## TECHNICAL MANUAL
### MAINTENANCE INSTRUCTIONS
#### UNIT MAINTENANCE
**M1078 SERIES, 2 1/2-TON, 4 X 4, LIGHT MEDIUM TACTICAL VEHICLES (LMTV)**
**VOLUME NO. 3 OF 5**

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**DISTRIBUTION STATEMENT A.** Approved for public release; distribution is unlimited.

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

**JUNE 1998**
WARNING SUMMARY

WARNING

EXHAUST GASES CAN KILL

1. DO NOT operate your vehicle engine in an enclosed area.
2. DO NOT idle vehicle engine with cab windows closed.
3. DO NOT drive vehicle with inspection plates or covers removed.
4. BE ALERT at all times for exhaust odors.
5. BE ALERT for exhaust poisoning symptoms, they are:
   - Headache
   - Dizziness
   - Sleepiness
   - Loss of Muscular Control
6. IF YOU SEE another person with exhaust poisoning symptoms:
   - Remove person from area.
   - Expose to open air.
   - Keep person warm.
   - Do not permit person to move.
   - Administer cardiopulmonary resuscitation, if necessary.*

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

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

WARNING

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

WARNING

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

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

Do not work on fuel system when engine is hot; fuel can be ignited by a hot engine.
WARNING SUMMARY (CONT)

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

Never let moving wire rope slide through hands, even when wearing gloves. A broken wire could cut through gloves and cut hands.
WARNING SUMMARY (CONT)

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

Goggles and gloves must be worn when working with glass. Failure to comply may result in injury to personnel.
WARNING SUMMARY (CONT)

WARNING

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

WARNING

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

WARNING

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

WARNING

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

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

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

WARNING

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

- Do not open coolant fill cap if temperature reads above 110°F (43°C). Steam or hot coolant is under pressure. Failure to comply may result in injury to personnel.

- Pressure in reservoir tank must be released before removing cap. Failure to comply may result in injury to personnel.

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

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

WARNING

S-280 shelter weighs approximately 1500 lbs (680 kgs) empty. Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.
Place this change sheet in the front of the publication for reference purposes.

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

VOLUME NO. 3 OF 5

TM 9-2320-365-20-3, 17 June 1998, is changed as follows:

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PETER J. SCHOOMAKER  
*General, United States Army  
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*SANDRA R. RILEY  
Administrative Assistant to the  
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JOHN P. JUMPER  
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*GREGORY S. MARTIN  
General, United States Air Force  
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DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington, D.C., 20 AUGUST 2005

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MAINTENANCE INSTRUCTIONS
UNIT MAINTENANCE
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| 6-39 and 6-40 | 6-39 and 6-40 | 7-259 and 7-260 | 7-259 and 7-260 |
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| 7-41 and 7-42 | 7-41 and 7-42 | none | 7-350.1 and 7-350.2 |

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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
0110104

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* Zero in this column indicates an original page.
You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or Email a letter or DA Form 2028 direct to: AMSTA-LC-LPITI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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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 3 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual.

- **CHAPTER 4, FUEL SYSTEM MAINTENANCE**

- **CHAPTER 5, EXHAUST SYSTEM MAINTENANCE**

- **CHAPTER 6, COOLING SYSTEM MAINTENANCE**

- **CHAPTER 7, ELECTRICAL SYSTEM MAINTENANCE**

- **CHAPTER 8, TRANSMISSION MAINTENANCE**

- **CHAPTER 9, PROPELLER SHAFT MAINTENANCE**

- **CHAPTER 10, FRONT AND REAR AXLE MAINTENANCE**

- **CHAPTER 11, BRAKE SYSTEM MAINTENANCE**

- **CHAPTER 12, WHEELS, TIRES, AND HUBS MAINTENANCE**

- **CHAPTER 13, STEERING SYSTEM MAINTENANCE**

- **CHAPTER 14, FRAME, TOWING ATTACHMENTS, AND DRAWBARS MAINTENANCE**
OVERVIEW (CONT)

- **CHAPTER 15, SUSPENSION 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 3 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 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 Volume 1, 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.
CHAPTER 4
FUEL SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

Section I. INTRODUCTION

4-1. INTRODUCTION

This chapter contains maintenance instructions for replacing, repairing, and adjusting fuel system components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
### Section II. MAINTENANCE PROCEDURES

#### 4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT

This task covers:

- a. Intake Air Cleaner Filter Element Removal
- b. Intake Air Cleaner Filter Element Installation
- c. Intake Air Cleaner Assembly Removal (except M1081)
- d. M1081 Intake Air Cleaner Assembly Removal
- e. Intake Air Cleaner Disassembly
- f. Intake Air Cleaner Assembly Disassembly
- g. M1081 Intake Air Cleaner Assembly Installation
- h. Intake Air Cleaner Assembly Installation (except M1081)
- i. Particle Extraction Tube Removal
- j. Particle Extraction Tube Installation
- k. Follow-On Maintenance

#### INITIAL SETUP

**Equipment Conditions**
- Engine shut down (TM 9-2320-365-10).
- Cab raised (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).
- Chemical detection unit removed, if equipped (TM 3-6665-225-12).
- Transmission oil fill tube removed (M1081 only) (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)
- Crowfoot Attachment, Socket Wrench (Item 6, Appendix B)
- Screwdriver Attachment, Socket Wrench (Item 46, Appendix B)
- Socket Set, Socket Wrench (Item 35, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

**Materials/Parts**
- Rag, Wiping (Item 51, Appendix D)
- Gasket (Item 32, Appendix G)
- Filter Element (Item 18, Appendix G)
- Washer, Spring (2) (Item 278, Appendix G)
- Nut, Self-Locking (3) (Item 140, Appendix G)
- Nut, Self-Locking (3) (Item 134, Appendix G) (M1081)
- Nut, Self-Locking (3) (Item 141, Appendix G) (all models except M1081)

**References**
- TM 3-6665-225-12
- FM 3-4
- FM 3-5

---

**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 materials 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.
a. Intake Air Cleaner Filter Element Removal.

(1) Unlatch three clasps (1) on cover (2).

(2) Remove cover (2) from intake air cleaner housing (3).

(3) Loosen wingnut (4) and remove filter element (5) from intake air cleaner housing (3). Discard filter element.

b. Intake Air Cleaner Filter Element Installation.

NOTE

Wipe inside of intake air cleaner housing with damp wiping rag.

(1) Position filter element (1) in intake air cleaner housing (2).

CAUTION

Tighten wingnut securely to prevent air leakage around air cleaner filter element. Do not overtighten. Failure to comply may result in damage to equipment.

(2) Tighten wingnut (3) on filter element (1).

(3) Install cover (4) on intake air cleaner housing (2) with three clasps (5).
c. Intake Air Cleaner Assembly Removal (except M1081).

(1) Remove dust cap (1) from connector J106 (2).

(2) Remove nut (3), dust cap lanyard (4), and connector J106 (2) from chemical detector mounting bracket (5).

(3) Remove four screws (6) and washers (7) from chemical detector mounting bracket (5).

(4) Disconnect air filter restriction gauge hose (8) from air flow sensor (9).

(5) Loosen clamp (10) on particle extraction hose (11).

(6) Remove particle extraction hose (11) from adapter (12).

(7) Loosen clamp (13) on air compressor intake hose (14).

(8) Remove air compressor intake hose (14) from intake air cleaner boot (15).
(9) Loosen clamp (16) on turbocharger intake hose (17).

(10) Remove turbocharger intake hose (17) from intake air cleaner boot (15).

(11) Remove two nuts (18), screws (19), lockwashers (19.1), and washers (20) from bracket (21). Discard lockwashers.

(12) Remove two screws (22), washers (23), and bracket (21) from engine inlet manifold (24).
(13) Loosen clamp (25) on turbocharger inlet coupling (26).

(14) Remove turbocharger tube (27) from turbocharger inlet coupling (26).

(15) Loosen clamp (28) on turbocharger inlet coupling (26).

**CAUTION**

Cover turbocharger inlet with wiping rags after removing turbocharger inlet coupling. Failure to comply may result in damage to equipment.

(16) Remove turbocharger inlet coupling (26) from turbocharger (29).

(17) Loosen clamp (30) on turbocharger intake hose (17).

(18) Remove turbocharger intake hose (17) from turbocharger tube (27).
(19) Remove screw (31) and washer (32) from resilient mount (33).

(20) Remove three self-locking nuts (34) and screws (35) from mounting brackets (36). Discard self-locking nuts.

(21) Remove intake air cleaner assembly (37) from three mounting brackets (36) and resilient mount (33).

(22) Remove screw (38), washer (39), and resilient mount (33) from mounting bracket (36).

d. M1081 Intake Air Cleaner Assembly Removal.

(1) Remove dust cap (1) from connector J106 (2).

(2) Remove nut (3), dust cap lanyard (4), and connector J106 (2) from chemical detector mounting bracket (5).

(3) Remove four screws (6) and washers (7) from chemical detector mounting bracket (5).

(4) Disconnect air filter restriction gauge hose (8) from air flow sensor (9).
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

(5) Loosen clamp (10) on particle extraction hose (11).

(6) Remove particle extraction hose (11) from adapter (12).

(7) Loosen clamp (13) on air compressor intake hose (14).

(8) Remove air compressor intake hose (14) from intake air cleaner boot (15).

(9) Loosen clamp (16) on turbocharger intake hose (17).

(10) Remove turbocharger intake hose (17) from intake air cleaner boot (15).
(11) Remove two nuts (18), screws (19), lockwashers (19.1),
and washers (20) from bracket (21). Discard
lockwashers.

(12) Remove two screws (22), washers (23), and bracket (21)
from engine inlet manifold (24).

(13) Loosen clamp (25) on turbocharger inlet coupling (26).

(14) Remove turbocharger tube (27) from turbocharger inlet
coupling (26).

(15) Loosen clamp (28) on turbocharger inlet coupling (26).

**CAUTION**

Cover turbocharger inlet with wiping rags after removing turbocharger inlet coupling.
Failure to comply may result in damage to equipment.

(16) Remove turbocharger inlet coupling (26) from
 turbocharger (29).
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

(17) Loosen clamp (30) on turbocharger intake hose (17).

(18) Remove turbocharger intake hose (17) from turbocharger tube (27).

(19) Remove screw (31) and washer (32) from resilient mount (33).

(20) Remove three self-locking nuts (34) and screws (35) from mounting brackets (36). Discard self-locking nuts.

(21) Remove intake air cleaner assembly (37) from mounting brackets (36) and resilient mount (33).

(22) Remove screw (38), washer (39), and resilient mount (33) from mounting bracket (36).
e. Intake Air Cleaner Disassembly.

(1) Remove air flow sensor (1) from pipe coupling (2).

(2) Remove pipe coupling (2) from intake air cleaner housing (3).

(3) Loosen clamp (4) on intake air cleaner boot (5).

(4) Remove intake air cleaner boot (5) from intake air cleaner housing (3).

(5) Loosen clamp (6) on intake air cleaner boot (5).

(6) Remove adapter (7) from intake air cleaner boot (5).

(7) Loosen clamp (8) on air intake hood (9).

(8) Remove air intake hood (9) from air intake adapter (10).

NOTE

- Vehicles may be equipped with air intake adapters PN 12420527, PN 12421274, or PN 12421380. If air intake adapter PN 12420527 or PN 12421274 is damaged, replace with intake adapter PN 12421380 and clamp PN 12421379-001.

- Perform step (9) on vehicles equipped with air intake adapter PN 12420572.

(9) Remove self-locking nut (11), screw (11.1), and clamp (11.2) from air intake adapter (10). Discard self-locking nut.
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

NOTE
Perform step (10) on vehicles equipped with air intake adapter PN 12421274.

(10) Remove self-locking nut (11) and screw (11.1) from band (11.2). Discard self-locking nut.

NOTE
Perform step (10.1) on vehicles equipped with air intake adapter PN 12421380.

(10.1) Remove self-locking nut (11) and clamp (11.2) from air intake adapter (10). Discard self-locking nut.

(10.2) Remove air intake adapter (10) from intake air cleaner housing (3).

(11) Loosen clamp (12) on resilient mount (13).

(12) Remove resilient mount (13) from intake air cleaner housing (3).

(13) Loosen clamp (14) on resilient mount (13).

(14) Remove adapter (15) from resilient mount (13).
(15) Remove pin (16), air shutter (17), and gasket (18) from intake air cleaner housing (3). Discard gasket.

f. Intake Air Cleaner Assembly.

(1) Install gasket (1), air shutter (2), and pin (3) in intake air cleaner housing (4).

(2) Install adapter (5) on resilient mount (6) with clamp (7).

(3) Install resilient mount (6) on intake air cleaner housing (4) with clamp (8).
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

(4) Position air intake adapter (9) on intake air cleaner housing (4).

**NOTE**
Perform steps (5) and (5.1) on vehicles equipped with air intake adapter PN 12421380.

(5) Position clamp (10) on air intake adapter (9) with self-locking nut (10.1).

(5.1) Tighten self-locking nut (10.1) to 6-8 lb-ft (10-11 N·m).

**NOTE**
Perform steps (5.2) and (5.3) on vehicles equipped with air intake adapter PN 12421274.

(5.2) Position screw (10.2) and self-locking nut (10.1) on band (10).

(5.3) Tighten self-locking nut (10.1) to 33-39 lb-ft (44-54 N·m).

**NOTE**
Perform steps (5.4) and (5.5) on vehicles equipped with air intake adapter PN 12420572.

(5.4) Position clamp (10) on air intake adapter (9) with screw (10.2) and self-locking nut (10.1).

(5.5) Tighten self-locking nut (10.1) to 33-39 lb-ft (44-54 N·m).
(6) Position air intake hood (11) on air intake adapter (9) with clamp (12).

(7) Tighten clamp (12) to 72-96 lb-in. (8-11 N·m).

(8) Install adapter (13) in intake air cleaner boot (14) with clamp (15).

(9) Position intake air cleaner boot (14) on intake air cleaner housing (4) with clamp (16).

(10) Tighten clamp (16) to 36-48 lb-in. (4-5 N·m).

(11) Install pipe coupling (17) in intake air cleaner housing (4).

(12) Install air flow sensor (18) in pipe coupling (17).

g. M1081 Intake Air Cleaner Assembly Installation.

(1) Position washer (1), screw (2), and resilient mount (3) on mounting bracket (4).

(2) Tighten screw (2) to 40-46 lb-ft (54-62 N·m).
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

(3) Position intake air cleaner assembly (5) on mounting brackets (4).

(4) Position washer (6) and screw (7) in resilient mount (3).

(5) Position three screws (8) and self-locking nuts (9) in mounting brackets (4).

(6) Tighten screw (7) to 40-52 lb-ft (54-70 N·m).

(7) Tighten three self-locking nuts (9) to 40-52 lb-ft (54-70 N·m).

(8) Position turbocharger intake hose (10) on turbocharger tube (11) with clamp (12).

(9) Tighten clamp (12) to 36-48 lb-in. (4-5 N·m).

**CAUTION**

Distance between front edge of air duct and alternator fan shroud must be no less than 0.5 in. (1.27 cm). Failure to comply may result in damage to equipment.

(10) Position air duct (13) on turbocharger (14) with clamp (15).

(11) Tighten clamp (15) to 21-25 lb-in. (2-3 N·m).

(12) Position turbocharger tube (11) in air duct (13) with clamp (16).

(13) Tighten clamp (16) to 36-48 lb-in. (4-5 N·m).
(14) Position bracket (17) on engine inlet manifold (18) with two washers (19) and screws (20).

(15) Tighten two screws (20) to 15-25 lb-ft (20-34 N·m).

(16) Position intake tube (21) on bracket (17) with two washers (22), lockwashers (23), screws (23.1) and nuts (23.2).

(17) Tighten two nuts (23.2) to 22-26 lb-ft (29-35 N·m).

(18) Position turbocharger intake hose (10) on intake air cleaner boot (24) with clamp (25).

(19) Tighten clamp (25) to 36-48 lb-in. (4-5 N·m).
(20) Position air compressor intake hose (26) on intake air cleaner boot (24) with clamp (27).

(21) Tighten clamp (27) to 36-48 lb-in. (4-5 N·m).

(22) Position particle extraction hose (28) on adapter (29) with clamp (30).

(23) Tighten clamp (30) to 36-48 lb-in. (4-5 N·m).

(24) Connect air filter restriction gauge hose (31) to air flow sensor (32).

(25) Install connector J106 (33) and dust cap lanyard (34) on chemical detector mounting bracket (35) with nut (36).

(26) Install dust cap (37) on connector J106 (33).

(27) Install four washers (38) and screws (39) in chemical detector mounting bracket (35).
h. Intake Air Cleaner Assembly Installation (except M1081).

(1) Position washer (1), screw (2), and resilient mount (3) on mounting bracket (4).

(2) Tighten screw (2) to 40-52 lb-ft (54-70 N·m).

(3) Position intake air cleaner housing (5) on mounting brackets (4).

(4) Position washer (6) and screw (7) in resilient mount (3).

(5) Position three screws (8) and self-locking nuts (9) in mounting brackets (4).

(6) Tighten screw (7) to 40-52 lb-ft (54-70 N·m).

(7) Tighten three self-locking nuts (9) to 43-52 lb-ft (58-70 N·m).

(8) Position turbocharger intake hose (10) on turbocharger tube (11) with clamp (12).

(9) Tighten clamp (12) to 36-48 lb-in. (4-5 N·m).
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

**CAUTION**

Distance between front edge of air duct and alternator fan shroud must be no less than 0.5 in. (1.27 cm). Failure to comply may result in damage to equipment.

(10) Position air duct (13) on turbocharger (14) with clamp (15).

(11) Tighten clamp (15) to 21-25 lb-in. (2-3 N·m).

(12) Position turbocharger tube (11) in air duct (13) with clamp (16).

(13) Tighten clamp (16) to 36-48 lb-in. (4-5 N·m).

(14) Position bracket (17) on engine inlet manifold (18) with two washers (19) and screws (20).

(15) Tighten two screws (20) to 15-25 lb-ft (20-34 N·m).

(16) Position intake tube (21) on bracket (17) with two washers (22), lockwashers (23), screws (23.1) and nuts (23.2).

(17) Tighten two nuts (23.2) to 22-26 lb-ft (29-35 N·m).
(18) Position turbocharger intake hose (10) on intake air cleaner boot (24) with clamp (25).

(19) Tighten clamp (25) to 36-48 lb-in. (4-5 N·m).

(20) Position air compressor intake hose (26) on intake air cleaner boot (24) with clamp (27).

(21) Tighten clamp (27) to 36-48 lb-in. (4-5 N·m).

(22) Position particle extraction hose (28) on adapter (29) with clamp (30).

(23) Tighten clamp (30) to 36-48 lb-in. (4-5 N·m).
(24) Connect air filter restriction gauge hose (31) to air flow sensor (32).

(25) Install connector J106 (33) and dust cap lanyard (34) on chemical detector mounting bracket (35) with nut (36).

(26) Install dust cap (37) on connector J106 (33).

(27) Install four washers (38) and screws (39) in chemical detector mounting bracket (35).

i. Particle Extraction Tube Removal.

(1) Loosen clamp (1) on particle extraction hose (2).

(2) Remove particle extraction hose (2) from particle extraction tube (3).

(3) Remove self-locking nut (4) and screw (5) from bracket (6). Discard self-locking nut.

(4) Loosen two clamps (7) on particle extraction hose (8).

(5) Remove particle extraction hose (8) from particle extraction tube (3) and tailpipe (9).
(6) Remove self-locking nut (10), screw (11), and clamp (12) from clamp (13). Discard self-locking nut.


**CAUTION**

Use care when removing particle extraction tube from vehicle. Failure to comply may result in damage to equipment.

**NOTE**

- Step (8) requires the aid of an assistant.
- Remove particle extraction tube toward front of vehicle.

(8) Remove particle extraction tube (3) from vehicle.
(9) Remove self-locking nut (16), screw (17), bracket (18), and screw (15) from vehicle. Discard self-locking nut.

j. Particle Extraction Tube Installation.

(1) Position screw (1), bracket (2), screw (3), and self-locking nut (4) on vehicle.

NOTE
Steps (2) through (5) require the aid of an assistant.

(2) Tighten self-locking nut (4) to 46-58 lb-ft (62-79 N·m).

CAUTION
Use care when installing particle extraction tube on vehicle. Failure to comply may result in damage to equipment.

NOTE
Install particle extraction tube from front of vehicle.

(3) Position particle extraction tube (5) on vehicle.

(4) Position self-locking nut (6) on screw (1).

(5) Tighten self-locking nut (6) to 46-58 lb-ft (62-79 N·m).
(6) Position clamp (7) on clamp (8) with screw (9) and self-locking nut (10).

(7) Tighten self-locking nut (10) to 46-58 lb-ft (62-79 N·m).

(8) Position particle extraction hose (11) on tailpipe (12) and particle extraction tube (5) with two clamps (13).

(9) Tighten clamps (13) to 36-48 lb-in. (4-5 N·m).

(10) Position screw (14) and self-locking nut (15) on bracket (16).

(11) Tighten self-locking nut (15) to 46-58 lb-ft (62-79 N·m).

(12) Position particle extraction hose (17) on particle extraction tube (5) with clamp (18).

(13) Tighten clamp (18) to 36-48 lb-in. (4-5 N·m).
4-2. INTAKE AIR CLEANER FILTER ELEMENT, AIR CLEANER ASSEMBLY, AND PARTICLE EXTRACTION TUBE REPLACEMENT (CONT)

k. Follow-On Maintenance.

(1) Install transmission oil fill tube (M1081 only) (para 8-13).

(2) Install chemical detection unit, if equipped (TM 3-6665-225-12).

(3) Connect batteries (para 7-48).

(4) Lower cab (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Check for air leaks around hose and tube connections.

(7) Check AIR FILTER RESTRICTION GAUGE (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.
4-3. FUEL PRESSURE REGULATING VALVE REPLACEMENT

This task covers:

a. Removal  c. Follow-On Maintenance
b. Installation

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)

<table>
<thead>
<tr>
<th>Materials/Parts</th>
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<tbody>
<tr>
<td>Packing, Preformed (Item 187, Appendix G)</td>
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<tr>
<td>Packing, Preformed (Item 180, Appendix G)</td>
</tr>
<tr>
<td>Packing, Preformed (Item 177, Appendix G)</td>
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</tbody>
</table>

**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.

a. Removal.

(1) Disconnect fuel return hose assembly (1) from 90-degree fitting (2).

(2) Remove 90-degree fitting (2) and preformed packing (3) from adapter (4). Discard preformed packing.
4-3. FUEL PRESSURE REGULATING VALVE REPLACEMENT (CONT)

(3) Remove adapter (4) and preformed packing (5) from tube assembly (6). Discard preformed packing.

(4) Remove spring (7) from tube assembly (6).

(5) Remove fuel pressure regulating valve (8) and preformed packing (9) from tube assembly (6). Discard preformed packing.

b. Installation.

(1) Install preformed packing (1) and fuel pressure regulating valve (2) in tube assembly (3).

(2) Install spring (4) in tube assembly (3).

(3) Install preformed packing (5) and adapter (6) in tube assembly (3).

(4) Install preformed packing (7) and 90-degree fitting (8) in adapter (6).

(5) Connect fuel return hose assembly (9) to 90-degree fitting (8).
c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check for fuel leaks around regulating valve.

(5) Check that engine runs smoothly at low idle speed.

(6) Check that engine runs smoothly at high idle speed.

(7) Lower cab (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.
4-4. TURBOCHARGER TO CHARGE AIR COOLER TUBE AND HOSES 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
Cap and Plug Set (Item 15, Appendix D)

a. Removal.

NOTE

Note position of clamps prior to removal.

(1) Loosen two hose clamps (1) and hose clamps (2) on turbocharger to charge air cooler tube (3).

(2) Remove turbocharger to charge air cooler tube (3) from charge air cooler (4) and turbocharger (5).

CAUTION

Cap or plug turbocharger outlet and charge air cooler inlet to prevent contamination of engine intake air system. Failure to comply may result in damage to equipment.

(3) Cap or plug turbocharger outlet (6) and charge air cooler inlet (4).
(4) Remove two clamps (1) and hose (7) from turbocharger to charge air cooler tube (3).

(5) Remove two clamps (2) and hose (8) from turbocharger to charge air cooler tube (3).

b. Installation.

(3) Remove caps or plugs from turbocharger outlet (6) and charge air cooler inlet (7).

**CAUTION**

Clamps at charge air cooler end of turbocharger to charge air cooler tube must be oriented as noted in removal. Failure to comply may result in damage to equipment.

(4) Position turbocharger to charge air cooler tube (2) on charge air cooler (7) and turbocharger (8).

(5) Tighten two hose clamps (2) and hose clamps (5) to 90-100 lb-in. (10-11 N·m).
4-4. TURBOCHARGER TO CHARGE AIR COOLER TUBE AND HOSES REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check for air leaks around turbocharger to charge air cooler tube.

(5) Lower cab (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
4-5. CHARGE AIR COOLER TO AIR INLET ELBOW TUBES AND HOSES 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)
Screwdriver Attachment, Socket Wrench (Item 46, Appendix B)

**Tools and Special Tools (Cont)**
Socket Set, Socket Wrench (Item 35, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

**Materials/Parts**
Nut, Self-Locking (2) (Item 138, Appendix G)

---

**a. Removal.**

(1) Remove two self-locking nuts (1), screws (2), and upper charge air tube bracket (3) from lower charge air tube bracket (4). Discard self-locking nuts.

(2) Loosen clamp (5) on hose (6).

(3) Disconnect hose (6) from air inlet elbow (7).

**NOTE**

Inner and outer charge air cooler to air inlet elbow tubes are removed the same way. Outer charge air cooler to air inlet elbow tube shown.

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4-31
4-5. CHARGE AIR COOLER TO AIR INLET ELBOW TUBES AND HOSES REPLACEMENT (CONT)

NOTE

Note position of clamps prior to removal.

(4) Loosen three clamps (8) on hose (9).

(5) Remove charge air cooler to air inlet elbow tube (10) from hose (9).

(6) Remove hose (9) from charge air cooler (11).

NOTE

Vehicle serial numbers 0001 through 3091 were originally equipped with a lower charge air tube bracket (part number 12421172). Vehicle serial numbers 3092 and higher were originally equipped with a lower charge air tube bracket (part number 12421172-001). Perform steps (7) and (8) on vehicle serial numbers 0001 through 3091 that have not previously had a valve cover or lower charge air tube bracket replaced.

(7) Remove screw (12) and washer (13) from lower charge air tube bracket (4).

(8) Remove screw (14), washer (15), and lower charge air tube bracket (4) from duct manifold (16).
NOTE
Perform steps (9) through (11) on vehicle serial numbers 3091 and higher, and vehicle serial numbers 0001 through 3091 that have previously had a valve cover or lower charge air tube bracket replaced.

(9) Remove screw (12) and washer (13) from lower charge air tube bracket (17).

(10) Remove screw (18), washer (19), and clamp (20) from lower charge air tube bracket (17).

(11) Remove screw (21), washer (22) and lower charge air tube bracket (17) from air inlet elbow (23).

(12) Loosen clamp (24) on hose (6).

(13) Remove hose (6) from charge air cooler to air inlet elbow tube (10).

b. Installation.

(1) Position hose (1) on charge air cooler to air inlet elbow tube (2) with clamp (3).
4-5. CHARGE AIR COOLER TO AIR INLET ELBOW TUBES AND HOSES REPLACEMENT (CONT)

NOTE

Perform steps (2) through (5) on vehicle serial numbers 3091 and higher, and vehicle serial numbers 0001 through 3091 that have previously had a valve cover or lower charge air tube bracket replaced.

(2) Position lower charge air tube bracket (4) on air inlet elbow (5) with washer (6) and screw (7).

(3) Position clamp (8), washer (9), and screw (10) in lower charge air tube bracket (4).

(4) Position washer (11) and screw (12) in lower charge air tube bracket (4).

(5) Tighten screw (7), screw (10), and screw (12) to 15-25 lb-ft (20-34 N·m).

NOTE

Perform steps (6) through (8) on vehicle serial numbers 0001 through 3091 that have not previously had a valve cover or lower charge air tube bracket replaced.

(6) Position lower charge air tube bracket (13) on duct manifold (14) with washer (15) and screw (16).

(7) Position washer (17) and screw (18) in lower charge air tube bracket (13).

(8) Tighten screws (16 and 18) to 15-25 lb-ft (20-34 N·m).
NOTE

Inner and outer charge air cooler to air inlet elbow tubes are installed the same way. Outer charge air cooler to air inlet elbow tube shown.

(9) Position hose (19) on charge air cooler (20) with three clamps (21).

(10) Position charge air cooler to air inlet elbow tube (2) in hose (19).

CAUTION

Clamps at charge air cooler end of charge air cooler to air inlet elbow tube must be oriented with screw vertical. Failure to comply will cause interference with bottom of cab.

(11) Tighten three clamps (21) to 90-100 lb-in. (7-8 N·m).

CAUTION

All clamps on engine air intake path must be positioned and tightened correctly. Failure to comply may allow foreign matter into engine air intake and result in engine failure.

(12) Position hose (1) on air inlet elbow (5) with clamp (22).

(13) Tighten clamps (3 and 22) to 90-100 lb-in. (7-18 N·m).
4-5. CHARGE AIR COOLER TO AIR INLET ELBOW TUBES AND HOSES REPLACEMENT (CONT)

(14) Position upper charge air tube bracket (23) on lower charge air tube bracket (4) with two screws (24) and self-locking nuts (25).

(15) Tighten two self-locking nuts (25) to 20-26 lb-ft (27-35 N·m).

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check around charge air cooler to air inlet elbow tubes and hoses for air leaks.

(5) Lower cab (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
4-6. FUEL RATIO CONTROL 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).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Packing, Preformed (2) (Item 183, Appendix G)
Packing, Preformed (2) (Item 181, Appendix G)

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.

a. Removal.

(1) Remove screw (1), washer (2), and loop clamp (3) from pressure regulating orifice (4).

(2) Disconnect fuel ratio control tube (5) from adapter (6).

(3) Remove preformed packing (7) from adapter (6). Discard preformed packing.

(4) Remove adapter (6) from inlet manifold (8).

(5) Remove preformed packing (9) from adapter (6). Discard preformed packing.
4-6. FUEL RATIO CONTROL TUBE REPLACEMENT (CONT)

(6) Remove fuel ratio control tube (5) from adapter (10).

(7) Remove preformed packing (11) from adapter (10). Discard preformed packing.

(8) Remove adapter (10) from fuel governor (12).

(9) Remove preformed packing (13) from adapter (10). Discard preformed packing.

b. Installation.

(1) Install preformed packing (1) on adapter (2).

(2) Install adapter (2) in fuel governor (3).

(3) Install preformed packing (4) in adapter (2).

(4) Connect fuel ratio control tube (5) to adapter (2).

(5) Install preformed packing (6) on adapter (7).

(6) Install adapter (7) in inlet manifold (8).

(7) Install preformed packing (9) on adapter (7).

(8) Install fuel ratio control tube (5) on adapter (7).

(9) Position loop clamp (10), washer (11), and screw (12) in pressure regulating orifice (13).

(10) Tighten screw (12) to 15-25 lb-ft (20-34 N·m).
c. **Follow-On Maintenance.**

1. Lower cab (TM 9-2320-365-10).
2. Start engine (TM 9-2320-365-10).
4. Check for fuel leaks around fuel ratio control tube.
5. Check that engine runs smoothly at low idle speed.
6. Check that engine runs smoothly at high idle speed.
7. Lower cab (TM 9-2320-365-10).

**End of Task.**
4-7. ORIFICE TUBE ASSEMBLY 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).
Fuel pressure regulating valve removed (para 4-3).
Fuel ratio control tube removed (para 4-6).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Packing, Preformed (Item 186, Appendix G)

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.

a. Removal.

(1) Remove two screws (1) and washers (2) from orifice tube assembly (3).

(2) Remove screw (4), orifice tube assembly (3), and preformed packing (5) from cylinder head (6). Discard preformed packing.

b. Installation.

(1) Position preformed packing (5) on cylinder head (6).

(2) Position orifice tube assembly (3) on cylinder head (6) with screw (4).

(3) Position two washers (2) and screws (1) in orifice tube assembly (3).

(4) Tighten screw (4) to 15-25 lb-ft (20-34 N·m).

(5) Tighten two screws (1) to 33-47 lb-ft (45-64 N·m).
c. Follow-On Maintenance.

(1) Install fuel ratio control tube (para 4-6).

(2) Install fuel pressure regulating valve (para 4-3).

(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 fuel leaks around fuel ratio control tube and orifice tube assembly.

(7) Check that engine runs smoothly at low idle speed.

(8) Check that engine runs smoothly at high idle speed.

(9) Lower cab (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

End of Task.
4-8. FUEL TANK AND BRACKETS REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries disconnected (para 7-48).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Container (60 Gal (227 L) capacity)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)
- Socket Set, Impact (Item 33, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

Materials/Parts

- Rag, Wiping (Item 51, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Packing, Preformed (Item 193, Appendix G)
- Sealing Compound (Item 61, Appendix D)
- Primer, Sealing Compound (Item 50, Appendix D)
- Nut, Self-Locking (2) (Item 140, Appendix G)
- Nut, Self-Locking (8) (Item 144, Appendix G)

Personnel Required

- 2

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.

a. Removal.

NOTE

Remove plastic cable ties as required.

(1) Disconnect connector clamp (1) from fuel level sending unit connector (2).

(2) Disconnect fuel level sending unit connector (2) from connector P82 (3).

(3) Position container under fuel tank (4).

(4) Remove drain plug (5) from fuel tank (4) and drain fuel.
NOTE
Tag fuel hoses and connection points prior to disconnecting.

(5) Disconnect fuel hose (6) from 90-degree pickup tube fitting (7).

(6) Disconnect fuel hose (8) from 90-degree return fitting (9).

(7) Disconnect fuel hose (10) from relief valve (11).

(8) Remove four nuts (12) from two straps (13).

(9) Move two straps (13) away from fuel tank (4).

NOTE
Step (10) requires the aid of an assistant.

(10) Remove fuel tank (4) from support brackets (14 and 15).

(11) Remove relief valve (11) from fuel tank (4).

(12) Remove 90-degree pickup tube fitting (7) from fuel tank (4).

(13) Remove 90-degree return fitting (9) from fuel tank (4).

(14) Remove five screws (16), fuel level sending unit (17), and preformed packing (18) from fuel tank (4). Discard preformed packing.

(15) Deleted.
4-8. FUEL TANK AND BRACKETS REPLACEMENT (CONT)

(16) Remove fuel tank insulators (20 and 21) from support brackets (14 and 15).

(17) Remove two bolts (22) and straps (13) from support brackets (14 and 15).

(18) Remove two insulator straps (23) from straps (13).

(19) Remove four self-locking nuts (24), bolts (25), two plates (26), and support bracket (14) from frame rail (27). Discard self-locking nuts.

(20) Remove two self-locking nuts (28), washers (29), and screws (30) from support bracket (15). Discard self-locking nuts.

(21) Remove self-locking nut (31) and bolt (32) from support bracket (15). Discard self-locking nut.
(22) Remove self-locking nut (33) and bolt (34) from support bracket (15). Discard self-locking nut.

(23) Remove two self-locking nuts (35), bolts (36), plate (37), and support bracket (15) from frame rail (27). Discard self-locking nuts.

b. Installation.

(1) Position support bracket (1) on frame rail (2) with plate (3), two bolts (4), and self-locking nuts (5).

(2) Position bolt (6) and self-locking nut (7) in support bracket (1).

(3) Position bolt (8) and self-locking nut (9) in support bracket (1).

**NOTE**

Step (4) requires the aid of an assistant.

(4) Tighten two self-locking nuts (5), and self-locking nuts (7 and 9) to 197-237 lb-ft (267-321 N·m).

(5) Position two screws (10), washers (11), and self-locking nuts (12) in support bracket (1).

(6) Tighten two self-locking nuts (12) to 42-52 lb-ft (57-70 N·m).
(7) Position support bracket (13) on frame rail (2) with two plates (14), four bolts (15), and self-locking nuts (16).

**NOTE**

Step (8) requires the aid of an assistant.

(8) Tighten four self-locking nuts (16) to 197-237 lb-ft (267-321 N·m).

(9) Install two insulator straps (17) on straps (18).

(10) Position two straps (18) on support brackets (1 and 13) with bolts (19).

(11) Tighten two bolts (19) to 76-94 lb-ft (103-127 N·m).

(12) Install fuel tank insulators (20 and 21) on support brackets (1 and 13).
(13) Deleted.

(14) Deleted.

(15) Deleted.

(16) Deleted.

(17) Position preformed packing (25) and fuel level sending unit (26) in fuel tank (23) with five screws (27).

(17.1) Tighten five screws (27) to 20-24 lb-in. (2-3 N·m).

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**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.

(18) Apply sealing compound primer to threads of 90-degree return fitting (28), 90-degree pickup tube fitting (29), and relief valve (30).

(19) Apply sealing compound to threads of 90-degree return fitting (28), 90-degree pickup tube fitting (29), and relief valve (30).

(20) Install 90-degree return fitting (28) in fuel tank (23).

(21) Install 90-degree pickup tube fitting (29) in fuel tank (23).

(22) Install relief valve (30) in fuel tank (23).
4-8. FUEL TANK AND BRACKETS REPLACEMENT (CONT)

NOTE

Step (23) requires the aid of an assistant.

(23) Install fuel tank (23) on support brackets (1 and 13) with straps (18).

(24) Position two nuts (31) on two straps (18).

(25) Tighten two nuts (31) to 76-94 lb-ft (103-127 N·m).

(26) Install two nuts (32) on two straps (18).

NOTE

Install plastic cable ties as required.

(27) Connect fuel hose (33) to relief valve (30).

(28) Connect fuel hose (34) to 90-degree return fitting (28).

(29) Connect fuel hose (35) to 90-degree pickup tube fitting (29).
(30) Install drain plug (36) in fuel tank (23).

(31) Connect fuel level sending unit connector (37) to connector P82 (38).

(32) Connect connector clamp (39) to fuel level sending unit connector (37).

c. Follow-On Maintenance.

(1) Fill fuel tank (TM 9-2320-365-10).

(2) Bleed fuel system (para 4-11).

(3) Check for fuel leaks around hoses and fittings.

(4) Connect batteries (para 7-48).

(5) Start engine (TM 9-2320-365-10).

(6) Check for fuel leaks around hoses and fittings.

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
4-9. FUEL HOSES REPLACEMENT

This task covers:

- a. Fuel Supply Hose Removal
- b. Fuel Supply Hose Installation
- c. Fuel Transfer Hose Removal
- d. Fuel Transfer Hose Installation
- e. Fuel Return Hose Removal
- f. Fuel Return Hose Installation
- g. Fuel Tank Vent Hose Removal
- h. Fuel Tank Vent Hose Installation
- i. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries disconnected (para 7-48).
- Cab raised (TM 9-2320-365-10).
- Spare tire lowered (TM 9-2320-365-10).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Socket Set, Socket Wrench (Item 34, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts

- Ties, Cable, Plastic (Item 76, Appendix D)
- Nut, Self-Locking (Item 134, Appendix G)
- Nut, Self-Locking (Item 140, Appendix G)

WARNING

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


(1) Disconnect fuel supply hose assembly (1) from 90-degree fitting (2).
**NOTE**

- Remove plastic cable ties as required.

- Perform steps (2) and (3) on vehicle serial number 3092 and higher, and vehicle serial numbers 0001 through 3091 that have previously had a spare tire retainer or fuel hose replaced.

(2) Remove self-locking nut (3), screw (4), and clamp (5) from spare tire retainer (6). Discard self-locking nut.

(3) Remove fuel supply hose assembly (1) from clamp (5).

(4) Remove self-locking nut (7), screw (8), and clamp (9) from spare tire retainer (6). Discard self-locking nut.

(5) Remove fuel supply hose assembly (1) from clamp (9).

(6) Remove fuel supply hose assembly (1) from 90-degree fuel pickup tube fitting (10).
b. Fuel Supply Hose Installation.

(1) Install fuel supply hose assembly (1) on 90-degree fuel pickup tube fitting (2).

(2) Install fuel supply hose assembly (1) in clamp (3).

(3) Position clamp (3) on spare tire retainer (4) with screw (5) and self-locking nut (6).

(4) Tighten self-locking nut (6) to 87-107 lb-in. (10-12 N·m).

(5) Install fuel supply hose assembly (1) in clamp (7).

(6) Position clamp (7) on spare tire retainer (4) with screw (8) and self-locking nut (9).

(7) Tighten self-locking nut (9) to 43-52 lb-ft (58-71 N·m).
NOTE

Install plastic cable ties as required.

(8) Connect fuel supply hose assembly (1) to 90-degree fitting (10).

c. Fuel Transfer Hose Removal.

(1) Disconnect fuel transfer hose assembly (1) from fuel/water separator (2).

(2) Remove fuel transfer hose assembly (1) from 90-degree fitting (3).
d. Fuel Transfer Hose Installation.

(1) Install fuel transfer hose assembly (1) on 90-degree fitting (2).

(2) Connect fuel transfer hose assembly (1) to fuel/water separator (3).

e. Fuel Return Hose Removal.

(1) Disconnect fuel return hose assembly (1) from 90-degree fitting (2).
NOTE

- Remove plastic cable ties as required.

- Perform steps (2) and (3) on vehicle serial number 3092 and higher, and vehicle serial numbers 0001 through 3091 that have previously had a spare tire retainer or fuel hose replaced.

(2) Remove self-locking nut (3), screw (4), and clamp (5) from spare tire retainer (6). Discard self-locking nut.

(3) Remove fuel return hose assembly (1) from clamp (5).

(4) Remove self-locking nut (7), screw (8), and clamp (9) from spare tire retainer (6). Discard self-locking nut.

(5) Remove fuel return hose assembly (1) from clamp (9).

(6) Remove fuel return hose assembly (1) from 90-degree return fitting (10).
f. Fuel Return Hose Installation.

(1) Install fuel return hose assembly (1) on 90-degree return fitting (2).

(2) Install fuel return hose assembly (1) in clamp (3).

(3) Position clamp (3) on spare tire retainer (4) with screw (5) and self-locking nut (6).

(4) Tighten self-locking nut (6) to 87-107 lb-in. (10-12 N·m).

(5) Install fuel return hose assembly (1) in clamp (7).

(6) Position clamp (7) on spare tire retainer (4) with screw (8) and self-locking nut (9).

(7) Tighten self-locking nut (9) to 43-52 lb-ft (58-71 N·m).
NOTE

Install plastic cable ties as required.

(8) Connect fuel return hose assembly (1) to 90-degree fitting (10).

g. Fuel Tank Vent Hose Removal.

(3) Remove fuel tank vent hose (5) from relief valve (6).

(4) Remove adapter (7) from fuel tank vent hose (5).

NOTE

Remove plastic cable ties as required.

(1) Remove self-locking nut (1), screw (2), and clamp (3) from spare tire retainer (4). Discard self-locking nut.

(2) Remove fuel tank vent hose (5) from clamp (3).
h. Fuel Tank Vent Hose Installation.

(1) Install adapter (1) in fuel tank vent hose (2).

(2) Install fuel tank vent hose (2) on relief valve (3).

NOTE
Install plastic cable ties as required.

(3) Form a 180-degree bend in fuel tank vent hose (2).

CAUTION
Use care when installing fuel tank vent hose in clamp so that fuel tank vent hose is not pinched or crimped. Failure to comply may result in damage to equipment.

(4) Install fuel tank vent hose (2) in clamp (4).

(5) Position clamp (4) on spare tire retainer (5) with screw (6) and self-locking nut (7).

(6) Tighten self-locking nut (7) to 87-107 lb-in. (10-12 N·m).
i. Follow-On Maintenance.

(1) Bleed fuel system (para 4-11).

(2) Lower cab (TM 9-2320-365-10).

(3) Connect batteries (para 7-48).

(4) Start engine (TM 9-2320-365-10).

(5) Raise cab (TM 9-2320-365-10).

(6) Check for fuel leaks around hoses and fittings.

(7) Raise spare tire (TM 9-2320-365-10).

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.
4-10. FUEL FILTER TUBES REPLACEMENT

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

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

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.

a. Removal.

(1) Disconnect fuel tube assembly (1) from tee fitting (2).

(2) Remove preformed packing (3) from tee fitting (2). Discard preformed packing.

(3) Remove fuel tube assembly (1) and 90-degree fitting (4) from adapter (5).

(4) Remove preformed packing (6) from adapter (5). Discard preformed packing.

(5) Remove adapter (5) from fuel governor (7).

(6) Remove preformed packing (8) from adapter (5). Discard preformed packing.

Materials/Parts
Packing, Preformed (4) (Item 157, Appendix G)
Packing, Preformed (6) (Item 180, Appendix G)
Sealant, Pipe, Teflon (Item 58, Appendix D)
(7) Remove 90-degree fitting (4) from fuel tube assembly (1).

(8) Remove preformed packing (9) from 90-degree fitting (4). Discard preformed packing.

(9) Remove screw (10), washer (11), and clip (12) from cylinder head (13).

(10) Remove clip (12) from fuel tube assembly (14).

(11) Disconnect fuel tube assembly (14) from tee fitting (15).

(12) Remove preformed packing (16) from tee fitting (15). Discard preformed packing.
4-10. FUEL FILTER TUBES REPLACEMENT (CONT)

(13) Remove fuel tube assembly (14) from 90-degree fitting (17).

(14) Remove preformed packing (18) from 90-degree fitting (17). Discard preformed packing.

(15) Remove 90-degree fitting (17) from cylinder head (13).

(16) Remove preformed packing (19) from 90-degree fitting (17). Discard preformed packing.

(17) Remove plug (20) from adapter (21).

(18) Remove adapter (21) from tee fitting (2).

(19) Remove preformed packing (22) from adapter (21). Discard preformed packing.

(20) Remove tee fitting (2) from fuel filter base (23).

(21) Remove preformed packing (24) from tee fitting (2). Discard preformed packing.
(22) Remove tee fitting (15) from fuel filter base (23).

(23) Remove preformed packing (25) from tee fitting (15). Discard preformed packing.

b. Installation.

(1) Install preformed packing (1) on tee fitting (2).

(2) Install tee fitting (2) in fuel filter base (3).

(3) Install preformed packing (4) on tee fitting (5).

(4) Install tee fitting (5) in fuel filter base (3).

(5) Install preformed packing (6) on adapter (7).

(6) Install adapter (7) in tee fitting (5).

**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.

(6.1) Apply sealing compound to threads of plug (8).

(7) Install plug (8) in adapter (7).
(8) Install preformed packing (9) on 90-degree fitting (10).

(9) Install 90-degree fitting (10) in cylinder head (11).

(10) Install preformed packing (12) on 90-degree fitting (10).

(11) Install fuel tube assembly (13) on 90-degree fitting (10).

(12) Install preformed packing (14) on tee fitting (2).

(13) Install fuel tube assembly (13) on tee fitting (2).
(14) Install clip (15) on fuel tube assembly (13).

(15) Install clip (15) on cylinder head (11) with washer (16) and screw (17).

(16) Install preformed packing (18) on 90-degree fitting (19).

(17) Install fuel tube assembly (20) on 90-degree fitting (19).

(18) Install preformed packing (21) on adapter (22).

(19) Install adapter (22) in fuel governor (23).

(20) Install preformed packing (24) on adapter (22).

(21) Install 90-degree fitting (19) on adapter (22).
(22) Install preformed packing (25) on tee fitting (5).
(23) Install fuel tube assembly (20) on tee fitting (5).

c. Follow-On Maintenance.
(1) Lower cab (TM 9-2320-365-10).
(2) Connect batteries (para 7-48).
(3) Start engine (TM 9-2320-365-10).
(4) Check for fuel leaks under vehicle.
(5) Raise cab (TM 9-2320-365-10).
(6) Check for fuel leaks around tubes and fittings.
(7) Lower cab (TM 9-2320-365-10).
(8) Shut down engine (TM 9-2320-365-10).

End of Task.
4-11. FUEL SYSTEM BLEEDING

This task covers:

a. Bleeding
b. 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)
Pan, Drain (Item 24, Appendix C)

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)

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.

a. Bleeding.

NOTE
Remove plastic cable ties as required.

(1) Position drain pan below fuel return hose assembly (1).
(2) Disconnect fuel return hose assembly (1) from 90-degree fitting (2).
(3) Direct fuel return hose assembly (1) into drain pan.
4-11. FUEL SYSTEM BLEEDING (CONT)

(4) Depress button (3) on fuel/water separator (4) as many times as necessary to get a steady stream of clear fuel.

**NOTE**

Install plastic cable ties as required.

(5) Connect fuel return hose assembly (1) to 90-degree fitting (2).

**b. Follow-On Maintenance.**

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine and allow to run until engine runs smoothly (TM 9-2320-365-10).

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
4-12. GOVERNOR LINKAGE REPLACEMENT

This task covers:

a. Removal  
b. Disassembly  
c. Assembly  
d. Installation  
e. Follow-On Maintenance

INITIAL SETUP

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

Materials/Parts
Pin, Cotter (Item 202, Appendix G)  
Spacer, Ring (Item 260, Appendix G)

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

a. Removal.

(1) Remove cotter pin (1), washer (2), and TPS cable assembly (3) from stud (4). Discard cotter pin.

(2) Remove clip (5) and throttle control cable (6) from stud (7).

NOTE

Note position of two springs prior to removal.

(3) Remove springs (8 and 9) from linkage plate (10).

(4) Remove bolt (11), washer (12), and linkage plate (10) from governor (13).

(5) Remove bolt (14), washer (15), and sensor bracket (16) from governor (13).
b. Disassembly.

(1) Remove ring spacer (1) from linkage plate (2). Discard ring spacer.

(2) Remove nut (3), washer (4), and stud (5) from sensor bracket (6).

c. Assembly.

(1) Install stud (1), washer (2), and nut (3) on sensor bracket (4).
(2) Install ring spacer (5) in linkage plate (6).

d. Installation.

(1) Position sensor bracket (1) on governor (2) with washer (3) and bolt (4).
(2) Tighten bolt (4) to 9 lb-ft (12 N·m).
(3) Position linkage plate (5) on governor (2) with washer (6) and bolt (7).
(4) Tighten bolt (7) to 20 lb-ft (27 N·m).

(5) Install springs (8 and 9) on linkage plate (5).
(6) Install throttle control cable (10) on stud (11) with clip (12).
(7) Install TPS cable assembly (13) on stud (14) with washer (15) and cotter pin (16).

e. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).
(2) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

End of Task.
4-13. FUEL/WATER SEPARATOR AND FILTER REPLACEMENT

This task covers:

a. Filter Removal
b. Filter Installation
c. Pump Head Removal
d. Pump Head Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

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

Materials/Parts
Cloth, Cleaning (Item 17, Appendix D)
Filter Element, Fluid (Item 14, Appendix G)
Oil, Fuel, Diesel (Item 37, 38, or 39, Appendix D)
Packing, Preformed (2) (Item 177, Appendix G)

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.

a. Filter Removal.

(1) Disconnect connector clamp (1) from fuel/water separator connector (2).

(2) Disconnect connector P33 (3) from fuel/water separator connector (2).

(3) Position drain pan under hose (4).

(4) Open drain valve (5) and allow fuel to drain.

(5) Loosen clamp (6) on hose (4).

(6) Remove hose (4) from drain valve (5).
(7) Remove fluid filter element (7) and bowl assembly (8) from pump head (9).

(8) Remove bowl assembly (8) from fluid filter element (7). Discard fluid filter element.

(9) Remove preformed packing (10) from bowl assembly (8). Discard preformed packing.

(10) Clean debris from valve (11) on bottom of pump head (9).

b. Filter Installation.

(1) Close drain valve (1).

(2) Install preformed packing (2) on bowl assembly (3).

(3) Install bowl assembly (3) on fluid filter element (4).

(4) Install fluid filter element (4) on pump head (5).

(5) Install hose (6) on drain valve (1) with clamp (7).

(6) Connect connector P33 (8) to fuel/water separator connector (9).

(7) Connect connector clamp (10) on fuel/water separator connector (9).
4-13. FUEL/WATER SEPARATOR AND FILTER REPLACEMENT (CONT)

c. Pump Head Removal.

(1) Disconnect fuel transfer hose assembly (1) from adapter (2).

(2) Remove adapter (2) and preformed packing (3) from pump head (4). Discard preformed packing.

(3) Disconnect fuel supply hose assembly (5) from 90-degree fitting (6).

(4) Remove 90-degree fitting (6) and preformed packing (7) from pump head (4). Discard preformed packing.

(5) Remove two screws (8), washers (9), and pump head (4) from bracket (10).

d. Pump Head Installation.

(1) Install pump head (1) on bracket (2) with two washers (3) and screws (4).
(2) Install preformed packing (5) on 90-degree fitting (6).

(3) Install 90-degree fitting (6) in pump head (1).

(4) Install fuel supply hose assembly (7) on 90-degree fitting (6).

(5) Install preformed packing (8) on adapter (9).

(6) Install adapter (9) in pump head (1).

(7) Install fuel transfer hose assembly (10) on adapter (9).

e. **Follow-On Maintenance.**

(1) Bleed fuel system (para 4-11).

(2) Lower cab (TM 9-2320-365-10).

(3) Connect batteries (para 7-48).

(4) Start engine (TM 9-2320-365-10).

(5) Check for fuel leaks under vehicle.

(6) Raise cab (TM 9-2320-365-10).

(7) Check engine compartment for fuel leaks.

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

**End of Task.**
4-14. FUEL FILTER AND FILTER BASE REPLACEMENT

This task covers:

a. Filter Removal
b. Filter Installation
c. Filter Base Removal
d. Filter Base Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Tools and Special Tools
Pan, Drain (Item 24, Appendix C)
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)
Wrench, Strap, Adjustable (Item 56, Appendix C)

Materials/Parts
Filter, Fuel (Item 21, Appendix G)
Packing, Preformed (2) (Item 157, Appendix G)
Packing, Preformed (3) (Item 180, Appendix G)
Packing, Preformed (Item 184, Appendix G)
Gasket, Fuel Filter (Item 42, Appendix G)
Oil, Fuel, Diesel (Item 37, 38, or 39, Appendix D)

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.

a. Filter Removal.

(1) Position drain pan under filter element (1).

(2) Remove filter element (1) from fuel filter base (2).
b. Filter Installation.

(1) Coat filter element seal (1) with a light coat of fuel.

(2) Fill filter element (2) with diesel fuel.

(3) Install filter element (2) on fuel filter base (3). Then turn 3/4-turn after filter element touches fuel filter base.

c. Filter Base Removal.

(1) Remove screw (1) and washer (2) from top of crankcase breather (3).

(2) Remove crankcase breather (3) from fuel filter base (4).

(3) Remove preformed packing (5) from fuel filter base (4). Discard preformed packing.

(4) Disconnect fuel tube assembly (6) from tee fitting (7).

(5) Remove preformed packing (8) from tee fitting (7). Discard preformed packing.
(6) Remove tee fitting (7) from fuel filter base (4).

(7) Remove preformed packing (9) from tee fitting (7). Discard preformed packing.

(8) Disconnect fuel tube assembly (10) from tee fitting (11).

(9) Remove preformed packing (12) from tee fitting (11). Discard preformed packing.

(10) Remove tee fitting (11) from fuel filter base (4).

(11) Remove preformed packing (13) from tee fitting (11). Discard preformed packing.

(12) Remove four screws (14) and washers (15) from fuel filter base (4).

(13) Remove fuel filter base (4) and gasket (16) from engine (17). Discard gasket.

(14) Remove plug (18) from fuel filter base (4).

(15) Remove preformed packing (19) from plug (18). Discard preformed packing.
d. Filter Base Installation.

(1) Install preformed packing (1) on plug (2).

(2) Install plug (2) in fuel filter base (3).

(3) Position fuel filter base (3) and gasket (4) on engine (5) with four washers (6) and screws (7).

(4) Tighten four screws (7) to 96-144 lb-in. (11-16 N·m).

(5) Install preformed packing (8) on tee fitting (9).

(6) Install tee fitting (9) in fuel filter base (3).

(7) Install preformed packing (10) on tee fitting (9).

(8) Connect fuel tube assembly (11) to tee fitting (9).

(9) Install preformed packing (12) on tee fitting (13).

(10) Install tee fitting (13) in fuel filter base (3).

(11) Connect fuel tube to filter base.
(11) Install preformed packing (14) on tee fitting (13).

(12) Connect fuel tube assembly (15) to tee fitting (13).

(13) Apply thin coat of lubricating oil to both sides of preformed packing (16).

(14) Install preformed packing (16) on top of fuel filter base (3).

(15) Position crankcase breather (17) on top of fuel filter base (3) with washer (18) and screw (19).

(16) Tighten screw (19) to 96-144 lb-in. (11-16 N·m).

e. Follow-On Maintenance.

(1) Bleed fuel system (para 4-11).

(2) Lower cab (TM 9-2320-365-10).

(3) Connect batteries (para 7-48).

(4) Start engine (TM 9-2320-365-10).
(5) Check for fuel leaks under vehicle.

(6) Raise cab (TM 9-2320-365-10).

(7) Check for fuel leaks around fuel filter.

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.
4-15. ETHER STARTING AID REPLACEMENT

This task covers:

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INITIAL SETUP

Equipment Conditions
- Batteries disconnected (para 7-48).
- Spare tire lowered (TM 9-2320-365-10).

Tools and Special Tools
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
- Gasket (Item 25, Appendix G)
- Nut, Self-Locking (4) (Item 138, Appendix G)

WARNING

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

a. Ether Cylinder Removal.

(1) Remove wingnut (1) from clamp (2).

(2) Remove ether cylinder (3) and gasket (4) from ether valve (5). Discard gasket.

(3) Remove ether cylinder (3) from clamp (2).

(4) Remove cap (6) from cap retainer (7).

(5) Install cap (6) on ether valve (5).
b. Ether Cylinder Installation.

(1) Remove cap (1) from ether valve (2).
(2) Install cap (2) on cap retainer (3).
(3) Install gasket (4) in ether valve (2).
(4) Position ether cylinder (5) in clamp (6).
(5) Install ether cylinder (5) on ether valve (2).
(6) Install wingnut (7) on clamp (6).

c. Clamp Removal.

Remove two self-locking nuts (1), screws (2), and clamp (3) from spare tire retainer (4). Discard self-locking nuts.

d. Clamp Installation.

(1) Position clamp (1) on spare tire retainer (2) with two screws (3) and self-locking nuts (4).
(2) Tighten two self-locking nuts (4) to 25-31 lb-ft (34-42 N·m).
4-15. ETHER STARTING AID REPLACEMENT (CONT)

e. Ether Valve Removal.

(1) Disconnect ether tube (1) from ether valve (2).

(2) Disconnect ether valve electrical connector (3) from connector J93 (4).

(3) Remove two self-locking nuts (5), screws (6), washers (7), terminal lug TL84 (8), and ether valve (2) from spare tire retainer (9). Discard self-locking nuts.

f. Ether Valve Installation.

(1) Position ether valve (1) on spare tire retainer (2) with terminal lug TL84 (3), two washers (4), screws (5) and self-locking nuts (6).

(2) Tighten two self-locking nuts (6) to 25-31 lb-ft (34-42 N·m).

(3) Connect ether valve electrical connector (7) to connector J93 (8).

(4) Connect ether tube (9) to ether valve (1).

g. Follow-On Maintenance.

(1) Raise spare tire (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Operate ether starting aid (TM 9-2320-365-10) and check for ether leaks.

End of Task.
4-16. THROTTLE POSITION SENSOR (TPS) CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Cab raised (TM 9-2320-365-10).

Materials/Parts
Pin, Cotter (Item 202, Appendix G)

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

a. Removal.

(1) Disconnect electrical connector (1) from TPS cable assembly (2).

(2) Remove three nuts (3), washers (4), screws (5), and TPS cable assembly (2) from bracket (6).

(3) Remove cotter pin (7) and washer (8) from stud (9). Discard cotter pin.

(4) Remove TPS cable assembly (2) from stud (9).

(5) Release latch (10) on clamp (11).

(6) Remove TPS cable assembly (2) from clamp (11).

(7) Remove TPS cable assembly (2) from engine.
b. Installation.

(1) Position TPS cable assembly (1) in clamp (2).

(2) Close latch (3) on clamp (2).

(3) Position TPS cable assembly (1) on stud (4).

(4) Install washer (5) and cotter pin (6) on stud (4).

(5) Install TPS cable assembly (1) on bracket (7) with three screws (8), washers (9) and nuts (10).

(6) Connect electrical connector (11) to TPS cable assembly (1).

(7) Lower cab (TM 9-2320-365-10).

(8) Connect batteries (para 7-48).

**NOTE**

Wait until Neutral (N) indication appears in pushbutton shift selector display before positioning master power switch off.

(9) Position master power switch on and off five times (TM 9-2320-365-10).

**NOTE**

TPS will self-adjust but vehicle will need to be operated through all gear ranges several times before correct shifting will be noticed.

(10) Operate vehicle and check for smooth transmission shifting through all gear ranges (TM 9-2320-365-10).

End of Task.
4-17. HAND THROTTLE LEVER REPLACEMENT/ADJUSTMENT

This task covers:

a. Removal
b. Installation/Adjustment
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Scale, Weighing (Item 30, Appendix C)

Materials/Parts
Washer, Spring (Item 281, Appendix G)

a. Removal.

Remove nut (1), washer (2), spring washer (3), HAND THROTTLE lever (4), and friction disk (5) from dashboard (6). Discard spring washer.

b. Installation/Adjustment.

**WARNING**
Tab of HAND THROTTLE lever must be positioned above throttle pivot bar. Failure to comply may result in injury to personnel or damage to equipment.

(1) Position friction disk (5), HAND THROTTLE lever (4), spring washer (3), washer (2), and nut (1) on dashboard (6).

**CAUTION**
HAND THROTTLE lever nut must be tightened so that 9-11 lbs (40-49 N) of force is required to change position of HAND THROTTLE lever. Failure to comply may result in damage to equipment.

(2) Tighten nut (1) on HAND THROTTLE lever (4).
c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Start engine (TM 9-2320-365-10).

(3) Check for smooth operation of HAND THROTTLE lever.

(4) Check high/low HAND THROTTLE lever positions (para 4-22).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
4-18. THROTTLE CONTROL CABLE REPLACEMENT/ADJUSTMENT

This task covers:

a. Removal  
b. Installation  
c. Adjustment  
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Steering wheel removed (para 13-2).

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

Materials/Parts
Grease, Molybdenum Disulfide (Item 25, Appendix D)

Personnel Required
(2)

a. Removal.

(1) Position master power switch to on (TM 9-2320-365-10).

(2) Place wiper blades in the full left position (TM 9-2320-365-10).

(3) Position master power switch to off (TM 9-2320-365-10).

(4) Disconnect batteries (para 7-48).

(5) Remove instrument panel assembly for access (para 7-15).

**WARNING**

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

(6) Remove retaining ring (1) and bellcrank (2) from stud (3).
(7) Remove clip (4) and throttle control cable (5) from stud (6).

(8) Loosen two nuts (7) with washers (8) on throttle control cable (5).

(9) Remove throttle control cable (5) from dashboard (9).

(10) Raise cab (TM 9-2320-365-10).

(11) Remove throttle control cable (5) and grommet (10) from cab (11).

(12) Remove clip (12) and throttle control cable (5) from stud (13).

NOTE

Count threads showing on throttle control cable ferrule. Record this number prior to removal.

(13) Loosen nut (14) with washers (15) on throttle control cable (5).

(14) Remove throttle control cable (5) from bracket (16).
(1) Remove throttle control cable (5) from vehicle.

b. Installation.

(2) Position nut (2) on throttle control cable (1) so that same number of threads are showing on ferrule as was recorded in removal.

(3) Position throttle control cable (1) in bracket (3) with two washers (4) and nut (5).

(4) Install throttle control cable (1) on stud (6) with clip (7).
4-18. THROTTLE CONTROL CABLE REPLACEMENT/ADJUSTMENT (CONT)

(5) Position grommet (8) and throttle control cable (1) in cab (9).

(6) Lower cab (TM 9-2320-365-10).

(7) Position throttle control cable (1) in dashboard (10) with two washers (11) and nuts (12).

(8) Install throttle control cable (1) on stud (13) with clip (14).

(9) Apply grease to stud (15).

**WARNING**

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

(10) Install bellcrank (16) on stud (15) with retaining ring (17).
c. Adjustment.

(1) Raise cab (TM 9-2320-365-10).

**CAUTION**

Ensure governor linkage rests against low idle stop with throttle control cable installed. Failure to comply may result in damage to equipment.

**NOTE**

Perform steps (2) and (3) if governor linkage does not contact low idle stop with throttle control cable installed.

(2) Loosen nut (1) on throttle control cable (2) until governor linkage (3) contacts low idle stop (4).

(3) Tighten nut (5) on throttle control cable (2).

**WARNING**

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

**CAUTION**

Ensure governor linkage contacts high idle stop with accelerator pedal fully depressed. Failure to comply may result in damage to equipment.

**NOTE**

Steps (4) through (7) require the aid of an assistant.

(4) Depress accelerator pedal (6) to cab floor (7).
(5) Observe movement of governor linkage (3) to high idle stop (8).

(6) Release accelerator pedal (6) from cab floor (7).

(7) Observe movement of governor linkage (3) from high idle stop (8) to low idle stop (4).
(8) Loosen nut (9) on throttle control cable (2).

(9) Tighten nut (10) on throttle control cable (2).

(10) Perform steps (4) through (9) until freeplay is removed from throttle control cable (2).

d. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Install instrument panel assembly (para 7-15).

(3) Operate windshield wipers, position wipers stowed (TM 9-2320-365-10).

(4) Start engine, check accelerator for smooth operation (TM 9-2320-365-10).

(5) Check high/low HAND THROTTLE lever positions (para 4-22).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Instrument panel assembly removed for access (para 7-15).

**Materials/Parts**
Grease, Molybdenum Disulfide (Item 25, Appendix D)

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

---

**a. Removal.**

1. Remove clip ring (1) from ball seat (2).

2. Remove ball seat (2) and threaded rod (3) from ball stud (4).

3. Remove clip ring (5) from ball seat (6).

4. Remove ball seat (6) and threaded rod (3) from accelerator pedal (7).
(5) Loosen two jam nuts (8) behind ball seats (2 and 6).

(6) Remove ball seats (2 and 6) and two jam nuts (8) from threaded rod (3).

b. Installation.

(1) Install two jam nuts (1) to bottom of threads on threaded rod (2).

(2) Install ball seats (3 and 4) on threaded rod (2) until ball seats contact two jam nuts (1).

(3) Tighten two jam nuts (1) against ball seats (3 and 4).

(4) Apply grease to inside of ball seat (3).

(5) Install ball seat (3) in accelerator pedal (5).

(6) Install clip ring (6) on ball seat (3).
(7) Apply grease to inside of ball seat (4).
(8) Install ball seat (4) on ball stud (7).
(9) Install clip ring (8) on ball seat (4).

d. Follow-On Maintenance.
(1) Install instrument panel assembly (para 7-15).
(2) Start engine (TM 9-2320-365-10).
(3) Depress accelerator pedal and check for smooth operation.
(4) Check high/low HAND THROTTLE lever positions (para 4-22).
(5) Shut down engine (TM 9-2320-365-10).

End of Task.
### 4-20. THROTTLE CONTROL LEVER REPLACEMENT

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### INITIAL SETUP

#### Equipment Conditions
- Steering wheel removed (para 13-2).

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

#### Materials/Parts
- Grease, Molybdenum Disulfide (Item 25, Appendix D)
- Washer, Spring (Item 277, Appendix G)

### a. Removal.

1. Position master power switch to on (TM 9-2320-365-10).
2. Place wiper blades in the full left position (TM 9-2320-365-10).
3. Position master power switch to off (TM 9-2320-365-10).
4. Disconnect batteries (para 7-48).
5. Remove instrument panel assembly for access (para 7-15).
6. Remove clip ring (1) from ball seat (2).
7. Remove ball seat (2) with threaded rod (3) from ball stud (4).
WARNING

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

(8) Remove retaining ring (5) and lever (6) from lever stud (7).

(9) Remove bushing (8) from lever stud (7).

(10) Remove clip (9) and throttle control cable (10) from stud (11).

(11) Remove nut (12), spring washer (13), and ball stud (4) from lever (6). Discard spring washer.

b. Installation.

(1) Install ball stud (1) on lever (2) with spring washer (3) and nut (4).

(2) Install throttle control cable (5) on stud (6) with clip (7).
(3) Apply grease to bushing (8) and lever stud (9).

**WARNING**

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

(4) Install bushing (8) and lever (2) on lever stud (9) with retaining ring (10).

(5) Apply grease to ball stud (1).

(6) Install ball seat (11) with threaded rod (12) on ball stud (1).

(7) Install clip ring (13) on ball seat (11).

d. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Start engine (TM 9-2320-365-10).

(3) Position windshield wiper control to off (TM 9-2320-365-10).

(4) Depress accelerator pedal and check for smooth operation.

(5) Check high/low HAND THROTTLE lever positions (para 4-22).

(6) Shut down engine (TM 9-2320-365-10).

**End of Task.**
4-21. ACCELERATOR PEDAL REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On 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)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Grease, Molybdenum Disulfide (Item 25, Appendix D)

a. Removal.

(1) Remove clip ring (1) from ball seat (2).

(2) Remove ball seat (2) and threaded rod (3) from ball stud (4).

(3) Remove two screws (6), washers (7), and accelerator pedal (5) from cab floor (8).

b Installation.

(1) Position accelerator pedal (5) on cab floor (8) with two washers (7) and screws (6).

(2) Tighten two screws (6) to 72-84 lb-in. (8-10 N·m).

(3) Apply grease to inside of ball seat (2).

(4) Install ball seat (2) and threaded rod (3) on ball stud (4).

(5) Install clip ring (1) on ball seat (2).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Depress accelerator pedal and check for smooth operation.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
# 4-22. CHECKING AND STENCILING HIGH/LOW HAND THROTTLE POSITIONS

This task covers:

| a. Checking High/Low Hand Throttle Positions | b. Stenciling High/Low Hand Throttle Positions |

## Equipment Conditions

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

## Tools and Special Tools

- STE/ICE-R (Item 39, Appendix C)
- Gloves, Rubber (Item 13, Appendix C)
- Respirator, Air Filter (Item 29, Appendix C)

## Materials/Parts

- Rubber Stamp Set, Fixed Type (Item 54, Appendix D)
- Polyurethane Coating (Item 49, Appendix D)
- Ink, Marking Stencil (Item 27, Appendix D)
- Inking Pad, Rubber Stamp (Item 28, Appendix D)

## References

- TM 9-4910-571-12&P
- TB 43-0209

## a. Checking High/Low Hand Throttle Positions.

1. Connect STE/ICE-R to DCA connector (1).
2. Start engine (TM 9-2320-365-10).

![Diagram](X2BPA01A)

3. Position HAND THROTTLE lever (2) so that upper edge of lever is even with line below L setting.

**NOTE**

Acceptable engine RPM with HAND THROTTLE lever at L setting is 1250-1450 RPM.

(5) Position HAND THROTTLE lever (2) so that upper edge of lever is even with line below H setting.

**NOTE**

Acceptable engine RPM with HAND THROTTLE lever at H setting is 2000-2200 RPM.

(6) Perform STE/ICE-R test #10.

(7) Perform subparagraph b. **Stenciling High/Low Hand Throttle Positions** if engine RPM results from steps (4) and (6) are not within acceptable limits.

### b. Stenciling High/Low Hand Throttle Positions.

(1) Paint over old high and low HAND THROTTLE lever position markings (TB 43-0209).
(2) Connect STE/ICE-R to DCA connector (1).
(3) Start engine (TM 9-2320-365-10).
(4) Perform STE/ICE-R test #10.
(5) Raise engine RPM to 1350 using HAND THROTTLE lever (2).

(6) Stencil a line even with top edge of HAND THROTTLE lever (2).

(7) Raise engine RPM to 2100 using HAND THROTTLE LEVER (2).

(8) Stencil a line even with top edge of HAND THROTTLE lever (2).

(9) Lower engine RPM to idle using HAND THROTTLE lever (2).

(10) Shut down engine (TM 9-2320-365-10).

(11) Stencil L above lower line.

(12) Stencil H above upper line.

End of Task.
CHAPTER 5
EXHAUST SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section I. INTRODUCTION

5-1. INTRODUCTION

This chapter contains maintenance instructions for replacing exhaust system components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

5-2. MUFFLER AND EXHAUST HEAT SHIELDS REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

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)
Drill, Electric, Portable (Item 7, Appendix C)
Drill Set, Twist (Item 6, Appendix C)
Drill, Twist (Item 8, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Nut, Self-Locking (2) (Item 141, Appendix G)
Nut, Self-Locking (4) (Item 138, Appendix G)
Nut, Self-Locking (Item 140, Appendix G)
Nut, Self-Locking (2) (Item 119, Appendix G)
Nut, Self-Locking (2) (Item 149, Appendix G)
Washer, Flat (4) (Item 271, Appendix G)
Screw, Cap (2) (Item 238, Appendix G)
Grommet, Nonmetallic (6) (Item 48, Appendix G)

Personnel Required
(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.

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

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

a. Removal.

(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

(2) Disconnect exhaust pipe (3) from muffler (4).

(4) Disconnect tail pipe (7) from muffler (4).

NOTE
Vehicle serial numbers 0001 through 3091 were originally equipped with different mounting hardware than vehicle serial numbers 3092 and higher. Perform steps (5) through (7) on vehicle serial numbers 0001 through 3091 that have not previously had a muffler replaced.

(5) Remove two screws (8) and washers (9) from muffler straps (10).

NOTE
Step (6) requires the aid of an assistant.

(6) Remove muffler (4) from two muffler support brackets (11).
(7) Remove four nuts (12), washers (13), screws (14), washers (15), and two resilient mounts (16) from muffler support brackets (11). Discard nuts, washers, screws, and resilient mounts.

**NOTE**

- Perform step (8) on vehicle serial numbers 3092 and higher, and vehicles that have previously had a muffler replaced.

- Step (8) requires the aid of an assistant.

(8) Remove two self-locking nuts (17), washers (18), rubber grommets (19), screws (20), washers (21), four rubber grommets (22), and muffler (4) from muffler support brackets (11). Discard self-locking nuts and rubber grommets.
(9) Remove four self-locking nuts (23), screws (24), and exhaust heat shield (25) from two muffler support brackets (11). Discard self-locking nuts.

(10) Remove two self-locking nuts (26), screws (27), and muffler straps (28) from muffler (4). Discard self-locking nuts.

b. Installation.

**NOTE**

Perform steps (1) through (5) on vehicle serial numbers 0001 through 3091 that have not previously had a muffler replaced.

(1) Scribe a line on muffler support bracket (1) 9.7 in. (24.6 cm) out from right frame rail (2).

(2) Scribe a line on muffler support bracket (1) 1.25 in. (3.2 cm) from front edge of front muffler support bracket.

(3) Drill a pilot hole at intersection of lines scribed in steps (1) and (2).

(4) Enlarge pilot hole to 16.5 mm.

(5) Perform steps (1) through (4) on rear muffler support bracket.
(6) Position two muffler straps (3) on muffler (4) with two screws (5) and self-locking nuts (6).

(7) Position exhaust heat shield (7) on two muffler support brackets (2) with four screws (8) and self-locking nuts (9).

(8) Tighten four self-locking nuts (9) to 25-29 lb-ft (34-39 N·m).

**NOTE**

Step (9) requires the aid of an assistant.

(9) Install muffler (4) on two muffler support brackets (2) with two rubber grommets (10), four rubber grommets (11), two washers (12), screws (13), washers (14), and self-locking nuts (15).
(10) Position tailpipe (16) on muffler (4) with clamp (17).

(11) Position exhaust pipe (18) on muffler (4) with clamp (19) and self-locking nut (20).

(12) Tighten self-locking nut (20) to 89-109 lb-in. (10-12 N·m).

(13) Tighten two self-locking nuts (6) to 42-52 lb-ft (51-71 N·m).

(14) Position self-locking nut (21) on clamp (17).

(15) Tighten self-locking nut (21) to 89-109 lb-in. (10-12 N·m).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check around muffler for exhaust leaks, excessive noise, and vibration.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
5-3. EXHAUST PIPE 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)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Nut, Self-Locking (4) (Item 140, Appendix G)
Nut, Self-Locking (3) (Item 119, Appendix G)

WARNING

• 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 vehicle with exhaust pipe removed. Toxic exhaust fumes may enter cab, resulting in serious injury or death to personnel.

a. Removal.

(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

(2) Disconnect exhaust pipe (3) from muffler (4).

(3) Remove clamp (2) from exhaust pipe (3).
(4) Remove two self-locking nuts (5), screws (6), and loop clamp half (7) from exhaust bracket (8). Discard self-locking nut.

(5) Remove two bolts (9) and exhaust bracket (8) from transmission (10).


(7) Remove exhaust pipe (3) from exhaust pipe (13).

(8) Remove clamp (12) from exhaust pipe (3).

(9) Remove two self-locking nuts (14), screws (15), and loop clamp half (16) from exhaust pipe bracket (17). Discard self-locking nuts.
5-3. EXHAUST PIPE REPLACEMENT (CONT)


(11) Remove exhaust pipe (13) from rear of turbocharger (20).

(12) Remove clamp (19) from exhaust pipe (13).

b. Installation.

(1) Install exhaust pipe (1) and clamp (2) to rear of turbocharger (3).

(2) Position self-locking nut (4) on clamp (2).

(3) Tighten self-locking nut (4) to 89-109 lb-in. (10-12 N·m).

(4) Position loop clamp half (5) on exhaust pipe bracket (6) with two screws (7) and self-locking nuts (8).

(5) Tighten two self-locking nuts (8) to 42-52 lb-ft (57-71 N·m).
(6) Position exhaust pipe (9) and clamp (10) on exhaust pipe (1).

(7) Position self-locking nut (11) on clamp (10).

(8) Tighten self-locking nut (11) to 89-109 lb-in. (10-12 N·m).

(9) Position exhaust bracket (12) on transmission (13) with two bolts (14).

(10) Tighten two bolts (14) to 44-55 lb-ft (60-75 N·m).

(11) Position loop clamp half (15) on muffler exhaust pipe (9) with two screws (16) and self-locking nuts (17).

(12) Tighten two self-locking nuts (17) to 42-52 lb-ft (57-71 N·m).

(13) Position exhaust pipe (9) and clamp (18) on muffler (19).

(14) Position self-locking nut (20) on clamp (18).

(15) Tighten self-locking nut (20) to 89-109 lb-in. (10-12 N·m).
5-3. EXHAUST PIPE REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check for exhaust leaks, excessive noise, and vibration.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
5-4. TAILPIPE REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

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)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts

- Nut, Self-Locking (4) (Item 140, Appendix G)
- Nut, Self-Locking (Item 119, Appendix G)

**WARNING**

- 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.

a. Removal.

(1) Loosen hose clamp (1) on particle extraction hose (2).

(2) Remove particle extraction hose (2) from tailpipe (3).
(3) Remove self-locking nut (4) from clamp (5). Discard self-locking nut.

(4) Disconnect tailpipe (3) from muffler (6).

(5) Remove clamp (5) from tailpipe (3).

(6) Remove two self-locking nuts (7), screws (8), and loop clamp halves (9) from tailpipe (3). Discard self-locking nuts.

(7) Remove two self-locking nuts (10), screws (11), and tailpipe bracket (12) from frame (13). Discard self-locking nuts.

b. Installation.

(1) Position tailpipe bracket (1) on frame (2) with two screws (3) and self-locking nuts (4).

(2) Tighten two self-locking nuts (4) to 42-52 lb-ft (57-71 N·m).

(3) Position two loop clamp halves (5) and tailpipe (6) on tailpipe bracket (1) with two screws (7) and self-locking nuts (8).
(4) Position clamp (9) and tailpipe (6) on muffler (10).

(5) Position self-locking nut (11) on clamp (9).

(6) Tighten self-locking nut (11) to 89-109 lb-in. (10-12 N·m).

(7) Tighten two self-locking nuts (8) to 42-52 lb-ft (57-71 N·m).

(8) Install particle extraction hose (12) on tailpipe (6) with hose clamp (13).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check around muffler and tailpipe for exhaust leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
CHAPTER 6
COOLING SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

Section I. INTRODUCTION

6-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and repairing cooling system components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
6-2. RADIATOR/CHARGE AIR COOLER REPLACEMENT

This task covers:

| a. Removal          | b. Installation | c. Follow-On Maintenance |

INITIAL SETUP

**Equipment Conditions**
Radiator fan shrouds removed (para 6-4).

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Sling, Cargo (Item 31, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Adapter, Socket Wrench (Item 2, Appendix B)

**Materials/Parts**
- Antiseize Compound (Item 63, Appendix D)
- Lockwasher (6) (Item 91, Appendix G)
- Nut, Self-Locking (4) (Item 140, Appendix G)
- Grommet, Nonmetallic (Item 49, Appendix G)
- Screw, Self-Locking (6) (Item 242, Appendix G)

**Personnel Required**
(2)

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**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) Disconnect air hose (1) from fitting (2).

(2) Remove fitting (2) from fan clutch assembly (3).
NOTE

Perform steps (3) through (6) on vehicles serial number 8426 and lower that have not had the fan clutch replaced.

(3) Remove six screws (4), lockwashers (5), and washers (6) from engine fan (7). Discard lockwashers.

**CAUTION**

Mark front of engine fan before removing. Failure to comply may result in damage to equipment.

(4) Remove engine fan (7) from fan clutch assembly (3).

(5) Remove fan support plate (8) from engine fan (7).

(6) Remove grommet (9) from engine fan (7). Discard grommet.

NOTE

Perform steps (6.1) and (6.2) on vehicles serial number 8427 and higher and on vehicles that have had the fan clutch replaced.

(6.1) Remove six nuts (9.1), lockwashers (9.2), and washers (9.3) from engine fan (9.4). Discard lockwashers.

**CAUTION**

Mark front of engine fan before removal. Failure to comply may result in damage to equipment.

(6.2) Remove engine fan (9.4) from fan clutch assembly (9.5).
(7) Remove four self-locking nuts (10) and screws (11) from two radiator mounting brackets (12). Discard self-locking nuts.

**NOTE**

- Additional coolant may drain out of radiator during removal.
- Steps (8) and (9) require the aid of an assistant.

(8) Slide radiator (13) to the rear approximately four inches, enough to clear left and right cab hinge pins (14).
**WARNING**

- Radiator and charge air cooler assembly weigh approximately 160 lbs (73 Kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

- Cargo sling must be placed under charge air cooler inlet and outlet ports. Failure to comply may result in injury to personnel or damage to equipment.

9) Remove radiator (13) and charge air cooler (15) from vehicle.

10) Remove six screws (16) and charge air cooler (15) from two radiator mounting brackets (12).

11) Remove ten screws (17) and two radiator mounting brackets (12) from radiator (13).

b. Installation.

(1) Position two radiator mounting brackets (1) on radiator (2) with ten screws (3).

(2) Tighten ten screws (3) to 20-26 lb-ft (27-35 N·m).

(3) Position charge air cooler (4) between two radiator mounting brackets (1) with six screws (5).

(4) Tighten six screws (5) to 20-26 lb-ft (27-35 N·m).
WARNING

- Radiator and charge air cooler assembly weigh approximately 160 lbs (73 Kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

- Cargo sling must be placed under charge air cooler inlet port and outlet port. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Use caution when lowering radiator and charge air cooler into vehicle. Failure to comply may result in damage to equipment.

NOTE

Step (5) requires the aid of an assistant.

(5) Position radiator (2) and charge air cooler (4) in vehicle.

(6) Position four screws (6) and self-locking nuts (7) through frame rails (8) and two radiator mounting brackets (1).

(7) Tighten four self-locking nuts (7) to 42-52 lb-ft (57-71 N·m).
CAUTION

Ensure engine fan is positioned with mark facing forward. Failure to comply may result in damage to equipment.

NOTE

Perform steps (7.1) through (7.3) on vehicles serial number 8427 and higher and on vehicles that have had the fan clutch replaced.

(7.1) Position engine fan (8.1) on fan clutch assembly (8.2) with six washers (8.3), lockwashers (8.4) and nuts (8.5).

(7.2) Tighten six nuts (8.5) to 15 lb-ft (20 N·m) in sequence shown.

(7.3) Re-tighten six nuts (8.5) to 23-29 lb-ft (31-39 N·m) in sequence shown.

NOTE

Perform steps (8) through (12) on vehicles serial number 8426 and lower that have not had fan clutch replaced.

(8) Install grommet (9) on engine fan (10).

(9) Install fan support plate (11) on engine fan (10).

(10) Position engine fan (10) and fan support plate (11) on fan clutch assembly (12) with six washers (13), lockwashers (14), and screws (15).

(11) Tighten six screws (15) to 15 lb-ft (20 N·m) in sequence shown.

(12) Re-tighten six screws (15) to 22-32 lb-ft (30-44 N·m) in sequence shown.
6-2. RADIATOR/CHARGE AIR COOLER REPLACEMENT (CONT)

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.

(13) Apply antiseize compound to threads of fitting (16).

(14) Install fitting (16) in fan clutch assembly (12).

(15) Connect air hose (17) to fitting (16).

c. Follow-On Maintenance.

Install radiator fan shrouds (para 6-4).

End of Task.
6-3. RADIATOR OVERFLOW TANK AND BRACKET REPLACEMENT/REPAIR

This task covers:

- a. Radiator Overflow Tank Removal
- b. Radiator Overflow Tank Disassembly
- c. Radiator Overflow Tank Assembly
- d. Radiator Overflow Tank Installation
- e. Radiator Overflow Tank Bracket Removal
- f. Radiator Overflow Tank Bracket Installation
- g. 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
- Pan, Drain (Item 24, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Screwdriver Attachment, Socket Wrench (Item 44, Appendix B)
- Socket Set, Socket Wrench (Item 35, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Tools and Special Tools (Cont)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

Materials/Parts
- Antiseize Compound (Item 63, Appendix D)
- Nut, Self-Locking (Item 148, Appendix G)
- Nut, Self-Locking (3) (Item 140, Appendix G)
- Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)
- Nut, Self-Locking (Item 136, Appendix G)

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.

a. Radiator Overflow Tank Removal.

(1) Remove radiator cap (1) from radiator overflow tank (2).

(2) Position drain pan under radiator draincock (3).

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.

(3) Open radiator draincock (3) and drain approximately three gallons (11 L) of coolant.

(4) Close radiator draincock (3).

(5) Loosen hose clamp (4) on lower coolant hose (5).

(6) Remove lower coolant hose (5) from radiator overflow tank (2).
(7) Loosen two hose clamps (6) on upper coolant hoses (7 and 8).

(8) Remove upper coolant hoses (7 and 8) from radiator overflow tank (2).

(9) Loosen screw (9) and remove clamp (10) from bracket (11).

(10) Remove radiator overflow tank (2) from bracket (11).

b. Radiator Overflow Tank Disassembly.

**NOTE**
Perform step (1) on all models except M1081.

(1) Remove 90-degree fitting (1) from radiator overflow tank (2).

**NOTE**
Perform step (2) on M1081.

(2) Remove 45-degree fitting (3) from radiator overflow tank (2).
(3) Remove two adapters (4) from radiator overflow tank (2).

(4) Remove two sightglasses (5) from radiator overflow tank (2).

c. Radiator Overflow Tank Assembly.

**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 two sightglasses (1) and adapters (2).

(2) Install two sightglasses (1) in radiator overflow tank (3).

(3) Install two adapters (2) in radiator overflow tank (3).
6-3. RADIATOR OVERFLOW TANK AND BRACKET REPLACEMENT/REPAIR (CONT)

**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.

**NOTE**

Perform step (4) on M1081.

(4) Install 45-degree fitting (4) in radiator overflow tank (3).

**NOTE**

Perform step (5) on all models except M1081.

(5) Install 90-degree fitting (5) in radiator overflow tank (3).

d. Radiator Overflow Tank Installation.

**NOTE**

If replacing radiator overflow tank PN 12421810 with radiator overflow tank PN 12421810-001 or PN 12421810-002, replace clamp PN 12421379-004 with clamp PN 12421379-006.

(1) Position radiator overflow tank (1) on bracket (2) with clamp (3) and screw (4).

(2) Tighten screw (4) to 108-132 lb-in. (12-15 N·m).
(3) Position two hose clamps (5) and upper coolant hoses (6 and 7) on radiator overflow tank (1).

(4) Position hose clamp (8) and lower coolant hose (9) on radiator overflow tank (1).

(5) Tighten two hose clamps (5) and hose clamp (8) to 36-44 lb-in. (4-5 N·m).

e. Radiator Overflow Tank Bracket Removal.

   NOTE
   Perform step (1) on all models except M1081.

(1) Remove self-locking nut (1), washer (2), screw (3), and washer (4) from radiator overflow tank bracket (5). Discard self-locking nut.

   NOTE
   Perform step (2) on M1081.

(2) Remove self-locking nut (6), washer (7), screw (8), washer (9), and spacer (10) from radiator overflow tank bracket (5). Discard self-locking nut.
(3) Remove self-locking nut (11), screw (12), and chain (13), from radiator overflow tank bracket (5). Discard self-locking nut.

(4) Remove three self-locking nuts (14), bolts (15), and radiator overflow tank bracket (5) from front lifting bracket (16). Discard self-locking nuts.

f. Radiator Overflow Tank Bracket Installation.

(1) Position radiator overflow tank bracket (1) on front lifting bracket (2) with three bolts (3) and self-locking nuts (4).

(2) Tighten three bolts (3) to 44-56 lb-ft (60-76 N·m).
(3) Position chain (5), screw (6), and self-locking nut (7) in radiator overflow tank bracket (1).

(4) Tighten screw (6) to 22-26 lb-ft (30-35 N·m).

NOTE

Perform steps (5) and (6) on M1081.

(5) Position washer (8), screw (9), spacer (10), washer (11), and self-locking nut (12) in radiator overflow tank bracket (1).

(6) Tighten self-locking nut (12) to 22-26 lb-ft (30-35 N·m).

NOTE

Perform steps (7) and (8) on all models except M1081.

(7) Position washer (13), screw (14), washer (15), and self-locking nut (16) in radiator overflow tank bracket (1).

(8) Tighten self-locking nut (16) to 22-26 lb-ft (30-35 N·m).
g. Follow-On Maintenance.

(1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check for coolant leaks under vehicle.

(5) Check coolant level after normal operating temperature is reached. Add coolant as needed (TM 9-2320-365-10).

(6) Raise cab (TM 9-2320-365-10).

(7) Check for coolant leaks around radiator overflow tank.

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.
6-4. RADIATOR FAN SHROUDS REPLACEMENT

This task covers:

a. Top Radiator Fan Shroud Removal  
b. Top Radiator Fan Shroud Installation  
c. Bottom Radiator Fan Shroud Removal  
d. Bottom Radiator Fan Shroud Installation  
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Turbocharger to charge air cooler tube/hoses removed (para 4-4).  
Charge air cooler to air inlet elbow tubes/hoses removed (para 4-5).  
Upper coolant tube and hoses removed (para 6-9).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)  
Container (52 qt (50 L) capacity)  
Socket Set, Socket Wrench (Item 35, Appendix C)

Tools and Special Tools (Cont)  
Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)  
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Nut, Self-Locking (6) (Item 116, Appendix G)  
Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)  
Sealing 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. Top Radiator Fan Shroud Removal.

(1) Loosen hose clamp (1) on radiator vent hose (2).

(2) Disconnect radiator vent hose (2) from radiator (3).

(3) Disconnect fan clutch hoses (4 and 5) from 90-degree fitting (6).
6-4. RADIATOR FAN SHROUDS REPLACEMENT (CONT)

(4) Remove three self-locking nuts (7), six washers (8), and three screws (9) from left side of top radiator fan shroud (10). Discard self-locking nuts.

(5) Remove screw (11) and washer (12) from left side of top radiator fan shroud (10).

(6) Remove three self-locking nuts (7), six washers (8), three screws (9), clamp (13), and fan clutch hose (4) from right side of top radiator fan shroud (10). Discard self-locking nuts.

(7) Remove screw (14) and washer (15) from right side of top radiator fan shroud (10).

(8) Remove top radiator fan shroud (10) from vehicle.

(9) Remove 90-degree fitting (6) from pipe coupling (11).

(10) Remove fitting (12) from pipe coupling (11).

(11) Remove nut (13), washer (14), and pipe coupling (11) from top radiator fan shroud (10).
b. **Top Radiator Fan Shroud Installation.**

(1) Install coupling (1) in top radiator fan shroud (2) with washer (3) and nut (4).

**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.

(2) Apply sealing compound to threads of 90-degree fitting (5) and fitting (6).

(3) Install fitting (6) in pipe coupling (1).

(4) Install 90-degree fitting (5) in pipe coupling (1).

(5) Position top radiator fan shroud (2) on vehicle.

**WARNING**

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

(6) Apply sealing compound to threads of screw (7).

(7) Position washer (8) and screw (7) on right side of radiator fan shroud (2).

(8) Tighten screw (7) to 84-108 lb-in. (10-12 N·m).

(9) Position fan clutch hose (9), clamp (10), six washers (11), three screws (12) and self-locking nuts (13) on right side of top radiator fan shroud (2).

(10) Tighten three self-locking nuts (13) to 84-108 lb-in. (10-12 N·m).
6-4. RADIATOR FAN SHROUDS REPLACEMENT (CONT)

WARNING

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

(11) Apply sealing compound to threads of screw (14).

(12) Install washer (15) and screw (14) on left side of top radiator fan shroud (2).

(13) Tighten screw (14) to 84-108 lb-in. (10-12 N·m).

(14) Position six washers (11), three screws (12), and self-locking nuts (13) on left side of top radiator fan shroud (2).

(15) Tighten three self-locking nuts (13) to 84-108 lb-in. (10-12 N·m).

(16) Connect fan clutch hoses (9 and 16) to 90-degree fitting (5).

(17) Install radiator vent hose (17) on radiator (18) with hose clamp (19).

c. Bottom Radiator Fan Shroud Removal.

(1) Position container under radiator (1).

(2) Remove radiator cap (2) from radiator overflow tank (3).

(3) Open radiator draincock (4) and drain coolant from radiator (1).

(4) Close radiator draincock (4).
(5) Loosen clamps (5 and 6) on lower coolant hose (7).

(6) Remove lower coolant hose (7) from radiator (1) and transmission oil cooler (8).

(7) Remove radiator draincock (4) from radiator (1).

(8) Remove three self-locking nuts (9), six washers (10), and three screws (11) from left side of bottom radiator fan shroud (12). Discard self-locking nuts.
6-4. RADIATOR FAN SHROUDS REPLACEMENT (CONT)

(9) Remove three self-locking nuts (13), six washers (14), three screws (15), clamp (16), and fan clutch hose (4) from right side of bottom radiator fan shroud (12). Discard self-locking nuts.

(10) Remove two screws (17) and washers (18) from each side of bottom radiator fan shroud (12).

(11) Remove bottom radiator fan shroud (12) and two engine airflow baffles (19).
d. Bottom Radiator Fan Shroud Installation.

(1) Position bottom radiator fan shroud (1) in mounting location.

(2) Position two engine airflow baffles (2) between bottom radiator fan shroud (1) and radiator (3).

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.

(3) Apply sealing compound to threads of four screws (5).

(4) Position two washers (4) and screws (5) in each side of bottom radiator fan shroud (1).
6-4. RADIATOR FAN SHROUDS REPLACEMENT (CONT)

- (5) Position six washers (6), three screws (7), and self-locking nuts (8) on left side of bottom radiator fan shroud (1).

- (6) Tighten three self-locking nuts (8) to 84-108 lb-in. (10-12 N·m).

- (7) Position six washers (9), three screws (10), self-locking nuts (11), fan clutch hose (12), and clamp (13) on right side of bottom radiator fan shroud (1).

- (8) Tighten three self-locking nuts (11) to 84-108 lb-in. (10-12 N·m).

- (9) Tighten two screws (5) on each side of bottom radiator fan shroud (1) to 84-108 lb-in (10-12 N·m).
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.

(10) Apply antiseize compound to threads of radiator draincock (14).

(11) Install radiator draincock (14) in radiator (3).

(12) Loosen two screws (15) in clamps (16) as far as possible without disengaging screws from D-nuts (17).

(13) Unhook clamp tabs (18) from tab windows (19).

CAUTION

• Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

• Position clamps so that screws will be toward center of vehicle and angled down.

(14) Position two clamps (16) on lower coolant hose (20).
(15) Install lower coolant hose (20) between radiator (3) and transmission oil cooler (21).

(16) Engage as many clamp tabs (18) as possible in tab windows (19) allowing little or no play between clamps (16) and lower coolant hose (20).

(17) Tighten two clamps (16) to 12-18 lb-in. (1-2 N·m).

**NOTE**
Minimum allowable gap on clamp is 0.2 in. (5 mm). If gap is less than 0.2 in. (5 mm), remove and re-install clamp.

(18) Measure gap on two clamps (16).

**e. Follow-On Maintenance.**

(1) Install upper coolant tube and hoses (para 6-9).

(2) Install charge air cooler to air inlet elbow tubes/hoses (para 4-5).

(3) Install turbocharger to charge air cooler tube/hoses (para 4-4).

(4) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(5) Check for coolant leaks under vehicle.

(6) Start engine (TM 9-2320-365-10).

(7) Check for coolant leaks under vehicle.
6-4. RADIATOR FAN SHROUDS REPLACEMENT (CONT)

(8) Check coolant level after normal operating temperature is reached. Add coolant as required.

(9) Install radiator cap on radiator overflow tank.

(10) Check for coolant leaks under vehicle.

(11) Raise cab (TM 9-2320-365-10).

(12) Check for coolant leaks in engine compartment.

(13) Check to make sure engine fan does not contact fan shroud.

(14) Lower cab (TM 9-2320-365-10).

(15) Shut down engine (TM 9-2320-365-10).

End of Task.
6-5. THERMOSTAT 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)
Pan, Drain (Item 24, Appendix C)

Goggles, Industrial (Item 15, Appendix C)
Gloves, Rubber (Item 13, Appendix C)

Materials/Parts
Gasket and Preformed Packing Set (Item 42.1,
Appendix G)
Adhesive (Item 6, Appendix D)

a. Removal.

(1) Position drain pan under thermostat housing (1).

(2) Remove two screws (2) and washers (3) from outlet housing (4).

(3) Remove outlet housing (4) from thermostat housing (1).

(4) Remove thermostat (5) from thermostat housing (1).

(5) Remove thermostat gasket (6) from thermostat housing (1). Discard thermostat gasket.

(6) Remove thermostat gasket debris from outlet housing (4) and thermostat housing (1).
6-5. THERMOSTAT REPLACEMENT (CONT)

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 adhesive to thermostat housing surface (1).
2. Position thermostat gasket (2) on thermostat housing (1).
3. Install thermostat (3) with long end up.
4. Apply adhesive to outlet housing (4) mating surface.
5. Install outlet housing (4) on thermostat housing (1) with two washers (5) and screws (6).

c. Follow-On Maintenance.

1. Lower cab (TM 9-2320-365-10).
2. Add coolant to bottom of radiator overflow tank filler neck (TM 9-2320-365-10).
3. Check for coolant leaks under vehicle.
5. Check coolant level after normal operating temperature is reached. Add coolant as required (TM 9-2320-365-10).
(7) Check thermostat housing for coolant leaks.

(8) Install radiator cap on radiator overflow tank.

(9) Lower cab (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

End of Task.
6-6. THERMOSTAT HOUSING REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Thermostat removed (para 6-5).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Pan, Drain (Item 24, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Gloves, Rubber (Item 13, Appendix C)

Materials/Parts
Packing, Preformed (Item 178, Appendix G)
Adhesive (Item 6, Appendix D)
Antifreeze, Ethylene Glycol, Permanent (Item 13,
Appendix D)
Antiseize Compound (Item 63, Appendix D)

a. Removal.

(1) Position drain pan under thermostat housing (1).

(2) Disconnect heater tube (2) from fitting (3).

(3) Loosen hose clamp (4) on radiator fill hose (5).

(4) Disconnect radiator fill hose (5) from fitting (6).

(5) Disconnect connector clamp (7) from water temperature
transducer connector (8).

(6) Disconnect water temperature transducer connector (8)
from connector P41 (9).

(7) Remove water temperature transducer (10) from tee
fitting (11).

(8) Disconnect connector clamp (12) from water temperature
light switch connector (13).

(9) Disconnect water temperature light switch connector (13)
from connector P37 (14).

(10) Remove water temperature light switch (15) from
thermostat housing (1).
(11) Loosen hose clamp (16) on transmission oil cooler hose (17).

(12) Disconnect transmission oil cooler hose (17) from thermostat housing (1).

(13) Disconnect compressor inlet coolant tube (18) from 90-degree fitting (19).

(14) Remove two screws (20) from thermostat housing (1).

(15) Remove thermostat housing (1) and gasket (21) from engine block (22). Discard gasket.

(16) Remove 90-degree fitting (19) from thermostat housing (1).

(17) Remove preformed packing (23) from 90-degree fitting (19). Discard preformed packing.

(18) Remove gasket debris from thermostat housing (1).

(19) Remove tee fitting (11) from thermostat housing (1).

(20) Remove fitting (6) from tee fitting (11).

(21) Remove fitting (24) from thermostat housing (1).
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 with soap and water. Failure to comply may result in injury to personnel.

1. Apply adhesive to threads of tee fitting (1) and fittings (2 and 3).
2. Install fitting (2) in tee fitting (1).
3. Install tee fitting (1) in thermostat housing (4).
4. Install fitting (3) in thermostat housing (4).
5. Install preformed packing (5) on 90-degree fitting (6).
6. Install 90-degree fitting (6) in thermostat housing (4).
7. Apply adhesive to surfaces of thermostat housing (4) and engine block (7).
8. Position gasket (8) on engine block (7).
9. Install thermostat housing (4) on engine block (7) with two screws (9).
(10) Connect compressor inlet coolant tube (10) to 90-degree fitting (6).

(11) Install transmission oil cooler hose (11) on thermostat housing (4) with hose clamp (12).

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 with soap and water. Failure to comply may result in injury to personnel.

(12) Apply antiseize compound to threads of water temperature light switch (13).

(13) Install water temperature light switch (13) in thermostat housing (4).

(14) Connect water temperature light switch connector (14) to connector P37 (15).

(15) Connect connector clamp (16) on water temperature light switch connector (14).
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 with soap and water. Failure to comply may result in injury to personnel.

(16) Apply antisize compound to threads of water temperature transducer (17).

(17) Install water temperature transducer (17) in tee fitting (1).

(18) Connect water temperature transducer connector (18) to connector P41 (19).

(19) Connect connector clamp (20) on water temperature transducer connector (18).

(20) Install radiator fill hose (21) on fitting (2) with hose clamp (22).

(21) Connect heater tube (23) to fitting (3).

c. Follow-On Maintenance.

(1) Install thermostat (para 6-5).

(2) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check for coolant leaks under vehicle.

(6) Check coolant level after normal operating temperature is reached. Add coolant as required (TM 9-2320-365-10).

(7) Check for coolant leaks under vehicle.
(8) Raise cab (TM 9-2320-365-10).

(9) Check for coolant leaks at thermostat housing.

(10) Lower cab (TM 9-2320-365-10).

(11) Shut down engine (TM 9-2320-365-10).

End of Task.
6-7. COOLANT BYPASS 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).
Batteries disconnected (para 7-48).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Container (52 qt (50 L) capacity)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Nut, Self-Locking (Item 116, Appendix G)

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 (3).

(3) Open radiator draincock (4) and drain coolant.

(4) Close radiator draincock (4).
(5) Remove self-locking nut (5), washer (6), screw (7), and clamp (8) from bracket (9). Discard self-locking nut.

(6) Remove clamp (8) from coolant bypass tube (10).

(7) Disconnect connector clamp (11) from ether sensor connector (12).

(8) Disconnect ether sensor connector (12) from connector P42 (13).

(9) Loosen two clamps (14) on coolant hose (15).

(10) Remove coolant hose (15) and flow restrictor (16) from transmission oil cooler (17).

(11) Remove coolant hose (15) and two clamps (14) from coolant bypass tube (10).
(12) Loosen two clamps (18) on coolant hose (19).

(13) Remove coolant bypass tube (10) from coolant hose (19).

(14) Remove coolant hose (19) from thermostat housing (20).

(15) Remove ether sensor (21) from coolant bypass tube (10).
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 ether sensor (1).

2. Install ether sensor (1) in coolant bypass tube (2).

**NOTE**

Both coolant hoses are assembled the same way. Only one shown.

3. Loosen two screws (3) in clamps (4) and clamps (5) as far as possible without disengaging screws from D-nuts (6).

4. Unhook clamp tabs (7) from tab windows (8).
CAUTION

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(5) Position two clamps (4) on coolant hose (9).
(6) Position two clamps (5) on coolant hose (10).
(7) Position coolant hose (9) on thermostat housing (11).
(8) Position coolant bypass tube (2) in coolant hose (9).
(9) Engage as many clamp tabs (7) as possible in tab windows (8) allowing little or no play between two clamps (4) and coolant hose (9).
(10) Position coolant hose (10) on coolant bypass tube (2).

(11) Position flow restrictor (12) and coolant hose (10) on transmission oil cooler (13).

(12) Engage as many clamp tabs (7) as possible in tab windows (8) allowing little or no play between two clamps (5) and coolant hose (10).

(13) Tighten two clamps (5) to 12-18 lb-in. (1-2 N·m).

(14) Tighten two clamps (4) to 12-18 lb-in. (1-2 N·m).

**NOTE**

Minimum allowable gap on clamp is 0.2 in. (5 mm). If gap is less than 0.2 in. (5 mm), remove and re-install clamp.

(15) Measure gap on two clamps (5).
(16) Measure gap on two clamps (4).

(17) Install clamp (14) on coolant bypass tube (2).

(18) Install clamp (14) on bracket (15) with screw (16), washer (17), and self-locking nut (18).

(19) Connect connector P42 (19) to ether sensor connector (20).

(20) Connect connector clamp (21) on ether sensor connector (20).
c. **Follow-On Maintenance.**

1. Connect batteries (para 7-48).
2. Add coolant to radiator overflow tank (TM 9-2320-365-10).
5. Check for coolant leaks under vehicle.
6. Check coolant level after normal operating temperature is reached. Add coolant as required (TM 9-2320-365-10).
7. Install radiator cap on radiator overflow tank.
8. Check for coolant leaks under vehicle.
10. Check around transmission oil cooler, thermostat, and coolant bypass tube for coolant leaks.

**End of Task.**
6-8. PERSONNEL HEATER HOSES REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Container (10 gal (38 L) capacity)
Tool Kit, Genl Mech (Item 44, Appendix C)

Tools and Special Tools (Cont)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)

**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.

a. Removal.

(1) Remove radiator cap (1) from radiator overflow tank (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.

(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).
NOTE

Remove plastic cable ties as required.

(5) Remove two screws (4) and washers (5) from front grille (6).

(6) Remove screw (7) and washer (8) from front grille (6).

(7) Remove front grille (6) from cab (9).

(8) Loosen clamp (10) on heater inlet hose (11).

(9) Remove heater inlet hose (11) from supply fitting (12).

(10) Loosen clamp (13) on heater outlet hose (14).

(11) Remove heater outlet hose (14) from return fitting (15).

(12) Raise cab (TM 9-2320-365-10).

(13) Loosen clamp (16) on heater inlet hose (11).

(14) Remove heater inlet hose (11) from supply tube (17).
(15) Loosen clamp (18) on heater outlet hose (14).

(16) Remove heater outlet hose (14) from return fitting (19).

b. Installation.

(1) Loosen four screws (1) in clamps (2) as far as possible without disengaging screws from D-nuts (3).

(2) Unhook clamp tabs (4) from tab windows (5).

CAUTION

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(3) Position two clamps (2) on heater outlet hose (6).

(4) Position two clamps (2) on heater inlet hose (7).
(5) Position heater outlet hose (6) on return fitting (8).

(6) Engage as many clamp tabs (4) as possible in tab windows (5) allowing little or no play between clamp (2) and heater outlet hose (6).

(7) Tighten clamp (2) to 12-18 lb-in. (1-2 N·m).

(8) Position heater inlet hose (7) on supply tube (9).

(9) Engage as many clamp tabs (4) as possible in tab windows (5) allowing little or no play between clamp (2) and heater inlet hose (7).

(10) Tighten clamp (2) to 12-18 lb-in. (1-2 N·m).
6-8. PERSONNEL HEATER HOSES REPLACEMENT (CONT)

(11) Lower cab (TM 9-2320-365-10).

**NOTE**
Heater outlet hose is marked with an arrow pointing down.

(12) Position heater outlet hose (6) on return fitting (10).

**NOTE**
Heater inlet hose is marked with an arrow pointing up.

(13) Position heater inlet hose (7) on supply fitting (11).

(14) Engage as many clamp tabs (4) as possible in tab windows (5) allowing little or no play between clamps (2) and heater outlet hose (6) and heater inlet hose (7).

(15) Tighten two clamps (2) to 8-9-in. (1 N·m).

(16) Raise cab (TM 9-2320-365-10).

**NOTE**
Minimum allowable gap on clamp is 0.1 in. (0.3 cm). If gap is less than 0.1 in. (0.3 cm), remove and re-install clamp.

(17) Measure gap on two clamps (2).
(18) Measure gap on clamp (2).

(19) Measure gap on clamp (2).

(20) Lower cab (TM 9-2320-365-10).

(21) Position front grille (12) on cab (13) with washer (14) and screw (15).

(22) Position two washers (16) and screws (17) in front grille (12).

(23) Tighten screw (15) to 48-60 lb-in. (5-7 N·m).

(24) Tighten two screws (17) to 24 lb-in. (3 N·m).
c. Follow-On Maintenance.

(1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Operate personnel heater (TM 9-2320-365-10).

(4) Raise cab (TM 9-2320-365-10).

(5) Check for coolant leaks around hoses and fittings.

(6) Lower cab (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
6-9. UPPER COOLANT TUBE AND HOSES 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).
- Batteries disconnected (para 7-48).

**Materials/Parts**
- Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)
- Antiseize Compound (Item 63, Appendix D)

**Tools and Special Tools**
- Pan, Drain (Item 24, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**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.

**a. Removal.**

1. Remove radiator cap (1) from radiator overflow tank (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.

2. Position drain pan under radiator (3).

3. Open radiator draincock (4) and drain approximately one gallon of coolant.

(5) Disconnect connector clamp (5) from water temperature switch electrical connector (6).

(6) Disconnect water temperature switch electrical connector (6) from connector P36 (7).

(7) Remove water temperature switch (8) from upper coolant tube (9).

(8) Loosen four hose clamps (10) on coolant hoses (11 and 12).

(9) Slide coolant hose (11) completely onto upper coolant tube (9).

(10) Remove upper coolant tube (9) from vehicle.

(11) Remove coolant hose (12) from radiator (3).
(12) Remove coolant hose (11) from upper coolant tube (9).

(13) Remove four clamps (10) from coolant hoses (11 and 12).

b. Installation.

NOTE
Both coolant hoses are assembled the same way. One coolant hose shown.

(1) Loosen two screws (1) in clamps (2) as far as possible without disengaging screws from D-nuts (3).

(2) Unhook clamp tabs (4) from tab windows (5).
6-9. UPPER COOLANT TUBE AND HOSES REPLACEMENT (CONT)

CAUTION

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(3) Position two clamps (2) on coolant hose (6).

(4) Perform steps (1) through (3) on coolant hose (7).

(5) Position coolant hose (6) on upper coolant tube (8).

(6) Position coolant hose (7) on radiator (9).
(7) Position upper coolant tube (8) between coolant hose (7) and thermostat housing (10).

(8) Slide coolant hose (6) onto thermostat housing (10).

(9) Engage as many clamp tabs (4) as possible in tab windows (5) allowing little or no play between four clamps and two coolant hoses (6 and 7).

(10) Tighten four clamps (2) to 12-18 lb-in. (1-2 N·m).

**NOTE**
Minimum allowable gap on clamp is 0.2 in. (5 mm). If gap is less than 0.2 in. (5 mm), remove and re-install clamp.

(11) Measure gap on four clamps (2).
6-9. UPPER COOLANT TUBE AND HOSES REPLACEMENT (CONT)

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.

(12) Apply antiseize compound to threads of water temperature switch (11).

(13) Install water temperature switch (11) in upper coolant tube (8).

(14) Connect water temperature switch electrical connector (12) to connector P36 (13).

(15) Connect connector clamp (14) on water temperature switch electrical connector (12).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check for coolant leaks under vehicle.

(5) Remove radiator cap from radiator overflow tank.

(6) Check coolant level after normal operating temperature is reached. Add coolant as required (TM 9-2320-365-10).

(7) Install radiator cap on radiator overflow tank.

(8) Raise cab (TM 9-2320-365-10).

(9) Check for coolant leaks around hoses and fittings.

(10) Lower cab (TM 9-2320-365-10).

(11) Shut down engine (TM 9-2320-365-10).

End of Task.
6-10. LOWER COOLANT HOSE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Container (52 qt (50 L) capacity)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Antifreeze, Ethylene Glycol, Permanent
(Item 13, Appendix D)

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.

a. Removal.

(1) Remove radiator cap (1) from radiator overflow tank (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.

(2) Position container under radiator draincock (3).

(3) Open radiator draincock (3) and drain coolant.

(4) Close radiator draincock (3).
(5) Loosen two clamps (4) on lower coolant hose (5).

(6) Remove lower coolant hose (5) from radiator (6) and transmission oil cooler (7).

b. Installation.

(1) Loosen two screws (1) in clamps (2) as far as possible without disengaging screws from D-nuts (3).

(2) Unhook clamp tabs (4) from tab windows (5).
CAUTION

- Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

- Position clamps so that screws will be toward center of vehicle and angled down.

(3) Position two clamps (2) on lower coolant hose (6).

(4) Install lower coolant hose (6) between radiator (7) and transmission oil cooler (8).

(5) Engage as many clamp tabs (4) as possible in tab windows (5) allowing little or no play between clamp and lower coolant hose (6).

(6) Tighten two clamps (2) to 12-18 lb-in. (1-2 N·m).

NOTE

Minimum allowable gap on clamp is 0.2 in. (0.5 cm). If gap is less than 0.2 in. (0.5 cm), remove and re-install clamp.

(7) Measure gap on two clamps (2).
c. Follow-On Maintenance.

(1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(2) Install radiator cap on radiator overflow tank.

(3) Start engine (TM 9-2320-365-10).

(4) Check for coolant leaks around lower coolant hose.

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
6-11. AIR COMPRESSOR INLET AND OUTLET COOLANT TUBES 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
Pan, Drain (Item 24, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)

Materials/Parts
Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)

a. Removal.

(1) Position drain pan under air compressor (1).

(2) Disconnect air compressor inlet coolant tube (2) from air compressor (1).

(3) Disconnect air compressor inlet coolant tube (2) from water pump (3).

(4) Remove air compressor inlet coolant tube (2) from vehicle.
(5) Disconnect air compressor outlet coolant tube (4) from air compressor (1).

(6) Disconnect air compressor outlet coolant tube (4) from thermostat housing (5).

(7) Remove air compressor outlet coolant tube (4) from vehicle.

b. Installation.

(1) Connect air compressor outlet coolant tube (1) to thermostat housing (2).
(2) Connect air compressor outlet coolant tube (1) to air compressor (3).

(3) Connect air compressor inlet coolant tube (4) to water pump (5).

(4) Connect air compressor inlet coolant tube (4) to air compressor (3).
6-11. AIR COMPRESSOR INLET AND OUTLET COOLANT TUBES REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check for coolant leaks under vehicle.

(5) Check coolant level after normal operating temperature is reached. Add coolant as needed (TM 9-2320-365-10).

(6) Install radiator cap on radiator overflow tank.

(7) Raise cab (TM 9-2320-365-10).

(8) Check for coolant leaks around coolant lines and fittings.

(9) Lower cab (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

End of Task.
6-12. WATER PUMP AND FITTINGS REPLACEMENT

This task covers:

a. Water Pump Removal
b. Water Pump Installation
c. Fittings Removal
d. Fittings Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
100 amp alternator removed, if equipped (para 7-2).
200 amp alternator removed, if equipped (para 20-56).
Alternator brackets removed (para 7-4).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Container (52 qt (50 L) capacity)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Wrench, Adjustable, Automotive (Item 51, Appendix C)
Gage, Belt Tension (Item 16, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Packing, Preformed (Item 172, Appendix G)
Packing, Preformed (Item 191, Appendix G)
Packing, Preformed (3) (Item 182, Appendix G)
Packing, Preformed (2) (Item 179, Appendix G)
Antifreeze, Ethylene Glycol, Permanent (Item 12, 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. Water Pump Removal.

(1) Position container under radiator (1).

(2) Remove radiator cap (2) from radiator overflow tank (3).

(3) Open radiator draincock (4) and drain coolant.

(4) Close radiator draincock (4).
(5) Disconnect heater supply tube (5) from fitting (6).

(6) Remove 45-degree fitting (6) and preformed packing (7) from water pump (8). Discard preformed packing.

(7) Loosen two clamps (9).

(8) Remove coolant hose (10) from water pump (8).

(9) Disconnect coolant tubes (11 and 12) from water pump (8).

**NOTE**

Note position and size of washers prior to removal.

(10) Remove two screws (13), washers (14), and drive belt/tension pulley (15) from engine (16).

(11) Remove water pump drive belt (17) from water pump (8).
(12) Remove four screws (18) from water pump (8).

(13) Remove water pump (8) and preformed packings (19 and 20) from engine (16). Discard preformed packings.

b. Water Pump Installation.

(1) Install preformed packings (1 and 2) in water pump (3).

(2) Position water pump (3) on engine (4) with four screws (5).

(3) Tighten four screws (5) to 33-47 lb-ft (45-64 N·m).
(4) Position drive belt/tension pulley (6) on engine (4) with two washers (7) and screws (8).

(5) Install water pump drive belt (9) on water pump (3) and drive belt/tension pulley (6).

**NOTE**

Use square hole in drive belt/tension pulley to apply and maintain tension on drive belt while adjusting belt tension.

(6) Adjust water pump drive belt (9) with drive belt/tension pulley (6) as follows:

a. New belt (less than 30 minutes running time) 115-125 lb (512-556 N).

b. Used belt 80-100 lb (356-444 N).

(7) Tighten two screws (8) to 35 lb-ft (47 N·m).

(8) Connect coolant tubes (10 and 11) to water pump (3).
(9) Loosen two screws (12) in clamps (13) as far as possible without disengaging screws from D-nuts (14).

(10) Unhook clamp tabs (15) from tab windows (16).

**CAUTION**
- Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.
- Position clamps with screw heads facing forward so they do not interfere with alternator mount.

(11) Position coolant hose (17) on water pump (3).

(12) Position two clamps (13) on coolant hose (17).

(13) Engage as many clamp tabs (15) as possible in tab windows (16) allowing little or no play between clamp and coolant hose (17).

(14) Tighten two clamps (13) to 13-17 lb-in. (2 N·m).

**NOTE**
Minimum allowable gap on clamp is 0.2 in. (0.5 cm). If gap is less than 0.2 in. (5 mm), remove and re-install clamp.

(15) Measure gap on two clamps (13).

(16) Install preformed packing (18) and 45-degree fitting (19) in water pump (3).

(17) Connect heater supply tube (20) to 45-degree fitting (3).
c. Fittings Removal.

(1) Remove plug (1) and preformed packing (2) from water pump (3). Discard preformed packing.

(2) Remove connector (4) and preformed packing (5) from water pump (3). Discard preformed packing.

(3) Remove fitting (6) and preformed packing (7) from pipe bushing (8). Discard preformed packing.

(4) Remove pipe bushing (8) and preformed packing (9) from water pump (3). Discard preformed packing.

d. Fittings Installation.

(1) Install preformed packing (1) on pipe bushing (2).

(2) Install pipe bushing (2) in water pump (3).

(3) Install preformed packing (4) on fitting (5).

(4) Install fitting (5) in pipe bushing (2).

(5) Install preformed packing (6) on connector (7).

(6) Install connector (7) in water pump (3).

(7) Install preformed packing (8) on plug (9).

(8) Install plug (9) in water pump (3).
e. Follow-On Maintenance.

(1) Install alternator bracket assembly (para 7-4).

(2) Install alternator (para 7-2 or 20-56).

(3) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(4) Lower cab (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Check for coolant leaks under vehicle.

(7) Check coolant level after normal operating temperature is reached. Add coolant as required (TM 9-2320-365-10).

(8) Raise cab (TM 9-2320-365-10).

(9) Check for coolant leaks around water pump.

(10) Lower cab (TM 9-2320-365-10).

(11) Shut down engine (TM 9-2320-365-10).

End of Task.
6-13. DRIVE BELT AND TENSION PULLEY REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

INITIAL SETUP

**Equipment Conditions**
Top radiator fan shroud removed (para 6-4).

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Gage, Belt Tension (Item 16, Appendix B)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

**Materials/Parts**
- Antiseize Compound (Item 63, Appendix D)
- Lockwasher (6) (Item 91, Appendix G)
- Screw, Self-Locking (6) (Item 242, Appendix G)
- Grommet, Nonmetallic (Item 49, Appendix G)

---

**a. Removal.**

**CAUTION**
Mark front of engine fan before removing. Failure to comply may result in damage to equipment.

1. Remove air hose (1) from fitting (2) on fan clutch assembly (3).

2. Remove fitting (2) from fan clutch assembly (3).

3. Remove six screws (4), lockwashers (5), and washers (6) from engine fan (7). Discard lockwashers and screws.

4. Remove engine fan (7) from fan clutch assembly (3).

5. Remove fan support plate (8) from engine fan (7).

6. Remove grommet (9) from engine fan (7). Discard grommet.

**NOTE**
Perform steps (3) through (6) on vehicles serial number 8426 and lower that have not had the fan clutch replaced.
NOTE

Perform steps (6.1) and (6.2) on vehicles serial number 8427 and higher and vehicles that have previously had the fan clutch replaced.

(6.1) Remove six nuts (9.1), lockwashers (9.2), and washers (9.3) from engine fan (9.4). Discard lockwashers.

(6.2) Remove engine fan (9.4) from fan clutch assembly (9.5).

(7) Loosen two screws (10) from front of engine block (11).

(8) Release alternator belts (12) tension by moving tension bracket (13) up.

(9) Remove two alternator belts (12) from engine (14).

(10) Remove two screws (15), washers (16), and tension pulley (17) from engine (14).

(11) Remove drive belt (18) from water pump pulley (19) and pulley damper (20).
b. Installation.

(1) Install drive belt (1) on pulley damper (2) and water pump pulley (3).

(2) Position tension pulley (4) on engine (5) with two washers (6) and screws (7).

**NOTE**

Use square hole in drive belt/tension pulley to apply and maintain tension on drive belt while adjusting belt tension.

(3) Adjust water pump drive belt with drive belt/tension pulley (4) as follows:

(a) New belt (less than 30 minutes running time) 115-125 lb (512-556 N).

(b) Used belt 80-100 lb (356-444 N).

(4) Tighten two screws (7) to 35 lb-ft (47 N⋅m).
(5) Install two alternator belts (8) onto engine (5).

**NOTE**

Use square hole in drive belt/tension bracket to apply and maintain tension on alternator belts while adjusting belt tension.

(6) Adjust alternator belts with tension bracket (9) as follows:

(a) New belt (less than 30 minutes running time) 115-125 lb (512-556 N).

(b) Used belt 80-100 lb (356-444 N).

(7) Tighten screw (10).

(8) Tighten screw (11) to 47 lb-ft (64 N·m).

---

**CAUTION**

Ensure engine fan is positioned with mark facing forward. Failure to comply may result in damage to equipment.

**NOTE**

Perform steps (8.1) through (8.3) on vehicles serial number 8427 and higher.

(8.1) Position engine fan (11.1) on fan clutch assembly (11.2) with six washers (11.3), lockwashers (11.4) and nuts (11.5).

(8.2) Tighten six nuts (11.5) to 15 lb-ft (20 N·m) in sequence shown.

(8.3) Re-tighten six nuts (11.5) to 23-29 lb-ft (31-39 N·m) in sequence shown.
6-13. DRIVE BELT AND TENSION PULLEY REPLACEMENT (CONT)

NOTE

Perform steps (9) through (13) on vehicles serial numbers 8426 and lower that have had fan clutch replaced.

(9) Install grommet (12) on engine fan (13).

(10) Install fan support plate (14) on engine fan (13).

CAUTION

Ensure engine fan is positioned with mark facing forward. Failure to comply may result in damage to equipment.

(11) Position engine fan (13) and fan support plate (14) on fan clutch assembly (15) with six washers (16), lockwashers (17), and screws (18).

(12) Tighten six screws (18) to 15 lb-ft (20 N·m) in sequence shown.

(13) Re-tighten six screws (18) to 22-32 lb-ft (30-44 N·m) in sequence shown.

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.

(14) Apply antiseize compound to threads of fitting (19).

(15) Install fitting (19) on fan clutch assembly (15).

(16) Connect air hose (20) to fitting (19).

c. Follow-On Maintenance.

Install top radiator fan shroud (para 6-4).

End of Task.
6-14. ENGINE FAN AND FAN CLUTCH ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

**Equipment Conditions**
Top radiator fan shroud removed (para 6-4).

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Adapter, Socket Wrench (Item 2, Appendix B)

**Materials/Parts**
- Antiseize Compound (Item 14, Appendix D)
- Grommet, Nonmetallic (Item 49, Appendix G)
- Lockwasher (6) (Item 91, Appendix G)
- Screw, Self-Locking (6) (Item 242, Appendix G)

---

**a. Removal.**

**CAUTION**
Mark front of engine fan before removing. Failure to comply may result in damage to equipment.

1. Disconnect air hose (1) from fitting (2) on fan clutch assembly (3).
2. Remove fitting (2) from fan clutch assembly (3).
NOTE

Perform steps (3) through (8) on vehicles serial number 8426 and lower that have not had the fan clutch replaced.

(3) Remove six screws (4), lockwashers (5), and washers (6) from engine fan (7). Discard lockwashers and screws.

(4) Remove fan support plate (8) from engine fan (7).

(5) Remove grommet (9) from engine fan (7). Discard grommet.

CAUTION

Mark front of engine fan before removal. Failure to comply may result in damage to equipment.

(6) Remove engine fan (7) from fan clutch assembly (3).

(7) Remove spacer plate (10) from fan clutch assembly (3).
NOTE

Perform steps (8) and (8.1) on vehicles serial number 8427 and higher and on vehicles that have had the fan clutch replaced.

(8) Remove six nuts (10.1), lockwashers (10.2), and washers (10.3) from engine fan (10.4). Discard lockwashers.

CAUTION

Mark front of engine fan before removal. Failure to comply may result in damage to equipment.

(8.1) Remove engine fan (10.4) from fan clutch assembly (10.5).

NOTE

- Application of 30 psi (207 kPa) air pressure to fan clutch will free rotation of fan clutch and allow removal of fan clutch screws.
- Both fan clutches are removed the same way. Fan clutch without studs shown.

(8.2) Install fitting (2) in fan clutch assembly (3).

(9) Apply 30 psi (207 kPa) air pressure to fitting (2).

(10) Turn fan clutch assembly (3) until bolts (11) are visible through fan clutch access holes (12).

(11) Remove six bolts (11) from pulley damper (13).

(12) Remove fan clutch assembly (3) from pulley damper (13).
b. Installation.

**NOTE**

Discard fan clutch assembly PN 1090-08000-03 and replace with fan clutch assembly PN 1090-08000-01.

(1) Position bolt (1) through hole (1.1) in fan clutch assembly (2).

(2) Position fan clutch assembly (2) on pulley damper (3).

(3) Position five bolts (1) on fan clutch assembly (2).

(4) Tighten six bolts (1) to 42-52 lb-ft (57-71 N·m).

**CAUTION**

Ensure engine fan is positioned with mark facing forward. Failure to comply may result in damage to equipment.

**NOTE**

Discard engine fan PN 4035-41393-74 and replace with engine fan PN 12421972.

(5) Position engine fan (4) on fan clutch assembly (2) with six washers (5), lockwashers (6) and nuts (7).

(6) Tighten six nuts (7) to 15 lb-ft (20 N·m) in sequence shown.

(7) Re-tighten six nuts (7) to 23-29 lb-ft (31-39 N·m) in sequence shown.
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.

(8) Apply antiseize compound to threads of fitting (8).

(9) Install fitting (8) in fan clutch assembly (2).

(10) Connect air hose (9) to fitting (8).

c. Follow-On Maintenance.

(1) Install top radiator fan shroud (para 6-4).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check for coolant leaks under vehicle.

(5) Raise cab (TM 9-2320-365-10).

(6) Check for coolant leaks around radiator.

(7) Lower cab (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.
CHAPTER 7
ELECTRICAL SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section II. MAINTENANCE PROCEDURES

7-2. 100 AMP ALTERNATOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

**Equipment Conditions**
- Batteries disconnected (para 7-48).
- Alternator belts removed (para 7-3).

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Vise, Machinist (Item 46, Appendix C)
- Caps, Vise Jaw (Item 4, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Socket Set, Socket Wrench (Item 35, Appendix C)

**Materials/Parts**
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Nut, Self-Locking (Item 137, Appendix G)
- Tape, Insulation, Electrical (Item 75, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)

**Personnel Required**
- (2)

---

a. Removal.

**NOTE**

Tag wires and connection points prior to disconnecting.

1. Remove screw (1), lockwasher (2), terminal lug TL5 (3), washer (4), and ground strap (5) from alternator (6).

2. Position washer (4), lockwasher (2), and screw (1) on alternator (6).

3. Lift dust boot (7) on terminal lug TL60 (8).

4. Remove self-locking nut (9), washer (10), terminal lug TL60 (8), and two washers (11) from alternator (6).

5. Position two washers (11), washer (10), and self-locking nut (9) on alternator (6).
7-2. 100 AMP ALTERNATOR REPLACEMENT (CONT)

(6) Remove screw (13), washer (14), and clamp (15) from alternator (6).

(7) Lift dust boot (16) on terminal lug TL2 (17).

(8) Remove self-locking nut (18), washer (19), terminal lugs TL2 (17) and TL6 (21), and two washers (22) from alternator (6).

(9) Position two washers (22), washer (19), and self-locking nut (18) on alternator (6).

(10) Lift dust boot (23) on terminal lug TL35 (24).

(11) Remove self-locking nut (25), washer (26), and terminal lug TL35 (24) from voltage regulator (27).

(12) Position washer (26) and self-locking nut (25) on voltage regulator (27).

(13) Lift dust boot (28) on terminal lug TL110 (29).

NOTE
Perform steps (14) and (15) on vehicles equipped with alternator P/N N1506-1 (12420852).

(14) Remove self-locking nut (30), washer (31), and terminal lug TL110 (29) from voltage regulator (27).

(15) Position washer (31) and self-locking nut (30) on voltage regulator (27).
(16) Remove nut (32), washer (33), screw (34), and washer (35) from alternator (6).

(17) Remove self-locking nut (36), screw (37), and washer (38) from alternator (6). Discard self-locking nut.

**WARNING**

Alternator weighs approximately 50 lbs (23 kgs). The aid of an assistant is required to remove alternator. Failure to comply may result in injury to personnel.

**NOTE**

Step (18) requires the aid of an assistant.

(18) Remove alternator (6) from support bracket (39).

**CAUTION**

Alternator pulley must be positioned in a vise equipped with vise jaw caps when loosening self-locking nut. Failure to comply may result in damage to equipment.

(19) Position pulley (40) in vise.

(20) Loosen self-locking nut (41).

(21) Remove pulley (40) from vise.

(22) Remove self-locking nut (41), washer (42), pulley (40), and key (43) from alternator (6).

(23) Position washer (42) and self-locking nut (41) on alternator (6).
7-2. 100 AMP ALTERNATOR REPLACEMENT (CONT)

b. Installation.

(1) Remove self-locking nut (1) and washer (2) from alternator (3).

(2) Position key (4) and pulley (5) on alternator (3) with washer (2) and self-locking nut (1).

**CAUTION**

Alternator pulley must be positioned in a vise equipped with vise jaw caps when tightening self-locking nut. Failure to comply may result in damage to equipment.

(3) Position pulley (5) in vise.

(4) Tighten self-locking nut (1) to 120 lb-ft (163 N·m).

(5) Remove pulley (5) from vise.

**WARNING**

Alternator weighs approximately 50 lbs (23 kgs). The aid of an assistant is required to install alternator. Failure to comply may result in injury to personnel.

**NOTE**

Step (6) requires the aid of an assistant.

(6) Position alternator (3) on support bracket (6) with washer (7), screw (8), and self-locking nut (9).

(7) Position washer (10), screw (11), washer (12) and nut (13) on alternator (3).

(8) Tighten nut (13) to 18-22 lb-ft (24-30 N·m).

(9) Tighten self-locking nut (9) to 44-56 lb-ft (60-76 N·m).
(10) Apply electrical tape to terminal lug TL110 (17).

NOTE

- Perform step (10) if replacing alternator P/N N1506-1 (12420852) with alternator P/N N1509-1 (12422863).

- Install plastic cable ties as required to terminal lug TL110 and tie wire away from alternator.

(10.1) Remove self-locking nut (14) and washer (15) from voltage regulator (16).

(11) Position terminal lug TL110 (17), washer (15), and self-locking nut (14) on voltage regulator (16).

(12) Tighten self-locking nut (14) to 20-lb-in. (3 N\(\text{m}\)).

(13) Position dust boot (18) on terminal lug TL110 (17).

(14) Remove self-locking nut (19) and washer (20) from voltage regulator (16).

(15) Position terminal lug TL35 (21), washer (20), and self-locking nut (19) on voltage regulator (16).

(16) Tighten self-locking nut (19) to 25 lb-in. (3 N\(\text{m}\)).

(17) Position dust boot (22) on terminal lug TL35 (21).

(18) Remove self-locking nut (23), washer (24), and two washers (25) from alternator (3).

(19) Position two washers (25) terminal lugs TL6 (26) and TL2 (27), washer (24), and self-locking nut (23) on alternator (3).

(20) Tighten self-locking nut (23) to 80 lb-in. (9 N\(\text{m}\)).

(21) Position dust boot (28) on terminal lug TL2 (27).

(22) Position clamp (29), washer (30), and screw (31) on alternator (3).

(23) Tighten screw (31) to 80 lb-in. (9 N\(\text{m}\)).
(24) Remove self-locking nut (32), washer (33), and two washers (34) from alternator (3).

(25) Position two washers (34) terminal lug TL60 (35), washer (33) and self-locking nut (32) on alternator (3).

(26) Tighten self-locking nut (32) to 80 lb-in. (9 N·m).

(27) Position dust boot (36) on terminal lug TL60 (35).

(28) Remove screw (37), lockwasher (38), and washer (39) from alternator (3).

(29) Position ground strap (40), washer (39), and terminal lug TL5 (41) on alternator (3) with lockwasher (38) and screw (37).

(30) Tighten screw (37) to 80 lb-in. (9 N·m).

c. Follow-On Maintenance

(1) Install alternator belts (para 7-3).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Check alternator operation (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-3. ALTERNATOR BELTS 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).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Gage, Belt Tension (Item 16, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Personnel Required
(2)

CAUTION

Alternator belts must be replaced as a pair. Failure to comply may result in damage to equipment.

a. Removal.

(1) Disconnect air hose (1) from fan clutch (2).

(2) Loosen two screws (3) on front of engine block (4).

(3) Move tension bracket (5) up.

(4) Remove two alternator belts (6) from pulley (7).
7-3. ALTERNATOR BELTS REPLACEMENT (CONT)

b. Installation.

(1) Position two alternator belts (1) on pulley (2).

**CAUTION**

Tension bracket adjustment varies for new or reinstalled belts. New belts must be adjusted to 110-130 lbs (489-478 N), reinstalled belts must be adjusted to 80-100 lbs (356-444 N). Failure to comply may result in early belt failures.

**NOTE**

- Steps (2) and (3) require the aid of an assistant.
- Use square hole in tension bracket to apply tension to alternator belts.

(2) Push tension bracket (3) down until belt tension gage indicates correct tension for new or reinstalled belts (1).

(3) Maintain belt tension and tighten two screws (4).

(4) Connect air hose (5) to fan clutch (6).
(5) Lower cab (TM 9-2320-365-10).

(6) Start engine and run for five minutes.

(7) Shut down engine (TM 9-2320-365-10).

(8) Raise cab (TM 9-2320-365-10).

NOTE

Check belt tension for proper tension for new or reinstalled belts.

(9) Loosen one screw (4) and readjust tension bracket (3) for new or reinstalled belts, as required.

(10) Tighten two screws (4) to 47 lb-ft (64 N·m).

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check VOLTS gage for indication of 22-28 volts (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-4. ALTERNATOR BRACKETS REPLACEMENT

This task covers:

a. Support Brackets Removal
b. Support Brackets Installation
c. Belt Take-Up Bracket Removal
d. Belt Take-Up Bracket Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
100 amp alternator removed, if equipped (para 7-2).
200 amp alternator removed, if equipped (para 20-56).

Tools and Special Tools
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Gage, Belt Tension (Item 16, Appendix B)

Material/Parts
- Sealing Compound (Item 62, Appendix D)
- Nut, Self-Locking (Item 148, Appendix G)

Personnel Required
- (2)


NOTE

Note location of different size screws for installation.

(1) Remove two screws (1), washers (2), and belt adjusting arm (3) from alternator bracket (4).
(2) Remove two screws (5) and washers (6) from alternator support bracket (7).

(3) Remove three screws (8) from alternator bracket (4).

(4) Remove self-locking nut (9) and alternator bracket (4) from thermostat housing (10). Discard self-locking nut.

(5) Remove two screws (11) and alternator support bracket (7) from engine block (12).

b. Support Brackets Installation.

(1) Position alternator support bracket (1) on engine block (2) with two screws (3).

(2) Tighten two screws (3) to 121-147 lb-ft (164-200 N·m).
WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles 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.

(3) Apply sealing compound to threads of three screws (4) and stud (5).

(4) Position alternator bracket (6) on thermostat housing (7) with three screws (4).

(5) Install self-locking nut (8) on stud (5).

(6) Tighten three screws (4) to 18-22 lb-ft (24-30 N·m).

(7) Position two washers (9) and screws (10) in alternator bracket (6).

(8) Tighten two screws (10) to 121-147 lb-ft (164-200 N·m).

(9) Position belt adjusting arm (11) on alternator bracket (6) with two washers (12) and screws (13).

(10) Tighten two screws (13) to 18-22 lb-ft (24-30 N·m).
c. Belt Take-Up Bracket Removal.

**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 two screws (1) on water pump pulley bracket (2).

2. Position water pump pulley bracket (2) for access to three screws (3).

3. Remove screw (4) and washer (5) from alternator belt take-up plate (6).

4. Remove screw (7), washer (8), and alternator belt take-up plate (6) from alternator belt take-up mounting bracket (9).

5. Remove three screws (3) from alternator belt take-up mounting bracket (9).

6. Remove two screws (10) and alternator belt take-up mounting bracket (9) from engine front cover (11).
d. Belt Take-Up Bracket Installation.

(1) Position alternator belt take-up mounting bracket (1) on engine front cover (2) with two screws (3).

(2) Position three screws (4) in engine front cover (2).

(3) Tighten two screws (3) to 121-147 lb-ft (164-200 N·m).

(4) Tighten three screws (4) to 106-130 lb-ft (144-176 N·m).

(5) Install alternator belt take-up plate (5) on alternator belt take-up mounting bracket (1) with washer (6) and screw (7).

(6) Install washer (8) and screw (9) in alternator belt take-up plate (5).

NOTE

- Steps (7) and (8) require the aid of an assistant.

- Use square hole in water pump belt pulley bracket to apply and maintain tension on water pump belt while adjusting belt tension.

(7) Adjust tension on water pump belt (10) to 80-100 lbs (356-444 N).

(8) Tighten two screws (11) to 35 lb-ft (47 N·m).
e. **Follow-On Maintenance.**

(1) Install 200 amp alternator, if equipped (para 20-56).

(2) Install 100 amp alternator, if equipped (para 7-2).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

**End of Task.**
This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

Initial Setup

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

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
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Lockwasher (2) (Item 100, Appendix G)
Nut, Self-Locking (Item 130, Appendix G)
Nut, Self-Locking (Item 131, Appendix G)
Sealing Compound (Item 64, Appendix D)
Tape, Insulation Electrical (Item 75, Appendix D)
Tie, Cable, Plastic (Item 76, Appendix D)

a. Removal.

NOTE
Tag wires and connection points prior to disconnecting.

(1) Lift dust boot (1) on terminal lug TL35 (2).

(2) Remove self-locking nut (3), washer (4), and terminal lug TL35 (2) from voltage regulator (5). Discard self-locking nut.

NOTE
Perform steps (3) and (4) on vehicles equipped with alternator P/N N1506-1 (12420852).

(3) Lift dust boot (6) on terminal lug TL110 (7).

(4) Remove self-locking nut (8), washer (9), and terminal lug TL110 (7) from voltage regulator (5). Discard self-locking nut.
(5) Disconnect voltage regulator connector (10) from voltage regulator (5).

(6) Remove two screws (11), lockwashers (12), and voltage regulator (5) from alternator (13). Discard lockwashers.

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 sealing compound to threads of two screws (1).

(2) Position voltage regulator (2) on alternator (3) with two lockwashers (4) and screws (1).

(3) Tighten two screws (1) to 65 lb-in. (7 N\(\text{m}\)).

(4) Connect voltage regulator connector (5) to voltage regulator (2).
7-5. 100 AMP VOLTAGE REGULATOR REPLACEMENT (CONT)

NOTE

- Perform step (5) if replacing alternator P/N N1506-1 (12420852) with alternator P/N N1509-1 (12422863).

- Install plastic cable ties to terminal lug TL110 and tie wire away from alternator.

(5) Apply electrical tape to terminal lug TL110 (6).

NOTE

Perform steps (5.1) through (7) on alternator N1506-1 (12420852).

(5.1) Cut terminal lug TL110 (6) from engine control cable assembly wire (6.1).

(6) Remove dust boot (7) from engine control cable assembly wire (6.1).

(7) Apply electrical tape to engine control cable assembly wire (6.1) so wire doesn’t interfere with engine or alternator operations.

(8) Position terminal lug TL35 (10) on voltage regulator (2) with washer (11), and self-locking nut (12).

(9) Tighten self-locking nut (12) to 25 lb-in. (3 N m).

(10) Position dust boot (13) on terminal lug TL35 (10).

c. Follow-On Maintenance

(1) Lower cab (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-6. AUXILIARY STARTER SOLENOID REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
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
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Adhesive (Item 10, Appendix D)
Lockwasher (2) (Item 93, Appendix G)
Lockwasher (2) (Item 96, Appendix G)
Nut, Self-Locking (2) (Item 141, Appendix G)

a. Removal.

NOTE
Tag wires and connection points prior to disconnecting.

(1) Remove adhesive, two nuts (1), lockwashers (2),
terminal lugs TL9 (3) and TL24 (4) from auxiliary starter
solenoid (5). Discard lockwashers.

(2) Remove adhesive, two nuts (6), lockwashers (7),
terminal lugs TL23 (8) and TL33 (9) from auxiliary starter
solenoid (5). Discard lockwashers.
NOTE

Perform steps (3) and (4) on vehicle serial number 7413 and higher, and vehicle serial numbers 0001 through 7412 which have previously had an auxiliary starter solenoid replaced.

(3) Remove self-locking nut (10), washer (11), and screw (12) from bracket (13). Discard self-locking nut.

(4) Remove self-locking nut (14), washer (15), clamp (16), screw (17), and auxiliary starter solenoid (5) from bracket (13). Discard self-locking nut.

NOTE

Perform step (5) on vehicle serial numbers 0001 through 7412 which have not previously had an auxiliary starter solenoid replaced.

(5) Remove self-locking nuts (10 and 14), washers (11 and 15), screws (12 and 17), and auxiliary starter solenoid (5) from bracket (13). Discard self-locking nuts.

b. Installation.

(1) Position auxiliary starter solenoid (1) on bracket (2) with screw (3), clamp (4), washer (5), and self-locking nut (6).

(2) Position screw (7), washer (8), and self-locking nut (9) in bracket (2).

(3) Tighten self-locking nuts (6 and 9) to 96-120 lb-in. (11-14 N·m).
(4) Install terminal lugs TL33 (10) and TL23 (11) on auxiliary starter solenoid (1) with two lockwashers (12) and nuts (13).

(5) Install terminal lugs TL24 (14) and TL9 (15) on auxiliary starter solenoid (1) with two lockwashers (16) and nuts (17).

**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.

(6) Apply adhesive on nuts (13 and 17) and terminal lugs TL33 (10), TL23 (11), TL24 (14), and TL9 (15).
7-6. AUXILIARY STARTER SOLENOID REPLACEMENT (CONT)

c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-7. STARTING MOTOR REPLACEMENT

This task covers:

a. Deleted
b. Removal
c. Installation
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Sling, Endless (Item 32, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
Socket Set, Socket Wrench (Item 35, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Adapter, Socket Wrench (Item 2, Appendix B)
Heater, Gun Type, Electric (Item 20, Appendix B)
Crowfoot Attachment, Socket Wrench (Item 9, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Adhesive (Item 8, Appendix D)
Adhesive (Item 10, Appendix D)
Bolt, Machine (3) (Item 2, Appendix G)
Gasket (Item 40, Appendix G)
Splice, Conductor (Item 261, Appendix G)
Tape, Insulation, Electrical (Item 75, Appendix D)
Insulation, Sleeving, Electrical (Item 30.1, Appendix D)

Personnel Required
(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.

a. Deleted.
b. Removal.

NOTE
Tag wires and connection points prior to disconnecting.

(1) Remove adhesive, nut (1), terminal lugs TL55 (2) and TL12 (3) from solenoid terminal (4).

(2) Position nut (1) on solenoid terminal (4).

(3) Remove adhesive, nut (5), and terminal lug TL26 (6) from solenoid terminal (7).

(4) Position nut (5) on solenoid terminal (7).
(5) Remove adhesive, nut (8), terminal lugs TL25 (9), TL46 (10), ground strap (11), and terminal lug TL53 (12) from starting motor terminal (13).

(6) Position nut (8) on starting motor terminal (13).

**NOTE**

Perform step (7) on vehicles that have not had connector P81 removed.

(7) Disconnect connector P81 (14) from starting motor connector (15).

(8) Remove screw (16) from starting motor (17). Discard screw.

**WARNING**

Starting motor 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.

**NOTE**

Step (9) requires the aid of an assistant.

(9) Remove two screws (18) and starting motor (17) from flywheel housing (19). Discard screws.

(10) Remove gasket (20) from starting motor (17). Discard gasket.
c. Installation.

(1) Deleted.

(2) Deleted.

(3) Deleted.

**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.

(4) Apply a bead of adhesive around flange (4) of starting motor (5).

(5) Install gasket (6) on starting motor (5).

(6) Apply a bead of adhesive around gasket (6).
7-7. STARTING MOTOR REPLACEMENT (CONT)

**WARNING**

Starting motor weighs approximately 60 lbs (27 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

**NOTE**

Step (7) requires the aid of an assistant.

(7) Position starting motor (5) in flywheel housing (7) with two screws (8).

(8) Position screw (9) in starting motor (5).

(9) Tighten two screws (8) and screw (9) to 47 lb-ft (64 N·m).

**NOTE**

Perform step (10) through (21) on vehicles that have not had connector P81 removed.

(10) Cut connector P81 (10) from start and charging cable assembly (11).

(11) Remove band marker (12) from start and charging cable assembly (11).

**NOTE**

Remove electrical tape as required.

(12) Remove convoluted tubing (13) from two wires (14 and 15).

(13) Remove insulation sleeving (16) from two wires (14 and 15).
NOTE
Measure wires from body of start and charging cable assembly.

(14) Cut wire (14) to 3 in. (7.6 cm) in length.
(15) Cut wire (15) to 4 in. (10.2 cm) in length.
(16) Remove 0.38 in. (1 cm) of insulation from two wires (14 and 15).
(17) Cut insulation sleeving (17) 1.5 in. (3.8 cm).
(18) Position insulation sleeving (17) on wire (15).
(19) Install conductor splice (18) on two wires (14 and 15).
(20) Install insulation sleeving (17) on conductor splice (18).

NOTE
Install electrical tape as required.

(21) Install convoluted tubing (13) on two wires (14 and 15).

(22) Deleted.

(23) Remove nut (19) from starting motor terminal (20).

(24) Position terminal lug TL53 (21), ground strap (22), terminal lugs TL46 (23), and TL25 (24) on starting motor terminal (20) with nut (19).

(25) Tighten nut (19) to 33-37 lb-ft (45-50 N·m).

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.

(26) Apply adhesive on terminal lug TL53 (21), ground strap (22), terminal lugs TL46 (23), TL25 (24), nut (19), and starting motor terminal (20).
(27) Remove nut (25) from solenoid terminal (26).

(28) Position terminal lug TL26 (27) on solenoid terminal (26) with nut (25).

(29) Tighten nut (25) to 31 lb-in. (4 N·m).

(30) Remove nut (28) from solenoid terminal (29).

(31) Position terminal lugs TL12 (30) and TL55 (31) on solenoid terminal (29) with nut (28).

(32) Tighten nut (28) to 30 lb-ft (41 N·m).

---

**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.

(33) Apply adhesive on terminal lug TL26 (27), solenoid terminal (26), and nut (25).

(34) Apply adhesive on terminal lugs TL12 (30), TL55 (31), solenoid terminal (29), and nut (28).
d. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-8. AUXILIARY PANEL REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Decal (Item 9, Appendix G)
Nut, Self-Locking (2) (Item 145, Appendix G)

a. Removal.

(1) Remove six screws (1) from auxiliary panel (2).

(2) Lift auxiliary panel (2) outward from auxiliary panel housing (3) to gain access.

NOTE

• Tag electrical connectors and connection points prior to removal.

• All rocker switches are removed the same way. PTO switch shown.

(3) Lift tab (4) on connector P904 (5).

(4) Disconnect connector P904 (5) from PTO switch (6).

(5) Disconnect connector P904A (7) from PTO switch (6).
(6) Push in two tabs (8) on PTO switch (6).

(7) Remove PTO switch (6) from auxiliary panel (2).

NOTE

Auxiliary panel rocker switches will vary according to vehicle model.

(8) Perform steps (3) through (7) on remaining rocker switches.

(9) Disconnect connector clamp (9) from tachometer connector (10).

(10) Disconnect connector P901 (11) from tachometer connector (10).

(11) Remove two protective caps (12), self-locking nuts (13), retaining ring (14), and tachometer (15) from auxiliary panel (2). Discard Self-locking nuts.

(12) Remove auxiliary panel (2) from vehicle.

(13) Remove eight screws (16) from auxiliary panel housing (3).

(14) Remove auxiliary panel housing (3) from heater assembly (17).

(15) Remove auxiliary panel cable assembly (18) from auxiliary panel housing (3).
b. Installation.

(1) Install decal (1) on auxiliary panel housing (2).

(2) Route auxiliary panel cable assembly (3) in auxiliary panel housing (2).

(3) Position auxiliary panel housing (2) on heater assembly (4) with eight screws (5).

(4) Tighten eight screws (5) to 35-44 lb-in. (4-5 N·m).

(5) Position tachometer (6) in auxiliary panel (7) with retaining ring (8) and two self-locking nuts (9).

(6) Tighten two self-locking nuts (9) to 9 lb-in. (1 N·m).

(7) Install two protective caps (10) on tachometer (6).

(8) Connect connector P901 (11) to tachometer connector (12).

(9) Connect connector clamp (13) on tachometer connector (12).
NOTE
All rocker switches are installed the same way. PTO switch shown.

(10) Install PTO switch (14) in auxiliary panel (7).

(11) Connect connector P904A (15) to PTO switch (14).

(12) Connect connector P904 (16) to PTO switch (14).

NOTE
Auxiliary panel rocker switches will vary according to vehicle model.

(13) Perform steps (10) through (12) on remaining rocker switches.

(14) Position auxiliary panel (7) on auxiliary panel housing (2) with six screws (17).

(15) Tighten six screws (17) to 18 lb-in. (2 N·m).

c. Follow-On Maintenance.
(1) Connect batteries (para 7-48).

(2) Check rocker switches and tachometer operation (TM 9-2320-365-10).

End of Task.
7-9. CIRCUIT BREAKER, DIODE, AND RELAY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
PDP cover removed (para 16-2).

NOTE

All circuit breakers, diodes, and relays are replaced the same way. Circuit breaker replacement shown.

a. Removal.

(1) Locate diode, relay, or circuit breaker to be replaced.

NOTE

Refer to Figure 7-1. Power Distribution Panel (PDP) Circuit Breakers, Diodes, and Relays, Table 7-1. Power Distribution Panel (PDP) Relays, and Table 7-1.1 Power Distribution Panel (PDP) Circuit Breakers for details.

(2) Remove circuit breaker (1) from PDP (2).

Figure 7-1. Power Distribution Panel (PDP) Circuit Breakers, Diodes, and Relays
<table>
<thead>
<tr>
<th>Relay</th>
<th>VDC</th>
<th>Throw</th>
<th>Function</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>24 VDC</td>
<td>SPST</td>
<td>Starter Relay</td>
<td></td>
</tr>
<tr>
<td>K2</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Control Power Relay</td>
<td></td>
</tr>
<tr>
<td>K6</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Stop Light Relay</td>
<td></td>
</tr>
<tr>
<td>K7</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Headlight Relay</td>
<td></td>
</tr>
<tr>
<td>K8</td>
<td>12 VDC</td>
<td>SPDT</td>
<td>Headlight LO/HI-Beam Relay</td>
<td></td>
</tr>
<tr>
<td>K9</td>
<td>12 VDC</td>
<td>SPDT</td>
<td>Hazard Flasher Blackout Override Relay</td>
<td></td>
</tr>
<tr>
<td>K10</td>
<td>12 VDC</td>
<td>SPDT</td>
<td>Stop/Hazard Flasher Relay</td>
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</tr>
<tr>
<td>K11</td>
<td>24 VDC</td>
<td>SPDT</td>
<td>Alternator Excitation Relay</td>
<td></td>
</tr>
<tr>
<td>K12</td>
<td></td>
<td></td>
<td></td>
<td>Empty</td>
</tr>
<tr>
<td>K13</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Rotating Beacon Relay</td>
<td></td>
</tr>
<tr>
<td>K15</td>
<td></td>
<td></td>
<td></td>
<td>Empty</td>
</tr>
<tr>
<td>K19</td>
<td>24 VDC</td>
<td>SPDT</td>
<td>Start Inhibit Relay</td>
<td></td>
</tr>
<tr>
<td>K20</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Marker Lights Relay</td>
<td></td>
</tr>
<tr>
<td>K24</td>
<td>24 VDC</td>
<td>SPDT</td>
<td>Cranking Lock-Out Relay</td>
<td></td>
</tr>
<tr>
<td>K25</td>
<td></td>
<td></td>
<td></td>
<td>Empty WTEC II</td>
</tr>
<tr>
<td>K25</td>
<td>24 VDC</td>
<td>SPST</td>
<td>Reverse Warning Relay</td>
<td>WTEC III</td>
</tr>
<tr>
<td>K26</td>
<td></td>
<td></td>
<td></td>
<td>Empty WTEC II</td>
</tr>
<tr>
<td>K26</td>
<td>24 VDC</td>
<td>SPST</td>
<td>Neutral Start Relay</td>
<td>WTEC III</td>
</tr>
<tr>
<td>K27</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Blackout Stoplight Relay</td>
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<tr>
<td>K28</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Trailer Rear Marker and Taillight Relay</td>
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<tr>
<td>K29</td>
<td>12 VDC</td>
<td>SPST</td>
<td>Trailer Blackout Marker Relay</td>
<td></td>
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<tr>
<td>K30</td>
<td>12 VDC</td>
<td>SPST</td>
<td>24 VDC Intervehicular Left Rear Composite Lamp Relay</td>
<td></td>
</tr>
<tr>
<td>K31</td>
<td>12 VDC</td>
<td>SPST</td>
<td>24 VDC Intervehicular Right Rear Composite Lamp Relay</td>
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</tr>
<tr>
<td>K32</td>
<td>24 VDC</td>
<td>SPST</td>
<td>Horn Relay</td>
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</tr>
<tr>
<td>K34</td>
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<td>Empty WTEC II</td>
</tr>
<tr>
<td>K34</td>
<td>24 VDC</td>
<td>SPDT</td>
<td>Inter-Axle Relay</td>
<td>WTEC III</td>
</tr>
<tr>
<td>K37</td>
<td></td>
<td></td>
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<td>Empty WTEC II</td>
</tr>
<tr>
<td>K37</td>
<td>24 VDC</td>
<td>SPST</td>
<td>PTO Relay</td>
<td>WTEC III</td>
</tr>
<tr>
<td>K52</td>
<td>12 VDC</td>
<td>SPDT</td>
<td>CTIS Overspeed Indication Relay</td>
<td></td>
</tr>
<tr>
<td>K53</td>
<td>24 VDC</td>
<td>SPDT</td>
<td>Radio Power</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7-1.1 Power Distribution Panel (PDP) Circuit Breakers

<table>
<thead>
<tr>
<th>CB</th>
<th>Amp</th>
<th>Function</th>
<th>Reset</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB20</td>
<td>25 AMP</td>
<td>Cab Radio</td>
<td>Manual</td>
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</tr>
<tr>
<td>CB21</td>
<td>15 AMP</td>
<td>Air Dryer, Frequency Divider, and Starter Pushbutton Switch</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB23</td>
<td>15 AMP</td>
<td>Personnel Heater</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB30</td>
<td>10 AMP</td>
<td>Chemical Alarm, Chemical Detector, and Chemical Detector Indicator Light</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB35</td>
<td>15 AMP</td>
<td>WTEC II TEPSS and WTEC II VIM</td>
<td>Manual</td>
<td>WTEC II</td>
</tr>
<tr>
<td>CB35</td>
<td>15 AMP</td>
<td>Empty</td>
<td>Manual</td>
<td>WTEC III</td>
</tr>
<tr>
<td>CB36</td>
<td>20 AMP</td>
<td>Horn</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB37</td>
<td>20 AMP</td>
<td>Windshield Wiper ECU and Wiper Motor</td>
<td>Manual</td>
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<tr>
<td>CB38</td>
<td>20 AMP</td>
<td>Rotating Warning Light</td>
<td>Manual</td>
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<tr>
<td>CB39</td>
<td>10 AMP</td>
<td>24 VDC Intervehicular Blackout Stoplights</td>
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<tr>
<td>CB40</td>
<td>10 AMP</td>
<td>CTIS, CTIS Air Pressure Switch, and CTIS Overspeed Indicator Light</td>
<td>Manual</td>
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<tr>
<td>CB41</td>
<td>15 AMP</td>
<td>24 VDC Intervehicular Clearance and Rear Lights</td>
<td>Manual</td>
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<tr>
<td>CB42</td>
<td>10 AMP</td>
<td>24 VDC Intervehicular Blackout Clearance, Left Blackout Marker, and Right Blackout Marker Lights</td>
<td>Manual</td>
<td></td>
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<tr>
<td>CB43</td>
<td>15 AMP</td>
<td>24 VDC Intervehicular Left Turn Light and Stoplight</td>
<td>Manual</td>
<td>WTEC II</td>
</tr>
<tr>
<td>CB43</td>
<td>10 AMP</td>
<td>WTEC III Transmission ECU Power</td>
<td>Manual</td>
<td>WTEC III</td>
</tr>
<tr>
<td>CB44</td>
<td>15 AMP</td>
<td>24 VDC Intervehicular Right Turn Light and Stoplight</td>
<td>Manual</td>
<td>WTEC II</td>
</tr>
<tr>
<td>CB44</td>
<td>15 AMP</td>
<td>24 VDC Intervehicular Right and Left Turn Lights and Stoplights</td>
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<td>WTEC III</td>
</tr>
<tr>
<td>CB45</td>
<td>15 AMP</td>
<td>Not Used</td>
<td>Manual</td>
<td></td>
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<tr>
<td>CB48</td>
<td>20 AMP</td>
<td>Not Used</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB49</td>
<td>15 AMP</td>
<td>Fuel/Water Separator, PTO Solenoid, PTO Switch, Winch In Solenoid, Winch In/Out Switch, Winch Out Solenoid, and Winch Switch</td>
<td>Manual</td>
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<tr>
<td>CB50</td>
<td>15 AMP</td>
<td>Van Door Switch</td>
<td>Manual</td>
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<tr>
<td>CB53</td>
<td>Empty</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CB54</td>
<td>8 AMP</td>
<td>Blackout Drive Light</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB61</td>
<td>Empty</td>
<td></td>
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<td></td>
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<tr>
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<td>CB</td>
<td>Amp</td>
<td>Function</td>
<td>Reset</td>
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<td>CB63</td>
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<tr>
<td>CB64</td>
<td></td>
<td>Empty</td>
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</tr>
<tr>
<td>CB65</td>
<td>8 AMP</td>
<td>Front Right and Left Parking Lights</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB66</td>
<td>8 AMP</td>
<td>Front Left, Front Right, Rear LH, and Rear RH Blackout Marker Lights and WTEC II/WTEC III TPSS Dimmer Module</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB67</td>
<td>25 AMP</td>
<td>12 VDC Intervehicular Marker Light and All Marker Lights</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB68</td>
<td></td>
<td>Empty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CB71</td>
<td>15 AMP</td>
<td>Hazard Warning Switch, Turn Signal Flasher, and Work Light Switch</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB72</td>
<td>15 AMP</td>
<td>Blackout Override Switch</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB73</td>
<td>8 AMP</td>
<td>Backup Light</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB74</td>
<td>10 AMP</td>
<td>Turn Signal Flasher ECU</td>
<td>Manual</td>
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</tr>
<tr>
<td>CB75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CB76</td>
<td>15 AMP</td>
<td>12 VDC Intervehicular Left and Right Turn Signals, and Stoplight, 24 VDC Intervehicular Auxiliary, Front Left and Right Turn Signals, Hazard Warning Switch, Left and Right Blackout Stoplights, Left and Right Turn Signal Indicators, Rear Right and Left Turn Signals, and Stoplight Switches (A) and (B)</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td>CB78</td>
<td>15 AMP</td>
<td>Left and Right Headlights</td>
<td>Auto</td>
<td></td>
</tr>
<tr>
<td>CB79</td>
<td>15 AMP</td>
<td>WTEC II 10 AMP Fuse TEPSS, Fuel Solenoid, and Start Inhibit Pushbutton Switch</td>
<td>Manual</td>
<td>WTEC II</td>
</tr>
<tr>
<td>CB80</td>
<td>25 AMP</td>
<td>12 VDC Intervehicular Taillight, Left and Right Taillights</td>
<td>Manual</td>
<td></td>
</tr>
</tbody>
</table>
b. Installation.

NOTE

Refer to Figure 7-1. Power Distribution Panel (PDP) Circuit Breakers, Diodes, and Relays, Table 7-1. Power Distribution Panel (PDP) Relays, and Table 7-1.1 Power Distribution Panel (PDP) Circuit Breakers for details.

Install circuit breaker (1) on PDP (2).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Connect batteries (para 7-48).

End of Task.
7-10. WTEC II DASHBOARD CABLE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Windshield wiper motor removed (para 18-4).
Personnel heater removed (para 18-9).
Instrument panel assembly removed (para 7-15).

Tools and Special Tools
Tool Kit, Auto Fuel (Item 42, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (4) (Item 64, Appendix G)
Lockwasher (4) (Item 90, Appendix G)
Lockwasher (2) (Item 74, Appendix G)
Lockwasher (10) (Item 73, Appendix G)
Lockwasher (4) (Item 81, Appendix G)

Personnel Required
(2)

a. Removal.

NOTE

- Remove plastic cable ties as required.
- Tag wires and connection points prior to disconnecting.

(1) Disconnect steering column switch connector J19 (1)
    from connector P19 (2).

(2) Disconnect steering column switch connector P18 (3)
    from connector J18 (4).

(3) Disconnect connector J118 (5) from connector P118 (6).
(4) Disconnect connector J43 (7) from connector P43 (8).

(5) Disconnect connector J31 (9) from connector P31 (10).

(6) Remove screw (11), washer (12), and clamp (13) from WTEC II dashboard cable assembly (14).

(7) Disconnect connector PX26 (15) from frequency ECU connector (16).

(8) Remove two screws (17) and frequency ECU (18) from left side dashboard (19).
(9) Remove nut (20), lockwasher (21), and terminal lug TL151 (22) from front brake air pressure transmitter terminal G (23). Discard lockwasher.

(10) Remove nut (24), lockwasher (25), and terminal lug TL157 (26) from front brake air pressure transmitter terminal WK (27). Discard lockwasher.

(11) Remove nut (28), lockwasher (29), and terminal lug TL150 (30) from rear brake air pressure transmitter terminal G (31). Discard lockwasher.

(12) Remove nut (32), lockwasher (33), and terminal lug TL156 (34) from rear brake air pressure transmitter terminal WK (35). Discard lockwasher.

(13) Remove two nuts (36), lockwashers (37), and terminal lugs TL153 (38) and TL152 (39) from rear stoplight switch (40). Discard lockwashers.

(14) Remove two nuts (41), lockwashers (42), and terminal lugs TL154 (43) and TL155 (44) from front stoplight switch (45). Discard lockwashers.
NOTE

Perform steps (15) and (16) on vehicles equipped with auxiliary panel.

(15) Disconnect connector J912 (46) from connector P912 (47)

(16) Disconnect connector P913 (48) from connector J913 (49).

(17) Remove windshield wiper ECU (50) from PDP (51).

(18) Disconnect terminal lugs TL158 (52) and TL159 (53) from start inhibit pushbutton switch (54).

(19) Remove spring clip (55) from start inhibit pushbutton switch (54).

(20) Remove start inhibit pushbutton switch (54) from PDP (51).
(21) Disconnect connector J27 (56) from connector P27 (57).

(22) Disconnect connector J51 (58) from connector P51 (59).

(23) Disconnect connector PX34 (60) from fan solenoid connector (61).

(24) Disconnect connector J65 (62) from warning light cable connector P65 (63).

(25) Disconnect connector P99 (64) from chemical alarm kit cable connector J99 (65).

(26) Disconnect connector PX20 (66) from flasher module (67).

(27) Disconnect connector P111 (68) from connector J111 (69).
(28) Loosen captive screw (70) and disconnect connector PX33 (71) from WTEC II VIM (72).

NOTE
Perform step (29) on vehicles equipped with cab radio.

(29) Disconnect connector J78 (73) from connector P78 (74).

(30) Disconnect WTEC II TEPSS dimmer module (75) from connector J7 (76).
(31) Remove screw (77), lockwasher (78), terminal lug TL56 (79), and terminal lug (80) from PDP (51).

(32) Position terminal lug (80) on PDP (51) with lockwasher (78) and screw (77).

(33) Remove screw (81), lockwasher (82), terminal lug TL41 (83), and four terminal lugs (84) from PDP (51).

(34) Position four terminal lugs (84) on PDP (51) with lockwasher (82) and screw (81).

(35) Remove screw (85), lockwasher (86), terminal lug TL42 (87), and four terminal lugs (88) from PDP (51).

(36) Position four terminal lugs (88) on PDP (51) with lockwasher (86), and screw (85).

(37) Remove terminal lug TL86 (89) from terminal board TB2 (90) position 4.

(38) Remove two nuts (91), lockwashers (92), washers (93), cover (94), and two washers (93) from terminal board TB1 (95).

(39) Remove terminal lug TL74 (96) from terminal board TB1 (95) position 3.

(40) Remove terminal lug TL73 (97) from terminal board TB1 (95) position 1.
(41) Remove terminal lug TL71 (98) from terminal board TB2 (90) position 2.

(42) Remove terminal lug TL75 (99) from terminal board TB1 (95) position 2.

(43) Position two washers (93) and cover (94) on terminal board TB1 (95) with two washers (93), lockwashers (92), and nuts (91).

(44) Remove terminal lug TL87 (100) from terminal board TB2 (90) position 6.

(45) Remove terminal lug TL14 (101) from terminal board TB2 (90) position 12.

**NOTE**

Step (46) requires the aid of an assistant.

(46) Remove WTEC II dashboard cable assembly (14) from dashboard (19).

**NOTE**

Tag relays and circuit breakers prior to removal.

(47) Remove relay K15 (103) from PDP (51).
(48) Remove circuit breaker CB68 (104) from PDP (51).

(49) Deleted.

(50) Deleted.

(51) Deleted.

b. Disassembly.

NOTE

Tag wires and connection points prior to removal.

(1) Remove nut (1), lockwasher (2), washer (3), and wire 1603 (4) from terminal board TB2 (5). Discard lockwasher.

(2) Remove 42 quick disconnect terminals (6) from terminal board TB2 (5) positions 3, 8, 9, 10, 11, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 39, 43, 44, 45, 46, 47, 50, 53, 55, 56, 58, 60, 62, 70, 74, 77, and 79.

(3) Remove two nuts (7), lockwashers (8), screws (9), and terminal board TB2 (5) from PDP frame (10). Discard lockwashers.
7-10. WTEC II DASHBOARD CABLE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(4) Remove screw (11), lockwasher (12), and wire 1603 (4) from PDP frame (10). Discard lockwasher.

(5) Remove two nuts (13), lockwashers (14), washers (15), cover (16), and two washers (15) from terminal board TB1 (17). Discard lockwashers.

(6) Remove 40 quick disconnect terminals (18) from terminal board TB1 (17) positions 5, 9, 11, 19, 20, 22, 23, 24, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 46, 47, 50, 51, 52, 53, 54, 56, 57, 59, 60, 61, 62, 63, and 64.

(7) Remove two nuts (19), lockwashers (20), washers (21), spacers (22), terminal board TB1 (17), two spacers (23), and screws (24) from PDP frame (10). Discard lockwashers.

(8) Remove six quick disconnect terminals (25) from connector PX21 (26).

(9) Push in two locking tabs (27) and remove connector PX21 (26) from front of PDP frame (10).
NOTE

Tag terminal lugs and connection points prior to removal.

(10) Remove screw (28), lockwasher (29), and four terminal lugs (30) from PDP (31). Discard lockwasher.

(11) Remove screw (32), lockwasher (33), and four terminal lugs (34) from PDP (31). Discard lockwasher.

(12) Remove 94 retaining locks (35) from PDP (31).

(13) Remove 94 terminals (36) from PDP (31).

(14) Remove bus bar X1 (37) from PDP (31).

(15) Remove bus bar X6 (38) from PDP (31).

(16) Remove bus bar X2 (39) from PDP (31).

(17) Remove 41 retaining locks (40) from PDP (31).

(18) Remove 41 terminals (41) from PDP (31).
(19) Remove six nuts (42), lockwashers (43), screws (44), washers (45), and PDP (31) from PDP frame (10). Discard lockwashers.

NOTE
Tag diodes, relays, and circuit breakers prior to removal.

(20) Remove three diodes (46) from PDP (31).

(21) Remove 20 relays (47) from PDP (31).

(22) Remove 30 circuit breakers (48) from PDP (31).

c. Assembly.

(1) Install 30 circuit breakers (1) on PDP (2).

(2) Install 20 relays (3) on PDP (2).

(3) Install three diodes (4) on PDP (2).
(4) Position PDP (2) on PDP frame (5) with six washers (6), screws (7), lockwashers (8), and nuts (9).

(5) Tighten six nuts (9) to 46-57 lb-ft (63-77 N·m).

(6) Install 41 terminals (10) on PDP (2).

(7) Install 41 retaining locks (11) on PDP (2).

(8) Install bus bar X2 (12) on PDP (2).

(9) Install bus bar X6 (13) on PDP (2).

(10) Install bus bar X1 (14) on PDP (2).

(11) Install 94 terminals (15) on PDP (2).

(12) Install 94 retaining locks (16) on PDP (2).
(13) Position four terminal lugs (17) on PDP (2) with lockwasher (18), and screw (19).

(14) Position four terminal lugs (20) on PDP (2) with lockwasher (21), and screw (22).

(15) Push in two locking tabs (23) and install connector PX21 (24) through front of PDP frame (5).

(16) Install six quick disconnect terminals (25) in connector PX21 (24).

(17) Install terminal board TB1 (26) on PDP frame (5) with two screws (27), spacers (28), spacers (29), washers (30), lockwashers (31), and nuts (32).
(18) Install 40 quick disconnect terminals (33) on terminal board TB1 (26) positions 5, 9, 11, 19, 20, 22, 23, 24, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 46, 47, 50, 51, 52, 53, 54, 56, 57, 59, 60, 61, 62, 63, and 64.

(19) Position two washers (34) and cover (35) on terminal board TB1 (26) with two washers (34), lockwashers (36), and nuts (37).

(20) Position wire 1603 (38) on PDP frame (5) with lockwasher (39), and screw (40).

(21) Install terminal board TB2 (41) on PDP frame (5) with two screws (42), lockwashers (43), and nuts (44).

(22) Install 42 quick disconnect terminals (45) on terminal board TB2 (41) positions 3, 8, 9, 10, 11, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 39, 43, 44, 45, 46, 47, 50, 53, 55, 56, 58, 60, 62, 70, 74, 77, and 79.

(23) Position wire 1603 (38) on terminal board TB2 (41) with washer (46), lockwasher (47), and nut (48).
d. Installation.

(1) Deleted.

(2) Deleted.

(3) Deleted.

(4) Install circuit breaker CB68 (5) on PDP (2).

(5) Install relay K15 (6) on PDP (2).
NOTE

- Step (6) requires the aid of an assistant.
- Install plastic cable ties as required.

(6) Position WTEC II dashboard cable assembly (7) in dashboard (8).

(7) Install terminal lug TL14 (9) on terminal board TB2 (10) position 12.

(8) Install terminal lug TL87 (11) on terminal board TB2 (10) position 6.

(9) Remove two nuts (12), lockwashers (13), washers (14), cover (15), and two washers (14) from terminal board TB1 (16).

(10) Install terminal lug TL75 (17) on terminal board TB1 (16) position 2.

(11) Install terminal lug TL71 (18) on terminal board TB2 (10) position 2.

(12) Install terminal lug TL73 (19) on terminal board TB1 (16) position 1.

(13) Install terminal lug TL74 (20) on terminal board TB1 (16) position 3.

(14) Install two washers (14) and cover (15) on terminal board TB1 (16) with two washers (14), lockwashers (13), and nuts (12).

(15) Install terminal lug TL86 (21) on terminal board TB2 (10) position 4.
(16) Remove screw (22), lockwasher (23), and four terminal lugs (24) from PDP (2).

(17) Position four terminal lugs (24) and terminal lug TL42 (25) on PDP (2) with lockwasher (23), and screw (22).

(18) Tighten screw (22) to 35-45 lb-in. (4-5 N·m).

(19) Remove screw (26), lockwasher (27), and four terminal lugs (28) from PDP (2).

(20) Position four terminal lugs (28) and terminal lug TL41 (29) on PDP (2) with lockwasher (27) and screw (26).

(21) Tighten screw (26) to 35-45 lb-in. (4-5 N·m).

(22) Remove screw (30), lockwasher (31), and terminal lug (32) from PDP (2).

(23) Position terminal lug (32) and terminal lug TL56 (33) on PDP (2) with lockwasher (31) and screw (30).

(24) Tighten screw (30) to 35-45 lb-in. (4-5 N·m).
(25) Connect WTEC II TEPSS dimmer module (34) to connector J7 (35).

NOTE

Perform step (26) on vehicles equipped with cab radio.

(26) Connect connector P78 (36) to connector J78 (37).

(27) Connect connector PX33 (38) to WTEC II VIM (39).

(28) Tighten captive screw (40) in connector PX33 (38).
(29) Connect connector P111 (41) to connector J111 (42).

(30) Connect connector PX20 (43) to flasher module (44).

(31) Connect connector J99 (45) to chemical alarm kit cable connector P99 (46).

(32) Connect connector P65 (47) to warning light cable connector J65 (48).

(33) Connect fan solenoid connector (49) to connector PX34 (50).

(34) Connect connector P51 (51) to connector J51 (52).

(35) Connect connector P27 (53) to connector J27 (54).
(36) Position start inhibit pushbutton switch (55) in PDP (2).

(37) Install spring clip (56) on start inhibit pushbutton switch (55).

(38) Connect terminal lugs TL159 (57) and TL158 (58) to start inhibit pushbutton switch (55).

(39) Install windshield wiper ECU (59) on PDP (2).

NOTE
Perform steps (40) and (41) on vehicles equipped with auxiliary panel.

(40) Connect connector P913 (60) to connector J913 (61).

(41) Connect connector P912 (62) to connector J912 (63).
7-10. WTEC II DASHBOARD CABLE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(42) Install terminal lugs TL155 (64) and TL154 (65) on front stoplight switch (66) with two lockwashers (67) and nuts (68).

(43) Install terminal lugs TL152 (69) and TL153 (70) on rear stoplight switch (71) with two lockwashers (72) and nuts (73).

(44) Install terminal lug TL156 (74) on rear brake air pressure transmitter terminal WK (75) with lockwasher (76) and nut (77).

(45) Install terminal lug TL150 (78) on rear brake air pressure transmitter terminal WK (79) with lockwasher (80) and nut (81).

(46) Install terminal lug TL157 (82) on front brake air pressure transmitter terminal WK (83) with lockwasher (84) and nut (85).

(47) Install terminal lug TL151 (86) on front brake air pressure transmitter terminal G (87) with lockwasher (88) and nut (89).
(48) Install frequency ECU (90) on left side dashboard (8) with two screws (91).

(49) Connect connector PX26 (92) to frequency ECU connector (93).

(50) Position clamp (94) on WTEC II dashboard cable assembly (7).

(51) Position clamp (94) on dashboard (8) with washer (95) and screw (96).

(52) Tighten screw (96) to 35-45 lb-in. (4-5 N·m).

(53) Connect connector J31 (97) to connector P31 (98).

(54) Connect connector J43 (99) to connector P43 (100).
(55) Connect connector P118 (101) to connector J118 (102).

(56) Connect steering column switch connector P18 (103) to connector J18 (104).

(57) Connect steering column switch connector J19 (105) to connector P19 (106).

e. Follow-On Maintenance.

(1) Install windshield wiper motor (para 18-4).

(2) Install personnel heater (para 18-9).

(3) Install instrument panel assembly (para 7-15).

(4) Start engine (TM 9-2320-365-10).

(5) Check instruments operation (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
7-11. WTEC III DASHBOARD CABLE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal  
b. Disassembly  
c. Assembly  
d. Installation  
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Windshield wiper motor removed (para 18-4).
- Personnel heater removed (para 18-9).
- Instrument panel assembly removed (para 7-15).

Tools and Special Tools

- Tool Kit, Auto Fuel (Item 42, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts

- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Lockwasher (4) (Item 64, Appendix G)
- Lockwasher (4) (Item 90, Appendix G)
- Lockwasher (2) (Item 74, Appendix G)
- Lockwasher (11) (Item 73, Appendix G)
- Lockwasher (4) (Item 81, Appendix G)

Personnel Required

(2)

a. Removal.

**NOTE**

- Remove plastic cable ties as required.
- Tag wires and connection points prior to disconnecting.

(1) Disconnect steering column switch connector J19 (1) from connector P19 (2).

(2) Disconnect steering column switch connector P18 (3) from connector J18 (4).
(3) Disconnect connector J43 (5) from connector P43 (6).

(4) Disconnect connector J31 (7) from connector P31 (8).

(5) Remove screw (9), washer (10), and clamp (11) from WTEC III dashboard cable assembly (12).

(6) Disconnect connector PX26 (13) from frequency ECU connector (14).

(7) Remove two screws (15) and frequency ECU (16) from left side dashboard (17).
(8) Remove nut (18), lockwasher (19), and terminal lug TL151 (20) from front brake air pressure transmitter terminal G (21). Discard lockwasher.

(9) Remove nut (22), lockwasher (23), and terminal lug TL157 (24) from front brake air pressure transmitter terminal WK (25). Discard lockwasher.

(10) Remove nut (26), lockwasher (27), and terminal lug TL150 (28) from rear brake air pressure transmitter terminal G (29). Discard lockwasher.

(11) Remove nut (30), lockwasher (31), and terminal lug TL156 (32) from rear brake air pressure transmitter terminal WK (33). Discard lockwasher.

(12) Remove two nuts (34), lockwashers (35), and terminal lugs TL153 (36) and TL152 (37) from rear stoplight switch (38). Discard lockwashers.

(13) Remove two nuts (39), lockwashers (40), and terminal lugs TL154 (41) and TL155 (42) from front stoplight switch (43). Discard lockwashers.
NOTE

Perform steps (14) and (15) on vehicles equipped with auxiliary panel.

(14) Disconnect connector J912 (44) from connector P912 (45).

(15) Disconnect connector P913 (46) from connector J913 (47).

(16) Remove windshield wiper ECU (48) from PDP (49).

(17) Disconnect terminal lugs TL158 (50) and TL159 (51) from start inhibit pushbutton switch (52).

(18) Remove spring clip (53) from start inhibit pushbutton switch (52).

(19) Remove start inhibit pushbutton switch (52) from PDP (49).
(20) Disconnect connector J27 (54) from connector P27 (55).

(21) Disconnect connector J51 (56) from connector P51 (57).

(22) Disconnect connector PX34 (58) from fan solenoid connector (59).

(23) Disconnect connector J65 (60) from warning light cable connector P65 (61).

(24) Disconnect connector P99 (62) from chemical alarm kit cable connector J99 (63).

(25) Disconnect connector PX20 (64) from flasher module (65).

(26) Disconnect connector P111 (66) from connector J111 (67).
(27) Disconnect connector clamp (68) from connector P115 (69).

(28) Disconnect connector P115 (69) from WTEC III transmission ECU (70).

(29) Disconnect connector clamp (71) from connector P116 (72).

(30) Disconnect connector P116 (72) from WTEC III transmission ECU (70).

(31) Disconnect connector J78 (73) from connector P78 (74).

(32) Remove screw (75), lockwasher (76), terminal lug TL56 (77), and terminal lug (78) from PDP (49).

(33) Position terminal lug (78) on PDP (49) with lockwasher (76) and screw (75).

(34) Remove screw (79), lockwasher (80), terminal lug TL41 (81), and four terminal lugs (82) from PDP (49).

(35) Position four terminal lugs (82) on PDP (49) with lockwasher (80) and screw (79).

NOTE
Perform step (31) on vehicles equipped with cab radio.

(31) Disconnect connector J78 (73) from connector P78 (74).
(36) Remove screw (83), lockwasher (84), terminal lug TL42 (85), and four terminal lugs (86) from PDP (49).

(37) Position four terminal lugs (86) on PDP (49) with lockwasher (84), and screw (83).

(38) Remove terminal lug TL86 (87) from terminal board TB2 (88) position 4.

(39) Remove two nuts (89), lockwashers (90), washers (91), cover (92), and two washers (91) from terminal board TB1 (93).

(40) Remove terminal lug TL74 (94) from terminal board TB1 (93) position 3.

(41) Remove terminal lug TL73 (95) from terminal board TB1 (93) position 1.

(42) Remove terminal lug TL71 (96) from terminal board TB2 (88) position 2.

(43) Remove terminal lug TL75 (97) from terminal board TB1 (93) position 2.

(44) Position two washers (91) and cover (92) on terminal board TB1 (93) with two washers (91), lockwashers (90), and nuts (89).

(45) Remove terminal lug TL87 (98) from terminal board TB2 (88) position 6.

(46) Remove terminal lug TL14 (99) from terminal board TB2 (88) position 12.
(47) Remove nut (100), lockwasher (101), terminal lug TL190 (102), terminal lug TL56 (103) and screw (104) from dashboard (17). Discard lockwasher.

**NOTE**

Step (48) requires the aid of an assistant.

(48) Remove WTEC III dashboard cable assembly (12) from dashboard (17).

(49) Deleted.

(50) Deleted.

(51) Deleted.
b. **Disassembly.**

**NOTE**

Tag wires and connection points prior to removal.

1. Remove nut (1), lockwasher (2), washer (3), and wire 1603 (4) from terminal board TB2 (5). Discard lockwasher.

2. Remove 46 quick disconnect terminals (6) from terminal board TB2 (5) positions 3, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 43, 44, 45, 46, 47, 50, 53, 55, 56, 60, 62, 70, 74, 77, and 79.

3. Remove two nuts (7), lockwashers (8), screws (9), and terminal board TB2 (5) from PDP frame (10). Discard lockwashers.

4. Remove screw (11), lockwasher (12), and wire 1603 (4) from PDP frame (10). Discard lockwasher.

5. Remove two nuts (13), lockwashers (14), washers (15), cover (16), and two washers (15) from terminal board TB1 (17). Discard lockwashers.

6. Remove 38 quick disconnect terminals (18) from terminal board TB1 (17) positions 5, 11, 20, 23, 24, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 46, 47, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 61, 62, 63, and 64.
(7) Remove two nuts (19), lockwashers (20), washers (21), spacers (22), terminal board TB1 (17), two spacers (23), and screws (24) from PDP frame (10). Discard lockwashers.

(8) Remove six quick disconnect terminals (25) from connector PX21 (26).

(9) Push in two locking tabs (27) and remove connector PX21 (26) from front of PDP frame (10).

**NOTE**

Tag terminal lugs and connection points prior to removal.

(10) Remove screw (28), lockwasher (29), and four terminal lugs (30) from PDP (31). Discard lockwasher.

(11) Remove screw (32), lockwasher (33), and four terminal lugs (34) from PDP (31). Discard lockwasher.
(12) Remove 94 retaining locks (35) from PDP (31).
(13) Remove 94 terminals (36) from PDP (31).
(14) Remove bus bar X1 (37) from PDP (31).
(15) Remove bus bar X6 (38) from PDP (31).
(16) Remove bus bar X2 (39) from PDP (31).

(17) Remove 41 retaining locks (40) from PDP (31).
(18) Remove 41 terminals (41) from PDP (31).

(19) Remove six nuts (42), lockwashers (43), screws (44),
washers (45), and PDP (31) from PDP frame (10).
Discard lockwashers.
NOTE

Tag diodes, relays, and circuit breakers prior to removal.

(20) Remove three diodes (46) from PDP (31).

(21) Remove 24 relays (47) from PDP (31).

(22) Remove 29 circuit breakers (48) from PDP (31).

c. Assembly.

(1) Install 29 circuit breakers (1) on PDP (2).

(2) Install 24 relays (3) on PDP (2).

(3) Install three diodes (4) on PDP (2).

(4) Position PDP (2) on PDP frame (5) with six washers (6), screws (7), lockwashers (8), and nuts (9).

(5) Tighten six nuts (9) to 46-57 lb-ft (63-77 N·m).
(6) Install 41 terminals (10) on PDP (2).

(7) Install 41 retaining locks (11) on PDP (2).

(8) Install bus bar X2 (12) on PDP (2).

(9) Install bus bar X6 (13) on PDP (2).

(10) Install bus bar X1 (14) on PDP (2).

(11) Install 94 terminals (15) on PDP (2).

(12) Install 94 retaining locks (16) on PDP (2).

(13) Position four terminal lugs (17) on PDP (2) with lockwasher (18), and screw (19).

(14) Position four terminal lugs (20) on PDP (2) with lockwasher (21), and screw (22).
(15) Push in two locking tabs (23) and install connector PX21 (24) through front of PDP frame (5).

(16) Install six quick disconnect terminals (25) in connector PX21 (24).

(17) Install terminal board TB1 (26) on PDP frame (5) with two screws (27), spacers (28), spacers (29), washers (30), lockwashers (31), and nuts (32).

(18) Install 38 quick disconnect terminals (33) on terminal board TB1 (26) positions 5, 11, 20, 23, 24, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 46, 47, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 61, 62, 63, and 64.

(19) Position two washers (34) and cover (35) on terminal board TB1 (26) with two washers (34), lockwashers (36), and nuts (37).

(20) Position wire 1603 (38) on PDP frame (5) with lockwasher (39), and screw (40).
(21) Install terminal board TB2 (41) on PDP frame (5) with two screws (42), lockwashers (43), and nuts (44).

(22) Install 46 quick disconnect terminals (45) on terminal board TB2 (41) positions 3, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 43, 44, 45, 46, 47, 50, 53, 55, 56, 60, 62, 70, 74, 77, and 79.

(23) Position wire 1603 (38) on terminal board TB2 (41) with washer (46), lockwasher (47), and nut (48).

d. Installation.

(1) Deleted.

(2) Deleted.

(3) Deleted.

**NOTE**

- Step (4) requires the aid of an assistant.
- Install plastic cable ties as required.

(4) Position WTEC III dashboard cable assembly (5) in dashboard (6).

(5) Install screw (7), terminal lug TL56 (8), terminal lug TL190 (9), washer (10), and nut (11) on dashboard (6).
(6) Install terminal lug TL14 (12) on terminal board TB2 (13) position 12.

(7) Install terminal lug TL87 (14) on terminal board TB2 (13) position 6.

(8) Remove two nuts (15), lockwashers (16), washers (17), cover (18), and two washers (17) from terminal board TB1 (19).

(9) Install terminal lug TL75 (20) on terminal board TB1 (19) position 2.

(10) Install terminal lug TL71 (21) on terminal board TB2 (13) position 2.

(11) Install terminal lug TL73 (22) on terminal board TB1 (19) position 1.

(12) Install terminal lug TL74 (23) on terminal board TB1 (19) position 3.

(13) Install two washers (17) and cover (18) on terminal board TB1 (19) with two washers (17), lockwashers (16), and nuts (15).

(14) Install terminal lug TL86 (24) on terminal board TB2 (13) position 4.
(15) Remove screw (25), lockwasher (26), and four terminal lugs (27) from PDP (2).

(16) Position four terminal lugs (27) and terminal lug TL42 (28) on PDP (2) with lockwasher (26), and screw (25).

(17) Tighten screw (25) to 35-45 lb-in. (4-5 N·m).

(18) Remove screw (29), lockwasher (30), and four terminal lugs (31) from PDP (2).

(19) Position four terminal lugs (31) and terminal lug TL41 (32) on PDP (2) with lockwasher (30) and screw (29).

(20) Tighten screw (29) to 35-45 lb-in. (4-5 N·m).

(21) Remove screw (33), lockwasher (34), and terminal lug (35) from PDP (2).

(22) Position terminal lug (35) and terminal lug TL56 (36) on PDP (2) with lockwasher (34) and screw (33).

(23) Tighten screw (33) to 35-45 lb-in. (4-5 N·m).
NOTE

Perform step (24) on vehicles equipped with cab radio.

(24) Connect connector P78 (37) to connector J78 (38).

(25) Connect connector P116 (39) to WTEC III transmission ECU (40).

(26) Connect connector clamp (41) on connector P116 (39).

(27) Connect connector P115 (42) to WTEC III transmission ECU (41).

(28) Connect connector clamp (43) on connector P115 (42).

(29) Connect connector P111 (44) to connector J111 (45).

(30) Connect connector PX20 (46) to flasher module (47).
(31) Connect connector J99 (48) to chemical alarm kit cable connector P99 (49).

(32) Connect connector P65 (50) to warning light cable connector J65 (51).

(33) Connect fan solenoid connector (52) to connector PX34 (53).

(34) Connect connector P51 (54) to connector J51 (55).

(35) Connect connector P27 (56) to connector J27 (57).

(36) Position start inhibit pushbutton switch (58) in PDP (2).

(37) Install spring clip (59) on start inhibit pushbutton switch (58).

(38) Connect terminal lugs TL159 (60) and TL158 (61) to start inhibit pushbutton switch (58).
(39) Install windshield wiper ECU (62) on PDP (2).

NOTE
Perform steps (40) and (41) on vehicles equipped with auxiliary panel.

(40) Connect connector P913 (63) to connector J913 (64).
(41) Connect connector P912 (65) to connector J912 (66).

(42) Install terminal lugs TL155 (67) and TL154 (68) on front stoplight switch (69) with two lockwashers (70) and nuts (71).

(43) Install terminal lugs TL152 (72) and TL153 (73) on rear stoplight switch (74) with two lockwashers (75) and nuts (76).
(44) Install terminal lug TL156 (77) on rear brake air pressure transmitter terminal WK (78) with lockwasher (79) and nut (80).

(45) Install terminal lug TL150 (81) on rear brake air pressure transmitter terminal G (82) with lockwasher (83) and nut (84).

(46) Install terminal lug TL157 (85) on front brake air pressure transmitter terminal WK (86) with lockwasher (87) and nut (88).

(47) Install terminal lug TL151 (89) on front brake air pressure transmitter terminal G (90) with lockwasher (91) and nut (92).

(48) Install frequency ECU (93) on left side dashboard (6) with two screws (94).

(49) Connect connector PX26 (95) to frequency ECU connector (96).
(50) Position clamp (97) on WTEC III dashboard cable assembly (5).

(51) Position clamp (97) on dashboard (6) with washer (98) and screw (99).

(52) Tighten screw (99) to 35-45 lb-in. (4-5 N·m).

(53) Connect connector J31 (100) to connector P31 (101).

(54) Connect connector J43 (102) to connector P43 (103).

(55) Connect steering column switch connector P18 (104) to connector J18 (105).

(56) Connect steering column switch connector J19 (106) to connector P19 (107).

e. Follow-On Maintenance.

(1) Install windshield wiper motor (para 18-4).

(2) Install personnel heater (para 18-9).

(3) Install instrument panel assembly (para 7-15).

(4) Start engine (TM 9-2320-365-10).

(5) Check instruments operation (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
7-12. DIMMER SWITCH REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

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

a. Removal.

(1) Disconnect connector clamp (1) from dimmer switch connector (2).

(2) Disconnect connector PX24 (3) from dimmer switch connector (2).

(3) Loosen screw (4) on dimmer switch knob (5).

(4) Remove dimmer switch knob (5) from dimmer switch (6).

(5) Remove nut (7), washer (8), and dimmer switch (6) from instrument panel assembly (9).

b. Installation.

(1) Install dimmer switch (6) in instrument panel assembly (9) with washer (8) and nut (7).

(2) Install dimmer switch knob (5) on dimmer switch (6).

(3) Tighten screw (4) on dimmer switch knob (5).

(4) Connect connector PX24 (3) to dimmer switch connector (2).

(5) Connect connector clamp (1) on dimmer switch connector (2).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Check dimmer switch operation (TM 9-2320-365-10).

End of Task.
### 7-13. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) DIMMER MODULE REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

#### INITIAL SETUP

**Equipment Conditions**
- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).

**Materials/Parts**
- Ties, Cable, Plastic (Item 76, Appendix D)

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

#### a. Removal.

1. Remove three screws (1) and washers (2) from PDP (3).
2. Remove three screws (4) from PDP (3).
3. Lift PDP (3) out to gain access.

#### NOTE

Remove plastic cable ties as required.

4. Disconnect connector J7 (5) from WTEC II TEPSS dimmer module connector (6).
b. Installation.

**NOTE**

Install plastic cable ties as required.

1. Connect connector J7 (1) to WTEC II TEPSS dimmer module connector (2).

2. Install PDP (3) on dashboard (4) with three screws (5).

3. Install three washers (6) and screws (7) in PDP (3).

c. Follow-On Maintenance.

1. Install PDP cover (para 16-2).

2. Connect batteries (para 7-48).

End of Task.
7-14. ELECTRICAL GAGES REPLACEMENT

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Nut, Self-Locking (2) (Item 125, Appendix G)
Ties, Cable, Plastic (Item 76, Appendix D)

a. Removal.

NOTE
All electrical gages are removed the same way. Speedometer shown.

(1) Disconnect connector clamp (1) from speedometer connector (2).

NOTE
Remove plastic cable ties as required.

(2) Disconnect connector PX8 (3) from speedometer connector (2).

NOTE
Note position of speedometer prior to removal.

(3) Remove two protective caps (4), self-locking nuts (5), retaining ring (6), and speedometer (7) from instrument panel assembly (8). Discard self-locking nuts.
b. Installation.

CAUTION

Ensure dipswitch settings are correct. Failure to comply may result in inaccurate speedometer readings.

NOTE

Perform steps (1) through (3) on speedometer.

1. Remove cover (1) from speedometer (2).
2. Set dipswitches 3, 6, 7, and 9 in the down position.
3. Set dipswitches 1, 2, 4, 5, 8, and 10 in the up position.

NOTE

Note position of speedometer prior to installation.

4. Position speedometer (2) in instrument panel assembly (3) with retaining ring (4) and two self-locking nuts (5).
5. Tighten two self-locking nuts (5) to 9 lb-in. (1 N•m).
6. Install two protective caps (6) on speedometer (2).

NOTE

Install plastic cable ties as required.

7. Connect connector PX8 (7) on speedometer connector (8).
8. Connect connector clamp (9) on speedometer connector (8).

c. Follow-On Maintenance.

1. Install instrument panel assembly (para 7-15).
2. Check gage(s) operation (TM 9-2320-365-10).

End of Task.
7-15. INSTRUMENT PANEL ASSEMBLY REPLACEMENT/REPAIR

This task covers

a. Removal  
b. Disassembly  
c. Assembly  
d. Installation  
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Batteries disconnected (para 7-48).  
Steering wheel removed (para 13-2).  
Inclinometer removed (para 16-77)

Materials/Parts

Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

Tools and Special Tools

Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)  
Socket Set, Socket Wrench (Item 34, Appendix C)

a. Removal.

NOTE

Perform steps (1) through (4) if removing instrument panel assembly for access.

(1) Loosen screw (1) in HAND THROTTLE knob (2).

(2) Remove HAND THROTTLE knob (2) from HAND THROTTLE lever (3).

NOTE

Depending upon pre-conditioned items removed; configuration of instrument panel can have 12 to 16 screws. Configuration with 16 screws shown.

(3) Remove 16 screws (4) and washers (5) from instrument panel assembly (6).

(4) Lift instrument panel assembly (6) outward to gain access.
NOTE
Remove plastic cable ties as required.

(5) Disconnect connector PX7 (7) from lighted indicator display (8).

NOTE
All electrical gages are disconnected the same way. OIL PRESS gage shown. Refer to Table 7-1.2 Electrical Gages Connectors for correct combinations of gages and connectors.

Table 7-1.2 Electrical Gages Connectors

<table>
<thead>
<tr>
<th>Electrical Gage</th>
<th>Connector Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONT BRAKE AIR</td>
<td>PX4</td>
</tr>
<tr>
<td>REAR BRAKE AIR</td>
<td>PX5</td>
</tr>
<tr>
<td>FUEL</td>
<td>PX9</td>
</tr>
<tr>
<td>Speedometer</td>
<td>PX8</td>
</tr>
<tr>
<td>OIL PRESS</td>
<td>PX6</td>
</tr>
<tr>
<td>VOLTS</td>
<td>PX10</td>
</tr>
<tr>
<td>WATER TEMP</td>
<td>PX11</td>
</tr>
</tbody>
</table>

(6) Disconnect connector clamp (9) from OIL PRESS gage connector (10).

(7) Disconnect connector (11) from OIL PRESS gage connector (10).

(8) Perform steps (6) and (7) on remaining electrical gages.
NOTE

- Vehicle serial numbers 0002 through 0017, 0019 through 0025, 0027 through 0031, 0033 through 0038, 0040 and 0041, 0043 through 0053, 0055 through 0089, 0091 through 0254, 0256 through 0258, 0260, 0261, 0263 through 2400, and 2402 through 3091 are not equipped with LAMP TEST switch.

- Vehicle serial numbers 0001 through 1477 were originally equipped with dashboard cable assemblies containing two unused connectors for LAMP TEST switch. Vehicle serial numbers 1478 through 3091 were originally equipped with dashboard cable assemblies without connectors for LAMP TEST switch.

- All rocker switches are disconnected the same way. Hazard lights switch shown. Refer to Table 7-2. Rocker Switch Connectors for correct combinations of rocker switches and connectors.

Table 7-2. Rocker Switch Connectors

<table>
<thead>
<tr>
<th>Switch Name</th>
<th>Connector Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiator Fan Off</td>
<td>PX1 and PX1A</td>
</tr>
<tr>
<td>LAMP TEST</td>
<td>PX2 and PX2A</td>
</tr>
<tr>
<td>Ether Start</td>
<td>PX13 and PX13A</td>
</tr>
<tr>
<td>Master Power</td>
<td>PX17 and PX17A</td>
</tr>
<tr>
<td>Warning Light</td>
<td>PX12 and PX12A</td>
</tr>
<tr>
<td>Hazard Lights</td>
<td>PX14 and PX14A</td>
</tr>
</tbody>
</table>

1. Lift tab (12) on connector (13).
2. Disconnect connector (13) from hazard lights switch (14).
3. Disconnect connector (15) from hazard lights switch (14).
4. Perform steps (9) through (11) on remaining rocker switches.
5. Disconnect vacuum hose (16) from AIR FILTER RESTRICTION GAUGE (17).
NOTE

Perform step (14) on M1079.

(14) Remove two screws (18) and terminal lugs TL160 (19) and TL161 (20) from audible alarm (21).

(15) Remove three screws (18) and terminal lugs TL160 (19), TL161 (20) and TL178 (22) from audible alarm (21).

(16) Remove connector clamp (23) from dimmer switch (24).

(17) Disconnect connector PX24 (25) from dimmer switch (24).

(18) Disconnect connector PX15 (26) from main light switch (27).
(19) Disconnect terminal lugs TL162 (28) and TL163 (29) from starter pushbutton switch (30).

**NOTE**

Perform steps (20) through (22) on vehicles equipped with WTEC II transmission controls.

(20) Disconnect connector J115 (31) from WTEC II TEPSS (32).

(21) Disconnect connector J114 (33) from WTEC II TEPSS (32).

(22) Remove screw (34), washer (35) and terminal lug (36) from instrument panel assembly (6).
NOTE

Perform step (23) on vehicles equipped with WTEC III transmission controls.

(23) Disconnect connector PX33 (37) from WTEC III TPSS (38).

(24) Remove instrument panel assembly (6) from dashboard (39).

b. Disassembly.

NOTE

- All rocker switches are removed the same way. Radiator fan off switch shown.

- Note position of rocker switches prior to removal.

(1) Push in two tabs (1) on radiator fan off switch (2).

(2) Remove radiator fan off switch (2) from instrument panel (3).

(3) Perform steps (1) and (2) on remaining rocker switches.
NOTE

- All electrical gages are removed the same way. FUEL gage shown.

- Note position of electrical gages prior to removal.

(4) Remove two protective caps (4), self-locking nuts (5), retaining ring (6), and FUEL gage (7) from instrument panel (3). Discard self-locking nuts.

(5) Perform step (4) on remaining electrical gages.

NOTE

Perform steps (6) and (7) on vehicles equipped with WTEC II transmission controls.

(6) Remove two screws (8) and washers (9) from mounting bracket (10).

(7) Remove four screws (11), mounting bracket (10), three clip nuts (12), and WTEC II TEPSS (13) from instrument panel (3).

NOTE

Perform steps (8) and (9) on vehicles equipped with WTEC III transmission controls.

(8) Remove two nuts (14) and brackets (15) from WTEC III TPSS (16).

(9) Remove WTEC III TPSS (16) from instrument panel (3).
(10) Remove four screws (17) and lighted indicator display (18) from instrument panel (3).

(11) Remove lock ring (19) and audible alarm (20) from instrument panel (3).

(12) Remove nut (21), washer (22), and starter pushbutton switch (23) from instrument panel (3).
(13) Remove two screws (24), faceplate (25) and AIR FILTER RESTRICTION GAUGE (26) from instrument panel (3).

(14) Loosen screw (27) on dimmer switch knob (28).

(15) Remove dimmer switch knob (28) from dimmer switch (29).

(16) Remove nut (30), washer (31), and dimmer switch (29) from instrument panel (3).

(17) Remove three screws (32) from knobs (33).

(18) Remove three knobs (33) and spacers (34) from main light switch (35)

(19) Remove four screws (36) and main light switch (35) from instrument panel (3).

(20) Remove electrical switch cover (37) from instrument panel (3).
c. Assembly.

(1) Install electrical switch cover (1) in instrument panel (2).

(2) Position main light switch (3) in instrument panel (2) with four screws (4).

(3) Tighten four screws (4) to 9 lb-in. (1 N·m).

(4) Install three spacers (5) and knobs (6) on main light switch (3).

(5) Install three screws (7) in knobs (6).

(6) Position dimmer switch (8) in instrument panel (2) with washer (9) and nut (10).

(7) Tighten nut (10) to 159-195 lb-in. (18-22 N·m).

(8) Install dimmer switch knob (11) on dimmer switch (8).

(9) Tighten screw (12) in dimmer switch knob (11).

(10) Install AIR FILTER RESTRICTION GAUGE (13) and faceplate (14) on instrument panel (2) with two screws (15).
(11) Position starter pushbutton switch (16) in instrument panel (2) with washer (17) and nut (18).

(12) Tighten nut (18) to 57-70 lb-in. (6-8 N·m).

(13) Install audible alarm (19) in instrument panel (2) with lock ring (20).

(14) Position lighted indicator display (21) in instrument panel (2) with four screws (22).

(15) Tighten four screws (22) to 9 lb-in. (1 N·m).
NOTE

Perform steps (16) through (19) on vehicles equipped with WTEC II transmission controls.

(16) Position WTEC II TEPSS (23) in instrument panel (2) with three clip nuts (24), mounting bracket (25) and four screws (26).

(17) Position two screws (27) and washers (28) in mounting bracket (25).

(18) Tighten four screws (26) to 9 lb-in. (1 N·m).

(19) Tighten two screws (27) to 27-35 lb-in. (3-4 N·m).

NOTE

Perform steps (20) through (22) on vehicles equipped with WTEC III transmission controls.

(20) Install WTEC III TPSS (29) in instrument panel (2).

(21) Position two brackets (30) on rear of WTEC III TPSS (29) with two nuts (31).

(22) Tighten two nuts (31) to 11-13 lb-in. (1 N·m).
7-15. INSTRUMENT PANEL ASSEMBLY REPLACEMENT/REPAIR (CONT)

NOTE

All electrical gages are installed the same way. FUEL gage shown.

(23) Position FUEL gage (32) in instrument panel (2) with mounting ring (33) and two self-locking nuts (34).

(24) Tighten two self-locking nuts (34) to 9 lb-in. (1 N·m).

(25) Install two protective caps (35) on FUEL gage (32).

(26) Perform steps (23) through (25) on remaining gages.

NOTE

All rocker switches are installed the same way. Radiator fan off switch shown.

(27) Install radiator fan off switch (36) in instrument panel (2).

(28) Perform step (27) on remaining rocker switches.

d. Installation.

(1) Position instrument panel assembly (1) on dashboard (2).

NOTE

Perform steps (2) through (4) on vehicles equipped with WTEC II transmission controls.

(2) Connect connector J114 (3) to WTEC II TEPSS (4).

(3) Connect connector J115 (5) to WTEC II TEPSS (4).

(4) Install terminal lug (6) on instrument panel assembly (1) with washer (7) and screw (8).
NOTE

Perform step (5) on vehicles equipped with WTEC III transmission controls.

(5) Connect connector PX33 (9) to WTEC III TPSS (10).

(6) Connect terminal lugs TL163 (11) and TL162 (12) to starter pushbutton switch (13).

(7) Connect connector PX15 (14) to main light switch (15).

(8) Connect connector PX24 (16) to dimmer switch (17).

(9) Install connector clamp (18) on dimmer switch (17).
NOTE

Perform step (10) on M1078 and M1081.

(10) Install terminal lugs TL160 (19), TL161 (20) and TL178 (21) on audible alarm (22) with three screws (23).

NOTE

Perform step (11) on M1079.

(11) Install terminal lugs TL160 (19) and TL161 (20) on audible alarm (22) with two screws (23).
(12) Connect vacuum hose (24) to AIR FILTER RESTRICTION GAUGE (25).

**NOTE**

- Vehicle serial numbers 0002 through 0017, 0019 through 0025, 0027 through 0031, 0033 through 0038, 0040 and 0041, 0043 through 0053, 0055 through 0089, 0091 through 0254, 0256 through 0258, 0260, 0261, 0263 through 2400, and 2402 through 3091 are not equipped with LAMP TEST switch.

- Vehicle serial numbers 0001 through 1477 were originally equipped with dashboard cable assemblies containing two unused connectors for LAMP TEST switch. Vehicle serial numbers 1478 through 3091 were originally equipped with dashboard cable assemblies without connectors for LAMP TEST switch.

- All rocker switches are connected the same way. Hazard lights switch shown. Refer to **Table 7-2. Rocker Switch Connectors** for correct combinations of rocker switches and connectors.

(13) Connect connector (26) to hazard lights switch (27).

(14) Connect connector (28) to hazard lights switch (27).

(15) Perform steps (13) and (14) on remaining rocker switches.

**NOTE**

All electrical gages are connected the same way. OIL PRESS gage shown. Refer to **Table 7-1.2 Electrical Gages Connectors** for correct combinations of gages and connectors.

(16) Connect connector (29) to OIL PRESS gage connector (30).

(17) Install connector clamp (31) on OIL PRESS gage connector (30).

(18) Perform steps (16) and (17) on remaining electrical gages.

(19) Connect connector PX7 (32) to lighted indicator display (33).
7-15. INSTRUMENT PANEL ASSEMBLY REPLACEMENT/REPAIR (CONT)

NOTE

Depending upon pre-conditioned items removed; configuration of instrument panel can have 12 to 16 screws. Configuration with 16 screws shown.

(20) Position instrument panel assembly (1) on dashboard (2) with 16 washers (34) and screws (35).

(21) Tighten 16 screws (35) to 24 lb-in (3 N·m).

(22) Install HAND THROTTLE knob (36) on HAND THROTTLE lever (37) with screw (38).

e. Follow-On Maintenance.

(1) Install steering wheel (para 13-2).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Check operation of instrument panel assembly switches and gages (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-16. LIGHTED INDICATOR DISPLAY REPLACEMENT/REPAIR

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation
- e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Lamp, Incandescent (Item 57, Appendix G)
Lamp, Incandescent (Item 58, Appendix G)

a. Removal.

(1) Remove four screws (1) and lighted indicator display (2) from instrument panel assembly (3).

(2) Disconnect connector PX7 (4) from lighted indicator display (2).

b. Disassembly.

(1) Loosen four captive screws (1) in lamp mounting panel (2).

(2) Remove lamp mounting panel (2) from lighted indicator display housing (3).

(3) Remove faulty lamp(s) (4) from printed circuit board (5). Discard faulty lamp(s).
c. Assembly.

**NOTE**

Left turn indicator, right turn indicator, and high beam indicator are 12 vdc lamps. All other lamps are 24 vdc.

(1) Install replacement lamp(s) (1) in printed circuit board (2).

(2) Install lamp mounting panel (3) in lighted indicator display housing (4).

(3) Tighten four captive screws (5) in lamp mounting panel (3).

d. Installation.

(1) Connect connector PX7 (1) to lighted indicator display (2).

(2) Position lighted indicator display (2) in instrument panel assembly (3) with four screws (4).

(3) Tighten four screws (4) to 9 lb-in. (1 N·m).

e. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Check operation of lighted indicator display (TM 9-2320-365-10).

End of Task.
7-17. MAIN LIGHT SWITCH REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)

a. Removal.

(1) Remove three screws (1) from knobs (2).

(2) Remove three knobs (2) and spacers (3) from main light switch (4).

NOTE
Remove plastic cable ties as required.

(3) Disconnect connector PX15 (5) from main light switch (4).

(4) Remove four screws (6) and main light switch (4) from instrument panel assembly (7).
7-17. MAIN LIGHT SWITCH REPLACEMENT (CONT)

b. Installation.

(1) Position main light switch (1) in instrument panel assembly (2) with four screws (3).

(2) Tighten four screws (3) to 11-13 lb-in. (1 N·m).

NOTE
Install plastic cable ties as required.

(3) Connect connector PX15 (4) to main light switch (1).

(4) Install three spacers (5) and knobs (6) on main light switch (1).

(5) Install three screws (7) in knobs (6).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Check lighting system operation (TM 9-2320-365-10).

End of Task.
7-18. ROCKER SWITCHES REPLACEMENT

This task covers:

a. Instrument Panel Rocker Switch Removal  
b. Instrument Panel Rocker Switch Installation  
c. Auxiliary Panel Rocker Switch Removal  
d. Auxiliary Panel Rocker Switch Installation  
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (for instrument panel rocker switches) (para 7-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)


NOTE

- Vehicle serial numbers 0002 through 0017, 0019 through 0025, 0027 through 0031, 0033 through 0038, 0040, 0041, 0043 through 0053, 0055 through 0089, 0091 through 0254, 0256 through 0258, 0260, 0261, 0263 through 2400, and 2402 through 3091 are not equipped with LAMP TEST switch.

- All instrument panel rocker switches are removed the same way. Radiator fan off switch shown.

- Tag electrical connectors and connection points prior to disconnecting.

(1) Lift tab (1) on connector PX1 (2).

(2) Disconnect connector PX1 (2) from radiator fan off switch (3).

(3) Disconnect connector PX1A (4) from radiator fan off switch (3).

(4) Push in two tabs (5) on radiator fan off switch (3).

(5) Remove radiator fan off switch (3) from instrument panel assembly (6).
(6) Remove lamp base (7) from radiator fan off switch (3).

(7) Remove lamp (8) from lamp base (7).


NOTE

All instrument panel rocker switches are installed the same way. Radiator fan off switch shown.

(1) Install lamp (1) in lamp base (2).

(2) Install lamp base (2) in radiator fan off switch (3).

(3) Install radiator fan off switch (3) in instrument panel assembly (4).

(4) Connect connector PX1A (5) to radiator fan off switch (3).

(5) Connect connector PX1 (6) to radiator fan off switch (3).
c. Auxiliary Panel Rocker Switch Removal.

(1) Remove six screws (1) from auxiliary panel (2).
(2) Lift auxiliary panel (2) outward to gain access.

NOTE

• All auxiliary panel rocker switches are removed the same way. PTO switch shown.

• Tag electrical connectors and connection points prior to disconnecting.

(3) Lift tab (3) on connector P903 (4).

(4) Disconnect connector P903 (4) from PTO switch (5).

(5) Disconnect connector P903A (6) from PTO switch (5).

(6) Push in two tabs (7) on PTO switch (5).

(7) Remove PTO switch (5) from auxiliary panel (2).
(8) Remove lamp base (8) from PTO switch (5).

(9) Remove lamp (9) from lamp base (8).

d. Auxiliary Panel Rocker Switch Installation.

(1) Install lamp (1) in lamp base (2).

(2) Install lamp base (2) in PTO switch (3).

(3) Install PTO switch (3) in auxiliary panel (4).

(4) Connect connector P903A (5) to PTO switch (3).

(5) Connect connector P903 (6) to PTO switch (3).

NOTE
All auxiliary panel rocker switches are installed the same way. PTO switch shown.

(1) Install lamp (1) in lamp base (2).

(2) Install lamp base (2) in PTO switch (3).
(6) Position auxiliary panel (4) on auxiliary panel housing (7) with six screws (8).

(7) Tighten six screws (8) to 18 lb-in. (2 N·m).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (instrument panel rocker switches) (para 7-15).

(2) Check rocker switch operation (TM 9-2320-365-10).

End of Task.
## 7-19. START INHIBIT PUSHBUTTON SWITCH REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

### INITIAL SETUP

**Equipment Conditions**
- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).

**Materials/Parts**
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

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

### a. Removal.

1. Remove three screws (1) and washers (2) from PDP (3).
2. Remove three screws (4) from PDP (3).
3. Lift PDP (3) outward to gain access.

**NOTE**
Tag electrical connectors and connection points prior to disconnecting.

4. Disconnect terminal lugs TL158 (5) and TL159 (6) from start inhibit pushbutton switch (7).
5. Remove spring clip (8) and start inhibit pushbutton switch (7) from PDP (3).
b. Installation.

(1) Install start inhibit pushbutton switch (1) in PDP (2) with spring clip (3).

(2) Connect terminal lugs TL159 (4) and TL158 (5) to start inhibit pushbutton switch (1).

(3) Position PDP (2) on dashboard (6).

(4) Install three screws (7) in PDP (2).

(5) Install three washers (8) and screws (9) in PDP (2).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Connect batteries (para 7-48).

End of Task.
7-20. STARTER PUSHBUTTON SWITCH REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

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 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

a. Removal.

NOTE
Tag wires and connection points prior to disconnecting.

(1) Disconnect terminal lugs TL162 (1) and TL163 (2) from starter pushbutton switch (3).

(2) Remove nut (4), washer (5), and starter pushbutton switch (3) from instrument panel assembly (6).

b. Installation.

(1) Position starter pushbutton switch (3) in instrument panel assembly (6) with washer (5) and nut (4).

(2) Tighten nut (4) to 57-70 lb-in. (6-8 N·m).

(3) Connect terminal lugs TL163 (2) and TL162 (1) to starter pushbutton switch (3).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Start engine (TM 9-2320-365-10).

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
7-21. TACHOMETER REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

Materials/Parts
Nut, Self-Locking (2) (Item 125, Appendix G)

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

a. Removal.

(1) Remove six screws (1) and auxiliary panel (2) from auxiliary panel housing (3).

(2) Lift auxiliary panel (2) outward to gain access.

(3) Disconnect connector clamp (4) from tachometer connector (5).

(4) Disconnect connector P901 (6) from tachometer connector (5).

(5) Remove two protective caps (7), self-locking nuts (8), and retaining ring (9) from tachometer (10). Discard self-locking nuts.

(6) Remove tachometer (10) from auxiliary panel (2).
b. Installation.

1. Position tachometer (1) in auxiliary panel (2) with retaining ring (3) and two self-locking nuts (4).

2. Tighten two self-locking nuts (4) to 9 lb-in. (1 N·m).

3. Install two protective caps (5) on tachometer (1).

4. Connect connector P901 (6) to tachometer connector (7).

5. Connect connector clamp (8) on tachometer connector (7).

6. Position auxiliary panel (2) on auxiliary panel housing (9) with six screws (10).

7. Tighten six screws (10) to 18 lb-in. (2 N·m).

c. Follow-On Maintenance.

1. Connect batteries (para 7-48).

2. Start engine (TM 9-2320-365-10).

3. Check tachometer operation (TM 9-2320-365-10).


End of Task.
7-22. COOLANT TEMPERATURE LIGHT SWITCH REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Pan, Drain (Item 24, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Crowfoot Attachment, Socket Wrench (Item 6, Appendix B)

Materials/Parts
Antiseize Compound (Item 63, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)

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 one gallon (one L) of coolant.

(4) Close radiator draincock (3).
7-22. COOLANT TEMPERATURE LIGHT SWITCH REPLACEMENT (CONT)

NOTE

Remove plastic cable ties as required.

(5) Disconnect connector clamp (4) from coolant temperature light switch (5).

(6) Disconnect connector P37 (6) from coolant temperature light switch (5).

(7) Remove coolant temperature light switch (5) from thermostat housing (7).

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 coolant temperature light switch (1).

(2) Position coolant temperature light switch (1) in thermostat housing (2).

(3) Tighten coolant temperature light switch (1) to 20-23 lb-ft (27-31 N·m).

(4) Connect connector P37 (3) to coolant temperature light switch (1).

NOTE

Install plastic cable ties as required.

(5) Connect connector clamp (4) on coolant temperature light switch (1).
c. **Follow-On Maintenance.**

   (1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

   (2) Connect batteries (para 7-48).

   (3) Lower cab (TM 9-2320-365-10).

   (4) Start engine (TM 9-2320-365-10).

   (5) Check for coolant leaks under vehicle.

   (6) Check coolant level after normal temperature is reached.
       Add coolant as required (TM 9-2320-365-10).

   (7) Raise cab (TM 9-2320-365-10).

   (8) Check for leaks around coolant temperature light switch.

   (9) Lower cab (TM 9-2320-365-10).

   (10) Shut down engine (TM 9-2320-365-10).

   **End of Task.**
7-23. FAN SOLENOID REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air tanks drained (TM 9-2320-365-10).
Batteries disconnected (para 7-48).
Kick panel removed (para 16-3).

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

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

a. Removal.

(1) Disconnect fan solenoid connector (1) from connector PX34 (2).

NOTE
Tag air hoses and connection points prior to disconnecting.

(2) Disconnect air hose (3) from 90-degree fitting (4).

(3) Disconnect air hose (5) from fitting (6).

(4) Remove four screws (7) and bracket (8) from dashboard (9).
(5) Remove two screws (10) and bracket (8) from solenoid (11).
(6) Remove 90-degree fitting (4) from solenoids (11).
(7) Remove fitting (6) from solenoid (11).
(8) Remove plug (12) from solenoid (11).

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 plug (1), fitting (2), and 90-degree fitting (3).
(2) Install plug (1) in solenoid (4).
(3) Install fitting (2) in solenoid (4).
(4) Install 90-degree fitting (3) in solenoid (4).
(5) Install bracket (5) on solenoid (4) with two screws (6).
(6) Install bracket (5) on dashboard (7) with four screws (8).

(7) Connect air hose (9) to fitting (2).

(8) Connect air hose (10) to 90-degree fitting (3).

(9) Connect fan solenoid connector (11) to connector PX34 (12).

c. Follow-On Maintenance.

(1) Install kick panel (para 16-3).

(2) Connect batteries (para 7-48).

(3) Start engine and allow engine temperature to rise to normal operating levels (TM 9-2320-365-10).

(4) Check operation of fan (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-24. FLASHER UNIT REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Kick panel removed (para 16-3).

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

a. Removal.

(1) Remove two screws (1), washers (2), and flasher unit (3) from dashboard (4).

(2) Disconnect connector PX20 (5) from flasher unit (3).

b. Installation.

(1) Connect connector PX20 (5) to flasher unit (3).

(2) Install flasher unit (3) on dashboard (4) with two washers (2) and screws (1).

c. Follow-On Maintenance.

(1) Install kick panel (para 16-3).

(2) Connect batteries (para 7-48).

(3) Check turn signal and hazard lights operation (TM 9-2320-365-10).

End of Task.
7-25. TURN SIGNAL SWITCH REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions  
Instrument panel assembly removed for access (para 7-15).

Materials/Parts  
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

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

a. Removal.

NOTE

Tag connectors and connection points prior to disconnecting.

(1) Disconnect turn signal switch connectors (1 and 2) from connectors P18 and J19 (3 and 4).

(2) Remove turn signal switch connectors (1 and 2) through opening (5) in dashboard (6).

(3) Remove screw (7) and sleeve (8) from steering column (9).
(4) Remove two screws (10), collar half (11), and turn signal switch (12) from steering column (9).

b. Installation.

(1) Install turn signal switch (1) on steering column (2) with collar half (3) and two screws (4).

(2) Install sleeve (5) on steering column (2) with screw (6).
(3) Route turn signal switch connectors (7 and 8) through opening (9) in dashboard (10).

(4) Connect turn signal switch connectors (7 and 8) to connectors P18 (11) and J19 (12).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Check operation of turn signal switch (TM 9-2320-365-10).

End of Task.
7-26. SHUNT REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Spare tire lowered (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Lockwasher (2) (Item 76, Appendix G)
Lockwasher (2) (Item 77, Appendix G)
Nut, Self-Locking (2) (Item 134, Appendix G)

a. Removal.

(1) Loosen clamp (1) on air hose (2).

(2) Remove air hose (2) from intake air cleaner boot (3).

NOTE
Tag wires and connection points prior to disconnecting.

(3) Remove screw (4), lockwasher (5), and terminal lug TL52 (6) from shunt (7). Discard lockwasher.

(4) Remove screw (8), lockwasher (9), and terminal lug TL45 (10) from shunt (7). Discard lockwasher.
(5) Remove screw (11), lockwasher (12), washer (13), and terminal lug TL51 (14) from shunt (7). Discard lockwasher.

(6) Remove screw (15), lockwasher (16), washer (17), and terminal lug TL38 (18) from shunt (7). Discard lockwasher.

(7) Remove two self-locking nuts (19), screws (20), and shunt (7) from spare tire retainer (21). Discard self-locking nuts.

b. Installation.

(1) Install shunt (1) on spare tire retainer (2) with two screws (3) and self-locking nuts (4).
(2) Install terminal lug TL38 (5) on shunt (1) with washer (6), lockwasher (7), and screw (8).

(3) Install terminal lug TL51 (9) on shunt (1) with washer (10), lockwasher (11), and screw (12).

(4) Install terminal lug TL45 (13) on shunt (1) with lockwasher (14) and screw (15).

(5) Install terminal lug TL52 (16) on shunt (1) with lockwasher (17) and screw (18).

(6) Position air hose (19) on intake air cleaner boot (20) with clamp (21).

(7) Tighten clamp (21) to 36-48 lb-in. (4-5 N·m).
c. **Follow-on Maintenance.**

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

**End of Task.**
## 7-27. 100 AMP REVERSE POLARITY RELAY REPLACEMENT

This task covers:

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### INITIAL SETUP

#### Equipment Conditions
- Spare tire lowered (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

#### 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 34, Appendix C)

#### Materials/Parts
- Lockwasher (4) (Item 88, Appendix G)
- Washer, Spring (6) (Item 274, Appendix G)
- Nut, Self-Locking (6) (Item 143, Appendix G)
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

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#### a. Removal.

**NOTE**

Tag wires and connection points prior to disconnecting.

1. Loosen clamp (1) on intake air cleaner boot (2).

2. Remove intake air cleaner boot (2) from intake air cleaner housing (3).

---
(3) Lift terminal cover (4) on terminal lugs TL61 (5) and TL47 (6).

(4) Remove nut (7), lockwasher (8), and terminal lugs TL61 (5) and TL47 (6) from 100 amp reverse polarity relay (9). Discard lockwasher.

(5) Lift dust boot (10) on terminal lug TL44 (11).

(6) Remove nut (12), lockwasher (13), and terminal lug TL44 (11) from 100 amp reverse polarity relay (9). Discard lockwasher.

**NOTE**

Perform step (7) on M1079.

(7) Remove terminal lug TL100 (14) from 100 amp reverse polarity relay (9).

(8) Lift dust boot (15) on terminal lug TL80 (16).

(9) Remove nut (17), lockwasher (18), and terminal lug TL80 (16) from 100 amp reverse polarity relay (9). Discard lockwasher.

(10) Lift terminal cover (19) on terminal lugs TL1 (20), TL37 (21), and TL36 (22).

(11) Remove nut (23), lockwasher (24), and terminal lugs TL1 (20), TL37 (21), and TL36 (22) from 100 amp reverse polarity relay (9). Discard lockwasher.
(12) Remove six self-locking nuts (25), spring washers (26), screws (27), and 100 amp reverse polarity relay (9) from bracket (28). Discard spring washers and self-locking nuts.

b. Installation.

(1) Position 100 amp reverse polarity relay (1) on bracket (2) with six screws (3), spring washers (4), and self-locking nuts (5).

(2) Tighten six screws (3) to 60-72 lb-in. (7-8 N·m).

(3) Position terminal lugs TL36 (6), TL37 (7), and TL1 (8) on 100 amp reverse polarity relay (1) with lockwasher (9) and nut (10).

(4) Tighten nut (10) to 120-144 lb-in. (14-16 N·m).

(5) Position terminal cover (11) on terminal lugs TL36 (6), TL37 (7), and TL1 (8).

(6) Install terminal lug TL80 (12) on 100 amp reverse polarity relay (1) with lockwasher (13) and nut (14).

(7) Tighten nut (14) to 120-144 lb-in. (14-16 N·m).

(8) Position dust boot (15) on terminal lug TL80 (12).
7-27. 100 AMP REVERSE POLARITY RELAY REPLACEMENT (CONT)

NOTE

Perform step (9) on M1079.

(9) Position terminal lug TL100 (16) on 100 amp reverse polarity relay (1).

(10) Position terminal lug TL44 (17) on 100 amp reverse polarity relay (1) with lockwasher (18) and nut (19).

(11) Tighten nut (19) to 120-144 lb-in. (14-16 N·m).

(12) Position dust boot (20) on terminal lug TL44 (17).

(13) Position terminal lug TL47 (21) and TL61 (22) on 100 amp reverse polarity relay (1) with lockwasher (23) and nut (24).

(14) Tighten nut (24) to 120-144 lb-in. (14-16 N·m).

(15) Position terminal cover (25) on terminal lugs TL47 (21) and TL61 (22).

(16) Position intake air cleaner boot (26) on intake air cleaner housing (27) with clamp (28).

(17) Tighten clamp (28) to 36-48 lb-in. (4-5 N·m).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-28. FREQUENCY ECU REPLACEMENT

This task covers:

a. Removal                      c. Follow-On Maintenance
b. Installation

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

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

a. Removal.

(1) Disconnect frequency ECU connector (1) from connector PX26 (2).

(2) Remove two screws (3) and frequency ECU (4) from bracket (5).

(3) Remove two nuts (6), washers (7), screws (8), washers (9), and bracket (5) from dashboard (10).
**7-28. FREQUENCY ECU REPLACEMENT (CONT)**

**b. Installation.**

1. Install bracket (1) on dashboard (2) with two washers (3), screws (4), washers (5), and nuts (6).

2. Install frequency ECU (7) on bracket (1) with two screws (8).

3. Connect frequency ECU connector (9) to connector PX26 (10).

**c. Follow-On Maintenance.**

Install instrument panel assembly (para 7-15).

**End of Task.**
7-29. BACKUP LIGHT ASSEMBLY REPLACEMENT/REPAIR

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation
- e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Batteries disconnected (para 7-48).

Tools and Special Tools
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
- Lockwasher (2) (Item 92, Appendix G)
- Packing, Preformed (Item 192, Appendix G)

a. Removal.

(1) Disconnect backup light connector (1) from connector P87 (2).

(2) Remove two screws (3), lockwashers (4), terminal lug TL17 (5), and backup light assembly (6) from taillight carrier (7). Discard lockwashers.

b. Disassembly.

(1) Loosen six screws (1) on lens (2).

(2) Remove lens (2) from housing (3).

(3) Remove preformed packing (4) from housing (3). Discard preformed packing.

(4) Remove two lamps (5) from sockets (6).
c. Assembly.

(1) Install two lamps (1) in sockets (2).

(2) Install preformed packing (3) and lens (4) on housing (5) with six screws (6).

d. Backup Light Assembly Installation.

(1) Position terminal lug TL17 (1) and backup light assembly (2) on taillight carrier (3) with two lockwashers (4) and screws (5).

(2) Tighten two screws (5) to 35-42 lb-ft (48-57 N·m).

(3) Connect backup light connector (6) to connector P87 (7).

e. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Check backup light operation (TM 9-2320-365-10).

End of Task.
7-30. BLACKOUT DRIVE LIGHT REPLACEMENT/REPAIR

This task covers:

a. Removal  d. Installation
b. Disassembly  e. Follow-On Maintenance
c. Assembly

e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

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 34, Appendix C)

Materials/Parts
Lockwasher (Item 92, Appendix G)
Packing, Preformed (Item 168, Appendix G)

a. Removal.

(1) Disconnect connector P17 (1) from blackout drive light (2).

(2) Remove nut (3), lockwasher (4), washer (5), washer (6), and terminal lug TL79 (7) from blackout drive light (2). Discard lockwasher.

(3) Remove blackout drive light (2) from bumper (8).

b. Disassembly.

(1) Loosen three screws (1) on cover (2).

(2) Remove cover (2) and preformed packing (3) from housing (4). Discard preformed packing.

(3) Remove lamp (5) from socket (6).
c. Assembly.

(1) Install lamp (1) in socket (2).

(2) Install preformed packing (3) and cover (4) on housing (5) with three screws (6).

d. Installation.

(1) Position blackout drive light (1) on bumper (2).

(2) Position terminal lug TL79 (3), washer (4), washer (5), lockwasher (6), and nut (7) on blackout drive light (1).

(3) Tighten nut (7) to 156-192 lb-in. (18-22 N·m).

(4) Connect connector P17 (8) to back of blackout drive light (1).

e. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Check blackout drive light operation (TM 9-2320-365-10).

End of Task.
This task covers:

a. Cab Clearance and Marker Light Removal  
b. Cab Clearance and Marker Light Installation  
c. Chassis Clearance and Marker Light Removal  
d. Chassis Clearance and Marker Light Installation  
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

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

Materials/Parts
Lockwasher (2) (Item 71, Appendix G)  
Adhesive (Item 6, Appendix D)

a. Cab Clearance and Marker Light Removal.

NOTE
All cab clearance and marker lights are removed the same way. Front left marker light shown.

(1) Remove two screws (1) and lens cover (2) from base (3).

(2) Remove two clips (4) and lens (5) from lens cover (2).

(3) Remove lamp (6) from socket (7).

(4) Remove four screws (8) from base (3).
7-31. CLEARANCE AND MARKER LIGHT ASSEMBLIES REPLACEMENT (CONT)

**CAUTION**

Do not let wires slip through hole and into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(5) Disconnect marker light connector (9) from connector P50 (10).

(6) Remove nut (11), lockwasher (12), terminal lug (13), lockwasher (14), base (3), and gasket (15) from vehicle. Discard lockwashers.

(7) Remove nut (16) and screw (17) from base (3).

**b. Cab Clearance and Marker Light 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 adhesive to threads of screw (1).

(2) Install screw (1) in base (2) with nut (3).

**NOTE**

Clearance and marker lights originally come with cork gaskets. Discard cork gaskets and replace with rubber gaskets PN 12421469.

(3) Install gasket (4) on base (2).

(4) Connect marker light connector (5) to connector P50 (6).

(5) Install lockwasher (7), terminal lug (8), lockwasher (9), and nut (10) on back of base (2).
(6) Install base (2) on vehicle with four screws (11).

(7) Install lamp (12) in socket (13).

(8) Install lens (14) in lens cover (15) with two clips (16).

(9) Install lens cover (15) on base (2) with two screws (17).

c. Chassis Clearance and Marker Light Removal.

**NOTE**

All chassis clearance and marker lights are removed the same way. Right rear marker light shown.

(1) Remove two screws (1) and lens cover (2) from base (3).

(2) Remove two clips (4) and lens (5) from lens cover (2).
(3) Remove lamp (6) from socket (7).

(4) Disconnect marker light connector (8) from connector P54 (9).

(5) Remove nut (10), lockwasher (11), terminal lug (12), and lockwasher (13) from screw (14). Discard lockwashers.

**CAUTION**

Do not let wires slip through hole and into cab structure. If wires slip into cab structure, vehicle will need further disassembly to retrieve wires.

(6) Remove four nuts (15), washers (16), screw (17), washers (18), base (3), and gasket (19) from vehicle.

(7) Remove nut (20) and screw (14) from base (3).
d. Chassis Clearance and Marker Light 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 adhesive to threads of screw (1).

(2) Install screw (1) in base (2) with nut (3).

**NOTE**

Clearance and marker lights originally come with cork gaskets. Discard cork gaskets and replace with rubber gaskets PN 12421469.

(3) Install gasket (4) and base (2) on vehicle with four washers (5), screws (6), washers (7) and nuts (8).

(4) Install lockwasher (9) and terminal lug (10) on screw (1) with lockwasher (11) and nut (12).

(5) Connect marker light connector (13) to connector P54 (14).

(6) DELETED.
(7) Install lamp (15) in socket (16).

(8) Install lens (17) on lens cover (18) with two clips (19).

(9) Install lens cover (18) on base (2) with two screws (20).

**e. Follow-On Maintenance.**

(1) Connect batteries (para 7-48).

(2) Check clearance and marker light operation (TM 9-2320-365-10).

**End of Task.**
7-32. COMPOSITE TAILLIGHT ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal  
b. Disassembly  
c. Assembly  
d. Installation  
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, 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)
Lockwasher (2) (Item 92, Appendix G)
Packing, Preformed (Item 170, Appendix G)
Nut, Self-Locking (Item 116, Appendix G)

NOTE

- Tag wires and connection points prior to disconnecting.
- Remove plastic cable ties as required.
- Right side connectors are P61, P62, P63, P64, 22-460, 24, 23, 21, and TL 21.

a. Removal.

NOTE

Left and right composite taillights are removed the same way. Left side shown.

(1) Remove self-locking nut (1), screw (2), and clamp (3) from taillight carrier (4). Discard self-locking nut.

(2) Disconnect connectors P74, P76, P77, P78 (5) from composite taillight connectors 22-461, 24, 23, 21 (6).

(3) Remove two screws (7), lockwashers (8), terminal lugs TL18 and TL16 (9), and composite taillight assembly (10) from taillight carrier (4). Discard lockwashers.
b. Disassembly.

(1) Remove six screws (1), cover (2), and preformed packing (3) from housing (4). Discard preformed packing.

(2) Remove two screws (5), bezel (6), lens (7), and retainer (8) from cover (2).

(3) Remove lamps (9 and 10) from sockets (11 and 12).

(4) Position blackout stoplight lamp (13) for access to socket (14).

(5) Remove connector (15) from socket (14).

(6) Position blackout marker lamp (16) for access to socket (17).

(7) Remove connector (18) from socket (17).

c. Assembly.

(1) Install connector (1) in socket (2).

(2) Install blackout marker lamp (3) in connector (1).

(3) Install connector (4) in socket (5).

(4) Install blackout stoplight lamp (6) in connector (4).

(5) Install two lamps (7 and 8) in sockets (9 and 10).
(6) Position retainer (11), lens (12), and bezel (13) on cover (14) with two screws (15).

(7) Position preformed packing (16) and cover (14) on housing (17) with six screws (18).

(8) Tighten two screws (15) and six screws (18) to 20-25 lb-in. (1 N·m).

---

d. Composite Taillight Assembly Installation.

**NOTE**

- Left and right composite taillights are installed the same way. Left side shown.

- Install plastic cable ties as required.

1. Position two lockwashers (1), screws (2), terminal lugs TL18 and TL16 (3), and composite taillight assembly (4) on taillight carrier (5).

2. Tighten two screws (2) to 35-42 lb-ft (48-57 N·m).

3. Connect connectors P74, P76, P77, P78 (6) to composite taillight connectors 22-461, 24, 23, 21 (7).

4. Install clamp (8) on taillight carrier (5) with screw (9) and self-locking nut (10).
e. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Check operation of taillights (TM 9-2320-365-10).

(3) Check operation of blackout lights (TM 9-2320-365-10).

(4) Check operation of brake lights (TM 9-2320-365-10).

End of Task.
7-33. COMPOSITE FRONT LIGHT ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
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 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Lockwasher (2) (Item 92, Appendix G)
Packing, Preformed (Item 170, Appendix G)

a. Removal.

NOTE

- Both composite front light assemblies are removed the same way. Left side shown.
- Tag wires and connection points prior to disconnecting.
- Connectors for right side are P8, P9 and P10.

(1) Disconnect connectors P22, P23, and P24 (1) from composite front light assembly (2).

(2) Remove two screws (3), lockwashers (4), three terminal lugs (5), and composite front light assembly (2) from front bumper (6). Discard lockwashers.
b. Disassembly.

(1) Loosen five screws (1) on cover (2).

(2) Remove cover (2) and preformed packing (3) from housing (4). Discard preformed packing.

(3) Remove lamps (5 and 6) from sockets (7).

(4) Open blackout marker lamp (8).

(5) Remove blackout marker lamp (8) from socket (9).

c. Assembly.

(1) Open blackout marker lamp (1).

(2) Install blackout marker lamp (1) in socket (2).

(3) Install lamps (3 and 4) in sockets (5).

(4) Install preformed packing (6) and cover (7) on housing (8) with five screws (9).
d. Installation.

NOTE

Both composite front light assemblies are installed the same way. Left side shown.

(1) Position composite front light assembly (1) in front bumper (2).

(2) Position three terminal lugs (3), two lockwashers (4), and screws (5) on composite front light assembly (1).

(3) Tighten two screws (5) to 156-192 lb-in. (18-22 N·m).

(4) Connect connectors P22, P23, and P24 (6) to composite front light assembly (1).

e. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Check operation of hazard lights, turn signals, park lights, and blackout marker lights (TM 9-2320-365-10).

End of Task.
## 7-34. HEADLIGHT AND HOUSING REPLACEMENT/REPAIR/ADJUSTMENT

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation
- e. Adjustment

### INITIAL SETUP

**Equipment Conditions**
Batteries disconnected (para 7-48).
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 34, Appendix C)
- Headlight Adjustment Screen (Item E-5, Appendix E)

**Materials/Parts**
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Grommet, Nonmetallic (3) (Item 51, Appendix G)
- Lockwasher (3) (Item 75, Appendix G)

### a. Removal.

**NOTE**

- Both headlights are removed the same way.
  Left headlight shown.

- Perform steps (1) through (3) to remove lamp.

(1) Remove three screws (1) and retaining ring (2) from housing (3).

(2) Remove lamp (4) from housing (3).

**NOTE**

- Tag connectors and connection points prior to disconnecting.

- Connector numbers are the same on left and right headlights.

(3) Disconnect connectors 18, 91, and 17 (5) from housing (3).
NOTE

• Tag connectors and connection points prior to disconnecting.

• Connectors for right side are P13, P14, and P12.

(4) Disconnect connectors P4, P19, and P20 (6) from housing (3).

(5) Remove three nuts (7) and housing (3) from bumper (8).

b. Disassembly.

(1) Remove two screws (1) and lens retainer (2) from housing (3).

(2) Remove three nuts (4), resilient mounts (5), washers (6), and lockwashers (7) from housing (3). Discard lockwashers.

(3) Remove three adapters (8) and grommets (9) from housing (3). Discard grommets.

c. Assembly.

(1) Install three grommets (1) and adapters (2) on housing (3).

(2) Install three resilient mounts (4) on housing (3) with three washers (5), lockwashers (6), and nuts (7).

(3) Install lens retainer (8) on housing (3) with three screws (9).
d. Installation.

NOTE
Both headlights are installed the same way.
Left headlight shown.

1. Position housing (1) on bumper (2) with three nuts (3).

2. Tighten three nuts (3) to 60-72 lb-in. (7-8 N·m).

NOTE
Connectors for right side are P13, P14, and P12.

3. Install connectors P20, P19, and P4 (4) to back of housing (1).

4. Connect connectors 18, 91, and 17 (5) on housing (1).

5. Install lamp (6) in housing (1).

6. Install retaining ring (7) on housing (1) with three screws (8).

7. Lower cab (TM 9-2320-365-10).

• Perform steps (4) through (6) to install lamp.

• Connector numbers are the same on left and right headlights.

4. Connect connectors 18, 91, and 17 (5) on housing (1).
**e. Adjustment.**

**NOTE**
Vehicle must be empty when making headlight adjustments.

1. Connect batteries (para 7-48).

2. Position vehicle on level surface with both headlights approximately 36 in. (91 cm) from headlight adjustment screen with vertical lines (1) directly in front of bumper ends (2).

3. Turn headlights on LOW beam (TM 9-2320-365-10).

(4) Observe headlight spots on headlight adjustment screen. If headlight spots are within squares (3), alignment is correct.

**NOTE**
Perform steps (5) and (6) if headlights need adjusting.

5. Adjust screw (4) to move headlight spot up or down.

6. Adjust screw (5) to move headlight spot left or right.

7. Turn off headlights (TM 9-2320-365-10).

End of Task.
7-35. AUDIBLE ALARM REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

**Equipment Conditions**
Instrument panel assembly removed for access (para 7-15).

**Materials/Parts**
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

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

---

a. Removal.

(1) Disconnect connector PX7 (1) from lighted indicator display (2).
(2) Remove lock ring (3) and audible alarm (4) from instrument panel assembly (5).

NOTE

- Tag wires and connection points prior to disconnecting.
- Perform step (3) on M1079.

(3) Remove two screws (6) and terminal lugs TL161 (7) and TL160 (8) from audible alarm (4).

NOTE

Perform steps (4) and (5) on M1078 and M1081.

(4) Remove two screws (6) and terminal lugs TL161 (7) and TL178 (8) from audible alarm (4).

(5) Remove screw (9) and TL160 (10) from audible alarm (4).

b. Installation.

NOTE

Perform steps (1) and (2) on M1078 and M1081.

(1) Install terminal lug TL160 (1) on audible alarm (2) with screw (3).

(2) Install terminal lugs TL161 (4) and TL178 (5) on audible alarm (2) with two screws (6).

NOTE

Perform step (3) on M1079.

(3) Install terminal lugs TL160 (5) and TL161 (4) on audible alarm (2) with two screws (6).

(4) Install audible alarm (2) in instrument panel assembly (7) with lock ring (8).
(5) Connect connector PX7 (9) to lighted indicator display (10).

c. **Follow-On Maintenance.**

(1) Install instrument panel assembly (para 7-15).

(2) Check operation of audible alarm (TM 9-2320-366-10-1).

**End of Task.**
7-36. AIR PRESSURE TRANSMITTER REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Air tanks drained (TM 9-2320-365-10).

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Lockwasher (2) (Item 64, Appendix G)
Preformed Packing (Item 170.1, Appendix G)

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

a. Removal.

NOTE

- Tag wires and connection points prior to disconnecting.
- Front brake air pressure transmitter and rear brake air pressure transmitter are removed the same way. Rear brake air pressure transmitter shown.
- Terminal lugs on front brake air pressure transmitter are TL150 for terminal G and TL156 for terminal WK.

(1) Remove nut (1), lockwasher (2), and terminal lug TL151 (3) from air pressure transmitter terminal G (4). Discard lockwasher.

(2) Remove nut (5), lockwasher (6), and terminal lug TL157 (7) from air pressure transmitter terminal WK (8). Discard lockwasher.

(3) Remove air pressure transmitter (9) from reducer (10).

NOTE

Perform the following step on air pressure transmitters equipped with preformed packing.

(4) Remove preformed packing (11) from air pressure transmitter (9). Discard preformed packing.
b. Installation.

(1) Install preformed packing (1) on air pressure transmitter (2).

(2) Install air pressure transmitter (2) in reducer (3).

NOTE

- Front brake air pressure transmitter and rear brake air pressure transmitter are installed the same way. Rear brake air pressure transmitter shown.

- Terminal lugs on front brake air pressure transmitter are TL150 for terminal G and TL156 for terminal WK.

(3) Install terminal lug TL157 (4) on air pressure transmitter terminal WK (5) with lockwasher (6) and nut (7).

(4) Install terminal lug TL151 (8) on air pressure transmitter terminal G (9) with lockwasher (10) and nut (11).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Start engine (TM 9-2320-365-10).

(3) Check FRONT BRAKE AIR and REAR BRAKE AIR pressure gage operation (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-37. COOLANT TEMPERATURE GAGE SENSOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Materials/Parts
Sealing Compound (Item 63, Appendix D)

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

a. Removal.

NOTE

Perform steps (1) through (3) on coolant temperature gage sensors equipped with a connector clamp.

(1) Disconnect connector clamp (1) from coolant temperature gage sensor (2).

(2) Disconnect connector P41 (3) from coolant temperature gage sensor (2).

(3) Remove coolant temperature gage sensor (2) from adapter (4).

NOTE

Perform steps (4) and (5) on coolant temperature gage sensors not equipped with a connector clamp.

(4) Disconnect connector P41 (3) from coolant temperature gage sensor (2).

(5) Remove coolant temperature gage sensor (2) from adapter (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. Apply antiseize compound to threads of coolant temperature gage sensor (1).
2. Install coolant temperature gage sensor (1) in adapter (2).
3. Connect connector P41 (3) to coolant temperature gage sensor (1).

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**c. Follow-On Maintenance.**

1. Connect batteries (para 7-48).
2. Lower cab (TM 9-2320-365-10).
4. Check coolant temperature gage operation (TM 9-2320-365-10).
5. Shut down engine (TM 9-2320-365-10).

*End of Task.*
7-38. ENGINE SPEED SENSOR REPLACEMENT/ADJUSTMENT

This task covers:

a. Removal  
b. Installation  
c. Adjustment

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10). Batteries disconnected (para 7-48).

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

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)

References
TM 9-4910-571-12&P

a. Removal.

(1) Disconnect connector clamp (1) from engine speed sensor connector (2).

(2) Disconnect engine speed sensor connector (2) from connector P38 (3).

(3) Loosen jam nut (4) on engine speed sensor (5).

(4) Remove engine speed sensor (5) from flywheel housing (6).
b. **Installation.**

(1) Turn engine speed sensor (1) to the right in flywheel housing (2) until engine speed sensor contacts flywheel.

(2) Turn engine speed sensor (1) to the left two full turns.

(3) Tighten jam nut (3) on engine speed sensor (1).

(4) Connect engine speed sensor connector (4) to connector P38 (5).

(5) Connect connector clamp (6) on engine speed sensor connector (4).

c. **Adjustment.**

(1) Lower cab (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

**NOTE**
Perform step (3) on vehicles not equipped with tachometer.

(3) Connect STE/ICE-R to DCA connector (1).

(4) Start engine (TM 9-2320-365-10).

**NOTE**
- Perform step (5) on vehicles equipped with tachometer.
- If engine speed is not obtained in steps (5) or (6), perform steps (7) through (13).

(5) Depress accelerator pedal and check tachometer operation (TM 9-2320-365-10).

**NOTE**
Perform step (6) on vehicles not equipped with tachometer.

(6) Perform STE/ICE-R test 10 and verify engine speed (TM 9-4910-571-12&P).
(7) Shut down engine (TM 9-2320-365-10).

(8) Raise cab (TM 9-2320-365-10).

(9) Loosen jam nut (2) on engine speed sensor (3).

(10) Turn engine speed sensor (3) to the right one-quarter turn.

(11) Tighten jam nut (2) on engine speed sensor (3).

(12) Lower cab (TM 9-2320-365-10).

(13) Repeat steps (4) through (12) to verify engine speed.

(14) If engine speed is not obtained, perform engine troubleshooting.

(15) Shut down engine (TM 9-2320-365-10).

NOTE
Perform step (16) on vehicles not equipped with tachometer.

(16) Disconnect STE/ICE-R from DCA connector (1).

End of Task.
7-39. ETHER SENSOR REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions  
Cab raised (TM 9-2320-365-10).  
Batteries disconnected (para 7-48).

Materials/Parts  
Antiseize Compound (Item 63, Appendix D)

Tools and Special Tools  
Tool Kit, Genl Mech (Item 44, Appendix C)  
Goggles, Industrial (Item 15, Appendix C)  
Pan, Drain (Item 24, Appendix C)

WARNING

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

• 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 one gallon (one L) of coolant.

(4) Close radiator draincock (3).
(5) Disconnect connector clamp (4) from ether sensor connector (5).

(6) Disconnect connector P42 (6) from ether sensor connector (5).

(7) Remove ether sensor (7) from coolant bypass tube (8).

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 ether sensor (1).

(2) Install ether sensor (1) in coolant bypass tube (2).

(3) Connect connector P42 (3) to ether sensor connector (4).

(4) Connect connector clamp (5) on ether sensor connector (4).
c. **Follow-On Maintenance.**

(1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check for coolant leaks under vehicle.

(6) Check coolant level after normal temperature is reached.
   Add coolant as required (TM 9-2320-365-10).

(7) Raise cab (TM 9-2320-365-10).

(8) Check for coolant leaks around ether sensor.

(9) Lower cab (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

**End of Task.**
7-40. OIL PRESSURE SWITCH REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).  
Batteries disconnected (para 7-48).

Materials/Parts
Antiseize Compound (Item 63, Appendix D)

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

a. Removal.

(1) Disconnect connector clamp (1) from connector J34 (2).

(2) Disconnect connector P34 (3) from connector J34 (2).

(3) Remove oil pressure switch (4) from fitting (5).

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 oil pressure switch (4).

(2) Install oil pressure switch (4) in fitting (5).

(3) Connect connector P34 (3) to connector J34 (2).

(4) Connect connector clamp (1) on connector J34 (2).
c. **Follow-On Maintenance.**

   (1) Connect batteries (para 7-48).

   (2) Lower cab (TM 9-2320-365-10).

   (3) Start engine (TM 9-2320-365-10).

   (4) Check that low oil pressure is not indicated (TM 9-2320-365-10).

   (5) Shut down engine (TM 9-2320-365-10).

**End of Task.**
7-41. OIL PRESSURE TRANSMITTER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Materials/Parts
Antiseize Compound (Item 63, Appendix D)

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

a. Removal.

(1) Disconnect connector P32 (1) from oil pressure transmitter (2).

(2) Remove oil pressure transmitter (2) from fitting (3).

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 oil pressure transmitter (2).

(2) Install oil pressure transmitter (2) in fitting (3).

(3) Connect connector P32 (1) to oil pressure transmitter (2).
c. **Follow-On Maintenance.**

1. Connect batteries (para 7-48).
2. Lower cab (TM 9-2320-365-10).
4. Check oil pressure gage operation (TM 9-2320-365-10).
5. Shut down engine (TM 9-2320-365-10).

**End of Task.**
7-42. WATER TEMPERATURE SWITCH REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

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

WARNING

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

- 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 one gallon (one L) of coolant.

(4) Close radiator draincock (3).
(5) Disconnect connector clamp (4) from connector P36 (5).

(6) Disconnect water temperature switch connector (6) from connector P36 (5).

(7) Remove water temperature switch (7) from upper coolant tube (8).

b. Installation.

(1) Install water temperature switch (1) in upper coolant tube (2).

(2) Connect connector P36 (3) to water temperature switch connector (4).

(3) Connect connector clamp (5) on connector P36 (3).
c. Follow-On Maintenance.

(1) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check for coolant leaks under vehicle.

(6) Check coolant level after normal temperature is reached. Add coolant as required (TM 9-2320-365-10).

(7) Raise cab (TM 9-2320-365-10).

(8) Check for leaks around water temperature switch.

(9) Lower cab (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

End of Task.
# 7-43. TRANSMISSION ENGINE SPEED SENSOR REPLACEMENT

## This task covers:

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## INITIAL SETUP

### Equipment Conditions

- Batteries disconnected (para 7-48).

### Materials/Parts

- Packing, Preformed (Item 176, Appendix G)

### Tools and Special Tools

- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

### WARNING

Wear 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. Disconnect engine speed sensor connector (1) from transmission engine speed sensor (2).

2. Remove screw (3), transmission engine speed sensor bracket (4), and transmission engine speed sensor (2) from converter housing module (5).

3. Remove preformed packing (6) from transmission engine speed sensor (2). Discard preformed packing.
b. Installation.

(1) Install preformed packing (1) on transmission engine speed sensor (2).

(2) Position transmission engine speed sensor bracket (3) and transmission engine speed sensor (2) on converter housing module (4) with screw (5).

(3) Tighten screw (5) to 22-26 lb-ft (30-35 N·m).

(4) Connect engine speed sensor connector (6) to transmission engine speed sensor (2).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Start engine (TM 9-2320-365-10).

(3) Check for diagnostic codes logged (para 8-4 or 8-5).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-44. HORN AND BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

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 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Lockwasher (2) (Item 63, Appendix G)

a. Removal.

(1) Remove two screws (1) and washers (2) from front grille (3).

(2) Remove screw (4), washer (5), and front grille (3) from cab (6).

NOTE
Tag connectors and connection points prior to disconnecting.

(3) Disconnect connectors P5 (7) and P6 (8) from horn (9).

(4) Remove two screws (10), lockwashers (11), strap (12), and horn (9) from horn bracket (13). Discard lockwashers.
(5) Remove two screws (14), washers (15), and horn bracket (13) from cab (6).

b. Installation.

(1) Install horn bracket (1) on cab (2) with two washers (3) and screws (4).

(2) Position horn (5) on horn bracket (1) with strap (6), two lockwashers (7), and screws (8).

(3) Tighten two screws (8) to 96-120 lb-in. (11-14 N·m).

(4) Connect connectors P6 (9) and P5 (10) to horn (5).
(5) Position front grille (11) on cab (2) with washer (12) and screw (13).

(6) Position two washers (14) and screws (15) in front grille (11).

(7) Tighten screw (13) to 48-60 lb-in. (5-7 N·m).

(8) Tighten two screws (15) to 24 lb-in. (3 N·m).

c. **Follow-On Maintenance.**

Connect batteries (para 7-48).

**End of Task.**
7-45. BATTERY TESTER REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).  
Battery box cover removed (TM 9-2320-365-10).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)  
Apron, Rubber (Item 3, Appendix C)  
Gloves, Rubber (Item 13, Appendix C)  
Puller, Battery Terminal (Item 28, Appendix C)  
Tool Kit, Genl Mech (Item 44, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)  
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)  
Lockwasher (Item 78, Appendix G)

WARNING

- Remove 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.

- Negative battery terminals must be disconnected first. Failure to comply may result in serious injury or death to personnel.

a. Removal.

NOTE

Tag cables and connection points prior to disconnecting.

(1) Remove nut (1) and lockwasher (2) from battery ground cable (3). Discard lockwasher.

(2) Deleted.

(3) Remove terminal lugs TL50A (5), TL48 (6), and battery tester terminal lug (7) from battery ground cable (3).
NOTE

Remove battery terminal covers as required.

(4) Loosen two terminal screws (8) on battery ground cable (3).

(5) Remove battery ground cable (3) from battery terminals BT4 E2 (9) and BT3 E2 (10).

(6) Remove nut (11) from battery 24 VDC cable (12).

(7) Deleted.

(8) Remove terminal lug TL49A (14) and battery tester terminal lug (15) from battery 24 VDC cable (12).

(9) Remove screw (16) and clamp (17) from battery hold-down bracket (18).

(10) Remove battery tester (19) from spring clip (20).

(11) Remove two screws (21) and spring clip (20) from battery hold-down bracket (18).
b. Installation.

(1) Install spring clip (1) on battery hold-down bracket (2) with two screws (3).

(2) Install battery tester (4) in spring clip (1).

(3) Install clamp (5) on battery hold-down bracket (2) with screw (6).

(4) Install battery tester terminal lug (7) and terminal lug TL49A (8) on battery 24 VDC cable (9).

(5) Deleted.

(6) Install nut (11) on battery 24 VDC cable (9).

**WARNING**

Negative battery terminals must be connected last. Failure to comply may result in serious injury or death to personnel.

(6) Install nut (11) on battery 24 VDC cable (9).
NOTE

Install battery terminal covers as required.

(7) Install battery ground cable (12) on battery terminals BT4 E2 (13) and BT3 E2 (14).

(8) Tighten two terminal screws (15) on battery ground cable (12).

(9) Install battery tester terminal lug (16), and terminal lugs TL50A (17) and TL48 (18) on battery ground cable (12).

(10) Deleted.

(11) Install lockwasher (20) and nut (21) on battery ground cable (12).

(12) Apply grease to all battery terminals.

C. **Follow-On Maintenance.**

Install battery box cover (TM 9-2320-365-10).

**End of Task.**
## 7-46. BATTERY/BATTERY CABLES REPLACEMENT

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### References

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### a. Removal.

**WARNING**

- Remove 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 (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.

- Negative battery terminals and battery tester negative terminal lug must be disconnected first. Failure to comply may result in serious injury or death to personnel.
Tag cables and connection points prior to disconnecting.

(1) Remove nut (1) and lockwasher (2) from battery ground cable (3). Discard lockwasher.

(2) Deleted.

(3) Remove terminal lugs TL50A (5), TL48 (6), battery tester terminal lug (7) and washer (4) from battery ground cable (3).

Remove battery terminal covers as required.

(4) Loosen two terminal screws (8) on battery ground cable (3).

(5) Remove battery ground cable (3) from battery terminals BT4 E2 (9) and BT3 E2 (10).

(6) Remove nut (11) and terminal lug TL99 (12) from battery BT2 to BT4 12 vdc cable (13).
(7) Remove nut (14) and terminal lug TL136 (15) from battery BT2 to BT4 12 vdc cable (13).

(8) Loosen two terminal screws (16) on battery BT4 to BT2 12 vdc cable (13).

(9) Remove battery BT2 to BT4 12 vdc cable (13) from battery terminals BT4 E1 (17) and BT2 E2 (18).

(10) Loosen two terminal screws (19) on battery BT1 to BT3 12 vdc cable (20).

(11) Remove battery BT1 to BT3 12 vdc cable (20) from battery terminals BT1 E2 (21) and BT3 E1 (22).

(12) Remove nut (23) from battery 24 vdc cable (24).

(13) Deleted.

(14) Remove terminal lug TL49A (26) and battery tester terminal lug (27) from battery 24 vdc cable (24).
(15) Remove nut (28), and terminal lugs TL39 (29) and TL10 (30) from battery 24 vdc cable (24).

(16) Loosen two terminal screws (31) on battery 24 vdc cable (24).

(17) Remove battery 24 vdc cable (24) from battery terminals BT1 E1 (32) and BT2 E1 (33).

(17) Remove nut (34) and washer (35) from battery bracket hold down screw (36).
(18) Remove battery hold down bracket (37) from battery box (38).

(19) Remove batteries BT3 (39), BT4 (40), BT1 (41), and BT2 (42) from battery box (38).

b. Installation

NOTE

Install battery terminal covers as required.

(1) Position batteries BT1 (1), BT2 (2), BT3 (3), and BT4 (4) in battery box (5).

(2) Position battery hold down bracket (6) in battery box (5).

(3) Install washer (7) and nut (8) on battery bracket hold down screw (9).
(4) Install battery 24 vdc cable (10) on battery terminals BT1 E1 (11) and BT2 E1 (12).

(5) Tighten two terminal screws (13) on battery 24 vdc cable (10).

(6) Install terminal lugs TL10 (14), TL39 (15) on battery 24 vdc cable (10) with nut (16).

**WARNING**

Negative battery terminals must be connected last. Failure to comply may result in serious injury or death to personnel.

(7) Install battery tester terminal lug (17) and terminal lug TL49A (18) on battery 24 vdc cable (10).

(8) Deleted.

(9) Install nut (20) on battery 24 vdc cable (10).
(10) Install battery BT1 to BT3 12 vdc cable (21) on battery terminals BT1 E2 (22) and BT3 E1 (23).

(11) Tighten two terminal screws (24) on battery BT1 to BT3 12 vdc cable (21).

(12) Install battery BT2 to BT4 12 vdc cable (25) on battery terminals BT4 E1 (26) and BT2 E2 (27).

(13) Tighten two terminal screws (28) on battery BT2 to BT4 12 vdc cable (25).

(14) Install terminal lug TL136 (29) on battery BT2 to BT4 12 vdc cable (25) with nut (30).

(15) Install terminal lug TL99 (31) on battery BT2 to BT4 12 vdc cable (25) with nut (32).
(16) Install battery ground cable (33) on battery terminals BT4 E2 (34) and BT3 E2 (35).

(17) Tighten two terminal screws (36) on battery ground cable (33).

(18) Install washer (40), battery tester terminal lug (37), and terminal lugs TL48 (38) and TL50A (39) on battery ground cable (33).

(19) Deleted.

(20) Install lockwasher (41) and nut (42) on battery ground cable (33).

(21) Apply grease to all battery terminals.

c. Follow-On Maintenance.

(1) Service batteries (TM 9-6140-200-14).

(2) Install battery box cover (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-47. BATTERY BOX REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries removed (para 7-46).
- NATO power cable removed (para 7-63).
- Wet tank removed (para 23-7).
- Secondary and primary air tanks removed (para 11-20).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Drill, Portable, Electric (Item 7, Appendix C)
- Drill Set, Twist (Item 6, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Blind Rivet (Item 43, Appendix C)
- Socket Set, Socket Wrench (Item 34, Appendix C)
- Wrench Set, Socket (Item 48, Appendix C)

Tools and Special Tools (Cont)

- Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)
- Adapter, Socket Wrench (Item 1, Appendix C)

Materials/Parts

- Lockwasher (2) (Item 85, Appendix G)
- Nut, Self-Locking (4) (Item 144, Appendix G)
- Washer, Flat (10) (Item 270.1, Appendix G)
- Tape, Adhesive, Rubber (Item 72.1, Appendix D)
- Rivet, Blind (Item 223.1, Appendix G)
- Rivet, Blind (Item 223.2, Appendix G)

Personnel Required

- (3)

a. Removal.

(1) Remove 16 nuts (1), screws (2), and 32 washers (3) from battery tray (4).

(2) Remove battery tray (4) from battery box (5).

(3) Deleted.

**WARNING**

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

(3.1) Remove six rivets (6), washers (6.1), and two latches (6.2) from battery box (5).

(3.2) Remove six band clamps (6.3) from battery box (5).
(4) Remove two nuts (7), lockwashers (8), and stud (9) from battery tray (4). Discard lockwashers.

(5) Remove nut (10), screw (11), and washer (12) from battery box (5).

(5.1) Remove two nuts (13.1), screws (13.2), four washers (13.3), and stone guard (13) from battery box (5).

**NOTE**

Step (6) requires the aid of an assistant.

(6) Remove two self-locking nuts (14) and screws (15) from battery box (5). Discard self-locking nuts.
WARNING

Battery box weighs approximately 70 lbs (32 kgs). The aid of two assistants is required to remove battery box from vehicle frame. Failure to comply may result in injury to personnel.

NOTE

Step (7) requires the aid of two assistants.

(7) Remove two self-locking nuts (16), screws (17), reinforcing plate (18), and battery box (5) from left frame rail (19). Discard self-locking nuts.

(8) Remove three nuts (20), screws (21), washers (22), and LH bracket (23) from battery box (5) and bracket (23.1).

(9) Remove six nuts (24), screws (25), washers (26) and bracket (23.1) from battery box (5).

(10) Deleted.
(11) Remove two nuts (30), screws (31), reinforcing plate (32), and RH bracket (33) from battery box (5).

**WARNING**

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

(12) Remove four rivets (34), washers (35), strip (36), and two plates (37) from battery box (5).

(13) Remove adhesive tape (38) from strip (36).

b. Installation.

(1) Cut adhesive tape (1) to 18 1/4 in. (465 mm).

(2) Install adhesive tape (1) on strip (2).

(3) Install two plates (3) and strips (2) on battery box (4) with four screws (6), washers (5) and nuts (6.1).
7-47. BATTERY BOX REPLACEMENT (CONT)

(4) Position RH bracket (7) and reinforcing plate (8) on battery box (4) with two screws (9) and nuts (10).

(5) Position bracket (10.1), six screws (11), washers (12), and nuts (13) in battery box (4).

(6) Tighten six nuts (13) to 31-39 lb-ft (42-53 N·m).

(7) Tighten two nuts (10) to 68-78 lb-ft (92-106 N·m).

(8) Deleted.

(9) Position bracket (10.1) and LH bracket (17) on battery box (4) with three screws (18), washers (19), and nuts (20).
WARNING

Battery box weighs approximately 70 lbs (32 kgs). The aid of two assistants is required to position battery box on vehicle frame. Failure to comply may result in injury to personnel.

NOTE

Step (10) requires the aid of two assistants.

(10) Position battery box (4), and reinforcing plate (21) on left frame rail (22) with two screws (23) and self-locking nuts (24).

(11) Deleted.

NOTE

Steps (12) and (13) require the aid of an assistant.

(12) Position two screws (27) and self-locking nuts (28) in battery box (4).

(13) Tighten screws (23 and 27) to 171-209 lb-ft (232-283 N·m).

(14) Position stone guard (29) on battery box (4) with screw (30), washer (31), and nut (32).

(14.1) Position two screws (32.1), four washers (32.2), and two nuts (32.3) in stone guard (29).

(15) Tighten nuts (32, 32.3 and 20) to 31-39 lb-ft (42-53 N·m).
(16) Position stud (33) in battery tray (34) with two lockwashers (35) and nuts (36).

(17) Tighten two nuts (36) to 81-99 lb-in. (9-11 N·m).

(18) Install two latches (37) on battery box (4) with six screws (38), lockwashers (39) and nuts (39.1).

(19) Install six band clamps (39.2) in battery box (4).

(20) Position battery tray (34) in battery box (4).

(21) Position 32 washers (40), 16 screws (41) and self-locking nuts (42) in battery tray (34).

(22) Tighten 16 nuts (42) to 9-11 lb-ft (12-15 N·m).
c. **Follow-On Maintenance.**

(1) Deleted.

(2) Deleted.

(3) Install secondary and primary air tanks (para 11-20).

(4) Install wet tank (para 23-7).

(5) Install NATO power cable (para 7-63).

(6) Install batteries (para 7-46).

(7) Start engine (TM 9-2320-365-10).

(8) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

**End of Task.**
7-48. DISCONNECTING/CONNECTING BATTERIES

This task covers:

a. Disconnecting
b. Connecting
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Engine shut down (TM 9-2320-365-10).
Battery box cover removed (TM 9-2320-365-10).

Tools and Special Tools

Goggles, Industrial (Item 15, Appendix C)
Apron, Rubber (Item 3, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Puller, Battery Terminal (Item 28, Appendix C)

Tools and Special Tools (Cont)

Tool Kit, Genl Mech (Item 44, Appendix C)

Materials/Parts

Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
Lockwasher (Item 78, Appendix G)

a. Disconnecting.

**WARNING**

- Remove 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.

- Negative battery terminals and battery tester negative terminal lug must be disconnected first. Failure to comply may result in serious injury or death to personnel.

**NOTE**

Tag battery terminals, terminal lugs, and connection points prior to disconnecting.

1. Remove nut (1) and lockwasher (2) from battery 24 VDC ground cable (3). Discard lockwasher.

2. Deleted.

3. Remove terminal lugs TL50A (5), TL48 (6), battery tester terminal lug (7) and washer (8) from battery 24 VDC ground cable (3).
(4) Remove nut (9) and terminal lug TL99 (10) from battery 12 VDC cable (11).

b. Connecting.

(1) Install terminal lug TL99 (1) on battery 12 VDC cable (2) with nut (3).

WARNING

Negative battery terminals must be connected last. Failure to comply may result in serious injury or death to personnel.

(2) Install washer (4), battery tester terminal lug (5), terminal lugs TL48 (6) and TL50A (7) on battery 24 VDC ground cable (8).

(3) Deleted.

(4) Install lockwasher (10) and nut (11) on battery 24 VDC ground cable (8).

(5) Apply grease to all battery terminals.
c. Follow-On Maintenance.

(1) Install battery box cover (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
a. Removal.

**NOTE**

- Remove plastic cable ties as required.
- Tag wires and connection points prior to disconnecting.

(1) Disconnect connector J108 (1) from connector P108 (2).

(2) Disconnect connector J210 (3) from connector P210 (4).

(3) Disconnect connector P913 (5) from connector J913 (6).

(4) Disconnect connector P912 (7) from connector J912 (8).

(5) Remove auxiliary panel cable assembly (9) from dashboard (10).
7-49. AUXILIARY PANEL CABLE ASSEMBLY REPLACEMENT (ALL MODELS EXCEPT M1079 W/O WINCH) (CONT)

b. Installation.

(1) Position auxiliary panel cable assembly (1) in dashboard (2).

(2) Connect connector P913 (3) to connector J913 (4).

(3) Connect connector P912 (5) to connector J912 (6).

NOTE
Install plastic cable ties as required.

(4) Connect connector P108 (7) to connector J108 (8).

(5) Connect connector P210 (9) to connector J210 (10).

c. Follow-On Maintenance:

(1) Install personnel heater (para 18-9).

(2) Check rocker switches and tachometer operation (TM 9-2320-365-10).

End of Task.
7-50. M1079 W/O WINCH AUXILIARY PANEL CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
   b. Installation  
   c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Personnel heater removed (para 18-9).

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

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)

a. Removal.

NOTE

- Remove plastic cable ties as required.
- Tag wires and connection points prior to disconnecting.

(1) Disconnect connector J108 (1) from connector P108 (2).

(2) Disconnect connector P912 (3) from connector J912 (4).

(3) Remove auxiliary panel cable assembly (5) from dashboard (6).
b. Installation.

(1) Position auxiliary panel cable assembly (1) in dashboard (2).

(2) Connect connector P912 (3) to connector J912 (4).

NOTE

Install plastic cable ties as required.

(3) Connect connector P108 (5) to connector J108 (6).

c. Follow-On Maintenance.

(1) Install personnel heater (para 18-9).

(2) Check rocker switches and tachometer for proper operation (TM 9-2320-365-10).

End of Task.
7-51. M1079 12/24 VDC POWER CABLE REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Spare tire lowered (TM 9-2320-365-10).
Batteries disconnected (para 7-48).
Kick panel removed (para 16-3).
Bottom radiator fan shroud removed (para 6-4).
Cab lowered (TM 9-2320-365-10).

Materials/Parts

Ties, Cable, Plastic (Item 76, Appendix D)
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Lockwasher (Item 88, Appendix G)
Lockwasher (Item 89, Appendix G)
Nut, Self-Locking (2) (Item 133, Appendix G)
Nut, Self-Locking (Item 143, Appendix G)

Tools and Special Tools

Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)

a. Removal.

NOTE

• Tag wires and connection points prior to disconnecting.

• Remove plastic cable ties as required.

(1) Disconnect connector P173 (1) from connector J173 (2).

(2) Disconnect connector P108 (3) from connector J108 (4).
(3) Remove lower left corner of grommet (5) from cab floor (6).

(4) Push connector P108 (3) through grommet (5).

(5) Raise cab (TM 9-2320-365-10).

(6) Remove self-locking nut (7), screw (8), clamp (9), and clamp (10) from right frame rail (11). Discard self-locking nut.

(7) Remove M1079 12/24 VDC power cable (12) from clamp (9).
(8) Remove self-locking nut (13), screw (14), and end clamp (15) from right frame rail (11). Discard self-locking nut.

(9) Remove M1079 12/24 vdc power cable (12) from clamp (15).

(10) Remove self-locking nut (16), clamp (17), terminal lug TL96 (18), and terminal lug TL83 (19) from screw (20). Discard self-locking nut.

(11) Remove M1079 12/24 vdc power cable (12) from clamp (17).
NOTE
Perform steps (12) and (13) on vehicles equipped with 100 amp alternator.

(12) Lift dust boot (21) on terminal lug TL44 (22).

(13) Remove nut (23), lockwasher (24), and terminal lugs TL44 (22) and TL100 (25) from 100 amp reverse polarity relay (26). Discard lockwasher.

NOTE
Perform steps (14) and (15) on vehicles equipped with 200 amp alternator.

(14) Lift dust boot (21) on terminal lug TL44 (22).

(15) Remove nut (27), lockwasher (28), washer (29), and terminal lugs TL44 (22) and TL100 (25) from terminal block terminal (30). Discard lockwasher.

(16) Remove M1079 12/24 vdc power cable (12) from vehicle.
b. Installation.

NOTE
Install plastic cable ties as required.

(1) Position M1079 12/24 vdc power cable (1) on vehicle.

NOTE
Perform steps (2) through (4) on vehicles equipped with 200 amp alternator.

(2) Position terminal lugs TL100 (2) and TL44 (3) on terminal block terminal (4) with washer (5), lockwasher (6), and nut (7).

(3) Tighten nut (7) to 15-19 lb-ft (21-25 N·m).

(4) Position dust boot (8) on terminal lug TL44 (3).

NOTE
Perform steps (5) and (6) on vehicles equipped with 100 amp alternator.

(5) Install terminal lugs TL100 (2) and TL44 (3) on 100 amp reverse polarity relay (9) with lockwasher (10) and nut (11).

(6) Position dust boot (8) on terminal lug TL44 (3).
(7) Install M1079 12/24 VDC power cable (1) in clamp (12).

(8) Position terminal lug TL96 (13), terminal lug TL83 (14), and clamp (12) on screw (15) with self-locking nut (16).

(9) Tighten self-locking nut (16) to 97-120 lb-in. (11-14 N·m).

(10) Install M1079 12/24 VDC power cable (1) in clamp (17).

(11) Position clamp (17) on right frame rail (18) with screw (19) and self-locking nut (20).

(12) Tighten self-locking nut (20) to 97-120 lb-in. (11-14 N·m).

(13) Install M1079 12/24 VDC power cable (1) in clamp (21).

(14) Position clamp (21) and clamp (22) on right frame rail (18) with screw (23) and self-locking nut (24).

(15) Tighten self-locking nut (24) to 97-120 lb-in. (11-14 N·m).
(16) Lower cab (TM 9-2320-365-10).

(17) Install connector P108 (25) in grommet (26).

(18) Install grommet (26) in cab floor (27).

(19) Connect connector P108 (25) to connector J108 (28).

(20) Connect connector P173 (29) to connector J173 (30).

c. Follow-On Maintenance.

(1) Raise cab (TM 9-2320-365-10).

(2) Install bottom radiator fan shroud (para 6-4).

(3) Install kick panel (para 16-3).

(4) Connect batteries (para 7-48).

(5) Raise spare tire (TM 9-2320-365-10).

End of Task.
7-52. CHEMICAL ALARM KIT CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Kick panel removed (para 16-3).

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)

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

a. Removal.

NOTE

• Note routing of chemical alarm kit cable prior to removal.

• Remove plastic cable ties as required.

(1) Disconnect connector J99 (1) from connector P99 (2).

(2) Remove chemical alarm kit cable assembly (3) from vehicle.

b. Installation.

NOTE

Install plastic cable ties as required.

Connect connector P99 (2) to connector J99 (1) and route chemical alarm kit cable assembly (3).

c. Follow-On Maintenance.

(1) Install kick panel (para 16-3).

(2) Connect batteries (para 7-48).

End of Task.
7-53. CENTRAL TIRE INFLATION SYSTEM (CTIS) CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries disconnected (para 7-48).
- Kick panel removed (para 16-3).
- Personnel heater removed (para 18-9).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts

- Ties, Cable, Plastic (Item 76, Appendix D)

a. Removal.

**NOTE**

- Note routing of CTIS cable assembly prior to removal.
- Remove plastic cable ties as required.

1. Disconnect connector P111 (1) from connector J111 (2).

2. Disconnect connector P112 (3) from manifold valve assembly (4).

3. Disconnect connector P113 (5) from pressure transducer (6).

4. Remove CTIS cable assembly (7) from vehicle.

b. Installation.

**NOTE**

Install plastic cable ties as required.

1. Position CTIS cable assembly (7) in vehicle.

2. Connect connector P113 (5) to pressure transducer (6).

3. Connect connector P112 (3) to manifold valve assembly (4).

4. Connect connector P111 (1) to connector J111 (2).
7-53. CENTRAL TIRE INFLATION SYSTEM (CTIS) CABLE ASSEMBLY REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Install personnel heater (para 18-9).

(2) Install kick panel (para 16-3).

(3) Connect batteries (para 7-48).

(4) Start engine (TM 9-2320-365-10).

(5) Operate vehicle and check CTIS system for proper operation (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
7-54. LEFT-HAND DOOR AND CAB MARKER LIGHTS CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions  
Batteries disconnected (para 7-48).  
PDP cover removed (para 16-2).

Materials/Parts  
Ties, Cable, Plastic (Item 76, Appendix D)  
Lockwasher (4) (Item 71, Appendix G)  
Lockwasher (2) (Item 81, Appendix G)  
Gasket (2) (Item 23, Appendix G)

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

a. Removal.

NOTE

- Note routing of left-hand door and cab marker lights cable assembly prior to removal.
- Remove plastic cable ties as required.

(1) Remove three screws (1) and washers (2) from PDP (3).
(2) Remove three screws (4) from PDP (3).
(3) Lift PDP (3) outward to gain access.

(4) Remove two nuts (5), lockwashers (6), washers (7), and cover (8) from terminal board TB1 (9). Discard lockwashers.

(5) Disconnect terminal lug TL75 (10) from terminal board TB1 (9) position 2.

(7) Remove two screws (13) and marker lens cover (14) from marker light (15).

(8) Remove four screws (16) and marker light (15) from cab (17).

(9) Remove nut (18), lockwasher (19), terminal lug TL133 (20), and lockwasher (21) from marker light (15). Discard lockwashers.

(10) Disconnect connector P129 (22) from marker light connector 489 (23).

(11) Remove gasket (24) from marker light (15). Discard gasket.
(12) Remove two screws (25) and marker lens cover (26) from marker light (27).

(13) Remove four screws (28) and marker light (27) from door (29).

(14) Remove nut (30), lockwasher (31), terminal lug TL130 (32), and lockwasher (33) from marker light (27). Discard lockwashers.

(15) Disconnect connector P130 (34) from marker light connector 489 (35).

(16) Remove gasket (36) from marker light (27). Discard gasket.
(17) Remove tube protector (37) and left-hand door and cab marker lights cable assembly (38) from door (29).

(18) Remove left-hand door and cab marker lights cable assembly (38) from dashboard (39).

b. Installation.

NOTE
Install plastic cable ties as required.

(1) Position left-hand door and cab marker lights cable assembly (1) in dashboard (2).

(2) Install left-hand door and cab marker lights cable assembly (1) and tube protector (3) in door (4).

(3) Install gasket (5) on marker light (6).

(4) Connect connector P130 (7) to marker light connector 489 (8).

(5) Install lockwasher (8.1) and terminal lug TL130 (9) on marker light (6) with lockwasher (10) and nut (11).
(6) Install marker light (6) on door (4) with four screws (12).

(7) Install marker lens cover (13) on marker light (6) with two screws (14).

(8) Install gasket (15) on marker light (16).

(9) Connect connector P129 (17) to marker light connector 489 (18).

(10) Install lockwasher (18.1) and terminal lug TL133 (19) on marker light (16) with lockwasher (20) and nut (21).
(11) Install marker light (16) on cab (22) with four screws (23).

(12) Install marker lens cover (24) on marker light (16) with two screws (25).

(13) Connect terminal lug TL87 (26) to terminal board TB2 (27) position 6.

(14) Connect terminal lug TL75 (28) to terminal board TB1 (29) position 2.

(15) Install cover (30) on terminal board TB1 (29) with two washers (31), lockwashers (32), and nuts (33).
(16) Install PDP (34) on dashboard (2) with three screws (35).

(17) Install three washers (36) and screws (37) in PDP (34).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Connect batteries (para 7-48).

(3) Check operation of left-hand door and cab marker lights (TM 9-2320-365-10).

End of Task.
7-55. M1081 CAB CLEARANCE AND MARKER LIGHTS LOWER CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).  
PDP cover removed (para 16-2).

Material/Parts
Dispenser, Pressure Sensitive Adhesive Tape  
(Item 21, Appendix D)  
Lockwasher (2) (Item 81, Appendix G)

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

a. Removal.

(1) Remove three screws (1) and washers (2) from PDP (3).

(2) Remove three screws (4) from PDP (3).

(3) Lift PDP (3) outward to gain access.

NOTE
Tag wires and connection points prior to disconnecting.

(4) Remove two nuts (5), lockwashers (6), washers (7), and cover (8) from terminal board TB1 (9). Discard lockwashers.

(5) Disconnect terminal lug TL74 (10) from terminal board TB1 (9) position 3.

(7) Disconnect connector P3 (13) from connector J3 (14).

(8) Remove two screws (15), washers (16), clamps (17), and M1081 cab clearance and marker lights lower cable assembly (18) from cab (19).

(9) Remove two clamps (17) from M1081 cab clearance and marker lights cable assembly (18).

b. Installation.

(1) Install two clamps (1) on M1081 cab clearance and marker lights cable assembly (2).

(2) Position M1081 cab clearance and marker lights lower cable assembly (2) in cab (3) with two clamps (1), washers (4), and screws (5).

(3) Tighten two screws (5) to 29-35 lb-in. (3-4 N·m).

(4) Connect connector P3 (6) to connector J3 (7).

(5) Connect terminal lug TL86 (8) to terminal board TB2 (9) position 4.

(6) Connect terminal lug TL74 (10) to terminal board TB1 (11) position 3.

(7) Install cover (12) on terminal board TB1 (11) with two washers (13), lockwashers (14), and nuts (15).
(8) Position PDP (16) on dashboard (17).

(9) Install three screws (18) in PDP (16).

(10) Install three washers (19) and screws (20) in PDP (16).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Connect batteries (para 7-48).

(3) Check operation of cab clearance and marker lights (TM 9-2320-365-10).

End of Task.
This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Lockwire (Item 32, Appendix D)
Gasket (5) (Item 23, Appendix G)
Lockwasher (10) (Item 71, Appendix G)

a. Removal.

(1) Disconnect connector J3 (1) from connector P3 (2).

NOTE
All M1081 cab clearance and marker lights are removed the same way. Upper left cab marker light shown.

(2) Remove two screws (3) and lens cover (4) from marker light (5).
(3) Remove four screws (6) and marker light (5) from cab roof (7).

**NOTE**

- Wrap mechanics wire on each connector and terminal lug for ease of installation.

- Refer to **Table 7-3. M1081 Cab Clearance and Marker Lights Connectors** for combinations of terminal lugs and connectors on each light.

(4) Remove nut (8), lockwasher (9), terminal lug (10), and lockwasher (11) from marker light (5). Discard lockwashers.

(5) Disconnect connector (12) from marker light connector 489 (13).

(6) Remove gasket (14) from marker light (5). Discard gasket.

<table>
<thead>
<tr>
<th>Light Location</th>
<th>Connector</th>
<th>Terminal lug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Side Marker</td>
<td>P50</td>
<td>TL27</td>
</tr>
<tr>
<td>Left Center Clearance</td>
<td>P57</td>
<td>TL22</td>
</tr>
<tr>
<td>Center Clearance</td>
<td>P60</td>
<td>TL8</td>
</tr>
<tr>
<td>Right Center Clearance</td>
<td>P59</td>
<td>TL4</td>
</tr>
<tr>
<td>Right Side Marker</td>
<td>P55</td>
<td>TL3</td>
</tr>
</tbody>
</table>
(7) Remove M1081 cab clearance and marker lights upper cable assembly (15) from cab roof (7).

b. Installation.

NOTE
Transfer mechanics wire to new M1081 cab clearance and marker lights upper cable assembly.

(1) Position M1081 cab clearance and marker lights upper cable assembly (1) in cab roof (2).

NOTE

- All M1081 cab clearance and marker lights are installed the same way. Upper left cab marker light shown.

- Refer to Table 7-3. M1081 Cab Clearance and Marker Lights Connectors for combinations of terminal lugs and connectors on each light.

(2) Install gasket (3) on marker light (4).

(3) Connect connector (5) to marker light connector 489 (6).

(4) Install lockwasher (6.1) and terminal lug (7) on marker light (4) with lockwasher (8) and nut (9).

Change 1 7-231
(5) Install marker light (4) on cab roof (2) with four screws (10).

(6) Install lens cover (11) on marker light (4) with two screws (12).

(7) Connect connector J3 (13) to connector P3 (14).

c. Follow-On Maintenance:

(1) Connect batteries (para 7-48).

(2) Check operation of cab clearance and marker lights (TM 9-2320-365-10).

End of Task.
7-57. RIGHT-HAND DOOR AND CAB MARKER LIGHTS CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).

Materials/Parts

- Ties, Cable, Plastic (Item 76, Appendix D)
- Lockwasher (4) (Item 71, Appendix G)
- Lockwasher (2) (Item 81, Appendix G)
- Gasket (2) (Item 23, Appendix G)

Tools and Special Tools

- Tool Kit, Genl Mech (Item 44, Appendix C)

a. Removal.

NOTE

- Note routing of right-hand door and cab marker lights cable assembly prior to removal.
- Remove plastic cable ties as required.

1. Remove three screws (1) and washers (2) from PDP (3).
2. Remove three screws (4) from PDP (3).
3. Lift PDP (3) outward to gain access.
4. Remove two nuts (5), lockwashers (6), washers (7), and cover (8) from terminal board TB1 (9). Discard lockwashers.
5. Disconnect terminal lug TL73 (10) from terminal board TB1 (9) position 1.
(7) Remove two screws (13) and marker lens cover (14) from marker light (15).

(8) Remove four screws (16) and marker light (15) from cab (17).

(9) Remove nut (18), lockwasher (19), terminal lug TL134 (20), and lockwasher (20.1) from marker light (15). Discard lockwashers.

(10) Disconnect connector P132 (21) from marker light connector 489 (22).

(11) Remove gasket (23) from marker light (15). Discard gasket.
(12) Remove two screws (24) and marker lens cover (25) from marker light (26).

(13) Remove four screws (27) and marker light (26) from door (28).

(14) Remove nut (29), lockwasher (30), terminal lug TL131 (31), and lockwasher (31.1) from marker light (26). Discard lockwashers.

(15) Disconnect connector P131 (32) from marker light connector 489 (33).

(16) Remove gasket (34) from marker light (26). Discard gasket.
(17) Remove tube protector (35) and right-hand door and cab marker lights cable assembly (36) from door (28).

(18) Remove right-hand door and cab marker lights cable assembly (36) from dashboard (37).

b. Installation.

![Diagram showing installation process]

**NOTE**

Install plastic cable ties as required.

(1) Position right-hand door and cab marker lights cable assembly (1) in dashboard (2).

(2) Install right-hand door and cab marker lights cable assembly (1) and tube protector (3) in door (4).

(3) Install gasket (5) on marker light (6).

(4) Connect connector P131 (7) to marker light connector 489 (8).

(5) Install lockwasher (8.1) and terminal lug TL131 (9) on marker light (6) with lockwasher (10) and nut (11).
(6) Install marker light (6) on door (3) with four screws (12).

(7) Install marker lens cover (13) on marker light (6) with two screws (14).

(8) Install gasket (15) on marker light (16).

(9) Connect connector P132 (17) to marker light connector 489 (18).

(10) Install lockwasher (18.1) and terminal lug TL134 (19) on marker light (16) with lockwasher (20) and nut (21).
(11) Install marker light (16) on cab (22) with four screws (23).

(12) Install marker lens cover (24) on marker light (16) with two screws (25).

(13) Connect terminal lug TL71 (26) to terminal board TB2 (27) position 2.

(14) Connect terminal lug TL73 (28) to terminal board TB1 (29) position 1.

(15) Install cover (30) on terminal board TB1 (29) with two washers (31), lockwashers (32), and nuts (33).
(16) Position PDP (34) on dashboard (2) with three screws (35).

(17) Install three washers (36) and screws (37) in PDP (34).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Connect batteries (para 7-48).

(3) Check operation of right-hand door and cab marker lights (TM 9-2320-365-10).

End of Task.
7-58. STE/ICE-R CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Instrument panel assembly removed for access (para 7-15).

Materials/Parts

Ties, Cable, Plastic (Item 76, Appendix D)  
Lockwasher (4) (Item 67, Appendix G)

Tools and Special Tools

Tool Kit, Genl Mech (Item 44, Appendix C)

a. Removal.

NOTE

Remove plastic cable ties as required.

(1) Disconnect connector J31X (1) from connector P31X (2).

(2) Disconnect connector J43X (3) from connector P43X (4).

(3) Remove two screws (5) and bracket (6) from cab (7).
(4) Remove two screws (8), washers (9), junction box (10), and STE/ICE-R cable assembly (11) from dashboard (12).

(5) Remove four nuts (13), lockwashers (14), screws (15), chain (16), and bracket (6) from STE/ICE-R cable assembly (11). Discard lockwashers.

b. Installation.

NOTE
Install plastic cable ties as required.

(1) Install bracket (1) on STE/ICE-R cable assembly (2) with chain (3), four screws (4), lockwashers (5), and nuts (6).
(2) Position STE/ICE-R cable assembly (2) in dashboard (7).

(3) Install junction box (8) on dashboard (7) with two washers (9) and screws (10).

(4) Install bracket (1) on cab (11) with two screws (12).

(5) Connect connector J43X (13) to connector P43X (14).

(6) Connect connector J31X (15) to connector P31X (16).

**c. Follow-On Maintenance.**

Install instrument panel assembly (para 7-15).

**End of Task.**
This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

### INITIAL SETUP

**Equipment Conditions**

- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).

**Materials/Parts**

- Lockwasher (10) (Item 71, Appendix G)
- Lockwasher (2) (Item 76, Appendix G)
- Gasket (5) (Item 23, Appendix G)
- Lockwire (Item 32, Appendix D)

**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 34, Appendix C)

---

**a. Removal.**

1. Remove three screws (1) and washers (2) from PDP (3).
2. Remove three screws (4) from PDP (3).
3. Lift PDP (3) outward to gain access.
4. Remove two nuts (5), lockwashers (6), washers (7), and cover (8) from terminal board TB1 (9). Discard lockwashers.
5. Disconnect terminal lug TL74 (10) from terminal board TB1 (9) position 3.
NOTE

All cab clearance marker lights are removed the same way. Upper left cab clearance marker light shown.

(7) Remove two screws (13) and marker lens cover (14) from marker light (15).

(8) Remove four screws (16) and marker light (15) from cab (17).

NOTE

• Wrap mechanics wire on each connector and terminal lug for ease of installation.

• Refer to Table 7-4. Cab Clearance Marker Light Connectors for combinations of terminal lugs and connectors on each marker light.

(9) Remove nut (18), lockwasher (19), terminal lug (20) and lockwasher (20.1) from marker light (15). Discard lockwashers.

(10) Disconnect connector (21) from marker light connector 489 (22).

(11) Remove gasket (23) from marker light (15). Discard gasket.
Table 7-4. Cab Clearance Marker Light Connectors

<table>
<thead>
<tr>
<th>Marker Light Location</th>
<th>Connector</th>
<th>Terminal lug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Side</td>
<td>P50</td>
<td>TL27</td>
</tr>
<tr>
<td>Left Center</td>
<td>P59</td>
<td>TL4</td>
</tr>
<tr>
<td>Center</td>
<td>P60</td>
<td>TL8</td>
</tr>
<tr>
<td>Right Center</td>
<td>P57</td>
<td>TL22</td>
</tr>
<tr>
<td>Right Side</td>
<td>P55</td>
<td>TL3</td>
</tr>
</tbody>
</table>

(12) Remove eight screws (24), washers (25), clamps (26), and cab clearance marker lights cable assembly (27) from cab (17).

(13) Remove eight clamps (26) from cab clearance and marker lights cable assembly (27).

b. Installation.

![Diagram of cab clearance marker lights installation]

**NOTE**

Transfer mechanics wire to new cab clearance marker lights cable assembly.

(1) Install eight clamps (1) on cab clearance and marker lights cable assembly (2).

(2) Install cab clearance marker lights cable assembly (2) on cab (3) with eight clamps (1), washers (4), and screws (5).
7-59. CAB CLEARANCE MARKER LIGHTS CABLE ASSEMBLY REPLACEMENT
(CONT)

NOTE

- All cab clearance marker lights are installed the same way. Upper left cab clearance marker light shown.

- Refer to Table 7-4. Cab Clearance Marker Light Connectors for combinations of terminal lugs and connectors on each marker light.

(3) Install gasket (6) on marker light (7).

(4) Connect connector (8) to marker light connector 489 (9).

(5) Install lockwasher (9.1) and terminal lug (10) on marker light (7) with lockwasher (11) and nut (12).

(6) Install marker light (7) on cab (2) with four screws (13).

(7) Install marker lens cover (14) on marker light (7) with two screws (15).
(8) Connect terminal lug TL86 (16) to terminal board TB2 (17) position 4.

(9) Connect terminal lug TL74 (18) to terminal board TB1 (19) position 3.

(10) Install cover (20) on terminal board TB1 (19) with two washers (21), lockwashers (22), and nuts (23).

(11) Position PDP (24) on dashboard (25).

(12) Install three screws (26) in PDP (24).

(13) Install three washers (27) and screws (28) in PDP (24).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Connect batteries (para 7-48).

(3) Check operation of cab clearance marker lights (TM 9-2320-365-10).

End of Task.
7-60. WINDSHIELD WASHER PUMP ELECTROMAGNETIC INTERFERENCE (EMI) CABLE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

Materials/Parts
Nut, Self-Locking (Item 148, Appendix G)

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

a. Removal.

(1) Loosen screw (1) and open cover (2).

(2) Disconnect connector J25 (3) from connector P25 (4).

(3) Disconnect connector P125 (5) from windshield washer pump (6).
(4) Remove self-locking nut (7), washer (8), screw (9), washer (10), terminal lug TL94 (11), and windshield washer pump EMI cable (12) from box (13). Discard self-locking nut.

b. Installation

(1) Position windshield washer pump EMI cable (1) in box (2).

(2) Install terminal lug TL94 (3) on box (2) with washer (4), screw (5), washer (6), and self-locking nut (7).

(3) Connect connector P125 (8) to windshield washer pump (9).

(4) Connect connector P25 (10) to connector J25 (11).
(5) Close cover (12) and tighten screw (13).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Check operation windshield washers (TM 9-2320-365-10).

End of Task.
7.61. WINDSHIELD WIPER ELECTROMAGNETIC INTERFERENCE (EMI) CABLE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Batteries disconnected (para 7-48).
PDP cover removed (para 16-2).

Materials/Parts

Ties, Cable, Plastic (Item 76, Appendix D)

Tools and Special Tools

Tool Kit, Genl Mech (Item 44, Appendix C)

a. Removal.

(1) Remove three screws (1) and washers (2) from PDP (3).

(2) Remove three screws (4) from PDP (3).

(3) Lift PDP (3) outward to gain access.

NOTE

Remove plastic cable ties as required.

(4) Disconnect windshield wiper EMI cable connector PX22 (5) from windshield wiper motor (6).

(5) Disconnect windshield wiper EMI cable connector P2 (7) from connector J2 (8).
7-61. WINDSHIELD WIPER ELECTROMAGNETIC INTERFERENCE (EMI) CABLE REPLACEMENT (CONT)

b. Installation.

**NOTE**
Install plastic cable ties as required.

1. Connect windshield wiper EMI cable connector P2 (1) to connector J2 (2).

2. Connect windshield wiper EMI cable connector PX22 (3) to windshield wiper motor (4).

3. Position PDP (5) on dashboard (6).

4. Install three screws (7) in PDP (5).

5. Install three washers (8) and screws (9) in PDP (5).

c. Follow-On Maintenance.

1. Install PDP cover (para 16-2).

2. Connect batteries (para 7-48).

3. Check operation of windshield wipers (TM 9-2320-365-10).

End of Task.
### 7-62. WINDSHIELD WIPER ECU REPLACEMENT

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<tr>
<td>c. Follow-On Maintenance</td>
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</tbody>
</table>

#### INITIAL SETUP

**Equipment Conditions**

- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).

---

**Removing Wiper ECU**

- **a. Removal.**
  
  Remove windshield wiper ECU (1) from PDP (2).

**Installing Wiper ECU**

- **b. Installation.**
  
  Install windshield wiper ECU (1) in PDP (2).

**Follow-On Maintenance**

- **c. Follow-On Maintenance.**
  
  1. Install PDP cover (para 16-2).
  2. Connect batteries (para 7-48).
  3. Operate windshield wipers and check for proper operation (TM 9-2320-365-10).

**End of Task.**
7-63. NATO POWER CABLE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Engine shut down (TM 9-2320-365-10).
Battery box cover removed (TM 9-2320-365-10).

Tools and Special Tools

Goggles, Industrial (Item 15, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Apron, Rubber (Item 3, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)

Materials/Parts

Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Nut, Self-Locking (4) (Item 142, Appendix G)
Lockwasher (Item 78, Appendix G)
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)

a. Removal.

WARNING

- Remove 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.

- Negative battery terminals and battery tester negative terminal lug must be disconnected first. Failure to comply may result in serious injury or death to personnel.

NOTE

Tag battery terminals, terminal lugs, and connection points prior to disconnecting.

(1) Remove nut (1) and lockwasher (2) from battery ground cable (3). Discard lockwasher.

(2) Deleted.

(3) Remove terminal lugs TL50A (5), TL48 (6), and battery tester terminal lug (7) from battery ground cable (3).
(4) Remove nut (8) from battery 24 vdc cable (9).

(5) Deleted.

(6) Remove terminal lug TL49A (11) and battery tester terminal lug (12) from battery 24 vdc cable (9).

(7) Remove four self-locking nuts (13), washers (14), screws (15), and eyelet (16) from NATO power cable (17). Discard self-locking nuts.

(8) Remove NATO power cable (17) and terminal lugs TL49A (11) and TL50A (5) from bracket (18) and battery box (19).

b. Installation.

(1) Position terminal lugs TL49A (1) and TL50A (2), and NATO power cable (3) in bracket (4) and battery box (5).

(2) Install NATO power cable (3) and eyelet (6) on bracket (4) with four screws (7), washers (8), and self-locking nuts (9).
WARNING

Negative battery terminals must be connected last. Failure to comply may result in serious injury or death to personnel.

(3) Install battery tester terminal lug (10) and terminal lug TL49A (1) on battery 24 vdc cable (11).

(4) Deleted.

(5) Install nut (13) on battery 24 vdc cable (11).

(6) Install battery tester terminal lug (14), and terminal lugs TL48 (15) and TL50A (2) on battery ground cable (16).

(7) Deleted.

(8) Install lockwasher (18) and nut (19) on battery ground cable (16).

(9) Apply grease to all battery terminals.

c. Follow-On Maintenance

Install battery box cover (TM 9-2320-365-10).

End of Task.
# 7-64. ALTERNATOR GROUND STRAP REPLACEMENT

## This task covers:

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<td>Installation</td>
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<td>c.</td>
<td>Follow-On Maintenance</td>
</tr>
</tbody>
</table>

## INITIAL SETUP

**Equipment Conditions**
- Cab raised (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

**Materials/Parts**
- Lockwasher (Item 98, Appendix G)
- Lockwasher (Item 71, Appendix G)
- Nut, Self-Locking (Item 142, Appendix G)

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

## a. Removal.

1. Remove screw (1), lockwasher (2), washer (3), terminal lug TL5 (4), and ground cable (5) from alternator (6). Discard lockwasher.

2. Remove self-locking nut (7), washer (8), ground cable (5), lockwasher (9), screw (10), and washer (11) from right frame rail (12). Discard self-locking nut and lockwasher.
b. Installation.

(1) Install lockwasher (1) and ground cable (2) on right frame rail (3) with washer (4), screw (5), washer (6), and self-locking nut (7).

(2) Install ground cable (2) and terminal lug TL5 (8) on alternator (9) with washer (10), lockwasher (11), and screw (12).

c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-65. 100 AMP ALTERNATOR TO REVERSE POLARITY RELAY 12 VDC CABLE REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Spare tire lowered (TM 9-2320-365-10).  
Cab raised (TM 9-2320-365-10).  
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)  
Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape  
(Item 21, Appendix D)  
Ties, Cable, Plastic (Item 76, Appendix D)  
Lockwasher (Item 89, Appendix G)  
Nut, Self-Locking (Item 131.1, Appendix G)

a. Removal.

(1) Loosen clamp (1) on turbocharger intake hose (2).

(2) Remove turbocharger intake hose (2) from intake air cleaner boot (3).

NOTE

Remove plastic cable ties as required.

(3) Lift terminal cover (4) on terminal lugs TL47 (5) and TL61 (6).

(4) Remove nut (7), lockwasher (8), and terminal lugs TL47 (5) and TL61 (6) from reverse polarity relay 12 VDC LOAD terminal (9). Discard lockwasher.
(5) Lift dust boot (10) on terminal lug TL60 (11).

(6) Remove self-locking nut (12), washer (13), insulation washer (14), and terminal lug TL60 (11) from alternator (15). Discard self-locking nut.

(7) Remove dust boot (10) from 100 amp alternator to reverse polarity relay 12 vdc cable (16).

(8) Remove three screws (17), washers (18), clamps (19), and 100 amp alternator to reverse polarity relay 12 vdc cable (16) from engine (20).

(9) Remove three clamps (19) from 100 amp alternator to reverse polarity relay 12 vdc cable (16).

b. Installation.

(1) Install three clamps (1) on 100 amp alternator to reverse polarity relay 12 vdc cable (2).

**NOTE**

Install plastic cable ties as required.

(2) Position 100 amp alternator to reverse polarity relay 12 vdc cable (2) on engine (3) with three clamps (1), washers (4), and screws (5).

(3) Tighten three screws (5) to 22-27 lb-ft (31-37 N·m).
(4) Install dust boot (6) on 100 amp alternator to reverse polarity relay 12 vdc cable (2).

**CAUTION**

Insulation washer must be installed with flat side up. Failure to comply may result in damage to equipment.

(5) Position terminal lug TL60 (7) on alternator (8) with insulator washer (9), washer (10) and self-locking nut (11).

(6) Tighten self-locking nut (11) to 40 lb-in. (5 N·m).

(7) Position dust boot (6) on terminal lug TL60 (7).

(8) Position terminal lugs TL61 (12) and TL47 (13) on reverse polarity relay 12 VDC LOAD terminal (14) with lockwasher (15) and nut (16).

(9) Tighten nut (16) to 120-144 lb-in. (14-16 N·m).

(10) Position terminal cover (17) on terminal lugs TL47 (13) and TL61 (12).

(11) Position turbocharger intake hose (18) on intake air cleaner boot (19) with clamp (20).

(12) Tighten clamp (20) to 36-48 lb-in. (4-5 N·m).
c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-66. **100 AMP ALTERNATOR TO REVERSE POLARITY RELAY 24 VDC CABLE REPLACEMENT**

**This task covers:**

- a. Removal
- b. Installation

**c. Follow-On Maintenance**

**INITIAL SETUP**

**Equipment Conditions**
- Spare tire lowered (TM 9-2320-365-10).
- Cab raised (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

**Tools and Special Tools**

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Socket Set, Socket Wrench (Item 34, Appendix C)

**Materials/Parts**

- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Lockwasher (Item 89, Appendix G)
- Nut, Self-Locking (Item 127, Appendix G)

**a. Removal.**

1. Loosen clamp (1) on turbocharger intake hose (2).

2. Remove turbocharger intake hose (2) from intake air cleaner boot (3).

3. Lift terminal cover (4) on terminal lugs TL1 (5), TL36 (6), and TL37 (7).

   **NOTE**

   Remove plastic cable ties as required.

4. Remove nut (8), lockwasher (9), and terminal lugs TL1 (5), TL36 (6), and TL37 (7) from reverse polarity relay 24 VDC LOAD terminal (10). Discard lockwasher.
(5) Lift dust boot (11) on terminal lugs TL2 (12) and TL6 (13).

(6) Remove self-locking nut (14), washer (15), insulation washer (16), and terminal lugs TL2 (12) and TL6 (13) from alternator (17). Discard self-locking nut.

(7) Remove 100 amp alternator to reverse polarity relay 24 vdc cable (18) from dust boot (11).

(8) Remove three screws (19), washers (20), clamps (21), and 100 amp alternator to reverse polarity relay 24 vdc cable (18) from engine (22).

(9) Remove three clamps (21) from 100 amp alternator to reverse polarity relay 24 vdc cable (18).
b. Installation.

(1) Install three clamps (1) on 100 amp alternator to reverse polarity relay 24 vdc cable (2).

**NOTE**

Install plastic cable ties as required.

(2) Position 100 amp alternator to reverse polarity relay 24 vdc cable (2) on engine (3) with three clamps (1), washers (4), and screws (5).

(3) Tighten three screws (5) to 22-27 lb-ft (31-37 N·m).

(4) Install 100 amp alternator to reverse polarity relay 24 vdc cable (2) in dust boot (6).

**CAUTION**

Insulation washer must be installed with flat side up. Failure to comply may result in damage to equipment.

(5) Position terminal lugs TL6 (7) and TL2 (8) on alternator (9) with insulation washer (10), washer (11) and self-locking nut (12).

(6) Tighten self-locking nut (12) to 40 lb-in. (5 N·m).

(7) Position dust boot (6) on terminal lugs TL2 (8) and TL6 (7).
(8) Position terminal lugs TL37 (13), TL36 (14), and TL1 (15) on reverse polarity relay 24 VDC LOAD terminal (16) with lockwasher (17) and nut (18).

(9) Tighten nut (18) to 120-144 lb-in. (14-16 N·m).

(10) Position dust boot (19) on terminal lugs TL1 (15), TL36 (14), and TL37 (13).

(11) Position turbocharger intake hose (20) on intake air cleaner boot (21) with clamp (22).

(12) Tighten clamp (22) to 36-48 lb-in. (4-5 N·m).

c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-67. BATTERY TO 100 AMP REVERSE POLARITY RELAY 12 VDC CABLE REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Spare tire lowered (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

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 34, Appendix C)

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (Item 89, Appendix G)

a. Removal.

(1) Lift terminal cover (1) on terminal lugs TL61 (2) and TL47 (3).

NOTE
Remove plastic cable ties as required.

(2) Remove nut (4), lockwasher (5), and terminal lugs TL61 (2) and TL47 (3) from 100 amp reverse polarity relay 12 VDC BAT terminal (6). Discard lockwasher.

NOTE
Note routing of 100 amp reverse polarity relay 12 vdc cable prior to removal.

(3) Remove battery to 100 amp reverse polarity relay 12 vdc cable (7) from vehicle.
b. Installation.

NOTE

Install plastic cable ties as required.

(1) Position battery to 100 amp reverse polarity relay 12 vdc cable (1) on vehicle.

(2) Position terminal lugs TL47 (2) and TL61 (3) on 100 amp reverse polarity relay 12 VDC BAT terminal (4) with lockwasher (5) and nut (6).

(3) Tighten nut (6) to 120-144 lb-in. (14-16 N·m).

(4) Position terminal cover (7) on terminal lugs TL47 (2) and TL61 (3).

c. Follow-On Maintenance.

(1) Raise spare tire (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
# 7-68. BATTERY TO 100 AMP REVERSE POLARITY RELAY 24 VDC CABLE REPLACEMENT

This task covers:

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<td>c.</td>
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## INITIAL SETUP

### Equipment Conditions
- Spare tire lowered (TM 9-2320-365-10).
- Cab raised (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).

### 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)
- Goggles, Industrial (Item 15, Appendix C)

### Materials/Parts
- Lockwasher (Item 89, Appendix G)

## a. Removal.

**WARNING**

Remove 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. Failure to comply may result in injury to personnel.

1. Remove nut (1), and terminal lugs TL39 (2) and TL10 (3) from battery 24 vdc cable (4).
(2) Loosen clamp (5) on turbocharger intake hose (6).

(3) Remove turbocharger intake hose (6) from intake air cleaner boot (7).

(4) Lift terminal cover (8) on terminal lugs TL1 (9), TL36 (10), and battery to 100 amp reverse polarity relay 24 VDC cable terminal lug TL37 (11).

(5) Remove nut (12), lockwasher (13), terminal lugs TL1 (9), TL36 (10), and battery to 100 amp reverse polarity relay 24 vdc cable terminal lug TL37 (11) from 100 amp reverse polarity relay 24 VDC BAT terminal (14). Discard lockwasher.

b. Installation.

(1) Position battery to 100 amp reverse polarity relay 24 vdc cable terminal lug TL37 (1), and terminal lugs TL36 (2) and TL1 (3) on 100 amp reverse polarity relay 24 VDC BAT terminal (4) with lockwasher (5) and nut (6).

(2) Tighten nut (6) to 120-144 lb-in. (14-16 N·m).

(3) Position terminal cover (7) on terminal lugs TL1 (3), TL36 (2), and battery to 100 amp reverse polarity relay 24 vdc cable terminal lug TL37 (1).
(4) Position turbocharger intake hose (8) on intake air cleaner boot (9) with clamp (10).

(5) Tighten clamp (10) to 36-48 lb-in. (4-5 N·m).

(6) Install terminal lugs TL10 (11) and TL39 (12) on battery 24 vdc cable (13) with nut (14).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for 24 vdc (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
7-69. BATTERY TO SHUNT CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Spare tire lowered (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Materials/Parts

Lockwasher (Item 75, Appendix G)

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 34, Appendix C)

a. Removal.

(1) Loosen clamp (1) on turbocharger intake hose (2).

(2) Remove turbocharger intake hose (2) from intake air cleaner boot (3).

(3) Remove screw (4), lockwasher (5), and terminal lug TL52 (6) from shunt (7). Discard lockwasher.
b. Installation.

(1) Install terminal lug TL52 (1) on shunt (2) with lockwasher (3) and screw (4).

(2) Position turbocharger intake hose (5) on intake air cleaner boot (6) with clamp (7).

(3) Tighten clamp (7) to 36-48 lb-in. (4-5 N·m).

c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-70. BATTERY TO STARTER CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Cab raised (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Adhesive (Item 10, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Nut, Self-Locking (2) (Item 134, Appendix G)

Personnel Required
(2)

a. Removal.

WARNING

Remove 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. Failure to comply may result in injury to personnel.

NOTE

• Note routing of battery to starter cable assembly prior to removal.

• Tag wires and connection points prior to disconnecting.

(1) Remove nut (1), and terminal lugs TL39 (2) and TL10 (3) from battery 24 vdc cable (4).
NOTE

• Both clamps are removed the same way. Only one shown.

• Remove plastic cable ties as required.

(2) Remove self-locking nut (5), screw (6), battery to starter cable assembly (7), and clamp (8) from frame rail (9). Discard self-locking nut.

NOTE

Step (3) requires the aid of an assistant.

(3) Perform step (2) on remaining clamp.

(4) Remove two clamps (8) from battery to starter cable assembly (7).

(5) Remove adhesive, nut (10), and terminal lug TL12 (11) from starter solenoid (12).
7-70. BATTERY TO STARTER CABLE ASSEMBLY REPLACEMENT (CONT)

b. Installation.

(1) Position terminal lug TL12 (1) on starter solenoid (2) with nut (3).

(2) Tighten nut (3) to 15-20 lb-ft (20-27 N·m).

**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.

(3) Apply adhesive to terminal lug TL12 (1) on starter solenoid (2).

(4) Install two clamps (4) on battery to starter cable assembly (5).

**NOTE**

Both clamps are installed the same way. Only one shown.

(5) Position battery to starter cable assembly (5) on frame rail (6) with clamp (4), screw (7), and self-locking nut (8).

**NOTE**

Steps (5) through (7) require the aid of an assistant.

(6) Perform step (5) on remaining clamp.

**NOTE**

Install plastic cable ties as required.

(7) Tighten two self-locking nuts (8) to 97-124 lb-in. (11-14 N·m).
(8) Install terminal lugs TL10 (9) and TL39 (10) on battery 24 vdc cable (11) with nut (12).

c. Follow-On Maintenance

(1) Lower cab (TM 9-2320-365-10).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-71. CAB TO CHASSIS GROUND STRAP REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Batteries disconnected (para 7-48).

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

Ties, Cable, Plastic (Item 76, Appendix D)  
Nut, Self-Locking (Item 148, Appendix G)  
Lockwasher (Item 70, Appendix G)

a. Removal.

NOTE

Remove plastic cable ties as required.

(1) Remove two screws (1) and washers (2) from front grille (3).

(2) Remove screw (4) and washer (5) from front grille (3).

(3) Remove front grille (3) from cab (6).

(4) Loosen screw (7) in chassis (8) and remove cab to chassis ground cable (9).

(5) Remove self-locking nut (10), washer (11), cab to chassis ground cable (9), and lockwasher (12) from stud (13). Discard self-locking nut and lockwasher.
b. Installation.

(1) Install cab to chassis ground cable (1) on stud (2) with lockwasher (3), washer (4), and self-locking nut (5).

(2) Install cab to chassis ground cable (1) on chassis (6) with screw (7).

(3) Position front grille (8) on cab (9) with washer (10) and screw (11).

(4) Position two washers (12) and screws (13) in front grille (8).

(5) Tighten screw (11) to 48-60 lb-in. (5-7 N\cdot m).

(6) Tighten two screws (13) to 24 lb-in. (3 N\cdot m).

c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Start engine (TM 9-2320-365-10).

(3) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-72. ENGINE CONTROL CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Instrument panel assembly removed for access (para 7-15).

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 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (2) (Item 90, Appendix G)
Lockwasher (Item 98, Appendix G)
Nut, Self-Locking (2) (Item 130, Appendix G)
Nut, Self-Locking (Item 131, Appendix G)
Nut, Self-Locking (5) (Item 116, Appendix G)
Tape, Insulation, Electrical (Item 75, Appendix D)

a. Removal.

NOTE

- Remove plastic cable ties as required.
- Note routing of engine control cable assembly prior to removal.
- Tag connectors and connection points prior to disconnecting.

(1) Disconnect connector P31 (1) from connector J31 (2).

(2) Disconnect connector P31X (3) from connector J31X (4).
(3) Raise cab (TM 9-2320-365-10).

(4) Disconnect connector clamp (5) from connector P38 (6).

(5) Disconnect connector P38 (6) from engine speed sensor connector J38 (7).

**NOTE**

Perform steps (6) and (7) on vehicles equipped with troopseats.

(6) Disconnect connector clamp (8) from connector P39 (9).

(7) Disconnect connector P39 (9) from connector J39 (10).

(8) Disconnect connector clamp (11) from connector P33 (12).

(9) Disconnect connector P33 (12) from fuel/water separator connector (13).

(10) Disconnect connector clamp (14) from connector P34 (15).

(11) Disconnect connector P34 (15) from oil pressure switch connector (16).

(12) Disconnect connector P32 (17) from oil pressure transducer (18).
(13) Remove nut (19), lockwasher (20), and terminal lugs TL29 (21) and TL66 (22) from fuel shutoff solenoid (23). Discard lockwasher.

(14) Remove nut (24), lockwasher (25), and terminal lug TL28 (26) from fuel shutoff solenoid (23). Discard lockwasher.

(15) Disconnect connector clamp (27) from connector P42 (28).

(16) Disconnect connector P42 (28) from ether sensor connector (29).

(17) Disconnect connector clamp (30) from connector P37 (31).

(18) Disconnect connector P37 (31) from coolant temperature light switch connector (32).
(19) Disconnect connector clamp (33) from connector P36 (34).

(20) Disconnect connector P36 (34) from water temperature switch connector (35).

(21) Remove screw (36), lockwasher (37), washer (38), terminal lugs TL5 (39) and TL8 (40) from alternator (41). Discard lockwasher.

(22) Lift dust boot (42) on terminal lugs TL6 (43) and TL2 (44).

(23) Remove self-locking nut (45), washer (46), insulation washer (47), and terminal lugs TL6 (43) and TL2 (44) from alternator (41). Discard self-locking nut.

(24) Remove terminal lug TL6 (43) from dust boot (42).

(25) Lift dust boot (48) on terminal lug TL35 (49).

(26) Remove self-locking nut (50), washer (51), and terminal lug TL35 (49) from voltage regulator (52). Discard self-locking nut.

(27) Remove dust boot (48) from engine control cable assembly (53).

NOTE
Perform steps (28) through (30) on vehicles that have not had terminal lug TL110 removed.

(28) Lift dust boot (54) on terminal lug TL110 (55).

(29) Remove self-locking nut (56), washer (57), and terminal lug TL110 (55) from voltage regulator (52). Discard self-locking nut.

(30) Remove dust boot (54) from engine control cable assembly (53).
(31) Disconnect connector clamp (58) from connector P41 (59).

(32) Disconnect connector P41 (59) from coolant temperature gage sensor connector (60).

(33) Remove two self-locking nuts (61), screws (62), and clamps (63 and 64) from clamps (65 and 66). Discard self-locking nuts.

(34) Remove clamps (63 and 64) from engine control cable assembly (53).

(35) Remove two self-locking nuts (67), screws (68), and clamps (69) from brackets (70 and 71). Discard self-locking nuts.

(36) Remove two clamps (69) from engine control cable assembly (53).
(37) Remove self-locking nut (72), screw (73), and clamp (74) from left frame rail (75).

(38) Remove clamp (74) from engine control cable assembly (53).

(39) Remove engine control cable assembly (53) from vehicle.

b. Installation.

NOTE
Install plastic cable ties as required.

(1) Position engine control cable assembly (1) in vehicle.

(2) Install clamp (2) on engine control cable assembly (1).

(3) Install clamp (2) on left frame rail (3) with screw (4) and self-locking nut (5).

(4) Install two clamps (6) on engine control cable assembly (1).

(5) Install two clamps (6) on brackets (7 and 8) with two screws (9) and self-locking nuts (10).
(6) Install clamps (11 and 12) on engine control cable assembly (1).

(7) Install clamps (11 and 12) on clamps (13 and 14) with two screws (15) and self-locking nuts (16).

(8) Connect connector P41 (17) to coolant temperature gage sensor connector (18).

(9) Connect connector clamp (19) on connector P41 (17).

NOTE

- Perform step (10) if replacing alternator N1506-1 (12420852) with alternator N1509-1 (12422863).

- Install plastic cable ties to TL110 and tie wire away from alternator.

(10) Apply electrical tape to TL110 (20).
NOTE

Perform step (10.1) through (13) on alternator N1506-1 (12420852).

(10.1) Install dust boot (21) on engine control cable assembly (1).

(11) Position terminal lug TL110 (20) on voltage regulator (22) with washer (23) and self-locking nut (24).

(12) Tighten self-locking nut (24) to 25 lb-in. (3 N•m).

(13) Position dust boot (21) on terminal lug TL110 (20).

(14) Install dust boot (25) on engine control cable assembly (1).

(15) Position terminal lug TL35 (26) on voltage regulator (22) with washer (27) and self-locking nut (28).

(16) Tighten self-locking nut (28) to 25 lb-in. (3 N•m).

(17) Position dust boot (25) on terminal lug TL35 (26).
(18) Install terminal lug TL6 (29) in dust boot (30).

CAUTION

Insulation washer must be installed with flat side up. Failure to comply may result in damage to equipment.

(19) Position terminal lugs TL2 (31) and TL6 (29) on alternator (32) with insulation washer (33), washer (34), and self-locking nut (35).

(20) Tighten self-locking nut (35) to 40 lb-in. (5 N·m).

(21) Position dust boot (30) on terminal lugs TL6 (29) and TL2 (31).

(22) Position terminal lugs TL8 (36) and TL5 (37) on alternator (32) with washer (38), lockwasher (39), and screw (40).

(23) Tighten screw (40) to 40 lb-in. (5 N·m).

(24) Connect connector P36 (41) to water temperature switch connector (42).

(25) Connect connector clamp (43) on connector P36 (41).

(26) Connect connector P37 (44) to coolant temperature light switch connector (45).

(27) Connect connector clamp (46) on connector P37 (44).
(28) Connect connector P42 (47) to ether sensor connector (48).
(29) Connect connector clamp (49) on connector P42 (47).

(30) Position terminal lug TL28 (50) on fuel shutoff solenoid (51) with lockwasher (52) and nut (53).
(31) Position terminal lugs TL66 (54) and TL29 (55) on fuel shutoff solenoid (51) with lockwasher (56) and nut (57).
(31.1) Tighten nuts (53 and 57) to 23-27 lb-in. (3 N·m).

(32) Connect connector P32 (58) to oil pressure transducer (59).
(33) Connect connector P34 (60) to oil pressure light switch connector (61).
(34) Connect connector clamp (62) on connector P34 (60).
(35) Connect connector P33 (63) to fuel/water separator connector (64).
(36) Connect connector clamp (65) on connector P33 (63).
(37) Connect connector P38 (66) to engine speed sensor connector J38 (67).

(38) Connect connector clamp (68) on connector P38 (66).

**NOTE**

Perform steps (39) and (40) on vehicles equipped with troopseats.

(39) Connect connector P39 (69) to connector J39 (70).

(40) Connect connector clamp (71) on connector P39 (69).

(41) Lower cab (TM 9-2320-365-10).

(42) Connect connector P31X (72) to connector J31X (73).

(43) Connect connector P31 (74) to connector J31 (75).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
# 7-73. FRONT INTERVEHICULAR 12 VDC (7 PIN) CABLE REPLACEMENT

This task covers:

- a. Removal
- b. Installation

## INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Materials/Parts</th>
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<tbody>
<tr>
<td>Batteries disconnected (para 7-48).</td>
<td>Ties, Cable, Plastic (Item 76, Appendix D)</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Tools and Special Tools**

- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)

### 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.

**NOTE**

Remove plastic cable ties as required.

1. Disconnect connector J52 (1) from connector P52F (2).

2. Remove two self-locking nuts (3), four washers (4), two screws (5), and front intervehicular 12vdc cable (6) from vehicle. Discard self-locking nuts.

### b. Installation.

1. Install front intervehicular 12vdc cable (6) on vehicle with two screws (5), four washers (4), and two self-locking nuts (3).

**NOTE**

Install plastic cable ties as required.

2. Connect connector J52 (1) to connector P52F (2).

End of Task.
7-74. FRONT LIGHTS CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).

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 34, Appendix C)
- Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts

- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Adhesive (Item 10, Appendix D)
- Lockwasher (3) (Item 92, Appendix G)
- Lockwasher (2) (Item 90, Appendix G)
- Adhesive (Item 9, Appendix D)

a. Removal.

NOTE

- Remove plastic cable ties as required.
- Tag wires and connection points prior to disconnecting.

1. Remove three screws (1) and washers (2) from PDP (3).

2. Remove three screws (4) from PDP (3).

3. Lift PDP (3) outward to gain access.

4. Disconnect connector P27 (5) from connector J27 (6).
(5) Loosen screw (7) and open cab step tread (8).

(6) Disconnect connector P25 (9) from connector J25 (10).

(7) Remove two screws (11) and washers (12) from front grille (13).

(8) Remove screw (14), washer (15), and front grille (13) from cab (16).

(9) Raise cab (TM 9-2320-365-10).
(10) Disconnect connectors P22 (17), P23 (18), and P24 (19) from left composite light connectors 481 (20), 461 (21), and 20 (22).

(11) Disconnect connectors P4 (23), P20 (24), and P19 (25) from headlight (26).

(12) Remove nut (27), terminal lug TL82 (28), and screw (29) from bracket (30).

(13) Remove screw (31), lockwasher (32), and terminal lugs TL79 (33), TL123 (34), and TL126 (35) from left composite light bracket (36). Discard lockwasher.
(14) Disconnect connector P17 (37) from blackout drive light (38).

(15) Remove nut (39), lockwasher (40), and terminal lug TL72 (41) from blackout drive light (38). Discard lockwasher.

(16) Disconnect connector P52F (42) from connector J52 (43).

**NOTE**

Perform step (16.1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(16.1) Remove adhesive and boot (43.1) from low pressure transmitter (44).

(17) Remove adhesive, two nuts (45), lockwashers (46), and terminal lugs TL201 (47) and TL202 (48) from low pressure transmitter (44). Discard lockwashers.
(18) Disconnect connectors P8 (49), P9 (50), and P10 (51) from right composite light connectors 20 (52), 461 (53), and 481 (54).

(19) Disconnect connectors P12 (55), P13 (56), and P14 (57) from headlight (58).

(20) Remove nut (59), screw (60), washer (61), clamp (62), and front lights cable assembly (63) from bracket (64).

(21) Remove clamp (62) from front lights cable assembly (63).
(22) Remove screw (65), lockwasher (66), and terminal lugs TL70 (67) and TL81 (68) from right composite light (69). Discard lockwasher.

(23) Disconnect connectors P5 (70) and P6 (71) from horn (72).

**NOTE**

Note routing of front lights cable prior to removal.

(24) Remove front lights cable assembly (63) from vehicle.

---

**b. Installation.**

**NOTE**

Install plastic cable ties as required.

(1) Position front lights cable assembly (1) on vehicle.

(2) Connect connectors P6 (2) and P5 (3) to horn (4).
(3) Install terminal lugs TL70 (5) and TL81 (6) on right composite light (7) with lockwasher (8) and screw (9).

(4) Install front lights cable assembly (1) on bracket (10) with clamp (11), screw (12), washer (13), and nut (14).

(5) Connect connectors P12 (15), P13 (16), and P14 (17) on headlight (18).

(6) Connect connectors P10 (19), P9 (20), and P8 (21) on right composite light connectors 481 (22), 461 (23), and 20 (24).
(7) Install terminal lugs TL202 (25) and TL201 (26) on low pressure transmitter (27) with two lockwashers (28) and nuts (29).

**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.

(8) Apply adhesive to terminal lugs TL202 (25) and TL201 (26) on low pressure transmitter (27).

(8.1) Install boot (27.1) on low pressure transmitter (27).

(8.2) Apply antiseize to holes TLR, TTR, and around edges of boot (27.1).

(9) Connect connector J52 (30) to P52F (31).
(10) Install terminal lug TL72 (32) on blackout drive light (33) with lockwasher (34) and screw (35).

(11) Connect connector P17 (36) to blackout drive light (33).

(12) Install terminal lugs TL126 (37), TL123 (38), and TL79 (39) on left composite light bracket (40) with washer (41) and screw (42).

(13) Connect connectors P19 (43), P20 (44), and P4 (45) on headlight (46).

(14) Install terminal lug TL82 (47) on bracket (48) with screw (49) and nut (50).
(15) Connect connectors P24 (51), P23 (52), and P22 (53) on left composite light connectors 20 (54), 461 (55), and 481 (56).

(16) Lower cab (TM 9-2320-365-10).

(17) Position front grille (57) on cab (58) with washer (59) and screw (60).

(18) Position two washers (61) and screws (62) in front grille (57).

(19) Tighten screw (60) to 48-60 lb-in. (5-7 N·m).

(20) Tighten two screws (62) to 24 lb-in. (3 N·m).
(21) Connect connector J25 (63) to connector P25 (64).

(22) Close cap step tread (65) and tighten screw (66).

(23) Connect connector J27 (67) to connector P27 (68).
(24) Install PDP (69) on dashboard (70) with three washers (71) and screws (72).

(25) Install three screws (73) in PDP (69).

c. Follow-On Maintenance

(1) Connect batteries (para 7-48).

(2) Start engine (TM 9-2320-365-10).

(3) Check operation of front lights, blackout drive light, horn, and windshield washer (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-75. REAR LIGHTS CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).
- Kick panel removed (para 16-3).
- Exhaust muffler removed (para 5-2).
- Bottom radiator fan shroud removed (para 6-4).

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)
- Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Lockwasher (3) (Item 102.1, Appendix G)
- Lockwasher (4) (Item 102.2, Appendix G)
- Lockwasher (5) (Item 71, Appendix G)
- Nut, Self-Locking (8) (Item 134, Appendix G)
- Nut, Self-Locking (11) (Item 116, 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.

a. Removal.

NOTE

Note routing of rear lights cable assembly and clamps prior to removal.

(1) Remove two self-locking nuts (1), clamps (2), and screws (3) from LH taillight carrier (4). Discard self-locking nuts.

(2) Remove two clamps (2) from rear lights cable assembly (5).
7-75. REAR LIGHTS CABLE ASSEMBLY REPLACEMENT (CONT)

NOTE

- Remove plastic cable ties as required.
- Tag connectors, terminal lugs, and connection points prior to disconnecting.

(3) Disconnect connectors P74 (6), P76 (7), P77 (8), and P78 (9) from left composite taillight connectors 460-461-22 (10), 24 (11), 23 (12), and 21 (13).

(4) Disconnect connector P86 (14) from LH marker light connector (15).

(5) Remove nut (16), lockwasher (17), terminal lug TL16 (18) and lockwasher (19) from LH marker light screw (20). Discard lockwashers.

(6) Remove two screws (21), lockwashers (22), left composite taillight (23), and terminal lug TL18 (24) from LH taillight carrier (4). Discard lockwashers.
(7) Disconnect connector P87 (25) from backup light connector (26).

(8) Remove two screws (27), lockwashers (28), backup light (29), and terminal lug TL17 (30) from LH taillight carrier (4). Discard lockwashers.

(9) Pull rear lights cable assembly (5) through left frame rail (31).

(10) Remove self-locking nut (47), clamp (48), and screw (49) from RH taillight carrier (50). Discard self-locking nut.

(11) Remove clamp (48) from rear lights cable assembly (5).

(12) Remove two self-locking nuts (47), clamps (48), and screws (49) from RH taillight carrier (50). Discard self-locking nuts.

(13) Remove two clamps (48) from rear lights cable assembly (5).

NOTE
Perform steps (10) and (11) on vehicles equipped with SRW.

Perform steps (12) and (13) on vehicles not equipped with SRW.
(14) Disconnect connectors P61 (51), P62 (52), P63 (53), and P64 (54) from right composite taillight connectors 460-461-22 (55), 24 (56), 23 (57), and 21 (58).

(15) Disconnect connector P89 (59) from RH marker light connector (60).

(16) Remove nut (61), lockwasher (62), terminal lug TL20 (63), and lockwasher (64) from RH marker light screw (65). Discard lockwashers.

(17) Remove two screws (66), lockwashers (67), right composite taillight (68), and terminal lug TL21 (69) from RH taillight carrier (50). Discard lockwashers.

(18) Pull rear lights cable assembly (5) through right frame rail (70).
(19) Disconnect connectors P54 (86), P56 (87), and P58 (88) from rear marker light connectors (89).

(20) Remove three nuts (90), lockwashers (91), terminal lugs TL30 (92), TL31 (93), TL32 (94), and three lockwashers (95) from rear marker light screws (96). Discard lockwashers.

(21) Disconnect connector clamp (98.1) from connector P52R (97).

(22) Disconnect connector P52R (97) from J52 (98).
(23) Remove two self-locking nuts (100.3), screws (99), washers (100), and clamps (100.1) from brackets (100.2). Discard self-locking nuts.

(24) Remove clamps (100.1) from rear lights cable assembly (5).

(25) Remove self-locking nut (101), washer (102), terminal lug TL93 (103), and washer (104) from left frame rail (31). Discard self-locking nut.

(26) Disconnect connector clamp (106) from connector P53R (105).

(27) Disconnect connector P53R (105) from J53 (107).
NOTE

- Steps (28) and (29) require the aid of an assistant.
- Other hoses, cable assemblies, and terminal lugs are removed with clamps.

(28) Remove self-locking nut (109), clamp (111), and terminal lug TL92 (112) from right frame rail stud (110). Discard self-locking nut.

(29) Remove clamp (111) from rear lights cable assembly (5).

(30) Remove self-locking nut (113), screw (114), clamp (115), and rear lights cable assembly (5) from bracket (116). Discard self-locking nut.

(31) Remove clamp (115) from rear lights cable assembly (5).

NOTE

Steps (32) and (33) require the aid of an assistant.

(32) Remove two self-locking nuts (117), screws (118), clamps (119), and rear lights cable assembly (5) from right frame rail (70). Discard self-locking nuts.

(33) Remove two clamps (119) from rear lights cable assembly (5).
(34) Remove two self-locking nuts (120), screws (121), clamps (122) and rear lights cable assembly (5) from exhaust muffler mounting brackets (123). Discard self-locking nuts.

(35) Remove two clamps (122) from rear lights cable assembly (5).

(36) Remove self-locking nut (124), screw (125), clamp (126), and rear lights cable assembly (5) from right frame rail (70). Discard self-locking nut.

(37) Remove clamp (126) from rear lights cable assembly (5).

(38) Remove self-locking nut (127), screw (128), clamp (129), and rear lights cable assembly (5) from right frame rail (70). Discard self-locking nut.

(39) Remove clamp (129) from rear lights cable assembly (5).

NOTE
Steps (36) through (39) require the aid of an assistant.
(40) Remove two screws (130) and washers (131) from front grille (132).

(41) Remove screw (133), washer (134), and front grille (132) from cab (135).

(42) Remove three screws (136) and washers (137) from PDP (138).

(43) Remove three screws (139) from PDP (138).

(44) Lift PDP (138) outward to gain access.

(45) Disconnect connector P51 (140) from connector J51 (141).

(46) Remove rear lights cable assembly (5) from dashboard (142).
7-75. REAR LIGHTS CABLE ASSEMBLY REPLACEMENT (CONT)

(47) Raise cab (TM 9-2320-365-10).

(48) Remove self-locking nut (136), clamp (144), and screw (145) from right frame rail (70). Discard self-locking nut.

(49) Remove clamp (144) from rear lights cable assembly (5).

(50) Remove self-locking nut (146), clamps (147 and 148), and screw (149) from right frame rail (70). Discard self-locking nut.

(51) Remove clamp (147) from rear lights cable assembly (5).

(52) Remove grommet (150) from cab (135).

(53) Remove rear lights cable assembly (5) from grommet (150).

(54) Lower cab (TM 9-23220-366-10-1).

(55) Remove rear lights cable assembly (5) from vehicle.
b. Installation.

NOTE

Install plastic cable ties as required.

(1) Position rear lights cable assembly (1) on vehicle.

(2) Raise cab (TM 9-2320-365-10).

(3) Position rear lights cable assembly (1) in grommet (2).

(4) Install grommet (2) in cab (3).

(5) Position rear lights cable assembly (1) in clamp (4).

(6) Position clamp (4) on right frame rail (5) with screw (6), clamp (7), and self-locking nut (8).

(7) Tighten self-locking nut (8) to 84-108 lb-in. (10-12 N·m).

(8) Position rear lights cable assembly (1) in clamp (9).

(9) Position clamp (9) on right frame rail (5) with screw (10) and self-locking nut (11).

(10) Tighten self-locking nut (11) to 84-108 lb-in. (10-12 N·m).

(11) Lower cab (TM 9-2320-366-10-1).
(12) Position rear lights cable assembly (1) in dashboard (12).

(13) Connect connector P51 (13) to connector J51 (14).

(14) Install PDP (15) in dashboard (12) with three screws (16).

(15) Install three washers (17) and screws (18) in PDP (15).

(16) Position grille (19) on cab (3) with washer (20) and screw (21).

(17) Position two washers (22) and screws (23) in grille (19).

(18) Tighten screw (21) to 48-60 lb-in. (5-7 N·m).

(19) Tighten two screws (23) to 24 lb-in. (3 N·m).
NOTE

- Other hoses, cable assemblies, and terminal lugs are installed with clamps.
- Steps (20) through (25) require the aid of an assistant.

(20) Position rear lights cable assembly (1) in clamp (24).

(21) Position clamp (24) on right frame rail (5) with screw (25) and self-locking nut (26).

(22) Tighten self-locking nut (26) to 84-108 lb-in. (10-12 N·m).

(23) Position rear lights cable assembly (1) in clamp (27).

(24) Position clamp (27) on right frame rail (5) with screw (28) and self-locking nut (29).

(25) Tighten self-locking nut (29) to 84-108 lb-in. (10-12 N·m).

(26) Position rear lights cable assembly (1) in two clamps (30).

(27) Position two clamps (30) on exhaust muffler mounting brackets (31) with screws (32) and self-locking nuts (33).

(28) Tighten two self-locking nuts (33) to 84-108 lb-in. (10-12 N·m).
7-75. REAR LIGHTS CABLE ASSEMBLY REPLACEMENT (CONT)

NOTE

Steps (29) through (31) require the aid of an assistant.

(29) Position rear lights cable assembly (1) in two clamps (34).

(30) Position two clamps (34) on right frame rail (5) with two screws (35) and self-locking nuts (36).

(31) Tighten two self-locking nuts (36) to 84-108 lb-in. (10-12 N·m).

(32) Position rear lights cable assembly (1) in clamp (37).

(33) Position clamp (37) on bracket (38) with screw (39) and self-locking nut (40).

(34) Tighten self-locking nut (40) to 84-108 lb-in. (10-12 N·m).

NOTE

Steps (35) through (37) require the aid of an assistant.

(35) Position rear lights cable assembly (1) in clamp (41).

(36) Position clamp (41) and terminal lug TL92 (42) on right frame rail stud (43) with self-locking nut (44).

(37) Tighten self-locking nut (44) to 84-108 lb-in. (10-12 N·m).
(38) Connect connector P53R (45) to connector P53 (46).

(39) Connect connector clamp (47) to connector P53R (45).

(40) Position washer (49) and terminal lug TL93 (50) on left frame rail (51) with washer (52) and with self-locking nut (53).

(41) Tighten self-locking nut (53) to 60-72 lb-in. (7-8 N·m).

(42) Position two clamps (53.1) on rear lights cable assembly (1).

(43) Position two washers (53.2) and clamps (53.1) on brackets (54) with screws (55) and self-locking nuts (55.1).

(44) Tighten self-locking nuts (55.1) to 84-108 lb-in. (10-12 N·m).
7-75. REAR LIGHTS CABLE ASSEMBLY REPLACEMENT (CONT)

(45) Connect connector P52R (56) to connector J52 (57).

(46) Connect connector clamp (57.1) to connector P52R (56).

(47) Install lockwashers (58), and terminal lugs TL32 (59), TL31 (60), TL30 (61) on three rear marker light screws (62) with lockwashers (63) and nuts (64).

(48) Connect connectors P58 (65), P56 (66), and P54 (67) to three rear marker light connectors (68).
NOTE

Perform steps (49) through (59) on vehicles equipped with one marker light on RH taillight carrier.

(49) Route rear lights cable assembly (1) through right frame rail (5).

(50) Install terminal lug TL21 (69) and right composite taillight (70) on RH taillight carrier (71) with two lockwashers (72) and screws (73).

(51) Install lockwasher (74) and terminal lug TL20 (75) on RH marker light screw (76) with lockwasher (77) and nut (78).

(52) Connect connector P89 (79) to RH marker light connector (80).

(53) Connect connectors P64 (81), P63 (82), P62 (83) and P61 (84) to right composite taillight connectors 21 (85), 23 (86), 24 (87), and 460-461-22 (88).
NOTE
Perform steps (54) through (56) on vehicles equipped with SRW.

(54) Install rear lights cable assembly (1) in clamp (89).

(55) Position screw (90) and clamp (89) on RH taillight carrier (71) with self-locking nut (91).

(56) Tighten self-locking nut (91) to 84-108 lb-in. (10-12 N·m).

NOTE
Perform steps (57) through (59) on vehicles not equipped with SRW.

(57) Install rear lights cable assembly (1) in two clamps (89).

(58) Position two screws (90) and clamps (89) on RH taillight carrier (71) with two self-locking nuts (91).

(59) Tighten two self-locking nuts (91) to 84-108 lb-in. (10-12 N·m).

(60) Route rear lights cable assembly (1) through left frame rail (51).

(61) Install terminal lug TL17 (107) and backup light (108) on LH taillight carrier (109) with two lockwashers (110) and screws (111).

(62) Connect connector P87 (112) to backup light connector (113).
(63) Install terminal lug TL18 (114) and left composite taillight (115) on LH taillight carrier (109) with two lockwashers (116) and screws (117).

(64) Install lockwasher (118) and terminal lug TL16 (119) on LH rear marker light screw (120) with lockwasher (121) and nut (122).

(65) Connect connector P86 (123) to LH rear marker light connector (124).

(66) Connect connector P78 (125), P77 (126), P76 (127), and P74 (128) to left composite taillight connectors 21 (129), 23 (130), 24 (131), and 460-461-22 (132).
(67) Install rear lights cable assembly (1) in two clamps (133).

(68) Position two screws (134) and clamps (133) on LH taillight carrier (109) with two self-locking nuts (135).

(69) Tighten two self-locking nuts (135) to 84-108 lb-in. (10-12 N·m).

c. Follow-On Maintenance.

(1) Install bottom radiator fan shroud (para 6-4).

(2) Install exhaust muffler (para 5-2).

(3) Install kick panel (para 16-3).

(4) Connect batteries (para 7-48).

(5) Start engine (TM 9-2320-365-10).

(6) Check operation of rear lights (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
# 7-76. POWER DISTRIBUTION PANEL (PDP) TO CAB GROUND CABLE REPLACEMENT

This task covers:

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## INITIAL SETUP

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## a. Removal

1. Remove three screws (1) and washers (2) from PDP (3).
2. Remove three screws (4) from PDP (3).
3. Lift PDP (3) outward to gain access.

**NOTE**

Remove plastic cable ties as required.

4. Remove screw (5), lockwasher (6), terminal lug TL56 (7), and wire 1623 (8) from PDP (3). Discard lockwasher.
5. Remove nut (9), lockwasher (10), and terminal lug TL57 (11) from grounding stud (12). Discard lockwasher.
6. Remove PDP to cab ground cable (13) from vehicle.
b. Installation.

**NOTE**

Install plastic cable ties as required.

1. Install terminal lug TL57 (1) on grounding stud (2) with lockwasher (3) and nut (4).

2. Install wire 1623 (5) and terminal lug TL56 (6) on PDP (7) with lockwasher (8) and screw (9).

3. Install PDP (7) on dashboard (10) with three screws (11).

4. Install three washers (12) and screws (13) in PDP (7).

---

c. Follow-On Maintenance.

1. Install PDP cover (para 16-2).

2. Connect batteries (para 7-48).


5. Shut down engine (TM 9-2320-365-10).

**End of Task.**
7-77. POWER TAKE-OFF (PTO) CABLE ASSEMBLY REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Batteries disconnected (para 7-63).
- Kick panel removed (para 16-3).

Tools and Special Tools

- Goggles, Industrial (Item 15, Appendix C)
- 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

- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Nut, Self-Locking (5) (Item 134, 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.

a. Removal.

NOTE

- Tag connectors and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(1) Disconnect connector P217 (1) from PTO solenoid connector (2).

(2) Disconnect connector P216 (3) from PTO pressure switch connector (4).
(3) Remove self-locking nut (5) and terminal lug TL76 (6) from screw (7). Discard self-locking nut.

(4) Remove self-locking nut (8), clamp (9), and screw (10) from bracket (11). Discard self-locking nut.

(5) Remove PTO cable assembly (12) from clamp (9).

(6) Remove self-locking nut (13), clamp (14), and terminal lugs TL83 (15), TL111 (16), and TL320 (17) from screw (18). Discard self-locking nut.

(7) Remove PTO cable assembly (12) from clamp (14).

(8) Disconnect connector clamp (19) from connector P215 (20).

(9) Disconnect connector P215 (20) from connector J215 (21).
(10) Remove self-locking nut (22), clamp (23), and screw (24) from frame rail (25). Discard self-locking nut.

(11) Remove PTO cable assembly (12) from clamp (23).

(12) Remove self-locking nut (26), clamp (27), screw (28), and clamp (29) from frame rail (25). Discard self-locking nut.

(13) Remove PTO cable assembly (12) from clamp (27).

(14) Disconnect connector P210 (30) from connector J210 (31).

(15) Remove PTO cable assembly (12) from cab (32).
b. Installation.

**NOTE**

Install plastic cable ties as required.

1. Position PTO cable assembly (1) in cab (2).

2. Connect connector J210 (3) to connector P210 (4).

3. Position PTO cable assembly (1) in clamp (5).

4. Position clamp (5) and clamp (6) on frame rail (7) with screw (8) and self-locking nut (9).

5. Tighten self-locking nut (9) to 84-108 lb-in. (10-12 N·m).

6. Position PTO cable assembly (1) in clamp (10).

7. Position clamp (10) on frame rail (7) with screw (11) and self-locking nut (12).

8. Tighten self-locking nut (12) to 84-108 lb-in. (10-12 N·m).
(9) Connect connector J215 (13) to connector P215 (14).

(10) Connect connector clamp (15) on connector P215 (14).

(11) Position PTO cable assembly (1) in clamp (16).

(12) Position terminal lugs TL320 (17), TL111 (18), TL83 (19), and clamp (16) on screw (20) with self-locking nut (21).

(13) Tighten self-locking nut (21) to 97-120 lb-in. (11-14 N·m).

(14) Position PTO cable assembly (1) in clamp (22).

(15) Position clamp (22) on bracket (23) with screw (24) and self-locking nut (25).

(16) Tighten self-locking nut (25) to 84-108 lb-in. (10-12 N·m).
(17) Position terminal lug TL76 (26) on screw (27) with self-locking nut (28).

(18) Tighten self-locking nut (28) to 84-108 lb-in. (10-12 N·m).

(19) Connector P216 (29) to PTO pressure switch (30).

(20) Connect connector P217 (31) to PTO solenoid (32).

c. Follow-On Maintenance.

(1) Install kick panel (para 16-3).

(2) Connect batteries (para 7-48).

(3) Operate PTO and check for proper operation (TM 9-2320-365-10).

(4) Operate 11K SRW and check for proper operation (TM 9-2320-365-10).

End of Task.
7-78. REAR INTERVEHICULAR 12 VDC (7 PIN) CABLE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

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

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)
Nut, Self-Locking (2) (Item 116, 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.

a. Removal.

NOTE
Remove plastic cable ties as required.

(1) Disconnect connector J52 (1) from connector P52R (2).

(2) Remove two self-locking nuts (3), screws (4), washers (5), and rear intervehicular 12 vdc (7 pin) cable (6) from vehicle. Discard self-locking nuts.
b. Installation.

(1) Install rear intervehicular 12 vdc (7 pin) cable (1) in vehicle with two washers (2), screws (3), and self-locking nuts (4).

NOTE
Install plastic cable ties as required.

(2) Connect connector J52 (5) to connector P52R (6).

c. Follow-On Maintenance.

Connect batteries (para 7-48).

End of Task.
This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).

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

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (4) (Item 102.2, Appendix G).

a. Removal.

NOTE
- Note position of cover hinge and cable key prior to removal.
- Remove plastic cable ties as required.

(1) Disconnect connector J53 (1) from connector P53R (2).

(2) Remove four nuts (3), lockwashers (4), screws (5), and rear intervehicular 24 vdc cable (6) from vehicle. Discard self-locking nuts.

b. Installation.

NOTE
- Cover will hinge and cable keying will be at 12 o’clock position.
- Install plastic cable ties as required.

(1) Install rear intervehicular 24 vdc cable (6) on vehicle with four screws (5), lockwashers (4), and nuts (3).

(2) Connect connector J53 (1) to connector P53R (2).

c. Follow-On Maintenance.
Connect batteries (para 7-48).
End of Task.

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
- Cover will hinge and cable keying will be at 12 o’clock position.
- Install plastic cable ties as required.

(1) Cover will hinge and cable keying will be at 12 o’clock position.
(2) Install plastic cable ties as required.
This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Batteries disconnected (para 7-48).
- PDP cover removed (para 16-2).
- Spare tire lowered (TM 9-2320-365-10).
- Lower radiator fan shroud removed (para 6-4).

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 34, Appendix C)

Materials/Parts
- Ties, Cable, Plastic (Item 76, Appendix D)
- Nut, Self-Locking (2) (Item 137, Appendix G)
- Lockwasher (Item 92, Appendix G)
- Lockwasher (Item 74, Appendix G)

a. Removal.

1. Remove three screws (1) and washers (2) from PDP (3).
2. Remove three screws (4) from PDP (3).
3. Lift PDP (3) outward to gain access.

NOTE

Remove plastic cable ties as required.

4. Remove screw (5), lockwasher (6), terminal lug TL41 (7), and four terminal lugs (8) from PDP (3). Discard lockwasher.
5. Position four terminal lugs (8) on PDP (3) with screw (5).
(6) Loosen clamp (9) on air compressor intake hose (10).

(7) Remove air compressor intake hose (10) from intake air cleaner boot (11).

(8) Loosen clamp (12) on intake air cleaner boot (11).

(9) Remove intake air cleaner boot (11) from intake air cleaner housing (13).

(10) Lift dust boot (14) on terminal lug TL80 (15).

(11) Remove nut (16), lockwasher (17), and terminal lug TL80 (15) from 100 amp reverse polarity relay 12 vdc terminal (18). Discard lockwasher.

(12) Remove spring pin (19) and suspension compression plate (20) from suspension compression plate stud (21).
(13) Loosen two screws (22) in heat shield assembly (23).

(14) Remove 100 amp reverse polarity relay to PDP 12 vdc cable (24) from heat shield assembly (23).

(15) Remove self-locking nut (25), screw (26), clamp (27), and 100 amp reverse polarity relay to PDP 12 vdc cable (24) from frame rail (28). Discard self-locking nut.

(16) Remove 100 amp reverse polarity relay to PDP 12 vdc cable (24) from clamp (27).

(17) Raise cab (TM 9-2320-365-10).

(18) Remove self-locking nut (29), washer (30), screw (31), and washer (32) from clamps (33 and 34).

(19) Remove 100 amp reverse polarity relay to PDP 12 vdc cable (24) from clamp (33).

(20) Remove 100 amp reverse polarity relay to PDP 12 vdc cable (24) from cab (35).
b. Installation.

NOTE

Install plastic cable ties as required.

(1) Route 100 amp reverse polarity relay to PDP 12 vdc cable (1) through bottom of cab (2).

(2) Position 100 amp reverse polarity relay to PDP 12 vdc cable (1) in clamp (3).

(3) Position clamps (3 and 4) on frame rail (5) with washer (6), screw (7), washer (8), and self-locking nut (9).

(4) Tighten self-locking nut (9) to 97-120 lb-in. (11-14 N·m).

(5) Position 100 amp reverse polarity relay to PDP 12 vdc cable (1) in clamp (10).

(6) Position clamp (10) on frame rail (5) with screw (11), and self-locking nut (12).

(7) Tighten self-locking nut (12) to 97-120 lb-in. (11-14 N·m).

(8) Tighten two screws (13) in heat shield assembly (14).
(9) Install suspension compression plate (15) on suspension compression plate stud (16) with spring pin (17).

(10) Install terminal lug TL80 (18) on 100 amp reverse polarity relay 12 vdc terminal (19) with lockwasher (20) and nut (21).

(11) Position dust boot (22) on terminal lug TL80 (18).

(12) Position intake air cleaner boot (23) on intake air cleaner housing (24) with clamp (25).

(13) Tighten clamp (25) to 36-48 lb-in. (4-5 N·m).

(14) Position air compressor intake hose (26) on intake air cleaner boot (23) with clamp (27).

(15) Tighten clamp (25) to 36-48 lb-in. (4-5 N·m).

(16) Lower cab (TM 9-2320-365-10).
(17) Remove screw (28) from PDP (29).

(18) Position four terminal lugs (30) and terminal lug TL41 (31) on PDP (29) with lockwasher (32) and screw (28).

(19) Tighten screw (28) to 35-45 lb-in. (4-5 N·m).

(20) Install PDP (29) on dashboard (33) with three screws (34).

(21) Install three washers (35) and screws (36) in PDP (29).

c. Follow-On Maintenance.

(1) Install PDP cover (para 16-2).

(2) Install lower radiator fan shroud (para 6-4).

(3) Connect batteries (para 7-48).

(4) Raise spare tire (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
7-81. 100 AMP REVERSE POLARITY RELAY TO POWER DISTRIBUTION PANEL (PDP) 24 VDC CABLE REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).  
PDP cover removed (para 16-2).  
Spare tire lowered (TM 9-2320-365-10).  
Bottom radiator fan shroud removed (para 6-4).  
Cab lowered (TM 9-2320-365-10).

Materials/Parts
Ties, Cable, Plastic (Item 76, Appendix D)  
Nut, Self-Locking (2) (Item 133, Appendix G)  
Lockwasher (Item 89, Appendix G)  
Lockwasher (Item 70, Appendix G)

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 34, Appendix C)

a. Removal.

(1) Remove three screws (1) and washers (2) from PDP (3).

(2) Remove three screws (4) from PDP (3).

(3) Lift PDP (3) outward to gain access.

NOTE
Remove plastic cable ties as required.

(4) Remove screw (5), lockwasher (6), terminal lug TL42 (7), and four terminal lugs (8) from PDP (3). Discard lockwasher.

(5) Position four terminal lugs (8) on PDP (3) with screw (5).
(6) Loosen clamp (9) on air compressor intake hose (10).

(7) Remove air compressor intake hose (10) from intake air cleaner boot (11).

(8) Loosen clamp (12) on intake air cleaner boot (11).

(9) Remove intake air cleaner boot (11) from intake air cleaner housing (13).

(10) Lift dust boot (14) on terminal lug TL44 (15).

(11) Remove nut (16), lockwasher (17), and terminal lug TL44 (15) from 100 amp reverse polarity relay 24 vdc terminal (18). Discard lockwasher.

**NOTE**
Perform step (12) on M1079.

(12) Remove terminal lug TL100 (19) from 100 amp reverse polarity relay 24 vdc terminal (18).

(13) Raise cab (TM 9-2320-365-10).

(14) Remove spring pin (20) and suspension compression plate (21) from suspension compression plate stud (22).
(15) Remove self-locking nut (23), screw (24), clamp (25), and 100 amp reverse polarity relay to PDP 24 vdc cable (26) from frame rail (27). Discard self-locking nut.

(16) Remove 100 amp reverse polarity relay to PDP 24 vdc cable (26) from clamp (25).

(17) Remove self-locking nut (28), washer (29), screw (30), and washer (31) from clamps (32 and 33). Discard self-locking nut.

(18) Remove 100 amp reverse polarity relay to PDP 24 vdc cable (26) from clamp (32).

(19) Remove 100 amp reverse polarity relay to PDP 24 vdc cable (26) from cab (34).
b. Installation.

**NOTE**

Install plastic cable ties as required.

(1) Position 100 amp reverse polarity relay to PDP 24 vdc cable (1) through bottom of cab (2).

(2) Position 100 amp reverse polarity relay to PDP 24 vdc cable (1) in clamp (3).

(3) Position clamps (3 and 4) on frame rail (5) with washer (6), screw (7), washer (8), and self-locking nut (9).

(4) Tighten self-locking nut (9) to 97-120 lb-in. (11-14 N·m).

(5) Position 100 amp reverse polarity relay to PDP 24 vdc cable (1) in clamp (10).

(6) Position clamp (10) on frame rail (5) with screw (11) and self-locking nut (12).

(6) Tighten self-locking nut (12) to 97-120 lb-in. (11-14 N·m).
(8) Install suspension compression plate (13) on suspension compression plate stud (14) with spring pin (15).

NOTE
Perform step (9) on M1079.

(9) Install terminal lug TL100 (16) on 100 amp reverse polarity relay 24 vdc terminal (17).

(10) Install terminal lug TL44 (18) on 100 amp reverse polarity relay 24 vdc terminal (17) with lockwasher (19) and nut (20).

(11) Position dust boot (21) on terminal lug TL44 (18).
(12) Position intake air cleaner boot (22) on intake air cleaner housing (23) with clamp (24).

(13) Position air compressor intake hose (25) on intake air cleaner boot (22) with clamp (26).

(14) Tighten clamps (24 and 26) to 36-48 lb-in. (4-5 N·m).

(15) Lower cab (TM 9-2320-365-10).

(16) Remove screw (27) from PDP (28).

(17) Position four terminal lugs (29) and terminal lug TL42 (30) on PDP (28) with lockwasher (31) and screw (27).

(18) Tighten screw (27) to 35-45 lb-in. (4-5 N·m).

(19) Install PDP (28) on dashboard (32) with three screws (33).

(20) Install three washers (34) and screws (35) in PDP (28).
c. Follow-On Maintenance.

(1) Install bottom radiator fan shroud (para 6-4).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Install PDP cover (para 16-2).

(4) Connect batteries (para 7-48).

(5) Start engine (TM 9-2320-365-10).

(6) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.
### 7-82. START AND CHARGING CABLE ASSEMBLY REPLACEMENT

This task covers:

| a. Removal                  | b. Installation                | c. Follow-On Maintenance |

#### INITIAL SETUP

**Equipment Conditions**
- Spare tire lowered (TM 9-2320-365-10).
- Batteries disconnected (para 7-48).
- Instrument panel assembly removed for access (para 7-15).

**Tools and Special Tools**
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Socket Set, Socket Wrench (Item 34, Appendix C)
- Heater, Gun Type, Electric (Item 20, Appendix B)

**Materials/Parts**
- Ties, Cable, Plastic (Item 76, Appendix D)
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Nut, Self-Locking (7) (Item 116, Appendix G)
- Nut, Self-Locking (Item 134, Appendix G)
- Nut, Self-Locking (Item 137, Appendix G)
- Lockwasher (Item 92, Appendix G)
- Lockwasher (3) (Item 78, Appendix G)
- Lockwasher (2) (Item 82, Appendix G)
- Adhesive (Item 8, Appendix D)
- Splice, Conductor (Item 261, Appendix G)
- Tape, Insulation, Electrical (Item 75, Appendix D)
- Insulation, Sleeving, Electrical (Item 30.1, Appendix G)

**Personnel Required**
- (2)

#### a. Removal.

**NOTE**
- Remove plastic cable ties as required.
- Tag connectors and connection points prior to disconnecting.

1. Disconnect connector P43 (1) from connector J43 (2).
2. Position connector P43 (1) through bottom of dashboard (3).
3. Disconnect connector P43X (4) from connector J43X (5).
4. Position connector P43X (4) through side of dashboard (3).
(5) Raise cab (TM 9-2320-365-10).

(6) Remove grommet (6) from cab (7).

(7) Remove start and charging cable assembly (8) from grommet (6).

(8) Disconnect connector clamp (9) from fuel sending unit connector J82 (10).

(9) Disconnect connector P82 (11) from fuel sender unit connector J82 (10).

(10) Remove self-locking nut (12), screw (13), and clamp (14) from bracket (15). Discard self-locking nut.

(11) Remove start and charging cable assembly (8) from clamp (14).
(12) Remove self-locking nut (16), clamp (17), and terminal lug TL83 (18) from screw (19). Discard self-locking nut.

NOTE

Perform step (13) on vehicles equipped with PTO.

(13) Remove terminal lug TL11 (20) from screw (19).

(14) Deleted.

NOTE

Perform step (15) on vehicles equipped with 11K SRW.

(15) Remove terminal lug TL320 (21) from screw (19).

(16) Disconnect connector clamp (22) from connector P93 (23).

(17) Disconnect connector J93 (24) from connector P93 (23).

(18) Remove self-locking nut (25), washer (25.1), screw (26), and terminal lug TL84 (27) from bracket (28). Discard self-locking nut.
(19) Disconnect connector P84 (29) from wet tank air pressure switch J84 (30).

(20) Disconnect connector P80 (31) from air dryer connector J80 (32).

(21) Remove self-locking nut (33), clamp (34), and terminal lug TL85 (35) from screw (36). Discard self-locking nut.

(22) Deleted.
(23) Remove dust cap (39) from connector J106 (40).

(24) Remove nut (41), dust cap lanyard (42), and connector J106 (40) from chemical detector mounting bracket (43).

(25) Remove screw (44), washer (45), and terminal lug TL51 (46) from upper shunt terminal (47).

(26) Remove screw (48), washer (49), and terminal lug TL38 (50) from lower shunt terminal (51).

NOTE

Perform steps (27) and (28) on vehicles equipped with 100 amp alternator.

(27) Lift terminal cover (52) on terminal lug TL36 (53).

(28) Remove nut (54), lockwasher (55), and terminal lug TL36 (53) from reverse polarity relay 24 VDC BAT terminal (56). Discard lockwasher.
NOTE

Perform step (29) on vehicles equipped with 200 amp alternator.

(29) Remove nut (57), lockwasher (58), washer (59), and terminal lug TL36 (53) from 200 amp terminal block terminal (60). Discard lockwasher.

(30) Remove adhesive, two nuts (61), lockwashers (62), and terminal lugs TL23 (63) and TL33 (64) from auxiliary starter solenoid (65). Discard lockwashers.

(31) Remove adhesive, two nuts (66), lockwashers (67), and terminal lugs TL24 (68) and TL9 (69) from auxiliary starter solenoid (65). Discard lockwashers.
NOTE

- Other terminal lugs may also need to be removed.

- Perform step (32) on vehicles that have not had connector P81 removed.

(32) Disconnect connector P81 (70) from starting motor connector (71).

(33) Remove adhesive, nut (72), and terminal lugs TL53 (73) and TL25 (74) from starting motor terminal (75).

(34) Remove adhesive, nut (76), and terminal lug TL26 (77) from starter solenoid terminal (78).

(35) Remove adhesive, nut (79), and terminal lug TL55 (80) from starter solenoid terminal (81).
7-82. START AND CHARGING CABLE ASSEMBLY REPLACEMENT (CONT)

**NOTE**

- All five clamps are removed the same way.
  One shown.
- Step (36) requires the aid of an assistant.

(36) Remove self-locking nut (82), screw (83), and clamp (84) from frame rail (85). Discard self-locking nut.

(37) Remove start and charging cable assembly (8) from clamp (84).

(38) Perform steps (36) and (37) on remaining four clamps.

(39) Remove start and charging cable assembly (8) from vehicle.

**b. Installation.**

**NOTE**

Install plastic cable ties as required.

(1) Position start and charging cable assembly (1) on vehicle.

**NOTE**

All five clamps are installed the same way.
One shown.

(2) Position start and charging cable assembly (1) in clamp (2).

**NOTE**

Steps (3) and (4) require the aid of an assistant.

(3) Position clamp (2) on frame rail (3) with screw (4) and self-locking nut (5).

(4) Tighten self-locking nut (5) to 120-144 lb-in. (14-16 N·m).

(5) Perform steps (2) through (4) on remaining four clamps.
(6) Position terminal lug TL55 (6) on starter solenoid terminal (7) with nut (8).

(7) Tighten nut (8) to 30 lb-ft (41 N·m).

(8) Position terminal lug TL26 (9) on starter solenoid terminal (10) with nut (11).

(9) Tighten nut (11) to 31 lb-in. (4 N·m).

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.

(10) Apply adhesive to nuts (8 and 11).

(11) Position terminal lugs TL25 (12) and TL53 (13) on starting motor terminal (14) with nut (15).

(12) Tighten nut (15) to 33-37 lb-ft (45-50 N·m).

(13) Apply adhesive to terminal lugs TL25 (12) and TL53 (13) and starting motor terminal (14).
7-82. START AND CHARGING CABLE ASSEMBLY REPLACEMENT (CONT)

NOTE
Perform steps (13.1) through (14) on start and charging cable assemblies equipped with P81 connector.

(13.1) Cut connector P81 (16) from start and charging cable assembly (1).

(13.2) Remove band marker (17) from start and charging cable assembly (1).

NOTE
Remove electrical tape and insulation sleeving as required.

(13.3) Remove convoluted tubing (17.1) from two wires (17.2 and 17.3).

NOTE
Measure wires from body of start and charging cable assembly.

(13.4) Cut wire (17.2) to 3 in. (7.6 cm) in length.

(13.5) Cut wire (17.3) to 4 in. (10.2 cm) in length.

(13.6) Remove 0.38 in. (1 cm) of insulation from two wires (17.2 and 17.3).

(13.7) Cut insulation sleeving (17.4) 1.5 in. (3.8 cm).

(13.8) Position insulation sleeving (17.4) on wire (17.3).

(13.9) Install conductor splice (17.5) on two wires (17.2 and 17.3).

(13.10) Install insulation sleeving (17.4) on conductor splice (17.5).

NOTE
Install electrical tape as required.

(14) Install convoluted tubing (17.1) on two wires (17.2 and 17.3).
(15) Install terminal lugs TL9 (18) and TL24 (19) on auxiliary starter solenoid (20) with two lockwashers (21) and nuts (22).
(16) Install terminal lugs TL33 (23) and TL23 (24) on auxiliary starter solenoid (20) with two lockwashers (25) and nuts (26).

**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.

(17) Apply adhesive to nuts (22 and 26).

**NOTE**

Perform steps (18) and (19) on vehicles equipped with 200 amp alternator.

(18) Install terminal lug TL36 (27) on 200 amp terminal block terminal (28) with washer (29), lockwasher (30), and nut (31).

(19) Tighten nut (31) to 16-18 lb-ft (21-25 N·m).
NOTE

Perform steps (20) and (21) on vehicles equipped with 100 amp alternator.

(20) Install terminal lug TL36 (32) on reverse polarity relay 24 VDC BAT terminal (33) with lockwasher (34) and nut (35).

(21) Position terminal cover (36) on terminal lug TL36 (32).

(22) Install terminal lug TL38 (37) on lower shunt terminal (38) with washer (39) and screw (40).

(23) Install terminal lug TL51 (41) on upper shunt terminal (42) with washer (43) and screw (44).

(24) Install connector J106 (45) on chemical detector mounting bracket (46) with dust cap lanyard (47) and nut (48).

(25) Install dust cap (49) on connector J106 (45).
(26) Deleted.

(27) Position terminal lug TL85 (53) and clamp (54) on screw (52) with self-locking nut (55).

(28) Tighten self-locking nut (55) to 120-144 lb-in. (14-16 N·m).

(29) Connect connector P80 (56) to air dryer connector J80 (57).

(30) Connect connector P84 (58) to wet tank air pressure switch J84 (59).
(31) Position terminal lug TL84 (60) on bracket (61) with screw (62), washer (62.1) and self-locking nut (63).

(32) Tighten self-locking nut (63) to 25-31 lb-ft (34-42 N·m).

(33) Connect connector J93 (64) to connector P93 (65).

(34) Connect connector clamp (66) on connector P93 (65).

**NOTE**
Perform step (35) on vehicles equipped with 11K SRW.

(35) Position terminal lug TL320 (67) on screw (68).

(36) Deleted.

**NOTE**
Perform step (37) on vehicles equipped with PTO.

(37) Position terminal lug TL111 (69) on screw (68).

(38) Position terminal lug TL83 (70) and clamp (71) on screw (68) with self-locking nut (72).

(39) Tighten self-locking nut (72) to 97-120 lb-in. (11-14 N·m).
(40) Position start and charging cable assembly (1) in clamp (73).

(41) Position clamp (73) on bracket (74) with screw (75) and self-locking nut (76).

(42) Tighten self-locking nut (76) to 120-144 lb-in. (14-16 N·m).

(43) Connect connector P82 (77) to connector J82 (78).

(44) Connect connector clamp (79) on connector J82 (78).

(45) Install start and charging cable assembly (1) in grommet (80).

(46) Install grommet (80) in cab (81).

(47) Lower cab (TM 9-2320-365-10).
(48) Route connector P43X (82) through side of dashboard (83).

(49) Connect connector P43X (82) to connector J43X (84).

(50) Route connector P43 (85) through bottom of dashboard (83).

(51) Connect connector P43 (85) to connector J43 (86).

c. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Connect batteries (para 7-48).

(3) Raise spare tire (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
a. Removal.

(1) Remove adhesive, nut (1), terminal lugs TL25 (2) and TL46 (3), and starter to chassis ground cable (4) from starting motor terminal (5).

(2) Remove self-locking nut (6), screw (7), starter to chassis ground cable (4), and lockwasher (8) from chassis (9). Discard self-locking nut and lockwashers.
b. Installation.

(1) Install lockwasher (1) and starter to chassis ground cable (2) on chassis (3) with screw (4) and self-locking nut (5).

(2) Position starter to chassis ground cable (2) and terminal lugs TL46 (6) and TL25 (7) on starting motor terminal (8) with nut (9).

(3) Tighten nut (9) to 15-20 lb-ft (20-27 N·m).

WARNING

Adhesive, 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.

(4) Apply adhesive to starting motor terminal (8).
c. **Follow-On Maintenance.**

(1) Connect batteries (para 7-48).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

**End of Task.**
This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Spare tire lowered (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Batteries disconnected (para 7-48).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (Item 78, Appendix G)
Nut, Self-Locking (2) (Item 116, Appendix G)
Adhesive (Item 8, Appendix D)

a. Removal.

NOTE
Tag wires and connection points prior to disconnecting.

(1) Remove adhesive, nut (1), and terminal lugs TL25 (2) and TL46 (3) from starting motor terminal (4).
7-84. STARTER TO SHUNT 24 VDC CABLE REPLACEMENT (CONT)

NOTE

- Both clamps are removed the same way. One shown.
- Remove plastic cable ties as required.
- Step (2) requires the aid of an assistant.

(2) Remove self-locking nut (5), screw (6), and clamp (7) from frame rail (8). Discard self-locking nut.

(3) Remove starter to shunt 24 vdc cable (9) from clamp (7).

(4) Perform steps (2) and (3) on remaining clamp.

(5) Remove screw (10), lockwasher (11), and terminal lug TL45 (12) from lower shunt terminal (13). Discard lockwasher.

NOTE

Note routing of starter to shunt 24 vdc cable prior to removal.

(6) Remove starter to shunt 24 vdc cable (9) from vehicle.

b. Installation.

(1) Position starter to shunt 24 vdc cable (1) on vehicle.

(2) Install terminal lug TL45 (2) on lower shunt terminal (3) with lockwasher (4) and screw (5).
**NOTE**

- Both clamps are installed the same way. One shown.
- Install plastic cable ties as required.

(3) Position starter to shunt 24 Vdc cable (1) in clamp (6).

(4) Position clamp (6) on frame rail (7) with screw (8) and self-locking nut (9).

(5) Perform steps (3) and (4) on remaining clamp.

**NOTE**

Step (6) requires the aid of an assistant.

(6) Tighten two self-locking nuts (9) to 96-120 lb-in. (11-14 N·m).

(7) Position terminal lugs TL46 (10) and TL25 (11) on starting motor terminal (12) with nut (13).

(8) Tighten nut (13) to 15-20 lb-ft (20-27 N·m).

**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.

(9) Apply adhesive to terminal lugs TL46 (10) and TL25 (11) and nut (13).
c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Raise spare tire (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-85. WINCH CONTROL VALVE CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Batteries disconnected (para 7-48).

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)

Materials/Parts

Ties, Cable, Plastic (Item 76, Appendix D)
Nut, Self-Locking (3) (Item 116, Appendix G)
Nut, Self-Locking (Item 134, Appendix G)

Personnel Required

(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.

a. Removal.

NOTE

Remove plastic cable ties as required.

(1) Disconnect connector J215 (1) from connector P215 (2).
(2) Remove self-locking nut (3), clamp (4), and terminal lug TL83 (5) from screw (6). Discard self-locking nut.

(3) Remove terminal lug TL111 (7) from screw (6).

(4) DELETED

(5) Remove terminal lug TL320 (8) from screw (6).

(6) Remove clamp (4) from winch control valve cable assembly (9).

NOTE

- Other hoses, cable assemblies, and terminal lugs are removed with clamps and winch control valve cable assembly.

- Steps (7) and (8) require the aid of an assistant.

(7) Remove three self-locking nuts (10), clamps (11), winch control valve cable assembly (9), and three screws (12) from right frame rail (13). Discard self-locking nuts.

(8) Remove three clamps (11) from winch control valve cable assembly (9).
(9) Remove four nuts (14), washers (15), and screws (16) from 11K SRW control valve bracket (17).

(10) Move 11K SRW control valve (18) away from right frame rail (13).

(11) Loosen two captive screws (19) and remove connectors L4 (20) and L5 (21) from 11K SRW control valve (18).

(12) Remove winch control valve cable assembly (9) from vehicle.

b. Installation

NOTE
Install plastic cable ties as required.

(1) Position winch control valve cable assembly (1) on vehicle.

(2) Install connectors L4 (2) and L5 (3) on 11K SRW control valve (4).

(3) Tighten two captive screws (5) in connectors L4 (2) and L5 (3).

(4) Position 11K SRW control valve (4) on right frame rail (6).

(5) Position four washers (7), screws (8), and nuts (9) in 11K SRW control valve bracket (10).

(6) Tighten four nuts (9) to 18-22 lb-ft (24-29 N·m).
NOTE

- Other hoses, cable assemblies, and terminal lugs are installed with clamps and winch control valve cable assembly.

- Steps (7) and (8) require the aid of an assistant.

(7) Position three clamps (11) on winch control valve cable assembly (1).

(8) Install winch control valve cable assembly (1) on right frame rail (6) with three clamps (11), screws (12), and self-locking nuts (13).

(9) Position clamp (14) on winch control valve cable assembly (1).

(10) Install terminal lug TL320 (15) on screw (16).

(11) DELETED

(12) Install terminal lug TL111 (17) on screw (16).

(13) Position terminal lug TL83 (18) and clamp (14) on screw (16) with self-locking nut (19).

(14) Tighten self-locking nut (19) to 97-120 lb-in. (11-14 N·m).
(15) Connect connector J215 (20) to connector P215 (21).

c. Follow-On Maintenance.

(1) Connect batteries (para 7-48).

(2) Start engine (TM 9-2320-365-10).

(3) Check 11K SRW operation (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
7-86. WTEC II CAB TRANSMISSION HARNESS REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Instrument panel assembly removed for access (para 7-15).
- Kick panel removed (para 16-3).
- Personnel heater removed (para 18-9).

Materials/Parts
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Lockwasher (4) (Item 67, Appendix G)
- Gasket (Item 24, Appendix G)

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

Personnel Required
- (2)

a. Removal.

NOTE
Tag wires and connection points prior to disconnecting.

(1) Remove screw (1), washer (2), and ground terminal lug (3) from WTEC II TEPSS (4).

(2) Disconnect connector J115 (5) from WTEC II TEPSS (4).

(3) Disconnect connector J114 (6) from WTEC II TEPSS (4).

(4) Disconnect connector J118 (7) from connector P118 (8).
(5) Remove two screws (9) and connector J117 (10) from dashboard (11).

(6) Loosen screw (12) in connector J116 (13).

(7) Disconnect connector J116 (13) from WTEC II VIM (14).

(8) Remove WTEC II cab transmission harness (15) from dashboard (11).
(9) Disconnect connector P119 (16) from connector J119 (17).

**NOTE**

Step (10) requires the aid of an assistant.

(10) Remove four nuts (18), lockwashers (19), screws (20), gasket (21), and connector J119 (17) from cab (22). Discard lockwashers and gasket.

**CAUTION**

Cab transmission harness connectors are easily damaged. Use care when routing harness through dashboard. Failure to comply may result in damage to equipment.

(11) Remove WTEC II cab transmission harness (15) from dashboard (11).
b. Installation.

**CAUTION**

Cab transmission harness connectors are easily damaged. Use care when routing harness through dashboard. Failure to comply may result in damage to equipment.

**NOTE**

If replacing WTEC II cab transmission harness with WTEC III cab transmission harness, perform para 8-8.

(1) Route cab transmission harness (1) inside dashboard (2).

**WARNING**

Ensure WTEC II cab transmission harness does not interfere with throttle linkage. Failure to comply may result in injury to personnel.

**NOTE**

Step (2) requires the aid of an assistant.

(2) Install gasket (3) and connector J119 (4) on cab (5) with four screws (6), lockwashers (7), and nuts (8).
(3) Connect connector P119 (9) to connector J119 (4).

(4) Route WTEC II cab transmission harness (1) through right side of dashboard (2).

(5) Connect connector J116 (10) to WTEC II VIM (11).

(6) Tighten screw (12) in connector J116 (10).
(7) Install connector J117 (13) on dashboard (2) with two screws (14).

(8) Connect connector P118 (15) to connector J118 (16).

(9) Connect connector J114 (17) to WTEC II TEPSS (18).

(10) Connect connector J115 (19) to WTEC II TEPSS (18).

(11) Install ground terminal lug (20) on WTEC II TEPSS (18) with washer (21) and screw (22).

c. Follow-On Maintenance.

(1) Install personnel heater (para 18-9).

(2) Install kick panel (para 16-3).

(3) Install instrument panel assembly (para 7-15).

(4) Operate vehicle and check for proper operation (TM 9-2320-365-10).

End of Task.
7-376

7-87. WTEC III CAB TRANSMISSION HARNESS REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Instrument panel assembly removed for access (para 7-15).
Kick panel removed (para 16-3)
Personnel heater removed (para 18-9).

Tools and Special Tools

Tool Kit, Genl Mech (Item 44, Appendix C)

Materials/Parts

Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (4) (Item 67, Appendix G)
Gasket (Item 24, Appendix G)

Personnel Required

(2)

a. Removal.

NOTE

• Remove plastic cable ties as required.

• Note routing of WTEC III cab transmission harness prior to removal.

• Tag connectors and connection points prior to disconnecting.

(1) Disconnect connector P119 (1) from connector J119 (2).

Step (2) requires the aid of an assistant.

(2) Remove four nuts (3), lockwashers (4), screws (5), gasket (6), and connector J119 (2) from cab (7). Discard lockwashers and gasket.
(3) Disconnect connector clamp (8) from connector P114 (9).

(4) Disconnect connector P114 (9) from WTEC III transmission ECU (10).

NOTE
Perform steps (5) through (7) on vehicles equipped with auxiliary panel.

(5) Disconnect connector J108 (11) from connector P108 (12).

(6) Disconnect connector J210 (13) from connector P210 (14).

(7) Pull auxiliary panel cable assembly (15) through forward hole in dashboard (16).
(8) Remove WTEC III cab transmission harness (17) from vehicle.

b. Installation.

NOTE

- Install plastic cable ties as required.
- Route connector J119 through forward hole in dashboard under kick panel. Route behind personnel heater to left side of dashboard.

(1) Position WTEC III cab transmission harness (1) in dashboard (2).

(2) Connect connector P114 (3) to WTEC III transmission ECU (4).

(3) Connect connector clamp (5) on connector P114 (3).
NOTE

Perform steps (4) through (6) on vehicles equipped with auxiliary panel.

(4) Push auxiliary panel cable assembly (6) back through forward hole in dashboard (2).

(5) Connect connector P108 (7) to connector J108 (8).

(6) Connect connector P210 (9) to connector J210 (10).

WARNING

Ensure WTEC III cab transmission harness does not interfere with throttle linkage. Failure to comply may result in injury to personnel.

NOTE

Step (7) requires the aid of an assistant.

(7) Install gasket (11) and connector J119 (12) on cab (13) with four screws (14), lockwashers (15), and nuts (16).
(8) Connect connector P119 (17) to connector J119 (12).

c. Follow-On Maintenance.

(1) Install personnel heater (para 18-9).

(2) Install kick panel (para 16-3).

(3) Install instrument panel assembly (para 7-15).

(4) Start engine (TM 9-2320-365-10).

(5) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
7-88. LOW PRESSURE TRANSMITTER 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).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Drill, Portable, Electric (Item 7, Appendix C)
Drill Set, Twist (Item 6, Appendix C)

Materials/Parts
Adhesive (Item 9, Appendix D)
Antiseize Compound (Item 14, Appendix D)
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Lockwasher (2) (Item 90, Appendix G)

a. Removal.

NOTE

- Perform step (1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

- Tag wires and connection points prior to removal.

(1) Remove adhesive and boot (1) from low pressure transmitter (2).

(2) Remove adhesive, two nuts (3), lockwashers (4), and terminal lugs TL201 (5) and TL202 (6) from low pressure transmitter (2). Discard lockwashers.

(3) Remove low pressure transmitter (2) from reducer bushing (7).
b. Installation.

**NOTE**

Perform steps (1) through (12) on vehicle serial numbers 0001 through 7447 that have not previously had front lights cable assembly replaced.

(1) Drill two holes 0.05-0.07 in. (0.127-0.178 cm) in TLR and TTR areas of boot (1).

(2) Cut two pieces of insulation sleeving (2) 1.57 in. (4 cm).

(3) Position two insulation sleevings (2) on wires 3024 (3) and 1616 (4).

(4) Route wire 3024 (3) through hole TLR in boot (1).

(5) Route wire 1616 (4) through hole TTR in boot (1).

(6) Cut two pieces of insulation sleeving (5) 0.78 in. (2 cm).

(7) Position two insulation sleevings (5) on wires 3024 (3) and 1616 (4).

(8) Remove approximately 1/4 in. (0.6 cm) of insulation from wires 3024 (3) and 1616 (4).

(9) Install terminal lug TL201 (6) on wire 3024 (3).

(10) Install terminal lug TL202 (7) on wire 1616 (4).

(11) Position two insulation sleevings (5) on terminal lugs TL201 (6) and TL202 (7).

(12) Shrink two insulation sleevings (2 and 5) on TL201 (6) and TL202 (7).
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.

(13) Apply antiseize compound to threads of air pressure transmitter (8).

(14) Install air pressure transmitter (8) in reducer bushing (9).

(15) Install terminal lugs TL201 (6) and TL202 (7) on air pressure transmitter (8) with two lockwashers (10) and nuts (11).

(16) Apply antiseize to nuts (11), lockwashers (10), and terminal lugs TL201 (6) and TL202 (7).

(17) Install boot (1) on air pressure transmitter (8).

(18) Apply adhesive to holes TLR and TTR and around edges of boot (1).

c. Follow-On Maintenance.

Lower cab (TM 9-2320-365-10).

End of Task.
CHAPTER 8
TRANSMISSION 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

Section I. INTRODUCTION

8-1. INTRODUCTION

This chapter contains maintenance instructions for replacing transmission components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

8-2. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) AND BRACKET REPLACEMENT AND CALIBRATION

This task covers:

a. Removal
b. Installation
c. Calibration

INITIAL SETUP

Equipment Conditions
Instrument panel assembly removed for access (para 7-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Solvent, Dry Cleaning SD (P-D-680) (Item 71, Appendix D)
Paper, Abrasive (Item 48, Appendix D)
Fastener Tape (Item 10, Appendix G)

a. Removal.

NOTE
Tag connectors and connection points prior to disconnecting.

(1) Disconnect connector J115 (1) from WTEC II TEPSS (2).

(2) Disconnect connector J114 (3) from WTEC II TEPSS (2).

(3) Remove screw (4), washer (5), and ground terminal lug (6) from WTEC II TEPSS (2).
(4) Remove two screws (7) from mounting bracket (8).

(5) Remove four screws (9), mounting bracket (8), two captive nuts (10), and WTEC II TEPSS (2) from instrument panel assembly (11).

b. Installation.

(1) Cut two pieces of fastener tape (hook side) (1) to 1.5 X 0.5 in. (3.8 X 1.3 cm).

(2) Install two fastener tapes (1) on light filter assembly (2) at locations shown.
8-2. WTEC II TRANSMISSION ECU PUSHBUTTON SHIFT SELECTOR (TEPSS) AND BRACKET REPLACEMENT AND CALIBRATION (CONT)

**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 dry cleaning 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 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.

1. Clean WTEC II TEPSS (3) with dry cleaning solvent.
2. Sand WTEC II TEPSS (3) lightly at locations shown.
3. Clean WTEC II TEPSS (3) with dry cleaning solvent.
4. Cut two pieces of fastener tape (hook side) (4) to 0.625 X 0.5 in. (15.9 X 12.7 mm).
5. Install two fastener tapes (4) on WTEC II TEPSS (3) at locations shown.
6. Install two fastener tapes (1) on WTEC II TEPSS (3) at locations shown.
7. Position WTEC II TEPSS (3) in instrument panel assembly (5) with mounting bracket (6), two captive nuts (7), and four screws (8).
8. Position two screws (9) in mounting bracket (6).
9. Tighten four screws (8) to 9 lb-in. (1 N·m).
10. Tighten two screws (9) to 27-35 lb-in. (3-4 N·m).
(13) Install ground terminal lug (10) on WTEC II TEPSS (3) with washer (11) and screw (12).

(14) Connect connector J114 (13) to WTEC II TEPSS (3).

(15) Connect connector J115 (14) to WTEC II TEPSS (3).

c. Calibration.

(1) Install instrument panel assembly (para 7-15).

**NOTE**

WTEC II TEPSS requires calibration after replacement. Calibration is accomplished in steps (2) through (5).

(2) Position master power switch to on and wait for Neutral (N) indication from WTEC II TEPSS (TM 9-2320-365-10).

(3) Position master power switch to off (TM 9-2320-365-10).

(4) Perform steps (2) and (3) four more times.

(5) Position master power switch to on and depress accelerator pedal all the way to cab floor (TM 9-2320-365-10).

(6) Start engine (TM 9-2320-365-10).

**NOTE**

Transmission shifting may be rough until WTEC II TEPSS determines proper shift points. Operating vehicle through each gear range several times will allow WTEC II TEPSS to determine proper shift points.

(7) Operate vehicle through all gear ranges several times (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

*End of Task.*
This task covers:

- a. Removal
- b. Installation.
- c. Calibration

INITIAL SETUP

**Equipment Conditions**
Instrument panel assembly removed for access (para 7-15).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

**Materials/Parts**
Nut, Self-Locking (2) (Item 155, Appendix G)

---

**a. Removal.**

**NOTE**
Tag connectors and connection points prior to disconnecting.

1. Disconnect connector PX33 (1) from WTEC III TPSS connector (2).
2. Remove two self-locking nuts (3) and brackets (4) from WTEC III TPSS (5). Discard self-locking nuts.
3. Remove WTEC III TPSS (5) from front of instrument panel assembly (6).
b. Installation.

(1) Install WTEC III TPSS (1) in instrument panel assembly (2).

(2) Position two brackets (3) and self-locking nuts (4) on WTEC III TPSS (1).

(3) Tighten two self-locking nuts (4) to 11-13 lb-in. (1-2 N·m).

(4) Connect connector PX33 (5) to WTEC III TPSS connector (6).

c. Calibration.

NOTE

WTEC III TPSS requires calibration after replacement. Calibration is accomplished in steps (1) through (4).

(1) Position master power switch to on and wait for neutral (N) indication from WTEC III TPSS (TM 9-2320-365-10).

(2) Position master power switch to off (TM 9-2320-365-10).

(3) Perform steps (1) and (2) four more times.

(4) Position master power switch to on (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Check VOLTS gage for charge indication (TM 9-2320-365-10).

NOTE

Transmission shifting may be rough until WTEC III TPSS determines proper shift points. Operating vehicle through each gear range several times will allow WTEC III TPSS to determine proper shift points.

(7) Test drive vehicle and check operation through all gear ranges several times (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.
8-4. WTEC II CODE READING AND CODE CLEARING PROCEDURES

This task covers:

a. Reading Diagnostic Codes
b. Clearing Active Diagnostic Codes
c. Clearing Historic Diagnostic Codes
d. Exiting the Diagnostic Display Mode
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Master power switch positioned to on (TM 9-2320-365-10).

a. Reading Diagnostic Codes.

NOTE

• Diagnostic codes may be viewed even while vehicle is moving.

• There are two types of diagnostic codes, active and historic, which may be displayed on WTEC II TEPSS. An active diagnostic code indicates a fault which is currently being detected by WTEC II TEPSS. An historic diagnostic code represents a fault which was detected prior to engine shutdown. All active diagnostic codes, except main code 69 sub code 34, will become historic codes when electrical power is removed from WTEC II TEPSS.

• When an active diagnostic code is displayed on WTEC II TEPSS, the MODE ON light will be illuminated.

(1) Enter diagnostic display mode by pressing ↑ (1) and ↓ (2) (up arrow and down arrow) buttons on WTEC II TEPSS (3) at the same time.
NOTE

• WTEC II TEPSS is capable of storing (logging) up to five diagnostic codes in memory. The diagnostic code positions are identified as d1, d2, d3, d4, and d5. Diagnostic code position d1 represents the most recently logged diagnostic code.

• WTEC II TEPSS will display the four position diagnostic codes two characters at a time, beginning with the most recently logged diagnostic code (d1). The following example shows main code 24 sub code 12 logged in diagnostic code position d1:

  1. Code list position  -  d1
  2. Main code        -  24
  3. Sub code         -  12
  4. Code position repeats  -  d1,24,12

• Display of first diagnostic code (d1) will be repeated until MODE button is pressed to view remaining diagnostic codes (d2, d3, d4, and d5) or until diagnostic mode is exited.

• Any diagnostic code position which does not have a diagnostic code logged will display "--".

(2) Record first diagnostic code (d1) displayed on WTEC II TEPSS (3).

NOTE

Pressing MODE button momentarily after fifth diagnostic code (d5) is displayed will cause code positions displayed to begin again with first diagnostic code (d1).

(3) Press MODE button (4) momentarily to view next diagnostic code (d2).

(4) Record diagnostic code, if any, displayed on WTEC II TEPSS (3).

(5) Perform steps (3) and (4) for remaining diagnostic code positions (d3, d4, and d5).

(6) Refer to Table 8-1. WTEC II Diagnostic Code List and Description for identification of diagnostic codes and to determine which troubleshooting task(s) to perform.
# 8-4. WTEC II Code Reading and Code Clearing Procedures (Cont)

## Table 8-1. WTEC II Diagnostic Code List and Description

<table>
<thead>
<tr>
<th>MAIN CODE</th>
<th>SUB CODE</th>
<th>DESCRIPTION</th>
<th>PERFORM TROUBLESHOOTING TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>ANY</td>
<td>ECU input voltage, low/high</td>
<td>f19</td>
</tr>
<tr>
<td>21</td>
<td>ANY</td>
<td>Throttle position sensor, failed low/high</td>
<td>f12</td>
</tr>
<tr>
<td>22</td>
<td>14</td>
<td>Engine speed sensor reasonableness test</td>
<td>f2</td>
</tr>
<tr>
<td>22</td>
<td>15</td>
<td>Turbine speed sensor reasonableness test</td>
<td>f3</td>
</tr>
<tr>
<td>22</td>
<td>16</td>
<td>Output speed sensor reasonableness or rapid decal test</td>
<td>f4</td>
</tr>
<tr>
<td>23</td>
<td>ANY</td>
<td>Shift selector fault</td>
<td>Replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>24</td>
<td>ANY</td>
<td>Sump oil temperature, cold/hot</td>
<td>f5</td>
</tr>
<tr>
<td>25</td>
<td>ANY</td>
<td>Output speed reasonableness test, detected at 0 speed</td>
<td>f14</td>
</tr>
<tr>
<td>32</td>
<td>ANY</td>
<td>C3 pressure switch open</td>
<td>f6</td>
</tr>
<tr>
<td>33</td>
<td>ANY</td>
<td>Sump oil temperature sensor failed low/high</td>
<td>f5</td>
</tr>
<tr>
<td>34</td>
<td>ANY</td>
<td>Calibration compatibility or check sum fault</td>
<td>Replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>35</td>
<td>ANY</td>
<td>Power interruption</td>
<td>f7</td>
</tr>
<tr>
<td>36</td>
<td>ANY</td>
<td>Hardware/software not compatible</td>
<td>Replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>41</td>
<td>ANY</td>
<td>Open or short to ground, solenoid circuit</td>
<td>f7</td>
</tr>
<tr>
<td>42</td>
<td>ANY</td>
<td>Short to battery, solenoid circuit</td>
<td>f7</td>
</tr>
<tr>
<td>43</td>
<td>ANY</td>
<td>Low side driver, solenoid circuit</td>
<td>f8</td>
</tr>
<tr>
<td>44</td>
<td>ANY</td>
<td>Short to ground, solenoid circuit</td>
<td>f7</td>
</tr>
<tr>
<td>45</td>
<td>ANY</td>
<td>Open circuit, solenoid circuit</td>
<td>f7</td>
</tr>
<tr>
<td>51</td>
<td>10</td>
<td>Offgoing ratio test (during shift), 1 to L</td>
<td>f13</td>
</tr>
<tr>
<td>51</td>
<td>12</td>
<td>Offgoing ratio test (during shift), 1 to 2</td>
<td>f13</td>
</tr>
<tr>
<td>51</td>
<td>21</td>
<td>Offgoing ratio test (during shift), 2 to 1</td>
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<tr>
<td>51</td>
<td>23</td>
<td>Offgoing ratio test (during shift), 2 to 3</td>
<td>f13</td>
</tr>
<tr>
<td>51</td>
<td>43</td>
<td>Offgoing ratio test (during shift), 4 to 3</td>
<td>f13</td>
</tr>
<tr>
<td>51</td>
<td>45</td>
<td>Offgoing ratio test (during shift), 4 to 5</td>
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<tr>
<td>51</td>
<td>65</td>
<td>Offgoing ratio test (during shift), 6 to 5</td>
<td>f13</td>
</tr>
<tr>
<td>52</td>
<td>ANY</td>
<td>Offgoing C3PS test (during shift)</td>
<td>f9</td>
</tr>
</tbody>
</table>
### Table 8-1. Diagnostic Code List and Description (Cont)

<table>
<thead>
<tr>
<th>MAIN CODE</th>
<th>SUB CODE</th>
<th>DESCRIPTION</th>
<th>PERFORM TROUBLESHOOTING TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>ANY</td>
<td>Offgoing speed test (during shift)</td>
<td>f15</td>
</tr>
<tr>
<td>54</td>
<td>01</td>
<td>Oncoming ratio test (after shift), L to 1</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>07</td>
<td>Oncoming ratio test (after shift), L to R</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Oncoming ratio test (after shift), 1 to L</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Oncoming ratio test (after shift), 1 to 2</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Oncoming ratio test (after shift), 1 to R</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Oncoming ratio test (after shift), 2 to 1</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Oncoming ratio test (after shift), 2 to 3</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Oncoming ratio test (after shift), 2 to R</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>Oncoming ratio test (after shift), 3 to 2</td>
<td>f16</td>
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<td></td>
<td>34</td>
<td>Oncoming ratio test (after shift), 3 to 4</td>
<td>f16</td>
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<td></td>
<td>43</td>
<td>Oncoming ratio test (after shift), 4 to 3</td>
<td>f16</td>
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<td>45</td>
<td>Oncoming ratio test (after shift), 4 to 5</td>
<td>f16</td>
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<td></td>
<td>54</td>
<td>Oncoming ratio test (after shift), 5 to 4</td>
<td>f16</td>
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<td>56</td>
<td>Oncoming ratio test (after shift), 5 to 6</td>
<td>f16</td>
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<td></td>
<td>65</td>
<td>Oncoming ratio test (after shift), 6 to 5</td>
<td>f16</td>
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<td></td>
<td>70</td>
<td>Oncoming ratio test (after shift), R to L</td>
<td>f16</td>
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<td></td>
<td>71</td>
<td>Oncoming ratio test (after shift), R to 1</td>
<td>f16</td>
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<td></td>
<td>72</td>
<td>Oncoming ratio test (after shift), R to 2</td>
<td>f16</td>
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<tr>
<td></td>
<td>80</td>
<td>Oncoming ratio test (after shift), N1 to L</td>
<td>f16</td>
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<td>81</td>
<td>Oncoming ratio test (after shift), N1 to 1</td>
<td>f16</td>
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<td></td>
<td>82</td>
<td>Oncoming ratio test (after shift), N1 to 2</td>
<td>f16</td>
</tr>
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<td></td>
<td>83</td>
<td>Oncoming ratio test (after shift), N1 to 3</td>
<td>f16</td>
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<td></td>
<td>85</td>
<td>Oncoming ratio test (after shift), N1 to 5</td>
<td>f16</td>
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<tr>
<td></td>
<td>86</td>
<td>Oncoming ratio test (after shift), N1 to 6</td>
<td>f16</td>
</tr>
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<td></td>
<td>92</td>
<td>Oncoming ratio test (after shift), N2 to 2</td>
<td>f16</td>
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<td></td>
<td>93</td>
<td>Oncoming ratio test (after shift), N3 to 3</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>Oncoming ratio test (after shift), N3 to 5</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>96</td>
<td>Oncoming ratio test (after shift), N4 to 6</td>
<td>f16</td>
</tr>
<tr>
<td></td>
<td>97</td>
<td>Oncoming ratio test (after shift), 2 to R (2 to NNC to R)</td>
<td>f16</td>
</tr>
</tbody>
</table>
### Table 8-1. Diagnostic Code List and Description (Cont)

<table>
<thead>
<tr>
<th>MAIN CODE</th>
<th>SUB CODE</th>
<th>DESCRIPTION</th>
<th>PERFORM TROUBLESHOOTING TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>ANY</td>
<td>Oncoming C3PS test (after shift)</td>
<td>f17</td>
</tr>
<tr>
<td>56</td>
<td>ANY</td>
<td>Range verification test</td>
<td>f18</td>
</tr>
<tr>
<td>57</td>
<td>ANY</td>
<td>Range verification C3PS test</td>
<td>f10</td>
</tr>
<tr>
<td>66</td>
<td>ANY</td>
<td>SCI (Serial Communication Interface) fault</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>12</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>13</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>14</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>15</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>16</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>21</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>22</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>23</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>24</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>25</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>26</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>32</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>33</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>34</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>35</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
<tr>
<td>69</td>
<td>36</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
</tbody>
</table>
### Table 8-1. Diagnostic Code List and Description (Cont)

<table>
<thead>
<tr>
<th>MAIN CODE</th>
<th>SUB CODE</th>
<th>DESCRIPTION</th>
<th>PERFORM TROUBLESHOOTING TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>41</td>
<td>ECU malfunction</td>
<td>f7. If fault persists, replace WTEC II TEPSS (para 8-2).</td>
</tr>
</tbody>
</table>

b. Clearing Active Diagnostic Codes.

**NOTE**

Active diagnostic codes can only be cleared when transmission output speed equals zero and no output speed sensor fault is active.

1. Press and hold MODE button (1), approximately three seconds, until WTEC II TEPSS tone sounds for 1/2 second.

2. Release MODE button (1).

c. Clearing Historic Diagnostic Codes.

(1) Press and hold MODE button (1), approximately 10 seconds, until tone sounds.

(2) Release MODE button (1).
c. Exiting the Diagnostic Display Mode.

(1) Exit the diagnostic display mode by any of the following methods.

(a) Press ↑ (1) and ↓ (2) (up arrow and down arrow) buttons on WTEC II TEPSS (3) at the same time.

(b) Press any range button (4), D, N, or R on WTEC II TEPSS (3) (the shift will be commanded if not inhibited by an active code).

(c) Wait until the calibrated time (approximately 10 minutes) has passed and system automatically returns to the normal operating mode.

(d) Position master power switch to off (TM 9-2320-365-10).

e. Follow-On Maintenance.

Perform Transmission System Troubleshooting (para 2-17).

End of Task.
### 8-5. WTEC III CODE READING AND CODE CLEARING PROCEDURES

This task covers:

<table>
<thead>
<tr>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Reading Diagnostic Codes</td>
</tr>
<tr>
<td>b. Clearing Active Diagnostic Codes</td>
</tr>
<tr>
<td>c. Clearing Historic Diagnostic Codes</td>
</tr>
<tr>
<td>d. Exiting the Diagnostic Display Mode</td>
</tr>
<tr>
<td>e. Follow-On Maintenance</td>
</tr>
</tbody>
</table>

**INITIAL SETUP**

**Equipment Conditions**
Master power switch positioned to on (TM 9-2320-365-10).

---

**a. Reading Diagnostic Codes.**

**NOTE**

- Diagnostic codes may be viewed even while vehicle is moving.

- There are two types of diagnostic codes, active and historic, which may be displayed on WTEC III TPSS. An active diagnostic code indicates a fault which is currently being detected by WTEC III TPSS. An historic diagnostic code represents a fault which was detected prior to engine shutdown. All active diagnostic codes, except main code 69 sub code 34, will become historic codes when electrical power is removed from WTEC III transmission ECU.

- When an active diagnostic code is displayed on WTEC III TPSS, the Light Emitting Diode (LED) at upper right corner of MODE button will be illuminated.

(1) Enter diagnostic display mode by pressing ↑ (1) and ↓ (2) (up arrow and down arrow) buttons on WTEC III TPSS selector (3) at the same time.
NOTE

- WTEC III transmission ECU is capable of storing (logging) up to five diagnostic codes in memory. The diagnostic code positions are identified as d1, d2, d3, d4, and d5. Diagnostic code position d1 represents the most recently logged diagnostic code.

- WTEC III TPSS will display the four position diagnostic codes one character at a time, beginning with the most recently logged diagnostic code (d1). The following example shows main code 24 sub code 12 logged in diagnostic code position d1:

  1. Code list position - d,1
  2. Main code - 2,4
  3. Sub code - 1,2
  4. Code position repeats - d,1,2,4,1,2

- Display of first diagnostic code (d1) will be repeated until MODE button is pressed to view remaining diagnostic codes (d2, d3, d4, and d5) or until diagnostic mode is exited.

- Any diagnostic code position which does not have a diagnostic code logged will display "--".

(2) Record first diagnostic code (d1) displayed on WTEC III TPSS (3).

NOTE

Pressing MODE button momentarily after fifth diagnostic code (d5) is displayed will cause code positions displayed to begin again with first diagnostic code (d1).

(3) Press MODE button (4) momentarily to view next diagnostic code (d2).

(4) Record diagnostic code, if any, displayed on WTEC III TPSS (3).

(5) Perform steps (3) and (4) for remaining diagnostic code positions (d3, d4, and d5).

(6) Refer to Table 8-2. WTEC III Diagnostic Code List and Description for identification of diagnostic codes and to determine which troubleshooting task(s) to perform.

Table 8-2. WTEC III Diagnostic Code List and Description

<table>
<thead>
<tr>
<th>MAIN CODE</th>
<th>SUB CODE</th>
<th>DESCRIPTION</th>
<th>PERFORM TROUBLESHOOTING TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>ANY</td>
<td>ECU input voltage, low/high</td>
<td>f37</td>
</tr>
<tr>
<td>21</td>
<td>ANY</td>
<td>Throttle position sensor, failed low/high</td>
<td>f30</td>
</tr>
</tbody>
</table>
8-5. WTEC III CODE READING AND CODE CLEARING PROCEDURES (CONT)

<table>
<thead>
<tr>
<th>MAIN CODE</th>
<th>SUB CODE</th>
<th>DESCRIPTION</th>
<th>PERFORM TROUBLESHOOTING TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>14</td>
<td>Engine speed sensor reasonableness test</td>
<td>f22</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Turbine speed sensor reasonableness test</td>
<td>f23</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Output speed sensor reasonableness test</td>
<td>f24</td>
</tr>
<tr>
<td>23</td>
<td>ANY</td>
<td>Shift selector fault</td>
<td>f39</td>
</tr>
<tr>
<td>24</td>
<td>ANY</td>
<td>Sump oil temperature, cold/hot</td>
<td>f25</td>
</tr>
<tr>
<td>25</td>
<td>ANY</td>
<td>Output speed reasonableness test, detected at 0 speed</td>
<td>f32</td>
</tr>
<tr>
<td>32</td>
<td>ANY</td>
<td>C3 pressure switch open</td>
<td>f26</td>
</tr>
<tr>
<td>33</td>
<td>ANY</td>
<td>Sump oil temperature sensor failed low/high</td>
<td>f25</td>
</tr>
<tr>
<td>34</td>
<td>ANY</td>
<td>Calibration compatibility or check sum fault</td>
<td>Replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>35</td>
<td>ANY</td>
<td>Power interruption</td>
<td>f27 and f37. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>36</td>
<td>ANY</td>
<td>Hardware/software not compatible</td>
<td>Replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>42</td>
<td>ANY</td>
<td>Short to battery, solenoid circuit</td>
<td>f27</td>
</tr>
<tr>
<td>44</td>
<td>ANY</td>
<td>Short to ground, solenoid circuit</td>
<td>f27</td>
</tr>
<tr>
<td>45</td>
<td>ANY</td>
<td>Open circuit, solenoid circuit</td>
<td>f27</td>
</tr>
<tr>
<td>46</td>
<td>ANY</td>
<td>Overcurrent to solenoid</td>
<td>f27</td>
</tr>
<tr>
<td>51</td>
<td>ANY</td>
<td>Offgoing ratio test (during shift)</td>
<td>f31</td>
</tr>
<tr>
<td>52</td>
<td>ANY</td>
<td>Offgoing C3PS test (during shift)</td>
<td>f28</td>
</tr>
<tr>
<td>53</td>
<td>ANY</td>
<td>Offgoing speed test (during shift)</td>
<td>f33</td>
</tr>
<tr>
<td>54</td>
<td>ANY</td>
<td>Oncoming ratio test (after shift)</td>
<td>f34</td>
</tr>
<tr>
<td>55</td>
<td>ANY</td>
<td>Oncoming C3PS test (after shift)</td>
<td>f35</td>
</tr>
<tr>
<td>56</td>
<td>ANY</td>
<td>Range verification test</td>
<td>f36</td>
</tr>
<tr>
<td>57</td>
<td>ANY</td>
<td>Range verification C3PS test</td>
<td>f29</td>
</tr>
<tr>
<td>66</td>
<td>ANY</td>
<td>SCI (Serial Communication Interface) fault</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>27</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>28</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>MAIN CODE</td>
<td>SUB CODE</td>
<td>DESCRIPTION</td>
<td>PERFORM TROUBLESHOOTING TASK</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>69</td>
<td>29</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>33</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>34</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>35</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>36</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>39</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>41</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>42</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
<tr>
<td>69</td>
<td>43</td>
<td>ECU malfunction</td>
<td>f27. If fault persists, replace WTEC III transmission ECU (para 8-7).</td>
</tr>
</tbody>
</table>
b. Clearing Active Diagnostic Codes.

**NOTE**

Active diagnostic codes can only be cleared when transmission output speed equals zero and no output speed sensor fault is active.

(1) Press and hold MODE button (1), approximately three seconds, until LED at upper right corner of MODE button flashes three times.

(2) Release MODE button (1).

c. Clearing Historic Diagnostic Codes.

(1) Press and hold MODE button (1), approximately 10 seconds, until LED at upper right corner of MODE button flashes three times.

(2) Release MODE button (1).
d. Exiting the Diagnostic Display Mode.

(1) Exit the diagnostic display mode by any of the following methods:

   (a) Press ↑ (1) and ↓ (2) (up arrow and down arrow) buttons on WTEC III TPSS (3) at the same time.

   (b) Press any range button (4), D, N, or R on WTEC III TPSS (3) (shift will be commanded if not inhibited by an active diagnostic code).

   (c) Wait until the calibrated time (approximately 10 minutes) has passed and system automatically returns to normal operating mode.

   (d) Position master power switch to off (TM 9-2320-365-10).

e. Follow-On Maintenance.

   Perform Transmission System Troubleshooting (para 2-17).

End of Task.
8-6. WTEC II VEHICLE INTERFACE MODULE (VIM) REPLACEMENT/REPAIR

This task covers:

- **a. Removal**
- **b. Disassembly**
- **c. Assembly**
- **d. Installation**
- **e. Follow-On Maintenance**

### INITIAL SETUP

**Equipment Conditions**

- Batteries disconnected (para 7-48).
- Kick panel removed (para 16-3).

**Tools and Special Tools**

- Tool Kit, Genl Mech (Item 44, Appendix C)

**Materials/Parts**

- Seal Ring, Metal (Item 251, Appendix G)

---

**a. Removal.**

1. Remove two screws (1) and washers (2) from WTEC II VIM (3).

2. Remove screw (4), washer (5), and two washers (6) from WTEC II VIM (3).

3. Loosen screw (7) in connector J116 (8).

4. Disconnect connector J116 (8) from WTEC II VIM (3).

5. Loosen screw (9) in connector PX33 (10).

6. Disconnect connector PX33 (10) from WTEC II VIM (3).

7. Remove WTEC II VIM (3) from vehicle.
8-6. WTEC II VEHICLE INTERFACE MODULE (VIM) REPLACEMENT/REPAIR (CONT)

b. Disassembly.

(1) Remove eight screws (1), washers (2), and VIM cover (3) from WTEC II VIM (4).

(2) Remove metal seal ring (5) from WTEC II VIM (4). Discard metal seal ring.

(3) Remove two 12V relays (6) from WTEC II VIM (4).

(4) Remove four 24V relays (7) from WTEC II VIM (4).

(5) Remove two 10 amp fuses (8) from WTEC II VIM (4).

(6) Remove nutplate (9) from WTEC II VIM (4).

c. Assembly

(1) Install nutplate (1) in WTEC II VIM (2).

(2) Install two 10 amp fuses (3) in WTEC II VIM (2).

(3) Install four 24V relays (4) in WTEC II VIM (2).

(4) Install two 12V relays (5) in WTEC II VIM (2).

(5) Install metal seal ring (6) on WTEC II VIM (2).

(6) Install VIM cover (7) on WTEC II VIM (2) with eight washers (8) and screws (9).
(7) Tighten eight screws (9) to 4-6 lb-ft (5-8 N\(\cdot\)m) in sequence shown.
d. Installation.

**NOTE**

If replacing WTEC II VIM and a WTEC II VIM is not available, perform para 8-8.

1. Connect connector PX33 (1) to WTEC II VIM (2).
2. Tighten screw (3) in connector PX33 (1).
3. Connect connector J116 (4) to WTEC II VIM (2).
5. Install WTEC II VIM (2) on bottom of dashboard (6) with two washers (7), washer (8), and screw (9).
6. Install two washers (10) and screws (11) in WTEC II VIM (2).

e. Follow-On Maintenance.

1. Install kick panel (para 16-3).
2. Connect batteries (para 7-48).
4. Road test vehicle (TM 9-2320-365-10).
5. Shut down engine (TM 9-2320-365-10).

End of Task.
8-7. WTEC III TRANSMISSION ECU REPLACEMENT

This task covers:

a. Removal
b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (para 7-48).
Kick panel removed (para 16-3).

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)

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

a. Removal.

NOTE

- Remove plastic cable ties as required.

- Tag connectors and connection points prior to disconnecting.

(1) Disconnect connector clamp (1) from connector P114 (2).

(2) Disconnect connector P114 (2) from WTEC III transmission ECU (3).

(3) Disconnect connector clamp (4) from connector P115 (5).

(4) Disconnect connector P115 (5) from WTEC III transmission ECU (3).

(5) Disconnect connector clamp (6) from connector P116 (7).

(6) Disconnect connector P116 (7) from WTEC III transmission ECU (3).
(7) Remove three screws (8) and washers (9) from PDP (10).

(8) Remove three screws (11) from PDP (10).

(9) Lift PDP (10) outward to gain access.

(10) Remove three nuts (12), washers (13), screws (14), washers (15), and WTEC III transmission ECU (3) from dashboard (16).

b. Installation.

**NOTE**

Install plastic cable ties as required.

(1) Install WTEC III transmission ECU (1) on dashboard (2) with three washers (3), screws (4), washers (5), and nuts (6).
8-7. WTEC III TRANSMISSION ECU REPLACEMENT (CONT)

(2) Install PDP (7) on dashboard (2) with three screws (8).

(3) Install three washers (9) and screws (10) in PDP (7).

(4) Connect connector P116 (11) to WTEC III transmission ECU (1).

(5) Connect connector clamp (12) to connector P116 (11).

(6) Connect connector P115 (13) to WTEC III transmission ECU (1).

(7) Connect connector clamp (14) to connector P115 (13).
(8) Connect connector P114 (15) to WTEC III transmission ECU (1).

(9) Connect connector clamp (16) to connector P114 (15).

c. Follow-On Maintenance.

(1) Install kick panel (para 16-3).

(2) Connect batteries (para 7-48).

(3) Start engine (TM 9-2320-365-10).

(4) Check VOLTS gage for charge indication (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
8-8. WTEC III TRANSMISSION CONTROLS INITIAL INSTALLATION

This task covers:

a. Initial Installation
b. WTEC III TPSS Calibration

INITIAL SETUP

Equipment Conditions
WTEC II dashboard cable assembly removed (para 7-10).
WTEC II TEPSS removed (para 8-2).
WTEC II VIM removed (para 8-6).
WTEC II cab transmission harness removed (para 7-86).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Drill, Portable, Electric (Item 7, Appendix C)
Drill Set, Twist (Item 6, Appendix C)
Goggles, Industrial (Item 15, Appendix C)

Personnel Required
(2)

8-26

a. Initial Installation.

(1) Install WTEC III TPSS (1) in instrument panel assembly (2).

(2) Position two brackets (3) and self-locking nuts (4) on rear of WTEC III TPSS (1).

(3) Tighten two self-locking nuts (4) to 11-13 lb-in. (1-2 N·m).

NOTE

Perform steps (4) through (6) on vehicles equipped with auxiliary panel.

(4) Disconnect connector J108 (5) from connector P108 (6).

(5) Disconnect connector J210 (7) from connector P210 (8).

(6) Pull auxiliary panel cable assembly (9) through forward hole in dashboard (10).
NOTE

- Install plastic cable ties as required.

- Route WTEC III cab transmission harness with connector J119 going through forward hole in dashboard under kick panel, until in position under left side dashboard.

(7) Position WTEC III cab transmission harness (11) in dashboard (10).

NOTE

Perform steps (8) through (10) on vehicles equipped with auxiliary panel.

(8) Route auxiliary panel cable assembly (9) through forward hole in dashboard (10).

(9) Connect connector P108 (6) to connector J108 (5).

(10) Connect connector P210 (8) to connector J210 (7).
NOTE
Reference points are from inside passenger side dashboard.

(11) Measure and mark a line 2.0 in. (5 cm) from point A to point B in dashboard (10).

NOTE
Position WTEC III transmission ECU in dashboard with mounting tabs down.

(12) Position WTEC III transmission ECU (11) in dashboard (10) with single mounting tab over matchmark.

CAUTION
Do not position WTEC III transmission ECU on weldnuts in dashboard. Failure to comply may result in damage to equipment.

(13) Match mark mounting tabs on WTEC III transmission ECU (11) with centerpunch.

(14) Remove WTEC III transmission ECU (11) from dashboard (10).

WARNING
Wear goggles when drilling metal. Failure to comply may result in injury to personnel.

(15) Drill a pilot hole at centerpunch points marked in step (13).

(16) Enlarge three pilot holes in step (15) to 0.315 in. (0.8 cm).

(17) Install WTEC III transmission ECU (11) under dashboard (10) with three washers (16), screws (17), washers (18), and nuts (19).
(18) Connect connector P114 (20) to WTEC III transmission ECU (11).

(19) Connect connector clamp (21) on connector P114 (20).

**WARNING**
Ensure WTEC III cab transmission harness does not interfere with throttle linkage. Failure to comply may result in injury to personnel.

**NOTE**
Step (20) requires the aid of an assistant.

(20) Install gasket (22) and connector J119 (23) on cab (24) with four screws (25), lockwashers (26), and nuts (27).
(21) Connect connector P119 (28) to connector J119 (23).

(22) Remove nut (29), lockwasher (30), terminal lug TL57 (31), washer (32), screw (33), and washer (34) from dashboard (10). Discard lockwasher.

(23) Install WTEC III dashboard cable assembly (para 7-11).
b. WTEC III TPSS Calibration.

NOTE

WTEC III TPSS requires calibration after installation. Calibration is accomplished in steps (1) through (4).

(1) Position master power switch to on and wait for neutral (N) indication from WTEC III TPSS (TM 9-2320-365-10).

(2) Position master power switch to off (TM 9-2320-365-10).

(3) Perform steps (1) and (2) four more times.

(4) Position master power switch to on (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Check VOLTS gage for charge indication (TM 9-2320-365-10).

NOTE

Transmission shifting may be rough until WTEC III TPSS determines proper shift points. Operating vehicle through each gear range several times will allow WTEC III TPSS to determine proper shift points.

(7) Test drive vehicle and check operation of vehicle through all gear ranges several times (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.
### 8-9. TRANSMISSION 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).

**Tools and Special Tools**

- Goggles, Industrial (Item 15, Appendix C)
- Container (60 qt (57 L) capacity)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

**Materials/Parts**

- Oil, Lubricating, OE/HDO 15W40 (Item 46, Appendix D)
- Kit, Filter (Item 55, Appendix G)
- Screw, Cap (4) (Item 237.1, 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.

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

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**CAUTION**

There are two transmission oil filters. Do not replace one transmission oil filter without replacing the other. Failure to comply may result in damage to equipment.


  1. Position container under transmission control valve module (1).

  2. Remove drain plug (2) from transmission control valve module (1) and drain oil.
CAUTION

Perform Transmission Troubleshooting, f20. Metal Particles Found During Transmission Oil Change, if inspection of drain plug reveals metal particles. Failure to comply may result in damage to equipment.

(3) Inspect drain plug (2) for presence of metal particles.

(4) Remove preformed packing (3) from drain plug (2). Discard preformed packing.

(5) Position container under transfer case (4).

(6) Remove drain plug (5) from transfer case (4) and drain oil.

CAUTION

Perform Transmission Troubleshooting, f20. Metal Particles Found During Transmission Oil Change, if inspection of drain plug reveals metal particles. Failure to comply may result in damage to equipment.

(7) Inspect drain plug (5) for presence of metal particles.

(8) Remove preformed packing (6) from drain plug (5). Discard preformed packing.
8-9. TRANSMISSION OIL FILTER REPLACEMENT (CONT)

**CAUTION**

Use care when removing bearing cups from universal joint. Failure to comply may result in damage to equipment.

9) Remove four screws (7) and two bearing cups (8) from drive yoke (9). Discard screws.

10) Slide drive shaft (10) from side to side and separate universal joint (10.1) from drive yoke (9).

**NOTE**

Both transmission oil filters are removed the same way. Right side transmission oil filter shown.

11) Remove six screws (11) from transmission oil filter cover (12).

**NOTE**

Perform step (12) on transmissions SN lower than 6510069120.

12) Remove transmission oil filter cover (12) and transmission oil filter (13) from transmission control valve module (1).

**NOTE**

Perform step (13) on transmissions SN 6510069120 and higher.

13) Remove transmission oil filter cover (12), gasket (14), and transmission oil filter (13) from transmission control valve module (1). Discard gasket.

14) Remove transmission oil filter (13) from transmission oil filter cover (12).
Perform Transmission Troubleshooting, f20. Metal Particles Found During Transmission Oil Change, if inspection of transmission oil filter reveals metal particles. Failure to comply may result in damage to equipment.

(15) Inspect transmission oil filter (13) for presence of metal particles. Discard transmission oil filter.

**NOTE**

- Transmissions lower than SN 6510029120 are equipped with two preformed packings on each transmission oil filter.

- Transmissions SN 651069120 and higher are equipped with one preformed packing on each transmission oil filter.

(16) Remove preformed packing(s) (15) from transmission oil filter cover (12). Discard preformed packing(s).

b. Installation.

**NOTE**

Both transmission oil filters are installed the same way. Right side transmission oil filter shown.

- Transmissions lower than SN 6510029120 are equipped with two preformed packings on each transmission oil filter.

- Transmissions SN 651069120 and higher are equipped with one preformed packing on each transmission oil filter.

(1) Install preformed packing (1) on transmission oil filter cover (2).

(2) Install transmission oil filter (3) in transmission oil filter cover (2).
8-9. TRANSMISSION OIL FILTER REPLACEMENT (CONT)

NOTE
Perform step (3) on transmissions SN 6510069120 and higher.

(3) Position gasket (4) and transmission oil filter cover (2) on transmission control module (5) with six screws (6).

NOTE
Perform step (4) on transmissions SN lower than 6510069120

(4) Position transmission oil filter cover (2) on transmission control module (5) with six screws (6).

(5) Tighten six screws (6) to 38-45 lb-ft (52-61 N·m) in sequence shown.

CAUTION
Ensure needle bearings are aligned prior to installation of bearing cups on universal joint trunnions. Failure to comply may result in damage to equipment.

(6) Position universal joint (7) in drive yoke (8) with two bearing cups (9) and four screws (10).

NOTE
When correct torque is reached, bearing cap screw small hex head will break off.

(7) Tighten four screws (10) to 26-35 lb-ft (35-47 N·m).
(8) Install preformed packing (11) on drain plug (12).

(9) Position drain plug (12) in transfer case (13).

(10) Tighten drain plug (12) to 18-24 lb-ft (25-32 N·m).

(11) Install preformed packing (14) on drain plug (15).

(12) Position drain plug (15) in transmission control valve module (5).

(13) Tighten drain plug (15) to 18-24 lb-ft (25-32 N·m).

c. Follow-On Maintenance.

(1) Add lubricating oil to transmission (Appendix H).

(1.1) Lubricate drive shaft and universal joint (Appendix H).

(2) Start engine (TM 9-2320-365-10).

(3) Check transmission oil level (TM 9-2320-365-10).

(4) Check for oil leaks around transmission oil filters.

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
8-10. TRANSMISSION OIL COOLER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Container (60 qt (57 L) capacity)
Pan, Drain (Item 24, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix B)
Crowfoot Attachment, Socket Wrench (Item 12.1, Appendix B)

Materials/Parts
Antifreeze, Ethylene Glycol, Permanent (Item 13, Appendix D)
Packing, Preformed (4) (Item 158, Appendix G)
Packing, Preformed (2) (Item 158.1, Appendix G)
Nut, Self-Locking (Item 122.1, Appendix G)

Personnel Required
(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.

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

a. Removal.

(1) Position container under radiator (1).

(2) Remove radiator cap (2) from radiator overflow tank (3).

(3) Open radiator draincock (4) and drain coolant.

(4) Close radiator draincock (4).
(5) Position drain pan under transmission oil cooler (5).

(6) Loosen clamp (6) on radiator hose (7).

(7) Remove radiator hose (7) from transmission oil cooler (5).

(8) Remove clamp (6) from radiator hose (7).

(9) Loosen clamp (8) on coolant hose (9).

(10) Remove coolant hose (9) from transmission oil cooler (5).

(11) Remove clamp (8) from coolant hose (9).

(12) Loosen clamp (10) on coolant hose (11).

(13) Remove coolant hose (11) and flow restrictor (12) from transmission oil cooler (5).

(14) Remove clamp (10) from coolant hose (11).

NOTE
Perform steps (15) through (17) on vehicles equipped with transmission oil cooler tubes.

(15) Disconnect transmission oil cooler tubes (13 and 14) from two fittings (15).

(16) Remove two fittings (15) from transmission oil cooler (5).

(17) Remove two preformed packings (16) from fittings (15). Discard preformed packings.
8-10. TRANSMISSION OIL COOLER REPLACEMENT (CONT)

NOTE

Perform steps (18) through (20) on vehicles equipped with transmission oil cooler hoses.

(18) Disconnect transmission oil cooler hoses (13 and 14) from two fittings (15).

(19) Remove two fittings (15) from transmission oil cooler (5).

(20) Remove two preformed packings (16 and 17) from fittings (15). Discard preformed packings.

NOTE

- Vehicles may be equipped with either a corrosive enhanced clamp or a non-corrosive enhanced clamp. Corrosive enhanced clamps have a self-locking nut and interior lining. When removing a non-corrosive enhanced clamp, replace it with a corrosive enhanced clamp.

- Steps (21) and (22) require the aid of an assistant.

- Perform step (21) on vehicles not equipped with corrosive enhanced clamp.

(21) Remove screw (18), clamp (19), and transmission oil cooler (5) from bracket (20). Discard clamp and screw.
NOTE
Perform step (22) on vehicles equipped with corrosive enhance clamp.

(22) Remove self-locking nut (21), clamp (22), and transmission oil cooler (5) from bracket (20). Discard self-locking nut.

b. Installation.

NOTE
Step (1) requires the aid of an assistant.

(1) Install transmission oil cooler (1) on bracket (2) with clamp (3) and self-locking nut (4).

NOTE
Perform steps (2) through (5) on vehicles equipped with transmission oil cooler hoses.

(2) Install two preformed packings (5 and 6) on fittings (7).

(3) Install two fittings (7) in transmission oil cooler (1).

(4) Position transmission oil cooler hoses (8 and 9) on two fittings (7).

(5) Tighten transmission oil cooler hoses (8 and 9) to 94-104 lb-ft (127-141 N·m).
NOTE

Perform steps (6) through (9) on vehicles equipped with transmission oil cooler tubes.

(6) Install two preformed packings (6) on fittings (7).

(7) Install two fittings (7) on transmission oil cooler (1).

(8) Position transmission oil cooler tubes (8 and 9) on two fittings (7).

(9) Tighten transmission oil cooler tubes (8 and 9) to 94-104 lb-ft (127-141 N·m).

(10) Loosen three screws (10) in clamps (11) as far as possible without disengaging screws from D-nuts (12).

(11) Unhook clamp tab (13) from tab window (14) on three clamps (11).

(12) Position three clamps (11) on coolant hoses (15, 16, and 17).
8-10. TRANSMISSION OIL COOLER REPLACEMENT (CONT)

(13) Position flow restrictor (18) and coolant hose (15) on transmission oil cooler (1).

(14) Position coolant hose (16) on transmission oil cooler (1).

(15) Position radiator hose (17) on transmission oil cooler (1).

**CAUTION**

Ensure clamp tongue is started in clamp groove. Failure to comply may result in damage to equipment.

(16) Engage as many clamp tabs (13) as possible in tab windows (14) allowing little or no play between clamp and coolant hose (15).

(17) Tighten three clamps (11) to 12-18 lb-in. (1-2 N·m).

**NOTE**

Minimum allowable gap between ends of clamp is 0.2 in. (5 mm). If gap is less than minimum allowable, remove and re-install clamp.

(18) Measure gap between ends of three clamps (11).

**c. Follow-On Maintenance.**

(1) Add coolant to radiator overflow tank (Appendix H).

(2) Install radiator cap on radiator overflow tank.

(3) Service transmission (Appendix H).

(4) Operate vehicle and check transmission oil cooler and fittings for oil leaks (TM 9-2320-366-10-1).

End of Task.
8-11. TRANSMISSION OIL COOLER TUBES 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)
Crowfoot Attachment, Socket Wrench (Item 12.1, Appendix B)

Tools and Special Tools (Cont)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts
Packing, Preformed (2) (Item 165, Appendix G)
Packing, Preformed (Item 158.2, 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.

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

a. Removal.

(1) Position drain pan under transmission oil cooler tube (1).

(2) Disconnect transmission oil cooler tube (1) from 90-degree fitting (2).

NOTE

Transmission oil cooler tube must exit from rear of vehicle.

(3) Remove transmission oil cooler tube (1) from transmission oil cooler (3).
(4) Disconnect transmission oil cooler tube (4) from 90-degree fitting (5).

(5) Disconnect transmission oil sampling hose (6) from 45-degree fitting (7).

(6) Remove 45-degree fitting (7) from transmission oil cooler tube (4).

(7) Remove preformed packing (8) from 45-degree fitting (7). Discard preformed packing.

(8) Remove transmission oil cooler tube (4) from transmission oil cooler (3).
b. Installation.

(1) Position transmission oil cooler tube (1) on transmission oil cooler (2).

(2) Tighten transmission oil cooler tube (1) to 94-104 lb-ft (127-141 N·m).

(3) Install preformed packing (3) on 45-degree fitting (4).

(4) Install 45-degree fitting (4) in transmission oil cooler tube (1).

(5) Connect transmission oil sampling hose (5) to 45-degree fitting (4).

(6) Position transmission oil cooler tube (1) on 90-degree fitting (6).

(7) Tighten transmission oil cooler tube (1) to 94-104 lb-ft (127-141 N·m).
8-11. TRANSMISSION OIL COOLER TUBES REPLACEMENT (CONT)

NOTE

Transmission oil cooler return tube must be installed from rear of vehicle.

(8) Position oil cooler tube (7) on transmission oil cooler (2).

(9) Tighten transmission oil cooler tube (7) to 94-104 lb-ft (127-141 N·m).

(10) Position transmission oil cooler tube (7) on 90-degree fitting (8).

(11) Tighten transmission oil cooler tube (7) to 94-104 lb-ft (127-141 N·m).

c. Follow-On Maintenance.

(1) Service transmission (Appendix H).

(2) Operate vehicle and check transmission oil cooler tubes and fittings for oil leaks (TM 9-2320-365-10).

End of Task.
## 8-12. TRANSMISSION SCAVENGE PUMP HOSE REPLACEMENT

This task covers:

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### INITIAL SETUP

**Equipment Conditions**
Exhaust pipe removed (para 5-3).
Transmission oil cooler tube removed, if equipped (para 8-11).
Transmission oil cooler hose removed, if equipped (para 8-15).

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

**Tools and Special Tools (Cont)**
Pan, Drain (Item 24, Appendix C)

**Materials/Parts**
Filter Element, Fluid (Item 15, Appendix G)
Packing, Preformed (2) (Item 175, 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.

### a. Removal.

1. Position drain pan under back end of scavenge pump hose (1).
2. Disconnect scavenge pump hose (1) from 45-degree fitting (2).
3. Remove scavenge pump hose (1) from fitting (3).
(4) Remove fitting (3) from scavenge pump (4).

(5) Remove preformed packing (5) from fitting (3). Discard preformed packing.

(6) Remove 45-degree fitting (2) from transfer case (6).

(7) Remove preformed packing (7) from 45-degree fitting (2). Discard preformed packing.

(8) Remove filter (8) from transfer case (6). Discard filter.

b. Installation.

(1) Install filter (1) in transfer case (2).

(2) Install preformed packing (3) on 45-degree fitting (4).

(3) Install 45-degree fitting (4) in transfer case (2).
(4) Install preformed packing (5) on fitting (6).

(5) Install fitting (6) in scavenge pump (7).

(6) Install scavenge pump hose (8) on fitting (6).

(7) Install scavenge pump hose (8) on 45-degree fitting (4).
8-12. TRANSMISSION SCAVENGE PUMP HOSE REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Install transmission oil cooler hose, if equipped (para 8-15).

(2) Install transmission oil cooler tube, if equipped (para 8-11).

(3) Install exhaust pipe (para 5-3).

(4) Service transmission (Appendix H).

(5) Check for exhaust leaks around exhaust pipe.

(6) Operate vehicle and check for oil leaks around transmission scavenge pump hose.

End of Task.
8-13. TRANSMISSION 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).

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 (3) (Item 148, Appendix G)

a. Removal.

(1) Remove screw (1) and clamp (2) from radiator overflow tank bracket (3).

(2) Position radiator overflow tank (4) for access to screw (5).

(3) Remove cap (6) from transmission oil fill tube (7).

(4) Remove self-locking nut (8), washer (9), lanyard mounting plate (10), transmission oil fill tube (7), screw (11), and washer (12) from engine oil fill tube (13). Discard self-locking nut.
8-13. TRANSMISSION OIL FILL TUBE REPLACEMENT (CONT)

NOTE

Perform step (5) on all models except M1081.

(5) Remove self-locking nut (14), washer (15), transmission oil fill tube (7), screw (5), and washer (16) from engine oil fill tube (13). Discard self-locking nut.

NOTE

Perform step (6) on M1081.

(6) Remove self-locking nut (14), washer (15), transmission oil fill tube (7), engine oil fill tube (13), screw (5), and washer (16) from front lifting beam (17). Discard self-locking nut.

(7) Loosen clamp (18) on transmission oil fill hose (19).

(8) Remove transmission oil fill tube (7) from transmission oil fill hose (19).
b. Installation.

(1) Position transmission oil fill tube (1) in transmission oil fill hose (2) with clamp (3).

(2) Tighten clamp (3) to 24-48 lb-in. (3-5 N·m).

NOTE
Perform step (3) on M1081.

(3) Position engine oil fill tube (4) and transmission oil fill tube (1) on front lifting beam (5) with washer (6), screw (7), washer (8), and self-locking nut (9).

NOTE
Perform step (4) on all models except M1081.

(4) Position transmission oil fill tube (5) on engine oil fill tube (4) with washer (6), screw (7), washer (8), and self-locking nut (9).
(5) Position lanyard mounting plate (10) and transmission oil fill tube (1) on engine oil fill tube (4) with washer (11), screw (12), washer (13), and self-locking nut (14).

(6) Tighten self-locking nuts (9 and 14) to 22-26 lb-ft (29-35 N·m).

(7) Position radiator overflow tank (15) on radiator overflow tank bracket (16) with clamp (17) and screw (18).

(8) Tighten screw (18) to 23-29 lb-ft (31-39 N·m).

(9) Install cap (19) on transmission oil fill tube (1).

c. Follow-On Maintenance.

Lower cab (TM 9-2320-365-10).

End of Task.
# 8-14. TRANSMISSION OIL COOLER HOSES INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

## INITIAL SETUP

### Equipment Conditions

- Engine shut down (TM 9-2320-365-10).
- Cab raised (TM 9-2320-365-10).
- Transmission oil cooler tubes removed (para 8-11).

### Tools and Special Tools

- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Pan, Drain (Item 24, Appendix C)
- Crowfoot Attachment, Socket Wrench (Item 12.1, Appendix B)
- Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)
- Socket Set, Socket Wrench (Item 34, Appendix C)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

### Materials/Parts

- Ties, Cable, Plastic (Item 69, Appendix D)
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

### Materials/Parts (Cont)

- Antiseize Compound (Item 63, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.2, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.3, Appendix D)
- Hose Assembly, Nonmetallic (Item 25.4, Appendix D)
- Elbow, Pipe to Tube (Item 21.2, Appendix D)
- Adapter, Straight, Pipe to Boss (2)(Item 1.1, Appendix D)
- Elbow, Pipe to Boss (Item 21.1, Appendix D)
- Clamp, Loop (4) (Item 15.1, Appendix D)
- Screw, Cap, Hex Hd (4) (Item 56.2, Appendix D)
- Nut, Self-Locking (4) (Item 134, Appendix G)
- Nut, Self-Locking (4) (Item 145, Appendix G)
- Bracket, Angle (Item 14.2, Appendix D)
- Screw, Cap, Hex Hd (4) (Item 56.3, Appendix D)
- Gasket (Item 40.1, Appendix G)

### Personnel Required

(2)

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**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.

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

### a. Installation.

1. Remove transmission oil sampling hose (1) from transmission oil sampling valve (2). Discard transmission oil sampling hose.
NOTE
Step (2) requires the aid of an assistant.

(2) Remove four self-locking nuts (3), bolts (4), and lower front support crossmember (5) from vehicle. Discard self-locking nuts.

(3) Remove four screws (6), washers (7), flywheel cover (8), and gasket (9) from flywheel housing (10). Discard screws and gasket.

(4) Loosen jam nut (11) on two 90-degree fittings (12).

(5) Remove two 90-degree fittings (12) from transmission (13). Discard 90-degree fittings.
(6) Remove two fittings (14) from transmission oil cooler (15). Discard fittings.

(7) Install fitting (16) in transmission oil cooler (15).

(8) Position transmission oil cooler hose (17) on fitting (16).

NOTE
Position hole in fitting so that hole faces upward towards engine.

(9) Install fitting (18) in transmission oil cooler (15).

(10) Position transmission oil cooler hose (19) on fitting (18).

(11) Tighten transmission oil cooler hoses (17 and 19) to 94-104 lb-ft (127-141 N·m).
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.

(12) Apply antiseize compound to threads of 45-degree fitting (20).

(13) Install 45-degree fitting (20) on transmission oil cooler hose (19).

(14) Connect transmission oil sampling hose (21) to 45-degree fitting (20).

(15) Connect transmission oil sampling hose (21) to transmission oil sampling valve (2).
(16) Position 90-degree fitting (22) in transmission (13).

(17) Tighten jam nut (23) on 90-degree fitting (22).

(18) Position transmission oil cooler hose (19) on 90-degree fitting (22).

(19) Position 90-degree fitting (24) on transmission (13).

(20) Tighten jam nut (25) on 90-degree fitting (24).

(21) Position transmission oil cooler hose (17) on 90-degree fitting (24).

(22) Tighten transmission oil cooler hoses (17 and 19) to 94-104 lb-ft (127-141 N·m).

(23) Position four clamps (26) on transmission oil cooler hoses (17 and 19).

**NOTE**
Step (24) requires the aid of an assistant.

(24) Position four clamps (26) on transmission oil cooler hose bracket (27) with four screws (28) and self-locking nuts (29).

(25) Install gasket (9), flywheel cover (8), and transmission oil cooler hose bracket (27) on flywheel housing (10) with four washers (7) and screws (28).

(26) Tighten four self-locking nuts (29) to 96-132 lb-in. (11-13 N·m).

(27) Tighten four screws (28) to 16-25 lb-ft (21-35 N·m).
8-14. TRANSMISSION OIL COOLER HOSES INITIAL INSTALLATION (CONT)

NOTE

Step (28) requires the aid of an assistant.

(28) Position lower front support crossmember (5) on vehicle with four bolts (4) and self-locking nuts (3).

(29) Tighten four self-locking nuts (3) to 295-369 lb-ft (400-500 N·m).

b. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Service transmission (Appendix H).

(3) Operate vehicle and check transmission oil cooler hoses and fittings for oil leaks (TM 9-2320-365-10).

End of Task.
8-15. TRANSMISSION OIL COOLER HOSES REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

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

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Pan, Drain (Item 24, Appendix C)
Wrench, Torque 0-200 lb-in. (Item 58, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Crowfoot Attachment, Socket Wrench (Item 12.1, Appendix B)
Socket Set, Socket Wrench (Item 34, Appendix C)
Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Cap and Plug Set (Item 15, Appendix D)
Tie, Cable, Plastic (Item 69, Appendix D)
Nut, Self-locking (4) (Item 134, Appendix G)
Nut, Self-locking (4) (Item 145, Appendix G)
Antiseize Compound (Item 63, Appendix D)
Packing, Preformed (2) (Item 158, Appendix G)
Packing, Preformed (2) (Item 158.1, Appendix G)

Personnel Required
(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.

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

a. Removal.

CAUTION

Cap or plug hoses when disconnecting to prevent contamination of transmission oil. Failure to comply may result in damage to equipment.

NOTE

• Tag hoses and connection points prior to disconnecting.

• Step (1) requires the aid of an assistant.

(1) Remove four self-locking nuts (1), bolts (2), and lower front support crossmember (3) from vehicle. Discard self-locking nuts.
(2) Remove four screws (4), washers (5), transmission oil cooler hose bracket (6), flywheel cover (7), and gasket (8) from flywheel housing (9). Discard gasket.

(3) Remove four self-locking nuts (10), screws (11), and clamps (12) from transmission oil cooler hose bracket (6). Discard self-locking nuts.

(4) Remove four clamps (12) from transmission oil cooler hoses (13 and 14).

(5) Position drain pan under transmission (15).

(6) Disconnect transmission oil cooler hose (13) from 90-degree fitting (16).

(7) Remove preformed packing (17) from 90-degree fitting (16). Discard preformed packing.

(8) Disconnect transmission oil cooler hose (14) from 90-degree fitting (18).

(9) Remove preformed packing (19) from 90-degree fitting (18). Discard preformed packing.
(10) Position drain pan under transmission oil cooler (20).

(11) Remove transmission oil cooler hose (13) from fitting (21).

(12) Remove preformed packing (22) from fitting (21). Discard preformed packing.

(13) Disconnect transmission oil sampling hose (23) from 45-degree fitting (24).

**NOTE**

Note orientation of 45-degree fitting prior to removal.

(14) Remove 45-degree fitting (24) from transmission oil cooler hose (14).

(15) Remove transmission oil cooler hose (14) from fitting (25).

(16) Remove preformed packing (26) from fitting (25). Discard preformed packing.
8-15. TRANSMISSION OIL COOLER HOSES REPLACEMENT (CONT)

b. Installation.

**NOTE**

Install plastic cable ties as required.

(1) Install preformed packing (1) on fitting (2).

(2) Position transmission oil cooler hose (3) on fitting (2).

(3) Tighten transmission oil cooler hose (3) to 94-104 lb-ft (127-141 N·m).

---

**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.

(4) Apply antiseize compound to threads of 45-degree fitting (4).

(5) Install 45-degree fitting (4) in transmission oil cooler hose (3).

(6) Connect transmission oil sampling hose (5) to 45-degree fitting (4).

(7) Install preformed packing (6) on fitting (7).

(8) Position transmission oil cooler hose (8) on fitting (7).

(9) Tighten transmission oil cooler hose (8) to 94-104 lb-ft (127-141 N·m).
(10) Install preformed packing (9) on 90-degree fitting (10).

(11) Position transmission oil cooler hose (8) on 90-degree fitting (10).

(12) Tighten transmission oil cooler hose (8) to 94-104 lb-ft (127-141 N·m).

(13) Install preformed packing (11) on 90-degree fitting (12).

(14) Position transmission oil cooler hose (3) on 90-degree fitting (12).

(15) Tighten transmission oil cooler hose (3) to 94-104 lb-ft (127-141 N·m).

(16) Position four clamps (13) on transmission oil cooler hoses (3 and 8).

**NOTE**

Step (17) requires the aid of an assistant.

(17) Position four clamps (13) on transmission oil cooler hose bracket (14) with four screws (15) and self-locking nuts (16).

(18) Position gasket (17), flywheel cover (18), and transmission oil cooler hose bracket (14) on flywheel housing (19) with four washers (20) and screws (21).

(19) Tighten four self-locking nuts (16) to 96-132 lb-in. (11-13 N·m).

(20) Tighten four screws (21) to 16-25 lb-ft (21-35 N·m).
**NOTE**

Step (21) requires the aid of an assistant.

(21) Position lower front support crossmember (22) on vehicle with four bolts (23) and self-locking nuts (24).

(22) Tighten four self-locking nuts (24) to 295-369 lb-ft (400-500 N·m).

c. **Follow-On Maintenance.**

(1) Lower cab (TM 9-2320-365-10).

(2) Service transmission (Appendix H).

(3) Operate vehicle and check transmission oil cooler hoses and fittings for oil leaks (TM 9-2320-365-10).

**End of Task.**
8-16. TRANSMISSION OIL COOLER HOSE BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions

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

Tools and Special Tools

Goggles, Industrial (Item 15, Appendix C)
Wrench, Torque 0-600 lb-ft (Item 59, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Socket Set, Socket Wrench (Item 34, Appendix C)

Materials/Parts

Ties, Cable, Plastic (Item 76, Appendix D)
Nut, Self-Locking (4) (Item 145, Appendix G)
Nut, Self-Locking (4) (Item 134, Appendix G)
Gasket (Item 40.1, Appendix G)

Personnel Required

(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.

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

a. Removal.

NOTE

• Remove plastic cable ties as required.

• Step (1) requires the aid of an assistant.

(1) Remove four self-locking nuts (1), bolts (2), and lower front support crossmember (3) from vehicle. Discard self-locking nuts.
8-16. TRANSMISSION OIL COOLER HOSE BRACKET REPLACEMENT (CONT)

(2) Remove four screws (4), washers (5), transmission oil cooler hose bracket (6), flywheel cover (7), and gasket (8) from flywheel housing (9). Discard gasket.

(3) Remove four self-locking nuts (10), screws (11), and clamps (12) from transmission oil cooler hose bracket (6). Discard self-locking nuts.

b. Installation.

NOTE

- Install plastic cable ties as required.
- Step (1) requires the aid of an assistant.

(1) Position four clamps (1) on transmission oil cooler hose bracket (2) with four screws (3) and self-locking nuts (4).
(2) Position gasket (5), flywheel cover (6), transmission oil cooler hose bracket (2) on flywheel housing (7) with four washers (8) and screws (9).

(3) Tighten four self-locking nuts (4) to 8-11 lb-ft (11-13 N·m).

(4) Tighten four screws (9) to 16-25 lb-ft (21-35 N·m).

NOTE
Step (5) requires the aid of an assistant.

(5) Position lower front support crossmember (10) on vehicle with four bolts (11) and self-locking nuts (12).

(6) Tighten four self-locking nuts (12) to 295-369 lb-ft (400-500 N·m).

End of Task.
CHAPTER 9
PROPELLER SHAFT 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section I. INTRODUCTION

9-1. INTRODUCTION

This chapter contains maintenance instructions for replacing drive shafts and universal joints authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
9-2. DRIVE SHAFT AND UNIVERSAL JOINT REPLACEMENT/REPAIR

This task covers:

a. Removal   d. Assembly
b. Disassembly e. Installation
c. Cleaning/Inspection f. Follow-On Maintenance

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)
Goggles, Industrial (Item 15, Appendix C)
Hammer, Hand (Item 18, Appendix C)

Materials/Parts
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)

Materials/Parts (Cont)
Solvent, Dry Cleaning (Item 71, Appendix D)
Rag, Wiping (Item 51, Appendix D)
Spider, Universal Joint, Vehicular (Item 260.1, Appendix G)
Seal, Shaft (Item 255.2, Appendix G)
Screw, Cap (8 per drive shaft) (Item 237.1, Appendix G)

Personnel Required
(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.

a. Removal.

NOTE

- All drive shafts are removed the same way. Front drive shaft shown.
- There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups with tabs.

(1) Lift tabs from two bearing cups (1).

(1.1) Remove four screws (2) and two bearing cups (1) from drive yoke (3). Discard screws.

(2) Slide drive shaft (4) from side to side and separate universal joint (5) from drive yoke (3).

(3) Perform steps (1) and (2) on opposite end of drive shaft (4).
NOTE

Perform the following step on bearing cups with tabs.

(4) Lift tabs from two bearing cups (6)
(4.1) Remove four screws (6) and two bearing cups (7) from drive shaft (4). Discard screws.

(5) Remove universal joint (5) from drive shaft (4).

(6) Remove two grease fittings (8) from universal joint (5).

b. Disassembly.

CAUTION

Match mark spline plug to slip yoke to prevent assembly out of phase or out of balance. Failure to comply may result in damage to equipment.

(1) Match mark spline plug (1) to slip yoke (2).
(2) Remove dust seal (3) from slip yoke (2).
(3) Remove slip yoke (2) from spline plug (1).
(4) Remove dust seal (3) from spline plug (1). Discard dust seal.
9-2. DRIVE SHAFT AND UNIVERSAL JOINT REPLACEMENT/REPAIR (CONT)

c. Cleaning/Inspection.

- 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.

(1) Clean inside of slip yoke (1) with dry cleaning solvent to remove dried or contaminated grease.

(2) Clean spline plug (2) with dry solvent to allow inspection of splines.

**NOTE**

Replace complete driveshaft if spline plug fails visual inspection.

(3) Inspect spline plug (2) for cracks, chips, galling, and signs of excessive wear.

d. Assembly.

(1) Install dust seal (1) on spline plug (2).

(2) Install slip yoke (3) on spline plug (2) with matchmarks aligned.

(3) Install dust seal (1) on slip yoke (3).
e. Installation.

**WARNING**

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

**CAUTION**

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

**NOTE**

Wipe end of yoke bearing bores prior to installation.

1. Install two grease fittings (1) in universal joint (2).

**NOTE**

There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups not equipped with tabs.

2. Position universal joint (2) on drive shaft (3) with two bearing cups (4) and four screws (5).
9-2. DRIVE SHAFT AND UNIVERSAL JOINT REPLACEMENT/REPAIR (CONT)

NOTE

Perform the following step on kits equipped with screws P/N C5H5-24-39.

(2.1) Tighten four screws (5) to 26-35 lb-ft (35-47 N·m).

NOTE

- Perform the following step on kits equipped with shearhead screws.
- Alternately tighten screws.
- When correct torque is reached, bearing cap screw small hex head will break off.

(3) Tighten four screws (5).

NOTE

Perform the following two steps on bearing cups equipped with tabs.

(3.1) Tighten four screws (5) to 26-35 lb-ft (35-47 N·m).

(3.2) Fold tabs on four screws (5).

(4) Deleted.

CAUTION

Grease must flow from all four seals. Failure to comply may result in damage to equipment.

(5) Apply lubrication to grease fittings (1).

(6) Perform steps (1) through (5) on opposite end of drive shaft (3).
WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

- Wipe end of yoke bearing bores prior to installation.
- There are two types of bearing cups, those with tabs and those without. Perform the following on bearing cups not equipped with tabs.

(7) Position universal joint (2) on drive yoke (6) with two bearing cups (7) and four screws (8).

NOTE

Perform the following step on kits equipped with screws P/N C5H5-24-39.

(7.1) Tighten four screws (8) to 26-35 lb-ft (35-47 N•M).

NOTE

- Perform the following step on kits equipped with shearhead screws.
- When correct torque is reached, bearing cap screw small hex head will break off.

(8) Tighten four screws (8).
9-2. DRIVE SHAFT AND UNIVERSAL JOINT REPLACEMENT/REPAIR (CONT)

NOTE

Perform the following two steps on bearing cups equipped with tabs.

(8.1) Tighten four screws (8) to 26-35 lb-ft (35-47 N•m).

(8.2) Fold tabs on four screws (8).

(9) Deleted.

(10) Perform steps (7) through (9) on opposite end of drive shaft (3).

CAUTION

Grease must flow from all four seals. Failure to comply may result in damage to equipment.

(11) Apply lubrication to grease fittings on drive shaft (3).


(1) Lubricate drive shaft and universal joints (Appendix H).

(2) Test drive vehicle and check for unusual vibrations.

End of Task.
9-3. DRIVE SHAFT HINGING INSPECTION

This task covers:

a. Inspection

INITIAL SETUP

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**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. Inspection.

1. Place vehicle on level surface.
2. Clean slip yoke (1) and shaft (2) with a dry rag.
3. Mount dial indicator magnetic base (3) on bottom center of slip yoke (1).
4. Place dial indicator (4) 0.5 inches (12.7 mm) from slip yoke seal (5).
5. Push up on shaft (2) and adjust indicator (4) to zero.
6. Pull down on shaft (2) and observe hinging reading.
7. If reading is greater than 0.020 in. (0.508 mm), replace drive shaft assembly (para 9-2).
8. Remove dial indicator (3) from shaft (2).

End of Task.
CHAPTER 10
FRONT AND REAR AXLE 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

Section I. INTRODUCTION

10-1. INTRODUCTION

This chapter contains maintenance instructions for replacing axle components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

10-2. WHEEL BEARING/CENTRAL TIRE INFLATION SYSTEM (CTIS) SEAL REPLACEMENT

This task covers:

a. Removal  
b. Cleaning/Inspection  
c. Installation  
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Wheel removed (TM 9-2320-365-10).  
Differential spider assembly removed (para 10-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)  
Gloves, Rubber (Item 13, Appendix C)  
Goggles, Industrial (Item 15, Appendix C)  
Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)  
Jack, Hydraulic, Hand (Item 21, Appendix C)  
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)  
Socket, Socket Wrench (Item 70, Appendix B)  
CTIS Seal Driver (Item E-18, Appendix E)  
Wheel Hub Grease Seal Driver (Item E-19, Appendix E)

Tools and Special Tools (Cont)
Wheel Bearing Shim Tool Rest (Item E-10, Appendix E)  
Gage, Depth, Micrometer (Item 10, Appendix C)

Materials/Parts
Rag, Wiping (Item 51, Appendix D)  
Adhesive (Item 6, Appendix D)  
Tape, Duct (Item 74, Appendix D)  
Solvent, Dry Cleaning (Item 71, Appendix D)  
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)  
Seal Assembly, CTIS (2) (Item 248, Appendix G)  
Seal Assembly, Hub (Item 249, Appendix G)

Personnel Required
(2)

a. Removal.

**WARNING**

Wheel drum weighs approximately 90 lbs (41 Kgs). Use the aid of an assistant to remove wheel drum. Failure to comply may result in injury to personnel or damage to equipment.

**NOTE**

Front axle and rear axle wheel bearings and CTIS seals are removed the same way. Left front axle shown.

(1) Remove wheel drum (1) from wheel end hub (2).
NOTE

Number of shims may vary on each wheel end.

(2) Remove shim(s) (3) and wheel bearing nut (4) from spindle (5).

(3) Remove outer wheel bearing cone (6) from wheel end hub (2).

(4) Remove wheel end hub (2) from spindle (5).

(5) Remove CTIS seal retaining ring (7) from wheel end hub (2).

(6) Remove CTIS seal guide (8) and CTIS seal (9) from wheel end hub (2). Discard CTIS seal.
(7) Remove hub seal (10) from wheel end hub (2). Discard hub seal.

(8) Remove inner wheel bearing cone (11) from wheel end hub (2).

(9) Remove CTIS seal retaining ring (12) from wheel end hub (2).

(10) Remove CTIS seal guide (13) and CTIS seal (14) from wheel end hub (2). Discard CTIS seal.

(11) Remove cup (15) from wheel end hub (2).
(12) Remove cup (16) from wheel end hub (2).

b. Cleaning/Inspection.

**WARNING**

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

- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If 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.

**NOTE**

Thoroughly clean all metal parts with dry cleaning solvent and dry with wiping rag prior to inspection.

(1) Inspect inner wheel bearing cone (1), outer wheel bearing cone (2), cup (3), and cup (4) for scoring, pitting, corrosion, and excessive wear. Replace both wheel bearing cones and cups if either fails visual inspection.
10-2. WHEEL BEARING/CENTRAL TIRE INFLATION SYSTEM (CTIS) SEAL REPLACEMENT (CONT)

(2) Inspect two CTIS seal guides (5) for nicks or cracks.

c. Installation.

(1) Install cup (1) in wheel end hub (2).

(2) Install cup (3) in wheel end hub (2).

NOTE

Front axle and rear axle wheel bearings and CTIS seals are installed the same way. Left front axle shown.

(1) Install cup (1) in wheel end hub (2).
NOTE

- Install CTIS seal bevel side down, lipped side up.
- Install CTIS seal guide bevel side up.

(3) Install CTIS seal (4) and CTIS seal guide (5) in wheel end hub (2).

(4) Install CTIS seal retaining ring (6) in wheel end hub (2).

(5) Pack inner wheel bearing cone (7) with grease.

(6) Install inner wheel bearing cone (7) in wheel end hub (2).

(7) Install hub seal (8) in wheel end hub (2).

(8) Install CTIS seal (9) and CTIS seal guide (10) in wheel end hub (2).

(9) Install CTIS seal retaining ring (11) in wheel end hub (2).
(10) Apply two wraps of duct tape on splined and threaded portions of spindle (12).

**CAUTION**

Use care when installing wheel end hub assembly on spindle. Failure to comply may damage CTIS seal and cause early failure of CTIS seals.

(11) Install wheel end hub (2) on spindle (12).

(12) Remove duct tape from spindle (12).

(13) Install outer wheel bearing cone (13) in wheel end hub (2).

(14) Position wheel bearing nut (14) on spindle (12).

**CAUTION**

Rotate wheel end hub to the left and to the right while tightening wheel bearing nut. Failure to comply may result in damage to equipment.

(15) Tighten wheel bearing nut (14) to 50 lb-ft (68 N·m).

(16) Loosen wheel bearing nut (14) one quarter turn (90-degrees).

**CAUTION**

Do not tighten wheel bearing nut more than 10-20 lb-ft (14-27 N·m). Failure to comply may result in damage to equipment.

(17) Tighten wheel bearing nut (14) to 10-20 lb-ft (14-27 N·m).
(18) Install inner bevel side gear (15) on spindle (12).

**CAUTION**

If alignment pins on wheel bearing nut do not line up with alignment holes on inner bevel side gear, loosen wheel bearing nut until pins and holes are aligned. Do not loosen wheel bearing nut more than one spline tooth. Failure to comply will result in damage to equipment.

(19) Align pins (16) on wheel bearing nut (14) with alignment holes in inner bevel side gear (15).

(20) Remove inner bevel side gear (15) from spindle (12).

**NOTE**

- Record measurement taken in step (21).
- Steps (21) through (24) are not required when packing wheel bearings for Preventive Maintenance Checks and Services (PMCS)

(21) Measure depth from surface of wheel bearing nut (14) to face of wheel end hub (2).
(22) Install wheel end shim(s) (17) on wheel bearing nut (14).

**CAUTION**

Measurement from surface of shims to face of wheel end hub must be 2.168-2.173 in. (5.51-5.52 cm). Failure to comply may result in damage to equipment.

(23) Measure distance from surface of shim(s) (17) to face of wheel end hub (2).

(24) Add or remove shim(s) (17) as required to obtain measurement of 2.1678-2.173 in. (5.51-5.52 cm).

**WARNING**

Wheel drum weighs approximately 90 lbs (41 kgs). Use the aid of an assistant to install wheel drum. Failure to comply may result in injury to personnel.

(25) Install wheel drum (18) on wheel end hub (2).
d. Follow-On Maintenance.

(1) Install differential spider assembly (para 10-3).

(2) Install wheel (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Road test vehicle and check for proper steering operation and excessive wheel end vibration.

(5) Shut down engine (TM 9-2320-365-10).

(6) Check for oil leaks around wheel end assembly.

End of Task.
10-3. DIFFERENTIAL SPIDER ASSEMBLY REPLACEMENT

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation
- d. Follow-On 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)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Gloves, Rubber (Item 13, Appendix C)
Pan, Drain (Item 24, Appendix C)

Materials/Parts
Rag, Wiping (Item 51, Appendix D)
Gasket Maker, RTV Silicone (Item 21.1, Appendix D)
Solvent, Dry Cleaning (Item 71, Appendix D)
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
Packing, Preformed (4) (Item 185, Appendix G)

a. Removal.

**NOTE**

Front and rear axle differential spider assemblies are removed the same way. Left front axle differential spider assembly shown.

1. Position fill port at 6 o'clock location.
2. Drain oil from wheel end hub assembly (3).
2.1 Remove 12 screws (1) from bevel gear hub cover (2).
2.2 Remove bevel gear hub cover (2) from wheel end hub assembly (3).
3. Remove thrust bearing (4) and thrust washer (5) from bevel gear hub cover (2).
(4) Remove outer bevel side gear (6) from wheel end hub assembly (3).

(5) Remove differential spider assembly (7) from wheel end hub assembly (3).

(6) Remove inner bevel side gear (8) from wheel end hub assembly (3).

(7) Remove four preformed packings (9) from differential spider (10). Discard preformed packings.

(8) Remove four outer thrust washers (11), inner thrust washers (12), thrust bearings (13), differential pinion gears (14), and pinion gear bearings (15) from differential spider (10).
b. Cleaning/Inspection.

**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 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.

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

**NOTE**

Thoroughly clean all metal parts with dry cleaning solvent and dry using compressed air prior to inspection.

(1) Inspect inner bevel side gear (1) and outer bevel side gear (2) for cracked or broken gear teeth, scoring, pitting, and corrosion. Replace inner and/or outer bevel side gear that fail inspection.
(2) Inspect differential pinion gears (3) for cracked or broken gear teeth, scoring, pitting, and corrosion. Replace differential pinion gear(s) that fail inspection.

(3) Inspect pinion gear bearings (4) for scoring, pitting, and corrosion. Replace radial pinion gear bearing(s) that fail inspection.

(4) Inspect differential spider (5) for cracks, scoring, pitting, and corrosion. Replace differential spider that fail inspection.

c. Installation.

NOTE
Front and rear axle differential spider assemblies are removed the same way. Left front axle differential spider assembly shown.

(1) Install four pinion gear bearings (1), differential pinion gears (2), thrust bearings (3), inner thrust washers (4), and outer thrust washers (5) on differential spider (6).

(2) Install four preformed packings (7) on differential spider (6).

NOTE
If pins in self-locking nut do not line up with holes in inner bevel side gear, adjust self-locking nut accordingly.

(3) Install inner bevel side gear (8) in wheel end hub assembly (9) with holes in inner bevel side gear aligned with pins in self-locking nut (10).
10-3. DIFFERENTIAL SPIDER ASSEMBLY REPLACEMENT (CONT)

(4) Install differential spider assembly (11) in wheel end hub assembly (9).

(5) Install outer bevel side gear (12) in wheel end hub assembly (9).

(6) Apply a small amount of grease to side gear thrust washer (13) and side gear thrust bearing (14) to hold them in bevel gear hub cover (15) during installation.

(7) Install side gear thrust washer (13) and side gear thrust bearing (14) in bevel gear hub cover (15).
Apply a small bead of gasket maker to mating surface of bevel gear hub cover (15).  

Install bevel gear hub cover (15) on wheel end hub assembly (9).  

Position 12 screws (16) in bevel gear hub cover (15).  

Tighten 12 screws (16) to 35-50 lb-ft (47-68 N·m).  

c. Follow-On Maintenance.  

(1) Fill hub assembly (front axle) (Appendix H).  

(1.1) Refill axle differential (rear axle) (Appendix H). 

(2) Start engine (TM 9-2320-365-10).  

(3) Test operate vehicle and check for unusual noise or vibration from planetary drive assembly.  

(4) Shut down engine (TM 9-2320-365-10).  

(5) Check for oil leaks around bevel gear hub cover.  

End of Task.
10-4. REAR AXLE SHAFT REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

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

Materials/Parts
Screw (Item 56.1, Appendix D)
Adhesive (Item 11.1, Appendix D)

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Adjustable (Item 50, Appendix C)

a. Removal.

NOTE

Left and right rear axle shafts are removed the same way. Right rear axle shaft shown.

(1) Remove grease cap (1) from wheel hub assembly (2).

(2) Install screw in axle shaft (3).

(3) Remove axle shaft (3) from wheel hub assembly (2).
b. Installation.

NOTE

Perform step (1) only if axle shaft is not being replaced.

(1) Remove screw from axle shaft (1).

(2) Align splines of axle shaft (1) with gears in differential carrier.

(3) Install axle shaft (1) in wheel hub assembly (2).

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.

(4) Apply adhesive to grease cap (3).

(5) Install grease cap (3) on wheel hub assembly (2).

c. Follow-On Maintenance.

(1) Add oil to differential carrier (Appendix H).

(2) Add oil to wheel hub assembly (Appendix H).

(3) Start engine (TM 9-2320-365-10).

(4) Road test vehicle and check for unusual noise or vibration from axles.

(5) Shut down engine (TM 9-2320-365-10).

(6) Check around grease cap for oil leaks.

End of Task.
10-5. SPINDLE REPLACEMENT

This task covers:

a. Removal
b. Cleaning/Inspection
c. Installation.
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10)
- Cab raised (TM 9-2320-365-10)
- Air tanks drained (TM 9-2320-365-10)
- Wheel and tire removed (TM 9-2320-365-10)
- Hub assembly drained (for front spindles only) (Appendix H)
- Differential spider assembly removed (para 10-3)
- Wheel bearing/CTIS seal removed (para 10-2)
- Front brake shoes removed (front spindles only) (para 11-2)
- Rear brake shoes removed (rear spindles only) (para 11-3)
- Front brake air chamber removed (front spindles only) (para 11-7)
- Rear brake air chambers removed (rear spindles only) (para 11-8)

Tools and Special Tools
- Goggles, Industrial (Item 15, Appendix C)
- Jack, Hydraulic, Hand (Item 21, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)
- Wrench Set, Socket (Item 47, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
- Antiseize Compound (Item 14, Appendix D)
- Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
- Oil, Lubricating, Gear, 80W-90 (Item 42, Appendix D)
- Rag, Wiping (Item 51, Appendix D)
- Sealing Compound (Item 62, Appendix D)
- Solvent, Dry Cleaning (Item 71, Appendix D)
- Retainer (Item 214, Appendix G)

Personnel Required

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.

NOTE

Front, intermediate, and rear spindles are removed the same way. Front left spindle shown.
a. Removal.

NOTE

- Tag hose(s) prior to disconnecting.
- Step (1) applies to front spindles only.

(1) Disconnect two air hoses (1 and 2) from fittings (3 and 4).

NOTE

- Note orientation of brake spider assembly prior to removal.
- Intermediate and rear spindle mounting bolts are removed through the rear of hub assembly.

(2) Disconnect air hose (1) from 45-degree fitting (5).

(3) Remove 10 screws (6), washers (7), and brake spider assembly (8) from hub assembly (9).
10-5. SPINDLE REPLACEMENT (CONT)

NOTE

- Note position and orientation of fitting(s) prior to removal.
- Steps (4) and (5) apply to front spindles only.

4) Remove fitting (3) from fitting (10).

5) Remove fittings (4 and 10) from spindle (11).

(6) Remove 45-degree fitting (5) from spindle (11).

Do not hit spindle with a steel hammer to remove. Damage to spindle can occur and broken parts can get as projectiles. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

CAUTION

Do not pry spindle with a sharp tool. Damage to the mounting surfaces can occur. Failure to comply may result in damage to equipment.

7) Remove spindle (11) from hub assembly (9) and axle shaft (12).

NOTE

Step (6) applies to intermediate and rear spindles only.

6) Remove 45-degree fitting (5) from spindle (11).
(8) Remove retainer (13), thrust washer (14), sleeve (15), and felt seal (16) from spindle (11). Discard retainer.

b. Cleaning/Inspection

**NOTE**

Vehicles with greasable front drive flange do not have felt seal or retainer.

(1) Clean all metal parts with dry cleaning solvent and dry using compressed air prior to inspection.

**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 flash point 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 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.

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

**NOTE**

Replace any part that fails visual inspection.

(2) Inspect spindle (1), sleeve (2), and thrust washer (3) for cracks, pitting or corrosion.
c. Installation

**NOTE**

Vehicles with greasable front drive flange do not have felt seal or retainer.

(1) Apply a small amount of grease to retainer (1) and sleeve (2).

(2) Install felt seal (3), sleeve (2), thrust washer (4), and retainer (1) in spindle (5).

**NOTE**

Ensure spindle mounting holes are aligned with holes of hub assembly and spindle is properly seated.

(3) Position spindle (5) on axle shaft (6) and hub assembly (7).
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.

NOTE

Steps (4) through (6) apply to front spindles

(4) Apply antiseize compound to threads of three fittings (8, 9, and 10).

(5) Install fittings (9 and 10) to spindle (5).

(6) Install fitting (8) on fitting (10).

NOTE

Steps (7) and (8) apply to intermediate and rear spindles only.

(7) Apply antiseize compound to threads of 45-degree fitting (11).

(8) Install 45 degree fitting (11) in spindle (5).
10-5. SPINDLE REPLACEMENT (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.

(9) Apply thread sealant to 10 screws (12).

NOTE

Intermediate and rear spindle mounting bolts are installed through the rear of hub assembly.

(10) Position brake spider assembly (13), 10 washers (14), and screws (12) on hub assembly (7).

(11) Tighten 10 screw (12) to 110-145 lb-ft (149-196 N•m).

NOTE

Step (12) applies to front spindles only.

(12) Connect two air hoses (15 and 16) to fittings (8 and 9).
(13) Connect air hose (17) to 45-degree fitting (11).

**d. Follow-On Maintenance**

(1) Install front brake air chamber (front spindles only) (para 11-7).

(2) Install rear brake air chambers (rear spindles only) (para 11-8).

(3) Install front brake shoes (front spindles only) (para 11-2).

(4) Install rear brake shoes (rear spindles only) (para 11-3).

(5) Install wheel bearing/CTIS seal (para 10-2).

(6) Install differential spider assembly (para 10-3).

(7) Refill hub assembly (for front spindles only) (Appendix H).

(8) Install wheel and tire (TM 9-2320-365-10).

(9) Lower cab (TM 9-2320-365-10).

(10) Start engine (TM 9-2320-365-10).

(11) Operate vehicle, checking for proper steering operation and excessive vibration (TM 9-2320-365-10).

(12) Shut down engine (TM 9-2320-365-10).

(13) Check for oil leaks around wheel end assembly.

**End of Task.**
CHAPTER 11
BRAKE SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section I. INTRODUCTION

11-1. INTRODUCTION

This chapter contains maintenance instructions for replacing, repairing, and adjusting brake system components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

11-2. FRONT BRAKE SHOES REPLACEMENT/ADJUSTMENT

This task covers:

a. Removal
b. Inspection
c. Installation
d. Adjustment
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Wheel and tire removed (TM 9-2320-365-10).

Tools and Special Tools
Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Tool, Spring Removal (Item 83, Appendix B)
Respirator, Air Filter (Item 29, Appendix C)
Adjusting Tool, Brake Shoe (Item 2, Appendix C)

Tools and Special Tools (Cont)
Brake Adjusting Tool Support (Item E-2, Appendix E)

Materials/Parts
Rag, Wiping (Item 51, Appendix D)
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
Lockwasher (2) (Item 102, Appendix G)

Personnel Required
(2)

a. Removal.

WARNING

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

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

1. Remove wheel drum (1) from wheel hub (2).
(2) Remove two return springs (3) from brake shoes (4).
(3) Remove two brake shoes (4) from holddown clips (5).
(4) Perform front brake plunger assembly replacement /repair (para 11-4).

b. Inspection.

CAUTION
Replace wheel drums that fail visual inspection. Failure to comply may result in damage to equipment.

(1) Clean wheel drums of all mud, sand, and debris.
(2) Inspect wheel drums for the following:
   a. Braking surface of wheel drums must be free of scoring and cracks.
   b. Maximum inside diameter, which is stamped on wheel drum, does not exceed 15.12 in. (38.4 cm).
   c. Wheel drum mounting holes must not be egg-shaped or have cracks around edges.
   d. Wheel drum mounting surface must be flat.
(3) Inspect brake shoes for presence of scallops at brake shoe lining four inner corners.
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.

- It is normal for the leading edge of the front brake shoes to wear faster than the remaining area of the lining.

(3) Inspect brake shoes for OUT-OF-SERVICE and IN-SERVICE criteria as shown in Figure 11-1. Front Brake Shoe Service Criteria.

**Figure 11-1. Front Brake Shoe Service Criteria**

<table>
<thead>
<tr>
<th>OUT-OF-SERVICE</th>
<th>IN-SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Cracks or voids that exceed 1/16 in. in width.</td>
<td>Vertical or horizontal cracks in lining edge not exceeding 1/16 in. in width or not exceeding 1-1/2 in. in length.</td>
</tr>
<tr>
<td>Cracks that exceed 1-1/2 in. in length.</td>
<td></td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Portion of lining missing that exposes a fastening device, or worn to the point that a fastening device is exposed.</td>
<td>Corner segment missing with no fastening device (rivet or bolt) exposed.</td>
</tr>
<tr>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>Cracks across the lining face that extend through the lining edges.</td>
<td>Surface cracks in lining face that can extend from hole to hole.</td>
</tr>
<tr>
<td></td>
<td>Pitting and material erosion on the lining face.</td>
</tr>
</tbody>
</table>
c. **Installation.**

1. Turn two adjusting screws (1) in plunger housing (2) until they bottom.

2. Apply a film of grease to slots (3) in two adjusting screws (1), anchor plungers (4) and to inside of two holddown clips (5).

---

**CAUTION**

- Do not rely on automatic adjusters to take up excessive initial clearance. Tightening adjusting screws against plunger housings may result in failure of automatic adjusters to function properly. Failure to comply may result in damage to equipment.

- Brake shoe ends stamped ADJUSTER are positioned on adjusting screws. Failure to comply may result in damage to equipment.

3. Loosen two adjusting screws (1) 1/2 turn or until slots (3) are aligned with brake shoes (6).

4. Install two brake shoes (6) in holddown clips (5) with ends seated in slots in adjusting screws (1) and anchor plungers (4).

5. Install two return springs (7) on brake shoes (6).
11-2. FRONTAL BRAKE SHOES REPLACEMENT/ADJUSTMENT (CONT)

WARNING

Wheel drum weighs approximately 90 lbs (41 kg). Use the aid of an assistant to help install wheel drum. Failure to comply may result in injury to personnel.

NOTE

Position lug nuts 180 degrees apart and tighten until wheel drum is seated.

(6) Position wheel drum (8) on hub (9) with two lugnuts (10).

d. Adjustment.

WARNING

Self-adjusting brakes will not self-adjust without applying brake pedal. Failure to comply may result in injury to personnel.

NOTE

Steps (1) and (2) require the aid of an assistant.

(1) Apply and release brake pedal.

(2) Turn wheel drum (1) through one or more revolutions to ensure there is no binding.
(3) Remove two screws (2) and lockwashers (3) from back of spider (4).

(4) Install two brake adjusting tool supports on spider (4) with lockwashers (3) and screws (2).

**WARNING**

Self-adjusting brakes will not self-adjust without applying brake pedal. Failure to comply may result in injury to personnel.

(5) Adjust brake adjusting screw (5) until wheel drum (1) does not turn freely or until heavy drag is noticed.

(6) Apply and release brake pedal several times to position brake shoes.

**NOTE**

Step (7) requires the aid of an assistant.

(7) Readjust brake adjusting screw (5) while turning wheel drum (1) until heavy drag is noticed.
11-2. FRONT BRAKE SHOES REPLACEMENT/ADJUSTMENT (CONT)

**CAUTION**

- Wheel drum clearance must be checked along centerline of brake shoe at scallop. Failure to comply may result in damage to equipment.

- Record the number of clicks as adjusting screw is loosened. All adjustments on any wheel should be within six clicks of one another. If not, repeat procedure or examine for damage. Failure to comply may result in damage to equipment.

(8) Back off brake adjusting screw (5) to obtain 0.020-0.040 in. (0.051-0.102 cm) clearance.

(9) Repeat steps (6 through 8) for second brake adjusting screw.

(10) Remove two screws (2), lockwashers (3), and brake adjusting tool supports from spider (4). Discard lockwashers.

(11) Install two lockwashers (3) and screws (2) in spider (4).

d. **Follow-On Maintenance.**

(1) Install wheel and tire (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Road test vehicle and check for proper brake operation.

(4) Shut down engine (TM 9-2320-365-10).

**End of Task.**
11-3. REAR BRAKE SHOES REPLACEMENT/ADJUSTMENT

This task covers:

a. Removal
b. Inspection
c. Installation
d. Adjustment
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Wheel and tire removed (TM 9-2320-365-10).
Brakes caged (para 11-6).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Tool, Spring Removal (Item 83, Appendix B)
Respirator, Air Filter (Item 29, Appendix C)
Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)

Tools and Special Tools (Cont)
Adjusting Tool, Brake Shoe (Item 2, Appendix C)
Brake Adjusting Tool Support (Item E-2, Appendix E)

Materials/Parts
Rag, Wiping (Item 51, Appendix D)
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
Lockwasher (4) (Item 102, Appendix G)

Personnel Required
(2)

a. Removal.

WARNING

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

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

NOTE

Left and right side rear brake shoes are removed the same way. Left side shown.

(1) Remove wheel drum (1) from wheel hub (2).
(2) Remove two return springs (3) from brake shoes (4).

(3) Remove brake shoes (4) from holddown clips (5).

(4) Perform rear brake plunger assembly replacement/repair (para 11-5).

b. Inspection.

**CAUTION**

Replace wheel drums that fail visual inspection. Failure to comply may result in damage to equipment.

1. Clean wheel drums of all mud, sand, and debris.

2. Inspect wheel drums for the following:
   a. Braking surface of wheel drums must be free of scoring and cracks.
   b. Maximum inside diameter, which is stamped on wheel drum, does not exceed 15.12 in. (384 mm).
   c. Wheel drum mounting holes must not be egg-shaped or have cracks around edges.
   d. Wheel drum mounting surface must be flat.

2.1 Inspect brake shoes for presence of scallops at brake shoe lining four inner corners.
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) Inspect rear brake shoes for OUT-OF-SERVICE and IN-SERVICE criteria as shown in Figure 11-2. Rear Brake Shoe Service Criteria.

Figure 11-2. Rear Brake Shoe Service Criteria

<table>
<thead>
<tr>
<th>OUT-OF-SERVICE</th>
<th>IN-SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracks or voids that exceed 1/16 in. in width.</td>
<td>Vertical or horizontal cracks in lining edge not exceeding 1/16 in. in width or not exceeding 1-1/2 in. in length.</td>
</tr>
<tr>
<td>Cracks that exceed 1-1/2 in. in length.</td>
<td></td>
</tr>
<tr>
<td>Portion of lining missing that exposes a fastening device.</td>
<td>Corner segment missing with no fastening device (rivet or bolt) exposed.</td>
</tr>
<tr>
<td>Cracks across the lining face that extend through the lining edges.</td>
<td>Surface cracks in lining face that can extend from hole to hole.</td>
</tr>
<tr>
<td></td>
<td>Pitting and material erosion on the lining face.</td>
</tr>
</tbody>
</table>
c. Installation.

(1) Turn two adjusting screws (1) in plunger housings (2) until they bottom.

(2) Apply a thin film of grease to slots (3) in two anchor plungers (4), adjusting screws (1), and inside of two holddown clips (5).

**CAUTION**
- Do not rely on automatic adjusters to take up excessive initial clearance. Tightening adjusting screws against plunger housings may result in failure of automatic adjusters to function properly. Failure to comply may result in damage to equipment.
- Brake shoe ends stamped ADJUSTER are positioned on adjusting screws. Failure to comply may result in damage to equipment.

(3) Loosen two adjusting screws (1) 1/2 turn or until slots (3) are aligned with brake shoes (6).

(4) Install two brake shoes (6) in holddown clips (5) with ends seated in slots in adjusting screws (1) and anchor plungers (4).

(5) Install two return springs (7) on brake shoes (6).
**WARNING**

Wheel drum weighs approximately 90 lbs (41 kg). Use the aid of an assistant to help install wheel drum. Failure to comply may result in injury to personnel.

**NOTE**

Position lugnuts 180 degrees apart and tighten until wheel drum is seated.

(6) Position wheel drum (8) on hub (9) with two lugnuts (10).

d. Adjustment.

**WARNING**

Self-adjusting brakes will not self-adjust without applying brake pedal. Failure to comply may result in injury to personnel.

**NOTE**

Steps (1) and (2) require the aid of an assistant.

(1) Apply and release brake pedal.

(2) Turn wheel drum (1) through one or more revolutions to ensure there is no binding.

(3) Remove screw (2) and lockwasher (3) from back side of spider (4) toward rear of vehicle.

(4) Install brake adjusting tool support on spider (4) with lockwasher (3) and screw (2).
11-3. REAR BRAKE SHOES REPLACEMENT/ADJUSTMENT (CONT)

**WARNING**

Self-adjusting brakes will not self-adjust without applying brake pedal. Failure to comply may result in injury to personnel.

(5) Adjust brake adjusting screw (5) until wheel drum (1) does not turn freely or until heavy drag is noticed.

(6) Uncage spring brakes (para 11-6).

(7) Apply and release brake pedal several times to position brake shoes.

**NOTE**

Step (8) requires the aid of an assistant.

(8) Readjust brake adjusting screw (5) while turning wheel drum (1) until heavy drag is noticed.

**CAUTION**

- Wheel drum clearance must be checked along centerline of brake shoe at scallop. Failure to comply may result in damage to equipment.

- Record the number of clicks as adjusting screw is loosened. All adjustments on any wheel should be within six clicks of one another. If not, repeat procedure or examine for damage. Failure to comply may result in damage to equipment.

(9) Back-off adjusting screw (5) to obtain 0.020-0.040 in. (0.5 mm) clearance between brake shoe and wheel drum.

(10) Remove screw (2), lockwasher (3) and brake adjusting tool support from spider (4). Discard lockwasher.

(11) Install lockwasher (3) and screw (2) in spider (4).
(12) Remove screw (6) and lockwasher (7) from back side of spider (4) toward front of vehicle.

(13) Install brake adjusting tool support on spider (4) with lockwasher (7) and screw (6).

WARNING
Self-adjusting brakes will not self-adjust without applying brake pedal. Failure to comply may result in injury to personnel.

(14) Adjust brake adjusting screw (8) until wheel drum (1) does not turn freely or until heavy drag is noticed.

(15) Apply and release brake pedal several times to position brake shoes.

NOTE
Step (16) requires the aid of an assistant.

(16) Readjust brake adjusting screw (8) while turning wheel drum (1) until heavy drag is noticed.
11-3. REAR BRAKE SHOES REPLACEMENT/ADJUSTMENT (CONT)

CAUTION

• Wheel drum clearance must be checked along centerline of brake shoe at scallop. Failure to comply may result in damage to equipment.

• All adjustments on any wheel should be within six clicks of one another. Record the number of clicks as adjusting screw is loosened. If not, repeat procedure or examine for damage. Failure to comply may result in damage to equipment.

(17) Back-off adjusting screw (8) to obtain 0.020-0.040 in. (0.5 mm) clearance between brake shoe and wheel drum.

(18) Remove screw (6), lockwasher (7), and brake adjusting tool support from spider (4).

(19) Install lockwasher (7) and screw (6) in spider (4).

e. Follow-On Maintenance.

(1) Install wheel and tire (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Road test truck and check for proper brake operation.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
## 11-4. FRONT BRAKE PLUNGER ASSEMBLY REPLACEMENT/REPAIR

**This task covers:**

|---|------------|----------------|------------------------|-------------|-----------------|--------------------------|

### INITIAL SETUP

**Equipment Conditions**
- Front brake shoes removed (para 11-2).
- Front brake air chamber removed (para 11-7).

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)
- Gloves, Rubber (Item 13, Appendix C)
- Brake Plunger Seal Driver (Item E-3, Appendix E)

**Materials/Parts**
- Solvent, Dry Cleaning (Item 71, Appendix D)
- Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
- Rag, Wiping (Item 51, Appendix D)
- Lockwasher (4) (Item 108, 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.

### a. Removal.

1. Remove wedge assembly (1) from plunger housing (2).
(2) Remove two adjusting pawl assemblies (3) and lockwashers (4) from plunger housing (2). Discard lockwashers.

**NOTE**

Note location of adjusting plunger assemblies prior to removal.

(3) Remove two adjusting plunger assemblies (5) from plunger housing (2).

(4) Remove two guide screws (6) and lockwashers (7) from plunger housing (8). Discard lockwashers.

(5) Remove two anchor plungers (9) from plunger housing (8).

**b. Disassembly.**

(1) Remove adjusting sleeve (1) from adjusting plunger (2).

(2) Remove adjusting screw (3) from adjusting sleeve (1).

(3) Remove seal (4) from adjusting screw (3).

(4) Perform steps (1) through (3) on second adjusting plunger assembly.
(5) Remove seal (5) from anchor plunger (6).

(6) Perform step (5) on second anchor plunger.

c. Cleaning/Inspection.

**WARNING**

Dry Cleaning Solvent is toxic and flammable. Wear protective goggles, face shield, and gloves; use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent. The flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II Dry Cleaning Solvent is 140°F (60°C). Failure to comply may result in serious injury or death to personnel.

(1) Clean all metal parts thoroughly with dry cleaning solvent.

**NOTE**

Replace plungers, sleeves, screws, springs, and pawls as a unit.

(2) Inspect two adjusting plungers (1), adjusting sleeves (2), and adjusting screws (3) for damage.

(3) Inspect two screws (4), springs (5), and adjusting pawls (6) for damage.
(4) Inspect two anchor plungers (7) and guide screws (8) for damage.

(5) Inspect rollers (9) for freedom of movement and pitting or cracks.

(6) Inspect spring (10) for cracks, distortion, or corrosion.

(7) Inspect rubber (11) for cracks, breaks or damage.

d. Assembly.

(1) Apply grease to inside surfaces of seal (1).

(2) Seat seal (1) on anchor plunger (2).

(3) Perform steps (1) and (2) for second anchor plunger.
(4) Apply grease to inside surface of seal (3).

(5) Seat seal (3) on adjusting screw (4).

(6) Install adjusting screw (4) in adjusting sleeve (5). Back off 1/4 turn.

(7) Apply film of grease on adjusting sleeve (5).

CAUTION

- Ensure adjusting sleeve is installed in adjusting plunger with large shouldered end up. Failure to comply will cause self-adjusting feature not to function.
- Adjusting sleeve must bottom on shoulder in adjusting plunger. If adjusting screw is threaded too far into adjusting sleeve, adjusting screw will bottom in adjusting plunger and automatic adjustment will not function.

(8) Install adjusting sleeve (5) in adjusting plunger (6).

(9) Apply film of grease on adjusting plunger (6).

(10) Perform steps (4) through (9) for other adjusting plunger assembly.

e. Installation.

CAUTION

Anchor plunger marked “L” is for left plunger housing. Anchor plunger marked “R” is for right plunger housing. Failure to comply may result in damage to equipment.

NOTE

Align keyway in anchor plunger with hole in plunger housing.

(1) Install anchor plunger (1) in plunger housing (2).

(2) Position lockwasher (3) and guide screw (4) in plunger housing (2).

(3) Tighten guide screw (4) to 15-25 lb-ft (20-34 N·m).

(4) Perform steps (1) through (3) on second anchor plunger.
11-4. FRONT BRAKE PLUNGER ASSEMBLY REPLACEMENT/REPAIR (CONT)

NOTE

Align keyway in adjusting plunger with hole in plunger housing.

(5) Install adjusting plunger (5) in plunger housing (6).

CAUTION

- Ensure pawl enters adjusting plunger so that adjusting plunger slides freely in plunger housing. Failure to comply may result in damage to equipment.
- Ensure grooves on pawl engages grooves on adjusting sleeve. Failure to comply may result in damage to equipment.

(6) Position lockwasher (7) and adjusting pawl assembly (8) in plunger housing (6).

(7) Tighten adjusting pawl assembly (8) to 15-25 lb-ft (20-34 N·m).

(8) Perform steps (5) through (7) on second adjusting plunger assembly.

(9) Apply grease on wedge rollers (9).

CAUTION

Ensure wedge rollers are aligned with slots in adjusting plungers. Firm pressure is required to fully seat wedge in adjusting plungers. Failure to fully seat wedge in adjusting plungers may result in damage to equipment.

(10) Install wedge (10) in plunger housing (6).


(1) Install front brake air chamber (para 11-7).

(2) Install front brake shoes (para 11-2).

End of Task.
### 11-5. REAR BRAKE PLUNGER ASSEMBLY REPLACEMENT/REPAIR

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#### INITIAL SETUP

**Equipment Conditions**
- Rear brake shoes removed (para 11-3).
- Rear brake air chamber removed (para 11-8).

**Tools and Special Tools**
- Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Respirator, Air Filter (Item 29, Appendix C)
- Gloves, Rubber (Item 13, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)

**Tools and Special Tools (Cont)**
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Brake Plunger Seal Driver (Item E-3, Appendix E)

**Materials/Parts**
- Solvent, Dry Cleaning (Item 71, Appendix D)
- Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)
- Lockwasher (4) (Item 108, 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.

#### a. Removal.

1. Remove wedge assembly (1) from plunger housing (2).
WARNING

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

NOTE

• Identify anchor and adjusting plunger locations prior to disassembly.

• Anchor plungers and adjusting plungers are opposite each other in each plunger housing. The positions are reversed for opposite sides of the wheel. Perform the following procedure to disassemble both plunger assemblies.

(2) Remove guide screw (3) and lockwasher (4) from plunger housing (5). Discard lockwasher.

(3) Remove seal (6) and anchor plunger (7) from plunger housing (5).

(4) Remove adjusting pawl assembly (8) and lockwasher (9) from plunger housing (5). Discard lockwasher.

(5) Remove seal (10), adjusting screw (11), and adjusting plunger (12) from plunger housing (5).
b. Disassembly.

1. Remove adjusting sleeve (1) from adjusting plunger (2).
2. Remove adjusting screw (3) from adjusting sleeve (1).
3. Remove seal (4) from adjusting screw (3).
4. Remove seal (5) from anchor plunger (6).
c. Cleaning/Inspection.

**WARNING**

Dry Cleaning Solvent is toxic and flammable. Wear protective goggles, face shield, and gloves; use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent. The flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II Dry Cleaning Solvent is 140°F (60°C). Failure to comply may result in serious injury or death to personnel.

1. Clean all metal parts thoroughly with dry cleaning solvent.

**NOTE**

Replace plungers, sleeves, screws, springs, and pawls as a unit.

2. Inspect adjusting plunger (1), adjusting sleeve (2), and adjusting screw (3) for damage.

3. Inspect screw (4), spring (5), and adjusting pawl (6) for damage.

4. Inspect anchor plunger (7) and guide screw (8) for damage.

5. Inspect rollers (9) for freedom of movement, and pitting or cracks.

6. Inspect spring (10) for cracks, distortion, or corrosion.

7. Inspect rubber (11) for deterioration or damage.
d. Assembly.

(1) Apply grease to inside surfaces of seal (1).

(2) Position and seat seal (1) on anchor plunger (2).

(3) Apply grease to inside surface of seal (3).

(4) Position and seat seal (3) on adjusting screw (4).

(5) Install adjusting screw (4) in adjusting sleeve (5) until snug. Back off 1/4 turn.

(6) Apply film of grease on adjusting sleeve (5).

**CAUTION**

Ensure adjusting sleeve is installed in adjusting plunger with large shouldered end up. Failure to comply will cause self-adjusting feature not to function.

(7) Position adjusting sleeve (5) in adjusting plunger (6).

(8) Apply film of grease on adjusting plunger (6).
11-5. REAR BRAKE PLUNGER ASSEMBLY REPLACEMENT/REPAIR (CONT)

e. Installation.

**CAUTION**

Adjusting sleeve must bottom on the shoulder inside the plunger. Threading adjusting screw too far into adjusting sleeve will cause automatic adjuster not to function.

**NOTE**

Install plungers in same location as removed and align keyways in anchor/adjusting plungers with hole in plunger housings.

1. Install adjusting plunger assembly (1) in plunger housing (2).

**NOTE**

Make certain grooves in pawl assembly end engage in adjusting sleeve grooves.

2. Position lockwasher (3) and pawl assembly (4) in plunger housing (2).

3. Tighten pawl assembly (4) to 15-25 lb-ft (20-34 N·m).

**NOTE**

- One anchor (solid) and one adjusting plunger must be installed in each plunger housing.
- Install anchor plunger marked "L" in left plunger housing. Install anchor plunger marked "R" in right plunger housing.

4. Apply film of grease on anchor plunger (5).

5. Install and seat seal (6) and anchor plunger (5) in plunger housing (2).

6. Position lockwasher (7) and guide screw (8) in plunger housing (2).

7. Tighten guide screw (8) to 15-25 lb-ft (20-34 N·m).
(8) Apply grease to rollers (9) on wedge assembly (10).

**CAUTION**

Ensure wedge rollers are aligned with slots in adjusting plunger and anchor plunder. Firm pressure is required to fully seat wedge in plungers. Failure to fully seat wedge in plungers may result in damage to equipment.

(9) Install wedge assembly (10) in back of plunger housing (2).

f. **Follow-On Maintenance.**

(1) Install rear brake air chamber (para 11-8).

(2) Install rear brake shoes (para 11-3).

End of Task.
11-6. REAR SPRING BRAKE CAGING

This task covers:

a. Caging  
b. Uncaging

INITIAL SETUP

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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. Caging.

NOTE

To cage brakes, apply caging procedure to both top and bottom spring brake chambers.

1. Remove nut (1) and washer (2) from caging bolt (3).

2. Remove caging bolt (3) from caging bolt holder (4).
NOTE

Save rubber cap for use after uncaging operation to seal spring brake chamber.

(3) Remove rubber cap (5) from spring brake chamber (6).

(4) Insert T-end of caging bolt (3) in back of spring brake chamber (6).

(5) Lock caging bolt (3) in place by turning caging bolt to the right 1/4 turn.

(6) Position washer (2) and nut (1) on caging bolt (3).

(7) Tighten nut (1) until brakes are fully released, wheel turns freely.

b. Uncaging.

(1) Remove nut (1) and washer (2) from caging bolt (3).

(2) Remove caging bolt (3) by turning to the left 1/4 turn.

(3) Remove caging bolt (3) from spring brake chamber (4).
(4) Install caging bolt (3) in caging bolt holder (5).

(5) Position washer (2) and nut (1) on caging bolt (3).

(6) Tighten nut (1) to 50 lb-ft (68 N·m).

(7) Install rubber cap (6) on spring brake chamber (4).

End of Task.
# 11-7. FRONT BRAKE AIR CHAMBER REPLACEMENT

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## INITIAL SETUP

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

### Tools and Special Tools
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Pipe (Item 55, Appendix C)
- Trestle, Motor Vehicle Maintenance (Item 45, Appendix C)
- Goggles, Industrial (Item 15, Appendix C)
- Respirator, Air Filter (Item 29, Appendix C)

### Materials/Parts
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Antiseize Compound (Item 63, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Nut, Plain, Round (Item 115.1, Appendix G)

### Personnel Required
(2)

---

### a. Removal.

**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**

Use caution not to pinch left side air hoses when positioning trestles. Failure to comply may result in damage to equipment.

**NOTE**

Left and right front brake air chambers are removed the same way. Left side shown.

1. Position front of vehicle on trestle so wheel is off ground.
2. Remove left front wheel from vehicle (TM 9-2320-365-10).
NOTE

- Tag air hoses and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(3) Disconnect two air hoses (1) from fittings (2).

(4) Loosen collet nut (3) on air chamber (4).

(5) Remove air chamber (4) from plunger housing (5).

(6) Remove two fittings (2) from air chamber (4).

(7) Remove collet nut (3) from air chamber (4). Discard collet nut.
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.

**NOTE**

Left and right front brake air chambers are installed the same way. Left side shown.

1. Apply antiseize compound to threads of two fittings (1).
2. Install two fittings (1) in air chamber (2).
3. Position collet nut (3) on air chamber (2).
4. Apply antiseize compound to threads of air chamber (2).

**CAUTION**

Ensure air chamber is installed with fittings positioned up. Failure to comply may result in damage to equipment.

5. Install air chamber (2) in plunger housing (4) until it bottoms.

**CAUTION**

Air chamber must not be loosened no more than one full turn. Failure to comply may result in damage to equipment.

6. Loosen air chamber (2) until fittings (1) are up.
11-7. FRONT BRAKE AIR CHAMBER REPLACEMENT (CONT)

NOTE

Install plastic cable ties as required.

(7) Connect two air hoses (5) to fittings (1).

CAUTION

Brake pedal must be fully applied before and during tightening of collet nut. Failure to comply may result in damage to equipment.

NOTE

Steps (8) through (10) require the aid of an assistant.

(8) Apply brake pedal and continue holding until steps (9) and (10) are accomplished.

(9) Hand tighten collet nut (3) against plunger housing (4).

(10) Tighten collet nut (5) 3/16 turn (1/2 tooth).

(11) Install left front wheel on vehicle (TM 9-2320-365-10).

(12) Remove trestle from front of vehicle.

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check for air leaks around air chamber and fittings.

(3) Road test truck and check for proper brake operation.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
11-8. REAR BRAKE AIR CHAMBER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Rear tire removed (TM 9-2320-365-10).
Rear spring brakes caged (para 11-6).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Pipe (Item 54, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Sealing Compound (Item 63, Appendix D)
Nut, Plain, Round (Item 115.1, 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.

a. Removal.

NOTE
Tag air hoses and connection points prior to removal.

(1) Disconnect six air hoses (1) from tee fittings (2, 3, and 4).
(2) Remove tee fittings (2 and 3) from rear air chamber (5).
(3) Remove tee fitting (4) from adapter (6).
(4) Remove adapter (6) from rear air chamber (5).

(5) Loosen collet nut (7) on rear air chamber (5).
(6) Remove rear air chamber (5) from plunger housing (8).
(7) Remove collet nut (7) from rear air chamber (5). Discard collet nut.

**NOTE**
Tag air hoses and connection points prior to disconnecting.

(8) Remove three air hoses (9) from 90-degree fittings (10, 11, and 12).
NOTE

Note orientation of fittings prior to removal.

(9) Remove 90-degree fitting (12) from adapter (13).

(10) Remove adapter (13) from front air chamber (14).

(11) Remove 90-degree fittings (10 and 11) from front air chamber (14).

(12) Loosen collet nut (15) on front air chamber (14).

(13) Remove front air chamber (14) from plunger housing (16).

(14) Remove collet nut (15) from front air chamber (14). Discard collet nut.
b. Installation.

(1) Install collet nut (1) on front air chamber (2) to bottom of threads.

**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.

(2) Apply antiseize compound to threads of front air chamber (2).

**WARNING**

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

**CAUTION**

Ensure front air chamber is installed with fitting ports positioned up. Failure to comply may result in damage to equipment.

(3) Install front air chamber (2) in plunger housing (3) until it bottoms.

**CAUTION**

Loosen front air chamber no more than one full turn. Failure to comply may result in damage to equipment.

(4) Loosen front air chamber (2) until fitting ports are up.

(5) Tighten collet nut (1) against plunger housing (3).
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.

NOTE
Clean fittings and front air chamber of all sealing compound residue prior to installation.

(6) Apply sealing compound to threads of 90-degree fittings (4 and 5).

(7) Install 90-degree fittings (4 and 5) in front air chamber (2).

(8) Apply sealing compound to threads of adapter (6).

(9) Install adapter (6) in front air chamber (2).

(10) Apply sealing compound to threads of 90-degree fitting (7).

(11) Install 90-degree fitting (7) in adapter (6).

(12) Connect three air hoses (8) to 90-degree fittings (4, 5, and 7).
11-8. REAR BRAKE AIR CHAMBER REPLACEMENT (CONT)

(13) Install collet nut (9) on rear air chamber (10) to bottom of threads.

**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.

(14) Apply sealing compound to threads of rear air chamber (10).

**WARNING**

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

(15) Install rear air chamber (10) in plunger housing (11) until it bottoms.

**CAUTION**

Loosen rear air chamber no more than one full turn. Failure to comply may result in damage to equipment.

(16) Tighten collet nut (9) against plunger housing (11).

**NOTE**

Clean fittings and rear air chamber of all sealing compound residue prior to installation.

(17) Apply sealing compound to threads of adapter (12).

(18) Install adapter (12) in rear air chamber (10).

(19) Apply sealing compound to tee fittings (13, 14, and 15).

(20) Install tee fittings (13 and 14) in rear air chamber (10).

(21) Install tee fitting (15) in adapter (12).
(22) Connect six air hoses (16) to tee fittings (13, 14, and 15).

(23) Start engine (TM 9-2320-365-10) and allow time for REAR BRAKE AIR pressure gage to reach at least 100 psi.

(24) Push in SYSTEM PARK control (TM 9-2320-365-10).

(25) Loosen two nuts (17) on caging bolts (18).

(26) Remove two caging bolts (18) from front and rear air chambers (2 and 10).

**NOTE**

Steps (27) through (29) require the aid of an assistant.

(27) Apply brake pedal and continue holding until steps (28) and (29) are accomplished.

(28) Hand tighten collet nuts (1 and 9) against plunger housings (3 and 11).

(29) Tighten collet nuts (1 and 9) 3/16 turn (1/2 teeth).
11-8. REAR BRAKE AIR CHAMBER REPLACEMENT (CONT)

(30) Pull out SYSTEM PARK control (TM 9-2320-365-10).

(31) Shut down engine (TM 9-2320-365-10).

(32) Install two caging bolts (18) in caging bolt holders (19).

(33) Position two washers (20) and nuts (17) on caging bolts (18).

(34) Tighten two nuts (17) to 50 lb-ft (68 N·m).

(35) Install two rubber caps (21) on air chambers (2 and 10).

c. Follow-On Maintenance.

(1) Install rear wheel and tire (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check for air leaks around air chamber and fittings.

(4) Road test vehicle and check for proper brake operation.

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
11-9. FOOT CONTROL VALVE AND BRAKE FOOT PEDAL REPLACEMENT

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation
- e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air tanks drained (TM 9-2320-365-10).
Instrument panel assembly removed for access (para 7-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Lockwasher (4) (Item 90, Appendix G)
Nut, Self-Locking (8) (Item 147, Appendix G)
Pin, Cotter (Item 203, Appendix G)
Ties, Cable, Plastic (Item 76, Appendix D)
Grease (Item 25, Appendix D)

Personnel Required
(2)

a. Removal.

NOTE
Tag terminal lugs and connection points prior to removal.

(1) Remove two nuts (1), lockwashers (2), and terminal lugs TL152 (3), and TL153 (4) from rear stoplight switch (5). Discard lockwashers.

(2) Remove two nuts (6), lockwashers (7), and terminal lugs TL154 (8), and TL155 (9) from front stoplight switch (10). Discard lockwashers.

(3) Remove stoplight switches (5 and 10) from foot control valve (11).
(4) Loosen clamp (12) on exhaust hose (13).

(5) Disconnect exhaust hose (13) from foot control valve (11).

**NOTE**

- Tag air hoses and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(6) Disconnect four air hoses (14) from foot control valve (11).

(7) Disconnect connector PX17 (15) from master power switch (16).

**NOTE**

Step (8) requires the aid of an assistant.

(8) Remove four self-locking nuts (17), washers (18), and screws (19) from foot control valve (11). Discard self-locking nuts.

(9) Remove foot control valve (11) from dashboard (20).
b. Disassembly.

(1) Remove cotter pin (1), washer (2), and pin (3) from foot control linkage (4). Discard cotter pin.

(2) Remove spring (5) from brake foot pedal (6).

(3) Remove two self-locking nuts (7), washers (8), and screws (9) from bracket (10). Discard self-locking nuts.

(4) Remove two self-locking nuts (11), washers (12), screws (13), foot control valve (14), and brake foot pedal (6) from bracket (10). Discard self-locking nuts.

(5) Remove left bracket (15) and right bracket (16) from brake foot pedal (6).

(6) Remove two bushings (17) from left bracket (15) and right bracket (16).
(7) Remove four adapters (18) from foot control valve (14).

(8) Remove two adapters (19) from foot control valve (14).

(9) Remove two plugs (20) from foot control valve (14).

c. Assembly.

**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 anti-seize compound to threads of four adapters (1), two adapters (2), and plugs (3).

(2) Install four adapters (1) in foot control valve (4).

(3) Install two adapters (2) in foot control valve (4).

(4) Install two plugs (3) in foot control valve (4).
(5) Position left bracket (5) and right bracket (6) on brake foot pedal (7).

(6) Lubricate pivot point of brake foot pedal (7) with MIL-G-21164 grease.

**NOTE**

Bushings (8) shall be press fitted on installation.

(7) Install two bushings (8) on left bracket (5) and right bracket (6).

(8) Position brake foot pedal (7) and foot control valve (4) on bracket (9) with two screws (10), washers (11), and self-locking nuts (12).

(9) Position two screws (13), washers (14), and self-locking nuts (15) in foot control valve (4).

(10) Tighten two self-locking nuts (12 and 15) to 18 lb-ft (24 N·m).

(11) Install spring (16) on bracket (9) and brake foot pedal (7).

(12) Install foot control linkage (17) on brake foot pedal (7) with pin (18), washer (19), and cotter pin (20).
11-9. FOOT CONTROL VALVE AND BRAKE FOOT PEDAL REPLACEMENT (CONT)

NOTE

Adjust tappet to meet pedal adjustment gap of 0.19 in (4.8 mm) to 0.28 in (7.1 mm) by pressing brake foot pedal lightly until tappet firmly engages foot control valve without causing valve movement. This provides approximately 0.5 in. (12.7 mm) of brake foot pedal freedom of movement.

(13) Loosen nut (21) and adjust tappet (22).

(14) Tighten nut (21).

d. Installation.

WARNING

Ensure air hoses are connected to correct fittings. Failure to comply may result in injury or death to personnel.

NOTE

Steps (1) through (3) require the aid of an assistant.

(1) Position foot control valve (1) beneath dashboard (2).

(2) Position four screws (3), washers (4), and self-locking nuts (5) in foot control valve (1).

(3) Tighten four self-locking nuts (5) to 18 lb-ft (24 N·m).

(4) Connect four air hoses (6) to foot control valve (1).

(5) Install exhaust hose (7) on foot control valve (1) with clamp (8).
(6) Connect connector PX17 (9) to master power switch (10).

**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.

(7) Apply antiseize compound to threads of stoplight switches (11 and 12).

(8) Install stoplight switches (11 and 12) in foot control valve (1).

(9) Install terminal lugs TL155 (13) and TL154 (14) on front stoplight switch (11) with two lockwashers (15) and nuts (16).

(10) Install terminal lugs TL153 (17) and TL152 (18) on rear stoplight switch (12) with two lockwashers (19) and nuts (20).
e. Follow-On Maintenance.

(1) Install instrument panel assembly (para 7-15).

(2) Start engine (TM 9-2320-365-10).

(3) Check around foot control valve and hoses for air leaks.

(4) Shut down engine (TM 9-2320-365-10).

(5) Open secondary air tank drain valve (TM 9-2320-365-10).

(6) Push in SYSTEM PARK control (TM 9-2320-365-10).

**NOTE**

- Audible alarm will sound during performance of steps (7) through (9). FRONT BRAKE light in lighted indicator display will illuminate and FRONT BRAKE AIR pressure gage will read "0" psi.

- Complete steps (7) through (9) before air pressure builds up in secondary air tank.

(7) Start engine (TM 9-2320-365-10).

(8) Position main light switch to SERVICE DRIVE (TM 9-2320-365-10).

**NOTE**

Rear brakes should lock up and brake lights should illuminate during step (9).

(9) Set transmission to first gear, accelerate to approximately 5 mph, and apply maximum foot brake pedal.

(10) Pull out SYSTEM PARK control (TM 9-2320-365-10).

(11) Close secondary air tank drain valve (TM 9-2320-365-10).

(12) Run engine until audible alarm no longer sounds.

(13) Shut down engine (TM 9-2320-365-10).

End of Task.
11-10. LOAD SENSING VALVE AND CONTROL CABLE REPLACEMENT/ADJUSTMENT

This task covers:

a. Load Sensing Valve Control Cable Removal
b. Load Sensing Valve Control Cable Installation
c. Load Sensing Valve Removal
d. Load Sensing Valve Installation
e. Load Sensing Valve Adjustment
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
STE/ICE-R (Item 39, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

Materials/Parts (Cont)
Antiseize Compound (Item 63, Appendix D)
Tee, Pipe (Item 75.1, Appendix D)
Nut, Self-Locking (2) (Item 148, Appendix G)
Nut, Self-Locking (2) (Item 150, Appendix G)

References
TM 9-4910-571-12 & P

Personnel Required
(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.

a. Load Sensing Valve Control Cable Removal.

(1) Loosen jam nut (1) on cable clamp (2).

(2) Loosen screw (3) on cable clamp (2).

(3) Remove load sensing valve control cable (4) from cable clamp (2).

(4) Remove screw (5) and load sensing valve control cable (4) from bracket (6).
Load Sensing Valve and Control Cable Replacement/Adjustment

b. Load Sensing Valve Control Cable Installation.

**WARNING**

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles 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.

1. Apply adhesive to threads of screw (1).
2. Position load sensing valve control cable (2) on bracket (3) with screw (1).
3. Tighten screw (1) to 35-43 lb-ft (48-58 N·m).

**CAUTION**

Load sensing valve control cable must be installed in cable clamp on back side of control lever, opposite cable clamp screw. Failure to comply may result in damage to load sensing valve control cable.

4. Install load sensing valve control cable (2) in cable clamp (4).
5. Perform load sensing valve adjustment.
c. Load Sensing Valve Removal.

(1) Loosen jam nut (1) on cable clamp (2).

(2) Loosen screw (3) on cable clamp (2).

(3) Remove load sensing valve control cable (4) from cable clamp (2).

NOTE

Tag air hoses and connection points prior to disconnecting.

(4) Disconnect two air hoses (5) from tee fitting (6).

(5) Disconnect air hose (7) from 45-degree fitting (8).

(6) Remove two self-locking nuts (9), screws (10), washers (11), and load sensing valve (12) from bracket (13). Discard self-locking nuts.
(7) Remove tee fitting (6) from adapter (14).

(8) Remove 45-degree fitting (8) from adapter (15).

(9) Remove two self-locking nuts (16), washers (17), screws (18), washers (19), and bracket (13) from crossmember (20). Discard self-locking nuts.

d. Load Sensing Valve Installation.

(1) Position bracket (1) on crossmember (2) with two washers (3), screws (4), washers (5), and self-locking nuts (6).

(2) Tighten two self-locking nuts (6) to 60-74 lb-ft (80-102 N·m).
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.

(3) Apply antiseize compound to threads of 45-degree fitting (7).

(4) Install 45-degree fitting (7) in adapter (8).

(5) Apply antiseize compound to threads of tee fitting (9).

(6) Install tee fitting (9) in adapter (10).

(7) Position load sensing valve (11) on bracket (1) with two washers (12), screws (13), and self-locking nuts (14).

(8) Tighten two self-locking nuts (14) to 14-18 lb-ft (20-24 N·m).

(9) Connect air hose (15) to 45-degree fitting (7).

(10) Connect two air hoses (16) to tee fitting (9).
11-10. LOAD SENSING VALVE AND CONTROL CABLE REPLACEMENT/ADJUSTMENT (CONT)

CAUTION

Load sensing valve control cable must be installed in cable clamp on back side of control lever, opposite cable clamp screw. Failure to comply may result in damage to load sensing valve control cable.

(11) Install load sensing valve control cable (16) in cable clamp (17).

(12) Perform load sensing valve adjustment.

e. Load Sensing Valve Adjustment.

WARNING

Proper adjustment may only be accomplished with vehicle unloaded. Failure to comply may result in injury to personnel or damage to equipment.

(1) Position cable clamp (1) on control lever (2) so that center of cable clamp measures 5 3/8 - 5 5/8 in. (13.65-14.29 cm) from center of pivot shaft (3).

(2) Position control lever (2) so that it is level.

(3) Tighten screw (4) in cable clamp (1).
(4) Disconnect air hose (5) from 90-degree fitting (6).

(5) Remove 90-degree fitting (6) from left rear service brake air chamber (7).

(6) Disconnect center air hose (8) from 90-degree fitting (9).

(7) Remove 90-degree fitting (9) from left rear service brake air chamber (7).

(8) Install tee fitting (10) in left rear service brake air chamber (7).

(9) Install 90-degree fitting (9) in tee fitting (10).

(10) Connect center air hose (8) to 90-degree fitting (9).

(11) Install 90-degree fitting (6) in left rear service brake air chamber (7).

(12) Connect air hose (5) to 90-degree fitting (6).

(13) Install pressure transducer (11) in tee fitting (10).

(14) Connect test cable (12) to pressure transducer (11).

(15) Perform STE/ICE-R Test #50 (TM 9-4910-571-12 & P).

CAUTION

Full system air pressure is required before calibrating load sensing valve. Failure to comply may result in incorrect calibration of load sensing valve.

(16) Close air tanks (TM 9-2320-365-10).

NOTE

Hold engine speed at high idle for at least one minute after pressure stabilizes.

(17) Start engine (TM 9-2320-365-10) and increase engine speed to high idle.

NOTE

REAR BRAKE AIR pressure gage should read approximately 120 psi. If REAR BRAKE AIR pressure gage reads less than 115 psi shut down engine and perform step (17) again.

(18) Decrease engine speed to low idle.

(19) Depress brake pedal (TM 9-2320-365-10).
NOTE

STE/ICE-R attached to rear service brake air chamber should indicate air pressure within limits shown in Table 11-1. Air Chamber Pressure Limits.

(20) Note reading on pressure gage while brake pedal is depressed.

Table 11-1. Air Chamber Pressure Limits

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Air Pressure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1078, M1081</td>
<td>45-55 psi (310-379 kPa)</td>
</tr>
<tr>
<td>M1080</td>
<td>22-28 psi (152-193 kPa)</td>
</tr>
<tr>
<td>M1079</td>
<td>45-55 psi (310-379 kPa)</td>
</tr>
</tbody>
</table>

NOTE

- If air chamber pressure is not within limits shown in Table 11-1. Air Chamber Pressure Limits, perform steps (21) through (23), depress brake pedal several times, shut down engine, and perform steps (17) through (20) again.

- Lengthening load sensing valve control cable will increase pressure reading, shortening cable will decrease pressure reading.

(21) Loosen screw (4) in cable clamp (1).

(22) Adjust length of load sensing valve control cable (13).

(23) Tighten screw (4) in cable clamp (1).

(24) Tighten jam nut (14) on screw (4).
(17) Shut down engine (TM 9-2320-365-10).

(18) Drain primary air tank (TM 9-2320-365-10).

(19) Disconnect test cable (12) from pressure transducer (11).

(20) Remove pressure transducer (11) from tee fitting (10).

(21) Disconnect air hose (5) from 90-degree fitting (6).

(22) Remove 90-degree fitting (6) from left rear service brake air chamber (7).

(23) Disconnect center air hose (8) from 90-degree fitting (9).

(24) Remove 90-degree fitting (9) from tee fitting (10).

(25) Remove tee fitting (10) from left rear service brake air chamber (7).

**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.

(26) Apply antiseize compound to threads of two 90-degree fittings (6 and 9).

(27) Install 90-degree fitting (9) in left rear service brake air chamber (7).

(28) Connect center air hose (8) to 90-degree fitting (9).

(29) Install 90-degree fitting (6) in left rear service brake air chamber (7).

(30) Connect air hose (5) to 90-degree fitting (6).

(1) Start engine (TM 9-2320-365-10) and allow enough
time for air pressure to build to normal operating
pressure.

(2) Shut down engine (TM 9-2320-365-10).

(3) Check around load sensing valve air hoses and fittings
for air leaks.

(4) Start engine (TM 9-2320-365-10).

(5) Road test vehicle and check for proper brake operation.

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
11-11. ANTI-COMPOUNDING RELAY VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Nut, Self-Locking (2) (Item 148, 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.

a. Removal.

NOTE

Tag air hoses and connection points prior to disconnecting.

(1) Disconnect two air hoses (1) from 90-degree fittings (2).
(2) Disconnect air hose (3) from 90-degree fitting (4).
(3) Disconnect air hose (5) from 90-degree fitting (6).
(4) Disconnect air hose (7) from 90-degree fitting (8).
(5) Remove two self-locking nuts (9), washers (10), screws (11), washers (12) and anti-compounding relay valve (13) from panel (14). Discard self-locking nuts.

(6) Remove plug (15) from anti-compounding relay valve (13).

(7) Remove 90-degree fitting (8) from bushing (16).

(8) Remove bushing (16) from anti-compounding relay valve (13).

(9) Remove 90-degree fitting (6) from anti-compounding relay valve (13).

(10) Remove 90-degree fitting (4) from anti-compounding relay valve (13).

(11) Remove two 90-degree fittings (2) from anti-compounding relay valve (13).
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 anti-seize compound to two 90-degree fittings (1), 90-degree fitting (2), 90-degree fitting (3), bushing (4), 90-degree fitting (5), and plug (6).

2. Install two 90-degree fittings (1) in anti-compounding relay valve (7).

3. Install 90-degree fitting (2) in anti-compounding relay valve (7).

4. Install 90-degree fitting (3) in anti-compounding relay valve (7).

5. Install bushing (4) in anti-compounding relay valve (7).

6. Install 90-degree fitting (5) in bushing (4).

7. Install plug (6) in anti-compounding relay valve (7).

8. Position anti-compounding relay valve (7) on panel (8) with two washers (9), screws (10), washers (11), and self-locking nuts (12).

9. Tighten two self-locking nuts (12) to 14-18 lb-ft (20-24 N·m).
(10) Connect air hose (13) to 90-degree fitting (5).

(11) Connect air hose (14) to 90-degree fitting (3).

(12) Connect air hose (15) to 90-degree fitting (2).

(13) Connect two air hoses (16) to 90-degree fittings (1).

d. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check anti-compounding relay valve for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
## 11-12. INVERSION VALVE REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

### INITIAL SETUP

<table>
<thead>
<tr>
<th>Equipment Conditions</th>
<th>Materials/Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine shut down (TM 9-2320-365-10).</td>
<td>Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)</td>
</tr>
<tr>
<td>Air tanks drained (TM 9-2320-365-10).</td>
<td>Antiseize Compound (Item 63, Appendix D)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tools and Special Tools</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Goggles, Industrial (Item 15, Appendix C)</td>
<td>Nut, Self-Locking (2) (Item 148, Appendix G)</td>
</tr>
<tr>
<td>Tool Kit, Genl Mech (Item 44, Appendix C)</td>
<td></td>
</tr>
<tr>
<td>Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)</td>
<td></td>
</tr>
</tbody>
</table>

**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.

**NOTE**

Tag air hoses and connection points prior to disconnecting.

1. Disconnect two air hoses (1) from branch tee fitting (2).
2. Disconnect two air hoses (3) from 90-degree fittings (4).
3. Disconnect two air hoses (5) from run tee fitting (6).
(4) Remove two self-locking nuts (7), screws (9), washers (10), and inversion valve (11) from panel (12). Discard self-locking nuts.

**NOTE**

Note orientation of fittings prior to removal.

(5) Remove run tee fitting (6) from inversion valve (11).

(6) Remove two 90-degree fittings (4) from inversion valve (11).

(7) Remove branch tee fitting (2) from inversion valve (11).
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 branch tee fitting (1), two 90-degree fittings (2), and run tee fitting (3).

2. Install branch tee fitting (1) in inversion valve (4).

3. Install two 90-degree fittings (2) in inversion valve (4).

4. Install run tee fitting (3) in inversion valve (4).

5. Position inversion valve (4) on panel (5) with two washers (6), screws (7) and self-locking nuts (9).

6. Tighten two self-locking nuts (9) to 14-18 lb-ft (20-24 N·m).
(7) Connect two air hoses (10) to run tee fitting (3).
(8) Connect two air hoses (11) to 90-degree fittings (2).
(9) Connect two air hoses (12) to branch tee fitting (1).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10) and allow time for air pressure to reach normal operating air pressure.
(2) Shut down engine (TM 9-2320-365-10).
(3) Check around inversion valve and air hoses for air leaks.
(4) Start engine (TM 9-2320-365-10).
(5) Road test vehicle and check for proper brake operation.
(6) Shut down engine (TM 9-2320-365-10).

End of Task.
### INITIAL SETUP

#### Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- Air tanks drained (TM 9-2320-365-10).

#### Tools and Special Tools
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

#### Materials/Parts
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Antiseize Compound (Item 63, Appendix D)
- Nut, Self-Locking (2) (Item 148, 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.

### a. Removal.

**NOTE**

Tag air hoses and connection points prior to disconnecting.

1. Disconnect two air hoses (1) from 90-degree fittings (2).
2. Disconnect two air hoses (3) from fittings (4).
3. Disconnect air hose (5) from 90-degree fitting (6).
4. Disconnect air hose (7) from 45-degree fitting (8).
(5) Remove two self-locking nuts (9), screws (11), washers (12), and relay valve (13) from panel (14). Discard self-locking nuts.

**NOTE**

Note orientation of fittings prior to removal.

(6) Remove 45-degree fitting (8) from relay valve (13).

(7) Remove two fittings (4) from relay valve (13).

(8) Remove 90-degree fitting (6) from relay valve (13).

(9) Remove two 90-degree fittings (2) from relay valve (13).

(10) Remove plug (15) from relay valve (13).
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 plug (1), two 90-degree fittings (2), 90-degree fitting (3), two fittings (4), and 45-degree fitting (5).

2. Install plug (1) in relay valve (6).

3. Install two 90-degree fittings (2) in relay valve (6).

4. Install 90-degree fitting (3) in relay valve (6).

5. Install two straight fittings (4) in relay valve (6).

6. Install 45-degree fitting (5) in relay valve (6).

7. Position relay valve (6) on panel (7) with two washers (8), screws (9), and self-locking nuts (11).

8. Tighten two self-locking nuts (11) to 14-18 lb-ft (20-24 N·m).
(9) Connect air hose (12) to 45-degree fitting (5).
(10) Connect air hose (13) to 90-degree fitting (3).
(11) Connect two air hoses (14) to fittings (4).
(12) Connect two air hoses (15) to 90-degree fittings (2).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10) and allow time for air pressure to reach normal operating air pressure.
(2) Shut down engine (TM 9-2320-365-10).
(3) Check around relay valve and hoses for air leaks.
(4) Start engine (TM 9-2320-365-10).
(5) Road test vehicle and check for proper brake operation.
(6) Shut down engine (TM 9-2320-365-10).

End of Task.
11-14. TWO-WAY CHECK VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Nut, Self-Locking (Item 148, Appendix G)

a. Removal.

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

Tag air hoses and connection points prior to disconnecting.

1) Disconnect three air hoses (1) from 90-degree fittings (2).

(2) Remove self-locking nut (3), screw (5), washer (6), and two-way check valve (7) from panel (8). Discard self-locking nut.
NOTE

Note orientation of fittings prior to removal.

(3) Remove three 90-degree fittings (2) from two-way check valve (7).

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 three 90-degree fittings (1).

(2) Install three 90-degree fittings (1) in two-way check valve (2).
11-14. TWO-WAY CHECK VALVE REPLACEMENT (CONT)

3. Position two-way check valve (2) on panel (3) with washer (4), screw (5) and self-locking nut (7).

4. Tighten self-locking nut (7) to 14-18 lb-ft (20-24 N·m).

5. Connect three air hoses (8) to 90-degree fittings (1).

c. Follow-On Maintenance.


2. Check for air leaks around two-way check valve fittings and air hoses.


End of Task.
# 11-15. FRONT AXLE QUICK RELEASE VALVE REPLACEMENT

This task covers:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>a.</td>
<td>Removal</td>
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<tr>
<td>b.</td>
<td>Installation</td>
</tr>
<tr>
<td>c.</td>
<td>Follow-On Maintenance</td>
</tr>
</tbody>
</table>

## INITIAL SETUP

### Equipment Conditions

- Engine shut down (TM 9-2320-365-10).
- Air tanks drained (TM 9-2320-365-10).
- Gravel deflector and gravel deflector extension removed (para 14-7)

### Tools and Special Tools

- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

### Materials/Parts

- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Antiseize Compound (Item 63, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)
- Nut, Self-Locking (2) (Item 148, 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.

a. Removal.

(1) Deleted.

(2) Deleted.
11-15. FRONT AXLE QUICK RELEASE VALVE REPLACEMENT (CONT)

NOTE

- Remove plastic cable ties as required.
- Tag air hoses and connection points prior to disconnecting.

(3) Disconnect air hose (6) from fitting (7).

(4) Disconnect air hose (8) from 90-degree fitting (9).

(5) Disconnect air hose (10) from 45-degree fitting (11).

(6) Remove two self-locking nuts (12), washers (13), screws (14), washers (15) and quick release valve (16) from bracket (17). Discard self-locking nuts.

NOTE

Note orientation of fittings prior to removal.

(7) Remove fitting (7) from quick release valve (16).

(8) Remove 90-degree fitting (9) from quick release valve (16).

(9) Remove 45-degree fitting (11) from quick release valve (16).
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 sealing compound to threads of 45-degree fitting (1), 90-degree fitting (2), and fitting (3).

2. Install 45-degree fitting (1) in quick release valve (4).

3. Install 90-degree fitting (2) in quick release valve (4).

4. Install fitting (3) in quick release valve (4).

5. Position quick release valve (4) on bracket (5) with two washers (6), screws (7), washers (8), and self-locking nuts (9).

6. Tighten two self-locking nuts (9) to 14-18 lb-ft (20-24 N·m).
11-15. FRONT AXLE QUICK RELEASE VALVE REPLACEMENT (CONT)

**NOTE**

Install plastic cable ties as required.

(7) Connect air hose (10) to 45-degree fitting (1).
(8) Connect air hose (11) to 90-degree fitting (2).
(9) Connect air hose (12) to fitting (3).

(10) Deleted.
(11) Deleted.
(12) Deleted.
(13) Deleted.

**c. Follow-On Maintenance.**

(1) Install gravel deflector and gravel deflector extension (para 14-7).

(1.1) Start engine (TM 9-2320-365-10).

(2) Check quick release valve and air hoses for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
11-16. AIR BRAKE PROTECTING VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Nut, Self-Locking (2) (Item 148, 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.

a. Removal.

NOTE
Tag air hoses and connection points prior to disconnecting.

(1) Disconnect air hose (1) from fitting (2).
(2) Disconnect air hose (3) from 90-degree fitting (4).
(3) Disconnect two air hoses (5) from 45-degree fittings (6).
(4) Disconnect two air hoses (7) from run tee fitting (8).
(5) Remove two self-locking nuts (9), screws (10), washers (11), and air brake protecting valve (12) from panel (13). Discard self-locking nuts.

NOTE

Note orientation of fittings prior to removal.

(6) Remove fitting (2) from air brake protecting valve (12).

(7) Remove 90-degree fitting (4) from air brake protecting valve (12).

(8) Remove two 45-degree fittings (6) from air brake protecting valve (12).

(9) Remove run tee fitting (8) from air brake protecting valve (12).

(10) Remove relief valve (14) from bushing (14.1).

(10.1) Remove bushing (14.1) from air brake protecting valve (12).

(11) Remove plug (15) from air brake protecting valve (12).
b. Air Brake Protecting Valve 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 plug (1), bushing (1.1), relief valve (2), run tee fitting (3), two 45-degree fittings (4), 90-degree fitting (5) and fitting (6).

2. Install plug (1) in air brake protecting valve (7).

2.1. Install bushing (1.1) in air brake protecting valve (7).

3. Install relief valve (2) in air brake protecting valve (7).

4. Install run tee fitting (3) in air brake protecting valve (7).

5. Install two 45-degree fittings (4) in air brake protecting valve (7).

6. Install 90-degree fitting (5) in air brake protecting valve (7).

7. Install fitting (6) in air brake protecting valve (7).

8. Position air brake protecting valve (7) on panel (8) with two washers (9), screws (10) and self-locking nuts (11).

9. Tighten two self-locking nuts (11) to 14-18 lb-ft (20-24 N·m).
11-16. AIR BRAKE PROTECTING VALVE REPLACEMENT (CONT)

(10) Connect two air hoses (12) to run tee fitting (3).

(11) Connect two air hoses (13) to 45-degree fittings (4).

(12) Connect air hose (14) to 90-degree fitting (5).

(13) Connect air hose (15) to fitting (6).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10) and allow time for air pressure to reach operating pressure.

(2) Shut down engine (TM 9-2320-365-10).

(3) Check around air brake protecting valve and hoses for air leaks.

(4) Start engine (TM 9-2320-365-10).

(5) Road test vehicle and check for proper brake operation.

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
11-17. PARK CONTROL TWO-WAY CHECK VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 14, Appendix D)
Nut, Self-Locking (Item 148, Appendix G)
Lockwasher (4) (Item 90, Appendix G)

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

a. Removal.

(1) Remove two screws (1) and frequency ECU (2) from bracket (3).

NOTE
Tag terminal lugs and connection points prior to disconnecting.

(2) Remove nut (4), lockwasher (5), and terminal lug TL150 (6) from front brake air pressure transmitter terminal WK (7). Discard lockwasher.

(3) Remove nut (8), lockwasher (9), and terminal lug TL156 (10) from front brake air pressure transmitter terminal G (11). Discard lockwasher.
(4) Remove nut (12), lockwasher (13), and terminal lug TL151 (14) from rear brake air pressure transmitter terminal WK (15). Discard lockwasher.

(5) Remove nut (16), lockwasher (17), and terminal lug TL157 (18) from rear brake air pressure transmitter terminal G (19). Discard lockwasher.

(6) Disconnect two air hoses (20) from 90-degree fittings (21).

(7) Disconnect air hose (22) from 90-degree fitting (23).

(8) Remove self-locking nut (24), washer (25), screw (26), and park control two-way check valve (27) from bracket (28). Discard self-locking nut.
(9) Remove two air pressure transmitters (29) from tee fittings (30).

(10) Remove two 90-degree fittings (21) from tee fittings (30).

**NOTE**

Note orientation of fittings prior to removal.

(11) Remove two tee fittings (30) from park control two-way check valve (27).

(12) Remove 90-degree fitting (23) from park control two-way check valve (27).

(13) Remove two adapters (31) from air pressure transmitters (29).
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 adhesive compound to bottom threads of two air pressure transmitters (1).

2. Install two adapters (2) on air pressure transmitters (1).

3. Apply antiseize compound to threads of 90-degree fitting (3), two tee fittings (4), and 90-degree fittings (5).

4. Install 90-degree fitting (1) in park control two-way check valve (6).

5. Install two tee fittings (4) in park control two-way check valve (6).

6. Install two 90-degree fittings (5) in tee fittings (4).
11-17. PARK CONTROL TWO-WAY CHECK VALVE REPLACEMENT (CONT)

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.

(7) Apply antiseize compound to threads of two adapters (2).

(8) Install two air pressure transmitters (1) in tee fittings (4).

(9) Position park control two-way check valve (6) on bracket (7) with screw (8), washer (8), and self-locking nut (10).

(10) Tighten self-locking nut (10) to 13-16 lb-ft (18-22 N•m).
(11) Connect air hose (11) to 90-degree fitting (3).

(12) Connect two air hoses (12) to 90-degree fittings (5).

(13) Install terminal lug TL157 (13) on rear brake air pressure transmitter terminal G (14) with lockwasher (15) and nut (16).

(14) Install terminal lug TL151 (17) on rear brake air pressure transmitter terminal WK (18) with lockwasher (19) and nut (20).

(15) Install terminal lug TL156 (21) on front brake air pressure transmitter terminal G (22) with lockwasher (23) and nut (24).

(16) Install terminal lug TL150 (25) on front brake air pressure transmitter terminal WK (26) with lockwasher (27) and nut (28).
(17) Install frequency ECU (29) on bracket (30) with two screws (31).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check park control two-way check valve and air hoses for air leaks and proper operation.

(3) Check operation of FRONT BRAKE AIR and REAR BRAKE AIR pressure gages.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
11-18. SYSTEM PARK AND TRAILER AIR SUPPLY 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).
Air tanks drained (TM 9-2320-365-10).

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)

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

a. Removal.

(1) Remove two roll pins (1) and knobs (2) from TRAILER AIR SUPPLY valve (3) and SYSTEM PARK valve (4).

(2) Remove two nuts (5) from TRAILER AIR SUPPLY valve (3) and SYSTEM PARK valve (4).

(3) Remove six screws (6) and panel (7) from personnel heater assembly (8).

(2) Remove two nuts (5) from TRAILER AIR SUPPLY valve (3) and SYSTEM PARK valve (4).

(3) Remove six screws (6) and panel (7) from personnel heater assembly (8).
NOTE
Tag air hoses and connection points prior to disconnecting.

(4) Disconnect two air hoses (9) from 90-degree fittings (10).

(5) Disconnect four air hoses (11) from 90-degree fittings (12).

(6) Remove SYSTEM PARK valve (4) from personnel heater assembly (8).

NOTE
Note orientation of fittings prior to removal.

(7) Remove two 90-degree fittings (10) from SYSTEM PARK valve (4).

(8) Remove two run tee fittings (13) from SYSTEM PARK valve (4).

(9) Remove four 90-degree fittings (12) from two run tee fittings (13).
(10) Disconnect four air hoses (14) from 90-degree fittings (15).

(11) Remove TRAILER AIR SUPPLY valve (3) from personnel heater assembly (8).

**NOTE**

Note orientation of fittings prior to removal.

(12) Remove four 90-degree fittings (15) from TRAILER AIR SUPPLY valve (3).

**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 four 90-degree fittings (1).

(2) Install four 90-degree fittings (1) in TRAILER AIR SUPPLY valve (2).
(3) Connect four air hoses (3) to 90-degree fittings (1).

(4) Position TRAILER AIR SUPPLY valve (2) in personnel heater assembly (4).

---

**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.

(5) Apply antiseize compound to threads of four 90-degree fittings (5), two run tee fittings (6), and 90-degree fittings (7).

(6) Install four 90-degree fittings (5) in two run tee fittings (6).

(7) Install two run tee fittings (6) in SYSTEM PARK valve (8).

(8) Install two 90-degree fittings (7) in SYSTEM PARK valve (8).
(9) Connect four air hoses (9) to 90-degree fittings (5).

(10) Connect two air hoses (10) to 90-degree fittings (7).

(11) Install SYSTEM PARK valve (8) in personnel heater assembly (4).

(12) Install panel (11) on personnel heater assembly (4) with six screws (12).

(13) Install two nuts (13) on TRAILER AIR SUPPLY valve (2) and SYSTEM PARK valve (8).

(15) Install two knobs (14) on TRAILER AIR SUPPLY valve (2) and SYSTEM PARK valve (8) with two roll pins (15).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check SYSTEM PARK valve for air leaks.

(3) Check TRAILER AIR SUPPLY valve for air leaks.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
11-19. BRAKE AIR HOSES REPLACEMENT

This task covers:

a. Brake Air Hose Locations
b. Follow-On Maintenance

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)

Materials/Parts
- Cap and Plug Set (Item 15, Appendix D)
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Ties, Cable, Plastic (Item 76, Appendix D)

a. Brake Air Hose Locations

**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**

Cap or plug hose connections to prevent contamination. Failure to comply may result in damage to equipment.

**NOTE**

- This task shows locations of hoses on the vehicle. It may not be necessary to remove all hoses at one time.
- Tag hoses and connection points prior to removal.
- Note location of plastic cable ties prior to removal.
- Remove plastic cable ties as required.
- Inspect hoses and fittings for cracks, kinks, nicks, stripped threads, and cuts. Replace damaged parts.
Figure 11-3. Rear Brake Air Hose Locations

Table 11-2. Rear Brake Air Hose Locations

<table>
<thead>
<tr>
<th>HOSE NAME (Number)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear brake air supply (214)</td>
<td>Primary tank fitting (1)</td>
<td>Two way valve fitting (2)</td>
</tr>
<tr>
<td>Rear brake air tie #1 (222)</td>
<td>Two way valve fitting (3)</td>
<td>Inversion valve input fitting (4)</td>
</tr>
<tr>
<td>Rear brake air tie #2 (223)</td>
<td>Inversion valve input fitting (5)</td>
<td>Relay valve input fitting (6)</td>
</tr>
<tr>
<td>Right rear brake supply</td>
<td>Relay valve output A (7)</td>
<td>Right rear brake cylinder #1 (8)</td>
</tr>
<tr>
<td>Right rear brake tie</td>
<td>Right rear brake cylinder #1 (8)</td>
<td>Right rear brake cylinder #2 (9)</td>
</tr>
<tr>
<td>Left rear brake supply</td>
<td>Relay valve output B (10)</td>
<td>Left rear brake cylinder #1 (11)</td>
</tr>
</tbody>
</table>
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**Figure 11-3. Rear Brake Air Hose Locations (Cont)**

![Rear Brake Air Hose Locations Diagram](diagram.png)

**Table 11-2. Rear Brake Air Hose Locations (Cont)**

<table>
<thead>
<tr>
<th>HOSE NAME (Number)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left rear brake tie</td>
<td>Left rear brake cylinder #1 (11)</td>
<td>Left rear brake cylinder #2 (12)</td>
</tr>
<tr>
<td>Right rear brake tie</td>
<td>Right rear brake cylinder #2 vent fitting (13)</td>
<td>Right rear brake cylinder #1 vent fitting (14)</td>
</tr>
<tr>
<td>Right rear brake vent</td>
<td>Right rear brake cylinder #1 vent fitting (14)</td>
<td>Vent fitting (15)</td>
</tr>
<tr>
<td>Left rear brake vent tie</td>
<td>Left rear brake cylinder #2 vent fitting (16)</td>
<td>Left rear brake cylinder #1 vent fitting (17)</td>
</tr>
<tr>
<td>Left rear brake vent</td>
<td>Left rear brake cylinder #1 vent fitting (17)</td>
<td>Vent Fitting (18)</td>
</tr>
<tr>
<td>Load sensing pilot (121)</td>
<td>Relay valve fitting (19)</td>
<td>Load sensing valve output (20)</td>
</tr>
</tbody>
</table>
Figure 11-4. Rear Brake Control Air Hose Locations

Table 11-3. Rear Brake Control Air Hose Locations

<table>
<thead>
<tr>
<th>AIR HOSE NAME (NUMBER)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear wheel valve supply (214)</td>
<td>Secondary tank fitting (1)</td>
<td>Two way valve input fitting (2)</td>
</tr>
<tr>
<td>Anti-compound valve supply (221)</td>
<td>Two way valve output fitting (3)</td>
<td>Anti-compound valve input fitting (4)</td>
</tr>
<tr>
<td>Right rear supply</td>
<td>Anti-compound valve output fitting (5)</td>
<td>Right rear cylinder #1 fitting (6)</td>
</tr>
<tr>
<td>Right rear supply tie</td>
<td>Right rear cylinder #1 fitting (6)</td>
<td>Right rear cylinder #2 fitting (7)</td>
</tr>
<tr>
<td>Left rear supply</td>
<td>Anti-compound valve output fitting (8)</td>
<td>Left rear cylinder #1 fitting (9)</td>
</tr>
<tr>
<td>Left rear supply tie</td>
<td>Left rear cylinder #1 fitting (9)</td>
<td>Left rear cylinder #2 fitting (10)</td>
</tr>
<tr>
<td>Anti-compound valve pilot (118)</td>
<td>Inversion valve output fitting (11)</td>
<td>Anti-compound valve output pilot (12)</td>
</tr>
</tbody>
</table>
**Table 11-3. Rear Brake Control Air Hose Locations (Cont)**

<table>
<thead>
<tr>
<th>AIR HOSE NAME (NUMBER)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-compound pilot (120)</td>
<td>Anti-compound pilot input fitting (13)</td>
<td>Air brake protecting valve input fitting (14)</td>
</tr>
<tr>
<td>Inversion valve pilot (125)</td>
<td>Inversion valve pilot input (15)</td>
<td>Air brake protecting valve input fitting (16)</td>
</tr>
<tr>
<td>Rear gladhand emergency (126)</td>
<td>Rear gladhand emergency input fitting (17)</td>
<td>Air brake protecting valve pilot input fitting (18)</td>
</tr>
<tr>
<td>Rear gladhand service (265)</td>
<td>Rear gladhand service output fitting (19)</td>
<td>Air brake protecting valve output fitting (20)</td>
</tr>
<tr>
<td>Load sensing supply tie (247)</td>
<td>Load sensing supply tee (21)</td>
<td>Air brake protecting valve fitting (22)</td>
</tr>
<tr>
<td>Trailer supply (102)</td>
<td>Trailer supply output fitting (23)</td>
<td>Bulkhead fitting (24)</td>
</tr>
<tr>
<td>Trailer supply tie (124)</td>
<td>Bulkhead fitting (24)</td>
<td>Air brake protecting input fitting (25)</td>
</tr>
</tbody>
</table>
Figure 11-5. Front Brake Air Hose Locations

Table 11-4. Front Brake Air Hose Locations

<table>
<thead>
<tr>
<th>AIR HOSE NAME (NUMBER)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary tank foot valve supply (215)</td>
<td>Primary tank output fitting (1)</td>
<td>Cab bulkhead fitting (2)</td>
</tr>
<tr>
<td>Primary tank foot valve supply tie (207)</td>
<td>Cab bulkhead fitting (2)</td>
<td>Foot valve input fitting (3)</td>
</tr>
<tr>
<td>Secondary tank foot valve supply (216)</td>
<td>Secondary tank output fitting (4)</td>
<td>Cab bulkhead fitting (5)</td>
</tr>
<tr>
<td>Secondary tank foot valve tie (208)</td>
<td>Cab bulkhead fitting (5)</td>
<td>Foot valve input fitting (6)</td>
</tr>
<tr>
<td>Foot valve front brake supply (206)</td>
<td>Foot valve front brake output (7)</td>
<td>Bulkhead fitting (8)</td>
</tr>
<tr>
<td>Foot valve front brake supply tie #1 (202)</td>
<td>Cab bulkhead fitting (8)</td>
<td>Two way valve fitting (9)</td>
</tr>
<tr>
<td>Foot valve front brake supply tie #2 (218)</td>
<td>Two way valve fitting (9)</td>
<td>Tee fitting (10)</td>
</tr>
</tbody>
</table>
**Table 11-4. Front Brake Air Hose Locations (Cont)**

<table>
<thead>
<tr>
<th>AIR HOSE NAME (NUMBER)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot valve front brake supply tie #3 (271)</td>
<td>Tee fitting (11)</td>
<td>Quick release valve input fitting (12)</td>
</tr>
<tr>
<td>Left front brake supply (220)</td>
<td>Quick release valve output fitting (13)</td>
<td>Bulkhead fitting (14)</td>
</tr>
<tr>
<td>Left front brake supply tie</td>
<td>Bulkhead fitting (14)</td>
<td>Left front brake cylinder fitting (15)</td>
</tr>
<tr>
<td>Left front brake vent</td>
<td>Left front cylinder vent fitting (16)</td>
<td>Bulkhead vent fitting (17)</td>
</tr>
<tr>
<td>Right front brake supply (219)</td>
<td>Quick release valve output fitting (18)</td>
<td>Bulkhead fitting (19)</td>
</tr>
<tr>
<td>Right front brake supply tie</td>
<td>Bulkhead fitting (19)</td>
<td>Right front brake cylinder fitting (20)</td>
</tr>
<tr>
<td>Right front brake vent</td>
<td>Right front cylinder vent fitting (21)</td>
<td>Bulkhead vent fitting (22)</td>
</tr>
<tr>
<td>Foot valve output (205)</td>
<td>Foot valve load sensing output fitting (23)</td>
<td>Bulkhead fitting (24)</td>
</tr>
<tr>
<td>Foot valve output tie (209)</td>
<td>Bulkhead fitting (24)</td>
<td>Two way valve input fitting (25)</td>
</tr>
</tbody>
</table>
Table 11-4. Front Brake Air Hose Locations (Cont)

<table>
<thead>
<tr>
<th>AIR HOSE NAME (NUMBER)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary supply (204)</td>
<td>Primary supply tee fitting (26)</td>
<td>Check valve fitting (27)</td>
</tr>
<tr>
<td>Secondary supply (203)</td>
<td>Secondary tee fitting (28)</td>
<td>Check valve fitting (29)</td>
</tr>
<tr>
<td>Park control input (107)</td>
<td>Check valve output (30)</td>
<td>Park control input fitting (31)</td>
</tr>
<tr>
<td>Trailer pilot input (108)</td>
<td>Park control output fitting (31.1)</td>
<td>Trailer supply pilot fitting (32)</td>
</tr>
<tr>
<td>Park control output (103)</td>
<td>Park control valve output fitting (33)</td>
<td>Bulkhead fitting (34)</td>
</tr>
<tr>
<td>Two way valve input #1 (109)</td>
<td>Bulkhead fitting (34)</td>
<td>Two way valve input #1 fitting (35)</td>
</tr>
<tr>
<td>Two way valve input #2 (231)</td>
<td>Two way valve input #2 fitting (36)</td>
<td>Gladhand emergency supply fitting (37)</td>
</tr>
</tbody>
</table>
Figure 11-5. Front Brake Air Hose Locations (Cont)

Table 11-4. Front Brake Air Hose Locations (Cont)

<table>
<thead>
<tr>
<th>AIR HOSE NAME (NUMBER)</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inversion valve supply (119)</td>
<td>Two way valve output fitting (38)</td>
<td>Inversion valve input supply fitting (39)</td>
</tr>
<tr>
<td>Gladhand service (229)</td>
<td>Gladhand valve service fitting (40)</td>
<td>Two way valve input tee (41)</td>
</tr>
<tr>
<td>Gladhand service tie (228)</td>
<td>Two way valve input tee (42)</td>
<td>Two way valve input fitting (43)</td>
</tr>
<tr>
<td>Trailer supply vent (105)</td>
<td>Trailer supply vent (44)</td>
<td>Park control vent tee (45)</td>
</tr>
<tr>
<td>Park control vent (106)</td>
<td>Park control vent tee (46)</td>
<td>Vent tee (47)</td>
</tr>
<tr>
<td>Foot control vent</td>
<td>Park control vent fitting (48)</td>
<td>Vent tee (47)</td>
</tr>
<tr>
<td>Interconnect (108)</td>
<td>Trailer fitting (49)</td>
<td>Park control fitting (50)</td>
</tr>
<tr>
<td>Rear axle vent</td>
<td>Trailer protection vent fitting (51)</td>
<td>Rear axle vent fitting (52)</td>
</tr>
<tr>
<td>Foot valve rear brake supply (117)</td>
<td>Tee fitting (53)</td>
<td>Inversion valve input fitting (54)</td>
</tr>
<tr>
<td>Load sensing (244)</td>
<td>Two way valve fitting (55)</td>
<td>Load sensing input fitting (56)</td>
</tr>
</tbody>
</table>
b. Follow-On Maintenance

(1) Start engine (TM 9-2320-365-10).

(2) Check around air hoses and fittings for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task
11-20. SECONDARY AND PRIMARY AIR TANKS REPLACEMENT

This task covers:

<table>
<thead>
<tr>
<th>Secondary Air Tank Removal</th>
<th>Primary Air Tank Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Air Tank Installation</td>
<td>Follow-On Maintenance</td>
</tr>
<tr>
<td>Primary Air Tank Removal</td>
<td></td>
</tr>
</tbody>
</table>

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)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Antiseize Compound (Item 63, Appendix D)
- Nut, Self-Locking (2) (Item 122.1, 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.

a. Secondary Air Tank Removal.

NOTE

Tag air hoses and connection points prior to disconnecting.

(1) Disconnect air hose (1) from 90-degree fitting (2).
(2) Disconnect air hose (3) from 90-degree fitting (4).
(3) Disconnect air hose (5) from branch tee fitting (6).
(4) Disconnect air hose (7) from branch tee fitting (6).

(5) Disconnect air hose (8) from 90-degree fitting (9).

(6) Disconnect air hose (10) from 90-degree fitting (11).

**NOTE**

- Vehicles may be equipped with either corrosion enhanced clamps or non-corrosion enhanced clamps. Corrosion enhanced clamps have a self-locking nut and cork lining. When removing a non-corrosion enhanced clamp, replace it with a corrosion enhanced clamp.

- Perform steps (7) through (8.1) on vehicles not equipped with corrosion enhanced clamps.

    (7) Remove two screws (12) from clamps (13).

    (8) Remove secondary air tank (14) from two clamps (13).

    (8.1) Remove two clamps (13) from battery box (14.1). Discard clamps and screws.
NOTE

Perform steps (8.2) and (8.3) on vehicles equipped with corrosion enhanced clamps.

(8.2) Remove two self-locking nuts (14.2) from clamps (13). Discard self-locking nuts.

(8.3) Remove secondary air tank (14) from two clamps (13).

NOTE

Note orientation of fittings prior to removal.

(9) Remove 90-degree fitting (2) from one-way check valve (15).

(10) Remove one-way check valve (15) from secondary air tank (14).

(11) Remove 90-degree fitting (4) from two-way check valve (16).

(12) Remove two-way check valve (16) from reducer fitting (17).

(13) Remove reducer fitting (17) from secondary air tank (14).
(14) Remove branch tee fitting (6) from secondary air tank (14).

(15) Remove drain valve (18) from secondary air tank (14).

(16) Remove inversion valve (19) from reducer fitting (20).

(17) Remove reducer fitting (20) from two-way check valve (16).

(18) Remove 90-degree fittings (9 and 11) from inversion valve (19).
b. Secondary Air Tank 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 90-degree fittings (1 and 2), and threads on both sides of reducer fitting (3).
2. Install 90-degree fittings (1 and 2) in inversion valve (4).
3. Install reducer fitting (3) in two-way check valve (5).
4. Install inversion valve (4) on reducer fitting (3).
5. Apply antiseize compound to threads of drain valve (6).
6. Install drain valve (6) in secondary air tank (7).
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.

(7) Apply antiseize compound to threads of branch tee fitting (8).

(8) Install branch tee fitting (8) in secondary air tank (7).

(9) Apply antiseize compound to threads on both sides of reducer fitting (9), and threads of 90-degree fitting (10), one-way check valve (11), and 90-degree fitting (12).

(10) Install reducer fitting (9) in secondary air tank (7).

(11) Install two-way check valve (5) on reducer fitting (9).

(12) Install 90-degree fitting (10) in two-way check valve (5).

(13) Install one-way check valve (11) in secondary air tank (7).

(14) Install 90-degree fitting (12) in one-way check valve (11).
NOTE

Perform step (15) on all models not previously equipped with corrosion enhanced clamps.

(15) Position two clamps (13) on battery box (14).

(16) Position secondary air tank (7) in two clamps (13) with self-locking nuts (14.1).

(16.1) Tighten two self-locking nuts (14.1).

(17) Connect air hose (15) to 90-degree fitting (1).

(18) Connect air hose (16) to 90-degree fitting (2).

(19) Connect air hose (17) to branch tee fitting (8).

(20) Connect air hose (18) to branch tee fitting (8).

(21) Connect air hose (19) to 90-degree fitting (10).

(22) Connect air hose (20) to 90-degree fitting (12).
c. Primary Air Tank Removal.

NOTE

Tag air hoses and connection points prior to disconnecting.

(1) Disconnect air hoses (1 and 2) from branch tee fitting (3).

(2) Disconnect air hose (4) from 45-degree fitting (5).

(3) Disconnect air hoses (6 and 7) from run tee fitting (8).

NOTE

- Vehicles may be equipped with either corrosion enhanced clamps or non-corrosion enhanced clamps. Corrosion enhanced clamps have a self-locking nut and cork lining. When removing a non-corrosion enhanced clamp, replace it with a corrosion enhanced clamp.

- Perform steps (4) through (5.1) on vehicles not equipped with corrosion enhanced clamps.

(4) Remove two screws (9) from clamps (10).

(5) Remove primary air tank (11) from two clamps (10).

(5.1) Remove two clamps (10) from battery box (11.1). Discard clamps and screws.
NOTE

Perform steps (5.2) and (5.3) on vehicles equipped with corrosion enhanced clamps.

(5.2) Remove two self-locking nuts (9) from clamps (10). Discard self-locking nuts.

(5.3) Remove primary air tank (11) from clamps (10).

NOTE

Note orientation of fittings prior to removal.

(6) Remove run tee fitting (8) from primary air tank (11).

(7) Remove 45-degree fitting (5) from primary air tank (11).

(8) Remove branch tee fitting (3) from one-way check valve (12).

(9) Remove one-way check valve (12) from primary air tank (11).
(10) Remove drain valve (13) from primary air tank (11).

d. Primary Air Tank Installation.

(1) Apply antiseize compound to threads of drain valve (1).

(2) Install drain valve (1) in primary air tank (2).

**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.
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.

(3) Apply antiseize compound to threads of one-way check valve (3), branch tee fitting (4), 45-degree fitting (5), and run tee fitting (6).

(4) Install one-way check valve (3) in primary air tank (2).

(5) Install branch tee fitting (4) in one-way check valve (3).

(7) Install 45-degree fitting (5) in primary air tank (2).

(8) Install run tee fitting (6) in primary air tank (2).

NOTE

Perform step (9) on all models not previously equipped with corrosion enhanced clamps.

(9) Position two clamps (7) on battery box (8).

(10) Position primary air tank (2) in two clamps (7) with self-locking nuts (8.1).

(10.1) Tighten two self-locking nuts (8.1).
(11) Connect air hoses (9 and 10) to run tee fitting (6).

(12) Connect air hose (11) to 45-degree fitting (5).

(13) Connect air hoses (12 and 13) to branch tee fitting (4).

e. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10) and allow time for air pressure to reach normal operating pressure.

(2) Shut down engine (TM 9-2320-365-10).

(3) Check around air hoses, fittings, and valves for air leaks.

(4) Start engine (TM 9-2320-365-10).

(5) Road test vehicle and check for proper brake operation.

(6) Shut down engine (TM 9-2320-365-10).

End of Task.
11-21. FRONT GLADHAND REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools

Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)

Materials/Parts

Filter Element (Item 13, Appendix G)
Damping Fluid (Item 20, Appendix D)
Packing, Preformed (Item 171, Appendix G)
Antiseize Compound (Item 63, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)
Lockwasher (Item 62, 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.

a. Removal.

NOTE

- Both front gladhands are removed the same way. Service gladhand shown.
- Remove plastic cable ties as required.

(1) Remove dummy coupling (1) from gladhand (2).

(2) Remove dummy coupling chain (3) from mounting bracket (4).

(3) Remove gladhand (2) and reducer (5) from adapter (6).

NOTE

Note orientation of preformed packing and filter prior to removal.

(4) Remove reducer (5), preformed packing (7), and filter (8) from gladhand (2). Discard filter and preformed packing.
(5) Disconnect air hose (9) from 90-degree fitting (10).

(6) Remove 90-degree fitting (10) from adapter (6).

(7) Remove nut (11), lockwasher (12), adapter (6), identification plate (13), and plate (14) from mounting bracket (4). Discard lockwasher.

b. Installation.

**NOTE**

- Both front gladhands are installed the same way. Service gladhand shown.

- Install plastic cable ties as required.

(1) Install plate (1), identification plate (2), and adapter (3) on mounting bracket (4) with lockwasher (5) and nut (6).

**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.

(2) Apply antiseize compound to threads of 90-degree fitting (7).

(3) Install 90-degree fitting (7) in adapter (3).

(4) Connect air hose (8) to 90-degree fitting (7).
CAUTION

Ensure that filter is firmly seated in gladhand and that top edge of filter does not extend above top edge of filter well. Failure to comply may result in gladhands that leak when pressurized.

(5) Install filter (9) in gladhand (10).

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.

(6) Apply damping fluid to preformed packing (11).
(7) Install preformed packing (11) in gladhand (10).
(7.1) Apply antiseize compound to threads of reducer fitting (12).
(8) Install reducer (12) in gladhand (10).
(9) Install reducer (12) with gladhand (10) in adapter (3).
(10) Install dummy coupling (13) on gladhand (10).
(11) Install dummy coupling chain (14) on mounting bracket (4).

C. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).
(2) Check gladhand for air leaks.
(3) Shut down engine (TM 9-2320-365-10).

End of Task.
11-22. REAR GLADHAND REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Materials/Parts
Filter Element (Item 13, Appendix G)
Damping Fluid (Item 20, Appendix D)
Packing, Preformed (Item 171, Appendix G)
Antiseize Compound (Item 63, Appendix D)
Lockwasher (Item 61, Appendix G)

Personnel Required
(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.

a. Removal.

NOTE

Both rear gladhands are removed the same way. EMERGENCY gladhand shown.

(1) Remove dummy coupling (1) from gladhand (2).

(2) Disconnect air hose (3) from reducer fitting (4).

NOTE

Steps (3) and (4) require the aid of an assistant.

(3) Remove reducer fitting (4) from adapter fitting (5).

(4) Remove nut (6), lockwasher (7), gladhand (2), and identification plate (8), from rear crossmember (9). Discard lockwasher.
(5) Position gladhand (2) in vise.

(6) Remove dummy coupling chain (10) from adapter fitting (5).

(7) Remove adapter fitting (5) from gladhand (2).

NOTE

Note orientation of preformed packing and filter prior to removal.

(8) Remove preformed packing (11) and filter (12) from gladhand (2). Discard preformed packing and filter.

b. Installation.

CAUTION

Ensure that filter is firmly seated in gladhand and that top edge of filter does not extend above top edge of filter well. Failure to comply may result in gladhands that leak when pressurized.

(1) Install filter (1) in gladhand (2).
**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.

(2) Apply damping fluid to preformed packing (3).

(3) Install preformed packing (3) in gladhand (2).

(4) Position gladhand (2) in vise.

(5) Apply antiseize compound to threads of adapter fitting (4).

(6) Install adapter fitting (4) in gladhand (2).

(7) Install dummy coupling chain (5) on adapter fitting (4).

(8) Remove gladhand (2) from vise.
NOTE

Steps (9) through (11) require the aid of an assistant.

(9) Install identification plate (6) and gladhand (2) in rear crossmember (7) with lockwasher (8) and nut (9).

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.

(10) Apply antiseize compound to threads of reducer fitting (10).

(11) Install reducer fitting (10) in adapter fitting (4).

(12) Connect air hose (11) to reducer fitting (10).

(13) Install dummy coupling (12) on gladhand (2).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Release TRAILER AIR SUPPLY and SYSTEM PARK valves (TM 9-2320-365-10).

(3) Check gladhand for air leaks.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
11-23. SERVICE GLADHAND TWO-WAY CHECK VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air tanks drained (TM 9-2320-365-10).
Windshield washer reservoir and pump removed (para 18-2).
Cab raised (TM 9-2320-365-10).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Nut, Self-Locking (Item 148, 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.

a. Removal.

NOTE
Tag air hoses and connection points prior to disconnecting.

1) Disconnect two air hoses (1) from branch tee fitting (2).
2) Disconnect air hose (3) from 90-degree fitting (4).
3) Disconnect air hose (5) from 45-degree fitting (6).
4) Remove self-locking nut (7), service gladhand two-way check valve (8), screw (9), and washer (10) from front fender (11). Discard self-locking nut.
11-23. SERVICE GLADHAND TWO-WAY CHECK VALVE REPLACEMENT (CONT)

**NOTE**

Note orientation of fittings prior to removal.

(5) Remove 45-degree fitting (6) from service gladhand two-way check valve (8).

(6) Remove 90-degree fitting (4) from service gladhand two-way check valve (8).

(7) Remove branch tee fitting (2) from service gladhand two-way check valve (8).

**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 branch tee fitting (1), 90-degree fitting (2), and 45-degree fitting (3).

(2) Install branch tee fitting (1) in service gladhand two-way check valve (4).

(3) Install 90-degree fitting (2) in service gladhand two-way check valve (4).

(4) Install 45-degree fitting (3) in service gladhand two-way check valve (4).
(5) Position service gladhand two-way check valve (4) on front fender (5) with washer (6), screw (7), and self-locking nut (8).

(6) Tighten self-locking nut (8) to 13-16 lb-ft (18-22 N·m).

(7) Connect air hose (9) to 45-degree fitting (3).

(8) Connect air hose (10) to 90-degree fitting (2).

(9) Connect two air hoses (11) to branch tee fitting (1).

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Install windshield washer reservoir and pump (para 18-2).

(3) Start engine (TM 9-2320-365-10) and allow air pressure to build to normal operating pressure.

(4) Check around service gladhand two-way check valve for air leaks.

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
# 11-24. FRONT BRAKE TWO-WAY CHECK VALVE REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

## INITIAL SETUP

**Equipment Conditions**
- Air tanks drained (TM 9-2320-365-10).
- Windshield washer reservoir and pump removed (para 18-2).
- Cab raised (TM 9-2320-365-10).

**Tools and Special Tools**
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

**Materials/Parts**
- Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
- Antiseize Compound (Item 63, Appendix D)
- Nut, Self-Locking (Item 148, Appendix G)

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## 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.

**NOTE**

Tag air hoses and connection points prior to disconnecting.

1. Disconnect two air hoses (1) from 90-degree fittings (2).
2. Disconnect air hose (3) from 45-degree fitting (4).
3. Remove self-locking nut (5), front brake two-way check valve (6), screw (7), and washer (8) from front fender (9). Discard self-locking nut.
NOTE

Note orientation of fittings prior to removal.

(4) Remove 45-degree fitting (4) from front brake two-way check valve (6).

(5) Remove two 90-degree fittings (2) from front brake two-way check valve (6).

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 two 90-degree fittings (1) and 45-degree fitting (2).

(2) Install two 90-degree fittings (1) in front brake two-way check valve (3).

(3) Install 45-degree fitting (2) in front brake two-way check valve (3).
(4) Position front brake two-way check valve (3) on front fender (4) with washer (5), screw (6), and self-locking nut (7).

(5) Tighten self-locking nut (7) to 13-16 lb-ft (11-22 N·m).

(6) Connect air hose (8) to 45-degree fitting (2).

(7) Connect two air hoses (9) to 90-degree fittings (1).

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Install windshield washer reservoir and pump (para 18-2).

(3) Start engine (TM 9-2320-365-10) and allow air pressure to build to normal operating pressure.

(4) Check around front brake two-way check valve for air leaks.

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
a. Removal.

**NOTE**

- Both stoplight switches are removed the same way. Rear stoplight switch shown.
- Tag wires and connection points prior to removal.
- Terminal lugs on front stoplight switch are TL154 and TL155.

(1) Remove two nuts (1), lockwashers (2), and terminal lugs TL152 (3) and TL153 (4) from stoplight switch (5). Discard lockwashers.

(2) Remove stoplight switch (5) from fitting (6).
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.

**NOTE**

- Both stoplight switches are installed the same way. Rear stoplight switch shown.
- Terminal lugs on front stoplight switch are TL154 and TL155.

1. Apply antiseize compound to threads of stoplight switch (1) and fitting (2).
2. Install stoplight switch (1) in fitting (2).
3. Install terminal lugs TL153 (3) and TL152 (4) on stoplight switch (1) with two lockwashers (5) and nuts (6).

c. Follow-On Maintenance.

1. Connect batteries (para 7-48).
2. Check operation of stoplights (TM 9-2320-365-10).

End of Task.
11-26. FRONT GLADHAND ONE-WAY CHECK VALVE REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air tanks drained (TM 9-2320-365-10).
Gravel deflector and gravel deflector extension removed (para 14-7).

Tools and Special Tools
Goggles, Industrial (Item 15, Appendix C)
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wrench, Box and Open End (Item 53, Appendix C)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)

a. Removal.

**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. Deleted.
2. Deleted.

(3) Disconnect three air hoses (6) from adapter (7), 90-degree fitting (8), and 90-degree fitting (9).

**NOTE**

- Tag air hoses and connection points prior to removal.
- Remove plastic cable ties as required.
(4) Remove one-way check valve (10) and 90-degree fitting (9) from tee fitting (11).

(5) Remove tee fitting (11) from fitting (12).

(6) Remove nut (13), lockwasher (14), and fitting (12) from bracket (15). Discard lockwasher.

(7) Remove adapter (7) and fitting (16) from one-way check valve (10).

(8) Remove 90-degree fitting (8) from 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 90-degree fitting (1).

(2) Install 90-degree fitting (1) in fitting (2).

(3) Apply antiseize compound to threads of adapter (3) and fitting (4).

(4) Install adapter (3) and fitting (4) in one-way check valve (5).

**NOTE**

Install plastic cable ties as required.

(5) Install fitting (2) on bracket (6) with lockwasher (7) and nut (8).

(6) Install tee fitting (9) in fitting (2).

(7) Apply antiseize compound to threads of 90-degree fitting (10) and one-way check valve (5).

(8) Install 90-degree fitting (10) and one-way check valve (5) in tee fitting (9).
(9) Connect three air hoses (11) to 90-degree fitting (10), 90-degree fitting (1), and adapter (3).

(10) Deleted.

(11) Deleted.

(12) Deleted.

(13) Deleted.

c. Follow-On Maintenance.

(1) Install gravel deflector and gravel deflector extension (para 14-7).

(1.1) Start engine (TM 9-2320-365-10).

(2) Check for air leaks around check valve.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
11-27. PRESSURE PROTECTION VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

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)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)

a. Removal.

(1) Disconnect air hose (1) from fitting (2).

(2) Disconnect air hose (3) from 90-degree fitting (4).

(3) Rotate pressure protection valve (5) to vertical position.

(4) Remove pressure protection valve (5) from 90-degree fitting (6).

(5) Remove 90-degree fitting (6) from air tank (7).
NOTE

Note position and orientation of fittings prior to removal.

(6) Remove fitting (2) from tee fitting (8).

(7) Remove 90-degree fitting (4) from bushing (9).

(8) Remove bushing (9) from tee fitting (8).

(9) Remove tee fitting (8) from pressure protection valve (5).

(10) Remove pipe nipple (10) from pressure protection valve (5).

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 pipe nipple (1).

(2) Install pipe nipple (1) in pressure protection valve (2).

(3) Apply antiseize compound to threads of tee fitting (3).

(4) Install tee fitting (3) in pressure protection valve (2).
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.

(5) Apply antiseize compound to threads of bushing (4).

(6) Install bushing (4) in tee fitting (3).

(7) Apply antiseize compound to threads of 90-degree fitting (5).

(8) Install 90-degree fitting (5) in bushing (4).

(9) Apply antiseize compound to threads of fitting (6).

(10) Install fitting (6) in tee fitting (3).

(11) Apply antiseize compound to threads of 90-degree fitting (7).

(12) Install 90-degree fitting (7) in air tank (8).

(13) Install pressure protection valve (2) in 90-degree fitting (7).

(14) Rotate pressure protection valve (2) to horizontal position.
(15) Connect air hose (9) to 90-degree fitting (5).

(16) Connect air hose (10) to fitting (6).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check pressure protection valve for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
11-28. LOW PRESSURE TRANSMITTER TWO-WAY CHECK VALVE 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).
Air tanks drained (TM 9-2320-365-10).

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

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape
(Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Adhesive (Item 8, Appendix D)
Lockwasher (2) (Item 90, Appendix G)
Adhesive (Item 9, Appendix D)

a. Removal.

NOTE
Perform step (1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(1) Remove adhesives and boot (1) from low pressure transmitter (1.1).

NOTE
Tag wires, air hoses, and connection points prior to removal.

(1.1) Remove adhesive, two nuts (2), lockwashers (3), and terminal lugs TL201 (4) and TL202 (5) from low pressure transmitter (1.1). Discard lockwashers.
(2) Disconnect two air hoses (6) from run tee fitting (7).

(3) Disconnect air hose (8) from fitting (9).

(4) Disconnect air hose (10) from 90-degree fitting (11).

(5) Remove screw (12), washer (13) and two-way check valve (14) from cab (15).

(6) Remove low pressure transmitter (1.1) from reducer bushing (16).

(7) Remove reducer bushing (16) from branch tee fitting (17).

(8) Remove 90-degree fitting (11) from branch tee fitting (17).

(9) Remove tee fitting (17) from two-way check valve (14).

(10) Remove run tee fitting (7) from two-way check valve (14).

(11) Remove fitting (9) from two-way check valve (14).
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 fitting (1), run tee fitting (2), branch tee fitting (3), 90-degree fitting (4), reducer bushing (5), and air pressure transmitter (6).

(2) Install fitting (1) in two-way check valve (7).

(3) Install run tee fitting (2) in two-way check valve (7).

(4) Install branch tee fitting (3) in two-way check valve (7).

(5) Install 90-degree fitting (4) in branch tee fitting (3).

(6) Install reducer bushing (5) in tee fitting (3).

(7) Install low pressure transmitter (6) in reducer bushing (5).

(8) Install two-way check valve (7) on cab (8) with washer (9) and screw (10).
(9) Connect air hose (11) to 90-degree fitting (4).

(10) Connect air hose (12) to fitting (1).

(11) Connect two air hoses (13) to run tee fitting (2).

(12) Install terminal lugs TL202 (14) and TL201 (15) on low pressure transmitter (6) with two lockwashers (16) and nuts (17).

**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.

(13) Apply adhesive to terminal lugs TL202 (14) and TL201 (15).

**NOTE**

Perform steps (14) and (15) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(14) Install boot (15.1) on low pressure transmitter (6).

(15) Apply antiseize compound to holes TLR and TTR and around edges of boot (15.1).
c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check low pressure transmitter two-way check valve for leaks.

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
11-29. AIR COMPRESSOR GOVERNOR REPLACEMENT/REPAIR/ADJUSTMENT

This task covers:

a. Removal  
b. Disassembly  
c. Cleaning/Inspection  
d. Assembly  
e. Installation  
f. Adjustment  
g. Follow-On Maintenance

INITIAL SETUP

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

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)  
STE/ICE-R (Item 39, Appendix C)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)  
Socket Set, Socket Wrench (Item 35, Appendix C)  
Goggles, Industrial (Item 15, Appendix C)

Materials/Parts
Antiseize Compound (Item 63, Appendix D)  
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)  
Repair Kit, Governor (Item 213.1, Appendix G)

References
TM 9-4910-571-12&P

Personnel Required
(2)

a. Removal.

NOTE
Tag air hoses and connection points prior to disconnecting.

(1) Disconnect two air compressor governor hoses (1) from fittings (2).

(2) Remove two fittings (2) from air compressor governor (3).
(3) Remove two screws (4), air compressor governor (3), and gasket (5) from air compressor (6). Discard gasket.

b. Disassembly.

(1) Remove cover (1), preformed packing (2), retaining ring (3), and caged spring assembly (4) from air compressor governor (5). Discard cover and preformed packing.

(2) Remove filter (6) from air compressor governor (5). Discard filter.

(3) Remove piston (7) from caged spring assembly (4).

CAUTION

Use caution when removing parts from piston. Failure to comply may result in damage to equipment.

(4) Remove spring (8) and pin (9) from piston (7).

(5) Remove spring (10) and valve disk (11) from piston (7).

(6) Remove two preforming packings (12) and preformed packing (13) from piston (7). Discard preformed packings.
11-29. AIR COMPRESSOR GOVERNOR REPLACEMENT/REPAIR/ADJUSTMENT (CONT)

c. Cleaning/Inspection.

**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.

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

**NOTE**
Replace any part that fails visual inspection.

(1) Clean all metal parts with dry cleaning solvent.

(2) Clean all internal passages with pressurized air.

(3) Inspect all parts for cracks, corrosion, or wear.

d. Assembly.

**NOTE**
Apply lubricating oil to preformed packings, piston, governor bore, and pin prior to assembly.

(1) Install two preformed packings (1) and preformed packing (2) on piston (3).

(2) Install valve disk (4) and spring (5) in piston (3).

(3) Install pin (6) and spring (7) in piston (3).

(4) Install piston (3) in air compressor governor (8).
(5) Install filter (9) in air compressor governor (8).

(6) Install caged spring assembly (10) in air compressor governor (8) with retaining ring (11).

(7) Install preformed packing (12) and cover (13) on air compressor governor (8).

e. Installation.

(1) Position gasket (1) and air compressor governor (2) on air compressor (3) with two screws (4).

(2) Tighten two screws (4) to 110-150 lb-in. (12-17 N·m).

**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.

(3) Apply sealing compound to threads of two fittings (5).

(4) Install two fittings (5) in air compressor governor (2).
(5) Install two air compressor governor hoses (6) in fittings (5).

(6) Lower cab (TM 9-2320-365-10).

f. Adjustment.

(1) Remove drain valve (1) from wet tank (2).

(2) Prepare STE/ICE-R Test #50 (TM 9-4910-571-12&P).

(3) Start engine (TM 9-2320-365-10).

(4) Raise cab (TM 9-2320-365-10).

(5) Remove cover (3) from air compressor governor (4).

(6) Loosen nut (5) on adjustment screw (6).
(7) Perform STE/ICE-R Test #50 (TM 9-4910-571-12&P).

NOTE

Turning adjustment screw to the left will increase wet tank pressure. Turning adjustment screw to the right will decrease wet tank pressure.

(8) Turn adjustment screw (6) until 120-130 psi is observed on STE/ICE-R.

(9) Tighten nut (5) on adjustment screw (6).

(10) Install cover (3) on air compressor governor (4).

(11) Lower cab (TM 9-2320-365-10).

(12) Shut down engine (TM 9-2320-365-10).

(13) Drain air tanks (TM 9-2320-365-10).

(14) Remove STE/ICE-R from wet tank (2).

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.

(15) Apply antiseize compound to threads of drain valve (1).

(16) Install drain valve (1) in wet tank (2).
g. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check around wet tank drain valve for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
CHAPTER 12
WHEELS, TIRES, AND HUBS 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section I. INTRODUCTION

12-1. INTRODUCTION

This chapter contains maintenance instructions for replacing wheels, tires, and hubs authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
**Section II. MAINTENANCE PROCEDURES**

### 12-2. WHEEL REPAIR

This task covers:

- a. Disassembly
- b. Assembly
- c. Follow-On Maintenance

#### INITIAL SETUP

**Equipment Conditions**

- Wheel removed (TM 9-2320-365-10).
- CTIS hose assemblies, manifold valve, kneeling valve and bracket removed (para 12-5).

**Tools and Special Tools**

- Tool Kit, Genl Mech (Item 44, Appendix C)
- Iron, Tire (Item 20, Appendix C)
- Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)
- Wrench Set, Socket (Item 48, Appendix C)

**Materials/Parts**

- Packing, Preformed (Item 169, Appendix G)
- Nut, Self-Locking (20) (Item 132, Appendix G)
- Nut, Self-Locking (4) (Item 152, Appendix G)

**Personnel Required**

- (2)

**References**

- TM 9-2610-200-14

---

**WARNING**

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

- Always use an inflation safety cage to inflate tires mounted on multipiece rims, and tire/rim assemblies not mounted on a tire changing machine that has a positive lock down device designed to hold the assembly during inflation (TM 9-2610-200-14). When using a tire changing machine, always follow manufacturer’s mounting and safety instructions. Failure to comply may result in serious injury or death to personnel. Always inflate tires that are mounted on rims with demountable side ring flanges or lockrings an inflation safety cage or serious injury or death may result.

---

**a. Disassembly.**

---

**CAUTION**

Loosen self-locking nuts no more than 1/2 inch (1.27 cm) at a time. Failure to comply may result in damage to equipment.

1. Loosen 20 self-locking nuts (1) approximately 1/2 in. (1.27 cm) at a time.

2. Remove 20 self-locking nuts (1) from outside wheel section (2). Discard self-locking nuts.

3. Remove outside wheel section (2) from tire (3).

4. Remove preformed packing (4) from inside wheel section (5). Discard preformed packing.
**WARNING**

Tire weighs approximately 350 lbs (159 Kgs). Use extreme care when handling tire. Failure to comply may result in injury to personnel.

**NOTE**

Steps (5) through (11) require the aid of an assistant.

(5) Turn tire (3) over to gain access to inside wheel section (5).

(6) Remove inside wheel section (5) from tire (3).

(7) Remove nut (6) and valve (7) from inside wheel section (5).

(8) Stand tire (3) on end with beadlock bolts (8) facing up.

(9) Push down on beadlock (9) to gain access to four self-locking nuts (10).

(10) Remove four self-locking nuts (10), bolts (8) and two clips (11) from beadlock (9). Discard self-locking nuts.

(11) Remove beadlock (9) from tire (3).

**b. Assembly.**

**NOTE**

Steps (1) through (6) require the aid of an assistant.

(1) Open tire (1) and install beadlock (2) inside tire.

(2) Install two clips (3) in beadlock (2) with four screws (4) and self-locking nuts (5).

(3) Center beadlock (2) in tire (1).
12-2. WHEEL REPAIR (CONT)

(4) Lay tire (1) on its side.

(5) Position valve (6) and nut (7) on inside wheel section (8).

(6) Tighten nut (7) to 175-200 lb-in. (20-23 N\text{m}).

(7) Install inside wheel section (8) in tire (1).

(8) Turn tire (1) over.

(9) Install preformed packing (9) on inside wheel section (8).

(10) Install outside wheel section (10) on inside wheel section (8).

(11) Position 20 nuts (11) on wheel section (10).

(12) Tighten 20 nuts (11) to 210-240 lb-ft (285-325 N\text{m}) in sequence shown.

c. Follow-On Maintenance.

(1) Inflate tire to 55 psi (379 kPa) (TM 9-2610-200-14).

(2) Install tire (TM 9-2320-365-10).

(3) Tighten wheel studs (para 12-4).

(4) Install CTIS hose assemblies, manifold valve, kneeling valve and bracket (para 12-5).
12-3. WHEEL STUD REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Wheel removed (TM 9-2320-365-10).
- Rear spring brakes caged (para 11-6).

Tools and Special Tools
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Respirator, Air Filter (Item 29, Appendix C)

Personnel Required
- (2)

a. Removal.

**WARNING**

- Spring brakes must be caged before attempting replacement of a rear axle wheel stud. Failure to comply may result in serious injury or death to personnel.

- Wheel drum weighs approximately 92 lbs (42 kgs). Use the aid of an assistant to help remove wheel drum from axle. Failure to comply may result in injury to personnel.

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

**CAUTION**

Wheel studs and nuts on left side of vehicle have left hand threads. Nuts must be turned to the right to loosen. Wheel studs and nuts on right side of vehicles have right hand threads. Nuts must be turned to the left to loosen. Failure to comply may result in damage to equipment.

**NOTE**

Step (1) requires the aid of an assistant.

(1) Remove wheel drum (1) from wheel hub (2).

(2) Turn hub to position stud (3), to be replaced, at top or bottom position.

(3) Knock stud (3) out through back side of wheel hub (2).
12-3. WHEEL STUD REPLACEMENT (CONT)

b. Installation.

(1) Install wheel stud (1) in wheel hub (2).

**NOTE**

Use a nut that was removed during wheel removal to perform step (2).

(2) Install nut (3) on wheel stud (1) with flat side of nut (3) toward wheel hub (2).

(3) Tighten nut (3) until wheel stud (1) is seated in wheel hub (2) as far as threads will allow.

(4) Remove nut (3) from wheel hub (2).

(5) Install nut (3) on wheel stud (1) with beveled side of nut (3) toward wheel hub (2).

(6) Tighten nut (3) until wheel stud (1) is seated in wheel hub (2).

(7) Remove nut (3) from wheel hub (2).

**WARNING**

Wheel drum weighs approximately 92 lbs (42 kgs). Use the aid of an assistant to help install wheel drum on axle. Failure to comply may result in injury to personnel.

**NOTE**

Step (8) requires the aid of an assistant.

(8) Install wheel drum (4) on wheel hub (2).

c. Follow-On Maintenance.

(1) Uncage rear spring brakes (para 11-6).

(2) Install wheel (TM 9-2320-365-10).

End of Task.
12-4. WHEEL STUD TIGHTENING SEQUENCE

This task covers:

Tightening Sequence

INITIAL SETUP

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<thead>
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</tr>
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Tightening Sequence.

Tighten ten nuts (1) to 415-475 lb-ft (563-644 N·m) in sequence shown.

End of Task.
12-5. CENTRAL TIRE INFLATION SYSTEM (CTIS) HOSE ASSEMBLIES, MANIFOLD VALVE, KNEELING VALVE AND BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Engine shut down (TM 9-2320-365-10).
- Air tanks drained (TM 9-2320-365-10).
- Rim cover removed, if equipped (Para 12-10).

Tools and Special Tools
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Fishing Tool, Pneumatic Tire Valve (Item 9, Appendix C)
- Socket, Socket Wrench (Item 68, Appendix B)
- Socket, Socket Wrench (Item 36, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)

Tools and Special Tools (Cont)
- Adapter, Socket Wrench (Item 2, Appendix B)

Materials/Parts
- Packing, Preformed (Item 160, Appendix G)
- Packing, Preformed (2) (Item 189, Appendix G)
- Sealing Compound (Item 62, Appendix D)

Tools and Special Tools (Cont)
- Adapter, Socket Wrench (Item 2, Appendix B)

a. Removal.

**WARNING**

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. Remove valve cap (1) from CTIS manifold valve (2).

2. Remove valve core (3) from CTIS manifold valve (2) and allow time for tire to deflate.

**NOTE**

Perform step (3) if wheel is mounted on vehicle.

3. Remove banjo bolt (4), CTIS hose (5), and two seals (6) from hollow wheel stud (7). Discard seals.

**NOTE**

Perform step (4) if wheel was removed from spare tire retainer.

4. Remove nut (8), screw (9), and two seals (6) from CTIS hose (5). Discard seals.
(5) Remove CTIS hose (5) from CTIS manifold valve (2).

(6) Remove preformed packing (10) from CTIS hose assembly (5). Discard preformed packing.

(7) Disconnect CTIS hose (11) from adapter (12).

(8) Remove CTIS hose (11) from CTIS manifold valve (2).

(9) Remove preformed packing (13) from CTIS hose (11). Discard preformed packing.

(10) Remove filter (14) from CTIS manifold valve (2). Discard filter.

(11) Remove two screws (15) and CTIS manifold valve (2) from mounting bracket (16).
NOTE
Perform step (12) on front wheels.

(12) Remove adapter (12) from kneeling valve (17).

NOTE
Perform step (13) on rear wheels.

(13) Remove adapter (12) from hose adapter (18).

(14) Remove preformed packing (19) from adapter (12). Discard preformed packing.

NOTE
Perform steps (15) and (16) on front wheels.

(15) Remove kneeling valve (17) from auxiliary valve (20).

(16) Remove preformed packing (21) from kneeling valve (17). Discard preformed packing.

NOTE
Perform steps (17) and (18) on rear wheels.

(17) Remove hose adapter (18) from auxiliary valve (20).

(18) Remove preformed packing (22) from hose adapter (18). Discard preformed packing.
(19) Remove two nuts (23) from wheel studs (24).

(20) Remove mounting bracket (16) from wheel studs (24).

b. Installation.

(1) Position mounting bracket (1) on two wheel studs (2) with nuts (3).

(2) Tighten two nuts (3) to 45-55 lb-ft (61-75 N·m).
Perform steps (3) and (4) on front wheels.

3) Install preformed packing (4) on kneeling valve (5).

4) Install kneeling valve (5) on auxiliary valve (6).

Perform steps (5) and (6) on rear wheels.

5) Install preformed packing (7) on hose adapter (8).

6) Install hose adapter (8) on auxiliary valve (6).

7) Install preformed packing (9) on adapter (10).

Perform step (8) on front wheels.

8) Install adapter (10) on kneeling valve (5).

Perform step (9) on rear wheels.

9) Install adapter (10) on hose adapter (8).
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, solvents, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(10) Apply sealing compound to threads of two screws (11).

(11) Position CTIS manifold valve (12) on mounting bracket (1) with two screws (11).

(12) Tighten two screws (11) to 15-17 lb-ft (20-23 N·m).

(13) Install filter (13) in CTIS manifold valve (12).

(14) Install preformed packing (14) on CTIS hose (15).

(15) Install CTIS hose assembly (15) on CTIS manifold valve (12).

(16) Install CTIS hose (15) on adapter (8).

(17) Install preformed packing (16) on CTIS hose (17).

(18) Install CTIS hose (17) on CTIS manifold valve (12).
12-5. CENTRAL TIRE INFLATION SYSTEM (CTIS) HOSE ASSEMBLIES, MANIFOLD VALVE, KNEELING VALVE AND BRACKET REPLACEMENT (CONT)

NOTE

Perform steps (19) and (20) if wheel is mounted on vehicle.

(19) Position CTIS hose (17) on hollow wheel stud (18) with two seals (19) and banjo bolt (20).

NOTE

Place a screwdriver behind CTIS hose assembly while tightening banjo bolt to keep CTIS hose assembly from contacting wheel studs.

(20) Tighten banjo bolt (20) to 22-28 lb-ft (30-38 N•m).

NOTE

Perform steps (21) and (22) if wheel will be installed in spare tire retainer.

(21) Position two seals (19), screw (21), and nut (22) on CTIS hose (17).

(22) Tighten nut (22) to 22-28 lb-ft (30-38 N•m).

(23) Install valve core (23) in CTIS manifold valve (12).

(24) Install valve cap (24) on CTIS manifold valve (12).

c. Follow-On Maintenance.

(1) Install rim cover, if equipped (Para 12-10).

(2) Start engine (TM 9-2320-365-10-1) and allow time for CTIS to inflate tire.

(3) Shut down engine (TM 9-2320-365-10-1).

(4) Check for air leaks around CTIS hoses, CTIS manifold valve assembly, and kneeling valve or hose adapter.

End of Task.
### 12-6. CENTRAL TIRE INFLATION SYSTEM (CTIS) ECU REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On 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)

### a. Removal.

1. Disconnect connector P110 (1) from CTIS ECU (2).

2. Remove screw (3), washer (4), and terminal lug TL50 (5) from CTIS ECU (2).

3. Remove two screws (6), washers (7), and CTIS ECU (2) from personnel heater (8).

### b. Installation.

1. Install CTIS ECU (2) on personnel heater (8) with terminal lug TL50 (5), washer (4), and screw (3).

2. Install two washers (7) and screws (6) in CTIS ECU (2).

3. Connect connector P110 (1) to CTIS ECU (2).

### c. Follow-On Maintenance.


2. Operate CTIS and check for proper operation (TM 9-2320-365-10).


**End of Task.**
12-7. MANIFOLD VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).
Kick panel removed (para 16-3).

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 34, Appendix C)

Materials/Parts

Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
Antiseize Compound (Item 63, Appendix D)
Ties, Cable, Plastic (Item 76, Appendix D)

a. Removal.

NOTE

Tag air hoses and connection points prior to disconnecting.

(1) Disconnect connector P113 (1) from manifold valve assembly (2).

(2) Disconnect connector P112 (3) from manifold valve assembly (2).

(3) Disconnect three air hoses (4) from 90-degree fittings (5).

(4) Remove four screws (6) and manifold valve assembly (2) from cab (7).
(5) Remove three 90-degree fittings (5) from manifold valve assembly (2).

(6) Remove four screws (8), washers (9), and bracket (10) from manifold valve assembly (2).

b. Disassembly.

(1) Remove relief valve (1) from manifold valve (2).

(2) Remove pressure transducer (3) from manifold valve (2).

c. Assembly.

(1) Install pressure transducer (1) in manifold valve (2).

(2) Install relief valve (3) in manifold valve (2).
d. 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 three 90-degree fittings (1).

**CAUTION**

Do not overtighten fittings. Failure to comply may result in damage to equipment.

(2) Install three 90-degree fittings (1) in manifold valve assembly (2).

(3) Install bracket (3) on manifold valve assembly (2) with four washers (4) and screws (5).

(4) Position manifold valve assembly (2) on cab (6) with four screws (7).

(5) Tighten four screws (7) to 120 lb-in. (14 N·m).

**NOTE**

Install plastic cable ties as required.

(6) Install three air hoses (8) on 90-degree fittings (1).

(7) Connect connector P112 (9) to manifold valve assembly (2).

(8) Connect connector P113 (10) to manifold valve assembly (2).
e. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10).

(2) Check operation of CTIS (TM 9-2320-365-10).

(3) Check air hoses and fittings for air leaks.

(4) Shut down engine (TM 9-2320-365-10).

(5) Install kick panel (para 16-3).

End of Task.
12-8. FRONT AXLE CENTRAL TIRE INFLATION SYSTEM (CTIS) QUICK RELEASE VALVE REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

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)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)  
Antiseize Compound (Item 63, Appendix D)  
Nut, Self-Locking (2) (Item 148, 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.

a. Removal.

NOTE

Tag air hoses and connection points before disconnecting.

(1) Disconnect three air hoses (1) from quick release valve (2).

(2) Remove two self-locking nuts (3) and washers (4) from screws (5). Discard self-locking nuts.

(3) Remove two screws (5), washers (6), and quick release valve (2) from frame (7).
(4) Remove two fittings (8) from quick release valve (2).

(5) Remove 90-degree fitting (9) from quick release valve (2).

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 on threads of 90-degree fitting (1) and two fittings (2).

(2) Install 90-degree fitting (1) in quick release valve (3).

(3) Install two fittings (2) in quick release valve (3).
(4) Position quick release valve (3) on frame (4) with two washers (5) and screws (6).

(5) Install two washers (7) and self-locking nuts (8) on screws (6).

(6) Connect three air hoses (9) to quick release valve (3).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10) and allow enough time for air pressure to reach normal operating pressure.

(2) Check quick release valve for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
12-9. REAR AXLE CENTRAL TIRE INFLATION SYSTEM (CTIS) QUICK RELEASE VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

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)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)
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.

NOTE

Tag air hoses and connection points prior to disconnecting.

(1) Disconnect three air hoses (1) from quick release valve (2).

(2) Remove two nuts (3) and washers (4) from screws (5).

(3) Remove two screws (5), washers (6), and quick release valve (2) from frame (7).
(4) Remove two fittings (8) from quick release valve (2).

(5) Remove 90-degree fitting (9) from quick release valve (2).

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 on threads of 90-degree fitting (1) and two fittings (2).

(2) Install 90-degree fitting (1) in quick release valve (3).

(3) Install two fittings (2) on quick release valve (3).
(4) Position quick release valve (3) on frame (4) with two washers (5) and screws (6).

(5) Install two washers (7) and self-locking nuts (8) on screws (6).

(6) Connect three air hoses (9) on quick release valve (3).

C. Follow-On Maintenance.

(1) Start engine (TM 9-2320-365-10) and allow enough time for air pressure to reach normal operating pressure.

(2) Check quick release valve for air leaks.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.
12-10. RIM COVER REPLACEMENT

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-366-10-1)

Tools and Special Tools
Tool Kit, Genl Mech (Item 46, Appendix C)
Wrench, Torque 0-175 lb-in. (Item 58, Appendix C)

a. Removal.

Remove four bolts (1), washers (2), and rim cover (3) from wheel (4).
b. Installation

NOTE
Slotted hole in rim cover is aligned with pressure valve extension.
(1) Position rim cover (1) on wheel (2) with four washers (3) and bolts (4).
(2) Tighten four bolts (1) to 71-95 lb-ft (96-128 N·m).

End of Task.
CHAPTER 13
STEERING SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section I. INTRODUCTION

13-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and adjusting steering system components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

13-2. STEERING WHEEL REPLACEMENT

This task covers:

| a. Removal | b. Installation |

INITIAL SETUP

<table>
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<tr>
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Equipment Conditions

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

Tools and Special Tools

Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Puller Kit, Mechanical (Item 27, Appendix C)

Screw, Cap, Socket Head (2) (Item 57, Appendix D)

a. Removal.

(1) Remove steering wheel nut cover (1) from steering wheel (2).

(2) Remove nut (3) from steering column (4).

(3) Match mark steering wheel (2) to steering column (4).

(4) Install two screws (5) and puller on steering wheel (2).

(5) Remove steering wheel (2) from steering column (4).

(6) Remove two screws (5) and puller from steering wheel (2).
b. Installation.

**CAUTION**

Ensure turn signal lever is in the center position prior to installing steering wheel. Failure to comply may result in damage to equipment.

**NOTE**

If new steering wheel is to be installed, transfer matchmark to new steering wheel.

(1) Install steering wheel (1) on steering column (2) with matchmarks aligned.

(2) Position nut (3) on steering column (2).

(3) Tighten nut (3) to 30-37 lb-ft (41-50 N·m).

(4) Install steering wheel nut cover (4).

End of Task.
13-3. DRAG LINK REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Steering wheel turned fully left (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)

Tools and Special Tools (Cont)
Separator, Ball Joint (Item 54, Appendix B)
Wrench Set, Socket (Item 48, Appendix C)
Goggles, Industrial (Item 15, Appendix C)

Materials/Parts
Pin, Cotter (2) (Item 205, Appendix G)

Personnel Required
(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.

a. Removal.

(1) Remove cotter pin (1) from drag link (2). Discard cotter pin.

(2) Remove slotted nut (3) from drag link (2).

(3) Remove drag link (2) from pitman arm (4).
(4) Remove cotter pin (5) from drag link (2). Discard cotter pin.

(5) Remove slotted nut (6) from drag link (2).

(6) Remove drag link (2) from steering knuckle arm (7).

b. Disassembly.

**NOTE**

- Count exposed threads on socket assembly to assist in installation.

- Note orientation of drag link clamp prior to removal.

(1) Loosen nut (1) on drag link clamp (2).

(2) Remove socket assembly (3) from drag link (4). Discard socket assembly.
c. Assembly.

**NOTE**

Use number of threads counted from disassembly.

1. Position socket assembly (1) on drag link (2) with same number of threads showing as in removal.

2. Tighten nut (3) on drag link clamp (4) to 139-171 lb-ft (188-232 N·m).

d. Installation.

**CAUTION**

Drag link must be installed with adjustable threaded rod end toward rear of vehicle. Failure to comply may result in damage to equipment.

1. Install drag link (1) in steering knuckle arm (2).

2. Position slotted nut (3) on drag link (1).

3. Tighten slotted nut (3) to 139-171 lb-ft (188-232 N·m).

**NOTE**

If slots in slotted nut do not line up with cotter pin hole in drag link, tighten slotted nut until slots and cotter pin hole are aligned.

4. Install cotter pin (4) in drag link (1).
13-3. DRAG LINK REPLACEMENT (CONT)

(5) Install drag link (1) in pitman arm (5).

(6) Position slotted nut (6) on drag link (1).

(7) Lower cab (TM 9-2320-365-10).

(8) Start engine (TM 9-2320-365-10).

(9) Turn steering wheel until wheels are straight (TM 9-2320-365-10).

(10) Shut down engine (TM 9-2320-365-10).

(11) Raise cab (TM 9-2320-365-10).

(12) Tighten slotted nut (6) to 139-171 lb-ft (188-232 N·m).

NOTE

If slots in slotted nut do not line up with cotter pin hole in drag link, tighten slotted nut until slots and cotter pin hole are aligned.

(13) Install cotter pin (7) in drag link (1).

e. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Perform front wheel toe-in alignment (para 13-5).

(3) Start engine (TM 9-2320-365-10).

(4) Check steering system for smooth operation.

(5) Shut down engine (TM 9-2320-365-10).

End of Task.
13-4. TIE-ROD REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. 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, 0-600 lb-ft (Item 59, Appendix C)

Tools and Special Tools (Cont)
Socket, Socket Wrench (Item 37, Appendix C)
Wrench Set, Socket (Item 48, Appendix C)
Goggles, Industrial (Item 15, Appendix C)

Materials/Parts
Pin, Cotter (2) (Item 200, 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.

a. Removal.

NOTE

Left and right tie rod ends are removed the same way. Left side shown.

(1) Remove cotter pin (1) and slotted nut (2) from each end of tie rod (3). Discard cotter pins.

(2) Remove tie rod (3) from two steering knuckle arms (4).
13-4. TIE-ROD REPLACEMENT (CONT)

b. Disassembly.

NOTE

• Count exposed threads on tie rod end to assist in installation.

• Note orientation of clamp on tie rod prior to removal.

• Left and right tie rod ends are removed the same way. Left side shown.

(1) Loosen nut (1) on tie rod clamp (2).

(2) Remove tie rod end (3) from tie rod (4). Discard tie rod end.

---

c. Assembly.

NOTE

• Use number of threads counted from disassembly.

• Left and right tie rod ends are installed the same way. Left side shown.

(1) Position tie rod end (1) on tie rod (2).

(2) Tighten nut (3) on tie rod clamp (4) to 140-180 lb-ft (190-244 N·m).
d. Installation.

**NOTE**
Left and right tie rod ends are installed the same way. Left side shown.

1. Install tie rod (1) in two steering knuckle arms (2).

2. Install slotted nut (3) on each end of tie rod (1).

3. Tighten two slotted nuts (3) to 140-180 lb-ft (190-244 N·m).

**NOTE**
If slots in slotted nuts do not line up with cotter pin holes in tie rod ends, tighten slotted nut until slots and cotter pin holes are aligned.

4. Install cotter pin (4) in each end of tie rod (1).

e. Follow-On Maintenance.

1. Lower cab (TM 9-2320-365-10).

2. Lubricate tie rod end (Appendix H).


**End of Task.**
13-5. FRONT WHEEL TOE-IN ALIGNMENT/ADJUSTMENT

This task covers:

a. Toe-In Alignment Check

b. Toe-In Adjustment

INITIAL SETUP

**Equipment Conditions**

Vehicle parked on flat surface (TM 9-2320-365-10).

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)

Gage, Wheel Alignment (Item 12, Appendix C)

**Personnel Required**

(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.

a. Toe-In Alignment Check.

(1) Place wheel alignment gage between front of front tires with both chains touching flat surface.

(2) Adjust movable scale on wheel alignment gage until pointer is at zero.

(3) Move vehicle forward until wheel alignment gage is at rear of wheels and at least one chain is touching flat surface.
13-5. FRONT WHEEL TOE-IN ALIGNMENT/ADJUSTMENT (CONT)

NOTE

Chains may not be equal distance from flat surface. High end of gage may require adjustment to level out chains.

(4) Adjust wheel alignment gage until both chains are touching flat surface.

NOTE

If toe-in is out of alignment perform Toe-In Adjustment.

(5) Wheel alignment gage pointer should read 0 to 1/8 in.

b. Toe-In Adjustment.

(1) Loosen nuts (1) on tie rod clamps (2).

NOTE

Proper toe-in is 0 to 1/8 in.

(2) Observe movable scale and rotate tie rod (3) to obtain proper toe-in measurement.

(3) Tighten nuts (1) on tie rod clamps (2).

(4) Remove wheel alignment gage from front tires.

End of Task.
13-6. STEERING COLUMN REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Turn signal switch removed (para 7-25).
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)
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
Gloves, Rubber (Item 13, Appendix C)

Materials/Parts
Sealing Compound (Item 68.3, Appendix D)
Washer, Spring (2) (Item 279, Appendix G)
Locknut (Item 60, Appendix G)
Nut, Self-Locking (4) (Item 116, Appendix G)

a. Removal.

(1) Remove four self-locking nuts (1), eight washers (2), and four screws (3) from steering column assembly (4). Discard self-locking nuts.

(2) Remove locknut (5) and bolt (6) from steering gear arm universal joint (7). Discard locknut.

(3) Disconnect steering gear arm universal joint (7) from steering gear input shaft (8).

(4) Lower cab (TM 9-2320-365-10).
(5) Remove two screws (9) and spring washers (10) from steering column assembly (4). Discard spring washers.

(6) Remove steering column assembly (4) from cab.

(7) Remove adhesive around opening in cab floor (11).
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 a thick bead of sealing compound around opening in cab floor (1).

2. Install steering column assembly (2) in cab.

3. Position two spring washers (3) and screws (4) in steering column assembly (2).

4. Tighten two screws (4) to 18-20 lb-ft (24-27 N·m).

5. Raise cab (TM 9-2320-365-10).
13-6. STEERING COLUMN REPLACEMENT (CONT)

(6) Connect steering gear universal joint (5) to steering gear input shaft (6).

(7) Position bolt (7) and locknut (8) in steering gear arm universal joint (5).

(8) Tighten locknut (8) to 32-39 lb-ft (43-53 N·m).

(9) Position four screws (9), eight washers (10), and four self-locking nuts (11) in steering column assembly (2).

(10) Tighten four self-locking nuts (11) to 71-88 lb-in. (8-10 N·m).

(11) Lower cab (TM 9-2320-365-10).

c. Follow-On Maintenance.

(1) Install turn signal arm assembly (para 7-25).

(2) Start engine (TM 9-2320-365-10).

(3) Operate vehicle and check for proper operation of steering and turn signal assemblies (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.
13-7. POWER STEERING HOSES AND TUBE REPLACEMENT

This task covers:

a. Return Hose Removal
b. Return Hose Installation
c. Pressure Hose Removal
d. Pressure Hose Installation
e. Suction Hose and Tube Removal
f. Suction Hose and Tube Installation
g. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Power steering pump reservoir drained (Appendix H)

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Goggles, Industrial (Item 15, Appendix C)
Pan, Drain (Item 24, Appendix C)
Dispensing Pump, Hand Driven (Item 5, Appendix C)

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. Return Hose Removal.

CAUTION
Cap or plug hydraulic connections to prevent contamination of power steering system. Failure to comply may result in damage to equipment.

(1) Loosen hose clamp (1) on return hose (2).

(2) Disconnect return hose (2) from steering gear box (3).
13-7. POWER STEERING HOSES AND TUBE REPLACEMENT (CONT)

**NOTE**
Perform steps (3) through (5) on vehicles that have not previously had a power steering return hose or power steering reservoir replaced.

(3) Pry hose clamp end (4) open.

(4) Disconnect return hose (2) from power steering reservoir (5).

(5) Remove hose clamp (4) from return hose (2). Discard clamp.

**NOTE**
Perform steps (6) through (8) on vehicles which have previously had a power steering return hose or power steering reservoir replaced.

(6) Loosen clamp (6) on return hose (2).

(7) Disconnect return hose (2) from power steering reservoir (5).

(8) Remove clamp (6) from return hose (2).
NOTE

Remove plastic cable ties as required.

(9) Remove two self-locking nuts (7), screws (8), and clamps (9) from return hose (2). Discard self-locking nuts.

(10) Remove return hose (2) from vehicle.

b. Return Hose Installation.

(1) Install hose clamp (1) and return hose (2) on steering gear box (3).

(2) Loosen screw (4) in clamp (5) as far as possible without disengaging screw from D-nut (6).

(3) Unhook clamp tabs (7) from tab windows (8).
13-7. POWER STEERING HOSES AND TUBE REPLACEMENT (CONT)

CAUTION

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(4) Position clamp (5) on return hose (2).

(5) Install return hose (2) on power steering reservoir (9).

(6) Engage as many clamp tabs (7) as possible in tab windows (8) allowing little or no play between clamp (5) and return hose (2).

(7) Tighten clamp (5) to 8-9 lb-in. (1 N·m).

NOTE

Minimum allowable gap on clamp is 0.2 in. (0.5 cm). If gap is less than 0.2 in. (0.5 cm), remove and re-install clamp.

(8) Measure gap on clamp (5).
(9) Install two clamps (10), screws (11), and self-locking nuts (12) on return hose (2).

c. Pressure Hose Removal.

NOTE
Install plastic cable ties as required.

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.

CAUTION
Cap or plug hydraulic connections to prevent contamination of power steering system. Failure to comply may result in damage to equipment.

(1) Disconnect pressure hose (1) from steering gear box (2).
13-7. POWER STEERING HOSES AND TUBE REPLACEMENT (CONT)

(2) Disconnect pressure hose (1) from power steering pump (3).

(3) Remove two self-locking nuts (4), screws (5), and clamps (6) from pressure hose (1).

(4) Disconnect pressure hose (1) from vehicle.

NOTE
Remove plastic cable ties as required.

d. Pressure Hose Installation.

(1) Install pressure hose (1) on power steering pump (2).
(2) Install pressure hose (1) on steering gear box (3).

**NOTE**

Install two clamps (4), screws (5), and self-locking nuts (6) on pressure hose (1).

(3) Install two clamps (4), screws (5), and self-locking nuts (6) on pressure hose (1).

**e. Suction Hose and Tube Removal.**

**CAUTION**

Cap or plug hydraulic connections to prevent contamination of power steering system. Failure to comply may result in damage to equipment.

(1) Loosen hose clamp (1) on suction hose (2).

(2) Disconnect suction hose (2) from suction tube (3).
13-7. POWER STEERING HOSES AND TUBE REPLACEMENT (CONT)

NOTE

Perform steps (3) through (5) on vehicles that have not previously had a power steering suction hose of power steering reservoir replaced.

(3) Pry hose clamp end (4) open.

(4) Disconnect suction hose (2) from power steering reservoir (5).

(5) Remove hose clamp (4) from suction hose (2). Discard clamp.

NOTE

Perform steps (6) through (8) on vehicles that have previously had a power steering suction hose or power steering reservoir replaced.

(6) Loosen clamp (6) on suction hose (2).

(7) Disconnect suction hose (2) from power steering reservoir (5).

(8) Remove clamp (6) from suction hose (2).
(9) Remove suction tube (3) from power steering pump (7).

f. Suction Hose and Tube Installation.

(1) Install suction tube (1) on power steering pump (2).

(2) Loosen screw (3) in clamp (4) as far as possible without disengaging screw from D-nut (5).

(3) Unhook clamp tabs (6) from tab windows (7).
CAUTION

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(4) Position clamp (4) on suction hose (8).

(5) Install suction hose (8) on power steering reservoir (9).

(6) Engage as many clamp tabs (6) as possible in tab windows (7) allowing little or no play between clamp (4) and suction hose (8).

(7) Tighten clamp (4) to 12-18 lb-in. (1-2 N·m).

NOTE

Minimum allowable gap on clamp is 0.2 in. (0.5 cm). If gap is less than 0.2 in. (0.5 cm), remove and re-install clamp.

(8) Measure gap on clamp (4).
(9) Remove power steering reservoir cap (10) from power steering reservoir (9).

(10) Fill power steering reservoir (9) to TOP mark on dip stick (11).

(11) Install power steering reservoir cap (10) on power steering reservoir (9).

g. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check power steering reservoir, hoses, and tube for oil leaks.

(5) Lower cab (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

(7) Raise cab (TM 9-2320-365-10).

(8) Check fluid level in power steering reservoir (TM 9-2320-365-10).

(9) Lower cab (TM 9-2320-365-10).

End of Task.
13-8. POWER STEERING PUMP RESERVOIR AND BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Auxiliary starter solenoid removed (para 7-6).
Power steering pump reservoir drained (Appendix H).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Dispensing Pump, Hand Driven (Item 5, Appendix C)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)

Materials/Parts
Cap and Plug Set (Item 15, Appendix D)
Oil, Lubricating, OE/HDO 10 (Item 43, Appendix D)
Nut, Self-Locking (2) (Item 140, Appendix G)
Clamp (Item 7, Appendix G)
Clamp (Item 8, Appendix G)

a. Removal.

CAUTION
Cap or plug hydraulic connections to prevent contamination of power steering system. Failure to comply may result in damage to equipment.

NOTE
Perform steps (1) through (3) on vehicles that have not previously had a power steering pump reservoir or power steering return hose replaced.

(1) Pry hose clamp end (1) open.

(2) Disconnect return hose (2) from power steering pump reservoir (3).

(3) Remove hose clamp (1) from return hose (2). Discard hose clamp.
NOTE

Perform steps (4) through (6) on vehicles that have previously had a power steering pump reservoir or power steering return hose replaced.

(4) Loosen clamp (1) on return hose (2).

(5) Disconnect return hose (2) from power steering pump reservoir (3).

(6) Remove clamp (1) from return hose (2).

(7) Pry hose clamp end (4) open.

(8) Disconnect suction hose (5) from power steering pump reservoir (3).

(9) Remove hose clamp (4) from suction hose (5). Discard hose clamp.

NOTE

Perform steps (7) through (9) on vehicles that have not previously had a power steering pump reservoir or power steering suction hose replaced.

(10) Loosen clamp (4) on suction hose (5).

(11) Disconnect suction hose (5) from power steering pump reservoir (3).

(12) Remove clamp (4) from suction hose (5).
(13) Loosen screw (6) on clamp (7).

(14) Remove power steering pump reservoir (3) from bracket (8).

(15) Remove two self-locking nuts (9), screws (10), and bracket (8) from frame bracket (11). Discard self-locking nuts.

NOTE
Perform the next step on brackets mounted on inside of frame bracket.
(16) Remove two self-locking nuts (9), screws (10), bracket (8), and spacer (12) from frame bracket (11). Discard self-locking nuts.

(17) Remove two self-locking nuts (13), bolts (14), and frame bracket (11) from frame rail (15). Discard self-locking nuts.

**NOTE**

Perform the next step on brackets mounted on inside of frame bracket.
b. Installation.

(1) Position frame bracket (1) on frame rail with two bolts (3) and self-locking nuts (4).

(2) Tighten two self-locking nuts (4) to 35 -39 lb-ft. (47-53 N·m).

(3) Position bracket (5) and spacer (6) on frame bracket (1) with two screws (7) and self-locking nuts (8).

(4) Tighten two self-locking nuts (8) to 35-39 lb-ft (47-53 N·m).

(5) Install bracket (5) on frame bracket (1) with two screws (9) and self-locking nuts (10).

NOTE

Perform the next step on brackets mounted on the outside of frame bracket.
(6) Position power steering pump reservoir (11) in bracket (5).

(7) Tighten screw (12) on clamp (13).

(8) Loosen screw (14) in clamp (15) as far as possible without disengaging screw (14) from D-nut (16).

(9) Unhook clamp tabs (17) from tab windows (18).
13-8. POWER STEERING PUMP RESERVOIR AND BRACKET REPLACEMENT (CONT)

**CAUTION**

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(10) Position clamp (15) on suction hose (19).

(11) Connect suction hose (19) on power steering pump reservoir (11).

(12) Engage as many clamp tabs (19) as possible in tab windows (18) allowing little or no play between clamp (15) and suction hose (13).

(13) Tighten clamp (15) to 12-18 lb-in. (1-2 N·m).

(14) Measure gap on clamp (15).

(15) Loosen screw (20) in clamp (21) as far as possible without disengaging screw from D-nut (22).

(16) Unhook clamp tabs (23) from tab windows (24).

**NOTE**

Minimum allowable gap on clamp is 0.2 in. (5 mm). If gap is less than 0.2 in. (5 mm), remove and re-install clamp.
CAUTION

Clamp tongue must be started in clamp groove. Failure to comply may result in damage to equipment.

(17) Position clamp (21) on return hose (25).

(18) Connect return hose (25) on power steering pump reservoir (11).

(19) Engage as many clamp tabs (23) as possible in tab windows (24) allowing little or no play between clamp (21) and return hose (25).

(20) Tighten clamp (21) to 8-9 lb-in. (1 N·m).

NOTE

Minimum allowable gap on clamp is 0.2 in. (5 mm). If gap is less than 0.2 in. (5 mm), remove and re-install clamp.

(21) Measure gap on clamp (21).
c. Follow-On Maintenance.

(1) Install auxiliary starter solenoid (para 7-6).

(2) Fill power steering pump reservoir (Appendix H).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check power steering system for smooth operation of steering wheel and wheels.

(6) Shut down engine (TM 9-2320-365-10).

(7) Raise cab (TM 9-2320-365-10).

(8) Check fluid level in power steering pump reservoir (TM 9-2320-365-10).

(9) Lower cab (TM 9-2320-365-10).

End of Task.
13-9.  POWER STEERING PUMP REPLACEMENT

This task covers:

<table>
<thead>
<tr>
<th>a. Removal</th>
<th>c. Installation</th>
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<td>b. Inspection</td>
<td>d. Follow-On Maintenance</td>
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</table>

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)
Wrench, Adjustable (Item 50, Appendix C)
Dispensing Pump, Hand Driven (Item 5, Appendix C)

Tools and Special Tools (Cont)
Pan, Drain (Item 24, Appendix C)
Socket Wrench Attachment, Screwdriver (Item 47, Appendix B)

Materials/Parts
Cap and Plug Set (Item 15, Appendix D)
Gasket, (Item 40.1, Appendix G)
Packing, Preformed (Item 166.1, Appendix G)
Packing, Preformed (Item 165, Appendix G)
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)

a. Removal.

(1) Remove fluid from power steering reservoir (1).

CAUTION
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE
Tag hoses, tubes and connection points prior to disconnecting.

(2) Loosen clamp (2) on hose (3).

(3) Disconnect hose (3) from tube (4).

(4) Disconnect hose (5) from 90-degree fitting (6).

(5) Remove tube (4) from 90-degree fitting (7).
(6) Remove two bolts (8), washers (9), power steering pump (10), and gasket (11) from air compressor (12). Discard gasket.

(7) Remove 90-degree fittings (6 and 7) from power steering pump (10).

(8) Remove preformed packings (13 and 14) from 90-degree fittings (6 and 7). Discard preformed packings.

(9) Remove spline adapter (15) from power steering pump (10).

b. Inspection.

**NOTE**

Replace any spline adapter that fails visual inspection.

(1) Visually inspect spline adapter (1) for cracks, dents, or excessive wear.
c. Installation.

(1) Install spline adapter (1) on power steering pump (2).

(2) Install preformed packings (3 and 4) on 90-degree fittings (5 and 6).

(3) Install 90-degree fittings (5 and 6) in power steering pump (2).

**CAUTION**

Spline adapter must be installed properly into groove of air compressor. Failure to comply may result in damage to equipment.

(4) Position gasket (7) and power steering pump (2) on air compressor (8) with two washers (9) and bolts (10).

(5) Tighten two bolts (10) to 43-52 lb-ft (58-71 N·m).
(6) Install tube (11) on 90-degree fitting (6).

(7) Install hose (12) on tube (11) with clamp (13).

(8) Install hose (14) on 90-degree fitting (5).

d. Follow-On Maintenance.

(1) Change power steering oil and filter (Appendix H).

(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 power steering pump and hoses for fluid leaks.

(6) Check power steering fluid level; fill as necessary (TM 9-2320-365-10).

(7) Lower cab (TM 9-2320-365-10).

(8) Operate vehicle and check steering for proper operation (TM 9-2320-365-10).

End of Task.
13-10  POWER STEERING PUMP RESERVOIR FILTER REPLACEMENT

This task covers:

a. Removal  
b. Installation  
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Engine shut down (TM 9-2320-365-10-1)
- Cab raised (TM 9-2320-365-10-1)
- Power steering pump reservoir drained (Appendix H)

Tools and Special Tools

- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Pan, Drain (Item 24, Appendix C)

Materials/Parts

- Cap and Plug Set (Item 15, Appendix D)
- Oil, Lubricating, OE/HDO 10 (Item 43, Appendix D)
- Head, Fluid Filter (Item 55.1, Appendix G)
- Seal, Nonmetallic (Item 270.1, Appendix G)

Personnel Required

(2)

a. Removal.

**CAUTION**

Cap or plug hydraulic connections to prevent contamination of power steering system. Failure to comply may result in damage to equipment.

(1) Remove cap (1) from power steering reservoir (2).

(2) Press down and turn T-handle (3) counter clockwise.

(3) Remove T-handle (3) from power steering reservoir (2).

(4) Remove seal (4) from cap (1). Discard seal.
(5) Remove T-handle (5) and spring (6) from filter (7). Discard Filter

b. Installation

NOTE
Push firmly on T-handle until a “pop” sound is heard.

(1) Install spring (1) and T-handle (2) on filter (3).
(2) Install T-handle (4) in power steering reservoir (5).

(3) Push down on T-handle and turn counter clockwise to lock filter assembly (4) in power steering reservoir (5).

(4) Refill power steering reservoir (5) to top mark on dipstick (6) (Appendix H).

(5) Install seal (7) in cap (8).

(6) Install cap (8) on power steering reservoir (5).

c. Follow-on Maintenance

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check power steering reservoir, hoses, and tube for oil leaks.

(5) Lower cab (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

(7) Raise cab (TM 9-2320-365-10).

(8) Check fluid level in power steering reservoir.

(9) Lower cab (TM 9-2320-365-10).

End Of Task
CHAPTER 14
FRAME, TOWING ATTACHMENTS, AND DRAWBARS 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

Section I. INTRODUCTION

14-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and repairing frame mounted accessories authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

14-2. FRONT BUMPER REPLACEMENT

This task covers:

- a. Removal
- b. Installation
- c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
- Blackout drive light removed (para 7-30).
- Composite front light assemblies removed (para 7-33).
- Gravel deflector and gravel deflector extension removed (para 14-7).

Materials/Parts
- Nut, Self-Locking (4) (Item 146, Appendix G)
- Nut, Self-Locking (2) (Item 116, Appendix G)
- Lockwasher (2) (Item 103, Appendix G)

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)
- Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)
- Socket Set, Socket Wrench (Item 35, Appendix C)

Personnel Required
- (2)

a. Removal.

WARNING

- Leave shackles installed in front bumper to support front bumper until ready to remove. 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.

(1) Deleted.

(2) Deleted.
(3) Disconnect connector P52F (6) from connector J52 (7).

(4) Remove eight screws (8) from front bumper (9).

**NOTE**

Steps (5) and (6) require the aid of an assistant.

(5) Remove two pins (10) and shackles (11) from supports (12).

**WARNING**

Front bumper weighs approximately 100 lbs (45 kgs). Use the aid of an assistant to remove front bumper. Failure to comply may result in injury to personnel.

(6) Remove front bumper (9) from vehicle.

(7) Remove two self-locking nuts (13), lockwashers (14), screws (15), and intervehicular 12 vdc (7 pin) cable (16) from front bumper (9). Discard self-locking nuts and lockwashers.

(8) Remove four self-locking nuts (17), screws (18), and two side markers (19) from front bumper (9). Discard self-locking nuts.
b. Installation.

(1) Position two side markers (1) on front bumper (2) with four screws (3) and self-locking nuts (4).

(2) Tighten four self-locking nuts (4) to 18-22 lb-in. (2 N·m).

(3) Position intervehicular 12 vdc (7 pin) cable (5) on front bumper (2) with two screws (6), lockwashers (7), and self-locking nuts (8).

(4) Tighten two self-locking nuts (8) to 31-36 lb-in. (4 N·m).

WARNING

Front bumper weighs approximately 100 lbs (45 kgs). Use the aid of an assistant to install front bumper. Failure to comply may result in injury to personnel.

NOTE

Steps (5) and (6) require the aid of an assistant.

(5) Install front bumper (2) on vehicle.

(6) Install two shackles (9) on supports (10) with pins (11).

(7) Install eight screws (12) on front bumper (2).

(8) Connect connector P52F (13) to connector J52 (14).
c. Follow-On Maintenance.

(1) Install composite front light assemblies (para 7-33).

(2) Install blackout drive light (para 7-30).

(3) Install gravel deflector and gravel deflector extension (para 14-7).

End of Task.
14-3. M1081 PARACHUTE SUSPENSION SLIDES REPLACEMENT

This task covers:

a. Parachute Suspension Slide Removal  
b. Parachute Suspension Slide Installation

INITIAL SETUP

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

Materials/Parts
Nut, Self-Locking (2) (Item 123, Appendix G)

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

a. Parachute Suspension Slide Removal.

(1) Remove wingnut (1) and retainer (2) from rod (3).

(2) Remove plate (4) from cargo bed (5).

(3) Remove two spring pins (6) from small pin (7) and large pin (8).

(4) Remove small pin (7) and large pin (8) from parachute suspension slide (9).
(5) Remove parachute suspension slide (9) from receptacle (10).

b. Parachute Suspension Slide Installation.

(1) Install parachute suspension slide (1) in receptacle (2).

(2) Install large pin (3) in upper hole of receptacle (2) and parachute suspension slide (1).

(3) Install small pin (4) in lower hole of receptacle (2) and parachute suspension slide (1).

(4) Install two spring pins (5) in large pin (3) and small pin (4).
14-3. M1081 PARACHUTE SUSPENSION SLIDES REPLACEMENT (CONT)

(5) Install plate (6) in receptacle (2).

(6) Install retainer (6) and wingnut (7) on rod (8).

End of Task.
14-4. TAILLIGHT CARRIER REPLACEMENT

This task covers:

a. Left Taillight Carrier Removal
b. Left Taillight Carrier Installation
c. Right Taillight Carrier Removal
d. Right Taillight Carrier Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Composite taillight assembly removed (para 7-32).
Backup light assembly removed (para 7-29).
Marker light assemblies removed (para 7-31).
Splash guards removed (para 16-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)
Wrench Set, Socket (Item 49, Appendix C)
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
Wrench Set, Socket (Item 47, Appendix C)
Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)

Materials/Parts
Nut, Self-locking (8) (Item 140, Appendix G)
Nut, Self-Locking (2) (Item 134, Appendix G)

Personnel Required
(2)

a. Left Taillight Carrier Removal.

(1) Remove two self-locking nuts (1), clamps (2), and screws (3) from left taillight carrier (4). Discard self-locking nuts.

(2) Remove two clamps (2) from rear lights cable assembly (5).
(3) Pull rear lights cable assembly (5) through left frame rail (6).

NOTE 
Perform steps (4) through (6) on M1078 vehicles.

(4) Remove self-locking nut (7) and screw (8) from brace (9). Discard self-locking nut.

NOTE 
Step (5) requires the aid of an assistant.

(5) Remove four self-locking nuts (10), screws (11), and left taillight carrier (4) from bracket (12). Discard self-locking nuts.
(6) Remove two self-locking nuts (13), screws (14), and brace (9) from left taillight carrier (4). Discard self-locking nuts.

NOTE
Perform steps (7) through (9) on M1079 vehicles.

(7) Remove self-locking nut (7) and screw (8) from brace (15). Discard self-locking nut.

(8) Remove self-locking nut (16), screw (17) and brace (15) from bumper (18). Discard self-locking nut.

NOTE
Step (9) requires the aid of an assistant.

(9) Remove four self-locking nuts (10), screws (11), and left taillight carrier (4) from bracket (12). Discard self-locking nuts.
b. Installation.

NOTE

- Perform steps (1) through (5) on M1079 vehicles.

- Step (1) requires the aid of an assistant.

(1) Position left taillight carrier (1) on bracket (2) with four screws (3) and self-locking nuts (4).

(2) Tighten four self-locking nuts (4) to 47 lb-ft (64 N·m).

(3) Position brace (5) on bumper (6) with screw (7) and self-locking nut (8).

(4) Position screw (9) and self-locking nut (10) on brace (5).

(5) Tighten four self-locking nuts (10) and (8) to 47 lb-ft (64 N·m).

NOTE

Perform steps (6) through (10) on M1078 vehicle.

(6) Position brace (11) on left taillight carrier (1) with two screws (12) and self-locking nuts (13).

(7) Tighten two self-locking nuts (13) to 47 lb-ft (64 N·m).
14-4. TAILLIGHT CARRIER REPLACEMENT (CONT)

NOTE

Step (8) requires the aid of an assistant.

(8) Position left taillight carrier (1) on bracket (2) with four screws (3) and self-locking nuts (4).

(9) Position brace (11) on cargo bed (14) with screw (9) and self-locking nut (10).

(10) Tighten self-locking nut (10) and four self-locking nuts (4) to 47 lb-ft (64 N·m).

NOTE

Perform steps (11) through (14) on all vehicles.

(11) Route rear lights cable (15) through left frame rail (16).

(12) Position two clamps (17) on rear lights cable assembly (15).

(13) Position two clamps (17) on left taillight carrier (1) with two screws (18) and self-locking nuts (19).

(14) Tighten two self-locking nuts (19) to 84-108 lb-in. (10-12 N·m).
c. Right Taillight Carrier Removal.

**NOTE**

Perform steps (1) through (3) on all vehicles without winch.

1. Remove two self-locking nuts (1), clamps (2) and screws (3) from taillight carrier (4). Discard self-locking nuts.

2. Remove two clamps (2) from rear lights cable assembly (5).

![Diagram showing taillight carrier removal process]

**NOTE**

- Perform steps (4) through (6) on M1078 vehicles.
- Steps (4) and (5) requires the aid of an assistant.

3. Pull rear lights cable assembly (5) through right frame rail (6).

![Diagram showing taillight carrier removal process]

**NOTE**

- Remove self-locking nut (7), screw (8), and brace (9) from cargo bed (10).

4. Remove four screws (11), self-locking nuts (12) and right taillight carrier (4) from bracket (13).
14-4. TAILLIGHT CARRIER REPLACEMENT (CONT)

(6) Remove two self-locking nuts (14), screws (15), and brace (9) from right taillight carrier (4).

NOTE
Perform steps (7) through (9) on M1079 without winch.

(7) Remove self-locking nut (16) and screw (17) from brace (18). Discard self-locking nut.

(8) Remove self-locking nut (19), screw (20) and brace (18) from bumper (21).

NOTE
Step (9) requires the aid of an assistant.

(9) Remove four self-locking nuts (12), screws (11) and right taillight carrier (4) from bracket (13).
NOTE

Perform step (10) on M1078 and M1079 with winch.

(10) Pull rear lights cable assembly (5) through right frame rail (6).

NOTE

• Perform steps (11) through (14) on M1078 with winch.

• Steps (12) and (13) require the aid of an assistant.

(11) Remove self-locking nut (7) and screw (8) from brace (9). Discard self-locking nut.

(12) Remove two self-locking nuts (22) and screws (23) from right taillight carrier (4). Discard self-locking nuts.

(13) Remove four self-locking nuts (12), screws (11), self-recovery winch rear roller fairlead bracket (24) and right taillight carrier (4) from bracket (13). Discard self-locking nuts.
(14) Remove two self-locking nuts (14), screws (15) and brace (9) from right taillight carrier (4).

NOTE
Perform steps (15) through (18) on M1079 with winch.


(16) Remove self-locking nut (19), screw (20) and brace (18) from bumper (21). Discard self-locking nut.

NOTE
Steps (17) and (18) requires the aid of an assistant.

(17) Remove two self-locking nuts (22) and screws (23) from right taillight carrier (4). Discard self-locking nuts.

(18) Remove four self-locking nuts (12), screws (11), self-recovery winch rear roller fairlead bracket (24) and right taillight carrier (4) from bracket (13). Discard self-locking nuts.
d. Right Taillight Carrier Installation.

**NOTE**

- Perform steps (1) through (7) on M1079 with winch.
- Steps (1) and (2) requires the aid of an assistant.

1. Position right taillight carrier (1) and rear roller fairlead bracket (2) on bracket (3) with four screws (4) and self-locking nuts (5).

2. Position two screws (6) and self-locking nuts (7) in rear roller fairlead bracket (2).

3. Tighten four self-locking nuts (5) to 149-182 lb-ft (202-247 N·m).

4. Tighten two self-locking nuts (7) to 26-32 lb-ft (35-43 N·m).

5. Position brace (8) on bumper (9) with screw (10) and self-locking nut (11).

6. Position screw (12) and self-locking nut (13) on brace (8).

7. Tighten self-locking nuts (13 and 11) to 47 lb-ft (64 N·m).

8. Position brace (14) on right taillight carrier (1) with two screws (15) and self-locking nuts (16).

9. Tighten two self-locking nuts (16) to 47 lb-ft (64 N·m).

**NOTE**

Perform steps (8) through (15) on M1078 with winch.

8. Position brace (14) on right taillight carrier (1) with two screws (15) and self-locking nuts (16).

9. Tighten two self-locking nuts (16) to 47 lb-ft (64 N·m).
14-4. TAILLIGHT CARRIER REPLACEMENT (CONT)

NOTE

Steps (10) requires the aid of an assistant.

(10) Position right taillight carrier (1) and rear roller fairlead bracket (2) on bracket (3) with four screws (4) and self-locking nuts (5).

(11) Position two screws (6) and self-locking nuts (7) in right taillight carrier (1).

(12) Tighten four self-locking nuts (5) to 149-182 lb-ft (202-247 N·m).

(13) Tighten two self-locking nuts (7) to 26-32 lb-ft (35-43 N·m).

(14) Position brace (14) on cargo bed (17) with screw (18) and self-locking nut (19).

(15) Tighten self-locking nut (19) to 47 lb-ft (64 N·m).

NOTE

Perform step (16) on all vehicles with winch.

(16) Pull rear lights cable assembly (20) through right frame rail (21).
NOTE

- Perform steps (17) through (21) on M1079 with no winch.

- Steps (17) and (18) require the aid of an assistant.

(17) Position right taillight carrier (1) on bracket (3) with four screws (4) and self-locking nuts (5).

(18) Tighten four self-locking nuts (5) to 47 lb-ft (64 N·m).

(19) Position brace (8) on bumper (9) with screw (10) and self-locking nut (11).

(20) Position screw (12) and self-locking nut (13) on brace (8).

(21) Tighten self-locking nuts (13 and 11) to 47 lb-ft (64 N·m).

NOTE

Perform steps (22) through (26) on M1078 with no winch.

(22) Position brace (14) on right taillight carrier (1) with two screws (15) and self-locking nuts (16).

(23) Tighten two self-locking nuts (16) to 47 lb-ft (64 N·m).
**14-4. TAILLIGHT CARRIER REPLACEMENT (CONT)**

**NOTE**

Step (24) requires the aid of an assistant.

(24) Position right taillight carrier (1) on bracket (3) with four screws (4) and self-locking nuts (5).

(25) Position brace (14) on cargo bed (17) with screw (18) and self-locking nut (19).

(26) Tighten self-locking nut (19) and four self-locking nuts (5) to 47 lb-ft (64 N·m).

**NOTE**

Perform steps (27) through (30) on vehicles with no winch.

(27) Position rear lights cable assembly (20) through right frame rail (21).

(28) Position two clamps (22) on rear lights cable assembly (20).

(29) Position two clamps (22) on right taillight carrier (1) with two screws (23) and self-locking nuts (24).

(30) Tighten two self-locking nuts (24) to 84-108 lb-in. (10-12 N·m).
e. Follow-On Maintenance.

(1) Install splash guards (para 16-10).

(2) Install marker light assemblies (para 7-31).

(3) Install backup light assembly (para 7-29).

(4) Install composite taillight assembly (para 7-32).

End of task.
14-5. SPARE TIRE RETAINER REPLACEMENT/REPAIR

This task covers:

a. Removal  
b. Disassembly  
c. Assembly  
d. Installation  
e. Follow-on Maintenance

INITIAL SETUP

Equipment Conditions
Spare tire removed (TM 9-2320-365-10).  
Cab raised (TM 9-2320-365-10).  
Hydraulic manifold removed (para 19-4).  
Tool box removed (para 16-16).  
Cab leveling valve removed (para 16-8).  
Air/hydraulic power unit and bracket removed (para 19-3).  
Ether starting aid removed (para 4-15).  
Shunt removed (para 7-26).  
100 amp reverse polarity relay removed, if equipped (para 7-27).  
200 amp reverse polarity relay removed, if equipped (M1081 only) (para 20-58).

Tools and Special Tools
Tool Kit, Genl Mech (Item 44, Appendix C)  
Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)  
Pan, Drain (Item 24, Appendix C)  
Gloves, Rubber (Item 13, Appendix C)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 15, Appendix C)  
Socket Set, Socket Wrench (Item 35, Appendix C)  
Wrench, Torque, 0-200 lb-in. (Item 58, Appendix C)

Materials/Parts
Cap and Plug Set (Item 15, Appendix D)  
Dispenser, Pressure Sensitive Adhesive Tape (Item 21, Appendix D)  
Ties, Cable, Plastic (Item 76, Appendix D)  
Nut, Self-Locking (12) (Item 140, Appendix G)  
Nut, Self-Locking (Item 142, Appendix G)  
Pin, Cotter (2) (Item 207, Appendix G)

Personnel Required
(3)

a. Removal.

[CAUTION]

Cap or plug intake air cleaner hoses to prevent contamination of turbocharger. Failure to comply may result in damage to turbocharger and engine.

(1) Loosen clamp (1) on intake air cleaner boot (2).

(2) Disconnect intake air cleaner boot (2) from intake air cleaner housing (3).

(3) Loosen clamp (4) on air compressor intake hose (5).

(4) Disconnect air compressor intake hose (5) from intake air cleaner boot (2).
WARNING

Hydraulic fluid (MIL-H-5606A) 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.

NOTE

- Remove plastic cable ties as required.
- Tag hoses and connection points prior to disconnecting.

(5) Disconnect two hydraulic hoses (6) from 90-degree fittings (7).

(6) Remove two self-locking nuts (8) and screws (9) from spare tire retainer (10). Discard self-locking nuts.
14-5. SPARE TIRE RETAINER REPLACEMENT/REPAIR (CONT)

NOTE

Perform step (7) on vehicle serial number 3092 and higher, and vehicle serial numbers 0001 through 3091 that have previously had a spare tire retainer or fuel hose replaced.

(7) Remove self-locking nut (11), screw (12), and clamp (13) from spare tire retainer (10). Discard self-locking nut.

NOTE

Perform step (8) on vehicle serial numbers 0001 through 3091 that have not previously had a spare tire retainer or fuel hose replaced.

(8) Remove self-locking nut (11) and screw (12) from spare tire retainer (10). Discard self-locking nut.

(9) Remove self-locking nut (14) and screw (15) from spare tire retainer (10). Discard self-locking nut.

(10) Remove two self-locking nuts (16) and screws (17) from spare tire retainer (10). Discard self-locking nuts.
(11) Remove two self-locking nuts (18) and screws (19) from spare tire retainer (10). Discard self-locking nuts.

(12) Remove two self-locking nuts (20) and screws (21) from spare tire retainer (10). Discard self-locking nuts.

(13) Remove self-locking nut (22), screw (23), and chain (24) from spare tire retainer (10). Discard self-locking nut.

(14) Remove self-locking nut (25), clamp (26), and screw (27) from spare tire retainer (10). Discard self-locking nut.
WARNING

Spare tire retainer weighs approximately 150 lbs (68 kgs). The aid of two assistants is required to remove spare tire retainer from vehicle. Failure to comply may result in injury to personnel.

(15) Remove spare tire retainer (10) from vehicle.

(16) Remove screw (28), washer (29), and bracket (30) from resilient mount (31).

(17) Remove screw (32), washer (33), and resilient mount (31) from spare tire retainer (10).

b. Disassembly.

(1) Remove cotter pin (1), pin (2), and hydraulic cylinder (3) from lift arm assembly (4). Discard cotter pin.
(2) Remove cotter pin (5), pin (6), and hydraulic cylinder (3) from spare tire retainer (7). Discard cotter pin.

(3) Remove self-locking nut (8), screw (9), and ratchet (10) from spare tire retainer (7). Discard self-locking nut.

(4) Remove two straight pins (11), spring pins (12), and lift arm assembly (4) from support assembly (13).
(5) Remove chain (14) from ring (15).

(6) Remove ring (15), stud (16), and sleeve (17) from lift arm assembly (4).

**NOTE**
Perform steps (7) through (9) on M1081.

(7) Remove four retaining clips (18) and two grooved pins (19) from front arm (20) and rear arm (21).

(8) Remove upper arm (22) from two couplers (23).

(9) Remove two couplers (23) from front arm (20) and rear arm (21).

c. Assembly.

**NOTE**
Perform steps (1) through (3) on M1081.

(1) Position two couplers (1) on rear arm (2) and front arm (3).

(2) Position upper arm (4) in two couplers (1).

(3) Install two grooved pins (5) and four retaining clips (6) in rear arm (2) and front arm (3).
(4) Install sleeve (7), stud (8), ring (9) in lift arm assembly (10).

(5) Install chain (11) on ring (9).

(6) Install lift arm assembly (10) on support assembly (12) with two spring pins (13) and straight pins (14).

(7) Install ratchet (15) on spare tire retainer (16) with screw (17) and self-locking nut (18).
(8) Install hydraulic cylinder (19) on spare tire retainer (16) with pin (20) and cotter pin (21).

(9) Install hydraulic cylinder (19) on lift arm assembly (10) with pin (22) and cotter pin (23).

d. Installation.

(1) Install resilient mount (1) on spare tire retainer (2) with washer (3) and screw (4).

(2) Install bracket (5) on resilient mount (1) with washer (6) and screw (7).
WARNING

Spare tire retainer weighs approximately 150 lbs (68 kgs). The aid of two assistants is required to install spare tire retainer on vehicle. Failure to comply may result in injury to personnel.

(3) Position spare tire retainer (2) on vehicle.

(4) Position clamp (8) on spare tire retainer (2) with screw (9) and self-locking nut (10).

(5) Tighten self-locking nut (10) to 87-107 lb-in. (10-12 N·m).

(6) Position chain (11) on spare tire retainer (2) with screw (12) and self-locking nut (13).

(7) Tighten self-locking nut (13) to 43-52 lb-ft (58-71 N·m).

(8) Position two screws (14) and self-locking nuts (15) in spare tire retainer (2).

(9) Tighten two self-locking nuts (15) to 43-52 lb-ft (58-71 N·m).
(10) Position two self-locking nuts (16) and screws (17) in spare tire retainer (2).

(11) Tighten two self-locking nuts (16) to 43-52 lb-ft (58-71 N·m).

(12) Position two screws (18) and self-locking nuts (19) in spare tire retainer (2).

(13) Tighten two self-locking nuts (19) to 43-52 lb-ft (58-71 N·m).

(14) Position screw (20) and self-locking nut (21) in spare tire retainer (2).

**NOTE**

Perform step (15) on vehicle serial number 3092 and higher, and vehicle serial numbers 0001 through 3091 that have previously had a spare tire retainer or fuel hose replaced.

(15) Position clamp (22) on spare tire retainer (2) with screw (23) and self-locking nut (24).

**NOTE**

Perform step (16) on vehicle serial numbers 0001 through 3091 that have not previously had a spare tire retainer or fuel hose replaced.

(16) Position screw (23) and self-locking nut (24) in spare tire retainer (2).

(17) Tighten self-locking nuts (21 and 24) to 43-52 lb-ft (58-71 N·m).
(18) Position two screws (25) and self-locking nuts (26) in spare tire retainer (2).

(19) Tighten two self-locking nuts (26) to 43-52 lb-ft (58-71 N·m).

WARNING
Hydraulic fluid (MIL-H-5606A) 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.

NOTE
Install plastic cable ties as required.

(20) Connect two hydraulic hoses (27) to 90-degree fittings (28).
(21) Position air compressor intake hose (29) on intake air cleaner boot (30) with clamp (31).

(22) Position intake air cleaner boot (30) on intake air cleaner housing (32) with clamp (33).

(23) Tighten clamps (31 and 33) to 36-48 lb-in. (4-5 N·m).

e. Follow-On Maintenance.

(1) Install 200 amp reverse polarity relay, if equipped (M1081 only) (para 20-58).

(2) Install 100 amp reverse polarity relay, if equipped (para 7-27).

(3) Install shunt (para 7-26).

(4) Install ether starting aid (para 4-15).

(5) Install air hydraulic power unit and bracket (para 19-3).

(6) Install cab leveling valve (para 16-8).

(7) Install tool box (para 16-16).

(8) Install hydraulic manifold (para 19-4).

(9) Lower cab (TM 9-2320-365-10).

(10) Install spare tire (TM 9-2320-365-10).

End of Task.
14-6. PINTLE HOOK REPLACEMENT

This task covers
a. Removal
b. Installation
c. Follow-On 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)
Goggles, Industrial (Item 15, Appendix C)
Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)
Wrench Set, Socket (Item 48, Appendix C)

Materials/Parts
Nut, Self-locking (4) (Item 144, Appendix G)
Pin, Cotter (Item 208.1, Appendix G)
Grease, Automotive and Artillery (GAA) (Item 23, Appendix D)

Personnel Required
(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.

a. Removal.

NOTE

All pintle hooks are removed the same way. M1078 shown.

(1) Remove cotter pin (1) from nut (2). Discard cotter pin.

(2) Remove nut (2) and washer (3) from pintle hook (4).

WARNING

Pintle hook weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(3) Remove pintle hook (4) from rear crossmember (5).

(4) Remove four self-locking nuts (6), screws (7), and support (8) from rear crossmember (5). Discard self-locking nuts.
b. Installation.

**NOTE**

All pintle hooks are installed the same way. M1078 shown.

1. Position support (1) on rear crossmember (2) with four screws (3) and self-locking nuts (4).

2. Tighten four self-locking nuts (4) to 195-239 lb-ft (265-325 N•m).

3. Apply coat of grease to shaft of pintle hook (5).

**WARNING**

Pintle hook weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

4. Install pintle hook (5) in rear crossmember (2) with washer (6) and nut (7).

**CAUTION**

Clearance between washer and support must be 0.003-0.017 in. (0.007-0.043 cm). Failure to comply may result in damage to equipment.

5. Adjust nut (7) until clearance is 0.003-0.017 in. (0.007-0.043 cm) with alignment holes lined up between nut and pintle hook (5).

6. Install cotter pin (8) in nut (7).

c. Follow-On Maintenance.

Lubricate pintle hook (TM 9-2320-365-20).

End of Task.
14-7. GRAVEL DEFLECTOR AND GRAVEL DEFLECTOR EXTENSION REPLACEMENT

This task covers:

a. Removal  
b. Installation

INITIAL SETUP

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a. Removal

**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 two self-locking nuts (1) and screws (2) from gravel deflector extension (3). Discard self-locking nuts.

2. Remove screw (4) and gravel deflector extension (3) from gravel deflector (5).
(3) Remove four screws (6) from top edge of gravel deflector (7).

(4) Remove three screws (8), self-locking nuts (9), and gravel deflector (7) from two brackets (10). Discard self-locking nuts.

b. Installation.

(1) Position gravel deflector (11) on brackets (12) with three screws (13) and self-locking nuts (14).

(2) Tighten three self-locking nuts (14) to 76-94 lb-ft (103-127 N·m).

(3) Position four screws (15) in top edge of gravel deflector (11).

(4) Tighten four screws (15) TO 43-52 lb-ft (58-71 N·m).

(5) Position gravel deflector extension (16) on gravel deflector (11) with screw (17).

(6) Position two screws (18) in gravel deflector extension (16) with two self-locking nuts (19).

(7) Tighten screw (17) to 43-52 lb-ft (58-70 N·m).

(8) Tighten two self-locking nuts (19) to 76-94 lb-ft (103-127 N·m).

End of Task.
CHAPTER 15
SUSPENSION SYSTEM 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 tasks described in this chapter. If the required tools are not authorized, the equipment must be submitted to DS Maintenance for repair.

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Section I. INTRODUCTION

15-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and repairing suspension system components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.
Section II. MAINTENANCE PROCEDURES

15-2. RESILIENT MOUNT AND MECHANICAL STOP REPLACEMENT

This task covers:

- a. Mechanical Stop Removal
- b. Mechanical Stop Installation
- c. Resilient Mount Removal
- d. Resilient Mount Installation
- e. Front Angle Bracket Resilient Mount Removal
- f. Front Angle Bracket Resilient Mount Installation
- g. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (for front angle bracket resilient mount) (TM 9-2320-365-10).

Tools and Special Tools
- Goggles, Industrial (Item 15, Appendix C)
- Tool Kit, Genl Mech (Item 44, Appendix C)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Crowfoot Attachment, Socket Wrench (Item 5, Appendix B)
- Vise, Machinist (Item 46, Appendix C)

Materials/Parts
- Nut, Self-Locking (2) (Item 144, Appendix G)
- Washer, Spring (Item 276, Appendix G)
- Washer, Spring (Item 280, 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.

a. Mechanical Stop Removal.

NOTE
Both mechanical stops are removed the same way. Right rear side shown.

Remove two self-locking nuts (1), bolts (2), and mechanical stop (3) from frame (4). Discard self-locking nuts.

b. Mechanical Stop Installation.

NOTE
Both mechanical stops are installed the same way. Right rear side shown.

(1) Position mechanical stop (3) on frame (4) with two bolts (2) and self-locking nuts (1).

(2) Tighten two self-locking nuts (1) to 118-148 lb-ft (160-201 N•m).
c. Resilient Mount Removal.

(1) Position mechanical stop (1) in vise.

**NOTE**

Perform step (2) on vehicles not equipped with enhanced resilient mounts.

(2) Remove nut (2), spring washer (3), bolt (4), and resilient mount (5) from mechanical stop (1). Discard spring washer.

**NOTE**

Perform step (3) on vehicles equipped with enhanced resilient mounts.

(3) Remove enhanced resilient mount (6) and bolt (7) from mechanical stop (1).

d. Resilient Mount Installation.

**NOTE**

Perform step (1) on vehicles not equipped with enhanced resilient mounts.

(1) Enlarge mounting hole on mechanical stop (1) to 0.6 in. (15 mm).

(2) Position resilient mount (2) on mechanical stop (1) with bolt (3), spring washer (4), and nut (5).

(3) Tighten nut (5) to 35-46 lb-ft (47-63 N·m).
15-2. RESILIENT MOUNT AND MECHANICAL STOP REPLACEMENT (CONT)

e. Front Angle Bracket Resilient Mount Removal.

   NOTE

   Left and right side front angle bracket resilient mounts are removed the same way. Right side shown.

   Remove nut (1), spring washer (2), bolt (3), and resilient mount (4) from front angle bracket (5). Discard spring washer.

f. Front Angle Bracket Resilient Mount Installation.

   NOTE

   Left and right side front angle bracket resilient mounts are installed the same way. Right side shown.

   (1) Position resilient mount (1) on front angle bracket (2) with bolt (3), spring washer (4), and nut (5).

   (2) Tighten nut (5) to 35-46 lb-ft (47-63 N•m).
g. Front Leaf Spring Resilient Mount Removal

**WARNING**

Use care when removing resilient mount from leaf spring. Spring is under tension and can act as a projectile if released. Failure to comply may result in injury to personnel or damage to equipment,

1. Install C-Clamp on leaf spring (1).

**NOTE**

If vehicle has resilient mounts attached with screws and washers, notify DS to install four kits P/N 57K2003 on vehicle.

2. Remove resilient mount (2) and spacer (3) from bolt (4).

h. Front Leaf Spring Resilient Mount Installation

1. Install C-Clamp on leaf spring (1).

**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.

**NOTE**

If vehicle has resilient mounts attached with screws and washers, notify DS to install four kits P/N 57K2003 on vehicle.

2. Apply sealing compound to threads of bolt (2).

3. Position spacer (3) and resilient mount (4) on bolt (2).

4. Tighten resilient mount (4) 1 ½ turns after contact with plate (5)

5. Remove C-Clamp from leaf spring (1).
i. Follow-On Maintenance.

   Lower cab (for front angle bracket resilient mount only) (TM 9-2320-365-10).

End of Task.
15-3. FRONT AXLE SHOCK ABSORBER 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, 0-600 lb-ft (Item 59, Appendix C)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 15, Appendix C)
Wrench Set, Socket (Item 48, Appendix C)

Materials/Parts
Nut, Self-Locking (Item 144, Appendix G)
Nut, Self-Locking (Item 145, 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.

a. Removal.

(1) Remove self-locking nut (1) and screw (2) from upper bracket (3). Discard self-locking nut.

(2) Remove self-locking nut (4) and screw (5) from lower bracket (6). Discard self-locking nut.

(3) Remove shock absorber (7) from upper bracket (3) and lower bracket (6).

b. Installation.

(1) Position shock absorber (7) in upper bracket (3) with screw (2) and self-locking nut (1).

(2) Extend or compress shock absorber (7) length to align with holes in lower bracket (6).

(3) Position shock absorber (7) in lower bracket (6) with screw (5) and self-locking nut (4).

(4) Tighten self-locking nut (1) to 200-236 lb-ft (271-320 N·m).

(5) Tighten screw (5) to 296-370 lb-ft (401-502 N·m).
c. **Follow-On Maintenance.**

   Lower cab (TM 9-2320-365-10).

**End of Task.**
### 15-4. REAR AXLE SHOCK ABSORBER REPLACEMENT

This task covers:

<table>
<thead>
<tr>
<th>a. Removal</th>
<th>b. Installation</th>
</tr>
</thead>
</table>

#### 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)
- Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)

**Tools and Special Tools (Cont)**

- Socket Set, Impact (Item 33, Appendix C)
- Wrench Set, Socket (Item 48, Appendix C)

**Materials/Parts**

- Nut, Self-Locking (2) (Item 144, 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.

#### a. Removal.

1. Remove self-locking nut (1), bolt (2), and washer (3) from upper bracket (4). Discard self-locking nut.

2. Remove self-locking nut (5), bolt (6), two washers (7), and shock absorber (8) from lower bracket (9). Discard self-locking nut.

#### b. Installation.

1. Position shock absorber (8) in upper bracket (4) with washer (3), bolt (2), and self-locking nut (1).

2. Extend or compress shock absorber (8) length to align with holes in lower bracket (9).

3. Position shock absorber (8) in lower bracket (9) with two washers (7), bolt (6), and self-locking nut (5).

4. Tighten self-locking nut (1) to 196-240 lb-ft (265-325 N·m).

5. Tighten bolt (6) to 373-454 lb-ft (505-615 N·m).

---

End of Task.
### 15-5. REAR STABILIZER BAR REPLACEMENT/REPAIR

This task covers:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td>Removal</td>
</tr>
<tr>
<td>b.</td>
<td>Disassembly</td>
</tr>
<tr>
<td>c.</td>
<td>Inspection</td>
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<tr>
<td>d.</td>
<td>Assembly</td>
</tr>
<tr>
<td>e.</td>
<td>Installation</td>
</tr>
<tr>
<td>f.</td>
<td>Follow-On Maintenance</td>
</tr>
</tbody>
</table>

#### 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)
- Wrench, Torque, 0-175 lb-ft (Item 57, Appendix C)
- Trestle, Motor Vehicle Maintenance (2) (Item 45, Appendix C)
- Wrench, Torque, 0-600 lb-ft (Item 59, Appendix C)

**Tools and Special Tools (Cont)**

- Socket, Socket Wrench (Item 68, Appendix B)
- Wrench Set, Socket (Item 48, Appendix C)

**Materials/Parts**

- Nut, Self-Locking (4) (Item 145, Appendix G)
- Nut, Self-Locking (4) (Item 144, Appendix G)

**Personnel Required**

- (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.

a. **Removal.**

   (1) Position trestles under rear stabilizer bar (1).
NOTE

Both rear stabilizer bar attachments are removed the same way. Right side shown.

(2) Remove self-locking nut (2), bolt (3), two washers (4), and washer (5) from frame bracket (6). Discard self-locking nut.

(3) Remove self-locking nut (7) and bolt (8) from axle bracket (9). Discard self-locking nut.

(4) Perform steps (2) and (3) on left side rear stabilizer bar attachments.

WARNING

Rear stabilizer bar weighs approximately 50 lbs (22 Kg). Rear stabilizer bar must be supported during removal. Failure to comply may result in serious injury to personnel or damage to equipment.

NOTE

Step (5) requires the aid of an assistant.

(5) Remove rear stabilizer bar (1) from vehicle.
NOTE

Left and right grommets and sleeves are removed the same way. Right side shown.

(6) Remove two grommets (10) and sleeve (11) from frame bracket (6).

b. Disassembly.

NOTE

Left and right bracket assemblies are removed the same way. Right side shown.

(1) Remove four self-locking nuts (1), screws (2), and two bracket assemblies (3) from brackets (4). Discard self-locking nut.

(2) Remove bracket (4) from resilient mount (5).

(3) Remove resilient mount (5) from rear stabilizer bar (6).

(4) Perform steps (1) through (3) on left side bracket assembly.

c. Inspection.

NOTE

- If axle brackets fail visual inspection, notify DS Maintenance.

- Replace any part that fails visual inspection.

- Perform step (1) on both sides of vehicle.

(1) Inspect axle brackets (1) and welds around axle brackets for cracks and corrosion.
(2) Inspect two resilient mounts (2) for cracks, breaks, or deterioration.

(3) Inspect sleeves (3) for cracks, breaks, or deterioration.

(4) Inspect grommets (4) for cracks, breaks, or deterioration.

(5) Inspect brackets (5) for cracks, breaks, or corrosion.

(6) Inspect brackets (6) for cracks, breaks, or corrosion.

d. Assembly.

15-1015-10

NOTE

- Assembly of the stabilizer bar is the same for both sides. Left side shown.

- Left and right sides of stabilizer bar is assembled the same way. Right side shown.

(1) Install resilient mount (1) on rear stabilizer bar (2).

(2) Install two bracket (3) on resilient mounts (1).

(3) Position bracket assembly (4) on bracket (3) with two screws (5) and self-locking nuts (6).

(4) Perform steps (1) through (3) on left side of stabilizer bar.
e. Installation.

NOTE

Left and right grommets and sleeves are installed the same way. Right side shown.

(1) Install two grommets (1) and sleeve (2) in frame bracket (3).

WARNING

Rear stabilizer bar weighs approximately 50 lbs (22 Kg). Rear stabilizer bar must be supported during installation. Failure to comply may result in serious injury to personnel or damage to equipment.

NOTE

Step (2) requires the aid of an assistant.

(2) Position rear stabilizer bar (4) under vehicle and support with trestles.
NOTE

Both rear stabilizer bar attachments are installed the same way. Right side shown.

(3) Position rear stabilizer bar (4) in axle bracket (5) with bolt (6) and self-locking nut (7).

NOTE

Bracket assembly may require adjustment to align with frame bracket.

(4) Position bracket assembly (8) on frame bracket (3) with two washers (9), washer (10), bolt (11) and self-locking nut (12).

(5) Tighten two self-locking nuts (13) on brackets (14) to 74-89 lb-ft (100-121 N·m).
(6) Tighten self-locking nut (7) to 70-100 lb-ft (95-136 N·m).

(7) Tighten self-locking nut (12) to 359-446 lb-ft (487-605 N·m).

(8) Perform steps (3) through (7) on right side rear stabilizer bar attachments.

(9) Remove trestles from under vehicle.


Operate vehicle, checking for normal operation (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) ................................................ TB 9-2300-365-15

Warranty Program for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) ...................................................... TB 9-2300-365-24P

N

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

da. 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 Materiel in Cold Weather (0° to -65°F) . . FM 9-207

f. Decontamination.

Decontamination Operations Facilities & Equipment ........................................ TB 700-4
NBC Protection .................................................................................................. FM 3-4
NBC Decontamination ...................................................................................... FM 3-5

g. Maintenance of Special Purpose Kits.

Operator and Organizational Maintenance Manual for Chemical Alarm .................. TM 3-6665-225-12
Operator’s and Unit Maintenance Manual Including Repair Parts and Special Tools
List for Decontaminating Apparatus: M13 .......................................................... TM 3-4230-214-12&P
Operator’s, Organizational, Direct Support, and General Support Maintenance Manual
Including Repair Parts and Special Tools List for Various Machine Gun Mounts ....... TM 9-1005-245-14
Operator’s, Organizational, Direct Support, and General Support Maintenance Manual, Air Conditioner, Horizontal Compact, 18,000 BTU/HR, 208 Volt, 3 Phase, 50/60 Hertz, Model F18H-3S .......................................................... TM 5-4120-384-14
Unit and Direct Support Maintenance, Repair Parts and Special Tools List for
Heater, Space, Multifuel with Blower, 60,000 BTU/HR, 120V, Model UH-68G, NSN 4520-01-203-4410, and Model UH-68GI, NSN 4520-01-297-6803 ................. TM 5-4520-253-23P

h. General.

Operator’s Manual (M998 Series) ..................................................................... TM 9-2320-280-10
Operator’s Manual (M1008 Series) ................................................................... TM 9-2320-289-10
Operator’s Manual (M35 Series) ...................................................................... TM 9-2320-361-10
Operator’s Manual (M939 Series) .................................................................... TM 9-2320-272-10
Principles of Automotive Vehicles .................................................................. TM 9-8000
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use
(US Army Tank-automotive and Armaments Command) ................................... TM 750-244-6
Route Reconnaissance and Classification ......................................................... FM 5-36
Soldier’s Manual MOS 88M Motor Transport Operator, Skill Levels 1/2 .............. STP 55-88-M12-SM
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: 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
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.

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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

<table>
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<th>Maintenance Function</th>
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<td>A</td>
<td>Battery service will be in accordance with TM 9-6140-200-14.</td>
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<tr>
<td>B</td>
<td>Repair of tires will be in accordance with TM 9-2610-200-14.</td>
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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.

## APPENDIX C

### Section II. TOOLS IDENTIFICATION LIST

<table>
<thead>
<tr>
<th>(1) ITEM NUMBER</th>
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<th>(4) PART NUMBER</th>
<th>(5) REFERENCE</th>
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<tr>
<td>1</td>
<td>ADAPTER, SOCKET WRENCH</td>
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<td>2</td>
<td>ADJUSTING TOOL, BRAKE SHOE</td>
<td>5120-00-154-3029</td>
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<td>3</td>
<td>APRON, RUBBER</td>
<td>8145-00-082-6108</td>
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<td>4</td>
<td>CAPS, VISE JAW</td>
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<td>5</td>
<td>DISPENSING PUMP, HAND DRIVEN</td>
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<td>53</td>
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<td>57</td>
<td>WRENCH, TORQUE, 0-175 lb-ft</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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<td>1.1</td>
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<td>8040-00-273-8717</td>
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<td>Adhesive (81348) MMM-A-1617 TY 3</td>
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<td>Adhesive (71984) 3145 RTV Clear</td>
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<td>8040-00-776-9602</td>
<td>Adhesive (73168) 80055-31</td>
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<td>8040-00-118-2695</td>
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<td>8040-00-728-3088</td>
<td>Adhesive (78500) 1199-T-3842 6 oz</td>
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<td>12</td>
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<td>6850-00-174-1806</td>
<td>Antifreeze, Arctic Type (81349) (MIL-A-11755) 55 gal drum</td>
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<td>13</td>
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<td>6850-01-441-3218</td>
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<td>Antiseize Compound (81349) (MIL-A-907) 1 lb</td>
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<td>5110-00-277-4588</td>
<td>Blade, Hand Hacksaw (54940) 31-51024</td>
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<td>5340-01-454-4336</td>
<td>Bracket, Angle (0FW39) 12421859-001</td>
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<td>Cap and Plug Set 10935405</td>
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<td>Clamp, Loop (18076) S630H-20</td>
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<td>16</td>
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<td>6850-00-926-2275</td>
<td>Cleaning Compound, Windshield (81349) O-C-1901 16 oz bottle</td>
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<td>7920-00-044-9281</td>
<td>Cloth, Cleaning (81349) (MIL-C-85043)</td>
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<td>8030-00-062-6950</td>
<td>Corrosion Preventive Compound (81349) (MIL-C-16173)</td>
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<td>Corrosion Preventive Compound (MIL-C-82594) 8 oz can</td>
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<td>Cover, Seat, Vehicular (27797) WM1059</td>
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<td>2540-01-463-8394</td>
<td>Cover, Seat, Vehicular (0FW39) WM1058</td>
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<td>20</td>
<td>C</td>
<td>9150-00-664-0047</td>
<td>Damping Fluid (81348) VV-D-1078 1 lb can</td>
<td>lb</td>
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<td>21</td>
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<td>7520-01-209-1152</td>
<td>Dispenser, Pressure Sensitive Adhesive Tape (75037) STD-0-9</td>
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<td>Elbow, Pipe to Boss (19207) 12421891-001</td>
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<td>Gasket Forming Compound (05972) 515</td>
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<td>Gasket Maker, RTV Silicone (05972) 5699</td>
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<td>23</td>
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<td>9150-01-197-7688</td>
<td>Grease, Automotive and Artillery (GAA) (81349) (MIL-G-10924)</td>
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<td></td>
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<td>9150-01-197-7690</td>
<td>2-1/4 oz tube</td>
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<td>9150-01-197-7689</td>
<td>1.75 lb can</td>
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<td>9150-01-197-7692</td>
<td>6.5 lb can</td>
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<td>9150-01-197-7689</td>
<td>35 lb can</td>
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<td>24</td>
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<td>9150-00-530-6814</td>
<td>Grease, Wire Rope-Exposed Gear (81349) (MIL-G-18458)</td>
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<td>25</td>
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<td>9150-00-935-4018</td>
<td>Grease, Molybdenum Disulfide (81349) (MIL-G-21164)</td>
<td>14 oz cartridge</td>
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<td>25.1</td>
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<td>4720-00-988-3842</td>
<td>Hose Assembly, Nonmetallic (50599) R25679-1</td>
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<td>O</td>
<td>4720-01-384-0995</td>
<td>Hose Assembly, Nonmetallic (19207) 12421858-006</td>
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<td>9150-00-252-6383</td>
<td>Hydraulic Fluid A (MIL-H-5606)</td>
<td>1 q.t can</td>
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<td>9150-00-223-4134</td>
<td>1 g.t can</td>
<td>cn</td>
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<td>27</td>
<td>O</td>
<td>7510-00-145-0559</td>
<td>Ink, Marking Stencil (MIL-I-43553)</td>
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<td>28</td>
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<td>7510-01-386-0787</td>
<td>Inking Pad, Rubber Stamp</td>
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<tr>
<td>29</td>
<td>O</td>
<td>9150-01-360-1905</td>
<td>Insulating Compound, Electrical</td>
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<td>30</td>
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<td>5970-00-838-5951</td>
<td>Insulation Sleeving, Electrical (06090) CRN3-16BLACK</td>
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<td>5970-01-378-3018</td>
<td>Insulation Sleeving, Electrical (06090) ATUM-1/4-0-4FT</td>
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<td>5970-01-422-3579</td>
<td>Insulation Sleeving, Electrical (06090) ATUM 1/2 4 ft length</td>
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<td>32</td>
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<td>1650-00-166-4834</td>
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<td>33</td>
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<td>Lubricant, Solid Film (MIL-L-46147) 16 oz can</td>
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<td>34</td>
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<td>4730-00-019-0608</td>
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<td>36</td>
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<td>5310-00-059-4265</td>
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<td>Description</td>
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<td>36.1 C</td>
<td>9140-00-286-5282</td>
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<tr>
<td></td>
<td>9140-00-286-5283</td>
<td>Bulk</td>
<td>gl</td>
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<tr>
<td></td>
<td>9140-00-286-5284</td>
<td>55 gl drum, 16 gauge</td>
<td>dr</td>
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<tr>
<td></td>
<td>9140-00-286-5285</td>
<td>55 gl drum, 18 gauge</td>
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<td>36.2 C</td>
<td>9140-00-286-5286</td>
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<td></td>
<td>9140-00-286-5288</td>
<td>55 gl drum, 16 gauge</td>
<td>dr</td>
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<td></td>
<td>9140-00-286-5289</td>
<td>55 gl drum, 18 gauge</td>
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<td>37 C</td>
<td>9140-00-286-5292</td>
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<td>5 gl can</td>
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<td>9140-00-286-5294</td>
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<td></td>
<td>9140-00-286-5295</td>
<td>Can</td>
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<tr>
<td></td>
<td>9140-00-286-5296</td>
<td>55 gl drum, 16 gauge</td>
<td>dr</td>
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<tr>
<td></td>
<td>9140-00-286-5297</td>
<td>55 gl drum, 18 gauge</td>
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<td>38 C</td>
<td>9140-00-286-5298</td>
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<td>9140-00-286-5299</td>
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<td>9140-00-286-5300</td>
<td>5 gl can</td>
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<td>9140-00-286-5301</td>
<td>55 gl drum, 16 gauge</td>
<td>dr</td>
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<td></td>
<td>9140-00-286-5302</td>
<td>55 gl drum, 18 gauge</td>
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<td>39 C</td>
<td>9140-00-286-5303</td>
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<td>9140-00-286-5305</td>
<td>Can</td>
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<td>9140-00-286-5306</td>
<td>55 gl drum, 16 gauge</td>
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<td>9140-00-286-5307</td>
<td>55 gl drum, 18 gauge</td>
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<td>9150-00-491-7198</td>
<td>55 gl drum</td>
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<td>Oil, Lubricating, Gear, GO 75W (MIL-L-2105C)</td>
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<td>9150-00-035-5391</td>
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<td>9150-00-035-5392</td>
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<td>9150-01-035-5395</td>
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<td>9150-00-186-6668</td>
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<td>9150-00-191-2772</td>
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<td>9150-00-189-6727</td>
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<td>48</td>
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<td>Paper, Abrasive (28124) 02347</td>
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<td>pg contains 100 sheets</td>
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<td>8010-01-146-2650</td>
<td>Polyurethane Coating (MIL-C-46168)</td>
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<td>8030-00-181-8372</td>
<td>Primer, Sealing Compound (05972) 747-56</td>
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<td>C</td>
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<td>7920-00-205-1711</td>
<td>Rag, Wiping A-A-531</td>
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<td>52</td>
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<td>53</td>
<td>O</td>
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<td>4020-00-855-2767</td>
<td>Rope, Fibrous (MIL-R-17343)</td>
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<td>75 ft</td>
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<td>7520-00-634-2442</td>
<td>Rubber Stamp Set, Fixed Type</td>
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<td>5330-01-337-1108</td>
<td>Rubber Strip (12624) V4062</td>
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<td>Rubber Strip (19207) 12328583-3</td>
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<td>5305-00-021-3740</td>
<td>Screw, Cap, Hex Hd (97942) 645A560H43</td>
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<td>5305-01-299-4602</td>
<td>Screw, Cap, Hex Hd (64678) 000933 006058</td>
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<td>Screw, Cap, Hex Hd (19207) 12419954-093</td>
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<td>5305-01-296-0019</td>
<td>Screw, Cap, Socket Head (06888) SHCM75275</td>
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<td>O</td>
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<td>1015-01-255-4144</td>
<td>Sealant, Pipe, Teflon (19207) 12297953</td>
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<td>50 ml tube</td>
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<td>8030-00-081-2327</td>
<td>Sealing Compound (05972) 079-21</td>
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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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<td>Lanyard Assembly</td>
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</tr>
<tr>
<td>12420196</td>
<td>Lanyard Assembly</td>
<td>E-14</td>
</tr>
<tr>
<td>12420197-001</td>
<td>Non-Metallic Vent Air Hose</td>
<td>E-15</td>
</tr>
<tr>
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<td>E-15</td>
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<td>Non-Metallic Vent Air Hose</td>
<td>E-15</td>
</tr>
<tr>
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<td>Non-Metallic Vent Air Hose</td>
<td>E-15</td>
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<td>Non-Metallic Vent Air Hose</td>
<td>E-15</td>
</tr>
<tr>
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<td>E-15</td>
</tr>
<tr>
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<td>Non-Metallic Vent Air Hose</td>
<td>E-15</td>
</tr>
<tr>
<td>12420198-002</td>
<td>Non-Metallic Vent Air Hose</td>
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</tr>
<tr>
<td>12420308-457</td>
<td>Personnel Heater Air Duct Hose</td>
<td>E-16</td>
</tr>
<tr>
<td>12420308-760</td>
<td>Personnel Heater Air Duct Hose</td>
<td>E-16</td>
</tr>
<tr>
<td>12420489</td>
<td>Block Seal</td>
<td>E-17</td>
</tr>
<tr>
<td>3256-H-1048</td>
<td>CTIS Seal Driver</td>
<td>E-18</td>
</tr>
<tr>
<td>3256-K-1051</td>
<td>Wheel Hub Grease Seal Driver</td>
<td>E-19</td>
</tr>
</tbody>
</table>

Dimmer Switch Test Wire
Purge Valve Tool
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.

<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 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.
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.
E-4. CAB SUPPORT TOOL (CONT)

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-10
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>
<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>
<td>J844TYBSIZE 3/8 (81343)</td>
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<td>12414690-118</td>
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<td>17.0</td>
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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>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>inches</td>
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<tr>
<td>12414690-201</td>
<td>C608-100BLK (13174)</td>
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<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>
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<td>C608-100BLK (13174)</td>
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</tr>
<tr>
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<td>C608-100BLK (13174)</td>
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<tr>
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<td>C608-100BLK (13174)</td>
<td>15.5</td>
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<tr>
<td>12414690-211</td>
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</tr>
<tr>
<td>12414690-212</td>
<td>C608-100BLK (13174)</td>
<td>16.9</td>
</tr>
<tr>
<td>12414690-213</td>
<td>C608-100BLK (13174)</td>
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<td>103.5</td>
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<td>32.8</td>
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<tr>
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<td>PFT-10B-BLK-100 (61424)</td>
<td>118.1</td>
</tr>
</tbody>
</table>
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>
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<td>49008</td>
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</tr>
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<td>49008</td>
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<tr>
<td>12416381P3</td>
<td>27413</td>
<td>7.3</td>
</tr>
<tr>
<td>12416381P30</td>
<td>49007</td>
<td>17.0</td>
</tr>
<tr>
<td>12416381P32</td>
<td>49005</td>
<td>1.7</td>
</tr>
<tr>
<td>12416381P34</td>
<td>49005</td>
<td>20.7</td>
</tr>
<tr>
<td>12416381P35</td>
<td>49005</td>
<td>21.8</td>
</tr>
<tr>
<td>12416381P36</td>
<td>49005</td>
<td>5.5</td>
</tr>
<tr>
<td>12416381P37</td>
<td>49005</td>
<td>8.0</td>
</tr>
<tr>
<td>12416381P38</td>
<td>49008</td>
<td>3.7</td>
</tr>
<tr>
<td>12416381P4</td>
<td>49008</td>
<td>12.0</td>
</tr>
<tr>
<td>12416381P5</td>
<td>49008</td>
<td>26.0</td>
</tr>
<tr>
<td>12416381P6</td>
<td>49008</td>
<td>7.7</td>
</tr>
<tr>
<td>12416381P7</td>
<td>49008</td>
<td>26.7</td>
</tr>
<tr>
<td>12416381P8</td>
<td>49008</td>
<td>5.2</td>
</tr>
<tr>
<td>12416381P9</td>
<td>49008</td>
<td>16.8</td>
</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></td>
<td></td>
<td>inches</td>
</tr>
<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>
<td>16.0</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 Type 1, Comp B</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>
</tr>
<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.
E-18. CTIS SEAL DRIVER 3256-H-1048

Used on Front and Rear Axle CTIS Seals.

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.
E-19. WHEEL HUB GREASE SEAL DRIVER 3256-K-1051

NOTES ON USE OF DRIVER
1) SEAL END OF DRIVER TO BE CLEAN OF DEBRIS, DIRT, NICKS AND BURRS
2) DO NOT USE A METAL HAMMER ON DRIVER
   A RUBBER, PLASTIC, WOOD OR SOME OTHER DEAD BLOW TYPE MALLET
   IS TO BE USED
3) SLIGHTLY GREASE SEAL END OF DRIVER PRIOR TO INSTALLING SEAL

Figure E-10. Wheel Hub Grease Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.
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.
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**

- All dimensions are in inches (cm).
- Cut steel bar (1) and bend to shape as shown in Figure E-11.
- Dimensional limits apply after coating.
- All edges shall be broken and free from burrs.
- Metal Stamp, electro etch, or engrave with the following marking IAW MIL-STD-130: 19207-12379968 MFR-19207.
APPENDIX F
TORQUE LIMITS

F-1. GENERAL

This appendix provides general torque limits for screws and nuts used on the vehicle. Special torque limits are shown in the maintenance procedures for applicable components. Use the general torque limit given in this appendix when specific torque limits are not given in the maintenance procedure. These general torque limits can not be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached. If a special torque limit is not given in the maintenance instructions for a fastener which retains a rubber component, tighten the screw or nut until it touches metal, then tighten one more turn. Whenever possible, the tightening force (torque) should be applied to the nut side of the fastener group.

F-2. TORQUE LIMITS

Refer to Table F-1. Torque Limits for SAE and ANSI Fasteners for torque limits on standard (SAE and ANSI) screws and free spinning nuts. Refer to Table F-2. Torque Limits for SAE and ANSI Prevailing Torque Nuts for torque limits on standard (SAE and ANSI) self-locking nuts. Refer to Table F-3. Torque Limits for Metric Screws and Free Spinning Nuts for torque limits on metric screws and free spinning nuts. Refer to Table F-4. Torque Limits for Metric Prevailing Torque Nuts for torque limits on metric self-locking nuts.

F-3. USE OF TORQUE TABLES

(1) Measure the diameter of the screw to be installed.

(2) Count the number of threads per inch.

(3) Under the heading DIAMETER look down the column until the diameter of the screw is found. (There are usually two lines beginning with the same diameter.)

(4) Under the heading THREADS PER INCH (SAE and ANSI) or THREAD PITCH (metric), find the number of threads per inch that matches the number counted in step (2).

(5) To find the grade of the screw, match the markings on the head to the correct picture under CAPSCREW HEAD MARKINGS on the torque table.

(6) Look down the column under the picture found in step (5) until the torque limit (lb-ft or N·m) for the diameter and threads per inch (or thread pitch, in the case of metric fasteners) of the screw are located.
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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SAE Grade 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAE Grade 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAE Grade 8</td>
</tr>
<tr>
<td>inch</td>
<td></td>
<td>lb-ft</td>
</tr>
<tr>
<td>1/4</td>
<td>20</td>
<td>3-5</td>
</tr>
<tr>
<td>1/4</td>
<td>28</td>
<td>4-6</td>
</tr>
<tr>
<td>1/4</td>
<td>32</td>
<td>4-6</td>
</tr>
<tr>
<td>5/16</td>
<td>18</td>
<td>7-9</td>
</tr>
<tr>
<td>5/16</td>
<td>24</td>
<td>8-10</td>
</tr>
<tr>
<td>3/8</td>
<td>16</td>
<td>13-17</td>
</tr>
<tr>
<td>7/16</td>
<td>14</td>
<td>20-28</td>
</tr>
<tr>
<td>7/16</td>
<td>20</td>
<td>23-31</td>
</tr>
<tr>
<td>7/16</td>
<td>28</td>
<td>25-33</td>
</tr>
<tr>
<td>1/2</td>
<td>13</td>
<td>32-42</td>
</tr>
<tr>
<td>1/2</td>
<td>20</td>
<td>35-47</td>
</tr>
<tr>
<td>1/2</td>
<td>28</td>
<td>38-50</td>
</tr>
<tr>
<td>9/16</td>
<td>18</td>
<td>50-68</td>
</tr>
<tr>
<td>9/16</td>
<td>24</td>
<td>53-71</td>
</tr>
<tr>
<td>5/8</td>
<td>11</td>
<td>62-84</td>
</tr>
<tr>
<td>5/8</td>
<td>24</td>
<td>73-99</td>
</tr>
</tbody>
</table>
Table F-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)

<table>
<thead>
<tr>
<th>Diameter inch</th>
<th>Threads per inch</th>
<th>SAE Grade 2 torque</th>
<th>SAE Grade 5 torque</th>
<th>SAE Grade 8 torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/16</td>
<td>24</td>
<td>99-133 lb-ft</td>
<td>135-181 N-m</td>
<td>153-207 lb-ft</td>
</tr>
<tr>
<td>3/4</td>
<td>10</td>
<td>110-148 lb-ft</td>
<td>150-200 N-m</td>
<td>171-229 lb-ft</td>
</tr>
<tr>
<td>3/4</td>
<td>16</td>
<td>123-165 lb-ft</td>
<td>168-224 N-m</td>
<td>190-256 lb-ft</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>127-171 lb-ft</td>
<td>174-232 N-m</td>
<td>197-265 lb-ft</td>
</tr>
<tr>
<td>13/16</td>
<td>20</td>
<td>252-340 lb-ft</td>
<td>345-459 N-m</td>
<td>357-481 lb-ft</td>
</tr>
<tr>
<td>7/8</td>
<td>9</td>
<td>275-369 lb-ft</td>
<td>374-498 N-m</td>
<td>387-521 lb-ft</td>
</tr>
<tr>
<td>7/8</td>
<td>14</td>
<td>303-407 lb-ft</td>
<td>413-551 N-m</td>
<td>427-575 lb-ft</td>
</tr>
<tr>
<td>7/8</td>
<td>20</td>
<td>319-429 lb-ft</td>
<td>435-579 N-m</td>
<td>450-606 lb-ft</td>
</tr>
<tr>
<td>15/16</td>
<td>20</td>
<td>395-531 lb-ft</td>
<td>538-718 N-m</td>
<td>558-750 lb-ft</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>411-553 lb-ft</td>
<td>560-748 N-m</td>
<td>581-781 lb-ft</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>450-606 lb-ft</td>
<td>614-818 N-m</td>
<td>636-856 lb-ft</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>483-649 lb-ft</td>
<td>658-878 N-m</td>
<td>681-917 lb-ft</td>
</tr>
<tr>
<td>1-1/16</td>
<td>18</td>
<td>576-776 lb-ft</td>
<td>782-1044 N-m</td>
<td>813-1095 lb-ft</td>
</tr>
<tr>
<td>1-1/8</td>
<td>7</td>
<td>507-683 lb-ft</td>
<td>693-923 N-m</td>
<td>824-1108 lb-ft</td>
</tr>
<tr>
<td>1-1/8</td>
<td>12</td>
<td>570-766 lb-ft</td>
<td>776-1034 N-m</td>
<td>923-1241 lb-ft</td>
</tr>
<tr>
<td>1-1/8</td>
<td>18</td>
<td>600-806 lb-ft</td>
<td>817-1089 N-m</td>
<td>971-1307 lb-ft</td>
</tr>
<tr>
<td>1-3/16</td>
<td>18</td>
<td>709-953 lb-ft</td>
<td>966-1288 N-m</td>
<td>1149-1545 lb-ft</td>
</tr>
<tr>
<td>1-1/4</td>
<td>7</td>
<td>716-964 lb-ft</td>
<td>976-1302 N-m</td>
<td>1161-1563 lb-ft</td>
</tr>
<tr>
<td>1-1/4</td>
<td>12</td>
<td>793-1067 lb-ft</td>
<td>1081-1441 N-m</td>
<td>1286-1730 lb-ft</td>
</tr>
<tr>
<td>1-1/4</td>
<td>18</td>
<td>831-1117 lb-ft</td>
<td>1132-1510 N-m</td>
<td>1346-1812 lb-ft</td>
</tr>
<tr>
<td>1-5/16</td>
<td>18</td>
<td>965-1299 lb-ft</td>
<td>1316-1754 N-m</td>
<td>1565-2105 lb-ft</td>
</tr>
<tr>
<td>1-3/8</td>
<td>6</td>
<td>939-1263 lb-ft</td>
<td>1281-1707 N-m</td>
<td>1523-2049 lb-ft</td>
</tr>
</tbody>
</table>

Manufacturer's marks may vary. These are all SAE Grade 5 material grade markings.
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>SAE Grade 5</th>
<th>SAE Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Torque</td>
<td>Torque</td>
</tr>
<tr>
<td></td>
<td>lb-ft</td>
<td>N·m</td>
<td>lb-ft</td>
</tr>
<tr>
<td>inch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>20</td>
<td>10-12</td>
<td>14-16</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>12-14</td>
<td>16-18</td>
</tr>
<tr>
<td>5/16</td>
<td>18</td>
<td>20-24</td>
<td>27-33</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>22-26</td>
<td>30-36</td>
</tr>
<tr>
<td>3/8</td>
<td>16</td>
<td>35-41</td>
<td>47-55</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>38-46</td>
<td>53-63</td>
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<td>14</td>
<td>55-65</td>
<td>74-88</td>
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<td>20</td>
<td>60-70</td>
<td>81-97</td>
</tr>
<tr>
<td>1/2</td>
<td>13</td>
<td>86-102</td>
<td>116-138</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>92-110</td>
<td>125-149</td>
</tr>
<tr>
<td>9/16</td>
<td>12</td>
<td>120-144</td>
<td>162-194</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>135-161</td>
<td>183-219</td>
</tr>
<tr>
<td>5/8</td>
<td>11</td>
<td>165-199</td>
<td>226-270</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>181-219</td>
<td>246-296</td>
</tr>
<tr>
<td>3/4</td>
<td>10</td>
<td>296-354</td>
<td>402-480</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>310-376</td>
<td>422-508</td>
</tr>
<tr>
<td>7/8</td>
<td>9</td>
<td>460-554</td>
<td>625-749</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>503-607</td>
<td>684-822</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>686-828</td>
<td>933-1121</td>
</tr>
</tbody>
</table>
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>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thread Pitch</td>
<td>lb-ft</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>1.25</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>10</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
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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.
## 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

Material Grade Markings

Screw Grade

- SAE Grade 2
- SAE Grade 5
- SAE Grade 8
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>MS25036-122</td>
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<td>268</td>
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<td>269</td>
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<td>12416409-006</td>
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<td>269.1</td>
<td>TERMINAL, LUG</td>
<td>12420344</td>
<td>5940-01-082-3321</td>
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<td>270</td>
<td>WASHER, FLAT</td>
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<td>5310-00-374-6990</td>
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<td>5365-01-436-8308</td>
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<td>271.1</td>
<td>WASHER, FLAT</td>
<td>251391</td>
<td>5310-01-417-1041</td>
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<td>272</td>
<td>WASHER, FLAT RUBBER</td>
<td>900.032</td>
<td>5330-00-378-7541</td>
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<tr>
<td>273</td>
<td>WASHER, NYLON</td>
<td>MS51859-16</td>
<td>5310-00-964-7811</td>
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<td>WASHER, SPRING</td>
<td>D63474/1-30</td>
<td>5310-01-413-8475</td>
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<tr>
<td>275</td>
<td>WASHER, SPRING</td>
<td>WW579S18</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>277</td>
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<td>5310-01-374-4517</td>
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<td>WASHER, SPRING</td>
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<td>5310-01-395-0820</td>
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<td>WASHER, SPRING</td>
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<td>5310-01-406-6326</td>
</tr>
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<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>
SECTION I. INTRODUCTION

H-1. GENERAL

The information contained in this appendix provides the lubrication/services requirements for the LMTV vehicle.

a. Adherence. Intervals (on-condition or hardtime) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals will be applied unless changed by the Army Oil Analysis Program (AOAP) laboratory. Change the hardtime interval if the lubricants are contaminated or if operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hardtime intervals will be applied in the event AOAP laboratory support is not available. Hardtime intervals must be applied during the warranty period.

Intervals shown in this lubrication order and services are based on mileage/calendar, and in some cases mileage alone. An example of a mileage/calendar interval is: Q, which means every 3,000 miles (4,827 km) or quarterly (every three months). The lubrication is to be performed at whichever interval occurs first for the vehicle. An example of a mileage alone interval is: 6K, which stands for every 6,000 miles (9,654 km). The lubrication/services is to be performed at the mileage indicated regardless of the calendar interval.

WARNING

• Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 138°F (50°C). Failure to comply may result in serious injury or death to personnel.

• If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in injury to personnel.

b. Cleaning fittings before lubricating. Clean parts with dry cleaning solvent (SD P-D-680) (Item 71, Appendix D) or equivalent. Dry before lubricating. Dashed arrows indicate lubrication on both sides of the equipment.

c. Lubricating after fording. If fording occurs, lubricate all fittings below fording depth and check submerged gearboxes for presence of water.

d. Lubricating after high-pressure washing. After a thorough washing, lubricate all grease fittings and oil can points outside and underneath vehicle.

e. Level of Maintenance. The lowest level of maintenance authorized to lubricate a point is Operator/Unit Maintenance (O). Operator/crew (C) may lubricate points authorized for Unit Maintenance (O) when authorized by Unit Maintenance (O).

f. Localized views. A reference to the appropriate localized view is given after most lubrication entries. Localized views begin on page H-9.
H-1. GENERAL (CONT)

| g. Interval Symbols. The lubrication/service interval symbols will be used as applicable:
| Q-quarterly/3,000 mi (4,827 km) (whichever occurs first)
| S-semiannually/6,000 mi (9,654 km) (whichever occurs first)
| A-annually/12,000 mi (19,308 km) (whichever occurs first)
| B-biennially/24,000 mi (38,616 km) (whichever occurs first)
| 3K-every 3,000 mi (4,827 km) (no calendar interval)
| 6K-every 6,000 mi (9,654 km) (no calendar interval)
| 12K-every 12,000 mi (19,308 km) (no calendar interval)
| 24K-every 24,000 mi (38,616 km) (no calendar interval)

H-2. OIL FILTERS

Oil filters shall be serviced/changed as applicable, when:

a. They are known to be contaminated, or clogged;

b. Service is recommended by AOAP laboratory analysis; or

c. At prescribed hardtime intervals while vehicle is under warranty, or if AOAP is not available/used as required.

H-3. AOAP SAMPLING INTERVAL

**WARNING**

- Engine oil is hot and under pressure. The oil sampling valve releases oil proportionally to the amount of pressure applied to valve. Activate oil sampling valve by pressing in slowly to prevent injury to personnel. Failure to comply may result in injury to personnel.

- Wear safety goggles when taking oil sample. Oil is under pressure and could cause injury to personnel. Failure to comply may result in injury to personnel.

Units participating in AOAP will sample engine oil every 3,000 miles (4,827 km) or 6 months, whichever occurs first and change engine oil as directed by AOAP. Units participating in AOAP will sample transmission oil every 6,000 miles (9,654 km) or 12 months, whichever occurs first and change transmission oil as directed by AOAP. Units participating in AOAP will sample hydraulic system oil initially after 6 weeks or 10 hours of operation, whichever occurs first. After initial oil change samples should be taken every 12 months or 50 hours of operation, whichever occurs first and change hydraulic oil as directed by AOAP.

H-4. WARRANTY HARDTIME STATEMENT

"For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer than usual operating hours, extended idling periods, extreme dust)."
SECTION II. LUBRICATION/SERVICE CHART

H-5. LUBRICATION/SERVICE KEY

<table>
<thead>
<tr>
<th>LUBRICANTS</th>
<th>Specification</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>
<td></td>
</tr>
<tr>
<td>MIL-L-46167 (OEA)</td>
<td>Lubricating Oil, Internal Combustion Engine, Arctic</td>
<td></td>
</tr>
<tr>
<td>MIL-L-2105 (GO)</td>
<td>Lubricating Oil, Gear, Multipurpose</td>
<td></td>
</tr>
<tr>
<td>MIL-G-10924 (GAA)</td>
<td>Grease, Automotive and Artillery</td>
<td></td>
</tr>
<tr>
<td>MIL-G-18458 (GW)</td>
<td>Grease, Wire-Rope and Exposed Gear</td>
<td></td>
</tr>
<tr>
<td>MIL-H-5606 (OHA)</td>
<td>Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CAPACITY</th>
<th>EXPECTED TEMPERATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine crankcase</td>
<td>25 qt (24 L)</td>
<td>Above +40 F (Above +4 C)</td>
</tr>
<tr>
<td>Transmission (total system)</td>
<td>43.3 qt (41 L)</td>
<td>OE/HDO-15/40</td>
</tr>
<tr>
<td>Transmission (at oil change)</td>
<td>31.8 qt (30.0 L)</td>
<td>OE/HDO-15/40</td>
</tr>
<tr>
<td>Transmission (after overhaul)</td>
<td>39.0 qt (37.0 L)</td>
<td>OE/HDO-15/40</td>
</tr>
<tr>
<td>Steering system</td>
<td>5 qt (4.8 L)</td>
<td>OE/HDO-10</td>
</tr>
<tr>
<td>Hydraulic reservoir</td>
<td>27 gal (102.2 L)</td>
<td>OE/HDO-10</td>
</tr>
<tr>
<td>Front axle differential (maximum capacity)</td>
<td>9.5 qt (9.0 L)</td>
<td>GO-80/90</td>
</tr>
<tr>
<td>Rear axle differential (maximum capacity)</td>
<td>18.05 qt (17.1 L)</td>
<td>GO-80/90</td>
</tr>
<tr>
<td>Front axle planetary hubs</td>
<td>11-13 oz (0.33-0.38 L)</td>
<td>GO-80/90</td>
</tr>
<tr>
<td>11K Self-Recovery Winch (SRW)</td>
<td>As Required</td>
<td>GO-85/140</td>
</tr>
<tr>
<td>Propeller shaft universal and slip joints</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>Tie rod ends</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>Towing pintle assembly</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>Spring bolts and spring shackles</td>
<td>As Required</td>
<td>GAA</td>
</tr>
<tr>
<td>Front axle shaft U-joints and steering knuckles</td>
<td>As Required</td>
<td>GAA</td>
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### H-5. LUBRICATION/SERVICE KEY (CONT)

<table>
<thead>
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<th>DESCRIPTION</th>
<th>CAPACITY</th>
<th>EXPECTED TEMPERATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Above +40 °F (Above +4 °C)</td>
</tr>
<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>
</tr>
<tr>
<td>Backup hydraulic pump</td>
<td>19 oz (562 ml)</td>
<td>OHA</td>
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### COOLANT

<table>
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<tr>
<th>Specification</th>
<th>Type</th>
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<tbody>
<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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Above +40 °F (Above +4 °C)</td>
</tr>
<tr>
<td>Cooling system (engine only)</td>
<td>14 qt (13 L)</td>
<td>A-A-52624A</td>
</tr>
<tr>
<td>Cooling system (total system)</td>
<td>43.8 qt (41.5 L)</td>
<td>A-A-52624A</td>
</tr>
<tr>
<td>Cooling system, Arctic (total system)</td>
<td>58.3 qt (55.2 L)</td>
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### CLEANING AGENT

<table>
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<tr>
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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>
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### H-6. LUBRICATION/SERVICE INTERVALS

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<th>Intervals</th>
<th>Total Man-Hours</th>
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<tbody>
<tr>
<td>Quarterly (Q)</td>
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<tr>
<td>Semi-annually (S)</td>
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<tr>
<td>Annually (A)</td>
<td>1.5</td>
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<tr>
<td>Biennially (B)</td>
<td>3.5</td>
</tr>
<tr>
<td>3K</td>
<td>1.0</td>
</tr>
<tr>
<td>6K</td>
<td>1.0</td>
</tr>
<tr>
<td>12K</td>
<td>4.0</td>
</tr>
<tr>
<td>24K</td>
<td>0.5</td>
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* Whichever occurs first.
** No calendar interval.

For arctic operation refer to FM 9-207.

<table>
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<th>DESCRIPTION</th>
<th>CAPACITY</th>
<th>EXPECTED TEMPERATURES</th>
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</thead>
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<tr>
<td>All metal parts as required</td>
<td>N/A</td>
<td>SD-II (all temperatures)</td>
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<tr>
<td>Windshield washer reservoir</td>
<td>7.5 qt (7.1 L)</td>
<td>2/3 water to 1/3 O-C-1901</td>
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<tr>
<td></td>
<td></td>
<td>+15 F to -15 F (-9 C to -26 C)</td>
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<tr>
<td></td>
<td></td>
<td>1/2 water to 1/2 O-C-1901</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/3 water to 2/3 O-C-1901</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above +15 F (Above -9 C)</td>
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H-7. LOCATOR VIEWS

**LUBRICANT INTERVAL**

<table>
<thead>
<tr>
<th>Component</th>
<th>Interval</th>
<th>Lubricant</th>
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<tbody>
<tr>
<td>Engine Crankcase Breather</td>
<td>(O)</td>
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<tr>
<td>(See note 17 and view A)</td>
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<td></td>
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<tr>
<td>Fuel Filter (O)</td>
<td>(See note 6 and view A)</td>
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</tr>
<tr>
<td>Fuel/Water Separator (O)</td>
<td>(See note 5 and view B)</td>
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</tr>
<tr>
<td>Cooling System (O)</td>
<td>(See note 7)</td>
<td></td>
</tr>
<tr>
<td>Transmission Filter (O)</td>
<td>(See note 3 and view F)</td>
<td></td>
</tr>
<tr>
<td>Transmission Drain and Fill</td>
<td>(O)</td>
<td></td>
</tr>
<tr>
<td>(See note 3 and views D, E, and F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Towing Pintle Fill (O)</td>
<td>(See note 16 and views J and K)</td>
<td></td>
</tr>
<tr>
<td>Engine Oil Filter (O)</td>
<td>(See note 2 and view C)</td>
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</tr>
<tr>
<td>Crankcase Drain and Fill (O)</td>
<td>(See note 1 and views C and D)</td>
<td></td>
</tr>
<tr>
<td>Front Axle Inner Wheel Bearing Repack (O)</td>
<td>(See note 22)</td>
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</tr>
<tr>
<td>Power Steering Reservoir Drain and Fill (O)</td>
<td>(See note 4 and view G)</td>
<td></td>
</tr>
<tr>
<td>Power Steering Filter (O)</td>
<td>(See note 4 and view G)</td>
<td></td>
</tr>
<tr>
<td>Spring Bolt Fill (O)</td>
<td>(See note 18 and view H)</td>
<td></td>
</tr>
<tr>
<td>Spring Shackle Fill (O)</td>
<td>(See note 18 and view AE)</td>
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</tr>
</tbody>
</table>

**CHASSIS**

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.
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

Front Axle
Check and Fill (O)
(See note 11 and view T)

Axle Shaft U-Joints
Fill (O)
(See note 20 and view U)

Steering Knuckles
Fill (O)
(See note 20 and view U)

Front Lifting Beam
Clean and Grease (O)
(See note 24 and view AD)

Hydraulic Reservoir and Filter
Drain and Fill (O)
(See note 8 and view X)

Wheel End Planetary Hubs
Drain and Fill (O)
(See note 12 and view V)

Wheel End Planetary Hubs
Check and Fill (O)
(See note 12 and view V)

11K Self-Recovery Winch (SRW) Cable
Fill (O)
(See note 14 and view W)

11K Self-Recovery Winch (SRW)
Check and Fill (O)
(See note 15 and view Y)

11K Self-Recovery Winch (SRW)
Drain and Fill (O)
(See note 15 and view Y)

Rear Axle Check and Fill (O)
(See note 11 and view T)

Rear Axle Inner Wheel Bearing Repack (O)
(See note 22)

Rear Axle
Drain and Fill (O)
(See note 11 and view T)

NOTE: Dashed arrows indicate lubrication on both sides of vehicle.
H-8. LOCAL VIEWS (CONT)

- **E**: Transmission Drain Plug
- **F**: Transfer Case Drain Plug
- **G**: Power Steering Reservoir
- **H**: Spring Bolt
H-8. LOCAL VIEWS (CONT)
H-8. LUBRICATION LOCAL VIEWS (CONT)

- WHEEL END PLANETARY HUB

- 11K SELF RECOVERY WINCH (SRW) CABLE

- FILTER

- HYDRAULIC RESERVOIR

- 11K SELF-RECOVERY WINCH (SRW) DRAIN/FILL
H-8. LOCAL VIEWS (CONT)

- AD
  - FRONT LIFTING BEAM

- AE
  - SPRING SHACKLE

- AF
  - AIR DRYER
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 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).
9. **DRIVE SHAFT UNIVERSAL and SLIP YOKE.**
Lubricate drive shafts with GAA every 3,000 miles (4,827 km) or once every three months, whichever occurs first, using a low pressure lubrication gun. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first. Perform drive shaft hinging inspection every time drive shafts are serviced (para 9-3).

- **UNIVERSAL JOINT:**
  A. Apply grease to both grease fittings until new grease purges from all four bearing caps.
  B. If grease does not purge from all four bearing caps, perform the following steps:
     1. Loosen two screws on bearing cap that does not purge, approximately 1/4 in.
     2. Apply grease to grease fitting for bearing cap that does not purge until bearing cap purges.
     3. Remove and discard the two screws loosened in step (1).
     4. Position two replacement screws in bearing cap and tighten down evenly.
     5. Tighten two screws to 26-35 lb-ft (35-47 N m).

- **SLIP JOINT:**
  A. Apply grease until grease appears at the vent in the welch plug.
  B. Place your finger over the welch plug vent and add grease until grease purges from the dust seal.
  C. If grease does not purge from the dust seal, inspect drive shaft slip yoke (para 9-2).

10. **AIR/HYDRAULIC POWER UNIT and BACKUP HYDRAULIC PUMP.** Change OHA oil every 24,000 miles (38,616 km) or once every two years, whichever occurs first. To service air/hydraulic power unit and backup hydraulic pump refer to vehicle para 19-7, Air Transportability Hydraulic System Service.

11. **ALL AXLE DIFFERENTIALS.** Check oil level in differentials every 3,000 miles (4,827 km). Check oil level with vehicle parked on level surface and axle differential at ambient temperature, allowing at least one hour to cool down after vehicle operation. If oil is checked when axle differential is hot, it is normal for oil to spill out of the port due to expansion from the heat. Oil level is considered full if it is within one inch of the bottom of the fill port. If oil spills from the fill port when the axle differential is cool, it is overfull. Allow oil to drain until no more drains out. If the oil level is more than one inch below the bottom of the fill port, refill axle differential with GO specified for the ambient temperature until level with bottom of fill port. Change the oil every 24,000 miles (38,616 km) or once every two years, whichever occurs first. Drain oil when hot after operation.

12. **FRONT AXLE WHEEL END PLANETARY HUBS.** There are two lube intervals for the front axle wheel end planetary hubs.

a. Check and fill front axle wheel end planetary hubs every 3,000 miles (4,827 km) or once every three months, whichever occurs first, as follows:

   1. Position vehicle on a level surface. Allow 15 minutes for vehicle to cool before checking oil levels.
   2. Position fill port at 4 o’clock position. If oil flows from fill port when plug is loosened, let oil drain to correct level.
      If oil level is below fill port, fill hub with GO specified for the ambient temperature until oil is level with fill port.

b. Drain and fill front axle wheel end planetary hubs every 24,000 miles (38,616 km) or once every two years, whichever occurs first, following the repacking of the inner wheel bearings or whenever wheel end assemblies are taken apart for other maintenance as follows:

   1. Position vehicle on a level surface.
   2. Position fill port at the 6 o’clock (down) position.
   3. Drain hub oil (allow a minimum of 15 minutes for oil to drain down from vent tubes).
   4. Refill hubs with 11-13 ounces of GO specified for the ambient temperature.
13. **TIE ROD ENDS.** Lubricate tie rod ends with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun, until new grease is seen purging from the boot area. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

14. **11K SELF-RECOVERY WINCH (SRW) CABLE:**

   **CAUTION**

   Do not use dry cleaning solvent to clean 11K Self-Recovery Winch (SRW) cables. Use of dry cleaning solvent will remove lubricant from inner strands of 11K SRW cables. Failure to comply may result in damage to equipment.

   a. After winch operation:

      Refer to FM 5-125.

   b. Care of wire rope:

      Refer to FM 5-125.

   c. Inspection of wire rope:

      Refer to FM 5-125.

   d. Every six months:

      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 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. Add oil until a small amount of oil runs out of lower plug hole.
      5. Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
      6. Rotate drum until open hole is at top.
      7. Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
      8. Tighten plugs to 13-15 lb-ft (18-20 N·m).
H-9. LUBRICATION/SERVICE NOTES (CONT)

b. Change oil as follows:

(1) Shift the freespool mechanism to the disengage position so the drum can be freely rotated.
(2) Rotate the drum to where either plug is near the top of the 11K SRW. Remove the plug.
(3) Rotate the drum 90 degrees in the direction that allows the other plug to be near the top of the 11K SRW. Remove the plug.
(4) Position drain pan (Item 17, Appendix C) under 11K SRW.
(5) Rotate the drum until either hole is straight down to the bottom of the 11K SRW. Allow the oil to drain completely.
(6) Rotate the drum until either hole is at top.

NOTE

Oil level is full if a small amount of oil runs out of lower plug.

(7) Add oil until a small amount of oil runs out of lower plug hole.
(8) Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
(9) Rotate drum until open hole is at top.
(10) Apply adhesive (Item 2, Appendix D) to plug and position plug in top hole.
(11) Tighten plugs to 13-15 lb-ft (18-20 N·m).

16. TOWING PINTLE. Lubricate towing pintle with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun until new grease is seen purging.

WARNING

- Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 138°F (50°C). Failure to comply may result in serious injury or death to personnel.

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

17. ENGINE CRANKCASE BREATHER. Remove crankcase breather and clean with Dry Cleaning Solvent (SD P-D-680) (Item 71, Appendix D) or equivalent, and replace o-ring seal every 6,000 miles (9,654 km) or once every six months, whichever occurs first (para 3-5).

18. FRONT and REAR AXLE SPRING BOLT and SPRING SHACKLE. Lubricate front and rear axle spring bolts and spring shackles with GAA every 3,000 miles (4,827 km) or once every three months, whichever occurs first, using a low pressure lubrication gun until grease appears between pins and bushings at both ends of spring bolt and spring shackle. If pins do not accept grease, notify Direct Support to remove pins. Clean and inspect pins and bushings, replace if necessary. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

19. BATTERY POSTS. Service batteries in accordance with TM 9-6140-200-14, every 6,000 miles (9,654 km) or once every six months, whichever occurs first.
20. FRONT AXLE SHAFT UNIVERSAL JOINTS and STEERING KNUCKLES. Lubricate universal joints every 3,000 miles (4,827 km) or once every three months, whichever occurs first. Lubricate steering knuckles with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

21. BRAKE WEDGE and AIR CHAMBER: BRAKE SPIDER, SELF-ADJUSTER MECHANISM, AND WEDGE ASSEMBLY. Clean and lubricate (with GAA) areas of spider and hardware that contact the brake shoes. Disassemble, clean and lubricate the self-adjuster mechanism. Clean and lubricate the wedge head, rollers and ramps in the plungers. Clean and lubricate every 6,000 miles (9,654 km). If operating conditions are severe or abnormal, service at 3,000 miles (4,827 km) or once every three months, whichever occurs first, or when any of the following occur: Refer to para 11-4 and 11-5.

- Seals are replaced
- Plungers are removed
- Brakes are relined
- Grease becomes contaminated or hardened

22. FRONT and REAR AXLE INNER WHEEL BEARINGS. Repack inner wheel bearings with GAA every 12,000 miles (19,308 km), when semiannual PMCS inspection of service brakes reveals oil leak from inner hub, or whenever wheel end assemblies are taken apart for other maintenance (para 10-2).

23. 11K SRW CABLE ROLLER FAIRLEADS. Lubricate with GAA every 6,000 miles (9,654 km) or once every six months, whichever occurs first, using a low pressure lubrication gun. If operating conditions are severe or abnormal, service at 1,000 miles (1,609 km) or once every month, whichever occurs first.

24. FRONT LIFTING BEAM. Remove left and right lifting beams and clean with Dry Cleaning Solvent (P-D-680) 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 Nm).
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>
</tr>
</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>
</tbody>
</table>
**TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART (CONT)**

<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>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 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 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>
</table>

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.
<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>
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</thead>
<tbody>
<tr>
<td>WTEC III (with ECU manufactured after October 1999)</td>
<td>TID 2 (transmission serial number 6510142172 to 6510262116)</td>
<td>No modification required.</td>
</tr>
<tr>
<td>WTEC III (with ECU manufactured after October 1999)</td>
<td>TID 3 (transmission serial number 6510262117 and subsequent)</td>
<td>No modification required.</td>
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### Section III.

#### MODIFICATION PARTS IDENTIFICATION

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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 (&quot;D&quot; 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 (&quot;D&quot; type) connector to a transmission external wiring harness with a 31-pin (round) connector.</td>
</tr>
</tbody>
</table>
TRANSMISSION/TRANSMISSION CONTROLS
ADAPTABILITY CHART (CONT)

FIGURE 1

WTEC II PUSHBUTTON SHIFT SELECTOR

24 PIN CONNECTOR

MANUFACTURE DATE

31 PIN CONNECTOR

WTEC II PUSHBUTTON SHIFT SELECTOR
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GLOSSARY
ABBREVIATIONS

A/C ................................................................. Air Conditioner
ANSI .......................................................... American National Standards Institute
CCW ............................................................. Counterclockwise
CTIS ............................................................ Central Tire Inflation System
CW ............................................................... Clockwise
ECU ............................................................. Electronic Control Unit
EMI .............................................................. Electromagnetic Interference
LED ............................................................. Light Emitting Diode
LH ................................................................. Left Hand
LMHC ............................................................ Light Material Handling Crane
MAC .............................................................. Maintenance Allocation Chart
NATO ............................................................ North Atlantic Treaty Organization
NBC .............................................................. Nuclear, Biological, or Chemical
NO/NC .......................................................... Normally Open/Normally Closed
PDP ............................................................... Power Distribution Panel
PMCS ............................................................ Preventive Maintenance Checks and Services
PTO .............................................................. Power Takeoff
RH ................................................................. Right Hand
SAE .............................................................. Society of Automotive Engineers
SRW ............................................................. Self-Recovery Winch
STE/ICE-R ................................................... Simplified Test Equipment/Internal Combustion Engine-Reprogrammable
TEPSS .......................................................... Transmission ECU Pushbutton Shift Selector
TPS ............................................................... Throttle Position Sensor
VDC .............................................................. Volts Direct Current
VIM ............................................................. Vehicle Interface Module
WTEC II ........................................ World Transmission Electronic Controls (version 2)

WTEC III ....................................... World Transmission Electronic Controls (version 3)
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
05138

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**DA Form 2028, Feb 74**

Replaces DA Form 2028, 1 Dec 68, Which Will Be Used.
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## PART III - REMARKS

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DELETED
# THE METRIC SYSTEM AND EQUIVALENTS

## LINEAR MEASURE
- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
- 1 Kilometer = 1000 Meters = 0.621 Miles

## SQUARE MEASURE
- 1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
- 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
- 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

## WEIGHTS
- 1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1000 Grams = 2.2 Lb
- 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

## CUBIC MEASURE
- 1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
- 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet
- 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

## LIQUID MEASURE
- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

## TEMPERATURE
- 5/9 (°F - 32) = °C
- 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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