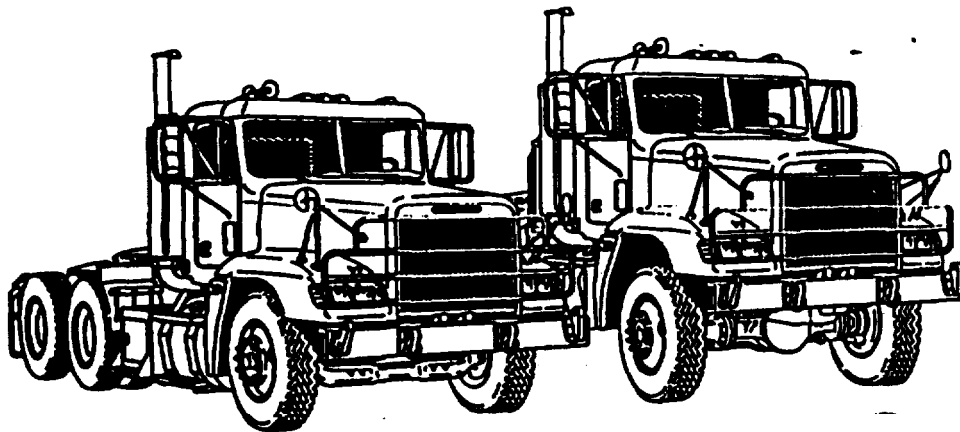


TECHNICAL MANUAL**DIRECT AND GENERAL SUPPORT
MAINTENANCE MANUAL
FOR****TRUCK, TRACTOR, LINE HAUL
52,000 GVWR, 6 X 4, M915A2
(NSN 2320-01-272-5029)****TRUCK, TRACTOR, LIGHT EQUIPMENT
TRANSPORTER (LET)
68,000 GVWR, 6 X 6, W/WINCH, M916A1
(NSN 2320-01-272-5028)**

Approved for public release; distribution is unlimited.

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DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

TRUCK, TRACTOR, LINE HAUL: 52,000 GVWR, 6 X 4, M915A2
(NSN 2320-01-272-5029)

TRUCK TRACTOR, LIGHT EQUIPMENT TRANSPORTER (LET)
68,000 GVWR, 6 X 6, W/WINCH, M916A1
(NSN 2320-01-272-5028)

TRUCK TRACTOR, LIGHT EQUIPMENT TRANSPORTER (LET)
68,000 GVWR, 6 X 6, W/WINCH, M916A2
(NSN 2320-01-431-1163)

TRUCK, DUMP, HEAVY, CHASSIS
68,000 GVWR, 6 X 6, 14 CU YD, ON-OFF HIGHWAY
M917A1 (NSN 3805-01-431-1165)
M917A1 W/MCS (NSN 3805-01-432-8249)

VOLUME 1 OF 2

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located at the back of this manual direct to: Commander, US Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. A reply will be furnished to you. You may also provide DA Form 2028-2 information to TACOM via datafax or e-mail. TACOM's datafax number for AMSTA-AC-NML is DSN 793-0726 or Commercial (309) 782-0726 and the e-mail address is: amsta-ac-nml@ria-emh2.army.mil.

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HOW TO USE THIS MANUAL

This manual has an edge index that will help you find specific information in a hurry. Simply spread the pages in the right edge of the manual until the printed blocks can be seen. Open the manual where the block on the edge of the page lines up with your selected topic printed in the front cover block.

OVERVIEW

This manual is organized by chapters, sections and appendices. A summary of the organization of this manual, by major divisions, follows:

Front cover index gives you a quick reference to chapters, sections, and appendices that you will use often.

WARNINGS - All warnings you should observe while working on or around the M915 family of vehicles are shown in this part of the manual. These are repeated in the parts of the manual where they apply.

Table of Contents - The contents of the chapters and appendices are listed here.

Chapter 1 - This chapter contains general information about the M915 family of vehicles.

Chapter 2 - This chapter outlines troubleshooting of the M915 family of vehicles, and their systems. It includes a troubleshooting index, by symptom and system, for troubleshooting. Other sections include information on tools, repair parts, and general maintenance instructions.

Chapters 3 thru 26 - These chapters contain step-by-step instructions for doing the maintenance tasks. Each system of the M915 family of vehicles has its own chapter, and any special tools, equipment, or supplies you may need for a task are listed.

Appendix A - This appendix lists the technical manuals and other publications you may have to refer to while working on the vehicle.

Appendix B - This appendix lists the expendable supplies and materials you will need while performing maintenance on the M915 family of vehicles.

Appendix C - This appendix describes any manufactured items you will need for performing maintenance on the M915 family of vehicles.

Appendix D - This appendix describes the proper method of tightening fasteners.

Index - The index is an alphabetical listing of the contents of this manual.

Back Cover - This inside back cover contains a metric conversion table.

USING THE MANUAL ON THE JOB

Find the task or component that needs repair by using the Index (page Index-I), then turn to the page listed for that task or component.

Read the INITIAL SETUP procedures, and gather the necessary items and personnel. Pay attention to the warnings. The INITIAL SETUP sheet is described on page vi.

1 → 2 → 3 → 4 → 5 → 6 → 7 →	TOP PLATE REPAIR This task covers: a. Disassembly b. Cleaning c. Inspection d. Assembly INITIAL SETUP Applicable Configuration: M915A2 Tools and Special Equipment: Shop Equipment, SC 4910-95-CL-A31 Tool Kit, SC 5180-90-CL-N05 Shop Equipment, SC 5180-95-CL-A62 Shop Equipment, SC 4910-95-CL-A63 Plug, TF-0237 Materials/Parts: Kit P/N RK-63503 Kit P/N RK-63506 Compound, Antiseize Appendix B, Item 11 Personnel Required: (2) References: LO 9-2320-363-12 TM 9-2320-363-20 TM 9-237	Equipment Condition: ← 8 <table border="0"> <tr> <td>Reference</td> <td>Condition Description</td> </tr> <tr> <td>Page 20-12</td> <td>Top Plate Removed</td> </tr> </table> General Safety Instructions: ← 9 WARNING • When removing spring, compress spring slightly and relieve tension slowly. Failure to do so could cause spring to fly off, resulting in injury to personnel. • Locks must be closed while adjusting to make sure contact is made with locks, yoke, and top plate. Failure to do so will result in loss of trailer.	Reference	Condition Description	Page 20-12	Top Plate Removed
Reference	Condition Description					
Page 20-12	Top Plate Removed					

1. TITLE—This is the name of the task.
2. TASK COVERS—This lists all the tasks included in the module.
3. APPLICABLE CONFIGURATION—If the task is applicable to only one of the vehicles, M915A2 or M916A1 (as appropriate) will be listed here.
4. TOOLS AND SPECIAL EQUIPMENT—These are the tools and equipment you will need to do the task.
5. MATERIALS/PARTS—These are the supplies you will need to do the task. If parts or materials are required, they are listed here or referenced to Appendix B.
6. PERSONNEL REQUIRED—Personnel required to perform a task will be identified if the task requires more than one.
7. REFERENCES—These are the other technical publications you will need to do the task.
8. EQUIPMENT CONDITION—This is the condition(s) the vehicle must be in before you start the task. Other tasks that must be done first are listed by page number or by technical manual number if another manual is required.
9. GENERAL SAFETY INSTRUCTIONS—These are the safety precautions that must be observed while you are doing the task.
10. FOLLOW-ON MAINTENANCE—These are the tasks listed at the end of the procedure that must be completed to return the vehicle to an operational condition.

CHAPTER 1 INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

Type of Manual: Direct and General Support Maintenance Manual.

Model Numbers and Equipment Names:

1. Truck, Tractor, Line Haul: 52,000 GVWR, 6 x 4, M915A2.
2. Truck, Tractor, Light Equipment Transporter (LET): 68,000 GVWR, 6 x 6, w/Winch, M916A1 and M916A2.
3. Truck, Dump, Heavy, Chassis: 6 x 6, M917A1 and M917A1 w/MCS.

Purpose of Equipment: The M915A2 truck tractor is a 6 x 4 prime mover of the M871, M872, and M1062 semitrailers used primarily to transport containers, bulk cargo, and petroleum products over primary and secondary roads under worldwide climatic conditions in a military environment.

The M916A1 and M916A2 truck tractors are 6 x 6 prime movers of low-bed M172 and M870 semitrailers, used primarily to transport heavy engineering equipment over primary and secondary roads, and off-roads, under worldwide climatic conditions in a military environment.

The M917A1 and M917A1 w/MCS dump trucks are 6 x 6 vehicles used to transport, dump or spread aggregate, hot mix asphalt and similar materials over primary and secondary roads and off-road.

MAINTENANCE FORMS, RECORDS, AND REPORTS

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

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

When the tactical situation requires that Army materiel be abandoned, refer to TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use, for procedures on destruction of the vehicle.

PREPARATION FOR STORAGE OR SHIPMENT

Instructions for storage and shipment, including administrative storage, are found in TM 740-90-1 and MIL-V-62038D.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs)

If your vehicle needs improvement, let us know. Send us a Quality Deficiency Report. You the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (QDR) and mail it to:

COMMANDER
U.S. Army Tank-automotive and Armaments Command
A-t-TN: AMSTA-AC-NML
Rock Island, IL 61299-7630

WARRANTY INFORMATION

The vehicles are warranted by Freightliner Corporation in accordance with TB 9-2320-363-15. Warranty starts on the date found in block 23, DA Form 2408-9 in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your direct and general support maintenance shop.

METRIC SYSTEM

The equipment described herein contains metric components and requires metric common and special tools; therefore, metric units in addition to English units will be used throughout the manual. An English-to-metric conversion table is included as the last page of this manual inside the back cover.

Section II. EQUIPMENT DESCRIPTION AND DATA

DESCRIPTION

This section contains information that can be useful when performing direct and general support maintenance tasks on the M915 family of vehicles. For equipment operating data, refer to TM 9-2320-363-10.

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

Refer to TM 9-2320-363-10 and TM 9-2320-363-20 for equipment characteristics, capabilities, and features.

LOCATION AND DESCRIPTION OF COMPONENTS

Refer to TM 9-2320-363-10 and TM 9-2320-363-20 for location and description of components.

DIFFERENCES BETWEEN MODELS

Refer to TM 9-2320-363-10 and TM 9-2320-363-20 for differences between models.

Section III. PRINCIPLES OF OPERATION

PRINCIPLES OF OPERATION

Refer to TM 9-2320-363-10 and TM 9-2320-363-20 for principles of operation.

CHAPTER 2

DIRECT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

SCOPE

This chapter contains information for troubleshooting the M915 family of vehicles, as well as general maintenance instructions.

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Section I. Repair Parts, Special Tools; Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment	2-1
Section II. Troubleshooting	2-2
Section III. General Maintenance Instructions	2-29

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

OVERVIEW

This section includes information on tools and equipment you need to support the M915 family of vehicles.

COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit. Tool kits required for each task in this manual are listed on the INITIAL SETUP page for each task.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools and support equipment required to maintain the M915 family of vehicles, are listed in the Maintenance Allocation Chart (TM 9-2320-363-20) and in the Repair Parts and Special Tools List (TM 9-2320-363-24P).

REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (TM 9-2320-363-24P).

Section II. TROUBLESHOOTING

OVERVIEW

This section contains troubleshooting, testing, and repair information for the M915 family of vehicles. Make sure the problems are real. Be sure the electrical or hydraulic power is on when needed. Refer to the preliminary troubleshooting procedures before you start troubleshooting, and during troubleshooting when referenced.

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Relieving Hydraulic System Pressure (M916A1 and M916A2)	2-2
Transmission Stall Test	2-3
Troubleshooting Symptom Index	2-4
Troubleshooting Table	2-6
Troubleshooting and Testing the Air Conditioning System (All Except M915A2 and M916A1)	2-28.1

PRELIMINARY TROUBLESHOOTING PROCEDURES

NOTE

Fluid leaks are classified as Class I, Class II, or Class III.

Class I: Seepage of fluid, as indicated by wetness or discoloration, not great enough to form drops.

Class II: Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked or observed.

Class III: Leakage of fluid great enough to form drops that fall from the item being checked or observed.

Before starting any specific troubleshooting procedures, perform the following procedures:

1. Visually check for ruptured oil hoses or tubes, and for Class II or Class III leaks.
2. Check for mechanical jamming or binding caused by rocks or other foreign matter.
3. Check fluid levels in subject area and service as required (Unit PMCS, TM 9-2320-363-20-1).

RELIEVING HYDRAULIC SYSTEM PRESSURE (M916A1 and M916A2)

Cycle hydraulic winch controls a few times to drain and relieve system pressure.

TRANSMISSION STALL TEST

NOTE

To make thorough test of vehicle-mounted transmission, be sure that engine is properly tuned and that oil level in transmission is correct.

Perform transmission stall test when power package (engine and transmission) is not performing satisfactorily. Purpose Of test is to determine if transmission or engine is defective.

WARNING

Apply parking brake when performing transmission stall test. Block wheels to prevent forward or reverse movement. In event of brake failure and/or improper blocking of wheels, vehicle can suddenly move forward or backward and could cause personal injury or death.

1. Block wheels to prevent forward or reverse movement.
2. Start engine and set parking brake.
3. Put transfer case in high range and set transmission to 2nd gear.

CAUTION

Do not maintain stall condition longer than 30 seconds. Transmission oil can become overheated and damage to transmission could occur. Do not allow temperature to exceed 300°F (140°C). Keep close check to prevent cooling system from overheating.

4. Accelerate engine to full throttle. Write down maximum rpm that engine will run (torque converter stall speed). Stall speed should be 2100 rpm $\pm$ 150 rpm.
 - If engine speed is high, go to Transmission Malfunction 10.
 - If engine speed is low, go to Transmission Malfunction 11.

Troubleshooting Symptom Index

Malfunction Number	Malfunction	Troubleshooting Procedure Page
ENGINE		
1.	ENGINE FAILS TO CRANK	2-5
2.	ENGINE CRANKS BUT FAILS TO START	2-5
3.	ENGINE RUNS ERRATICALLY	2-6
4.	ENGINE OVERHEATS	2-6
5.	ENGINE RETARDER (JAKE BRAKE) NOT OPERATING	2-6

Troubleshooting Symptom Index (Cont)

Malfunction Number	Malfunction	Troubleshooting Procedure Page
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| 2. | TRANSMISSION NOISY | 2-9 |
| 3. | TRANSMISSION WILL NOT SHIFT INTO GEAR, SLIPS OUT OF GEAR, OR
OPERATES ERRATICALLY | 2-11 |
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| 5. | EXCESSIVE CREEP IN FIRST AND REVERSE | 2-13 |
| 6. | AUTOMATIC SHIFTS OCCUR AT TOO HIGH A SPEED | 2-14 |
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| 8. | VEHICLE MOVES IN NEUTRAL. | 2-17 |
| 9. | TRANSMISSION SLIPS IN ALL FORWARD GEARS | 2-17 |
| 10. | HIGH STALL SPEED (ABOVE 1200 RPM) | 2-18 |
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TRANSFER CASE (ALL EXCEPT M915A2)

- | | | |
|----|--|------|
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OPERATIVE, SHIFT CONTROL CABLE AND LINKAGE IS OPERATING | 2-19 |
| 4. | TRANSFER CASE OVERHEATS DURING OPERATION, LUBRICATION AT
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STEERING

- | | | |
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| 3. | EXTERNAL OIL LEAKS FROM STEERING GEAR | 2-23 |
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HYDRAULIC WINCH (M916A1 AND M916A2)

- | | | |
|----|---|------|
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| 2. | EXTERNAL LEAKS | 2-24 |
| 3. | DELIVERS LESS THAN OR NO RATED PULL | 2-25 |
| 4. | DOES NOT HOLD LINE IN NEUTRAL. | 2-25 |
| 5. | BRAKE WILL NOT RELEASE | 2-25 |
| 6. | BRAKE WILL NOT APPLY, OR APPLIES BUT TORQUE LOW | 2-26 |

Troubleshooting Symptom Index (Cont)

Malfunction Number	Malfunction	Troubleshooting Procedure Page
ARCTIC HEATER		
1.	HEATER WILL NOT START, BLOWER DOES NOT RUN	2-26
2.	BLOWER RUNS WHEN SWITCH IS IN START POSITION, BUT HEATER WILL NOT IGNITE	2-26
3.	BLOWER RUNS WHEN SWITCH IS IN START POSITION AND HEATER IGNITES, BUT PILOT LAMP WILL NOT LIGHT	2-27
4.	HEATER STARTS AND RUNS BUT GOES OUT LATER	2-27
5.	HEATER OVERHEATS	2-27
6.	HEAT OUTPUT LOW	2-27
7.	HEATER BURNS ON HIGH HEAT CONTINUOUSLY	2-28
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9.	HEATER SMOKES EXCESSIVELY	2-28
10.	BLOWER WILL NOT STOP WHEN HEATER IS SHUT OFF.	2-28

Table 2-1. Troubleshooting

Malfunction	Test or Inspection	Corrective Action
ENGINE		
1. ENGINE FAILS TO CRANK.		
	Using accessory drive, rotate engine two complete revolutions.	
		• If engine cannot be rotated, internal damage is indicated and engine must be disassembled to determine damage (page 3-2).
2. ENGINE CRANKS BUT FAILS TO START.		
	Step 1. Inspect timing wheel for looseness.	
		• Tighten timing wheel (page 12-41).
	Step 2. Inspect timing wheel for chipped or missing teeth.	
		• Replace timing wheel (page 12-41).
	Step 3. Check injector drive pulses. With ignition off, remove rocker arm cover (page 3-71). Disconnect return wire 619 or 620 and install 6-volt test light in place of disconnected wire and ground. Crank engine and observe that plunger motion coincides with light flashes. Reconnect return wire and repeat step for remaining cylinders.	
		• If light does not flash for one or more tests, troubleshoot DDEC (TM 9-2320-363-20). If light and start of plunger motion do not coincide, check mechanical timing (page 3-178).

Table 2-1. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
-------------	--------------------	-------------------

ENGINE (CONT)**3. ENGINE RUNS ERRATICALLY.**

Step 1. Inspect timing wheel for looseness.

- Tighten timing wheel (page 12-41).

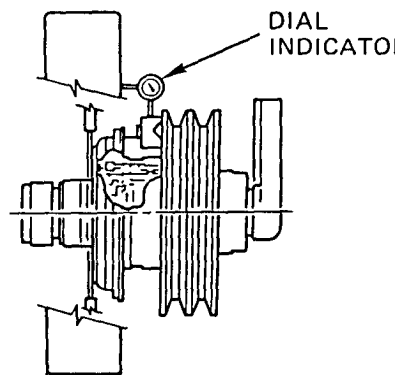
Step 2. Inspect timing wheel for chipped or missing teeth.

- Replace timing wheel (page 12-41).

4. ENGINE OVERHEATS.

Step 1. Check for excessive fan tip movement (wobble). Measure movement with fan disengaged. Movement must not exceed 3/16 in. (4.76 mm) fore and aft at blade tip.

- If measurement exceeds 3/16 in. (4.76 mm), replace clutch (TM 9-2320-363-20). If measurement is within tolerance, go to step 2.



Step 2. Check for lining wear. Install dial indicator as close to clutch as possible and place indicator probe on clutch. Apply air pressure of at least 90 psi (620.5 kPa). Make sure fan rotates freely. Zero indicator and release pressure and disconnect tube.

- If dial indicator reads 0.17 in. (4.32 mm) or greater, repair (page 12-206) or replace clutch (TM 9-2320-363-20).

5. ENGINE RETARDER (JAKE BRAKE) NOT OPERATING.

Test retarder solenoid (page 4-50).

- Replace retarder solenoid (page 4-50).

Table 2-1. Troubleshooting (Cont)

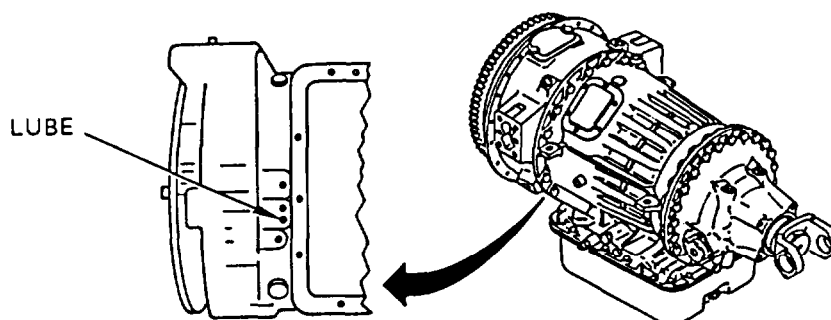
Malfunction	Test or Inspection	Corrective Action
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NOTE

To make a thorough test of vehicle-mounted transmission, be sure engine is properly tuned and oil level in transmission is correct.

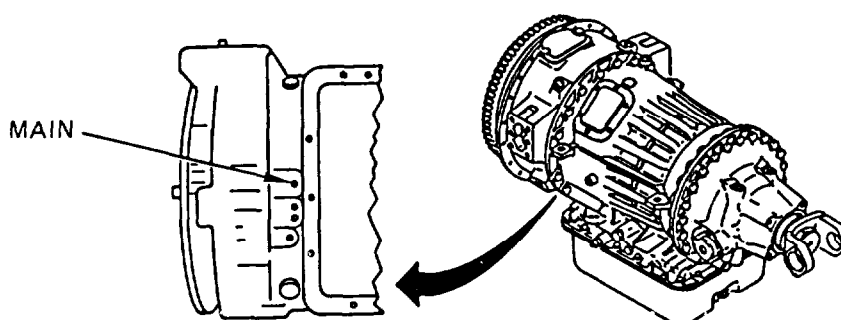
TRANSMISSION

1. TRANSMISSION OIL TEMPERATURE GAGE STAYS OVER 250°F (121°C).



Step 1. Check for low lubrication oil pressure. Remove plug from lube port and install 0 to 100 psi (0 to 690 kPa) gage. Start engine and allow to run at idle speed. With parking brake applied, shift transmission into DRIVE and accelerate engine to approximately 1900 rpm. Check for 25 to 30 psi (172 to 207 kPa) lube system pressure.

- If pressure is less than 25 or more than 30 psi (172 to 207 kPa), disassemble transmission (pages 14-22, 14-27, 14-35) and check for damaged torque converter.



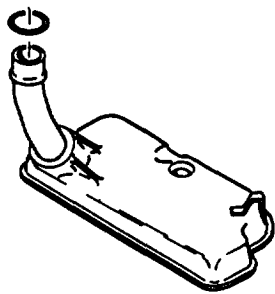
Step 2. Check for low main pressure. Remove oil line (all except M915A2) or plug (M915A2) from main pressure port on transmission and install tee (all except M915A2) and 0 to 300 psi (0 to 2070 kPa) gage. Start engine and allow to run at idle speed (600 rpm). With parking brake applied, shift transmission into DRIVE. Check for 80 to 100 psi (552 to 690 kPa) main system pressure.

- If pressure is not 80 to 100 psi (552 to 690 kPa), disassemble transmission (page 14-27) and inspect lubrication pressure regulator and converter bypass valve for damage.

Table 2-1. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
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TRANSMISSION (CONT)



Step 3. Check for clogged internal filter element. Remove internal filter element (page 3-258).

- If internal filter element is clogged, replace internal filter element (page 3-258) and repeat step 2.

Step 4. Check for damaged or missing preformed packing on internal filter pickup tube.

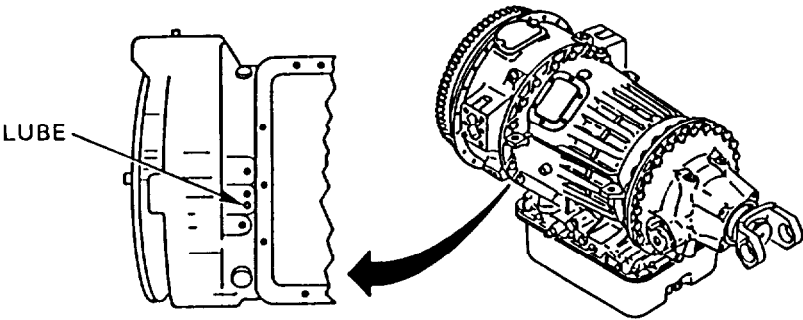
- If preformed packing is damaged or missing, replace preformed packing (page 3-258) and repeat step 2.
- If preformed packing is not damaged or missing, disassemble transmission (page 14-1) and inspect oil pump, main pressure regulator valve, and control valve body for loose screws and sticking valves. Repeat step 2.

Table 2-1. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
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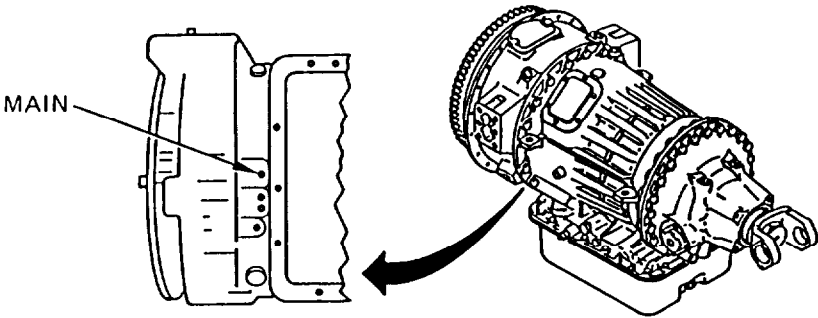
TRANSMISSION (CONT)

2. TRANSMISSION NOISY.



Step 1. Check for low lubrication oil pressure. Remove plug from lube port. Install 0 to 100 psi (0 to 690 kPa) gage. Start engine and allow to run at idle speed. With parking brake applied, shift transmission into DRIVE and accelerate engine to approximately 1900 rpm. Check for 25 to 30 psi (172 to 207 kPa) lube system pressure.

- If pressure is less than 25 or more than 30 psi (172 to 207 kPa), disassemble transmission (page 14-1) and check torque converter, planetary gear assemblies, and bearings for damage.



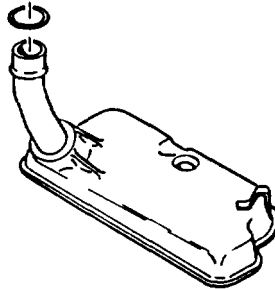
Step 2. Check for low main pressure. Remove oil line (all except M915A2) or plug (M915A2) from main pressure port on transmission and install tee (all except M915A2) and 0 to 300 psi (0 to 2070 kPa) gage. Start engine and allow to run at idle speed (600 rpm). With parking brake applied, shift transmission into DRIVE. Check for 80 to 100 psi (552 to 690 kPa) main system pressure.

- If pressure is less than 80 or more than 100 psi (552 to 690 kPa), disassemble transmission (page 14-27) and inspect lubrication pressure regulator and converter bypass valve for damage. Inspect all other moving parts for damage from lack of oil.

Table 2-1. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
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TRANSMISSION (CONT)



Step 3. Check for clogged internal filter element. Remove internal filter element (page 3-258).

- If internal filter element is clogged, replace internal filter element (page 3-258) and repeat step 2.
- If filter element is not clogged, check for damaged or missing preformed packing on pickup tube. Replace damaged or missing preformed packing (page 3-258) and repeat step 2.
- If transmission is still noisy, disassemble transmission (page 14-27) and inspect oil pump, main pressure regulator valve, converter bypass valve, and lubrication pressure regulator for damage. Inspect all other parts for damage from lack of oil.