (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 (par 7-50).</td>
</tr>
<tr>
<td>8</td>
<td>Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
</tbody>
</table>

**WARNING**

Remove 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

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set multimeter to volts dc.</td>
</tr>
<tr>
<td>2</td>
<td>Connect positive (+) probe of multimeter to connector J108-16.</td>
</tr>
<tr>
<td>3</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>4</td>
<td>If 24 vdc is not present, repair wire 2006 (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).</td>
</tr>
<tr>
<td>5</td>
<td>Connect connector P108 to connector J108.</td>
</tr>
<tr>
<td>6</td>
<td>Install kick panel (para 16-3).</td>
</tr>
</tbody>
</table>
e118. M1079 VAN DOOR OPEN INDICATOR DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.
- Dashboard cable assembly OK.
- Auxiliary panel cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty M1079 12/24 vdc power cable.
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

---

**6.** Is 24 vdc present at connector P173-A?

- **YES**
  - Repair wire 2010 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).

- **NO**
  - Repair wire 2006 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).

---

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

**TEST OPTIONS**
- Voltage Test or STE/ICE-R #89

**REASON FOR QUESTION**
- If 24 vdc is not present, wire 2010 is faulty.

---

**7.** Is 24 vdc present at connector P173-F?

- **NO**
  - Repair wire 2006 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).

- **YES**
  - Repair wire 2006 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).

---

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

**TEST OPTIONS**
- Voltage Test or STE/ICE-R #89

**REASON FOR QUESTION**
- If 24 vdc is not present, wire 2006 is faulty.
VOLTAGE TEST

(1) Disconnect connector P173 from connector J173.
(2) Set multimeter to volts dc.
(3) Connect positive (+) probe of multimeter to connector P173-A.
(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 2010 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
(7) Position master power switch to off (TM 9-2320-365-10).

VOLTAGE TEST (2nd page)

(1) Set multimeter to volts dc.
(2) Connect positive (+) probe of multimeter to connector P173-F.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 24 vdc is not present, repair wire 2006 (para 2-40) or replace M1079 12/24 vdc power cable (para 7-51).
### 8. M1079 VAN DOOR OPEN INDICATOR DOES NOT OPERATE

**Known Info**
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.
- Dashboard cable assembly OK.
- Auxiliary panel cable assembly OK.
- M1079 12/24 vdc power cable OK.

**Possible Problems**
- Faulty door ajar switch.
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

**Test Options**
- Continuity Test or STE/ICE-R #91

**Reason for Question**
If continuity is not present, door ajar switch is faulty.

**Question**
Is continuity present from door ajar switch terminal 1 to terminal 2?

**Answer**
- **NO**
- **YES**
  - Replace door ajar switch (para 16-55).

---

### 9. M1079 VAN DOOR OPEN INDICATOR DOES NOT OPERATE

**Known Info**
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.
- Dashboard cable assembly OK.
- Auxiliary panel cable assembly OK.
- M1079 12/24 vdc power cable OK.
- Door ajar switch OK.

**Possible Problems**
- Faulty wire 2006.
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

**Test Options**
- Voltage Test or STE/ICE-R #89

**Reason for Question**
If 24 vdc is not present, wire 2006 is faulty.

**Question**
Is 24 vdc present on wire 2006 at door ajar switch?

**Answer**
- **NO**
- **YES**
  - Repair or replace wire 2006 (para 2-40).
CONTINUITY TEST

1. Remove three screws, lockwashers, cover, and gasket from door ajar switch.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to door ajar switch terminal 1.
4. Connect negative (-) probe of multimeter to door ajar switch terminal 2 and note reading on multimeter.
5. If continuity is not present, replace door ajar switch (para 16-55).

WARNING

Remove 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 screw 2 in door ajar switch.
2. Remove wire 2006 from door ajar switch terminal 2.
3. Connect connector P173 to connector J173.
4. Set multimeter to volts dc.
5. Connect positive (+) probe of multimeter to wire 2006.
6. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
7. If 24 vdc is not present, repair or replace wire 2006 (para 2-40).
8. Disconnect connector P173 from connector J173.
10. Tighten screw 2 in door ajar switch.
11. Install gasket and cover on door ajar switch with three lockwashers and screws.
12. Connect connector P173 to connector J173.
**10.**

**POSSIBLE PROBLEMS**
- Faulty wire 1506.
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

**KNOWN INFO**
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.
- Dashboard cable assembly OK.
- Auxiliary panel cable assembly OK.
- M1079 12/24 vdc power cable OK.
- Door ajar switch OK.
- Wire 2006 OK.

**TEST OPTIONS**
- Voltage Test or STE/ICE-R #89

**REASON FOR QUESTION**
- If 24 vdc is not present, wire 1506 is faulty.

**11.**

**POSSIBLE PROBLEMS**
- Faulty wire 3086.
- Faulty wire 2010.
- Faulty flasher ECU.

**KNOWN INFO**
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.
- Dashboard cable assembly OK.
- Auxiliary panel cable assembly OK.
- M1079 12/24 vdc power cable OK.
- Door ajar switch OK.
- Wire 2006 OK.
- Wire 1506 OK.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3086 is faulty.

**WARNING**
Read WARNING on following page.

10. Is 24 vdc present at flasher ECU terminal 1?

- **NO**
- **YES** Repair or replace wire 1506 (para 2-40).

11. Is continuity present on wire 3086 from flasher ECU terminal 3 to a known good ground?

- **NO**
- **YES** Repair or replace wire 3086 (para 2-40).
WARNING

Remove 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 screw in cover.
(2) Open cover on relay box assembly.
(3) Set multimeter to volts dc.
(4) Connect positive (+) probe of multimeter to flasher ECU terminal 1.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If 24 vdc is not present, repair or replace wire 1506 (para 2-40).

VOLTAGE TEST

(1) Disconnect connector P173 from connector J173.
(2) Loosen screw 3 in flasher ECU.
(3) Remove wire 3086 from flasher ECU terminal 3.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to wire 3086.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present, repair or replace wire 3086 (para 2-40).
(8) Install wire 3086 on flasher ECU terminal 3.
(9) Tighten screw 3 in flasher ECU.
12. Is 24 vdc present on wire 2010 at flasher ECU terminal 5?

**YES**
- Repair or replace wire 2010 (para 2-40).

**NO**
- Replace flasher ECU (para 16-63).

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
- Voltage Test or STE/ICE-R #89

**REASON FOR QUESTION**
If 24 vdc is not present, wire 2010 is faulty. If 24 vdc is present, flasher ECU is faulty.

---

**KNOWN INFO**
- Other indicator lights illuminate.
- Audible alarm sounds when FRONT BRAKE AIR or REAR BRAKE AIR pressure gage reads less than 65 psi.
- Circuit breaker CB50 OK.
- Lighted indicator display OK.
- Dashboard cable assembly OK.
- Auxiliary panel cable assembly OK.
- M1079 12/24 vdc power cable OK.
- Door ajar switch OK.
- Wire 2006 OK.
- Wire 1506 OK.
- Wire 3086 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 2010.
- Faulty flasher ECU.
**WARNING**

Remove 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 screw 1 in flasher ECU.
2. Remove wire 1506 from flasher ECU terminal 1.
3. Loosen screw 5 in flasher ECU.
4. Remove wire 2010 from flasher ECU terminal 5.
5. Connect connector P173 to connector J173.
6. Position master power switch to on (TM 9-2320-365-10).
7. Set multimeter to volts dc.
8. Connect positive (+) probe of multimeter to wire 2010.
9. Connect negative (-) probe of multimeter to flasher ECU terminal 3 and note reading on multimeter.
10. If 24 vdc is not present, repair or replace wire 2010 (para 2-40).
11. If 24 vdc is present, replace flasher ECU (para 16-63).
15. Tighten screw 5 in flasher ECU.
16. Install wire 1506 on flasher ECU terminal 1.
17. Tighten screw 1 in flasher ECU.
18. Close cover on relay box assembly.
19. Tighten screw in cover.
20. Connect connector P173 to connector J173.
1. Is continuity present across circuit breaker CB1 left terminal?

   YES → Replace circuit breaker CB1 (para 16-65).

   NO → TEST OPTIONS

   Continuity Test or STE/ICE-R #91

   REASON FOR QUESTION

   If continuity is not present, circuit breaker CB1 is faulty.
CONTINUITY TEST

(1) Position circuit breaker CB1 to OFF.
(2) Remove six screws and cover from 110/208 VAC POWER DISTRIBUTION PANEL.
(3) Position circuit breaker CB1 to ON.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to left output terminal of circuit breaker CB1.
(6) Connect negative (-) probe of multimeter to left input terminal of circuit breaker CB1 and note reading on multimeter.
(7) If continuity is not present, replace circuit breaker CB1 (para 16-65).
M1079 110 VAC POWER DOES NOT OPERATE (CONT)

**KNOWN INFO**
12/24 vdc circuits OK.

**POSSIBLE PROBLEMS**
- Faulty circuit breaker CB1.
- Faulty wire 1499N.
- Faulty wire 3085N.
- Faulty wire 3085P.
- Faulty wire 3085Q.
- Faulty wire 3085R.
- Faulty wire 3085Y.
- Faulty wire 500.
- Faulty wire 501.
- Faulty wire 502.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, circuit breaker CB1 is faulty.

2. Is continuity present across circuit breaker CB1 middle terminal?
   - **YES** Replace circuit breaker CB1 (para 16-65).
   - **NO**

3. Is continuity present across circuit breaker CB1 right terminal?
   - **YES** Replace circuit breaker CB1 (para 16-65).
   - **NO**

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to right output terminal of circuit breaker CB1.
(3) Connect negative (-) probe of multimeter to right input terminal of circuit breaker CB1 and note reading on multimeter.
(4) If continuity is not present, replace circuit breaker CB1 (para 16-65).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to middle output terminal of circuit breaker CB1.
(3) Connect negative (-) probe of multimeter to middle input terminal of circuit breaker CB1 and note reading on multimeter.
(4) If continuity is not present, replace circuit breaker CB1 (para 16-65).
M1079 110 VAC POWER DOES NOT OPERATE (CONT)

**Known Info**
- 12/24 VDC circuits OK.
- Circuit breaker CB1 OK.

**Possible Problems**
- Faulty wire 1499N.
- Faulty wire 3085N.
- Faulty wire 3085P.
- Faulty wire 3085Q.
- Faulty wire 3085R.
- Faulty wire 3085Y.
- Faulty wire 500.
- Faulty wire 501.
- Faulty wire 502.

**Test Options**
- Continuity Test or STE/ICE-R #91

**Reason for Question**
- If continuity is not present, wire 1499N is faulty.

**Test Options**
- Continuity Test or STE/ICE-R #91

**Reason for Question**
- If continuity is not present, wire 1499N is faulty.

**Diagrams**

- Diagram showing test flow with YES and NO outcomes.
- YES: Repair or replace wire 1499N (para 2-40).
- NO: Continuity test or STE/ICE-R #91.
CONTINUITY TEST

(1) Remove dust cover on 110/208 VAC power IN connector.
(2) Loosen screw in terminal board TB4.
(3) Remove wire 1499N from terminal board TB4.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to 110/208 vac IN connector pin N.
(6) Connect negative (-) probe of multimeter to terminal board TB4 wire 1499N and note reading on multimeter.
(7) If continuity is not present, repair or replace wire 1499N (para 2-40).
(8) Position wire 1499N in terminal board TB4.
(9) Tighten screw in terminal board TB4.
**119. M1079 110 VAC POWER DOES NOT OPERATE (CONT)**

**KNOWN INFO**
- 12/24 vdc circuits OK.
- Circuit breaker CB1 OK.
- Wire 1499N OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085N.
- Faulty wire 3085P.
- Faulty wire 3085Q.
- Faulty wire 3085R.
- Faulty wire 3085Y.
- Faulty wire 500.
- Faulty wire 501.
- Faulty wire 502.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
If continuity is not present, wire 3085N is faulty.

**KNOWLEDGE INFO**
- 12/24 vdc circuits OK.
- Circuit breaker CB1 OK.
- Wire 1499N OK.
- Wire 3085N OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085P.
- Faulty wire 3085Q.
- Faulty wire 3085R.
- Faulty wire 3085Y.
- Faulty wire 500.
- Faulty wire 501.
- Faulty wire 502.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
If continuity is not present, wire 3085P is faulty.

---

**5.** Is continuity present on wire 3085N from 110/208 vac IN connector pin G1 to ground?

- **YES**
  - Repair or replace wire 3085N (para 2-40).

- **NO**
  - Repair or replace wire 3085N (para 2-40).

**6.** Is continuity present on wire 3085P from 110/208 vac IN connector pin G2 to ground?

- **YES**
  - Repair or replace wire 3085P (para 2-40).

- **NO**
  - Repair or replace wire 3085P (para 2-40).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to 110/208 vac IN connector pin G1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 3085N (para 2-40).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to 110/208 vac IN connector pin G2.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 3085P (para 2-40).
e119. M1079 110 VAC POWER DOES NOT OPERATE (CONT)

**KNOWN INFO**

| 12/24 vdc circuits OK. |
| Circuit breaker CB1 OK. |
| Wire 1499N OK. |
| Wire 3085N OK. |
| Wire 3085P OK. |

**POSSIBLE PROBLEMS**

- Faulty wire 3085Q.
- Faulty wire 3085R.
- Faulty wire 3085Y.
- Faulty wire 500.
- Faulty wire 501.
- Faulty wire 502.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R #91
- Reason for Question

**REASON FOR QUESTION**

If continuity is not present, wire 3085Q is faulty.

---

7. Is continuity present on wire 3085Q from 110/208 vac IN connector pin G3 to ground?

- **NO**
  - **YES**
    - Repair or replace wire 3085Q (para 2-40).

---

8. Is continuity present on wire 3085R from 110/208 vac IN connector pin G4 to ground?

- **NO**
  - **YES**
    - Repair or replace wire 3085R (para 2-40).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to 110/208 vac IN connector pin G3.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 3085Q (para 2-40).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to 110/208 vac IN connector pin G4.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 3085R (para 2-40).
**119. M1079 110 VAC POWER DOES NOT OPERATE (CONT)**

**KNOWN INFO**
- 12/24 vdc circuits OK.
- Circuit breaker CB1 OK.
- Wire 1499N OK.
- Wire 3085N OK.
- Wire 3085P OK.
- Wire 3085Q OK.
- Wire 3085R OK.

**POSSIBLE PROBLEMS**
- Faulty wire 3085Y.
- Faulty wire 500.
- Faulty wire 501.
- Faulty wire 502.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3085Y is faulty.

**9.** Is continuity present on wire 3085Y from 110/208 vac ground to terminal board TB3 wire 3085Y?

**YES**
- Repair or replace wire 3085Y (para 2-40).

**NO**

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 500 is faulty.

**10.** Is continuity present on wire 500 from 110/208 vac IN connector pin A circuit breaker CB1 left input terminal?

**YES**
- Repair or replace wire 500 (para 2-40).

**NO**

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 501 is faulty.

**11.** Is continuity present on wire 501 from 110/208 vac IN connector pin B circuit breaker CB1 middle input terminal?

**YES**
- Repair or replace wire 501 (para 2-40).

**NO**

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 501 is faulty.
## CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to 110/208 vac ground.
3. Connect negative (-) probe of multimeter to terminal board TB3 wire 3085Y and note reading on multimeter.
4. If continuity is not present, repair or replace wire 3085Y (para 2-40).

### Diagram
- **3085Y**
- **TB3**

## CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to 110/208 vac IN connector pin A.
3. Connect negative (-) probe of multimeter to circuit breaker CB1 left input terminal and note reading on multimeter.
4. If continuity is not present, repair or replace wire 500 (para 2-40).

### Diagram
- **110/208 VAC GROUND**
- **110/208 VAC IN**
- **Q4**, **A1**, **Q1**, **Q3**, **Q2**
- **LEFT INPUT TERMINAL**
- **MIDDLE INPUT TERMINAL**
- **CB1**

## CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to 110/208 vac IN connector pin B.
3. Connect negative (-) probe of multimeter to circuit breaker CB1 middle input terminal and note reading on multimeter.
4. If continuity is not present, repair or replace wire 501 (para 2-40).

### Diagram
- **Q4**, **A1**, **Q1**, **Q3**, **Q2**
- **LEFT INPUT TERMINAL**
- **MIDDLE INPUT TERMINAL**
- **CB1**
119. M1079 110 VAC POWER DOES NOT OPERATE (CONT)

**KNOWN INFO**
- 12/24 vdc circuits OK.
- Circuit breaker CB1 OK.
- Wire 1499N OK.
- Wire 3085N OK.
- Wire 3085P OK.
- Wire 3085Q OK.
- Wire 3085Y OK.
- Wire 500 OK.
- Wire 501 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 502.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91
- *REASON FOR QUESTION*
  - If continuity is not present, wire 502 is faulty.

**12.**
Is continuity present on wire 502 from 110/208 vac IN connector pin C circuit breaker CB1 right input terminal?

**YES**
- Repair or replace wire 502 (para 2-40).

**NO**
- Troubleshoot 110 vac power source.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to 110/208 vac IN connector pin C.
(3) Connect negative (-) probe of multimeter to circuit breaker CB1 right input terminal and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 502 (para 2-40).
(5) If continuity is present, troubleshoot 110 vac power source.
(6) Position circuit breaker CB1 to OFF.
(7) Install cover on 110/208 VAC POWER DISTRIBUTION PANEL with six screws.
(8) Install dust cover on 110/208 VAC power IN connector.
(9) Position circuit breaker CB1 to ON.
e120. M1079 FLUORESCENT LIGHTS DO NOT OPERATE IN BLACKOUT OVERRIDE MODE

INITIAL SETUP

Equipment Condition
Engine shut down (TM 9-2320-365-10).
AC power disconnected (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

---

START

---

1. Is continuity present across LIGHTS/BLACKOUT OVERRIDE switch S33?

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<td>Fluorescent lights OK in BLACKOUT mode.</td>
</tr>
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<td>POSSIBLE PROBLEMS</td>
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<tr>
<td>Faulty LIGHTS/BLACKOUT OVERRIDE switch S33.</td>
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<td>Faulty wire 38.</td>
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<tr>
<td>Faulty wire 707A.</td>
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<td>Faulty wire 1511.</td>
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<th>TEST OPTIONS</th>
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<tr>
<td>Continuity Test or STE/ICE-R #91</td>
</tr>
<tr>
<td>REASON FOR QUESTION</td>
</tr>
<tr>
<td>If continuity is not present, LIGHTS/BLACKOUT OVERRIDE switch S33 is faulty.</td>
</tr>
</tbody>
</table>

---

YES

Replace LIGHTS/BLACKOUT OVERRIDE switch S33 (para 16-56).

NO

---

2-1352
CONTINUITY TEST

(1) Pull out circuit breaker CB10 (TM 9-2320-365-10).
(2) Loosen screw in cover.
(3) Open cover on relay box assembly.
(4) Set multimeter to ohms.
(5) Position LIGHTS/BLACKOUT OVERRIDE switch S33 to BLACKOUT OVERRIDE (TM 9-2320-365-10).
(6) Connect positive (+) probe of multimeter to wire 707A terminal lug on LIGHTS/BLACKOUT OVERRIDE switch S33.
(7) Connect negative (-) probe of multimeter to wire 1511 terminal lug on LIGHTS/BLACKOUT OVERRIDE switch S33 and note reading on multimeter.
(8) If continuity is not present, replace LIGHTS/BLACKOUT OVERRIDE switch S33 (para 16-56).
120. M1079 FLUORESCENT LIGHTS DO NOT OPERATE IN BLACKOUT OVERRIDE MODE (CONT)

**KNOWN INFO**
- Fluorescent lights OK in BLACKOUT mode.
- LIGHTS/BLACKOUT OVERRIDE switch S33 OK.

**POSSIBLE PROBLEMS**
- Faulty wire 38.
- Faulty wire 707A.
- Faulty wire 1511.

---

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, wire 38 is faulty.

---

**2.**

- Is continuity present on wire 38 from LIGHTS/BLACKOUT OVERRIDE switch S33 to K36 relay base terminal A?

---

**IF NO**

---

**YES**

- Repair or replace wire 38 (para 2-40).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to wire 38 terminal lug on LIGHTS/BLACKOUT OVERRIDE switch S33.
(3) Connect negative (-) probe of multimeter to K36 relay base terminal A and note reading on multimeter.
(4) If continuity is not present, repair or replace wire 38 (para 2-40).
**e120. M1079 Fluorescent Lights Do Not Operate in Blackout Override Mode**

**Known Info**
- Fluorescent lights OK in BLACKOUT mode.
- LIGHTS/BLACKOUT OVERRIDE switch S33 OK.
- Wire 38 OK.

**Possible Problems**
- Faulty wire 707A.
- Faulty wire 1511.

**Test Options**
- Continuity Test or STE/ICE-R #91

**Reason for Question**
- If continuity is not present, wire 707A is faulty. If continuity is present, wire 1511 is faulty.

**Diagram**
- **3.** Is continuity present on wire 707A from LIGHTS/BLACKOUT OVERRIDE switch S33 to K36 relay base terminal 7?
  - **YES**
    - Repair or replace wire 707A (para 2-40).
  - **NO**
    - Repair or replace wire 1511 (para 2-40).
CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to wire 707A terminal lug on LIGHTS/BLACKOUT OVERRIDE switch S33.
3. Connect negative (-) probe of multimeter to K36 relay base terminal 7 and note reading on multimeter.
4. If continuity is not present, repair or replace wire 707A (para 2-40).
5. If continuity is present, repair or replace wire 1511 (para 2-40).
7. Close cover on relay box assembly.
8. Tighten screw in cover.
2-17. TRANSMISSION SYSTEM TROUBLESHOOTING

This paragraph covers Transmission System Troubleshooting. The Transmission System Fault Index, Table 2-16, lists faults for the transmission system of the vehicle.

Table 2-16. Transmission System Fault Index

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<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Emits Eight Seconds of Beeps and/or Transmission Does Not Shift Gears</td>
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<tr>
<td>f2.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 14</td>
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<tr>
<td>f3.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15</td>
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<td>f4.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16</td>
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<tr>
<td>f5.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 24 and/or 33 and Any Sub Code</td>
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<tr>
<td>f6.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code</td>
<td>2-1396</td>
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<tr>
<td>f7.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 41, 42, 44, 45, 66, and/or 69 and Any Sub Code</td>
<td>2-1400</td>
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<tr>
<td>f8.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 52 and Any Sub Code</td>
<td>2-1410</td>
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<tr>
<td>f9.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 57 and Any Sub Code</td>
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<tr>
<td>f10.</td>
<td>Transmission Unusually Noisy When Operating</td>
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<td>f11.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 21 and Any Sub Code</td>
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<tr>
<td>f12.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 25 and Any Sub Code</td>
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<td>f13.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 53 and Any Sub Code</td>
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<td>f14.</td>
<td>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</td>
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<td>f17.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 55 and Any Sub Code</td>
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<td>f18.</td>
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<td>f19.</td>
<td>WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 13 and Any Sub Code</td>
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<th>Page</th>
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<tr>
<td>f23</td>
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<td></td>
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<td>Main Code 22 Sub Code 15</td>
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<td>f24</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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</tr>
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<td></td>
<td>Main Code 22 Sub Code 16</td>
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<td>f25</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<td>f26</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<td></td>
<td>Main Code 32 and Any Sub Code</td>
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<td>f27</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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</tr>
<tr>
<td></td>
<td>Main Code 42, 44, 45, 46, 66, and/or 69 and Any Sub Code</td>
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<tr>
<td>f28</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
<td></td>
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<td></td>
<td>Main Code 52 and Any Sub Code</td>
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<tr>
<td>f29</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<td>Main Code 57 and Any Sub Code</td>
<td>2-1532</td>
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<td>f30</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<td>Main Code 21 and Any Sub Code</td>
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<tr>
<td>f31</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<tr>
<td></td>
<td>Main Code 51 and Any Sub Code</td>
<td>2-1550</td>
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<tr>
<td>f32</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<td></td>
<td>Main Code 25 and Any Sub Code</td>
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</tr>
<tr>
<td>f33</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<tr>
<td></td>
<td>Main Code 53 and Any Sub Code</td>
<td>2-1558</td>
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<tr>
<td>f34</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Code 54 and Any Sub Code</td>
<td>2-1562</td>
</tr>
<tr>
<td>f35</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Code 55 and Any Sub Code</td>
<td>2-1568</td>
</tr>
<tr>
<td>f36</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Code 56 and Any Sub Code</td>
<td>2-1574</td>
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<tr>
<td>f37</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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<tr>
<td></td>
<td>Main Code 13 and Any Sub Code</td>
<td>2-1580</td>
</tr>
<tr>
<td>f38</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
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</tr>
<tr>
<td></td>
<td>Displays &quot;--&quot; and/or Transmission Does Not Shift Gears</td>
<td>2-1594</td>
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<tr>
<td>f39</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Code 23 and Any Sub Code</td>
<td>2-1596</td>
</tr>
<tr>
<td>f40</td>
<td>WTEC III Transmission Pushbutton Shift Selector (TPSS) Does Not Illuminate</td>
<td></td>
</tr>
</tbody>
</table>
INITIAL SETUP

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

KNOWLEDGED INFO

| Engine runs. |
| Transmission oil level OK. |
| Fuse OK. |
| Batteries OK. |

POSSIBLE PROBLEMS

| Diagnostic code(s) logged in WTEC II TEPSS. |

START

1. Is a diagnostic code(s) logged in WTEC II TEPSS and does it return after clearing diagnostic codes?

NO

YES

Fault corrected.

Perform Transmission System Troubleshooting per para 8-4, Table 8-1. WTEC II Diagnostic Code List and Description.

TEST OPTIONS

WTEC II Diagnostic Code Reading/Code Clearing Procedure

REASON FOR QUESTION

If WTEC II TEPSS does not display any diagnostic codes after clearing, an intermittent problem was detected and corrected. If any diagnostic code(s) is logged after clearing, further troubleshooting is required.
(1) Perform WTEC II Code Reading and Code Clearing (para 8-4).
(2) If no diagnostic codes are logged after clearing, fault is corrected.
(3) If diagnostic codes are still logged, perform Transmission System Troubleshooting of active diagnostic codes per para 8-4, Table 8-1. WTEC II Diagnostic Code List and Description.
f2. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 14

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

Tools and Special Tools (Cont)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
STE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

WARNING
Read WARNING and CAUTION on following page.

1. Is 200-400 ohms resistance present from transmission engine speed sensor pin A to pin B?

NO

YES

Replace transmission engine speed sensor (para 7-43).

TEST OPTIONS
Resistance Test or STE/ICE-R Test #91

REASON FOR QUESTION
If transmission engine speed sensor does not have the proper resistance, WTEC II TEPSS may display main code 22 sub code 14.

KNOWN INFO
Transmission oil level OK.
Fuse OK.
Batteries OK.

POSSIBLE PROBLEMS
Faulty transmission engine speed sensor.
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.
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.

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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) Disconnect transmission engine speed sensor connector from transmission engine speed sensor.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to terminal A of transmission engine speed sensor.
(4) Connect negative (-) probe of multimeter to terminal B of transmission engine speed sensor and note reading on multimeter.

NOTE

A good transmission engine speed sensor will return a reading of 200-400 ohms resistance as follows:
   a. 200 ohms at -40°F (-40°C).
   b. 300 ohms at 68°F (20°C).
   c. 400 ohms at 230°F (110°C).

(5) If resistance is not 200-400 ohms, replace transmission engine speed sensor (para 7-43).
(6) Connect transmission engine speed sensor connector to transmission engine speed sensor.
### Known Info
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Transmission engine speed sensor OK.

### Possible Problems
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

### Test Options
- Resistance Test or STE/ICE-R Test #91

### Reason For Question
- If 200-400 ohms resistance is not present, or short circuits are found, DS Maintenance needs to be notified.

---

<table>
<thead>
<tr>
<th>Test Option</th>
<th>Reason For Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Test or STE/ICE-R Test #91</td>
<td>If 200-400 ohms resistance is not present, or short circuits are found, DS Maintenance needs to be notified.</td>
</tr>
</tbody>
</table>

---

#### Step 2
- **Is 200-400 ohms resistance present from connector pin P119m to P119s?**

---

**CAUTION**
Read CAUTION on following page.

---

**Notify DS Maintenance.**
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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>(2) Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>(3) Remove front grille from cab.</td>
</tr>
<tr>
<td>(4) Disconnect connector P119 from connector J119.</td>
</tr>
<tr>
<td>(5) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(6) Connect positive (+) probe of multimeter to connector P119 pin m.</td>
</tr>
<tr>
<td>(7) Connect negative (-) probe of multimeter to connector P119 pin s and note reading on multimeter.</td>
</tr>
<tr>
<td>(8) Connect negative (-) probe of multimeter to all other pins in connector P119 and note reading on multimeter.</td>
</tr>
<tr>
<td>(9) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(10) If 200-400 ohms resistance is not present in step 7, or continuity is present in step 8 or step 9, notify DS Maintenance.</td>
</tr>
</tbody>
</table>
f2. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 14 (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Transmission engine speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**CAUTION**
Read CAUTION on following page.

3. **Is continuity present from connector socket J 119m to connector socket J 115-7?**

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

**YES**
- Replace WTEC II cab transmission harness (para 7-86).

**NO**
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 J 115 (top connector) from WTEC II TEPSS. |
| (3) Set multimeter to ohms. |
| (4) Connect positive (+) probe of multimeter to connector socket J 115-7. |
| (5) Connect negative (-) probe of multimeter to connector socket J 119m and note reading on multimeter. |
| (6) Connect negative (-) probe of multimeter to all other sockets in connector J 119 and note reading on multimeter. |
| (7) Connect negative (-) probe of multimeter to ground to and note reading on multimeter. |
| (8) If continuity is not present in step 5, or continuity is present in step 6 or step 7, replace WTEC II cab transmission harness (para 7-86). |
f2. WTEC II TRANSMISSION ECU PUSHPUSH BUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 14 (CONT)

**TEST OPTIONS**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Transmission engine speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

**CAUTION**
Read CAUTION on following page.

4. Is continuity present from connector socket J119s to connector socket J115-16?

**YES**
- Replace WTEC II cab transmission harness (para 7-86).

**NO**
- Replace WTEC II TEPSS (para 8-2).
**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 position.
2. Connect positive (+) probe of multimeter to connector socket J115-16.
3. Connect negative (-) probe of multimeter to connector socket J119s and note reading on multimeter.
4. Connect negative (-) probe of multimeter to all other sockets in connector J119 and note reading on multimeter.
5. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
6. If continuity is not present in step 3, or continuity is present in step 4 or step 5, replace WTEC II cab transmission harness (para 7-86).
7. If continuity is present in step 3 and no shorts circuits are found, replace WTEC II TEPSS (para 8-2).
8. Connect connector J115 to WTEC II TEPSS.
9. Install instrument panel assembly (para 7-15).
10. Connect connector P119 to connector J119.
11. Position front grille on cab with washer and screw.
12. Tighten two washers and screws in front grille.
13. Tighten screw to 48-60 lb-in. (5-7 N·m).
14. Tighten two screws to 24 lb-in. (3 N·m).
15. Clear diagnostic codes (para 8-4).
### f3. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 15

**INITIAL SETUP**

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<th>Equipment Conditions</th>
<th>Tools and Special Tools (Cont)</th>
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<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)</td>
</tr>
<tr>
<td>Tools and Special Tools</td>
<td>Wrench Set, Socket (Item 49 Appendix C)</td>
</tr>
<tr>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
<tr>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
<td>References</td>
</tr>
<tr>
<td></td>
<td>TM 9-4910-571-12&amp;P</td>
</tr>
</tbody>
</table>

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

**START**

1. **Is continuity present from connector J119 socket p to connector J115 socket 15?**

**CAUTION**
Read CAUTION on following page.

**NO**

**YES**

Replace WTEC II cab transmission harness (para 7-86).
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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

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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>(2) Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>(3) Remove front grille from cab.</td>
</tr>
<tr>
<td>(4) Disconnect connector P119 from connector J119.</td>
</tr>
<tr>
<td>(5) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(6) Disconnect connector J115 (top connector) from WTEC II TEPSS.</td>
</tr>
<tr>
<td>(7) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(8) Connect positive (+) probe of multimeter to connector J115-15.</td>
</tr>
<tr>
<td>(9) Connect negative (-) probe of multimeter to connector J119p and note reading on multimeter.</td>
</tr>
<tr>
<td>(10) Connect negative (-) probe of multimeter to all other sockets in connector J119 and note reading on multimeter.</td>
</tr>
<tr>
<td>(11) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(12) If continuity is not present in step 9, or continuity is present in step 10 or step 11, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
</tbody>
</table>
3. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 15 (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
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<tbody>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC II cab transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

**2.** Is continuity present from connector J119 socket r to connector J115 socket 6?

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
- Continuity Test or
- STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

**YES**
Replace WTEC II cab transmission harness (para 7-86).

**NO**
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J115 socket 6.
(3) Connect negative (-) probe of multimeter to connector J119 socket 1 and note reading on multimeter.
(4) Connect negative (-) probe of multimeter to all other sockets in connector J119 and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present in step 3, or continuity is present in step 4 or step 5, replace WTEC II cab transmission harness (para 7-86).
3. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 15 (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- WTEC II cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**CAUTION**
Read CAUTION on following page.

3. Is 200-400 ohms resistance present from connector P119 pin p to pin r?

**REASON FOR QUESTION**
If 200-400 ohms resistance is not present, or short circuits are found, DS Maintenance needs to be notified.

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC II TEPSS (para 8-2).
**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 P119 pin p.
3. Connect negative (-) probe of multimeter to connector P119 pin r and note reading on multimeter.

**NOTE**

A good turbine speed sensor will return a reading of 200-400 ohms resistance as follows:

- a. 200 ohms at -40°F (-40°C).
- b. 300 ohms at 68°F (20°C).
- c. 400 ohms at 230°F (110°C).

4. Connect negative (-) probe of multimeter to all other pins in connector P119 and note reading on multimeter.
5. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
6. If 200-400 ohms resistance is not present in step 4, or continuity is present in step 5 or step 6, notify DS Maintenance.
7. If 200-400 ohms resistance is present in step 3, and continuity is not present in step 5 or step 6, replace WTEC II TEPSS (para 8-2).
8. Connect connector J 115 to WTEC II TEPSS.
9. Install instrument panel assembly (para 7-15).
10. Connect connector P119 to connector J 119.
11. Position front grille on cab with washer and screw.
12. Position two washers and screws in front grille.
13. Tighten screw to 48-60 lb-in. (5-7 N·m).
14. Tighten two screws to 24 lb-in. (3 N·m).
15. Clear diagnostic codes (para 8-4).
f4. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 16

INITIAL SETUP

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

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

Tools and Special Tools
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
STE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

START

WARNING
CAUTION
Read WARNING and CAUTION on following page.

1. Is 200-400 ohms resistance present from output speed sensor pin C to pin D?

NO

YES

Notify DS Maintenance.

KNOWN INFO
Transmission oil level OK.
Fuse OK.
Batteries OK.

POSSIBLE PROBLEMS
Faulty output speed sensor.
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

TEST OPTIONS
Resistance Test or STE/ICE-R Test #91

REASON FOR QUESTION
If 200-400 ohms resistance is not present, DS Maintenance needs to be notified.
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.

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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) Disconnect output speed sensor connector from transfer case connector. |
| (2) Set multimeter to ohms. |
| (3) Connect positive (+) probe of multimeter to pin C of transfer case connector. |

NOTE
A good output speed sensor will return a reading of 200-400 ohms resistance as follows:
- a. 200 ohms at -40°F (-40°C)
- b. 300 ohms at 68°F (20°C)
- c. 400 ohms at 230°F (110°C)

(4) Connect negative (-) probe of multimeter to pin D of transfer case connector and note reading on multimeter.
(5) If 200-400 ohms resistance is not present, notify DS Maintenance.
(6) Connect output speed sensor connector to transfer case connector.
f4. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 16 (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

---

**2.** Is 200-400 ohms resistance present from connector P119 pin n to pin g?

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If 200-400 ohms resistance is not present, or short circuits are found, DS Maintenance needs to be notified.

---

**YES**
- Notify DS Maintenance.

**NO**
**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

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>2</td>
<td>Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>3</td>
<td>Remove front grille from cab.</td>
</tr>
<tr>
<td>4</td>
<td>Disconnect connector P119 from connector J119.</td>
</tr>
<tr>
<td>5</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>6</td>
<td>Connect positive (+) probe of multimeter to connector P119 pin n.</td>
</tr>
<tr>
<td>7</td>
<td>Connect negative (-) probe of multimeter to connector P119 pin g and note reading on multimeter.</td>
</tr>
<tr>
<td>8</td>
<td>Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>9</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>10</td>
<td>Connect positive (+) probe of multimeter to connector P119 pin g.</td>
</tr>
<tr>
<td>11</td>
<td>Connect negative (-) probe of multimeter to all other pins in connector P119 (except pin n), one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>12</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>13</td>
<td>If 200-400 ohms resistance is not present in step 7, or continuity is present in step 8, 9, 11, or 12, notify DS Maintenance.</td>
</tr>
</tbody>
</table>
f4. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 22 SUB CODE 16 (CONT)

KNOWN INFO
Transmission oil level OK.
Fuse OK.
Batteries OK.
Output speed sensor OK.

POSSIBLE PROBLEMS
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

TEST OPTIONS
Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty. If continuity is present, and no short circuits are found, WTEC II TEPSS is faulty.

3. Is continuity present from connector J119n and J119g to connector J115-5 and J115-14?

YES
Replace WTEC II cab transmission harness (para 7-86).

NO
3. Is continuity present from connector J119n and J119g to connector J115-5 and J115-14?

YES
Replace WTEC II TEPSS (para 8-2).

NO
Replace WTEC II TEPSS (para 8-2).
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>2</td>
<td>Disconnect connector J115 (top connector) from WTEC II TEPSS.</td>
</tr>
<tr>
<td>3</td>
<td>Install jumper wire from connector J119g to J119n.</td>
</tr>
<tr>
<td>4</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>5</td>
<td>Connect positive (+) probe of multimeter to connector J115-5.</td>
</tr>
<tr>
<td>6</td>
<td>Connect negative (-) probe of multimeter to connector J115-14 and note reading on multimeter.</td>
</tr>
<tr>
<td>7</td>
<td>Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>8</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>9</td>
<td>Connect positive (+) probe of multimeter to connector J115-14.</td>
</tr>
<tr>
<td>10</td>
<td>Connect negative (-) probe of multimeter to all other sockets in connector J115 (except J115-5), one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>11</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>12</td>
<td>If continuity is not present in step 6, or continuity is present in step 7, 8, 10, or 11, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td>13</td>
<td>If continuity is present in step 6, and continuity is not present in steps 7, 8, 10, and 11, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>14</td>
<td>Remove jumper wire from connector J119.</td>
</tr>
<tr>
<td>15</td>
<td>Connect connector J115 to WTEC II TEPSS.</td>
</tr>
<tr>
<td>16</td>
<td>Install instrument panel assembly (para 7-15).</td>
</tr>
<tr>
<td>17</td>
<td>Connect connector P119 to connector J119.</td>
</tr>
<tr>
<td>18</td>
<td>Position front grille on cab with washer and screw.</td>
</tr>
<tr>
<td>19</td>
<td>Position two washers and screws in front grille.</td>
</tr>
<tr>
<td>20</td>
<td>Tighten screw to 48-60 lb-in. (5-7 N·m).</td>
</tr>
<tr>
<td>21</td>
<td>Tighten two screws to 24 lb-in. (3 N·m).</td>
</tr>
<tr>
<td>22</td>
<td>Clear diagnostic codes (para 8-4).</td>
</tr>
</tbody>
</table>
F5. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

Tools and Special Tools
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
STE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

KNOWN INFO
Transmission oil level OK.
Fuse OK.
Batteries OK.
Engine does not overheat.

POSSIBLE PROBLEMS
Faulty transmission oil cooler tubes.
Faulty transmission oil cooler hoses.
Faulty transmission oil cooler.
Faulty transmission oil filters.
Faulty WTEC II cab transmission harness.
Faulty transmission external wiring harness.
Faulty WTEC II TEPSS.

TEST OPTIONS
Visual inspection

REASON FOR QUESTION
If main code 24 is logged, WTEC II TEPSS has detected an unacceptable sump oil temperature.

START

1. CAUTION
Read CAUTION on following page.

Does WTEC II TEPSS display main code 24?

NO

YES

Go to step 8 of this fault.
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Position master power switch to on (TM 9-2320-365-10).
(2) Check to see if main code 24 or main code 33 is logged in WTEC II TEPSS (para 8-4).
(3) If main code 24 is logged:
   (a) WTEC II TEPSS has detected a sump oil temperature above (sub code 23) or below (sub code 12) operating limits.
   (b) Troubleshoot oil cooling system followed by sump oil temperature sensor and circuits.
(4) If main code 33 is logged:
   (a) WTEC II TEPSS has detected a fault with sump oil temperature sensor or its circuit.
   (b) Go to step 8 of this fault.
(5) Position master power switch to off (TM 9-2320-365-10).
**f5. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE (CONT)**

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.

**POSSIBLE PROBLEMS**
- Faulty transmission oil cooler tubes.
- Faulty transmission oil cooler hoses.
- Faulty transmission oil cooler.
- Faulty transmission oil filters.
- Faulty WTEC II cab transmission harness.
- Faulty transmission external wiring harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Visual inspection

**WARNING**
Read WARNING on following page.

**REASON FOR QUESTION**
Damaged oil cooler tubes/hoses may cause WTEC II TEPSS to display main code 24 and/or 33.

---

2. Are transmission oil cooler tubes/hoses free of damage?

NO

---

YES

Replace transmission oil cooler tubes/hoses (paras 8-11 or 8-14).
Check transmission oil cooler tubes/hoses for damage and restrictions.

If damage or restriction are present, replace transmission oil cooler tubes/hose (paras 8-11 or 8-14).

**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 tubes/hoses for damage and restrictions.
2. If damage or restriction are present, replace transmission oil cooler tubes/hose (paras 8-11 or 8-14).
**KNOWN INFO**

Transmission oil level OK.
Fuse OK.
Batteries OK.
Engine does not overheat.
Transmission oil cooler tubes OK.
Transmission oil cooler hoses OK.

**POSSIBLE PROBLEMS**

Faulty transmission oil cooler.
Faulty transmission oil filters.
Faulty WTEC II cab transmission harness.
Faulty transmission external wiring harness.
Faulty WTEC II TEPSS.

**TEST OPTIONS**

Transmission Oil Inspection

**REASON FOR QUESTION**

Contaminated transmission oil may cause WTEC II TEPSS to display main code 24 and/or 33.

3. Is transmission oil free from coolant contamination?

- **NO**
  - Replace transmission oil cooler (para 8-10) and change transmission oil (Appendix H).

- **YES**
  - Read WARNING and CAUTION on following page.
WARNING

Do not drain transmission oil when transmission is hot. Failure to comply may result in injury to personnel.

CAUTION

Transmission oil must be changed whenever there is evidence of oil breakdown or contamination. Oil breakdown or contamination may be caused from overheating transmission and/or oil cooler internal failure and is indicated by discoloration, strong odor, or oil analysis.

TRANSMISSION OIL INSPECTION

Note

Transmission fluid capacity is 42.3 qt (40 L).

(1) Start engine (TM 9-2320-365-10).
(2) Allow oil to circulate for a few minutes.
(3) Position drain pan under transmission AOAP valve.
(4) Remove drain plug from transmission AOAP valve and press plunger to extract oil from system.
(5) Allow approximately 1 qt (0.9 L) of oil to drain into drain pan. Release plunger.
(6) Install drain plug on transmission AOAP valve.
(7) Inspect oil for coolant contamination.
(8) If oil is contaminated, replace transmission oil cooler (para 8-10).
(9) Shut down engine (TM 9-2320-365-10).
(10) Add oil to transmission (Appendix H).
f5. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.
- Transmission oil cooler tubes OK.
- Transmission oil cooler hoses OK.
- Transmission oil cooler OK.

**POSSIBLE PROBLEMS**
- Faulty transmission oil filters.
- Faulty WTEC II cab transmission harness.
- Faulty transmission external wiring harness.
- Faulty WTEC II TEPSS.

4. Are transmission oil filters free from damage?

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Plugged transmission oil filters may cause WTEC II TEPSS to display main code 24 and/or 33 sub code 23.

**YES**
Replace transmission oil filters (para 8-9).

**NO**
Check transmission oil filters for damage (para 8-9).

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.
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

Known Info
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.
- Transmission oil cooler tubes OK.
- Transmission oil cooler hoses OK.
- Transmission oil cooler OK.
- Transmission oil filters OK.

Possible Problems
- Faulty WTEC II cab transmission harness.
- Faulty transmission external wiring harness.
- Faulty WTEC II TEPSS.

Test Options
- Continuity Test or STE/ICE-R Test #91

Reason for Question
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

5. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE (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 two screws and washers from front grille.
2. Remove screw, washer and front grille from cab.
3. Disconnect connector P119 from connector J119.
4. Remove instrument panel assembly for access (para 7-15).
5. Disconnect connector J115 (top connector) from WTEC II TEPSS.
6. Install jumper wire from connector J119d to J119a.
7. Set multimeter to ohms.
9. Connect negative (-) probe of multimeter on J115-1 and note reading on multimeter.
10. Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and note reading on multimeter.
11. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
12. Connect positive (+) probe of multimeter to connector J115-1.
13. Connect negative (-) probe of multimeter to all other pins in connector J115 (except J115-13), one at a time, and note reading on multimeter.
14. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
15. If continuity is not present in step 9, or continuity is present in step 10, 11, 13, or 14, replace WTEC II cab transmission harness (para 7-86).
16. Remove jumper wire from connector J119d to connector J119a.
17. Connect connector J115 to WTEC II TEPSS.
18. Install instrument panel assembly (para 7-15).
f5. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.
- Transmission oil cooler tubes OK.
- Transmission oil cooler hoses OK.
- Transmission oil cooler OK.
- Transmission oil filters OK.
- WTEC II cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty transmission external wiring harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If correct resistance is not present, or short circuits are found, transmission external wiring harness is faulty, notify DS Maintenance. If correct resistance is present and no short circuits are found, WTEC II TEPSS is faulty.

**6.**
Is correct resistance present, and no short circuits found, from connector P119a to P119d?

**YES**
- Replace WTEC II TEPSS (para 8-2).

**NO**
- Notify DS Maintenance.

---

**CAUTION**
Read CAUTION on following page.
RESISTANCE TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter on P119a.

NOTE
Transmission sump oil temperature sensor resistance reading is affected by temperature. Refer to Table 2-17.
Transmission Sump Oil Temperature Sensor Resistance Readings for details.

(3) Connect negative (-) probe of multimeter on P119d and note reading on multimeter.
(4) Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to connector P119d.
(7) Connect negative (-) probe of multimeter to all other pins in connector P119 (except P119a), one at a time, and note reading on multimeter.
(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(9) If correct resistance is not present in step 3, or continuity is present in step 4, 5, 7, or 8, notify DS Maintenance.
(10) If correct resistance is present in step 3 and continuity is not present in step 4, 5, 7, or 8, replace WTEC II TEPSS (para 8-2).
(11) Connect connector P119 to connector J119.
(12) Position front grille on cab with washer and screw.
(13) Position two washers and screws in front grille.
(14) Tighten screw to 48-60 lb-in. (5.7 N·m).
(15) Tighten two screws to 24 lb-in. (3 N·m).
(16) Clear diagnostic codes (para 8-4).

Table 2-17. Transmission Sump Oil Temperature Sensor Resistance Readings

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4°F to 14°F (-20°C to -10°C)</td>
<td>691-754 ohms</td>
</tr>
<tr>
<td>14°F to 32°F (-10°C to 0°C)</td>
<td>754-820 ohms</td>
</tr>
<tr>
<td>32°F to 50°F (0°C to 10°C)</td>
<td>820-889 ohms</td>
</tr>
<tr>
<td>50°F to 68°F (10°C to 20°C)</td>
<td>889-962 ohms</td>
</tr>
<tr>
<td>68°F to 86°F (20°C to 30°C)</td>
<td>962-1039 ohms</td>
</tr>
<tr>
<td>86°F to 104°F (30°C to 40°C)</td>
<td>1039-1118 ohms</td>
</tr>
<tr>
<td>104°F to 122°F (40°C to 50°C)</td>
<td>1118-1202 ohms</td>
</tr>
<tr>
<td>122°F to 140°F (50°C to 60°C)</td>
<td>1202-1286 ohms</td>
</tr>
</tbody>
</table>
f6. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 32 AND ANY SUB CODE

**INITIAL SETUP**

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

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)
- STE/ICE-R (Item 39, Appendix C)

**KNOWN INFO**
- Fuse OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present from connector J119h and J119j to connector J115-27 and J115-28?

**START**

1. Is continuity present from connector J119h and J119j to connector J115-27 and J115-28?

**CAUTION**
Read CAUTION on following page.

**NO**

**YES**
Replace WTEC II cab transmission harness (para 7-86).

**REFERENCES**
- TM 9-4910-571-12&P
CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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. Disconnect connector P119 from connector J119.
5. Remove instrument panel assembly for access (para 7-15).
6. Disconnect connector J115 (top connector) from WTEC II TEPSS.
7. Install jumper wire from connector J119h to J119j.
8. Set multimeter to ohms.
9. Connect positive (+) probe of multimeter to connector J115-27.
10. Connect negative (-) probe of multimeter to connector J115-28 and note reading on multimeter.
11. Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and note reading on multimeter.
12. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
13. If continuity is not present in step 10, or continuity is present in step 11 or step 12, replace WTEC II cab transmission harness (para 7-86).
15. Position front grille on cab with washer and screw.
16. Position two washers and screws in front grille.
17. Tighten screw to 48-60 lb-in. (5-7 N·m).
18. Tighten two screws to 24 lb-in. (3 N·m).
f6. WTEC II TRANSMISSION ECU PUSHPARTION SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 32 AND ANY SUB CODE (CONT)

2. Does main code 32 appear on WTEC II TEPSS with new WTEC II TEPSS installed?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC II TEPSS (para 8-2).

**KNOWN INFO**
- Fuse OK.
- Batteries OK.
- WTEC II cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- WTEC II TEPSS Replacement Check

**REASON FOR QUESTION**
If WTEC II TEPSS is faulty, WTEC II TEPSS may display main code 32.
1. Remove original WTEC II TEPSS (para 8-2).
2. Install replacement WTEC II TEPSS (para 8-2).
3. Install instrument panel assembly (para 7-15).
5. Road test vehicle and read WTEC II TEPSS codes (para 8-4).
6. If main code 32 does not appear with replacement WTEC II TEPSS installed, replace original WTEC II TEPSS (para 8-2).
7. If main code 32 appears with replacement WTEC II TEPSS installed, notify DS Maintenance.
##INITIAL SETUP

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

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**Tools and Special Tools**
STE/ICE-R (Item 39, Appendix C)

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

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###f7. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 41, 42, 44, 45, 66, AND/OR 69 AND ANY SUB CODE

####KNOWN INFO
- Fuse OK.
- Batteries OK.

####POSSIBLE PROBLEMS
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

####TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

####REASON FOR QUESTION
- If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

---

###Flowchart:

1. **CAUTION**
   - Read CAUTION on following page.

2. **Is continuity present, and short circuits absent, on transmission solenoid circuits from connector J 119 to connector J 114?**

   - **NO**
   - **YES**

3. **Replace WTEC II cab transmission harness (para 7-86).**
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Jumper Across</th>
<th>Connector J114</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive (+) Probe</td>
</tr>
<tr>
<td>12</td>
<td>J119M to J119B</td>
<td>J114-2</td>
</tr>
<tr>
<td>13</td>
<td>J119T to J119N</td>
<td>J114-21</td>
</tr>
<tr>
<td>14</td>
<td>J119C to J119V</td>
<td>J114-30</td>
</tr>
<tr>
<td>15</td>
<td>J119W to J119B</td>
<td>J114-2</td>
</tr>
<tr>
<td>16</td>
<td>J119U to J119N</td>
<td>J114-21</td>
</tr>
<tr>
<td>21</td>
<td>J119F to J119H</td>
<td>J114-10</td>
</tr>
<tr>
<td>22</td>
<td>J119D to J119V</td>
<td>J114-30</td>
</tr>
<tr>
<td>23</td>
<td>J119P to J119S</td>
<td>J114-22</td>
</tr>
<tr>
<td>24</td>
<td>J119 to J119B</td>
<td>J114-2</td>
</tr>
<tr>
<td>26</td>
<td>J119K to J119A</td>
<td>J114-1</td>
</tr>
</tbody>
</table>

(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 P119 from connector J119.
(5) Remove instrument panel assembly for access (para 7-15).
(6) Disconnect connector J114 (bottom connector) from WTEC II TEPSS.
(7) Install jumper wire on connector J119 for appropriate sub code. Refer to Table 2-18. WTEC II Cab Transmission Harness Transmission Solenoid Test Points.
(8) Set multimeter to ohms.
(9) Connect positive (+) probe of multimeter to connector J114. Refer to Table 2-18. WTEC II Cab Transmission Harness Transmission Solenoid Test Points.
(10) Connect negative (-) probe of multimeter to connector J114 and note reading on multimeter. Refer to Table 2-18. WTEC II Cab Transmission Harness Transmission Solenoid Test Points.
(11) Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and note reading on multimeter.
(12) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(13) If continuity is not present in step 10, or continuity is present in step 11 or step 12, replace WTEC II cab transmission harness (para 7-86).
(14) Connect connector J114 to WTEC II TEPSS.
(15) Install instrument panel assembly (para 7-15).
F7. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 41, 42, 44, 45, 66, AND/OR 69 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
<tr>
<td>WTEC II cab transmission harness OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty circuit from P119 to affected solenoid.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

2. Is correct solenoid resistance present at connector P119?

- **NO**
  - If correct resistance is not present at connector P119, DS Maintenance needs to be notified.

- **YES**
  - Notify DS Maintenance.
  - Replace WTEC II TEPSS (para 8-2).
RESISTANCE TEST

(1) Disconnect connector P119 from connector J119.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P119. Refer to Table 2-19. Connector P119 Transmission Solenoid Resistance Test Points for appropriate sub code(s) and connector P119 pin(s).
(4) Connect negative (-) probe of multimeter to connector P119 and note reading on multimeter. Refer to Table 2-19. Connector P119 Transmission Solenoid Resistance Test Points for appropriate sub code(s) and connector P119 pin(s).

NOTE
Transmission solenoid resistance is affected by temperature. Refer to Table 2-20. Transmission Solenoid Resistance Readings.

(5) If resistance reading indicates transmission solenoid is good, replace WTEC II TEPSS (para 8-2).
(6) If resistance reading indicates transmission solenoid is faulty, notify DS Maintenance.
(7) Connect connector P119 to connector J119.
(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).
(12) Clear diagnostic codes (para 8-4).

Table 2-19. Connector P119 Transmission Solenoid Resistance Test Points

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Positive (+) Probe</th>
<th>Negative (-) Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>P119M</td>
<td>P119B</td>
</tr>
<tr>
<td>13</td>
<td>P119T</td>
<td>P119N</td>
</tr>
<tr>
<td>14</td>
<td>P119C</td>
<td>P119V</td>
</tr>
<tr>
<td>15</td>
<td>P119W</td>
<td>P119B</td>
</tr>
<tr>
<td>16</td>
<td>P119U</td>
<td>P119N</td>
</tr>
<tr>
<td>21</td>
<td>P119F</td>
<td>P119H</td>
</tr>
<tr>
<td>22</td>
<td>P119D</td>
<td>P119V</td>
</tr>
<tr>
<td>23</td>
<td>P119P</td>
<td>P119S</td>
</tr>
<tr>
<td>24</td>
<td>P119J</td>
<td>P119B</td>
</tr>
<tr>
<td>26</td>
<td>P119K</td>
<td>P119A</td>
</tr>
</tbody>
</table>

Table 2-20. Transmission Solenoid Resistance Readings

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4°F to 16°F (-20° to -10°C)</td>
<td>2.50-3.12 ohms</td>
</tr>
<tr>
<td>16°F to 32°F (-10° to 0°C)</td>
<td>2.62-3.25 ohms</td>
</tr>
<tr>
<td>32°F to 50°F (0° to 10°C)</td>
<td>2.74-3.38 ohms</td>
</tr>
<tr>
<td>50°F to 68°F (10° to 20°C)</td>
<td>2.86-3.50 ohms</td>
</tr>
<tr>
<td>68°F to 86°F (20° to 30°C)</td>
<td>2.98-3.62 ohms</td>
</tr>
<tr>
<td>86°F to 104°F (30° to 40°C)</td>
<td>3.09-3.75 ohms</td>
</tr>
<tr>
<td>104°F to 122°F (40° to 50°C)</td>
<td>3.21-3.88 ohms</td>
</tr>
<tr>
<td>122°F to 140°F (50° to 60°C)</td>
<td>3.33-4.00 ohms</td>
</tr>
</tbody>
</table>
f8. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 43 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

Tools and Special Tools (Cont)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
STE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

**KNOWN INFO**
Transmission oil level OK.
Fuse OK.
Batteries OK.

**POSSIBLE PROBLEMS**
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

**START**

1. **CAUTION**
Read CAUTION on following page.

Is continuity present, and short circuits absent, on transmission solenoid circuits from connector J119 to connector J114?

**NO**

**YES**

Replace WTEC II cab transmission harness (para 7-86).

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

**CAUTION**
Read CAUTION on following page.
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>(2) Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>(3) Remove front grille from cab.</td>
</tr>
<tr>
<td>(4) Disconnect connector P119 from connector J119.</td>
</tr>
<tr>
<td>(5) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(6) Disconnect connectors J114 and J115 from WTEC II TEPSS.</td>
</tr>
<tr>
<td>(7) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(8) Connect positive (+) probe of multimeter to High side socket of connector J119. Refer to Table 2-21. Main Code 43 Sub Code 21 and 26 High Side Test Points.</td>
</tr>
<tr>
<td>(9) Connect negative (-) probe of multimeter to High side socket of connector J114 and note reading on multimeter. Refer to Table 2-21. Main Code 43 Sub Code 21 and 26 High Side Test Points.</td>
</tr>
<tr>
<td>(10) Connect negative (-) probe of multimeter to all other sockets in connector J114, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>(11) Connect negative (-) probe of multimeter to all sockets in connector J115, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>(12) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(13) If continuity is not present in step 9, or continuity is present in step 10, 11, or 12, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
</tbody>
</table>

Table 2-21. Main Code 43 Sub Code 21 and 26 High Side Test Points

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Connector J114</th>
<th>Connector J119</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>7</td>
<td>F</td>
</tr>
<tr>
<td>26</td>
<td>16</td>
<td>K</td>
</tr>
</tbody>
</table>
f8. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 43 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

2. Is continuity present, and short circuits absent, on transmission solenoid circuits from connector J119 to connector J114?

**USER RESPONSE**
- **YES**
  - Replace WTEC II cab transmission harness (para 7-86).
- **NO**
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J119. Refer to Table 2-22. Main Code 43 Sub Code 21 and 26 Low Side Test Points.
(3) Connect negative (-) probe of multimeter to connector J114 and note reading on multimeter. Refer to Table 2-22. Main Code 43 Sub Code 21 and 26 Low Side Test Points.
(4) Connect negative (-) probe of multimeter to all other sockets in connector J114, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to all sockets in connector J115, one at a time, and note reading on multimeter.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If continuity is not present in step 3, or continuity is present in step 4, 5, or 6, replace WTEC II cab transmission harness (para 7-86).

Table 2-22. Main Code 43 Sub Code 21 and 26 Low Side Test Points

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Connector J114</th>
<th>Connector J119</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>10</td>
<td>H</td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td>A</td>
</tr>
</tbody>
</table>
f8. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 43 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Batteries OK.
- WTEC II cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If driver solenoids F and N do not have the proper resistance, WTEC II TEPSS may display main code 43.

**3.**
Is 3.26-4.4 ohms resistance present across connector P119 pins for affected solenoid circuit(s)?

<table>
<thead>
<tr>
<th>YES</th>
<th>Notify DS Maintenance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>Replace WTEC II TEPSS (para 8-2).</td>
</tr>
</tbody>
</table>
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P119. Refer to Table 2-23. Transmission Solenoid F and G Resistance Test Points.
(3) Connect negative (-) probe of multimeter to connector P119 and note reading on multimeter. Refer to Table 2-23. Transmission Solenoid F and G Resistance Test Points.
(4) Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If good resistance is not noted in step 3, or continuity is present in step 4 or step 5, replace WTEC II cab transmission harness (para 7-86).
(7) If good resistance is noted in step 3, and continuity is not present in step 4 or step 5, replace WTEC II TEPSS (para 8-2).
(8) Connect connector P119 to connector J119.
(9) Position front grille on cab with washer and screw.
(10) Position two washers and screws in front grille.
(11) Tighten screw to 48-60 lb-in. (5-7 N·m).
(12) Tighten two screws to 24 lb-in. (3 N·m).
(13) Connect connectors J114 and J115 to WTEC II TEPSS.
(14) Install instrument panel assembly (para 7-15).
(15) Clear diagnostic codes (para 8-4).

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Affected Solenoid</th>
<th>Connector P119 High</th>
<th>Connector P119 Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>F</td>
<td>K</td>
<td>H</td>
</tr>
<tr>
<td>26</td>
<td>N</td>
<td>F</td>
<td>A</td>
</tr>
</tbody>
</table>
f9. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 52 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)

Tools and Special Tools (Cont)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
STE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

1. Is continuity present from connector J 119h to connector J 115-27?

CAUTION
Read CAUTION on following page.

REASON FOR QUESTION
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

TEST OPTIONS
Continuity Test or STE/ICE-R Test #91

KNOWN INFO
Fuse OK.
Batteries OK.

POSSIBLE PROBLEMS
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

YES
Replace WTEC II cab transmission harness (para 7-86).

NO
**CAUTION**

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.

---

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>(2) Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>(3) Remove front grille on cab.</td>
</tr>
<tr>
<td>(4) Disconnect connector P119 from connector J119.</td>
</tr>
<tr>
<td>(5) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(6) Disconnect connector J115 (top connector) from WTEC II TEPSS.</td>
</tr>
<tr>
<td>(7) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(8) Connect positive (+) probe of multimeter to connector J119.</td>
</tr>
<tr>
<td>(9) Connect negative (-) probe of multimeter to connector J115-27 and note reading on multimeter.</td>
</tr>
<tr>
<td>(10) Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>(11) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(12) If continuity is not present in step 9, or continuity is present in step 10 or step 11, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
</tbody>
</table>
Is continuity present from connector J119j to connector J115-27 and absent from J119j to all other J115 sockets and ground?

**Known Info**
- Fuse OK.
- Batteries OK.

**Possible Problems**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**Test Options**
- Continuity Test or STE/ICE-R Test #91

**Reason for Question**
- If continuity is not present from connector J119j to connector J115-27, or continuity is present from J119j to any other J115 sockets or ground, WTEC II cab transmission harness is faulty.

Replace WTEC II cab transmission harness (para 7-86).
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J 119.
(3) Connect negative (-) probe of multimeter to connector J 115-28 and note reading on multimeter.
(4) Connect negative (-) probe of multimeter to all other sockets in connector J 115, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present in step 3, or continuity is present in step 4 or step 5, replace WTEC II cab transmission harness (para 7-86).
3. Is high resistance (20,000 ohms or higher) present from connector P119h to P119j?

**KNOWN INFO**
- Fuse OK.
- Batteries OK.
- WTEC II cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If resistance is high (20,000 ohms or higher), WTEC II TEPSS is faulty.

**YES**
- Notify DS Maintenance.

**NO**
- Replace WTEC II TEPSS (para 8-2).
RESISTANCE TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to connector P119h.
3. Connect negative (-) probe of multimeter to connector P119j and note reading on multimeter.
4. If resistance is high (20,000 ohms or higher), replace WTEC II TEPSS (para 8-2).
5. If resistance is low (less than 20,000 ohms), notify DS Maintenance.
6. Connect connector J115 to WTEC II TEPSS.
7. Install instrument panel assembly (para 7-15).
8. Connect connector P119 to connector J119.
9. Position front grille on cab with washer and screw.
11. Tighten screw to 48-60 lb-in. (5-7 N·m).
12. Tighten two screws to 24 lb-in. (3 N·m).
13. Clear diagnostic codes (para 8-4).
f10. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 57 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49 Appendix C)

Materials/Parts
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

Reference
TM 9-491-571-12&P

Personnel Required
(2)

START

WARNING
CAUTION
Read WARNING and CAUTION on following page.

1. Is zero pressure present on C3 clutch when shift is made into affected range?

YES

NO

TEST OPTIONS
Clutch Pressure Test or STE/ICE-R Test #50

REASON FOR QUESTION
If there is pressure to C3 clutch when shift is made, DS Maintenance needs to be notified.

YES

Notify DS Maintenance.

NO

KNOWLEDGMENT
Transmission oil level OK.
Fuse OK.
Batteries OK.
WTEC II cab transmission harness OK.

POSSIBLE PROBLEMS
Faulty WTEC II TEPSS.
WARNING

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

CLUTCH PRESSURE TEST

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under C3 pressure tap plug.
(3) Remove C3 pressure tap plug and preformed packing from control valve module. Discard preformed packing.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to C3 pressure tap.
(5) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10) and run at idle.
(7) With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R.
(8) If pressure does not drop to zero in selected range indicated by code values, notify DS Maintenance.
(9) Shut down engine (TM 9-2320-365-10).
(10) Remove pipe to tube adapter, hose, and tube to boss adapter from C3 pressure tap.
(11) Position preformed packing and C3 pressure tap plug in control valve module.
(12) Tighten C3 pressure tap plug to 84-120 lb-in. (9-14 N·m).
(13) Remove drain pan under C3 pressure tap.
(14) Install front and rear propeller shafts (para 9-2).

Table 2-24. Sub Code Range

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1st Range VER</td>
</tr>
<tr>
<td>22</td>
<td>2nd Range VER</td>
</tr>
<tr>
<td>44</td>
<td>4th Range VER</td>
</tr>
<tr>
<td>66</td>
<td>6th Range VER</td>
</tr>
<tr>
<td>88</td>
<td>N1 Range VER</td>
</tr>
<tr>
<td>99</td>
<td>N2/N4 Range VER</td>
</tr>
</tbody>
</table>
2. Is 2 ohms (or less) resistance present from connector P119h to P119j?

**Known Info**
Transmission oil level OK.
Fuse OK.
Batteries OK.
WTEC II cab transmission harness OK.

**Possible Problems**
Faulty WTEC II TEPSS.

**Test Options**
Resistance Test or STE/ICE-R Test #91

**Reason for Question**
If resistance is greater than 2 ohms, WTEC II TEPSS is faulty.

**Caution**
Read CAUTION on following page.

**Yes**
Replace WTEC II TEPSS (para 8-2).

**No**
Notify DS Maintenance.
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) 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 P119 from connector J119.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector P119h.
(7) Connect negative (-) probe of multimeter to connector P119j and note reading on multimeter.
(8) If 2 ohms (or less) resistance is present, notify DS Maintenance.
(9) If resistance is greater than 2 ohms, replace WTEC II TEPSS (para 8-2).
(10) Connect connector P119 to connector J119.
(11) Position front grille on cab with washer and screw.
(12) Position two washers and screws in front grille.
(13) Tighten screw to 48-60 lb-in. (5-7 N·m).
(14) Tighten two screws to 24 lb-in. (3 N·m).
(15) Clear diagnostic codes (para 8-4).
f11. TRANSMISSION UNUSUALLY NOISY WHEN OPERATING

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
Wrench, Torque, 0-175 lb ft (Item 57, Appendix C)

Tools and Special Tools
STE/ICE-R (Item 39, Appendix C)

Materials/Parts
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

References
TM 9-4910-571-12&P

Known Info
Transmission oil level OK.
Oil not contaminated.
Operation temperature normal.
No codes logged in ECU.

Possible Problems
Faulty PTO engagement.
Faulty scavenge pump engagement.
Faulty oil pump.
Faulty flexplate.
Faulty propeller shafts and / or universal joints.
Faulty transmission transfer case.

Test Options
Noise Check

Reason for Question
Some transmission faults will only be audible when vehicle is in motion.

START

1. Is transmission noise present when vehicle is in neutral?

NO

YES

Go to step 6 of this fault
<table>
<thead>
<tr>
<th><strong>NOISE CHECK</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Check if noise is heard when transmission is in neutral.</td>
</tr>
<tr>
<td>(2) If noise is present when vehicle is in motion, probable causes are faulty propeller drive shafts, or faulty transfer case bearings.</td>
</tr>
</tbody>
</table>
TRANSMISSION UNUSUALLY NOISY WHEN OPERATING (CONT)

**KNOWN INFO**
Transmission oil level OK.
Oil not contaminated.
Operating temperature normal.
No codes logged in ECU.

**POSSIBLE PROBLEMS**
Faulty PTO engagement.
Faulty scavenge pump engagement.
Faulty oil pump.
Faulty flexplate bolts.
Faulty flexplate.
Faulty propeller shafts and/or universal joints.
Faulty transmission transfer case.

**TEST OPTIONS**
Noise Check

**REASON FOR QUESTION**
Worn transmission gear teeth and/or PTO gear teeth will cause a noisy transmission.

---

2. Does operating noise increase when PTO is engaged?

**YES**
Notify DS Maintenance.

**NO**

---

3. Is scavenge pump free from damage?

**YES**
Notify DS Maintenance.

**NO**

---

**KNOWN INFO**
Transmission oil level OK.
Oil not contaminated.
Operating temperature normal.
No codes logged in ECU.
PTO engagement OK.

**POSSIBLE PROBLEMS**
Faulty scavenge pump engagement.
Faulty oil pump.
Faulty flexplate bolts.
Faulty flexplate.
Faulty propeller shafts and/or universal joints.
Faulty transmission transfer case.

**TEST OPTIONS**
Visual Inspection and Scavenge Pump Suction Test

**REASON FOR QUESTION**
Worn transmission gear teeth and/or scavenge pump gear will cause a noisy transmission.
NOISE CHECK
(1) Engage PTO (TM 9-2320-365-10).
(2) Listen for unusual noise or increase in noise from PTO.
(3) If transmission is noisy when PTO is engaged, transmission gear teeth are faulty and/or PTO gear teeth are faulty. Notify DS Maintenance.
(4) Disengage PTO (TM 9-2320-365-10).
(5) Shut down engine (TM 9-2320-365-10).

CAUTION
Be sure to shut down engine immediately after test has been completed. Failure to comply may result in damage to transmission.

SCAVENGE PUMP SUCTION TEST
(1) Place drain pan under transfer case.
(2) Disconnect scavenge pump suction hose at transfer case.
(3) Start engine (TM 9-2320-365-10).
(4) If oil drips or runs from fitting on transfer case, scavenge is not picking up oil from transmission transfer case causing it to overflow.
(5) Perform scavenge pump suction test.
(6) Shut down engine (TM 9-2320-365-10).

(1) Place end of hose in cup containing approximately one pint of oil.
(2) Start engine (TM 9-2320-365-10).
(3) Select neutral at pushbutton shift selector (TM 9-2320-365-10) and check if oil is immediately sucked into hose by scavenge pump.
(4) Shut down engine (TM 9-2320-365-10).
(5) If oil is not immediately removed from cup by scavenge pump, scavenge pump is faulty due to worn gears. Notify DS Maintenance.
(6) Connect scavenge pump suction hose to transfer case.
(7) Remove drain pan under transfer case.
f11. TRANSMISSION UNUSUALLY NOISY WHEN OPERATING (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level OK.</td>
<td>Main Pressure Test or STE/ICE-R Test #50</td>
<td>Low main oil pressure causes main regulator valve to oscillate.</td>
</tr>
<tr>
<td>Oil not contaminated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature normal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No codes logged in ECU.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTO engagement OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scavenge pump engagement OK.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty oil pump.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty flexplate bolts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty flexplate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty propeller shafts and / or universal joints.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty transmission transfer case.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Is 218-276 psi (1,503-1,903 kPa) present at main oil pressure tap?

YES

NO

Notify DS Maintenance.
WARNING
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

MAIN OIL PRESSURE TEST

(1) Position drain pan under pressure tap.
(2) Remove main pressure tap plug and preformed packing from control valve module. Discard preformed packing.
(3) Connect tube to boss adapter, hose, and pipe to tube adapter to main pressure tap.
(4) Perform STE/ICE-R Test # 50 (TM 9-4910-571-12&P).
(5) Start engine (TM 9-2320-365-10) and run at idle.
(6) With parking brake applied, position WTEC II TEPSS to R position then to N position while assistant notes reading on STE/ICE-R.
(7) Shut down engine (TM 9-2320-365-10).
(8) If main oil pressure is low, oil pump is faulty. Notify DS Maintenance.
(9) If oil pressure is good, moving components in transmission are faulty. Notify DS Maintenance.
(10) Remove pipe to tube adapter, hose, and tube to boss adapter from main pressure tap.
(11) Position preformed packing and main pressure tap plug in control valve module.
(12) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(13) Remove drain pan under pressure tap.
f11. TRANSMISSION UNUSUALLY NOISY WHEN OPERATING (CONT)

Are transmission to engine flexplate bolts tight?

YES

Tighten bolts to 33-47 lb-ft (45-64 N-m)

NO

Notify DS Maintenance.

KNOWN INFO
Transmission oil level OK.
Oil not contaminated.
Operating temperature normal.
No codes logged in ECU.
PTO engagement OK.
Scavenge pump engagement OK.
Oil pump OK.

POSSIBLE PROBLEMS
Faulty flexplate bolts.
Faulty flexplate.
Faulty propeller shafts and/or universal joints.
Faulty transmission transfer case.

TEST OPTIONS
Visual Inspection

REASON FOR QUESTION
Loose transmission to engine flexplate bolts and/or damaged flexplate will cause transmission to be unusually noisy when operating.
(1) Remove four bolts from engine flywheel housing plate.
(2) Turn engine alternator pulley in clockwise direction to reposition transmission flexplate for transmission to engine flexplate bolt inspection.
(3) Inspect bolts in flexplate for looseness.
(4) Inspect flexplate for play or damage.
(5) If bolts are loose, transmission will make noise.
(6) Tighten bolts in flexplate.
(7) If flexplate has play or visible signs of damage, flexplate is faulty.
TRANSMISSION UNUSUALLY NOISY WHEN OPERATING (CONT)

Is transmission propeller shaft free from damage?

**KNOWN INFO**
- Transmission oil level OK.
- Oil not contaminated.
- Operating temperature normal.
- No codes logged in ECU.
- PTO engagement OK.
- Scavenge pump engagement OK.
- Oil pump OK.
- Flexplate bolts OK.
- Flexplate OK.

**POSSIBLE PROBLEMS**
- Faulty propeller shafts and / or universal joints.
- Faulty transmission transfer case.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Damaged propeller shaft could cause transmission to be usually noisy when operating.

**WARNING**
Read WARNING on following page.

- YES
  - Replace propeller shaft(s) and/or universal joints (para 9-2)
  - Notify DS Maintenance.

- NO
WARNING

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

(1) Inspect propeller shaft for loose universal joints, bent tubing, or missing balance weights.
(2) If propeller shafts and universal joints are undamaged, bearings in transmission transfer case are faulty. Notify DS Maintenance.
## f12. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE

### INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>TM 9-4910-571-126P</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tools and Special Tools</th>
<th>Personnel Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
<td>(2)</td>
</tr>
<tr>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
<td></td>
</tr>
<tr>
<td>STE/ICE-R (Item 39, Appendix C)</td>
<td></td>
</tr>
</tbody>
</table>

### CAUTION
Read CAUTION on following page.

### KNOWN INFO
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.

### POSSIBLE PROBLEMS
- Faulty WTEC II cab transmission harness.
- Faulty TPS cable assembly.
- Faulty WTEC II TEPSS.

### TEST OPTIONS
- WTEC II TEPSS Reset Check

### REASON FOR QUESTION
Main code 21 may appear on WTEC II TEPSS if voltage from TPS to WTEC II TEPSS is temporarily lost.

---

1. Does main code 21 repeat after code has been manually cleared and throttle counts reset?

---

**START**

---

**NO**

---

**YES**

Fault corrected.
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.

Main display code 21 needs to be cleared manually from WTEC II TEPSS after a maintenance task has been performed and before vehicle is returned to service (para 8-4).

---

<table>
<thead>
<tr>
<th>WTEC II TEPSS RESET CHECK</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Cycle master power switch to on (TM 9-2320-365-10), then to off five times to clear existing throttle count settings.</td>
</tr>
<tr>
<td>(2) Position master power switch to on (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(3) Depress accelerator pedal from idle position to full throttle position (TM 9-2320-365-10) to set new 0% and 100% throttle count values in WTEC II TEPSS.</td>
</tr>
<tr>
<td>(4) Clear diagnostic code from WTEC II TEPSS (para 8-4).</td>
</tr>
<tr>
<td>(5) If main code 21 does not reappear, electrical communication between WTEC II TEPSS and TPS may be faulty.</td>
</tr>
<tr>
<td>(6) If main code 21 reappears, TPS may be faulty.</td>
</tr>
<tr>
<td>(7) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
</tbody>
</table>
2. Is main code 33 logged in conjunction with main code 21?

- **NO**
  - Go to step 4 of this fault.

- **YES**
  - Go to step 4 of this fault.

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.
- Faulty TPS cable assembly.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- Main code 21 in conjunction with main code 33 indicates loss of common ground.
(1) Position master power switch to on (TM 9-2320-365-10).
(2) Press MODE button on WTEC II TEPSS to bring up second code (if any).
(3) If main code 33 displays at WTEC II TEPSS, common ground may have been lost.
(4) If main code 21 is the only code displayed TPS may be faulty. Go to step 4 of this fault.
(5) Position master power switch to off (TM 9-2320-365-10).
f12. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
<tr>
<td>TPS cable assembly OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC II cab transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity for common ground is absent, main code 33 will be logged in addition to main code 21.</td>
</tr>
</tbody>
</table>

3. Is continuity for common ground present from connector J115-1 to connector J119Z and J119a?

- **NO**
  - Replace WTEC II cab transmission harness (para 7-86).

- **YES**
  - Replace WTEC II TEPSS (para 8-2).
(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 P119 from connector J119.
(5) Remove instrument panel assembly for access (para 7-15).
(6) Disconnect connector J115 (top connector) from WTEC II TEPSS.
(7) Set multimeter to ohms.
(8) Connect positive (+) probe of multimeter to connector J115-1.
(9) Connect negative (-) probe of multimeter to connector J119a and note reading on multimeter.
(10) Connect negative (-) probe of multimeter to connector J119Z and note reading on multimeter.
(11) If continuity is not present from connector J115-1 to connector J119a and J119Z, replace WTEC II cab transmission harness (para 7-86).
(12) If continuity is present, replace WTEC II TEPSS (para 8-2).
(13) Install instrument panel assembly (para 7-15).
(14) Connect connector P119 to connector J119.
(15) Position front grille on cab with washer and screw.
(16) Position two washers and screws in front grille.
(17) Tighten screw to 48-60 lb-in. (5-7 N·m).
(18) Tighten two screws to 24 lb-in. (3 N·m).
(19) Clear diagnostic codes (para 8-4).
f12. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty TPS cable assembly.</td>
</tr>
<tr>
<td>Faulty WTEC II cab</td>
</tr>
<tr>
<td>transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty TPS cable assembly.</td>
</tr>
<tr>
<td>Faulty WTEC II cab</td>
</tr>
<tr>
<td>transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main code 21 will be displayed</td>
</tr>
<tr>
<td>on WTEC II TEPSS if TPS cable</td>
</tr>
<tr>
<td>assembly is out of adjustment.</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**

- Linkage Test

4. Is TPS cable assembly properly adjusted?
   - NO
   - YES Adjust bracket assembly.

5. Is TPS operating?
   - NO
   - YES Replace TPS cable assembly (para 4-16).

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Test or STE/ICE-R</td>
</tr>
<tr>
<td>Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main code 21 will be displayed</td>
</tr>
<tr>
<td>on WTEC II TEPSS if TPS is</td>
</tr>
<tr>
<td>faulty.</td>
</tr>
</tbody>
</table>
**RESISTANCE TEST**

1. Disconnect connector P73 from TPS connector.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to TPS terminal A.
4. Connect negative (-) probe of multimeter to TPS terminal C and verify multimeter reads between 9,000-15,000 ohms across terminals A and C.
5. Disconnect negative (-) probe of multimeter from terminal C.
6. Connect negative (-) probe of multimeter to TPS terminal B and note record on multimeter.
7. Move governor linkage to high idle stop and record reading on multimeter.
8. Return governor linkage to low idle stop.
9. Verify that difference between highest (high idle) reading and lowest (low idle) reading is between 4,000 and 6,000 ohms.
10. Verify that highest (high idle) reading does not exceed 15,000 ohms.
11. If resistance readings are not within limits, replace TPS cable assembly (para 4-16).

**LINKAGE TEST**

1. Raise cab (TM 9-2320-365-10).
2. Verify distance between hitch pin clip on end of sensor rod and center of cable groove in ferrule is 4 in. (10 cm).
3. If distance is not 4 in. (10 cm), adjust bracket assembly to obtain correct measurement.
6. Are throttle position sensor wires free from short circuits at connector P119?

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.
- TPS cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, DS Maintenance needs to be notified.

If YES, Notify DS Maintenance.

If NO, continue to step 7.

7. Are throttle position sensor wires free from short circuits at connector P119?

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.
- TPS cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If any throttle position sensor wire is shorted, DS Maintenance needs to be notified.

If YES, Notify DS Maintenance.
# CONTINUITY TEST

1. Disconnect connector P119 from connector J119.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to connector P119R.
4. Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
5. Connect positive (+) probe of multimeter to connector P119f.
6. Connect negative (-) probe of multimeter to connector P119Z.
7. Connect positive (+) probe of multimeter to connector P73 pin C and note reading on multimeter.
8. Connect positive (+) probe of multimeter to connector P119f.
9. Connect negative (-) probe of multimeter to connector P119Z.
10. If continuity is found between pin R and any other pin, notify DS Maintenance.
11. If continuity is found between pin f and any other pin, or between pin Z and any other pin, notify DS Maintenance.
12. Connect connector P73 to TPS connector.
8. Is continuity present from connector J 119 to connector J 114?

If continuity is not present, WTEC II cab transmission harness is faulty.

Replace WTEC II cab transmission harness (para 7-86).
CONTINUITY TEST

(1) Lower cab (TM 9-2320-365-10).
(2) Remove two screws and washers from front grille.
(3) Remove screw and washer from front grille.
(4) Remove front grille from cab.
(5) Remove instrument panel assembly for access (para 7-15).
(6) Disconnect connector J114 (bottom connector) at WTEC II TEPSS.
(7) Set multimeter to ohms.
(8) For each line of Table 2-25. WTEC II Cab Transmission Harness Continuity Check:
   (a) Install jumper wire across sockets in column 1.
   (b) Connect positive (+) probe of multimeter to socket in column 2.
   (c) Connect negative (-) probe of multimeter to socket in column 3 and note reading on multimeter.
(9) If continuity is not present on any wire in Table 2-25. WTEC II Cab Transmission Harness Continuity Check, replace WTEC II cab transmission harness (para 7-86).
(10) Remove jumper wire from connector J119.

Table 2-25. WTEC II Cab Transmission Harness Continuity Check

<table>
<thead>
<tr>
<th>Column 1 Jumper Across:</th>
<th>Column 2 Positive (+) Probe to:</th>
<th>Column 3 Negative (-) Probe to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>J119f to J119Z</td>
<td>J115-1</td>
<td>J115-22</td>
</tr>
<tr>
<td>J119Z to J119R</td>
<td>J115-1</td>
<td>J114-24</td>
</tr>
<tr>
<td>J119f to J119R</td>
<td>J115-22</td>
<td>J114-24</td>
</tr>
</tbody>
</table>
f12. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.
- TPS cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
WTEC II TEPSS may display main code 21 if wire is shorted to another in the harness.

---

9. Are TPS wires free from short circuits at connectors J114 and J115?

- **NO**
  - Replace WTEC II cab transmission harness (para 7-86).

- **YES**
  - Replace WTEC II TEPSS (para 8-2).
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disconnect connector J115 (top connector) from WTEC II TEPSS.</td>
</tr>
<tr>
<td>2</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>3</td>
<td>Connect positive (+) probe of multimeter to connector J114-24.</td>
</tr>
<tr>
<td>4</td>
<td>Connect negative (-) probe of multimeter to all other sockets in connector J114, one at a time, and all sockets in connector J115, one at a time, and note readings on multimeter.</td>
</tr>
<tr>
<td>5</td>
<td>Connect positive (+) probe of multimeter to connector J115-1.</td>
</tr>
<tr>
<td>6</td>
<td>Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and all sockets in connector J114, one at a time, and note readings on multimeter.</td>
</tr>
<tr>
<td>7</td>
<td>Connect positive (+) probe of multimeter to connector J115-22.</td>
</tr>
<tr>
<td>8</td>
<td>Connect negative (-) probe of multimeter to all other sockets in connector J115, one at a time, and all sockets in connector J114, one at a time, note readings on multimeter.</td>
</tr>
<tr>
<td>9</td>
<td>If continuity is present in step 4, 6, or 8, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td>10</td>
<td>If continuity is not present in step 4, 6, and 8, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>11</td>
<td>Connect connector J114 (bottom connector) to WTEC II TEPSS.</td>
</tr>
<tr>
<td>12</td>
<td>Connect connector J115 (top connector) to WTEC II TEPSS.</td>
</tr>
<tr>
<td>13</td>
<td>Install instrument panel assembly (para 7-15).</td>
</tr>
<tr>
<td>14</td>
<td>Connect connector P119 to connector J119.</td>
</tr>
<tr>
<td>15</td>
<td>Position front grille on cab with washer and screw.</td>
</tr>
<tr>
<td>16</td>
<td>Position two washer and screws in front grille.</td>
</tr>
<tr>
<td>17</td>
<td>Tighten screw to 48-60 lb-in. (5-7 N·m).</td>
</tr>
<tr>
<td>18</td>
<td>Tighten two screws to 24 lb-in. (3 N·m).</td>
</tr>
<tr>
<td>19</td>
<td>Clear diagnostic codes (para 8-4).</td>
</tr>
</tbody>
</table>
**f13. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 51 SUB CODE 10, 12, 21, 43, 45, or 65**

**INITIAL SETUP**

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

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)

**Materials/Parts**
- Packing, Preformed (Item 199, Appendix G)
- Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
- Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

**Personnel Required**
- (2)

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

---

**KNOWN INFO**

<table>
<thead>
<tr>
<th>Transmission oil level OK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

- Faulty output speed sensor.
- Faulty turbine speed sensor.
- Faulty WTEC II TEPSS.

---

**START**

1. Is main code 51 logged without main code 22 sub code 15 or 16?

**CAUTION**

Read CAUTION on following page.

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

If main code 22 sub code 15 or 16 is logged, turbine speed sensor, output speed sensor, or associated circuit(s) is faulty.

**YES**

Check if main code 22 sub code 15 or 16 is logged in WTEC II TEPSS (para 8-4). If main code 22 sub code 15 or 16 is logged, WTEC II TEPSS has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuits. Perform Transmission System Troubleshooting (f3. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 or f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.
2. Does off-going clutch pressure go to 0 psi (0 kPa) when shift is made?

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
Clutch Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If off-going clutch oil pressure does not go to 0 psi (0 kPa) when transmission shifts, WTEC II TEPSS may display main code 51 and one or more sub codes.

**KNOWLEDGE INFO**
Transmission oil level OK.
Fuse OK.
Batteries OK.
Output speed sensor OK.
Turbine speed sensor OK.

**POSSIBLE PROBLEMS**
Faulty WTEC II TEPSS.

**YES**
Notify DS Maintenance.

**NO**
Replace WTEC II TEPSS (para 8-2).
WARNING
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

Table 2-26. Off-Going Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Off-Going Clutch</th>
<th>Solenoid Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2-1 Downshift</td>
<td>C5</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>12</td>
<td>2-3 Upshift</td>
<td>C5</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>21</td>
<td>3-2 Downshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>23</td>
<td>3-4 Upshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>43</td>
<td>5-4 Downshift</td>
<td>C2</td>
<td>Rotating Clutch</td>
</tr>
<tr>
<td>45</td>
<td>5-6 Upshift</td>
<td>C1</td>
<td>Rotating Clutch</td>
</tr>
<tr>
<td>65</td>
<td>7-6 Downshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
</tbody>
</table>

CLUTCH PRESSURE TEST

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under pressure tap.
(3) Remove pressure tap plug and preformed packing from off-going clutch indicated by the sub code, refer to Table 2-26. Off-Going Clutch Pressure Tap. Discard preformed packing.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
(5) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10) and run at idle.
(7) With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R.
(8) If one or more off-going clutches fail to lose pressure, notify DS Maintenance.
(9) Shut down engine (TM 9-2320-365-10).
(10) Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
(11) Position preformed packing and pressure tap plug in control valve module.
(12) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(13) Remove drain pan under pressure tap.
(14) Install front and rear propeller shaft (para 9-2).
(15) Clear diagnostic codes (para 8-4).
1. Is main code 25 logged without main code 22 sub code 16?

**NO**


**YES**

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
Visual Inspection

**REASON FOR QUESTION**
If main code 22 sub code 16 is logged, output speed sensor or its circuit is faulty.

**KNOWN INFO**
Transmission oil level OK.
Fuse OK.
Batteries OK.

**POSSIBLE PROBLEMS**
Faulty WTEC II TEPSS.

**INITIAL SETUP**

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

**Tools and Special Tools**
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)

**Materials/Parts**
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

**Personnel Required**
(2)

**Reference**
TM 9-4910-571-12&P
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Check if main code 22 sub code 16 is logged in WTEC II TEPSS (para 8-4).
(2) If main code 22 sub code 16 is logged, WTEC II TEPSS has sensed a fault with the output sensor or its circuit. Perform Transmission System Troubleshooting (f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).

CAUTION
f14. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 25 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
<tr>
<td>Output speed sensor OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

**WARNING**
Read WARNING on following page.

2. Is there pressure to clutch(s) when shift is made?

**NO**

**YES**

Notify DS Maintenance.

**TEST OPTIONS**
Clutch Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If there is no pressure to clutch(s), or pressure is leaking when shift is made, WTEC II TEPSS may display main code 25 and one or more sub codes.

Replace WTEC II TEPSS (para 8-2).
**WARNING**

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

---

**CLUTCH PRESSURE TEST**

1. Remove front and rear propeller shafts (para 9-2).
2. Position drain pan under pressure tap.
3. Remove pressure tap plug and preformed packing from clutch pressure tap indicated by the sub code. Refer to Table 2-27.
4. Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
5. Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
7. With brake applied, make shift indicated by sub code. Refer to Table 2-27. Clutch Pressure Tap.
8. Accelerate engine until WTEC II TEPSS displays desired range. Refer to Table 2-27. Clutch Pressure Tap.
9. Maintain engine speed to keep desired transmission range while assistant notes reading on STE/ICE-R.
10. Let engine return to idle.
11. Shift transmission into neutral.
13. Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
15. Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
16. Remove drain pan.
17. Install front and rear propeller shafts (para 9-2).
18. If one or more clutches failed to indicate proper pressure, notify DS Maintenance.

---

**Table 2-27. Clutch Pressure Tap**

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure at Clutch(s)</th>
<th>Pressure Readings at Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Speed Zero in 1st</td>
<td>C3 &amp; C6</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>11</td>
<td>Speed Zero in 2nd</td>
<td>C1 &amp; C5</td>
<td>215-305 psi (1480-2103 kPa)</td>
</tr>
<tr>
<td>22</td>
<td>Speed Zero in 3rd</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>33</td>
<td>Speed Zero in 4th</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>44</td>
<td>Speed Zero in 5th</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>55</td>
<td>Speed Zero in 6th</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>66</td>
<td>Speed Zero in 7th</td>
<td>C2 &amp; C4</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>77</td>
<td>Speed Zero in R</td>
<td>C3 &amp; C5</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
</tbody>
</table>
f15. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 53 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)

Materials/Parts
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

Personnel Required
(2)

Reference
TM 9-4910-571-12&P

KNOWN INFO
Transmission oil level OK.
Fuse OK.
Batteries OK.

POSSIBLE PROBLEMS
Faulty output speed sensor.
Faulty turbine speed sensor.
Faulty WTEC II TEPSS.

START

CAUTION
1. Read CAUTION on following page.

TEST OPTIONS
Visual Inspection

REASON FOR QUESTION
If main code 22 sub code 15 or 16 is logged, turbine speed sensor, output speed sensor, or associated circuitry is faulty.

YES

NO

Check if main code 22 sub code 15 or 16 is logged in WTEC II TEPSS (para 8-4).

If main code 22 sub code 15 or 16 is logged, WTEC II TEPSS has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuits. Perform Transmission System Troubleshooting (f3. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 or f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

1) Check if main code 22 sub code 15 or 16 is logged in WTEC II TEPSS (para 8-4).
2) If main code 22 sub code 15 or 16 is logged, WTEC II TEPSS has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuits. Perform Transmission System Troubleshooting (f3. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 or f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).
Does off-going clutch pressure go to 8 psi (55 kPa) or less when shift is made?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.
- Turbine speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II TEPSS.

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
- Clutch Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If off-going clutch oil pressure does not go to 8 psi (55 kPa) or less when shift is made, WTEC II TEPSS may display main code 53 and one or more sub codes.

**YES**
Notify DS Maintenance.

**NO**
Replace WTEC II TEPSS (para 8-2).
WARNING

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

### CLUTCH PRESSURE TEST

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under pressure tap.
(3) Remove pressure tap plug and preformed packing from off-going clutch indicated by the sub code. Refer to Table 2-28. Off-Going Clutch Pressure Tap. Discard preformed packing.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
(5) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10) and run at idle.
(7) With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R.
(8) If off-going clutch pressure does not go to 8 psi (55 kPa) or less when shift is made, notify DS Maintenance.
(9) If off-going clutch pressure does go to 8 psi (55 kPa) or less when shift is made, replace WTEC III TEPSS (para 8-2).
(10) Shut down engine (TM 9-2320-365-10).
(11) Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
(12) Position preformed packing and pressure tap plug in control valve module.
(13) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(14) Remove drain pan under pressure tap.
(15) Install front and rear propeller shafts (para 9-2).
(16) Clear diagnostic codes (para 8-4).

### Table 2-28. Off-Going Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Off-Going Clutch(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>L-N1</td>
<td>C3</td>
</tr>
<tr>
<td>18</td>
<td>1-N1</td>
<td>C1</td>
</tr>
<tr>
<td>28</td>
<td>2-N1</td>
<td>C1 &amp; C4</td>
</tr>
<tr>
<td>29</td>
<td>2-N2</td>
<td>C1</td>
</tr>
<tr>
<td>38</td>
<td>3-N1</td>
<td>C1 &amp; C3</td>
</tr>
<tr>
<td>39</td>
<td>3-N3</td>
<td>C1</td>
</tr>
<tr>
<td>48</td>
<td>4-N1</td>
<td>C1 &amp; C2</td>
</tr>
<tr>
<td>49</td>
<td>4-N3</td>
<td>C1 &amp; C2</td>
</tr>
<tr>
<td>58</td>
<td>5-N1</td>
<td>C2 &amp; C3</td>
</tr>
<tr>
<td>59</td>
<td>5-N3</td>
<td>C2</td>
</tr>
<tr>
<td>68</td>
<td>6-N1</td>
<td>C2 &amp; C4</td>
</tr>
<tr>
<td>69</td>
<td>6-N4</td>
<td>C2</td>
</tr>
<tr>
<td>78</td>
<td>R-N1</td>
<td>C3</td>
</tr>
<tr>
<td>99</td>
<td>N3-N2 or N2-N3 Shift</td>
<td>C2 &amp; C4</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>INITIAL SETUP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment Conditions</strong></td>
</tr>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
</tr>
<tr>
<td><strong>Tools and Special Tools</strong></td>
</tr>
<tr>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
<tr>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
<tr>
<td>Pan, Drain (Item 24, Appendix C)</td>
</tr>
<tr>
<td>Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)</td>
</tr>
<tr>
<td>Wrench Set, Socket (Item 49, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials/Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing, Preformed (Item 199, Appendix G)</td>
</tr>
<tr>
<td>Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)</td>
</tr>
<tr>
<td>Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)</td>
</tr>
<tr>
<td>Hose Assembly, Nonmetallic (Item 25.1, Appendix D)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personnel Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM 9-4910-571-12&amp;P</td>
</tr>
</tbody>
</table>

---

START

**WARNING**

**CAUTION**

Read WARNING and CAUTION on following page.

1. Is main code 54 logged without main code 22 sub code 15 or 16?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty output speed sensor.</td>
</tr>
<tr>
<td>Faulty turbine speed sensor.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If main code 22 sub code 15 or 16 is logged, turbine speed sensor, output speed sensor or associated circuitry is faulty.</td>
</tr>
</tbody>
</table>

Check if main code 22 sub code 15 or 16 is logged in the WTEC II TEPSS (para 8-4).

If main code 22 sub code 15 or 16 is logged, WTEC II TEPSS has sensed a fault with the turbine speed sensor, output sensor or associated circuits. Perform Transmission System Troubleshooting (f3. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 or f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).

**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.

**CAUTION**

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

1. Check if main code 22 sub code 15 or 16 is logged in the WTEC II TEPSS (para 8-4).
2. If main code 22 sub code 15 or 16 is logged, WTEC II TEPSS has sensed a fault with the turbine speed sensor, output sensor or associated circuits. Perform Transmission System Troubleshooting (f3. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 or f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).
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 (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level OK.</td>
<td>Pressure Test or STE/ICE-R Test #50</td>
<td>Low main oil pressure may cause WTEC II TEPSS to display main code 54 and one or more sub codes.</td>
</tr>
<tr>
<td>Fuse OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batteries OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output speed sensor OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbine speed sensor OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Is 218-276 psi (1,503-1,903 kPa) present at main oil pressure tap?

YES
  Notify DS Maintenance.

NO
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

**WARNING**

**PRESSURE TEST**

1. Position drain pan under pressure tap.
2. Remove main pressure tap plug and preformed packing from control valve module.
3. Connect tube to boss adapter, hose, and pipe to tube adapter to main pressure tap.
5. Start engine (TM 9-2320-365-10) and run at idle.
6. With parking brake applied, position WTEC II TEPSS to R position then to N position while assistant checks reading on STE/ICE-R.
7. Shut down engine (TM 9-2320-365-10).
8. If main oil pressure is low, notify DS Maintenance.
9. Remove pipe to tube adapter, hose, and tube to boss adapter from main pressure tap.
10. Position preformed packing and main pressure tap plug in control valve module.
11. Tighten main pressure tap plug to 84-120 lb-in. (9-14 N·m).
12. Remove drain pan under main pressure tap.
3. Is there pressure to clutch(s) when shift is made?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Turbine speed sensor OK.
- Output speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
- If there is no pressure to clutch(s) when shift is made, WTEC II TEPSS may display main code 54 and one or more sub codes.

**NO**

**YES**
- Notify DS Maintenance.

- Replace WTEC II TEPSS (para 8-2).
(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under pressure tap.
(3) Remove pressure tap plug and preformed packing from clutch pressure tap indicated by the sub code. Refer to Table 2-29. Clutch Pressure Tap.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
(5) Start engine (TM 9-2320-365-10).
(6) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).
(7) With parking brake applied, make shift indicated by sub code. Refer to Table 2-29. Clutch Pressure Tap.
(8) Accelerate engine until WTEC II TEPSS displays denied range. Refer to Table 2-29. Clutch Pressure Tap.
(9) Maintain sufficient engine speed to keep desired transmission range while assistant notes reading on STE/ICE-R.
(10) Let engine return to idle.
(11) Shift WTEC II TEPSS into neutral.
(12) If one or more clutches failed to indicate proper pressure, notify DS Maintenance. If all clutches indicate proper pressure, replace WTEC II TEPSS (para 8-2).
(13) Shut down engine (TM 9-2320-365-10).
(14) Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
(15) Position preformed packing and pressure tap plug in control valve module.
(16) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(17) Remove drain pan under pressure tap.
(18) Install front and rear propeller shafts (para 9-2).
(19) Clear diagnostic codes (para 8-4).

Table 2-29. Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure at Clutch(s)</th>
<th>Pressure Readings at Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>L-R Upshift</td>
<td>C1 &amp; C5</td>
<td>187-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>07</td>
<td>L-1 Shift</td>
<td>C3 &amp; C5</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>10</td>
<td>1-L Downshift</td>
<td>C3 &amp; C6</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>12</td>
<td>1-2 Upshift</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>17</td>
<td>1-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>21</td>
<td>2-1 Downshift</td>
<td>C1 &amp; C5</td>
<td>186-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>23</td>
<td>2-3 Upshift</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>27</td>
<td>2-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>32</td>
<td>3-2 Downshift</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>34</td>
<td>3-4 Upshift</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>43</td>
<td>4-3 Downshift</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>45</td>
<td>4-5 Upshift</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>54</td>
<td>5-4 Downshift</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>56</td>
<td>5-6 Upshift</td>
<td>C2 &amp; C4</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>65</td>
<td>6-5 Downshift</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>70</td>
<td>R-L Shift</td>
<td>C3 &amp; C6</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>71</td>
<td>R-1 Shift</td>
<td>C1 &amp; C5</td>
<td>186-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>72</td>
<td>R-2 Shift</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>80</td>
<td>N1-L Shift</td>
<td>C3 &amp; C6</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>81</td>
<td>N1-1 Shift</td>
<td>C1 &amp; C5</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>82</td>
<td>N1-2 Shift</td>
<td>C1 &amp; C4</td>
<td>186-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>83</td>
<td>N1-3 Shift</td>
<td>C1 &amp; C3</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>85</td>
<td>N1-5 Shift</td>
<td>C2 &amp; C3</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>86</td>
<td>N1-6 Shift</td>
<td>C2 &amp; C4</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>92</td>
<td>N2-2 Shift</td>
<td>C1 &amp; C4</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>93</td>
<td>N3-3 Shift</td>
<td>C1 &amp; C3</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>95</td>
<td>N3-5 Shift</td>
<td>C2 &amp; C3</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>96</td>
<td>N4-6 Shift</td>
<td>C2 &amp; C4</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>97</td>
<td>2-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
</tbody>
</table>
## f17. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 55 AND ANY SUB CODE

### INITIAL SETUP

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

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49 Appendix C)

**Materials/Parts**
- Packing, Preformed (Item 199, Appendix G)
- Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.1, Appendix D)
- Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)

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

**Personnel Required**
- (2)

---

### KNOWN INFO

| Nothing |

### POSSIBLE PROBLEMS

- Improper Transmission oil level.
- Faulty WTEC II TEPSS.

---

### TEST OPTIONS

- Visual Inspection

### REASON FOR QUESTION

- If transmission oil level is improper code 55 may be recorded.

---

### Diagram

1. **START**

    - **KNOWN INFO**
      - Nothing
    - **POSSIBLE PROBLEMS**
      - Improper Transmission oil level.
      - Faulty WTEC II TEPSS.

    - Is transmission oil level ok?
      - **NO**
      - **YES**

    - **Materials/Parts**
      - Packing, Preformed (Item 199, Appendix G)
      - Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
      - Hose Assembly, Nonmetallic (Item 25.1, Appendix D)
      - Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)

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

    - **Personnel Required**
      - (2)

---

- **Correct improper transmission oil level (TM 9-2320-365-10).**
(1) Check transmission oil level (TM 9-2320-365-10).
(2) If transmission oil level is improper, correct as required (TM 9-2320-365-10).
f17. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 55 AND ANY SUB CODE (CONT)

KNOWN INFO
Transmission oil level OK.

POSSIBLE PROBLEMS
Faulty WTEC II TEPSS.

TEST OPTIONS
Visual Inspection

REASON FOR QUESTION
If main code 32 is logged, C3 pressure switch or its circuit is faulty.

CAUTION
Read CAUTION on following page.

2. Is main code 55 logged without main code 32?

NO

YES

Perform Transmission System Troubleshooting
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

1. Check if main code 32 is logged in WTEC II TEPSS (para 8-4).
2. If main code 32 is logged, WTEC II TEPSS has sensed a faulty C3 pressure switch or its circuit. Perform Transmission System Troubleshooting (f6, WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 32 and Any Sub Code).
f17. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 55 AND ANY SUB CODE (CONT)

- **KNOWN INFO**
  - Transmission oil level OK.
- **POSSIBLE PROBLEMS**
  - Faulty WTEC II TEPSS.

- **TEST OPTIONS**
  - Pressure Test or STE/ICE-R Test #50

- **REASON FOR QUESTION**
  - Low main oil pressure may cause WTEC II TEPSS to display main code 55 and one or more sub codes.

3. Is 218-276 psi (1,503-1,903 kPa) present at main oil pressure tap?

- YES: Notify DS Maintenance.
- NO: Read WARNING on following page.
**WARNING**

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

<table>
<thead>
<tr>
<th>PRESSURE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position drain pan under pressure tap.</td>
</tr>
<tr>
<td>(2) Remove main pressure tap plug and preformed packing from control valve module.</td>
</tr>
<tr>
<td>(3) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.</td>
</tr>
<tr>
<td>(4) Start engine (TM 9-2320-365-10) and run at idle.</td>
</tr>
<tr>
<td>(5) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&amp;P).</td>
</tr>
<tr>
<td>(6) With parking brake applied, position WTEC II TEPSS to R position then to N position while assistant checks reading on STE/ICE-R.</td>
</tr>
<tr>
<td>(7) Shut down engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(8) If main oil pressure is low, notify DS Maintenance.</td>
</tr>
<tr>
<td>(9) Remove pipe to tube adapter, hose, and tube to boss adapter from main pressure tap.</td>
</tr>
<tr>
<td>(10) Position preformed packing and main pressure tap plug in control valve module.</td>
</tr>
<tr>
<td>(11) Tighten main pressure tap plug to 84-120 lb-in. (9-14 N·m).</td>
</tr>
<tr>
<td>(12) Remove drain pan under pressure tap.</td>
</tr>
</tbody>
</table>

---

**Diagram:**

- MAIN PRESSURE TAP

---

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.
f17. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 55 AND ANY SUB CODE (CONT)

**KNOWN INFO**
Transmission oil level OK.

**POSSIBLE PROBLEMS**
Faulty WTEC II TEPSS.

**TEST OPTIONS**
Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If pressure is low or missing to C3 clutch when shift is made, WTEC II TEPSS may display main code 55 and one or more sub codes.

4. **Is pressure present at C3 clutch when shift is made?**

   **NO**
   - Notify DS Maintenance.

   **YES**
   - Replace WTEC II TEPSS (para 8-2).
### Table 2-30. Clutch Pressures

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure Readings C3 Tap</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>1-R</td>
<td>215-276 psi (1,480-1,900 kPa)</td>
</tr>
<tr>
<td>27</td>
<td>2-R</td>
<td>215-276 psi (1,480-1,900 kPa)</td>
</tr>
<tr>
<td>80</td>
<td>N1-L</td>
<td>215-276 psi (1,480-1,900 kPa)</td>
</tr>
<tr>
<td>87</td>
<td>N1-R</td>
<td>215-276 psi (1,480-1,900 kPa)</td>
</tr>
<tr>
<td>97</td>
<td>2-R</td>
<td>215-276 psi (1,480-1,900 kPa)</td>
</tr>
</tbody>
</table>
f18. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 56 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)

Materials/Parts
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

Personnel Required
(2)

Reference
TM 9-4910-571-12&P

START

WARNING
CAUTION
Read WARNING and CAUTION on following page.

1. Is main code 56 logged without main code 22 sub code 15 or 16?

NO

YES

(1) Check if main code 22 sub code 15 or 16 is logged in WTEC II TEPSS (para 8-4).

(2) If main code 22 sub code 15 or 16 is logged, WTEC II TEPSS has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuit(s). Perform Transmission System Troubleshooting (f3. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 15 or f4. WTEC II Transmission ECU Pushbutton Shift Selector (TEPSS) Displays Main Code 22 Sub Code 16).

WARNING
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.
2. Is 218-276 psi (1,503-1,903 kPa) present at main oil pressure tap?

**WARNING**
Read WARNING on following page.

**KNOWN INFO**
Transmission oil level OK.
Fuse OK.
Batteries OK.
Output speed sensor OK.
Transmission turbine speed sensor OK.

**POSSIBLE PROBLEMS**
Faulty oil pressure pump.
Faulty control valve module.
Faulty WTEC II TEPSS.

**KNOWN INFO**
Pressure Test or STE/ICE-R TEST #50

**POSSIBLE PROBLEMS**
Low main oil pressure may cause WTEC II TEPSS to display main code 56 and one or more sub codes.

**YES**

Notify DS Maintenance.

**NO**
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

**WARNING**

<table>
<thead>
<tr>
<th>PRESSURE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position drain pan under pressure tap.</td>
</tr>
<tr>
<td>(2) Remove main pressure tap plug and preformed packing from control valve module.</td>
</tr>
<tr>
<td>(3) Connect tube to boss adapter, hose, and pipe to tube adapter to main pressure tap.</td>
</tr>
<tr>
<td>(4) Perform STE/ICE-R test #50 (TM 9-4910-571-12&amp;P).</td>
</tr>
<tr>
<td>(5) Start engine (TM 9-2320-365-10) and run at idle.</td>
</tr>
<tr>
<td>(6) With parking brake applied, position WTEC II TEPSS to R position then to N position while assistant checks reading on STE/ICE-R.</td>
</tr>
<tr>
<td>(7) Shut down engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(8) If main oil pressure is low, notify DS Maintenance.</td>
</tr>
<tr>
<td>(9) Remove pipe to tube adapter, hose, and tube to boss adapter from main pressure tap.</td>
</tr>
<tr>
<td>(10) Position preformed packing and main pressure tap plug in control valve module.</td>
</tr>
<tr>
<td>(11) Tighten main pressure tap plug to 84-120 lb-in. (9-14 N·m).</td>
</tr>
<tr>
<td>(12) Remove drain pan under pressure tap.</td>
</tr>
</tbody>
</table>
3. Is pressure present at clutch(s) when shift is made?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC II TEPSS (para 8-2).

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.
- Transmission turbine speed sensor OK.
- Oil pressure pump OK.

**POSSIBLE PROBLEMS**
- Faulty control valve module.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If pressure is low or missing to clutch(s) when shift is made, WTEC II TEPSS may display main code 56 and one or more sub codes.
PRESSURE TEST

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under pressure tap.
(3) Remove pressure tap plug and preformed packing from clutch pressure tap indicated by the sub code. Refer to Table 2-31. Clutch Pressure Tap.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
(5) Perform STE/ICE-R test #50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10).
(7) Make shift indicated by sub code. Refer to Table 2-31. Clutch Pressure Tap.
(8) Accelerate engine until WTEC II TEPSS displays desired range. Refer to Table 2-31. Clutch Pressure Tap.
(9) Maintain sufficient engine speed to keep desired transmission range while assistant notes reading on STE/ICE-R.
(10) Let engine return to idle.
(11) Shift transmission into neutral (TM 9-2320-365-10).
(12) Shut down engine (TM 9-2320-365-10).
(13) If one or more of clutches failed to indicate proper pressure, notify DS Maintenance. If all clutches indicate proper pressure, replace WTEC II TEPSS (para 8-2).
(14) Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
(15) Position preformed packing and pressure tap plug in control valve module.
(16) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(17) Remove drain pan under pressure tap.
(18) Install front and rear propeller shafts (para 9-2).
(19) Clear diagnostic codes (para 8-4).

Table 2-31. Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure at Clutch(s)</th>
<th>Pressure Readings at Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>L Range Test</td>
<td>C3 &amp; C6</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>11</td>
<td>1 Range Test</td>
<td>C1 &amp; C5</td>
<td>215-305 psi (1480-2100 kPa)</td>
</tr>
<tr>
<td>22</td>
<td>2 Range Test</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>33</td>
<td>3 Range Test</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>44</td>
<td>4 Range Test</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>55</td>
<td>5 Range Test</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>66</td>
<td>6 Range Test</td>
<td>C2 &amp; C4</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>77</td>
<td>R Range Test</td>
<td>C3 &amp; C5</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
</tbody>
</table>
f19. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 13 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
STE/ICE-R (Item 39, Appendix C)

Tools and Special Tools (Cont)
Wrench Set, Socket (Item 49, Appendix C)

References
TM 9-4910-571-12&P

Personnel Required
(2)

KNOWLEDGE INFO

Fuse OK.
Battery OK.
Vehicle runs.
Battery charging system OK.

POSSIBLE PROBLEMS
Faulty WTEC II dashboard cable assembly.
Faulty WTEC II VIM.
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

WARNING

CAUTION

Read WARNING and CAUTION on following page.

1. 

Is more than 8 vdc present on connector PX33-J1 and PX33-J2?

TEST OPTIONS

Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION

If less than 8 vdc is present, WTEC II TEPSS may display main code 13 sub code 12.

YES

Repair wire 1900 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

NO

START
WARNING

Remove 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.

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>(2) Set multimeter to volts dc.</td>
</tr>
<tr>
<td>(3) Start engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(4) Connect positive (+) probe of multimeter to connector PX33-J1.</td>
</tr>
<tr>
<td>(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(6) Connect positive (+) probe of multimeter to connector PX33-J2.</td>
</tr>
<tr>
<td>(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(8) If 12 to 14.5 vdc is not verified, repair wire 1900 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).</td>
</tr>
<tr>
<td>(9) Shut down engine (TM 9-2320-365-10).</td>
</tr>
</tbody>
</table>
f19. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 13 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Battery OK.</td>
</tr>
<tr>
<td>Vehicle runs.</td>
</tr>
<tr>
<td>Battery charging system OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC II VIM.</td>
</tr>
<tr>
<td>Faulty WTEC II cab transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC II dashboard cable assembly.</td>
</tr>
<tr>
<td>Faulty WTEC II TEPSS.</td>
</tr>
</tbody>
</table>

**WARNING**

Read WARNING on following page.

2. Is more than 8 vdc present at connector J116-E1 and J116-E2?

![Diagram](image.png)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Test or STE/ICE-R Test #89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If WTEC II VIM does not supply more than 8 vdc output, WTEC II TEPSS may display main code 13 sub code 12.</td>
</tr>
</tbody>
</table>

YES

Replace WTEC II VIM (para 8-6).

NO

Replace WTEC II VIM (para 8-6).
VOLTAGE TEST

(1) Start engine (TM 9-2320-365-10).
(2) Set multimeter to volts DC.
(3) Connect positive (+) probe of multimeter to connector J116-E1.
(4) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(5) Connect positive (+) probe of multimeter to connector J116-E2.
(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(7) If 12 to 14.5 vdc is not present, replace WTEC II VIM (para 8-6).
(8) Shut down engine (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.
3. Is more than 8 vdc present at connector J115-2 and J115-11?

**WARNING**
Read WARNING on following page.

**REASON FOR QUESTION**
If less than 8 vdc is present at connector J115-2 and J115-11, WTEC II TEPSS may display main code 13 sub code 12.

**TEST OPTIONS**
Voltage Test or STE/ICE-R Test #89

**KNOWN INFO**
- Fuse OK.
- Battery OK.
- Vehicle runs.
- Battery charging system OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II dashboard cable assembly.
- Faulty WTEC II VIM.
- Faulty WTEC II TEPSS.

**YES**
Replace WTEC II cab transmission harness (para 7-86).

**NO**
WARNING

Remove 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(2) Start engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(3) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(4) Disconnect connector J115 (top connector) from WTEC II TEPSS.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to connector J115-2.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) Connect positive (+) probe of multimeter to connector J115-11.</td>
</tr>
<tr>
<td>(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(9) If 12 to 14.5 vdc is not present at connector J115-2 and J115-11, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td>(10) Shut down engine (TM 9-2320-365-10).</td>
</tr>
</tbody>
</table>
f19. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 13 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Battery OK.
- Vehicle runs.
- Battery charging system OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II dashboard cable assembly.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II VIM.
- Faulty WTEC II TEPSS.

---

4. Is continuity present from connector PX33-K1 and PX33-K2 to a known good ground?

- **YES**
  - Repair wire 3101 or 3102 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

- **NO**
  - Test Options
  - Continuity Test or STE/ICE-R Test #91
  - Reason for Question
  - Faulty battery ground may cause WTEC II TEPSS to display main code 13 sub code 12.

---

5. Is continuity present from WTEC II VIM connector pins L1 and L2 to a known good ground?

- **YES**
  - Replace WTEC II VIM (para 8-6).

- **NO**
  - Test Options
  - Continuity Test or STE/ICE-R Test #91
  - Reason for Question
  - Faulty battery ground may cause WTEC II TEPSS to display main code 13 sub code 12.
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 connector J116-K1.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to connector J116-K2.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If continuity is not present in steps (5) and (7), replace WTEC II VIM (para 8-6).
(9) Connect connector J116 to WTEC II VIM.
(10) Tighten screw in connector J116.
(11) Install kick panel (para 16-3).

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 PX33-K1.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to connector PX33-K2.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) If continuity is not present on connector PX33-K1, repair wire 3101 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
(9) If continuity is not present on connector PX33-K2, repair wire 3102 (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.
**f19. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 13 AND ANY SUB CODE (CONT)**

**KNOWN INFO**
- Fuse OK.
- Battery OK.
- Vehicle runs.
- Battery charging system OK.
- WTEC II dashboard cable assembly OK.
- WTEC II VIM OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- Faulty battery ground may cause WTEC II TEPSS to display main code 13 sub code 12.

---

**6.**
Is continuity present from connector J 115-9 and J 115-18 to a known good ground?

- **NO**
  - Replace WTEC II cab transmission harness (para 7-86).

- **YES**
  - Replace WTEC II TEPSS (para 8-2).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J115-9.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) Connect positive (+) probe of multimeter to connector J115-18.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present, replace WTEC II cab transmission harness (para 7-86).
(7) If continuity is present, replace WTEC II TEPSS (para 8-2).
(8) Connect connector J115 (top connector) to WTEC II TEPSS.
(9) Install instrument panel assembly (para 7-15).
(10) Clear diagnostic codes (para 8-4).
f19A. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE

INITIAL SETUP

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

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

Personnel Required
- (2)

Notes

Perform Electrical System Troubleshooting e1.
Circuit Breaker Does Not Operate on circuit breaker C35 prior to beginning this task.

NOTE

CAUTION

Read CAUTION on following page.

Does main code 23 logged in WTEC II TEPSS return after clearing diagnostic code?

YES
Fault corrected.

NO

TEST OPTIONS

WTEC II Diagnostic Code Clearing procedure.

REASON FOR QUESTION

If WTEC II TEPSS does not display any diagnostic code after clearing, an intermittent problem was detected and corrected. If diagnostic code is logged after clearing, further troubleshooting is required.

KNOW INFO

Circuit breaker CB35 OK.

POSSIBLE PROBLEMS
- Faulty WTEC II dashboard cable assembly.
- Faulty 10 AMP MAIN POWER fuse.
- Faulty WTEC II vehicle interface module (VIM).
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Perform WTEC II Code Reading and Code Clearing (para 8-4).
(2) If diagnostic code 23 is not logged after clearing, fault is corrected.
(3) If diagnostic code 23 is logged after clearing, further troubleshooting is required.
2. Is 12 VDC present at connector PX33 socket J1 and J2?

**WARNING**

**CAUTION**

Read WARNING and CAUTION on following page.

**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

If 12 VDC is not present, wire 1900 is faulty.

---

**KNOWN INFO**

Circuit breaker CB35 OK.

**POSSIBLE PROBLEMS**

- Faulty WTEC II dashboard cable assembly.
- Faulty 10 AMP MAIN POWER fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

---

**YES**

Repair wire 1900 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

**NO**
WARNING

Remove 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 not to bend connector pins or damage connector 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) Loosen screw in PX33 connector.
(3) Disconnect connector PX33 from VIM connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector PX33 socket J1.
(6) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to connector PX33 socket J2.
(8) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(9) If 12 VDC is not present in steps (5) and (7), repair wire 1900 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
f19A. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Circuit breaker CB35 OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II dashboard cable assembly.
- Faulty 10 AMP MAIN POWER fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 3101 is faulty.

**3.**
Is continuity present from connector PX33 socket K1 to ground?

**YES**
- Repair wire 3101 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

**NO**
(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX33 socket K1.
(3) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3101 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
f19A. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Circuit breaker CB35 OK.
- WTEC II dashboard cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty 10 AMP MAIN POWER fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, 10 AMP MAIN POWER fuse is faulty.

**CAUTION**
Read CAUTION on following page.

4. Is continuity present through 10 AMP MAIN POWER fuse?

- **YES**
  - Replace 10 AMP MAIN POWER fuse (para 8-6).

- **NO**
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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove seven screws and washers from WTEC II VIM cover.</td>
</tr>
<tr>
<td>(2) Remove screw, washer, WTEC II VIM cover, and nut from WTEC II VIM.</td>
</tr>
<tr>
<td>(3) Remove 10 AMP MAIN POWER fuse from WTEC II VIM.</td>
</tr>
<tr>
<td>(4) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to one terminal on 10 AMP MAIN POWER fuse.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to other terminal on 10 AMP MAIN POWER fuse and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) If continuity is not present, replace 10 AMP MAIN POWER fuse (para 8-6).</td>
</tr>
<tr>
<td>(8) Position WTEC II VIM cover on WTEC II VIM with washer, screw, and nut.</td>
</tr>
<tr>
<td>(9) Install seven washers, and screws in WTEC II VIM cover.</td>
</tr>
</tbody>
</table>
5. If continuity is not present, **WTEC II VIM** is faulty. Is continuity present from WTEC II VIM connector pin K3 to pin L2?

- **YES**
  - Repair or replace WTEC II VIM (para 8-6).
- **NO**
  - Circuit breaker CB35 OK.
  - WTEC II dashboard cable assembly OK.
  - 10 AMP MAIN POWER fuse OK.

### KNOWN INFO
- Faulty WTEC II VIM
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS

### POSSIBLE PROBLEMS
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

### TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

### CAUTION
Read CAUTION on following page.

### REASON FOR QUESTION
- If continuity is not present, WTEC II VIM is faulty.
**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

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loosen screw in connector J116.</td>
</tr>
<tr>
<td>2</td>
<td>Disconnect connector J116 from WTEC II VIM.</td>
</tr>
<tr>
<td>3</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>4</td>
<td>Connect positive (+) probe of multimeter to WTEC II VIM connector pin K3.</td>
</tr>
<tr>
<td>5</td>
<td>Connect negative (-) probe of multimeter to WTEC II VIM connector pin L2 and note reading on multimeter.</td>
</tr>
<tr>
<td>6</td>
<td>If continuity is not present, repair or replace WTEC II VIM (para 8-6).</td>
</tr>
<tr>
<td>7</td>
<td>Connect connector PX33 to WTEC II VIM connector.</td>
</tr>
<tr>
<td>8</td>
<td>Tighten screw in connector PX33.</td>
</tr>
</tbody>
</table>
f19A. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Circuit breaker CB35 OK.
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.
- WTEC II VIM OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

6. **CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty.

Is continuity present from connector J116 socket E2 to connector J115 socket 11 and no short circuits found?

**YES**
Replace WTEC II cab transmission harness (para 7-86).

**NO**
CAUTION

Use care when testing electrical connectors not to bend connector pins or damage connector 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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(2)</td>
<td>Disconnect connector J115 from WTEC II TEPSS connector.</td>
</tr>
<tr>
<td>(3)</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>(4)</td>
<td>Connect positive (+) probe of multimeter to connector J116 socket E2.</td>
</tr>
<tr>
<td>(5)</td>
<td>Connect negative (-) probe of multimeter to connector J115 socket 11 and note reading on multimeter.</td>
</tr>
<tr>
<td>(6)</td>
<td>Connect negative probe (-) of multimeter to all other sockets in connector J115 and note reading on multimeter.</td>
</tr>
<tr>
<td>(7)</td>
<td>Connect negative probe (-) of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(8)</td>
<td>If continuity is not present in step (5), or continuity is present in step (6) or step (7), replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
</tbody>
</table>
f19A. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Circuit breaker CB35 OK
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.
- WTEC II VIM OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, or short circuits are found, WTEC II cab transmission harness is faulty. If continuity is present and short circuits are not found, WTEC II TEPSS is faulty.

---

<table>
<thead>
<tr>
<th><strong>7.</strong></th>
<th>Is continuity present from connector J116 socket A1 to connector J115 socket 9 and no short circuits found?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NO</strong></td>
<td>Replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td><strong>YES</strong></td>
<td>Replace WTEC II TEPSS (para 8-2).</td>
</tr>
</tbody>
</table>
**CAUTION**

Use care when testing electrical connectors not to bend connector pins or damage connector 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

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>2.</td>
<td>Connect positive (+) probe of multimeter to connector J116 socket A1.</td>
</tr>
<tr>
<td>3.</td>
<td>Connect negative (-) probe of multimeter to connector J115 socket 9 and note reading on multimeter.</td>
</tr>
<tr>
<td>4.</td>
<td>Connect negative probe (-) of multimeter to all other sockets in connector J115 and note reading on multimeter.</td>
</tr>
<tr>
<td>5.</td>
<td>Connect negative probe (-) of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>6.</td>
<td>If continuity is not present in step (3), or continuity is present in step (4) or step (5), replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td>7.</td>
<td>If continuity is present in step (3) and continuity is not present in step (4) or (5), replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>8.</td>
<td>Connect connector J116 to VIM connector.</td>
</tr>
<tr>
<td>10.</td>
<td>Connect connector J115 to WTEC II TEPSS connector.</td>
</tr>
<tr>
<td>11.</td>
<td>Install kick panel (para 16-3).</td>
</tr>
<tr>
<td>12.</td>
<td>Install instrument panel assembly (para 7-15).</td>
</tr>
<tr>
<td>13.</td>
<td>Clear diagnostic codes (para 8-4).</td>
</tr>
</tbody>
</table>
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- Kick panel removed (para 16-3).

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 breakers CB35 and CB79 prior to

- beginning this task.

START

WARNING
CAUTION
Read WARNING and
CAUTION on
following page.

1. Is 12 VDC present at

- connector PX33 socket J1?

TEST OPTIONS

Voltage Test or
STE/ICE-R Test #89

REASON FOR QUESTION

If 12 VDC is not present,

- WTEC II dashboard cable

- assembly is faulty.

POSSIBLE PROBLEMS

- Faulty WTEC II dashboard
cable assembly.
- Faulty terminal board TB1.
- Faulty 10 AMP MAIN POWER
fuse.
- Faulty 10 AMP IGNITION fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab
transmission harness.
- Faulty WTEC II TEPSS.

KNOWLEDGE INFO

- 12 VDC and 24 VDC circuits
operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.

YES

NO

Repair wire 1900 from connector
PX33 sockets J1 and J2 to circuit
breaker CB35 (para 2-40) or replace
WTEC II dashboard cable assembly
(para 7-10).
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.

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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Loosen screw in connector PX33.</td>
</tr>
<tr>
<td>(2) Disconnect connector PX33 from WTEC II VIM.</td>
</tr>
<tr>
<td>(3) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(4) Connect positive (+) probe of multimeter to connector PX33 socket J1.</td>
</tr>
<tr>
<td>(5) Connect negative (-) probe of multimeter to ground.</td>
</tr>
<tr>
<td>(6) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(8) If 12 VDC is not present, repair wire 1900 from connector PX33 sockets J1 and J 2 to circuit breaker CB35 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).</td>
</tr>
</tbody>
</table>
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II dashboard cable assembly.
- Faulty terminal board TB1.
- Faulty 10 AMP MAIN POWER fuse.
- Faulty 10 AMP IGNITION fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Voltage Test or STE/ICE-R Test #89

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

**WARNING**

**CAUTION**
Read WARNING and CAUTION on following page.

2. Is 24 VDC present at connector PX33 socket C1?

- **NO**
  - Go to step 10 of this fault.

- **YES**
  - Go to step 10 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.

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set multimeter to volts DC.</td>
</tr>
<tr>
<td>2</td>
<td>Connect positive (+) probe of multimeter to connector PX33 socket C1.</td>
</tr>
<tr>
<td>3</td>
<td>Connect negative (-) probe of multimeter to ground.</td>
</tr>
<tr>
<td>4</td>
<td>Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.</td>
</tr>
<tr>
<td>5</td>
<td>Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>6</td>
<td>If 24 VDC is not present, go to step 10 of this fault.</td>
</tr>
</tbody>
</table>
**f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)**

**KNOWN INFO**

| 12 VDC and 24 VDC circuits operate. |
| Circuit breaker CB35 OK. |
| Circuit breaker CB79 OK. |
| Terminal board TB1 OK. |

**POSSIBLE PROBLEMS**

- Faulty WTEC II dashboard cable assembly.
- Faulty 10 AMP MAIN POWER fuse.
- Faulty 10 AMP IGNITION fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, WTEC II dashboard cable assembly is faulty.

3. **CAUTION**

   Read CAUTION on following page.

   Is continuity present from connector PX33 socket K1 to connector PX33 socket K2?

   **NO**

   Repair wires 3101 and 3102 from connector PX33 sockets K1 and K2 to terminal board TB2 position 16 and 17 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).

   **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 batteries (para 7-48).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector PX33 socket K1.
(4) Connect negative (-) probe of multimeter to connector PX33 socket K2 and note reading on multimeter.
(5) If continuity is not present, Repair wires 3101 and 3102 from connector PX33 sockets K1 and K2 to terminal board TB2 position 16 and 17 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
4. Is continuity present from WTEC II VIM connector pin J1 to WTEC II VIM connector pin R1?

- **NO**
  - This question eliminates possible problems and determines where troubleshooting continues.

- **YES**
  -Go to step 12 of this fault.
**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. Loosen screw in connector P116.
2. Disconnect connector P116 from WTEC II VIM.
3. Set multimeter to ohms.
4. Connect positive (+) probe of multimeter to WTEC II connector pin J1.
5. Connect negative (-) probe of multimeter to WTEC II connector pin R1 and note reading on multimeter.
6. If continuity is not present, go to step 12 of this fault.
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.
- Terminal block TB1 OK.
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.

**POSSIBLE PROBLEMS**

- Faulty 10 AMP IGNITION fuse.
- Faulty WTEC II VIM.
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

**5. Is continuity present from WTEC II VIM connector pin C1 to WTEC II VIM connector pin S1?**

**NO**

- Go to step 13 of this fault.

**YES**

- Go to step 13 of this fault.
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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(2) Connect positive (+) probe of multimeter to WTEC II connector pin C1.</td>
</tr>
<tr>
<td>(3) Connect negative (-) probe of multimeter to WTEC II connector pin S1 and note reading on multimeter.</td>
</tr>
<tr>
<td>(4) If continuity is not present, go to step 13 of this fault.</td>
</tr>
</tbody>
</table>
6. Is continuity present from WTEC II VIM connector pin L2 to WTEC II VIM connector pin K2?

If continuity is not present, WTEC II VIM is faulty.

Faulty WTEC II VIM.
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

12 VDC and 24 VDC circuits operate.
Circuit breaker CB35 OK.
Circuit breaker CB79 OK.
Terminal board TB1 OK.
WTEC II dashboard cable assembly OK.
10 AMP MAIN POWER fuse OK.
10 AMP IGNITION fuse OK.

TM 9-2320-365-20-2

f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) 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. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to WTEC II connector pin L2.
3. Connect negative (-) probe of multimeter to WTEC II connector pin K2 and note reading on multimeter.
4. If continuity is not present, replace WTEC II VIM (para 8-6).
5. Connect connector PX33 to WTEC II VIM.
6. Tighten screw in connector PX33.
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.
- Terminal board TB1 OK.
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.
- 10 AMP IGNITION fuse OK.
- WTEC II VIM OK.

**POSSIBLE PROBLEMS**

- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

---

**7.**

Is continuity present from connector J116 socket E1 to connector J116 socket E2?

**NO**

Go to step 14 of this fault.

**YES**
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

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>2</td>
<td>Connect positive (+) probe of multimeter to connector J116 socket E1.</td>
</tr>
<tr>
<td>3</td>
<td>Connect negative (-) probe of multimeter to connector J116 socket E2 and note reading on multimeter.</td>
</tr>
<tr>
<td>4</td>
<td>If continuity is not present, go to step 14 of this fault.</td>
</tr>
</tbody>
</table>
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.
- Terminal board TB1 OK.
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.
- 10 AMP IGNITION fuse OK.
- WTEC II VIM OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, WTEC II cab transmission harness is faulty.

**8.**
Is continuity present from connector J116 socket F1 to connector J115 socket 12?

- **NO**
- **YES**

Replace WTEC II cab transmission harness (para 7-86).
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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(2) Disconnect connector J115 from WTEC II TEPSS.</td>
</tr>
<tr>
<td>(3) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(4) Connect positive (+) probe of multimeter to connector J116 socket F1.</td>
</tr>
<tr>
<td>(5) Connect negative (-) probe of multimeter to connector J115 socket 12 and note reading on multimeter.</td>
</tr>
<tr>
<td>(6) If continuity is not present, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
</tbody>
</table>
9B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.
- Terminal board TB1 OK.
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.
- 10 AMP IGNITION fuse OK.
- WTEC II VIM OK.

**POSSIBLE PROBLEMS**

- Faulty WTEC II cab transmission harness.
- Faulty WTEC II TEPSS.

---

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

---

**REASON FOR QUESTION**

- If continuity is not present, WTEC II cab transmission harness is faulty. If continuity is present, WTEC TEPSS is faulty.

---

**Diagram**

- **YES**: Replace WTEC II cab transmission harness (para 7-86).
- **NO**: Is continuity present from connector J116 socket A2 to connector J115 socket 18?
- **NO**: Faulty WTEC II cab transmission harness.
- **YES**: Replace WTEC II TEPSS (para 8-2).
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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(2) Connect positive (+) probe of multimeter to connector J116 socket A2.</td>
</tr>
<tr>
<td>(3) Connect negative (-) probe of multimeter to connector J115 socket 18 and note reading on multimeter.</td>
</tr>
<tr>
<td>(4) If continuity is not present, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td>(5) If continuity is present, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>(6) Connect connector J116 to WTEC II VIM connector.</td>
</tr>
<tr>
<td>(7) Tighten screw in connector P116.</td>
</tr>
<tr>
<td>(8) Install kick panel (para 16-3).</td>
</tr>
</tbody>
</table>
10. Is continuity present from connector PX33 socket C1 to terminal board TB1 position 60?

If continuity is not present, WTEC II dashboard cable assembly is faulty.

If continuity is present, repair wires 1460 from connector PX33 sockets C1 to terminal board TB1 position 60 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
CONTINUITY TEST

1. Disconnect batteries (para 7-48).
2. Remove PDP cover (para 16-2).
3. Remove three screws from PDP.
4. Remove three screws and washers from PDP.
5. Lift PDP outward to gain access.
6. Set multimeter to ohms.
7. Connect positive (+) probe of multimeter to connector PX33 socket C1.
8. Connect negative (-) probe of multimeter to terminal board TB1 position 60 and not reading on multimeter.
9. If continuity is not present, Repair wire 1460 from connector PX33 sockets C1 to terminal board TB1 position 60 (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).
Is continuity present from terminal board TB1 position 60 to terminal board TB1 position 62?

YES

Replace terminal board TB1 (7-10).

NO

If continuity is not present, terminal board TB1 is faulty. If continuity is present, WTEC II dashboard cable assembly is faulty.

Test Options
- Continuity Test or STE/ICE-R Test #91

Known Info
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.
- 10 AMP MAIN POWER fuse OK.
- 10 AMP IGNITION fuse OK.
- WTEC II VIM OK.
- WTEC II cab transmission harness OK.
- WTEC II TEPSS OK.

Possible Problems
- Faulty WTEC II dashboard cable assembly.
- Faulty terminal board TB1.

Repairs:
- Repair wires 1690 from terminal board TB1 position 62 to circuit breaker CB79 (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 terminal board TB1 position 60.
3. Connect negative (-) probe of multimeter to terminal board TB1 position 62 and note reading on multimeter.
4. If continuity is not present, replace terminal board TB1 (para 7-10).
5. If continuity is present, Repair wire 1690 from terminal board TB1 position 62 to circuit breaker CB79 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10).
6. Install PDP on dashboard with three screws.
7. Install three washers and screws in PDP.
8. Install PDP cover (para 16-2).

---

**TERMINAL BOARD TB1**

- PDP
- SCREW
- WASHER
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

KNOWN INFO
12 VDC and 24 VDC circuits operate.
Circuit breaker CB35 OK.
Circuit breaker CB79 OK.
Terminal board TB1 OK.
WTEC II dashboard cable assembly OK.
10 AMP IGNITION fuse OK.
WTEC II cab transmission harness OK.
WTEC II TEPSS OK.

POSSIBLE PROBLEMS
Faulty 10 AMP MAIN POWER fuse.
Faulty WTEC II VIM.

TEST OPTIONS
Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, 10 AMP MAIN POWER fuse is faulty. If continuity is present, WTEC II VIM is faulty.

12.
Is continuity present through 10 AMP MAIN POWER fuse?

YES
Replace WTEC II VIM (para 8-6).

NO
Replace 10 AMP MAIN POWER fuse (para 8-6).
CONTINUITY TEST

(1) Remove seven screws and washers from WTEC II VIM cover.
(2) Remove screw, washer, cover, and nut from WTEC II VIM.
(3) Remove 10 AMP MAIN POWER fuse from WTEC II VIM.
(4) Set multimeter to ohms.
(5) Connect positive (+) probe of multimeter to one terminal on 10 AMP MAIN POWER fuse.
(6) Connect negative (-) probe of multimeter to other terminal on 10 AMP MAIN POWER fuse and note reading on multimeter.
(7) If continuity is not present, replace 10 AMP MAIN POWER fuse (para 8-6).
(8) If continuity is present replace WTEC II VIM (para 8-6).
13. Is continuity present through 10 AMP IGNITION fuse?

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB35 OK.
- Circuit breaker CB79 OK.
- Terminal block TB1 OK.
- WTEC II dashboard cable assembly OK.
- 10 AMP MAIN POWER fuse OK.
- WTEC II cab transmission harness OK.
- WTEC II TEPSS OK.

**POSSIBLE PROBLEMS**
- Faulty 10 AMP IGNITION fuse.
- Faulty WTEC II VIM.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, 10 AMP IGNITION fuse is faulty. If continuity is present, WTEC II VIM is faulty.

**YES**
- Replace WTEC II VIM (para 8-6).

**NO**
- Replace 10 AMP IGNITION fuse (para 8-6).
## CONTINUITY TEST

1. Remove seven screws and washers from WTEC II VIM cover.
2. Remove screw, washer, cover, and nut from WTEC II VIM.
3. Remove 10 AMP IGNITION fuse from WTEC II VIM.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to one terminal on 10 AMP IGNITION fuse.
6. Connect negative (-) probe of multimeter to other terminal on 10 AMP IGNITION fuse and note reading on multimeter.
7. If continuity is not present, replace 10 AMP IGNITION fuse (para 8-6).
8. If continuity is present replace WTEC II VIM (para 8-6).
f19B. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**
12 VDC and 24 VDC circuits operate.
Circuit breaker CB35 OK.
Circuit breaker CB79 OK.
Terminal board TB1 OK.
WTEC II dashboard cable assembly OK.
10 AMP MAIN POWER fuse OK.
10 AMP IGNITION fuse OK.
WTEC II VIM OK.

**POSSIBLE PROBLEMS**
Faulty WTEC II cab transmission harness.
Faulty WTEC II TEPSS.

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, cab transmission harness is faulty. If continuity is present, WTEC II TEPSS is faulty.

14. Is continuity present from connector J115 socket 2 to connector J115 socket 11?

- **NO**
  - Replace WTEC II cab transmission harness (para 7-86).

- **YES**
  - Replace WTEC II TEPSS (para 8-2).
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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Connect connector P116 to WTEC II VIM.</td>
</tr>
<tr>
<td>(2) Tighten screw in connector P116.</td>
</tr>
<tr>
<td>(3) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(4) Disconnect connector J115 from WTEC II TEPSS.</td>
</tr>
<tr>
<td>(5) Set multimeter ohms.</td>
</tr>
<tr>
<td>(6) Connect positive (+) probe of multimeter to connector P115 socket 2.</td>
</tr>
<tr>
<td>(7) Connect negative (-) probe of multimeter to connector J115 socket 11 and note reading on multimeter.</td>
</tr>
<tr>
<td>(8) If continuity is not present, replace WTEC II cab transmission harness (para 7-86).</td>
</tr>
<tr>
<td>(9) If continuity is present, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>(10) Install kick panel (para 16-3).</td>
</tr>
<tr>
<td>(11) Connect batteries (para 7-48).</td>
</tr>
</tbody>
</table>
I20. METAL PARTICLES FOUND DURING TRANSMISSION OIL CHANGE

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Gen1 Mech (Item 44, Appendix C)

---

START

KNOWLEDGE

Transmission oil level
OK.

Metal particles found in transmission oil.

POSSIBLE PROBLEMS

Faulty C6 thrust bearing.
Faulty transfer case.

1.

Do metal particles pass inspection criteria?

---

TEST OPTIONS

Visual inspection

REASON FOR QUESTION

If large metal particles are found, C6 thrust bearing or transfer case may be faulty.

---

NO

Notify DS Maintenance.

---

YES

Notify DS Maintenance.
If metal particles are found on transfer case drain plug that are 0.165 in. (4.19 mm) x 0.078 in. (1.98 mm) or larger, C6 thrust bearing may be faulty. Notify DS Maintenance.
## F21. TRANSMISSION DOES NOT SHIFT OR IS SLOW TO SHIFT WHEN COLD

### INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl, Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
<tr>
<td>References</td>
<td>Materials/Parts</td>
</tr>
<tr>
<td>(TM 9-4910-571-12&amp;P)</td>
<td>Adapter, Pipe to Tube (Item 1, Appendix D)</td>
</tr>
<tr>
<td></td>
<td>Packing, Preformed (Item 177, Appendix G)</td>
</tr>
</tbody>
</table>

### TEST OPTIONS

#### WARNING

Read WARNING on following page.

#### TEST OPTIONS

- Visual Inspection

#### REASON FOR QUESTION

This question eliminates possible problems and determines where troubleshooting continues.

### FLOWCHART

1. Is vehicle equipped with transmission oil cooler tubes?

   - **NO**
     - Go to step 3 of this fault.
   - **YES**
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 to see if vehicle is equipped with transmission oil cooler tubes.
(2) If vehicle is not equipped with transmission oil cooler tubes, go to step 3 of this fault.
21. TRANSMISSION DOES NOT SHIFT OR IS SLOW TO SHIFT WHEN COLD (CONT)

**KNOWN INFO**
- Transmission oil level OK.

**POSSIBLE PROBLEMS**
- Faulty converter regulator pin.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50.

**REASON FOR QUESTION**
- If pressure is less than 10 PSI, converter regulator pin is faulty.

**2.**
- Is 10 PSI or more present at transmission oil cooler tube?

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

**FLOWCHART:***
- **YES:** Fault corrected.
- **NO:** Notify DS Maintenance.
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**

(1) Place drain pan under transmission oil cooler tube.
(2) Disconnect transmission oil sampling hose from 45 degree fitting.

**NOTE**

Note orientation of 45 degree fitting prior to removal.

(3) Remove 45 degree fitting from transmission oil cooler tube.
(4) Remove preformed packing from 45 degree fitting. Discard preformed packing.
(5) Install adapter fitting in transmission oil cooler tube.
(6) Install STE/ICE-R 0-1000 PSI transducer in adapter fitting.
(7) Start engine (TM 9-2320-365-10).
(8) Perform STE/ICE-R Test # 50 and note reading on STE/ICE-R.
(9) If pressure is less than 10 PSI, notify DS Maintenance.
(10) Shut down engine (TM 9-2320-365-10).
(11) Remove STE/ICE-R 0-1000 PSI transducer from adapter fitting.
(12) Remove adapter fitting from transmission oil cooler tube.
(13) Install preformed packing on 45 degree fitting.
(14) Install 45 degree fitting in transmission oil cooler tube.
(15) Connect transmission oil sampling hose to 45 degree fitting.
(16) Remove drain pan from under oil cooler tube.
f21. TRANSMISSION DOES NOT SHIFT OR IS SLOW TO SHIFT WHEN COLD (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level OK.</td>
<td>Pressure Test or STE/ICE-R Test #50.</td>
<td>If pressure is less than 10 PSI, converter regulator pin is faulty.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty converter regulator pin.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Is 10 PSI or more present at transmission oil cooler hose?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Fault corrected.
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**

**PRESSURE TEST**

(1) Place drain pan under transmission oil cooler hose.
(2) Disconnect transmission oil sampling hose from 45 degree fitting.

**NOTE**

Note orientation of 45 degree fitting prior to removal.

(3) Remove 45 degree fitting from transmission oil cooler hose.
(4) Install street elbow on transmission oil cooler hose.
(5) Connect flexible hose assembly to street elbow.
(6) Install reducer fitting on flexible hose assembly.
(7) Install STE/ICE-R 0-1000 PSI transducer on reducer fitting.
(8) Start engine (TM 9-2320-365-10).
(9) Perform STE/ICE-R Test #50 and note reading on STE/ICE-R.
(10) If pressure is less than 10 PSI, notify DS Maintenance.
(11) Shut down engine (TM 9-2320-365-10).
(12) Remove STE/ICE-R 0-1000 PSI transducer from reducer fitting.
(13) Remove reducer fitting from flexible hose assembly.
(14) Disconnect flexible hose assembly from street elbow.
(15) Remove street elbow from transmission oil cooler hose.
(16) Install 45 degree fitting on transmission oil cooler hose.
(17) Connect transmission oil sampling hose to 45 degree fitting.
(18) Remove drain pan from under oil cooler hose.
Is 200-400 ohms resistance present from transmission engine speed sensor pin A to pin B?

**WARNING**

**CAUTION**

Read WARNING and CAUTION on following page.

If 200-400 ohms resistance is not present, transmission engine speed sensor is faulty.

**KNOWN INFO**

Transmission oil level OK.
Fuse OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty transmission engine speed sensor.
Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.

**START**

**YES**

Replace transmission engine speed sensor (para 7-43).

**NO**

**TEST OPTIONS**

Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If 200-400 ohms resistance is not present, transmission engine speed sensor is faulty.

**INITIAL SETUP**

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

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 81, Appendix B)

**Tools and Special Tools**
STE/ICE-R (Item 39, Appendix C)

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

**CAUTION**

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Disconnect connector P72 from transmission engine speed sensor.</td>
</tr>
<tr>
<td>2.</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>3.</td>
<td>Connect positive (+) probe of multimeter to pin A of transmission engine speed sensor.</td>
</tr>
</tbody>
</table>

**NOTE**

A good transmission engine speed sensor will return a reading of 200-400 ohms resistance as follows:

- a. 200 ohms at -40° F (-40° C)
- b. 300 ohms at 68° F (20° C)
- c. 400 ohms at 230° F (110° C)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Connect negative (-) probe of multimeter to pin B of transmission engine speed sensor and note reading on multimeter.</td>
</tr>
<tr>
<td>5.</td>
<td>If good resistance is not noted, replace transmission engine speed sensor (para 7-43).</td>
</tr>
<tr>
<td>6.</td>
<td>Connect connector P72 to transmission engine speed sensor.</td>
</tr>
</tbody>
</table>
f22. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 22 SUB CODE 14 (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level OK.</td>
</tr>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
<tr>
<td>Transmission engine speed sensor OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC III cab transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC III transmission ECU.</td>
</tr>
</tbody>
</table>

2. **Is 200-400 ohms resistance present from connector P119m to P119s?**

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If 200-400 ohms resistance is not present, or short circuits are found, DS Maintenance needs to be notified.

**NO**

**YES** Notify DS Maintenance.
RESISTANCE 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 P119 from connector J119.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to connector P119m.
7. Connect negative (-) probe of multimeter to connector P119s and note reading on multimeter.
8. Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
9. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
10. Connect positive (+) probe of multimeter to connector P119s.
11. Connect negative (-) probe of multimeter to all other pins in connector P119 (except P119m), one at a time, and note reading on multimeter.
12. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
13. If continuity is not present at 200-400 ohms resistance in step 7, or continuity is present in step 8, 9, 11, or 12, notify DS Maintenance.
3. Is continuity present from connector J119m and J119s to connector P114-14 and P114-30?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Transmission engine speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC III cab transmission harness is faulty. If continuity is present, and no short circuits are found, WTEC III transmission ECU is faulty.

**YES**
- Replace WTEC III cab transmission harness (para 7-86).

**NO**
- Replace WTEC III transmission ECU (para 8-7).
## CONTINUITY TEST

1. Remove kick panel (para 16-3).
2. Disconnect connector clamp from connector P114.
3. Disconnect connector P114 from WTEC III transmission ECU.
4. Install jumper wire from connector J119m to J119s.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to connector P114-14.
7. Connect negative (-) probe of multimeter to connector P114-30 and note reading on multimeter.
8. Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.
9. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
10. Connect positive (+) probe of multimeter to connector P114-30.
11. Connect negative (-) probe of multimeter to all other sockets in connector P114 (except P114-14), one at a time, and note reading on multimeter.
12. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
13. If continuity is not present in step 7, or continuity is present in step 8, 9, 11, or 12, replace WTEC III cab transmission harness (para 8-7). If continuity is present in step 7, and continuity is not present in step 8, 9, 11, and 12, replace WTEC III transmission ECU (para 7-86).
14. Remove jumper wire from connector J119s and J119m.
15. Connect connector P119 to connector J119.
16. Position front grille on cab with washer and screw.
17. Position two washers and screws in front grille.
18. Tighten screw to 48-60 lb-in. (5-7 N·m).
19. Tighten two screws to 24 lb-in. (3 N·m).
20. Connect connector P114 to WTEC III transmission ECU.
21. Connect connector clamp to connector P114.
22. Install kick panel (para 16-3).
23. Clear diagnostic codes (para 8-5).
f23. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 22 SUB CODE 15

INITIAL SETUP

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Tools and Special Tools (Cont)
STE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

---

**KNOWN INFO**
Transmission oil level OK.
Fuse OK.
Batteries OK.

**POSSIBLE PROBLEMS**
Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.

**START**

1. **CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or shorts are found, WTEC III cab transmission harness is faulty.

Is continuity present from connector J 119p and J 119r to connector P114-15 and P114-31?

**NO**

**YES**
Replace WTEC III cab transmission harness (para 7-138).
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>2</td>
<td>Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>3</td>
<td>Remove front grille from cab.</td>
</tr>
<tr>
<td>4</td>
<td>Disconnect connector P119 from connector J119.</td>
</tr>
<tr>
<td>5</td>
<td>Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>6</td>
<td>Disconnect connector clamp from connector P114.</td>
</tr>
<tr>
<td>7</td>
<td>Disconnect connector P114 from WTEC III transmission ECU.</td>
</tr>
<tr>
<td>8</td>
<td>Install jumper wire from connector J119p to J119r.</td>
</tr>
<tr>
<td>9</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>10</td>
<td>Connect positive (+) probe of multimeter to connector P114-15.</td>
</tr>
<tr>
<td>11</td>
<td>Connect negative (-) probe of multimeter to connector P114-31 and note reading on multimeter.</td>
</tr>
<tr>
<td>12</td>
<td>Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>13</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>14</td>
<td>Remove jumper wire from connector J119r and J119p.</td>
</tr>
<tr>
<td>15</td>
<td>Connect positive (+) probe of multimeter to connector P114-31.</td>
</tr>
<tr>
<td>16</td>
<td>Connect negative (-) probe of multimeter to all sockets in connector P114 (except P114-15), one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>17</td>
<td>Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
</tbody>
</table>

CONTINUITY TEST (CONT)

(18) If continuity is not present in step 11, or continuity is present in step 12, 13, 16, or 17, replace WTEC III cab transmission harness (para 7-138).

(19) Connect connector P114 to WTEC III transmission ECU.

(20) Connect connector clamp to connector P114.

(21) Install kick panel (para 16-3).
If 200-400 ohms resistance is not present from connector P119p to P119r, or short circuits are found, DS Maintenance needs to be notified.

**Known Info**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- WTEC III cab transmission harness OK.

**Possible Problems**
- Faulty WTEC III transmission ECU.

**Test Options**
- Resistance Test or STE/ICE-R Test #91

**Reason for Question**
If 200-400 ohms resistance is not present from connector P119p to P119r, or short circuits are found, DS Maintenance needs to be notified.

**Known Info**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- WTEC III cab transmission harness OK.

**Possible Problems**
- Faulty WTEC III transmission ECU.

**Test Options**
- Resistance Test or STE/ICE-R Test #91

**Reason for Question**
If 200-400 ohms resistance is not present from connector P119p to P119r, or short circuits are found, DS Maintenance needs to be notified.

---

2. **Is 200 - 400 ohms resistance present from connector P119p to P119r?**

- **Yes**
  - Replace WTEC III transmission ECU (para 8-7).
- **No**
  - Notify DS Maintenance.
RESISTANCE TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P119p.
(3) Connect negative (-) probe of multimeter to connector P119r and note reading on multimeter.

NOTE
A good turbine speed sensor will return a reading of 200-400 ohms resistance as follows:
   a. 200 ohms at -40°F (-40°C).
   b. 300 ohms at 68°F (20°C).
   c. 400 ohms at 230°F (110°C).

(4) Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to connector P119r.
(7) Connect negative (-) probe of multimeter to all pins in connector P119 (except P119p), one at a time, and note reading on multimeter.
(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(9) If good resistance is not noted in step 3, or continuity is present in step 4, 5, 7, or 8, notify DS Maintenance.
(10) If good resistance is noted in step 3 and continuity is not present in step 4, 5, 7, or 8, replace WTEC III transmission ECU (para 8-7).
(11) Connect connector P119 to connector J119.
(12) Position front grille on cab with washer and screw.
(13) Position two washers and screws in front grille.
(14) Tighten screw to 48-60 lb-in. (5-7 N·m).
(15) Tighten two screws to 24 lb-in. (3 N·m).
(16) Clear diagnostic codes (para 8-5).
1. Is 200-400 ohms resistance present from transmission output speed sensor pin C to pin D?

**WARNING**

**CAUTION**

Read WARNING and CAUTION on following page.

If 200-400 ohms resistance is not present, notify DS Maintenance.

**KNOW INFO**

Transmission oil level OK.
Fuse OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.

**TOOLS AND SPECIAL TOOLS**

- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 81, Appendix B)
- STE/ICE-R (Item 39, Appendix C)

**REFERENCES**

TM 9-4910-571-12&P
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.

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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) Disconnect output speed sensor connector from transfer case connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to pin C of transfer case connector.

NOTE

A good output speed sensor will return a reading of 200-400 ohms resistance as follows:
   a. 200 ohms at -40° F (-40° C)
   b. 300 ohms at 68° F (20° C)
   c. 400 ohms at 230° F (110° C)

(4) Connect negative (-) probe of multimeter to pin D of transfer case connector and note reading on multimeter.
(5) If good resistance is not noted, notify DS Maintenance.
(6) Connect output speed sensor connector to transfer case connector.
Is 200-400 ohms resistance present from connector P119n to P119g?

If 200-400 ohms resistance is not present, or short circuits are found, notify DS Maintenance.
RESISTANCE 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 P119 from connector J119.
(5) Set multimeter to ohms.
(6) Connect positive (+) probe of multimeter to connector P119n.
(7) Connect negative (-) probe of multimeter on connector P119g and note reading on multimeter.
(8) Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
(9) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(10) Connect positive (+) probe of multimeter to connector P119g.
(11) Connect negative (-) probe of multimeter to all other pins in connector P119 (except P119n), one at a time, and note reading on multimeter.
(12) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(13) If 200-400 ohms resistance is not present in step 7, or continuity is present in step 8, 9, 11, or 12, notify DS Maintenance.
3. Is continuity present from connector J119n and J119g to connector P114-16 and P114-32?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC III cab transmission harness is faulty. If continuity is present, and no short circuits are found, WTEC III transmission ECU is faulty.

**YES**
- Replace WTEC III cab transmission harness (para 7-86).

**NO**
- Replace WTEC III transmission ECU (para 8-7).
CONTINUITY TEST

1. Remove kick panel (para 16-3).
2. Disconnect connector clamp from connector P114.
3. Disconnect connector P114 from WTEC III transmission ECU.
4. Install jumper wire from connector J119g to J119n.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to connector P114-32.
7. Connect negative (-) probe of multimeter to connector P114-16 and note reading on multimeter.
8. Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.
9. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
10. Connect positive (+) probe of multimeter to connector P114-16.
11. Connect negative (-) probe of multimeter to all other sockets in connector P114 (except P114-32), one at a time, and note reading on multimeter.
12. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
13. If continuity is not present in step 7, or continuity is present in step 8, 9, 11, or 12, replace WTEC III cab transmission harness (para 7-86).
14. If continuity is present in step 7, and continuity is not present in step 8, 9, 11, and 12, replace WTEC III transmission ECU (para 8-7).
15. Remove jumper wire from connector J119n and J119g.
17. Position front grille on cab with washer and screw.
18. Position two washers and screws in front grille.
19. Tighten screw to 48-60 lb-in. (5-7 N·m).
20. Tighten two screws to 24 lb-in. (3 N·m).
21. Connect connector P114 to WTEC III transmission ECU.
22. Connect connector clamp to connector P114.
23. Install kick panel (para 16-3).
24. Clear diagnostic codes (para 8-5).
f25. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
Pan, Drain (Item 24, Appendix C)

Tools and Special Tools (Cont)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 48, Appendix C)
STIE/ICE-R (Item 39, Appendix C)

References
TM 9-4910-571-12&P

WARNING
CAUTION
Read WARNING and CAUTION on following page.

1. Is main code 24 displayed on WTEC III TPSS?

TEST OPTIONS
Visual Inspection

TEST OPTIONS
If main code 24 is displayed, WTEC III transmission ECU has detected an unacceptable sump oil temperature.

START

YES

NO

Go to step 6 of this fault.

KNOWN INFO
Transmission oil level OK.
Fuse OK.
Batteries OK.
Engine does not overheat.

POSSIBLE PROBLEMS
Faulty transmission oil cooler tubes.
Faulty transmission oil cooler.
Faulty transmission oil filters.
Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.
(1) Position master power switch to on
(TM 9-2320-365-10).
(2) Check to see if main code 24 or main code 33 is displayed on WTEC III TPSS (para 8-5).
(3) If main code 24 is displayed:
   (a) WTEC III transmission ECU has detected a sump oil temperature above (sub code 23) or below (sub code 12) operating limits.
   (b) Troubleshoot oil cooling system followed by sump oil temperature sensor and circuits.
(4) If main code 33 is displayed:
   (a) WTEC III transmission ECU has detected a fault with sump oil temperature sensor or its circuit.
   (b) Troubleshoot electrical system.
(5) Position master power switch to off
(TM 9-2320-365-10).

**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.

**CAUTION**
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.
2. Are transmission oil cooler tubes free from damage?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.

**POSSIBLE PROBLEMS**
- Faulty transmission oil cooler tubes.
- Faulty transmission oil cooler.
- Faulty transmission oil filters.
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Damaged oil cooler tubes may cause WTEC III TPSS to display main code 24 and/or 33.

**YES**
Replace transmission oil cooler tube(s) (para 8-11).

**NO**
(1) Check transmission oil cooler tubes for damage and restrictions.
(2) If damage or restrictions are found, replace transmission oil cooler tube(s) (para 8-11).
Replace transmission oil cooler (para 8-10) and change transmission oil (Appendix H).
**WARNING**

Do not drain transmission oil when transmission is hot. Failure to comply may cause severe injury to personnel.

**CAUTION**

Transmission oil must be changed whenever there is evidence of oil breakdown or contamination. Oil breakdown or contamination may be caused from overheating transmission and/or oil cooler internal failure and is indicated by discoloration, strong odor, or oil analysis.

### TRANSMISSION OIL INSPECTION

**NOTE**

Transmission fluid capacity is 42.3 qt (40 L).

2. Allow oil to circulate for a few minutes.
3. Place drain pan under transmission AOAP valve.
4. Remove drain plug from transmission AOAP valve and press plunger to extract oil from system.
5. Allow approximately 1 qt (0.9 L) of oil to drain into drain pan. Release plunger.
6. Install drain plug on transmission AOAP valve.
7. Inspect oil for coolant contamination.
8. If oil is contaminated, replace transmission oil cooler (para 8-10).
10. Fill transmission (Appendix H).
4. Are transmission oil filters free from damage?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.
- Transmission oil cooler tubes OK.
- Transmission oil cooler OK.

**POSSIBLE PROBLEMS**
- Faulty transmission oil filters.
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Plugged transmission oil filters may cause WTEC III TPSS to display main code 24 and/or 33.

**YES**
Replace transmission oil filters (para 8-9).

**NO**
Check transmission oil filters for damage (para 8-9).
25. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 24 AND/OR 33 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.
- Transmission oil cooler tubes OK.
- Transmission oil cooler OK.
- Transmission oil filters OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

5. Is continuity present from connector J119d and J119a to connector P114-27 and P114-25?

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, or short circuits are found, WTEC III cab transmission harness is faulty.

**YES**
Replace WTEC III cab transmission harness (para 7-86).

**NO**
CAUTION

Use care when testing electrical connectors not to bend connector pins or damage connector 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) Disconnect connector P119 from connector J119.
(5) Remove kick panel (para 16-3).
(6) Disconnect connector clamp from connector P114.
(7) Disconnect connector P114 from WTEC III transmission ECU.
(8) Install jumper wire from connector J119d to connector J119a.
(9) Set multimeter to ohms.
(10) Connect positive (+) probe of multimeter to P114-27.
(11) Connect negative (-) probe of multimeter to connector P114-25 and note reading on multimeter.
(12) Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.
(13) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(14) Connect positive (+) probe of multimeter to connector P114-25.
(15) Connect negative (-) probe of multimeter to all sockets in connector P114 (except P114-27), one at a time, and note reading on multimeter.
(16) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(17) If continuity is not present in step 11, or continuity is present in step 12, 13, 15, or 16, replace WTEC III cab transmission harness (para 7-86).
(18) Remove jumper wire from connector J119.
(19) Connect connector P114 to WTEC III transmission ECU.
(20) Connect connector clamp on connector P114.
(21) Install kick panel (para 16-3).
Replace WTEC III transmission ECU (para 8-7).

**6.**

Is correct resistance present, and no short circuits found, from connector P119a to P119d?

**Known Info**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Engine does not overheat.
- Transmission oil cooler tubes OK.
- Transmission oil cooler OK.
- Transmission oil filters OK.
- WTEC III cab transmission harness OK.

**Possible Problems**
- Faulty WTEC III transmission ECU.

**Test Options**
- Resistance Test or STE/ICE-R Test #91

**Reason for Question**
If correct resistance is not present or short circuits are found, DS Maintenance needs to be notified. If correct resistance is present and no short circuits are found, WTEC III transmission ECU is faulty.

**Notify DS Maintenance.**
Use care when testing electrical connectors not to bend connector pins or damage connector sockets with multimeter probes. Failure to comply may result in damage to equipment.

**RESISTANCE TEST**

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P119a.

**NOTE**
Transmission sump oil temperature sensor resistance reading is affected by temperature. Refer to Table 2-32. Transmission Sump Oil Temperature Sensor Resistance Readings for details.

(3) Connect negative (-) probe of multimeter to connector P119d and note reading on multimeter.
(4) Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) Connect positive (+) probe of multimeter to connector P119d.
(7) Connect negative (-) probe of multimeter to all other pins in connector P119 (except P119a), one at a time, and note reading on multimeter.
(8) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(9) If correct resistance is not present in step 3, or continuity is present in step 4, 5, 7, or 8, notify DS Maintenance.
(10) If correct resistance is present in step 3 and continuity is not present in step 4, 5, 7, or 8, replace WTEC III transmission ECU (para 8-7).
(11) Connect connector P119 to connector J119.
(12) Position front grille on cab with washer and screw.
(13) Position two washers and screws in front grille.
(14) Tighten screw to 48-60 lb-in. (5-7 N·m).
(15) Tighten two screws to 24 lb-in. (3 N·m).
(16) Clear diagnostic codes (para 8-5).

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4° to 14° F (-20° to -10° C)</td>
<td>691-754 ohms</td>
</tr>
<tr>
<td>14° to 32° F (-10° to 0° C)</td>
<td>754-820 ohms</td>
</tr>
<tr>
<td>32° to 50° F (0° to 10° C)</td>
<td>820-889 ohms</td>
</tr>
<tr>
<td>50° to 68° F (10° to 20° C)</td>
<td>889-962 ohms</td>
</tr>
<tr>
<td>68° to 86° F (20° to 30° C)</td>
<td>962-1039 ohms</td>
</tr>
<tr>
<td>86° to 104° F (30° to 40° C)</td>
<td>1039-1118 ohms</td>
</tr>
<tr>
<td>104° to 122° F (40° to 50° C)</td>
<td>1118-1202 ohms</td>
</tr>
<tr>
<td>122° to 140° F (50° to 60° C)</td>
<td>1202-1286 ohms</td>
</tr>
</tbody>
</table>
f26. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 32 AND ANY SUB CODE

### INITIAL SETUP

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

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, 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

---

<table>
<thead>
<tr>
<th><strong>Known Info</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Possible Problems</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC III cab transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC III transmission ECU.</td>
</tr>
</tbody>
</table>

---

**Test Options**

- Continuity Test or STE/ICE-R Test #91

**Reason for Question**

If continuity is not present from connector J 119j to connector P114-12, or continuity is present from J 119j to any other P114 sockets or ground, WTEC III cab transmission harness is faulty.

---

**Start**

1. **CAUTION**
   - Read CAUTION on following page.
   - Is continuity present from connector J 119j to connector P114-12 and absent from J 119j to all other P114 sockets and ground?

---

NO

---

YES

- Replace WTEC III cab transmission harness (para 7-87).
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) Disconnect connector P119 from connector J119.
(5) Remove kick panel (para 16-3).
(6) Disconnect connector clamp from connector P114.
(7) Disconnect connector P114 from WTEC III transmission ECU.
(8) Set multimeter to ohms.
(9) Connect positive (+) probe of multimeter to connector J119.
(10) Connect negative (-) probe of multimeter to connector P114-12 and note reading on multimeter.
(11) Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.
(12) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(13) If continuity is not present in step 10, or continuity is present in step 11 or 12, replace WTEC III cab transmission harness (para 7-87).

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.

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.
Replace WTEC III cab transmission harness (para 7-87).

2. Is continuity present from connector J119h to connector P114-13?

NO

YES

KNOWN INFO
Fuse OK.
Batteries OK.

POSSIBLE PROBLEMS
Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.

TEST OPTIONS
Continuity Test or STE/ICE-R #91

REASON FOR QUESTION
If continuity is not present, WTEC III cab transmission harness is faulty.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J119.
(3) Connect negative (-) probe of multimeter to connector P114-13 and note reading on multimeter.
(4) If continuity is not present, replace WTEC III cab transmission harness (para 7-87).
(5) Connect connector P119 to connector J119.
(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).
Does main code 32 appear on WTEC III TPSS with new WTEC III transmission ECU installed?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).

**KNOWN INFO**
- Fuse OK.
- Batteries OK.
- WTEC III cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- WTEC III Transmission ECU Replacement Check

**REASON FOR QUESTION**
If WTEC III transmission ECU is faulty, WTEC III TPSS may display main code 32.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Remove original WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>(2)</td>
<td>Install replacement WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>(3)</td>
<td>Install kick panel (para 16-3).</td>
</tr>
<tr>
<td>(4)</td>
<td>Start engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(5)</td>
<td>Road test vehicle and read WTEC III transmission ECU codes (para 8-5).</td>
</tr>
<tr>
<td>(6)</td>
<td>If main code 32 does not appear with new WTEC III transmission ECU, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>(7)</td>
<td>If main code 32 does appear with new WTEC III transmission ECU, notify DS Maintenance.</td>
</tr>
<tr>
<td>(8)</td>
<td>Shut down engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(9)</td>
<td>Install original WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>(10)</td>
<td>Clear diagnostic codes (para 8-5).</td>
</tr>
</tbody>
</table>
1. Is continuity present, and short circuits absent, on transmission solenoid circuits from connector J119 to connector P114?

**CAUTION**
Read **CAUTION** on following page.

If continuity is not present, or short circuits are found, WTEC III cab transmission harness is faulty.

**YES**
Replace WTEC III cab transmission harness (para 7-87).

**NO**

---

**INITIAL SETUP**

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

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
- STE/ICE-R (Item 39, Appendix C)

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

---

**KNOWN INFO**
- Fuse OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

---

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, WTEC III cab transmission harness is faulty.
CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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) Disconnect connector P119 from connector J119.
(5) Remove kick panel (para 16-3).
(6) Disconnect connector clamp from connector P114.
(7) Disconnect connector P114 from WTEC III transmission ECU.
(8) Install jumper wire on connector J119 for appropriate sub code. Refer to Table 2-33. WTEC III Cab Transmission Harness Transmission Solenoid Test Points.
(9) Set multimeter to ohms.
(10) Connect positive (+) probe of multimeter to connector P114. Refer to Table 2-33. WTEC III Cab Transmission Harness Transmission Solenoid Test Points.
(11) Connect negative (-) probe of multimeter to connector P114 and note reading on multimeter. Refer to Table 2-33. WTEC III Cab Transmission Harness Transmission Solenoid Test Points.
(12) Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.
(13) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(14) If continuity is not present, in step 11, or continuity is present in step 12 or 13, replace WTEC III cab transmission harness (para 7-87).
(15) Remove jumper wire from connector J119.
(16) Connect connector P119 to connector J119.
f27. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 42, 44, 45, 46, 66, AND/OR 69 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Batteries OK.
- WTEC III cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty circuit from P119 to affected solenoid. Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If correct resistance is not present at connector P119, DS Maintenance needs to be notified.

2. Is correct solenoid resistance present at connector P119?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).
RESISTANCE TEST

(1) Disconnect connector P119 from connector J119.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to connector P119. Refer to Table 2-34. Connector P119 Transmission Solenoid Resistance Test Points for appropriate sub code(s) and connector P119 pin(s).
(4) Connect negative (-) probe of multimeter to connector P119 and note reading on multimeter. Refer to Table 2-34. Connector P119 Transmission Solenoid Resistance Test Points for appropriate sub code(s) and connector P119 pin(s).

NOTE
Transmission solenoid resistance is affected by temperature. Refer to Table 2-35. Transmission Solenoid Resistance Readings.

(5) If resistance reading indicates transmission solenoid is good, replace WTEC III transmission ECU (para 8-7).
(6) If resistance reading indicates transmission solenoid is faulty, notify DS Maintenance.
(7) Connect connector P119 to connector J119.
(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).
(12) Clear diagnostic codes (para 8-5).

Table 2-34. Connector P119 Transmission Solenoid Resistance Test Points

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Connector P119</th>
<th>Positive (+) Probe</th>
<th>Negative (-) Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>P119M</td>
<td>P119B</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>P119T</td>
<td>P119N</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>P119C</td>
<td>P119V</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>P119W</td>
<td>P119B</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>P119U</td>
<td>P119N</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>P119F</td>
<td>P119H</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>P119D</td>
<td>P119V</td>
<td></td>
</tr>
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<td>23</td>
<td>P119P</td>
<td>P119S</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>P119J</td>
<td>P119B</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>P119K</td>
<td>P119A</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>P119M</td>
<td>P119B</td>
<td></td>
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</tbody>
</table>

Table 2-35. Transmission Solenoid Resistance Readings

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4°F to 16°F (-20°F to -10°C)</td>
<td>2.50-3.12 ohms</td>
</tr>
<tr>
<td>16°F to 32°F (-10°F to 0°C)</td>
<td>2.62-3.25 ohms</td>
</tr>
<tr>
<td>32°F to 50°F (0°F to 10°C)</td>
<td>2.74-3.38 ohms</td>
</tr>
<tr>
<td>50°F to 68°F (10°F to 20°C)</td>
<td>2.86-3.50 ohms</td>
</tr>
<tr>
<td>68°F to 86°F (20°F to 30°C)</td>
<td>2.98-3.62 ohms</td>
</tr>
<tr>
<td>86°F to 104°F (30°F to 40°C)</td>
<td>3.09-3.75 ohms</td>
</tr>
<tr>
<td>104°F to 122°F (40°F to 50°C)</td>
<td>3.21-3.88 ohms</td>
</tr>
<tr>
<td>122°F to 140°F (50°F to 60°C)</td>
<td>3.33-4.00 ohms</td>
</tr>
</tbody>
</table>
1. Is continuity present from connector J119h to connector P114-13?

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, WTEC III cab transmission harness is faulty.

**KNOWN INFO**
- Fuse OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**INITIAL SETUP**

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

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)

**Tools and Special Tools (Cont)**
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)
- STE/ICE-R (Item 39, Appendix C)

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

If continuity is present, go to yes.

If continuity is not present, go to no.

Replace WTEC III cab transmission harness (para 7-87).
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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 on cab.
4. Disconnect connector P119 from connector J119.
5. Remove kick panel (para 16-3).
6. Disconnect connector clamp from connector P114.
7. Disconnect connector P114 from WTEC III transmission ECU.
8. Set multimeter to ohms.
9. Connect positive (+) probe of multimeter to connector J199h.
10. Connect negative (-) probe of multimeter to connector P114-13 and note reading on multimeter.
11. If continuity is not present, replace WTEC III cab transmission harness (para 7-87).
28. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 52 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC III cab transmission harness.</td>
</tr>
<tr>
<td>Faulty WTEC III transmission ECU.</td>
</tr>
</tbody>
</table>

2. Is continuity present from connector J119j to connector P114-12 and absent from J119j to all other P114 sockets and ground?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present from connector J119j to connector P114-12, or continuity is present from J119j to any other P114 sockets or ground, WTEC III cab transmission harness is faulty.</td>
</tr>
</tbody>
</table>

YES: Replace WTEC III cab transmission harness (para 7-87).

NO:
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector J119.
(3) Connect negative (-) probe of multimeter to connector P114-12 and note reading on multimeter.
(4) Connect negative (-) probe of multimeter to all other sockets in connector P114, one at a time, and note reading on multimeter.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If continuity is not present in step 3, or continuity is present in step 4 or 5, replace WTEC III cab transmission harness (para 7-87).
F28. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 52 AND ANY SUB CODE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
<tr>
<td>WTEC III cab transmission harness OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty WTEC III transmission ECU.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If resistance is high (20,000 ohms or higher), WTEC III transmission ECU is faulty.</td>
</tr>
</tbody>
</table>

3. Is high resistance (20,000 ohms or higher) present from connector P119h to P119j?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).
RESISTANCE TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P119h.
(3) Connect negative (-) probe of multimeter to connector P119j and note reading on multimeter.
(4) If resistance is high (20,000 ohms or higher), replace WTEC III transmission ECU (para 8-7).
(5) If resistance is low (less than 20,000 ohms), notify DS maintenance.
(6) Install instrument panel assembly (para 7-18).
(7) Connect connector P119 to connector J119.
(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).
(12) Connect connector P114 to WTEC III transmission ECU.
(13) Connect connector clamp on connector P114.
(14) Install kick panel (para 16-3).
(15) Clear diagnostic codes (para 8-5).
f29. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 57 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools (Cont)
Wrench Set, Socket (Item 49, Appendix C)

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Multimeter, Digital (Item 22, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

Materials/Parts
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

Reference
TM 9-491-571-12&P

1. Is zero pressure present on C3 clutch when shift is made into affected range?

WARNING
CAUTION
Read WARNING and CAUTION on following page.

REASON FOR QUESTION
Clutch Pressure Test or STE/ICE-R Test #50

REASON FOR QUESTION
If pressure is present on C3 clutch when shift is made, WTEC III TPSS may display main code 57 and one or more sub codes.

NO

YES

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.

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

CLUTCH PRESSURE TEST
(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under C3 pressure tap plug.
(3) Remove C3 pressure tap plug and preformed packing from control valve module. Discard preformed packing.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to C3 pressure tap.
(5) Perform STE/ICE-R Test # 50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10) and run at idle.
(7) With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R. Refer to Table 2-36. Sub Code Range.
(8) If pressure does not drop to zero in selected range indicated by code values, notify DS Maintenance.
(9) Shut down engine (TM 9-2320-365-10).
(10) Remove pipe to tube adapter, hose, and tube to boss adapter from C3 pressure tap.
(11) Position preformed packing and C3 pressure tap plus in control valve module.
(12) Tighten C3 pressure tap plug to 84-120 lb-in. (9-14 N·m).
(13) Remove drain pan under C3 pressure tap plug.
(14) Install front and rear propeller shafts (para 9-2).

Table 2-36. Sub Code Range

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1st Range VER</td>
</tr>
<tr>
<td>22</td>
<td>2nd Range VER</td>
</tr>
<tr>
<td>44</td>
<td>4th Range VER</td>
</tr>
<tr>
<td>66</td>
<td>6th Range VER</td>
</tr>
<tr>
<td>88</td>
<td>N1 Range VER</td>
</tr>
<tr>
<td>99</td>
<td>N2/N4 Range VER</td>
</tr>
</tbody>
</table>
f29. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 57 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- WTEC III cab transmission harness OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Resistance Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If resistance is greater than 2 ohms, WTEC III transmission ECU is faulty.

2. Is 2 ohms (or less) resistance present from connector P119h to P119j?

**CAUTION**
Read CAUTION on following page.

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).

- **NO**
  - Notify DS Maintenance.
**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. 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 P119 from connector J119.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter on P119h.
7. Connect negative (-) probe of multimeter on P119j and note reading on multimeter.
8. If 2 ohms (or less) resistance is present, notify DS Maintenance.
9. If resistance is greater than 2 ohms, replace WTEC III transmission ECU (para 8-7).
10. Connect connector P119 to connector J119.
11. Position front grille on cab with washer and screw.
12. Position two washers and screws in front grille.
13. Tighten screw to 48-60 lb-in. (5-7 N·m).
14. Tighten two screws to 24 lb-in. (3 N·m).
15. Clear diagnostic codes (para 8-5).
f30. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE

INITIAL SETUP

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

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

References
TM 9-4910-571-12&P

Personnel Required
(2)

KNOWLED INFO
Fuse OK.
Transmission oil level OK.
Batteries OK.

POSSIBLE PROBLEMS
Faulty WTEC III cab transmission harness.
Faulty TPS cable assembly.
Faulty WTEC III transmission ECU.

TEST OPTIONS
WTEC III Transmission ECU Reset Check

REASON FOR QUESTION
Main code 21 may appear on WTEC III TPSS if voltage from TPS WTEC III transmission ECU is temporarily lost.

START

1. Does main code 21 repeat after code has been manually cleared and throttle counts reset?

CAUTION
Read CAUTION on following page.

NO

YES

Fault corrected.
WTEC III TRANSMISSION ECU RESET CHECK

(1) Cycle master power switch to on (TM 9-2320-365-10), then to off five times to clear existing throttle count settings.
(2) Position master power switch to on (TM 9-2320-365-10).
(3) Depress accelerator pedal from idle position to full throttle position (TM 9-2320-365-10) to set new 0% and 100% throttle count values in WTEC III transmission ECU.
(4) Clear diagnostic code from WTEC III transmission ECU display (para 8-5).
(5) If main code 21 does not reappear, electrical communication between WTEC III transmission ECU and TPS may be faulty. If main code 21 reappears, TPS may be faulty.
(6) Position master power switch to off (TM 9-2320-365-10).

CAUTION
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.

Main display code 21 needs to be cleared manually from WTEC III transmission ECU after a maintenance task has been performed and before vehicle is returned to service (para 8-5).
2. Is main code 33 logged in conjunction with main code 21?

**KNOW INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.
- Faulty TPS cable assembly.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Main code 21 in conjunction with main code 33 indicates loss of common ground.

**Flowchart**
- If NO, Go to step 4 of this fault.
- If YES, Go to step 4 of this fault.

---

f30. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE (CONT)
(1) Position master power switch to on
(TM 9-2320-365-10).
(2) Press MODE button on WTEC III TPSS
to bring up second code (if any) (para 8-5).
(3) If main code 33 displays on WTEC III TPSS,
    common ground may have been lost. If main
code 21 is the only code displayed, TPS may
be faulty. Go to step 4 of this fault.
(4) Position master power switch to off
(TM 9-2320-365-10).
3. Is continuity for common ground present from connector P114-25 to connector J119Z and J119a?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity for common ground is absent, main code 33 will be logged in addition to main code 21.

---

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.
- TPS cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**Replace WTEC III cab transmission harness (para 7-87).**

**Replace WTEC III transmission ECU (para 8-7).**
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) Disconnect connector P119 from connector J119.
(5) Remove kick panel (para 16-3).
(6) Disconnect connector clamp from connector P114.
(7) Disconnect connector P114 from WTEC III transmission ECU.
(8) Set multimeter to ohms.
(9) Connect positive (+) probe of multimeter to connector P114-25.
(10) Connect negative (-) probe of multimeter to connector J119a and note reading on multimeter.
(11) Connect negative (-) probe of multimeter to connector J119Z and note reading on multimeter.
(12) If continuity is not present from connector P114-25 to connector J119a and J119Z, replace WTEC III cab transmission harness (para 7-87).
(13) If continuity is present, replace WTEC III transmission ECU (para 8-7).
(14) Connect connector P114 to WTEC III transmission ECU.
(15) Connect connector clamp on connector P114.
(16) Install kick panel (para 16-3).
(17) Connect connector P119 to connector J119.
(18) Position front grille on cab with washer and screw.
(19) Position two washers and screws in front grille.
(20) Tighten screw to 48-60 lb-in. (5-7 N·m).
(21) Tighten two screws to 24 lb-in. (3 N·m).
(22) Clear diagnostic codes (para 8-5).
f30. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.

**POSSIBLE PROBLEMS**
- Faulty TPS cable assembly.
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- **LINKAGE TEST**

**REASON FOR QUESTION**
- Main code 21 will be displayed on WTEC III TPSS if TPS cable assembly is out of adjustment.

---

4. **Is TPS cable assembly linkage properly adjusted?**

---

4. **YES**
   - Adjust bracket assembly.

4. **NO**
   - **TEST OPTIONS**
     - **Resistance Test or STE/ICE-R Test #91**

**REASON FOR QUESTION**
- Main code 21 will be displayed on WTEC III TPSS if TPS cable assembly is faulty.

---

5. **Is TPS operating?**

---

5. **YES**
   - Replace TPS cable assembly (para 4-16).

5. **NO**
   - **TEST OPTIONS**
     - **Resistance Test or STE/ICE-R Test #91**
**LINKAGE TEST**

1. Raise cab (TM 9-2320-365-10).
2. Verify distance between hitch pin clip on end of sensor rod and center of cable groove in ferrule is 4 in. (10 cm).
3. If distance is not 4 in. (10 cm), adjust bracket assembly to obtain correct measurement.

**RESISTANCE TEST**

1. Disconnect connector P73 from TPS connector.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to TPS terminal A.
4. Connect negative (-) probe of multimeter to TPS terminal C and verify multimeter reads between 9,000-15,000 ohms across terminals A and C.
5. Disconnect negative (-) probe of multimeter from terminal C.
6. Connect negative (-) probe of multimeter to TPS terminal B and note record on multimeter.
7. Move governor linkage to high idle stop and record reading on multimeter.
8. Return governor linkage to low idle stop.
9. Verify that difference between highest (high idle) reading and lowest (low idle) reading is between 4,000 and 6,000 ohms.
10. Verify that highest (high idle) reading does not exceed 15,000 ohms.
11. If resistance readings are not within limits, replace TPS cable assembly (para 4-16).
f30. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 21 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.
- TPS cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, DS Maintenance needs to be notified.

**6.** Is continuity present from connector P73 to connector P119?

- **NO**

- **YES** Notify DS Maintenance.

**7.** Are TPS wires free from short circuits at connector P119?

- **NO**

- **YES** Notify DS Maintenance.
CONTINUITY TEST

1. Disconnect connector P119 from connector J119.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to connector P119R.
4. Connect negative (-) probe of multimeter to connector P73 pin C and note reading on multimeter.
5. Connect positive (+) probe of multimeter to connector P119f.
6. Connect negative (-) probe of multimeter to connector P73 pin B and note reading on multimeter.
7. Connect positive (+) probe of multimeter to connector P119Z.
8. Connect negative (-) probe of multimeter to connector P73 pin A and note reading on multimeter.
9. If continuity is not present on one or more wires, notify DS Maintenance.

CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to connector P119R.
3. Connect negative (-) probe of multimeter to all other pins in connector P119, one at a time, and note reading on multimeter.
4. If continuity is found between pin R and any other pin, notify DS Maintenance.
5. Perform steps (2) and (3) for P119f and P119Z.
6. If continuity is found between pin f and any other pin, or between pin Z and any other pin, notify DS Maintenance.
7. Connect connector P73 to TPS connector.
8. Is continuity present from connector J119 to connector P114?

TEST OPTIONS
Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, WTEC III cab transmission harness is faulty.

KNOWN INFO
Fuse OK.
Transmission oil level OK.
Batteries OK.
TPS cable assembly OK.

POSSIBLE PROBLEMS
Faulty WTEC III cab transmission harness.
Faulty WTEC III transmission ECU.

YES
Replace WTEC III cab transmission harness (para 7-87).

NO
CONTINUITY TEST

(1) Lower cab (TM 9-2320-365-10).
(2) Remove two screws and washers from front grille.
(3) Remove screw and washer from front grille.
(4) Remove front grille from cab.
(5) Remove kick panel (para 16-3).
(6) Disconnect connector clamp from connector P114.
(7) Disconnect connector P114 from WTEC III transmission ECU.
(8) Set multimeter to ohms.
(9) For each line of Table 2-37, Cab Transmission Harness Continuity Check:
   (a) Install jumper wire across sockets in column 1.
   (b) Connect positive (+) probe of multimeter to socket in column 2.
   (c) Connect negative (-) probe of multimeter to socket in column 3 and note reading on multimeter.
(10) If continuity is not present on any wire in Table 2-37, Cab Transmission Harness Continuity Check, replace WTEC III cab transmission harness (para 7-87).
(11) Remove jumper wire from connector J119.

Table 2-37. Cab Transmission Harness Continuity Check

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2 Positive (+) Probe to:</th>
<th>Column 3 Negative (-) Probe to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>J119f to J119Z</td>
<td>P114-10</td>
<td>P114-25</td>
</tr>
<tr>
<td>J119f to J119R</td>
<td>P114-10</td>
<td>P114-9</td>
</tr>
<tr>
<td>J119R to J119Z</td>
<td>P114-25</td>
<td>P114-9</td>
</tr>
</tbody>
</table>
9.
Are TPS wires free from short circuits at connector P114?

- **YES**
  - Replace WTEC III cab transmission harness (para 7-87).
  - Replace WTEC III transmission ECU (para 8-7).

- **NO**
  - If short circuits are present, WTEC III cab transmission harness is faulty.

**KNOWN INFO**
- Fuse OK.
- Transmission oil level OK.
- Batteries OK.
- TPS cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III cab transmission harness.
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If short circuits are present, WTEC III cab transmission harness is faulty.
### CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to connector P114-9.
3. Connect negative (-) probe of multimeter to all other sockets of connector P114, one at a time, and note reading on multimeter.
4. Connect positive (+) probe of multimeter to connector P114-10.
5. Connect negative (-) probe of multimeter to all other sockets of connector P114, one at a time, and note reading on multimeter.
6. Connect positive (+) probe of multimeter to connector P114-25.
7. Connect negative (-) probe of multimeter to all other sockets of connector P114 (except P114-13), one at a time, and note reading on multimeter.
8. If continuity is present in step 3, 5, or 7, replace WTEC III cab transmission harness (para 7-87).
9. If no short circuits are found, replace WTEC III transmission ECU (para 8-7).
10. Connect connector P114 to WTEC III transmission ECU.
11. Connect connector clamp on connector P114.
12. Install kick panel (para 16-3).
13. Connect connector P119 to connector J119.
14. Position front grille on cab with washer and screw.
15. Position two washers and screws in front grille.
16. Tighten screw to 48-60 lb-in. (5-7 N·m).
17. Tighten two screws to 24 lb-in. (3 N·m).
18. Clear diagnostic codes (para 8-5).
f31. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 51 AND ANY SUB CODE

**INITIAL SETUP**

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

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)

**Materials/Parts**
- Packing, Preformed (Item 199, Appendix G)
- Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
- Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

**Personnel Required**
- (2)

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

---

**KNOWLEDGE INFO**

Transmission oil level OK.
Fuse OK.
Batteries OK.

**POSSIBLE PROBLEMS**

Faulty output speed sensor.
Faulty turbine speed sensor.
Faulty WTEC III transmission ECU.

---

**CAUTION**

Read CAUTION on following page.

1. **Is main code 51 logged without main code 22 sub code 15 or 16?**

   - **YES**
   - **NO**
     - Visual Inspection

**REASON FOR QUESTION**

If main code 22 sub code 15 or 16 is present, transmission turbine speed sensor, output speed sensor, or associated circuit is faulty.
Check if main code 22 sub code 15 or 16 is logged in WTEC III TPSS (para 8-5).

If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with the turbine speed sensor, output sensor, or associated circuits. Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Check if main code 22 sub code 15 or 16 is logged in WTEC III TPSS (para 8-5).
(2) If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with the turbine speed sensor, output sensor, or associated circuits. Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).
2. Does off-going clutch pressure go to 0 psi (0 kPa) when shift is made?

**WARNING**

Read **WARNING** on following page.

**TEST OPTIONS**

Clutch Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**

If off-going clutch oil pressure does not go to 0 psi (0 kPa) when transmission shifts, WTEC III TPSS may display main code 51 and one or more sub codes.

**KNOWN INFO**

Transmission oil level OK.
Fuse OK.
Batteries OK.
Output speed sensor OK.
Turbine speed sensor OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III transmission ECU.

**YES**

Notify DS Maintenance.

**NO**

Replace WTEC III transmission ECU (para 8-7).
**WARNING**

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

**CLUTCH PRESSURE TEST**

1. Remove front and rear propeller shafts (para 9-2).
2. Position drain pan under pressure tap.
3. Remove pressure tap plug and preformed packing from off-going clutch indicated by the sub code, refer to Table 2-38. Off-Going Clutch Pressure Tap. Discard preformed packing.
4. Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
5. Perform STE/ICE-R Test # 50 (TM 9-4910-571-12&P).
6. Start engine (TM 9-2320-365-10) and run at idle.
7. With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R. Refer to Table 2-38. Off-Going Clutch Pressure Tap.
8. If one or more off-going clutches fail to lose pressure, notify DS Maintenance.
10. Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
11. Position preformed packing and pressure tap plug in control valve module.
12. Tighten pressure tap plug to 84-120 lb-in. (9-14 N-m).
13. Remove drain pan under pressure tap.
15. Clear diagnostic codes (para 8-5).

### Table 2-38. Off-Going Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Off-Going Clutch</th>
<th>Solenoid Assembly Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2-1 Downshift</td>
<td>C5</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>12</td>
<td>2-3 Upshift</td>
<td>C5</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>21</td>
<td>3-2 Downshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>23</td>
<td>3-4 Upshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>43</td>
<td>5-4 Upshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
<tr>
<td>45</td>
<td>5-6 Upshift</td>
<td>C2</td>
<td>Rotating Clutch</td>
</tr>
<tr>
<td>65</td>
<td>7-6 Downshift</td>
<td>C4</td>
<td>Stationary Clutch</td>
</tr>
</tbody>
</table>
1. Is main code 25 logged without main code 22 sub code 16?

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
Visual Inspection

**REASON FOR QUESTION**
If main code 22 sub code 16 is logged, output speed sensor or its circuit is faulty.

**YES**

**NO**
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Check if main code 22 sub code 16 is logged in the WTEC III TPSS (para 8-5).
(2) If main code 22 sub code 16 is logged, WTEC III transmission ECU has sensed a fault with the output speed sensor or its circuit. Perform Transmission System Troubleshooting (f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).
f32. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 25 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III transmission ECU.

---

**TEST OPTIONS**
- Clutch Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If there is no pressure to clutch(s), or pressure is leaking when shift is made, WTEC III TPSS may display main code 25 and one or more sub codes.

---

2. Is there pressure to clutch(s) when shift is made?

**WARNING**
Read WARNING on following page.

---

**YES**

Notify DS Maintenance.

---

**NO**

Replace WTEC III transmission ECU (para 8-7).
WARNING

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

CLUTCH PRESSURE TEST

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under pressure tap.
(3) Remove pressure tap plug and preformed packing from clutch pressure tap indicated by the sub code. Refer to Table 2-39. Clutch Pressure Tap. Discard preformed packing.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
(5) Perform STE/ICE-R Test # 50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10).
(7) With brake applied, make shift indicated by sub code. Refer to Table 2-39. Clutch Pressure Tap.
(8) Accelerate engine until WTEC III TPSS displays desired range. Refer to Table 2-39. Clutch Pressure Tap.
(9) Maintain engine speed to keep desired transmission range while assistant notes reading on STE/ICE-R.
(10) Let engine return to idle.
(11) Shift transmission into neutral.
(12) Shut down engine (TM 9-2320-365-10).
(13) Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
(14) Position preformed packing and pressure tap plug in control valve module.
(15) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(16) Remove drain pan under pressure tap.
(17) Install front and rear propeller shafts (para 9-2).
(18) If one or more clutches fail to indicate proper pressure, notify DS Maintenance.

---

Table 2-39. Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure at Clutch(s)</th>
<th>Pressure Readings at Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Speed Zero in 1st</td>
<td>C3 &amp; C6</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>11</td>
<td>Speed Zero in 2nd</td>
<td>C1 &amp; C5</td>
<td>215-305 psi (1480-2103 kPa)</td>
</tr>
<tr>
<td>22</td>
<td>Speed Zero in 3rd</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>33</td>
<td>Speed Zero in 4th</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>44</td>
<td>Speed Zero in 5th</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>55</td>
<td>Speed Zero in 6th</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>66</td>
<td>Speed Zero in 7th</td>
<td>C2 &amp; C4</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>77</td>
<td>Speed Zero in R</td>
<td>C3 &amp; C5</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
</tbody>
</table>
f33. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 53 AND ANY SUB CODE

**INITIAL SETUP**

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

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)

**Materials/Parts**
- Packing, Preformed (Item 199, Appendix G)
- Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
- Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

**Personnel Required**
- (2)

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

---

<table>
<thead>
<tr>
<th><strong>KNOWN INFO</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission oil level Fuse OK.</td>
</tr>
<tr>
<td>Batteries OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>POSSIBLE PROBLEMS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty output speed sensor.</td>
</tr>
<tr>
<td>Faulty turbine speed sensor.</td>
</tr>
<tr>
<td>Faulty WTEC III transmission ECU.</td>
</tr>
</tbody>
</table>

**START**

**CAUTION**
- Read CAUTION on following page.

1. Is main code 53 logged without main code 22 sub code 15 or 16?

**YES**


**NO**

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If main code 22 sub code 15 or 16 is logged, turbine speed sensor, output speed sensor, or associated circuitry is faulty.
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Check if main code 22 sub code 15 or 16 is logged in WTEC III TPSS (para 8-5).
(2) If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with turbine speed sensor, output speed sensor, or associated circuits. Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).
f33. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 53 AND ANY SUB CODE (CONT)

**KNOWN INFO**

Transmission oil level OK.
Fuse OK.
Batteries OK.
Output speed sensor OK.
Turbine speed sensor OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III transmission ECU.

---

**WARNING**

Read WARNING on following page.

2. Does off-going clutch pressure go to 8 psi (55 kPa) or less when shift is made?

---

**TEST OPTIONS**

Clutch Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**

If off-going clutch oil pressure does not go to 8 psi (55kPa) or less when shifts is made, WTEC III TPSS may display main code 53 and one or sub codes.

---

**NO**

---

**YES**

Notify DS Maintenance.

---

Replace WTEC III transmission ECU (para 8-7).
WARNING
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

**CLUTCH PRESSURE TEST**

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Off-Going Clutch(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>L-N1 Shift</td>
<td>C3</td>
</tr>
<tr>
<td>18</td>
<td>1-N1 Shift</td>
<td>C1</td>
</tr>
<tr>
<td>28</td>
<td>2-N1 Shift</td>
<td>C1 &amp; C4</td>
</tr>
<tr>
<td>29</td>
<td>2-N2 Shift</td>
<td>C1</td>
</tr>
<tr>
<td>38</td>
<td>3-N1 Shift</td>
<td>C1 &amp; C3</td>
</tr>
<tr>
<td>39</td>
<td>3-N3 Shift</td>
<td>C1</td>
</tr>
<tr>
<td>48</td>
<td>4-N1 Shift</td>
<td>C1 &amp; C2</td>
</tr>
<tr>
<td>49</td>
<td>4-N3 Shift</td>
<td>C1 &amp; C2</td>
</tr>
<tr>
<td>58</td>
<td>5-N1 Shift</td>
<td>C2 &amp; C3</td>
</tr>
<tr>
<td>59</td>
<td>5-N3 Shift</td>
<td>C2</td>
</tr>
<tr>
<td>68</td>
<td>6-N1 Shift</td>
<td>C2 &amp; C4</td>
</tr>
<tr>
<td>69</td>
<td>6-N4 Shift</td>
<td>C3</td>
</tr>
<tr>
<td>78</td>
<td>R-N1 Shift</td>
<td>C2</td>
</tr>
<tr>
<td>99</td>
<td>N3-N2 or N2-N3 Shift</td>
<td>C2 &amp; C4</td>
</tr>
</tbody>
</table>

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under pressure tap.
(3) Remove pressure tap plug and preformed packing from off-going clutch indicated by the sub code. Refer to Table 2-40. Off-Going Clutch Pressure Tap. Discard preformed packing.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
(5) Perform STE/ICE-R Test # 50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10) and run at idle.
(7) With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R. Refer to Table 2-40. Off-Going Clutch Pressure Tap.
(8) If off-going clutch pressure does not go to 8 psi (55 kPa) or less when shift is made, notify DS Maintenance.
(9) If off-going clutch pressure does go to 8 psi (55 kPa) or less when shift is made, replace WTEC III transmission ECU (para 8-7).
(10) Shut down engine (TM 9-2320-365-10).
(11) Remove pipe to tube adapter, hose, and tube to boss adapter from pressure tap.
(12) Position preformed packing and pressure tap plug in control valve module.
(13) Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
(14) Remove drain pan under pressure tap.
(15) Install front and rear propeller shafts (para 9-2).
(16) Clear diagnostic codes (para 8-5).
**f34. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 54 and Any Sub Code**

**INITIAL SETUP**

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

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)

**Materials/Parts**
- Packing, Preformed (Item 199, Appendix G)
- Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
- Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

**Personnel Required**
- (2)

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

---

**START**

---

**WARNING**

**CAUTION**

Read WARNING and CAUTION on following page.

---

1. Is main code 54 logged without main code 22 sub code 15 or 16?

---

**NO**

---

**YES**


---

**KNOWN INFO**

- Transmission oil level OK.
- Fuse OK.
- Batteries OK.

**POSSIBLE PROBLEMS**

- Faulty output speed sensor.
- Faulty turbine speed sensor.
- Faulty WTEC III transmission ECU.

---

**TEST OPTIONS**

- Visual Inspection

**REASON FOR QUESTION**

If main code 22 sub code 15 or 16 is logged, turbine speed sensor, output speed sensor, or associated circuitry is faulty.
Check if main code 22 sub code 15 or 16 is logged in WTEC III TPSS (para 8-5). If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuits. Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).

---

**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.

**CAUTION**

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

1. Check if main code 22 sub code 15 or 16 is logged in WTEC III TPSS (para 8-5).
2. If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuits. Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).
### Known Info
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.
- Turbine speed sensor OK.

### Possible Problems
- Faulty WTEC III transmission ECU.

#### Test Options
- Pressure Test or STE/ICE-R Test #50

#### Reason for Question
- Low main oil pressure may cause WTEC III TPSS to display main code 54 and one or more sub codes.

#### Test Procedure

1. Check if the conditions met in Known Info are present.
2. **Is** 218-276 psi (1,503-1903 kPa) present at main oil pressure tap?
   - **YES**: Notify DS Maintenance.
   - **NO**: Read WARNING on following page.

### Warning
Read WARNING on following page.
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

**WARNING**

<table>
<thead>
<tr>
<th>PRESSURE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Place drain pan under transmission tap.</td>
</tr>
<tr>
<td>(2) Remove main pressure tap plug and preformed packing from control valve assembly.</td>
</tr>
<tr>
<td>(3) Connect tube to boss adapter, hose, and pipe to tube adapter to main pressure tap.</td>
</tr>
<tr>
<td>(4) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&amp;P).</td>
</tr>
<tr>
<td>(5) Start engine (TM 9-2320-365-10) and run at idle.</td>
</tr>
<tr>
<td>(6) With parking brake applied, position WTEC III TPSS to R position then to N position while assistant checks reading on STE/ICE-R.</td>
</tr>
<tr>
<td>(7) Shut down engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(8) If main oil pressure is low, notify DS Maintenance.</td>
</tr>
<tr>
<td>(9) Remove pipe to tube adapter, hose, and tube to boss from main pressure tap.</td>
</tr>
<tr>
<td>(10) Position preformed packing and main pressure tap plug in control valve module.</td>
</tr>
<tr>
<td>(11) Tighten main pressure tap plug to 84-120 lb-in. (9-14 N·m).</td>
</tr>
</tbody>
</table>
3. Is there pressure to clutch(s) when shift is made?

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If there is no pressure to clutch(s) when shift is made, WTEC III TPSS may display main code 54 and one or more sub codes.

**YES**
Notify DS Maintenance.

**NO**
Replace WTEC III transmission ECU (para 8-7).
PRESSURE TEST

1. Remove front and rear propeller shafts (para 9-2).
2. Position drain pan under pressure tap.
3. Remove pressure tap plug and preformed packing from clutch pressure tap indicated by the sub code. Refer to Table 2-41. Clutch Pressure Tap.
4. Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
5. Start engine (TM 9-2320-365-10).
7. With parking brake applied, make shift indicated by sub code. Refer to Table 2-41. Clutch Pressure Tap.
8. Accelerate engine until WTEC III TPSS displays denied range. Refer to Table 2-41. Clutch Pressure Tap.
9. Maintain sufficient engine speed to keep desired transmission range while assistant notes reading on STE/ICE-R.
10. Let engine return to idle.
11. Shift WTEC III TPSS into neutral.
12. If one or more clutches failed to indicate proper pressure, notify DS Maintenance.
13. If all clutches indicate proper pressure, replace WTEC III transmission ECU (para 8-7).
15. Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
16. Position preformed packing and pressure tap plug in control valve module.
17. Tighten pressure tap plug to 84-120 lb-in. (9-14 N-m).
18. Remove drain pan under pressure tap.
19. Install transmission front and rear output propeller shafts (para 9-2).
20. Clear diagnostic codes (para 8-5).

### Table 2-41. Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure at Clutch(s)</th>
<th>Pressure Readings at Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>L-1 Upshift</td>
<td>C1 &amp; C5</td>
<td>187-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>07</td>
<td>L-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>10</td>
<td>1-L Downshift</td>
<td>C3 &amp; C6</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>12</td>
<td>1-2 Upshift</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>17</td>
<td>1-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>21</td>
<td>2-1 Downshift</td>
<td>C1 &amp; C5</td>
<td>186-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>23</td>
<td>2-3 Upshift</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>27</td>
<td>2-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>32</td>
<td>3-2 Downshift</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>34</td>
<td>3-4 Upshift</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>43</td>
<td>4-3 Downshift</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>45</td>
<td>4-5 Upshift</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>54</td>
<td>5-4 Downshift</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>56</td>
<td>5-6 Upshift</td>
<td>C2 &amp; C4</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>65</td>
<td>6-5 Downshift</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>70</td>
<td>R-L Shift</td>
<td>C3 &amp; C6</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>71</td>
<td>R-1 Shift</td>
<td>C1 &amp; C5</td>
<td>186-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>72</td>
<td>R-2 Shift</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>80</td>
<td>N1-L Shift</td>
<td>C3 &amp; C6</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>81</td>
<td>N1-1 Shift</td>
<td>C1 &amp; C5</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>82</td>
<td>N1-2 Shift</td>
<td>C1 &amp; C4</td>
<td>186-305 psi (1280-2100 kPa)</td>
</tr>
<tr>
<td>83</td>
<td>N1-3 Shift</td>
<td>C1 &amp; C3</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>85</td>
<td>N1-5 Shift</td>
<td>C2 &amp; C3</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>86</td>
<td>N1-6 Shift</td>
<td>C2 &amp; C4</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>92</td>
<td>N2-2 Shift</td>
<td>C1 &amp; C4</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>93</td>
<td>N3-3 Shift</td>
<td>C1 &amp; C3</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>95</td>
<td>N3-5 Shift</td>
<td>C2 &amp; C3</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>96</td>
<td>N4-6 Shift</td>
<td>C2 &amp; C4</td>
<td>164-239 psi (1130-1650 kPa)</td>
</tr>
<tr>
<td>97</td>
<td>2-R Shift</td>
<td>C3 &amp; C5</td>
<td>215-305 psi (1480-1900 kPa)</td>
</tr>
</tbody>
</table>
f35. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 55 AND ANY SUB CODE

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
STE/ICE-R (Item 39, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)

Materials/Parts
Packing, Preformed (Item 199, Appendix G)
Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
Hose Assembly, Nonmetallic (Item 25.1, Appendix D)
Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)

Personnel Required
(2)

Reference
TM 9-4910-571-12&P

START

1. Is transmission oil level ok?

NO

YES

Correct improper transmission oil level (TM 9-2320-365-10).

KNOWLEDGE INFO

Nothing

POSSIBLE PROBLEMS

Improper Transmission oil level.
Faulty WTEC III TPSS.

TEST OPTIONS

Visual Inspection

REASON FOR QUESTION

If transmission oil level is improper code 55 may be recorded.
(1) Check transmission oil level (TM 9-2320-365-10).
(2) If transmission oil level is improper, correct as required (TM 9-2320-365-10).
Is main code 55 logged without main code 32?

YES

NO


KNOWN INFO
Transmission oil level OK.

POSSIBLE PROBLEMS
Faulty WTEC III transmission ECU.

CAUTION
Read CAUTION on following page.

2.

Is main code 55 logged without main code 32?

TEST OPTIONS
Visual Inspection

REASON FOR QUESTION
If main code 32 is logged, C3 pressure switch or its circuit is faulty.
(1) Check if main code 32 is logged in WTEC III TPSS (para 8-5).
(2) If main code 32 is logged, WTEC III transmission ECU has sensed a fault with the C3 pressure switch or its circuit. Perform Transmission System Troubleshooting (f26. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 32 and Any Sub Code).

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.
f35. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 55 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Transmission oil level OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
- Low main oil pressure may cause WTEC III TPSS to display main code 55 and one or more sub codes.

---

3. **WARNING**
   - Read WARNING on following page.

   Is 218-276 psi (1,503-1903 kPa) present at main oil pressure tap?

---

**YES**
- Notify DS Maintenance.

**NO**
**WARNING**

Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

<table>
<thead>
<tr>
<th>PRESSURE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position drain pan under pressure tap.</td>
</tr>
<tr>
<td>(2) Remove main pressure tap plug and preformed packing from control valve module.</td>
</tr>
<tr>
<td>(3) Connect tube to boss adapter, hose, and pipe to tube adapter to main pressure tap.</td>
</tr>
<tr>
<td>(4) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&amp;P).</td>
</tr>
<tr>
<td>(5) Start engine (TM 9-2320-365-10) and run at idle.</td>
</tr>
<tr>
<td>(6) With parking brake applied, position WTEC III TPSS to R position then to N position while assistant checks reading on STE/ICE-R.</td>
</tr>
<tr>
<td>(7) Shut down engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(8) If main oil pressure is low, notify DS Maintenance.</td>
</tr>
<tr>
<td>(9) Remove pipe to tube adapter, hose, and tube to boss adapter from main pressure tap.</td>
</tr>
<tr>
<td>(10) Position preformed packing and main pressure tap plug in control valve module.</td>
</tr>
<tr>
<td>(11) Tighten main pressure tap plug to 84-120 lb-in. (9-14 N-m).</td>
</tr>
<tr>
<td>(12) Remove drain pan under pressure tap.</td>
</tr>
</tbody>
</table>
4. Is pressure present at C3 clutch when shift is made?

- **NO**
  - Notify DS Maintenance.

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If pressure is low or missing to C3 clutch when shift is made, WTEC III TPSS may display main code 55 and one or more sub codes.
PRESSURE TEST

(1) Remove front and rear propeller shafts (para 9-2).
(2) Position drain pan under C3 pressure tap.
(3) Remove C3 pressure tap plug and preformed packing from control valve module.
(4) Connect tube to boss adapter, hose, and pipe to tube adapter to C3 pressure tap.
(5) Perform STE/ICE-R test # 50 (TM 9-4910-571-12&P).
(6) Start engine (TM 9-2320-365-10) and run at idle.
(7) With parking brake applied, make shift indicated by sub code while assistant notes reading on STE/ICE-R.
(8) Shut down engine (TM 9-2320-365-10).
(9) If 215-276 psi (1480-1900 kPa) pressure is not obtained for affected code, notify DS Maintenance.
(10) If 215-276 psi (1480-1900 kPa) pressure is obtained, replace WTEC transmission ECU (para 8-7).
(11) Remove pipe to tube, adapter, hose, and tube to boss adapter from C3 pressure tap.
(12) Position performed packing and C3 pressure tap plug on control valve module.
(13) Tighten C3 pressure tap plug to 84-120 lb-in. (9-14 N·m).
(14) Remove drain pan under pressure tap.
(15) Install front and rear propeller shafts (para 9-2).
(16) Clear diagnostic codes (para 8-5).

Table 2-42. Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure Readings C3 Tap</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>1-R Shift</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>27</td>
<td>2-R Shift</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>80</td>
<td>N1-L Shift</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>87</td>
<td>N1-R Shift</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
<tr>
<td>97</td>
<td>2-R Shift</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
</tbody>
</table>
### f36. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 56 and Any Sub Code

#### Initial Setup

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

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)

**Materials/Parts**
- Packing, Preformed (Item 199, Appendix G)
- Adapter, Straight, Pipe to Tube (Item 1.2, Appendix D)
- Adapter, Straight, Tube to Boss (Item 1.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.1, Appendix D)

**Personnel Required**
- (2)

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

#### Known Info

**Transmission oil level OK.**
- **Fuse OK.**
- **Batteries OK.**

#### Possible Problems

- Faulty output speed sensor.
- Faulty turbine speed sensor.
- Faulty WTEC III transmission ECU.

#### Test Options

**Visual Inspection**

#### Reason for Question

If main code 22 sub code 15 or 16 is logged, turbine speed sensor, output speed sensor, or associated circuit(s) is faulty.

---

1. **Is main code 56 logged without main code 22 sub code 15 or 16?**

   **START**

   **Warning**

   **CAUTION**

   Read WARNING and CAUTION on following page.

   **NO**

   **YES**

Check if main code 22 code 15 or 16 is logged in WTEC III TPSS (para 8-5).

If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuit(s). Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Check if main code 22 code 15 or 16 is logged in WTEC III TPSS (para 8-5).
(2) If main code 22 sub code 15 or 16 is logged, WTEC III transmission ECU has sensed a fault with the turbine speed sensor, output speed sensor, or associated circuit(s). Perform Transmission System Troubleshooting (f23. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 15 or f24. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 22 Sub Code 16).

**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.

**CAUTION**

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.
f36. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 56 AND ANY SUB CODE (CONT)

**KNOWN INFO**
Transmission oil level OK.
Fuse OK.
Batteries OK.
Output speed sensor OK.
Turbine speed sensor OK.

**POSSIBLE PROBLEMS**
Faulty WTEC III transmission ECU.

---

**REASON FOR QUESTION**
Pressure Test or STE/ICE-R Test #50

**TEST OPTIONS**
Low main oil pressure may cause WTEC III TPSS to display main code 56 and one or more sub codes.

---

2.

Is 218-276 psi (1,503-1,903 kPa) present at main oil pressure tap?

**WARNING**
Read WARNING on following page.

**YES**

Notify DS Maintenance.

**NO**
Wear approved eye protection when performing transmission pressure checks. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.

**PRESSURE TEST**

1. Position drain pan under pressure tap.
2. Remove main pressure tap plug and preformed packing from control valve module.
3. Connect tube to boss adapter, hose, and pipe to tube adapter on main pressure tap.
5. Start engine (TM 9-2320-365-10) and run at idle.
6. With parking brake applied, position WTEC III TPSS to R position then to N position while assistant checks reading on STE/ICE-R.
7. Shut down engine (TM 9-2320-365-10).
8. If main oil pressure is low, notify DS Maintenance.
9. Remove pipe to tube adapter, hose, and tube to boss adapter from main pressure tap.
10. Position preformed packing and main pressure tap plug in control valve module.
11. Tighten main pressure tap plug to 84-120 lb-in. (9-14 N·m).
12. Remove drain pan under pressure tap.
f36. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 56 AND ANY SUB CODE (CONT)

3.
Is pressure present at clutch(s) when shift is made?

- YES
  - Notify DS Maintenance.
- NO
  - Replace WTEC III transmission ECU (para 8-7).

**KNOWN INFO**
- Transmission oil level OK.
- Fuse OK.
- Batteries OK.
- Output speed sensor OK.
- Turbine speed sensor OK.
- Main oil pressure OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III transmission ECU.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #50

**REASON FOR QUESTION**
If pressure is low or missing to clutch(s) when shift is made, WTEC III TPSS may display main code 56 and one or more sub codes.
### PRESSURE TEST

1. Remove front and rear propeller shafts (para 9-2).
2. Position drain pan under pressure tap.
3. Remove pressure tap plug and preformed packing from clutch pressure tap indicated by the sub code. Refer to Table 2-43. Clutch Pressure Tap.
4. Connect tube to boss adapter, hose, and pipe to tube adapter to clutch pressure tap.
5. Perform STE/ICE-R test #50 (TM 9-4910-571-12&P).
7. Make shift indicated by sub code. Refer to Table 2-43. Clutch Pressure Tap.
8. Accelerate engine until WTEC III TPSS displays desired range. Refer to Table 2-43. Clutch Pressure Tap.
9. Maintain sufficient engine speed to keep desired transmission range while assistant notes reading on STE/ICE-R.
10. Let engine return to idle.
13. If one or more of clutches failed to indicate proper pressure, notify DS Maintenance.
14. If all clutches indicate proper pressure, replace WTEC III transmission ECU (para 8-7).
15. Remove pipe to tube adapter, hose, and tube to boss adapter from clutch pressure tap.
16. Position preformed packing and pressure tap plug in control valve module.
17. Tighten pressure tap plug to 84-120 lb-in. (9-14 N·m).
18. Remove drain pan under pressure tap.
19. Install front and rear propeller shafts (para 9-2).
20. Clear diagnostic codes (para 8-5).

### Table 2-43. Clutch Pressure Tap

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>Sub Code Meaning</th>
<th>Pressure at Clutch(s)</th>
<th>Pressure Readings at Taps</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>L Range Test</td>
<td>C3 &amp; C6</td>
<td>215-334 psi (1480-2300 kPa)</td>
</tr>
<tr>
<td>11</td>
<td>1 Range Test</td>
<td>C1 &amp; C5</td>
<td>215-305 psi (1480-2100 kPa)</td>
</tr>
<tr>
<td>22</td>
<td>2 Range Test</td>
<td>C1 &amp; C4</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>33</td>
<td>3 Range Test</td>
<td>C1 &amp; C3</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>44</td>
<td>4 Range Test</td>
<td>C1 &amp; C2</td>
<td>142-203 psi (980-1400 kPa)</td>
</tr>
<tr>
<td>55</td>
<td>5 Range Test</td>
<td>C2 &amp; C3</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>66</td>
<td>6 Range Test</td>
<td>C2 &amp; C4</td>
<td>128-189 psi (880-1300 kPa)</td>
</tr>
<tr>
<td>77</td>
<td>R Range Test</td>
<td>C3 &amp; C5</td>
<td>215-276 psi (1480-1900 kPa)</td>
</tr>
</tbody>
</table>
f37. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 13 AND ANY SUB CODE

INITIAL SETUP

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

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

References
TM 9-4910-571-12&P

Personnel Required
(2)

KNOWLEDGE INFO
Vehicle runs.
Batteries OK.

POSSIBLE PROBLEMS
Faulty WTEC III dashboard cable assembly.
Faulty WTEC III transmission ECU.
Faulty WTEC III TPSS.
Faulty voltage regulator.

START

1. Does WTEC III TPSS display main code 13 sub code 12?

CAUTION
Read CAUTION on following page.

YES

NO

TEST OPTIONS
Transmission diagnostic code check

REASON FOR QUESTION
This question helps eliminate possible problems and determines where troubleshooting continues.

GO TO STEP 7 OF THIS FAULT.
Check to see if main code 13 sub code 12 is active in WTEC III TPSS (para 8-5).

If main code 13 sub code 12 is not active in WTEC III TPSS, go to step 7 of this fault.

CAUTION

Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

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.

(1) Check to see if main code 13 sub code 12 is active in WTEC III TPSS (para 8-5).
(2) If main code 13 sub code 12 is not active in WTEC III TPSS, go to step 7 of this fault.
2. Are connectors P115-1 and P115-16 free from short circuits to ground or to other wires?

If short circuits to ground or other wires are present, wire 136 is faulty.

- YES
  - Repair wire 136 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
- NO
  - Continuity Test or STE/ICE-R Test #91
  - Reason for Question: If short circuits to ground or other wires are present, wire 136 is faulty.
(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 P115-1.
(6) Connect negative (-) probe of multimeter to all other sockets in connector P115 except P115-16, one at a time, and note reading on multimeter.
(7) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(8) Connect positive (+) probe of multimeter to connector P115-16.
(9) Connect negative (-) probe of multimeter to all other sockets in connector P115 except P115-1, one at a time, and note reading on multimeter.
(10) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(11) If continuity is present repair wire 136 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
3. Is 0.5 ohms, or less, resistance present from connectors P115-17 and P115-32 to ground?

**Known Info**
- Vehicle runs.
- Batteries OK.

**Possible Problems**
- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III transmission ECU.
- Faulty WTEC III TPSS.

**Test Options**
- Resistance Test or STE/ICE-R Test #91

**Reason for Question**
- If resistance is higher than 0.5 ohms, wire 143 is faulty.

**Yes**
- Repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

**No**
RESISTANCE TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P115-17.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) Connect positive (+) probe of multimeter to connector P115-32.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If resistance noted in step 3 or step 5 is higher than 0.5 ohms, repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(7) Connect connector P115 to WTEC III transmission ECU.
(8) Connect connector clamp on connector P115.
4. Is continuity present from connector P116-16 to connector PX33R and no short circuits found?

If continuity is not present, or short circuits are found, wire 136 is faulty.

Repaired wire 136 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

Possible Problems:
- Faulty WTEC III transmission ECU.
- Faulty WTEC III TPSS.

Known Info:
- Vehicle runs.
- Batteries OK.

Test Options:
- Continuity Test or STE/ICE-R Test #91

Reason for Question:
- If continuity is not present, or short circuits are found, wire 136 is faulty.

Overview:
- F37. WTEC III Transmission Pushbutton Shift Selector (TPSS) Displays Main Code 13 and Any Sub Code (Cont)
### CONTINUITY TEST

1. Disconnect connector clamp from connector P116.
2. Disconnect connector P116 from WTEC III transmission ECU.
3. Remove instrument panel assembly for access (para 7-15).
4. Disconnect connector PX33 from WTEC III TPSS.
5. Set multimeter to ohms.
6. Connect positive (+) probe of multimeter to connector P116-16.
7. Connect negative (-) probe of multimeter to connector PX33R and note reading on multimeter.
8. Connect negative (-) probe of multimeter to all other sockets in connector PX33, one at a time, and note reading on multimeter.
9. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
10. If continuity is not present in step 7, or continuity is present in step 8 or step 9, repair wire 136 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
5. Is continuity present from connector P116-32 to connector PX33P and no short circuits found?

**KNOWLEDGMENT**
Vehicle runs.
Batteries OK.

**POSSIBLE PROBLEMS**
Faulty WTEC III dashboard cable assembly.
Faulty WTEC III transmission ECU.
Faulty WTEC III TPSS.

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, or short circuits are found, wire 143 is faulty.

**YES**
Replace WTEC III transmission ECU (para 8-7).

**NO**
Repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to connector P116-32.
3. Connect negative (-) probe of multimeter to connector PX33P and note reading on multimeter.
4. Connect negative (-) probe of multimeter to all other sockets in connector PX33, one at a time, and note reading on multimeter.
5. If continuity is not present in step 3, or continuity is present in step 4, repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
6. Connect connector PX33 to WTEC III TPSS.
7. Install instrument panel assembly (para 7-15).
8. Clear diagnostic codes (para 8-5).
Does main code 13 sub code 12 appear on WTEC III TPSS with replacement WTEC III transmission ECU installed?

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).
  - Replace WTEC III TPSS (para 8-3).

- **NO**
  - If main code 13 sub code 12 is not active, WTEC III TPSS is faulty.
WTEC III TRANSMISSION ECU REPLACEMENT CHECK

1. Install replacement WTEC III transmission ECU (para 8-7).
2. Start engine (TM 9-2320-365-10).
3. Check to see if main code 13 sub code 12 appears on WTEC III TPSS (para 8-5).
4. If main code 13 sub code 12 does not appear, replace WTEC III transmission ECU (para 8-7).
5. If main code 13 sub code 12 does appear, replace WTEC III TPSS (para 8-3).
7. Install original WTEC III transmission ECU (para 8-7).
8. Clear diagnostic codes (para 8-5).
7. Is 33 vdc or more present at DCA connector terminal N?

- **YES**
  - Replace WTEC III transmission ECU (para 8-7).

- **NO**
  - Replace 100 amp voltage regulator (para 7-5) or 200 amp voltage regulator (para 20-57).

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**
If 33 vdc or more is present, voltage regulator is faulty. If 24-32 vdc is present, WTEC III transmission ECU is faulty.

**KNOWN INFO**
Vehicle runs.
Batteries OK.
WTEC III dashboard cable assembly OK.

**POSSIBLE PROBLEMS**
Faulty WTEC III transmission ECU.
Faulty voltage regulator.
WARNING

Remove 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**

2. Remove dust cap from DCA connector.
3. Set multimeter to volts dc.
4. Connect positive (+) probe of multimeter to DCA connector terminal N.
5. Connect negative (-) probe of multimeter to DCA connector terminal P and note reading on multimeter.
6. If 33 vdc or more is present, replace 100 amp voltage regulator (para 7-5) or 200 amp voltage regulator (para 20-57).
7. If 24-32 is present, replace WTEC III transmission ECU (para 8-7).
8. Install dust cap on DCA connector.
9. Clear diagnostic codes (para 8-5).
10. Shut down engine (TM 9-2320-365-10).
1. Is a diagnostic code(s) logged in WTEC III TPSS and does it return after clearing diagnostic codes?

NO

YES

Perform Transmission System Troubleshooting per para 8-5, Table 8-2. Diagnostic Code List and Description.

TEST OPTIONS
WTEC III Diagnostic Code Reading/Code Clearing Procedure

REASON FOR QUESTION
If WTEC III TPSS does not display any diagnostic codes after clearing, an intermittent problem was detected and corrected. If any diagnostic code(s) is logged after clearing further troubleshooting is required.

KNOWN INFO
Engine runs.
Transmission oil level OK.
Fuse OK.
Batteries OK.

POSSIBLE PROBLEMS
Diagnostic code logged in WTEC III TPSS.
(1) Perform WTEC III Code Reading and Code Clearing (para 8-5).
(2) If no diagnostic codes are logged after clearing, fault is corrected.
(3) If diagnostic codes are still logged, perform Transmission System Troubleshooting of active diagnostic codes per para 8-25, Table 8-2.
WTEC III Diagnostic Code List and Description.
**INITIAL SETUP**

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

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- STE/ICE-R (Item 39, Appendix C)
- Wrench Set, Socket (Item 49, Appendix C)

**Tools and Special Tools (Cont)**
- Wrench, Torque, 0-200 lb-in. (Item 58, 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 breakers C43 and CB79 prior to beginning this task.

---

**KNOWLEDGE INFO**

Circuit Breakers CB43 and CB79 OK.

**POSSIBLE PROBLEMS**

- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III TPSS.
- Faulty WTEC III transmission ECU.

---

**TEST OPTIONS**

WTEC III Diagnostic Code Clearing procedure.

**REASON FOR QUESTION**

If WTEC III TPSS does not display any diagnostic code after clearing, an intermittent problem was detected and corrected. If diagnostic code is logged after clearing, further troubleshooting is required.

---

1. Does main code 23 logged in WTEC III TPSS return after clearing diagnostic code?

   **YES**

   Fault corrected.

   **NO**
Loose or dirty connectors may cause intermittent loss of power to transmission ECU and diagnostic codes to be logged. Ensure that all connectors are clean and tight before performing troubleshooting. Failure to comply may result in incorrect test results.

(1) Perform WTEC III Code Reading and Code Clearing (para 8-5).
(2) If diagnostic code 23 is not logged after clearing, fault is corrected.
(3) If diagnostic code 23 is logged after clearing, further troubleshooting is required.
f39. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Circuit breaker CB43 and CB79 OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III transmission ECU.
- Faulty WTEC III TPSS.

**TEST OPTIONS**
- Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**
- If 24 VDC is not present, wire 136 is faulty.

**WARNING**
Read WARNING and CAUTION on following page.

**CAUTION**

2. Is 24 VDC present at connector P115 sockets 1 and 16?

- **NO**
- **YES** Repair wire 136 (para 2-40) or replace 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.

CAUTION

Use care when testing electrical connectors not to bend connector pins or damage connector 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 connector.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to connector P115 socket 1.
(6) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(7) Connect positive (+) probe of multimeter to connector P115 socket 16.
(8) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(9) If 24 VDC is not present in steps (6) and (8), repair wire 136 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
f39. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

**KNOWN INFO**
- Circuit breaker CB43 and CB79 OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III transmission ECU.
- Faulty WTEC III TPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, wire 143 is faulty.

3. Is continuity present from connector P115 sockets 17, 25, and 32 to ground?

- **NO**
- **YES**
  - Repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P115 socket 17.
(3) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(4) If continuity is not present in step (3), repair wire 143 from connector P115-17 to terminal board 2 pin 27 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(5) Connect positive (+) probe of multimeter to connector P115 socket 25.
(6) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(7) If continuity is not present in step (6), repair wire 144 from connector P115-25 to chassis ground (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(8) Connect positive (+) probe of multimeter to connector P115 socket 32.
(9) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
(10) If continuity is not present in step (9), repair wire 143 from connector P115-32 to terminal board 2 pin 16 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
(11) Connect connector P115 to WTEC III Transmission ECU.
(12) Connect connector clamp on connector P115.
f39. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DISPLAYS MAIN CODE 23 AND ANY SUB CODE (CONT)

KNOWN INFO
- Circuit Breakers CB 43 and CB79 OK.

POSSIBLE PROBLEMS
- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III TPSS.
- Faulty WTEC III transmission ECU.

TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
- If continuity is not present, or short circuits are found, wire 124 is faulty.

4. Is continuity present from connector P116 socket 3 to connector PX33 socket N and no short circuits found?

- NO
  - Repair wire 124 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

- YES
  - Read CAUTION on following page.
CAUTION

Use care when testing electrical connectors not to bend connector pins or damage connector 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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Disconnect connector clamp from connector P116.</td>
</tr>
<tr>
<td>(2) Disconnect connector P116 from WTEC III transmission ECU.</td>
</tr>
<tr>
<td>(3) Remove instrument panel assembly for access (para 7-15).</td>
</tr>
<tr>
<td>(4) Disconnect connector PX33 from WTEC III TPSS.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to connector P116 socket 3.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to connector PX33 socket N and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) Connect negative probe (-) of multimeter to all other sockets in connector PX33, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>(8) Connect negative probe (-) of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(9) If continuity is not present in step 6, or continuity is present in step 7 or step 8, repair wire 124 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).</td>
</tr>
</tbody>
</table>
Is continuity present from connector P116 socket 32 to connector PX33 socket P and no short circuits found?

If continuity is not present, or short circuits are found, wire 143 is faulty.

Yes

Repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

No

Known Info

Circuit Breakers CB 43 and CB79 OK.

Possible Problems

Faulty WTEC III dashboard cable assembly.
Faulty WTEC III TPSS.
Faulty WTEC III transmission ECU.

Test Options

Continuity Test or STE/ICE-R Test #91

Reason for Question

If continuity is not present, or short circuits are found, wire 143 is faulty.
**CAUTION**

Use care when testing electrical connectors not to bend connector pins or damage connector 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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Connect positive (+) probe of multimeter to connector P116 socket 32.</td>
</tr>
<tr>
<td>(2) Connect negative (-) probe of multimeter to connector PX33 socket P and note reading on multimeter.</td>
</tr>
<tr>
<td>(3) Connect negative probe (-) of multimeter to all other sockets in connector PX33, one at a time, and note reading on multimeter.</td>
</tr>
<tr>
<td>(4) Connect negative probe (-) of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(5) If continuity is not present in step 2, or continuity is present in step 3 or step 4, repair wire 143 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).</td>
</tr>
<tr>
<td>(6) Connect connector P116 to WTEC III transmission ECU.</td>
</tr>
<tr>
<td>(7) Connect connector clamp on connector P116.</td>
</tr>
</tbody>
</table>
Does main code 23 appear on WTEC III TPSS with a known good WTEC III TPSS installed?

- **YES**: Replace WTEC III TPSS (para 8-3).

- **NO**: Replace WTEC III transmission ECU (para 8-7).

### Known Info
- Circuit Breakers CB43 and CB79 OK.
- WTEC III dashboard cable assembly OK.

### Possible Problems
- Faulty WTEC III TPSS.
- Faulty WTEC III transmission ECU.

### Test Options
- WTEC III TPSS replacement check.

### Reason for Question
If main code 23 does not appear, WTEC III TPSS is faulty. If main code 23 does appear, WTEC III transmission ECU is faulty.
### WTEC III TPSS REPLACEMENT CHECK

1. Replace WTEC III TPSS with a known good WTEC III TPSS (para 8-3).
2. Start engine (TM 9-2320-365-10).
3. Observe if main code 23 appears on WTEC III TPSS (para 8-5).
4. If main code 23 does not appear, replace WTEC III TPSS (para 8-3).
5. If main code 23 does appear, replace WTEC III transmission ECU (para 8-7).
7. Install original WTEC III TPSS (para 8-3).
8. Connect connector PX33 to WTEC III TPSS.
9. Install instrument panel assembly (para 7-15).
10. Install kick panel (para 16-3).
11. Clear diagnostic codes (para 8-5).
f40. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DOES NOT ILLUMINATE

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- Kick panel removed (para 16-3).

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 breakers CB43 and CB79 prior to beginning this task.

KNOWED INFO
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB43 OK.
- Circuit breaker CB79 OK.

POSSIBLE PROBLEMS
- Faulty WTEC III dashboard cable assembly.
- Faulty terminal board TB1.
- Faulty WTEC III ECU.
- Faulty WTEC III TPSS.

START

WARNING
CAUTION
Read WARNING and CAUTION on following page.

1. Is 24 VDC present at connector P115 socket 16?

TEST OPTIONS
- Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION
- If 24 VDC is not present, WTEC III dashboard cable assembly is faulty.

NO

YES

Repair wire 136 from connector P115 sockets 16 to circuit breaker CB43 (para 2-40) or replace 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.

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 clamp from connector P115.
(2) Disconnect connector P115 from WTEC III ECU.
(3) Set multimeter to volts DC.
(4) Connect positive (+) probe of multimeter to connector P115 socket 16.
(5) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(6) If 24 VDC is not present, repair wire 136 from connector P115 sockets 16 to circuit breaker CB43 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
F40. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**

12 VDC and 24 VDC circuits operate.
Circuit breaker CB43 OK.
Circuit breaker CB79 OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III dashboard cable assembly.
Faulty terminal board TB1.
Faulty WTEC III ECU.
Faulty WTEC III TPSS.

---

**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

If 24 VDC is not present, WTEC III dashboard cable assembly is faulty.

---

**WARNING**

CAUTION

Read WARNING and CAUTION on following page.

---

2. Is 24 VDC present at connector P115 socket 1?

---

**YES**

Repair wire 136 from connector P115 sockets 1 to circuit breaker CB43 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

---

**NO**
WARNING

Remove 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 P115 socket 1.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If 24 VDC is not present, repair wire 136 from connector P115 sockets 1 to circuit breaker CB43 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
12 VDC and 24 VDC circuits operate.
Circuit breaker CB43 OK.
Circuit breaker CB79 OK.

FAULTY PROBLEMS
Faulty WTEC III dashboard cable assembly.
Faulty terminal board TB1.
Faulty WTEC III ECU.
Faulty WTEC III TPSS.

TEST OPTIONS
Voltage Test or STE/ICE-R Test #89

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

3. Is 24 VDC present at connector P116 socket 4?

YES
Go to step 7 of this fault.

NO

WARNING
Read WARNING and CAUTION on following page.
WARNING

Remove 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Connect connector P115 to WTEC III ECU.</td>
</tr>
<tr>
<td>(2) Connect connector clamp to connector P115.</td>
</tr>
<tr>
<td>(3) Disconnect connector clamp from connector P116.</td>
</tr>
<tr>
<td>(4) Disconnect connector P116 from WTEC III ECU.</td>
</tr>
<tr>
<td>(5) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(6) Connect positive (+) probe of multimeter to connector P116 socket 4.</td>
</tr>
<tr>
<td>(7) Connect negative (-) probe of multimeter to ground.</td>
</tr>
<tr>
<td>(8) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.</td>
</tr>
<tr>
<td>(9) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(10) If 24 VDC is not present, go to step 7 of this fault.</td>
</tr>
</tbody>
</table>
**KNOWN INFO**

12 VDC and 24 VDC circuits operate.
Circuit breaker CB43 OK.
Circuit breaker CB79 OK.
Terminal board TB1 OK.

**POSSIBLE PROBLEMS**

Faulty WTEC III dashboard cable assembly.
Faulty WTEC III ECU.
Faulty WTEC III TPSS.

**TEST OPTIONS**

Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

---

**f40. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DOES NOT ILLUMINATE (CONT)**

4. Is 24 VDC present at connector PX33 socket R?

**WARNING**

Read WARNING and CAUTION on following page.

**NO**

**YES**

Go to step 9 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.

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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Connect connector P116 to WTEC III ECU.</td>
</tr>
<tr>
<td>(2) Connect connector clamp to connector P116.</td>
</tr>
<tr>
<td>(3) Remove instrument panel for access (para 7-15).</td>
</tr>
<tr>
<td>(4) Disconnect connector PX33 from WTEC III TPSS.</td>
</tr>
<tr>
<td>(5) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(6) Connect positive (+) probe of multimeter to connector PX33 socket R.</td>
</tr>
<tr>
<td>(7) Connect negative (-) probe of multimeter to ground.</td>
</tr>
<tr>
<td>(8) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.</td>
</tr>
<tr>
<td>(9) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(10) If 24 VDC is not present, go to step 9 of this fault.</td>
</tr>
</tbody>
</table>
f40. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB43 OK.
- Circuit breaker CB79 OK.
- Terminal board TB1 OK.
- WTEC III ECU OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III TPSS.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, WTEC III dashboard cable assembly is faulty.

---

5. Is continuity present from connector PX33 socket T to known good ground?

**CAUTION**
Read CAUTION on following page.

- **NO**
  - Repair wire 186 from connector PX33 socket T to terminal board TB2 position 15 (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) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector PX33 socket T.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, Repair wire 186 from connector PX33 socket T to terminal board TB2 position 15 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
**KNOW INFO**
12 VDC and 24 VDC circuits operate.
Circuit breaker CB43 OK.
Circuit breaker CB79 OK.
Terminal board TB1 OK.
WTEC III ECU OK.

**POSSIBLE PROBLEMS**
Faulty WTEC III dashboard cable assembly.
Faulty WTEC III TPSS.

**CAUTION**
Read CAUTION on following page.

**TEST OPTIONS**
Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, WTEC III dashboard cable assembly is faulty. If continuity is present, WTEC III TPSS is faulty.

6. Is continuity present from connector PX33 socket V to known good ground?

NO

YES

Repair wire 188 from connector PX33 socket V to terminal board TB2 position 13 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

Replace WTEC III TPSS (para 8-3).
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

<table>
<thead>
<tr>
<th>(1) Set multimeter to ohms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Connect positive (+) probe of multimeter to connector PX33 socket V.</td>
</tr>
<tr>
<td>(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(4) If continuity is not present, Repair wire 188 from connector PX33 socket V to terminal board TB2 position 13 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).</td>
</tr>
<tr>
<td>(5) If continuity is present, replace WTEC III TPSS (para 8-3).</td>
</tr>
</tbody>
</table>
**f40. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DOES NOT ILLUMINATE (CONT)**

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB43 OK.
- Circuit breaker CB79 OK.
- WTEC III ECU OK.
- WTEC III TPSS OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III dashboard cable assembly.
- Faulty terminal board TB1.

---

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, WTEC III dashboard cable assembly is faulty.

---

**CAUTION**
Read CAUTION on following page.

7. Is continuity present from connector P116 socket 4 to terminal board TB1 position 60?

- **NO**
  - Repair wire 146 from connector P116 socket 4 to terminal board TB1 position 60 (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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Disconnect batteries (para 7-48).</td>
</tr>
<tr>
<td>(2) Remove PDP cover (para 16-2).</td>
</tr>
<tr>
<td>(3) Remove three screws from PDP.</td>
</tr>
<tr>
<td>(4) Remove three screws and washers from PDP.</td>
</tr>
<tr>
<td>(5) Lift PDP outward to gain access.</td>
</tr>
<tr>
<td>(6) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(7) Connect positive (+) probe of multimeter to connector P116 socket 4.</td>
</tr>
<tr>
<td>(8) Connect negative (-) probe of multimeter to terminal board TB1 position 60 and note reading on multimeter.</td>
</tr>
<tr>
<td>(9) If continuity is not present, Repair wire 146 from connector P116 socket 4 to terminal board TB1 position 60 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).</td>
</tr>
<tr>
<td>(10) Connect connector P116 to WTEC III ECU.</td>
</tr>
<tr>
<td>(11) Connect connector clamp to connector P116.</td>
</tr>
<tr>
<td>(12) Install kick panel (para 16-3).</td>
</tr>
</tbody>
</table>
8. Is continuity present from terminal board TB1 position 60 to terminal board TB1 position 62?

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB43 OK.
- Circuit breaker CB79 OK.
- WTEC III ECU OK.
- WTEC III TPSS OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III dashboard cable assembly.
- Faulty terminal board TB1.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- If continuity is not present, terminal board TB1 is faulty.
- If continuity is present, WTEC III dashboard cable assembly is faulty.

YES
- Replace terminal board TB1 (7-11).

NO
- Repair wire 1690 from terminal board TB1 position 62 to circuit breaker CB79 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to terminal board TB1 position 60.
(3) Connect negative (-) probe of multimeter to terminal board TB1 position 62 and note reading on multimeter.
(4) If continuity is not present, replace terminal board TB1 (para 7-11).
(5) If continuity is present, Repair wire 1690 from terminal board TB1 position 62 to circuit breaker CB79 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-11).
(6) Install PDP on dashboard with three screws.
(7) Install three washers and screws in PDP.
(8) Install PDP cover (para 16-2).
(9) Connect batteries (para 7-48).
f40. WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR (TPSS) DOES NOT ILLUMINATE (CONT)

**KNOWN INFO**
- 12 VDC and 24 VDC circuits operate.
- Circuit breaker CB43 OK.
- Circuit breaker CB79 OK.
- Terminal board TB1 OK.
- WTEC III TPSS OK.

**POSSIBLE PROBLEMS**
- Faulty WTEC III dashboard cable assembly.
- Faulty WTEC III ECU.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
If continuity is not present, WTEC III dashboard cable assembly is faulty. If continuity is present, WTEC III ECU is faulty.

**CAUTION**
Read CAUTION on following page.

9. Is continuity present from connector PX33 socket R to connector P116 socket 16?

- **NO**
  - Repair wire 136 from connector PX33 socket R to connector P116 socket 16 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).

- **YES**
  - Replace WTEC III ECU (para 8-7).
**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.

<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Disconnect connector clamp from connector P116.</td>
</tr>
<tr>
<td>(2) Disconnect connector P116 from WTEC III ECU.</td>
</tr>
<tr>
<td>(3) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(4) Connect positive (+) probe of multimeter to connector PX33 socket R.</td>
</tr>
<tr>
<td>(5) Connect negative (-) probe of multimeter to connector P116 socket 16 and note reading on multimeter.</td>
</tr>
<tr>
<td>(6) If continuity is not present, repair wire 136 from connector PX33 socket R to connector P116 socket 16 (para 2-40) or replace WTEC III dashboard cable assembly (para 7-11).</td>
</tr>
<tr>
<td>(7) If continuity is present, replace WTEC III ECU (para 8-7).</td>
</tr>
<tr>
<td>(8) Connect connector PX33 to WTEC III TPSS.</td>
</tr>
<tr>
<td>(9) Install instrument panel assembly (para 7-15).</td>
</tr>
</tbody>
</table>
2-18. PROPELLER SHAFT TROUBLESHOOTING

This paragraph covers Propeller Shaft Troubleshooting. The Propeller Shaft Fault Index, Table 2-44, lists faults for the propeller shafts of the vehicle.

Table 2-44. Propeller Shaft Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>g1</td>
<td>Drive Shaft or Universal Joint Unusually Noisy When Operating</td>
<td>2-1598</td>
</tr>
</tbody>
</table>
g1. DRIVE SHAFT OR UNIVERSAL JOINT UNUSUALLY NOISY WHEN OPERATING

INITIAL SETUP

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

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

---

**START**

**WARNING**
Read WARNING on following page.

1. **TEST OPTIONS**
   - Visual inspection

   **REASON FOR QUESTION**
   Drive shaft may operate unusually noisy if not properly lubricated.

   **Is drive shaft properly lubricated?**

   **KNOWN INFO**
   Nothing.
   **POSSIBLE PROBLEMS**
   Drive shaft requires lubrication.
   Loose universal joint(s) bearing cap screws.
   Worn universal joints.
   Faulty drive shaft.

   **YES**
   **Lubricate drive shaft (Appendix H).**

   **NO**

2. **TEST OPTIONS**
   - Visual inspection

   **REASON FOR QUESTION**
   Drive shaft may operate unusually noisy if not secure.

   **Are universal joint(s) bearing cap screws secure?**

   **KNOWN INFO**
   Drive shaft properly lubricated.
   **POSSIBLE PROBLEMS**
   Loose universal joint(s) bearing cap screws.
   Worn universal joints.
   Faulty drive shaft.

   **YES**
   **Replace universal joint(s) bearing cap screws (para 9-2).**

   **NO**
Lubricate drive shaft lubrication fittings (Appendix H).

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) Visually inspect universal joint(s) bearing cap screws for tightness.
(2) Replace any screw(s) that appears to be loose (para 9-2).
g1. DRIVE SHAFT OR UNIVERSAL JOINT UNUSUALLY NOISY WHEN OPERATING (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight.</td>
<td>Visual inspection</td>
<td>Drive shaft may operate unusually noisy if there is movement at universal joint(s).</td>
</tr>
</tbody>
</table>

3. Are universal joints free from observable movement?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight. Universal joints OK.</td>
<td>Worn universal joints. Faulty drive shaft.</td>
</tr>
</tbody>
</table>

**NO**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight. Universal joints OK.</td>
<td>Faulty drive shaft.</td>
</tr>
</tbody>
</table>

**YES**

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>Drive shaft may operate unusually noisy if worn or damaged.</td>
</tr>
</tbody>
</table>

4. Does drive shaft pass drive shaft hinging inspection and visual inspection for damage?

**NO**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight. Universal joints OK.</td>
<td>Faulty drive shaft.</td>
</tr>
</tbody>
</table>

**YES**

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>Drive shaft may operate unusually noisy if there is movement at universal joint(s).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight. Universal joints OK.</td>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight. Universal joints OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive shaft properly lubricated. Universal joint(s) bearing cap screws tight. Universal joints OK.</td>
<td>Worn universal joints. Faulty drive shaft.</td>
</tr>
</tbody>
</table>

**YES**

Replace universal joint(s) (para 9-2).

**NO**

Replace drive shaft(s) (para 9-2).

Notify DS Maintenance.
(1) Check drive shaft for excessive movement at universal joints.
(2) If universal joint(s) shows any movement, replace universal joint(s) (para 9-2).

(1) Perform drive shaft hinging inspection (para 9-3).
(2) Visually inspect drive shaft for damaged slip yoke, bent/dented tubing, or missing balance weights.
(3) If drive shaft does not pass hinging inspection or visual inspection, replace drive shaft (para 9-2).
2-19. POWER TAKE OFF (PTO) TROUBLESHOOTING

This paragraph covers Power Take Off (PTO) Troubleshooting. The PTO Fault Index, Table 2-45, lists faults for the PTO of the vehicle.

Table 2-45. PTO Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>h1</td>
<td>PTO Does Not Engage</td>
<td>2-1604</td>
</tr>
</tbody>
</table>
1. It is likely that PTO is faulty if PTO indicator light illuminates, but PTO does not engage.

**Nothing**

**Faulty PTO solenoid valve.**

**Does PTO indicator light when the PTO is engaged?**

**NO**

- **Perform Electrical System Troubleshooting (e32. PTO Indicator Does Not Operate).**

**YES**

- **Perform Electrical System Troubleshooting (e88. PTO Does Not Operate).**
(1) Engage PTO (TM 9-2320-365-10).
(2) Check if PTO indicator lights.
(3) If PTO indicator does not light, perform Electrical System Troubleshooting (e32. PTO Indicator Does Not Operate).
(4) If PTO indicator does light, perform Electrical System Troubleshooting (e88. PTO Does Not Operate).
(5) Disengage PTO (TM 9-2320-365-10).
(6) Shut down engine (TM 9-2320-365-10).
This paragraph covers Brake System Troubleshooting. The Brake System Fault Index, Table 2-46, lists faults for the Brake System of the vehicle.

### Table 2-46. Brake System Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>i1</td>
<td>Excessive Braking Distance</td>
<td>2-1608</td>
</tr>
<tr>
<td>i2</td>
<td>Rear Brakes Do Not Apply</td>
<td>2-1620</td>
</tr>
<tr>
<td>i3</td>
<td>Parking Brake Does Not Release</td>
<td>2-1644</td>
</tr>
<tr>
<td>i4</td>
<td>Front Brakes Overheat and/or Do Not Release</td>
<td>2-1670</td>
</tr>
<tr>
<td>i5</td>
<td>Vehicle Brakes Unevenly, Brakes Pull To One Side or Grab</td>
<td>2-1676</td>
</tr>
<tr>
<td>i6</td>
<td>Front Brakes Do Not Apply</td>
<td>2-1690</td>
</tr>
<tr>
<td>i7</td>
<td>Rear Brakes Overheat</td>
<td>2-1700</td>
</tr>
<tr>
<td>i8</td>
<td>Parking Brake Does Not Apply</td>
<td>2-1708</td>
</tr>
<tr>
<td>i9</td>
<td>Brake System Loses Air When Service Brakes Are Applied</td>
<td>2-1712</td>
</tr>
</tbody>
</table>
1. ECESSIVE BRAKING DISTANCE

INITIAL SETUP

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

Personnel Required
(2)

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Jack, Hydraulic, Hand (Item 21, Appendix C)
Trestle, Motor Vehicle Maintenance (2) (Item 45, Appendix C)
Tool, Spring Removal (Item 83, Appendix B)

START

WARNING
Read WARNING on following page.

1. Are rear brakes operating?

TEST OPTIONS
Visual inspection

REASON FOR QUESTION
Excessive braking distance will occur if rear brakes do not apply.

NO

YES

Perform Brake System Troubleshooting (i2. Rear Brakes Do Not Apply).

KNOWN INFO
Air tanks pressurized.

POSSIBLE PROBLEMS
Rear brakes do not apply.
Front brakes do not apply.
Faulty brake shoe adjustment.
Faulty brake linings.
Faulty return springs.
Faulty detent washers.
Faulty adjusting pawl.
Faulty actuator.
Faulty plunger chamber seals.
Faulty wedge assemblies or brake chamber.
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) Apply brakes and observe operation of brake shoes at all rear wheels.
(2) If brake shoes fail to apply at all rear wheels, rear brake system is faulty. Perform Brake System Troubleshooting (i2. Rear Brakes Do Not Apply).
1. EXCESSIVE BRAKING DISTANCE (CONT)

**KNOWLEDGE**

<table>
<thead>
<tr>
<th>Air tanks pressurized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear brakes apply OK.</td>
</tr>
<tr>
<td>Front brakes apply OK.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

- Front brakes do not apply.
- Faulty brake shoe adjustment.
- Faulty brake linings.
- Faulty return springs.
- Faulty detent washers.
- Faulty adjusting pawl.
- Faulty actuator.
- Faulty plunger chamber seals.
- Faulty wedge assemblies or brake chamber.

**TEST OPTIONS**

<table>
<thead>
<tr>
<th>Visual inspection</th>
</tr>
</thead>
</table>

**REASON FOR QUESTION**

- Excessive braking distance may occur if front brakes do not apply.

2. Are front brakes operating?

3. Are brake shoe clearances adjusted properly?

**KNOWLEDGE**

<table>
<thead>
<tr>
<th>Air tanks pressurized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear brakes apply OK.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

- Faulty brake shoe adjustment.
- Faulty brake linings.
- Faulty return springs.
- Faulty detent washers.
- Faulty adjusting pawl.
- Faulty actuator.
- Faulty plunger chamber seals.
- Faulty wedge assemblies or brake chamber.

**TEST OPTIONS**

| Visual inspection |

**REASON FOR QUESTION**

- Improperly adjusted brake shoes can cause excessive braking distance.

**TEST OPTIONS**

- Perform brake adjustment (para 11-2 or 11-3).
(1) Apply brakes and observe operation of brake shoes at each front wheel.

(2) If all shoes at front wheels fail to apply, front brake system is faulty. Perform Brake System Troubleshooting (i6. Front Brakes Do Not Apply).

(1) Jack up axle with affected brakes and support with trestles.

(2) Make periodic brake applications to position floating shoes.

NOTE
Over time a ridge will form on the outer edge of the brake shoes. This is normal and does not affect brake shoe serviceability.

(3) Measure shoe clearance checking along centerline of shoe at scallop. Rotate wheel during check.

(4) If clearance is not between .020 and .040, adjust brakes (para 11-2 or 11-3).
1. EXCESSIVE BRAKING DISTANCE (CONT)

### Known Info

- Air tanks pressurized.
- Rear brakes apply OK.
- Front brakes apply OK.
- Brake shoes adjustment OK.

### Possible Problems

- Faulty brake linings.
- Faulty return springs.
- Faulty detent washers.
- Faulty adjusting pawl.
- Faulty actuator.
- Faulty plunger chamber seals.
- Faulty wedge assemblies or brake chamber.

### Test Options

<table>
<thead>
<tr>
<th>Reason for Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damaged or worn brake linings and drums will cause insufficient torque to stop vehicle.</td>
</tr>
</tbody>
</table>

### Test Options

<table>
<thead>
<tr>
<th>Reason for Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>A broken or damaged return spring will cause brake adjustment to fail.</td>
</tr>
</tbody>
</table>

### Question

4. Are brake linings or drums free from damage?

- **NO**
  - Replace brake linings (para 11-2-or 11-3) or brake drums.

- **YES**
  - Replace broken or damaged brake return spring (para 11-2 or 11-3).

### Question

5. Are return springs free from damage?

- **NO**
  - Replace broken or damaged brake return spring (para 11-2 or 11-3).

- **YES**
  - Replace brake linings (para 11-2-or 11-3) or brake drums.
(1) Remove lugnuts and lift off wheel.
(2) Slide brake drum off axle.
(3) Inspect brake linings for worn, glazed, damaged condition, or contamination (para 11-2).
(4) Inspect brake drum for, out of round, scoring, pitting, heat cracks, and blue scorch marks.

(1) Detach each return spring from brake shoe.
(2) Examine return spring for stretching, bluing, damage or breakage.
(3) If return spring(s) is damaged, replace broken or damaged return spring(s) (para 11-2 or 11-3).
I1. EXCESSIVE BRAKING DISTANCE (CONT)

6. Are all detent washers free from damage?

- **NO**
- **YES**

   - **TEST OPTIONS**
     - Visual inspection
   - **REASON FOR QUESTION**
     - Damaged detent washers will not allow automatic adjusters to operate properly.

   - **POSSIBLE PROBLEMS**
     - Faulty detent washers.
     - Faulty adjusting pawl.
     - Faulty actuator.
     - Faulty plunger chamber seals.
     - Faulty wedge assemblies or brake chamber.

7. Are adjusting pawl springs present and free from damage and are pawl teeth free from damage?

- **NO**
- **YES**

   - **TEST OPTIONS**
     - Visual inspection
   - **REASON FOR QUESTION**
     - Automatic adjusters will not work if adjusting pawl springs are damaged or missing or if pawl teeth are damaged.

   - **POSSIBLE PROBLEMS**
     - Faulty adjusting pawl.
     - Faulty actuator.
     - Faulty plunger chamber seals.
     - Faulty wedge assemblies or brake chamber.

   - **KNOWN INFO**
     - Air tanks pressurized.
     - Rear brakes apply OK.
     - Front brakes apply OK.
     - Brake shoe adjustment OK.
     - Brake linings OK.
     - Return springs OK.
     - Detent washers OK.
(1) Remove brake shoes from clips on wheel hub.
(2) Screw adjuster bolt out of plunger housing.
(3) Check if detent washer is damaged or broken.
(4) If detent washer is damaged, replace adjusting bolt assembly (para 11-4 or 11-5).

(1) Unscrew adjusting pawl from plunger housing.
(2) Check adjusting pawl springs for damage.
   Ensure that springs are not missing or broken.
(3) Check adjusting pawl teeth for damage and abrasion.
8. Are actuator teeth free from damage?

- **NO**

- **YES**
  - Replace actuator (para 11-4 and 11-5).

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- Damaged actuator teeth will not allow automatic adjusters to operate properly.

**POSSIBLE PROBLEMS**
- Faulty actuator.
- Faulty plunger chamber seals.
- Faulty wedge assemblies or brake chamber.

---

9. Are seals free from damage?

- **NO**

- **YES**
  - Replace seals (para 11-4 and 11-5).

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- Automatic adjusters will not work if seals are damaged and allow dirt to enter plunger chamber.

**POSSIBLE PROBLEMS**
- Faulty plunger chamber seals.
- Faulty wedge assemblies or brake chamber.
(1) Lift actuator from plunger housing.
(2) Check actuator teeth for damage.

(1) Check that seal elements are not damaged or broken.
(2) A damaged seal may permit dirt to enter plunger chamber and interfere with adjustment.
10. Are wedge assemblies free from wear and damage, and do they operate?

If wedge assembly is damaged or does not operate, brake shoes will not apply.

- Replace faulty brake chamber (para 11-7 or 11-8).
- Replace/repair wedge assembly (para 11-4 or 11-5).

**KNOWLEDGE INFO**
- Air tanks pressurized.
- Rear brakes apply OK.
- Front brakes apply OK.
- Brake shoe adjustment OK.
- Brake linings OK.
- Return springs OK.
- Detent washers OK.
- Adjusting pawl OK.
- Actuator OK.
- Plunger chamber seals OK.

**POSSIBLE PROBLEMS**
- Faulty wedge assemblies or brake chamber.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If wedge assembly is damaged or does not operate, brake shoes will not apply.
(1) Disconnect and tag air hoses to brake chambers at wheel.
(2) Cage spring brakes on rear wheels (para 11-6).
(3) Unscrew brake chamber(s) from hub.
(4) Remove wedge assembly from wheel.
(5) Inspect wedge spring for damage.
(6) Inspect rollers for flattening or damage.
(7) Manually check operation of wedge assembly in plunger chamber.
(8) Insert wedge assembly into plunger chamber.
(9) Screw brake chamber onto wheel hub (para 11-7 or 11-8).
(10) Attach air hoses to brake chamber.
(11) Uncage rear spring brakes (para 11-6).
(12) Install plunger into plunger housing, open end up.
(13) Align slot to accept pawl (para 11-4 or 11-5).
(14) Install pawl and pawl spring into side of plunger housing.
(15) Install actuator, seal, and adjustment bolt into head of plunger housing (para 11-4 or 11-5).
(16) Install brake shoes into clips on wheel hub with leading (toe) edge of shoe fitting slot on head of adjusting bolt. Arrow stamped on shoe should point away from adjusting plunger (para 11-2 or 11-3).
(17) Install return springs on brake shoes (para 11-2 or 11-3).
(18) Install brake drum.
(19) Adjust brake shoes (para 11-2 or 11-3).
(20) Install wheel.
(21) Raise vehicle and remove trestle.
1. Is air present at foot control valve supply air hoses and is air hose free from leaks and damage?

YES

Replace damaged air hose(s) (para 11-19).

NO

WARNING
Read WARNING on following page.

i2. REAR BRAKES DO NOT APPLY

REASON FOR QUESTION
A blocked or leaking supply air hose to foot control valve will prevent air delivery to service brake chambers and cause brakes not to apply.

TEST OPTIONS
Visual inspection

POSSIBLE PROBLEMS
Faulty supply air hose to foot control valve.
Faulty foot control valve.
Faulty air hoses at cab floor.
Faulty air hose to check valve.
Faulty check valve.
Faulty air hose to load sensing valve.
Faulty load sensing valve.
Faulty air hose to control port of relay valve.
Faulty air hose to supply port of relay valve.
Faulty relay valve.
Faulty air hose to spring brakes.
Faulty vent hose from spring brake service chamber.
Faulty spring brake chamber.

KNOWN INFO
Front brakes OK.
Air tanks pressurized.

INITIAL SETUP

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

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

Personnel Required
(2)
**WARNING**

- When working on parking brake control system vehicle may roll. Wheel shocks must be positioned in front of and behind one of the rear wheels to prevent it from rolling. Failure to comply may cause serious injury or death to personnel.

- 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. Loosen supply air hose at foot control valve.
2. Check for presence of air. If no air is present, replace air hose (para 11-19).
3. Tighten supply air hose to foot control valve.
I2. REAR BRAKES DO NOT APPLY (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front brakes OK.</td>
<td>Visual inspection</td>
<td>A lack of air from delivery port of foot control valve will prevent air delivery to service brake chambers and cause brakes not to apply.</td>
</tr>
<tr>
<td>Air tanks pressurized.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply air hose to foot control valve OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POSSIBLE PROBLEMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty foot control valve.</td>
<td></td>
<td></td>
</tr>
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<td>Faulty air hoses at cab floor.</td>
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<tr>
<td>Faulty air hose to check valve.</td>
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<tr>
<td>Faulty check valve.</td>
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<tr>
<td>Faulty air hose to load sensing valve.</td>
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<tr>
<td>Faulty load sensing valve.</td>
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<tr>
<td>Faulty air hose to control port of relay valve.</td>
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<tr>
<td>Faulty air hose to supply port of relay valve.</td>
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<td>Faulty relay valve.</td>
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<tr>
<td>Faulty air hoses to spring brakes.</td>
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<tr>
<td>Faulty vent hose from spring brake service chamber.</td>
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<tr>
<td>Faulty spring brake chamber.</td>
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</tr>
</tbody>
</table>

2. Is air present at foot control valve delivery air hose?

- **YES**
  - Replace foot control valve (para 11-9).

- **NO**
  - Faulty foot control valve.
  - Faulty air hoses at cab floor.
  - Faulty air hose to check valve.
  - Faulty check valve.
  - Faulty air hose to load sensing valve.
  - Faulty load sensing valve.
  - Faulty air hose to control port of relay valve.
  - Faulty air hose to supply port of relay valve.
  - Faulty relay valve.
  - Faulty air hoses to spring brakes.
  - Faulty vent hose from spring brake service chamber.
  - Faulty spring brake chamber.
(1) Loosen delivery air hose at foot control valve.
(2) Apply brake and check for presence of air.
(3) If no air is present, replace foot control valve (para 11-9).
(3) Tighten delivery air hose on foot control valve.
3. **Are air hoses to rear brakes free from leaks and damage at cab floor?**

   - **YES**
     - Replace damaged air hose(s) and fitting (para 11-19).
   - **NO**
     - **REASON FOR QUESTION**
       - If air hoses at cab floor junction are leaking or damaged, rear brakes may not apply.

**KNOWN INFO**
- Front brakes OK.
- Air tanks pressurized.
- Supply air hose to foot control valve OK.
- Foot control valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hoses at cab floor.
- Faulty air hose to check valve.
- Faulty check valve.
- Faulty air hose to load sensing valve.
- Faulty load sensing valve.
- Faulty air hose to control port of relay valve.
- Faulty air hose to supply port of relay valve.
- Faulty relay valve.
- Faulty air hoses to spring brakes.
- Faulty vent hose from spring brake service chamber.
- Faulty spring brake chamber.
(1) Loosen delivery air hose at cab floor.
(2) Apply brakes.
(3) Check for presence of air from air hose when brake is applied.
(4) If no air is present, replace air hose (para 11-19).
(5) Tighten air hose at cab floor.
(6) Raise cab (TM 9-2320-365-10).
(7) Loosen delivery air hose under cab floor.
(8) Apply foot brake.
(9) Check for presence of air from fitting when brake is applied.
(10) If no air is present, replace air hose and fitting (para 11-19).
(11) Tighten air hose and fitting.
12. REAR BRAKES DO NOT APPLY (CONT)

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<tr>
<th>KNOWN INFO</th>
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<tbody>
<tr>
<td>Front brakes OK.</td>
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<tr>
<td>Air tanks pressurized.</td>
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<tr>
<td>Supply air hose to foot control valve OK.</td>
</tr>
<tr>
<td>Foot control valve OK.</td>
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<tr>
<td>Air hoses at cab floor OK.</td>
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<thead>
<tr>
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</thead>
<tbody>
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<td>Faulty relay valve.</td>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is air present at check valve supply air hose and is the air hose free from leaks and damage?</td>
</tr>
</tbody>
</table>

4. **NO**

   A blocked or leaking air hose to the check valve will prevent air delivery to the check valve and will cause the rear brakes not to apply.

4. **YES**

   Replace damaged air hose (para 11-19).
(1) Loosen supply air hose at check valve.
(2) Apply brakes.
(3) Check for presence of air at air hose when brake is applied.
(4) If no air is present, replace air hose (para 11-19).
(5) Tighten air hose at supply port of check valve.
### REAR BRAKES DO NOT APPLY (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
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<tbody>
<tr>
<td>Front brakes OK.</td>
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<tr>
<td>Air tanks pressured.</td>
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<tr>
<td>Supply air hose to foot control valve OK.</td>
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<tr>
<td>Foot control valve OK.</td>
</tr>
<tr>
<td>Air hoses at cab floor OK.</td>
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<tr>
<td>Air hose to check valve OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
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<tbody>
<tr>
<td>Faulty check valve.</td>
</tr>
<tr>
<td>Faulty air hose to load sensing valve.</td>
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<tr>
<td>Faulty load sensing valve.</td>
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<tr>
<td>Faulty vent hose from spring brake service chamber.</td>
</tr>
<tr>
<td>Faulty spring brake chamber.</td>
</tr>
</tbody>
</table>

5. Is air present at the check valve delivery air hose when applying brakes?

- **NO**
  - **REASON FOR QUESTION**
    - A lack of air from the air delivery port of the check valve will not allow the rear brakes to be applied.

- **YES**
  - Replace check valve (para 11-14).
(1) Loosen delivery air hose on check valve.
(2) Apply brakes.
(3) Check for presence of air from air hose when brake is applied.
(4) If no air is present, replace check valve (para 11-14).
(5) Tighten delivery air hose on check valve.
I2. REAR BRAKES DO NOT APPLY (CONT)

**KNOWN INFO**
- Front brakes OK.
- Air tanks pressurized.
- Supply air hose to foot control valve OK.
- Foot control valve OK.
- Air hoses at cab floor OK.
- Air hose to check valve OK.
- Check valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hose to load sensing valve.
- Faulty load sensing valve.
- Faulty air hose to control port of relay valve.
- Faulty air hose to supply port of relay valve.
- Faulty relay valve.
- Faulty air hoses to spring brakes.
- Faulty vent hose from spring brake service chamber.
- Faulty spring brake chamber.

---

6. Is delivery air hose to load sensing valve free from blockage, leaks or damage?

- **NO**
  - **REASON FOR QUESTION**
    - A blocked or leaking delivery air hose to load sensing valve will prevent air delivery to service brake chambers and cause rear brakes not to apply.

- **YES**
  - Replace damaged air hose (para 11-19).
(1) Loosen delivery air hose at load sensing valve.
(2) Apply brakes.
(3) Check for presence of air.
(4) If no air is present, replace air hose (para 11-19).
(5) Tighten delivery air hose on load sensing valve.
12. REAR BRAKES DO NOT APPLY (CONT)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Front brakes OK.</td>
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<tr>
<td>Air tanks pressurized.</td>
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<td>Supply air hose to foot control valve OK.</td>
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<td>Foot control valve OK.</td>
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<tr>
<td>Air hoses at cab floor OK.</td>
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<td>Air hose to check valve OK.</td>
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<tr>
<td>Check valve OK.</td>
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<tr>
<td>Air hose to load sensing valve OK.</td>
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<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
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<tbody>
<tr>
<td>Faulty load sensing valve.</td>
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<tr>
<td>Faulty air hose to control port of relay valve.</td>
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<tr>
<td>Faulty air hose to supply port of relay valve.</td>
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<td>Faulty relay valve.</td>
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<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lack of air at load sensing valve will prevent air delivery to service brake chambers and cause rear brakes not to apply.</td>
</tr>
</tbody>
</table>

7. Is air present at load sensing valve outlet hose?

- **YES** Replace load sensing valve (para 11-10).
- **NO**
(1) Loosen outlet air hose at load sensing valve.
(2) Apply brakes.
(3) Check for presence of air.
(4) If no air is present, replace load sensing valve (para 11-10).
(5) Tighten outlet air hose on load sensing valve.
12. REAR BRAKES DO NOT APPLY (CONT)

**KNOWN INFO**
- Front brakes OK.
- Air tanks pressured.
- Supply air hose to foot control valve OK.
- Foot control valve OK.
- Air hoses at cab floor OK.
- Air hose to check valve OK.
- Check valve OK.
- Air hose to load sensing valve OK.
- Load sensing valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hose to control port of relay valve.
- Faulty air hose to supply port of relay valve.
- Faulty relay valve.
- Faulty air hoses to spring brakes.
- Faulty vent hose from spring brake service chamber.
- Faulty spring brake chamber.

8. **Is air present at relay valve control port air hose?**

- **YES**
  - Replace damaged air hoses (para 11-19).

- **NO**
  - **TEST OPTIONS**
    - Visual inspection
  - **REASON FOR QUESTION**
    - A lack of air at relay valve control port air hose will prevent air delivery to service brake chambers and cause rear brakes not to apply.
(1) Loosen control port air hoses at relay valve.
(2) Apply brakes.
(3) Check for presence of air.
(4) If no air is present, replace air hose(s) (para 11-19).
(5) Tighten inlet air hoses on relay valve.
## I2. REAR BRAKES DO NOT APPLY (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
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<tbody>
<tr>
<td>Front brakes OK.</td>
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<td>Air tanks pressuried.</td>
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<td>Supply air hose to foot control valve OK.</td>
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<tr>
<td>Air hose to load sensing valve OK.</td>
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<tr>
<td>Load sensing valve OK.</td>
</tr>
<tr>
<td>Air hose to control port of relay valve OK.</td>
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</tbody>
</table>

### POSSIBLE PROBLEMS
- Faulty air hose to supply port of relay valve.
- Faulty relay valve.
- Faulty air hoses to spring brakes.
- Faulty vent hose from spring brake service chamber.
- Faulty spring brake chamber.

### TEST OPTIONS

<table>
<thead>
<tr>
<th>9. Is air present at supply port of relay valve?</th>
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<tbody>
<tr>
<td>YES</td>
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</tbody>
</table>

### REASON FOR QUESTION

A blocked or leaking supply air hose from primary tank to supply port of relay valve will prevent air delivery to service brake chambers and cause rear brakes not to apply.

### Replace damaged air hose (para 11-19).
(1) Loosen supply air hose at supply port of relay valve.
(2) Apply brakes.
(3) Check for presence of air.
(4) If no air is present, replace air hose (para 11-19).
(5) Tighten supply air hose to relay valve.
12. REAR BRAKES DO NOT APPLY (CONT)

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<td>Air hose to supply port relay valve OK.</td>
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<td>Faulty relay valve.</td>
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<td>A lack of air at delivery port(s) of relay valve will prevent air delivery to service brake chambers and cause rear brakes not to apply.</td>
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</table>

10. Is air present at relay valve delivery port(s)?

   YES

   Replace relay valve (para 11-13).

   NO
(1) Loosen delivery air hose(s) at relay valve.
(2) Apply brakes.
(3) Check for presence of air.
(4) If no air is present, replace relay valve (para 11-13).
(5) Tighten delivery air hose(s) to relay valve.
12. REAR BRAKES DO NOT APPLY (CONT)

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<td>Air hose to control port of relay valve OK.</td>
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<tr>
<td>Air hose to supply port relay valve OK.</td>
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<tr>
<td>Relay valve OK.</td>
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<tbody>
<tr>
<td>A lack of air at service brake air chambers will cause rear brakes not to apply.</td>
</tr>
</tbody>
</table>

11. Is air present at service brake air chamber(s) of spring brakes?

- NO
- YES

Replace damaged air hose(s) (para 11-19).
(1) Loosen service brake air hose at spring brake chamber.
(2) Apply brakes.
(3) Check for presence of air.
(4) If no air is present, replace air hose (para 11-19).
(5) Tighten service brake air hose on spring brake chamber.
12. REAR BRAKES DO NOT APPLY (CONT)

**KNOWN INFO**
- Front brakes OK.
- Air tanks pressurized.
- Supply air hose to foot control valve OK.
- Foot control valve OK.
- Air hoses at cab floor OK.
- Air hose to check valve OK.
- Check valve OK.
- Air hose to load sensing valve OK.
- Load sensing valve OK.
- Air hose to control port of relay valve OK.
- Air hose to supply port relay valve OK.
- Relay valve OK.
- Air hoses to spring brakes OK.

**POSSIBLE PROBLEMS**
- Faulty vent hose from spring brake service chamber.
- Faulty spring brake chamber.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- Blocked vent hoses will prevent air from escaping at brake service chambers and will cause rear brakes not to apply.

12. Is air present at spring brake vent hose on frame?

- **NO**
  - Replace rear service brake air chamber (para 11-8).

- **YES**
  - Replace vent hose(s) (para 11-19) or relay valve (para 11-13).
(1) Disconnect vent hose(s) at brake chamber(s).
(2) Blow compressed air through vent hoses.
(3) Check for air escaping at vent valve.
(4) If air does not escape from vent hose, replace vent hose(s) (para 11-19) or relay valve (para 11-13).
(5) If air does escape from vent hose, replace rear service brake air chamber (para 11-8).
(6) Connect vent hose(s) at brake chamber(s).
(7) Lower cab (TM 9-2320-365-10).
3. PARKING BRAKE DOES NOT RELEASE

INITIAL SETUP

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

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

KNOWN INFO
Air tanks pressurized.
Gladhands OK.

POSSIBLE PROBLEMS
Faulty air hose 107.
Faulty park control two-way check valve.
Faulty SYSTEM PARK air supply valve.
Faulty air hose 103.
Faulty air hose 109.
Faulty two-way check valve.
Faulty air hose 119.
Faulty inversion valve.
Faulty air hose 221.
Faulty anti-compounding valve.
Faulty air hose 231.

1. WARNING
Read WARNING on following page.

Do all rear wheels fail to release?

NO

YES

TEST OPTIONS
Visual inspection

REASON FOR QUESTION
If some but not all wheels fail to release, fault is delivery of air to individual wheel brakes.

When working on parking brake control system, vehicle may roll. Wheel chocks must be positioned in front of and behind one of the rear wheels to keep it from rolling. Failure to comply may result in serious injury or death to personnel.

2. Release SYSTEM PARK control (TM 9-2320-365-10).
3. Check if vehicle moves.
4. If vehicle moves, locate locked wheel(s) and troubleshoot individual wheel(s).
5. Shut down engine (TM 9-2320-365-10).
**i3. PARKING BRAKE DOES NOT RELEASE (CONT)**

**KNOWN INFO**
Air tanks pressurized.

**POSSIBLE PROBLEMS**
- Faulty air hose 107.
- Faulty park control two-way check valve.
- Faulty SYSTEM PARK air supply valve.
- Faulty air hose 103.
- Faulty air hose 109.
- Faulty two-way check valve.
- Faulty air hose 119.
- Faulty inversion valve.
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

**TEST OPTIONS**
Visual Inspection

**REASON FOR QUESTION**
SYSTEM PARK air supply valve cannot be tested if no air is present at supply port.

2. Is air present at SYSTEM PARK air supply valve port?

- **NO**
  - Go to step 11 of this fault.

- **YES**
  - Go to step 11 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) Remove roll pins from knobs of SYSTEM PARK and TRAILER AIR SUPPLY valves.
(2) Remove SYSTEM PARK and TRAILER AIR SUPPLY valve knobs.
(3) Unscrew nuts at base of knob stem on each valve.
(4) Remove six screws from dash plate.
(5) Remove dash plate from personnel heater.
(6) Pull out SYSTEM PARK air supply valve from personnel heater.
(7) Loosen air hose 107 at SYSTEM PARK air supply valve supply port.
(8) Check air hose 107 for escaping air.
(9) If no air escapes from air hose 107, go to step 11 of this fault.
3. PARKING BRAKE DOES NOT RELEASE (CONT)

**KNOWN INFO**
- Air tanks pressurized.
- Air hose 107 OK.
- Park control two-way check valve OK.

**POSSIBLE PROBLEMS**
- Faulty SYSTEM PARK air supply valve.
- Faulty air hose 103.
- Faulty air hose 109.
- Faulty two-way check valve.
- Faulty air hose 119.
- Faulty inversion valve.
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- No air present at delivery port indicates faulty SYSTEM PARK air supply valve.

3. Is air present at delivery port of SYSTEM PARK air supply valve?

- **NO**
  - Replace SYSTEM PARK air supply valve (para 11-18).

- **YES**
(1) Tighten air hose 107 at SYSTEM PARK air supply valve supply port.
(2) Loosen air hose 103 at SYSTEM PARK air supply valve delivery port.
(3) Check for presence of air from SYSTEM PARK air supply valve.
(4) If no air is present, replace SYSTEM PARK air supply valve (para 11-18).
13. PARKING BRAKE DOES NOT RELEASE (CONT)

**KNOWLEDGE INFO**
- Air tanks pressurized.
- Air hose 107 OK.
- Park control two-way check valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 103.
- Faulty air hose 109.
- Faulty two-way check valve.
- Faulty air hose 119.
- Faulty inversion valve.
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- No air present at air hose 103 indicates faulty air hose.

4. **Is air present at air hose 103?**

- **NO**
  - Faulty air hose 103.
  - Faulty air hose 109.
  - Faulty two-way check valve.
  - Faulty air hose 119.
  - Faulty inversion valve.
  - Faulty air hose 221.
  - Faulty anti-compounding valve.
  - Faulty air hose 231.

- **YES**
  - Replace air hose 103 (para 11-19).
(1) Tighten air hose 103 at SYSTEM PARK air supply valve delivery port.
(2) Loosen air hose 103 at cab floor fitting.
(3) Check for presence of air from air hose 103.
(4) If no air is present, replace air hose 103 (para 11-19).


**i3. PARKING BRAKE DOES NOT RELEASE (CONT)**

**KNOWN INFO**
- Air tanks pressurized.
- Air hose 107 OK.
- Park control two-way check valve OK.
- Air hose 103 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 109.
- Faulty two-way check valve.
- Faulty air hose 119.
- Faulty inversion valve.
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Two-way check valve cannot be tested if no air is present at supply port.

5. Is air present at supply port of two-way check valve?

- **NO**

- **YES** Replace air hose 109 (para 11-19).
(1) Tighten air hose 103 at cab floor fitting.
(2) Push SYSTEM PARK and TRAILER AIR SUPPLY valves back into personnel heater.
(3) Install dash plate over valve stems with six screws.
(4) Install nuts on knob stems.
(5) Install SYSTEM PARK and TRAILER AIR SUPPLY knobs on stems with roll pins.
(6) Raise cab (TM 9-2320-365-10).
(7) Loosen air hose 109 at supply port of two-way check valve.
(8) Check for presence of air at air hose 109.
(9) If no air is present, replace air hose 109 (para 11-19).
**3. PARKING BRAKE DOES NOT RELEASE (CONT)**

**KNOWN INFO**
- Air tanks pressurized.
- Air hose 107 OK.
- Park control two-way check valve OK.
- Air hose 103 OK.
- Air hose 109 OK.

**POSSIBLE PROBLEMS**
- Faulty two-way check valve.
- Faulty air hose 119.
- Faulty inversion valve.
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

### TEST OPTIONS
- Visual Inspection

### REASON FOR QUESTION
No air at delivery port of two-way check valve indicates a faulty two-way check valve.

**6.** Is air present at delivery port of two-way check valve?

- **NO**
  - Replace two-way check valve (para 11-14).

- **YES**
(1) Tighten air hose 109 at two-way check valve supply port.
(2) Loosen air hose 119 at delivery port of two-way check valve.
(3) Release SYSTEM PARK (TM 9-2320-365-10) and check for presence of air at air hose 119.
(4) If no air is present, replace two-way check valve (para 11-14).
i3. PARKING BRAKE DOES NOT RELEASE (CONT)

**KNOWN INFO**
Air tanks pressurized.
Air hose 107 OK.
Park control two-way check valve OK.
Air hose 103 OK.
Air hose 109 OK.
Two-way check valve OK.

**POSSIBLE PROBLEMS**
Faulty air hose 119.
Faulty inversion valve.
Faulty air hose 221.
Faulty anti-compounding valve.
Faulty air hose 231.

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inversion valve cannot be tested if no air is present at supply port.</td>
</tr>
</tbody>
</table>

7. **Is air present at supply port of inversion valve?**

- **NO**
- **YES**
  - Replace air hose 119 (para 11-19).
(1) Tighten air hose 119 at two-way check valve delivery port.
(2) Lower cab (TM 9-2320-365-10).
(3) Loosen air hose 119 at inversion valve supply port.
(4) Check for presence of air at air hose 119.
(5) If no air is present, replace air hose 119 (para 11-19).
3. PARKING BRAKE DOES NOT RELEASE (CONT)

**KNOWN INFO**
- Air tanks pressurized.
- Air hose 107 OK.
- Park control two-way check valve OK.
- Air hose 103 OK.
- Air hose 109 OK.
- Two-way check valve OK.
- Air hose 119 OK.

**POSSIBLE PROBLEMS**
- Faulty inversion valve.
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Leaking inversion valve may cause rapid loss of system air pressure.

B. Is air present at inversion valve delivery port?

- **NO**
- **YES**

Replace inversion valve (para 11-12).
(1) Tighten air hose 119 at inversion valve supply port.
(2) Loosen air hose 118 at inversion valve delivery port.
(3) Check for presence of air at air hose 118. 
(4) If no air is present, replace inversion valve (para 11-12).
3. PARKING BRAKE DOES NOT RELEASE (CONT)

**KNOWING INFO**
- Air tanks pressurized.
- Air hose 107 OK.
- Park control two-way check valve OK.
- Air hose 103 OK.
- Air hose 109 OK.
- Two-way check valve OK.
- Air hose 119 OK.
- Inversion valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 221.
- Faulty anti-compounding valve.
- Faulty air hose 231.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Anti-compounding valve cannot be checked if air is not present at supply port.

**9.**
Is air present at supply port of anti-compounding valve?

---

**NO**

---

**YES**
Replace air hose 221 (para 11-19).
(1) Tighten air hose 118 at inversion valve delivery port.
(2) Loosen air hose 221 at supply port of anti-compounding valve.
(3) Check for presence of air at air hose 221.
(4) If no air is present, replace air hose 221 (para 11-19).
13. PARKING BRAKE DOES NOT RELEASE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air tanks pressurized.</td>
</tr>
<tr>
<td>Air hose 107 OK.</td>
</tr>
<tr>
<td>Park control two-way check</td>
</tr>
<tr>
<td>valve OK.</td>
</tr>
<tr>
<td>Air hose 103 OK.</td>
</tr>
<tr>
<td>Air hose 109 OK.</td>
</tr>
<tr>
<td>Two-way check valve OK.</td>
</tr>
<tr>
<td>Air hose 119 OK.</td>
</tr>
<tr>
<td>Inversion valve OK.</td>
</tr>
<tr>
<td>Air hose 221 OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty anti-compounding valve.</td>
</tr>
<tr>
<td>Faulty air hose 231.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaking anti-compounding valve may cause rapid loss of system air pressure.</td>
</tr>
</tbody>
</table>

10. Is air present at delivery ports of anti-compounding valve?

- **YES**
  - Replace anti-compounding valve (para 11-11).

- **NO**
  - Replace air hose 231 (para 11-19).
(1) Tighten air hose 221 at anti-compounding valve supply port.
(2) Loosen air delivery hoses at delivery ports of anti-compounding valve.
(3) Check for presence of air at anti-compounding valve air hoses.
(4) If no air is present, replace anti-compounding valve (para 11-11).
(5) If air is present, replace air hose 231 (para 11-19).
(6) Tighten air delivery hoses at delivery ports of anti-compounding valve.
i3. PARKING BRAKE DOES NOT RELEASE (CONT)

**KNOWN INFO**
- Air tanks pressurized.
- No air pressure present at SYSTEM PARK air supply valve supply port.

**POSSIBLE PROBLEMS**
- Faulty air hose 107.
- Faulty park control two-way check valve.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
If no air pressure is present at park control two-way check valve, park control two-way check valve is faulty. If air pressure is present, air hose 107 is faulty.

**11.** Is air present at park control two-way check valve delivery port?

- **YES**
  - Replace park control two-way check valve (para 11-17).

- **NO**
  - Replace air hose 107 (para 11-19).
(1) Tighten air hose 107 at SYSTEM PARK air supply valve supply port.
(2) Push SYSTEM PARK and TRAILER AIR SUPPLY valves back into personnel heater.
(3) Install dash plate over valve stems with six screws.
(4) Install nuts on knob stems.
(5) Install SYSTEM PARK and TRAILER AIR SUPPLY knobs on stems with roll pins.
(6) Loosen air hose 107 at park control two-way check valve delivery port.
(7) Check for presence of air at air hose 107.
(8) If no air is present, replace park control two-way check valve (para 11-17).
(9) If air is present, replace air hose (para 11-19).
(10) Tighten air hose 107 at park control two-way check valve.
14. FRONT BRAKES OVERHEAT AND/OR DO NOT RELEASE

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Trestle, Motor Vehicle Maintenance (2)</td>
</tr>
<tr>
<td></td>
<td>(Item 45, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Adjusting Tool, Brake Shoe (Item 2, Appendix C)</td>
</tr>
</tbody>
</table>

KNOWN INFO

- Tires undamaged and inflated to proper operating pressure.
- Front gladhands OK.

POSSIBLE PROBLEMS

- Faulty air hose 229.
- Faulty brake adjusting components.
- Faulty wedge assembly.
- Faulty wheel bearings.
- Faulty brake chamber(s).

START

1. WARNING
   
   Read WARNING on following page.

   Are air hose 229 and fittings free from leaks or damage?

   SOAPY WATER LEAK TEST AND VISUAL INSPECTION

   REASON FOR QUESTION

   If leaks or damage are present, air hose 229 and/or fittings are faulty.

   YES

   Replace air hose 229 and/or fittings (para 11-19).

   NO
**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.

---

**SOAPY WATER LEAK TEST**

(1) Apply soapy water solution to air hose 229 and fittings.
(2) Check air hose 229 and fittings for bubbles, indicating leaks.

(1) Check air hose 229 from front service gladhand to two-way check valve for leaks and damage.
(2) If air hose 229 and/or fittings are faulty, replace damaged air hose 229 and/or fittings (para 11-19).
2. Are front brake adjusting bolts locked-up?

- **NO**

3. Are front brake adjusting components functioning and free from damage and at affected wheel(s)?

- **NO**
  - Replace faulty return springs and/or adjusting chamber components (para 11-2).

- **YES**
  - CAUTION Read CAUTION on following page.
  - Test options: Visual inspection
  - Reason for question: Poorly adjusted brake shoes and/or stuck adjusting bolts may cause shoes to bind on wheels and brakes may overheat or not release.

- **NO**
  - WARNING Read WARNING on following page.
  - Test options: Visual inspection
  - Reason for question: Poorly adjusted brake shoes and/or stuck adjusting bolts may cause shoes to bind on wheels and brakes may overheat or not release.

- **YES**
  - Test options: Visual inspection
  - Reason for question: Brake shoes will not retract and brakes will overheat if return springs and/or adjusting chamber components are stuck or damaged.

Known info:

<table>
<thead>
<tr>
<th>Test options</th>
<th>Reason for question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>Poorly adjusted brake shoes and/or stuck adjusting bolts may cause shoes to bind on wheels and brakes may overheat or not release.</td>
</tr>
</tbody>
</table>

Possible problems:

- Faulty brake adjusting components.
- Faulty brake chamber(s).
- Faulty wheel bearings.
- Faulty wedge assembly.

Tires undamaged and inflated to proper operating pressure.
Front gladhands OK.
Air hose 229 OK.
WARNING

Overheated brakes can cause severe burns. Perform task only when brakes have cooled. Failure to comply may result in injury to personnel.

(1) Jack up side with overheated or non-releasing brakes, and support with trestle stands.
(2) Turn adjusting bolt clockwise with adjusting tool.
(3) If bolt will not turn or if brake shoes do not move away from wheel when adjuster is turned, adjust brakes (para 11-2).

(1) Remove wheel(s) with affected brakes and disassemble brake components (para 11-2).
(2) Inspect return springs for stretching, bluing, damage, or breakage.
(3) If spring(s) is damaged, replace spring(s) (para 11-2).
(4) Check adjusting pawl spring for damage.
(5) Ensure adjusting pawl spring is not missing or broken.
(6) Check adjusting pawl teeth for damage and abrasion.
(7) Ensure seal elements are not damaged or broken.

CAUTION

Ensure seal is free from damage. Failure to comply may result in dirt entering plunger chamber and interfering with adjustment.

(8) Check actuator teeth for damage.
(9) Check plunger for freedom of movement inside plunger housing.
4. FRONT BRAKES OVERHEAT AND/OR DO NOT RELEASE (CONT)

**KNOWN INFO**
- Tires undamaged and inflated to proper operating pressure.
- Front gladhands OK.
- Air hose 229 OK.
- Brake adjusting components OK.

**POSSIBLE PROBLEMS**
- Faulty wedge assembly.
- Faulty wheel bearings.
- Faulty brake chamber(s).

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If wedge assembly is damaged or does not operate, brake shoes may remain partially applied.

4.

Are wedge assemblies free from wear and damage, and do they operate?

- **NO**

- **YES**
  - Replace wedge assembly (para 11-4).

5.

Are wheel bearings tight and free from damage?

- **NO**

- **YES**
  - Adjust or replace wheel bearings (para 10-2).

Replace brake chamber(s) (para 11-7).
1. Install wheel(s) (TM 9-2320-365-10).
2. Rotate affected wheel(s) by hand and listen for loose or damaged bearings.
3. If wheel makes grinding sound during rotation, replace wheel bearings (para 10-2).
4. Grasp wheel on opposite sides of top and bottom and pull in and out.
5. If wheel has excessive play on the axle, replace wheel bearings (para 10-2).
6. Check wheel hub oil level (Appendix H).
7. If oil level is low, replace wheel bearings (para 10-2).
8. Lower wheels to ground and remove trestle stands.

(1) Disconnect and tag air hoses from brake chambers at affected wheel(s).
(2) Unscrew brake chambers from hub and remove wedge assembly from wheels (para 11-4).
(3) Inspect wedge spring for damage.
(4) Inspect rollers for flattening or damage.
(5) Manually check operation of wedge assembly in plunger chamber.
(6) Install wedge assembly and brake chamber (para 11-4).
(7) Install front wheel brake components and adjust brakes (para 11-2).
### 5. VEHICLE BRAKES UNEVENLY, BRAKES PULL TO ONE SIDE OR GRAB

#### INITIAL SETUP

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

**Tools and Special Tools**  
Goggles, Industrial (Item 15, Appendix C)  
Tool Kit, Genl Mech (Item 44, Appendix C)  
Trestle, Motor Vehicle Maintenance (2) (Item 45, Appendix C)

---

#### KNOWN INFO

Air tanks pressurized.

#### POSSIBLE PROBLEMS

- Contaminated front wheel brake shoes.
- Faulty front wheel brake adjustment.
- Faulty front axle quick release valve.
- Faulty air hose to front brake air chamber.
- Faulty front brake vent hose.
- Faulty front brake air chamber.
- Faulty load sensing valve.
- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

#### TEST OPTIONS

**Visual inspection**

**REASON FOR QUESTION**

Failure or binding of front brakes on one side of vehicle will cause vehicle to pull to one side.

---

**START**

1. **Does vehicle pull to left or right when brakes are applied?**

   **NO**

   **YES**

   Go to step 7 of this fault.

---

**Personnel Required**  
(2)
(1) Start engine (TM 9-2320-365-10).
(2) Test drive unloaded vehicle and apply brakes.
(3) Note response of brakes on both sides of vehicle and on each axle.
(4) Shut down engine (TM 9-2320-365-10).
(5) If vehicle pulls to one side when brakes are applied, front brakes are faulty.
(6) If both rear wheels lock up before front wheels, load sensing valve may need adjustment or is faulty.
(7) If individual rear wheel locks up or drags, individual rear wheel brakes may need adjustment or are faulty.
5. VEHICLE BRAKES UNEVENLY, BRAKES PULL TO ONE SIDE OR GRAB (CONT)

**WARNING**
Read WARNING on following page.

2. Are front wheel brake shoes free from contamination, oil, and grease?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air tanks pressurized.</td>
<td>Visual inspection</td>
<td>Brakes will slip or bind if brake shoes are contaminated.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**
- Contaminated front wheel brake shoes.
- Faulty front wheel brake adjustment.
- Faulty front axle quick release valve.
- Faulty air hose to front brake air chamber.
- Faulty front brake vent hose.
- Faulty front brake air chamber.
- Faulty load sensing valve.
- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

**NO**

**YES**

Clean brake shoes (para 2-37) and replace wheel bearing seals (para 10-2).

3. Do brakes at one front wheel fail to apply?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air tanks pressurized. Front wheel brake shoes OK.</td>
<td>Visual inspection</td>
<td>If one front wheel brake does not apply, vehicle will pull to other side when brakes are applied.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**
- Faulty front wheel brake adjustment.
- Faulty front axle quick release valve.
- Faulty air hose to front brake air chamber.
- Faulty front brake vent hose.
- Faulty front brake air chamber.
- Faulty load sensing valve.
- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

**NO**

**YES**

Perform brake shoe clearance adjustment (para 11-2).
(1) Apply brakes and observe operation of brake shoes at both front wheels.
(2) If brake shoes fail to apply on one side, brake air delivery system or brake air chamber is faulty on that side.
(3) If both wheel brakes apply, adjust brake shoe clearance (para 11-2).
(4) Rotate wheel on affected side by hand and check if wheel grabs or is hard to turn.
(5) If wheel resists turning by hand, adjust brake shoe clearance (para 11-2).

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) Lift front axle so that front wheels are off the ground and support with maintenance trestles.
(2) Rotate wheel and check for contamination, oil, or grease at brake shoe linings.
(3) If oil contamination is present replace wheel bearing seals (para 10-2).
15. VEHICLE BRAKES UNEVENLY, BRAKES PULL TO ONE SIDE OR GRAB (CONT)

**KNOWN INFO**
- Air tanks pressurized.
- Front wheel brake shoes OK.
- Front wheel brake adjustment OK.

**POSSIBLE PROBLEMS**
- Faulty front axle quick release valve.
- Faulty air hose to front brake air chamber.
- Faulty front brake vent hose.
- Faulty front brake air chamber.
- Faulty load sensing valve.
- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

**TEST OPTIONS**
- Audible and Visual inspection

**REASON FOR QUESTION**
- If front axle quick release valve is providing air to only one delivery hose, front brakes will only apply on one side.

**4.**

**KNOWN INFO**
- Air tanks pressurized.
- Front wheel brake shoes OK.
- Front wheel brake adjustment OK.

**POSSIBLE PROBLEMS**
- Faulty front axle quick release valve.
- Faulty air hose to front brake air chamber.
- Faulty front brake vent hose.
- Faulty front brake air chamber.
- Faulty load sensing valve.
- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

**TEST OPTIONS**
- Audible and Visual inspection

**REASON FOR QUESTION**
- When brakes are applied, is air present at front axle quick release valve delivery port to failed brake?

**5.**

**KNOWN INFO**
- Air tanks pressurized.
- Front wheel brake shoes OK.
- Front wheel brake adjustment OK.
- Front axle quick release valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hose to front brake air chamber.
- Faulty front brake vent hose.
- Faulty front brake air chamber.
- Faulty load sensing valve.
- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

**TEST OPTIONS**
- Audible and Visual inspection

**REASON FOR QUESTION**
- If air hose to front brake(s) is damaged or blocked, brakes will not operate on affected side of vehicle.

**YES**
- Replace front axle quick release valve (para 11-15).

**NO**
- Replace damaged air hose(s) (para 11-19).

**YES**
- Replace front axle quick release valve (para 11-15).

**NO**
- Replace front axle quick release valve (para 11-15).

**YES**
- Replace damaged air hose(s) (para 11-19).
(1) Remove gravel deflector extension and gravel deflector (para 14-7).
(2) Loosen delivery air hose on affected side of front axle quick release valve.
(3) Apply brakes.
(4) Listen for escaping air at delivery port of front axle quick release valve when brake is applied.
(5) If escaping air cannot be heard at delivery port for affected side, replace front axle quick release valve (para 11-15).
(6) Tighten delivery air hose on front axle quick release valve.
(7) Install gravel deflector and gravel deflector extension (para 14-7).

(1) Loosen supply air hose(s) at front brake air chamber(s).
(2) Apply brakes.
(3) Listen for escaping air at supply air hose(s) when brakes are applied.
(4) If escaping air cannot be heard, replace supply air hose(s) (para 11-19).
(5) Tighten supply air hose(s) at front brake air chamber(s).
6. **TEST OPTIONS**

**REASON FOR QUESTION**

If vent hose is plugged, brakes will not apply on affected side of vehicle.

**KNOWN INFO**

Air tanks pressurized.
Front wheel brake shoes OK.
Front wheel brake adjustment OK.
Front axle quick release valve OK.
Air hose to front brake air chamber OK.

**POSSIBLE PROBLEMS**

Faulty front brake vent hose.
Faulty front brake air chamber.
Faulty load sensing valve.
Contaminated rear brake shoes.
Faulty rear wheel brake adjustment.
Faulty relay valve.
Faulty air hose to rear brake air chamber.
Faulty rear wheel brake vent hose or vent valve.
Faulty rear brake air chamber(s).

---

7. **TEST OPTIONS**

**REASON FOR QUESTION**

If rear brakes lock up or grab before front brakes on unloaded vehicle, load sensing valve needs adjustment or is faulty.

**KNOWN INFO**

Air tanks pressurized.
Front wheel brake shoes OK.
Front wheel brake adjustment OK.
Front axle quick release valve OK.
Air hose to front brake air chamber OK.
Front brake vent hose OK.
Front brake air chamber OK.

**POSSIBLE PROBLEMS**

Faulty load sensing valve.
Contaminated rear brake shoes.
Faulty rear wheel brake adjustment.
Faulty relay valve.
Faulty air line to rear brake air chamber.
Faulty rear brake vent line or vent valve.
Faulty rear brake air chamber(s).
(1) If rear brakes locked up before front brakes on road test of unloaded vehicle, check load sensing valve hardware, arm position, adjusting clamp, and cable.
(2) If valve arm is in full up position (valve spring rest position), adjust or replace load sensing valve (para 11-10).
8. Are rear brake shoes on affected wheel(s) free from contamination, oil, and grease?

- **NO**
  - Test Options: Visual inspection
  - Reason for Question: Rear brakes will slip or bind on affected wheels if brake shoes are contaminated.

- **YES**
  - Test Options: Visual inspection
  - Reason for Question: If one rear or more rear wheel brakes do not apply, vehicle will drag or swerve when brakes are applied.

9. Do brakes at one or more rear wheels fail to apply?

- **NO**
  - Test Options: Visual inspection
  - Reason for Question: If one rear or more rear wheel brakes do not apply, vehicle will drag or swerve when brakes are applied.

- **YES**
  - Test Options: Visual inspection
  - Reason for Question: If one rear or more rear wheel brakes do not apply, vehicle will drag or swerve when brakes are applied.

**KNOWN INFO**

- Air tanks pressurized.
- Front wheel brake shoes OK.
- Front wheel brake adjustment OK.
- Front axle quick release valve OK.
- Air hose to front brake air chamber OK.
- Front brake vent hose OK.
- Front brake air chamber OK.
- Load sensing valve OK.

**POSSIBLE PROBLEMS**

- Contaminated rear brake shoes.
- Faulty rear wheel brake adjustment.
- Faulty relay valve.
- Faulty air hose to rear brake air chamber.
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).
(1) Lift rear axle so that rear wheels are off the ground and support with maintenance trestles.
(2) Rotate affected wheel(s) and check for signs of contamination, oil, or grease at brake shoe linings.
(3) If oil contamination is present, replace wheel bearing seals (para 10-2).
(4) Lift rear axle off maintenance trestles.
(5) Remove maintenance trestles and lower wheels to ground.

(1) Chock wheels.
(2) Release parking brake (TM 9-2320-365-10).
(3) Apply brakes and observe operation of brake shoes at rear wheels.
(4) If brake shoes fail to apply on one side, brake air delivery system or brake air chamber is faulty on that side.
(5) If both rear wheel brakes apply, adjust brake shoe clearance (para 11-3).
5. VEHICLE BRAKES UNEVENLY, BRAKES PULL TO ONE SIDE OR GRAB (CONT)

**KNOWN INFO**

Air tanks pressurized.
Front wheel brake shoes OK.
Front wheel brake adjustment OK.
Front axle quick release valve OK.
Air hose to front brake air chamber OK.
Front brake vent hose OK.
Front brake air chamber OK.
Load sensing valve OK.
Rear brake shoes OK.
Rear wheel brake adjustment OK.

**POSSIBLE PROBLEMS**
Faulty relay valve.
Faulty air hose to rear brake air chamber.
Faulty rear brake vent hose or vent valve.
Faulty rear brake air chamber(s).

**TEST OPTIONS**
Audible and Visual inspection

**REASON FOR QUESTION**
If relay valve does not supply air to all rear brake air chambers, braking will be uneven.

---

10. **Is air present at relay valve delivery port(s) to affected wheel(s)?**

- **NO**
- **YES**
  - Replace relay valve (para 11-13).

---

11. **Is air present at brake air chamber of affected wheel(s) when brakes are applied?**

- **NO**
- **YES**
  - Replace damaged air hose(s) (para 11-19).
(1) Loosen delivery air hoses on relay valve delivery ports.
(2) Apply brakes.
(3) Listen for escaping air from relay valve delivery ports when brakes are applied.
(4) If escaping air cannot be heard, replace relay valve (para 11-13).
(5) Tighten delivery air hoses on relay valve delivery ports.

(1) Loosen service brake air hose on rear brake air chamber.
(2) Apply brakes.
(3) Listen for escaping air when brakes are applied.
(4) If escaping air cannot be heard, replace air hose (para 11-19).
(5) Tighten service brake air hose on rear brake air chamber.
(6) Apply parking brake (TM 9-2320-365-10).
12. Are vent hoses and vent valve for affected rear wheel brakes free from obstructions?

- **NO**
  - If vent hoses or vent valves are plugged, brakes will not apply at affected wheel(s).

- **YES**
  - Replace damaged vent hose or vent valve (para 11-19).
  - Replace rear brake air chamber(s) at affected wheel(s) (para 11-8).

**KNOWN INFO**
- Air tanks pressurized.
- Front wheel brake shoes OK.
- Front wheel brake adjustment OK.
- Front axle quick release valve OK.
- Air hose to front brake air chamber OK.
- Front brake vent hose OK.
- Front brake air chamber OK.
- Load sensing valve OK.
- Rear brake shoes OK.
- Rear wheel brake adjustment OK.
- Relay valve OK.
- Air hose to rear brake air chamber OK.

**POSSIBLE PROBLEMS**
- Faulty rear brake vent hose or vent valve.
- Faulty rear brake air chamber(s).

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If vent hoses or vent valves are plugged, brakes will not apply at affected wheel(s).
(1) Disconnect vent hose(s) on rear brake air chamber(s).
(2) Blow compressed air through vent hoses.
(3) Check for presence of air at vent valve.
(4) Connect vent hose(s) on rear brake air chamber(s).
(5) Remove wheel chocks (TM 9-2320-365-10).
6. FRONT BRAKES DO NOT APPLY

**INITIAL SETUP**

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

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

**Personnel Required**
(2)

**WARNING**
Read WARNING on following page.

**POSSIBLE PROBLEMS**
- Faulty air hose 208
- Faulty air hose 206
- Faulty air hose 202
- Faulty front brake two-way check valve
- Faulty air hose 218
- Faulty air hose 217
- Faulty front axle quick release valve

**KNOWLEDGE INFO**
- Air tanks pressurized
- Rear brakes OK

**TEST OPTIONS**
- Audible and Visual Inspection

**REASON FOR QUESTION**
A blocked or leaking air hose 208 may cause front brakes not to apply.

**NOTE**
- Start

1. Is air present at foot control valve supply port 12?

   **YES**
   - Replace damaged/blacked air hose 208 (para 11-19).

   **NO**

   - Replace damaged/blacked air hose 208 (para 11-19).
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.

NOTE

Air system pressure must be in the 90-120 psi operating range to begin brake system troubleshooting. If air pressure cannot be maintained within operating range, proceed to Air System Troubleshooting.

1. Loosen air hose 208 at foot control valve supply port 12 and listen for presence of escaping air.
2. If escaping air cannot be heard, replace air hose 208 (para 11-19).
3. Tighten air hose 208 on foot control valve supply port 12.
i6. FRONT BRAKES DO NOT APPLY (CONT)

**KNOWN INFO**
Air tanks pressurized.
Rear brakes OK.
Air hose 208 OK.

**POSSIBLE PROBLEMS**
Faulty foot control valve.
Faulty air hose 206.
Faulty air hose 202.
Faulty front brake two-way check valve.
Faulty air hose 218.
Faulty air hose 217.
Faulty front axle quick release valve.

**TEST OPTIONS**
Audible and Visual Inspection

**REASON FOR QUESTION**
Lack of air from foot control valve delivery port 22 will prevent front brakes from applying.

2. Is air present at foot control valve delivery port 22 when applying brakes?
   - **NO**
   - **YES** Replace foot control valve (para 11-9).

**KNOWN INFO**
Air tanks pressurized.
Rear brakes OK.
Air hose 208 OK.
Foot control valve OK.

**POSSIBLE PROBLEMS**
Faulty air hose 206.
Faulty air hose 202.
Faulty front brake two-way check valve.
Faulty air hose 218.
Faulty air hose 217.
Faulty front axle quick release valve.

**TEST OPTIONS**
Audible and Visual Inspection

**REASON FOR QUESTION**
A blocked or leaking air hose 206 may cause front brakes not to apply.

3. Is air hose 206 free from leaks and damage?
   - **NO**
   - **YES** Replace damaged/blocke air hose 206 (para 11-19).
(1) Loosen air hose 206 at fitting on cab floor.
(2) Apply foot brake.
(3) Listen for escaping air from air hose 206 when brakes are applied.
(4) If escaping air cannot be heard when brakes are applied, replace air hose 206 (para 11-19).
(5) Tighten air hose 206 at fitting on cab floor.

(1) Loosen air hose 206 on foot control valve delivery port 22.
(2) Apply foot brake.
(3) Listen for escaping air from air hose 206 when brakes are applied.
(4) If escaping air cannot be heard when brakes are applied, replace foot control valve (para 11-9).
(5) Tighten air hose 206 on foot control valve delivery port 22.
6. FRONT BRAKES DO NOT APPLY (CONT)

**KNOWN INFO**
Air tanks pressurized.
Rear brakes OK.
Air hose 208 OK.
Foot control valve OK.
Air hose 206 OK.

**POSSIBLE PROBLEMS**
Faulty air hose 202.
Faulty front brake two-way check valve.
Faulty air hose 218.
Faulty air hose 217.
Faulty front axle quick release valve.

**TEST OPTIONS**
Audible and Visual Inspection

**REASON FOR QUESTION**
A blocked or leaking air hose 202 may cause front brakes not to apply.

4. Is air present at front brake two-way check valve supply port when applying brakes?

**KNOWN INFO**
Air tanks pressurized.
Rear brakes OK.
Air hose 208 OK.
Foot control valve OK.
Air hose 206 OK.
Air hose 202 OK.

**POSSIBLE PROBLEMS**
Faulty front brake two-way check valve.
Faulty air hose 218.
Faulty air hose 217.
Faulty front axle quick release valve.

5. Is air present at front brake two-way check valve delivery port when applying brakes?

**TEST OPTIONS**
Audible and Visual Inspection

**REASON FOR QUESTION**
If air is not present at front brake two-way check valve delivery port when applying brakes, front brake two-way check valve is faulty.

Replace damaged/blockedor air hose 202 (para 11-19).
(1) Loosen air hose 202 on front brake two-way check valve supply port.
(2) Apply foot brake.
(3) Listen for escaping air from air hose 202 when brakes are applied.
(4) If escaping air cannot be heard when brakes are applied, replace air hose 202 (para 11-19).
(5) Tighten air hose 202 on front brake two-way check valve supply port.

(1) Loosen air hose 218 on front brake two-way check valve delivery port.
(2) Apply foot brake.
(3) Listen for air escaping from front brake two-way check valve delivery port when brakes are applied.
(4) If escaping air cannot be heard when brakes are applied, replace front brake two-way check valve (para 11-24).
(5) Tighten air hose 218 on front brake two-way check valve delivery port.
6. FRONT BRAKES DO NOT APPLY (CONT)

**KNOWN INFO**
Air tanks pressurized.
Rear brakes OK.
Air hose 208 OK.
Foot control valve OK.
Air hose 206 OK.
Air hose 202 OK.
Front brake two-way check valve OK.

**POSSIBLE PROBLEMS**
Faulty air hose 218.
Faulty air hose 217.
Faulty front axle quick release valve.

---

6. Is air present at tee fitting when applying brakes?

**REASON FOR QUESTION**
A blocked or leaking air hose 218 may cause front brakes not to apply.

**TEST OPTIONS**
Audible and Visual Inspection

- **YES**
  - Replace damaged/blocked air hose 218 (para 11-19).

- **NO**
  - Replace damaged/blocked air hose 217 (para 11-19).

---

7. Is air present at front axle quick release valve supply port when applying brakes?

**REASON FOR QUESTION**
A blocked or leaking air hose 217 may cause front brakes not to apply.

**TEST OPTIONS**
Audible and Visual Inspection

- **YES**
  - Replace damaged/blocked air hose 217 (para 11-19).

- **NO**
  - Replace front axle quick release valve (para 11-15).

---

Air tanks pressurized.
Rear brakes OK.
Air hose 208 OK.
Foot control valve OK.
Air hose 206 OK.
Air hose 202 OK.
Front brake two-way check valve OK.
Air hose 218 OK.

---

(2-1697 Blank)/2-1698  Change 1
(1) Loosen air hose 218 on tee fitting.
(2) Apply foot brake.
(3) Listen for escaping air from air hose 218 when brakes are applied.
(4) If escaping air cannot be heard when brakes are applied, replace air hose 218 (para 11-19).
(5) Tighten air hose 218 on tee fitting.

(1) Remove gravel deflector extension and gravel deflector (para 14-7).
(2) Loosen air hose 217 on front axle quick release valve supply port.
(3) Apply foot brake.
(4) Listen for air escaping from air hose 217 when brakes are applied.
(5) If escaping air cannot be heard when brakes are applied, replace air hose 217 (para 11-19).
(6) If air can be heard escaping when brakes are applied, replace front axle quick release valve (para 11-15).
(7) Tighten air hose 217 on front axle quick release valve supply port.
(8) Install gravel deflector and gravel deflector extension (para 14-7).
INITIAL SETUP

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

Personnel Required
(2)

Tools and Special Tools
Goggles, Industrial (Item 14, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Trestle, Motor Vehicle Maintenance (2) (Item 45, Appendix C)
Adjusting Tool, Brake Shoe (Item 2, Appendix C)

KNOWN INFO
Tires undamaged and inflated to operating pressure.

POSSIBLE PROBLEMS
Faulty spring brake chamber(s).
Faulty brake adjusting components.
Faulty wedge assembly.
Faulty wheel bearings.

TEST OPTIONS
Visual Inspection

REASON FOR QUESTION
A failed spring brake will cause brakes to apply and overheat affected wheel.

1. Do both spring brakes release on affected rear wheels?

YES

Tighten or replace air hose (para 11-19).
Replace spring brake chamber(s) (para 11-8).

NO
WARNING

- Overheated brakes can cause severe burns. Perform task only when brakes have cooled. Failure to comply may result in injury to personnel.
- Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE
If wheel drums are too hot for hand touch after road test of vehicle, brakes are overheated.

1. Release parking brake (TM 9-2320-365-10).
2. Check for presence of air at air hose to spring brake chamber. If air is present at spring brake chamber, replace fittings or air hose (para 11-19).
3. Remove cover plug from caging hole at back of spring brake chamber (TM 9-2320-365-10).
4. With flashlight directed at caging hole, apply and release parking brake. Check if spring retracts when air is supplied by releasing parking brake. If brake does not cage (retract) when air is supplied to spring brake chamber, replace spring brake chamber (para 11-8).
5. Replace plug in caging hole of spring brake chamber (TM 9-2320-365-10).
6. Apply parking brake (TM 9-2320-365-10).
### 17. REAR BRAKES OVERHEAT (CONT)

#### KNOWN INFO
- Tires undamaged and inflated to operating pressure.
- Spring brake chamber(s) OK

#### POSSIBLE PROBLEMS
- Faulty brake adjusting components.
- Faulty wedge assembly.
- Faulty wheel bearings.

#### TEST OPTIONS
- Visual inspection

#### REASON FOR QUESTION
- Poorly adjusted brake shoes and/or stuck adjusting bolts may cause brakes to bind on wheel and overheat.

#### Diagram
- **2. Are brake adjusting bolts locked-up at affected wheels?**
  - NO
  - YES
    - Perform brake adjustment (para 11-3).
(1) Jack up axle with overheated brakes, and support with trestle stands.
(2) Release parking brake (TM 9-2320-365-10).
(3) Turn adjusting bolt clockwise with adjusting tool. If bolt will not turn or if brake shoes do not move away from wheel when adjuster is turned, perform brake adjustment (para 11-3).
3. Are brake adjusting components free from damage and functioning at affected wheel(s)?

**Known Info**
- Tires undamaged and inflated to operating pressure.
- Spring brake chamber(s) OK.

**Possible Problems**
- Faulty brake adjusting components.
- Faulty wedge assembly.
- Faulty wheel bearings.

**Test Options**
- Visual inspection
  - Reason for question: Brake shoes will not retract and brakes will overheat if return springs and adjusting chamber components are stuck or damaged.

**Flowchart**
- **YES**: Replace faulty return springs and adjusting components (para 11-3).
- **NO**
(1) Remove wheel(s) with affected brakes (TM 9-2320-365-10).
(2) Disassemble brakes (para 11-3).
(3) Inspect spring for stretching, bluing, damage, or breakage. If spring(s) is damaged, brake shoes will not retract from wheel.
(4) Check adjusting pawl spring for damage. Ensure springs are not missing or broken.
(5) Check adjusting pawl teeth for damage and abrasion.

NOTE
A damaged seal may permit dirt to enter plunger chamber and interfere with adjustment.

(6) Ensure seal elements are not damaged or broken.
(7) Check actuator teeth for damage.
(8) Check plunger for freedom of movement inside plunger housing.
I7. REAR BRAKES OVERHEAT (CONT)

4. If wedge assembly is damaged or does not operate, brake shoe will remain partially applied.

5. Loose or damaged wheel bearings may cause brake drums to overheat.

Adjust or replace wheel bearings (para 10-2).

Replace brake chamber(s) (para 11-8).

Replace wedge assembly (para 11-5).
WARNING

Spring brake chambers are very powerful. Cage spring brakes before removing chambers. Failure to comply may result in injury to personnel.

1. Disconnect and tag air lines to spring brake chambers at wheel.
2. Cage spring brakes on rear wheels (para 11-6).
3. Unscrew brake chamber(s) from hub and remove wedge assembly from wheel (para 11-5).
4. Inspect wedge spring for damage.
5. Inspect rollers for flattening or damage.
6. Manually check operation of wedge assembly in plunger chamber.
7. Install wedge assembly and brake chambers (para 11-5).
8. Install wheel brake components and adjust brakes (para 11-3).

1. Install wheels (TM 9-2320-365-10).
2. Rotate affected wheel and listen for loose or damaged wheel bearings. If wheel makes grinding sound during rotation, adjust or replace wheel bearings (para 10-2).
3. Grasp wheel on opposite sides, top and bottom, and pull in and out. If wheel has excessive play on the axle, adjust or replace wheel bearings (para 10-2).
4. If wheel bearings are good, replace brake chamber(s) (para 11-8).
5. Check wheel hub oil level (Appendix H). If oil level is low, replace wheel bearings (para 10-2).
7. Remove trestle stands and lower wheels to ground.
### INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
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<tbody>
<tr>
<td>Air tanks pressurized (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
</tbody>
</table>

| Personnel Required | (2) |

---

#### KNOWN INFO

- Air tanks pressurized
- Rear brakes operate.

#### POSSIBLE PROBLEMS

- Faulty system park air supply valve.
- Faulty inversion valve.
- Faulty anti-compounding relay valve.
- Faulty rear brake plunger assembly(ies).

---

#### TEST OPTIONS

**System Park Air Supply Valve Test**

**REASON FOR QUESTION**

If air cannot be heard escaping from system park air supply valve when system park air supply valve is pulled, system park air supply valve is faulty.

---

**KNOWLEDGE INFO**

1. Is air release audible at system park air supply valve when system park air supply valve is pulled?

---

**YES**

Replace system park air supply valve (para 11-18).

**NO**

---

**START**
SYSTEM PARK AIR SUPPLY VALVE TEST

(1) Push in system park air supply valve.
(2) Pull system park air supply valve out and note release of air.
(3) If air is not heard escaping from system park air supply valve, replace system park air supply valve (para 11-18).
I8. PARKING BRAKE DOES NOT APPLY (CONT)

2. Is air release audible at inversion valve when system park air supply valve is pulled?

- **Known Info**
  - Air tanks pressurized.
  - Rear brakes operate.
  - System park air supply valve OK.

- **Possible Problems**
  - Faulty inversion valve.
  - Faulty anti-compounding relay valve.
  - Faulty rear brake plunger assembly(ies).

- **Test Options**
  - Inversion Valve Test
  - **Reason for Question**
    - If air cannot be heard escaping from inversion valve when system park air supply valve is pulled, inversion valve is faulty.

- **Flowchart**
  - **Yes**
    - Replace inversion valve (para 11-12).
  - **No**
    - Replace anti-compounding relay valve (para 11-11).

3. Is air release audible at anti-compounding relay valve when system park air supply valve is pulled?

- **Known Info**
  - Air tanks pressurized.
  - Rear brakes operate.
  - System park air supply valve OK.
  - Inversion valve OK.

- **Possible Problems**
  - Faulty anti-compounding relay valve.
  - Faulty rear brake plunger assembly(ies).

- **Test Options**
  - Anti-Compounding Relay Valve Test
  - **Reason for Question**
    - If cannot be heard escaping from anti-compounding relay valve when system park air supply valve is pulled, anti-compounding relay valve is faulty. If air can be heard escaping from anti-compounding relay valve, rear brake plunger assembly(ies) is faulty.

- **Flowchart**
  - **Yes**
    - Replace anti-compounding relay valve (para 11-11).
  - **No**
    - Repair rear brake plunger assembly(ies) (para 11-5).
### INVERSION VALVE TEST

1. Push in SYSTEM PARK air supply valve.
2. Pull SYSTEM PARK air supply valve out and note release of air.
3. If air is not heard escaping from inversion valve, replace inversion valve (para 11-12).

### ANTI-COMPONDING RELAY VALVE TEST

1. Push in SYSTEM PARK air supply valve.
2. Pull SYSTEM PARK air supply valve out and note release of air.
3. If air is not heard escaping from anti-compounding relay valve, replace anti-compounding relay valve (para 11-11).
4. If air is heard escaping from anti-compounding relay valve, repair rear brake plunger assembly(ies) (para 11-5).
5. Pull SYSTEM PARK air supply valve out.
I9. BRAKE SYSTEM LOSES AIR WHEN SERVICE BRAKES ARE APPLIED

INITIAL SETUP

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

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

START

WARNING
Read WARNING on following page.

1. Does air escape from front axle quick release valve when service brakes are applied?
   
   NO
   
   YES
   
   Replace front axle quick release valve (para 11-15).

   KNOWLEDGE
   Air tanks pressurized.
   Faulty front axle quick release valve.
   Faulty rear gladhand(s).

   POSSIBLE PROBLEMS
   Faulty rear gladhand(s).

   TEST OPTIONS
   Visual inspection

   REASON FOR QUESTION
   If leak is present, front axle quick release valve is faulty.

2. Does air escape from front rear gladhand(s) when service brakes are applied?
   
   NO
   
   YES
   
   Replace rear gladhand(s) (para 11-22).

   KNOWLEDGE
   Air tanks pressurized.
   Front axle quick release valve OK.

   POSSIBLE PROBLEMS
   Faulty rear gladhand(s).

   TEST OPTIONS
   Visual inspection

   REASON FOR QUESTION
   If leak is present, front axle quick release valve is faulty.

Perform Air System Troubleshooting J1. Air System Loses Pressure During Operation/Slow Air Pressure Buildup.

2-1712 Change 1
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) Have assistant apply service brakes (TM 9-2320-365-10).
(2) Listen for air escaping from front axle quick release valve.
(3) If air leak is present, replace front axle quick release valve (para 11-15).

(1) Have assistant apply service brakes (TM 9-2320-365-10).
(2) Listen for air escaping from rear gladhand(s).
(3) If air leak is present, replace rear gladhand(s) (para 11-15).
(4) If air leak is not present, perform Air System Troubleshooting J 1. Air System Loses Pressure During Operation/Slow Air Pressure Buildup.
This paragraph covers Air System Troubleshooting. The Air System Fault Index, Table 2-47, lists faults for the Air System of the vehicle.

**Table 2-47. Air System Fault Index**

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<th>Description</th>
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<td>Air System Loses Pressure During Operation/Slow, No, or Incorrect Air Pressure Buildup</td>
<td>2-1714</td>
</tr>
<tr>
<td>J2</td>
<td>Large quantity of moisture Expelled From Air Reservoirs</td>
<td>2-1730</td>
</tr>
<tr>
<td>J3</td>
<td>Air Dryer Purges Contstantly</td>
<td>2-1734</td>
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<tr>
<td>J4</td>
<td>No Air Pressure Present at Rear Gladhand(s)</td>
<td>2-1738</td>
</tr>
<tr>
<td>J5</td>
<td>Air System Pressure Builds Up More Than 120 Psi (827 kPa) (Compressor Fails to Unload)</td>
<td>2-1744</td>
</tr>
<tr>
<td>J6</td>
<td>Noisy Air Compressor Operation</td>
<td>2-1748</td>
</tr>
</tbody>
</table>
j1. AIR SYSTEM LOSES PRESSURE DURING OPERATION/SLOW, NO, OR INCORRECT AIR PRESSURE BUILDUP

INITIAL SETUP

Equipment Conditions
Engine running (TM 9-2320-365-10).
Parking brake on (TM 9-2320-365-10).
Wheels chocked (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Pan, Wash (Item 25, Appendix C)

Materials/Parts
Soap, Laundry (Item 69, Appendix D).

START

1. Do FRONT BRAKE/REAR BRAKE AIR pressure gages show even pressure?

   KNOWLEDGE

   Known Info
   Nothing.

   If Yes,
   Faulty FRONT BRAKE/REAR BRAKE AIR pressure gages.
   Damaged air hose from air cleaner to air compressor.
   Damaged air hose from air compressor to air dryer.
   Damaged air hose from air dryer to wet tank.
   Damaged air hose from wet tank to air compressor.
   Damaged air hoses from wet tank to primary and secondary air tanks.
   Faulty check valves at primary and secondary air tanks.
   Faulty air dryer purge valve and/or clogged desiccant cartridge.
   Faulty air compressor governor.
   Faulty air compressor.

   No

   Perforh Brake Troubleshooting
   i2. Rear Brakes Do Not Apply or
   i6. Front Brakes Do Not Apply.

   Reason for Question
   Visual Inspection
   Low pressure on both FRONT BRAKE/REAR BRAKE AIR pressure gages indicates air system cannot maintain operating pressure.
(1) Check to see if both FRONT BRAKE/REAR BRAKE AIR pressure gages indicate less than 120 psi.
(2) If only FRONT BRAKE AIR pressure gage indicates less than 120 psi, perform Brake Troubleshooting i6. Front Brakes Do Not Apply.
(3) If only REAR BRAKE AIR pressure gage indicates less than 120 psi, perform Brake Troubleshooting i2. Rear Brakes Do Not Apply.
j1. AIR SYSTEM LOSES PRESSURE DURING OPERATION/SLOW, NO, OR INCORRECT AIR PRESSURE BUILDUP (CONT)

**KNOWN INFO**

FRONT BRAKE/REAR BRAKE
AIR pressure gages OK.

**POSSIBLE PROBLEMS**

Damaged air hose from air cleaner to air compressor.
Damaged air hose from air compressor to air dryer.
Damaged air hose from air dryer to wet tank.
Damaged air hose from wet tank to air compressor.
Damaged air hoses from wet tank to primary and secondary air tanks.
Faulty check valves at primary and secondary air tanks.
Faulty air dryer purge valve and/or clogged desiccant cartridge.
Faulty air compressor governor.
Faulty air compressor.

---

2. **WARNING**

Read WARNING on following page.

Are air hose from air cleaner to air compressor and fittings free from damage?

---

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

A damaged air intake hose may cause air system to take an excessive amount of time to build up air pressure.

---

**IF YES**

Replace damaged air intake hose and/or fittings (para 23-2).

---

**IF NO**

...
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) Raise cab (TM 9-2320-365-10).
(2) Check air intake hose from air cleaner to air compressor and fittings for damage.
(3) If air intake hose and/or fittings are faulty, replace damaged air intake hose and/or fittings (para 23-2).
3. **known info**

<table>
<thead>
<tr>
<th>FRONT BRAKE/REAR BRAKE</th>
<th>AIR pressure gages OK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses and fittings from air cleaner to air compressor OK.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>possible problems</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Damaged air hose from air compressor to air dryer.</td>
</tr>
<tr>
<td>Damaged air hose from air dryer to wet tank.</td>
</tr>
<tr>
<td>Damaged air hose from wet tank to air compressor.</td>
</tr>
<tr>
<td>Damaged air hoses from wet tank to primary and secondary air tanks.</td>
</tr>
<tr>
<td>Faulty check valves at primary and secondary air tanks.</td>
</tr>
<tr>
<td>Faulty air dryer purge valve and/or clogged desiccant cartridge.</td>
</tr>
<tr>
<td>Faulty air compressor governor.</td>
</tr>
<tr>
<td>Faulty air compressor.</td>
</tr>
</tbody>
</table>

3. **test options**

<table>
<thead>
<tr>
<th>Soapy Water Leak Test and Visual Inspection</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>reason for question</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A leaking or damaged supply hose or fitting may cause air system to lose pressure or take an excessive amount of time to build up air pressure.</td>
</tr>
</tbody>
</table>

**Flowchart**

- **Yes**
  - Replace damaged supply air hose and/or fittings (para 23-2).

- **No**
  - Are supply hose from air compressor to air dryer and fittings free from leaks or damage?
SOAPY WATER LEAK TEST

1. Apply soapy water solution to hoses, fittings, and couplings.
2. Check hoses and fittings for bubbles, indicating leaks.

1. Check air hose from air compressor to pipe coupling and fittings for leaks or damage.
2. Check air hose from pipe coupling to frame pipe coupling and fittings for leaks or damage.
3. Check air hose from frame pipe coupling to air dryer and fittings for leaks or damage.
4. If supply air hose and/or fittings are faulty, replace damaged supply air hose and/or fittings (para 23-2).
**KNOWN INFO**

FRONT BRAKE/REAR BRAKE
AIR pressure gages OK.
Air hoses and fittings from air cleaner to air compressor OK.
Air hoses and fittings from air compressor to air dryer OK.

**POSSIBLE PROBLEMS**

- Damaged air hose from air dryer to wet tank.
- Damaged air hose from wet tank to air compressor.
- Damaged air hoses from wet tank to primary and secondary air tanks.
- Faulty check valves at primary and secondary air tanks.
- Faulty air dryer purge valve and/or clogged desiccant cartridge.
- Faulty air compressor governor.
- Faulty air compressor.

**TEST OPTIONS**

Soapy Water Leak Test and Visual Inspection

**REASON FOR QUESTION**

A leaking or damaged hose or fitting may cause air system to lose pressure or take an excessive amount of time to build up air pressure.

### 4. Are air hose from air dryer to wet tank and fittings free from leaks or damage?

**NO**

**YES**

Replace damaged air hose and/or fittings (para 23-2).
SOAPY WATER LEAK TEST

(1) Apply soapy water solution to hoses, fittings, and couplings.
(2) Check hoses and fittings for bubbles, indicating leaks.

(1) Check air hose from air dryer to wet tank and fittings for leaks or damage.
(2) If air hose and/or fittings are faulty, replace damaged air hose and/or fittings (para 23-2).
j1. AIR SYSTEM LOSES PRESSURE DURING OPERATION/SLOW, NO, OR INCORRECT AIR PRESSURE BUILDUP (CONT)

**KNOWN INFO**

FRONT BRAKE/REAR BRAKE
AIR pressure gages OK.
Air hoses and fittings from air cleaner to air compressor OK.
Air hoses and fittings from air compressor to air dryer OK.
Air hose and fittings from air dryer to wet tank OK.

**POSSIBLE PROBLEMS**

Damaged air hose from wet tank to air compressor.
Damaged air hoses from wet tank to primary and secondary air tanks.
Faulty check valves at primary and secondary air tanks.
Faulty air dryer purge valve and/or clogged desiccant cartridge.
Faulty air compressor governor.
Faulty air compressor.

**TEST OPTIONS**

Soapy Water Leak Test and Visual Inspection

**REASON FOR QUESTION**

A damaged air hose or fitting may cause air system to lose pressure or take an excessive amount of time to build up air pressure.

---

5. Are air hose from wet tank to air compressor governor and fittings free from damage?

---

NO

---

YES

Replace damaged air hose and/or fittings (para 23-2).
SOAPY WATER LEAK TEST

1. Apply soapy water solution to hoses, fittings, and couplings.
2. Check hoses and fittings for bubbles, indicating leaks.

1. Check air hose from wet tank to pipe coupling and fittings for leaks and damage.
2. Check air hose from pipe coupling to air compressor and fittings for leaks and damage.
3. If air hose and/or fittings are faulty, replace damaged air hose and/or fittings (para 23-2).
** KNOWN INFO **

FRONT BRAKE/REAR BRAKE
Air pressure gages OK.
Air hoses and fittings from air cleaner to air compressor OK.
Air hoses and fittings from air compressor to air dryer OK.
Air hose and fittings from air dryer to wet tank OK.
Air hoses and fittings from wet tank to air compressor OK.

** POSSIBLE PROBLEMS **

Damaged air hoses from wet tank to primary and secondary air tanks.
Faulty check valves at primary and secondary air tanks.
Faulty air dryer surge valve and/or clogged desiccant cartridge.
Faulty air compressor governor.
Faulty air compressor.

** TEST OPTIONS **

Soapy Water Leak Test and Visual Inspection

** REASON FOR QUESTION **

A leaking or damaged air hose or fitting may cause air system to loose pressure or take an excessive amount of time to build up air pressure.

6. Are air hoses from wet tank to primary and secondary air tanks, check valves, and fittings free from damage?

** YES **

Replace damaged air hose and/or fittings (para 23-2).

** NO **
SOAPY WATER LEAK TEST

(1) Apply soapy water solution to hoses, fittings, and couplings.
(2) Check hoses and fittings for bubbles, indicating leaks.

(1) Check air hose from wet tank to primary air tank check valve, and fittings for leaks and damage.
(2) Check air hose from primary air tank check valve to secondary air tank check valve, and fittings for leaks and damage.
(3) If air hose and/or fittings are faulty, replace damaged air hose and/or fittings (para 23-2).
7. Is air dryer purge valve free from constant air leaks and excessive moisture?

**KNOWN INFO**

FRONT BRAKE/REAR BRAKE AIR pressure gages OK.  
Air hoses and fittings from air cleaner to air compressor OK.  
Air hoses and fittings from air compressor to air dryer OK.  
Air hose and fittings from air dryer to wet tank OK.  
Air hoses and fittings from wet tank to air compressor OK.  
Air hoses, check valves, and fittings from wet tank to primary and secondary air tanks OK.

**POSSIBLE PROBLEMS**

Faulty air dryer purge valve and/or clogged desiccant cartridge.  
Faulty air compressor governor.  
Faulty air compressor.

**TEST OPTIONS**

Soapy Water Leak Test and Visual Inspection

**REASON FOR QUESTION**

A leaking air dryer purge valve or a clogged air dryer desiccant cartridge may cause air system to lose pressure or take an excessive amount of time to build up air pressure.
SOAPE WATER LEAK TEST

(1) Apply soapy water solution to hoses, fittings, and couplings.
(2) Check hoses and fittings for bubbles, indicating leaks.

(1) Open wet tank drain cock and check for excessive amounts of moisture.
(2) If moisture exists in wet tank, service air dryer desiccant (para 23-6).
(3) Close wet tank drain cock.
8. Do both FRONT BRAKE/REAR BRAKE AIR pressure gages read 120 psi?

**KNOWN INFO**

- FRONT BRAKE/REAR BRAKE AIR pressure gages OK.
- Air hoses and fittings from air cleaner to air compressor OK.
- Air hoses and fittings from air compressor to air dryer OK.
- Air hose and fittings from air dryer to wet tank OK.
- Air hoses and fittings from wet tank to air compressor OK.
- Air hoses, check valves, and fittings from wet tank to primary and secondary air tanks OK.
- Purge valve and desiccant cartridge OK.

**POSSIBLE PROBLEMS**

- Faulty air compressor governor.
- Faulty air compressor.

**TEST OPTIONS**

- Visual Inspection

**REASON FOR QUESTION**

With no leaks in supply system, 120 psi cannot be maintained if air compressor governor is out of adjustment or faulty.

**YES**

Adjust or replace air compressor governor (para 11-29)

**NO**

Notify DS Maintenance to replace air compressor.
(1) Allow pneumatic system to build pressure and observe FRONT BRAKE/REAR BRAKE AIR pressure gages without applying brakes or operating air system.
(2) Check to see if air pressure stabilizes at 120 psi.
(3) If air pressure remains below 120 psi, adjust or replace air compressor governor (para 11-29).
(4) If air pressure continues to remain below 120 psi, notify DS Maintenance to replace air compressor.
(5) Shut down engine (TM 9-2320-365-10).
### 2. LARGE QUANTITY OF MOISTURE EXPELLED FROM AIR RESERVOIRS

**INITIAL SETUP**

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

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

---

**KNOWLEDGE INFO**

- **Nothing.**

**POSSIBLE PROBLEMS**

- Dessicant cartridge dirty.
- Faulty air dryer purge valve.
- Blocked governor air hose.
- Faulty air compressor.

---

**TEST OPTIONS**

**REASON FOR QUESTION**

- **Visual inspection**

---

1. **Is dessicant cartridge clean?**

   - **NO**
   - **YES**

   **SERVICE AIR DRYER (para 23-6).**

---

2. **Is purge valve clear?**

   - **NO**
   - **YES**

   **SERVICE AIR DRYER (para 23-6).**

---

**KNOWLEDGE INFO**

- **Desiccant cartridge OK.**

**POSSIBLE PROBLEMS**

- Faulty air dryer purge valve.
- Blocked governor air hose.
- Faulty air compressor.
(1) Remove desiccant cartridge from air dryer (para 23-6).
(2) Inspect the desiccant cartridge for cleanliness.

(1) Remove three screws, purge valve, and exhaust boot.
(2) Check purge valve for blockage. If blocked, purge valve is faulty.
(3) Install exhaust boot, purge valve, and three screws.
j2. LARGE QUANTITY OF MOISTURE EXPULLED FROM AIR RESERVOIRS (CONT)

**KNOWN INFO**
- Desiccant cartridge OK.
- Air dryer purge valve OK.
- Governor air hose OK.

**POSSIBLE PROBLEMS**
- Blocked governor air hose.
- Faulty air compressor.

**TEST OPTIONS**
- Blockage Test

**REASON FOR QUESTION**
- Air compressor will fail to unload if governor air hose is blocked.

3. Does governor to air dryer purge valve air hose pass test?

**YES**
- Replace governor air hose (para 23-2).

**NO**

4. Does air escape from governor to air dryer purge valve air hose?

**YES**
- Notify DS Maintenance.

**NO**

**KNOWN INFO**
- Desiccant cartridge OK.
- Air dryer purge valve OK.
- Governor air hose OK.

**POSSIBLE PROBLEMS**
- Faulty air compressor.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- Air compressor will fail to unload if air governor is defective.

**YES**
- Service air dryer (para 23-6).
BLOCKAGE TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disconnect governor to air dryer air hose at governor and at purge valve.</td>
</tr>
<tr>
<td>2</td>
<td>Blow through one end of air hose. If no air escapes from other end of air hose, air hose is blocked.</td>
</tr>
<tr>
<td>3</td>
<td>Connect governor to air dryer air hose to governor and purge valve.</td>
</tr>
</tbody>
</table>

(1) Disconnect governor air hose at air dryer purge valve.
(2) Start engine (TM 9-2320-365-10).
(3) Check for presence of air at air hose. If no air escapes from air hose air compressor is defective. If air escapes, service air dryer for faulty purge valve.
(4) Shut down engine (TM 9-2320-365-10).
(5) Connect air compressor to air dryer air hose to air dryer.
(6) Install desiccant cartridge in air dryer (para 23-6).
1. **Is air temperature 32°F (0°C) or below?**
   - **YES:** Go to step 3 of this fault.
   - **NO:**
     - **KNOWLEDGE INFO:** Air hoses and fittings OK.
     - **POSSIBLE PROBLEMS:** Faulty air dryer heater. Blocked air hose from air dryer to wet tank. Faulty air dryer. Faulty air compressor governor.

2. **Does air dryer heater operate?**
   - **NO:**
     - **KNOWLEDGE INFO:** Air hoses and fittings OK.
     - **POSSIBLE PROBLEMS:** Faulty air dryer heater. Blocked air hose from air dryer to wet tank. Faulty air dryer. Faulty air compressor governor.
     - **TEST OPTIONS:** Check Heater Temperature
       - **REASON FOR QUESTION:** Air may leak steadily from purge valve if purge valve is frozen and heater does not operate.
   - **YES:**
     - **KNOWLEDGE INFO:** Air hoses and fittings OK.
     - **POSSIBLE PROBLEMS:** Faulty air dryer heater. Blocked air hose from air dryer to wet tank. Faulty air dryer. Faulty air compressor governor.
     - **TEST OPTIONS:** Perform Electrical System Troubleshooting (e97. Air Dryer Does Not Operate).
NOTE

- Air dryer heater cuts in at 32°F (0°C) and shuts off between 55-75°F (31-42°C).

- A failed air dryer heater will not affect operation of purge valve if vehicle is operating at temperature above freezing.

(1) Start engine (TM 9-2320-365-10).
(2) Bring engine to operating temperature.
(3) Check bottom (heater) housing on air dryer.
(4) If housing is not warm, heater is not receiving power or is faulty.
(5) Shut down engine (TM 9-2320-365-10).
3. **AIR DRYER CONTINUALLY PURGES (CONT)**

**KNOWN INFO**
- Air hoses and fittings OK.
- Air dryer heater OK.
- Blocked air hose from air dryer to wet tank.
- Faulty air dryer.
- Faulty air compressor governor.

**POSSIBLE PROBLEMS**
- Blocked air hose from air dryer to wet tank.
- Faulty air dryer.
- Faulty air compressor governor.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- A blocked air hose from air dryer to wet tank will cause purge valve to release air.

3. **Does air escape from air dryer to wet tank air hose?**

   **YES**
   - Replace damaged air hose (para 23-2).
   - Service air dryer (para 23-6).
   - Notify DS Maintenance.

   **NO**

4. **Does air escape from compressor air hose at purge valve?**

   **YES**
   - Notify DS Maintenance.

   **NO**
   - Check for air at purge valve air hose.
   - Air dryer will continually purge if air compressor governor is defective.
(1) Disconnect air hose on wet tank coming from air dryer.
(2) Start engine (TM 9-2320-365-10).
(3) Check for presence of air at air hose. If no air escapes from air hose, air hose is faulty.
(4) If air escapes, service air dryer (para 23-6).
(5) Shut down engine (TM 9-2320-365-10).

(1) Disconnect air hose from purge valve on air dryer.
(2) Start engine (TM 9-2320-365-10).
(3) Check for presence of air from air hose.
(4) If air is steadily present from air hose and purge valve air has stopped, air compressor governor is defective.
(5) Shut down engine (TM 9-2320-365-10).
(6) Connect air hose to purge valve on air dryer.
### INITIAL SETUP

**Equipment Conditions**

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

**Tools and Special Tools**

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)

### KNOWN INFO

- Vehicle park and service brakes OK.
- Air hoses free from kinks.

### POSSIBLE PROBLEMS

- Faulty emergency gladhand.
- Faulty air hose 126.
- Faulty air hose 124.
- Faulty air hose 102.
- Faulty air hose 108.
- Faulty TRAILER AIR SUPPLY valve.
- Faulty air hose 104.
- Faulty service gladhand.
- Faulty air hose 265.
- Faulty air brake protecting valve.
- Faulty air hose 247.
- Faulty load sensing valve control port tee fitting.
- Faulty service gladhand two-way check valve.
- Faulty air hose 244.
- Faulty air hose 120.
- Faulty inversion valve control port 90-degree fitting.
- Faulty air hose 117.

### TEST OPTIONS

- Visual inspection

### REASON FOR QUESTION

This question eliminates possible problems and determines where troubleshooting continues.

---

**START**

1. Is air present at either rear gladhand?

   - **NO**
   - **YES**

   **NO**

   Go to step 5 of this fault.

   **YES**

   Go to step 5 of this fault.
(1) Disconnect dummy coupling from emergency gladhand.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Check for presence of air at emergency gladhand.
(5) Connect dummy coupling to emergency gladhand.
(6) Disconnect dummy coupling from service gladhand.
(7) Apply service brakes (TM 9-2320-365-10).
(8) Check for presence of air at service gladhand.
(9) Shut down engine (TM 9-2320-365-10).
(10) Connect dummy coupling to service gladhand.
(11) If air is not present at both rear gladhands, go to step 5 of this fault.
4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**

- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.

**POSSIBLE PROBLEMS**

- Faulty emergency gladhand.
- Faulty air hose 126.
- Faulty service gladhand.
- Faulty air hose 265.
- Faulty air brake protecting valve.
- Faulty air hose 247.
- Faulty load sensing valve control port tee fitting.
- Faulty service gladhand two-way check valve.
- Faulty air hose 244.
- Faulty air hose 120.
- Faulty inversion valve control port 90-degree fitting.
- Faulty air hose 117.

**TEST OPTIONS**

- Visual inspection

**REASON FOR QUESTION**

This question eliminates possible problems and determines where troubleshooting continues.

2. Is air present at service gladhand?

- **NO**
  - Go to step 10 of this fault.

- **YES**
  - Go to step 10 of this fault.
(1) Disconnect dummy coupling from service gladhand.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Apply service brakes (TM 9-2320-365-10).
(5) Check for presence of air at service gladhand.
(6) Shut down engine (TM 9-2320-365-10).
(7) Connect dummy coupling to service gladhand.
(8) If air is not present, go to step 10 of this fault.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**

<table>
<thead>
<tr>
<th>Vehicle park and service brakes OK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses free from kinks.</td>
</tr>
<tr>
<td>Air hose 124 OK.</td>
</tr>
<tr>
<td>Air hose 102 OK.</td>
</tr>
<tr>
<td>Air hose 108 OK.</td>
</tr>
<tr>
<td>TRAILER AIR SUPPLY valve OK.</td>
</tr>
<tr>
<td>Air hose 104 OK.</td>
</tr>
<tr>
<td>Service gladhand OK.</td>
</tr>
<tr>
<td>Air hose 265 OK.</td>
</tr>
<tr>
<td>Air hose 247 OK.</td>
</tr>
<tr>
<td>Load sensing valve control port tee fitting OK.</td>
</tr>
<tr>
<td>Service gladhand two-way check valve OK.</td>
</tr>
<tr>
<td>Air hose 244 OK.</td>
</tr>
<tr>
<td>Air hose 120 OK.</td>
</tr>
<tr>
<td>Inversion valve control port 90-degree fitting OK.</td>
</tr>
<tr>
<td>Air hose 117 OK.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

- Faulty emergency gladhand.
- Faulty air hose 126.
- Faulty air brake protecting valve.

---

**TEST OPTIONS**

- Visual inspection

**REASON FOR QUESTION**

If air is present, emergency gladhand is faulty.

---

**WARNING**

Read WARNING on following page.

---

3. Is air present at emergency gladhand supply port?

---

**IF YES**

Go to step 4 of this fault.

---

**IF NO**

Replace emergency gladhand (para 11-22).
Loosen air hose 126 at emergency gladhand.
Start engine (TM 9-2320-365-10).
Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
Check for presence of air at air hose 126.
Shut down engine (TM 9-2320-365-10).
If air is not present, go to step 4 of this fault.
If air is present, replace emergency gladhand (para 11-22).
Tighten air hose 126 at emergency gladhand.

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) Loosen air hose 126 at emergency gladhand.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Check for presence of air at air hose 126.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 4 of this fault.
(7) If air is present, replace emergency gladhand (para 11-22).
(8) Tighten air hose 126 at emergency gladhand.
4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.
- Service gladhand OK.
- Air hose 265 OK.
- Air hose 247 OK.
- Load sensing valve control port tee fitting OK.
- Service gladhand two-way check valve OK.
- Air hose 244 OK.
- Air hose 120 OK.
- Inversion valve control port 90-degree fitting OK.
- Air hose 117 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 126.
- Faulty air brake protecting valve.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If air is not present, air brake protecting valve is faulty. If air is present, air hose 126 is faulty.

**Flowchart**

4. Is air present at air brake protecting valve delivery port TRLR E?

- Yes: Replace air brake protecting valve (para 11-16).
- No: Replace air hose 126 (para 11-19).
(1) Loosen air hose 126 at air brake protecting valve delivery port TRLR E.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Check for presence of air at air brake protecting valve delivery port TRLR E.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, replace air brake protecting valve (para 11-16).
(7) If air is present, replace air hose 126 (para 11-19).
(8) Tighten air hose 126 at air brake protecting valve delivery port TRLR E.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**
Vehicle park and service brakes OK.
Air hoses free from kinks.
Emergency gladhand OK.
Air hose 126 OK.
Service gladhand OK.
Air hose 265 OK.
Air hose 247 OK.
Load sensing valve control port tee fitting OK.
Service gladhand two-way check valve OK.
Air hose 244 OK.
Air hose 120 OK.
Inversion valve control port 90-degree fitting OK.
Air hose 117 OK.

**POSSIBLE PROBLEMS**
Faulty air hose 124.
Faulty air hose 102.
Faulty air hose 108.
Faulty TRAILER AIR SUPPLY valve.
Faulty air hose 104.
Faulty air brake protecting valve.

**TEST OPTIONS**
Visual inspection

**REASON FOR QUESTION**
If air is present, air brake protecting valve is faulty.

5. Is air present at air brake protecting valve control port TRA E?

**YES**
Go to step 6 of this fault.

**NO**

Replace air brake protecting valve (para 11-16).
(1) Loosen air hose 124 at air brake protecting valve control port TRA E.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Check for presence of air at air hose 124.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 6 of this fault.
(7) If air is present, replace air brake protecting valve (para 11-16).
(8) Tighten air hose 124 at air brake protecting valve control port TRA E.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Service gladhand OK.
- Air hose 265 OK.
- Air brake protecting valve OK.
- Air hose 247 OK.
- Load sensing valve control port tee fitting OK.
- Service gladhand two-way check valve OK.
- Air hose 244 OK.
- Air hose 120 OK.
- Inversion valve control port 90-degree fitting OK.
- Air hose 117 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 124.
- Faulty air hose 102.
- Faulty air hose 108.
- Faulty TRAILER AIR SUPPLY valve.
- Faulty air hose 104.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If air is present, air hose 124 is faulty.

6. Is air present at cab floor fitting?

   **NO**

   Go to step 7 of this fault.

   **YES**

   Replace air hose 124 (para 11-19).
(1) Loosen air hose 102 at cab floor fitting.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Check for presence of air at air hose 102.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 7 of this fault.
(7) If air is present, replace air hose 124 (para 11-19).
(8) Tighten air hose 102 at cab floor fitting.
7. Is air present at TRAILER AIR SUPPLY valve delivery port?

- **YES**
  - Go to step 8 of this fault.

- **NO**
  - Replace air hose 102 (para 11-19).
(1) Remove roll pins from knobs of SYSTEM PARK and TRAILER AIR SUPPLY valves.
(2) Remove SYSTEM PARK and TRAILER AIR SUPPLY valve knobs.
(3) Unscrew nuts at base of valve stem on each valve.
(4) Remove six screws and dash plate from personnel heater.
(5) Pull out TRAILER AIR SUPPLY valve from personnel heater.
(6) Loosen air hose 102 at TRAILER AIR SUPPLY valve delivery port.
(7) Start engine (TM 9-2320-365-10).
(8) Push in SYSTEM PARK control (TM 9-2320-365-10).
(9) Push in TRAILER AIR SUPPLY valve stem.
(10) Check for presence of air at TRAILER AIR SUPPLY valve delivery port.
(11) If air is not present, go to step 8 of this fault.
(12) If air is present, replace air hose 102 (para 11-19).
(13) Shut down engine (TM 9-2320-365-10).
(14) Tighten air hose 102 at TRAILER AIR SUPPLY valve delivery port.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

KNOWN INFO
Vehicle park and service brakes OK.
Air hoses free from kinks.
Emergency gladhand OK.
Air hose 126 OK.
Air hose 124 OK.
Air hose 102 OK.
Service gladhand OK.
Air hose 265 OK.
Air brake protecting valve OK.
Air hose 247 OK.
Load sensing valve control port tee fitting OK.
Service gladhand two-way check valve OK.
Air hose 244 OK.
Air hose 120 OK.
Inversion valve control port 90-degree fitting OK.
Air hose 117 OK.

POSSIBLE PROBLEMS
Faulty air hose 108.
Faulty TRAILER AIR SUPPLY valve.
Faulty air hose 104.

8. Is air present at TRAILER AIR SUPPLY valve control port?

TEST OPTIONS
Visual inspection

REASON FOR QUESTION
If air is not present, air hose 108 is faulty.

YES

NO

Replace air hose 108 (para 11-19).
Loosen air hose 108 at TRAILER AIR SUPPLY valve control port.
Start engine (TM 9-2320-365-10).
Push in SYSTEM PARK control (TM 9-2320-365-10).
Check for presence of air at air hose 108.
If air is not present, replace air hose 108 (para 11-19).
Shut down engine (TM 9-2320-365-10).
Tighten air hose 108 at TRAILER AIR SUPPLY valve control port.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- Service gladhand OK.
- Air hose 265 OK.
- Air brake protecting valve OK.
- Air hose 247 OK.
- Load sensing valve control port tee fitting OK.
- Service gladhand two-way check valve OK.
- Air hose 244 OK.
- Air hose 120 OK.
- Inversion valve control port 90-degree fitting OK.
- Air hose 117 OK.

**POSSIBLE PROBLEMS**
- Faulty TRAILER AIR SUPPLY valve.
- Faulty air hose 104.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If air is not present, air hose 104 is faulty. If air is present, TRAILER AIR SUPPLY valve is faulty.

9. Is air present at TRAILER AIR SUPPLY valve supply port?

- **NO**
- **YES**

Replace TRAILER AIR SUPPLY valve (para 11-18).

Replace air hose 104 (para 11-19).
(1) Loosen air hose 104 at TRAILER AIR SUPPLY valve supply port.
(2) Start engine (TM 9-2320-365-10).
(3) Push in SYSTEM PARK control (TM 9-2320-365-10).
(4) Check for presence of air at air hose 104.
(5) If air is not present, replace air hose 104 (para 11-19).
(6) If air is present, replace TRAILER AIR SUPPLY valve (para 11-18).
(7) Shut down engine (TM 9-2320-365-10).
(8) Tighten air hose 104 at TRAILER AIR SUPPLY valve supply port.
(9) Push SYSTEM PARK and TRAILER AIR SUPPLY valves back into personnel heater.
(10) Install dash plate on personnel heater with six screws.
(11) Install nuts on valve stems.
(12) Install SYSTEM PARK and TRAILER AIR SUPPLY knobs on valve stems with roll pins.
4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**

Vehicle park and service brakes OK.
Air hoses free from kinks.
Emergency gladhand OK.
Air hose 126 OK.
Air hose 124 OK.
Air hose 102 OK.
Air hose 108 OK.
TRAILER AIR SUPPLY valve OK.
Air hose 104 OK.

**POSSIBLE PROBLEMS**

Faulty service gladhand.
Faulty air hose 265.
Faulty air brake protecting valve.
Faulty air hose 247.
Faulty load sensing valve control port tee fitting.
Faulty service gladhand two-way check valve.
Faulty air hose 244.
Faulty air hose 120.
Faulty inversion valve control port 90-degree fitting.
Faulty air hose 117.

**TEST OPTIONS**

Visual inspection

**REASON FOR QUESTION**

If air is present, service gladhand is faulty.

**WARNING**

Read WARNING on following page.

**10.**

Is air present at service gladhand supply port?

**YES**

Replace service gladhand (para 11-22).

**NO**

Go to step 11 of this fault.
(1) Loosen air hose 265 at service gladhand.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Apply service brakes (TM 9-2320-365-10).
(5) Check for presence of air at air hose 265.
(6) Shut down engine (TM 9-2320-365-10).
(7) If air is not present, go to step 11 of this fault.
(8) If air is present, replace service gladhand (para 11-22).
(9) Tighten air hose 265 at service gladhand.

**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.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOW INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Service gladhand OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 265.
- Faulty air brake protecting valve.
- Faulty air hose 247.
- Faulty load sensing valve control port tee fitting.
- Faulty service gladhand two-way check valve.
- Faulty air hose 244.
- Faulty air hose 120.
- Faulty inversion valve control port 90-degree fitting.
- Faulty air hose 117.

11. Is air present at air brake protecting valve delivery port TRLR S?

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If air is present, air hose 265 is faulty.

**YES**
- Go to step 12 of this fault.

**NO**
- Replace air hose 265 (para 11-19).
(1) Loosen air hose 265 at air brake protecting valve delivery port TRLR S.
(2) Start engine (TM 9-2320-365-10).
(3) Push in TRAILER AIR SUPPLY control (TM 9-2320-365-10).
(4) Apply service brakes (TM 9-2320-365-10).
(5) Check for presence of air at air brake protecting valve delivery port TRLR S.
(6) Shut down engine (TM 9-2320-365-10).
(7) If air is not present, go to step 12 of this fault.
(8) If air is present, replace air hose 265 (para 11-19).
(9) Tighten air hose 265 at air brake protecting valve delivery port TRLR S.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

12. Is air present at air brake protecting valve supply port FV1?

- **KNOWN INFO**
  - Vehicle park and service brakes OK.
  - Air hoses free from kinks.
  - Emergency gladhand OK.
  - Air hose 126 OK.
  - Service gladhand OK.
  - Air hose 124 OK.
  - Air hose 102 OK.
  - Air hose 108 OK.
  - TRAILER AIR SUPPLY valve OK.
  - Air hose 104 OK.
  - Air hose 265 OK.

- **POSSIBLE PROBLEMS**
  - Faulty air brake protecting valve.
  - Faulty air hose 247.
  - Faulty load sensing valve control port tee fitting.
  - Faulty service gladhand two-way check valve.
  - Faulty air hose 244.
  - Faulty air hose 120.
  - Faulty inversion valve control port 90-degree fitting.
  - Faulty air hose 117.

- **TEST OPTIONS**
  - Visual inspection

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

- **YES**
  - Go to step 14 of this fault.

- **NO**
(1) Loosen air hose 247 at air brake protecting valve supply port FV1.
(2) Start engine (TM 9-2320-365-10).
(3) Apply service brakes (TM 9-2320-365-10).
(4) Check for presence of air at air hose 247.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 14 of this fault.
(7) Tighten air hose 247 at air brake protecting valve supply port FV1.
Is air present at air brake protecting valve supply port FV2?

If air is present, air brake protecting valve is faulty.

Replace air brake protecting valve (para 11-16).

Vehicle park and service brakes OK.
Air hoses free from kinks.
Emergency gladhand OK.
Air hose 126 OK.
Service gladhand OK.
Air hose 124 OK.
Air hose 102 OK.
Air hose 108 OK.
TRAILER AIR SUPPLY valve OK.
Air hose 104 OK.
Air hose 265 OK.
Air hose 247 OK.
Load sensing valve control port tee fitting OK.
Service gladhand two-way check valve OK.
Air hose 244 OK.

Faulty air brake protecting valve.
Faulty air hose 120.
Faulty inversion valve control port 90-degree fitting.
Faulty air hose 117.

TM 9-2320-365-20-2 2-1742.20 Change 1
(1) Loosen air hose 120 at air brake protecting valve supply port FV2.
(2) Start engine (TM 9-2320-365-10).
(3) Apply service brakes (TM 9-2320-365-10).
(4) Check for presence of air at air hose 120.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 17 of this fault.
(7) If air is present, replace air brake protecting valve (para 11-16).
(8) Tighten air hose 120 at air brake protecting valve supply port FV2.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**

| Vehicle park and service brakes OK. |
| Air hoses free from kinks. |
| Emergency gladhand OK. |
| Air hose 126 OK. |
| Service gladhand OK. |
| Air hose 124 OK. |
| Air hose 102 OK. |
| Air hose 108 OK. |
| TRAILER AIR SUPPLY valve OK. |
| Air hose 104 OK. |
| Air hose 265 OK. |
| Air brake protecting valve OK. |
| Air hose 120 OK. |
| Inversion valve control port 90-degree fitting OK. |
| Air hose 117 OK. |

**POSSIBLE PROBLEMS**

- Faulty air hose 247.
- Faulty load sensing valve control port tee fitting.
- Faulty service gladhand two-way check valve.
- Faulty air hose 244.

**TEST OPTIONS**

| Visual inspection |

**REASON FOR QUESTION**

If air is present, air hose 247 is faulty.

14. Is air present at load sensing valve control port tee fitting delivery port?

- **YES**
  - Go to step 15 of this fault.
  - Replace air hose 247 (para 11-19).
- **NO**
(1) Loosen air hose 247 at load sensing valve control port tee fitting delivery port.
(2) Start engine (TM 9-2320-365-10).
(3) Apply service brakes (TM 9-2320-365-10).
(4) Check for presence of air at load sensing valve control port tee fitting delivery port.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 15 of this fault.
(7) If air is present, replace air hose 247 (para 11-19).
(8) Tighten air hose 247 at load sensing valve control port tee fitting delivery port.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Service gladhand OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.
- Air hose 265 OK.
- Air brake protecting valve OK.
- Air hose 247 OK.
- Air hose 120 OK.
- Inversion valve control port 90-degree fitting OK.
- Air hose 117 OK.

**POSSIBLE PROBLEMS**
- Faulty load sensing valve control port tee fitting.
- Faulty service gladhand two-way check valve.
- Faulty air hose 244.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- If air is present, load sensing valve control port tee fitting is faulty.

15. Is air present at load sensing valve control port tee fitting supply port?

- **YES**
  - Go to step 16 of this fault.
  - Replace load sensing valve control port tee fitting (para 11-10).

- **NO**
(1) Loosen air hose 244 at load sensing valve control port tee fitting supply port.
(2) Start engine (TM 9-2320-365-10).
(3) Apply service brakes (TM 9-2320-365-10).
(4) Check for presence of air at air hose 244.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 16 of this fault.
(7) If air is present, replace load sensing valve control port tee fitting (para 11-10).
(8) Tighten air hose 244 at load sensing valve control port tee fitting supply port.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**Known Info**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Service gladhand OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.
- Air hose 265 OK.
- Air brake protecting valve OK.
- Air hose 247 OK.
- Load sensing valve control port tee fitting OK.
- Air hose 120 OK.
- Inversion valve control port 90-degree fitting OK.
- Air hose 117 OK.

**Possible Problems**
- Faulty service gladhand two-way check valve.
- Faulty air hose 244.

**Test Options**
- Visual inspection

**Reason for Question**
If air is not present, service gladhand two-way check valve is faulty. If air is present, air hose 244 is faulty.

16. Is air present at service gladhand two-way check valve delivery port?

- **Yes**
  - Replace service gladhand two-way check valve (para 11-23).

- **No**
  - Replace air hose 244 (para 11-19).
(1) Raise cab (TM 9-2320-365-10).
(2) Loosen air hose 244 at service gladhand two-way check valve delivery port.
(3) Start engine (TM 9-2320-365-10).
(4) Apply service brakes (TM 9-2320-365-10).
(5) Check for presence of air at service gladhand two-way check valve delivery port.
(6) Shut down engine (TM 9-2320-365-10).
(7) If air is not present, replace service gladhand two-way check valve (para 11-23).
(8) If air is present, replace air hose 244 (para 11-19).
(9) Tighten air hose 244 at service gladhand two-way check valve delivery port.
(10) Lower cab (TM 9-2320-365-10).
17. Is air present at inversion valve control port 90-degree fitting delivery port?

**KNOWN INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Service gladhand OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.
- Air hose 265 OK.
- Air hose 247 OK.
- Load sensing valve control port tee fitting OK.
- Service gladhand two-way check valve OK.
- Air hose 244 OK.
- Air brake protecting valve OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 120.
- Faulty inversion valve control port 90-degree fitting.
- Faulty air hose 117.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If air is present, air hose 120 is faulty.

**Go to step 18 of this fault.**

Replace air hose 120 (para 11-19).
(1) Loosen air hose 120 at inversion valve control port 90-degree fitting delivery port.
(2) Start engine (TM 9-2320-365-10).
(3) Apply service brakes (TM 9-2320-365-10).
(4) Check for presence of air at inversion valve control port 90-degree fitting delivery port.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, go to step 18 of this fault.
(7) If air is present, replace air hose 120 (para 11-19).
(8) Tighten air hose 120 at inversion valve control port 90-degree fitting delivery port.
j4. NO AIR PRESSURE PRESENT AT REAR GLADHAND(S) (CONT)

**KNOWN INFO**
- Vehicle park and service brakes OK.
- Air hoses free from kinks.
- Emergency gladhand OK.
- Air hose 126 OK.
- Service gladhand OK.
- Air hose 124 OK.
- Air hose 102 OK.
- Air hose 108 OK.
- TRAILER AIR SUPPLY valve OK.
- Air hose 104 OK.
- Air hose 265 OK.
- Air hose 247 OK.
- Load sensing valve control port tee fitting OK.
- Service gladhand two-way check valve OK.
- Air hose 244 OK.
- Air brake protecting valve OK.
- Air hose 120 OK.

**POSSIBLE PROBLEMS**
- Faulty inversion valve control port 90-degree fitting.
- Faulty air hose 117.

18. Is air present at inversion valve control port 90-degree fitting supply port?

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If air is not present, air hose 117 is faulty. If air is present, inversion valve control port 90-degree fitting is faulty.

- **NO**
  - Replace air hose 117 (para 11-19).

- **YES**
  - Replace inversion valve control port 90-degree fitting (para 11-12).
(1) Loosen air hose 117 at inversion valve control port 90-degree fitting supply port.
(2) Start engine (TM 9-2320-365-10).
(3) Apply service brakes (TM 9-2320-365-10).
(4) Check for presence of air at air hose 117.
(5) Shut down engine (TM 9-2320-365-10).
(6) If air is not present, replace air hose 117 (para 11-19).
(7) If air is present, replace inversion valve control port 90-degree fitting (para 11-12).
(8) Tighten air hose 117 at inversion valve control port 90-degree fitting supply port.
j5. AIR SYSTEM PRESSURE BUILDS UP MORE THAN 120 PSI (827 KPA) (COMPRESSOR FAILS TO UNLOAD)

**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)
- Goggles, Industrial (Item 15, Appendix C)

---

**KNOWLEDGE OF INFORMATION**

- FRONT BRAKE/REAR BRAKE
- AIR pressure gage reads above 120 psi.

**POSSIBLE PROBLEMS**

- Blocked air hose.
- Faulty air compressor governor.
- Faulty purge valve.

---

**TEST OPTIONS**

1. Visual Inspection
   - Does air escape from wet tank to governor air hose?

---

**REASON FOR QUESTION**

- Air compressor cannot unload if air is not present at governor air intake.

---

**FLOW CHART**

START

1. WARNING: Read WARNING on following page.

   - Does air escape from wet tank to governor air hose?

     NO

     YES

     Clear or replace blocked wet tank to governor air hose (para 23-2).
WARNING

Engine compartment includes a partially covered fan blade. Extreme care should be taken when working in the engine compartment. Failure to comply may result in injury to personnel.

(1) Raise cab (TM 9-2320-365-10).
(2) Disconnect (wet tank to governor) air hose from air compressor governor.
(3) Lower cab (TM 9-2320-365-10).
(4) Start engine (TM 9-2320-365-10).
(5) Raise cab (TM 9-2320-365-10).
(6) Check for air escaping from (wet tank to governor) air hose.
(7) If no air escapes, clear or replace air hose from wet tank to air compressor governor (para 23-2).
(8) Lower cab (TM 9-2320-365-10).
(9) Shut down engine (TM 9-2320-365-10).
(10) Raise cab (TM 9-2320-365-10).
(11) Connect (wet tank to governor) air hose to air compressor governor.
j5. AIR SYSTEM PRESSURE BUILDS UP MORE THAN 120 PSI (827 KPA) (COMPRESSOR FAILS TO UNLOAD) (CONT)

**KNOWN INFO**

FRONT BRAKE/REAR BRAKE
AIR pressure gage reads above 120 psi.
Air hose from wet tank to air compressor governor OK.

**POSSIBLE PROBLEMS**

Blocked governor air hose.
Faulty air compressor governor.
Faulty purge valve.

---

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

Air compressor will fail to unload if air compressor to purge valve air hose is blocked.

---

2.

Does air escape from air compressor to air dryer purge valve air hose?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

Air compressor will fail to unload if air compressor to purge valve air hose is blocked.

---

**KNOWN INFO**

FRONT BRAKE/REAR BRAKE
AIR pressure gage reads above 120 psi.
Air hose from wet OK.
Governor air hose OK.

**POSSIBLE PROBLEMS**

Faulty air compressor governor.
Faulty purge valve.

---

3.

Is air present from air compressor to purge valve?

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

If air is not present from air compressor, air compressor governor is faulty. If air is present air dryer purge valve is faulty.

---

**KNOWN INFO**

FRONT BRAKE/REAR BRAKE
AIR pressure gage reads above 120 psi.
Air hose from wet OK.
Governor air hose OK.

**POSSIBLE PROBLEMS**

Faulty air compressor governor.
Faulty purge valve.

---

Clear or replace air hose from air compressor to purge valve (para 23-2).

---

Adjust or replace air compressor governor (para 11-29).

---

Service air dryer (para 23-6).
1. Disconnect (air compressor to purge valve) air hose from air compressor and purge valve.
2. Blow through one end of air hose. If no air escapes from other end of air hose, air hose is blocked.
3. Connect (air compressor to purge valve) air hose to air compressor.

2. Check for presence of air at (air compressor to purge valve) air hose.
3. If no air escapes from air hose, Adjust or replace air compressor governor (para 11-29).
4. If air escapes from air hose, service air dryer for faulty purge valve (para 23-6).
5. Shut down engine (TM 9-2320-365-10).
6. Connect (air compressor to purge valve) air hose to air dryer purge valve.
**j6. NOISY AIR COMPRESSOR OPERATION**

**INITIAL SETUP**

<table>
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<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
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<tr>
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<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
</tbody>
</table>

---

**KNOWLEDGE INFO**

- Engine runs.

**POSSIBLE PROBLEMS**

- Kinked compressor oil hoses.
- Kinked compressor coolant hoses.
- Loose or missing air compressor mounting hardware.
- Faulty air compressor.

**TEST OPTIONS**

- Visual inspection

**REASON FOR QUESTION**

- Kinked compressor oil hoses will cause noisy air compressor operation.

---

1. Are air compressor oil hoses free from kinks?

   **NO**

   Replace air compressor oil hose(s).

   **YES**

   **KNOWLEDGE INFO**

   - Air compressor oil hoses OK.

   **POSSIBLE PROBLEMS**

   - Kinked compressor coolant hoses.
   - Loose or missing air compressor mounting hardware.
   - Faulty air compressor.

   **TEST OPTIONS**

   - Visual inspection

   **REASON FOR QUESTION**

   - Kinked compressor coolant hoses will cause overheating and noisy compressor operation.

---

2. Are air compressor coolant hoses free from kinks?

   **NO**

   Replace air compressor coolant hose(s) (para 6-11).

   **YES**
(1) Raise cab (TM 9-2320-365-10).
(2) Check air compressor oil hoses for kinks.

Check air compressor coolant hoses.
3. Is air compressor free from loose or missing mounting hardware?

**KNOWN INFO**
- Air compressor oil hoses OK.
- Air compressor coolant hoses OK.

**POSSIBLE PROBLEMS**
- Loose or missing air compressor mounting hardware.
- Faulty air compressor.

**TEST OPTIONS**

**REASON FOR QUESTION**
- Loose or missing air compressor mounting hardware will cause noisy operation.

**YES**
- Replace loose or missing mounting hardware.

**NO**
- Notify DS Maintenance.
(1) Check air compressor for loose or missing mounting hardware.
(2) Lower cab (TM 9-2320-365-10).
2-22. WHEEL TROUBLESHOOTING

This paragraph covers Wheel Troubleshooting. The Wheel Fault Index, Table 2-48, lists faults for the Wheel of the vehicle.

Table 2-48. Wheel Fault Index

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<td>k2</td>
<td>Wheel Wobbles or Shimmies</td>
<td>2-1758</td>
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</tbody>
</table>
k1. TIRES WEAR UNEVENLY OR EXCESSIVELY

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Multiplier, Torque Wrench (Item 23, Appendix C)
Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)

START

1. Are lug nuts tight?

YES

Tighten lug nuts to 415-475 lb-ft (576-644 N m) in sequence shown.

NO

2. Are shock absorbers free from leaks and damage?

YES

Replace shock absorber(s) (para 15-3 or 15-4).

NO

Tighten lug nuts to 415-475 lb-ft (576-644 N m) in sequence shown.
Inspect tires for excessive wear and for spacing between lug nuts and wheels. Tires that are worn unevenly may indicate that lug nuts need tightening.

Inspect tires for excessive wear. Tires that have flat spots may indicate a defective shock absorber. Inspect shock absorbers for leaks or damage.
k1. TIRES WEAR UNEVENLY OR EXCESSIVELY (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lug nuts tightened.</td>
<td>Visual inspection</td>
<td>Tie rods adjusted incorrectly (improper toe-in) will cause tires to wear unevenly or excessively.</td>
</tr>
<tr>
<td>Tire pressure OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock absorbers OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improper toe-in.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Is the tie rod properly adjusted?

- **NO**
  - Perform front wheel toe-in (para 13-5).

- **YES**
  - Perform Wheel System Troubleshooting (k2. Wheel Wobbles or Shimmies).
Check front wheel toe-in (para 13-5).
k2. WHEEL WOBBLING OR SHIMMIES

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)

START

1. Is wheel free from damage?
   - YES
   - NO

   NO
   Replace damaged wheel(s) (para 12-2).

   YES

2. Is wheel free of play?
   - YES
   - NO

   NO
   Notify DS Maintenance.

   YES

3. Is drag link free of play?
   - YES
   - NO

   NO
   Replace drag link (para 13-3).

   YES
   Notify DS Maintenance.
**WARNING**

Vehicle must be on level ground and wheels must be chocked. Failure to comply may result in injury to personnel.

(1) Jack up vehicle (TM 9-2320-365-10) one wheel at a time.
(2) Rotate tire to check for bent wheel.
(3) Insert pry bar under tire and lift while observing wheel play.
(4) Check drag link play.
(5) Lower vehicle (TM 9-2320-365-10).
2-23. HYDRAULIC SYSTEM TROUBLESHOOTING

This paragraph covers Hydraulic System Troubleshooting. The Hydraulic System Fault Index, Table 2-49, lists faults for the Hydraulic System of the vehicle.

Table 2-49. Hydraulic System Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Loss of Hydraulic Pressure (Single Stage Pump)</td>
<td>2-1762</td>
</tr>
</tbody>
</table>
1. Are hydraulic fittings and tubing free from kinks, bends and debris?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic oil level OK.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
</tr>
<tr>
<td>Bent, kinked, or clogged hydraulic tubing or fittings.</td>
</tr>
<tr>
<td>Clogged filter screen.</td>
</tr>
<tr>
<td>Faulty hydraulic oil filter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A clogged, bent, or kinked hydraulic tubing or fitting will cause loss of hydraulic pressure.</td>
</tr>
</tbody>
</table>

2. Is filter screen free of debris?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic oil level OK.</td>
</tr>
<tr>
<td>Hydraulic tubing or fittings OK.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
</tr>
<tr>
<td>Clogged filter screen.</td>
</tr>
<tr>
<td>Faulty hydraulic oil filter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A clogged filter screen will cause loss of hydraulic pressure.</td>
</tr>
</tbody>
</table>

START
Check hydraulic tubes and fittings for kinks, bends, and debris.

Check filter screen for debris.
### 11. LOSS OF HYDRAULIC PRESSURE (SINGLE STAGE PUMP) (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>3. Is hydraulic oil filter free of blockage?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic oil level OK.</td>
<td>Replacement hydraulic oil filter (para 19-12).</td>
</tr>
<tr>
<td>Hydraulic tubing or fittings OK.</td>
<td></td>
</tr>
<tr>
<td>Filter screen OK.</td>
<td></td>
</tr>
</tbody>
</table>

#### POSSIBLE PROBLEMS
- Faulty hydraulic oil filter.

#### TEST OPTIONS
- Visual inspection

#### REASON FOR QUESTION
- A clogged hydraulic oil filter will cause loss of hydraulic pressure.

#### YES
- Replace hydraulic oil filter (para 19-12).

#### NO
- Notify DS Maintenance.
(1) Remove hydraulic oil filter (para 19-12).
(2) Check hydraulic oil filter for blockage.
(3) Install hydraulic oil filter (para 19-12).
This paragraph covers Central Tire Inflation System (CTIS) Troubleshooting. The Central Tire Inflation System (CTIS) Fault Index, Table 2-50, lists faults for the CTIS System of the vehicle.

Table 2-50. Central Tire Inflation System (CTIS) Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>m1</td>
<td>Two Steady Mode Lights Illuminate on Central Tire Inflation System (CTIS) ECU</td>
<td>2-1768</td>
</tr>
<tr>
<td>m2</td>
<td>Four CTIS ECU Indicator Lights Flashing</td>
<td>2-1798</td>
</tr>
<tr>
<td>m3</td>
<td>Five CTIS ECU Indicator Lights Flashing</td>
<td>2-1822</td>
</tr>
<tr>
<td>m4</td>
<td>CTIS Repeatedly Resumes Cycling 30 Seconds After Indicator Lights Stop Flashing</td>
<td>2-1856</td>
</tr>
<tr>
<td>m5</td>
<td>Central Tire Inflation System (CTIS) ECU Indicates No Fault Code But System Fails To Inflate or Deflate</td>
<td>2-1862</td>
</tr>
<tr>
<td>m6</td>
<td>No Overspeed Warning Light and/or Overspeed Pressure Change</td>
<td>2-1874</td>
</tr>
</tbody>
</table>
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU

**INITIAL SETUP**

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

**Materials/Parts**
Soap, Laundry (Item 69, Appendix D)

**Personnel Required**
(2)

**Tools and Special Tools**
Materials/Parts
Tool Kit, Genl Mech (Item 44, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Trestle, Motor Vehicle Maintenance (2)
(Item 45, Appendix C)
Pan, Wash (Item 25, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

---

**KNOWN INFO**

Nothing

**POSSIBLE PROBLEMS**

- Faulty air hose from wet tank to manifold valve assembly.
- Faulty air compressor or governor adjustment.
- Faulty wheel valve venting.
- Faulty manifold valve assembly relief valve.
- Faulty manifold valve assembly.
- Faulty quick release valve(s).
- Faulty rear axle quick release valve fittings.
- Faulty front quick release valve fittings.
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor supply hose fittings.
- Faulty supply hoses from quick release valve(s) to wheel valve(s).
- Faulty wheel valve filters.
- Faulty electrical connections at CTIS ECU and manifold valve assembly.
- Faulty CTIS ECU.

---

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

If two mode lights illuminate during inflation, air supply to manifold valve assembly may not be adequate.

---

**WARNING**

Read WARNING on following page.

---

**START**

Are two steady mode lights illuminated during inflation?

---

**NO**

---

**YES**

Go to step 4 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.

NOTE

Two steady mode lights are an indication that the CTIS has disconnected operation because of particular inflation or deflation sequence has taken longer than limits allow (40 minutes for inflate; 20 minutes for deflate).

Two steady mode lights indicates that system shut off with air pressure between modes.

The CTIS may still operate including modes that are illuminated by manually pressing the desired mode.

To perform deflate or inflate checks throughout this task, it will be necessary to perform the opposite function first from time to time so that a desired mode selection is available.

(1) Start engine (TM 9-2320-365-10).
(2) Select an inflation mode on CTIS ECU (TM 9-2320-365-10) and determine if two light mode is displayed.
(3) Select RUN FLAT mode or shut down engine and restart engine (TM 9-2320-365-10) again to reset ECU.
(4) Select a deflation mode on CTIS ECU (TM 9-2320-365-10) and determine if two light mode is displayed.
(5) Shut down engine (TM 9-2320-265-10).
(6) If two steady light mode lights do not illuminate during inflation, go to step 4 of this fault.
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two steady mode lights illuminate during inflation.</td>
<td>Soapy Water Leak Test</td>
<td>Steady Mode lights may light if an air leak is present.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty air hoses from wet tank to manifold valve assembly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty air compressor or governor adjustment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty wheel valve venting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty manifold valve assembly relief valve.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty manifold valve assembly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty quick release valve(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty rear axle quick release valve fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty front quick release valve fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty front tee fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty cab floor supply hose fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty supply hoses from quick release valve(s) to wheel valve(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty wheel valve filters.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty electrical connections at CTIS ECU and manifold valve assembly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty CTIS ECU.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Are air hoses from wet tank to manifold valve assembly free from leaks?

- **NO**
  - Tighten loose air hoses.
  - Replace damaged air hoses and/or fittings (para 23-2).

- **YES**

2-1770
NOTE

- Two steady mode lights are an indication that the CTIS has discontinued operation because a particular inflate or deflate sequence has taken longer than limits allow (40 minutes for inflate, 20 minutes for deflate).
- Two steady mode lights indicate that CTIS is shut off with air pressure between modes.
- The CTIS may still operate including modes that are lit, by manually pressing the desired mode.
- To perform deflate or inflate checks throughout this task, it may be necessary to perform the opposite function first so that a desired mode selection is available.

<table>
<thead>
<tr>
<th>SOAPY WATER LEAK TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>(2) Apply soapy water solution to supply air hose fitting at manifold valve assembly.</td>
</tr>
<tr>
<td>(3) Check for air escaping at manifold valve assembly, indicated by air bubbles.</td>
</tr>
<tr>
<td>(4) Remove two screws and washers from front grille.</td>
</tr>
<tr>
<td>(5) Remove screw and washer from front grille.</td>
</tr>
<tr>
<td>(6) Remove front grille from cab.</td>
</tr>
<tr>
<td>(7) Apply soapy water solution to supply air hose from wet tank at cab floor.</td>
</tr>
<tr>
<td>(8) Check for air escaping at cab floor fittings, indicated by air bubbles.</td>
</tr>
</tbody>
</table>
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

Is air compressor supplying enough air to CTIS for operation of inflation mode?

If two mode lights persist during inflation with engine operating at 1,000 RPM for more than five minutes, air supply from air compressor may be inadequate.

Perform Air System Troubleshooting (j1. Air System Loses Pressure During Operation).

Go to step 6 of this fault.
(1) Start engine (TM 9-2320-365-10) and operate at 1,000 RPM for five minutes.
(2) Select an inflation mode at CTIS ECU and check if two steady mode light returns.
(3) Apply and release brakes once or twice and check if pressure gages are slow to reach 120 psi.
(4) If two steady mode lights remain illuminated and brake air pressure gages are slow to reach 120 psi, Perform Air System Troubleshooting (j1. Air System Loses Pressure During Operation).
(5) Shut down engine (TM 9-2320-365-10).
4. Are all wheel valves properly vented?

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
Wheel Valve Vent Test

**REASON FOR QUESTION**
Changes in temperature can cause wheel valves to stay closed and prevent deflation to lower settings causing two steady mode lights to illuminate.

**KNOWN INFO**
Air hoses from wet tank to manifold valve assembly OK.
Air compressor and governor adjustment OK.

**POSSIBLE PROBLEMS**
Faulty wheel valve venting.
Faulty manifold valve assembly relief valve.
Faulty manifold valve assembly.
Faulty quick release valve(s).
Faulty rear axle quick release valve fittings.
Faulty front quick release valve fittings.
Faulty front tee fittings.
Faulty manifold valve assembly delivery port fittings.
Faulty cab floor supply hose fittings.
Faulty supply hoses from quick release valve(s) to wheel valve(s).
Faulty wheel valve filters.
Faulty electrical connections at CTIS ECU and manifold valve assembly.
Faulty ECU.

Replace faulty CTIS wheel valve(s) (para 12-5).
WARNING

Do not loosen screw on wheel valve while CTIS is in use. Failure to comply may result in injury to personnel.

NOTE

At high temperatures, air pressure increases in cap chamber of wheel valve, adding to spring pressure so that valve cannot open to allow tire deflation to lower settings.

WHEEL VALVE VENT TEST

(1) Release air from all CTIS wheel valves by backing off vent screws approximately three turns.
(2) If CTIS wheel valve fails to release air, replace CTIS wheel valve (para 12-5).
(3) Tighten vent screws. Do not overtighten.
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses from wet tank to manifold valve assembly OK.</td>
</tr>
<tr>
<td>Air compressor and governor adjustment OK.</td>
</tr>
<tr>
<td>Wheel valves venting OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty manifold valve assembly relief valve.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty quick release valve(s).</td>
</tr>
<tr>
<td>Faulty rear axle quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front tee fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
</tr>
<tr>
<td>Faulty cab floor supply hose fittings.</td>
</tr>
<tr>
<td>Faulty supply hoses from quick release valve(s) to wheel valve(s).</td>
</tr>
<tr>
<td>Faulty wheel valve filters.</td>
</tr>
<tr>
<td>Faulty electrical connections at CTIS ECU and manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty ECU.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relief Valve Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A damaged relief valve may cause continual air loss and prevent proper inflation of tires for CTIS mode.</td>
</tr>
</tbody>
</table>

5. Is relief valve on manifold valve assembly operating?

If NO, Replace relief valve (para 12-7).
<table>
<thead>
<tr>
<th>RELIEF VALVE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>(2) Check if relief valve poppet on manifold valve assembly is missing.</td>
</tr>
<tr>
<td>(3) Position master power switch to on (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(4) Select a mode that is lower on CTIS ECU (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(5) Check if air escapes continuously from relief valve during deflation sequence.</td>
</tr>
<tr>
<td>(6) If air escapes continuously, replace relief valve (para 12-7).</td>
</tr>
<tr>
<td>(7) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
</tbody>
</table>
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses from wet tank to manifold valve assembly OK.</td>
</tr>
<tr>
<td>Air compressor and governor adjustment OK.</td>
</tr>
<tr>
<td>Wheel valves venting OK.</td>
</tr>
<tr>
<td>Manifold valve assembly relief valve OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty quick release valve(s).</td>
</tr>
<tr>
<td>Faulty rear axle quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front tee fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
</tr>
<tr>
<td>Faulty cab floor supply hose fittings.</td>
</tr>
<tr>
<td>Faulty supply hoses from quick release valve(s) to wheel valve(s).</td>
</tr>
<tr>
<td>Faulty wheel valve filters.</td>
</tr>
<tr>
<td>Faulty electrical connections at CTIS ECU and manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty ECU.</td>
</tr>
</tbody>
</table>

---

**6.** Is manifold valve assembly operating?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifold Valve Assembly Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If manifold valve assembly is not operating, CTIS cannot inflate or deflate, and will cause two steady mode lights to illuminate.</td>
</tr>
</tbody>
</table>

NO

Repair or replace manifold valve assembly (para 12-7).

YES
NOTE
When checking manifold valve assembly, ensure air pressure in air tanks is 120 psi. Manifold valve assembly cannot be checked if air supply is not available to it.

<table>
<thead>
<tr>
<th>MANIFOLD VALVE ASSEMBLY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position master power switch to on (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(2) If two mode lights illuminate during deflation</td>
</tr>
<tr>
<td>(a) Select a mode that is lower on CTIS ECU (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(b) Check if manifold valve assembly clicks when no air is escaping from relief valve.</td>
</tr>
<tr>
<td>(c) If manifold valve assembly clicks and no air escapes at relief valve, replace manifold valve assembly (para 12-7).</td>
</tr>
<tr>
<td>(3) If two mode lights illuminate during inflation</td>
</tr>
<tr>
<td>(a) Select a mode that is higher on CTIS ECU (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(b) Disconnect air hose at delivery port of manifold valve assembly.</td>
</tr>
<tr>
<td>(c) Check if manifold valve assembly clicks and no air escapes at delivery port.</td>
</tr>
<tr>
<td>(d) If no air escapes at delivery port during inflation mode, replace manifold valve assembly (para 12-7).</td>
</tr>
</tbody>
</table>
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses from wet tank to manifold valve assembly OK.</td>
<td>Visual inspection</td>
<td>If air leaks continuously from quick release valve(s) during inflation or deflation, CTIS will not select tire pressure and two steady mode lights will illuminate.</td>
</tr>
<tr>
<td>Air compressor and governor adjustment OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheel valves venting OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manifold valve assembly relief valve OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manifold valve assembly OK.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty CTIS quick release valve(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty rear axle quick release valve fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty front quick release valve fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty front tee fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty cab floor supply hose fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty supply hoses from quick release valve(s) to wheel valve(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty wheel valve filters.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty electrical connections at CTIS ECU and manifold valve assembly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty ECU.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is CTIS quick release valve(s) free from leaks and damage?

NO

Replace or clean quick release valve(s) (para 12-8 or 12-9).

YES
(1) Position CTIS ECU in a mode that is higher.

(2) Check for air escaping continuously from exhaust port of quick release valve(s).

(3) If air escapes continuously from quick release valve(s) during inflation, quick release valve diaphragm is damaged, replace quick release valve(s) or clean quick release valve(s) (para 12-8 or 12-9).

(5) If foreign object is lodged in quick release valve(s), replace quick release valve(s) (para 12-8 or 12-9).
8. Are rear axle quick release valve fittings free from leaks and damage?

- Known Info:
  - Air hoses from wet tank to manifold valve assembly OK.
  - Air compressor and governor adjustment OK.
  - Wheel valves venting OK.
  - Manifold valve assembly relief valve OK.
  - Manifold valve assembly OK.
  - Quick release valves OK.

- Possible Problems:
  - Faulty rear axle quick release valve fittings.
  - Faulty front quick release valve fittings.
  - Faulty front tee fittings.
  - Faulty manifold valve assembly delivery port fittings.
  - Faulty cab floor supply hose fittings.
  - Faulty supply hoses from quick release valve(s) to wheel valve(s).
  - Faulty wheel valve filters.
  - Faulty electrical connections at CTIS ECU and manifold valve assembly.
  - Faulty ECU.

- Test Options:
  - Visual Inspection and Soapy Water Leak Test
  - CTIS may be unable to reach selected pressure and two lights will flash if air leaks from CTIS air hoses during inflation/deflation sequences.

- Reason for Question:

  - YES
    - Tighten loose air hoses. Replace damaged air hoses or fittings (para 23-2).
  - NO
(1) Select an inflation mode at CTIS ECU (TM 9-2320-365-10).
(2) If obvious air escape is heard. Tighten loose air hoses or replace damaged air hoses and/or fittings (para 23-2).
(3) If no obvious air escape is heard, proceed to Soapy Water Leak Test.

<table>
<thead>
<tr>
<th>SOAPY WATER LEAK TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Apply soapy water solution to quick release valve fittings at rear axle.</td>
</tr>
<tr>
<td>(2) Check for air bubbles indicating leaks.</td>
</tr>
</tbody>
</table>
m1. **TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses from wet tank to manifold valve assembly OK.</td>
</tr>
<tr>
<td>Air compressor and governor adjustment OK.</td>
</tr>
<tr>
<td>Wheel valves venting OK.</td>
</tr>
<tr>
<td>Manifold valve assembly relief valve OK.</td>
</tr>
<tr>
<td>Manifold valve assembly OK.</td>
</tr>
<tr>
<td>Quick release valves OK.</td>
</tr>
<tr>
<td>Rear axle quick release valve fittings OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty front quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front tee fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
</tr>
<tr>
<td>Faulty cab floor supply hose fittings.</td>
</tr>
<tr>
<td>Faulty supply hoses from quick release valve(s) to wheel valve(s).</td>
</tr>
<tr>
<td>Faulty wheel valve filters.</td>
</tr>
<tr>
<td>Faulty electrical connections at CTIS ECU and manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty ECU.</td>
</tr>
</tbody>
</table>

9. Is CTIS front quick release valve fittings free from leaks and damage?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soapy Water Leak Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTIS may be unable to reach selected pressure and two lights will flash if air leaks from CTIS air hoses during inflation/deflation sequences.</td>
</tr>
</tbody>
</table>

- **NO**
  - Tighten loose air lines.
  - Replace damaged air lines and/or fittings (para 23-2).

- **YES**
SOAPY WATER LEAK TEST

(1) Apply soapy water solution to front quick release valve fittings.
(2) Check for air bubbles indicating leaks.
Are fittings for tee at muffler free from leaks and damage?

10.

KNOWLED INFO
- Air hoses from wet tank to manifold valve assembly OK.
- Air compressor and governor adjustment OK.
- Wheel valves venting OK.
- Manifold valve assembly relief valve OK.
- Manifold valve assembly OK.
- Quick release valves OK.
- Rear axle quick release valve fittings OK.
- Front quick release valve fittings OK.

POSSIBLE PROBLEMS
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor supply hose fittings.
- Faulty supply hoses from quick release valve(s) to wheel valve(s).
- Faulty wheel valve filters.
- Faulty electrical connections at CTIS ECU and manifold valve assembly.
- Faulty ECU.

TEST OPTIONS
- Soapy Water Leak Test

REASON FOR QUESTION
- CTIS may be unable to reach selected pressure and two lights will flash if air leaks from CTIS air hoses during inflation/deflation.

Tighten loose air hoses. Replace damaged air hoses or fittings (para 23-2).
SOAPY WATER LEAK TEST

(1) Apply soapy water solution to fittings at tee above muffler.
(2) Check for air bubbles indicating leaks.
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

**TEST OPTIONS**
- Soapy Water Leak Test

**REASON FOR QUESTION**
- CTIS may be unable to reach selected pressure and two lights will flash if air leaks from CTIS air hoses during inflation/deflation.

**KNOWLEDGE INFO**
- Air hoses from wet tank to manifold valve assembly OK.
- Air compressor and governor adjustment OK.
- Wheel valves venting OK.
- Manifold valve assembly relief valve OK.
- Manifold valve assembly OK.
- Quick release valves OK.
- Rear axle quick release valve fittings OK.
- Front quick release valve fittings OK.
- Front tee fittings OK.

**POSSIBLE PROBLEMS**
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor supply hose fittings.
- Faulty supply hoses from quick release valve(s) to wheel valve(s).
- Faulty wheel valve filters.
- Faulty electrical connections at CTIS ECU and manifold valve assembly.
- Faulty ECU.

Are manifold valve assembly delivery port fittings free from leaks and damage?

- **NO**
  - Tighten loose air hoses. Replace damaged air hoses or fittings (para 23-2).

- **YES**
SOAPY WATER LEAK TEST

(1) Apply soapy water solution to manifold valve assembly delivery port fittings.
(2) Check for air bubbles indicating leaks.
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air hoses from wet tank to manifold valve assembly OK.</td>
<td>Soapy Water Leak Test</td>
</tr>
<tr>
<td>Air compressor and governor adjustment OK.</td>
<td></td>
</tr>
<tr>
<td>Wheel valves venting OK.</td>
<td></td>
</tr>
<tr>
<td>Manifold valve assembly relief valve OK.</td>
<td>REASON FOR QUESTION</td>
</tr>
<tr>
<td>Manifold valve assembly OK.</td>
<td>CTIS may be unable to reach selected pressure and two lights will flash if air leaks from CTIS air hoses during inflation/deflation.</td>
</tr>
<tr>
<td>Quick release valves OK.</td>
<td></td>
</tr>
<tr>
<td>Rear axle quick release valve fittings OK.</td>
<td></td>
</tr>
<tr>
<td>Front quick release valve fittings OK.</td>
<td></td>
</tr>
<tr>
<td>Front tee fittings OK.</td>
<td></td>
</tr>
<tr>
<td>Manifold valve assembly delivery port fittings OK.</td>
<td></td>
</tr>
</tbody>
</table>

| POSSIBLE PROBLEMS | |
|--------------------| |
| Faulty cab floor supply hose fittings. | |
| Faulty supply hoses from quick release valve(s) to wheel valve(s). | |
| Faulty wheel valve filters. | |
| Faulty electrical connections at CTIS ECU and manifold valve assembly. | |
| Faulty ECU. | |

12. Are cab floor supply hose fittings free from leaks and damage?

NO

Tighten loose air hoses. Replace damaged air hoses and/or fittings (para 23-2).

YES
SOAPY WATER LEAK 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. Apply soapy water solution to cab floor supply hose fittings.
5. Check for air bubbles indicating leaks.
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).
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

**KNOWN INFO**
- Air hoses from wet tank to manifold valve assembly OK.
- Air compressor and governor adjustment OK.
- Wheel valves venting OK.
- Manifold valve assembly relief valve OK.
- Manifold valve assembly OK.
- Quick release valves OK.
- Rear axle quick release valve fittings OK.
- Front quick release valve fittings OK.
- Front tee fittings OK.
- Manifold valve assembly delivery port fittings OK.
- Cab floor supply line fittings OK.

**POSSIBLE PROBLEMS**
- Faulty supply hoses from quick release valve(s) to wheel valve(s).
- Faulty wheel valve filters.
- Faulty electrical connections at CTIS ECU and manifold valve assembly.
- Faulty ECU.

**TEST OPTIONS**
- Wheel Valve Air Line Test

**REASON FOR QUESTION**
- Leaking or blocked air supply hoses to wheel valves will prevent CTIS from coming to selected pressure during inflation or deflation and cause two steady mode lights to illuminate.

13. Are air supply hoses from quick release valves to wheel valves free from leaks and damage?

**YES**
- Tighten loose air hoses. Replace damaged air hoses and/or fittings (para 23-2).

**NO**
WHEEL VALVE AIR LINE TEST

(1) Check tire pressures after a deflation or inflation sequence. If one or more tires are at a different pressure than the rest, air hose to affected wheel(s) may be faulty.

(2) Disconnect supply air hose at banjo fitting on affected wheel(s).

(3) Select an inflation sequence at CTIS ECU (TM 9-2320-365-10).

(4) Check if air escapes at wheel during inflation.

(5) If air does not escape, locate leak or blockage by tracing hose between quick release valve and affected wheel(s) (refer to pneumatic schematic).
Wheel Valve Filter Inspection

Clogged wheel valve filters prevent air from passing into or escaping from tires during inflation or deflation and cause two steady mode lights to illuminate.

**Known Info**
- Air hoses from wet tank to manifold valve assembly OK.
- Air compressor and governor adjustment OK.
- Wheel valves venting OK.
- Manifold valve assembly relief valve OK.
- Manifold valve assembly OK.
- Quick release valves OK.
- Rear axle quick release valve fittings OK.
- Front quick release valve fittings OK.
- Front tee fittings OK.
- Manifold valve assembly delivery port fittings OK.
- Cab floor supply hose fittings OK.
- Supply hoses from quick release valve to wheel valves OK.

**Possible Problems**
- Faulty wheel valve filters.
- Faulty electrical connections at CTIS ECU and manifold valve assembly.
- Faulty ECU.

**Test Options**
- Wheel Valve Filter Inspection

**Reason for Question**
- Are filters at wheel valves clean?

**Diagram**
- If 'No', clean or replace wheel valve filters (para 12-5).
- If 'Yes', proceed to next step.
WHEEL VALVE FILTER INSPECTION

1. Jack up axle at affected wheel and support with trestles.
2. Remove two screws from wheel valve.
3. Remove wheel valve and unscrew from delivery hose.
4. Unscrew wheel valve filter from wheel valve.
5. Check if filter is clean and free from obstruction.
6. If filter is plugged with dirt, clean or replace wheel valve filters (para 12-5).
7. Install wheel valve on delivery hose.
8. Install wheel valve with two screws.
9. Install supply air line on banjo fitting.
m1. TWO STEADY MODE LIGHTS ILLUMINATE ON CTIS ECU (CONT)

Are electrical connectors at CTIS ECU and at manifold valve assembly clean and secure?

**KNOWN INFO**

- Air hoses from wet tank to manifold valve assembly OK.
- Air compressor and governor adjustment OK.
- Wheel valves venting OK.
- Manifold valve assembly relief valve OK.
- Manifold valve assembly OK.
- Quick release valves OK.
- Rear axle quick release valve fittings OK.
- Front quick release valve fittings OK.
- Front tee fittings OK.
- Manifold valve assembly delivery port fittings OK.
- Cab floor supply hose fittings OK.
- Supply hoses from quick release valve to wheel valves OK.
- Wheel valve filters OK.

**POSSIBLE PROBLEMS**

- Faulty electrical connections at CTIS ECU and manifold valve assembly.
- Faulty ECU.

**TEST OPTIONS**

- Visual inspection

**REASON FOR QUESTION**

- Erratic operation of CTIS system can often be traced to poor electrical connections.

---

**Clean and/or tighten electrical connections. Notify DS maintenance if electrical connectors are damaged.**

**Replace CTIS ECU (para 12-6).**
(1) Disconnect connectors P110 at CTIS ECU, P112 at manifold valve assembly solenoid, and P113 at manifold valve assembly pressure transducer.

(2) Check if connectors are clean and pins are undamaged.

(3) Connect and tighten connectors P113, P112, and P110.

(4) Install kick panel (para 16-3).
2-1798

m2. FOUR CTIS ECU INDICATOR LIGHTS FLASHING

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine running (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Parking brake on (TM 9-2320-365-10).</td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
<tr>
<td>Wheels chocked (TM 9-2320-365-10).</td>
<td>Gage, Tire Pressure (Item 11, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials/Parts</th>
<th>Pan, Wash (Item 25, Appendix C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap, Laundry (Item 69, Appendix D)</td>
<td>Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)</td>
</tr>
</tbody>
</table>

START

WARNING
CAUTION
Read WARNING and CAUTION on following page.

1. Are tires free from leaks?

NO

REASON FOR QUESTION

Tire Pressure Measurement

Low tire pressure or tire damage may cause CTIS to shut down to protect tire pressure in other wheels. Four CTIS ECU indicator lights will flash.

YES

Repair wheel (para 12-2).

KNOWLEDGE INFO

Air pressure at wet tank OK.

POSSIBLE PROBLEMS

Faulty tire(s).
Faulty CTIS wheel seal(s).
Faulty kneeling valve(s) at front wheel(s).
Faulty CTIS wheel valve(s).
Faulty air hoses from quick release valve to affected wheel(s).
Faulty front axle quick release valve.
Faulty rear axle quick release valve(s).
Faulty rear axle quick release valve fittings.
Faulty front axle quick release valve fittings.
Faulty front tee fittings.
Faulty manifold valve assembly delivery port fittings.
Faulty cab floor air hose fittings.
Faulty manifold valve assembly.
Faulty CTIS ECU.
WARNING

Wear appropriate eye protection when working under vehicle and around CTIS due to the possibility of falling or blown debris. Failure to comply may result in injury to personnel.

CAUTION

When RUN FLAT has been selected to perform a troubleshooting step, be sure to press RUN FLAT again when step is completed to terminate CTIS operation and prevent excessive air loss.

NOTE

Four mode lights flashing indicate CTIS has shut off due to uneven tire pressure (one tire 50 percent less than other pressures will do it), tire damage, or major leak. Operator can continue CTIS operation by pressing RUN FLAT on CTIS ECU. When RUN FLAT has been selected CTIS ECU checks pressures at 15 second intervals.

TIRE PRESSURE MEASUREMENT

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>(1) Measure and record the tire pressure of each tire (TM 9-2320-365-10).</td>
<td></td>
</tr>
<tr>
<td>(2) If any tire pressure is lower than the rest, visually inspect tire for damage.</td>
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<tr>
<td>(3) Apply soapy water solution to tire bead.</td>
<td></td>
</tr>
<tr>
<td>(4) Observe tire for bubbles indicating leaks.</td>
<td></td>
</tr>
</tbody>
</table>
2. Are CTIS wheel seals free from leaks at affected wheel(s)?

**Known Info**
- Air pressure at wet tank OK.
- Tires OK.

**Possible Problems**
- Faulty CTIS wheel seal(s).
- Faulty kneeling valve(s) at front wheel(s).
- Faulty CTIS wheel valve(s).
- Faulty air hoses from quick release valve to affected wheel(s).
- Faulty front axle quick release valve.
- Faulty rear axle quick release valve(s).
- Faulty rear axle quick release valve fittings.
- Faulty front axle quick release valve fittings.
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor air hose fittings.
- Faulty manifold valve assembly.
- Faulty CTIS ECU.

**Test Options**
- CTIS Wheel Seal Test

**Reason for Question**
- Four CTIS ECU indicator lights may flash if CTIS wheel seal is damaged.

**Diagram**
- NO
- Replace CTIS wheel seal (para 10-2).
- YES
CTIS WHEEL SEAL TEST

(1) Check axle hubs for presence of oil leaks that indicate a damaged CTIS wheel seal.

(2) Ensure wheel is at rest with hub plug at top of hub.

(3) Remove hub oil plug.

(4) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).

(5) Determine if air is escaping from hub. If air escapes, replace CTIS wheel seal (para 10-3).

(6) Install hub oil plug on wheel hub.
m2. **FOUR CTIS ECU INDICATOR LIGHTS FLASHING (CONT)**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pressure at wet tank OK.</td>
</tr>
<tr>
<td>Tires OK.</td>
</tr>
<tr>
<td>CTIS wheel seals OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty kneeling valve(s) at front wheel(s).</td>
</tr>
<tr>
<td>Faulty CTIS wheel valve(s).</td>
</tr>
<tr>
<td>Faulty air hoses from quick release valve to affected wheel(s).</td>
</tr>
<tr>
<td>Faulty front axle quick release valve.</td>
</tr>
<tr>
<td>Faulty rear axle quick release valve(s).</td>
</tr>
<tr>
<td>Faulty rear axle quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front axle quick release valve fittings.</td>
</tr>
<tr>
<td>Faulty front tee fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
</tr>
<tr>
<td>Faulty cab floor air hose fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty CTIS ECU.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soapy Water Leak Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air leaks from wheel valves and kneeling valve at front wheels may cause four CTIS ECU indicator lights to flash.</td>
</tr>
</tbody>
</table>

3. Are CTIS wheel valves and front wheel kneeling valves free from leaks and damage at affected wheel(s)?

- NO
  - Clean or replace kneeling valve (para 12-5). Replace wheel seal (para 12-5).
- YES
SOAPY WATER LEAK TEST

1. If front wheel is leaking, ensure kneeling valve is tight and secure in valve seat.
2. Apply soapy water to kneeling valve and check for leaks.
3. Apply soapy water solution to fittings on either side of wheel valve and observe fittings for bubbles indicating leaks.
4. With wheel valve still connected to tire, disconnect wheel valve air supply hose from hub at banjo fitting.
5. Place open end of air supply hose in container of water. Look for bubbles. Persistent bubbles from air supply hose indicate leaking wheel valve.
6. Connect air supply hose to hub at banjo fitting.
m2. FOUR CTIS ECU INDICATOR LIGHTS FLASHING (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pressure at wet tank OK.</td>
<td>Soapy Water Leak Test</td>
<td>A leak in supply hose to affected wheel will prevent wheel from coming to matching pressure with all other wheels and will cause four CTIS ECU indicator lights to flash.</td>
</tr>
<tr>
<td>Tires OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTIS wheel seals OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kneeling valves at front wheels OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTIS wheel valves OK.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th></th>
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<tbody>
<tr>
<td>Faulty air hoses from quick release valve to affected wheel(s).</td>
<td></td>
</tr>
<tr>
<td>Faulty front axle quick release valve.</td>
<td></td>
</tr>
<tr>
<td>Faulty rear axle quick release valve(s).</td>
<td></td>
</tr>
<tr>
<td>Faulty rear axle quick release valve fittings.</td>
<td></td>
</tr>
<tr>
<td>Faulty front axle quick release valve fittings.</td>
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<tr>
<td>Faulty front tee fittings.</td>
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<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
<td></td>
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<tr>
<td>Faulty cab floor air hose fittings.</td>
<td></td>
</tr>
<tr>
<td>Faulty manifold valve assembly.</td>
<td></td>
</tr>
<tr>
<td>Faulty CTIS ECU.</td>
<td></td>
</tr>
</tbody>
</table>

4. Are air hoses and fittings from quick release valve to affected wheel(s) free from leaks and damage?

- **NO**
  - Tighten loose air hoses. Replace damaged air hoses or fittings (para 23-2).

- **YES**
**SOAPY WATER LEAK TEST**

(1) If affected wheel is on intermediate axle
   (a) Apply soapy water solution to air supply fittings at affected wheel(s).
   (b) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
   (c) Check for bubbles indicating leaks at fittings.
   (d) Inspect air hose from wheel to quick release valve for leaks and damage.

(2) If affected wheel is on front axle
   (a) Apply soapy water solution to air supply fittings at affected wheel(s) and at frame adapter.

   **NOTE**
   CTIS air supply is front fitting on left front wheel back fitting on right front wheel.

   (b) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
   (c) Check for bubbles indicating leaks at fittings.
   (d) Inspect air hose from frame adapter to quick release valve for leaks and damage.
### Known Info
- Air pressure at wet tank OK.
- Tires OK.
- CTIS wheel seals OK.
- Kneeling valves at front wheels OK.
- CTIS wheel valves OK.
- Air hoses from quick release valve to affected wheels OK.

### Possible Problems
- Faulty front axle quick release valve.
- Faulty rear axle quick release valve(s).
- Faulty rear axle quick release valve fittings.
- Faulty front axle quick release valve fittings.
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor air hose fittings.
- Faulty manifold valve assembly.
- Faulty CTIS ECU.

### Test Options
- Visual inspection

### Reason for Question
Four CTIS ECU indicator lights will flash if quick release valve continually purges air.

#### Question
Is front axle quick release valve free from constant escape of air during inflation sequence?

#### Flowchart:
- **NO**
- **YES**
  - Clean or replace quick release valve (para 12-7).
(1) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
(2) Check front axle quick release valve for constant escape of air during inflation sequence.
(3) If air escapes from quick release valve exhaust port during inflation attempt, quick release valve diaphragm is damaged or a foreign object is lodged under diaphragm preventing it from closing.
6. Are rear axle quick release valves free from constant escape of air during inflation sequence?

**KNOWLEDGE INFO**
- Air pressure at wet tank OK.
- Tires OK.
- CTIS wheel seals OK.
- Kneeling valves at front wheels OK.
- CTIS wheel valves OK.
- Air hoses from quick release valve to affected wheels OK.
- Front axle quick release valve OK.

**POSSIBLE PROBLEMS**
- Faulty rear axle quick release valve(s).
- Faulty rear axle quick release valve fittings.
- Faulty front axle quick release valve fittings.
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor air hose fittings.
- Faulty manifold valve assembly.
- Faulty CTIS ECU.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- Four CTIS ECU indicator lights will flash if quick release valve continually purges air.

**OUTCOME**
- **NO**
  - Clean or replace rear quick release valve (para 12-9).
- **YES**
(1) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).

(2) Check rear axle quick release valve for constant escape of air during inflation sequence.

(3) If air escapes from quick release valve exhaust port during inflation attempt, quick release valve diaphragm is damaged or a foreign object is lodged under diaphragm preventing it from closing.
m2. FOUR CTIS ECU INDICATOR LIGHTS FLASHING (CONT)

**KNOWN INFO**
- Air pressure at wet tank OK.
- Tires OK.
- CTIS wheel seals OK.
- Kneeling valves at front wheels OK.
- CTIS wheel valves OK.
- Air hoses from quick release valve to affected wheels OK.
- Front axle quick release valve OK.
- Rear axle quick release valves OK.

**POSSIBLE PROBLEMS**
- Faulty rear axle quick release valve fittings.
- Faulty front axle quick release valve fittings.
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor air hose fittings.
- Faulty manifold valve assembly.
- Faulty CTIS ECU.

<table>
<thead>
<tr>
<th>Test Options</th>
<th>Reason for Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soapy Water Leak Test</td>
<td>CTIS may be unable to reach selected pressure and four CTIS ECU indicator lights will flash if air leaks from CTIS air hoses during inflation/deflation sequence.</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**

**REASON FOR QUESTION**

7. Are rear axle quick release valve fittings free from leaks and damage?

**Flowchart:**
- **YES:** Tighten loose air hoses. Replace damaged air hoses or fittings (para 23-2).
- **NO:**
  - Faulty rear axle quick release valve fittings.
  - Faulty front axle quick release valve fittings.
  - Faulty front tee fittings.
  - Faulty manifold valve assembly delivery port fittings.
  - Faulty cab floor air hose fittings.
  - Faulty manifold valve assembly.
  - Faulty CTIS ECU.
### SOAPY WATER LEAK TEST

1. Select RUN FLAT at CTIS ECU (TM 9-2320-365-10) and listen for obvious air escape in CTIS system.
2. If obvious air escape is heard, perform repair at damaged area. If no obvious air escape is heard, proceed to quick release valve leak check.
3. Apply soapy water solution to quick release valve fittings at rear axle.
4. Check for bubbles indicating leaks.

![Diagram of Rear Axle Quick Release Valve](image-url)
Soapy Water Leak Test

Are front axle quick release valve fittings free from leaks and damage?

REASON FOR QUESTION
CTIS may be unable to reach selected pressure and four CTIS ECU indicator lights will flash if air leaks from CTIS air hoses during inflation/deflation sequence.

KNOWLEDGE INFO
Air pressure at wet tank OK. Tires OK. CTIS wheel seals OK. Kneeling valves at front wheels OK. CTIS wheel valves OK. Air hoses from quick release valve to affected wheels OK. Front axle quick release valve OK. Rear axle quick release valves OK. Rear axle quick release valve fittings OK.

POSSIBLE PROBLEMS

TEST OPTIONS
Soapy Water Leak Test

YES

Tighten loose air hoses. Replace damaged air hose and/or fittings (para 23-2).

NO
### SOAPY WATER LEAK TEST

1. Apply soapy water solution to front quick release valve fittings.
2. Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
3. Check for bubbles indicating leaks.
Soapy Water Leak Test
Are front tee fittings free from leaks and damage?

**KNOWN INFO**
- Air pressure at wet tank OK.
- Tires OK.
- CTIS wheel seals OK.
- Kneeling valves at front wheels OK.
- CTIS wheel valves OK.
- Air hoses from quick release valve to affected wheels OK.
- Front axle quick release valve OK.
- Rear axle quick release valves OK.
- Rear axle quick release valve fittings OK.
- Front quick release valve fittings OK.

**POSSIBLE PROBLEMS**
- Faulty front tee fittings.
- Faulty manifold valve assembly delivery port fittings.
- Faulty cab floor air hose fittings.
- Faulty manifold valve assembly.
- Faulty CTIS ECU.

**TEST OPTIONS**
- Soapy Water Leak Test

**REASON FOR QUESTION**
- CTIS may be unable to reach selected pressure and four CTIS ECU indicator lights will flash if air leaks from CTIS air hoses during inflation/deflation sequence.

**9.**

- **NO**
  - Tighten loose air hoses or fittings (para 23-2).

- **YES**
  - Replace damaged air hoses or fittings (para 23-2).
SOAPY WATER LEAK TEST

(1) Apply soapy water solution to tee fittings at muffler.
(2) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
(3) Check for bubbles indicating leaks.
m2. **FOUR CTIS ECU INDICATOR LIGHTS FLASHING (CONT)**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pressure at wet tank OK.</td>
</tr>
<tr>
<td>Tires OK.</td>
</tr>
<tr>
<td>CTIS wheel seals OK.</td>
</tr>
<tr>
<td>Kneeling valves at front wheels OK.</td>
</tr>
<tr>
<td>CTIS wheel valves OK.</td>
</tr>
<tr>
<td>Air hoses from quick release valve to affected wheels OK.</td>
</tr>
<tr>
<td>Front axle quick release valve OK.</td>
</tr>
<tr>
<td>Rear axle quick release valves OK.</td>
</tr>
<tr>
<td>Rear axle quick release valve fittings OK.</td>
</tr>
<tr>
<td>Front quick release valve fittings OK.</td>
</tr>
<tr>
<td>Front tee fittings OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty manifold valve assembly delivery port fittings.</td>
</tr>
<tr>
<td>Faulty cab floor air hose fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty CTIS ECU.</td>
</tr>
</tbody>
</table>

---

10. Are manifold valve assembly delivery port fittings free from leaks and damage?

- **NO**
  - **TEST OPTIONS**
    - Soapy Water Leak Test
    - **REASON FOR QUESTION**
      - CTIS may be unable to reach selected pressure and four CTIS ECU indicator lights will flash if air leaks from CTIS air hoses during inflation/deflation sequence.

- **YES**
  - Tighten loose air hoses. Replace damaged air hoses or fittings (para 23-2).
<table>
<thead>
<tr>
<th>SOAPY WATER LEAK TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>(2) Apply soapy water solution to manifold valve assembly delivery port fittings.</td>
</tr>
<tr>
<td>(3) Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(4) Check for bubbles indicating leaks.</td>
</tr>
</tbody>
</table>
m2. FOUR CTIS ECU INDICATOR LIGHTS FLASHING (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
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<tr>
<td>Air pressure at wet tank OK.</td>
</tr>
<tr>
<td>Tires OK.</td>
</tr>
<tr>
<td>CTIS wheel seals OK.</td>
</tr>
<tr>
<td>Kneeling valves at front wheels OK.</td>
</tr>
<tr>
<td>CTIS wheel valves OK.</td>
</tr>
<tr>
<td>Air hoses from quick release valve to affected wheels OK.</td>
</tr>
<tr>
<td>Front axle quick release valve OK.</td>
</tr>
<tr>
<td>Rear axle quick release valves OK.</td>
</tr>
<tr>
<td>Rear axle quick release valve fittings OK.</td>
</tr>
<tr>
<td>Front quick release valve fittings OK.</td>
</tr>
<tr>
<td>Front tee fittings OK.</td>
</tr>
<tr>
<td>Manifold valve assembly delivery port fittings OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty cab floor air hose fittings.</td>
</tr>
<tr>
<td>Faulty manifold valve assembly.</td>
</tr>
<tr>
<td>Faulty CTIS ECU.</td>
</tr>
</tbody>
</table>

11. Are cab floor supply hose fittings free from leaks and damage?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soapy Water Leak Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTIS may be unable to reach selected pressure and four CTIS ECU indicator lights will flash if air leaks from CTIS air hoses during inflation/deflation sequence.</td>
</tr>
</tbody>
</table>

NO

Tighten loose air hoses.
Replace damaged air hoses or fittings (para 23-2).

YES
### SOAPY WATER LEAK TEST

1. Remove two screws and washers from front grille.
2. Remove screw and washer from front grille.
3. Remove front grille.
4. Apply soapy water solution to cab floor supply hose fittings.
5. Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
6. Check for bubbles indicating leaks.
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).
m2. **FOUR CTIS ECU INDICATOR LIGHTS FLASHING (CONT)**

**KNOWN INFO**

| Air pressure at wet tank OK. |
| Tires OK. |
| CTIS wheel seals OK. |
| Kneeling valves at front wheels OK. |
| CTIS wheel valves OK. |
| Air hoses from quick release valve to affected wheels OK. |
| Front axle quick release valve OK. |
| Rear axle quick release valves OK. |
| Rear axle quick release valve fittings OK. |
| Front quick release valve fittings OK. |
| Front tee fittings OK. |
| Manifold valve assembly delivery port fittings OK. |
| Cab floor air hose fittings OK. |

**POSSIBLE PROBLEMS**

- Faulty manifold valve assembly.
- Faulty CTIS ECU.

**TEST OPTIONS**

| Manifold Valve Assembly Test |

**REASON FOR QUESTION**

Four CTIS ECU indicator lights will flash if manifold valve assembly is defective.

---

12. **Does manifold valve assembly click when selecting mode change and is no air heard blowing through valve?**

**YES**

- Repair or replace manifold valve assembly (para 12-7).

**NO**

- Replace CTIS ECU (para 12-6).
### MANIFOLD VALVE ASSEMBLY TEST

1. Select RUN FLAT at CTIS ECU (TM 9-2320-365-10).
2. Check manifold valve assembly by listening for clicking when selecting mode change. If no clicking is heard or if air blows through manifold valve assembly, replace manifold valve assembly (para 12-7).
3. If manifold valve is ok, replace CTIS ECU (para 12-6).
4. Install kick panel (para 16-3).
m3. FIVE CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATOR LIGHTS FLASHING

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- Kick panel removed (para 16-3).

Personnel Required
- (2)

Tools and Special Tools
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Multimeter, Digital (Item 22, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

1. WARNING
   Read WARNING on following page.

   Is CTIS manifold valve vent hose or bulkhead fitting plugged or restricted?

   TEST OPTIONS
   - Visual Inspection

   REASON FOR QUESTION
   If CTIS manifold valve vent hose or bulkhead fitting is plugged, CTIS system will not operate correctly.

   YES
   Clean CTIS manifold valve vent hose (para 2-38).

   NO
   Go to step 2 of this fault.
The sudden release of high pressure air can cause damage to eyes. Wear appropriate eye protection when working near pressurized air. Failure to comply may result in injury to personnel.

(1) Check to see if vehicle is equipped vent cover and vent cover is in good condition.
(2) If vehicle is not equipped with vent cover or vent cover is damaged perform steps (4) through (18) of this test.
(3) If vehicle is equipped with vent cover and vent cover is in good condition, go to step 2 of this fault.
(4) Disconnect CTIS manifold valve vent hose from CTIS manifold valve assembly.
(5) Disconnect CTIS manifold valve vent hose from bulkhead fitting in cab floor.
(6) Check to see if CTIS manifold valve vent hose or bulkhead fitting is plugged or restricted.
(7) If CTIS manifold valve vent hose and bulkhead fitting are not plugged or restricted, go to step 2 of this fault.
(8) If CTIS manifold valve vent hose or bulkhead fitting is plugged or restricted, clean CTIS manifold valve vent hose and bulkhead fitting (para 2-38).
(9) Connect CTIS manifold valve vent hose to CTIS manifold valve assembly.
(10) Connect CTIS manifold valve vent hose to bulkhead fitting in cab floor.
(11) Remove two screws and washer from front grille.
(12) Remove screw, washer, and front grille from cab.

**NOTE**
Perform step (13) if vent cover is damaged.

(13) Remove retaining nut and vent cover from bulkhead fitting. Discard retaining nut and vent cover.

**NOTE**
Part number 12422659 is required for step (14).

(14) Install vent cover on bulkhead fitting with retaining nut.
(15) Position front grille on cab with washer and screw.
(16) Position two washers and screws in front grille.
(17) Tighten screw to 48-60 lb-in. (5-7 N.m).
(18) Tighten two screws to 24 lb-in. (3 N.m).
m3. FIVE CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATOR LIGHTS FLASHING (CONT)

**KNOWN INFO**

Front and rear air gages read 120 PSI.
CTIS manifold valve vent hose and bulkhead fitting OK.

**POSSIBLE PROBLEMS**

Faulty air hose or fittings.
Faulty front axle CTIS quick release valve.
Faulty rear axle CTIS quick release valve.
Faulty wheel valve.
Faulty front wheel kneeling valve.
Faulty wheel seals.
Faulty electrical system.

---

**TEST OPTIONS**

Is air present from port C on CTIS manifold valve?

- **YES**
  - Go to Electrical System Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).

- **NO**
  - Replace or repair air hose or fittings (para 2-42).

**REASON FOR QUESTION**

If air is leaking during inflation mode, CTIS pneumatic system is faulty.
Five flashing indicator lights indicate a defect in CTIS critical component(s) causing system to shut off. Override cannot be applied but system can be activated by turning vehicle off and then on again.

2. Set CTIS ECU to RUN FLAT mode (TM 9-2320-365-10).
3. Check CTIS air hoses and fittings for leaks (Table 23-2 Central Tire Inflation System (CTIS) Air Hose Locations).
4. If any leaks are found, repair or replace CTIS air hose and/or fittings (para 2-42).
5. Shut down engine (TM 9-2320-365-10).

NOTE

Disconnect CTIS manifold output hose from CTIS manifold valve assembly port C.
(2) Start engine (TM 9-2320-365-10).
(3) Select CTIS inflation mode (TM 9-2320-365-10).
(4) Wait for CTIS to cycle and check for quick bursts of air to expel from CTIS manifold valve assembly port C.
(5) Check for five CTIS ECU indicator lights flashing.
(6) If air does not expel from CTIS manifold valve assembly or CTIS ECU does not have five flashing indicator lights, go to Electrical System Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).
(7) Shut down engine (TM 9-2320-365-10).
(8) Connect CTIS manifold output hose to CTIS manifold valve assembly port C.
(9) Install kick panel (para 16-3).
m3. FIVE CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATOR LIGHTS FLASHING (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front and rear air gages read 120 PSI.</td>
</tr>
<tr>
<td>CTIS manifold valve vent hose and bulkhead fitting OK.</td>
</tr>
<tr>
<td>Air hose and fittings OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty front axle CTIS quick release valve.</td>
</tr>
<tr>
<td>Faulty rear axle CTIS quick release valve.</td>
</tr>
<tr>
<td>Faulty wheel valve.</td>
</tr>
<tr>
<td>Faulty front wheel kneeling valve.</td>
</tr>
<tr>
<td>Faulty wheel seals.</td>
</tr>
<tr>
<td>Faulty electrical system.</td>
</tr>
</tbody>
</table>

4. Is front axle CTIS quick release valve free from exhausting air during inflation mode?

- **NO**
  - Visual Inspection
  - REASON FOR QUESTION: If air exhausts from CTIS quick release valve during inflation mode, CTIS quick release valve is faulty.

- **YES**
  - Replace front axle CTIS quick release valve (para 12-8).
(1) Start engine (TM 9-2320-365-10).
(2) Select CTIS inflation mode (TM 9-2320-365-10).
(3) Check for air escaping from front axle CTIS quick release valve during inflation mode.
(4) If air is escaping from front axle CTIS quick release valve during inflation mode, replace front axle CTIS quick release valve (para 12-8).
(5) Shut down engine (TM 9-2320-365-10).
m3. FIVE CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATOR LIGHTS FLASHING (CONT)

**KNOWN INFO**

Front and rear air gages read 120 PSI.
CTIS manifold valve vent hose and bulkhead fitting OK
Air hose and fittings OK.
Front axle CTIS quick release valve OK.

**POSSIBLE PROBLEMS**

Faulty rear axle CTIS quick release valve.
Faulty wheel valve.
Faulty front wheel kneeling valve.
Faulty wheel seals.
Faulty electrical system.

**TEST OPTIONS**

Visual Inspection

**REASON FOR QUESTION**

If air exhausts from CTIS quick release valve during inflation mode, CTIS quick release valve is faulty.

---

5. Are rear axle CTIS quick release valves free from exhausting air during inflation mode?

**YES**

Replace rear axle CTIS quick release valve (para 12-9).

**NO**
(1) Start engine (TM 9-2320-365-10).
(2) Select CTIS inflation mode (TM 9-2320-365-10).
(3) Check for air escaping from rear axle CTIS quick release valves during inflation mode.
(4) If air is escaping from rear axle CTIS quick release valves during inflation mode, replace rear axle CTIS quick release valve (para 12-9).
(5) Shut down engine (TM 9-2320-365-10).
6. Are CTIS wheel valves and front wheel kneeling valves free from leaks and damage?

**KNOWN INFO**
- Front and rear air gages read 120 PSI.
- CTIS manifold valve vent hose and bulkhead fitting OK.
- Air hose and fittings OK.
- Front axle CTIS quick release valves OK.
- Rear axle CTIS quick release valve OK.

**POSSIBLE PROBLEMS**
- Faulty wheel valve.
- Faulty front wheel kneeling valve.
- Faulty wheel seals.
- Faulty electrical system.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
Leaks at wheel valves and front wheel kneeling valve(s) that cause rapid tire deflation will make five CTIS ECU mode lights flash.

**YES**
- Replace kneeling valve(s) or wheel valve(s) (para 12-5).

**NO**
(1) Start engine (TM 9-2320-365-10).
(2) Select CTIS inflation mode (TM 9-2320-365-10).
(3) Listen for audible escape of air at kneeling valve (front wheels only) and CTIS wheel valves on each wheel.
(4) If audible escape of air is present, replace wheel kneeling valve(s) or wheel valve(s) (para 12-5).
(5) Shut down engine (TM 9-2320-365-10).
m3. FIVE CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATOR LIGHTS FLASHING (CONT)

| KNOWN INFO |
| Front and rear air gages read 120 PSI.  
  CTIS manifold valve vent hose and bulkhead fitting OK.  
  Air hose and fittings OK.  
  Front axle CTIS quick release valves OK.  
  Rear axle CTIS quick release valve OK.  
  Wheel valves OK.  
  Front wheel kneeling valves OK. |

| POSSIBLE PROBLEMS |
| Faulty wheel seals.  
 Faulty electrical system. |

| TEST OPTIONS |
| Visual Inspection |

| REASON FOR QUESTION |
| Seriously damaged wheel seals will audibly exhaust air and cause CTIS to shutdown with five CTIS ECU mode lights flashing. |

7. Are wheel seals free from major leaks?

- **NO**
  - Replace wheel seals (para 12-2).  
  - Go to Electrical System Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).

- **YES**
  - Go to Electrical System Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).
(1) Move vehicle until hub plug on wheel is in 12 o'clock position.
(2) Remove wheel hub plug.
(3) Start engine (TM 9-2320-365-10).
(4) Select CTIS inflation mode (TM 9-2320-365-10).
(5) Listen at wheel hub for audible escape of air.
(6) If audible escape of air is present, replace wheel seal (para 12-2).
(7) Install wheel hub plug.
(8) Perform steps 1 thru 5 on remaining wheels.
(9) If no air is audibly present from wheel hub, perform Electrical System Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).
(10) Shut down engine (TM 9-2320-365-10).
Front and rear pressure gages read 120 psi. CTIS system operates OK.

Are front tires losing pressure?

**KNOW INFO**
- Front and rear pressure gages read 120 psi.
- CTIS system operates OK.

**POSSIBLE PROBLEMS**
- Faulty kneeling valve(s).
- Faulty tire(s).
- Faulty wheel valve(s).
- Faulty air hose(s) from quick release valve to affected wheel(s).
- Faulty quick release valve(s).

**TEST OPTIONS**
- Tire Pressure Measurement
- REASON FOR QUESTION
  - Low tire pressure caused by leaking kneeling valve(s) (front tires only), damaged tire(s) or CTIS wheel valve(s) may cause system to recycle.

**INITIAL SETUP**

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

**Materials/Parts**
- Soap, Laundry (Item 69, Appendix D)

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Gage, Tire Pressure (Item 11, Appendix C)
- Pan, Wash (Item 25, Appendix C)
WARNING

Wear appropriate eye protection when working under vehicle and around CTIS system due to the possibility of falling and/or blown debris. Failure to comply may result in injury to personnel.

NOTE

CTIS ECU checks tire pressure 30 seconds after completing a pressure change sequence. If tire pressures are the same, system reverts to checking pressure every 15 minutes. If tires are losing pressure, ECU inflates tires and checks pressure again in 30 seconds. If CTIS has to repeat this process more than 10 times, ECU will display four flashing lights.

(1) Measure and record the tire pressure of each tire (TM 9-2320-365-10).
(2) If front tire(s) have lower pressure than the rest, kneeling valve, tire or CTIS wheel valve is faulty.
(3) If rear tire(s) have lower pressure than the rest, tire or CTIS wheel valve is faulty.
m4. CTIS REPEATEDLY RESUMES CYCLING 30 SECONDS AFTER INDICATOR LIGHTS STOP FLASHING (CONT)

2. Is kneeling valve on affected wheel(s) free from leaks?

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Front and rear pressure gages read 120 psi.</td>
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<tr>
<td>CTIS system operates OK.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
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<tbody>
<tr>
<td>Faulty kneeling valve(s).</td>
</tr>
<tr>
<td>Faulty tire(s).</td>
</tr>
<tr>
<td>Faulty wheel valve(s).</td>
</tr>
<tr>
<td>Faulty air hose(s) from quick release valve to affected wheel(s).</td>
</tr>
<tr>
<td>Faulty quick release valve(s).</td>
</tr>
</tbody>
</table>

NO

- Clean and tighten or replace kneeling valve (para 12-5).

YES

3. Are tires free from leaks or damage?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front and rear pressure gages read 120 psi.</td>
</tr>
<tr>
<td>CTIS system operates OK.</td>
</tr>
<tr>
<td>Kneeling valve(s) OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty tire(s).</td>
</tr>
<tr>
<td>Faulty wheel valve(s).</td>
</tr>
<tr>
<td>Faulty air hose(s) from quick release valve to affected wheel(s).</td>
</tr>
<tr>
<td>Faulty quick release valve(s).</td>
</tr>
</tbody>
</table>

NO

- Repair tire(s) (para 12-2) or replace tire(s) (TM 9-2320-365-10).

YES

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soapy Water Leak Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A leaking kneeling valve can cause tire to loose air pressure and CTIS system may repeat inflation sequence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soapy Water Leak Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A leaking tire can cause CTIS system to detect a pressure loss and repeat inflation sequence.</td>
</tr>
</tbody>
</table>
### SOAPY WATER LEAK TEST

1. Check kneeling valve is tight and secure in valve seat.
2. Apply soapy water to valve and check for leaks.

---

<table>
<thead>
<tr>
<th>TIRE BEAD</th>
<th>KNEELING VALVE</th>
</tr>
</thead>
</table>

### SOAPY WATER LEAK TEST

1. Visually inspect tire for damage.
2. Apply soapy water solution to tire bead.
3. Observe tire for bubbles indicating leaks.
m4. **CTIS REPEATEDLY RESUMES CYCLING 30 SECONDS AFTER INDICATOR LIGHTS STOP FLASHING (CONT)**

**KNOWN INFO**
- Front and rear pressure gages read 120 psi.
- CTIS system operates OK.
- Kneeling valve(s) OK.
- Tire(s) OK.

**POSSIBLE PROBLEMS**
- Faulty wheel valve(s).
- Faulty air hose(s) from quick release valve to affected wheel(s).
- Faulty quick release valve(s).

<table>
<thead>
<tr>
<th>4.</th>
<th>Are CTIS wheel valves free from leaks and damage at affected wheel(s)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>Replace wheel valve (para 12-5).</td>
</tr>
<tr>
<td>YES</td>
<td>Replace faulty quick release valve(s) (para 12-8 and/or 12-9).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.</th>
<th>Are air lines between affected wheel(s) and quick release valve(s) free from folds or constrictions?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>Replace damaged air lines (para 23-2).</td>
</tr>
<tr>
<td>YES</td>
<td>Replace faulty quick release valve(s) (para 12-8 and/or 12-9).</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**
- Soapy Water Leak Test
- Visual inspection

**REASON FOR QUESTION**
- If CTIS wheel valves are leaking, CTIS ECU may detect loss of pressure on system and repeat inflation sequence.
- If air line(s) between wheel(s) and quick release valves are constricted, wheel valve(s) may not close immediately and tires will lose air, causing CTIS to recycle.
**SOAPY WATER LEAK TEST**

1. Apply soapy water solution to CTIS fittings on outside of wheel.
2. Observe fittings for bubbles indicating leaks.
3. With wheel valve still connected to tire, disconnect wheel valve air supply line from hub at banjo bolt.
4. Place open end of air supply line in container of water. Look for air bubbles.
5. Persistent bubbles from air line indicate faulty wheel valve.
6. Connect wheel valve to hub at banjo bolt.

**NOTE**

If air line from quick release valve to affected wheel is partially obstructed, air line to wheel cannot escape back to quick release valve immediately after tire is pressurized causing wheel valve to remain partially open and tire to lose pressure. System will cycle again when low pressure is checked after 30 seconds.

1. Check air supply line(s) from quick release valve(s) to affected wheel(s) for constrictions. See illustration for fitting and quick release valve locations.
2. If air supply line is not constricted, quick release valve for affected wheel is faulty.
### INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Pan, Wash (Item 25, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials/Parts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap, Laundry (Item 69, Appendix D)</td>
<td></td>
</tr>
</tbody>
</table>

### KNOWN INFO

- Front and rear air gages read 120 psi.

### POSSIBLE PROBLEMS

- Leaking air hoses or fittings.
- Faulty pressure protection valve.
- Faulty main air supply hose.
- Faulty CTIS manifold input hose.
- Faulty electrical system.

### TEST OPTIONS

<table>
<thead>
<tr>
<th>WARNING Read WARNING on following page.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is CTIS air hoses and fittings free from air leaks during inflation mode?</td>
</tr>
</tbody>
</table>

1. If air is leaking during inflation mode, CTIS air hose(s) and/or fittings are faulty.

2. Replace air hose(s) and/or fittings (para 23-2).
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) Start engine (TM 9-2320-365-10).
(2) Set CTIS ECU to RUN FLAT mode (TM 9-2320-365-10).
(3) Apply soapy water solution to CTIS air hoses and fittings (Table 23-2 Central Tire Inflation System (CTIS) Air Hose Locations).
(4) Check for soap bubbles indicating leaks.
(5) If any leaks are found, replace CTIS air hose and/or fittings (para 23-2).
(6) Shut down engine (TM 9-2320-365-10).
m5. CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATES NO FAULT CODE BUT SYSTEM FAILS TO INFLATE OR DEFLATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front and rear air gages read 120 psi.</td>
<td>Visual Inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaking air hoses or fittings.</td>
<td>If air is leaking from air transportability air hose(s) and/or fittings, air hose(s) and/or fittings are faulty.</td>
</tr>
<tr>
<td>Faulty pressure protection valve.</td>
<td></td>
</tr>
<tr>
<td>Faulty main air supply hose.</td>
<td></td>
</tr>
<tr>
<td>Faulty CTIS manifold input hose.</td>
<td></td>
</tr>
<tr>
<td>Faulty electrical system.</td>
<td></td>
</tr>
</tbody>
</table>

2. Are air transportability air hoses and fittings free from leaks?

- NO
  - Replace air hose(s) and/or fittings (para 23-3).

- YES
(1) Start engine (TM 9-2320-365-10).
(2) Apply soapy water solution to air transportability air hoses and fittings (Table 23-3. Air Transportability Air Hose Locations).
(3) Check for soap bubbles indicating leaks.
(4) If any leaks are found, replace air transportability air hose and/or fittings (para 23-3).
(5) Shut down engine (TM 9-2320-365-10).
m5. CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATES NO FAULT CODE BUT SYSTEM FAILS TO INFLATE OR DEFATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front and rear air gages read 120 psi.</td>
</tr>
<tr>
<td>Air hoses and fittings free from leaks.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty pressure protection valve.</td>
</tr>
<tr>
<td>Faulty main air supply hose.</td>
</tr>
<tr>
<td>Faulty CTIS manifold input hose.</td>
</tr>
<tr>
<td>Faulty electrical system.</td>
</tr>
</tbody>
</table>

3. **Is air present from pressure protection valve?**

   - **NO**
     - **REASON FOR QUESTION**
       - If air is not present from pressure protection valve, pressure protection valve is faulty.

   - **YES**
     - **TEST OPTIONS**
       - Visual Inspection
     - **Replace pressure protection valve (para 11-27).**
(1) Disconnect main air supply hose from pressure protection valve.
(2) Start engine (TM 9-2320-365-10).
(3) If air is not present from pressure protection valve, replace pressure protection valve (para 11-27).
(4) Shut down engine (TM 9-2320-365-10).
(5) Connect main air supply hose to pressure protection valve.
m5. CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATES NO FAULT CODE BUT SYSTEM FAILS TO INFLATE OR DEFLATE (CONT)

**KNOWN INFO**
- Front and rear air gages read 120 psi.
- Air hoses and fittings free from leaks.
- Pressure protection valve OK.

**POSSIBLE PROBLEMS**
- Faulty main air supply hose.
- Faulty CTIS manifold input hose.
- Faulty electrical system.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- Is air present from main air supply hose?

- If air is not present from main air supply hose, main air supply hose is faulty.

- Replace main air supply hose (para 23-2).
(1) Remove kick panel (para 16-3).
(2) Disconnect CTIS manifold input hose from cab bulkhead fitting.
(3) Start engine (TM 9-2320-365-10).
(4) If air is not present from cab bulkhead fitting, replace main air supply hose (para 23-2).
(5) Shut down engine (TM 9-2320-365-10).
(6) Connect CTIS manifold input hose to cab bulkhead fitting.
m5. CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU INDICATES NO FAULT CODE BUT SYSTEM FAILS TO INFLATE OR DEFLECT (CONT)

**KNOWN INFO**
- Front and rear air gages read 120 psi.
- Air hoses and fittings free from leaks.
- Pressure protection valve OK.
- Main air supply hose OK.

**POSSIBLE PROBLEMS**
- Faulty CTIS manifold input hose.
- Faulty electrical system.

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Inspection</td>
<td>If air is not present from CTIS manifold input hose, CTIS manifold input hose is faulty.</td>
</tr>
</tbody>
</table>

5. Is air present from CTIS manifold input hose?

- **NO**
  - Replace CTIS manifold input hose (para 23-2).

- **YES**
  - Go to Electrical System Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).
1. Disconnect CTIS manifold input hose from CTIS manifold valve.
2. Start engine (TM 9-2320-365-10).
3. If air is not present from CTIS manifold input hose, replace CTIS manifold input hose (para 23-2).
4. If air is present from CTIS manifold input hose go to Electrical Troubleshooting (e82. Central Tire Inflation System (CTIS) Does Not Operate).
5. Shut down engine (TM 9-2320-365-10).
6. Connect CTIS manifold input hose to CTIS manifold valve.
7. Install kick panel (para 16-3).
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine running (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td>Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td>Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)</td>
</tr>
<tr>
<td>References</td>
<td>STE/ICE-R (Item 39, Appendix C)</td>
</tr>
<tr>
<td>TM 9-4910-571-12&amp;P</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KNOWLEDGE INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breakers OK.</td>
</tr>
<tr>
<td>Power supplied to CTIS.</td>
</tr>
<tr>
<td>Speedometer OK.</td>
</tr>
<tr>
<td>Indicator display lights OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty CTIS cable-speed signal.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - speed signal.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - LED input to CTIS cable.</td>
</tr>
<tr>
<td>Faulty CTIS cable - LED input to ECU.</td>
</tr>
<tr>
<td>Faulty ECU - O.S pressure change function.</td>
</tr>
<tr>
<td>Faulty overspeed indicator LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - ground for LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - power to LED.</td>
</tr>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S. warning indicator function.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If ECU does not receive a speed signal it cannot activate the overspeed protection system.</td>
</tr>
</tbody>
</table>

1. Do overspeed warning light and overspeed pressure change bolts fail to operate?

START

NO

YES

Go to step 6 of this fault.
(1) Select -C mode at CTIS ECU (TM 9-2320-365-10).
(2) Turn on headlights (TM 9-2320-365-10).
(3) Perform road test.
(4) Increase speed to 40 mph.
(5) Check if overspeed warning light flashes.
(6) After about one minute, check if overspeed pressure change is activated to raise tire pressure to HWY mode.
(7) If both functions fail to activate, speed signal to ECU is faulty or ECU may be faulty.
(8) Shut down engine (TM 9-2320-365-10).
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breakers OK.</td>
</tr>
<tr>
<td>Power supplied to CTIS.</td>
</tr>
<tr>
<td>Indicator display lights OK.</td>
</tr>
</tbody>
</table>

<table>
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<td>Faulty cab dashboard wiring harness - speed signal.</td>
</tr>
<tr>
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<tr>
<td>Faulty CTIS cable - LED input to ECU.</td>
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</tr>
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<td>Faulty cab dashboard wiring harness - ground for LED.</td>
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<tr>
<td>Faulty cab dashboard wiring harness - power to LED.</td>
</tr>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S warning indicator function.</td>
</tr>
</tbody>
</table>

2. Is continuity present from P110U to P111B?

- **NO**
  - Repair wire 1528 (para 2-40)
  - or replace CTIS cable assembly (para 7-53).

- **YES**
  - **TEST OPTIONS**
    - Continuity Test or STE/ICE-R Test #91
  - **REASON FOR QUESTION**
    - CTIS overspeed warning light and overspeed pressure change will not operate if CTIS ECU does not receive speed signal through CTIS cable assembly.
<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove kick panel (para 16-3).</td>
</tr>
<tr>
<td>(2) Disconnect connector P110 from CTIS ECU.</td>
</tr>
<tr>
<td>(3) Disconnect connector P111 from connector J111.</td>
</tr>
<tr>
<td>(4) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to connector P110U.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to connector P111B and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) If continuity is not present, repair wire 1528 (para 2-40) or replace CTIS cable assembly (para 7-53).</td>
</tr>
</tbody>
</table>
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE
(CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breakers OK.</td>
</tr>
<tr>
<td>Power supplied to CTIS.</td>
</tr>
<tr>
<td>Speedometer OK.</td>
</tr>
<tr>
<td>Indicator display lights OK.</td>
</tr>
<tr>
<td>CTIS cable-speed signal OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty cab dashboard wiring harness - speed signal.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - LED input to CTIS cable.</td>
</tr>
<tr>
<td>Faulty CTIS cable - LED input to ECU.</td>
</tr>
<tr>
<td>Faulty ECU - O.S pressure change function.</td>
</tr>
<tr>
<td>Faulty overspeed indicator LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - ground for LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - power to LED.</td>
</tr>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S warning indicator function.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTIS overspeed warning light and overspeed pressure change will not operate if CTIS ECU does not receive speed signal through cab dashboard wiring harness.</td>
</tr>
</tbody>
</table>

3. Is continuity present from J111B to P 8-4?

- **NO**
  - Repair wire 1793 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

- **YES**
CONTINUITY TEST

(1) Remove instrument panel assembly for access (para 7-15).
(2) Disconnect connector clamp from speedometer connector.
(3) Disconnect connector P 8 from speedometer.
(4) Set multimeter to ohms position.
(5) Connect positive (+) probe of multimeter to connector J111B.
(6) Connect negative (-) probe of multimeter to connector P 8-4 and note reading on multimeter.
(7) If continuity is not present, repair wire 1793 (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 P 8 to speedometer.
(9) Connect connector clamp to speedometer connector.
(10) Install instrument panel assembly (para 7-15).
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
</table>
| Circuit breakers OK.  
| Power supplied to CTIS.  
| Speedometer OK.  
| Indicator display lights OK.  
| CTIS cable-speed signal OK.  
| Cab dashboard wiring harness - speed signal OK.  |

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
</table>
| Faulty cab dashboard wiring harness - LED input to CTIS cable.  
| Faulty CTIS cable - LED input to ECU.  
| Faulty ECU - O.S. pressure change function.  
| Faulty overspeed indicator LED.  
| Faulty cab dashboard wiring harness - ground for LED.  
| Faulty cab dashboard wiring harness - power to LED.  
| Faulty CTIS cable power to LED.  
| Faulty ECU - O.S. warning indicator function.  |

**TEST OPTIONS**

<table>
<thead>
<tr>
<th>Voltage Test or STE/ICE-R Test #89</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTIS overspeed indicator will not work without 24 vdc to P111D.</td>
</tr>
</tbody>
</table>

**REASON FOR QUESTION**

4. Is 24 vdc present on P111D power input to CTIS harness for warning light?

**WARNING**

Read WARNING on following page.

**YES**

Repair wire 1793 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).

**NO**

4. Is 24 vdc present on P111D power input to CTIS harness for warning light?
WARNING

Remove 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position master power switch to on (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(2) Connect positive (+) probe of multimeter to connector P111.</td>
</tr>
<tr>
<td>(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(4) If 24 vdc is not present, repair wire 1793 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).</td>
</tr>
<tr>
<td>(5) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(6) Connect connector P111 to connector J111.</td>
</tr>
</tbody>
</table>
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE (CONT)

**KNOWN INFO**
- Circuit breaker OK.
- Power supplied to CTIS.
- Speedometer OK.
- Indicator display lights OK.
- CTIS cable-speed signal OK.
- Cab dashboard wiring harness - speed signal OK.
- Cab dashboard wiring harness - LED input to CTIS cable OK.

**POSSIBLE PROBLEMS**
- Faulty CTIS cable - LED input to ECU.
- Faulty ECU - O.S pressure change function.
- Faulty overspeed indicator LED.
- Faulty cab dashboard wiring harness - ground for LED.
- Faulty cab dashboard wiring harness - power to LED.
- Faulty CTIS cable power to LED.
- Faulty ECU - O.S. warning indicator function.

**TEST OPTIONS**
- Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**
CTIS overspeed indicator will not work without 24 vdc to P110E.

**WARNING**
Read WARNING on following page.

5. Is 24 vdc present on P110E power input to ECU for warning light?

- **NO**
  - Go to step 9 of this fault.

- **YES**
  - Replace CTIS ECU (para 12-6).
WARNING

Remove 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. Position master power switch to on (TM 9-2320-365-10).
2. Connect positive (+) probe of multimeter to connector P110E.
3. Connect negative (-) probe of multimeter to ground and note reading on multimeter.
4. If 24 vdc is not present, CTIS wiring harness is faulty.
5. If 24 vdc is present, replace CTIS ECU (para 12-6).
6. Position master power switch to off (TM 9-2320-365-10).
7. Connect connector P110 to CTIS ECU.
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker OK.</td>
</tr>
<tr>
<td>Power supplied to CTIS.</td>
</tr>
<tr>
<td>Speedometer OK.</td>
</tr>
<tr>
<td>Indicator display lights OK.</td>
</tr>
<tr>
<td>CTIS cable-speed signal OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - speed signal OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - LED input to CTIS cable OK.</td>
</tr>
<tr>
<td>CTIS cable - LED input to ECU OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty ECU - O.S. pressure change function.</td>
</tr>
<tr>
<td>Faulty overspeed indicator LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - ground for LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - power to LED.</td>
</tr>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S. warning indicator function.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>If overspeed warning light failed, warning lamp or warning lamp circuit may be faulty.</td>
</tr>
</tbody>
</table>
(1) If overspeed warning light failed on road test while overspeed pressure change occurred
   (a) Warning lamp may be faulty.
   (b) Wiring from CTIS ECU to lamp or lamp to ground may be faulty.
   (c) CTIS ECU may be faulty.
(2) If overspeed warning light flashed on road test while overspeed pressure change did not occur,
   CTIS ECU has received a good speed signal but has not translated the signal into an overspeed inflation. CTIS ECU is faulty.
m6. **CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker OK.</td>
</tr>
<tr>
<td>Power supplied to CTIS.</td>
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<tr>
<td>Indicator display lights OK.</td>
</tr>
<tr>
<td>CTIS cable-speed signal OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - speed signal OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - LED input to CTIS cable OK.</td>
</tr>
<tr>
<td>CTIS cable - LED input to ECU OK.</td>
</tr>
<tr>
<td>ECU - O.S. pressure change function OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty overspeed indicator LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - ground for LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - power to LED.</td>
</tr>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S. warning indicator function.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

**REASON FOR QUESTION**

CTIS overspeed indicator will not work if continuity is not present from indicator display lights socket 9 to socket 17.

7. Is continuity verified on indicator display lights socket 9 to socket 17?

- **NO**
- **YES** Replace lighted indicator display (para 7-16).
CONTINUITY TEST

1. Remove four screws from lighted indicator display.
2. Remove lighted indicator display from instrument panel assembly.
3. Disconnect connector P 7 from lighted indicator display.
4. Set multimeter to ohms.
5. Connect positive (+) probe of multimeter to lighted indicator display terminal 17.
6. Connect negative (-) probe of multimeter to lighted indicator terminal 9 and note reading on multimeter.
7. If continuity is not present, replace lighted indicator display (para 7-16).
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
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<tbody>
<tr>
<td>Circuit breaker OK.</td>
</tr>
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<tr>
<td>Cab dashboard wiring harness - speed signal OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - LED input to CTIS cable OK.</td>
</tr>
<tr>
<td>CTIS cable - LED input to ECU OK.</td>
</tr>
<tr>
<td>ECU - O.S. pressure change function OK.</td>
</tr>
<tr>
<td>Overspeed indicator LED OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty cab dashboard wiring harness - ground for LED.</td>
</tr>
<tr>
<td>Faulty cab dashboard wiring harness - power to LED.</td>
</tr>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S. warning indicator function.</td>
</tr>
</tbody>
</table>

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<tr>
<th>TEST OPTIONS</th>
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<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTIS overspeed indicator requires continuity from P 7-17 to ground.</td>
</tr>
</tbody>
</table>

8. Is continuity present from P 7-17 to ground?

NO

YES

Repair wire 3130 (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 P 7-17.
(3) Connect negative (-) probe of multimeter to ground and note reading on multimeter.
(4) If continuity is not present, repair wire 3130 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
Is continuity present from J111D to P 7-9?

**TEST OPTIONS**
- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**
- CTIS overspeed indicator requires continuity from P 7-9 to J111D.

**KNOWLEDGE INFO**
- Circuit breaker OK.
- Power supplied to CTIS.
- Speedometer OK.
- Indicator display lights OK.
- CTIS cable-speed signal OK.
- Cab dashboard wiring harness - speed signal OK.
- Cab dashboard wiring harness - LED input to CTIS cable OK.
- CTIS cable - LED input to ECU OK.
- ECU - O.S. pressure change function OK.
- Overspeed indicator LED OK.
- Cab dashboard wiring harness - ground for LED OK.

**POSSIBLE PROBLEMS**
- Faulty cab dashboard wiring harness - power to LED.
- Faulty CTIS cable power to LED.
- Faulty ECU - O.S. warning indicator function.

**YES**
- 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).

**NO**
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to connector P 7-9.
(3) Connect negative (-) probe of multimeter to connector J111D and note reading on multimeter.
(4) If continuity is not 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).
(5) Connect lighted indicator display to connector P 7.
(6) Position lighted indicator display in instrument panel assembly with four screws.
(7) Tighten four screws to 6-10 lb-in. (1 N m).
m6. CTIS OVERSPEED WARNING LIGHT DOES NOT ILLUMINATE AND/OR OVERSPEED PRESSURE CHANGE
(CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker OK.</td>
</tr>
<tr>
<td>Power supplied to CTIS.</td>
</tr>
<tr>
<td>Speedometer OK.</td>
</tr>
<tr>
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<td>Cab dashboard wiring harness - LED input to CTIS cable OK.</td>
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<tr>
<td>CTIS cable - LED input to ECU OK.</td>
</tr>
<tr>
<td>ECU - O.S. pressure change function OK.</td>
</tr>
<tr>
<td>Overspeed indicator LED OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - ground for LED OK.</td>
</tr>
<tr>
<td>Cab dashboard wiring harness - power to LED OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty CTIS cable power to LED.</td>
</tr>
<tr>
<td>Faulty ECU - O.S. warning indicator function.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
<tr>
<td>REASON FOR QUESTION</td>
</tr>
<tr>
<td>CTIS overspeed indicator requires continuity from P111D to P110E.</td>
</tr>
</tbody>
</table>

10. Is continuity present from P111D to P110E?

YES

Replace CTIS ECU (para 12-6).

NO

Repair wire 1528 (para 2-40) or replace CTIS cable assembly (para 7-53).
**CONTINUITY TEST**

1. Disconnect connector P110 from CTIS ECU.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to connector P111D.
4. Connect negative (-) probe of multimeter to connector P110E and note reading on multimeter.
5. If continuity is not present, repair wire 1528 (para 2-40) or replace CTIS cable assembly (para 7-53).
6. If continuity is present, replace CTIS ECU (para 12-6).
7. Connect connector P110 to CTIS ECU.
8. Connect connector P111 to connector J111.
9. Install kick panel (para 16-3).
### 2-25. AXLE TROUBLESHOOTING

This paragraph covers Axle Troubleshooting. The Axle Fault Index, Table 2-51, lists faults for the axles of the vehicle.

#### Table 2-51. Axle Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>n1</td>
<td>Axle Differential(s) Noisy</td>
<td>2-1896</td>
</tr>
</tbody>
</table>
1. AXLE DIFFERENTIAL(S) NOISY

INITIAL SETUP

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

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

---

**KNOWN INFO**

Nothing

**POSSIBLE PROBLEMS**

Leaking planetary wheel ends and/or wheel bearings.
Leaking axle differential and/or pinion drive yoke.
Damaged axle differential.
Low or contaminated oil in differential.
Faulty pinion drive yoke.

---

**TEST OPTIONS**

Visual inspection

**REASON FOR QUESTION**

Leaks may indicate worn or damaged seals and cause planetary wheel ends or wheel bearings to make noise.

---

START

1. Are planetary wheel ends, and wheel bearings free from leaks?

   **NO**

   **YES** Replace seal (para 10-2).

2. Are axle differentials and pinion drive yoke free from leaks?

   **NO** Notify DS Maintenance.

   **YES**
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 planetary wheel ends for leaks (para 10-2).
(2) Check wheel bearings for leaks (para 10-2).
(3) If leaks are found replace seal(s) (para 10-2).

(1) Check differential and pinion drive yoke seal for leaks.
(2) If leaks are found, notify DS maintenance.
n1. AXLE DIFFERENTIAL(S) NOISY (CONT)

**KNOWN INFO**
No visible leaks of planetary wheel ends or wheel bearings.
No visible leaks of axle differential or pinion drive yoke.

**POSSIBLE PROBLEMS**
Damaged axle differential.
Low or contaminated oil in axle differential.
Faulty pinion drive yoke.

---

**TEST OPTIONS**

**TEST OPTIONS**

**KNOWN INFO**
Is the axle differential oil at proper level and free of contamination?

**POSSIBLE PROBLEMS**
Low or contaminated oil in axle differential.
Faulty pinion drive yoke.

---

**TEST OPTIONS**

**REASON FOR QUESTION**
Axle differential(s) may be unusually noisy when operating if damaged.

---

**TEST OPTIONS**

**REASON FOR QUESTION**
Low oil level will cause axle differential(s) to make unusual noises and lead to damage.

---

**TEST OPTIONS**

Add/change oil (Appendix H).
(1) Check axle differential for loose, missing, or damaged hardware.
(2) If axle differential is damaged, Notify DS Maintenance.
(3) Check drive shaft and bearing caps for looseness.
(4) If drive shaft is loose, perform Propeller Shaft Troubleshooting (g1. Drive Shaft or Universal Joint Unusually Noisy When Operating).

(1) Check oil level according to (Appendix H).
(2) Remove axle differential fill plug.
(3) Insert finger into axle differential to check oil level.
(4) Remove axle differential drain plug.
(5) Allow differential oil to drain into pan.
(6) Check oil for contamination. If metal chips are present, notify DS Maintenance.
(7) Install axle differential drain plug.
(8) Fill axle differential with oil (Appendix H).
(9) Install axle differential fill plug.
1. AXLE DIFFERENTIAL(S) NOISY (CONT)

KNOWN INFO

- No visible leaks of planetary wheel ends or wheel bearings.
- No visible leaks of axle differential or pinion drive yoke.
- Axle differential(s) free from damage.
- Axle differential oil OK.

POSSIBLE PROBLEMS

- Faulty pinion drive yoke.

5.

Is pinion drive yoke secure and free from damage?

NO

YES

TEST OPTIONS

- Visual inspection

REASON FOR QUESTION

- A loose or damaged pinion drive yoke may cause axle differential(s) to be unusually noisy when operating.

NO

Notify DS Maintenance.

Notify DS Maintenance.
(1) Check pinion drive yoke for looseness by attempting to rotate pinion drive yoke in both directions and listening for unusual backlash noise.
(2) If pinion drive yoke is damaged, notify DS Maintenance.
(3) If pinion drive yoke is not damaged, notify DS Maintenance.
This paragraph covers Steering Troubleshooting. The Steering Fault Index, Table 2-52, lists faults for the steering of the vehicle.

**Table 2-52. Steering Fault Index**

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>p1</td>
<td>Hard To Steer</td>
<td>2-1904</td>
</tr>
<tr>
<td>p2</td>
<td>Wanders, Pulls To One Side, or Shimmies</td>
<td>2-1910</td>
</tr>
<tr>
<td>p3</td>
<td>Excessive Play When Turning Steering Wheel</td>
<td>2-1916</td>
</tr>
<tr>
<td>p4</td>
<td>No Response When Turning Steering Wheel</td>
<td>2-1920</td>
</tr>
</tbody>
</table>
p1. HARD TO STEER

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine running (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personnel Required</th>
<th>Materials/Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>Locknut (Item 60, Appendix G)</td>
</tr>
</tbody>
</table>

START

1. Are reservoir components and steering pump hoses and fittings free from leaks, kinks and damage?

   NO

   Replace damaged oil hose(s) and fitting(s) (para 13-7).

   YES

   2. Is air compressor secure, free from damage and noisy operation?

      NO

      Vehicle may steer hard if oil lines are leaking, kinked, or damaged.

      YES

      YES

      Tighten hardware if loose. Notify DS maintenance of damaged air compressor.
WARNING

- Engine compartment and its components may be hot to the touch. Extreme care should be taken when checking for leaks in the engine compartment. Failure to comply may result in burns or injury to personnel.

- Engine compartment includes a partially covered fan blade. Extreme care should be taken when working in the engine compartment. Failure to comply may cause injury to personnel.

NOTE

Refer to steering hydraulic hose schematic for steering hose locations.

Check reservoir components and steering hoses and fittings for leakage, kinks and damage.

Check air compressor for loose or missing mounting hardware, damage and noisy operation and rotation.
p1. HARD TO STEER (CONT)

**KNOWN INFO**
- Tires OK.
- Steering oil level OK.
- Power steering pump oil hoses and fittings OK.
- Air compressor OK.
- Power steering pump OK.
- Steering gear assembly OK.

**POSSIBLE PROBLEMS**
- Faulty steering shaft and tie rod.
- Faulty pitman arm and drag link.

---

3. Is steering shaft and tie rod properly lubricated, secure, and free from damage?

**TEST OPTIONS**
- Visual inspection
- Steering Shaft/Tie Rod Test

**REASON FOR QUESTION**
Vehicle may steer hard if steering shaft or tie rod is loose, damaged, or requires lubrication.

---

**KNOWN INFO**
- Tires OK.
- Steering oil level OK.
- Power steering pump oil hoses and fittings OK.
- Air compressor OK.
- Power steering pump OK.
- Steering gear assembly OK.
- Steering shaft and tie rods OK.

**POSSIBLE PROBLEMS**
- Faulty pitman arm and drag link.

---

4. Is pitman arm and drag link secure, and free from damage?

**TEST OPTIONS**
- Visual inspection
- Pitman Arm/Drag Link Test

**REASON FOR QUESTION**
Vehicle may steer hard if pitman arm or drag link is loose or damaged.

---

**FAULTY STEERING SHAFT AND TIE ROD.**

**KNOWLEDGE INFO**
- Lubricate tie rods (Appendix H).
- Replace damaged tie rods (para 13-4).
- Notify DS maintenance of damaged steering shaft.

**TEST OPTIONS**
- Visual inspection
- Steering Shaft/Tie Rod Test

**REASON FOR QUESTION**
Vehicle may steer hard if steering shaft or tie rod is loose, damaged, or requires lubrication.

---

**FAULTY PITMAN ARM AND DRAG LINK.**

**KNOWLEDGE INFO**
- Tighten loose drag link.
- Replace drag link (para 13-3).
- Notify DS maintenance of loose or damaged pitman arm.

**TEST OPTIONS**
- Visual inspection
- Pitman Arm/Drag Link Test

**REASON FOR QUESTION**
Vehicle may steer hard if pitman arm or drag link is loose or damaged.
Check steering shaft and tie rod for damage, and loose or missing mounting hardware. Refer to Appendix H to lubricate tie rods.

<table>
<thead>
<tr>
<th>STEERING SHAFT/TIE ROD TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Grasp steering shaft to ensure there is no up and down play.</td>
</tr>
<tr>
<td>(2) Grasp tie rod to ensure there is no up and down or left and right play.</td>
</tr>
</tbody>
</table>

Check pitman arm and drag link for damage, and loose or missing mounting hardware.

<table>
<thead>
<tr>
<th>PITMAN ARM/DRAG LINK TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Check nut securing pitman arm to steering gear assembly. Ensure there is no play.</td>
</tr>
<tr>
<td>(2) Grasp drag link and ensure there is no play left and right or up and down.</td>
</tr>
<tr>
<td>(3) Check for loose bolts, nuts, and clamps on drag link.</td>
</tr>
</tbody>
</table>
1. HARD TO STEER (CONT)

5. Is power steering pump free from leaks or damage and is required mounting hardware secure and free from damage?

- **NO**
  - Notify DS Maintenance.
  - **Tighten power steering pump and hoses. Notify DS maintenance of damaged power steering pump.**

- **YES**

6. Does steering gear assembly output shaft turn freely by hand?

- **NO**
  - Notify DS Maintenance.

- **YES**

**KNOWN INFO**
- Tires OK.
- Steering oil level OK
- Power steering pump oil hoses and fittings OK.
- Air compressor OK.

**POSSIBLE PROBLEMS**
- Faulty power steering pump.
- Faulty steering gear assembly.
- Faulty steering shaft and tie rod.
- Faulty pitman arm and drag link.

**TEST OPTIONS**
- Visual inspection

**REASON FOR QUESTION**
- Vehicle may be hard to steer if power steering pump is leaking, or mounting is loose or damaged.

**KNOWN INFO**
- Tires OK.
- Steering oil level OK.
- Power steering pump oil hoses and fittings OK.
- Air compressor OK.
- Power steering pump OK.

**POSSIBLE PROBLEMS**
- Faulty steering gear assembly.
- Faulty steering shaft and tie rod.
- Faulty pitman arm and drag link.

**TEST OPTIONS**
- Steering Gear Assembly Test

**REASON FOR QUESTION**
- Vehicle may steer hard if steering gear assembly output shaft is binding.
An alignment mark shall be marked on yoke and steering gear assembly to ensure ease during installation.

**NOTE**

<table>
<thead>
<tr>
<th>STEERING GEAR TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Remove yoke from top steering gear assembly shaft.</td>
</tr>
<tr>
<td>(3) Remove drag link (para 13-3).</td>
</tr>
<tr>
<td>(4) Turn top steering gear assembly shaft to check for binding and proper output. Notify DS maintenance if steering gear assembly fails to turn smoothly or if it binds when top shaft is turned.</td>
</tr>
<tr>
<td>(5) Install drag link (para 13-3).</td>
</tr>
<tr>
<td>(6) Position yoke onto top steering gear assembly shaft.</td>
</tr>
<tr>
<td>(7) Install bolt and self-locking nut into yoke to secure yoke to top steering gear assembly shaft.</td>
</tr>
</tbody>
</table>
## Initial Setup

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

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

## Known Info

| Lugnuts OK. |
| Tires OK. |

### Possible Problems
- Faulty steering shaft and tie rod.
- Faulty pitman arm and drag link.
- Faulty steering gear assembly.
- Brakes out of adjustment.
- Faulty U-joints, splines or yokes.

## Test Options

| Visual inspection |
| Manual check |

### Reason for Question
- A steering shaft or tie rod that is loose, damaged, or requires lubrication may cause vehicle to wander, pull to one side, or shimmy.

## Diagram

1. **Is steering shaft and tie rod properly lubricated, secure, and free from damage?**

   - **Yes**
     - **Lubricate tie rods (Appendix H). Replace loose or damaged tie rods (para 13-4). Notify DS maintenance of damaged steering shaft or U-joint.**

   - **No**
     - **Is steering shaft and tie rod properly lubricated, secure, and free from damage?**
(1) Raise cab (TM 9-2320-365-10).
(2) Check steering shaft and tie rods for damage, and loose or missing mounting hardware. Refer to Appendix H to lubricate tie rods.
(3) Grasp the steering gear shaft and ensure there is no up and down play.
(4) Grasp the tie rod and ensure there is no up and down or sideways play.
p2. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES (CONT)

2. Is pitman arm and drag link properly secure and free from damage?

- **NO**
  - Tighten loose drag link.
  - Replace drag link (para 13-3).
  - Notify DS maintenance of loose or damaged pitman arm.

- **YES**

3. Is steering gear assembly free from damage, and mounted securely?

- **NO**
  - Notify DS Maintenance.

- **YES**

**KNOWN INFO**
- Lugnuts OK.
- Tires OK.
- Steering shaft and tie rod OK.
- U-joints, splines and yoke OK.

**POSSIBLE PROBLEMS**
- Faulty pitman arm and drag link.
- Faulty steering gear assembly.
- Brakes out of adjustment.

**TEST OPTIONS**
- Visual inspection
- Manual check

**REASON FOR QUESTION**
- A pitman arm or drag link that is loose, damaged, may cause vehicle to wander, pull to one side, or shimmy.

**KNOWN INFO**
- Lugnuts OK.
- Tires OK.
- Steering shaft and tie rod OK.
- U-joints, splines and yokes OK.
- Pitman arm and drag link OK.

**POSSIBLE PROBLEMS**
- Faulty steering gear assembly.
- Brakes out of adjustment.

**TEST OPTIONS**
- Visual inspection
- Manual check

**REASON FOR QUESTION**
- Damaged steering gear assembly or mounting hardware may cause vehicle to wander, pull to one side, or shimmy.
(1) Check steering gear assembly for damage, and loose or missing mounting hardware.
(2) Lower cab (TM 9-2320-365-10).

(1) Check pitman arm and drag link for damage, and loose or missing mounting hardware.
(2) Grasp pitman arm and ensure it and drag link are free of play.
4. Are brakes properly adjusted?

**KNOWN INFO**
- Lugnuts OK.
- Tires OK.
- Steering shaft and tie rod OK.
- U-joints, splines and yoke OK.
- Pitman arm and drag link OK.
- Steering gear assembly OK.

**POSSIBLE PROBLEMS**
- Brakes out of adjustment.

**TEST OPTIONS**
- Refer to brake adjustment procedure (para 11-2 or 11-3).

**REASON FOR QUESTION**
- Vehicle may wander, pull to one side, or shimmy if brakes are not properly adjusted.

If brakes are properly adjusted:

**YES**
- Fault not corrected. Perform Suspension System Troubleshooting (q1. Wanders, Pulls To One Side, Or Shimmies).

If brakes are not properly adjusted:

**NO**
- Adjust brakes (para 11-2 or 11-3).
Refer to para 11-2 or 11-3 to adjust brakes.
2. Is pitman arm and drag link secure and free from damage?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering oil level OK.</td>
<td>Faulty pitman arm and drag link.</td>
</tr>
<tr>
<td>Steering lines OK.</td>
<td>Faulty steering gear assembly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>A pitman arm or drag link which is loose, damaged or may cause vehicle to have excessive play when turning steering wheel.</td>
</tr>
<tr>
<td>Pitman Arm/Drag Link Test</td>
<td></td>
</tr>
</tbody>
</table>

YES

Tighten loose drag link.
Replace drag link (para 13-3).
Notify DS maintenance of loose or damaged pitman arm.

NO

3. Is steering shaft U-joint, steering gear assembly shaft and tie rod properly lubricated, secure, and free from damage?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering oil level OK.</td>
<td>Faulty steering shaft U-joints and tie rod.</td>
</tr>
<tr>
<td>Steering lines OK.</td>
<td>Faulty pitman arm and drag link.</td>
</tr>
<tr>
<td>Steering shaft and tie rod OK.</td>
<td>Faulty steering gear assembly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>A steering shaft U-joint, steering gear assembly shaft or tie rod that is loose, damaged, or requires lubrication may cause vehicle to have excessive play when turning steering wheel.</td>
</tr>
<tr>
<td>Steering Gear Shaft Tie Rod Test</td>
<td></td>
</tr>
</tbody>
</table>

NO

Lubricate tie rods (Appendix H).
Replace damaged tie rod (para 13-4).
Notify DS maintenance of damaged steering shaft.

YES

START

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)

Materials/Parts
Locknut (Item 60, Appendix G)

Personnel Required
(2)
Check steering shaft U-joint, steering gear assembly shafts, and tie rod for damage and loose or missing mounting hardware. Refer to Appendix H to lubricate tie rods.

**NOTE**
An alignment mark shall be used on yoke and steering gear assembly to ensure ease during installation.

<table>
<thead>
<tr>
<th>STEERING GEAR SHAFT TIE ROD TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Grasp steering shaft and ensure there is no up and down play.</td>
</tr>
<tr>
<td>(2) Remove self-locking nut and bolt securing yoke of top steering shaft to steering gear assembly shaft. Discard self-locking nut.</td>
</tr>
<tr>
<td>(3) Remove yoke from top steering gear assembly shaft.</td>
</tr>
<tr>
<td>(4) Ensure spline shaft of steering gear assembly and yoke of steering shaft are not damaged.</td>
</tr>
<tr>
<td>(5) Grasp tie rod and ensure there is no up and down or left or right play.</td>
</tr>
</tbody>
</table>

Check pitman arm and drag link for damage and loose or missing mounting hardware.

<table>
<thead>
<tr>
<th>PITMAN ARM/DRAG LINK TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Check nut securing pitman arm to steering gear assembly. Ensure there is no play.</td>
</tr>
<tr>
<td>(2) Grasp drag link and ensure there is no play left or right and up or down.</td>
</tr>
<tr>
<td>(3) Check for loose bolts, nuts, and clamps on drag link.</td>
</tr>
</tbody>
</table>
Steering oil level OK.
Steering lines OK.
Steering linkage OK.

POSSIBLE PROBLEMS
Faulty steering gear assembly.

3. Does pitman arm move immediately when turning steering wheel?

KNOWLEDGE OPTIONS
Steering Gear Preload Test
Reason for Question

If steering gear input shaft turns before pitman arm begins to move, steering gear assembly has excessive play.

NO

Notify DS Maintenance.

YES

Notify DS Maintenance.
STEERING GEAR PRELOAD TEST

1. Remove drag link (para 13-3).
2. Pull pitman arm back and forth to check for binding and proper output. If pitman arm fails to turn smoothly or if it binds and top shaft does not turn immediately, steering gear assembly is damaged.
3. Install drag link (para 13-3).
4. Position yoke onto top steering gear assembly shaft.
5. Install bolt and self-locking nut onto yoke to secure yoke to top steering gear assembly shaft.
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 43, Appendix C)

Materials/Parts
Locknut (Item 63, Appendix G)

p4. NO RESPONSE WHEN TURNING STEERING WHEEL

START

1. Are steering shaft, U-joints, splines and yoke secure and free from damage?

   YES
   Notify DS Maintenance.

   NO

   TEST OPTIONS
   Visual inspection
   Manual check

   REASON FOR QUESTION
   A steering shaft, U-joint, splines or yoke that is loose or damaged may cause no response when turning steering wheel.

2. Is pitman arm and drag link properly secure and free from damage?

   YES

   NO

   TEST OPTIONS
   Visual inspection
   Manual check

   REASON FOR QUESTION
   A pitman arm or drag link which is loose or damaged may cause no response when turning steering wheel.

   YES

KNOWLEDGE
Nothing

POSSIBLE PROBLEMS
Faulty steering shaft, U-joints and tie rod.
Faulty pitman arm and drag link.
Faulty steering gear assembly.
Faulty U-joints, splines and yoke.

TEST OPTIONS
Visual inspection
Manual check

Reason for Question
A steering shaft, U-joint, splines or yoke that is loose or damaged may cause no response when turning steering wheel.

Faulty steering shaft, U-joints and tie rod.
Faulty pitman arm and drag link.
Faulty steering gear assembly.
Faulty U-joints, splines and yoke.

KNOWLEDGE
U-joints, splines and yoke OK.

POSSIBLE PROBLEMS
Faulty pitman arm and drag link.
Faulty steering gear assembly.

TEST OPTIONS
Visual inspection
Manual check

Reason for Question
A pitman arm or drag link which is loose or damaged may cause no response when turning steering wheel.

Tighten loose drag link.
Replace drag link (para 13-3).
Notify DS maintenance of loose or damaged pitman arm.
(1) Raise cab (TM 9-2320-365-10).
(2) Check steering shaft for looseness and damage.
(3) Grasp steering shaft and ensure it is free of play.
(4) Repeat step (3) while observing yoke, U-joint and locknuts.

(1) Check pitman arm and drag link for damage and loose or missing mounting hardware.
(2) Grasp pitman arm and ensure it and drag link are free of play.
3. Does steering gear assembly output shaft turn freely?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering oil level OK.</td>
<td>Visual inspection</td>
</tr>
<tr>
<td>Steering shaft OK.</td>
<td>Manual check</td>
</tr>
<tr>
<td>Pitman arm and drag link OK.</td>
<td></td>
</tr>
<tr>
<td>U-joints, splines and yokes OK.</td>
<td></td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td>REASON FOR QUESTION</td>
</tr>
<tr>
<td>Faulty steering gear assembly.</td>
<td>A faulty steering gear assembly may cause no response when turning steering wheel.</td>
</tr>
</tbody>
</table>

- **YES**
  - Notify DS Maintenance.

- **NO**
  - Notify DS Maintenance.
NOTE
An alignment mark shall be made on yoke and steering gear assembly shaft prior to disassembly to ensure proper alignment during installation.

<table>
<thead>
<tr>
<th>STEERING GEAR TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove bolt and locknut from lower yoke of steering gear arm. Discard locknut.</td>
</tr>
<tr>
<td>(2) Remove yoke from top steering gear assembly shaft.</td>
</tr>
<tr>
<td>(3) Remove drag link (para 13-3).</td>
</tr>
<tr>
<td>(4) Turn pitman arm to check for binding and proper output. Notify DS maintenance if steering gear assembly fails to turn smoothly or if it binds when top shaft is turned.</td>
</tr>
<tr>
<td>(5) Install drag link (para 13-3).</td>
</tr>
<tr>
<td>(6) Position yoke on to steering gear assembly.</td>
</tr>
<tr>
<td>(7) Install bolt and locknut into yoke to top steering gear assembly shaft.</td>
</tr>
<tr>
<td>(8) Lower cab (TM 9-2320-365-10).</td>
</tr>
</tbody>
</table>
2-27. SUSPENSION SYSTEM TROUBLESHOOTING

This paragraph covers Suspension System Troubleshooting. The Suspension System Fault Index, Table 2-53, lists faults for the suspension system of the vehicle.

Table 2-53. Suspension System Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>q1</td>
<td>Wanders, Pulls To One Side, or Shimmies</td>
<td>2-1926</td>
</tr>
<tr>
<td>q2</td>
<td>Leans To One Side or Rear of Vehicle Sags</td>
<td>2-1940</td>
</tr>
</tbody>
</table>
q1. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Iron, Tire (Item 20, Appendix C)

KNOW LED INFO
Lugnuts OK.
Steering shaft and components OK.
Brake adjustment OK.

POSSIBLE PROBLEMS
Faulty or damaged front shock absorbers.
Faulty or damaged front leaf springs.
Faulty or damaged rear shock absorbers or shock absorber brackets.
Faulty or damaged spring bushings or spring shackles.
Faulty or damaged rear leaf springs.
Faulty or damaged resilient mounts.
Faulty or damaged stabilizer bar.

TEST OPTIONS
Visual inspection
Shock Absorber Test

REASON FOR QUESTION
Vehicle may wander, pull to one side, or shimmy if shock absorbers and bracket(s) are loose or damaged.

1. Are front shock absorbers and bracket(s) secure and free from damage?

YES

NO

Replace damaged shock absorber(s) or bracket(s) (para 15-3).
NOTE
Perform Steering System Troubleshooting (p2, Wanders, Pulls To One Side, Or Shimmies) before starting the steps given below.

1. Check shock absorbers for damage or leaks, and for missing mounting hardware.
2. Check shock absorbers bushings for movement.
3. Check shock absorber brackets for damage and for missing mounting hardware.

<table>
<thead>
<tr>
<th>SHOCK ABSORBER TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grasp shock absorber and ensure there is no excessive play.</td>
</tr>
<tr>
<td>2. Replace worn bushings.</td>
</tr>
</tbody>
</table>

HYDRAULIC CYLINDER REMOVED FOR CLARITY
q1. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lugnuts OK.</td>
</tr>
<tr>
<td>Steering shaft and components OK.</td>
</tr>
<tr>
<td>Brake adjustment OK.</td>
</tr>
<tr>
<td>Front shock absorbers OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty or damaged front leaf springs.</td>
</tr>
<tr>
<td>Faulty or damaged rear shock absorbers or shock absorber brackets.</td>
</tr>
<tr>
<td>Faulty or damaged spring bushings or spring shackles.</td>
</tr>
<tr>
<td>Faulty or damaged rear leaf springs.</td>
</tr>
<tr>
<td>Faulty or damaged resilient mounts.</td>
</tr>
<tr>
<td>Faulty or damaged stabilizer bar.</td>
</tr>
</tbody>
</table>

2. Are front leaf springs secure and free from damage?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle may wander, pull to one side, or shimmy if leaf springs are loose or damaged.</td>
</tr>
</tbody>
</table>

NO

YES

Notify DS Maintenance.
(1) Check leaf springs for cracked or broken leaves or missing spring clips and U-bolts.
(2) Check seats for looseness or damage.
3. Are spring shackles and spring bushings secure and free from damage?

**KNOWN INFO**
- Lugnuts OK.
- Steering shaft and components OK.
- Brake adjustment OK.
- Front shock absorbers OK.
- Front leaf springs OK.

**POSSIBLE PROBLEMS**
- Faulty or damaged spring bushings or spring shackles.
- Faulty rear shock absorbers and shock absorber brackets.
- Faulty or damaged rear leaf springs.
- Faulty or damaged resilient mounts.
- Faulty or damaged stabilizer bar.

**TEST OPTIONS**
- Visual inspection
- Spring Shackle/Bushing Test

**REASON FOR QUESTION**
Vehicle may wander, pull to one side, or shimmy if spring shackles and spring bushings are loose or damaged.

**LUBRICATION OPTIONS**
- Lubricate spring bushings (Appendix H)
- or notify DS Maintenance.

q1. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES (CONT)
Check spring shackles and spring bushings for damage and for missing mounting hardware. Refer to Appendix H for lubrication of spring bushings.

**SPRING SHACKLE/BUSHING TEST**

(1) Position tire iron between spring assembly and frame.
(2) Pry up and down and ensure there is no movement.
(3) Shackles or bushings are damaged if movement occurs.
4. Are rear shock absorbers and shock absorber brackets secure and free from damage?

**KNOWN INFO**
- Lugnuts OK.
- Steering shaft and components OK.
- Brake adjustment OK.
- Front shock absorbers OK.
- Front leaf springs OK.
- Spring bushings or spring shackles OK.

**POSSIBLE PROBLEMS**
- Faulty or damaged rear shock absorbers or shock absorber brackets.
- Faulty or damaged rear leaf springs.
- Faulty or damaged resilient mounts.
- Faulty or damaged stabilizer bar.

**TEST OPTIONS**
- Visual inspection
- Shock Absorber Test

**REASON FOR QUESTION**
Vehicle may wander, pull to one side, or shimmy if shock absorber and shock absorber brackets are loose or damaged.

**YES**

**NO**
Replace damaged shock absorber(s) or brackets (para 15-4).
(1) Check shock absorbers for damage or leaks, and for missing mounting hardware.
(2) Check shock absorber brackets for damage and for missing mounting hardware.
(3) Check shock absorber bushings for movement.

**SHOCK ABSORBER TEST**

(1) Grasp shock absorber and ensure there is no excessive play.
(2) Replace worn bushings.
q1. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES (CONT)

5. Are leaf springs secure and free from damage?

- **KNOWN INFO**
  - Lugnuts OK.
  - Steering shaft and components OK.
  - Brake adjustment OK.
  - Front shock absorbers OK.
  - Front leaf springs OK.
  - Rear shock absorbers and shock absorber brackets OK.
  - Spring bushings and spring shackles OK.

- **POSSIBLE PROBLEMS**
  - Faulty or damaged rear leaf springs.
  - Faulty or damaged resilient mounts.
  - Faulty or damaged stabilizer bar.

- **TEST OPTIONS**
  - Visual inspection
  - Reason for question: Vehicle may wander, pull to one side, or shimmy if leaf springs are loose or damaged.

- **OUTPUT OPTIONS**
  - Yes
    - Notify DS Maintenance.
  - No

2-1934
Check rear leaf springs for damage and for missing mounting hardware.
q1. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES (CONT)

Are resilient mounts secure and free from damage?

KNOWN INFO
Lugnuts OK.
Steering shaft and components OK.
Brake adjustment OK.
Front shock absorbers OK.
Front leaf springs OK.
Rear shock absorbers and shock absorber brackets OK.
Spring bushings and spring shackles OK.
Rear leaf springs OK.

POSSIBLE PROBLEMS
Faulty or damaged resilient mounts.
Faulty or damaged stabilizer bar.

TEST OPTIONS
Visual Inspection
Resilient Mount Test

REASON FOR QUESTION
Vehicle may wander, pull to one side, or Shimmy if resilient mounts are loose or damaged.

Notify DS Maintenance.
Check resilient mounts for damage and for missing mounting hardware.

<table>
<thead>
<tr>
<th>RESILIENT MOUNT TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position tire iron between spring near resilient mount and tire.</td>
</tr>
<tr>
<td>(2) Pry up and down to ensure there is no movement.</td>
</tr>
<tr>
<td>(3) Resilient mount is damaged if movement occurs.</td>
</tr>
</tbody>
</table>

RESILIENT MOUNT
q1. WANDERS, PULLS TO ONE SIDE, OR SHIMMIES (CONT)

**KNOWN INFO**
- Lugnuts OK.
- Steering shaft and components OK.
- Brake adjustment OK.
- Front shock absorbers OK.
- Front leaf springs OK.
- Rear shock absorbers and shock absorber brackets OK.
- Spring bushings and spring shackles OK.
- Rear leaf springs OK.
- Resilient mounts OK.

**POSSIBLE PROBLEMS**
- Faulty or damaged stabilizer bar.

**TEST OPTIONS**
- Visual inspection
- Stabilizer Bar Test

**REASON FOR QUESTION**
- Vehicle may wander, pull to one side, or shimmy if stabilizer bar, bushings and mounts are loose or damaged.

**FLOWCHART**

1. Is stabilizer bar, bushing and mounting secure and free from damage?
   - **YES**: Notify DS Maintenance.
   - **NO**: Replace stabilizer bar (para 15-5).
Check stabilizer bar, bushings and mounts for damage and for missing mounting hardware.

**STABILIZER BAR TEST**

1. Position tire iron between bottom of pintle hook mount and top of stabilizer bar.
2. Pry up to ensure there is no movement.
3. Replace stabilizer bar or mounts if movement occurs or damaged.
q2. LEANS TO ONE SIDE OR REAR OF VEHICLE SAGS

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. Are front shock absorbers secure and free from damage?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing.</td>
<td>Faulty or damaged front shock absorbers.</td>
</tr>
<tr>
<td></td>
<td>Faulty or damaged front leaf springs.</td>
</tr>
<tr>
<td></td>
<td>Faulty or damaged rear shock absorbers.</td>
</tr>
<tr>
<td></td>
<td>Faulty or damaged rear leaf springs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

REASON FOR QUESTION
Vehicle may lean to one side if shock absorbers are loose or damaged.

NO

YES

2. Are front leaf springs secure and free from damage?

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front shock absorbers OK.</td>
<td>Faulty or damaged front leaf springs.</td>
</tr>
<tr>
<td></td>
<td>Faulty or damaged rear shock absorbers.</td>
</tr>
<tr>
<td></td>
<td>Faulty or damaged rear leaf springs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

REASON FOR QUESTION
Vehicle may lean to one side if front leaf springs are loose or damaged.

NO

Notify DS Maintenance.

YES

START
Check shock absorbers for damage or leaks, and for missing or cracked mounting hardware.

Check front leaf springs for damage and for loose or missing mounting hardware.
q2. LEANS TO ONE SIDE OR REAR OF VEHICLE SAGS (CONT)

3. Are rear shock absorbers secure and free from damage?

- **NO**
  - Replace damaged shock absorber(s) (para 15-4).

- **YES**

4. Are rear leaf springs secure and free from damage?

- **NO**
  - Notify DS Maintenance if rear leaf springs are loose or damaged.

- **YES**
  - Notify DS Maintenance.

**KNOWN INFO**

- Front shock absorbers OK.
- Front leaf springs OK.

**POSSIBLE PROBLEMS**

- Faulty or damaged rear shock absorbers.
- Faulty or damaged rear leaf springs.

**TEST OPTIONS**

- Visual inspection

**REASON FOR QUESTION**

- Vehicle may lean to one side if shock absorbers are loose or damaged.

- Vehicle may lean to one side if rear leaf springs are loose or damaged.
Check shock absorbers for damage or leaks, and for missing or cracked mounting hardware.

Check rear leaf springs for damage or leaks, and for missing mounting hardware.
### Table 2-54. 11K Self-Recovery Winch (SRW) System Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>r1</td>
<td>11K Self-Recovery Winch (SRW) Does Not Work</td>
<td>2-1946</td>
</tr>
</tbody>
</table>
1. 11K SELF-RECOVERY WINCH DOES NOT WORK

**INITIAL SETUP**

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td>Pan, Drain (Item 24, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td>Transducer, STE/ICE-R (Item 1, Appendix J)</td>
</tr>
<tr>
<td>References</td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
<tr>
<td>TM 9-4910-571-12&amp;P</td>
<td>Materials/Parts</td>
</tr>
<tr>
<td></td>
<td>Rag, Wiping (Item 51, Appendix D)</td>
</tr>
</tbody>
</table>

**KNOWLEDGE INFO**

- Hydraulic oil level OK.
- Hydraulic tubes and fittings OK.

**POSSIBLE PROBLEMS**

- Faulty hydraulic rotary pump.
- Faulty 11K self-recovery winch.
- Faulty winch control valve.
- Faulty electrical supply/control valve solenoid.

**TEST OPTIONS**

- Input Flow Test

**REASON FOR QUESTION**

- Faulty hydraulic rotary pump will cause winch to not operate.

**Diagram Flow**

START → WARNING (Read WARNING on following page) → 1. Is hydraulic pressure to winch control valve OK? → NO → Notify DS maintenance. → YES
**WARNING**

- Drop hydraulic pressure to zero before disconnecting any hydraulic hoses, tubes, or fittings. Failure to comply may result in injury to personnel.
- Wear approved eye protection when performing pressure checks. Failure to comply may result in oil getting into eyes. If oil contacts eyes, seek medical attention immediately.
- Fuel and oil are slippery and can cause falls. Wipe up spilled fuel or oil with rags. Failure to comply may result in injury to personnel.

### INPUT FLOW TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Place drain pan under control valve.</td>
</tr>
<tr>
<td>2</td>
<td>Disconnect hose from port P of winch control valve.</td>
</tr>
<tr>
<td>3</td>
<td>Connect STE/ICE-R with 5/8 in. tee and adapter kit between hose fitting and port P.</td>
</tr>
<tr>
<td>4</td>
<td>Start engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>5</td>
<td>Position PTO switch to on (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>6</td>
<td>Attach stall load to winch cable (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>7</td>
<td>Position WINCH POWER switch to on (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>8</td>
<td>Engage winch clutch (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>9</td>
<td>Toggle WINCH IN/OUT switch to IN (TM 9-2320-365-10) and perform STE/ICE-R test #51 (TM 9-4910-574-12&amp;P) and note pressure reading.</td>
</tr>
<tr>
<td>10</td>
<td>Check if pressure is 2000-2100 psi (13790-14480 kPa); if pressure is lower than 2000 psi (13790 kPa), notify DS Maintenance.</td>
</tr>
<tr>
<td>11</td>
<td>Position WINCH POWER and PTO switches to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>12</td>
<td>Shut down engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>13</td>
<td>Disconnect STE/ICE-R, tee, and adapter kit.</td>
</tr>
<tr>
<td>14</td>
<td>Connect hose fitting to port P.</td>
</tr>
<tr>
<td>15</td>
<td>Remove drain pan.</td>
</tr>
</tbody>
</table>
r1. 11K SELF-RECOVERY WINCH DOES NOT WORK (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic oil level OK.</td>
</tr>
<tr>
<td>Hydraulic tubes and fittings OK.</td>
</tr>
<tr>
<td>Hydraulic rotary pump OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty 11K self-recovery winch.</td>
</tr>
<tr>
<td>Faulty winch control valve.</td>
</tr>
<tr>
<td>Faulty electrical supply/ control valve solenoid.</td>
</tr>
</tbody>
</table>

2. Is pressure absent or below 2000 psi (13790 kPa) at V1 and/or V2 on 11K self-recovery winch?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winch Control Valve Pressure Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty winch control valve will cause 11K self-recovery winch not to operate due to low or absent hydraulic pressure.</td>
</tr>
</tbody>
</table>

NO

Notify DS maintenance.

YES
## WINCH CONTROL VALVE PRESSURE TEST

1. Disconnect hose from fitting below elbow at port V1 (on side of 11K self-recovery winch toward front of vehicle).
2. Connect STE/ICE-R with tee between port V1 and hose.
4. Attach stall load to winch cable (TM 9-2320-365-10).
5. Position PTO switch and WINCH POWER switch to ON (TM 9-2320-365-10).
7. Perform STE/ICE-R test #51 and toggle WINCH IN/OUT switch to IN position and hold (TM 9-4910-571-12&P).
8. Check if pressure reading is between 2000-2100 psi (13790-14480 kPa) on STE/ICE-R.
9. If pressure is less than 2000 psi (13790 kPa), notify DS Maintenance.
12. Disconnect STE/ICE-R and tee.
13. Connect hose fitting to port V1.
14. Disconnect hose (below elbow) from port V2.
15. Connect STE/ICE-R with tee between hose and port V2.
17. Position PTO and WINCH POWER switches to on (TM 9-2320-365-10).
18. Perform STE/ICE-R test #51 and toggle WINCH IN/OUT switch to OUT (TM 9-4910-571-12&P).
19. Check if pressure reading is between 2000-2100 psi (13790-14480 kPa).
20. If pressure is lower than 2000 psi, notify DS Maintenance.
22. Position WINCH POWER and PTO switches to off (TM 9-2320-365-10).
25. Disconnect STE/ICE-R and tee.
3. **Is pressure totally absent at V1 and/or V2 on 11K self-recovery winch?**

   - **YES**
     - Perform Electrical System Troubleshooting (e85. Self-Recovery Winch Does Reel In or Pay Out).
   - **NO**
     - Replace winch control valve (para 17-6).

**KNOWN INFO**
- Hydraulic oil level OK.
- Hydraulic tubes and fittings OK.
- Hydraulic rotary pump OK.
- 11K self-recovery winch OK.

**POSSIBLE PROBLEMS**
- Faulty winch control valve.
- Faulty electrical supply/ control valve solenoid.

**TEST OPTIONS**
- Winch Control Valve Fault Check

**REASON FOR QUESTION**
A faulty electrical system or winch control valve will cause pressure to be absent at both ports on 11K self-recovery winch.
<table>
<thead>
<tr>
<th>WINCH CONTROL VALVE FAULT CHECK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(1)</strong> If hydraulic pressure was absent in winch control valve pressure test (step 2.), perform Electrical System Troubleshooting (e85. 11K Self-Recovery Winch Does Not Reel In or Pay Out).</td>
</tr>
<tr>
<td><strong>(2)</strong> If hydraulic pressure was low in winch control valve pressure test (step 2.), replace winch control valve (para 17-6).</td>
</tr>
</tbody>
</table>
2-29. STEERING HYDRAULIC SYSTEM TROUBLESHOOTING

This paragraph covers Steering Hydraulic System Troubleshooting. The Steering Hydraulic System Fault Index, Table 2-55, lists faults for the steering hydraulic system of the vehicle.

Table 2-55. Steering Hydraulic System Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Steering Hard or Does Not Work</td>
<td>2-1954</td>
</tr>
</tbody>
</table>
s1. STEERING HARD OR DOES NOT WORK

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>Materials/Parts</td>
<td></td>
</tr>
<tr>
<td>Rag, Wiping (Item 51, Appendix D)</td>
<td></td>
</tr>
</tbody>
</table>

START

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

   Are visible or audible indications of faulty steering components absent?

   **TEST OPTIONS**
   Visual inspection

   **REASON FOR QUESTION**
   Faulty steering components are often revealed by noise, or visible clues.

   **NO**

   Notify DS Maintenance.

   **YES**

   KNOWN INFO
   Steering oil level OK.
   Hydraulic lines and fittings OK.

   POSSIBLE PROBLEMS
   Faulty steering pump.
   Faulty steering gear.
   Faulty steering gear adjustment.

   NOTIFY DS Maintenance.
WARNING

- Drop hydraulic pressure to zero before disconnecting any hydraulic line. Failure to comply may result in injury to personnel.
- Wear approved eye protection when performing pressure checks. Failure to comply may result in oil getting into eyes. If oil contacts eyes, seek medical attention immediately.
- Fuel and oil are slippery and can cause falls. Wipe up spilled fuel or oil with rags. Failure to comply may result in injury to personnel.

(1) Check steering oil level and fill as required (Appendix H).
(2) Start engine (TM 9-2320-365-10).
(3) Turn steering wheel from lock-to-lock.
(4) Listen for unusual sounds. Faulty steering pump or steering gear may be noisy.
(5) Shut down engine (TM 9-2320-365-10).
s1. STEERING HARD OR DOES NOT WORK (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering oil level OK.</td>
</tr>
<tr>
<td>Hydraulic lines and fittings OK.</td>
</tr>
<tr>
<td>Steering pump not noisy.</td>
</tr>
<tr>
<td>Steering gear not noisy.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty steering gear adjustment.</td>
</tr>
</tbody>
</table>

2. Is steering hard in both directions?

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If steering is hard to one side but not the other, adjustment may be faulty.</td>
</tr>
</tbody>
</table>

NO

Notify DS Maintenance.

YES

Perform Steering Troubleshooting (p1. Hard to Steer).
(1) Raise cab (TM 9-2320-365-10).

(2) Inspect point on each end of front axle housing where wheel stop contacts axle. If this spot is gouged or peened or if steering is harder in one direction than the other, steering adjustment may be faulty.

(3) Lower cab (TM 9-2320-365-10).
2-30. AIR TRANSPORT TROUBLESHOOTING

This paragraph covers Air Transport Troubleshooting. The Air Transport Fault Index, Table 2-56, lists faults for the air transport components of the vehicle.

Table 2-56. Air Transport Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1</td>
<td>Cab Tilt, Spare Tire Retainer, and Suspension Compression Do Not Operate</td>
<td>2-1960</td>
</tr>
<tr>
<td>t2</td>
<td>Suspension Does Not Compress and/or Return To Normal</td>
<td>2-1970</td>
</tr>
<tr>
<td>t3</td>
<td>Cab Leveling Air Springs Do Not Operate</td>
<td>2-1972</td>
</tr>
</tbody>
</table>
1. Does either PUMP button or back-up hydraulic pump operate?

**KNOWN INFO**
- Hydraulic hoses free from leaks.

**POSSIBLE PROBLEMS**
- Faulty air/hydraulic manifold filter(s).
- Faulty hydraulic hose 515.
- Faulty air/hydraulic power unit.
- Faulty air hose 507.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.
- Faulty hydraulic hose 514.
- Faulty back-up hydraulic pump.
- Faulty hydraulic hose 521.
- Faulty hydraulic hose 520.
- Faulty air/hydraulic manifold.

**TEST OPTIONS**
- Visual Inspection

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

**INITIAL SETUP**

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

**Personnel Required**
- (2)

**Material/Parts**
- Filter Assembly (2) (Item 12, Appendix G)
- Rag, Wiping (Item 51, Appendix D)

**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)
- Goggles, Industrial (Item 15, Appendix C)
- Transducer, 10,000 PSI (Item 1, Appendix J)
- Gloves, Rubber (Item 13, Appendix C)

**References**
- TM 9-4910-571-12&P
(1) Attempt to raise cab using PUMP button (TM 9-2320-365-10).
(2) Attempt to raise cab using back-up hydraulic pump (TM 9-2320-365-10).
(3) If cab does not raise in both steps (1) and (2), go to step 10 of this fault.
t1. CAB TILT, SPARE TIRE RETAINER, AND SUSPENSION COMPRESSION DO NOT OPERATE (CONT)

**KNOWN INFO**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.

**POSSIBLE PROBLEMS**
- Faulty hydraulic hose 515.
- Faulty air/hydraulic power unit.
- Faulty air hose 507.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.
- Faulty hydraulic hose 514.
- Faulty back-up hydraulic pump.
- Faulty hydraulic hose 521.
- Faulty hydraulic hose 520.
- Faulty air/hydraulic manifold.

**TEST OPTIONS**

**Reason for Question**
This question eliminates possible problems and determines where troubleshooting continues.

**2.**
Does back-up hydraulic pump operate?

- NO
  - Go to step 12 of this fault.
- YES
  - Go to step 11 of this fault.

**3.**
Is 2,500-4,000 psi (17,238-27,580 kPa) present at air/hydraulic power unit return port?

- NO
  - Go to step 12 of this fault.
- YES
  - Go to step 11 of this fault.
(1) Attempt to raise cab using back-up hydraulic pump (TM 9-2320-365-10).
(2) If cab does not raise, go to step 12 of this fault.
(3) Lower cab (TM 9-2320-365-10).

**PRESSURE TEST**

- Position drain pan under air/hydraulic power unit.
- Disconnect hydraulic hose 514 from air/hydraulic power unit return port.
- Connect STE/ICE-R between hydraulic hose 514 and return port.
- Start engine (TM 9-2320-365-10).
- Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
- Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
- Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
- If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 11 of this fault.
- Disconnect STE/ICE-R from hydraulic hose 514 and return port.
- Connect hydraulic hose 514 to return port.
4. Is 2,500-4,000 psi (17,238-27,580 kPa) present at port P1?

**Known Info**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.

**Possible Problems**
- Faulty hydraulic hose 515.
- Faulty air/hydraulic power unit.
- Faulty air hose 507.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.
- Faulty air/hydraulic manifold.

**Test Options**
- Pressure Test or STE/ICE-R Test #51

**Reason for Question**
If 2,500-4,000 psi (17,238-27,580 kPa) is present, air/hydraulic manifold is faulty.

**Flowchart**
- **Yes**
  - Replace air/hydraulic manifold (para 19-4).
- **No**
  - Go to step 5 of this fault.
### PRESSURE TEST

1. Position drain pan under air/hydraulic manifold.
2. Disconnect hydraulic hose 515 from port P1.
3. Connect STE/ICE-R between hydraulic hose 515 and port P1.
5. Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
6. Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
7. Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
8. If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 5 of this fault.
9. If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace air/hydraulic manifold (para 19-4).
10. Disconnect STE/ICE-R from hydraulic hose 515 and port P1.
11. Connect hydraulic hose 515 to port P1.
5. Is 2,500-4,000 psi (17,238-27,580 kPa) present at air/hydraulic power unit output port?

**KNOWN INFO**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.

**POSSIBLE PROBLEMS**
- Faulty hydraulic hose 515.
- Faulty air/hydraulic power unit.
- Faulty air hose 507.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.
- Faulty air/hydraulic manifold.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**
If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 515 is faulty.

YES

Replace hydraulic hose 515 (para 19-11).

NO

Go to step 6 of this fault.
PRESSURE TEST

(1) Position drain pan under air/hydraulic power unit.
(2) Disconnect hydraulic hose 515 from output port.
(3) Connect STE/ICE-R between hydraulic hose 515 and output port.
(4) Start engine (TM 9-2320-365-10).
(5) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 6 of this fault.
(9) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 515 (para 19-11).
(10) Disconnect STE/ICE-R from hydraulic hose 515 and output port.
(11) Connect hydraulic hose 515 to output port.
t1. CAB TILT, SPARE TIRE RETAINER, AND SUSPENSION COMPRESSION DO NOT OPERATE (CONT)

**KNOWN INFO**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.

**POSSIBLE PROBLEMS**
- Faulty air/hydraulic power unit.
- Faulty air hose 507.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.
- Faulty air/hydraulic manifold.

6. Is air present at air/hydraulic power unit supply port?

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
If air is present, air/hydraulic power unit is faulty.

- **NO**
  - Go to step 7 of this fault.

- **YES**
  - Replace air/hydraulic power unit (para 19-3).
(1) Drain air tanks (TM 9-2320-365-10).
(2) Loosen air hose 507 at air/hydraulic power unit.
(3) Start engine and charge air tanks (TM 9-2320-365-10).
(4) Check for presence of air at air hose 507.
(5) If air is not present, go to step 7 of this fault.
(6) If air is present, replace air/hydraulic power unit (para 19-3).
(7) Drain air tanks (TM 9-2320-365-10).
(8) Tighten air hose 507 at air/hydraulic power unit.
### KNOWN INFO

- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Air/hydraulic power unit OK.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.

### POSSIBLE PROBLEMS

- Faulty air hose 507.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.
- Faulty air/hydraulic manifold.

### TEST OPTIONS

- Visual Inspection

### REASON FOR QUESTION

If air is present, air hose 507 is faulty.

---

**Question 7:**

Is air present at PUMP CYL port?

- **YES**
  - Replace air hose 507 (para 23-3).

- **NO**
  - Go to step 8 of this fault.
(1) Drain air tanks (TM 9-2320-365-10).
(2) Loosen air hose 507 at PUMP CYL port.
(3) Start engine and charge air tanks (TM 9-2320-365-10).
(4) Check for presence of air at PUMP CYL port.
(5) If air is not present, go to step 8 of this fault.
(6) If air is present, replace air hose 507 (para 23-3).
(7) Drain air tanks (TM 9-2320-365-10).
(8) Tighten air hose 507 at PUMP CYL port.
### KNOWN INFO
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Air/hydraulic power unit OK.
- Air hose 507.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.

### POSSIBLE PROBLEMS
- Faulty air/hydraulic manifold.
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.

#### 8. Is air present at AIR IN P port?
- **YES**
  - Go to step 9 of this fault.
- **NO**
  - Replace air/hydraulic manifold (para 19-4).

#### TEST OPTIONS
- Visual Inspection

#### REASON FOR QUESTION
- If air is present, air/hydraulic manifold is faulty.
(1) Drain air tanks (TM 9-2320-365-10).
(2) Loosen air hose 502 at AIR IN P port.
(3) Start engine and charge air tanks
    (TM 9-2320-365-10).
(4) Check for presence of air at air hose 502.
(5) If air is not present, go to step 9 of this fault.
(6) If air is present, replace air/hydraulic manifold
    (para 19-4).
(7) Drain air tanks (TM 9-2320-365-10).
(8) Tighten air hose 502 at AIR IN P port.
9. **Is air present at secondary air tank inversion valve delivery port?**

- **YES**
  - Replace air hose 502 (para 23-3).

- **NO**
  - Replace secondary air tank inversion valve (para 23-4).

---

**KNOWN INFO**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Air/hydraulic power unit OK.
- Air hose 507.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.
- Air/hydraulic manifold OK.

**POSSIBLE PROBLEMS**
- Faulty secondary air tank inversion valve.
- Faulty air hose 502.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
If air is not present, secondary air tank inversion valve is faulty. If air is present, air hose 502 is faulty.
(1) Drain air tanks (TM 9-2320-365-10).
(2) Loosen air hose 502 at secondary air tank inversion valve delivery port.
(3) Start engine and charge air tanks (TM 9-2320-365-10).
(4) Check for presence of air at secondary air tank inversion valve delivery port.
(5) If air is not present, replace secondary air tank inversion valve (para 23-4).
(6) If air is present, replace air hose 502 (para 23-3).
(7) Drain air tanks (TM 9-2320-365-10).
(8) Tighten air hose 502 at secondary air tank inversion valve delivery port.
10. **WARNING**

Read WARNING on following page.

Are air/hydraulic manifold filters free from debris?

**TEST OPTIONS**

**Visual Inspection**

**REASON FOR QUESTION**

If air/hydraulic manifold filter(s) is clogged, filter(s) is faulty.

---

**KNOWN INFO**

<table>
<thead>
<tr>
<th>Hydraulic hoses free from leaks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic hose 515 OK.</td>
</tr>
<tr>
<td>Air/hydraulic power unit OK.</td>
</tr>
<tr>
<td>Air hose 507 OK.</td>
</tr>
<tr>
<td>Secondary air tank inversion valve OK.</td>
</tr>
<tr>
<td>Air hose 502 OK.</td>
</tr>
<tr>
<td>Hydraulic hose 514 OK.</td>
</tr>
<tr>
<td>Back-up hydraulic pump OK.</td>
</tr>
<tr>
<td>Hydraulic hose 521 OK.</td>
</tr>
<tr>
<td>Hydraulic hose 520 OK.</td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

- Debris in air/hydraulic manifold filter(s).
- Faulty air/hydraulic manifold.
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

(1) Remove two plugs from air/hydraulic manifold. Discard plugs.
(2) Remove two retainers, filters, and springs from air/hydraulic manifold. Discard retainers and springs.
(3) Inspect filters for debris or signs of damage.
(4) Discard filters.
(5) If filters are free from debris and damage, repair or replace air/hydraulic manifold (para 19-4).
(6) Position two springs and filters in hydraulic manifold with two retainers.
(7) Install two preformed packings on plugs.
(8) Install two plugs in air/hydraulic manifold.
11. Is 2,500-4,000 psi (17,238-27,580 kPa) present at port T1?

**Known Info**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515.
- Air/hydraulic power unit OK.
- Air hose 507 OK.
- Secondary air tank inversion valve OK.
- Air hose 502 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.
- Hydraulic hose 520 OK.

**Possible Problems**
- Faulty hydraulic hose 514.
- Faulty air/hydraulic manifold.

**Test Options**
- Pressure Test or STE/ICE-R Test #51

**Reason for Question**
- If 2,500-4,000 psi (17,238-27,580 kPa) is not present, air/hydraulic manifold is faulty.
- If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 514 is faulty.

- **YES**
  - Replace hydraulic hose 514 (para 19-11).

- **NO**
  - Replace air/hydraulic manifold (para 19-4).
PRESSURE TEST

(1) Position drain pan under air/hydraulic manifold.
(2) Disconnect hydraulic hose 514 from port T1.
(3) Connect STE/ICE-R between hydraulic hose 514 and port T1.
(4) Start engine (TM 9-2320-365-10).
(5) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, replace air/hydraulic manifold (para 19-4).
(9) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 514 (para 19-11).
(10) Disconnect STE/ICE-R from hydraulic hose 514 and port T1.
(11) Connect hydraulic hose 514 to port T1.
12. Is 2,500-4,000 psi (17,238-27,580 kPa) present at back-up hydraulic pump return port?

**KNOWN INFO**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Air/hydraulic power unit OK.
- Air hose 507 OK.
- Secondary air tank inversion valve OK.
- Air hose 502 OK.
- Air hose 514 OK.

**POSSIBLE PROBLEMS**
- Faulty back-up hydraulic pump.
- Faulty hydraulic hose 521.
- Faulty hydraulic hose 520.
- Faulty air/hydraulic manifold.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

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

**YES**
- Go to step 15 of this fault.

**NO**
<table>
<thead>
<tr>
<th>PRESSURE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Position drain pan under back-up hydraulic pump.</td>
</tr>
<tr>
<td>(2) Disconnect hydraulic hose 520 from back-up hydraulic pump return port.</td>
</tr>
<tr>
<td>(3) Connect STE/ICE-R between hydraulic hose 520 and return port.</td>
</tr>
<tr>
<td>(4) Start engine (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(5) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.</td>
</tr>
<tr>
<td>(8) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 15 of this fault.</td>
</tr>
<tr>
<td>(9) Disconnect STE/ICE-R from hydraulic hose 520 and return port.</td>
</tr>
<tr>
<td>(10) Connect hydraulic hose 520 to return port.</td>
</tr>
</tbody>
</table>

**Diagram:**
- Back-up Hydraulic Pump Cover Removed for Clarity
- Back-up Hydraulic Pump
- Hydraulic Hose 520
13. **Is 2,500-4,000 psi (17,238-27,580 kPa) present at port P2?**

**Known Info**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Air/hydraulic power unit OK.
- Air hose 507 OK.
- Secondary air tank inversion valve OK.
- Air hose 502 OK.
- Air hose 514 OK.
- Air hose 520 OK.

**Possible Problems**
- Faulty back-up hydraulic pump.
- Faulty hydraulic hose 521.
- Faulty air/hydraulic manifold.

**Test Options**
- Pressure Test or STE/ICE-R Test #51

**Reason for Question**
If 2,500-4,000 psi (17,238-27,580 kPa) is present, air/hydraulic manifold is faulty.

**Flowchart**
- **Yes**: Replace air/hydraulic manifold (para 19-4).
- **No**: Go to step 14 of this fault.
PRESSURE TEST

(1) Position drain pan under air/hydraulic manifold.
(2) Disconnect hydraulic hose 521 from port P2.
(3) Connect STE/ICE-R between hydraulic hose 521 and port P2.
(4) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
(5) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(6) Operate back-up hydraulic pump (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(7) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 14 of this fault.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace air/hydraulic manifold (para 19-4).
(9) Disconnect STE/ICE-R from hydraulic hose 521 and port P2.
(10) Connect hydraulic hose 521 to port P2.
14. Is 2,500-4,000 psi (17,238-27,580 kPa) present at back-up hydraulic pump output port?

**Known Info**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515 OK.
- Air/hydraulic power unit OK.
- Air hose 507 OK.
- Secondary air tank inversion valve OK.
- Air hose 502 OK.
- Air hose 514 OK.
- Hydraulic hose 520 OK.
- Air/hydraulic manifold OK.

**Possible Problems**
- Faulty back-up hydraulic pump.
- Faulty hydraulic hose 521.

**Test Options**
- Pressure Test or STE/ICE-R Test #51

**Reason for Question**
- If 2,500-4,000 psi (17,238-27,580 kPa) is not present, back-up hydraulic pump is faulty. If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 521 is faulty.

**Flowchart**
- **YES**
  - Replace hydraulic hose 521 (para 19-11).
- **NO**
  - Replace back-up hydraulic pump (para 19-2).
PRESSURE TEST

(1) Position drain pan under back-up hydraulic pump.
(2) Disconnect hydraulic hose 521 from back-up hydraulic pump output port.
(3) Connect STE/ICE-R between hydraulic hose 521 and output port.
(4) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
(5) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(6) Operate back-up hydraulic pump (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(7) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, replace back-up hydraulic pump (para 19-2).
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 521 (para 19-11).
(9) Disconnect STE/ICE-R from hydraulic hose 521 and output port.
(10) Connect hydraulic hose 521 to output port.
1. CAB TILT, SPARE TIRE RETAINER, AND SUSPENSION COMPRESSION DO NOT OPERATE (CONT)

**KNOWN INFO**
- Hydraulic hoses free from leaks.
- Air/hydraulic manifold filters OK.
- Hydraulic hose 515.
- Air/hydraulic power unit OK.
- Air hose 507 OK.
- Secondary air tank inversion valve OK.
- Air hose 502 OK.
- Hydraulic hose 514 OK.
- Back-up hydraulic pump OK.
- Hydraulic hose 521 OK.

**POSSIBLE PROBLEMS**
- Faulty hydraulic hose 520.
- Faulty air/hydraulic manifold.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**
If 2,500-4,000 psi (17,238-27,580 kPa) is not present, air/hydraulic manifold is faulty. If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 520 is faulty.

**15.**
Is 2,500-4,000 psi (17,238-27,580 kPa) present at port T2?

- **NO**
  - Replace hydraulic hose 520 (para 19-11).

- **YES**
  - Replace air/hydraulic manifold (para 19-4).
## PRESSURE TEST

1. Position drain pan under air/hydraulic manifold.
2. Disconnect hydraulic hose 520 from port T2.
3. Connect STE/ICE-R between hydraulic hose 520 and port T2.
5. Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
6. Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
7. Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
8. If 2,500-4,000 psi (17,238-27,580 kPa) is not present, replace air/hydraulic manifold (para 19-4).
9. If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 520 (para 19-11).
10. Disconnect STE/ICE-R from hydraulic hose 520 and port T2.
11. Connect hydraulic hose 520 to port T2.
2. SUSPENSION DOES NOT COMPRESS AND/OR RETURN TO NORMAL

INITIAL SETUP

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

**Personnel Required**
(2)

**Material/Parts**
Rag, Wiping (Item 51, Appendix D)

**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)
- Goggles, Industrial (Item 15, Appendix C)
- Transducer, 10,000 PSI (Item 1, Appendix J)
- Gloves, Rubber (Item 13, Appendix C)

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

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other hydraulic manifold functions OK.</td>
</tr>
<tr>
<td>Hydraulic hoses free from leaks.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty hydraulic hose(s) 508 and/or 510.</td>
</tr>
<tr>
<td>Faulty suspension compression tee fitting.</td>
</tr>
<tr>
<td>Faulty air/hydraulic manifold.</td>
</tr>
<tr>
<td>Faulty hydraulic hose 512.</td>
</tr>
<tr>
<td>Faulty hydraulic hose 513.</td>
</tr>
<tr>
<td>Faulty suspension release tee fitting.</td>
</tr>
<tr>
<td>Faulty suspension cylinder(s).</td>
</tr>
<tr>
<td>Faulty hydraulic hose(s) 509 and/or 511.</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

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

**WARNING**
Read WARNING on following page.

---

1. **Is 2,500-4,000 psi (17,238-27,580 kPa) present at suspension cylinder input ports?**

---

**YES**
Go to step 3 of this fault.

**NO**

---

2-1970  Change 1
NOTE
SYSTEM PARK control must be engaged (TM 9-2320-365-10) before operating SUSPENSION compression.

WARNING
Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

Hydraulic oil (MIL-H 5605) 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 into contact with hydraulic oil should be washed immediately. Failure to comply may result in injury to personnel.

PRESSURE TEST

(1) Position drain pan under RH suspension cylinder.
(2) Disconnect hydraulic hose 508 from RH suspension cylinder input port.
(3) Connect STE/ICE-R between hydraulic hose 508 and RH suspension cylinder input port.
(4) Start engine (TM 9-2320-365-10).
(5) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(6) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(7) Shut down engine (TM 9-2320-365-10).
(8) Disconnect STE/ICE-R from RH suspension cylinder input port and hydraulic hose 508.
(9) Connect hydraulic hose 508 to RH suspension cylinder input port.
(10) Repeat steps (1) through (9) on LH suspension cylinder and hydraulic hose 510.
(11) If 2,500-4,000 psi (17,238-27,580 kPa) is not present at either suspension cylinder, go to step 3 of this fault.
t2. SUSPENSION DOES NOT COMPRESS AND/OR RETURN TO NORMAL (CONT)

**KNOWN INFO**
- Other hydraulic manifold functions OK.
- Hydraulic hoses free from leaks.
- Hydraulic hoses 508 and 510 OK.
- Suspension compression tee fitting OK.
- Hydraulic hose 512 OK.

**POSSIBLE PROBLEMS**
- Faulty air/hydraulic manifold.
- Faulty hydraulic hose 513.
- Faulty suspension release tee fitting.
- Faulty suspension cylinder(s).
- Faulty hydraulic hose(s) 509 and/or 511.

**2.**

Is 2,500-4,000 psi (17,238-27,580 kPa) present at PILOT input port?

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**
- If 2,500-4,000 psi (17,238-27,580 kPa) is present, air/hydraulic manifold is faulty.

**FLOWCHART**
- **NO**
  - Go to step 6 of this fault.
- **YES**
  - Repair or replace air/hydraulic manifold (para 19-4).
PRESSURE TEST

(1) Position drain pan under air/hydraulic manifold
(2) Disconnect hydraulic hose 513 from PILOT port.
(3) Connect STE/ICE-R between hydraulic hose 513 and PILOT port.
(4) Start engine (TM 9-2320-365-10).
(5) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 6 of this fault.
(9) If 2,500-4,000 psi (17,238-27,580 kPa) is present, repair or replace air/hydraulic manifold (para 19-4).
(10) Disconnect STE/ICE-R from hydraulic hose 513 and PILOT port.
(11) Connect hydraulic hose 513 to PILOT port.
t2. SUSPENSION DOES NOT COMPRESS AND/OR RETURN TO NORMAL (CONT)

KNOWN INFO
Other hydraulic manifold functions OK.
Hydraulic hoses free from leaks.
Hydraulic hose 513 OK.
Suspension release tee fitting OK.
Suspension cylinders OK.
Hydraulic hoses 509 and 511 OK.

POSSIBLE PROBLEMS
Faulty hydraulic hose(s) 508 and/or 510.
Faulty suspension compression tee fitting.
Faulty air/hydraulic manifold.
Faulty hydraulic hose 512.

3. Is 2,500-4,000 psi (17,238-27,580 kPa) present at suspension compression tee fitting output ports?

TEST OPTIONS
Pressure Test or STE/ICE-R Test #51

REASON FOR QUESTION
If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose(s) 508 and/or 510 is faulty.

NO

YES

Go to step 4 of this fault.

Replace hydraulic hose(s) 508 and/or 510 (para 19-11).
(1) Position drain pan under suspension compression tee fitting.
(2) Disconnect hydraulic hose 510 from suspension compression tee fitting LH output port.
(3) Connect STE/ICE-R between hydraulic hose 510 and suspension compression tee fitting LH output port.
(4) Start engine (TM 9-2320-365-10).
(5) Position SUSPENSION knob to RAISE (TM 9-2320-365-10).
(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 4 of this fault.
(9) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 510 (para 19-11).
(10) Disconnect STE/ICE-R from hydraulic hose 510 and suspension compression tee fitting LH output port.
(11) Connect hydraulic hose 510 to suspension compression tee fitting LH output port.
(12) Repeat steps (2) through (12) on hydraulic hose 508 and suspension compression tee fitting RH output port.
t2. SUSPENSION DOES NOT COMPRESS AND/OR RETURN TO NORMAL (CONT)

**KNOWN INFO**
- Other hydraulic manifold functions OK.
- Hydraulic hoses free from leaks.
- Hydraulic hoses 508 and 510 OK.
- Hydraulic hose 513 OK.
- Suspension release tee fitting OK.
- Suspension cylinders OK.
- Hydraulic hoses 509 and 511 OK.

**POSSIBLE PROBLEMS**
- Faulty suspension compression tee fitting.
- Faulty air/hydraulic manifold.
- Faulty hydraulic hose 512.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**
If 2,500-4,000 psi (17,238-27,580 kPa) is present, suspension compression tee fitting is faulty.

**4.**

Is 2,500-4,000 psi (17,238-27,580 kPa) present at suspension compression tee fitting input port?

**NO**

**YES**

Replace suspension compression tee fitting (para 19-11).

Go to step 5 of this fault.
### PRESSURE TEST

(1) Disconnect hydraulic hose 512 from suspension compression tee fitting input port.

(2) Connect STE/ICE-R between hydraulic hose 512 and suspension compression tee fitting input port.

(3) Start engine (TM 9-2320-365-10).

(4) Position SUSPENSION knob to RAISE (TM 9-2320-365-10).

(5) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).

(6) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.

(7) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 5 of this fault.

(8) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace suspension compression tee fitting (para 19-11).

(9) Disconnect STE/ICE-R from hydraulic hose 512 and suspension compression tee fitting input port.

(10) Connect hydraulic hose 512 to suspension compression tee fitting input port.
t2. SUSPENSION DOES NOT COMPRESS AND/OR RETURN TO NORMAL (CONT)

**KNOWN INFO**
- Other hydraulic manifold functions OK.
- Hydraulic hoses free from leaks.
- Hydraulic hoses 508 and 510 OK.
- Suspension compression tee fitting OK.
- Hydraulic hose 513 OK.
- Suspension release tee fitting OK.
- Suspension cylinders OK.
- Hydraulic hoses 509 and 511 OK.

**POSSIBLE PROBLEMS**
- Faulty air/hydraulic manifold.
- Faulty hydraulic hose 512.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**
- If 2,500-4,000 psi (17,238-27,580 kPa) is not present, air/hydraulic manifold is faulty.
- If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 512 is faulty.

5. Is 2,500-4,000 psi (17,238-27,580 kPa) present at SUSP COMPRESS output port?

**NO**
- Repair or replace air/hydraulic manifold (para 19-4).

**YES**
- Replace hydraulic hose 512 (para 19-11).
PRESSURE TEST

(1) Position drain pan under air/hydraulic manifold.
(2) Disconnect hydraulic hose 512 from SUSP COMPRESS port.
(3) Connect STE/ICE-R between hydraulic hose 512 and SUSP COMPRESS port.
(4) Start engine (TM 9-2320-365-10).
(5) Position SUSPENSION knob to RAISE (TM 9-2320-365-10).
(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, repair or replace air/hydraulic manifold (para 19-4).
(9) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 512 (para 19-11).
(10) Disconnect STE/ICE-R from hydraulic hose 512 and SUSP COMPRESS port.
(11) Connect hydraulic hose 512 to SUSP COMPRESS port.
**T2. SUSPENSION DOES NOT COMPRESS AND/OR RETURN TO NORMAL (CONT)**

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other hydraulic manifold functions OK.</td>
<td>Pressure Test or STE/ICE-R Test #51</td>
<td>If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 513 is faulty.</td>
</tr>
<tr>
<td>Hydraulic hoses free from leaks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic hoses 508 and 510 OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspension compression tee fitting OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air/hydraulic manifold OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic hose 512 OK.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**POSSIBLE PROBLEMS**

- Faulty hydraulic hose 513.
- Faulty suspension release tee fitting.
- Faulty suspension cylinder(s).
- Faulty hydraulic hose(s) 509 and/or 511.

**6.** Is 2,500-4,000 psi (17,238-27,580 kPa) present at suspension release tee fitting output port?

- **YES**
  - Replace hydraulic hose 513 (para 19-11).

- **NO**
  - Go to step 7 of this fault.
The text is a series of numbered steps describing a procedure for a pressure test:

1. Position drain pan under suspension release tee fitting.
2. Disconnect hydraulic hose 513 from suspension release tee fitting output port.
3. Connect STE/ICE-R between hydraulic hose 513 and suspension release tee fitting output port.
5. Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
6. Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
7. Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
8. If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 7 of this fault.
9. If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 513 (para 19-11).
10. Disconnect STE/ICE-R from hydraulic hose 513 and suspension release tee fitting output port.
11. Connect hydraulic hose 513 to suspension release tee fitting output port.
7. Is 2,500-4,000 psi (17,238-27,580 kPa) present at suspension release tee fitting input ports?

- **YES**
  - Go to step 8 of this fault.

- **NO**
  - Replace suspension release tee fitting (para 19-11).

---

**KNOWN INFO**

- Other hydraulic manifold functions OK.
- Hydraulic hoses free from leaks.
- Hydraulic hoses 508 and 510 OK.
- Suspension compression tee fitting OK.
- Air/hydraulic manifold OK.
- Hydraulic hose 512 OK.
- Hydraulic hose 513 OK.

**POSSIBLE PROBLEMS**

- Faulty suspension release tee fitting.
- Faulty suspension cylinder(s).
- Faulty hydraulic hose(s) 509 and/or 511.

**TEST OPTIONS**

- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**

If 2,500-4,000 psi (17,238-27,580 kPa) is present, suspension release tee fitting is faulty.
PRESSURE TEST

(1) Disconnect hydraulic hose 511 from suspension release tee fitting LH input port.
(2) Connect STE/ICE-R between hydraulic hose 511 and suspension release tee fitting LH input port.
(3) Start engine (TM 9-2320-365-10).
(4) Position SUSPENSION knob to LOWER (TM 9-2320-365-10).
(5) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(6) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(7) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, go to step 5 of this fault.
(8) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose 511 (para 19-11).
(9) Disconnect STE/ICE-R from hydraulic hose 511 and suspension release tee fitting LH input port.
(10) Connect hydraulic hose 511 to suspension release tee fitting LH input port.
(11) Repeat steps (2) through (12) on hydraulic hose 509 and suspension release tee fitting RH input port.
8. Is 2,500-4,000 psi (17,238-27,580 kPa) present at suspension cylinder output ports?

**Known Info**
- Other hydraulic manifold functions OK.
- Hydraulic hoses free from leaks.
- Hydraulic hoses 508 and 510 OK.
- Suspension compression tee fitting OK.
- Air/hydraulic manifold OK.
- Hydraulic hose 512 OK.
- Hydraulic hose 513 OK.
- Suspension release tee fitting OK.

**Possible Problems**
- Faulty suspension cylinder(s).
- Faulty hydraulic hose(s) 509 and/or 511.

**Test Options**
- Pressure Test or STE/ICE-R Test #51

**Reason for Question**
- If 2,500-4,000 psi (17,238-27,580 kPa) is not present, suspension cylinder(s) is faulty.
- If 2,500-4,000 psi (17,238-27,580 kPa) is present, hydraulic hose 509 and/or 511 is faulty.

**YES**
- Replace suspension cylinder(s) (para 19-9).

**NO**
- Replace hydraulic hose(s) 509 and/or 511 (para 19-11).
PRESSURE TEST

(1) Position drain pan under RH suspension cylinder.
(2) Disconnect hydraulic hose 509 from RH suspension cylinder output port.
(3) Connect STE/ICE-R between hydraulic hose 509 and RH suspension cylinder output port.
(4) Start engine (TM 9-2320-365-10).
(5) Position SUSPENSION knob to RAISE (TM 9-2320-365-10).
(6) Position FUNCTION SELECT knob to SUSPENSION (TM 9-2320-365-10).
(7) Push and hold PUMP plunger button (TM 9-2320-365-10) and perform STE/ICE-R Test #51.
(8) Shut down engine (TM 9-2320-365-10).
(9) Disconnect STE/ICE-R from RH suspension cylinder output port and hydraulic hose 509.
(10) Connect hydraulic hose 509 to RH suspension cylinder output port.
(11) Repeat steps (1) through (10) on LH suspension cylinder and hydraulic hose 511.
(12) If 2,500-4,000 psi (17,238-27,580 kPa) is not present, replace suspension cylinder(s) (para 19-9).
(13) If 2,500-4,000 psi (17,238-27,580 kPa) is present, replace hydraulic hose(s) 509 and/or 511.
t3. CAB LEVELING AIR SPRINGS 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)
Goggles, Industrial (Item 15, Appendix C)

References
TM 9-4910-571-12&P

KNOWLEDGE

CTIS operates.
Air hoses free from kinks and leaks.

POSSIBLE PROBLEMS
Faulty variable control check valve.
Faulty air hose 503.
Faulty air hose 522.
Faulty cab leveling valve tee fitting.
Faulty air hose 506.
Faulty air/hydraulic manifold.
Faulty pressure protection valve.
Faulty air hose 501.
Faulty cab leveling valve.
Faulty air spring cylinder(s).
Faulty air hose(s) 504 and/or 505.

REASON FOR QUESTION

Visual Inspection

This question eliminates possible problems and determines where troubleshooting continues.

TEST OPTIONS

START

1. Do cab air springs deflate?

NO

GO TO STEP 5 OF THIS FAULT

YES

GO TO STEP 5 OF THIS FAULT
NOTE

SYSTEM PARK control must be engaged (TM 9-2320-365-10) before operating SUSPENSION compression.

(1) Attempt to deflate cab air springs (TM 9-2320-365-10).
(2) If cab air springs do not deflate, go to step 5 of this fault.
t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)

**KNOWN INFO**
CTIS operates.
Air hoses free from kinks and leaks.
Air hose 522 OK.
Air hose 506 OK.
Air/hydraulic manifold OK.
Pressure protection valve OK.
Air hose 501 OK.

**POSSIBLE PROBLEMS**
Faulty variable control check valve.
Faulty air hose 503.
Faulty cab leveling valve tee fitting.
Faulty cab leveling valve.
Faulty air spring cylinder(s).
Faulty air hose(s) 504 and/or 505.

**TEST OPTIONS**
Visual Inspection

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

2. Do cab air springs inflate?

**POSSIBLE PROBLEMS**
Faulty variable control check valve.
Faulty air hose 503.
Faulty cab leveling valve tee fitting.
Faulty cab leveling valve.
Faulty air spring cylinder(s).
Faulty air hose(s) 504 and/or 505.

3. Is air present at variable control check valve input port?

**POSSIBLE PROBLEMS**
Faulty variable control check valve.
Faulty air hose 503.
Faulty cab leveling valve tee fitting.

Replace variable control check valve (para 16-9).
(1) Attempt to inflate cab air springs (TM 9-2320-365-10).
(2) If cab air springs do not inflate, go to step 13 of this fault.

(1) Start engine and allow air tanks to pressurize (TM 9-2320-365-10).
(2) Shut down engine (TM 9-2320-365-10).
(3) Raise cab (TM 9-2320-365-10).
(4) Loosen air hose 503 at variable control check valve input port.
(5) Check for pressure of air at air hose 503.
(6) Tighten air hose 503 to variable control check valve.
(7) If air is not present, go to step 4 of this fault.
(8) If air is present, replace variable control check valve (para 16-9).
t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)

**Known Info**
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 522 OK.
- Air hose 506 OK.
- Air/hydraulic manifold OK.
- Pressure protection valve OK.
- Air hose 501 OK.
- Cab leveling valve OK.
- Air spring cylinders OK.
- Air hoses 504 and 505 OK.

**Possible Problems**
- Faulty air hose 503.
- Faulty cab leveling valve tee fitting.

**Test Options**
- Visual Inspection

**Reason for Question**
- If air is not present, cab leveling valve tee fitting. If air is present, air hose 503 is faulty.

4. Is air present at cab leveling valve tee fitting check valve output port?

- **Yes**
  - Replace cab leveling valve tee fitting (para 16-8).

- **No**
  - Replace air hose 503 (para 23-3).
(1) Loosen air hose 503 at cab leveling valve tee fitting check valve output port.
(2) Check for pressure of air at cab leveling valve tee fitting check valve output port.
(3) Tighten air hose 503 at cab leveling valve tee fitting check valve output port.
(4) Lower cab (TM 9-2320-365-10).
(5) If air is not present, replace cab leveling valve tee fitting (para 16-8).
(6) If air is present, replace air hose 503 (para 23-3).
t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)

**KNOWN INFO**
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 503 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 522.
- Faulty cab leveling valve tee fitting.
- Faulty air hose 506.
- Faulty air/hydraulic manifold.
- Faulty pressure protection valve.
- Faulty air hose 501.
- Faulty cab leveling valve.
- Faulty air spring cylinder(s).
- Faulty air hose(s) 504 and/or 505.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If air is present, air spring cylinder(s) is faulty.

5. Is air present at air spring cylinder input ports?

- **NO**
- **YES**

Yes:
- Go to step 6 of this fault.

No:
- Replace air spring cylinder(s) (para 16-9).
(1) Start engine and allow air tanks to pressurize (TM 9-2320-365-10).
(2) Shut down engine (TM 9-2320-365-10).
(3) Raise cab (TM 9-2320-365-10).
(4) Loosen air hose 504 at RH air spring cylinder.
(5) Turn CAB knob to the right and push in (TM 9-2320-365-10).
(6) Check for presence of air at air hose 504.
(7) Turn CAB knob to the left (TM 9-2320-365-10).
(8) Tighten air hose 504 at RH air spring cylinder.
(9) Repeat steps (4) through (8) on LH air spring cylinder and air hose 505.
(10) If air is not present, go to step 6 of this fault.
(11) If air is present, replace air spring cylinder(s) (para 16-9).
**t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)**

### KNOWN INFO
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 503 OK.
- Air spring cylinders OK.

### POSSIBLE PROBLEMS
- Faulty air hose 522.
- Faulty cab leveling valve tee fitting.
- Faulty air hose 506.
- Faulty air/hydraulic manifold.
- Faulty pressure protection valve.
- Faulty air hose 501.
- Faulty cab leveling valve.
- Faulty air hose(s) 504 and/or 505.

### TEST OPTIONS
- **Visual Inspection**

### REASON FOR QUESTION
- If air is present, air hose(s) 504 and/or 505 is faulty.

---

6. **Is air present at cab leveling valve output ports?**

   - **NO**
     - Go to step 7 of this fault.

   - **YES**
     - Replace air hose(s) 504 and/or 505 (para 23-3).
(1) Loosen air hoses 504 and 505 at cab leveling valve output ports.
(2) Turn CAB knob to the right and push in (TM 9-2320-365-10).
(3) Check for presence of air at cab leveling valve output ports.
(4) Turn CAB knob to the left (TM 9-2320-365-10).
(5) Tighten air hoses 504 and 505 at cab leveling valve output ports.
(6) If air is not present, go to step 7 of this fault.
(7) If air is present, replace air hose(s) 504 and/or 505 (para 23-3).
7. Is air present at cab leveling valve input port?

**KNOWN INFO**
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 503 OK.
- Air spring cylinders OK.
- Air hoses 504 and 505 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 522.
- Faulty cab leveling valve tee fitting.
- Faulty air hose 506.
- Faulty air/hydraulic manifold.
- Faulty pressure protection valve.
- Faulty air hose 501.
- Faulty cab leveling valve.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
If air is present, cab leveling valve is faulty.

**Flowchart**
- **No**: Go to step 8 of this fault.
- **Yes**: Replace cab leveling valve (para 16-8).
(1) Loosen air hose 522 at cab leveling valve input port.
(2) Turn CAB knob to the right and push in (TM 9-2320-365-10).
(3) Check for presence of air at air hose 522.
(4) Turn CAB knob to the left (TM 9-2320-365-10).
(5) Tighten air hose 522 at cab leveling valve input port.
(6) If air is not present, go to step 8 of this fault.
(7) If air is present, replace cab leveling valve (para 16-8).
8. Is air present at cab leveling valve tee fitting output port?

**YES**
- Go to step 9 of this fault.

**NO**
- Replace air hose 522 (para 23-3).

**POSSIBLE PROBLEMS**
- Faulty air hose 522
- Faulty cab leveling valve tee fitting
- Faulty air hose 506
- Faulty air/hydraulic manifold
- Faulty pressure protection valve
- Faulty air hose 501

**KNOWN INFO**
- CTIS operates
- Air hoses free from kinks and leaks
- Variable control check valve OK
- Air hose 503 OK
- Cab leveling valve OK
- Air spring cylinders OK
- Air hoses 504 and 505 OK

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If air is present, air hose 522 is faulty.
(1) Loosen air hose 522 at cab leveling valve tee fitting output port.
(2) Turn CAB knob to the right and push in (TM 9-2320-365-10).
(3) Check for presence of air at cab leveling valve tee fitting output port.
(4) Turn CAB knob to the left (TM 9-2320-365-10).
(5) Tighten air hose 522 at cab leveling valve tee fitting output port.
(6) If air is not present, go to step 9 of this fault.
(7) If air is present, replace cab leveling valve tee fitting (para 16-8).
t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)

**KNOWLEDGE INFO**
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 503 OK.
- Air hose 522 OK.
- Cab leveling valve OK.
- Air spring cylinders OK.
- Air hoses 504 and 505 OK.

**POSSIBLE PROBLEMS**
- Faulty cab leveling valve tee fitting.
- Faulty air hose 506.
- Faulty air/hydraulic manifold.
- Faulty pressure protection valve.
- Faulty air hose 501.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If air is present, cab leveling valve tee fitting is faulty.

9. Is air present at cab leveling valve tee fitting input port?

- **NO**
  - Go to step 10 of this fault.

- **YES**
  - Replace cab leveling valve tee fitting (para 16-8).
(1) Loosen air hose 506 at cab leveling valve tee fitting input port.
(2) Turn CAB knob to the right and push in (TM 9-2320-365-10).
(3) Check for presence of air at air hose 506.
(4) Turn CAB knob to the left (TM 9-2320-365-10).
(5) Tighten air hose 506 at cab leveling valve tee fitting input port.
(6) Lower cab (TM 9-2320-365-10).
(7) If air is not present, go to step 10 of this fault.
(8) If air is present, replace cab leveling valve tee fitting (para 16-8).
10. Is air present at air/hydraulic manifold BAG CYL port?

- **NO**
  - Go to step 11 of this fault.

- **YES**
  - Replace air hose 506 (para 23-3).

---

**KNOWN INFO**
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 503 OK.
- Air hose 522 OK.
- Cab leveling valve tee fitting OK.
- Cab leveling valve OK.
- Air spring cylinders OK.
- Air hoses 504 and 505 OK.

**POSSIBLE PROBLEMS**
- Faulty air hose 506.
- Faulty air/hydraulic manifold.
- Faulty pressure protection valve.
- Faulty air hose 501.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
If air is present, air hose 506 is faulty.
(1) Loosen air hose 506 at air/hydraulic manifold BAG CYL port.
(2) Turn CAB knob to the right and push in (TM 9-2320-365-10).
(3) Check for presence of air at air/hydraulic manifold BAG CYL port.
(4) Turn CAB knob to the left (TM 9-2320-365-10).
(5) Tighten air hose 506 at air/hydraulic manifold BAG CYL port.
(6) If air is not present, go to step 11 of this fault.
(7) If air is present, replace air hose 506 (para 23-3).
11. Is air present at air/hydraulic manifold AIR IN B port?

- **YES**
  - Go to step 12 of this fault.
  - Repair or replace air/hydraulic manifold (para 19-4).

- **NO**
  - If air is present, air/hydraulic manifold is faulty.
(1) Loosen air hose 501 at air/hydraulic manifold AIR IN B port.
(2) Check for presence of air at air hose 501.
(3) Tighten air hose 501 at air/hydraulic manifold AIR IN B port.
(4) If air is not present, go to step 12 of this fault.
(5) If air is present, repair or replace air/hydraulic manifold (para 19-4).
12. Is air present at pressure protection valve output port?

**NO**

- Faulty pressure protection valve.
- Faulty air hose 501.

**YES**

- Replace pressure protection valve (para 11-29).
- Replace air hose 501 (para 23-3).
(1) Loosen air hose 501 at pressure protection valve output port.
(2) Check for presence of air at pressure protection valve output port.
(3) Tighten air hose 501 at pressure protection valve output port.
(4) If air is not present, replace pressure protection valve (para 11-29).
(5) If air is present, replace air hose 501 (para 23-3).
t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTIS operates.</td>
</tr>
<tr>
<td>Air hoses free from kinks and leaks.</td>
</tr>
<tr>
<td>Variable control check valve OK.</td>
</tr>
<tr>
<td>Air hose 503 OK.</td>
</tr>
<tr>
<td>Air hose 522 OK.</td>
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<tr>
<td>Cab leveling valve tee fitting OK.</td>
</tr>
<tr>
<td>Air hose 506 OK.</td>
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<tr>
<td>Air/hydraulic manifold OK.</td>
</tr>
<tr>
<td>Pressure protection valve OK.</td>
</tr>
<tr>
<td>Air hose 501 OK.</td>
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</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty cab leveling valve.</td>
</tr>
<tr>
<td>Faulty air spring cylinder(s).</td>
</tr>
<tr>
<td>Faulty air hose(s) 504 and/or 505.</td>
</tr>
</tbody>
</table>

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<tr>
<td>Visual Inspection</td>
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<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If air is present, cab leveling valve is faulty.</td>
</tr>
</tbody>
</table>

13. Is air present at cab leveling valve input ports?

- **NO**
  - Go to step 14 of this fault.

- **YES**
  - Replace cab leveling valve (para 16-8).
(1) Start engine and allow air tanks to pressurize (TM 9-2320-365-10).
(2) Shut down engine (TM 9-2320-365-10).
(3) Raise cab (TM 9-2320-365-10).
(4) Loosen air hoses 504 and 505 at cab leveling valve input ports.
(5) Turn CAB knob to the left (TM 9-2320-365-10).
(6) Check for presence of air at air hoses 504 and 505.
(7) Tighten air hoses 504 and 505 at cab leveling valve input ports.
(8) If air is not present, go to step 14 of this fault.
(9) If air is present, replace cab leveling valve (para 16-8).
**t3. CAB LEVELING AIR SPRINGS DO NOT OPERATE (CONT)**

**KNOWN INFO**
- CTIS operates.
- Air hoses free from kinks and leaks.
- Variable control check valve OK.
- Air hose 503 OK.
- Air hose 522 OK.
- Cab leveling valve tee fitting OK.
- Air hose 506 OK.
- Air/hydraulic manifold OK.
- Pressure protection valve OK.
- Air hose 501 OK.
- Cab leveling valve OK.

**POSSIBLE PROBLEMS**
- Faulty air spring cylinder(s).
- Faulty air hose(s) 504 and/or 505.

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
- If air is present, air hose(s) 504 and/or 505 is faulty. If air is not present, air spring cylinder(s) is faulty.

14. Is air present at air spring cylinder output ports?

- **YES**
  - Replace air spring cylinder(s) (para 16-9).

- **NO**
  - Replace air hose(s) 504 and/or 505 (para 23-3).
(1) Loosen air hose 504 at RH air spring cylinder.
(2) Turn CAB knob to the right (TM 9-2320-365-10).
(3) Check for presence of air at RH air spring cylinder.
(4) Tighten air hose 504 at RH air spring cylinder.
(5) Repeat steps (1) through (4) on LH air spring cylinder and air hose 505.
(6) Lower cab (TM 9-2320-365-10).
(7) If air is not present, replace air spring cylinder(s) (para 16-9).
(8) If air is present, replace air hose(s) 504 and/or 505 (para 23-3).
2-31. SPECIAL PURPOSE KIT TROUBLESHOOTING

This paragraph covers Special Purpose Kit Troubleshooting. The Special Purpose Kit Fault Index, Table 2-57, lists faults for the special purpose kits of the vehicle.

**Table 2-57. Special Purpose Kit Fault Index**

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<th>Page</th>
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<td>No Power to Digitization Rack</td>
<td>2-1978</td>
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<tr>
<td>u2</td>
<td>No Power to Mobile Tracking System (MTS) Sense</td>
<td>2-1988</td>
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<tr>
<td>u3</td>
<td>No Power to Enhanced Position Location Reporting System (EPLRS)</td>
<td>2-1994</td>
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<tr>
<td>u4</td>
<td>No Power to Precision Lightweight Global Positioning System Receiver (PLGR)</td>
<td>2-1998</td>
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<tr>
<td>u5</td>
<td>No Power to Drive Visual Enhancement (DVE)</td>
<td>2-2002</td>
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<tr>
<td>u6</td>
<td>No Power to SINCGR/Force XXI Battle Command Brigade and Below (FBCB)</td>
<td>2-2006</td>
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<td>u7</td>
<td>No Power to Mobile Tracking System (MTS)</td>
<td>2-2010</td>
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<td>u8</td>
<td>Deleted</td>
<td>2-2016</td>
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<td>u18</td>
<td>Troop Transport Alarm Does Not Operate</td>
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<td>u19</td>
<td>Light Material Handling Crane (LMHC) Does Not Operate</td>
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<tr>
<td>u20</td>
<td>Light Material Handling Crane (LMHC) Hoist IN Does Not Operate</td>
<td>2-2106</td>
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<tr>
<td>u21</td>
<td>Light Material Handling Crane (LMHC) Hoist OUT Does Not Operate</td>
<td>2-2110</td>
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</table>
u1. NO POWER TO DIGITIZATION RACK

INITIAL SETUP

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<tr>
<td>Materials/Parts</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
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<tr>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
<td>Personnel Required</td>
</tr>
<tr>
<td>(2)</td>
<td></td>
</tr>
</tbody>
</table>

TEST OPTIONS

| Nothing. |

POSSIBLE PROBLEMS

- Circuit breaker CB11 tripped.
- Faulty circuit breaker CB11.
- Faulty power cable from terminal lug TL24 to terminal lug TL20.
- Faulty power cable from terminal lug TL23 to terminal lug TL16.
- Faulty power cable from terminal lug TL18 to terminal block TB2.
- Faulty Power Distribution Panel (PD1).

REASON FOR QUESTION

This question eliminates possible problems and determines where troubleshooting continues.

START

WARNING

Read WARNING on following page.

1. Is 24 VDC present at terminal lug TL16?

NO

Go to step 2 of this fault.

YES

Go to step 5 of this fault.

TEST OPTIONS

| Voltage Test or STE/ICE-R Test #89 |

CHANGE 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 circuits and cause severe burns or electrical shock.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove wing screw from power distribution shelf.</td>
</tr>
<tr>
<td>(2) Loosen wing screw on electrical distribution block cover.</td>
</tr>
<tr>
<td>(3) Remove electrical distribution block cover from power distribution shelf.</td>
</tr>
<tr>
<td>(4) Remove dust boot from terminal lug TL16.</td>
</tr>
<tr>
<td>(5) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(6) Connect positive (+) probe of multimeter to terminal lug TL16.</td>
</tr>
<tr>
<td>(7) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(8) If 24 VDC is not present, go to step 2 of this fault.</td>
</tr>
<tr>
<td>(9) If 24 VDC is present, go to step 5 of this fault.</td>
</tr>
<tr>
<td>(10) Install dust boot on terminal lug TL16.</td>
</tr>
</tbody>
</table>
**u1. NO POWER TO DIGITIZATION RACK (CONT)**

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
</table>

2. **Is circuit breaker CB11 tripped?**

   - **NO**
     - Go to step 3 of this fault.
   - **YES**
     - Reset circuit breaker CB11. If circuit breaker CB11 trips again, replace circuit breaker CB11 (para 20-88).

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Inspection</td>
<td>If circuit breaker CB11 is tripped, digitization rack will not have power.</td>
</tr>
</tbody>
</table>
(1) Remove three screws and washers from Power Distribution Panel (PDP).
(2) Remove three screws from Power Distribution Panel (PDP).
(3) Lift Power Distribution Panel (PDP) to gain access.
(4) Push in reset button on circuit breaker CB11 to see if it is tripped.
(5) If circuit breaker CB11 is not tripped, go to step 3 of this fault.
(6) If circuit breaker CB11 trips again, replace circuit breaker CB11 (para 20-88).

**NOTE**
Perform steps (7) through (9) if circuit breaker CB11 is faulty.

(7) Position electrical distribution block cover on power distribution shelf.
(8) Tighten wing screw on electrical distribution block cover.
(9) Install wing screw in power distribution shelf.
TEST OPTIONS
- Circuit breaker CB11 not tripped.
- POSSIBLE PROBLEMS
- Faulty circuit breaker CB11.
- Faulty power cable from terminal lug TL24 to terminal lug TL20.
- Faulty power cable from terminal lug TL23 to terminal lug TL16.

3. Is 24 VDC present at terminal lug TL24?

- YES: Replace power cable from terminal lug TL24 to terminal lug TL20 (para 20-88).
- NO: Read WARNING on following page.

TEST OPTIONS
- Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION
- If 24 VDC is not present, power cable from terminal lug TL24 to terminal lug TL20 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove dust boot from terminal lug TL24.</td>
</tr>
<tr>
<td>(2) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(3) Connect positive (+) probe of multimeter to terminal lug TL24.</td>
</tr>
<tr>
<td>(4) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(5) If 24 VDC is not present, replace power cable from terminal lug TL24 to terminal lug TL20 (para 20-88).</td>
</tr>
<tr>
<td>(6) Install dust boot on terminal lug TL24.</td>
</tr>
</tbody>
</table>
u1. NO POWER TO DIGITIZATION RACK (CONT)

**TEST OPTIONS**

| Circuit breaker CB11 not tripped. Power cable from terminal lug TL24 to terminal lug TL20 OK. |

**POSSIBLE PROBLEMS**

| Faulty circuit breaker CB11. Faulty power cable from terminal lug TL23 to terminal lug TL16. |

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

   Is 24 VDC present at terminal lug TL23?

   if **YES**
   
   Replace circuit breaker CB11 (para 20-88).

   if **NO**
   
   Replace power cable from terminal TL23 to terminal TL16 (para 20-88).

**TEST OPTIONS**

- Voltage Test or STE/ICE-R Test #89

**REASON FOR QUESTION**

- If 24 VDC is not present, circuit breaker CB11 is faulty. If 24 VDC is present, power cable from terminal lug TL23 to terminal lug TL16 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove dust boot from terminal lug TL23.</td>
</tr>
<tr>
<td>(2) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(3) Connect positive (+) probe of multimeter to terminal lug TL23.</td>
</tr>
<tr>
<td>(4) Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(5) If 24 VDC is not present, replace circuit breaker CB11 (para 20-88).</td>
</tr>
<tr>
<td>(6) If 24 VDC is present, replace power cable from terminal lug TL23 to terminal lug TL16 (para 20-88).</td>
</tr>
</tbody>
</table>

NOTE
Perform steps (7) through (9) if circuit breaker CB11 is faulty.

(7) Position electrical distribution block cover on power distribution shelf.
(8) Tighten wing screw on electrical distribution block cover.
(9) Install wing screw on power distribution shelf.
u1. NO POWER TO DIGITIZATION RACK (CONT)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker CB11 not tripped. Circuit breaker CB11 OK. Power cable from terminal lug TL24 to terminal lug TL20 OK. Power cable from terminal lug TL23 to terminal lug TL16 OK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty power cable from terminal lug TL18 to terminal block TB2. Faulty Power Distribution Panel (PD1).</td>
</tr>
</tbody>
</table>

5. Is continuity present from terminal lug TL18 to a known good ground?

- NO
  - If continuity is not present, power cable from terminal lug TL18 to terminal board TB2 is faulty. If continuity is present, Power Distribution Panel (PD1) is faulty.
  - Replace power cable from terminal lug TL18 to terminal board TB2 (para 20-88).

- YES
CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to terminal lug TL18.
3. Connect negative (-) probe of multimeter to a known good ground and note reading on multimeter.
4. If continuity is not present, replace power cable from terminal lug TL18 to terminal board TB2 (para 20-88).
5. If continuity is present, replace Power Distribution Panel (PD1) (para 20-88).
u2. NO POWER TO MOBILE TRACKING SYSTEM (MTS) SENSE

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools/Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
<tr>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
</tbody>
</table>

Personnel Required (2)

TEST OPTIONS

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker CB1 is not tripped.</td>
<td>Faulty circuit breaker CB1.</td>
</tr>
<tr>
<td>Faulty power cable from terminal lug TL15 to terminal lug TL22.</td>
<td>Faulty power cable from terminal lug TL15 to terminal lug TL22.</td>
</tr>
<tr>
<td>Faulty Mobile Tracking System (MTS) Sense.</td>
<td>Faulty Mobile Tracking System (MTS) Sense.</td>
</tr>
</tbody>
</table>

WARNING

Read WARNING on following page.

Is 24 VDC present at terminal lug TL6?

START

NO

YES

If 24 VDC is not present, go to step 2 of this fault. If 24 VDC is present perform Mobile Tracking System (MTS) Sense troubleshooting.

Contact supervisor, Mobile Tracking System (MTS) Sense troubleshooting needs to be performed.

Go to step 2 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove wing screw from power distribution shelf.</td>
</tr>
<tr>
<td>(2) Loosen wing screw on electrical distribution block cover.</td>
</tr>
<tr>
<td>(3) Remove electrical distribution block cover from power distribution shelf.</td>
</tr>
<tr>
<td>(4) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to terminal lug TL6.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to known good ground.</td>
</tr>
<tr>
<td>(7) Position master power switch to on (TM 9-2320-365-10) and note reading on multimeter.</td>
</tr>
<tr>
<td>(8) Position master power switch to off (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>(9) If 24 VDC is not present, go to step 2 of this fault.</td>
</tr>
<tr>
<td>(10) If 24 VDC is present, contact supervisor, Mobile Tracking System (MTS) Sense troubleshooting needs to be performed.</td>
</tr>
</tbody>
</table>
u2. NO POWER TO MOBILE TRACKING SYSTEM (MTS) SENSE (CONT)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
</table>

2. Is continuity present through circuit breaker CB1?

- **NO**
  - If continuity is not present, circuit breaker CB1 is faulty.

- **YES**
  - Replace circuit breaker CB1 (para 20-87).
<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove circuit breaker CB1 from Power Distribution Panel (PD2).</td>
</tr>
<tr>
<td>(2) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(3) Connect positive (+) probe of multimeter to one terminal of circuit breaker CB1.</td>
</tr>
<tr>
<td>(4) Connect negative (-) probe of multimeter to other terminal of circuit breaker CB1 and note reading on multimeter.</td>
</tr>
<tr>
<td>(5) If continuity is not present, replace circuit breaker CB1 (para 20-87).</td>
</tr>
<tr>
<td>(6) Install circuit breaker CB1 in Power Distribution Panel (PD2).</td>
</tr>
</tbody>
</table>

**TERMINALS**

**CIRCUIT BREAKER CB1**

**POWER DISTRIBUTION PANEL PD2**
TEST OPTIONS

Is 24 VDC present at terminal lug TL15?

YES

Replace power cable from terminal lug TL15 to terminal lug TL22 (para 20-88).

NO

Replace Power Distribution Panel (PD2) (para 20-88).

TEST OPTIONS

Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION

If 24 VDC is not present, power cable from terminal lug TL15 to terminal lug TL22 is faulty. If 24 VDC is present, Power Distribution Panel (PD2) is faulty.

POSSIBLE PROBLEMS

Faulty power cable from terminal lug TL15 to terminal lug TL22.

Faulty Power Distribution Panel (PD2).

TEST OPTIONS

Circuit breaker CB1 is not tripped.

Circuit breaker CB1 OK.
WARNING

Remove 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 dust boot from terminal lug TL15.
2. Set multimeter to volts DC.
3. Connect positive (+) probe of multimeter to terminal lug TL15.
4. Connect negative (-) probe of multimeter to known good ground.
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. If 24 VDC is not present, replace power cable from terminal lug TL15 to terminal lug TL22 (para 20-88).
8. If 24 VDC is present, replace Power Distribution Panel (PD2) (para 20-88).
TM 9-2320-365-20-2

u3. NO POWER TO ENHANCED POSITION LOCATION REPORTING SYSTEM (EPLRS)

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools/Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
<tr>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Personnel Required (2)</td>
</tr>
</tbody>
</table>

START

1. Is 24 VDC present at terminal lug TL8?

TEST OPTIONS

Circuit breaker CB5 is not tripped.

POSSIBLE PROBLEMS


TEST OPTIONS

Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION

If 24 VDC is not present, go to step 2 of this fault. If 24 VDC is present, perform Enhanced Position Location Reporting System (EPLRS) troubleshooting.

Contact supervisor, Enhanced Position Location Reporting System (EPLRS) troubleshooting needs to be performed.

YES

Go to step 2 of this fault.

NO
WARNING

Remove 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove wing screw from power distribution shelf.</td>
</tr>
<tr>
<td>(2) Loosen wing screw on electrical distribution block cover.</td>
</tr>
<tr>
<td>(3) Remove electrical distribution block cover from power distribution shelf.</td>
</tr>
<tr>
<td>(4) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to terminal lug TL8.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) If 24 VDC is not present, go to step 2 of this fault.</td>
</tr>
<tr>
<td>(8) If 24 VDC is present, contact supervisor, Enhanced Position Location Reporting System (EPLRS) troubleshooting needs to be performed.</td>
</tr>
</tbody>
</table>
u3. NO POWER TO ENHANCED POSITION LOCATION REPORTING SYSTEM (EPLRS) (CONT)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker CB5 is not tripped.</td>
<td>Faulty circuit breaker CB5. Faulty digitization rack power supply.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity Test or STE/ICE-R Test #91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If continuity is not present, circuit breaker CB5 is faulty. If continuity is present, perform Special Purpose Kits Troubleshooting task u1. No Power to Digitization Rack.</td>
</tr>
</tbody>
</table>

2. Is continuity present through circuit breaker CB5?

- **NO**
  - Replace circuit breaker CB5 (para 20-87).
- **YES**
  - Perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.
(1) Remove circuit breaker CB5 from Power Distribution Panel (PD1).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to one terminal of circuit breaker CB5.
(4) Connect negative (-) probe of multimeter to other probe of circuit breaker CB5 and note reading on multimeter.
(5) If continuity is not present, replace circuit breaker CB5 (para 20-87).
(6) If continuity is present, perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

**NOTE**
Perform steps (7) through (10), if continuity is present through circuit breaker CB5.

(7) Install circuit breaker CB5 in Power Distribution Panel (PD1)
(8) Position electrical distribution block cover on power distribution shelf.
(9) Tighten wing nut on electrical distribution block cover.
(10) Install wing screw on power distribution shelf.
u4. NO POWER TO PRECISION LIGHTWEIGHT GLOBAL POSITIONING SYSTEM RECEIVER (PLGR)

INITIAL SETUP

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

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)

Tools/Special Tools
Multimeter, Digital (Item 22, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)

Personnel Required
(2)

TEST OPTIONS

Circuit breaker CB7 is not tripped.

POSSIBLE PROBLEMS
Faulty circuit breaker CB7.
Faulty digitization rack power supply.
Faulty Precision Lightweight Global Positioning System Receiver (PLGR).

REASON FOR QUESTION
If 24 VDC is not present, go to step 2 of this fault. If 24 VDC is present, perform Precision Lightweight Global Positioning System Receiver (PLGR) troubleshooting.

1. Is 24 VDC present at terminal lug TL9?

START

WARNING
Read WARNING on following page.

NO

YES

CONTACT supern visor, Precision Lightweight Global Positioning System Receiver (PLGR) troubleshooting needs to be performed.

Go to step 2 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

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Remove wing screw from power distribution shelf.</td>
</tr>
<tr>
<td>(2)</td>
<td>Loosen wing screw on electrical distribution block cover.</td>
</tr>
<tr>
<td>(3)</td>
<td>Remove electrical distribution block cover from power distribution shelf.</td>
</tr>
<tr>
<td>(4)</td>
<td>Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(5)</td>
<td>Connect positive (+) probe of multimeter to terminal lug TL9.</td>
</tr>
<tr>
<td>(6)</td>
<td>Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(7)</td>
<td>If 24 VDC is not present, go to step 2 of this fault.</td>
</tr>
<tr>
<td>(8)</td>
<td>If 24 VDC is present, contact supervisor, Precision Lightweight Global Positioning System Receiver (PLGR) troubleshooting needs to be performed.</td>
</tr>
</tbody>
</table>
u4. NO POWER TO PRECISION LIGHTWEIGHT GLOBAL POSITIONING SYSTEM RECEIVER (PLGR) (CONT)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker CB7 is not tripped.</td>
<td>Faulty circuit breaker CB7. Faulty digitization rack power supply.</td>
</tr>
</tbody>
</table>

2. Is continuity present through circuit breaker CB7?

YES    NO

YES   Replace circuit breaker CB7 (para 20-87).

NO   If continuity is not present, circuit breaker CB7 is faulty. If continuity is present, perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

Perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.
(1) Remove circuit breaker CB7 from Power Distribution Panel (PD1).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to one terminal of circuit breaker CB7.
(4) Connect negative (-) probe of multimeter to other probe of circuit breaker CB7 and note reading on multimeter.
(5) If continuity is not present, replace circuit breaker CB7 (para 20-87).
(6) If continuity is present, perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

**NOTE**

Perform steps (7) through (10), if continuity is present through circuit breaker CB7.

(7) Install circuit breaker CB7 in Power Distribution Panel (PD1)
(8) Position electrical distribution block cover on power distribution shelf.
(9) Tighten wing nut on electrical distribution block cover.
(10) Install wing screw on power distribution shelf.
u5. NO POWER TO DRIVER VISUAL ENHANCEMENT (DVE)

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools/Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials/Parts</th>
<th>Personnel Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
<td>(2)</td>
</tr>
</tbody>
</table>

TEST OPTIONS

Circuit breaker CB6 is not tripped.

POSSIBLE PROBLEMS

Faulty circuit breaker CB6.
Faulty digitization rack power supply.
Faulty Driver Visual Enhancement (DVE) system.

WARNING

Read WARNING on following page.

Is 24 VDC present at terminal lug TL3?

If 24 VDC is not present, go to step 2 of this fault.
If 24 VDC is present, perform Driver Visual Enhancement (DVE) troubleshooting.

Contact supervisor, Driver Visual Enhancement (DVE) troubleshooting needs to be performed.

TEST OPTIONS

Voltage Test or STE/ICE-R Test #89

REASON FOR QUESTION

If 24 VDC is not present, go to step 2 of this fault. If 24 VDC is present, perform Driver Visual Enhancement (DVE) 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.

<table>
<thead>
<tr>
<th>VOLTAGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove wing screw from power distribution shelf.</td>
</tr>
<tr>
<td>(2) Loosen wing screw on electrical distribution block cover.</td>
</tr>
<tr>
<td>(3) Remove electrical distribution block cover from power distribution shelf.</td>
</tr>
<tr>
<td>(4) Set multimeter to volts DC.</td>
</tr>
<tr>
<td>(5) Connect positive (+) probe of multimeter to terminal lug TL3.</td>
</tr>
<tr>
<td>(6) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>(7) If 24 VDC is not present, go to step 2 of this fault.</td>
</tr>
<tr>
<td>(8) If 24 VDC is present, contact supervisor, Driver Visual Enhancement (DVE) troubleshooting needs to be performed.</td>
</tr>
</tbody>
</table>
u5. NO POWER TO DRIVER VISUAL ENHANCEMENT (DVE) (CONT)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker CB6 is not tripped.</td>
<td>Faulty circuit breaker CB6. Faulty digitization rack power supply.</td>
</tr>
</tbody>
</table>

2. Is continuity present through circuit breaker CB6?

- NO
- YES

YES: Replace circuit breaker CB6 (para 20-87).

NO: Perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

TEST OPTIONS
- Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, circuit breaker CB6 is faulty. If continuity is present, perform Special Purpose Kits Troubleshooting task u1. No Power to Digitization Rack.
<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Remove circuit breaker CB6 from Power Distribution Panel (PD1).</td>
</tr>
<tr>
<td>(2) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(3) Connect positive (+) probe of multimeter to one terminal of circuit breaker CB6.</td>
</tr>
<tr>
<td>(4) Connect negative (-) probe of multimeter to other probe of circuit breaker CB6 and note reading on multimeter.</td>
</tr>
<tr>
<td>(5) If continuity is not present, replace circuit breaker CB6 (para 20-87).</td>
</tr>
<tr>
<td>(6) If continuity is present, perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.</td>
</tr>
</tbody>
</table>

**NOTE**  
Perform steps (7) through (10), if continuity is present through circuit breaker CB6.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(7) Install circuit breaker CB6 in Power Distribution Panel (PD1)</td>
</tr>
<tr>
<td>(8) Position electrical distribution block cover on power distribution shelf.</td>
</tr>
<tr>
<td>(9) Tighten wing nut on electrical distribution block cover.</td>
</tr>
<tr>
<td>(10) Install wing screw on power distribution shelf.</td>
</tr>
</tbody>
</table>
u6. NO POWER TO SINGLE CHANNEL GROUND & AIRBORNE RADIO (SINCGAR)/FORCE XXI BATTLE COMMAND BRIGADE OR BELOW (FBCB)

INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools/Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
<tr>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td></td>
</tr>
</tbody>
</table>

TEST OPTIONS

| Circuit breaker CB8 is not tripped. |

POSSIBLE PROBLEMS

| Faulty circuit breaker CB8. |
| Faulty digitization rack power supply. |
| Faulty SINCGAR/FBCB. |

WARNING

Read WARNING on following page.

1. Is 24 VDC present at terminal lug TL2?

TEST OPTIONS

| Voltage Test or STE/ICE-R Test #89 |

REASON FOR QUESTION

If 24 VDC is not present, go to step 2 of this fault. If 24 VDC is present, perform SINCGAR/FBCB troubleshooting.

CONTACT

Contact supervisor, SINGGAR/Force XXI Battle Command Brigade or Below (FBCB) troubleshooting needs to be performed.

START

NO

YES

Go to step 2 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) Remove wing screw from power distribution shelf.
(2) Loosen wing screw on electrical distribution block cover.
(3) Remove electrical distribution block cover from power distribution shelf.
(4) Set multimeter to volts DC.
(5) Connect positive (+) probe of multimeter to terminal lug TL2.
(6) Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.
(7) If 24 VDC is not present, go to step 2 of this fault.
(8) If 24 VDC is present, contact supervisor, SINCGAR/FBCB troubleshooting needs to be performed.
TEST OPTIONS

Circuit breaker CB8 is not tripped.

POSSIBLE PROBLEMS

Faulty circuit breaker CB8. Faulty digitization rack power supply.

2.

Is continuity present through circuit breaker CB8?

TEST OPTIONS

Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION

If continuity is not present, circuit breaker CB8 is faulty. If continuity is present, perform Special Purpose Kits Troubleshooting task u1. No Power to Digitization Rack.

NO

YES

Replace circuit breaker CB8 (para 20-87).

Perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.
CONTINUITY TEST

(1) Remove circuit breaker CB8 from Power Distribution Panel (PD1).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to one terminal of circuit breaker CB8.
(4) Connect negative (-) probe of multimeter to other probe of circuit breaker CB8 and note reading on multimeter.
(5) If continuity is not present, replace circuit breaker CB8 (para 20-87).
(6) If continuity is present, perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

NOTE
Perform steps (7) through (10), if continuity is present through circuit breaker CB8.

(7) Install circuit breaker CB8 in Power Distribution Panel (PD1)
(8) Position electrical distribution block cover on power distribution shelf.
(9) Tighten wing nut on electrical distribution block cover.
(10) Install wing screw on power distribution shelf.
**u7. NO POWER TO MOBILE TRACKING SYSTEM (MTS)**

**INITIAL SETUP**

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools/Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10)</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
<tr>
<td></td>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials/Parts</th>
<th>Personnel Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
<td>(2)</td>
</tr>
</tbody>
</table>

**TEST OPTIONS**

- Circuit breaker CB10 is not tripped.

**POSSIBLE PROBLEMS**

- Faulty circuit breaker CB10.
- Faulty digitization rack power supply.
- Faulty Mobile Tracking System (MTS).

**START**

1. **WARNING**

   Read WARNING on following page.

   Is 24 VDC present at terminal lug TL1?

   **TEST OPTIONS**

   - Voltage Test or
     - STE/ICE-R Test #89

   **REASON FOR QUESTION**

   If 24 VDC is not present, go to step 2 of this fault. If 24 VDC is present, perform Mobile Tracking System (MTS) troubleshooting.

   **YES**

   Go to step 2 of this fault.

   Contact supervisor, Mobile Tracking System (MTS) troubleshooting needs to be performed.

   **NO**
WARNING

Remove 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

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove wing screw from power distribution shelf.</td>
</tr>
<tr>
<td>2</td>
<td>Loosen wing screw on electrical distribution block cover.</td>
</tr>
<tr>
<td>3</td>
<td>Remove electrical distribution block cover from power distribution shelf.</td>
</tr>
<tr>
<td>4</td>
<td>Set multimeter to volts DC.</td>
</tr>
<tr>
<td>5</td>
<td>Connect positive (+) probe of multimeter to terminal lug TL1.</td>
</tr>
<tr>
<td>6</td>
<td>Connect negative (-) probe of multimeter to known good ground and note reading on multimeter.</td>
</tr>
<tr>
<td>7</td>
<td>If 24 VDC is not present, go to step 2 of this fault.</td>
</tr>
<tr>
<td>8</td>
<td>If 24 VDC is present, contact supervisor, Mobile Tracking System (MTS) troubleshooting needs to be performed.</td>
</tr>
</tbody>
</table>
u7. NO POWER TO MOBILE TRACKING SYSTEM (MTS) (CONT)

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
<th>POSSIBLE PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker CB10 is not tripped.</td>
<td>Faulty circuit breaker CB10. Faulty digitization rack power supply.</td>
</tr>
</tbody>
</table>

2. Is continuity present through circuit breaker CB10?

- **NO**
  - Replace circuit breaker CB10 (para 20-87).
- **YES**
  - Perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

**TEST OPTIONS**

- Continuity Test or STE/ICE-R Test #91

**REASON FOR QUESTION**

If continuity is not present, circuit breaker CB10 is faulty. If continuity is present, perform Special Purpose Kits Troubleshooting task u1. No Power to Digitization Rack.
CONTINUITY TEST

(1) Remove circuit breaker CB10 from Power Distribution Panel (PD1).
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to one terminal of circuit breaker CB10.
(4) Connect negative (-) probe of multimeter to other probe of circuit breaker CB10 and note reading on multimeter.
(5) If continuity is not present, replace circuit breaker CB10 (para 20-87).
(6) If continuity is present, perform Special Purpose Kit Troubleshooting task u1. No Power to Digitization Rack.

NOTE
Perform steps (7) through (10), if continuity is present through circuit breaker CB10.

(7) Install circuit breaker CB10 in Power Distribution Panel (PD1)
(8) Position electrical distribution block cover on power distribution shelf.
(9) Tighten wing nut on electrical distribution block cover.
(10) Install wing screw on power distribution shelf.
u18. TROOP TRANSPORT ALARM DOES NOT OPERATE

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)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wire, Elect, 50 ft (Item 77, Appendix D)

TEST OPTIONS
Continuity Test or STE/ICE-R Test #91

REASON FOR QUESTION
If continuity is not present, troop transport alarm switch is faulty.

1. Is continuity present across troop transport alarm switch?

   YES
   Replace troop transport alarm switch (para 20-80).

   NO
   Faulty troop transport alarm switch.
   Faulty troop transport alarm cable assembly.
   Faulty troop transport alarm switch connector.
   Faulty engine control cable assembly.
   Faulty dashboard cable assembly.
   Faulty audible alarm.

KNOWN INFO
Nothing.

POSSIBLE PROBLEMS
Faulty troop transport alarm switch.
Faulty troop transport alarm cable assembly.
Faulty troop transport alarm switch connector.
Faulty engine control cable assembly.
Faulty dashboard cable assembly.
Faulty audible alarm.
<table>
<thead>
<tr>
<th>CONTINUITY TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Disconnect connector P921 from connector J921.</td>
</tr>
<tr>
<td>(2) Set multimeter to ohms.</td>
</tr>
<tr>
<td>(3) Connect positive (+) probe of multimeter to pin 1 of troop transport alarm switch.</td>
</tr>
<tr>
<td>(4) Connect negative (-) probe of multimeter to pin 2 of troop transport alarm switch.</td>
</tr>
<tr>
<td>(5) Press troop transport alarm switch and note reading on multimeter.</td>
</tr>
<tr>
<td>(6) If continuity is not present, replace troop transport alarm switch (para 20-80).</td>
</tr>
</tbody>
</table>
u18. TROOP TRANSPORT ALARM DOES NOT OPERATE (CONT)

2.
Is continuity present from terminal lug TL165 to connector J921-C?

- **YES**
  - Repair wire 32 (para 2-40) or replace troop transport switch connector (para 20-80).

- **NO**
  - If continuity is not present, wire 32 is faulty.

3.
Is continuity present from terminal lug TL165 to connector J921-C?

- **YES**
  - Repair wire 3028 (para 2-40) or replace troop transport switch connector (para 20-80).

- **NO**
  - If continuity is not present, wire 3028 is faulty.
**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to terminal lug TL164.
3. Connect negative (-) probe of multimeter to connector J921-A and note reading on multimeter.
4. If continuity is not present, repair wire 32 (para 2-43) or replace troop transport alarm switch connector (para 20-80).

---

**CONTINUITY TEST**

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to terminal lug TL165.
3. Connect negative (-) probe of multimeter to connector J921-C and note reading on multimeter.
4. If continuity is not present, repair wire 3028 (para 2-43) or replace troop transport alarm switch connector (para 20-80).
4. Is continuity present from connector P921-A to connector J39-2?

- **NO**
  - If continuity is not present, wire 32 is faulty.
  - Repair wire 32 (para 2-40) or replace troop transport alarm cable assembly (para 20-79).

- **YES**
  - Repair wire 32 (para 2-40) or replace troop transport alarm cable assembly (para 20-79).

5. Is continuity present from connector P921-C to connector J39-1?

- **NO**
  - If continuity is not present, wire 3028 is faulty.
  - Repair wire 3028 (para 2-40) or replace troop transport alarm cable assembly (para 20-79).

- **YES**
  - Repair wire 3028 (para 2-40) or replace troop transport alarm cable assembly (para 20-79).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Disconnect connector clamp from connector J39.
(3) Disconnect connector J39 from connector P39.
(4) Connect positive (+) probe of multimeter to connector P921-A.
(5) Connect negative (-) probe of multimeter to connector J39-2 and note reading on multimeter.
(6) If continuity is not present, repair wire 32 (para 2-40) or replace troop transport alarm cable assembly (para 20-79).

(1) Set multimeter to ohms.
(2) Disconnect connector clamp from connector J39.
(3) Disconnect connector J39 from connector P39.
(4) Connect positive (+) probe of multimeter to connector P921-A.
(5) Connect negative (-) probe of multimeter to connector J39-2 and note reading on multimeter.
(6) If continuity is not present, repair wire 32 (para 2-40) or replace troop transport alarm cable assembly (para 20-79).
6. Is continuity present from connector P39-2 to connector P31-17?

- **NO**
  - If continuity is not present, wire 32 is faulty.
  - Repair wire 32 (para 2-40) or replace engine control cable assembly (para 7-72).

- **YES**
  - Repair wire 32 (para 2-40) or replace engine control cable assembly (para 7-72).

7. Is continuity present from connector P39-1 to connector P31-9?

- **NO**
  - If continuity is not present, wire 3028 is faulty.
  - Repair wire 3028 (para 2-40) or replace engine control cable assembly (para 7-72).

- **YES**
  - Repair wire 3028 (para 2-40) or replace engine control cable assembly (para 7-72).

**KNOWN INFO**
- Troop transport alarm switch OK.
- Troop transport alarm switch connector OK.
- Troop transport alarm cable assembly OK.

**POSSIBLE PROBLEMS**
- Faulty engine control cable assembly.
- Faulty dashboard cable assembly.
- Faulty audible alarm.
CONTINUITY TEST

1. Lift instrument panel assembly outward to gain access (para 7-15).
2. Disconnect connector P31 from connector J31.
3. Set multimeter to ohms.
5. Connect negative (-) probe of multimeter to connector P31-17 and note reading on multimeter.
6. If continuity is not present, repair wire 32 (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 P39-1.
3. Connect negative (-) probe of multimeter to connector P31-9 and note reading on multimeter.
4. If continuity is not present, repair wire 3028 (para 2-40) or replace engine control cable assembly (para 7-72).
6. Connect connector clamp to connector J39.
8. Is continuity present from connector J31-9 to ground? 
   - **NO**
     - Repair wire 3028 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
   - **YES**
     - Replace audible alarm (para 7-35).

9. Is continuity present from connector J31-17 to terminal lug TL178? 
   - **NO**
     - Repair wire 32 (para 2-40) or replace WTEC II dashboard cable assembly (para 7-10) or WTEC III dashboard cable assembly (para 7-11).
   - **YES**
     - Replace audible alarm (para 7-35).
### CONTINUITY TEST

1. Remove screw and terminal lug TL178 from audible alarm.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to connector J31-17.
4. Connect negative (-) probe of multimeter to terminal lug TL178 and note reading on multimeter.
5. If continuity is not present, repair wire 32 (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 audible alarm (para 7-35).
7. Install terminal lug TL178 on audible alarm with screw.
9. Install instrument panel assembly (para 7-15).

---

**Diagram:**
- J31-17
- J31-9
- TL 178
- SCREW
- AUDIBLE ALARM
u19. LIGHT MATERIAL HANDLING CRANE (LMHC) DOES NOT OPERATE

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

---

**KNOWN INFO**

- Engine starts.

**POSSIBLE PROBLEMS**

- Faulty NATO power cable.
- Faulty NATO plug.
- Faulty wire 150.
- Faulty circuit breaker.
- Faulty wire 170.
- Faulty wire 592.
- Faulty power cable.
- Faulty power harness.
- Faulty out solenoid.
- Faulty in solenoid.
- Faulty LMHC winch assembly.
- Faulty winch cable.

---

**TEST OPTIONS**

- Voltage Test or
  STE/ICE-R #89

**REASON FOR QUESTION**

If 24 vdc is not present, NATO power cable is faulty.

---

**WARNING**

Read WARNING on following page.

---

1. **Is 24 vdc present across NATO power receptacle?**

   - **NO**
   - **YES**

**YES**

Replace NATO power cable (para 7-63).

---

**NO**

Is 24 vdc present across NATO power receptacle?
WARNING

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

VOLTAGE TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disconnect NATO plug from NATO power cable receptacle.</td>
</tr>
<tr>
<td>2</td>
<td>Set multimeter to volts dc.</td>
</tr>
<tr>
<td>3</td>
<td>Connect positive (+) probe of multimeter to inside of NATO power cable receptacle.</td>
</tr>
<tr>
<td>4</td>
<td>Connect negative (-) probe of multimeter to outside of NATO power cable receptacle and note reading on multimeter.</td>
</tr>
<tr>
<td>5</td>
<td>If 24 vdc is not present, replace NATO power cable (para 7-63).</td>
</tr>
</tbody>
</table>
Engine starts.
NATO power cable OK.

POSSIBLE PROBLEMS
Faulty NATO plug.
Faulty wire 150.
Faulty circuit breaker.
Faulty wire 170.
Faulty wire 592.
Faulty power cable.
Faulty power harness.
Faulty out solenoid.
Faulty in solenoid.
Faulty LMHC winch assembly.
Faulty winch cable.

Known Info

2. Is continuity present from NATO plug pin to NATO plug positive (+) terminal?

TEST OPTIONS
Continuity Test or STE/ICE-R #91

REASON FOR QUESTION
If continuity is not present, NATO plug is faulty.

YES
Replace NATO plug (para 20-63).

NO

3. Is continuity present from NATO plug outer wall to NATO plug negative (-) terminal?

TEST OPTIONS
Continuity Test or STE/ICE-R #91

REASON FOR QUESTION
If continuity is not present, NATO plug is faulty.

YES
Replace NATO plug (para 20-63).

NO
CONTINUITY TEST

(1) Remove eight screws, cover, and retainer from NATO plug.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to NATO plug pin.
(4) Connect negative (-) probe of multimeter to NATO plug positive (+) terminal lug and note reading on multimeter.
(5) If continuity is not present, replace NATO plug (para 20-63).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to NATO plug outer wall.
(3) Connect negative (-) probe of multimeter to NATO plug negative (-) terminal lug and note reading on multimeter.
(4) If continuity is not present, replace NATO plug (para 20-63).
u19. LIGHT MATERIAL HANDLING CRANE (LMHC) DOES NOT OPERATE (CONT)

4. Is continuity present from NATO plug positive (+) terminal to LMHC control box circuit breaker supply post?

- **YES**
  - Replace wire 170 (para 20-63).

- **NO**
  - **REASON FOR QUESTION**
    - Continuity Test or STE/ICE-R #91
    - If continuity is not present, wire 170 is faulty.

5. Is continuity present from NATO plug negative (-) terminal to LMHC control box connector pin B?

- **YES**
  - Replace wire 150 (para 20-63).

- **NO**
  - **REASON FOR QUESTION**
    - Continuity Test or STE/ICE-R #91
    - If continuity is not present, wire 150 is faulty.
CONTINUITY TEST

(1) Open cover on LMHC control box.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to NATO plug positive (+) terminal.
(4) Connect negative (-) probe of multimeter to LMHC control box circuit breaker supply post and note reading on multimeter.
(5) If continuity is not present, replace wire 170 (para 20-63).

CONTINUITY TEST

(1) Disconnect LMHC control box power cable from LMHC control box connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to NATO plug negative (-) terminal.
(4) Connect negative (-) probe of multimeter to LMHC control box connector pin B and note reading on multimeter.
(5) If continuity is not present, replace wire 150 (para 20-63).
(6) Install cover and retainer on NATO plug with eight screws.
u19. LIGHT MATERIAL HANDLING CRANE (LMHC) DOES NOT OPERATE (CONT)

6. Is continuity present across LMHC control box circuit breaker?
   - Yes
     - Replace LMHC control box circuit breaker (para 20-77).
   - No
     - Continuity Test or STE/ICE-R #91
       - Reason for Question: If continuity is not present, circuit breaker is faulty.
       - Possible Problems:
         - Faulty circuit breaker.
         - Faulty wire 592.
         - Faulty power cable.
         - Faulty power harness.
         - Faulty out solenoid.
         - Faulty in solenoid.
         - Faulty LMHC winch assembly.
         - Faulty winch cable.

7. Is continuity present from LMHC control box circuit breaker outlet post to LMHC control box connector pin A?
   - Yes
     - Replace wire 592 (para 20-63).
   - No
     - Continuity Test or STE/ICE-R #91
       - Reason for Question: If continuity is not present, wire 592 is faulty.
       - Possible Problems:
         - Faulty wire 592.
         - Faulty power cable.
         - Faulty power harness.
         - Faulty out solenoid.
         - Faulty in solenoid.
         - Faulty LMHC winch assembly.
         - Faulty winch cable.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to one end of LMHC control box circuit breaker.
(3) Connect negative (-) probe of multimeter to other end of LMHC control box circuit breaker.
(4) Position LMHC control box circuit breaker to ON and note reading on multimeter.
(5) If continuity is not present, replace LMHC control box circuit breaker (para 20-77).
(6) Position LMHC control box circuit breaker to OFF.

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to LMHC control box circuit breaker outlet post.
(3) Connect negative (-) probe of multimeter to LMHC control box connector pin A and note reading on multimeter.
(4) If continuity is not present, replace wire 592 (para 20-63).
(5) Close cover on LMHC control box.
(6) Connect LMHC control box power cable to LMHC control box connector.
8. Is continuity present from one end of LMHC control box power cable socket A to other end of LMHC control box power cable socket A?  
   YES  
   Replace LMHC control box power cable.  
   NO

9. Is continuity present from one end of LMHC control box power cable socket B to other end of LMHC control box power cable socket B?  
   YES  
   Replace LMHC control box power cable.  
   NO

POSSIBLE PROBLEMS:
- Faulty power cable.
- Faulty power harness.
- Faulty out solenoid.
- Faulty in solenoid.
- Faulty LMHC winch assembly.
- Faulty winch cable.

Known Info:
- Engine starts.
- NATO power cable OK.
- NATO plug OK.
- Wire 170 OK.
- Wire 150 OK.
- Circuit breaker OK.
- Wire 592 OK.

Test Options:
- Continuity Test or STE/ICE-R #91

Reason for Question:
- If continuity is not present, LMHC control box power cable is faulty.
### CONTINUITY TEST

1. Disconnect LMHC control power cable from LMHC winch assembly power connector.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to one end of LMHC control box power cable socket A.
4. Connect negative (-) probe of multimeter to other end of LMHC control box power cable socket A and note reading on multimeter.
5. If continuity is not present, replace LMHC control box power cable.

---

### CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to LMHC control box power cable socket B.
3. Connect negative (-) probe of multimeter to LMHC control box power cable socket B and note reading on multimeter.
4. If continuity is not present, replace LMHC control box power cable.
19. LIGHT MATERIAL HANDLING CRANE (LMHC) DOES NOT OPERATE (CONT)

**KNOWN INFO**
- Engine starts.
- NATO power cable OK.
- NATO plug OK.
- Wire 170 OK.
- Wire 150 OK.
- Circuit breaker OK.
- Wire 592 OK.
- Power cable OK.

**POSSIBLE PROBLEMS**
- Faulty power harness.
- Faulty out solenoid.
- Faulty in solenoid.
- Faulty LMHC winch assembly.
- Faulty winch cable.

**TEST OPTIONS**
- Continuity Test or STE/ICE-R #91

**REASON FOR QUESTION**
- If continuity is not present, power harness is faulty.

**10.**
Is continuity present from power harness connector pin A to top post of out solenoid?

**YES**
Replace power harness (para 20-70).

**NO**
Replace out solenoid (para 20-70).

**11.**
Is continuity present across out solenoid top and bottom right post?

**YES**
Replace out solenoid (para 20-70).

**NO**
Replace out solenoid (para 20-70).
CONTINUITY TEST

(1) Remove 18 screws and cover from base plate.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to power harness connector pin A.
(4) Connect negative (-) probe of multimeter to top post of out solenoid and note reading on multimeter.
(5) If continuity is not present, replace power harness (para 20-70).

---

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to top right post of out solenoid.
(3) Connect negative (-) probe of multimeter to bottom right post of out solenoid and note reading on multimeter.
(4) If continuity is not present, replace out solenoid (para 20-70).
12. Is continuity present from bottom post of out solenoid to winch assembly top terminal lug?

**YES**
- Replace power harness (para 20-70).

**NO**
- If continuity is not present, power harness is faulty.

13. Is continuity present from power harness connector pin B to left top post of in solenoid?

**YES**
- Replace power harness (para 20-70).

**NO**
- If continuity is not present, power harness is faulty.
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to bottom post of out solenoid.
(3) Connect negative (-) probe of multimeter to winch assembly top terminal lug and note reading on multimeter.
(4) If continuity is not present, replace power harness (para 20-70).

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to power harness connector pin B.
(3) Connect negative (-) probe of multimeter to left top post of in solenoid and note reading on multimeter.
(4) If continuity is not present, replace power harness (para 20-70).
14. Is continuity present from left top post to left bottom post of in solenoid?

- **NO**
  - **REASON FOR QUESTION**
    - Continuity Test or STE/ICE-R #91
  - **TEST OPTIONS**
    - If continuity is not present, in solenoid is faulty.

- **YES**
  - Replace in solenoid (para 20-70).

15. Is continuity present from left bottom post of in solenoid to winch assembly bottom terminal lug?

- **NO**
  - **REASON FOR QUESTION**
    - Continuity Test or STE/ICE-R #91
  - **TEST OPTIONS**
    - If continuity is not present, power harness is faulty.

- **YES**
  - Replace power harness (para 20-70).
CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to left top post of in solenoid.
(3) Connect negative (-) probe of multimeter to left bottom post of in solenoid and note reading on multimeter.
(4) If continuity is not present, replace in solenoid (para 20-70).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to left bottom post of in solenoid.
(3) Connect negative (-) probe of multimeter to winch assembly bottom terminal lug and note reading on multimeter.
(4) If continuity is not present, replace power harness (para 20-70).
16. Is continuity present from top middle post of in solenoid to winch remote control connector pin A?

   NO

   YES Replace power harness (para 20-70).

17. Is continuity present from winch remote control cable connector socket A to socket B and from socket A to socket C?

   NO

   YES Replace winch remote control cable.

   Replace LMHC winch assembly (para 20-70).
CONTINUITY TEST

1. Disconnect winch remote control cable from winch remote control connector.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to top middle post of in solenoid.
4. Connect negative (-) probe of multimeter to winch remote control connector pin A and note reading on multimeter.
5. If continuity is not present, replace power harness (para 20-70).

CONTINUITY TEST

1. Set multimeter to ohms.
2. Connect positive (+) probe of multimeter to winch remote control cable connector socket A.
3. Connect negative (-) probe of multimeter to winch remote control cable connector socket B.
4. Position winch remote control switch to OUT and note reading on multimeter.
5. Connect positive (+) probe of multimeter to winch remote control cable connector socket A.
6. Connect negative (-) probe of multimeter to winch remote control cable connector socket C.
7. Position winch remote control switch to in and note reading on multimeter.
8. If continuity is not present, replace winch remote control cable.
9. If continuity is present, replace LMHC winch assembly (para 20-70).
10. Connect LMHC control power cable to LMHC winch assembly power connector.
11. Connect winch remote control cable to winch remote control connector.
12. Install cover on base plate with 18 screws.
u20. LIGHT MATERIAL HANDLING CRANE (LMHC) HOIST IN DOES NOT OPERATE

INITIAL SETUP


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

KNOWLEDGMENT

LMHC hoist out operates.

POSSIBLE PROBLEMS
- Faulty in solenoid.
- Faulty power harness.
- Faulty LMHC winch assembly.
- Faulty winch cable.

1. Is continuity present from left top post to left bottom post of in solenoid?

NO

YES

Replace in solenoid (para 20-70).

TEST OPTIONS

Continuity Test or STE/ICE-R #91

REASON FOR QUESTION
If continuity is not present, in solenoid is faulty.
## CONTINUITY TEST

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove 18 screws and cover from base plate.</td>
</tr>
<tr>
<td>2</td>
<td>Set multimeter to ohms.</td>
</tr>
<tr>
<td>3</td>
<td>Connect positive (+) probe of multimeter to left top post of in solenoid.</td>
</tr>
<tr>
<td>4</td>
<td>Connect negative (-) probe of multimeter to left bottom post of in solenoid and note reading on multimeter.</td>
</tr>
<tr>
<td>5</td>
<td>If continuity is not present, replace in solenoid (para 20-70).</td>
</tr>
</tbody>
</table>

---

![Diagram of solenoid with labels for screw, cover, base plate, top post in solenoid, and bottom post in solenoid.](image)
u20. LIGHT MATERIAL HANDLING CRANE (LMHC) HOIST IN DOES NOT OPERATE (CONT)

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMHC hoist out operates. In solenoid OK.</td>
<td>Continuity Test or STE/ICE-R #91</td>
<td>If continuity is not present, power harness is faulty.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty power harness. Faulty LMHC winch assembly. Faulty winch cable.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Is continuity present from middle top post of in solenoid to LMHC remote control connector pin C?  
   
   NO  
   Replace power harness (para 20-70).  
   YES  

<table>
<thead>
<tr>
<th>KNOWN INFO</th>
<th>TEST OPTIONS</th>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMHC hoist out operates. In solenoid OK.</td>
<td>Continuity Test or STE/ICE-R #91</td>
<td>If continuity is not present, winch remote control cable is faulty. If continuity is present, LMHC winch assembly is faulty.</td>
</tr>
<tr>
<td>POSSIBLE PROBLEMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty LMHC winch assembly. Faulty winch cable.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Is continuity present from winch remote control cable socket A to socket C?  
   
   NO  
   YES  
   Replace winch remote control cable.  
   Replace LMHC winch assembly (para 20-70).
CONTINUITY TEST

(1) Disconnect winch remote control cable from winch remote control connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to left middle post of in solenoid.
(4) Connect negative (-) probe of multimeter to winch remote control connector pin C and note reading on multimeter.
(5) If continuity is not present, replace winch remote control cable.
(6) If continuity is present, replace LMHC winch assembly (para 20-70).
(7) Connect winch remote control cable to winch remote control connector.
(8) Install cover on base plate with 18 screws.

CONTINUITY TEST

(1) Disconnect winch remote control cable from winch remote control connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to winch remote control cable socket A.
(4) Connect negative (-) probe of multimeter to winch remote control cable socket C.
(5) Position winch remote control switch to in and note reading on multimeter.
(6) If continuity is not present, replace winch remote control cable.
(7) If continuity is present, replace LMHC winch assembly (para 20-70).

(8) Connect winch remote control cable to winch remote control connector.
(9) Install cover on base plate with 18 screws.
## u21. LIGHT MATERIAL HANDLING CRANE (LMHC) HOIST OUT DOES NOT OPERATE

### INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Tools and Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-366-10-1).</td>
<td>Tool Kit, Genl Mech (Item 46, Appendix C)</td>
</tr>
<tr>
<td>Personnel Required</td>
<td>STE/ICE-R (Item 41, Appendix C)</td>
</tr>
<tr>
<td>(2)</td>
<td>Multimeter, Digital (Item 22, Appendix C)</td>
</tr>
</tbody>
</table>

### KNOWN INFO

- LMHC hoist in operates.

### POSSIBLE PROBLEMS

- Faulty out solenoid.
- Faulty power harness.
- Faulty LMHC winch assembly.
- Faulty winch cable.

### TEST OPTIONS

- Continuity Test or STE/ICE-R #91

### REASON FOR QUESTION

- If continuity is not present, out solenoid is faulty.

### Flowchart

1. Is continuity present from right top post to right bottom post of out solenoid?

   - **NO**
     - Faulty out solenoid.
     - Faulty power harness.
     - Faulty LMHC winch assembly.
     - Faulty winch cable.

   - **YES**
     - Replace out solenoid (para 20-70).
**CONTINUITY TEST**

1. Remove 18 screws and cover from base plate.
2. Set multimeter to ohms.
3. Connect positive (+) probe of multimeter to right top post of out solenoid.
4. Connect negative (-) probe of multimeter to right bottom post of out solenoid and note reading on multimeter.
5. If continuity is not present, replace out solenoid (para 20-70).
21. LIGHT MATERIAL HANDLING CRANE (LMHC) HOIST OUT DOES NOT OPERATE (CONT)

**KNOWN INFO**

| LMHC hoist in operates. |
| Out solenoid OK. |

**POSSIBLE PROBLEMS**

- Faulty power harness.
- Faulty LMHC winch assembly.
- Faulty winch cable.

**TEST OPTIONS**

| Continuity Test or |
| STE/ICE-R #91 |

**REASON FOR QUESTION**

- If continuity is not present, power harness is faulty.

2. **Is continuity present from middle top post of out solenoid to LMHC remote control connector pin B?**

   **NO**

   **YES**

   Replace power harness (para 20-70).

3. **Is continuity present from winch remote control cable socket A to socket B?**

   **NO**

   **YES**

   Replace winch remote control cable.

   Replace LMHC winch assembly (para 20-70).
CONTINUITY TEST

(1) Disconnect winch remote control cable from winch remote control connector.
(2) Set multimeter to ohms.
(3) Connect positive (+) probe of multimeter to right middle post of out solenoid.
(4) Connect negative (-) probe of multimeter to winch remote control connector pin B and note reading on multimeter.
(5) If continuity is not present, replace power harness (para 20-70).

CONTINUITY TEST

(1) Set multimeter to ohms.
(2) Connect positive (+) probe of multimeter to winch remote control cable socket A.
(3) Connect negative (-) probe of multimeter to winch remote control cable socket B.
(4) Position winch remote control switch to out and note reading on multimeter.
(5) If continuity is not present, replace winch remote control cable.
(6) If continuity is present, replace LMHC winch assembly (para 20-70).
(7) Connect winch remote control cable to winch remote control connector.
(8) Install cover on base plate with 18 screws.
2-32. CAB AND SPARE TIRE RETAINER TROUBLESHOOTING

This paragraph covers Cab and Spare Tire Retainer Troubleshooting. The Cab and Spare Tire Retainer Fault Index, Table 2-58, lists faults for the cab and spare tire retainer of the vehicle.

Table 2-58. Cab and Spare Tire Retainer Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>v1.</td>
<td>Cab Does Not Raise</td>
<td>2-2116</td>
</tr>
<tr>
<td>v2.</td>
<td>Cab Does Not Lower</td>
<td>2-2116.8</td>
</tr>
<tr>
<td>v3.</td>
<td>Spare Tire Retainer Does Not Raise</td>
<td>2-2118</td>
</tr>
<tr>
<td>v4.</td>
<td>Spare Tire Retainer Does Not Lower</td>
<td>2-2118.6</td>
</tr>
</tbody>
</table>
v1. CAB DOES NOT RAISE

INITIAL SETUP

Equipment Condition
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Personnel Required
(2)

Material/Parts
Rag, Wiping (Item 51, Appendix D)
Filter Element, Fluid (Item 14.1, Appendix G)

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)
Goggles, Industrial (Item 15, Appendix C)
Transmitter, Pressure (Item 1, Appendix J)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Key, Socket Head Screw (Item 35.1, Appendix B)

References
TM 9-4910-571-12&P

NOTE
Vehicles S/N 0001 through 7558, with hydraulic manifold P/N HFC32598, were not originally equipped with an orifice filter. However, an orifice filter may have been installed during previous maintenance to the hydraulic manifold.

KNOWN INFO
Air/hydraulic power unit oil level OK.
Air/hydraulic power unit primed.
Hydraulic and air hoses OK.
Air tanks charged.
Hydraulic oil filter OK.
Other hydraulic manifold functions OK.

POSSIBLE PROBLEMS
Debris in orifice filter (if equipped).
Debris in orifice screw.
Faulty cab hydraulic latch.
Faulty hydraulic manifold CAB TILT valve.
Faulty cab hydraulic cylinder.

TEST OPTIONS
Visual Inspection

REASON FOR QUESTION
If orifice screw and/or orifice filter (if equipped) is clogged, cab may not raise.
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE

Perform steps (1) through (11) on hydraulic manifolds P/N HFC32598.

(1) Remove pin from hydraulic manifold cover and lower cover.
(2) Cycle FUNCTION SELECT knob through all settings.
(3) Cycle CAB TILT knob through both selector settings.
(4) Remove screw, knob, and CAB TILT valve from hydraulic manifold.
(5) Remove orifice filter (if equipped) from hydraulic manifold.
(6) If debris is present in orifice filter, replace orifice filter.
(7) Remove orifice screw from hydraulic manifold.
(8) If debris is present in orifice screw, clean orifice screw with compressed air.

NOTE

If no orifice filter was previously installed, install orifice filter at this time.

(9) Install orifice screw and orifice filter in hydraulic manifold.
(10) Position CAB TILT valve and knob on hydraulic manifold with screw.
(11) Tighten screw to 5-15 lb-in. (1-2 N·m).

Cont. on page 2-2116.3.
Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

**NOTE**
Perform steps (12) through (23) on hydraulic manifolds P/N 65234.

12. Remove pin from hydraulic manifold cover and lower cover.
13. Cycle FUNCTION SELECT knob through all settings.
14. Cycle CAB TILT knob through both selector settings.
15. Remove nut, knob, spring, spacer, retainer ring, and rubber sleeve from CAB TILT valve.
16. Remove CAB TILT valve from hydraulic manifold.
17. Remove orifice filter from hydraulic manifold.
18. If debris is present in orifice filter, replace orifice filter.
19. Remove orifice screw from hydraulic manifold.
20. If debris is present in orifice screw, clean orifice screw with compressed air.
21. Install orifice screw and orifice filter in hydraulic manifold.
22. Install CAB TILT valve in hydraulic manifold.
23. Install rubber sleeve, retainer ring, spacer, spring, knob, and nut on hydraulic manifold.
v1. CAB DOES NOT RAISE (CONT)

**KNOWN INFO**
- Air/hydraulic power unit oil level OK.
- Air/hydraulic power unit primed.
- Hydraulic and air hoses OK.
- Air tanks charged.
- Hydraulic oil filter OK.
- Other hydraulic manifold functions OK.
- Orifice filter OK.
- Orifice screw OK.

**POSSIBLE PROBLEMS**
- Faulty cab hydraulic latch.
- Faulty hydraulic manifold CAB TILT valve.
- Faulty cab hydraulic cylinder.

2. **Is cab hydraulic latch adjusted properly?**

<table>
<thead>
<tr>
<th>TEST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Inspection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REASON FOR QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If cab hydraulic latch is not adjusted properly, cab hydraulic latch is faulty.</td>
</tr>
</tbody>
</table>

---

Adjust cab hydraulic latch (para 19-6).
(1) Start engine and charge air tanks (TM 9-2320-365-10).
(2) Position CAB TILT knob to RAISE.
(3) Position FUNCTION SELECT knob to CAB TILT.
(4) Check to see if cab hydraulic latch indicator button is in the unlatched position.
(5) If cab hydraulic latch indicator button does not unlatch, adjust cab hydraulic latch (para 19-6).
v1. CAB DOES NOT RAISE (CONT)

KNOWLEDGE

Air/hydraulic power unit oil level OK.
Air/hydraulic power unit primed.
Hydraulic and air hoses OK.
Air tanks charged.
Hydraulic oil filter OK.
Other hydraulic manifold functions OK.
Orifice filter OK.
Orifice screw OK.
Cab hydraulic latch OK.

POSSIBLE PROBLEMS

Faulty hydraulic manifold CAB TILT valve.
Faulty cab hydraulic cylinder.

3. WARNING

Read WARNING on following page.

Is 2,500-4,000 psi (17,237-27,580 kPa) present at CAB RAISE output port?

TEST OPTIONS

Pressure Test or STE/ICE-R Test #51

REASON FOR QUESTION

If 2,500-4,000 psi (17,237-27,580 kPa) is not present, hydraulic manifold CAB TILT valve is faulty. If 2,500-4,000 psi (17,237-27,580 kPa) is present, cab hydraulic cylinder is faulty.

NO

Replace cab hydraulic cylinder (para 19-10).

YES

Repair hydraulic manifold CAB TILT valve (para 19-4).
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

### PRESSURE TEST

1. Position drain pan under cab hydraulic cylinder.
2. Disconnect CAB RAISE pressure hose from cab hydraulic cylinder output port.
3. Connect STE/ICE-R to CAB RAISE pressure hose.
5. Position CAB TILT knob to RAISE.
6. Position FUNCTION SELECT knob to CAB TILT.
7. Push and hold PUMP plunger button and perform STE-ICE-R Test #51 (TM 9-4910-571-12&P).
8. If pressure is not 2,500-4,000 psi (17,237-27,580 kPa), repair hydraulic manifold CAB TILT valve (para 19-4).
9. If pressure is 2,500-4,000 psi (17,237-27,580 kPa), replace cab hydraulic cylinder (para 19-10).
10. Drain air tanks (TM 9-2320-365-10).
11. Disconnect STE/ICE-R from pressure hose.
12. Connect pressure hose to cab hydraulic cylinder output port.
13. Close hydraulic manifold cover and install pin.
**v2. CAB DOES NOT LOWER**

### INITIAL SETUP

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Air tanks drained (TM 9-2320-365-10).

**Personnel Required**
(2)

**Material/Parts**
- Rag, Wiping (Item 51, Appendix D)
- Filter Element, Fluid (Item 14.1, Appendix G)

**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)
- Goggles, Industrial (Item 15, Appendix C)
- Transmitter, Pressure (Item 1, Appendix J)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Key, Socket Head Screw (Item 35.1, Appendix B)

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

### NOTE

Vehicles S/N 0001 through 7558, with hydraulic manifold P/N HFC32598, were not originally equipped with an orifice filter. However, an orifice filter may have been installed during previous maintenance to the hydraulic manifold.

---

**KNOWLEDGE INFO**

- Air/hydraulic power unit oil level OK.
- Air/hydraulic power unit primed.
- Hydraulic and air hoses OK.
- Air tanks charged.
- Hydraulic oil filter OK.
- Other hydraulic manifold functions OK.

**POSSIBLE PROBLEMS**

- Debris in orifice filter (if equipped).
- Debris in orifice screw.
- Faulty hydraulic manifold CAB TILT valve.
- Faulty cab hydraulic cylinder.

---

![Flowchart Diagram](image-url)
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE

Perform steps (1) through (11) on hydraulic manifolds P/N HFC32598.

(1) Remove pin from hydraulic manifold cover and lower cover.
(2) Cycle FUNCTION SELECT knob through all settings.
(3) Cycle CAB TILT knob through both selector settings.
(4) Remove screw, knob, and CAB TILT valve from hydraulic manifold.
(5) Remove orifice filter (if equipped) from hydraulic manifold.
(6) If debris is present in orifice filter, replace orifice filter.
(7) Remove orifice screw from hydraulic manifold.
(8) If debris is present in orifice screw, clean orifice screw with compressed air.

NOTE

If no orifice filter was previously installed, install orifice filter at this time.

(9) Install orifice screw and orifice filter in hydraulic manifold.
(10) Position CAB TILT valve and knob on hydraulic manifold with screw.
(11) Tighten screw to 5-15 lb-in. (1-2 N·m).

Cont. on page 2-2116.11.
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE

Perform steps (12) through (23) on hydraulic manifolds P/N 65234.

(12) Remove pin from hydraulic manifold cover and lower cover.
(13) Cycle FUNCTION SELECT knob through all settings.
(14) Cycle CAB TILT knob through both selector settings.
(15) Remove nut, knob, spring, spacer, retainer ring, and rubber sleeve from CAB TILT valve.
(16) Remove CAB TILT valve from hydraulic manifold.
(17) Remove orifice filter from hydraulic manifold.
(18) If debris is present in orifice filter, replace orifice filter.
(19) Remove orifice screw from hydraulic manifold.
(20) If debris is present in orifice screw, clean orifice screw with compressed air.
(21) Install orifice screw and orifice filter in hydraulic manifold.
(22) Install CAB TILT valve in hydraulic manifold.
(23) Install rubber sleeve, retainer ring, spacer, spring, knob, and nut on hydraulic manifold.
2. CAB DOES NOT LOWER (CONT)

**KNOWN INFO**
- Air/hydraulic power unit oil level OK.
- Air/hydraulic power unit primed.
- Hydraulic and air hoses OK.
- Air tanks charged.
- Hydraulic oil filter OK.
- Other hydraulic manifold functions OK.
- Orifice filter OK.
- Orifice screw OK.

**POSSIBLE PROBLEMS**
- Faulty hydraulic manifold CAB TILT valve.
- Faulty cab hydraulic cylinder.

---

**WARNING**
Read WARNING on following page.

**TEST OPTIONS**
- Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**
If 2,500-4,000 psi (17,237-27,580 kPa) is not present, hydraulic manifold CAB TILT valve is faulty. If 2,500-4,000 psi (17,237-27,580 kPa) is present, cab hydraulic cylinder is faulty.

---

**Is 2,500-4,000 psi (17,237-27,580 kPa) present at CAB LOWER output port?**

**NO**
- Replace cab hydraulic cylinder (para 19-10).

**YES**
- Repair hydraulic manifold CAB TILT valve (para 19-4).
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

### PRESSURE TEST

1. Position drain pan under cab hydraulic cylinder.
2. Disconnect CAB LOWER pressure hose from cab hydraulic cylinder output port.
3. Connect STE/ICE-R to CAB LOWER pressure hose.
5. Position CAB TILT knob to LOWER.
6. Position FUNCTION SELECT knob to CAB TILT.
7. Push and hold PUMP plunger button and perform STE-ICE-R Test #51 (TM 9-4910-571-12&P).
8. If pressure is not 2,500-4,000 psi (17,237-27,580 kPa), repair hydraulic manifold CAB TILT valve (para 19-4).
9. If pressure is 2,500-4,000 psi (17,237-27,580 kPa), replace cab hydraulic cylinder (para 19-10).
10. Drain air tanks (TM 9-2320-365-10).
11. Disconnect STE/ICE-R from pressure hose.
12. Connect pressure hose to cab hydraulic cylinder output port.
13. Close hydraulic manifold cover and install pin.
v3. SPARE TIRE RETAINER DOES NOT RAISE

INITIAL SETUP

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Air tanks drained (TM 9-232-365-10).

**Personnel Required**
(2)

**Material/Parts**
- Rag, Wiping (Item 51, Appendix D)
- Filter Element, Fluid (Item 14.1, Appendix G)

**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)
- Goggles, Industrial (Item 15, Appendix C)
- Transmitter, Pressure (Item 1, Appendix J)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Key, Socket Head Screw (Item 35.1, Appendix B)

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

**NOTE**
Vehicles S/N 0001 through 7558, with hydraulic manifold P/N HFC32598, were not originally equipped with an orifice filter. However, an orifice filter may have been installed during previous maintenance to the hydraulic manifold.

**KNOWLEDGMENT**

**Air/hydraulic power unit oil level OK.**
- Air/hydraulic power unit primed.
- Hydraulic and air hoses OK.
- Air tanks charged.
- Hydraulic oil filter OK.
- Other hydraulic manifold functions OK.

**POSSIBLE PROBLEMS**
- Debris in orifice filter (if equipped).
- Debris in orifice screw.
- Faulty hydraulic manifold.
- SPARE TIRE valve.
- Faulty spare tire retainer cylinder.

**WARNING**
Read WARNING on following page.

1. Is orifice screw or orifice filter (if equipped) free of debris?

**TEST OPTIONS**
- Visual Inspection

**REASON FOR QUESTION**
If orifice screw and/or orifice filter (if equipped) is clogged, spare tire may not raise.

**YES**
Clean orifice screw and/or replace orifice filter (if equipped).

**NO**

START
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE

Perform steps (1) through (11) on hydraulic manifolds HFC32598.

(1) Remove pin from hydraulic manifold cover and raise cover.
(2) Cycle FUNCTION SELECT knob through all settings.
(3) Cycle SPARE TIRE knob through both selector settings.
(4) Remove screw, knob, and SPARE TIRE valve from hydraulic manifold.
(5) Remove orifice filter (if equipped) from hydraulic manifold.
(6) If debris is present in orifice filter, replace orifice filter.
(7) Remove orifice screw from hydraulic manifold.
(8) If debris is present in orifice screw, clean orifice screw with compressed air.

NOTE

If no orifice filter was previously installed, install orifice filter at this time.

(9) Install orifice screw and orifice filter in hydraulic manifold.
(10) Position SPARE TIRE valve and knob on hydraulic manifold with screw.
(11) Tighten screw to 5-15 lb-in. (1-2 N·m).

Cont. on page 2-2118.3.
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE
Perform steps (12) through (23) on hydraulic manifolds P/N 65234.

(12) Remove pin from hydraulic manifold cover and lower cover.
(13) Cycle FUNCTION SELECT knob through all settings.
(14) Cycle SPARE TIRE knob through both selector settings.
(15) Remove nut, knob, spring, spacer, retainer ring, and rubber sleeve from SPARE TIRE valve.
(16) Remove SPARE TIRE valve from hydraulic manifold.
(17) Remove orifice filter from hydraulic manifold.
(18) If debris is present in orifice filter, replace orifice filter.
(19) Remove orifice screw from hydraulic manifold.
(20) If debris is present in orifice screw, clean orifice screw with compressed air.
(21) Install orifice screw and orifice filter in hydraulic manifold.
(22) Install SPARE TIRE valve in hydraulic manifold.
(23) Install rubber sleeve, retainer ring, spacer, spring, knob, and nut on hydraulic manifold.
2. Is 2,500-4,000 psi (17,237-27,580 kPa) present at SPARE EXT port?

**YES**
- Repair hydraulic manifold SPARE TIRE valve (para 19-4).

**NO**
- Replace spare tire retainer cylinder (para 14-5).

**POSSIBLE PROBLEMS**
- Faulty hydraulic manifold SPARE TIRE valve.
- Faulty spare tire retainer cylinder.
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

PRESSURE TEST

(1) Position drain pan under spare tire retainer cylinder.
(2) Disconnect SPARE EXT pressure hose from spare tire retainer cylinder port.
(3) Connect STE/ICE-R to SPARE EXT pressure hose.
(4) Start engine and charge air tanks (TM 9-2320-365-10).
(5) Position SPARE TIRE knob to RAISE.
(6) Position FUNCTION SELECT knob to SPARE TIRE.
(7) Push and hold PUMP plunger button and perform STE-ICE-R Test #51 (TM 9-4910-571-12&P).
(8) If pressure is not 2,500-4,000 psi (17,237-27,580 kPa), repair hydraulic manifold SPARE TIRE valve (para 19-4).
(9) If pressure is 2,500-4,000 psi (17,237-27,580 kPa), replace spare tire retainer cylinder (para 14-5).
(10) Drain air tanks (TM 9-2320-365-10).
(11) Disconnect STE/ICE-R from pressure hose.
(12) Connect pressure hose to spare tire retainer cylinder port.
(13) Close hydraulic manifold cover and install pin.
### v4. SPARE TIRE RETAINER DOES NOT LOWER

#### INITIAL SETUP

**Equipment Condition**
- Engine shut down (TM 9-2320-365-10).
- Air tanks drained (TM 9-232-365-10).

**Personnel Required**
- (2)

**Material/Parts**
- Rag, Wiping (Item 51, Appendix D)
- Filter Element, Fluid (Item 14.1, Appendix G)

**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)
- Goggles, Industrial (Item 15, Appendix C)
- Transmitter, Pressure (Item 1, Appendix J)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Key, Socket Head Screw (Item 35.1, Appendix B)

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

#### NOTE

Vehicles S/N 0001 through 7558, with hydraulic manifold P/N HFC32598, were not originally equipped with an orifice filter. However, an orifice filter may have been installed during previous maintenance to the hydraulic manifold.

---

#### KNOWN INFO

<table>
<thead>
<tr>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air/hydraulic power unit oil level OK.</td>
</tr>
<tr>
<td>Air/hydraulic power unit primed.</td>
</tr>
<tr>
<td>Hydraulic and air hoses OK.</td>
</tr>
<tr>
<td>Air tanks charged.</td>
</tr>
<tr>
<td>Hydraulic oil filter OK.</td>
</tr>
<tr>
<td>Other hydraulic manifold functions OK.</td>
</tr>
</tbody>
</table>

#### POSSIBLE PROBLEMS

- Debris in orifice filter (if equipped).
- Debris in orifice screw.
- Faulty hydraulic manifold.
- SPARE TIRE valve.
- Faulty spare tire retainer cylinder.

---

#### WARNING

**Read WARNING on following page.**

---

#### TEST OPTIONS

<table>
<thead>
<tr>
<th>Reason for Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>If orifice screw and/or orifice filter (if equipped) is clogged, spare tire may not lower.</td>
</tr>
</tbody>
</table>

---

#### Visual Inspection

1. **Is orifice screw or orifice filter (if equipped) free of debris?**

---

**YES**

**Clean orifice screw and/or replace orifice filter (if equipped).**

---

**NO**

**Clean orifice screw and/or replace orifice filter (if equipped).**

---

**START**
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE
 Perform steps (1) through (11) on hydraulic manifolds P/N HFC32598.

(1) Remove pin from hydraulic manifold cover and lower cover.
(2) Cycle FUNCTION SELECT knob through all settings.
(3) Cycle SPARE TIRE knob through both selector settings.
(4) Remove screw, knob, and SPARE TIRE valve from hydraulic manifold.
(5) Remove orifice filter (if equipped) from hydraulic manifold.
(6) If debris is present in orifice filter, replace orifice filter.
(7) Remove orifice screw from hydraulic manifold.
(8) If debris is present in orifice screw, clean orifice screw with compressed air.

NOTE
 If no orifice filter was previously installed, install orifice filter at this time.

(9) Install orifice screw and orifice filter in hydraulic manifold.
(10) Position SPARE TIRE valve and knob on hydraulic manifold with screw.
(11) Tighten screw to 5-15 lb-in. (1-2 N·m).

Cont. on page 2-2118.9.
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

Compressed air used for cleaning purposes will not exceed 30 psi (270 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shields, gloves, etc.). Failure to comply may result in injury to personnel.

NOTE

Perform steps (12) through (23) on hydraulic manifolds P/N 65234.

(12) Remove pin from hydraulic manifold cover and lower cover.
(13) Cycle FUNCTION SELECT knob through all settings.
(14) Cycle SPARE TIRE knob through both selector settings.
(15) Remove nut, knob, spring, spacer, retainer ring, and rubber sleeve from SPARE TIRE valve.
(16) Remove SPARE TIRE valve from hydraulic manifold.
(17) Remove orifice filter from hydraulic manifold.
(18) If debris is present in orifice filter, replace orifice filter.
(19) Remove orifice screw from hydraulic manifold.
(20) If debris is present in orifice screw, clean orifice screw with compressed air.
(21) Install orifice screw and orifice filter in hydraulic manifold.
(22) Install SPARE TIRE valve in hydraulic manifold.
(23) Install rubber sleeve, retainer ring, spacer, spring, knob, and nut on hydraulic manifold.
v4. SPARE TIRE RETAINER DOES NOT LOWER (CONT)

**KNOWN INFO**

| Air/hydraulic power unit oil level OK. |
| Air/hydraulic power unit primed. |
| Hydraulic and air hoses OK. |
| Air tanks charged. |
| Hydraulic oil filter OK. |
| Other hydraulic manifold functions OK. |
| Orifice filter OK. |
| Orifice screw OK. |

**POSSIBLE PROBLEMS**

Faulty hydraulic manifold SPARE TIRE valve.
Faulty spare tire retainer cylinder.

2. **WARNING**

Read WARNING on following page.

**TEST OPTIONS**

Pressure Test or STE/ICE-R Test #51

**REASON FOR QUESTION**

If 2,500-4,000 psi (17,237-27,580 kPa) is not present, hydraulic manifold SPARE TIRE valve is faulty. If 2,500-4,000 psi (17,237-27,580 kPa) is present, spare tire retainer cylinder is faulty.

**Flowchart**

- YES: Repair hydraulic manifold SPARE TIRE valve (para 19-4).
- NO: Replace spare tire retainer cylinder (para 14-5).
WARNING

Drop hydraulic pressure to zero before disconnecting any hydraulic hoses. Failure to comply may result in injury to personnel.

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 into contact with hydraulic fluid should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

PRESSURE TEST

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Position drain pan under spare tire retainer cylinder.</td>
</tr>
<tr>
<td>2.</td>
<td>Disconnect SPARE RET pressure hose from spare tire retainer cylinder port.</td>
</tr>
<tr>
<td>3.</td>
<td>Connect STE/ICE-R to SPARE RET pressure hose.</td>
</tr>
<tr>
<td>5.</td>
<td>Position SPARE TIRE knob to LOWER.</td>
</tr>
<tr>
<td>6.</td>
<td>Position FUNCTION SELECT knob to SPARE TIRE.</td>
</tr>
<tr>
<td>7.</td>
<td>Push and hold PUMP plunger button and perform STE-ICE-R Test #51 (TM 9-4910-571-12&amp;P).</td>
</tr>
<tr>
<td>8.</td>
<td>If pressure is not 2,500-4,000 psi (17,237-27,580 kPa), repair hydraulic manifold SPARE TIRE valve (para 19-4).</td>
</tr>
<tr>
<td>9.</td>
<td>If pressure is 2,500-4,000 psi (17,237-27,580 kPa), replace spare tire retainer cylinder (para 14-5).</td>
</tr>
<tr>
<td>10.</td>
<td>Drain air tanks (TM 9-2320-365-10).</td>
</tr>
<tr>
<td>11.</td>
<td>Disconnect STE/ICE-R from pressure hose.</td>
</tr>
<tr>
<td>12.</td>
<td>Connect pressure hose to spare tire retainer cylinder port.</td>
</tr>
<tr>
<td>13.</td>
<td>Close hydraulic manifold cover and install pin.</td>
</tr>
</tbody>
</table>
2-33. FRAME TROUBLESHOOTING

This paragraph covers Frame Troubleshooting. The Frame Fault Index, Table 2-59, lists faults for the frame of the vehicle.

Table 2-59. Frame Fault Index

<table>
<thead>
<tr>
<th>Fault No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>w1</td>
<td>Tires Continue To Wear After Front End Alignment and/or Vehicle Drives Sideways Down Road</td>
<td>2-2122</td>
</tr>
</tbody>
</table>
w1. TIRES CONTINUE TO WEAR AFTER FRONT END ALIGNMENT AND/OR VEHICLE DRIVES SIDEWAYS DOWN ROAD

INITIAL SETUP

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

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

Personnel Required
(4)

START

1. **KNOWN INFO**
   - Tire pressure OK.
   - POSSIBLE PROBLEMS
     - Damaged frame rail.
     - Improper toe-in.

   **TEST OPTIONS**
   - Visual inspection

   **REASON FOR QUESTION**
   - If damage is visible on frame rail(s), frame rail is faulty.

   **1. YES**
   - Notify DS Maintenance.

   **1. NO**
   - **2. KNOWLEDGE INFO**
     - Tire pressure OK.
     - POSSIBLE PROBLEMS
       - Improper toe-in.
       - Damaged frame rail.

   **TEST OPTIONS**
   - Refer to para 13-7.

   **REASON FOR QUESTION**
   - If front end is not aligned properly, tires will continue to wear.

   **2. NO**
   - Align front end (para 13-5).

   **2. YES**
Inspect frame rails and cross members for visible damage. If frame rail(s) and/or cross member(s) show any evidence of damage or bends, notify DS Maintenance.

Perform front end alignment and verify proper toe-in (para 13-5).
w1. Tires continue to wear after front end alignment and/or vehicle drives sideways down road (Cont)

**Known Info**
- Tire pressure OK.
- Front end aligned properly.
- Damaged frame rail.

**Possible Problems**
- Damaged frame rail.

**Test Options**
- Road Test

**Reason for Question**
- If vehicle does not travel in a straight line, frame rail(s) is faulty.

**Diagram**

- **3.** Does vehicle travel in a straight line?
  - **NO**
    - Notify DS Maintenance.
  - **YES**
    - Fault corrected.
<table>
<thead>
<tr>
<th>ROAD TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Road test vehicle with additional vehicle following.</td>
</tr>
<tr>
<td>(2) Have following vehicle monitor path of lead vehicle.</td>
</tr>
<tr>
<td>(3) If front of vehicle can be seen while in direct line of rear of vehicle, notify DS Maintenance.</td>
</tr>
</tbody>
</table>
Section V. MAINTENANCE PROCEDURES

2-34. MAINTENANCE INTRODUCTION

This section provides general procedures to be followed for the Unit Maintenance level as specified in the Maintenance Allocation Chart (MAC). When a special procedure is used, the detailed procedure will be in the section covering that component.

2-35. GROUND HANDLING

a. Towing. Two towing eyes are located at front and two located at rear of vehicle.

b. Parking. Parking brakes are designed to hold GVW on a minimum of 7-9 percent grade, pointing either uphill or downhill per Federal Motor Carrier Safety Regulation 393.41.

c. Mooring and Transporting. For forward, aft, lateral and upward movements, vehicle has four tiedown rings. Refer to TM 9-2320-365-10 for mooring condition and tiedown locations.

d. Hoisting. Sling assemblies and towing eyes used for hoisting are found on the vehicle.

2-36. GENERAL REMOVAL INSTRUCTIONS

a. Work Required. Remove parts if repair or replacement is required. Do not disassemble a component any further than needed.

b. Preparation. Before removal of any electrical, hydraulic, or air system components, ensure system component is not energized or pressurized. Disconnect battery ground cables. Relieve air system pressure. Before removal of fasteners (nuts, self-locking nuts) remove any paint on threads to prevent binding of fastener.

c. Identification. To ease assembly and installation, tag and mark shims, connectors, wires and mating ends of lines before disconnecting them. Identify similar parts to ensure correct assembly.

d. Position of Valves. Before removing valve handles, mark or diagram their positions when open and closed. This will help during assembly.

e. Tire Removal. Before removing any tires, position jackstands under axles, walking beams or frame. This will secure the vehicle for safe tire removal.

f. Location. Before removing cable ties, cushion clamps, hoses, tubing, wiring etc., note the location, position and routing to ensure correct assembly.
2-36. GENERAL REMOVAL INSTRUCTIONS (CONT)

g. Data Plate Removal.

WARNING

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

CAUTION

Use appropriate size drill bit when removing rivets. Failure to comply may cause damage to equipment.

Remove rivets and data plate from vehicle.

h. Blind Rivet Nut Removal.

WARNING

Wear appropriate eye protection when removing blind rivet nuts. Failure to comply may result in injury to personnel.

CAUTION

Use appropriate size drill bit when removing blind rivet nuts. Failure to comply may cause damage to equipment.

Remove blind rivet nut from vehicle.

2-37. GENERAL DISASSEMBLY INSTRUCTIONS

a. Cleanliness. Work area must be as clean as possible to prevent contamination to components.

CAUTION

Self-locking fasteners that are loosened must be replaced, not tightened.

b. Locking Parts. Replace all lockwashers, cotter pins and self-locking nuts at time of reassembly.

c. Expendable Parts. All gaskets, preformed packings, and seals removed during repair must be discarded and replaced with new parts.

d. Removing Seals. Be sure all traces of oil, gaskets and sealants are removed from components. When possible, use wood or plastic probes and scrapers to prevent damage to machined surfaces.
CAUTION

Do not use tape to close off fuel or oil openings. Sticky surface of tape can mix with fuel and oil and cause engine malfunctions.

e. Parts Protection. To keep dust, dirt, moisture and other objects out of internal parts of systems or components, cap or tape all open tubes, hoses, air lines, fittings and components openings as soon as part is removed. Wrap all removed parts in clean paper or dip parts in preservation oil.

2-38. GENERAL CLEANING INSTRUCTIONS

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 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.

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

a. Cleaning Solvents. Use only approved cleaning solvents to clean parts. Dry Cleaning Solvent P-D-680 (Item 71, Appendix D) is commonly used. Always work in a well-ventilated area.

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.

b. Removing Deposits. Soak parts in Dry Cleaning Solvent P-D-680 (Item 71, Appendix D), and wash away deposits by flushing or spraying. When necessary, brush with a soft bristle brush (not wire) moistened in solvent. Use compressed air to dry parts, except bearings, after cleaning. Bearings must drip and air dry.

c. Tools. Do not use wire brushes, abrasive wheels, or compounds to clean parts unless specifically approved in the detailed procedures. Parts may be scratched or altered and may weaken a highly stressed part.

d. Ball and Roller Bearings. When cleaning ball or roller bearings, place them in a basket and suspend them in a container of Dry Cleaning Solvent P-D-680 (Item 71, Appendix D). If needed, use a brush to remove caked grease, chips, etc. Avoid rotating bearing before solid particles are removed to prevent damaging races and balls. When bearings have been cleaned, coat them lightly with lubricating oil (Item 43, Appendix D) to remove Dry Cleaning Solvent.
e. Rubber Parts. Do not clean preformed packings or other rubber parts in Dry Cleaning Solvent. Wipe parts clean with a dry wiping rag (Item 51, Appendix D).

WARNING

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

CAUTION

Steam cleaning may cause water to enter the transmission Electronic Control Unit (ECU) connector. Failure to dry off connector after steam cleaning may result in bad ECU codes.

f. Exterior Parts. Steam clean all exterior parts thoroughly before removing. This will make inspection and disassembly easier.

WARNING

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

g. Engine, Cab, and Body. Use a spray gun and solvent mixture for cleaning exterior of engine, cab, and body. Allow mixture to remain on item surface for 10 minutes before rinsing. Rinse with hot water under 80 to 120 psi (550 to 830 Kpa), if available. An ordinary garden hose with nozzle may be used if other equipment is not available. Rinse thoroughly.

CAUTION

To prevent corrosion, parts should be dipped in rust preventive within two hours of degreasing. Failure to comply may result in damage to equipment.

h. Degreasing Machine. A degreasing machine may be used to remove heavy grease and oil from metal parts.
• **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 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.

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

  i. **Passages.** After degreasing, check all oil passages and cavities for dirt or blockage before coating with lubricating oil (Item 43, Appendix D). Run a thin, flexible wire through oil passages to make sure they are not clogged. Use a pressure spray gun and Dry Cleaning Solvent P-D-680 (Item 71, Appendix D) to clean dirty passages.

  j. **Electrical Parts.** Electrical parts, such as coils, junction blocks, and switches should not be soaked or sprayed with cleaning solutions. Clean these parts with a clean wiping rag (Item 51, Appendix D) moistened with Dry Cleaning Solvent P-D-680 (Item 71, Appendix D).

• **CAUTION**

  Do not use soap or alkalies for cleaning tank interiors. Failure to comply may result in damage to equipment.

  k. **Fuel Tank.** Pay special attention to all warnings and cautions when working on vehicle's fuel tank. Fuel tanks should be flushed, using a spray gun and Dry Cleaning Solvent P-D-680 (Item 71, Appendix D).

• **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.

  l. **Battery.** Exterior surfaces of the electrical system and battery should be cleaned with a weak solution of baking soda and water. Apply solution with a bristle brush to remove any corrosion. Pay special attention to all warnings and cautions when working on batteries.

  m. **Hydraulic System.** When cleaning hydraulic system parts use Dry Cleaning Solvent P-D-680 (Item 71, Appendix D). Clean and dry parts thoroughly to make sure no residue remains. If a coating of preservative is required before assembly, apply a light film of lubricating oil (Item 43, Appendix D).
2-39. GENERAL INSPECTION INSTRUCTIONS

a. **Cleaning.** Clean all parts before inspection. Check for defects such as physical distortion, wear, cracks, and pitting.

b. **Sealing Surfaces.** Inspect all surfaces in contact with gaskets, packings, or seals for nicks and burrs. If any defect is found, remove it before assembly.

c. **Bearings.** Inspect bearings for rusted or pitted balls, races, or separators. Inspect balls and races for brinelling, abrasion, and serious discoloration. The following are conditions for bearing rejection:
   
   (1) Cuts or grooves parallel to ball or roller rotation.
   
   (2) Fatigue pits (not minor machine marks or scratches).
   
   (3) Cracks.

d. **Gears and Splined Shafts.** Inspect gears and splined shafts for wear, pitting, rolling, peening, scoring, burning, brinelling and fatigue cracks.

e. **Tubing and Hoses.** Inspect all hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or contact with other parts of the vehicle. Inspect copper tubing lines for kinks. Inspect fitting threads and mating surfaces for damage. Replace any defective part. After assembly and during initial vehicle operation period, check for leaks.

f. **Electrical Parts.** Inspect all wiring harnesses for broken, chafed, or burned wiring. Inspect all terminal connectors for loose connections and broken parts.

g. **Metal Parts.** Visually inspect all castings and weldments for cracks. Parts that carry a great load should receive magnetic particle inspection. Critical non-ferrous parts may be inspected with fluorescent penetrant.

h. **Drain Plugs.** When removing drain plugs from transmission, engine, hydraulic system components, or axle differential and planetary hubs, check amount of sediment on plugs. Accumulations of grit or fine metal particles may indicate actual or potential component failure. A few fine particles are normal. This inspection helps to determine if there are defective parts prior to internal inspection of the component and to predict degradation of the equipment.

2-40. GENERAL REPAIR INSTRUCTIONS

a. **Burrs.** Remove burrs from surface teeth with a fine-cut file or crocus cloth.

b. **Exterior Parts.** Chassis and exterior painted parts may be resurfaced when paint is damaged, or where parts have been repaired (TB 43-0242).

   **NOTE**

   Polished and machined steel parts not protected by cadmium, tin, copper, or other plating or surface treatment require protection. Bare metal parts must be free of moisture when protective coating is applied.

c. **Protecting Parts.** Protect bare steel surfaces from rust when not actually undergoing repair work. Dip parts in, or spray them with, corrosion preventive compound (Item 18, Appendix D). Aluminum parts may require protection in atmospheres having a high salt content.
d. **Screws, Nuts and Fittings.** Replace any screw, nut, or fitting with damaged threads. Inspect tapped holes for thread damage. If cross-threading is evident retap the hole for the next oversize screw or stud. If the retapping will weaken the part, or if the cost of the part makes retapping impractical, replace the part. Chasing the threads with proper size tap or die may be adequate.

e. **Stud Installation.** When installing studs use a proper driver. A worn stud driver may damage the end thread. Then a chasing die must be used before a nut can be screwed on. This procedure will remove cadmium plating and allow corrosion. Before installing a stud, inspect the hole for chips. Blow out foreign matter and start stud by hand. Before final insertion, coat thread with a film of antiseize compound (Item 14, Appendix D). Install stud to proper "setting height", which is the total projecting length.

f. **Dents.** Straighten minor body dents by tapping with a soft-faced hammer while using a wooden block backing.

g. **Sheet Metal Repair.** Repair minor skin cracks by installing patches.

h. **Wire Repair.** Replace all broken, worn, or burned electrical wiring. Wires with several broken strands must be replaced. Broken strands will increase the resistance of the wire and impair efficiency of electrical components, especially the ignition system. Wire numbers must be permanently identified on any new wiring.

i. **Repair of Wires with Female Sockets.** Strip insulation from wire to equal depth of terminal well. Slide shell and sleeve over wire insulation. Insert wire into terminal well. Crimp terminal well on wire. Slide sleeve and shell over terminal.

j. **Repair of Wires with Male Plugs.** Strip insulation from wire to equal depth of terminal well. Slide shell over wire insulation. Insert wire into terminal well. Crimp terminal well on wire. Place slotted washer over crimped terminal well. Slide shell over slotted washer and terminal.

k. **Repair of Wires with Terminals of Various Configurations.** Strip insulation from wire to equal depth of terminal well. Slide insulator over insulation. Insert wire into terminal well. Crimp terminal well on wire. Slide insulator over crimped terminal well.

l. **Repair of Cables with Multiple Conductor Receptacle Connectors.** Remove insulation sleeving from cable. Discard insulation sleeving. Extract electrical contact from receptacle body. Strip insulation from wire to equal depth of well in electrical contact. Position insulation sleeving on cable. Crimp electrical contact on wire. Install electrical contact in receptacle body. Heat shrink insulation sleeving.

m. **Repair of Cables with Multiple Conductor Plug Connectors.** Remove insulation sleeving from cable. Discard insulation sleeving. Extract electrical contact from plug body. Strip insulation from wire to equal depth of well in electrical contact. Position insulation sleeving on cable. Crimp electrical contact on wire. Install electrical contact in plug body. Heat shrink insulation sleeving.

n. **Repair of Cables with Multiple Conductor Mate-N-Lock Series Connectors.** Remove electrical contact from connector body. Strip insulation equal to depth of well on electrical contact. Position wire end in electrical contact. Crimp electrical contact on wire end. Install electrical contact in connector body. Remove electrical contact from connector body. Strip insulation equal to depth of well on electrical contact. Position wire end in electrical contact. Crimp electrical contact on wire end. Install electrical contact in connector body.

o. **Repair of Cables with Multi-Conductor Metri-Pack Series Connectors.** Extract electrical contact from connector body. Strip insulation from wire to equal depth of well in electrical contact. Crimp electrical contact on wire. Install electrical contact in connector body.

q. **Repair of Cables with MIL-SPEC Solder-Type Terminal Connectors.** Loosen two retaining screws on cable clamp. Remove cable clamp from connector body. Desolder wire from electrical contact. Remove wire from electrical contact. Strip insulation from wire to equal depth of well in electrical contact. Position wire in electrical contact. Solder wire to electrical contact. Install cable clamp on connector body with two retaining screws.

### 2-41. GENERAL ASSEMBLY INSTRUCTIONS

a. **Preparation.** Remove protective grease coatings from new parts before installation.

b. **Preformed Packing Installation.** Lubricate all preformed packings with a thin coat of lubricating oil (Item 43, Appendix D) before installing. To install a preformed packing, first clean the groove, then stretch packing and place into position. Place component on flat surface and uniformly press packing into position.

c. **Pipe Joints and Fittings.** Use nonhardening sealing compound (Item 64, Appendix D) or antiseizing tape (Item 73, Appendix D) to join piping and fittings.

d. **Oil Seals.** Coat oil seals evenly with oil or grease before installing. Install oil seals with seal lip facing toward lubricant, applying an even force to outer edge of seal. If oil seals are to be installed over keyed or splined shafts, use a guide to prevent sharp edge of keyway or splines from cutting the leather or neoprene seal. Construct guides of very thin gauge sheet metal and shape to the required diameter. Make certain guide edges are not sharp and are bent slightly inward so they do not cut the seal.

e. **Bearings and Shafts.** When mounting bearings on shafts always apply force to the inner races. When mounting bearings into housing always apply the force to the outer race.

f. **Bearing Lubrication.** Lubricate bearings before assembly with lubricant used in the related housing or container to provide the first run-in until lubricant from the system can reach the bearings.

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**WARNING**

On direct contact, uncured silicone sealant irritates eyes. In case of contact, flush eyes with water and seek medical attention. In case of skin contact, wipe off and flush with water. Failure to comply may result in injury to personnel.

g. **Silicone Sealant.** Silicone sealant is often used instead of a gasket to seal mating parts. The mating parts must be clean, dry, and free of oil or grease for proper adhesion. After silicone sealant has been applied, the mating parts must be assembled immediately. Silicone sealant starts to set-up in 15 minutes and takes 24 hours to completely dry. Excess silicone sealant should be wiped off after assembling the mating parts.
h. Gaskets. Remove all traces of previous gasket and sealant before installing new gasket. Coat both sides of gasket with sealant to provide added sealing.

2-42. GENERAL INSTALLATION INSTRUCTIONS

a. Preparation. When unpacking items, remove all packing material, barrier paper, tape, plastic bags, protective caps and protective grease coatings. Handle and store removed components carefully.

CAUTION

Use sealing compound sparingly and only on threads. Do not apply compound to hose connections. Failure to comply may result in damage to equipment.

b. Sealing Compounds. Use sealing compounds as required in each maintenance task.

c. Torquing. Tighten nuts, bolts, screws, and fittings as required in Appendix F or in each maintenance task.

d. Identification Tags. Put hoses, tubes, lines, and electrical wiring in place by matching identification tags and markings on equipment.

e. Hoses, Air Lines and Wiring. After installing hoses, air lines and wiring, ensure that they do not contact moving parts or components edges. Secure in place, out of way with cable ties and cushion clamps.

f. Data Plate Installation.

Install data plate on vehicle with rivets.

g. Blind Rivet Nut Installation.

Install blind rivet nut on vehicle using blind rivet tool kit.

2-43. PREPARATION FOR STORAGE OR SHIPMENT INTRODUCTION

a. This section gives instructions for making the vehicle ready for shipment or storage.

b. Refer to AR 750-1 for detailed administrative storage instructions.

c. Refer to TB 9-2300-422-20 for security procedures.
2-44. PREPARATION FOR STORAGE OR SHIPMENT

a. Perform Preventive Maintenance Checks and Services (PMCS) listed in Table 2-1.

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.

b. Correct all deficiencies noted during inspection, if facilities are available. If repairs are required beyond the scope of Unit Maintenance, refer the deficiencies to Direct or General Support Maintenance.

2-45. STORAGE MAINTENANCE PROCEDURES

a. Provide access to the vehicle during storage.

CAUTION

Ensure tires are not resting on surfaces containing grease or oil. Failure to comply may result in damage to equipment.

b. Do not block wheels, but do be sure tires are not resting on surfaces containing grease or oil.

c. Perform complete lubrication in accordance with TM 9-2320-365-10 and Appendix H.

d. If possible, store vehicles close together, out of direct sunlight and away from electrical or generating equipment.

e. Ensure the fuel tank contains at least 20 gallons (75.7 liters) of treated fuel. The fuel should be treated with Biobor J.F. The addition of 3 teaspoons of Biobor to 20 gallons of fuel will provide adequate protection against fungus growth. When storing a vehicle in freezing conditions, the addition of 3 ounces of isopropyl alcohol to every 20 gallons of diesel fuel will help prevent fuel-line freeze up.

f. Monthly Storage Maintenance Instructions.

(1) Conduct visual inspection of vehicle. Check lubricant, battery electrolyte, coolant level and tire pressures. Correct any discrepancies.

(2) Inspect oil can points. Lubricate if necessary.
2-45. STORAGE MAINTENANCE PROCEDURES (CONT)

(3) Start engine and idle for 10 minutes. After 10 minutes of engine idle, operate engine for 5 minutes at 1500 rpm or until engine water temperature reaches 180°F. Shift transmission slowly through all gear selector positions. Return transmission to neutral.

(4) Move vehicle 30 feet forward and reverse.

(5) Idle engine 10 minutes before shutdown.

(6) Check grease coating on all chromium plated and unpainted surfaces. If grease was wiped from chromium plates or unpainted surfaces when vehicle was moved, recoat these surfaces.

g. Quarterly Storage Maintenance Instructions.

(1) Move vehicle at least 1/4 mile. While driving, shift transmission through all gear ranges.

(2) Exercise all auxiliary equipment and winch. While operating winch or crane, lubricate hoist and cables.

h. Yearly Storage Maintenance Instructions.

(1) Clean exterior, engine and undercarriage. Clean interior of cab. Wash any oil or grease from tires.

(2) Visually inspect vehicle. Check lubricant levels and tire pressures. Correct all discrepancies.

(3) Lubricate chassis, auxiliary equipment, winch and hoist cable and oil can points.
CHAPTER 3
ENGINE MAINTENANCE

RESTRICTED MAINTENANCE NOTICE

Units not authorized SC 4910-95-CL-A72 (SHOP EQUIPMENT, COMMON NO. 2) in their T.O.E. may be unable to perform some of the maintenance in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

Section I. INTRODUCTION

3-1. INTRODUCTION

This chapter contains maintenance instructions for replacing engine components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

3-2. LIFTING PLATE REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

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)  
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)  
Container (40 qt (38 L) capacity)

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.

• 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. Removal.

(1) Remove radiator cap (1) from radiator overflow tank (2).

(2) Position container under radiator draincock (3).

(3) Open radiator draincock (3) and drain approximately five gallons (19 L) of coolant.

(4) Close radiator draincock (3).
(5) Disconnect air compressor inlet coolant tube (4) from fitting (5) on thermostat housing (6).

(6) Remove five screws (7), washers (8), and front lifting plate (9) from engine (10).

(7) Remove four screws (11), washers (12), and rear lifting plate (13) from engine (10).
b. Installation.

(1) Position rear lifting plate (1) on engine (2) with four washers (3) and screws (4).

(2) Tighten four screws (4) to 47 lb-ft (64 N·m).

(3) Position front lifting plate (5) on engine (2) with five washers (6) and screws (7).

(4) Tighten five screws (7) to 47 lb-ft (64 N·m).

(5) Connect air compressor inlet coolant tube (8) to fitting (9) on thermostat housing (10).
c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check for coolant leaks under vehicle.

(4) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(5) Check coolant level after normal operating temperature is reached.

(6) Check for coolant leaks under vehicle.

(7) Raise cab (TM 9-2320-365-10).

(8) Check around thermostat housing for coolant leaks.

(9) Lower cab (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

End of Task.
3-3. VALVE COVER AND GASKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Charge air cooler to air inlet elbow tubes/hoses removed (para 4-5).

Tool and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Rag, Wiping (Item 51, Appendix D)
Sealing Compound (Item 64, Appendix D)
Gasket (for valve cover 7W5627) (Item 42, Appendix G)
Gasket (for valve cover 119-2960) (Item 27, Appendix G)
Adhesive (Item 7, Appendix D)
Screw, Cap (14) (for replacement of valve cover 7W5627 with valve cover 119-2960) (Item 239, Appendix G)

a. Removal.

NOTE
Position hoses to allow access to valve cover.

(1) Remove screw (1), washer (2), and clamp (3) from valve cover (4).
CAUTION

Area around valve cover must be clean before removing valve cover from inlet manifold to prevent contaminants from entering inlet manifold. Failure to comply may result in damage to equipment.

(2) Remove 13 screws (5) and washers (6) from valve cover (4).

CAUTION

Cover inlet manifold with wiping rags after valve cover is removed to prevent contamination of engine. Failure to comply may result in damage to equipment.

(3) Remove valve cover (4) from inlet manifold (7).

(4) Remove valve cover gasket (8) from valve cover (4). Discard gasket.

CAUTION

Engine data plate must remain with original engine. It contains engine serial number and other data for this engine. Failure to comply may result in damage to equipment.

(5) Remove engine data plate (9) from valve cover (4).
b. Installation.

**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 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.

(1) Install engine data plate (1) on valve cover (2) with adhesive.

(2) Apply sealing compound between screw holes of valve cover (2).

(3) Position valve cover gasket (3) on valve cover (2).

**NOTE**

Vehicle serial numbers 0001 through 3091 were originally equipped with valve cover part number 7W5627. Vehicle serial numbers 3092 and higher serial numbers were originally equipped with valve cover part number 119-2960. If replacing valve cover part number 7W5627 with valve cover part number 119-2960, it will be necessary to use the longer screws.

(4) Position valve cover (2) on inlet manifold (4) with 13 washers (5) and screws (6).
(5) Position clamp (7) on valve cover (2) with washer (8) and screw (9).

(6) Tighten 13 screws (6) and screw (9) to 84-132 lb-in. (9-15 N·m) in sequence shown.

c. Follow-On Maintenance.

(1) Install charge air cooler to air inlet elbow tubes/hoses (para 4-5).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Raise cab (TM 9-2320-365-10).

(5) Check for oil leaks around valve cover gasket.

(6) Lower cab (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
3-4. ENGINE OIL FILTER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

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)
Wrench, Strap, Adjustable (Item 56, Appendix C)
Container (40 qt (38 L) capacity)

Materials/Parts
Oil, Lubricating, OE/HDO 30 (Item 46, Appendix D)
Filter, Oil (Item 22, Appendix G)
Packing, Prefomed (Item 180, Appendix G)

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.

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

a. Removal.

(1) Position container under oil pan (1).

(2) Remove oil pan plug (2) from oil pan (1).

(3) Remove preformed packing (3) from oil pan drain plug (2). Discard preformed packing.
(4) Remove oil filter (4) from oil filter base (5). Discard oil filter.

b. Installation.

(1) Install preformed packing (1) on oil pan drain plug (2).

(2) Install oil pan drain plug (2) in oil pan (3).

(3) Apply a thin coat of lubricating oil to oil filter gasket (4).

(4) Install oil filter (5) on oil filter base (6), hand tight.
c. Follow-On Maintenance.

(1) Add oil to engine (Appendix H).

(2) Lower cab (TM 9-2320-365-10).

(3) Check for oil leaks under vehicle.

(4) Start engine (TM 9-2320-365-10).

(5) Raise cab (TM 9-2320-365-10).

(6) Check for oil leaks around oil filter and oil pan drain plug.

(7) Check engine oil level (TM 9-2320-365-10); if low, add oil (Appendix H).

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.
3-5. CRANKCASE BREATHER REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

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)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)  
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Rag, Wiping (Item 51, Appendix D)  
Packing, Preformed (Item 184, Appendix G)  
Oil, Lubricating, OE/HDO 30 (Item 46, Appendix D)

a. Removal.

CAUTION

Wipe around fuel filter base before removing crankcase breather housing. Failure to comply may result in damage to equipment.

(1) Loosen hose clamp (1) on hose (2).

(2) Remove hose (2) from crankcase breather housing (3).

(3) Remove screw (4) and washer (5) from crankcase breather housing (3).

(4) Remove crankcase breather housing (3) from fuel filter base (6).

(5) Remove preformed packing (7) from fuel filter base (6). Discard preformed packing.
3-5. CRANKCASE BREATHER REPLACEMENT (CONT)

b. Installation.

(1) Apply a thin coat of lubricating oil to both sides of preformed packing (1).

(2) Install preformed packing (1) on fuel filter base (2).

(3) Position crankcase breather housing (3) on fuel filter base (2) with washer (4) and screw (5).

(4) Tighten screw (5) to 96-144 lb-in. (11-16 N·m).

(5) Position hose (6) on crankcase breather housing (3) with clamp (7).

(6) Tighten clamp (7) to 35-45 lb-in. (4-5 N·m).

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check for oil leaks under vehicle.

(4) Raise cab (TM 9-2320-365-10).

(5) Check for oil leaks around breather housing gasket.

(6) Lower cab (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
3-6. ENGINE AND TRANSMISSION OIL SAMPLING VALVES REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

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

Tools and Special Tools  
Goggles, Industrial (Item 15, Appendix C)  
Pan, Drain (Item 24, Appendix C)  
Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)  
Wrench Set, Socket (Item 49, Appendix C)

Materials/Parts  
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)  
Packing, Preformed (Item 166, Appendix G)  
Antiseize Compound (Item 63, Appendix D)

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.

a. Removal.

(1) Position drain pan under transmission oil sampling valve (1) and engine oil sampling valve (2).

NOTE  
Tag hoses and connection points prior to disconnecting.

(2) Disconnect transmission oil sampling hose (3) from transmission oil sampling valve (1).

(3) Disconnect engine oil sampling hose (4) from engine oil sampling valve (2).

(4) Remove nut (5) and transmission oil sampling valve (1) from bracket (6).

(5) Remove nut (7) and engine oil sampling valve (2) from bracket (6).
(6) Remove transmission oil sampling hose (3) from 45-degree fitting (8).

**NOTE**

- Note orientation of fitting prior to removal.
- Perform steps (7) and (8) on vehicles equipped with transmission oil cooler tubes.

(7) Remove 45-degree fitting (8) from transmission oil cooler tube (9).

(8) Remove preformed packing (10) from 45-degree fitting (8). Discard preformed packing.

**NOTE**

Perform step (9) on vehicles equipped with transmission oil cooler hoses.

(9) Remove 45-degree fitting (8) from transmission oil cooler hose (9).

(10) Remove engine oil sampling hose (4) from adapter (11).

(11) Remove adapter (11) from 90-degree fitting (12).
b. Installation.

**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 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.

(1) Apply antiseize compound to threads of adapter (1).

(2) Install adapter (1) on 90-degree fitting (2).

(3) Install engine oil sampling hose (3) on adapter (1).

**NOTE**

Perform steps (4) and (5) on vehicles equipped with transmission oil cooler tubes.

(4) Install preformed packing (4) on 45-degree fitting (5).

(5) Install 45-degree fitting (5) in transmission oil cooler tube (6).

**NOTE**

Perform step (5.1) and (5.2) on vehicles equipped with transmission oil cooler hoses.

(5.1) Apply antiseize compound to threads of 45-degree fitting (5).

(5.2) Install 45-degree fitting (5) in transmission oil cooler hose (6).

(6) Install transmission oil sampling hose (7) on 45-degree fitting (5).
(7) Position engine oil sampling valve (8) on bracket (9) with nut (10).

(8) Position transmission oil sampling valve (11) on bracket (9) with nut (12).

(9) Tighten nuts (10 and 12) to 67 lb-in. (8 N·m).

(10) Install engine oil sampling hose (3) on engine oil sampling valve (8).

(11) Install transmission oil sampling hose (7) on transmission oil sampling valve (11).

c. **Follow-On Maintenance.**

(1) Lower cab (TM 9-2320-365-10).

(2) Check for oil leaks under vehicle.

(3) Start engine (TM 9-2320-365-10).

(4) Raise cab (TM 9-2320-365-10).

(5) Check for oil leaks around transmission and engine oil sampling hoses and valves.

(6) Lower cab (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

**End of Task.**
3-7. ENGINE OIL FILL TUBE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Transmission oil fill tube removed (para 8-13).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Screwdriver Attachment, Socket Wrench (Item 46, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Nut, Self-Locking (all models except M1081) (Item 148, Appendix G)

Tools and Special Tools (Cont)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Nut, Self-Locking (M1081) (Item 148, Appendix G)

a. Removal.

(1) Remove cap (1) from engine oil fill tube (2).

**NOTE**

Perform steps (2) and (3) on all models except M1081.

(2) Remove self-locking nut (3), washer (4), engine oil fill tube (2), screw (5), and washer (6) from radiator overflow tank bracket (7). Discard self-locking nut.

(3) Remove self-locking nut (8), washer (9), engine oil fill tube (2), screw (10), and washer (11) from front lifting beam (12). Discard self-locking nut.
3-7. ENGINE OIL FILL TUBE REPLACEMENT (CONT)

NOTE

Perform step (4) on M1081.

(4) Remove self-locking nut (3), washer (4), engine oil fill tube (2), screw (13), washer (6), and spacer (14) from radiator overflow tank bracket (7). Discard self-locking nut.

(5) Loosen clamp (15) on engine oil fill hose (16).

(6) Remove engine oil fill tube (2) from engine oil fill hose (16).

b. Installation.

(1) Position engine oil fill tube (1) in engine oil fill hose (2) with clamp (3).

(2) Tighten clamp (3) to 27-44 lb-in. (3-5 N·m).
NOTE

Perform steps (3) and (4) on M1081.

(3) Position engine oil fill tube (1) on radiator overflow tank bracket (4) with spacer (5), washer (6), screw (7), washer (8), and self-locking nut (9).

(4) Tighten self-locking nut (9) to 21-26 lb-ft (29-35 N·m).

NOTE

Perform steps (5) through (7) on all models except M1081.

(5) Position engine oil fill tube (1) on front lifting beam (10) with washer (11), screw (12), washer (13), and self-locking nut (14).

(6) Position engine oil fill tube (1) on radiator overflow tank bracket (4) with washer (6), screw (15), washer (8), and self-locking nut (9).

(7) Tighten self-locking nuts (9 and 14) to 21-26 lb-ft (29-35 N·m).

(8) Install cap (15) on engine oil fill tube (1).

c. Follow-On Maintenance.

(1) Install transmission oil fill tube (para 8-13).

(2) Lower cab (TM 9-2320-365-10).

End of Task.
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
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
e. Cold Weather Operation.

Basic Cold Weather Manual ................................. FM 31-70
Northern Operations ........................................ FM 31-71
Operation and Maintenance of Ordnance Material 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 .................................. 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/Field** - includes two subcolumns, C (Operator/Crew) and O (Unit) maintenance.
   - **Direct Support/Field** - includes an F subcolumn.
   - **General Support/Sustainment** - includes an H subcolumn.
   - **Depot/Sustainment** - 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/Field maintenance  
F....................................................................................................................................Direct Support/Field maintenance  
L .................................................................................................................................. Specialized Repair Activity (SRA)5  
H ..................................................................................................................General Support/Sustainment maintenance  
D ....................................................................................................................................Depot/Sustainment 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.

5This 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

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### Section III. TOOLS AND TEST EQUIPMENT FOR LMTV VEHICLES (Cont)

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## Section III. TOOLS AND TEST EQUIPMENT FOR LMTV VEHICLES (Cont)

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### Section IV. REMARKS FOR THE LMTV VEHICLE

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## 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.

#### Section II. TOOLS IDENTIFICATION LIST

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### Section II. TOOLS IDENTIFICATION LIST (CONT)

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<td>WRENCH, TORQUE, 0-175 lb-ft</td>
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<td>5120-00-221-7983</td>
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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

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<thead>
<tr>
<th>(1) Item Number</th>
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<td>Adapter, Straight, Pipe to Tube (96906) MS51503B4-4</td>
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<td>Adapter, Straight, Tube to Boss (81361) C116-3-71</td>
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<td>Adhesive (71984) 3145 RTV Clear</td>
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<td>Adhesive (73168) 80055-31</td>
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<td>6850-00-174-1806</td>
<td>Antifreeze, Arctic Type (81349) (MIL-A-11755) 55 gl drum</td>
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<td>6850-01-441-3218</td>
<td>Antifreeze, Multi-Engine Type (58536) (A-A-52624A) Type I (Green) – 1 gal</td>
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<td>Type II (Purple) - 5 gal</td>
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<td>Cleaning Compound, Windshield (81349) O-C-1901 16 oz bottle</td>
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### Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

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Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

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# 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

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### Section II. MANUFACTURED ITEMS INDEX (CONT)

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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.

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<td>1</td>
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<td>Steel, ASTM A569 Sheet, Hot Rolled</td>
<td>6.0 in. (152.4 mm) x 6.0 in. (152.4 mm) x 0.134 in. (3.4 cm)</td>
<td>2</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Material Description</th>
<th>Size</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/A</td>
<td>Steel, Flat Bar</td>
<td>4.0 in. (10.2 cm) X 33.38 in. X (84.8 cm) X 0.38 in. (0.96 cm)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>N/A</td>
<td>Steel, Flat Bar</td>
<td>4.0 in. (10.2 cm) X 12.0 in. (30.5 cm) X 0.38 in. (0.96 cm)</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>N/A</td>
<td>Angle Iron</td>
<td>2.0 in. (5.1 cm) X 2.0 in. (5.1 cm) X 3.5 in. (8.9 cm)</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>H.S.105VW-1</td>
<td>Insulgrip, CSA 105 C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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.
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.
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.
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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Material Part Number</th>
<th>CAGE Code</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackout Shield Header Seal</td>
<td>942P00001</td>
<td>0SHR6</td>
<td>28-3/4 in. (730 mm)</td>
</tr>
<tr>
<td>Blackout Shield Jamb Seal (van body serial numbers 001 through 190)</td>
<td>942P00001</td>
<td>0SHR6</td>
<td>63-3/8 in. (1610 mm)</td>
</tr>
<tr>
<td>Blackout Shield Jamb Seal (van body serial number 191 and higher)</td>
<td>942P00001</td>
<td>0SHR6</td>
<td>33 in. (838 mm)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Material Part Number</th>
<th>CAGE Code</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH Door Gasket</td>
<td>12416417</td>
<td>19207</td>
<td>214 in. (5435 mm)</td>
</tr>
<tr>
<td>RH Door Gasket</td>
<td>12416417</td>
<td>19207</td>
<td>197 in. (5004 mm)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Material Part Number</th>
<th>CAGE Code</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window Sash Top/Bottom Seal</td>
<td>941P00001</td>
<td>0SHR6</td>
<td>26-13/16 in. (681 mm)</td>
</tr>
<tr>
<td>Window Sash Side Seal (van body serial numbers 001 through 190)</td>
<td>941P00001</td>
<td>0SHR6</td>
<td>28-1/2 in. (724 mm)</td>
</tr>
<tr>
<td>Window Sash Side Seal (van body serial number 191 and higher)</td>
<td>941P00001</td>
<td>0SHR6</td>
<td>12-11/16 in. (322 mm)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Material Description</th>
<th>National Stock Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire, Electrical (MIL-W-16878)</td>
<td>6145-00-330-3318</td>
<td>6 in. (152 mm)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>National Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QQ-T-570</td>
<td>9510-00-866-1037</td>
<td>Bar, Metal</td>
</tr>
</tbody>
</table>

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.
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**

<table>
<thead>
<tr>
<th>Tube Part Number</th>
<th>Bulk Tubing Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12414690-001</td>
<td>NT-100-4 (79470)</td>
<td>18.1</td>
</tr>
<tr>
<td>12414690-002</td>
<td>NT-100-4 (79470)</td>
<td>16.0</td>
</tr>
<tr>
<td>12414690-004</td>
<td>NT-100-4 (79470)</td>
<td>74.8</td>
</tr>
<tr>
<td>12414690-005</td>
<td>NT-100-4 (79470)</td>
<td>69.7</td>
</tr>
<tr>
<td>12414690-010</td>
<td>NT-100-4 (79470)</td>
<td>180.0</td>
</tr>
<tr>
<td>12414690-101</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>18.0</td>
</tr>
<tr>
<td>12414690-102</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>35.4</td>
</tr>
<tr>
<td>12414690-103</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>20.9</td>
</tr>
<tr>
<td>12414690-104</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>13.8</td>
</tr>
<tr>
<td>12414690-105</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>11.8</td>
</tr>
<tr>
<td>12414690-106</td>
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<td>20.5</td>
</tr>
<tr>
<td>12414690-107</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>39.0</td>
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<td>12414690-108</td>
<td>J844TYBSIZE 3/8 (81343)</td>
<td>15.4</td>
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<td>12414690-118</td>
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<td>11.8</td>
</tr>
<tr>
<td>12414690-119</td>
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<td>12414690-126</td>
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<td>12414690-127</td>
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<td>17.0</td>
</tr>
</tbody>
</table>
Table E-1. Pneumatic Tube Lengths (Cont)

<table>
<thead>
<tr>
<th>Tube Part Number</th>
<th>Bulk Tubing Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>inches</td>
</tr>
<tr>
<td>12414690-201</td>
<td>C608-100BLK (13174)</td>
<td>14.8</td>
</tr>
<tr>
<td>12414690-202</td>
<td>C608-100BLK (13174)</td>
<td>14.0</td>
</tr>
<tr>
<td>12414690-203</td>
<td>C608-100BLK (13174)</td>
<td>6.5</td>
</tr>
<tr>
<td>12414690-205</td>
<td>C608-100BLK (13174)</td>
<td>14.5</td>
</tr>
<tr>
<td>12414690-206</td>
<td>C608-100BLK (13174)</td>
<td>14.9</td>
</tr>
<tr>
<td>12414690-207</td>
<td>C608-100BLK (13174)</td>
<td>15.5</td>
</tr>
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<td>C608-100BLK (13174)</td>
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<tr>
<td>12414690-209</td>
<td>C608-100BLK (13174)</td>
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<tr>
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<td>C608-100BLK (13174)</td>
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<td>C608-100BLK (13174)</td>
<td>8.0</td>
</tr>
<tr>
<td>12414690-212</td>
<td>C608-100BLK (13174)</td>
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<td>12414690-213</td>
<td>C608-100BLK (13174)</td>
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</table>
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

<table>
<thead>
<tr>
<th>Tube Part Number</th>
<th>Bulk Tube Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>inch</td>
</tr>
<tr>
<td>12416381P1</td>
<td>49008</td>
<td>8.9</td>
</tr>
<tr>
<td>12416381P10</td>
<td>49008</td>
<td>17.8</td>
</tr>
<tr>
<td>12416381P11</td>
<td>49008</td>
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<td>49008</td>
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<tr>
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</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Hose Part Number</th>
<th>Bulk Hose Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12418037</td>
<td>A110 (30327)</td>
<td>75.5</td>
</tr>
<tr>
<td>12418460-001</td>
<td>MS521302B110360 (96906)</td>
<td>17.5</td>
</tr>
<tr>
<td>12418460-002</td>
<td>MS521301A206R (96906)</td>
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<table>
<thead>
<tr>
<th>Hose Part Number</th>
<th>Bulk Hose Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Material Description</th>
<th>Size</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MIL-W-83420</td>
<td>1/16 in. stranded wire cable</td>
<td>4 in. (102 mm)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>MS51844-22</td>
<td>Sleeve</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>N/A</td>
<td>Tab, Stainless Steel ASTM A617</td>
<td>.06 in. (16 cm) X .37 in. (9.5 mm) X 1.25 in. (32 mm)</td>
<td>1</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Hose Part Number</th>
<th>Bulk Hose Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12420197-001</td>
<td>483666 (02280)</td>
<td>180.0</td>
</tr>
<tr>
<td>12420197-002</td>
<td>483666 (02280)</td>
<td>120.0</td>
</tr>
<tr>
<td>12420197-003</td>
<td>483666 (02280)</td>
<td>96.0</td>
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<tr>
<td>12420197-004</td>
<td>483666 (02280)</td>
<td>36.0</td>
</tr>
<tr>
<td>12420197-005</td>
<td>483666 (02280)</td>
<td>156.0</td>
</tr>
<tr>
<td>12420197-006</td>
<td>483666 (02280)</td>
<td>72.0</td>
</tr>
<tr>
<td>12420198-001</td>
<td>881-16 (98441)</td>
<td>120.0</td>
</tr>
<tr>
<td>12420198-002</td>
<td>11657469</td>
<td>36.0</td>
</tr>
</tbody>
</table>

E-16. PERSONNEL HEATER AIR DUCT HOSE FABRICATION

Cut the following hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

<table>
<thead>
<tr>
<th>Hose Part Number</th>
<th>Bulk Hose Part Number</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12420308-457</td>
<td>8711054 (19207)</td>
<td>18.3</td>
</tr>
<tr>
<td>12420308-760</td>
<td>8711054 (19207)</td>
<td>30.4</td>
</tr>
</tbody>
</table>

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.
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-9. CTIS Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.
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.
Fabricate the dimmer switch test wire according to the following steps. Refer to the following parts list for materials.

<table>
<thead>
<tr>
<th>Material Description</th>
<th>National Stock Number</th>
<th>Quantity</th>
<th>Cut Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire, Electrical (M168678/14BKE9)</td>
<td>6145-01-229-4134</td>
<td>1</td>
<td>12 in (305 mm)</td>
</tr>
<tr>
<td>Pin, Grooved, Headless (12258939-1)</td>
<td>5315-01-156-6314</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Contact, Electrical (12258939-2)</td>
<td>5999-01-150-8808</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Material Description</th>
<th>Size</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/A</td>
<td>Steel, ASTM A 108 or A576 Grade 1015-1025, BAR (Ref UNS G10150-G10250). Finish Black Oxide Coat, Class I, IAW MIL-C-13924.</td>
<td>14.0 in. (356 mm)</td>
<td>1</td>
</tr>
</tbody>
</table>

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.
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.

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.

(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.
# APPENDIX F
## TORQUE LIMITS

Table F-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Threads per inch</th>
<th>Material Grade Markings</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>lb-ft</td>
</tr>
<tr>
<td>inch</td>
<td></td>
<td>SAE Grade 2</td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>20</td>
<td>3-5</td>
<td>5-7</td>
</tr>
<tr>
<td>1/4</td>
<td>28</td>
<td>4-6</td>
<td>5-7</td>
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<tr>
<td>1/4</td>
<td>32</td>
<td>4-6</td>
<td>5-7</td>
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<tr>
<td>5/16</td>
<td>18</td>
<td>7-9</td>
<td>9-13</td>
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<td>5/16</td>
<td>24</td>
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</tr>
<tr>
<td>5/16</td>
<td>32</td>
<td>9-11</td>
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</tr>
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<td>3/8</td>
<td>16</td>
<td>13-17</td>
<td>17-23</td>
</tr>
<tr>
<td>3/8</td>
<td>24</td>
<td>15-19</td>
<td>20-26</td>
</tr>
<tr>
<td>7/16</td>
<td>14</td>
<td>20-28</td>
<td>28-38</td>
</tr>
<tr>
<td>7/16</td>
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<td>53-71</td>
<td>72-96</td>
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<td>62-84</td>
<td>85-113</td>
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<td>70-94</td>
<td>96-128</td>
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</table>
Table F-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Threads per inch</th>
<th>Torque</th>
</tr>
</thead>
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<tr>
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<td></td>
<td>lb-ft</td>
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<td>24</td>
<td>99-133</td>
</tr>
<tr>
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<td>10</td>
<td>110-148</td>
</tr>
<tr>
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<td>16</td>
<td>123-165</td>
</tr>
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<td>252-340</td>
</tr>
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<td>9</td>
<td>275-369</td>
</tr>
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<td>14</td>
<td>303-407</td>
</tr>
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</tr>
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<td>20</td>
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</tr>
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<td>8</td>
<td>411-553</td>
</tr>
<tr>
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<td>12</td>
<td>450-606</td>
</tr>
<tr>
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<td>20</td>
<td>483-649</td>
</tr>
<tr>
<td>1-1/16</td>
<td>18</td>
<td>576-776</td>
</tr>
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<td>7</td>
<td>507-683</td>
</tr>
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<td>12</td>
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</tr>
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<td>18</td>
<td>600-806</td>
</tr>
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</tr>
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<td>7</td>
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<td>12</td>
<td>793-1067</td>
</tr>
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<td>18</td>
<td>831-1117</td>
</tr>
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<td>1-5/16</td>
<td>18</td>
<td>965-1299</td>
</tr>
<tr>
<td>1-3/8</td>
<td>6</td>
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</tr>
</tbody>
</table>

Material Grade Markings

- SAE Grade 2
- SAE Grade 5
- SAE Grade 8
APPENDIX F
TORQUE LIMITS

Table F-2. Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts

<table>
<thead>
<tr>
<th>Hole Diameter</th>
<th>Threads per inch</th>
<th>Torque</th>
<th>Material Grade Markings</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>lb-ft</td>
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</tr>
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<td>inch</td>
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<td>28</td>
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</tr>
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<td>18</td>
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<td>13</td>
<td>86-102</td>
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<td>92-110</td>
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<td>12</td>
<td>120-144</td>
<td>162-194</td>
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Table F-3. Dry Torque Limits for Metric Screws and Free Spinning Nuts

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Thread Pitch</th>
<th>Metric Grade 4.8</th>
<th></th>
<th>Metric Grade 8.8</th>
<th></th>
<th>Metric Grade 10.9</th>
<th></th>
<th>Metric Grade 12.9</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>lb-ft</td>
<td>N·m</td>
<td>lb-ft</td>
<td>N·m</td>
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<td>lb-ft</td>
<td>N·m</td>
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<td>3</td>
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<td>5-7</td>
<td>7-9</td>
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<td>11-15</td>
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<td>21-27</td>
<td>27-37</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>1.25</td>
<td>14-18</td>
<td>18-24</td>
<td>26-34</td>
<td>35-47</td>
<td>36-48</td>
<td>49-65</td>
<td>42-56</td>
<td>57-77</td>
</tr>
<tr>
<td>10</td>
<td>0.75</td>
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<td>21-27</td>
<td>29-39</td>
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<td>54-72</td>
<td>47-63</td>
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</tr>
<tr>
<td>12</td>
<td>1.75</td>
<td>22-30</td>
<td>30-40</td>
<td>43-57</td>
<td>58-78</td>
<td>60-80</td>
<td>81-107</td>
<td>69-93</td>
<td>94-126</td>
</tr>
<tr>
<td>12</td>
<td>1.5</td>
<td>23-31</td>
<td>32-42</td>
<td>46-60</td>
<td>61-81</td>
<td>63-83</td>
<td>85-113</td>
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<td>12</td>
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<td>24-32</td>
<td>33-45</td>
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<td>65-87</td>
<td>88-118</td>
<td>76-102</td>
<td>104-138</td>
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<td>67-89</td>
<td>68-90</td>
<td>93-123</td>
<td>80-106</td>
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<td>36-48</td>
<td>48-74</td>
<td>69-91</td>
<td>93-125</td>
<td>95-127</td>
<td>129-173</td>
<td>112-148</td>
<td>151-201</td>
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<tr>
<td>14</td>
<td>1.5</td>
<td>39-51</td>
<td>52-70</td>
<td>75-99</td>
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<td>103-137</td>
<td>140-186</td>
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</tr>
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# Appendix F  
Torque Limits

## Table F-4. Dry Torque Limits for Metric Prevailing Torque Nuts

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### Table F-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts

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**NOTE**: Manufacturer's marks may vary. These are all SAE Grade 5.
## APPENDIX F
### TORQUE LIMITS

Table F-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)

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Manufacturer's marks may vary. These are all SAE Grade 5.
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

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## Section II. MANDATORY REPLACEMENT PARTS LIST (CONT)

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<td>SPLICE, CONDUCTOR</td>
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<td>STRAIN RELIEF</td>
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<td>WASHER, NYLON</td>
<td>MS51859-16</td>
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<td>276</td>
<td>WASHER, SPRING</td>
<td>110 7289</td>
<td>5310-01-246-1387</td>
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<td>5310-01-374-4517</td>
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<td>5310-01-395-0820</td>
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<td>WASHER, SPRING</td>
<td>12414560-018</td>
<td>5310-01-381-3281</td>
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<tr>
<td>280</td>
<td>WASHER, SPRING</td>
<td>12414560-019</td>
<td>5310-01-369-6074</td>
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<td>281</td>
<td>WASHER, SPRING</td>
<td>12417503</td>
<td>5310-01-406-6326</td>
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<tr>
<td>282</td>
<td>WASHER, SPRING</td>
<td>12418220</td>
<td>5310-01-372-3495</td>
</tr>
<tr>
<td>283</td>
<td>WASHER, SPRING</td>
<td>12414560-009</td>
<td>5310-01-333-5517</td>
</tr>
</tbody>
</table>
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.

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 person nel. 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

<table>
<thead>
<tr>
<th>LUBRICANTS</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL-L-2104 (OE/HDO)</td>
<td>Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service</td>
</tr>
<tr>
<td>MIL-L-46167 (OEA)</td>
<td>Lubricating Oil, Internal Combustion Engine, Arctic</td>
</tr>
<tr>
<td>MIL-L-2105 (GO)</td>
<td>Lubricating Oil, Gear, Multipurpose</td>
</tr>
<tr>
<td>MIL-G-10924 (GAA)</td>
<td>Grease, Automotive and Artillery</td>
</tr>
<tr>
<td>MIL-G-18458 (GW)</td>
<td>Grease, Wire-Rope and Exposed Gear</td>
</tr>
<tr>
<td>MIL-H-5606 (OHA)</td>
<td>Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance</td>
</tr>
</tbody>
</table>

### DESCRIPTION | CAPACITY | EXPECTED TEMPERATURES

<table>
<thead>
<tr>
<th>Description</th>
<th>Capacity</th>
<th>Above +40 F</th>
<th>+40 F to -15 F</th>
<th>-15 F to -50 F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine crankcase</td>
<td>25 qt (24 L)</td>
<td>OE/HDO-15/40</td>
<td>OE/HDO-15/40</td>
<td>OEA</td>
</tr>
<tr>
<td>Transmission (total system)</td>
<td>43.3 qt (41 L)</td>
<td>OE/HDO-15/40</td>
<td>OE/HDO-15/40</td>
<td>OEA</td>
</tr>
<tr>
<td>Transmission (at oil change)</td>
<td>31.8 qt (30.0 L)</td>
<td>OE/HDO-15/40</td>
<td>OE/HDO-10</td>
<td>OEA</td>
</tr>
<tr>
<td>Transmission (after overhaul)</td>
<td>39.0 qt (37.0 L)</td>
<td>OE/HDO-15/40</td>
<td>OE/HDO-10</td>
<td>OEA</td>
</tr>
<tr>
<td>Steering system</td>
<td>5 qt (4.8 L)</td>
<td>OE/HDO-10</td>
<td>OE/HDO-10</td>
<td>OEA</td>
</tr>
<tr>
<td>Hydraulic reservoir</td>
<td>27 gal (102.2 L)</td>
<td>OE/HDO-10</td>
<td>OE/HDO-10</td>
<td>OEA</td>
</tr>
<tr>
<td>Front axle differential (max capacity)</td>
<td>9.5 qt (9.0 L)</td>
<td>GO-80/90</td>
<td>GO-80/90</td>
<td>SAE 75W90 OR GO-75</td>
</tr>
<tr>
<td>Rear axle differential (max capacity)</td>
<td>18.05 qt (17.1 L)</td>
<td>GO-80/90</td>
<td>GO-80/90</td>
<td>SAE 75W90 OR GO-75</td>
</tr>
<tr>
<td>Front axle planetary hubs</td>
<td>11-13 oz (0.33-0.38 L)</td>
<td>GO-80/90</td>
<td>GO-80/90</td>
<td>SAE 75W90 OR GO-75</td>
</tr>
<tr>
<td>11K Self-Recovery Winch (SRW)</td>
<td>As Required</td>
<td>GO-85/140</td>
<td>GO-80/90</td>
<td>GO-75</td>
</tr>
<tr>
<td>Propeller shaft universal and slip joints</td>
<td>As Required</td>
<td>GAA</td>
<td>GAA</td>
<td>GAA</td>
</tr>
<tr>
<td>Tie rod ends</td>
<td>As Required</td>
<td>GAA</td>
<td>GAA</td>
<td>GAA</td>
</tr>
<tr>
<td>Towing pintle assembly</td>
<td>As Required</td>
<td>GAA</td>
<td>GAA</td>
<td>GAA</td>
</tr>
<tr>
<td>Spring bolts and spring shackles</td>
<td>As Required</td>
<td>GAA</td>
<td>GAA</td>
<td>GAA</td>
</tr>
<tr>
<td>Front axle shaft U-joints and steering knuckles</td>
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<td>GAA</td>
<td>GAA</td>
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</table>
### H-5. LUBRICATION/SERVICE KEY (CONT)

<table>
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<th>DESCRIPTION</th>
<th>CAPACITY</th>
<th>EXPECTED TEMPERATURES</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Above +40 °F (Above +4 °C)</td>
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<tr>
<td>Front axle inner wheel bearing</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>Rear axle inner wheel bearing</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>Front lifting beam</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>11K Self-Recovery Winch (SRW) cable</td>
<td>As Required</td>
<td>GW</td>
</tr>
<tr>
<td>Air/hydraulic power unit</td>
<td>3 pt (1.4 L)</td>
<td>OHA</td>
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<tr>
<td>Backup hydraulic pump</td>
<td>19 oz (562 ml)</td>
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### COOLANT

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<th>Type</th>
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<tr>
<td>A-A-52624A</td>
<td>Antifreeze, Multi-Engine Type</td>
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<tr>
<td>MIL-A-11755</td>
<td>Antifreeze, Arctic-Type</td>
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<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CAPACITY</th>
<th>EXPECTED TEMPERATURES</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Above +40 °F (Above +4 °C)</td>
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<tr>
<td>Cooling system (engine only)</td>
<td>14 qt (13 L)</td>
<td>A-A-52624A</td>
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<td>Cooling system (total system)</td>
<td>43.8 qt (41.5 L)</td>
<td>A-A-52624A</td>
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<td>Cooling system, Arctic (total system)</td>
<td>58.3 qt (55.2 L)</td>
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### CLEANING AGENT

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<tr>
<td>P-D-680</td>
<td>Dry Cleaning Solvent, SD-II</td>
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<tr>
<td>O-C-1901</td>
<td>Cleaning Compound, Windshield</td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>CAPACITY</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------</td>
</tr>
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<td></td>
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<tr>
<td>All metal parts as required</td>
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<tr>
<td>Windshield washer reservoir</td>
<td>7.5 qt (7.1 L)</td>
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</table>

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

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<th>Intervals</th>
<th>Total Man-Hours</th>
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<td>Semi-annually (S)</td>
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<td>Annually (A)</td>
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<tr>
<td>Biennially (B)</td>
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<tr>
<td>3K</td>
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<td>6K</td>
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<td>12K</td>
<td>4.0</td>
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<tr>
<td>24K</td>
<td>0.5</td>
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* Whichever occurs first.
** No calendar interval.
**H-7. LOCATOR VIEWS**

### LUBRICANT INTERVAL

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<th>Component</th>
<th>Interval</th>
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<tr>
<td>Engine Crankcase Breather (O)</td>
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<tr>
<td>(See note 17 and view A)</td>
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</tr>
<tr>
<td>Fuel Filter (O)</td>
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<tr>
<td>(See note 6 and view A)</td>
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</tr>
<tr>
<td>Fuel/Water Separator (O)</td>
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<tr>
<td>(See note 5 and view B)</td>
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</tr>
<tr>
<td>Cooling System (O)</td>
<td></td>
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<tr>
<td>(See note 7)</td>
<td></td>
</tr>
<tr>
<td>Transmission Filter (O)</td>
<td></td>
</tr>
<tr>
<td>(See note 3 and view F)</td>
<td></td>
</tr>
<tr>
<td>Transmission Drain and Fill (O)</td>
<td></td>
</tr>
<tr>
<td>(See note 3 and views D, E, and F)</td>
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</tr>
<tr>
<td>Towing Pintle Fill (O)</td>
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</tr>
<tr>
<td>(See note 16 and views J and K)</td>
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### INTERVAL LUBRICANT

<table>
<thead>
<tr>
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<th>LUBRICANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Oil Filter (O)</td>
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</tr>
<tr>
<td>(See note 2 and view C)</td>
<td></td>
</tr>
<tr>
<td>Crankcase Drain and Fill (O)</td>
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</tr>
<tr>
<td>(See note 1 and views C and D)</td>
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</tr>
<tr>
<td>Front Axle Inner Wheel Bearing Repack (O)</td>
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</tr>
<tr>
<td>(See note 22)</td>
<td></td>
</tr>
<tr>
<td>Power Steering Reservoir Drain and Fill (O)</td>
<td></td>
</tr>
<tr>
<td>(See note 4 and view G)</td>
<td></td>
</tr>
<tr>
<td>Power Steering Filter (O)</td>
<td></td>
</tr>
<tr>
<td>(See note 4 and view G)</td>
<td></td>
</tr>
<tr>
<td>Spring Bolt Fill (O)</td>
<td></td>
</tr>
<tr>
<td>(See note 18 and view H)</td>
<td></td>
</tr>
<tr>
<td>Spring Shackle Fill (O)</td>
<td></td>
</tr>
<tr>
<td>(See note 18 and view AE)</td>
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</tbody>
</table>

**CHASSIS**

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.

H-6 Change 2
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

<table>
<thead>
<tr>
<th>Component</th>
<th>Action</th>
<th>Interval</th>
<th>LUBRICANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Axle</td>
<td>Check and Fill (O)</td>
<td>(See note 11 and view T)</td>
<td></td>
</tr>
<tr>
<td>Axle Shaft U-Joints</td>
<td>Fill (O)</td>
<td>(See note 20 and view U)</td>
<td></td>
</tr>
<tr>
<td>Steering Knuckles</td>
<td>Fill (O)</td>
<td>(See note 20 and view U)</td>
<td></td>
</tr>
<tr>
<td>Front Lifting Beam</td>
<td>Clean and Grease (O)</td>
<td>(See note 24 and view AD)</td>
<td></td>
</tr>
<tr>
<td>Hydraulic Reservoir and Filter</td>
<td>Drain and Fill (O)</td>
<td>(See note 8 and view X)</td>
<td></td>
</tr>
<tr>
<td>Rear Axle Inner Wheel Bearing Repack (O)</td>
<td></td>
<td>(See note 22)</td>
<td></td>
</tr>
<tr>
<td>Rear Axle</td>
<td>Check and Fill (O)</td>
<td>(See note 11 and view T)</td>
<td></td>
</tr>
<tr>
<td>Wheel End Planetary Hubs</td>
<td>Drain and Fill (O)</td>
<td>(See note 12 and view V)</td>
<td></td>
</tr>
<tr>
<td>11K Self-Recovery Winch (SRW) Cable</td>
<td>Fill (O)</td>
<td>(See note 14 and view W)</td>
<td></td>
</tr>
<tr>
<td>11K Self-Recovery Winch (SRW)</td>
<td>Check and Fill (O)</td>
<td>(See note 15 and view Y)</td>
<td></td>
</tr>
<tr>
<td>11K Self-Recovery Winch (SRW)</td>
<td>Drain and Fill (O)</td>
<td>(See note 15 and view Y)</td>
<td></td>
</tr>
<tr>
<td>Rear Axle</td>
<td>Drain and Fill (O)</td>
<td>(See note 11 and view T)</td>
<td></td>
</tr>
</tbody>
</table>

CHASSIS

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.

H-8 Change 2
H-8. LOCAL VIEWS (CONT)

- **E**: Transmission drain plug
- **F**: Transfer case drain plug
- **G**: Power steering reservoir
- **H**: Spring bolt

---

H-10  Change 2
H-8. LOCAL VIEWS (CONT)

M

REAR BRAKE WEDGE

REAR BRAKE AIR CHAMBER

N

TIE ROD END

P

UNIVERSAL JOINT

GREASE PLUG VENT

WELCH

BATTERY POSTS

Q

GREASE FITTING

GREASE FITTING

DUST SEAL

SLIP JOINT
H-8. LUBRICATION 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. 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 Nm).

- 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.

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 freewheel 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) 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 Nm).

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

<table>
<thead>
<tr>
<th>(1) National Stock Number</th>
<th>(2) Description (CAGE) Part Number</th>
<th>(3) U/M</th>
<th>(4) Qty Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>6685-01-193-1733</td>
<td>10,000 PSI Transducer: (19207) 12258956</td>
<td>EA</td>
<td>1</td>
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</tbody>
</table>
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

<table>
<thead>
<tr>
<th>(1) Installed Controls or Controls Being Installed</th>
<th>(2) Installed Transmission or Transmission Being Installed</th>
<th>(3) Required Modification (Refer to Section III)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTEC II (with 24-pin connector)</td>
<td>PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)</td>
<td>No modification required.</td>
</tr>
<tr>
<td>WTEC II (with 24-pin connector)</td>
<td>PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)</td>
<td>Install 31-pin connector.</td>
</tr>
<tr>
<td>WTEC II (with 24-pin connector)</td>
<td>TID 1 (transmission serial number 6510090786 to 6510142171)</td>
<td>Install 31-pin connector.</td>
</tr>
<tr>
<td>WTEC II (with 24-pin connector)</td>
<td>TID 2 (transmission serial number 6510142172 to 6510262116)</td>
<td>Install 31-pin connector and replace transmission internal wiring harness.</td>
</tr>
<tr>
<td>(1) Installed Controls or Controls Being Installed</td>
<td>(2) Installed Transmission or Transmission Being Installed</td>
<td>(3) Required Modification (Refer to Section III)</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>WTEC II (with 24-pin connector)</td>
<td>TID 3 (transmission serial number 6510262117 and subsequent)</td>
<td>Install 31-pin connector, replace transmission internal wiring harness, and reprogram WTEC II TEPSS.¹</td>
</tr>
<tr>
<td>WTEC II (with 31-pin connector)</td>
<td>PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)</td>
<td>Install adapter cable assembly.</td>
</tr>
<tr>
<td>WTEC II (with 31-pin connector)</td>
<td>PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)</td>
<td>No modification required.</td>
</tr>
<tr>
<td>WTEC II (with 31-pin connector)</td>
<td>TID 1 (transmission serial number 6510090786 to 6510142171)</td>
<td>No modification required.</td>
</tr>
<tr>
<td>WTEC II (with 31-pin connector)</td>
<td>TID 2 (transmission serial number 6510142172 to 6510262116)</td>
<td>Replace transmission internal wiring harness.</td>
</tr>
<tr>
<td>WTEC II (with 31-pin connector)</td>
<td>TID 3 (transmission serial number 6510262117 and subsequent)</td>
<td>Replace transmission internal wiring harness and reprogram WTEC II TEPSS.¹</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured prior to October 1999)²</td>
<td>PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)</td>
<td>Install adapter cable assembly and ID harness.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured prior to October 1999)²</td>
<td>PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)</td>
<td>Install ID harness.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured prior to October 1999)²</td>
<td>TID 1 (transmission serial number 6510090786 to 6510142171)</td>
<td>No modification required.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured prior to October 1999)²</td>
<td>TID 2 (transmission serial number 6510142172 to 6510262116)</td>
<td>No modification required.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured prior to October 1999)²</td>
<td>TID 3 (transmission serial number 6510262117 and subsequent)</td>
<td>Reprogram WTEC III ECU ¹ or install new WTEC III ECU (P/N 12421787-002).</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured after October 1999)³</td>
<td>PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)</td>
<td>Install adapter cable assembly and ID harness.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured after October 1999)³</td>
<td>PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)</td>
<td>Install ID harness.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured after October 1999)³</td>
<td>TID 1 (transmission serial number 6510090786 to 6510142171)</td>
<td>No modification required.</td>
</tr>
</tbody>
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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.
Section III.

MODIFICATION PARTS IDENTIFICATION

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<th>Identification</th>
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<th>Description</th>
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<td>31-pin connector</td>
<td>300130 5935-21-921-1813</td>
<td>Converts a transmission external wiring harness from a 24-pin ('D' type) connector to a 31-pin (round type) connector.</td>
</tr>
<tr>
<td>Transmission internal wiring harness</td>
<td>29529474 6150-01-481-8088</td>
<td>Converts a TID 2 transmission to a TID 1 configuration to allow WTEC II controls to communicate with the transmission.</td>
</tr>
<tr>
<td>Gasket</td>
<td>29503283 5330-01-360-9035</td>
<td>Required when replacing transmission internal wiring harness.</td>
</tr>
<tr>
<td>ID harness</td>
<td>200100 6150-21-921-1191</td>
<td>Allows WTEC III controls to communicate with a PRE-ID transmission.</td>
</tr>
<tr>
<td>Adapter cable assembly</td>
<td>29519210 6150-01-420-5987</td>
<td>Adapts a PRE-ID transmission with 24-pin ('D' type) connector to a transmission external wiring harness with a 31-pin (round) connector.</td>
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## SUBJECT INDEX

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<td>Brake System Loses Air When Brakes Are Applied</td>
<td>2-20</td>
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<tr>
<td>M1079 Van Door Open Light Does Not Illuminate and Audible Alarm Does Not Operate</td>
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WTEC II ........................................ World Transmission Electronic Controls (version 2)
WTEC III ....................................... World Transmission Electronic Controls (version 3)
By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
05144

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| PAGE NO.                                  | COLM NO.         | LINE NO.         | NATIONAL STOCK NUMBER | REFERENCE NO. | FIGURE NO. | ITEM NO. |
| TOTAL NO. OF MAJOR ITEMS SUPPORTED        |                  |                  |                  |                  |
| RECOMMENDED ACTION                       |                  |                  |                  |                  |

| PART III - REMARKS | (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.) |

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**SIGNATURE**

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**Figure 0-1: Electrical System Schematic**

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## The Metric System and Equivalents

### Linear Measure
- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
- 1 Kilometer = 1000 Meters = 0.621 Miles

### 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

#### Cubic Measure
- 1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
- 1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
- 1 Kilogram = 1000 Grams = 2.2 Lb
- 1 Cu Meter = 1000,000 Cu Centimeters = 35.31 Cu Feet
- 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

### Liquid Measure
- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 5/9 (°F - 32) = °C
- 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces
- 212°F Fahrenheit is equivalent to 100°C Celsius
- 90°F Fahrenheit is equivalent to 32.2°C Celsius
- 32°F Fahrenheit is equivalent to 0°C Celsius
- 9/5°C + 32 = °F

### Temperature
- 212°F Fahrenheit is equivalent to 100°C Celsius
- 90°F Fahrenheit is equivalent to 32.2°C Celsius
- 32°F Fahrenheit is equivalent to 0°C Celsius

### Approximate Conversion Factors

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